Precept II

User Manual

Tekmar

Precept II

User Manual

Tekmar-DOHRMANN™

TekmarCompany

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Tygon	Norton Performance Plastics

Patents

Patents are pending on Precept.

Contents and Organization of the Manual

The table below lists parts of the manual and tells you what information you can find in each.

In this part of the manual	you will find this information:
Preface	• using and understanding the manual
Chapter 1 - Introduction	• unpacking Precept II • a list of what you need to do to begin using Precept II • understanding how Precept II works • safety
Chapter 2 - Parts Description	• an "encyclopedia" of Precept II's parts and accessories
Chapter 3 - Making Plumbing and Electronic Connections	• connecting Precept II to gas and water supplies • connecting drain lines • connecting Precept II to a 3000 Concentrator
Chapter 4 - Getting Ready to Run Samples	• understanding initial operation • setting flow rates and pressure • preparing standards and blank water • arranging and storing vials • leak checking
Chapter 5 - Processing Samples and Maintaining the Precept II	• editing configurations • understanding operation steps • using default methods • creating custom methods • scheduling sample runs • viewing temperatures • processing aqueous and solid samples • running blanks • processing priority samples • using the optional bar code reader • cleaning and maintaining Precept II and accessories

Table 1 Contents and Organization of the Manual

continued

In this part of the manual	you will find this information:
Chapter 6- Troubleshooting the Precept II System	• contacting Service • safety • understanding error messages • finding leaks • solving electronic, mechanical, and analytical problems
Chapter 7- Ordering Parts and Service	• contacting Sales and Service • parts list
Appendices	• diagrams • charts

Table 1 Contents and Organization of the Manual

Understanding Symbols and Notices

The table below describes symbols and notices used in this manual.

This symbol and/or notice	Indicates:
 **DANGER**	an imminently hazardous situation, which, if not avoided, will result in death or serious injury
 **WARNING**	a potentially hazardous situation, which, if not avoided, can result in death or serious injury
 **CAUTION**	a hazardous situation, which, if not avoided, will result in product or property damage and possible injury
	hazardous voltage
	explosion
	fire
	the risk of eye injury; wear safety glasses
	the risk of burn injury
	the risk of hands, hair, jewelry, or clothing getting caught in moving parts
	the risk of receiving puncture wounds
Note:	an operating tip or maintenance suggestion; may result in instrument damage

Table 2 Explanation of Symbols and Notices

1.1 Description of Precept II

Precept II is a programmable, microprocessor-controlled vial autosampler. Precept II prepares many purge and trap sample types: drinking water, wastewater, soils, sludges, and many more. It purges the samples to the trap of a Tekmar purge and trap concentrator automatically. Precept II performs all of the sample handling steps, thereby providing total purge and trap performance: automation, reproducibility, accuracy, and productivity.

Precept II consists of sample vial trays, a robotic arm, and sampling module(s). The robotic arm transfers each sample vial from a tray to a sampling module. Each type of module performs a unique function. For example, the *aqueous (W) module* processes drinking water, groundwater, wastewater, and other liquids. Precept II transfers the sample to the concentrator glassware. The *solid (S1) module* processes soil, sludge, and other solid samples. Precept II purges the sample in the vial, then transfers analytes to the trap.

1.2 Precept II's Versatility

Precept II will perform different tasks, depending on which module(s) and accessory(ies) are installed. For example, if you plan to analyze both aqueous and solid samples, you need a Precept II with both aqueous (W) and solid (S1) modules installed. If you plan to analyze water only, you need a Precept II with a W module only installed. If necessary, a Tekmar-Dohrmann service representative can add an S1 module to a W only system.

The table below describes the different Precept II systems.

System	Function	Features
Precept II W	processes aqueous samples, such as drinking water and wastewater, in single-ended vials	two removable vial trays, automatic backflush particulate filter, standard vessel, priority sample capability, 25 ml variable volume sampling syringe, 25 ml frit sparger, cable for connecting Precept II to a concentrator
Precept II W/S1	processes aqueous and solid samples in single-ended vials; solid samples use the needle-sparge technique	two removable vial trays, automatic backflush particulate filter, standard vessel, priority sample capability, 25 ml variable volume sampling syringe, 25 ml frit sparger, sample heating chamber, cable for connecting Precept II to a concentrator

Table 1-1 Precept II Systems

1.3 Unpacking Precept II

This section explains how to unpack Precept II. Failure to follow instructions could void your warranty for parts damaged in shipment.

⚠ CAUTION

- **Never attempt to lift Precept II by yourself.**
- **Do not lift or pull Precept II by the robotic arm.**

1. Allow someone to help you lift the shipping container onto a sturdy table or workbench. The table or workbench must be able to support 80-100+ lbs.
2. A box has been placed over Precept II and secured to a base with a strap. Unfasten the strap and lift the box straight up from the base. With your partner's help, hold Precept II by its bottom and lift it from the foam base and onto the table.
3. Precept II is shipped with a kit box that contains the parts you will need for installation. Compare the contents of the kit box to the packing list that accompanies your shipment.

If an item is missing, call the Tekmar-Dohrmann Customer Service Department toll-free in the US and Canada at (800) 874-2004; outside the US and Canada, call (513) 247-7000.

4. Carefully examine Precept II. If it is damaged, notify the shipping carrier and Tekmar-Dohrmann immediately. Do not continue installation or return the instrument until a Tekmar-Dohrmann representative authorizes you to do so.
5. Save all shipping materials until you verify that Precept II is working properly. To save on shipping costs, you may wish to keep the shipping materials for as long as you own Precept II, in case you need to send Precept II back to Tekmar-Dohrmann for service or refurbishing.

1.4 List of Steps to Begin Using Precept II

Briefly, here is what you need to do to begin using Precept II:

1. Place Precept II on a level working surface.
2. Get familiar with Precept II by reading the user manual.
3. Make sure any optional accessories you ordered are installed.
4. Connect Precept II to water and gas supplies.
5. Connect Precept II to the concentrator. Make sure that you complete both plumbing and electronic connections.
6. Set pressure and flow rates.
7. Leak check all the connections you have made.
8. Program Precept II to operate according to your specific needs.
9. Place sample vials into the vial trays.
10. Initiate the run.

1.5 How Precept II Processes Samples

Precept II can process either aqueous and/or solid samples in any sequence. This section briefly explains how Precept II processes each type of sample.

How Precept II Processes Aqueous Samples

1. The robotic arm lifts the vial from the tray and delivers it to one of three sample equilibration chambers. In the chamber, the sample reaches room temperature. The equilibration time is programmable.
2. The robotic arm lifts the vial from the equilibration chamber and into the bar code reader chamber (optional) which records the bar code on the vial.
3. The robotic arm lifts the vial from the bar code chamber and puts it into the aqueous module sampling cup.
4. The sampling cup raises the vial onto the needle.
5. Concentric needles (one needle is inside the other) pierce the septum at the top of the vial.
6. The vial is pressurized.
7. A programmed amount of sample is drawn into the sample syringe.
8. Precept II transfers the sample with standards and/or programmed dilution to the sparger on the purge and trap concentrator.
9. Precept II initiates purging of the sample at the concentrator onto an absorbent trap.
10. The trap is rapidly heated and the analytes swept with GC carrier gas onto the GC column for separation and detection.
11. Precept II sweeps (with gas) and rinses the sample's pathway, including the needle and glassware on the concentrator.

continued

How Precept II Processes Solid Samples

1. The robotic arm lifts the vial from the tray and delivers it to one of three sample equilibration chambers. In the chamber, the sample reaches room temperature. The equilibration time is programmable.
2. The robotic arm lifts the vial from the equilibration chamber and into the bar code reader chamber (optional) which records the bar code on the vial.
3. The robotic arm lifts the vial from the bar code chamber and puts it into the sampling cup.
4. The sampling cup raises the vial onto the needle.
5. Concentric needles (one needle is inside the other) pierce the septum at the top of the vial.
6. Precept II adds water and standard(s) to the vial.
7. Gas purges the sample in the vial and carries the analytes to the concentrator trap.
8. The analytes are desorbed from the trap and transferred to the GC.
9. Precept II sweeps (with gas) and rinses the sample's pathway, including the needle and glassware on the concentrator.

1.6 Applications

Precept II maintains efficiency and accuracy by:

- Operating unattended
- Eliminating tedious, manual tasks such as injecting, stirring, diluting, and transferring samples
- Measuring and dispensing samples, standards, and dilutions in a consistent manner
- Regularly cleaning the sample pathways
- Providing default (factory-programmed) methods that are approved by the USEPA
- Heating sample pathways to prevent carryover
- Cooling samples prior to analyses
- Automatically reading bar codes (with the optional bar code reader)
- Processing both aqueous and solid samples in any sequence
- Running blanks to test sample integrity
- Processing duplicate samples from the same vial
- Running priority samples

Precept II processes samples using USEPA 500/600/SW846 series protocols. You can also design your own methods and easily program Precept II to use them.

If you have samples that contain unknown amounts of volatile organic compounds, you can program Precept II to dilute the samples. This prevents overloading of the system.

1.7 Understanding Terms and Abbreviations

This section contains definitions for words and abbreviations that are specific to Precept II.

Analyte	a chemical compound
Aqueous	water-based liquid, e.g., drinking water, wastewater, groundwater; sample type used in the aqueous (W) module
Board	an electronic printed circuit board
Card	see *Board*
Concentrator	an instrument (such as the Tekmar 2000 or 3000) that extracts the volatile portion of a sample and transfers it to the gas chromatograph
Concentric Needles	two needles with a common center
GC	gas chromatograph
I/O Cables	input/output cables used for the "communication" or transfer of electrical signals and/or information between instruments
Matrix	type of sample (i.e., aqueous or solid)
Matrix Spike	intermittent standard addition
Method	group of instrumentational parameters guiding the sampling procedure
Mode	one step of a method
Module	a part of Precept II designated by its function, i.e., aqueous module (W), which is used for sampling water and other liquids), or solid module (S1), which is used for sampling soil and other solids
Parameter	changeable parts of a method
Purge Gas	an inert gas flowing through the sample
S1 module	module that processes soils, sludges, slurry, and other solids; also called solid module

continued

Sample Gas	resulting gas after the purge gas passes through the sample; contains the analytes of interest
Schedule	programmed sequence for running multiple samples
Single-Ended Vial	a vial that is screw-capped at one end
Solid	sample type, e.g., soil, sludge, slurry; processed in the S1 module
Step	to move from a particular mode to another
Switching Valve	multiposition valve used to select a sample from a number of different streams
System Configuration	arrangement of Precept II systems (W, W/S1), accessories (bar code reader), and hardware (GC, MS, concentrator, etc.)
Transfer Gas	an inert gas that is used to force aqueous sample and standards through Precept II's flow paths
USEPA	United States Environmental Protection Agency
W module	module that processes drinking water, wastewater, groundwater and other liquids; also called aqueous module

1.8 Specifications for Precept II

This section lists requirements to operate Precept II properly and to proper specifications.

Utility Requirements:

Voltage: 100/120/230 VAC (±10%)
Frequency: 50/60 Hz
Power: 750VA
Btu: 2574 Btu/hour

Environmental Specifications:

Operating Temperature: 10–30°C
Storage Temperature: -20–60°C
Relative Humidity: 10–90% with no condensation

Weight:

80–100+ lbs. (depends on configuration and installed accessories)

Dimensions:

Height: 30" (76.2 cm)
Width: 20" (50.8 cm)
Depth: 23" (59.0 cm)

Gas Supply Requirements:

Ultra high purity (99.999%) helium or nitrogen
Incoming pressure: 20-60 psi

Vials:

Recommended vial: I-Chem 40 ml vials; screw cap at one end

Vial Storage:

Precept II can hold 48 vials in two sample trays. You can keep samples cool by placing a sample tray loaded with vials in a refrigerator, or you can use the vial chillers which cool samples to 4°C. (The vial chillers require an external recirculating cooling bath.)

Sample Volume:

1 to 25 ml at 1 ml increments ± 1%

Internal Standard Volume:

1 µl (2 µl rotor option can be purchased from Tekmar-Dohrmann)

Sample Lines:

Nickel tubing

Transfer Lines:

Nickel tubing

continued

Electronic Control:

Motorola 68332 Master microprocessor embedded controller

Fuse Ratings:

100 VAC: 10.0 amp; 250V rating
115 VAC: 8.0 amp; 250V rating
220 VAC: 4.0 amp; 250V rating

Displays:

- Two columns of lights (LEDs) in Precept II's upper left corner
- TekLink computer screen display

Sample Types:

Precept II processes drinking water, wastewater, groundwater, and other liquid samples with the aqueous (W) module. It processes soil, sludge, and other solid samples with a solid (S1) module.

Note: **When you are using the aqueous module, particulate content of the sample must not exceed 14 mm above the bottom of the vial.**

PC Requirements

- 386+ processor
- Windows 3.1+
- Teklink-Precept 3.0
- 10 Mb of free hard-drive space
- 3½" disk drive
- 8 Mb of RAM (recommended)
- 256-color mode (recommended)

1.9 Working Safely

DANGER

Never use hydrogen or other flammable gases with Precept II. Use only 99.999% ultra high pure helium or nitrogen. The wrong gas will explode or catch on fire.

WARNING

When using gas and chemicals, follow the manufacturers' directions for safe handling. Gas and chemicals can explode or catch on fire if you use them improperly. Refer to Material Safety Data Sheets for information on safe handling.

WARNING

Voltages inside Precept II can cause electrical shock and other injuries.
To use Precept II safely:

- **Do not process samples without the panels in place.**
- **Do not remove the panels unless it is necessary.**
- **Plug Precept II into outlets that provide the correct amount of voltage.**

WARNING

To avoid electrical shock, turn off and unplug Precept II and the concentrator before removing panels.

WARNING

- **Do not use an extension cord; it can overheat and cause a fire.**
- **The three-wire power cord is a safety feature. Plug the power cord into a properly grounded outlet.**

WARNING

Some parts inside Tekmar instruments heat to high temperatures. To avoid being burned, allow the instruments to thoroughly cool before you remove the panels.

continued

WARNING

Always keep hands, hair, jewelry, and clothing away from all moving parts. Since you may not be able to predict when a part will move, turn off and unplug Precept II before you place your hands near parts that can move. To stop a moving part (such as the robotic arm), use software commands. If this is not possible, stop movement by turning off Precept II.

WARNING

To avoid puncture wounds, do not place your hands near the sample needles. The cup or module that raises and lowers the sample can push your hand into the needle.

The arrows below point to areas where moving parts can cause injury.

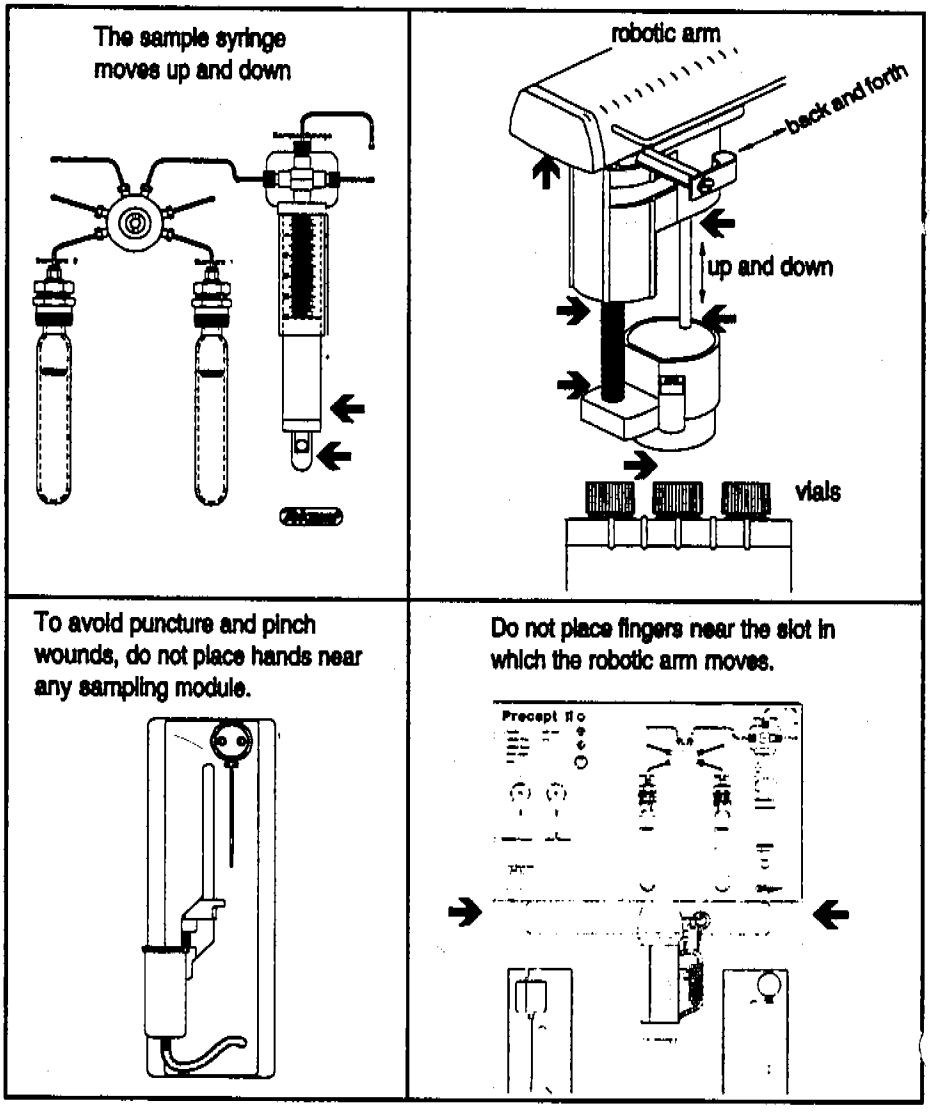


Figure 1-1 Areas Where Moving Parts Can Cause Injury

⚠ CAUTION

To avoid injury to yourself or damage to the instruments, do not exceed recommended pressure settings.

⚠ CAUTION

Do not allow Precept II to process samples without supply gas. Precept II will continue to cycle through all the operating modes, even if the supply gas tank is empty. This will cause the rinse water to back up into the gas line, which will damage the flow controllers.

⚠ CAUTION

Do not place hands, arms or objects on the robotic arm. The weight will damage the arm by creating stress on parts and inhibiting movement.

Notes:

- **To avoid interference with Precept II's operation, maintain at least two inches of empty space around it. Move all other equipment outside the two-inch perimeter.**
- **Do not open the memory access door during operation. (The door is in front of Precept II, behind the equilibration chambers and bar code reader). Opening the door automatically shuts off the power supply, which may result in method and/or schedule parameter losses.**
- **Connect Precept II to a water supply to avoid clogging the internal lines.**
- **To prevent damage to the sample syringe, do not allow it to run without liquid. See Chapter 5 *Maintaining the Precept II System*.**
- **Harsh chemicals can damage Precept II. Clean spills immediately.**
- **Do not allow water to drip or run behind the panels; it will damage the electronics.**

2.1 Overview

This chapter describes and illustrates Precept II's internal and external parts.

Precept II is illustrated below and on the following page. You can use these illustrations to locate individual parts.

For more information:

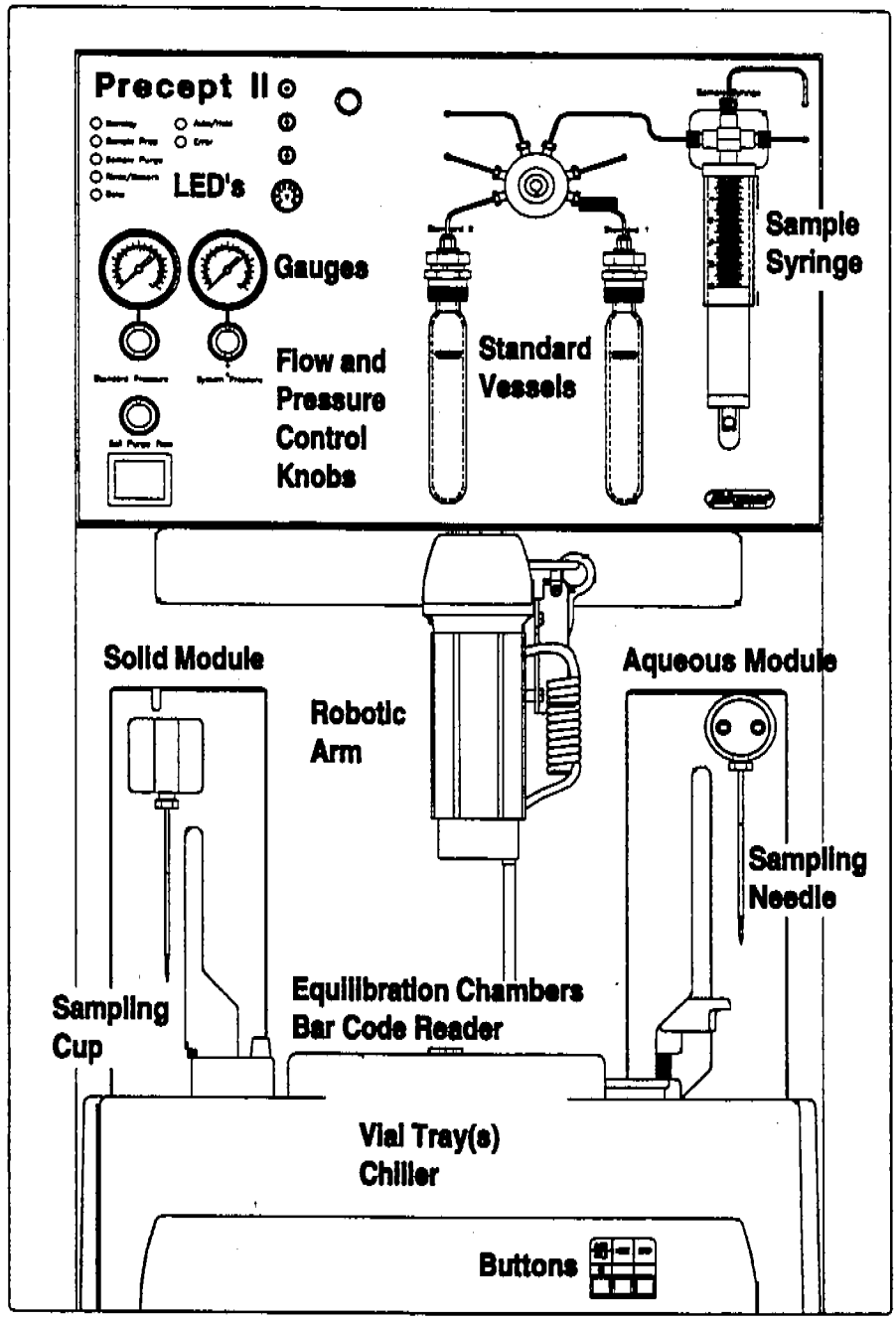


Figure 2-1 Front View of Precept II

continued

For more information:

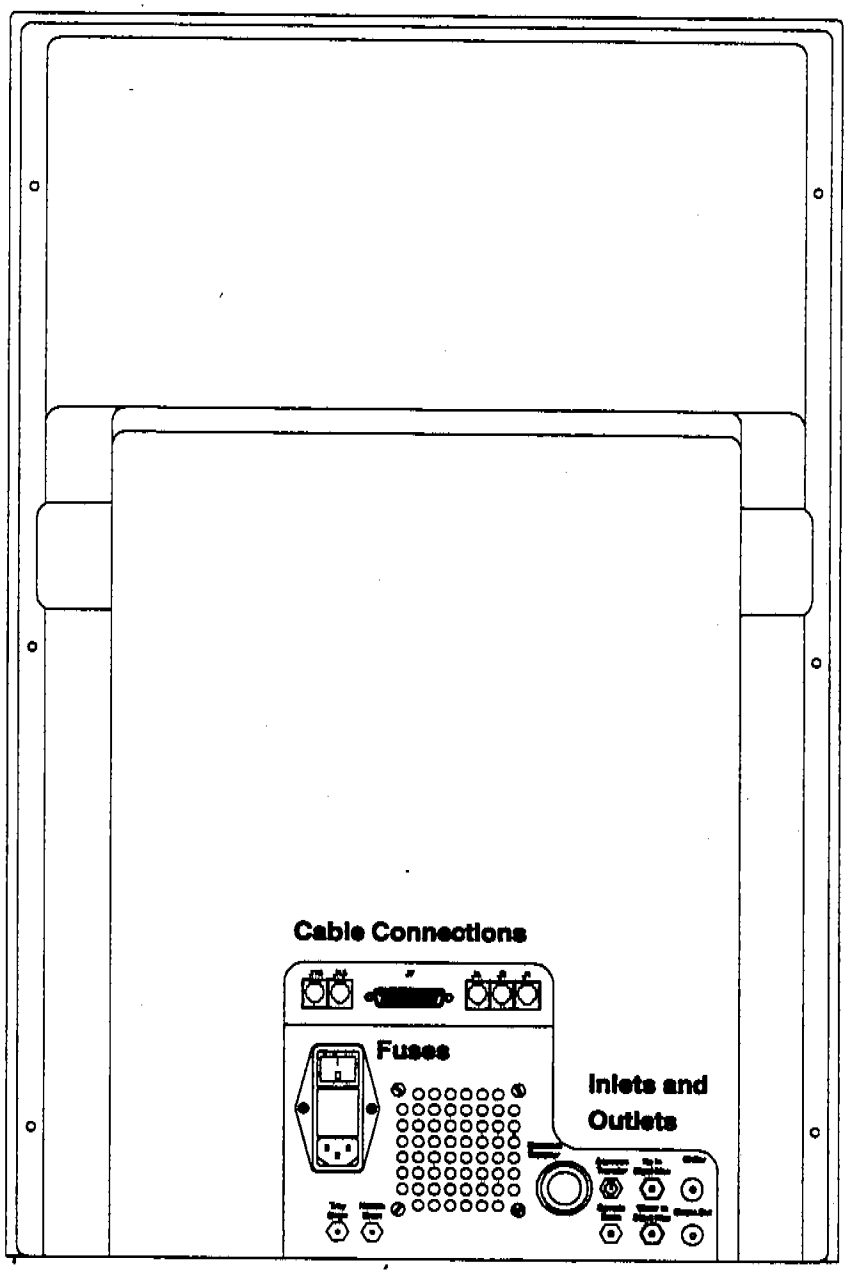


Figure 2-2 Back View of Precept II

2.2 Vials

The standard, USEPA-approved 40 ml glass vial is commonly used for environmental samples. Tekmar recommends that you use the I-Chem 40 ml vial.

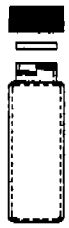


Figure 2-3 Vial Used with Precept II

2.3 Light Display (LEDs)

Two columns of lights (LEDs or light-emitting diodes) are in Precept II's upper left corner (Figure 2-4). The shorter column of lights are *status* lights; the longer column of lights are *run* lights. The LEDs indicate:

- When Precept II is operating automatically
- When Precept II is in hold
- An error
- The mode in which the error occurred
- Precept II's current mode of operation

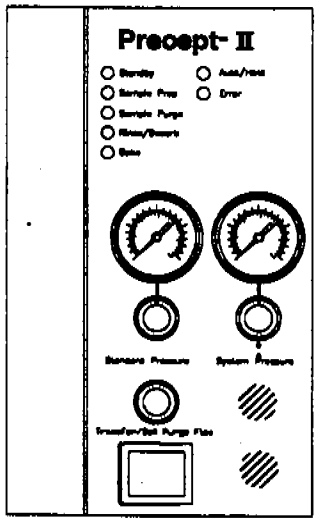


Figure 2-4 LEDs, Pressure Gauges, Pressure and Flow Control Knobs

2.4 Pressure Gauges, Pressure and Flow Control Knobs

Two pressure gauges, two pressure control knobs, and one gas flow control knob are underneath the LEDs. See Figure 2-4 above. You set pressure and gas flow rate by slowly turning the knobs. The knobs are labeled:

- System Pressure
- Standards Pressure
- Transfer/Soil Purge Flow

More information is in Chapter 4 *Getting Ready to Run Samples*.

2.5 Standard Vessels

Glass 20 ml vessels with UV-coating are used to store standards. The UV-coating keeps the light out, preserving standard integrity. If you need to replace a vessel, make sure the replacement is also UV-coated.

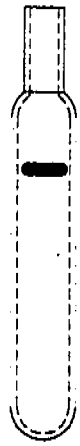


Figure 2-5 Standard Vessel

2.6 Sample Syringe

Precept II transfers aqueous sample from the vial to the sample syringe. It can accurately dispense 1 to 25 ml of liquid at 1 ml increments (±1%).

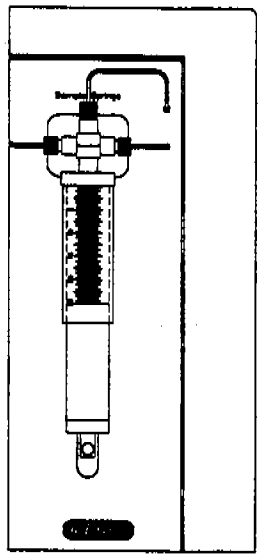


Figure 2-6 Sample Syringe

2.7 Robotic Arm

The robotic arm is an electronically-controlled mechanism that lifts vials from the vial trays and delivers them to the equilibration chambers, bar code reader chamber, and sampling cups. (It also returns the vials to the vial trays.) The arm moves in three directions: side to side (x movement), front to back (y movement), and up and down (z movement). One side to side movement can be a maximum of 15" (38.1 cm); front to back, 11" (27.9 cm); and up and down, 4" (10.2 cm).

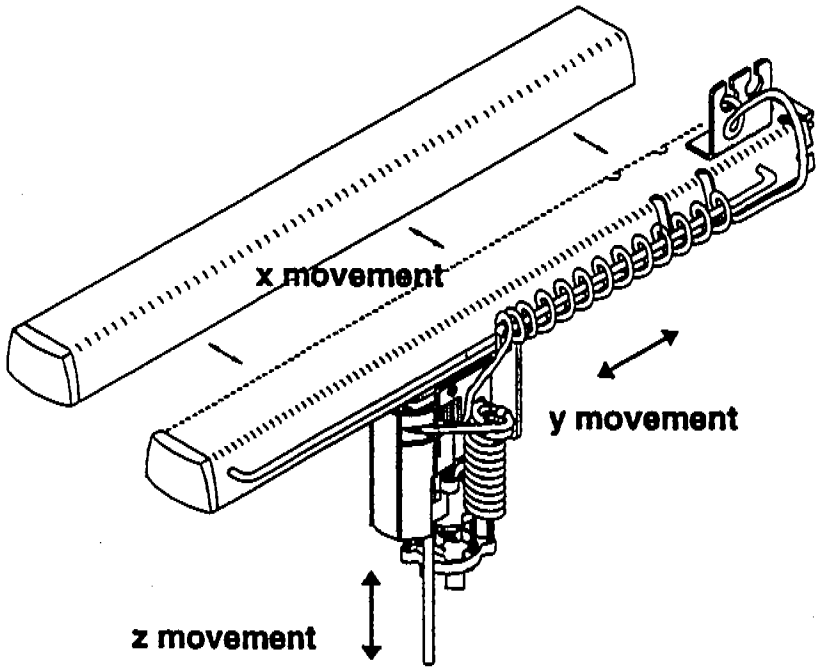


Figure 2-7 Robotic Arm

2.8 Sampling Modules

Precept II can process samples with the installation of the W only or W and S1 modules. The W module processes aqueous samples, and the S1 module processes solid samples.

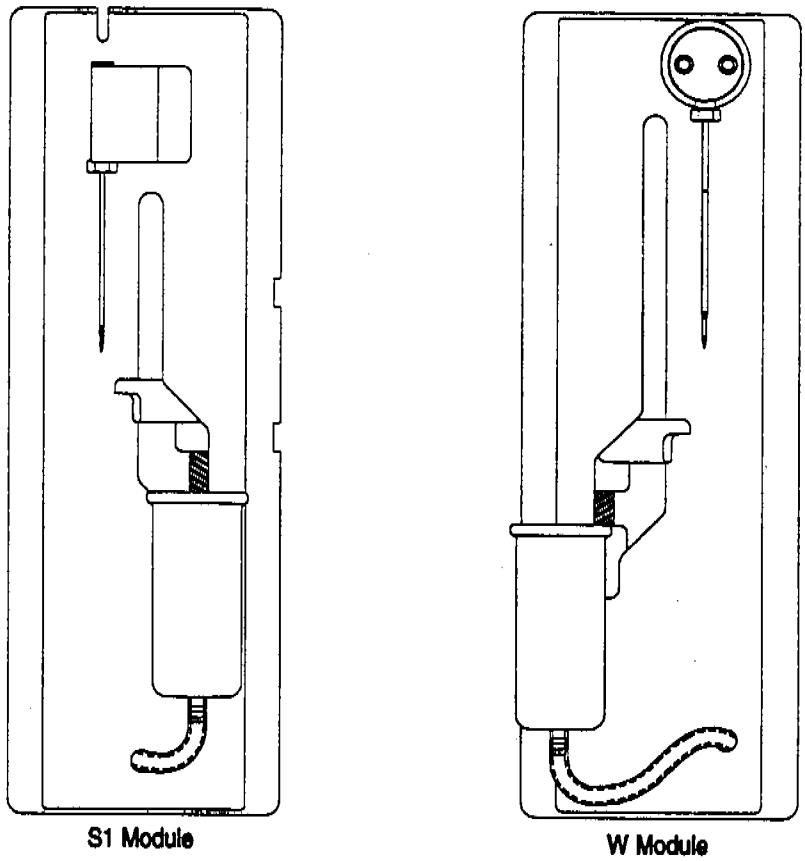


Figure 2-8 Front View of Sampling Modules

2.9 Sampling Needles

Both aqueous and solid modules use sampling needles. Precept II pierces the septum by moving the vial onto the needles.

Needles in the Aqueous (W) Module

The module that processes aqueous samples contains concentric sampling needles. Concentric needles have the same center (one needle is inside the other). Precept II positions the inlet of the inner needle within 3/8" above the bottom of the vial. Aqueous sample leaves the vial through this inlet. Precept II positions the outlet of the outer needle 1/8" below the septum. At this outlet, the headspace in the vial is pressurized with gas.

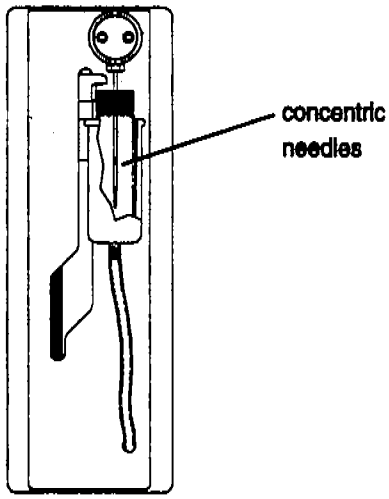


Figure 2-9 Needles on the Aqueous (W) Module

Needles in the Solid (S1) Module

The module that processes solid samples contains concentric needles (one needle is inside the other) that pierce the vial's septum. The inlet of the outer needle is positioned about 1/8" below the septum. At this inlet, sample gas leaves the vial. Precept II positions the outlet of the inner needle within 3/4" above the bottom of the vial. Blank water and purge gas enter the vial through this outlet.

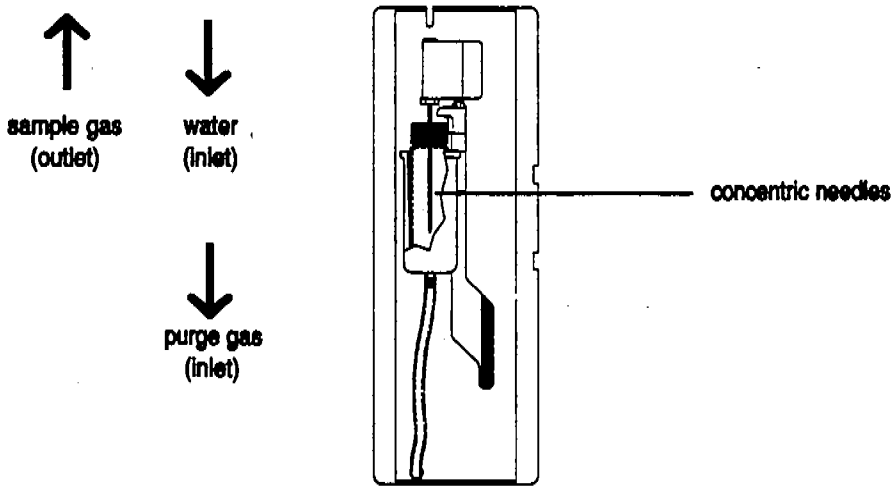


Figure 2-10 Needles on the Solid (S1) Module

2.10 Sampling Cup

A sampling cup (one for each module) holds the vial while Precept II moves it onto and off of the sampling needles.

The sampling cup on the aqueous module also serves as a drain. The cup catches water that has been flushed through the sample needle. The water exits through a drain tube and out the sample drain.

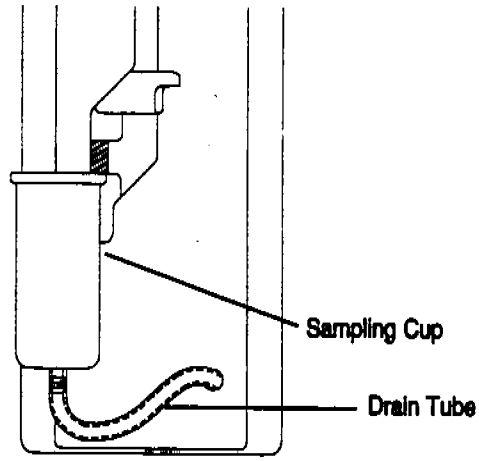


Figure 2-11 Aqueous Sampling Cup

2.11 Sample Equilibration Chambers

The USEPA specifies that samples should reach room temperature before processing.

To satisfy this specification, Precept II's robotic arm moves each sample from the vial tray and into a sample equilibration chamber (A, B, or C) for a programmed time (default is one hour) prior to processing.

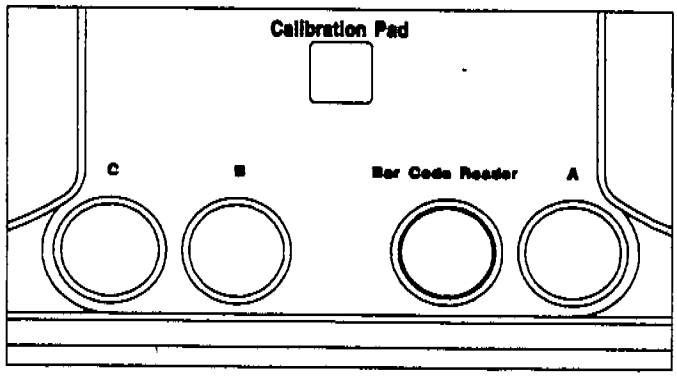


Figure 2-12 Sample Equilibration Chambers and Bar Code Reader

2.12 Bar Code Reader

The bar code reader (optional) automatically reads bar code labels on the vials. Precept II's robotic arm lifts the vials from the equilibration chambers and delivers them into the bar code reader before moving the vials into the sampling cup.

2.13 Vial Tray(s)

Two vial trays hold 48 vials (24 vials per tray). Having two trays allows you to process one load of 24 samples while another load stays cool in the refrigerator. You can also use the vial chiller to keep samples cool.

The receptacle in front of Precept II holds the vial trays. The robotic arm removes the vial from a tray and delivers it to its respective sampling module.

Two pressure-activated switches are at the bottom of the receptacle. When a tray is placed in its half of the receptacle, it rests on a switch. When the switch is pressed, Precept II receives a signal indicating that a tray is present; the robotic arm will move the vials to and from the present tray.

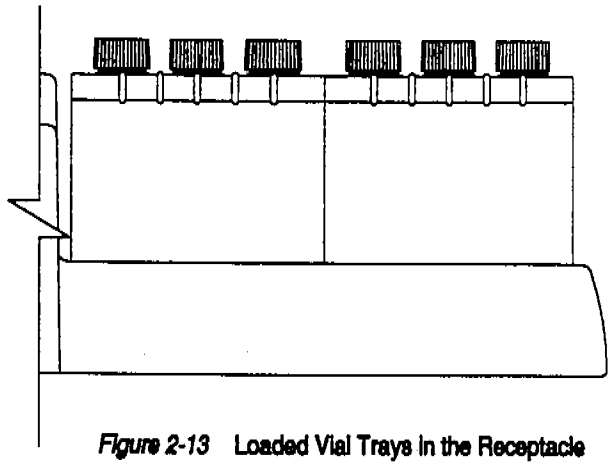


Figure 2-13 Loaded Vial Trays in the Receptacle

2.14 Vial Chiller

The vial chiller assembly is inside Precept II, underneath the vial trays. Recirculating coolant maintains a sample temperature of 4°C, which prevents loss of sample integrity and reduces the possibility of microbial activity in aqueous samples.

The vial chiller must be connected to an external recirculating cooling bath.

2.15 Buttons

In Precept II's lower right corner, you will find three push buttons labeled "Step," "Home," and "Auto/Hold." The push buttons allow you to use the Step and Auto/Hold functions without accessing TekLink software. (The Home button is not available at this time.)

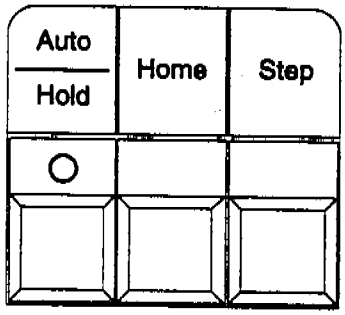


Figure 2-14 STEP, HOME, and AUTO/HOLD Buttons

2.16 Cable Connections

Cable connections allow you to connect Precept II electronically to other instruments or accessories. Make sure you plug each end of a cable into the proper connectors on each instrument.

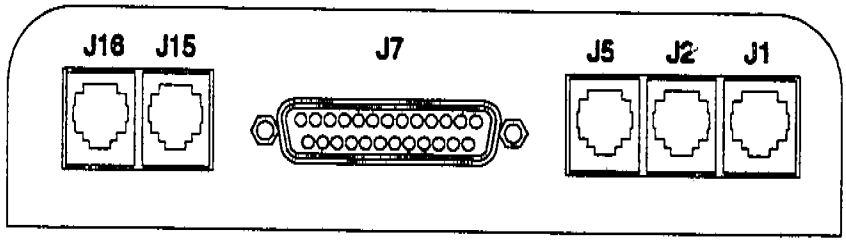


Figure 2-15 Cable Connections

2.17 Fuses

There are fuses located in a compartment at the rear of Precept II. (See Figure 2-16.)

The correct fuse ratings and specifications are listed on the back panel. See Chapter 6 section 6-9 for instructions on changing fuses.

WARNING

For continued fire protection, use fuses of correct type and rating.

WARNING

To avoid electical shock, unplug and turn off Precept II before changing fuses.

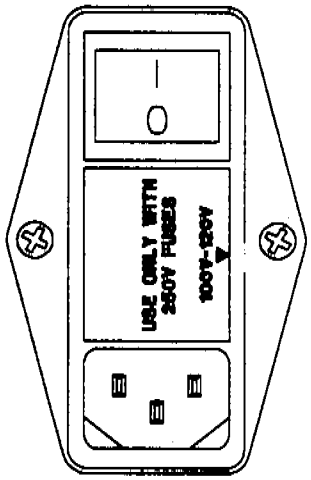


Figure 2-16 Fuse Compartment

Fuses are also located on the DC Output board, the AC Output board, the XYZ board, and in the power supply.

2.18 Inlets and Outlets

Precept II's inlets and outlets, which are also referred to as *bulkheads*, *fittings*, and/or *drains* include:

- Sample Drain
- Water In 40psi Max
- Tray Drain
- Gaseous Transfer
- He in 60psi Max
- Needle Drain
- Aqueous Transfer
- Chiller In
- Chiller Out

Coolant circulates through the vial chiller by way of the vial chiller inlet and outlet on the rear of Precept II.

⚠ WARNING

Drainage may contain toxic compounds. Follow applicable regulations and Good Laboratory Practice when handling waste.

⚠ CAUTION

Do not tee the Sample Drain, Needle Drain, and Tray Drain together. If the drains are teed together and the line is plugged downstream of the tee, the sample drain will back up, and liquid will spill from the system.

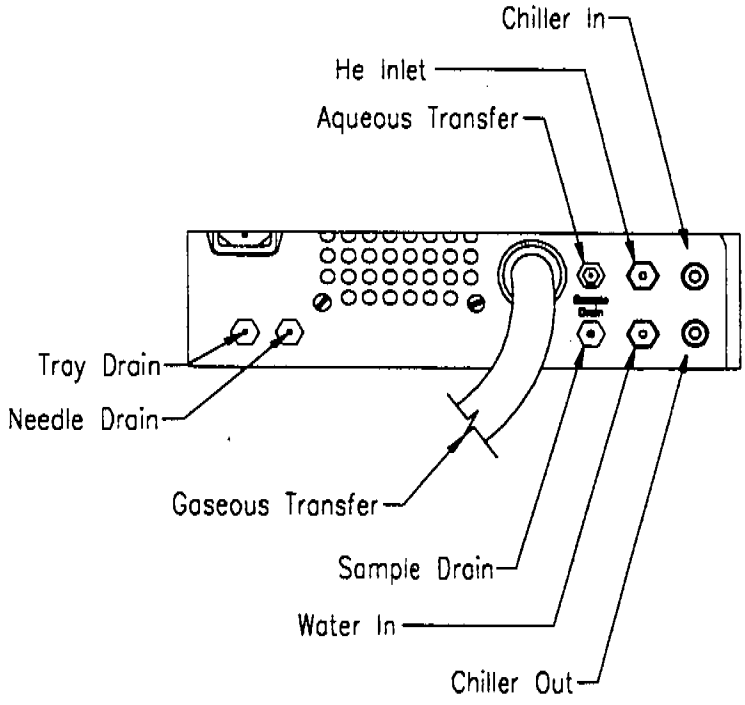


Figure 2-17 Inlets and Outlets on Precept II

2.19 Flow Controllers

The flow controllers maintain the amount of gas traveling through the system flow paths.

The control knobs are in Precept II's upper left corner.

2.20 Pressure Regulators

Two regulators maintain a specified amount of pressure throughout Precept II. The Standard Pressure regulator maintains pressure throughout the assembly that dispenses standards. The System Pressure regulator maintains pressure throughout the rest of the system.

The gauges and control knobs are in Precept II's upper left corner.

2.21 Sample Filter

The 90-micron sample filter traps contaminants that may enter Precept II by way of water or sample. It also prevents particulates from clogging the lines. To reduce the possibility of carryover, Precept II backflushes the sample filter between runs.

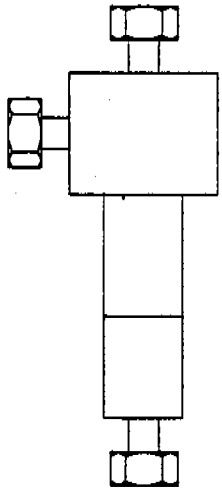


Figure 2-18 90-Micron Sample Filter

2.22 Heaters

When processing solid samples, Precept II heats the sample pathway to aid in sample transfer and prevent carryover.

If analyzing both aqueous and solid samples in a single run, Precept II uses a heated switching valve to keep the different samples separate, and to prevent carryover.

Tables 2-1 lists Precept II's heated zones.

Heated Zones—Aqueous and Solid System

Heated Rate Zone	Temperature Range (in Celsius degrees)	Rise Rate (in C degrees per minute)	Cooldown (in C degrees per minute)
vial	ambient + 5 to 85	> 50	> 10
needle block	ambient + 5 to 100	> 50	> 10
line from needle to switching valve	ambient + 5 to 300	> 50	>10
switching valve	ambient + 5 to 300	> 50	> 10
line from switching valve to concentrator	ambient + 5 to 300	> 50	> 10

Table 2-1 Heated Zones—Aqueous and Solid System

2.23 Valves

Valves regulate gas and liquid flow throughout Precept II. Depending on the type of samples you are running, Precept II contains different valves. For example, if you are processing both aqueous and solid samples, Precept II uses a switching valve to keep the two types of samples separate.

For more information on the valve configurations, see the flow diagrams in the back of this manual.

2.24 Electronics

The electronics and printed circuit boards provide various voltages, receive and transmit signals, store programs, allow communication with other instruments, and monitor time and temperature.

Note: Do not attempt to service a Precept II circuit board unless you are qualified to do so. Please call Tekmar-Dohrmann Service (800) 874-2004 in the US and Canada; (513) 247-7000 outside the US and Canada.

3.1 Overview

This chapter tells you how to:

- Connect Precept II to gas and water supplies
- Hook up the drain lines
- Connect Precept II to the 3000

Note: After you connect Precept II to the gas and water supplies, concentrator, and accessories, you must set pressure, adjust flow rates, and leak check all connections. After you complete the tasks described in this chapter, proceed to Chapter 4, which provides instructions on setting pressure, adjusting flow rates, and leak checking.

3.2 Swaging a Nut and Ferrule onto Tubing

Connect Precept II to a water or gas supply by swaging a nut and ferrule onto the end of tubing; then attaching the tubing to Precept II. If the nut and ferrule are the wrong sizes or not properly installed, leaks can occur. Different types of nuts and ferrules are shown below.

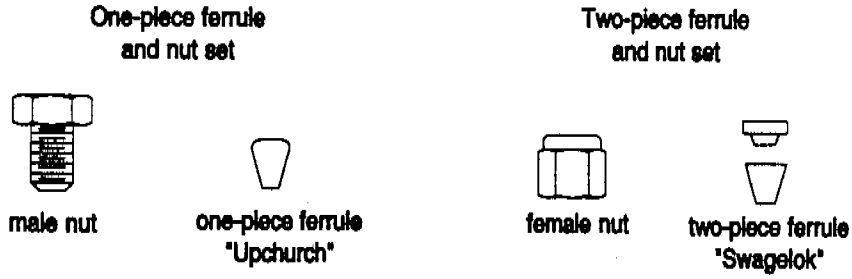


Figure 3-1 Different Types of Nuts and Ferrules

To swage a nut and ferrule onto tubing, refer to the illustration below and follow these steps:

1. Slide the nut onto the tubing.

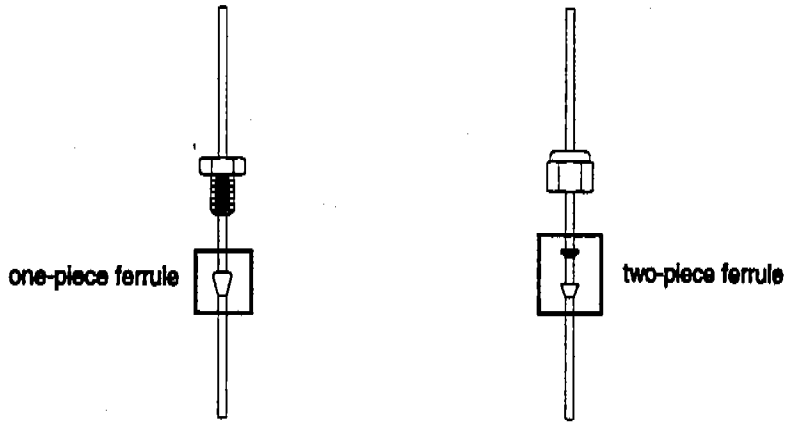


Figure 3-2 Placing Nuts and Ferrules onto Tubing

continued

2. Slide the ferrule onto the tubing, placing the smallest end of the ferrule toward the tip of the tubing. Allow about 1/8" of tubing to extend past the ferrule's smallest end.

⚠ CAUTION

To avoid damaging the nuts and ferrules, do not overtighten them. Once swaged onto tubing, you may need to slightly tighten the nuts and ferrules to eliminate a leak. If a leak persists, use a leak detector to find another source of the leak or call Tekmar-Dohrmann Service toll-free in the US and Canada (800) 874-2004; outside the US and Canada (513) 247-7000.

3. Tighten the nut--1/4 turn (90°) to a maximum 3/4 turn (270°) past finger-tight in 1/4 turn increments--onto a designated bulkhead or connection.

Note: First, finger-tighten the nut. Then use a wrench to tighten the nut further. Turning the nut in 1/4 turn (90°) increments is adequate for most fittings. However, the amount of force you need to apply can vary, depending on the friction between the nut and threads, as well as the composition and thickness of the tubing or line.

To assure that the nut and ferrule have been properly swaged, loosen the nut and pull on the ferrule. The ferrule should not slide off easily.

3.3 Connecting Precept II to a Gas Supply

Precept II requires a high purity (99.999%) helium or nitrogen gas supply. The gas enters Precept II through copper tubing and a hydrocarbon trap. You may find the hydrocarbon trap with copper tubing in the Precept II kit box.

Connecting the Gas Supply to a Hydrocarbon Trap and Tee Union

Note: You may connect a tee union (usually 1/8") to the tubing between the hydrocarbon trap and the unit (on the same tubing) if you need to attach other instruments to the line. (See Figure 3-3 on the next page.)

To make the connections:

1. Please read Section 3.1 *Swaging a Nut and Ferrule onto Tubing*.
2. Turn off the gas supply to the concentrator (if applicable).
3. Disconnect the tubing from the outlet of the hydrocarbon trap between the supply tank and the back of the concentrator. Remove any existing union.

4. Use tubing and a 1/8" brass nut and ferrule assembly to connect the tee union on the outlet side of the hydrocarbon trap. Make sure that the small part of the ferrule faces the outlet of the trap.

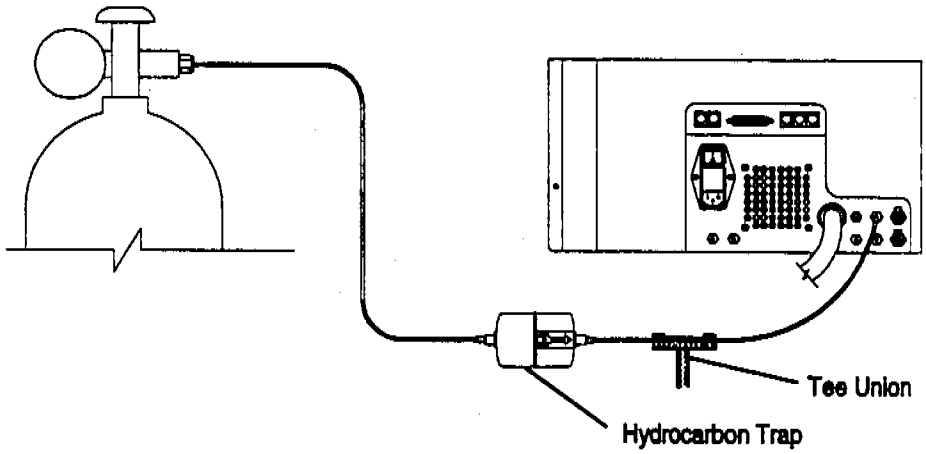


Figure 3-3 Connecting the Gas Supply to Precept II

5. Tighten the nut 3/4 turn (270°) past finger-tight.
6. Reconnect the tubing (that you disconnected in Step 3) to the tee union. Use the 1/8" brass nut and ferrule.
7. Using the 1/8" brass nut and ferrule, connect tubing to the remaining port on the tee union. Proceed to the next section.

Connecting Tubing from the Hydrocarbon Trap to Precept II

To connect tubing to Precept II:

1. Route tubing from the gas cylinder to the rear of Precept II and trim as necessary. Tekmar-Dohrmann recommends leaving a few extra feet of tubing so that you may easily move Precept II.
2. Using the 1/8" brass nut and ferrule assembly, attach the tubing to the connection labeled "He In 60psi Max" on the rear of Precept II.
3. Remember to set pressure, adjust flow rates, and leak check the connections. The instructions are in Chapter 4. However, if you have not completed all connections that you intend to make (e.g., connections to the concentrator), finish making all connections first, then go to Chapter 4. It is easier to leak check all connections at the same time.

3.4 Connecting Precept II to a Water Supply

This section tells you how to connect Precept II to a water supply. You may choose to puchase an external tap rinse kit or a Teknar-Dohrmann rinse reservoir kit. You can use the external tap rinse kit to connect Precept II to a water pipe. The rinse reservoir provides water via a container or reservoir.

> **⚠ CAUTION**
>
> **If you fail to connect Precept II to a water supply, you can clog the sample pathways and void the warranty.**

Figure 3-4 shows you how to install the water filter. Refer to the figure as you follow the installation steps. You may have to cut tubing to install the water filter. Cuts must be clean and free of burrs. Openings must be round and free of distortion.

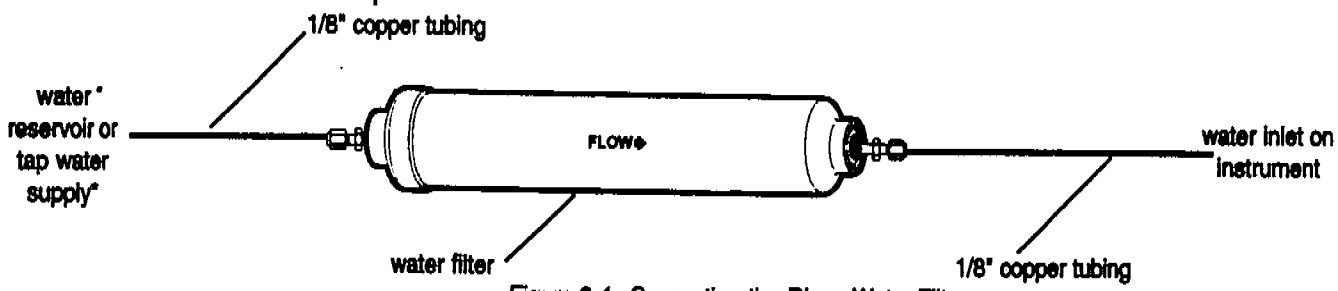


Figure 3-4 Connecting the Rinse Water Filter

* If you are using the rinse reservoir kit, do not connect the water filter to the pressure regulator. Connect the filter (via tubing) to the outlet of water reservoir, which is the container that holds the water. Refer to the installation instructions shipped with the rinse reservoir or tap water kits, if you need more information.

1. Turn off the water supply.
2. Remove the old filter (if installed). As you loosen the nuts or fittings, some "leftover" water may leak from the filter and lines.
3. If you removed an old filter, you should not have to cut lines. Simply install the new filter, using the existing lines. However, examine the existing lines for damage and fix imperfections.
4. Loosen the nuts on the ends of the water filter. Be careful not to lose the ferrules, which are inside the nuts.

   Note: Locate the flow arrow (Figure 3-5) on the water filter. This arrow must point away from the water supply line.

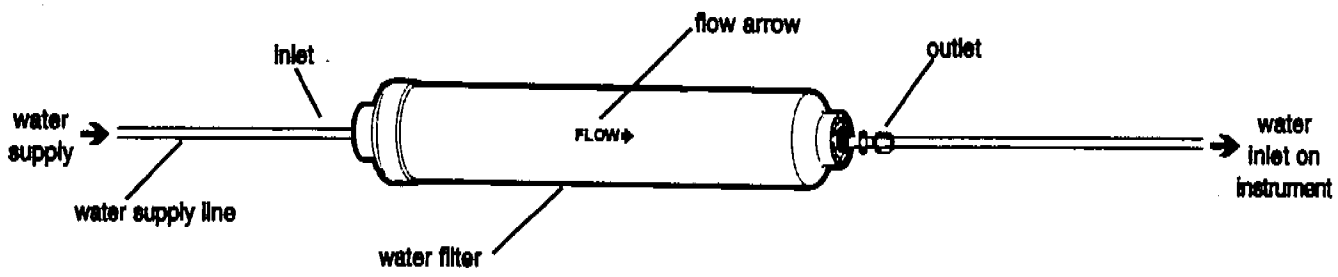


Figure 3-5 Direction of Water Flow

continued

5. Slide one of the nuts, then one of the ferrules, onto the end of the water supply line.
6. Connect the water supply line to the INLET on the water filter. Do not overtighten the nut.
7. The activated charcoal inside the water filter will settle during shipment. To obtain satisfactory analytical results, flush the filter before use. Referring to Figure 3-6, follow these steps:
   a. Place the water filter into a sink or large container.
   b. Turn on the water supply.
   c. Allow at least 4 gallons (15 liters) of water to pass through the line and filter.
   d. Turn off the water supply.

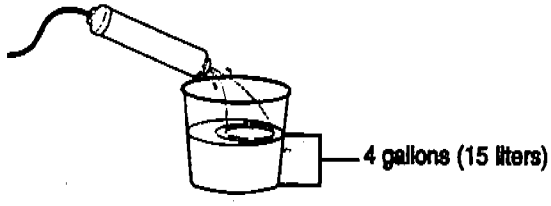


Figure 3-6 Flushing the Water Filter

8. Connect another line to the other end of the water filter.
9. If you have not already done so, connect the opposite end of this line to the water inlet on the back of the instrument. (On Precept II, the inlet is labeled "Water In 40psi Max".)
10. Turn on the water supply. Check for leaks.

Note: To prevent contamination, replace the water filter every six months. Turn off the water supply before replacing the filter.

3.5 Connecting the Drain Lines

To connect the drain lines:

1. Locate the fittings labeled "Sample Standard Drain," "Needle Drain," and "Tray Drain" on the rear of Precept II.
2. Attach Tygon tubing to each drain fitting and route each piece of tubing to a sink or collection bottle. Make sure the tubing is directly behind Precept II and runs to a large beaker or drain.

Notes: **The Tray and Needle drains rely on gravity. The tubing from each must run down from the instrument. The Sample drain is pressurized. The tubing may run down or up from the instrument.**

Make sure you cut the Tygon tubing near the exact size needed. Do not loop the tubing, or you may not get any drainage.

⚠ WARNING

Drainage may contain toxic compounds. Follow applicable regulations and Good Laboratory Practices when handling waste.

⚠ CAUTION

Do not push the Tygon tubing into the instrument through the bulkhead. If the tubing loops inside the instrument, it may cause drainage to back up inside of the instrument.

Water condensation exits through the Tray drain. The condensation from the chiller may increase the amount of water exiting through the drain. Choose a waste receptacle (sink or bottle) that can accommodate a large amount of drainage.

⚠ CAUTION

Do not tee the Sample Drain, Needle Drain, and Tray Drain together. If the drains are teed together and the line is plugged downstream of the tee, the sample drain will back up, and liquid will spill from the system.

Draining the Concentrator Sparger

Refer to the concentrator's manual for draining the sparger.

3.6 Connecting Precept II to the Tekmar 3000

This section explains how to connect Precept II to the Tekmar 3000 Purge and Trap Concentrator.

Disconnecting a Tekmar Autosampler

If you have a Tekmar autosampler attached to the 3000, you must disconnect it. To do this:

Note: If the autosampler is the AQUATek 50 or 2050, skip step 1.

> **⚠ WARNING**
>
> **To avoid electrical shock, turn off and unplug Precept II and the 3000 (concentrator) before going to Step 1.**

1. Remove the 3000's panels:
   a. Loosen the two fasteners on the right corner (trap) panel (viewing the front of the 3000). Pull the panel forward, then to the right.
   b. Pull the top panel forward until it stops. Lift.
2. Visually follow the transfer line and/or cable from the Precept II to 3000.
3. Disconnect the transfer line and/or cable.

Checking the 3000's ROM Version

The 3000 needs the latest ROM version to operate with Precept II. To check the ROM version:

1. Press and hold the **SHIFT** key on the 3000's keypad.
2. Choose **SETUP**.
3. Choose **A**. The ROM version appears on the display.

If you have already installed the new ROM, proceed to the section *Making Plumbing Connections Between Precept II and the 3000*. If you need to install the new ROM, proceed to the next section.

Replacing the Memory Board in the 3000

The ROM is on the memory board. To install the ROM, you must replace the memory board.

Note: Before you remove the memory board, copy the method parameters (other than default) on paper or computer disk. Also, record the GC Port Type (standard or user) and the User GC Type number (if applicable). This information will be lost; you must re-enter it after installing the new memory board.

> **⚠ WARNING**
>
> **To avoid electrical shock, turn off and unplug Precept II and the 3000 before removing panels.**

> **⚠ WARNING**
>
> **Parts inside the 3000 are heated to high temperatures. To prevent burn injury, allow the 3000 to thoroughly cool before you remove the panels.**

1. Remove the 3000's panels:
   a. Loosen the two fasteners on the right corner (trap) panel (viewing the front of the 3000). Pull the panel forward, then to the right.
   b. Pull the top panel forward until it stops. Lift.
   c. Remove the screw that fastens the right side panel to the 3000. The screw is at the top of the panel.
   d. Lift the side panel.
2. Locate the memory board (Figure 3-7). It is plugged into the bottom connector.

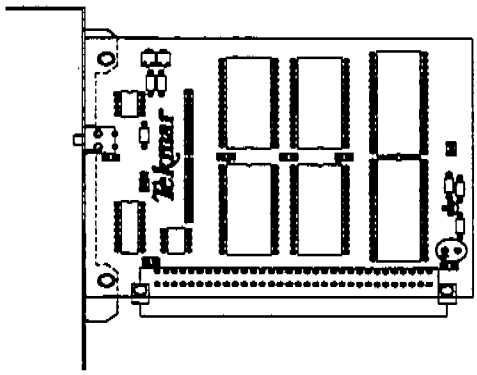


Figure 3-7 Memory Board

Note: Electro-static discharge (ESD) can damage electronic parts on circuit boards. Before touching a board, discharge static electricity by touching a conductive (metal) surface. Hold the board by its bracket or edge only.

3. Remove the screw that secures the board to the 3000.
4. Pull the board out of the connector. Slide it out of the slot.
5. Locate the new board in Precept II's installation kit.
6. Install the new board. Insert the screw into the bracket and tighten.
7. Proceed to the next section *Making Plumbing Connections Between Precept II and the 3000.*

Making Plumbing Connections Between Precept II and the 3000

⚠ WARNING

To avoid electrical shock, turn off and unplug Precept II and the 3000 before removing panels.

⚠ WARNING

Parts inside the 3000 are heated to high temperatures. To prevent burn injury, allow the 3000 to thoroughly cool before you remove the panels.

