ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Agilent / Varian Saturn 2000* at our website: ***Click HERE***

Varian, Inc.
2700 Mitchell Drive
Walnut Creek, CA 94598-1675/USA

CP-8400 AutoSampler and CP-8410 AutoInjector

Operator's Manual

Attention 3900 GC and Saturn 2100 Users:
Additional information on CP-8400 AutoSampler and CP-8410 AutoInjector operation is included in the 3900 GC Getting Started Manual, 03-914884-00.



©Varian, Inc. 2003 Printed in the Netherlands 03-914852-00:Rev. 4.1

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table of Contents

Introduction **1**

Installing the CP-8400/8410 ..... **3**

Configuring your CP-8400/8410 to use SPME **9**

Setup and Calibration of the CP-8400/8410 ..... **11**
Vial 0 / Vial 1 Calibration 17
Vial Calibration tool 19
Injector Calibration 21

Operation **23**
Parameters and Quick Reference 23
Automation Page Parameters 28
- Single Method Automation Parameters 28
- Method Sequence Table Parameters 32
- Priority Sample 34

Method Parameters 35
- Standard Split/Splitless and Standard On-Column Sampling Modes 36
- Neat Sampling Mode 38
- Volatile Sampling Mode 40
- Viscous Sampling Mode 42
- SPME Sampling Mode 44
- User Defined Sampling Mode 47

Instrument Menu 54
CP-8400/8410 Status 55

Special Uses **57**
Dual/Duplicate Mode Operation 57
- Dual Run 57
- Duplicate Run 58

Assigning Methods to Vial Ranges 58
Automated Metering of Internal Standard 59
Priority Sample 59

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Introduction

We strongly recommend that you read the entire manual before you start using your CP-8400 AutoSampler or CP-8410 AutoInjector. The CP-3800 will sense whether you have a CP-8400 or CP-8410 installed automatically and will sense if the Auto Sampler is set to perform liquid sampling with a syringe or SPME sampling. You will be presented with the appropriate screens and limits for the specific Auto Sampler and sampling mode configured on powering up the GC and Auto Sampler.

The CP-8400 is a 100 vial capacity AutoSampler designed to be used with the CP-3800 GC. The CP-8410 is an AutoInjector based on the CP-8400; it has a manually positioned tray and can accommodate up to 10, 6, and 5 each of 2 mL, 5 mL and 10 mL vials, respectively. Both the AutoSampler and AutoInjector can inject into up to two injectors; the injection may be made into either one or the other of the injectors or into both (either from the same vial or from adjacent vials) during the same run. You may select to sample just before injecting or you may choose to have the Auto Sampler prepare the next injection before the current run ends (Prep Ahead). Both the CP-8400 and CP-8410 are preprogrammed with several injection modes (Standard On-Column, Standard Split/Splitless, Viscous, Volatile, and Neat) that are optimized for most common types of samples. The User Defined mode allows access to all parameters and should be used with discretion since injection accuracy and precision may be adversely affected by incorrect choice of certain parameters. The SPME mode requires different hardware (optional) and is selected through a switch on the Auto Sampler's syringe carriage. If the SPME mode is selected the other injection modes will not be presented to you.

Once your CP-8400 or CP-8410 is installed and calibrated, you may begin running immediately. To perform a single injection, complete the following steps:

1. Press the green Start button located at the upper left corner of the CP-3800 keypad.
2. Enter the vial number, number of replicate injections, the injection volume, and which injector you wish to use.
3. Press the AutoInject softkey.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Your AutoSampler or AutoInjector will execute the desired injection.

To set up an automated series of injections, simply complete the following steps:

1. Press the Automation Select/Edit button on the CP-3800, choose either Single Method automation to run all of your samples with a single method, or choose Method Sequence Automation to run specific methods with specific vials.
2. Press the Automation Select/Edit button again and press **2** to select Single Method, or **3** to select Method Sequence and enter the methods you wish to use, the vial range, the amount you want to inject and the injector you wish to use (if you have more than one injector installed).
3. Place your samples into the AutoSampler carrousel.
4. Press the Start button.

This manual will cover AutoSampler installation, software setup and calibration to the correct sampling and injection positions, a description of the operating parameters, and some examples of how you may wish to use the CP-8400/8410 to accomplish your analyses. If, after reading this manual you still have questions or encounter a problem that is not covered, please contact Technical Support for further assistance.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Installing the CP-8400/8410

To use the CP-8400 with the CP-3800 Gas Chromatograph, your CP-3800 must have Version 3.2 or later software installed. The CP-8410 requires version 3.3 or later. To use SPME mode sample introduction with either the CP-8400 or CP-8410 you must have Version 3.3.5 or later software installed. To check the software version installed in your GC, press the Status key on the GC keyboard, press the Enter key to show instrument status, and then press the Software Version softkey. The software version will be shown on the CP-3800 display. If your GC was manufactured before October 1999 and you have two or more injectors installed, you will need to schedule a service call with your Varian Technical Support Representative to have the injector positions relocated so that the CP-8400 can effectively use them.

Power Requirements

19-24 Vac provided by Varian GC auxiliary (fused)
Input current max. 1A

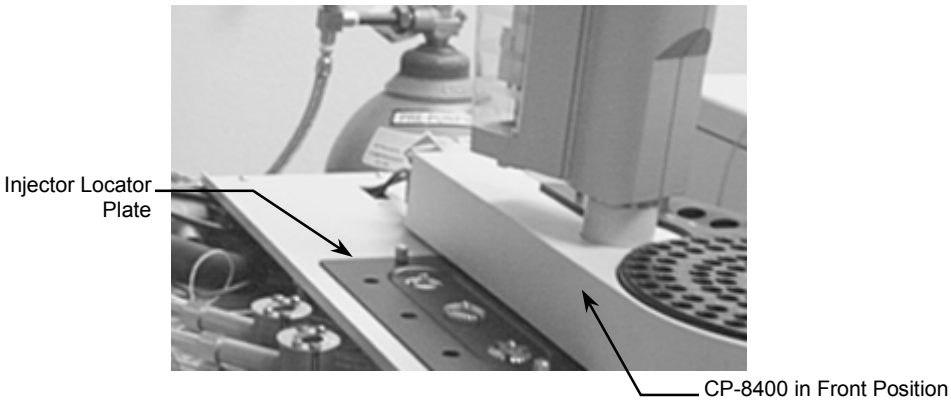
Environmental Conditions

Temperature range 5 to 40 °C
Relative humidity 0 to 95%

Before installing the CP-8400 or CP-8410, make certain your CP-3800 is equipped with the appropriate top cover. This cover will have a long rectangular opening for the installation of the injector locator plate, markings indicating the front and rear installation positions for the AutoSampler, and a small rectangular opening to route the CP-8400/8410 power/communication cable through.

There are two positions on the CP-3800 in which the CP-8400/8410 may be installed: front and rear. The front position allows the CP-8400/8410 to use the front and middle injectors. The rear position allows the CP-8400/8410 to use the middle and rear injectors. The CP-8400/8410 is aligned to the top cover of the CP-3800 by a pair of pins protruding from the bottom of the AutoSampler/AutoInjector base. These pins will fit into holes on the top cover. The base is secured to the top cover via two screws at the rear and three screws underneath the AutoSampler carrousel/AutoInjector sample tray. The figures that accompany this description depict a CP-8400 AutoSampler. They apply equally to both the CP-8400 and CP-8410.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



CP-8400/8410 CP-3800 Top Cover

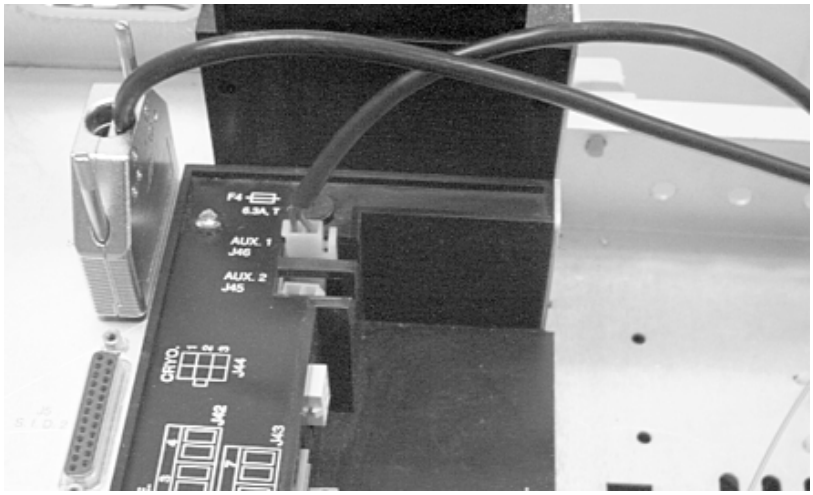
To install the CP-8400/8410, follow the steps below:

WARNING:
SHOCK HAZARD

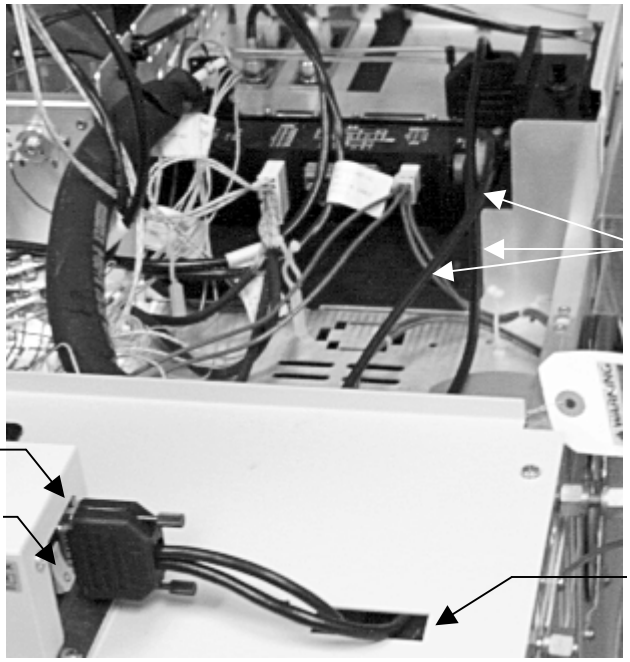
Dangerous voltage exposed. Turn the CP-3800 GC power off. Failure to do so may result in accidental contact with dangerous voltage.

1. Power down the GC and any other attached devices. Remove any old equipment or old autosamplers from the top of the GC. Place the CP-8400/8410 near the GC, manually rotate the Injector tower so that it does not obstruct the carrousel.
2. Remove the old CP-3800 top cover by lifting up and removing the Detector cover; set it aside in a location that is out of the way. Remove the left side top cover by lifting the rear of the cover and sliding it towards the rear of the GC and up. Remove the 4 screws holding the injector cover down on the top of the GC. Retain the screws and set the old top cover aside.
3. Locate the CP-8400/8410 power/communication cable and the CP-8400/ CP-3800 top cover. Route the single D-shell connector through the hole from the bottom of the cover to the top so that the single D-shell is available from the top of the cover. Route the power cable and CP-3800 25 pin D-shell connector across the top of the GC to the left side of the GC. Plug the power cable into Aux 1 (J46) and the 25-pin D-shell into the S.I.D. 1 (J4) connector.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



CP-8400/8410 Power/Communication Connection to CP-3800

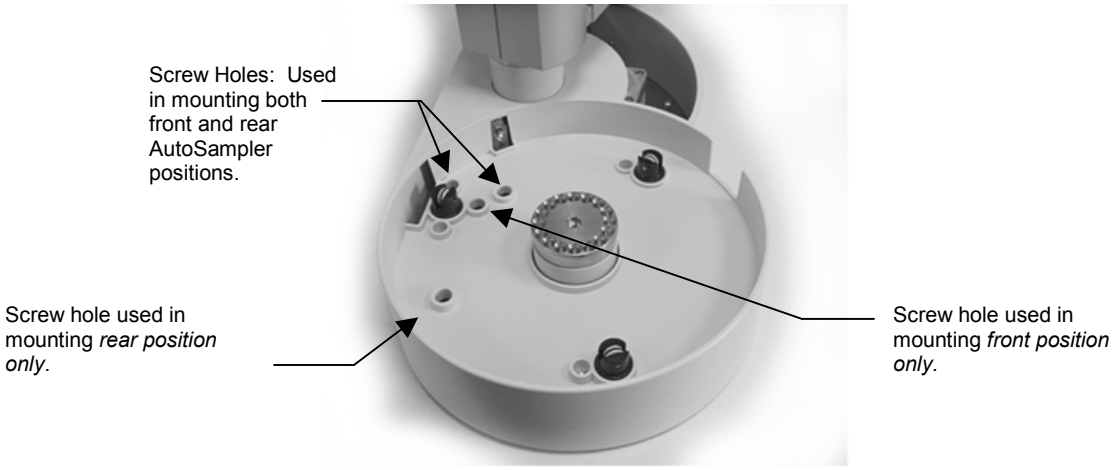


Cable Routing for CP-3800

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4. If the Injector locator plate is installed in the top cover, remove it by removing the two screws located on either end of the locator plate. Install the top cover so that the pins on the top cover fit into the corresponding slots on the CP-3800 chassis. Screw the top cover in place.
5. Install the Injector locator plate by fitting the circular holes over the injectors. You may need to push the locator plate just a little bit in order to get the injectors to fit. Do not use excessive force. If the injectors do not fit conveniently, loosen the screws holding the injector(s) to the CP-3800 chassis and adjust the injector(s) positions so that they conveniently fit into the locator plate. The top cover has small access holes to allow you to loosen the retaining screws on the injectors. You may need to unscrew the injector nut and remove the inject switch to have unimpeded access to the injector retaining screws; replace the injector nut (if removed) so that you have proper alignment when the locator plate is installed. Once the injector(s) are properly aligned, screw down the alignment plate and then screw down the injector retaining screws. Remove the locator plate, replace the inject switch on each of the injector(s) and reinstall the locator plate.
6. Place the CP-8400/8410 onto the top cover, aligning it with either the front or rear mounting position as appropriate. Locate and install the two small screws provided with your CP-8400/8410 and screw down the rear tab.
7. Locate the three long screws and install in appropriate screw location under the carrousel (note that the CP-8410 does not have the rollers or central hub but will have the same screw locations).

