



**AutoSelect™
AS50 Autosampler
Operator's Manual**

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1 • Introduction

The Dionex Autoselect™ AS50 Autosampler precisely delivers from 1.0 to 99.9 μL (in 0.1 μL increments) or 100 to 1000 μL (in 1 μL increments) of sample to an injection valve.

Two types of trays are available for sample vials: one for 2 mL vials and one for 10 mL vials. During sampling, the tray remains stationary and a sampling needle arm moves from vial to vial. Up to 99 injections can be taken from each vial.

The AS50 can be controlled locally, from the front panel keypad and display, or remotely, with a personal computer running Chromeleon® software installed. Limited remote control is also available, using TTL and relay signals.

For communication between the AS50 and Chromeleon, the AS50 is connected to a Dionex DX-LAN™ interface card.

The AS50 can be configured with PEEK flow paths and components for ion chromatography (IC) applications, or with stainless steel flow paths and components for high-performance liquid chromatography applications (HPLC).

1.1 About This Manual

Chapter 1 Introduction	Introduces the AS50; explains the conventions used in this manual, including safety-related information.
Chapter 2 Features Overview	Describes the AS50 operating features and system components; provides the theory of operation.
Chapter 3 Operation and Maintenance	Provides operating instructions using the AS50 front panel buttons and screens and describes routine preventive maintenance procedures.
Chapter 4 Troubleshooting	Lists problems and presents step-by-step procedures for how to isolate and eliminate the cause of each problem.
Chapter 5 Service	Provides step-by-step instructions for routine service and parts replacement procedures that the user can perform.
Appendix A Specifications	Lists the AS50 specifications and installation site requirements.
Appendix B Installation	Describes how to install the AS50.
Chapter C Display Screens	Describes the front panel operational and diagnostic display screens.
Appendix D TTL and Relay Control	Describes the AS50 TTL and relay control features.
Appendix E Unpacking Instructions	Provides step-by-step instructions for removing the AS50 from its shipping box and packing materials.

1.1.1 Safety Messages and Notes

This manual contains warnings and precautionary statements that can prevent personal injury and/or damage to the AS50 when properly followed. Safety messages appear in bold type and are accompanied by icons, as shown below.



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, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Also used to identify a situation or practice that may seriously damage the instrument, but will not cause 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.

Notes

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 you to an unexpected result of an action, suggest how to optimize instrument performance, etc.

1.1.2 Safety Labels

The AS50 meets European, EMC, and safety requirements per Council Directives 73/23/EEC and 89/336/EEC, EN 61010-1:1993 (safety), EN 50082-1:1992 (susceptibility), and EN 55011:1991 (emissions). The TUV/CE and GS safety label on the AS50 attests to compliance with these standards.

The symbols below appear on the AS50 or on AS50 labels.



Alternating current



Protective conductor terminal (earth ground)



Power supply is on



Power supply is off

2.1 Overview of Features

[Figure 2-1](#) illustrates the main features of the AS50 Autosampler.

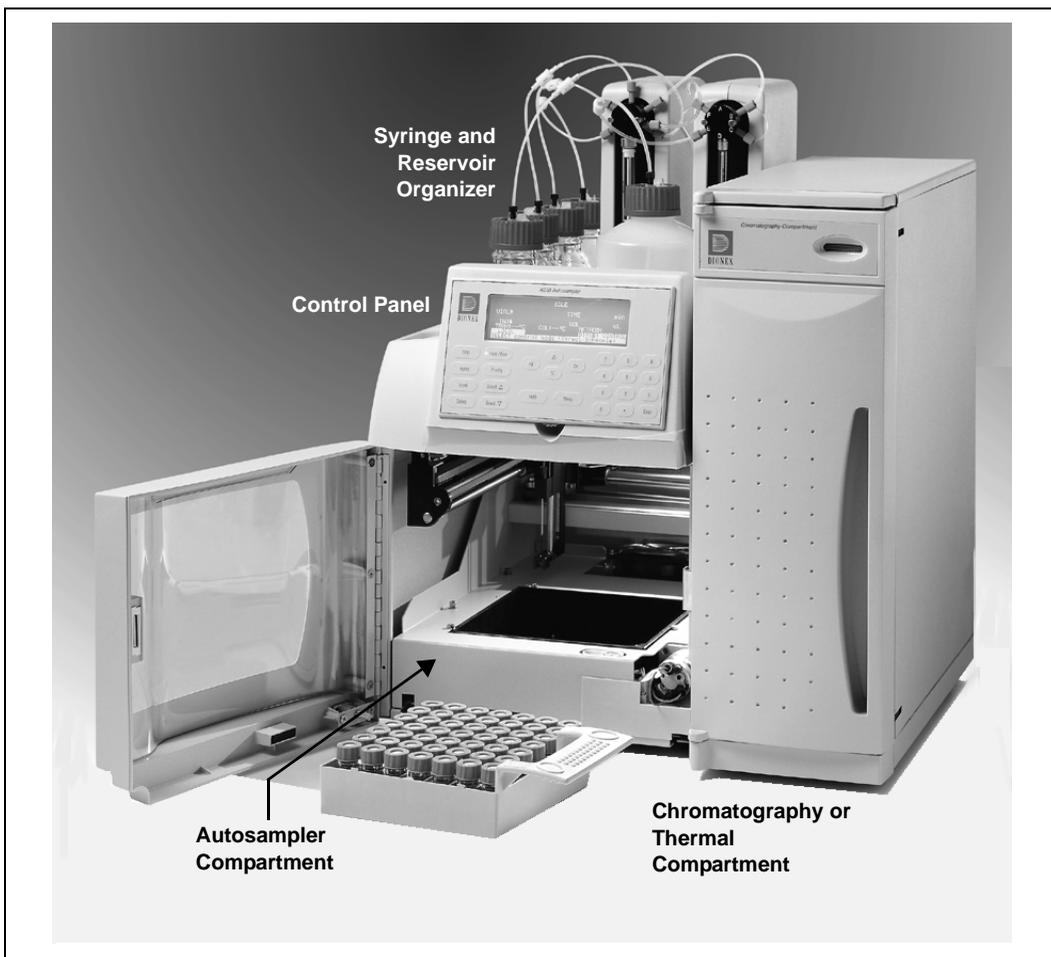


Figure 2-1. AS50 Operating Features

Control Panel

The control panel contains a liquid crystal display (LCD) and membrane keypad (see [Section 2.2](#)). The control panel permits manual control of all AS50 functions.

Autosampler Compartment

The autosampler compartment contains a stationary sample vial tray and a sampling needle arm that moves from vial to vial during operation (see [Section 2.3](#)).

Sample Temperature Control Option (Not Pictured)

The optional sample temperature control unit mounts under the autosampler and provides uniform heating and cooling of the vial tray. See [Section 2.3.2](#) for details.

Syringe and Reservoir Organizer

The organizer on top of the autosampler holds the sample syringe, the flush liquid reservoir, the optional prep syringe, and the optional reagent reservoir(s). See [Section 2.4](#) for details.

Chromatography Compartment Option

The optional chromatography compartment houses the components required for a single- or dual-column chromatography system. The components, such as the analytical column(s), cell(s), and suppressor(s), must be ordered separately from the AS50. See [Section 2.6](#) for details.

Thermal Compartment Option

A version of the chromatography compartment is available that provides heating and cooling of the chromatography components. See [Section 2.6.2](#) for details.

Injection Valve

When the AS50 is configured without a chromatography or thermal compartment, the injection valve is installed in the autosampler compartment. When the AS50 is configured with one of the compartments, the injection valve is installed in the compartment. See [Section 2.5](#) for details.

2.2 Control Panel Features

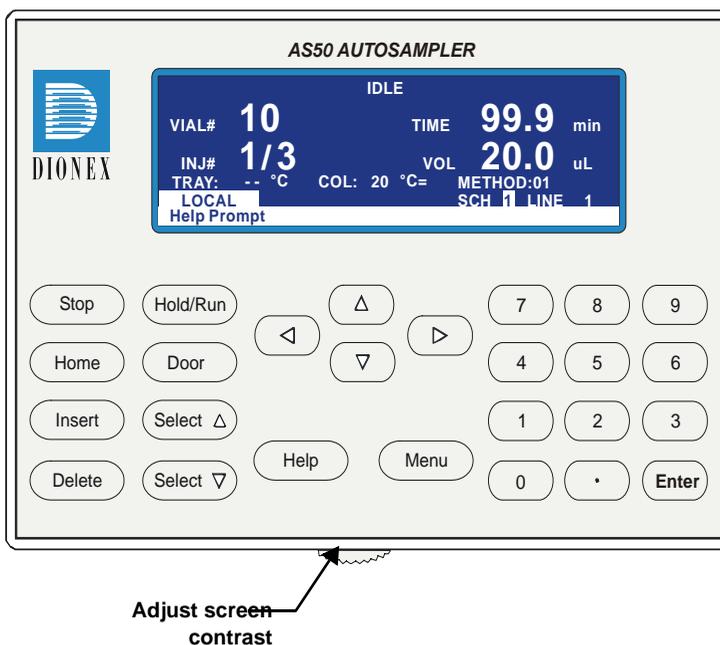


Figure 2-2. AS50 Control Panel

Information is displayed on the LCD, or *screen*. To adjust the screen contrast, use the knurled knob in the recess below the keypad (see [Figure 2-2](#)).

From the keypad, you can:

- Directly control AutoSelect AS50 Autosampler operation
- Create and modify programmed series of operating steps, called *methods*
- Create and modify programmed series of injections, called *schedules*

Refer to [Section 2.2.2](#) for a summary of how to select screens and edit parameters.

2.2.1 Keypad Button Functions

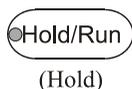
Button	Function
--------	----------

The following buttons directly control AS50 operation:

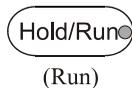


Stop performs the following functions:

- Stops a *schedule* (a programmed series of injections), if one is running. If the autosampler is in Remote mode (under computer control), it immediately switches to Local mode (front panel control). This prevents the computer from starting another operation. A confirmation message appears; press **Stop** again to abort the schedule.
- Stops the current action when the autosampler is performing a flush, prime, or direct control operation.



Starts (Run) or pauses (Hold) a schedule. When on Hold, the left LED is illuminated. When running, the right LED is illuminated. This button functions only when the AS50 is in Local mode.



At power-up, the AS50 is on Hold. After you select a schedule to run, pressing Hold/Run starts the schedule. When complete, the AS50 returns to Hold.



Sends the needle arm to its home position. This button functions only when the AS50 is in Local mode and not running a schedule. If you press **Home** when a schedule is on hold, and then resume the schedule, the needle arm returns to where it was when you pressed **Home**.

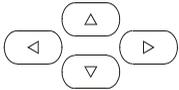


When the **Door** button is pressed, a message screen indicates whether it is currently safe to open the door. If it is, a timer counts down the remaining time in which it is safe to open the door. Opening the door without first pressing this button, or when the message indicates it is not safe, aborts the currently running schedule.

The following buttons control screen functions:



Inserts a new step into a method or schedule. Move the cursor to the leftmost field on the **SAMPLE PREP, TIMED EVENTS,** or **SCHEDULE** screen and press **Insert**. The new step is added above the cursor position.

Button	Function
	<p>Delete performs several functions:</p> <ul style="list-style-type: none"> • Cancels an entry that is in progress and restores the previous value. • Returns a field to its default value (if an entry is not in progress). • Deletes a line in a method or schedule. To do this, position the cursor in the leftmost field of the line that you want to delete and press Delete twice. • Deletes an entire method or schedule. To do this, position the cursor in the method or schedule edit field, or in the time field of the INIT step, and press Delete twice.
	<p>The Select buttons cycle through predetermined options in entry fields. To confirm the selected value, press Enter or move out of the field by pressing a cursor arrow button. In fields that have predetermined numeric choices, Select Δ increases the value by one unit and Select ∇ decreases the value by one. Holding down a Select button increases (or decreases) the value continuously.</p>
	
	<p>The arrow buttons move the cursor in the direction of the arrow to the next entry field (if one exists). At the end of a line, the left arrow wraps the cursor around to the next entry field on the line above; the right arrow wraps the cursor to the next entry field on the line below. The up and down arrows do not wrap around.</p> <p>After entering a new value in an entry field, pressing an arrow button saves and/or executes the change.</p>
	Displays a help screen specific to the current entry field.
	Displays a list of the available screens.
	The numeric buttons enter the selected number into the current entry field. From a menu, pressing a numeric button opens the corresponding screen.
	Saves and/or executes changes made in entry fields. If a menu screen is displayed, pressing Enter opens the highlighted screen.

2.2.2 Display Screens

The LCD displays status information and allows access to all AS50 operations.

When the power is turned on, the AS50 performs an initialization sequence (see [Section 3.1.2](#)) and then displays the **MAIN STATUS** screen. [Figure 2-3](#) is an example of the **MAIN STATUS** screen during AS50 operation.

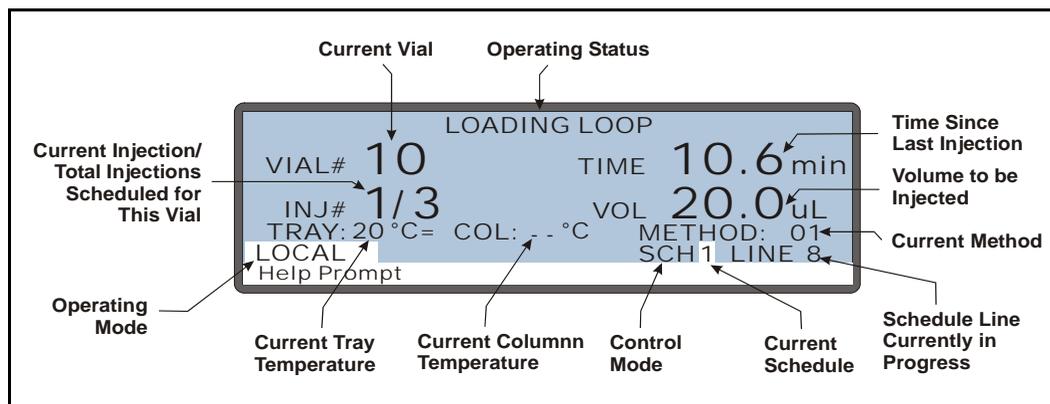


Figure 2-3. Main Status Screen

NOTE TRAY temperature is displayed only when the sample temperature control option is installed. COL temperature is displayed only when the thermal compartment is installed.

To access other AS50 screens:

Press the **Menu** button. The **MENU of SCREENS** appears (see [Figure 2-4](#)).

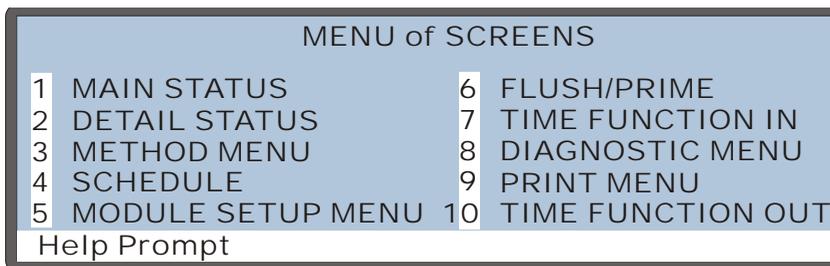


Figure 2-4. Menu of Screens

To select a screen from the menu:

- Press the keypad number button corresponding to the screen's number on the menu, or
- Move the cursor to highlight the screen number and press **Enter**.

To display a brief description of each screen:

Press the **Help** button. See Appendix C for details about each screen.

To edit a field on the screen:

1. Press a cursor arrow button to position the cursor in the field to be edited. Fields on the screen that are in reverse video (blue letters on white background) can be edited. Other fields display information only.
2. If the field accepts numerical values, press the desired numerical buttons to enter the value.

If the field has predetermined options, press the **Select** Δ or **Select** ∇ button to choose the desired option.

3. To confirm the selected value, press **Enter** or move the cursor out of the field by pressing an arrow button.

2.3 Autosampler Compartment

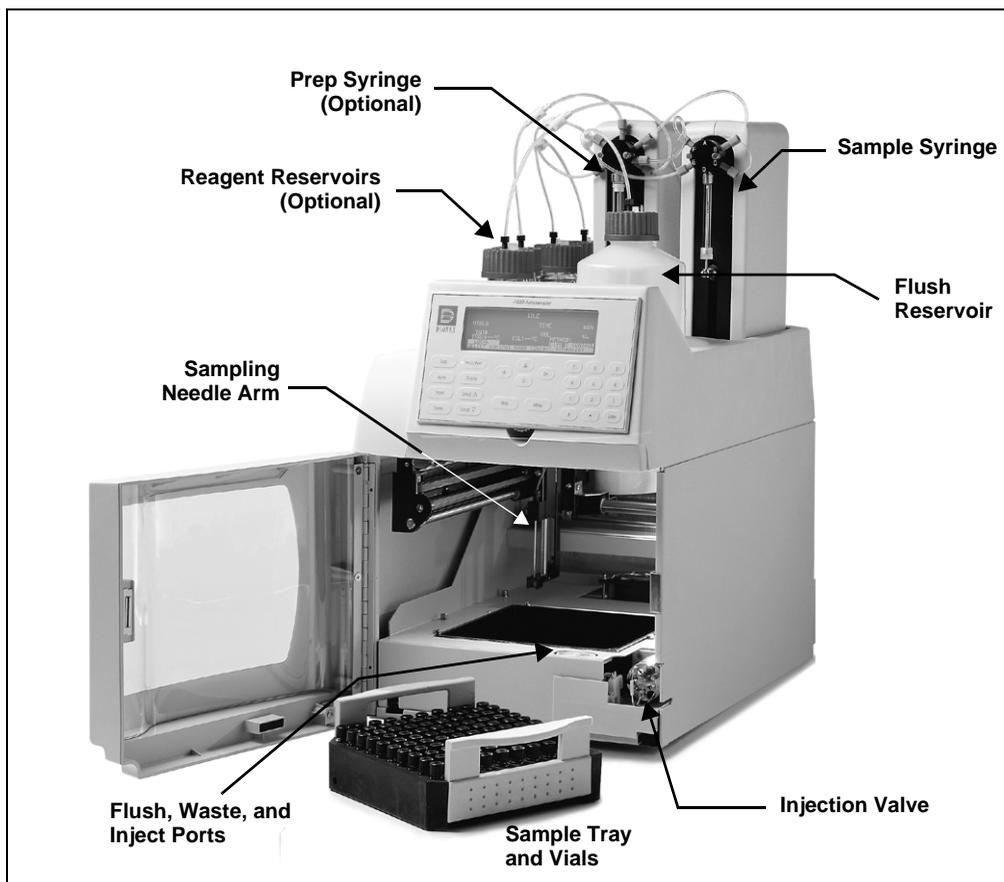


Figure 2-5. Autosampler Compartment Features

Feature	Function
Sampling Needle Arm	Moves the sampling needle (see Figure 2-5).
Sampling Needle	Pierces the top of the sample vial to allow fluid to be drawn or delivered. Delivers the sample to the inject port; delivers flush fluid to the flush port (see Figure 2-6).
Flush Port	Flushes the outside of the sampling needle with fluid from the flush reservoir. Excess fluid flows to the waste port.
Waste Port	Accepts waste fluid from the sampling needle and the flush port; directs it out the drain line.
Inject Port	Accepts the sample to be injected and delivers it to the injection valve.

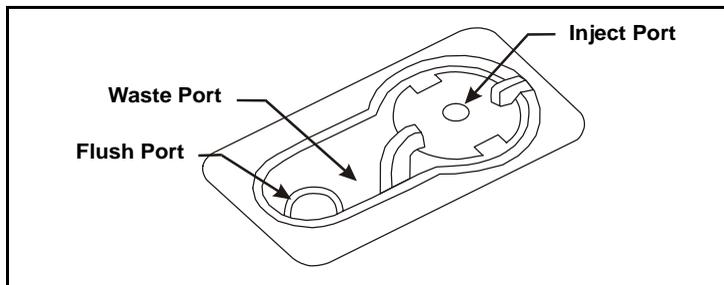


Figure 2-6. Flush, Waste, and Inject Ports

2.3.1 Sampling Needle Arm

IMPORTANT

The autosampler door must remain closed during operation. If the door is opened during operation, the sampling arm stops immediately. If a schedule is running, it is aborted. To safely open the door during a schedule, see [Section 3.8](#).

During operation, the sampling needle arm moves along X-, Y-, and Z-axes. To sample from a vial, the arm moves to the vial's position in the tray and lowers the needle into the vial. When sampling is complete, the arm raises the needle out of the vial. The vial tray is stationary throughout the sampling process. When running a schedule of injections, vials can be sampled in any order.

The needle height (the distance from the tip of the needle to the bottom of the vial) can be adjusted, allowing operations such as liquid-liquid extraction.

2.3.2 Sample Temperature Control Option

The optional sample temperature control unit provides heating and cooling of the sample vial tray. You can program the temperature set point to between 4 °C and 60 °C. Vials in the tray are uniformly heated or cooled to the programmed set point (to a minimum of 20 °C below ambient and a maximum of 40 °C above ambient).

The temperature control unit sits on the workbench with the autosampler compartment above it (see [Figure 2-7](#)).

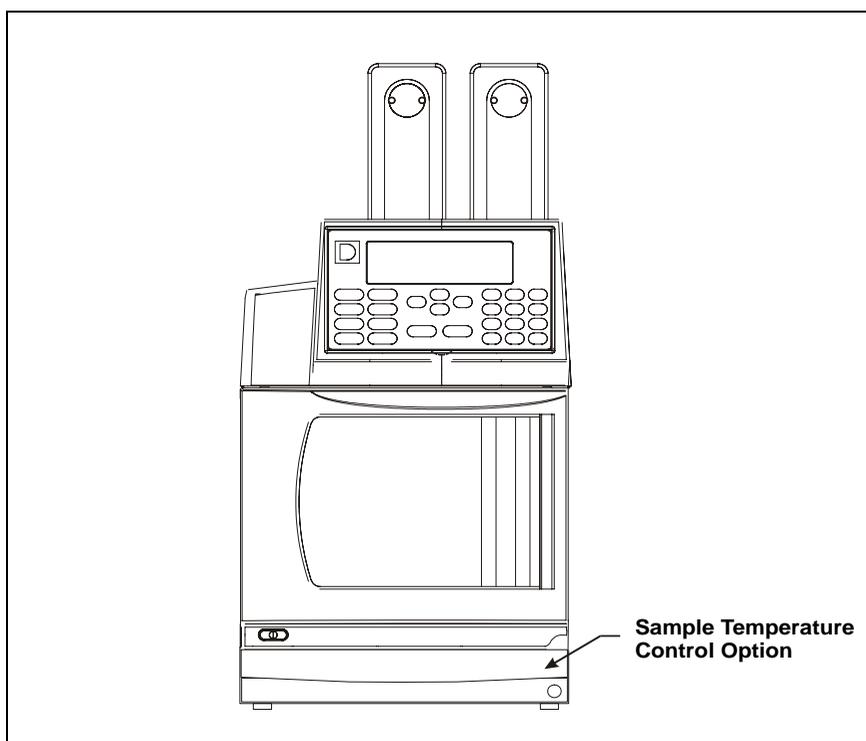


Figure 2-7. AS50 with Sample Temperature Control

2.3.3 Sample Vials and Trays

Vials

The following vials are available:

- 0.3 mL polymer (P/N 055428, package of 100)
- 1.5 mL glass (P/N 055427, package of 100)
- 10 mL PolyVial™ (P/N 055058, package of 100)

Vial Trays

Two tray types are available:

Vial Size Held	Tray Capacity	Tray Material	Part Number
0.3 mL, 1.5 mL	100	Aluminum	055057
10 mL	49	Plastic	055056

The AS50 automatically detects the type of tray installed.

IMPORTANT

Dionex does not recommend using the 10 mL plastic tray with the sample temperature control option because the plastic tray is inefficient at heating and cooling the vials. In addition, the tray is not designed for temperatures above 40 °C and may deform over time if used above 40 °C.

2.4 Syringe and Reservoir Organizer

The organizer on the top of the autosampler holds the sample syringe, 1 L flush reservoir, and sample preparation option (prep syringe and reagent reservoirs) (see [Figure 2-5](#)).

2.4.1 Sample Syringe Functions

The sample syringe performs these operations:

- Pipettes liquid from one vial to another or to waste
- Mixes a vial by repeatedly drawing and expelling the vial contents. If the AS50 is equipped with the sample preparation option (see [Section 2.4.2](#)), mixing is done with the sample prep syringe instead of the sample syringe.
- Delivers sample to the injection valve

Several sample syringe volumes are available:

Syringe Volume	Part Number
100 μL	055064
250 μL (standard)	053916
500 μL	055065
1000 μL	055066

2.4.2 Sample Preparation Option Functions

The AS50 can be equipped with a sample preparation option that includes a sample prep syringe, a sample prep valve, and one 250 mL reagent reservoir. Additional reagent reservoirs are available.

The sample preparation syringe performs these operations:

- Dispenses reagents from external reservoirs to any vial
- Mixes a vial by repeatedly drawing and expelling the vial contents
- Performs dilutions, allowing preparation of multilevel calibration standards
- Performs liquid-liquid extractions by adjusting the height of the needle in the vial

The following sample prep syringe volumes are available:

Syringe Volume	Part Number
2.5 mL	055067
5 mL (standard)	053915
10 mL	055068

The reagent reservoir connects to Port A on the sample prep valve. Additional reservoirs can be connected to ports B, C, and D. Commands from the front panel screens or from Chromeleon let you select between the reservoirs.

2.5 Rheodyne Injection Valve Option

The injection valve can be installed in the autosampler compartment, or it can be installed externally. However, if the chromatography or thermal compartment is installed, the injection valve is always included in these compartments.

The injection valve has two operating positions: Load and Inject. In the Load position, sample is loaded into the sample loop, where it is held until injection. In the Inject position, sample is swept to the column for analysis. Eluent flows through one of two paths, depending on the valve position (see [Figure 2-8](#)):

- In the Load position, eluent flows from the pump, through the valve, and to the column, bypassing the sample loop. Sample flows from the AS50 inject port line, through the valve, and into the sample loop; excess sample flows out to waste.
- In the Inject position, eluent flows from the pump, through the sample loop, and on to the column, carrying the contents of the sample loop with it.

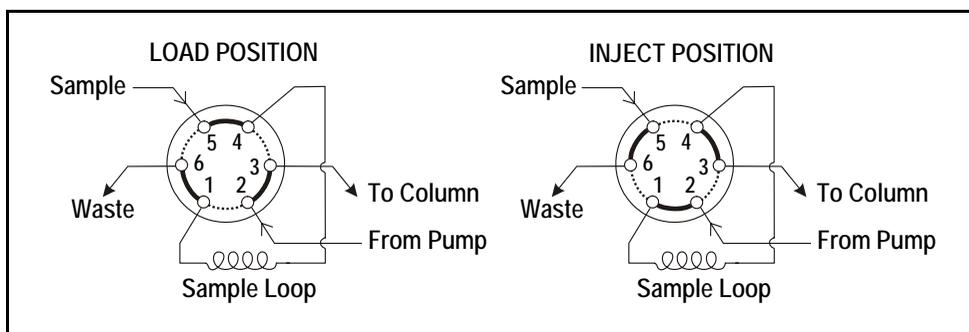


Figure 2-8. Injection Valve Flow Schematics

2.6 Chromatography Compartment Option

The optional chromatography compartment houses the column(s), detector cell(s), and Self-Regenerating Suppressor™(s), required for a single- or dual-column system. These chromatography components must be ordered separately from the AS50, or as part of another module.

The compartment is equipped at the factory with a PEEK or stainless steel automated injection valve.

If heating and cooling of the compartment is required, a thermal compartment version is available. Refer to [Section 2.6.2](#) for details.

2.6.1 Chromatography Components

- *Columns*: One or two analytical columns and one or two guard columns can be installed in the compartment.
- *Detector cells*: Cells for conductivity detection and/or amperometry detection are mounted in the compartment. If preferred, the conductivity cell can be housed in a DS3 Detection Stabilizer (P/N 044130). The DS3 improves baseline stability by heating the cell to a selectable set point above ambient and preventing temperature fluctuations.
- *Self-Regenerating Suppressor(s) (SRS)*: The SRS neutralizes the eluent and enhances analyte conductivity.
- *Column switching valve*: The column switching valve is installed when the chromatography compartment is configured for two sets of columns. The valve controls liquid flow to the selected column set.

Components for a Single-Column System

- Guard column (optional)
- Analytical column
- Suppressor (conductivity detection only)
- Detector cell (conductivity or electrochemical detection only)

Components for a Dual-Column System

- Column switching valve for switching liquid flow between two column sets
- Two guard columns (optional)
- Two analytical columns
- One or two suppressors (conductivity detection only)
- One detector cell

Chromatography Compartment Component Layout

[Figure 2-9](#) illustrates the component layout for a dual-column suppressed conductivity system. See Appendix B for additional layouts and installation instructions.

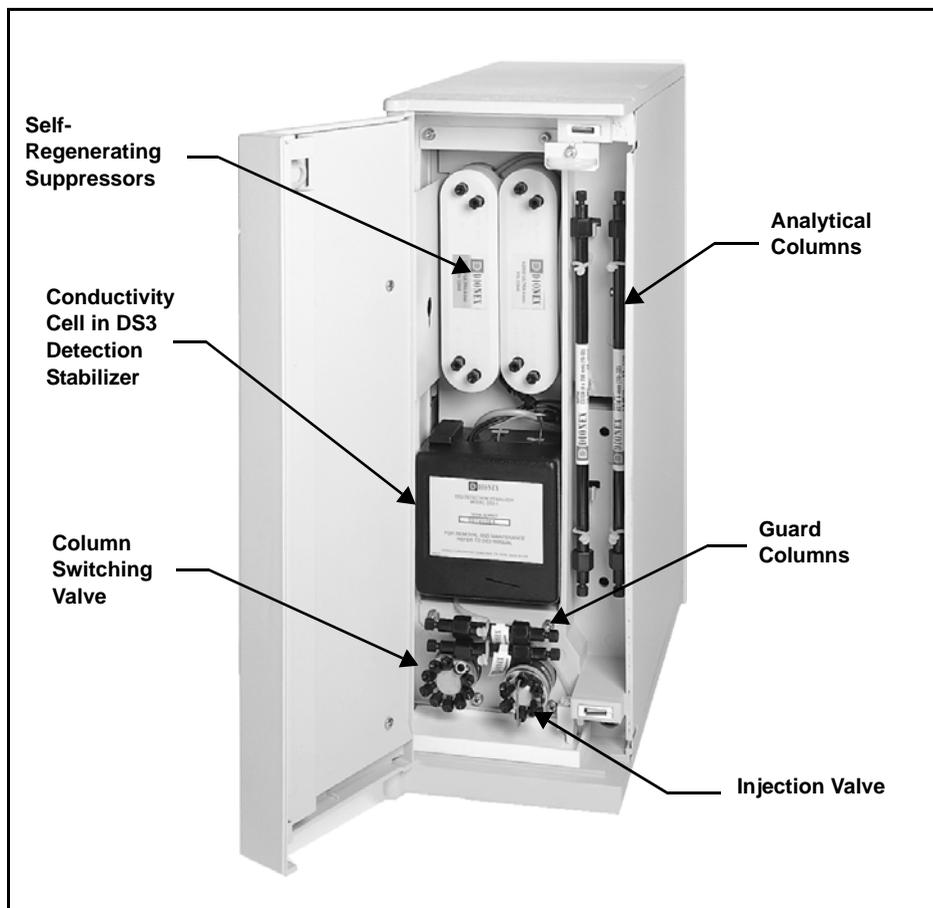


Figure 2-9. Layout for Suppressed Conductivity: Dual-Column

2.6.2 Thermal Compartment Option

A Peltier device controls the compartment temperature to between 10 °C and 40 °C (PEEK systems) or 10 °C and 80 °C (stainless steel systems). The device can cool the compartment to a minimum of 10 °C below ambient and heat it to a maximum of 60 °C above ambient. A heat exchanger equilibrates the sample temperature before it enters the column.



Do not touch any metal parts inside the thermal compartment while it is heating up or after it reaches the set point temperature. Wait for the compartment to cool down before servicing any parts.



Ne touchez à aucune des pièces métalliques à l'intérieur du compartiment thermique pendant qu'il chauffe ou après qu'il ait atteint la température de consigne. Attendez que le compartiment soit refroidi avant de réparer les pièces.



Berühren Sie im Thermal Compartment keine metallischen Teile, während dieses aufgeheizt wird oder nachdem die Solltemperatur erreicht ist. Warten Sie, bis die Kammer abgekühlt ist, ehe Sie Wartungsarbeiten durchführen.

2.6.3 Column Switching Valve Option

The optional column switching valve can be installed in either the chromatography or the thermal compartment. The valve is an electronic 10-port, 2-position valve. The valve position can be switched automatically during a method, or directly from the **DETAIL STATUS** screen (see [Section C.3](#)).

2.7 Rear Panel Features

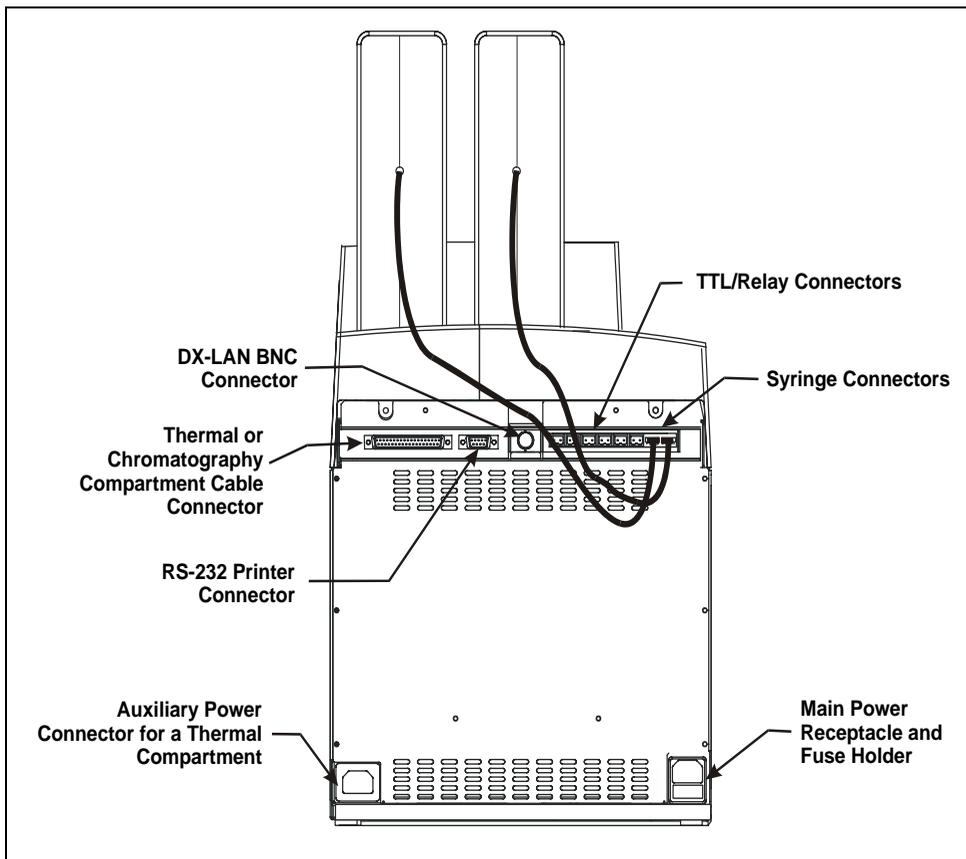


Figure 2-10. AS50 Rear Panel

2.7.1 TTL/Relay Connectors

The eight relay and TTL connectors interface with Dionex and non-Dionex modules. The input connectors allow for relay and TTL control of the autosampler by a connected module(s). The output connectors allow the AS50 to control other module(s). Appendix D describes the relay and TTL functions and the connections between the AS50 and other modules.

2.7.2 RS-232 Connector

Allows a serial printer to be connected to the AS50, for printing of schedules, methods, setup and configuration information, or the message log.

2.7.3 DX-LAN BNC Connector

The DX-LAN BNC connector connects the AS50 to the DX-LAN interface. This enables computer control of the autosampler. See [Section B.3.3](#) for network connection instructions.

2.8 Operating and Control Modes

The operating mode determines *how* the AS50 receives operating commands:

- In Local mode, the AS50 receives commands from the front panel buttons and screens. When the AS50 is powered up, it is always in Local mode. In Local mode, all AS50 operating functions are available.
- In Locked Remote mode, Chromeleon software sends commands from the host computer via the DX-LAN interface. Connecting the AS50 to a Chromeleon Control Panel immediately selects the Locked Remote mode. Disconnecting from Chromeleon returns the AS50 to Local mode.

The control mode determines *when* operating commands are executed.

- In Direct control, the AS50 executes commands immediately.
- In Schedule control, the AS50 executes commands by running a programmed schedule of injections. Schedule control is used in Local mode only.

The table below summarizes the AS50 operating and control mode configurations.

Operating/Control Mode	Autosampler Operation
Locked Remote/Direct Control	Commands are sent from Chromeleon and executed immediately when received.
Local/Direct Control	Commands are entered from the AS50 front panel and executed immediately after being entered.
Local/Schedule Control	Commands are entered from the AS50 front panel and executed by running a schedule programmed from the front panel.

TTL input signals from a remote controller, such as an integrator, can also be used to control the AS50. The AS50 accepts TTL signals when it is in Local or Locked Remote mode. The following functions can be controlled via TTL input signals.

- Start a schedule or continue a schedule that is waiting for a run command
- Turn the optional tray temperature control on and off
- Turn the optional column temperature control on and off

See Appendix D for details about TTL control.

2.8.1 Local/Direct Control Mode

You can directly control the following AS50 functions from the front panel:

- TTL and relay outputs
- Injection valve position
- Injection valve 2 position (if installed)
- Tray set point (if installed)
- Column set point (if installed)

Set the above functions from the **DETAIL STATUS** screen (see [Figure 2-11](#)).

DETAIL	IDLE			
VIAL#:	TIME:	min	TTL1	1
INJ#:	VOL:	uL	TTL2	0
METHOD:	TRAY: 2	mL	RLY1	0
TRAY: 25	20 °C↑	LOOP: 100	uL	RLY2 0
COL: --	-- °C		INJ VLV	L
LOCAL	DIRECT CONTROL		CS VLV	A
Help Prompt				

Figure 2-11. Detail Status Screen Example

2.8.2 Local/Schedule Control Mode

The AS50 runs all injections according to a programmed schedule. The schedule defines a series of vials to be sampled and the operating parameters to run on each vial. A schedule consists of the following parameters:

- The vials to sample
- The number of injections to take from each vial
- The volume of each injection
- The method to run on each injection
- The action to take when a scheduled vial is missing

You program, save, and edit schedules from the **SCHEDULE** screen (see [Figure 2-12](#)). The AS50 can store up to nine schedules in memory. The

stored schedules are retained in memory when the AS50 is turned off. [Section 3.11](#) describes how to create schedules.

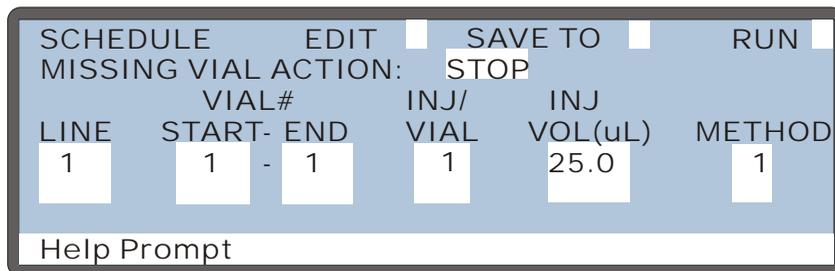


Figure 2-12. Schedule Screen

Each injection in a schedule is assigned a *method* (a series of operating instructions that tells the AS50 how to perform a single injection). A method consists of the following three phases:

Method Phase	Used To	Examples
Sample preparation	Prepare the sample for injection	Pipetting, mixing, diluting
Method setup	Set parameters that remain constant throughout the method	Sample needle height, column temperature
Timed events	Perform functions at a specific time in the method	Loading the sample loop injecting

When the method runs, the AS50 performs the sample preparation steps first, followed by the method setup, and then the timed events steps. [Section 3.10](#) describes how to create methods.

Understanding the Wait Operation

NOTE This section pertains to AS50 operation in Local/Schedule Control mode only.

The wait operation is a step in the sample preparation phase in a method. After performing all other sample preparation steps, the AS50 waits for a continue command before performing the method's timed events. The continue command can be from either the front panel **Hold/Run** button or a TTL input signal.

The wait's position in the sample preparation steps determines whether samples are run overlapped or sequentially. When the wait is the last step in the sample preparation (the default), samples are overlapped (see [Section 2.8.4](#)). When the wait is at the beginning of the sample preparation, samples are run sequentially (see [Section 2.8.5](#)).

2.8.3 Locked Remote/Direct Control Mode (Chromeleon Control)

Connecting the AS50 to a Chromeleon Control Panel immediately selects the Locked Remote/Direct Control mode. In this mode, the front panel keypad is disabled to prevent any changes to operating parameters. To return the AS50 to Local mode, disconnect the AS50 from the Chromeleon Control Panel, or turn off the AS50 power.

Two modes of software control are available: direct control and automated control:

- With direct control, you select operating parameters and commands from the Chromeleon menu bar, toolbars, and Control Panels.
- With automated control, you create a list of samples (a sequence) to be processed automatically. The sequence includes programs with commands and parameters for controlling the AS50, acquiring sample data, and producing reports.

System Control Panels

NOTE This section provides a brief overview of how to open and connect to a Chromeleon Control Panel. For details, refer to the Chromeleon Help or user's manual.

System Control Panels are used for controlling and monitoring system operation, including AS50 operation. Control Panels are located in the **Dionex Templates/Panels/Dionex_IC** folder in the Chromeleon Browser. Chromeleon provides panels for various IC system configurations.

To open a Control Panel, expand the folder for the type of system in which the AS50 is connected (for example **.../Dionex_IC/ICS-2000 System Panels**) and double-click a panel that includes an AS50. For example, double-clicking **ICS-2000_System_AS50.pan**, opens the

AutoSelect AS50 Autosampler

Control Panel shown in [Figure 2-13](#). After opening the Control Panel, connect it to the timebase in which the AS50 is configured (select **Control>Connect to Timebase**).

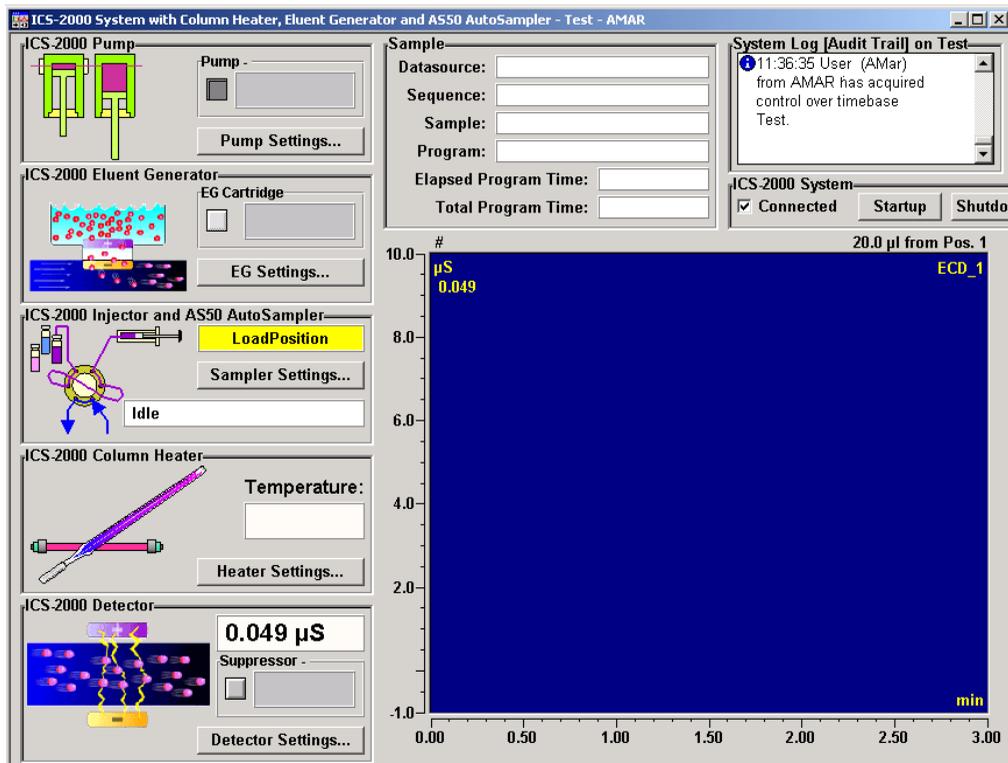


Figure 2-13. Example Chromeleon System Control Panel

To control AS50 operation, click the **Sampler Settings** button to open the **Injector Settings** window. This window lets you select various AS50 operating parameters, including the vial to be sampled, the injection

volume, and the position of the injection valve. You can also initiate a flush or prime operation from this window.

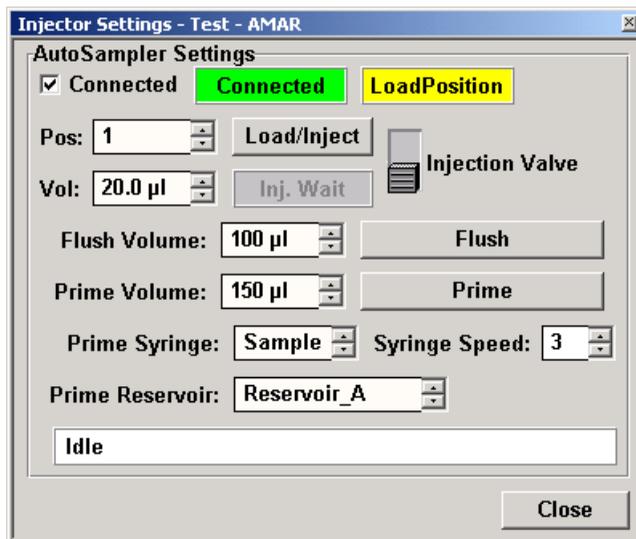


Figure 2-14. Example Chromeleon System Control Panel: Injector Settings Window

2.8.4 Overlapping Sample Preparation

NOTE If Chromeleon is controlling the AS50, sample preparation is enabled or disabled in the Properties dialog box in the Chromeleon Server Configuration program. Sample preparation overlap is enabled by default.

When the wait is at the end of the sample prep sequence (the default), the AS50 overlaps sample preparation. This means that while data collection is occurring for one injection, the AS50 performs the sample prep steps for the next injection (see [Figure 2-15](#)). For a detailed description of the schedule run sequence of operations, see [Section 2.8.8](#).

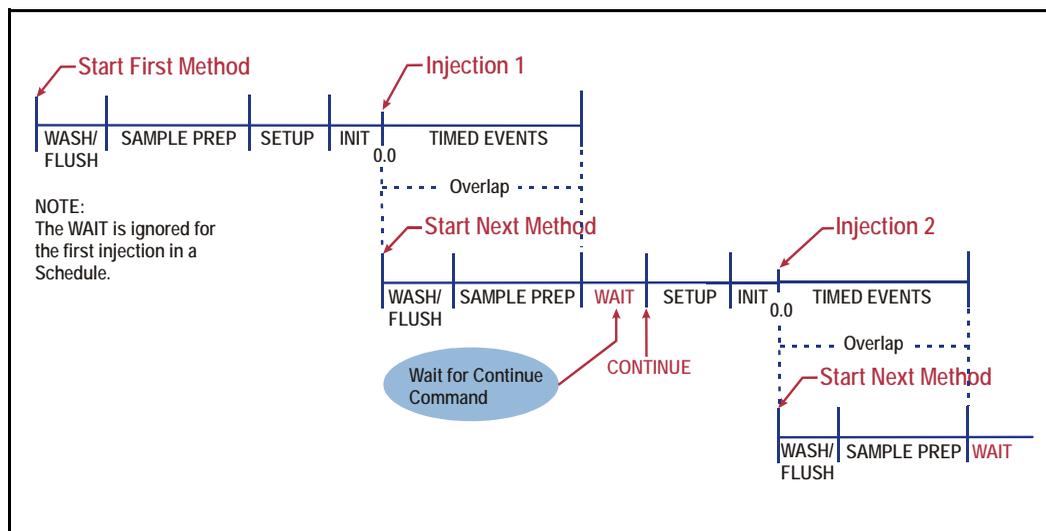


Figure 2-15. Method Overlap: Wait Operation at End of Sample Preparation Steps (Default)

2.8.5 Running Samples Sequentially

Placing the wait at the start of the sample preparation steps allows methods to be run sequentially. The AS50 completes the sample prep and timed events for an injection before starting the next (see [Figure 2-16](#)).

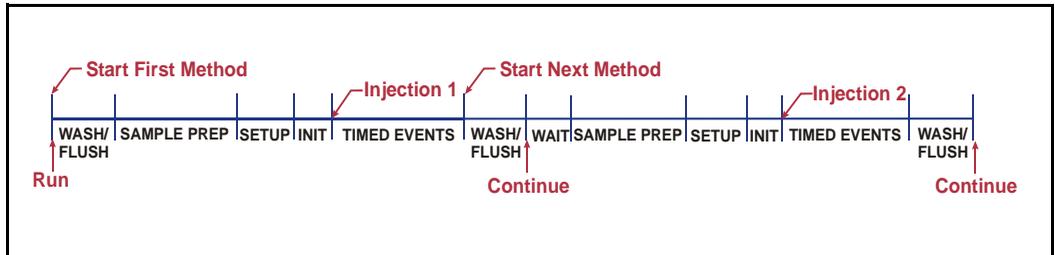


Figure 2-16. No Method Overlap: Wait Operation at Beginning of Sample Preparation Steps

2.8.6 Using the AS50 as the System Master (Disabling the Wait Operation)

When the wait operation is disabled, a single run command (for example, pressing the **Hold/Run** button) starts the schedule. Thereafter, the AS50 performs the schedule lines without requiring additional commands. This allows the AS50 to act as the *system master* (the AS50 controls the system by sending TTL signals to start the pump and detector methods).

To disable the wait operation, press **Menu** and **5** to go to the **MODULE SETUP MENU** and press **5** to go to the **SYSTEM PARAMETERS** screen. Set the **WAIT** field to **DISABLED** (see [Figure 2-17](#)).

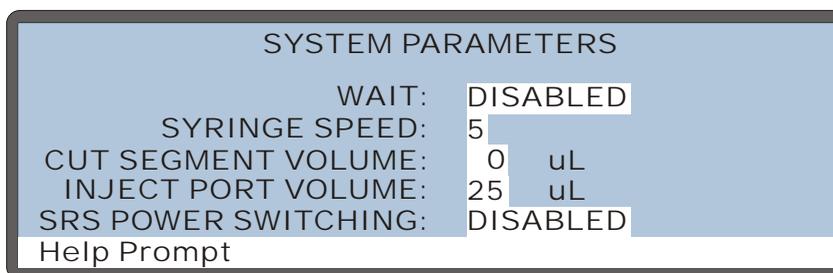


Figure 2-17. System Parameters Screen

For details about the flow of events during a schedule when the wait is disabled, see [Figure 2-20](#).

2.8.7 Understanding the Cycle Time

Cycle time determines the time between injections. When a method is assigned a cycle time, the AS50 delays sample injection until the specified time has elapsed since the previous injection. Cycle time is measured from the start of the previous method's timed events (see [Figure 2-18](#)). Assuming injection occurs at time zero for each method (the default), specifying a cycle time allows a uniform time interval between injections, regardless of differences in sample prep and timed events among methods.

