ASE 100®
ACCELERATED SOLVENT EXTRACTOR
OPERATOR'S MANUAL

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Contents

1 • Introduction

2 • Description

3 • Operation and Maintenance

4 • Troubleshooting

5 • Service

A • Specifications

B • Installation

C • User Interface

D • Reordering Information

1 • Introduction

1.1 Overview

The ASE® 100 Accelerated Solvent Extractor is a system for extracting either organic or inorganic compounds from a variety of solid and/or semisolid samples. The ASE 100 accelerates the traditional extraction process by using solvent at elevated temperatures and pressures. Pressure is applied to the sample extraction cell to maintain the heated solvent in a liquid state during the extraction. After heating, the extract is flushed from the sample cell into a collection bottle and is ready for analysis.

Figure 1-1. ASE 100 Accelerated Solvent Extractor

The ASE 100 is designed to minimize the amount of solvent used without sacrificing the speed of extraction or ease of operation. Samples are extracted one at a time, and the extraction process is typically completed in 15 to 25 minutes. All functions are controlled from the ASE 100 front panel.

Built-in safety diagnostics monitor the system during operation. If a problem occurs, the front panel displays an error message that identifies the problem. In addition, the method currently running is aborted and basic system functions are shut down until the situation is corrected.

The ASE 100 is available in four product versions:

Product Description	Part Number
ASE 100 with 10 mL extraction cells	059700
ASE 100 with 34 mL extraction cells	059701
ASE 100 with 66 mL extraction cells	059702
ASE 100 with 100 mL extraction cells	059703

Each ASE 100 is shipped from Dionex with two extraction cells in the sizes indicated above, one rinse cell in the required size, and 12 collection bottles.

Ordering Extraction Cells in Other Sizes

The ASE 100 accommodates four extraction cell sizes (10 mL, 34 mL, 66 mL, or 100 mL). To perform an extraction with a cell in any size other than the size included with your system, order the appropriate cells from Dionex. Cells are available individually and in packages of six. For cell descriptions and part numbers, see Appendix D of this manual.

Note that installation of a different extraction cell will require a few additional changes:

- Reposition the cell holder to accommodate the new extraction cell size, if required. For instructions, refer to Section B.2.7.
- Order a new rinse cell, if required. The rinse cell size must be matched to the extraction cell size. For details, see Section 2.1.3.
- Before beginning an extraction, specify the new cell size on the **SETUP** screen (see Section C.1.3).

1.2 About This Manual

Chapter 1 Introduction	Presents a brief overview of the ASE 100 Accelerated Solvent Extractor. Explains the meaning of safety messages and icons in the manual and safety labels on the instrument.
Chapter 2 Description	Describes the physical aspects of the ASE 100: the front panel controls, rear panel connections, electronics, and mechanical components. Briefly describes the extraction process.
Chapter 3 Operation and Maintenance	Describes key operating features and how to create, edit, and run methods. Lists routine preventive maintenance requirements.
Chapter 4 Troubleshooting	Lists possible causes of minor problems, as well as step-by-step procedures to resolve them.
Chapter 5 Service	Contains step-by-step instructions for routine service and parts replacement procedures.
Appendix A Specifications	Lists the ASE 100 specifications and installation site requirements.
Appendix B Installation	Describes how to install the ASE 100.
Appendix C User Interface	Illustrates and describes all of the display screens selected from the ASE 100 front panel.
Appendix D Reordering Information	Lists names and part numbers for spare parts for the ASE 100.

1.2.1 Typefaces

Uppercase bold type indicates an ASE 100 front panel button, the name of a screen, or an on-screen entry. For example:

- Press **RINSE** to start the rinse cycle.
- The **MAIN** screen has four options.
- Move the cursor to the **SAVE** field.

1.2.2 Safety Messages and Notes

This manual contains warnings and precautionary statements that can prevent personal injury and/or damage to the ASE 100 when properly followed. Safety messages appear in bold type and are accompanied by icons, as shown here.

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Indicates that the function or process of the instrument may be impaired. Operation does not constitute a hazard.

Messages d'avertissement en français

Signale une situation de danger immédiat qui, si elle n'est pas évitée, entraînera des blessures graves à mortelles.

Signale une situation de danger potentiel qui, si elle n'est pas évitée, pourrait entraîner des blessures graves à mortelles.

Signale une situation de danger potentiel qui, si elle n'est pas évitée, pourrait entraîner des blessures mineures à modérées. Également utilisé pour signaler une situation ou une pratique qui pourrait gravement endommager l'instrument mais qui n'entraînera pas de blessures.

Warnhinweise in Deutsch

Bedeutet unmittelbare Gefahr. Mißachtung kann zum Tod oder schwerwiegenden Verletzungen führen.

Bedeutet eine mögliche Gefährdung. Mißachtung kann zum Tod oder schwerwiegenden Verletzungen führen.

Bedeutet eine mögliche Gefährdung. Mißachtung kann zu kleineren oder mittelschweren Verletzungen führen. Wird auch verwendet, wenn eine Situation zu schweren Schäden am Gerät führen kann, jedoch keine Verletzungsgefahr besteht.

Informational messages also appear throughout this manual. These are labeled NOTE and are in bold type.

NOTE NOTES call attention to certain information. They alert the user to an unexpected result of an action, suggest how to optimize instrument performance, etc.

1.3 Safety Labels

The TUV GS, C, US Mark safety label and the CE Mark label on the ASE 100 indicate that the ASE 100 is in compliance with the following standards: EN 61010-1:1993 (safety), CAN/CSA-C22.2 No. 1010.1-92 (safety), UL 3101-1/10.93 (safety), EN 50082-1:1992 (susceptibility), and EN 55011:1991 (emissions).

The symbols below appear on the ASE 100 or on ASE 100 labels.

Alternating current

Protective conductor terminal

Power supply is on

Power supply is off

Hot surface

- Section 2.1 and Section 2.2 describe key operating features and components of the ASE 100.
- Section 2.3 describes the extraction process of the ASE 100.
- Section 2.4 describes method control of the ASE 100.
- Section 2.5 lists the operating parameters for preprogrammed methods.

2.1 Operating Features

Figure 2-1 illustrates the main operating features of the ASE 100.

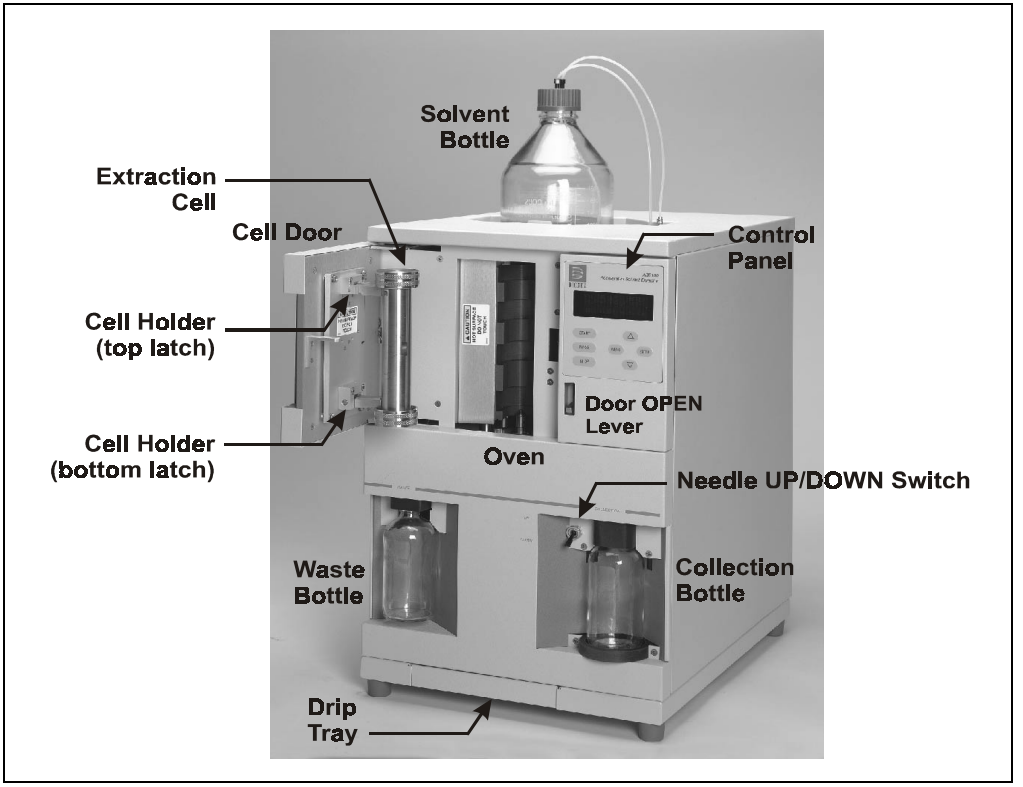


Figure 2-1. ASE 100 Key Operating Features

Control Panel

The ASE 100 control panel includes a display screen and a membrane keypad with seven buttons. For more information about the display screen, refer to Section 2.1.1. For a description of the keypad buttons, refer to Section 2.1.2.

Cell Holder

Before a sample extraction or a rinse cycle is performed, an extraction cell or rinse cell, respectively, must be installed in the cell holder on the inside of the cell door. To access the cell holder, push down on the **OPEN** lever (to release the door latch) and pull open the door.

Oven

The oven is located behind the cell door. This area also houses the AutoSeal™ tips, which seal the cell during an extraction. A pull-out drip tray is installed below the oven to collect any liquid leaks that may occur during an extraction or a rinse cycle.

Needle Mechanism

The needle mechanism includes a source needle and two vent needles. The **UP/DOWN** toggle switch controls the position of the needles. When the needles are in the "down" position, they pierce the collection bottle septum, allowing the extract to flow from the extraction cell into the collection bottle. The vent needles are connected to the waste bottle cap and the system vent to allow displaced gases to escape.

Solvent Bottle

A 1-liter or 2-liter solvent bottle is installed in a recess on top of the ASE 100. The recess contains a plastic liner to contain any solvent leaks or spills that may occur.

Waste Bottle

The waste bottle is a 250 mL collection bottle that is sealed with a special cap assembly. The waste bottle cap is connected to the vent needles. This allows excess solvent vapors to condense and be collected in the waste bottle before being vented out the ASE 100 rear panel.

Collection Bottle

After each extraction, the 250 mL collection bottle contains solvent and the analytes extracted from the sample.

2.1.1 Control Panel Screen

The control panel screen displays status and operating information for the ASE 100. Use the screen, in conjunction with the control panel keypad (see Section 2.1.2), to control ASE 100 operation.

You can edit any field on the screen that contains a blinking cursor. A field without a blinking cursor is for display only.

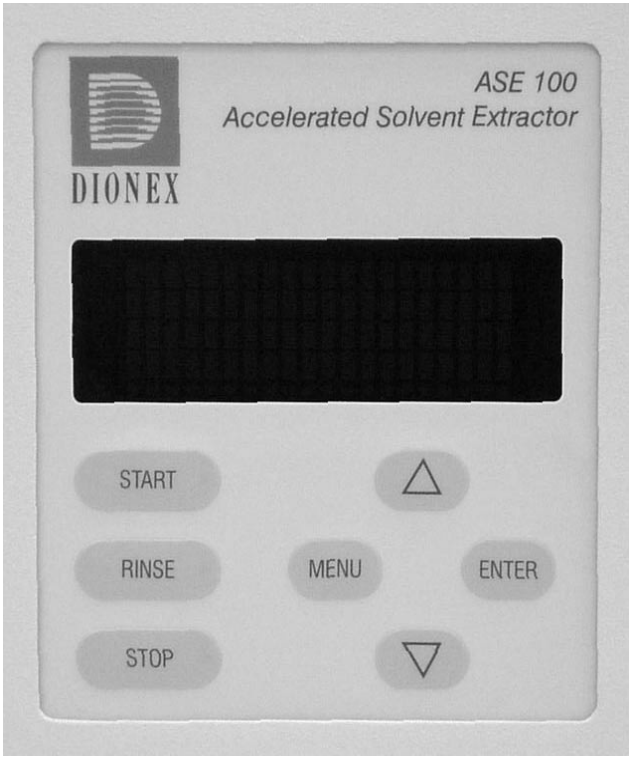


Figure 2-2. ASE 100 Control Panel

2.1.2 Control Panel Keypad

Use the control panel keypad, in conjunction with the control panel screen (see Section 2.1.1), to control ASE 100 operation.

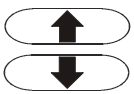
Three of the control panel buttons (**START**, **RINSE**, and **STOP**) let you directly control the most frequently used functions.

Button	Function
START	Starts the currently selected method. The LED starts flashing when the oven is within 5 °C of the set point. During the method run, the LED is lighted, but does not flash. When the method finishes running (or is aborted), three beeps are emitted and the LED turns off.
RINSE	Starts a rinse cycle in which about 5 mL of solvent is pumped through the system. During the rinse cycle, the LED is lighted. When the rinse cycle is complete (or is aborted), three beeps are emitted and the LED turns off. **Note:** Always install a rinse cell and a rinse bottle before starting a rinse cycle; see Section B.2.6 for instructions.
STOP	Interrupts the currently running method or rinse cycle and displays the **ABORT** screen. Pressing the button lights the LED. The LED turns off when you select an option on the **ABORT** screen; see Section 3.6 for details.

The four screen navigation buttons (**MENU**, **ENTER**, the up arrow, and the down arrow) are used in conjunction with the ASE 100 display to access less frequently used functions. The action of the navigation keys depends on whether the cursor is in *normal* mode or *editing* mode:

In *normal* mode, the cursor does not blink and looks like this. ▶

In *editing* mode, the cursor blinks and looks like this. ■
You can edit any field that contains a blinking cursor.

Button	Function
MENU	*Normal mode:* Exits the screen currently displayed and returns to the screen one level up in the hierarchy. For example, if the **METHOD EDITOR** screen is displayed, pressing **MENU** returns you to the **MAIN** screen. See Figure C-1 for an overview of the screens. *Editing mode:* Rejects your editing change in a field and reverts to the previously selected parameter.
ENTER	*Normal mode:* Selects the field the cursor is currently pointing to. On the **MAIN** or **DIAGNOSTICS** screen, this selects and displays a different screen. On other screens, pressing **ENTER** moves the cursor from the left margin to the first field in that line that can be edited; it also changes the normal cursor into the blinking editing cursor. *Editing mode:* Saves the parameter currently displayed in a field.
	*Normal mode:* Moves the cursor, in the direction of the arrow, to the next selectable line on the display (if any). *Editing mode:* Pressing and releasing an arrow button displays the next or previous parameter or numeric value allowed for the field. Pressing and holding down an arrow button moves the cursor continuously through the allowed settings.

2.1.3 Extraction Cells and Rinse Cells

IMPORTANT **Always tighten cell end caps by hand. Use of a wrench or other tool can damage the cell, as well as the seal inside the cell cap.**

Extraction Cells

ASE 100 extraction cells are available in four sizes: 10 mL, 34 mL, 66 mL, and 100 mL. Interchangeable end caps screw onto each end of the cell body. Each cell end cap contains a stainless steel frit and a seal. During a run, the cell caps are compressed to form a tight seal between the caps and the cell body.

An O-ring is installed on the outside of each cell cap. Teflon® O-rings (P/N 049457, pkg. of 50) are standard. Viton® O-rings (P/N 056325, pkg. of 50) are available for high temperature extractions, such as dioxins.

IMPORTANT **If a Viton (black) O-ring is installed on the outside of the cell cap, do not use acetone as the solvent for an extraction.**

Note that only cell end caps with two knurled bands can be used with the ASE 100 (see Figure 2-3).

IMPORTANT **Cell end caps with two knurled bands can be installed in either the ASE 100 or ASE 300 Accelerated Solvent Extractor. However, end caps with one knurled band can only be used with the ASE 300.**

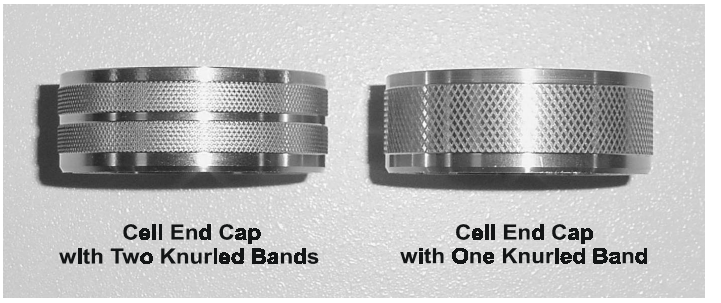


Figure 2-3. Knurling on Cell End Caps

Rinse Cells

During a rinse cycle, solvent passes directly through the blue rinse cell and into the collection bottle. For more information about rinse cycles, see Section 3.1.7 and Section B.2.6.

The rinse cell size (short, medium, or long) must be matched to the size of the extraction cell, as indicated in the table below.

Use this rinse cell:	With this extraction cell:
Short (P/N 060174)	10 mL, 34 mL
Medium (P/N 060175)	66 mL
Long (P/N 060176)	100 mL

2.1.4 Collection Bottle

The 250 mL collection bottle (P/N 056284, pkg. of 12) is made of clear glass. The collection bottle cap contains a solvent-resistant septum. During an extraction, the needle mechanism is lowered so that the needles pierce the septum. This creates a liquid flow path from the extraction cell to the collection bottle.

After an extraction, the bottle contains solvent and the analytes extracted from the sample. Refer to Section 3.5 for post-extraction procedures.

As with any glass object, the collection bottle may become damaged after repeated use. Before each extraction, carefully inspect the collection bottle for chips, scratches, or cracks. If you notice any signs of damage, dispose of the bottle and install a new one.

IMPORTANT

Replace the septum (P/N 049464, pkg. of 72) in the bottle cap after each extraction. Using the septum more than once may cause loss of sample and damage to the instrument.

2.1.5 Solvent Bottle

The ASE 100 Ship Kit (P/N 059397) includes a 2-liter glass bottle with shatterproof plastic coating (P/N 045901) and a bottle cap assembly (P/N 051977) with tubing and fittings for the inlet and outlet connections. For instructions on how to install the solvent bottle, see Section B.2.4.

Use only Dionex solvent bottles (1-liter, P/N 045900; 2-liter, P/N 045901). These are glass bottles with a shatterproof plastic coating. To prevent operator injury, make sure the pressure applied to the bottles does not exceed 0.07 MPa (10 psi).

Utilisez uniquement des réservoirs à solvant Dionex (1 litre, N/P 045900; 2 litres, N/P 045901). Ce sont des réservoirs en verre à revêtement incassable en plastique. Veillez à ce que la pression exercée sur ces réservoirs ne dépasse pas 0,07 MPa.

Verwenden Sie ausschließlich die Lösemittelbehälter von Dionex (1-Liter, Bestell-Nr. 045900; 2-Liter, Bestell-Nr. 045901). Dabei handelt es sich um Glasbehälter mit einer splittersicheren Plastikbeschichtung. Vergewissern Sie sich, daß der Druck, der auf die Behälter ausgeübt wird, 0,07 MPa nicht übersteigt.

NOTE Never fill the solvent bottle or disconnect the tubing connections to the SOLVENT and GAS connectors (see Figure 3-1) when the system is performing an extraction or a rinse cycle. During these times, the solvent bottle is pressurized. If you remove the bottle cap when the solvent bottle is pressurized, the ASE 100 may not operate to specification.

2.1.6 Waste Bottle

A 250 mL collection bottle (P/N 056284, pkg. of 12) serves as the waste bottle (see Figure 2-1) for the system.

Three vent lines, one from the pressure relief valve and two from the needle mechanism, are connected to the waste bottle cap. The waste bottle collects the small amounts of condensed solvent vented through these lines.

A vent outlet line is connected to the waste bottle cap, also. Gas is vented out this line to the rear panel of the ASE 100. For installation instructions, see Section B.2.1.

NOTE Check the waste bottle regularly and empty whenever necessary.

2.2 Rear Panel

Figure 2-4 illustrates the rear panel of the ASE 100.

- The **POWER** switch provides on/off control of the main power for the system. The power receptacle also includes the fuse holder. For instructions on how to replace the fuses, see Section 5.11.
- The oven voltage switches must be set to match the voltage from the power source at the ASE 100 installation site. For instructions on how to set the switches, see Section B.2.2.
- The **NITROGEN** connector is connected to a nitrogen supply regulated to between 1.03 and 1.38 MPa (150 to 200 psi). For installation instructions, see Section B.2.1.
- The **VENT** connector provides a connection for the vent outlet line. For installation instructions, see Section B.2.1.
- The model data label lists fuse and power information, as well as the ASE 100 serial number. You will be asked to provide the serial number when ordering replacement parts for the system.

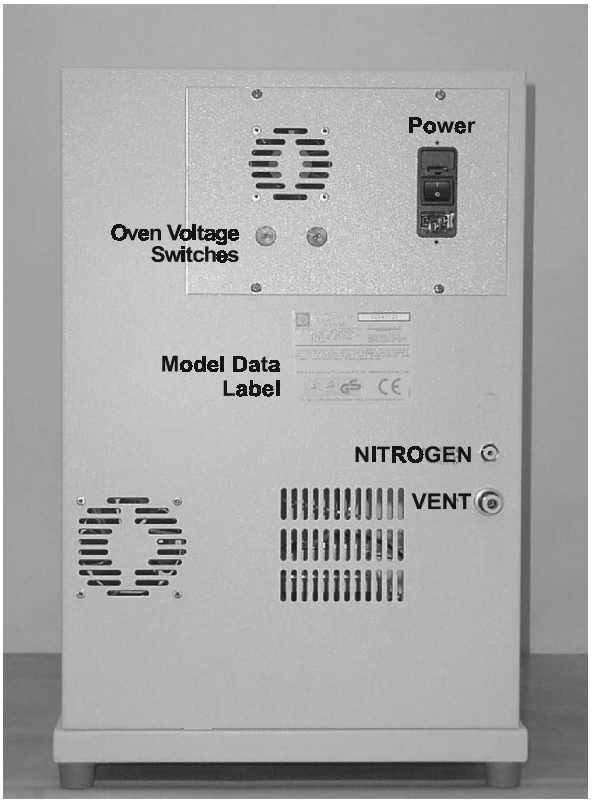


Figure 2-4. ASE 100 Rear Panel

2.3 Extraction Process

Before starting an extraction, perform the following steps. Refer to Chapter 3 for detailed instructions for each step.

