XY-2 / XY-3 Sampler

Operation Manual

Publication No.: MB7-52EN-03
Date: July 2008

Read the instructions in this manual carefully before installing or starting the system. SEAL Analytical GmbH can accept no liability for damages due to non-observance of this manual.

The system must be installed, operated and serviced by adequately qualified and trained personnel only!

Using non-SEAL Analytical spare parts will invalidate the guarantee.

Information in this manual is subject to change without notice and does not represent a commitment on the part of SEAL Analytical GmbH.

Where manuals are translated into several languages, the English text is considered as the original.

SEAL Analytical GmbH • Werkstraße 4, D-22844 Norderstedt, Germany •
Telephone (++49) 40-522 02-100 • Fax (++49) 40-522 02-473 •
Email info.germany@seal-analytical.com
Internet http//:www.seal-analytical.com

Contents

List of Figures

1 Introduction

The XY sampler is available in 2 models:

- XY-2
- XY-3

Each sampler can accommodate a variety of different fixtures including standard racks, sample racks, a wash reservoir, a sample probe kit and other accessories.

Possible racks include:

- One Standards Rack for the XY-2 or XY-3.
- Plastic Sample Racks (21, 24, 40, 60 and 90 positions).

The XY2-Sampler can also be fitted with a Dual Probe rack. This rack holds 2 x 40 cups.

Each model can be operated with a Fixed Wash Reservoir and/or a Mobile Rinse Station.

1.1 Customer Service

For technical assistance or service questions please contact your local SEAL Analytical office or distributor or our central customer support centre in Germany.

Please visit our website www.seal-analytical.com to find the one nearest to you

1.2 Description

The XY sampler is a random access single probe sampler for AAII, AA3, TRAACS, QUAATRO and other CFA analyzers. A selection of options and accessories are available.

References to left or right in this manual are based on the reader facing the front of the sampler (as in Figure 1.1).

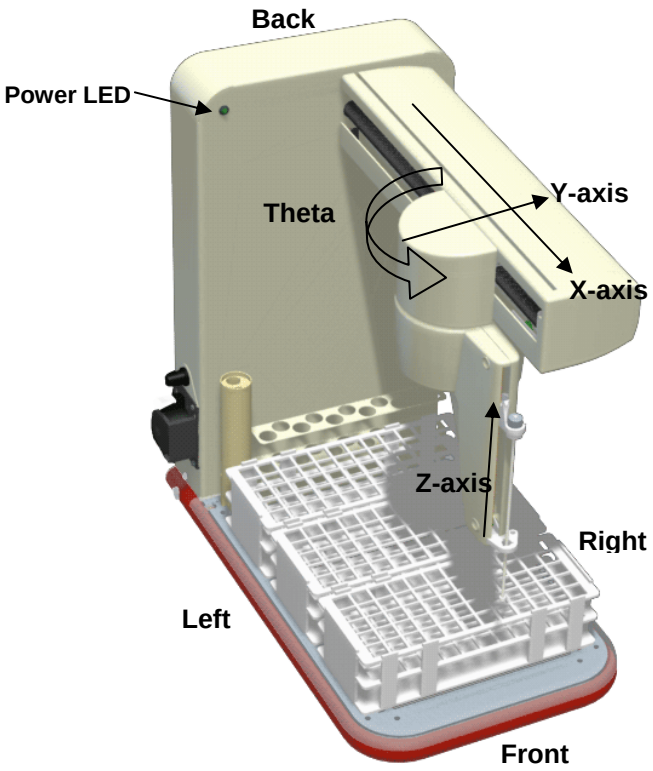


Figure 1.1: Machine Orientation and Axis Description

1.3 Safety Symbols

The symbols below appear on the XY sampler models.

Caution symbol:

Caution: Risk of danger!

Power Switch symbol:

| **Power Supply is ON**

○ **Power Supply is OFF**

1.4 Intended Use

The sampler is designed to automate the delivery of liquid samples to the analyzer. The sampler is controlled through software commands sent by a PC via the PC serial cable.

An Auxiliary serial port is provided to allow other devices to be connected and controlled via commands sent to the sampler.

In addition, the XY-3 sampler provides relay outputs that can be used to connect and control low power devices. These outputs should be limited to loads of 1 Amp or less. Eight digital inputs are also available on the XY-3 sampler to allow the user to monitor electrical signals between 0 and +24 volts.

The sampler should only be used within the stated specifications.

If the equipment is used in a manner not specified by the manufacturer the protection provided by the equipment may be impaired.

2 Specifications

SEAL Analytical reserves the right to change these specifications at any time without notice. .

Table 1 XY-2 / XY-3 sampler Specifications

		XY-2	XY-3
Base plate size:		415mm x 265mm (16.3in x 10.4in)	490mm x 285mm (19.3in x 11.2in)
Height:		435mm (17.1in)	510mm (20.1in)
Shipping Dimensions:	**Single Box**	530mm x 530mm x 400mm, 20.8in x 20.8in x 15.7in (approx.)	600mm x 600mm x 400mm, 23.6in x 23.6in x 15.7in (approx.)
Net Weight		12kg, 26.5lbs (approx.)	15kg, 33.1lbs (approx.)
Shipping Weight:	**Single Box**	15kg, 33lbs (approx.)	19kg, 41.8lbs (approx.)
Power Supply:		50 Watt 100-240VAC 50-60Hz 1.2A No manual voltage adjustments are required. (The power supply unit has international approvals to BS, UL, CSA and VDE standards.)	75 Watt 100-240VAC 50-60Hz 1.8A No manual voltage adjustments are required. (The power supply unit has international approvals to BS, UL, CSA and VDE standards.)
Fuse Rating:		3.15 Amps	5 Amps
Temperature Range:			
Non-Operating		5°C - 45°C, 20 - 80% RH 41°F - 113°F, 20 - 80% RH	5°C - 45°C, 20 - 80% RH 41°F - 113°F, 20 - 80% RH
Operating		10°C - 35°C, 8 - 80% RH 50°F - 95°F, 8 - 80% RH	10°C - 35°C, 8 - 80% RH 50°F - 95°F, 8 - 80% RH
Max. Number of Sample Racks		2	3
Max. Number of Standards Racks		1	2
Dual Probe option		yes	No

NOTE: **The number of racks refers only to racks currently offered by SEAL Analytical.**

2.1 C-Tick and CE Approvals

The sampler is designed and certified to C-Tick and CE standards.

2.2 Trademarks and Copyright

3 Inspection & Unpacking

3.1 External Damage Check

Check the shipping carton for any external signs of damage. If the carton shows any sign of damage then contact the supplier immediately.

3.2 Unpacking

It is a requirement of the warranty that, should it be necessary to return the equipment during the warranty period, the equipment is repacked in the original shipping carton.

Retain the shipping carton for later use.

All items should be unpacked and checked against the packing list. Report any discrepancies to the supplier immediately.

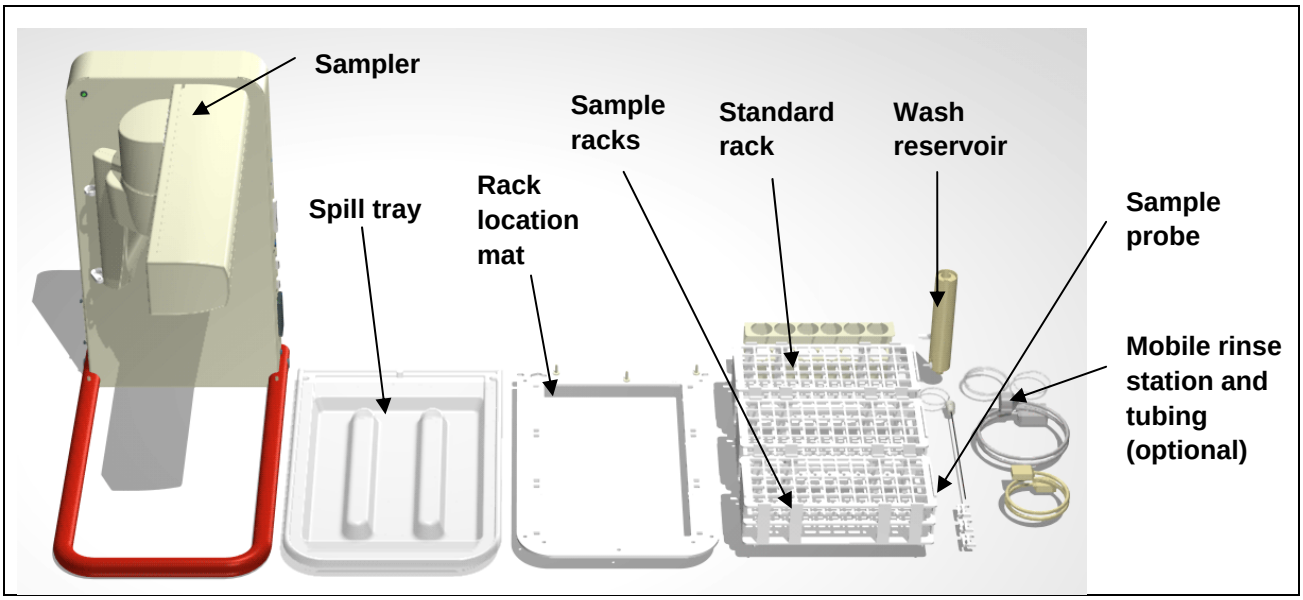


Figure 3.1: Typical Sampler Contents

4 Pre-Installation

4.1 Operator Safety

4.1.1 Electrical

The XY-2 and XY-3 samplers are certified to European safety requirements as per European Council Directives EN 61010:1998 *"Safety Requirements for electrical equipment for measurement, control and laboratory use".*

To reduce the risks of electrical shock, this equipment employs a three-wire electrical cord and plug to connect the equipment to earth ground. To preserve this safety feature:

- Make sure the matching wall outlet receptacle is properly wired and earth grounded to provide a protective earth.
- Never use a three-wire to two-wire plug adapter.
- Never use a two wire extension cord or a non-grounding type multiple outlet receptacle strip.
- Ensure to position the sampler so that it is easy to access the mains power switch or to remove the power cord.
- Any servicing of this equipment which requires removal of covers or panels can expose parts, which involve the risk of electric shock or personal injury. Refer such servicing to trained, qualified personnel.

Ensure that the sampler is always connected to protective earth through the power cord.

4.1.2 Flammable Liquids

Please observe the following when using the sampler in conjunction with flammable liquids: To reduce the risk of fire, the sampler shall not be used to sample flammable liquids with a flame point of less than +50°C to +60°C (+122 to +140°F). Ensure the sampler has no parts in contact with the surface of the fluid or near the surface of the fluid that consume power, produce heat, or conduct heat from other areas in any form.

Furthermore, ensure no parts, in or near the fluid surface are capable of igniting a flammable liquid.

4.1.3 Mechanical

Because the parts of the sampler move automatically, keep clear of the Probe Arm assembly during operation.

The Probe Arm can move fast, and even though the sampler is designed to stop on detecting an obstruction, injury may occur if a user is struck. A protective cover is available as an option.

- **Keep clear of the Probe Arm assembly during operation.**
- **The sample probe is extremely sharp. Never touch it during operation.**

4.2 Side Panel

Figure and Figure below show the side panel layout.

Side Panel Layout

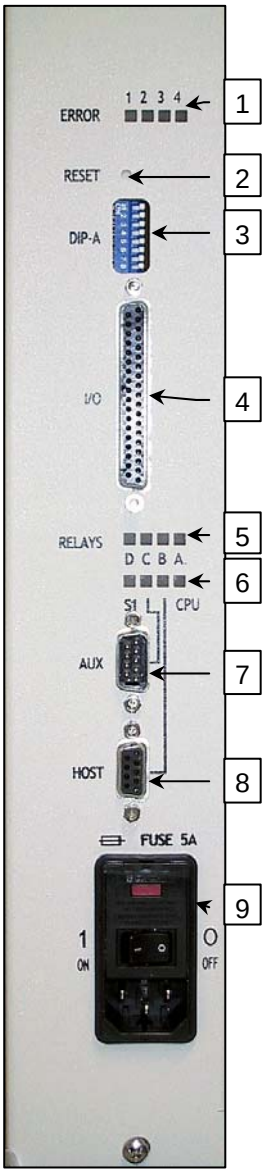


Figure 4.1: XY-3

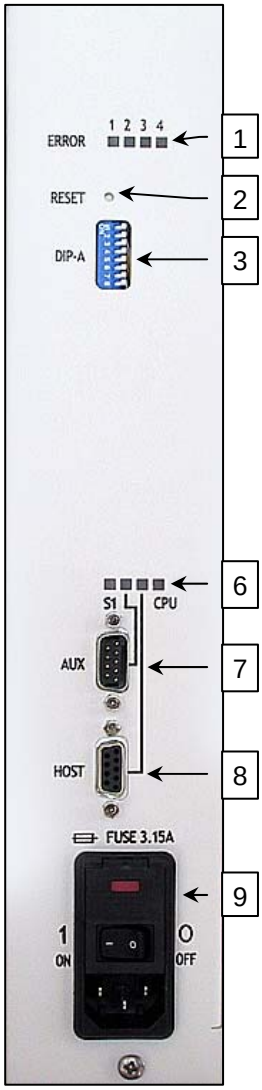


Figure 4.2: XY-2

1. Error Indicators
2. Reset Switch
3. DIP Switch Settings (DIP-A)
4. I/O Port (XY-3 Only)
5. Relay Status Indicators (XY-3 Only)
6. Status Indicators
7. Auxiliary Communications Port (AUX)
8. PC Communications Port (HOST)
9. Power Supply Input

4.2.1 Error Indicators

The Error Indicators are located towards the top of the side panel of the sampler. The lights are blue. These indicators illuminate to show the binary error code for the fault. Refer to 8.1.2 in the Troubleshooting section of this manual for details of the error codes indicated.