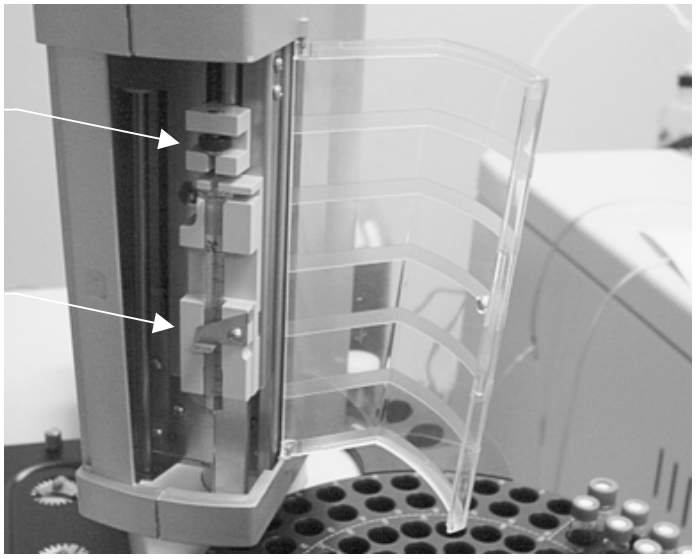
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Carrousel Removed to Show Mounting Screw Locations

8. Plug the D-shell connector of the power/communications cable into the CP-8400/8410.
9. Remove protective shipping materials from the injector carriage and install the syringe into the AutoSampler injector tower by opening the clear plastic door, carefully inserting the syringe into its holder and the needle through its guide, then fasten the plunger screw on the top and snap the retaining clip over the syringe.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Syringe Installation

10. If the currently installed CP-3800 ROM is version 3.1 or lower, replace with a version 3.3.5 or higher ROM board. To use the CP-8400 with the CP-3800 Gas Chromatograph, your CP-3800 must have Version 3.2 or later software installed. The CP-8410 requires version 3.3 or later. To use SPME mode sample introduction with either the CP-8400 or CP-8410 you must have Version 3.3.5 or later software installed.
11. Replace the left side top cover.
12. Place a vial with cap into the Vial 0 location if you have a CP-8400 or the Vial 1 location if you have a CP-8410.
13. Place the CP-8400 carrousel onto the base or place the CP-8410 sample tray oriented so that Vial 1 is under the arc traced by the tower. Follow the setup procedure described in the next section to properly calibrate the AutoSampler/AutoInjector sampling and inject positions.

CAUTION **If you re-locate the CP-8400/8410 to the rear position, you MUST recalibrate the injector positions. You will not be automatically prompted to recalibrate the injector positions. If you fail to re-calibrate the injector positions, the AutoSampler may miss the injector, resulting in bent syringe needles**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

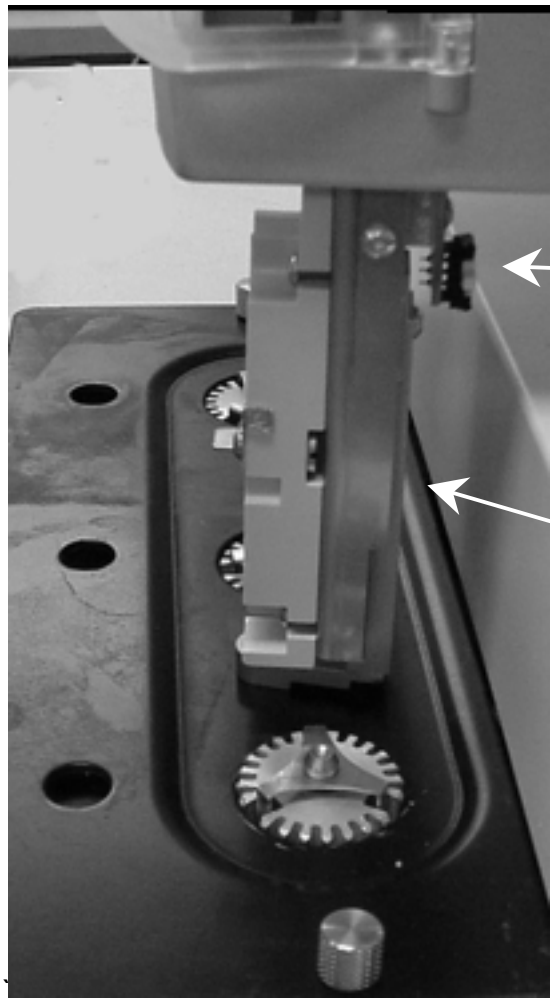
Configuring your CP-8400/8410 to use SPME

The Auto Sampler will only come up in one of two configurations. The first and default configuration is the liquid sampling configuration. In this configuration your Auto Sampler will use a syringe to withdraw liquid for subsequent injection into the chromatograph. The second configuration is the SPME mode. The SPME operation can be thought of as fundamentally reversed from liquid sampling in terms of the actions the plunger performs during the sampling process. In liquid sampling, for instance, the plunger is at its home state more or less fully descended and sampling is done by withdrawing the plunger from the syringe barrel in order to take an aliquot for injection. In SPME however, the plunger is at the top of its travel when it is in the home position and the SPME fiber must be exposed by inserting the plunger into the fiber holder barrel to expose the fiber. Obviously this fundamental difference in the sampling process mechanics could cause unintentional damage to the SPME fiber. In order to change the configuration of your Auto Sampler from liquid sampling to SPME sampling you will need to change the position of a switch on the CP-8400/8410 tower's sled assembly. Follow the procedure below:

1. Turn off the power to your CP-3800 GC.
2. Manually rotate the CP-8400/8410 tower so that it is over the GC. It is best not to place it over an injector since the injector may be hot.
3. Open the tower's clear plastic door and remove the syringe or SPME Fiber holder.
4. Push the syringe sled as far down as it will go. Note that once the syringe guide foot touches the top of the GC it can be compressed further. Do this compression gently and watch for the white switch that will be just exposed once the sled has reached its maximum downward travel.
5. If the switch is in the down position, the Auto Sampler is in the liquid sampling configuration. If the switch is in the up position then it is in the SPME configuration. Set the switch to the desired configuration.
6. Raise the sled, install the appropriate block for either a syringe or a SPME fiber holder and then install the device (syringe or fiber holder) into the block as appropriate.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7. Close the cover on the tower and power up the GC. The GC will automatically sense the configuration of the switch and behave accordingly.



Location of switch for configuration change on the CP-8400/8410 Tower Sled Assembly

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Setup and Calibration of the CP-8400/8410



WARNING:
BURN HAZARD

The injector nut and locator plate may be very hot during instrument operation and should not be touched with unprotected hands.



WARNING

Syringe moves automatically during operation of instrument. Keep your hands and fingers out of the injection area. Failure to do so may result in accidental needle prick/scratch.

Important Note: *In order to accurately calibrate vial positions, a calibration tool (CP740889) is used. Follow the "vial calibration tool" procedure given on page 19*

Important Note: *Using SPME mode sample introduction, it is mandatory to perform the calibration process with the liquid sampling syringe provided standard with your Auto Sampler.*

Important Note: *If one injector is installed, the setup configuration must reflect the one-injector position to avoid accidentally injecting into a non-existent injector and causing damage to your GC and bending the needle.*

	Injector position		
CP-8400/8410	***Front***	***Middle***	***Rear***
Front position	*Position 1*	*Position 2*	*-*
Rear position	*-*	*Position 1*	*Position 2*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

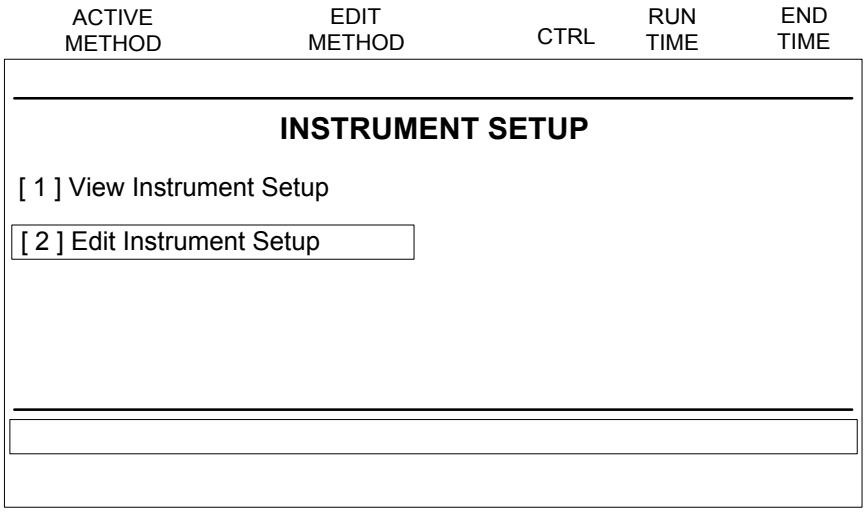
Calibrate both the sampling and injector positions of the CP-8400/8410 the first time you install it. Calibrate the injector positions any time you move the CP-8400/8410 from one position to the other (for instance from the front mounting position to the rear position). If calibration fails on either the vial 0 or the injector, you must recalibrate both the injector and vial 0.

Important Note: *Switch the CP-8400/8410 power on before powering up the CP-3800. Do not turn off the power switch during normal operations.*

If you turn the CP-8400/8410 off while the GC is on, or if there is a momentary communication failure, a communication error fault will occur. The CP-3800 must be turned off and then on to clear this fault.

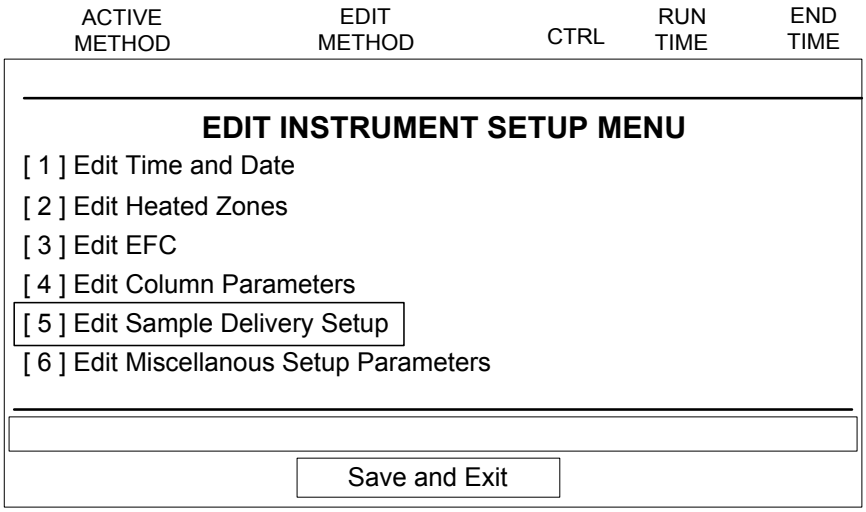
CP-3800 Keyboard

To enter Setup, press the Setup key.

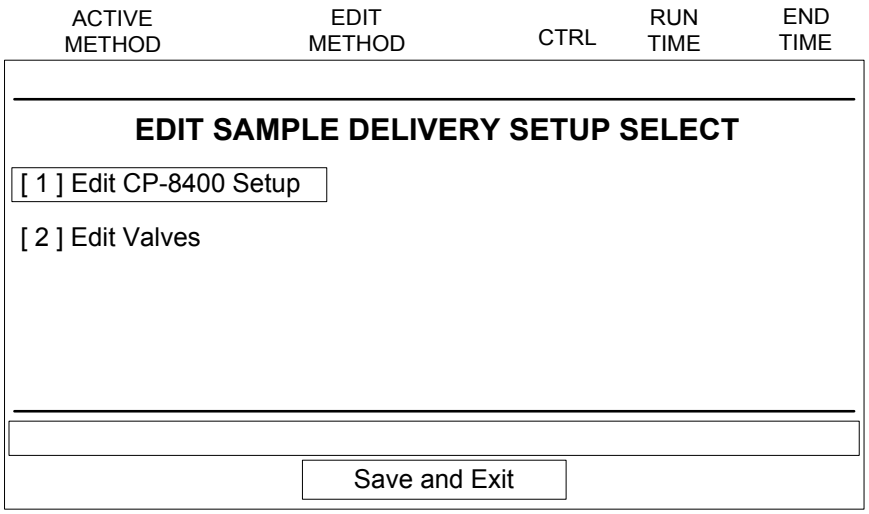


Setup Screen *Select item 2, Edit Setup, by pressing 2 on the CP-3800 keypad and then pressing the Enter key.*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

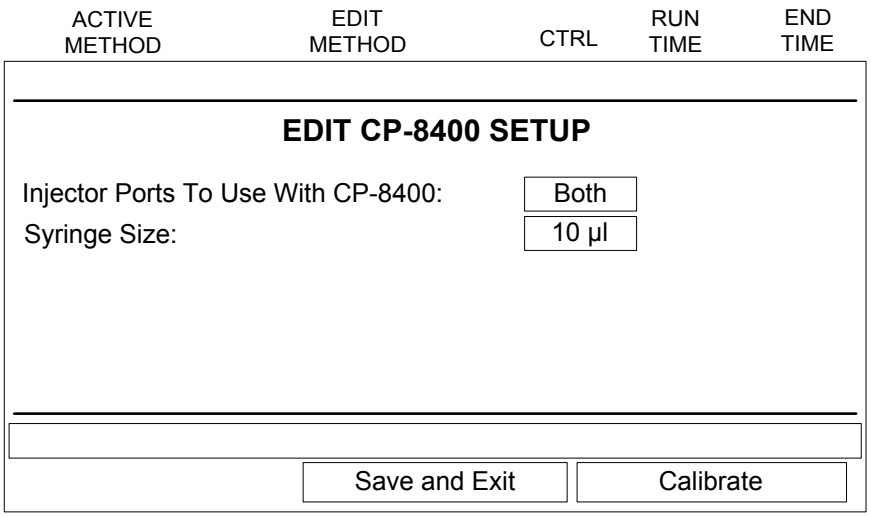


Setup Edit Menu *Select item 5, Edit Sample Delivery, by pressing 5 on the CP-3800 keypad and then pressing the Enter key.*



Automation Selection *Select item 1, CP-8400 Setup (or Edit CP-8410 Setup as appropriate), by pressing 1 on the CP-3800 keypad and then pressing the Enter key.*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Automation Configuration *Select the Calibrate softkey to begin the CP-8400 (or CP-8410) calibration process.*

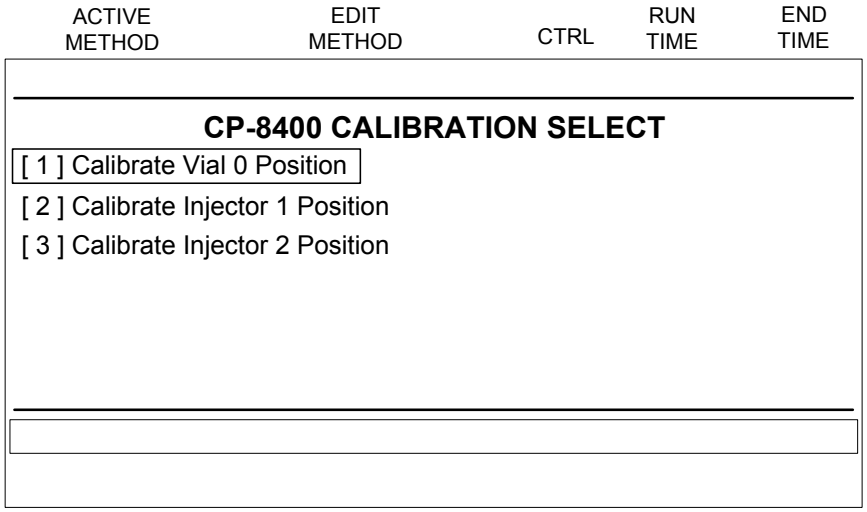
Injector Ports to use with CP-8400/8410 – Available entries: Position 1, Position 2, Both. If one injector is installed on your CP-3800, make certain to specify the correct injector in the "Injector Ports to use with CP-8400 (or CP-8410)" selection. An incorrect setting may cause the CP-8400/8410 to inadvertently inject into the top cover resulting in damage to the syringe and the top cover. The CP-8400/8410 syringe tower rotates clockwise to reach the injectors. The first injector the tower will encounter is referred to as Position 1. The second injector is Position 2. Select the Both setting if you have two injectors that you wish to use with the CP-8400/8410. Note that selecting both allows the CP-8400/8410 to use two injection volumes when dual/duplicate mode is used. If you configure a single injector, you will see a single injection volume in the automation tables.

