

ACQUITY Classic System Sample Manager

ACQUITY UPLC™ *Sample Manager*

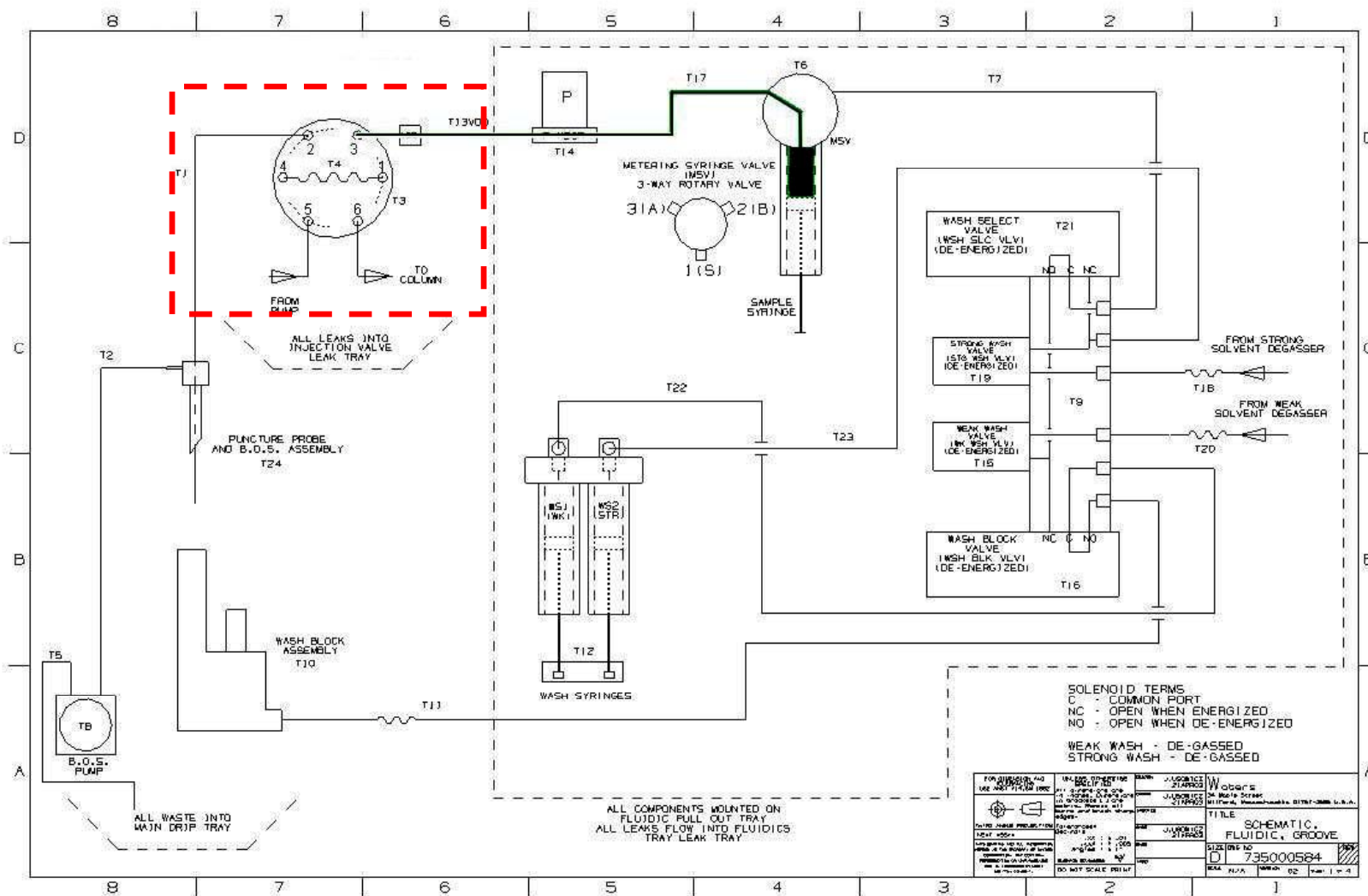
	UPLC	Alliance
Technology	Loop based	Direct flow inject
Cycle time	30s or 11s with load ahead	Not specified
Sample Capacity	2 well plates	120 x 2 mL vials
Needlewash	2 solvents	1 solvent
Temperature control samples	Yes standard	Yes standard
Carryover spec	< 5 nL	< 20 nL
% RSD	<0.3% 5-50 uL	<0.5% 5-80 uL
Injection Range	0.5- 50 uL	0.1- 100 uL



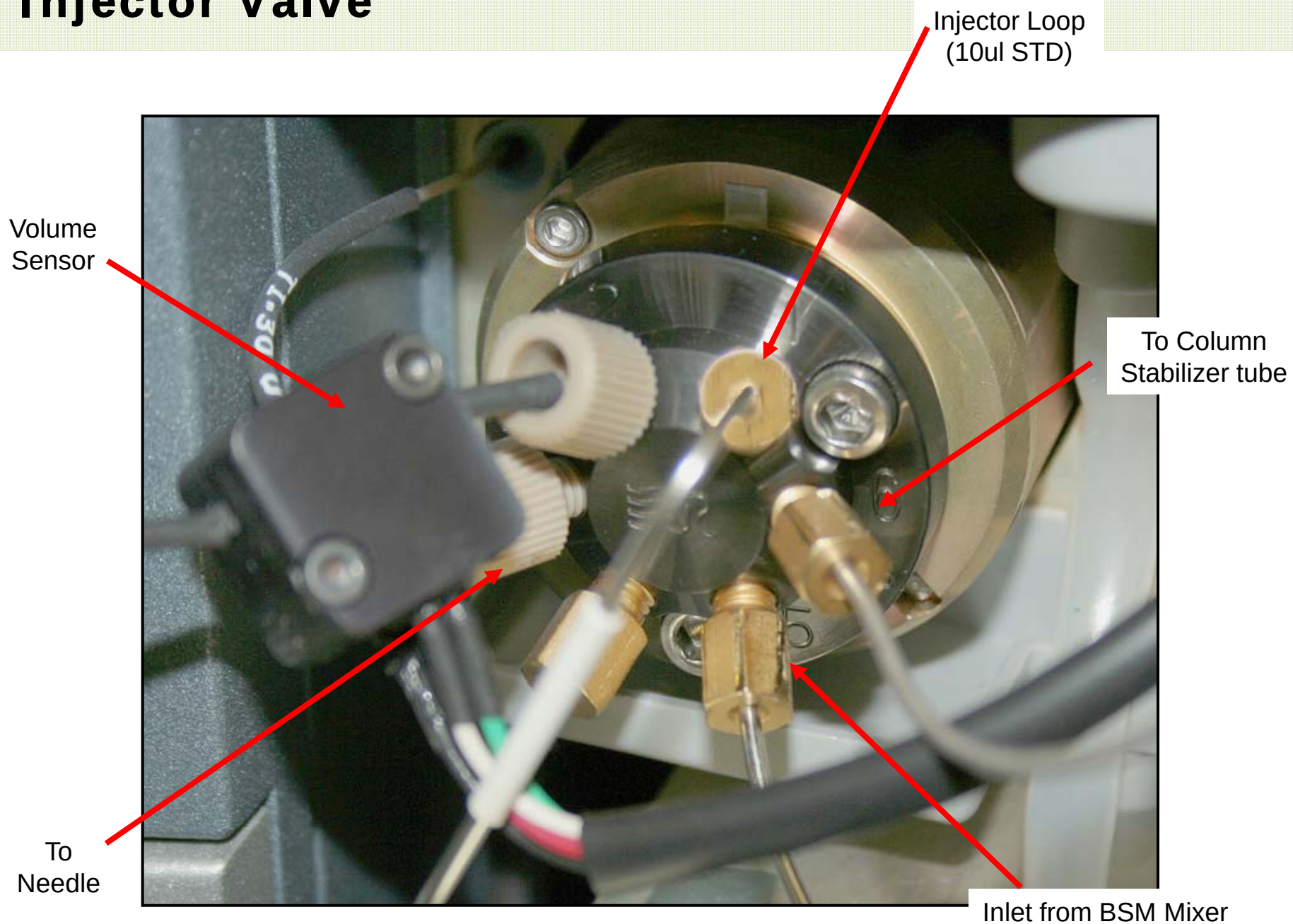
SM Classic-Major Differences from SM-FL

- Fluidics
- Electronics
 - Power Supply and distribution
 - Control boards- CPU2000, Personality card, Barrier PCB
- XYZZ Assembly
 - XY- motion to support various ANSI STD plates
 - ZZ-Vial piercing, Sampling needle and Wash/Inject movement
- Sample Heating and Cooling
- Column Heater