4.2.2 Reset Switch

The Reset Switch is used to return the sampler to its initial start up sequence. A small pointed device is required to press the recessed button.

4.2.3 DIP Switch Settings (DIP-A)

The default settings for the Eight DIP switches, numbered 1 to 8 from top to bottom are listed in Table 2. The switch positions are indicated as 0 = Off (Up/Open) and 1= On (Down/Closed).

Table 2: DIP Switch Settings

DIP switch ID	Defaults	Description
SW 1	OFF	Self Test Mode
SW 2	OFF	Reserved
SW 3	OFF	Reserved
SW 4	OFF	Reserved
SW 5	OFF	Baud Rate
SW 6	OFF	Mode Selection
SW 7	OFF	Mobile Rinse Station Expiry Timer (not required with AACE)
SW 8	OFF	Wash Select MRS/FWR (not required with AACE)

4.2.4 I/O Port

The I/O port is only available on the XY-3 model through a 37-way D type connector. The interface provides I/O as follows:

- Eight contact closure inputs.
- Four relay outputs.

The **XY-3** has 4 internal relays with normally open and normally closed contact pairs available on the external I/O connector. These relays are nominated as Relay A, B, C, and D.

The **XY-2** has only one relay; nominated as Relay A. The contacts are only available for internal use in controlling the internal pump if installed. There is no I/O port on the XY-2.

On both models of sampler, Relay A is dedicated to the internal Wash Pump control (if fitted).

4.2.5 Relay Status Indicators

The yellow indicators are located towards the middle of the side panel of the sampler. These indicators illuminate to show the state of the internal relays.

For the **XY-3** sampler the relay status indicators show the status of the equipment relays A, B, C and D incorporated in the sampler. These indicators illuminate when the relay is energized.

For the **XY-2** sampler the relay indicator for RELAY A is shown as the Relay A status in the Status Indicators (refer to Section 4.2.6).

4.2.6 Status Indicators

The status indicators illuminate yellow to indicate various conditions of the sampler:

Table 3: Status Indicators

Indicator Label		Description	Indication
XY-2	XY-3		
Relay A	S1	Programmable Behaviour LED	On when Relay A is energized.
AUX	AUX	Auxiliary Instrument Port activity LED	On when a byte is sent or received on Auxiliary Instrument Port, then Off.
HOST	HOST	PC Interface Port activity LED	On when a byte is sent or received on the PC Interface Port, then Off.
CPU	CPU	Central Processor Unit (CPU) Heartbeat LED	Off for 10 sec. then On for 1 sec. repeating.

4.2.7 Auxiliary Communications Port (AUX)

This port provides the interface connection to accessories. The port operates as connected DCE (Data Computer Equipment) and the accessories as DTE (Data Terminal Equipment).

The port can be used for either RS232 or RS485 serial communication. If there is an internal Wash Pump then the communications must be RS485. It supports multiple devices when used as RS485.

4.2.8 PC Communications Port

Unlike some other SEAL Analytical samplers, the XY-2 and XY-3 samplers are controlled directly from the PC. If your PC does not have a COM port available, use a USB to COM port adapter, for example 167+9066-01 (1 USB to 4 COM ports: needs power supply with European outlet) or 167+9067-02 (1 USB to 2 COM ports: no external power supply needed).

Use the supplied communications cable to connect your sampler to the PC. The physical interface is a standard 9-way “D” type connector. This is a standard RS232C interface.

The PC communication settings needed are listed below. They are normally controlled by the AACE software:

Baud rate:	9600
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	None

The only setting that can be changed on the sampler is the baud rate. To ensure that communication with the PC works correctly, the sampler baud rate must be set to 9600 (i.e. all DIP switches on the sampler must be in the “OFF” position). This is the factory default setting.

4.2.9 Power Supply Input

The power supply input panel incorporates an on-off switch with fuses and pull-out fuse compartment. The Power Indicator is a green LED located at the front, top left hand side of the sampler and indicates when power to the unit has been turned on.

To ensure safety against fire, the sampler is protected by fuses that provide multiple levels of protection against over-current conditions:

- The unit is protected by dual power inlet fuses.
- The internal electrical circuits are protected by fuses.

The internal fuses are not user replaceable and are not accessible to the user.

The Power Inlet fuses are user replaceable fuses. For continued protection against risk of fire, replace the fuses only with the same type and rating specified.

Replacement fuses are available from an Authorized Service Agent. Please contact SEAL Analytical for replacing the fuses.

5 Installation

Be sure to carry out the assembly and test instructions as detailed below.

A typical sampler configuration includes the following items:

- Spill tray
- Rack Location Mat
- Standards Rack(s)
- Sample Racks
- Fixed Wash Reservoir Kit
- Communications Cable
- Power Supply Cable
- User Manual

For electrical safety, always position the sampler so that it is easy to operate the mains power switch or to remove the power cord.

5.1 Spill Tray

The sampler has a separate Spill Tray fitted prior to shipping. In the event of the Spill Tray becoming separated from the unit, follow the procedure below to fit the Spill Tray:

- Ensure the alignment pins protrude above the base support tube.
- Locate the tray so that the two alignment pins at the rear of the base support tube fit into the slots in the Spill Tray.
- Lower the Spill Tray until the front edge rests on the front of the base support tube.
- Check that the Spill Tray is firmly in place by trying to move it from side to side.

Note: The Spill Tray must be located firmly in position without any movement.

5.2 Rack Location Mat

The sampler has a separate Rack Location Mat that is installed on the Spill Tray.
A different mat is required for each type of sample rack.

The sampler is generally shipped with the Rack Location Mat in position. However, if required, follow the procedure below to fit the Rack Location Mat:

- Note that there are cut-outs in the sides and the rear of the Rack Location Mat. These are to slot over the raised locating tabs that are moulded into the Spill Tray to ensure proper alignment.
- Ensure that the slot for the Fixed Wash Reservoir is located on the left side when installing the Rack Location Mat.
- Position the Rack Location Mat over the Spill Tray and press the mat onto the locating tabs.
- Check that the Rack Location Mat fits firmly in place by trying to move it side to side. It should not exhibit any movement.
- If it does not fit properly contact your supplier.

5.3 Fixed Wash Reservoir

The Fixed Wash Reservoir kit is supplied with the inlet and outlet nipples fitted along with inlet and outlet tubing.

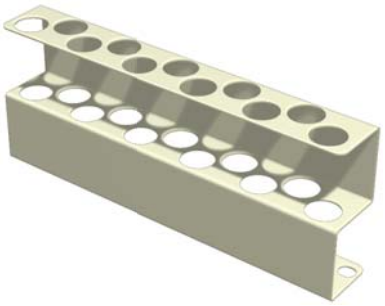
The Fixed Wash Reservoir is mounted to the rear left-hand side of the Rack Location Mat.

Install the Fixed Wash Reservoir as follows:

- Ensure that the Rack Location Mat is firmly installed. Refer to section 5.2 on installing the Rack Location Mat.
- Mount the assembled Fixed Wash Reservoir into the hole provided to the rear left-hand side of the Rack Location Mat.
- The Fixed Wash Reservoir must be twisted clockwise 90 degrees until it locks into position. The nipples on the Fixed Wash Reservoir should be facing the left-hand side of the sampler. (See Figure below)
- Ensure that the Fixed Wash Reservoir is seated correctly by checking that it is both perpendicular and firmly attached to the Rack Location Mat.
- The 5mm nipple is the outlet nipple. Attach the 5mm ID tubing and place the other end of the tubing or drain line in a suitable waste facility.
- The 2.5mm tubing is attached to the inlet (lower) nipple.

Note: The tubing attached to the inlet nipple is to be connected to the wash fluid supply.

5.4 Standards Rack



The Standards Rack is located on the Rack Location Mat by three mounting studs.

To install the Standards Rack:

- Locate the holes for the mounting studs and push the studs into place. The holes for the mounting studs may be positioned at the rear and/or the front of the Rack Location Mat for the XY-3, at the rear of the XY-2 Flat Pack Sample Mat, or on the left hand side for both the XY-2 and XY-3 Micro Titre Rack Location Mat.
- Place the Standards Rack over the three studs on the Rack Location Mat closest to the sampler chassis.
- Place the Standards Rack so that the lowest numbers are adjacent to the Fixed Wash Reservoir.

The rack should be pushed firmly onto the mounting studs to secure its position.

NOTE:
The Standards Racks for the XY-2 and XY-3 sampler are different and not interchangeable.

5.5 Sample Probe

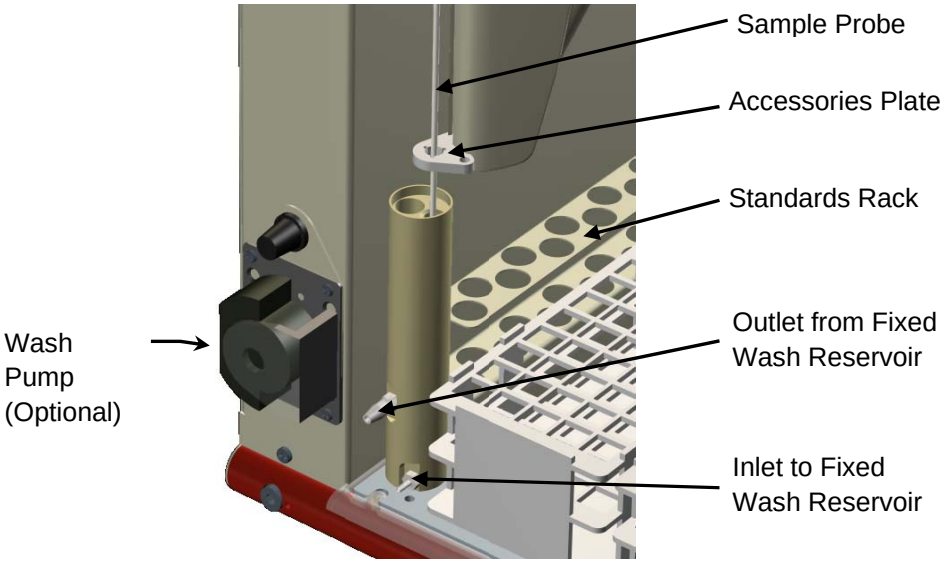


Figure 5.1: Sample Probe in Fixed Wash Reservoir

Always switch off the power to the sampler before installing or removing the probe.

Install the Sample Probe as follows:

- Turn the sampler off. Manually rotate the Probe arm so that it can be easily worked on.
- Move the Z-axis slide to the top of the probe carriage
- Slide the probe mount block into the Z-axis slide, ensuring the probe passes through the accessories plate and secure with the knurled mount nut.