1. Please read section 3.2 *Swaging a Nut and Ferrule onto Tubing.*
2. If you have not already done so, remove the 3000's panels:
   a. Loosen the two fasteners on the right corner (trap) panel (viewing the front of the 3000). Pull the panel forward, then to the right.
   b. Pull the top panel forward until it stops. Lift.
3. Locate the square-shaped valve oven cover on the top of the 3000.
4. Remove the thumbscrew on the front of the valve oven cover.
5. Tilt the valve oven cover toward the back of the 3000. Carefully lift the cover.
6. If you have not already done so, leak check the 3000. The *3000 Purge and Trap Concentrator User Manual* explains how to leak check.

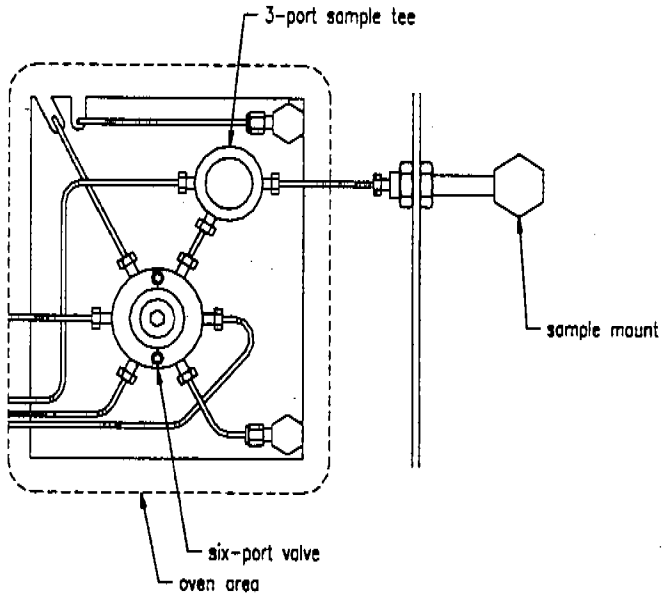


Figure 3-8 Tee Union (3-port Sample Tee)

7. A 3000 with a serial number of 95073002 or less contains a 3-port sample tee union (Figure 3-8). You must replace the sample tee union with a 4-port cross union before you can plumb the heated transfer line. The 4-port cross union is shown in Figure 3-9 below. Locate the cross union in Precept II's installation kit.

⚠ CAUTION

The screw that holds the sample tee union to the 3000 may be difficult to remove. Do not force the screw: you can strip the oven block. If this happens, the entire block must be replaced. If you have difficulty removing the sample tee, please call Tekmar-Dohrmann Service toll-free in the US and Canada (800) 874-2004; outside the US and Canada (513) 247-7000.

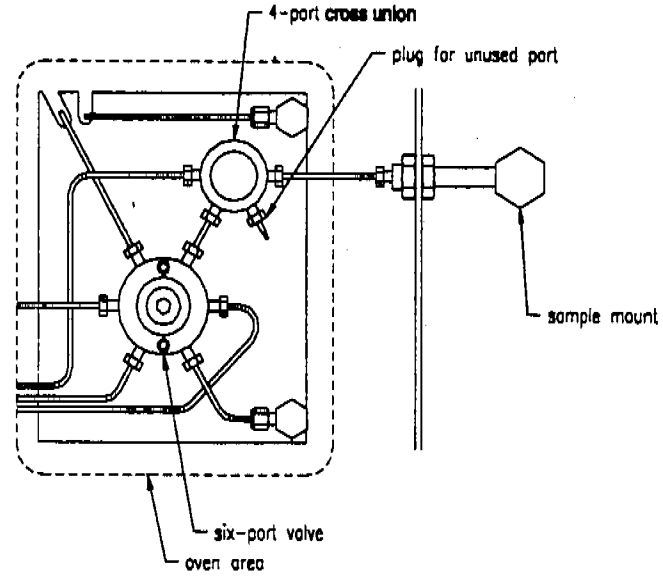


Figure 3-9 Cross Union with One Port Plugged

8. Slide Precept II's heated transfer line (Figure 3-10) through the hole in the top part of the 3000's rear panel. Allow Precept II's heated transfer line to rest on top of the 3000-to-GC transfer line.

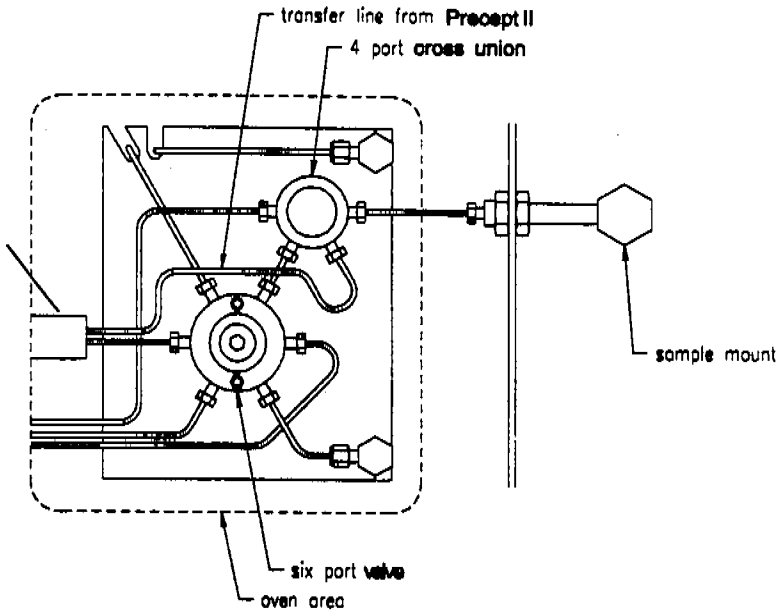


Figure 3-10 Precept II-to-3000 Transfer Line Connection

9. Referring to Figures 3-9 and 3-10, locate the cross union.
10. One of the fittings that is attached to the cross union has no lines or tubing connected. This fitting is a plug. Remove the plug.
11. Locate the male nut and the two-piece ferrule in Precept II's kit box.
12. Slide the male nut onto the end of Precept II's transfer line.
13. Slide the two-piece ferrule onto Precept II's transfer line, placing the smallest end of the ferrule toward the end of the line.
14. Attach Precept II's transfer line to the cross union fitting where you removed the plug. Do not overtighten.
15. If you still need to set flow rates and pressure and check for leaks, do not install the valve oven cover or panels. Finish making all connections before you proceed to the next chapter; it is easier to leak check all connections at the same time.

Connecting a Line from Precept II to the Glassware on the 3000

To connect a line to the glassware:

1. Locate the following parts in Precept II's kit box.
   - 1/16" nickel tubing
   - 1/16" male nut
   - 1/16" one-piece ferrule
   - 1/4"–1/16" reducing union
   - 1/16" two-piece ferrule
   - 1/4" Teflon ferrule
2. Please read section 3.2 *Swaging a Nut and Ferrule onto Tubing.*
3. Slide the 1/16" male nut onto the tubing.
4. Slide on the 1/16" ferrule, placing the small end of the ferrule toward the tip of the tubing.
5. Locate the transfer line fitting on the rear of Precept II. It is labeled "Aqueous Transfer." (See Figure 3-11.)

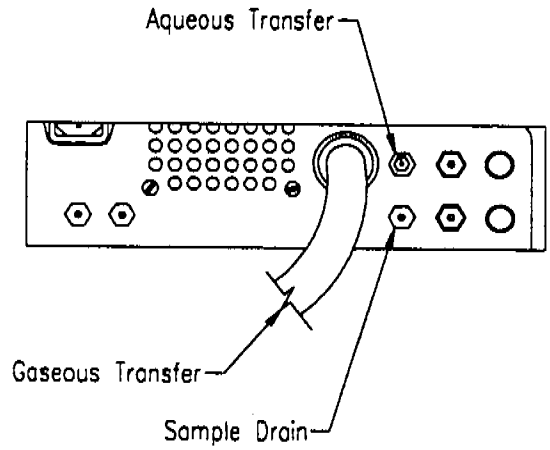


Figure 3-11 Aqueous Transfer Line Bulkhead on Precept II

6. Insert the tubing into the correct transfer line bulkhead until it stops.
7. Tighten the nut no more than 3/4 turn (270°) past finger-tight.
8. Connect the other end of the tubing to the 1/4"-1/16" reducing union:
   a. Slide the 1/16" nut (supplied with the union) onto the tubing.
   b. Slide the ring-shaped part of the two-piece ferrule (with the ridge facing out) onto the tubing.
   c. Slide the cone-shaped part of the ferrule onto the transfer line, placing the small end of the ferrule toward the tip of the line.
   d. Insert the tubing into the union. Make sure that it is fully seated.
   e. Tighten the nut.

9. Use the 1/4" nut (supplied with the union) and the 1/4" Teflon ferrule to connect the union to the sidearm near the top of the glassware on the concentrator.
10. Tighten the nut 1/4 turn (90°) past finger-tight.

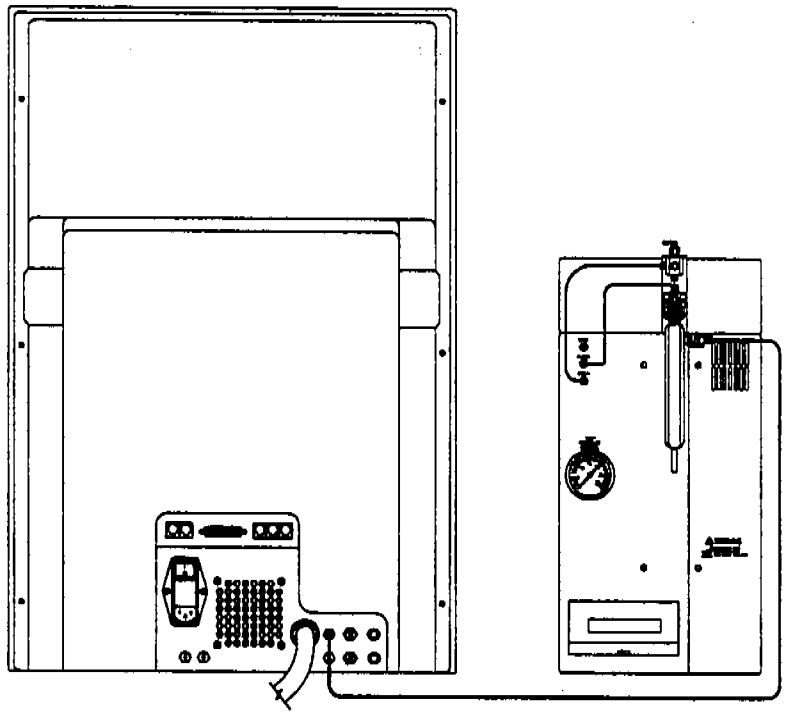


Figure 3-12 Connecting Aqueous Transfer Line

Making Electronic Connections Between Precept II and the 3000

To make electronic connections between Precept II and the 3000, connect the communications cable to both instruments.

1. Locate the communications cable in the installation kit.
2. Locate J16 on the back of Precept II (Figure 3-13).

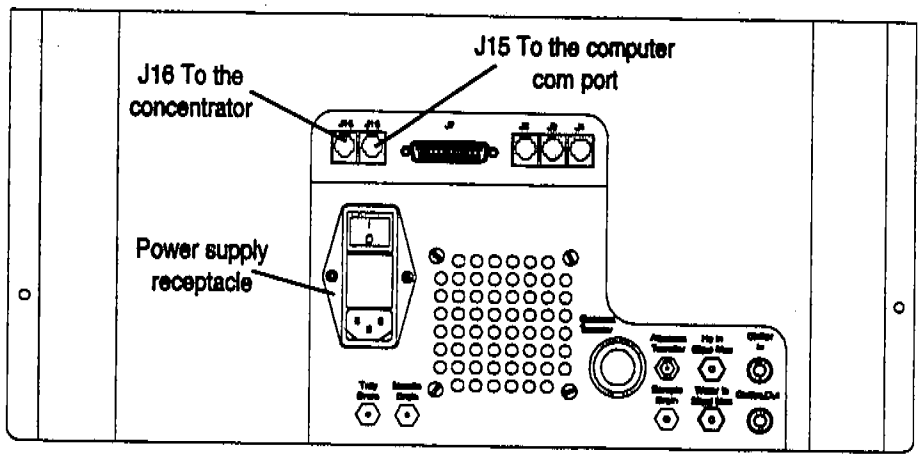


Figure 3-13 Locating J16

3. Plug the modular end of the communications cable into J16.
4. Plug the 9-pin adapter end of the communications cable into the 9-pin connector on the GC I/O board (on the back of the 3000).
5. Locate the power cord in the installation kit. Plug one end of the cord into the power supply receptacle (Figure 3-13) and the other end into a wall outlet.

To ensure that Precept II acknowledges the 3000:

1. Turn on both instruments and wait for self tests.
2. **If Precept II's ROM and TekLink software are versions 3.0 or greater**, program Precept II to recognize the 3000 instead of the 2000. (To find out Precept II's ROM and TekLink version, click **HELP** on the TekLink menu bar. Choose **About TekLink**. The version number will appear above the copyright. Click OK.)
   a. Click the **SETUP** menu.
   b. Choose **Configure Instrument**.
   c. Click the **3000** option.
   d. Click **OK**.
3. If the ROM and TekLink versions are less than 3.0, Precept II will automatically recognize the 3000.

From this point on, you cannot program the 3000; Precept II controls all operations.

4.1 Overview

Before you run samples, you must complete several tasks, including:

- Preparing standard(s) and blank water
- Arranging and storing vials
- Setting flow rate, sample volume, and pressure
- Leak checking

You will also need to familiarize yourself with initial operation and displays.

4.2 Installing TekLink

Note: Tekmar-Dohrmann recommends making a copy of the TekLink program disk(s) before installation. Store the original TekLink program disk(s) in a safe place and use the duplicate(s) to install TekLink.

1. Make sure **Windows** is running; then insert the TekLink disk into the appropriate drive.
2. From the **File menu** on the **Program Manager** window, choose **Run**. The **Run** dialog box appears.
3. In the **Run** dialog box, type **A:\SETUP** or **B:\SETUP** (depending on the drive you are using) in the **Command Line**. Click **OK**. The **TekLink Installation** screen appears.
4. Click **OK**; the **Select Installation Drive** dialog box appears.
5. Select the installation drive from the list and click **OK**. (Tekmar-Dohrmann recommends choosing the **C:** drive.) The **Setup** dialog box appears.
6. Click **OK** to install TekLink in the default directory or type in another directory and click **OK**. **TekLink Setup** installs the program on the drive and directory you specified. When the installation is complete, the TekLink icon appears in its own program group in the **Program Manager** window.
7. Double-click on the TekLink icon to start the program. The TekLink **Control** screen appears.
8. Read the **ONLINE HELP** and Chapter 4 for instructions on using TekLink.

Access to the main features of the program is through the **Control** screen.

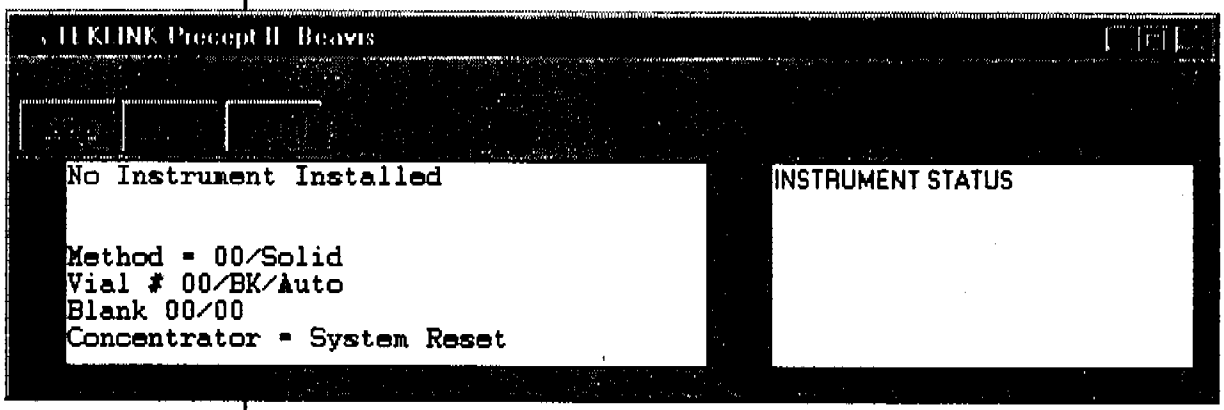


Figure 4-1 TekLink-Precept II Control Screen and Copyright Notice

4.3 Using TekLink

This section covers the basic operations of Windows software.

Use your mouse and PC keyboard to fill in parameters and choose options.

Using the Mouse

Choose menus, options, and buttons with a click of your mouse button. Menus are at the top of the screens. They contain more options for using TekLink.

Options are denoted by radio buttons and check boxes. When you choose an option by clicking one of the radio buttons, a black dot appears in the middle of the button. When you choose an option by clicking one of the check boxes, a check mark appears in the middle of the box.

Buttons have different functions depending on the name of the button. Click the button to choose it.

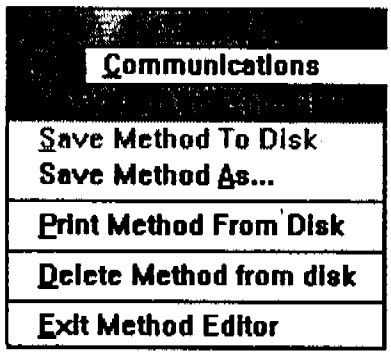
Using the Keyboard

Keep the following keys in mind for use in TekLink.

Tab	moves to the next option, button, entry
Shift + Tab	moves to the previous option, button, entry
Shift	chooses the upper character on a key
Ctrl	and/or Alt used with another key, allows you to use the keyboard as a shortcut to choosing items and options, rather than using the mouse
Enter	accepts the screen's parameters
Delete	erases an entire entry

Using the Menus

Press Alt and the underlined letter to pull down the menu OR move the mouse until the arrow is on the menu name. Click once to pull down the menu.



Example

Press Alt + F to pull down the File menu or click on it once with the mouse.
To choose a menu item, press the underlined letter (L, S, A, P, D, E) or click on the item with the mouse.
If you have not already opened the menu, you may choose one of the keyboard shortcuts listed next to the menu item.

Figure 4-2 Example of Using Keyboard Shortcuts

Press the key or key combinations to choose the menu option. These shortcuts work only if you have not already pulled the menu down. After the menu is opened, only press the underlined letter *or* move the mouse until the arrow is over the option. Click once to choose the menu option.

Control Screen

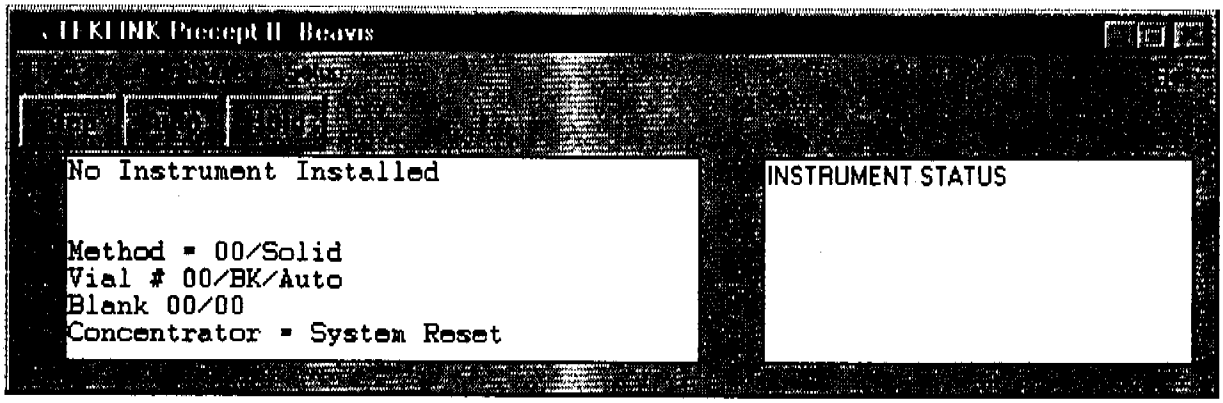


Figure 4-3 TekLink Control Screen

When you double-click on the TekLink program icon, the TekLink **Control** screen appears.

The **Control** screen contains menus with keyboard shortcuts, buttons, an instrument status screen, and a status bar.

Configuration Screen

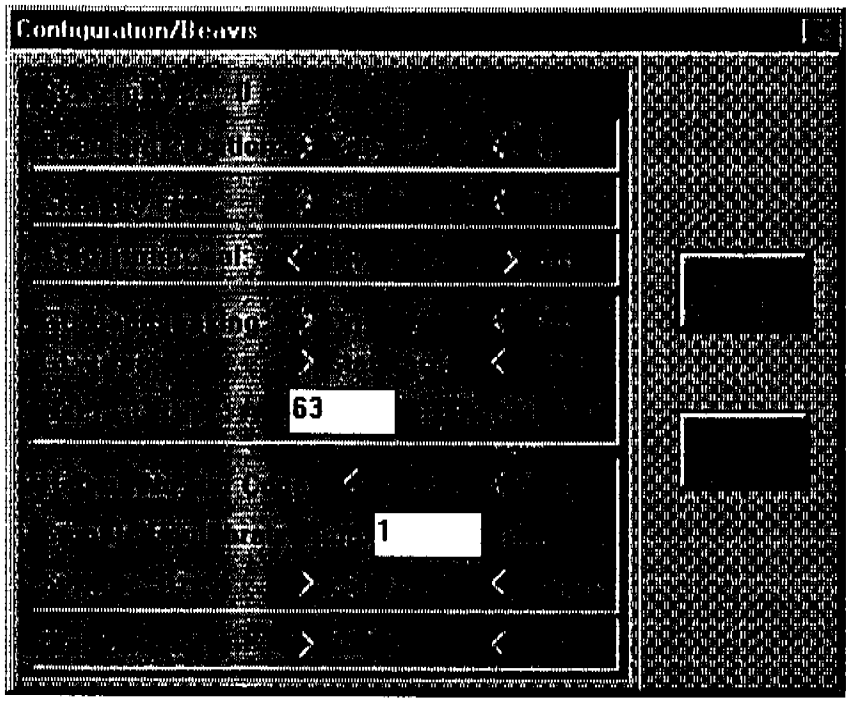


Figure 4-4 TekLink Configuration Screen

The **Configuration** screen contains options for specifying the instrument's configuration.

To select an option, position the mouse over the radio button or box and click. To input a value into a white box, position the mouse in the box, click, and enter the value.

Method Editor Screen

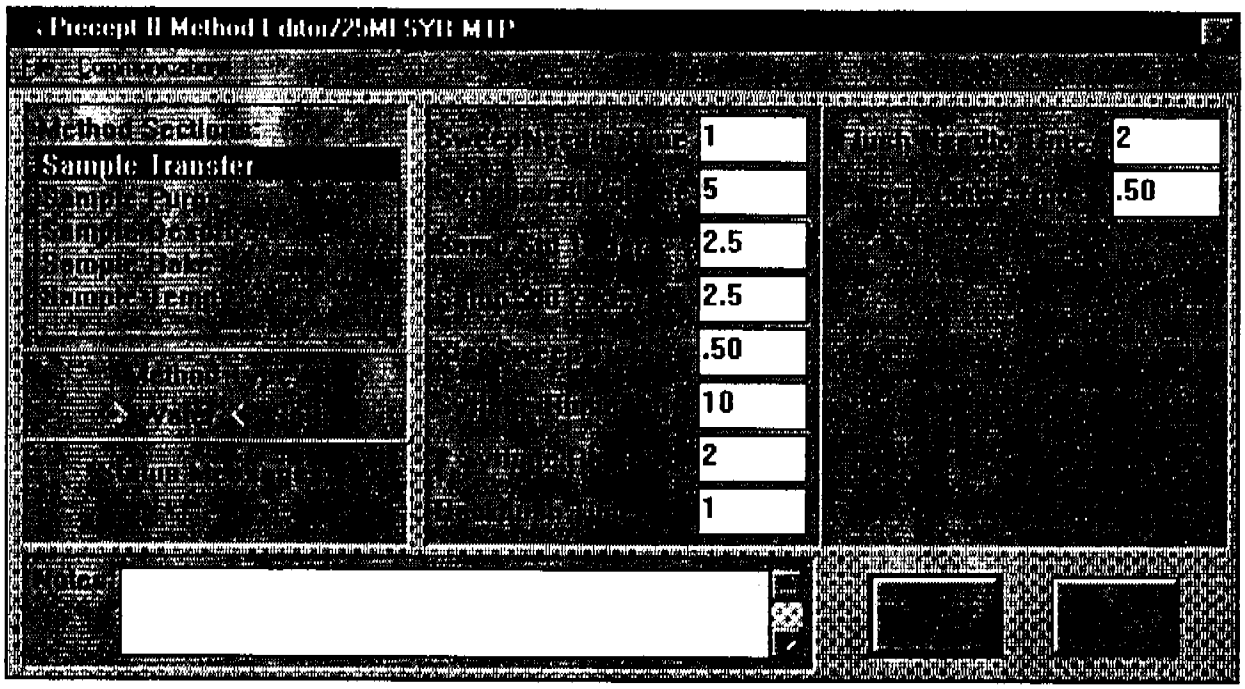


Figure 4-5 TekLink Method Editor Screen

The **Method Editor** allows you to review and edit methods. The screen includes a "Method Sections" area to choose the parameter group for viewing and editing.

Method Schedule Screen

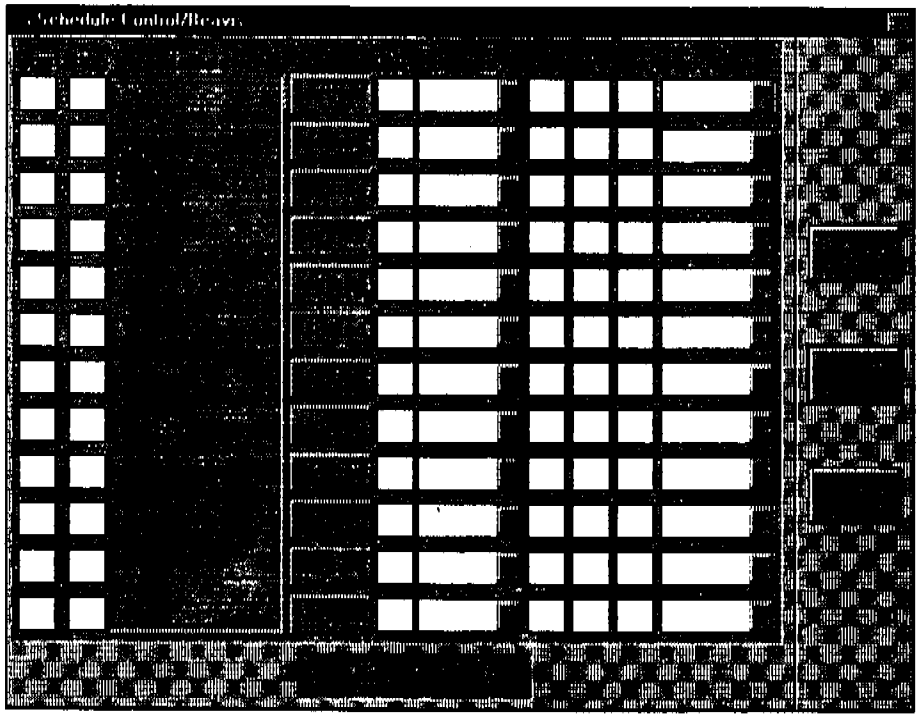


Figure 4-6 TekLink Method Scheduler Screen

The **Method Schedule** screen allows you to set up a processing timetable to run samples, standards, and blanks. The screen contains buttons, entry lines, and a value range area. You enter each line of the schedule through the entry lines.

Reading the LEDs

Two columns of LEDs in Precept II's upper left corner indicate:

- Precept II's current mode of operation
- When Precept II is operating automatically
- When Precept II is in hold
- An error
- Mode in which an error occurred

One column of lights is called *run lights;* the other column is called *status lights.*

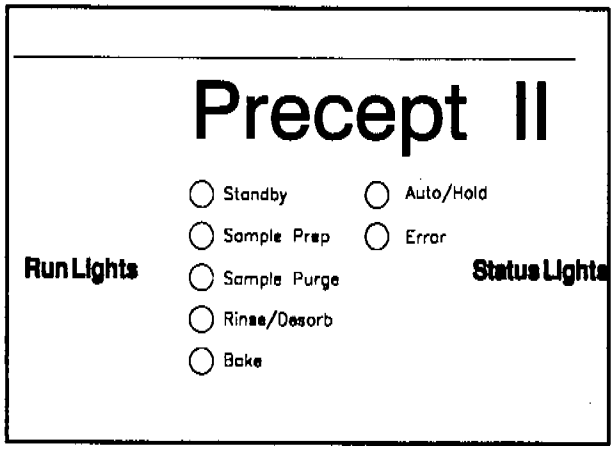


Figure 4-7 LEDs

The lights indicate Precept II's current mode or step of operation. For example, if Precept II advances to Sample Purge mode, the run light labeled "Sample Purge" lights up. When Precept II steps out of Sample Purge mode, the light turns off.

The lights also explain when Precept II is in hold. For example, if you press the Hold button while Precept II is in Sample Purge mode, the status light labeled "Auto/Hold" blinks and the run light labeled "Sample Purge" stays on until you return Precept II to automatic operation. Once Precept II returns to automatic operation, the Auto/Hold light stops blinking and stays on continuously.

A blinking Error light indicates that an error has occurred. A run light that is on simultaneously represents the mode in which the error occurred.

The table on the following page lists the various LED combinations and what they indicate.

LEDs on Precept II			
Run Light(s) activated (or on)	**Is the Auto/Hold light blinking or is it on all the time?**	**Is the Error light blinking?**	**Condition Indicated**
any light	on all the time	no	Precept II is running automatically. The run light that is on indicates the current mode of operation.
any light	blinking	no	You have placed Precept II in hold.
any light	on all the time	yes	Precept II is not automatically processing samples; an error has caused Precept II to halt. The run light that is on indicates the mode of operation in which the error occurred.
no light	on all the time	no	Precept II is automatically processing samples. Its current mode of operation is "Waiting for Desorb."
no light	blinking	no	You have put Precept II in hold.
no light	on all the time	yes	Precept II is not automatically processing samples. An error has caused it to halt.

Table 4-1 LEDs on Precept II

4.4 Using the Step, Home, and Auto/Hold Buttons

In Precept II's lower right corner, you will find three push buttons labeled "Step," "Home," and "Auto/Hold" (Figure 4-8). The push buttons allow you to use the Step, Home, and Auto/Hold functions without the keypad. However, if a keypad is installed, the Step, Home, and Auto/Hold buttons are ignored; this prevents the keypad from hitting the buttons and activating them. If the Auto/Hold button is pressed when a keypad is installed, the LED will light even though Precept II ignores the signal.

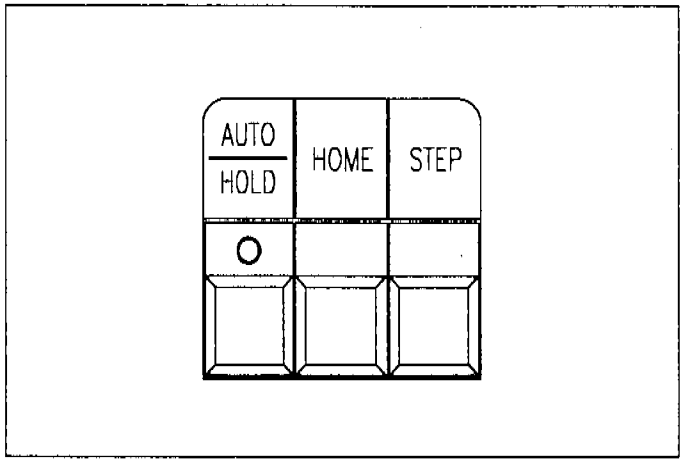


Figure 4-8 STEP, HOME, and AUTO/HOLD Buttons

4.5 Preparing Blank Water

To avoid contamination problems, use blank (organic-free) water to clean the sample pathways and to dilute samples.

Chapter 4 *Getting Ready to Run Samples*, gives you more information on how to program Precept II to run blanks or dilute samples. However, if you have not set pressure, adjusted flow rates, or checked for leaks, continue through this chapter before going to Chapter 5.

You may use any of these methods to prepare blank water:

- Pass distilled water through a column of activated carbon at least 12" deep. Put the supply vessel at a higher elevation than the collection vessel, with the supply line entering the column at the bottom. This configuration allows the water to flow from the bottom to the top of the column.
- Boil water. Then purge it at 80-90°C with helium or nitrogen for at least one hour.
- Pass water through a freshly charged Millipore Super Q water purifier.

No matter which method you use to prepare blank water, follow these guidelines:

- Check its purity by analysis before use.
- Use the prepared water immediately.

4.6 Using Standards

Precept II offers two options for standards:

- You can add one standard per sample, per run by using the Standard 1 vessel.
- You can add two standards per sample, per run by using the Standard 1 vessel and the Standard 2 vessel.

Each standard is stored in a 20 ml glass vessel, mounted into Precept II's top panel. The vessels attach to the fittings labeled "Standard 1" and "Standard 2."

If you plan to use only one standard, use Standard 1. Use Standard 2 for intermittent standards: matrix spike.

Note: Do not use Standard 2 if you plan to use only one standard. Standard 1 is set up to be used alone or in conjunction with Standard 2. Standard 2 is set up to be used only in conjunction with Standard 1.

See Online Help for explanation on how to program Precept II to run standards. However, if you have not set pressure, adjusted flow rates, or checked for leaks, continue through this chapter before turning to Chapter 4.

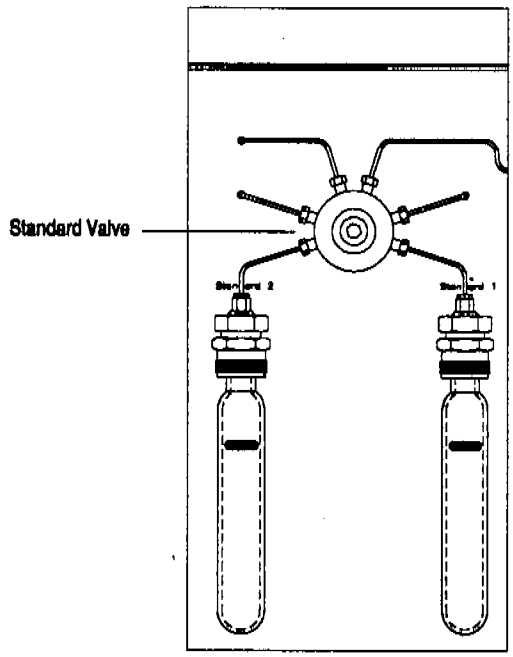


Figure 4-9 Standard Valve and Surrounding Parts

Preparing Standards

Accurate analytical results depend on the careful storage and use of correctly prepared analytical standards. The low-level standards required for purge and trap analysis must be of high quality. Small errors that are insignificant in a high level standard are large errors in a low-level standard.

You can buy commercially prepared standards or you can prepare your own. Commercially prepared standards must meet USEPA specifications. Before buying standards, ask the manufacturer if the standards they offer are certified. Also make sure that the standards meet your specifications. Suppliers include:

- AccuStandard, Inc. in New Haven, CT
- Chem Service Inc. in West Chester, PA
- Restek in Bellefonte, PA
- Supelco in Bellefonte, PA
- Ultra Scientific in North Kingstown, RI

If you wish to prepare your own standards, refer to USEPA Methods for further information.

To prepare a methanol standard according to procedures approved by the USEPA, follow these steps:

1. Fill a clean 10 ml volumetric flask with about 9.8 ml of methanol. Allow the open flask to stand until all alcohol-wetted surfaces have dried.
2. Weigh the flask and its contents to the nearest 100 µg. Assign the alphanumeric combination "W_1" to the microgram value.
3. Using a 100 ml syringe, immediately add two drops of neat standard (minimum 75% purity) to the flask. Make sure the drops fall directly into the methanol without touching the neck of the flask.
4. Weigh the flask with its contents. Assign the alphanumeric combination "W_2" to the microgram value.
5. Dilute the solution to volume with methanol. Assign "V_c" to this milliliter value. Stopper the flask and turn it upside down several times to mix the liquids.
6. Use the formula, $(W_2-W_1)/V_c$ to calculate the concentration in micrograms per milliliters.
7. Transfer the solution to a 10 ml screw cap bottle with a Teflon cap liner and store it at 6°C.

4.7 Arranging and Storing Vials

Use a 40 ml USEPA-approved sample vials with Precept II: a vial that is screw-capped at one end (Tekmar recommends I-Chem).

You can insert vials containing aqueous and solid samples into the trays in any combination. For example, sample number one can be soil; number two, water; number three, soil; numbers four and five, water; etc.

Do not insert vials upside down; the caps must be on top.

Two trays hold 48 vials. You can set both trays into the receptacle in front of Precept II, or you can set one tray (24 vials) into the receptacle and store another tray in the refrigerator.

Two pressure-activated switches at the center of the receptacle indicate to Precept II whether or not vial trays are present. Placing a tray onto either switch presses it down, alerting Precept II that a tray is present. If a tray is not pressing a switch down, Precept II will not attempt to pick up vials from that half of the receptacle; Precept II will display an error.

Chapter 5 *Processing Samples*, contains instructions for loading a sample into the vial. If you still need to set pressure, adjust gas flow rates, or check for leaks, you do not need to load samples into the vials at this time; proceed to the next section *Setting Pressure*.

4.8 Setting Pressure

Whether you are analyzing aqueous or solid samples, you must adjust system and water supply pressure. If you are adding standards, you must set standard pressure also.

Note: If you are using TekLink-Precept IIv1.3 or greater, you may set pressures and leak check through TekLink. For information in ordering an upgrade of the software, please see page 7-1.

⚠ CAUTION

- **To prevent too much pressure from entering the lines when you turn on Precept, turn the pressure control knobs (on the front of Precept II) to the lowest setting. Before you turn Precept IIon, rotate the knobs counterclockwise.**
- **Adjust the pressure slowly; a sudden burst of pressure can damage the gauge.**
- **Do not exceed recommended pressure ratings.**

Before setting pressure, make sure that glassware (if applicable) is installed and that all lines are connected.

Name of Pressure	Rate (psi)	Function
standard	3 - 5	forces the internal standard into the standard switching valve and into the sample syringe
system	20	forces analytes, gas and/or liquid through internal lines and to the concentrator
water supply	15 - 20	Forces water through the lines

Table 4-3 Pressure Settings

Setting Standard Pressure

To set standard pressure:

1. Turn on the gas supply.
2. Locate the control knob labeled "Standard Pressure" on the front of Precept.
3. Turning the control knob clockwise, adjust the pressure to 3-5 psi.

Setting System Pressure

To set system pressure:

1. Turn on the gas supply.
2. Locate the control knob labeled "System Pressure" on the front of Precept.
3. Turning the control knob clockwise, adjust the pressure to 20 psi.

4.9 Setting Flow Rates

Tekmar sets flow rates before shipping Precept to customers. However, if adjustment knobs are moved during shipping or installation, you will need to adjust flow rates.

Note: If you are using TekLink-Precept IIv1.3 or greater, you may set pressures and leak check through TekLink. For information in ordering an upgrade of the software, please see page 7-1.

transfer/soil purge	35-40	sweeps lines with gas to transfer analytes to the concentrator and remove contaminants

Table 4-4 Information on Gas Flow

4.10 Checking for Leaks

Note: If you are using TekLink-Precept II v1.3 or greater, you may set pressures and leak check through TekLink. For information in ordering an upgrade of the software, please see page 8-1.

Sometimes gas will leak from the fittings or lines, causing loss of sample integrity. The fittings are the hardware (nuts and ferrules) that connect lines to valves, glassware, and other parts. Leaks usually occur at the fittings.

You can see water or other liquid leaking, but you need a gas-leak detector to find gas leaks. Do not assume that a fitting is leak-free because it does not leak liquid; gas leaks more readily than liquid.

Note: Tekmar checks Precept II's internal fittings for leaks before it is shipped. Therefore, after you initially install Precept II, you do not need to check all internal fittings or lines. You need to check only the connections that you made during installation.

continued

Any time you install new parts and connect or disconnect lines, you need to check the new connections for leakage.

To check for leaks, follow these guidelines:

- Leak check after you have made all connections.
- For assistance, refer to the gas flow diagrams in the back of the manual.
- Use an electronic thermal conductivity detector, such as a Tekmar gas leak detector..
- If an electronic leak detector is not available, use a 1:1 solution of isopropanol and water. Apply a drop or two of the solution to each fitting. A leak will cause the solution to bubble.

Note: Never overtighten a fitting. First, finger-tighten the nut. Then use a wrench to tighten the nut further. Turning the nut in 1/4 turn (90º) increments is adequate for most fittings. However, the amount of force you need to apply can vary, depending on the friction between the nut and threads, as well as the composition and thickness of the tubing or line. If slightly turning the nut fails to eliminate a leak, look for other possible causes. Make sure that the correct size nut and ferrule are installed properly. Also, examine the nut, ferrule, and tubing for fractures or deformities. Do not risk damaging the ferrule; if a leak problem persists, call Tekmar-Dohrmann Service toll-free in the US and Canada (800) 874-2004, outside the US and Canada (513) 247-7000.

continued

Note: After you leak check, if there is still leaking, check all connections. Occasionally, parts become loose during shipping.

Causes of leaks include the following:

- A loose nut where a line enters a valve or regulator
- A ferrule that is damaged, worn, or missing
- A break or hairline crack on a line
- A nut or ferrule that is the wrong size or type
- A line that is not connected
- A missing part

Note: Use the following tips when you leak check.

- **Do not use any type of soap solution (Snoop or Detect) to check for leaks. Soap can get into the lines, causing increased background and adsorption.**
- **Use isopropanol and water sparingly to avoid contaminating the fittings.**
- **Allow Precept II and the concentrator to warm up for at least 30 minutes before you leak-check the system. The fittings need time to expand and warm to operating temperature. If you try to tighten fittings while the instruments are cold, you will either tighten the fittings too tight or not enough.**

4.11 Flow Setting/Leak Checking With TekLink

1. Click on the **Setup** pull-down menu.
2. Choose **Flows/Leak Checking**. Seven options appear in a sub-menu.

Set Transfer Flow

This option is only available during "Standby–Load Vials and Hit Step." The system moves into "Sweeping Transfer Lines."

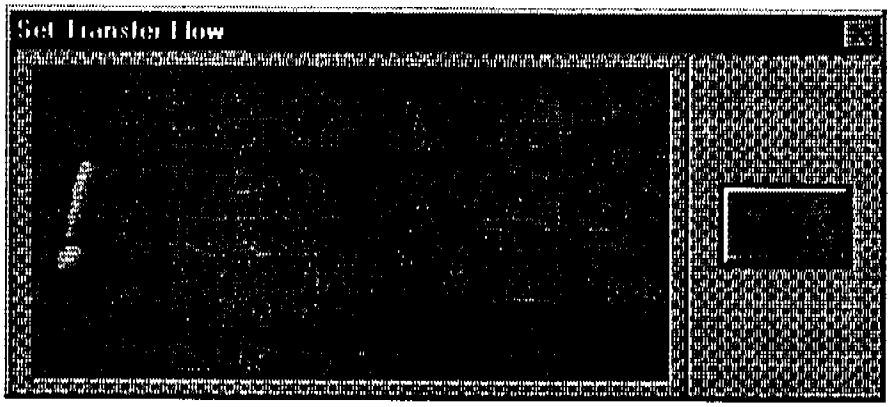


Figure 4-10 Set Transfer/Soil Purge Flow Screen

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the Precept II User Manual.
2. Attach a flow meter to the vent on the concentrator. The flow will exit through the vent.
3. Turn on the concentrator, Precept II, and the gas supply. Follow the directions in the dialog box (like the one above) to set pressure.
4. Click **OK** when you have successfully set the flow.

Leak Check IS Pathway

This option is only available during "Standby–Load Vials and Hit Step."

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the Precept II User Manual.
2. Make sure Precept II is turned **OFF**. Take off the back cover of Precept II:
   a. Remove the six screws on the sides.
   b. Gently pull the cover up and towards you. Be very careful not to pull too hard.
3. Turn on the concentrator, Precept II, and the gas supply.

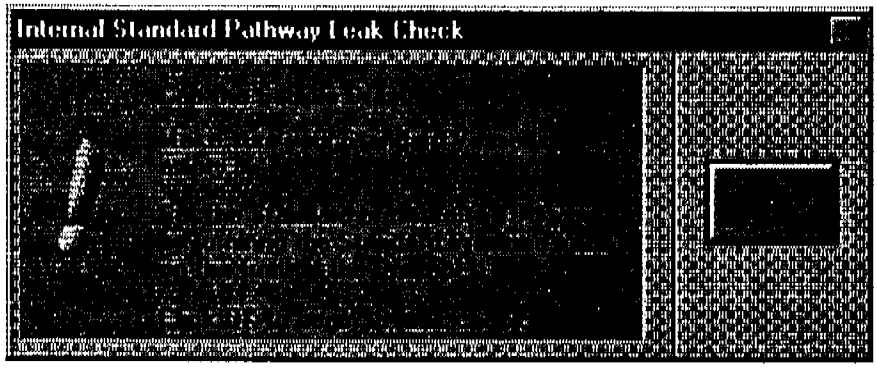


Figure 4-11 Internal Standard Pathway Leak Check

4. Follow the instructions in the above dialog box.
   a. The drain bulkhead is on the back of Precept II, in the bottom right corner. See the figure below.
   b. Cap the drain with a 1/16" cap. You can locate the cap in the kit box. Make sure the fitting is on finger-tight.
5. After you finish the instructions above and click **OK**, the system moves to "Filling Standard 1" mode.
6. Follow the instructions in the dialog box below.

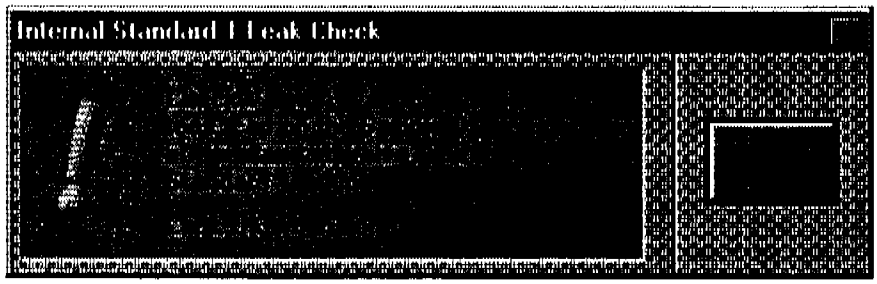


Figure 4-12 Internal Standard 1 Leak Check

continued

7. If you also have a standard 2 installed, TekLink will display the following dialog box.

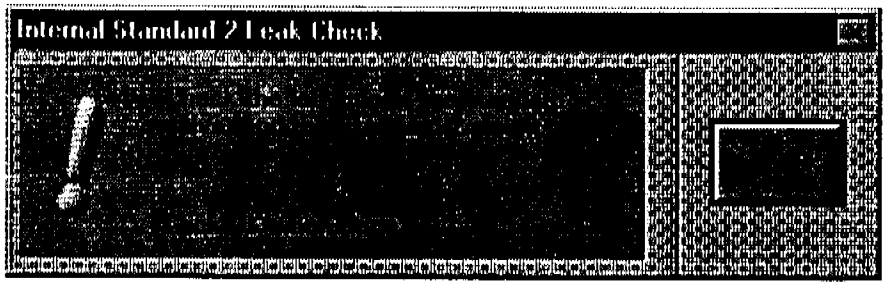


Figure 4-13 Internal Standard 2 Leak Check

8. After you finish the instructions above and press **OK**, the next set of instructions appear.

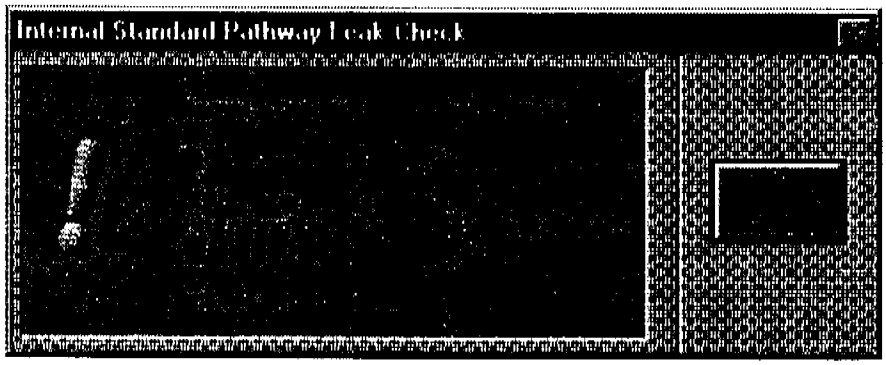


Figure 4-14 Internal Standard Pathway Leak Check Screen 2

9. Follow the instructions in the dialog box above. When you are finished, continue leak checking by choosing the other options. When you are finished leak checking completely:
   a. Turn Precept II **OFF**.
   b. Fasten the back cover onto Precept with the six screws you removed earlier.

Leak Check Water Sample Path

This option is only available during "Standby–Load Vials and Hit Step."

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the Precept II User Manual.
2. Make sure Precept II is turned **OFF**. Take off the back cover of Precept II:
   a. Remove the six screws on the sides.
   b. Gently pull the cover up and towards you. Be very careful not to pull too hard.
3. Turn on the concentrator, Precept II, and the gas supply.

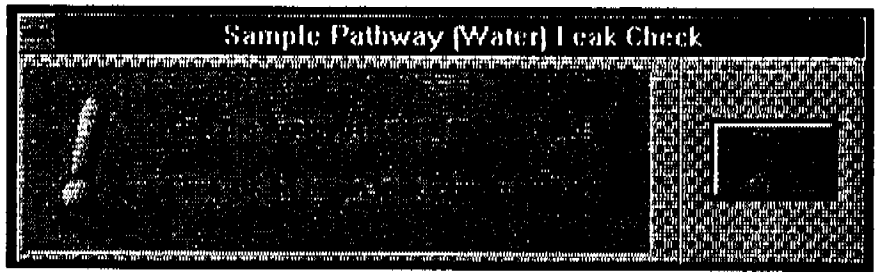


Figure 4-15 Sample Pathway (Water) Leak Check Screen 1

4. Follow the instructions in the dialog box above.
   a. Locate the Aqueous Transfer bulkhead on the back of Precept II, in the bottom right corner. See the figure below.
   b. Cap the drain with a 1/16" Valco plug nut. You can locate the cap in the kit box. Tighten the fitting finger-tight.
5. After you finish the instructions in the dialog box in step 3, click OK. The system moves to "Sweeping Lines" mode. The next set of instructions appear.

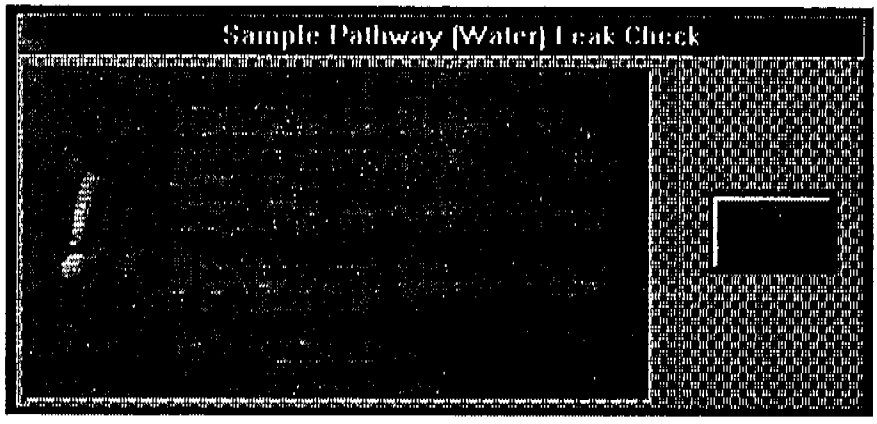


Figure 4-16 Sample Pathway (Water) Leak Check Screen 2

continued

6. When you have finished the instructions in the dialog box:
   a. Place a clean, empty vial in the aqueous cup.
   b. Press OK.

   The aqueous elevator rises, pushing the vial onto the needle. The next set of instructions appear. See the dialog box below.

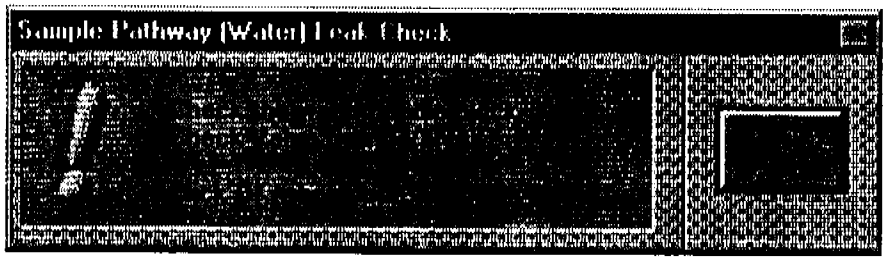


Figure 4-17 Sample Pathway (Water) Leak Check Screen 3

7. After you finish the instructions in the dialog box in step 6 and click **OK**, the next set of instructions appear. See the dialog box below.

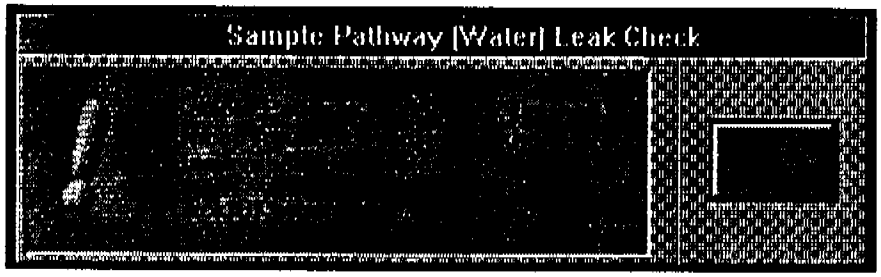


Figure 4-18 Sample Pathway (Water) Leak Check Screen 4

8. Follow the instructions in the dialog box above. When you are finished, continue leak checking by choosing the other options. When you are done leak checking completely:
   a. Turn Precept II **OFF**.
   b. Fasten the back cover onto Precept II with the six screws you removed earlier.

Leak Check Water Pathway

This option is only available during "Standby–Load Vials and Hit Step."

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the Precept II User Manual.
2. Make sure Precept II is turned **OFF**. Take off the back cover of Precept II:
   a. Remove the six screws on the sides.
   b. Gently pull the cover up and towards you. Be very careful not to pull too hard.
3. Turn on the concentrator, Precept II, and the gas supply.

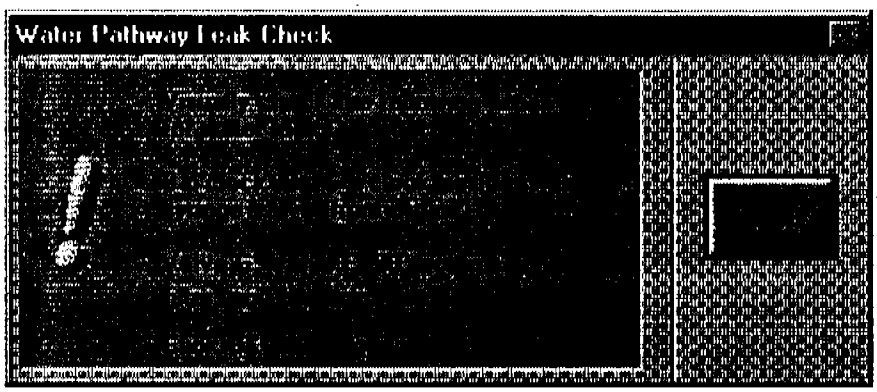


Figure 4-19 Water Pathway Leak Check Screen 1

4. Follow the instructions in the dialog box above. The system moves into "Syringe Rinse" mode.

Leak Check Soil Sample Path

This option is only available during "Standby–Load Vials and Hit Step."

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the Precept II User Manual.
2. Make sure Precept II is turned **OFF**. Take off the back cover of Precept II:
   a. Remove the six screws on the sides.
   b. Gently pull the cover up and towards you. Be very careful not to pull too hard.
3. Turn on the concentrator, Precept II, and the gas supply.

Figure 4-20 Sample Pathway (Solid) Leak Check Screen 1

4. Follow the instructions in the dialog box above.
   a. Locate the 3000 vent fitting on the front panel.
   b. Cap the drain with a 1/16" brass plug nut. You can locate the cap in the 3000's kit box. Tighten the fitting wrench-tight.
5. After you place the clean empty vial in the soil cup and click OK, the soil elevator rises. The system moves into "Purging Vial" mode. The 3000 moves into "Purge" mode and holds.

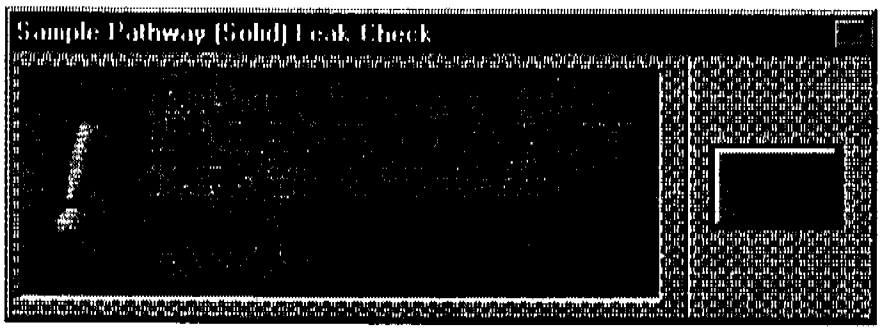


Figure 4-21 Sample Pathway (Solid) Leak Check

continued

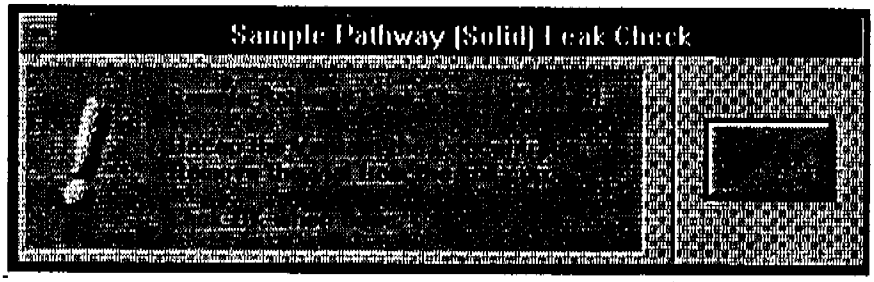


Figure 4-22 Sample Pathway (Solid) Leak Check Screen 2

6. Follow the instructions in the above dialog box. When you are finished, continue leak checking by choosing the other options. When you are finished leak checking completely:
   a. Turn Precept II **OFF**.
   b. Fasten the back cover onto Precept II with the six screws you removed earlier.

4.12 Overview

Before you begin an analytical run, you must complete these steps:

- Select an appropriate sample volume.
- Configure Precept II according to your specifications.
- Consider the chosen methods and their parameters. Edit parameters as needed.
- Program a schedule for the methods to run the samples, including blanks.
- Load the samples into the tray positions according to your method schedule.

4.13 Preparing Blanks

Precept II gives you two options for running blanks for aqueous samples **only**. You may choose for Precept II to automatically bring the blank water in from the water source; or you may choose to manually fill a vial with blank water. For solid samples, you must pour blank water into a vial and run it as a sample to test sample integrity.

Scheduling Blanks

Schedule blanks for aqueous samples only if you prefer Precept II to automatically bring in the water from the water source and transfer it to the glassware on the concentrator. This water must go through a charcoal filter (inside the rinse water filter) to purify it. You will **not** need to fill separate vials with blank water if you schedule blanks in the method schedule. However, you may only schedule blanks with aqueous methods. You may schedule up to nine blanks after every sample, if desired.

Filling a Vial

If you want to manually fill a vial with blank water and run it through Precept II as an aqueous sample, do not schedule it as a blank in the method schedule; schedule it as a sample. When you are using a solid method, pour blank water into a vial and schedule it as a sample. The blank sample will be analyzed according to the method parameters set up for its position.

4.14 Using Dilutions

Precept II dilutes aqueous samples with blank water according to the method schedule. The water source supplies the dilution water. You do not need to input any data (other than the data in the method schedule) for dilutions. Precept II cannot dilute solid samples.

4.15 Running Samples

This section describes the manual aspects of running samples.

Select a Sample Volume

Determine the amount of sample to put in the vial according to the method and schedule parameters chosen. The vials hold a maximum of 40 ml of sample.

Load the Sample

1. Fill a 40 ml vial with sample, leaving no headspace within the vial. (Tekmar-Dohrmann recommends I-Chem vials.)
2. Cap the vial and tighten 1/4 turn (90°) past finger-tight.
3. Insert the vial into the tray according to the position programmed in the method schedule.
4. Click the **STEP** button to begin the run.

Precept II takes over from here. To understand more about how Precept II automation works, see Chapter 1.

4.16 Using the Bar Code Reader Option

To help you keep track of your samples, an optional bar code reader can be installed at the factory, into Precept II.

Apply **one** bar code label to each sample vial. The bar code must be placed vertically anywhere on the vial at least 1/4" from the top or bottom of the glass part of the vial. Before the sample is loaded into the sampling module, the robotic arm moves the vial into the bar code reader.

If the bar code reader is installed, you must configure it ON or OFF.

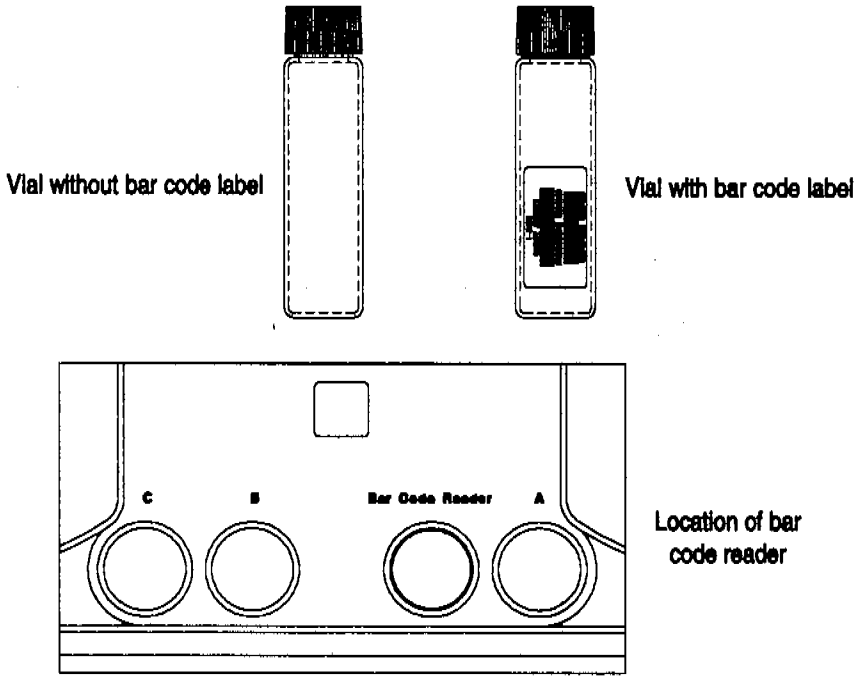


Figure 4-23 Bar Code Reader

5.1 Overview

Continuous maintenance of Precept II is the essential key to getting optimum performance at all times. Maintenance includes cleaning parts and modules, and replacing parts and supplies. (See Chapter 7 for purchasing replacement parts.) Carefully follow these procedures to keep Precept II contamination-free and clean.

This chapter explains how to maintain:

- Precept II and modules
- Rinse water filter
- Needles, sample syringe, and sample filter
- Glassware

Note: To maintain the concentrator, consult its manual.

> **WARNING**
>
> **To avoid electrical shock, turn off and unplug Precept II before cleaning or replacing parts.**

5.2 Precept II and Modules

Please follow these instructions carefully to avoid damaging any part of Precept II.

Shell

Clean with water and a soft cloth. Be careful not to let excess water drip into any parts or modules.

Trays

Remove trays from the tray holder. Clean the trays with water and a soft cloth. Make sure the the trays are dry before putting them back in the tray holder.

Tray Holder

Remove trays from tray holder. Clean the tray holder with water and a soft cloth. Make sure the tray holder is dry before replacing the trays.

Glassware

Clean glassware is essential for interference-free runs. This applies to flasks and cylinders as well as samplers (any vessel used to handle samples, standards, blank water, etc.)

To clean glassware, Tekmar recommends that you use the following:

- Dedicated glassware
- Ultrasonic bath
- Muffle furnace (Contact Ney Company, Bloomfield, CT)

continued

Dedicated glassware refers to glassware that is used for Precept II work only. Glassware that is used for other procedures such as extractions, often is not clean enough to use in trace applications.

An ultrasonic bath is a time-saver. Instead of heavy scrubbing, a brief scrubbing followed by ultrasonics is more effective and less work. It is acceptable to use any glassware detergents that are recommended for use in an ultrasonic bath. (Recommended product: Tekmar Ultrasonic Bath.)

A muffle furnace is excellent for cleaning many samplers with hard-to-remove residue. Set the temperature to approximately 350-400°C (**do not go too high - the glassware may melt**) and allow the residues to be oxidized. After the glassware has cooled, the remaining char is easily removed with a brush and a cleaning agent. (Recommended product: Tekmar Muffle Furnace.)

Remove the glass vessels at Standards 1 and 2 by unscrewing the fittings. Clean with soap and water. Bake at 100°C.

⚠ CAUTION

The standard vessel is UV-coated. Do not bake the standard vessel at temperatures above 135°C. Exceeding the maximum temperature will damage the UV-coating and cause it to turn brown.

5.3 Rinse Water Filter

With use, the granular activated carbon in the filter will become saturated with organics, allowing impurities to pass through it. These impurites can cause background or ghost peaks to appear on chromatograms. Every six months, Tekmar recommends that you replace the complete assembly.

You can order a replacement rinse water filter or the refill kit from Tekmar. See Chapter 7 for ordering information.

See Chapter 3 for instructions on installing the rinse water filter.