- Prepare sample and load it into the extraction cell.
- Set up a method.
- Press the **START** button.
- Verify that the system **STATUS** is **OVEN READY** (see Figure 2-5) and the LED on the **START** button is flashing.
- Place the collection bottle, with the bottle cap screwed on, in the holder. Lower the needle mechanism.
- Place the extraction cell in the cell holder and close the cell door.
- Press **START** to begin the run.

From this point, the ASE 100 automatically performs the extraction process. An extraction consists of six main steps:

- Filling the cell with solvent
- Heating the cell (equilibration)
- Static extraction
- Flushing with fresh solvent
- Purging solvent from the system
- End relief

You can monitor the progress of an extraction on the **STATUS** screen (a **MAIN** screen option). Operating parameters are updated in real time. Figure 2-5 illustrates a typical **STATUS** screen. Table 2-1 describes the screen parameters.

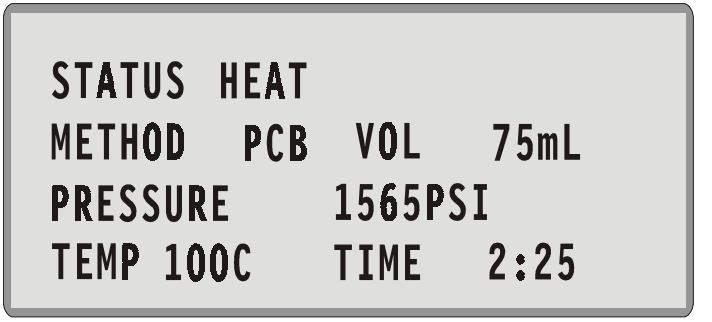


Figure 2-5. Status Screen

Parameter	Description
STATUS	The method step in progress, if any, or the current system status. If the latter is indicated, the **STATUS** field will display one of the following descriptions: Initialize, Idle, Load, Fill, Preheat, Heat, Oven Wait, Oven Ready, Static, Flush, Purge, Relief, Unload, Rinse, or Abort. If the status is Static or Flush, the cycle number is indicated.
METHOD	The name or number of the current method.
VOL	The approximate volume of solvent (in mL) delivered by the pump since the method started running.
PRESSURE	The current pressure reading. Select the unit of measure on the **SETUP** screen (see Section C.1.3).
TEMP	The temperature specified in the method.
TIME	Elapsed time (in minutes and seconds) since the method started running.

Table 2-1. Status Screen Parameters

2.4 Method Control

A *method* defines all of the timed events that occur during a sample extraction (see Table 2-2). There are two types of methods:

- *Preprogrammed* methods are application-specific methods created by Dionex. These methods cannot be changed or deleted by the user. For a list of the parameters for each preprogrammed method, see Section 2.5.
- *Custom* methods are customer-programmable methods. All custom methods initially contain the default method parameters. These methods can easily be modified (i.e., customized) by the user as required. For instructions on how to edit a custom method, see Section 3.2.

Parameter	Function	Value Range
TEMPERATURE	Temperature at which to heat the extraction cell.	Off, 40 to 200 °C (default=100)
STATIC TIME	Static solvent extraction time.	0 to 99 min (default=5)
FLUSH VOLUME	Amount of solvent to flush through the extraction cell after the static heating step. The **FLUSH VOLUME** is expressed as a percentage of the cell volume; for example, if the **FLUSH VOLUME** is set to 50%, 5 mL is flushed through a 10 mL cell, 17 mL is flushed through a 34 mL cell, and so on.	0 to 150% vol in 5% increments (default=60)
PURGE TIME	Amount of time the cell is purged with nitrogen.	20 to 900 sec (default=100)
STATIC CYCLE	Number of times the static heating and flushing steps are performed. When more than one cycle is specified, the flush volume is divided among the cycles.	1 to 5 (default=1)

Table 2-2. Method Parameters

2.5 Preprogrammed Methods

To enable you to quickly produce results with the ASE 100, Dionex provides nine preprogrammed methods. These methods are designated by three-letter abbreviations (see the table below).

Preprogrammed Method	Method Name
Semivolatiles	BNA
Total Fat (crude)	FAT
Chlorinated Herbicides	HRB
Organochlorine Pesticides	OCP
Organophosphorous Pesticides	OPP
Polychlorinated Biphenyls	PCB
Dioxins and Furans	PDF
Polymer Additives	PPE
Total Petroleum Hydrocarbons	TPH

The remainder of this section lists the operating conditions and recommended solvent for each preprogrammed method. You cannot edit or delete a preprogrammed method.

BNA (Semivolatiles) Method Parameters	
Solvent	$MeCl_2$/Acetone (1:1, v/v)
Temperature	100 °C
Static Time	5 min
Flush Volume	60%
Purge Time	100 sec
Static Cycle	1

FAT (Total Fat) Method Parameters	
Solvent	Hexane/Acetone (4:1)
Temperature	125 °C
Static Time	5 min
Flush Volume	100%
Purge Time	60 sec
Static Cycle	3

HRB (Chlorinated Herbicides) Method Parameters	
Solvent	$MeCl_2$/Acetone (1:1) with 1% H_3PO_4
Temperature	100 °C
Static Time	5 min
Flush Volume	60%
Purge Time	100 sec
Static Cycle	1

OCP (Organochlorine Pesticides) Method Parameters	
Solvent	Hexane/Acetone (1:1, v/v)
Temperature	100 °C
Static Time	5 min
Flush Volume	60%
Purge Time	100 sec
Static Cycle	1

OPP (Organophosphorous Pesticides) Method Parameters	
Solvent	$MeCl_2$/Acetone (1:1, v/v)
Temperature	100 °C
Static Time	5 min
Flush Volume	60%
Purge Time	100 sec
Static Cycle	1

PCB (Polychlorinated Biphenyls) Method Parameters	
Solvent	Hexane
Temperature	100 °C
Static Time	5 min
Flush Volume	60%
Purge Time	100 sec
Static Cycle	1

PDF (Dioxins and Furans) Method Parameters	
Solvent	Toluene
Temperature	200 °C
Static Time	5 min
Flush Volume	60%
Purge Time	100 sec
Static Cycle	1

PPE (Polymer Additives) Method Parameters	
Solvent	2.5% Cyclohexane in Isopropyl Alcohol
Temperature	140 °C
Static Time	3 min
Flush Volume	100%
Purge Time	60 sec
Static Cycle	3

TPH (Total Petroleum Hydrocarbons) Method Parameters	
Solvent	$MeCl_2$/Acetone (1:1, v/v)
Temperature	175 °C
Static Time	5 min
Flush Volume	60%
Purge Time	100 sec
Static Cycle	1

3 • Operation and Maintenance

3.1 Preparing to Run an Extraction

3.1.1 Selecting and Preparing Solvent

Do not use solvents with an autoignition point of 40 to 200 °C (104 to 392 °F). The table below is a partial list of solvents that should not be used with the ASE 100. If you have a question about solvent suitability, contact Dionex.

Solvents Not to Use	Autoignition Point
Carbon disulfide: CS_2	100 °C (212 °F)
Diethylether: $(C_2H_5)_2O$	180 °C (356 °F)
1,4-dioxane: $C_4H_8O_2$	180 °C (356 °F)

N'utilisez pas de solvants ayant un point d'auto-inflammation entre 40 et 200 °C. Le tableau ci-dessous donne la liste de quelques solvants qui ne devraient pas être utilisés avec l'ASE 100. Contactez Dionex si vous avez des questions sur le caractère approprié d'un solvant.

Solvants à ne pas utiliser	Point d'auto-inflammation
Disulfure de carbone: CS_2	100 °C
Éther diéthylique: $(C_2H_5)_2O$	180 °C
1,4-dioxane: $C_4H_8O_2$	180 °C

Verwenden Sie keine Lösungsmittel, deren Selbstentzündungstemperatur bei 40° bis 200°C liegt. Die untenstehende Tabelle zeigt einige Lösungsmittel, die Sie nicht mit dem ASE 100 verwenden sollten. Bei Fragen zur Eignung von Lösungsmitteln wenden Sie sich bitte an Dionex.

Nicht zu verwendende Lösungsmittel	Selbstentzündungstemperatur
Kohlendisulfid: CS_2	100 °C
Diethyläther: $(C_2H_5)_2O$	180 °C
1,4-dioxan: $C_4H_8O_2$	180 °C

- When developing a new extraction method, select a solvent or solvent mixture that has a high solubility for the analytes of interest, but not for the sample matrix. If you have been using another extraction method (Soxhlet, for example), use the same solvent with the ASE 100 that you used with the other method.
- Before running a preprogrammed method, refer to Section 2.5 for the recommended solvent.
- Use HPLC- or pesticide-grade solvents.
- Use organic or aqueous solvents.
- Use single- or multiple-component solvents.
- Weak acids and bases (pH >2 or pH <11) or other noncorrosive additives can be used, but add them in small percentages (<5% by volume) to the solvent system. Do not use nitric, hydrochloric, or sulfuric acid with the ASE 100.

IMPORTANT **After extracting with acidic solvents or basic solvents, rinse the system with either 100% organic solvent (e.g., acetone or methanol) or distilled water before overnight shutdown.**

- Solvents do not generally need to be degassed. Degas solvents only if the analyte of interest oxidizes easily.

IMPORTANT **Do not use acetone if the O-ring on the outside of the extraction cell cap is Viton (black).**

3.1.2 Filling the Solvent Bottle

Use only Dionex solvent bottles (1-liter, P/N 045900; 2-liter, P/N 045901). These are glass bottles with a plastic, shatterproof coating. Make sure the pressure applied to the bottles does not exceed 0.07 MPa (10 psi).

Utilisez uniquement des réservoirs à solvant Dionex (1 litre, N/P 045900; 2 litres, N/P 045901). Ce sont des réservoirs en verre à revêtement incassable en plastique. Veillez à ce que la pression exercée sur ces réservoirs ne dépasse pas 0,07 MPa.

Verwenden Sie ausschließlich die Lösemittelbehälter von Dionex (1-Liter, Bestell-Nr. 045900; 2-Liter, Bestell-Nr. 045901). Dabei handelt es sich um Glasbehälter mit einer splittersicheren Plastikbeschichtung. Vergewissern Sie sich, daß der Druck, der auf die Behälter ausgeübt wird, 0,07 MPa nicht übersteigt.

NOTE Never fill the solvent bottle or disconnect the tubing connections to the SOLVENT and GAS connectors (see Figure 3-1) when the system is performing an extraction or a rinse cycle. During these times, the solvent bottle is pressurized. If you remove the bottle cap when the solvent bottle is pressurized, the ASE 100 may not operate to specification.

1. Fill the solvent bottle with prepared solvent to the level indicated in Figure 3-1.

   If you plan to run a preprogrammed method, refer to Section 2.5 for the recommended solvent. If you plan to run a custom method, review the solvent selection guidelines in Section 3.1.1.

   NOTE The solvent level in the bottle must remain below the gas inlet line. This prevents solvent from coming into contact with the pneumatic valves.

2. Place the bottle in the recess on top of the system.

3. Insert the solvent outlet line extending from the underside of the bottle cap assembly into the bottle (see Figure 3-1). Make sure the in-line filter rests on the bottom of the bottle. (This prevents air from being drawn through the line.)

4. Hand-tighten the red lock ring cap securely over the stopper.

NOTE **Always connect the outlet line to the SOLVENT connector first, and then the inlet line to the GAS connector. Reverse this order when disconnecting the lines. It is not necessary to disconnect the solvent and gas lines before refilling the solvent bottle.**

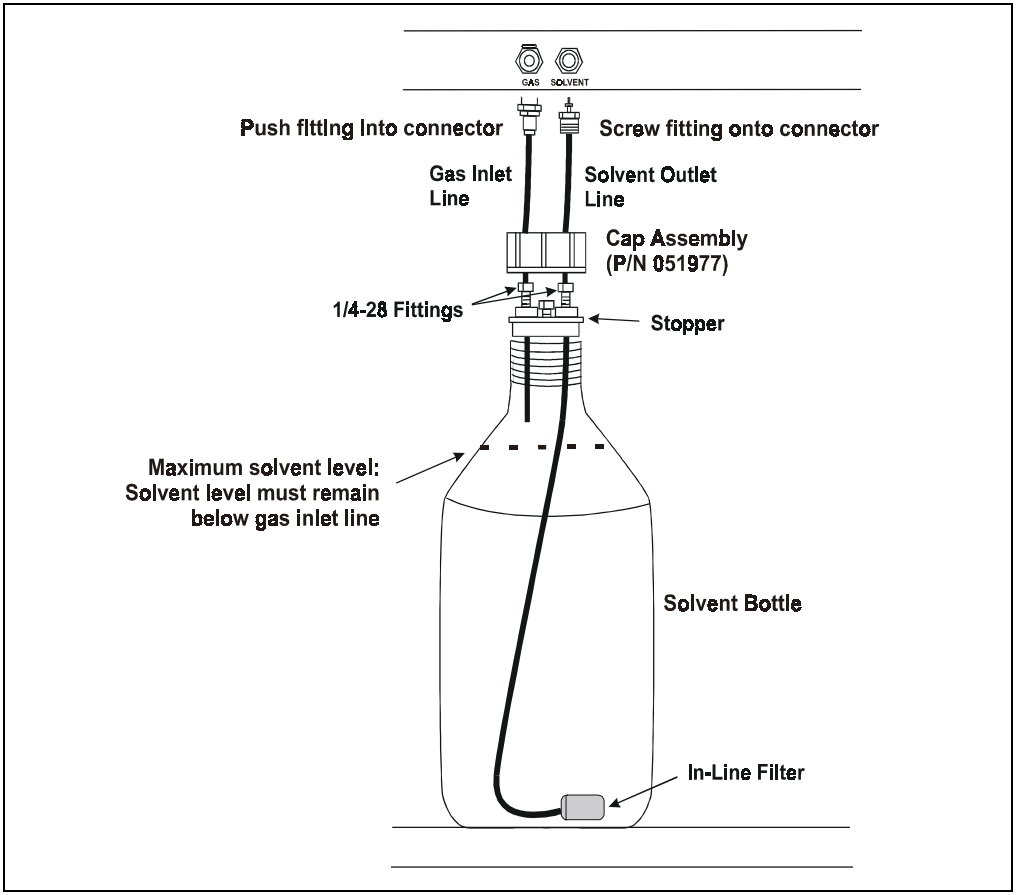


Figure 3-1. Solvent Bottle Connections (Top view)

3.1.3 Preparing the Sample

Some samples must be mixed with a drying or dispersing agent before being loaded into the cell. If you have successfully followed a particular sample pretreatment procedure for another extraction method (Soxhlet, for example), use the same procedure with the ASE 100. If you have never run an extraction before or if you are preparing a new sample, follow the guidelines here.

Drying or Dispersing Agent Selection Guidelines

- The sample preparation guidelines in the next section mention two drying and dispersing agents: sodium sulfate (Na_2SO_4) and pelletized diatomaceous earth (DE). DE is easier to work with than sodium sulfate; it dries samples more quickly, provides a cleaner transfer of the mixtures to the cell, and extracts well. Sodium sulfate is more readily available, but it tends to clump the samples and this makes transfer more difficult.
- The use of sodium sulfate with very wet samples (30% moisture) can clog the frits in the cell with recrystallized sodium sulfate. This is most likely to occur when using a mixed solvent with acetone or methanol. To prevent clogging, substitute DE as a drying agent and mix it with the sample before loading into the extraction cell. Or, use DE as a drying agent in the cell for all levels of moisture.
- To ensure that very wet samples are completely dried (regardless of which drying agent is used), add sodium sulfate to the bottles after collection and then pass the extracts through either a drying column or a drying cartridge. At the temperatures used during ASE 100 extractions, more water is co-extracted than with other extraction procedures. To ensure good analyte recovery, thoroughly rinse the sodium sulfate from the bottle and the cleanup column.

Sample Preparation Guidelines

The mixtures here are recommendations; adjust the proportions as required for your extraction.

- If the sample appears dry, use one of these mixtures:

  4 grams sample to 1 gram DE

  4 grams sample to 4 grams Na_2SO_4

  Mix the sample and the DE or Na_2SO_4 thoroughly in a small bottle, beaker, or mortar.

- If the sample appears wet, use one of these mixtures:

  4 grams sample to 2 grams DE

  4 grams sample to 8 grams Na_2SO_4

  Mix the sample and the DE or Na_2SO_4 thoroughly in a small bottle, beaker, or mortar.

- If the sample is pure liquid, use 5 grams sample to 3 grams DE.

  Fill the cell with DE and then add the sample.

3.1.4 Installing the Cell Filter

A disposable filter must be installed in the bottom end of the extraction cell before sample is loaded. The filter prevents blockage of the stainless steel frit in the bottom cap.

There are two types of cell filters:

- *Cellulose* filters (P/N 056780, pkg. 100) are appropriate for most extraction methods that use organic solvents. The ASE 100 Ship Kit (P/N 059397) includes a package of cellulose filters.
- *Glass-fiber* filters (P/N 056781, pkg. 100) are recommended for aqueous extractions, where cellulose may provide inadequate filtration or may interfere with the analytical technique.

1. Screw a cell cap onto the bottom of the cell body. (There is a groove around the top of the cell body, but no groove around the bottom.) Hand-tighten the cap.

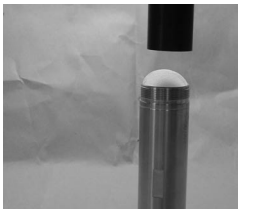
IMPORTANT **Always tighten the cell end caps by hand. Use of a wrench or other tool can damage the cell, as well as the seals inside the caps.**

IMPORTANT **Always tighten the bottom cell cap onto the cell before installing the cell filter. If you install the filter first, the cap will not seal properly and will allow leaks.**

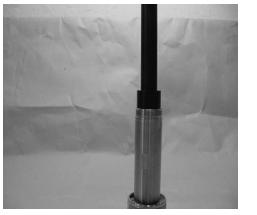
2. Follow the steps below to install the cell filter.

Insert a cellulose or glass-fiber filter into the cell at a slight angle.

Position the filter insertion tool (P/N 056929) over the filter.



Slowly push the insertion tool straight into the cell.



Push down on the filter until it is in full contact with the end cap frit. (End cap not shown in photo.)

3.1.5 Filling the Cell

NOTE **When filling the cell with sample, keep the threads on the cell body and end cap as clean as possible to prevent thread fouling and extend the life of the cell. Also make sure that the ends of the cell body and the seals in the end caps are clean; if debris remains here, it will damage the cell body and/or allow leaks during the extraction.**

1. Carefully load the sample into the top of the extraction cell, using the funnel (P/N 056699) provided in the ASE 100 Ship Kit (P/N 059397).
2. (*Optional*) To reduce the amount of solvent used during the extraction, fill any void volume in the cell with an inert material such as Ottawa sand (Fisher S23-2).
3. Using a soft brush or cloth, wipe all debris off the threads.
4. Screw the top cap onto the cell body. Hand-tighten the cap.

IMPORTANT **Always tighten the cell caps by hand. Use of a wrench or other tool can damage the cell, as well as the seals inside the cell caps.**

5. Check the ends of each end cap to verify that the O-rings are in place and are in good condition (see Figure 3-2). If an O-ring is discolored or has a hole size of less than 0.5 mm, replace it:
   a. Use a small flathead screwdriver (P/N 046985) to remove the old O-ring from the cell cap.
   b. Place a new O-ring over the opening in the end of the cell cap and press it into place, using the O-ring insertion tool (P/N 049660).

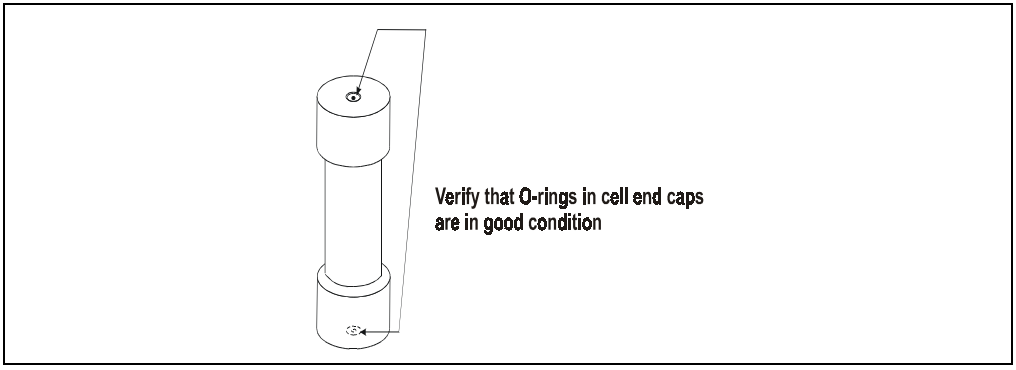


Figure 3-2. Inspecting Cell O-Rings

3.1.6 Installing the Collection Bottle

1. Toggle the needle switch on the front panel (see Figure 3-3) to the **UP** position.
2. Place a 250 mL collection bottle (P/N 056284, pkg. of 12), with the bottle cap screwed on, in the collection bottle holder (see Figure 3-3).
3. Toggle the needle switch to the **DOWN** position.

NOTE Reverse the steps above to remove the collection bottle from the system.

Figure 3-3. Installing the Collection Bottle

NOTE Verify that the waste bottle is installed (see Section B.2.5).

3.1.7 Rinsing/Priming the System

During a rinse cycle, approximately 5 mL of solvent is pumped through the system. Run a rinse cycle at the following times:

- After initial setup
- After refilling the solvent bottle
- After changing solvents (rinse twice to remove all of the previous solvent)
- When the solvent lines contain bubbles
- After a run is aborted
- Before shutting down the system, if an extraction used acidic solvents or basic solvents (see Section 3.8)
- After a shutdown of more than one day (see Section 3.8)

Before starting a rinse cycle:

- Check that the rinse cell size is matched to the extraction cell size.
- Adjust the cell holder to accommodate the rinse cell, if necessary.
- Install the rinse cell in the cell holder.
- Close the cell door.

When you are ready, press the **RINSE** button to start the rinse cycle. For detailed instructions, refer to Section B.2.6.

3.2 Editing a Custom Method (1–24)

If the ASE 100 preprogrammed methods (see Section 2.5) are not suitable for a particular extraction, edit one of the 24 *custom* methods provided with the system. All parameters in these methods are initially set to their default values. You can create a new method by editing either a custom method that still contains the default parameters or a custom method that you previously edited. The edited method can be saved to a new method number, if desired.

Before beginning, review the method development guidelines in Section 3.3. For a list of the values allowed for method parameters, see Table 3-3.