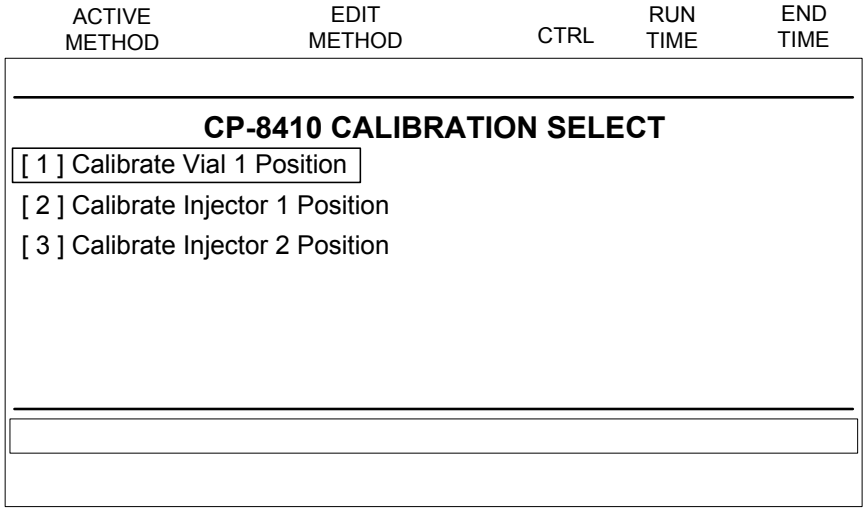
Syringe Size – Available entries: 5 µL, 10 µL and 100 µL. (Note that this field is not used when the Auto Sampler is in the SPME mode and will be dashed out). Enter the syringe volume you will install and use with your CP-8400/8410. The CP-3800 will use this value to set the correct entry selections and any needed internal settings to correctly use the indicated syringe size. Incorrectly setting this parameter may cause poor operation but will not harm either the GC or the AutoSampler.

If you are simply changing a syringe with a different volume syringe you can press Save and Exit at this point to accept the new syringe size.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

To begin calibrating the CP-8400/8410, press the Calibrate softkey at the bottom right corner of the Edit CP-8400 (or CP-8410) Setup screen. If you press Save and Exit without calibrating, the existing calibration parameters will be retained.





Press 1 on the CP-3800 keyboard to begin the “Calibrate Vial 0 Position” procedure for the CP-8400. If you have a CP-8410, Press 1 on the CP-3800 keyboard to begin the “Calibrate Vial 1 Position” procedure for the CP-8410. This procedure will allow the AutoSampler/AutoInjector to learn the tower and carrousel/tray positions so that the syringe is positioned directly over the middle

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

of the first vial in the carrousel (vial 0) or the middle of the first 2 mL vial of the AutoInjector sample tray. The CP-8400 may use a number of different sample vial form factors; however, you should use all of the same vials for each session. Mixing different vials is strongly discouraged. If you calibrate using one vial type and then begin using another vial type with a different height, it is strongly recommended that you recalibrate the Vial 0 Position to avoid bent needles and other minor problems.

The CP-8410 uses three different vial form factors;

Vials	Size
2 mL	12 X 32 mm
5 mL	20 x 38 mm
10 mL	22 x 46 mm

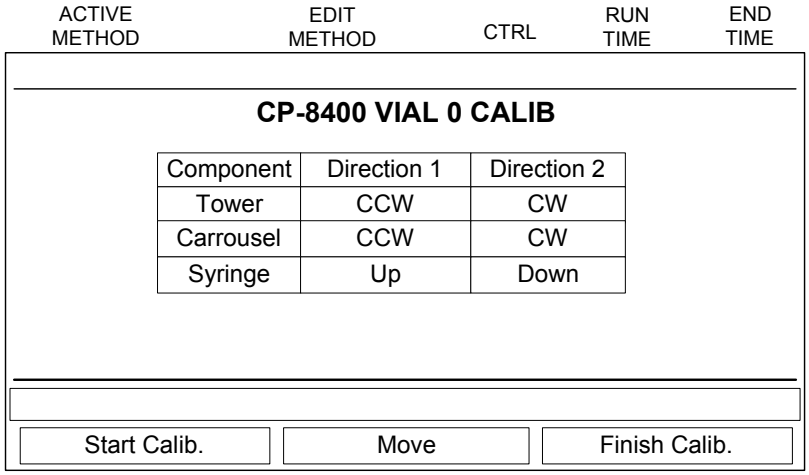
You may use the “Calibrate Vial 0/1 Position” of the CP-8400 or the “Calibrate Vial 1 Position” of the CP-8410 without having to recalibrate the injector positions by pressing the Save and Exit softkey after performing the “Calibrate Vial 0 Position” or “Calibrate Vial 1 Position” exercise.

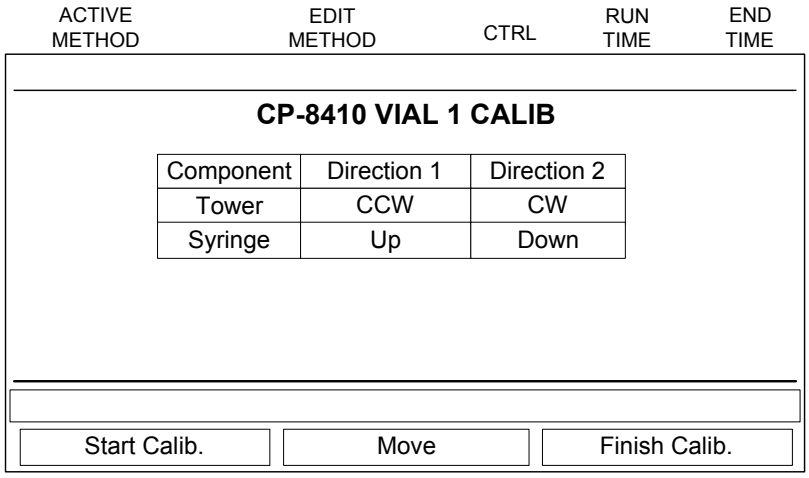
Calibrate Injector 1 Position – This procedure is normally performed only once when the CP-8400/8410 is first installed. You do not need to recalibrate the Injector 1 Position after normal injector maintenance such as changing septa or inserts. If you remove the injector or remove the CP-8400/8410, it is recommended that you recalibrate the Injector 1 position.

Calibrate Injector 2 Position – This procedure is normally performed only once when the CP-8400/8410 is first installed. You do not need to recalibrate the Injector 2 Position after normal injector maintenance such as changing septa or inserts. If you remove the injector or remove the CP-8400/8410, it is recommended that you recalibrate the Injector 2 position.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Vial 0 / Vial 1 Calibration





Tower – moves the syringe tower either counterclockwise (CCW) or clockwise (CW).

Carrousel (CP-8400 only) – moves the vial carrousel either counterclockwise (CCW) or clockwise (CW).

Syringe – Moves the syringe sled either Up or Down.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

To start the Vial 0 (or Vial 1) calibration, make certain a vial with the same form factor and cap as the ones you will be using for your analyses is placed in the 0 position of the carrousel (or the Vial 1 position of the CP-8410). Press the Start Calib. softkey located in the lower left corner of the display. Use the cursor keys located at the upper right corner of the CP-3800 keypad to highlight an action associated with one of the AutoSampler components (tower, syringe or carrousel). Once the appropriate action is highlighted, pressing the Move softkey will cause the selected action to be completed for the associated component.

NOTE: One basic rule associated with this calibration concerns rotation of the tower and carrousel; to assure consistent operation, always approach the final calibration position with clockwise movements. To help facilitate this rule, the carrousel will backup 10 steps when a counterclockwise action is selected but will move one step per Move softkey action when a clockwise tower rotation is selected.

Calibrating the Vial 0 (or Vial 1) position involves manipulating the positions of three different components. The object of the calibration is to position the syringe exactly over the center of the sampling target area of the vial. Upon starting the calibration procedure, the CP-8400/8410 will rotate the tower, rotate the carrousel, and lower the syringe sled to the approximate location of Vial 0 (or Vial 1 if CP-8410). After the CP-8400/8410 has found the approximate Vial 0 (or Vial 1) position, visually check that the syringe sled is not resting on the vial top. If it is, scroll down to the Syringe selection and highlight the Up action. Press the Move softkey until the syringe sled is clear of the vial top by approximately 1 mm. Start the calibration process by adjusting the tower position

Next, for CP-8400 users, set the carrousel position. You may have to switch back and forth between the tower and carrousel one or more times to determine the optimum rotational positions. Finally, scroll to the Syringe selection and adjust the syringe sled height so that the needle is just barely above the vial cap (You should be able to see about a paper's thickness of space between the syringe sled needle guide and the top of the vial cap. The penetration depth into the vial is measured from the bottom of the needle guide, so this height will give you optimum penetration depth.)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Vial Calibration tool

In order to accurately calibrate vial positions, a calibration tool (CP740889) is used.



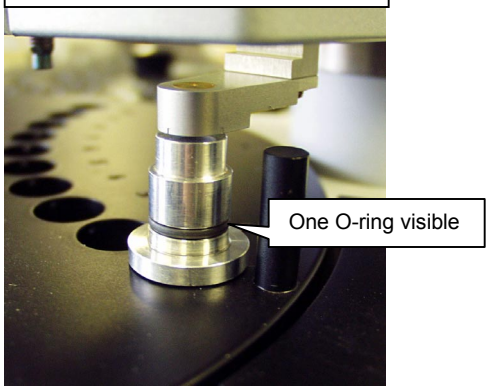
The calibration tool simulates a standard vial. The tool is used for both the CP-8400 and CP-8410 AutoSamplers.

The calibration tool can be placed (depending of the tray-material) in two different ways in the tray.

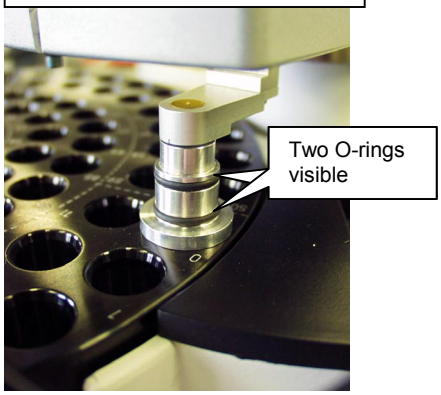
See the table below for the correct position.

	CP-8400 **Calibration Vial in Position 0**	**CP-8410** **Calibration Vial in Position 1**
Metal tray	Two O-rings visible	Two O-rings visible
Polymer tray	-	One O-ring visible

CP-8410 (polymer tray)
calibration tool in vial position 1

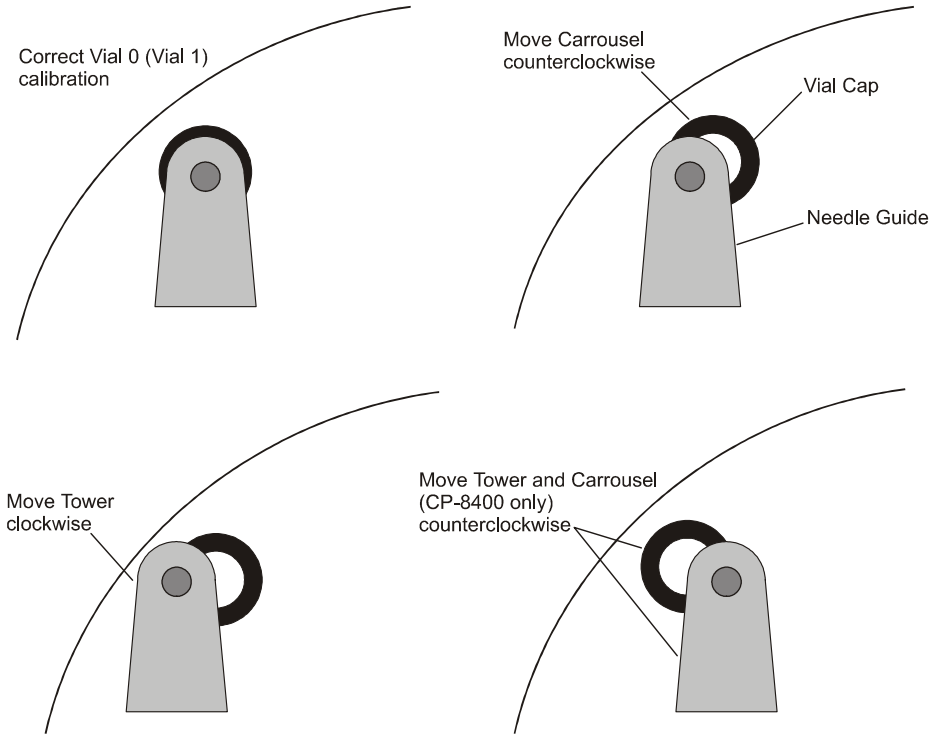


CP-8400 (metal tray)
calibration tool in vial position 0



For the correct calibration procedure of the sampler vial position, please refer to the Setup and Calibration section of this manual.