5.4 Needles

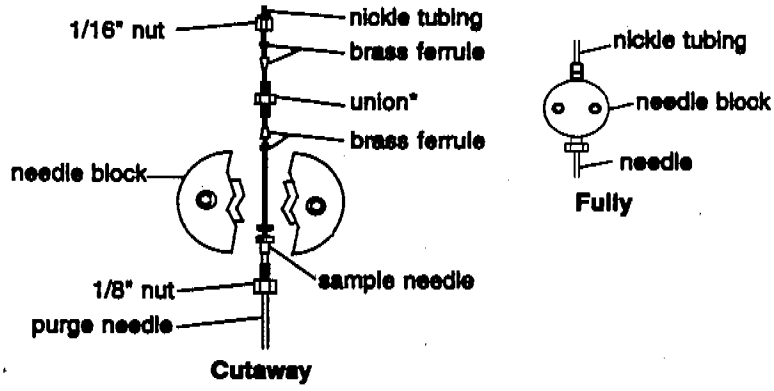
Clean the needles on a routine basis. Frequency of cleaning depends on the kind of samples you are running. If you wish to wipe the outside of the needles, use methanol, then wipe with water.

Disconnecting Aqueous Needles

You will need a 3/8" open-end wrench, tubing cutters, and two 5/16" open-end wrenches. If you wish to replace the needle, then the washer must also be replaced. For ordering information, see Chapter 7.

Note: Do not turn the fitting more than 1/4 turn (90º) turn past finger-tight. Doing so may damage the ferrule.

1. Loosen the 1/16" stainless steel union nut (Figure 5-1) using a 5/16" open-end wrench. You may want to secure the union with another 5/16" open-end wrench.
2. Use a 5/16" open-end wrench to loosen the 1/16" stainless steel union. Put the union aside.
3. Push the needle up from the bottom to expose the ferrule at the top.
4. Cut off the needle below the ferrule with tubing cutters.
5. Pull the needle straight down from the bottom. (There will be another part of the needle still present.)
6. Push the new needle up and swage on the new brass 1/16" ferrule. The ferrule goes on upside down, tapered side up.
7. Using the existing 1/16" stainless steel union, reconnect the fittings. As you tighten the union, the needle moves down into its correct position.



* The union includes one 1/16" nut and one two-piece ferrule.
** The sample collar is part of the needle. It is not a separate part.

Figure 5-1 Sample Needle and Surrounding Parts

Note: Finger-tighten the 1/16" plug nut and union. Then use a 5/16" open-end wrench to tighten an additional 1/4 turn. Do not overtighten. Too much force will damage the ferrules, causing leaks.

Disconnecting Solid Needles

Disconnect the solid sample needle using the same directions as the aqueous needle. However, before step 1, use a screwdriver to remove the screw holding the cover on top of the solid module.

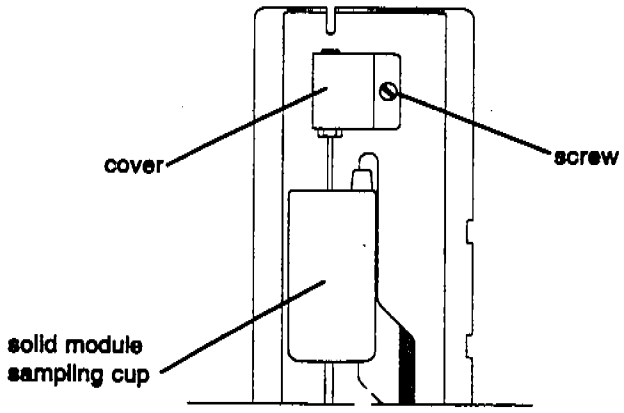


Figure 5-2 Removing the Solid Module Cover

1. Take off the solid needle cover (Figure 5-2, above).
2. Loosen the 1/16" stainless steel union nut using a 5/16" open-end wrench. You may want to secure the union with another 5/16" open-end wrench.

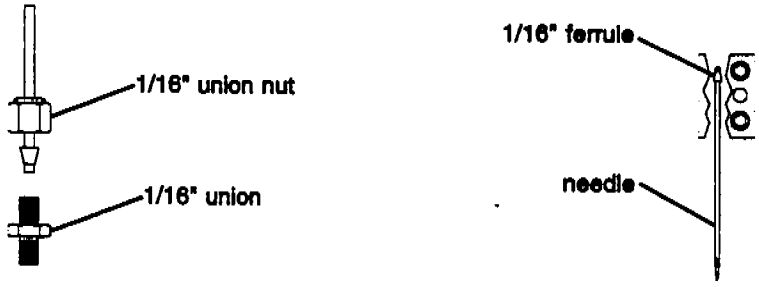


Figure 5-3 Parts of the Needle

3. Use a 5/16" open-end wrench to loosen the 1/16" stainless steel union. Put the union aside.
4. Push the needle up from the bottom to expose the ferrule at the top.
5. Cut off the needle below the ferrule with tubing cutters.
6. Pull the needle straight down from the bottom. (There will be another part of the needle still there.)
7. Push the new needle up and put on the new brass 1/16" ferrule. The ferrule goes on upside down, tapered side up.
8. Using the existing 1/16" stainless steel union, reconnect the fittings. As you tighten the union, the needle moves down into its correct position.

Cleaning the Needles

If it becomes necessary to clean the needles, clean with a methanol flush, and rinse very well with blank water.

5.5 HydrocarbonTrap

Tekmar-Dohrmann recommends that you replace the hydrocarbon trap (connected to the tubing between the gas supply and Precept II) every three–six tanks. If you see ghost peaks in your chromatograms, you may wish to change your hydrocarbon trap. For instructions, see Chapter 3.

5.6 Sample Syringe

Take special care in maintaining the sample syringe (Figure 5-4, next page). It requires periodic maintenance and replacement of parts to give optimum performance at all times.

Replacing the Sample Syringe

Referring to Figure 5-4 on the next page, follow the steps below.

1. Locate the sample syringe in the kit box.
2. Turn on Precept II. Allow Precept II to run through the self tests. Wait for the mode "Standby-Load Vials and Hit Step." Then choose **Replace Syringe** from the **Setup** menu in TekLink. Precept II moves the lever down.
3. Disconnect the barrel from Port B by grasping the barrel and turning it to the left.

Note: Port B is plastic, and can break under stress. To avoid damaging the port, turn the barrel slowly and carefully.

continued

4. Remove the thumbscrew. Pull the sample syringe forward.
5. Connect the new sample syringe to Port B. Make sure that the gradations on the barrel are facing out, where you can see them.
6. Slide the plunger onto the lever. (You may have to pull the plunger down to reach the lever.) Insert the thumbscrew, and tighten.
7. Check for leaks during the next sample run.

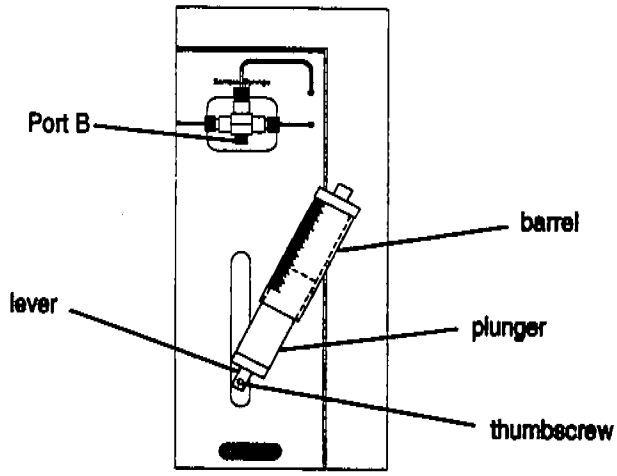


Figure 5-4 Replacing the Sample Syringe

5.7 Sample Filter

Precept II cleans the 90-micron sample filter (Figure 5-5, next page) by backflushing between sample runs. However, carryover or contamination is still a possibility.

Once a year (or when you see flow restriction), it is recommended you replace the sample filter. Make sure you replace it with another 90-micron filter.

Replacing the Sample Filter

You will need one 1" and one 1/4" open-end wrenches to replace the sample filter.

Referring to Figure 5-5 on the next page, replace the sample filter:

1. Turn off the gas and water supplies to Precept II.

> **WARNING**
>
> **To avoid electrical shock, turn off and unplug Precept II before removing the panel.**

2. Remove Precept II's back panel. Looking at the rear of Precept II, locate the sample filter in the upper left side.

continued

3. A small amount of water may drain from the filter or lines when you remove the filter. Place a towel underneath the filter to prevent water from dripping onto the electronics.

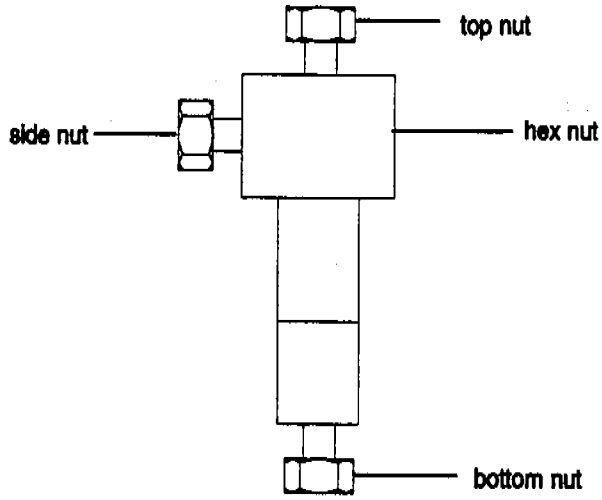


Figure 5-5 Replacing the Sample Filter

4. Hold the hex nut with a 1" open-end wrench while loosening the top nut with a 1/4" open-end wrench.
5. Repeat step 4 for the bottom and side nut.
6. Remove the sample filter from the fittings.
7. Install the new filter into Precept II. You may use the fittings from the old filter with the new filter.

⚠ CAUTION

Tighten the nut with your fingers. Then use a wrench to tighten it 1/4-turn (90°). Do not overtighten. Too much force will damage the ferrule, resulting in leaks.

5.8 Installing the Standard Vessel(s)

1. Locate the standard vessel(s) (14-6150-024) in the kit box.
2. Slide the standard vessel up on the nickel tubing until the tubing hits the bottom.
3. Move the standard vessel down approximately 1/16".
4. Tighten the ridged nut around the top of the vessel. You may need a 7/8" wrench.
5. Choose "Prime Standards" from the Setup menu in TekLink. You must choose this option or run blanks before running samples. If you do not prime the standards or run blanks, the likelihood of reproducing either or both standards is very low.

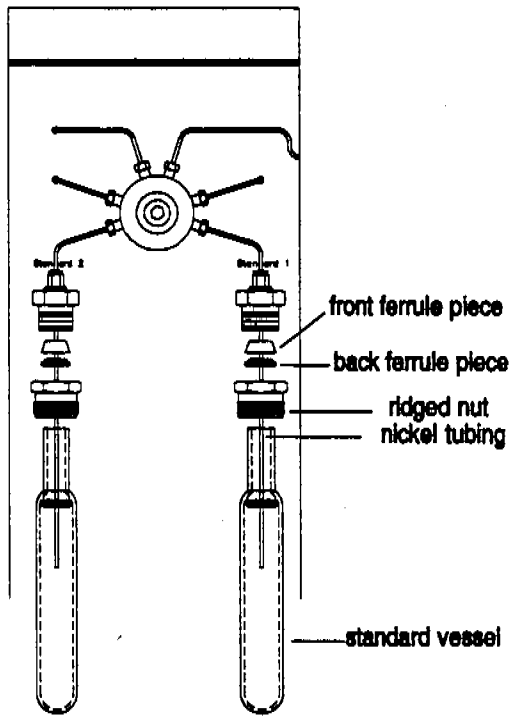


Figure 5-6 Installing the Standard Vessel(s)

6.1 Overview

This chapter gives you basic troubleshooting information. If Precept II needs more advanced troubleshooting, please do not hesitate to call Tekmar-Dohrmann Service.

Basic troubleshooting information includes troubeshooting safety, understanding error messages, finding leaks, and solving electronic, mechanical, and analytical problems.

6.2 CallingTekmar-Dohrmann Service

If you need assistance solving a problem, follow these steps:

1. Write down the model name, model number, and serial number of the instrument.
2. Note the type of problem you are having: write down the conditions under which the problem occurred, and the display, activity, or result that indicated the existence of a problem.
3. Place the manual near the telephone. The service representative may ask you to look at a diagram.
4. Call Tekmar-Dohrmann Service at one of the following numbers:

- (800) 874-2004: toll-free in the US and Canada
- (513) 247-7000: outside the US and Canada

6.3 Returning Precept II

Do not return Precept II unless a Tekmar-Dohrmann representative authorizes you to do so. A service representative may be able to help you solve the problem over the telephone. Also, if the instrument must be returned, the representative can tell you how to prevent damage during shipment. **The representative must give you a return authorization number.** Write this number down on the return label.

6.4 Safety

Before you troubleshoot, read the safety information in this section.

⚠ WARNING

To avoid electrical shock, turn off and unplug Precept II and the concentrator before removing panels.

Do not redesign or modify the equipment in any way. Do not remove equipment grounds. Never replace a fuse with one of a higher rating. Always use the correct replacement parts. Failure to follow this guideline will void your warranty.

Follow the manufacturer's directions when using solvent and other chemicals. They may ignite, explode, or damage the equipment if used incorrectly. Refer to the MSDS (Material Safety Data Sheet) for safety information.

Internal parts (especially heaters, heat sinks, and some electronic components) can get very hot. When troubleshooting, be careful not to touch these parts. Allow parts to cool before replacing them.

SAFETY TIPS

Do not place liquids near the area where you are troubleshooting; liquids can spill on circuits and conduct electricity.

Jewelry conducts electricity; remove jewelry.

Wear safety glasses.

Do not exceed maximum pressure ratings.

6.5 Troubleshooting Problem Directory

Use the table below to quickly find possible solutions to problems.

Table 6-1 Troubleshooting Problem Directory

6.6 Understanding Error Messages

Precept II may communicate error messages when the system finds a problem within itself. This section overviews the types of error messages Precept II may display.

All errors can be separated into three different categories: operation, user interface, and fatal.

Operation Errors

Operation errors indicate problems with a mechanical or electronic device within Precept II. For example, during the self tests, Precept II notifies you that the solid sample heater is not rising to its programmed temperature. The heater may be burned out or connections may be loose.

User Interface Errors

User interface errors flag discrepancies between what the operator has configured Precept II to do and what the system is capable of doing. For example, you may have tried to turn on a bar code reader that is not installed. It it is installed, its connections may be loose.

Fatal Errors

Fatal errors indicate a problem from within the system. Reset Precept II by turning it off for a few seconds, then turning it back on. If this does not solve the problem, call Tekmar-Dohrmann Service for assistance.

Error Codes

The table on the following page describes error codes and lists possible causes of the errors.

Error Codes - Table A		
Error #	**Name of Error**	**Causes of Errors and Possible Solutions**
1	Elevator Time Out	Most likely a fuse is blown on the DC Output Board. Please refer to section 6.7. To reset fuses, turn off and then back on again. If the elevator times out again, contact Tekmar-Dohrmann Technical Support.
2	Pumper Error	PUMPER TIME-OUT: the pumper failed to complete its move before the allotted time. Restart Precept II and watch to make sure the syringe is initialized upon power-up. If it is not, please contact Tekmar-Dohrmann Technical Support for more information. PLUNGER OVERLOAD: flow is restricted. Check tubing, hydrocarbon filter, rinse water filter, and sample filter for clogs. INVALID OPERAND: this occurs if the syringe size is set to 10 ml in the Configuration screen and you are using the methods for a 25 ml syringe. Edit the method parameters to use the 10 ml syringe.
3	Robotic Arm Error	VIAL STUCK IN GRIPPER: remove the vial. If this error persists, please contact Tekmar-Dohrmann Technical Support. VIAL NOT PRESENT: a vial was not found to complete the required move. Compare the method schedule against the vials in the trays. Make sure the two match position numbers. VIAL DROPPED: the gripper dropped the vial in mid-movement. Check the cap on the vial to make sure it is not skewed or loose. If that is not the correct solution, please contact Tekmar-Dohrmann Technical Support. PAD NOT FOUND: Precept II missed hard home during calibration. Check to see which axis the arm missed during calibration. Turn off the unit, then repower. If the error persists, please contact Tekmar-Dohrmann Technical Support. Turn off the power to prevent any possible damage. ARM NOT CALIBRATED: an instruction was given to the arm to move a vial before the arm was calibrated. Force calibration by pressing down Ctrl + Alt + Shift + F10 during "Standby-Load Vials and Hit Step" or restart Precept II. X AND Y OFFSET NOT REACHED: Precept II moves the arm to known safe points to determine the offset for each axis. If Precept II cannot reach one or more of these points, you will receive this error. Call Tekmar-Dohrmann Technical Support for more information. X, Y, AND Z TIME-OUTS: the arm took longer than its estimated time to complete a move. Please contact Tekmar-Dohrmann Technical Support for information. SENSOR FAILURE: two of the arm sensors were flagged at the same time. Please contact Tekmar-Dohrmann Technical Support for information.
4	3000 Error	Troubleshoot 3000. See 3000 user or service manual.
5	Bar Code	A bar code was not detected on a vial. You may wish to move the position of the bar code on the vial. See Chapter 4 for more information.

Table 6-2 Error Codes: Table A

Error Codes - Table B		
Error #	**Name of Error**	**Causes of Errors and Possible Solutions**
11	1-24 Tray Missing	If you do not wish to process samples that are in positions 1-24, and have removed the tray, check the method schedule. You may have unintentionally scheduled Precept II to process samples from those positions. Position Tray. Tray may not be resting on pressure-activated switch.
12	25-48 Tray Missing	If you do not wish to process samples that are in positions 25-48, and have removed the tray, check the method schedule. You may have unintentionally scheduled Precept II to process samples from those positions. Position tray. Tray may not be resting on pressure-activated switch.
13	Elevator Failure	The specified elevator is not down when it needs to be; follow the instructions in the dialog box. If the problem continues, call Tekmar-Dohrmann Technical Support for more information.
14	Invalid Method	A water only system was scheduled to run a soil sample. Please check your method schedule.
20	RTD Failure	Precept II not reading temperatures correctly. Follow instructions on screen.
22	Max Failsafe Exceeded	Temperature of internal part (or region) has exceeded the limit. Follow instructions on screen. If instructions do not help, turn off Precept II immediately. Call Tekmar-Dohrmann Technical Support.
23	Setpoint Not Reached	Contact Tekmar-Dohrmann Technical Support.
24	6 Port Error	An error has occurred with the 6 port valve. Contact Tekmar-Dohrmann Technical Support for assistance.
25	8 Port	An error has occurred with the 8 port valve . Contact Tekmar-Dohrmann Technical Support for assistance.

Table 6-3 Error Codes: Table B

6.7 Solving Electro-mechanical Problems

The following pages contain troubleshooting flow charts and instructions. Each flow chart is titled with the type of problem that it is designed to help you solve. Please read section 6.3 before you begin.

Precept II Will Not Turn On

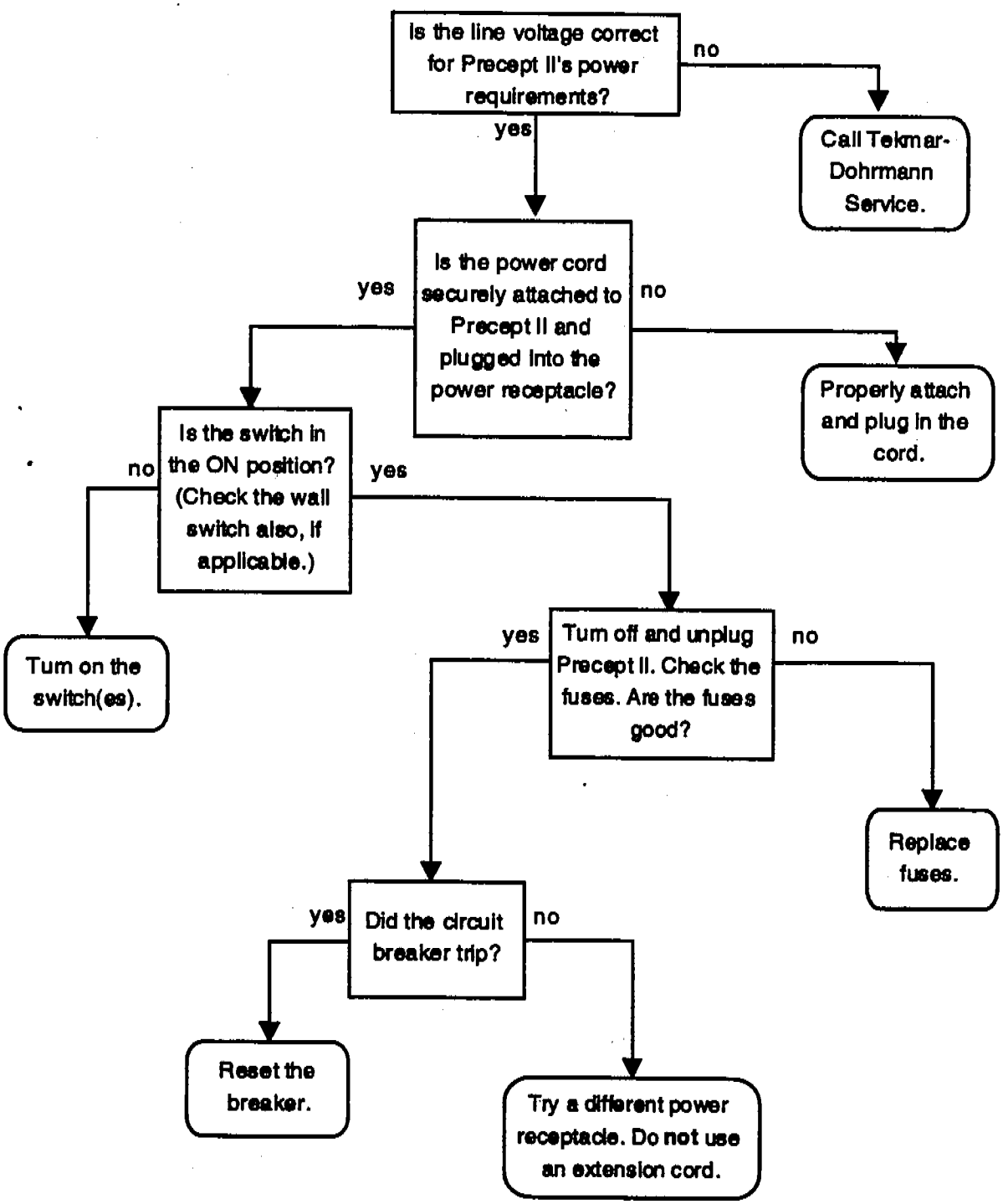


Figure 6-1 Precept II Will Not Turn On

Bar Code Reader Is Not Properly Scanning the Codes

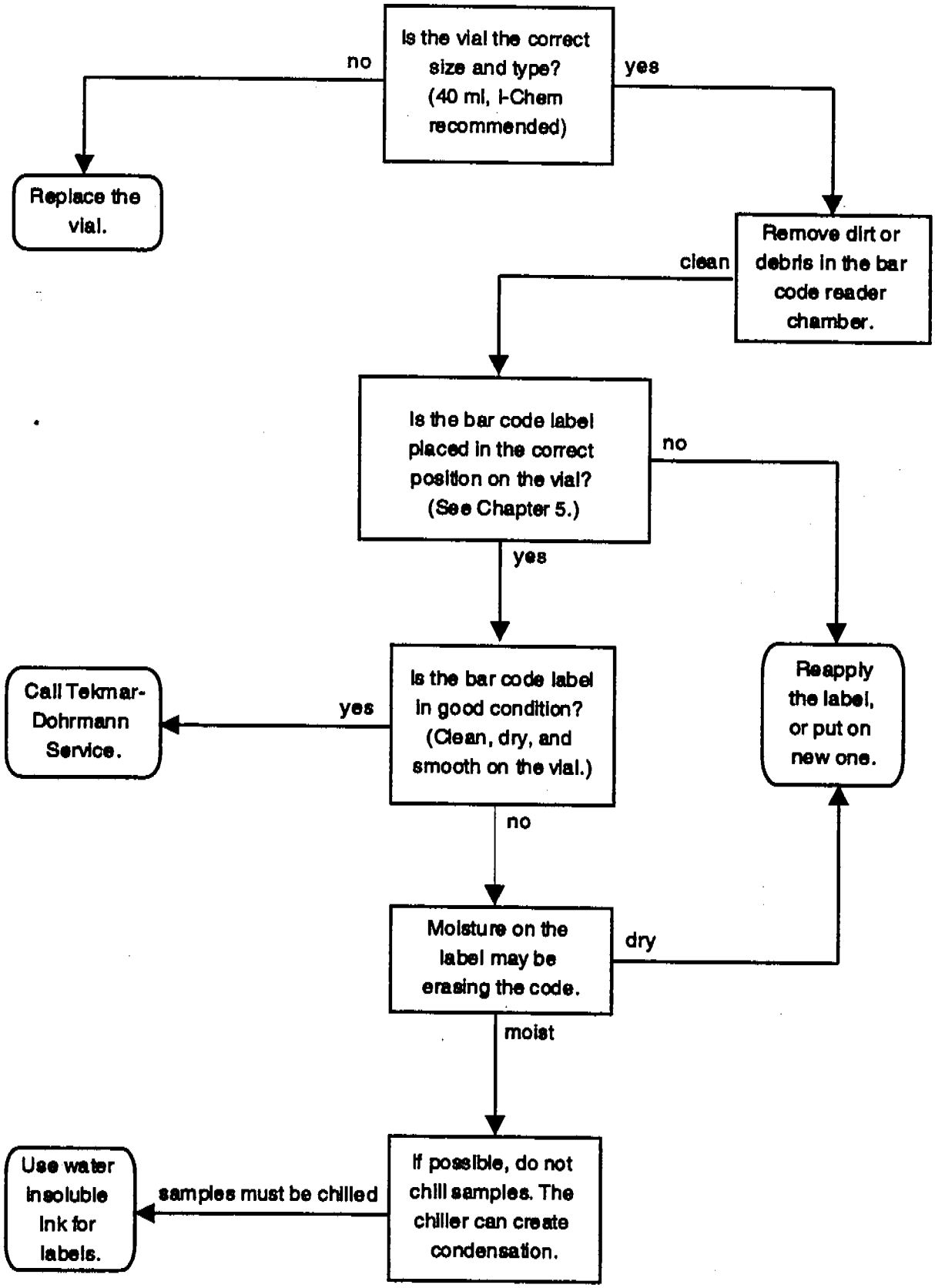


Figure 6-2 Bar Code Reader Is Not Properly Scanning the Codes

Robotic Arm Moves the Vial to the Wrong Position

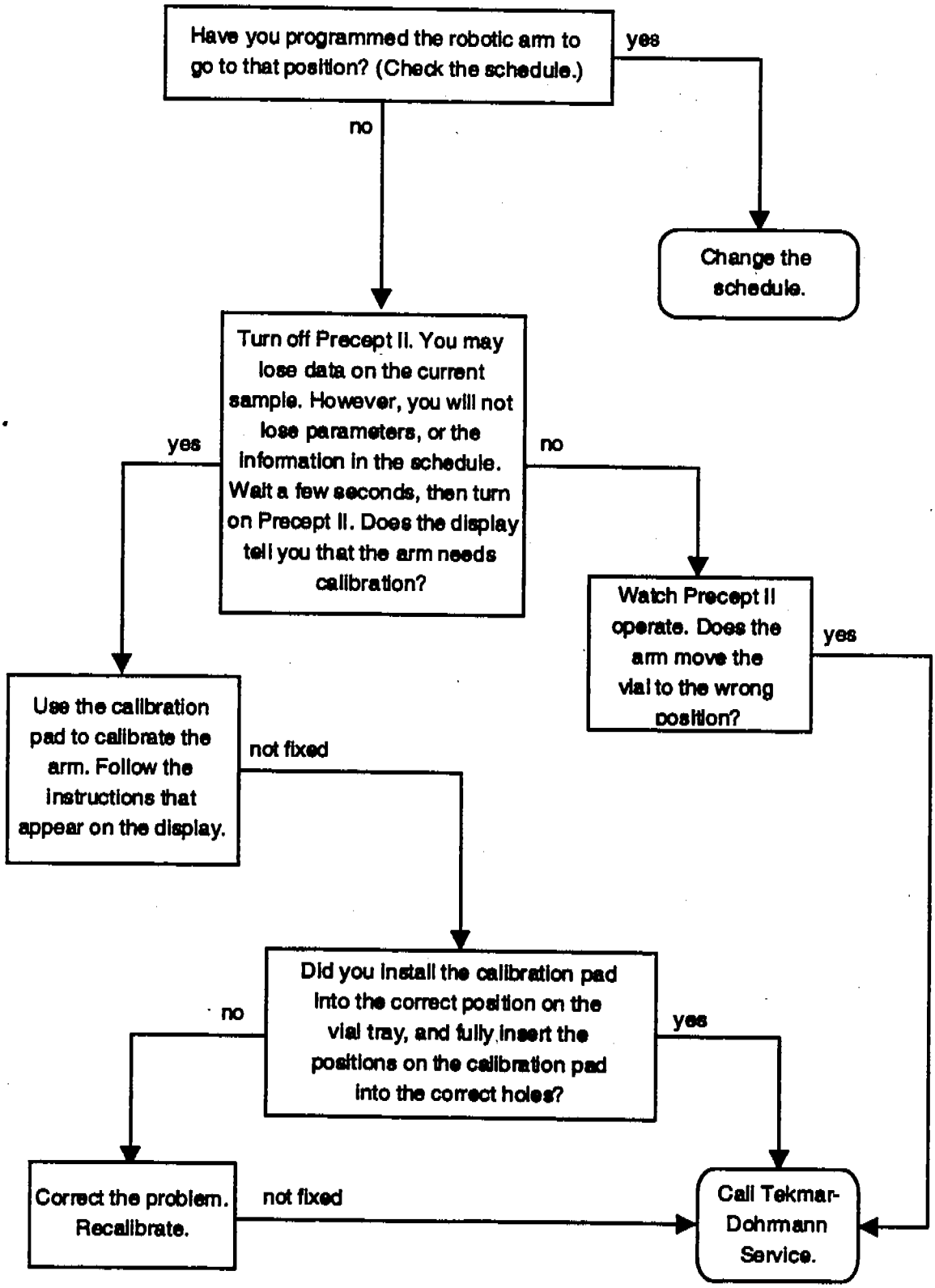


Figure 6-3 Robotic Arm Moves the Vial to the Wrong Position

Robotic Arm Stops Moving

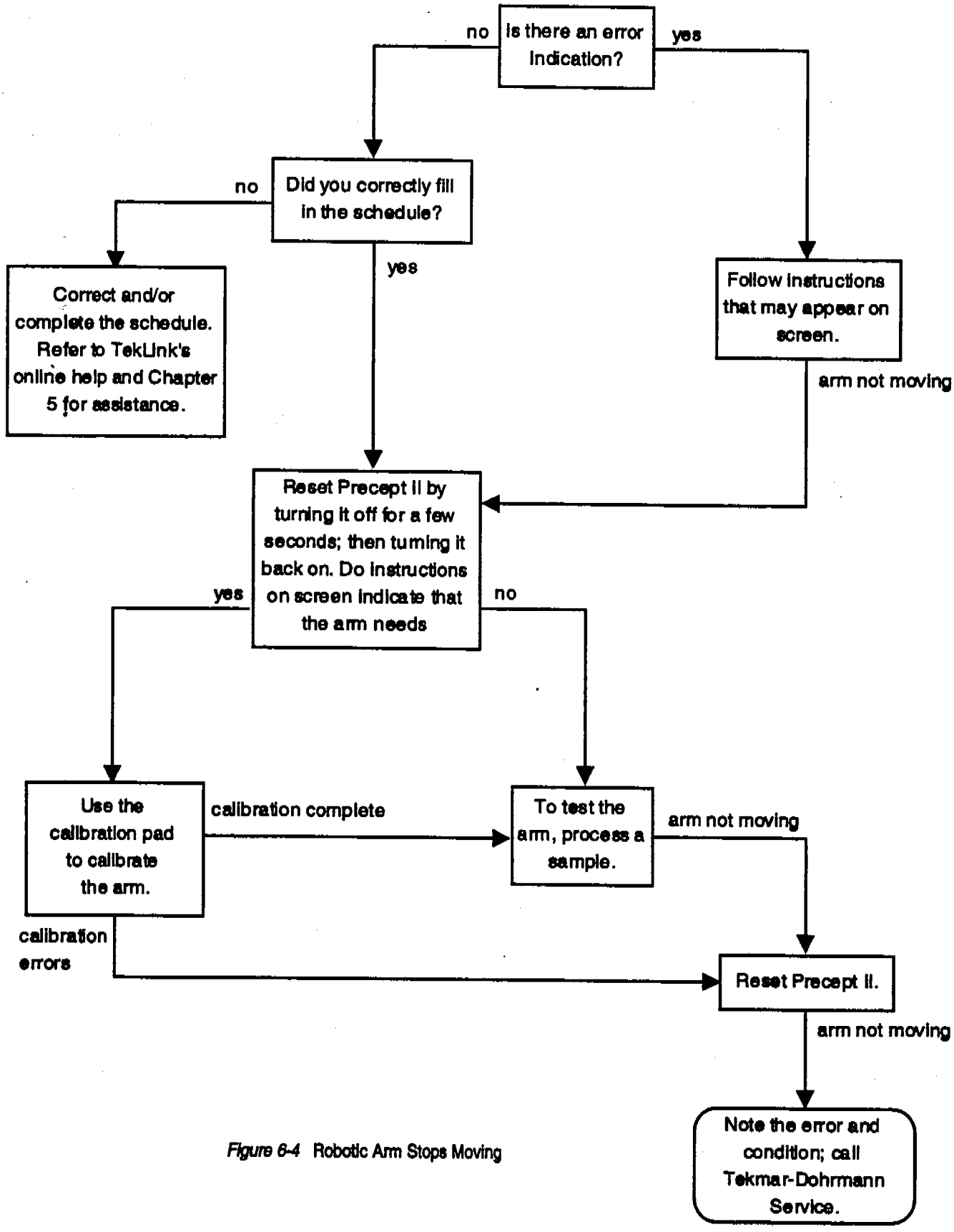


Figure 6-4 Robotic Arm Stops Moving

Vial Gripper Stops Working Correctly

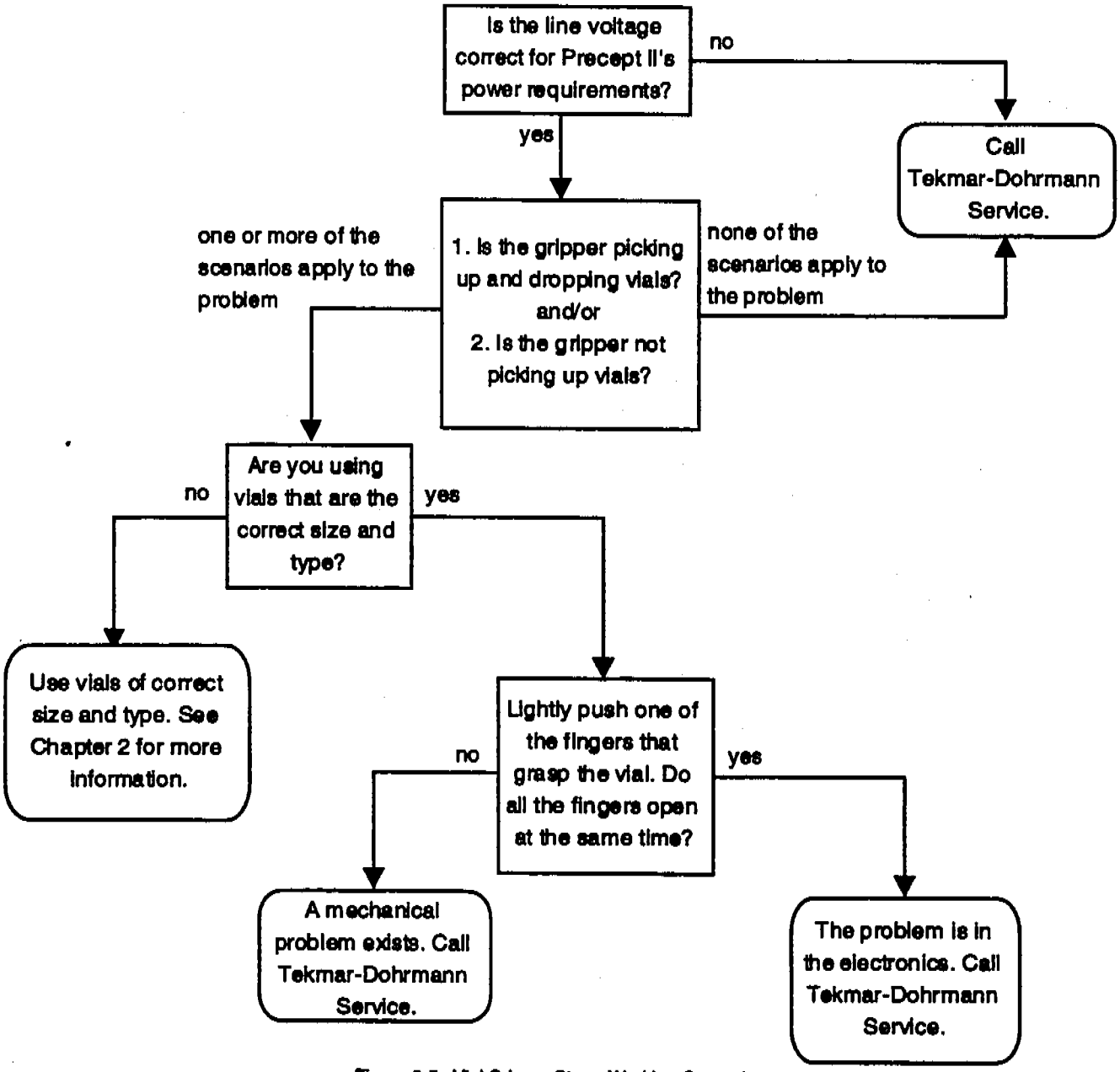


Figure 6-5 Vial Gripper Stops Working Correctly

Precept II Loads the Sample Into the Wrong Module

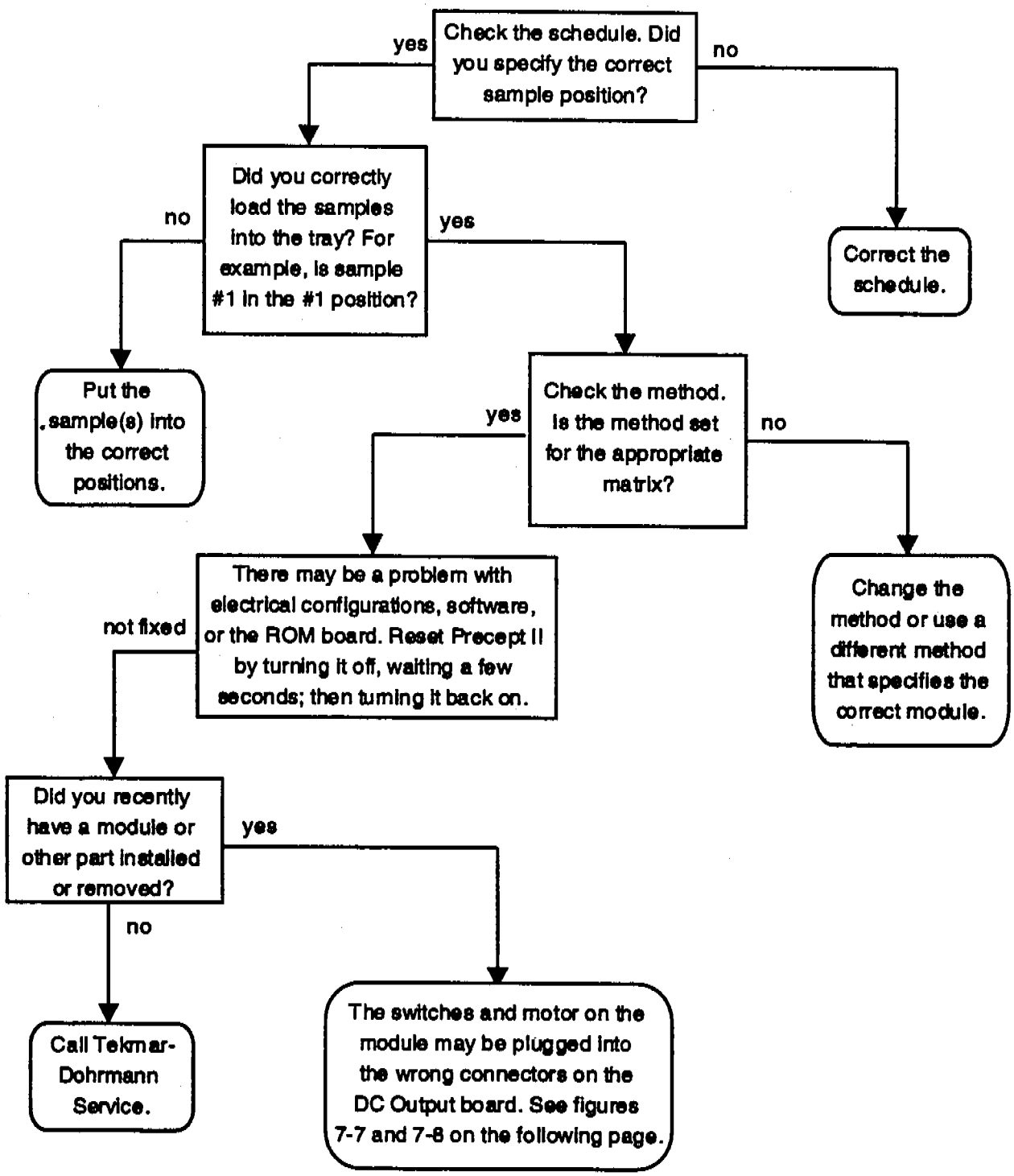


Figure 6-6 Precept II Loads the Sample into the Wrong Module

WARNING

To avoid electical shock, turn off and unplug Precept II before removing the back panel.

Rear view of Precept II (after the back panel has been removed)

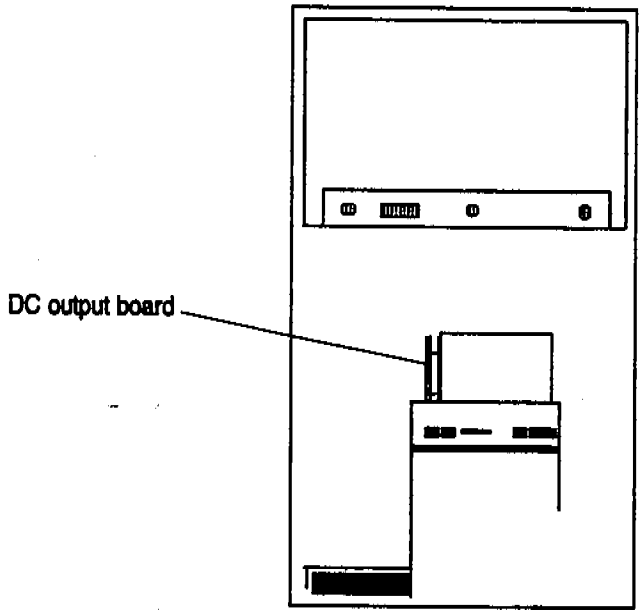


Figure 6-7 Location of the DC Output Board

Note: The connectors are keyed to keep you from plugging them in backwards.

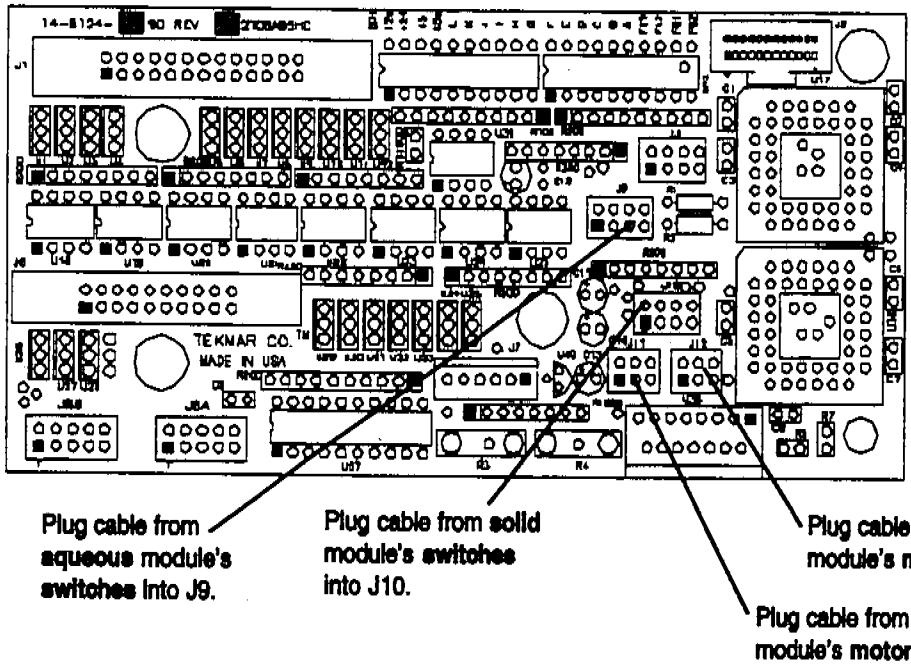


Figure 6-8 Connections on the DC Output Board

No Sample and/or Volume in Sample Loop Transfers to the Concentrator

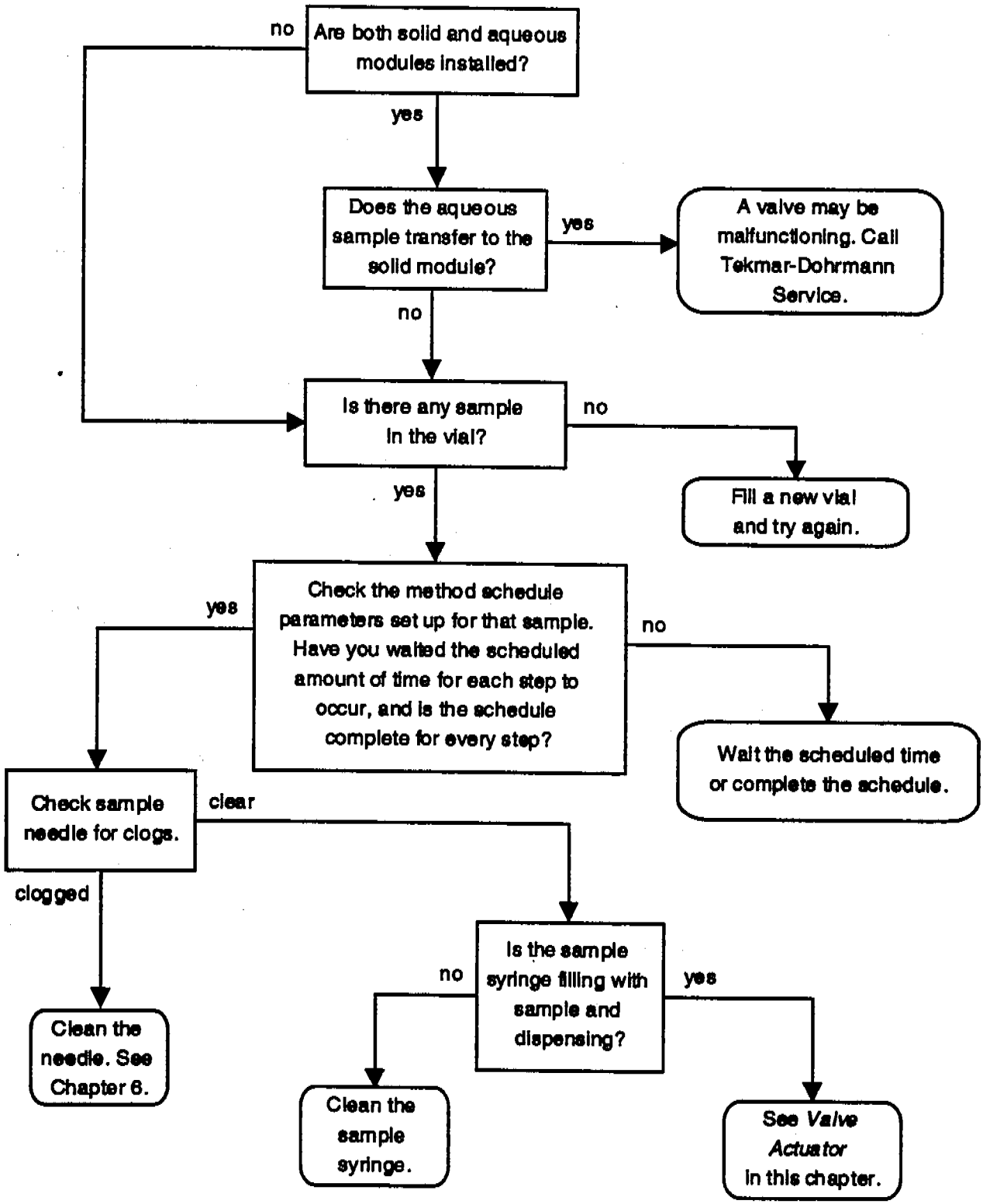


Figure 6-9 No Sample and/or Volume in Sample Loop Transfers to the Concentrator

Standard Does Not Transfer to the Concentrator

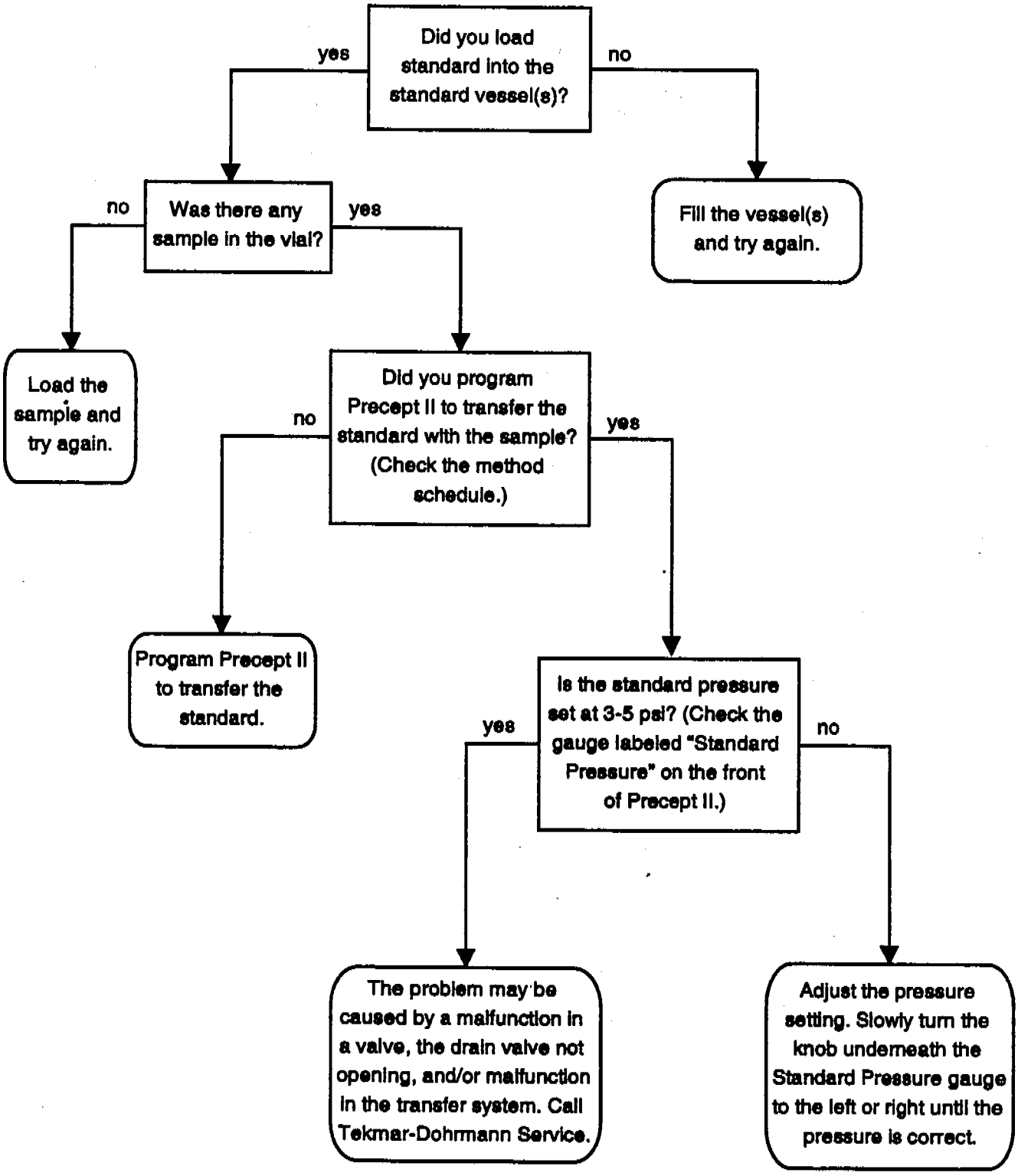


Figure 6-10 Standard Does Not Transfer to the Concentrator

Precept II Will Not Backflush the Filter

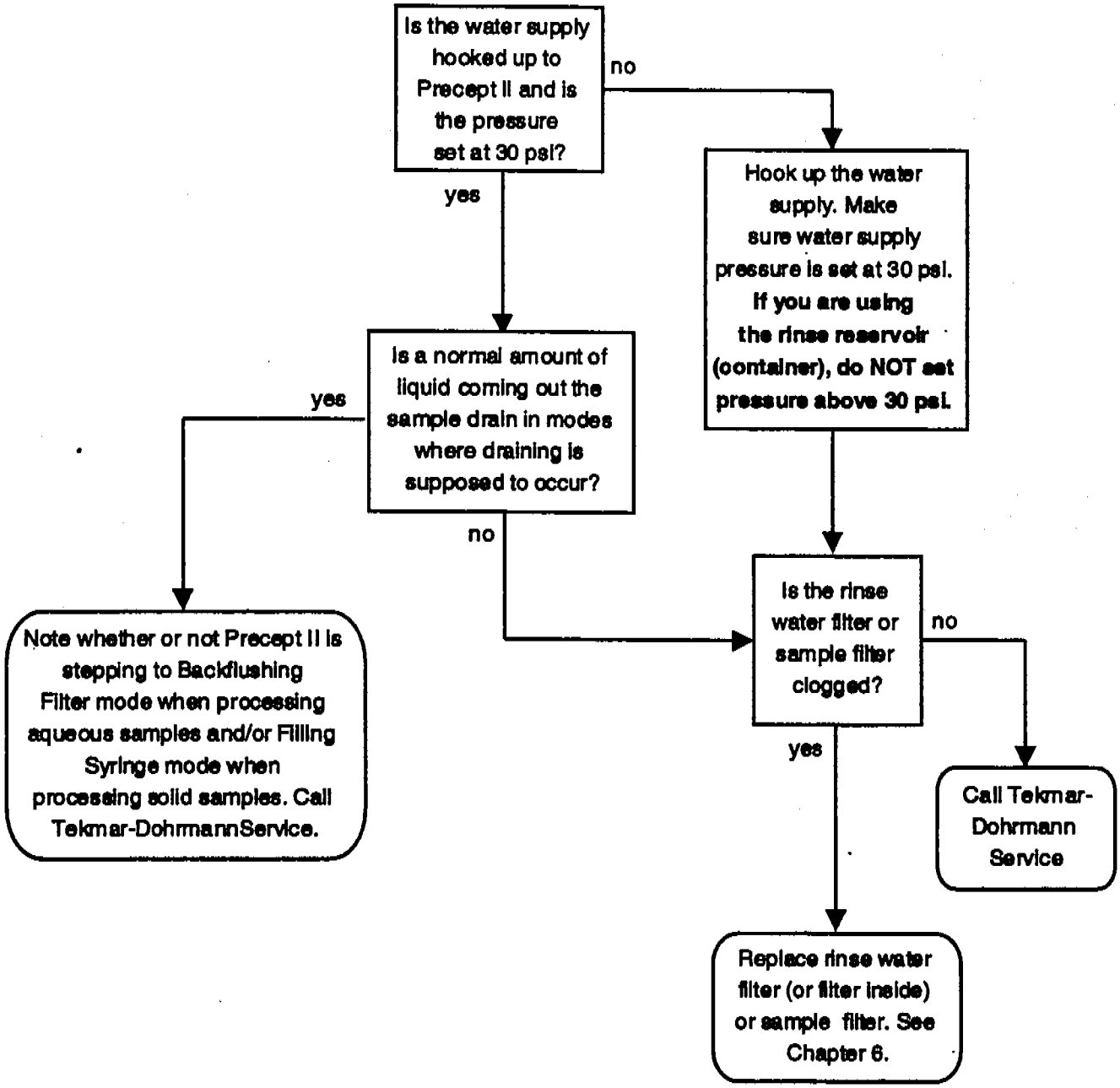


Figure 6-11 Precept II Will Not Backflush the Filter

Precept II Will Not Backflush the Needle

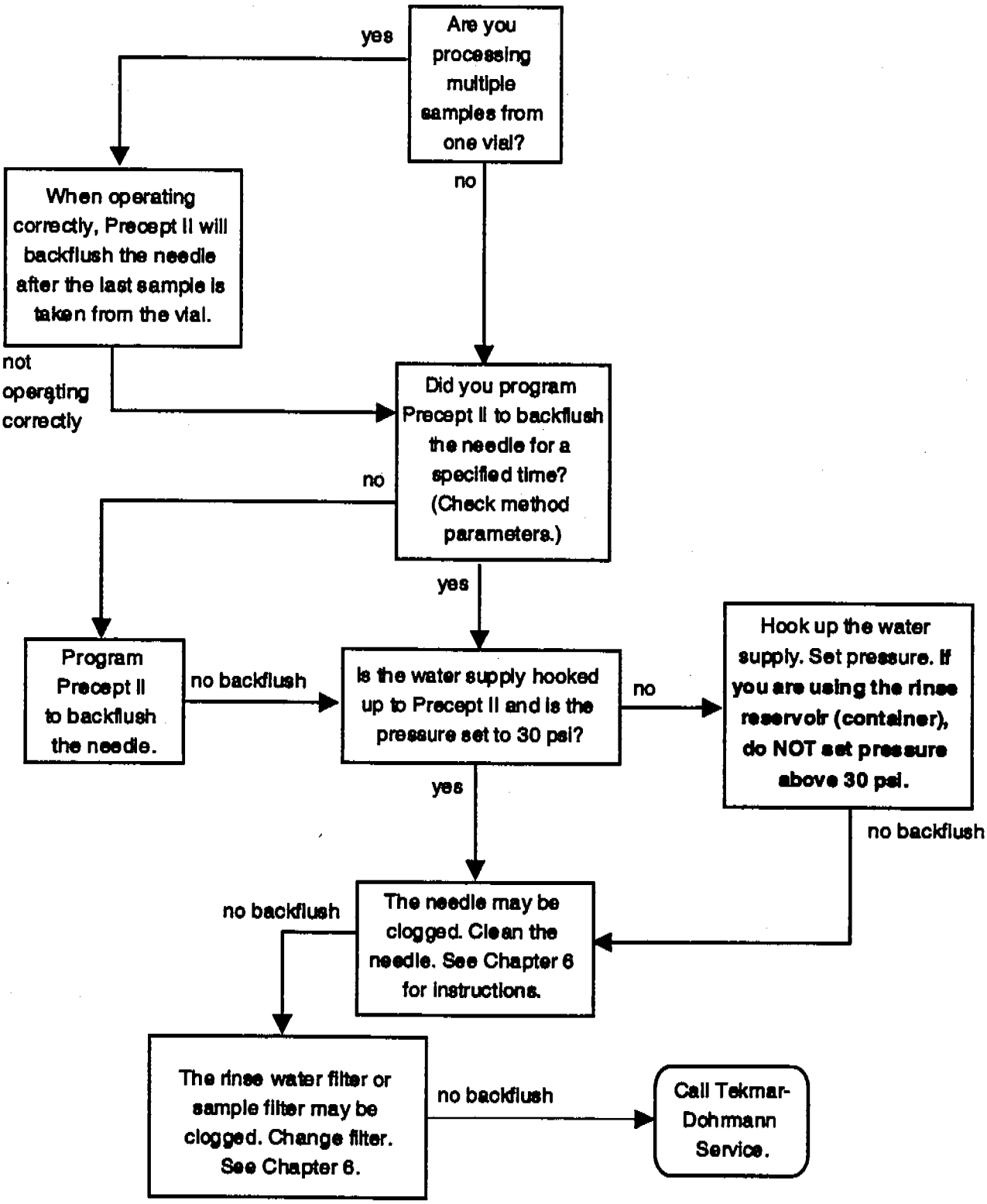


Figure 6-12 Precept II Will Not Backflush the Needle

No Water Flow for Filling, Rinsing, Blanks, and Dilutions

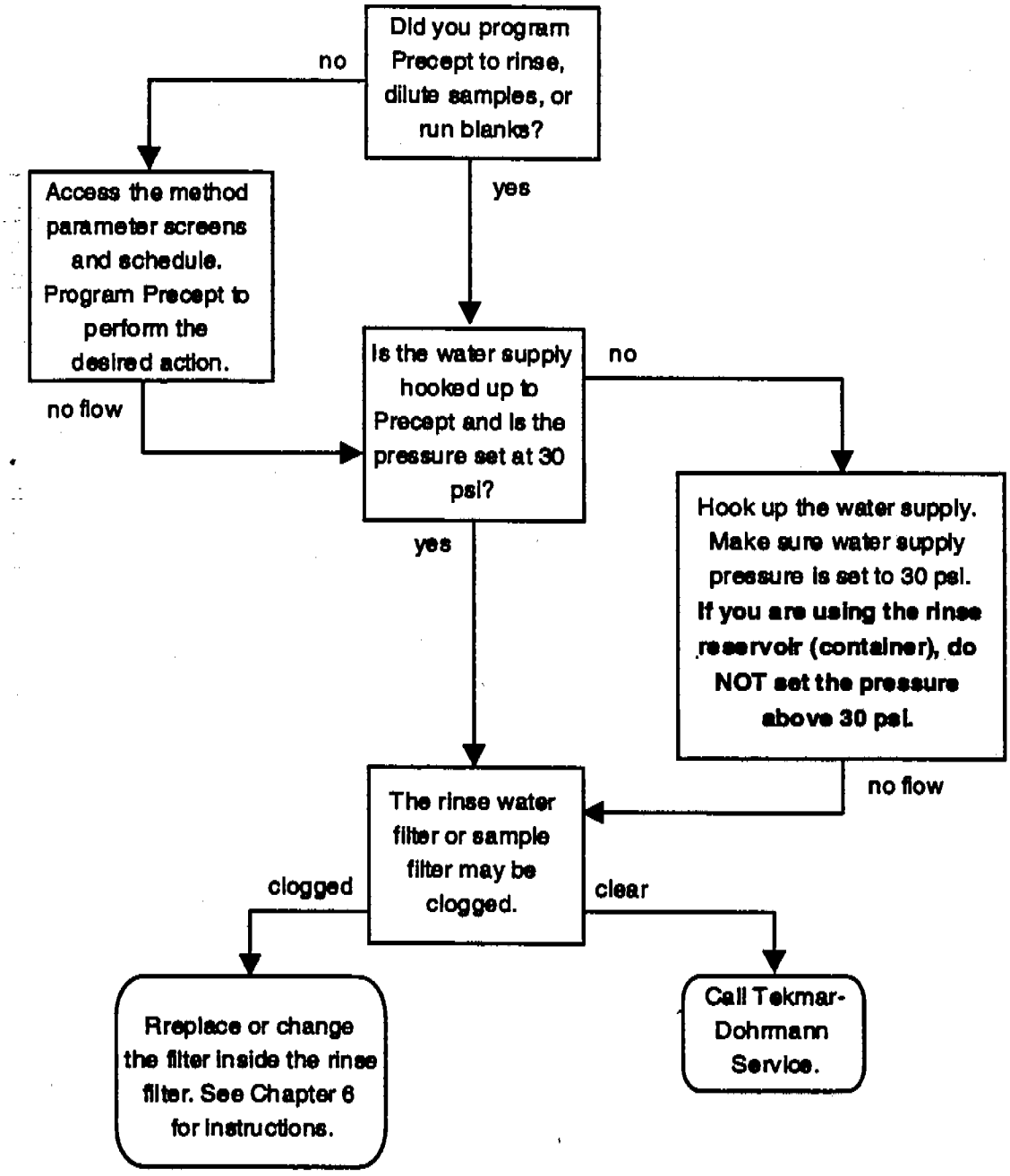


Figure 6-13 No Water Flow for Filling, Rinsing, Blanks, and Dilutions

6.8 Valve Actuator

The 6-port Valco (standard) valve is on the front panel near the standard vessels. Valve actuator deficiencies can cause various problems, such as flow restriction. You can check the actuator by following these steps:

1. To release pressure, remove the standard vessels. If you do not remove the vessels, pressure will cause fluid to spill from the valve.
2. The 6-port valve has a ring-shaped ridged top. Unscrew the ridged top with your fingers.

Note: Do not insert an Allen wrench into the center hole to loosen the ridged top. You cannot remove the ridged top by turning an Allen wrench in this hole. If you do so, you will be adjusting pressure on the rotor which will cause the valve to malfunction.

If you have difficulty removing the ridged top, place a cloth around it, and use pliers to carefully loosen the top. (The cloth will prevent the top from getting scratched.)

3. Do **not** place your fingers into the valve. While Precept II is operating, the rotor inside the valve should turn. (You can identify the rotor by the black round circle in its center.) If the rotor does not turn, the actuator may need to be replaced. Call Tekmar-Dohrmann Service. If the rotor is turning, the actuator is working. However, you may need to clean the rotor.

Note: The rotor is fragile; if it is scratched or damaged, it will leak.

4. Turn off Precept II. Use a magnet to carefully remove the rotor. Clean the rotor in a sonicator.
5. Insert the rotor into the valve, making sure you orient it correctly. The rotor's tab (Figure 6-14) fits into a slot inside the valve. The position of the slot determines the orientation of the rotor. If the slot inside the valve is horizontal, place the rotor's grooves at the three and twelve o'clock positions. If the slot inside the valve is vertical, place the grooves at the nine and twelve o'clock positions.

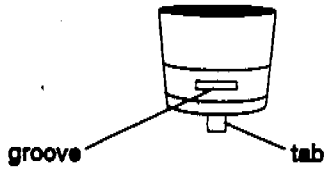


Figure 6-14 Rotor

6.9 Replacing Fuses

If Precept II does not turn on, the fuses may be blown in the power entry module.