Parameter	Function	Value Range
TEMPERATURE	Temperature at which to heat the cell.	Off, 40 to 200 °C (default = 100)
STATIC TIME	Static solvent extraction time.	0 to 99 min (default = 5)
FLUSH VOLUME	Amount of solvent to flush through the extraction cell after the static heating step, expressed as a percentage of the cell volume. For example, if the **FLUSH VOLUME** is set to 50%, 5 mL is flushed through a 10 mL cell, 17 mL is flushed through a 34 mL cell, and so on.	0 to 150% vol in 5% increments (default = 60)
PURGE TIME	Amount of time the cell is purged with nitrogen. We recommend 40 to 80 seconds for a 10 mL cell, 70 to 110 seconds for a 34 mL cell, 160 to 200 seconds for a 66 mL cell, and 250 to 290 seconds for a 100 mL cell.	20 to 900 sec (default = 100)
STATIC CYCLE	Number of times the static heating and flushing steps are performed. When more than one cycle is specified, the flush volume is divided among the cycles.	1 to 5 (default = 1)

Table 3-3. Method Parameters

To edit a custom method (for example, method 1):

1. Press **MENU** to display the **MAIN** screen.

Figure 3-4. Main Screen

2. Move the cursor to the **METHOD EDITOR** option and press **ENTER**.

   The **METHOD EDITOR** screen is displayed (see Figure 3-5).

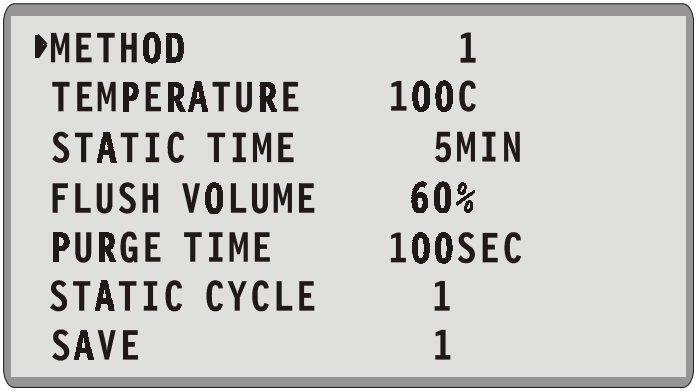


Figure 3-5. Method Editor Screen (Additional text shown)

NOTE **For convenience, Figure 3-5 illustrates all of the method parameters. In reality, the screen displays no more than four lines of text at once. To scroll the screen and view additional lines of text, press an arrow button.**

3. The **METHOD EDITOR** screen displays the parameters for the method last selected on the **SETUP** screen (see Section C.1.3). If method 1 is not currently displayed, press **ENTER** to move the cursor to the method editing field. Use an arrow button to step through the method numbers (1 through 24). When 1 is displayed, press **ENTER**.
4. All method 1 parameters are set to the default values (see Table 3-3). Follow the steps below to edit the method as required.
    a. Using an arrow button, move the cursor to the first parameter that you want to change (for example, **TEMPERATURE**).
    b. Press **ENTER** to move the cursor to the editing field for this parameter. (This also highlights the value currently selected here.)

    NOTE If you decide not to edit this field, press MENU to return the cursor to the left margin of the screen.

    c. Press an arrow button to step through the values allowed for the highlighted parameter. (Pressing and holding the arrow button steps through the values more rapidly.) When the required value is displayed, press **ENTER** to save it and to return the cursor to the left margin of the screen.
    d. If other changes are required, repeat Steps a-c.
5. When you finish editing, use one of the following options to save the method.

    To save to the current method number:

    NOTE Saving to the current method number will permanently overwrite the previous version of the method. There is no way to undo this action.

    a. Using an arrow button, move the cursor to **SAVE**.
    b. Press **ENTER** to move the cursor to the **SAVE** editing field.
    c. Press **ENTER** to save the modified version of the method to the current method number. The screen displays a message confirming that the method was saved.
    d. Press **MENU** to exit the **METHOD EDITOR** screen and return to the **MAIN** screen.

To save to a different method number:

a. Using an arrow button, move the cursor to **SAVE**.

b. Press **ENTER** to move the cursor to the **SAVE** editing field.

c. Press an arrow button to step through the method numbers (1 through 24). When the desired number is displayed, press **ENTER**. The screen displays a message confirming that the method was saved.

d. Press **MENU** to exit the **METHOD EDITOR** screen and return to the **MAIN** screen.

3.3 Guidelines for Method Development

Follow the procedure below to develop a method for a new sample type.

1. Select a solvent(s) (see Section 3.1.1).
2. Prepare the sample (see Section 3.1.3).
3. Press the **MENU** button to display the **MAIN** screen.

Figure 3-6. Main Screen

4. Move the cursor to **METHOD EDITOR** and press **ENTER.**

   This displays the **METHOD EDITOR** screen.

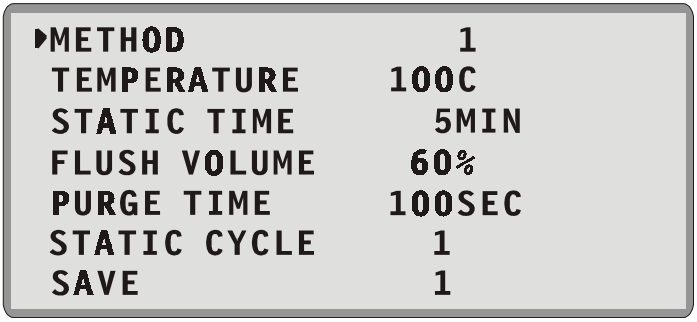


Figure 3-7. Method Editor Screen (Additional text shown)

5. The **METHOD EDITOR** screen displays the parameters for the method last selected on the **SETUP** screen (see Section C.1.3). If this is not the method you want to edit, press **ENTER** to move the cursor to the method editing field. Press an arrow button to step through the method numbers (1 through 24). When the correct method number is displayed, press **ENTER** to display the parameters for this method.
6. Begin editing the method as follows:
    a. Using an arrow button, move the cursor to the first parameter that you want to change (for example, **TEMPERATURE**).
    b. Press **ENTER** to move the cursor to the editing field for this parameter.
    c. Press an arrow button to step through the values allowed for the highlighted parameter. When the required value is displayed, press **ENTER** to save it and to return the cursor to the left margin of the screen. Figure 3-8 shows how the screen would look after changing the temperature from the previous setting (100 °C) to 150 °C.

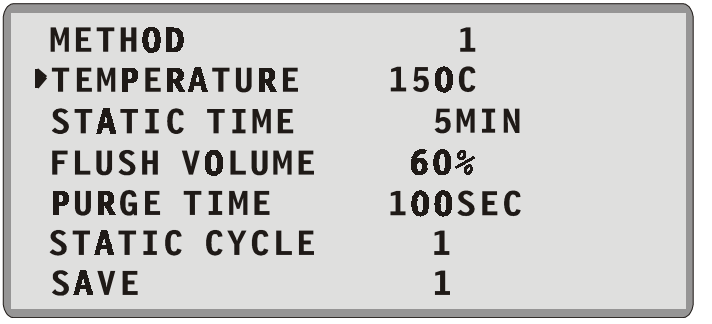


Figure 3-8. Method Editor Screen after Editing (Additional text shown)

7. Repeat Step 6 to change other parameters, if required.
8. When you finish editing, assign a number to the new method as follows:
    a. Move the cursor to **SAVE**.
    b. Press **ENTER** to move the cursor to the editing field.
    c. Press an arrow button to step through the method numbers. When the desired number is displayed, press **ENTER** to save the new

method to this number and to return the cursor to the left margin of the screen.

9. Run the new method *three times* (with the same cell and sample) and analyze the extracts.

10. If target analytes are present in extract 2 or 3, make the adjustments listed below *(one at a time)* to the method. After each adjustment, repeat the method and analyze the extract.

    a. Raise the temperature. In general, raising the temperature increases the efficiency of the extraction process. However, because compounds can degrade at high temperature, it is advisable to keep the temperature below the maximum allowed (200 °C). If oxidation is a concern, degas the solvent before use.

    b. Run two static/flush cycles. Extending the static time enhances diffusion of the analytes into the extraction fluid. Separating the static time into two cycles, instead of using one longer cycle, allows the introduction of fresh solvent midway through. This helps maintain a favorable solvent/sample equilibrium for samples that are heavily loaded or otherwise difficult to extract.

    c. Increase the flush volume to allow more solvent to pass through the sample.

    NOTE When using 100 mL cells, it may be necessary to balance the number of static cycles and flush volume to prevent the collection bottle from being overfilled.

11. If analytes still appear in the extract from the second extract, make the adjustments listed below. When target analytes no longer appear in the extract from the second extract, the method is complete for this sample type.

    a. Run three static/flush cycles.

    b. Raise the temperature again.

    c. Increase static time.

    d. Select a different solvent.

3.4 Running an Extraction

1. Press **MENU** to display the **MAIN** screen.

Figure 3-9. Main Screen

2. Select **SETUP** and press **ENTER**.

   This displays the **SETUP** screen.

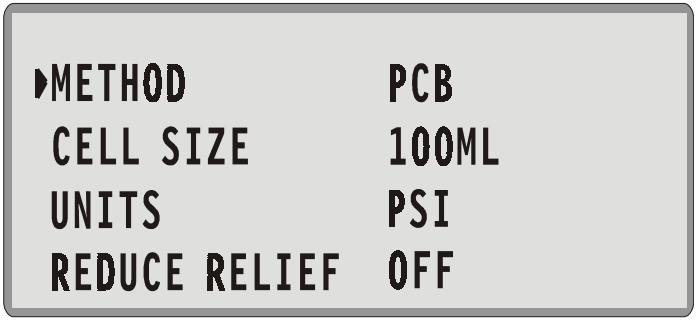


Figure 3-10. Setup Screen (Initial view)

3. Check that the selected method is correct. If it is not, use an arrow to move the cursor to **METHOD**, and then press **ENTER** to move the cursor to the editing field. Press an arrow button to step through the method numbers and names. When the method required for the extraction is displayed, press **ENTER.**

   This displays the **METHOD EDITOR** screen. If this is a custom method, check that the parameters are appropriate for the extraction. Edit the method, if necessary. (Remember to press **Enter** after making a change.)

4. Press **MENU** to return to the **MAIN** screen.
5. On the **MAIN** screen, select the **STATUS** option and press **ENTER.**

   This displays the **STATUS** screen.

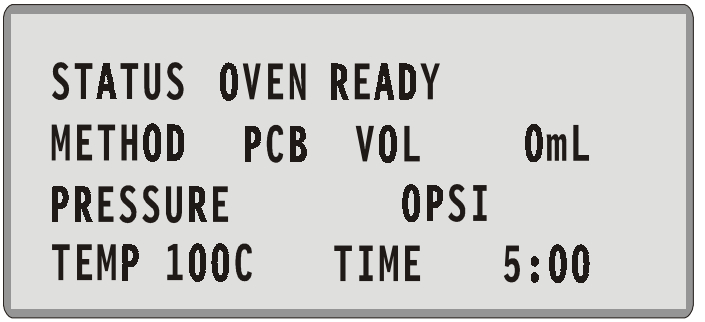


Figure 3-11. Status Screen

6. Press **START,** and then check the **STATUS** field (on the **STATUS** screen). If the **STATUS** is **OVEN WAIT**, the oven temperature is not at the set point yet.

IMPORTANT **Do not install the cell while the status is OVEN WAIT. Installing the cell before the oven is ready will cause an error.**

7. When the oven is within 5 °C of the set point, the **STATUS** field changes to **OVEN READY**. You can now install an empty collection bottle (P/N 056284, pkg. of 12) and toggle the needle switch to the **DOWN** position.

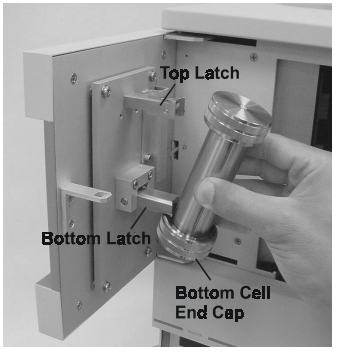
WARNING **As with any glass object, the collection bottle may become damaged after repeated use. Before installing a used collection bottle, carefully inspect it for chips, scratches, or cracks. If there are any signs of damage, dispose of the bottle and install a new one.**

IMPORTANT **Replace the septum (P/N 049464, pkg. of 72) in the collection bottle cap after each extraction. Using the septum more than once may cause loss of sample and may damage the ASE 100.**

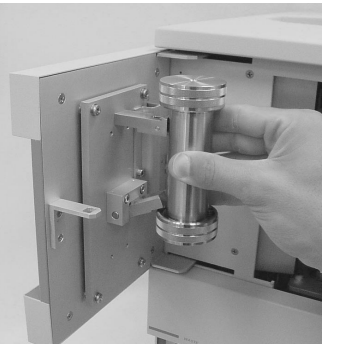
8. Open the cell door and install the cell in the cell holder.

IMPORTANT **Always install the cell in the cell holder. If you install the cell directly in the oven, the cell door will not close and the run will not start.**

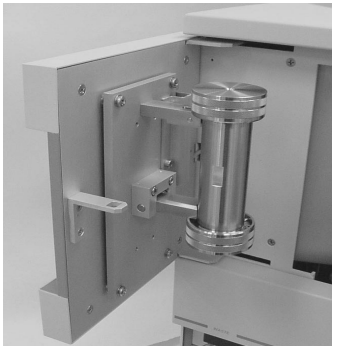
While holding the extraction cell at a slight angle, position the bottom end cap under the bottom latch of the cell holder.



Raise the cell so that the bottom end cap lifts the bottom latch.



Straighten the cell until it is vertical. Now, lower the cell until the top end cap rests on the top latch of the cell holder.



9. Close the cell door and press **START** to begin the extraction. A typical extraction takes 15 to 25 minutes.

Do not attempt to open the cell door while an extraction is in progress.

N'ouvrez pas la porte pendant une extraction.

Halten Sie die Tür während der Extraktion geschlossen.

10. When the extraction is complete, three beeps are emitted and the **START** LED turns off.

Cells are extremely hot after an extraction. Be especially cautious with cells that have been heated over 50 °C (122 °F).

Les cellules sont extrêmement chaudes après une extraction. Faites particulièrement attention aux cellules qui ont été chauffées à plus de 50 °C.

Die Zellen sind nach ihrer Entnahme sehr heiß. Seien Sie besonders vorsichtig, wenn Zellen über 50°C erhitzt wurden.

11. If you need to start the next extraction right away, put on the thermal gloves (P/N 060372) supplied in the ASE 100 Ship Kit (P/N 059397), remove the cell from the cell holder, and place it on the cell rack (P/N 059927) to cool.

    If you are not starting another extraction right away, open the cell door and let the cell cool in the cell holder for at least 15 minutes. Afterward, put on the thermal gloves, remove the cell from the cell holder, and place it on the cell rack. Close the cell door until the next extraction, to save energy and prevent anybody from accidentally touching the inside of the door while it is hot.

12. Toggle the needle switch to the **UP** position and remove the collection bottle containing the extract from the bottle holder. Refer to Section 3.5 for post-extraction procedures.

3.5 Post-Extraction Procedures

3.5.1 Cleaning the Cells

Cells are extremely hot after an extraction. Be especially cautious with cells that have been heated over 50 °C (122 °F).

Les cellules sont extrêmement chaudes après une extraction. Laissez-les refroidir pendant au moins 15 minutes avant de les manipuler. Faites particulièrement attention aux cellules qui ont été chauffées à plus de 50 °C.

Die Zellen sind nach ihrer Entnahme sehr heiß. Lassen Sie die Zellen mindestens 15 Minuten abkühlen. Seien Sie besonders vorsichtig, wenn Zellen über 50°C erhitzt wurden.

After an extraction, empty the cells and rinse the cell bodies and end caps with water or organic solvent. For most applications, it is sufficient to simply rinse the end caps; however, if necessary, disassemble the end caps and sonicate or soak in solvent to clean them. See Section 5.1 for instructions on how to disassemble the cell.

The cell bodies (but not the caps) can be cleaned in a dishwasher or high-temperature cleaning unit, provided that the temperature does not exceed 400 °C (752 °F).

3.5.2 Processing Extracts

The composition of the extracts generated by the ASE 100 is very close to that generated by Soxhlet and other standard solid-liquid extraction techniques when using the same solvent. Use the same analytical method for ASE 100 extracts that you employed for extracts obtained from other techniques.

3.6 Aborting a Run

To abort a run manually, press the **STOP** button. This stops the run and displays the **ABORT** screen (see Figure 3-12).

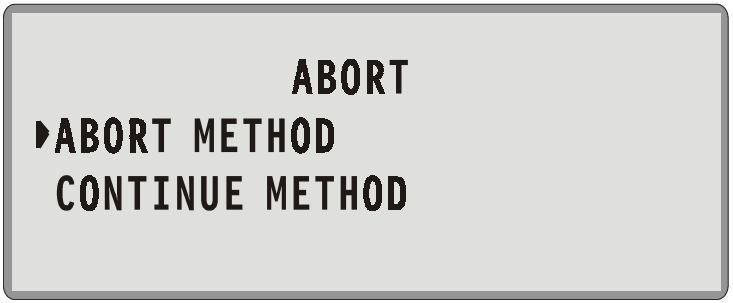


Figure 3-12. Abort Screen

The **ABORT** screen presents two options (see below). Move the cursor to the preferred option and press **ENTER.**

Option	What it means:
ABORT METHOD	Cancels the method. If necessary, a purge is done to remove solvent from the sample. Then, residual pressure is relieved from the system.
CONTINUE METHOD	Resumes the run from the point at which the **STOP** button was pressed.

The ASE 100 contains built-in diagnostics and sensors that continuously monitor the system. Under certain conditions (for example, if the collection bottle becomes too full or if the hydrocarbon vapor level exceeds the upper limit), the system will automatically abort a run. If this occurs, the ASE 100 screen will display an error message; the message will remain on-screen until you press a key to clear it or until it is replaced by another error message. For a list of error messages (and corrective action to take), see Section 4.1.

NOTE **After a run is aborted (whether manually or automatically), rinse the system before resuming operation. For instructions on how to run a rinse cycle, see Section B.2.6.**

3.7 Routine Maintenance

This section describes routine maintenance procedures that the user can perform. All other ASE 100 maintenance procedures must be performed by qualified Dionex personnel.

3.7.1 Daily Maintenance

- Fill the solvent bottle, if needed. After filling the solvent bottle, always run two rinse cycles to clear the solvent lines of bubbles (see Section 3.1.7).
- Empty the waste bottle, if needed.
- Check the gases.
- Check for leaks.
- Pull out the drip tray holder below the oven and check the plastic drip tray. If the tray contains liquid, remove it from the holder, dispose of the liquid, and reinstall the tray.

3.7.2 Periodic Maintenance

NOTE The EXTRACTION COUNTERS screen (see Section C.2.5) indicates the number of extractions the ASE 100 has performed.

- Replace the PEEK seals (P/N 049455, pkg. of 10; P/N 049454, pkg. of 50) inside the cell end caps after approximately 50 extractions, or when they become worn (see Section 5.1).
- Replace the O-rings (P/N 049457, pkg. of 50 Teflon O-rings; P/N 056325, pkg. of 50 Viton O-rings) on the outside of the cell end caps and rinse cells after approximately 50 extractions, or when they become worn (see Section 5.2).
- Verify that the source needle is straight. If it is not, try bending the needle back slightly. If this does not straighten the needle, it should be replaced (see Section 5.8).
- Approximately every 6 months, open the cell door and inspect the lower AutoSeal tip. Make sure the tip is not flattened, and that it is not

scratched, gouged, or corroded. If the tip is damaged or worn, replace it (see Section 5.10).

3.8 Shutdown

Overnight Shutdown

- After extracting with a 100% organic solvent, you may turn off the power immediately. No other action is required.
- After extracting with an acidic solvents or a basic solvent, rinse the system with either 100% organic solvent or distilled water (see Section 3.1.7) before turning off the power.

Longer Shutdowns

- Before shutting down for more than one night:
    1. After extracting with acidic solvents or basic solvents, rinse the system with either 100% organic solvent or distilled water (see Section 3.1.7) before turning off the power.
    2. Turn off the gas supply.
- Before shipping the ASE 100:
    1. After extracting with acidic solvents or basic solvents, rinse the system with either 100% organic solvent (e.g., acetone or methanol) or distilled water (see Section 3.1.7).
    2. Empty the solvent bottle, reconnect the bottle to the system, and run one or more rinse cycles to ensure that all solvent is removed from the lines.
    3. Remove the solvent bottle.

4 • Troubleshooting

This chapter is a guide to troubleshooting minor problems that may occur during operation of the ASE 100 Accelerated Solvent Extractor. Turn to the section of this chapter that best describes the operating problem; there, the possible causes of the problem are listed in order of probability, along with the recommended corrective action. If an error message appears on the ASE 100 screen, refer to Section 4.1 for details.

If you are unable to resolve a problem, contact Dionex Technical Support. In the U.S., call 1-800-346-6390. Outside the U.S., call the nearest Dionex office.

4.1 Error Messages

The ASE 100 Moduleware can identify several potential operating problems. If one of these problems occurs, an error message is displayed on the screen. The message remains until you press any key to clear it or until another error message appears.

Each error message is identified by a number. This section lists the error messages and explains how to respond if an error occurs. Most problems can be resolved by the user.

Error 001	**Oven compression pressure low.**
Cause:	Insufficient nitrogen gas pressure applied to the oven compression system during an extraction.
Action:	Check the nitrogen supply; if it is low, replace it. Regulate the supply to between 1.03 and 1.38 MPa (150 and 200 psi); 1.03 MPa (150 psi) is recommended.
Action:	Check the **REGULATORS** screen (see Section C.2.3). When the oven is compressed, the **COMPRESSION** field should read 0.90 ± 0.03 MPa (130 ± 5 psi); if it does not, adjust the pressure regulator for the compression oven.
Action:	If the error message appears again, contact Dionex for assistance.

Error 002	System pressure low.
Cause:	Insufficient nitrogen gas pressure applied to the system.
Action:	Check the nitrogen supply; if it is low, replace it. Regulate the supply to between 1.03 and 1.38 MPa (150 and 200 psi); 1.03 MPa (150 psi) is recommended.
Action:	Check the **REGULATORS** screen (see Section C.2.3). The **SYSTEM** field should read 0.34 ± 0.02 MPa (50 ± 3 psi); if it does not, adjust the pressure regulator for the system gas to 0.34 MPa (50 psi).
Action:	If the error message appears again, contact Dionex for assistance.