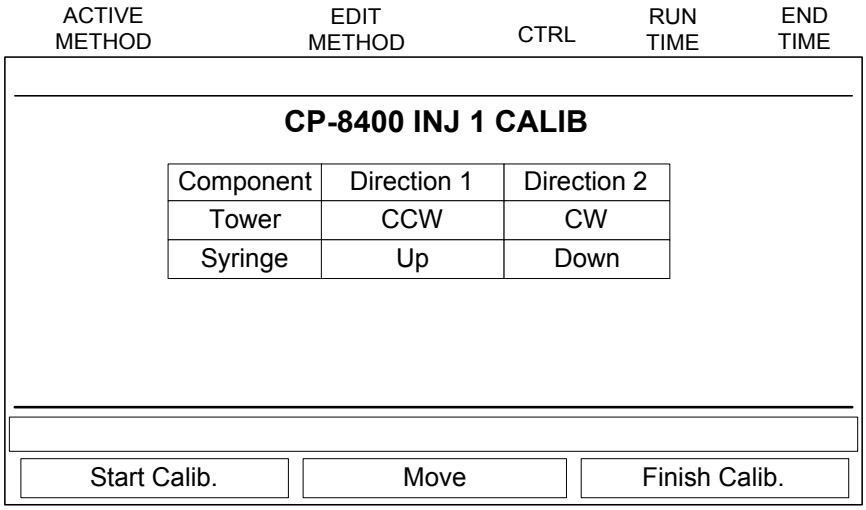
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



When you have completed the Vial 0 (or Vial 1) calibration, press the Finish Calib. softkey. When “Finish Calib.” is done, the softkey will change from “Reverse Video” to Normal, indicating the calibration process for this page is finished. You may either Save and Exit to store the new Vial 0 calibration values by pressing the Page Up key two times and then the Save and Exit keys, or you may continue to the Injector Position calibrations by pressing the Next Page key on the CP-3800 keypad.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

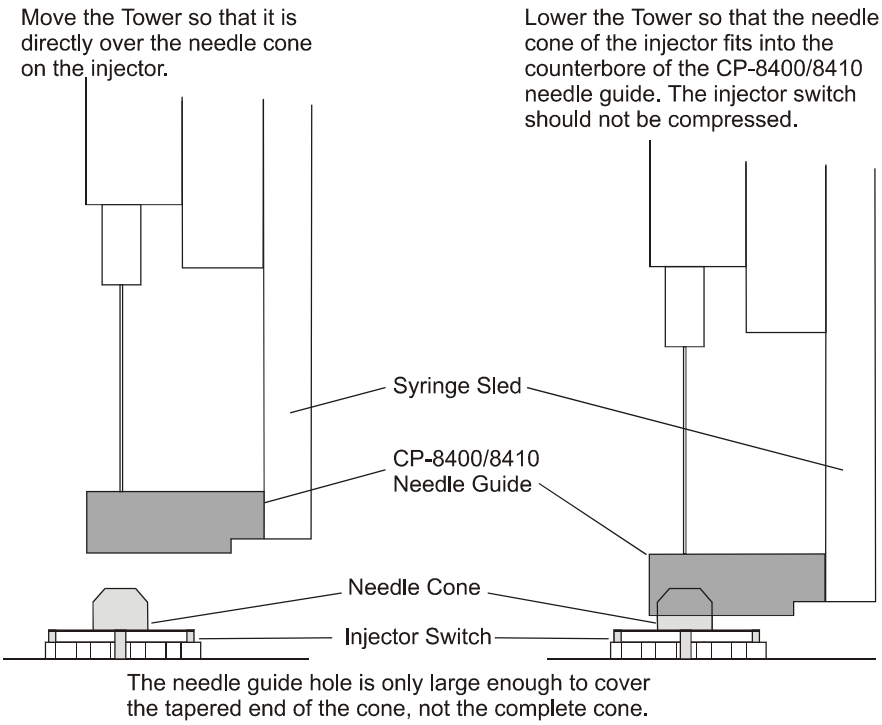
Injector Calibration



To calibrate the Injector 1 and Injector 2 Positions, perform the following steps:

1. Press the Start Calib. softkey. The CP-8400/8410 will rotate the tower so that it is over the Injector 1 position and lower the syringe sled so that it is over the injector. If the needle guide descends so that it is either resting on the inject switch or below the needle cone on the inject switch, use the scroll key to highlight the Syringe up and move the sled up by highlighting the Up selection and pressing the Move softkey until the needle guide is just above the injector cone.
2. Using the cursor keys at the right top corner of the CP-3800 keypad, highlight either the CCW (rotates the tower counterclockwise 10 steps) or CW (rotates the tower clockwise 1 step). Position the tower directly over the injector Inject Switch Locator cone.
3. Scroll to the syringe setting and adjust the height of the needle guide such that the sled is just resting on or very slightly depressing the Injector Switch and is covering the locator cone.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



4. Press the Finish Calib. softkey when the Injector 1 calibration is complete. You may either press the Page Down key on the CP-3800 keypad to continue to the Injector 2 calibration (follow the instructions above to calibrate the Injector 2 position) or Page Up three times and press the Save and Exit softkey to save the values and restart your CP-3800.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

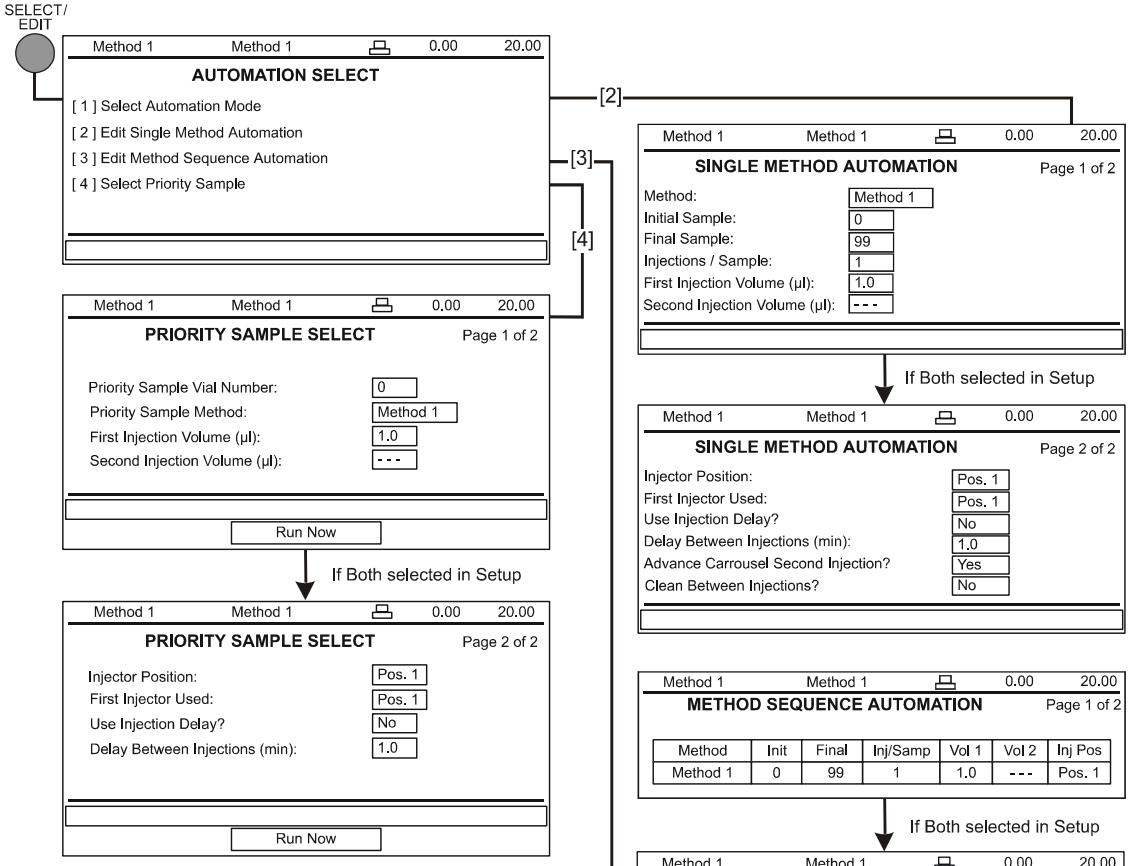
Operation

Parameters and Quick Reference

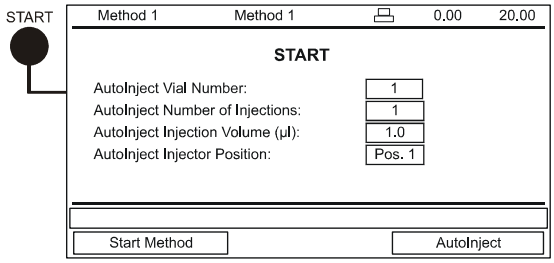
The layout of the screens and the placement of the parameters followed the philosophy of keeping those parameters that an operator may wish to change for a series of samples (such as the injection volume, vial range, GC method) within the Automation pages for quick access and change. Those parameters that drive the AutoSampler actions such as clean, viscosity settings, and needle residence times are located within the AutoSampler Method. The CP-8400/8410 is preprogrammed with settings and actions that are appropriate for most common analyses. The following diagrams represent the hierarchy of screens that follow from selecting the indicated key on the CP-3800 front panel.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

AUTOMATION section of CP-3800 Keypad (Select/Edit Button)



Manual Injection Mode (Start Button)

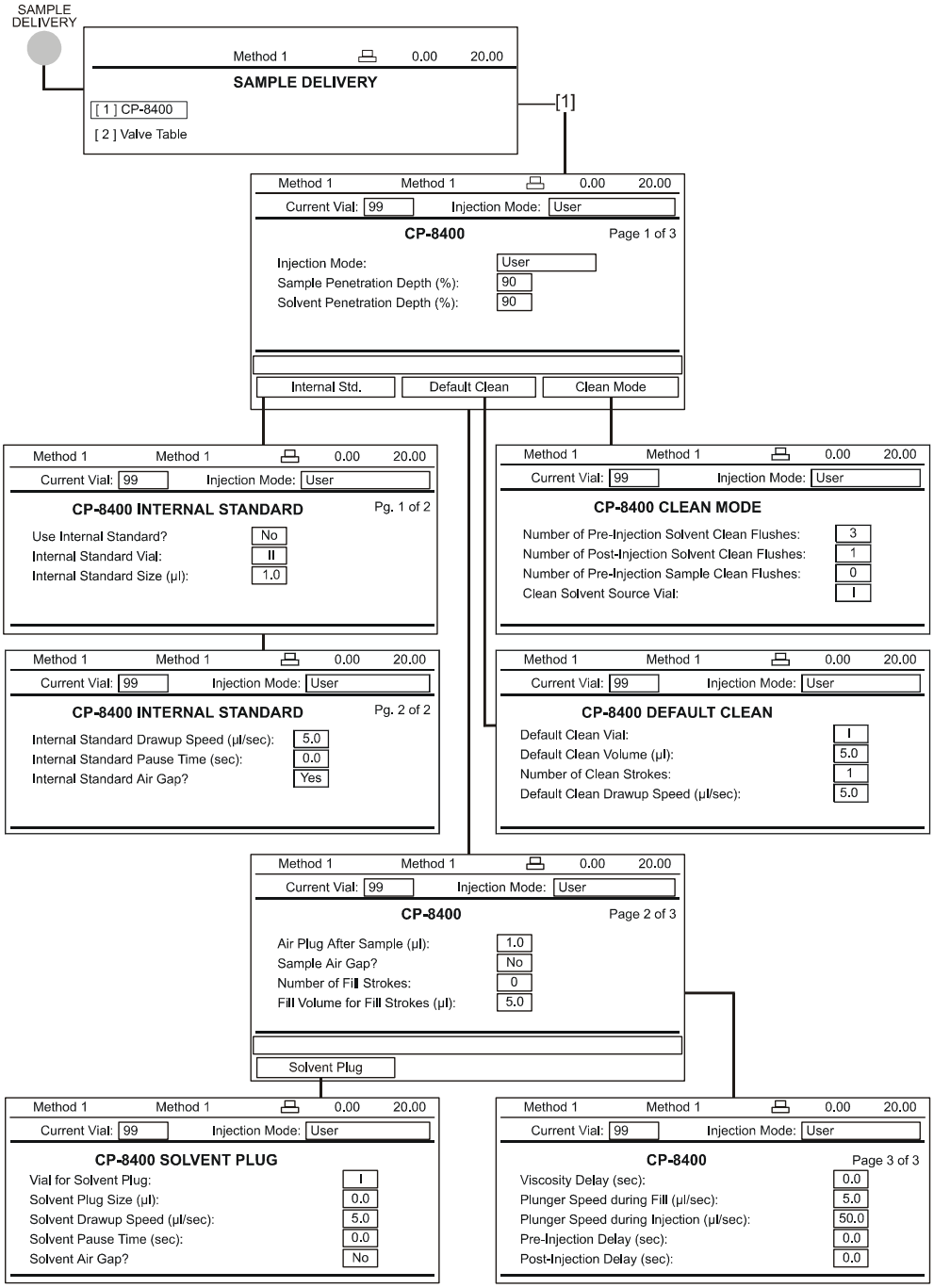


Single Method or Method Sequence Mode



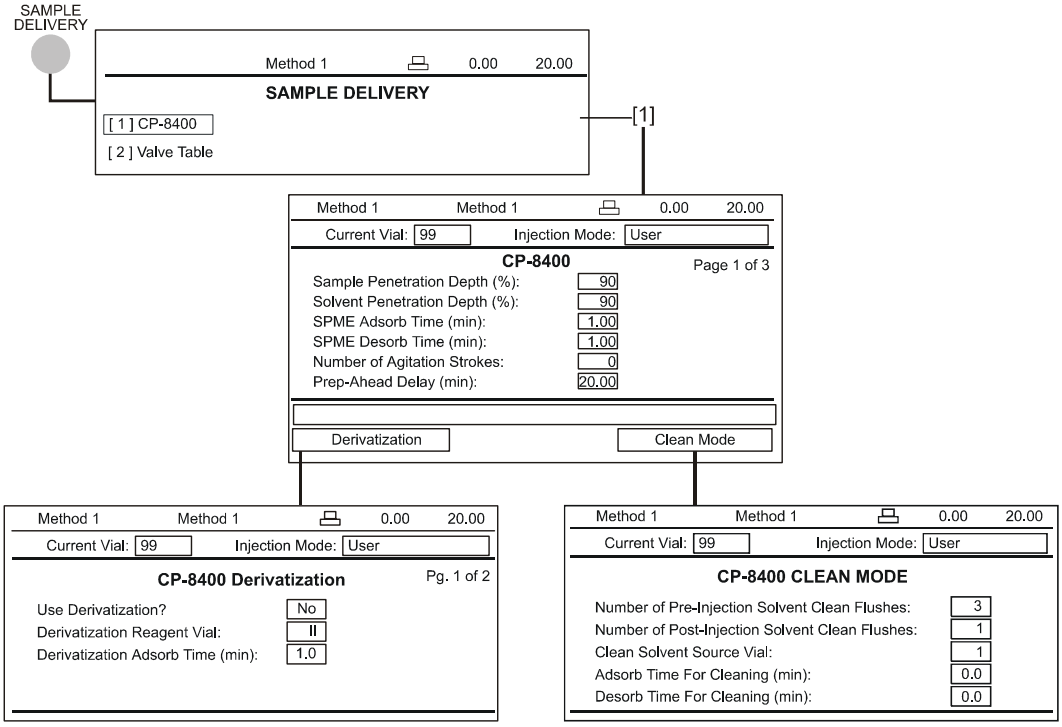
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

GC CONTROL section of CP-3800 keypad (Sample Delivery Button)