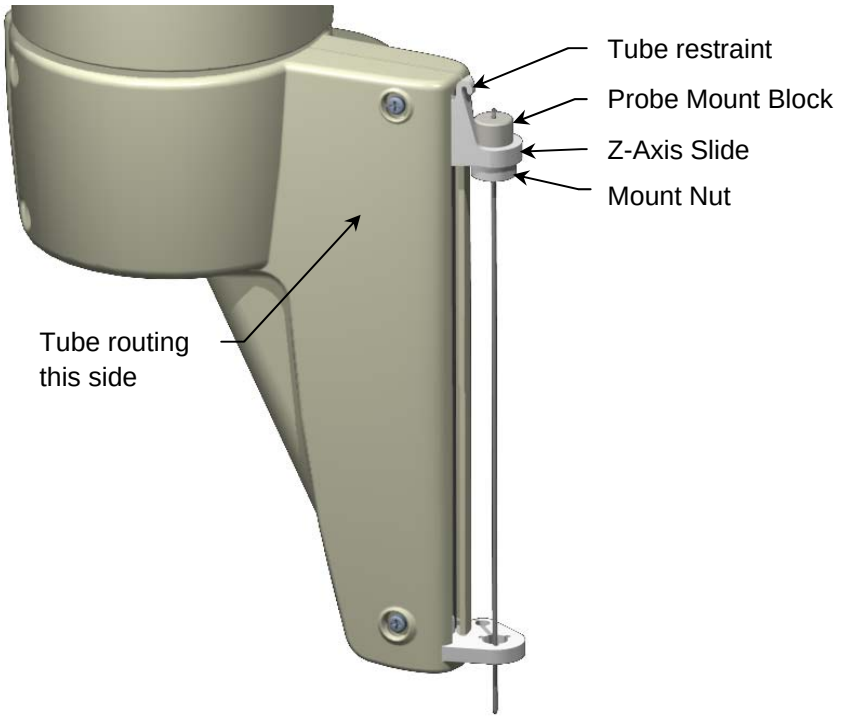


Figure 5.2: Install the Sample Probe

- Clip the tubing into the tube restraint on the Z-axis slider. Allow for a small loop in the tubing to prevent kinking the tubing. Run the tubing to the left around the probe arm housing and attach the tubing using the supplied cable tie through the eyelet at the underside of the housing leaving a loop in the cable tie of 10mm.

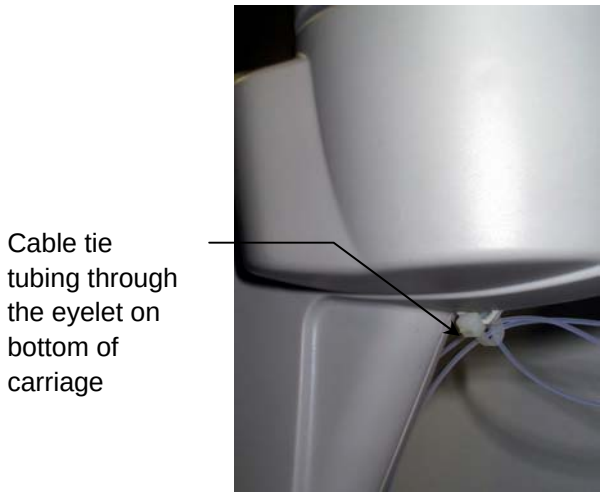


Figure 5.3: Routing the tubing

Locate one tube anchor approximately half way along the X Axis Cover and the second tube anchor towards the back near the column case.

Attach the tubing to middle tube anchor using the two tube markers as shown in the figure below.

Figure 5.4: Routing the tubing.

- Route the tube along the side of the X-Axis arm anchoring the tube in position with correctly spaced tube anchors or the shortest route to the analyzer.
- Adjust the length of the sample line to the analyzer. Position the sampler so that the sample tubing is as short as possible.

5.6 Power Connection

Please note that, in some countries, it may be necessary to fit a suitable power plug to the cord. A three pin earthed power outlet must be used.

Ensure that the sampler is always connected to the mains supply protective earth.

Connect the power cord to the sampler and power supply outlet.

Do not switch on the sampler until all checks and settings for the Operating Mode have been completed.

5.7 Conversion to Dual Probe (optional)

The XY2-Sampler can also be fitted with a Dual Probe rack. This rack holds 2 x 40 cups.

Figure 5.5: Dual Probe Sampler

For the conversion of your XY-2 Sampler Single Probe to Dual Probe, you need the following installation kit:

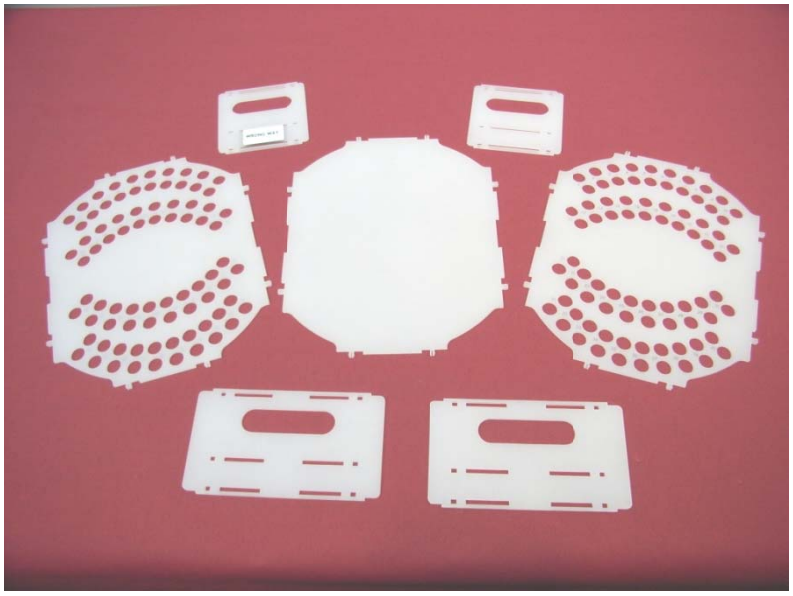


Figure 5.6: Dual Probe rack and mat

Figure 5.7: Sample Probes and holder

Figure 5.8: Fixed dual wash receptacle and tubings

<u>Before</u> modifying the sampler hardware you have to change the configuration in AACE (version 6.4 or higher) to 'XY2-Sampler Dual Probe' and start charting. AACE sends the new parameters of the wash receptacle and the sample rack to the sampler. Afterwards stop charting and start to modify the sampler.

5.7.1 Rack Location Mat for Dual Probe

The sampler needs for Dual Probe a specific Rack Location Mat that must be installed on the Spill Tray. Follow the procedure as described in section 5.2 to fit the Rack Location Mat.

Figure 5.9: XY-2 Sampler with dual probe location mat

5.7.2 Building the Sample Rack for Dual Probe

The dual probe sample rack is delivered in four pieces and must be fitted together. The figure below shows the assembled dual probe sample rack:

Figure 5.10: Sample rack for Dual probe (P/N : 169+5401-02)

5.7.3 Dual Probe Wash receptacle

The Dual Probe Fixed Wash Reservoir kit is supplied with tow inlet nipples and one outlet nipple fitted along with inlet and outlet tubing. The installation procedure is the same as for the Single Probe Sampler. Refer to section 5.3 for further details.

Figure 5.11: Dual probe wash receptacle

5.7.4 Dual Sample Probe

Always switch off the power to the sampler before installing or removing the probe.

For the installation of the Dual Sample Probe you can follow the same procedure as described in section 5.5. The only difference is that the parts are provided for two sample probes. Figure 5.12 shows the probe arm where two sample probes are mounted.

Figure 5.12: Dual Sample Probe

6 Operation

6.1 Start-up

To switch the sampler on follow the procedure below:

- Ensure the sampler is connected with a three pin earthed power cord to a three pin earthed power outlet.
- Turn on the power.
- The sampler will start up and perform an initialisation routine.

The initialisation routine moves the probe arm through the extents of the samplers working envelope and returns to position the probe above the Fixed Wash Reservoir position.

IMPORTANT: Should the probe fail to initialize or to run through the sample and standards positions successfully, refer to the Trouble shooting section of this manual.

6.2 Operating Mode

The operating mode must be set to the XY sampler mode.

The mode is selected via a DIP switch setting on the right side of the sampler case.

The DIP switch setting is:

DIP Switch	Setting	Default
SW6	OFF = XY sampler mode ON = (not available with AACE)	OFF = XY sampler mode

The XY sampler mode gives the user the ability to set and configure the operating parameters of the sampler as well as use all of the commands available for operating the sampler.

Automatic Probe Movements

In XY sampler mode, all actions for controlling the Sample Probe movement are controlled by the AACE software.

6.3 Wash Pump Control

These remarks apply to the small auxiliary wash pump, not to the main AA3 or QUAATRO system pump.

Integrated Pump

The **XY-2** sampler Pump speed is constant and can be controlled by AACE.

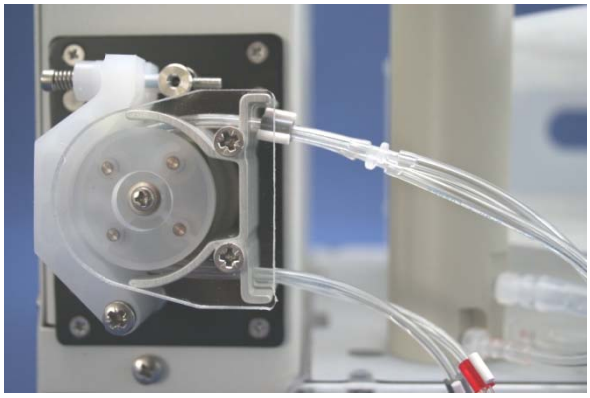


Figure 6.1: Optional wash pump for XY2-Sampler

The **XY-3** sampler Pump speed is adjustable via the Speed Control Knob fitted above the pump.

Refer also to section 11 for installation of the additional wash pump.

External Pump

If the XY-3 sampler is required to control an external pump, this can be achieved using a relay output contact through an external connector. The relay contacts can be controlled through the relay commands. Refer to section 4.2.4 for details on the connector.

7 Maintenance

The **XY-2** and **XY-3** have been designed for low maintenance and there are no user adjustments necessary under normal operating conditions.

General user maintenance is restricted to:

7.1 Cleaning

Periodic cleaning of the sampler covers, spill tray, rack location mat and accessories with a damp soft cloth and diluted mild detergent.
This will assist to preserve the plastic components and painted surfaces.

IMPORTANT: Spillage should be cleaned immediately to preserve the life of the instrument.

7.2 Lubrication

The sampler is self lubricating and does not need the user to apply lubrication.

7.3 Service

Service of the XY-2 and XY-3 must be performed by an Authorized Service Agent.

8 Troubleshooting

It is necessary to distinguish between an error in the sampler and an error in the PC control software. The following sections provide useful steps to diagnose most problems encountered with the sampler.

The sampler is designed with tools (reset procedures, self-test sequence and error indicators) to assist in identifying the problem area(s).

- The error indicators provide useful information on the error state of the sampler. Refer to Section 8.1.2.
- The reset procedure identifies problems with movement of the sampler in X, Theta and Z axes. If the unit successfully completes the reset procedure then this confirms that the motors operate and the action of the carriages is correct.
- The self-test sequence will test that the sampler functions in X, Theta, and Z axes by moving through the standard and sample positions for the currently loaded mat and rack settings. It does not test the serial communications. If the self-test sequence is successful, it is only necessary to check the serial port connection to the PC.

Contact the Authorized Service Agent for issues beyond the scope of this document.

8.1 Communications

- Check that the external DIP switches are set correctly; refer to Section 4.2.3 for DIP Switch defaults.
- Check that the PC and the sampler have the same communications parameters set; refer to Section 4.2.4 for PC configuration settings. The parameters are normally controlled by the AACE software.
- Check that the PC to sampler RS232 cable is firmly connected and screwed into place.
- Initialize the sampler to ensure that it is in a working state. Turn off the power switch, wait 10 seconds and turn the power switch on.
- Using the PC, send commands to the sampler.
- Check to determine if the PC (Host) LED flashes while commands from AACE are being sent to the sampler. If the PC LED flashes, the sampler has received a character from the PC. It will always respond on receipt of the Carriage Return (Enter Key) regardless of the success of the message (this will indicate the Baud Rate is correct).
- If the PC LED does not flash, confirm that the sampler is functioning by watching for the CPU Activity LED to flash. This should take about 10 to 15 seconds. If this does not occur, reset the sampler to ensure that it follows through the reset sequence and then wait until the CPU Activity LED flashes. If this is successful then retest from step 5 above. If unsuccessful, contact the Authorized Service Agent.

8.1.1 Operating State Check

There are four external indicators used to identify the functioning state of the sampler:

Refer to the following table for a summary on these indicators.