Error 003	Oven temperature low.
Cause:	The heater cable connection to the power supply is loose, or a heater component malfunctioned.
Action:	Contact Dionex for assistance.

Error 004	Oven temperature high
Cause:	The heater cable connection to the power supply is loose, or a heater component malfunctioned.
Action:	Contact Dionex for assistance.

Error 005	Cell pressure threshold exceeded.
Cause:	A blockage in the system.
Action:	Run a rinse cycle (see Section 3.1.7). If the rinse runs successfully, the extraction cell may be plugged. Replace the cell filter (see Section 3.1.4) and the stainless steel cell frit (see Section 5.1).
Action:	If the rinse is not successful, there may be a blockage in the solvent lines. Contact Dionex for assistance.

Error 006	Collection bottle full.
Cause:	The collection bottle is full.
Action:	Empty the collection bottle. If the error message reappears, contact Dionex for assistance.

Error 007	Collection bottle not detected.
Cause:	The collection bottle is not installed, or the sensor failed to detect the bottle.
Action:	Install the collection bottle (with the bottle cap screwed on) and toggle the needle switch to the **DOWN** position (see Section 3.1.6). If the error message reappears, contact Dionex for assistance.

Error 008	Cell not detected.
Cause:	No cell is installed, or the sensor failed to detect the cell.
Action:	Install the appropriate cell (see either Section 3.4, Step 8, or Section B.2.6.) The installation procedure for extraction cells and rinse cells is identical. If the error message reappears, contact Dionex for assistance.

Error 009	Pump volume limit exceeded.
Cause:	If the pump exceeds the volume limit (250 mL), there is probably a leak somewhere in the system.
Action:	Remove the right side panel of the ASE 100 (see Section 5.3). Inspect the following fittings for leaks (see Figure 4-1): pump fittings, pump check valves, pressure transducer fittings, relief valve fittings, static valve fittings, and solvent line fittings. Tighten any leaking fittings.
Action:	Pull out the drip tray holder below the oven and check the plastic drip tray. If the tray contains liquid, remove it from the holder, dispose of the liquid, and reinstall the tray. Then, remove the collection bottle and waste bottle from the system. Remove the lower trim panel and check for leaks near the oven and the AutoSeal mechanism.

Error 010	Analog-to-digital converter failed.
Cause:	Failure of the main printed circuit board (PCB). The board must be replaced.
Action:	Contact Dionex for assistance.

Error 011	Solvent vapor threshold exceeded.
Cause:	The cell is leaking.
Action:	Check for foreign material on the threads of the cap, the seal surface, and the cell body. If necessary, replace the O-rings and/or seals (see Section 5.1). Tighten the cell end caps hand-tight. **Do not use a wrench or other tool.**
Cause:	Solvent was not completely removed from the cell during the purge cycle.
Action:	The optimal purge time varies, depending on the extraction cell size (see Table 3-3). If you are running a preprogrammed method, create a custom method with the appropriate purge time (see Section 3.2). If you are already running a custom method, edit the method to increase the purge time (see Section 3.2).
Cause:	A leaking fitting(s) somewhere in the system.
Action:	Remove the right side panel of the ASE 100 (see Section 5.3). Inspect the following fittings for leaks (see Figure 4-1): pump fittings, pump check valves, pressure transducer fittings, relief valve fittings, static valve fittings, and solvent line fittings. Tighten or replace any leaking fittings.
Action:	Pull out the drip tray holder below the oven and check the plastic drip tray. If the tray contains liquid, remove it from the holder, dispose of the liquid, and reinstall the tray. Then, remove the collection bottle and waste bottle from the system. Remove the lower trim panel and check for leaks near the oven and the AutoSeal mechanism.

Error 012	Clamp plate temperature low.
Cause:	The heater cable connection to the power supply is loose, or a heater component has malfunctioned.
Action:	Contact Dionex for assistance.

Error 013	Clamp plate temperature high.
Cause:	The heater cable connection to the power supply is loose, or a heater component has malfunctioned.
Action:	Contact Dionex for assistance.

Error 014	Oven unable to reach temperature.
Cause:	The heater cable connection to the power supply is loose, or there is a problem with a heater component.
Action:	The defective component should be replaced. Contact Dionex for assistance.

Error 015	Unable to flush.
Cause:	The solvent bottle is empty, or is not properly installed.
Action:	Refill the solvent bottle, if necessary. Check that the solvent bottle is installed as instructed in Section B.2.4.
Cause:	The pump could not deliver the specified flush volume within the allotted time. The cell or lines may be plugged.
Action:	Run a rinse cycle (see Section 3.1.7). If the rinse runs successfully, the extraction cell may be plugged. Replace the cell filter (see Section 3.1.4) and the stainless steel cell frit (see Section 5.1).
Action:	If the rinse is not successful, there may be a blockage in the solvent lines. Contact Dionex for assistance.

Error 016	Unable to fill cell.
Cause:	Insufficient pressure was applied to the cell during an extraction.
Action:	Remove the right side panel of the ASE 100 (see Section 5.3). Inspect the following fittings for leaks (see Figure 4-1): pump fittings, pump check valves, pressure transducer fittings, relief valve fittings, static valve fittings, and solvent line fittings. Tighten or replace any leaking fittings. If the error message appears again, contact Dionex for assistance.

Error 017	Remove cell during oven wait period
Cause:	An extraction cell was installed in the cell holder before the temperature set point was reached.
Action:	Remove the cell from the cell holder. Never install the cell until the **STATUS** field (on the **STATUS** screen) indicates **OVEN READY** and the LED on the front panel **Start** button starts flashing. For more details, refer to Section 3.4.

4.2 Liquid Leaks

- **Worn-out seal in extraction cell end cap**

  Replace the seal (see Section 5.1).

- **Missing or worn-out cell O-rings**

  Check the ends of the cell to verify that the O-rings are in place and in good condition. Replace any O-ring with a hole size of less than 0.5 mm or a white Teflon O-ring that is discolored (see Section 5.2).

  O-rings should last for approximately 50 extractions. To learn how many extractions the ASE 100 has performed, go to the **EXTRACTION COUNTERS** screen (see Section C.2.5).

- **Leak in solvent flow path**

  Remove the right side panel of the ASE 100 (see Section 5.3). Inspect the following fittings for leaks (see Figure 4-1): pump fittings, pump check valves, pressure transducer fittings, relief valve fittings, static valve fittings, and solvent line fittings. Tighten or replace any leaking fittings.

  If the pump head is leaking, replace the piston seal (see Section 5.5).

- **Leaking into waste bottle during static cycle**

  If liquid drips into the waste bottle when the cell is under pressure and the static valve is closed, the relief valve is dirty or worn and must be replaced (see Section 5.6).

- **Leaking into collection bottle during static cycle**

  If solvent leaks into the collection bottle during the static cycle, the static valve is dirty or worn and must be replaced (see Section 5.7).

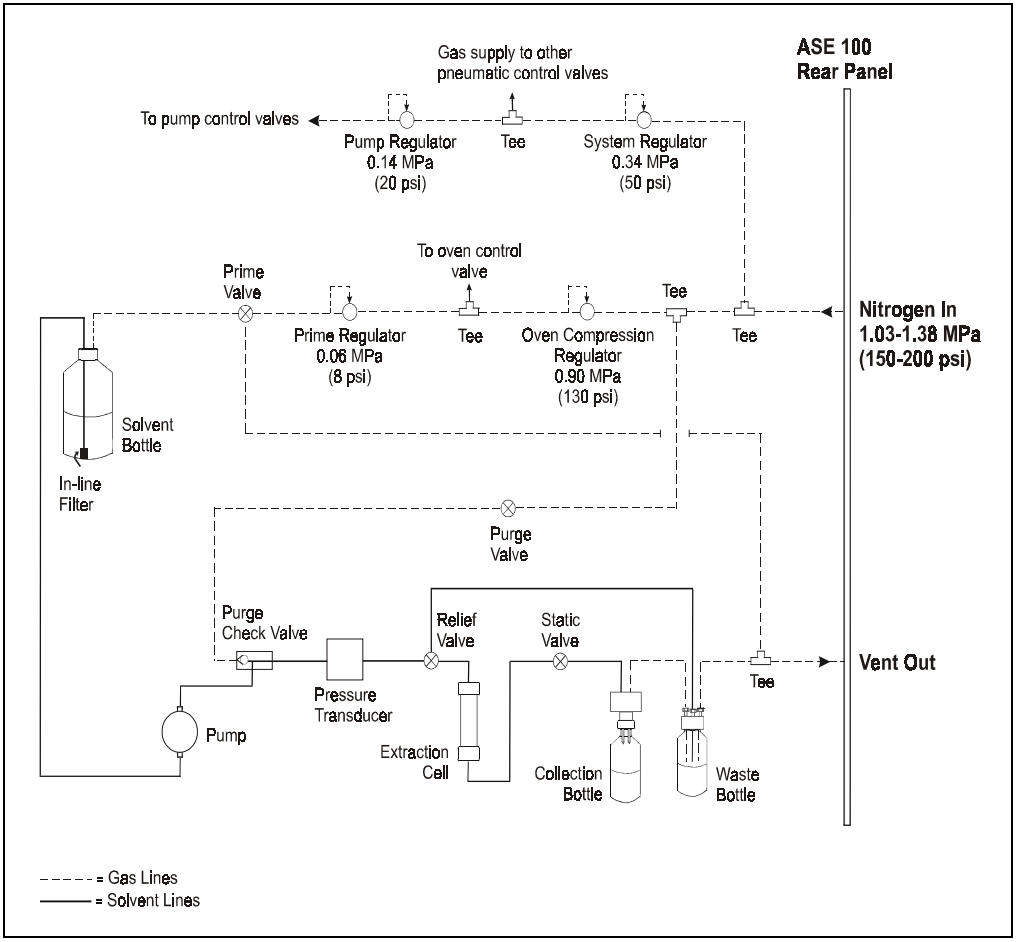


Figure 4-1. ASE 100 Plumbing Diagram

4.3 Gas Leaks

Gas leaks are usually audible. In addition, excessive gas consumption often indicates a gas leak.

If you suspect a leak, check the following locations: gas supply, rear panel, solvent bottle, and interior connections. Listen for leaks and run your hand over the area to feel for escaping gas.

If you find a loose connection, push the tubing firmly onto its fitting. If the fitting or tubing continues to leak, replace it.

4.4 System Stops

- **Electrical cables improperly installed**

  Remove the right side panel of the ASE 100 (see Section 5.3). Check that all electrical cables are seated properly in their connectors on the main PCB (printed circuit board).

5 • Service

This chapter describes routine repair and replacement procedures that the user can perform. All procedures not included here should be performed by Dionex personnel.

NOTE The ASE 100 electronics components cannot be serviced by the user. All repairs involving the electronics must be performed by Dionex personnel.

Before replacing any part in the ASE 100, refer to the troubleshooting information in Chapter 4 of this manual to isolate the cause of the problem. When ordering replacement parts, please specify the ASE 100 serial number listed on the model data label on the rear panel. To contact Dionex in the U.S., call 1-800-346-6390. Outside the U.S., call the nearest Dionex office.

IMPORTANT **Substituting non-Dionex parts may impair the performance of the ASE 100, thereby voiding the product warranty. Refer to the warranty statement in the Dionex Terms and Conditions for more information.**

5.1 Replacing the Seal in the Cell End Cap

1. Unscrew the cell end cap from the cell body (see Figure 5-1).

Wear safety glasses when removing the old snap ring from the cell end cap or installing a new snap ring.

2. Remove the snap ring from the end cap, using the snap ring tool (P/N 056684) provided in the ASE 100 Ship Kit (P/N 059397).
    a. Insert the pointed ends of the tool into the two holes in the snap ring.
    b. Squeeze the handles of the tool together to release the tension on the ring. At the same time, carefully pull the ring out of the cap.
    c. Carefully release the handles of the tool and remove the ring from the tool.
3. Remove the cap insert. Remove the seal from the groove in the bottom of the cap insert.
4. Remove the stainless steel frit from the bottom of the end cap.
5. Clean the frit by sonicating it in solvent or replace it.
6. Place the stainless steel frit (either cleaned or new) into the bottom of the end cap.
7. Press a new seal into the bottom of the cap insert.
8. Align the pins in the cap insert with the grooves in the end cap and then place the insert, with the seal facing down, into the end cap.

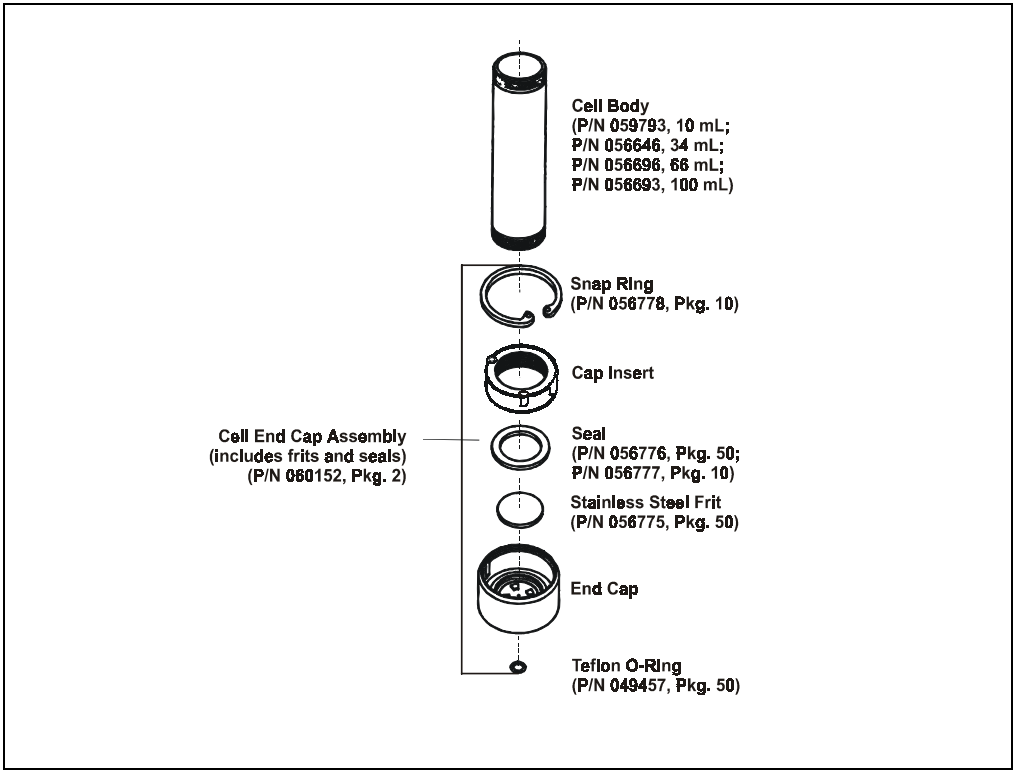


Figure 5-1. Extraction Cell Assembly

9. With the cap assembly upright on the workbench, install the snap ring:

    a. Insert the snap ring tool into the holes on the ring.

    b. Squeeze the tool handles to bring the ends of the ring together.

    c. Insert the ring into the cap. Using your fingers, push the ring under the lip of the end cap. After verifying that the entire ring is under the lip, release the tension on the tool and remove the tool from the ring.

    d. Screw the cap back onto the cell body and hand-tighten.

5.2 Replacing the Cell O-Ring

IMPORTANT **Be careful not to scratch the interior of the cell end cap when installing or removing the cell O-ring. Scratches on the sealing surface will prevent the O-ring from sealing properly and may result in leaks during operation.**

1. Use the small flathead screwdriver (P/N 046985) provided in the ASE 100 Ship Kit (P/N 059397) to remove worn O-rings. To do so, insert the tip of the screwdriver into the end cap and carefully pick out the O-ring.
2. Place a new O-ring (Teflon: P/N 049457, pkg. of 50; Viton: P/N 056325, pkg. of 50) over the opening in the end of the cell cap and press it into place, using the O-ring insertion tool (P/N/ 049660) (see Figure 5-2).

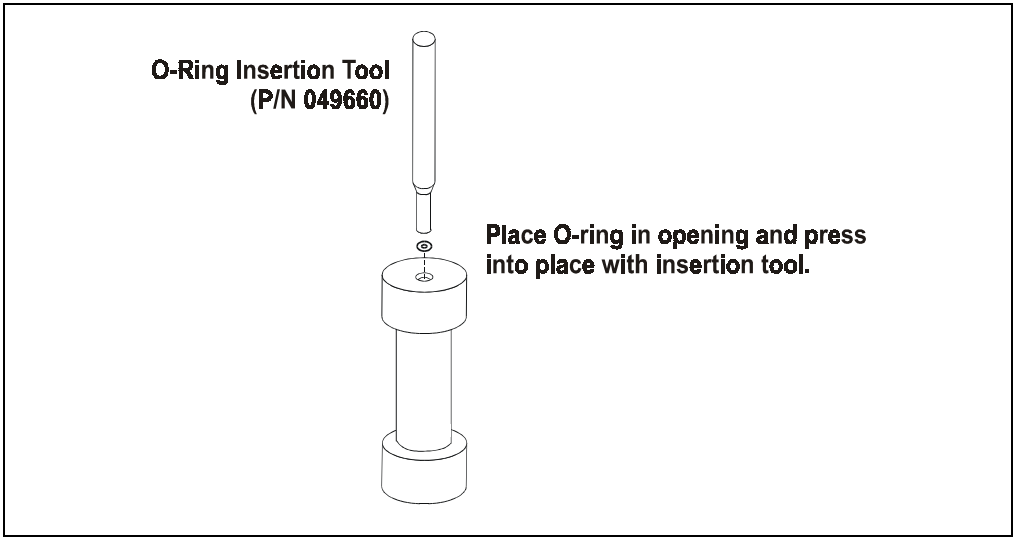


Figure 5-2. Installing the Cell O-Ring

5.3 Removing the Right Side Panel

Many parts that the user can service (the pump check valves, etc.) are located behind the panel on the right side of the ASE 100.

To remove the right side panel:

1. Turn off the ASE 100 main power switch.
2. Unscrew the waste bottle from the bottle cap and set the bottle aside.
3. Toggle the needle switch to the **UP** position. If a collection bottle is installed, remove the bottle from the bottle holder and set it aside.
4. Turn off the gas supply. Disconnect the gas source at the ASE 100 rear panel.
5. Remove the lower trim panel of the ASE 100:
    a. Stand directly in front of the ASE 100, with both hands facing palm upwards.
    b. Hook the first two fingers of each hand under the top edges of the bottle holders, near the **WASTE** and **COLLECTION** labels (see Figure 5-3).
    c. Brace your thumbs against the bottom of the cell door and the control panel. Pull forward until the top of the trim panel pops off the ball studs that secure it to the system.

Figure 5-3. Removing the Lower Trim Panel

d. Note the small round depressions on the left and right sides of the trim panel, near the bottom (see Figure 5-4). Place your index fingers in these depressions and pull forward until the bottom of the trim panel pops off.

e. Pull the trim panel completely off, exposing the inner front panel, and set the trim panel aside.

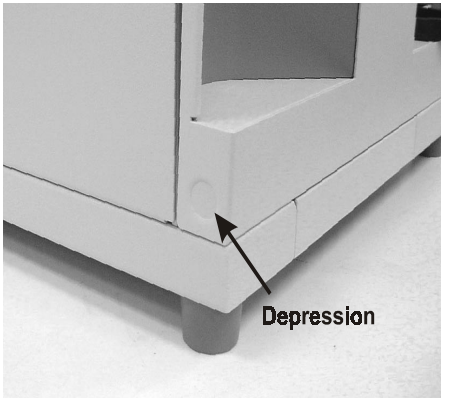


Figure 5-4. Depression in Lower Trim Panel

6. Remove the right side panel of the ASE 100:
    a. Using a Phillips screwdriver, remove the two screws on the inner front panel, near the needle assembly (see Figure 5-5).
    b. Insert a screwdriver into the hole located beneath the top screw hole (see Figure 5-5). Push the screwdriver in until the right side panel slides back about 1/2 inch. **To prevent scratches or other damage to the panel, do not let the panel fall onto the workbench.**
    c. Remove the right side panel from the system and set it aside.

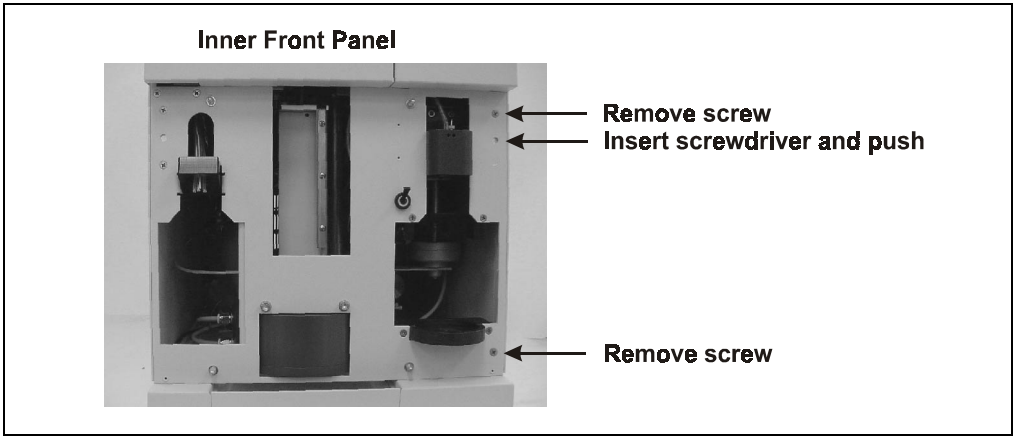


Figure 5-5. Removing the Right Side Panel

To reinstall the right side panel:

1. Hold the panel against the right side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
2. Replace the two Phillips screws on the inner front panel.
3. Carefully align the lower trim panel with the edges of the instrument, and then gently push the panel into place.
4. Reinstall the waste bottle.
5. Turn on the ASE 100 main power switch.
6. Reconnect the gas source at the ASE 100 rear panel and turn on the gas supply.