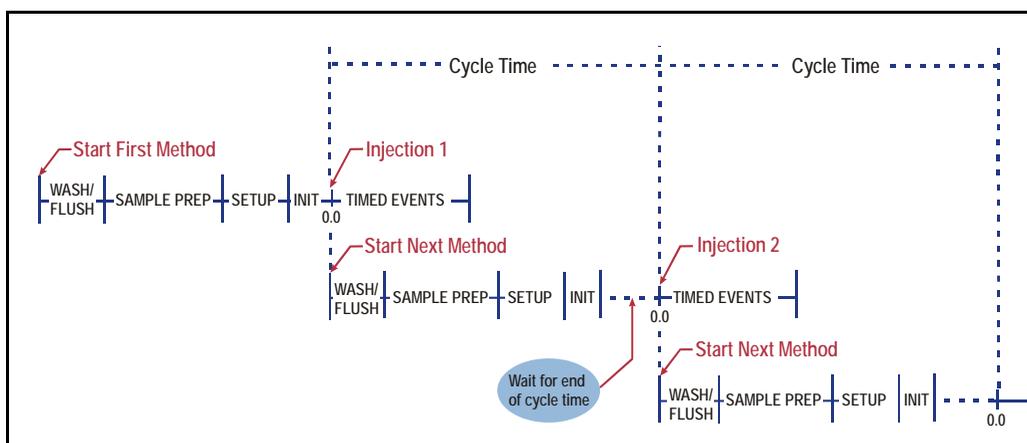


Figure 2-18. Cycle Time Example

A cycle's duration is never shorter than the specified time. However, cycle time will be ignored, thus delaying injection, if any of the following events occurs:

- If **WAIT FOR TEMP STABLE** is enabled and the column temperature has not stabilized by the end of the cycle time.
- If the sample prep **WAIT** operation is enabled and a run command has not occurred by the end of the cycle time.
- If the previous method's timed events extend beyond the cycle time.

If the cycle time expires before the injection occurs, a warning message is displayed and the message is logged in the **MESSAGE LOG** screen (see [Section C.9.6](#)).

2.8.8 Sequence of Operations During a Schedule

- [Figure 2-19](#) shows the flow of events during a schedule when the wait operation is enabled.
- [Figure 2-20](#) shows the flow of events during a schedule when the wait operation is disabled.

See See [“Understanding the Wait Operation” on page 2-24.](#) for details about the wait operation.

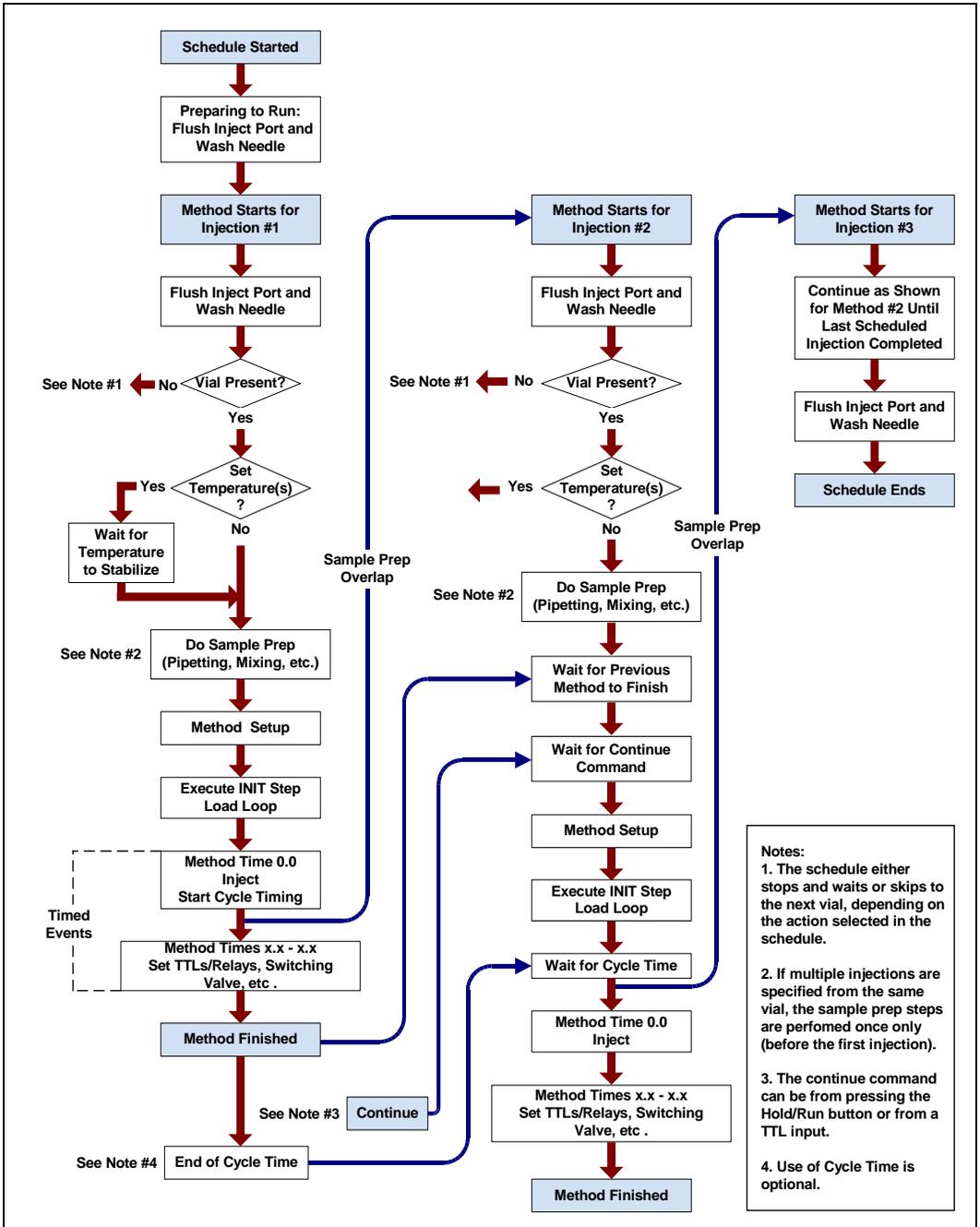


Figure 2-19. Schedule Run Flow of Operation (Wait Enabled)

2.8.9 Understanding the Status Display During a Run

During runs, the **MAIN STATUS** and **DETAIL STATUS** screens display the operation(s) currently being performed. Because of sample prep overlap, information on multiple injections may be displayed simultaneously at certain points in the schedule. For example, in [Figure 2-21](#), the AS50 is injecting the sample and performing the timed events for the first injection from vial 1 while preparing for the second injection.

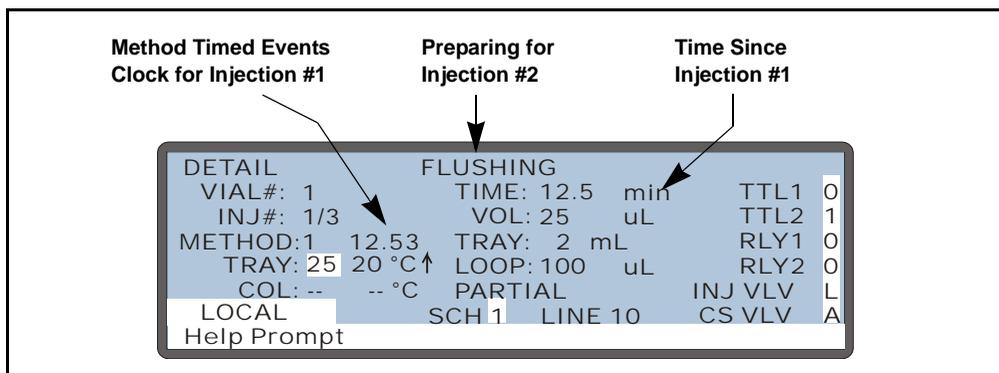


Figure 2-21. Detail Status Screen Example

Notes

- The **INJ#** field is updated when the AS50 loads the loop for the next injection.
- The **TIME** field and the **METHOD** timed events clock are reset to zero at injection.
- The **TIME** field counts up from the injection until the next injection occurs.
- The **METHOD** timed events clock counts up until all timed events have been performed for an injection. It then stops and is no longer displayed.

2.8.10 Sequence of Operations During Flushing and Priming

The AS50 automatically flushes the inject port and washes the outside of the needle at the beginning and end of a schedule, as well as before each injection, while the schedule is running. Flushing can also be performed manually when the AS50 is idle, or as a step in the sample prep phase of a method.

Priming of the flush and reagent lines is done manually after refilling a reservoir, or after the AS50 has been idle for a period of time.

Flushing Sequence

The AS50 performs the following sequence of operations during flushing:

- The sampling needle arm moves to the waste port and expels any fluid from the needle.
- The needle arm then moves to the inject port and delivers a volume of fluid for flushing the inject port. If the injection valve is set to the Load position, the sample loop is also flushed.
- The needle arm moves to the flush port and delivers a volume of flush fluid. This washes the outside of the needle.

The flush reservoir and sample syringe are always used to perform the flush.

The needle is washed with a factory-set volume. Select the volume of liquid to flush through the inject port from the **FLUSH/PRIME** screen. If you specify a flush volume that is greater than the sample syringe volume, the AS50 performs multiple syringe strokes until the volume is reached.

Priming Sequence

The AS50 performs the following sequence of operations during priming:

- The sampling needle arm moves to the waste port and expels any fluid from the needle.
- The needle arm then delivers a volume of fluid to the flush port. This primes the lines from the flush reservoir to the syringe and through the sample transfer line to the sampling needle (see [Figure 2-22](#)).

When the optional sample prep option is installed, additional priming is required to prime the lines from the reagent reservoir(s) to the sample syringe (see [Figure 2-23](#)). See [Section B.3.8](#) for details.

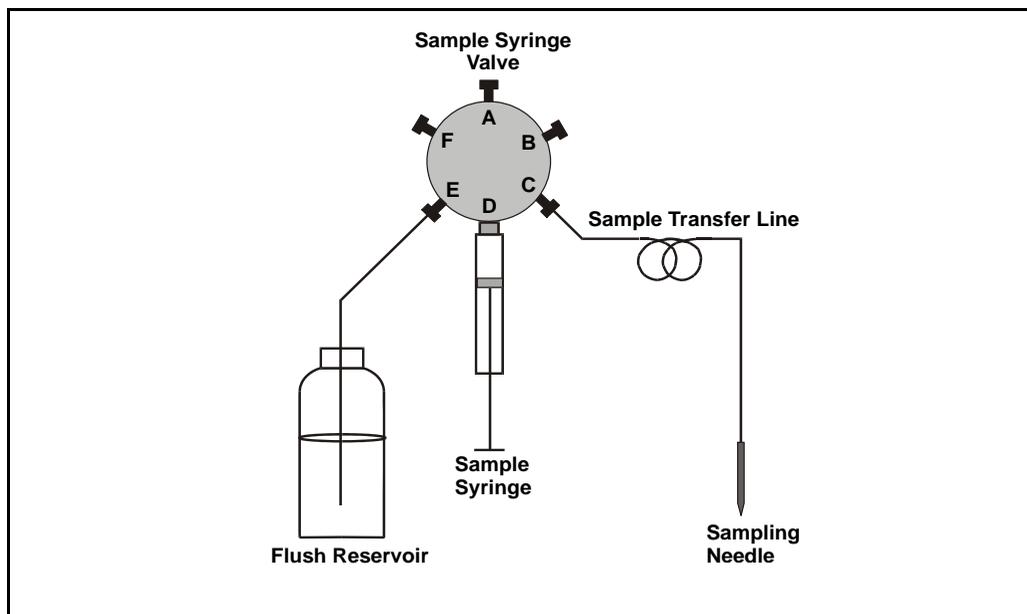


Figure 2-22. Fluid Schematic for Sample Syringe

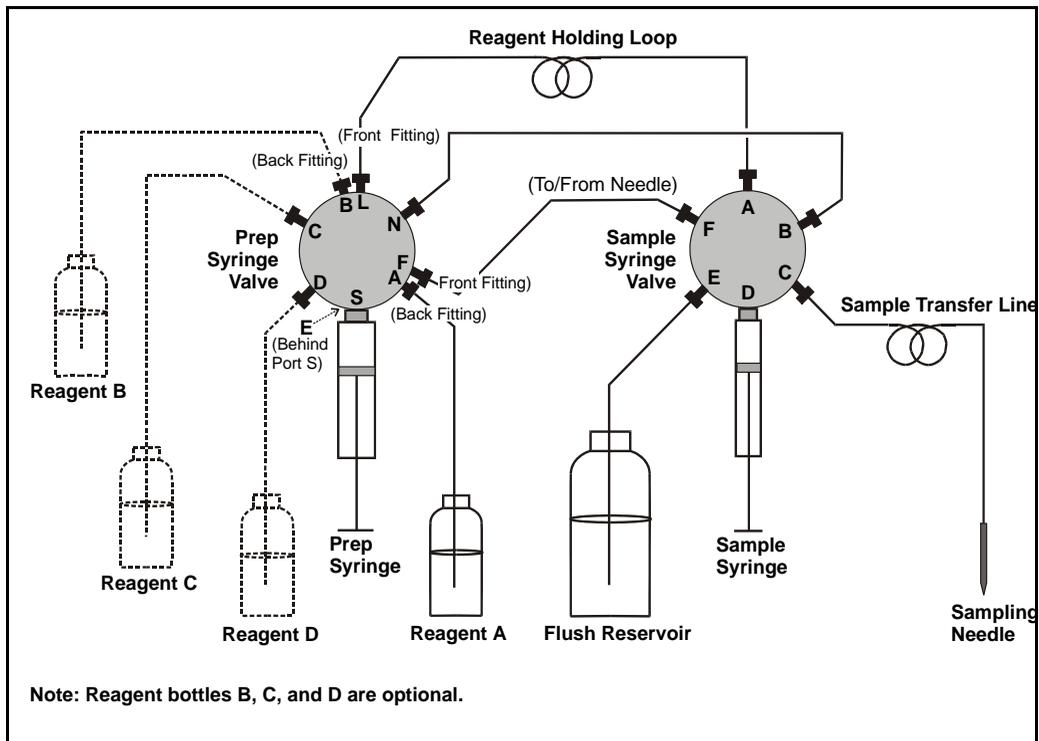


Figure 2-23. Fluid Schematic for Sample Syringe with Optional Prep Syringe

3 • Operation and Maintenance

3.1 Getting Ready to Run

The AutoSelect AS50 Autosampler is designed for use with IC (ion chromatography) and BioLC® (biocompatible liquid chromatography) applications and should not be used for any other purpose. Operation of the AS50 in a manner not specified by Dionex may result in personal injury.

If you have a question regarding appropriate usage, contact Dionex before proceeding. In the U.S., call 1-800-346-6390 and select the Technical Support option. Outside the U.S., call the nearest Dionex office.

3.1.1 Fill the Vials and Load the Sample Tray

1. Fill the vials to the vial shoulder or lower (see [Figure 3-1](#)). **Do not fill to the top.**

During sampling, make sure the needle's vent is not immersed in liquid.

For 10 mL vials only: If necessary, raise the needle height inside the vial to position the vent above the liquid (see [“Controlling the Needle’s Position in the Vial”](#) on page 3-30).

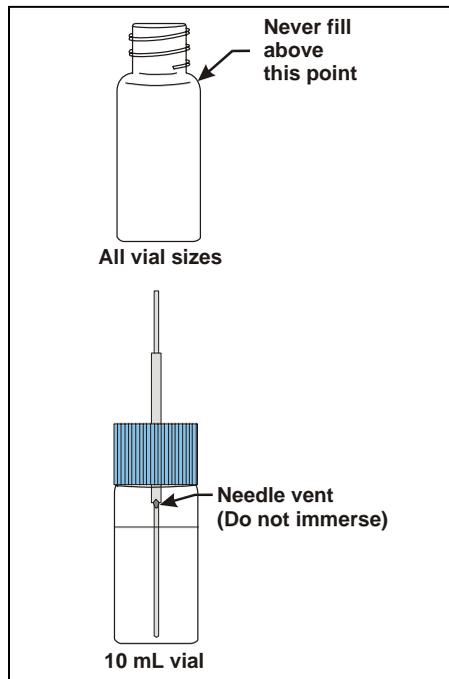


Figure 3-1. Maximum Level to Fill Vials

2. Screw a cap onto each vial and tighten. To prevent septa from falling into the vials when they are pierced by the sampling needle, make sure the cap septas are pushed fully into the caps and the caps are securely tightened.

NOTE If the sample temperature control option is installed, Dionex recommends using vial caps with slit septa only (P/N 055427; package of 100, 1.5 mL glass vials, caps, and slit septa).

3. Load the vials in the tray in the order required for the schedule to be run. See [Section 3.11](#) for how to create a schedule of injections.
4. If the sample temperature control option is installed, position tray covers (P/N 061010) over any empty positions on the tray (see [Figure 3-2](#)). This ensures temperature stability and minimizes condensation, especially at low temperature set points.

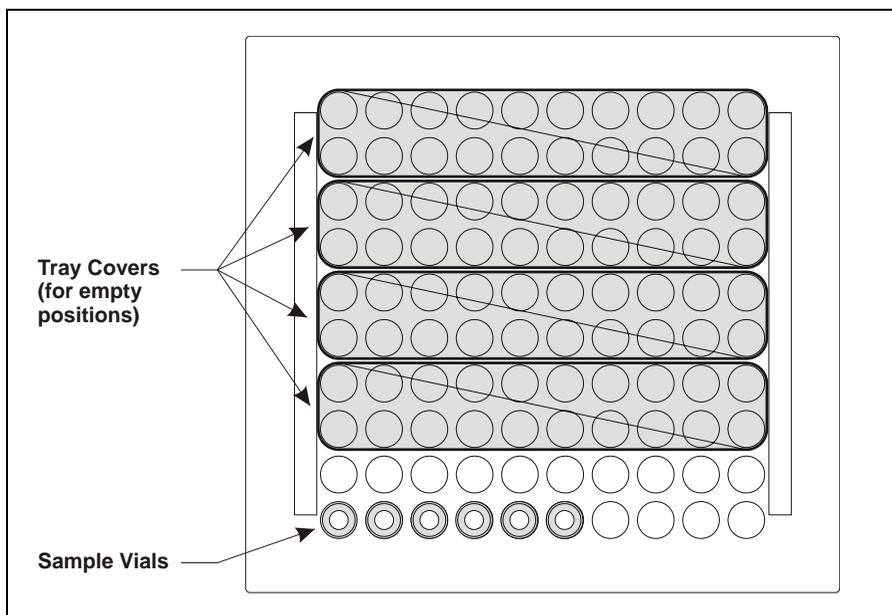


Figure 3-2. Installing Tray Covers (Sample Temperature Control Option Only)

5. Install the tray in the autosampler compartment.
6. Close the autosampler compartment door. Make sure the door remains closed during operation.

IMPORTANT

If the door is opened during operation, the sampling arm stops immediately. If a schedule is running, it is aborted. To safely open the door during operation, see [Section 3.8](#).

3.1.2 Turn On the Power

Press the power switch on the lower left corner of the front door to turn on the AS50 power. When the power is turned on, a series of screens are displayed and the autosampler performs an initialization sequence.

- The **COPYRIGHT NOTICE** screen is displayed briefly, and then the **POWER-UP** screen.
- While the **POWER-UP** screen is displayed, the AS50 performs initialization procedures and a series of diagnostic tests. If one of the tests fails, the tests stop and the **DIAGNOSTIC TEST** screen is displayed. See [Section C.9.2](#) if this occurs.
- When the initialization process is complete and all tests have been passed, the **INSTALLED OPTIONS** screen appears, indicating which options are present. After a few seconds (or if you press a button), the **MAIN** screen is displayed. The power-up sequence is then complete.

The **POWER-UP**, **INSTALLED OPTIONS**, and **DIAGNOSTIC TEST** screens can also be viewed after the power is on. See Appendix C.

3.2 Overview of AS50 Screens

Figure 3-3 shows the screens that are available for operating the autosampler. Refer to Appendix C for details about each screen.

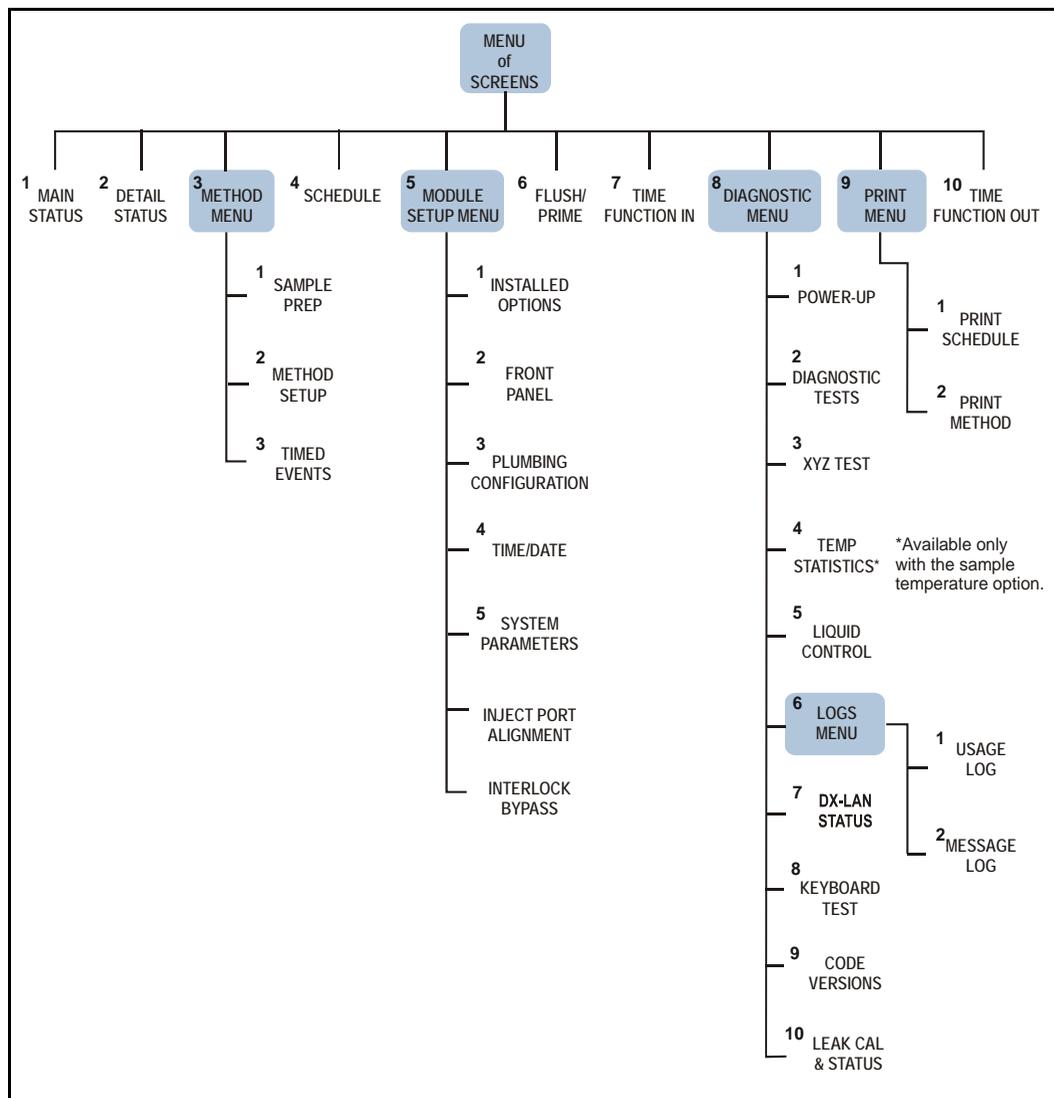


Figure 3-3. AS50 Menu Structure

To access AS50 screens:

- Press the **Menu** button to display a menu of screens.
- To select a screen from the menu, press the keypad number button corresponding to the screen's number on the menu, or move the cursor to highlight the screen number and press **Enter**.

Example:

To go to the **SYSTEM PARAMETERS** screen from the **MAIN STATUS** screen:

1. Press the **Menu** button to display the **MENU of SCREENS**.
2. Press **5** to go to the **MODULE SETUP MENU**.
3. Press **5** again to go to the **SYSTEM PARAMETERS** screen.

To return to the **MAIN STATUS** screen:

1. Press **Menu** twice.
2. Press **Enter** or **1**.

To enter or change a value in a screen field:

NOTE You can enter or change screen field values only when the AS50 is in Local mode (see [Section 3.4](#)).

1. Press a cursor arrow button to position the cursor in the field.
2. Enter the desired value, using the following buttons.
 - To select from a list of predetermined options, press **Select** Δ or **Select** ∇ ; repeat to cycle through the choices.
 - To enter a numeric value, press the numeric buttons.
 - To cancel an entry that is in progress and restore the previous value, press **Delete**.
 - To return a field to its default value (if an entry is not in progress), press **Delete**.
3. **IMPORTANT:** Press **Enter** or a cursor arrow button to confirm the entry.

3.3 Default Operating Parameters

The following table lists the factory-set values for AS50 operating parameters:

Operating Screen	Parameter	Default Value	
Method Sample Prep	Step	1 Wait step only	
Method Setup	Cycle Time	Off	
	Sample Needle Height	2 mm	
	Column Temperature	Off	
	Wait for Temp Stable	No	
	Method Timed Events	Time=Init	
Inject Valve		Load	
CSV		A	
TTL/Relays		all off (0)	
Time=0.00			
Inject Valve		Inject	
CSV		A	
TTL/Relays		all off (0)	
Schedule		Missing Vial Action	Stop
		Vial # Start/End	1/1
	Injections per Vial	1	
	Injection Volume	20.0 μ L	
	Method Number	1	
System Parameters	Wait	Enabled	
	Syringe Speed	5	
	Cut Segment Volume	10 μ L	
	Inject Port Volume	(varies; factory-calibrated)	
	SRS Power Switching	Disabled (available only when the column switching valve is installed)	
	Air Bubble Volume	8 μ L (cannot be changed by user)	
Flush/Prime	Flush Volume	400 μ L	
	Flush Reservoir	Flush (always)	
	Flush Syringe	Sample (always)	
	Prime Volume	400 μ L	
	Prime Reservoir	Flush	
	Prime Syringe	Sample	

3.4 Selecting Computer or Front Panel (Local) Control

When the AS50 is powered up, it is always in front panel (Local) control. To select computer control, start Chromeleon and open the Control Panel for the timebase to which the AS50 is assigned. Connect the AS50 timebase to the Control Panel.

When the AS50 is under computer control, the front panel **MAIN** and **DETAIL** screens indicate this by displaying **LOCKED RMT** and **DIRECT CONTROL** in the operating and control mode fields. See the example in [Figure 3-4](#).

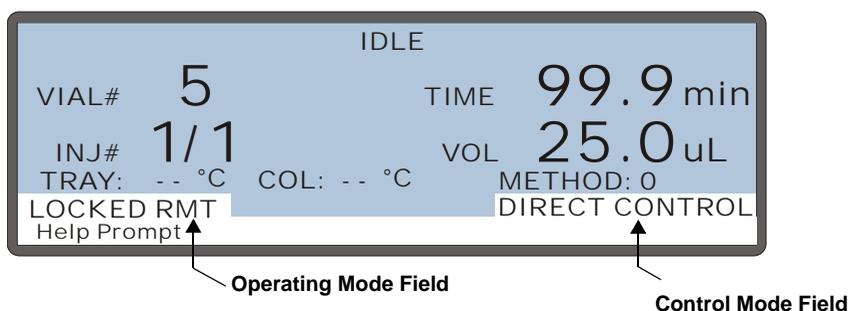


Figure 3-4. Main Screen—Computer Control

To return the AS50 to Local mode, disconnect the AS50 from the Chromeleon Control Panel (clear the **Connected** check box). The operating mode field on the **MAIN** and **DETAIL** screens displays **LOCAL**. See the example in [Figure 3-5](#).

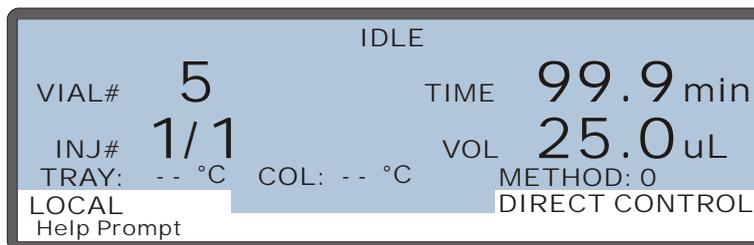


Figure 3-5. Main Screen—Local Control

3.5 Running a Schedule of Injections from the Front Panel

This section describes how to run a schedule from the AS50 front panel (Local mode). To run a schedule from the computer (Locked Remote mode), refer to the Chromeleon on-line help.

Before you can run a schedule, you must first create a method and schedule. See [Section 3.10](#) for details about creating methods and [Section 3.11](#) for details about creating schedules.

Notes

- The AS50 can run a schedule while you are entering or editing any method or schedule, even the one that is currently running.
- Changes made to the currently running method or schedule will be implemented on the next injection.
- When saving changes to the currently running method or schedule, or switching to a different schedule, the clock continues running unaffected. Only those parameter changes which affect the schedule after the current time will be implemented in the current run.
- The AS50 can store up to nine (1 through 9) schedules in memory.
- Methods and schedules are retained in memory even after the AS50 power is turned off.

3.5.1 Selecting Schedule Control

1. Go to the **MAIN STATUS** or **DETAIL STATUS** screen.
2. Position the cursor in the control mode field and press **Select** Δ or **Select** ∇ to toggle to **SCH** (schedule) control (see [Figure 3-6](#)).
3. Press **Enter**.

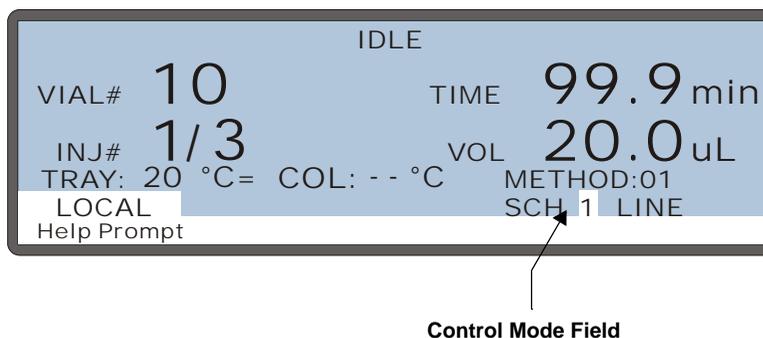


Figure 3-6. Main Status Screen—Schedule Control Mode

3.5.2 Selecting and Starting the Schedule

1. Go to the **MAIN STATUS** or **DETAIL STATUS** screen.
2. Position the cursor in the control mode field and toggle to Schedule control, if necessary.
3. Press a number key to select the desired schedule number or press **Select** Δ or **Select** ∇ to cycle through the numbers (1 through 9).
4. Press **Enter**.
5. To start the schedule, press the **Hold/Run** button.

NOTE You can also select the schedule from the **SCHEDULE** screen (see [Section C.5](#)). Enter the number in the **RUN** field and press the **Hold/Run** button to start the run.

3.6 Putting a Schedule on Hold

To put a running schedule on hold, press **Hold/Run** or **Stop**.

The AS50 will finish the current method step before suspending operation.

While the schedule is on hold, the time since the last injection continues to count up. If the schedule is put on hold during a method's timed events, the timed events clock is suspended until the schedule resumes. See [Section 2.8.9](#) for details about the clock displays.

To resume running the schedule, press **Hold/Run**.

NOTE If **WAIT** is enabled on the **SYSTEM PARAMETERS** screen, the schedule is automatically put on hold when it reaches the **WAIT** step in a sample prep sequence. The schedule will resume running only if a TTL signal is received (see [Section D.2](#)) or if the **Hold/Run** button is pressed.

3.7 Stopping a Running Schedule

1. To halt a schedule, press **Stop**.
2. When the following message appears, press **Stop** again.

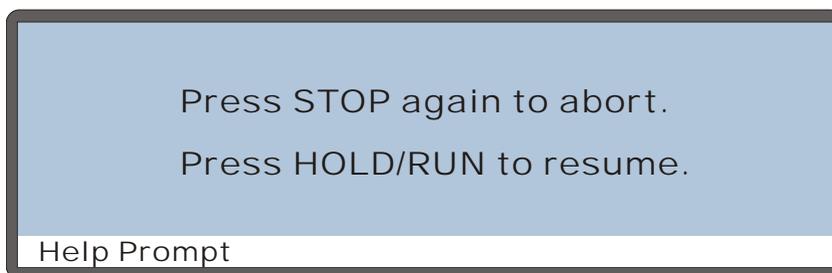


Figure 3-7. Stop Message Screen

If you stop a schedule when the AS50 is in Remote or Locked Remote mode, the AS50 automatically switches to Local mode. This prevents the computer from sending additional operating commands to the AS50.

When a schedule is aborted, the AS50 performs the following sequence of operations:

- The sampling needle arm moves to the waste port and empties any fluid from the needle.
- The needle arm moves to the flush port and delivers a volume of flush fluid that washes the outside of the needle.
- The needle arm then moves to the inject port where a volume of flush fluid is delivered for flushing the inject port.
- The needle arm moves back to the flush port and the outside of the needle is again flushed.
- The needle arm moves to the home position.

3.8 Opening the Sampler Door During a Schedule

Normally, the sampler door must remain closed while the AS50 is running a schedule. If the door is opened inadvertently, the sampling arm stops immediately and the schedule is aborted.

If you want to open the door during a schedule, first press the **Door** button on the front panel, and then follow the on-screen instructions.

If it is not safe, the following message appears:



Figure 3-8. Open Door Safety Screen: Not Safe to Open Door

This message remains until the AS50 reaches the correct status and the sampling arm is in the home position. The screen then displays the message that it is safe to open the door (see [Figure 3-9](#)).

When it is safe to open the door, the following message appears:



Figure 3-9. Open Door Safety Screen: Safe to Open Door

The **TIME** field counts down the amount of time remaining in which it is safe to open the door. When the door is opened, the schedule goes to hold. The timer continues counting down until the door is closed. The schedule then resumes.

If the door is still open when the timer reaches zero, the schedule continues holding (for up to two hours) until the door is closed. If the door is still open after two hours, the schedule is aborted.

Notes

- If the AS50 is operating under front panel control, the door can be opened only when the sampling arm is at the home position and the status displays **WAITING FOR CYCLE TIME TO EXPIRE**. Cycle time controls the time between injections (see [Section 2.6.5](#) and [Section 3.10.7](#)). For most runs, selecting a cycle time greater than 4 minutes provides an adequate wait period between each injection for opening the door. If a method has a long sample prep phase, however, a longer cycle time may be required.
- If the AS50 is operating under Chromeleon control, the door can be opened only when the sampling arm is at the home position and the status displays **WAITING**. This occurs during the wait step of the sample prep portion of a method.
- If the AS50 never reaches a status that allows opening the door, check for one of the following:
 - If the AS50 is operating under front panel control, verify that a cycle time was specified for each method in the schedule and that the cycle time is long enough to provide a wait period between injections.
 - If the AS50 is operating under Chromeleon control, check the run length specified for the Chromeleon Method. It may need to be increased to allow a longer wait period between injections.
- To cancel the **OPEN DOOR SAFETY** screen, press any front panel button. If the door is open, a message cautions you that pressing a button again will abort the schedule.

3.9 Running Under Direct Control from the Front Panel

NOTE This section describes how to directly control the AS50 from the front panel (Local mode). To run under direct control from the computer (Locked Remote mode), refer to the Chromeleon online Help.

The following AS50 functions can be controlled directly (not as part of a schedule):

- Column and tray temperature set points
- TTL and relay outputs
- Injection valve and column switching valve positions

In addition, the AS50 must be in Direct Control to initiate a manual flush or priming cycle, or to perform maintenance or diagnostic procedures.

3.9.1 Selecting Direct Control Mode

1. Go to the **MAIN STATUS** or **DETAIL STATUS** screen.
2. Position the cursor in the control mode field and press **Select** Δ or **Select** ∇ to toggle to **DIRECT CONTROL** (see [Figure 3-10](#)).
3. Press **Enter**.

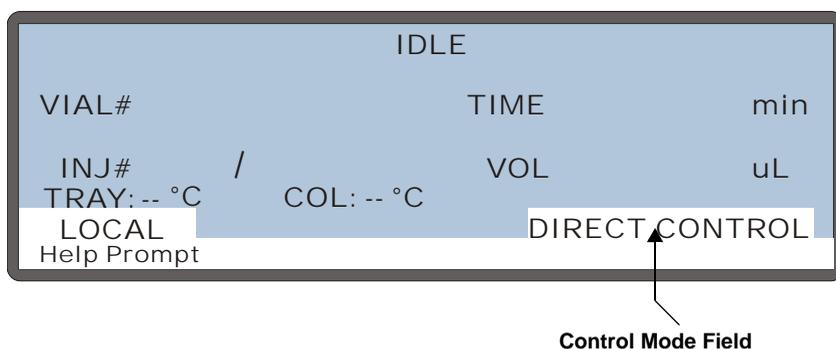


Figure 3-10. Main Status Screen—Direct Control Mode

3.9.2 Setting the Tray Temperature in Direct Control Mode

The tray temperature parameter is available only when the sample temperature control option is installed.

1. Go to the **DETAIL STATUS** screen.
2. If necessary, toggle the AS50 to Direct Control mode.
3. Position the cursor in the **TRAY** field.
4. If the field is displaying "--", tray temperature control is currently turned off. Press **Select** Δ or **Select** ∇ to turn on tray temperature control.
5. Press numeric buttons to enter the desired temperature setting (between 4 °C and 60 °C).
6. Press **Enter**.

IMPORTANT

Dionex does not recommend using the 10 mL plastic tray with the sample temperature control option because the plastic tray is inefficient at heating and cooling the vials. In addition, the tray is not designed for temperatures above 40 °C and may deform over time if used above 40 °C.

3.9.3 Setting the Column Temperature in Direct Control Mode

The column temperature parameter is available only when the thermal compartment is installed.

1. Go to the **DETAIL STATUS** screen.
2. If necessary, toggle the AS50 to Direct Control mode.
3. Position the cursor in the **COL** field.
4. If the field is displaying "--", column temperature control is currently turned off. Press **Select** Δ or **Select** ∇ to turn on column temperature control.
5. Press numeric buttons to enter the desired temperature setting (between 10 °C and 40 °C for PEEK systems or between 10 °C and 80 °C for stainless steel systems).
6. Press **Enter**. The thermal compartment begins heating the column to the selected set point.



Do not touch any metal parts inside the thermal compartment while it is heating up or after it reaches the set point temperature. Wait for the compartment to cool down before servicing any parts.



Ne touchez à aucune des pièces métalliques à l'intérieur du compartiment thermique pendant qu'il chauffe ou après qu'il ait atteint la température de consigne. Attendez que le compartiment soit refroidi avant de réparer les pièces.



Berühren Sie im Thermal Compartment keine metallischen Teile, während dieses aufgeheizt wird oder nachdem die Solltemperatur erreicht ist. Warten Sie, bis die Kammer abgekühlt ist, ehe Sie Wartungsarbeiten durchführen.

3.9.4 Controlling TTL and Relay Outputs in Direct Control Mode

1. Go to the **DETAIL STATUS** screen.
2. If necessary, set the AS50 to Direct Control mode.
3. Position the cursor in the desired **TTL** or **RLY** field.
4. Press **Select** Δ or **Select** ∇ to toggle the TTL or relay field to **1** (on) or **0** (off).
5. Press **Enter**.

3.9.5 Controlling the Injection Valve in Direct Control Mode

1. Go to the **DETAIL STATUS** screen.
2. If necessary, set the AS50 to Direct Control mode.
3. Position the cursor in the **INJ VLV** field.
4. Press **Select** Δ or **Select** ∇ to toggle between the two positions: **L** (load) and **I** (inject).
5. Press **Enter**.

3.9.6 Controlling the Column Switching Valve in Direct Control Mode

1. Go to the **DETAIL STATUS** screen.
2. If necessary, set the AS50 to Direct Control mode.
3. Position the cursor in the **CSV VLV** field.
4. Press **Select** Δ or **Select** ∇ to toggle between the two positions: **A** (to switch flow to column set A) and **B** (to switch flow to column set B).
5. Press **Enter**.

3.10 Creating Methods from the Front Panel

NOTE This section describes how to create methods from the front panel (Local mode). To create methods from the computer, refer to the software user's guide and online Help.

A method defines a series of operating instructions that tells the AS50 how to perform a single injection. A method consists of three parts:

- Sample preparation ([Section 3.10.6](#))
- Method setup ([Section 3.10.7](#))
- Timed events ([Section 3.10.8](#))

Parameters for these are defined on separate screens. A method definition always includes the parameters from all three of the screens.

Notes

- The method parts are run in the order listed above. See [Section 2.8.8](#) for details.
- A method can have a total of 100 steps, including the sample preparation steps, the method setup (which counts as one step), and the timed events steps.
- You can create a new method when the AS50 is running, on hold, or stopped.

3.10.1 Creating a Method

1. Press **Menu** and **3** to go to the **METHOD MENU** screen (see [Figure 3-11](#)).



Figure 3-11. Method Menu

2. In the **EDIT** field, enter the number of an unused method.
3. Press **Enter**.
4. Go to each method screen and enter the method parameters. See [Section 3.10](#) for details about each screen.
5. Save the method (see [Section 3.10.3](#)).

3.10.2 Editing a Method

After creating a method, you can modify it by changing, adding, or deleting steps and parameters. These changes can be made at any time. If the method you are editing is currently running, changes made to steps that have not yet been completed are performed in the current run. Changes made to steps that have already been completed are performed the next time the method runs.

1. Go to the **METHOD MENU** screen.
2. In the **EDIT** field, enter the number of the method to be edited.
3. Go to the method screen to be changed and edit the parameters as required.
4. Save the method (see [Section 3.10.3](#)). The changes can be saved to the same method number or to a new (unused) method number. If you save to a new number, the original method remains unchanged.

3.10.3 Saving a Method

1. From any of the three method screens, press the **Menu** button to return to the **METHOD MENU**.
2. Position the cursor in the **SAVE TO** field.
3. Do one of the following:
 - To save the current method, press **Enter**.
 - To save to a different method, enter a new number and then press **Enter**.

3.10.4 Deleting a Method

1. Go to the **METHOD MENU** screen.
2. Position the cursor in the **EDIT** field and press **Delete**.
A confirmation message appears.
3. Press **Delete** again to delete the method.

3.10.5 Copying a Method

1. Go to the **METHOD MENU** screen.
2. Position the cursor in the **EDIT** field and enter the number of the existing method to be copied.
3. Position the cursor in the **SAVE TO** field and enter a new (unused) method number.
4. Press **Enter**.

The parameters from the original method are copied to the new method and the original method is unchanged.

3.10.6 Defining Sample Prep Steps

Overview

- Six standard sample prep operations are available: **PIPET**, **MIX**, **DELAY**, **FLUSH**, **NEEDLE**, and **WAIT**. If the sample preparation option is installed, **DISPENSE** and **DILUTE** operations are added.
- If the sample preparation option is installed, you can include any combination of these operations in the prep sequence.
- If the sample preparation option is not installed, do not include any **DISPENSE** or **DILUTE** operations.
- Except for **WAIT**, each operation can be performed multiple times, or not at all.
- The sequence must include a single **WAIT** step. The wait operation can be disabled, however, from the **SYSTEM PARAMETERS** screen (see [Section C.6.5](#)).
- When multiple injections are scheduled from a single vial, the sample prep sequence is performed once only (before the first injection). The method setup and timed events are performed for each injection.

Specifying Vial Positions

Vial positions in prep operations can be specified by an absolute number or a relative position.

- To specify an absolute number, press the numeric button(s) for the desired position. The valid vial positions depend on which type of tray is installed:

Tray Type	Valid Vial Numbers
1.5 mL, aluminum	1 to 100
10 mL, plastic	1 to 49

- To enter a relative position, press **Select** Δ or **Select** ∇ to cycle through the choices. **SMP** is the sample vial specified for the current injection in the schedule. **S+1** is one vial past the sample vial. **S+2** is two vials past the sample vial, and so on, up to **S+9**. **WST** is the waste port.

Defining Sample Prep Steps

1. In the **METHOD MENU**, move the cursor to the **1** field (**SAMPLE PREP**) and press **Enter** to display the **SAMPLE PREP** screen (see [Figure 3-12](#)).

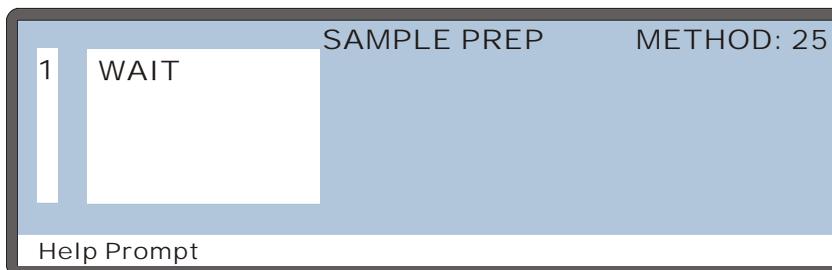


Figure 3-12. Sample Prep Screen (Default)

2. Press **Insert** to add a new step above the **WAIT** step. A **DELAY** step of 0 minutes is added by default (see [Figure 3-13](#)).

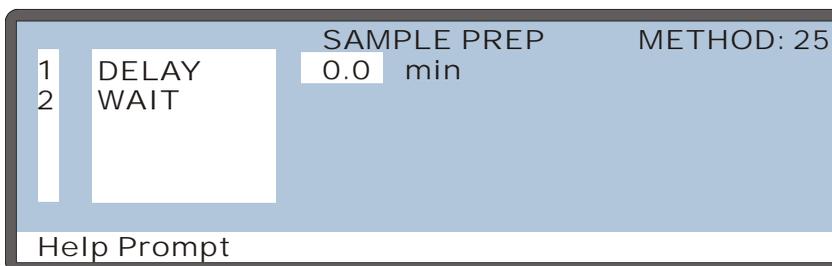


Figure 3-13. Example Sample Prep Screen

3. To select a prep operation, move the cursor one field to the right and press **Select** Δ or **Select** ∇ to scroll through the list of operations. As you select each type of operation, the parameters for that operation are displayed to the right.
4. Press **Enter** or a cursor arrow to select an operation.
5. After selecting an operation, enter its parameters. Refer to the following sections for details.

NOTE To delete a sample prep step, position the cursor in the step's leftmost column and press **Delete** twice.

Pipetting Liquid From One Vial to Another

The **PIPET** operation uses the sample syringe to transfer liquid from a source vial to a destination vial. After pipetting, mix the destination vial before sampling from it. Be sure to specify enough mix cycles to completely mix the vial contents (see “Mixing a Vial” below).

	Volume to Pipet		Source Vial		Destination Vial
PIPET	20.0	uL	#S+1	to	#SMP
	Volume to Pipet		Source Vial		Destination Vial
	1.0 to 99.9 μ L		1 to 100 (aluminum tray)		1 to 100
	100 to 1000 μ L		1 to 49 (plastic tray) SMP, S+1, ..., S+9		1 to 49 SMP, S+1, ..., S+9, WST

NOTE Unlike the **DILUTE** operation, the **PIPET** operation does not include an automatic mixing step. If the sample preparation option is installed, use the **DILUTE** operation, not **PIPET**, for dilutions (see [“Diluting” on page 3-27](#)).

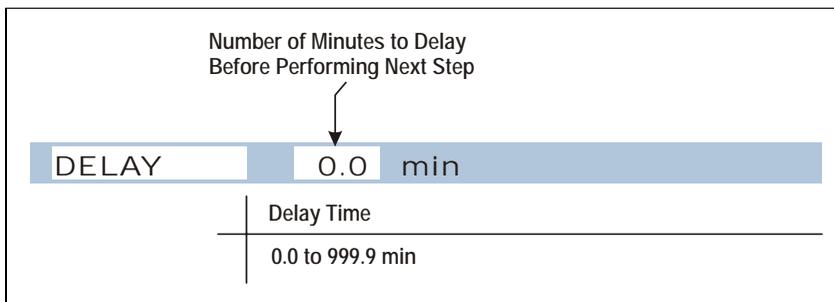
Mixing a Vial

The AS50 mixes the vial by repeatedly drawing up and expelling a volume of the contents. The prep syringe is used if the sample preparation option is installed; otherwise, the sample syringe is used. When specifying the volume, enter a value that is less than or equal to the volume of the syringe. If the volume is greater than the syringe volume, an error message occurs and the syringe volume is used.

	Vial to Mix		Volume to Aspirate and Expel per Cycle		Number of Mix Cycles
MIX	#SMP		250	uL	10 times
	Vial to Mix		Volume		Cycles
	1 to 100 (aluminum tray)		1 to 9999 μ L		1 to 99
	1 to 49 (plastic tray) SMP, S+1, ..., S+9				

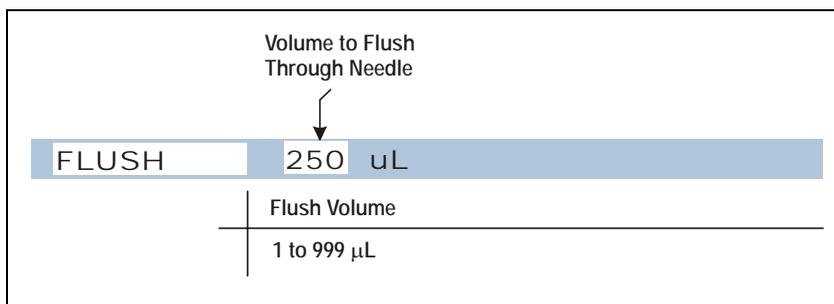
Specifying a Delay Between Prep Steps

The **DELAY** operation specifies the number of minutes to wait before proceeding to the next step in the prep sequence.



Flushing the Needle

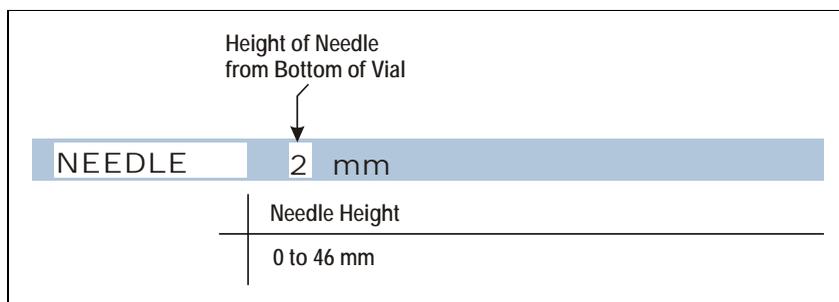
The sample syringe is used to flush the needle with the specified volume of liquid. If you specify a volume greater than the syringe volume, multiple flushes are done.



Specifying a Needle Height

The **NEEDLE** operation positions the tip of the needle at the specified height up from the bottom of the vial. Zero is closest to the bottom; 46 is closest to the top of the vial. The height applies to subsequent **PIPET**, **MIX**, and **DISPENSE** operations. When pipetting, the height applies only to the source vial.

NOTE For 0.3 mL and 1.5 mL vials, use a maximum needle height of 2 mm. This ensures the vent in the sampling needle is positioned correctly inside the vial.



NOTE The needle height specified here does not change the default sample needle height specified on the **METHOD SETUP** screen (see [Section 3.10.7](#)).

Dispensing from a Reagent Reservoir

DISPENSE is available only if the sample preparation option is installed. During dispensing, the prep syringe moves a volume of reagent from a reservoir to a vial.

	Volume to Dispense	Source Reservoir	Destination Vial
DISPENSE	1000 uL	RES C	to #100
	Volume	Reservoir	Destination Vial
	1.0 to 99.9 µL	RES A, B, C, D	1 to 100 (aluminum tray)
	100 to 1000 µL		1 to 49 (plastic tray) SMP, S+1, ..., S+9, WST

Diluting

DILUTE is available only if the sample preparation option is installed. The following steps occur during a dilution:

- The sample syringe picks up a volume of concentrate from the concentrate vial and dispenses it to the destination vial.
- The prep syringe dispenses a volume of diluent to the destination vial.
- The sample syringe mixes the destination vial five times, using 80% of the volume in the vial.
- The sample syringe is flushed with a volume equal to the amount of concentrate plus one full syringe stroke.

	Concentrate Volume	Concentrate Vial	Diluent Volume	Diluent Reservoir	Destination Vial
DILUTE	12.3 uL	#S+1	+1234 uL	A	→ #SMP
	Concentrate Volume	Concentrate Vial	Diluent Volume	Diluent Reservoir	Destination Vial
	1.0 to 99.9 µL	1 to 100 (aluminum tray)	100 to 9999 mL	RES A, B, C, D	1 to 100 (aluminum tray)
	100 to 1000 µL	1 to 49 (plastic tray) SMP, S+1, ..., S+9			1 to 49 (plastic tray) SMP, S+1, ..., S+9

Using the Wait Operation

The wait operation puts the method on hold until the AS50 receives a run command from the front panel **Hold/Run** button or a TTL input signal.