WARNING

To avoid electical shock, turn off and unplug Precept II before removing the fuse compartment.

WARNING

For continued fire protection, use fuses of correct type and rating.

To replace fuses, follow the steps below, referring to Figure 6-15.

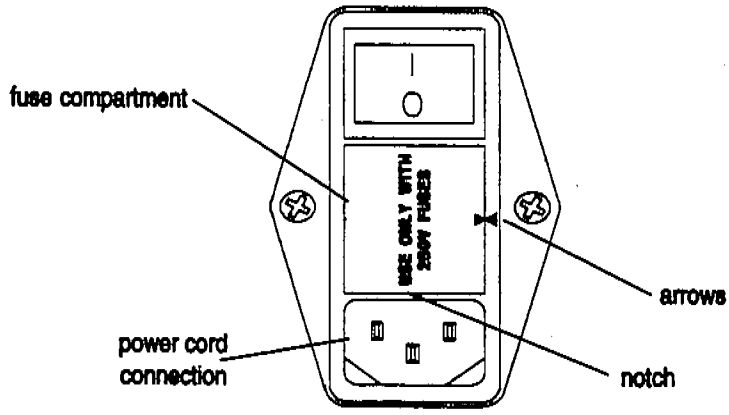


Figure 6-15 Power Entry Module

1. Turn off and unplug Precept II.
2. Disconnect the power cord from Precept II.
3. Insert the end of a small flat blade screwdriver into the notch that is above the power cord connection.
4. **Carefully** pry the fuse compartment out of the power entry module.
5. Replace blown fuses. The correct fuse ratings and specifications are listed on the back panel.
6. Orient the fuse compartment so that the arrow on the fuse compartment and the arrow on the power entry module are pointing at each other.
7. Push the fuse compartment back into the power entry module.

Replacing Fuses on the DC Output Board

If you are having mechanical problems with the elevator(s), you may need to change the fuses on the DC output board at connections R3 and R4. Do **NOT** replace fuses unless Tekmar-Dohrmann Service recommends that you do so.

> **WARNING**
>
> **To avoid electical shock, turn off and unplug Precept II before removing the back cover.**

1. Turn off and unplug Precept II, then remove the back cover.
2. Locate the DC output board. It sits sideways. See Figure 6-16.

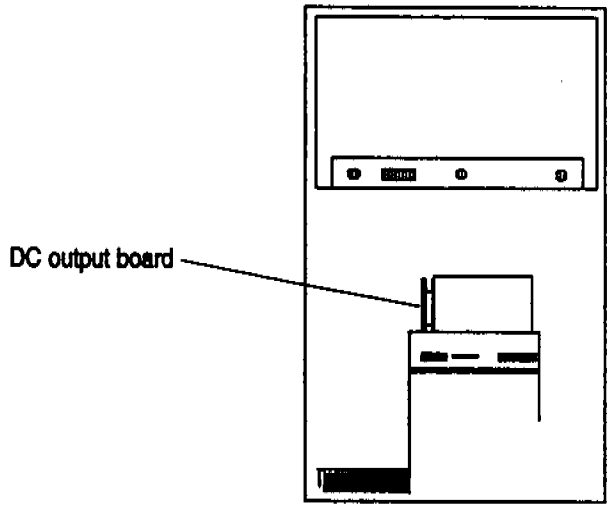


Figure 6-16 Location of the DC Output Board

3. Locate the two 2-amp 125 V, fast acting, pico fuses in the kit box.
4. Trim the wires on the fuses to 0.3"-0.35" from the bend in the wire. See Figure 6-17 below.

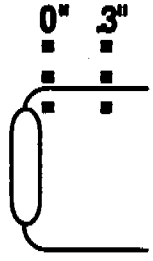


Figure 6-17 Cutting the Fuse Wires

continued

5. **Carefully** use needle nose pliers to pull the blown fuses out of R3 and R4 on the DC output board (Figure 6-18).

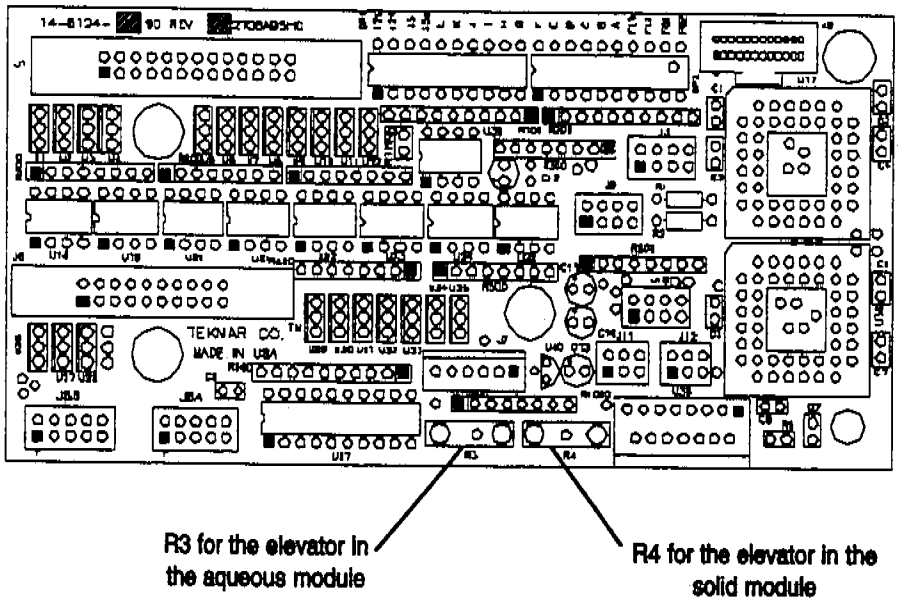


Figure 6-18 Locating R3 and R4

6. **Carefully** use needle nose pliers to push the new fuses into R3 and R4. Make sure the fuses are all the way down; however, **do not** push too hard–the fuses or board may crack.

6.10 Solving Analytical Problems

This section explains how to solve analytical problems, such as reduced sensitivity, ghost peaks, and carryover contamination. Please read section 6.3 before you troubleshoot.

Finding the Source of an Analytical Problem

To troubleshoot successfully, you must isolate the source of the problem. The problem could be in the GC, Precept II, or the concentrator. The flow chart on the following page will help you find which instrument is causing the problem.

Determining the Source of a Bad Chromatogram

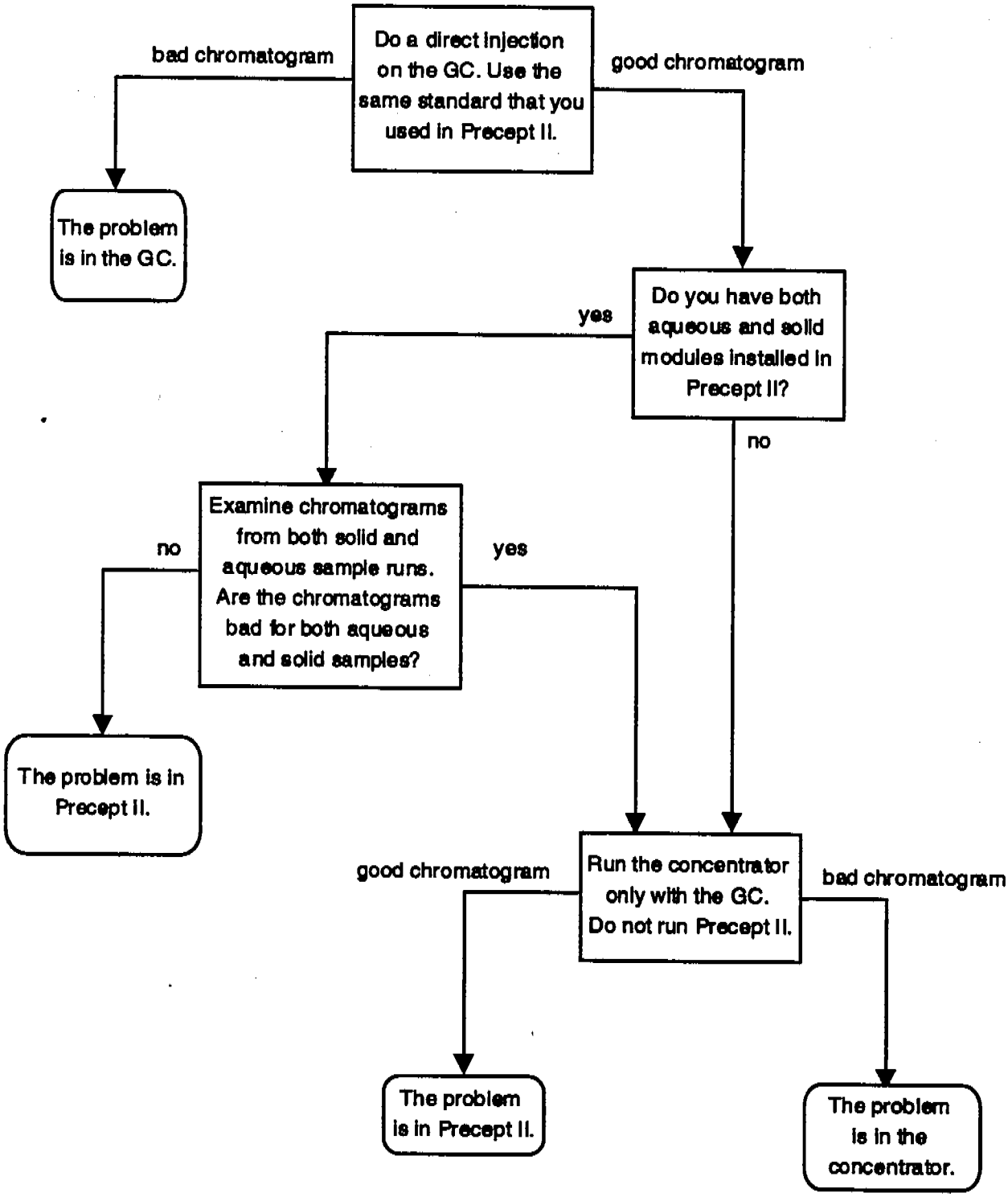


Figure 6-19 Determining the Source of an Bad Chromatogram

Reduced Sensitivity

Reduced sensitivity is one of the most common analytical problems. The flow chart on the following page will help you troubleshoot.

Sometimes, only certain compounds show reduced sensitivity. You can pinpoint these compounds. Check if any new peaks have appeared on the chromatograms. If so, there may be an active site in the concentrator. Active sites form if aerosol or foaming samples get into the lines. Some compounds are very sensitive to active sites; they can disappear without a trace. These include:

- Bromoform
- 2-chloroethyl vinyl ether
- Chloroethane

Via chemical reaction:

- 1,1,1-trichloroethane decomposes into 1,1-dichloroethene
- 1,1,2,2-tetrachloroethane decomposes into trichloroethene
- 1,2-dichloroethane decomposes into vinyl chloride

These reactions take place on metal surfaces in the presence of heat and water. Turn off the line and valve heaters and see if the compounds return.

Reduced Sensitivity

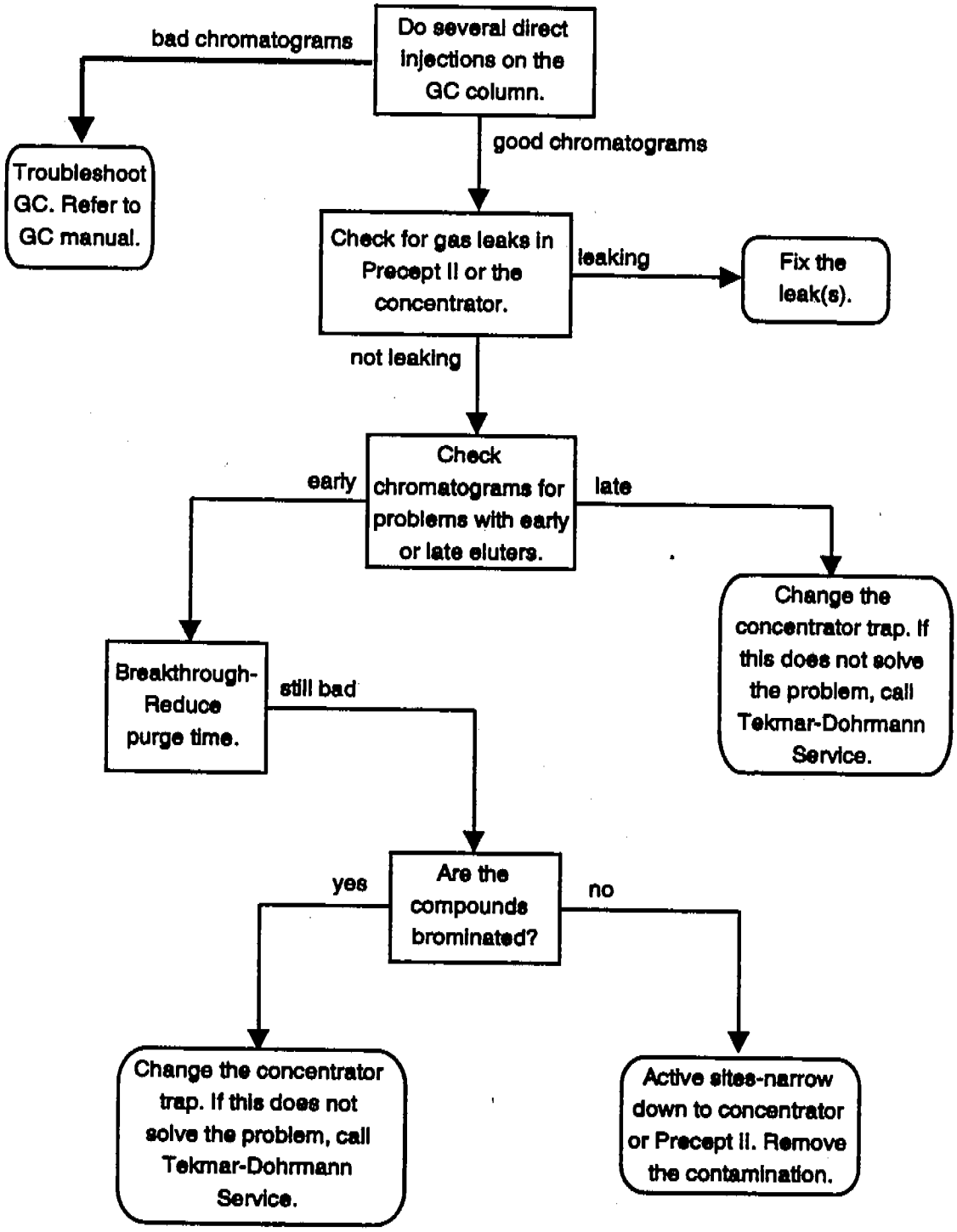


Figure 6-20 Reduced Sensitivity

No Analytical Response

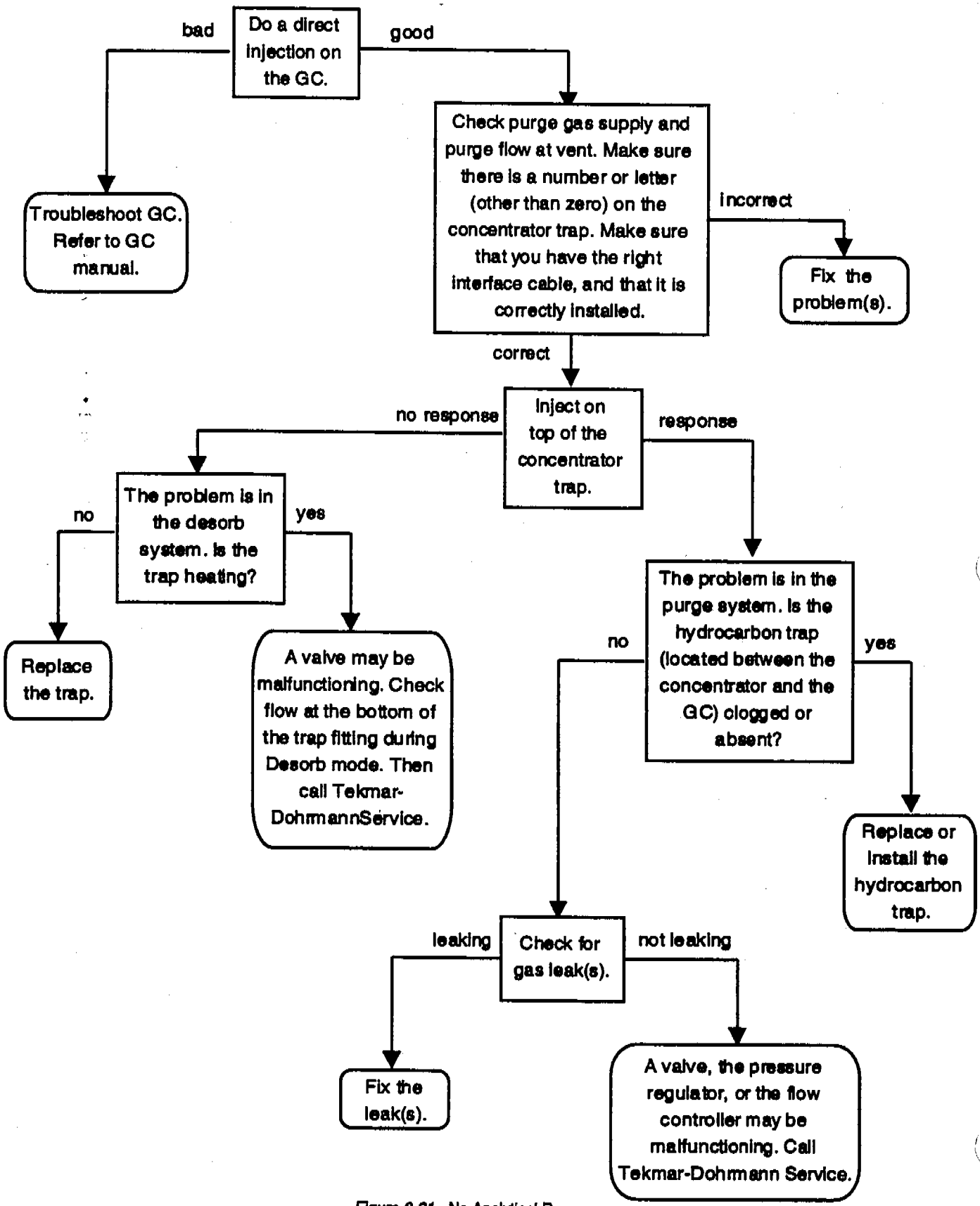


Figure 6-21 No Analytical Response

Background Peaks

Background peaks are a common problem in any trace analytical method. On chromatograms, you may observe two types of background peaks: *carryover* and *ghost.*

Carryover Peaks

Carryover peaks match previous samples, or slowly disappear after a few runs. Carryover peaks are caused by:

- Condensation on cold spots
- Adsorption on the 6-port valve rotor
- Incomplete baking
- Foaming samples, aerosols, or particulates that get into the lines

Adsorption in the valve rotor and condensation, which can cause carryover peaks, are usually the result of overloading the system. Running a sample that is too large or too concentrated can cause the overload. Diluting or reducing the size of the sample can eliminate the problem

Incomplete baking, another cause of carryover peaks, can occur if the trap has been heavily loaded, or if the duration of Bake mode is too short. Increasing the bake time can solve the problem.

Sometimes foaming samples, aerosols, or particulates can get into the lines, causing contamination. You may be able to remove the contamination by putting the system in Bake mode for about 1–8 hour(s). If you cannot remove the contamination, call Tekmar-Dohrmann Service.

Ghost Peaks

Ghost Peaks do not appear as a result of problems with previous samples. Ghost peaks are caused by one or more of the following:

- Impurities in the purge gas supply
- Volatiles in the lab air
- Breakdown products of the trap
- Contaminated water and methanol
- Outgassing of volatiles from components in the gas stream

Impurities in the purge gas supply can cause ghost peaks to appear during a purge and trap run because of the concentrating action of the trap. Eliminate the peaks by using a hydrocarbon trap. See *Connecting Precept II to a Gas Supply* in Chapter 3.

Volatiles, a cause of ghost peaks, can fill the lab air, and adsorb on sampler surfaces. Some volatiles can permeate Teflon lines. To clear the air, store solvents in a separate lab. Also, complete all distillations, extractions, etc. underneath a hood in a separate lab.

continued

To test for volatiles in the lab air:

1. Step the concentrator to "Standby."
2. Being careful not to burn yourself, open the top of the concentrator trap. Leave the trap open 10–20 minutes.
3. Close the top of the trap.
4. Desorb to the GC.

After testing, if the same peaks are present in much larger quantities, volatiles in the lab air are at fault.

Breakdown products of the trap–benzene, toluene, styrene, benzaldehyde, and possibly 1,1,1-trichloreoethane–can also cause ghost peaks to appear. Usually, alcohols accelerate the problem. To solve the problem, purge a water sample spiked with 20-50 µl of methanol. If the peaks increase, replace the trap. If they do not increase, call Tekmar-Dohrmann Service.

Contaminated water and methanol can produce ghost peaks. To find out whether water and/or methanol is contaminated, run the system with a clean, dry sampler. Next, run a water sample through the system. Then run a water sample spiked with methanol. Compare the resulting chromatograms.

Outgassing of volatiles from mechanical parts in the gas stream can also be responsible for the appearance of ghost peaks. This outgassing may occur in new instruments. The parts include: pressure regulator, flow controller, and sample valve. Tekmar-Dohrmann builds instruments with clean parts. However, parts can be exposed to organics (such as exhaust fumes) during shipment. To remove the contamination, clean the instrument by overnight conditioning (baking). To prevent future contamination of parts, always use standard equipment, and make sure that the equipment is clean.

7.1 Calling Sales or Service

Before you call for service or parts:

1. Write down Precept II's model and serial numbers.
2. If Precept II needs service or repair, write down the conditions under which the problem occurred, and any error messages that appeared on the display. Also, place the manual near the telephone. The service representative may ask you to look at a diagram.
3. When ordering parts, write down the part name, part number, and quantity needed.

To speak with a sales representative call:
(800) 543-4461 in the US and Canada;
(513) 247-7000 outside the US and Canada

To speak with a service representative call:
(800) 874-2004 in the US and Canada;
(513) 247-7000 outside the US and Canada

Do not return Precept II to Tekmar unless you are authorized to do so by a Tekmar-Dohrmann service representative. The representative must assign a return authorization number to a Tekmar instrument that needs service.

7.2 Precept II Parts List

Precept II parts are listed by type.

Precept II Systems

14-PRE2-000	Precept II W, 115V: for aqueous sampling in single-ended vials
14-PRE2-00B	Precept II W, 115V, with bar code
14-PRE2-100	Precept II W, 220V
14-PRE2-10B	Precept II W, 220V, with bar code
14-PRE2-200	Precept II W/S1, 115V: for aqueous and solid sampling in single-ended vials
14-PRE2-20B	Precept II W/S1, 115V, with bar code
14-PRE2-300	Precept II W/S1, 220V
14-PRE2-30B	Precept II W/S1, 220V, with bar code

Modules

14-6408-000	aqueous (W) module assembly
14-6606-000	solid (S1) module assembly, 100/115 V
14-6606-100	solid (S1) module assembly, 230 V

Software

14-TEKL-000	software, instrument control, TekLink
14-6740-000	kit, upgrade, software, includes TekLink diskettes (14-6741-076) and memory card with ROM (14-6716-090)

Optional Accessories

14-BCOD-000	bar code reader kit
21-0240-000	refrigerated recirculating bath, model 2055, 115V, 60 Hz, 11 amps, compact size, 12-1/2" x 8-3/4" footprint
14-4362-000	installation kit for model 2055 refrigerated recirculating bath

Glassware

14-3916-024	40 ml vials, quantity 72, single-ended, with caps and septa
14-4006-024	5 ml frit sparger for 2000 or 3000 with pocket heater
14-4007-024	25 ml frit sparger for 2000 or 3000 with pocket heater
14-4825-024	5 ml fritless sparger for 2000 or 3000 with pocket heater
14-4826-024	25 ml fritless sparger for 2000 or 3000 with pocket heater
14-6150-024	standard vessel with UV coating, 0.330" ID

Needles

14-6157-053	stainless steel needle, 5.616" long, for aqueous (W) module
14-6602-053	stainless steel needle, 5.62" long, for solid (S1) module
14-3196-053	stainless steel needle, sample, 25 ml, 9 1/8" long

Tubing

14-5540-002	electroform tubing, 0.06" OD, 0.04" ID
14-5228-002	nickel tubing, 0.064–0.060 OD, 0.024–0.020 ID, small bore
14-5229-002	nickel tubing, 0.064–0.060 OD, 0.042–0.038 ID, small bore
14-6577-002	pressure gauge tubing, 0.062" OD, 0.040" ID, 6" long
12-0315-002	Tygon tubing, 1/4" OD, 1/8" ID
14-6417-002	Tygon tubing, 5/16" OD, 3/16" ID
14-1313-002	copper tubing, 1/4"
14-0546-002	copper tubing, 1/8"
14-6893-002	nickel tubing, 0.064-0.060 OD, 0.01 ID

Valves

14-5026-050	pressure regulator valve, 1/16" fitting, 0-60 psi
14-6154-050	standard switching valve, with 1 µl rotor
14-6452-050	flow controller valve, 1/16" fitting
14-6292-050	8-port switching valve, for solid and aqueous combination system
14-6292-150	8-port valve only
14-6292-250	8-port actuator only
14-6292-350	8-port control box only
14-6154-150	6-port valve only
14-6154-250	6-port actuator only
14-6154-350	6-port control box only
14-6464-050	2-port Kip standard drain valve assembly, A, B
14-6465-150	2-port Angar sample pressure valve assembly, C
14-6465-250	2-port Angar backflush filter valve assembly, F
14-6463-150	3-port Kloehn sample drain valve assembly, G
14-6463-050	3-port Angar standard transfer valve assembly, H
14-6462-050	3-port Kloehn valve assembly, I
14-6958-050	4-port syringe valve

Motors

14-7095-000	220 V motor accessory
14-6685-086	soil module motor
14-6687-086	aqueous module motor
14-6331-000	24 VDC motor assembly, for robotic arm, X drive
14-6332-000	motor and potentiometer assembly, for robotic arm, Y drive
14-6541-000	motor assembly, for robotic arm, Z drive 110 V
14-6540-000	bar code reader motor assembly

Heaters

14-5996-120	cartridge heater, 8-port valve oven, 120 V, 50 W, 12" long
14-5996-220	cartridge heater, 8-port valve oven, 230 V, 30 W, 12" long
14-6673-020	line heater assembly, 5 3/4", 115 V, needle block to 8-port
14-6673-120	line heater assembly, 5 3/4", 230 V, needle block to 8-port

continued

	14-6707-020	heater assembly, cartridge, 115 V, soil needle block
	14-6707-120	assy, cartridge heater, 230 V, soil needle block
	14-6592-000	assy, soil cup heater, S1, 120 V, 30 W
	14-6592-100	assy, soil cup heater, S1, 230 V, 30 W
Fittings	14-5663-016	ferrule, Teflon 1/16", one-piece, for needle in mount
	12-0041-016	ferrule, Teflon, 1/4", glassware
	12-0062-016	ferrule, brass, 1/16"
	14-0241-016	ferrule, stainless steel, 1/16", one-piece
	14-0158-016	ferrule, stainless steel, 1/16", two-piece
	14-0159-016	nut, stainless steel, 1/16"
	12-0521-016	nut, brass, 1/16"
	14-6412-016	nut, male, stainless steel, 1/16", 1.5" long
	14-4602-016	nut, stainless steel, Valco, 1/8", for top of trap
	14-0243-016	nut, stainless steel, Valco, short, 1/16"
	14-1590-016	nut, plug, Valco, 1/16"
	14-6274-009	washer, Teflon, flat, 0.25 OD, 0.09 ID
	14-4887-016	union, drilled through, stainless steel, 1/16"
	14-0051-016	union, stainless steel, 1/16"
	14-6724-016	union, bulkhead, hose barb, for needle/tray drain
	14-3785-016	union, bulkhead, stainless steel, Valco, 1/16"
	14-0264-016	union, bulkhead, stainless steel, Upchurch, 1/16"
	12-0074-016	union, bulkhead, brass, 1/8"
	14-6712-016	union, bulkhead, brass, 1/8"–1/6"
	12-0064-016	union, bulkhead, tube stub, brass, 1/8"–1/8"
	14-0356-016	union, bulkhead, filter assembly, 1/8"
	14-2261-116	union, reducing, 1/4"–1/16", without ferrules
	12-0042-016	union, reducing, tube stub, brass, 1/8"–1/16"
	14-6587-016	tee, barb union, 0.245 OD, 3/16" ID tubing
	14-4695-016	tee, brass union, 1/16"
	12-0070-016	tee, brass, 1/8"
	14-4828-016	connector, female, brass, 1/8 NPT–1/16 tube
	14-6711-016	connector, 4-way, 3/16-7/32 (for S1 modules)
	14-6168-079	block, mount fitting, aqueous module
	14-6167-079	block, mount fitting, soil (S1, S2) module
	14-1484-016	fitting, stainless steel, 1/16 TB–1/16 stud, with ferrule
	12-0334-016	fitting, female, quick connect, tube pan mount
	12-0346-016	fitting, male, quick connect, 1/4 hose
	14-6216-016	fitting, union, 1/16", 4-way
	14-6416-016	elbow, 90 degree, brass, 1/4–1/8 NPT, for chiller
	14-2549-016	elbow, 90 degree, tube, 1/8 NPT to 1/16, for 2-port Kip valve assembly (B)

continued

	14-6415-016	insert, brass, for 1/4" OD, 1/8" ID tubing
	14-2887-016	assembly, sample mount, 1/2" x 1/16"
	14-1968-016	cap, 1/16"
	14-0524-100	clamp for cable, bright nickel
Gears	14-6385-056	gear, 23 teeth, 24 pitch, 1.04 diameter, for robotic arm
	14-6384-056	gear, 21 teeth, 24 pitch, 0.25 bore, for robotic arm
	14-6380-056	gear, 12 teeth, 24 pitch, 0.25 ID, aluminum spur, for robotic arm
	14-6381-056	gear, 30 teeth, 24 pitch, molded spur
	14-6284-056	gear, 24 pitch, 1/4 bore, 1.167 PD, molded, for aqueous (W) or solid (S1) module
	14-6281-056	gear, 48 pitch, 0.187 bore, 1.75 PD, molded
	14-6282-056	gear, 48 pitch, 0.187 bore, 1.50 PD, molded
Cables	14-6313-086	DC power, muliport power input cable
	14-6317-086	DC power, DC control board input cable
	14-6325-086	DC power, XYZ drive power input cable
	14-6518-086	DC power, AC control board input cable
	14-6466-086	DC power, power supply cable, 24 V
	14-6319-086	DC power, power supply output cable, tri
	14-6318-086	DC power, power supply output cable, quad
	14-6312-086	DC power, backplane power cable
	14-6321-086	AC power, switch and interlock cable
	14-6320-086	AC power, AC control board input cable
	14-6326-086	AC power, power supply input
	14-6316-086	AC power, switched, LED display cable
	14-6322-086	AC input cable
	14-6517-086	AC control to bar code reader cable
	14-6314-086	power and signal, pumper input cable, 24/RS485
	14-6444-086	base shroud switches to bar code reader cable
	14-6450-086	bar code reader to tray sensors cable
	14-5975-086	output board to backplane board cable
	14-6324-086	6 conductor phone jack cable, XYZ comm 485
	14-6323-086	6 conductor phone jack cable, bar code reader
	14-6330-086	flexible cable, bar code reader and interface
	14-6613-086	retractable cable, 5 conductor, for robotic arm
	14-6611-186	retractable cable, 10 conductor, for robotic arm, Y-interconnect
	14-6245-086	retractable shielded cable din-8
	14-6327-086	20 conductor ribbon cable, 52" long
	14-6328-086	26 conductor ribbon cable, 50" long
	14-6679-086	6 conductor cable, Precept II to concentrator

continued

	14-6679-186	6 conductor cable, computer to Precept II
	14-6721-086	extension cable, 7 ft., for computer to Precept II cable
	14-6684-086	cable assy switch, water module
	14-6686-086	cable assy switch, soil module (S1)
	14-6697-086	cable assy, jumper sensor, water module
	14-6697-186	cable assy, jumper sensor, soil module
	14-6725-086	grounding, X motor
	14-6736-035	coupler, 6 x 6, RJ12, crossed
Printed Circuit Boards	14-5799-190	microprocessor board
	14-6171-090	power distribution board
	14-6124-090	DC output board
	14-6204-090	AC output board
	14-6716-090	memory board with ROM
	14-5801-190	data acquisition board
	14-6117-090	microcontroller board
	14-6119-090	LED board
	14-6121-090	GC I/O board
	14-6122-090	backplane board
	14-6125-090	switch board for front panel
	14-6205-090	bar code interface board
	14-6205-190	bar code interface board with I/F
	14-6123-090	XYZ driver board
	14-6206-090	Y interconnect board
	14-6120-090	gripper board
	14-5745-090	serial port expansion board for PC (use if your computer has no available serial ports)
Fuses	14-6454-034	6.3 amp fuse, 5 x 20 mm, 115V
	14-4961-034	4.0 amp fuse, 5 x 20 mm, 250V
	14-6877-134	1 amp fuse, 125 V, fast acting, for AC and DC output circuit boards
	14-5814-034	3 amp fuse, 250 V, fast acting, pico 2, for AC output circuit board
	14-5813-034	7 amp fuse, 125 V, fast acting, pico 2, for AC output circuit board
	14-4960-034	8 amp fuse, 250 V, GDB, 5 x 20 mm

Electronic Parts

14-6539-000	potentiometer assembly, for robotic arm, X drive
14-6332-000	potentiometer and motor assembly, for robotic arm, Y drive switch
14-4704-028	switch, auxiliary actuator, roller level, for Precept IIs with serial numbers greater than 90150001 (requires 4705-028)
14-6221-028	power switch
14-4738-028	switch, interlock safety, 125 VAC for trays
14-6219-028	switch, 10A, large hinge lever cut-off switch
14-5831-000	battery, 3V, lithium
14-6370-026	RTD, 100 ohm, #10-32 threaded probe, soil needle block
14-5990-126	RTD assembly, 18" long for 8-port valve
14-5803-090	power supply, 70 W, quad +5, ±15
14-6255-000	power supply, single output, 24 VDC, 4 amp
14-6256-000	power supply, ±12 VDC, 4 amp
14-6273-000	power entry module, 250 V, 10 amp filter, fused
14-0298-039	universal power cord, (115V system)
14-5028-039	universal power cord, 6 amp, Europe shield
14-6869-000	power supply accessory

Miscellaneous

14-6208-000	installation kit, Precept II to 2000
14-6208-100	installation kit, Precept II to 3000, before SN 95073002
14-6679-086	cable assembly, Precept II to concentrator
14-6211-000	rinse reservoir kit
14-6211-100	external tap rinse kit
14-6129-000	removable vial tray, for sample positions 1–24
14-6129-100	removable vial tray, for sample positions 25–48
14-6649-079	calibration pad
14-6853-052	10 ml sample syringe
14-6270-052	25 ml sample syringe
14-6153-021	sample syringe (pumper) with 4-port valve
14-5947-079	heat sink, 2" OD for 8-port valve
14-6315-019	assembly, fan, 12 VDC, CFM
14-6718-000	assembly, alarm

continued

14-6382-047	timing pulley, aluminum, 20 teeth, 0.2 pitch, robotic arm
14-6383-000	timing belt, 170 teeth, 3/8" wide, robotic arm
14-6226-000	pressure gauge, 0–30 psi
14-6650-020	transfer line, 100-115 V, 72" long
14-6650-120	transfer line, 230 V, 72" long
14-6710-016	sample filter, 90 micron, compact inline, for Precept IIs with serial numbers 95243009 and greater
14-5153-016	sample filter, 90 micron, for Precept IIs with serial numbers less than 95243009; must also buy tee (14-5398-016), and adapters (1 of 14-5399-016 and 2 of 14-1484-016)
14-3707-000	filter, rinse water
14-1968-016	cap, 1/16", for plugging sample drain
14-6361-031	gray knob
14-3823-000	septa for 40 ml vials, pkg. of 24
14-6855-000	screw cap for 40 ml vials, pkg. of 24
14-PREC-217	shipping container
14-7096-000	robotic arm, 220V
14-6729-000	robotic arm, 110V

Documentation

14-6676-074	user manual, Precept II, without flow diagrams
14-6676-174	user manual, Precept II, with flow diagrams
14-6246-074	flow diagrams, Precept II, W
14-6248-074	flow diagrams, Precept II, W/S1
14-6208-074	instructions, *Using Precept II with the 2000*
14-6740-074	instructions, *Upgrading Precept II's Software*
14-6649-074	instructions, *Calibrating the Robotic Arm*
14-6211-074	instructions, *Installing the Rinse Reservoir*
14-6211-174	instructions, *Installing the External Tap Rinse Kit*
14-6982-074	instructions, *Replacement Water Filter*

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Connect Precept II to the PC

1. Locate the 6-conductor modular cable **(14-6679-166)** in the Precept II kit box.

2. Make sure both Precept II and the PC are off and unplugged.

3. Plug one end of the cable into an empty COM port on the PC.

4. Locate the cable connections on the back of Precept II. Plug the other end of the cable into the connection labeled **"J15."** See Figure 1.

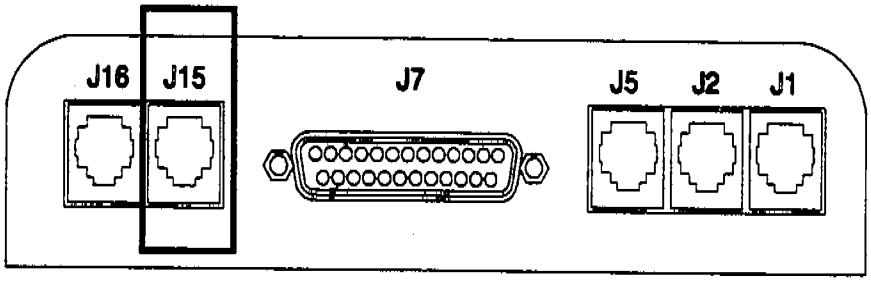


Figure 1 Cable Connections

Note: A 7' extension cable for the Precept II TekLink cable is now available from Tekmar for $25.00. The P/N is 14-6721-066.

Install TekLink in the PC

Note: Tekmar recommends making a copy of the TekLink program disk before using. Store the original TekLink program disk in a safe place and use the duplicate to install TekLink.

1. Make sure Windows is running; then insert the TekLink disk into the appropriate drive.

2. From the **File menu** on the **Program Manager** window, choose Run. The Run dialog box appears.

3. In the Run dialog box, type **A:\SETUP** or **B:\SETUP** (depending on the drive you are using) in the **Command Line** box. Click **OK**. The TekLink Installation screen appears.

4. Click **OK**; the **Select Installation Drive** dialog box appears.

5. Select a drive from the list and click **OK**. (Tekmar recommends choosing the **C:** drive.) The **SETUP** dialog box appears.

6. Click **OK** to install TekLink in the default directory or type in another directory and click **OK**. **TekLink Setup** installs the program on the drive and directory you specified. When the installation is complete, the TekLink icon appears in its own program group in the **Program Manager** window.

7. Double-click on the TekLink icon to start the program. The TekLink **control screen** appears.

8. Read the **ONLINE HELP** for instructions on using TekLink.

* License Agreement on back.

Tekmar-Dohrmann Company
7143 E. Kemper Rd. Cincinnati, OH 45249

A

B

C

D

E

F

G, H, I

G, H, I (Continued)

L, M, N

O, P

P (Continued)

R

S

S (Continued)

T, U

V, W

X, Y, Z

Aqueous Only

Waiting for Purge Ready
Sweeping Needle
Raising Vial
Filling Syringe
Filling Syringe (Sample Vent)
Filling Standard 1
Transferring Standard 1
Sweeping Transfer Lines
Filling Standard 2
Transferring Standard 2
Sweeping Transfer Lines
Rinsing Syringe H_2O
Rinsing Syringe H_2O (Draining)
Filtering Backflush
Lowering Vial
Flushing Needle
Sweeping Lines
Waiting for Desorb
Rinsing Glassware (Bake Cleanup Off)
Purging Glassware (Bake Cleanup Off)
Bake Cleanup (Fill)
Bake Cleanup (Transfer)
Bake

W/S1 Running Aqueous

Waiting for Purge Ready
Sweeping Needle
Raising Vial
Filling Syringe
Filling Syringe (Sample Vent)
Filling Standard 1
Transferring Standard 1
Sweeping Transfer Lines 1
Filling Standard 2
Transferring Standard 2
Sweeping Transfer Lines 2
Rinsing Syringe H_2O
Rinsing Syringe H_2O (Draining)
Filtering Backflush
Lowering Vial
Flushing Needle
Sweeping Lines
Waiting for Desorb
Rinsing Glassware (Bake Cleanup Off)
Purging Glassware (Bake Cleanup Off)
Bake Cleanup (Fill)
Bake Cleanup (Transfer)
Bake

W/S1 Running Solid

Waiting for Purge Ready
Needle Sweep
Raise Vial
Fill Syringe
Fill Syringe (Sample Vent)
Standard 1 Fill
Standard 1 Transfer
Sweeping Transfer Lines 1
Standard 2 Fill
Standard 2 Transfer
Sweeping Transfer Lines 2
Preheat
Vial Purge
Waiting on Desorb
Lower Vial
Rinse 1st Stage Needle
Rinse 2nd Stage Needle
Purge 1st Stage Needle
Purge 2nd Stage Needle
Bake

WS1 RUNNING AQUEOUS

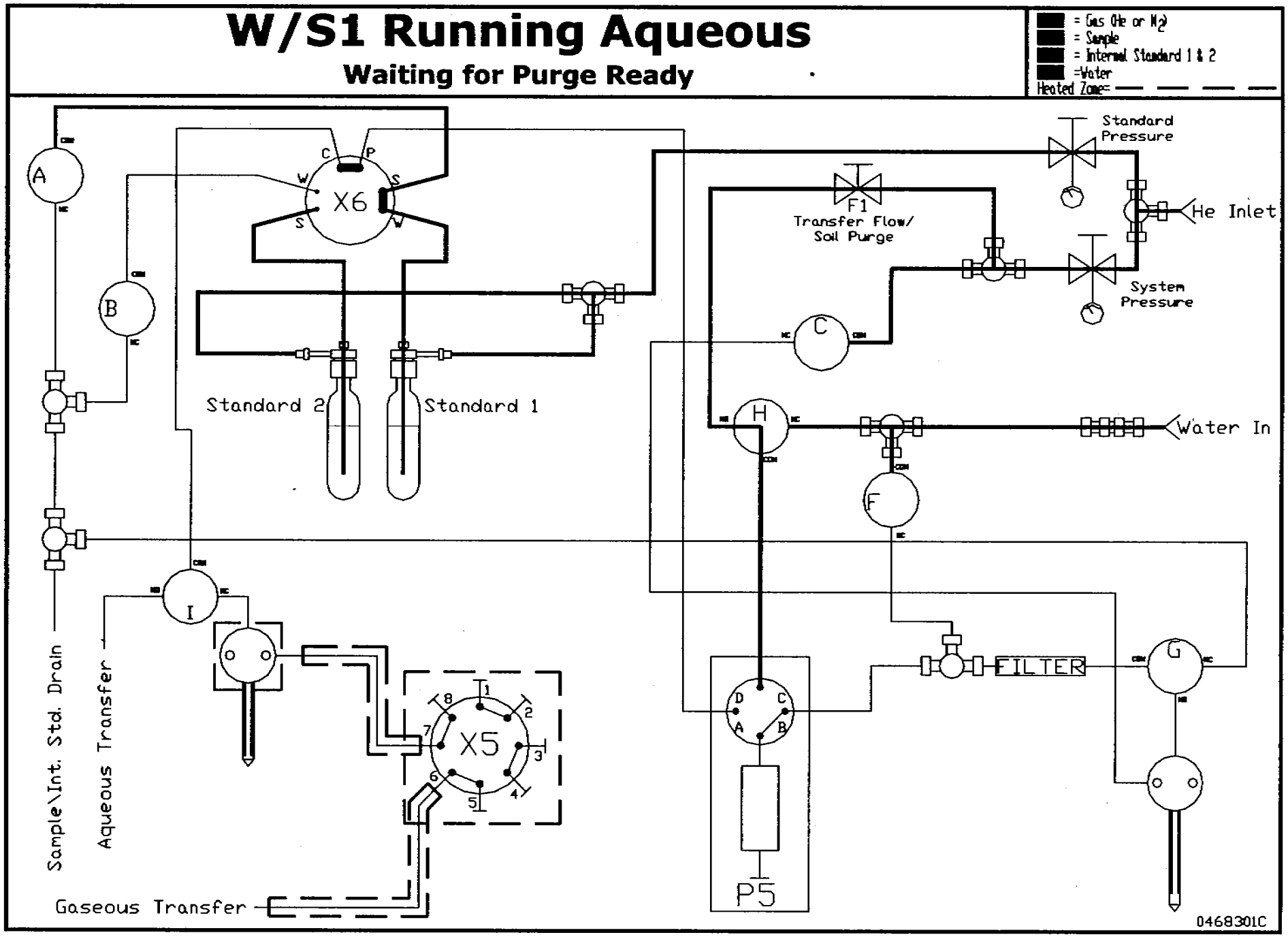
MODE	A	B	C	F	G	H	I	X5	X6	VIAL	P5
Wait for purge ready	0	0	0	0	0	0	0	1 & 2	A	0	B
Needle sweep	0	0	1	0	0	0	0	1 & 2	A	0	C
Raise vial	0	0	0	0	0	0	0	1 & 2	A	1	B
Fill syringe	0	0	1	0	0	0	0	1 & 2	A	1	B
(Sample vent)	0	0	0	0	1	0	0	1 & 2	A	1	B
STD 1 fill	1	0	0	0	0	0	0	1 & 2	A	1	B
STD 1 transfer	0	0	0	0	0	0	0	1 & 2	B	1	A
STD 1 sweep	0	0	0	0	0	0	0	1 & 2	B	1	D
STD 2 fill	0	1	0	0	0	0	0	1 & 2	B	1	B
STD 2 transfer	0	0	0	0	0	0	0	1 & 2	A	1	A
STD 2 sweep	0	0	0	0	0	0	0	1 & 2	A	1	D
Syringe rinse (water)	0	0	0	1	0	0	0	1 & 2	A	1	B
(draining)	0	0	0	0	1	0	0	1 & 2	A	1	B
Backflush filter	0	0	0	1	1	0	0	1 & 2	A	1	B
Lower vial	0	0	0	0	0	0	0	1 & 2	A	0	B
Flush needle	0	0	0	1	0	0	0	1 & 2	A	0	B
Sweep lines	0	0	1	0	0	0	0	1 & 2	A	0	C
Waiting for desorb	0	0	0	0	0	0	0	1 & 2	A	0	B
Rinse glassware (bake clean-up off)	0	0	0	0	0	1	0	1 & 2	A	0	D
Purge glassware (bake clean-up off)	0	0	0	0	0	0	0	1 & 2	A	0	D
Bake clean-up (fill)	0	0	0	1	0	0	0	1 & 2	A	0	B
Bake clean-up (transfer)	0	0	0	0	0	0	0	1 & 2	A	0	A
Bake	0	0	0	0	0	0	0	1 & 2	A	0	D

CALL OUT	DESCRIPTION	CODE
A	2 Port solenoid valve	0-off, 1-on
B	2 Port solenoid valve	0-off, 1-on
C	2 Port solenoid valve	0-off, 1-on
F	2 Port solenoid valve	0-off, 1-on
G	3 Port solenoid valve	0-off, 1-on
H	3 Port solenoid valve	0-off, 1-on
I	3 Port solenoid valve	0-off, 1-on
X5	8 Port switching valve	1 & 2 ports conn. or 1 & 8 conn.
X6	6 Port internal standard valve	A - middle & right ports conn.
		B - middle & left ports conn.
VIAL	Vial location	0 - vial off needle
		1 - vial on needle

P5		4 Port valve on pumper		A,B,C,D, ports between letters conn.	

W/S1 Running Aqueous

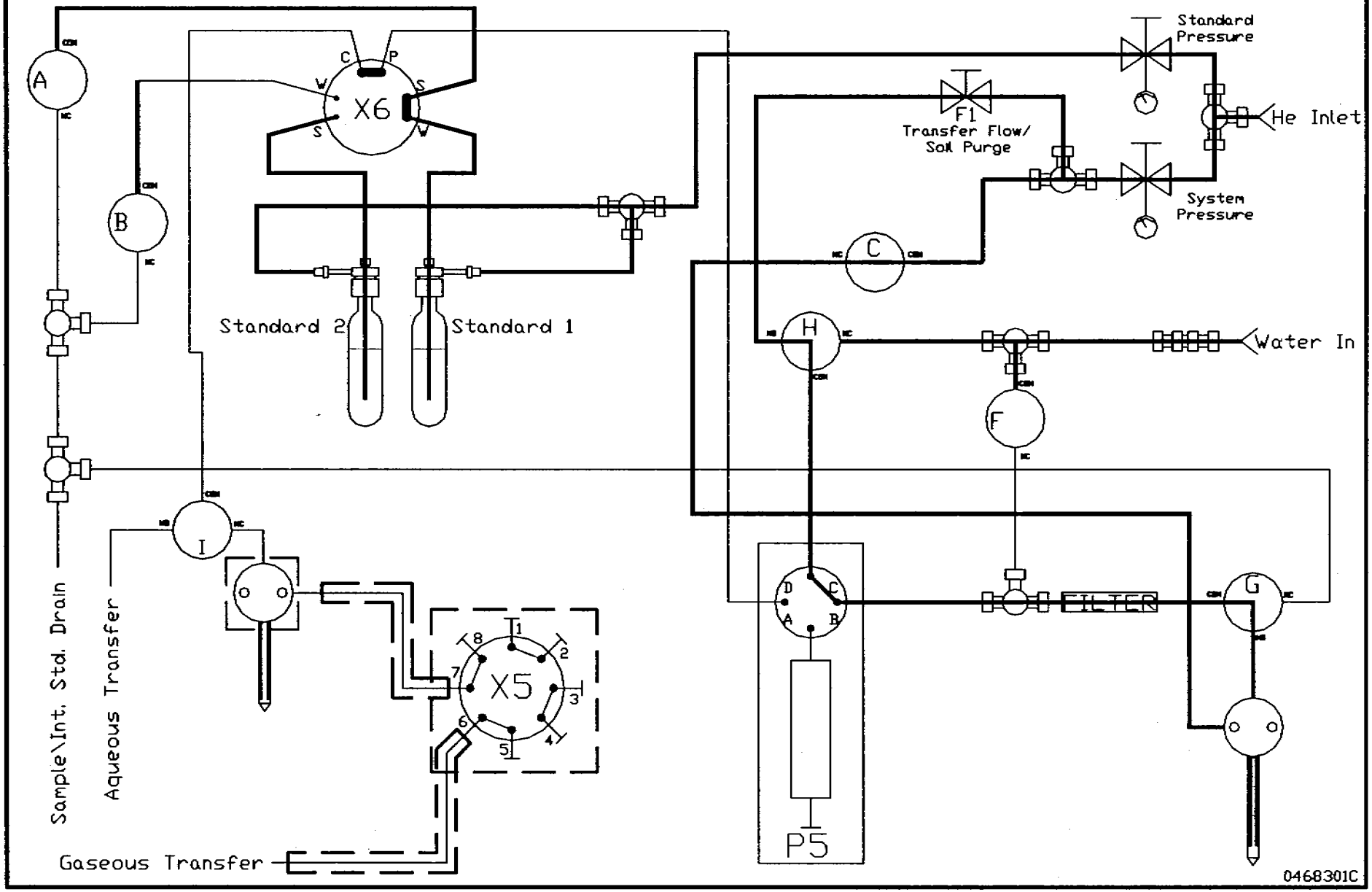
Waiting for Purge Ready



W/S1 Running Aqueous

Needle Sweep

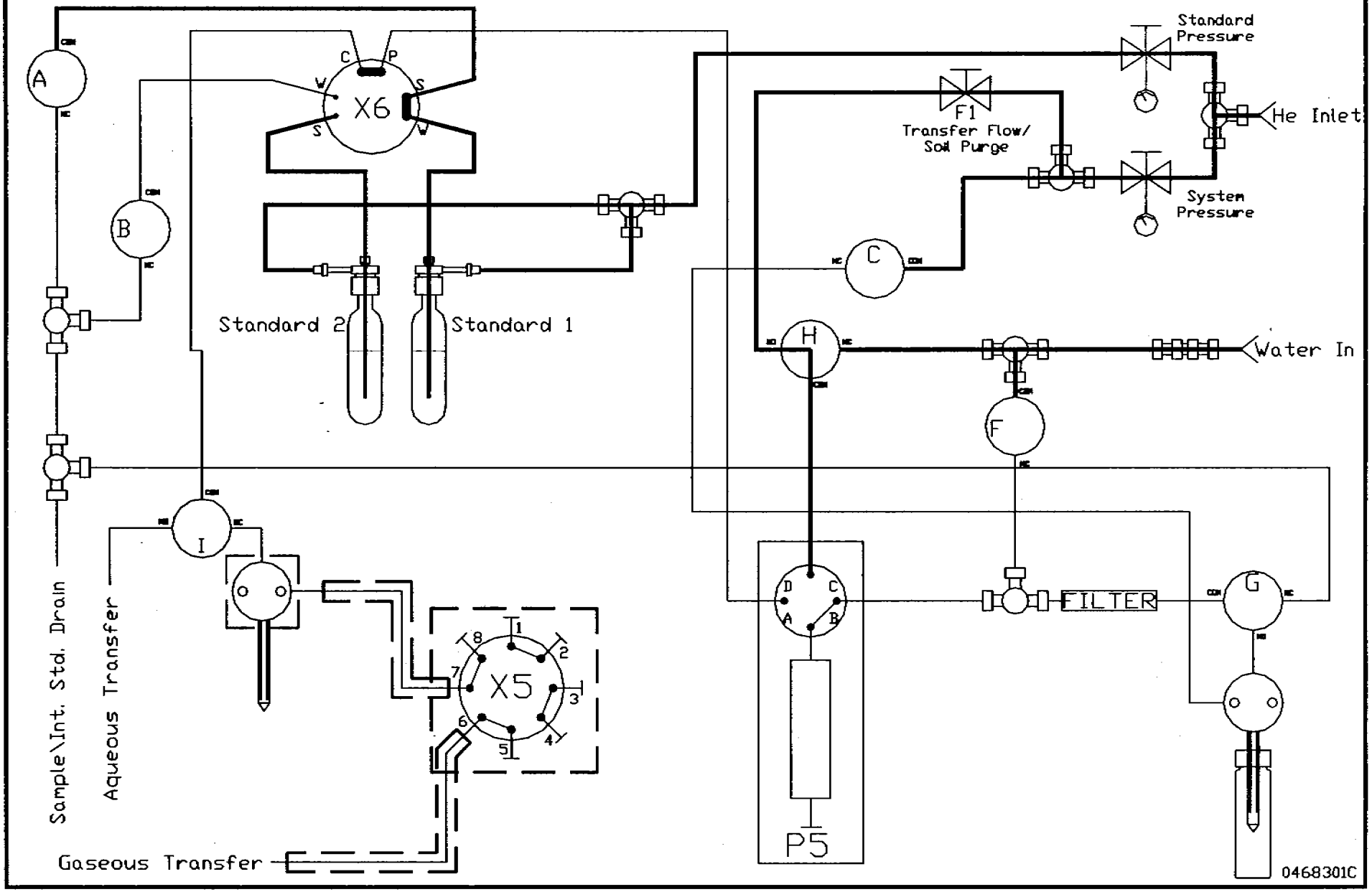
= Gas (He or N_2)
= Sample
= Internal Standard 1 & 2
=Water
Heated Zone= — — — —



W/S1 Running Aqueous

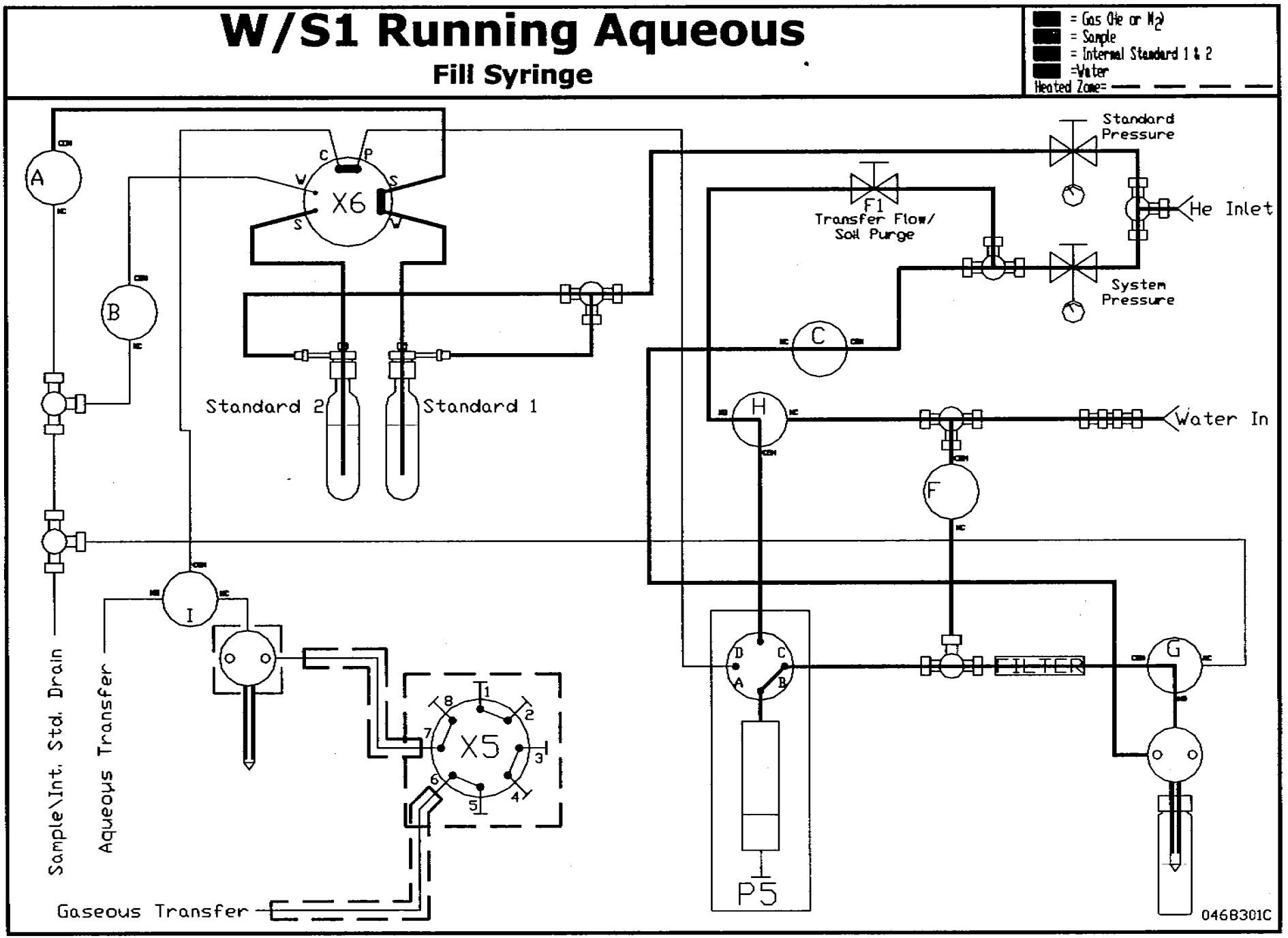
Raise Vial

= Gas (He or H_2)
= Sample
= Internal Standard 1 & 2
= Water
Heated Zone= — — — —



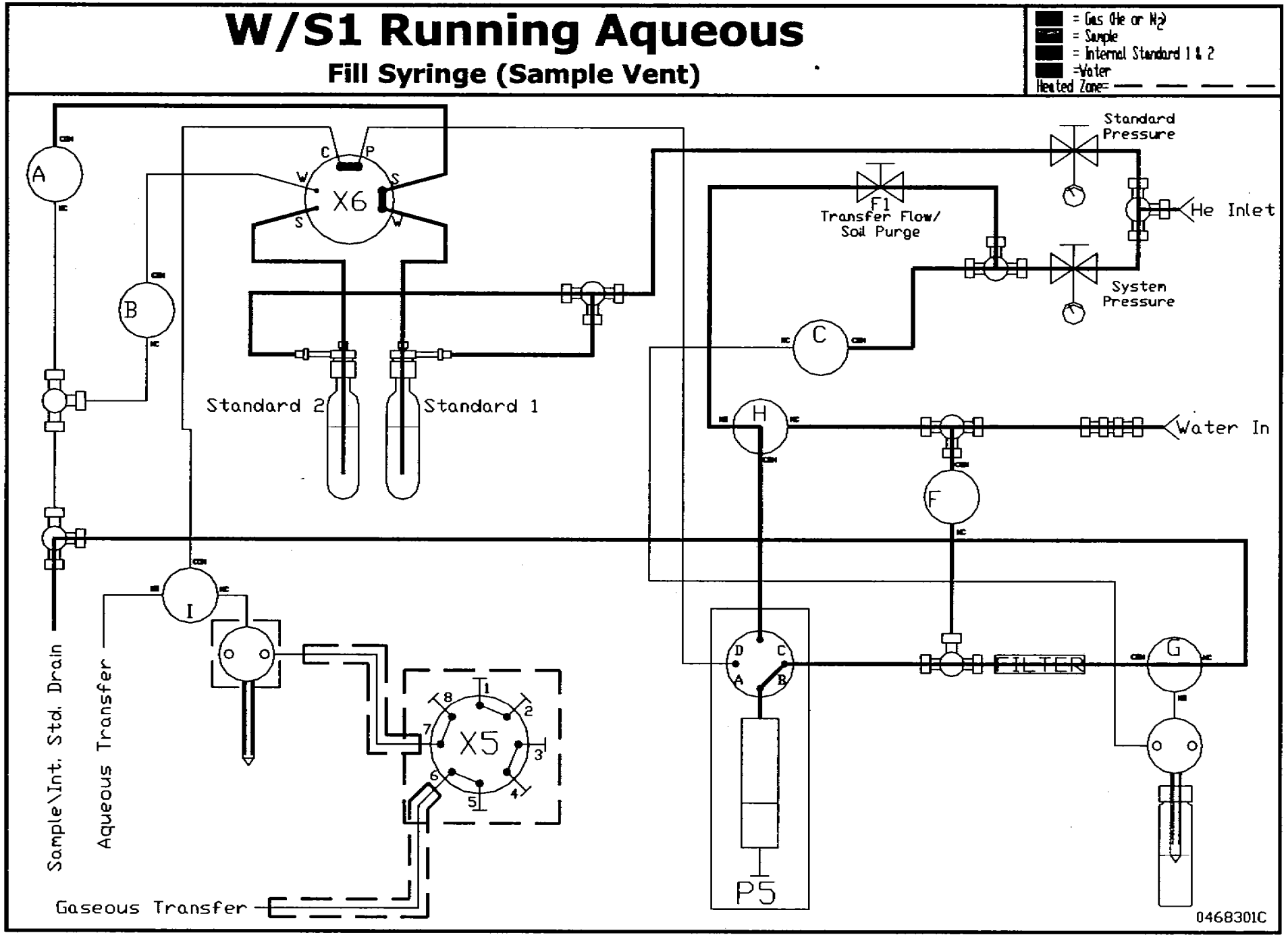
W/S1 Running Aqueous

Fill Syringe



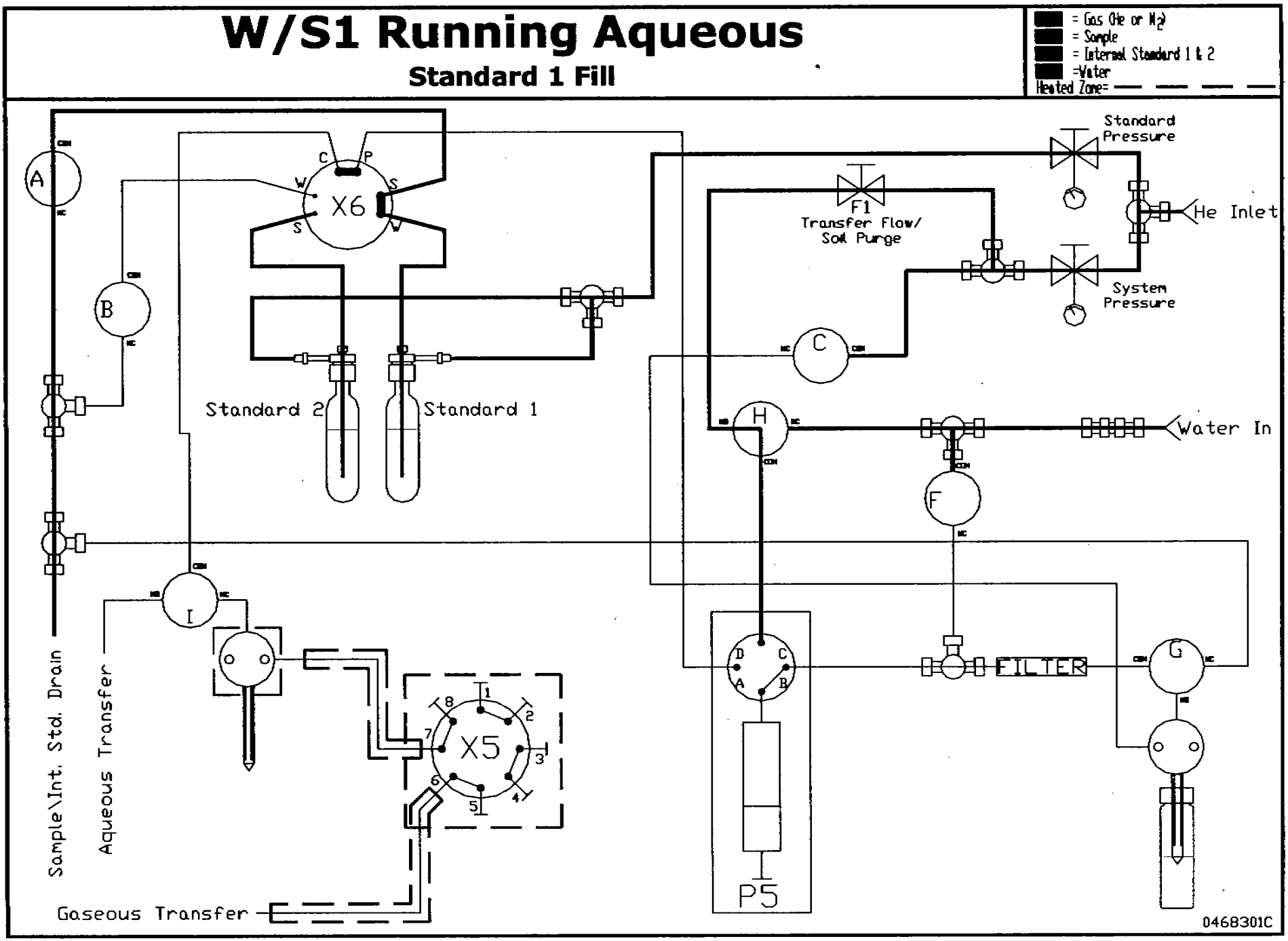
W/S1 Running Aqueous

Fill Syringe (Sample Vent)