5.4 Cleaning and/or Replacing Pump Check Valves

5.4.1 Removing the Pump

1. Turn off the ASE 100 main power switch.
2. Unscrew the waste bottle from the bottle cap and set the bottle aside.
3. Toggle the needle switch to the **UP** position. If a collection bottle is installed, remove the bottle from the bottle holder and set it aside.
4. Turn off the gas supply. Disconnect the gas source at the ASE 100 rear panel.
5. Remove the lower trim panel of the ASE 100:
   a. Stand directly in front of the ASE 100, with both hands facing palm upwards.
   b. Hook the first two fingers of each hand under the top edges of the bottle holders, near the **WASTE** and **COLLECTION** labels (see Figure 5-3).
   c. Brace your thumbs against the bottom of the cell door and the control panel. Pull forward until the top of the trim panel pops off the ball studs that secure it to the system.
   d. Note the small round depressions on the left and right sides of the trim panel, near the bottom (see Figure 5-4). Place your index fingers in these depressions and pull forward until the bottom of the trim panel pops off.
   e. Pull the trim panel completely off, exposing the inner front panel, and set the trim panel aside.
6. Remove the right side panel of the ASE 100:
   a. Using a Phillips screwdriver, remove the two screws on the inner front panel, near the needle assembly (see Figure 5-5).
   b. Insert a screwdriver into the hole located beneath the top screw hole (see Figure 5-5). Push the screwdriver in until the right side panel slides back about 1/2 inch. **To prevent scratches or other damage to the panel, do not let the panel fall onto the workbench.**
   c. Remove the right side panel from the system and set it aside.

7. Disconnect the red tubing and the transparent blue tubing from the two black elbow press fittings on top of the pump (see Figure 5-6).
8. Using a 1/4-inch open-end wrench, disconnect the stainless steel fitting from the outlet check valve (see Figure 5-6).
9. Disconnect the PEEK fitting from the inlet check valve, by hand (see Figure 5-6).
10. Disconnect the gray cable from the pump PC board (see Figure 5-6).
11. Using a 3 mm hex-screw driver (P/N 060154), remove the screws in the left and right end plates (see Figure 5-6) that secure the pump to the component panel.

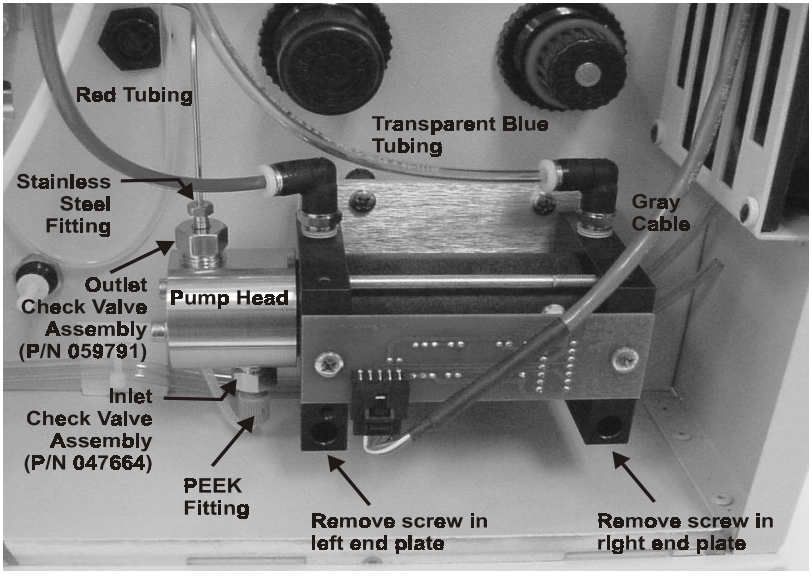


Figure 5-6. ASE 100 Pump

5.4.2 Removing the Check Valves

1. Use a 1/2-inch open-end wrench to loosen the *inlet* check valve housing. Remove the housing, and then remove the check valve cartridge from the housing.
2. Turn the pump over, so that the outlet check valve is facing down.
3. Use a 1/2-inch open-end wrench to loosen the *outlet* check valve housing. Remove the housing, and then remove the check valve cartridge from the housing.

5.4.3 Cleaning the Check Valves

1. Place the check valve housings and cartridges in a beaker with methanol. Sonicate or agitate for several minutes.
2. Rinse each check valve housing and cartridge thoroughly with filtered, deionized water.

5.4.4 Reinstalling the Inlet Check Valve

1. The inlet check valve assembly housing has a 1/4-28 port. (This is the larger of the two ports.) Place the inlet check valve cartridge (P/N 047755) in the inlet check valve housing so that the double-hole end of the cartridge is visible.

   NOTE When correctly installed, liquid enters the check valve through the large single hole and exits through the small double holes.

2. Install the check valve assembly. Tighten the check valve assembly just enough to seat (25 in-lb torque); tighten a little more only if it leaks.

Overtightening may damage the pump head and the check valve housing and crush the check valve seats.

5.4.5 Reinstalling the Outlet Check Valve

1. The outlet check valve assembly housing has a 10-32 port. (This is the smaller of the two ports.) Place the outlet check valve cartridge (P/N 057346) in the outlet check valve housing so that the arrow points inward.

   NOTE When correctly installed, the arrow on the outlet check valve housing points away from the pump.

2. With the pump inverted, reinstall the check valve assembly. Tighten the check valve just enough to seat (25 in-lb torque); tighten a little more only if it leaks.

Overtightening may damage the pump head and the check valve housing and crush the check valve seats.

5.4.6 Reinstalling the Pump

1. Reinstall the pump on the component panel.
2. Reconnect the red gas line to the left press fitting on top of the pump. Reconnect the transparent blue gas line to the right press fitting.
3. Reconnect the solvent lines to the inlet and outlet check valve housings.
4. Reconnect the electrical connector to the pump PC board.

5.4.7 Completing the Procedure

1. Reinstall the right side panel:
   a. Hold the panel against the right side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
   b. Replace the two Phillips screws on the inner front panel.
2. Carefully align the lower trim panel with the edges of the instrument, and then gently push the panel into place.

3. Reinstall the waste bottle.
4. Turn on the ASE 100 main power switch.
5. Reconnect the gas source at the ASE 100 rear panel and turn on the gas supply.
6. Rinse the system (see Section 3.1.7) and check that the pump flow is normal.

   If cleaning the check valves does not eliminate the problem, replace both check valve cartridges (inlet check valve cartridge, P/N 047755; outlet check valve cartridge, P/N 057346).

5.5 Replacing the Piston Seal

5.5.1 Removing the Pump

1. Turn off the ASE 100 main power switch.
2. Unscrew the waste bottle from the bottle cap and set the bottle aside.
3. Toggle the needle switch to the **UP** position. If a collection bottle is installed, remove the bottle from the bottle holder and set it aside.
4. Turn off the gas supply. Disconnect the gas source at the ASE 100 rear panel.
5. Remove the lower trim panel of the ASE 100:
   a. Stand directly in front of the ASE 100, with both hands facing palm upwards.
   b. Hook the first two fingers of each hand under the top edges of the bottle holders, near the **WASTE** and **COLLECTION** labels (see Figure 5-3).
   c. Brace your thumbs against the bottom of the cell door and the control panel. Pull forward until the top of the trim panel pops off the ball studs that secure it to the system.
   d. Note the small round depressions on the left and right sides of the trim panel, near the bottom (see Figure 5-4). Place your index fingers in these depressions and pull forward until the bottom of the trim panel pops off.

e. Pull the trim panel completely off, exposing the inner front panel, and set the trim panel aside.

6. Remove the right side panel of the ASE 100:

   a. Using a Phillips screwdriver, remove the two screws on the inner front panel, near the needle assembly (see Figure 5-5).

   b. Insert a screwdriver into the hole located between the two screw holes (see Figure 5-5). Push the screwdriver in until the right side panel slides back about 1/2 inch. **To prevent scratches or other damage, do not let the panel fall onto the workbench.**

   c. Remove the right side panel from the system and set it aside.

7. Disconnect the red tubing and the transparent blue tubing from the two black elbow press fittings on top of the pump.

8. Using a 1/4-inch open-end wrench, disconnect the stainless steel fitting from the outlet check valve (see Figure 5-6).

9. Disconnect the PEEK fitting from the inlet check valve (by hand).

10. Disconnect the gray cable from the pump PC board.

11. Remove the two screws in the end plates (see Figure 5-6) that secure the pump to the component panel.

5.5.2 Replacing the Piston Seal

1. Using a 3-mm hex driver or wrench, loosen and remove the two screws securing the pump head to the body.

2. Slide the pump head straight off the pump.

Lateral motion while disengaging the pump head from the pump may break the piston.

3. Turn the pump head upside down. The tan piston guide should drop out of the head; if it does not, gently tap the head on the lab bench to dislodge the guide. Save the piston guide (it will be reinstalled in Step 7).

4. If tapping the head on the bench does not remove the piston guide, use the wooden end of a cotton-tipped swab to pry the guide out of the pump head. Discard the used piston guide.
5. To remove the orange piston seal from the pump head, insert the wooden end of a cotton-tipped swab and pry out the seal. Discard the seal.
6. Hold the new piston seal (P/N 047583) over the cavity in the pump head, center the seal, and drop it into place.
7. If the piston guide was easily removed from the pump head (Step 3), place the original piston guide on top of the piston seal and firmly press it into place. This also seats the piston seal in the pump head.

   If you had to pry the piston guide out of the pump head (Step 4), install a new piston guide (P/N 049014) as described above. The original piston guide may have been scratched during removal, so do not use it again. A scratched guide will not seal properly.

5.5.3 Reinstalling the Pump

1. Reinstall the pump on the component panel.
2. Reconnect the red gas line to the left press fitting on top of the pump. Reconnect the transparent blue gas line to the right press fitting.
3. Connect the solvent lines to the inlet and outlet check valve housings.
4. Connect the electrical connector to J8 on the main board.

5.5.4 Completing the Procedure

1. Reinstall the right side panel:
   a. Hold the panel against the right side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
   b. Replace the two Phillips screws on the inner front panel.
2. Carefully align the lower trim panel with the edges of the instrument, and then gently push the panel into place.
3. Reinstall the waste bottle.

4. Turn on the ASE 100 main power switch.
5. Reconnect the gas source at the ASE 100 rear panel and turn on the gas supply.

5.6 Replacing the Relief Valve

1. Turn off the ASE 100 main power switch.
2. Unscrew the waste bottle from the bottle cap and set the bottle aside.
3. Toggle the needle switch to the **UP** position. If a collection bottle is installed, remove the bottle from the bottle holder and set it aside.
4. Turn off the gas supply. Disconnect the gas source at the ASE 100 rear panel.
5. Remove the lower trim panel of the ASE 100:
    a. Stand directly in front of the ASE 100, with both hands facing palm upwards.
    b. Hook the first two fingers of each hand under the top edges of the bottle holders, near the **WASTE** and **COLLECTION** labels (see Figure 5-3).
    c. Brace your thumbs against the bottom of the cell door and the control panel. Pull forward until the top of the trim panel pops off the ball studs that secure it to the system.
    d. Note the small round depressions on the left and right sides of the trim panel, near the bottom (see Figure 5-4). Place your index fingers in these depressions and pull forward until the bottom of the trim panel pops off.
    e. Pull the trim panel completely off, exposing the inner front panel, and set the trim panel aside.

6. Remove the right side panel of the ASE 100:
    a. Using a Phillips screwdriver, remove the two screws on the inner front panel, near the needle assembly (see Figure 5-5).
    b. Insert a screwdriver into the hole located beneath the top screw hole (see Figure 5-5). Push the screwdriver in until the right side panel slides back about 1/2 inch. **To prevent scratches or other damage to the panel, do not let the panel fall onto the workbench.**
    c. Remove the right side panel from the system and set it aside.
7. The relief valve is installed in the upper left corner of the component panel (see Figure 5-7). Disconnect the green gas tubing from the elbow press fitting on the valve.
8. Disconnect the stainless steel line from the right side of the valve. (This tubing connects to the pump transducer.)

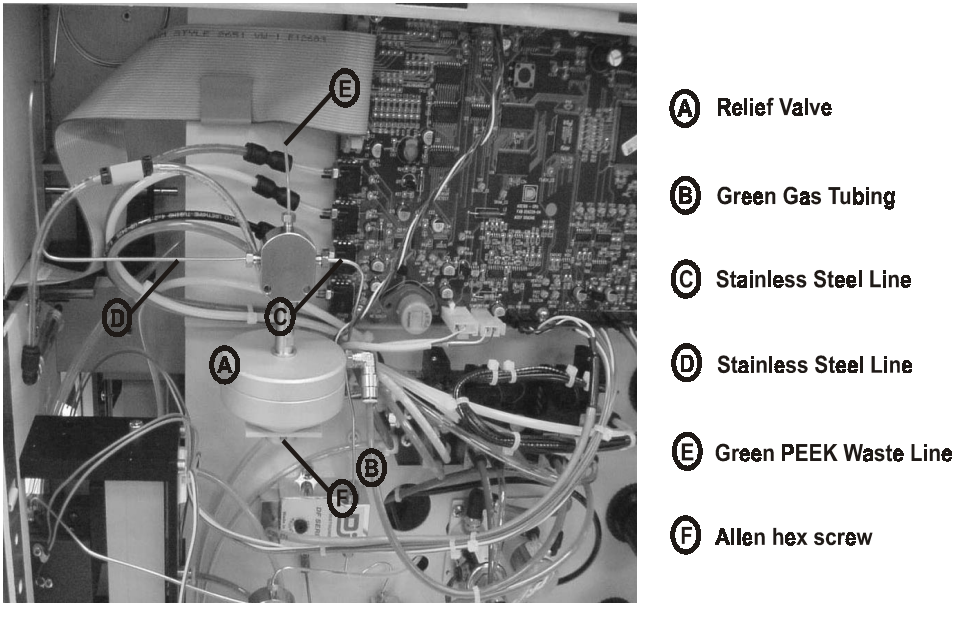


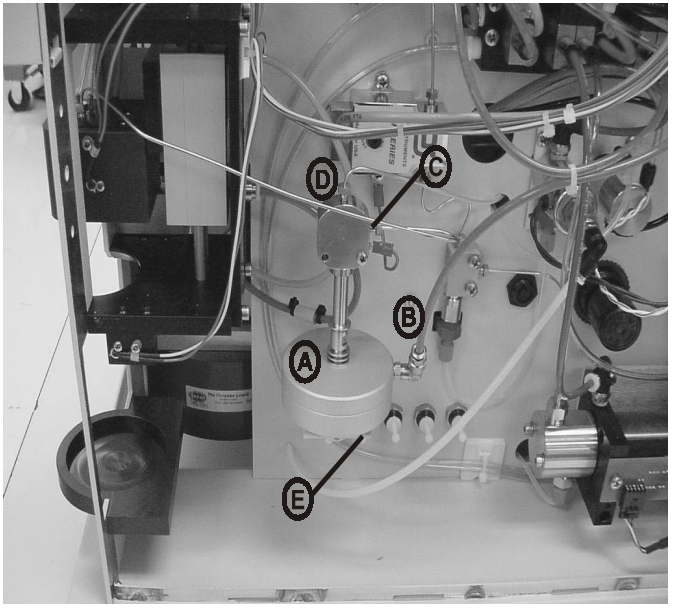
Figure 5-7. Connections to the Relief Valve

9. Disconnect the stainless steel line from the left side of the valve. (This tubing connects to the upper AutoSeal tip.)
10. Disconnect the green PEEK waste line from the top of the valve.
11. Loosen the Allen hex screw (9/64-inch) on the clamp ring below the valve base.
12. Lift the old valve off the valve base.
13. Lower the new relief valve (P/N 048889) onto the valve base. Tighten the Allen hex screw on the clamp ring.
14. Reconnect all of the lines.
15. Reinstall the right side panel:
    a. Hold the panel against the right side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
    b. Replace the two Phillips screws on the inner front panel.
16. Carefully align the lower trim panel with the edges of the instrument, and then gently push the panel into place.
17. Reinstall the waste bottle.
18. Turn on the ASE 100 main power switch.
19. Reconnect the gas source at the ASE 100 rear panel and turn on the gas supply.

5.7 Replacing the Static Valve

1. Turn off the ASE 100 main power switch.
2. Unscrew the waste bottle from the bottle cap and set the bottle aside.
3. Toggle the needle switch to the **UP** position. If a collection bottle is installed, remove the bottle from the bottle holder and set it aside.
4. Turn off the gas supply. Disconnect the gas source at the ASE 100 rear panel.
5. Remove the lower trim panel of the ASE 100:
    a. Stand directly in front of the ASE 100, with both hands facing palm upwards.
    b. Hook the first two fingers of each hand under the top edges of the bottle holders, near the **WASTE** and **COLLECTION** labels (see Figure 5-3).
    c. Brace your thumbs against the bottom of the cell door and the control panel. Pull forward until the top of the trim panel pops off the ball studs that secure it to the system.
    d. Note the small round depressions on the left and right sides of the trim panel, near the bottom (see Figure 5-4). Place your index fingers in these depressions and pull forward until the bottom of the trim panel pops off.
    e. Pull the trim panel completely off, exposing the inner front panel, and set the trim panel aside.
6. Remove the right side panel of the ASE 100:
    a. Using a Phillips screwdriver, remove the two screws on the inner front panel, near the needle assembly (see Figure 5-5).
    b. Insert a screwdriver into the hole located beneath the top screw hole (see Figure 5-5). Push the screwdriver in until the right side panel slides back about 1/2 inch. **To prevent scratches or other damage to the panel, do not let the panel fall onto the workbench.**
    c. Remove the right side panel from the system and set it aside.

7. The static valve is installed in the lower left corner of the component panel (see Figure 5-8). Disconnect the orange tubing from the elbow press fitting on the valve.
8. Disconnect the stainless steel line from the right side of the valve. (This line connects to the source needle.)
9. Disconnect the stainless steel line (P/N 059821) from the top of the valve. (This line connects to the lower AutoSeal tip.)
10. Loosen the Allen hex screw (9/64-inch) on the clamp ring below the valve base.
11. Lift the old valve off the valve base.
12. Lower the new static valve (P/N 048778) onto the valve base. Tighten the Allen hex screw on the clamp ring.
13. Reconnect all of the lines.



A Static Valve

B Orange Tubing

C Stainless Steel Line

D Stainless Steel Line

E Allen hex screw

Figure 5-8. Connections to the Static Valve

14. Reinstall the right side panel:
    a. Hold the panel against the right side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
    b. Replace the two Phillips screws on the inner front panel.
15. Carefully align the lower trim panel with the edges of the instrument, and then gently push the panel into place.
16. Reinstall the waste bottle.
17. Turn on the ASE 100 main power switch.
18. Reconnect the gas source at the ASE 100 rear panel and turn on the gas supply.

5.8 Replacing the Source Needle

1. Turn off the ASE 100 main power switch.
2. Unscrew the waste bottle from the bottle cap and set the bottle aside.
3. Toggle the needle switch to the **UP** position. If a collection bottle is installed, remove the bottle from the bottle holder and set it aside.
4. Turn off the gas supply. Disconnect the gas source at the ASE 100 rear panel.
5. Remove the lower trim panel of the ASE 100:
    a. Stand directly in front of the ASE 100, with both hands facing palm upwards.
    b. Hook the first two fingers of each hand under the top edges of the bottle holders, near the **WASTE** and **COLLECTION** labels (see Figure 5-3).
    c. Brace your thumbs against the bottom of the cell door and the control panel. Pull forward until the top of the trim panel pops off the ball studs that secure it to the system.
    d. Note the small round depressions on the left and right sides of the trim panel, near the bottom (see Figure 5-4). Place your index fingers in these depressions and pull forward until the bottom of the trim panel pops off.

e. Pull the trim panel completely off, exposing the inner front panel, and set the trim panel aside.

6. Remove the right side panel of the ASE 100:

   a. Using a Phillips screwdriver, remove the two screws on the inner front panel, near the needle assembly (see Figure 5-5).

   b. Insert a screwdriver into the hole located beneath the top screw hole (see Figure 5-5). Push the screwdriver in until the right side panel slides back about 1/2 inch. **To prevent scratches or other damage to the panel, do not let the panel fall onto the workbench.**

   c. Remove the right side panel from the system and set it aside.

7. Using a 1/4-inch open-end wrench, disconnect the stainless steel fitting on the right side of the static valve (see Figure 5-8).

8. The needle assembly is secured to the inner front panel. The source needle assembly is on the right side of the needle block (see Figure 5-9). Disconnect the 1/4-inch stainless steel fitting (part of the source needle assembly) from the needle block.

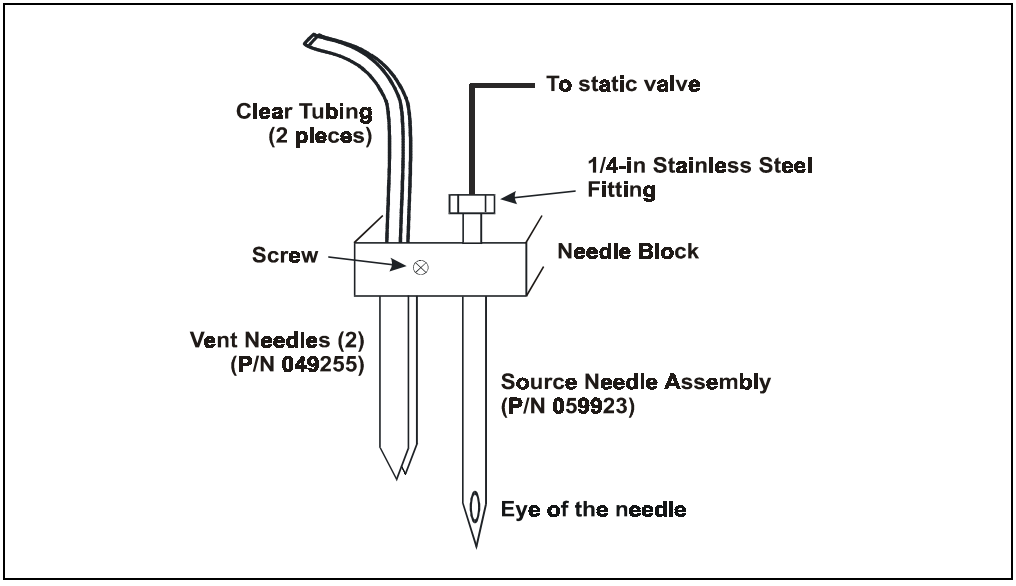


Figure 5-9. Vent and Source Needles

9. Pull up the source needle assembly to remove the needle.
10. Insert the new source needle assembly (P/N 059923) into the top of the needle block. Verify that the eye of the needle is toward the front of the needle block.

