DIONEX

ASI-100

Autosampler Series

Operating Instructions

Version: 2.00

Date: December 2004

DIONEX

CE

Declaration of Conformity

Product: Autosampler
Type: ASI-100 / ASI-100T / ASI-100 P / ASI-100 PT

Dionex Softron GmbH herewith declares conformity of the above products with the respective requirements of the following regulations:

- Low-Voltage Equipment Directive 73/23/EEC
  changed by 93/68/EEC
- EMC Directive 89/336/EEC
  changed by 91/263/EEC; 92/31/EEC; 93/68/EEC

The electrical safety of the products was evaluated based on the following standard:

- EN 61010-1: 1993
  Safety requirements for electrical equipment for measurement, control and laboratory use
  Part 1: General Requirements

The Electromagnetic Compatibility (EMC) of the products was evaluated based on the following standards:

- EN 50081-1: 1992:
  Electromagnetic Compatibility (EMC) - Generic emissions standard
  Part 1: Residential, commercial and light industry
- EN 50082-1: 1992:
  Electromagnetic Compatibility (EMC) - Generic immunity standard
  Part 1: Residential, commercial and light industry
- EN 61000-3-2: 1998
  Electromagnetic Compatibility (EMC)
  Part 3 / Section 2: Limits for harmonic current emissions

This declaration is issued for the manufacturer

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January 23, 2003

Contents

1 Introduction

1.1 How to Use the Manual

The layout of this manual is designed to provide quick reference to the sections of interest to the user. However, we recommend that you review the manual thoroughly before beginning operation of the autosampler in order to obtain a full understanding of the instrument.

Almost all descriptions in the manual apply to all autosampler types of the ASI-100 series. Therefore, the term "the autosampler" is also used throughout the manual. If some detail applies to only one autosampler model, the model is identified by name.

At various points throughout the manual, messages of particular importance are indicated by the following symbols whose relevance is as follows:

Please note: Indicates general information to help obtain optimum performance of the instrument.

Important: Indicates that failure to take note of the accompanying information may cause wrong results or damage to the instrument.

Warning: Indicates that failure to take note of the accompanying information may result in personal injury.

This manual is provided "as is." Every effort has been made to supply complete and accurate information and all technical specifications and programs have been developed with the utmost care. However, Dionex assumes no responsibility and cannot be held liable for any errors, omissions, damage, or loss that might result from any use of this manual or the information contained therein. We appreciate your help in eliminating any errors that may appear in this document.

The information contained in this document is subject to change without notice.

1.2 Unpacking

All electrical and mechanical components of the autosampler are carefully tested before the instrument is shipped from the factory. After unpacking, please check the autosampler for any signs of mechanical damage that might have occurred during shipment.

Please note: Immediately report any shipping damages to both, the incoming carrier and Dionex. The shipping insurance will compensate for the damage only if reported immediately.

Please note: Keep the original packing material, as it is the optimum packaging for shipping the instrument (e.g., for repair). Using any other packaging automatically voids the warranty.

To unpack the autosampler:

- Place the box on the floor and remove the accessories pack.
- Pull out the autosampler, slowly and carefully, using the two foam inserts.

Important: To prevent the autosampler from falling, lift the autosampler itself from the sides. Do not lift the autosampler by the packaging material.

- Remove the foam inserts.
- Remove the polythene packaging by placing the autosampler on a firm base and lifting at one side, then the other, while drawing the packaging out from underneath.
- Check-off the contents of the accessory pack against the list in section 11.1 Standard Accessories (included in shipment), page 121).

Important: When lifting or moving the autosampler, lift only from the bottom or sides of the autosampler. This is to avoid damage to the instrument.

1.3 Intended Use

The autosamplers of the ASI-100 series are designed for operation exclusively in analytical or preparative HPLC systems. The autosampler can be operated either in stand-alone mode or controlled via Chromeleon.

Please note that the autosampler may be operated only within its technical specifications (→ page 115).

If there is any question regarding appropriate usage, contact Dionex before proceeding.

Dionex assumes no liability for material or immaterial damage resulting from misuse of the instrument.

1.4 Information for the User

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his expense.

2 Overview

2.1 Unit Description

The **ASI-100 Automated Sample Injector** is a highly flexible module for automating high-performance liquid chromatography (HPLC) methods. The autosampler, which allows independent processing of sequences and methods, was developed especially for routine analysis, offering minimum downtime and high reproducibility, even with lowest injection volumes.

The autosampler's capabilities were significantly enhanced compared to its predecessor series:

- Random vial access
- Variable injection volume for each sample
- Multiple-draw operation
- Several standards per analysis sequence
- Variable number of replicates per sample

These capabilities plus additional safety features, such as the electronic needle resistance cutout or automatic vial recognition, make the autosampler ideal for unattended routine implementation.

The in-line injection principle (in which the needle itself is an integral part of the sample loop) enables variable injection volumes, excellent volume reproducibility, and minimal carry-over.

The following versions are available:

Part no.	Description
5810.0010	ASI-100 standard version with 250-µl syringe and sample loop, no sample cooling
5810.0015	ASI-100T, same as ASI-100, however with temperature control
5810.0020	ASI-100 with carrier for 1.2-ml vials
5810.0025	ASI-100T with carrier for 1.2-ml vials and temperature control
5810.0030	ASI-100P with carrier for 4-ml vials, 250-µl syringe and sample loop, no sample cooling
5810.0035	ASI-100PT, same as ASI-100P; however with temperature control

The ASI-100T/ASI-100PT autosampler allows sample cooling by 18°C (32.4°F) from the respective ambient temperature. The lower temperature limit is +4°C (39.2°F). In addition, the samples can be warmed to max. +45°C (113°F).

All parts that may be exposed to solvents are made of stainless steel, PCTFE, PTFE, PEEK, and Vespel providing optimum resistance to the most commonly used solvents and buffer solutions.

2.2 Injection Principle

The key to the injection principle is that the needle itself is part of the sample loop. First, the sample is drawn by the syringe, through the needle, into the loop (→ Fig. 1). The needle withdraws from the vial and descends into the needle port. Then, the injection valve is switched, directing the solvent flow through the loop (including the needle), thus transporting the sample to the column. This principle not only eliminates the requirement of a flush cycle, but also enables the exact injection of varying volumes. In addition, this principle is loss-free, i.e., the aspirated sample volume is completely injected.

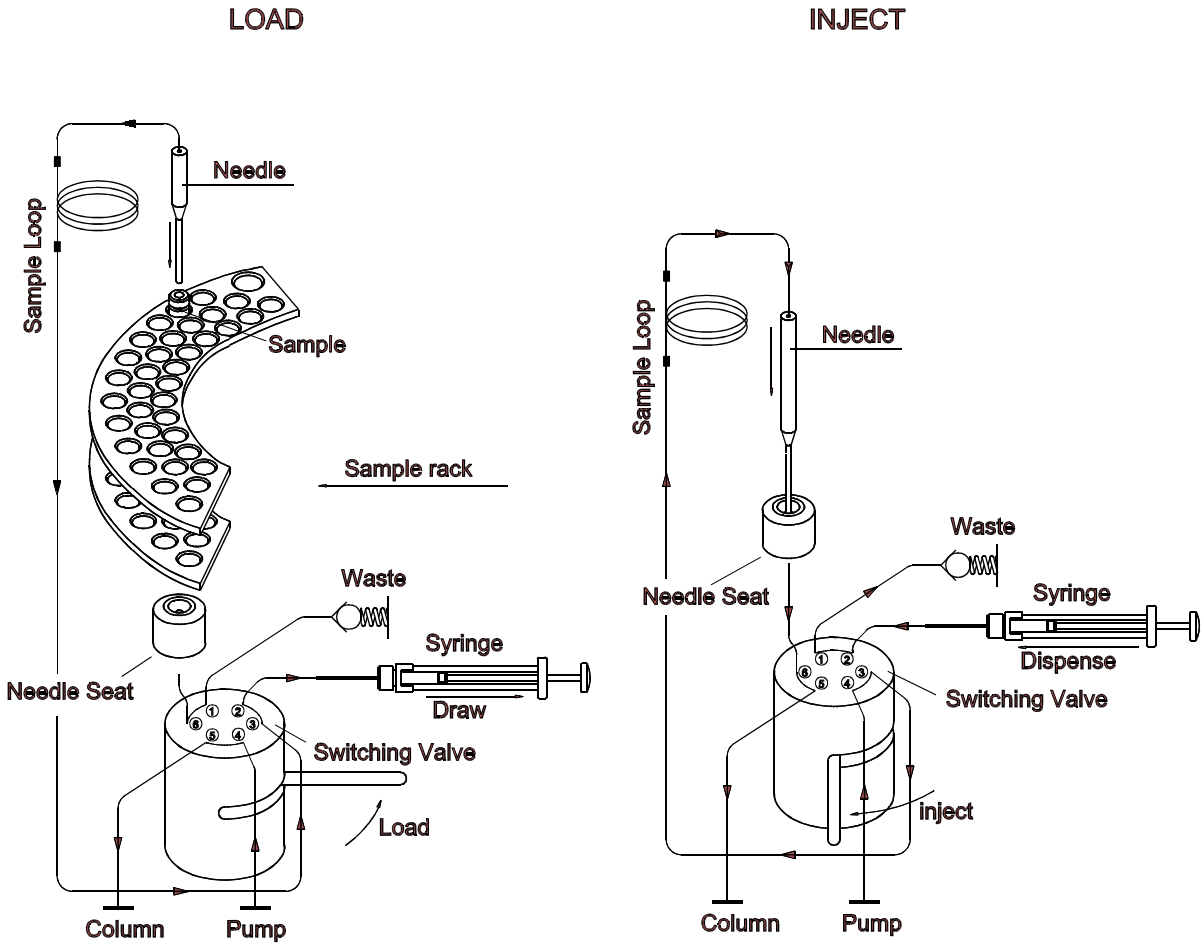


Fig. 1: Injection principle

For information about the dead volumes of the capillaries, see the tables below:

ASI-100/ASI-100T

Part no.	Description	Dead Volume
5810.3001	Capillary (analytical) Needle Port - MSV (port 6)	19 µl
5810.3002	Sample Needle (analytical)	68 µl
5810.3003	Sample Loop for Sample Needle (analytical)	150 µl
5810.3004	Capillary Sample Loop - MSV (port 3)	96 µl

ASI-100P/ASI-100PT

Part no.	Description	Dead Volume
5810.3015	Capillary Needle (preparative) Port - MSV (port 6)	75 µl
5810.3014	Sample Needle (preparative)	127 µl
5810.3011	Sample Loop for Sample Needle (preparative)	2510 µl
5810.3004	Capillary Sample Loop - MSV (port 3)	96 µl

2.3 Special Features of the ASI-100T/ASI-100PT Autosamplers

The ASI-100T (part no. 5810.0015) and ASI-100 PT (part no. 5810.0035) autosamplers with temperature control are equipped with electronic Peltier heating/cooling elements that allow precise equalization of the sample temperature. Additional supplies such as cooling water, compressed air, etc. are not required.

Make sure that the ventilation is sufficient. Drainage tubing (included in the standard accessories) can be connected at the bottom front of the autosampler to direct any condensing water to the waste. We recommend that you use this tubing especially if the ASI-100T or ASI-100PT autosampler is placed on top of another device. Make sure, however, that no part of the tubing is placed higher than the connecting piece. Otherwise, condensing water may flow into the system and cause damage to the instrument. In case of heavy formation of cooling water, we recommend to clean the tray regularly to prevent impurities in the tray.

To reduce the formation of condensing water and to allow precise equalization of the sample temperature, the ASI-100T/ASI-100PT autosamplers are delivered with a cover for the cooling unit (part no. 5810.4401). The ASI-100T/ASI-100PT can be operated without the cover; however, in this case, small temperature imprecision must be accepted.

You can turn on temperature control and set the desired set point temperature either manually by pressing the **Temp**. key (→ The Temp. Key, page 12) or via the corresponding Chromeleon commands if the autosampler is connected to the data system (→ Operation with Chromeleon, page 88).

With enabled cooling function, the tray rotates slowly to enhance the homogeneity of the sample temperatures. To remove or load the sample tray, stop the rotation by pressing one of the **R**, **G**, or **B** function keys. To continue rotation, press the **Pause/Cont**. key. If you do not press the **Pause/Cont**. key within five minutes, rotation is continued automatically.

Please note: To ensure trouble-free operation of the ASI-100T/ASI-100PT samplers when cooling at temperatures resulting in the formation of condensing water in the cooling tray, we recommend that you disable automatic segment and tray detection. However, make sure to use the appropriate segment settings for the carrier. Disabling automatic tray detection also disables manual interference monitoring.

2.4 Function Keys and Display

All ASI-100 samplers use the same control panel (→ Fig. 2). For a description of the displays and buttons, see the table below:

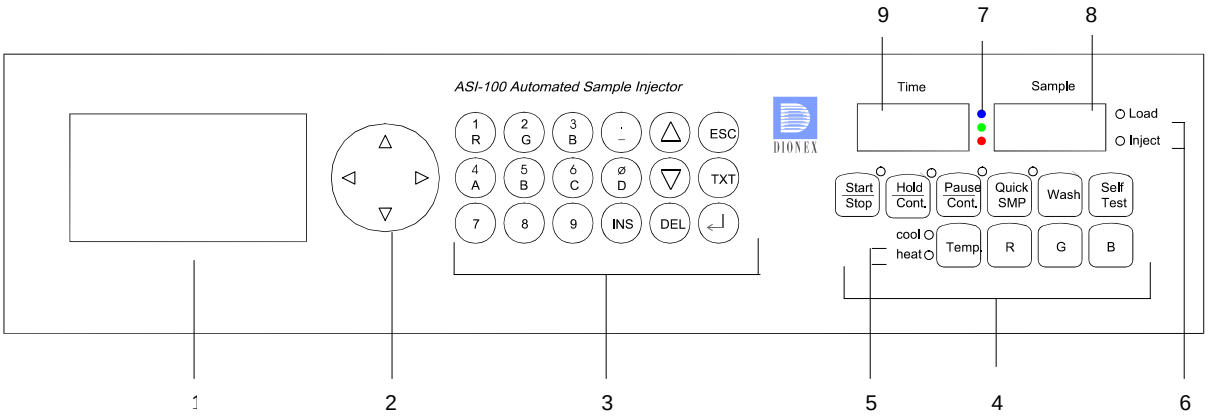


Fig. 2: Control panel

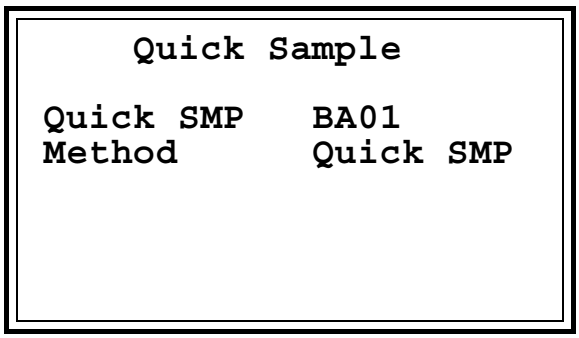
No.	Control Element	Function
1	**LCD**	Indicates the status, the individual menus, the programs, and the individual program steps.
2	△▽◁▷	The cursor keys move the cursor to the desired position on the LCD.
3	**Control Elements in the Center Keypad:**	
	0...9	Allow direct input of numerical values.
	R, G, B	Define the segment for specifying the sample position.
	A, B, C, D	Define the row within the segment for specifying the sample position.
	.	Decimal point; toggles between capital and small letters in case of texts.
	-	Minus sign; toggles between capital and small letters in case of texts.
	Ins	Re-inserts the line deleted by pressing the Del key above the cursor position, inserts a new line above the cursor position if no line was deleted before, proceeds to the next input position when used in text mode.
	△	Arrow key; increments numerical values, brings you to the next letter in the alphabet in case of texts (with small letters: after z follows dash, then a with capital letters: after Z follows A).
	▽	Arrow key; decrements numerical values, returns you to the previous letter in the alphabet in case of texts (with small letters: after a follows dash, then z with capital letters: after A follows Z).
	Del	Deletes lines in programs and methods, backspace key when the cursor is located at the end of the entry field, deletes the character at the cursor position.
	Esc	Returns you to the superior menu on the LCD.
	Text	Enables the text mode allowing you to enter program names and method names; is displayed at the cursor position.
	↵ (Enter)	Confirms the input.

No.	Control Element	Function
4	**Function Keys for Direct Control:**	
	Start/Stop	**Start** starts either the analysis of the batch selected on the **Sample Batch** menu or one of the methods selected on the **Methods** menu. However, the prerequisite is that the autosampler is not busy (the Start/Stop LED is not lighted), **Stop** opens the Stop Menu when the autosampler is busy (the Start/Stop LED is lighted). The following options are available: Abort Replicate – Next Sample – Abort Batch (→ Starting and Stopping the Analysis, page 60).
	Hold/Cont.	**Hold** stops the current sample and its analysis time immediately. The Stop Menu is opened providing the following options: Next Sample – Abort Replicate – Abort Batch – Continue (→ Starting and Stopping the Analysis, page 60 and Interrupting and Continuing the Analysis, page 61). When you press this key while the autosampler is operated by Chromeleon, the command issued by the data system is held. The **Stop** menu is opened; you can either abort or continue the command.
	Pause/Cont.	**Pause** interrupts the sequence after the running sample, **Cont.** continues the sequence with the next sample (→ Interrupting and Continuing the Analysis, page 61)
	Quick SMP	Press this key to analyze a quick sample after the running sample (→ The Quick SMP Key, page 11).
	Wash	Press the **Wash** key to perform a wash cycle. The syringe is fully loaded (from a previously defined sample position) and the volume is dispensed into the waste container. Repeat this process as required (→ The Wash Key, page 11).
	Self Test	Press this key to reset and check drivers, opto sensors, segment detection, MSV movements, etc. The self-test is performed immediately, unless a sample/sequence is currently running. If a sample is running, the self-test will be performed after a delay of approximately 2 seconds. After a self test has been performed, the injection valve is in **Inject** position.
	Temp. (ASI-100T/ ASI-100PT)	Press this key to display the set point temperature and the actual temperature on the LCD. The arrow keys (in the keypad center) increment and decrement the set point temperature. Besides, the number keys allow you to directly enter the new temperature value. Press ↵ to complete the entry and to return the LCD to the previous state.
	R / G / B	Press one of these keys to move correspondingly colored segment to the front. In this way, you can insert the samples without the need to remove the carrier. The keys are also active when the instrument is controlled by Chromeleon (→ Operation with Chromeleon, page 88)
	LED-Displays:	
5	**cool/heat** (ASI-100T/ ASI-100PT)	The **cool** LED is lighted while the set point temperature is below the actual temperature; the **heat** LED is lighted while the set point temperature is above the actual temperature. Both LEDs is lighted while the set point temperature is identical to the actual temperature. They are not lighted if cooling is turned off.
6	**Load/Inject**	Reports the status of the motorized switching valve: the **Load** LED is lighted while the syringe is loaded; the **Inject** LED is lighted while the sample is injected.
7 + 8	**3 LEDs + Sample**	Together they specify the sample position: The segment that holds the current sample is identified by the lighting LED. The **Sample** display shows the position of the current sample within the segment, e.g., b03. The letter (A, b, C, or d) indicates the row while the two digits indicate the position of the sample within the row.
9	**Time**	Reports the retention time for the current sample.

2.4.1 The Quick SMP Key

Use the **Quick SMP** key to include a new sample into the running analysis:

Press the **Quick SMP** key to open the **Quick Sample** window:



Define the sample position using the arrow keys to increment or decrement the indicated position. Or else, enter the new position directly on the central keypad. Instead of the default **Quick Sample** method (→ page 48), you may also select any other defined method, using the arrow keys.

To insert a quick sample, press the **Start/Stop** function key. The red **Quick SMP** LED is lighted and the quick sample is analyzed after the currently running sample. The analysis parameters specified in the **Quick SMP** method are used for the analysis. When the quick sample has been analyzed, the red LED stops lighting; the sequence continues with the next sample in the batch.

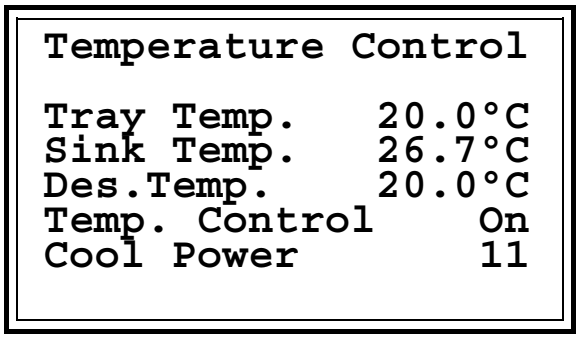
If you have activated a quick sample for processing (the LED is red) and do not want processing to start, press the **Quick SMP** key once again. The LED is off and the sequence continues with the next sample in the batch, when the running sample has been processed.

2.4.2 The Wash Key

The **Wash** key is closely related to the **Wash** method (→ **Wash** method, page 49). Press the **Wash** key to start the method without further prompts. The wash cycle is performed according to the method settings. Repeat this process as required.

2.4.3 The Temp. Key

Press the **Temp**. key to open the following dialog window:



Use this dialog window to enable or disable temperature control and to specify the desired temperature. In addition, the actual tray temperature, the sink temperature, and the cooling power are displayed.

With enabled temperature control, use the arrow keys on the central keypad to increase or decrease the desired temperature. Or else, enter the new temperature value via the number keys.

The following options are available for temperature control: **On**, **Off**, and **Fixed**. If the setting is **On**, the unit automatically adjusts to the desired temperature. **Off** disables temperature control; **Fixed** is available for diagnosis only and should not be selected by the user.

The cooling power is read-only and displayed for diagnosis purposes only.

Please note: The fan speed changes automatically as required by the cooling power. Therefore, immediately after enabling temperature control, the fans start running at maximum speed and with the corresponding noise. Usually, the fan speed and thus, the corresponding noise are considerably reduced as soon as the desired temperature has been reached.

2.5 System Wellness

To help you detect small problems before they turn into big ones, the autosampler supports several System Wellness and reliability features. If an error is found, an error message is displayed. If the autosampler is controlled by Chromeleon, the error is logged in the Chromeleon Audit Trail.

Feature	Description
Leak sensor (→ page 112)	Reliable operation
Monitoring of communication errors between the autosampler and the data system (→ page 51)	Reliable operation
Injection counter (→ page 51)	Allows you to schedule the next service date
Needle seal and needle port wear monitoring (→ page 51)	Allows you to schedule the next service date
Syringe movements counter (→ page 51)	Allows you to schedule the next service date
Rotor wear and stator wear monitoring for the internal motorized switching valve (→ page 51)	Allows you to schedule the next service date

2.6 Safety Precautions

Please observe the following general safety precautions while operating the autosampler or carrying out any maintenance work:

Warning: Keep in mind that the fluid components of the autosampler may be filled with toxic solvents. Therefore, put on protective clothing before starting maintenance work.

Warning: Do not reach inside the sample compartment while the carrier or the needle unit is moving.

Important: The autosampler is shipped with 2-propanol.

Important: Only remove or replace the carrier while the needle is in the needle port.

Important: When moving or shipping the autosampler, make sure that the needle is not in the needle port. Select the **Needle Up** command (→ section 5.7.3, page 55) to move the needle out of the needle port. Besides, the injection valve is switched into the **Load** position. Make sure that this command has been selected whenever the autosampler is moved or shipped.

Important: When operating the HPLC system, always make sure that the lower pressure limit of the pump is active and set to a sensible value to stop. This is to stop pumping in case of system leakage and thus, to prevent the damage resulting from leakage.

Important: When lifting or moving the autosampler, lift only from the bottom or sides of the autosampler. This is to avoid damage to the instrument.

3 Installation

3.1 Location

Bring the autosampler to a moderate temperature for four hours to allow any condensation that might have occurred during shipping to evaporate. Do not connect the instrument to the mains yet. After four hours, check the instrument; if condensation is still there, allow the instrument to continue to warm up (without connecting it to the mains) until the condensation is completely gone.

Install the autosampler in the laboratory on a stable surface that is free of vibrations. Make sure that the surface is resistant to solvents. Avoid locations with extreme changes in temperature, such as direct sunlight or drafts. Allow sufficient clearance behind the instrument for power connections. Ensure adequate air circulation: Place the autosampler with at least 15 cm clearance behind the autosampler. Do not place any other objects underneath, i.e., between the pads.

Upon installation of the autosampler, install the waste container according to Fig. 32, page 111. This is to prevent the injection overflow from running off into the leak sensor tray and avoid sensor reactions. Therefore, please check the level in the waste container in regular intervals.

3.2 Setting the Voltage Selector

Dionex instruments are factory-set for operation at the local voltage requirements of the destination country.

Fig. 3: Factory-set voltage selection, here: 230V

If the setting is not appropriate for your local requirements, reset the voltage at the selector on the autosampler's rear panel (next to the main supply connector) as explained below:

Warning: Before resetting the voltage, turn off the autosampler. Be sure to disconnect the power cord from its source.

- Open the mains filter, using a small screwdriver (→ Fig. 4).

- Use small pliers or tweezers to pull the small voltage selector board out of the mains filter (→ Fig. 5).

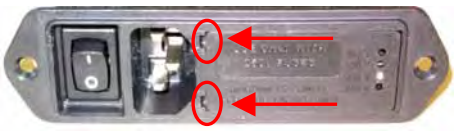
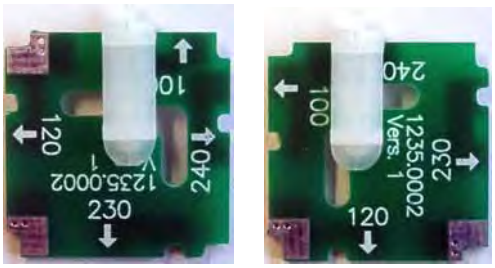


Fig. 4: Fuse cartridge

Fig. 5: Voltage selector board

- Place the board (with the writing face up) on a firm surface.
- Turn the board so that you see the correct voltage selection, as shown in → Fig. 6.
- Without turning the board, adjust the plastic clip as required for the mains voltage (→ Fig. 6). Make sure that the clip locks into position.



a) b)

Fig. 6: Voltage selector board settings
a) for 200V-240V and b) for 90V-130V

Please note: Set the voltage selector as follows:
For a voltage of 90V-130V: Set the selector to 100 or 120.
For a voltage of 200V-240V: Set the selector to 230 or 240.

- Reinstall the voltage selector board in the power socket enclosure.
- If necessary, install new fuses of the correct rating (→ Replacing the Fuses, page 17).
- Reinstall the fuse cartridge and check that the correct voltage is set.

Important: During initial installation of the autosampler, check the correct power supply, the grounding, and the fuses.

Please note: For minimum interference effects, all components of the analytical system should be connected to the same mains output (same phase).

3.3 Replacing the Fuses

Replace the fuses as follows:

Warning: Before replacing the fuses, turn off the autosampler. Be sure to disconnect the power cord from its source.

- Remove the fuse cartridge, using a small screwdriver (→ Fig. 7).
- Replace the fuses with fuses of the appropriate rating.

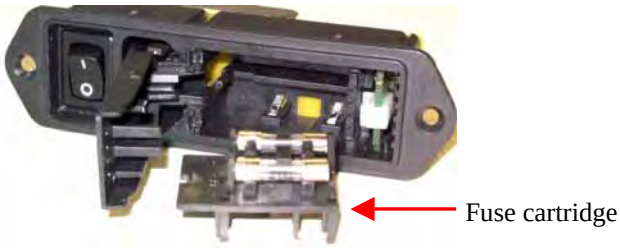


Fig. 7: Fuses

Important: Always replace both fuses at the same time.

Important: Use only the fuses indicated below (nominal voltage: 250V).

Voltage	Instrument Type	Description	Order Nos.
200-240V*	ASI-100/ ASI-100P	Fuse, 1.0A, slow, 5x20 mm, 250 V	The fuses are part of the spare part kits **Fuses ASI-100 Kit Europe** and **Fuses ASI-100 Kit USA**, respectively (→ section 11.3, page 125).
	ASI-100T/ ASI-100 PT	Fuse, 2.0A, slow, 5x20 mm, 250 V	
90-130V**	ASI-100/ ASI-100P	Fuse, 2.0A, slow, 5x20 mm, 250 V	
	ASI-100T/ ASI-100 PT	Fuse, 3.15A, slow, 5x20 mm, 250V	

* The voltage selector is set to 230V or 240V.

** The voltage selector is set to 100V or 120V.

- Reinstall the fuse cartridge.
- Reconnect the power cord to its source and turn on the autosampler.

Please note: Verify that always two fuses are used!

3.4 Fluid Connections

The fluid connections are located on the right-hand side of the autosampler. As illustrated in Fig. 8, the pump is connected to port 4; the column is connected to port 5.

Only use the supplied capillaries. They are internally cleaned. To cut the capillaries, use an appropriate capillary cutting tool (part no. 2140.0001). Capillaries should never be filed.

⚠ **Important:** To connect the capillaries, use only Rheodyne ferrules and fittings. The Rheodyne ferrules and fittings are not compatible with those from other manufacturers.

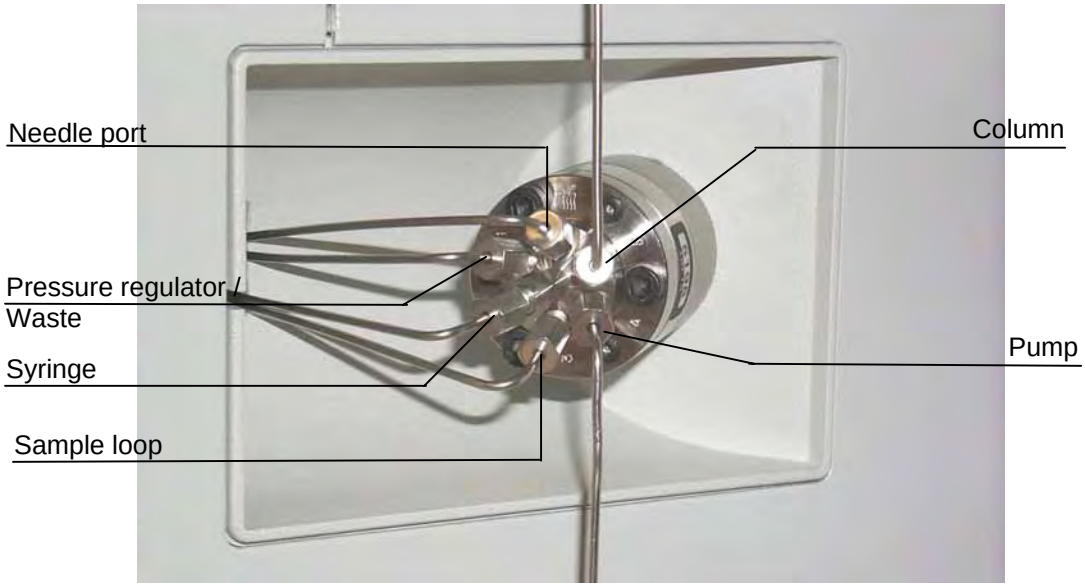


Fig. 8: Fluid connections

⚠ **Important:** Dirt or filings (even minute particles) can cause severe damage to the injection valve!

The injection overflow must remain open at all times. When connecting additional tubing, make sure that it does not seal off the overflow and result in pressure build-up.

Always make sure that the pump's lower pressure limit is active and set to a sensible level. This is to stop pumping in case of a system leakage.

The autosampler is shipped with 2-propanol.

3.5 Sample Dosing

The autosampler is equipped at the factory with a 250-µl syringe (part no. 5805.2930). However, if required, you can also install a syringe with a different volume. In this case, do not forget to change the syringe type on the **Default Values** menu (→ Default Values, page 49).

Make sure that the installed sample loop is appropriate for the syringe and the maximum injection volume. The autosampler is equipped at the factory with a sample loop (part no. 5810.3003) for a syringe volume of 250 µl. Alternative loops and syringes (for volumes up to 100 µl, 1000 µl, and 2500 µl) are available from Dionex on request (→ Optional Accessories, page 124).

3.6 Motorized Switching Valve (MSV)

The autosampler can be equipped with a second motorized switching valve (MSV-6 or MSV 2x3) that is operated as external switching valve.

External control of the motorized switching valve is via the 15-pin socket on the autosampler's rear panel (MSV, → Fig. 9).

3.7 Rear Panel Connections

Fig. 9: Rear panel connections

For information about the pinout of the respective connectors, refer to the Technical Appendix A.

3.7.1 RS-232 Port

The autosampler is equipped with two 9-pin RS-232 ports (→ Fig. 9). The RS232[B] port is reserved for future use. The RS232[A] port is used:

- To connect the autosampler directly to the Chromeleon chromatography management system (→ Fig. 10). The following connection cables are available from Dionex:

Part No.	Description
8914.0103A	25-pin to 9-pin null modem cable
8914.0130	9-pin to 9-pin null modem cable

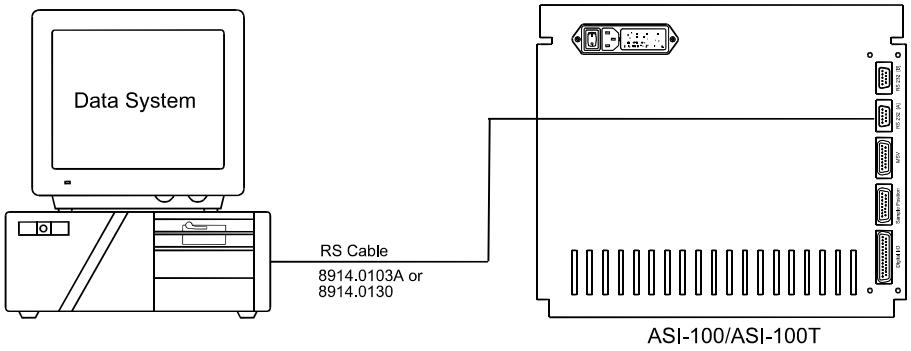


Fig. 10: Direct connection via RS-232

- To connect the autosampler to a pump of the P680 series (→ Fig. 11). The required connection cable (part no. 8030.9001) is provided in the accessories kit. In this case, the autosampler is connected to Chromeleon via the pump.