W/S1 Running Aqueous

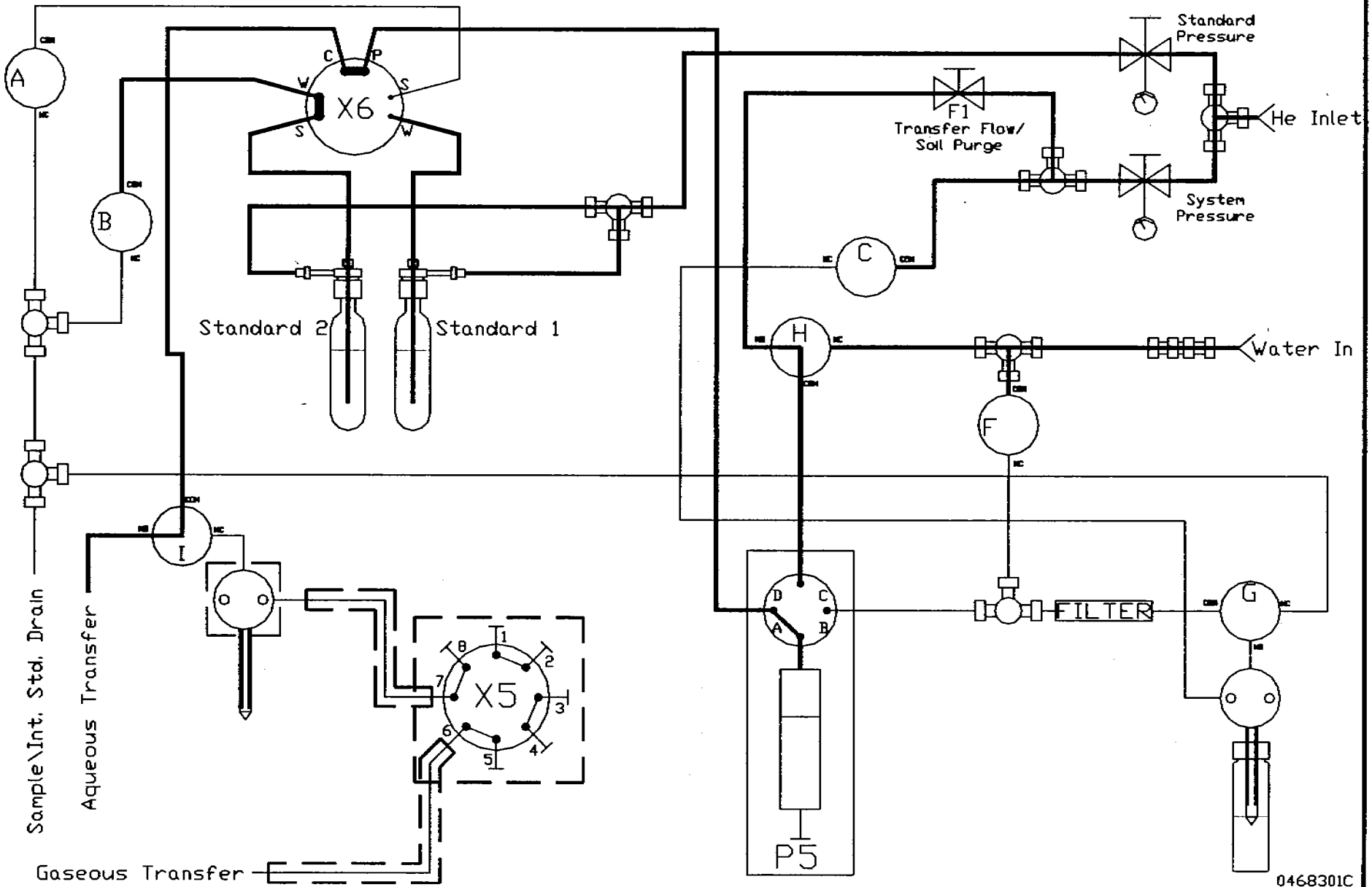
Standard 1 Fill



W/S1 Running Aqueous

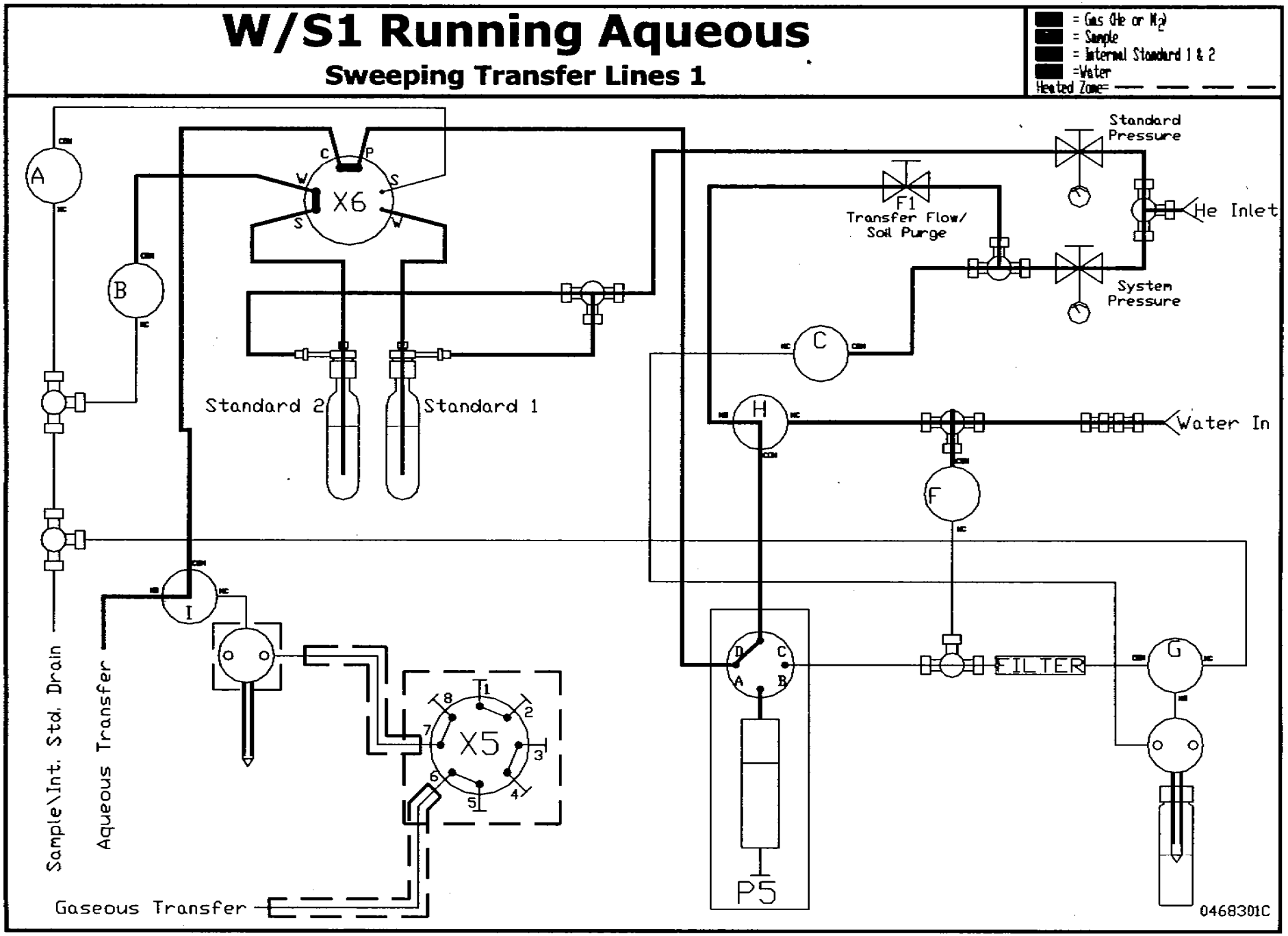
Standard 1 Transfer

= Gas (He or N_2)
= Sample
= Internal Standard 1 & 2
= Water
Heated Zone= — — — —



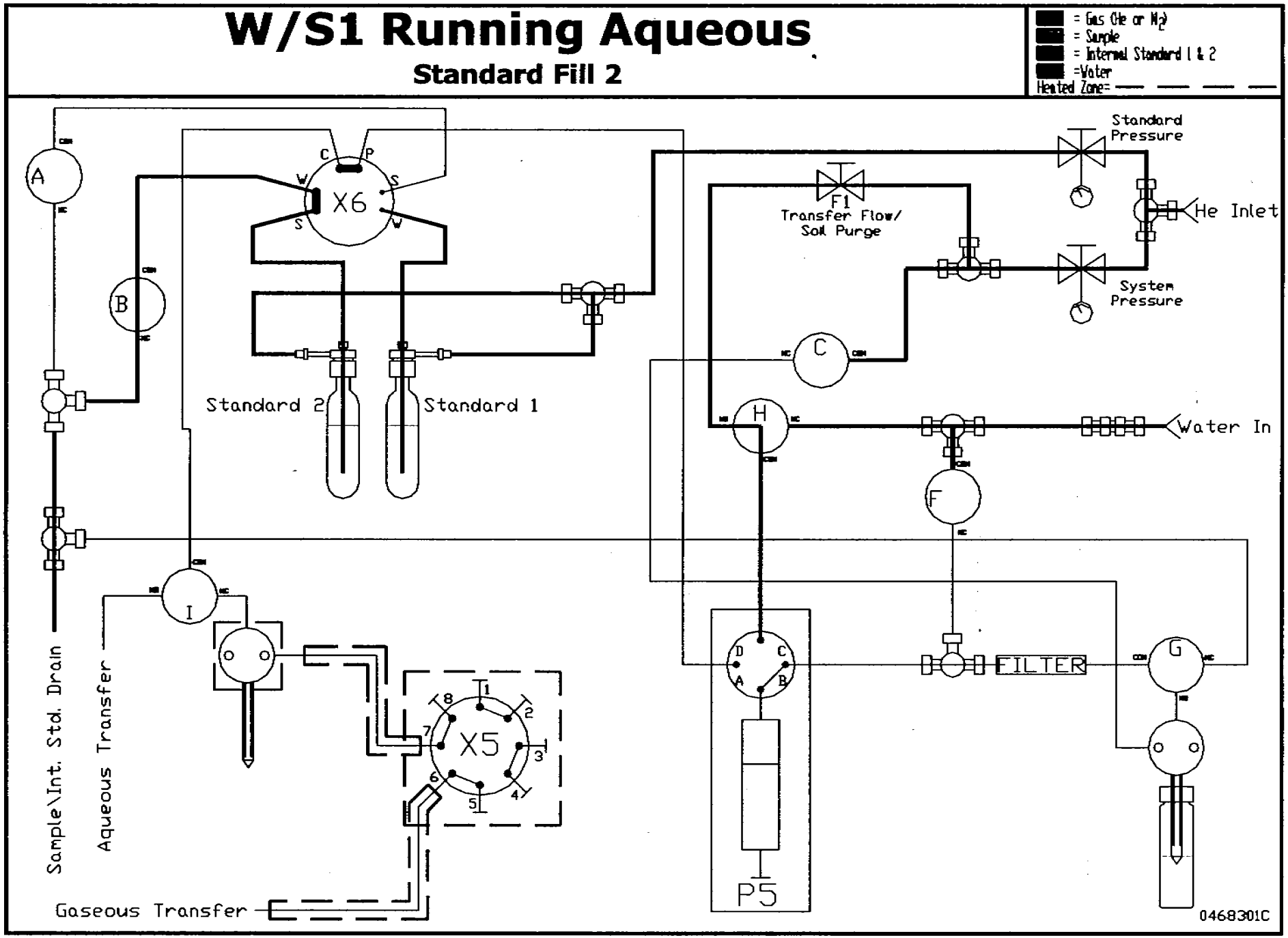
W/S1 Running Aqueous

Sweeping Transfer Lines 1



W/S1 Running Aqueous

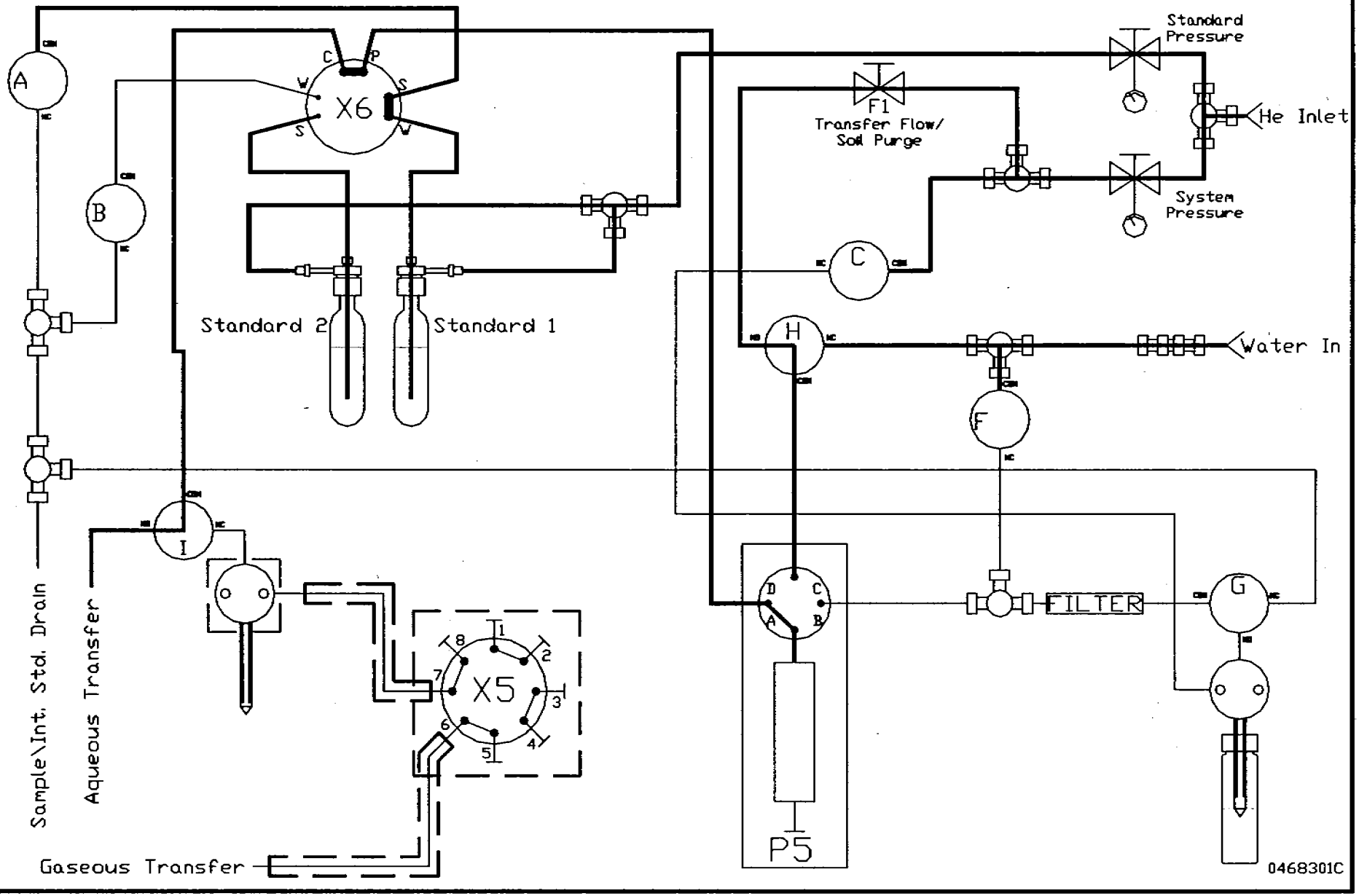
Standard Fill 2



W/S1 Running Aqueous

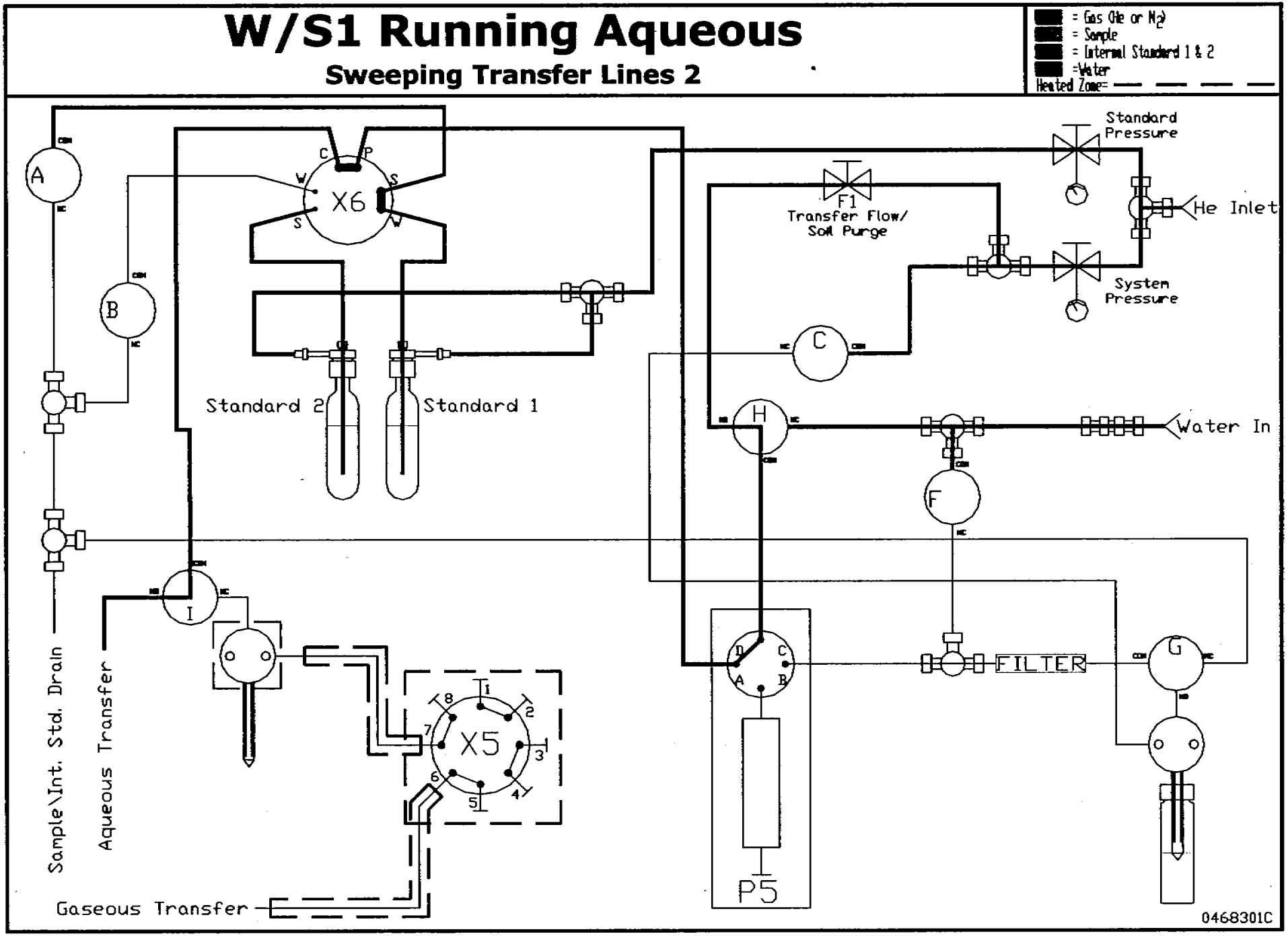
Standard 2 Transfer

= Gas (He or N_2)
= Sample
= Internal Standard 1 & 2
= Water
Heated Zone= — — — —



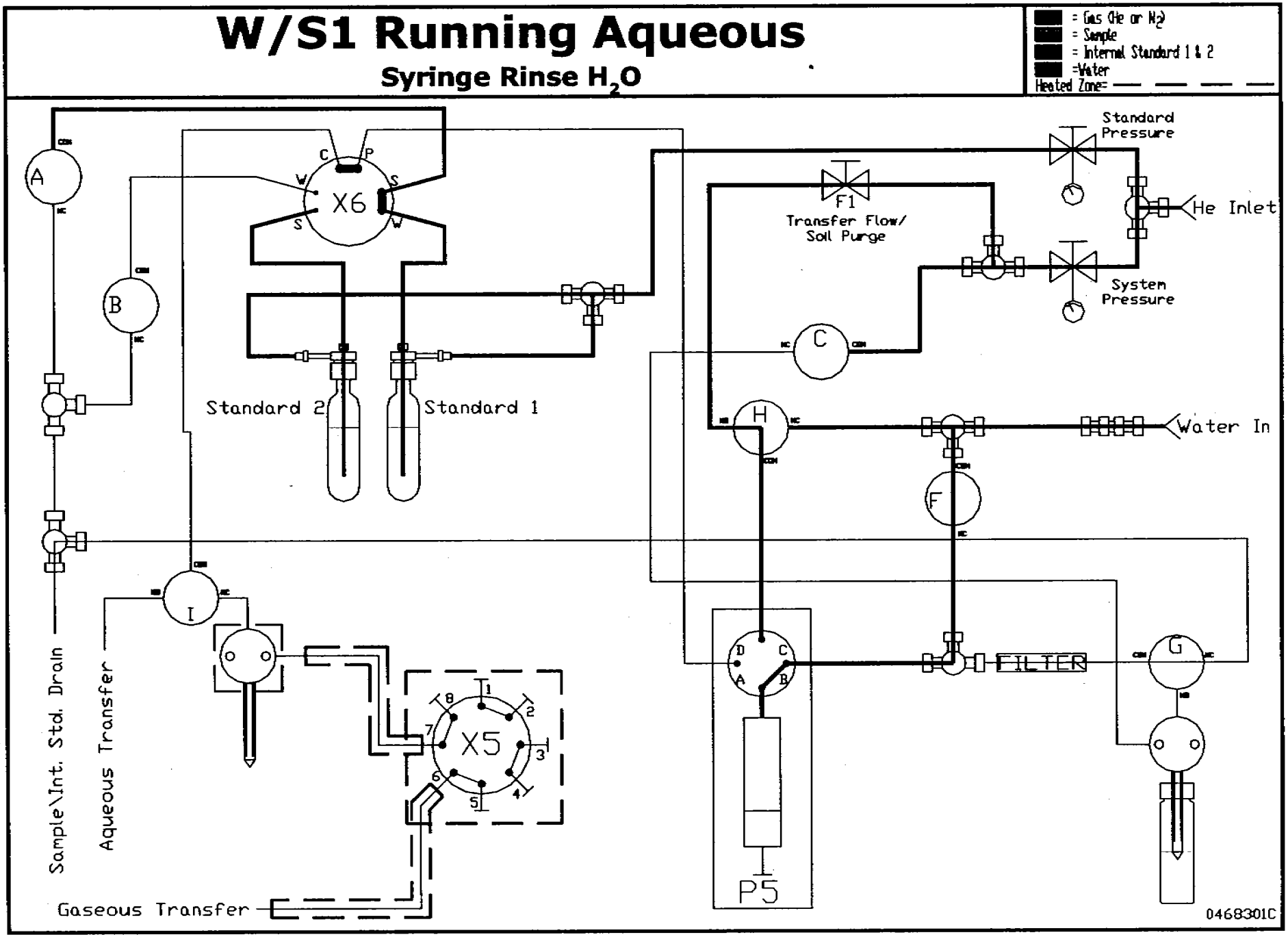
W/S1 Running Aqueous

Sweeping Transfer Lines 2



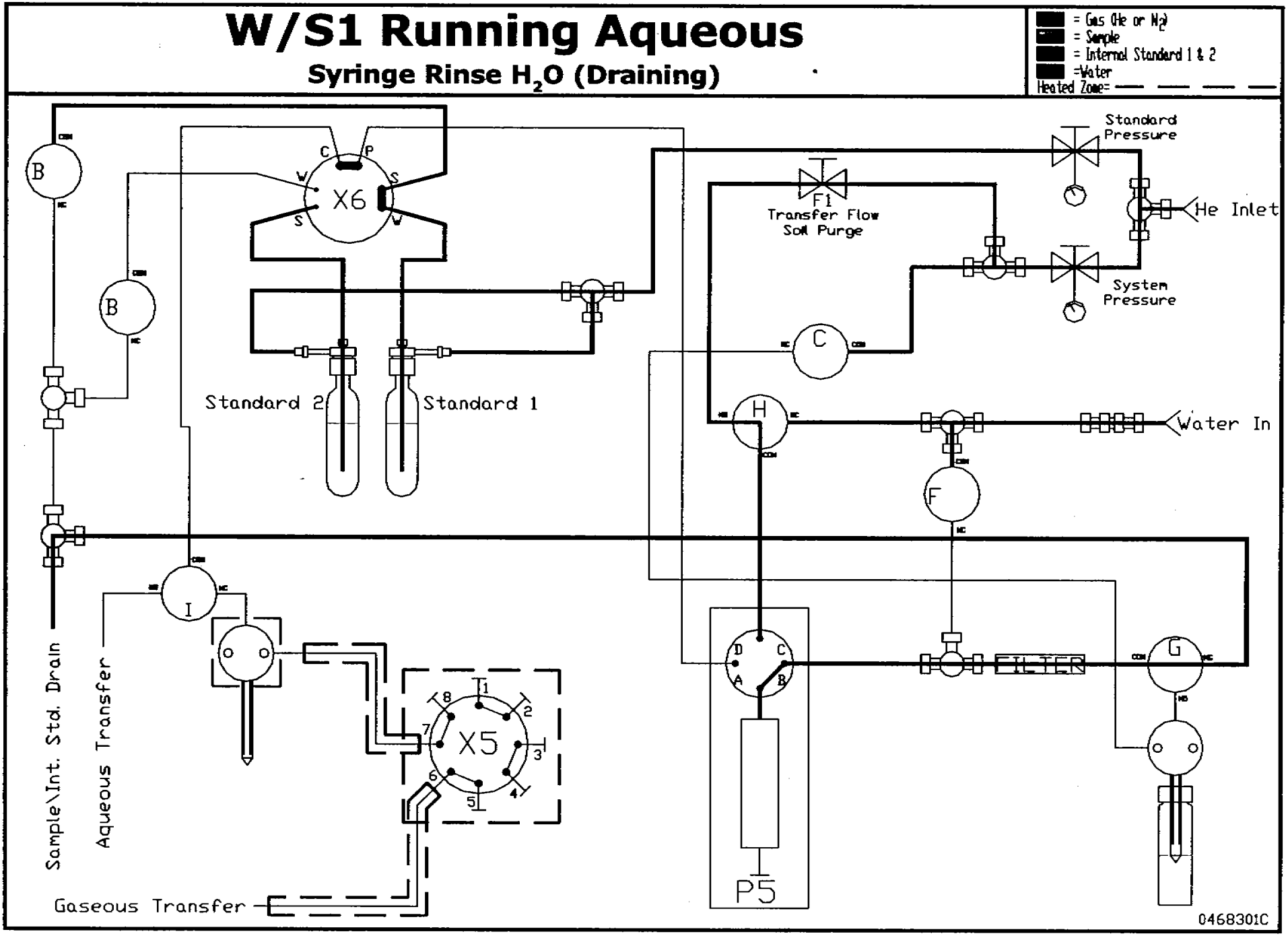
W/S1 Running Aqueous

Syringe Rinse H_2O



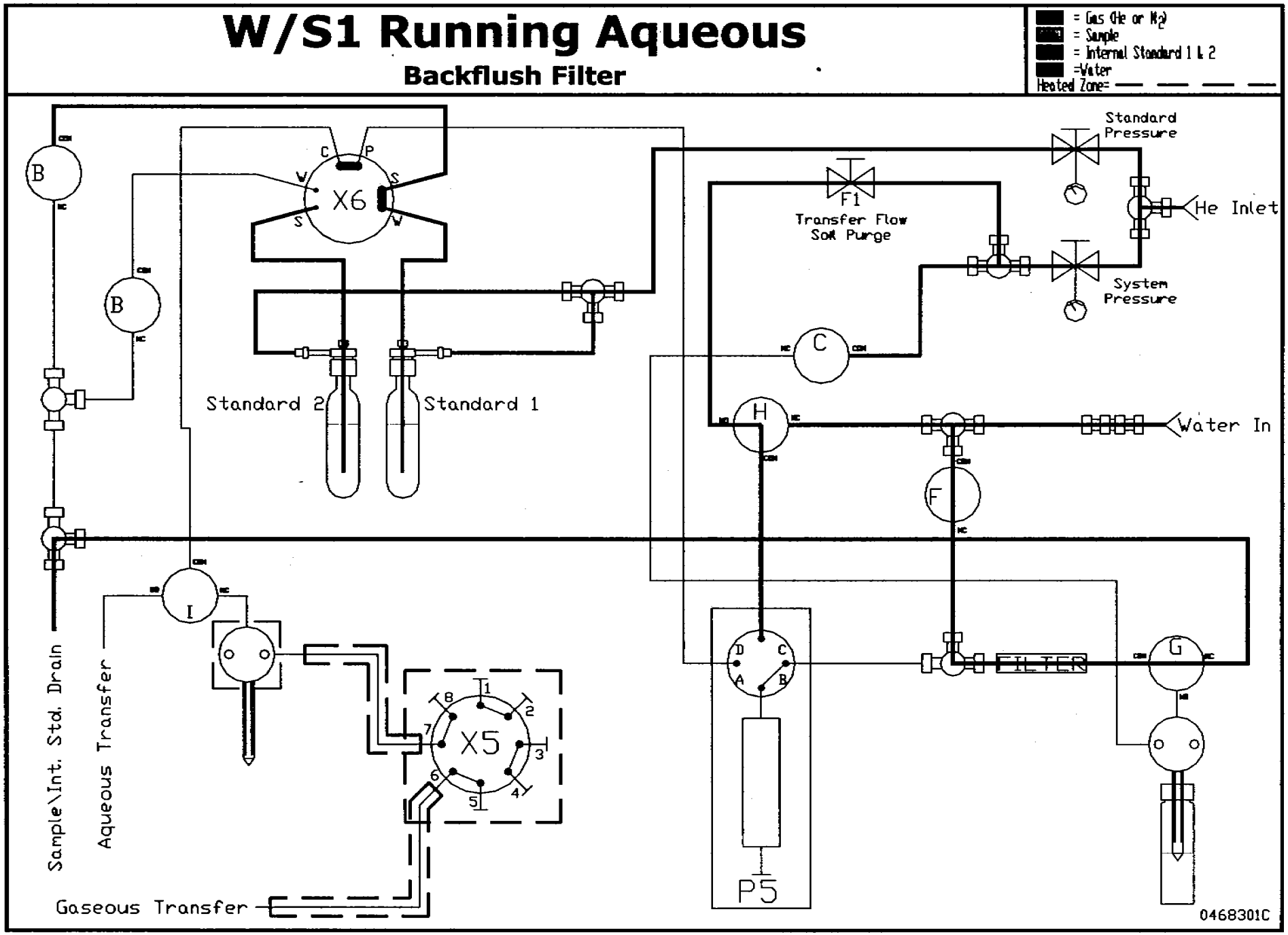
W/S1 Running Aqueous

Syringe Rinse H_2O (Draining)



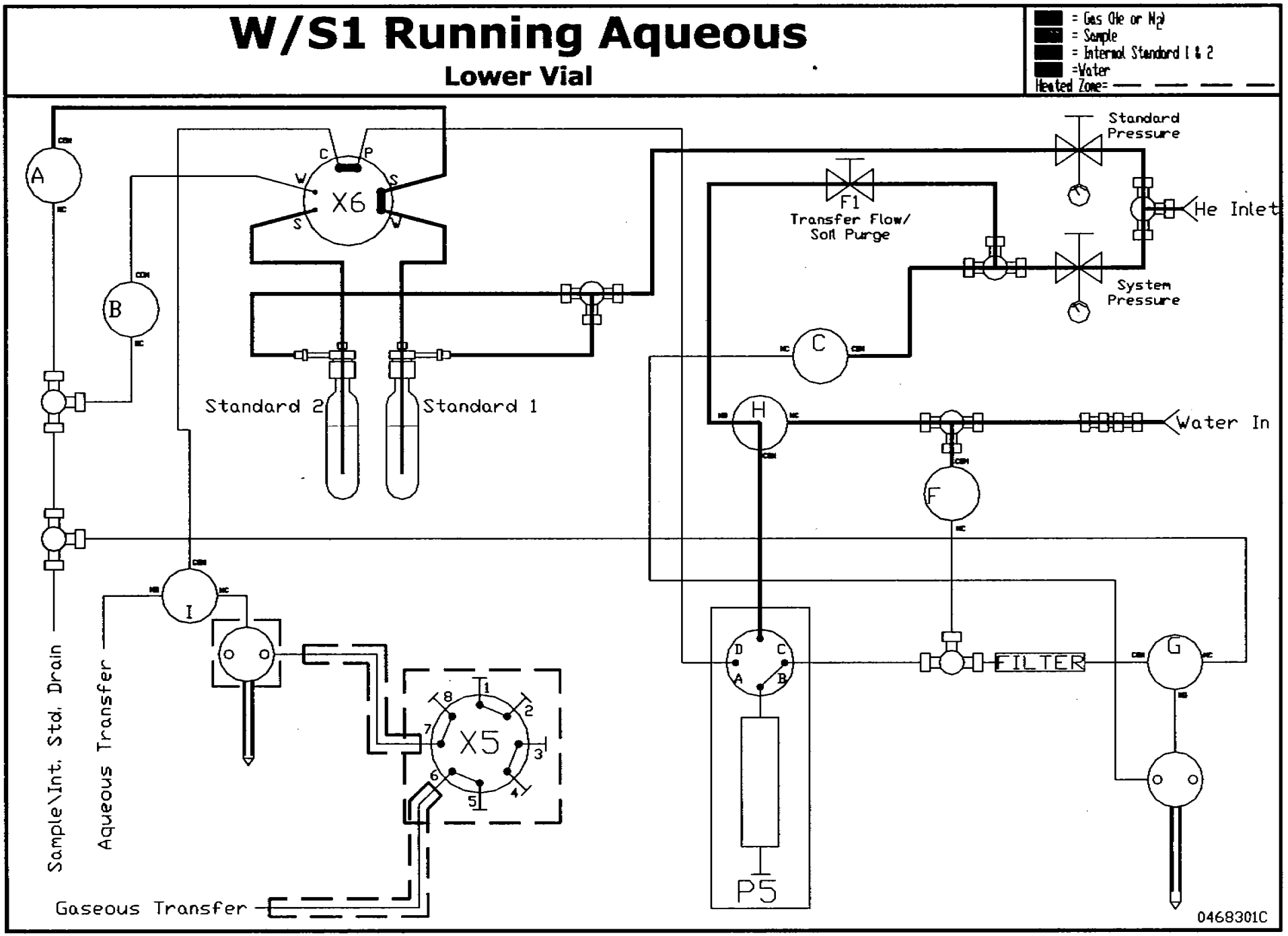
W/S1 Running Aqueous

Backflush Filter



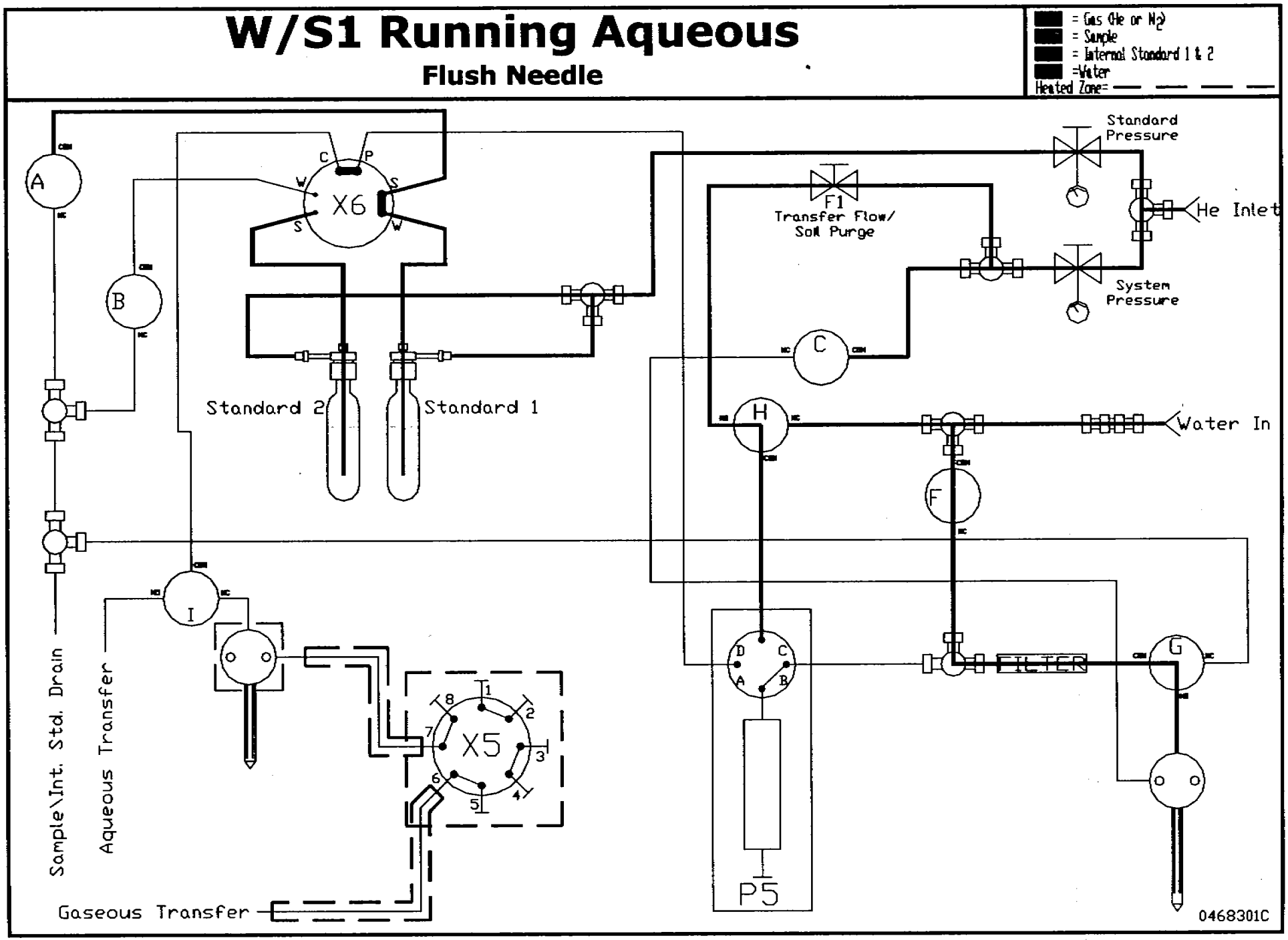
W/S1 Running Aqueous

Lower Vial



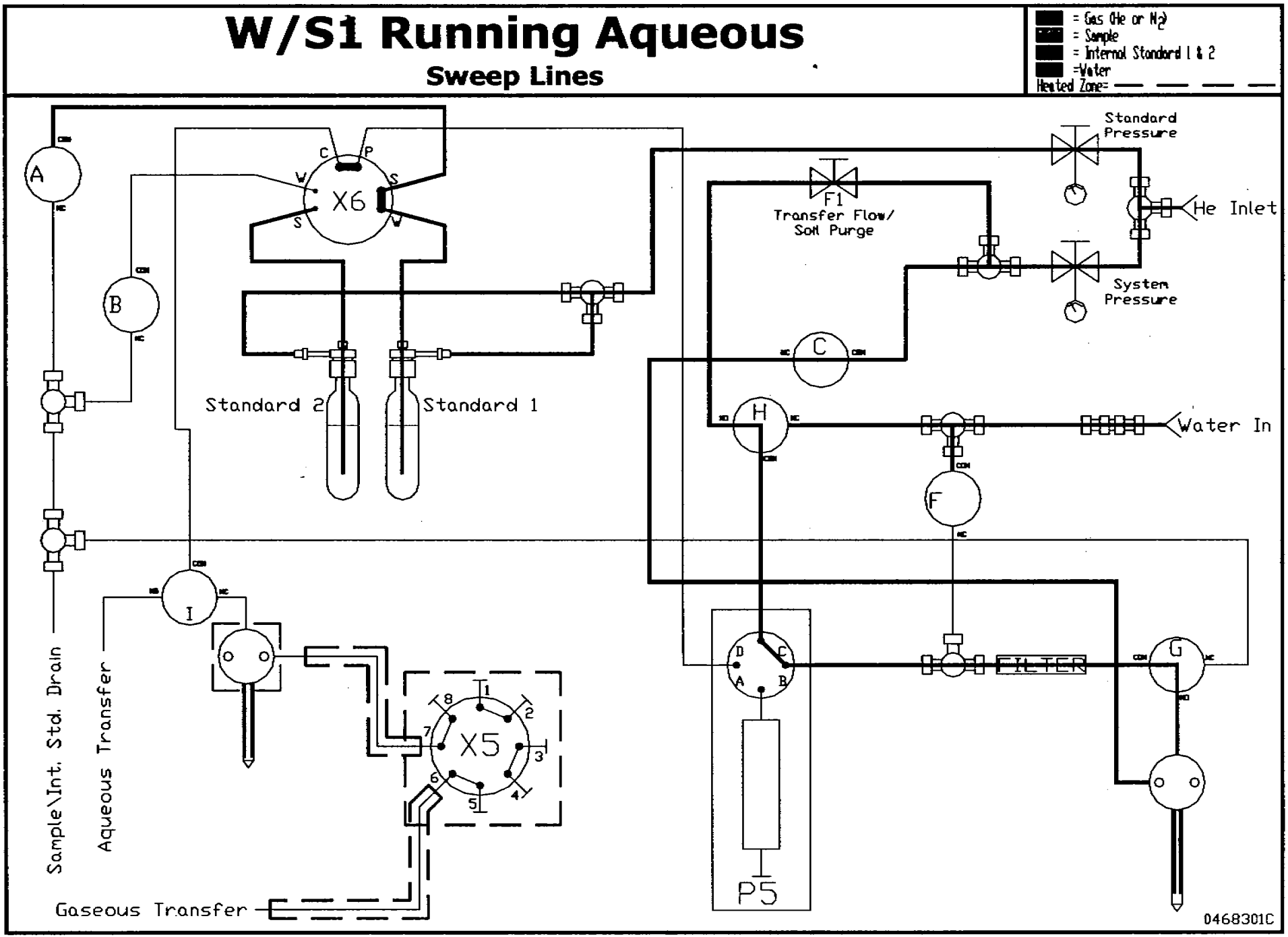
W/S1 Running Aqueous

Flush Needle



W/S1 Running Aqueous

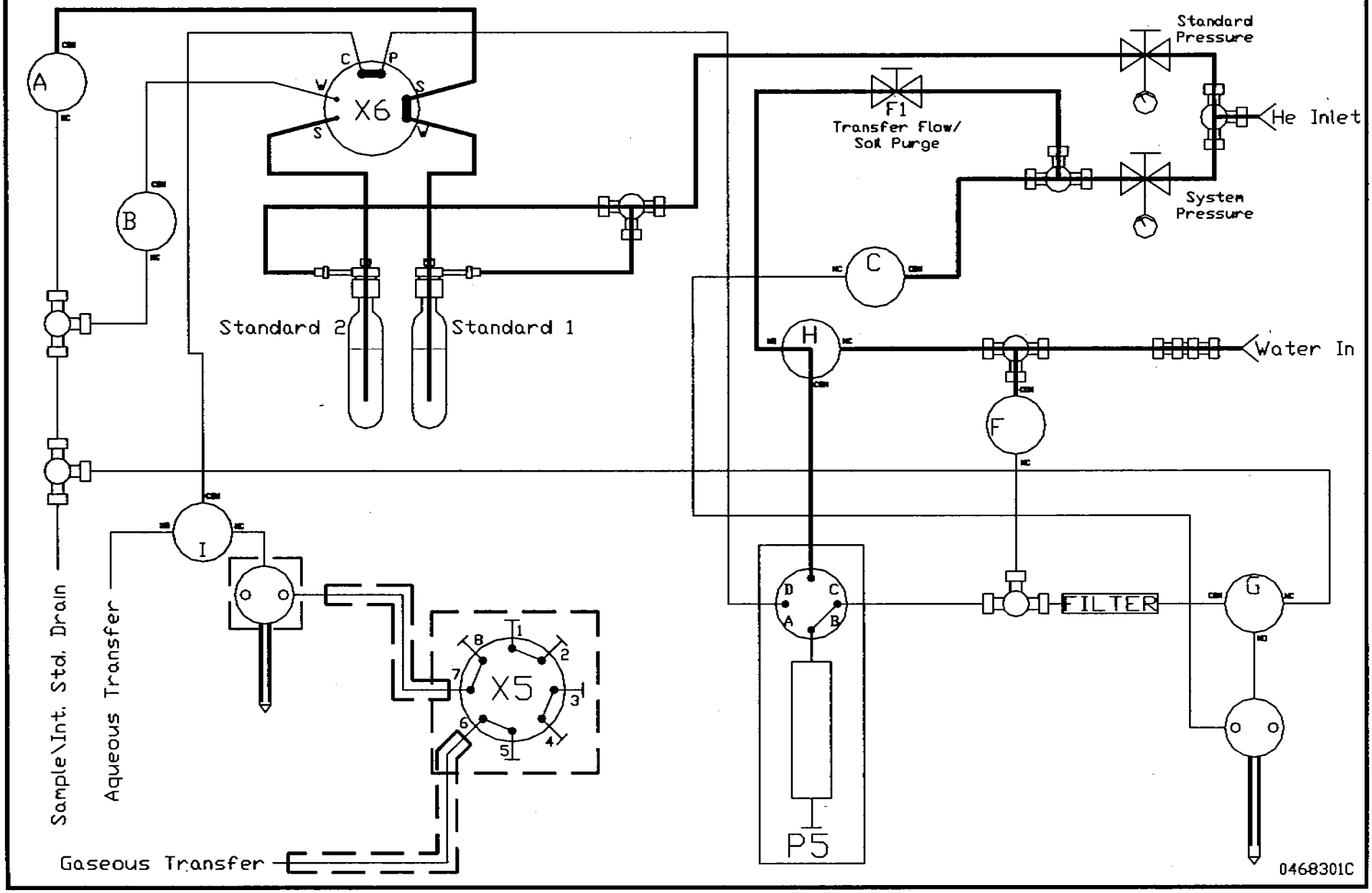
Sweep Lines



W/S1 Running Aqueous

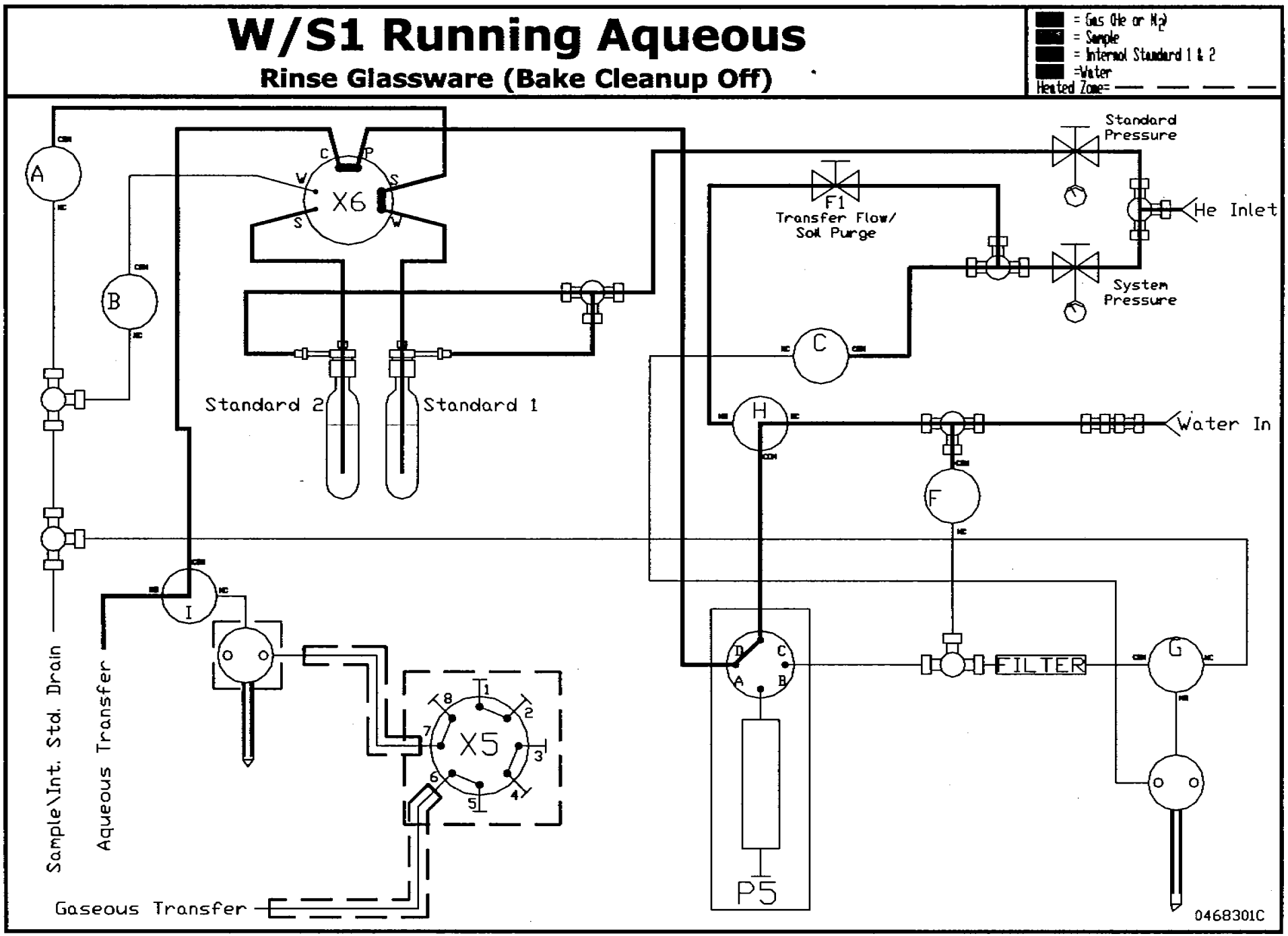
Wait for Desorb

= Gas (He or N_2)
= Sample
= Internal Standard 1 & 2
= Water
Heated Zone= — — — —



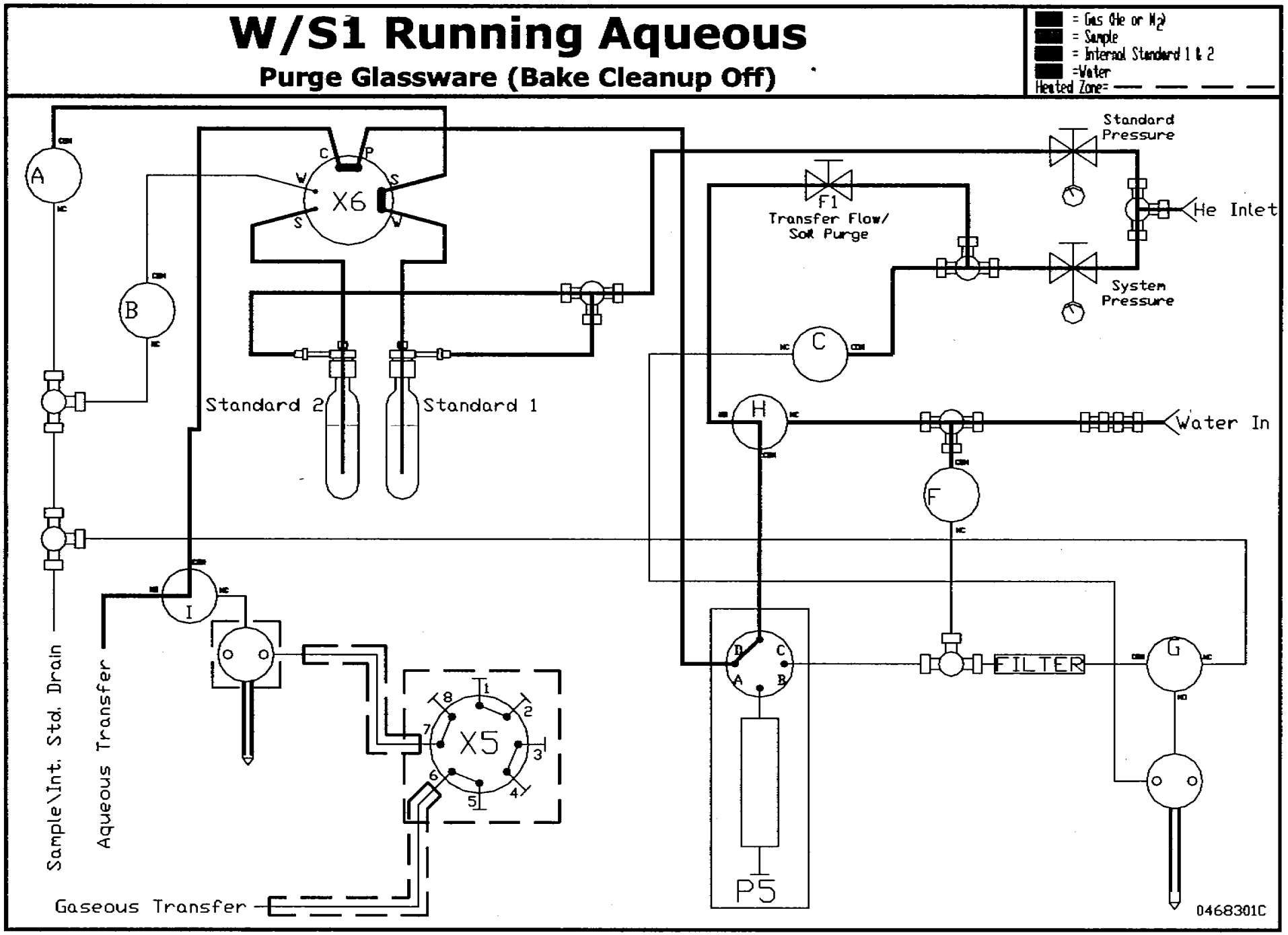
W/S1 Running Aqueous

Rinse Glassware (Bake Cleanup Off)



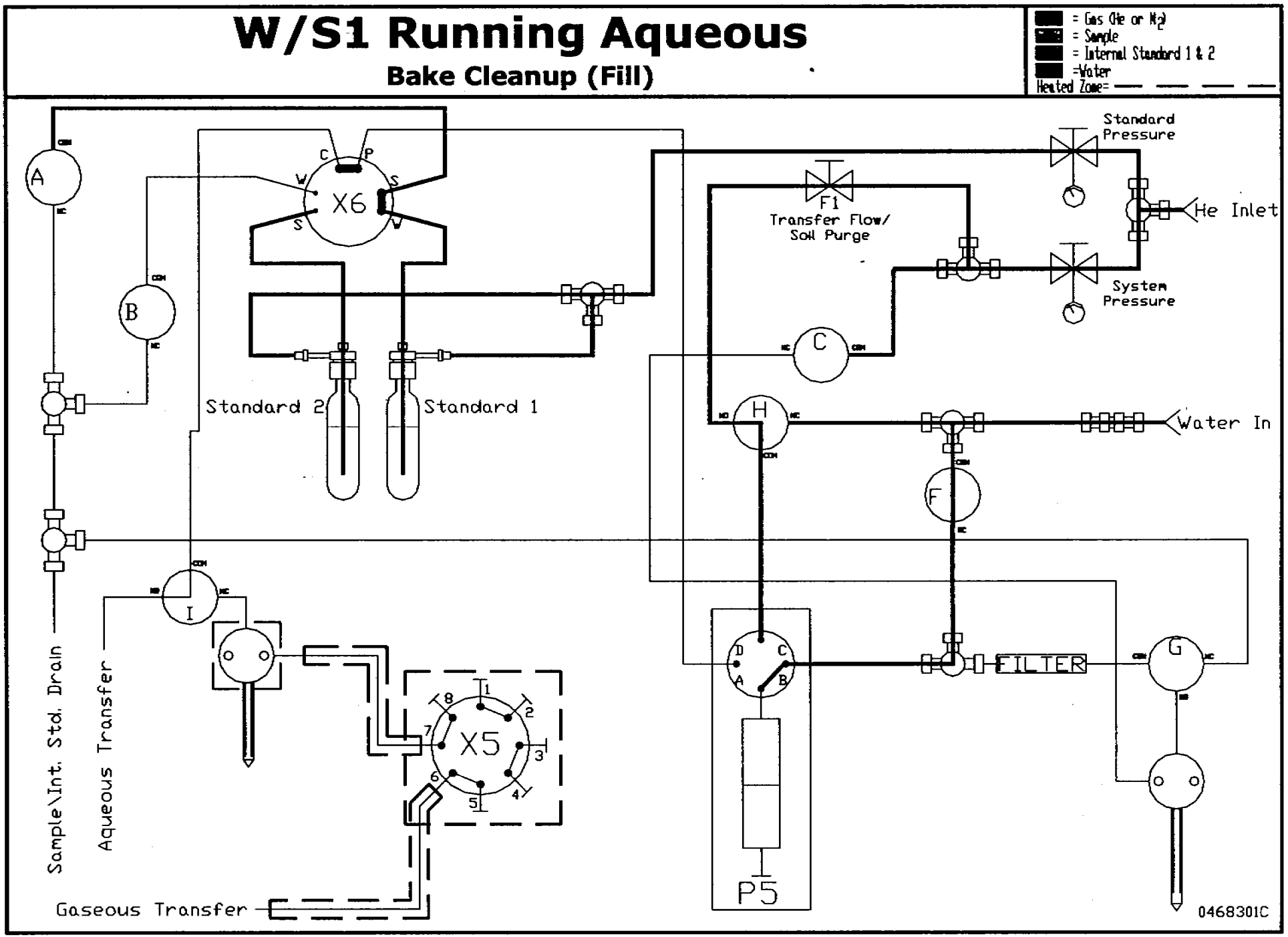
W/S1 Running Aqueous

Purge Glassware (Bake Cleanup Off)



W/S1 Running Aqueous

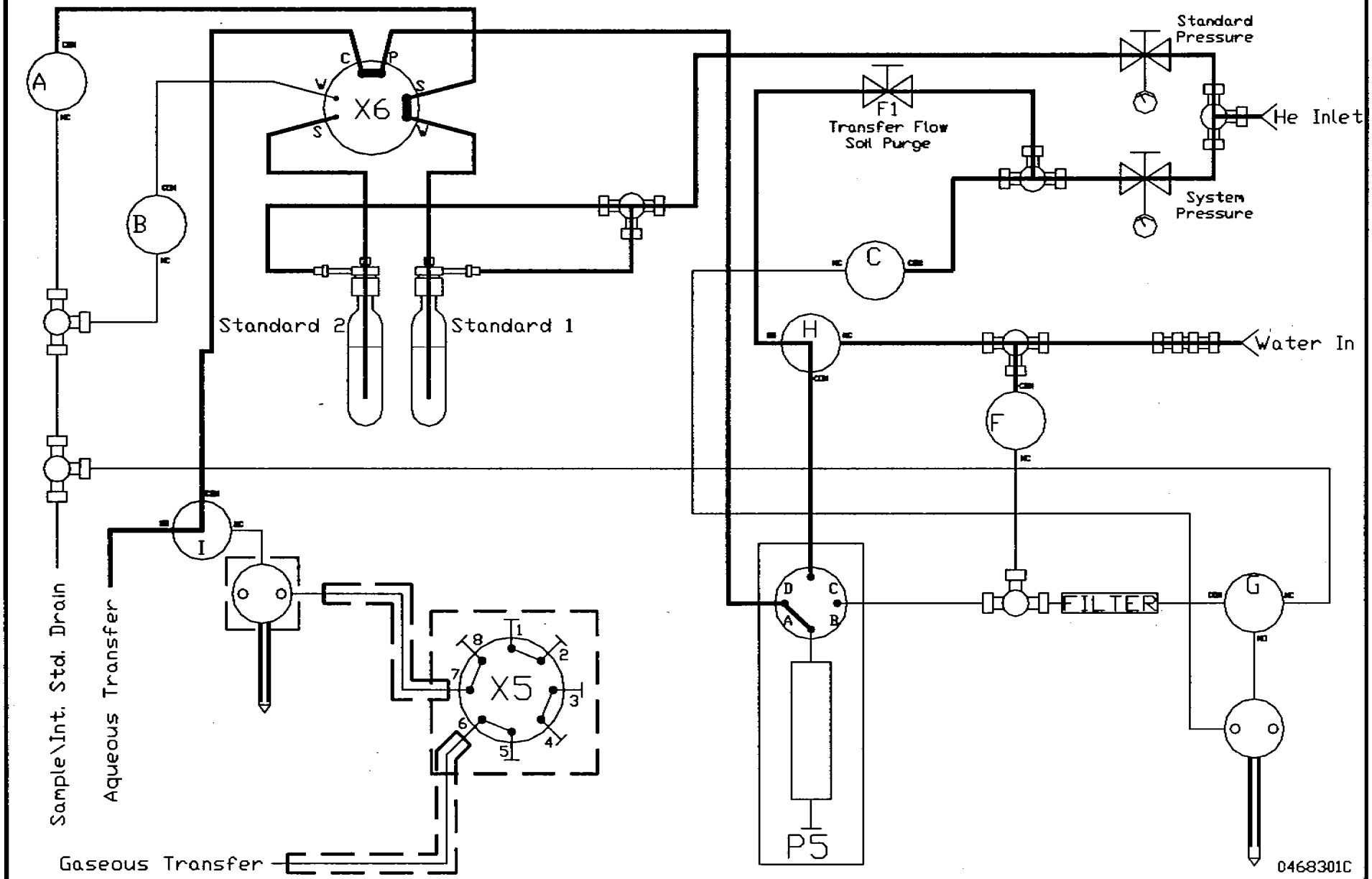
Bake Cleanup (Fill)



W/S1 Running Aqueous

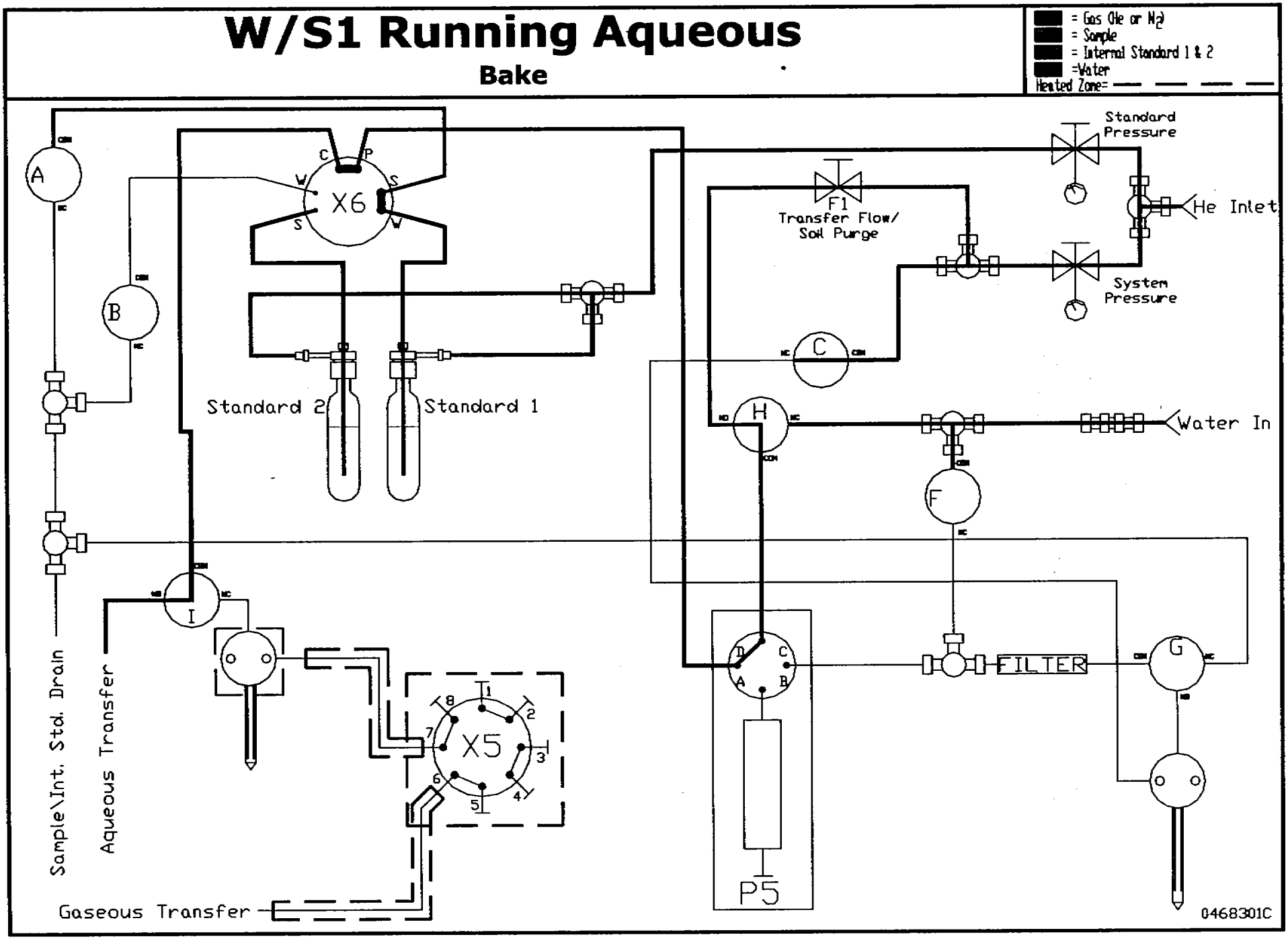
Bake Cleanup (Transfer)