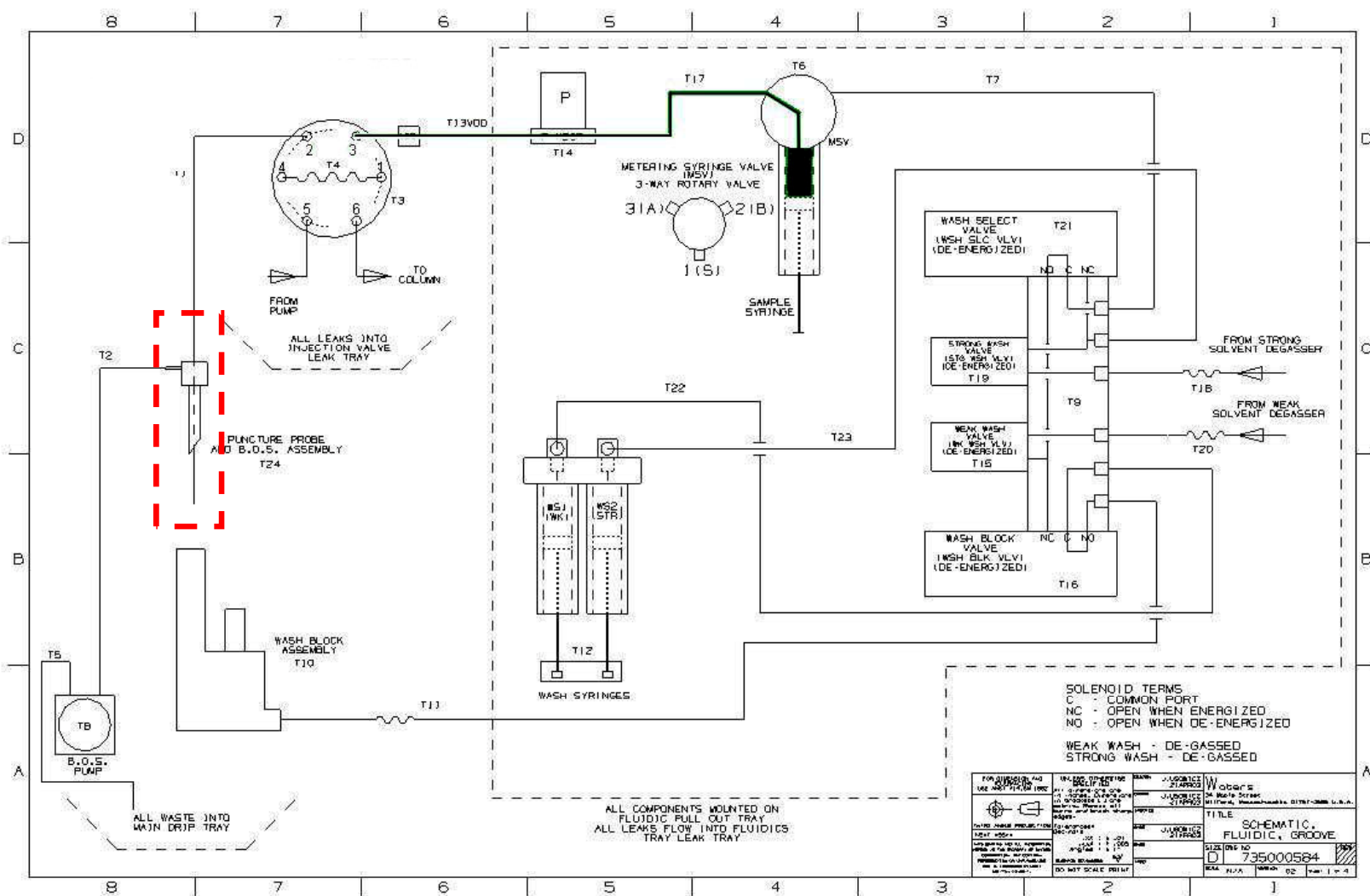
Fluidic Components



Injector Valve

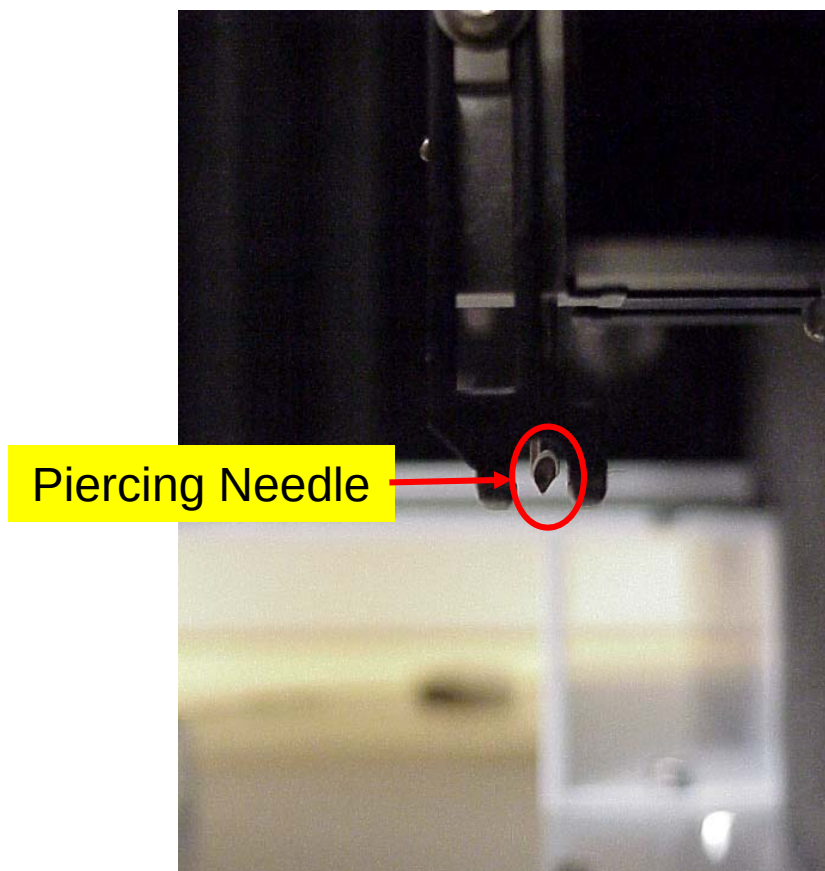


Piercing and Sample Needle

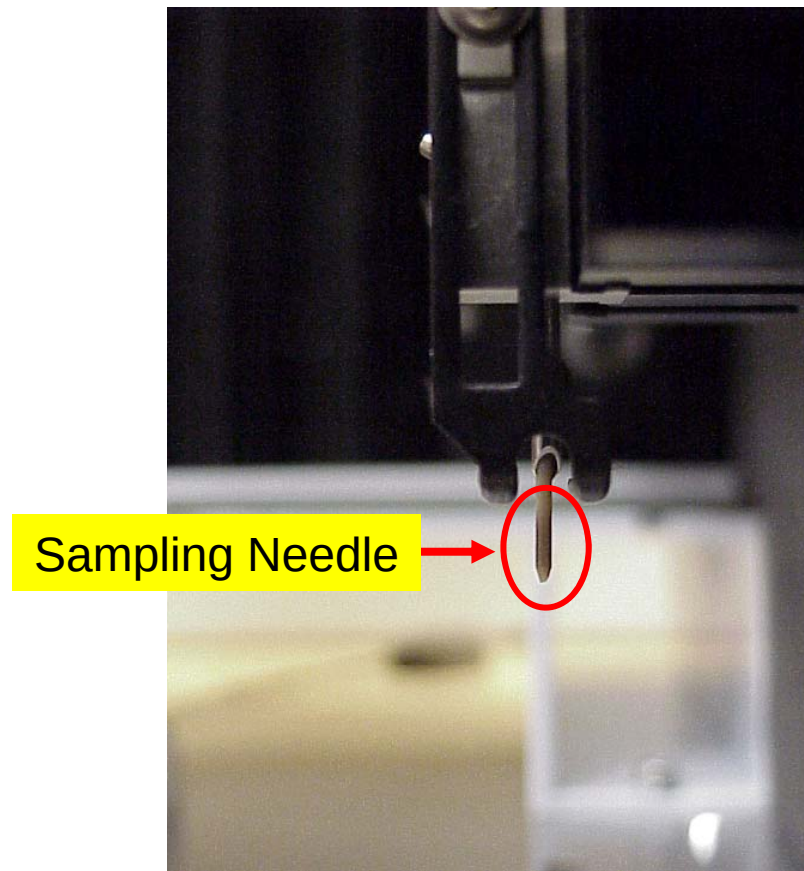


Sampling and Puncture Needles

- Piercing Needle

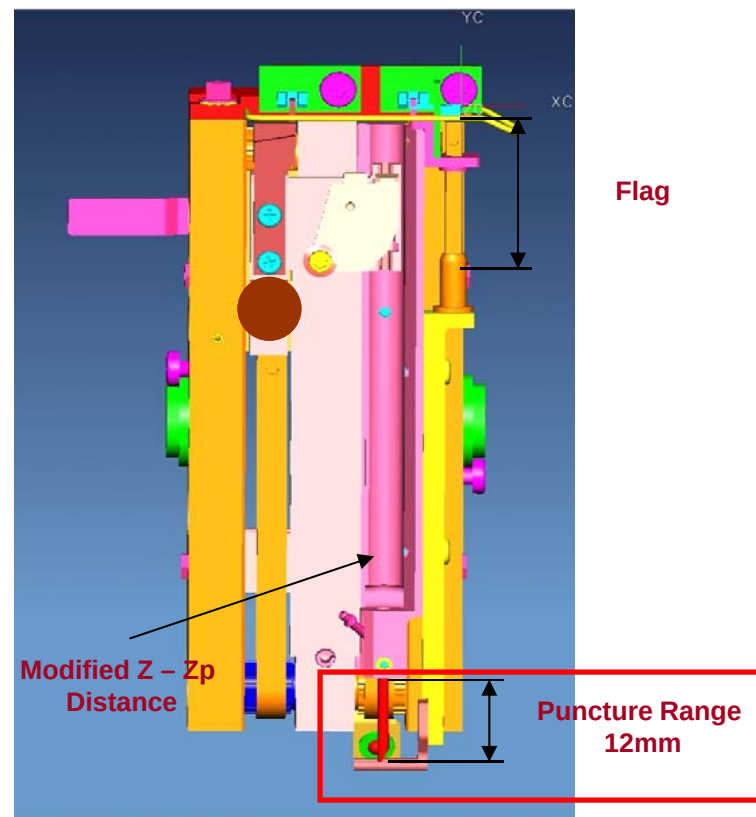


- Sampling Needle

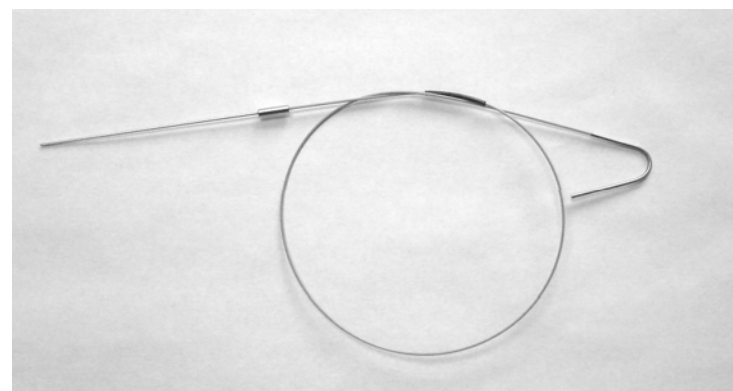
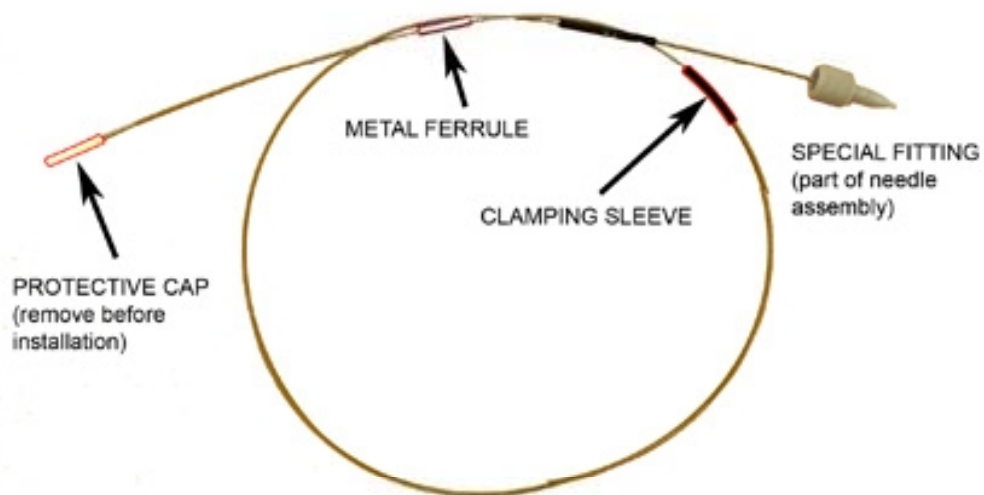
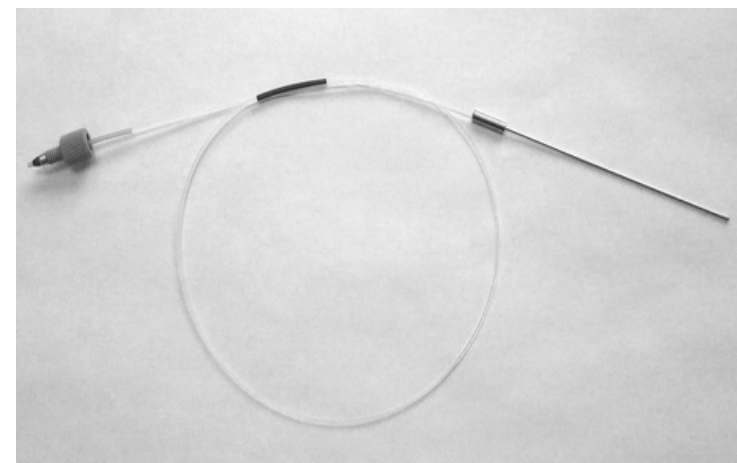


New-More Robust Needle Piercing

- New Y-carriage Assembly
 - Old = Red
 - New = Grey
- Extends the range of piercing depth
- Sharper cutting edge
- Requires ACQUITY UPLC System Driver v1.30
 - Backwards compatible with v1.23, without additional range



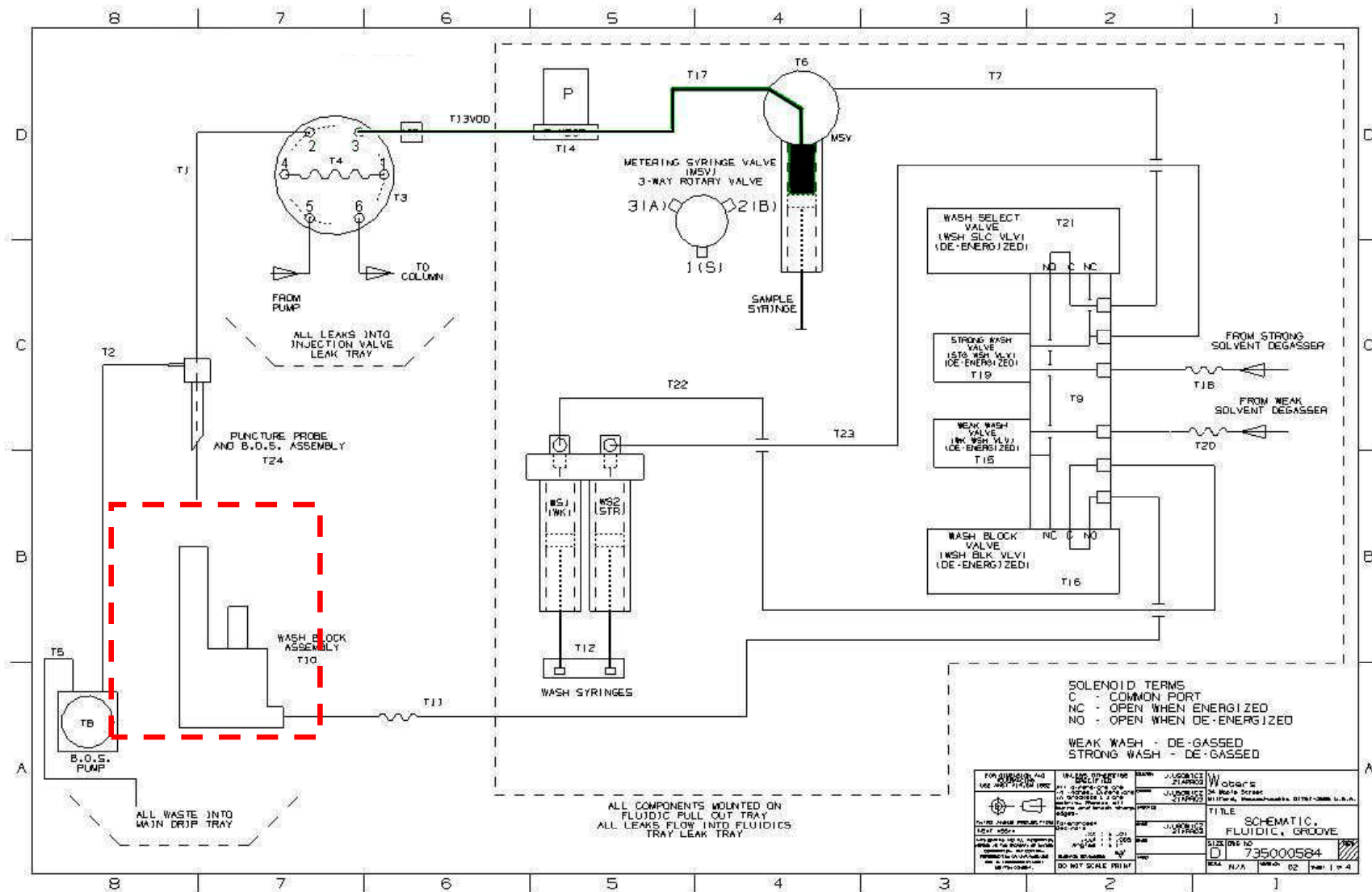
Sample Needles- Types and Sizes



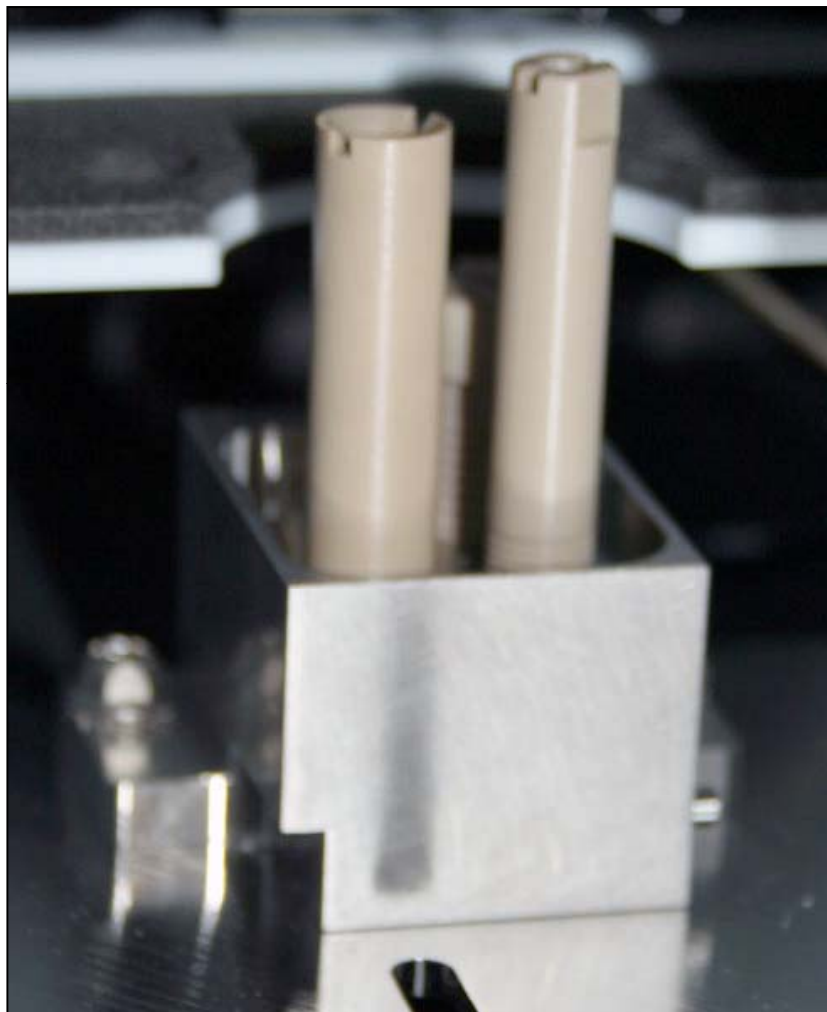
Sample Needles- Recommendations

Part Number	Description	Wetted Material	Recommended Applications	Recommended Needlewash Solvent	Recommended Sample Format
700002644	Sample Needle, 30uL, PEEK	All PEEK	Configured as default needle. Not recommended for hydrophobic compounds	Reversed Phase solvents, excluding THF and Hexane	For original needle design – only vials or heat sealed Plate foils - Not recommended for use with cap mats or re-sealable caps, unless new extended range Y-carriage installed on ACQUITY SM's Serial # A08UPA918M and higher
205000369	Sample Needle, 30uL, FEP Tubing w/ SS Tip	FEP Teflon with stainless steel tip	Lower cost alternative to stainless steel, alternate surface to PEEK. Less interaction with hydrophobic compounds compared to PEEK	Reversed Phase solvents, excluding THF and Hexane	Any recommended Plate or Vial format, recommended for use with Sample Manager Firmware version 1.30.
205000362	Sample Needle, 30uL, SS Tubing w/ SS Tip	All stainless steel tip and tubing	Recommended for strongly hydrophobic compounds	Reversed Phase solvents, including THF and Hexane	Any recommended Plate or Vial format, recommended for use with Sample Manager Firmware version 1.30.
205000363	Sample Needle, 15uL, SS Tubing w/ SS Tip	All stainless steel tip and tubing	Recommended for strongly hydrophobic compounds. With reduced aspiration speeds, which will impact injection cycle time, the smaller volume can increase precision	Reversed Phase solvents, including THF and Hexane	Any recommended Plate or Vial format, recommended for use with Sample Manager Firmware version 1.30.