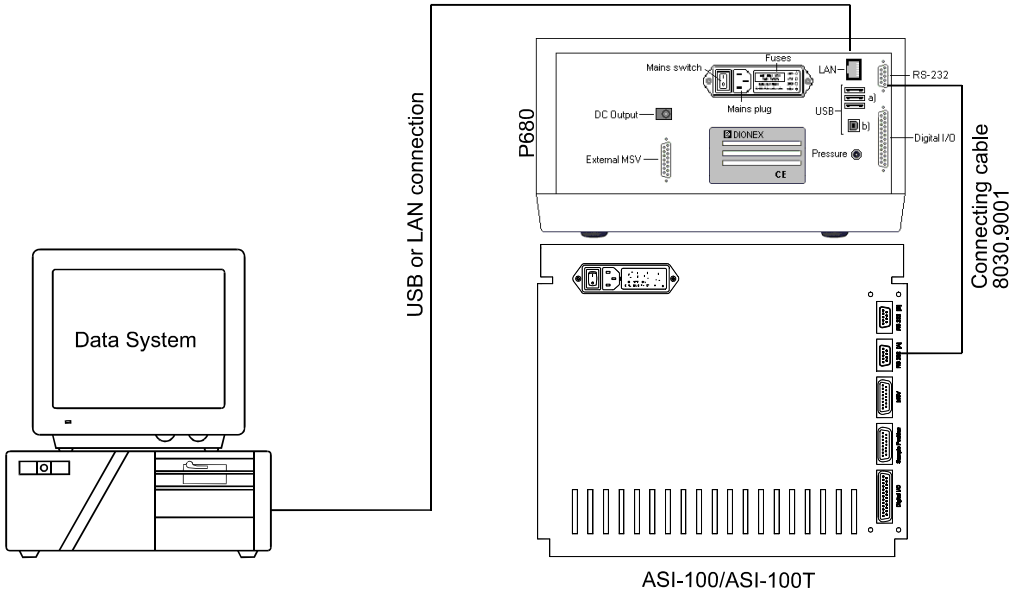


Fig. 11: Autosampler connection to the data system via a P680 pump

3.7.2 Remote Control and Relays (Digital I/O)

External control is performed via the 25-pin D-SUB pin connector (→ Fig. 9). For information about the wire and pin assignments of the ribbon cable for the digital I/O interface (part no. 8025.9001), refer to the table below. For information about the signal level, see the Technical Appendix A.

Depending on the settings made on the **Configuration** menu (→, page 55), relays 3 and 4 can be switched by the user (setting: Off) or the instrument status is displayed (setting: On). Both relays are factory-set to **On**.

Relay 3 (Operable Out) is disabled only if a leakage has been detected or if a self-test has failed. When the internal MSV switches to **Inject**, relay 4 (inject response) switches for 1 second.

Each relay signal (= digital output) is also available as inverted output. For example, relay1/NO (NO = normal open)is inversely available as relay1/NC (NC = normal close).

Wire	Pin	Signal	Remark
1	1	Relay1/NO*	Marked wire
2	14	GND	
3	2	Relay1	
4	15	GND	
5	3	Relay1/NC*	
6	16	GND	
7	4	Relay2/NO	
8	17	GND	
9	5	Relay2	
10	18	INPUT1	
11	6	Relay2/NC	
12	19	GND	
13	7	Relay3/NO	
14	20	INPUT2	Operable Out
15	8	Relay3	
16	21	GND	
17	9	Relay3/NC	
18	22	INPUT3	
19	10	Relay4/NO	
20	23	GND	Inject Out
21	11	Relay4	
22	24	INPUT4	
23	12	Relay4/NC	
24	25	GND	
25	13	+5V	

* NO = normal open, NC = normal close

Fig. 12: Wire- and pin assignments of the ribbon cable (digital I/O interface)

3.7.3 Sample Position Output

On the rear panel, the autosampler provides the current sample position in BCD code. The sample position output is valid from the injection until the internal MSV is switched back to **Load** after the analysis. For information about the wire and pin assignments of the ribbon cable (part no. 8810.9001) and the coding for the sample position, refer to the tables below. For information about the signal level, refer to the Technical Appendix A.

Wire	Pin	Signal	Remark
1	1	BCD1-A	Marked wire
2	9	BCD3-A	
3	2	BCD1-B	
4	10	BCD3-B	
5	3	BCD1-C	
6	11	BCD3-C	
7	4	BCD1-D	
8	12	BCD3-D	
9	5	BCD2-A	
10	13	+12V	
11	6	BCD2-B	
12	14	GND	
13	7	BCD2-C	
14	15	+5V	
15	8	BCD2-D	

Fig. 13: Wire and pin assignments of the ribbon cable (Sample Position interface)

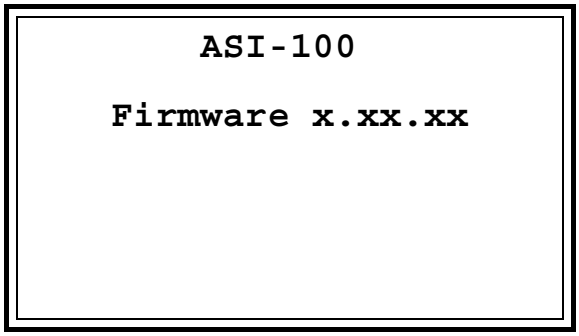
Sample position	BCD3D	BCD3C	BCD3B	BCD3A	BCD2D	BCD2C	BCD2B	BCD2A	BCD1D	BCD1C	BCD1B	BCD1A
	Segment A-D				Tens Unit Digit				Units Position			
RA01	0	0	0	0	0	0	0	0	0	0	0	1
RA10	0	0	0	0	0	0	0	1	0	0	0	0
RB01	0	0	0	1	0	0	0	0	0	0	0	1
RC01	0	0	1	0	0	0	0	0	0	0	0	1
RD01	0	0	1	1	0	0	0	0	0	0	0	1
R-99	0	0	0	0	1	0	0	1	1	0	0	1
GA01	0	1	0	0	0	0	0	0	0	0	0	1
GA10	0	1	0	0	0	0	0	1	0	0	0	0
GB01	0	1	0	1	0	0	0	0	0	0	0	1
GC01	0	1	1	0	0	0	0	0	0	0	0	1
GD01	0	1	1	1	0	0	0	0	0	0	0	1
G-99	0	1	0	0	1	0	0	1	1	0	0	1
BA01	1	0	0	0	0	0	0	0	0	0	0	1
BA02	1	0	0	0	0	0	0	1	0	0	1	0
BA03	1	0	0	0	0	0	0	0	0	0	1	1
BA04	1	0	0	0	0	0	0	0	0	1	0	0
BA08	1	0	0	0	0	0	0	0	1	0	0	0
B-99	1	0	0	0	1	0	0	1	1	0	0	1

Fig. 14: Sample Position (Coding)

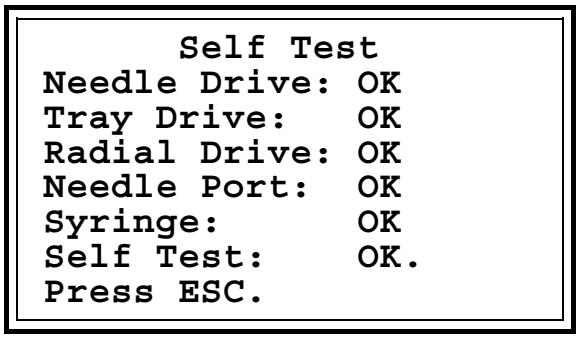
4 Initial Preparation

4.1 Power-Up

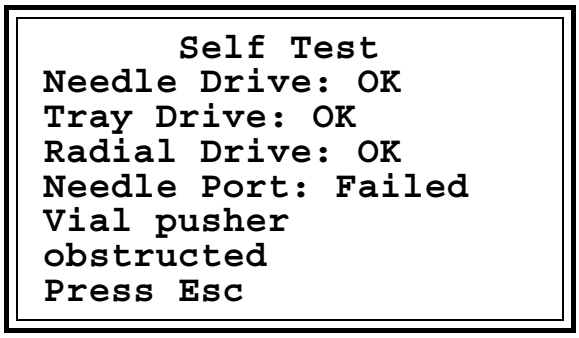
When you turn on the autosampler, the LCD temporarily displays the autosampler type and the current firmware version:



A system reset including a self-test is automatically performed.



Press **Esc** to open the **Main** menu. The autosampler is ready for analysis. The injection valve is in **Inject** position; the **Inject** LED is red. If an error is detected, **Failed** appears together with the corresponding error message:



Press **Esc** to open the **Main** menu. However, please note that the instrument is not ready for analysis. Eliminate the error (→ List of the Most Frequently Observed Error Messages, page 95) and then, perform the self-test (**Self Test** function key) once again.

Please note: During the self-test, the needle drive, tray drive, radial drive, needle port, and syringe are always tested and their status is reported. Other parameters (such as segment detection) are displayed only if they have been enabled in the **Configuration** dialog on the **Setup** menu (→ Configuration, page 55).

For more information about the individual menus and the parameter programming, refer to Menu Structure (→ page 33).

Important: Do not turn off the autosampler during analysis as this may cause leakage at the needle port. If necessary, terminate the analysis by pressing the **Hold/Cont**. key and selecting the corresponding command on the **Stop** Menu (→ Starting and Stopping the Analysis, page 60). When the autosampler is operated by Chromeleon, select the **Disconnect** command.

Always verify that the lower pressure limit of the pump is active and set to a sensible level. This is to stop pumping in case of a system leakage.

4.2 Sample Loading

The autosampler is designed to enable easy sample loading without the need to remove the vial carrier. (Press the **R**, **G**, **B** function keys (→ Function Keys and Display, page 9) to rotate the respective segment to the front. The autosampler switches into **Pause** mode. The mode is automatically cancelled after five minutes. To cancel **Pause** mode earlier, press the **Pause/Cont.** key.) If required, you can easily remove the carrier by undoing the central retaining screw. When reinstalling the carrier, make sure that the positioning pins on the carrier bottom engage in the corresponding cutout sections of the carrier seat. Tighten the retaining screw afterward.

Warning: Do not reach inside the sample compartment while the carrier or the needle unit is moving.

Important: Only remove or replace the carrier while the needle is in the needle port.

Please note: The **ASI-100T/ASI-100PT** autosamplers are shipped with a cover for the cooling unit. Use the cover when you operate the autosampler at low temperatures. This is to enhance the cooling performance and to reduce the formation of condensing water.

To ensure error-free operation when cooling at temperatures that cause the formation of condensing water in the cooling tray, we recommend that you disable automatic segment detection and tray detection. However, make sure to use the appropriate segment settings for the carrier. Disabling automatic tray detection also disables manual interference monitoring.

Both autosampler types are equipped with a carousel that is divided into three segments. The standard carrier has three segments for 1.8 ml (cylindrical) vials. For information about the available options, see the table below:

Description	Part no.
Standard:	
Carrier with 3 segments for cylindrical 1.8 ml vials	5810.9101A
Optionally available:	
Carrier with 3 segments for cylindrical 1.2 ml vials	5810.9102A
Carrier with 3 segments for conical 1.1 ml vials	5810.9105A
Carrier with 3 segments for cylindrical 4 ml vials	5810.9103A
Carrier with 3 different segments (1 each for cylindrical 1.8 ml, 1.2 ml, and 4 ml vials)	5810.9104A
Carrier with 3 segments for 2.0 ml Eppendorf vials	5810.9106A
Carrier with 3 segments for 1.5 ml Eppendorf vials	5810.9107A
Carrier with 3 segments for 0.5 ml Eppendorf vials	5810.9108A
Carrier with 3 segments for 0.25 ml Beckmann vials	5810.9109A

Please note: In each segment, position 99 can house a 4 ml vial.

You can obtain and install all segment types separately (see table below):

Segment Type	Description	Part no.
01 (Analyt./Cylindrical)	For 39 vials at 1.8 ml each + 1 vial at 4 ml (cylindrical vials)	5810.9110*
01 (Analyt./Conical)	For 39 vials at 1.1 ml each + 1 vial at 4 ml (conical vials)	5810.9114*
02 (Mini)	For 64 vials at 1.2 ml each + 1 vial at 4 ml (cylindrical vials)	5810.9111*
02 (Mini, Beckmann)	For 64 Beckmann vials (mini) at 0.25 ml each + 1 vial at 4 ml	5810.9118*
03 (Semiprep)	For 22 vials at 4 ml each (cylindrical vials)	5810.9112*
04 (Eppendorf)	For 22 Eppendorf vials at 2.0 ml each + 1 vial at 4 ml	5810.9115*
04 (Eppendorf, conical)	For 22 Eppendorf vials (conical) at 1.5 ml each + 1 vial at 4 ml	5810.9116*
04 (Eppendorf, conical)	For 22 Eppendorf vials (conical) at 0.5 ml each + 1 vial at 4 ml	5810.9117*

* The order number refers to the packing unit, i.e., six elements (three elements with the rows and position numbers printed on them plus three accompanying **blank** elements to stabilize the vials within the segment) to completely equip the carrier with the respective segment type.

Please note: **Due to the air inlet in the needle, fill 4 ml vials with max. 2 ml liquid only. Otherwise, liquid may flow into the air inlet. This may result in sample carry-over and worse reproducibility.**

For the same reason, fill 1.1 ml and 1.2 ml vials with 0.6 ml sample and 1.8 ml vials with 1.2 ml sample only. Fill 0.5 ml Eppendorf vials with 0.4 ml sample, 1.5 ml Eppendorf vials with 0.5 ml sample, and 2.0 ml Eppendorf vials with 1 ml sample, only. Fill 0.25 ml Beckmann vials with 0.2 ml sample, only.

Remove the individual segments as follows (Fig. 15 to Fig. 17).

- Loosen the four fixing screws at the bottom of the individual segment.
- Undo the spacing screw in the middle of the segment (from the top).
- Remove the segment and replace it by a new one.

To install the new segment, proceed in the reverse order.

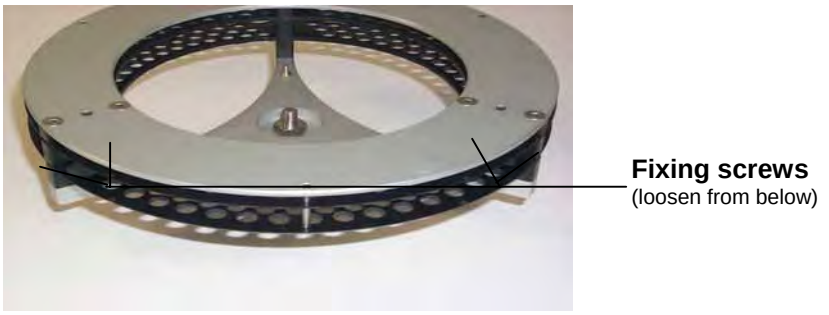


Fig. 15: Carrier (view from below)

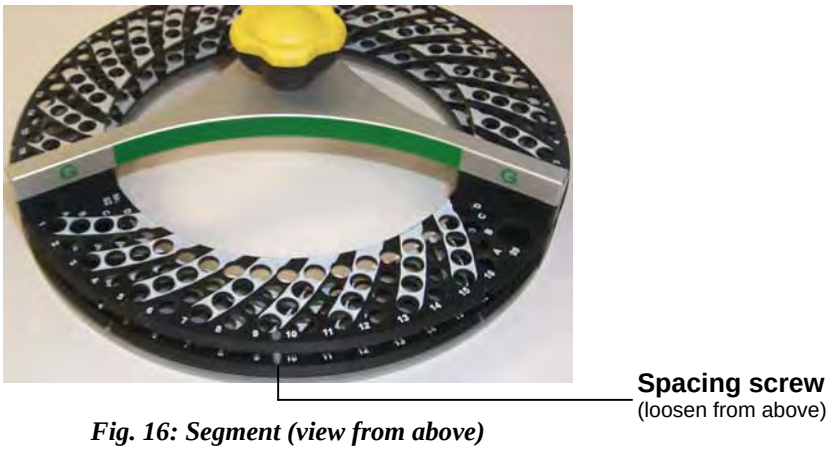


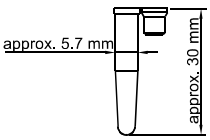
Fig. 16: Segment (view from above)

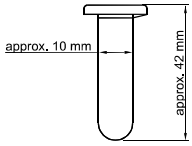
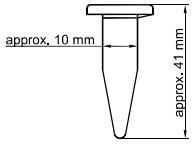
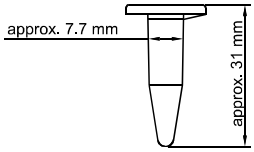
Fig. 17: Segment removed from carrier

Please note: Always loosen the fixing screws for one segment only. Do not loosen all screws for all segments at a time. Exact adjustment of the individual segments and carriers will be more difficult then.

For information about segments for special vials and customer-specific segment types, contact your Dionex sales representative.

For information about the vials/septa to be used with the individual segment types, refer to the table below:

Segment	Description
Type 01 (Analyt./Cylindrical)	Cylindrical 1.8 ml vial (part no. 727.70201; 100 pcs.) with crimp cap and slotted silicone/PTFE septum (part no. 727.11.03.0278; 100 pcs.)
Type 01 (Analyt/Conical)	Conical 1.1 ml vial (part no. 742.1.1CTV, 500 pcs.) with crimp cap and slotted silicone/PTFE septum (part no. 727.11.03.0278; 100 pcs.)
Type 02 (Mini)	Cylindrical 1.2 ml vial (part no. 742.1.2-CWV; 500 pcs.) with AL-crimp cap (part no. 742.8.ACB; 1000 pcs.) and slotted silicone/PTFE septum (part no. 742.8-ST14X; 500 pcs.)
Type 02 (Mini, Beckmann)	0.25 ml Beckmann PE mini vial*, (available from Beckmann, part no. 652823) 
Type 03 (Semiprep)	Cylindrical 4 ml vial (part no. 742.4SV; 1000 pcs.) with screw cap (part no. 742.12.SCW; 500 pcs.) and silicone/PTFE septum (part no. 742.12ST2; 1000 pcs.)

Segment	Description
Type 04 (Eppendorf)	2 ml Eppendorf vial (Available from Eppendorf; part no. 0030 120.094) 
Type 04 (Eppendorf, conical)	1.5 ml Eppendorf vial (Available from Eppendorf; part no. 0030 120.086) 
Type 04 (Eppendorf, conical)	Colorless 0.5 ml Eppendorf safe-lock vial**, (Available from Eppendorf (part no. 0030 121.023) 

* In the **Vials** dialog of the **Setup** menu (→ section 5.7.6, page 56), change the **Min. Height** parameter of the **Mini** segment from 35 mm to 25 mm when using 0.25-ml Beckmann mini vials.

** In the **Vials** dialog of the **Setup** menu (→ section 5.7.6, page 56), change the **Min. Height** parameter of the **Eppendorf** segment from 35 mm to 28 mm when using 0.5-ml Eppendorf vials.

If you have questions regarding the different vial types and the quantities for purchasing vials, caps, and septa, please contact your Dionex sales representative.

⚠ **Important:** **Due to the air inlet in the needle, fill 4 ml vials with up to 2 ml liquid only. Otherwise, liquid may flow into the air inlet. This may result in sample carry-over and worse reproducibility.**

For the same reason, fill 1.1 ml and 1.2 ml vials with 0.6 ml sample and 1.8 ml vials with 1.2 ml sample only. Fill 0.5 ml Eppendorf vials with 0.4 ml sample, 1.5 ml Eppendorf vials with 0.5 ml sample, and 2.0 ml Eppendorf vials with 1 ml sample, only. 0.25 ml Beckmann vials should be filled with 0.2 ml sample, only.

Please note: Using different types of septa may block the capillaries in the autosampler or affect chromatographic results.

4.3 Specifying the Sample Position

The carriers for the individual segments are color-coded: red, green, and blue (R/G/B). This information is important when specifying the sample position (see below).

Each plastic segment provides three rows (segment types 01 and 03) or four rows (segment type 02) for holding the vials (Fig. 18).

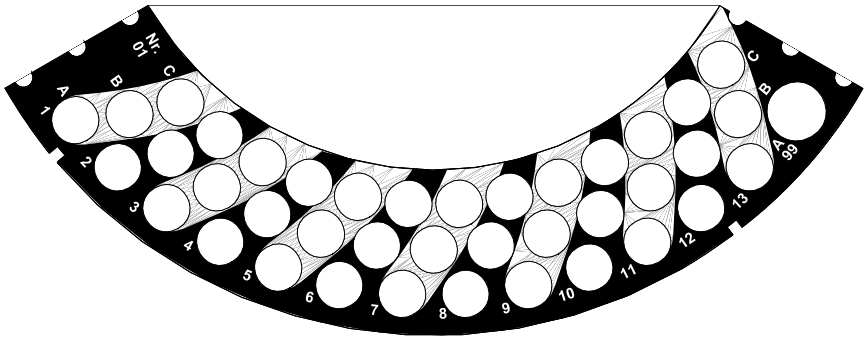


Fig. 18: Carrier segment (type 01)

The positions in the individual segments are identified by 2 letters and 1 digit. The first letter identifies the segment that holds the vial, i.e., R, G, or B, the second letter indicates the row, and the digit specifies the position of the vial in the row. Samples are arranged from A in the outer row to D in the inner row; the samples are numbered in counterclockwise order. For example, the exact sample position for a vial placed in the fourth hole of the second row in the **red** carrier is: RB04. The position 99 on each segment (located at the outside right in the segment), e.g., R-99, can house a 4 ml vial.

The samples are processed in the following order: First, all samples in the same row are processed in incrementing order (e.g., A1 → A13). Then, the samples in the next row (A → B → C) are processed, and finally the samples in the next segments (R → G → B → R) are analyzed.

If automatic segment detection is enabled (→ Configuration, page 55), the autosampler automatically recognizes both the segment types and the vial types that are currently used in the carrier.

Please note: To ensure error-free operation when cooling temperatures are set at the ASI-100T/ASI-100PT autosampler that cause the formation of condensing water in the cooling tray, we recommend that you disable automatic segment detection and tray detection. However, make sure to use the appropriate segment settings for the carrier. Disabling tray detection also disables manual interference monitoring.

In addition, the autosampler provides automatic vial recognition: Based on the vial height, the autosampler determines whether a vial is present at the specified position. If no vial is present, the autosampler automatically stops the sequence. If the autosampler is operated by Chromeleon, an error message appears. Based on the segment type and the used vial, the autosampler adjusts the needle height automatically. Thus, the user is not required to make any further entries.

Please note: If a vial is present at position 99 in the segment type 01, automatic vial recognition is disabled for the sample positions B13 and C13.

4.4 Priming the System

Before starting an analysis sequence, make sure that the syringe and the fluidics are primed with the mobile phase. This is particularly important after a long period without operation or after exchanging the syringe.

To prime the system, use the **PrimeSyringe** command in Chromeleon (→ page 90). This command allows removing gas bubbles from the system without dismantling the syringe from the autosampler.

Before performing the **PrimeSyringe** command:

- Turn off the pump flow. Else, the pump would deliver eluent to the wash vial when the injection valve switches from Load to Inject.
- In Chromeleon, set the **WashSpeed** (→ page 92) and the syringe speed (**DispSpeed**; → page 88).
- Fill the wash vial with wash liquid and specify the position of the wash vial in Chromeleon (**WashVial**; → page 92).

Please note: Dionex recommends using isopropanol as wash liquid, as it effectively removes gas bubbles from the system.

For PrimeSyringe, the following three steps are performed automatically:

Step 1:

The injection valve switches to Load, allowing the pump flow to bypass the sample loop and needle. The needle descends into the selected wash vial and the syringe draws a full syringe volume (→ Fig. 19).

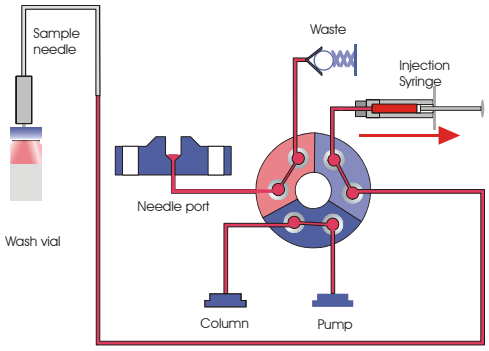


Fig. 19: The needle is in the wash vial; the syringe draws a full syringe volume.

Step 2:

The injection valve switches to Inject. The needle remains in the wash vial. The syringe liquid is dispensed into waste (→ Fig. 20).

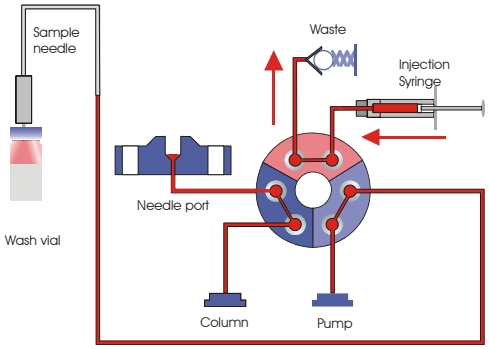


Fig. 20: The injection valve is in Inject position; the needle is still in the vial.

Step 3:

The injection valve switches to **Load** and steps 1 and 2 are repeated 4 times. During this process, the liquid reaches the syringe, removing gas bubbles and exchanging the liquid in the syringe. After completion of the PrimeSyringe procedure, the needle moves back to the needle port and the injection valve switches to **Inject**.

When the pump flow is turned on, the flow path is as described in Fig. 21:

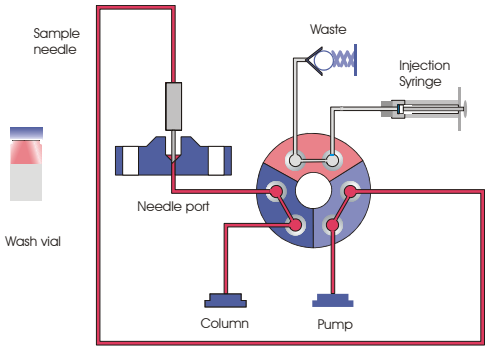


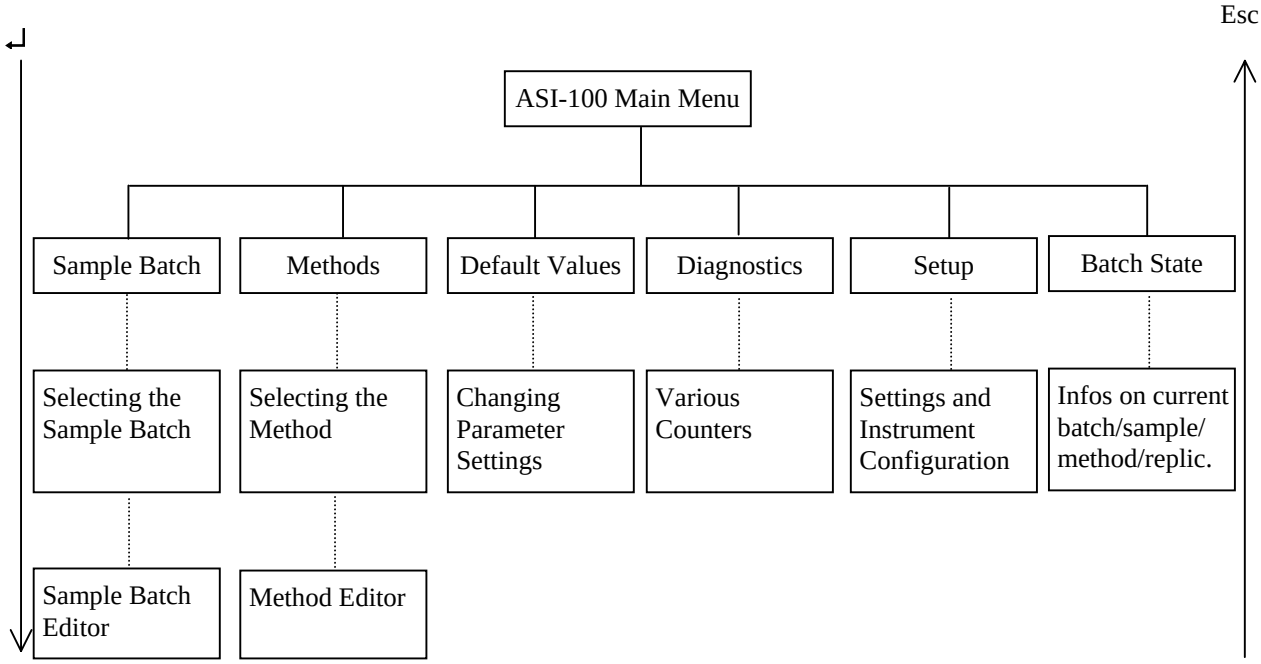
Fig. 21: Flow path after PrimeSyringe and with the pump flow turned on again.

Most of the liquid is exchanged by the current eluent. However, the segment between the syringe and the waste remains filled with the wash liquid (isopropanol). Thus, repeat PrimeSyringe, using the eluent composition of your current application as wash liquid. This ensures that the whole flow path of the autosampler is purged with the same liquid.

Please note: If the current eluent contains a buffer, Dionex recommends using an appropriate eluent composition without buffer to avoid crystallization or microbiological growth in the syringe.

5 Standalone Operation

5.1 Menu Structure



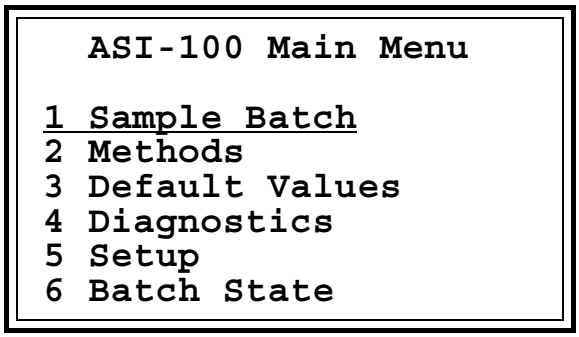
Use the up or down cursor key to the right of the LCD, (→ Function Keys and Display, page 9, keys no. 2) to make your selection on the **Main** menu and on the individual submenus. Press the ↵ (Enter) to confirm your selection. The selected item is underlined. Or else, press the respective number on the instrument's keypad to directly access to the selected item. On the individual submenus, the left/right cursor keys take you to the left or the right column. **Esc** returns you to the superior menu.

In the editors, use the arrow keys on the keypad (→ Function Keys and Display, page 9, keys no. 3) to scroll through the parameters. The arrow keys are also used to enter texts, and increment, and decrement numerical values. Editable parameters are underlined. Use the cursor keys to move to the desired position (up or down, to the left or right, respectively).

To delete the line at the current cursor position, press **Del**. Pressing **Ins** allows you to re-insert the deleted line above the current cursor position. If you have not deleted an existing line before pressing **Ins**, an empty line is inserted above the current cursor position.

5.2 Main Menu

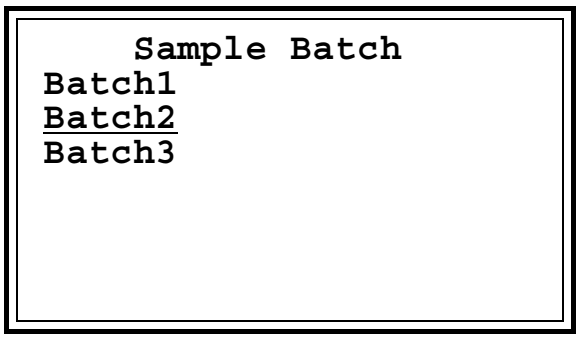
When the autosampler is turned on, the autosampler type and the firmware version are temporarily displayed on the LCD. Afterward, a Self Test is performed. When the Self Test was successful, press **Esc** to open the **Main** menu:



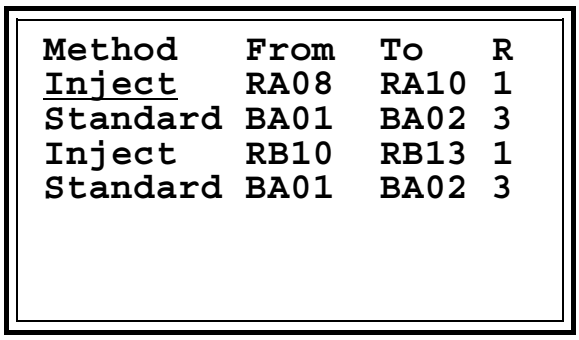
Use the up or down cursor key to select the desired menu item. Press ↵ (Enter) to confirm your selection. Or else, press the respective number key on the instrument's keypad. Pressing **Esc** returns you from the submenus to the **Main** menu.