IMPORTANT **Be careful when handling the source needle. The tip of the needle is sharp; in addition, it is fragile and can easily be bent.**

11. Reconnect the 1/4-inch stainless steel fitting to the needle block.
12. Reconnect the stainless steel tubing to the right side of the static valve.
13. Reinstall the right side panel:
    a. Hold the panel against the right side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
    b. Replace the two Phillips screws on the inner front panel.
14. Carefully align the lower trim panel with the edges of the instrument, and then gently push the panel into place.
15. Reinstall the waste bottle.
16. Turn on the ASE 100 main power switch.
17. Reconnect the gas source at the ASE 100 rear panel and turn on the gas supply.

5.9 Replacing the Solvent Outlet Line

1. Make sure the ASE 100 power is turned on. (This ensures that the AutoSeal mechanism is lowered.)
2. Unscrew the waste bottle from the bottle cap and set the bottle aside.
3. Toggle the needle switch to the **UP** position. If a collection bottle is installed, remove the bottle from the bottle holder and set it aside.
4. Turn off the gas supply. Disconnect the gas source at the ASE 100 rear panel and let the system vent.
5. Turn off the ASE 100 main power switch.
6. Check that the cell door is closed.
7. Remove the lower trim panel of the ASE 100:
    a. Stand directly in front of the ASE 100, with both hands facing palm upwards.
    b. Hook the first two fingers of each hand under the top edges of the bottle holders, near the **WASTE** and **COLLECTION** labels (see Figure 5-3).
    c. Brace your thumbs against the bottom of the cell door and the control panel. Pull forward until the top of the trim panel pops off the ball studs that secure it to the system.
    d. Note the small round depressions on the left and right sides of the trim panel, near the bottom (see Figure 5-4). Place your index fingers in these depressions and pull forward until the bottom of the trim panel pops off.
    e. Pull the trim panel completely off, exposing the inner front panel, and set the trim panel aside.

8. Remove the right side panel of the ASE 100:
    a. Using a Phillips screwdriver, remove the two screws on the inner front panel, near the needle assembly (see Figure 5-5).
    b. Insert a screwdriver into the hole located beneath the top screw hole (see Figure 5-5). Push the screwdriver in until the right side panel slides back about 1/2 inch. **To prevent scratches or other damage to the panel, do not let the panel fall onto the workbench.**
    c. Remove the right side panel from the system and set it aside.
9. Remove the left side panel of the ASE 100:
    a. Using a Phillips screwdriver, remove the two screws in the upper left section of the inner front panel (see Figure 5-10).
    b. Gently slide the left side panel backward as far as it can travel (about 1/2 inch). Pull the panel to the left and remove it from the system.

IMPORTANT **Be careful not to damage the mounting tabs on the left side panel.**

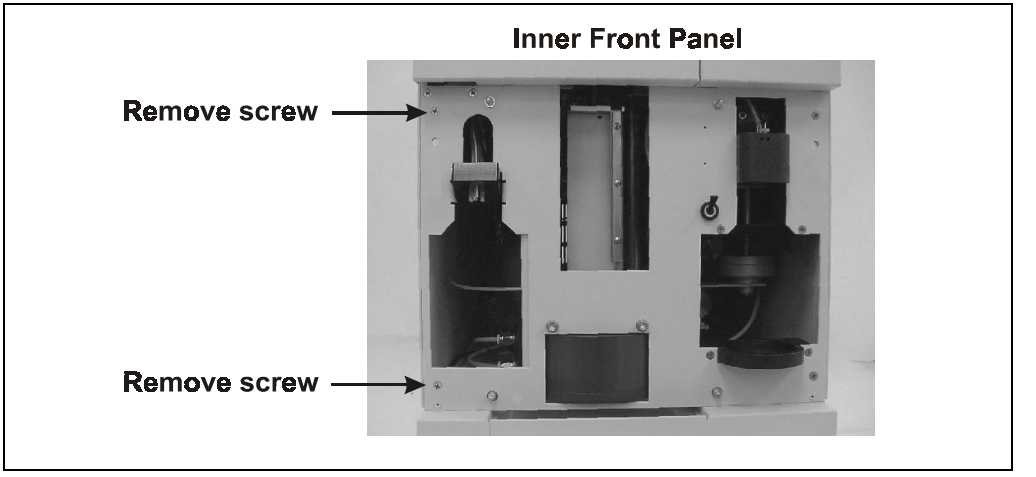


Figure 5-10. Removing the Left Side Panel

10. Locate the static valve in the lower left corner of the component panel (see Figure 5-11). The stainless steel solvent outlet line is connected to the top of the static valve. (The other end of the solvent outlet line is connected to the lower AutoSeal tip.)

    Remove the fitting that connects the solvent outlet line to the static valve. Carefully feed the tubing through the small round opening in the component panel (see Figure 5-11) and into the left side of the instrument.

    NOTE Many tubes and wires are connected to both sides of the component panel. Be careful not to disconnect or unseat any of the connections.

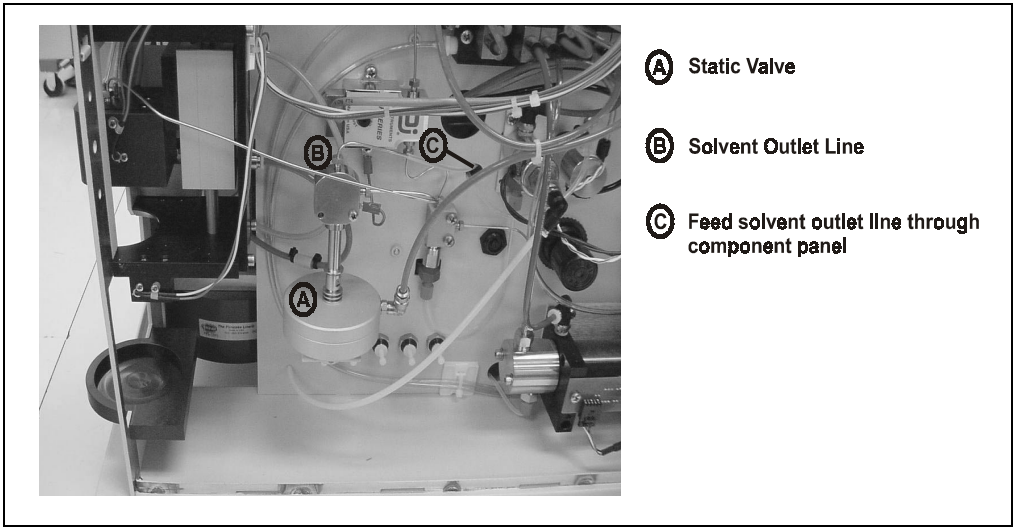


Figure 5-11. Solvent Outlet Line–Static Valve Connection

11. The stainless steel solvent outlet line is connected to the lower AutoSeal tip (see Figure 5-12). From there, the solvent outlet line is routed through a vertical guide.

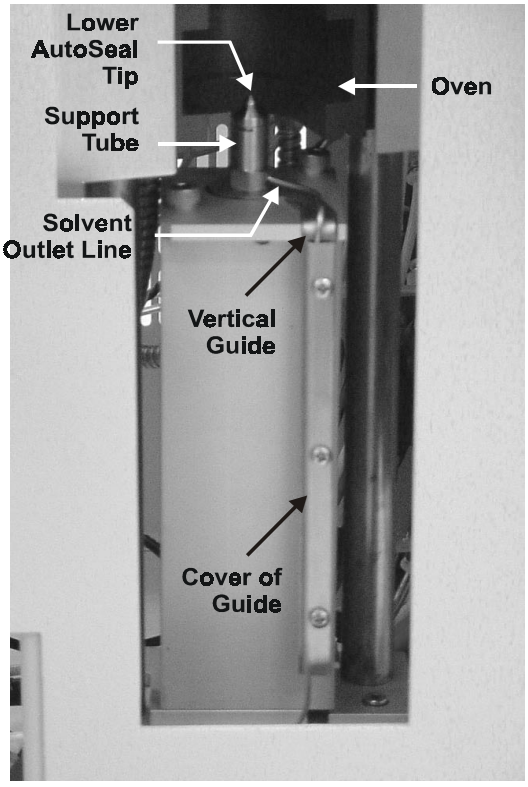


Figure 5-12. Lower AutoSeal Tip–Solvent Outlet Line Connection

12. Loosen the three Phillips screws that secure the cover to the vertical guide. Slip the solvent outlet line out the left side of the cover (see Figure 5-13).

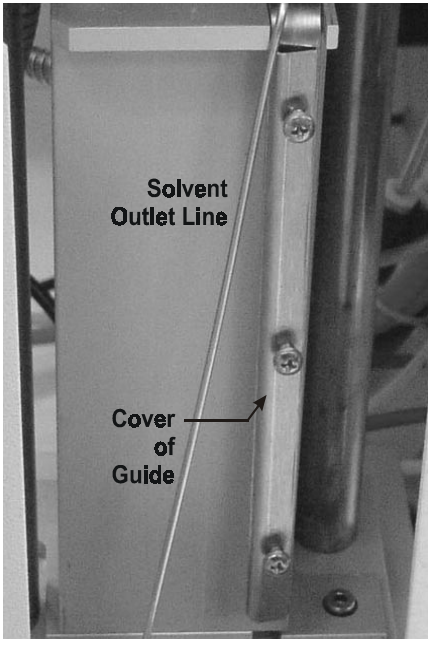


Figure 5-13. Removing the Solvent Outlet Line from the Vertical Guide

13. Lift the lower AutoSeal tip out of the support tube located on top of the air cylinder shaft (see Figure 5-14).
14. Note the indentation along the top edge of the support tube, where it meets the lower AutoSeal tip (see Figure 5-14). Insert the tip of a small flathead screwdriver into the indentation and twist the screwdriver just enough to raise and loosen the lower AutoSeal tip.
15. Remove the old solvent outlet line. Remove the lower AutoSeal tip from the outlet line.
16. Screw the lower AutoSeal tip onto the end of the new solvent outlet line (P/N 059821). While holding the solvent line securely with a 1/4-inch wrench, use a 3/8-inch open-end wrench to tighten the AutoSeal tip.
17. Reinstall the AutoSeal tip in the support tube on top of the air cylinder.
18. Route the new solvent outlet line through the vertical guide and reinstall the Phillips screws in the guide.
19. Connect the other end of the new solvent outlet line to the top of the static valve. Make sure that there is adequate clearance above and below the solvent line. During operation, the solvent line must be able to move up and down freely.

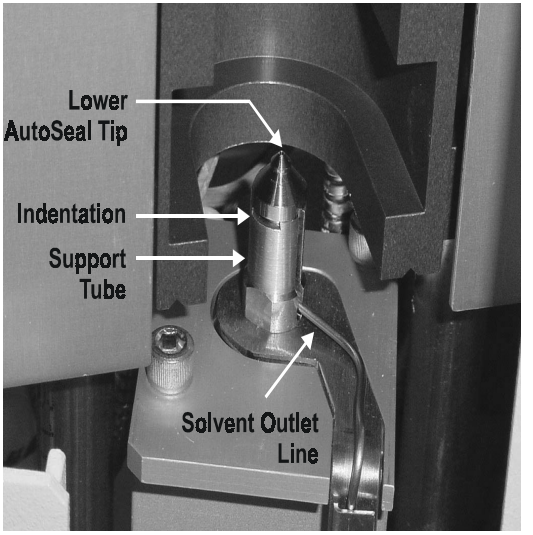


Figure 5-14. Support Tube for Lower AutoSeal Tip

20. Reinstall the left side panel:
    a. Hold the panel against the left side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
    b. Replace the two Phillips screws on the inner front panel.
21. Reinstall the right side panel:
    a. Hold the panel against the right side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
    b. Replace the two Phillips screws on the inner front panel.
22. Carefully align the lower trim panel with the edges of the instrument, and then gently push the panel into place.
23. Reinstall the waste bottle.
24. Turn on the ASE 100 main power switch.
25. Reconnect the gas source at the ASE 100 rear panel and turn on the gas supply.

5.10 Replacing the Lower AutoSeal Tip

1. Make sure the ASE 100 power is turned on. (This ensures that the AutoSeal mechanism is lowered.)
2. Toggle the needle switch to the **UP** position. If a collection bottle is installed, remove the bottle from the bottle holder and set it aside.
3. Turn off the gas supply. Disconnect the gas source at the ASE 100 rear panel and let the system vent.
4. Turn off the ASE 100 main power switch.
5. Check that the cell door is closed.
6. Unscrew the waste bottle from the bottle cap and set the bottle aside.

7. Remove the lower trim panel of the ASE 100:
    a. Stand directly in front of the ASE 100, with both hands facing palm upwards.
    b. Hook the first two fingers of each hand under the top edges of the bottle holders, near the **WASTE** and **COLLECTION** labels (see Figure 5-3).
    c. Brace your thumbs against the bottom of the cell door and the control panel. Pull forward until the top of the trim panel pops off the ball studs that secure it to the system.
    d. Note the small round depressions on the left and right sides of the trim panel, near the bottom (see Figure 5-4). Place your index fingers in these depressions and pull forward until the bottom of the trim panel pops off.
    e. Pull the trim panel completely off, exposing the inner front panel, and set the trim panel aside.
8. Remove the left side panel of the ASE 100:
    a. Using a Phillips screwdriver, remove the two screws in the upper left section of the inner front panel (see Figure 5-10).
    b. Gently slide the left side panel backward as far as it can travel (about 1/2 inch). Pull the panel to the left and remove it from the system.

IMPORTANT **Be careful not to damage the mounting tabs on the left side panel.**

9. The stainless steel solvent outlet line is connected to the lower AutoSeal tip. From there, the outlet line is routed through a vertical guide with a cover (see Figure 5-15).

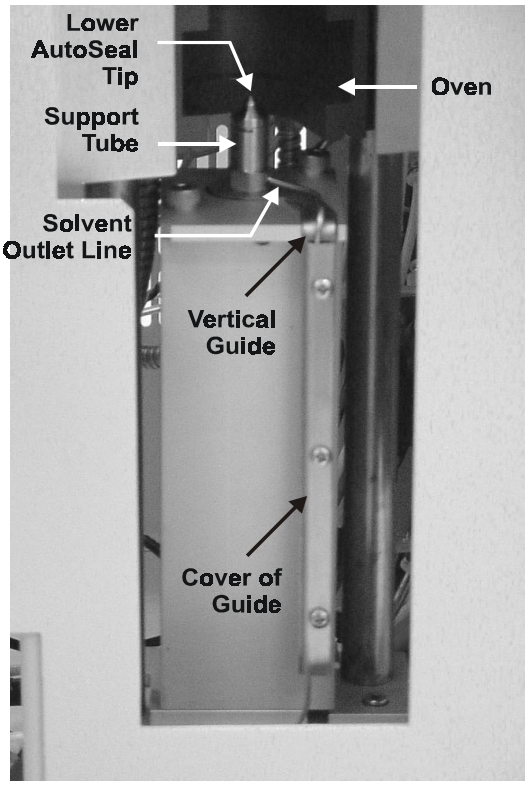


Figure 5-15. Lower AutoSeal Tip–Solvent Outlet Line Connection

10. Loosen the three Phillips screws that secure the cover to the vertical guide. Slip the solvent outlet line out the left side of the cover (see Figure 5-16).

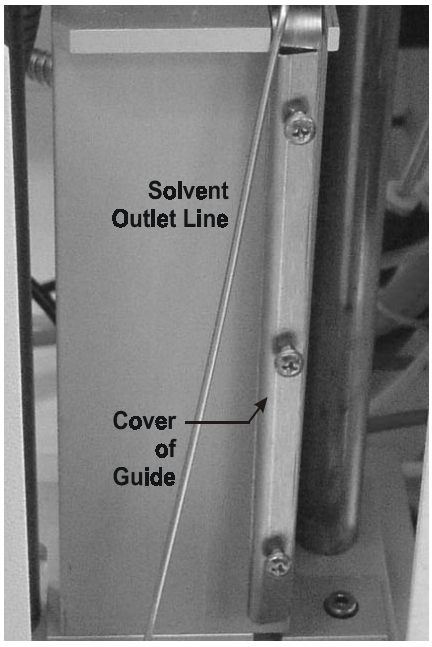


Figure 5-16. Removing the Solvent Outlet Line from the Vertical Guide

11. Lift the lower AutoSeal tip out of the support tube located on top of the air cylinder shaft (see Figure 5-17).
12. Note the indentation along the top edge of the support tube, where it meets the lower AutoSeal tip (see Figure 5-17). Insert the tip of a small flathead screwdriver into the indentation and twist the screwdriver just enough to raise and loosen the lower tip.
13. Hold the solvent line securely with a 1/4-inch wrench, to prevent it from moving; at the same time, use a 3/8-inch wrench to loosen the lower tip. Remove the tip and discard it.
14. Screw the new AutoSeal tip (P/N 056641) onto the end of the solvent line. While holding the solvent line securely with a 1/4-inch wrench, use a 3/8-inch wrench to tighten the new AutoSeal tip.
15. Push the new AutoSeal tip into the support tube on top of the air cylinder.
16. Route the solvent outlet line through the vertical guide and reinstall the Phillips screws in the guide.

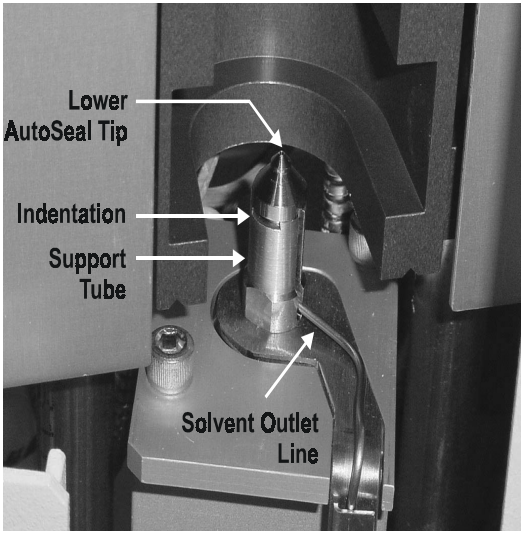


Figure 5-17. Support Tube for Lower AutoSeal Tip

17. Reinstall the left side panel:
    a. Hold the panel against the left side of the system. Engage the small tabs on the top and bottom of the panel with the slots in the chassis. Pull the panel forward until it locks into place.
    b. Replace the two Phillips screws on the inner front panel.
18. Carefully align the lower trim panel with the edges of the instrument, and then gently push the panel into place.
19. Reinstall the waste bottle.
20. Turn on the ASE 100 main power switch.
21. Reconnect the gas source at the ASE 100 rear panel and turn on the gas supply.

5.11 Replacing the Main Power Fuses

1. Turn off the ASE 100 main power switch and disconnect the main power cord.

HIGH VOLTAGE—Disconnect the main power cord from its source, as well as from the rear panel of the ASE 100.

HAUTE TENSION—Débranchez le cordon d'alimentation principal de sa source et du panneau arrière du ASE 100.

HOCHSPANNUNG—Ziehen Sie das Netzkabel aus der Steckdose und der Netzbuchse auf der Rückseite des ASE 100.

2. The fuse holder is part of the main power receptacle on the ASE 100 rear panel (see Figure 5-18).

   Note the recessed lock located on the bottom of the fuse holder. Using a small screwdriver, push the tab on the recessed lock upward to release the lock. When the fuse holder pops out slightly, pull the fuse holder straight out of its compartment.

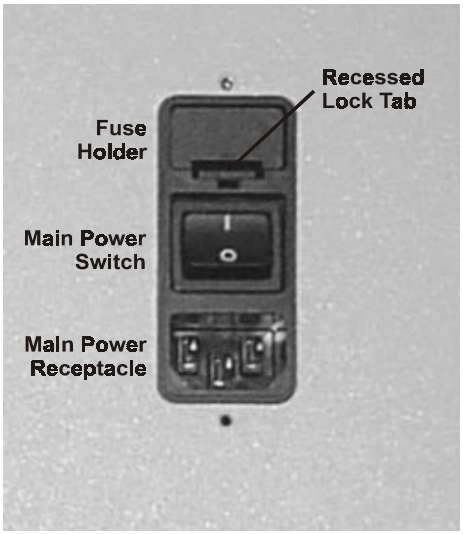


Figure 5-18. Main Power Fuse Holder

3. Replace the two fuses in the holder with new IEC127 fast-blow fuses rated 8 amps (P/N 954766).

NOTE Dionex recommends always replacing both fuses.

4. Reinsert the fuse holder into its compartment. Apply enough pressure evenly against the holder to engage the tab on the recessed lock; when the tab is engaged, the holder is flush against the panel.
5. Reconnect the main power cord. Turn on the ASE 100 main power switch.

A • Specifications

A.1 Physical

Dimensions	56 cm high (excluding solvent bottle) x 36 cm wide x 46 cm deep (22 in x 14 in x 18 in) 6 cm (2.5 in) clearance required behind the system
Weight	34 kg (75 lb)

A.2 Environmental

Operating Temperature	10 to 40 °C (50 to 104 °F)
Operating Humidity	5% to 95% relative humidity (noncondensing)
Decibel Level	76 db (“A WEIGHING” setting)

A.3 Electrical

Main Power Requirements	100-120/220-240 Vac, 50/60 Hz; 6 amps; the ASE 100 main power supply adjusts automatically to the power source at the installation site
Oven Power Requirements	Select the oven voltage range (100-120 Vac or 220-240 Vac) via switches on the rear panel power supply; for details, see Section B.2.2
Fuse Requirements	Two 8 amp fast-blow IEC127 fuses (P/N 954766)

A.4 Pneumatic

Nitrogen 1.03 to 1.38 MPa (150 to 200 psi)

A.5 Front Panel Display and Keypad

Display Vacuum fluorescence display (VFD)

Keypad Seven buttons for entering commands and selecting screen parameters

A.6 Extraction Cells

Extraction Cells Stainless steel cell bodies and end caps with seals and stainless steel frits. Cells are available in four sizes: 10 mL (10.0 mL actual volume), 34 mL (33.0 mL actual volume), 66 mL (66.0 mL actual volume), and 100 mL (99.8 mL actual volume). The internal diameter of the 10 mL cell is 16 mm (0.61 in). The internal diameter of the other cells is 28 mm (1.12 in).

A.7 Collection Bottles

Collection Bottles 250 mL bottle; the bottle septum is Teflon-coated on the solvent side

A.8 Interior Components

Oven Heats from 40 to 200 °C; the oven turns off automatically after eight hours of no system activity

Pump Operating pressure of 10.35 MPa (1500 psi)

Valves High pressure valves: purge, pressure relief, and static

Bottle Sensors When the needles are in the "down" position, sensors detect whether a collection bottle is present and whether it is full

Hydrocarbon Sensor	Monitors the hydrocarbon vapor level
Cell Sensor	When the cell door is closed, the sensor can detect whether a cell is installed in the cell holder.