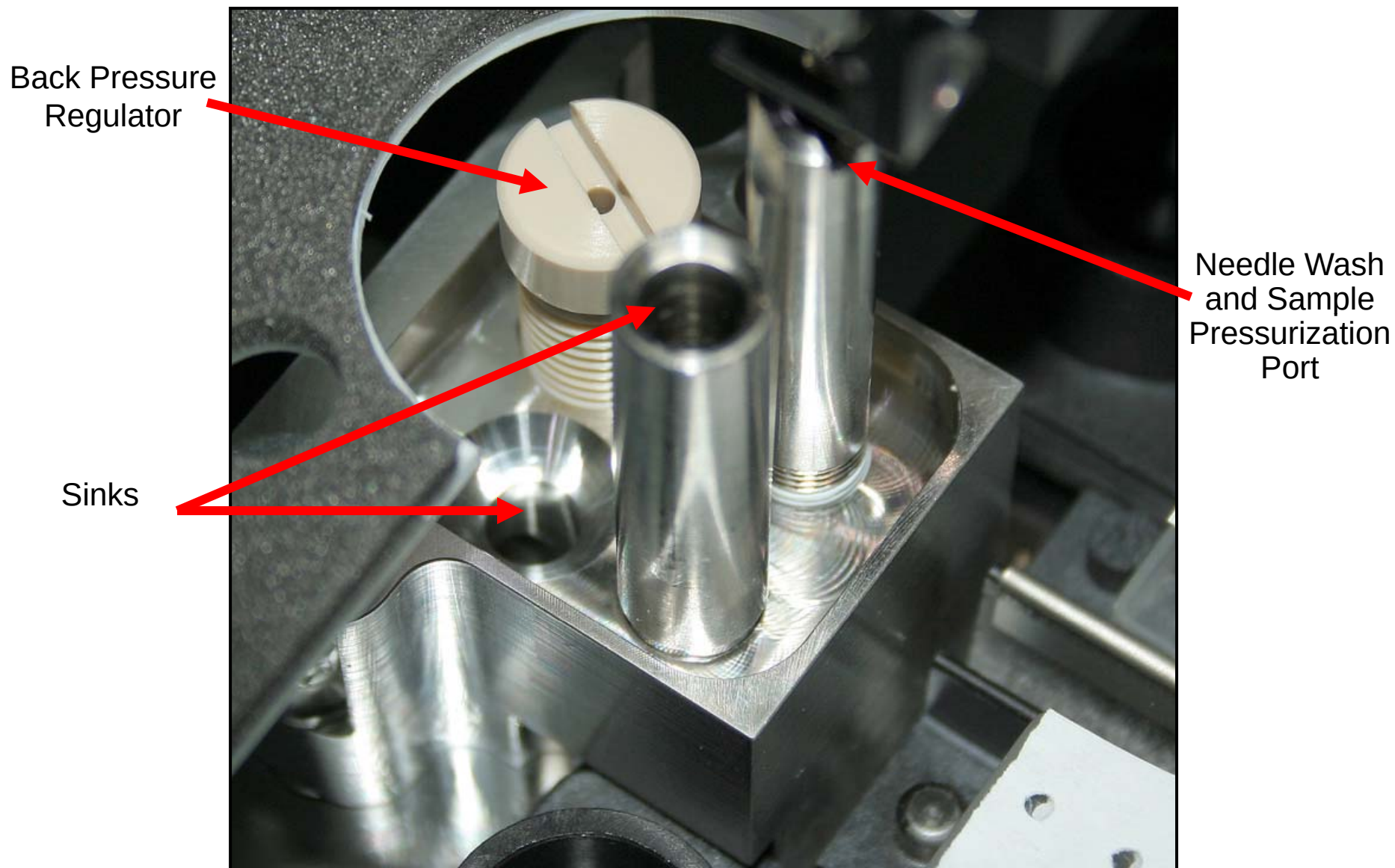
Wash / Inject Block Assembly



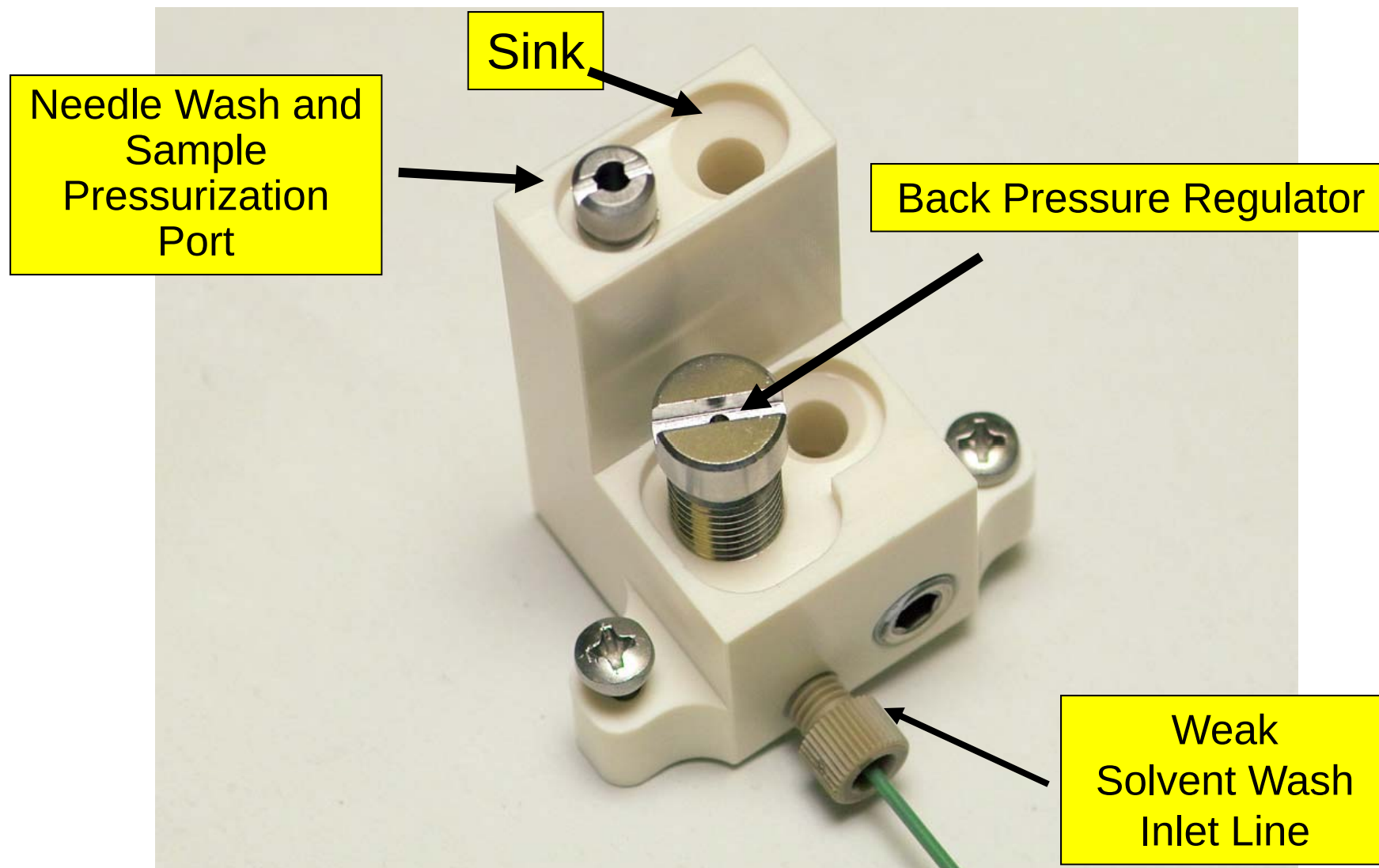
Wash / Inject Block Assembly- New Style



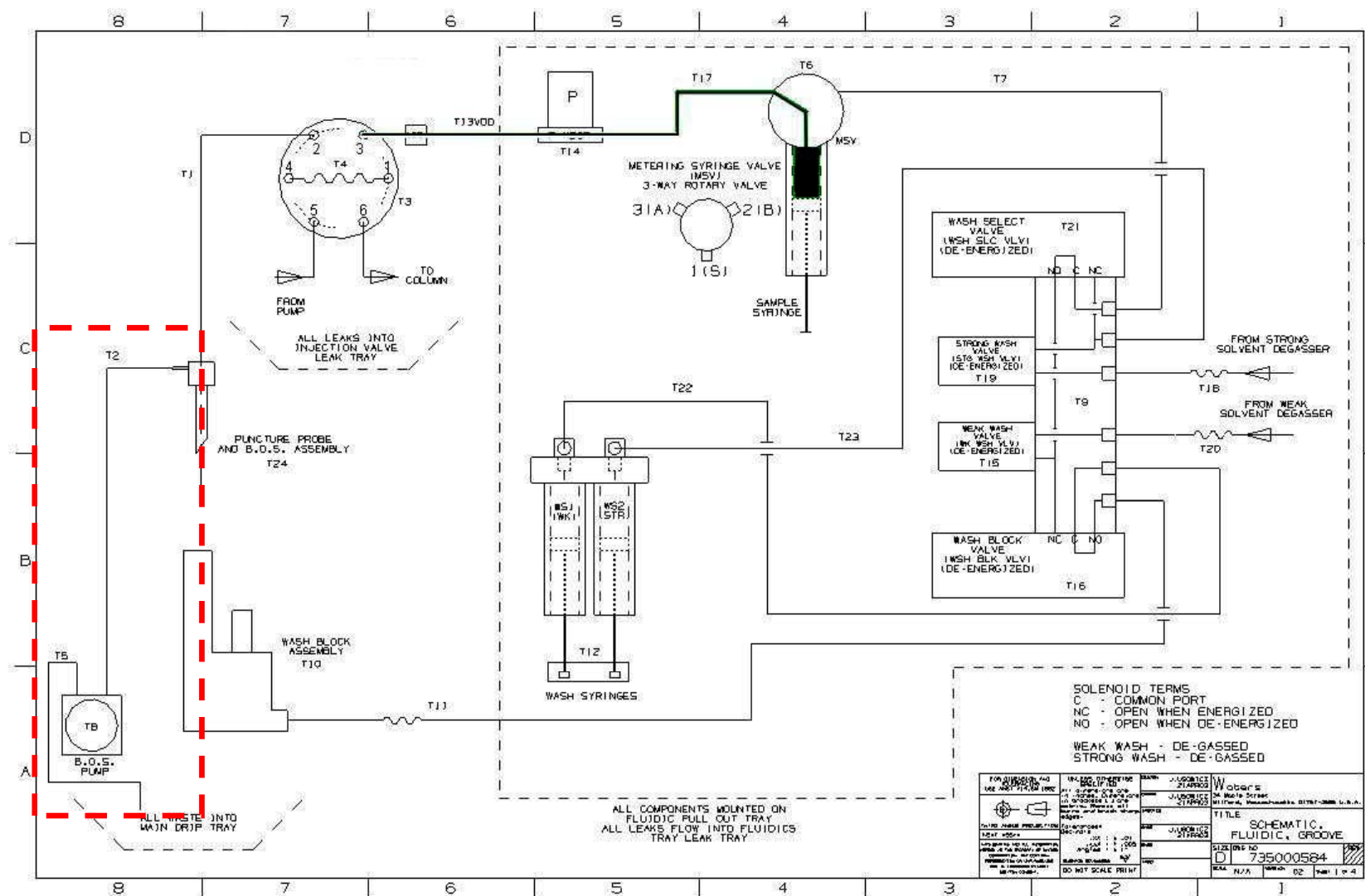
Wash / Inject Block Assembly- Older Style



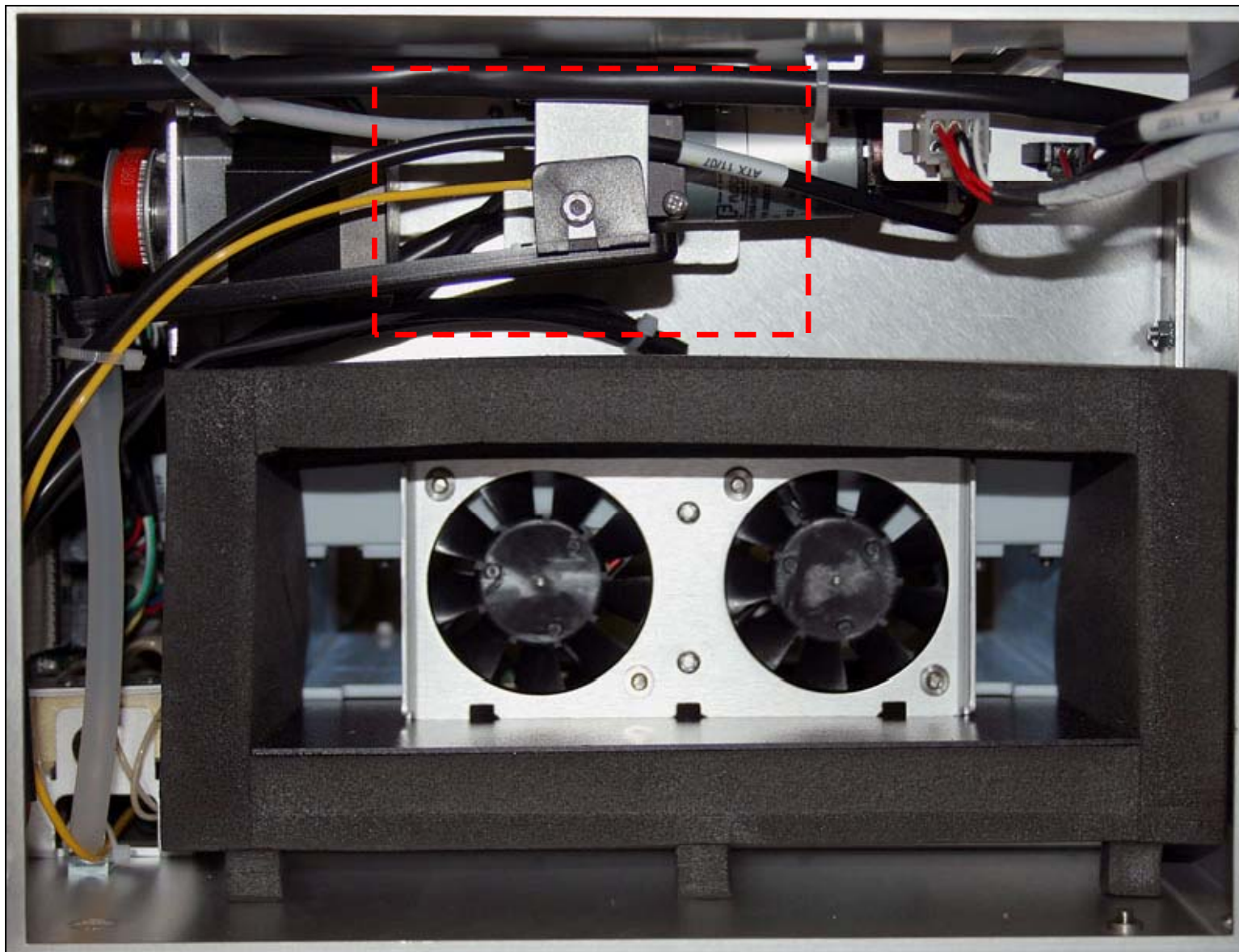
Wash / Inject Block Assembly- Oldest Style