= Gas (He or N_2)
= Sample
= Internal Standard 1 & 2
= Water
Heated Zone= — — — —



W/S1 Running Aqueous

Bake

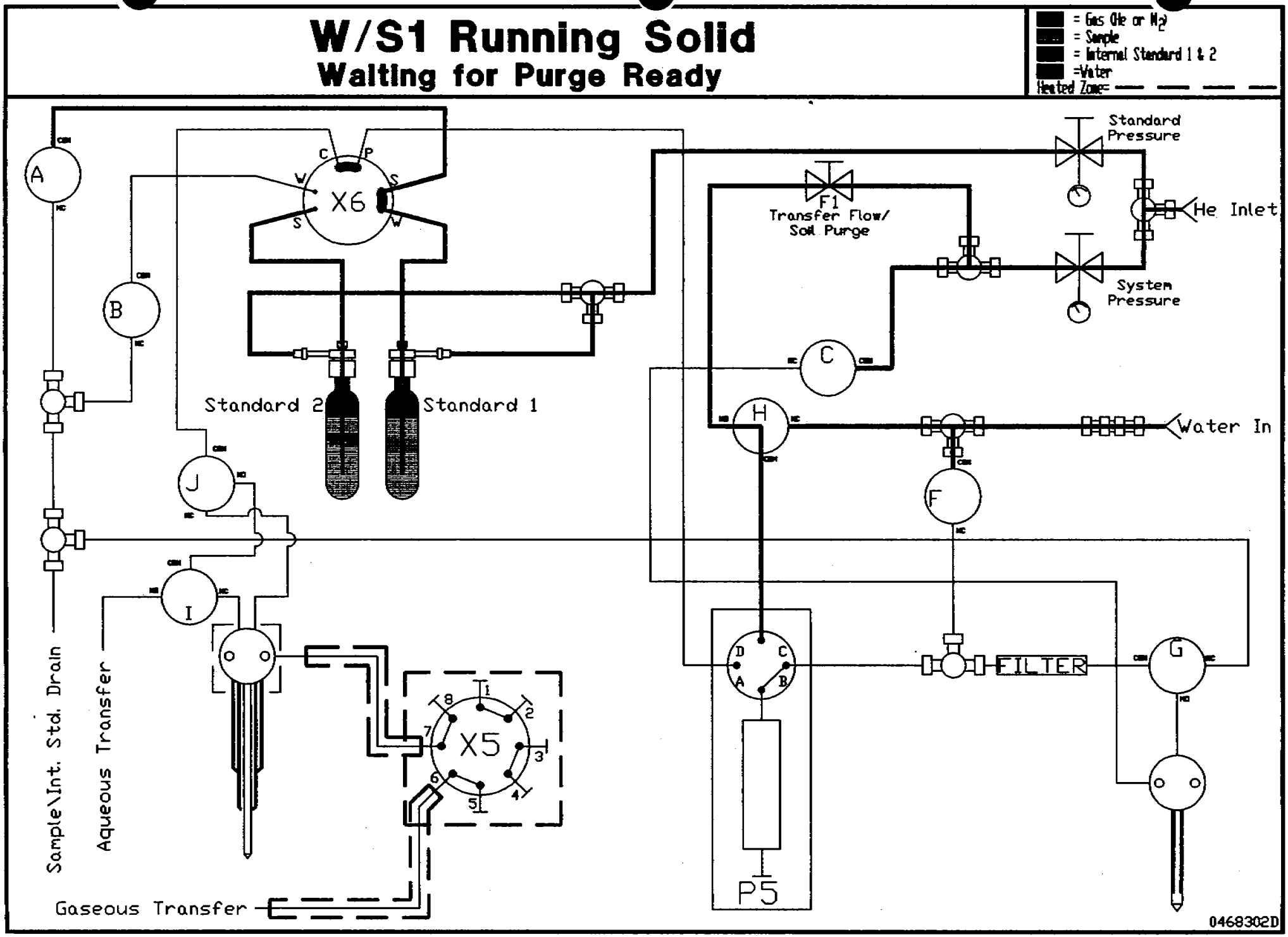


W/S1 RUNNING SOLIDS

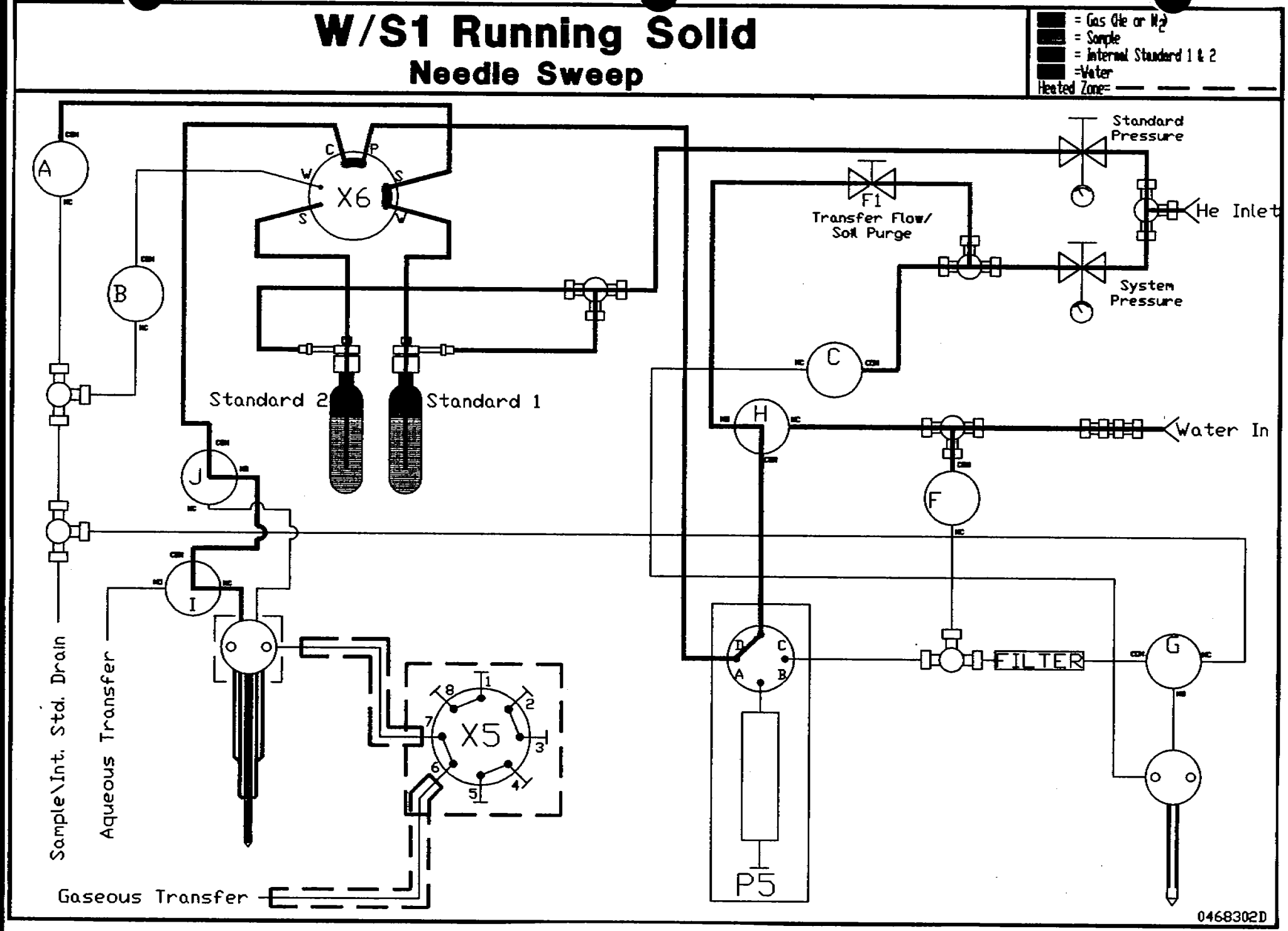
Waiting for Purge Ready	0	0	0	0	0	0	0	0	1 & 2	A	Down	B
Needle Sweep	0	0	0	0	0	0	1	0	1 & 8	A	Down	D
Raise Vial	0	0	0	0	0	0	0	0	1 & 2	A	Up	B
Fill Syringe	0	0	0	1	0	0	0	1	1 & 2	A	Up	B
Fill Syringe (Sample Vent)	0	0	0	0	1	0	0	1	1 & 2	A	Up	B
Standard 1 Fill	1	0	0	0	0	0	0	1	1 & 2	A	Up	B
Standard 1 Transfer	0	0	0	0	0	0	1	1	1 & 8	B	Up	A
Sweeping Transfer Lines 1	0	0	0	0	0	0	1	1	1 & 8	B	Up	D
Standard 2 Fill	0	1	0	0	0	0	0	1	1 & 8	B	Up	B
Standard 2 Transfer	0	0	0	0	0	0	1	1	1 & 8	A	Up	A
Sweeping Transfer Lines 2	0	0	0	0	0	0	1	1	1 & 8	A	Up	D
Preheat	0	0	0	0	0	0	0	0	1 & 8	A	Up	B
Vial Purge	0	0	0	0	0	0	1	0	1 & 8	A	Up	D
Waiting on Desorb	0	0	0	0	0	0	0	0	1 & 2	A	Up	B
Lower Vial	0	0	0	0	0	0	0	0	1 & 2	A	Down	B
Rinse 1st Stage Needle	0	0	0	0	0	1	1	0	1 & 2	A	Down	D
Rinse 2nd Stage Needle	0	0	0	0	0	0	1	1	1 & 2	A	Down	D
Purge 1st Stage Needle	0	0	0	0	0	0	1	0	1 & 2	A	Down	D
Purge 2nd Stage Needle	0	0	0	0	0	0	1	1	1 & 2	A	Down	D
Bake	0	0	0	0	0	0	1	0	1 & 2	A	Down	D

A	2 Port solenoid valve	0-off, 1-on	*I*	3 Port solenoid valve	0-off, 1-on
B	2 Port solenoid valve	0-off, 1-on	*J*	3 Port solenoid valve	0-off, 1-on
C	2 Port solenoid valve	0-off, 1-on	*X5*	8 Port switching valve	1 & 2 ports conn. or 1 & 8 conn.
F	2 Port solenoid valve	0-off, 1-on	*X6*	6 Port internal standard valve	A - middle & right ports conn. B - middle & left ports conn.
G	3 Port solenoid valve	0-off, 1-on	*VIAL*	Vial location	Down - vial off needle Up - vial on needle
H	3 Port solenoid valve	0-off, 1-on	*P5*	4 Port valve on pumper	A,B,C,D, ports between letters conn.

W/S1 Running Solid
Waiting for Purge Ready

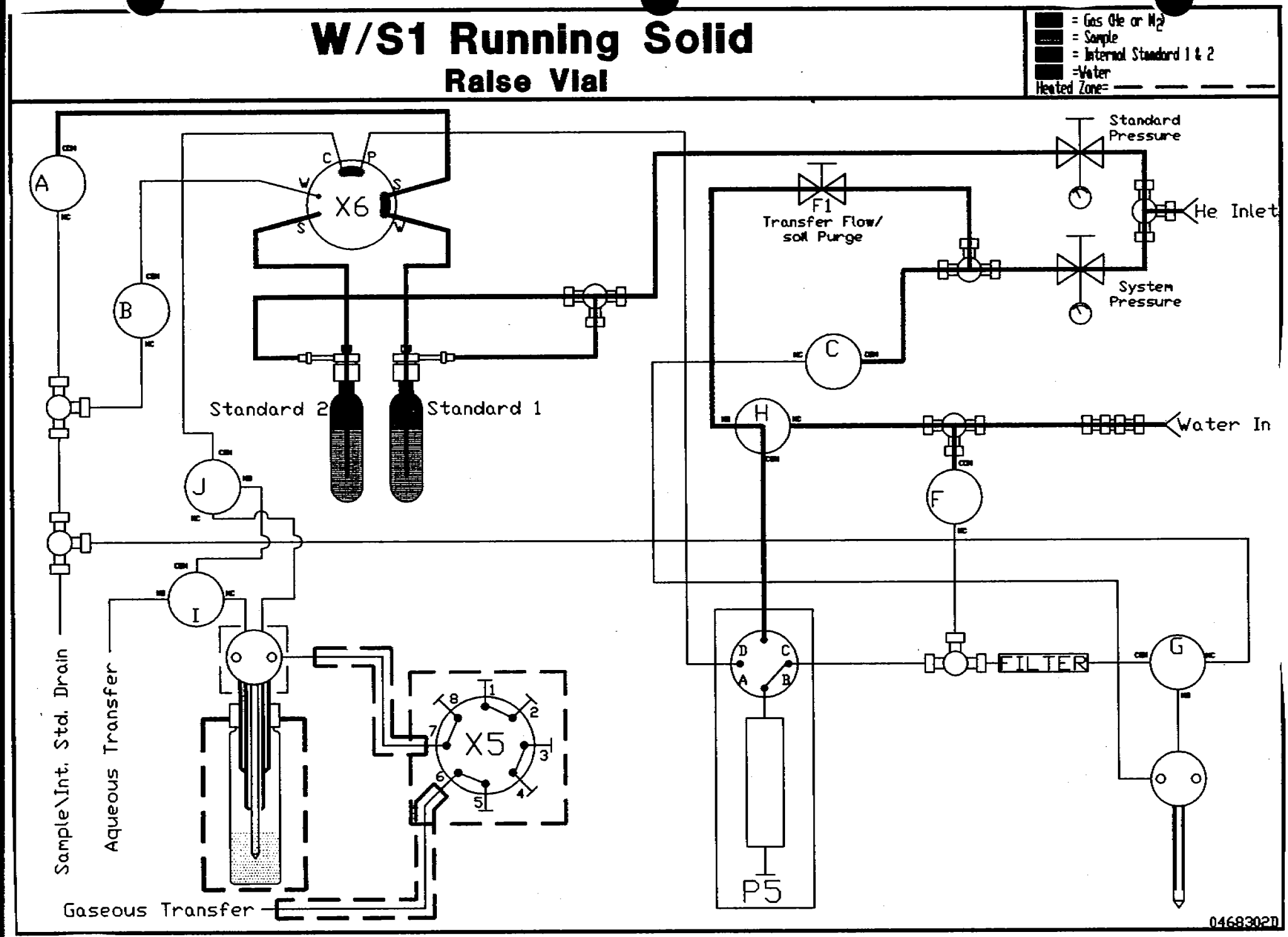


W/S1 Running Solid
Needle Sweep



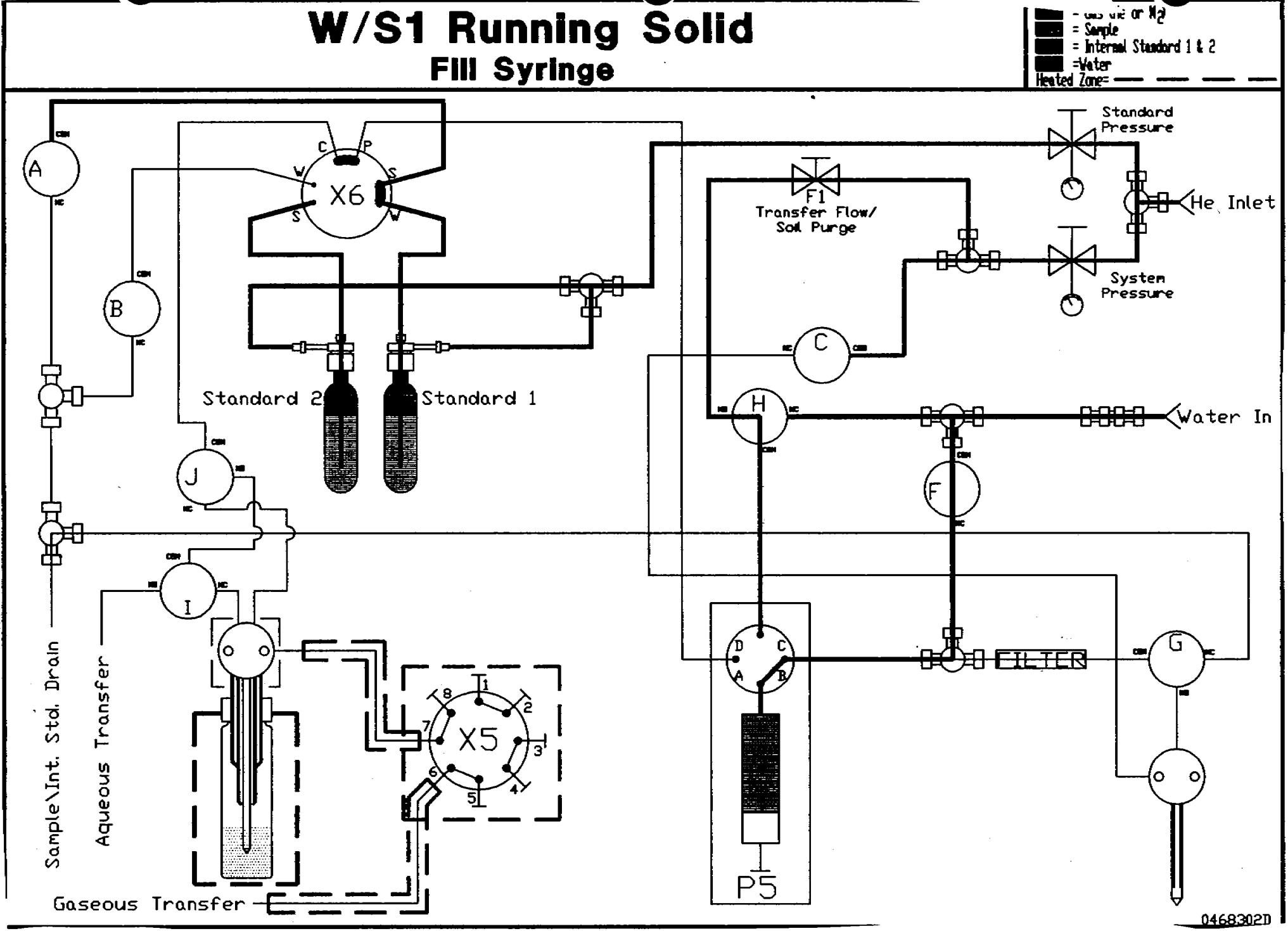
W/S1 Running Solid

Raise Vial



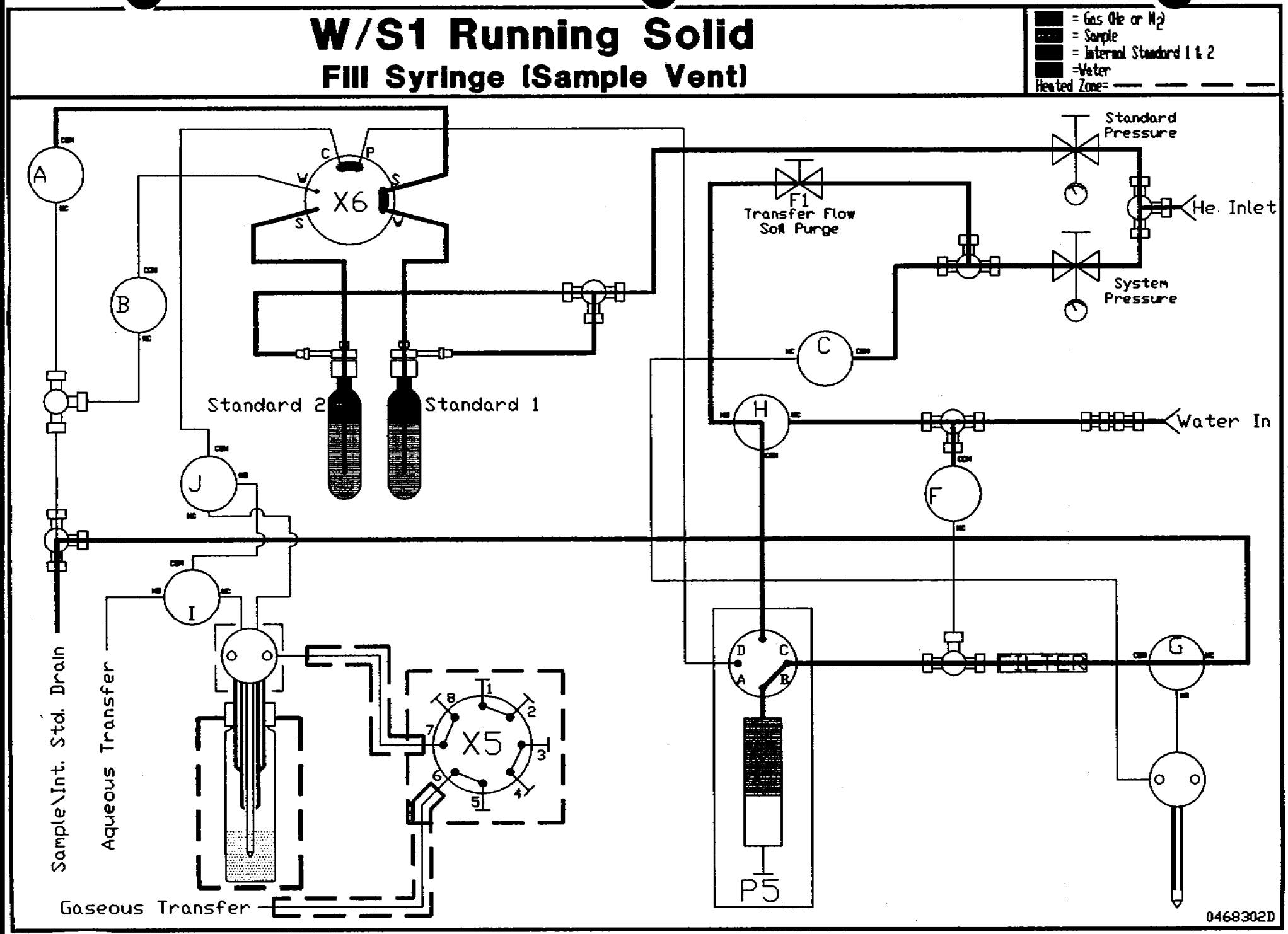
W/S1 Running Solid

Fill Syringe



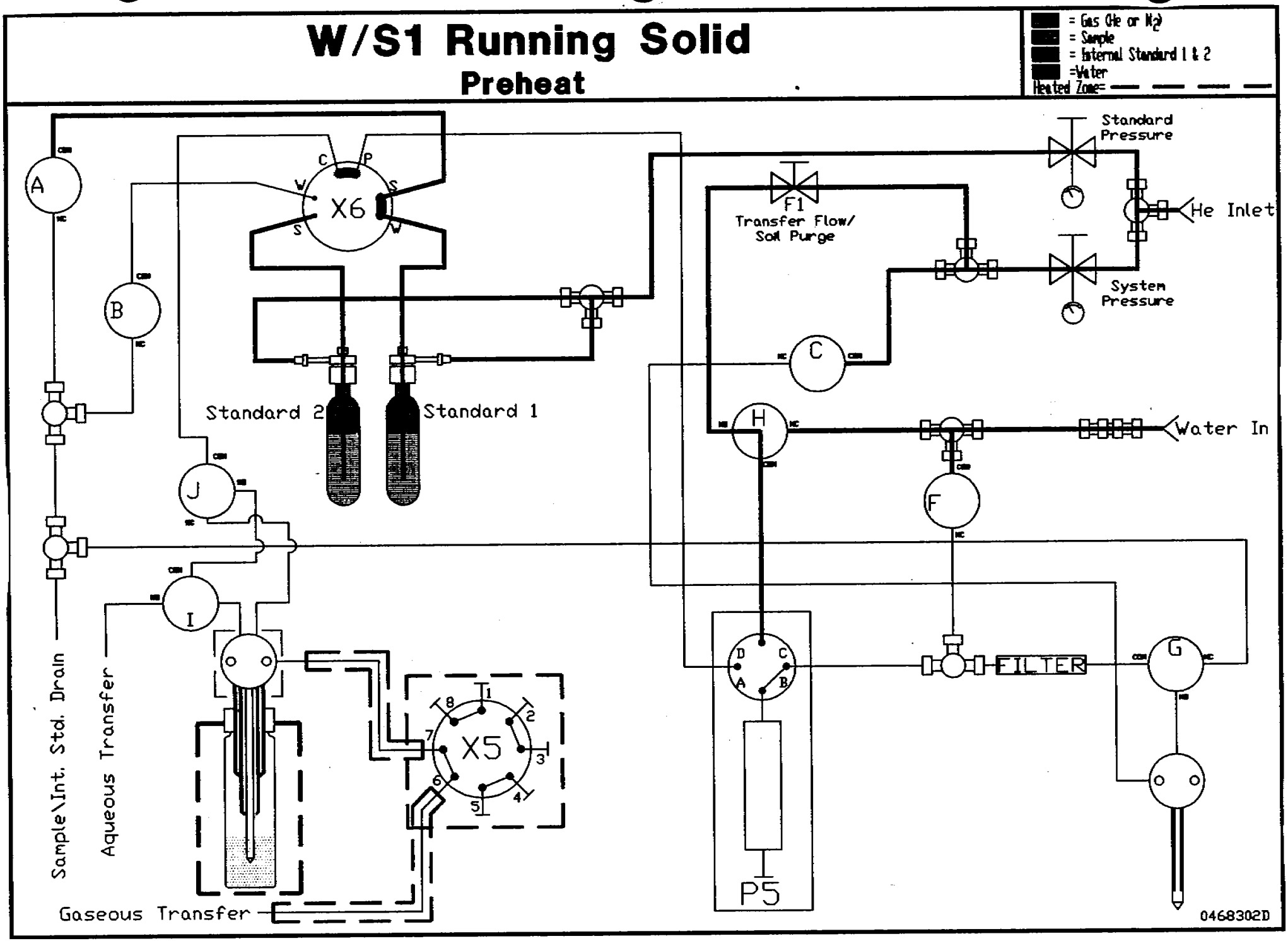
W/S1 Running Solid

Fill Syringe (Sample Vent)



W/S1 Running Solid

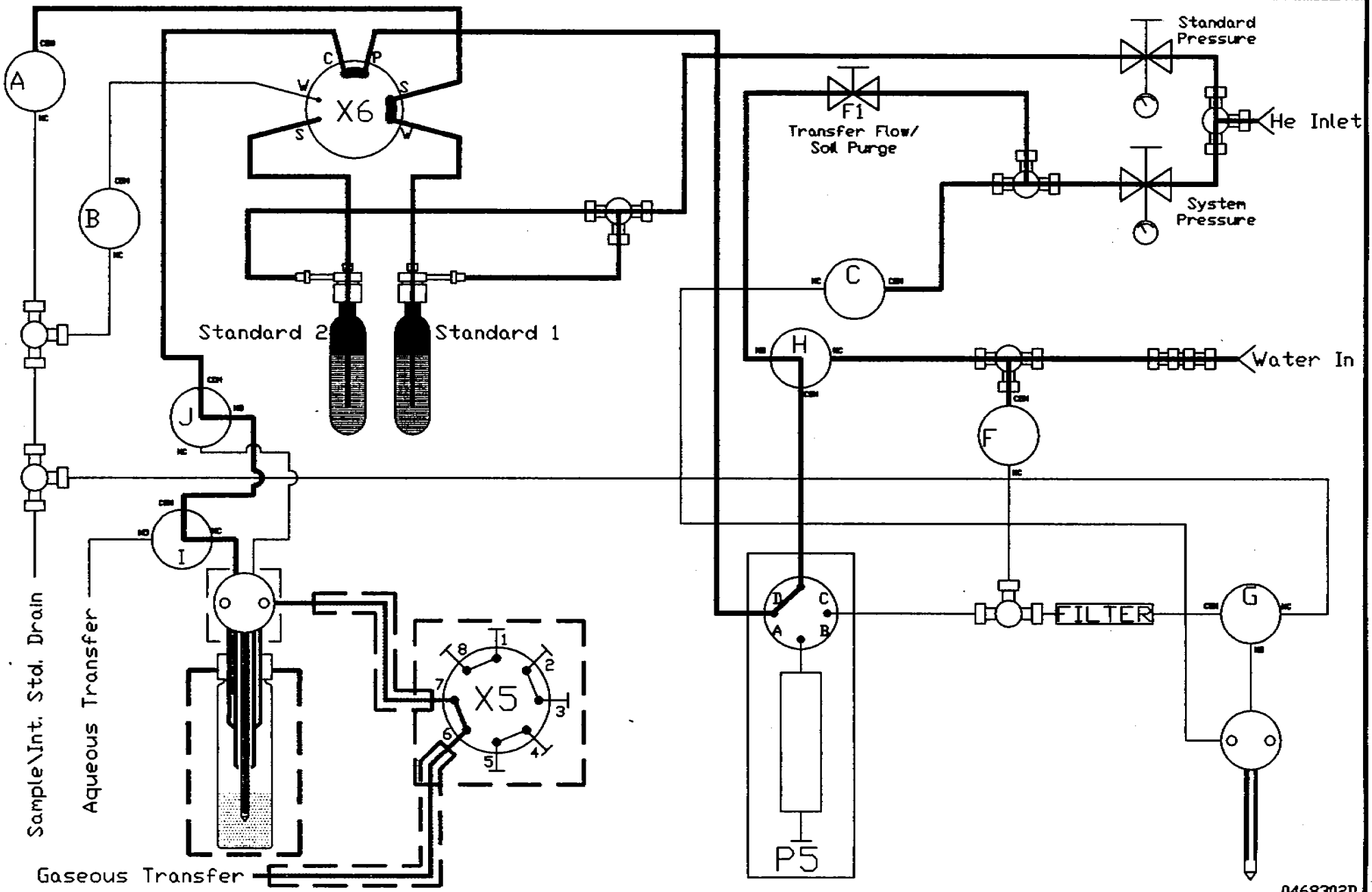
Preheat



W/S1 Running Solid

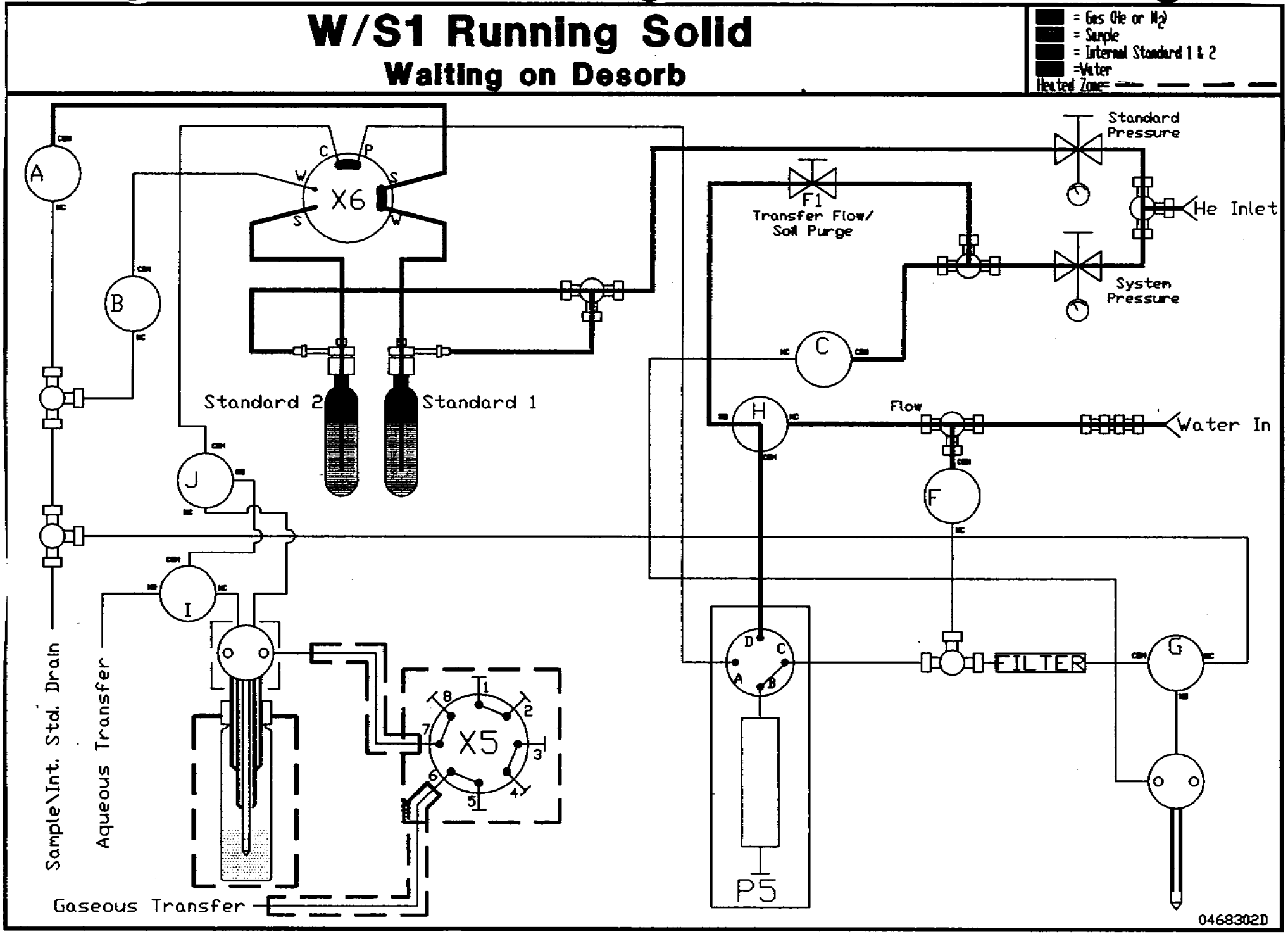
Vial Purge

= Gas (He or N_2)
= Sample
= Internal Standard 1 & 2
= Water
Heated Zone= — — — —



W/S1 Running Solid

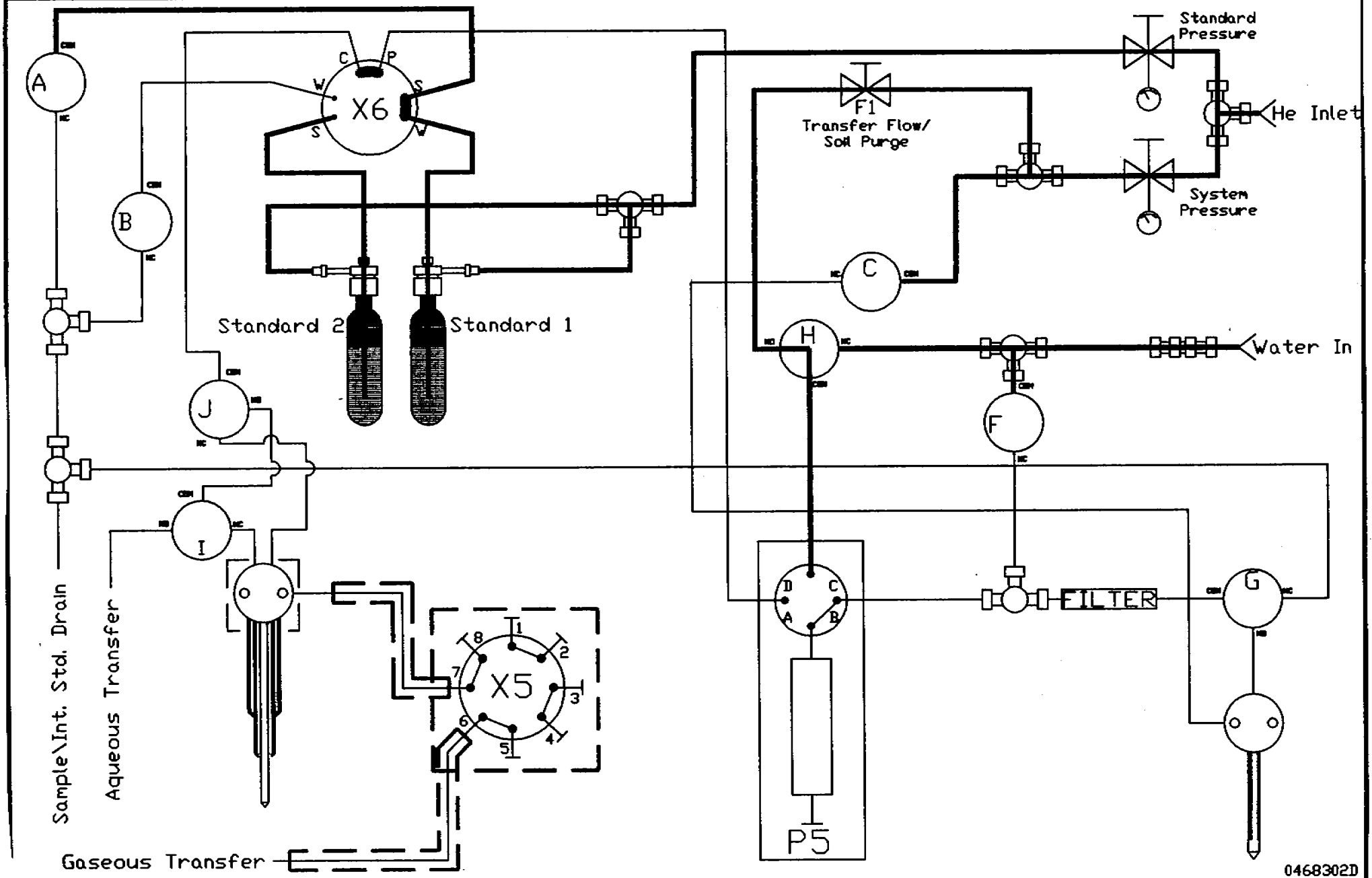
Waiting on Desorb



W/S1 Running Solid

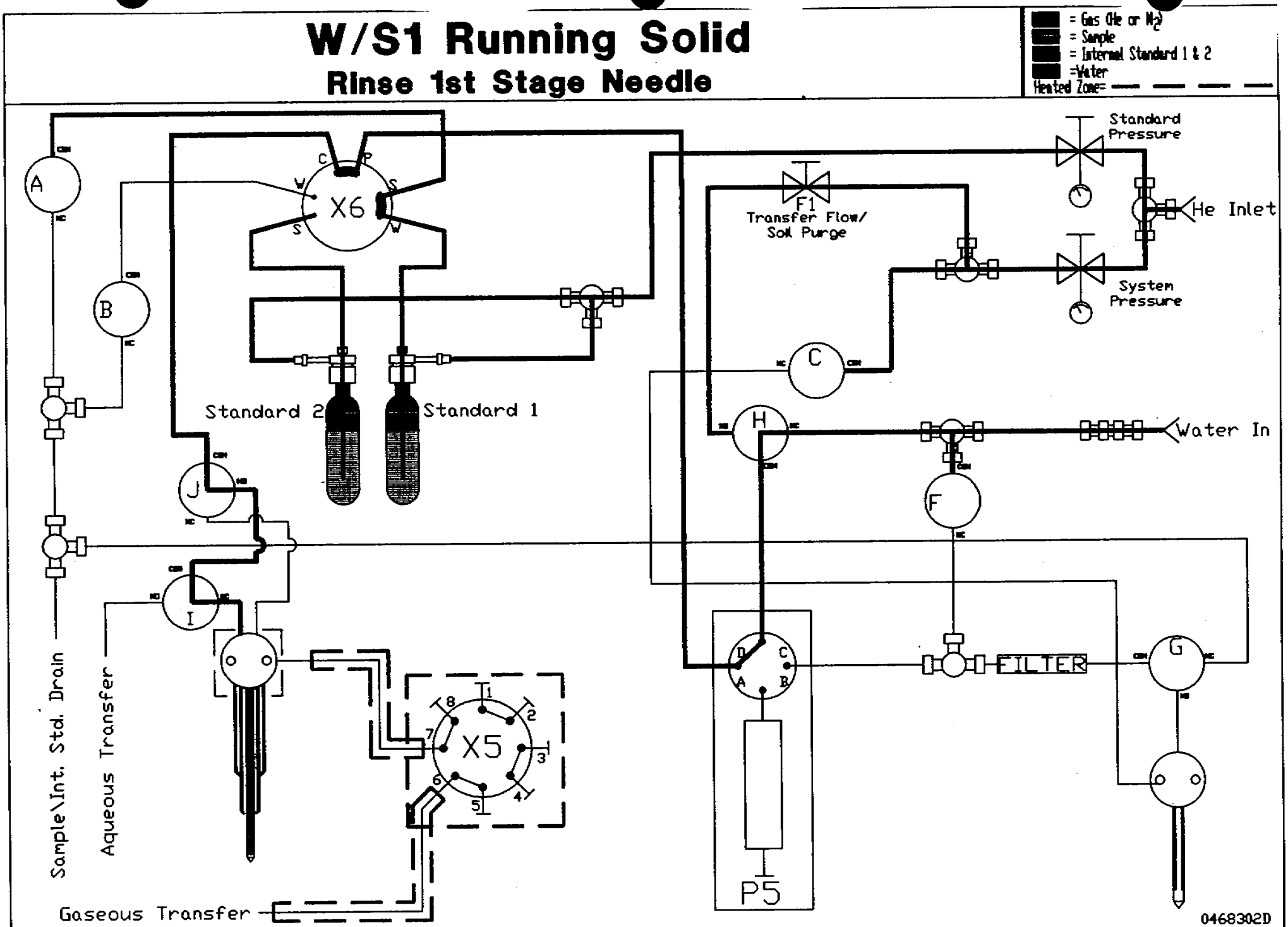
Lower Vial

= Gas (He or N_2)
= Sample
= Internal Standard 1 & 2
= Water
Heated Zone= — — — —



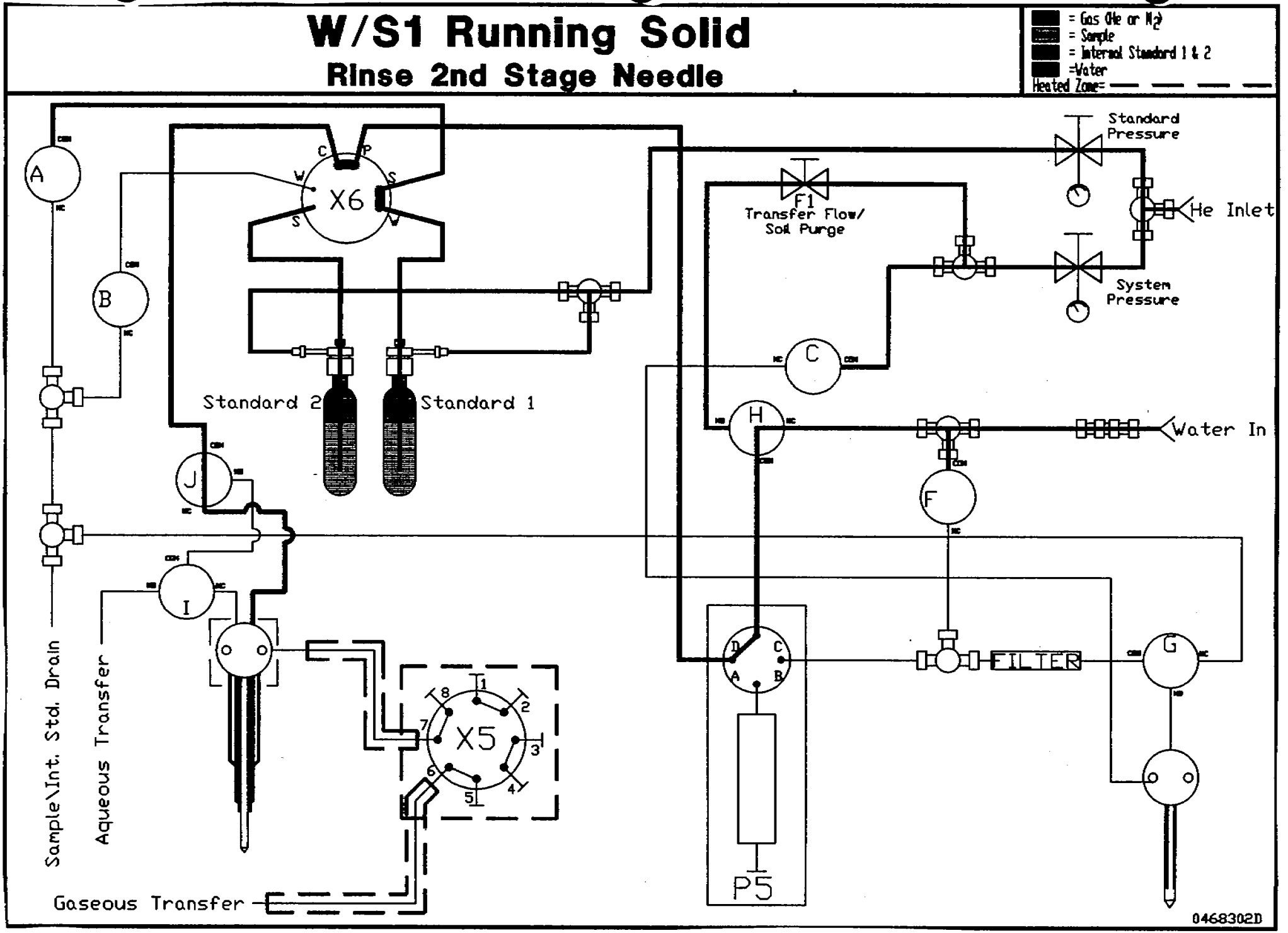
W/S1 Running Solid

Rinse 1st Stage Needle



W/S1 Running Solid

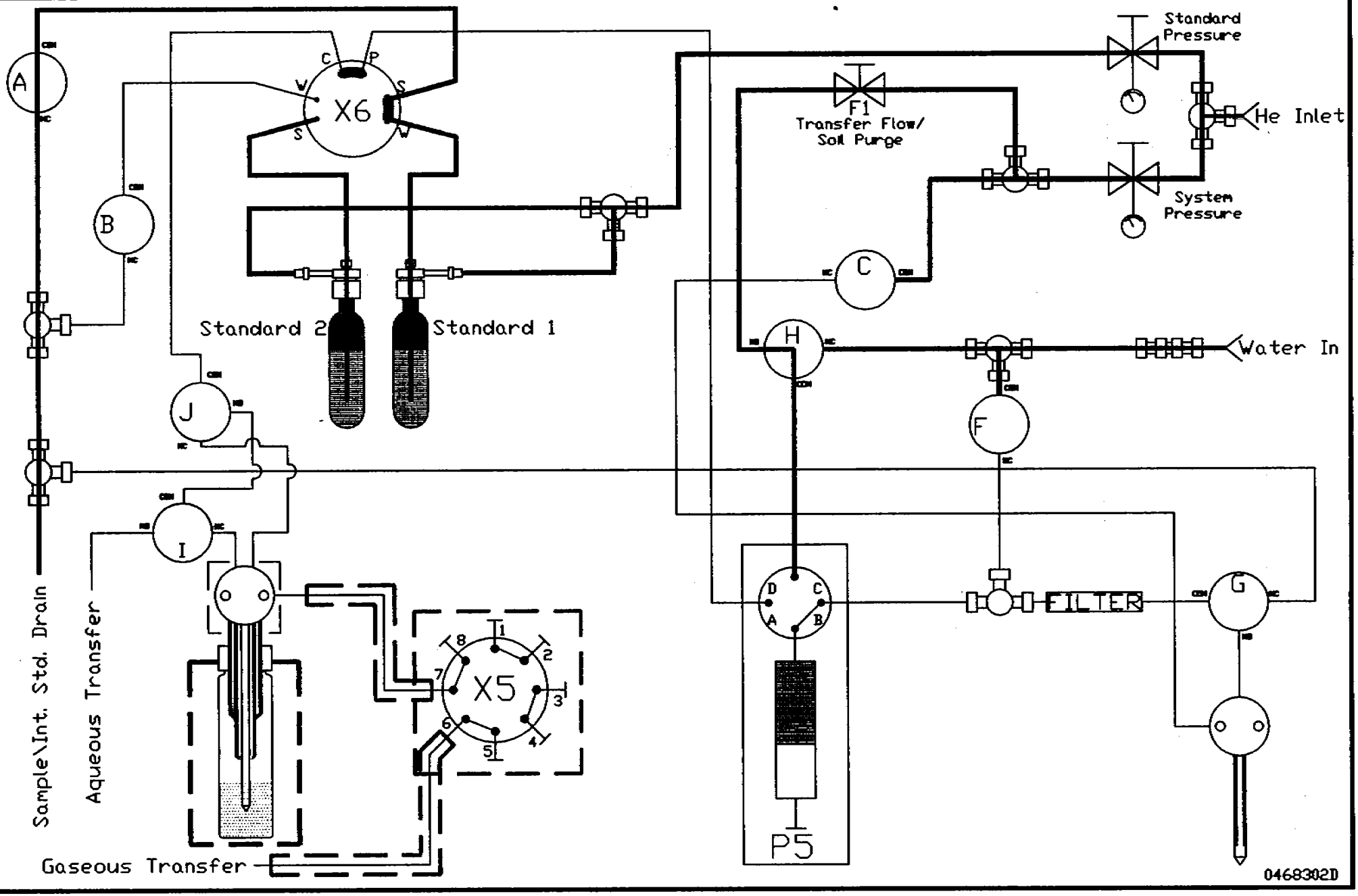
Rinse 2nd Stage Needle



W/S1 Running Solid

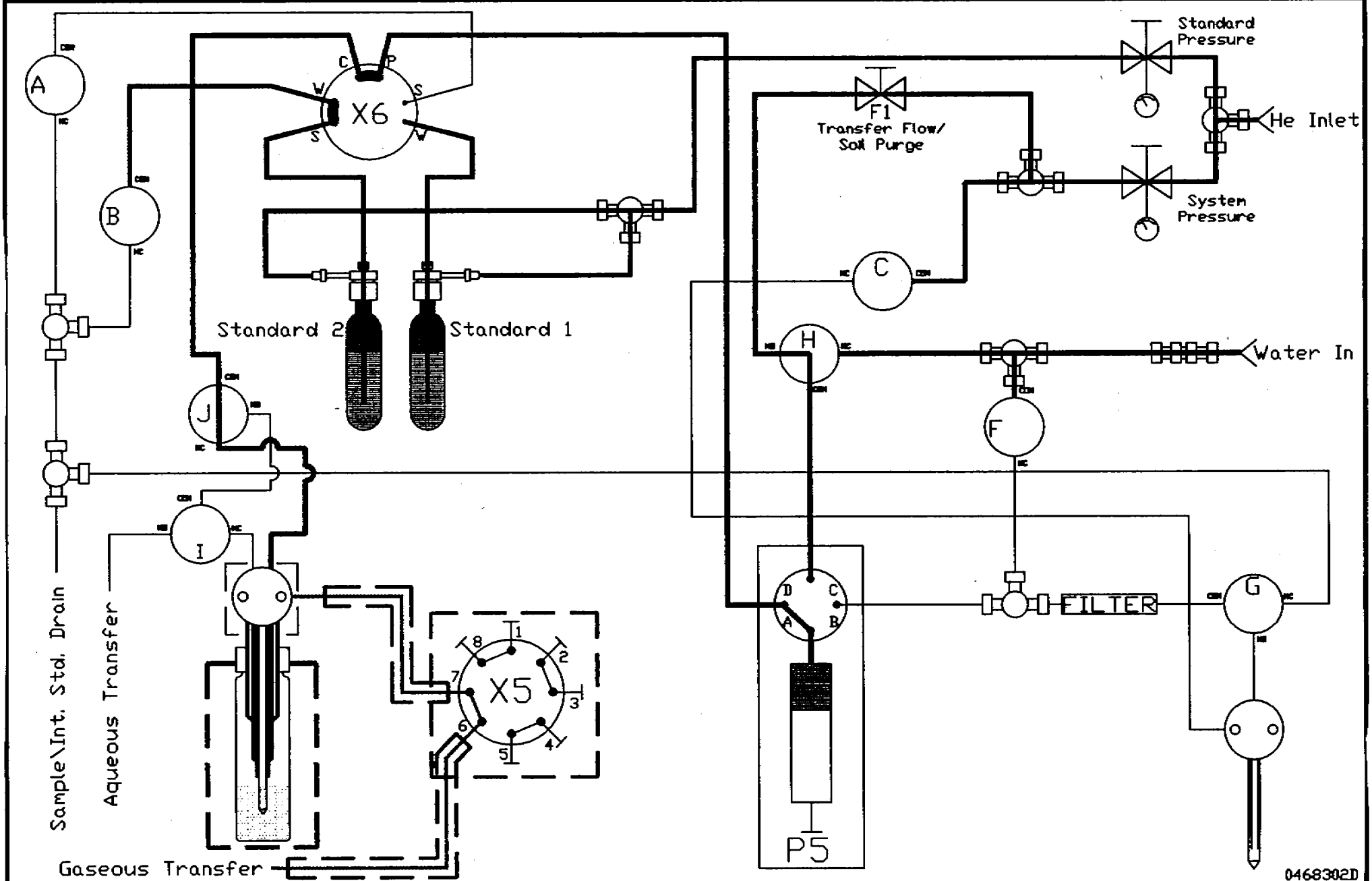
Standard 1 Fill

= Gas (He or N_2)
= Sample
= Internal Standard 1 & 2
= Water
Heated Zone= — — — —