INDICATOR	MEANING / ACTION
The green indicator on the front of the sampler	If it is illuminated then the main power supply is operational. If it is not lit then toggle the Power Supply Switch on the side of the sampler. Wait 10 second before turning the unit back on. If the unit initializes but the light does not come on then the indicator is faulty. If the unit does not initialize and indicator does not light then it is possible that either the power supply fuse has blown or the internal power supply is faulty.
The CPU Activity LED on the side of the sampler	If the LED flashes at 10 second intervals then the internal computer is operating and the power supply is operational. If the indicator does not light then it is possible that: • The internal power supply is faulty. • The main electronics board is faulty. • The indicator is faulty. Further confirmation of a failure can be obtained by observing the status of the other LED indicators, the communications, and by resetting the sampler by powering off, then on. If it does not perform the initialisation sequence by driving the probe arm then there is a fault. Contact the Authorized Service Agent.
The PC communications LED	This LED flashes when serial communications from the PC is received. Use the PC or other computer to send serial commands to the sampler. If the LED flashes, then the internal computer is operating, it is receiving characters from the PC, and its power supply is operational. **NOTE**: The flashing only indicates that a character has been received. It does not indicate that the character is correct.
The Error Status Indicator LEDs	These LEDs show the status of the sampler and the error state. Refer to the error codes in the Section: 8.1.2.

Generally, if all these indicators are active then it is reasonable to assume that the sampler's electronics are working correctly.

If the problem affecting operation cannot be identified, call the Authorized Service Agent.

8.1.2 Error Status Indicator Codes

Error indicators have been provided to give a quick view of the status of the sampler and of what could be the cause of the unit not functioning correctly.

The error indicators are a line of blue LEDs on the side panel of the sampler and are used to provide a visual indication if an error has occurred. If an error occurs, the binary error code is indicated and an error message is sent to the Host. e.g. Error 7 = 0111 a Theta-axis position error, where E4 is the least significant bit in the binary code. Other more extensive error reporting is available via the software commands.

Refer to Table 4: Error Indicator Codes for a description on the Error codes.

Table 4: Error Indicator Codes

E1	E2	E3	E4	Error	Error Description	Action
0	0	0	0	0	No Error.	-
0	0	0	1	1	Reserved.	-
0	0	1	0	2	Program memory check-sum error.	Contact the Authorized Service Agent
0	0	1	1	3	Configuration memory check-sum error.	Contact the Authorized Service Agent
0	1	0	0	4	RAM Test error.	Contact the Authorized Service Agent
0	1	0	1	5	Reserved.	-
0	1	1	0	6	X-axis position error. The X-axis motor was commanded to move, but did not reach the desired position.	Refer to Section 8.1.3 for details.
0	1	1	1	7	Theta-axis position error. The Theta-axis motor was commanded to move, but did not reach the desired position.	Refer to Section 8.1.3 for details.
1	0	0	0	8	Z-axis position error. The Z-axis motor was commanded to move, but did not reach the desired position.	Refer to Section 8.1.3 for details.
1	0	0	1	9	Reserved.	-
1	0	1	0	10	Reserved.	-
1	0	1	1	11	X-axis movement detected without the motor being commanded to move.	Refer to Section 8.1.3 for details.
1	1	0	0	12	Theta-Axis movement detected without the motor being commanded to move.	Refer to Section 8.1.3 for details.
1	1	0	1	13	Z-axis movement detected without the motor being commanded to move.	Refer to Section 8.1.3 for details.
1	1	1	0	14	Reserved.	-
1	1	1	1	15	Reserved.	-

8.1.3 Probe Arm Jam

A Probe Arm Jam is indicated when the sampler cannot complete its instructed move. This could be due to:

- The Probe Arm hits an obstacle while moving into position.
- The Probe Arm does not reach a position within defined limits of the intended position which causes the probe movement to cease. (Movement errors of less than 1 mm will cause a probe jam.)
- The mechanical movement has excessive friction, so much so that the Probe Arm has difficulty in moving, the probe drive will stop.
- The position of the probe arm has been moved without being actively driven by the sampler

In all cases, if an error occurs, the status LEDs will show the error code and an error message will be sent to the PC.

Should the probe arm become jammed, the error control system will lock the motor drive and send an error message to the controlling PC and to the Error Indicator LEDs. If this happens, then re-initialize the sampler (power off, wait 10 seconds, power on) and then watch for correct initialisation.

If, upon investigation, there is no obvious cause for the jam then contact the Authorized Service Agent.

8.1.4 Failure to Initialize

The sampler Initialisation process is in itself a powerful self-diagnostic tool. The initialisation procedure is as follows:

On power up, the sampler runs through the initialisation sequence and sets the probe position. The probe moves to all the physical limits of the working envelope of the sampler and then returns to the home position. This initialisation sequence will be performed each time the sampler is switched on. The probe travels through the following sequence:

- Probe raises to the full extremes of the Z-axis,
- Probe travels to the full extremes of the X-axis,
- Probe travels to the full extremes of the Theta axis,
- Probe positions itself above the Fixed Wash Reservoir location.

If the sampler fails to initialize then the Probe Arm has failed to travel the required distance along one or all of the axes. The blue LEDs will light up to indicate an error.

Action: Turn the power off and check each axis manually for correct travel to determine if there is any mechanical obstruction.

If no mechanical obstruction can be identified:

1. Switch off the sampler.
2. Move the carriage so that it is half way along its track.
3. Turn the carriage clockwise viewed from the top as far as it will go (the two screws are then facing you).
4. Switch on the sampler.

If this procedure is unsuccessful, contact your Authorized Service Agent.

8.2 Power Supply

If the sampler appears to have no power, i.e. the Power Indicator and the Status LEDs are not lit:

- Check that the power cable is connected to the power socket and that it is turned on.
- Check the fuses located in the pull-drawer of the sampler input switch unit. Before replacing a blown fuse; a visual check of the sampler and power lead should be performed.

If the sampler still fails to power up, contact your Authorized Service Agent.

It is important for safety purposes that for continued protection against risk of fire always replace the fuse only with the same type and rating specified.

Access to the power supply unit and components requires removal of the main housing and should only be carried out by a qualified service technician.

Replace the fuses located in the mains input unit only with the same type and rating specified. Contact SEAL Analytical for replacing the fuses. It should only be carried out by qualified personnel.

9 Appendix A – Accessories and Spare Parts

9.1 Sampler

Part Number	Description
168+B531-04	Fixed Wash Reservoir Kit, 150mm (only suitable for XY-3)
168+B531-03	Fixed Wash Reservoir Kit, 125mm
168+B531-02	Fixed Wash Reservoir Kit, 105mm
168+B531-01	Fixed Wash Reservoir Kit, 95mm
168+B530-01	Mobile Rinse Station Kit
168+5001-01	Rack Location Mat Type A, XY-2, for two Flat Packs and one Standards Rack
168+5001-02	Rack Location Mat Type A, XY-3, for three Flat Packs and up to two Standards Racks
168+5002-01	Rack Location Mat Type B, XY-2, for two Index Moulded Racks and one Standards Rack
168+5002-02	Rack Location Mat Type B, XY-3, for three Index Moulded Racks and one Standards Rack
168+5003-01	Rack Location Mat Type C, XY-2, for four 96 well Micro Titre trays and one Standards Rack
168+5003-02	Rack Location Mat Type C, XY-3, for six 96 well Micro Titre trays and one Standards Rack
168+B532-01	Sample Probe Kit (incl. PE tubing and plastic parts), XY-2, PEEK, 0.5mm ID
168+5320-01	Sample Probe, XY-2, PEEK, 0.5 mm ID (red brown, short)
168+B582-01	Sample Probe Kit (incl. PE tubing and plastic parts), XY-3, PEEK, 0.5mm ID
168+5820-01	Sample Probe, XY-3, PEEK, 0.5 mm ID (red brown, long)
168+B532-02	Sample Probe Kit (incl. PE tubing and plastic parts), XY-2, PEEK, 0.8mm ID
168+5320-02	Sample Probe, XY-2, PEEK, 0.8 mm ID (green, short)
168+B582-02	Sample Probe Kit (incl. PE tubing and plastic parts), XY-3, PEEK, 0.8mm ID
168+5820-02	Sample Probe, XY-3, PEEK, 0.8 mm ID (green, short)
175+9000-02	Sample Probe, XY-2, Hi-tech 0.75 mm ID
175+9000-12	Sample Probe, XY-3, Hi-tech 0.75 mm ID
175+9000-03	Sample Probe, XY-2, Hi-tech 1.00 mm ID
175+9000-13	Sample Probe, XY-3, Hi-tech 1.00 mm ID
175+9000-04	Sample Probe, XY-2, Hi-tech 1.50 mm ID
175+9000-14	Sample Probe, XY-3, Hi-tech 1.50 mm ID
168-1009-01	Sample Rack, Index Moulded 50 position, for 16mm OD tubes
168-1006-01	Sample Rack, Flat Pack, 21 positions for 30mm OD tubes
168-1007-01	Sample Rack, Flat Pack, 24 positions for 24mm OD tubes
168-1008-01	Sample Rack, Flat Pack, 40 positions for 20mm OD tubes
168-1010-01	Sample Rack, Flat Pack, 60 positions for 16mm OD tubes
168-1011-01	Sample Rack, Flat Pack, 90 positions for 13mm OD tubes
168+B532-06	Septum Piercing Sample Probe Kit, XY-2
168+B582-06	Septum Piercing Sample Probe Kit, XY-3
168+5005-01	Spill Tray, XY-2
168+5005-02	Spill Tray, XY-3

Part Number	Description
168+5010-10	Standards Rack 10 positions, XY-2, for 17mm OD tubes (off white)
168+5010-11	Standards Rack 11 positions, XY-3, for 17mm OD tubes (off white)
168+5010-05	Standards Rack 5 positions, XY-2, for 28mm OD tubes (off white)
168+5010-06	Standards Rack 6 positions, XY-3, for 28mm OD tubes (off white)
168+5011-01	Standard Rack Mounting Stud (three required per Standards Rack)
168+B501-01	Sampler Cover for XY-2
168+B551-01	Sampler Cover for XY-3
168+B535-01	Low Probe Guide/Vial Stop Kit, XY-2
168+B585-01	Low Probe Guide/Vial Stop Kit, XY-3
168+5100-01	Probe Guide, Polypropylene
625+9012-01	Fuse, 250V, 3A or 3.15, 5 x 20mm
834 847	Fuse, 250V, 5A, 5 x 20mm
171-0354-01	Sample Cups, plastic, 5 mL (1000 pieces)
127-0018-01	Sample Cups, plastic, 4 mL (1000 pieces)
168-1000-01	Sample Cups, plastic, 8 mL (1000 pieces)
168-1001-01	Sample Cups, plastic, 11 mL (1000 pieces)
168-1004-01	Tubes for Standards, 15.5 mL for XY-2/-3 sampler (100 pieces)

9.2 Syringe Diluter

Part Number	Description
168+5020-01	Glass Syringe, 0.25ml (250ul)
168+5020-02	Glass Syringe, 0.50ml (500ul)
168+5020-03	Glass Syringe, 1.0ml
168+5020-04	Glass Syringe, 2.5ml
168+5020-05	Glass Syringe, 5.0ml
168+5020-06	Glass Syringe, 10.0ml
168+5020-07	Glass Syringe, 25.0ml

9.3 Mobile Rinse Station

Part Number	Description
168+5301-01	P-Clip (only for MRS tube routing)
168+5603-01	MRS Top Seal (only for MRS)
168+5304-01	Tube Anchor (provided with probe kit)

10 Appendix B – Mobile Rinse Station

The Mobile Rinse Station (MRS) is an alternative accessory to the Fixed Wash Reservoir (FWR). The MRS provides a more efficient means of rinsing the probe between samples because the sampler does not have to return to a fixed position to rinse the probe.

The MRS is attached directly to the bottom of the moving probe arm. Wash solution is pumped by an internal or external pump directly into and out of the MRS. This circulation of the wash solution cleans the outside of the probe as it moves up and down above a sampling position. In its fully retracted position, the tip of the probe lies between the inlet and outlet of the MRS. While in this position the inside of the probe and sample tubing is cleaned as the analyzer aspirates. The inter-sample air bubble between sample and wash solution is minimized by the use of the MRS and size consistency.

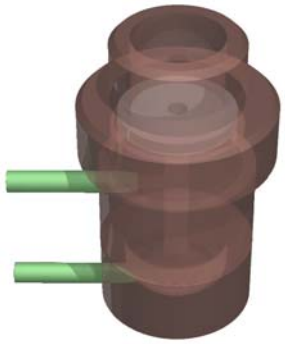


Figure 10.1: Mobile Rinse Station

10.1 Configuring the Sampler to use the MRS

It is recommended that when using a MRS that the sampler be controlled to ensure that the fluid flow through the MRS achieves optimal wash performance. In XY sampler mode, the operation of the sampler with a MRS is controlled by the AACE software. AACE controls the probe movement through the MRS and the switching of the Wash Pump.