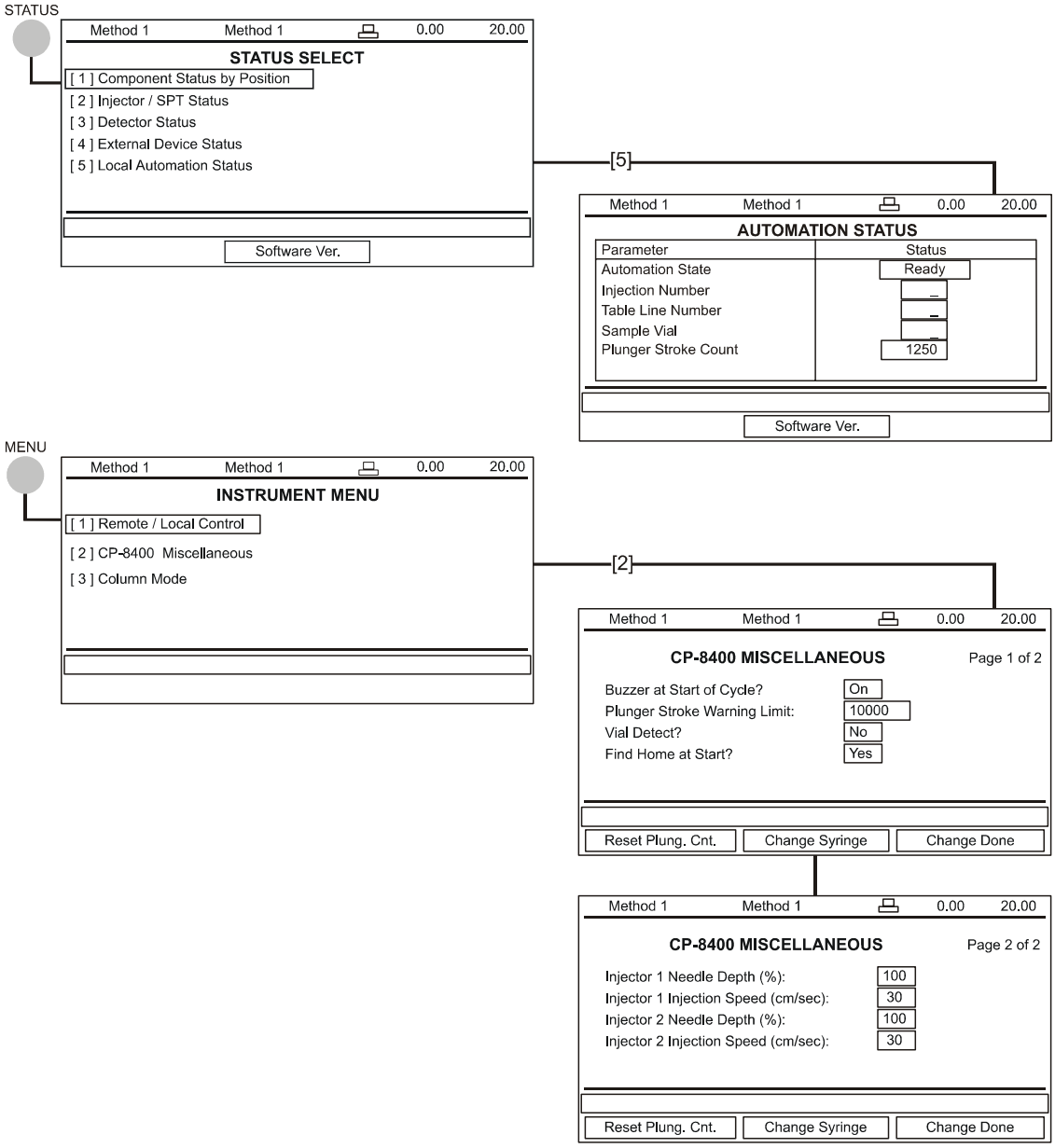
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

GC CONTROL section of CP-3800 keypad (Sample Delivery Button) (SPME)



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

INSTRUMENT section of CP-3800 keypad (Status / Menu Buttons)



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Automation Page Parameters

The CP-8400/8410 has a Single Method automation mode and a Method Sequence mode. The Single Method Automation consists of one page if the Setup parameter Number of Injection Ports is set to either Position 1 or Position 2, or two pages if the Number of Injection Ports in Setup is set to Both. Similarly, the Method Sequence automation mode requires one page for a single defined injector and two pages for both injectors. A Priority Sample 'override' is provided for urgent analyses.

Single Method Automation Parameters

Page1

Method	Method 1 - Method 8	default = Method 1
Initial Sample	0 to 99 (1 to 21)*	default = 0
Final Sample	0 t o 99 (1 to 21)*	default = 99
Injections / Sample	1 to 99	default = 99
First Injection Volume (µL)	0.1-5, 0.1-10, or 1-100	default = 1.0
Second Injection Volume (µL)	0.1-5, 0.1-10, or 1-100	default = 1.0

(if a single injector is configured, only the first Injection Volume will be displayed)
(if SPME is being used, the Injection Volume fields will have dashed lines)

Page 2 (if Both selected in Setup)

Use Prep-Ahead?	Yes or No	default = No
Injector Position	Pos. 1, Pos. 2, Both	default = Pos. 1
First Injector Used	Pos. 1, Pos. 2	default = Pos. 1
Use Injection Delay?	Yes or No	default = No
Delay Between Injections (min)	0.5-10.0	default = 1
Advance for Second Injection?	Yes or No	default = Yes
Clean Between Injections?	Yes or No	default = No

* values in parentheses denote CP-8410 limits

Note that the Page 2 Parameters are only used if Both is selected for the Inj Pos parameter.

Under Workstation control, user access and control of automation through the Local User Interface is not allowed; viewing the existing Automation setup parameters is allowed. Workstation control will function through its own SampleList and automation structures.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Method (Method 1 to Method 8) – This parameter selects which of the local methods will be used for single automation. Default selection will be Method 1.

Initial Sample (0 to 99 for the CP-8400, 1 to 21 for the CP-8410) – The Initial Sample represents the vial position of the first vial to be used with the specified method. The Initial Sample position must be less than or equal to the Final Sample. Setting the Initial and Final Samples to the same vial position will cause only that vial to be used. The default value is 0 for the CP-8400 or 1 for the CP-8410.

Final Sample (0 to 99 for the CP-8400, 1 to 21 for the CP-8410) – The Final Sample represents the vial position of the last vial to be used with the specified method. The Final Sample position must be greater than or equal to the Initial Sample position. Setting the Initial and Final Samples to the same vial position will cause only that vial to be used. The default value is 99 for the CP-8400 or 21 for the CP-8410.

NOTE: If either an initial sample selection or a final sample selection can not be reached by the CP-8410 tower due to the sample tray orientation, those vials that can not be reached are treated as missing vials.

Injections / Sample (1 to 99) – This parameter defines how many injections will be performed from the same vial. When only a single injector is used, this parameter application is obvious. When both injectors are used, the application of this parameter will treat the two injectors as one. If Advance Carrousel for Second Injection is set to Yes, the AutoSampler is at vial position 10, and the Injections/Sample is set to 3, then the CP-8400 will inject from vial 10 followed by vial 11. After the run finishes, the CP-8400 will again inject from vial 10 followed by vial 11. This process will be repeated a third time. If the Advance Carrousel for Second Injection is set to No, and we are again considering the situation in which the AutoSampler is on position 10, then the CP-8400 will inject from position 10 into both injectors. When the run ends, it will again inject from vial 10 into both injectors. It will repeat the process a third time. The default value is 99.

First Injection Volume (0.1 to either 5 or 10 µL or 1-100 µL syringe depending on configured syringe) – This selection defines the volume of sample that will be used for the first injection. If only one injector is being used, this volume represents the volume that will be injected. Note that there are two places where the number of injectors are set. The first place is in Setup where you configure the instrument (if you have selected a single injector in Setup, then this field will be labeled ***Injection Volume***). The second place will be in the Injector Position parameter (described below). If the Injector Position parameter selects either position 1 or Position 2, then the First Injection Volume will be the only

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

injection volume used. The volume is settable in 0.1 µL increments for the 5 and 10 µL syringes and 1 mL increments for the 100 µL syringe. The default value is 1 µL irrespective of the configured syringe volume. This volume will be used with the first injection made. This may be into either injector 1 or injector 2 depending on the First Injector Used parameter described below.

Second Injection Volume (0.1 to either 5 or 10 µL, or 1-100 µL syringe depending on configured syringe) – This selection defines the volume of sample that will be used for the Second injection. In order to use the Second Injection Volume you must have the Injector Position parameter described below set to Both. The Second Injection Volume is ignored if the Injector Position is set to either 1 or 2. If you have only configured one injector, then this entry field will not be displayed. The volume is settable in 0.1 mL increments for the 5 and 10 µL syringes and 1 µL increments for the 100 µL syringe. The default value is 1 µL irrespective of the configured syringe volume. This volume will be used with the second injection made. This may be into either injector 1 or injector 2 depending on the First Injector Used parameter described below.

Use Prep-Ahead? (Yes or No) – This parameter is used to select whether the Auto Sampler will sample for the next injection immediately after the current chromatographic run is completed or to cause the Auto Sampler to sample while the current run is in progress thus improving throughput. Prep-Ahead works for either liquid or SPME sampling modes. If you set the Prep-Ahead selection to Yes, the system will use the Prep-Ahead delay time entered into the method to determine when to begin sampling for the next run. The Prep-Ahead timer will begin after the Auto Sampler has completed all of its actions for the current run. For instance, if you have dual or duplicate injections selected and the second injection is set to take place 0.5 minutes into the run, the Prep-Ahead timer for the next sample will start once the second injection is finished. So if you have set the Prep-Ahead timer to 10 minutes, the system will actually start sampling at around 10.5 minutes into the run. If your sample is either heat or light sensitive you may wish to leave the Prep-Ahead selection at No. Note that the Prep-Ahead timer is independent of the run time; this allows you to set a next sampling time while the instrument is either equilibrating or stabilizing if the sample may be heat or light sensitive. You will have to experiment with sample and solvent flushes along with any other pre-injection settings for your Auto Sampler to determine the correct Prep-Ahead time for optimum cycle time and minimum wait before injection.

Injector Position (1, 2, or Both) – This parameter is used to either limit the automation to a single injector (either Position 1 or Position 2), or to

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

force the CP-8400/8410 to inject into both injectors for each run. The default value is 1.

First Injector Used (1, 2) – This parameter is only used if the Injector Position is set to *Both*. This parameter defines which of the injectors will be used to inject into first and thus start the run. If you set the First Injector Used to 1, the system will inject the first injection volume into the position 1 injector. If First Injector Used is set to 2, the system will inject the first injection volume into the position 2 injector. The default value is 1.

Use Injection Delay? (Yes or No) – This parameter is only used if the Injector Position is set to *Both*. Selecting Yes for this parameter will cause the Delay between injections time to be used. Selecting No will cause the second injection to be made as soon as the AutoSampler has sampled the second vial. The default value is No.

Delay Between Injections (0.5-10 min) – This parameter is only used if the Injector Position is set to *Both*. The AutoSampler will immediately sample the vial for the subsequent injection and the syringe sled will advance to the top of its travel and position itself over the second injector. Once the Run clock, started at the time of the first injection, reaches the set time, the injector sled will descend and the second injection made. If the set delay expires before the AutoSampler is ready to inject, the second injection will be made as soon as the AutoSampler is ready and the operator will be notified of the discrepancy. The default value is 1 minute.

Advance for Second Injection? (Yes or No) – This parameter is only used if the Injector Position is set to *Both*. Selecting Yes for this parameter will cause the AutoSampler to advance to the next vial in the specified vial range for the second injection. If the SampleList is already at the end of the selected range, the second injection should not be performed and the message 'No more vials in selected range' displayed in the message line. If No is selected, the AutoSampler will use the contents of one vial to inject into each injector. The default value is Yes.

Clean Between Injections? (Yes or No) – This parameter is only used if the Injector Position is set to *Both*. Setting this parameter to Yes will cause the CP-8400 to execute the clean steps specified in the Clean Mode softkey of the method. Setting this parameter to No will cause the system to execute the second injection without a clean. The default value is No.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Method Sequence Table Parameters

Page 1 (table) * denotes CP-8410

	Method	Vial Range	Inj/Samp	Inj Vol 2	Inj Vol 1	Inj Pos
entries	1, 2, ..., 8	0 to 99 (1 to 21)*	1 to 99	0.1 to 5, 10 or 1 to 100	0.1 to 5, 10 or 1 to 100	1, 2, or Both
default	1	0 to 99 (1 to 21)*	1	1.0	1.0	1

Page 1 of 2

Method	Init	Final	Inj/ Samp	Inj Vol 1	Inj Vol 2	Inj Pos
1	1	20	3	0.5	----	1
2	21	38	2	2.0	1.0	Both
3	70	98	1	1.5	----	2

Page 2

Use Prep-Ahead (if Both selected in Setup)	Yes/No	default = No
First Injector Used	Pos. 1, Pos. 2	default = Pos. 1
Use Injection Delay?	Yes or No	default = No
Delay Between Injections (min)	0.5-10.0	default = 1
Advance for Second Injection?	Yes or No	default = Yes
Clean Between Injections?	Yes or No	default = No

Note that the Page 2 Parameters are only used if Both is selected for the Inj Pos parameter.

The vial range can be set to any combination of vial positions in ascending order. A range of 1 vial is allowed, thus a range of 1 to 1 means use Vial 1 with the specified method. The default value is 0 to 99 for the CP-8400 and 1 to 21 for the CP-8410.

The number of injections per sample may be set between 1 and 99; the system will inject the specified number of replicates. If a priority sample is invoked, the system will remember the number of completed replicates and return to the next replicate after the priority request is completed. The default value is 1.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Injection volume 1 & 2 specifies the volume of the sample that will be injected for the first and second injection respectively. (The First Injector Used parameter defines which of the two injector positions is injected into first.) This volume will be either 0.1 to 5 µL in 0.1 µL increments or, 0.1 to 10 µL in 0.1 µL increments, or 1 to 100 µL in 1 µL increments, depending on the volume of the installed syringe. The default value is 1.0. Note that the second injection volume is only used when Both is selected for the injector position. It is ignored if the Method Sequence Table line specifies either Position 1 or Position 2.

Injector position will be set to Pos.1 if the Setup parameter instructs the system to inject from the position 1 injector only; Pos.2 if the Setup parameter instructs the system to inject from position 2 only, or selectable by the user to any of Pos.1, Pos.2, or Both if the Setup parameter is set to both. Selecting Both during the Setup process causes a second page to be used in the SampleList. The default value is 1.

First Injector Used (1, 2) – This parameter defines which of the injectors will be used to inject into first (using the first injection volume) and thus start the run. For instance if you were to set the First Injector Used to 2, the system would use the first injection volume to inject into injector 2 followed by an injection using the second injection volume into injector 1. The default value is 1.

Use Injection Delay? (Yes or No) – This parameter is only used if the Injector Position is set to *Both*. Selecting Yes for this parameter will cause the Delay Between Injections time to be used. Selecting No will cause the second injection to be made as soon as the AutoSampler has sampled the second vial. The default value is No.

Delay Between Injections (0.5–10 min) – The AutoSampler will immediately sample the vial for the subsequent injection and the syringe sled will advance to the top of its travel and position itself over the second injector. Once the Run clock, started at the time of the first injection, reaches the set time, the injector sled will descend and the second injection made. If the set delay expires before the AutoSampler is ready to inject, the second injection will be made as soon as the AutoSampler is ready and the operator will be informed. The default value is 1 minute.

Advance for Second Injection? (Yes or No) – Selecting Yes for this parameter will cause the AutoSampler to advance to the next vial in the specified vial range for the second injection. When all of the sampling actions for the pair of vials is complete, the CP-8400 will skip the next vial in the range and proceed to the next vial after that. Thus if the AutoSampler samples from vials 10 and 11, it will advance to vials 12 and 13 (or what ever vials are next in the carrousel) for the next injection.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

This will prevent having the contents of the second vial being injected into both position 1 and position 2. If the SampleList is already at the end of the selected range, the second injection is not performed and the message ‘ No more vials in selected range’ displayed in the message line. If No is selected, the AutoSampler will use the contents of one vial to inject into each injector. The default value is Yes.