- The AS50 inserts a single wait operation at the end of every method's sample prep sequence.
- You cannot delete the wait operation from the sample prep sequence, but you can change its position or disable it.

See [“Understanding the Wait Operation” on page 2-24](#) for details about the wait operation and how it affects schedule runs.

Changing the Position of the Wait Operation in the Sequence

- To insert a step above the **WAIT** line, position the cursor on the **WAIT** line and press the **Insert** button.
- To insert a step below the **WAIT** line, position the cursor on the blank line below **WAIT** and press the **Insert** button.

Enabling and Disabling the Wait Operation

1. If you are editing a method, save the current settings (see [Section 3.10.3](#)).
2. Go to the **MODULE SETUP** menu and press **5** to go to the **SYSTEM PARAMETERS** screen.
3. Position the cursor in the **WAIT** field and press **Select** Δ or **Select** ∇ to toggle the field to **ENABLED** or **DISABLED**.
4. Press **Enter**.

3.10.7 Selecting Method Setup Parameters

To go to the **METHOD SETUP** screen:

1. Go to the **METHOD MENU**.
2. Position the cursor on the **2** field (**SETUP**).
3. Press **Enter**.

[Figure 3-14](#) shows the default setup parameters.

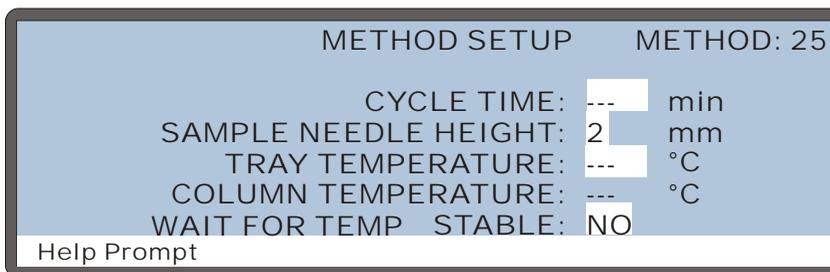


Figure 3-14. Method Setup Screen (default)

The table below shows the value ranges for each parameter.

Parameter	Value Range	Default
Cycle Time	1 to 240 minutes	off (---)
Sample Needle Height	0 to 46 mm	2 mm*
NOTE For 0.3 mL and 1.5 mL vials, use a maximum needle height of 2 mm. This ensures the vent in the sampling needle is positioned correctly inside the vial.		
Tray Temperature (optional)	4 to 60 °C	off (---) 20 °C (when on)
Column Temperature (optional)	10 to 40 °C (PEEK) 10 to 80 °C (Stainless Steel)	off (---) 20 °C (when on)
Wait For Temp Stable	Yes/No	No

*Sample needle height is measured from the bottom of the vial. Zero is closest to the bottom; 46 is closest to the top of the vial.

Controlling the Time Between Injections (Cycle Time)

1. Position the cursor in the **CYCLE TIME** field.
2. If the field is displaying "--", press **Select** Δ or **Select** ∇ to toggle cycle time to on.
3. Press numeric buttons to enter the desired time between injections.
4. Press **Enter**.

See [Section 2.8.7](#) for more information about cycle time.

Controlling the Needle's Position in the Vial

The **SAMPLE NEEDLE HEIGHT** parameter positions the tip of the needle at the specified height up from the bottom of the vial. This height is always used for sample injections. It is also the default height for mixing, pipetting, and dispensing, unless a **NEEDLE** operation is specified in the sample prep steps (see [Section 3.10.6](#)).

1. Position the cursor in the **SAMPLE NEEDLE HEIGHT** field.
2. Press numeric buttons to enter the height setting.
3. Press **Enter**.

NOTE For 0.3 mL and 1.5 mL vials, use a maximum needle height of 2 mm. This ensures the vent in the sampling needle is positioned correctly inside the vial.

Setting the Tray Temperature

(Available only when the sample temperature control option is installed.)

1. Position the cursor in the **SAMPLE TRAY TEMPERATURE** field.
2. If the field is displaying "--", tray temperature control is currently turned off. Press **Select** Δ or **Select** ∇ to toggle tray temperature control to on.
3. Press numeric buttons to enter the desired temperature setting.
4. Press **Enter**.

Setting the Column Temperature

The column temperature parameter is available only when the thermal compartment option is installed. Otherwise, this field will display "--" and will not be illuminated.

1. Position the cursor in the **COLUMN TEMPERATURE** field.
2. If the field is displaying "--", column temperature control is currently turned off. Press **Select** Δ or **Select** ∇ to toggle the temperature control to on.
3. Press numeric buttons to enter the desired temperature setting.
4. Press **Enter**.



Do not touch any metal parts inside the thermal compartment while it is heating up or after it reaches the set point temperature. Wait for the compartment to cool down before servicing any parts.



Ne touchez à aucune des pièces métalliques à l'intérieur du compartiment thermique pendant qu'il chauffe ou après qu'il ait atteint la température de consigne. Attendez que le compartiment soit refroidi avant de réparer les pièces.



Berühren Sie im Thermal Compartment keine metallischen Teile, während dieses aufgeheizt wird oder nachdem die Solltemperatur erreicht ist. Warten Sie, bis die Kammer abgekühlt ist, ehe Sie Wartungsarbeiten durchführen.

Waiting for the Temperature to Stabilize

Turning on the **WAIT FOR TEMP STABLE** parameter delays the start of the method until the temperature of the sample tray and/or the thermal compartment has reached the specified set point(s).

1. Position the cursor in the **WAIT FOR TEMP STABLE** field.
2. Press **Select** Δ or **Select** ∇ to select either **YES** (wait) or **NO** (do not wait).
3. Press **Enter**.

3.10.8 Defining Timed Events Steps

To go to the **TIMED EVENTS** screen:

1. Go to the **METHOD MENU**.
2. Position the cursor on the **3** field (**TIMED EVENTS**).
3. Press **Enter**.

[Figure 3-15](#) shows the default screen.

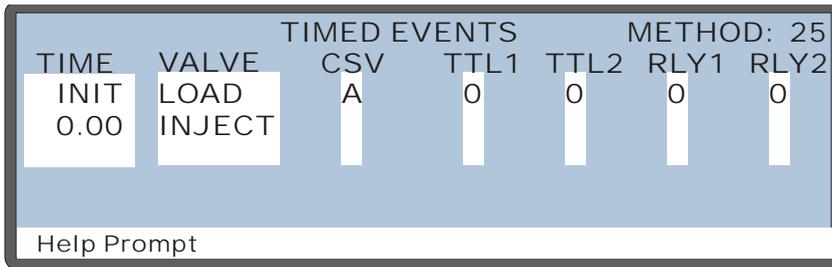


Figure 3-15. Timed Events Screen (Default)

Understanding the INIT and Time Zero Steps

The method timed events always start with two steps. The parameters in these steps can be changed, but the steps cannot be deleted.

- The first step is the INIT (initial conditions) step. The initial conditions are executed immediately after the method setup.
- The second step is the time zero step, which is executed after the INIT step. When the time zero step is executed, the timed events clock begins counting up from zero and any additional timed events run at their specified times.

NOTE When a cycle time is specified, the AS50 waits until the cycle time is reached before executing the time zero step of that method (see [Section 2.8.7](#) for details).

Adding Timed Events Steps

1. Use one of the following methods to add a step:
 - Move the cursor to the empty **TIME** field below the last step. Enter the elapsed time at which to start the new step and press **Enter** or a cursor arrow button.
 - Move the cursor to any **TIME** field and press **Insert**. This adds a new step before the cursor position. Enter the elapsed time at which to start the new step and press **Enter** or a cursor arrow button.

After you add a step, the steps are reorganized in chronological order.

2. Enter the remainder of the parameters for the new step (see the following sections).

To retain a value set in the previous step, leave the field blank. A blank field means there is no change from the previous step.

Deleting Timed Events Steps

To delete a step, move the cursor to the step's **TIME** field and press **Delete** twice.

Controlling the Injection Valve

The **VALVE** parameter sets the position of the injection valve to either **LOAD** or **INJECT**. A method's timed events can include only one Load and one Inject command. The Load command must precede the Inject.

By default, the valve is set to **LOAD** in the INIT step and to **INJECT** in the time zero step. This allows the valve to be loaded before timed events begin. Then, you do not need to include the time for loading the loop in the timed events.

You can clear the **LOAD** and **INJECT** parameters from the **INIT** and/or time zero steps and then move them to other steps if desired.

- To clear a **LOAD** or **INJECT**, position the cursor on the field and press **Delete**.
- To move the **LOAD** or **INJECT** to a different step, position the cursor on the **VALVE** field of the desired step and press **Select** Δ or **Select** ∇ to toggle to **LOAD** or **INJECT**.

Notes

- If you move the **LOAD** and/or **INJECT** parameters to different steps, be sure to allow enough time between the **LOAD** and the **INJECT** for the loop to be completely loaded. The time needed depends on the sample syringe volume and the syringe speed (see [Section 3.13](#)).
- The load and inject events are required, even if the injection valve is installed externally because the AS50 must still know when to load the external valve and when the injection occurred. A TTL output can be programmed to control the external valve. See Appendix D for details about using TTL outputs.

Controlling the Column Switching Valve

The **COL** parameter sets the position of the column switching valve (if installed) to either **A** (column A) or **B** (column B). Select **A** if no column switching valve is installed.

Switching the SRS Power When the Column is Switched

In systems with two Self-Regenerating Suppressors, you can automatically switch the power from one SRS to the other SRS whenever the column switching valve position is changed.

1. If you are editing a method, save the current settings (see [Section 3.10.3](#)).
2. Go to the **MODULE SETUP** menu and press **5** to go to the **SYSTEM PARAMETERS** screen.
3. Position the cursor in the **SRS POWER SWITCHING** field and press **Select Δ** or **Select ∇** to toggle the field to **ON**.

When SRS power switching is turned off, the power always goes to SRS A.

The detector supplies the power for both suppressors. A cable connects the rear panel of the chromatography or thermal compartment to the SRS connector on the detector electronic chassis (see [Figure B-38](#)). You select a power setting for the SRS or turn off the SRS power from the detector front panel screens. Refer to the detector manual for details.

Setting TTL and Relay Outputs

The AS50 has two TTL and two relay outputs for control of functions in other devices. For example, if you connect TTL output 1 on the AS50 to TTL input 1 on the pump, a signal from the AS50 will turn the pump motor on and off.

In the **TTL** and **RLY** fields on the **TIMED EVENTS** screen, select **1** (on) or **0** (off).

See Appendix D for details about TTL and relay control.

3.10.9 Example Methods

Example Method 1: Dilution

NOTE The sample prep option is required for this method.

This method uses the sample prep option to dilute a sample before injection. In this method, the AS50 delivers 600 μL of the concentrated sample from vial 6 and 5400 μL of diluent from reagent reservoir A into the sample vial. Default values are used for all other method parameters. [Figure 3-16](#) shows the sample prep steps for the method.

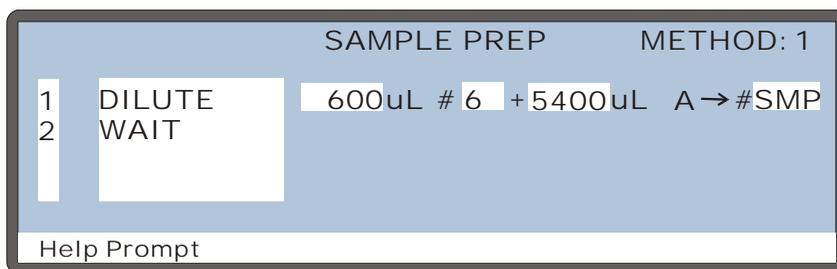


Figure 3-16. Dilution Method Example: Sample Prep Steps

Example Method 2: Column Switching

This method sets up the timing for switching between column sets in a dual-column system. When switching between columns, enough time must be allowed after the injection occurs for column A before switching to column B.

This example assumes the following system parameters:

- 100 μ L sample loop
- 250 μ L sample syringe
- Full-loop injection

Default method setup and sample prep parameters are used.

The table below shows the AS50 timed events for example method 2:

Time	Valve	CSV	TTL/RLY	Comment
Init	Load	A	0000	Load the loop
0.00	Inject	A	0000	Inject the sample
3.00		B	0000	Switch to column B

For reference, the table below shows the method used for the pump to switch eluent when the valve switches:

Time	Flow	%A	%B	%C	%D	Curve	Comment
Init	1.00	0.00	100.00	0.00	0.00	5	Pump eluent for column A
0.00	1.00	0.00	100.00	0.00	0.00	5	
0.30	1.20	0.00	0.00	100.00	0.00	5	Run DI H ₂ O to clear lines of first eluent
2.90	1.20	0.00	0.00	100.00	0.00	5	
3.00	1.20	0.00	0.00	0.00	100.00	5	Switch eluents

Eluent B = 22 mA MSA (used for column A)

Eluent C = DI water

Eluent D = 3.5 mM CO₃/ 1 mM HCO₃ (used for column B)

3.11 Creating Schedules from the Front Panel

NOTE This section describes how to create schedules from the front panel (Local mode). For instructions on creating schedules from the computer, refer to the software user's guide and online Help.

The schedule defines injection parameters for each vial to be sampled. A schedule consists of the following parameters:

- The vials to sample
- The number of injections to take from each vial (if any)
- The volume of each injection
- The method to run on each injection
- The action to take when a scheduled vial is missing

You can create a new schedule or edit an existing schedule when the AS50 is running, on hold, or stopped. If the schedule you are editing is currently running, changes to steps that have not yet been completed are performed in the current run. Changes made to steps that have already completed are performed the next time the schedule runs.

3.11.1 Creating a New Schedule

1. Go to the **SCHEDULE** screen.

LINE	START	END	INJ/ VIAL	INJ VOL(μL)	METHOD
1	1	- 1	1	25.0	1

SCHEDULE EDIT SAVE TO RUN
MISSING VIAL ACTION: STOP
VIAL#
Help Prompt

Figure 3-17. Schedule Screen (Default Settings)

If you are opening the screen for the first time after the power is turned on, the screen displays an empty (unused) schedule (see [Figure 3-17](#)). Otherwise, the screen displays the last schedule that was edited.

2. If a schedule is currently displayed, position the cursor in the **EDIT** field. Enter the number of an unused schedule, or press **Select** Δ or **Select** ∇ to cycle through the choices (1 through 9).
3. Press **Enter**.
4. Select an action to take if a vial is missing (see [Section 3.11.6](#)).
5. Define the schedule lines required for your sample injections (see [Section 3.11.7](#)).
6. Save the schedule.

NOTE If injections per vial is zero for a particular vial, only the sample prep phase of the method is run.

3.11.2 Editing a Schedule

1. Go to the **SCHEDULE** screen.
2. In the **EDIT** field, enter the number of the schedule to be edited.
3. Press **Enter**.
4. Change the schedule parameters.
5. Save the schedule. The changes can be saved to the same method number or to a new (unused) method number. If you save to a new number, the original method remains unchanged.

3.11.3 Saving a Schedule

1. Position the cursor in the **SAVE TO** field.
2. Do one of the following:
 - To save the current schedule, press **Enter**.
 - To save to a different schedule, enter a new number and then press **Enter**.

3.11.4 Deleting a Schedule

1. Go to the **SCHEDULE** screen.
2. Position the cursor in the **EDIT** field and press **Delete**.
A confirmation message appears.
3. Press **Delete** again to delete the schedule.

3.11.5 Copying a Schedule

1. Go to the **SCHEDULE** screen.
2. Position the cursor in the **EDIT** field and enter the number of the schedule to be copied.
3. Position the cursor in the **SAVE TO** field and enter a new (unused) schedule number.
4. Press **Enter**. The parameters from the original schedule are copied to the new schedule and the original schedule is unchanged.

3.11.6 Selecting an Action if a Scheduled Vial Is Missing

Before beginning each injection, the AS50 checks that a vial is present in the scheduled position in the tray. If the vial is missing, the AS50 can either stop and wait, or skip the vial and continue. The action is specified in the schedule.

1. In the **SCHEDULE** screen, move the cursor to the **MISSING VIAL ACTION** field and select either **STOP** or **SKIP**.

STOP: The AS50 stops when a scheduled vial is missing, allowing you to place a vial in position. To resume the schedule, press **Hold/Run**.

SKIP: The AS50 skips a missing vial and continues to the next vial.

2. Press **Enter** or a cursor arrow to confirm the choice.

3.11.7 Defining Schedule Lines

Each schedule *line* contains operating parameters for one vial. Line numbers are automatically generated when you define parameters for the vials in the schedule. If the parameters are different for each vial, line numbers are shown consecutively. If you define identical parameters for a series of vials, line numbers are shown in a range format (see [Figure 3-18](#)). A schedule can include up to 999 lines.

Each range of vials (or one horizontal line on the screen) is one schedule *step* (see [Figure 3-18](#)). A schedule can have up to 203 steps.

	LINE	VIAL#		INJ/ VIAL	INJ VOL(uL)	METHOD
	START	END				
Step 1	1	1	1	1	25.0	1
Step 2	2-11	5	14	3	12.3	12

Line Numbers in Range Format

Figure 3-18. Schedule Screen Example

Inserting Steps

1. Position the cursor in the **LINE** field below where you want the new step to appear.
2. Press **Insert**.

Notes

- The new step is inserted above the cursor.
- The start and end vial numbers are set to one more than the previous end number. Other parameters (injections per vial, injection volume, and method number) are copied from the previous step.
- If you insert a new step at the beginning of a schedule, parameters are copied from the first step.
- To add a step at the end of a schedule, position the cursor on the blank step at the bottom of the screen and press **Insert**.

Deleting Steps

To delete a step, position the cursor in the step's **LINE** field and press **Delete** twice.

Entering Vial Numbers

In the **START** and **END** fields, enter the starting and ending vials for a range of vials. A range is a group of consecutively numbered vials that will be sampled using the same schedule parameter values (injections per vial, injection volume, and method number). Valid vial numbers are 1 through 49 for plastic trays and 1 through 100 for aluminum trays. The starting vial can be a higher number than the ending vial.

For a single vial, enter the same number for the starting and ending vials.

After you enter the vial numbers, the **LINE** field displays the appropriate schedule line numbers. You cannot edit the **LINE** field.

Entering the Number of Injections per Vial

In the **INJ/VIAL** field, enter the number of injections (0 to 99) to perform on each vial in the range.

- If you enter 0 injections per vial, only the sample prep phase of the selected method is performed.
- If you enter multiple injection per vial, the sample prep phase of the selected method is performed once only (before the first injection). The method setup and timed events are performed for each injection.
- The volume entered determines whether the injection is a full-loop; partial-loop; or partial-loop, limited-sample. See [Section 3.12](#) for details.

Entering the Injection Volume

In the **INJ VOL** field, enter the volume of sample to deliver for each injection. The allowed volume ranges are from 1.0 through 99.9 μL (in 0.1 μL increments) and 100 through 1000 μL (in 1 μL increments). See [Section 3.12](#) for information about setting up full-loop or partial-loop injections.

Selecting the Method to Run

In the **METHOD** field, enter the method to run (1 through 99) on each vial in the range.

3.12 Choosing the Injection Type

Three types of sample injections are possible:

- **Full-loop**—the full loop volume is injected
- **Partial-loop**—a partial volume of the loop is injected
- **Partial-loop, limited-sample**—a partial volume of the loop is injected, and no extra sample is aspirated from the vial

The table below summarizes the injection types. See the following sections for details.

Injection Type	Injection Volume *	Cut Volume	Sample Volume Used	Volume Injected
Full-loop	≥ Loop volume	Ignored	4 X Loop volume or 2.5 X Loop volume + 25 µL (whichever is greater)	Loop volume
Partial-loop**	< Loop volume***	1 – 30 µL	Injection volume + 2 X cut volume	Injection volume from schedule
Partial-loop, limited sample**	< Loop volume†	0	Injection volume	Injection volume from schedule

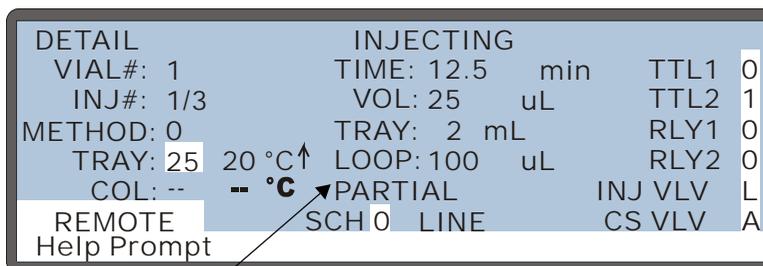
* Injection volume is entered on the **SCHEDULE** screen (see [Section C.5](#)) or in the Chromeleon schedule.

** Only available when the injection valve is installed in the AS50 autosampler compartment, or the chromatography or thermal compartment.

***For the best accuracy when performing partial-loop injections, specify an injection volume equal to half the loop volume or less. For example, if the loop is 100 µL, use an injection volume of 50 µL or less.

† For the best accuracy when performing partial-loop, limited sample injections, specify an injection volume no greater than the loop volume minus the air bubble volume (8 µL). For example, if the loop is 25 µL, use an injection volume of 17 µL or less. Note: Two air bubbles sandwich the sample when it is loaded into the loop.

During an injection, the **DETAIL STATUS** screen displays the type of injection.



Injection Type

Figure 3-19. Detail Status Screen: Partial-Loop Injection Type

3.12.1 Full-Loop Injections

When performing a full-loop injection, the AS50 draws four times the loop volume from the sample vial and delivers it to the injection valve. The middle portion of the sample is positioned in the loop and injected (see [Figure 3-20](#)).

NOTE For very small loop sizes (less than 17 μL), 2.5 times the loop volume plus 25 μL is delivered to the valve.

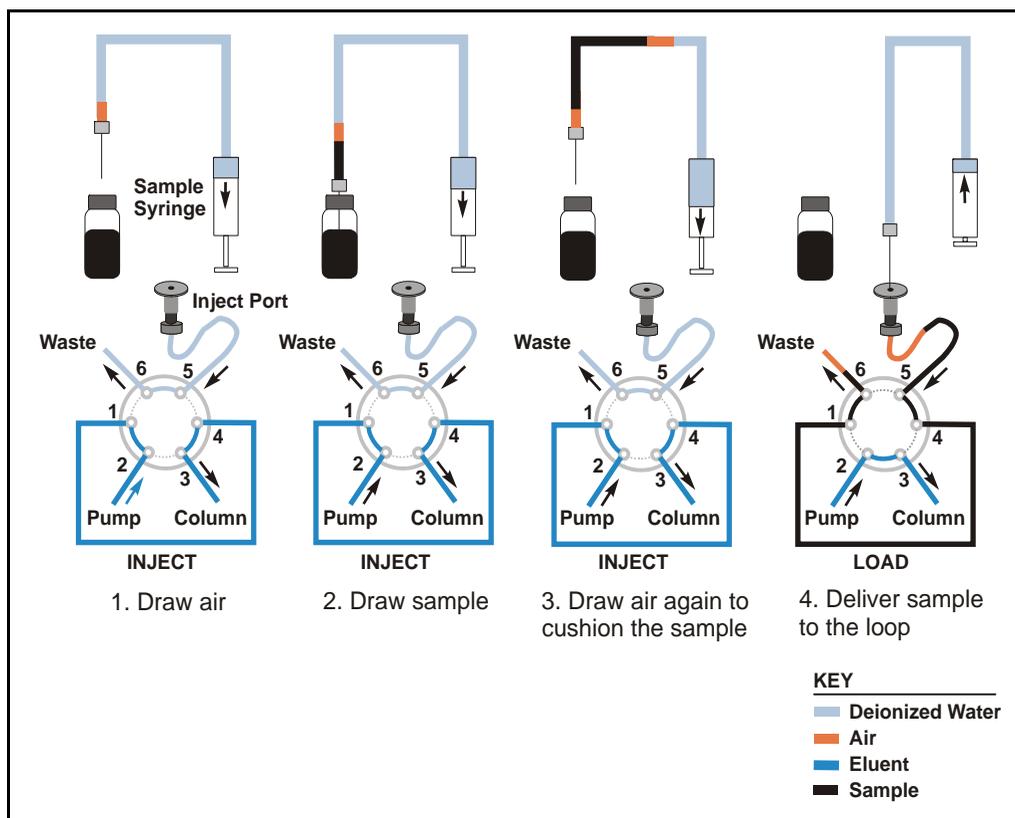


Figure 3-20. Full-Loop Injection Sequence

IMPORTANT

The maximum loop size for full-loop injections is 300 μL . If a larger loop size is used, sample can contaminate the flush bottle because the sample volume drawn exceeds the sample transfer line volume of 1200 μL .

Setting Up a Full-Loop Injection

When defining injection parameters on the **SCHEDULE** screen (see [Figure 3-21](#)), enter an injection volume equal to or greater than the volume of the loop installed on the injection valve.

NOTE Entering an injection volume greater than the sample loop volume sets up the AS50 for a full-loop injection. The actual volume of sample injected will equal the sample loop volume.

NOTE The loop volume is entered on the **PLUMBING CONFIGURATION** screen (see [Section C.6.3](#)).

LINE	START	END	INJ/ VIAL	INJ VOL(uL)	METHOD
1	1	1	1	25.0	1

Help Prompt

Enter the injection volume

Figure 3-21. Schedule Screen

3.12.2 Partial-Loop Injections

When performing a partial-loop injection, the AS50 draws the volume to be injected from the sample vial, plus two times the *cut segment volume*. The cut segment volume is a portion of sample that is discarded from each end of the aspirated sample. The middle portion of the sample is positioned in the loop and injected (see [Figure 3-22](#)).

NOTE Partial-loop injections are possible only when the injection valve is installed in the autosampler compartment or in a chromatography or thermal compartment. If the injection valve is installed externally (for example, in a DX-120), only full-loop injections can be performed.

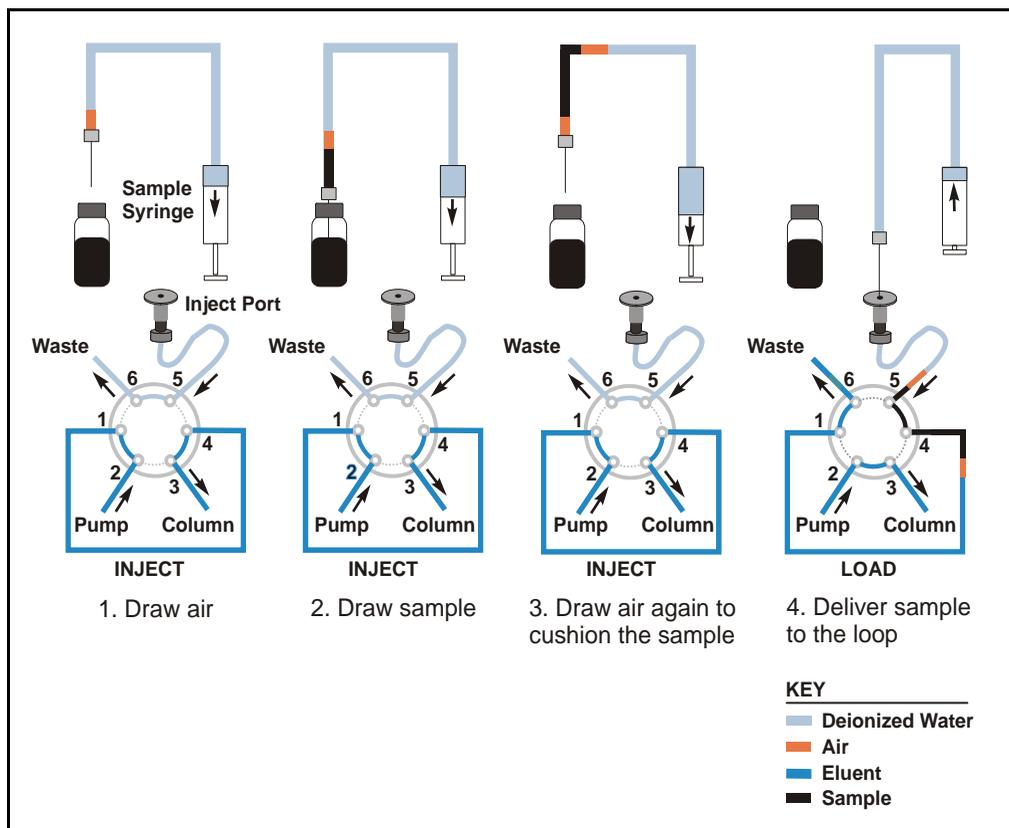


Figure 3-22. Partial-Loop Injection Sequence

Setting Up a Partial-Loop Injection

1. When defining injection parameters on the **SCHEDULE** screen, enter a sample injection volume that is less than the volume of the sample loop installed on the injection valve.
2. On the **SYSTEM PARAMETERS** screen (see [Section C.6.5](#)), enter a **CUT SEGMENT VOLUME** greater than zero. The cut volume amount will be subtracted from both ends of the injected sample volume.

Example:

Sample loop volume: 100 μL

Injection volume: 50 μL

Cut segment volume: 20 μL

To perform the injection, the AS50 aspirates 90 μL from the sample vial (the inject volume plus double the cut volume) and delivers it to the injection valve. One cut segment volume (20 μL) passes to waste and the next 50 μL is loaded into the loop. At injection, 50 μL is injected. After injection, the remaining cut segment volume (20 μL) flows to waste.

3.12.3 Partial-Loop, Limited-Sample Injections

When performing a partial-loop, limited-sample injection, the AS50 draws only the volume to be injected from the sample vial (see [Figure 3-23](#)).

NOTE Partial-loop, limited-sample injections are possible only when the injection valve is installed in the autosampler compartment or in a chromatography or thermal compartment. If the injection valve is installed externally (for example, in a DX-120), only full-loop injections can be performed.

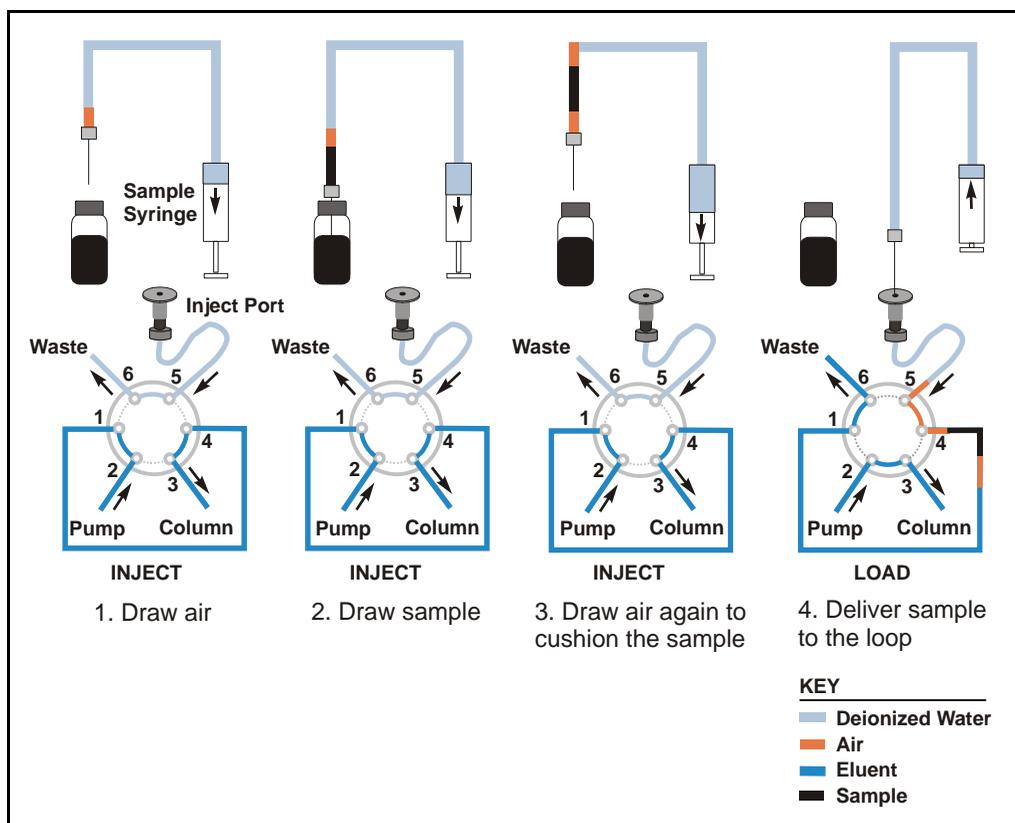


Figure 3-23. Partial-Loop, Limited-Sample Injection Sequence

Setting Up a Partial-Loop, Limited-Sample Injection

1. When defining injection parameters on the **SCHEDULE** screen, enter a sample injection volume that is less than the volume of the sample loop.
2. On the **SYSTEM PARAMETERS** screen, enter a **CUT SEGMENT VOLUME** of **0**.

3.13 Adjusting the Sample Syringe Speed for Different Sample Viscosities

1. Go to the **SYSTEM PARAMETERS** screen.
2. Position the cursor in the **SYRINGE SPEED** field.
3. Press **Select** Δ or **Select** ∇ to select the desired speed or enter the speed by pressing a numeric button (1 – 5). The default is 4. Select a slower setting for more viscous samples.

The table below lists the flow rates delivered by the sample and prep syringes at each speed setting. All sizes of sample syringes deliver the same flow rates and all sizes of prep syringes deliver the same flow rates.

Syringe Setting	Sample Syringe Flow Rate (mL/min)	Prep Syringe Flow Rate (mL/min)
1	0.06	1.8
2	0.12	2.4
3	0.24	4.8
4	0.6	7.2
5	2.4	15

The syringe speed selected on the **SYSTEMS PARAMETERS** screen is used for the following operations:

- Aspirating and dispensing sample during loop loading
- Aspirating and dispensing sample during sample prep operations, except for mixing and dilution
- Aspirating from and dispensing to the flush reservoir during sample prep operations and loop loading
- Aspirating an air bubble

Factory-set speeds are used for the following operations:

- Aspirating and dispensing sample during mixing (speed 3)
- Aspirating and dispensing concentrate during dilution (speed 1)
- Aspirating and dispensing reagent (speed 3)
- Flushing (speed 5)

3.14 Routine Maintenance

This section describes routine maintenance procedures that the user can perform. Any other maintenance procedures must be performed by Dionex personnel.

3.14.1 Daily

- Check for air bubbles in the syringe(s) and remove them if they appear (see [Section B.3.9](#)).
- Check the volume of liquid in the flush bottle (and reagent bottle(s) if installed) and refill when needed. After refilling the flush reservoir, manually flush the inject port (see [Section 3.14.5](#)).
- Check the volume of liquid in the waste container and empty when needed.



Neutralize acidic and caustic wastes before disposal. Dispose of all wastes in accordance with local regulations.



Neutralisez les déchets acides ou caustiques avant de les jeter. Jetez les déchets aux règlements locaux.



Neutralisieren Sie säurehaltige und ätzende Abfälle vor ihrer Entsorgung. Entsorgen Sie alle Abfälle entsprechend den lokalen Bestimmungen.



For correct drainage, make sure the end of the waste line is not submerged in waste liquid.

3.14.2 Periodically

- Check the alignment of the sampling arm needle. If the needle is not centered in the inject port opening when it enters the port, realign the needle. See [Section 5.7](#) for instructions.
- Remove the drip tray (see [Section 5.4](#)), rinse the tray and leak sensor, dry thoroughly, and replace (see [Section 5.5](#)).
- Check for leaks from the inject port, the syringe(s), the syringe valve(s), and the sampling needle line. See [Section 4.2](#) if leaks occur.

3.14.3 Every Six Months

Visually inspect the dark Teflon™ coating on the needle and replace the needle assembly if the coating is worn (see [Section 5.2](#)).

3.14.4 Annually

Perform the AS50 preventive maintenance procedure. An AS50 Preventive Maintenance Kit is available for this purpose (P/N 055644, with PEEK parts, or P/N 055643, with stainless steel parts). The kit provides parts and instructions for performing the procedure.

3.14.5 Manually Flushing the Inject Port

Flush the inject port after refilling the flush reservoir. The AS50 must be idle to initiate a flush cycle.

1. Set the AS50 to **LOCAL** mode and **DIRECT CONTROL**.
2. Go to the **FLUSH** screen and enter the desired **FLUSH VOLUME**, or keep the default value.
3. Move the cursor to the **ACTION** field and select **FLUSH** (see [Figure 3-24](#)).
4. Press **Enter** to start the flush.

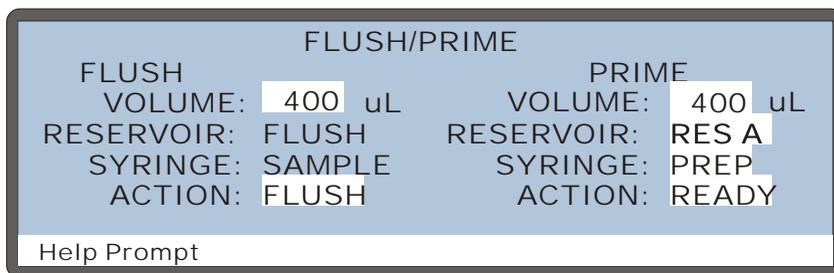


Figure 3-24. Initiating a Manual Flush Cycle

3.15 System Shutdown

No special system shutdown procedure is required. To automatically shut down if you are using Chromeleon to control the AS50, load a shutdown program at the end of the schedule that turns off the pump flow and the SRS current.

4 • Troubleshooting

This chapter is a guide to troubleshooting problems that may occur while operating the AutoSelect AS50 Autosampler. If the screen displays an error message, check [Section 4.1](#) for possible causes. Otherwise, turn to the section that best describes the operating problem. There, the possible causes of the problem are listed in order of probability, along with the recommended courses of action. For additional help, refer to Appendix C for instructions on running the AS50 diagnostics program.

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

4.1 Error Messages

When an error occurs, a beep sounds and a message appears. Each message is identified by a number in brackets in the lower-right corner of the screen. To clear the message, press any key.

Most error messages occur because you have pressed an incorrect key or attempted to enter an incorrect value for a particular field. These types of messages generally do not need additional explanation and they are not listed here.

- **[232] Maximum number of steps reached.**

A method can have a maximum of 100 steps, including the sample prep steps, the timed events steps, and one step for the method setup parameters.

Possible Causes: The 100th step has been reached for the method.

Actions: No action is required at this time. Before trying to create a new step in the method, delete an existing step.

- **[237] Memory is full. Cannot save additional method or schedule.**

The current method or schedule occupies all available memory.

Possible Causes: Too many complex methods or schedules saved.

Actions: To free memory for future use, delete a method or schedule that is no longer used.

- **[250] DSP does not acknowledge.**

The DSP (digital signal processor) did not respond to a command from the CPU.

Possible Causes: Communication problem between the DSP and the CPU.

Actions:

- Turn the power off and then back on.
- If the error message appears again, contact Dionex.

- **[331] Method does not exist.**

The schedule contains a method that does not exist.

Possible Causes: Incorrect method number entered into the schedule.

Actions:

- Enter the method number of an existing method in the schedule.
- Create a new method and save it to the method number indicated in the schedule.

- **[348] A failure has occurred during power up! The status of all tests run during power up are indicated on the Diagnostic Tests screen which follows this error message.**

At power up, the AS50 electronics are tested. If one or more tests fails, this message appears. On the **DIAGNOSTIC TESTS** screen, an “F” indicates that a test failed and a “P” indicates it passed.

Possible Causes: One or more of these tests has failed, indicating a problem with that portion of the electronics.

Actions:

- See [Section C.9.2](#) for a description of each test.
 - If the **SYRINGE COMM** test failed, make sure the sample syringe cable is installed and connected to the correct connector on the AS50 rear panel (see [Section B.3.2](#)). If the prep syringe is installed, check its cable connection, also. Rerun the test.
 - If the test still fails, contact Dionex.
- **[375] An attempt was made to use the sample prep syringe. This option is not installed.**

Two of the method sample prep operations (**DISPENSE** and **DILUTE**) can be used only when the sample preparation option is installed. See [Section 3.10.6](#) for details.

Possible Causes: A **DISPENSE** or **DILUTE** operation was specified in the sample prep steps of the current method although the sample preparation option is not installed.

Actions:

- Remove the step(s) requiring the sample preparation option.
- Select a method that does not require the sample preparation option.

- **[376] Time-out occurred waiting for syringe to complete an action.**

Every syringe action is assigned a maximum time in which the action should be completed. The syringe did not complete its task in the allotted time, indicating either a mechanical or a communication problem.

Possible Causes:

- Faulty syringe
- Faulty cable

Actions:

- Check the syringe motion. If the syringe action is faulty, the syringe may need to be replaced (see [Section 5.2](#)).
- If the syringe does not move in response to a command, the cable may need to be replaced. Contact Dionex.

- **[377] Time-out occurred waiting for syringe serial port txrdy.**

Possible Causes:

- Blocked syringe lines
- Faulty syringe
- Faulty cable

Actions:

- Check the lines to the syringe for crimps or other blockages. Replace the lines, if necessary (see [Section 5.1](#)).
- Check the syringe motion. If the syringe action is faulty, the syringe may need to be replaced (see [Section 5.2](#)).
- If the syringe does not move in response to a command, the cable may need to be replaced. Contact Dionex.

- **[378] Time-out occurred waiting for syringe to respond to command.**

Possible Causes: Communication problem.

Actions: Turn off the AS50 power, check the syringe cable connections, and then turn on the power again. If the message still appears, contact Dionex.
- **[380] Response from syringe was too long. Receive buffer overflowed.**

Possible Causes: Communication problem.

Actions: Turn off the AS50 power and then turn on the power again. If the message still appears, contact Dionex.
- **[381] An attempt was made to move the syringe to an illegal position. Most likely, the specified volume was larger than the remaining syringe capacity.**

Valid positions for the syringes are programmed into the AS50 instrument control Moduleware. There was an internal instruction to move a syringe to a position that was not programmed.

Possible Causes: Problem with the Moduleware.

Actions: Turn off the AS50 power and then turn on the power again. If the message still appears, contact Dionex.
- **[382] An attempt was made to move a syringe valve to an illegal position.**

Valid positions for the syringe valves are programmed into the AS50 instrument control Moduleware. There was an internal instruction to move a syringe valve to a position that was not programmed.

Possible Causes: Problem with the Moduleware.

Actions: Contact Dionex.

- **[383] An attempt was made to set the syringe speed to an illegal value.**

Valid speeds for the syringes are programmed into the AS50 instrument control Moduleware. There was an internal instruction to move a syringe at a speed that was not programmed.

Possible Causes: Problem with the Moduleware.

Actions: Contact Dionex.

- **[384] Cannot use sample syringe to aspirate from specified source reservoir.**

Possible Causes: The sample syringe can aspirate only from the flush reservoir or from the sampling needle.

Actions: Select a different source for the aspirate function or select the prep syringe (if installed).

- **[386] Operation could not be completed because vial tray is not installed.**

Magnets on the vial trays indicate to a magnetic sensor in the autosampler compartment when a tray is installed (and the type of tray).

Possible Causes: (assuming a tray is installed, but is not recognized by the sensor)

- Tray magnets are missing or incorrectly installed.
- Sensors are not working.

Actions:

- Replace the tray.
- Replace the tray sensor card. Contact Dionex.

- [387] **An illegal vial number was specified.**

The type of tray installed determines which vial numbers can be used in methods and schedules.

Tray Type	Tray Capacity
1.5 mL, aluminum	100 vials (1.5 or 0.3 mL)
10 mL, plastic	49 PolyVials

Possible Causes: The vial number specified in the method sample prep steps or the schedule steps is not available for the type of tray installed in the autosampler compartment.

Actions:

- Use a tray type that accommodates the specified vial.
- Change the vial specified in the method or schedule.

- [388] **A NAK command was received from the DSP.**

The CPU sent a command to the DSP which the DSP cannot execute.

Possible Causes: An installed option is not being recognized.

Actions:

- Check the **INSTALLED OPTIONS** screen (see [Section C.6.1](#)) to verify that all optional features are being recognized. A check mark should appear beside each installed option.
- If an installed option is not checked, turn off the power and then turn on the power and recheck the **INSTALLED OPTIONS** screen. If the problem persists, contact Dionex.

- **[389] Timed out waiting for motion complete command from DSP.**

The DSP could not complete a motion in the time allowed.

Possible Causes:

- Mechanical problem with the sampler needle arm
- A valve is not being actuated

Actions:

- Check for an obstruction in the autosampler compartment.
- Manually test the sampler needle arm movement, using the **XYZ TEST** screen (see [Section C.9.3](#)).
- Manually test the sample syringe, the sample prep syringe, and the injection and column switching valves, using the **LIQUID CONTROL** screen (see [Section C.9.5](#)).
- Contact Dionex.

- **[390] Received invalid command from DSP.**

Possible Causes: Communication between the CPU and the DSP was corrupted.

Actions: Turn off the power and then turn on the power again. If the message reappears, contact Dionex.

- **[391] Schedule error. Specified schedule does not exist.**

Possible Causes: The schedule selected to be run has not been saved.

Actions: Create the schedule or select an existing schedule.

- **[398] Battery backed up RAM failed data validation test. Setting system parameters to defaults and initializing schedule and method database.**

Possible Causes:

- Temporary short on CPU board
- Dead battery on CPU board
- Malfunctioning power supply

Actions: If a temporary short is suspected, the AS50 can still be operated. You will need to re-enter any method and schedule information and customized system setup parameters. If the problem persists, contact Dionex.

- **[408] Recoverable motion error occurred in X-axis**

Possible Causes: An error occurred during X-axis movement of the sampling arm. The DSP was able to recover from the error and continue the motion.

Actions: Occasional occurrences of this error can be ignored. If the problem persists, contact Dionex.

- **[409] Non-recoverable motion error occurred in X-axis. Clear any physical obstructions and then press any key to reset system.**

Possible Causes: An error occurred during X-axis movement of the sampling arm. The DSP was not able to recover from the error.

Actions:

1. Turn off the power.
2. Check for an obstruction in the autosampler compartment.
3. Check for freedom of movement in all three axes of the sampling arm.
4. Turn on the power again. If the problem persists, contact Dionex.

- **[414] Specified volume is larger than size of sample syringe.**

During normal operation (not during diagnostics), the syringe can perform up to four multiple strokes to aspirate or dispense a volume up to four times larger than the syringe size.

Possible Causes:

- During a schedule or flush/prime operation, the specified volume is more than four times the size of the sample syringe.
- On the **LIQUID CONTROL** diagnostics screen, the specified volume exceeds the size of the sample syringe, or the cumulative volume when performing multiple actions exceeds the size of the syringe.

Actions:

- Reduce the volume specified or, if the sample prep option is installed, use the prep syringe not the sample syringe for certain operations. See [Section 2.4.2](#) for details.
- On the **LIQUID CONTROL** screen, select a different operation or reduce the volume specified.

- **[415] Cycle time expired before INIT step was completed.**

When the cycle time expires, the AS50 ignores the cycle time and delays injection until the INIT step is complete. See [Section 2.8.7](#) for details.

Possible Causes: The selected cycle time was too short.

Actions: Select a longer cycle time (see [Section 3.10.7](#)).

- **[416] Timed out waiting for column temperature to stabilize. Either temperature control is broken, or set temperature is too far away from ambient.**

The temperature control option in the chromatography compartment was not able to reach the temperature set point within the time allotted.

Possible Causes:

- Ambient temperature too high or low
- Malfunction of the temperature control option

Actions:

- Go to the **TEMPERATURE STATISTICS** screen (press **Menu, 8,** and **4**) and check the following parameters under **COL SET TEMP:**

PELTIER: The peltier value should be above zero. If it is not, contact Dionex.

DUTY CYCLE: A value of 255 means the sample temperature control unit is working to capacity. The ambient temperature may be too high or too low, or the airflow to the Peltier device is restricted.

- Select a temperature that is closer to ambient. If possible, adjust the ambient temperature before running the AS50.
- If the problem persists, contact Dionex.

- **[418] DSP not able to home XYZ motor arm**

Possible Causes:

- Physical blockage of the sampling arm
- DSP malfunction

Actions:

1. Turn off the power.
2. Check for an obstruction in the autosampler compartment.
3. Check for freedom of movement in all three axes of the sampling arm.
4. Turn on the power again. If the problem persists, contact Dionex.

- **[421] Timed events step took so long to execute that at least one subsequent step was missed.**

Possible Causes:

- Insufficient time allowed for loading the sample loop

Actions:

- On the method's **TIMED EVENTS** screen, set the injection valve to the load position in the INIT step (the default).
- If the valve is not set to load in the INIT step, be sure to allow enough time between the **LOAD** and the **INJECT** parameters for the loop to be completely loaded. The time needed varies with the sample syringe volume and the selected syringe speed (see [Section 3.13](#)).

- **[429] Format of global database has changed. Reinitializing to default values.**

Possible Causes:

- Dead battery on CPU board
- Malfunctioning power supply

Actions: Contact Dionex.

- [430] **Format of method/schedule database has changed. Reinitializing to default values.**
Possible Causes:
 - Dead battery on CPU board
 - Malfunctioning power supply**Actions:** Contact Dionex.

- [431] **Format of calibration database has changed. Reinitializing to default values.**
Possible Causes:
 - Dead battery on CPU board
 - Malfunctioning power supply**Actions:** Contact Dionex.

- [438] **Timed out waiting for home position to be found.**
Possible Causes:
 - Autosampler compartment door open at power-up
 - DSP malfunction
 - Sampling arm malfunction**Actions:**
 - Close the autosampler compartment door and then press the **Home** button.
 - If closing the door does not eliminate the problem, try turning the power off and then on again. If the problem persists, contact Dionex.

- **[439] Method/Schedule database has been corrupted. Reinitializing database.**

Possible Causes:

- Dead battery on CPU board
- Malfunctioning power supply

Actions: Contact Dionex.

- **[441] Sampler door opened.**

Possible Causes:

- Autosampler compartment door accidentally opened.
- Door not closing properly
- Door sensor malfunction
- Door magnet missing

Actions:

- The autosampler door must be closed to operate the AS50. Close the door and restart the schedule, if necessary.
- If the door appears closed, but the message still occurs, check for an obstruction that is preventing the door from closing all the way.
- Make sure the magnet on the inside lower front edge of the door is present. Also make sure the magnet on the lower edge of the autosampler compartment is present. If a magnet is missing or has come off, contact Dionex.

- [443] **Leak detected in tray/syringe area.**

Possible Causes:

- Excess liquid in the waste container is preventing liquid from siphoning through the waste tubing
- Blocked or crimped waste tubing
- Leaking inject port
- Miscalibrated leak sensor

Actions:

- Empty the waste container.
- Make sure the waste tubing is not crimped and that it is not pushed against the bottom of the waste container.
- If the inject port is leaking, see [Section 4.2.3](#).
- If the tray is dry, but the error is still appearing, recalibrate the sensor (see [Section 5.10](#)).

- [444] **Leak detected in oven compartment.**

Possible Causes:

- Leaking fitting
- Broken liquid line
- Blocked or improperly installed waste line
- Leaking SRS
- Leaking DS3
- Leaking cell

Actions:

- Tighten or replace the leaking fitting (see [Section 5.1](#)).
- Replace the broken line and fittings (see [Section 5.1](#)).
- Make sure the waste lines are not crimped or otherwise blocked. Also make sure the waste lines are not elevated at any point after they exit the chromatography or thermal compartment.
- If the leak is from the SRS, refer to the SRS manual for troubleshooting procedures.
- If the leak is from the DS3, refer to the detector manual for troubleshooting procedures.
- If liquid is seeping from around the cell cables, the cell has an internal leak and is inoperable; return it to Dionex for repair or exchange.

- **[445] Invalid leak sensor reading. May be open- or short-circuit, or bad sensor. See Leak Sensor Calibration screen for more information.**

Actions: The leak sensor card, the cables, or the sensor must be replaced. Contact Dionex.
- **[446] Current leak sensor voltage is outside of legal calibration range.**

Attempting to calibrate when the leak sensor voltage reading is outside the normal dry range.

Possible Causes: The sensor is not dry enough for calibration.