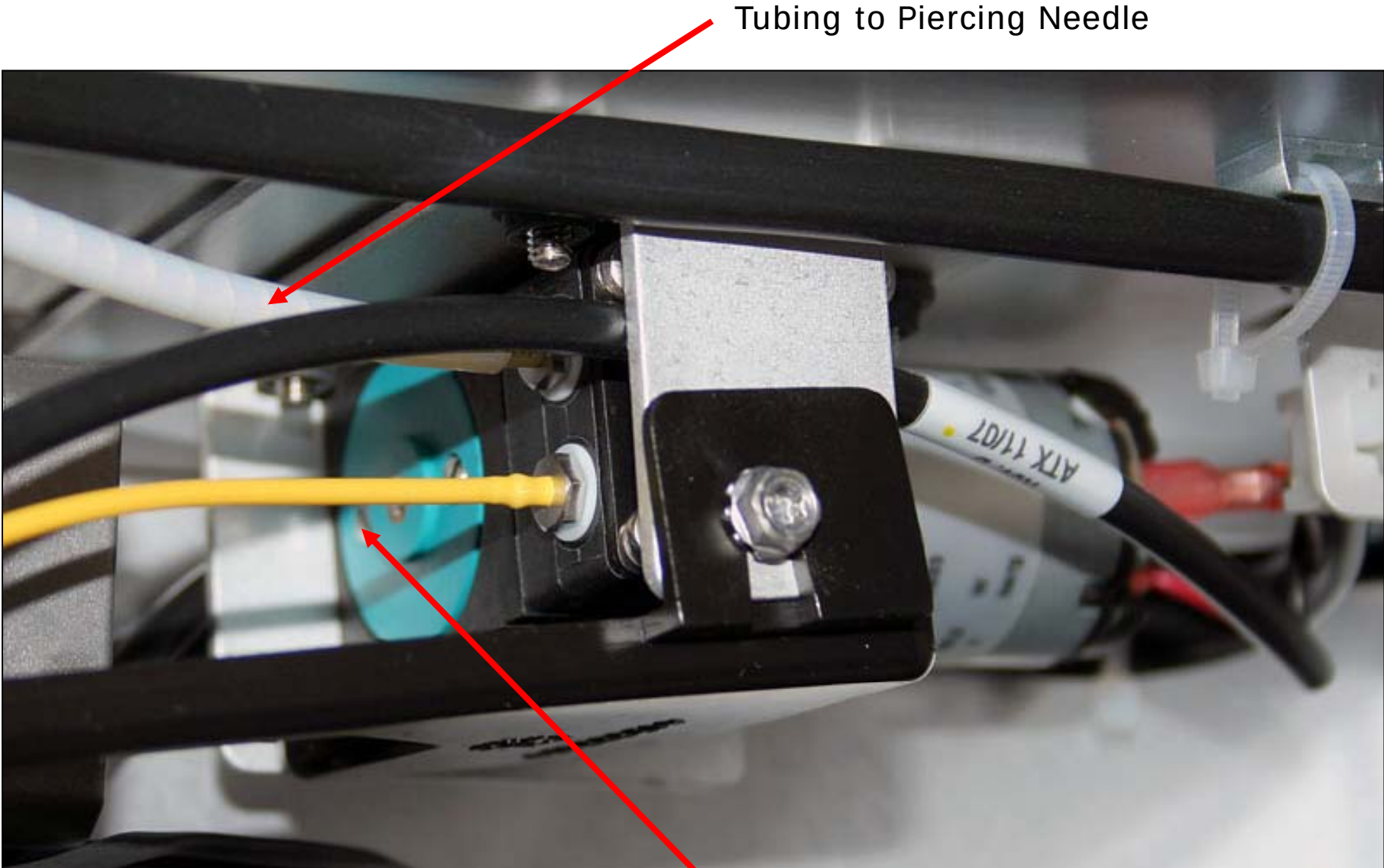
B.O.S. Pump and Tubing Connection



BOS Pump Assembly



BOS Pump Assembly

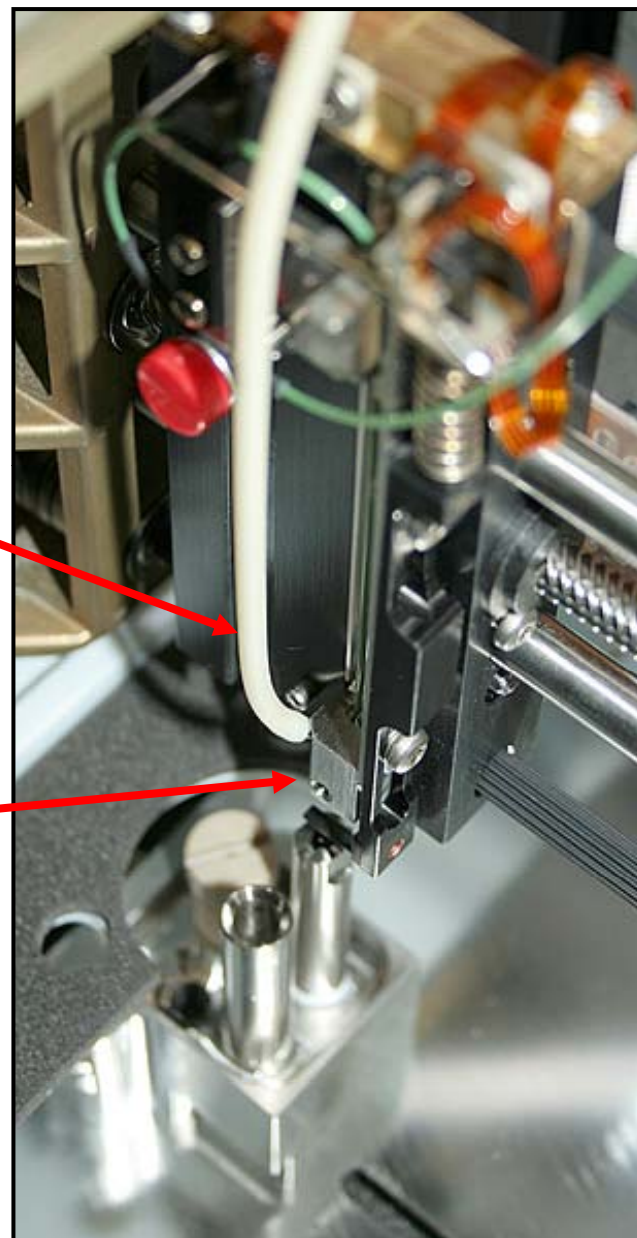


Tubing to Waste

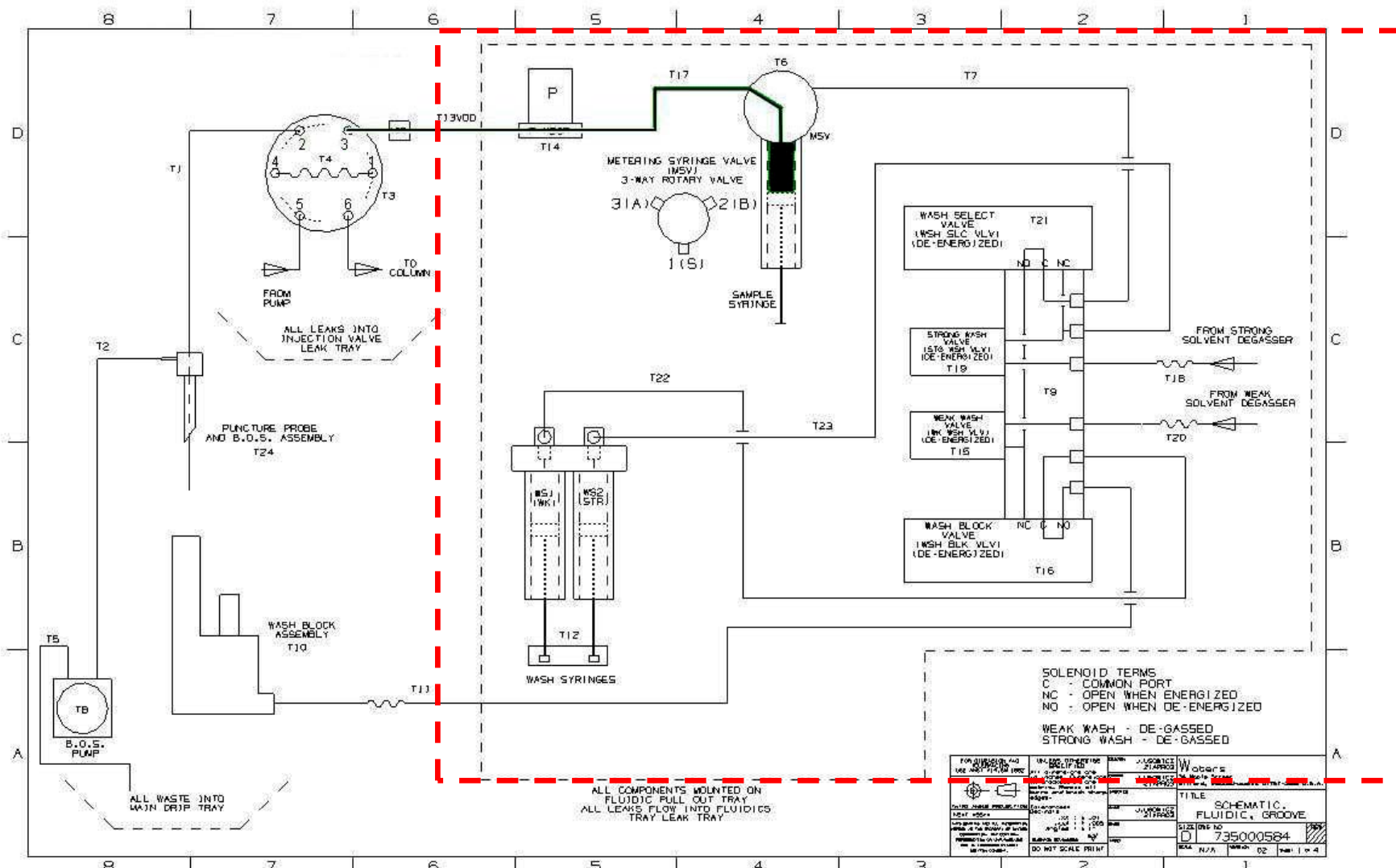
Needle Wash System- BOS Pump

Tubing to BOS Pump

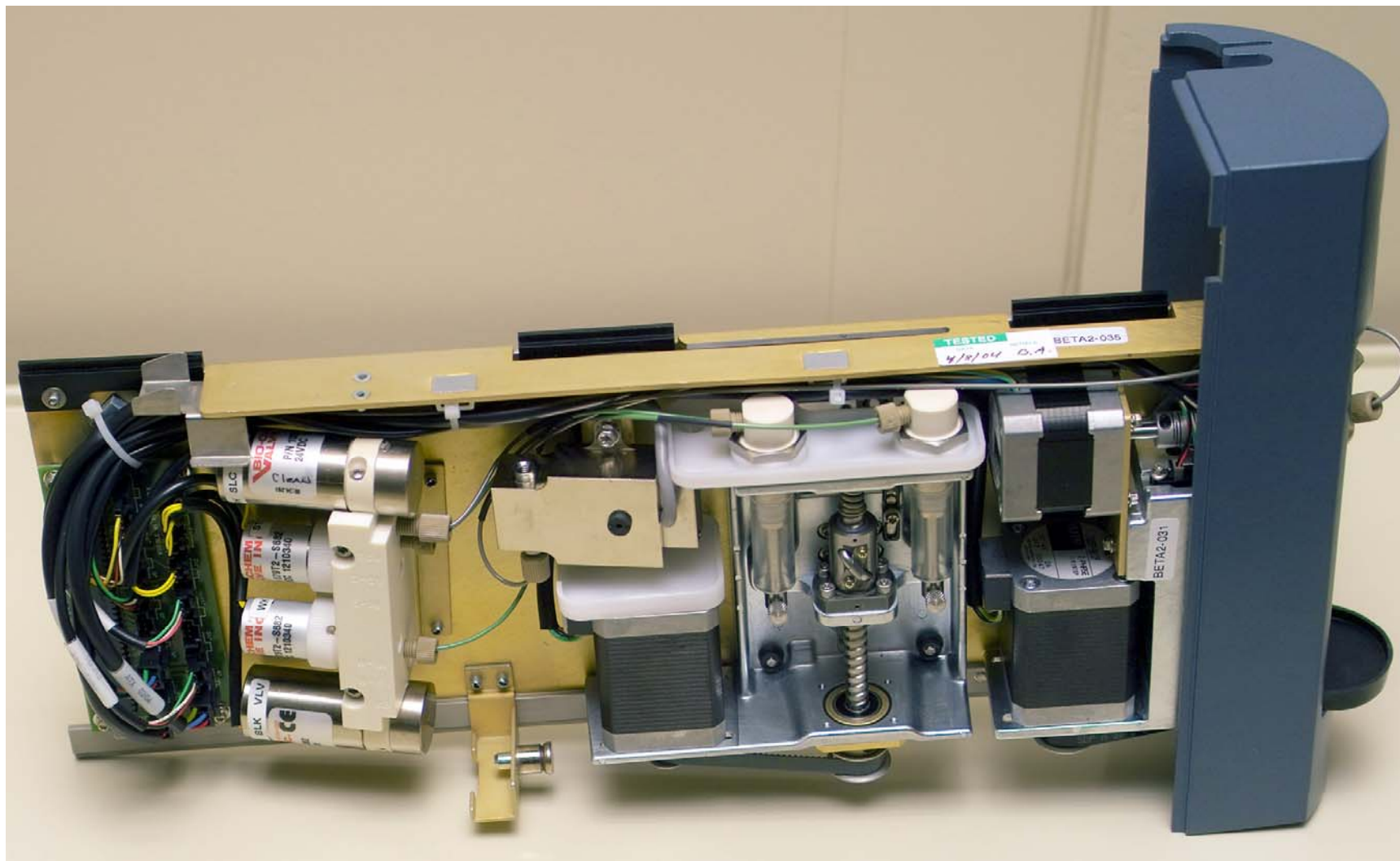
Piercing Needle



Sample Manager Fluidics Tray



Fluidics Tray- Major Assemblies



Valve Manifold Connections

to Strong Wash Syringe

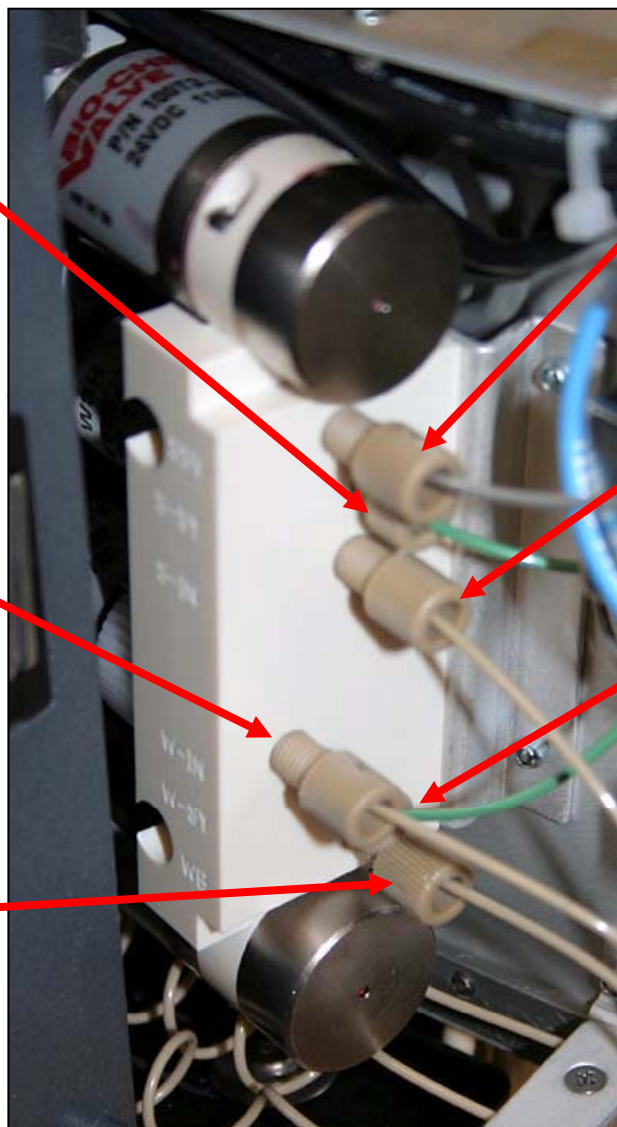
to Sample Metering Valve-
Right Connection

to Weak Wash in
(orange line)

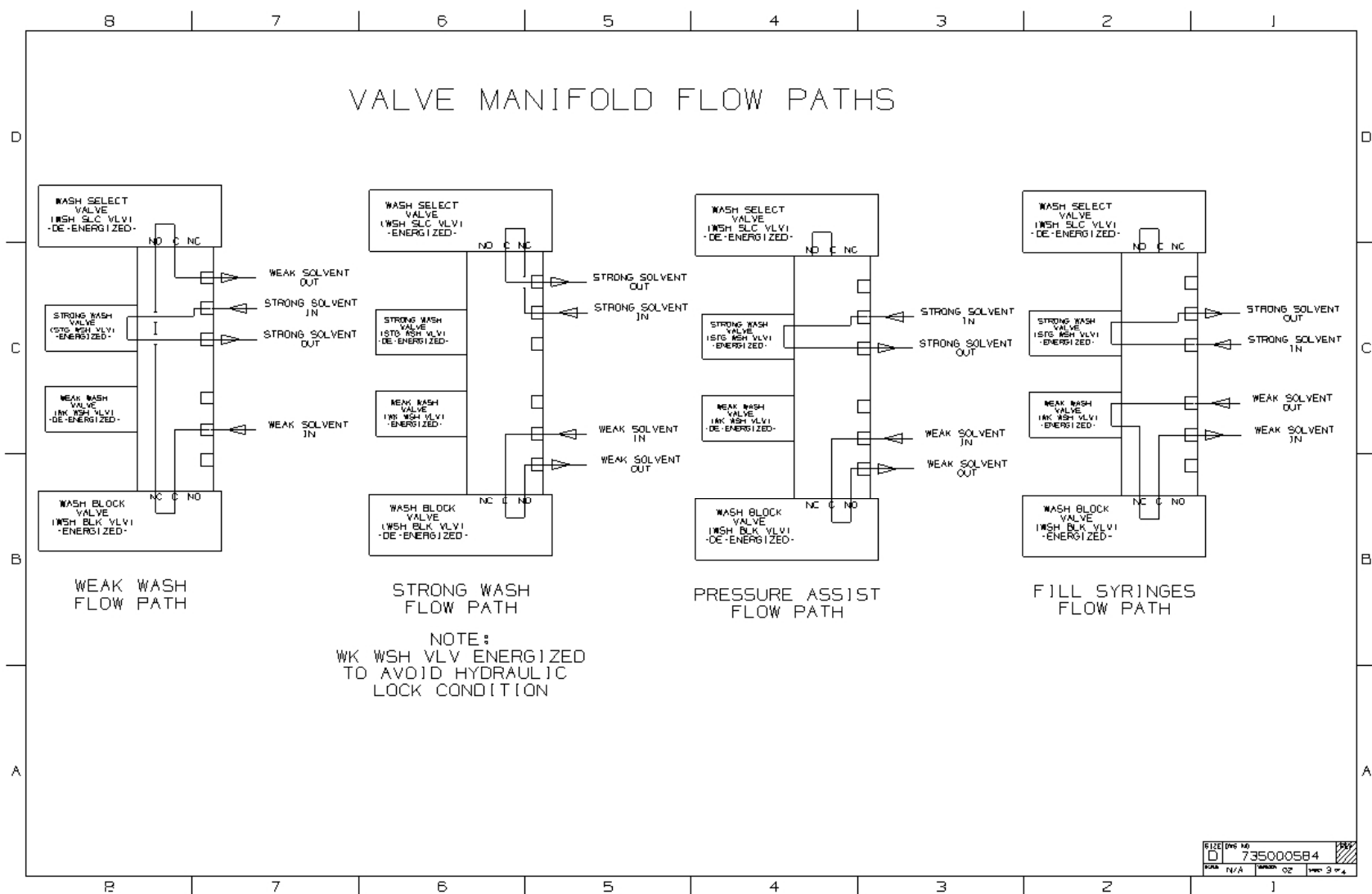
to Strong Wash in
(white line)