10.2 Mounting Instructions

- Make sure the power to the unit is switched off.
- Screw the MRS onto the underside of the accessory foot plate by hand until it is screwed in finger tight.
- Rotate the MRS back until the inlet and outlet ports are facing back underneath the probe arm.
- Carefully mount the sample probe* into the top of the MRS being careful not to damage the probe.
- Check that the tip of the fitted probe (must be a probe with a 1.6mm or 1/16in outer diameter) is approximately 2mm below the inlet when in the fully retracted position.

*A choice of Hi-Tec or stainless steel probes (1.6mm OD) is available for use with the MRS. Fitting or removal of the MRS may reduce the accuracy. Contact the service agent or supplier for custom calibration of the unit if required.

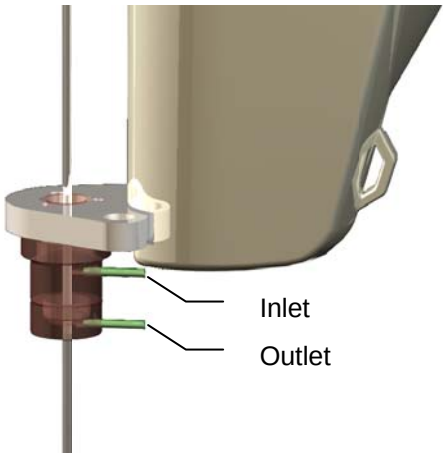


Figure 10.2: Fitting the MRS

CAUTION:
The inlet and outlet must be orientated underneath the probe arm. If they are positioned in the incorrect position, they may hit the column of the sampler and cause damage!

10.3 Connecting the Tubing

The tubing should be neatly routed through the cable tie located on the underside of the probe arm and the lower probe arm cover 'anchor' provided as part of the plastic covers of the probe arm before connecting to the MRS. Connect the 1.4mm OD x 0.8mm ID, PTFE Tubing to the input and output connections of the MRS using the supplied 15mm joining lengths of PVC tubing. The input should be connected to the higher port while the outlet is connected to the lower port. From the cable tie loop up to the middle of the X axis cover and secure to the Tube Anchor between the 2 tube markers. Continue to route the tubing back to the column case and secure in the second Tube Anchor. Route the tubing around the side of the column case to the back cover and secure using either P-clips or self adhesive fasteners across and down the back cover to the Wash Pump.

Figure 10.3: Routing the Connecting Tubing

Important:
When routing the tubing it must <u>not</u> run across the front face of the sampler casing since this can interfere with the probe arm action as well as the initialization sequence!

10.4 MRS Pump Flow Rates

Setting the correct wash solution and sample flow rates are important if optimum performance is to be achieved:

Relationship between sample flow rate and the wash solution flow rate	It is necessary to maintain a wash solution flow rate which is slightly higher, at least 20% more than the analyzer's sample flow rate. This ensures that a sufficient volume of wash fluid is available when the probe is raised in the wash position.
Relationship between wash inlet and wash outlet flow rates	The flow rate from the MRS to waste must be at least 20% higher than the flow rate to the inlet. This ensures that positive draining of the MRS occurs and that solution does not leak from the device. This can typically be done by using tubing one or two sizes larger on the drain than on the inlet side.

Table 5 - Typical wash pump flow rates by using AA3 pump tubes (in ml/min)

Tubing Colour	Orange /White	Black /Black	Orange /Orange	White /White	Red /Red	Grey /Grey	Yellow /Yellow
I.D. (inch)	0.023	0.030	0.035	0.040	0.045	0.051	0.056
rpm	**Flow Rates (in ml/min)**						
20	0.40	0.60	0.80	1.10	1.40	1.80	2.20
30	0.70	0.90	1.20	1.60	2.20	2.70	3.30
40	0.90	1.20	1.60	2.20	2.80	3.60	4.30

Tubing Colour	Yellow /Blue	Blue /Blue	Green /Green	Purple /Purple	Purple /Black	Purple /Orange	Purple /White
I.D. (inch)	0.060	0.065	0.073	0.081	0.090	0.100	0.110
rpm	**Flow Rates (in ml/min)**						
20	2.50	2.80	3.50	4.20	5.10	5.40	6.90
30	3.80	4.30	5.30	6.30	7.70	8.10	10.00
40	5.00	5.80	7.00	8.40	10.40	10.70	13.40

10.5 Troubleshooting the Mobile Rinse Station

The following hints will help you improve the operation of your MRS:

- Smaller tubing and a faster pump speed is recommended for more even flow from the Wash Pump (for integrated Wash Pump).
- If the flow on the outlet line of the MRS is uneven, it may be necessary to “condition” the MRS. This is carried out by running at a higher flow rate for the first one or two days. Once conditioned, the flow can be reduced.
- The PTFE seal in the MRS body generally needs replacing after using the MRS for an extended period of time if:
    - excessive beads of liquid begin to appear on the sample probe
    - the MRS starts to leak
    - Liquid overflows through the top orifice.
- If there are bubbles in the inlet line check that the Wash Pump tubing clamp is correctly set and there are no leaks in the line (for integrated Wash Pump).
- It is recommended to release the Wash Pump platen when the pump is not in use to extend the life of the pump tubes.

11 Appendix C – Wash Pump Kit

11.1 Tube Loading

Refer to Figure during the following procedure:

- Release the platen by disengaging the securing arm.
- Feed the pump tubing into the suction side (top) of the pump.
- Feed the tube around the rotor and locate the tube shoulders into the holders. Make sure there are no twists or kinks in the tubing after loading as this will adversely affect tube life.
- Reposition the platen over the rotor and fix by slotting the securing pin back into the slot.
- Compressing the spring on the securing pin will increase the suction height and performance against back pressure.
- Connect the outlet line to the inlet nipple of the fixed wash reservoir.
- Connect the suction line to the wash solution reservoir.

11.2 Tube Removal

- Release the track by disengaging the track occlusion arm.
- Remove both tubing bridges from their location slots and remove the tubing from the pump head.

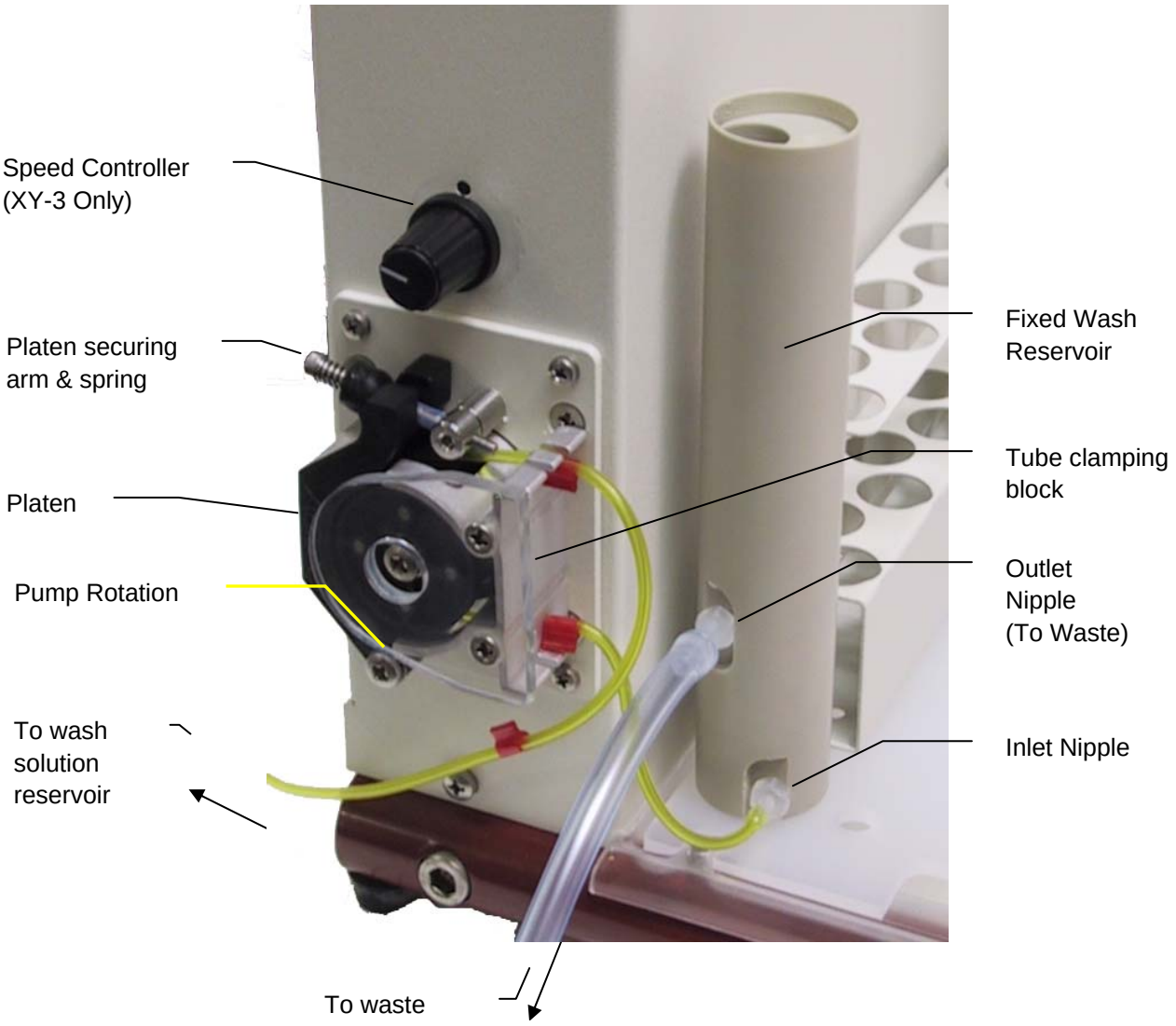
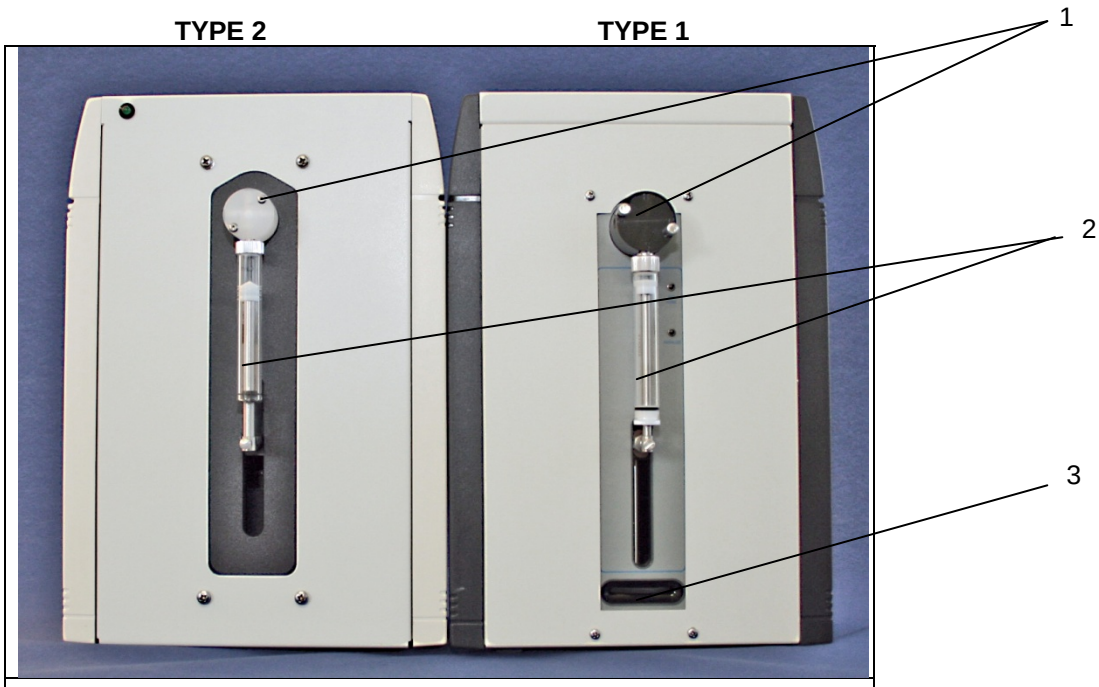


Figure 11.1: Wash Pump Tube Routing and Connections

12 Appendix D – Syringe Diluter

The Syringe Diluter is an accessory for the XY-2 /XY-3 sampler that can be used for the automatic dilution of off-scale samples occurring during a run. It consists of a syringe that aspirates and dispenses solution by moving a piston up and down. A valve mounted above the syringe allows to switch between diluent and sample.