Actions: Clean and dry the area thoroughly and recalibrate (see [Section 5.10](#)).
- **[447] Leak sensor needs recalibration. Go to Leak Sensor Calibration screen to perform recalibration operation.**

Actions: See [Section 5.10](#) for calibration instructions.
- **[448] Motion command to DSP was aborted. Needle may not have homed properly.**

Possible Causes: Loose coupling in the Z-axis. The needle does not stay up.

Actions: Try the motion again. If the problem persists, contact Dionex.
- **[449] Recoverable motion error occurred in Y-axis.**

Possible Causes: An error occurred during Y-axis movement of the sampling arm. The DSP was able to recover from the error and continue the motion.

Actions: Occasional occurrences of this error can be ignored. If the problem persists, contact Dionex.

- **[450] Non-recoverable motion error occurred in Y-axis. Clear any physical obstructions and then press any key to reset system.**

Possible Causes:

- Vial obstructing motion
- Misaligned sampling needle arm

Actions:

- Remove the vial obstruction.
- Align the sampling needle arm in the inject port (see [Section 5.7](#)).
- Turn off the power and check for freedom of movement of all three axes of the sampling arm.

- **[451] Recoverable motion error occurred in Z-axis.**

Possible Causes: An error occurred during Z-axis movement of the sampling arm. The DSP was able to recover from the error and continue the motion.

Actions: Occasional occurrences of this error can be ignored. If the problem persists, contact Dionex.

- **[452] Non-recoverable motion error occurred in Z-axis. Clear any physical obstructions and then press any key to reset system.**

Possible Causes:

- Vial obstructing motion
- Bent sampling needle
- Misaligned sampling needle arm
- Incorrect X-Y position (not over a vial)

Actions:

- Remove the vial obstruction.
- If the needle is bent, replace the sampling needle assembly (see [Section 5.2](#)).
- Align the sampling needle arm in the inject port (see [Section 5.7](#)).
- Turn off the power and check for freedom of movement of all three axes of the sampling arm.
- Contact Dionex.

- **[453] Recoverable motion error occurred in inject valve.**

Possible Causes:

- Valve in wrong position

Actions: Turn off the power and then turn on the power again. If the message reappears, contact Dionex.

- **[454] Non-recoverable motion error occurred in inject valve. Clear any physical obstructions and then press any key to reset system.**

Possible Causes: Valve in wrong position

Actions: Turn off the power and then turn on the power again. If the message reappears, contact Dionex.

- **[455] Recoverable motion error occurred in auxiliary valve.**
Possible Causes: Valve in wrong position
Actions: Turn off the power and then turn on the power again. If the message reappears, contact Dionex.
- **[457]- [474] Syringe reports fatal error:
Syringe reports error:**
Possible Causes: Syringe errors can result from various mechanical problems or from a communication failure between the syringe and the AS50 electronics.
Actions:
 - Check the syringe cable connections.
 - For fatal errors, press a key to reset the system.
 - If the error persists, contact Dionex.
- **[475] Cannot run schedule. No DSP detected.**
Possible Causes: Electronic malfunction
Actions: Turn off the power and then turn on the power again. If the message reappears, contact Dionex.

- **[476] Cannot run schedule. No sample syringe detected.**

Possible Causes:

- Syringe cable not plugged into the rear of the AS50
- Faulty syringe cable or syringe

Actions:

- Check the syringe cable connection.
- Replace the cable. Contact Dionex.

- **[477] Partial-loop injections are not allowed when an external inject valve is used.**

Possible Causes: The injection valve is not installed in the AS50 autosampler compartment or in the chromatography or thermal compartment but the schedule specifies an injection volume less than the volume of the sample loop.

Actions: Specify an injection volume in the schedule that is equal to, or greater than, the sample loop volume.

- **[479] Non-recoverable error. Both internal and external inject valves are connected. Please, power down and disconnect one inject valve before continuing.**

Possible Causes: An injection valve is installed in both the autosampler compartment and the chromatography or thermal compartment.

Actions: Disconnect one of the valves.

- [480] **Timed out waiting for tray temperature to stabilize. Either temperature control is broken, or set temperature is too far away from ambient.**

The sample temperature control option was not able to reach the temperature set point within the time allotted.

Possible Causes:

- Ambient temperature too high or low
- Airflow to cool the Peltier devices is restricted
- Malfunction of the sample temperature control option

Actions:

- Go to the **TEMPERATURE STATISTICS** screen (press **Menu, 8,** and **4**) and check the following parameters under **TRAY SET TEMP:**

PELTIER: The Peltier value should be above zero. If it is not, contact Dionex.

DUTY CYCLE: A value of 255 means the sample temperature control unit is working to capacity. The ambient temperature may be too high or too low, or the airflow to the Peltier device is restricted.

- Select a temperature that is closer to ambient. If possible, adjust the ambient temperature before running the AS50.
- Check the fan intake under the unit and the fan exhaust in the back for any obstructions restricting airflow. Make sure there is at least 6 cm (2.5 in) free space behind the unit for ventilation.
- If the problem persists, contact Dionex.

4.2 Liquid Leaks

4.2.1 Leaking Syringe or Syringe Valve Port

Possible Causes:

- Cracked syringe
- Missing or worn Teflon O-ring in the leaking valve port
- Loose syringe

Actions:

- Check for a crack in the syringe. Replace the syringe, if necessary (see [Section 5.2](#)).
- If the leak is from one of the valve ports, remove the valve and syringe (see [Section 5.11](#)). Remove the existing white Teflon O-ring from inside the valve port and replace it with a new O-ring. The O-rings are supplied with the syringe valve. Reinstall the syringe and valve.
- Make sure the syringe is tightened. To tighten, hold the syringe at the top and bottom fittings and turn it to the right (as viewed from the front) (see [Figure 4-1](#)). Tighten fingertight only; do not overtighten.

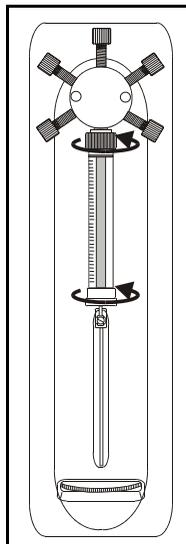


Figure 4-1. Tightening the Syringe

4.2.2 Leaking Drain Line Connection

- Make sure the drain line is not crimped or otherwise blocked.
- Make sure the line is not submerged in liquid in the waste container. Empty the container, if needed.
- For autosamplers without sample temperature control, make sure the line is pushed tightly onto the drip tray fitting and that it is not elevated at any point after it exits the autosampler.
- For autosamplers with sample temperature control,

4.2.3 Leaking Inject Port

Check for a leaking fitting and tighten. Check for a damaged or worn needle seal. Replace the needle seal assembly, if necessary (see [Section 5.6](#)).

If fluid appears on the top of the inject port during injection, the needle may not be reaching the correct depth in the port or may not be aligned over the inject port. Try aligning the inject port (see [Section 5.7](#)).

4.2.4 Leaking Fitting

Locate the source of the leak. Tighten or replace the liquid line connection (see [Section 5.1](#)). Refer to *Installation of Dionex Ferrule Fittings* for tightening requirements.

4.2.5 Broken Liquid Line

Replace the line and fittings (see [Section 5.1](#)).

4.3 No SRS Power

- Cable on the SRS is not plugged into the correct connector inside the chromatography or thermal compartment (see [Figure B-25](#)).
- SRS cable on the rear panel of the chromatography or thermal compartment is not plugged in or is not connected to the detector (see [Figure B-38](#)).

This chapter describes AS50 service and repair procedures that the user can perform. All procedures not included here, including electronics-related repair procedures, must be performed by Dionex personnel. For assistance, contact Dionex Technical Support. In the U.S., call 1-800-346-6390. Outside the U.S., call the nearest Dionex office.

Before replacing any parts, refer to the troubleshooting information in Chapter 4 to isolate the cause of the problem.



The CPU card contains a lithium battery. If the CPU card is replaced, dispose of the used battery according to the manufacturer's instructions.

IMPORTANT

Substituting non-Dionex parts may impair AS50 performance, thereby voiding the product warranty. Refer to the warranty statement in the Dionex Terms and Conditions for more information.

5.1 Replacing Tubing and Fittings

The following tables list the tubing and fittings, and tubing assemblies used to plumb the AS50 autosampler compartment.

5.1.1 Syringe and Reservoir Connections

Part Number	Description	Used For
052112	PFA tubing: 1.55-mm (0.062-in) ID	Connecting the flush reservoir to the sample syringe valve
048949	1/8-in flangeless ferrule fitting	
052267	1/4-28 flangeless nut	

5.1.2 Assemblies, Tubing, and Fittings for PEEK Systems

Common Connections (All PEEK Systems)

Part Number	Description	Used For
054810	Needle seal assembly, 6-in	Connecting the AS50 inject port to port 5 of the injection valve in the autosampler compartment (6-in), or in the chromatography or thermal compartment (12-in)
054811	Needle seal assembly, 12-in	
054271	Sampling Needle Assembly, 2 mL	Connecting the sampling needle arm to the sampling valve
044777	PEEK tubing: 0.75-mm (0.030-in) ID	Connecting the injection valve port 6 (waste) to the AS50 drip tray
043276	Double-cone ferrule fitting	
043275	10-32 double-cone bolt	
042857	Sample loop, 25 μ L	Connecting ports 1 and 4 on the injection valve

Additional Connections for Systems with a Chromatography or Thermal Compartment

Part Number	Description	Used For
014157	Tefzel tubing: 1.55-mm (0.062-in) ID	SRS Regen Out waste line
048949	1/8-in flangeless ferrule fitting	
052267	1/4-28 flangeless nut	
046290	PEEK tubing: 0.25-mm (0.010-in) ID	All column, cell, and SRS connections (except SRS Regen Out)
043276	Double-cone ferrule fitting	
043275	10-32 double-cone bolt	

5.1.3 Assemblies, Tubing, and Fittings for Stainless Steel Systems

Common Connections (All Stainless Steel Systems)

Part Number	Description	Used For
054814	Needle seal assembly	Connecting the AS50 inject port to the injection valve port 5
054273	Sampling needle assembly, 2 mL	Connecting the sampling needle arm to the sampling valve
055374	Sample loop 20 µL	Connecting ports 1 and 4 on the injection valve

Additional Connections for Systems without a Thermal Compartment or Column Heater

Part Number	Description	Used For
055367	Stainless steel tubing: 0.25-mm (0.010-in) ID, 12-in	Connecting the injection valve port 3 to the column inlet
055368	Stainless steel tubing: 0.25-mm (0.010-in) ID, 16-in	Connecting the column outlet to the absorbance detector cell inlet
055365	Stainless steel tubing: 0.5-mm (0.020-in) ID, 2-in	Connecting the injection valve port 6 (waste) to the AS50 drip tray
055371	Stainless steel ferrule, 1/16-in	All above tubing connections
055372	Stainless steel nut, 1/16-in	

Additional Connections for Systems with a Thermal Compartment



Do not touch any metal parts inside the thermal compartment while it is heating up or after it reaches the set point temperature. Wait for the compartment to cool down before servicing any parts.



Ne touchez à aucune des pièces métalliques à l'intérieur du compartiment thermique pendant qu'il chauffe ou après qu'il ait atteint la température de consigne. Attendez que le compartiment soit refroidi avant de réparer les pièces.



Berühren Sie im Thermal Compartment keine metallischen Teile, während dieses aufgeheizt wird oder nachdem die Solltemperatur erreicht ist. Warten Sie, bis die Kammer abgekühlt ist, ehe Sie Wartungsarbeiten durchführen.

Part Number	Description	Used For
055755	Stainless steel tubing: 0.25-mm (0.010-in) ID, 26.5-in	Connecting the injection valve port 3 to the column inlet
055368	Stainless steel tubing: 0.25-mm (0.010-in) ID, 16-in	Connecting the column outlet to the absorbance detector cell inlet
055621	Stainless steel waste line assembly: 0.5-mm (0.020-in) ID, 8.5-in	Connecting the injection valve port 6 (waste) to the AS50 drip tray
055371	Stainless steel ferrule, 1/16-in	All above tubing connections
055372	Stainless steel nut, 1/16-in	

Additional Connections for Systems with a Column Heater

Part Number	Description	Used For
055367	Stainless steel tubing: 0.25-mm (0.010-in) ID, 12-in	Connecting the injection valve port 3 to the heat exchanger inlet
018513	Stainless steel tubing: 0.5-mm (0.020-in) ID, 10-in	Connecting the heat exchanger outlet to the column inlet
055432	Stainless steel tubing: 0.5-mm (0.020-in) ID, 24-in	Connecting the column outlet to the absorbance detector cell inlet
055365	Stainless steel tubing: 0.5-mm (0.020-in) ID, 2-in	Connecting the injection valve port 6 (waste) to the AS50 drip tray
055371	Stainless steel ferrule, 1/16-in	All above tubing connections
055372	Stainless steel nut, 1/16-in	

5.2 Replacing the Sample or Prep Syringe

The table below lists part numbers for the available syringe sizes.

Syringe Type	Syringe Size	Part Number
Sample	100 μ L	055064
	250 μ L	053916
	500 μ L	055065
	1000 μ L	055066
Prep	2.5 mL	055067
	5 mL	053915
	10 mL	055068

5.2.1 Removing The Existing Syringe

1. Using a flathead screwdriver, unscrew and remove the syringe drive connecting screw (see [Figure 5-1](#)).
2. Hold the syringe at the top and bottom and unscrew it from the valve.
3. Remove the white Teflon washer from the syringe valve port. **Note:** To remove the washer, push a piece of 0.8-mm (0.031-in) OD PEEK tubing into the center of the washer and twist sideways to dislodge the washer.
4. Install a new white Teflon washer (P/N 061315) into the new syringe.

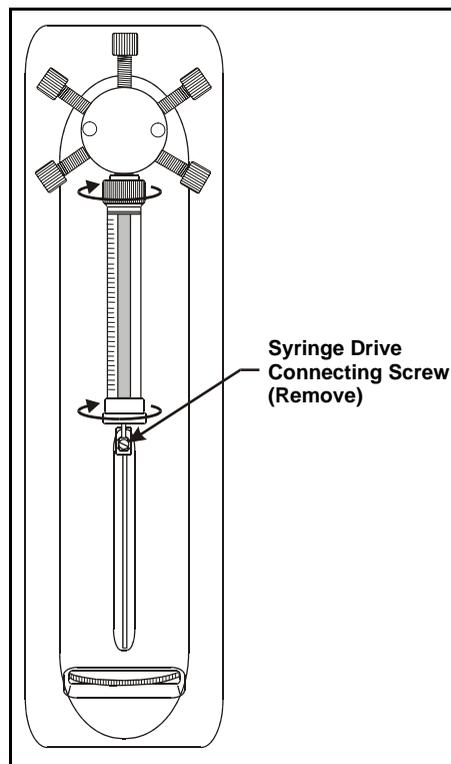


Figure 5-1. Removing the Syringe

5.2.2 Filling the New Syringe and Removing Bubbles

1. Place the threaded end of the syringe into the flush liquid container (isopropyl alcohol is recommended) and slowly pull liquid into the syringe.
2. Remove the syringe from the liquid and point the threaded end up into the air. If air bubbles are present, push the syringe plunger up and pull down rapidly with short movements to dislodge the bubbles. Repeat until all bubbles are dislodged.
3. Place the threaded end of the syringe back into the flush liquid and draw a full syringe volume up by pulling the plunger out slowly.
4. Keeping the syringe in the flush liquid, slowly push the syringe plunger until the bubble(s) exits the syringe. Then fill the syringe completely.
5. Remove the syringe from the flush liquid. While holding it vertically, push a small amount of liquid out the top to make sure there is no air present.

5.2.3 Connecting the New Syringe and Flushing

1. Position the syringe under the valve.
2. Holding the syringe at the top and bottom, screw it back into the valve and tighten fingertight.
3. Align the syringe piston with the connecting screw mount on the syringe drive.
4. Insert the syringe drive connecting screw removed in [Section 5.2.1](#) and tighten fingertight.
5. Perform a flush cycle:
 - a. Press **Menu**, **Menu**, and **6** to go to the **FLUSH/PRIME** screen.
 - b. Move the cursor to the Action field and press **Select** Δ or **Select** ∇ to select **FLUSH**. Press **Enter**.
6. Check the syringe for bubbles. If any exist, remove the syringe and remove the bubbles ((see [Section 5.2.2](#)). Reconnect the syringe and flush again.

5.2.4 Initializing the Syringe

1. From the **MENU of SCREENS**, press **5**, and **3** to go to the **PLUMBING CONFIGURATION** screen.

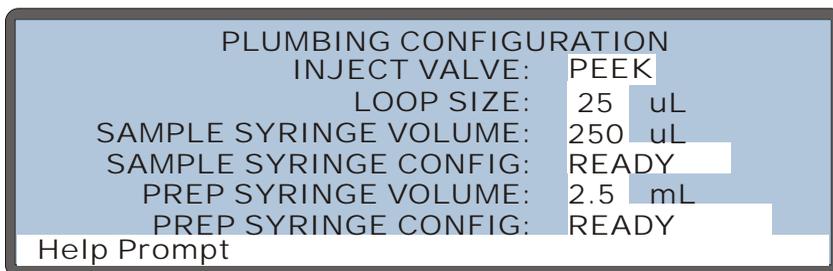


Figure 5-2. Plumbing Configuration Screen

2. Move the cursor to the **SAMPLE SYRINGE CONFIG** field or the **PREP SYRINGE CONFIG** field (depending on which syringe is to be removed).
3. Press **Select** Δ to select the **INITIALIZE** option.
4. Press **Enter**.
5. The syringe plunger moves down a small amount. This is its initial position (see [Figure 5-3](#), View A).

5.2.5 Setting the Syringe Home Position

1. Move the set home thumb wheel to the left to move up the syringe plunger until it is approximately 1 to 2 mm from the top of the syringe (see [Figure 5-3](#), View B).

When the syringe is in operation, this set position will be the uppermost stopping point for the syringe plunger.

2. In the **PLUMBING CONFIGURATION** screen, **SAMPLE SYRINGE CONFIG** field or the **PREP SYRINGE CONFIG** field, press **Select** ▾ to select the **SET HOME** option.
3. Press **Enter**.

The syringe moves down to the initial position and then back up to the home position.

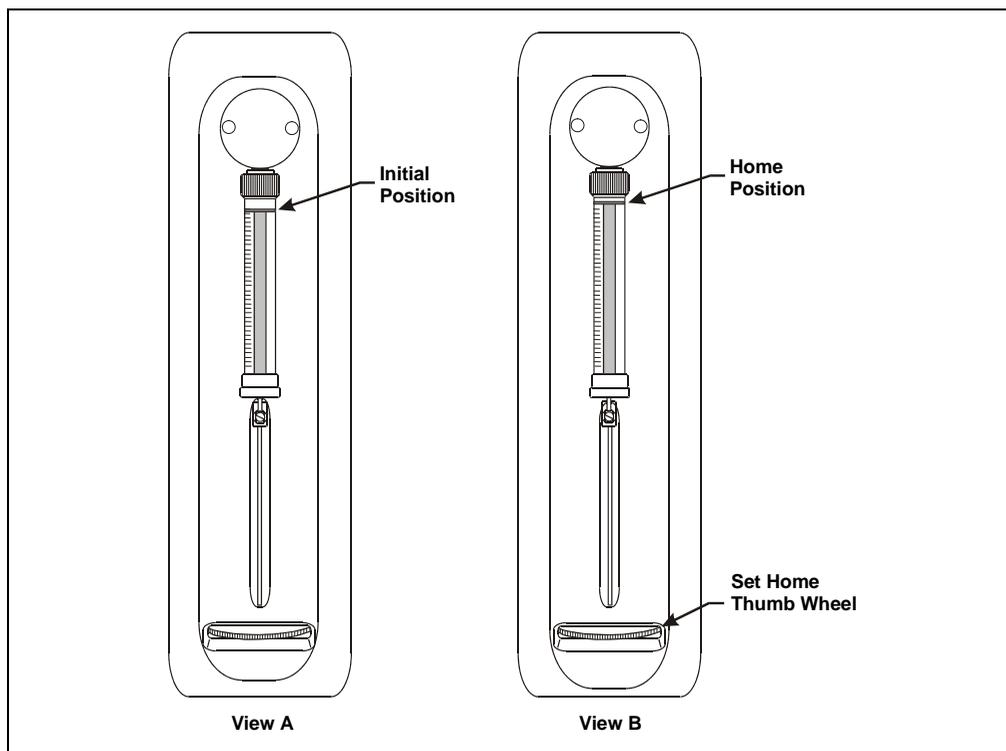


Figure 5-3. Setting the Syringe Home Position

5.3 Replacing the Sampling Needle Assembly

5.3.1 Removing the Old Sampling Needle Assembly

1. Press **Menu**, **8**, and **5** to go to the **LIQUID CONTROL** screen.
2. With the cursor in the **VIAL#** field, press **Select** ▾ to select **FLU** and press **Enter**.

The needle arm moves to the flush port.

3. Turn off the power and open the autosampler door.
4. The sample transfer line tubing that connects the sampling needle to the sample syringe is clipped to the upper-right side of the needle arm (see [Figure 5-4](#)). Using a 2.5 mm Allen wrench, remove the M3 screw that attaches the clip to the sampling arm. Remove the clip and then remove the tubing from the clip.

NOTE Some sampling arms have a clip that is open at the top. This type of clip does not need to be removed. To remove the tubing from the clip, pull the clip out slightly and push the tubing up and out of the clip.

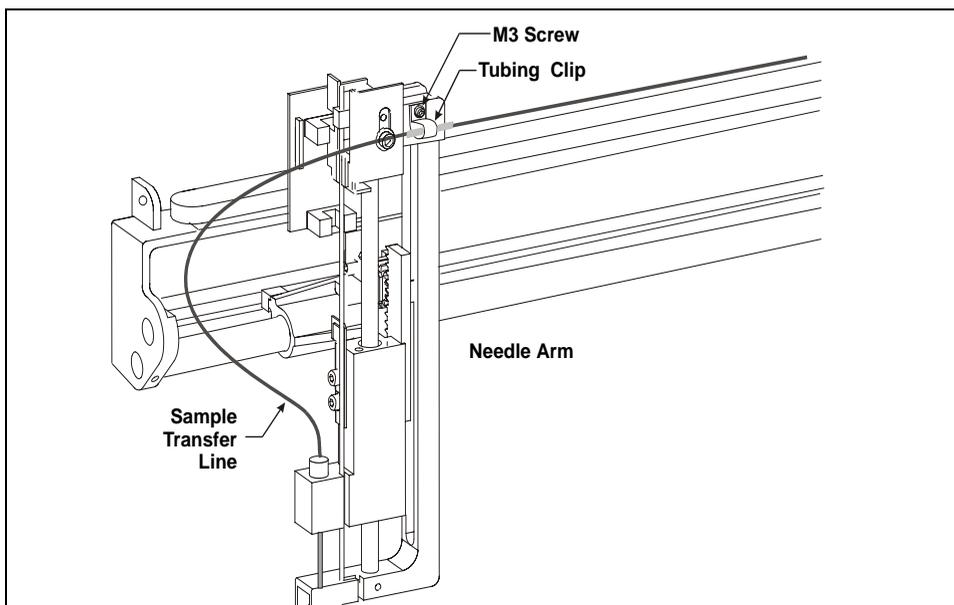


Figure 5-4. Sample Transfer Line and Tubing Clip

AutoSelect AS50 Autosampler

5. Measure the distance from the yellow sleeve on the sample transfer line (see [Figure 5-4](#)) to the needle. When installing the new sample transfer line, position the sleeve on the new line the same distance from the needle.
6. The sample transfer line is coiled and held by a bracket and clamp on the upper-right side of the autosampler compartment (see [Figure 5-5](#)). To remove the tubing, use a flathead screwdriver to gently pry the center bracket apart. Then, lift the tubing out of the bracket and clamp.
7. Measure the distance from the second yellow sleeve (see [Figure 5-5](#)) to the needle. When installing the new sample transfer line, position the sleeve on the new line the same distance from the needle.
8. Disconnect the sample transfer line from port C on the sample syringe valve.
9. Pull the ferrule fitting off the end of the tubing and remove the bolt.
10. Tape one end of a piece of string or other tubing to the end of the sample transfer line. This will help you thread the new line through the autosampler later in the procedure.

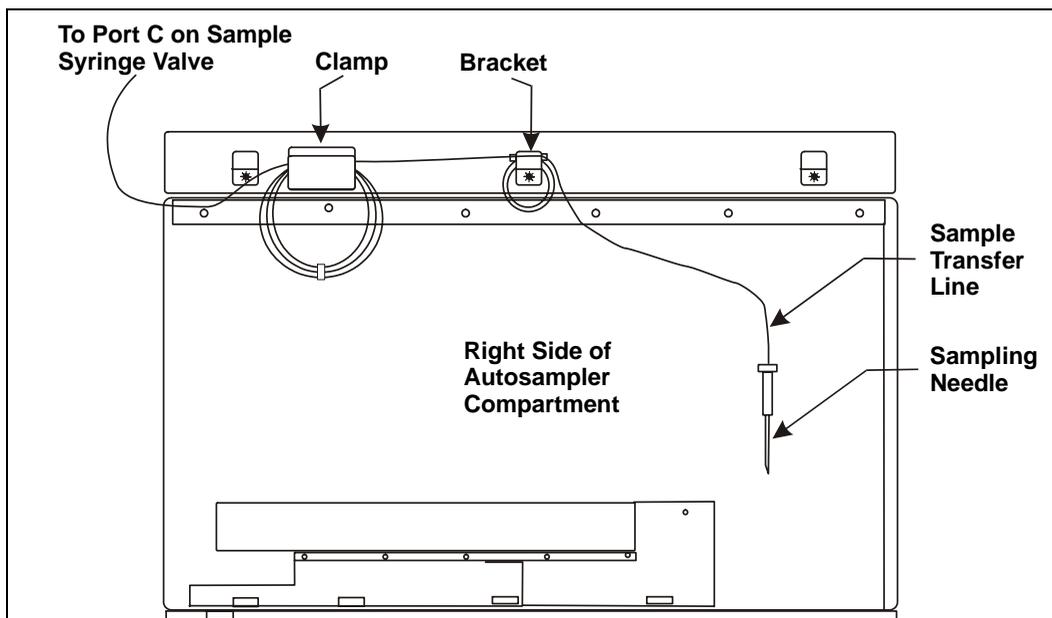


Figure 5-5. Sample Transfer Line Bracket and Clamp (Right Side of Compartment)

11. From the inside of the autosampler, pull the tubing into the autosampler compartment, along with the end of the attached string or tubing.
12. Turn the needle fitting above the needle block (see [Figure 5-6](#)) counterclockwise until it is loose.
13. Pull the needle assembly up and out of the needle block and cradle.
14. Remove the needle assembly from the autosampler.

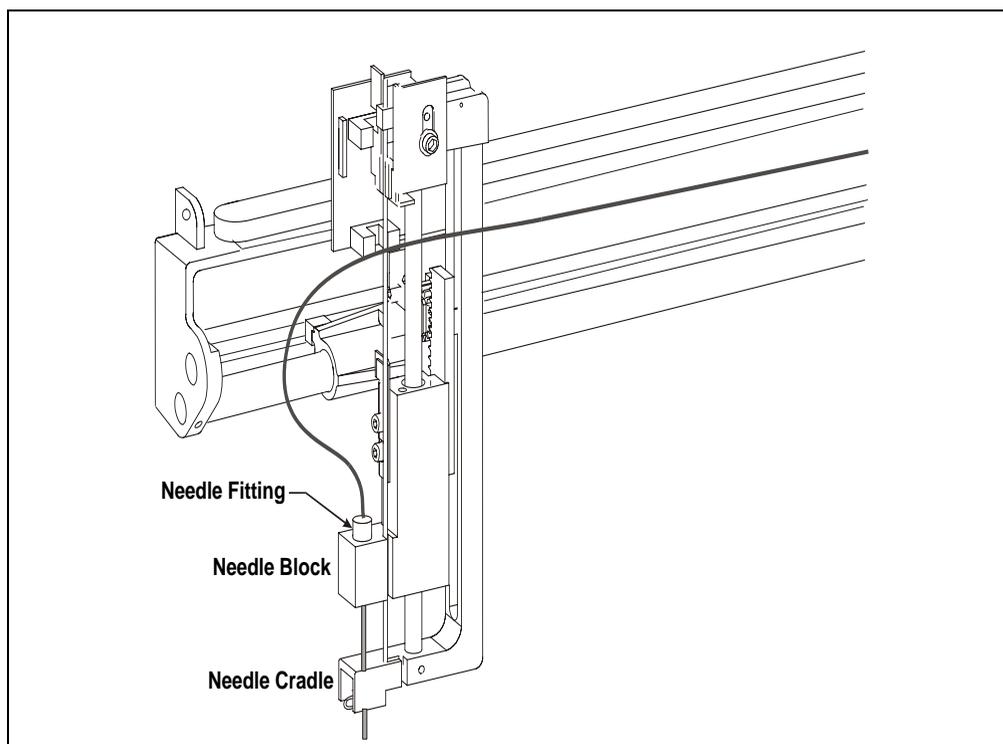


Figure 5-6. Removing the Needle from the Cradle

5.3.2 Installing the New Sampling Needle Assembly

1. [Figure 5-7](#) illustrates the sampling needle assembly.

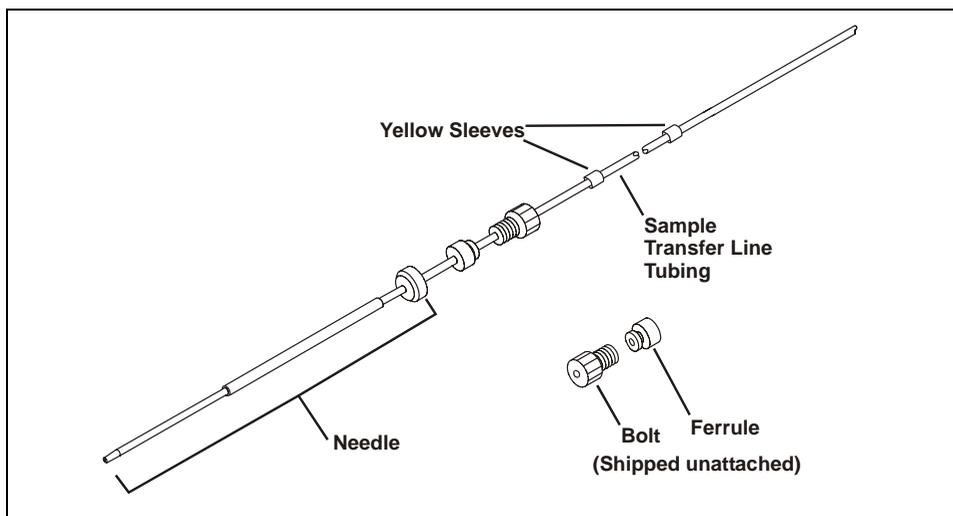


Figure 5-7. Sampling Needle Assembly

2. From the top, carefully insert the needle into the needle block (see [Figure 5-8](#)). Make sure the needle is vertical and centered so that it goes through the opening inside the block.

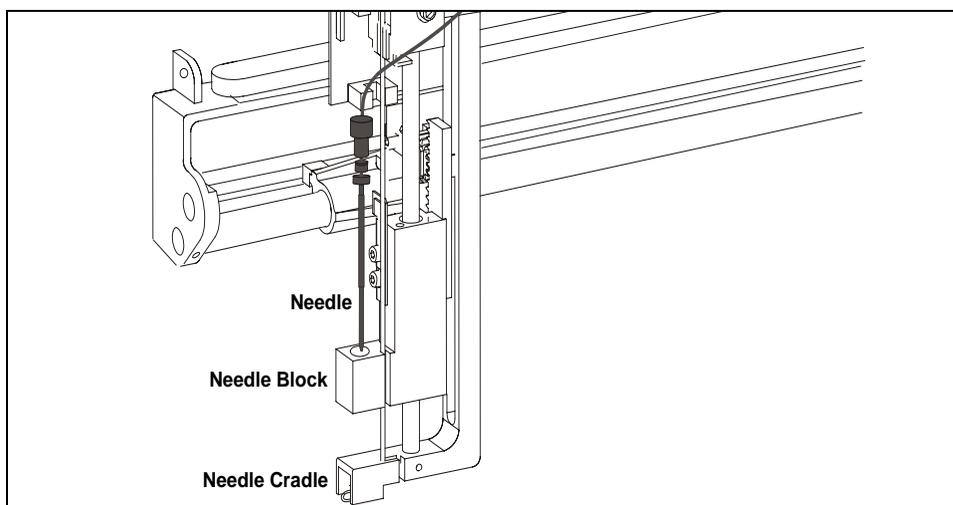


Figure 5-8. Installing the Needle in the Cradle

3. Continue inserting the needle, making sure it is lined up with the opening in the cradle. The needle stops when the fitting on the needle reaches the bottom of the needle block.
4. Insert the bolt into the needle block.
5. With one hand, hold the tubing in place above the bolt to make sure the needle remains vertical and centered in the needle block and cradle. With the other hand, tighten the bolt fingertight.
6. To check the position of the needle inside the cradle, hold the bolt above the needle block and lift the needle up all the way until it stops. Then let it back down, making sure it goes through the center of the needle block and is centered in the cradle.
7. Position the yellow sleeve on the tubing in the position measured in [Section 5.3.1, Step 5](#). Orient the tubing clip up or down, depending on the natural curve of the tubing and attach the clip to the tubing where the yellow sleeve is attached. Screw the clip back onto the needle arm.

IMPORTANT

Do not shorten the sample transfer line tubing. The extra length is required to prevent sample from being pulled into the syringe during operation.

IMPORTANT

The tubing must curve away from the arm assembly when the arm is moved toward the right/front of the autosampler. Adjust the tubing length to the needle when the needle is all the way down.

8. Close the autosampler door and turn on the power. Press **Home** to confirm the tubing moves correctly.
9. Turn off the power and open the door.
10. Position the second yellow sleeve on the tubing in the position measured in [Section 5.3.1, Step 7](#). Loop the tubing at the second yellow sleeve and attach it to the center bracket on the upper-right side of the autosampler compartment (see [Figure 5-5](#)). Use a screwdriver to push the bracket in slightly and hold the tubing securely.

NOTE The front and back brackets on the upper-right side of the compartment are not used.

11. Loop the remaining tubing and hang it on the rear clamp, leaving about 18 inches free.
12. Tape the string that was pulled into the compartment in [Section 5.3.1, Step 11](#), to the free end of the new tubing. Pull the string, along with the tubing, out the back of the compartment.
13. Slide the bolt, large end first, onto the end of the tubing and then slide the ferrule, small end first, onto the tubing (see [Figure 5-9](#)). Slide the ferrule about 10 mm (3/8 in) past the end of the tubing.

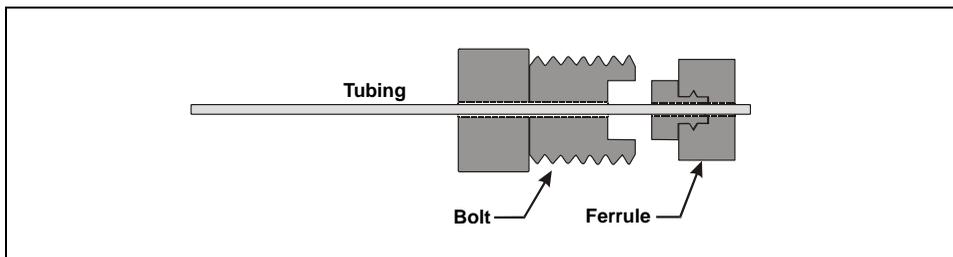


Figure 5-9. Installing the Ferrule Fitting and Bolt

14. Insert the tubing with the bolt and ferrule into port C on the sample syringe and push the tubing snugly into the bottom of the port.
15. Close the autosampler door and turn on the power. As the arm moves to the idle position, verify there is enough slack in the sample transfer line to prevent the tubing from being pulled.
16. Turn off the power and open the door.
17. While holding the tubing with one hand to avoid twisting it, screw the bolt into the port fingertight. This seats the ferrule onto the tubing.

IMPORTANT

If the fitting leaks when operation is resumed, tighten the bolt slightly. Do not overtighten. Overtightening can damage the inside of the valve.

18. Realign the new sampling needle in the inject port. See [Section 5.7](#) for instructions.

5.4 Removing the Drip Tray

1. Using a 2.5-mm Allen wrench, remove the screw that secures the drip tray and remove the injection valve waste line from the front of the tray (see [Figure 5-10](#)).
2. Pull the tray out toward the front of the autosampler about 6 mm (1/4 in).
3. Tilt the bottom of the tray out slightly and push the tray down slightly until the leak sensor on the inside of the tray (see [Figure 5-10](#)) clears the overhang on the front of the sampler.
4. Pull the tray out toward the front of the sampler.
5. The leak sensor is hooked onto the tray and its cable is connected inside the sampler. To remove the drip tray entirely from the sampler, unhook the leak sensor from the tray.

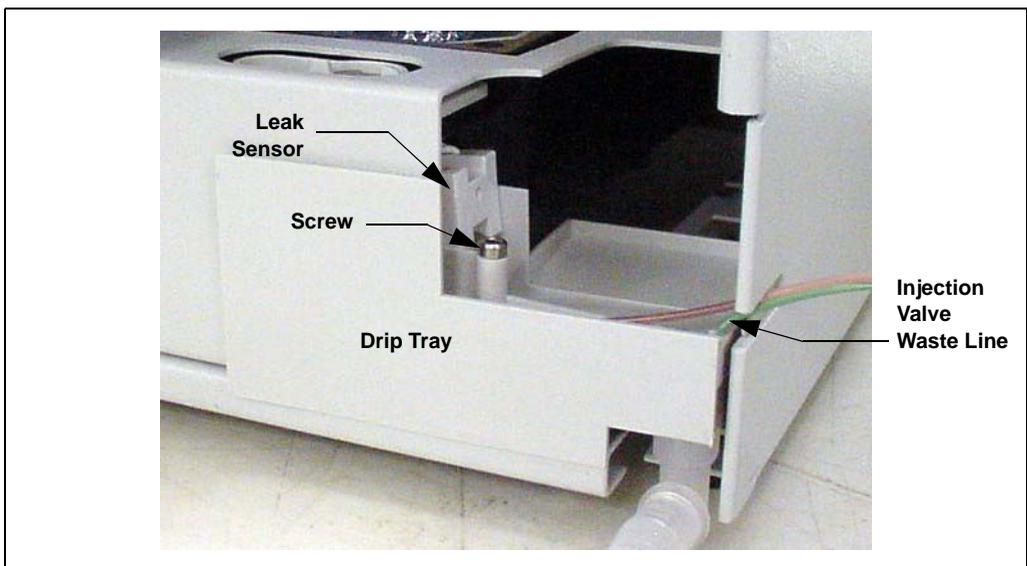


Figure 5-10. Removing the Drip Tray

5.5 Installing the Drip Tray

1. Hook the leak sensor on the tray as shown in [Figure 5-11](#); make sure it is pushed all the way down onto the tray edge.

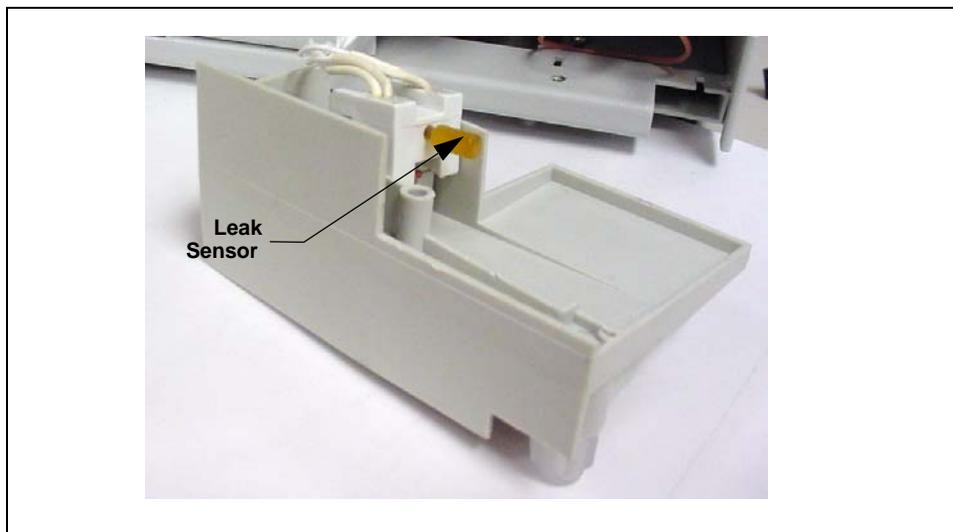


Figure 5-11. Drip Tray with Leak Sensor Installed

NOTE Make sure the bottom wire on the leak sensor is not touching the tray. There should be at least a paper-width gap between it and the tray.

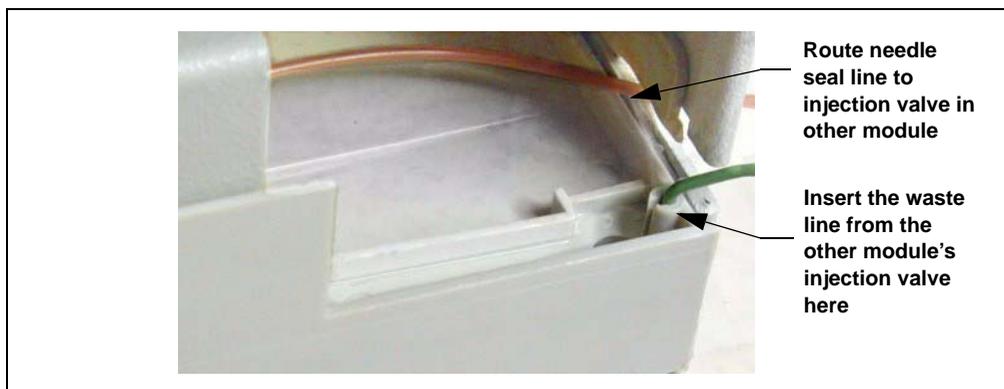
2. Tilt the top of the tray in and the bottom out, and partially slide the tray back into the sampler; make sure the leak sensor clears the front overhang on the autosampler.
3. Make sure the needle seal line is in the front of the tray.
4. Straighten the tray and push it back into the autosampler until it is flush with the front. Replace the screw.

NOTE After installing the drip tray, make sure the tray is not tilted to the left; if it is, liquid will not drain properly during operation.

5. Insert the injection valve waste line into the small round opening at the right front corner of the drip tray. See [Figure 5-12](#) if the injection valve is installed in the AS50, or [Figure 5-13](#) if the valve is in another module.



*Figure 5-12. Routing the Injection Valve Waste Line to the Drip Tray:
Valve Installed in the AS50*



*Figure 5-13. Routing the Injection Valve Waste Line to the Drip Tray:
Valve Installed in Another Module*

6. If the injection valve is installed in a chromatography or thermal compartment, route the needle seal line out the autosampler right side slot to the compartment (see [Figure 5-13](#)).
7. Do not connect the needle seal line to the injection valve until after you align the inject port and calibrate the inject port volume.

5.6 Replacing the Needle Seal Assembly

1. Remove the drip tray (see [Section 5.4](#)).
2. Remove the needle seal line fitting from the injection valve.

If the valve is installed in the autosampler compartment or in a chromatography or thermal compartment, the needle seal line is connected to port 5 on the valve. Using a 5/16-in wrench, turn the fitting counterclockwise to loosen it and then complete the removal with your fingers.

If the injection valve is installed in another module or is a stand-alone valve, refer to the documentation for the module or valve for instructions.

3. Rotate the fitting below the inject port until the slots in the needle seal line up with the projections on the top of the inject port (see [Figure 5-14](#)).

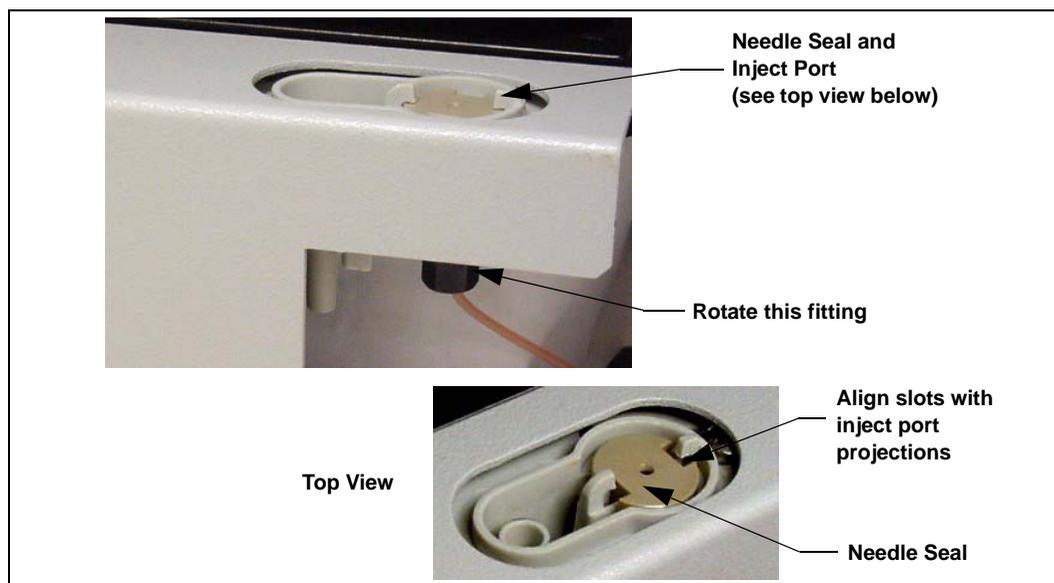


Figure 5-14. Removing the Needle Seal Assembly

4. Push up from underneath and slide the needle seal assembly, including the needle seal line and fitting, up and out of the inject port.

IMPORTANT

Do not cut the needle seal line to shorten it, and do not replace it with a different line. The needle seal line is specially constructed and the autosampler will not function correctly if this line is cut.

5. Thread the new needle seal line (see [Figure 5-15](#)) down through the top of the inject port.

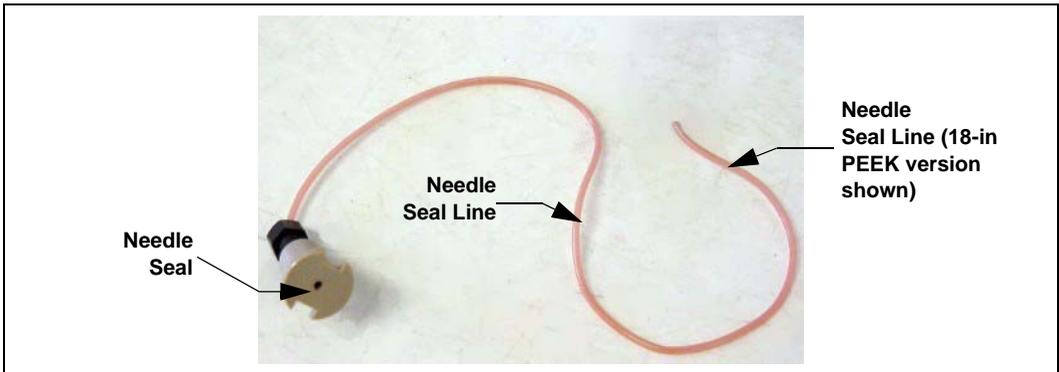


Figure 5-15. Needle Seal Assembly

6. Align the slots on the needle seal with the projections on the inject port and push the needle seal into the inject port.
7. Rotate the bottom fitting until the slots are perpendicular to the projections on the inject port (see [Figure 5-16](#)).

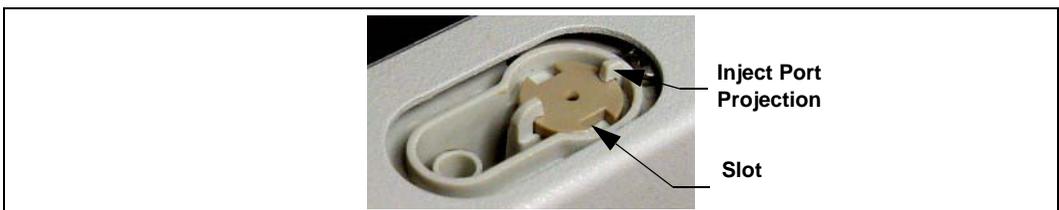


Figure 5-16. Inject Port

8. Reinstall the drip tray (see [Section 5.5](#)).
9. Align the inject port (see [Section 5.7](#)) and then calibrate the inject port volume (see [Section 5.8](#)).

NOTE Do not connect the needle seal line to the injection valve until after aligning the inject port and calibrating the inject port volume.

5.7 Aligning the Inject Port

Align the sampling needle in the inject port after replacing the sampling needle assembly and/or the needle seal assembly, or if the needle becomes misaligned after a period of operation.

NOTE Before aligning the inject port, always inspect the needle to make sure it is not bent. If it is bent, replace the sampling needle assembly (see [Section 5.2](#)).

NOTE This procedure has numerous steps. To help maintain your place in the procedure, check off each step after completing it.

1. Close the autosampler door and turn on the power.
2. For a better view of the needle and inject port during the alignment procedure, you can temporarily disable the door lock to allow operation with the door open.
 - a. From the **MENU of SCREENS**, press **5** and then **7** to go to the **DOOR INTERLOCK BYPASS** screen.

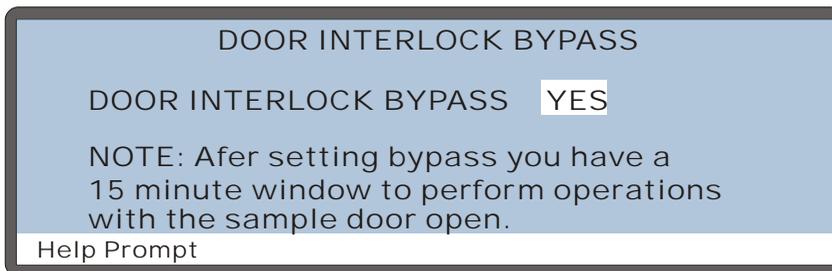


Figure 5-17. Door Interlock Bypass Screen

- b. Press **Select** Δ or **Select** ∇ to select **YES** (bypass the door lock) and press **Enter**. The door lock is disabled for 15 minutes. You can now perform the alignment with the door open. To extend the bypass for another 15 minutes, select **YES** and press **Enter** again. This restarts the 15-minute window.



Be aware of unexpected sampling arm movement when operating with the door open.



Soyez conscient de la possibilité de mouvements imprévus du bras d'échantillon lorsqu'il est utilisé avec la porte ouverte.



Achten Sie beim Betrieb mit geöffneter Tür auf unerwartete Bewegungen des Probenarms.

- Press **Menu** and **6** to go to the **INJECT PORT ALIGNMENT** screen.

INJECT PORT ALIGNMENT

X ADDRESS: 1340
Y ADDRESS: 1930
Z ADDRESS: 230

Help Prompt

Figure 5-18. Inject Port Alignment Screen

- Record the current values in the **X**, **Y**, and **Z ADDRESS** fields.

X _____

Y _____

Z _____
- Verify that the cursor is in the **X ADDRESS** field and press **Enter**.
The needle arm moves to the inject port.
- Move the cursor to the **Z ADDRESS** field and enter **180**. Press **Enter**.
The needle moves down 180 steps. Note: Each step is 0.127 mm (0.005 in).
- Verify that the needle is centered over the inject port opening.
- Adjust the alignment by changing the **X ADDRESS** and/or **Y ADDRESS** values. Change the values in 2- to 5-step increments.

After each value change, press **Enter**. The needle arm moves up and then adjusts to the new X or Y position.