to Weak Wash Syringe

Weak Wash out
to Wash Block



Valve Manifold Flow Paths



Column Heating Compartment

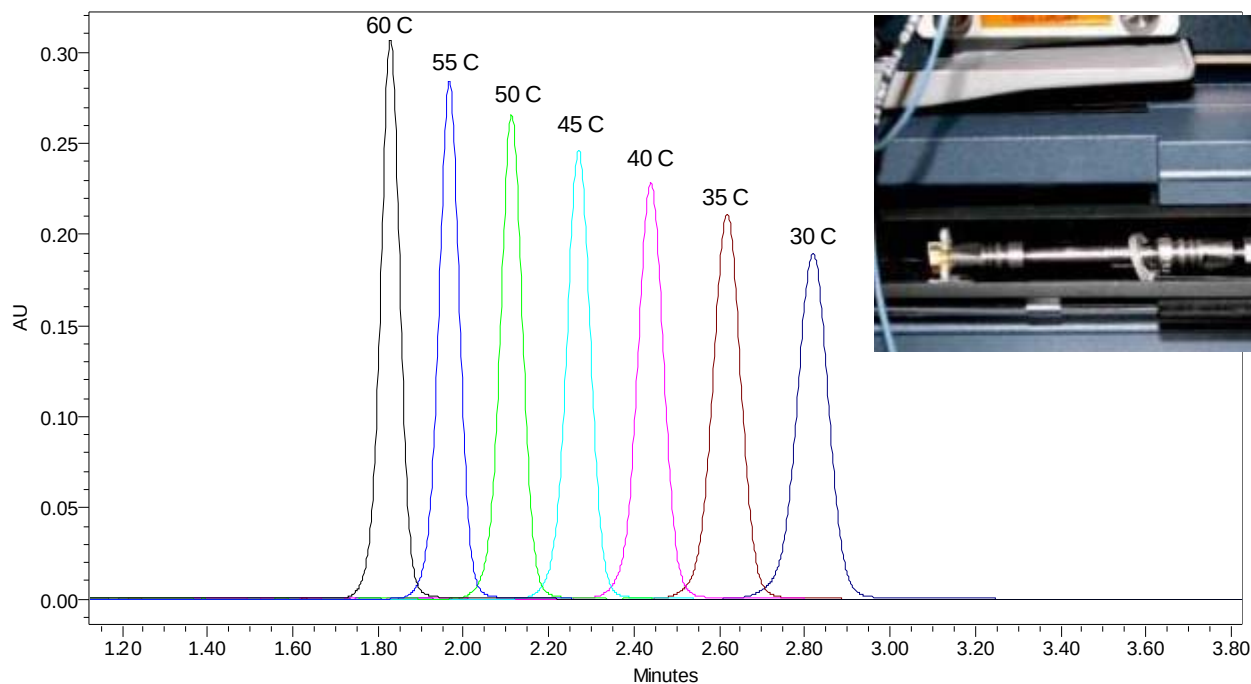


Column compartment at 180 °

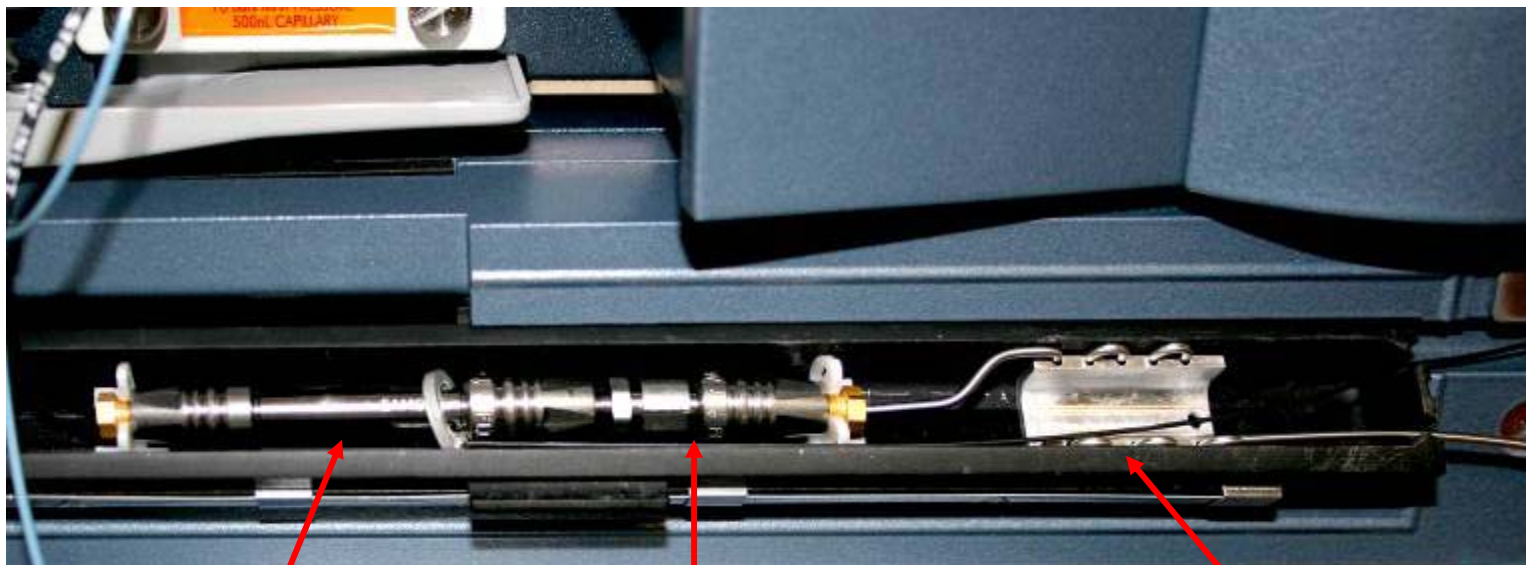


Column Heating

- Column heating requires the Column Stabilizer Tube Assembly
 - Consistent temperature for RT stability – low residency time
 - Solvent viscosity is lower at higher temperatures
 - Lower backpressures at higher temperatures
 - Solvent residency time is short in small columns at high flow rate