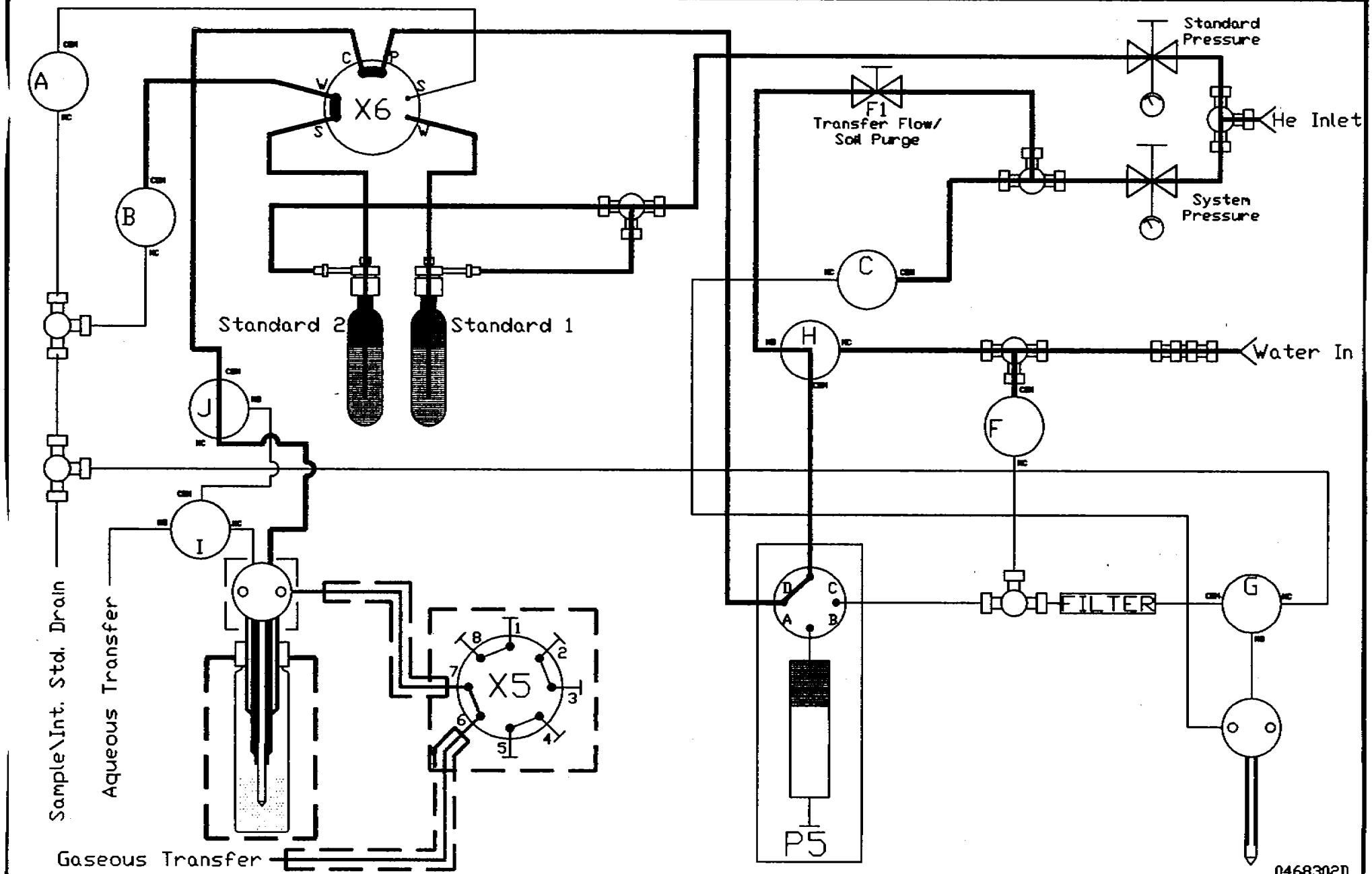
W/S1 Running Solid

Standard 1 Transfer



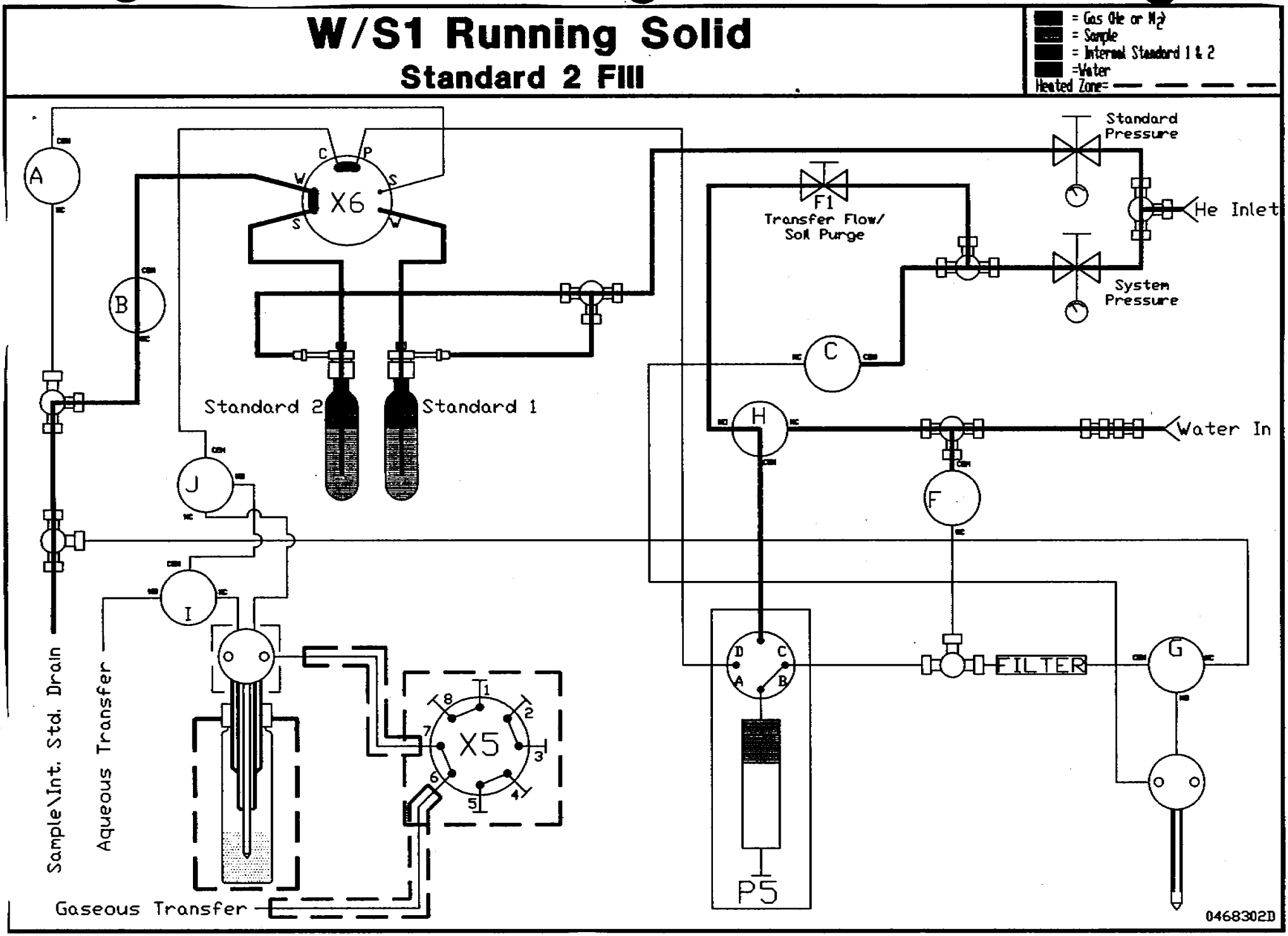
W/S1 Running Solid

Sweeping Transfer Lines 1



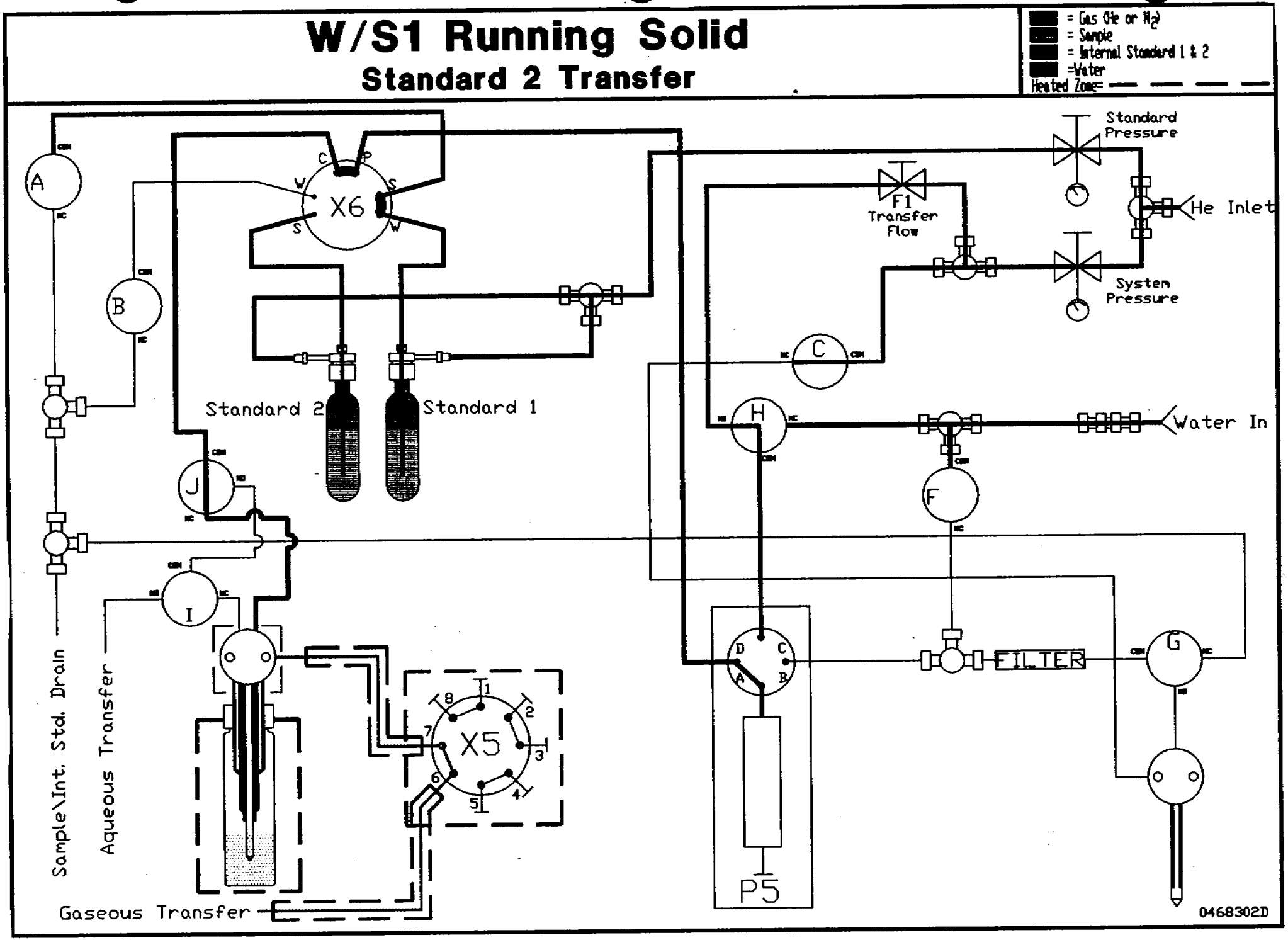
W/S1 Running Solid

Standard 2 Fill



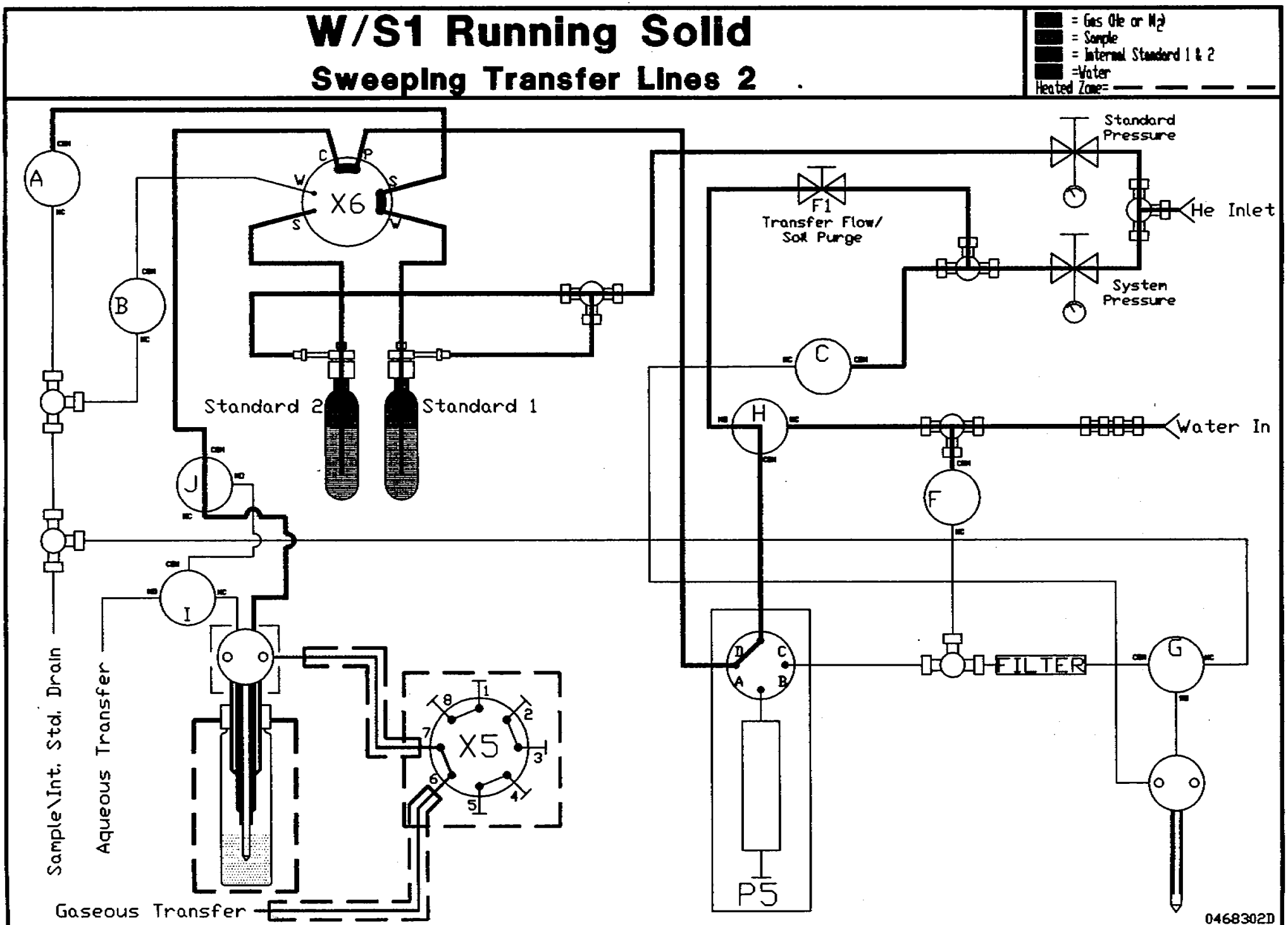
W/S1 Running Solid

Standard 2 Transfer



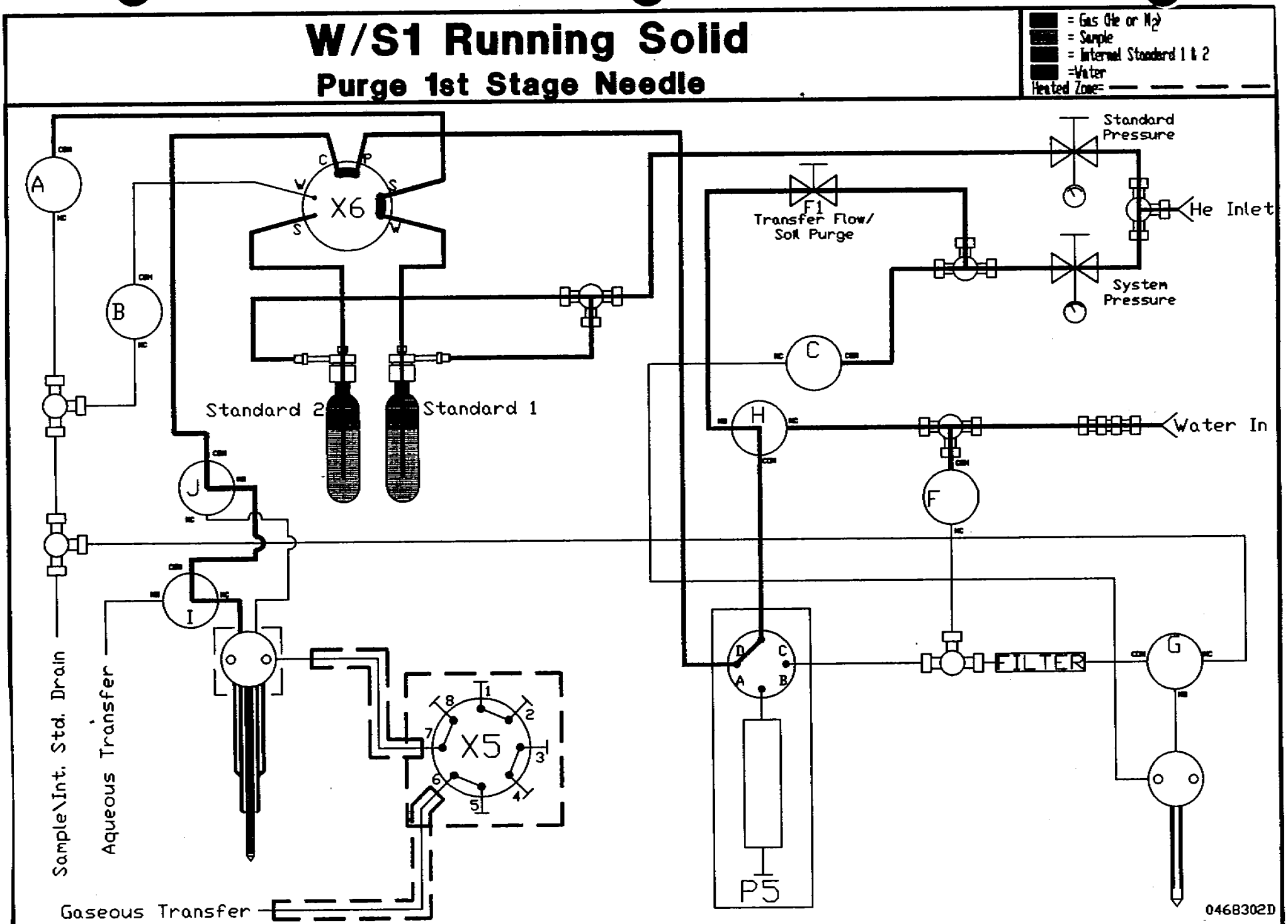
W/S1 Running Solid

Sweeping Transfer Lines 2



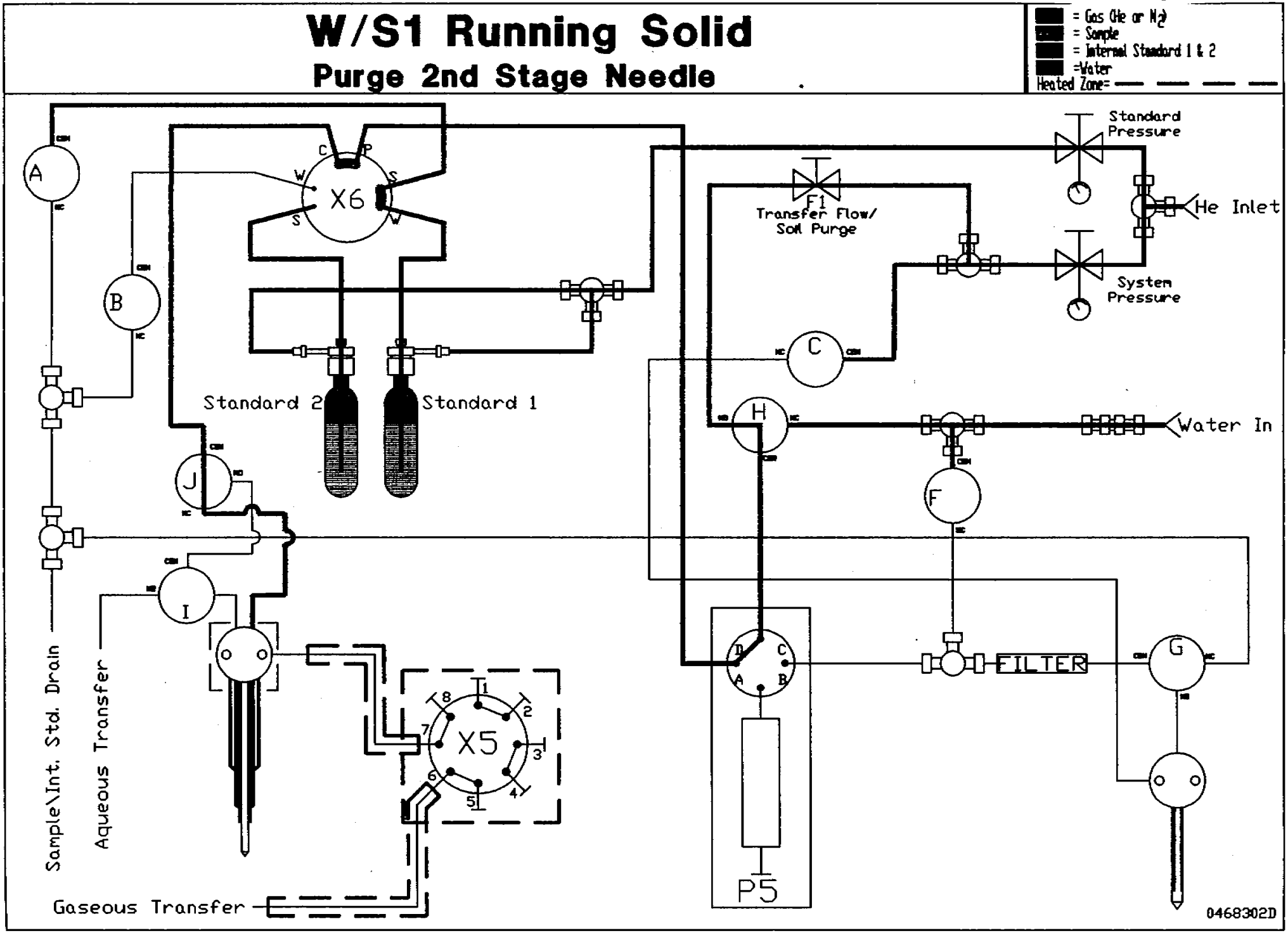
W/S1 Running Solid

Purge 1st Stage Needle



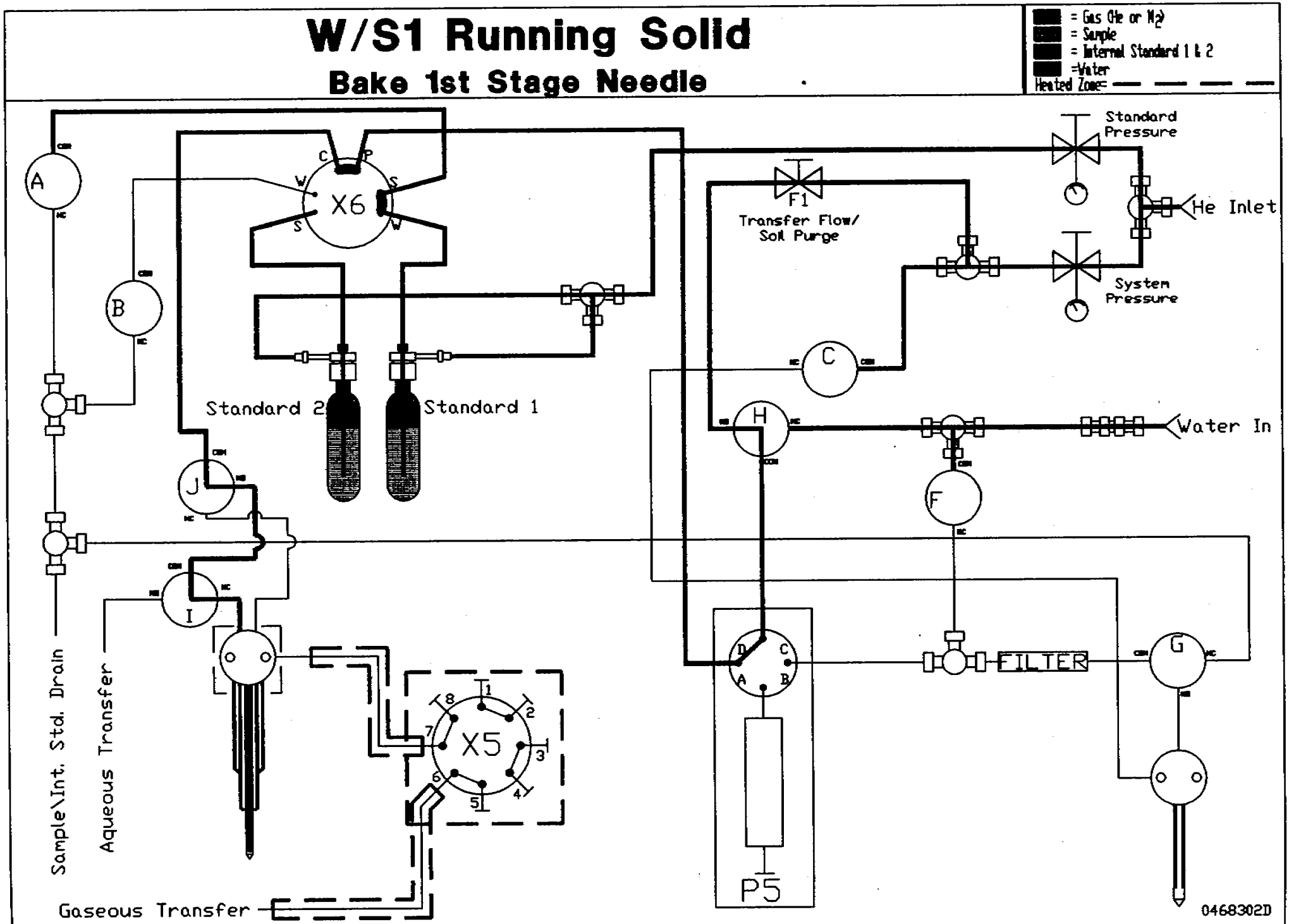
W/S1 Running Solid

Purge 2nd Stage Needle



W/S1 Running Solid

Bake 1st Stage Needle



Using Precept II-TekLink with the 3000

Tekmar®

Updates
Tekmar-Dohrmann may update the information contained in this booklet without notice to purchaser.

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1.1 Overview

An analytical run on Precept II consists of a programmed sequence of steps, called a method. Tekmar programs Precept II with the default method parameters listed in Tables 1-3 and 1-4 on pages 1-15 and 1-16.

This chapter explains how to:

- Access and edit the COM Port and Configuration screens
- Access and edit default methods
- Prepare and run a schedule for your samples, standards, and blanks
- Access the temperature screen
- Use online help.

For more information on installing and using TekLink, please see Chapter 4 *Getting Ready to Run Samples.*

1.2 Configuring COM Ports

You must configure TekLink to identify each instrument connected to the PC with the appropriate COM port on the PC.

1. Click on the **Unit Control** pull-down menu and choose **Configure Ports** *-or-* hold down the **Ctrl** key and press the **C** key.
2. Position the mouse in the first white box and click.
3. Enter a unit name and then hit **Tab** for next field.
4. Enter the COM port number for unit.
5. For other units (if applicable) press **Tab** and repeat steps 3 and 4.
6. Click **OK.**

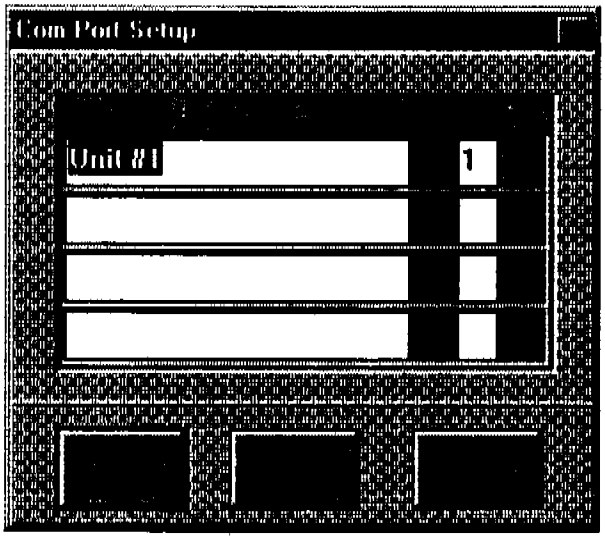

Figure 1-1 COM Port Screen

1.3 Designating an Active Unit

1. On the TekLink control screen, click on the **Unit Control** pull-down menu to open.
2. Select a unit. When you do so:
   - a check mark appears next to the selected name
   - the name of the selected unit appears in the screen title bar
   - the operation status window displays status information for the selected unit.

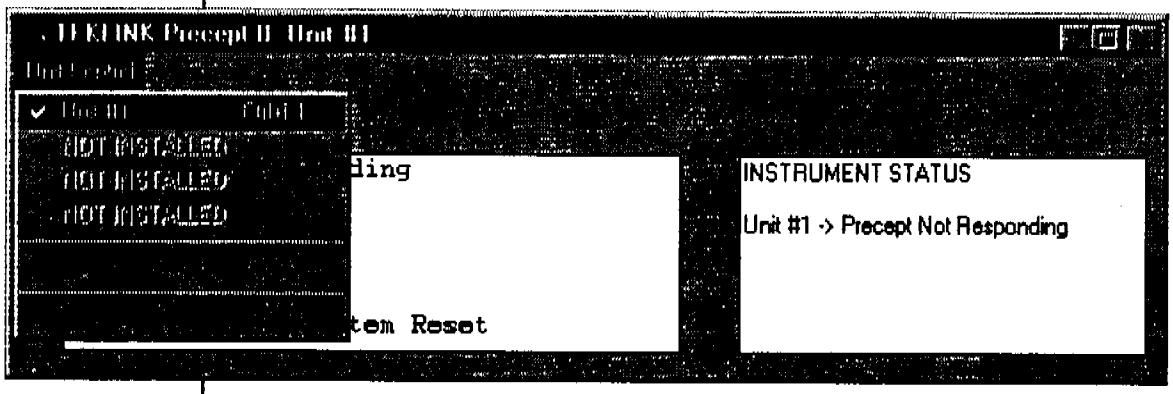

Figure 1-2 TekLink Control Screen, Unit Control Menu

1.4 Editing Configurations

Enter information in the Configuration screen to specify the hardware setup for your unit.

1. Click on the **Setup** pull-down menu and choose **Configure Instrument** *-or-* hold down the **Ctrl** key and press the **I** key.
2. Position the mouse over the desired radio buttons and click to choose an option. Position the mouse in the white boxes and click to enter values.
3. Repeat step 2 for each parameter.
4. Click **OK.**

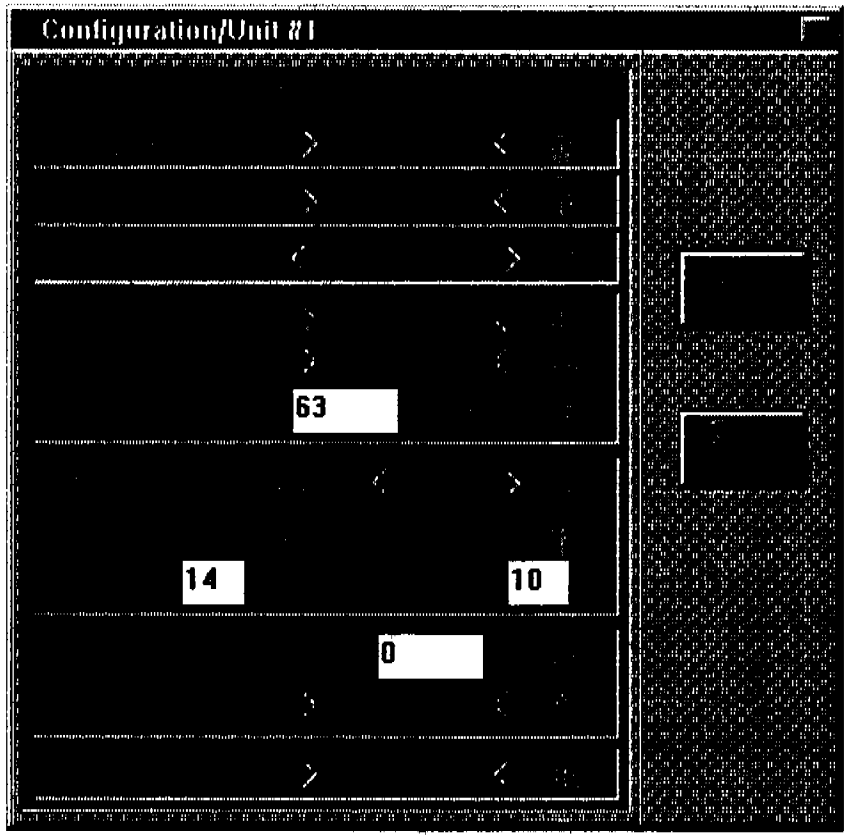

Figure 1-3 Configure Screen

NOTE: Some of the options are not available with the 2000 concentrator and will be grayed out.

continued

Configuration Parameter Descriptions

System Type

TekLink automatically fills in the system type.

- **W** is for a Water-only system
- **W/S1** is for a combination water and soil system

Standard 2 Option

This option should always be checked "Yes" in Precept II.

Standby Flow

This is a 3000 concentrator parameter. If you wish to have helium flowing through the sample pathway during Standby, click "On".

Trap TurboCool

This is a 3000 concentrator parameter. Click "On" if you have a TurboCool unit installed and plan to use it; the concentrator operates at subambient temperatures with the TurboCool unit.

GC Handshaking

This option specifies handshaking characteristics

- **On** indicates that the GC requires handshaking to operate
- **Off** indicates that the GC operates with no handshaking

GC Type

- **Standard:** all input and output signals are normally open relay closures or TTL active-low signals
- **User:** the GC supplies or accepts all normally closed relay closures, all TTL active-high signals, a combination of normally open and closed relays, or a combination of TTL active-low and TTL active-high signals; if you choose User, you must enter its GC number

User GC Type

Refer to the GC interface cable instruction sheet or the *3000 User Manual* to find the correct number.

Halt on No Bar Code

If a bar code reader is installed and you are using it, click "Yes" if you want TekLink to hold when a bar code is not detected on a vial.

Sample Equilibrate Time

Choose a time, in minutes, for a vial to equilibrate to room temperature.

Syringe Size

Choose the syringe size installed on your Precept II.

Concentrator

Choose the concentrator type connected to your Precept II; if you choose "2000," some of the parameters will gray out (See *Using Precept II-TekLink with the 2000*).

Interleaved 2 of 5 Sizes (0-30 Even #'s)

Enter the number of digits your **2 of 5 Bar Code Reader** uses; you may program a maximum of two different sizes.

1.5 Menu Options

Instrument Menu

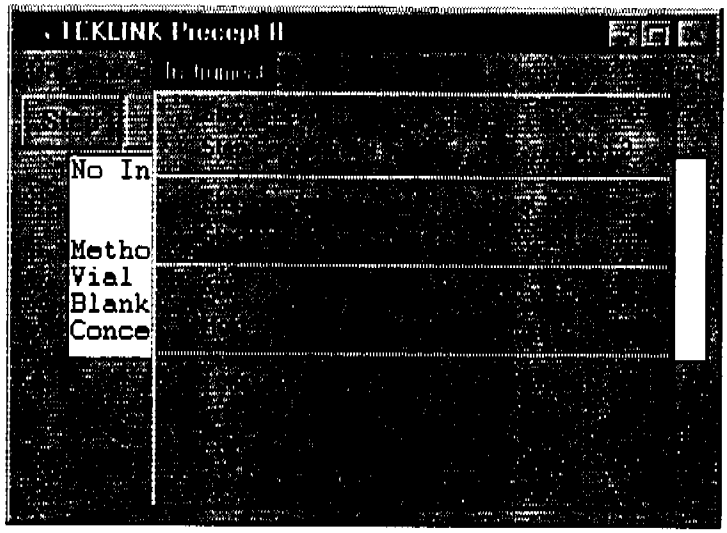

Figure 1-4 Instrument Menu Options

Step Precept II

Choose this option if you need to step Precept II into the next mode. If you are in "Waiting for Purge Ready" or "Waiting for Desorb," this option becomes unavailable while Precept II waits for the concentrator to reach those modes. If you wish to step into the next mode while Precept II is in either of those modes, you may step the concentrator.

Step Concentrator

Choose this option if you need to step the concentrator into the next mode.

Step Precept II to Desorb Preheat

This option step Precept II into "Waiting for Desorb" and the concentrator into "Desorb Preheat."

continued

Step Precept II to Bake

If you need to bake out Precept II and the concentrator, choose this option from Standby.

Auto

Choose this option if Precept II is in "Hold" and you want to go back to automatic processing.

Hold

This option holds Precept II in its current mode.

Temp Zone Status

To view Precept II and concentrator temperatures, choose this option. This is a read-only screen.

Edit Method

When you need to edit a method's values, choose this option.

Edit Schedule

When you need to edit the method schedule, choose this option.

Priority Sample

This option allows you to send a priority sample to Precept II.

Setup Menu

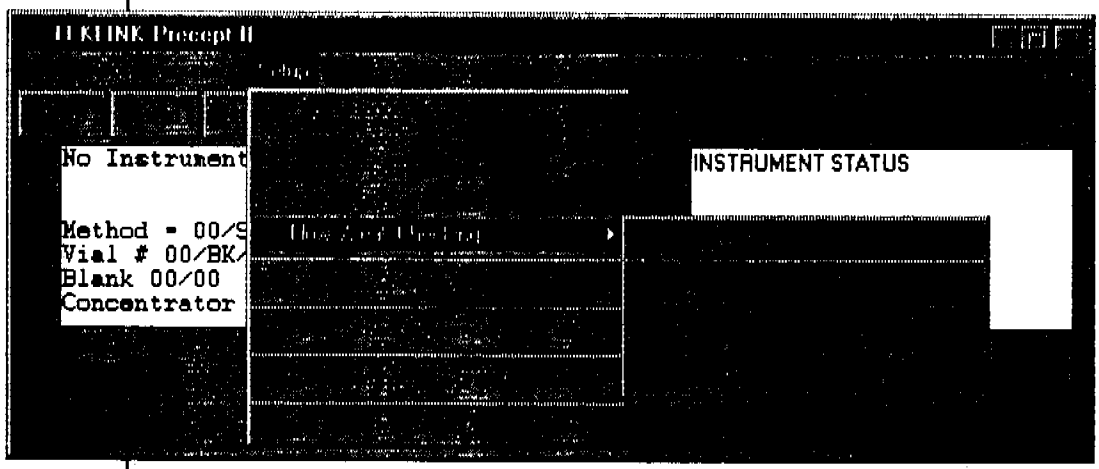

Figure 1-5 Setup Menu Options

Prime Standards

When you change the standard vessels, you must choose **Prime Standards** from the **Setup** menu. If you do not run this option, your standard reproducibility will be affected. When the Precept II finishes running **Prime Standards**, the concentrator will step to **Bake** and the drain will turn on.

Note: Precept II must be in "Standby/Load Vials & Hit Step."

continued

Prime Water Line

If you are using a water reservoir with your Precept II, and not a water line, choose this option after making plumbing and electronic connections. Prime the water line until the water flows freely from the Sample Drain. When you are finished priming the water line, press **Step.**

Note: Precept II must be in "Standby/Load Vials & Hit Step."

Replace Syringe

Choose this option if you need to replace the syringe. Precept II will finish its current actions, then ready the syringe for changing by moving the mechanism down for easy replacement. Follow the instructions in *Chapter 5 of the Precept II User Manual.* Press **Step** to home the syringe.

Note: Precept II must be in "Standby/Load Vials & Hit Step."

Toggle Concentrator Drain

This option toggles the concentrator drain on and off.

Flows/Leak Checking

You may choose any of these options to set flows or leak check your Precept II system.

Diagnostic Screen

This screen allows you to troubleshoot the Precept II.

Abort Schedule/Sample

If you need to cancel sample processing, choose this option. TekLink then displays four options for cancelling processing.

Reset Methods & Schedule

Choose this option to return the method and schedule to the original values.

Configure Instrument

TekLink displays a screen for you to configure your Precept II system.

continued

1.6 Operating Steps and Mode Descriptions

Aqueous Operating Steps

The Precept II moves through a programmed sequence of operating steps. Table 1-1 describes the steps.

Steps	Purpose
Standby	You can choose to run the current schedule or reprogram your Precept II at this time.
Waiting for Purge Ready	Waits for signal from the concentrator indicating it is ready for the next sample.
Sweeping Needle	Removes excess water used in rinsing.
Raising Vial	Positions vial onto the needle.
Filling Syringe	Fills sample syringe with sample. Over fills by 1 ml to assure no air bubbles exist. If dilution is used, the volume is a percentage of the total sample to transfer. Dispenses the 1 ml overfill from sample syringe to the sample drain.
Filling Standard 1	Fills groove in injection valve with standard from Standard 1.
Transferring Standard 1	Transfers the selected sample and standard volume in the valve groove to glassware. A portion of the volume in the sample syringe is dispensed.
Sweeping Transfer Lines	Sweeps helium through the transfer lines to complete transfer to the sparge vessel.

Table 1-1 Aqueous Operating Steps

continued

Steps	Purpose
Filling Standard 2	Fills groove in injection valve with standard from the Standard 2 vessel.
Transferring Standard 2	Transfers the standard volume in the valve groove. The remaining portion of the volume in the sample syringe is dispensed.
Sweeping Transfer Lines	Sweeps helium through the transfer lines to complete transfer to the sparge vessel.
Rinsing Syringe	Fills the sample syringe with blank water to clean it. Blank water empties out the drain.
Returning Vial	Sample cup lowers and vial is returned to its original tray position.
Backflushing Filter	Flushes the filter with water to remove particulate matter.
Flushing Needle	Flushes needle with water to remove particulate matter.
Sweeping Lines	Sweeps helium through the sample path to remove moisture.
Waiting for Desorb	Waits until the concentrator steps to desorb.
Rinsing Glassware	Flushes the glassware with water.
Purging Glassware	Purges the glassware with helium.
Bake	During Bake, the system transfers rinse water to the sparge vessel and sends it out the concentrator drain multiple times if programmed to do so. After Bake, the concentrator steps to Standby.

Table 1-1 Aqueous Operating Steps

Solid Operating Steps

Steps	Purpose
Standby	You can choose to run the current schedule or reprogram your Precept II at this time.
Sweeping Needle	Sends helium flow through the needle to remove oxygen and to blanket the needle with inert helium. The inert helium prevents oxidation during the Purge step.
Waiting for Purge Ready	Waits for signal from the concentrator indicating it is ready for the next sample.
Raising Vial	Positions vial onto the needle.
Filling Syringe	Fills sample syringe with blank water. Over fills by 1 ml to assure no air bubbles exist. Dispenses the 1 ml overfill from sample syringe to the sample drain.
Filling Standard 1	Fills groove in injection valve with standard from Standard 1.
Transferring Standard 1	Transfers the selected volume in the valve groove to a vial. Spiked water is flushed into the vial.
Sweeping Transfer Line	Sweeps helium through the transfer lines to complete transfer of sample.

Table 1-2 Solid Operating Steps

continued

Steps	Purpose
Filling Standard 2	Fills groove in injection valve with standard from the Standard 2 vessel.
Transferring Standard 2	Transfers the volume in the valve groove. The remaining portion of the volume in the sample syringe is dispensed.
Sweeping Transfer Lines	Sweeps helium through the transfer line to remove moisture.
Preheating	Heats vial to a setpoint.
Purging Vial	Purges the solid sample with helium for the specified purge time.
Returning Vial	Returns vial back to its original position on tray.
Waiting for Desorb	Waits until concentrator steps to Desorb.
Rinsing Glassware	Rinses the soil needle with blank water through the soil cup.
Purging Glassware	Purges the soil needle with helium. Continues to purge while the concentrator moves through Bake mode. Finishes purging when the concentrator returns to Standby.

Table 1-2 Solid Operating Steps

1.7 Using Default Method Parameters

After installing, connecting, and configuring Precept II, you can create customized methods (operating sequences) for sample processing that meet your analytical requirements; or you can use default (preprogrammed) methods. This section explains how to use predefined methods with default parameters, define time parameters for custom methods, and restore default parameters. Tables 1-3 and 1-4 on pages 1-15 and 1-16 list the parameters and default values. Use the worksheets on pages 1-17 and 1-18 to make your own method tables.

To access the Method Editor click on the **Instrument** menus and choose **Edit Method** *-or-* hold down the **Ctrl** key and press the **E** key.

TekLink-Precept II includes three sets of method parameters.

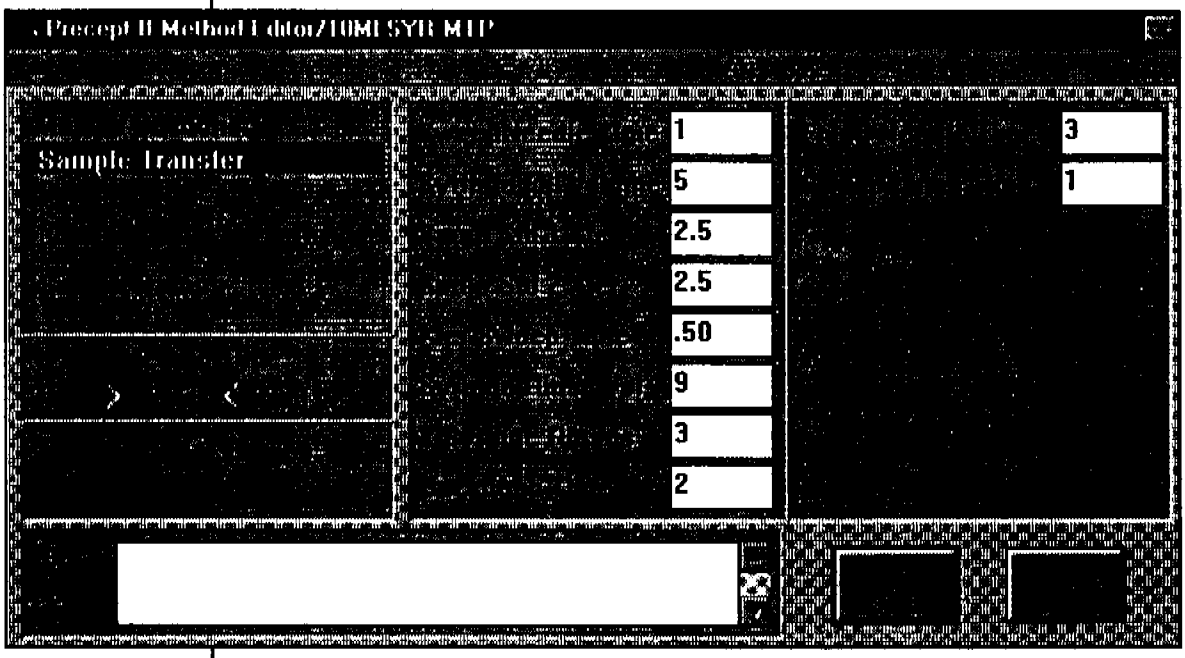

Figure 1-6 Sample Transfer Method Editor Screen

continued

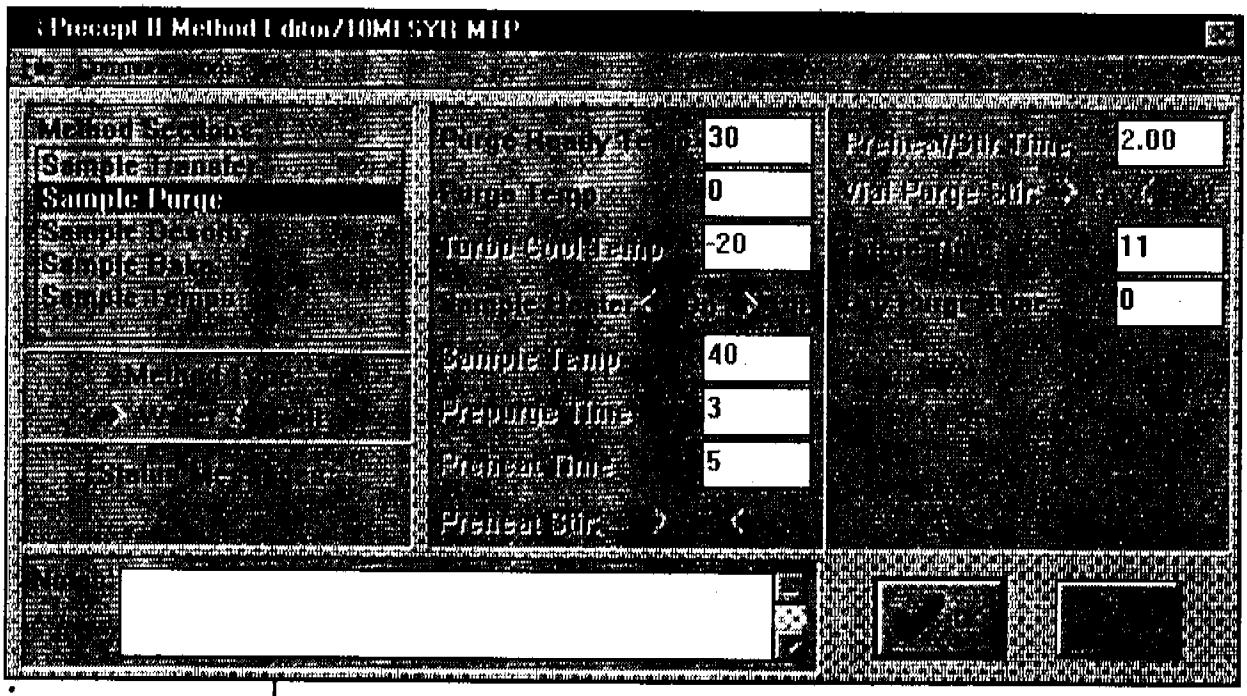

Figure 1-7 Sample Purge Method Editor Screen

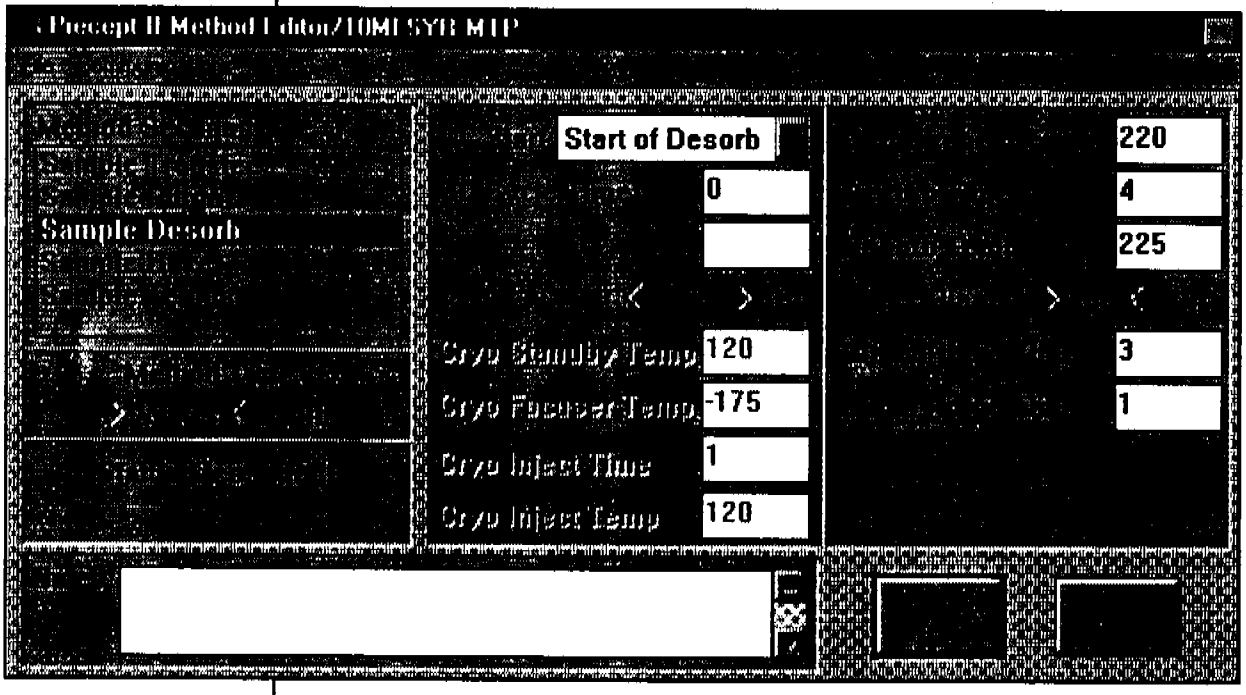

Figure 1-8 Sample Desorb Method Editor Screen

continued

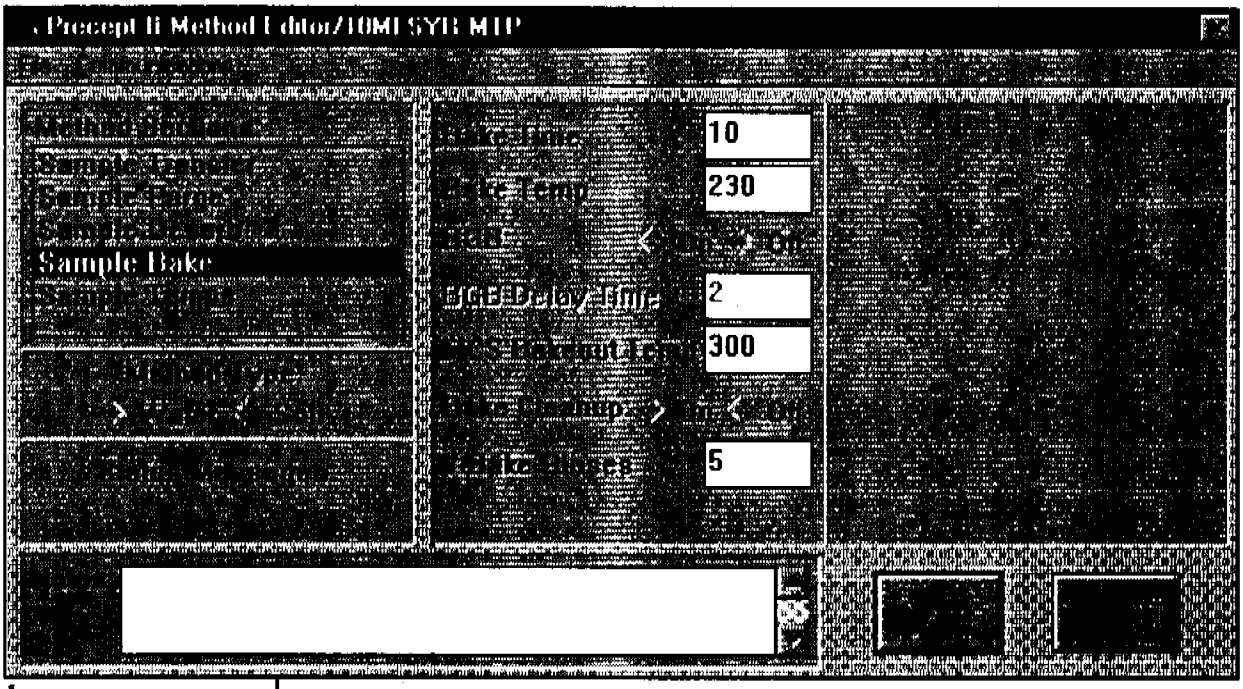

Figure 1-9 Sample Bake Method Editor Screen

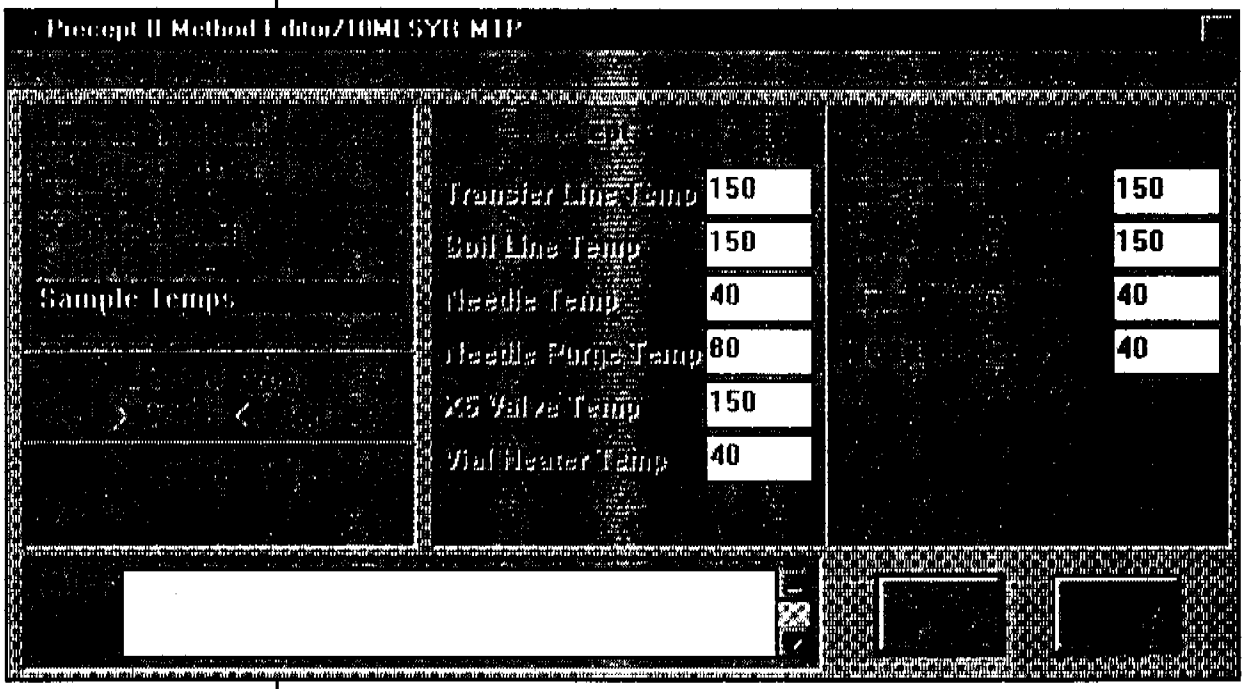

Figure 1-10 Sample Temps Method Editor Screen

continued

Aqueous Parameters for the 3000 Method Editor (25 ml Defaults)

Aqueous Parameter	Defaults
Sweep Needle Time	1 min
Syringe Fill Volume	5 ml
Samp Std 1 Xfer	2.5 ml
Samp Std 2 Xfer	2.5 ml
Transfer Sweep Time	0.5 min
Syringe Rinse Vol	10 ml
# of Syringe Rinses	2
Backflush Time	1 min
Flush Needle Time	2 min
Sweep Lines Time	.50 min
Preheat Time/Stir On	NA
Purge Ready Temp (°C)	30
Purge Temp (°C)	0
TurboCool Temp (°C)	-20
Sample Heater	off
Sample Temp (°C)	NA
Prepurge Time	NA
Preheat Time	NA
Preheat Stir	NA
Preheat Stir Time	NA
Vial Purge Stir	NA
Purge Time	11 min
Dry Purge Time	0 min

Aqueous Parameter	Defaults
GC Start	Start Desorb
GC Cycle Time	User Defined
Cryofocuser	Off
Cryo Standby Temp (°C)	NA
Cryo Temp (°C)	NA
Cryo Inject Time	NA
Cryo Inject Temp (°C)	NA
Dsrb Preheat† Temp	220
Desorb Time†	4 min
Desorb Temp (°C)†	225
Glassware Rinse	On
Glassware Rinse Time	3 min
Glassware Purge Time	1 min
Bake Time	10 min
Bake Temp (°C)	230
BGB	Off
BGB Delay Time	NA
MCS Bake Temp (°C)	310
Bake Cleanup	off
# of Bake Rinses	NA
3000 Line Temp (°C)	NA
3000 Valve Temp (°C)	NA
3000 Mount Temp (°C)	NA
3000 MCS Line Temp (°C)	NA

Table 1-3
Aqueous 3000 Parameters

† When using a trap without Tenax, Desorb Preheat and Desorb Temp can be increased to 250; Bake Temp can be increased to 255.

* These parameters should add up to the syringe fill volume.

Solid Parameters for the 3000 Method Editor

Solid Parameter	Defaults
Sweep Needle Time	2 min
Syringe Fill Volume	10 ml
Water/Std Trans Vol*	5 ml
Water/Std 2 Trans Vol*	5 ml
Transfer Sweep Time	0.5 min
Syringe Rinse Vol	10 ml
# of Syringe Rinses	2
Backflush Time	1 min
Flush Needle Time	2 min
Sweep Lines Time	.50 min
Purge Ready Temp (°C)	30
Purge Temp (°C)	0
TurboCool Temp (°C)	-20
Sample Heater	NA
Sample Temp (°C)	NA
Prepurge Time	NA
Preheat Time	NA
Preheat Stir	off
Preheat/Stir Time	0 min
Vial Purge Stir	off
Purge Time	11 min
Dry Purge Time	0 min
GC Start	Start Desorb
GC Cycle Time	User Defined
Cryofocuser	off
Cryo Standby Temp	NA
Cryofocuser Temp (°C)	NA
Cryo Inject Time	NA

* These parameters should add up to the syringe fill volume.

Solid Parameter	Defaults
Cryo Inject Temp (°C)	NA
Dsrb Preheat Temp (°C)	220
Desorb Time†	4 min
Desorb Temp (°C)†	225
Glass Rinse	On
Glass Rinse Time	3 min
Glass Purge Time	1 min
Bake Time	10 min
Bake Temp (°C)	230
BGB	off
BGB Delay Time	NA
MCS Bakeout Temp (°C)	300
Bake Cleanup	NA
# of Bake Rinses	NA
Precept II Xfer Line Temp (°C)	150
Precept II Soil Line Temp (°C)	150
Precept II Needle Temp (°C)	40
Precept II Needle Purge Temp (°C)	80
Precept II X5 Valve Temp (°C)	125
Precept II Vial Heater (°C)	40
3000 Line Temp (°C)	150
3000 Valve Temp (°C)	150
3000 Mount Temp (°C)	40
3000 MCS Line Temp (°C)	40

Table 1-4 Solid 3000 Parameters

† When using a trap without Tenax, Desorb Preheat and Desorb Temp can be increased to 250; Bake Temp can be increased to 255.

Aqueous Parameter	Defaults
Sweep Needle Time	
Syringe Fill Volume	
Samp Std 1 Xfer	
Samp Std 2 Xfer	
Transfer Sweep Time	
Syringe Rinse Vol	
# of Syringe Rinses	
Backflush Time	
Flush Needle Time	
Sweep Lines Time	
Preheat Time/Stir On	
Purge Ready Temp (°C)	
Purge Temp (°C)	
TurboCool Temp (°C)	
Sample Heater	
Sample Temp (°C)	
Prepurge Time	
Preheat Time	
Preheat Stir	
Preheat Stir Time	
Vial Purge Stir	
Purge Time	
Dry Purge Time	

Aqueous Parameter	Defaults
GC Start	
GC Cycle Time	
Cryofocuser	
Cryo Standby Temp (°C)	
Cryo Temp (°C)	
Cryo Inject Time	
Cryo Inject Temp (°C)	
Desorb Preheat[1] Temp	
Desorb Time	
Desorb Temp (°C)	
Glassware Rinse	
Glassware Rinse Time	
Glassware Purge Time	
Bake Time	
Bake Temp (°C)	
BGB	
BGB Delay Time	
MCS Bake Temp (°C)	
Bake Cleanup	
# of Bake Rinses	
3000 Line Temp (°C)	
3000 Valve Temp (°C)	
3000 Mount Temp (°C)	
3000 MCS Line Temp (°C)	

Aqueous Method Worksheet

Solid Parameter	Defaults
Sweep Needle Time	
Syringe Fill Volume	
Water/Std Trans Vol	
Water/Std 2 Trans Vol	
Transfer Sweep Time	
Syringe Rinse Vol	
# of Syringe Rinses	
Backflush Time	
Flush Needle Time	
Sweep Lines Time	
Purge Ready Temp (°C)	
Purge Temp (°C)	
TurboCool Temp (°C)	
Sample Heater	
Sample Temp (°C)	
Prepurge Time	
Preheat Time	
Preheat Stir	
Preheat/Stir Time	
Vial Purge Stir	
Purge Time	
Dry Purge Time	
GC Start	
GC Cycle Time	
Cryofocuser	
Cryo Standby Temp	
Cryofocuser Temp (°C)	
Cryo Inject Time	

Solid Parameter	Defaults
Cryo Inject Temp (°C)	
Dsrb Preheat Temp (°C)	
Desorb Time	
Desorb Temp (°C)	
Glass Rinse	
Glass Rinse Time	
Glass Purge Time	
Bake Time	
Bake Temp (°C)	
BGB	
BGB Delay Time	
MCS Bakeout Temp (°C)	
Bake Cleanup	
# of Bake Rinses	
Precept II Xfer Line Temp (°C)	
Precept II Soil Line Temp (°C)	
Precept II Needle Temp (°C)	
Precept II Needle Purge Temp (°C)	
Precept II X5 Valve Temp (°C)	
Precept II Vial Heater (°C)	
3000 Line Temp (°C)	
3000 Valve Temp (°C)	
3000 Mount Temp (°C)	
3000 MCS Line Temp (°C)	

Solid Method Worksheet

Method Editor Sample Transfer Parameter Descriptions

Sweep Needle Time *(Precept II)*

Length of time gas sweeps the needle before sampling

Syringe Fill Volume *(Precept II)*

The amount of sample and dilution (if applicable) the syringe extracts from the vial (1-25 ml in 1 ml increments with a 25 ml syringe; 1-10 ml in 1 ml increments with a 10ml syringe)

Sample/Std 1 Xfer *(Precept II)*

The amount of sample that transfers to the sparger or vial from the syringe

Sample/Std 2 Xfer *(Precept II)*

The amount of sample that transfers to the sparger or vial from the syringe (second transfer)

Xfer Sweep Time *(Precept II)*

The length of time gas sweeps the transfer line after each sample and standard transfer

Syringe Rinse Volume *(Precept II)*

Volume of blank water necessary to rinse syringe after after transferring both sample and standard(s)

 # Syringe Rinses *(Precept II)*

How many times blank water rinses the syringe after transferring both sample and standard(s)

Backflush Time *(Precept II)*

The amount of time water backflushes the filter after after transferring both sample and standard(s)

Flush Needle Time *(Precept II)*

The amount of time blank water flushes the needle after after transferring both sample and standard(s)

Sweep Lines Time *(Precept II)*

The amount of time gas sweeps the lines after after transferring both sample and standard(s)

Method Editor Sample Purge Parameter Descriptions

Purge Ready Temp *(3000)*

The temperature at which the 3000 steps from Purge Ready mode to Purge mode

Purge Temp *(3000)*

The trap temperature during Purge

Turbo Cool Temp *(3000)*

The temperature of the trap during Purge mode if the Turbo Cool accessory is used

Sample Heater *(3000)*

Used for water only samples to preheat before purging

Sample Temp *(3000)*

Setpoint for the sample heater

continued

Prepurge Time *(3000)*

The amount of time purge gas flows through the glassware

Preheat Time *(3000)*

The amount of time the sample is heated to reach the sample temperature

Preheat Time *(Precept II)*

The amount of time the sample is heated before purge

Purge Time *(3000 - water only, Precept II - water and soil)*

The amount of time the sample is purged in the vial for soil or sparge vessel for water samples

Note: The purge valve on the concentrator is turned off during Preheat on Precept II and stays off until the last minute of purge on the concentrator. The 3000 purge time is calculated by taking the vial purge time and adding the Preheat time, then adding one minute. During the extra minute, the purge valve on the concentrator turns back on and Precept II returns the vial

Dry Purge Time *(3000)*

The amount of time dry gas sweeps through the concentrator trap

Method Editor Sample Desorb Parameter Descriptions

GC Start *(3000)*

Specifies when Precept II sends a Start signal to the GC; the four available options are:

- **Start/End Desorb,** both at the beginning of the Desorb step and the end of the Desorb step
- **Start of Desorb,** at the beginning of the Desorb step. Select Start of Desorb if you are not using a Cryofocusing Module
- **End of Desorb,** at the end of the Desorb step. Select End of Desorb if you are using a Cryofocusing Module
- **Disabled,** does not send any Start signal

GC Cycle Time *(3000)*

The amount of time required for the GC to process a sample

Cryofocuser *(3000)*

If on, cools the desorbed analytes and focuses them on the head of the column before they are introduced into the GC

Cryo Standby Temp *(3000)*

When the concentrator is in Standby, the Cryofocuser remains at this temperature

Cryofocuser Temp *(3000)*

Low temperature setpoint for trapping analytes

Cryo Inject Time *(3000)*

The Cryofocuser Inject Temperature during Cryofocuser Inject

continued

Cryofocuser Inject Temp *(3000)*

Cryofocuser is heated to this setpoint; heating releases the analytes immobilized on the column

Desorb Preheat Temp *(3000)*

Heats the concentrator trap to the Desorb Preheat Temp in preparation for analyte transfer from the trap to the GC

Desorb Time *(3000)*

The amount of time the concentrator heats to the Desorb Temp

Desorb Temp *(Precept II)*

Setpoint for the concentrator trap to heat to

Glass Rinse* *(Precept II)*

Choose to rinse the glassware on the concentrator after sample and standard transfer (or not)

Glass Rinse Time *(Precept II)*

The amount of time blank water rinses the glassware on the concentrator

Glass Purge Time* *(Precept II)*

The amount of time gas purges the glassware on the concentrator

* These two parameters should add up to the Desorb Time.

Method Editor Sample Bake Parameter Descriptions

Bake Time *(3000)*

Duration of the Trap Bake step

Bake Temp *(3000)*

Trap temperature during bake step

BGB *(3000)*

Bake Gas Bypass: on or off

BGB Delay Time *(3000)*

The amount of time for BGB delay

MCS Bakeout Temp *(3000)*

MCS temperature during the Bake step

Bake Cleanup *(Precept II)*

Only applies to water methods. If "No" is chosen, Precept II will purge gas to the sparge vessel only. If "Yes" is chosen, program the number of bake rinses. Precept II will rinse the sample drain line for 1 minute then do the number of syringe rinses specified. If the system is **not** a W/S1, it will purge gas to the sparge vessel for the remainder of Bake. If the system is a W/S1, it will then raise the soil cup and rinse water to the soil cup for 1 minute, then sweep the lines into the soil cup. It will then purge gas to the sparge vessel for the remainder of Bake.

Bake Rinses *(Precept II)*

Program number of times you want to rinse the sparge vessel during Bake.

continued

Method Editor Sample Temps Parameter Descriptions (In °C)

Transfer Line Temp *(Precept II)*

Setpoint temperature for transfer line

Soil Line Temp *(Precept II)*

Setpoint temperature for the soil line

Needle Temp *(Precept II)*

Setpoint temperature for the needle

Needle Purge Temp *(Precept II)*

During Purge, the temperature of the needle heats up to this setpoint

X5 Valve Temp *(Precept II)*

The setpoint temperature of the X5 valve

Vial Heater Temp *(Precept II)*

Setpoint temperature for heating the vial

Line Temp *(3000)*

Setpoint temperature for the transfer line

Valve Temp *(3000)*

Setpoint temperature for the valve oven and the bottom of trap

Mount Temp *(3000)*

Setpoint for the sample mount heater

MCS Line Temp *(3000)*

Setpoint for the Moisture Control System line

1.8 Creating Custom Methods

You can create a customized method by accessing the method editing screens and modifying parameters to meet your analytical requirements.

1. To access the Method Editor, click on the **Instrument** menu and choose **Edit Method** *-or-* hold down the **Ctrl** key and press the **E** key.
2. Click on the **File** menu and choose **Load Method from Disk.**

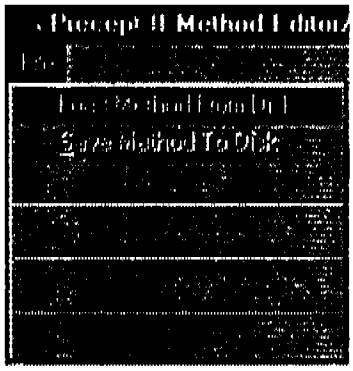

Figure 1-11 Choose Load Method from Disk

3. A dialog box appears, Choose the correct directory and method names will appear in the left of the dialog box. Click on the method you wish to load and modify.
4. The Method editing screen opens with the parameter values filled in. To change any of the parameters:
   a. Position the mouse in the white box next to the parameter and click.
   b. Erase the old value and enter a new value.
   c. Press **Tab** and repeat step 4b until you are finished.
5. Save the method. See the section *Saving Methods* on page 1-25 for more information.

continued

Printing a Method

1. After opening the Method Editor, click on the **File** menu and choose **Print Method from Disk.**
2. A dialog box appears. Choose the correct directory and method names will appear in the left of the dialog box. Click on the method you wish to print.

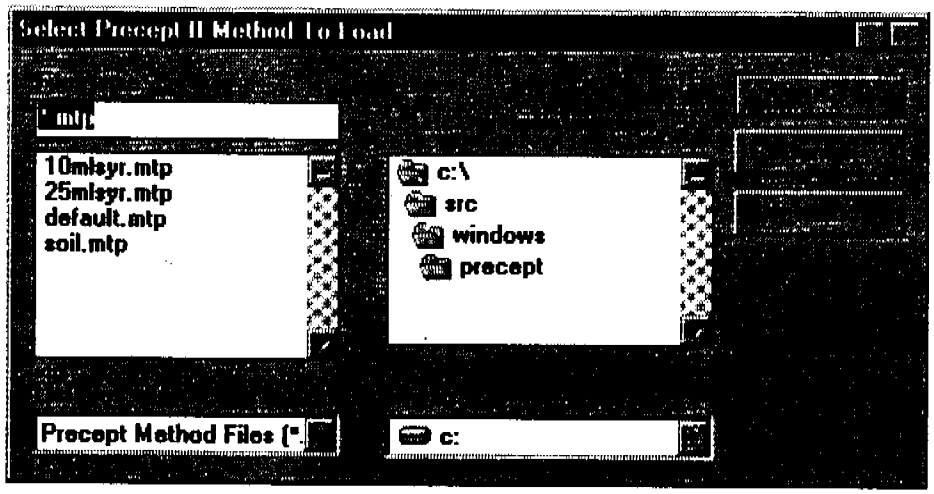

Figure 1-12 Print a Method

3. Click **OK** to print.

Saving a Method

New Method and Changing the Name of an Existing Method

1. After opening the **Method Editor,** click on the **File** menu and choose **Save Method As.**
2. A dialog box appears. Type the name you wish to give the method you are saving.
3. Choose the correct directory where you wish to save the method and click **OK.**

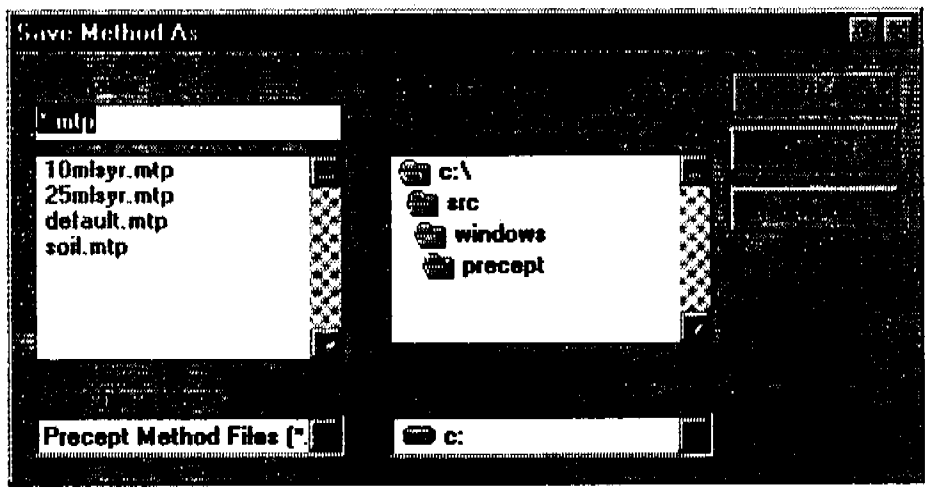

Figure 1-13 Save a Method

Saving an Existing Method

After opening the **Method Editor**, click on the **File** menu and choose **Save Method to Disk.** The method file is updated to reflect any changes.

1.9 Scheduling Methods and Runs

You must set up a *Method Schedule,* or processing timetable, for running sample, blanks, and standards. Before you create and activate a method schedule, consider the following:

- The number and positions of samples, blanks, and standards to be run.
- The method required for each run.
- The preferred sequence for runs.
- The volume of sample, blank, and standard(s) needed per entry.