- To move the needle to the right, increase the **X ADDRESS** value.
 - To move the needle to the left, decrease the **X ADDRESS** value.
 - To move the needle forward, increase the **Y ADDRESS** value.
 - To move the needle back, decrease the **Y ADDRESS** value.
9. After each adjustment, move the cursor to the **Z ADDRESS** field (keep the value at **180**) and press **Enter**. The needle arm moves back down. Observe the alignment and adjust the position again if needed.
 10. When the adjustments are complete, press **Home**.
The needle arm moves to the home position.
 11. Press **Enter**.
 12. Position the cursor in the **X** or **Y ADDRESS** field and press **Enter**.
The needle arm moves to the selected X, Y position.
 13. Recheck the alignment and adjust the X and/or Y position, if necessary.
 14. Position the cursor in the **Z ADDRESS** field.
 15. Enter the following value in the **Z ADDRESS** field: **230**.
 16. Press **Enter**.
The needle moves down into the inject port.
 17. Press **Home**.
 18. Press **Menu** three times to return to the **MENU of SCREENS**.
 19. Press **8** to go to the **DIAGNOSTICS MENU** and press **5** to go to the **LIQUID CONTROL** screen.
 20. Select **VIAL#: INJ** and press **Enter**.
The needle moves into the inject port.
 21. Position the cursor in the **FROM** field and select **FLUSH**.
 22. Position the cursor in the **SYRINGE** field and select **SAMPLE**.
 23. Position the cursor in the **ACTION** field and select **FILL**.

24. Press **Enter**.
The syringe fills.
25. Select **SYRINGE SPEED: 5**. This speed ensures a fast enough flow rate to detect a leak.
26. Select **ACTION: EMPTY** and press **Enter**.
27. Repeat the **FILL** and **EMPTY** actions until the new needle seal tubing is filled.
28. Once the tubing is filled and fluid reaches the needle, empty the syringe again and monitor the top of the inject port for fluid.

If fluid appears, first wipe up the leak, and then adjust the needle's Z position down (see the next step).

29. To adjust the needle's Z position:
 - a. Press **Menu, Menu, 5** and **6** to return to the **INJECTION PORT ALIGNMENT** screen.
 - b. Increase the **Z ADDRESS** field value 5 steps and press **Enter**.
 - c. Repeat [Step 17](#) through [Step 26](#), above, and check again for leaks.
 - d. If a leak still occurs, continue increasing the Z address in 5-step increments, checking for leaks after each increase, until no more leaks occur.

NOTE Increase the Z address only until no more leaks occur. If the Z address is too large, the needle will hit the bottom of the port during operation and can damage the needle or port.

30. When all adjustments are complete, press **Home**.
31. Factory calibration settings are recorded on a label on the inside of the autosampler compartment door. If you changed the X, Y, or Z inject port coordinates during alignment, record the new value(s) on the label.
32. If you are performing this procedure after replacing the needle seal assembly, calibrate the inject port volume (see [Section 5.8](#)).

5.8 Calibrating the Inject Port Volume

Calibrate the inject port volume after replacing the needle seal assembly, or if reproducibility between injections is poor.

NOTE This procedure has numerous steps. To help maintain your place in the procedure, check off each step after completing it.

1. Disconnect the needle seal line fitting from port 5 of the injection valve.
2. Press **Menu**, **8**, and **5** to go to the **LIQUID CONTROL** screen.
3. With the cursor in the **VIAL#** field, press **Select** ▾ to select **INJ** and press **Enter**.

The needle arm moves to the inject port.

4. Select the following options:
Note: Throughout the procedure, retain the current or default settings for options that are not listed.

from FLUSH
SYRINGE SPEED: 5
SYRINGE: SAMPLE
ACTION: FILL

5. Press **Enter**.
Note: Throughout the procedure, to initiate the selected action, the cursor must be in the **ACTION** field when you press Enter.

6. Select **ACTION: EMPTY** and press **Enter**.

7. Select the following options:

ASPIRATE: 60 µL
from NEEDLE
SYRINGE SPEED: 3
ACTION: ASPIRATE

8. Press **Enter**.
9. Select **VIAL#: FLU** and press **Enter**.

The needle arm moves to the flush port.

10. Select **ACTION: EMPTY** and press **Enter**.

11. Select the following options:
from FLUSH
SYRINGE SPEED: 5
ACTION: FILL
12. Press **Enter**.
13. Select the following options:
DISPENSE: 50 μL
SYRINGE SPEED: 5
ACTION: DISPENSE
14. Press **Enter**.
15. Select **VIAL#: INJ** and press **Enter**.
The needle arm moves to the inject port.
16. Select the following options:
DISPENSE: 1 μL
SYRINGE SPEED: 1
ACTION: DISPENSE
17. Press **Enter**.
The syringe dispenses 1 μL .
18. Continue pressing **Enter**, counting each key press, **until a tiny drop of liquid appears at the end of the needle seal line**. After each key press, wait until the sound of the syringe motor stops before pressing Enter again.
19. Record the number of times you pressed Enter (including the first time in [Step 17](#)). Also, notice the size of the liquid drop. This will be compared to the size of the liquid drop in [Step 32](#).
20. Select the following options:
ASPIRATE: 60 μL
from NEEDLE
SYRINGE SPEED: 3
ACTION: ASPIRATE
21. Press **Enter**.

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22. Select **VIAL#: FLU** and press **Enter**.
The needle arm moves to the flush port.
23. Select the following options:
SYRINGE SPEED: 5
ACTION: EMPTY
24. Press **Enter**.
25. Select the following options:
from FLUSH
SYRINGE SPEED: 5
ACTION: FILL
26. Press **Enter**.
27. Select the following options:
DISPENSE: 50 μ L
SYRINGE SPEED: 5
ACTION: DISPENSE
28. Press **Enter**.
29. Select **VIAL#: INJ** and press **Enter**.
The needle arm moves to the inject port.
30. Select the following options:
DISPENSE: # of key presses (microliters) recorded in [Step 19](#)
SYRINGE SPEED: 3
ACTION: DISPENSE
31. Press **Enter**.
32. Verify that a drop of liquid appears at the end of the needle seal tubing. If no drop appears or if the size of the drop is different, repeat [Step 7](#) through [32](#).
33. Select **VIAL#: FLU** and press **Enter**.
34. Select the following options:
SYRINGE SPEED: 5
ACTION: EMPTY
35. Press **Enter**.

36. Press **Home** to move the needle arm to the home position.
37. Press **Menu** twice to go to the **MENU of SCREENS**.
38. Press **5** twice to go to the **SYSTEM PARAMETERS** screen (see [Figure 5-19](#)).

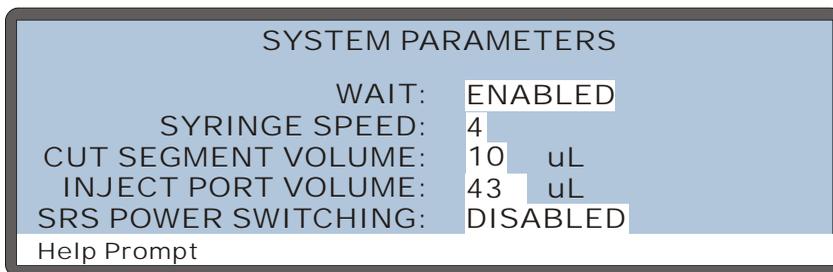


Figure 5-19. System Parameters Screen

39. In the **INJECT PORT VOLUME** field, enter the # of key presses (microliters) recorded in [Step 19](#).
40. Press **Enter**.
41. Factory calibration settings are recorded on a label on the inside of the autosampler compartment door. Record the new inject port volume on the label.
42. If you are performing this procedure after replacing the needle seal assembly:
 - a. Slide the bolt and ferrule removed from the old needle seal line onto the end of the new needle seal line, or install a new bolt and ferrule fitting.
 - b. Connect the needle seal line fitting to the injection valve. Tighten the fitting fingertight and then tighten it an additional one-quarter turn using the 5/16-in wrench.

5.9 Replacing the Leak Sensor

1. Remove the autosampler drip tray (see [Section 5.4](#)).
2. Unhook the leak sensor from the drip tray and pull the leak sensor cable out until the connector is visible.
3. Unplug the old leak sensor and connect a new leak sensor (P/N 053669).
4. Attach the sensor to the drip tray, push the cable inside the autosampler compartment, and reinstall the drip tray (see [Section 5.5](#)).

NOTE After installing the drip tray, make sure the tray is not tilted to the left; if it is, liquid will not drain properly during operation.

5.10 Calibrating the Leak Sensor

1. Remove the drip tray from the autosampler (see [Section 5.4](#)) and thoroughly clean and dry the tray and sensor.
2. Replace the sensor in the tray and reinstall the drip tray (see [Section 5.5](#)).

NOTE Make sure the bottom wire on the leak sensor is not touching the tray. There should be at least a paper-width gap between it and the tray.

NOTE Make sure the tray is not tilted to the left; if it is, liquid will not drain properly during operation.

3. Press **Menu**, **8**, and **0** to go to the **LEAK SENSOR CALIBRATION AND STATUS** screen.
4. Press **Select** Δ or **Select** ∇ to select **CAL** and then press **Enter**.
5. The current measured value becomes the new calibration value.

5.11 Removing the Sample or Prep Syringe Valve

1. Press **Menu**, **5**, and **3** to go to the **PLUMBING CONFIGURATION** screen.
2. Move the cursor to the **SAMPLE SYRINGE CONFIG** field or the **PREP SYRINGE CONFIG** field (depending on which syringe requires initialization).
3. Press **Select** Δ to select the **INITIALIZE** option.
4. Press **Enter**.

The syringe plunger moves to the initial position and the syringe motor then shuts off to allow you to remove the valve.

5. Unscrew and remove the syringe drive connecting screw and the two screws on the syringe valve (see [Figure 5-20](#)).
6. Pull the valve and syringe assembly straight out to remove it.
7. Holding the syringe at the top fitting, unscrew it from the valve.
8. Set the syringe aside in a safe place.

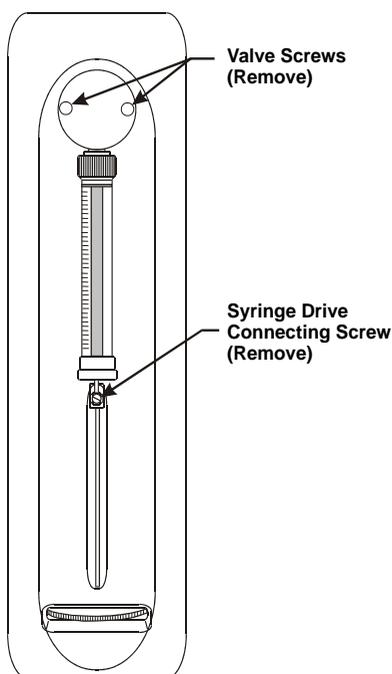


Figure 5-20. Removing the Syringe Valve

5.12 Replacing the Sample Syringe Valve

1. Disconnect the liquid lines from the existing valve.
2. Remove the existing valve (see [Section 5.11](#)).

3. When the valve is removed, the syringe drive shaft is visible. When the syringe is in the initial position (the position selected when the valve was removed), the slot in the drive shaft should be horizontal (see [Figure 5-21](#)).

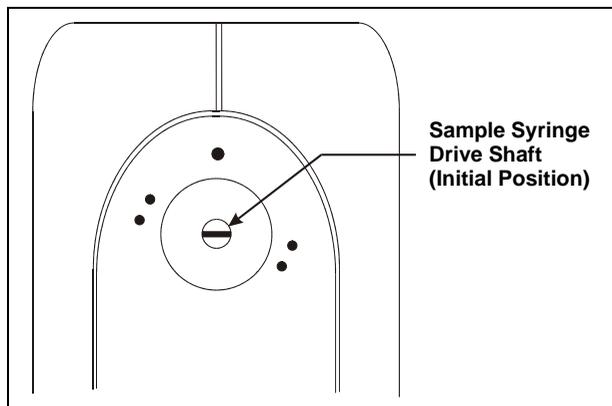


Figure 5-21. Sample Syringe Drive Shaft Initial Position

If the slot in the drive shaft is not horizontal, the syringe drive may need replacing. Contact Dionex for assistance. Do not attempt to manually turn the drive shaft.

4. Check the back of the new sample syringe valve (P/N 054242). The valve drive shaft should be perpendicular to valve ports A and D (see [Figure 5-22](#)).

If it is not, rotate the valve rotor until the drive shaft is in the correct position.

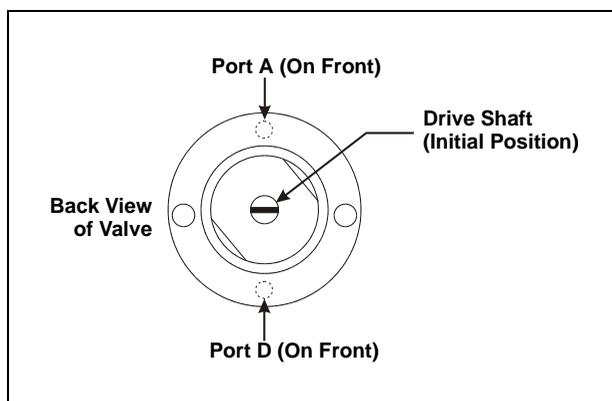


Figure 5-22. Sample Syringe Valve Drive Shaft Initial Position

5. Each valve port must contain a white Teflon washer. Check the inside of each port and insert a washer (P/N 061315), if one is not already present. The washers are supplied with the valve and with the AS50 Preventive Maintenance Kit (P/N 060581).
6. Holding the syringe at the top fitting, screw it into the bottom of the valve at port D and tighten fingertight.
7. With valve ports A and D at the 12 o'clock and 6 o'clock positions, push the valve onto the syringe drive shaft.
8. Replace the two valve thumbscrews and partially tighten.
9. Carefully align the syringe piston with the connecting screw mount on the syringe drive.
10. Insert the syringe drive connecting screw and tighten fingertight. Finish tightening the valve thumb screws.
11. Reconnect the valve liquid lines. Tighten the fittings fingertight.

IMPORTANT

If a fitting leaks after operation is resumed, tighten it slightly. Do not overtighten; overtightening can damage the inside of the valve.

12. Set the syringe home position (see [Section 5.2.5](#)).
13. On the **PLUMBING CONFIGURATION** screen, move the cursor to the **SAMPLE SYRINGE VOLUME** field. Press **Select** Δ or **Select** ∇ to select the syringe volume. Press **Enter**.

5.13 Replacing the Prep Syringe Valve

1. Disconnect the liquid lines from the existing valve.
2. Remove the existing valve (see [Section 5.11](#)).

3. When the valve is removed, the syringe drive shaft is visible. When the syringe is in the initial position (the position selected when the valve was removed), the slot in the drive shaft should be in the 11 o'clock position (see [Figure 5-23](#)).

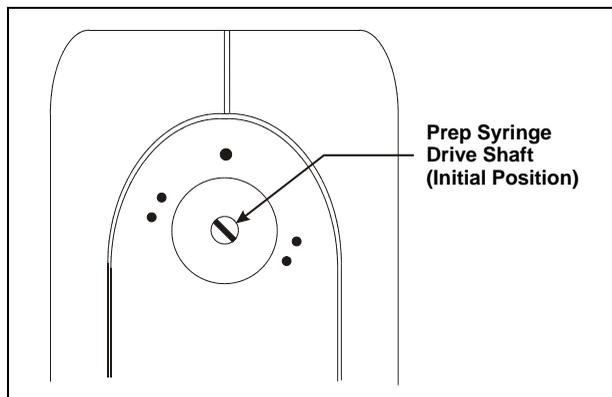


Figure 5-23. Prep Syringe Drive Shaft Initial Position

If the slot in the drive shaft is not in this position, the syringe drive may need replacing. Contact Dionex for assistance. Do not attempt to manually turn the drive shaft.

4. Check the back of the new prep syringe valve (P/N 054243). The valve drive shaft should be perpendicular to valve ports N and D (see [Figure 5-24](#)).

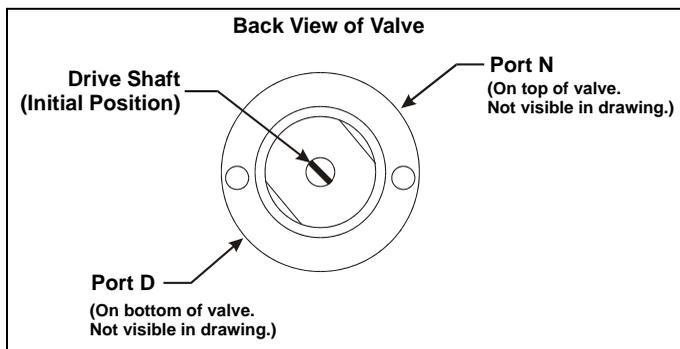


Figure 5-24. Prep Syringe Valve Drive Shaft Initial Position

If it is not, rotate the valve rotor until the drive shaft is in the correct position. To check the position, insert the end of a paper clip into valve port N. The paper clip should be inserted fully into the port.

5. Each valve port must contain a white Teflon washer. Check the inside of each port and insert a washer (P/N 061315), if one is not already present. The washers are supplied with the syringe valve and with the AS50 Preventive Maintenance Kit (P/N 060581).
6. Holding the syringe at the top fitting, screw it into the bottom of the valve at port S and tighten fingertight.
7. With valve ports L and B at the 12 o'clock position and the syringe at the 6 o'clock position, push the valve onto the syringe drive shaft.
8. Replace the two valve thumbscrews and partially tighten.
9. Carefully align the syringe piston with the connecting screw mount on the syringe drive.
10. Insert the syringe drive connecting screw and tighten fingertight. Finish tightening the valve thumbscrews.
11. Reconnect the valve liquid lines. Tighten the fittings fingertight.

IMPORTANT

If a fitting leaks when operation is resumed, tighten it slightly. Do not overtighten. Overtightening can damage the inside of the valve.

12. Set the syringe home position (see [Section 5.2.5](#)).
13. On the **PLUMBING CONFIGURATION** screen, move the cursor to the **PREP SYRINGE VOLUME** field. Press **Select** Δ or **Select** ∇ to select the syringe volume. Press **Enter**.

5.14 Changing the Main Power Fuses

The fuse holder is part of the main power receptacle on the rear panel of the AS50 autosampler compartment. The optional thermal compartment also has a fuse holder on its rear panel. Instructions for each vary slightly.

5.14.1 Changing the Autosampler Compartment Fuses

1. Turn off the main power.



HIGH VOLTAGE—Disconnect the main power cord from its source and also from the rear panel of the AS50.



HAUTE TENSION—Débranchez le cordon d'alimentation principal de sa source et du panneau arrière du AS50.



HOCHSPANNUNG—Ziehen Sie das Netzkabel aus der Steckdose und der Netzbuchse auf der Rückseite des AS50.

2. A recessed lock is located on each side of the fuse holder (see [Figure 5-25](#)). Using a small screwdriver, push each lock toward the center to release it. The fuse holder pops out approximately 0.16 cm ($1/16$ in) when the locks release. When both locks are released, pull the fuse holder straight out of its compartment.

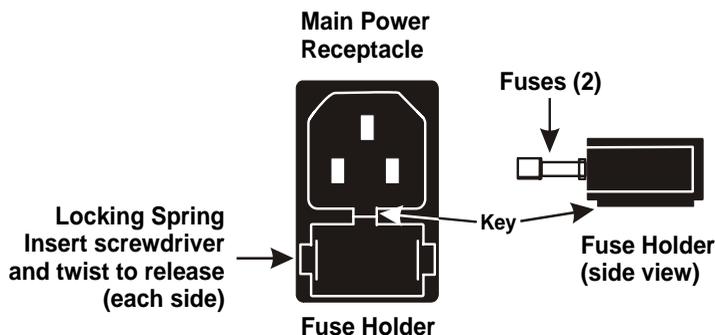


Figure 5-25. Autosampler Compartment Main Power Fuse Holder

3. The holder contains two fuses. Replace both with new 3.15 amp fast-blow IEC127 fuses (P/N 954745). Dionex recommends replacing both fuses.
4. Reinsert the fuse holder into its compartment. The fuse holder is keyed to fit only in its proper orientation. Apply sufficient pressure evenly against the holder to engage the two locks. The holder is flush against the panel when both locks are engaged.
5. Reconnect the main power cord and turn on the power.

5.14.2 Changing the Thermal Compartment Fuses

1. Turn off the main power.



HIGH VOLTAGE—Disconnect the main power cord from its source and also from the rear panel of the AS50.



HAUTE TENSION—Débranchez le cordon d'alimentation principal de sa source et du panneau arrière du AS50.



HOCHSPANNUNG—Ziehen Sie das Netzkabel aus der Steckdose und der Netzbuchse auf der Rückseite des AS50.

2. The fuse drawer is located below the main power receptacle (see [Figure 5-26](#)). Squeeze the tab in the center top of the drawer and pull the drawer out.

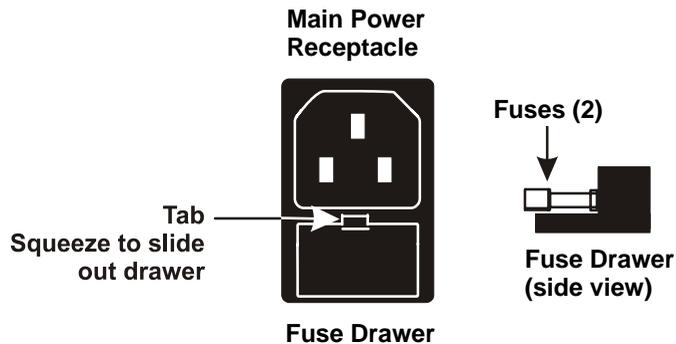


Figure 5-26. Thermal Compartment Main Power Fuse Holder

3. The drawer contains two fuses. Replace both with new 3.15 amp fast-blow IEC127 fuses (P/N 954745). Dionex recommends replacing both fuses.
4. Reinsert the fuse drawer until it is flush against the receptacle panel.
5. Reconnect the main power cord and turn on the power.

5.15 Isolating a Restriction in the Liquid Plumbing

This section applies to systems that include a chromatography or thermal compartment. A restriction in the liquid plumbing will cause excessive system backpressure.

1. Run the pump at the flow rate normally used.
2. Follow the appropriate plumbing schematic (see Figures B-29 – B-34) and work backward through the system, beginning at the cell exit. One at a time, loosen each fitting and observe the pressure. The connection at which the pressure drops abnormally indicates the point of restriction.
3. If the restriction has caused such high pressure that the system cannot be operated, you must work forward through the flow schematic, adding parts one at a time until an abnormal pressure increase (and hence, the restriction) is found.
4. If the restriction is in the tubing or fitting, remove the restriction either by back flushing or by replacing the tubing or fitting.

A • Specifications

A.1 Autosampler

A.1.1 Electrical

Main Power 100 Vac to 240 Vac, 50/60 Hz; 6 amps. The AS50 power supply is main voltage auto-sensing and requires no adjustment.

Fuses Two 3.15 amp fast-blow IEC127 fuses (P/N 954745)

A.1.2 Environmental/Physical

Ambient Operating Temperature 10 °C to 40 °C (50 °F to 104 °F)

Operating Humidity 10% to 95% relative humidity, non-condensing

Decibel Level <60 db (at “A WEIGHING” setting)

Dimensions 58 cm high x 30 cm wide x 46 cm deep (23 in x 12 in x 19 in)

Weight < 30 kg (< 65 lb)

A.1.3 Valves (Optional)

Injection	Two-position, six-port, electrically-activated Rheodyne valve IC version: PEEK with Tefzel® rotor seal HPLC version: Stainless steel with Vespel® rotor seal
Column Switching	Two-position, ten-port, electrically-activated Rheodyne valve IC version: PEEK with Tefzel rotor seal HPLC version: Stainless steel with Vespel rotor seal

A.1.4 Injection

Injections Per Vial	1 to 99
Vial Sizes Available	0.3 mL polymer vials (P/N 055428, package of 100) 1.5 mL glass vials (P/N 055427, package of 100) 10 mL PolyVials (P/N 055058, package of 100)
Variable Volume Range	1 to 100 µL in 0.1 µL increments 100 to 1000 µL in 1 µL increments
Injection Loop Size	IC version: 25 µL standard; other sizes are available HPLC version: 20 µL standard; other sizes are available

A.2 Sample Temperature Control Unit (Optional)

Temperature Control Range 4 °C to 60 °C in 1 °C increments at 24 °C (75 °C) ambient, stable to ± 0.2 °C

Operating Humidity 5% to 90% relative humidity, noncondensing
Cooling capacity is slightly reduced at high humidity

Dimensions (Sample Temp. + Autosampler) 65 cm high x 30 cm wide x 46 cm deep (2.75 in x 12 in x 19 in)

Weight (Sample Temp. + Autosampler) <38 kg (<81 lb)

A.3 Chromatography Compartment (Optional)

Dimensions 50 cm high x 17.5 cm wide x 40 cm deep (20 in x 7 in x 16 in)

Weight 9 kg (20 lb)

A.4 Thermal Compartment (Optional)

Dimensions	50 cm high x 17.5 cm wide x 40 cm deep (20 in x 7 in x 16 in)
Weight	18 kg (40 lb)
Temperature Control Range (IC Mode)	10 °C to 40 °C in 1 °C increments, stable to ± 0.2 °C
Temperature Control Range (HPLC Mode)	10 °C to 80 °C in 1 °C increments, stable to ± 0.2 °C
Ambient Operating Temperature	10 °C to 40 °C (50 °F to 104 °F)
Delay Volume	< 100 μ L

This chapter provides installation instructions for the initial setup of the AutoSelect AS50 Autosampler. Instructions for installing optional features, such as the chromatography or thermal compartments and the DX-LAN interface, are also provided.

B.1 Facility Requirements

- Make sure the AS50 meets the power and environmental specifications listed in Appendix A.
- Install the AS50 on a sturdy workbench at a height that ensures convenient viewing of the front panel display and access to the interior.



Two or more persons should lift the AS50, which weighs more than 18 kg (40 lb). Lift the AS50 only from each side of the cabinet bottom. Lifting from the front door will damage the door hinges.



Au moins deux personnes peuvent soulever l'AS50, qui pèse plus de 18 kg (40 lb). Ne soulevez l'AS50 que par chaque côté du fond de l'armoire. Son soulèvement par la porte du panneau avant endommagera les charnières de la porte.



Der AS50 hat ein Gewicht von mehr als 18 kg. Daher sollte er nur von zwei oder mehr Personen angehoben werden. Greifen Sie an jeder Seite unter das Gerät. Heben Sie den AS50 nicht an der Vordertür an. Dadurch könnten die Scharniere der Tür beschädigt werden.

B.2 Unpacking

1. Remove the top of the AS50 shipping box and locate the unpacking instructions included inside. The unpacking instructions are also included in Appendix E.
2. Follow the instructions to unpack the module.

IMPORTANT

After unpacking, save the shipping restraints. To stabilize the sampling arm and prevent damage, always replace these shipping restraints before moving or shipping the AS50.

3. If desired, set the AS50 on the bench sideways while installing it, to allow easy access to the rear panel connections.

B.2.1 Recommended System Layouts

Figures B-1 through B-3 show the layouts for three different system configurations. Place the AS50 and the other system module(s) on the workbench as shown in the layout for your system.

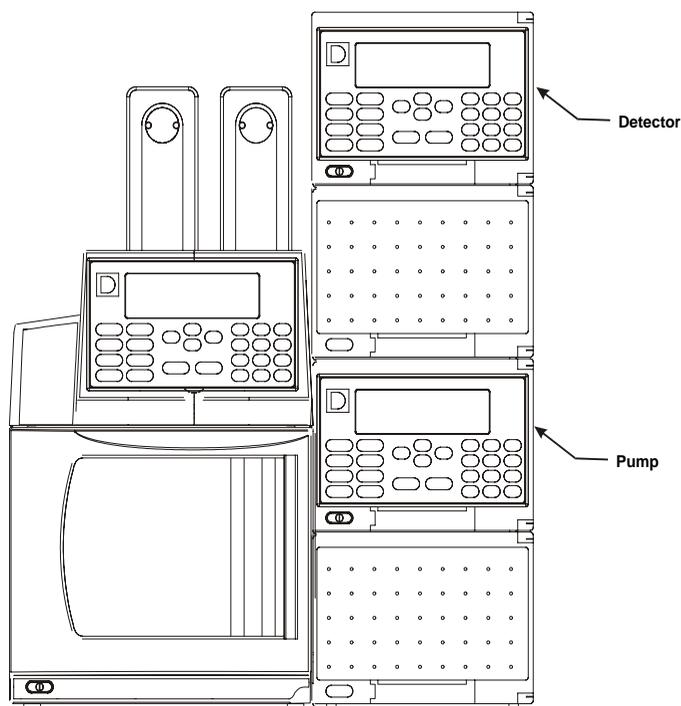


Figure B-1. Recommended Layout for a DX-500 System without an AS50 Chromatography or Thermal Compartment

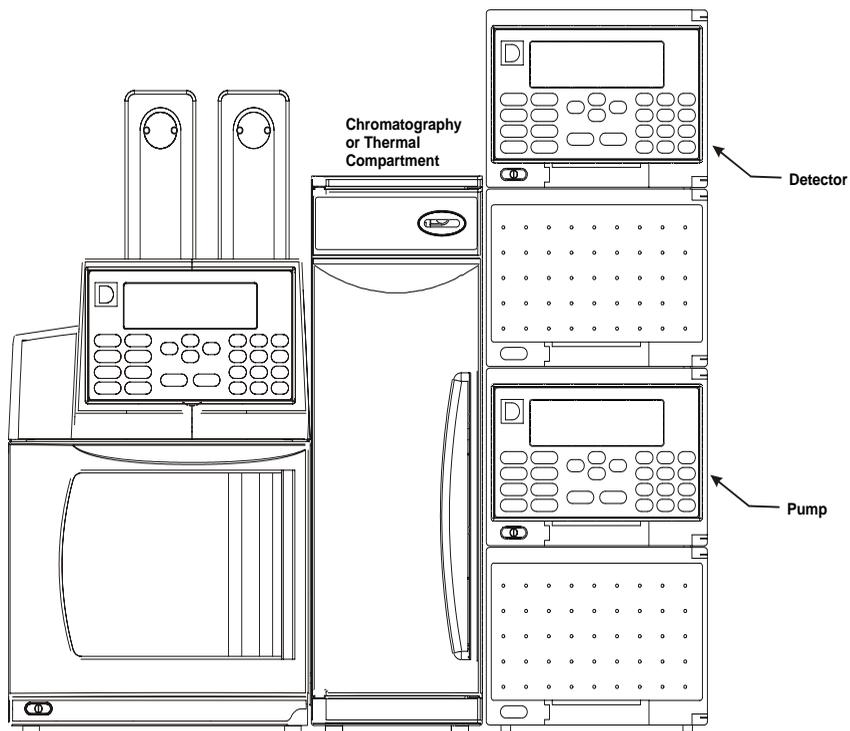


Figure B-2. Recommended Layout for a DX-500 System with an AS50 Chromatography or Thermal Compartment

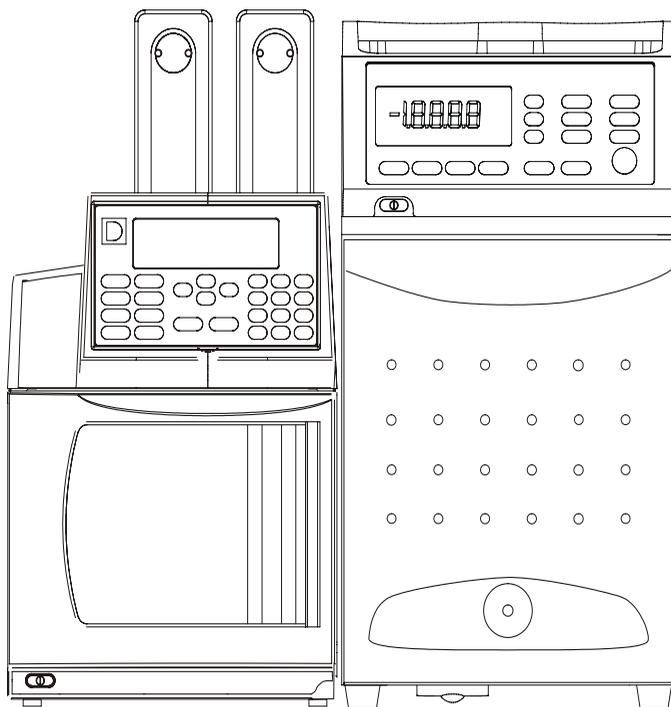


Figure B-3. Recommended Layout for a DX-120 System

B.3 Autosampler Installation

NOTE If you are installing a chromatography or thermal compartment, also see [Section B.4](#).

B.3.1 Installation Checklist

- Connect the following cables to the AS50 rear panel: power cord, syringe cable(s), TTL/relay cables (optional), DX-LAN cable (optional), thermal or chromatography compartment cables (optional)
- Connect the syringe(s) and drain line:
 - Connect the needle/sample transfer line to the sample syringe
 - Fill the flush reservoir and connect it to the sample syringe
 - (For sample prep option only) Fill the eluent reservoir(s) and connect them to the prep syringe
 - Connect the drain line and place it in a waste container
- Connect the injection valve to the pump and column
- Plug the power cord into a grounded power source and turn on the system power
- Select module setup options:
 - Select plumbing configuration options
 - Initialize the syringe(s)
 - Set the time and date
 - Set up the AS50 for remote control or for use as the system master
- Prime the liquid lines

B.3.2 Rear Panel Connections

Refer to [Figure B-4](#) when completing the following steps.

1. Connect the power cord (IEC 320 C13) to the main power receptacle on the AS50 rear panel.
2. Connect the cable from the sample syringe to the **SAMPLE SYRINGE** connector on the rear panel.
3. (Optional) If the sample prep option is installed, connect the cable from the prep syringe to the **PREP SYRINGE** connector on the rear panel.
4. (Optional) For software control, connect the AS50 to the DX-LAN network (see [Section B.3.3](#)).
5. (Optional) For TTL/relay control, connect TTL/relay cables between the AS50 and the pump and/or detector. See Appendix D for details.
6. (Optional) Connect an RS-232 printer control cable to the RS-232 connector.

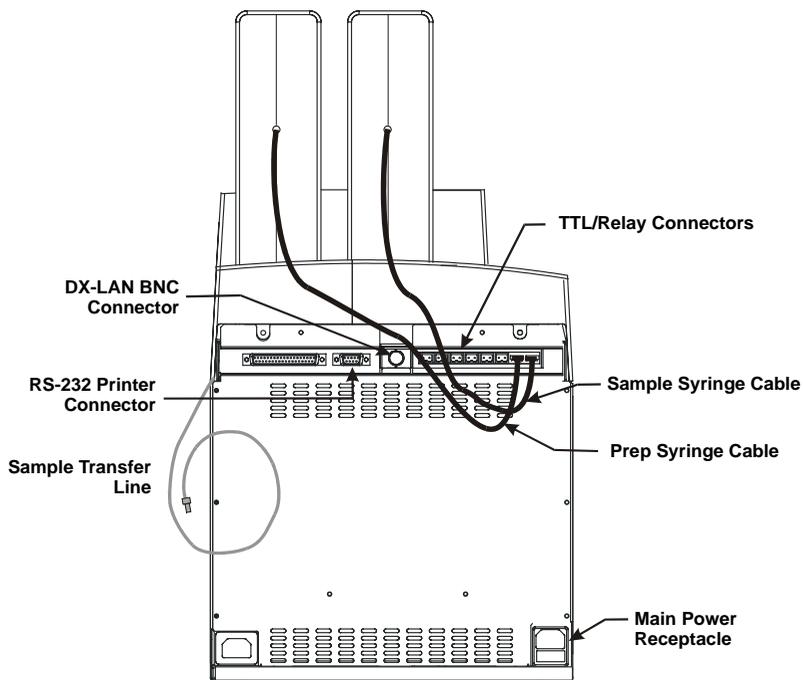


Figure B-4. AS50 Rear Panel Connections

B.3.3 DX-LAN Network Connection (Optional)

For the AS50 to communicate with 58 software, a DX-LAN cable (P/N 960404) must be connected to a DX-LAN BNC tee connector (P/N 921914) on the rear panel.

The tee connector and cable are shipped with the AS50.

1. Install the BNC tee connector (P/N 921914):
 - a. Note the two small locking pins on either side of the DX-LAN BNC connector on the rear panel (see [Figure B-4](#)).
 - b. Push the tee connector onto the BNC connector and twist until the locking pins are fully engaged in the slots on the tee connector.
 - c. Pull firmly on the tee connector to verify that it cannot move.
2. Install the DX-LAN cable (P/N 960404):

- a. Push the metal sleeve on the end of the DX-LAN cable onto one port of the BNC tee connector.
- b. Twist the metal sleeve until the locking pins on the tee are fully engaged in the slots on the cable's metal sleeve.
- c. Pull the end of the cable to verify that it cannot move.

IMPORTANT

The DX-LAN cable is a 50 ohm coaxial impedance cable. (Fifty ohm cables are imprinted with “RG-58U.”) Do not substitute an inferior cable, such as a 75 ohm television coaxial cable. Failure to install the correct cable or to lock it into place on the BNC tee connector will cause the AS50 to lose communication with the data system.

3. If the AS50 is the last module in the network to be connected, install a terminator resistor plug (P/N 921034), shipped with Chromeleon software, on the remaining port of the BNC tee connector. If this is not the last module, connect the cable from the next module to the BNC tee.

IMPORTANT

Terminator resistor plugs must be installed at each end of the DX-LAN network. Verify that both ends of the DX-LAN have terminator resistor plugs installed.

B.3.4 Syringe(s) and Drain Line Connections

Refer to [Figure B-5](#) when completing the following steps.

1. Remove the acorn nut from the fitting on the sample transfer line, which extends from the AS50 rear panel. Gently pull the line out the rear panel until there is enough free tubing (about 18 in) to route the line to the front of the sample syringe.
2. Remove the 1/4-28 plug from port C on the sample syringe valve. Make sure the white Teflon O-ring remains installed inside the port.
3. Connect the sample transfer line to port C.
4. Fill the flush reservoir (P/N 046545) with flush fluid and place it in the organizer.
5. Remove the 1/4-28 plug from port E on the sample syringe. Make sure the white Teflon O-ring remains installed inside the port.

6. Remove the acorn nut from the line that extends from the flush reservoir cap and connect the line to port E.
7. Place the end of the drain line that extends from the lower right front corner of the autosampler, or from the sample temperature control unit (if present), into a waste container.

IMPORTANT

For correct drainage, make sure the tubing is not bent, pinched, or elevated at any point. Do not allow the end of the waste line to be submerged in waste liquid.



Neutralize acidic and caustic wastes before disposal. Dispose of all wastes in accordance with local regulations.



Neutralisez les déchets acides ou caustiques avant de les jeter. Jetez les déchets aux règlements locaux.



Neutralisieren Sie säurehaltige und ätzende Abfälle vor ihrer Entsorgung. Entsorgen Sie alle Abfälle entsprechend den lokalen Bestimmungen.

For sample preparation option installation:

1. Fill the reagent reservoir(s) (P/N 043494) with the desired reagent(s) and place them in the organizer.
2. If you are installing a single reagent reservoir, connect the line that extends from port A on the prep syringe valve to the reservoir cap.
3. If you are installing additional reagent reservoirs, connect the lines from ports B, C, and/or D to the additional reservoirs.

NOTE Port letters A through D on the prep syringe valve correspond to reagent reservoirs A–D on the AS50 front panel screens and in Chromeleon software.

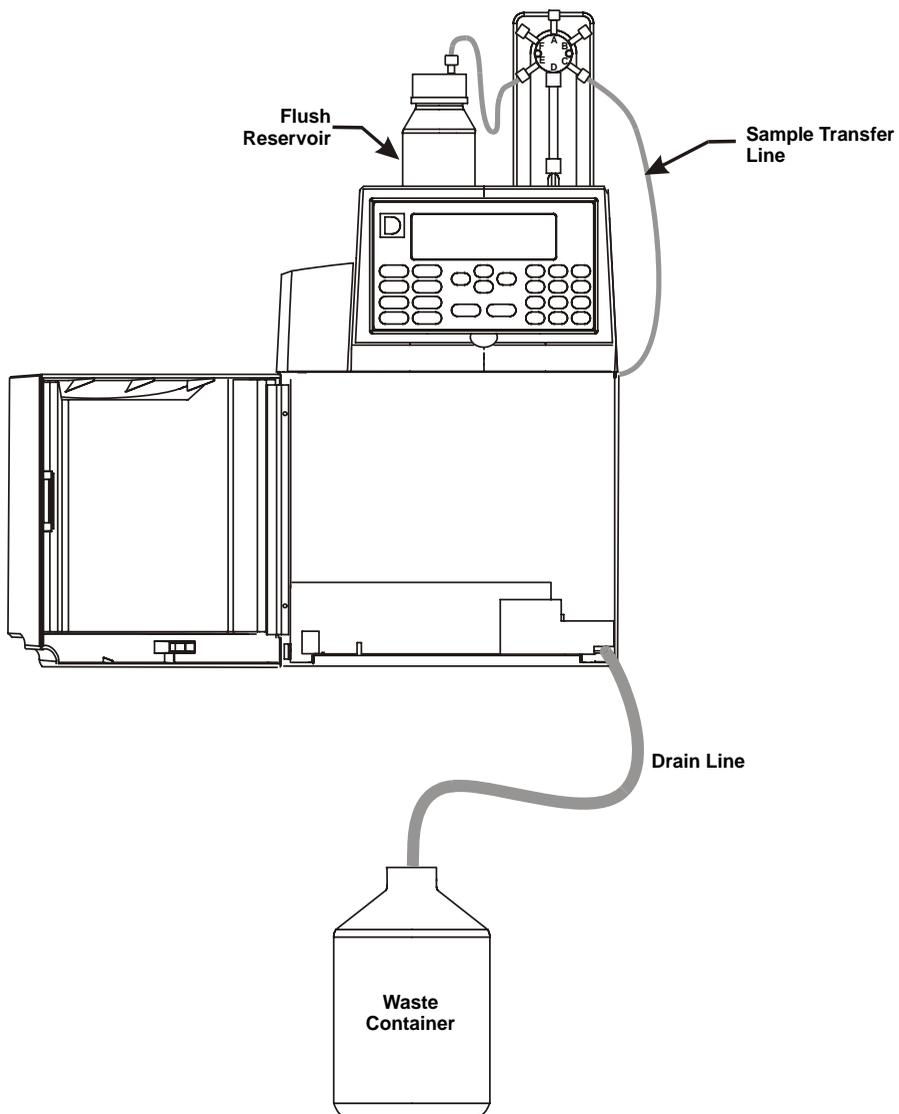


Figure B-5. Syringe and Drain Line Connections

B.3.5 Injection Valve Connections

The injection valve connections depend on whether the valve is installed in the autosampler compartment, in a chromatography or thermal compartment, or in a DX-120 Ion Chromatograph.

Autosampler Compartment Injection Valve Connections

1. Connect the line from port 2 on the injection valve to the pump pressure transducer eluent outlet fitting (see [Figure B-6](#)).
2. Connect the line from port 3 on the injection valve to the column.

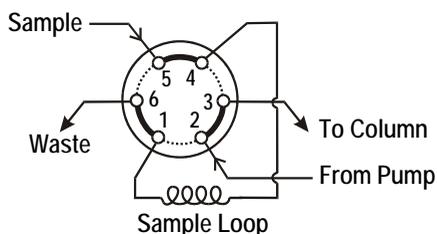


Figure B-6. Injection Valve Connections

Chromatography Compartment Injection Valve Connections

1. Open the autosampler and the chromatography compartment doors.
2. The needle seal line that extends from the inject port in the autosampler compartment is coiled inside the door on the right side. Route this line through the side slots on each module and connect it to port 5 on the injection valve inside the chromatography compartment (see Figures B-6 and B-7).

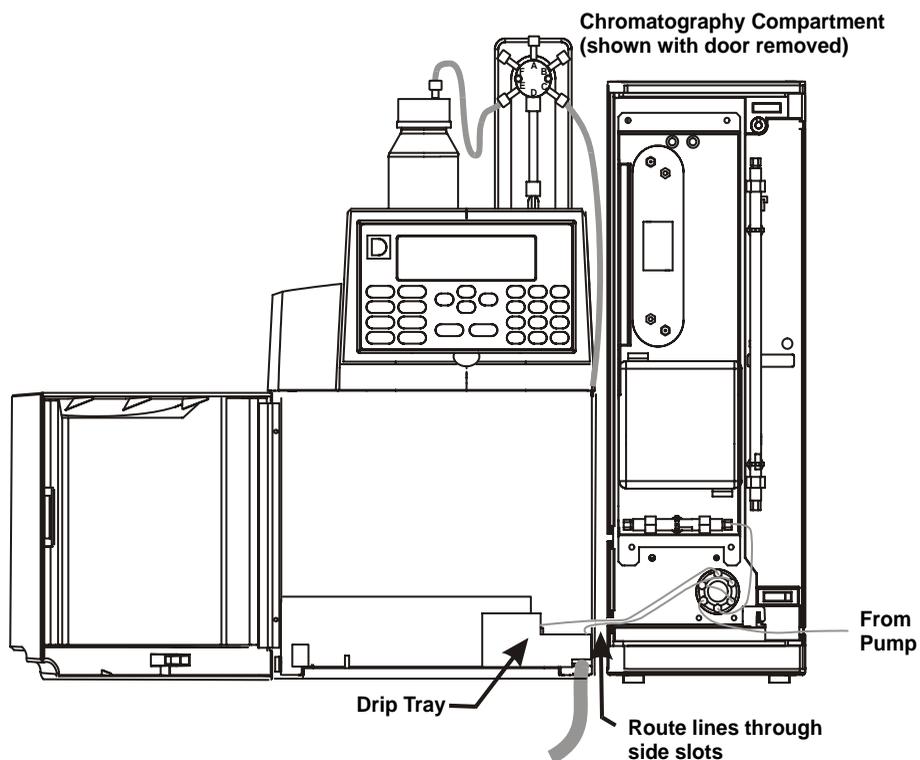


Figure B-7. Injection Valve Connections to a Chromatography Compartment

3. Route the waste line from port 6 on the injection valve through the side slots on each module. Push the end of the line down into the small round opening on the right side of the autosampler compartment drip tray (see [Figure B-8](#)). **Do not push the end of the waste line into the large drain tube opening.**

NOTE For PEEK waste lines, sharply bend the waste line tubing about 5 mm from the end to ensure it stays in place in the opening in the drip tray. When bending the tubing, be sure not to restrict the inner diameter.

4. Connect the line from port 2 on the injection valve to the pump pressure transducer eluent outlet fitting.
5. Connect the line from port 3 on the injection valve to the column.

NOTE In a dual-channel system, the line from port 3 is connected to port 2 on the column switching valve.

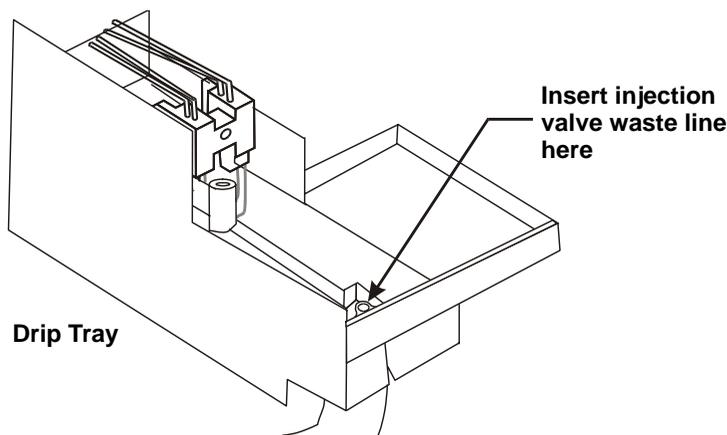


Figure B-8. Injection Valve Waste Line Connection

Thermal Compartment Injection Valve Connections

1. Open the autosampler and the thermal compartment doors.
2. The needle seal line that extends from the inject port in the autosampler compartment is coiled inside the door on the right side. Route this line through the side slots on each module and connect it to port 5 on the injection valve inside the thermal compartment (see [Figure B-9](#)).
3. Route the waste line from port 6 on the injection valve through the side slots on each module. Push the end of the line down into the small round opening on the right side of the autosampler compartment drip tray (see [Figure B-8](#)). **Do not push the end of the waste line into the large drain tube opening.**

NOTE For PEEK waste lines, sharply bend the waste line tubing about 5 mm from the end to ensure it stays in place in the opening in the drip tray. When bending the tubing, be sure not to restrict the inner diameter.

4. Connect the line from port 2 on the injection valve to the pump pressure transducer eluent outlet fitting.
5. Connect the line from the heat exchanger inlet in the thermal compartment (see [Figure B-10](#)) to port 3 on the injection valve.

NOTE In a dual-channel system, the line from port 3 on the injection valve is connected to port 2 on the column switching valve.

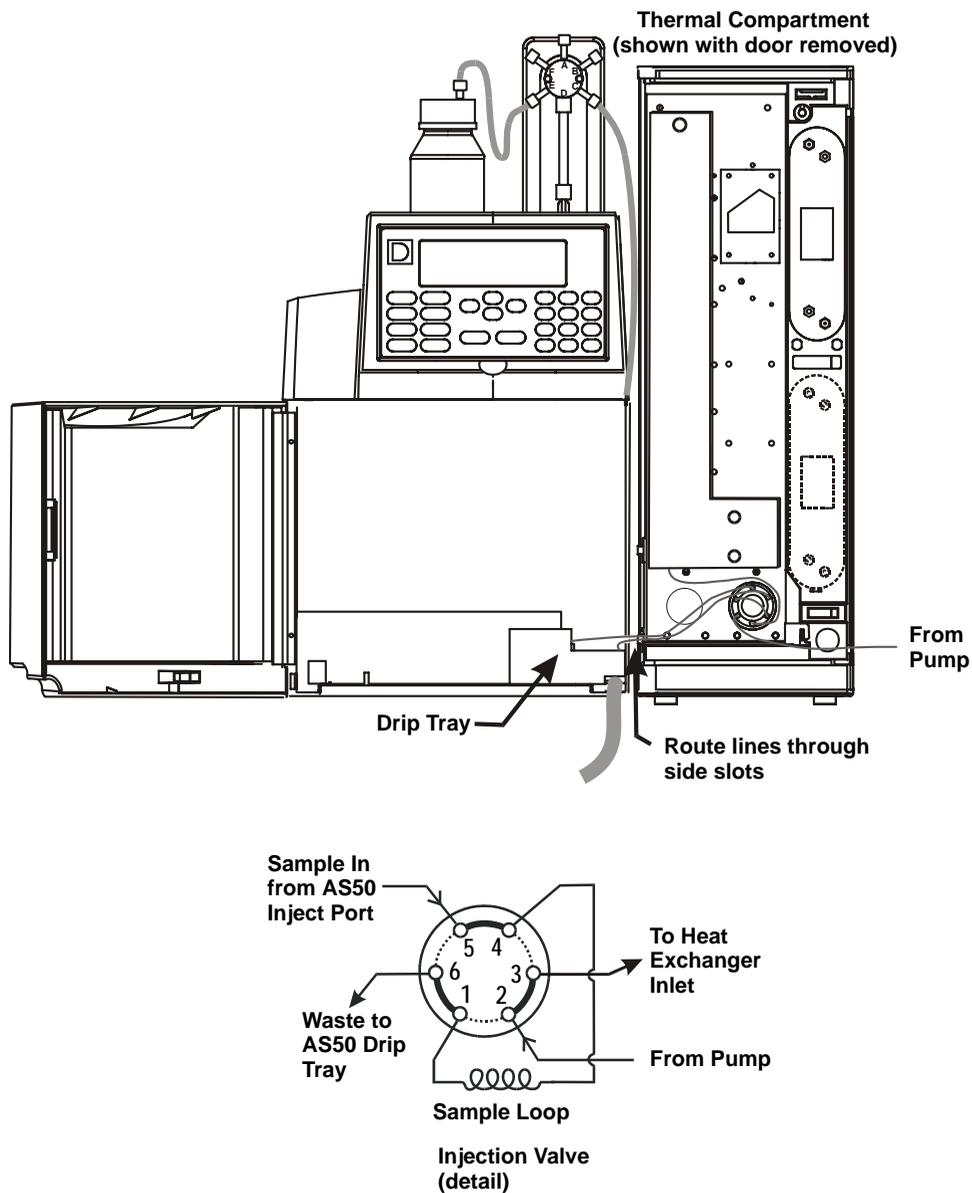


Figure B-9. Injection Valve Connections to a Thermal Compartment

**Thermal Compartment
(shown with door removed)**

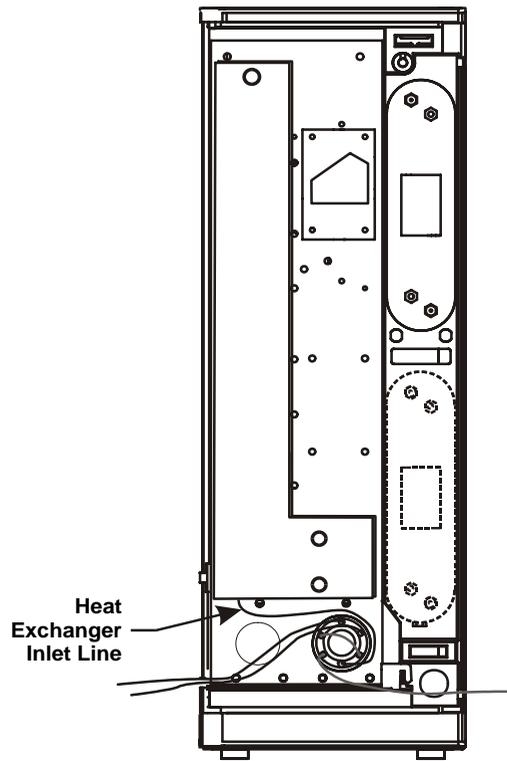


Figure B-10. Injection Valve Connection to the Heat Exchanger

DX-120 Injection Valve Connections

1. Open the autosampler compartment and the DX-120 doors.
2. Disconnect the sample line from port 5 on the DX-120 injection valve (see [Figure B-11](#)).