Column In-Line Filter Installed



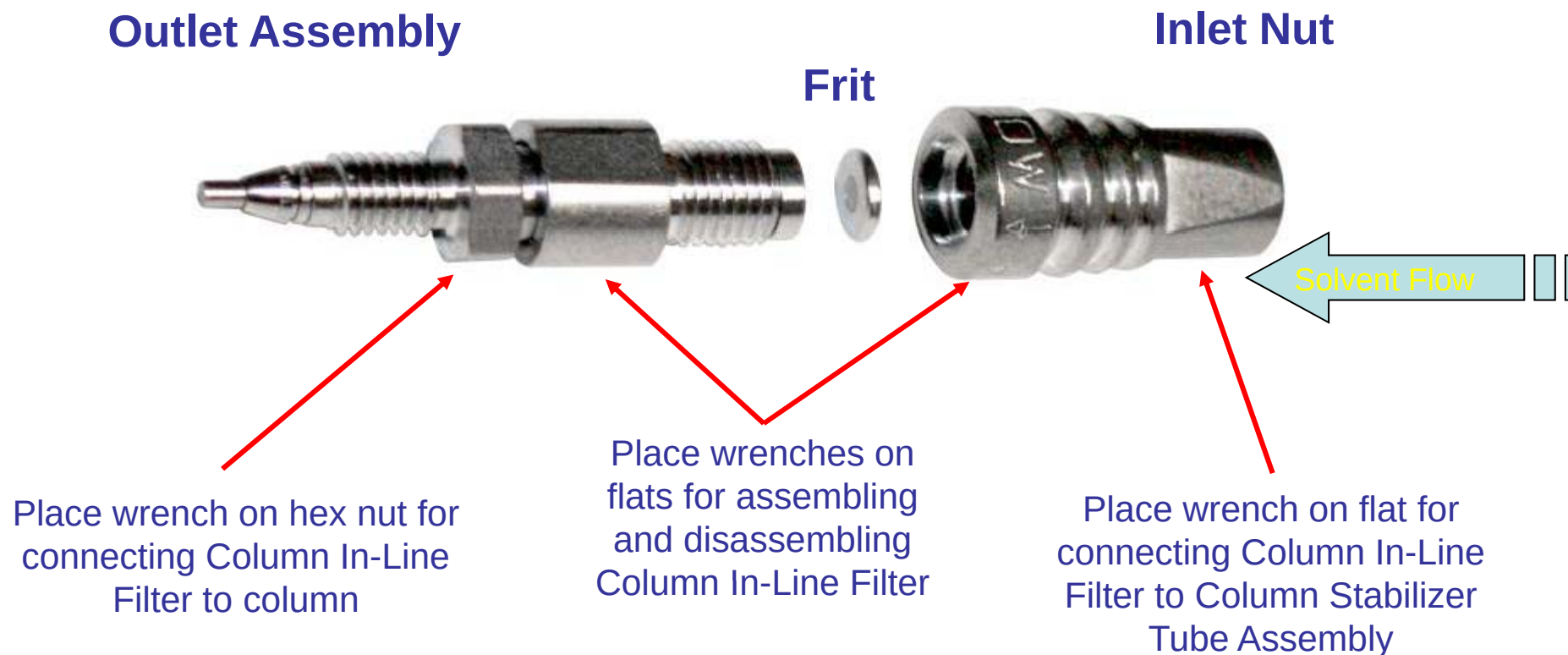
50 mm Length
ACQUITY UPLC™
Column

Column In-Line
Filter

Column Stabilizer
Tube Assembly

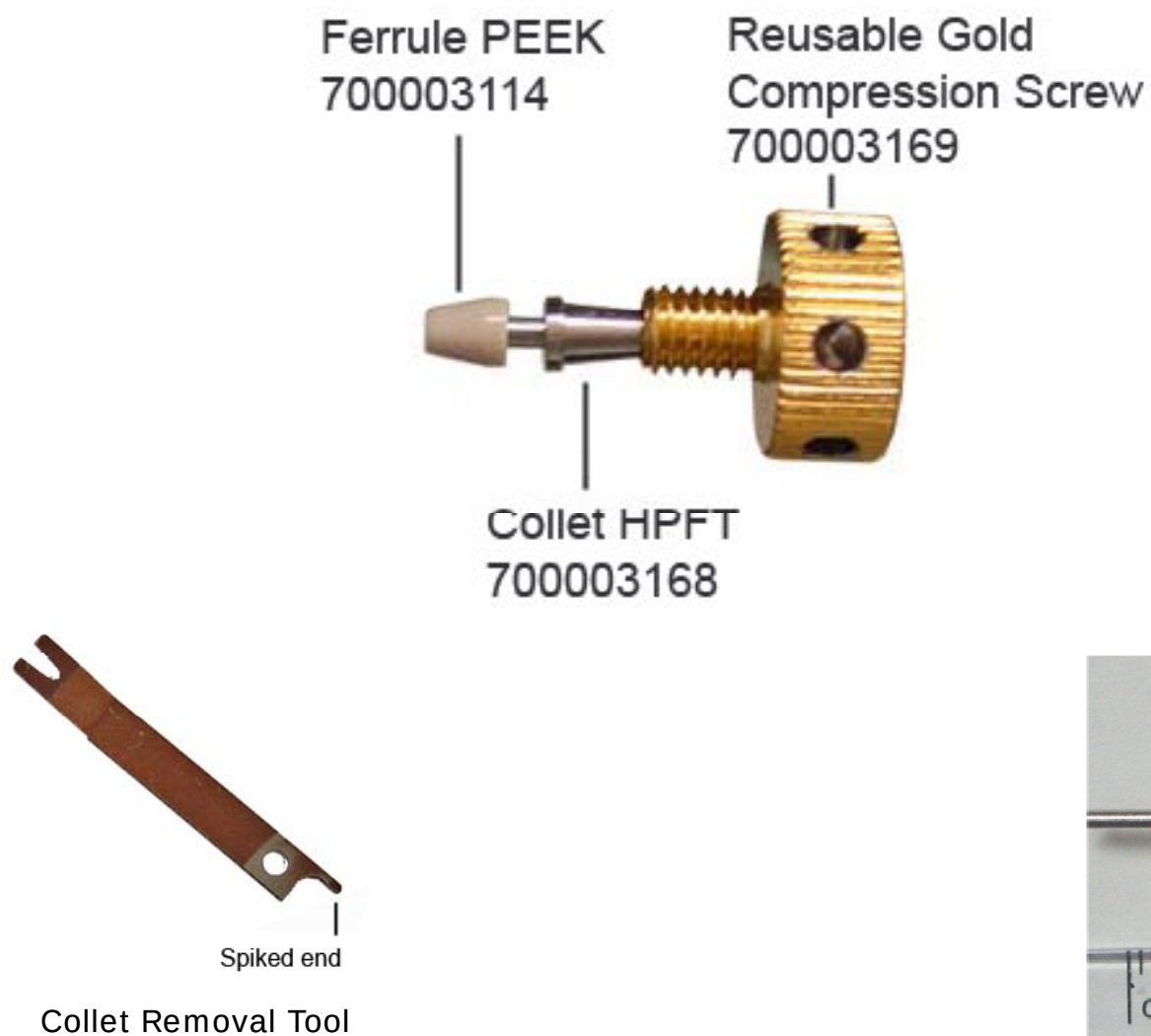
Column In-Line Filter Assembly

– P / N 205000343



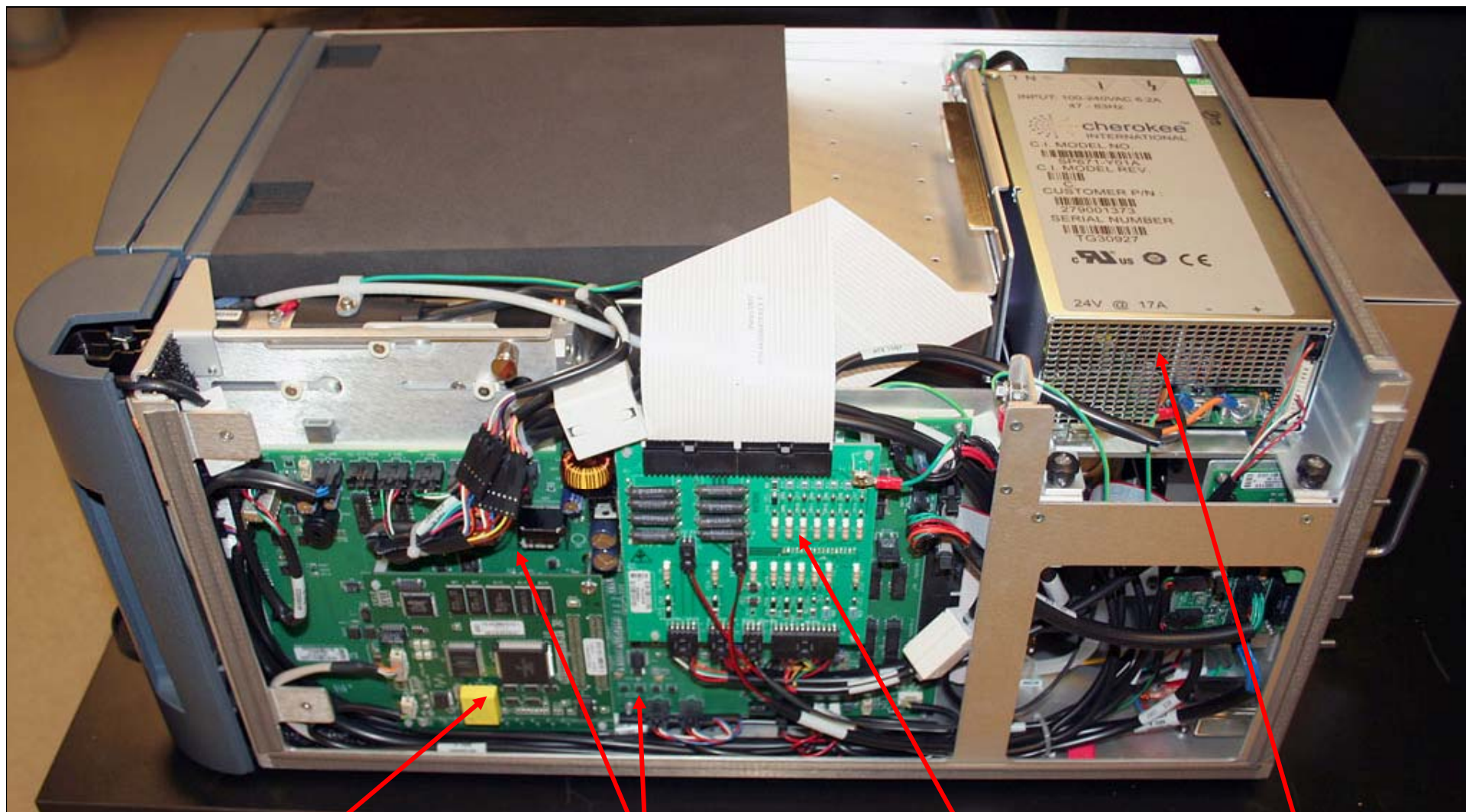
700002775 –Replacement Frits, 5 Pack

UPLC™ Fingertight Fitting



Electronics

SM Side View



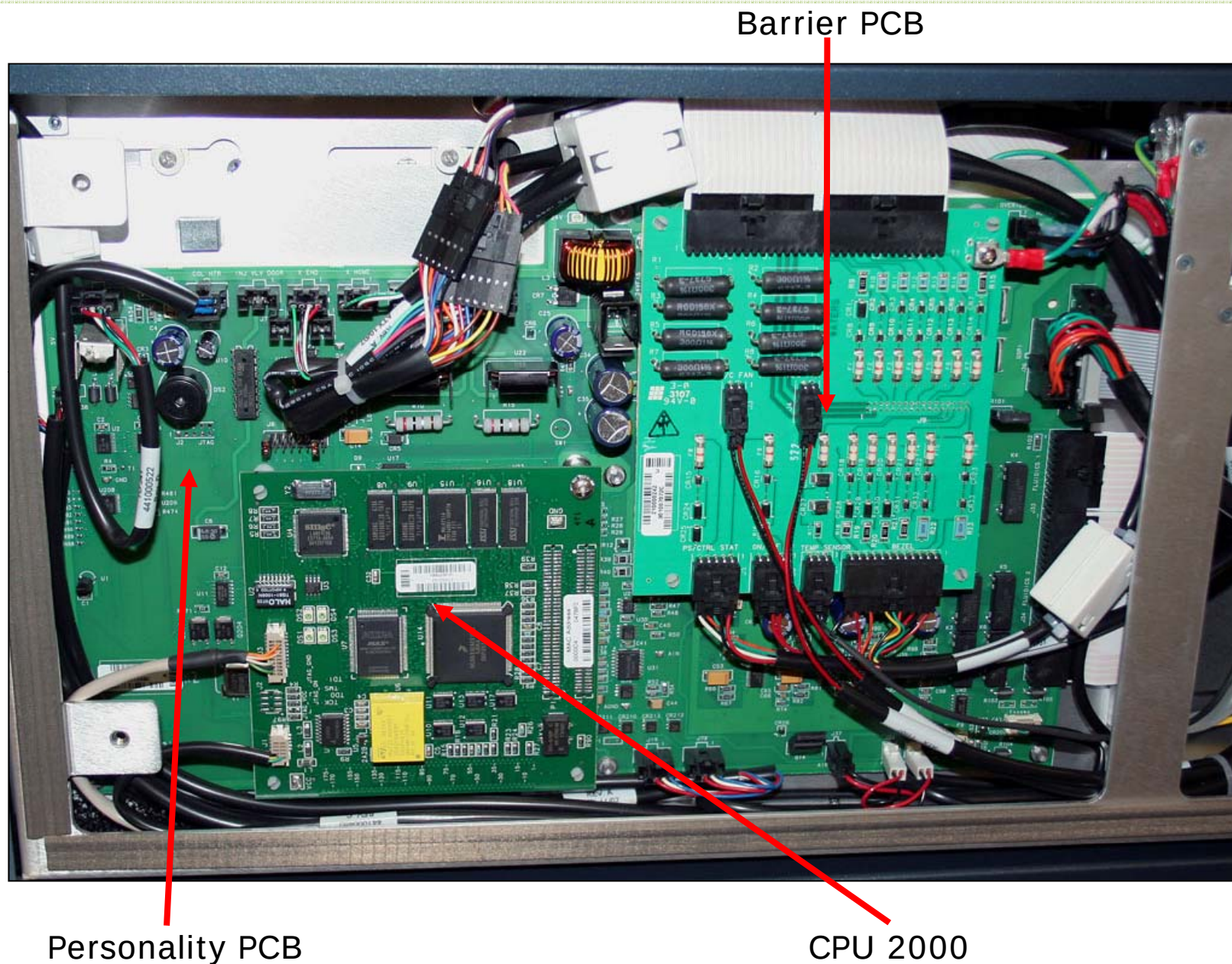
CPU 2000 PCB

Personality PCB

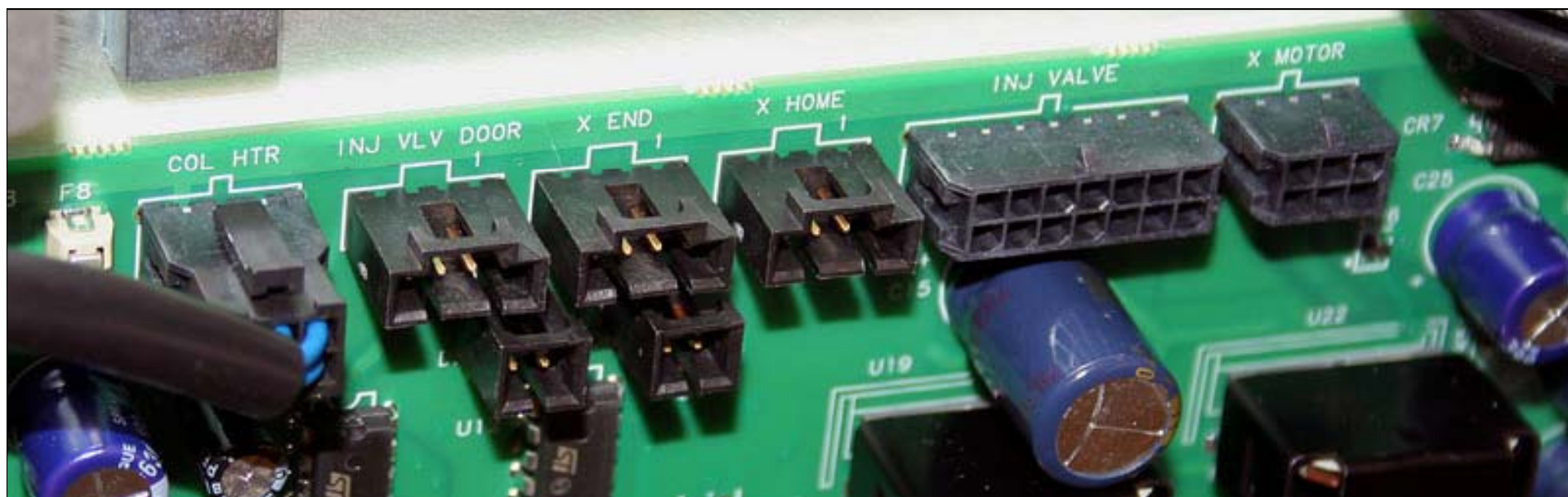
Barrier PCB

Power Supply

Right Side Panel



Personality PCB Connections



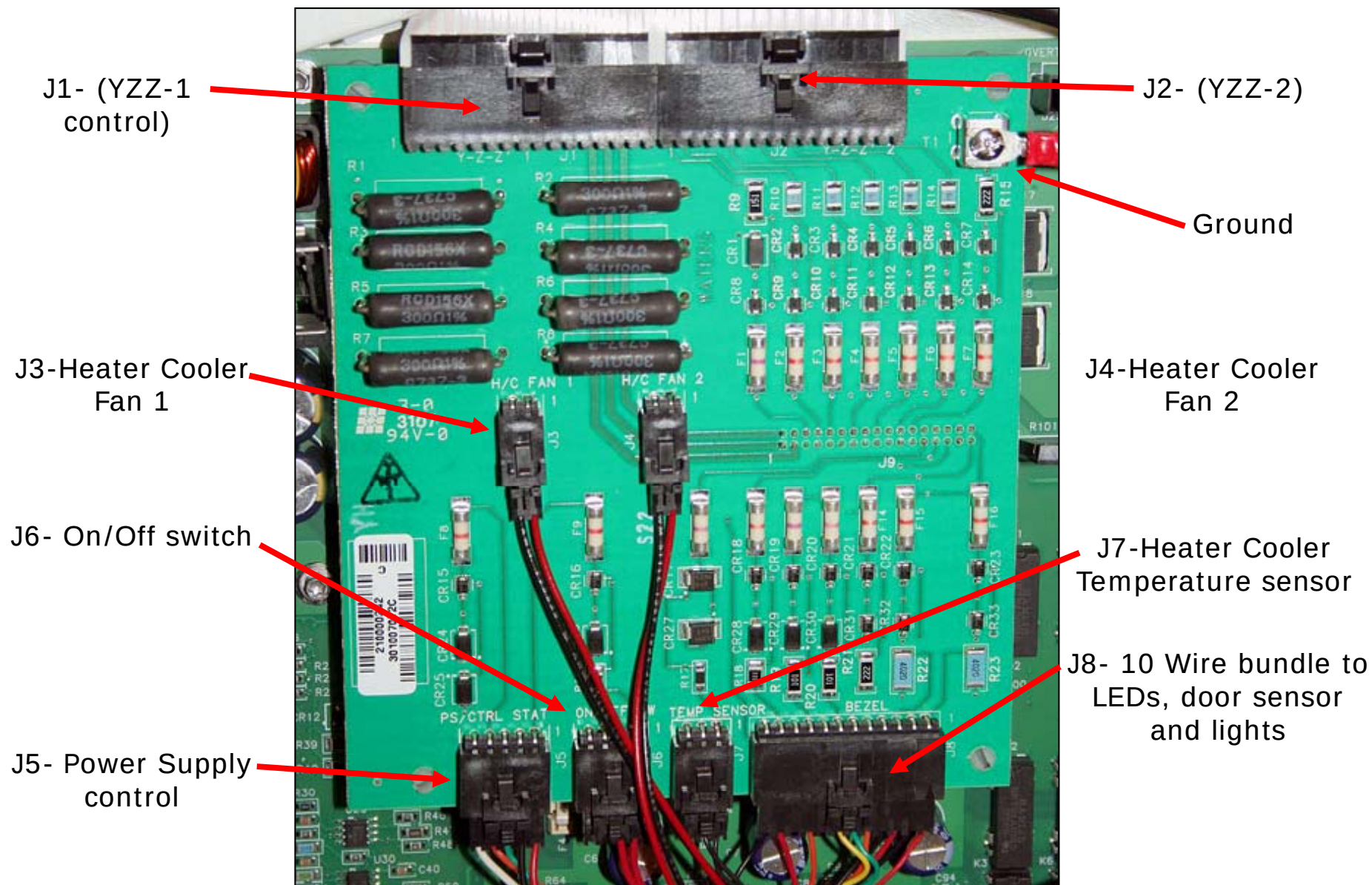
Personality PCB Connections (Detailed in Service Procedure)

- **Ref Name Functional Description Location**
- J3 COLUMN HEATER Column Heater control & Temperature Sensor
- J10 X END X End sensor
- J12 INJ VALVE Injection Valve motor and home sensors
- J14 CPU20002000 CPU20002000 PCB interface
- J15 X HOME X Home sensor
- J17 X MOTOR X Motor drive
- J18 BARRIER Barrier PCB interface
- J19 LEAK DET 2 Dual thermistors of lower Leak Detector assembly
- J21 FAN 1 Electronics Cooling Fan 1
- J22 FAN 2 Electronics Cooling Fan 2
- J25 OVERTEMP Over-temperature sensor of Heater/Cooler A
- J26 POWER IN 24VDC Power Input

Personality PCB Connections

- J28 H/C+ Heater/Cooler positive connection
- J29 H/C- Heater Cooler negative connection
- J32 RS-232 (A) 3-wire RS-232 Serial Communications Port
- J33 FLUIDICS 1 10-wire Flex cable to Fluidics Interface PCB
(Fluidics solenoids, Pressure Transducer)
- J34 FLUIDICS 2 24-wire Flex cable to Fluidics Interface PCB
(Fluidics motors and sensors)
- J35 EVENT I/O 2 Event Inputs, 6 Event Outputs, 1 Chart Output
- J36 QSPI QSPI interface
- J37 AIR PUMP Needle vacuum cleaner air pump
- J38 TAG Column Tag interface
- J39 LEAK DET 1 Dual thermistors of upper Leak Detector assembly
- J41 BUBBLE DET Optical sensor for Bubble Detector

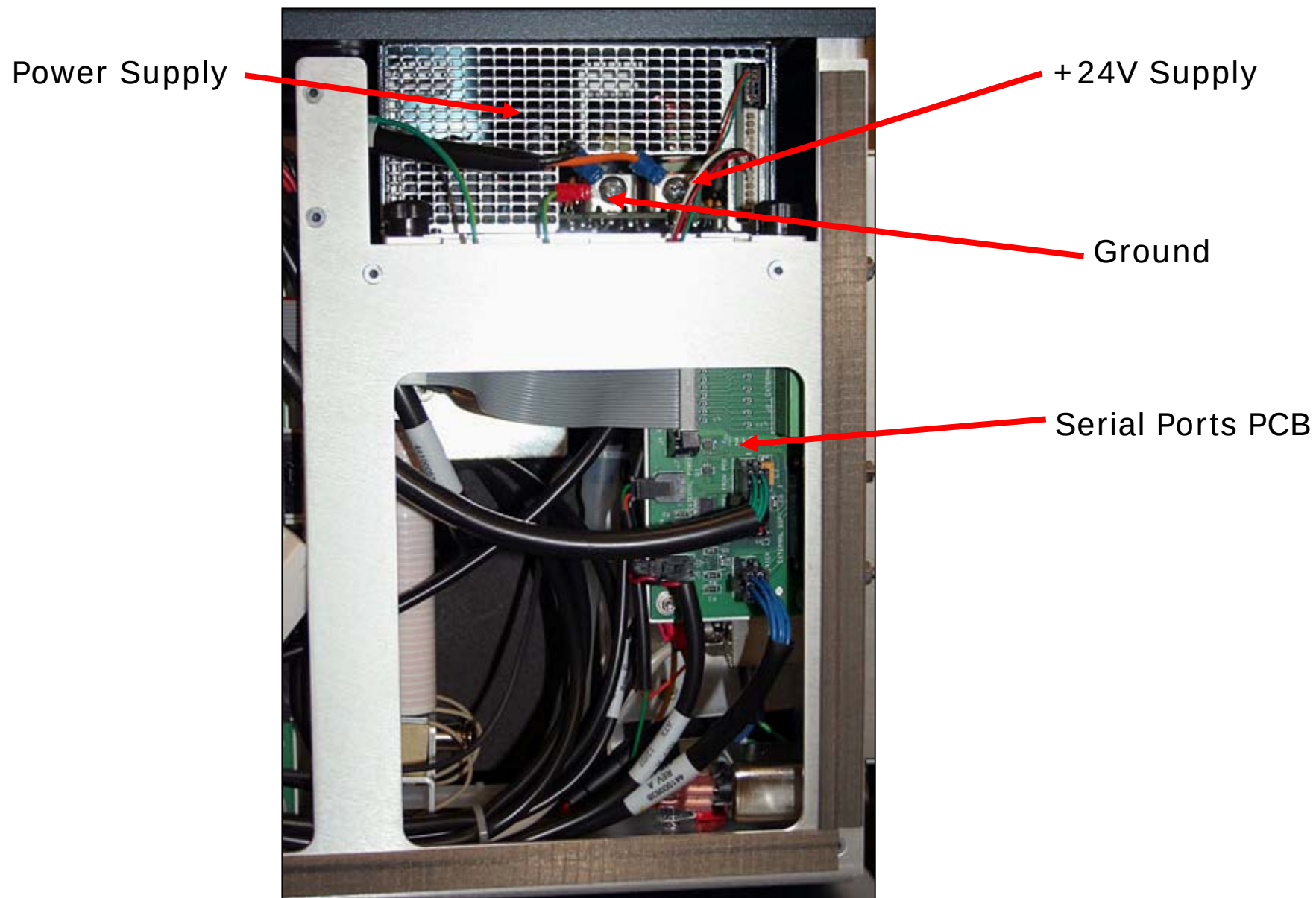
Barrier PCB Connections



Barrier PCB Functions

- XYZZ control
- Heater/Cooler FAN control
- Power Supply control
- ON/OFF power switch connection
- TEMP SENSOR for Sample Compartment Thermistor in unit
- Control of LEDs, door sensor and sample chamber lamp

Right-Rear Side Panel



Power Supply



Ground

AC Line

SM- Rear Panel



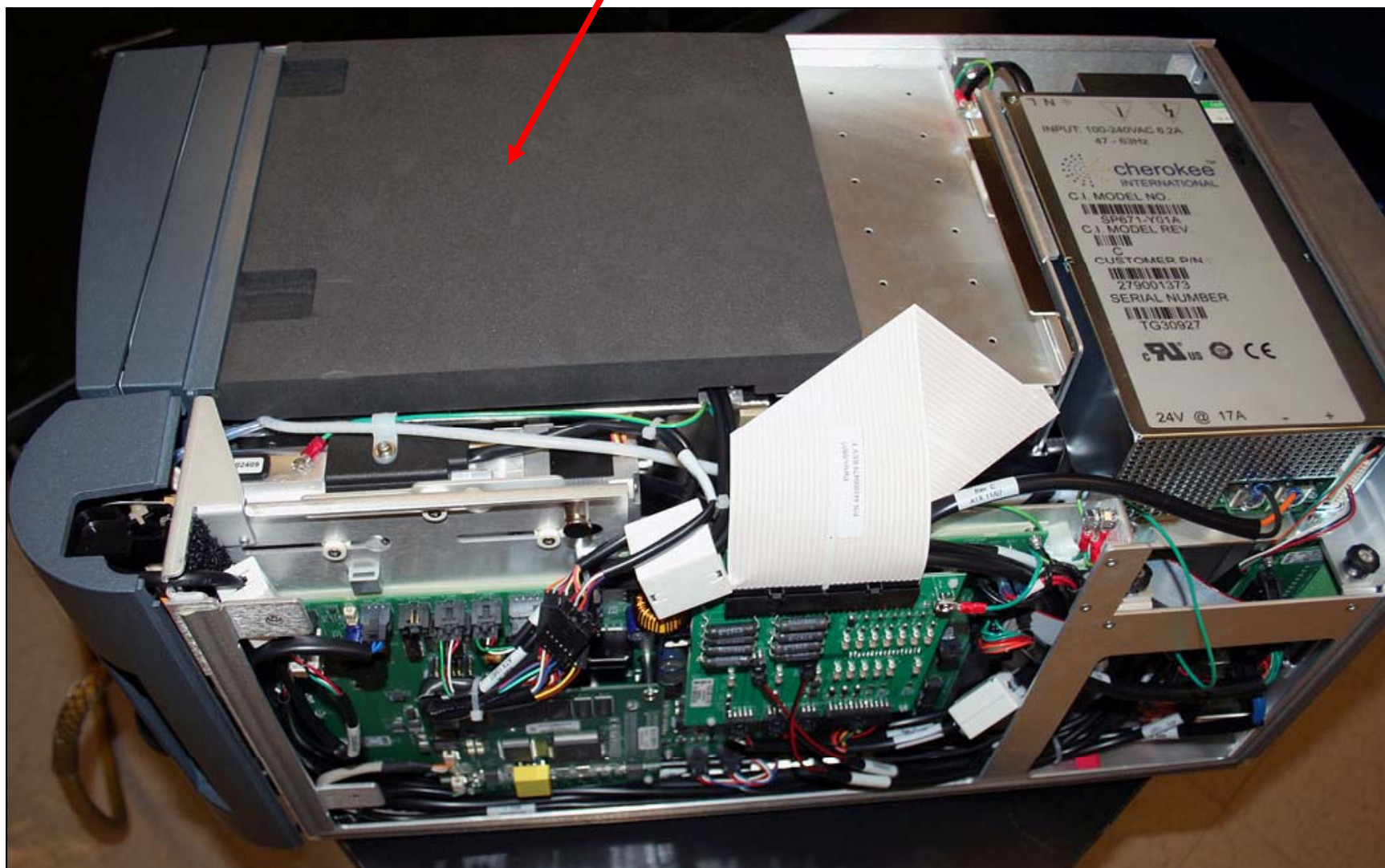
XYZz' Assembly

XYZz' Mechanism Assembly

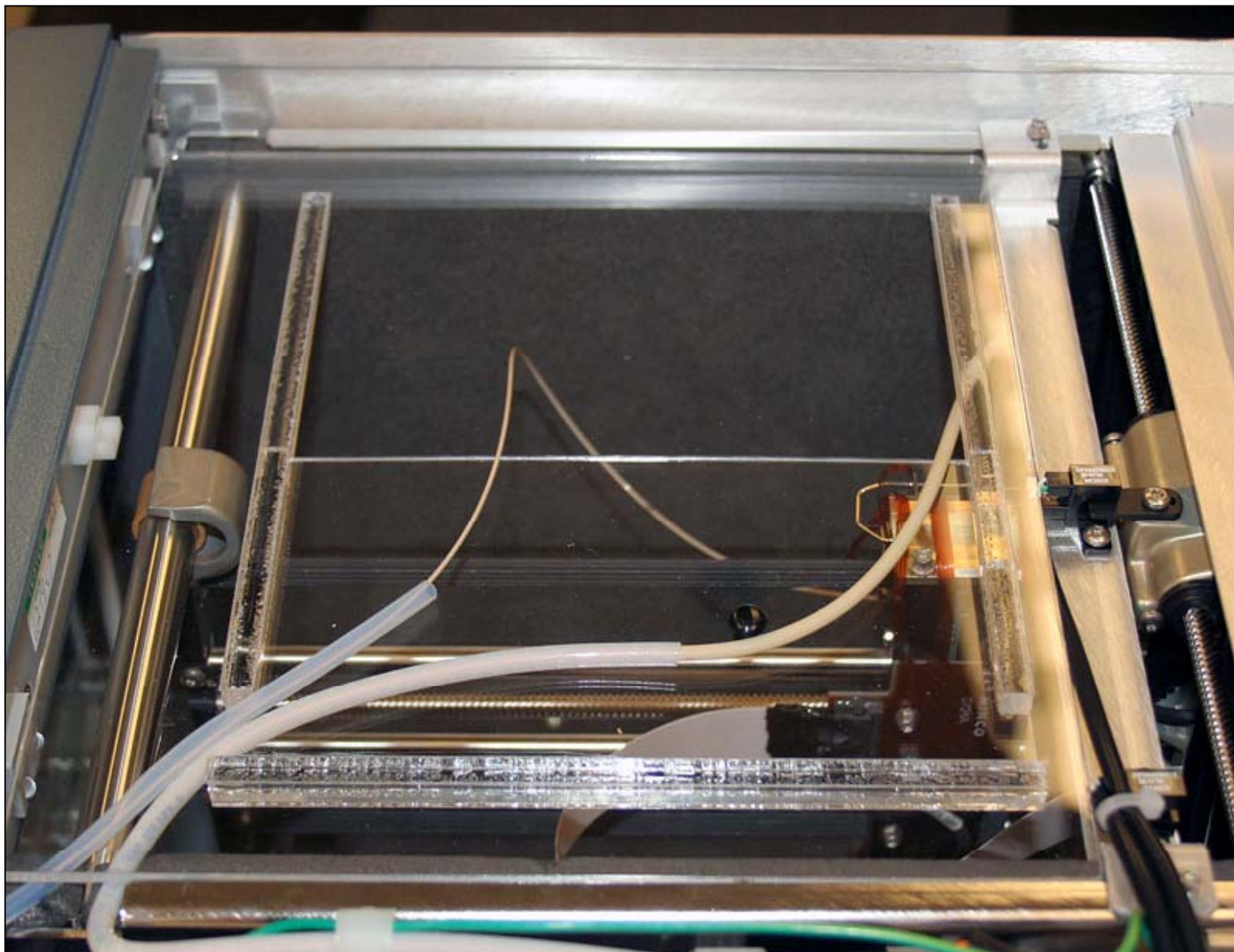
- The XYZ_nz_p Mechanism provides for all non-fluidic S/M motion
 - well to well translation to and across sample plates (in the X-Y plane)
 - to Septum puncture (Z_p-axis)
 - Sample Needle manipulation (Z_n-axis)
- Four separate stepper motors are used to drive the needle with exacting precision to the desired location