5.3 Sample Batch Menu

On the **Main** menu, use the up or down cursor key to select the **Sample Batch** menu. Press ↵ (Enter) to confirm you selection. The sample batch defines the order for automatic sample processing. The user enters the sample positions and the number of replicates. The analysis parameters are specified in the selected method. On the **Sample Batch** menu, select an existing batch or define a new batch by modifying an existing one:



Use the up or down cursor key to select an existing batch (the selected batch is underlined). Press ↵ (Enter) to confirm your selection:



Only the underlined item can be edited. To access the other columns, press the left or right cursor key. **Ins** allows you to extend a batch by inserting a new line above the selected one. In the corresponding input line, use the arrow keys to select the method for batch processing. The following default methods are available: Derivate – Inject – Quick SMP – Refill – Wash (→ Methods, page 38). To change the sample positions in the **From** and **To** columns and to enter new positions, use the cursor keys to access the corresponding input fields. Enter the new positions via the letter and number keys on the keypad. Existing entries are automatically overwritten.

Use the arrow keys to increment or decrement the entered positions as follows: First, the positions in the same row are incremented or decremented, then the rows in the same segment (A – B – C), and finally the segments (R – G – B → R).

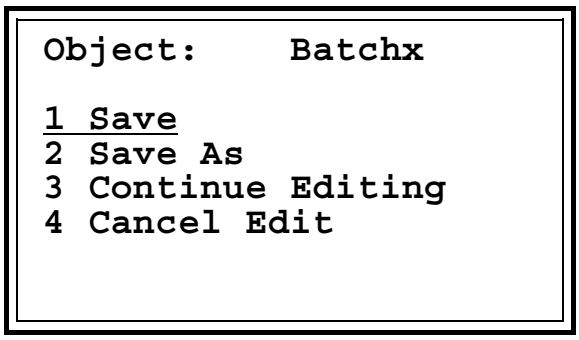
The samples are processed in the following order: First, all samples in the same row are processed in incrementing order (e.g., A1 → A13). Then, the samples in the next row (A → B → C) are processed, and finally the samples in the next segments (R → G → B → R) are analyzed.

Please note: The **99** positions are omitted during incrementing and decrementing because they should not be used within a sample batch. If you manually enter position 99 as sample end position, nevertheless, e.g., **from RA01 to B-99**, an endless loop is created. The end position **99** will not be accessed. Instead, the autosampler will first process all samples in the R segment, continue with the samples in the G and B segments, and afterward start processing the samples in the R segment again, etc.

Please note: If the **To** entry of a method is left empty during batch creation, the autosampler will use the specified method until no more samples are available and then continue processing the batch as specified in the next line.

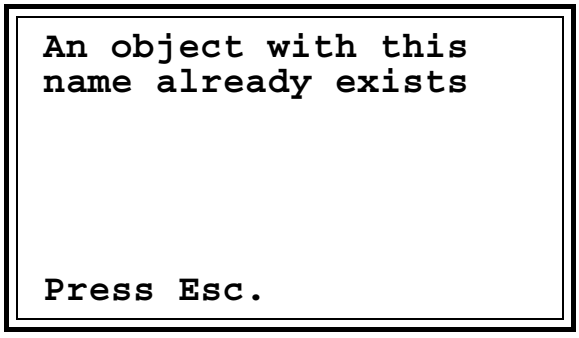
The **R** column specifies the number of replicates. Enter the desired number via the number keys on the keypad. Or else, use the arrow keys to increment or decrement the indicated numbers.

Press ↵ (Enter) to accept your input. Press **Esc** to exit the sample batch editor. If you have modified an entry, the following dialog window is opened:



Select **Save** to save the object including any modifications under the existing object name.
Select **Save as** to enter a new name. The cursor moves behind the object name. Press **Del** to delete the existing name character by character. To enter a new name, press **Text** to enable the text mode. Enter the first character of the new name using the arrow keys (→ Function Keys and Display, page 9). Press **Text** again to enter the second character, etc. The • key on the keypad toggles between capital and small letters. Select the desired letter first, and then press the • key. To enter a number after the name, press the corresponding number key on the keypad after the last character. The cursor automatically moves one position to the right.

Press ↵ (Enter) to confirm the new name. This returns you to the **Sample Batch** menu. If the name has not been changed, the following message appears:



Press **Esc** to return to the previous menu where you can enter a new name.

Continue Editing returns you to the previously selected sample batch.

Cancel Edit returns you to the **Sample Batch** menu without saving the modifications.

Please note: To create a new sample batch, modify an existing one and save it under a new name. To delete a sample batch, select the respective batch on the **Sample Batch** menu and press **Del**. The **Confirm delete** dialog window opens and prompts you to confirm the action. **Delete** the batch or select **Cancel** to return to the **Sample Batch** menu.

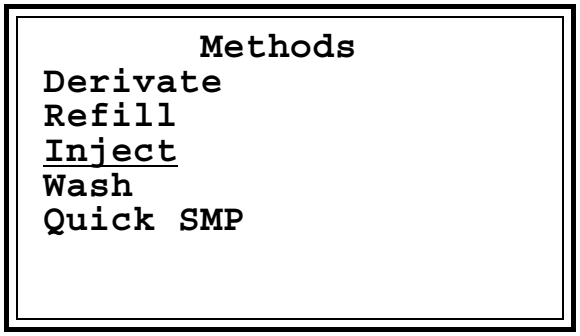
Please note: To include the **Wash** method into a sample batch, select the method in the batch. However, do not specify a position for the wash vials. The wash vial position defined under **Default Values** on the **Setup** menu (→ Default Values, page 49) is always adopted.

If you specify a position for the wash vial in the sample batch editor, nevertheless, it will not be considered. Although the position appears on the **Sample** display, the wash action will not be performed from this position.

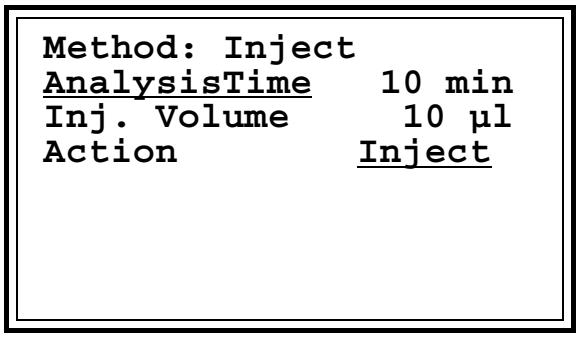
Instead, the **Wash** method will be executed correspondingly often. For example, if you specify the positions from RA01 to RA13 while the number of replicates is **1**, the **Wash** method will be executed 13 times from the position of the wash vial specified under **Default Values** on the **Setup** menu.

5.4 Methods Menu

On the **Main** menu, use the up or down cursor key to select the **Methods** menu. Press ↵ (Enter) to confirm your selection. The method defines the analysis parameters. On the **Methods** menu, select an existing method. Or else, define a new method by modifying an existing one. The following default methods are available (for a short description of these methods, refer to Description of the Default Methods (→ page 45):



Use the up or down cursor key to select an existing method (the selected method is underlined). Press ↵ (Enter) to confirm your selection:



Only the underlined item can be edited. On the display, use the cursor keys to move up and down, to the left and right, respectively. To modify existing entries, use the arrow keys for scrolling and selecting the available parameters and incrementing or decrementing numerical values. Or else, directly enter new values on the keypad (e.g., sample positions). Existing entries are overwritten automatically.

Press ↵ (Enter) to accept the modifications. Press **Esc** to exit the method editor. A dialog window is opened. Save the modifications under either the displayed name (**Save**) or a new name (**Save As**), continue editing or cancel the modifications (**Cancel Edit**). For more information, refer to section 5.3 (→ page 34).

In a method, either use the default parameters (→ Default Values, page 49) or define your own method using the available parameters and actions. The default values are considered for all parameters that are not specified in the respective method.

The following parameters are available:

Parameter	Description
Action	Select the desired action. The following actions are available: Dispense – Ext. Inj. – Ext. Load – Draw – Inject – MSV Inj. – MSV Load – Mix – Test – Wash (see the table on page 41).
Analysis Time	Enter the analysis time (= total time for an analysis). When the analysis time has expired, the next sample / the next replicate is started (→ **Inject Time** and **Start Time** parameters and the examples in section 6, page 63).
DispSpeed	Specify the dispensing speed of the **syringe** for the **Inject**, **MSV Inj**. and **Wash** actions (range: 0.01 - 62.5 µl/s, the range depends on the syringe type, the given range refers to 250 µl syringes).
Down Speed	Specify the **needle** speed when moving down (range: 0.1 - 25 mm/s)
Draw Speed	Specify the drawing speed of the **syringe** for the **Inject** action (range: 0.01 - 62.5 µl/s, the range depends on the syringe type, the given range refers to 250 µl syringes). Make sure for low injection volumes that the drawing process lasts at least some seconds (e.g., 5 seconds). Hence, a drawing speed of 0.2 µl would be appropriate for 1-µl volumes.
Inj.Volume	Specify the volume to be injected.
Inject Time	The **Inject Time** is the time within the analysis time during which the internal MSV is switched to **Inject**. When the time has expired, the valve will switch to **Load**. This parameter is considered only if the Inject Time is shorter than the analysis time (→ **AnalysisTime** and **Start Time** parameters, the note regarding running gradients, page 41 and the example in section 6.3 page 66).
Mix Height	Specify the distance between the bottom of the mixing vial and the needle tip when the needle is completely dipped into the vial. This parameter is considered for **Mix**, **Draw** and **Dispense** (range: 0 - 99 mm) actions.
Mix Repeat	Specify the number of during mixing cycles (range: 0 - 9999)
Mix Speed	Specify the syringe speed for the **Mix**, **Draw** and **Dispense** actions (range: 0.01 - 62.5 µl/s, the range depends on the syringe type, the given range refers to 250 µl syringes).
Mix Subject	Specify the subject to be used for the **Mix**, **Draw**, and **Dispense** actions. The following subjects are available: Air – Mix Vial – Reagent A/B/C/D – Sample (specified in the sample batch) – Wash Vial. If **Air** is specified as mix subject, air is drawn in. During **Dispense**, the needle moves into the needle port and its content is dispensed there.
Mix Vial	Specify the vial position for mixing.
Mix Volume	Specify the volume that is drawn and dispensed during the **Mix**, **Draw**, and **Dispense** actions.
Relay 1	Enables or disables relay 1.
Relay 2	Enables or disables relay 2.
Relay 3	Enables or disables relay 3.
Relay 4	Enables or disables relay 4.
Rg A Cap.	Specify how often the volume can be drawn from a vial with reagent A (→ page 41).
Rg A Vial.	Specify the position of the first vial with reagent A.
Rg B Cap.	Specify how often the volume can be drawn from a vial with reagent B (→ page 41).
Rg B Vial.	Specify the position of the first vial with reagent B.
Rg C Cap.	Specify how often the volume can be drawn from a vial with reagent C (→ page 41).
Rg C Vial.	Specify the position of the first vial with reagent D.

Parameter	Description
Rg D Cap.	Specify how often the volume can be drawn from a vial with reagent D (→ page 41).
Rg D Vial.	Specify the position of the first vial with reagent D.
SampleHeight	Specify the distance between the bottom of the sample vial and the needle tip when the needle is completely dipped into the vial (range: 0 - 99 mm)
Start Time	The **Start Time** has to be entered in the **first** line of a method to start the sample preparation before the analysis time of the previous sample has expired. Sample preparation is possible only when the internal MSV is switched to **Load** (see **Inject Time**). A start time of e.g., -3 minutes means that the sample preparation is started 3 minutes before the previous analysis time ends (→ **AnalysisTime** and **Inject Time** parameters and the example in section 6.3, page 66).
Syr. Delay	Specify how long the needle shall remain in the vial after loading (range: 0 - 300 s)
Up Speed	Specify the **needle** speed when moving up (range: 0.1 - 25 mm/s)
Wait Inp. 1	Set the parameter to **Off** or **On**. When the parameter is set to **Off**, the digital input 1 waits until the level is **high**. When the parameter is set to **On**, the digital input 1 waits until the level is **low**.
Wait Inp. 2	Set the parameter to **Off** or **On**. When the parameter is set to **Off**, the digital input 2 waits until the level is **high**. When the parameter is set to **On**, the digital input 2 waits until the level is **low**.
Wait Inp. 3	Set the parameter to **Off** or **On**. When the parameter is set to **Off**, the digital input 3 waits until the level is **high**. When the parameter is set to **On**, the digital input 3 waits until the level is **low**.
Wait Inp. 4	Set the parameter to **Off** or **On**. When the parameter is set to **Off**, the digital input 4 waits until the level is **high**. When the parameter is set to **On**, the digital input 4 waits until the level is **low**.
Wait until	The **Wait until** parameter is considered only if a start time or an analysis has been set before. This parameter defines the **moment of time** when the next command shall be executed (not the space of time until the next command; → example in section 6.4, page 74).
Wash Height	Specify the distance between the bottom of the wash vial and the needle tip when the needle is completely dipped into the vial (range: 0 - 99 mm)
Wash Speed	Specify the draw speed of the **syringe** for the **Wash** action (range: 0.01 - 62.5 µl/s, the range depends on the syringe type, the given range refers to 250 µl syringes).
Wash Vial	Specify the position of the wash vial (→ page 40).
Wash Vl. V.	Volume of the wash liquid in the wash vial (→ page 40).
Wash Vol.	Specify the volume to be drawn from the wash vial.

Please Note: To overwrite the default **Wash Vl. V**. and **Wash Vial** values, set these parameters in a method. However, if you set other parameters in a method, these new settings are only valid for the corresponding method. In this case, the default values (→ Default Values, page 49) are not overwritten. This makes sure that the same settings are used whenever these parameters are not explicitly defined in a method.

Please Note: When running gradients, please note: If the internal motorized switching valve is in the **Inject** position, the liquid flows through the autosampler capillaries. This is not the case if the valve is in the **Load** position (→ Injection Principle, page 6). Thus, switching the valve influences the gradient profile.

Important: Under Default Values on the **Setup** menu (→ page 49), you can specify any position for the **Wash** action. Based on the parameter settings for the wash vial volume (**Wash Vl. V**.) and the volume to be drawn during the wash cycle (**Wash Vol**.), the autosampler calculates when the vial will be empty and automatically moves to the next position. The positions are incremented. For example, if RA01 is specified as position for the wash vial, the autosampler automatically moves to the vial at position RA02 when, based on the calculation, the first vial is be empty. When the vial at position RA02 is considered empty, the autosampler moves to position RA03 and so on.

To avoid that sample liquid is drawn by mistake instead of wash liquid, we recommend specifying R-99 as position for the wash vial. When the vial at R-99 is considered empty, the autosampler moves to position G-99 first, then to position B-99, and again to position R-99, and so on.

Please note: Reagents vials are treated similarly to wash vials. If the vial at the specified position is empty, the autosampler moves to the next position. To avoid that a wrong reagent is drawn by mistake, we recommend placing vials containing the same reagent in the same row next to each other and vials containing different reagents in different rows (for example, vials with reagent 1 at positions RA01, RA02, RA03, and vials with reagent 2 at positions RB01, RB02, RB03, etc.)

The following actions are available:

Action	Description
Dispense	The syringe dispenses the volume defined by the **Mix Volume** parameter into the position determined by the **Mix Subject** parameter. The **MixSpeed** parameter defines the syringe speed.
Ext. Inj.	The motorized switching valve connected to the MSV interface on the autosampler's rear panel is switched to the **Inject** position.
Ext. Load	The motorized switching valve connected to the MSV interface on the autosampler's rear panel is switched to the **Load** position.
Draw	The syringe draws the volume defined by the **Mix Volume** parameter from the position determined by the **Mix Subject** parameter. The **MixSpeed** parameter defines the syringe speed.

Action	Parameter
Inject	The injection volume (defined by the **Inj. Volume** parameter) is drawn from the position that is defined in the sample batch. The needle moves into the needle port and the MSV switches to **Inject**. This applies the sample onto the column. Afterward, the syringe is dispensed into the waste. The **Draw Speed** parameter defines the speed for loading the syringe; the **DispSpeed** parameter defines the dispensing speed.
Mix	From the position defined by the **Mix Subject** parameter, the syringe draws and dispenses the volume defined by the **Mix Volume** parameter (one mixing cycle). If **Mix Vial** is selected as **Mix Subject**, the **Mix Vial** parameter must be specified as well. The **Mix Repeat** parameter defines the number of mixing cycles. The **Mix Speed** parameter defines the syringe speed.
MSV Inj.	The needle moves into the needle port, the internal MSV is switched into the **Inject** position and the syringe content is dispensed, if necessary. The **DispSpeed** parameter defines the syringe.
MSV Load	The internal MSV is switched into the **Load** position.
Test	The needle moves to the position defined by the **Mix Subject** parameter to check whether a vial is present.
Wash	The internal MSV is switched into the **Load** position, if necessary. The volume defined by the **Wash Vol.** parameter is drawn from the position defined by the **Wash Vial** parameter and dispensed into the needle port. In addition, the **Wash Speed** (for drawing the wash volume) and **DispSpeed** (for dispensing the wash volume) parameters as well as **Wash Height** are considered.

Please note: To create a new method, modify an existing one and save it under a new name. To delete a method, select the method on the **Methods** menu and press **Del**. The **Confirm delete** dialog window is opened. You are prompted to confirm the action. **Delete** the method or select **Cancel** to return to the **Methods** menu.

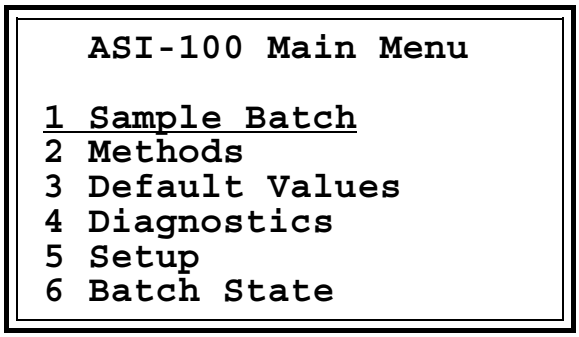
Please note: You cannot deleted the standard methods of the manufacturer (Derivate – Inject – Quick SMP – Refill - Wash). However, you can restore them to the defaults, if modified. Select the respective method and press **Del**. The **Restore to Factory Default?** dialog window prompts you to confirm or cancel this action.

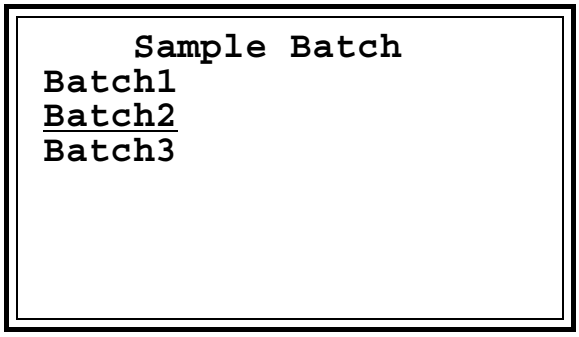
Please note: The methods are not limited to sample batches only. The **Start/Stop** function key allows you to start the methods directly from the **Methods** menu.

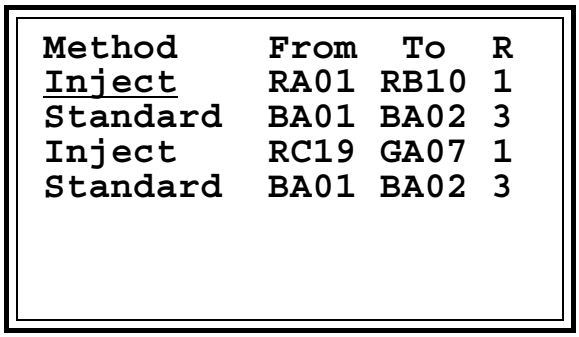
5.4.1 Example for a Sample Batch and a Typical Method

For an example of how to create a sample batch and of a typical method, see below. The default **Inject** method is used as basis.

First, create the batch in the **Sample Batch** menu (→ Sample Batch, page 34). Specify the sample positions and the method for sample processing (see below):

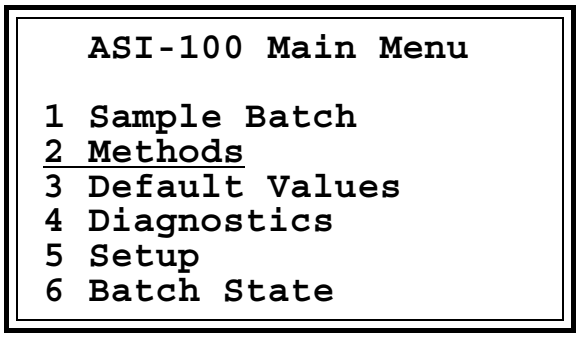




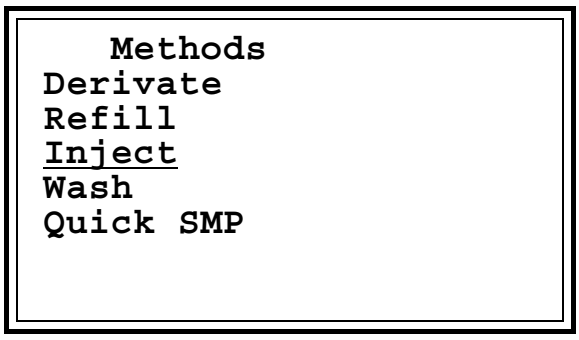


The meaning of these settings is as follows: First, all samples in segment R, row A, are analyzed once with the Inject method. Then, samples 1-10 in row B of the same segment are analyzed once with the Inject method. Then, three injections each follow from positions 1 and 2 of segment B, row A with the Standard method. After processing all samples following sample 19 in segment R, row C (and, if available, any samples in row D), the autosampler will move to segment G to perform one analysis each for the samples 1-7 in row A. The batch ends with three further standard injections each from positions BA01 and BA02.

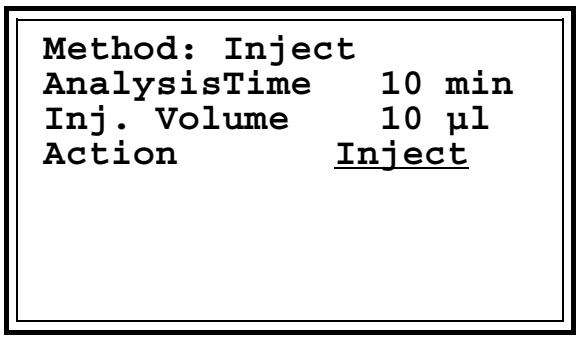
On the **Methods** menu, determine the contents of the method selected for sample batch processing. Save the batch settings and change to the **Methods** menu (→ Methods, page 38).



Select the **Inject** method.



The default **Inject** method is defined as follows:



Based on the above parameters, an injection volume of 10 µl is drawn and injected from the sample positions that are defined in the sample batch. The **Inject** method is used. The analysis runs for 10 minutes, i.e., the next sample is started 10 minutes after the MSV has been switched to the **Inject** position (= analysis start).

5.4.2 Description of the Default Methods

The following default methods are available: Derivate – Inject – Quick SMP – Refill – Wash. For examples of how to operate the autosampler standalone, refer to page 63.

The Derivate method:

With the **Derivate** method, 100 µl solution is drawn from the respective sample vial and dispensed into an empty vial (reagent D). Then, 100 µl of reagent A is added and mixed. After a reaction time of one minute 100 µl of reagent B is added and mixed. Afterward, this derivatizing solution is analyzed: injection volume 10 µl, analysis time 10 min.

In the **Refill** method, first specify the desired positions and capacities for the reagents, and then run this method once at the beginning of the batch.

Please note: The positions of the reagents and the wash vial need to be set only once. Based on the settings for the reagent vial capacities and the wash volume, the autosampler calculates when the respective vial will be empty and automatically moves to the next incremented position.

Then, run the **Derivate** method in the batch. The default settings are as follows:

Parameter	Setting	What it does
Start Time	-6 min	The preparation of the new sample starts six minutes before the analysis time of the previous sample ends.
Syr. Delay Mix Speed Mix Repeat	1s 25 µl/s 3	Via these settings, the parameters are defined. This can affect the precision and the reproducibility of the analysis.
Mix Subject Mix Volume Action	Wash Vial 100 µl Draw	To begin with, 100 µl wash liquid (= solvent) are drawn to flush the interior of the needle after the sample preparation.
Mix Subject Mix Volume Action Mix Subject Mix Volume Action Mix Subject Mix Volume Action	Air 5 µl Draw Sample 100 µl Draw Reagent D 105 µl Dispense	First, 5 µl air, then 100 µl sample are drawn and dispensed into the position that has been defined for reagent D. The air segment prevents mixing of the sample and the solvent.

Parameter	Setting	What it does
Mix Subject Mix Volume Action Mix Subject Mix Volume Action Mix Subject Mix Volume Action	Air 5 µl Draw Reagent A 100 µl Draw Reagent D 105 µl Dispense	First 5 µl air, then 100 µl reagent A are drawn and dispensed into the position that has been defined for reagent D. The air segment prevents mixing of the reagent and the solvent.
Mix Subject Mix Volume Action Mix Subject Mix Volume Action Mix Volume Action	Air 50 µl Draw Reagent D 100 µl Mix 50 µl Dispense	As specified above (**Mix Repeat** = 3), mixing is performed three times at the position specified for reagent D. An air segment is drawn first to prevent contact between the sample solution and the solvent, and thus, dilution of the sample.
Start Time	-1 min	Reagent B shall be injected drop by drop exactly one minute after the air segment was dispensed (see: Wait until, see below). An hourglass is started at -1 min.
Mix Subject Mix Volume Action Mix Subject Mix Volume Action Mix Subject Mix Volume	Air 5 µl Draw Reagent B 100 µl Draw Reagent D 105 µl	First, 5 µl air, and then 100 µl reagent B is drawn. The air segment prevents mixing of the reagent and the solvent.
Action	Test	The **Test** action moves the needle to the mix subject (reagent D) and tests whether a vial is present. Thus, the autosampler needle is already located at the position of the reaction solution before dispensing. If the needle was positioned only upon expiration of the reaction time, the time required for positioning the needle had to be added to the reaction time.
Wait until	0 min	Before executing further commands, the autosampler waits until the hourglass (started via the **Start Time**) has reached 0 min.
Action	Dispense	The previously drawn reagent B is dispensed.

Parameter	Setting	What it does
Mix Subject Mix Volume Action Mix Subject Mix Volume Action Mix Volume Action	Air 50 µl Draw Reagent D 100 µl Mix 50 µl Dispense	As specified above (**Mix Repeat** = 3), mixing is performed three times at the position specified for reagent D. An air segment is drawn first to prevent contact between the sample solution and the solvent, and thus, dilution of the sample.
Mix Subject Mix Volume Action	Reagent C 100 µl Dispense	The solvent that was drawn before all mixing commands is dispensed into the waste vial (reagent C).
Mix Subj. Mix Volume Action Mix Subj. Action	Wash Vial 200 µl Draw Reagent C Dispense	200 µl wash liquid is drawn and dispensed into the waste vial (reagent C).
Inject Time Analysis Time Mix Subj. Mix Volume Action Action	2 min 10 min Reagent D 10 µl Draw MSV Inject	10 µl reaction solution is drawn, the internal motorized switching valve is switched to **Inject**, and the contents of the syringe is dispensed into the waste. Two minutes later, the motorized switching valve switches into the **Load** position so that the next sample can be prepared. Ten minutes after the motorized switching valve switched to **Inject**, the analysis is complete and the next sample can be injected.

Please note: For more information about derivatization, refer to Pre-Column Derivatization and Injection of 3 Replicates (→ page 74).

Please note: The syringe speed defined for the **Draw**, **Dispense**, and **Mix** actions influences the reproducibility of the analysis results. These effects are especially obvious with high speeds. Therefore, we recommend optimizing the speed for the respective application.

The Inject method:

For a description of the default **Inject** method and the preset parameters, refer to Example for a Sample Batch and a Typical Method (→ page 43).

The Quick Sample method:

Select the **Quick Sample** method to insert a new sample into the running analysis (→ The Quick SMP Key, page 11). The defaults for the **Quick Sample** method are as follows:

```
Method: Quick SMP
AnalysisTime  10 min
Inj. Volume   10 µl
Action       Inject
```

The Refill method:

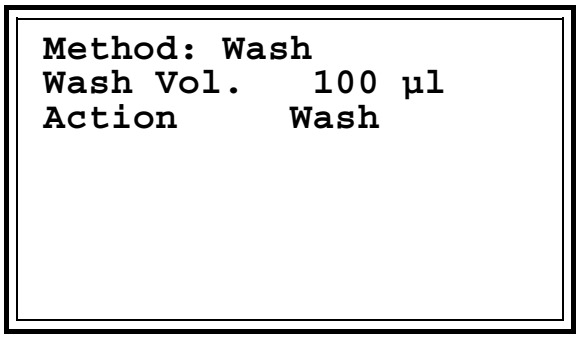
The **Refill** method defines the positions and the capacities of the reagent vials. This is necessary when the reagent vials were refilled. Based on the parameter settings, the autosampler calculates when the vial at the specified position will be empty and automatically moves to the next position (→ page 41).

The defaults for this method are as follows:

```
Method: Refill
Rg A Vial    GA01
Rg A Cap.       1
Rg B Vial    GB01
Rg B Cap.       1
Rg C Vial    GC01
Rg C Cap.       1
Rg D Vial    BA01
Rg D Cap.       1
```

The Wash method:

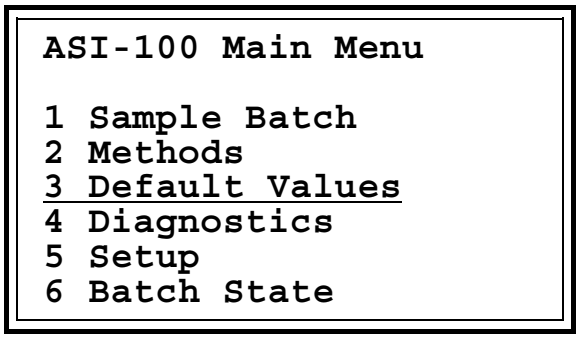
The **Wash** method allows the user to clean the inner and outer surface of the needle (→ **Wash** action, page 41 and **Wash** key, page 11). The default settings for the **Wash** method are as follows:



Please note: You cannot delete the standard methods of the manufacturer (Derivate – Inject – Quick SMP –Refill - Wash). However, you can restore them to the defaults, if modified. Select the respective method and press **Del**. The **Restore to Factory Default?** dialog window prompts you to confirm or cancel this action.

5.5 Default Values Menu

On the **Main** menu, use the up or down cursor key to select the **Default Values** menu. Press ↵ (Enter) to confirm your selection.



This menu lets you change the default values for the individual parameters and provides information about the instrument's status. Use the up or down cursor key to select the individual parameters. The selected menu item is underlined. To modify existing entries, use the arrow keys to increment or decrement numerical values. Or else, enter the new values directly on the keypad. Existing entries are automatically overwritten.

The following parameters are available:

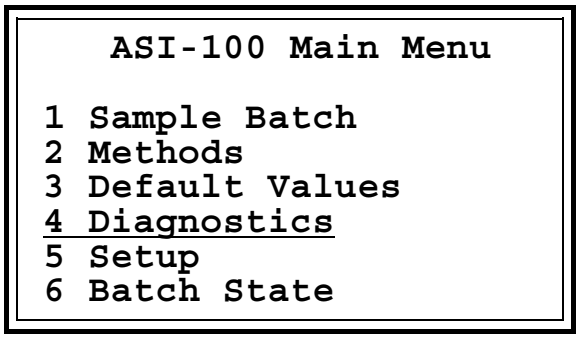
Parameter	Description	Factory Default
DispSpeed	Specify the dispensing speed of the **syringe** for the **Inject**, **MSV Inj**. and **Wash** actions.	10.0 µl/s
Down Speed	Specify the speed with which the **needle** shall move down.	10.0 mm/s
Draw Speed	Specify the drawing speed of the **syringe** for the **Inject** action.	10.0 µl/s
Inj. Volume	Specify the volume to be injected.	10 µl
Mix Height	Specify the distance between the bottom of the mixing vial and the needle tip when the needle is completely dipped into the vial. The parameter is considered for the **Mix**, **Draw**, and **Dispense** actions.	0.5 mm
Mix Repeat	Specify the number of mixing cycles.	3
Mix Speed	Specify the syringe speed for the **Mix**, **Draw**, and **Dispense** actions.	10 µl/s
Mix Volume	Volume to be drawn and dispensed during the **Mix**, **Draw**, and **Dispense** actions.	10 µl
SampleHeight	Specify the distance between the bottom of the sample vial and the needle tip when the needle is completely dipped into the vial.	0.5 mm
Syr. Delay	Specify the time the needle shall remain in the vial after loading.	5 s
Up Speed	Specify the speed with which the **needle** shall move up.	10.0 mm/s
Wash Vl. V.	Volume of the wash liquid in the wash vial (→ page 41).	10 µl
Wash Height	Specify the distance between the bottom of the wash vial and the needle tip when the needle is completely dipped into the vial.	1 mm
Wash Speed	Specify how fast the wash liquid shall be drawn.	10.0 µl/s
Wash Vial	Specify the position of the wash vial (→ page 41).	R-99
Wash Vol.	Specify the volume to be drawn from the wash vial	100 µl

Please note: To restore the Dionex standard settings, select **Factory Defaults** on the **Setup** menu (→ section 5.7.4, page 55). Please note: This restores both the settings made on the **Default Values** menu and the **Configuration** settings on the **Setup** menu.

Please Note: To overwrite the default **Wash Vl. V**. and **Wash Vial** values, set these parameters in a method. However, if you set other parameters in a method, these new settings are only valid for the corresponding method. In this case, the default values (see above) are not overwritten. This makes sure that the same settings are used whenever these parameters are not explicitly defined in a method.