1	Valve	3	Hand wheel (only for Type 1)
2	Piston		

Figure 12.1:: Syringe Diluter Type 1 and Type 2

Figure 12.1 shows the Syringe diluter Type 1 and 2. The Syringe diluter Type 2 (white side panels) has the same functions, but need no hand wheel. It is necessary in AACE that the Type of Syringe is selected in Configure – CFA System – Syringe.

The sample positions and the ways of the sample and diluent through the valve are illustrated in Figure and can be described as follows:

Valve Position	Line Positions	Syringe	Sampler	Pump
1	Pump to sampler Syringe to diluent		Go to wash	Aspirate wash
1	Pump to sampler Syringe to diluent	Aspirate diluent	In wash	Aspirate wash
2	Pump to diluent Syringe to sampler	Aspirate sample	Go to sample	Aspirate diluent
2	Pump to diluent Syringe to sampler	Dispense all	Go to diluent cup	Aspirate diluent
1	Pump to sampler Syringe to diluent		Go to wash	Aspirate wash

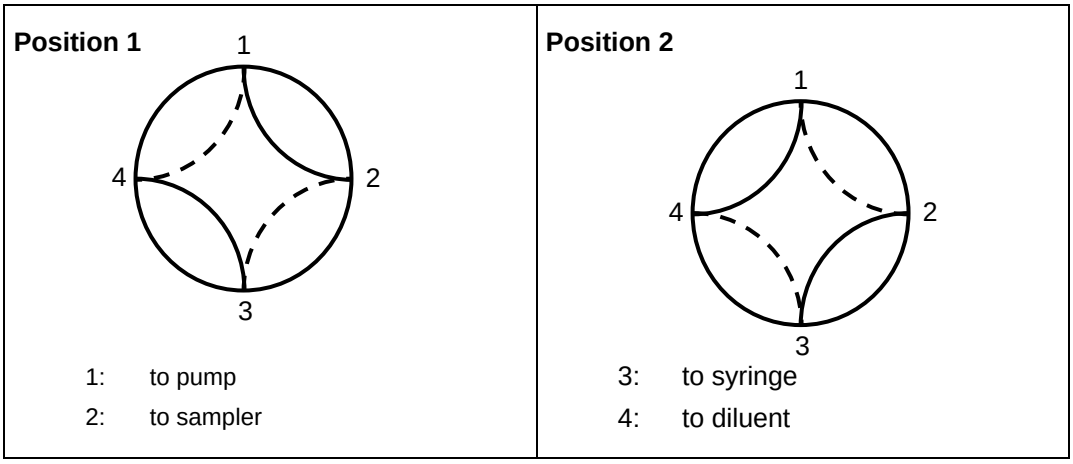


Figure 12.2:: Valve positions in the Syringe Diluter valve

SPECIFICATIONS

Dimensions	320 mm H x 140 mm D x 220 mm W
Power requirement	100-240 VAC, 50/60 Hz
Power consumption	30W
Fuse	2 A 240 VAC fast blow
Communication	1 serial RS232C interface
Resolution	24000 steps
Piston drive	Stepper motor driven lead screw with optical feedback
Syringe	Sizes: 2.5 ml, 5 ml, 10 ml Materials: Barrel: borosilicate glass Piston: stainless steel Seal: virgin Teflon
Imprecision	0.05% CV within run at full stroke
Inaccuracy	<1% at full stroke
Valve/valve drive	Positions: Input, Output, Bypass Angle: 120 degrees Turn time: 250ms Drive stepper motor with optical feedback Materials: plug: Virgin Teflon body: Kel-F Standard fitting: 1/4” tubing fitting, luer fitting to syringe
Fluid contact	Glass, Kel-F, Teflon
Environmental	Temperature: 15°C - 40°C Humidity: 20-95%RH at 40°C

12.1 Installation

In order to keep the tubing connections as short as possible we recommend that you place the Syringe Diluter next to the XY-2 / XY-3 sampler.

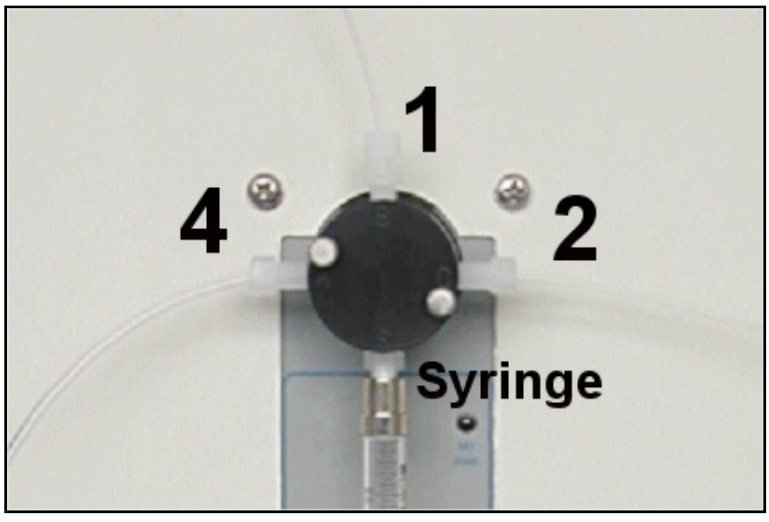
12.1.1 Electrical Connections

The following connections must be made:

- **Power supply**
- Plug the power cord provided into the power inlet socket on the back of the Syringe Diluter and then into your mains supply outlet, see Figure 12.3.
- The power supply is a switched mode (SMPS) type which can handle any mains voltage within the range of 100-240 Volts AC. You will not have to make any manual voltage adjustments.
- The power supply unit has international approvals to BS, UL, CSA and VDE standards.
- **RS232 cable connection**
- Connect the RS232 port on the rear of the Syringe Diluter to the PC com port. Use the RS232 cable supplied with the Syringe Diluter.

12.1.2 Tubing connections

Figure schematically shows the outlets of the syringe diluter valve. Use tubes that correspond to the specification in your method documentation, and connect them to the corresponding outlet. Suitable tubes and connectors are shipped with the syringe diluter.



1 - to pump
2 - to sampler
4 - to diluent

The syringe is connected to position 3.

Figure 12.3: Connecting Syringe Diluter and XY-2 / XY-3 Sampler

Ensure that all connectors are tightened to make a leak-proof joint. The ingress of air during operation will indicate poor connections either at the probe or the Syringe Diluter.

The inter-sample air bubble must pass through the tubing and connections, otherwise the separation between peaks will be affected. In this case, there may be a gap between two tubes or the tubing diameter may be too wide.

NOTE:
Due to the internal diameter of the valve channel, the sample flow rate must be at least 1 ml/min. If the total sample flow rate is lower, a by-pass tube should be added.

12.1.3 Fitting the Syringe

For the following description, please refer to Figure .

To remove the syringe:

1. Switch off the Syringe diluter.
2. Syringe Type 1: Use the hand wheel to move the piston down a bit.
   Syringe Type 2: Use AACE commands to move the piston down a bit (refer also to the AACE software manual)
3. Loosen the screw that holds the piston, pull the screw out, and remove the piston.
4. Loosen the syringe and remove it.

To fit a new syringe:

1. Screw in the new syringe.
2. Refit the piston, insert the screw, and fix it.

Configure the volume of the new syringe in the AACE software. The AACE software then automatically adjusts the position of the piston inside the syringe. For details please refer to the AACE operation manual.

12.1.4 Syringe Speed

The choice of speed can affect both accuracy and precision. As a general rule aspiration should be slow and dispense fast. Rapid aspiration can cause the air gap to break up, affecting the sample volume, or can introduce bubbles into the system. Faster dispense speeds generally result in better break off at the sample probe tip. Larger syringes generally require slower rates.

The viscosity of the fluid should also be considered. Higher viscosity fluids require slower rates.

Tubing diameter also affects the syringe feed, and a poor choice of tubing and piston speeds for a given viscosity and syringe size can cause the syringe drive to stall due to excessive flow resistance.

The speed is set in the AACE software.

12.2 Syringe Diluter Maintenance

To obtain optimum performance and maximum life from the Syringe Diluter it is important that the recommended cleaning and maintenance instructions are followed.

DAILY MAINTENANCE

- Flush the syringe pump out thoroughly with distilled or deionized water after each use, if you were using a different liquid for dilution.
- The syringe pump should be primed with distilled or deionised water when not in use.
- Do not allow the syringe pump to run dry for more than a few cycles.
- Inspect the syringe pump for leaks and correct any problems immediately.
- Wipe up all spills on and around the Syringe Diluter immediately.

PERIODIC MAINTENANCE

- **Cleaning**

  If the syringe appears dirty you should thoroughly clean the fluid path using one of the procedures outlined below, depending on the diluent you use:

  - **weak detergent with bactericidal action**
    1. Prime the syringe with a weak, 2%, laboratory detergent solution with bactericidal action.
    2. The detergent should sit in the syringe with the syringe plungers fully lowered for 30 minutes.
    3. After the 30 minute period, remove the reagent tubing from the detergent and cycle all the fluid from the syringe and tubing into a waste container.
    4. Prime the instrument a minimum of 10 cycles with distilled or deionised water. Leave the fluid pathways filled for storage.
  - **weak acid and base in sequence**
    1. Prime the syringe with 0.1 N NaOH, and allow the solution to stay in the syringe pump for 10 minutes with the syringe fully lowered.
    2. Flush the syringe with distilled or deionised water.
    3. Prime the syringe with 0.1 N HCl and allow the solution to stay in the unit for 10 minutes with the syringe fully lowered.
    4. After a 10 minute period, remove the reagent tubing from the 0.1 N HCl solution and cycle all the fluid from the syringes and tubing into a waste container.
    5. Prime the syringe pump a minimum of 10 cycles with distilled water or deionised water.

- **10% bleach**
  1. Make a 10% solution by adding 1 part of commercial bleach to 9 parts of water.
  2. Prime the syringe with the 10% solution, and allow the solution to stay in the syringe with the syringe fully lowered for 30 minutes.
  3. After the 30 minute period remove the reagent tubing from the 10% solution and cycle all the fluid from the syringe and tubing into a waste container.
  4. Prime the syringe a minimum of 10 cycles with distilled or deionised water.

- **Tubing replacement**
  - It is important to keep all tubing clean and free of crimps. Tubing that has become dirty, blocked or crimped can result in poor accuracy and precision, loss of air gap or syringe stalls. Replace tubing if necessary. The frequency of replacement will be dependant on duty cycle, reagents and maintenance.

- **Seal replacement**
  - The syringe seals will need to be replaced periodically. How often will depend on the duty cycle of the syringe pump, the types of fluids being run through the system, the size of the syringe and how well the instrument is maintained.
  - If a syringe seal becomes worn and is not replaced, the following problems may occur.
    - ⇒ Poor precision and accuracy.
    - ⇒ Variable or moving air gap.
    - ⇒ Fluid leaks from the bottom of the syringe.
    - ⇒ The tip of the piston breaks through the seal and scratches the inside of the barrel. If this happens the entire syringe will need to be replaced.

For spare parts, please contact your local SEAL Analytical representative.

13 Appendix E – Sampler Cover

The sampler cover encapsulates a 3-rack or 2-rack sampler and can be used for the following:

- As a protective cover to restrict access to the unit in operation and protect users from accidental contact with the moving probe-arm, or sharp edged sample probes.
- To protect the integrity of samples from dust and other environmental contaminants.
- For vapour and/or fume containment to protect the laboratory environment from possible exposure to harmful chemicals.

Warning!

The sampler cover is NOT to be used with volatile and corrosive chemicals without an air replenishment system incorporated. If this occurs the cover will trap and concentrate the volatiles producing a concentration which may be harmful to the Operator, the sampler cover and/or the sampler.

Figure 13.1: Sampler Cover

13.1 Tools Required

The tools required are:

- Cotton or rubber gloves are recommended to avoid fingerprints on the cover as a result of assembly.
- An 8mm (5/16") spanner is required to attach the door handles.
- A sharp knife or object to pierce the grommets for connecting sample lines etc.

The sampler cover requires approximately 15 - 30 minutes to assemble. It is recommended that these instructions are read through first and then followed step by step from the beginning.

13.2 Unpacking the Sampler Cover

You will need a clean flat bench top area to unpack and assemble the sampler cover.

NOTE:
Using gloves when assembling your sampler cover will reduce fingerprints.