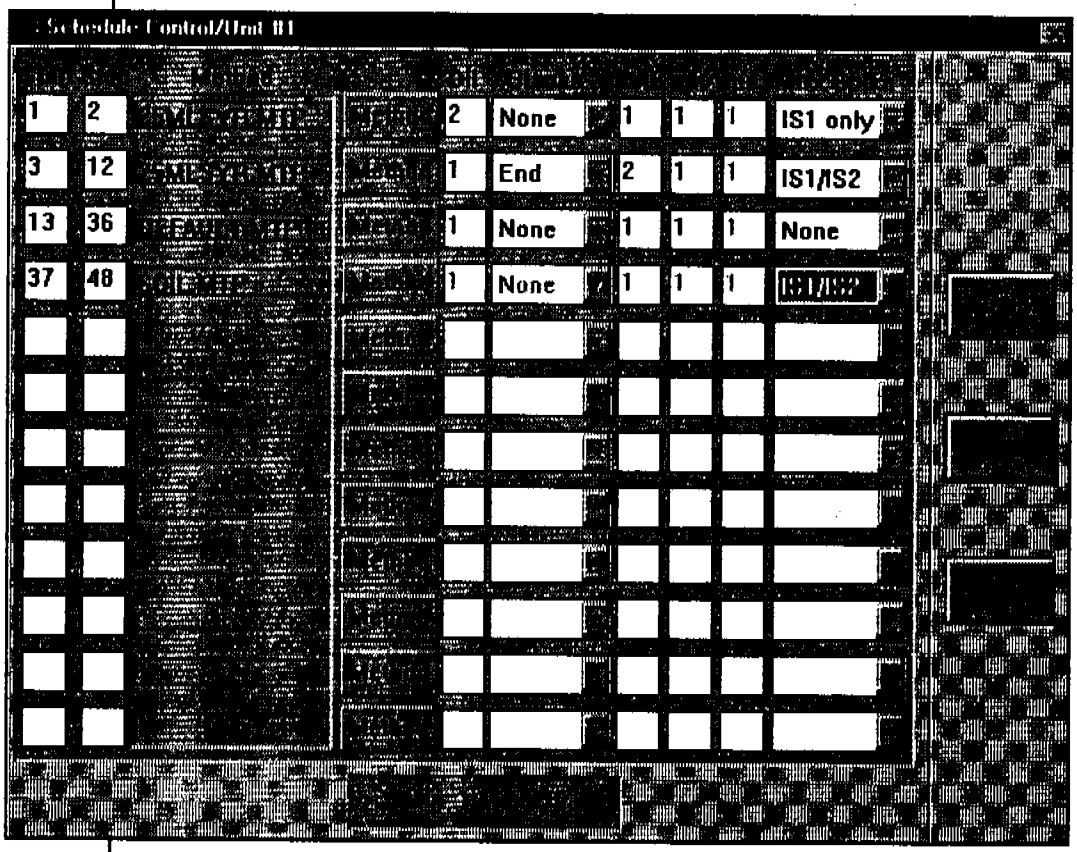

Figure 1-14 Method Scheduler Screen

Scheduler Field Descriptions

Start

The first vial position to be analyzed (within a range) defined by user

Stop

The last vial position to be analyzed (within a range) defined by user

Method

Method name you selected by clicking on the **Method** button; the method parameters you selected will be displayed in this field. This field displays the method you wish to use to run the samples

continued

Method Button

Select the file name of a method to be run. The recommended default methods are: 10mlsyr.mtp and 25mlsyr.mtp run aqueous samples; soil.mtp runs solid samples; you may customize methods to fit your needs

Note: If you wish to erase a line in the schedule, press the **Method** button, then press **Cancel** at the **Choose Method** dialog box.

Dil

Only for aqueous samples: "#" defines the total parts of sample and dilution; a dilution of 10X injects one part sample for nine parts dilution
See page 1-28 for further discussion of Dilutions.

Blanks

Three options:

- **None:** no blanks run
- **Every:** blank(s) run after every sample for that schedule line
- **End:** blank(s) run after the entire set of samples for that schedule line

#Blk

Number of blanks run at the time specified by the parameter listed above

SPV

Samples Per Vial: the number of samples that run from each vial in that schedule line

RPS

Runs Per Sample: this option is unavailable at this time

Matrix Spike

Refers to Standard 1 and Standard 2; three options:

- None: no standard transfers with the sample
- IS1 only: only Standard 1 transfers with the sample
- IS1 and IS2: both standards transfer with the sample

Dilutions

Dilutions work with aqueous samples only.

Formulas

1. $D(ml) = S(ml) + B(ml)$
2. $S(\mu l) = \frac{D(\mu l)}{Df}$

Key

D = volume of diluted sample

S = volume of sample used

B = volume of blank water added

Df = dilution factor

Example

25mls of total diluted sample

20x dilution factor

how much volume of sample?

Use formula 2 (above) to figure the total volume of sample used.

$S(\mu) = \frac{D(\mu l)}{Df} = \frac{25{,}000\mu l}{20}$ $\quad S = 1250\mu l$

Guide Chart

(D)il Sample	=	(S)ample	+	(B)lank	Resulting (D)ilution (f)actor
10ml	=	1ml	+	9ml	10x(1 part sample/9 parts dilution)
25ml	=	1.25ml	+	23.75ml	20x(1 part sample/19 parts dilution)
25ml	=	1ml	+	24ml	25x(1 part sample/24 parts dilution)

Entering Lines in the Schedule

Note: When loading new standards, you must choose "Prime Standards" from the Setup menu or run a few blanks. If you do not run either of these options, the likelihood of standard reproducibility is very low. When you are finished, press Step.

1. Position the cursor on the **Start** position in the first row. Type the position number of the first sample to be run.
2. Press **Tab** to move the cursor to the **Stop** position. Type the position number of the last sample to be run.
3. Click on the **Method** button to choose a method.

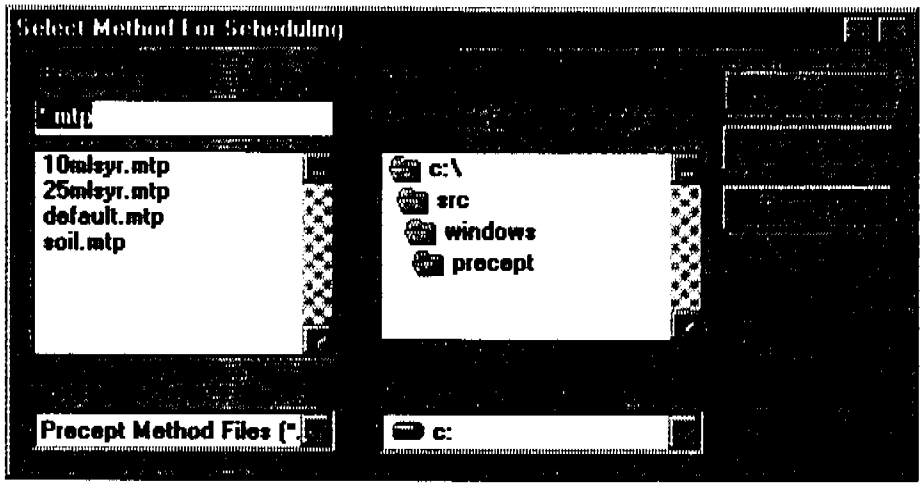

Figure 1-15 Select a Method for Scheduling

4. Highlight the name of the desired method file and click **OK.**
5. Press **Tab** to move the cursor to the **Dil** position. Choose a dilution (for aqueous samples only). You can dilute a sample up to 25X. Please see the topic **Dilutions** on page 1-28 for more information.
6. Press **Tab** to move the cursor to the **Blanks** position. Blanks can only be scheduled with aqueous samples. Three options:
   - **None:** no blanks run
   - **Every:** blank(s) run after every sample for that schedule line
   - **End:** blank(s) run after the entire set of samples for that schedule line
7. Press **Tab** to move the cursor to the **#Blk** position. You may choose up to 9 blanks to be run based on preceding parameters.
8. Press **Tab** to move the cursor to the **SPV** position. This option is for aqueous samples only. Choose how many times you wish to run multiple samples from one vial.

9. Press **Tab** to move the cursor to the **Matrix Spike** position. This option allows you to choose which standard(s) to send with the group of sample(s).
10. If you wish to schedule more samples, proceed to the next line and refer back to Step 1.
11. When you are finished, click **Send.**

Note: If you wish to erase a line in the schedule, press the Method button, then press Cancel at the Choose Method dialog box.

Guidelines

- Blanks can only be scheduled with aqueous samples
- Only schedule blanks if you wish to automate this process. You may manually fill a vial with blank water (aqueous) or run an empty vial (solid) for manual processing
- SPV refers to Samples Per Vial: available for aqueous samples; allows you to run multiple samples from one vial
- Dilutions, for aqueous samples only, are calculated by #_. For example, a dilution of 10X injects one part sample for nine parts dilution. Please see the topic **Dilutions** on page 1-28 for more information

Running a Schedule

When you are satisfied and are ready to run the schedule, click the **Send** button. TekLink downloads the schedule to Precept II to begin processing.

To stop a schedule in the middle of a run, see *Aborting the Schedule* on page 1-32.

Priority Sample

To run a priority sample:

1. Click on the **Instrument** pull-down menu on the TekLink control screen.
2. Choose **Priority Sample.** The Priority Sample screen appears.

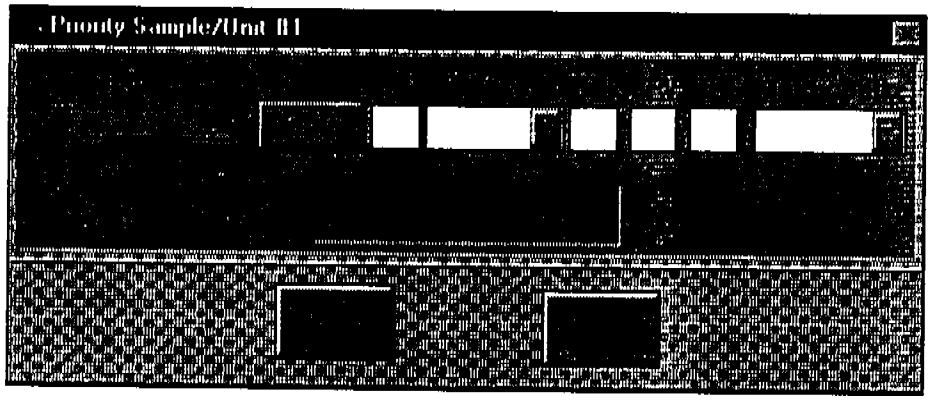

Figure 16a Priority Sample Screen

3. Click the **Method** button and choose a method. The default values for the chosen method fill in the rest of the options. You may change any of the values. See *Entering Lines in the Schedule* section on page 1-29 for descriptions of all parameters listed in the Priority Sample Screen.
4. Press the **Send** button. Precept II finishes processing the current sample; then prompts you to process the priority sample.

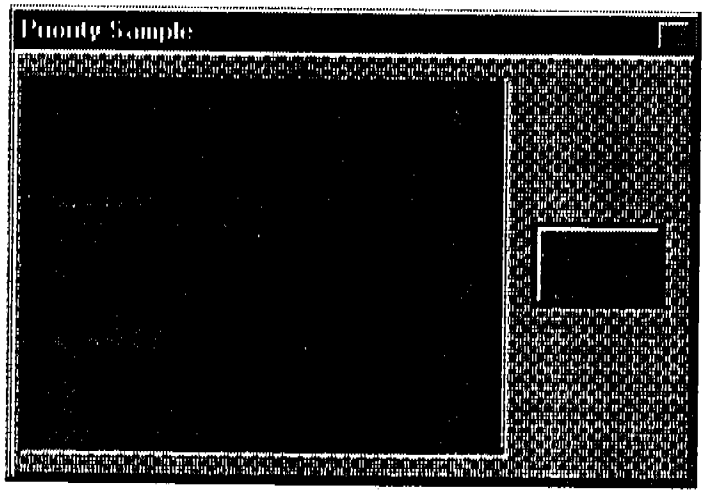

Figure 16b Priority Sample Prompt Screen

Note: TekLink runs the priority sample after the current vial comes off of the needle.

Aborting the Schedule

To cease a currently running schedule:

1. Click on the **Setup** pull-down menu, choose **Abort Schedule/Sample.**
2. A dialog box appears with four Abort options. Choose one.

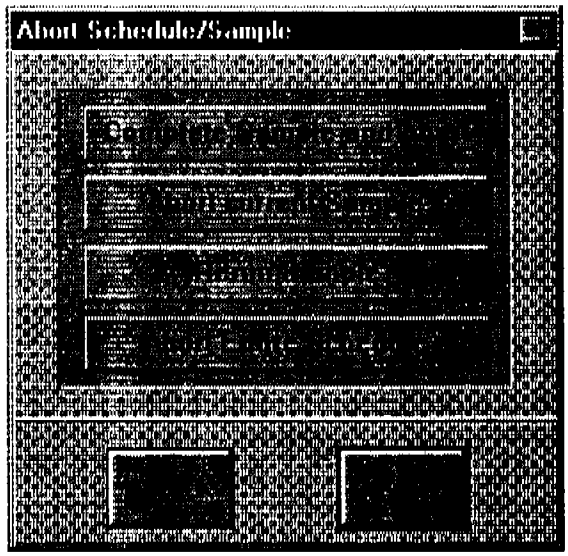

Figure 1-17 TekLink Abort Screen

The four options are as follows:

- **Complete Current Sample then Abort Schedule**

  Precept II completes processing the current sample and aborts the rest of the schedule. TekLink finishes the current run, goes back to the beginning of the schedule, and displays the Standby Status screen.

- **Abort Current Sample**

  Precept II skips the rest of the current sample analysis, then moves to process the next scheduled sample. TekLink returns to the Standby Status screen to continue running scheduled samples.

- **Rerun Sample**

  Precept II reruns the current sample. The current analysis is interrupted and goes back to the beginning of the analysis. TekLink returns to the Standby Status screen and reprocesses the current sample.

- **Abort Entire Schedule**

  TekLink aborts the entire schedule/sample, returns all vials to the trays, and returns to Standby mode.

NOTE: Use caution while operating within this screen. When you click on one of the four options, the abort automatically occurs. If you do not wish to abort a schedule/sample, click OK to exit

1.10 Flow Setting/Leak Checking

1. Click on the **Setup** pull-down menu.
2. Choose **Flows/Leak Checking.** Five options appear in a sub-menu.

Set Transfer Flow

This option is only available during "Standby-Load Vials and Hit Step." The system moves into "Sweeping Transfer Lines" when this option is selected.

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the *Precept II User Manual.*
2. Attach a flow meter to the vent on the concentrator. The flow will exit through the vent.
3. Turn on the concentrator, Precept II, and the gas supply. Follow the directions in the dialog box (like the one above) to set pressure.

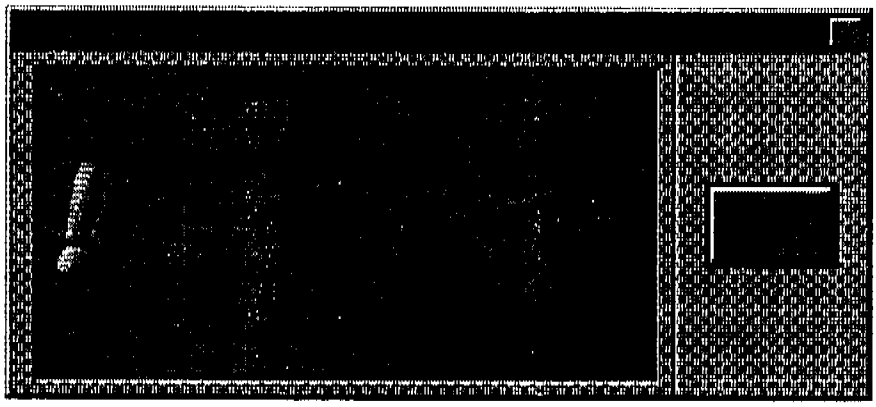

Figure 1-18 Set Transfer Flow Screen

4. Click **OK** when you have successfully set the flow.

Leak Check IS and IS 2 Pathway

This option is only available during "Standby-Load Vials and Hit Step."

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the *Precept II User Manual.*
2. Make sure Precept II is turned **OFF.** Take off the back cover of Precept II:
   a. Remove the six screws on the sides.
   b. Gently pull the cover up and towards you. Be very careful not to pull too hard.
3. Turn on the concentrator, Precept II, and the gas supply.
   a. Select **Leakcheck IS Pathway** option and the following screen will appear:

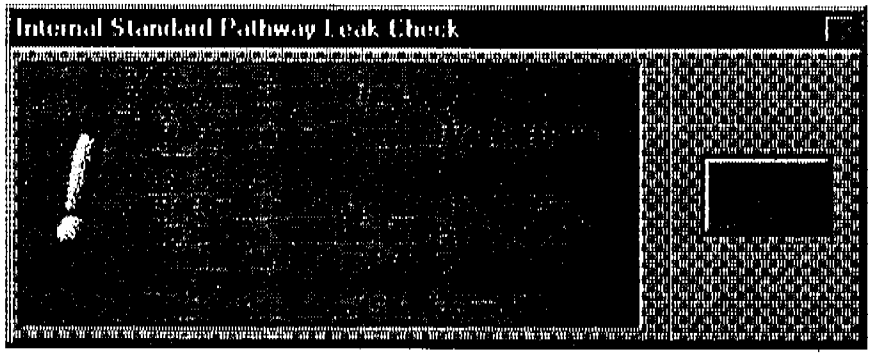

Figure 1-19 Internal Standard Pathway Leak Check

4. Follow the instructions in the above dialog box.
   a. The drain bulkhead is on the back of the Precept II, in the bottom right corner. See the figure below.
   b. Cap the drain with a 1/16" cap **(14-1968-016).** You can locate the cap in the kit box. Please refer to Chapter 3 of your *Precept II User Manual* for tightening instructions.

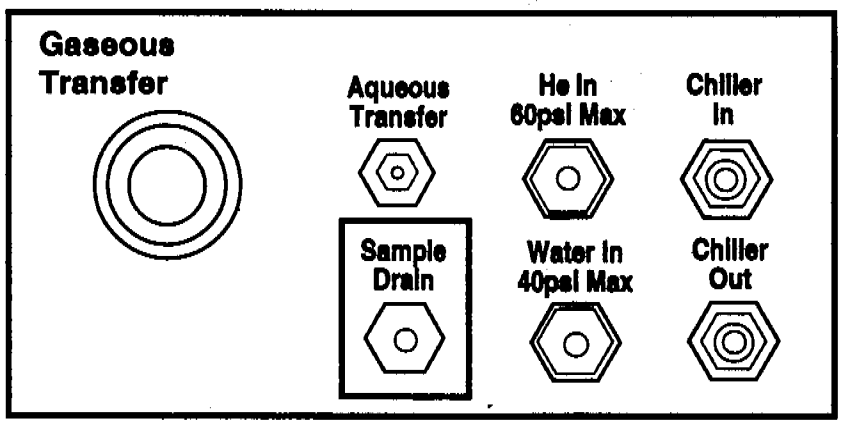

Figure 1-20 Location of the Sample Drain Bulkhead

5. After you finish the instructions above and click **OK,** the system moves to "Filling Standard 1" mode.

continued

6. Follow the instructions in the dialog box below.

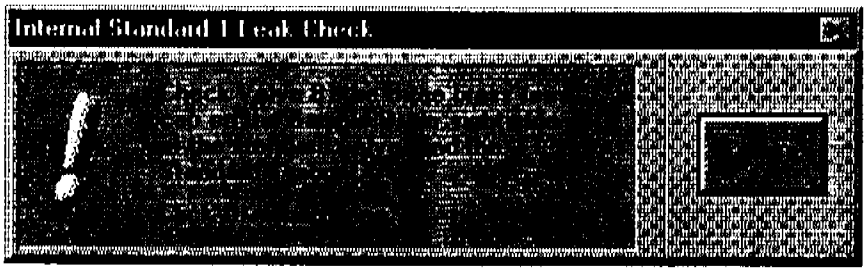

Figure 1-21a Internal Standard 1 Leak Check

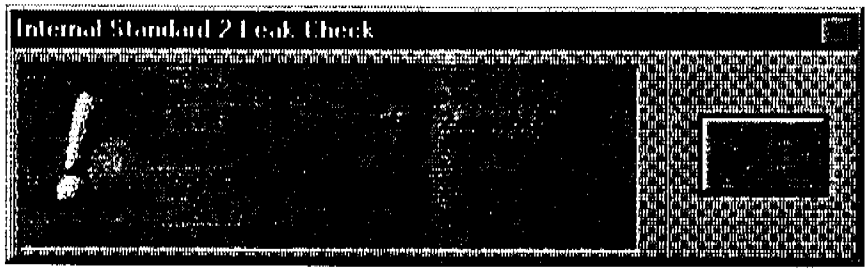

Figure 1-21b Internal Standard 2 Leak Check

- From the back of the Precept II, locate Valves A & B in the upper section of the unit. See the figure below.

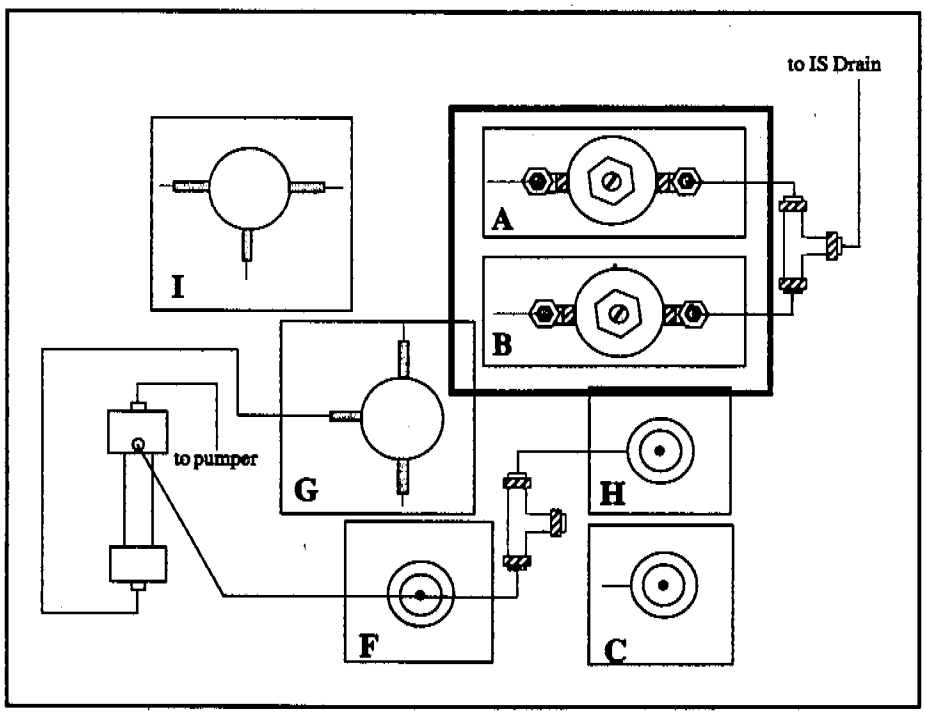

Figure 1-22 Location of Valves A & B

continued

- **Standards:** From the back of Precept II, locate the three brass tees by looking at the figure below.

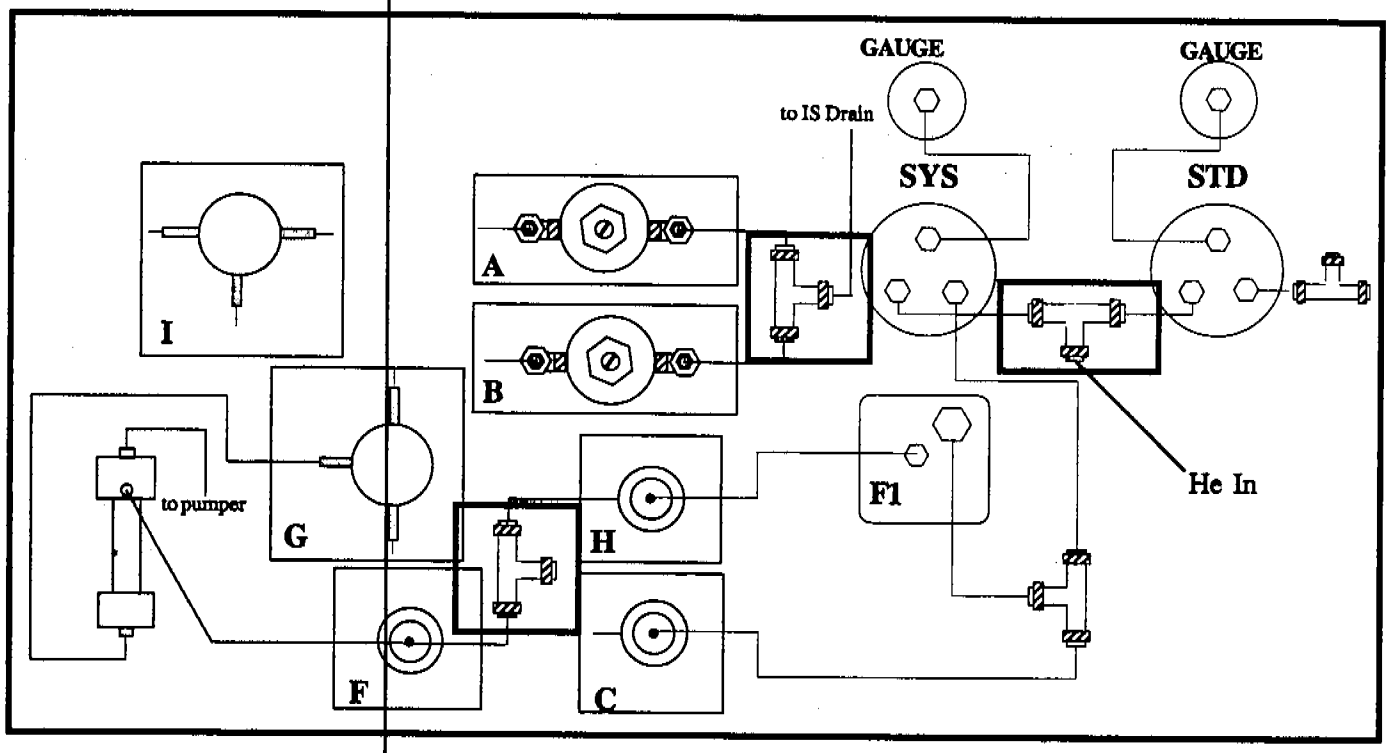

Figure 1-23 Location of Three Brass Tees

- From the front of the Precept II, locate the standard valve and the Standard 1 mount. See the figure below.

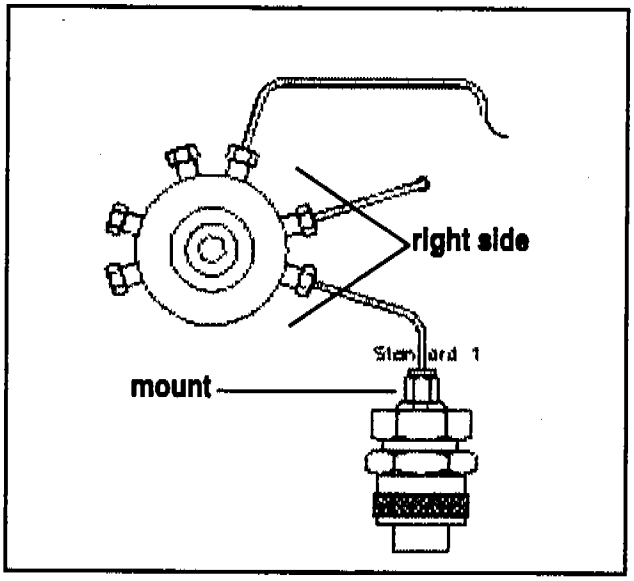

Figure 1-24 Location of the Standard Valve and the Standard 1 Mount

continued

- From the front of Precept II, locate the standard valve and the Standard 2 mount. See the figure below.

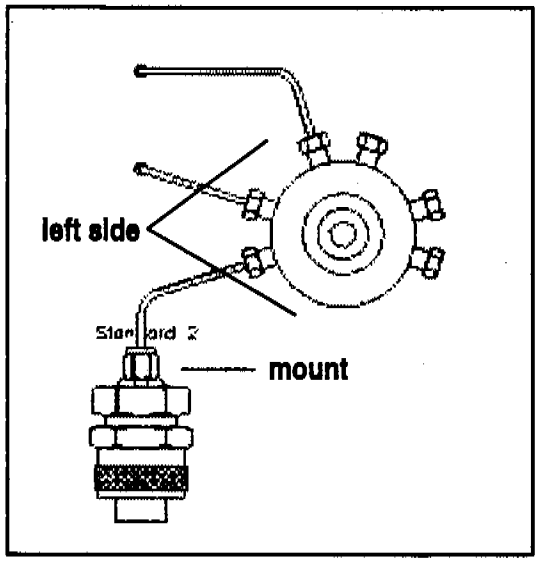

Figure 1-25 Location of the Standard Valve and the Standard 2 Mount

8. After you finish the instructions above and press **OK,** the next set of instructions appear.

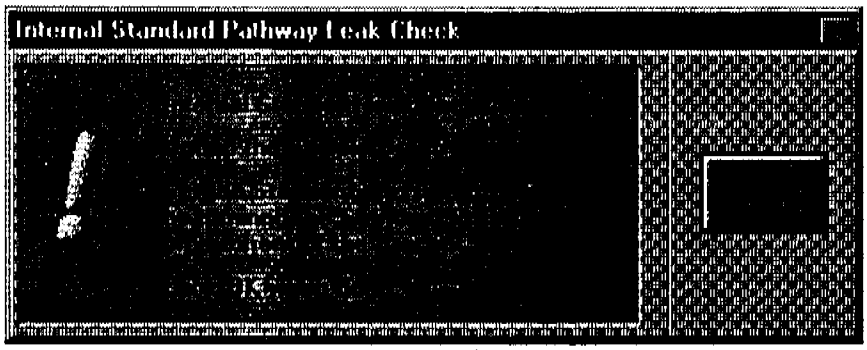

Figure 1-26 Internal Standard Pathway Leak Check Screen 2

9. Follow the instructions in the dialog box above, When you are finished, continue leak checking by choosing the other options. When you are finished leak checking completely:
   a. Turn Precept II **OFF.**
   b. Fasten the back cover onto Precept II with the six screws you removed earlier.

Leak Check Water Sample Path

This option is only available during "Standby-Load Vials and Hit Step."

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the *Precept II User Manual.*
2. Make sure Precept II is turned **OFF.** Take off the back cover of Precept II:
   a. Remove the six screws on the side.
   b. Gently pull the cover up and towards you. Be very careful not to pull too hard.
3. Turn on the concentrator, Precept II, and the gas supply.
   a. Select **Leak Check Water Sample Path** and the following screen will appear

Figure 1-27 Sample Pathway (Water) Leak Check Screen 1

4. Follow the instructions in the dialog box above.
   a. Locate the Aqueous Transfer bulkhead on the back of Precept II, in the bottom right corner. See the figure below.
   b. Cap the drain with a 1/16" Valco plug nut **(14-1590-016).** You can locate the plug nut in the kit box. Please refer to Chapter 3 of your *Precept II User Manual* for tightening instructions.

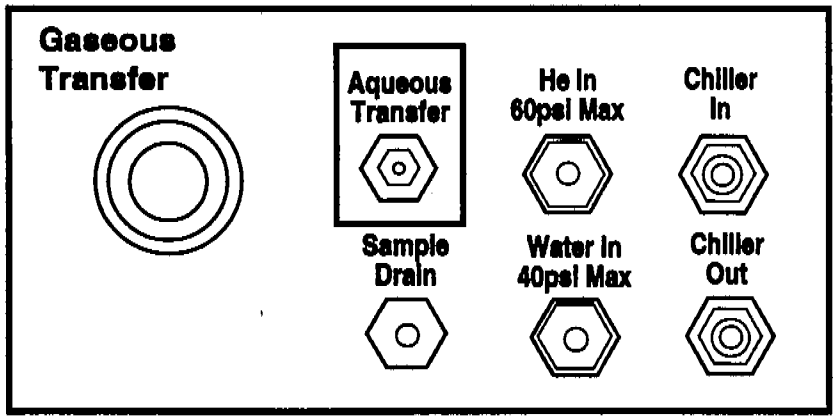

Figure 1-28 Location of the Aqueous Transfer Bulkhead

5. After you finish the instructions in the dialog box in step 3, click **OK.** The system moves to "Sweeping Lines" mode. The next set of instructions appear.

continued

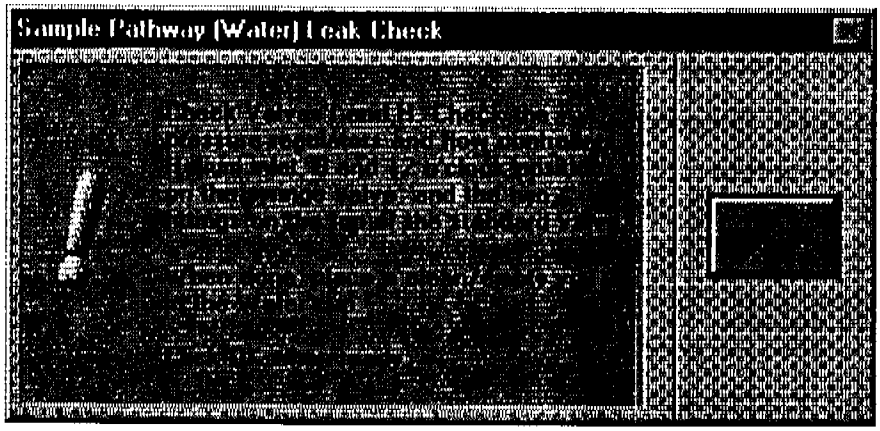

Figure 1-29 Sample Pathway (Water) Leak Check Screen 2

- From the back of Precept II, locate valves I and H in the upper middle section of the unit. See the figure below.

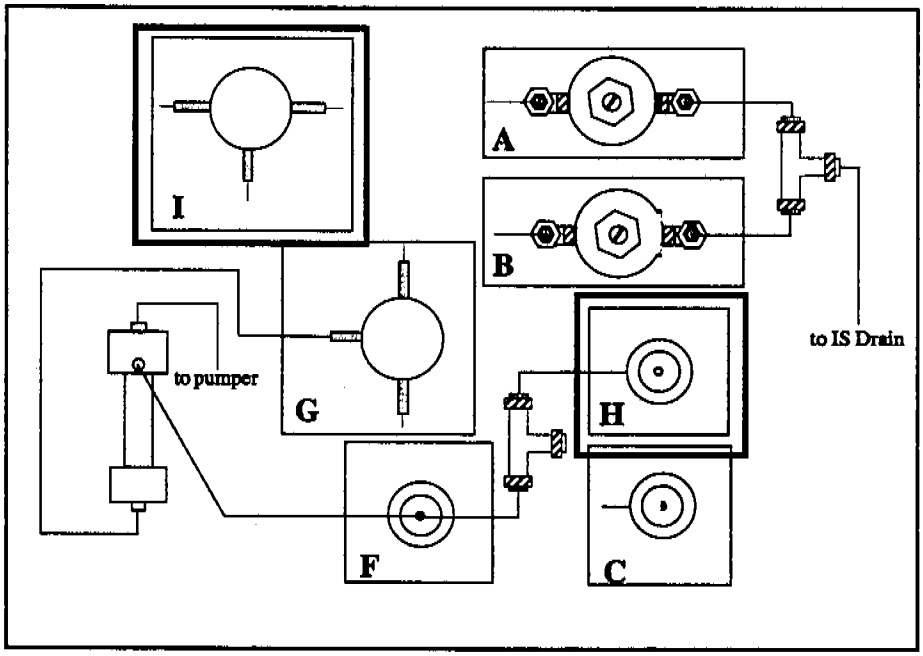

Figure 1-30 Location of Valves I, and H

continued

- From the back of Precept II, locate the pressure regulators and flow controller in the upper right section of the unit. See the figure below.

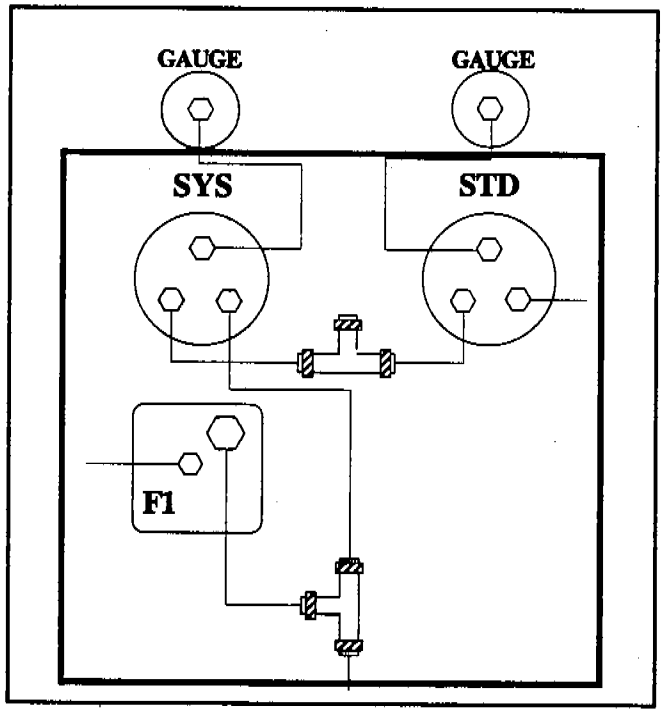

Figure 1-31 Location of the Pressure Regulators and Flow Controller

- From the back of Precept II, locate the Helium Inlet in the bottom right corner of the unit. See the figure below.

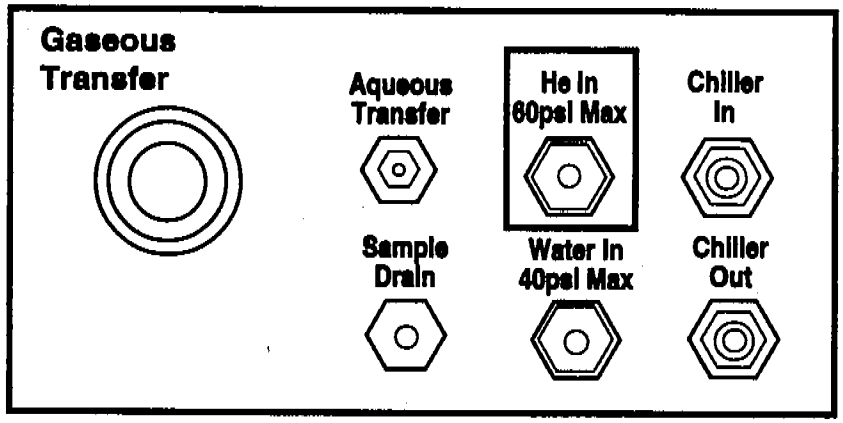

Figure 1-32 Location of the Helium Inlet

continued

- From the front of Precept II, locate the 9 and 12 o'clock positions on the syringe valve and the two fittings on the top of the standard valve. See the figures below.

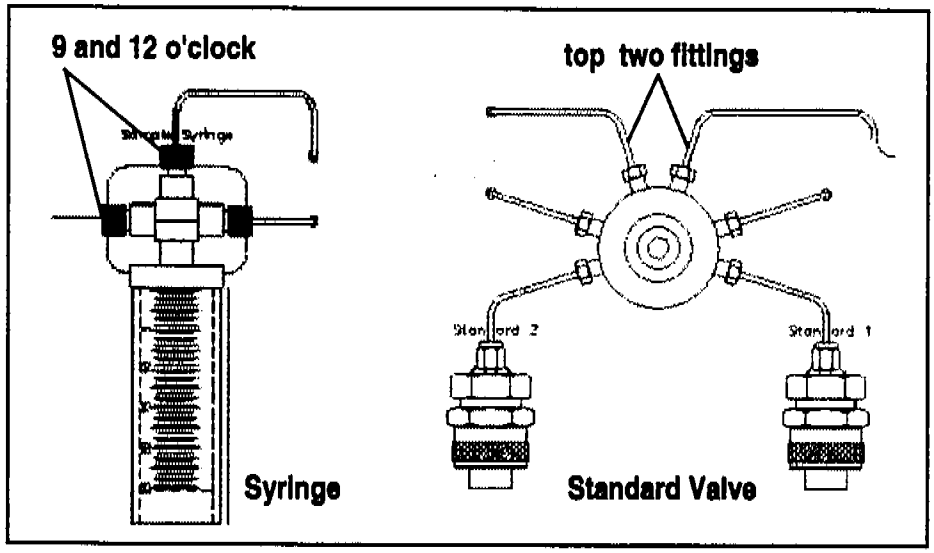

Figure 1-33 Locations of the 9 and 12 O'clock Positions and the Top Two Fittings on the Standard Valve

6. When you have finished the instructions in the dialog box:
   a. Place a clean, empty vial in the aqueous cup.
   b. Click **OK.**

   The aqueous elevator rises, pushing the vial onto the needle. The next set of instructions appear:

Figure 1-34 Sample Pathway (Water) Leak Check Screen 3

continued

- From the front of Precept II, locate the water needle block. See the figure below.

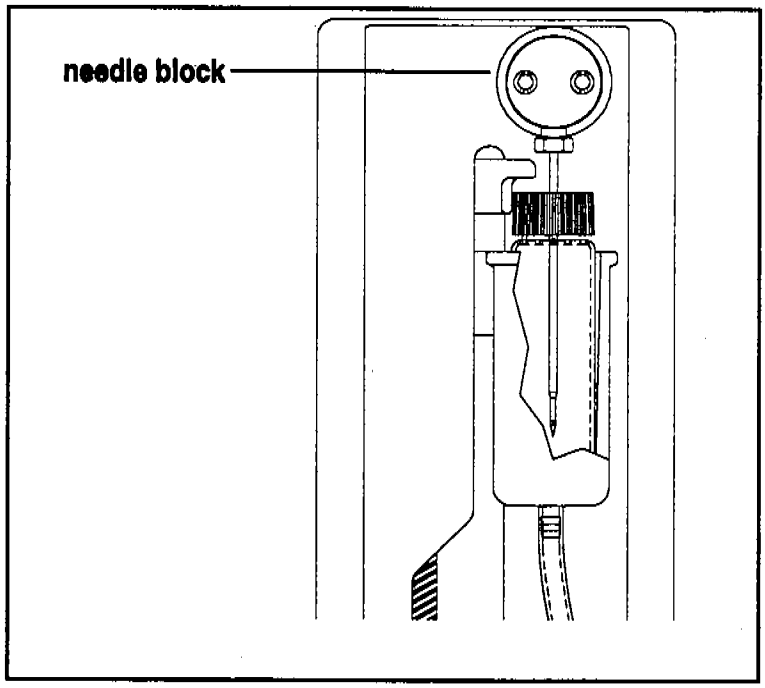

Figure 1-35 Location of the Needle Block

- From the back of Precept II, locate valves G and C in the upper middle section. See the figure below.

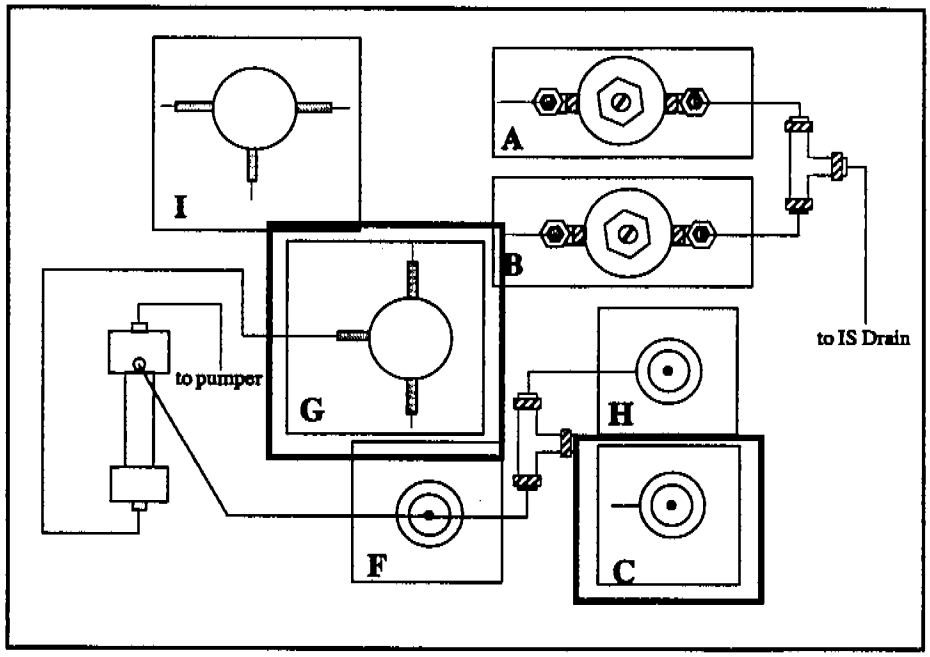

Figure 1-36 Location of Valves G and C

continued

7. After you finish the instructions in the dialog box in step 6 and click **OK,** the next set of instructions appear. See the dialog box below.

Figure 1-37 Sample Pathway (Water) Leak Check Screen 4

8. Follow the instructions in the dialog box above. When you are finished, continue leak checking by choosing the other options. When you are done leak checking completely:
   a. Turn Precept II **OFF.**
   b. Fasten the back cover onto Precept II with the six screws you removed earlier.

Leak Check Water Pathway

This option is only available during "Standby-Load Vials and Hit Step."

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the *Precept II User Manual.*
2. Make sure Precept II is turned **OFF.** Take off the back cover of Precept II:
   a. Remove the six screws on the sides.
   b. Gently pull the cover up and towards you. Be careful not to pull too hard.
3. Turn on the concentrator, Precept II, and the gas supply.
   a. Select **Leak Check Water Pathway** and the following screen appears:

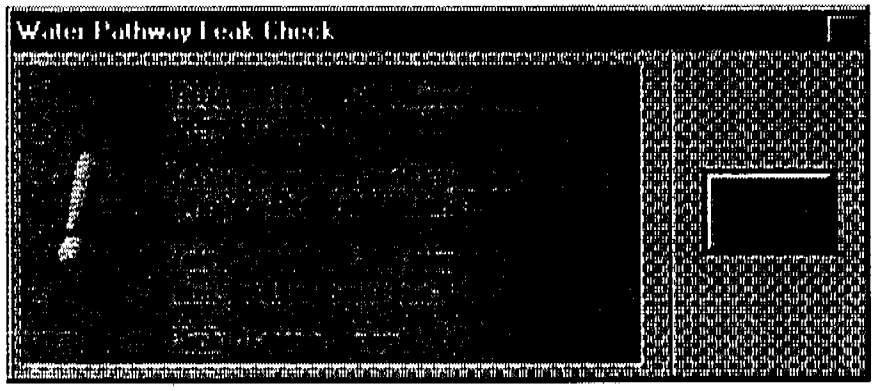

Figure 1-38 Water Pathway Leak Check Screen 1

4. Follow the instructions in the dialog box above. The system moves into "Syringe Rinse" mode.

continued

- From the front of Precept II, locate the 3 and 6 o'clock positions on the syringe valve. See the figure below.

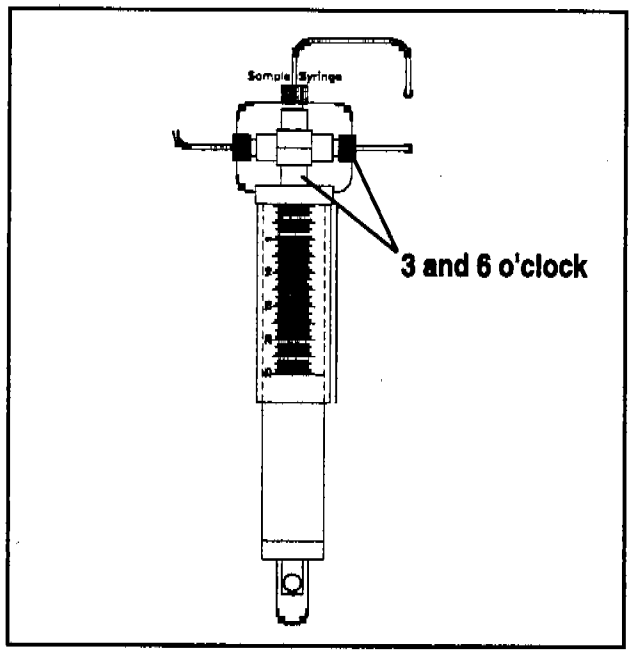

Figure 1-39 Locations of the 3 and 6 O'clock Positions

- From the back of Precept II, locate the Valves F & G. See the figure below.

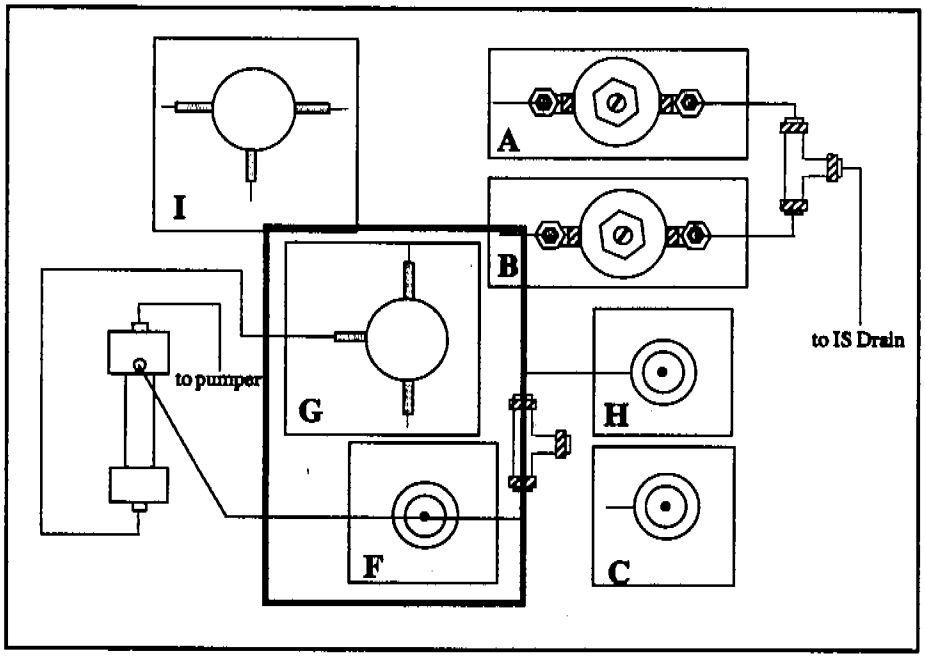

Figure 1-40 Locations of Valves F & G

continued

- From the back of Precept II, locate the 90-micron sample filter. See the figure below.

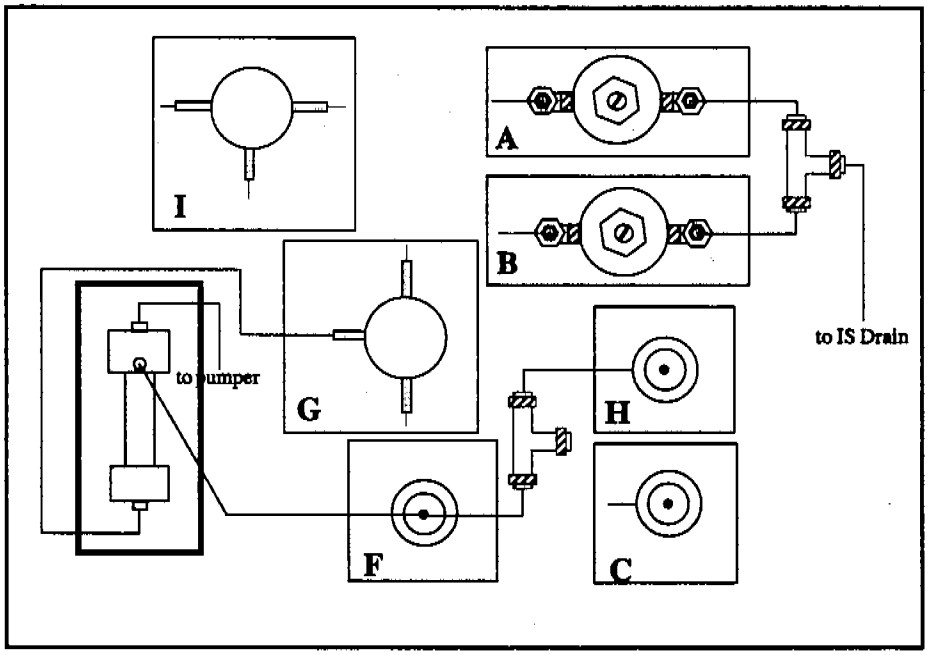

Figure 1-41 Location of the 90-Micron Sample Filter

continued

- From the back of Precept II, locate the brass tee. See the figure below.

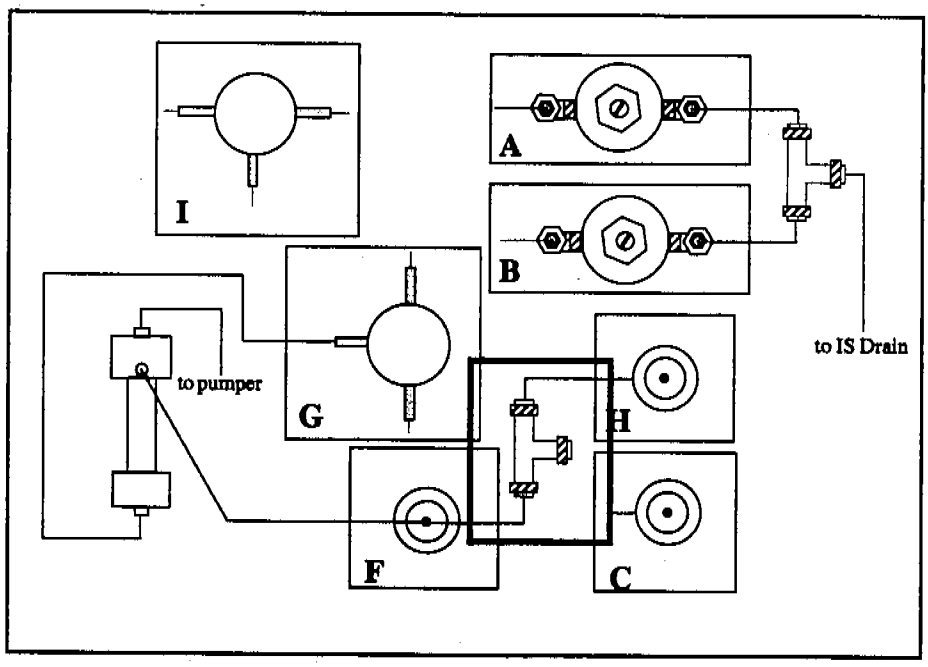

Figure 1-42 Location of the Brass Tee Area

5. When you are finished, continue leak checking by choosing the other options. When you are finished leak checking completely:
   a. Turn Precept II **OFF.**
   b. Fasten the back cover onto Precept II with the six screws you removed earlier.

Leak Check Soil Sample Path

This option is only available during "Standby-Load Vials and Hit Step."

1. Make sure you have attached the transfer line(s) to the concentrator. If you have not, do so now. See Chapter 3 in the *Precept II User Manual.*
2. Make sure Precept II is turned **OFF.** Take off the back cover of Precept II:
   a. Remove the six screws on the sides.
   b. Gently pull the cover up and towards you. Be very careful not to pull too hard.
3. Turn on the concentrator, Precept II, and the gas supply.
   a. Select **Leak Check Soil Sample Path** and the following screen will appear:

Figure 1-43 Sample Pathway (Solid) Leak Check Screen 1

4. Follow the instructions in the dialog box above.
   a. Locate the 3000 vent fitting on the front panel.
   b. Cap the drain with a 1/16" brass plug nut **(14-2792-016).** You can locate the cap in the 3000's kit box. Please refer to Chapter 3 in your *Precept II User Manual* for tightening instructions.
5. After you place the clean empty vial in the soil cup and click **OK,** the soil elevator rises. The system moves into "Purging Vial" mode. The 3000 moves into "Purge" mode and holds.

continued

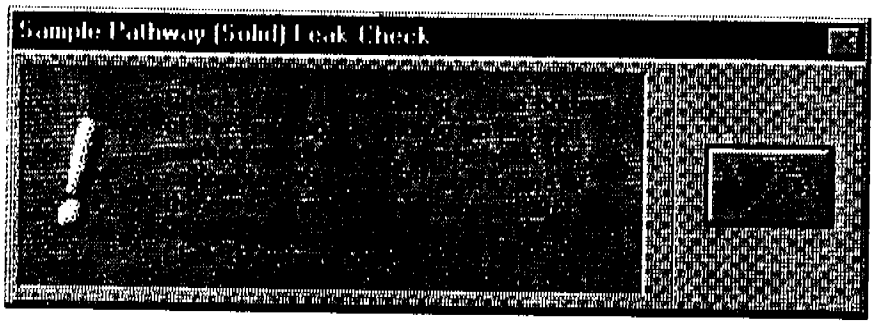

Figure 1-44 Sample Pathway (Solid) Leak Check*

*The fitting at the bottom of the soil cup is no longer an option.

- From the back of Precept II, locate Valve I. See the figure below.

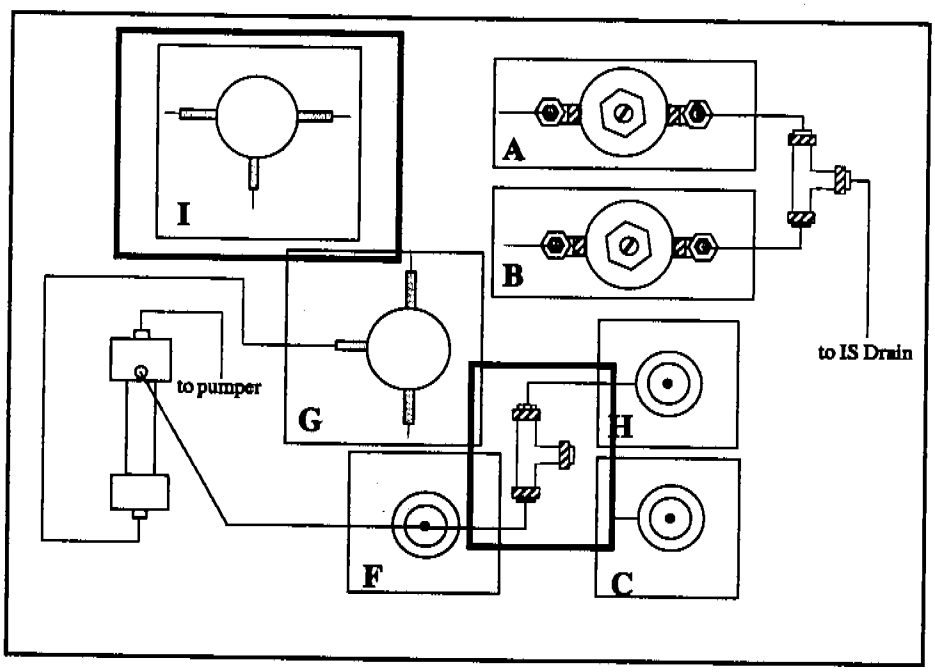

Figure 1-45 Location of Valve I

- From the front of Precept II, locate the soil needle block. See the figure below.

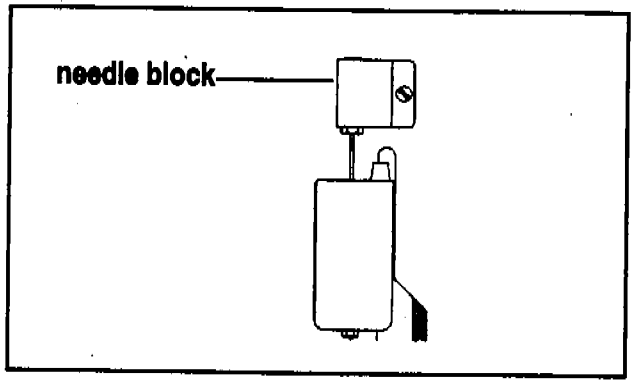

Figure 1-46 Location of the Solid Needle Block

continued

- From the top of the 3000, locate the cross union. See the figure below. For additional information, please reference Chapter 3 in your *Precept II User Manual.*

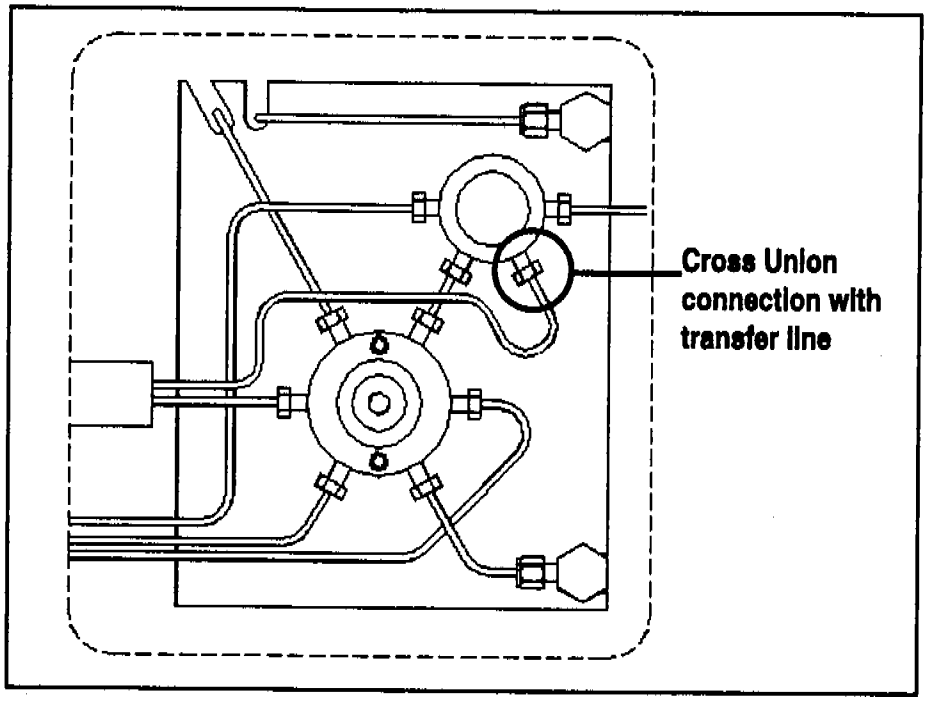

Figure 1-47 Location of the Cross Union Connection on the 3000

6. Finished.

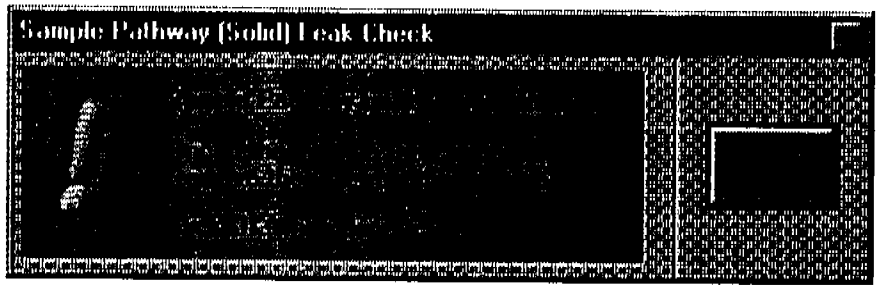

Figure 1-48 Sample Pathway (Solid) Leak Check Screen

Follow the instructions in the above dialog box. When you are finished, continue leak checking by choosing other options. When you are finished leak checking completely:

a. Turn Precept II **OFF.**
b. Fasten the back cover onto Precept II with the six screws.

1.11 Accessing the Temperature Screen

You may access the Temperature screen any time to check on the temperatures of heated zones within the unit.

Click on the **Instrument** pull-down menu and choose **Temp Zone Status.**

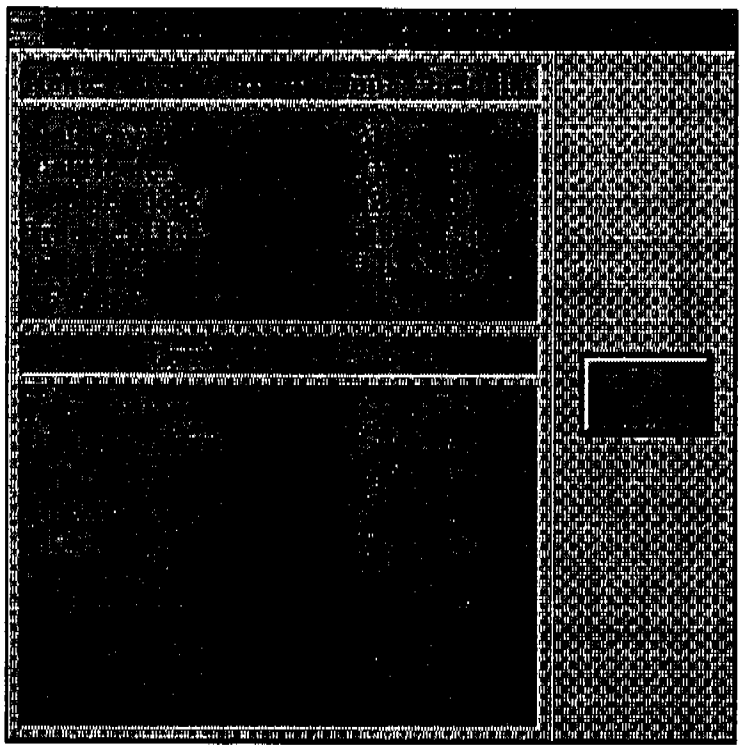

Figure 1-49 TekLink-Precept II Temperature Screen

1.12 DDE Availability

Dynamic Data Exchange (DDE) allows TekLink to communicate with other Windows programs. TekLink passes data and control to the other programs. These other programs include spreadsheets and databases.

For more information, please contact Tekmar-Dohrmann Technical Support at (800) 874-2004 in the US and Canada; outside the US and Canada, please call (513) 247-7000.

1.13 Accessing Online Help

TekLink provides comprehensive online help. Any time you are using the software, you may access the online help for information.

Online help contains much of the same content as in this chapter; however, it gives you easier accessibility when you are using your PC. The online help also provides electronic interaction, which you may consider easier to use than traditional paper form.

The **TekLink Help** menu contains four options:

- **Contents**
  Opens the Contents page of TekLink online Help.
- **Search for Help On**
  Opens the TekLink online help Search dialog box.
- **Using Help**
  Opens the Windows online Help. This explains how to use (any) Windows online help.
- **Flow Diagram**
  Displays the flow diagram for the current mode
- **About TekLink**
  A screen appears with the TekLink/3000 version information.

Note: Any time you are in a screen with a Help button, you may click the button for instant access to help on that specific topic.

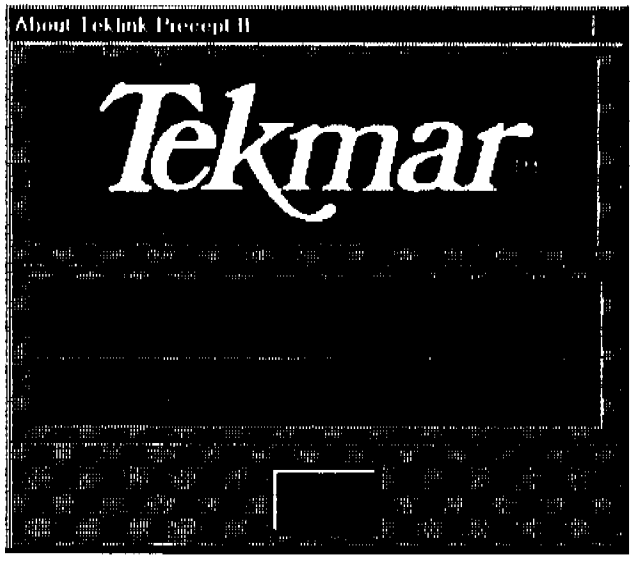

Figure 1-50 About TekLink Screen