5.6 Diagnostics Menu

On the **Main** menu, select the **Diagnostics** menu using the up and down cursor keys. Press ↵ (Enter) to confirm your selection:



The menu provides statistical information about the individual counters:

Counter	Description
Comm. Errors	A communication error on the serial interface, i.e., communication between the autosampler and the data system is interrupted.
Injections	Number of executed injections.
Nd.Seal Wear	Number of needle movements into the needle seal.
Port Wear	Number of needle movements into the needle port.
Rotor Wear	Number of rotor movements of the internal MSV (→ sec. 9.4, page 112).
Stator Wear	Number of stator movements of the internal MSV (→ sec. 9.4, page 112).
Syringe Wear	Number of syringe movements.

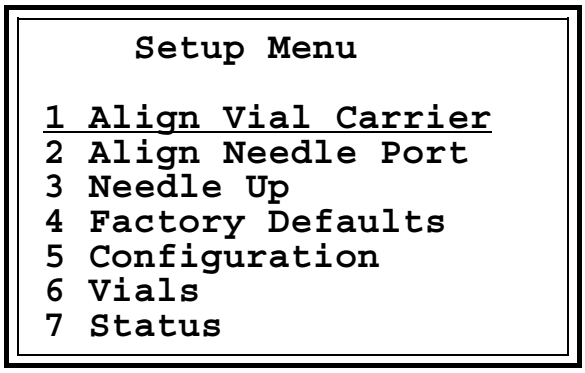
Please note: You can modify all counter readings except **Injections** and **Port Wear**. To modify existing entries, use the arrow keys to increment or decrement the numerical values. Or else, enter the new value directly on the keypad. If one of the wear parts mentioned above is exchanged, reset the respective counter to **0**.

The stator and the rotor of the motorized switching valve as well as the needle seal and the needle port can be replaced independently from each other. Therefore, the counter readings can be different.

Please note: Due to extensive automatic error correction, the serial communication between autosampler and PC is very reliable. However, a high counter reading indicates communication problems between the autosampler and the PC. Verify that the correct RS cable (part no. 8914.0103A) is installed and tighten the cable at both ends.

5.7 Setup Menu

On the **Main** menu, select the **Setup** menu with the up and down cursor keys. Press ↵ (Enter) to confirm your selection:



5.7.1 Aligning the Vial Carrier

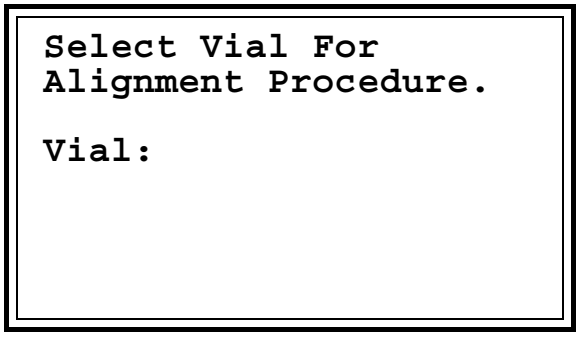
On the **Setup** menu, select **Align Vial Carrier** to center the needle above the vial and to specify the lowest position of the needle tip inside the vial.

Please note: To align the vial carrier for an ASI-100T/ASI-100 PT autosampler, make sure that the temperature control is set to Off. (→ The Temp. Key, page 12).

Please note: It is only possible to align the carrier if the segments have been defined before (→ Configuration, page 55).

Please note: Align the vial carrier after you have changed either an individual segment or the complete carrier (→ Sample Loading, page 24).

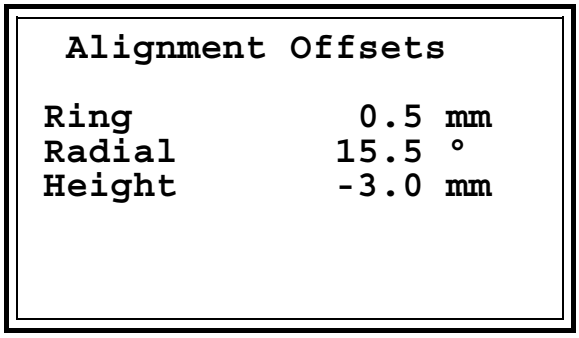
You are prompted to select the vial for the alignment procedure:



Enter the position via the keys on the keypad. Press ↵ (Enter) to confirm you selection. Or else, increment or decrement the indicated position using the arrow keys and confirm the new position by pressing ↵ (Enter) twice.

⚠ **Important:** If different segment types are used in the carrier, align the carrier using the vial with the smallest possible septum diameter (for the actual combination of segments) for the procedure. If a vial with too large a septum diameter is selected, the needle may not meet the septa centers of the vials in the other segments.

The needle moves to the specified position and the **Alignment Offsets** dialog window is opened:



Use this dialog window to modify the settings for the indicated parameters. Use the **Ring** and **Radial** parameters to center the needle over the vial. Specify the lowest position of the needle inside the vial via the **Height** parameter. Check this setting for all used vial types because it depends on the type and mechanical device tolerances. The setting is used as the initial point for all other height settings (e.g., sample height). Therefore, it should be as exact as possible to reduce the sample amount that remains within the vial to the minimum.

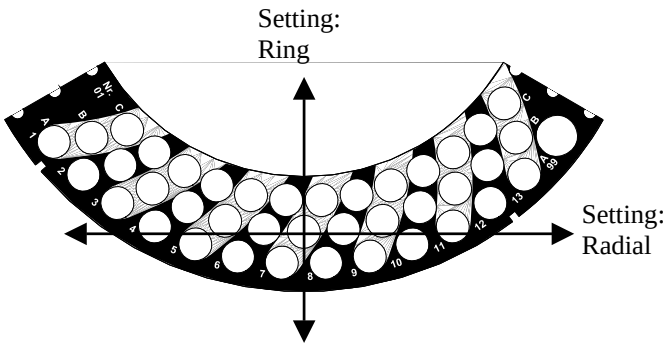


Fig. 22:Setting the Ring and Radial parameters

Use the up and down cursor keys to increment or decrement the **Ring** value. The up key moves the needle to the needle port; the down key moves the needle away from the needle port. The value given for **Radial** is modified via the left and right cursor keys. The left key moves the carrier counter-clockwise; the right key moves the carrier clockwise.

🛈 **Please note:** To set these two parameters, lift the vial pusher manually so that it does not rest on the vial. This is to allow free movement of the needle.

To modify the value given for **Height**, move the needle completely into the vial by pressing the down arrow key and then use the up and down cursor keys to reach the desired setting.

Press ↵ (Enter) to accept the modifications or press **Esc** to cancel them.

🛈 **Please note:** The **Ring** and **Radial** parameter settings can be modified only if the needle touches the septum or if it is moved up completely via the up

arrow key. The **Height** parameter can be modified only if the needle was moved completely into the vial via the down arrow key. If necessary, press the down arrow key twice.

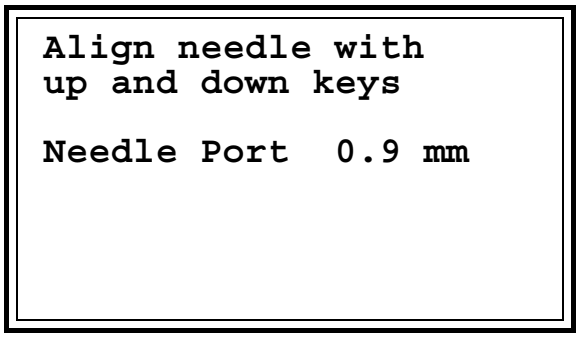
5.7.2 Aligning the Needle Port

On the **Setup** menu, select **Align Needle Port** to align the needle over the needle port so that it can move vertically into the port without being bent.

Please note: To align the needle port for an ASI-100T/ASI-100PT autosampler, make sure that temperature control is set to Off. (→ The Temp. Key, page 12).

Please note: Always align the needle port whenever you have changed the needle or the needle port (→ Replacing the Needle, page 104 and Replacing the Needle Port Seal, page 108).

You are prompted to align the needle port using the arrow keys:



You can use either the up and down cursor keys or the arrow keys to increment or decrement the indicated value. The up keys move the needle away from the carrier; the down keys move the needle toward the carrier.

To accept the modifications, press ↵ (Enter). Or else, select **Esc** to cancel them.

5.7.3 Needle Up

On the **Setup** menu, select **Needle Up** to move the needle out of the needle port. The injection valve is switched into the **Load** position.

Please note: Make sure that this command has been selected whenever the autosampler is moved or shipped.

5.7.4 Factory Defaults

On the **Setup** menu, select **Factory Default** to restore the standard settings. The **Restore to Factory Default?** dialog window is opened. To confirm the restore, select **Ok**. Or else, select **Cancel**.

Please note: After the default settings have been restored, perform a self-test to check the settings. Start the self test by pressing the **Self Test** key

Please note: **Factory Defaults** restores both the settings made on the **Default Values** menu and the **Configuration** settings on the **Setup** menu to the standard settings.

5.7.5 Configuration

On the **Setup** menu, select **Configuration** to specify the instrument's configuration. Use the up and down cursor keys to access the individual parameters. Only the underlined item can be edited. To modify existing entries use the arrow keys. The new settings are valid upon modification; you are not required to confirm them explicitly. The following parameters are available:

Parameter	Description	Factory Default
Blue Seg.	Select the segment type. Available are: Analyt. – Semiprep – Mini – Eppendorf	According to delivered carrier type
Detect Seg.	Enable or disable automatic segment detection. If automatic segment detection is enabled, the autosampler automatically recognizes the segment types and the vial types that are currently used in the carrier. With disabled detection, the user can specify the types manually.	Off
Detect Tray	Enable or disable tray detection and thus, manual interference monitoring. With enabled tray detection, a home run is performed when the tray is installed. If the tray was removed while the tray detection was disabled, perform a self-test after reinstalling the tray. This is to make sure that the sample is injected from the correct position.	On

Parameter	Description	Factory Default
Green Seg.	Select the segment type. Available are: Analyt. – Semiprep – Mini – Eppendorf	According to delivered carrier type
Impact Depth	Specify the impact depth that presses the needle into the needle port. The indicated path (in mm) generates the impact depth via a spring. (The parameter is read-only.)	–1.0 mm
Inj. at R4	Inject response at relay 4 can be turned on or off (→ page 21).	On
Language	Specify the language (German or English).	English
Rad. Speed	Change the speed of the radial movements (horizontal drive) (range: 0.1 - 25 mm/s). Usually, the user is not required to make any changes.	20 mm/s
Rdy at R3	Enable and disable Operable out at relay 3 (→ page 21). The relay is turned off only after a leak or a failed self-test.	On
Red Seg.	Select the segment type. Available are: Analyt. – Semiprep – Mini – Eppendorf	According to delivered carrier type
Serial No.	Indicates the serial number of your autosampler. (The parameter is read-only.)	Serial number
Service Code	Indicates the service code. (The parameter is read-only.)	service code
Syringe	Specify the volume of the syringe.	250 µl
Temp. Adj.	This value is used to correct possible deviations from the set point temperature. (This parameter is helpful for the ASI-100T/ASI-100PT. The parameter is read-only.)	0.0°C
Temp. Unit	Specify the temperature unit (°C or °F) for the cooling option.	°C
Version	Indicates the installed firmware version.	Firmware version

Please note: To restore the Dionex standard settings select **Factory Defaults** on the **Setup** menu (→ section 5.7.4, page 55). Please note: This restores both the settings made on the **Default Values** menu and the **Configuration** settings on the **Setup** menu.

5.7.6 Vials

On the **Setup** menu, select **Vials** to specify the dimensions for the different vial types. A vial is only detected automatically if it is within these limits.

Bottom Hgt. indicates the thickness of the vial bottom. **Min. Height** and **Max. Height** specify the dimensions of the vial to enable detection. Use **Bottom Hgt.** to position the needle as close as possible to the vial bottom if vials other than those recommended by Dionex are used.

Use the up and down cursor keys to select the vial type. Only the underlined item can be edited.

The following vial types are available: Eppendorf – Mini – Analyt. – Semiprep. The default settings are as follows:

```
Vial:  Mini

Bottom Hgt.      1 mm
Min. Height     35 mm
Max. Height     45 mm
```

Please note: When using the 0.25 ml Beckmann mini vials (→ page 27), change the **Min. Height** parameter to 25 mm.

```
Vial: Analyt.

Bottom Hgt.      1 mm
Min. Height     28 mm
Max. Height     38 mm
```

```
Vial:  Semiprep

Bottom Hgt.      2 mm
Min. Height     42 mm
Max. Height     52 mm
```

```
Vial:  Eppendorf

Bottom Hgt.      2 mm
Min. Height     35 mm
Max. Height     48 mm
```

Please note: When using the 0.5 ml Eppendorf vials (→ page 28), change the **Min. Height** parameter to 28 mm.

The values are reference values for the vials recommended by Dionex (→ Sample Loading, page 24). If necessary, adapt these values to your specific requirements.

To modify existing entries, use the arrow keys to increment or decrement numerical values. Or else, enter the new values directly on the keypad. Existing entries are overwritten automatically. Press ↵ (Enter) to confirm your selection. To exit the **Vials** menu, press **Esc**. A dialog window is opened. Select **Save** to save the modifications under the displayed vial type. Or else, continue editing or cancel the modifications (**Cancel Edit**). For more information about this dialog window, refer to Sample Batch (→ page 34).

⚠ **Important:** Although you can create a new vial type by saving any modifications under a new name (**Save As**), the new type is currently not considered as it is not possible to specify the position(s) for the new vial type. This option is reserved for new segment types in the future.

Please note: You cannot delete default vial types (Mini – Analyt. – Semiprep – Eppendorf). However, you can restore them to the defaults, if modified. Select the respective vial type, and then press **Del**. The **Restore to Factory Default?** dialog window is opened. Either confirm or cancel the action.

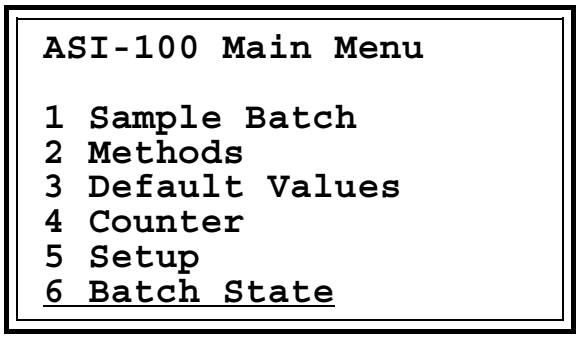
Please note: If vials smaller than the specified minimum height are used, an error message appears when the sample is accessed saying **No vial found**. If vials higher than the specified maximum height are used, an error message appears saying **Vial pusher obstructed**.

5.7.7 Status

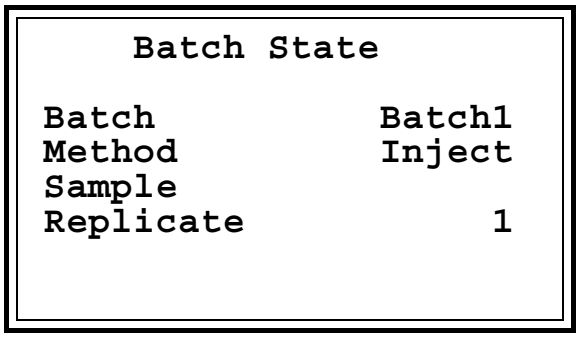
The **Status** menu provides information about several positions (tray, needle, etc.), motor speed, and sensors and is reserved for service personnel only. The status variables are read-only; they cannot be changed by the user.

5.8 Batch State Menu

On the **Main** menu, select the **Batch State** menu:



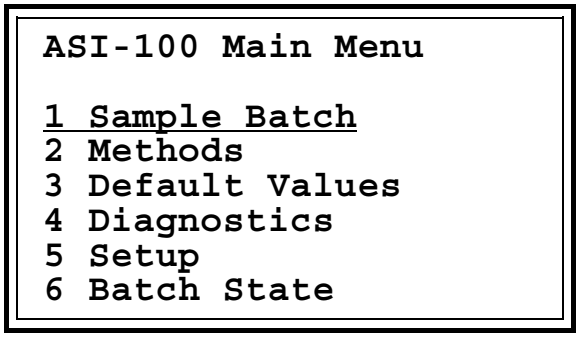
The menu provides information about the running sample batch. The batch itself, the method, the sample, and the replicate are displayed:

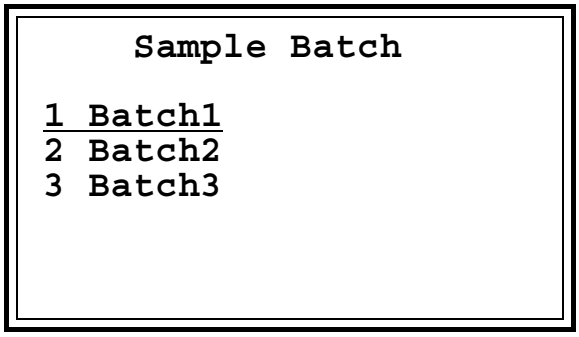


Information about the sample is displayed only when a batch is being processed. If no sample information is displayed, no analysis is currently performed.

5.9 Starting and Stopping the Analysis

After you have specified all necessary parameters, select the desired batch on the **Sample Batch** menu. Press **Start/Stop** to start the analysis:





The LED is lighted.

The autosampler is busy while the LED is lighted. To terminate the analysis, press the **Start/Stop** key. The **Stop Menu** is opened:

Select **Abort Batch** to terminate the analysis of the running batch and to return to the **Sample Batch** menu. The **Start/Stop** LED stops lighting.

5.10 Interrupting and Continuing the Analysis

Several options are available to interrupt and continue the analysis:

Press **Pause/Cont.** to interrupt the analysis of the batch after the running sample. The LED is red. Press **Pause/Cont.** again (the LED is off) to continue the analysis with the next sample in the batch.

Please note: Even if a sample batch is running, an intermediate method can be started. However, the analysis of the running sample has to be finished completely! Press the **Pause/Cont**. key to enable the pause mode. The **Pause/Cont**. LED is red. Select a method, and then start it by pressing the **Start/Stop** key when the analysis of the current sample has been finished. The **Start/Stop** and **Pause/Cont** LEDs are red. To continue the sample batch after the intermediate method, press the **Pause/Cont**. key again. The **Pause/Cont**. LED is off; the **Start/Stop** LED is lighted.

To interrupt a running sequence, you can also press the **Hold/Cont** key. The current sample and, if necessary, its analysis time are stopped immediately and the movements are interrupted. The LED is red. The **Stop Menu** is opened:

Use the up and down cursor keys to select the desired option. Press ↵ (Enter) to confirm your selection. Or else, press the respective number key on the keypad.

Select **Abort Replicate** to interrupt the running replicate immediately. The **Pause/Cont.** LED is lighted. Press the **Pause/Cont.** key to continue the analysis of the batch with the previously interrupted sample; the analysis time continues to run.
If this command is selected while a sample is being prepared (i.e., before the valve is switched to the **Inject** position), sample preparation is aborted. The **Pause/Cont.** LED is lighted. Press the **Pause/Cont**. key again to restart sample preparation of the interrupted replicate.

Select **Next Sample** to abort the analysis of the running sample immediately. If necessary, the valve is switched to the **Load** position. The **Pause/Cont.** LED is red. Press the **Pause/Cont.** key to continue the analysis with the next sample.

Select **Abort Batch** to terminate the analysis of the selected batch immediately and to return the **Sample Batch** menu. If necessary, the valve is switched to the **Load** position.

Select **Continue** or press **4** on the keypad to continue the analysis of the previously interrupted sample. Or else, press the **Hold/Cont.** key again. The **Hold/Cont**. LED stops lighting; the **Start/Stop** LED is on. The motions and analysis time continue to run.

Please note: If an error occurs while the batch is processed (→ List of the Most Frequently Observed Error Messages, page 95), the autosampler will automatically switch to **Pause/Cont**. The LED is red. As soon as the error is eliminated, the batch will continue automatically with the next sample.

5.11 Operation after Power-Failure

After a power-failure, standalone instruments return to a reliable condition; the functions are no longer executed. As soon as the power returns, the autosampler performs a self-test and the motorized switching valve switches to the **Inject** position.

However, if the HPLC system is operated by the Chromeleon data system, the system can be programmed via the corresponding program file (PGM File) in such a way that operation is started again as desired after a power failure. For more information, refer to the Chromeleon Online Help.

6 Examples for Stand-Alone Operation

6.1 Introduction

The examples below describe the operations that can be performed with the autosampler. They support you in getting familiar with and taking full advantage of the autosampler's functions. In addition, you will find extensive support as to which parameters can influence the accuracy, the precision, and the reproducibility of your analysis.

To carry out the examples, turn on the autosampler and wait until the self-test has been performed successfully (→ Power-Up, page 23). All examples refer to the standard 250-µl-volume syringe and the corresponding sample loop. The carrier is equipped with three segments for analytical vials.

In all examples, various samples are subsequently processed automatically. Their order of processing is defined on the **Sample Batch** menu, which is a submenu of the **Main** menu. For each sample, the number of replicates and the analytical method are defined.

The analysis parameters (e.g., injection volume, injection time and the speeds for the syringe movements) are defined in the method. The **Methods** menu, too, is a submenu of the **Main** menu. Please note that some parameters have to be defined while default settings are provided for others. The default setting is used unless the respective parameter is explicitly defined in the method. Please refer to the example Injecting 15 µl Sample on page 63.

The examples are based on one another. Circumstances that have already been described in previous examples are not always repeated. We assume that you are familiar with the menu structure and that you know how to enter and/or modify method parameters, methods, and sample batches (→ Menu Structure and the following chapters, starting at page 33).

6.2 Injecting 15 µl Sample

6.2.1 Introduction

Vials are located at the following positions: RA1, RA2, RA3 to RA13, RB1, RB2, RB3 to RB8, GB1, GB2, GB3 to GB10, BC3, BC4, BC5. Each sample is injected once. The injection volume is 15 µl; the analysis time is 20 minutes.

6.2.2 Defining the Method

On the **Main** menu, select the **Methods** menu, and then select the **Inject** method.

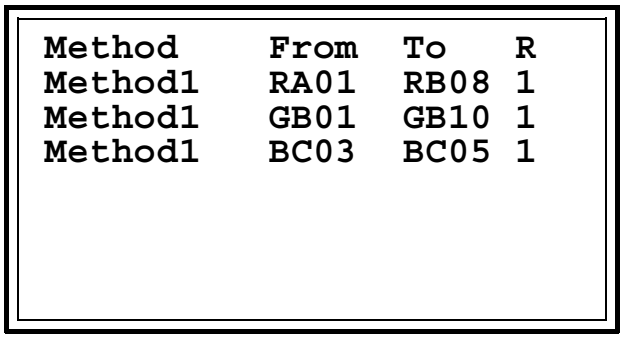
The following table shows the parameters to be defined. The bold parameters have to be defined, while the other settings are optional only. However, we recommend that you always define these values in a method. This is to make sure that the settings used for this method are always the same, i.e., they do depend on the values defined in the Default Values(page 49).

Having made all the settings, save the method as **Method1**.

Parameter	Setting	What it does
Inj. Volume	15 µl	
Draw Speed	25 µl/s	The **Draw Speed** is the drawing speed of the syringe for the **Inject** action. If the speed is too high, negative pressure can build up in the syringe and the connected capillaries that may result in gas bubbles and affect the accuracy, precision, and reproducibility of the analysis results. The intensity of this effect depends mainly on the viscosity of the used solvent. At room temperature, we recommend a value of 25 µl/s for water (→ Test Description, page 118).
Syr. Delay	5 s	After drawing the injection volume, the needle waits for the syringe delay before moving out of the vial. This compensates the negative pressure that builds up when the liquid is drawn into the needle and the connected capillaries. The sample flows until the injection volume is completely drawn. Too short a time may affect the accuracy of the results if different injection volumes are used. The intensity of this effect depends mainly on the viscosity of the used solvent. At room temperature, we recommend a value of 5 s for water (→ Test Description, page 118).
DispSpeed	50 µl/s	The **DispSpeed** specifies the dispensing speed of the syringe. With highly viscous eluents, too high a dispensing speed can result in heavy wear of the syringe and the mechanics of the autosampler. At room temperature, we recommend a value of 50 µl/s for water (→ Test Description, page 118).
SampleHeight	0.5 mm	The sample height has to be defined, especially with inhomogeneous sample solutions, to ensure reproducible analysis results. In any case, select the sample height so that the needle tip remains in the sample solution during the entire drawing process.
Down Speed	10 mm/s	Too high a needle speed when moving down can result in load stress and thus, in early needle wear when the needle moves through the vial septum. The speed of 10 mm/s is for the recommended septa types (→ table on page 28).
Up Speed	10 mm/s	Too high a needle speed when moving up can build up a negative pressure in the vial that may cause the problems described under **Syringe Delay**. It depends on the used septa. The speed of 10 mm/s is for the recommended septa types (→ table on page 28).
Analysis Time	**20 min**	Twenty minutes after the injection was executed, the internal MSV is switched to **Load**. Only then, the next sample can be injected.
Action	**Inject**	Executes the injection: 15 µl sample is drawn and the needle moves into the needle port. The internal MSV is switched to **Inject**. As the needle and the connected capillaries are now part of the high-pressure circuit of the HPLC system (→ Injection Principle, page 6), the sample is transported to the column. The content of the syringe is then dispensed into the waste, independent of the high-pressure circuit of the HPLC system.

6.2.3 Defining the Batch

On the menu **Sample Batch**, select **Batch1**. Edit the batch as follows:



Method	From	To	R
Method1	RA01	RB08	1
Method1	GB01	GB10	1
Method1	BC03	BC05	1

Save the batch as **Ex1**.

The samples are processed in the following order: First, all samples in one row are processed in incrementing order (e.g., A1 → A13). Then, the samples in the next row (A → B → C) are processed, and finally the samples in the next segments (R → G → B → R) are analyzed.

In the current example, the samples are processed as follows: The samples RA01, RA02, RA03 to RA13, RB01, RB02 RB03 to RB08 are processed in the indicated order according to the first line of the batch. A new line is required for the samples GB01, GB02, GB03 to GB10. Otherwise, having processed the sample at position RB08, the autosampler would move on to position RB09 where there is no sample available. Likewise, a new line is required for the samples BC03 to BC05. Therefore, position all samples to be processed with the same method in such a way that they require only one line in the sample batch definition.

Entering a position in the **To** column is optional. If no position is entered, the autosampler will continue until it reaches the first empty position. This completes the processing of the samples in the first line and the autosampler continues with the samples in the next line.

Since the **R** column in **Ex1** defines the number of replicates as 1, i.e., each sample is injected once.

6.2.4 Processing the Samples

On the **Sample Batch** menu, select **Ex1**, and then press the **Start/Stop** key to start your analysis.

6.3 Diluting a Sample 1:1 and Subsequent Injection

6.3.1 Introduction

100 µl sample is drawn from the respective vial and dispensed into an empty vial. 100 µl solvent is added and mixed. The mixture is analyzed once: injection volume 10 µl, analysis time 25 min.

The sample rack is loaded as described below, with information about the **mix subject** assignments in brackets. The samples to be diluted are located at positions RA01 to RA13 (= sample). Empty vials are situated at positions RB01 to RB13 (= reagent B). Vials containing 1000 µl solvent for diluting are at positions GA01 and GA02 (= reagent A). To rinse the needle and dispose of the rinse solution, eluent vials are required at positions R99 and G99 (= wash vial), and empty vials (= reagent C) are required at positions BA01 to BA05.

For this example, two different methods need to be defined. While the samples are processed with the **Mix** method, the diluting solution is prepared and injected. The **Fill2** method defines the desired positions and reagent capacities. This method runs **only once at the beginning of the batch**. Based on the reagent capacities, the autosampler calculates when the respective vial will be empty and automatically moves to the next position (→ page 41 and Defining the Fill2, page 66).

6.3.2 Defining the Fill2 Method

The **Fill2** method defines the desired positions and capacities of the reagents. The method runs **only once at the beginning of the batch**.

The reagent capacity parameters (Rg A Cap., etc.) indicate the number of replicates that can be processed with the contents of one vial. The autosampler counts how many replicates have been processed. If this counter reaches the value defined as reagent capacity, it is reset to zero with the next replicate and the autosampler automatically uses the next vial (→ order of sample processing, page 41).

In addition, the counter is reset to zero when the reagent capacity parameter is set in a method. So, if the reagent capacity is defined in the **Mix** method, the counter is reset whenever a diluting solution is prepared. Thus, for all samples, the reagents are drawn from the same vial. Therefore, contrary to all other parameters, do not set the reagent capacity parameters in the **Mix** method.

Select the **Methods** menu on the **Main** menu, and then select the **Refill** method. Having made all the settings, save the method as **Fill2**.

Parameter	Setting	What it does
Rg A Vial Rg A Cap.	GA01 9	Each vial contains 1000 µl solvent, 100 ml of which are required per sample. Max. 9 samples can be processed with one vial because the vial volume cannot be drawn completely. For the first 9 samples, reagent A is drawn from position GA01, for the following samples, reagent A is drawn from position GA02.
Rg B Vial Rg B Cap.	RB01 1	Reagent B is assigned to those vials in which the diluting solution is prepared. Each sample requires a new sample. The vial capacity is one sample.
Rg C Vial Rg C Cap.	BA01 4	For each sample, 300 µl rinse solution is required. With the reagent capacity being 4 samples, 1200 µl are disposed of into each of the waste vials. Avoid a higher filling quantity. Otherwise, the air inlet in the needle (which is required for pressure compensation) may be contaminated. This may result in carry-over of the rinse solution to the next vial (→ note, page 28).
Wash Vial Wash Vl. V.	R99 2500 µl	For each sample, 300 µl wash solution is required. For the first 8 samples (2400 µl), the wash solution is drawn from position R99; the wash solution for the next samples is drawn from position G99.

6.3.3 Defining the Mix Method

On the **Main** menu, select the **Methods** menu, and then select the **Derivate** method.

Similar to the example in section 6.2 (page 63), all bold parameters must be set in the **Mix** method. All other parameters are optional only.

Having made all the settings, save the method as **Mix**.

No.	Parameter	Setting	What it does
1	**Start Time**	**-6 min**	The start time of -6 minutes means that the sample preparation starts six minutes before the previous analysis ends. Thus, the available measurement time of the HPLC system can be fully used, as no time is lost for sample preparation between the injections. **Please note:** The start time has to be entered in the **first line** of the method! Prerequisite for the autosampler to consider this parameter: The MSV must be in **Load** position! This is because the needle is part of the high-pressure circuit of the HPLC system in the **Inject** position. Only the method used for processing the previous sample can switch the MSV from **Inject** to **Load**. To do so, the **Inject Time** parameter (→ line 48, page 71 and Overlapping Sample Preparation, page 72) is used.

No.	Parameter	Setting	What it does
2	DrawSpeed	25 µl/s	The **Draw Speed** is the drawing speed of the syringe for the **Inject** actions. If the speed is too high, negative pressure can build up in the syringe and the connected capillaries that may result in gas bubbles and affect the accuracy, precision, and reproducibility of the analysis results. The intensity of this effect depends mainly on the viscosity of the used solvent. At room temperature, we recommend a value of 25 µl/s for water (→ Test Description, page 118).
3	Syr.Delay	5 s	After drawing the injection volume for the **Draw**, **Inject**, or **Wash** actions, the needle waits for the syringe delay before moving out of the vial. This compensates the negative pressure that builds up when the liquid is drawn into the needle and the connected capillaries. The sample flows until the injection volume is completely drawn. Too short a time may affect the accuracy of the results if different injection volumes or sample preparation steps are used. The intensity of this effect depends mainly on the viscosity of the used solvent. At room temperature, we recommend a value of 5 s for water (→ Test Description, page 118).
4	DispSpeed	50 µl/s	The **DispSpeed** specifies the dispensing speed of the syringe for the **Inject**, **MSV Inj**., and **Wash** actions. For the **Wash** action, see lines 43-47 (→ page 70). With highly viscous eluents, too high a dispensing speed can result in heavy wear of the syringe and the mechanics of the autosampler. At room temperature, we recommend a value of 50 µl/s for water (→ Test Description, page 118).
5	SampleHeight	0.5 mm	The sample height has to be defined, especially with inhomogeneous sample solutions, to ensure reproducible analysis results. In any case, select the sample height so that the needle tip remains in the sample solution during the entire drawing process. The sample height is relevant only for the **Inject** action (→ Mix Height, line 9, page 69).
6	Down Speed	10 mm/s	Too high needle speeds when moving down can result in load stress and in early needle wear when the needle moves through the vial septum. The speed of 10 mm/s is for the recommended septa types (→ table on page 28).
7	Up Speed	10 mm/s	A too high needle speed when moving up can build up negative pressure in the vial that may cause the problems described under **Syringe Delay** and depends on the used septa. The speed of 10 mm/s is for the recommended septa types (→ table on page 28).