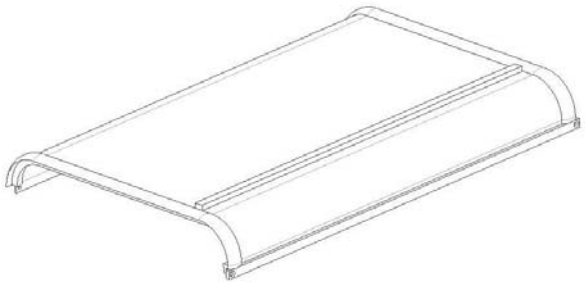
Ensure you open the box from the top. When unpacking, remove the individual wrapping and arrange the components so they can be recognized from the photos below in this manual.

Caution

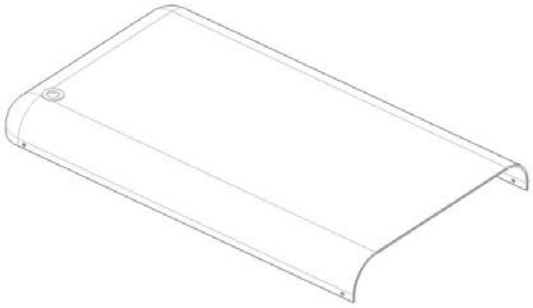
The clear parts of the cover are sensitive to scratching; avoid sliding these parts across the bench top or against each other.

The unpacked sampler cover should consist of:

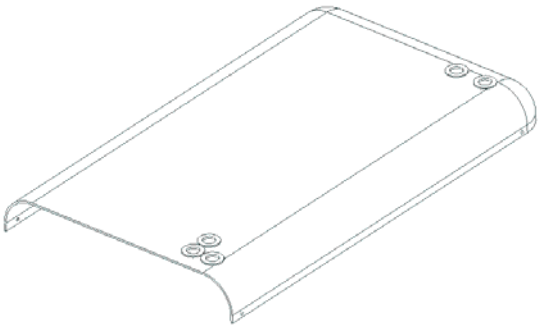
- A bag containing two door handles with nuts and washers, approximately 20 plastic rivets (4 are spare), and a length of rubber profile used on the bottom edge of the cover.



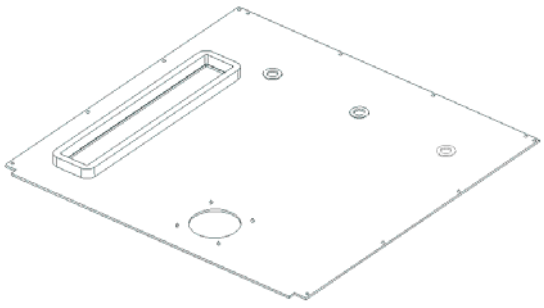
- A Top Panel.



- A Right Side Panel.



- A Left Side Panel.



- A Back Panel.

13.3 Assembly Instructions

1. Lie the back panel down with the I/O seal facing up. Position four plastic rivets along each side from underneath as shown in the picture below. Be careful not to 'engage' the rivets by pressing on them until the side covers are in position.
2. Position the four holes in the back edge of the Side Panels on top of the back panel and over the rivets as shown below. Once positioned over all rivets, push down on the panel beside the rivet to lock in position. Repeat this for Both Side Panels.

NOTE:
If a rivet is accidentally engaged then it can be removed by pressing on the center part of the tail end of the rivet.

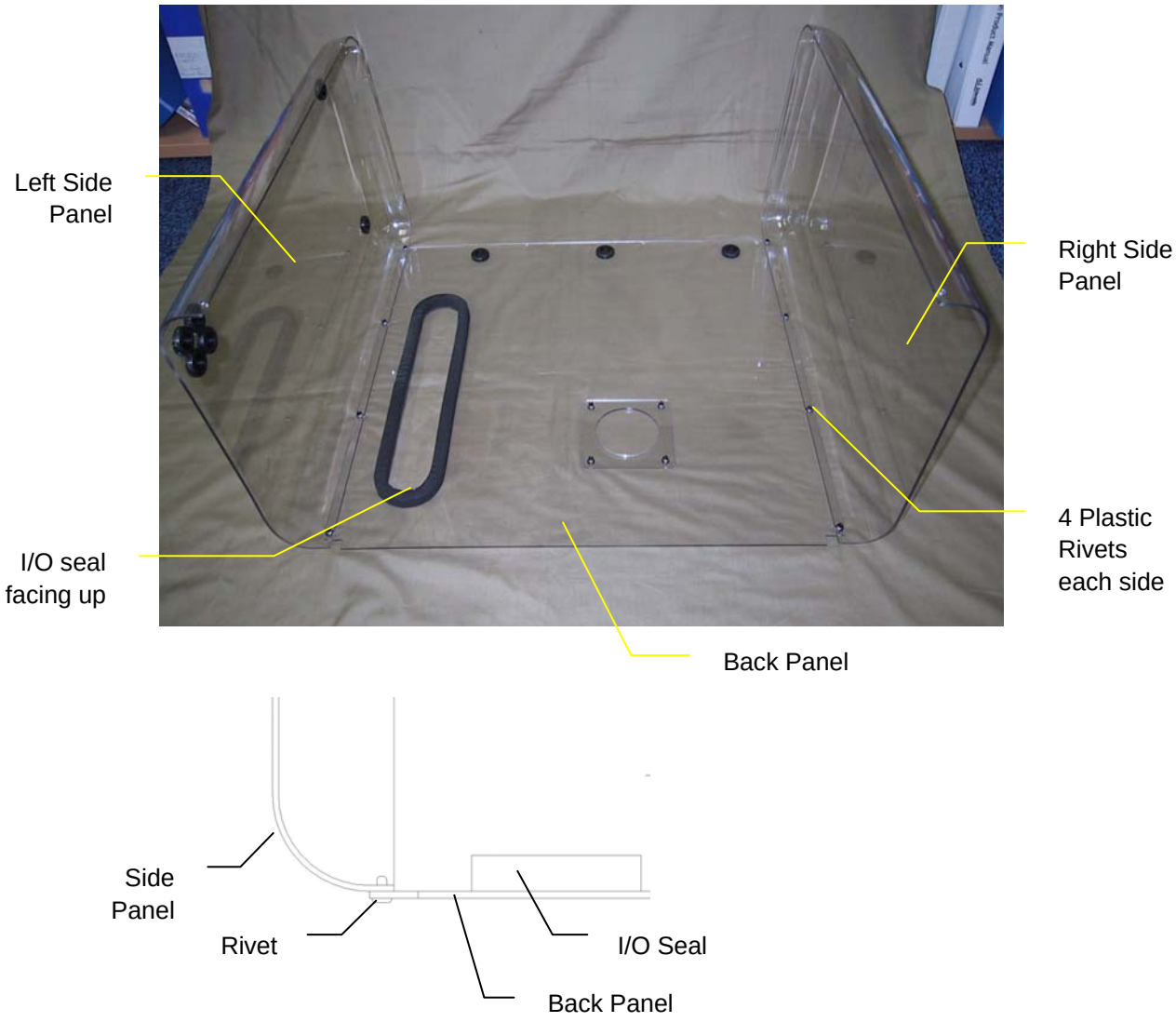
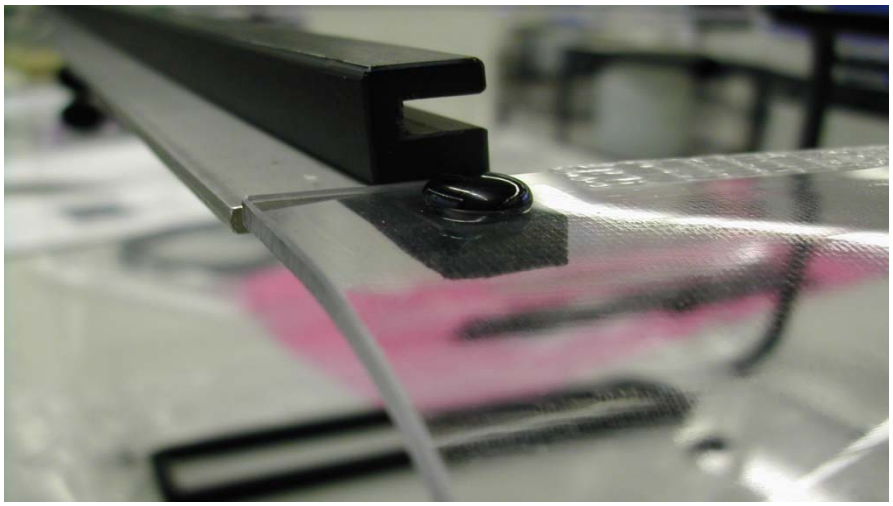


Figure 13.2: View from the bottom, straight on

3. Take the **Bottom Door Track (the one with the metal plate fitted)** and position the holes in its ends behind the bottom holes in the side covers. Assemble from the outside a plastic rivet at each end tying the sides together as shown below. Ensure the track is towards the outside of the cover.



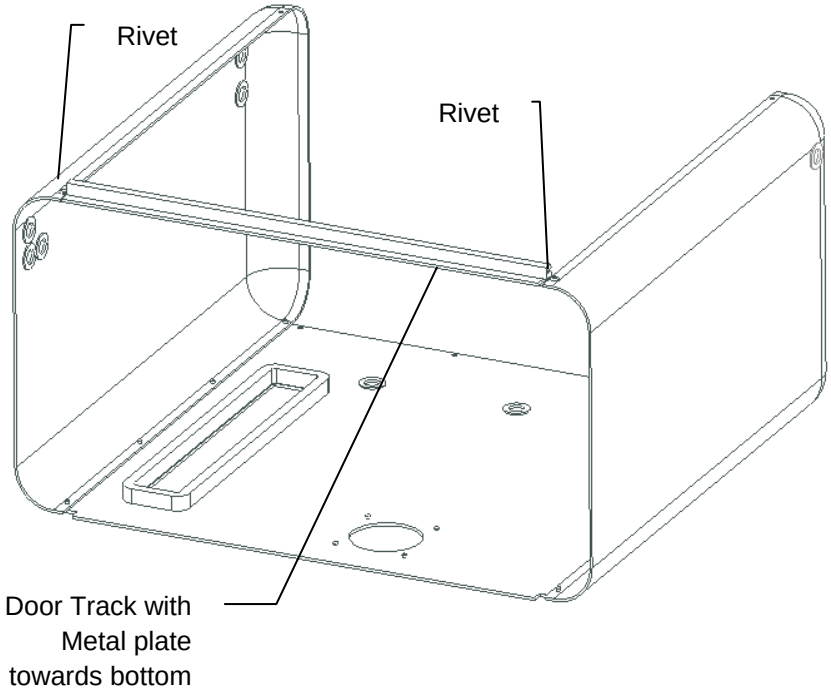
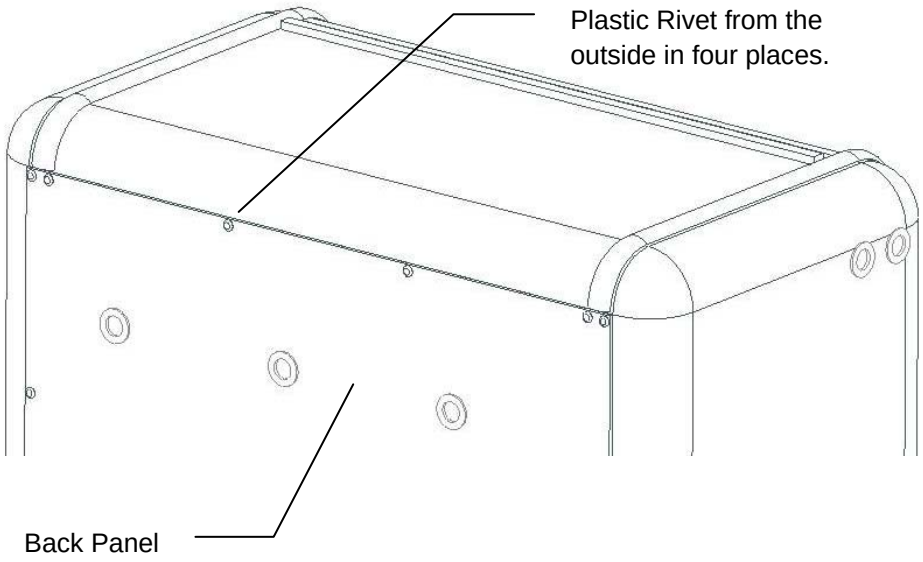
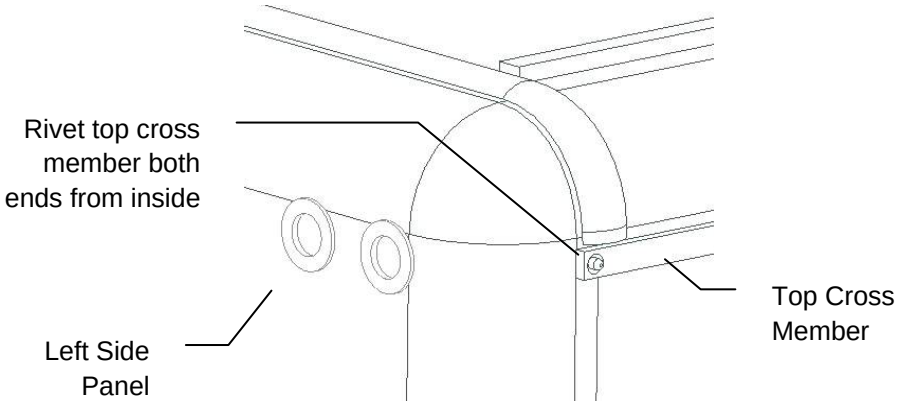