SM Top Side View

Insulation for Sample Compartment



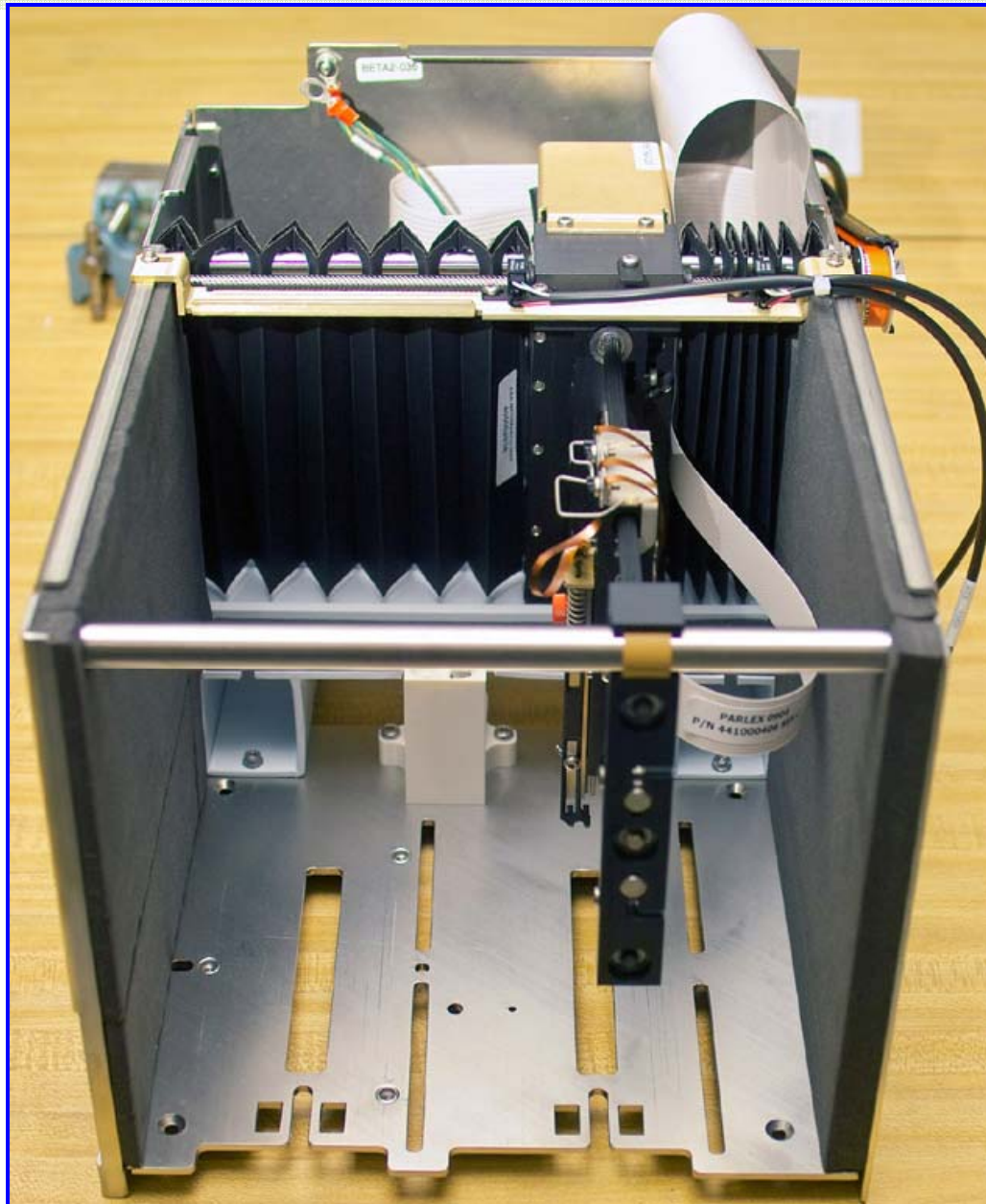
Sample Compartment



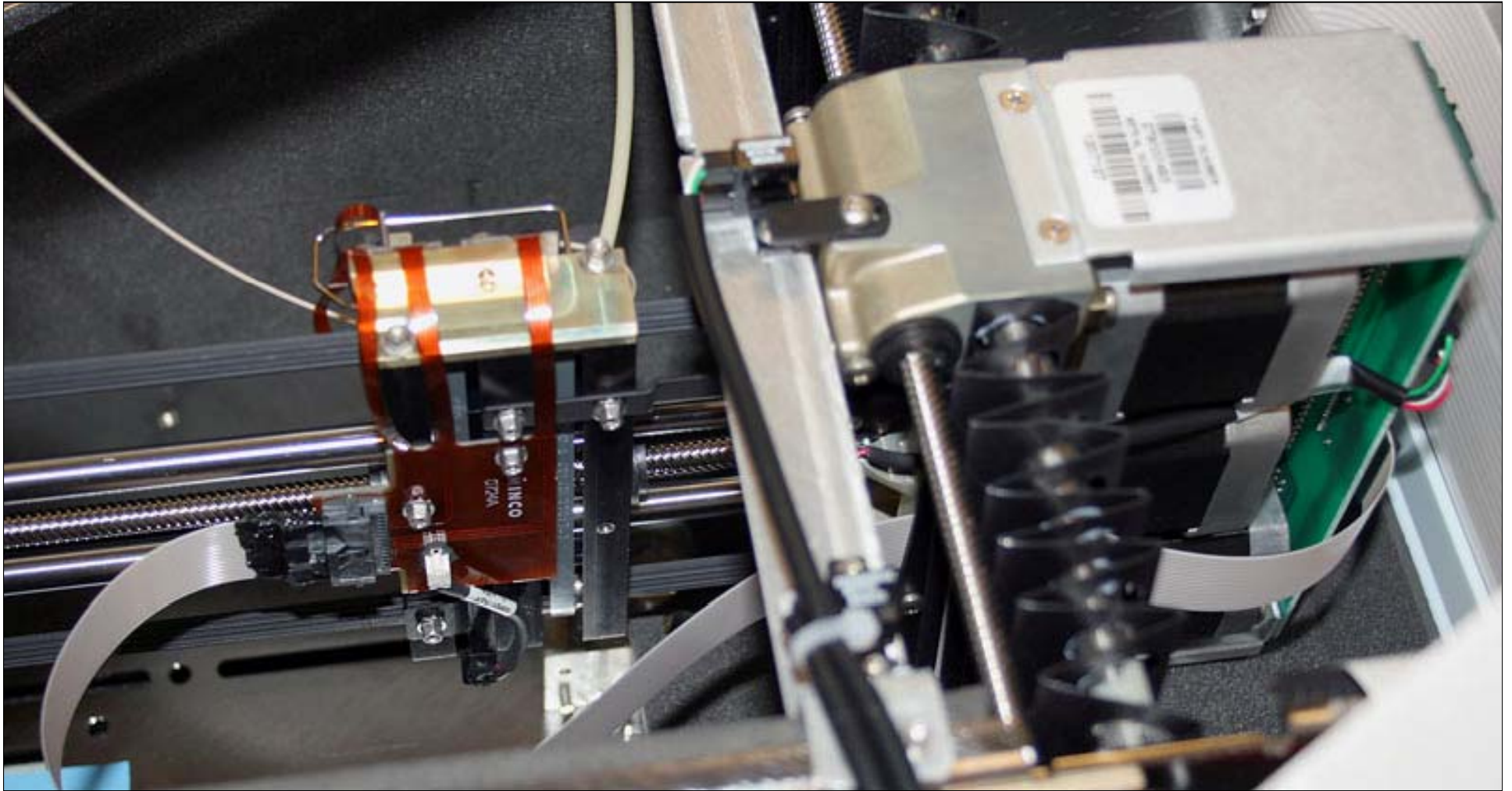
XYZZ Assembly



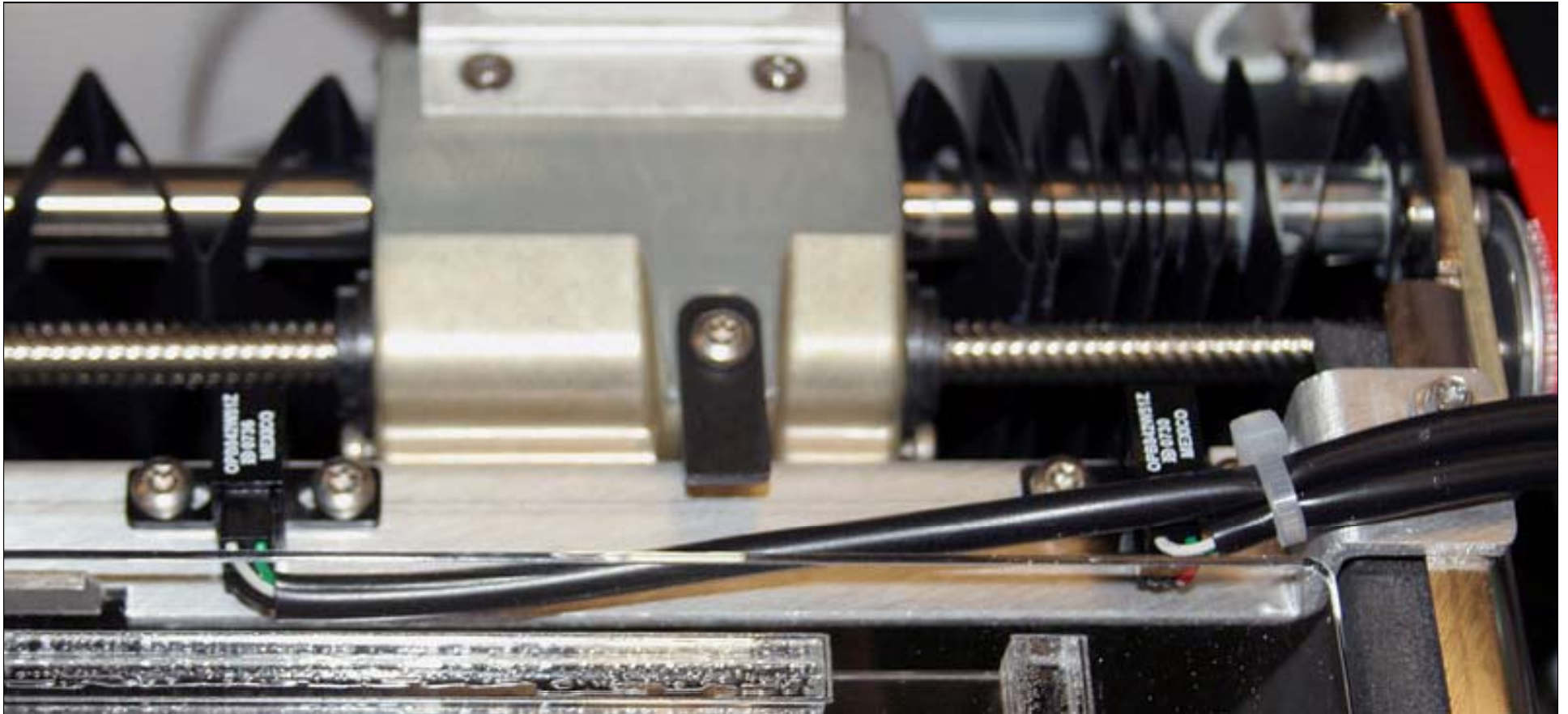
XYZz' Assembly



XYZZ Assembly- Y-Carriage Cable



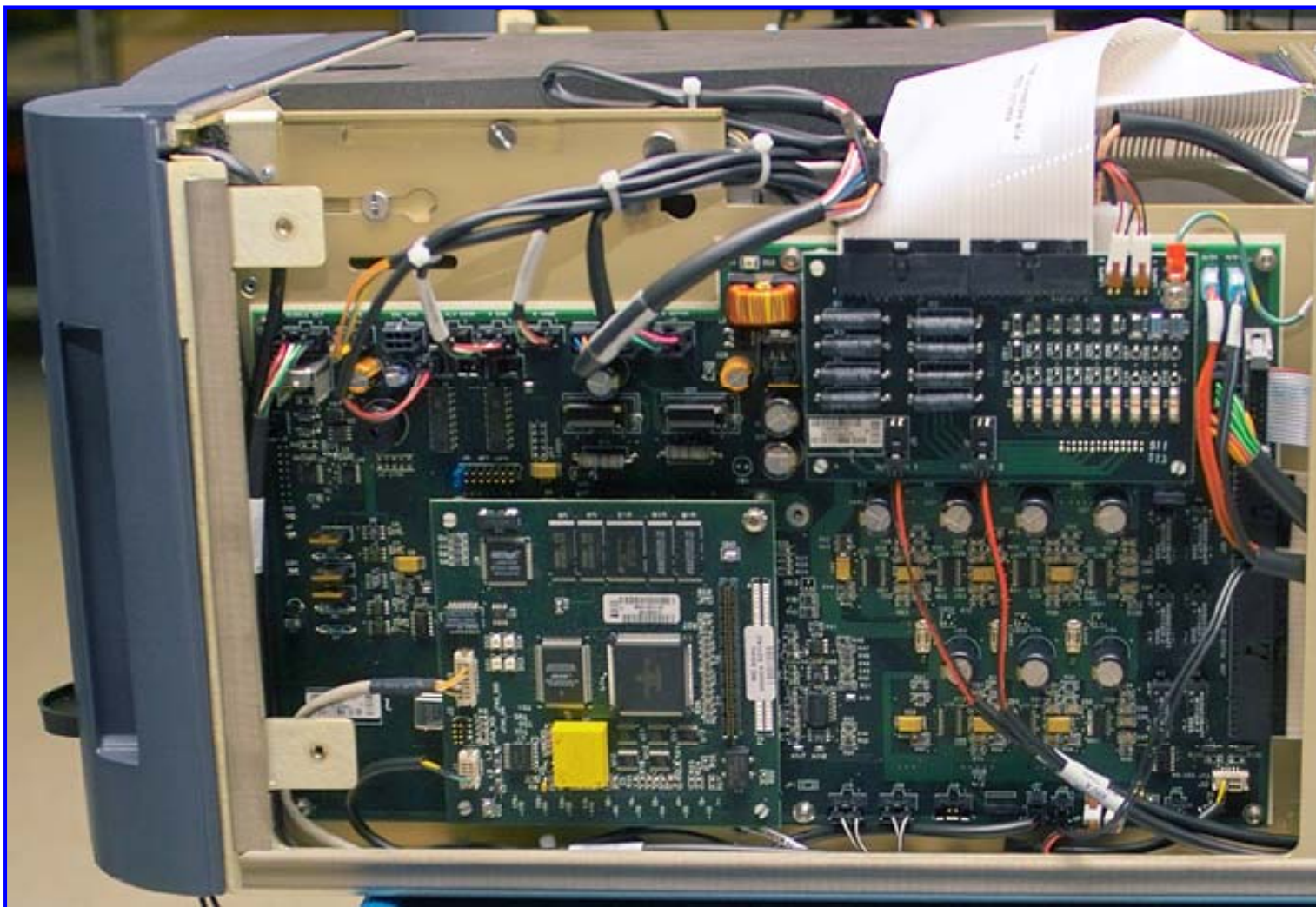
XYZZ Home Sensors and Flag



XYZ_pZ_n Position Calibration

- The “XYZ_p&Z_n Calibration” calibrates the instrument for mechanical tolerances
 - Z_p = Punch Pin
 - Z_n = Sample Needle
- This test needs to be performed every time the following repairs are performed on the XYZ_pZ_n mechanism:
 - Replace or adjust any axis flag.
 - Replace or adjust a home or reference sensor
 - NVRam Battery failure.
 - Z_n when Replacement Needle
 - Z_p when Punch Pin Replace

Printed Circuit Boards



Heater / Cooler System

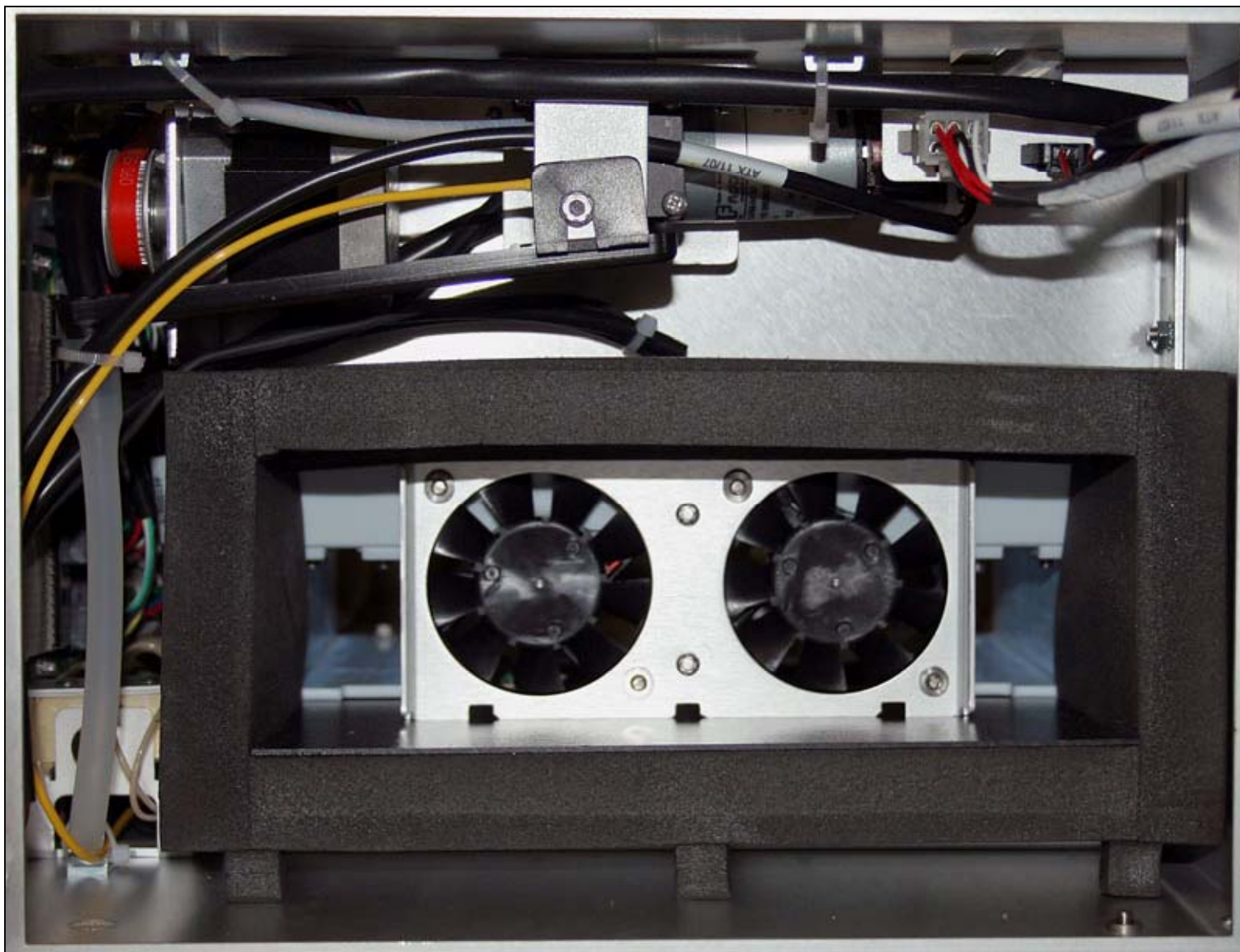
Sample Conditioning

- Sample conditioning is achieved by means of a Heater/Cooler (H/C)
- This employs solid-state P & N type semiconductor based thermo-electric cooling chips to actively cool (or heat) a set of internal fins
- Leaks and condensate is captured and managed by a set of drip trays
- They are arranged so that any accumulated liquid cascades down through the S/M in an organized manner

Heater Cooler Assembly



Heater Cooler Assembly- Insulation and Circulating Fans

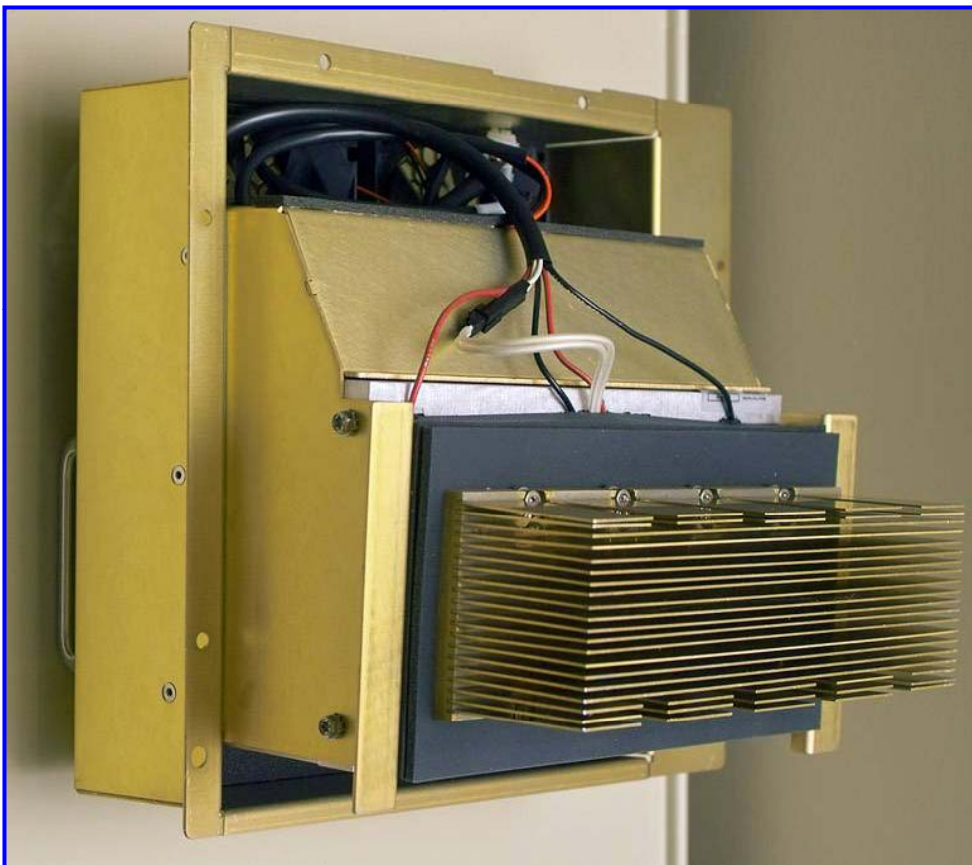


Heater Cooler Assembly

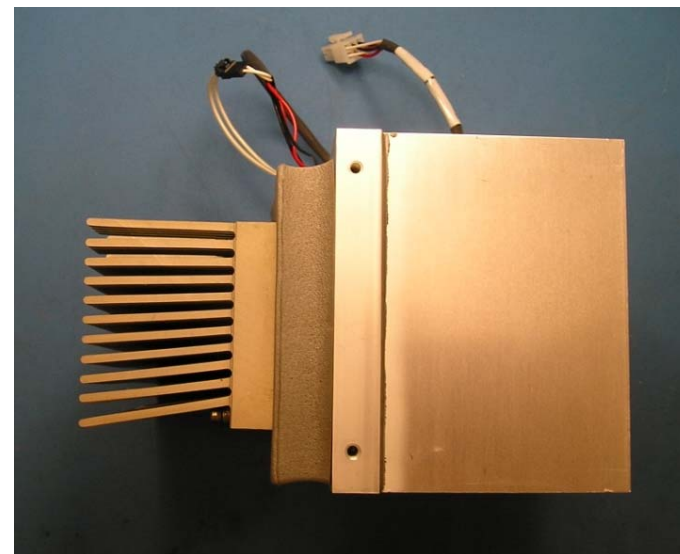


Heater Cooler Engine

Old Style



Old Style



New Style