Clean Between Injections? (Yes or No) – This parameter is only used if the Injector Position is set to Both. Setting this parameter to Yes will cause the CP-8400 to execute the clean steps specified in the Clean Mode softkey of the method. Setting this parameter to No will cause the system to execute the second injection without cleaning. The default value is No.

Priority Sample

Priority Sample functions to allow you to interrupt automation to run a sample that needs to be run as soon as possible. After the priority sample(s) have been completed the automation that had been running will resume where it left off. Please note that Prep-Ahead is not available for Priority Samples. Any time that the CP-3800 is running one of its automation modes, the Priority Sample will be available; and can be initiated at any time using the Run Now softkey. The current run in progress will continue to its conclusion before the Priority Sample is run. The system will return to the next replicate of the run that was in progress or continue with the next scheduled injection once the Priority Sample is completed. The numbering of the carrousel for the CP-8400 is designed to facilitate use of the priority sample feature. If you plan to use priority samples during automation, arrange your regular samples in positions 1-99. Position 0 can be reserved as the Priority Sample position and will require a minimum of intervention to run. Of course, any vial position may be designated as a Priority Sample. The Priority Sample screen has two pages with the following choices.

Page 1

Priority Sample Vial Number	0 to 99	default = 0
Priority Sample Method	Method 1 to Method 8	default = Method 1
Injection 1 Volume	0.1-5, 0.1-10 µL, 1-100 µL	default = 1.0
Injection 2 Volume	0.1-5, 0.1-10 µL, 1-100 µL	default = 1.0

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Page 2 (only displayed if Both is set in Setup)

Injector Position	Pos. 1, Pos. 2, Both	default = Pos. 1
First Injector Used	Pos. 1, Pos. 2	default = Pos. 1
Use Injection Delay?	Yes or No	default =No
Delay Between Injections (min)	0.5-10.0	default = 1

Note that the Page 2 parameters are only used if Both is selected for the Inj Pos parameter.

If the operator chooses to use an Injector Position or Both, the carrousel will not advance. Priority Sample does not support dual mode but does support duplicate mode. (When two injections are performed from a single vial into both injectors, that operation is referred to as “duplicate mode”.) There will be no cleaning steps between injections. All listed parameters work as described above for Single Method and Method Sequence Automation.

Method Parameters

The fundamental CP-8400/8410 method has three pages of parameters that represent the most frequently used parameters and four pages of softkeys to access more advanced features; however, predefined modes of operation limit the need to access all parameters. Varian has extensively researched the injection process for a wide variety of solvents and techniques. The CP-8400 is preprogrammed with five injection modes designed to optimize your analysis for volatile samples (Volatile), viscous samples (Viscous), neat samples (Neat), and standard (or generic) samples using either a split/splitless injection or an on-column injection (Standard Split/Splitless or Standard On-Column). Choosing one of these five injection modes will preset critical parameters for optimum performance and limit the parameters you need to set. If you prefer to develop your own injection method for your CP-8400/8410, the sixth CP-8400/8410 operation mode user defined (User), allows access to the full suite of CP-8400/8410 parameters. You should exercise care when using the user defined mode since choices for some parameters may have unintended consequences. An example of this is the use of an Internal Standard with sample fill strokes. If an Internal Standard is withdrawn and then sample fill strokes are executed, the Internal Standard will be introduced into the sample and diluted.

1. Pre-injection Clean Flushes (if defined)
2. Sample Clean Flushes (if defined)
3. Upper Solvent Air Gap (if defined)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4. Solvent plug (if defined)
5. Upper Internal Standard Air Gap (if defined)
6. Internal Standard (if defined)
7. Upper Sample Air Gap (if defined)
8. Sample
9. Air Plug After Sample (if defined)

There are six liquid injection modes (Standard On-Column, Standard Split/Splitless, Neat, Volatile, Viscous, User Defined) **and SPME**– Selecting one of the five predefined modes or SPME will cause predefined AutoSampler methods to be used. These methods are defined as follows.

Standard Split/Splitless and Standard On-Column Sampling Modes

Internal Standard is not permitted with Standard Sampling modes.

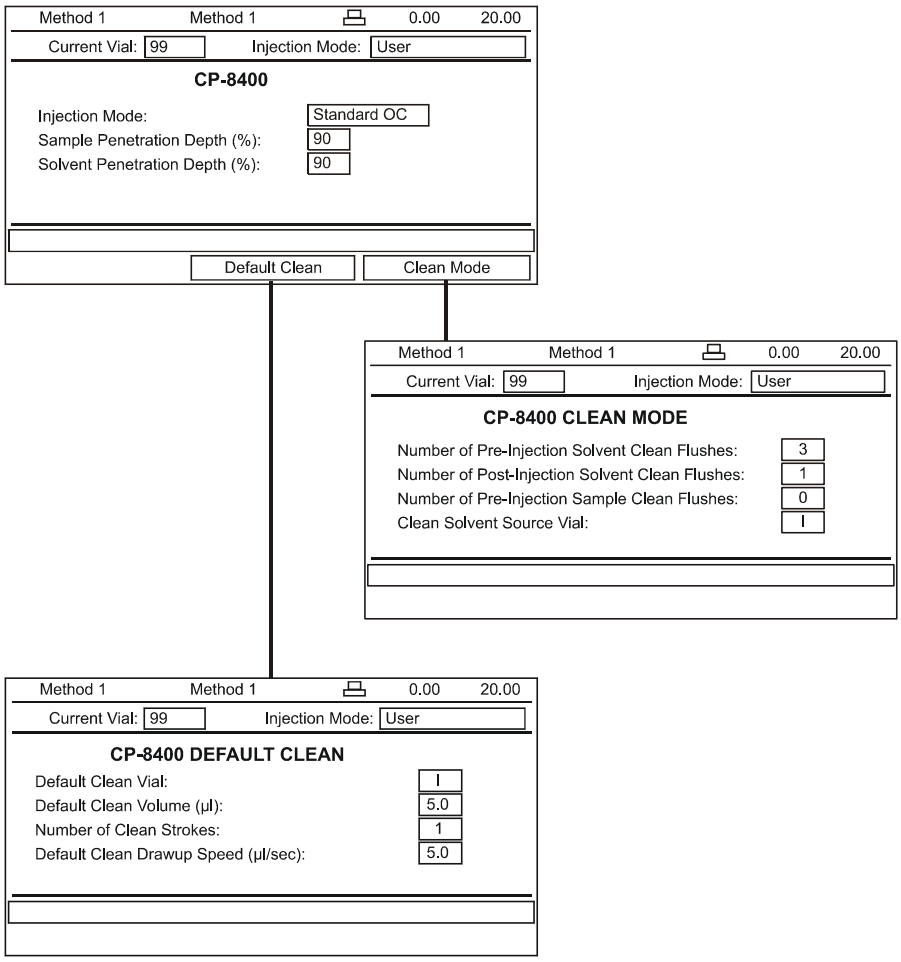
Standard mode parameters are set for samples dissolved in common solvents such as iso-octane.

The Standard sampling mode performs the following sequence of actions:

1. Any pre-injection Clean actions will occur.
2. The syringe is positioned in the sample vial according to the Sample Penetration Depth setting. The syringe plunger is withdrawn and the Syringe contents expelled back into the vial five times at the set plunger withdrawal Speed and the maximum plunger expel speed.
3. The volume of sample specified in the Single Method or Method Sequence Automation will be withdrawn from the specified sample vial. The sled will ascend to the top of its travel and the plunger will be withdrawn an amount equal to 1 µL (Air Plug after Sample).
4. The AutoSampler will inject the entire contents into the specified injector. Standard On-Column mode injects at 5 µL/second. Standard Split/Splitless mode injects at 50 µL/second with 10 µL syringe.
5. The post injection clean flushes will be executed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The Standard On-Column and Standard Split/Splitless entries and available screens are summarized below:



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Neat Sampling Mode

Internal Standard is not permitted with Neat Sampling mode.

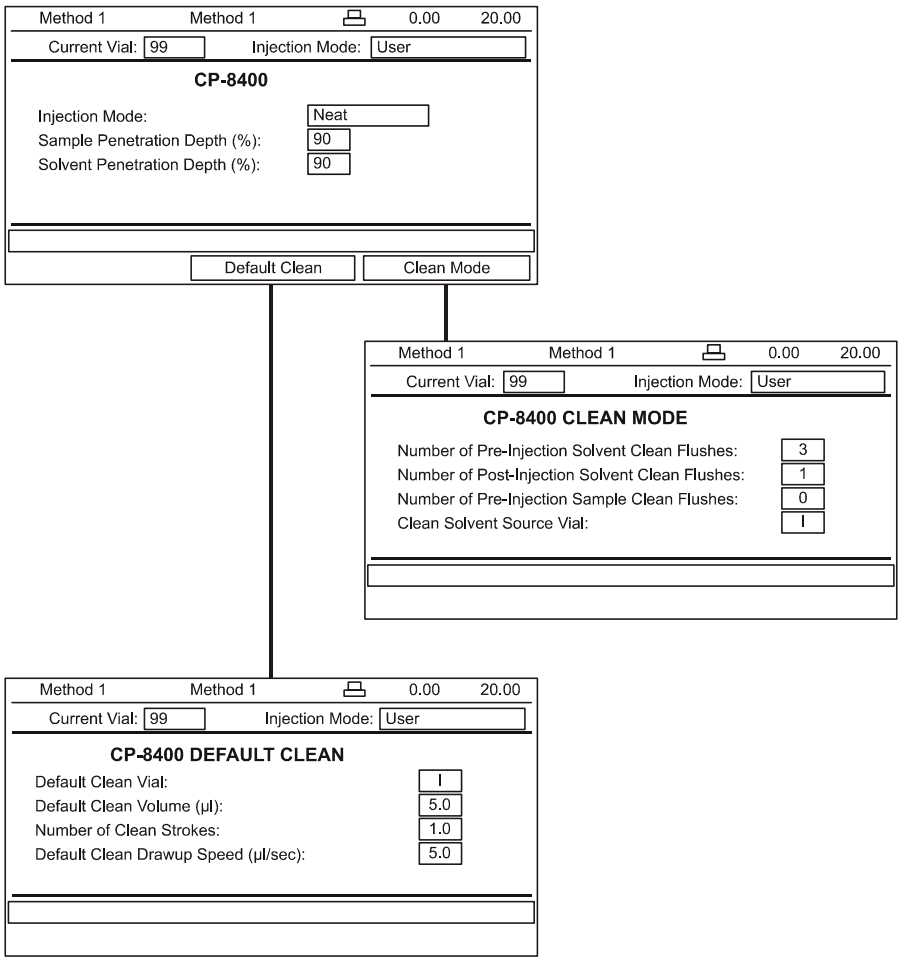
Neat mode parameters are set for samples that are normally liquids that will be injected without dilution.

The Neat sampling mode performs the following sequence of actions:

1. Any pre-injection Clean actions will be executed.
2. A full syringe volume of sample is withdrawn (2 µL/sec) and expelled (50 µL/sec) into the waste cup. This is performed a total of six times.
3. A full syringe volume of sample is withdrawn (2 µL/sec) and expelled (50 µL/sec) into the sample vial. This is performed three times.
4. The sample volume is withdrawn (2 µL/sec) and a 1 µL lower air gap is formed.
5. The volume specified in the SampleList is injected. The post injection clean is performed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The Neat mode screens and parameters are displayed below:



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

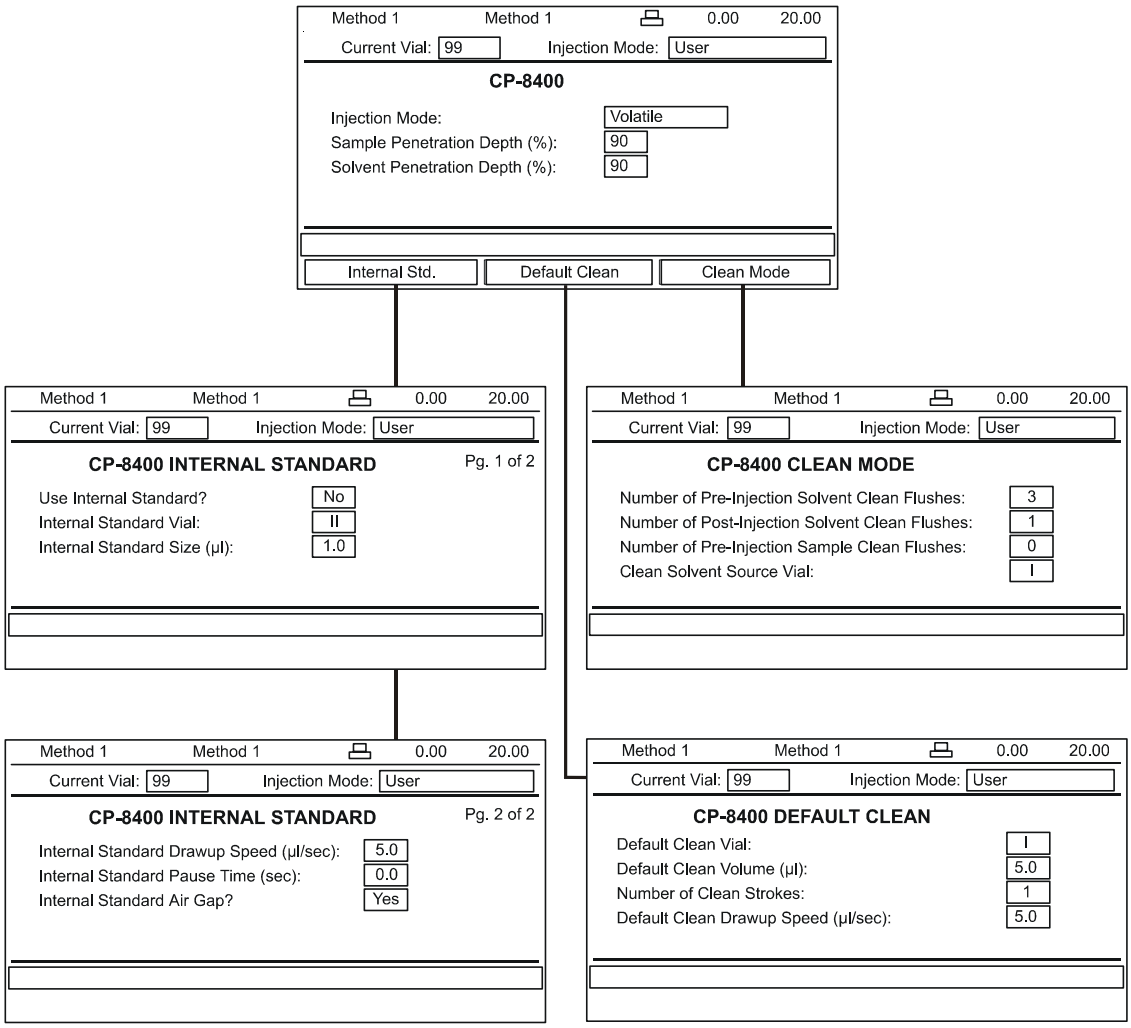
Volatile Sampling Mode

This mode is designed for samples dissolved in highly volatile solvents such as pentane.