No.	Parameter	Setting	What it does
8	Mix Speed	10 µl/s	The **Mix Speed** specifies the syringe speed for the **Draw**, **Dispense**, and **Mix** actions. The higher the speed, the sooner mixing may occur between the drawn / dispensed liquids and any existing / remaining solution in the needle. When the drawn liquid is dispensed again, it is diluted. This may affect the precision and the accuracy of the analysis results. For drawing information, also refer to line 2, page 68. The intensity of this effect mainly depends on the number of **Draw** and **Dispense** actions and the viscosity of the used solvent. It might be necessary to adapt the mix speed to the respective application. At room temperature, we recommend a value of 10 µl/s for water (→ Test Description, page 118). This value is different from the values for the **Draw Speed** and the **DispSpeed** actions (→ lines 2 and 4, page 68).
9	Mix Height	0.5 mm	**Mix Height** specifies the distance between the bottom of the mixing vial and the needle tip when the needle is completely dipped into the vial. This parameter is considered for the **Mix**, **Draw**, and **Dispense** actions. Define the mix height to obtain reproducible analysis results because during sample preparation inhomogeneous solutions are developed in the first place. In any case, select the mix height so that the needle tip remains in the solution during the whole drawing process. It might be necessary to adapt this parameter to your application.
10 11 12	**Mix Subject** **Mix Volume** **Action**	**Wash Vial** **100 µl** **Draw**	This vial contains the eluent. 100 µl are drawn to rinse the needle by dispensing the eluent after all draw and dispense actions. (→ lines 40 – 42, page 70).
13 14 15	**Mix Subject** **Mix Volume** **Action**	**Air** **5µl** **Draw**	This command sequence draws an air segment to prevent mixing of the drawn sample and the eluent that is in the needle. Such mixing would affect the precision and the accuracy of the analysis results (→ line 8, page 69).
16 17 18	**Mix Subject** **Mix Volume** **Action**	**Sample** **100 µl** **Draw**	If **sample** is selected as mix subject, the vial position defined in the sample batch is used. This command sequence draws 100 µl of the sample to be diluted.
19 20 21	**Mix Subject** **Mix Volume** **Action**	**Reagent B** **105 µl** **Dispense**	Reagent B has the positions of the empty vials assigned in which the diluting solution is prepared. This command sequence dispenses the drawn sample volume (→ lines 16 – 18, page 69) and the air segment (→ lines 13 - 15, page 69) into the empty vial.

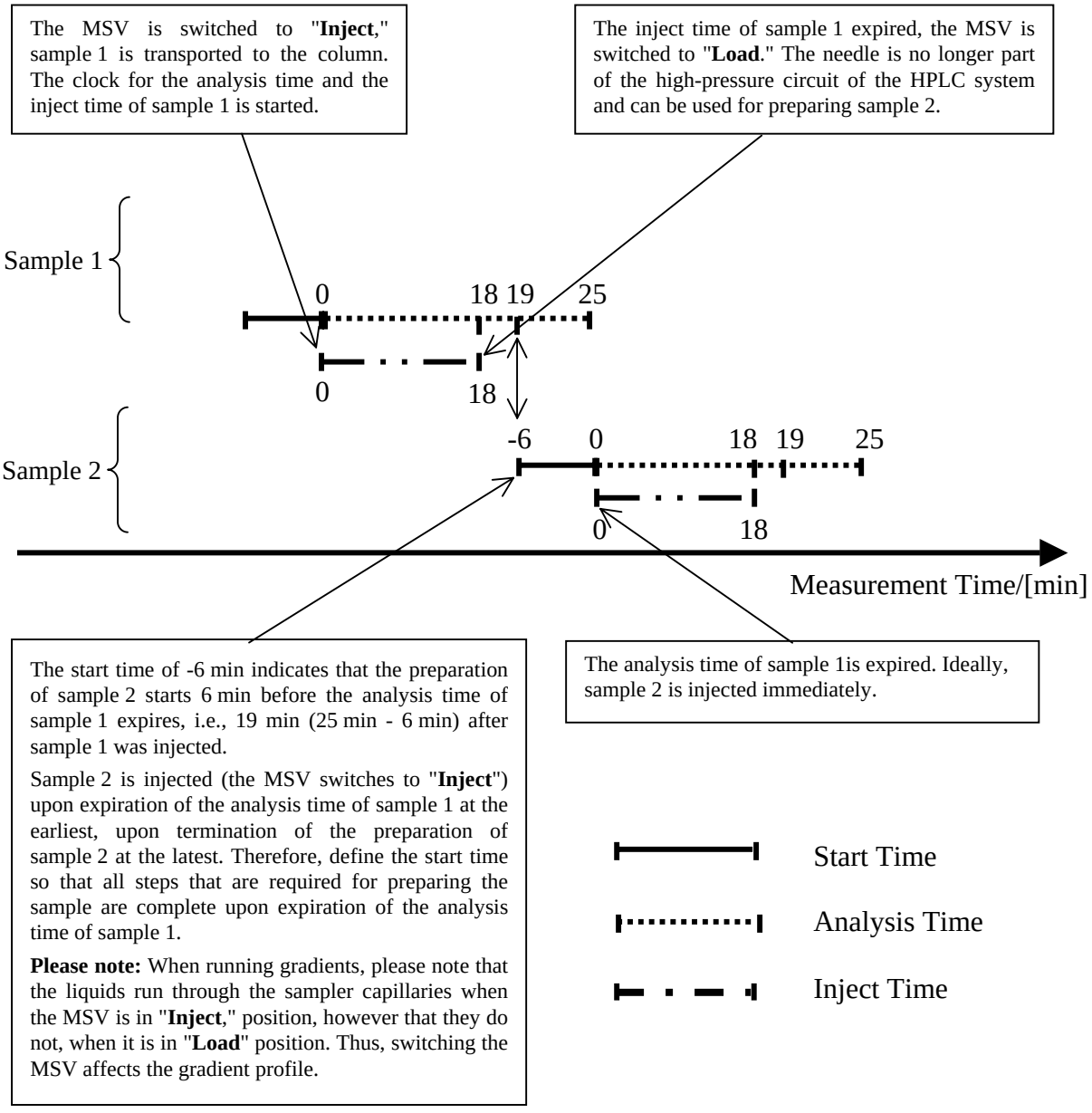
No.	Parameter	Setting	What it does
22	**Mix Subject**	**Air**	This command sequence draws 5 µl air followed by 100 µl reagent A (solvent used for diluting) and dispenses both of them into the empty vial.
23	**Mix Volume**	**5µl**	
24	**Action**	**Draw**	
25	**Mix Subject**	**Reagent A**	
26	**Mix Volume**	**100 µl**	
27	**Action**	**Draw**	
28	**Mix Subject**	**Reagent B**	
29	**Mix Volume**	**105 µl**	
30	**Action**	**Dispense**	
31	**Mix Subject**	**Air**	After drawing 50 µl air, three times 100 µl diluting solution (= reagent B) are drawn (parameter: **Mix Repeat** = 3) and dispensed (**Mix** action). This repeat count is sufficient for a homogeneous mixture when round-bottom vials are used and water is used as solvent. It might be necessary to adapt the **Mix Repeat** and **Mix Volume** parameters to your application.
32	**Mix Volume**	**50 µl**	
33	**Action**	**Draw**	
34	**Mix Subject**	**Reagent B**	
35	**Mix Volume**	**100 µl**	
36	**Mix Repeat**	**3**	
37	**Action**	**Mix**	
38	**Mix Volume**	**50 µl**	The air segment that was drawn before mixing (→ lines 31 – 33, page 70) is dispensed into the diluting solution.
39	**Action**	**Dispense**	
40	**Mix Subject**	**Reagent C**	The eluent that was drawn at the beginning of all mixing processes (→ lines 10 – 12, page 69) is dispensed into the empty waste vial (defined as reagent C). Avoid dispensing the rinse solution into the needle port as this might affect the precision and accuracy of the analysis results. Reason: If the MSV is switched to the **Inject** position the capillaries that are connected to the needle port are part of the high-pressure circuit of the HPLC system. Thus, the rinse solution would also be transported to the column.
41	**Mix Volume**	**100 µl**	
42	**Action**	**Dispense**	
43	**Mix Subject**	**Wash Vial**	This command sequence draws 200 µl eluent and dispenses them into the empty waste vial (defined as reagent C). Do not use the **Wash** action because the rinse solution would then be disposed of into the needle port (→ lines 40 - 42, page 70).
44	**Mix Volume**	**200 µl**	
45	**Action**	**Draw**	
46	**Mix Subject**	**Reagent C**	
47	**Action**	**Dispense**	

No.	Parameter	Setting	What it does
48	**Inject Time**	**18 min**	18 minutes after the MSV switched from **Load** to **Inject** and thus, the diluting solution was transported to the column, the MSV switches back to **Load**. However, the analysis continues for another 8 minutes (analysis time: 25 min). This time is required to remove the needle from the high-pressure circuit of the HPLC system. Only then, it can be used for preparing the next sample (→ line 1, page 67, line 49 and Overlapping Sample Preparation, page 72). **Please note:** When running gradients, please note that the liquids run through the autosampler capillaries when the MSV is in **Inject** position, however that they do not, when it is in **Load** position. Thus, switching the MSV affects the gradient profile.
49	**Analysis Time**	**25 min**	25 minutes after the diluting solution was transported to the column, the analysis is finished. Only then, the next sample can be injected. In the current example, the next sample has a negative start time (-6 min → line 1, page 67), i.e., the preparation of the next sample is started 19 minutes (25 min - 6 min) after the MSV switched to **Inject**. (→ lines 48 and 1 (page 67) and Overlapping Sample Preparation, page 72).
50 51 52 53	**Mix Subject** **Mix Volume** **Action** **Action**	**Reagent B** **10 µl** **Draw** **MSV Inj.**	With the **Inject** action, the injection is performed from the position defined in the sample batch. This is the position of the undiluted sample. To inject the diluting solution (= reagent B), it needs to be drawn first (→ lines 50 to 52) before being injected with the **MSV Inj.** action. The needle moves into the needle port; the internal MSV is switched to **Inject**. As the needle and the connected capillaries are part of the high-pressure circuit of the HPLC system (→ Injection Principle, page 6), the sample is now transported to the column. Independent of the high-pressure circuit of the HPLC system, the contents of the syringe is then dispensed into the waste.

6.3.4 Overlapping Sample Preparation

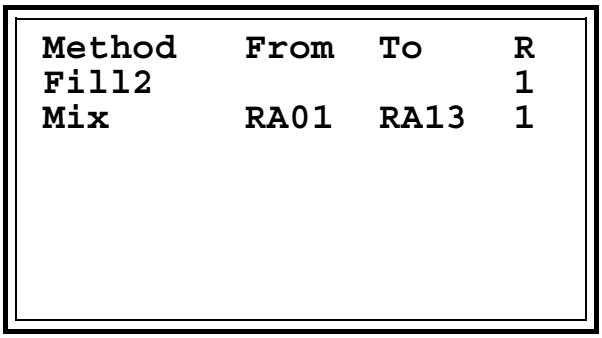
The objective of overlapping sample preparation is to fully use the measuring time of the HPLC system. Start preparing the next sample (sample no. 2) while the current sample (sample no. 1) is still being analyzed.

Three parameters are required: Analysis Time (25 min), Inject Time (18 min), and Start Time (-6 min). The illustration below refers to the above values in parenthesis.



6.3.5 Defining the Batch

On the **Sample Batch** menu, select **Batch1**. Edit the batch as follows:



Save the batch as **Ex2**.

For the **Fill2** method, no sample position is indicated as the method does not include parameters and/or actions that refer to any sample position (e.g., **Inject** action, Mix Subject: Sample). If no position appears in the **To** column, the respective method is processed only once (→ Defining the Fill2, page 66).

6.3.6 Processing the Samples

On the **Sample Batch** menu, select **Ex2**. Press the **Start/Stop** key to start your analysis.

6.4 Pre-Column Derivatization and Injection of 3 Replicates

6.4.1 Introduction

100 µl solution is drawn from the respective sample vial and dispensed into an empty vial. 100 µl reagent A is added and mixed. After a reaction time of one minute, 50 µl reagent B is added and mixed. The derivatizing solution is analyzed three times: injection volume 5 µl, analysis time 25 min

The autosampler is loaded as follows, with information about the **Mix Subjects** assignments in brackets. The samples are located at the positions RA01 to RA13 (= sample). The empty vials for derivatization reactions are situated at the positions RB01 to RB13 (= reagent D). Vials containing 1000 µl reagent A and reagent B, respectively, are located at the positions GA1 to GA2 (= reagent A), and GB1 (= reagent B). To rinse the needle and dispose of the rinse solution, eluent vials are required at the positions R99 and G99 (= wash vial), and empty vials (= reagent C) are required at the positions BA01 to BA05.

For this example, two different methods need to be defined. While the samples are processed with the **Derivat2** method, the derivatizing solution is prepared **and** injected **three times**. The **Fill3** method defines the desired positions and reagent capacities. This method runs **only once at the beginning of the batch**.

Based on the reagent capacities, the autosampler calculates when the respective vial will be empty and automatically moves to the next position (→ page 41 and Defining the Fill 3 Method, page 74).

6.4.2 Defining the Fill 3 Method

The **Fill3** method defines the desired positions and the reagent capacities. The method runs **only once at the beginning of the sample batch**.

The reagent capacity parameters indicate the number of replicates that can be processed with the contents of one vial. In the current example, several injections are performed while the **Derivat2** method is processed. They are regarded as replicates.

The autosampler counts how many replicates have been processed. If this counter reaches the value defined as reagent capacity, it is reset to zero with the next replicate and the autosampler automatically uses the next vial (→ order of sample processing, page 41).

In addition, the counter is reset to 0 whenever the reagent capacity parameter is set within a method. So, if the reagent capacity is defined in the **Derivat2** method, the counter is reset whenever a derivatizing solution is prepared. Thus, for all samples, the reagents are drawn from the same vial. Therefore, unlike all other parameters do not set the reagent capacity parameters in the **Mix** method.

Select the **Methods** menu on the **Main** menu, and then select the **Refill** method. Having made all the settings, save the method as **Fill3**.

Parameter	Setting	What it does
Rg A Vial Rg A Cap.	GA01 9	Each vial contains 1000 µl solvent, 100 ml of which are required per sample. Max. 9 samples can be drawn from one vial because the vial volume cannot be drawn completely. For the first 9 samples, reagent A is drawn from position GA01, for the following samples, reagent A is drawn from position GA02.
Rg B Vial Rg B Cap.	GB01 19	Each vial contains 1000 µl reagent, 50 ml of which are required per sample. Max. 19 samples can be drawn from one vial. For all samples, reagent B is drawn from position GB1.
Rg C Vial Rg C Cap.	BA01 4	For each sample, 300 µl rinse solution is required. With a reagent capacity of 4 samples, 1200 µl are disposed of into each of the waste vials. Avoid a higher filling quantity. Otherwise, the air inlet in the needle (which is required for pressure compensation) may be contaminated. This may result in carry-over of the rinse solution to the next vial (→ note, page 28).
Rg D Vial Rg D Cap.	RB01 1	Reagent D is assigned to those vials in which the derivatizing solution is prepared. Each sample requires a new sample. The vial capacity is one sample.
Wash Vial. Wash Vl. V.	R99 2500 µl	For each sample, 300 µl wash solution is required. For the first 8 samples (2400 µl), the wash solution is drawn from position R99; the wash solution for the next samples is drawn from position G99.

6.4.3 Defining the Derivat2 Method

On the **Main** menu, select the **Methods** menu, and then select the **Derivate** method.

Similar to the example in section 6.2 (page 63), all bold parameters must be set in the **Derivat2** method. All other parameters are optional only.

Having made all the settings, save the method as **Derivat2**.

No.	Parameter	Setting	What it does
1	**Start Time**	**-6 min**	The start time of -6 minutes means that the sample preparation starts six minutes before the previous analysis ends. Thus, the available measurement time of the HPLC system can be fully used, as no time is lost for sample preparation between the injections. **Please note:** The start time has to be entered in the **first line** of the method! Setting the start time starts a clock. The command **Wait until xx min** can be used to execute a command at a specific time (→ line 50, page 79). Prerequisite for the autosampler to consider this parameter: The MSV must be in the **Load** position because, in the **Inject** position, the needle is part of the high-pressure circuit of the HPLC system. Only the method used for processing the previous sample can switch the MSV from **Inject** to **Load**. To do so, the **Inject Time** parameter (→ line 69, page 80 and Overlapping Sample Preparation, page 72) is used.
2	Draw Speed	25 µl/s	The **Draw Speed** is the drawing speed of the syringe for the **Inject** action. If the speed is too high, a negative pressure can build up in the syringe and the connected capillaries that may result in gas bubbles and affect the accuracy, precision, and reproducibility of the analysis results. The intensity of this effect depends mainly on the viscosity of the used solvent. At room temperature, we recommend a value of 25 µl/s for water (→ Test Description, page 118).
3	Syringe Delay	5 s	After drawing the injection volume for the **Draw**, **Inject**, or **Wash** actions, the needle waits for the syringe delay before moving out of the vial. This compensates the negative pressure that builds up when the liquid is drawn into the needle and the connected capillaries. The sample flows until the injection volume is completely drawn. Too short a time may affect the accuracy of the results if different injection volumes or sample preparation steps are used. The intensity of this effect depends mainly on the viscosity of the used solvent. At room temperature, we recommend a value of 5 s for water (→ Test Description, page 118).
4	DispSpeed	50 µl/s	The **DispSpeed** specifies the dispensing speed of the syringe for the **Inject**, **MSV Inj**. and **Wash** actions. For the **Wash** action, also see lines 61-63 (→ page 80). With highly viscous eluents, too high a dispensing speed can result in heavy wear of the syringe and the mechanics of the autosampler. At room temperature, we recommend a value of 50 µl/s for water (→ Test Description, page 118).

No.	Parameter	Setting	What it does
5	Sample Height	0.5 mm	The sample height has to be defined, especially with inhomogeneous sample solutions, to ensure reproducible analysis results. In any case, select the sample height so that the needle tip remains in the sample solution during the entire drawing process. The sample height is relevant for the **Inject** action (→ Mix Height, line 9, page 77) only.
6	Down Speed	10 mm/s	Too high a needle speed when moving down can result in load stress and thus to early needle wear when the needle moves through the vial septum. The speed of 10 mm/s is for the recommended septa types (→ table on page 28).
7	Up Speed	10 mm/s	A too high needle speed when moving up can build up negative pressure in the vial that may cause the problems described under **Syringe Delay** and depends on the used septa. The speed of 10 mm/s is for the recommended septa types (→ table on page 28).
8	Mix Speed.	10 µl/s	**Mix Speed** specifies the syringe speed for the **Draw**, **Dispense** and **Mix** actions. The higher the speed, the sooner mixing may occur between the drawn / dispensed liquids and any existing / remaining solution in the needle. When the drawn liquid is dispensed again, it is diluted. This may affect the precision and the accuracy of the analysis results. For drawing information, also see line 2 (→ page 76). The intensity of this effect mainly depends on the number of **Draw** and **Dispense** actions and the viscosity of the used solvent. It might be necessary to adapt the mix speed to the respective application. At room temperature, we recommend a value of 10 µl/s for water (→ Test Description, page 118). This value is different from the values for the **Draw Speed** and the **DispSpeed** (→ lines 2 and 4, page 76).
9	Mix Height	0.5 mm	**Mix Height** specifies the distance between the bottom of the mixing vial and the needle tip when the needle is completely dipped into the vial. This parameter is considered for the **Mix**, **Draw**, and **Dispense** actions. Define the mix height to obtain reproducible analysis results because during sample preparation inhomogeneous solutions are developed in the first place. In any case, select the mix height so that the needle tip remains in the solution during the whole drawing process. If necessary, adapt the parameter to your application.
10	**Mix Subject**	**Wash Vial**	This vial contains the eluent. 100 µl are drawn to rinse the needle by dispensing the eluent after all draw and dispense actions (→ lines 61 – 63, page 80).
11	**Mix Volume**	**100 µl**	
12	**Action**	**Draw**	

No.	Parameter	Setting	What it does
13	**Mix Subject**	**Air**	This command sequence draws an air segment to prevent mixing of the drawn sample and the eluent that is in the needle. Mixing may affect the precision and the accuracy of the analysis results (→ line 8, page 77).
14	**Mix Volume**	**5µl**	
15	**Action**	**Draw**	
16	**Mix Subject**	**Sample**	If **sample** is selected as mix subject, the vial position defined in the sample batch is used. This command sequence draws 100 µl of the sample to be derivatized.
17	**Mix Volume**	**100 µl**	
18	**Action**	**Draw**	
19	**Mix Subject**	**Reagent D**	Reagent D has the positions of the empty vials assigned in which the derivatizing solution is prepared. This command sequence dispenses the drawn sample volume (→ lines 16 – 18, page 78) and the air segment (→ lines 13 – 15, page 78) into the empty vial.
20	**Mix Volume**	**105 µl**	
21	**Action**	**Dispense**	
22	**Mix Subject.**	**Air**	This command sequence draws 5 µl air followed by 100 µl reagent A and dispenses both of them into the empty vial.
23	**Mix Volume**	**5µl**	
24	**Action**	**Draw**	
25	**Mix Subject**	**Reagent A**	
26	**Mix Volume**	**100 µl**	
27	**Action**	**Draw**	
28	**Mix Subject**	**Reagent D**	
29	**Mix Volume**	**105 µl**	
30	**Action**	**Dispense**	
31	**Mix Subject**	**Air**	
32	**Mix Volume**	**50 µl**	
33	**Action**	**Draw**	
34	**Mix Subject**	**Reagent D**	100 µl reaction solution is drawn three times (parameter **Mix Repeat** = 3) and dispensed (**Mix** action). This repeat count is sufficient for a homogeneous mixture when round-bottom vials are used and water is the solvent. It might be necessary to adapt the **Mix Repeat** and **Mix Volume** parameters to your application.
35	**Mix Volume**	**100 µl**	
36	**Mix Repeat**	**3**	
37	**Action**	**Mix**	
38	**Mix Volume**	**50 µl**	The air segment that was drawn before mixing is dispensed into the reaction solution.
39	**Action**	**Dispense**	

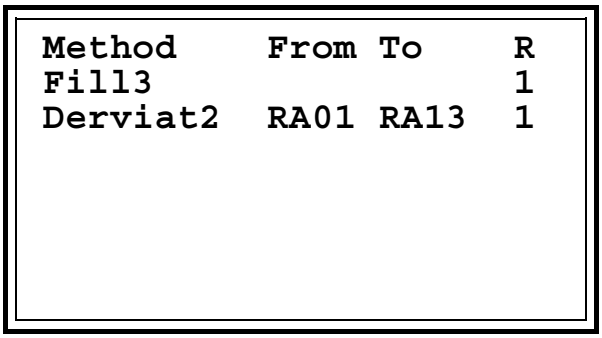
No.	Parameter	Setting	What it does
40	**Start Time**	**-1 min**	Exactly one minute after the air segment is dispensed (→ line 39), reagent B shall be added. The **Wait until** command (→ line 50, page 79) allows you to define a **particular time** for executing the next command. The reference time is the previously set start time. The start time is reset here so that the reaction time can be defined as a space of time. The clock that was started at the beginning of the method (→ line 1, page 76) is stopped and restarted at -1 min
41	**Mix Subject**	**Air**	This command sequence draws 5 µl air followed by 50 µl reagent B.
42	**Mix Volume**	**5µl**	
43	**Action**	**Draw**	
44	**Mix Subject**	**Reagent B**	
45	**Mix Volume**	**50 µl**	
46	**Action**	**Draw**	
47	**Mix Subject**	**Reagent D**	The **Test** action serves to move the needle to the position of the mix subject (the reaction solution) to check whether a vial is present. Thus, the autosampler needle is located at the position of the reaction solution even before dispensing. If the autosampler is positioned after the reaction time is expired, the time required for positioning the needle must be added to the reaction time.
48	**Mix Volume**	**55 µl**	
49	**Action**	**Test**	
50	**Wait until**	**0 min**	The **moment** is waited for when the last set start time reached 0 min. At the beginning of the reaction time, the start time was set to -1 min (→ line 40, page 79). Then, the next command is executed, i.e., reagent B is dispensed.
51	**Action**	**Dispense**	The previously drawn 55 µl reagent B (→ lines 41 to 46, page 79) is dispensed into the reaction solution.
52	**Mix Subject**	**Air**	
53	**Mix Volume**	**50 µl**	
54	**Action**	**Draw**	
55	**Mix Subject**	**Reagent D**	100 µl reaction solution is drawn three times (parameter **Mix Repeat** = 3) and dispensed (**Mix** action). This repeat count is sufficient for a homogeneous mixture when round-bottom vials are used and water is the solvent. It might be necessary to adapt the **Mix Repeat** and **Mix Volume** parameters to your application.
56	**Mix Volume**	**100 µl**	
57	**Mix Repeat**	**3**	
58	**Action**	**Mix**	
59	**Mix Volume**	**50 µl**	The air segment that was drawn before mixing is dispensed into the reaction solution.
60	**Action**	**Dispense**	

No.	Parameter	Setting	What it does
61	**Mix Subject**	**Reagent C**	The eluent that was drawn at the beginning of all mixing processes (→ lines 10–12, page 77) is dispensed into the empty waste vial (defined as reagent C). Avoid dispensing the rinse solution into the needle port as this might affect the precision and the accuracy of the analysis results. Reason: If the MSV is switched to **Inject**, the capillaries that are connected to the needle port are part of the high-pressure circuit of the HPLC system. Thus, the rinse solution would also be transported to the column.
62	**Mix Volume**	**100 µl**	
63	**Action**	**Dispense**	
64	**Mix Subject**	**Wash Vial**	This command sequence draws 200 µl eluent and dispenses them into the empty waste vial (defined as reagent C). Do not use the **Wash** action because the rinse solution would then be disposed of into the needle port (→ lines 61 to 63, page 80).
65	**Mix Volume**	**200 µl**	
66	**Action**	**Draw**	
67	**Mix Subject**	**Reagent C**	
68	**Action**	**Dispense**	
69	**Inject Time**	**18 min**	18 minutes after the MSV was switched from **Load** to **Inject** and thus, the sample was transported to the column, the MSV is switched back to **Load**. However, the analysis continues for another 7 minutes (analysis time: 25 min). This time is required to remove the needle from the high-pressure circuit of the HPLC system. Only then, it can be used for preparing the next sample (→ line 1, page 76 and line 70 and Overlapping Sample Preparation, page 72). This parameter is used for all injections of this method. **Please note:** When running gradients, please note that the liquids run through the autosampler capillaries when the MSV is in **Inject** position, however that they do not, when it is in **Load** position. Thus, switching the MSV affects the gradient profile.
70	**Analysis Time**	**25 min**	25 minutes after the sample was transported to the column, the analysis is terminated. The next injection can be performed with the **Inject** or **MSV Inj.** actions. The start time of the method that is used for the next sample is considered only after all commands of the method used for the actual sample have been processed (→ line 80, page 81). In the current example, the start time of the next sample is negative (-6 min, → line 1, page 76), i.e., the preparation of the next sample starts 19 minutes (25 min – 6 min) after the MSV switched to **Inject** for the **last (!)** time (→ line 1, page 76, lines 69, 71-74 and 80, page 81 and Overlapping Sample Preparation, page 72).

No.	Parameter	Setting	What it does
71	**Mix Subject**	**Reagent D**	With the **Inject** action, the injection is performed from the position defined in the sample batch. At this position, the original sample is placed. To inject the derivatizing solution (= reagent D), it must be drawn first (lines 71 to 73) before being injected with the **MSV Inj**. action. The needle moves into the needle port, the internal MSV switches to **Inject**. As the needle and the connected capillaries are now part of the high-pressure circuit of the HPLC system (→ Injection Principle, page 6), the sample is transported to the column. Independent of the high-pressure circuit of the HPLC system, the contents of the syringe is then dispensed into the waste. Switching the MSV to **Inject** starts the analysis time (→ Overlapping Sample Preparation, page 72).
72	**Mix Volume**	**5 µl**	
73	**Action**	**Draw**	
74	**Action**	**MSV Inj.**	
75	**Wait until**	**25 min**	The **Wait until** command specifies the **moment** when the next command shall be executed. The reference is the analysis time because this clock was started last (→ lines 71–74). After 25 min, the first analysis is finished and the second injection can be started.
76	**Action**	**Draw**	
77	**Action**	**MSV Inj.**	The derivatizing solution is transported to the column and the clock indicating the analysis time is restarted at 0 min.
78	**Wait until**	**25 min**	The **Wait until** command specifies the **moment** when the next command shall be executed. The reference is the analysis time because this clock was started last (→ line 77). After 25 min, the second analysis is finished and the third injection can be started.
79	**Action**	**Draw**	
80	**Action**	**MSV Inj.**	The derivatizing solution is transported to the column and the clock indicating the analysis time is restarted at 0 min. This command is the last command of the method. The negative start time of the method used for the next sample (-6 min) is now considered. Thus, the preparation of the next sample starts 19 minutes (25 min - 6 min) after the MSV switched to **Inject** for the third injection (→ line 1, page 76, lines 69–74, page 80 and Overlapping Sample Preparation, page 72)

6.4.4 Defining the Batch

Select **Batch1** on the **Sample Batch** menu. Edit the batch as follows:



Save the batch as **Ex3**.

For the **Fill3** method, no sample position is indicated as the method does not include parameters and/or actions that refer to any sample position (e.g., **Inject** action, Mix Subject: Sample). If no position appears in the **To** column, the respective method is processed only once (→ Defining the Fill 3 Method, page 74).

6.4.5 Processing the Samples

On the **Sample Batch** menu, select **Ex3**. Press the **Start/Stop** key to start your analysis.

7 Automated Control by Chromeleon

7.1 General

If desired, the autosampler can be controlled by the Chromeleon Chromatography Management System. The autosampler is connected to the chromatography system via the built-in RS-232 interface RS232[A] (→ RS-232 Port, page 20). Automated control provides additional capabilities for full automation and documentation that is important in a GLP regulated environment (→ Unit Description, page 5):

- Definition of longer sample batches
- Definition of more methods
- Automatic documentation of the measuring conditions via Audit Trail

To control the autosampler by Chromeleon, make sure that the following license is available:

- For Chromeleon ≤ 6.40: Device Control license
- For Chromeleon ≥ 6.50: Class 1 license

If you have any questions, please contact your Dionex Sales Representative.

The descriptions in the following sections refer to Chromeleon 6.50.

7.2 Installing the Autosampler in Chromeleon

To install the autosampler in Chromeleon, follow the steps below:

- Start the Server Monitor program by selecting Server Monitor on the **Start**/**Programs/Chromeleon** menu on the task bar. Start the server and close the Server Monitor window. The Server Monitor icon appears on the task bar. In the left window section, click on a timebase and select the **Add Device...** on the **Edit** menu.

  Please note: Clicking the **Quit Monitor** button quits (exits) the Server Monitor program, but it does not stop the server. To stop the server, click the **Stop** button.

- Start the **Server Configuration** program by selecting Server Configuration on the **Start** > **Programs** > **Chromeleon** menu on the taskbar.
- If necessary, click the + character beside the server name to display the items underneath.
- Select the timebase to which to add the autosampler.
- Select **Add Device…** on the **Edit** or context menu.
- The **Add device to timebase** dialog box is opened. Select **Dionex** from the left list box, and then select **ASI-100 Autosampler** from the right list box. (For Chromeleon < 6.50, select the **Dionex ASI-100 Autosampler** driver from the list.) Click **OK** to confirm your selection.

The tabbed pages show the current configuration of your autosampler.

General Tab Page

Use the **General** tab page to define the general instrument parameters.

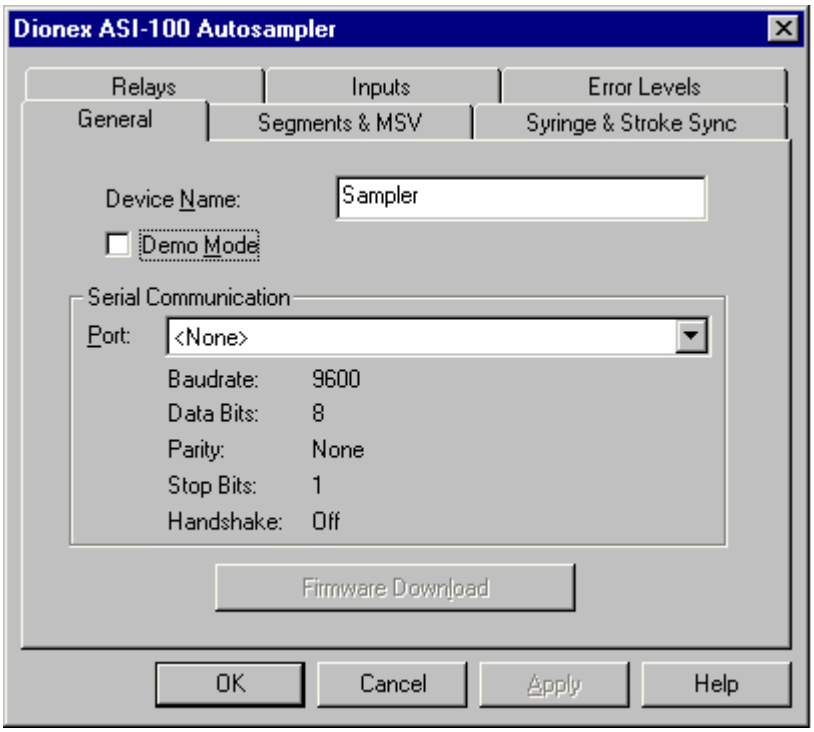


Fig. 23: The General tab page

- The **Device Name** field indicates the name under which the autosampler is identified in the installation environment. Do not change the default device name (**Sampler**).

  Please note: If the default is changed, the links to the corresponding control panels may no longer be available.

- Verify that the **Demo Mode** check box is cleared.
- Underneath **Serial Communication**, select the port to be used for serial communication.
- Click the **Firmware Download** button to download the current firmware version of the autosampler driver from the data system to the instrument. (The button is disabled if the Demo Mode is enabled.) The current firmware version is displayed here as well as the version of the file that is available in the \Bin directory of your Chromeleon installation (ASI100.HEX).

  Click **OK** to start the firmware download. Please note that the Chromeleon server needs to be in **running idle** mode for the download. The download takes several minutes.