B • Installation

B.1 Facility Requirements

- Make sure the ASE 100 installation site meets the electrical and environmental specifications listed in Appendix A.
- The ASE 100 requires a grounded, single-phase power source of from 100 to 240 Vac and 50/60 Hz.
- The ASE 100 oven voltage setting is controlled by two switches on the rear panel power supply. The switch settings must match the voltage from the power source at the ASE 100 installation site. The switches are factory-set for voltages between 220 and 240 Vac. If the voltage from your power source is between 100 and 120 Vac, change the switch settings (see Section B.2.2).
- A source of 99.9% pure nitrogen gas, regulated to between 1.03 and 1.38 MPa (150 and 200 psi); 1.03 MPa (150 psi) is recommended. Applications that use a very clean baseline electron capture detector (ECD) may require UHP (ultra-high purity) gas.
- Install the ASE 100 on a sturdy workbench at a height that allows convenient viewing of the front panel display. Allow at least 6 cm (2.5 in) of free space behind the ASE 100 for connections and ventilation.

Lift the ASE 100 only from the bottom and/or sides of the instrument. If the system is lifted from the front, the drip tray may slide forward. Use caution when lifting the ASE 100: it weighs 34 kg (75 lb).

Ne soulevez le ASE 100 que par le fond ou les côtés. Soyez prudent lorsque vous soulevez le ASE 100: il pèse 34 kg.

Wenn Sie den ASE 100 anheben oder bewegen möchten, greifen Sie bitte unter den Boden oder heben Sie das Gerät an den Seiten an. Seien Sie vorsichtig, wenn Sie den ASE 100 anheben. Das Gerät wiegt 34 kg.

B.2 Installation Instructions

The ASE 100 Ship Kit (P/N 059397) should be at hand before beginning the installation procedure. The Ship Kit contains several items (tubing, fittings, solvent bottle, etc.) that are required to install the system.

B.2.1 Nitrogen Connections

The connections from the ASE 100 to the nitrogen gas source are made with press fittings:

- To *connect* a press fitting, firmly push the tubing into the fitting until it is seated.
- To *disconnect* a press fitting, use your fingers (or a small open-end wrench) to press the ring on the fitting *in*, while at the same time pulling the tubing *out*.

1. Connect the 4-mm (0.156-in) elbow fitting (P/N 049272) to the regulator on the nitrogen gas source. Push one end of the blue 4-mm (0.156-in) OD tubing (P/N 049296) into the elbow fitting; push the other end of the tubing into the **NITROGEN** connector on the ASE 100 rear panel (see Figure B-1).
2. Push one end of a 10-ft length of clear 8-mm (0.312-in) OD tubing (P/N 053514) into the **VENT** connector on the ASE 100 rear panel (see Figure B-1). Route the free end of the tubing to a vent hood, if desired.

Do not obstruct or pressurize the vent outlet.

Make sure the vent tubing runs downhill from the ASE 100 rear panel. This prevents formation of a trap, which would prevent vapors from being vented through the tubing.

3. Adjust the nitrogen pressure source to between 1.03 and 1.38 MPa (150 and 200 psi); 1.03 MPa (150 psi) is recommended.

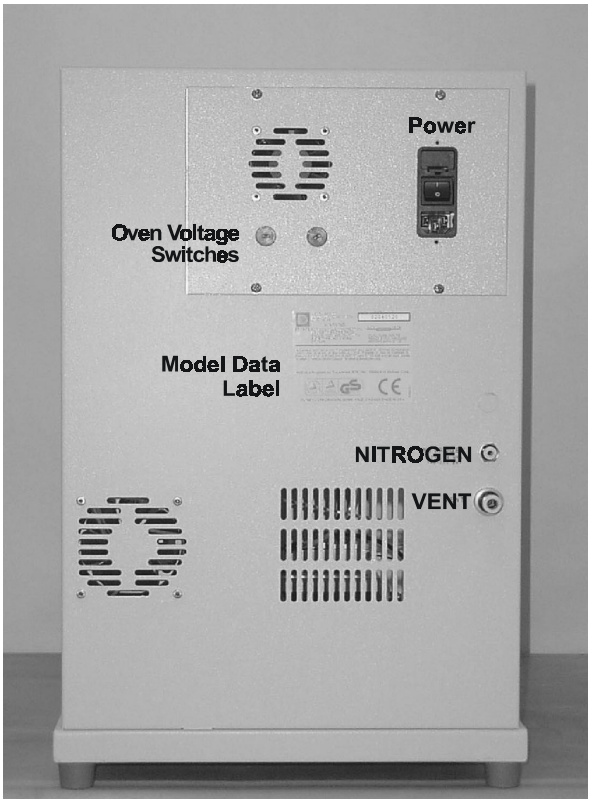


Figure B-1. ASE 100 Rear Panel

B.2.2 Electrical Connections

1. Connect a modular power cord (IEC 320 C13) from the power receptacle on the ASE 100 rear panel (see Figure B-1) to a grounded, single-phase power source of 100 to 240 Vac and 50/60 Hz.

SHOCK HAZARD—To avoid electrical shock, use a grounded receptacle. Do not operate the ASE 100 or connect it to AC power mains without an earthed ground connection.

The power supply cord is used as the main disconnect device. Make sure the socket-outlet is located near the ASE 100 and is easily accessible.

Operation at AC input levels outside of the specified operating voltage range may damage the ASE 100.

DANGER D'ÉLECTROCUTION—Pour éviter toute électrocution, il faut utiliser une prise de courant avec prise de terre. Ne l'utilisez pas et ne le branchez pas au secteur C.A. sans utiliser de branchement mis à la terre.

Le cordon d'alimentation principal est utilisé comme dispositif principal de débranchement. Veillez à ce que la prise de base soit située/installée près du module et facilement accessible.

STROMSCHLAGGEFAHR—Zur Vermeidung von elektrischen Schlägen ist eine geerdete Steckdose zu verwenden. Das Gerät darf nicht ohne Erdung betrieben bzw. an Wechselstrom angeschlossen werden.

Das Netzkabel ist das wichtigste Mittel zur Stromunterbrechung. Stellen Sie sicher, daß sich die Steckdose nahe am Gerät befindet und leicht zugänglich ist.

2. The settings for the two oven voltage switches on the ASE 100 rear panel (see Figure B-2) must match the voltage from the power source at the installation site.

   Check that both switches are set to either **110** (for voltages between 100 and 120 Vac) or **220** (for voltages between 220 and 240 Vac). To change the switch settings, insert a small screwdriver into the slot in each switch and turn it to either **110** or **220**.

   NOTE The oven voltage switch settings have no effect on system components other than the oven. The ASE 100 main power supply adjusts automatically to the power source at the installation site.

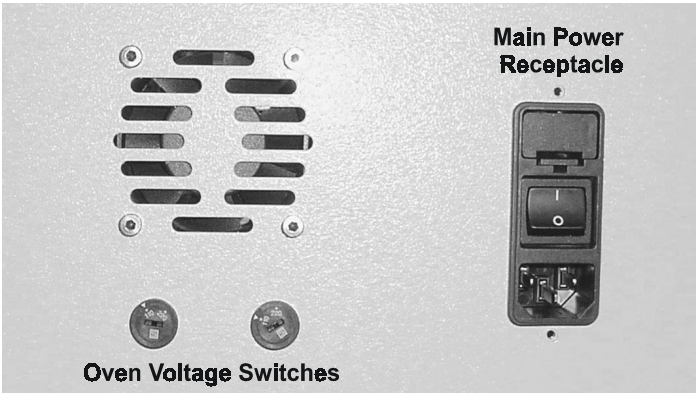


Figure B-2. Oven Voltage Switches

B.2.3 Checking Pressure Readings

1. Press **MENU** to display the **MAIN** screen.
2. Select **DIAGNOSTICS** and press **ENTER.**

   This displays the **DIAGNOSTICS** screen (see Figure B-3).

Figure B-3. Diagnostics Screen (Additional text shown)

3. Select **REGULATORS** and press **ENTER.**

   This displays the **REGULATORS** screen (see Figure B-4).

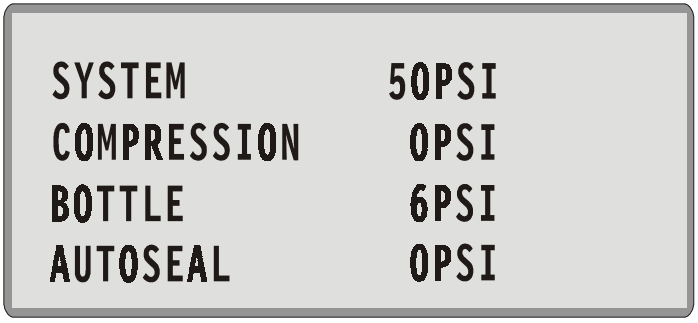


Figure B-4. Regulators Screen

NOTE The COMPRESSION and AUTOSEAL pressure readings are zero unless an extraction is in process.

4. Compare the pressure readings on the **REGULATORS** screen with the values listed in the table below. If a pressure reading does not meet specification, contact Dionex.

Field	Function	Pressure Spec
SYSTEM	Pressure applied to the system	0.34 ± 0.02 MPa (50 ± 3 psi)
COMPRESSION	Pressure applied when the oven is compressed	0.90 ± 0.03 MPa (130 ± 5 psi)
BOTTLE	Pressure applied to the solvent bottle	0.03 to 0.07 MPa* (5 to 10 psi)
AUTOSEAL	Pressure applied when the AutoSeal air cylinder is actuated	0.10 ± 0.01 MPa (15 ± 2 psi)

*This pressure is nominally set for 0.04 MPa (6 psi). The pressure may increase during periods of system inactivity, but will return to a value within the normal range as soon as an extraction begins.

B.2.4 Solvent Bottle Connections

Use only Dionex solvent bottles (1-liter, P/N 045900; 2-liter, P/N 045901). These are glass bottles with a plastic, shatterproof coating. To prevent personal injury, make sure the pressure applied to the bottles does not exceed 0.07 MPa (10 psi).

Utilisez uniquement des réservoirs à solvant Dionex (1 litre, N/P 045900; 2 litres, N/P 045901). Ce sont des réservoirs en verre à revêtement incassable en plastique. Veillez à ce que la pression exercée sur ces réservoirs ne dépasse pas 0,07 MPa.

Verwenden Sie ausschließlich die Lösemittelbehälter von Dionex (1-Liter, Bestell-Nr. 045900; 2-Liter, Bestell-Nr. 045901). Dabei handelt es sich um Glasbehälter mit einer splittersicheren Plastikbeschichtung. Vergewissern Sie sich, daß der Druck, der auf die Behälter ausgeübt wird, 0,07 MPa nicht übersteigt.

NOTE Never fill the solvent bottle or disconnect the tubing connections to the SOLVENT and GAS connectors (see Figure B-5) when the system is performing an extraction or a rinse cycle. During these times, the solvent bottle is pressurized. If you remove the bottle cap when the solvent bottle is pressurized, the ASE 100 may not operate to specification.

1. Fill the solvent bottle with prepared solvent to the level indicated in Figure B-5.

   If you plan to run a preprogrammed method, refer to Section 2.5 for the recommended solvent. If you plan to run a custom method, review the solvent selection guidelines in Section 3.1.1.

   NOTE The solvent level in the bottle must remain below the gas inlet line. This prevents solvent from coming into contact with the pneumatic valves.

2. Place the solvent bottle in the recess on top of the system.

3. Insert the solvent outlet line extending from the underside of the cap assembly (P/N 051977) into the solvent bottle (see Figure B-5). Make sure the in-line filter rests on the bottom of the bottle. (This prevents air from being drawn through the line.)
4. Hand-tighten the red lock ring cap securely over the stopper.
5. Screw the fitting on the solvent outlet line into the connector labeled **SOLVENT**.
6. Push the fitting on the gas inlet line into the connector labeled **GAS**. (To disconnect the line, push the small latch at the top of the connector toward the center of the connector.)

NOTE Always connect the outlet line to the SOLVENT connector first, and then the inlet line to the GAS connector. Reverse this order when disconnecting the lines. It is not necessary to disconnect the solvent and gas lines before refilling the solvent bottle.

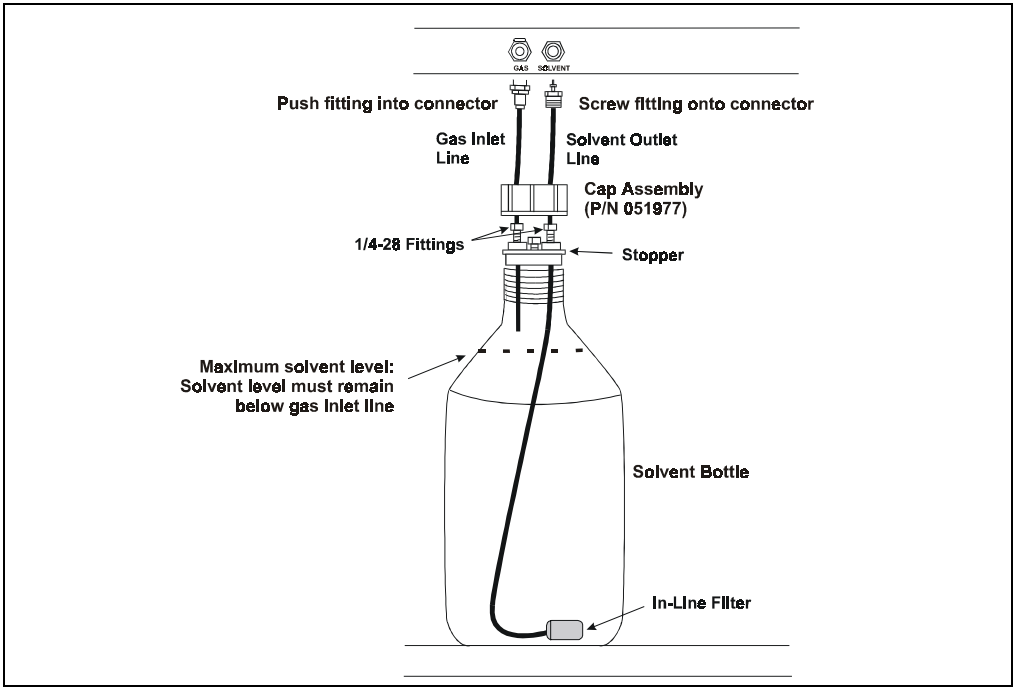


Figure B-5. Solvent Bottle Connections (Top view)

B.2.5 Waste Bottle Installation

A 250 mL collection bottle (P/N 056284, pkg. of 12)–minus the standard bottle cap–is used to collect condensed vented solvent during a sample extraction. A built-in waste bottle cap is installed above the bottle holder on the ASE 100 front panel (see Figure B-6).

1. Lift the built-in waste bottle cap with one hand. With your other hand, tilt the waste bottle at a slight angle and position it below the bottle cap. While being careful not to bend the tubing that extends from the bottle cap, insert the bottle into the bottle cap.
2. Screw the bottle into the cap and release the bottle, allowing it to swing gently into place.

Figure B-6. Installing the Waste Bottle

B.2.6 Rinsing the System

Selecting the Rinse Cell

The rinse cell size (short, medium, or long) must be matched to the extraction cell size. Each ASE 100 is shipped from Dionex with one rinse cell in the required size (see the table below).

Use this rinse cell:	With this extraction cell:
Short (P/N 060174)	10 mL, 34 mL
Medium (P/N 060175)	66 mL
Long (P/N 060176)	100 mL

NOTE **If you order an extraction cell in a size other than the size originally shipped with the ASE 100, you may need to order a different rinse cell.**

Adjusting the Cell Holder

When the ASE 100 is shipped from the factory, the cell holder (on the inside of the cell door) is positioned to accommodate either a 100 mL extraction cell or a long rinse cell (see Figure B-9).

Before you can install a cell in any other size, you must reposition the lower latch of the cell holder. For instructions, see Section B.2.7.

Rinsing the System

1. Install the rinse cell in the cell holder. Rinse cells are installed in the same way as extraction cells; for instructions, see Section 3.4, Step 8.
2. Close the cell door.
3. Toggle the needle switch on the front panel (see Figure B-7) to the **UP** position.
4. Place a rinse bottle in the collection bottle holder (see Figure B-7).
5. Toggle the needle switch to the **DOWN** position.
6. Press the **RINSE** button to begin the rinse cycle. The LED on the **RINSE** button turns on and will remain lighted while the rinse cycle is in progress.

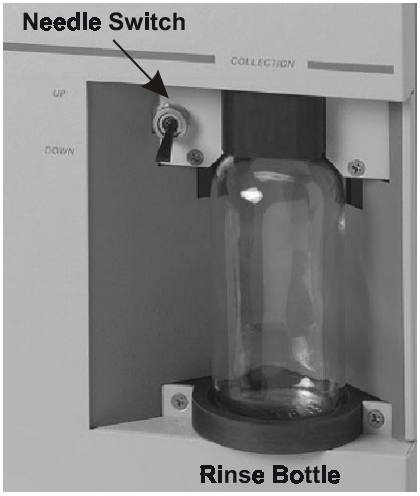


Figure B-7. Installing the Rinse Bottle

7. When the rinse cycle is complete (after about 1 minute), three beeps are emitted and the **RINSE** button LED turns off. Remove the rinse bottle from the system.

   If you need to start the next extraction right away, put on the thermal gloves (P/N 060372) supplied in the ASE 100 Ship Kit (P/N 059397), remove the cell from the cell holder, and place it on the cell rack (P/N 059927) to cool.

   If you are not starting another extraction right away, open the cell door and let the cell cool in the cell holder for at least 15 minutes. Afterward, put on the thermal gloves, remove the cell from the cell holder, and place it on the cell rack. Close the cell door until the next extraction, to save energy and prevent anybody from accidentally touching the inside of the door while it is hot.

B.2.7 Adjusting the Cell Holder

When the ASE 100 is shipped from the factory, the cell holder is positioned to hold a 100 mL extraction cell (or a long rinse cell). To accommodate a cell of any other size, move the lower latch of the cell holder to the appropriate mounting site on the cell door (see Figure B-9).

CAUTION

If the ASE 100 has recently finished an extraction, the inside of the cell door may be hot. Put on thermal gloves (P/N 060372) before adjusting the cell holder, or wait until the system cools down.

1. Push the **OPEN** lever down and open the cell door.
2. Use a 3 mm hex-screw driver (P/N 060154) to remove the two hex screws (P/N 046253) securing the lower latch to the cell door.

   NOTE The ASE 100 Ship Kit (P/N 059397) includes two extra hex screws, in case the original screws are misplaced.

3. When the latch is correctly installed, the small tab is on the underside of the latch (see Figure B-8).

Figure B-8. Correct Orientation of the Lower Latch

4. Position the latch in the new location on the cell door and install the hex screws.

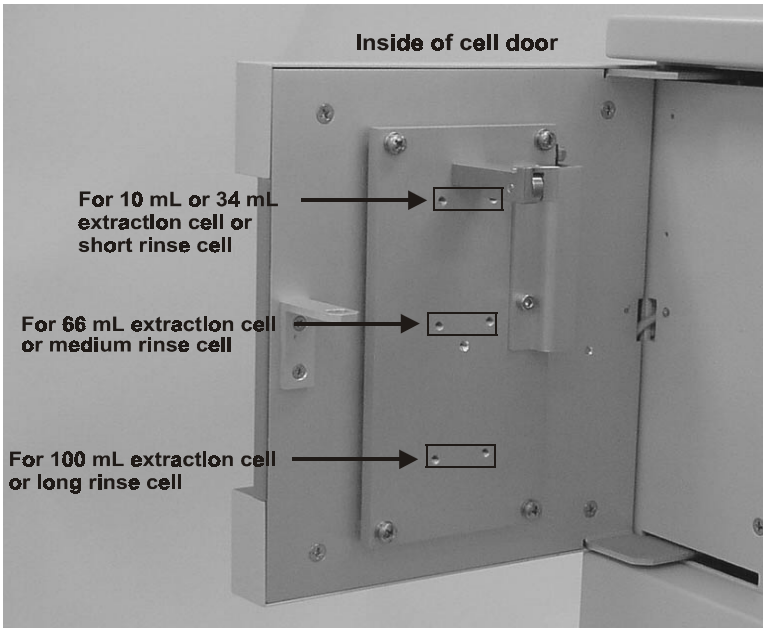


Figure B-9. Mounting Sites for the Cell Holder Lower Latch

B.2.8 Inspecting the Cell

O-rings are installed in the exterior ends of each extraction cell end cap, as well as in the ends of the rinse cell. Before each run, inspect the O-rings (see Figure B-10).

- If an O-ring is *dislodged*: Press it into place, using the O-ring insertion tool (P/N 049660).
- If an O-ring is *missing*: Place a new O-ring over the opening in the end of the cell cap or rinse cell and press the O-ring into place (see Figure B-11), using the O-ring insertion tool (P/N 049660).