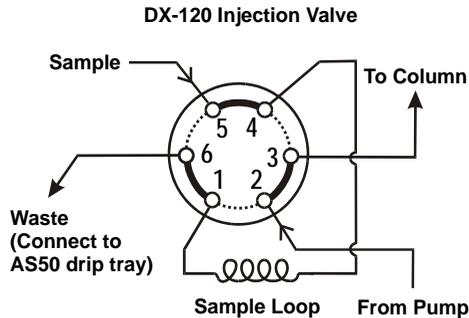


Figure B-11. DX-120 Injection Valve Schematic

3. The needle seal line that extends from the inject port in the autosampler is coiled inside the door, on the right side. Route this line through the autosampler right side slot and through the opening below the injection port on the DX-120 front door (see [Figure B-12](#)).

IMPORTANT

The needle seal line from the inject port to the DX-120 injection valve is calibrated for use with the DX-120. To ensure injection precision, do not shorten or lengthen this line, or replace it with a different (uncalibrated) line.

4. Connect the line to port 5 on the injection valve.
5. Bring the waste line from port 6 on the injection valve to the drip tray in the sampler compartment and push the end of the line down into the small round opening on the right side of the tray (see [Figure B-8](#)).
Do not push the end of the waste line into the large drain tube opening.

IMPORTANT

Make sure the injection valve waste line is not elevated above the injection valve at any point between the valve and the AS50 drip tray.

NOTE For PEEK waste lines, sharply bend the waste line tubing about 5 mm from the end to ensure it stays in place in the opening in the drip tray. When bending the tubing, be sure not to restrict the inner diameter.

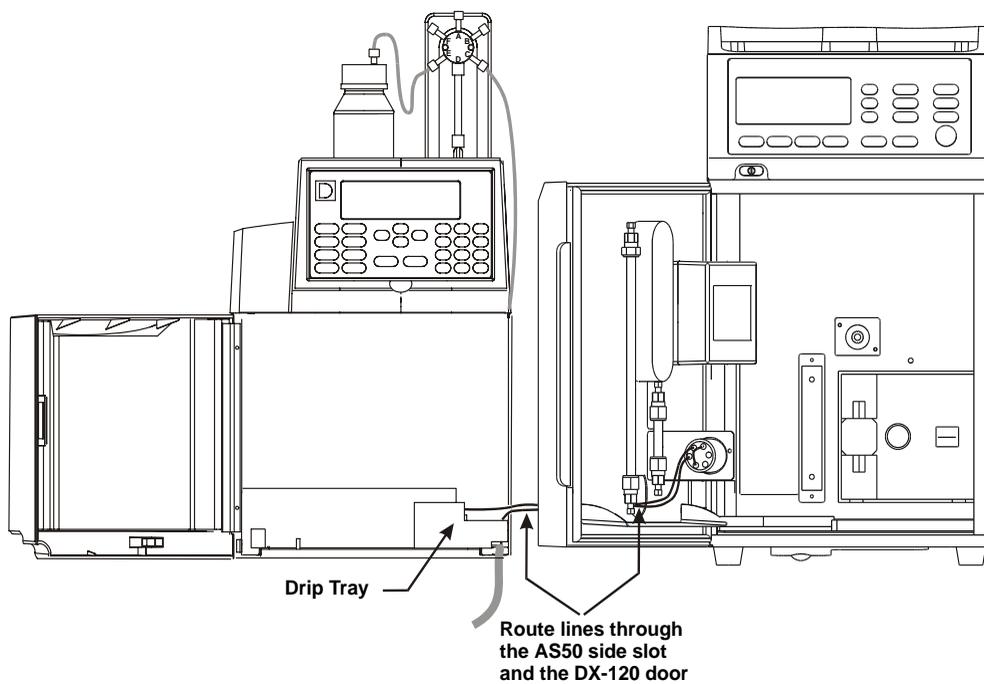


Figure B-12. DX-120 Injection Valve Connections

B.3.6 Power Connection and Power-Up



SHOCK HAZARD—To avoid electrical shock, use a grounded receptacle. Do not operate the AS50 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 AS50 and is easily accessible.



Operation at AC input levels outside of the specified operating voltage range may damage the AS50.



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.



STROMSCHLAGEFAHR—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.

1. Plug the power cord from the AS50 rear panel into a grounded power source.
2. Press the power switch on the lower left corner of the front door to turn on the AS50 power.

When the power is turned on, a series of screens is displayed and the autosampler performs an initialization sequence.

- The **COPYRIGHT NOTICE** screen appears briefly, followed by the **POWER-UP** screen.

- While the **POWER-UP** screen is displayed, the AS50 performs initialization procedures and a series of diagnostic tests. If one of the tests fails, the power-up sequence stops and the **DIAGNOSTIC TEST** screen appears. See [Section C.9.2](#) if this occurs.
- When the initialization process is complete and all tests have been passed, the **INSTALLED OPTIONS** screen appears, indicating which optional equipment is installed in the AS50. After a few seconds (or if you press a button), the **MAIN** screen appears. The power-up sequence is then complete.

B.3.7 Module Setup

Select Plumbing Configuration Options

1. Press **Menu** and **5** to go to the **MODULE SETUP MENU**.
2. Press **3** to go to the **PLUMBING CONFIGURATION** screen.

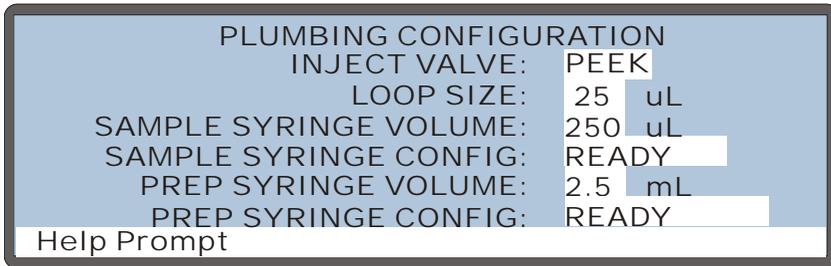


Figure B-13. Plumbing Configuration Screen

3. If an injection valve is installed in the AS50 sampler compartment or in a chromatography or thermal compartment, position the cursor in the **INJECT VALVE** field and press **Select** Δ or **Select** ∇ to specify the valve material: **PEEK** or **SST** (stainless steel). This field is not available when an external valve is installed.
4. Move the cursor to the **LOOP SIZE** field and use the numeric buttons to enter the size of the sample loop installed on the injection valve.
5. Move the cursor to the **SAMPLE SYRINGE VOLUME** field and press **Select** Δ or **Select** ∇ to specify the volume of the sample syringe installed.
6. If the sample preparation option is installed, move the cursor to the **PREP SYRINGE VOLUME** field and press **Select** Δ or **Select** ∇ to specify the volume of the prep syringe.
7. Press **Enter**.

Set the Time and Date

1. From the **MODULE SETUP MENU**, press **4** to go to the **TIME/DATE** screen.



Figure B-14. Time/Date Screen

2. The **SET TIME** field uses a 24-hour time format (hour:minutes:seconds). Press numeric buttons to enter the time directly or press **Select** Δ or **Select** ∇ to increase or decrease the current values.
3. Move the cursor to the **DATE** field.
4. Press numeric buttons to enter the day and year directly, or press **Select** Δ or **Select** ∇ to increase or decrease the current values. Press **Select** Δ or **Select** ∇ to select the month.
5. After selecting the last option, press **Enter** before exiting the screen.

Set Up the AS50 for Remote Control or as the System Master

NOTE Do not complete this section if the AS50 is controlled by Chromeleon. The software enables the wait function automatically and the setting in the **SYSTEM PARAMETERS** screen is ignored.

1. From the **MODULE SETUP MENU**, press **5** to go the **SYSTEM PARAMETERS** screen.

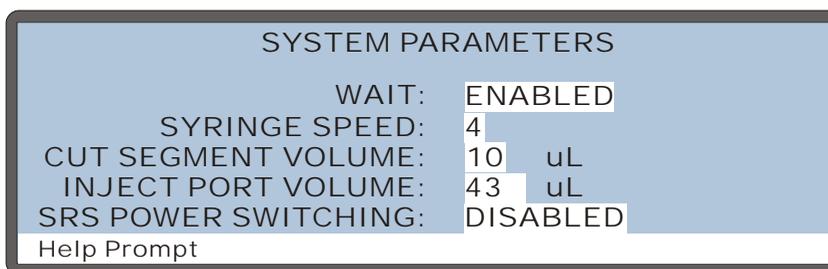


Figure B-15. System Parameters Screen

2. Position the cursor in the **WAIT** field and press **Select** Δ or **Select** ∇ to select either **ENABLED** or **DISABLED**.
 - If the AS50 will be controlled by another instrument, set the **WAIT** field to **ENABLED**. See the notes below.
 - If the AS50 will control other modules through TTL or relay connections, set the **WAIT** field to **DISABLED**.
3. Press **Enter**.

Notes

- When Wait is enabled, the AS50 waits for a continue command before performing the next line in a schedule of injections. See [“Understanding the Wait Operation” on page 2-24](#) for details.
- When Wait is disabled, a schedule of injections is started by pressing the **Hold/Run** button. The AS50 then performs all injections in the schedule without waiting for any continue commands. See [Section 2.8.6](#) for details.

B.3.8 Priming the Liquid Lines

Refer to the priming guidelines on the next page for details about priming procedures for different AS50 configurations.

1. On the **MAIN** screen, set the AS50 to **LOCAL** mode and **DIRECT CONTROL**.
2. Press **Menu** and then **6** to go to the **FLUSH** screen.
3. Enter the desired **PRIME VOLUME**. See the guidelines on the next page for volume suggestions.
4. If the sample prep option is installed:
 - a. Move the cursor to the **PRIME RESERVOIR** field and select the desired reservoir.
 - b. Move the cursor to the **PRIME SYRINGE** field and select the **PREP** syringe.

If there is no sample prep option, the **PRIME RESERVOIR** and **PRIME SYRINGE** fields default to **FLUSH** and **SAMPLE**, respectively, and cannot be edited.

5. Move the cursor to the **PRIME ACTION** field and select **PRIME** (see [Figure B-16](#)).
6. Press **Enter** to start the prime cycle.
7. When priming is complete, there are often small air bubbles on top of the syringe. Remove the bubbles before proceeding. See [Section B.3.9](#) for instructions.

FLUSH/PRIME	
FLUSH	PRIME
VOLUME: 400 uL	VOLUME: 2000 uL
RESERVOIR: FLUSH	RESERVOIR: RES A
SYRINGE: SAMPLE	SYRINGE: PREP
ACTION: READY	ACTION: PRIME
Help Prompt	

Figure B-16. Initiating a Priming Cycle

Priming guidelines when only the sample syringe is installed:

Enter a **PRIME VOLUME** of 2000 to 2500 μL .

This primes the flush reservoir line to the sampling valve and the sample transfer line from the valve to the sampling needle (see [Figure B-17](#)).

Priming guidelines when the sample prep option is installed:

When the sample prep option is installed, the lines from each installed reagent reservoir must be primed, as well as the flush reservoir line, the reagent holding loop, and the sample transfer line (see [Figure B-18](#)).

NOTE For all priming cycles, select **PREP** for the **PRIME SYRINGE**.

- To prime the flush reservoir line, reagent holding loop, and sample transfer line, prime with approximately two times the volume of the prep syringe. For the 5 mL and 10 mL syringes, more than one priming cycle will be required (see the table below).

For each priming cycle, enter a **PRIME VOLUME** of 5000 μL and select the **FLUSH** reservoir.

Syringe Size	Suggested Priming Volume	Number of Priming Cycles Required
2.5 mL	5000 μL	1
5 mL	10,000 μL	2
10 mL	20,000 μL	4

- To prime the line from a reservoir to the solvent selector valve:
 1. Enter a **PRIME VOLUME** of 2000 μL .
 2. Select the reservoir in the **PRIME RESERVOIR** field.
 3. Repeat for each installed reservoir.

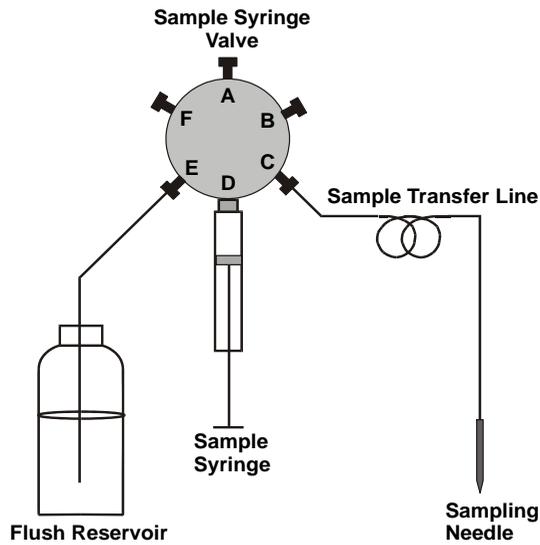
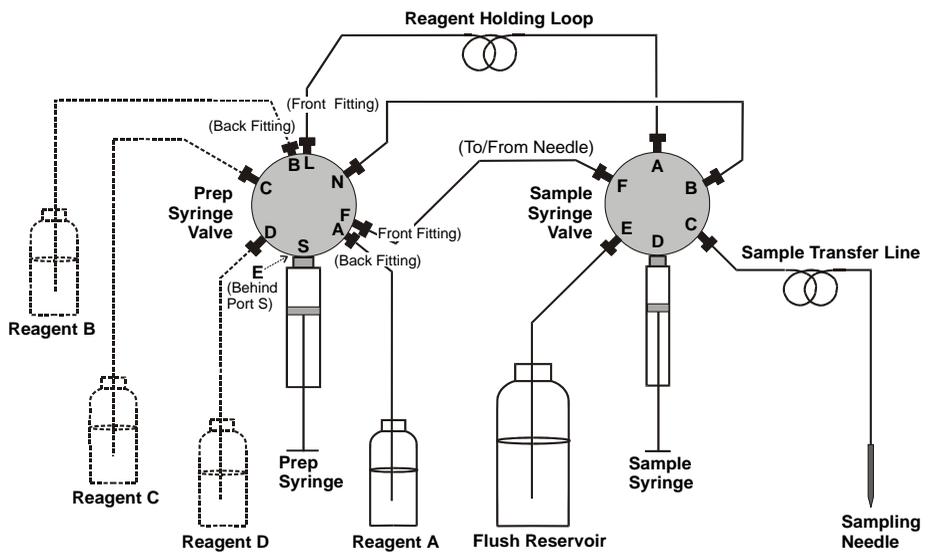


Figure B-17. Sample Syringe Fluid Schematic



Note: Reagent bottles B, C, and D are optional.

Figure B-18. Sample Prep Option Fluid Schematic

B.3.9 Removing Bubbles from the Syringe

1. Press **Menu**, **5**, and **3** to go to the **PLUMBING CONFIGURATION** screen.
2. Move the cursor to the **SAMPLE SYRINGE CONFIG** field or the **PREP SYRINGE CONFIG** field (depending on which syringe is to be removed).
3. Press **Select** Δ to select the **INITIALIZE** option.
4. Press **Enter**.
5. The syringe plunger moves down to an initial position. The syringe motor then shuts off to allow removal of the syringe.
6. Unscrew and remove the syringe drive connecting screw (see [Figure B-19](#)).
7. While holding the syringe at the top and bottom, turn the syringe to the left (as viewed from the front of the valve) to unscrew it from the valve.

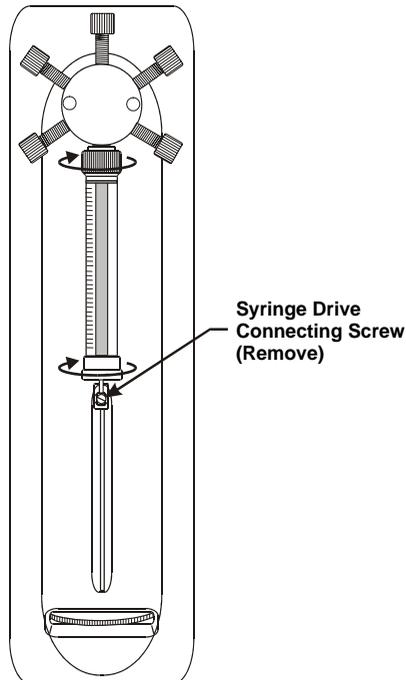


Figure B-19. Removing the Syringe

8. Direct the threaded end of the syringe toward a sink or waste container and push the syringe plunger very rapidly. This forces liquid out of the syringe in a fast stream.
9. Place the threaded end of the syringe into the flush liquid container and slowly pull liquid into the syringe.
10. Remove the syringe from the liquid and point the threaded end up into the air. Push the syringe plunger up and pull down rapidly with short movements to dislodge the air bubble(s). Repeat until all bubble(s) are dislodged.
11. Place the threaded end of the syringe back into the flush liquid and draw a full syringe volume up by pulling the plunger out slowly.
12. Keeping the syringe in the flush liquid, slowly push the syringe plunger until the bubble exits the syringe. Then fill the syringe completely.

13. Remove the syringe from the flush liquid. While holding it vertically, push a small amount of liquid out the top to make sure no air is present.
14. Orient the syringe with the threaded end toward the top, and position the syringe under the valve.
15. While holding the syringe at the top and bottom, turn it clockwise to screw it back into the valve. Tighten it fingertight.
16. Align the syringe piston with the connecting screw mount on the syringe drive.
17. Insert the syringe drive connecting screw and tighten fingertight.

B.4 Chromatography or Thermal Compartment Installation

B.4.1 Component Layouts

The AS50 chromatography or thermal compartment can be set up for three detection types: absorbance, conductivity, or amperometry.

Conductivity detection can be in one of three modes:

- AutoSuppression® Recycle mode (SRS required).
- AutoSuppression with External Regenerant mode (SRS required). This mode is required when the eluent contains organic solvents.
- Nonsuppressed mode (no SRS). Note: Conductivity measurements made when no suppressor is in-line may show noticeable baseline drift.

In addition, the compartment can accommodate components for dual-channel conductivity or dual-channel conductivity with amperometry.

Figures B-20 through B-34 illustrate the component layouts for these configurations.

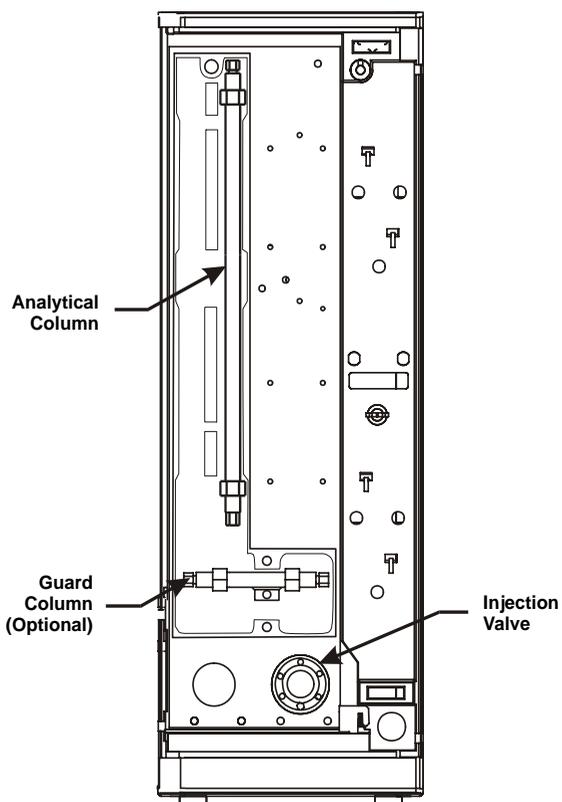


Figure B-20. Thermal Compartment Component Layout for Absorbance Detection

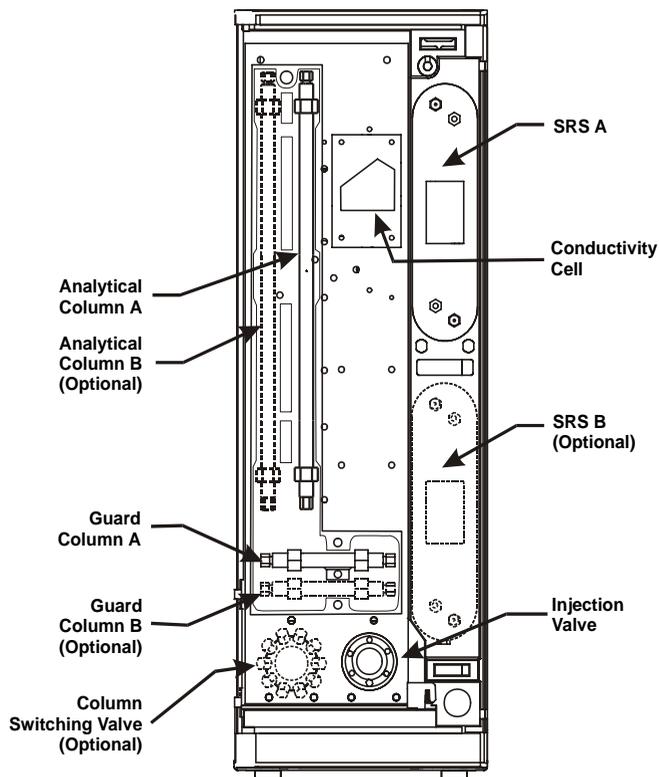
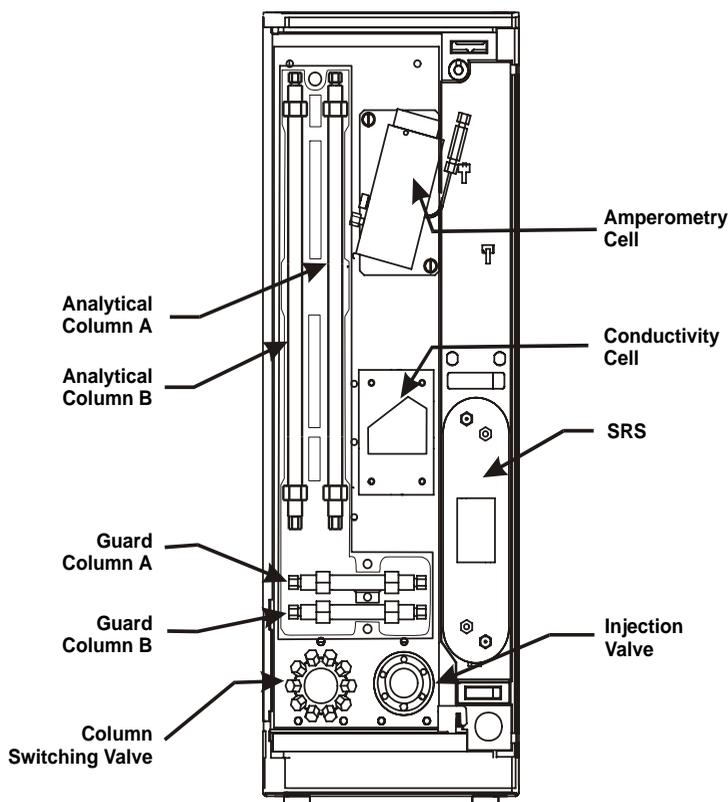


Figure B-21. Thermal Compartment Component Layout for Conductivity Detection



*Figure B-22. Thermal Compartment Component Layout
Dual-Channel Conductivity and Amperometry Detection*

NOTE When connecting the liquid lines for this layout, refer to the column switching valve plumbing diagram (see [Figure B-39](#)). Connect the lines from the conductivity column and SRS to the column A/SRS A ports. For the column B (amperometry) connections, connect the column inlet to port 1, the column outlet to port 7, and a waste line to port 6.

Only one cell can be connected to the column switching valve at one time. To switch cells, disconnect the cell inlet line from port 8 and the outlet from port 5. Then, connect the other cell's inlet and outlet lines.

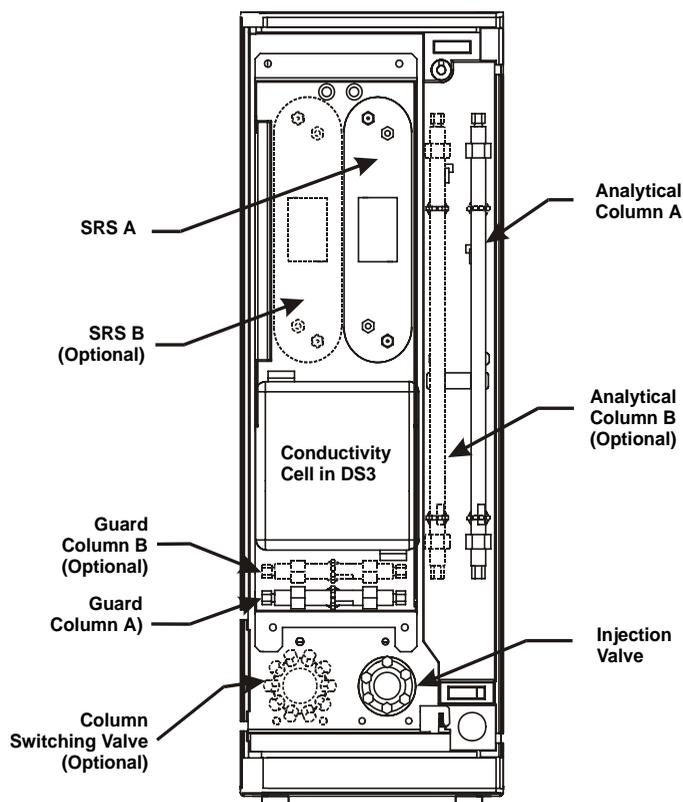


Figure B-23. Chromatography Compartment Layout for Conductivity Detection

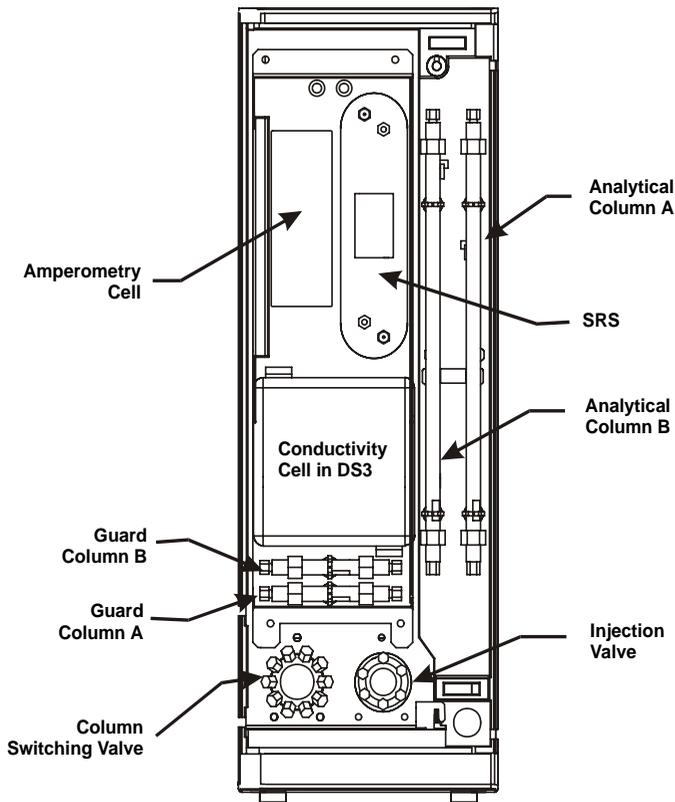


Figure B-24. Chromatography Compartment Layout for Conductivity and Amperometry Detection

NOTE When connecting the liquid lines for this layout, refer to the column switching valve plumbing diagram (see [Figure B-39](#)). Connect the lines from the conductivity column and SRS to the column A/SRS A ports. For the column B (amperometry) connections, connect the column inlet to port 1, the column outlet to port 7, and a waste line to port 6.

Only one cell can be connected to the column switching valve at one time. To switch cells, disconnect the cell inlet line from port 8 and the outlet from port 5. Then, connect the other cell's inlet and outlet lines.

B.4.2 Column Installation

Before installing a column in the compartment, refer to the column manual for specialized installation and start-up instructions.

1. Before installing the column, pump deionized water through the injection valve at 1.0 to 3.0 mL/min for 2 to 5 minutes to clear any air from the liquid lines. Trapped air reduces the column efficiency.
2. Switch the position of the injection valve between Inject and Load several times to allow water to flow through the sample loop and each valve port. To switch the valve position:
 - a. Go to the **DETAIL STATUS** screen (press **Menu** and **2**).
 - b. Set the AS50 to Local mode, Direct Control.
 - c. Move the cursor to the **INJ VLV** field, press **Select** Δ or **Select** ∇ to toggle the valve position, and then press **Enter**.
3. Set the pump flow rate to 2.0 mL/min and verify that the pressure through the system, with no columns installed, is less than 690 KPa (100 psi).
4. Stop the pump.
5. Remove the end plugs from the column and store them in a safe place. You must reinstall the end plugs in the column before placing it in storage.
6. For installation into a chromatography compartment:
 - a. Open the column clips by twisting the ends counterclockwise.
 - b. Orient the analytical column with the outlet facing up, and install the column in the clips. To close the clips, twist the ends clockwise.
 - c. If installing a guard column, orient it with the outlet facing the inlet of the analytical column and install it in its clips.
7. For installation into a thermal compartment:
 - a. Unscrew the three captive fasteners on the lid of the L-shaped column box and remove the lid.
 - b. Orient the analytical column with the outlet facing up and install the column in the box.

- c. If installing a guard column, orient it with the outlet facing the inlet of the analytical column and install it in the column box. Replace the lid.

NOTE An arrow on each column indicates the liquid flow direction. The arrow points away from the column inlet, toward the column outlet.

B.4.3 SRS Installation (Optional)

NOTE The instructions here do not replace the instructions in your SRS manual. For complete SRS installation instructions, and for the initial SRS start-up procedure, please refer to the SRS manual.

1. The SRS mounts on tabs in the compartment. For mounting locations, see Figure B-21 (for the thermal compartment) or Figure B-23 (for the chromatography compartment).
2. Orient the SRS with the **REGEN OUT** port and the cable at the top; align the slots on the back of the SRS with the tabs in the compartment. Press in, and then down, to lock the SRS in place. Lift up and pull out to remove the SRS, if necessary.
3. Two SRS connectors extend from openings in the compartment. See [Figure B-25](#) for the location of the connectors in each compartment.
4. If a single suppressor is installed, plug its cable into the connector on the right.
5. If two suppressors are installed, plug the cable from SRS A into the connector on the right and plug the cable from SRS B into the connector on the left.

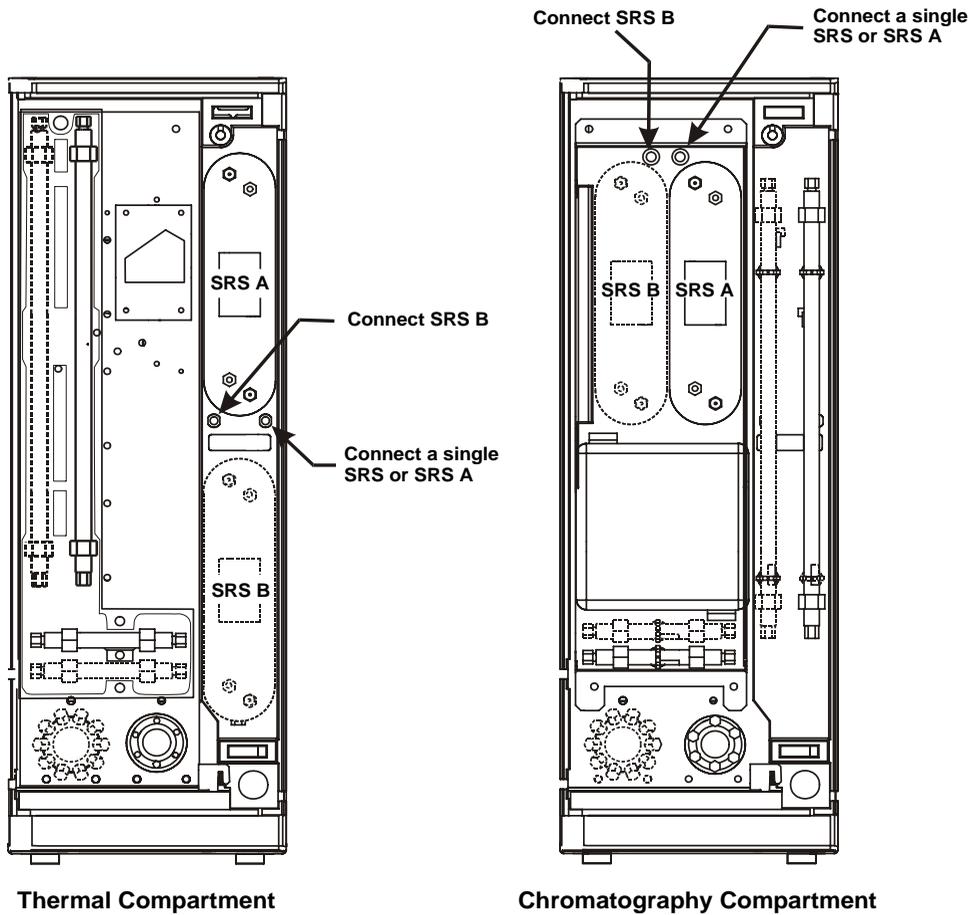


Figure B-25. SRS Cable Connectors

B.4.4 DS3 Detection Stabilizer Installation (Optional)

1. See [Figure B-23](#) for the DS3 mounting location in the chromatography compartment.
2. Orient the DS3 with the inlet and outlet openings at the top. Position the keyhole slots on the rear of the DS3 over the shoulder washers on the compartment. Then pull the DS3 down into position.

Refer to the detector manual for details about the DS3.

B.4.5 Conductivity Cell Installation (Optional)

1. See [Figure B-21](#) for the cell mounting locations in the thermal compartment.
2. Orient the cell with the cell inlet and cables on the top and screw the cell into place at the mounting location.
3. Attached the ground wire to one of the metal mounting screws. Loosen the mounting screw enough to slip the metal hook on the ground wire onto the screw and then retighten.

B.4.6 Amperometry Cell Installation (Optional)

Refer to the detector manual for detailed cell installation instructions. After completing the instructions in that manual, install the cell in the compartment at the mounting location shown in [Figure B-22](#) for the thermal compartment or [Figure B-24](#) for the chromatography compartment.

B.4.7 Liquid Line Connections

The injection valve and optional column switching valve are always installed and plumbed at the factory before shipping.

Tubing assemblies for connecting the other components are also included in the compartment. Labels on the tubing identify where to connect each one.

NOTE For shipping purposes, unions are installed between unconnected lines. Remove these unions before connecting the lines to their respective components.

When connecting the lines, refer to the plumbing schematic for the type of detection mode being installed (see Figures B-29 through B-36). If you are connecting a thermal compartment, also see Figures B-26 through B-28.

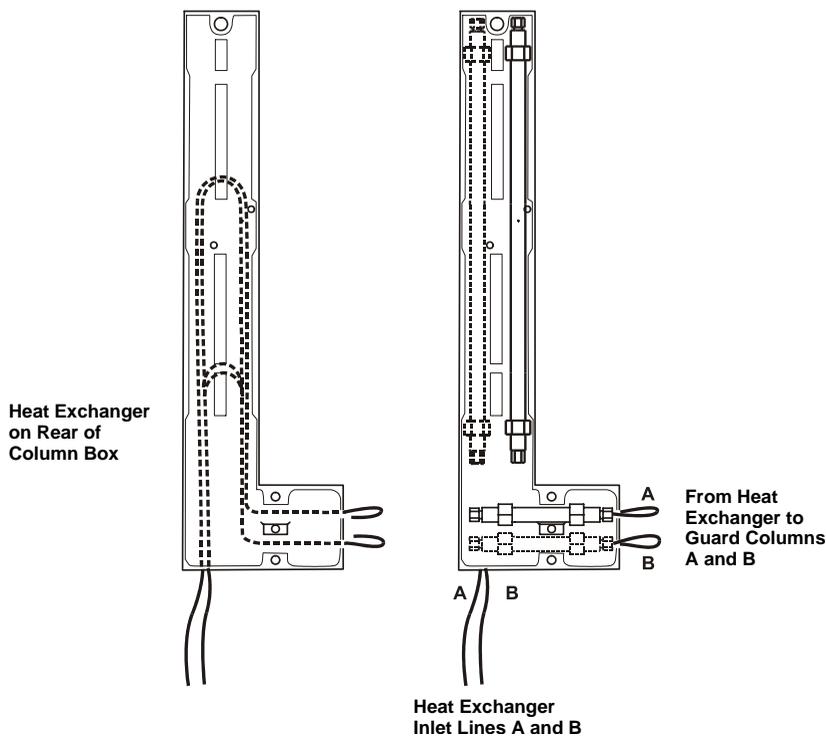


Figure B-26. Heat Exchanger/Guard Column Connections in the Thermal Compartment

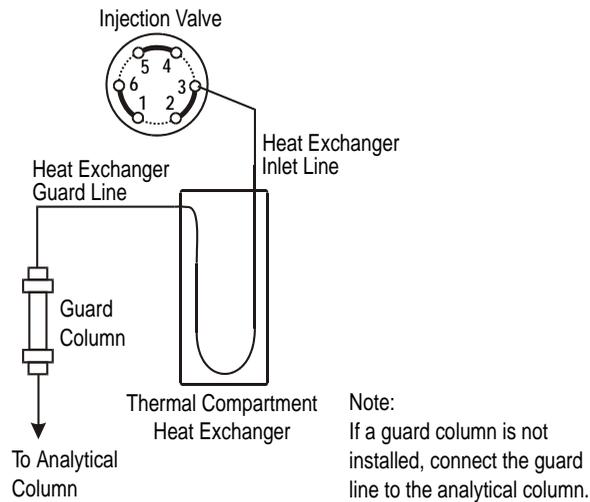


Figure B-27. Single-Column Thermal Compartment Heat Exchanger Connections

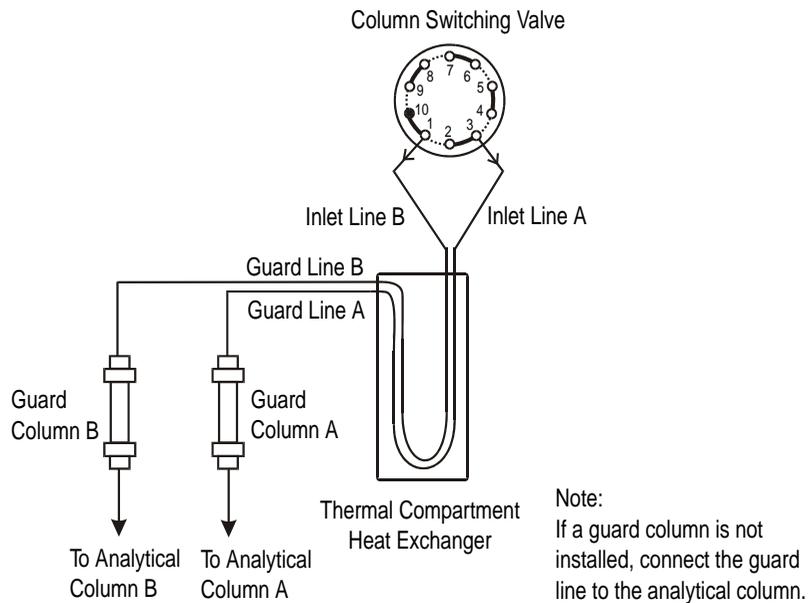


Figure B-28. Dual-Column Thermal Compartment Heat Exchanger Connections

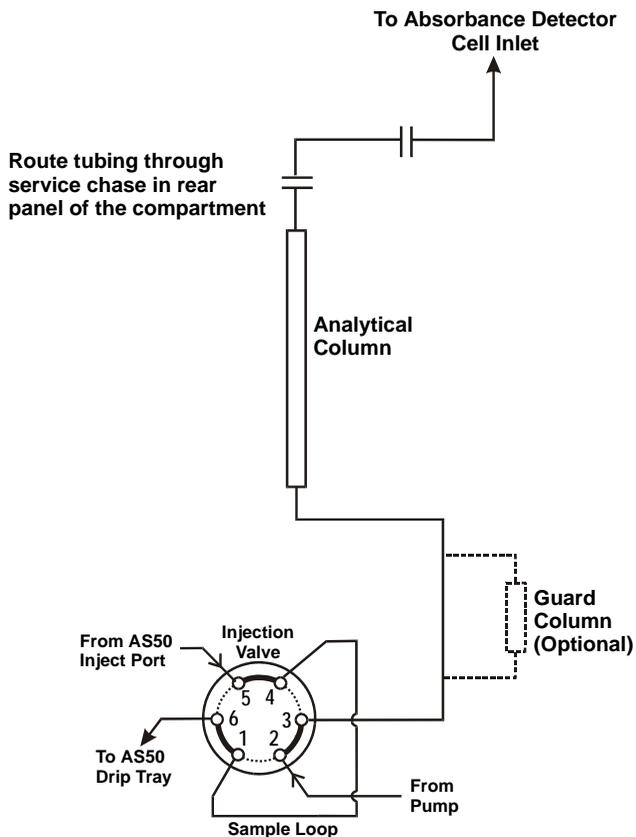
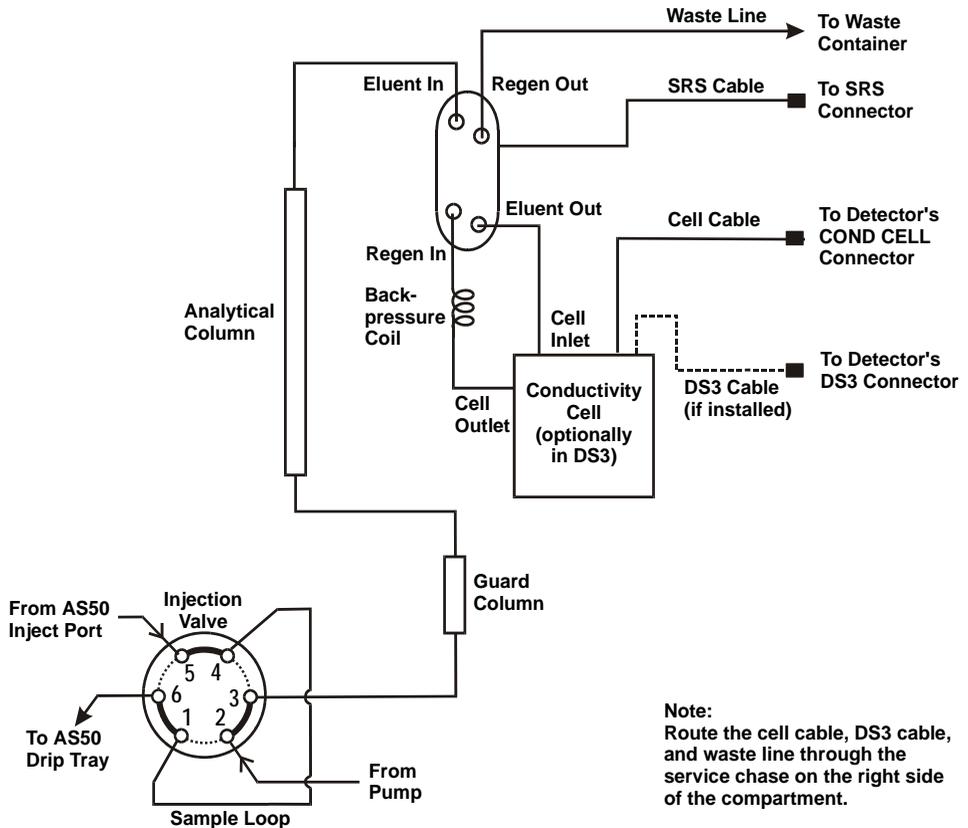


Figure B-29. Absorbance Detector Cell Plumbing Schematic

NOTE For thermal compartment connections, also see Figures B-26 and B-27.



*Figure B-30. Conductivity Cell Plumbing Schematic:
AutoSuppression Recycle Mode*

NOTE For thermal compartment connections, also see Figures B-26 and B-27.

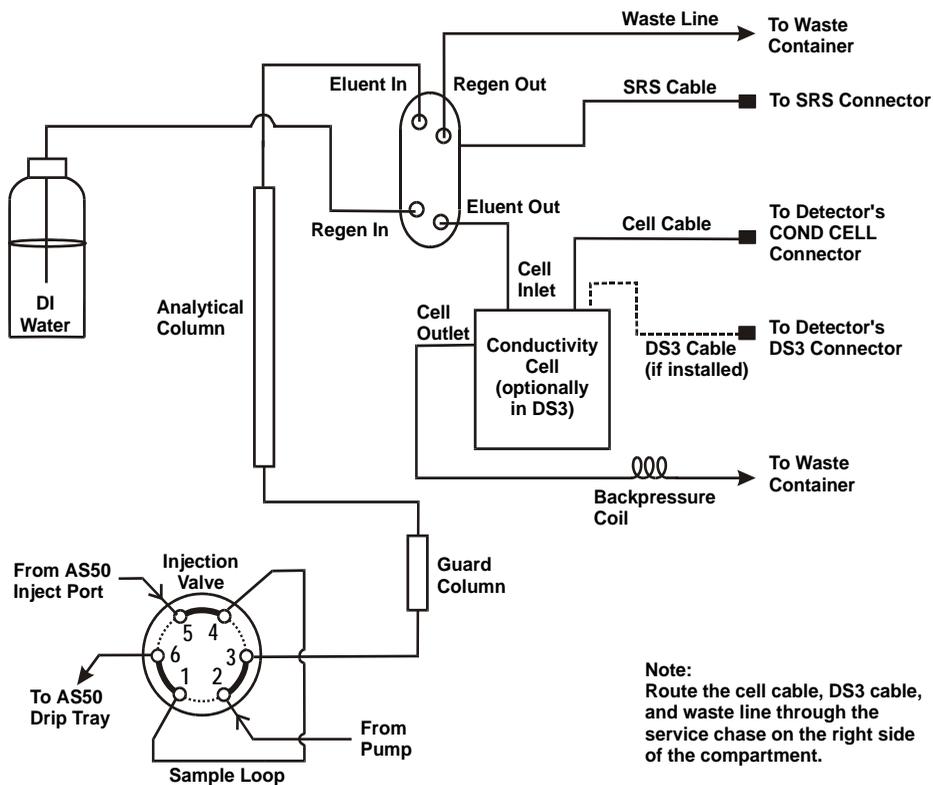


Figure B-31. Conductivity Cell Plumbing Schematic:
AutoSuppression External Water Mode

NOTE For thermal compartment connections, also see Figures B-26 and B-27.

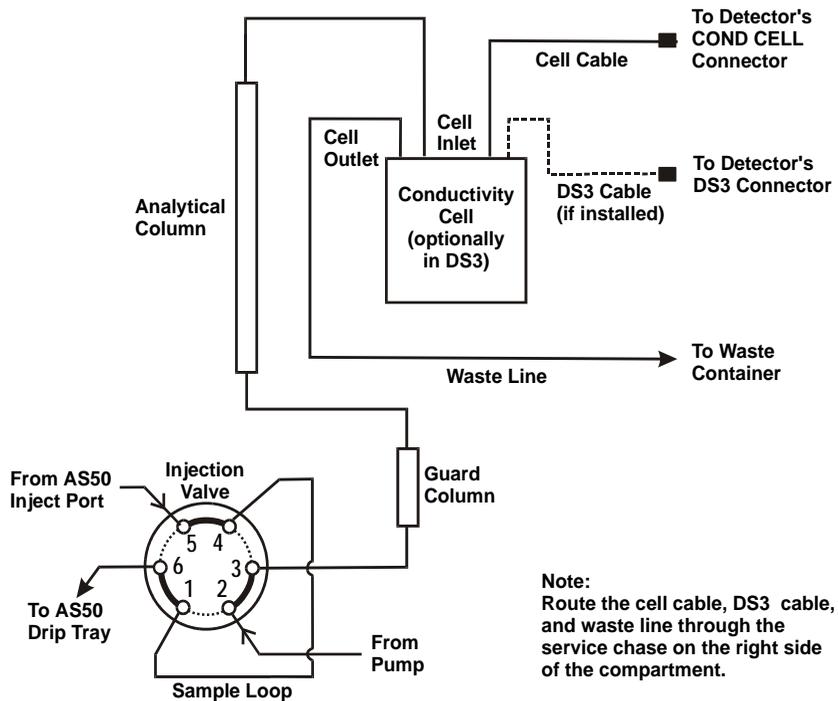


Figure B-32. Conductivity Cell Plumbing Schematic:
Nonsuppressed Mode

NOTE For thermal compartment connections, also see Figures B-26 and B-27.

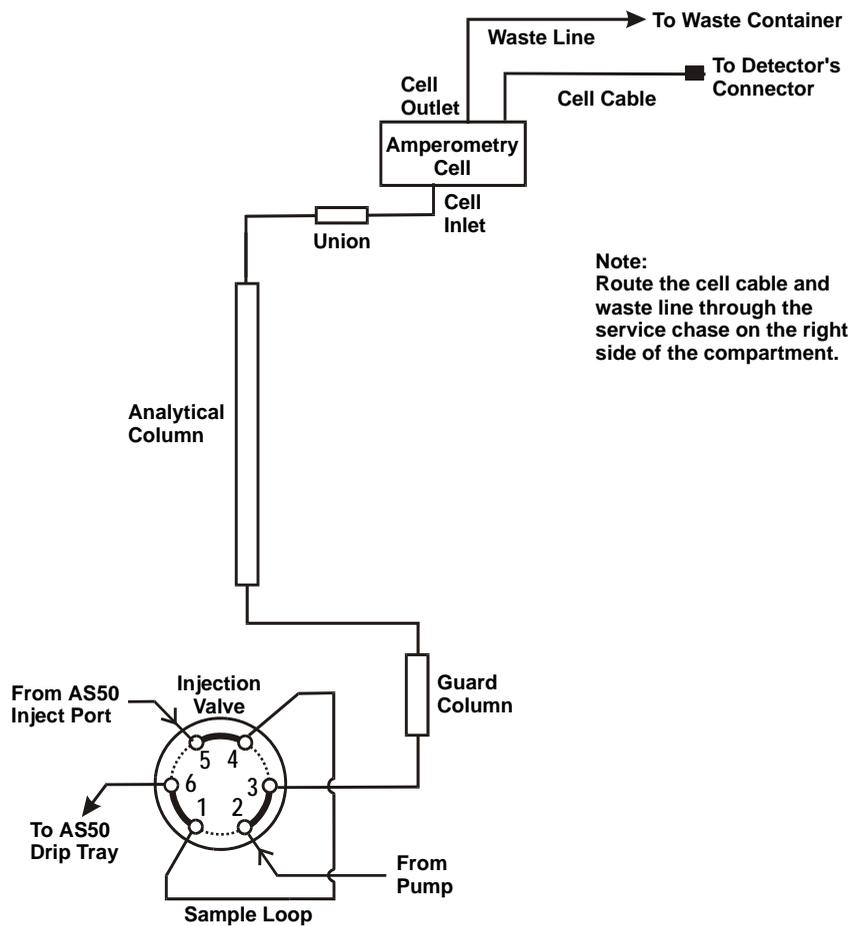


Figure B-33. Amperometry Cell Plumbing Schematic

NOTE For thermal compartment connections, also see Figures B-26 and B-27.