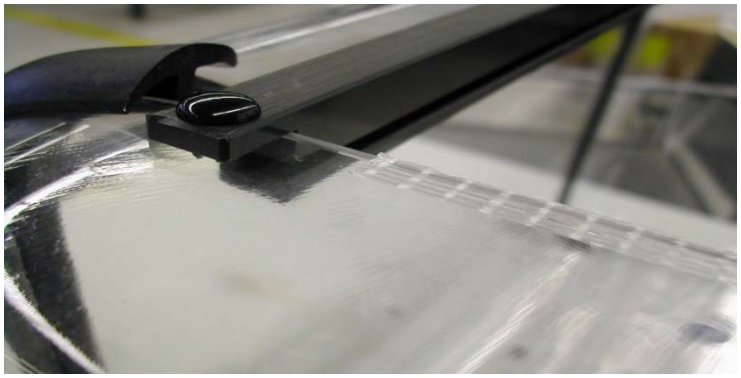
Figure 13.3: Door track

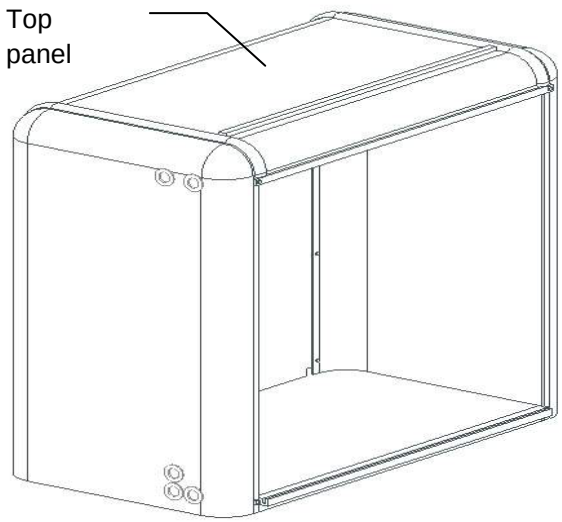
4. Orient the assembly onto its base, bottom down. Take the top panel and position onto the assembly ensuring the back edge with the four holes in it is tucked in behind the back panel. Assemble the four plastic rivets along the back edge from the outside using a hand inside the cover to push against.



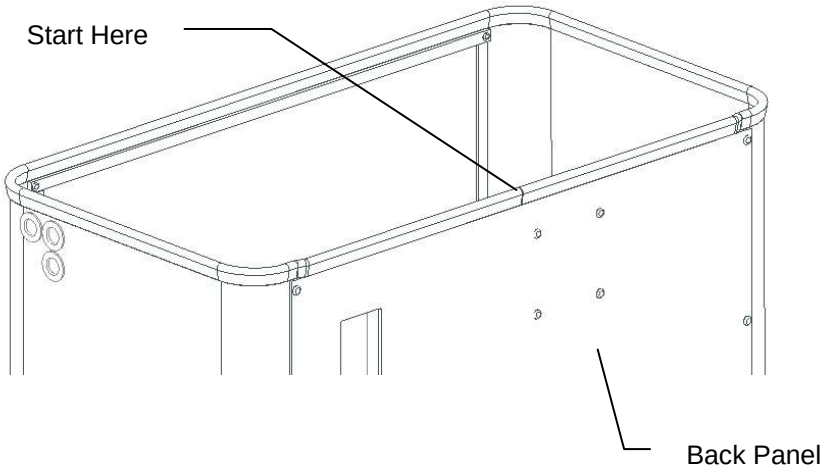
5. Push down firmly on the front and along the rubber seals. Fit a plastic rivet FROM THE INSIDE into each end of the top cross member.



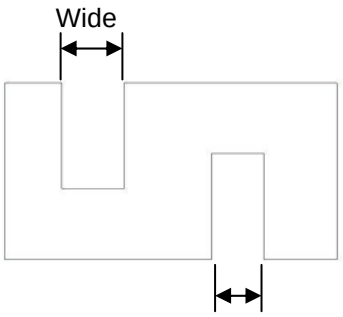


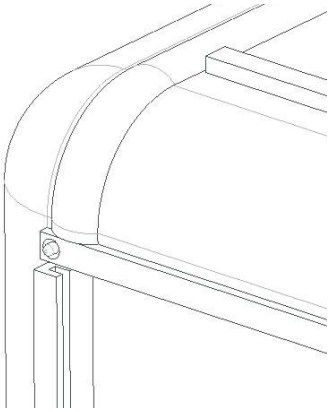


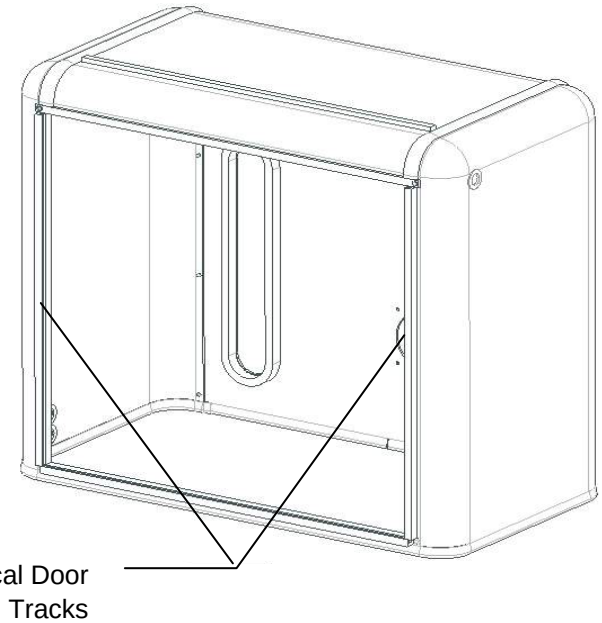
6. Turn the cover upside down and rest on its roof. To fit the bottom seal start near the middle of the back panel, open the end of the seal and push the end over the edge. From here work the seal all the way around the bottom of the cover. To minimize the gap at the join the seal can be stretched around while in position. Pick up the assembly and orient back on its base.



7. The vertical door tracks have a narrow and a wide slot (see picture below).Fit the tracks by pressing the narrow slot over the vertical edges of the Side Panels. Start at the bottom and work your way up. The wide slot is oriented towards the outside of the cover for the door to fit into. Ensure the tracks are fully seated or else the door will not run freely.







8. Fit the Door handles as shown using an 8mm (5/16") spanner. Slide the door into position from the top flex the door to get the nuts past the top cross member. See section 13.5.1 on the recommended operation of the door.

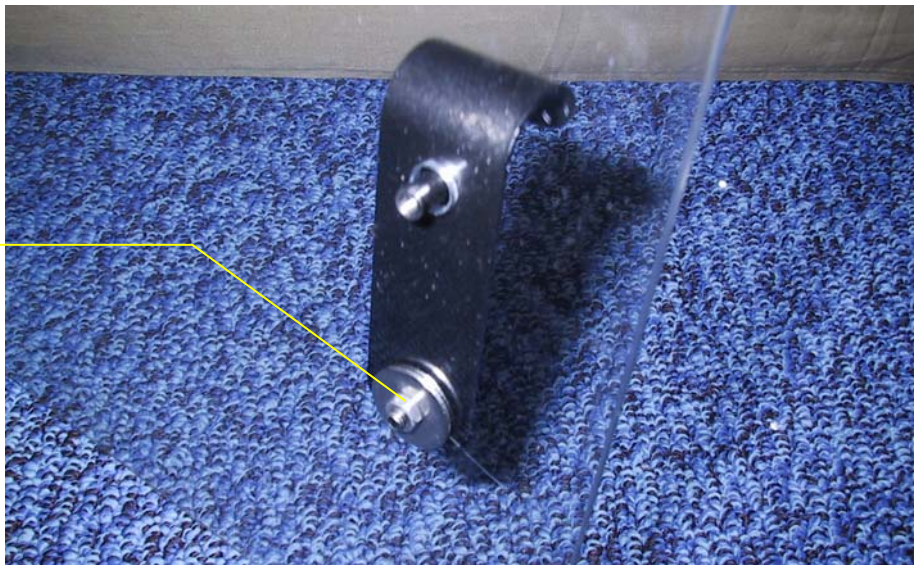


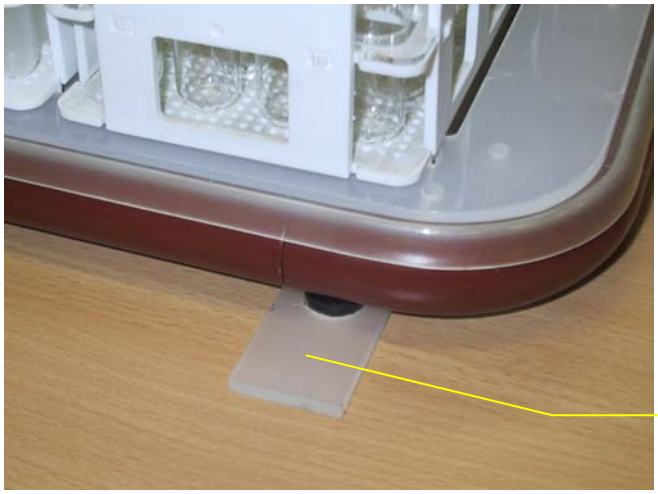
Figure 13.4: Door handles

9. Check all rivets are fully ‘engaged’. If gaps exist at the ends of the top rubber seals then stretch the rubber along while in position to fill the gaps.

Top seal in 2 places.
To close gaps at ends stretch rubber along while in position.

13.4 Installation

1. Turn off the power and remove all cables and connections to the sampler.
2. Position both the locating spacers underneath the feet of the sampler with the long end towards the front of the sampler (away from the power cable and communication ports).



Sampler cover spacer (Long end)

Figure 13.5: Sampler cover spacer

3. Orient the sampler cover with the door to the front of the sampler (opposite power cable). Lift the sampler cover up and over the sampler. Be careful not to damage the I/O seal or scratch the cover on the peristaltic pump (if option is fitted). Position the cover to suit the I/O seal and spread the front and back of the cover over the outside of the locating spacers ensuring the cover is sitting on the bench top and not on top of the position spacers.

13.5 General Use

13.5.1 Door Operation

The door has two positions:

- In the Closed position, the door creates an enclosure around the samples.
- In the Open position, sample racks and standard racks/tubes can be added or removed.

The door is held in the open position via pins protruding from the back of the handles which rest on the top edge of the top cross member. To raise or lower the door these pins are retracted by pulling horizontally on the curved portion of the door handles.

NOTE:
When pulling the handles to retract the locking pins push with your thumb against the door to avoid moving the whole cover.

Ensure the Sample Probe is in the home position before removing racks.

Warning!

It is recommended not to remove samples racks or standard racks or vials while the sampler is in motion.

13.5.2 Connections

General

There are multiple entry or exit points to the sampler cover through various rubber grommets. Use a sharp knife to pierce or cross cut the grommets where required to feed through any tubing etc.

Exhaust Ducting

On the back panel there is a location hole for connecting exhaust ducting which has a cover plate fitted. To fit the ducting, remove the cover plate by pressing on the centre part of the end of the plastic rivet. The hole will suit ducting of internal Diameter 75mm used in conjunction with an appropriate flange having Ø4mm mount holes on a PCD of 101mm is suitable.

Purge Line

A purge line can be fitted to any of the Ø20mm holes currently plugged with a rubber grommet. When the grommet is removed, a suitable fitting can be installed, such as a barb connector, to fit an inlet purge line.

13.5.3 Care and Maintenance

- Do not use abrasive cleaners or strong solvents to clean the cover as this will reduce the clarity of the cover.
- If using volatile chemicals ensure the cover is adequately purged.
- It is recommended not to place objects on top of the sampler cover.

14 Index