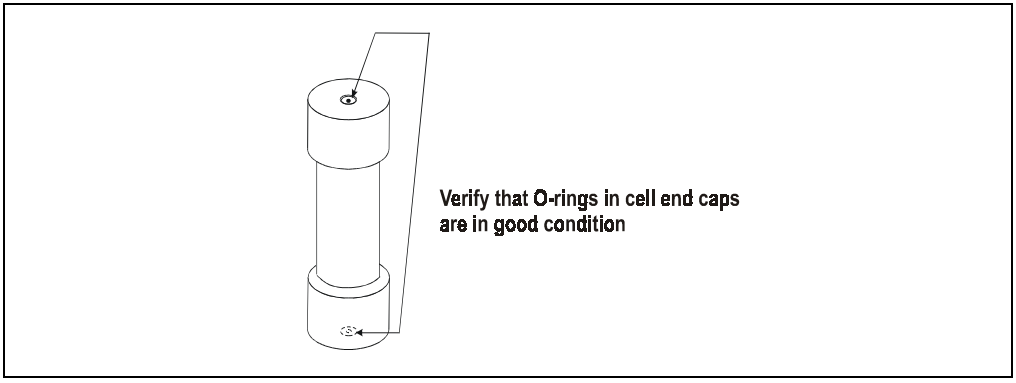


Figure B-10. Inspecting Cell O-Rings

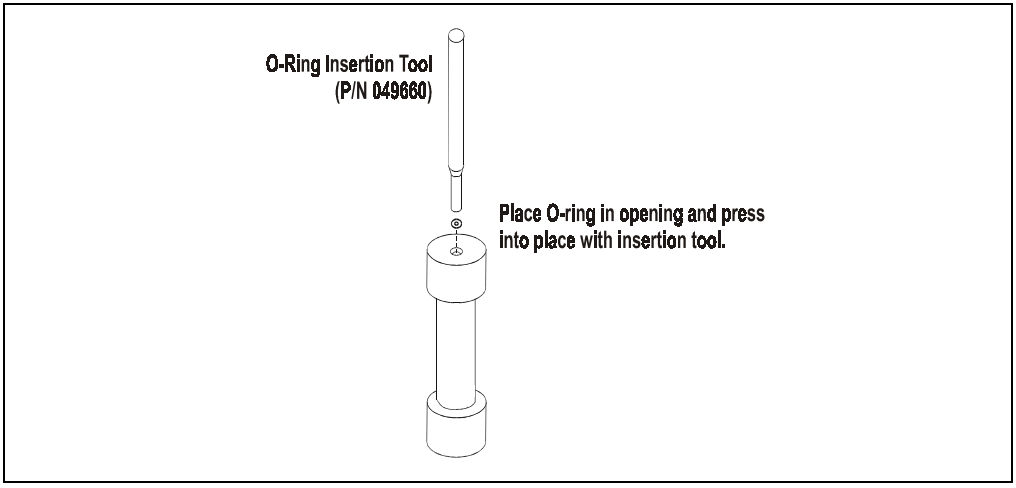


Figure B-11. Installing Cell O-Rings

B.2.9 Completing the Installation

On the **MAIN** screen, press an arrow button to move the cursor to the **SETUP** option, and then press **Enter** to display the **SETUP** screen (see Figure B-12).

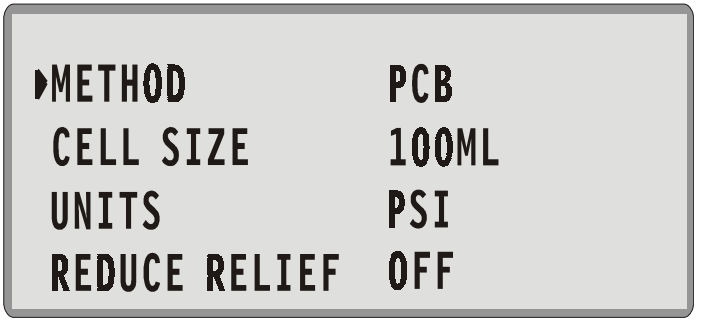


Figure B-12. Setup Screen (Initial view)

Use the **SETUP** screen to specify the default settings for various ASE 100 parameters. These include the unit of measure for on-screen pressure displays, for how long the relief valve is open, the duration of the preheat period, and whether a beep is emitted when a front panel keypad button is pushed. Press **Enter** after each change to save the new setting.

For more information about parameters on the **SETUP** screen, see Section C.1.3.

C • User Interface

This appendix describes all of the screens that can be displayed on the ASE 100 front panel (see Figure C-1). There are two functional categories for screens: operational and diagnostic.

- *Operational* screens let you select certain default parameters for the ASE 100, run the methods that control an extraction, and create and edit custom methods.
- *Diagnostic* screens let you monitor input from sensors, monitor pressure settings, adjust the solvent vapor threshold, check the usage of certain parts, and check which version of ASE 100 Moduleware is installed.

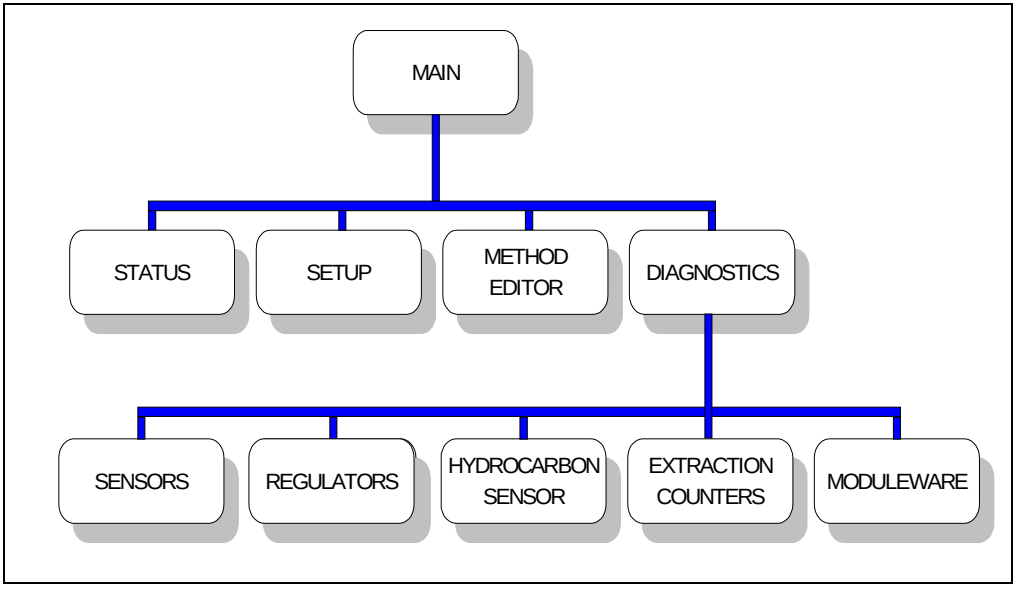


Figure C-1. Overview of ASE 100 Screens

C.1 Operational Screens

C.1.1 Main Screen

The **MAIN** screen is a "menu" that provides top-level access to the most frequently used ASE 100 screens. To display the **MAIN** screen, press the **MENU** button on the front panel.

Figure C-2. Main Screen

To display a screen listed on the **MAIN** screen:

1. Press an up or down arrow button to move the cursor to the screen name.
2. Press the **ENTER** button.

C.1.2 Status Screen

Use the **STATUS** screen to monitor the progress of a method run. The screen is updated three times per second. You cannot edit any information on this screen.

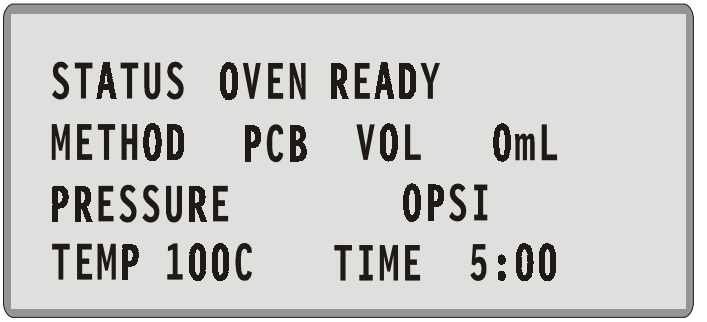


Figure C-3. Status Screen

Parameter	Description
STATUS	The method step in progress, if any, or the current system status. If the latter is indicated, the **STATUS** field will display one of the following descriptions: Initialize, Idle, Load, Fill, Preheat, Heat, Oven Wait, Oven Ready, Static, Flush, Purge, Relief, Unload, Rinse, or Abort. If the status is Static or Flush, the cycle number is indicated.
METHOD	The name or number of the current method.
VOL	The approximate volume (in mL) of solvent delivered by the pump since the method started.
PRESSURE	The current pressure reading. Select the unit of measure on the **SETUP** screen (see Section C.1.3).
TEMP	The oven temperature specified in the method.
TIME	Elapsed time (in minutes and seconds) since the method started running.

C.1.3 Setup Screen

Use the **SETUP** screen to specify which method to run, the extraction cell size, and certain ASE 100 default parameters.

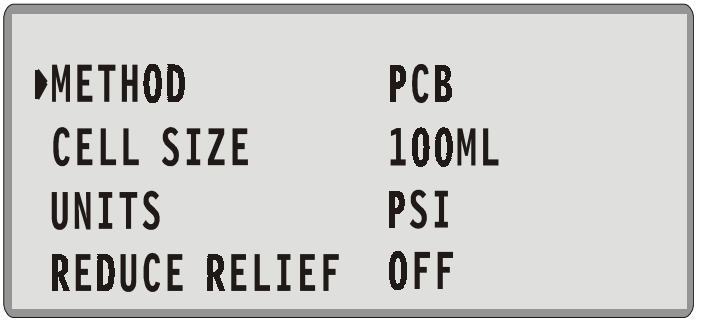


Figure C-4. Setup Screen (Initial view)

Parameter	Description
METHOD	Specifies the name or number of the method to run.
CELL SIZE	Specifies which extraction cell is installed (10 mL, 34 mL, 66 mL, or 100 mL).
UNITS	Selects the unit of measure for pressure displays (psi, MPa, bar, or atm).
REDUCE RELIEF	Determines whether the relief valve is open for a reduced period (**ON**) or the normal period (**OFF**). When the relief valve is open, residual pressure is released from the extraction cell.

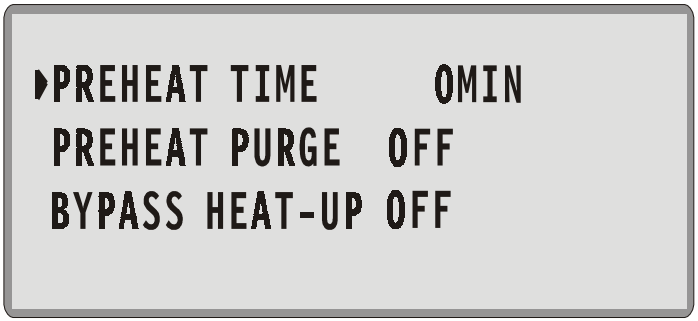


Figure C-5. Setup Screen (Second view)

Parameter	Description
PREHEAT TIME	Specifies for how long the oven heats up without solvent (0 to 99 minutes).
PREHEAT PURGE	Enables and disables purging of the cell (without solvent) during the preheat period.
BYPASS HEAT-UP	Specifies whether to bypass the heat-up period for the extraction cell.

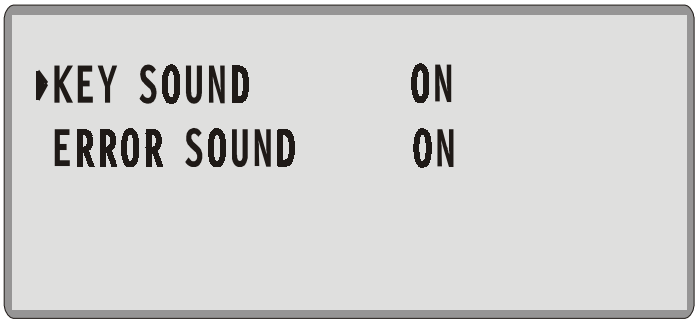


Figure C-6. Setup Screen (Third view)

Parameter	Description
KEY SOUND	Determines whether a beep is emitted when a keypad button is pushed.
ERROR SOUND	Determines whether a beep is emitted when an error occurs (for example, you press the wrong keypad button).

C.1.4 Method Editor Screen

Use the **METHOD EDITOR** screen to define the parameters in a custom method.

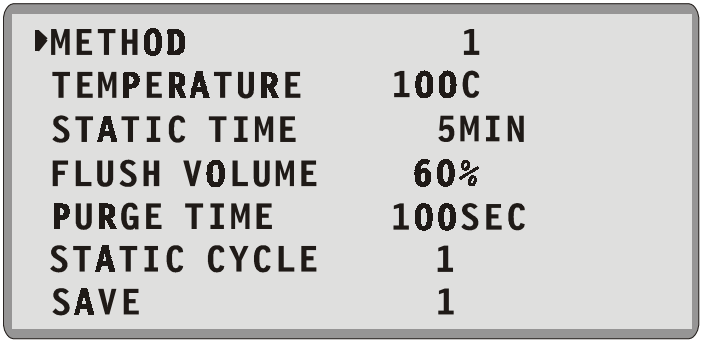


Figure C-7. Method Editor Screen (Additional text shown)

Parameter	Description
METHOD	Number of the method currently selected for editing.
TEMPERATURE	Temperature at which the extraction cell is heated (Off, 40 to 200 °C).
STATIC TIME	Static solvent extraction time (0 to 99 minutes).
FLUSH VOLUME	Amount of solvent flushed through the cell after the static heating step, expressed as a percentage of the cell volume (0 to 150%). For example, if the **FLUSH VOLUME** is 50%, 5 mL of solvent is flushed through a 10 mL cell, 17 mL of solvent is flushed through a 34 mL cell, and so on.
PURGE TIME	Amount of time the cell is purged with nitrogen (0 to 900 seconds). Dionex recommends the following settings: 40 to 80 seconds for a 10 mL cell, 70 to 110 seconds for a 34 mL cell, 160 to 200 seconds for a 66 mL cell, and 250 to 290 seconds for a 100 mL cell.
STATIC CYLE	Number of times the static heating and flushing steps are performed (1 to 5). If more than one cycle is specified, the flush volume is divided among the cycles.

Parameter	Description
SAVE	Method number that the selected parameters will be saved to (1 through 24).

C.2 Diagnostic Screens

C.2.1 Diagnostics Screen

The **DIAGNOSTICS** screen is a "menu" that provides top-level access to ASE 100 screens with diagnostic functions (see Figure C-8).

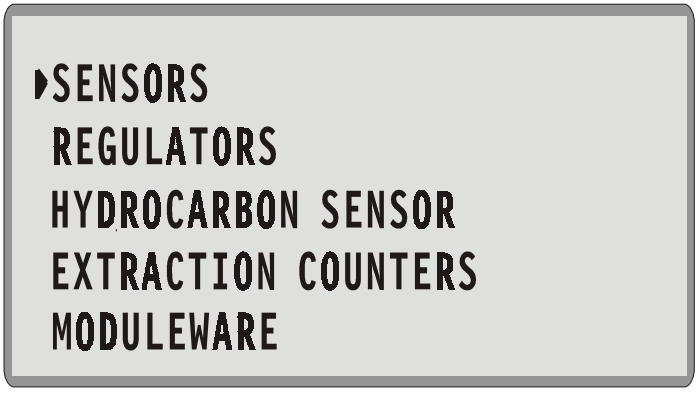


Figure C-8. Diagnostics Screen (Additional text shown)

To display the **DIAGNOSTICS** screen:

1. Press the **MENU** button to display the **MAIN** screen (see Section C.1.1).
2. Press an up or down arrow button to move the cursor to the **DIAGNOSTICS** option, and then press the **ENTER** button.

To display a screen option on the **DIAGNOSTICS** screen:

1. Press an up or down arrow button to move the cursor to the screen name.
2. Press the **ENTER** button.

C.2.2 Sensors Screen

Use the **SENSORS** screen to monitor information reported by various internal sensors. You cannot edit any information on this screen.

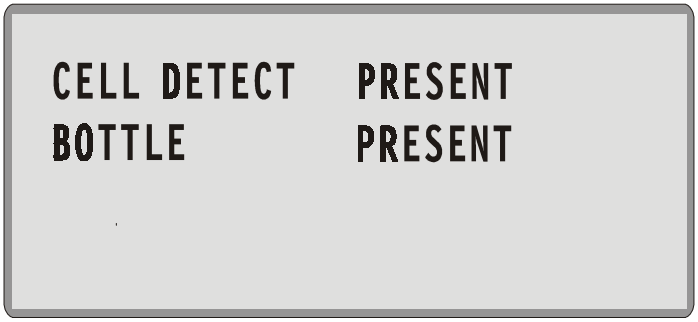


Figure C-9. Sensors Screen

Parameter	Description
CELL DETECT	When the cell door is closed, the sensor can detect whether a cell is installed in the cell holder. The sensor cannot identify which type of cell is installed.
BOTTLE	When the needles are in the "down" position, the sensor can detect whether a collection bottle is present in the bottle holder.

C.2.3 Regulators Screen

Use the **REGULATORS** screen to monitor various pressure readings for the ASE 100. You cannot edit any information on this screen.

NOTE Select the unit of measure for on-screen pressure readings on the SETUP screen (see Section C.1.3).

Figure C-10. Regulators Screen

Parameter	Description
SYSTEM	Indicates the pressure from the nitrogen gas source.
COMPRESSION	Indicates the nitrogen gas pressure applied to the oven compression system. During an extraction, the oven is compressed and the reading is approximately 1.03 MPa (130 psi). When the oven is not compressed, this reading is zero.
BOTTLE	Indicates the pressure applied to the solvent bottle.
AUTOSEAL	Indicates the pressure applied to the AutoSeal air cylinder. When the air cylinder is actuated, the reading is 0.10 ± 0.01 MPa (15 ± 2 psi). When the air cylinder is not actuated, this reading is zero.

C.2.4 Hydrocarbon Sensor Screen

Use the **HYDROCARBON SENSOR** screen to monitor the hydrocarbon level at the ASE 100 installation site and to adjust the solvent vapor threshold, if necessary.

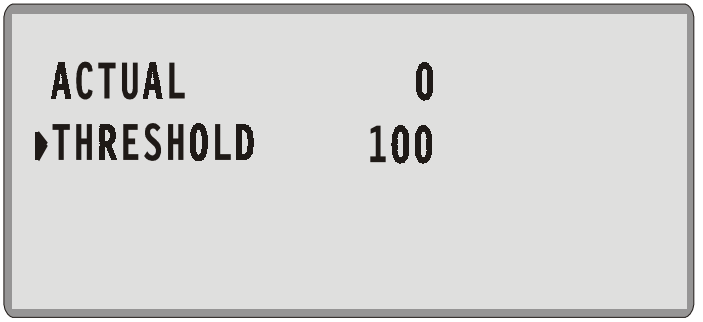


Figure C-11. Hydrocarbon Sensor Screen

Parameter	Description
ACTUAL	Indicates the hydrocarbon level detected by the hydrocarbon sensor.
THRESHOLD	Selects the solvent vapor threshold (10 to 10000). If necessary, adjust the threshold to compensate for high background levels at the installation site.

C.2.5 Extraction Counters Screen

Use the **EXTRACTION COUNTERS** screen to check the number of extractions the system has run or the number of pump strokes performed. This can be helpful in scheduling the routine replacement of certain parts.

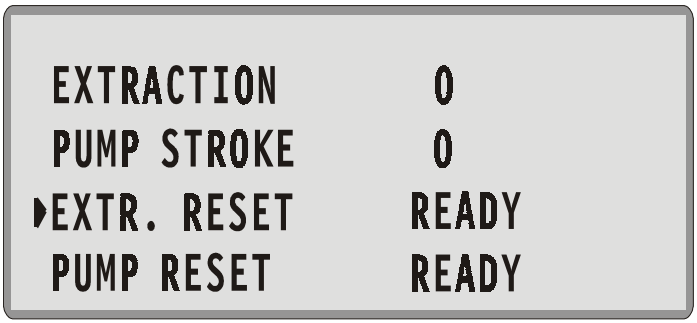


Figure C-12. Extraction Counters Screen

Parameter	Description
EXTRACTION	Indicates the number of extractions performed since the ASE 100 was installed or the extraction counter was last reset.
PUMP STROKE	Indicates the number of pump strokes performed since the ASE 100 was installed or the pump stroke counter was last reset.
EXTR. RESET	Select **RESET** to reset the extraction counter to zero.
PUMP RESET	Select **RESET** to reset the pump stroke counter to zero.

C.2.6 Moduleware Screen

The **MODULEWARE** screen indicates which version of ASE 100 Moduleware is currently installed. The **MODULEWARE** screen is also displayed for a few seconds when the ASE 100 power is turned on.

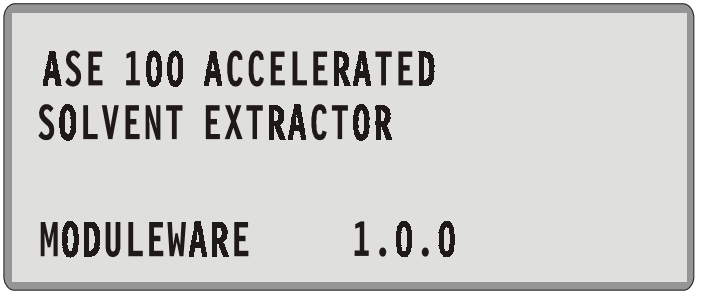


Figure C-13. Moduleware Screen

D • Reordering Information

Part Number	Item	Quantity
060074	Extraction cell, 10 mL	Pkg. 6
060075	Extraction cell, 34 mL	Pkg. 6
060076	Extraction cell, 66 mL	Pkg. 6
060077	Extraction cell, 100 mL	Pkg. 6
060070	Extraction cell, 10 mL	1
060071	Extraction cell, 34 mL	1
060072	Extraction cell, 66 mL	1
060073	Extraction cell, 100 mL	1
059793	Extraction cell body, 10 mL	1
056646	Extraction cell body, 34 mL	1
056696	Extraction cell body, 66 mL	1
056693	Extraction cell body, 100 mL	1
060152	Extraction cell end cap (includes frit and seal)	Pkg. 2
056775	Stainless steel frit for extraction cell end cap	Pkg. 50
056776	PEEK seal for extraction cell end cap	Pkg. 50
056777	PEEK seal for extraction cell end cap	Pkg. 10
049457	Teflon O-ring for outside of extraction cell end cap	Pkg. 50
056325	Viton O-ring for outside of extraction cell end cap	Pkg. 50
056778	Snap ring for extraction cell end cap	Pkg. 10
056684	Snap ring tool	1
049660	O-ring insertion tool	1
056780	Cellulose filter, 30 mm	Pkg. 100
056781	Glass-fiber filter, 30 mm	Pkg. 100

Part Number	Item	Quantity
056929	Filter insertion tool	1
056699	Aluminum funnel	1
059927	Cell cooling rack	1
060372	Thermal gloves	1 pair
060174	Rinse cell, short	1
060175	Rinse cell, medium	1
060176	Rinse cell, long	1
045900	Solvent bottle, plastic-coated glass, 1 liter	1
045901	Solvent bottle, plastic-coated glass, 2 liters	1
051977	Solvent bottle cap assembly	1
056284	Collection bottle (clear), 250 mL	Pkg. 12
049463	Collection bottle lid	Pkg. 72
049464	Collection bottle septum	Pkg. 72
059923	Source needle assembly	1
056641	AutoSeal tip, lower	1
059821	Solvent line, outlet	1
954766	Fast-blow IEC127 fuse, 8 amps	1

Index

D

E

N

O

P

R

S

T

U

V

W