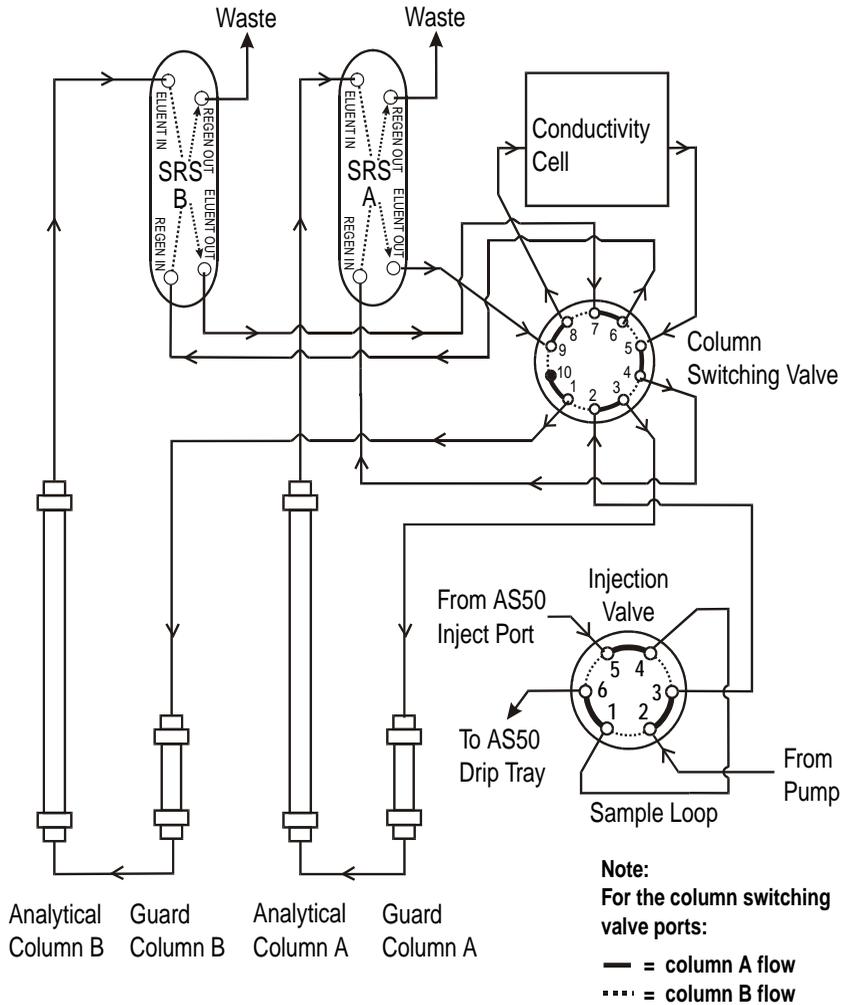


Figure B-34. Dual-Column Plumbing Schematic: Conductivity Detection

NOTE For thermal compartment connections, also see Figures B-26 and B-28.

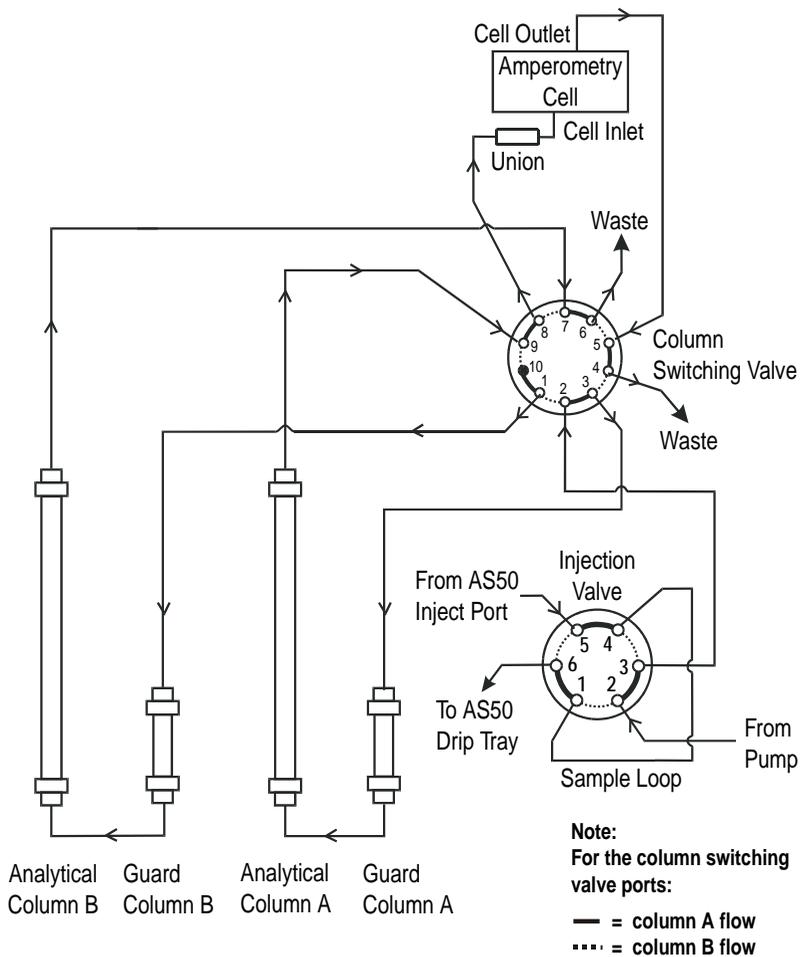


Figure B-35. Dual-Column Plumbing Schematic: Amperometry Detection

NOTE For thermal compartment connections, also see Figures B-26 and B-28.

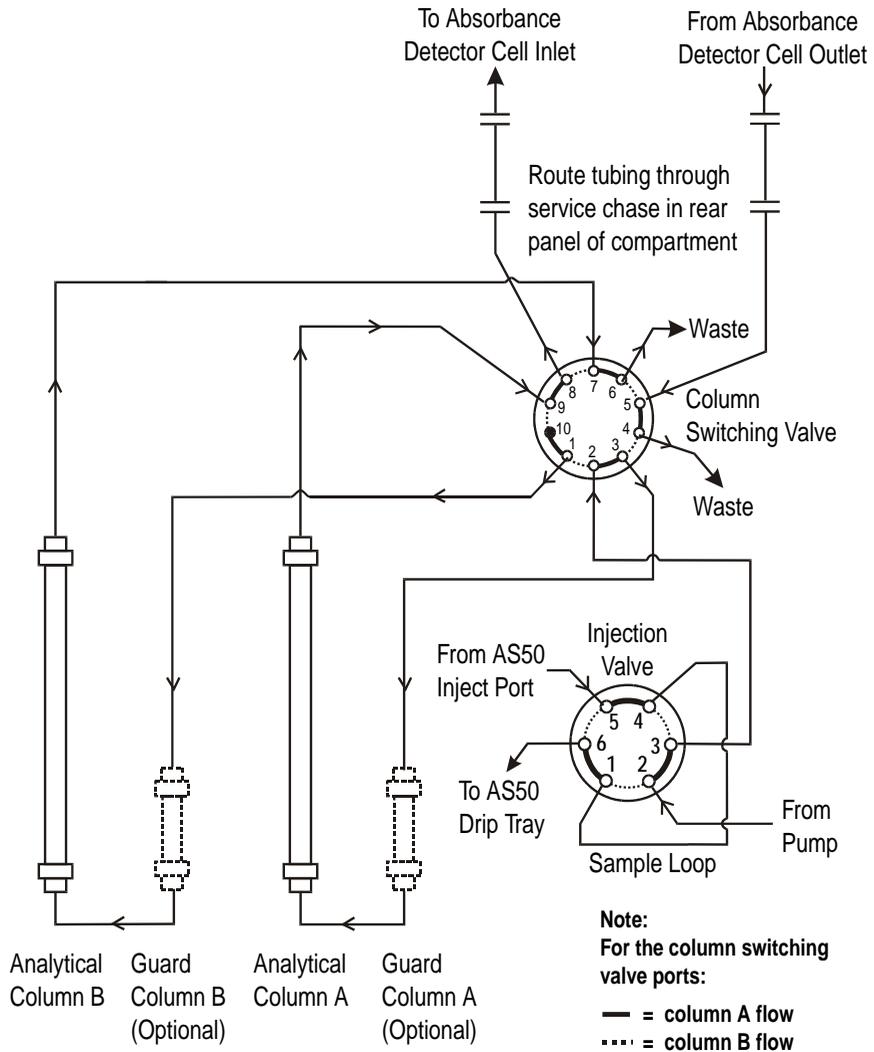


Figure B-36. Dual-Column Plumbing Schematic: Absorbance Detection

NOTE For thermal compartment connections, also see Figures B-26 and B-28.

B.4.8 Completing the Connections

1. Route the SRS waste line and cable (if present) and the cell cable through the service chase on the right side of the compartment (see [Figure B-37](#)).

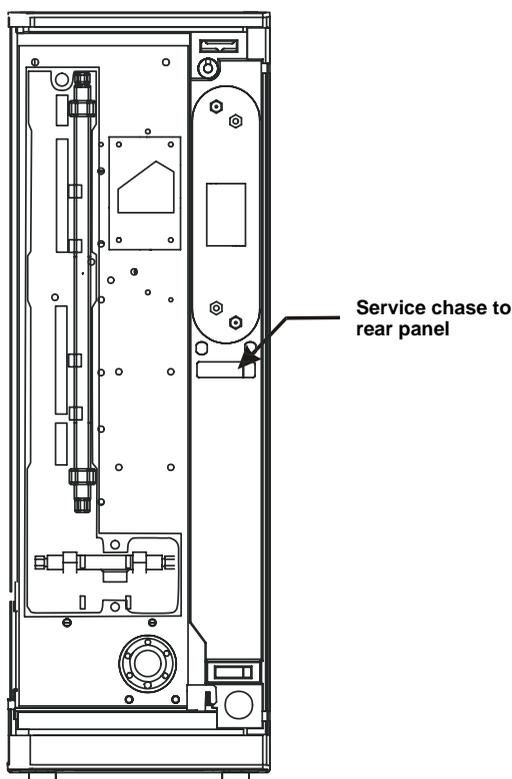


Figure B-37. Routing Cables and Waste Lines to the Rear Panel

2. Place the end of the waste line in a waste container (see [Figure B-38](#)).
3. Place the end of the drain line in a waste container. Make sure the tubing is not bent, pinched, or elevated at any point.



Neutralize acidic and caustic wastes before disposal. Dispose of all wastes in accordance with local regulations.

Rear Panel Connections

Refer to [Figure B-38](#) when completing the following steps.

1. Turn off the main power on the AS50 autosampler and unplug the power cord.
2. Connect the compartment control cable (P/N 960764) to the compartment connector on the AS50 rear panel.
3. Route the cell cable and SRS cable (P/N 054574) to the front of the detector and connect them to the appropriate connectors on the detector electronics chassis. Refer to the label on the inside of the chassis door or to the detector operator's manual for connector locations.

Thermal Compartment Power Connection



Always connect the thermal compartment power exactly as described below. Incorrect power connections can cause irreparable damage to the thermal compartment.

1. Turn off the main power on the AS50 autosampler and unplug the power cord.
2. Connect the accessory power cord (P/N 960748) to the Accessory Outlet on the AS50 rear panel (see [Figure B-38](#)).
3. Connect the compartment control cable ground wire (the single wire terminating in a lug) to the AS50 chassis by sliding the ground wire under the screw to the left of the control cable. This will guarantee the stability of temperature readings.
4. Reconnect the AS50 power cord.

IMPORTANT

Use only the accessory power cord (P/N 960748) shipped with the thermal compartment. This is an IEC jumper cord. Do not use a regular power cord.

IMPORTANT

Never connect the thermal compartment directly to a power source or power main! Connect the accessory power cord from the thermal compartment only to the Accessory Outlet on the AS50 rear panel.

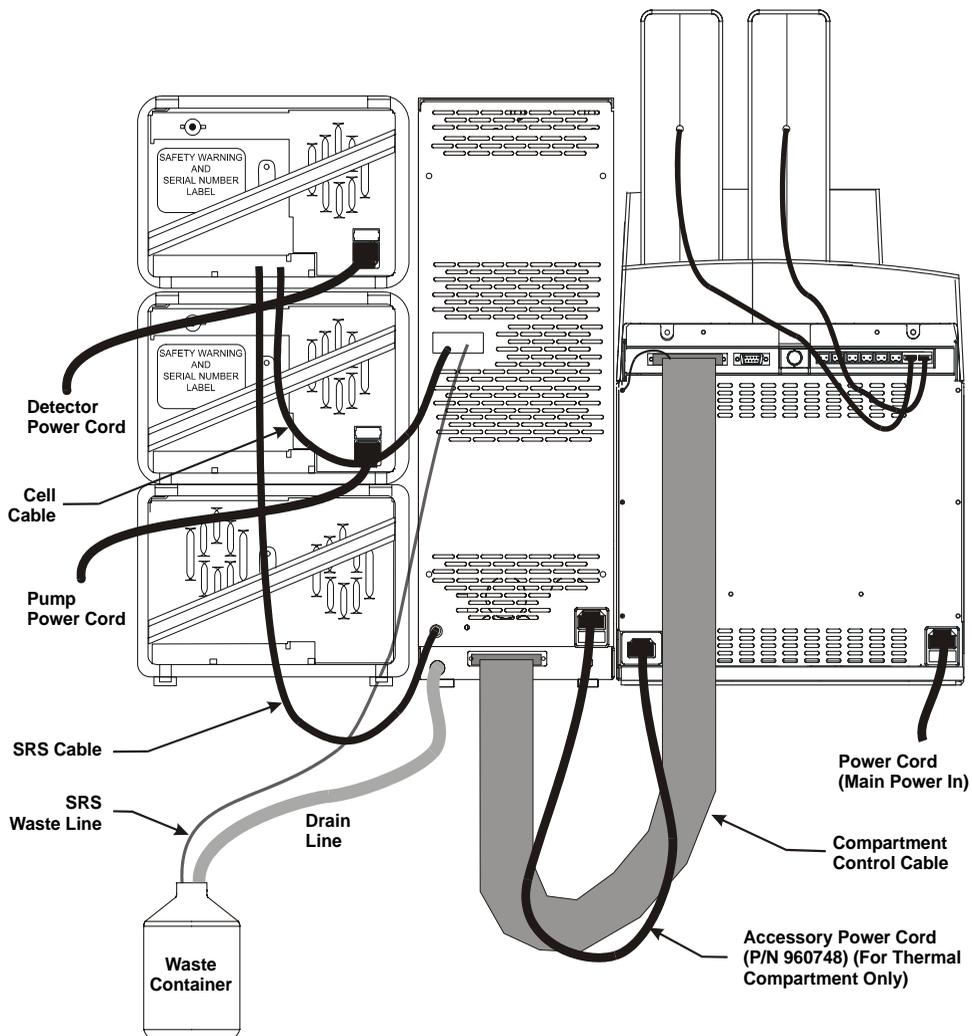


Figure B-38. Rear Panel Connections to a Chromatography or Thermal Compartment (Conductivity Detection System Shown)

B.5 Column Switching Valve Plumbing

The column switching valve required for dual-column configurations is plumbed at the factory. [Figure B-39](#) shows the connections from the valve to the columns, suppressors, injection valve, and cell. This information is for reference, should you need to replace any tubing or fittings.

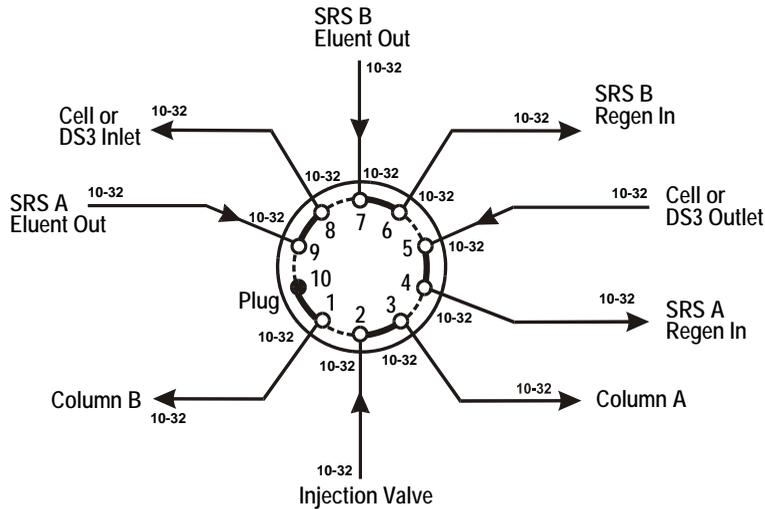


Figure B-39. Column Switching Valve Plumbing

NOTE For thermal compartment connections, connect the heat exchanger inlet line A to port 3 and the heat exchanger inlet line B to port 1.

B.6 Injection Valve Plumbing

The injection valve is plumbed at the factory with all tubing and fittings for connections to the pump, injection port, and column (or to the column switching valve in dual-column systems).

For PEEK valves, a 25 μL PEEK sample loop (P/N 042857) is installed between ports 1 and 4. For stainless steel valves, a 20 μL stainless steel loop (P/N 055374) is installed. Other sample loop sizes are available. Contact Dionex for information.

[Figure B-40](#) shows the connections for the PEEK valve and [Figure B-41](#) shows the connections for the stainless steel valve. This information is for reference, should you need to replace any tubing or fittings.

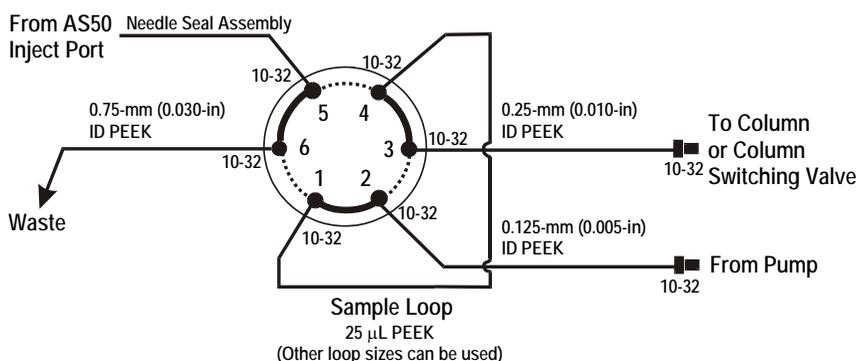


Figure B-40. Injection Valve Plumbing (PEEK)

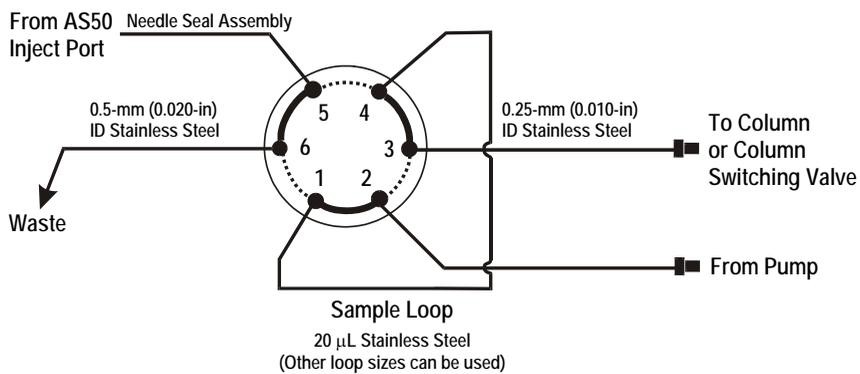


Figure B-41. Injection Valve Plumbing (Stainless Steel)

C • Display Screens

This appendix illustrates and describes the screens available for display on the front panel of the AS50. [Figure C-1](#) illustrates the hierarchy of screens.

There are two categories of screens: operational and diagnostic.

- Operational screens allow you to create, edit, and run methods and schedules that control AS50 operation, and to select default autosampler parameters.
- Diagnostic screens provide access to AS50 diagnostic information and tests.

AutoSelect AS50 Autosampler

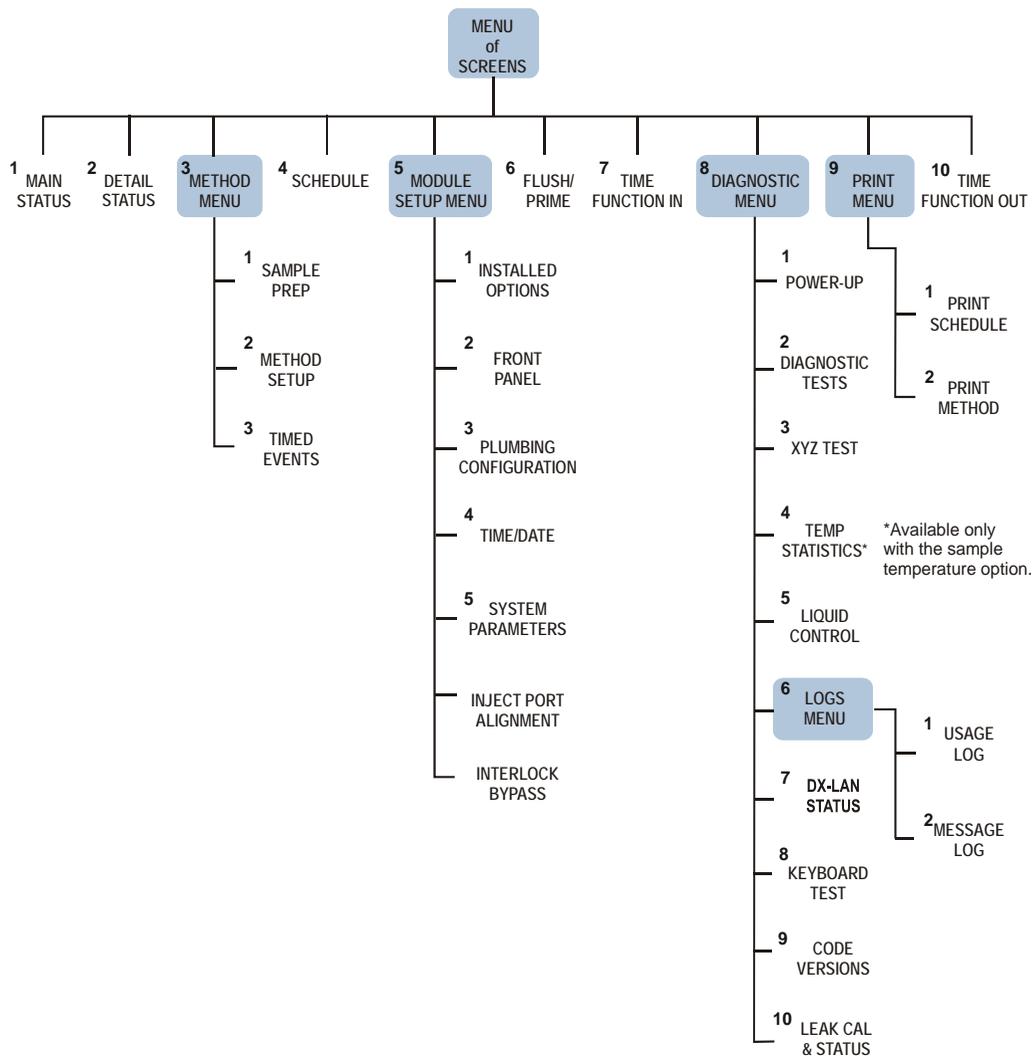


Figure C-1. AS50 Menu Structure

C.1 Menu of Screens

Pressing **Menu** displays the **MENU of SCREENS**, which provides top-level access to the menu structure.

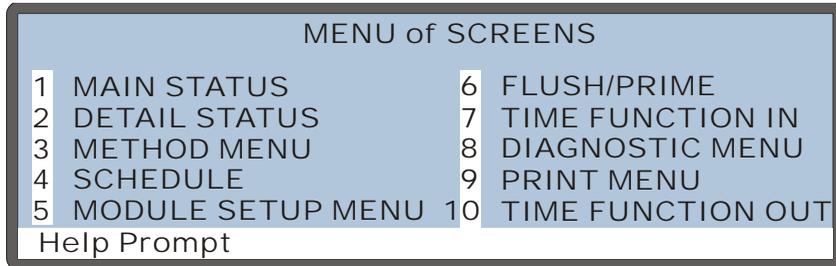


Figure C-2. Menu of Screens

There are two ways to select a screen from a menu:

- Move the cursor to the field containing the screen number and press **Enter**.
- Press the numeric button on the front panel keypad that corresponds to the screen number in the menu.

To display a brief description of each screen, press **Help**.

NOTE If no keypad buttons are pressed within a two-hour period, the backlight automatically turns off. To turn the backlight on again, press any button on the keypad. Press the button a second time if you want to activate its function.

C.2 Main Status Screen

Use the **MAIN STATUS** screen to:

- Display the status of basic operating parameters
- Select operating and control modes

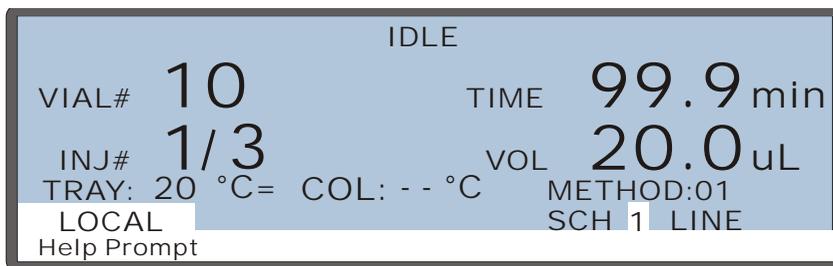


Figure C-3. Main Screen

Screen Field	Description
Status Line (top of screen)	The top line on the screen displays the instrument's current operating status. The following status values are displayed as they occur:
IDLE	No method is currently running.
PREPARING TO RUN SCHEDULE	The AS50 is performing pre-schedule operations such as flushing.
HOLDING	The schedule and method are on hold.
CHECKING FOR SAMPLE VIAL PRESENCE	At the beginning of a method, the AS50 checks that the specified sample vial is present.
PIPETTING...	The AS50 is pipetting from one vial to another during the method's sample prep steps.
DISPENSING...	The AS50 is dispensing from a reservoir during the method's sample prep steps.
MIXING...	The AS50 is mixing the vial contents during the method's sample prep steps.

Screen Field	Description
FLUSHING..	The needle is being flushed (either during sample prep or between schedule lines).
DELAYING xx.x min	The AS50 is delaying for the period of time specified in the sample prep portion of the method.
DILUTE...	The AS50 is performing a dilution as part of the sample prep portion of the method.
WAITING	The AS50 is waiting for a command to continue running a method. The command can be from the front panel (pressing Hold/Run), from Chromeleon, or from a TTL or relay input.
WAITING FOR RUN TO FINISH	The AS50 has completed overlapped sample prep and is waiting for the timed events of the previous method to complete.
EXECUTING SETUP AND INIT STEP	The AS50 is executing the method setup conditions and the INIT step of the method's timed events.
WAITING FOR CYCLE TIME TO EXPIRE	The AS50 is waiting for the cycle time to expire before starting the method's timed events.
WAITING FOR TEMP TO STABILIZE	The AS50 is waiting for the column and/or tray temperature to stabilize before starting the method's timed events.
EXECUTING TIMED EVENTS	The AS50 is executing the method's timed events. This status message is displayed until a load or inject step is executed.
LOADING LOOP	Sample is being loaded into the loop during the method's timed events.
INJECTING	Sample is being injected during the timed events portion of the method.
VIAL#	The number of the vial from which the injection is occurring. The AS50 updates the vial number after executing the INIT step of the method's timed events.

AutoSelect AS50 Autosampler

Screen Field	Description
INJ#	The number of injections completed using the current vial on the current schedule line followed by the total number of injections scheduled for this vial.
TRAY °C	If the sample temperature control option is installed, this field displays the current tray temperature. A symbol to the right of this field indicates the temperature status (see the description in COL °C below). If the sample temperature control option is not installed, the field displays "--" and it is not backlighted.
COL °C	<p>If the thermal compartment is installed, this field displays the current temperature of the compartment.</p> <p>A symbol to the right of this field indicates the temperature status:</p> <ul style="list-style-type: none"> = The temperature is stabilized ↑ The temperature is increasing ↓ The temperature is decreasing -- The temperature control is off <p>If the optional thermal compartment is not installed, the field displays "--" and it is not backlighted.</p>
TIME	The number of minutes since the last injection. The clock counts up until the next injection begins or until reaching the maximum time of 999.9 minutes.
VOL	The volume of sample to be injected.
Operating Mode LOCAL or LOCKED RMT (remote)	Select LOCAL mode for control from the front panel. When the AS50 is connected to Chromeleon software, connecting the AS50 to a Chromeleon Control Panel automatically selects LOCKED RMT . In Locked Remote mode, the front panel keypad is disabled to prevent any changes to operating parameters. To return the AS50 to Local mode, disconnect the AS50 from the Chromeleon Control Panel, or turn off the AS50 power. Note: The REMOTE setting is not used.
Control Mode SCH (schedule) or DIRECT CONTROL	<p>Press Select Δ or Select ∇ to select SCH (schedule) or DIRECT CONTROL mode.</p> <p>In Schedule mode, the screen displays the number of the currently running schedule, the schedule line, and the method. Enter the schedule number to run (1 to 9) in the SCH field.</p> <p>Note: In Remote (software) control, the schedule number is always 0.</p>

C.3 Detail Status Screen

Use the **DETAIL STATUS** screen to:

- Display detailed information about the status of AS50 operating parameters. This screen displays all the information shown on the **MAIN STATUS** screen, plus additional parameters.

NOTE See [Section C.2](#) for descriptions of the parameters common to the **MAIN STATUS** and the **DETAIL STATUS** screens.

- Set several parameters for Direct Control operation.

DETAIL	INJECTING		
VIAL#: 1	TIME: 0.0 min	TTL1	0
INJ#: 1/3	VOL: 25 uL	TTL2	1
METHOD: 01	TRAY: P10mL	RLY1	0
TRAY: 25 20 °C ↑	LOOP: 25.0 uL	RLY2	0
COL: -- °C	PARTIAL	INJ VLV	L
LOCAL	SCH 1	LINE 1	CS VLV
Help prompt			

Figure C-4. Detail Status Screen

Screen Field	Description	Values
TRAY °C	<p>If the sample temperature control option is not installed, "--" is displayed and the field is not backlit.</p> <p>If the sample temperature control option is installed, this field displays, and also allows you to set, the tray temperature set point in °C (see the description in COL °C below). The actual measured temperature is displayed to the right, with a symbol indicating the temperature status.</p> <p>Pressing Select Δ or Select ∇ toggles the tray temperature control on and off. The default is off. When on, the default set point is 20 °C.</p>	0 to 60 °C (default=20)

AutoSelect AS50 Autosampler

Screen Field	Description	Values
COL °C	<p>Displays, and lets you set, the thermal compartment temperature set point in °C. The actual measured temperature and a symbol indicating the temperature status are displayed to the right of this:</p> <p>= The temperature is stabilized ↑ The temperature is increasing ↓ The temperature is decreasing -- The temperature control option is off</p> <p>If a thermal compartment is not installed, "--" is displayed and the field is not backlighted.</p> <p>Pressing Select Δ or Select ▽ toggles the column temperature control on and off. The default is off. When on, the default set point is 20 °C. The injection valve material (PEEK or stainless steel) determines the upper temperature limit. The valve material is specified on the PLUMBING CONFIGURATION screen (see Section C.6.3).</p>	<p>10 to 40 °C (PEEK) 10 to 80 °C (stainless steel)</p>
TRAY	The tray type in use.	NONE, 2 mL, P10 mL (10 mL plastic)
LOOP (Injection Type)	The size of the loop in microliters. The type of injection: FULL for full-loop injections, PARTIAL for partial-loop, and PARTIAL LS for partial-loop, limited-sample. This field is updated when the initial conditions of the method's timed events are executed.	FULL PARTIAL PARTIAL LS
TTL1 TTL2 RLY1 RLY2	Provides TTL and relay control of other devices. In Direct Control, select 1 (on) or 0 (off). In Schedule control set the TTL and relay fields from the TIMED EVENTS screen for the method being run. Appendix D describes TTL and relay control.	1 (on) 0 (off)
INJ VLV	Displays, and lets you set, the position of the injection valve. Press Select Δ or Select ▽ to select the position.	L (load) I (inject)
CS VLV	Displays, and lets you set, the position of the column switching valve. Press Select Δ or Select ▽ to select the position. This field cannot be edited when the valve is not installed.	A (column A) B (column B)

C.4 Method Menu

Use the **METHOD MENU** to:

- Enter the number of the method to be created or edited
- Enter the number to save the method to
- Access the three method editing screens



Figure C-5. Method Menu

To open a method editing screen, move the cursor to the screen's number and press **Enter**. To return to this screen, press **Menu**.

NOTE A method can have a maximum total of 100 steps. The total includes the sample prep steps, the method setup (which counts as one step), and the timed events steps. For example, a default method would have a total of four steps: one for the sample prep Wait step, one for the method setup, and two timed events (INIT and time 0.00).

C.4.1 Sample Prep Screen

Use the **SAMPLE PREP** screen to specify a sequence of operations to be performed before the method's timed events.

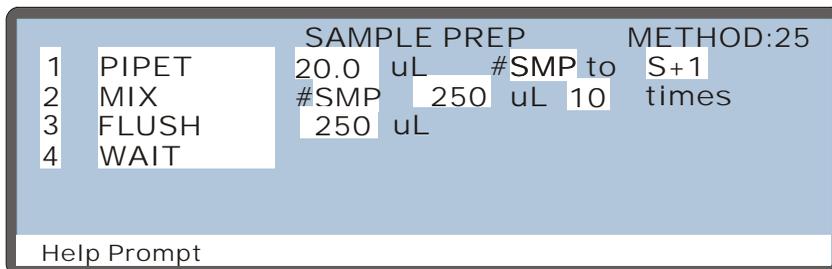


Figure C-6. Sample Prep Screen

NOTE See [Section 3.10.6](#) for instructions on how to define sample prep steps.

Prep Operation	Description
PIPET	<p>Moves a specified volume of sample from one vial to another. The sample syringe is always used for pipetting.</p> <p>μL: Enter the volume to pipet, from 1.0 to 99.9 μL (in 0.1 μL increments) or 100 to 1000 μL (in 1 μL increments) (default=20 μL).</p> <p>#: Enter the source vial position (the vial from which to pick up the specified volume) (default=S+1). See below for how to enter vial positions.</p> <p>to #: Enter the destination vial position (the vial to receive the volume of sample) (default=SMP).</p> <p>To enter vial positions:</p> <ul style="list-style-type: none"> Press numeric buttons to specify an absolute vial position from 1 to 100 (depending on the number of vial positions available in the currently installed tray), or Press Select Δ or Select ∇ to cycle through a list of relative vial positions: SMP (the current sample vial), S+1 (one position past the sample vial), S+9 (9 positions past the sample vial). The destination vial list also includes a WST (waste) option.

Prep Operation	Description
MIX	<p>Mixes the vial contents by repeatedly drawing up and expelling a volume of sample. Mixing is done with the prep syringe if it is installed; otherwise, the sample syringe is used.</p> <p>#: Enter the position of the vial to be mixed (see above) (default =SMP).</p> <p>X: Enter the number of times to repeat the mixing operation, from 1 to 99 (default=10).</p> <p>uL Enter the volume to be drawn up and expelled, from 1.0 to 9999 μL. The default is 500 μL if the prep syringe is installed; otherwise, it is 250 μL. The mix volume must be equal to or less than the syringe volume.</p>
FLUSH	<p>Flushes the needle with a specified volume, from 1 to 999 μL (default=250 μL). The sample syringe and flush reservoir are always used for flushing. If the volume specified is greater than the syringe volume, the syringe takes multiple strokes to achieve the volume.</p> <p>This operation is independent from the flush that takes place before each injection in a schedule (see Section 2.8.8).</p>
NEEDLE HEIGHT	<p>The height of the needle above the bottom of the vial, from 0 to 46 mm (default=2 mm). The needle height is used for all pipet dispense and mix operations until a new needle height is specified.</p> <p>NOTE For 0.3 mL and 1.5 mL vials, use a maximum needle height of 2 mm. This ensures the vent in the sampling needle is positioned correctly inside the vial.</p>
DELAY	<p>Specifies for how long the AS50 waits (0.0 to 999.9 minutes) before proceeding to the next step in the sample prep sequence (default=0.0).</p>

Prep Operation	Description
DISPENSE	<p>Moves a specified volume of reagent from a reservoir to a vial using the prep syringe. DISPENSE is available only if the sample preparation option is installed.</p> <p>μL: Enter the volume to dispense, from 100 to 9999 μL (default=1000 μL).</p> <p>source: Select the reservoir from which to dispense the reagent: RES A, RES B, RES C, or RES D (default=RES A).</p> <p>to #: Enter the destination vial position (the vial to receive the dispensed volume) (default=SMP).</p>
DILUTE	<p>A volume of concentrate is diluted with a specified volume of diluent. DILUTE is available only if the sample preparation option is installed.</p> <p>μL: Enter the concentrate volume, from 1.0 to 99.9 μL or 100 to 1000 mL (default=10 μL).</p> <p>#: Enter the source vial. The sample syringe picks up the concentrate from the source vial and dispenses it to the destination vial (default vial=S+1).</p> <p>μL: Enter the diluent volume (default=1000 μL).</p> <p>source: Select the reservoir from which to dispense the diluent: RES A, RES B, RES C, or RES D (default=RES A).</p> <p>to #: Enter the destination vial position (the vial to receive the concentrate and diluent volumes) (default vial=SMP).</p>
WAIT	<p>The AS50 waits for a continue command before proceeding with the method. The command can be from the front panel (pressing Hold/Run) or a TTL input. Each method must have one WAIT step and no more. Sample prep operations can be added before and after the WAIT step. By default, the WAIT step is at the end of the sample prep sequence.</p> <p>The WAIT step can be disabled from the SYSTEM PARAMETERS screen (see Section C.6.5).</p>

C.4.2 Method Setup Screen

Use the **METHOD SETUP** screen to set the initial conditions and default parameters for a method.

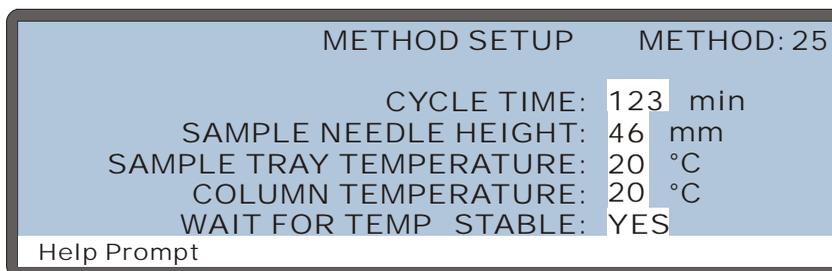


Figure C-7. Method Setup Screen

Screen Field	Description	Values
CYCLE TIME	The time between injections. When a method is assigned a cycle time, its timed events are not executed until the specified time has elapsed. See Section 2.8.7 for details. Cycle time is ignored in the following situations: <ul style="list-style-type: none"> • If WAIT FOR TEMP STABLE is enabled and the tray or column temperature has not stabilized by the end of the cycle time. • If the WAIT step of the method's sample prep sequence is enabled and a continue command has not occurred by the end of the cycle time. 	1 to 240 minutes (default=off)
SAMPLE NEEDLE HEIGHT	Controls the height of the sample needle above the bottom of the vial.	0 to 46 mm (default=2)

NOTE For 0.3 mL and 1.5 mL vials, use a maximum needle height of 2 mm. This ensures the vent in the sampling needle is positioned correctly inside the vial.

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Screen Field	Description	Values
SAMPLE TRAY TEMPERATURE	The sample tray temperature set point. Pressing Select Δ or Select ∇ toggles the tray temperature control on and off. Available only when the sample temperature control option is installed.	4 to 60 °C (default=off) (default set point=20)
COLUMN TEMPERATURE	<p>The thermal compartment temperature set point. Pressing Select Δ or Select ∇ toggles the thermal temperature control on and off. Available only when the thermal compartment option is installed.</p> <p>The inject valve material (PEEK or stainless steel) determines the upper temperature limit. The valve type is specified on the PLUMBING CONFIGURATION screen (see Section C.6.3).</p>	(PEEK) (default=off) 10 to 80 °C (stainless steel) 10 to 40 °C (default set point=20)
WAIT FOR TEMP STABLE	Specifies whether the AS50 should wait until the temperature of the sample tray and/or thermal compartment has stabilized before continuing.	YES/NO

C.4.3 Timed Events Screen

Use the **TIMED EVENTS** screen to specify a sequence of events after the method's sample prep sequence is completed.

TIMED EVENTS				METHOD: 25		
TIME	VALVE	CSV	TTL1	TTL2	RLY1	RLY2
INIT 0.00	LOAD INJECT	A	0	0	0	0

Help Prompt

Figure C-8. Timed Events Screen

When entering timed event parameters:

- Press **Select** Δ or **Select** ∇ to select a value.
- Press **Delete** to clear a value from a field. When a field is blank, the value from the previous step remains in effect.

Screen Field	Description	Values
TIME	The elapsed time at which the method step starts. Every method begins with an INIT (initial) step and a TIME = 0.00 step. You can edit the events for these steps, cannot delete them. The initial step occurs when the timed events for the previous injection end.	0 to 999.99 minutes
Valve	The position of the injection valve. Only one LOAD and one INJECT command can be specified in a method. Sample loading must occur before the injection. By default, LOAD occurs at the INIT step and INJECT occurs at TIME = 0.00 . The load and inject commands are required, even if the injection valve is installed externally. The AS50 must still know when to load the valve and when the injection occurred. A TTL output must be programmed to control the external valve. See Appendix D for details about using TTL outputs.	LOAD/INJECT

Screen Field	Description	Values
	NOTE If the schedule specifies an injection per vial of 0, then only the method's sample prep sequence of steps occurs.	
CSV	The position of the optional column switching valve.	A (column A) B (column B)
TTL1, TTL2 RLY1, RLY2	Provides TTL and relay control of other devices. See Appendix D for details.	1 (on) 0 (off)

C.5 Schedule Screen

Use the **SCHEDULE** screen to program a sequence of injections.

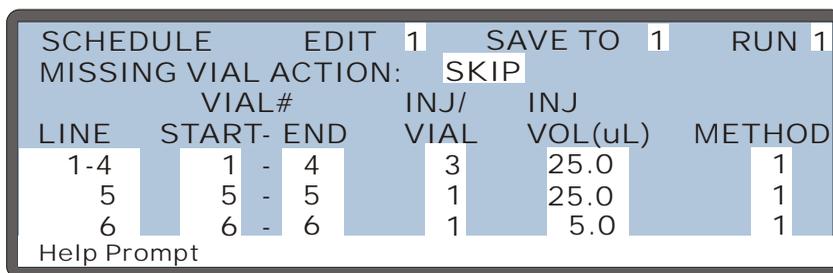


Figure C-9. Schedule Screen

Screen Field	Description	Values
EDIT	The schedule number to edit. Press a numeric button to select the number or press Select Δ or Select ∇ to cycle through the choices. Press Enter to display the selected schedule.	1 to 9
SAVE TO	The schedule number to save the current schedule to. It does not have to be the EDIT number.	1 to 9
RUN	The schedule number to run. Note: Entering a value in this field does not start the schedule. Press Hold/Run or send a TTL/RLY run command to start.	1 to 9

Screen Field	Description	Values
Missing Vial Action	The action the AS50 takes if a vial is missing from the tray. Select SKIP to skip the missing vial and move to the next vial in the schedule. Select STOP to stop the schedule. To resume, press Hold/Run .	SKIP/STOP (default=STOP)
LINE	Each line contains the parameters for one vial in the schedule. Line numbers are assigned automatically when you insert steps. (A step is one horizontal line on the SCHEDULE screen.) If consecutive vials have identical parameter values, line numbers are shown in a range format (see the example above). A schedule can have a maximum of 203 steps, containing up to 999 lines.	1 to 999 (automatically assigned)
VIAL# START END	The first and last vial numbers for the schedule step. The vials in this range are sampled according to the parameters specified in the step. The starting vial does not have to be a smaller number than the ending vial. To sample just one vial, enter the same vial number for the start and end.	1 to 100 (1.5 mL tray) 1 to 49 (plastic 10 mL tray)
INJ/VIAL	The number of injections performed on each vial. If zero injections is specified, only the sample prep portion of the method will be performed.	0 to 99 (default=1)
INJ VOL (μL)	The volume of sample delivered for each injection, from 1.0 to 99.9 (in increments of 0.1 μL) or 100 to 1000 (in increments of 1 μL). The maximum injection volume depends on the loop size installed.	1.0 to 99.9 μL 100 to 1000 μL (default=20)
METHOD	The method number to run on each vial in the range.	1 to 99

C.6 Module Setup Menu

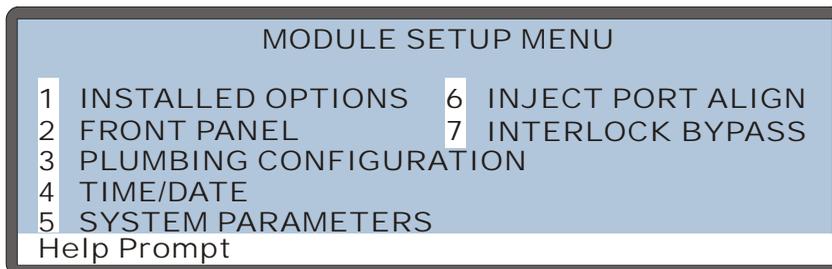


Figure C-10. Module Setup Menu Screen

C.6.1 Installed Options Screen

The **INSTALLED OPTIONS** screen lists the optional features installed in the AS50. This screen is displayed briefly at power-up.

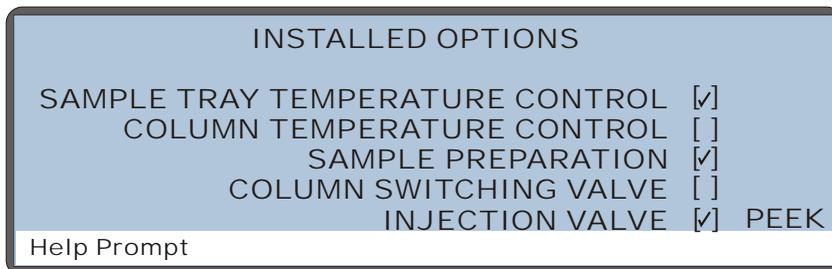


Figure C-11. Installed Options Screen

Except for the injection valve material, the AS50 automatically detects which options are installed and displays a check mark in the appropriate fields. You must specify the injection valve material on the **PLUMBING CONFIGURATION** screen at installation.

C.6.2 Front Panel Screen

Use the **FRONT PANEL** screen to select display options.

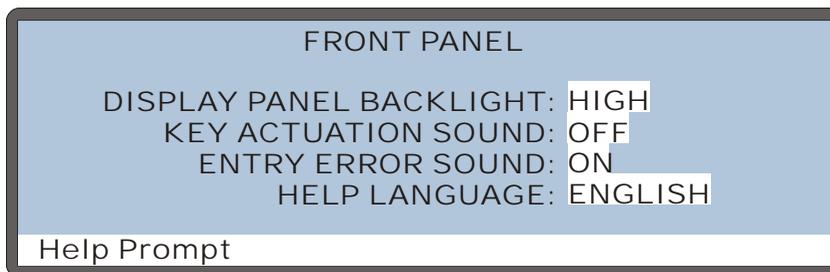


Figure C-12. Front Panel Screen

Screen Field	Description	Values
DISPLAY PANEL BACKLIGHT	Selects the brightness of the display panel backlight. The off option darkens the display completely. When off, press any button to turn the light on again.	LOW/MEDIUM,/ HIGH/OFF (default= HIGH)
KEY ACTUATION SOUND	Toggles the key sound on and off.	ON/OFF (default= OFF)
ENTRY ERROR SOUND	Toggles the error sound on and off.	ON/OFF (default= OFF)
HELP LANGUAGE	Selects the language for help and error messages.	ENGLISH/ JAPANESE

C.6.3 Plumbing Configuration Screen

Use the **PLUMBING CONFIGURATION** screen to specify the plumbing options installed in the AS50.

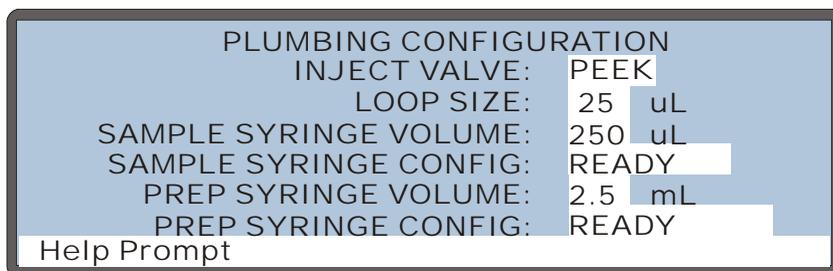


Figure C-13. Plumbing Configuration Screen

Screen Field	Description	Values
INJECT VALVE	The injection valve material. This setting determines the maximum temperature set point for the optional thermal compartment. If PEEK is selected, the maximum temperature allowed is 40 °C.	SST (stainless steel) PEEK (default= PEEK)
LOOP SIZE	The size of loop in use.	2 to 99.9 µL 100 to 1100 µL (default=25)
SAMPLE SYRINGE VOLUME	The volume of the sample syringe installed. Press Select Δ or Select ▽ to cycle through the choices.	100 µL, 250 µL, 500 µL, 1000 µL (default=250)
SAMPLE SYRINGE CONFIG	The action to be performed by the sample syringe. These actions are used to configure the syringe at initial setup or after the syringe is replaced. INITIALIZE brings the syringe to an initial position. SET HOME sets the topmost position the syringe will reach during operation. READY is displayed when syringe configuration is complete; no action occurs. See Section 5.2.5 for details.	SET HOME INITIALIZE READY

Screen Field	Description	Values
PREP SYRINGE VOLUME	The volume of the prep syringe installed. Press Select Δ or Select ∇ to cycle through the choices.	2.5 mL, 5 mL, 10 mL (default=5)
PREP SYRINGE CONFIG	The action to be performed by the prep syringe. See the SAMPLE SYRINGE CONFIG section for details.	SET HOME INITIALIZE READY

C.6.4 Time/Date Screen

Use the **TIME/DATE** screen to set the time and date on the real-time clock.



Figure C-14. Time/Date Screen

Screen Field	Description
ACTUAL TIME	Displays the time on the real-time clock.
SET TIME	Sets the 24-hour real-time clock. Enter the hour first, followed by minutes, and then seconds. For example, if the time is 8:35 a.m. and 50 seconds, enter 08:35:50. If the time is 8:35 p.m. and 50 seconds, enter 20:35:50. Press numeric buttons to enter the time directly or press Select Δ or Select ∇ to increase or decrease the current value.
DATE	Sets the date on the real-time clock. Press numeric buttons to enter the day and year directly, or press Select Δ or Select ∇ to increase or decrease the current values. Press Select Δ or Select ∇ to select the month.

C.6.5 System Parameters Screen

Use the **SYSTEM PARAMETERS** screen to set default system operating parameters.