- The number of pre-injection **solvent** clean flushes specified in the method will be performed by drawing a full syringe of solvent from the specified clean vial and expelling it into the waste cup.
- The number of pre-injection **sample** clean flushes specified in the method will be performed by drawing a full syringe of sample from the specified sample vial at 1 µL/sec, waiting 6 sec with the needle in the sample, and expelling it into the waste cup at 50 µL/sec.
- If an Internal Standard is used, the Internal Standard will be withdrawn from the specified source vial at this point – the air gap will be set now if specified.
- The volume of sample specified in the Single Method or Method Sequence Automation will be withdrawn from the specified sample vial at 1 µL/sec.
- The system will pause 6 sec, and the sample will be injected into the specified injector at a rate of 1 µL/sec.
- The post injection clean flushes will be executed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The Volatile mode screens and parameters are displayed below:



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Viscous Sampling Mode

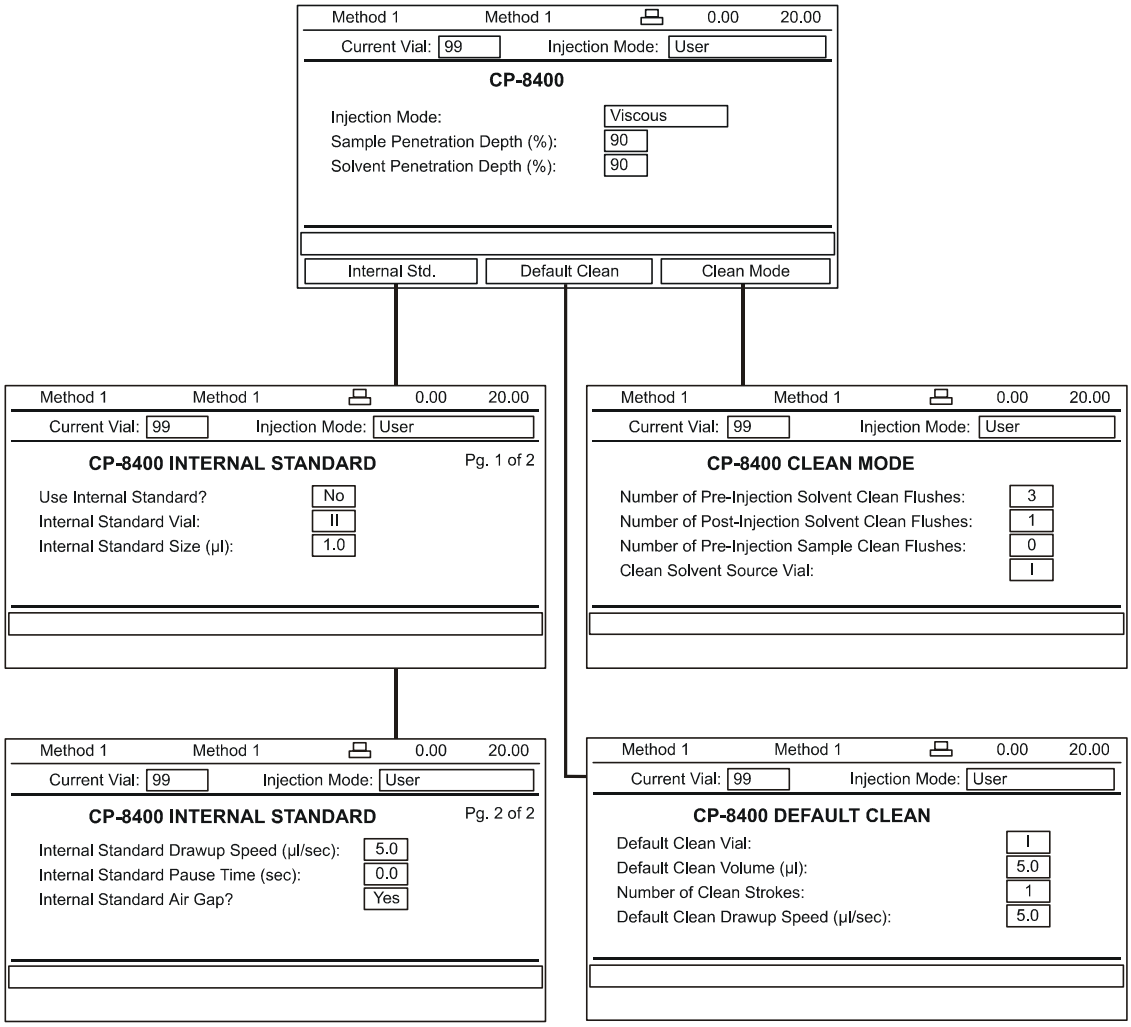
Viscous mode is designed for samples that either are viscous or are dissolved in a viscous solvent such as cyclohexanol.

Viscous mode actions are summarized below:

- The number of pre-injection **solvent** clean flushes specified in the method will be performed by drawing a full syringe of solvent from the specified clean vial and expelling it into the waste cup.
- The number of pre-injection **sample** clean flushes specified in the method will be performed by drawing a full syringe of sample from the specified sample vial at 1 µL/sec waiting 9.9 sec with the needle in the sample, and expelling it into the waste cup at 50 µL/sec.
- If an Internal Standard is used, the Internal Standard will be withdrawn from the specified source vial at this point – the Internal Standard air gap will be withdrawn if specified.
- The volume of sample specified in the Single Method or Method Sequence Automation will be withdrawn from the specified sample vial at 1 µL/sec.
- The system will pause 9.9 sec, and the sample will be injected into the specified injector at a rate of 5 µL/sec. The syringe will remain in the injector for 12 seconds before being withdrawn.
- The post injection clean flushes will be executed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The Viscous mode screens and parameters are summarized below:



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SPME Sampling Mode

SPME mode is designed for using the special Solid Phase Micro-Extraction fibers and fiber holder.

Note that you can not select the SPME Sampling mode from the CP-3800 keypad. In order to configure the system to use SPME you must set a switch on the syringe sled to the correct position and install the special SPME fiber holder block. This means of setting up the system to use SPME was adopted to avoid unintentional damage to either SPME hardware or syringes.

SPME mode actions are summarized below:

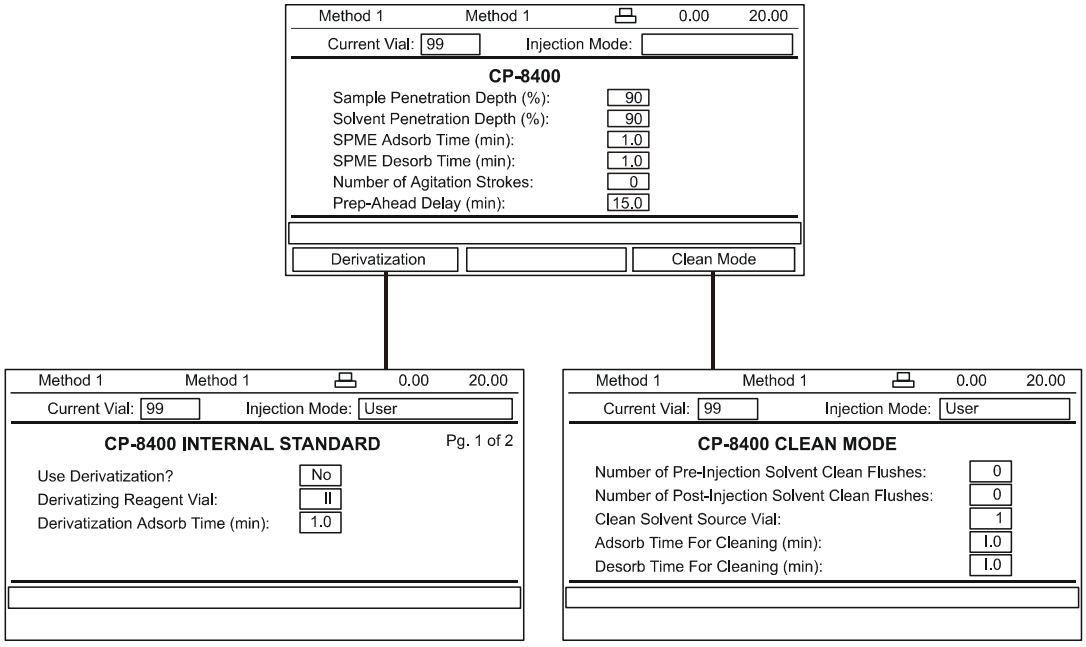
- ***Warning: do not use the clean mode actions unless you have experience with SPME or have very dirty samples with insoluble materials that need to be removed. Indiscriminate use of cleaning can introduce contaminants into your analytical run and degrade your results.***The number of pre-injection solvent clean flushes specified in the method will be performed by dipping the fiber into the solvent and waiting for each clean stroke the time specified in the Adsorb Time for Cleaning. Once the cleaning strokes are completed the tower will rotate over the waste station, the fiber holder will descend and the fiber exposed for drying/desorbing (desorbing requires a heated gas stream to be gently blown over the fiber).
- If Prep-Ahead is used, the Auto Sampler will begin the sampling process at the set delay time after the Prep-Ahead timer has expired. This allows you to sample for extended lengths of time without adversely affecting the throughput of your system. The Prep-Ahead timer starts after the Auto Sampler has finished all injections actions for the current injection.
- If Derivatization is specified, the fiber will next be introduced into the Derivatizing Agent vial specified in the Derivatization page. The fiber will penetrate into the Derivatizing agent vial the depth set for the Solvent penetration depth on the main SPME parameters page. The fiber will wait for the specified Adsorb time and then be withdrawn.
- The SPME fiber holder will be positioned over the sample vial and the number of agitation strokes requested will be performed. Agitation is accomplished by moving the fiber into and out of the fiber holder at between 1 and 2 times per second. It is common for this action to pause a little longer sometimes relative to others. This non-regular motion is expected and normal. Each time the fiber descends into the sample, it will stay in the sample for the specified

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Adsorb Time. Use the Sample Penetration Depth to sample from either headspace (the vapor above the sample) or into the liquid. The fiber holder sheath (the needle at the end of the fiber holder) will penetrate about 6 mm into the sample vial. The fiber will be extended varying distances based on the penetration depth setting. For liquid sampling you will get best results if the level of the liquid in the vial does not contact the fiber sheath thus potentially causing carry-over.

- The Auto Sampler will next perform the SPME sample introduction into the injector. The SPME fiber holder will descend and penetrate the injector septum. The fiber will then be extended the specified Desorb time on the main SPME parameters page.
- Upon withdrawal from the injector, any post injection clean actions will be performed.

The SPME mode screens and parameters are summarized below:



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

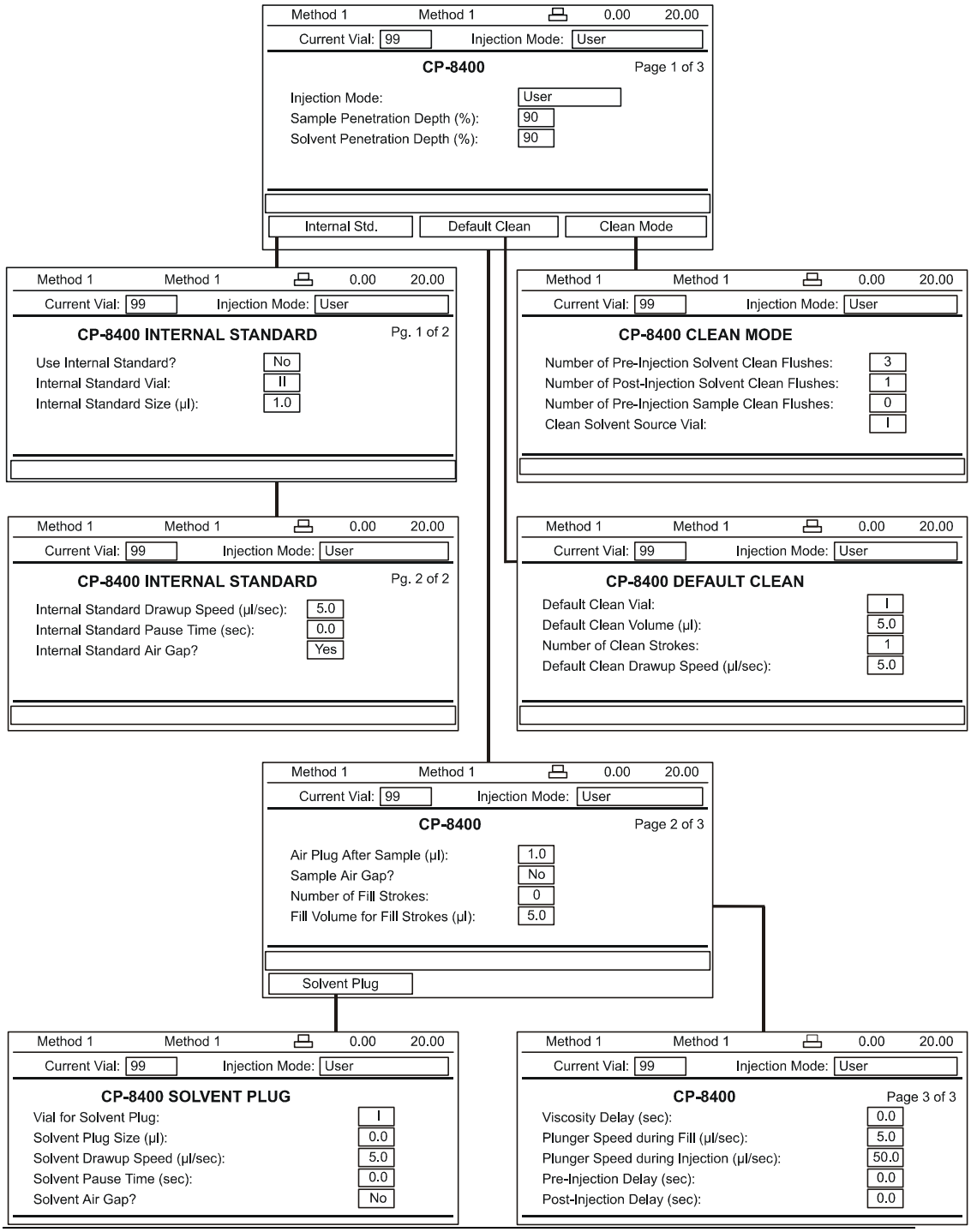
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

User Defined Sampling Mode

Allows access to all AutoSampler parameters.

This mode of operation should be used with caution since some parameters, if not optimally set, can produce poor area precision and anomalous results. User Defined mode has three pages of parameters, and softkeys leading to additional parameters.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Page 1 Parameters and Softkeys

Sample Penetration Depth (0-100%) – This parameter defines how far the needle penetrates through the septum into the sample vial. The percentage refers to the distance from the bottom of the vial septum to the bottom of the vial interior. The valid range is settable in 1% steps. The default is 90%.

Solvent Penetration Depth (0-100%) – This parameter defines how far into the solvent vials the needle will penetrate. The percentage refers to the distance from the bottom of the vial septum to the bottom of the clean vial interior. There is only one penetration depth for all three clean/Internal Standard vials. This parameter is settable in 1% steps. The default is 90%.

Clean Mode Selecting this softkey will display a page with the following parameters:

Number of Pre-Injection Solvent Clean Flushes (0-99) – This parameter defines the number of times the syringe will draw up solvent, rotate to the waste cup and expel the syringe contents before the sampling process begins. The default value is 3.