Segments & MSV Tab Page

Use the **Segments & MSV** tab page to specify the used segment types and the installed options:

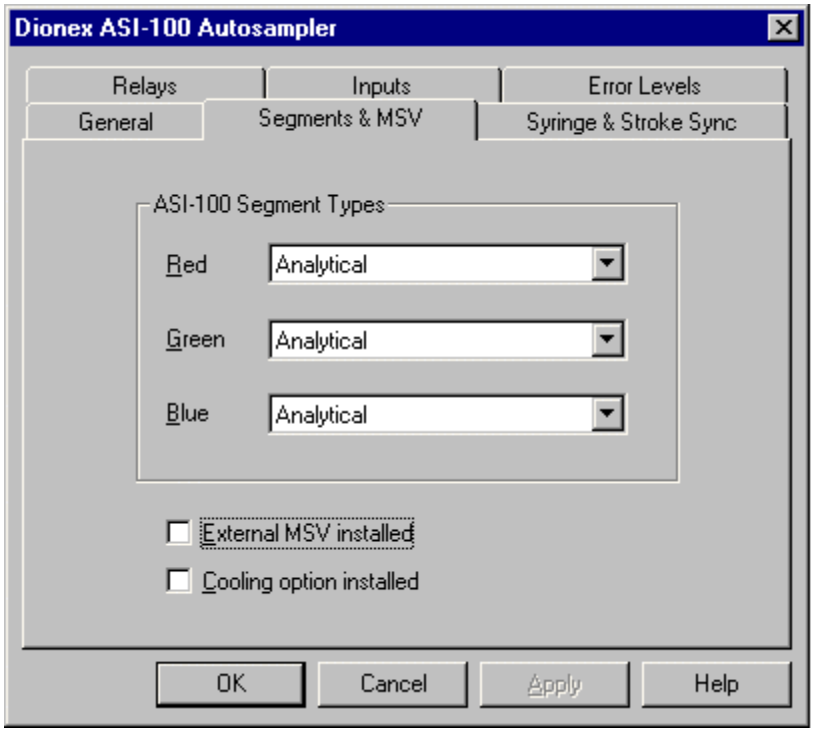


Fig. 24: The Segments & MSV tab page

- Select the segment type installed in the corresponding segment from the drop-down list. The following entries are available Analytical - Semiprep - Mini - Eppendorf.
- Select the **External MSV installed** check box if an external motorized switching valve is installed.
- Select the **Cooling option installed** check box if your autosampler is an ASI-100T or ASI-100PT with integrated temperature control.

Syringe & Stroke Sync Tab Page

Use this tab page to specify the volume of the installed syringe and determine whether the injection command shall be synchronized with the strokes of the pump:

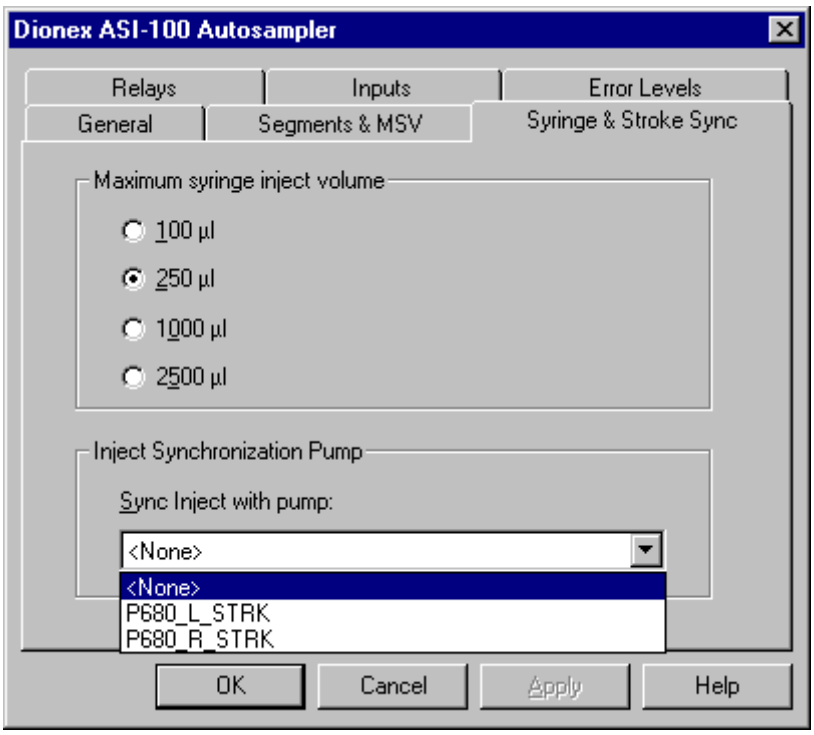


Fig. 25: Syringe & Stroke Sync tab page *(In this case, a P680A DGP-6 is installed).*

- Underneath **Maximum syringe inject volume**, select the volume of the installed syringe.
- It is possible to synchronize the injection command of the autosampler with the strokes of a P680A LPG-4 or P680A DGP-6 pump. Synchronization ensures that all injections are performed at the same phase of the pump cycle. Click the arrow of the **Sync Inject with pump** field and select the desired option from the drop-down list:
  - Select **None** to disable synchronization.
  - To enable synchronization for a P680A LPG-4 pump, select **P680_STROKE**.
  - To enable synchronization with the right pump of a P680A DGP-6, select **P680_R_STRK**; for synchronization with the left pump of a P680A DGP-6, select **P680_L_STRK**.

Please note: To change the synchronization assignment for a specific application, use the **PumpDevice** property from the **Commands** dialog box (→ page 90). To disable synchronization for a specific application, set the **SyncWithPump** property to **Off** (→ page 91). Chromeleon supports these properties in the program file (PGM File), also.

Please note: Synchronizing an autosampler of the ASI-100 series with a pump makes sense only for a low-pressure gradient system (P680A LPG-4 or P680A DGP-6) and for gradient operation. Therefore, please use synchronization for this combination only.

Relays Tab Page

The **Relays** tab page lists all available relays. Click a check box to enable or disable the corresponding relay. Make sure that the required relays inputs are selected; if they are not, they will not be available in Chromeleon.

Relay	Description
Relay_1	Relay 1
Relay_2	Relay 2
Relay_3	Relay 3 / Operable Out
Relay_4	Relay 4 / Inject Out

Please note: The relays are either freely programmable in Chromeleon or they can have a special function. This depends on the settings made on the autosampler. Relays 1 and 2 are always freely programmable. To freely program relays 3 and 4, set the corresponding options (**Rdy at R3** for relay 3 and **Inj. at R4** for relay 4) to **No** on the Configuration menu (→ page 55). If the setting is **Yes**, the relay has the special function described on page 21.

Inputs Tab Page

The **Inputs** tab page lists all available remote inputs. Click a check box to enable or disable the corresponding remote input. Make sure that the required inputs are selected; if they are not, they will not be available in Chromeleon.

Input	Description
Input_1	Input 1
Input_2	Input 2
Input_3	Input 3
Input_4	Input 4

Error Level Tab Page

The **Error Levels** tab page classifies the severity of any errors that occur. It is generally not necessary to change the default settings.

Finally, save and close the server configuration.

Important: Before turning off the autosampler, always **disconnect** the autosampler in Chromeleon.

7.3 Operation with Chromeleon

Controlling the autosampler under Chromeleon can be in two ways:

- Directly via the icon and menu bars or via the controls in the corresponding control panel
- Via programs (PGM Files or programmable buttons)

The following commands, properties, signals, and relays are available in the **Expert** mode; some of them are displayed only if the corresponding check boxes have been selected in the Server Configuration program. (For information about how to set the Expert mode, refer to the Chromeleon online Help.) The installed Chromeleon version determines which commands and properties are available.

Chromeleon	Description	Firmware
BlueSegment	Selects the segment type that is used in the blue segment. Available types are: Analytical - Semiprep - Mini.	Blue Seg.
Connect	Connects the device to the data system, enables computer control (see **Connected**, **Disconnect**).	Not available
Connected	Reports whether the device is connected to the data system, i.e., under computer control (see **Connect**, **Disconnect**).	Not available
CoolingPower (ASI-100T/ASI-100PT)	Reports the cooling power (for diagnosis purposes only). The entry is available only if you have selected the **Cooling option installed** check box in the autosampler's properties (on the **Segments & MSV** tab page in the Server Configuration program).	Temp. key
Disconnect	Disconnects the device from the data system, enables manual control from the device's front panel (see **Connected**, **Connect**).	Not available
Dispense	Dispenses the previously drawn volume.	Not available
DispSpeed	Specifies the speed with which the contents of the syringe shall be dispensed into the needle port/waste.	DispSpeed
DownSpeed	Specifies the speed with which the needle moves down.	Down Speed
Draw	Draws the specified volume.	Action Draw
DrawSpeed	Specifies the speed for filling the syringe.	Draw Speed
ExternalMSV	State of the external valve.	Not available
FirmwareVersion	Indicates the autosampler's firmware version.	Version
GreenSegment	Selects the segment type that is used in the green segment. Available types are: Analytical - Semiprep - Mini.	Green Seg.
HeatSinkTemperature (ASI-100T/ASI-100PT)	Reports the heat sink temperature. The entry is available only if you have selected the **Cooling option installed** check box in the autosampler's properties (on the **Segments & MSV** tab page in the Server Configuration program).	Temp key
Inject	Injects a sample.	Action Inject
InjectionCounter	Reports the number of injections.	Injections
InjectMode	Inject Mode. If set to **Normal**, the autosampler draws the specified volume from the specified position and injects. If set to **Mix**, the autosampler injects whatever volume is left in the syringe after preceding draw/dispense operations.	
InjectWaitTime	Period between the issuing of the command by the data system and the acknowledgement of the autosampler	Not available

Chromeleon	Description	Firmware
Input1	State of the digital input 1. This input is available only if you have selected the corresponding check box on the **Inputs** tab page in the Server Configuration program.	Wait Inp. 1
Input2	State of the digital input 2. This input is available only if you have selected the corresponding check box on the **Inputs** tab page in the Server Configuration program.	Wait Inp. 2
Input3	State of the digital input 3. This input is available only if you have selected the corresponding check box on the **Inputs** tab page in the Server Configuration program.	Wait Inp. 3
Input4	State of the digital input 4. This input is available only if you have selected the corresponding check box on the **Inputs** tab page in the Server Configuration program.	Wait Inp. 4
InternalMSV	State of the internal motorized switching valve	Not available
Mix	From the position that is determined via the **PrepSubject** parameter, the syringe draws and dispenses the volume that is determined via the **PrepVolume** parameter. If **PrepVial** is selected as **PrepSubject**, the **PrepVial** parameter must be specified as well. The **MixRepeat** parameter reports the number of replicates during mixing.	Action Mix
MixRepeat	Repeat count for **draw**, **dispense**, and **mix** operations for mixing.	Mix Repeat
ModelNo.	Indicates the autosampler type.	Indiated on the Main menu.
Msv2ToInject	Switches the external valve to **Inject**. This command is available only if you have selected the **External MSV installed** check box in the autosampler's properties (on the **General** tab page in the Server Configuration program).	Action Ext. Inj.
Msv2ToLoad	Switches the external valve to **Load**. This command is available only if you have selected the **External MSV installed** check box in the autosampler's properties (on the **General** tab page in the Server Configuration program).	Action Ext. Load
MsvToInject	Switches the injection valve to **Inject**.	MSV Inj.
MsvToLoad	Switches the injection valve to **Load**.	MSV Load
NeedleSealCounter	Needle seal wear.	Nd.SealWear
Position	The sample's position on the tablet.	Position given in the sample batch
PrepareNextSample**	Starts the injection procedure for the next sample, if available. However, the injection valve is only switched at the next **Inject** command.	Not available
PrepareThisSample**	Starts the injection procedure for the current sample. However, the injection valve is only switched at the next **Inject** command.	Not available
PrepHeight*	Needle height for **draw**, **dispense**, and **mix** operations; specify how deep the needle will dip into the vial for mixing.	Mix Height
PrepSpeed*	Syringe speed for **draw** and **dispense** operations for mixing.	Mix Speed

Chromeleon	Description	Firmware
PrepSubject*	Specify the subject to be used for **draw**, **dispense**, and **mix** operations. The following subjects are available: MixVial, SampleVial, WashVial, Air, ReagentAVial, ReagentBVial, ReagentCVial, ReagentDVial. If **Air** is specified as mix subject, air is drawn in. During **Dispense** the needle moves into the needle port and is dispensed there.	Mix Subject
PrepVial*	Vial position if **PrepVial** is selected as **PrepSubject** (see **PrepSubject**)	Mix Vial
PrepVolume*	Volume to be used for the **Draw**, **Dispense**, and **Mix**.	Mix Volume
PrimeSyringe***	Allows removing gas bubbles from the syringe without dismantling the syringe from the autosampler. The syringe is filled 5 times with the wash liquid. Repeat the procedure afterward with the solvent. For more information, refer to section 4.4 (→ page 30) and/or the Chromeleon online Help.	Not available.
PumpDevice**	This entry is available only if you have specified on the **Syringe & Sync Stroke** tab in the autosampler's properties that the injection command be synchronized with the strokes of P680A LPG-4 or P680A DGP-6 pump. Usually, the setting from the Syringe & Sync Stroke tab page is displayed by default. If you want to change the synchronization assignment for a specific application, enter the pump in the input field. This does not overwrite the default setting on the Syringe & Sync Stroke tab page. (Also, see: SyncWithPump).	Not available.
RadialSpeed	The speed of the radial needle movement.	Rad. Speed
Ready	Reports whether the autosampler is **Ready** or **NotReady**.	Not available
ReagentACapacity	Specifies how often the volume can be drawn from the vial with reagent A.	Rg A Cap.
ReagentAVial	Position of the reagent A vial - is used only if **ReagentAVial** is selected as **PrepSubject** (see **PrepSubject**).	Rg A Vial
ReagentBCapacity	Specifies how often the volume can be drawn from the vial with reagent B.	Rg B Cap.
ReagentBVial	Position of the reagent B vial - is used only if **ReagentBVial** is selected as **PrepSubject** (see **PrepSubject**).	Rg B Vial
ReagentCCapacity	Specifies how often the volume can be drawn from the vial with reagent C.	Rg C Cap.
ReagentCVial	Position of the reagent C vial - is used only if **ReagentCVial** is selected as **PrepSubject** (see **PrepSubject**).	Rg C Vial
ReagentDCapacity	Specifies how often the volume can be drawn from the vial with reagent D.	Rg D Cap.
ReagentDVial	Position of the reagent D vial - is used only if **ReagentDVial** is selected as **PrepSubject** (see **PrepSubject**).	Rg D Vial
RedSegment	Selects the segment type that is used in the red segment. Available types are: Analytical - Semiprep - Mini.	Red Seg.

Chromeleon	Description	Firmware
Relay1	Relay 1. This relay is available only if you have selected the corresponding check box on the **Relays** tab page in the Server Configuration program. The following commands are available: **State** (reports or sets the state of the relay), **Duration** (when set, the relay's state toggles after the specified time), **On** (turns the relay on) and **Off** (turns the relay off).	Relay 1
Relay2	Relay 2. This relay is available only if you have selected the corresponding check box on the **Relays** tab page in the Server Configuration program. The following commands are available: **State** (reports or sets the state of the relay), **Duration** (when set, the relay's state toggles after the specified time), **On** (turns the relay on) and **Off** (turns the relay off).	Relay 2
Relay3	Relay 3. This relay is available only if you have selected the corresponding check box on the **Relays** tab page in the Server Configuration program. The following commands are available: **State** (reports or sets the state of the relay), **Duration** (when set, the relay's state toggles after the specified time), **On** (turns the relay on) and **Off** (turns the relay off).	Relay 3
Relay3Enabled	Relay3 mode. Reports whether the relay has a special function or whether it is available under Chromeleon. If set to **Yes**, the relay can be controlled by the data system. If set to **No**, the relay is controlled by the autosampler; it reports whether the autosampler is operable.	Rdy. at R3
Relay4	Relay 4. This relay is available only if you have selected the corresponding check box on the **Relays** tab page in the Server Configuration program. The following commands are available: **State** (reports or sets the state of the relay), **Duration** (when set, the relay's state toggles after the specified time), **On** (turns the relay on) and **Off** (turns the relay off).	Relay 4
Relay4Enabled	Relay 4 mode. Reports whether the relay has a special function or whether it is available under Chromeleon. If set to **Yes**, the relay can be controlled by the data system. If set to **No**, the relay is controlled by the autosampler; it reports injection.	Rdy at R4
Reset	Resets the autosampler to its initial conditions, as attained after power-up.	Self Test key
SampleHeight	Reports the height at which the sample is drawn, measured from the vial bottom to the needle tip.	SampleHeight
SerialNo	Indicates the autosampler's serial number.	Serial No.
State	Reports that the autosampler has injected.	Not available
SyncWithPump**	The entry is available only if you have specified on the **Syringe & Sync Stroke** tab in the autosampler's properties that the injection command be synchronized with the strokes of a P680A LPG-4 or P680A DGP-6 pump. In this case, the setting is **On**. If you want to disable synchronization for a specific application, set the property to **Off**. (Also, see PumpDevice.) **Note:** SyncWithPump is automatically set to **On** when you change the PumpDevice setting.	Not available

Chromeleon	Description	Firmware
Syringe	Reports the volume of the syringe that is installed in the autosampler.	Syringe
SyringeCounter	Reports the number of syringe movements.	Syringe Wear
SyringeDelay	Specifies the time the needle shall remain in the vial after loading.	Syr. Delay
TempCtrl (ASI-100T/ASI-100PT)	Temperature control. This command is available only if you have selected the **Cooling option installed** check box in the autosampler's properties (on the **Segments & MSV** tab page in the Server Configuration program). Select **On** to enable cooling/heating; select **Off** to disable cooling/heating (see: **Nominal**, **Value**, **HeatSinkTemperature**, and **Cooling Power**.)	Temp. key
Temperature (ASI-100T/ASI-100PT)	This command is available only if you have selected the **Cooling option installed** check box in the autosampler's properties (on the **Segments & MSV** tab page in the Server Configuration program). You can enter the set temperature for the autosampler's tray. The following commands available: **Value** (= actual temperature, read only), **Nominal** (= set temperature), **Upper Limit** (upper temperature limit), and **Lower Limit** (= lower temperature limit). With the upper and lower limits, the system aborts the batch if the nominal temperature is outside these values.	Temp. key
Test	Moves the needle to the specified vial. If no vial is specified, MixSubject is used (→ **MixSubject**).	Action Test
TrayDetection	Turns tray detection (including manual interference monitoring) on or off. When tray detection is enabled, a home run is performed when the tray is installed. If the tray was removed while tray detection was disabled, perform a self-test when the tray is reinstalled. This is to make sure that the sample is injected from the correct position.	Detect Tray
UpSpeed	Speed used to move the needle up.	Up Speed
Volume	Injection volume.	Inj.Volume
Wash	The internal MSV is switched to **Load**, if necessary. The volume specified under **WashVolume** is drawn from the position specified under **WashVial** and dispensed into the needle port/waste. The **WashSpeed** and **WashHeight** parameters are also considered.	Action Wash
WashHeight	Wash height (= distance between the bottom of the wash vial and the needle tip (= the depth with which the needle will dip into the vial).	Wash Height
WashSpeed	The speed with which the syringe draws the wash volume.	Wash Speed
WashVial	Position of the wash vial.	Wash Vial
WashVialVolume	Total volume of the wash vial.	Wash Vl. V.
WashVolume	Specifies the volume to be drawn from the wash vial.	Wash Vol.

* From Chromeleon 6.40 on, the MixHeight, MixSpeed, MixSubject, MixVial, and MixVolume commands have been renamed to PrepHeight, PrepSpeed, PrepSubject, PrepVial, and PrepVolume. However, these Mix commands are still executed by Chromeleon. Thus, you do not need to adapt any existing PGM Files using these commands.

** These commands are available from firmware 1.16 and Chromeleon 6.50 on.

*** These commands are available from firmware 1.21 and Chromeleon 6.50 SP4 on.

For information about individual commands and parameters and about the command syntax, refer to the corresponding Chromeleon control panel. Select **Command…** on the **Control** menu. The **Commands** dialog box is opened. You can also open this box by pressing the F8 key. In the left list box, click the "+" character beside **Sampler** to display the items underneath.

For more information (also on any parameter or command that might not be listed here), refer to the Chromeleon online Help.

Please note: If the autosampler is controlled by Chromeleon, all front panel keys are locked, except the **R**, **G**, **B**, **Hold/Cont.** (→ Function Keys and Display, page 9), and **Temp**. (→ The Temp. Key, page 12) keys. The **Remote** message on the LCD reports that the autosampler is connected to the data system.

Press the **R**, **G**, or **B** function keys when the **Start/Stop** LED is not lighted (indicating that the autosampler is not busy) to rotate the carrier with the desired segment type to the front. It is now easy to insert the vials.

To hold a command issued by the data system press the **Hold/Cont** key. The **Stop** menu is opened. To definitely cancel the command, select **Abort command** and press ↵ (Enter) to confirm your selection. Or else, press **1** on the central keypad. To continue the command, select **Continue** and press ↵ (Enter) to confirm your selection. Or else, press **4** on the central keypad. You may also press the **Hold/Cont**. key again. The **Hold / Continue** and **Abort** actions are logged in the Audit Trail.

You can press the **Temp**. key to display the corresponding menu. However, the entries are read-only and you cannot make any changes.

8 Troubleshooting

8.1 List of the Most Frequently Observed Error Messages

The following table provides a summary of the most commonly observed error messages, lists probable causes, and suggests appropriate remedial action.

Note: To clear an error message, press Esc.

Problem	Probable Cause	Remedial Action
Alignment necessary.	There is no alignment information available.	Check the alignment settings (→ sec. 5.7, page 52).
An object with this name already exists.	The **Save as** option was selected for saving the changes but you did not enter a new name.	Save the change with **Save** under the indicated name or with **Save as** under a new name (→ sec. 5.3, page 34).
Attempt to change R/O property	The message is displayed if the user attempts to make changes on the **Status** menu.	Some variables are read only and cannot be changed by the user.
Batch already running.	A batch is started while a batch is already running.	Wait until the sample batch is processed or stop the analysis (→ sec. 5.9, page 60) and restart the desired sample batch.
Can't delete method because it is used in the batch.	An attempt was made to delete the method on the Sample Batch menu by pressing Del. However, if method is used in a batch, it cannot be deleted.	Delete the method in the batch before deleting it on the Methods menu → sections 5.3, page 34 and. 5.4, page 38).
Endpoint not reached.	At the end of the movement, the drive did not reach its endpoint. The actual value and the set value are given.	Perform a self-test (Self Test key); contact Dionex Service, if the message is displayed again.
Excessive quiescent current	Electrical problems in the drive.	Contact Dionex Service.
Ext. MSV failed.	The external motorized switching valve did not switch correctly. External motorized switching valve defective.	Check cabling; contact Dionex Service, if this message is displayed again. Contact Dionex Service.
Fatal error: Cooling system is overheated.	Cooling system defective.	Contact Dionex Service.
Flash memory erase error.	The flash memory cannot be erased.	Retry; contact Dionex Service, if this message is displayed again.
Flash memory program error	The flash memory cannot be programmed.	Retry; contact Dionex Service, if this message is displayed again.

Problem	Probable Cause	Remedial Action
Function is disabled by remote control.	The autosampler is connected to Chromeleon.	Disconnect the autosampler.
xxx: Home sensor failed. (xxx = drive name)	A **Home** signal was received although the drive should not be in **Home** position.	Perform a self-test (Self Test key); contact Dionex Service, if this message is displayed again.
Inject not yet finished	A command that requires the needle to be moved out of the needle port was issued during the inject phase.	Wait until the injection is terminated; issue the command again. Check the **AnalysisTime** and **Inject Time** parameters (→ sec.5.4, page 38).
Inject valve failed.	The internal motorized switching valve did not switch correctly.	Turn the autosampler off and on and retry; contact Dionex Service, if this message is displayed again.
Invalid object.	An object was referenced that was deleted or had an unexpected type.	Select a different method.
Invalid property value.	The value is not valid for the property.	Enter a correct value.
Invalid serial number.	The serial number is not valid.	Contact Dionex Service.
Invalid vial position.	The vial position does not exist in the current configuration (attempt to access a position within a method although the position does not exist, e.g., position B**D**15 in the **Analyt**. segment type).	Check the vial position. Check that segment type is specified and select the correct one, if necessary (→ sec. 5.7.5, page 55).
Invalid volume.	The volume adjusted is not correct.	Enter a volume valid for the syringe that is used and specified on the Configuration menu (→ sec. 5.7.5, page 55).
IR sensor failed.	The automatic segment detection is realized via the IR sensor. The error message occurs during the self-test, e.g., if the sample rack is installed incorrectly or if the IR sensor is dirty or defective.	Check the sample rack. Perform a self-test (Self-Test key); contact Dionex Service, if this message is displayed again.
Leak detected. Start self-test.	The autosampler is leaking; the leak detector responded.	→ sec. 9.5, page 112.
Manual Interference	Manual interference near the needle in the sample compartment or manipulation at the vial carrier (the needle stops moving for safety reasons).	Press **Hold/Cont.** and select **Continue** in the opening Stop Menu.

Problem	Probable Cause	Remedial Action
Memory is locked.	The memory region is currently used by another operation (probably executing a method).	Wait until the method is finished and retry. If necessary, stop the batch before.
Motor command sequence error.	The command was not accepted by the motor control.	Perform a self-test (Self Test key); contact Dionex Service, if this message is displayed again.
Motor controller does not initialize.	Motor control defective.	Contact Dionex Service.
xxx: Motor position error. (xxx = drive name)	The drive did not find its destination. Possible reasons: too much friction, drive obstructed, motor power failure.	Perform a self-test (Self Test key); contact Dionex Service, if the message is displayed again.
Needle obstructed.	The needle is obstructed when dipping into the vial. The needle descends onto the rim of the vial and does not enter the septum.	Remove obstruction. Align carrier (→ sec. 5.7.1, page 52).
Needle port missed.	The needle sensor did not respond although the needle moved into the needle port down to the lower limit.	Perform a self-test (Self Test key); contact Dionex Service, if this message is displayed again.
No external MSV	The external motorized switching valve is missing or not properly connected. The external motorized switching valve does not work.	Connect the external motorized switching valve or check the connection for correctness. Check cabling; contact Dionex Service, if this message is displayed again.
No inject valve.	The injection valve is not connected or it does not work properly.	Turn the autosampler off and on and retry; contact Dionex Service, if this message is displayed again.
No reagent vial	There is no vial present at the reagent position.	Place a vial at the desired position.
No wash vial	There is no vial present at the wash vial position.	Place a vial at the desired position.
Not all segments were detected.	Automatic segment detection did not detect all segments.	To continue working: On the Configuration menu, specify the segments manually and disable automatic segment detection (→ sec. 5.7.5, page 55). Clean the segments. If the segments are not detected during the next self-test either, contact Dionex Service.
Out of memory.	There is not enough free space in the flash memory (probably too many methods stored already).	Delete one or several methods and retry.
Property out of range	The value for the respective property is out of range.	Enter a value that is valid for the property.

Problem	Probable Cause	Remedial Action
RAM failure. Using backup. Please check default values and configuration. Press Esc.	The battery is empty or there are electrical problems (changes made on the **Default Values** menu and in the **Configuration** dialog on the **Setup** menu are first saved in a battery-buffered memory before they are definitely stored e.g., when starting a batch or with a Remote Connect. If a failure occurs during this time, the settings may be lost).	To continue working: check settings and, if necessary, reset them as desired. Contact Dionex Service.
Relay is not enabled	Relay 3 and/or relay 4 are enabled in a method although they are set to Rdy. at R3: On and Inj. at R4: On respectively in the configuration.	On the **Setup** menu, select **Configuration**, and then set the parameter(s) to Off (→ sec. 5.7.5, page 55).
Remote connection was lost.	RS Cable between the autosampler and the data system is not installed or defective.	Check cabling and re-establish the connection to Chromeleon (connect).
Segment detection failed.	Too many segment markers detected; possible reasons: Edge of the vial carrier is not clean or damaged. Segment(s) not installed correctly in the carrier.	 Clean or exchange vial carrier. Install segment(s) correctly (→ sec. 4.2, page 24).
Spurious interrupt.	The source for the interrupt could not be found.	Probably electrical problems. Check whether there is a source for heavy interferences nearby.
Syringe not empty.	The syringe was not empty at the beginning of an inject action.	Empty the syringe (**Wash** key) or press the Self Test key.
Syringe not filled sufficiently.	The volume to be dispensed is higher than the volume previously drawn.	Change method (volume to be dispensed ≤ volume drawn).
System busy.	The system already executes another command.	Wait until the other command is executed; execute the desired command again.
System halted.	A command was given while the system was in Hold mode.	Press the **Hold/Cont.** key and select **Continue** in the opening Stop Menu to cancel the **Hold** status, execute the command again.
System is not remote controlled.	A command is received from the data system while the autosampler is not under remote control. The autosampler is disconnected in Chromeleon (disconnect).	Re-establish the connection (connect).

Problem	Probable Cause	Remedial Action
System needs self-test.	The self-test failed. The autosampler will not operate until another self-test is performed successfully. The leak sensor responds.	Perform a self-test (Self Test key). → sec. 9.5, page 112.
System not ready.	An attempt was made to reconfigure the system or to control it under a data system while a batch was running.	Wait until the sample batch is processed or stop the analysis (→ sec. 5.9, page 60) and retry.
This property is in use.	An attempt was made to modify a property on the **Default Values** menu while it is used in the currently running batch.	Wait until the sample batch is processed; change the property afterwards.
Too many objects.	There are too many objects stored in the flash memory.	Delete batch(es) or method(s).
Too much ambient light at ext. MSV	The opto sensor at the external motorized switching valve is defective or receives too much outside light.	Perform a self-test (Self Test key); contact Dionex Service, if this message is displayed again.
Too much ambient light at home sensor	The opto sensor at the home sensor is defective or receives too much outside light.	Perform a self-test (Self Test key); contact Dionex Service, if this message is displayed again.
Too much ambient light at inject valve	The opto sensor at the internal motorized switching valve is defective or receives too much outside light.	Perform a self-test (Self Test key); contact Dionex Service, if this message is displayed again.
Too much ambient light at needle sensor.	The opto sensor is in the sample compartment when the needle moves into the sample compartment.	Darken the location where the autosampler is operated.
Too much ambient light at vial sensor.	The opto sensor in the sample compartment receives too much outside light.	Darken the location where the autosampler is operated.
Tray Drive: Home seek failed.	No carrier available in the autosampler. The tray drive did not reach its **Home** position or the sensor did not recognize this.	Install vial carrier. Perform a self-test (Self Test key); contact Dionex Service, if the message is displayed again.
Unknown sector.	The segment is not configured.	In the **Configuration** dialog on the **Setup** menu, set the segment manually (→ sec. 5.7.5, page 55).
Unknown vial type.	The vial type is not known.	In the **Vials** dialog on the **Setup** menu, restore the settings to the defaults (→ sec. 5.7.6, page 56).

Problem	Probable Cause	Remedial Action
Vial not found	There is no vial present at the specified position.	Place a vial at the respective position.
	Wrong segment type.	Select the correct segment type.
	The used vial is smaller than specified under **Min. Height** on the **Vials** menu.	On the **Vials** menu, change **the Min. Height** parameter accordingly (→ sec. 5.7.6, page 56).
Vial pusher obstructed.	The vial pusher is obstructed.	Remove obstruction.
	The used vial is higher than specified under Max. Height on the **Vials** menu.	On the **Vials** menu, change the **Max. Height** parameter accordingly (→ sec. 5.7.6, page 56).
Volume too large for syringe.	An attempt is made to draw more volume than the syringe can hold.	Change the method (total of the volumes to be drawn ≤ syringe volume).

8.2 Summary of the Most Frequently Observed Problems

The following table provides a summary of the most frequently observed problems, lists probable causes, and suggests appropriate remedial action.

Problem	Probable Cause	Remedial Action
No function or display	The autosampler is not connected to the mains.	Check the mains supply.
	The autosampler is not turned on	Power-up the autosampler.
	An incorrect voltage is selected.	Check the voltage selector setting (→ sec. 3.2, page 15).
	The fuse is blown.	Replace the fuse (→ sec. 3.3, page 17).
	The replacement fuse blows immediately.	Contact Dionex Service.
System leakage	The needle is incorrectly secured	Check and replace the needle as necessary (→ sec. 9.2.1, page 104)
	The **Needle Port** parameter is incorrect.	Align the needle port (→ sec. 5.7.2, page 54).
	The **Impact Depth** parameter is incorrect.	Contact Dionex Service.
	The injection valve is not tight.	Service the valve according to the manufacturer's specification (→ sec. 9.4, page 112).
	The fittings are not tight.	Tighten fittings and replace as necessary.
	The needle port is dirty or damaged	Replace the needle port seal (→ sec. 0, page 106).
Heavy baseline drift	The column is contaminated.	Clean or replace the column.
	The system is not sufficiently equilibrated.	Flush the system until equilibration.
	The eluent is contaminated.	Change the eluent.
High noise level	There are pressure fluctuations from the pump.	Prime the pump; check general function.
	There are gas bubbles in the system.	Prime the system.
	The eluent is contaminated	Change the eluent.
	The detector is defective.	Contact Dionex Service.

Problem	Probable Cause	Remedial Action
Peak Broadening	The capillary's inner diameter is too large.	Change the capillary.
	The column is overloaded or contaminated.	Clean or replace the column.
	The eluent is contaminated.	Change the eluent.
Needle descends onto the carrier or onto the vial caps.	The segment type is incorrect.	On the **Configuration** menu, check the segment setting (→ sec. 5.7.5, page 55).
	The **Align Vial Carrier** parameter incorrect.	On the **Configuration** menu, check and change the carrier alignment as necessary (→ sec. 5.7.1, page 52).
Leakage sensor alarm	The system leaks.	Refer to sec. 9.5, page 112.
Poor reproducibility	The autosampler draws air from the vial.	There is not enough sample in the vial, the **Sample Height** or **Mix Height** parameters are too large, or there are too many replicates.
	There are gas bubbles in the syringe.	Prime the system (→ sec. 4.4, page 30).
	The autosampler is not tight.	Refer to sec. 9.5, page 112.
	The injection valve is not tight.	Refer to sec. 9.4, page 112.
	The gradient does not re-establish the start conditions before returning to **Load** position.	Extend the analysis time; check gradient former.
	The gradient is irreproducible.	Change the gradient.
	The sample is unstable and undergoes decomposition.	Replace the sample.

8.3 Chromeleon Error Messages

For a list of the Chromeleon error messages, see the Chromeleon Installation Program (**Server Configuration**). Double-click the autosampler in the left pane and select the **Error Levels** tab in the dialog box. You can also open the dialog box by clicking the autosampler in the left pane and then selecting **Properties** on either the **Edit** or context menu.

9 Maintenance

9.1 General Care and Precautions

The autosamplers of the ASI-100 series are made of high-quality components and materials, which keep maintenance requirements to a minimum. In general, the autosampler should be kept clean. All painted surfaces are relatively resistant against weak acids and organic solvents. Nevertheless, immediately wipe up all liquids spilled onto the pump's surface, using a lint-free cloth or paper.

The following sections describe all maintenance procedures that are regularly required and can be carried out by the user. Only qualified Dionex personnel should perform any additional servicing.

Warning: Keep in mind that the fluid components of the autosampler may be filled with toxic solvents. Therefore, put on protective clothing before starting maintenance work.

Important: Use original Dionex spare parts only. Substituting non-Dionex parts or using non-Dionex accessories may impair the performance of the instrument, thereby voiding the product warranty. Refer to the warranty statement in the terms of sale for more information.

Important: Before you return any instrument to Dionex for repair, contact Dionex Service or your local distributor. An RMA (Return Material Authorization) number is required for the return so that we can properly track and account for your instrument. Always use the original packaging when shipping the autosampler. Shipping the instrument in anything other than the original packaging voids the warranty. Refer to the warranty statement in the terms of sale for more information.

9.2 The Needle and Needle Port

The needle consists of a capillary tube, contained within a supporting sheath. At the tip, the sheath tapers to the same external diameter as the enclosed capillary. The suction port is located on the front of the needle tip and may be serviced by qualified personnel only. During the injection process, the needle is pressed with considerable force into the needle port, forming a tight connection to the sample loop.

Clean the needle by rinsing with a syringe as described in Priming the System, page 30.

After prolonged use, the repeated penetration of vial septa results in the formation of an abrasion ring on the needle, which can contaminate or damage the needle port. If the abrasion ring cannot be removed by cleaning, replace the needle port seal or the needle port.

To maximize the lifetime of the needle/needle port, we recommend rinsing the needle thoroughly after analysis, especially when solvents with a high salt content were used. Otherwise, the solvent may adhere to or damage the needle port by crystallization.

9.2.1 Replacing the Needle

9.2.1.1 Removing the Needle

Before replacing the needle, be sure that the needle is in the needle port.

Follow the description below:

- Remove the vial carrier and turn on the autosampler. The self-test will stop with a **Home seek failed** error message.
- Turn off the autosampler and disconnect the power cord.
  The needle is now in the highest position above the needle port.
- First, loosen the upper enclosure cover that is affixed by four screws. Completely remove the two screws at the rear and loosen two screws at the front. You can then push the cover to the back.

  Warning: Before opening the cover be sure that the autosampler is turned off and disconnected from the mains.

- Remove the fitting screw of the needle capillary from the fluid block using the supplied 3/16” spanner (part no. 2146.1231).
- Remove the retaining screw on top of the needle arm using a 17-mm spanner. While loosening the screw make sure that the needle capillary is situated in the hole of the screw and not in its lateral slot (→ Fig. 26).

  Important: Hold the needle guide to let the spring relax slowly. The needle guide is easily accessible via the sample compartment.

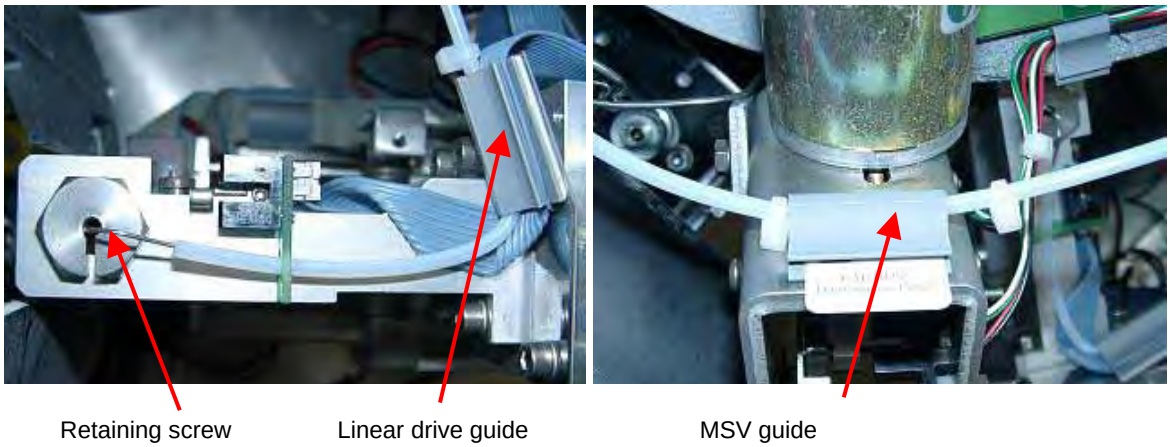


Fig. 26: Needle capillary

- Before you push up and remove the needle from the needle guide, remove the needle capillary from its three guides (on the linear drive, on the MSV enclosure and on the green printed circuit board; → Fig. 26).
- Remove the needle guide.

9.2.1.2 Installing the Analytical Needle

To install the new needle (part no. 5810.3002), follow the steps below:

- Via the sample compartment, insert the needle guide from below into the needle arm.
- From the top, insert the needle as far as possible into the needle guide.
- Press the needle guide to the top until its thread is visible at the top of the needle arm. Make sure that the horizontal guide pin is in the corresponding cutout of the needle arm.
- Attach the retaining screw and check by applying slight upward pressure whether the needle guide can be moved towards the top. Tighten the retaining screw hand-tight.
- With your thumb and forefinger, bend the needle capillary as close as possible to the retaining screw by 90° parallel to the needle arm away from the sample compartment.

  ⚠ **Important:** Be sure not to break the needle capillary and observe a bend radius of minimum 5 mm!

- To begin with, press the needle capillary into the respective guide of the green printed-circuit board on the needle arm, after the next bend (factory-default) into the gray guide at the linear drive and finally into the respective guide at the MSV enclosure.
- Tighten the needle capillary on the fluid block.
- Close the enclosure cover.
- Install the vial carrier.
- If necessary, align the needle port (→ Aligning the Needle Port, page 54).

9.2.1.3 Installing the Preparative Needle

To install the new preparative needle (part no. 5810.3014), follow the steps below:

- Remove the needle. Follow the instructions in section 9.2.1.1 (→ page 104).
- From the top, insert the preparative needle from the modification kit as far as possible into the needle guide. Make sure that the horizontal guide pin is in the corresponding cutout of the needle arm.
- Install the retaining screw. Check whether you can move the needle guide toward the top, by applying slight upward pressure (→ Fig. 27). Tighten the retaining screw hand-tight.

Fig. 27: Needle guide

- With your thumb and forefinger, bend the needle capillary as close as possible to the retaining screw by 90° parallel to the needle arm away from the sample compartment.

⚠ **Important:** Make sure not to break the needle capillary. See that the bend radius is at least 5 mm!

- Press the needle capillary into the respective guide of the green printed circuit board on the needle arm. After the next bend, press it into the gray guide on the linear drive and finally on the respective guide on the MSV housing.
- Attach the coupling piece on the needle arm, using the included cable ties (concatenate 2 cable ties). Make sure that the closures are not situated on top of the needle arm.

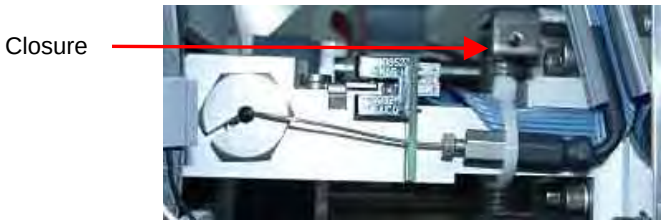


Fig. 28: Needle capillary coupling

- Clean the front side of the syringe block with isopropanol.
- Loosen the front sample loop fitting situated on the syringe block.

- Adhere the cable guide from the modification kit to the front of the syringe block (left-hand side; → Fig. 29).

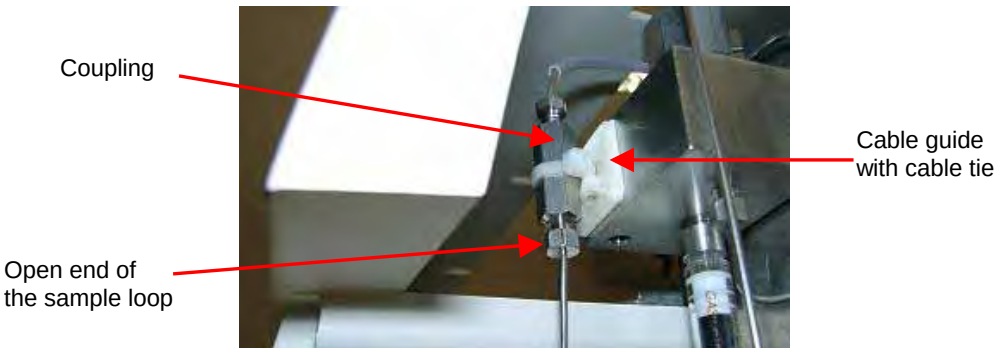


Fig. 29: Syringe block with cable guide

- Connect and tighten the open sample loop fitting to the coupling piece of the preparative needle capillary. Fix the needle in the respective guide, using the included cable tie.
- If necessary, align the needle port (→ Aligning the Needle Port, page 54).

9.2.2 Replacing the Needle Port Seal

The needle port seal (part no. 5805.1334) is accessible from the sample compartment. Use the 10-mm spanner (part no. 2146.1220) provided in the shipment kit to remove the needle port seal:

- Remove the vial carrier and turn on the autosampler. The self-test will stop with an **Home seek failed** error message.
- Turn off the autosampler and disconnect the power cord.
  The needle is now in the highest position above the needle port.
- Remove the top part of the needle port using the 10 mm spanner.
- Remove the needle port seal that is located in the top part of the needle port (e.g., by using tweezers).

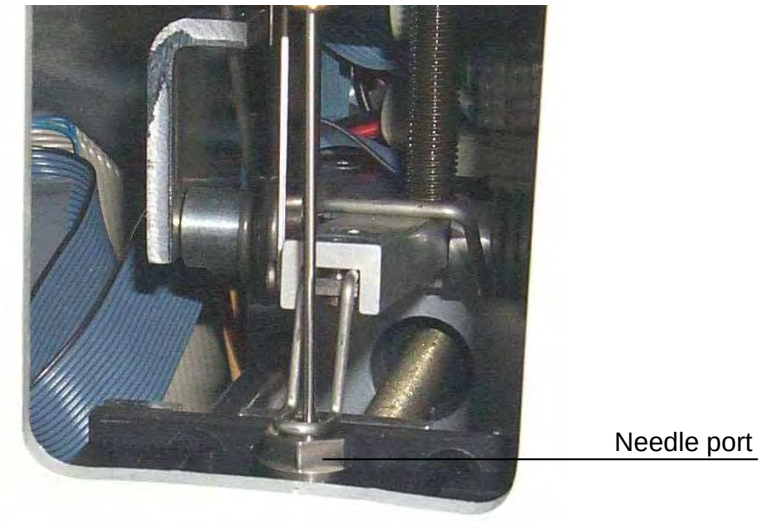


Fig. 30: Needle port

To install the new needle port, follow the steps below:

- The needle port seal has two different sides: The top provides a cone-shaped cavity into which the needle moves. The bottom is even. Using a pair of tweezers, insert the needle port seal into the top part of the needle port without tilting the seal. The top of the needle port seal must point to the top of the needle port (→ *Fig. 31*). If the seal is correctly installed, it will seal smooth with the respective cutout in the top part of the needle port.

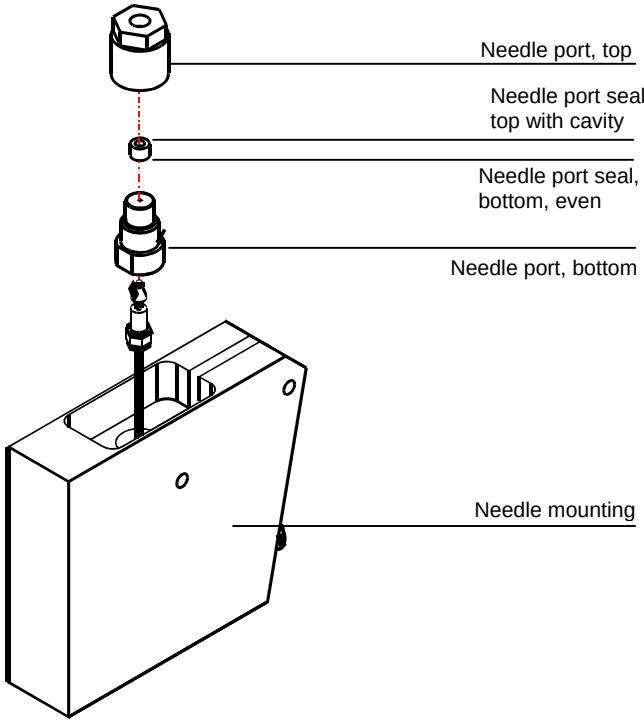


Fig. 31: Needle port with needle port seal

- Tighten the needle port top to its bottom part. Tighten the port hand-tight.
- Install the vial carrier.
- If necessary, align the needle port (→ Aligning the Needle Port, page 54).
- Check the needle port for tightness. If necessary, retighten the needle port bottom part.

9.3 Replacing the Syringe

The autosampler is equipped with a 250 µl syringe and the appropriate sample loop. Other syringes and sample loops are available as an option:

Description	Part no.	Part no. of the appropriate sample loop
Standard:		
250 µl syringe incl. seal (ASI-100/ASI-100T)	5805.2930	5810.3003
2500 µl syringe incl. seal (ASI-100P/ASI-100PT)	5805.2950	5810.3011
Optional:		
1000 µl syringe incl. seal	5805.2940	5810.3010
100 µl syringe incl. seal	5805.2920	5810.3012

Please note: When replacing the syringe, also replace the seal.

Important: When using the 2500-µl-syringe, make sure that the operating pressure does not exceed 200 bar (20 Mpa).

To remove the syringe (→ Fig. 32):

- Draw the maximum syringe volume from any sample position desired to prevent gas bubbles in the system.
- Turn off the autosampler and disconnect the power cord.

  Important: When changing the syringe, failure to turn off the autosampler may result in personal injury.
- Loosen the retaining screw of the syringe drive-carriage.
- Carefully twist the barrel of the syringe, unscrewing it from its location.
- Once loose, pull the syringe downwards and remove it.

Please note: When installing syringes with a volume other than 250µl we recommend installing the appropriate sample loop as well because:
The volume of the sample loop should be at least as large as the volume of the syringe. The chromatographic quality may deteriorate if a sample loop with an unnecessary large volume is used.

To install the new syringe:

- Fill the syringe with the mobile phase making sure that no bubbles occur in the syringe.
- Place the seal on the syringe to be inserted.

⚠ **Important:** **For syringes with a nominal volume of 1000 µl or 2500 µl, the drive-carriage must be moved to the lower position. Loosen the two mounting screws and install the carriage in the lower position.**

- Locate the syringe in the drive-carriage and carefully screw the syringe into place.
- Tighten the retaining screw hand-tight.
- Turn on the autosampler. A self-test is performed during which the syringe volume is dispensed.
- If necessary, change the syringe volume (→ Configuration, page 55).

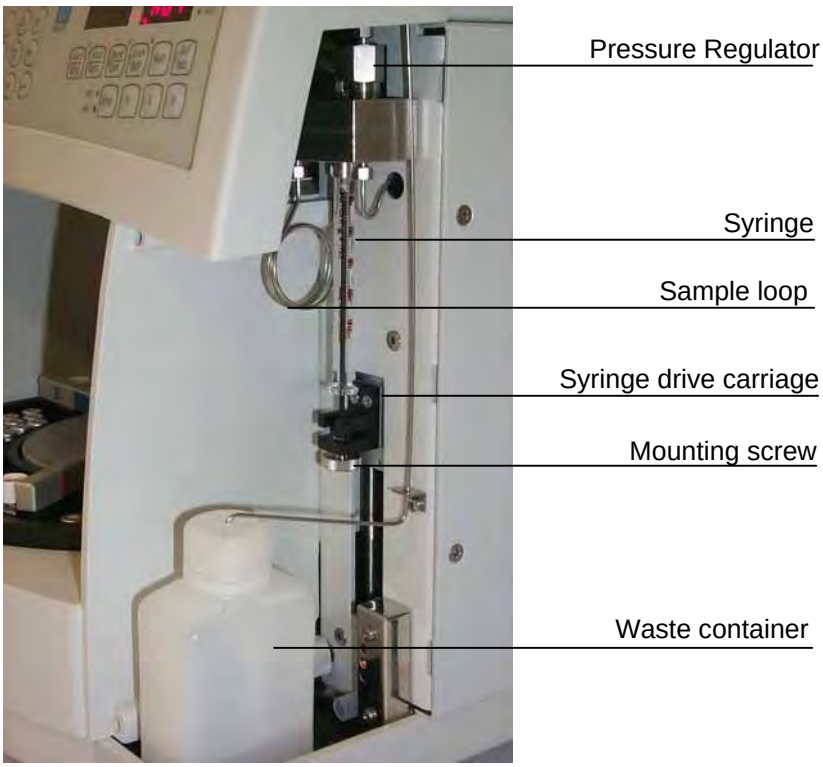


Fig. 32: Syringe removal/replacement

9.4 Injection Valve Maintenance

The autosamplers are fitted with a RHEODYNE RH7000 injection valve. The valve is located in such a way that it allows simple access to both, fluid connections and maintenance. Two valve parts, the rotor (made of Vespel) and the stator (made of stainless steel), are subject to wear. This might result in valve leakage. The degree of wear depends on the application. Both parts can be replaced independently from each other. Reset the respective counter after exchange (→ Diagnostics Menu, page 51). For maintenance instructions, see the instructions of the manufacturer (→ Technical Appendix B).

For a description of the fluid connections to the injection valve, see Fig. 8 on page 18 (i.e., 1 = pressure regulator/waste, 2 = syringe, 3 = sample loop, 4 = pump, 5 = column, 6 = needle port).

Please note: For applications with pH>10, a Tefzel rotor seal (part no. 709.7010.071) is available as an option.

9.5 Overflow/Leak Sensor

Warning: Keep in mind that the fluid components of the autosampler may be filled with toxic solvents. Therefore, put on protective clothing before starting maintenance work.

A waste container (→Fig. 32, page 111) within the autosampler enclosure receives the injection overflow. The container stands in a tray in which a sensor is installed. If a certain level of liquid is reached in the drip tray, an acoustic beep sounds. On the display, an error message appears stating **Leak detected**:

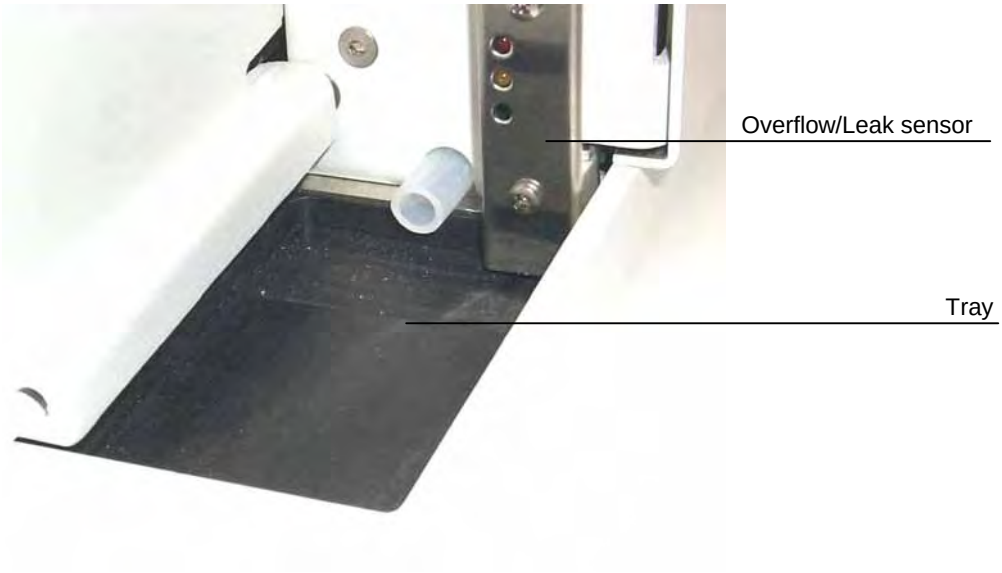


Fig. 33: Overflow/Leak sensor

⚠ **Important:** The injection overflow must remain open at all times. If you connect additional tubing, be sure that this does not block the overflow. Blockage may result in pressure build-up in the injection system.

Please note: Wearing appropriate protective clothing, regularly empty the waste container to avoid overflowing. This is to avoid that the liquid concentrates in the tray and the sensor reacts. To direct larger volumes of liquid into the waste container, connect the longer tubing from the accessories kit to the injection overflow. (The tubing is also provided in the Plastic Syringe and Tubing Kit, part no. 6000.0010, page 125).

The samplers are designed in such a way that liquids arriving in the interior, e.g., because capillaries, fittings, or the needle port is leaking, are directed into the tray. Therefore, if an acoustic beep sounds, first check the liquid level in the waste container. If necessary, test all other components for leaks afterwards. When the leak sensor has been detected, the autosampler will be ready for operation only after a self-test has been performed successfully.

Please note: The acoustic beep sounds as long as liquids are in the drip tray. To turn off the beep, empty and dry the tray, wearing appropriate protective clothing. To clear the error message, press **Esc**.

9.6 Shutting Down the Autosampler

Please observe the following precautions before interrupting the operation for more than one week or for shipment:

⚠ **Important:** Rinse out buffers or solvents.

⚠ **Important:** Fill the autosampler with methanol (or a similar alcohol such as 2-propanol or ethanol). If the solvents in the autosampler are not miscible with water, replace the solvents step-by-step.

⚠ **Important:** Do not forget to empty the waste container (→ Fig. 32, page 111) before shipping the autosampler.

⚠ **Important:** When moving or shipping the autosampler, make sure that the needle is not in the needle port. Select the **Needle Up** command (→ section 5.7.3, page 55) to move the needle out of the needle port. Besides, the injection valve is switched into the **Load** position. Make sure that this command has been selected whenever the autosampler is moved or shipped.

Please note: Ship the unit only in the original packaging. Shipping the unit in any other packaging automatically voids the warranty!

10 Technical Information

10.1 Specifications

Injection principle:	In-line split-loop (→ page 6)
Sample capacity:	Depending on the vial carrier; carrier with: 3 anal./cylind. segments = 117 vials at 1.8 ml + 3 at 4 ml 3 anal./concial segments = 117 vials at 1.1 ml + 3 at 4 ml 3 mini segments = 192 vials at 1.2 ml + 3 at 4 ml 3 mini segments/Beckmann = 192 vials at 0.25ml + 3 at 4 ml 3 semiprep. segments = 63 vials at 4 ml + 3 at 4 ml 3 Eppendorf segments = 66 vials at 2.0 ml + 3 at 4 ml 3 Eppendorf/concial segments = 66 vials at 1.5 ml + 3 at 4 ml 3 Eppendorf/conical segments = 66 vials at 0.5 ml + 3 at 4 ml
Vial types:	Depending on the segment type: *Type 01 (Analyt./Cylindrical):* 1.8 ml vials, cylindrical, with crimp cap *Type 01 (Analyt./Conical)*: 1.1 ml vials, conical, with crimp cap *Type 02 (Mini):* 1.2 ml vials, cylindrical, with crimp cap *Type 03 (Semiprep):* 4 ml vials, cylindrical, with screw cap All above vials with silicone/PTFE septa. *Type 02 (Mini/Beckmann):* 0,25 ml Beckmann mini vials (Beckmann part no. 652823) *Type 04 (Eppendorf):* 2.0 ml Eppendorf vials (Eppendorf part no. 0030 120.094) *Type 04 (Eppendorf/Conical):* 1.5 ml Eppendorf vials, conical (Eppendorf part no. 0030 120.086) *Type 04 (Eppendorf/Conical):* 0.5 ml Eppendorf vials, conical (Eppendorf part no. 0030 121.023)
Injection Volume:	ASI-100/ASI-100T: 1 - 250 µl in 0.1µl increments ASI-100P/ASI-100PT: 10 – 2500 µl in 1 µl increments
Carry-Over:	< 0.1%

Linearity:	RSD < 0.5 %
Flush volume:	None
Sample loss/injection:	None
Min. required sample:	5µl (ASI-100/ASI-100T)
Reproducibility:	Specified RSD < 0.3% at 5µl (250 µl syringe) Typical RSD < 0.2% at 5 µl 250 µl syringe) Typical RSD < 1.0% at 1µl 250 µl syringe) Specified RSD < 0,3% at 100 µL (2500 µl syringe)
Repeat injections:	Max. 9 per vial
Counters	For a description of the various counters that provide information about the autosampler status (→ Diagnostics Menu, page 51).
Method Parameters:	For a detailed description of the method parameters, see Methods, (→ page 38).
Safety features:	Overflow/leak sensor, automatic segment detection (when enabled), tray detection/manual interference monitoring (when enabled), automatic vial recognition (i.e., monitoring in case no vial is present at the specified position), electronic needle protection, all mechanical operations internally monitored (injection valve, syringe etc.)
Temperature Control (ASI-100T/ ASI-100PT):	In the range of 4 - 45°C (39.2 - 113°F) cooling: -18°C (32.4°F) from ambient heating: +35°C (63°F) from ambient
Input/Display:	LCD, keypad with control elements and function keys for direct control, LED display (7 segments) for retention time indication, LED display (7 segments) plus three LEDs (red/green/blue) indicating the sample position, 2 LEDs (Load/Inject) indicating the status of the motorized switching valve, 2 LEDs (cool/heat) indicating the temperature status (ASI-100T/ASI-100PT).
Wetted parts:	Stainless steel (1.4571/316SS), PCTFE, PTFE, PEEK, Vespel.
Operating pressure:	Max. 340 bar (34 MPa) Max 200 bar (20 MPa) with 2.5 ml syringe + corresponding sample loop.
In-/Outputs:	2x serial (RS232[A] and RS232 [B]), MSV, Sample Position, Digital I/O
Power requirements:	115 V/60 Hz and 230 V/50 Hz, respectively

Power Consumption:	ASI-100/ASI-100P: max. 126 VA; ASI-100T/ASI-100PT: max. 250 VA.
Compressed air:	None.
Environmental conditions:	Range of use: Indoor use Temperature: 10°C to 35°C (50°F to 95°F), Air humidity: 40 to 85% relative humidity, non-condensing Overvoltage category: II Pollution degree: 2
Dimensions:	400 x 450 x 360 mm (w x d x h).
Weight:	ASI-100: 17 kg (37.4 lbs); ASI-100T: 21 kg (46.2 lbs)
Max. load for stacking:	25 kg (55 lbs)

Technical specification subject to alterations without notice. Date: December 2002

10.2 Test Description

The following tests were performed to reach the above specification:

HPLC System

- Solvent: 100% water, HPLC-grade
- PEEK restriction capillary (inner diameter 0.13 mm, length 13 m) between the autosampler and the UV detector
- Isocratic pump (P680A recommended)
- UV detector (UVD170S or UVD340S recommended)
- 3 different samples of Uracil in water (ASI-100/ASI-100T: 10 µg/ml, 100 µg/ml, and 200 µg/ml; ASI-100P/ASI-100PT: 2 µg/ml, 5 µg/ml, and 75 µg/ml)
- The samples must be available in analytical 1.8 ml vials with slotted septa (ASI-100/ASI-100T). For the ASI-100P/ASI-100PT, 4 ml vials are used.

Carry-Over

Following the injection of a highly concentrated sample (Uracil in water, concentration: 300 µg/ml for a syringe volume of 250 µl; 75 µl/ml for a syringe volume of 2500 µl), a sample is injected which contains only water. The injection volume is 20 µl for both samples (250 µl syringe) or 100 µl (2500 µl syringe). The water is used as solvent at a flow rate of 1 ml/min. The carry-over is indicated by the ratio of the signal areas of the two samples.

Sampler parameters for the measuring the carry-over:

Sampler.UpSpeed = 10.0
Sampler.DownSpeed = 10.0
Sampler.SampleHeight = 0.50
Sampler.WashSpeed = 50.00
Sampler.DispSpeed = 50.00
Sampler.DrawSpeed = 25.00
SyringeDelay = 5

Signal parameters for the measuring the carry-over:

UV_VIS_1.Wavelength = 254
UV_VIS_1.Bandwidth = 1
UV_VIS_1.Step = 0.50
UV_VIS_1.Average = On
UV_VIS_1.RefWavelength = 600
UV_VIS_1.RefBandwidth = 1

Linearity

One sample of Uracil in water (concentration 10 µg/ml, solvent: water at a flow rate of 1 ml/min) is injected five times. The injection volume is varied as follows: 5 µl, 10 µl, 20 µl, 40 µl, and 80 µl (ASI-100/ASI-100T) or 100 µl, 200 µl, 300 µl, 400 µl, and 500 µl (ASI-100P/ASI-100PT). Peak area and injection volume are represented in a graph and the regression line (linear regression with offset) is determined. The relative standard deviation of this line reports the linearity.

Sampler parameters for measuring the linearity:

Sampler.UpSpeed = 10.0
Sampler.DownSpeed = 10.0
Sampler.SampleHeight = 0.50
Sampler.WashSpeed = 50.00
Sampler.DispSpeed = 50.00
Sampler.DrawSpeed = 25.00
SyringeDelay = 5

Signal parameters for measuring the linearity:

UV_VIS_1.Wavelength = 254
UV_VIS_1.Bandwidth = 1
UV_VIS_1.Step = 0.50
UV_VIS_1.Average = On
UV_VIS_1.RefWavelength = 600
UV_VIS_1.RefBandwidth = 1

Reproducibility

One sample of Uracil in water (concentration: 140 µg/ml (ASI-100/ASI-100T or 5 µg/ml (ASI-100P/ASI-100PT)) is injected 10 times with a volume of 5 µl each (ASI-100/ASI-100T) or 100 µl each (ASI-100P/ASI-100PT). The solvent is water with a flow rate of 0.3 ml/min (ASI-100/ASI-100T) or 1 ml/min (ASI-100P/ASI-100PT).
The relative standard deviation of the peak areas of the 10 injections reports the reproducibility of the volume.

Sampler parameters for measuring the reproducibility:

Sampler.UpSpeed = 10.0
Sampler.DownSpeed = 10.0
Sampler.SampleHeight = 0.50
Sampler.WashSpeed = 50.00
Sampler.DispSpeed = 50.00
Sampler.DrawSpeed = 25.00
SyringeDelay = 5

Signal parameters for measuring reproducibility:

UV_VIS_1.Wavelength = 254
UV_VIS_1.Bandwidth = 1
UV_VIS_1.Step = 0.20
UV_VIS_1.Average = On
UV_VIS_1.RefWavelength = 600
UV_VIS_1.RefBandwidth = 1

11 Spare Parts and Accessories

Spare parts and accessories are always maintained at the latest technical standard. Therefore, part numbers are subject to alteration. However, updated parts will always be compatible with the parts they replace.

11.1 Standard Accessories (included in shipment)

The following standard accessories are part of the shipment (subject to change without notice). Accessory parts stated below without order number are available in the corresponding spare part kits (→ section 11.3, page 125).

Description	Part no.*	Qty./Pcs.
Standard accessories for standard ASI-100 and ASI-100T samplers	5810.9000	
Accessories box	2309.1100	1
Power cable (230 V, 3 x 0.75 mm², 2 m *or* Power cable (115 V, 3 x AWG18), 2 m (depending on the country-specific requirements)	1310.7031 1310.7032	1
Slow 1A fuse (5 x 20 mm, 250V, for the ASI-100)		2
Slow 2A fuse (5 x 20 mm, 250V, for the ASI-100 and ASI-100T)		2
Slow 3.15A fuse (5 x 20 mm, 250V, for the ASI-100T)		2
Spanner (¼" x 5/16")	2146.1051	1
Spanner (10 mm)	2146.1220	1
Spanner (3/16”)	2146.1231	1
Silicone tubing (2.80 x 1.30 ODxID)		1
Drainage tubing for directing condensing water to the waste		1
12 ml plastic syringe		1
Syringe seal (for 100 to 2500 µl syringes)	6805.9002	1 (pack. unit: 5)*
Set of connecting capillaries	5805.9310	1
Fitting kit for Rheodyne valve	709.7000.012	1
Crimp cap with septa (for 1.1 ml / 1.8 ml vials)	727.11.03.0278	10 (pack. unit: 100)*
Screw cap (white, for 4 ml vial)	742.12.SCW	6 (pack. unit: 500)*
Silicone seal (red, for 4 ml vial)	742.12ST2	6 (pack. unit: 1000)*
1.8 ml vial (cylindrical bottom; without cap/septum)	727.70201	10 (pack. unit 100)*
4 ml vial (cylindrical bottom; without cap/septum)	742.4SV	6 (pack. unit: 1000)*
Waste container (PE)	5810.9501	1 (pack. unit: 12)*
Cover for cooling unit (ASI-100T)	5810.4401	1
ASI-100 sample position connecting cable	8810.9001	1
25-pin I/O connecting cable	8025.9001	1
P680-ASI-100 connecting cable (30 cm, 9-9 pins)	8030.9001	1
Operating Instructions (English)	4828.1051	1

* The part number always refers to the packing unit. For further information, contact your Dionex sales representative.

Description	Part no.*	Qty./Pcs.
Standard accessories for ASI-100 and ASI-100T samplers with a carrier for 1.2 ml vials	5810.9002	
Accessories box	2309.1100	1
Power cable (230 V, 3 x 0.75 mm², 2 m **or** Power cable (115 V, 3 x AWG18), 2 m (depending on the country-specific requirements)	1310.7031 1310.7032	1
Slow 1A fuse (5 x 20 mm, 250V, for the ASI-100)		2
Slow 2A fuse (5 x 20 mm, 250V, for the ASI-100 and ASI-100T)		2
Slow 3.15A fuse (5 x 20 mm, 250V, for the ASI-100T)		2
Spanner (¼" x 5/16")	2146.1051	1
Spanner (10 mm)	2146.1220	1
Spanner (3/16”)	2146.1231	1
Silicone tubing (2.80 x 1.30 ODxID)		1
Drainage tubing for directing condensing water to the waste		1
12 ml plastic syringe		1
Syringe seal (for 100 to 2500 µl syringes)	6805.9002	1 (pack. unit: 5)*
Set of connecting capillaries	5805.9310	1
Fitting kit for Rheodyne valve	709.7000.012	1
Alu crimp cap for 1.2 ml vial with Silicone/PFTE septum for 1.2 ml vial	742.8.ACB with 742.8.ST14X	10 (pack. unit: 100)*
Screw cap (white, for 4 ml vial)	742.12.SCW	3 (pack. unit: 500)*
Silicone seal (red, for 4 ml vial)	742.12ST2	6 (pack. unit: 1000)*
1.2 ml vial (cylindrical bottom; without cap/septum)	742.1.2.CWV	10 (pack. unit: 100)*
4 ml vial (cylindrical bottom; without cap/septum)	742.4SV	6 (pack. unit: 1000)*[)]
Waste container (PE)	5810.9501	1 (pack. unit: 12)*[)]
Cover for cooling unit (ASI-100T)	5810.4401	1
ASI-100 sample position connecting cable	8810.9001	1
25-pin I/O connecting cable	8025.9001	1
P680-ASI-100 connecting cable (30 cm, 9-9 pins)	8030.9001	1
Operating Instructions (English)	4828.1051	1

* The part number always refers to the packing unit. For further information, contact your Dionex sales representative.

Description	Part no.*	Qty./Pcs.
Standard accessories for ASI-100P and ASI-100PT samplers with a carrier for 4 ml vials	5810.9003	
Accessories box	2309.1100	1
Power cable (230 V, 3 x 0.75 mm², 2 m **or** Power cable (115 V, 3 x AWG18), 2 m (depending on the country-specific requirements)	1310.7031 1310.7032	1
Slow 1A fuse (5 x 20 mm, 250V, for the ASI-100)		2
Slow 2A fuse (5 x 20 mm, 250V, for the ASI-100 and ASI-100T)		2
Slow 3.15A fuse (5 x 20 mm, 250 V, for the ASI-100T)		2
Spanner (¼" x 5/16")	2146.1051	1
Spanner (10 mm)	2146.1220	1
Spanner (3/16")	2146.1231	1
Silicone tubing (2.80 x 1.30 ODxID)		1
Drainage tubing for directing condensing water to the waste		1
12 ml plastic syringe		1
Syringe seal (for 100 to 2500 µl syringes)	6805.9002	1 (pack. unit: 5)*
Set of connecting capillaries	5805.9310	1
Fitting kit for Rheodyne valve	709.7000.012	1
Screw cap (white, for 4 ml vial)	742.12.SCW	3 (pack. unit: 500)*
Silicone seal (red, for 4 ml vial)	742.12ST2	10 (pack. unit: 1000)*
4 ml vial (cylindrical bottom; without cap/septum)	742.4SV	10 (pack. unit: 1000)*)
Waste container (PE)	5810.9501	1 (pack. unit: 12)*)
Cover for cooling unit (ASI-100T)	5810.4401	1
ASI-100 sample position connecting cable	8810.9001	1
25-pin I/O connecting cable	8025.9001	1
P680-ASI-100 connecting cable (30 cm, 9-9 pins)	8030.9001	1
Operating Instructions (English)	4828.1051	1

* The part number always refers to the packing unit. For further information, contact your Dionex sales representative.

11.2 Optional Accessories

Part no.*	Description
2140.0001	Capillary cutting tool
5805.2920	100µl syringe with seal
5805.2940	1000µl syringe with seal
5805.2950	2500µl syringe with seal
5810.0070	ASI-100 to ASI-100 prep modification kit
5810.3010	Sample loop for 1000µl syringe
5810.3011	Sample loop for 2500µl syringe
5810.3012	Sample loop for 100µl syringe
5810.9101A	Standard vial carrier with 3 segments for cylindrical 1.8 ml vials
5810.9102A	Vial carrier with 3 segments for cylindrical 1.2 ml vials
5810.9103A	Vial carrier with 3 segments for cylindrical 4 ml vials
5810.9104A	Vial carrier with 1 segment each for cylindrical 1.2 ml, 1.8 ml, and 4 ml vials
5810.9105A	Vial carrier with 3 segments for conical 1.1 ml vials
5810.9106A	Vial carrier with 3 segments for 2.0 ml Eppendorf vials
5810.9107A	Vial carrier with 3 segments for conical 1.5 ml Eppendorf vials
5810.9108A	Vial carrier with 3 segments for 0.5 ml Eppendorf vials
5810.9109A	Vial carrier with 3 segments for 0.25 ml Beckmann mini vials
5810.9110	Segment type 01 (Analyt./Cylindrical) for cylindrical 1.8 ml vials
5810.9111	Segment type 02 (Mini) for cylindrical 1.2 ml vials
5810.9112	Segment type 03 (Semiprep) for cylindrical 4 ml vials
5810.9114	Segment type 01 (Analyt./Conical) for conical 1.1 ml vials
5810.9115	Segment type 04 (Eppendorf) for 2.0 ml Eppendorf vials
5810.9116	Segment type 04 (Eppendorf/conical) for conical 1.5 ml Eppendorf vials
5810.9117	Segment type 04 (Eppendorf/conical) for 0.5 ml Eppendorf vials
5810.9118	Segment type 02 (Mini/Beckmann) for 0.25 ml Beckmann mini vials
6805.9002	Seal for 100µl to 2500µl syringes
709.7010.071	Rheodyne rotor seal (Tefzel)
742.1.1CTV	1.1 ml vial (conical bottom, without cap/septum)
742.1.2-CWV	1.2 ml vial (cylindrical bottom, without cap/septum)
742.8.ACB	Al crimp cap for 1.2 ml vial
742.8-ST14X	Silicone/PTFE septum for 1.2 ml vial
8914.0103A	25-pin to 9-pin null modem cable
8914.0130	9-pin to 9-pin null modem cable

* The part number always refers to the packing unit. For further information, contact your Dionex sales representative.

11.3 Spare Parts

Part no.*	Description
5805.1334	Needle port seal
5805.2930	Syringe 250 µl with seal
5810.2002	Needle port (complete)
5810.3001	Capillary connecting the needle port to the MSV (ASI-100/ASI-100T)
5810.3002	Analytical sample needle
5810.3003	Sample loop for 250µl syringe
5810.3004	Capillary connecting the MSV to the sample loop
5810.3005	Capillary connecting the pressure regulator to the MSV (ASI-100/ASI-100T)
5810.3006	Capillary connecting the syringe to the MSV
5810.3011	Sample loop for 2500µl syringe
5810.3014	Preparative sample needle
5810.3015	Capillary connecting the needle port to the MSV (ASI-100P/ASI-100PT)
5810.3016	Capillary connecting the pressure regulator to the MSV (ASI-100P/ASI-100PT)
5810.4401	Cover for cooling unit (ASI-100T)
6000.0010	Syringe and Tubing Kit, including: 5 12-ml plastic syringes 3 m silicone tubing (OD 2.80 x ID 1.30)
6000.0020	Capillary and Fitting Kit including: 15 each of FS-7 fitting screw and SR-7 ferrule; 1 capillary tube (OD 1.58 x ID 0.70); 2 capillary tubes (OD 1.58 x ID 0.25); 8 Rheodyne ferrules; 3 extra long Rheodyne fitting screws 5 long Rheodyne fitting screws
6805.9002	Seal for 100 to 2500 µl syringes
6810.9010	Fuses, Kit Europe, including: 10 slow 4A fuses (6.3 x 32 mm, 250 V) 10 slow 1A fuses (5 x 20 mm, 250 V) 10 slow 2A fuses (5 x 20 mm, 250 V) 5 slow 10A fuses (6.32 x 32 mm)
6810.9011	Fuses, Kit USA, including: 10 slow 4A fuses (6.3 x 32 mm, 250 V) 10 slow 2A fuses 5 x 20 mm, 250 V) 10 slow 3.15A fuses (5 x 20 mm, 250 V) 5 slow 10A fuses (6.32 x 32 mm)
6810.9012	Needle mounting kit
709.7010.039	Rheodyne rotor seal (Vespel)
709.7010.040	Stator for Rheodyne valve

* The part number always refers to the packing unit. For further information, contact your Dionex sales representative.

12 Technical Appendix - Pinouts

Pin	Signal Name	Signal Level	Remark
1			Not used
2	RX	RS-232	
3	TX	RS-232	
4			Not used
5	GND	GND	
6			Not used
7			Not used
8			Not used
9			Not used

Fig. 34: RS232[A] – 9-pin D-SUB connector

Pin	Signal Name	Signal Level	Remark
1	DCD		Not used
2	RX	RS-232	
3	TX	RS-232	
4	DTR	RS-232	
5	GND	GND	
6	DSR		Not used
7	RTS	RS-232	Connected to pin 8
8	CTR	RS-232	Connected to pin 7
9	RI		Not used

Fig. 35: RS232[B] – 9-pin D-SUB connector

Pin	Wire	Signal Name	Signal Level	Remark
1	1	LS-Load (+)	Logic	Marked wire
2	9	LS-Load (C)	Logic	
3	2	LS-Inject (+)	Logic	
4	10	LS-Inject (C)	Logic	
5	3	Motor (+)	+35V/GND-Motor	
6	11	V-Motor (+)	+35V	
7	4	V-Motor (-)	GND-Motor	
8	12	VCC	+5V	
9	5	LS-Load (-)	Logic	
10	13	LS-Load (E)	GND	
11	6	LS-Inject (-)	GND	
12	14	LS-Inject (E)	GND	
13	7	Motor (-)	+35V/GND-Motor	
14	15	V-Motor (+)	+35V	
15	8	V-Motor (-)	GND-Motor	

Fig. 36: MSV – 15-pin D-SUB socket

Pin	Wire	Signal Name	Signal Level	Remark
1	1	BCD1-A	Logic	Marked wire
2	3	BCD1-B	Logic	
3	5	BCD1-C	Logic	
4	7	BCD1-D	Logic	
5	9	BCD2-A	Logic	
6	11	BCD2-B	Logic	
7	13	BCD2-C	Logic	
8	15	BCD2-D	Logic	
9	2	BCD3-A	Logic	
10	4	BCD3-B	Logic	
11	6	BCD3-C	Logic	
12	8	BCD3-D	Logic	
13	10	+12V	+12V/1A	Fused
14	12	GND	GND	
15	14	+5V	+5V/0,5A	Fused

Fig. 37: Sample position – 15-pin D-SUB connector

Pin	Wire	Signal Name	Signal Level	Remark
1	1	Relay1/NO	Potential free	Marked wire
2	3	Relay1	Potential free	Freely configurable
3	5	Relay1/NC	Potential free	
4	7	Relay2/NO	Potential free	
5	9	Relay2	Potential free	Freely configurable
6	11	Relay2/NC	Potential free	
7	13	Relay3/NO	Potential free	
8	15	Relay3	Potential free	Freely configurable
9	17	Relay3/NC	Potential free	
10	19	Relay4/NO	Potential free	
11	21	Relay4	Potential free	Freely configurable
12	23	Relay4/NC	Potential free	
13	25	+5V	+5V/0,5A	
14	2	GND	GND	
15	4	GND	GND	
16	6	GND	GND	
17	8	GND	GND	
18	10	INPUT1	Logic	Freely configurable
19	12	GND	GND	
20	14	INPUT2	Logic	Freely configurable
21	16	GND	GND	
22	18	INPUT3	Logic	Freely configurable
23	20	GND	GND	
24	22	INPUT4	Logic	Freely configurable
25	24	GND	GND	

Fig. 38: Digital I/O - 25-pin D-SUB socket

13 Technical Appendix - Rheodyne Valve

RHEODYNE®

Operating Instructions
Type 70 High Pressure Switching Valves
Model 7010 Sample Injector

1.0 DESCRIPTION

Rheodyne's Type 70 valves are high pressure switching valves: 7000, 7000L, 7030, 7030L, 7040, 7040L, 7060 and 7060L. Unless otherwise indicated, statements about non-L models apply also to the L models.

Model 7010 is a sample injector. An accessory Loop Filler Port (P/N 7012) is needed to load sample into Model 7010. If your valve is to be operated with a Rheodyne actuator, refer also to the separate actuator instructions.

Figure 1 shows a schematic flow diagram of each of the switching valves. The circles represent the ports in the valve stator. The dark grooves are the connecting passages in the rotor seal.

Rotation of the valve shaft through 60° switches the valve from one position to the other. Models 7010, 7000, 7030, and 7040 are two-position valves with stops that restrict the rotation of the valve to 60° turns. Model 7060 is a six-position valve. A spring-loaded detent mechanism is included which allows continuous rotation and insures that the shaft "falls into" each of the six positions at the precise 60° spacing.

2.0 SUPPLIED WITH THE VALVE

Supplied with the valve in a separate bag are RheFlex® stainless steel fittings sets for all ports and the following items. A 20 µL sample loop is supplied with Model 7010. A joining tube is supplied with Model 7040.

- Hex Key(s)
- Mounting Screws (2)

3.0 SPECIFICATIONS

- Maximum Operating Pressure: Model 7010 and Type 70 non-L models - 48 MPa (483 bar, 7000 psi); L models - 34 MPa (345 bar, 5000 psi)
- Maximum Operating Temperature: Models 7010, 7000, 7030, 7040, and L models - 150°C; Model 7060 - 80°C
- Flow Passage Diameters: Models 7010, 7000, 7030, 7040 - 0.5 mm (0.018") and 0.6 mm (0.024"); Model 7060 - 0.5 mm (0.018") and 0.4 mm (0.016"); L models - 1 mm (0.040")
- Wetted Surfaces: stainless steel and an inert polymer
- Ports in all models accept 10-32 male threaded fittings

4.0 IMPORTANT SAFETY NOTICES

4.1 Warning: (Using 7010 as an injector): When using sample loops larger than 100 µL, shield yourself from mobile phase coming out of the needle port when the valve is turned from INJECT to LOAD. Example: 1 mL loop ejects 20 µL upon decompression from 19 MPa (200 bar, 2898 psi).

4.2 Caution: Do not mount the valve with the ports facing up. Leakage due to a damaged rotor seal or loose fittings can cause the bearings to corrode.

4.3 Caution: Rinse the valve thoroughly after using buffer solutions to prevent salt crystals from forming, which can cause damage to the rotor seal and stator face assembly.

5.0 INSTALLATION

All valves can be panel mounted:

a) Remove the handle assembly by loosening the knob set screw(s).

b) Fasten the valve to the panel using the two mounting screws supplied.

On Model 7060, the two screws that hold the detent mechanism on the valve should be removed before fastening the valve to the panel. If the detent mechanism needs to be disabled, as is required when installing a pneumatic actuator around Model 7060, refer to Section 8.4.

5.1 MODEL 7010 INJECTOR

Model 7010, as a sample injector, connects to different system components.

a) Connect an accessory injection port to Port 5 and the vent line to Port 6. Place the injection port at the same horizontal level as Vent Line 6 to avoid siphoning.

b) Connect the pump to Port 2 and the column to Port 3. Leave the column disconnected from the valve during initial flushing.

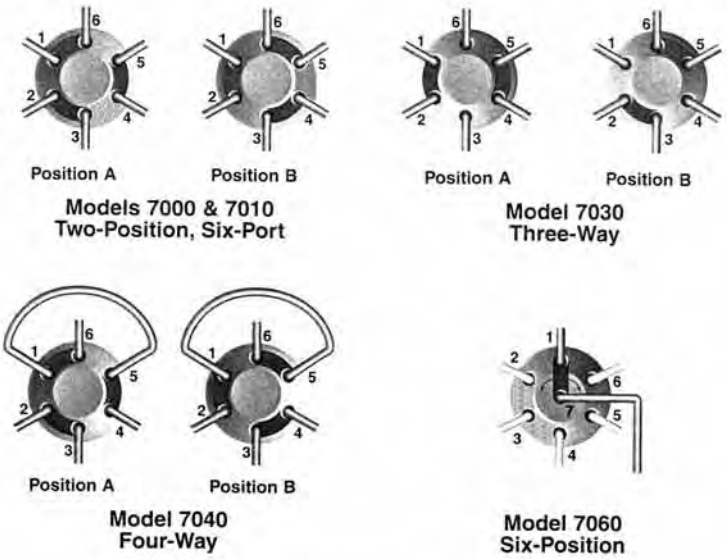


Fig. 1. Flow diagrams of Rheodyne Type 70 high pressure switching valves.

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6.0 OPERATION

6.1 INJECTIONS (MODEL 7010 ONLY)

Before connecting the column to the injector, flush the injector with mobile phase in both the LOAD and INJECT positions. After flushing the injector, turn to LOAD, and connect the column.

6.1.1 LOADING THE SAMPLE LOOP

Overfill the loop with at least two to five loop volumes of sample. Six to ten loop volumes will provide even better precision. An excess of sample is needed because mobile phase near the wall of the loop is displaced slowly due to the laminar flow effect shown in Figure 2.

To completely fill the loop (see Figure 3):

a) See **Warning 4.1** and turn to LOAD.

b) Insert the syringe into the accessory injection port.

c) Load the sample.

d) Leave the syringe in position and turn to INJECT.

6.2 SUGGESTED APPLICATIONS FOR SWITCHING VALVES

Flush the valve with mobile phase before connecting the valve to system components.

Suggested applications for switching valve applications are shown in Figures 7, 8, 9, and 10.

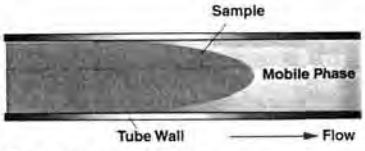

Fig. 2. Laminar flow effect.

7.0 ADJUSTING FOR LEAKAGE OR HIGHER PRESSURE OPERATION

The three small set screws in the stator (see Figure 4) have been factory set so that when the three stator screws are fully tightened, the spring force between the valve rotor and stator is sufficient to hold the indicated pressure. If leakage is to be corrected, or if operation at a higher pressure is to be done, proceed as follows: The three set screws should be loosened about 1/20 turn each (18° of rotation) and the three stator screws tightened an equal amount. If this new setting fails to accomplish leak-free operation at the desired pressure, repeat the procedure by an additional 1/20 turn. Avoid excessive tightening which will only increase wear of the rotor seal. If it is necessary to loosen spring tension, either to lower the operating pressure, or to adjust for a new rotor seal, which may be thicker than the one being replaced, reverse the above procedures. For example, first loosen the stator screws, then tighten the set screws.

If leakage cannot be stopped by tightening the valve, or if, as a result of tightening to stop the leakage, the handle is too hard to turn, the rotor seal needs replacing. See next section.

8.0 MAINTENANCE

The only parts that may need eventual replacement are the rotor seal and isolation seal. Abrasive particles in the sample can damage the rotor seal.

Genuine Rheodyne parts are easily replaced by the following instructions.

8.1 DISASSEMBLY

To disassemble the valve, refer to Figure 4 and proceed as follows:

a) Remove the three stator screws.

b) Remove stator and stator ring from valve body.

c) Pull the rotor seal off of the pins.

d) Remove the isolation seal.

8.2 REASSEMBLY

8.2.1 TWO-POSITION VALVE REASSEMBLY

To reassemble Models 7010, 7000, 7030, and 7040, refer to Figures 4 and 6 and proceed as follows:

a) Mount the new isolation seal onto the shaft with the open side facing the handle.

b) Be sure that the rotor seal is correctly oriented as shown in Figure 6 with rotor seal grooves facing the stator and with the notch in the metal rim of the rotor seal in line as shown (the notch also faces the stator).

c) In replacing the stator ring, be sure that the two stop pins are still in their holes in the stator ring, then push the stator ring squarely onto the shaft assembly allowing the stop pins to enter the mating holes in the body. Be sure the rotor pin is located between the two stop pins (Model 7060 does not have a rotor pin so the rotor can be in any position).

d) Replace the stator by first pushing it onto the two pins on the stator ring and then adding the three stator screws. Tighten each screw a little at a time to keep the stator surface parallel to the stator ring surface. If the three set screws in the stator were left unchanged, tighten the three stator screws a 1/2 turn past fingertight. The three set screws will ensure that the gap between stator and stator ring is uniform and in the original position before disassembly.

e) If the set screws need adjusting because a new rotor seal was installed or because leakage has to be stopped, each set screw should be turned an equal amount to ensure that after the stator screws are retightened, the gap between the stator and stator ring is uniform all around. Refer also to Section 7.0.

8.2.2 MODEL 7060 REASSEMBLY

An arrow has been engraved on the knob end of the shaft. Orient the rotor seal on the rotor as shown in Figure 6 relative to this arrow (with the grooves in the rotor seal facing the stator).

Follow the steps in Section 8.2.1.

8.3 ATTACHING HANDLE

The knob for the Model 7060 has a single set screw located opposite the black handle. The knob should be oriented on the Model 7060 shaft so that the knob pointer points in the same direction as the arrow on the end of the shaft. The set screw should be tightened on the flat of the shaft with the tip of the set screw centered on the hole in the shaft. Confirm this centering before final tightening of the set screw.

The knob for the two-position valves has two set screws, both at 90° from the black handle. It is best to tighten only the one set screw on the flat of the shaft although both set screws can be tightened. Confirm that the set screw tip is centered on the hole in the shaft before tightening (remove one set screw to observe alignment while tightening the other).

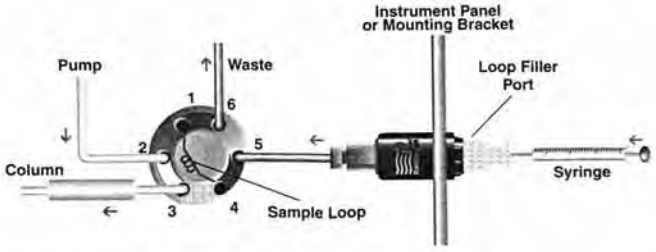

Fig. 3. Using a Loop Filler Port to fill the loop by pressure loading.

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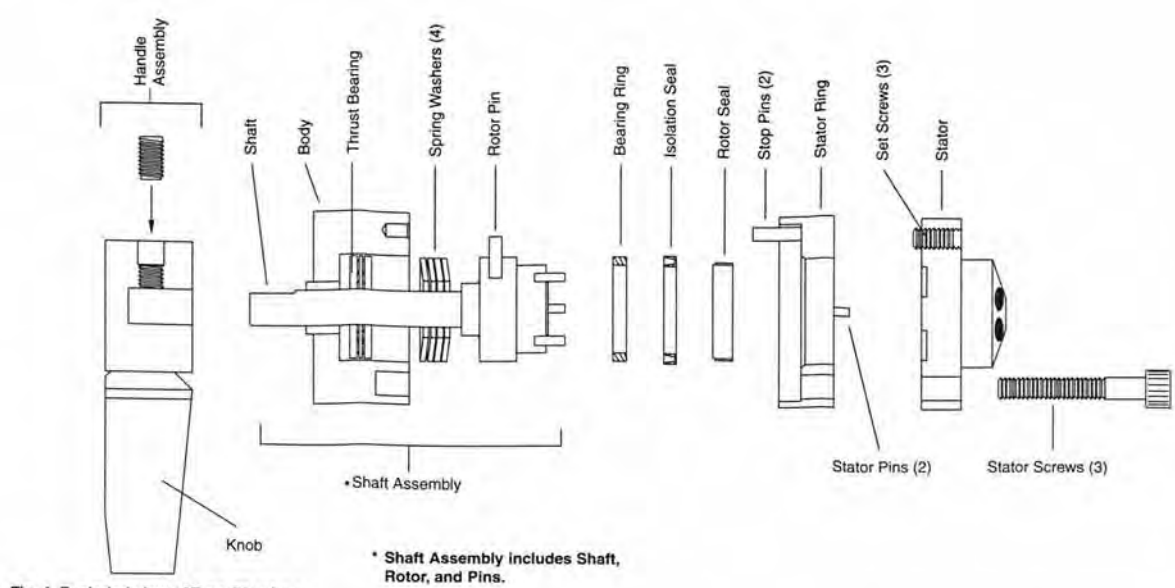

* **Shaft Assembly includes Shaft, Rotor, and Pins.**

Fig. 4. Exploded view of Type 70 valves.

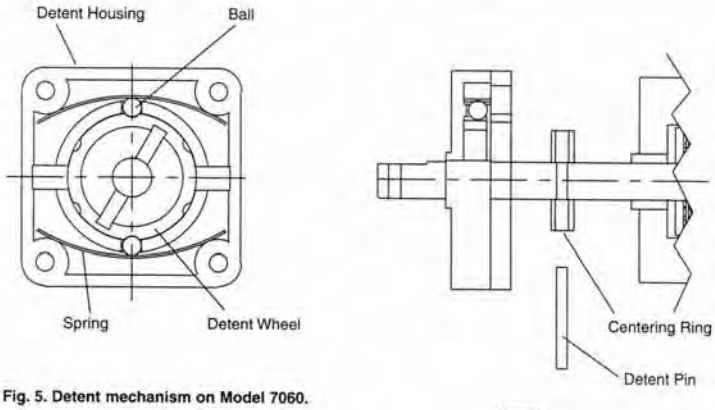

Fig. 5. Detent mechanism on Model 7060.

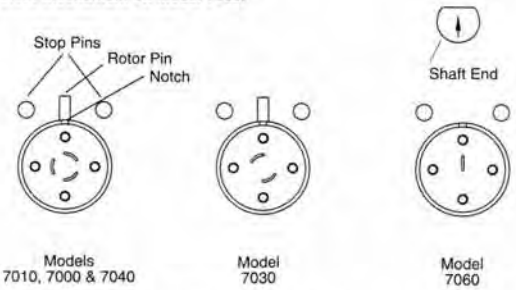

Fig. 6. Correct rotor seal orientation (viewed from stator).

8.4 DETENT MECHANISM ON MODEL 7060

If mounting Model 7060 on an actuator, the detent mechanism must be disabled (refer to Figure 5):

a) Remove the detent pin and centering ring.

b) Push the detent pin into the holes in the centering ring and the shaft.

c) Center the pin, making each end project equally from the ring OD.

d) Rotate the body while pushing the detent body in place to allow the detent pin to fall into the two notches in the detent wheel.

e) Rotate the body while holding the detent body in place to allow the mounting holes to line up with the threaded mounting holes in the valve body.

9.0 OPERATING SUGGESTIONS

9.1 USE OF AQUEOUS BUFFERS OR SALT SOLUTIONS

To prevent the formation of salt crystals in the valve, flush out the flow passages with water after using salt solutions.

9.2 USE OF HIGH pH SOLUTIONS

The standard rotor seal is Vespel[1], which has exceptionally good wear resistance. However, Vespel is susceptible to alkaline attack, deteriorating rapidly when used with solutions of pH over 10. PEEK and Tefzel[1] rotor seals are available for alkaline applications.

9.3 ACCURACY OF SAMPLE LOOPS

Sample loop sizes are not actual values. The actual volume can differ by ± 10% for a 20 µL loop and ±5% for a 10 mL loop. There is a greater difference for smaller loops.

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10.0 RECOMMENDED SPARE PARTS

The only parts that may need eventual replacement is the rotor seal and the isolation seal. Genuine Rheodyne rotor seals are easily replaced by following the instructions in Section 8.0.

Table I shows the Rheodyne part numbers for the replacement rotor seal:

Table I.

Model	Standard Models	L Models
7000 and 7040	7010-039	7000-016
7030	7030-003	7030-014
7060	7060-070	7060-064

A convenient alternative to separate replacement part ordering is the Rheodyne RheBuild® Kit for Models 7010, 7000 and 7040. The RheBuild Kit includes all necessary parts, tools, and instructions to maintain the quality performance of your Rheodyne valve.

7010-999 RheBuild Kit for 7010, 7000, and 7040.

11.0 WARRANTY

All Rheodyne products are warranted against defects in materials and workmanship for a period of one-year following the date of shipment by Rheodyne. Rheodyne will repair or replace any Rheodyne product that fails during the warranty period due to a defect in materials or workmanship at no charge to the customer. The product must be returned to Rheodyne's factory in original packaging or equivalent, transportation prepaid. Damage occurring in transit is not covered by the warranty. This limited warranty is Rheodyne's sole warranty of its products, and all other warranties of merchantability or fitness for any particular purpose are hereby disclaimed.

Under no circumstances will Rheodyne be liable for any consequential or incidental damages attributable to a claimed failure of a Rheodyne product, even if Rheodyne has been placed on notice of possibility of such damages.

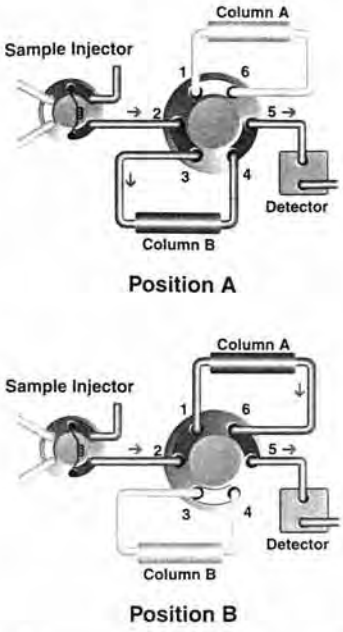

Fig. 7. Two column selection using Model 7000.

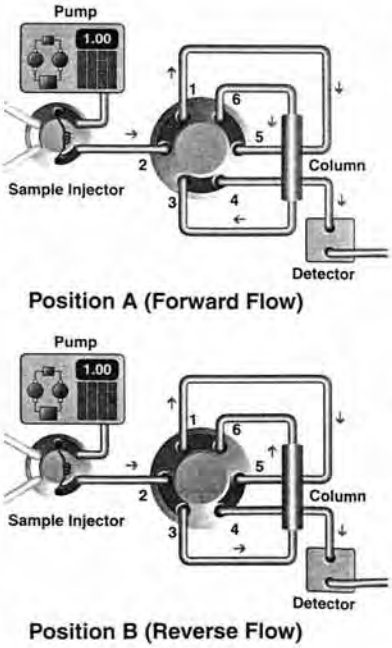

Fig. 8. Illustration of column flow reversal for backflushing using Model 7040.

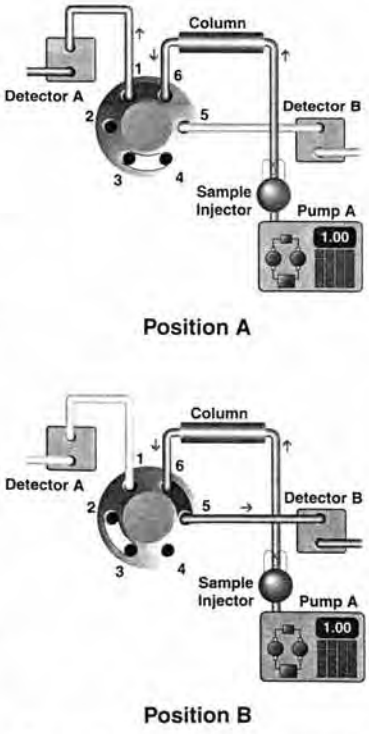

Fig. 9. Diverting flow from one detector to the other using Model 7030.

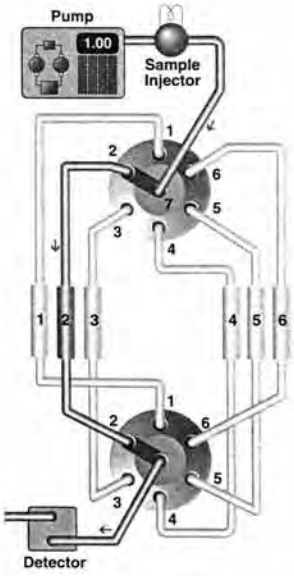

Fig. 10. Six column selection using two Model 7060 switching valves.

[1] Tefzel and Vespel are trademarks of E.I. DuPont.

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