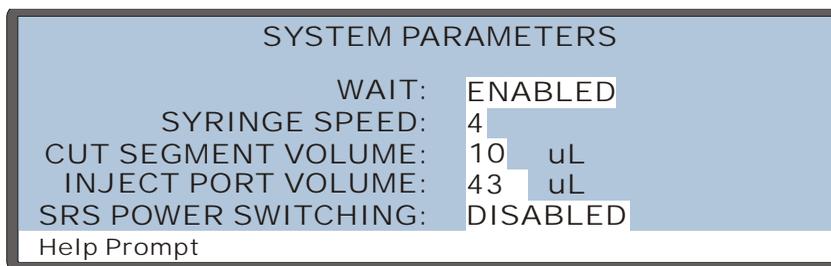


Figure C-15. System Parameters Screen

Screen Field	Description	Values
WAIT	Enables or disables the wait step in the sample prep sequence of the method. When WAIT is enabled, the AS50 waits for a run command from either the front panel Hold/Run button or a TTL input signal before performing a method's timed events steps. This allows another instrument to control the timing of each injection in a schedule. When WAIT is disabled, a run command is required to start a schedule. Thereafter, the AS50 performs the schedule lines without requiring additional run commands. Disabling WAIT allows the AS50 to act as a system master. The AS50 can send TTL signals to other modules in the system, thereby controlling system functions (starting the pump, starting the detector method, etc.).	ENABLED DISABLED
SYRINGE SPEED	The syringe speed to use. Select the default value of 5 for water; more viscous liquids require slower speeds.	1 (slowest) to 5 (fastest) (default=5)
CUT SEGMENT VOLUME	For partial-loop injections, specifies the volume to cut from each side of the sample during the injection process. See Section 3.12 for details about injection types.	0 to 30 μ L (default=10)

Screen Field	Description	Values
INJECT PORT VOLUME	The volume of tubing between the inject port and injection valve. This represents the amount of extra liquid to be dispensed when loading the loop in order to accurately position the sample. This value is determined at the factory and should not be changed unless a new needle seal assembly is installed.	1 to 999 μ L (default=25)
SRS POWER SWITCHING	Specifies whether to switch the power from one SRS to the other at the same time that the column switching valve position is switched (dual-channel conductivity systems only). If the column switching valve is not installed, the field is blank.	ENABLED DISABLED

C.6.6 Inject Port Alignment Screen

Use the **INJECT PORT ALIGNMENT** screen to align the sampling needle in the inject port. See [Section 5.7](#) for detailed instructions.

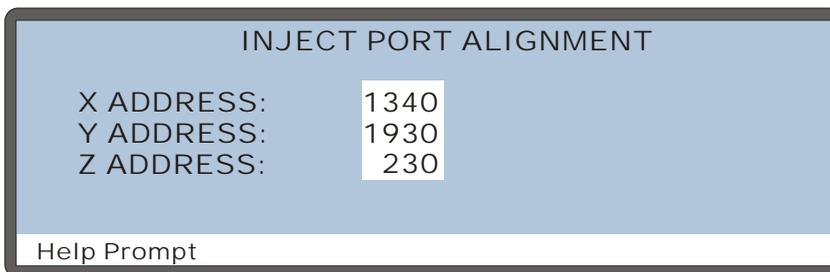


Figure C-16. inject Port Alignment Screen

Screen Field	Description	Values
X ADDRESS	The X-axis position of the needle arm.	1290 to 1390 (default=1340)
Y ADDRESS	The Y-axis position of the needle arm.	1880 to 1950 (default=1930)
Z ADDRESS	The Z-axis position of the needle arm.	180 to 280 (default=230)

C.6.7 Door Interlock Bypass Screen

Use the **DOOR INTERLOCK BYPASS** screen to temporarily disable the autosampler compartment door lock.

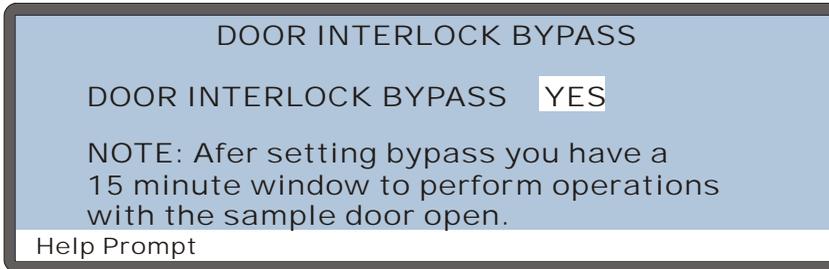


Figure C-17. Door Interlock Bypass Screen



Be aware of unexpected sampling arm movement when operating with the door open.



Soyez conscient de la possibilité de mouvements imprévus du bras d'échantillon lorsqu'il est utilisé avec la porte ouverte.



Achten Sie beim Betrieb mit geöffneter Tür auf unerwartete Bewegungen des Probenarms.

Screen Field	Description
DOOR INTERLOCK BYPASS	<p>Press Select Δ or Select ∇ to select YES (bypass the door lock) or NO (do not bypass the door lock) and press Enter. The default setting is NO.</p> <p>After selecting YES and pressing Enter, the door lock alarm is disabled for 15 minutes. During this time, if you open the autosampler compartment door, the sampling arm continues its current operation; if a schedule is running, it also continues. To extend the bypass for another 15 minutes, press Enter again. This restarts the fifteen-minute window.</p> <p>When the 15 minutes is up, the DOOR INTERLOCK BYPASS setting automatically reverts to NO. When NO is selected, opening the autosampler compartment door stops the sampling arm operation and aborts the currently running schedule.</p>

C.7 Flush/Prime Screen

Use the **FLUSH/PRIME** screen to:

- Set parameters for and initiate a flush cycle that flushes the inject port and washes the outside of the needle.
- Set parameters for and initiate a prime cycle that primes the lines to the reservoir(s) and the sampling needle.

The screenshot shows a screen titled "FLUSH/PRIME" with two columns of settings. The left column is for "FLUSH" and the right column is for "PRIME".

FLUSH	PRIME
VOLUME: 250 uL	VOLUME: 2000 uL
RESERVOIR: FLUSH	RESERVOIR: RES A
SYRINGE: SAMPLE	SYRINGE: PREP
ACTION: READY	ACTION: READY

At the bottom of the screen, there is a "Help Prompt" field.

Figure C-18. Flush/Prime Screen

Screen Field	Description	Values
FLUSH VOLUME	The volume of fluid used to flush the inject port. The inject port is flushed, using the volume specified, and then the exterior of the needle is washed (in the wash port), using a factory-set volume.	100 to 5000 μ L (default=400)
FLUSH RESERVOIR	The flush reservoir is always used for flushing.	FLUSH
FLUSH SYRINGE	The sample syringe is always used for flushing.	SAMPLE
FLUSH ACTION	To start a flush cycle, press Select Δ or Select ∇ to select FLUSH and press Enter . The AS50 must be in Direct Control mode before starting the flush cycle.	READY, FLUSH
PRIME VOLUME	The volume of fluid used for priming.	100 to 5000 μ L (default=400)

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Screen Field	Description	Values
PRIME RESERVOIR	The reservoir used for the priming cycle. If the sample prep option is installed, press Select Δ or Select ∇ to cycle through the choices. If the sample prep option is not installed, the flush reservoir is always used and this field cannot be edited.	FLUSH, RES A, RES B, RES C, RES D
PRIME SYRINGE	The syringe used for the prime cycle. If there is no sample prep option installed, the sample syringe is always used and this field cannot be edited.	SAMPLE, PREP
PRIME ACTION	To start a prime cycle, press Select Δ or Select ∇ to select PRIME and press Enter . The AS50 must be in Direct Control mode before starting the prime cycle.	READY, PRIME

C.8 Time Function In Screen

Use the **TIME FUNCTION IN** screen to:

- Display the AS50 functions that can be controlled via TTL input from another device.
- Select a TTL signal mode for each function.

See Appendix D for details about TTL controlled functions and connections.

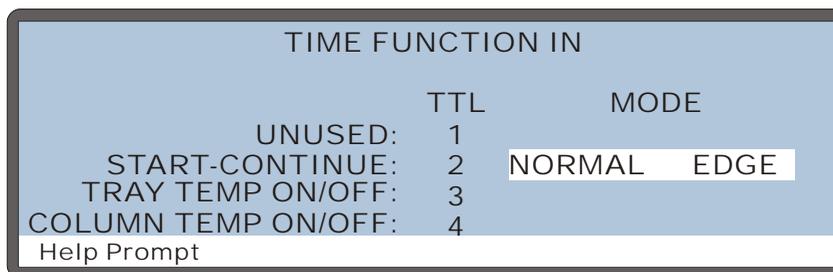


Figure C-19. Time Function In Screen

Screen Field	Description	Values
MODE	Select the signal mode that corresponds to the signal type of the controlling device. NORMAL EDGE , the default mode, is compatible with the TTL output signals provided by Dionex modules.	NORMAL EDGE INVERTED EDGE NORMAL PULSE INVERTED PULSE
UNUSED:TTL1	Not active.	
START-CONTINUE:TTL2	A signal to TTL2 from the controlling device starts the schedule (if it is not currently running), or continues the current schedule when the AS50 is at the WAIT step of a method.	
TRAY TEMP ON/OFF:TTL3	A signal to TTL3 from the controlling device turns the optional sample temperature control unit on and off.	
COLUMN TEMP ON/OFF:TTL4	A signal to TTL4 from the controlling device turns the optional thermal compartment temperature control on and off.	

C.9 Diagnostic Menu

To go to the **DIAGNOSTIC MENU**, press **Menu** and **8**.

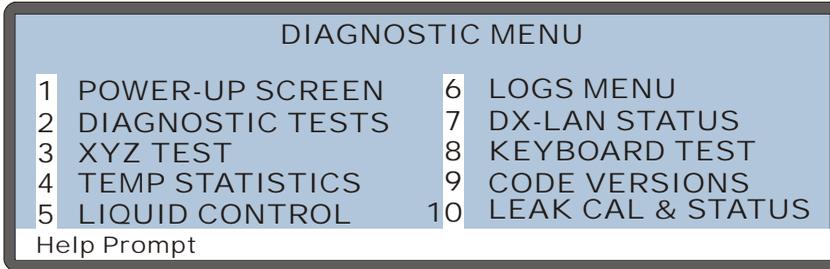


Figure C-20. Diagnostic Menu Screen

C.9.1 Power-Up Screen

Use the **POWER-UP** screen to display the revision levels of the Moduleware and BIOS code, the DX-LAN ID number (if connected), and the serial number of the AS50. This is the same power-up screen that displays when you turn on the AS50.

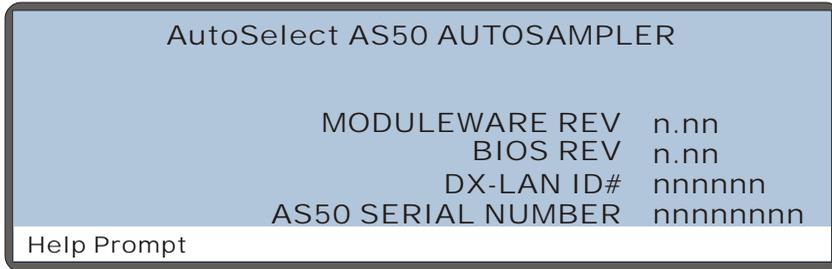


Figure C-21. Power-Up Screen

C.9.2 Diagnostic Tests Screen

This screen lets you test the AS50 electronics components.

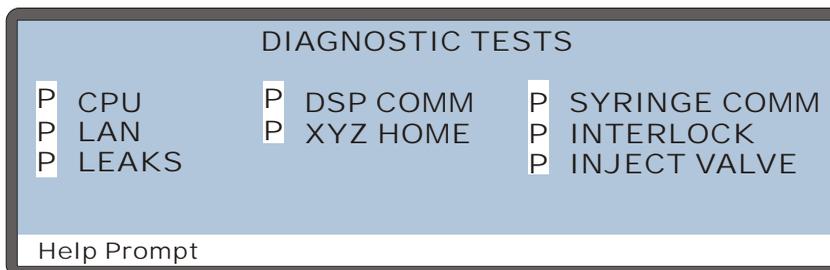


Figure C-22. Diagnostic Tests Screen

At power-up, these tests are run automatically. If any tests fail, the screen opens and displays the status of each test:

“--” the test was not run

“>” the test is in progress

“P” the test passed

“F” the test failed

To run a test manually, position the cursor in the edit field next to the test, press **Select** Δ or **Select** ∇ to select the asterisk (*), and press **Enter**.

Test	Description
CPU	Checks the CPU internal configuration and the Moduleware checksum.
LAN	Checks the DX-LAN hardware configuration and loop back.
LEAKS	Checks whether the leak sensors detect a leak.
DSP COMM	Checks communication between the CPU and the DSP (Digital Signal Processor) hardware.
XYZ HOME	Tells the DSP to search for the XYZ home position.
SYRINGE COMM	Checks the communication between the CPU and the sample syringe.
INTERLOCK	Checks that the sampler door is closed.
INJECT VALVE	Checks that the injection valve operates correctly.

C.9.3 XYZ Test Screen

Use the **XYZ TEST** screen to test operation of the sampling needle arm.

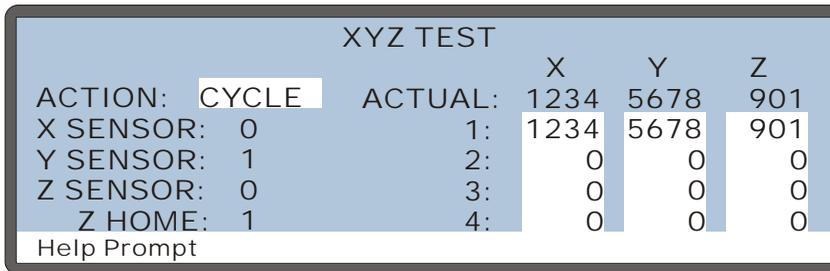


Figure C-23. XYZ Test Screen

Screen Field	Description
ACTION	The action the needle arm should perform: HOME Homes all three axes. GO TO X Positions the arm at the specified location (1, 2, 3, or 4). CYCLE Continuously cycles the arm through the four positions. PATTERN Continuously cycles through a four corners test pattern, with the needle moving about halfway into the vial. VIALS Continuously cycles the arm through each position in the currently installed tray, with the needle tapping the top of each vial.
ACTUAL XYZ	Displays the needle arm's current XYZ position. The numbers indicate the number of motor steps away from the home position.
XYZ 1, 2, 3, 4	Allows entry of XYZ values for four needle arm positions. The numbers indicate the number of motor steps away from the home position.
X SENSOR Y SENSOR	Indicates the current state of the X and Y sensors. The X and Y sensors detect evenly spaced slots that indicate the home position and mark distance intervals.
Z SENSOR	Indicates whether a vial is present. When the needle is down and a vial is present, a '1' is displayed. If no vial is present at the current location when the needle is down, a '0' is displayed.

Screen Field	Description
Z HOME	Indicates whether the Z axis is at the home position. A '0' indicates home.

To run a test:

1. Move the cursor to the **ACTION** field and select an action to perform. For the **GO TO** action, enter the desired xyz positions.
2. Press **Enter**.

C.9.4 Temperature Statistics Screen

Use the **TEMPERATURE STATISTICS** screen to:

- Manually control the temperature of the tray and/or thermal compartment.
- Monitor the status of temperature-related values.

NOTE This screen is available only when the temperature control option is installed.

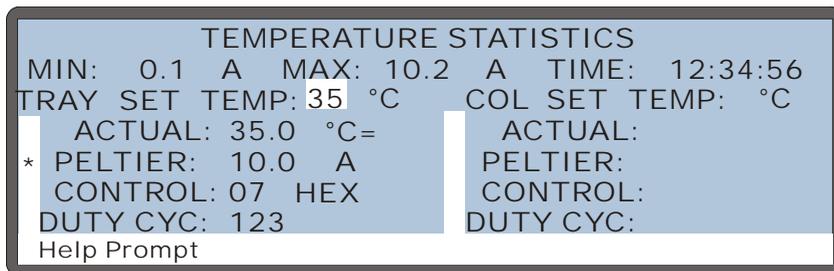


Figure C-24. Temperature Statistics Screen

Screen Field	Description
MIN, MAX, TIME	Displays the minimum and maximum values measured for the selected value, and the length of time the value has been monitored. An asterisk indicates the value being monitored. To select a value to monitor, move the cursor to the desired field and press Enter .

AutoSelect AS50 Autosampler

Screen Field	Description
TRAY SET TEMP COL SET TEMP	The temperature to maintain in the tray and thermal compartments.
ACTUAL	Displays the measured temperature. The reading is updated every 3 seconds. A symbol to the right of the reading indicates the temperature's status: = The temperature is stabilized ↑ The temperature is increasing ↓ The temperature is decreasing
PELTIER	Displays the measured Peltier currents.
CONTROL	Displays the state of the Peltier control bits: bit 0: saturate (0=duty cycle, 1=saturate) bit 1: Peltier enable (1=on) bit 2: heat/cool (0=heat, 1=cool) bits 3-7: always 0
DUTY CYCLE	Displays the Peltier duty cycle (from 0 through 255).

C.9.5 Liquid Control Screen

Use the **LIQUID CONTROL** screen to:

- Manually control the sample and prep syringes.
- Manually control the inject valve and column switching valve.
- Manually position the needle at a specified vial.

The AS50 must be in Local mode, Direct Control to manually control these functions.

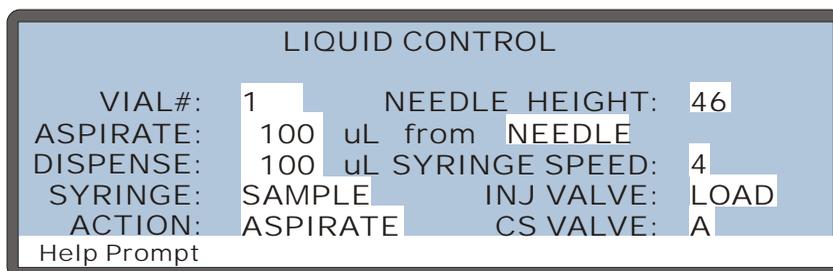


Figure C-25. Liquid Control Screen

Screen Field	Description	Values
VIAL#	The position for the sampling needle. Press Select Δ or Select ∇ to cycle through vial numbers and options. Use numeric buttons to enter an absolute vial number. The range of valid vial numbers depends on the type of tray currently installed. Press Enter to move the needle to the selected position.	Absolute vial numbers (default=1), INJ (inject port), FLU (flush port)
ASPIRATE	The volume of liquid to be drawn during an aspirate action.	1.0 to 99.9 μ L or 100 to 1000 μ L (default=100 μ L)
from	The source for the action. The choices depend on the syringe in use: Sample: NEEDLE, FLUSH Prep: NEEDLE, FLUSH, RES A, RES B, RES C, RES D, AIR	

AutoSelect AS50 Autosampler

Screen Field	Description	Values
DISPENSE	The volume of liquid to dispense during a dispense action.	1.0 to 99.9 μL or 100 to 1000 μL (default=100 μL)
SYRINGE	The syringe to use for an action.	SAMPLE, PREP
ACTION	The action to perform. Press Select Δ or Select ∇ to cycle through the choices; press Enter to start the action.	ASPIRATE, DISPENSE, EMPTY, FILL
NEEDLE HEIGHT	The height of the needle above the bottom of the vial. If 0 is selected, a small distance is added to prevent the needle from touching the bottom of the vial.	0 to 46 mm (default=46 mm)
SYRINGE SPEED	The syringe speed to use. Use the default value of 5 for water. More viscous liquids require slower speeds.	1 (slowest) to 5 (fastest) (default=5)
INJ VALVE	The injection valve position.	INJECT, LOAD
CS VALVE	The position of the optional column switching valve.	A (column A), B (column B)

C.9.6 Logs Menu



Figure C-26. Logs Menu Screen

Usage Log Screen

Use the **USAGE LOG** screen to:

- Display for how long various AS50 components have been in use.
- Reset counters after replacing a component.

The status of each parameter is updated in real time.

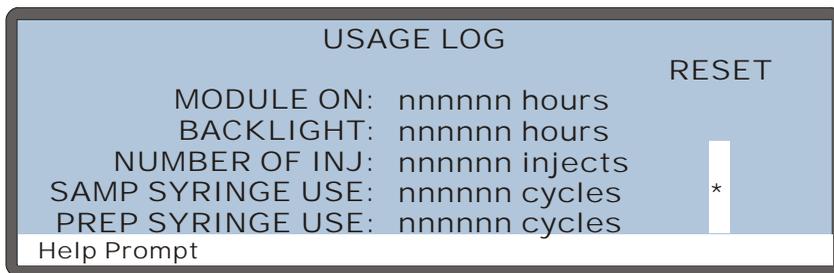


Figure C-27. Usage Log Screen

Screen Field	Description
MODULE ON	The number of hours the AS50 has been powered-up.
BACKLIGHT	The number of hours the backlight has been on.
NUMBER OF INJ	The total number of injections. Reset the count after replacing the injection valve
SAMP SYRINGE USE	The total number of aspirate/dispense cycles the sample syringe has performed. Reset the count after replacing the syringe.

Screen Field	Description
PREP SYRINGE USE	The total number of aspirate/dispense cycles the prep syringe has performed. Reset the count after replacing the syringe.
RESET	To reset the NUMBER OF INJ , SAMP SYRINGE USE , or PREP SYRINGE USE counter to 0, move the cursor to the corresponding asterisk (*) field and press Enter .

Message Log Screen

Displays a list of errors that have occurred.



MESSAGE LOG			
1	11:22:33	29 SEPTEMBER 04	#208
	Incorrect key pressed		
2	12:13:14	29 SEPTEMBER 04	#567
	Missing vial detected		
3	15:67:02	29 SEPTEMBER 04	#890
	Syringe communications timeout		
Help Prompt			

Figure C-28. Message Log Screen

Each message includes the time and date the message was recorded, the error code, and a brief description of the error.

To see a full-screen description of an error, move the cursor to the error's entry number and press **Help**.

Press **Select** Δ or **Select** ∇ to go to the beginning or ending of the log, respectively.

C.9.7 DX-LAN Status Screen

Use the **DX-LAN STATUS** screen to:

- Display the DX-LAN addresses.
- Display network errors. The DX-LAN driver monitors the network and reports errors to the AS50.

```

                                DX-LAN STATUS
                                UNIQUE ID:  nn nn nn
                                DX-LAN ADDRESS:  nn nn nn nn nn nn
                                COLLISION:  0   ALIGNMENT:  0   CRC:  0
                                BUS WRITE:  0   BUS READ:  0   RUNT:  0
                                UNDERFLOW:  0   OVERFLOW:  0   RETRY:  0
                                Help Prompt

```

Figure C-29. DX-LAN Status Screen

Screen Field	Description
UNIQUE ID	The three-byte DX-LAN ID programmed into the AS50 Moduleware (in HEX). The ID is unique to each AS50 and never changes.
DX-LAN ADDRESS	The six-byte DX-LAN address assigned by the PC (in HEX). The first three bytes are the system assignment and the last three bytes are the assignment within the system.
COLLISION	Indicates that 16 unsuccessful transmissions of the same packet occurred, due to collisions.
BUS WRITE	Indicates that a ready response could not be issued within 2.4 microseconds after the WR signal was asserted. This occurs when the transmit buffer memory is full.
UNDERFLOW	Indicates that data from the transmit section of the hardware buffer memory is not available for serial transmission. The DX-LAN will continue to send out this data frame.
ALIGNMENT	Indicates that a packet was received with an alignment error, meaning that there were one to seven extra bits at the end of the packet. This is usually caused by a collision or a faulty transceiver.

Screen Field	Description
BUS READ	Indicates that a ready response could not be issued within 2.4 microseconds after the ready signal was asserted. This occurs when reading an empty buffer.
OVERFLOW	Indicates that the DX-LAN hardware receive buffer became full and had to reject a packet for lack of space.
CRC	Indicates that a packet was received with a CRC error. This usually means that a collision has corrupted the packet.
RUNT	Indicates that a “runt” packet (less than 15 bytes in length) was received. This usually occurs after a collision has truncated the original length.
RETRY	Indicates the number of retries required to transmit the last packet.

C.9.8 Keyboard Test Screen

Use the **KEYBOARD TEST** screen to conduct an interactive test of the front panel keypad buttons.

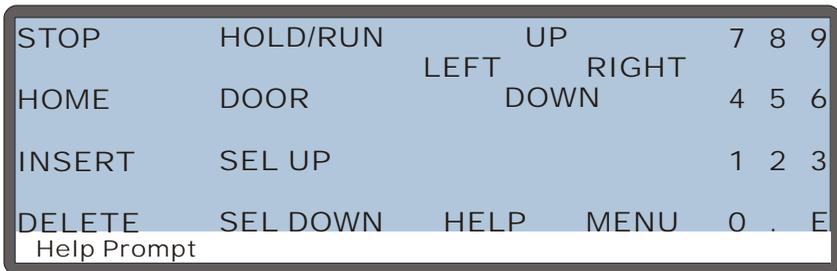


Figure C-30. Keyboard Test Screen

To test the buttons:

1. Press a button on the keypad. Its display changes to reverse video, confirming proper operation of that button.
2. Continue pressing all buttons in turn. Only the most recently pressed button shows in reverse video.
3. To end the test and return to the **DIAGNOSTIC MENU**, press **Menu** twice.

C.9.9 Code Versions Screen

Displays revision numbers for the current digital signal processor (DSP) code and syringe operating code.

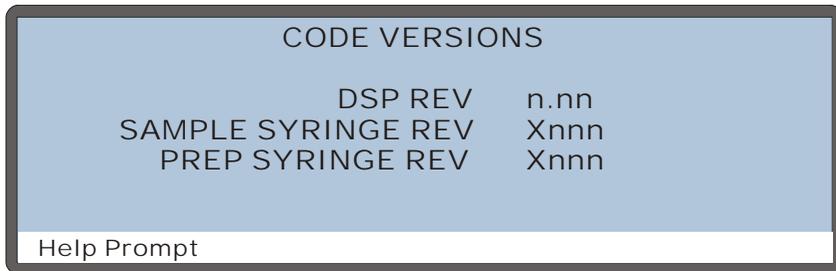


Figure C-31. Code Versions Screen

C.9.10 Leak Sensor Calibration and Status Screen

Use this screen to display the status of the leak sensors and to calibrate them.

LEAK SENSOR CALIBRATION AND STATUS		
	TRAY	OVEN
MEASURED VALUE:	2.48	2.50
CURRENT CONDITION:	DRY	CAL
CALIBRATION VALUE:	2.49	2.52
LOW LEAK THRESHOLD:	2.29	2.31
ENABLE LEAK DETECTION	YES	YES
Help Prompt		

Figure C-32. Leak Sensor Calibration and Status Screen

Screen Field	Description
MEASURED VALUE	Reports the current measured voltages for the two leak sensors. TRAY is the sensor installed in the autosampler drip tray. OVEN is the sensor installed in the optional thermal or chromatography module.
CURRENT CONDITION	Reports the current state of the sensors: DRY if the sensor reading is within the dry range, WET if the sensor reading is within the wet range, or ERR if the sensor is out of range. If the measured value drops 0.02 volts below the calibration value, the current condition is wet. If the measured value goes 0.06 volts above the calibration value, the sensor needs to be recalibrated. To calibrate a sensor, press Select Δ or Select ∇ to select CAL and then press Enter . The current measured value becomes the new calibration value. See Section 5.10 for detailed instructions.
CALIBRATION VALUE	Reports the voltage values set for the calibration.
LOW LEAK THRESHOLD	Reports the minimum voltage reading that will be interpreted as a dry sensor. A reading below this voltage indicates a wet sensor.

C.10 Print Menu

When a printer with a serial (RS-232) interface is connected, the **PRINT MENU** can be used to print a schedule; a method; setup and configuration information; or a message log. Automatic schedule printouts can also be enabled or disabled from here. The communication parameters for setting up the serial printer are listed on the next page.

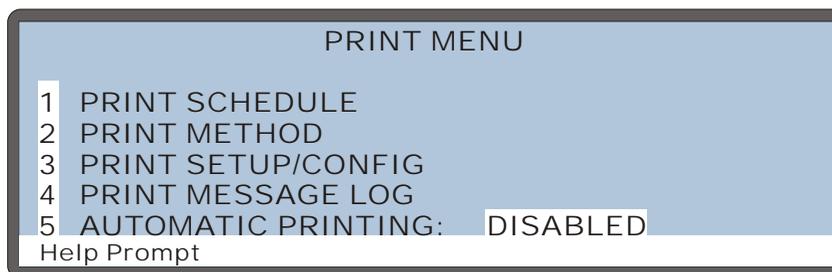


Figure C-33. Print Menu

Screen Field	Description
PRINT SCHEDULE	Opens a prompt screen on which you enter the schedule number to be printed.
PRINT METHOD	Opens a prompt screen on which you enter the method number to be printed.
PRINT SETUP/ CONFIG	Prints setup and configuration information.
PRINT MESSAGE LOG	Prints the message log (up to 20 messages).
AUTOMATIC PRINTING	Toggles between DISABLED and ENABLED . When enabled, schedule information will print automatically while the schedule is running.

RS-232 Interface Communication Parameters:

Parameter	Specification
Baud	9600
Mode	full duplex
Data Bits	8
Parity	none
Stop Bits	1
Flow Control	XON/XOFF
Connector	DB9 male jack

D • TTL and Relay Control

The 12-pin connector on the AS50 rear panel provides two relay outputs, two TTL outputs, and four TTL inputs (see [Figure D-1](#)).

- To control functions in another device, connect the AS50 TTL and relay outputs to the TTL or relay inputs of a device compatible with the AS50's TTL and relay signals.
- To control certain AS50 functions (schedule start and continue, tray temperature control on/off, and thermal compartment control on/off), connect the AS50 inputs to the TTL or relay outputs of a device compatible with the AS50's TTL and relay signals.

Connection instructions and examples are in [Section D.3.1](#).

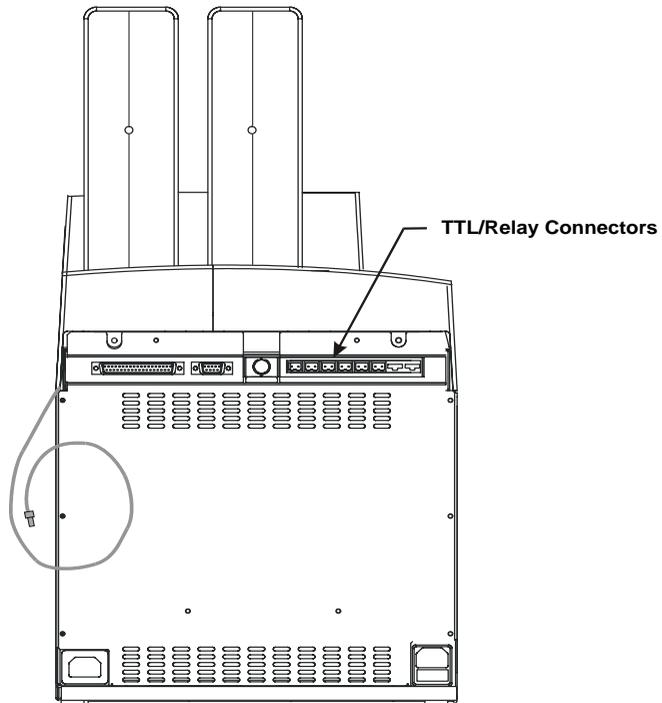


Figure D-1. TTL/Relay Connector Strip (on AS50 rear panel)

D.1 TTL and Relay Output Operation

The AS50 provides two TTL outputs and two relay contacts to control functions in external devices such as a pump or detector.

After connecting the TTL and Relay outputs (see [Section D.3.1](#)), toggle the output states on and off in Direct Control from the **DETAIL** screen, or in Schedule Control during the timed events portion of the method.

- To turn on a TTL or relay output, set the corresponding output field in the **DETAIL** screen or method **TIMED EVENTS** screen to 1 (on).
- To turn off a TTL or relay output, set the corresponding output field to 0 (off).

For example, if TTL output 1 on the AS50 is connected to TTL input 2 on a DX-500 pump, setting TTL1 to 1 (on), as shown in [Figure D-2](#), sends a signal to the pump to start the pump method.

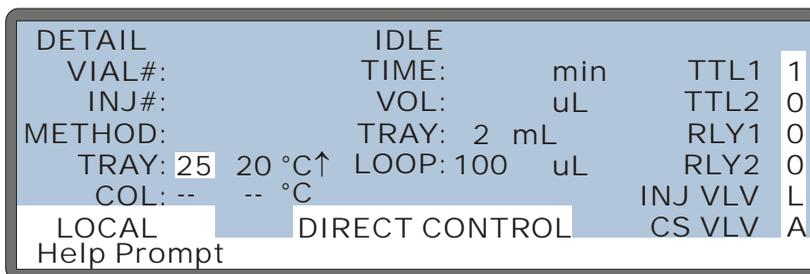


Figure D-2. Detail Status Screen - Direct Control of TTL and Relays

D.2 TTL Input Operation

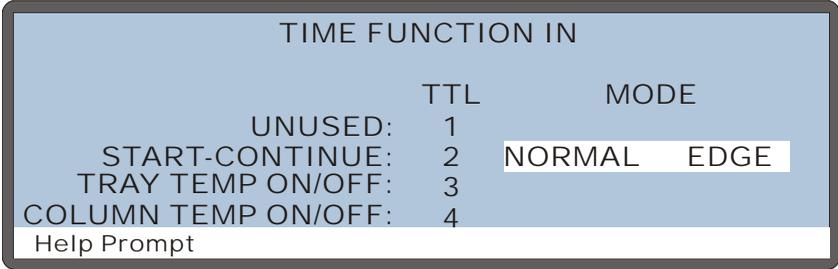
NOTE TTL input 1 is not currently used.

The four TTL inputs can be connected to devices capable of providing TTL signals. The signal from the connected devices can control the following AS50 functions:

- **TTL input 2** controls schedule runs. A signal to TTL2 from the controlling device starts the schedule (if it is not currently running), or continues the current schedule when the AS50 is at the WAIT step of the method.
- **TTL input 3** controls the optional sample temperature control unit. A signal to TTL3 from the controlling device turns the sample temperature control on and off.
- **TTL input 4** controls the thermal compartment temperature. A signal to TTL4 from the controlling device turns the thermal compartment temperature control on and off.

D.2.1 TTL Input Signal Modes

The AS50 TTL inputs respond to four types of device output signals. The default signal mode, normal edge, is compatible with the output signals provided by Dionex modules. If the device connected to the AS50 outputs a different signal type, select a different signal mode from the **TIME FUNCTION IN** screen (see [Figure D-3](#)).



The screenshot shows a terminal window titled "TIME FUNCTION IN". It contains a table with two columns: "TTL" and "MODE". The "MODE" column has two sub-columns, "NORMAL" and "EDGE". The "NORMAL" column is highlighted with a white background. Below the table is a "Help Prompt" line.

	TTL	MODE
UNUSED:	1	
START-CONTINUE:	2	NORMAL EDGE
TRAY TEMP ON/OFF:	3	
COLUMN TEMP ON/OFF:	4	

Help Prompt

Figure D-3. Time Function In Screen – Selecting Signal Modes

The four input signal modes are:

- *Normal Edge*: In normal edge operation, the negative (falling) edge of a signal turns on the function and the positive (rising) edge turns off the function (see [Figure D-4](#)). For example, a negative edge sent to TTL4 turns on the column temperature control, while a positive edge turns it off.
- *Inverted Edge*: The inverted edge mode works identically to the normal edge mode, except that the positive and negative edges are reversed in function.
- *Normal Pulse*: In normal pulse operation, the negative (falling) edge of the TTL signal is the active edge and the positive (rising) edge is ignored. For example, when an AS50 schedule is idle, applying a negative pulse to TTL2 starts the schedule. This has the same result as pressing the **Off/On** button on the front panel keypad.

The minimum pulse width guaranteed to be detected is 50 ms. The maximum pulse width guaranteed to be ignored as noise or invalid is 4 ms. The action of the AS50 is undefined for pulses less than 50 ms or greater than 4 ms.

- *Inverted Pulse*: The inverted pulse mode operates identically to the normal pulse mode, except that the positive and negative edges are reversed in function.

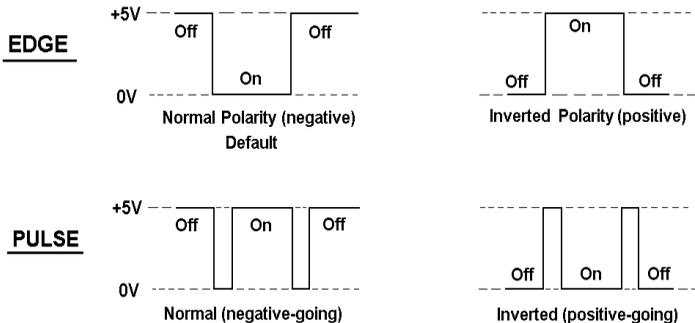


Figure D-4. TTL and Relay Input Signal Modes

D.3 Setting Up Relay or TTL Control

For relay or TTL output control, follow these basic steps:

1. Connect wires between the TTL/relay output connector pins on the AS50 rear panel and the TTL/relay input pins on the other module(s) in the system. See [Section D.3.1](#) for instructions.
2. Create an AS50 method that includes timed events for turning the connected relay or TTL outputs on and off at the appropriate times.
3. Create an AS50 schedule that includes the method in its injection parameters.
4. Run the schedule.

For relay or TTL input control of the AS50, follow these basic steps:

1. Connect wires between the TTL input connector pins on the AS50 rear panel and the TTL/relay output pins on the other module(s) in the system. See [Section D.3.1](#) for instructions.
2. Create a method for the other module that turns the AS50 TTL function on and off at the appropriate times.
3. Run the method.

NOTE Chromeleon can also be used to control TTL and relay outputs.

D.3.1 TTL and Relay Connections

The 12-pin connector strip for TTL/relay control is located on the AS50 rear panel (see [Figure D-1](#)). A 12-pin connector plug (P/N 923687) and twisted pairs of wires (P/N 043598) are provided in the AS50 Ship Kit. These are used for connecting the AS50 TTL/relay inputs and outputs to other modules.

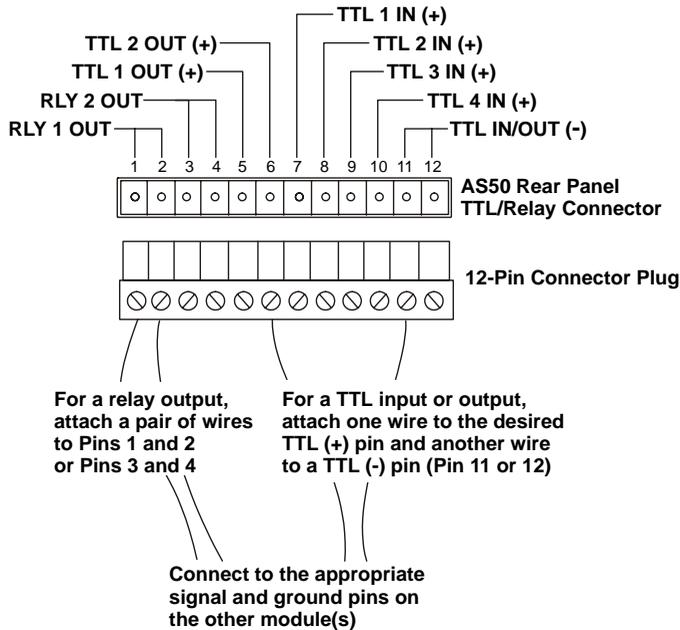
Follow these basic steps to connect the TTL or relays. See [Section D.3.2](#) for examples of specific systems.

1. For each relay or TTL to be used, connect an active wire (red) and a ground wire (black) to the 12-pin connector plug at the appropriate pin locations. Refer to [Figure D-5](#) or the label on the rear panel for the connector pin assignments.

To attach a wire to the plug, strip the end of the wire, insert it into the plug, and use a screwdriver to tighten the locking screw. If necessary, multiple ground wires can be attached to a TTL input/output ground (-) pin.

2. Plug the connector into the 12-pin connector strip on the AS50 rear panel.
3. Connect the wires from the AS50 connector to the TTL or relay connector pins on the other module(s). Be sure to use the correct connector plug. For example, for DX-500 modules, attach two-pin plugs (provided in the DX-500 Ship Kits) to each pair of active and ground wires.

NOTE Check the polarity of each connection. Connect signal wires to signal (+) pins and ground wires to ground (-) pins.



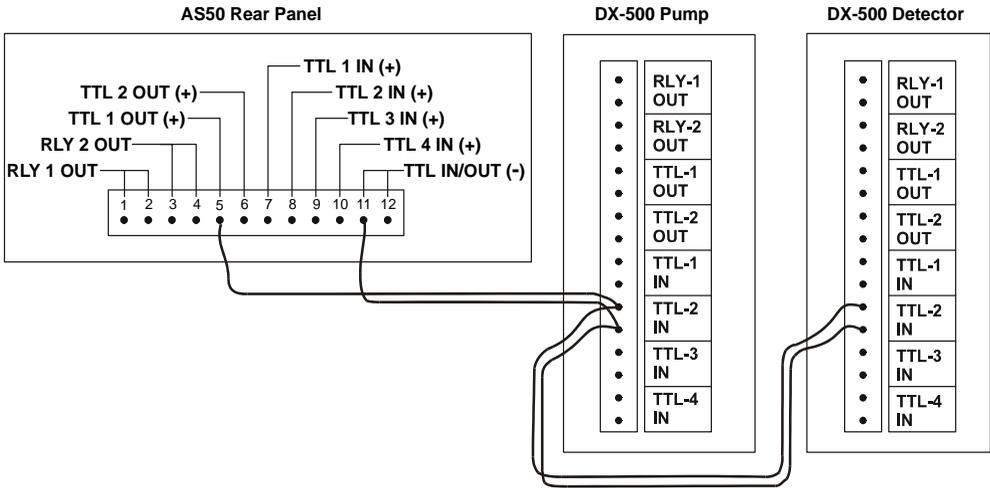
Pin	Assignment	Input Pin Functions
1	Relay 1 output	Active
2	Relay 1 output	Ground
3	Relay 2 output	Active
4	Relay 2 output	Ground
5	TTL 1 output	Active
6	TTL 2 output	Active
7	TTL 1 input	Active (unassigned)
8	TTL 2 input	Active Start/Continue Schedule
9	TTL 3 input	Active Tray Temperature ON/OFF
10	TTL 4 input	Active Thermal Compartment ON/OFF
11	TTL input or output	Ground
12	TTL input or output	Ground

Figure D-5. TTL/Relay Connector Pin Assignments

D.3.2 Example TTL/Relay Connections

DX-500

Figure D-6 shows an example of TTL/relay connections for an AS50 connected to a DX-500 system.



AS50 TTL Input Assignments

- TTL 1 IN - (unassigned)
- TTL 2 IN - Start/Continue Schedule
- TTL 3 IN - Tray Temperature ON/OFF
- TTL 4 IN - Thermal Compartment ON/OFF

DX-500 Pump TTL Input Assignments

- TTL IN 1 - Pump Motor ON/OFF
- TTL IN 2 - HOLD/RUN Method
- TTL IN 3 - Increment Method Number
- TTL IN 4 - Decrement Method Number

DX-500 Detector TTL Input Assignments (defaults)

- TTL IN 1 - OFFSET
- TTL IN 2 - HOLD/RUN Method
- TTL IN 3 - SRS ON/OFF (CD20/ED40)
Lamp ON/OFF (AD20)
- TTL IN 4 - Increment Method Number

Figure D-6. TTL/Relay Connections for a DX-500 System

DX-120

Figure D-7 shows an example of TTL/relay connections for an AS50 connected to a DX-120 Ion Chromatograph.

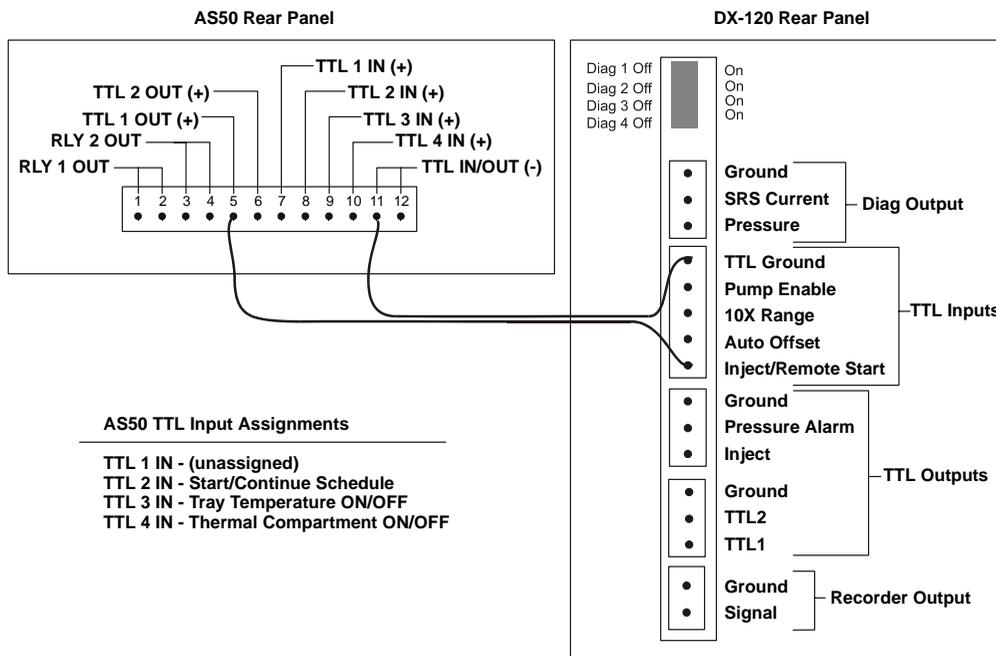


Figure D-7. TTL/Relay Connections for a DX-120

Example AS50 Method Timed Events

The following method timed events can be used with the TTL/Relay connections shown in the previous examples for the DX-500 and DX-120.

TIME	VALVE	CSV	TTL1	TTL2	RLY1	RLY2
INIT	LOAD	0	0	0	0	0
0.00	INJECT		1			
15.0			0			

For the DX-500 system, the injection valve is installed in the AS50. At time 0.00, injection occurs and the AS50 triggers TTL1, which starts the pump and detector methods. Data collection is 15 minutes. After data collection TTL1 is switched back to 0.

For the DX-120 system, the injection valve is installed in the DX-120. At time 0.00, the AS50 triggers relay 1, which switches the injection valve to the inject position. Data collection is 15 minutes. At which time TTL1 is switched back to 0.

E • Unpacking Instructions



Figure 1.
Fully-packed AS50 with foam spacer on top of geometric foam pack

1. Remove the outer cardboard sheath and Ship Kit spacer (see Figure 2).



Figure 2.
AS50 and Ship Kit with the outer cardboard sheath and Ship Kit spacer removed

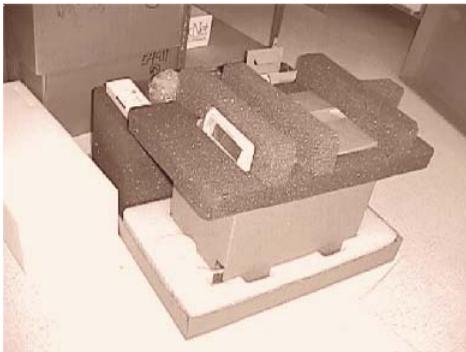


Figure 3.
AS50 with foam top cap installed

2. Remove the foam top cap.

AutoSelect AS50 Autosampler



Figure 4.
AS50 with sleeve assembled over cradle

Note: The AS50 is inserted into the bottom foam of the main shipping container. The tubing is coiled in front of the AS50.

3. Using the hand holes in the cradle, place the AS50 on the bench.
4. Remove the sleeve (see Figure 5).



Figure 5.
AS50 setting on cradle (with the sleeve removed)

Note: The rear edge of the cradle and the rear edge of the AS50 are aligned.



Figure 6.
AS50 fully wrapped and taped within polyethylene bag

5. Remove the polyethylene bag (see Figure 7). Be careful not to damage the drain tube.



Figure 7.
AS50 sitting on foam spacer inside polyethylene bag

Note: The rear of the AS50 is aligned with the rear edge of the foam.

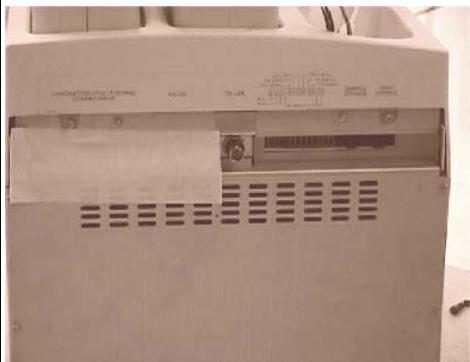


Figure 8.
2-in wide masking tape securing tubing within the recess at the rear of the AS50

6. Remove the masking tape.
7. Remove the coiled tubing inside of the recess (see Figure 9). Be careful not to damage the tubing.



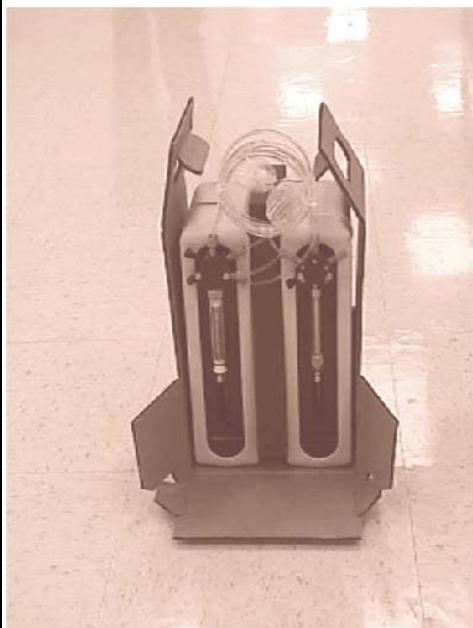
Figure 9.
Coiled inlet tubing inserted into the recess in the rear of AS50



*Figure 10.
Typical items shipped in Ship Kit geometric
foam pack*

Note: All items are in polyethylene bags and wired closed with sturdy ties.

8. Remove the items from the geometric foam pack.



Note: For a single syringe, a foam insert is placed on the left.



*Figures 11 and 12.
Dual syringes with pigtails bagged and wired
closed with sturdy ties. Syringes packed with
foam insert placed between them. Both
handles are tied together with sturdy ties*

9. Remove the sturdy ties and the polyethylene bag.
10. Open the front of the sheath and use the handles to set the pack and syringes on top of the main AS50.
11. Slide the syringes into positions (see Figure 13).



*Figure 13.
Fully assembled dual syringes with bottle*

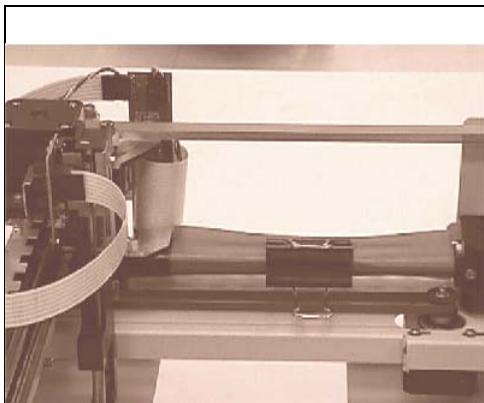


*Figure 14.
Shipping bracket hooked into frame and
attached to sample arm and chassis with
screws*

12. Remove the sturdy tie, the two cap screws, and the bracket (see Figure 15).

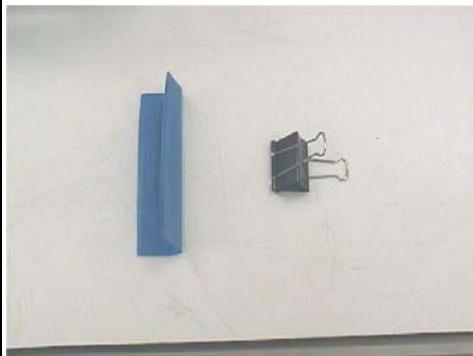


*Figure 15.
Shipping bracket with M4 Allen cap screws*

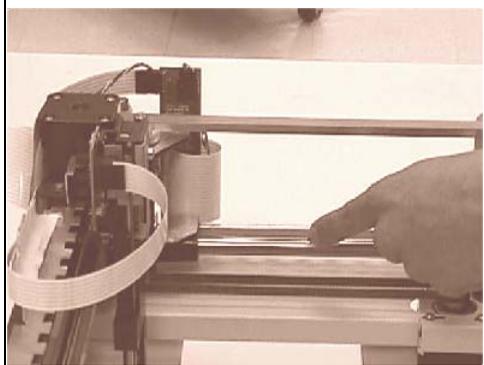


*Figure 16.
Polyethylene sleeve assembled (clipped) to
shaft to eliminate sliding of sample arm
during shipment*

13. Remove the clip and sleeve (see
Figures 17 and 18).



*Figure 17.
Polyethylene sleeve and clip*



*Figure 18.
Shaft with polyethylene sleeve removed*

A

- Aborting a schedule, 3-11
- Absorbance
 - Plumbing schematic for dual-column, B-51
 - Plumbing schematic for single-column, B-44
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