Number of Post-Injection Solvent Clean Flushes (0-99) – This parameter defines the number of times the syringe will draw up solvent, rotate to the waste cup and expel the syringe contents after the injection process has ended. The default value is 1.

Number of Pre-Injection Sample Clean Flushes (0-99) – This parameter defines the number of times the syringe will draw up sample, rotate to the waste cup and expel the syringe contents before the sampling process begins. The default value is 0.

Clean Solvent Source Vial (I, II, III, I&II, I&III, II&III, I&II&III) – There are three clean vials. This parameter selects which clean solvent source or combination of clean solvent sources the AutoSampler will use for its clean flushes. If a combination Clean Solvent Source is specified, the system will perform the number of solvent clean flushes as set by the operator from each of the solvent sources. Consequently, if the operator selected the Clean Solvent Source of I&II&III and the number of pre-injection solvent clean flushes was set to three, the system would draw up and expel solvent from Clean Solvent Source I three times, Clean Solvent Source II three times and finally Clean Solvent Source III three times for a total of nine syringe actions prior to beginning the sampling process. The default value for the Clean Solvent Source is I.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Internal Standard Selecting this softkey will display a page with the following parameters:

Use Internal Standard? (Yes or No) – This parameter determines whether the system will use an Internal Standard as part of the sampling procedure. Selecting Yes will cause the CP-8400/8410 to draw up the specified amount of Internal Standard from the specified vial. Selecting No will cause the AutoSampler/AutoInjector to not use an Internal Standard. The Internal Standard will always be withdrawn before the sample is withdrawn to avoid as much as possible cross contamination of the Internal Standard with analytes. The default value is No.

Internal Standard Vial (I, II, III) – This parameter will identify which of the three Clean vials contains the Internal Standard. The AutoSampler/ AutoInjector will draw up the Internal Standard before the sample. This order is to minimize contamination of the Internal standard by residual sample. The default Internal standard vial is Clean Vial position II.

Internal Standard Size (0-4.9, 0-9.0 µL or 0-90 µL) – This parameter defines the volume of Internal Standard that will be extracted for injection. The AutoSampler/AutoInjector will draw up the Internal Standard before the sample. The default Internal Standard volume is 1 µL.

Internal Standard Drawup Speed (0.1-25, 0.1-50, or 1-100 µL/sec) – This parameter defines how fast the plunger will be drawn out of the syringe extracting Internal Standard from the vial and into the syringe. The default value is 5 µL/sec.

Internal Standard Pause Time (0-9.9 sec) – This parameter defines how long the syringe will remain in the vial after the plunger has reached its set withdrawal volume. This is required to allow the Internal standard to fully migrate into the syringe. The default value is 0 sec.

Internal Standard Air Gap (Yes or No) – Selecting Yes for this parameter will cause the AutoSampler to withdraw the plunger a distance equal to 1 µL after the syringe has been withdrawn from the vial. Selecting No will cause the syringe plunger to remain in its position subsequent to the extraction of the Internal Standard until some other sampling action is required. No air gap will be withdrawn. The default value is Yes.

Default Clean Selecting this softkey will display a page with the following parameters. Use in case Automation is stopped or a serious fault is detected.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Default Clean Vial (I, II, III) – This parameter specifies the wash solvent vial that will be used by the Default Cleaning procedure. The default value is 1.

Default Clean Volume (0-5, 0-10, or 0-100 µL) – This parameter defines the amount of cleaning solvent that will be drawn up and expelled to waste. The volume is selectable in 0.1 µL increments for the 5 and 10 µL syringes. The default value is 5.0 µL.

Number of Clean Strokes (0-10) – This defines the number of times the cleaning solvent will be drawn up and expelled into the waste cup. The default value is 1.

Default Clean Drawup Speed (0.1-25, 0.1-50, or 1-100 µL/sec) – This parameter specifies how quickly the plunger will be withdrawn from the syringe drawing solvent into the barrel. The default value is 5 µL/sec. This same value should be used as the plunger speed when expelling the syringe contents into the waste cup.

Page 2 Parameters and Softkeys

Air Plug After Sample (0-5, 0-10, or 0-100 µL) – This parameter defines the volume of air drawn up after the sample has been drawn into the syringe. The valid range is selectable in 0.1 µL steps for the 5 µL and 10 µL syringes. The default value is 1 µL.

Sample Air Gap (Yes or No) – Setting this parameter to Yes will cause the syringe plunger to be withdrawn an amount corresponding to 1 µL prior to the syringe sled descending and the sample being drawn up. Setting this parameter to No will cause no upper air gap to be formed. The default value is No.

Number of Fill Strokes (0-99) – This parameter defines how many times the syringe plunger will be “pumped” (withdrawn and then advanced). This parameter is required to effectively flush the syringe with the sample to remove bubbles and prevent dilution of the sample by residual solvent from wash processes. The syringe will use the Plunger speed parameters as defined in the viscosity settings page. The default value is 0.

Fill Volume for Fill Strokes (0-5, 0-10, or 0-100 µL)) – This parameter defines the volume that will be used by the fill strokes specified above. This volume will usually be equal to or larger than the sample volume specified in the SampleList. The default value is 5 µL.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Solvent Plug Selecting this softkey will display a page with the following parameters:

Vial for Solvent Plug (I, II, III) – This parameter defines which of the vials will be used as the source for the solvent plug. The default selection is wash vial I.

Solvent Plug Size (0-5, 0-10, or 0-100 µL) – This parameter defines the volume of solvent that will be used for the solvent plug in 0.1 µL steps for the 5 and 10 µL syringes. The default volume is 0 µL.

Solvent Drawup Speed (0.1-25, 0.1-50, or 1-100 µL/sec) – This parameter defines how quickly the plunger will be withdrawn form the syringe during the solvent plug extraction procedure. The default value is 5 µL/sec for each of the syringe types.

Solvent Pause Time (0-9.9 sec) – This parameter defines how long the syringe needle will remain in the vial after the plunger has been withdrawn a distance corresponding to its set volume in the Solvent plug size parameter. The default value is 0 sec.

Solvent Air Gap (Yes or No) – Setting this parameter to Yes will cause the syringe plunger to be withdrawn an amount corresponding to 1 µL prior to the syringe sled descending and the solvent being drawn up. Setting this parameter to No will cause no upper air gap to be formed. The default value is 0.

Page 3 Parameters

***Viscosity* Delay** (sec) – defines the amount of time the system will wait after the syringe plunger is withdrawn, drawing sample into the syringe. This time is required to allow samples with high viscosity to migrate into the syringe. The syringe remains in its loading position with the needle at its programmed depth in the sample vial for the duration of the Viscosity delay. The default value is 0.0.

Plunger Speed During Filling (0.1-25, 0.1-50, or 1-100 µL/sec) – defines the speed at which the plunger will be withdrawn to draw up sample. This parameter is required to prevent cavitation of some solvents during extraction. The default speed is 5 µL/sec.

Plunger Speed During Injection (0.1-25, 0.1-50, or 1-100 µL/sec) – Depending on the volume of the syringe installed, this parameter will be limited to the specified ranges. The Injection rate setting has 0.1 µL/sec step resolution. The default value is 50 µL/sec.

Pre-Injection Delay (0-99.9 sec) – Specifies the length of time the needle will remain in the injector prior to the advancing of the syringes plunger to expel its contents into the injector. The default value is 0 sec.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Post-Injection Delay (0-99.9 sec) – Specifies the length of time the needle will remain in the injector after the syringes contents have been completely expelled. The default value is 0 sec.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Instrument Menu

The Instrument Setup button displays a screen with two selections. The CP-8400/8410 selection has two screens that display the following parameters:

Buzzer at Start of Cycle (On/Off) – A sound will be generated to warn of impending tower movements when this parameter is set to On. The default value is On.

Plunger Stroke Warning Limit (1-100,000) – This parameter defines the expected number of strokes the plunger is expected to survive without significant degradation. Once the entered value is exceeded, a message will be displayed on the CP-8400/8410 Status page indicating the plunger counter has exceeded the set value. The default number of strokes is 10,000.

Vial Detect? (Yes or No) – Selecting Yes will cause the AutoSampler/ AutoInjector to halt and generate an error if a missing vial is encountered. A selection of No will cause the AutoSampler/AutoInjector to ignore a missing vial and continue until it finds a vial within the specified range. The default value is No.

Find Home at Start? (Yes or No) – Selecting Yes will cause the CP-8400/8410 to find its home position before starting automation or before an autoinject action. If several people are using the CP-3800 on which the AutoSampler/AutoInjector is mounted, then it is advisable to leave this setting to Yes. Use the No selection for higher throughput.

Change Syringe (Softkey) -Selecting this softkey will cause the tower to rotate such that the user will have easy access to the syringe for routine service and syringe removal and replacement. The buzzer will sound before any tower movement occurs. Press the Change Done softkey upon completion of the syringe maintenance.

Change Done (Softkey) – Selecting Change Done will cause the tower to return to its previous position and state. The buzzer will sound prior to movement as designated by the “Buzzer at start of cycle” setting.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Reset Plunger Stroke Counter (Softkey) – Selecting this softkey causes the Plunger stroke count to be reset to 0.

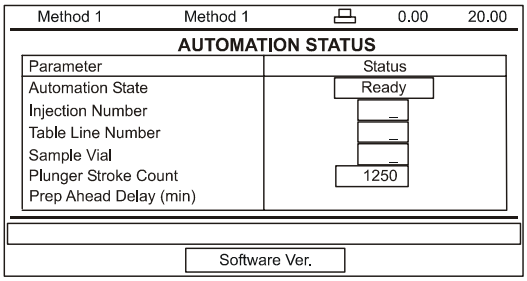
Injector 1 Needle Depth (%)	0 to 100	default=100
Injector 1 Injection Speed (cm/sec)	1 to 30	default=30
Injector 2 Needle Depth (%)	0 to 100	default=100
Injector 2 Injection Speed (cm/sec)	1 to 30	default=30

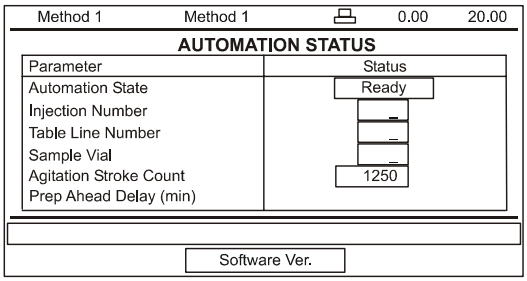
The Injector Needle Depth parameters define how far into the designated injector the needle will penetrate. 100% causes the needle to be completely inserted to its 2-inch length.

The Injector Injection Speed parameters define the rate at which the needle will penetrate the injector septum and descend to the set Injector Needle Depth.

CP-8400/8410 Status

The Automation Status page displays the current state of automation and the CP-8400/8410 progress through the selected automation table.





SPME STATUS

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Special Uses

The CP-8400 and CP-8410 have a variety of features that support novel uses for completing your analyses quickly and reliably. Some of the features include Dual and Duplicate injections, assigning analytical methods to certain vial ranges for “turn-key” type operation, the ability to meter Internal Standards with analytical injections and Priority Sample interruption of in-progress automation.

Dual/Duplicate Mode Operation

The terms Dual and Duplicate injections refers to injecting into two different injectors during a single run. The injectors will have different method sections within the CP-3800 and may be set to either run the same injector oven profile or different oven profiles. The Column Oven will run a single column oven profile and the detectors will operate according to their individual sections set in the CP-3800 method. It is strongly recommended that you turn Vial Detect On when using Dual/Duplicate mode to avoid unintended mismatches between Sample Lists and runs.

Dual Run

A Dual run refers to sampling from two different vials and injecting into two different injectors.

To perform a Dual run you must have, of course, two injectors installed adjacent to each other and within the reach of the CP-8400/8410. The CP-8400/8410 must be configured to use both injectors. Two important considerations to keep in mind when setting up a Dual run are to set the injector used in the Automation table you are using to Both and to set the Advance Vial for second injection to Yes. Two other parameters of special note are the first injector used and the delay time between injections. The CP-8400/8410 will always go to the first injector specified to make the first injection of a Dual run. The delay time between injections will cause a timer to begin incrementing at the first injection. The CP-8400/8410 will immediately sample for the second injection and will pause immediately over the second injector to be used until the delay timer expires. As soon as the timer reaches the set time, the second injection will be performed. This feature of the CP-8400/8410 is designed to allow high throughput with precise retention times.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Duplicate Run

Duplicate runs are performed exactly the same way as Dual runs except the “Advance Vial for second injection” parameter is set to No. This will cause the CP-8400/8410 to inject the contents of a single vial into both injectors. Note that you may use any of the preprogrammed Sampling modes in either the Dual or Duplicate modes.

Assigning Methods to Vial Ranges

If you examine the Automation table section of the CP-3800, you will notice that you may associate methods with certain vial ranges. This is called Method Sequence Automation. If your CP-3800 is in a laboratory that performs a limited number of routine methods, you can preprogram the methods and associate them with a specific vial range on your CP-8400. Set the Automation mode to Method Sequence automation and leave the CP-3800 in that state (the LED adjacent to Method Sequence on the left side of the CP-3800 keyboard will be illuminated). Next edit the Method Sequence automation table. You may set the same method to different vial ranges if you wish but you may not have overlapping vial ranges. Setting the Vial Detect parameter in the Instrument Menu selection to off will cause the CP-8400 to skip any vial locations that are empty. The CP-8410 works similarly except that the AutoInjector sample tray does not rotate automatically. If a method is associated with a vial range that is not under the arc traced by the tower, the CP-8410 will treat those vials that are out-of-reach as missing. You must manually move the tray and start automation after the tray is relocated. Once a vial is encountered, the CP-3800 will activate the method associated with the vial range in which the detected vial resides and run the sample. This feature allows vial ranges to be assigned to specific operators who may then simply place their samples into the appropriate range and press the green Start button located in the upper left corner of the CP-3800 keyboard.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Automated Metering of Internal Standard

Internal Standard may be drawn up by the CP-8400/8410 syringe prior to drawing up the sample aliquot for injection. The Internal Standard may be placed into Solvent Vial positions I, II, or III. Internal Standard is always withdrawn before the sample to avoid contamination of the Internal Standard by sample that may remain on the syringe needle. You should avoid using Sample Fill strokes when using an Internal Standard since the Sample Fill strokes will expel the entire syringe contents back to the sample vial inadvertently contaminating your sample. Control of the Internal Standard sampling parameters is defined in the Internal Standard softkey that is located on the first page of the CP-8400/8410 method screens. Note that since both Standard mode and Neat mode use Sample Fill strokes, Internal Standard is not allowed with those preprogrammed modes.

Priority Sample

The Priority Sample is designed to be used while the CP-3800 is actively running an automation series. To use the Priority Sample, press the Automation Select/Edit button and press 4 to choose the Priority Sample. Enter the Method, injector, first and second (if appropriate) injection volume and other parameters. When you have set up the Priority Sample, press the Run Now softkey. The Priority Sample run will be queued immediately after the current run in progress. Upon completing the Priority Sample, the CP-3800 will return to the Automation that was in progress when the Priority Sample was selected.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP