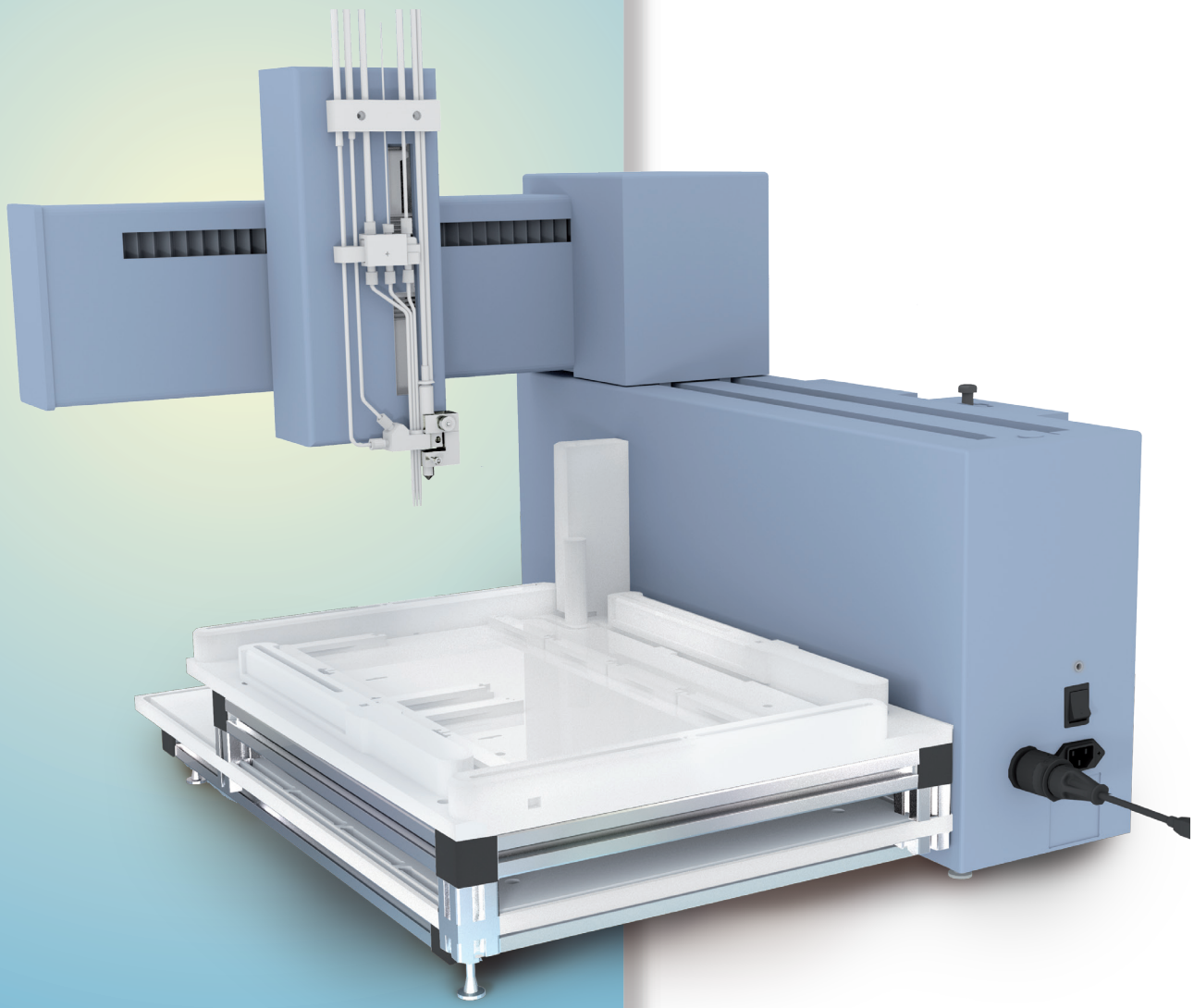
AUTOMATED SAMPLE PREPARATION

*Easy***PREP** Sample Handler

User Manual



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Disclaimer: Products are supplied for laboratory use only. **SCP SCIENCE** assumes that only trained and qualified individuals, familiar with procedures suitable for the safe operation of these instruments, will handle them. Our customers are solely responsible for the safe operation, handling and use of these products.

CERTIFIED to comply with the following EMC:

NF EN 61000-4-2(2009), NF EN 61000-4-3(2006,+A1:2007+A2:2010), NF EN 61000-4-4(2004,+A1:2010), NF EN 61000-4-5(2005),

NF EN 61000-4-6(2009), NF EN 61000-4-11(2004).

Shipment:

Courier or truck FOB. Warehouse locations: Baie d'Urfé, QC, Canada; Champlain, NY, USA; Courtaboeuf, Paris, France. Insurance covering the full value of the shipment is included with the transportation charges. If you wish to select a specific carrier and/or have insurance to cover your shipment, please contact us immediately.

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No returns can be accepted without prior approval. Please contact **SCP SCIENCE** for a return authorization number and shipping instructions before returning merchandise. Restocking charges may be applicable.

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Contact your local distributor for disposal instructions.

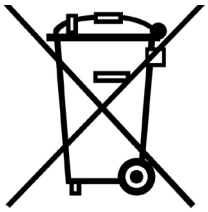


Table Of Contents

Ordering Information

FOLLOW STEPS 1-4 TO CHOOSE THE CORRECT CONFIGURATION

STEP 1 - ORDER INSTRUMENT

Description	Catalog No.
***Easy*PREP** Sample Handler (110V/230V), with software	010-400-001

ITEMS INCLUDED IN THE BASIC CONFIGURATION

Description	Catalog No.
Full tray, for Sample Handler	010-400-096
Dispensing tip	010-400-025
***Easy*PREP** 8ML Dispensing Tubing, (pk/4)	010-400-020

STEP 2 - SELECT SYRINGE PUMP

Description	Catalog No.
*Syringe Pump, 1 ml, 5 ml, 10 ml, 25 ml	010-400-018
Syringe Pump, 50 ml	010-400-119
Syringe Pump for HF, 5 ml	010-400-109

* Standard

ISO 17025 and ISO 8655-5 COMPLIANT

REQUEST INSTRUMENT CERTIFICATION

SPECIAL CERTIFICATION

SYSTEM CALIBRATION OF DISPENSING ACCURACY

Catalog No. 010-400-050

STEP 4 - SELECT RACK

Description	Catalog No.
Rack, ***Digi*PREP** MS, 15 ml tubes, 54 positions	010-515-027
Rack, ***Digi*PREP** Jr, 15 ml tubes, 40 positions	010-515-023
Rack, for CETAC Autosampler, 50 ml tubes, 12 positions	010-510-050
Rack, for Hotblock, 50 ml tubes, 18 positions	010-500-025
Rack, for CETAC Autosampler, 16 mm tubes, 40 positions	130-012-102
Rack, for CETAC Autosampler, 15 mm tubes, 60 positions	020-020-120
Rack, for ***Digi*PREP** Jr, 50 ml ***Digi*TUBE**s, 24 positions	010-505-021
Rack, for ***Digi*PREP**, MS/LS 50 ml ***Digi*TUBE**s, 24 positions	010-500-021
Rack, custom	PLEASE CONTACT US
Rack, ***Nova*WAVE** Transport Rack, 50/75 ml vessels, 12 positions	010-400-044

ACCESSORIES

Description	Catalog No.
Half tray, for use with ***Nova*WAVE** Transport Rack	010-400-098
Barcode reader, for rapid loading of sample identification	010-600-034
***Accu*NORM**, required to normalize sample volumes	010-400-090
Bubble Stirrer, with inert gas feature	010-400-092
13 ml loop, for larger sample volumes, prevents sample from entering the syringe	010-400-048
Dispensing tip replacement, for Bubble Stirrer	010-400-093
Fume Hood, protects samples from environmental contamination and vice versa when using Sample Handler, Inside dimensions: D 37.2 x W 31 x H 31.7, Outside dimensions: D 43 x W 32.7 x H 35.7	010-400-094
PC with Windows OS	010-400-008
Dispensing tip for dual pump	010-400-027

1 Warranty and Safety Measures

1.1 WARRANTY

SCP SCIENCE warrants this product free from defects in workmanship and materials for one (1) year from date of purchase.

- Should the unit malfunction, please contact **SCP SCIENCE**'s Service Department or your local distributor for further instructions.
- The warranty is void if the instrument shows evidence of tampering or has been subjected to excessive moisture, heat, corrosion or other misuse.
- **SCP SCIENCE** shall not be responsible for any damage or losses, however caused, which may be the result of improper installation or misuse of this product.
- Products are supplied for laboratory use only and should not be used for any household, medical or therapeutic application. **SCP SCIENCE** presumes that only trained and qualified individuals, familiar with procedures suitable for the safe operation of these instruments, will handle them. Our customers are solely responsible for the safe operation, handling and use of these products.

1.2 SAFETY INFORMATION

1.2.1 Minimum Safety Considerations

Must be followed when operating the ***Easy*PREP** Sample Handler in order to maintain good laboratory practices.

1.2.2 Measures for Your Protection

a. When using chemicals and solvents, comply with the instructions of the manufacturer and the general lab safety rules.

b. Always wear safety glasses when handling samples and reagents.

1.2.3 Measures for Your Operational Safety

a. Make sure the ***Easy*PREP** Sample Handler is placed on an inflammable surface capable of supporting 45 kg (100 lbs).

b. ***Easy*PREP** Sample Handler requires a clearance of five inches (12.7cm) on all sides.

c. If moving the system, always use 2 people and do not lift by the Kydex panels. Lift by the bottom aluminum frame instead.

d. Keep hands and fingers free of the system when it is moving to reduce the risk of pinching.

e. Always plug the Eay**PREP** Sample Handler in a properly grounded three-prong electrical outlet (100-240V receptacle).

f. Use a stabilized constant voltage AC power supply, with a voltage within +/-5% of the specified level

g. Always use the provided power cord.

h. The Sample Handler may be installed in a fume hood.

1.3 CAUTIONS, NOTES AND SYMBOLS

Symbol	Description	Symbol	Description
V	Voltage	1	Mains on
~	Alternating current	0	Mains off
A	Current		Attention, consult accompanying documents
Hz	Frequency		Protective conductor terminal
F	Fast-acting fuse	W	Watts

CAUTIONS, WARNINGS AND NOTES ARE INCLUDED THROUGHOUT THIS MANUAL.

CAUTION

A caution is used to emphasize information pertaining to procedures that, if not strictly followed, may result in damage or destruction to the instrument or improper instrument operation.

WARNING

A warning is used to emphasize information about dangerous or hazardous conditions relating to the operation, cleaning or maintenance of the instrument that may result in personal injury.

NOTE

A note is used to emphasize procedures or conditions that may be misinterpreted or overlooked, and to clarify potentially confusing situations.

2 Installation Instructions

2.1. SYSTEM OVERVIEW

Label	Description	Label	Description	Label	
1	X axis of the robotic arm	9	Tilt calibration rod	17	Bubble Stirrer module (also see figure 4)
2	Y axis of the robotic arm	10	Full tray upper rack platform	18	***Accu*NORM** module (also see figure Figure 5)
3	Z axis of the robotic arm	11	Bottom rack platform	19	Syringe pump module
4	Dispensing tip & bubble stirrer (see figure 2)	12	Chassis	20	Autosampler rack spacers
5	Rinsing tip	13	***Digi*PREP** and Hotblock rack adaptors	21	Second syringe pump module
6 a/b	Guides	14	Power on/off button	22	Syringe (also see figure 3)
7	Level sensor (***Accu*NORM**-see figure 5)	15	Power in receptacle	23	Syringe Valve with ports
8	Washing station	16	USB receptacle (connects to computer)		

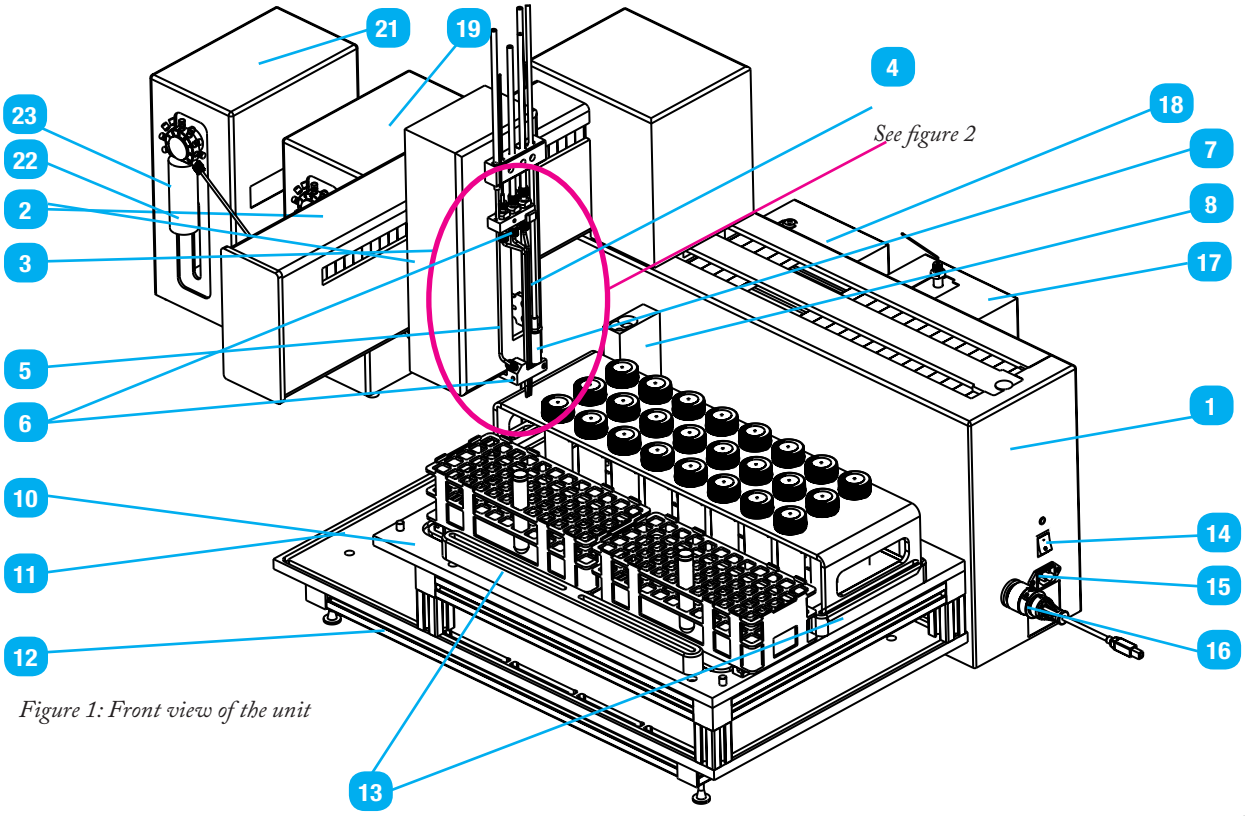


Figure 1: Front view of the unit

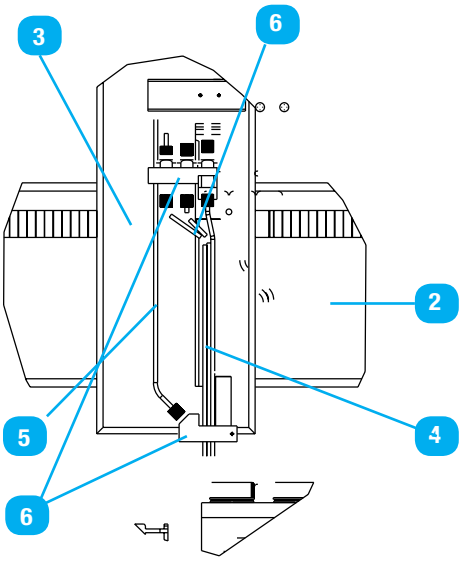


Figure 2: Dispensing unit

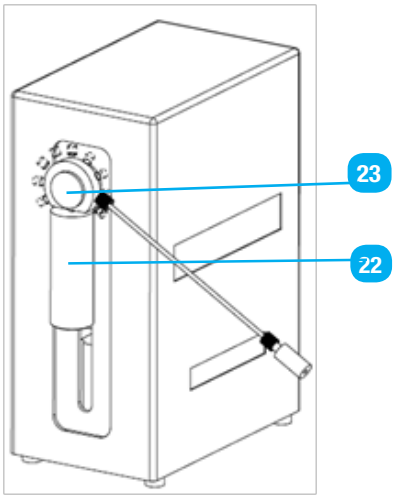


Figure 3: Pump module

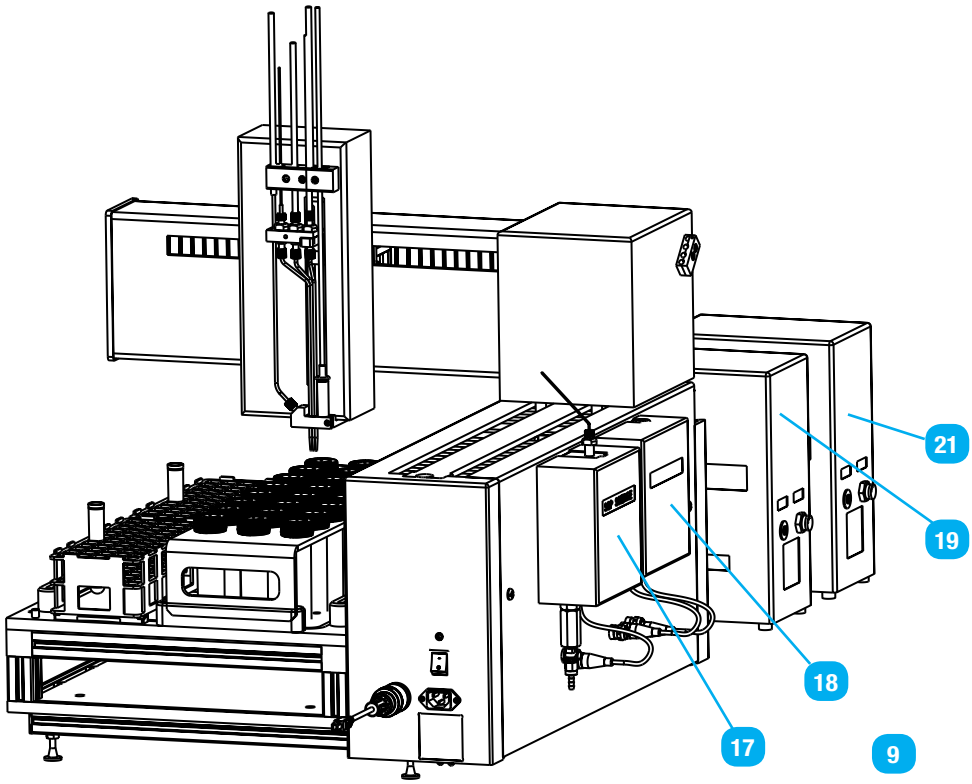


Figure 4: Rear view of the unit

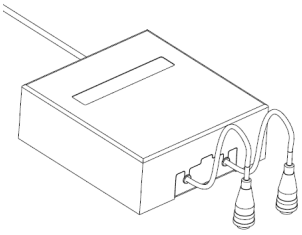


Figure 5: AccuNORM module

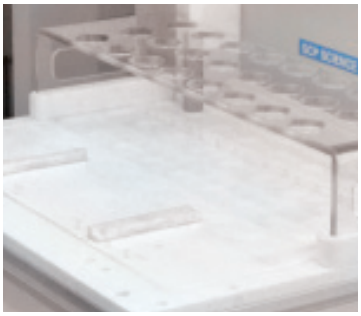
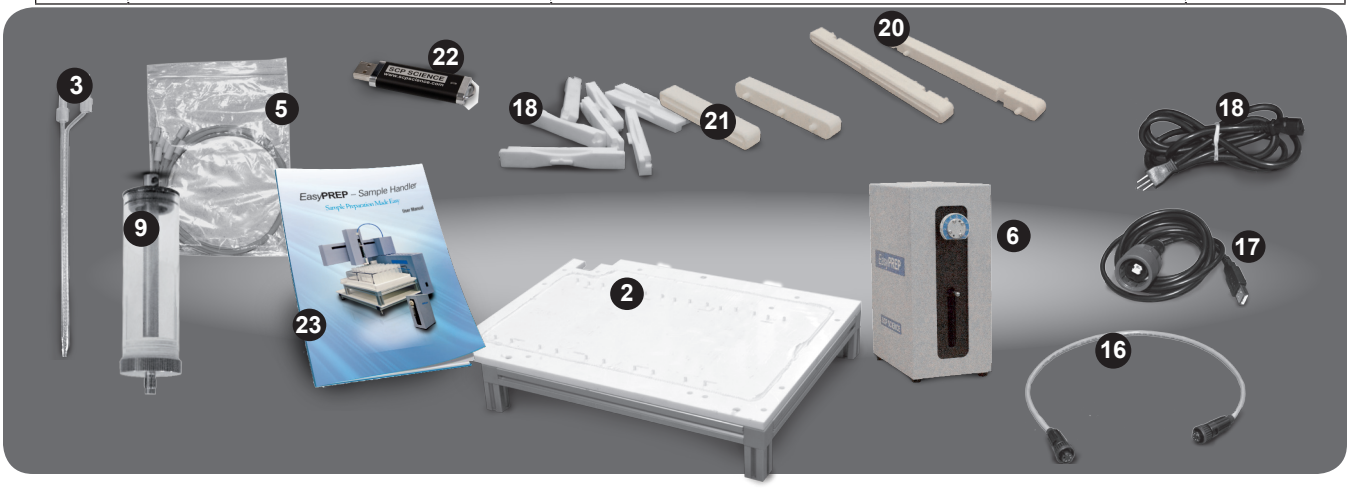


Figure 6: Spacers for Autosampler Racks. Could be placed horizontally or vertically on the platform.

2.2 CHECKING ALL COMPONENTS AGAINST THE PACKING LIST

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	010-400-001	***Easy*PREP** Sample Handler (110V/230V), with software	1 ☐
2	010-400-096	Full tray for Sample Handler	1 ☐
3	010-400-025	Dispensing Tip for Single Pump	1 ☐
4	010-400-027	Dispensing Tip for Dual Pump	1 ☐
5	010-400-020	Dispensing Tubing, (pk/7), ***Easy*PREP**	1 ☐
6	010-400-018	Dispensing Pump, 1 ml, 5 ml, 10 ml, 25 ml	1 ☐
7	010-400-019	Dispensing Pump, 50 ml	1 ☐
8	010-400-009	Dispensing Pump for HF, 5 ml	1 ☐
9	010-400-102	Dispenser, 1 ml	1 ☐
10	010-400-104	Dispenser, 5 ml	1 ☐
11	010-400-106	Dispenser for HF, 5 ml	1 ☐
12	010-400-108	Dispenser, 10 ml	1 ☐
13	010-400-110	Dispenser, 25 ml	1 ☐
14	010-400-112	Dispenser, 50 ml	1 ☐
15	010-400-050	System calibration of dispensing accuracy	1 ☐
16	AS014	Cable linking Pump to Main Unit	1 ☐
17	E1749	USB Cable Male A to Male B-2m linking Main Unit to PC/Laptop	1 ☐
18	010-500-xxx	Power Cord	1 ☐
19	AP034	Jr Rack Adapter	2 ☐
20	AP035	Dual adapter MS Rack	2 ☐
21	AP036	Autosampler Rack Adapter	8 ☐
22	AE101	USB Key SH -SW, Parameters File, User Manual and Installation Guide	1 ☐
23		***Easy*PREP** Sample Handler User Manual	1 ☐
24	AP138	Single Adapter MS Rack	2 ☐
25	AP041	Autosampler Gilson 50ml rack pins	1 ☐



3 System Specifications

3.1 DIMENSIONS – SAMPLE HANDLER

DIMENSIONS - INSTRUMENT	
Width	70 cm (27 ½ in)
Depth	66 cm (26 in)
Height	90 cm (35.7 in)

3.2 DIMENSIONS – FUME HOOD (OUTER)

DIMENSIONS – FUME HOOD	
Width	109 cm (43 in)
Depth	83 cm (32.8 in)
Height	90 cm (35.7 in)

3.3 ENVIRONMENTAL

ENVIRONMENTAL	
Relative Humidity	30% to 80%
Altitude	up to 2000 m
Installation	Category II
Pollution	Degree 2
Ambient Operating Temperature	-5°C to 40°C

3.4 ELECTRICAL

ELECTRICAL	
Model Number	*Easy***PREP** Sample Handler
Voltage	100-240 V
Power	108W
Frequency	50/60 Hz

NOTE The Power Supply has overvoltage, overload and short circuit protections.

4 Hardware Installation

4.1 REMOVING THE PROTECTIVE PLASTIC WRAP

Remove the protective plastic wrap (surface protection film) bound to the upper and bottom Platforms by peeling it off (Figures 7 and 8).

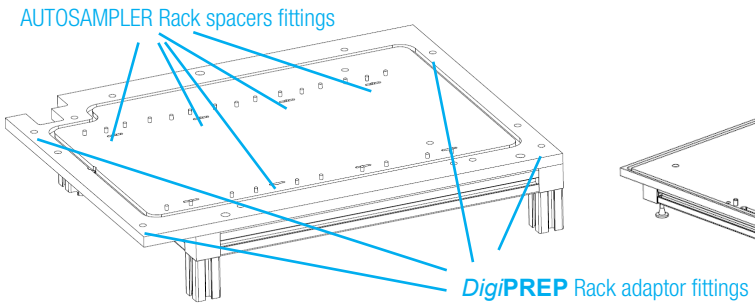


Figure 7: Peel the protective wrap off the Full tray upper rack platform the top Platform

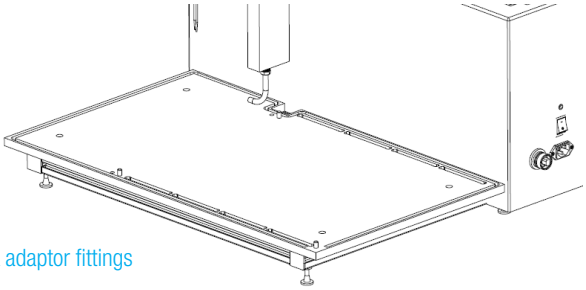


Figure 8: Peel the protective wrap off bottom rack platform the bottom Platform

4.2 INSTALLING THE RACKS

Place the purchased racks on the top table, using the provided rack adaptors and spacers.

Figures 7 and 8 (the top one on the left) shows the Cetac Rack spacers fitings. They allow users to install upt to 5 vertical Cetac racks vertically and 2 Cetac racks horizontally on the upper platform.

Figure 8 allows to place higher tubes such as ***Nova*WAVE** vessels. The lower platform in combination with the half tray allows users to transfer normalize, add internal standard and transfer samples onto Cetac rack.

4.3 PREPARING THE WASTE STATION

The Sample Handler upper platform contains wedges around the periphery to allow overflow or accidental spills to be easily drained out.

The drainage tubing is located under the lower platform. Unroll the tubing and place the unbound end in a waste container in order to allow drainage of excess liquid.

4.4 INSTALLING THE DISPENSING TIP

The Sample Handler allows to pick up and dispense very small sample amounts. The Dispensing tip dips as low as the bottom of the tubes.

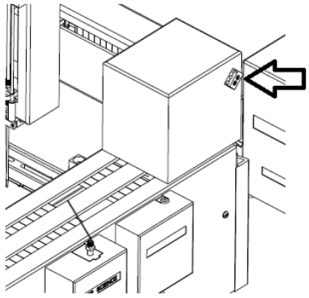


Figure 9: Loose the tubing guide on the back of the Y axis

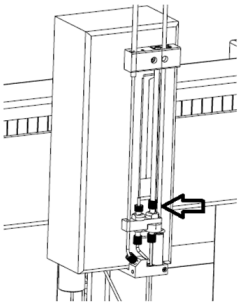


Figure 10: Remove the clear plastic nut

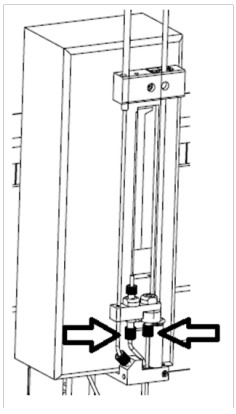


Figure 11: Remove the two probes by removing the two clear nuts at the bottom of the holder

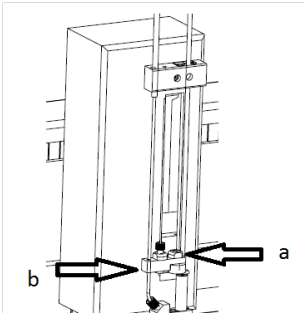


Figure 12: Remove the black adaptor (a), then slide up the bubble adaptor (b)

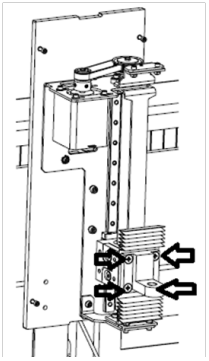


Figure 13: Pull the Z axis front cover to the front and remove the 4 screws that are holding the probe holder

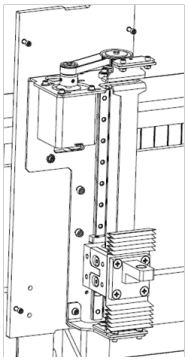


Figure 14: Replace the new probe holder

Put back the cover, the bubble adaptor the black adaptor and replace the probes.

NOTE The ***Accu*NORM** and Bubble Stirrer components will only be available for customers that purchased these options.

4.5 INSTALLING THE BUBBLE STIRRER

Available Hardware only when the Bubble Stirrer option has been purchased.

a. Slide the two black pins of the Bubble Stirrer module into the appropriate grooves at the back of the Sample Handler (Figure 15).

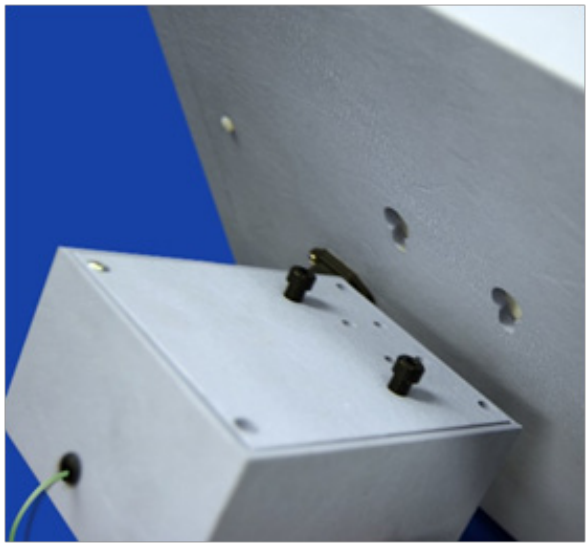


Figure 15: Bubble Stirrer installation

b. Attach the electrical connection (Figure 15).

c. Unroll the PEEK tubing connected to the Bubble Stirrer box

d. Pass the PEEK tubing through the upper tubing guide on the Z-axis arm and connect it to the Z-axis arm fitting (Figure 15).

t

4.6 INSTALLING THE *Accu*NORM

Available Hardware only when the ***Accu*NORM** option has been purchased.

a. Slide the black pins located on the back of the ***Accu*NORM** module to the into the grooves on the Sample Handler back panel and connect the two cables (Figure 16).

b. Pass the sensor cable through the hook on the z-axis back cover and thought he top guide on the front of the z-axis arm (Figure 16).

c. Screw the cable connector to the level sensor and place the assembly in the hole beside the probe (Figure 17).

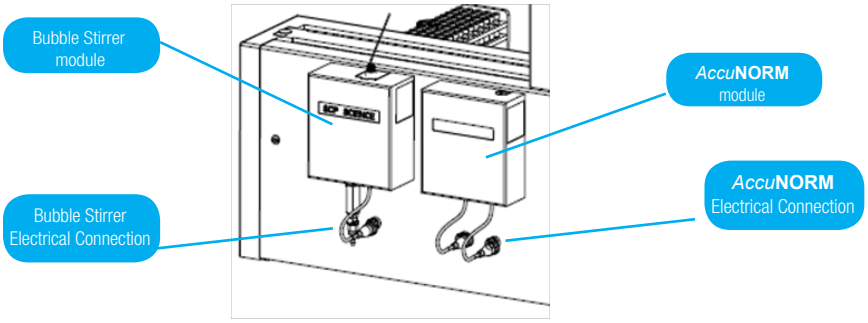


Figure 16: View of the Bubble Stirrer and **AccuNORM** *connceted to the Sample Handler back cover*

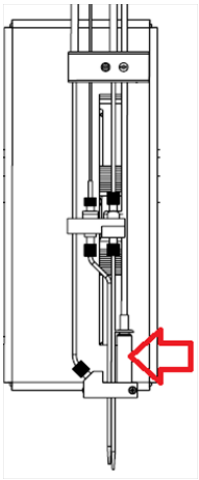


Figure 17: **AccuNORM** *level sensor connected tot he lower guide*

4.7 INSTALLING THE SYRINGE PUMP DISPENSING TUBING

a. The pump module should be placed on the left hand side of the instrument and connected to the ***Easy*PREP** Sample Handler via the COM2 cable.

b. Connect the liquid dispensing tubing to port #1 of the syringe pump valve.

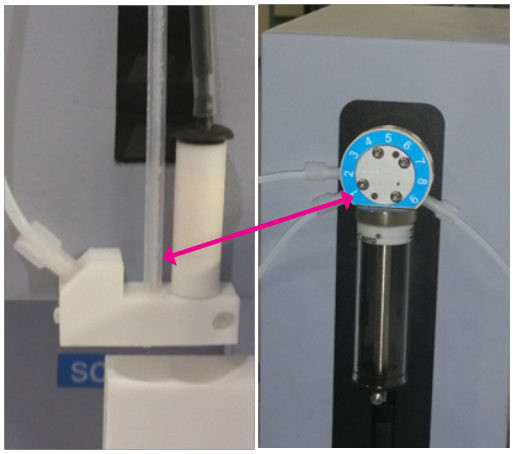


Figure 18: Dispensing tip connection to Syringe pump module

c. Connect washing tubing to port #2 of the syringe pump valve

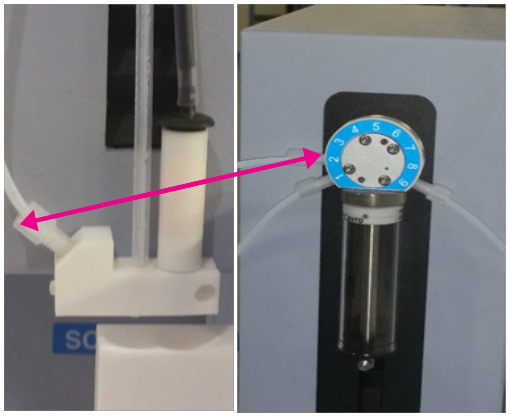


Figure 19: Washing tubing connection to Syringe pump

d. Port 9 on the syringe pump is reserved for priming. Screw on, to port 9, one of the tube to the syringe valve. A pack of tubing is shipped along with the unit (item number 010-400-020). More reagent tubing lines could be added on the rest to available ports. The rest of the tubing is dedicated to dispensing other reagents through port 3 to 8 of the syringe valve. The system allows to dispense up to 7 reagents.

e. The following steps are to be done once the software has been installed. (See Section 5)

f. Priming

g. Installing the syringe

4.7.1 INSTALLING DUAL PUMPS (Optional)

a. The Sample Handler allows to combine or duplicate all the different types of syringe pumps. In the case of dual pumps, the pumps are issued a label 1 or 2. Please connect respectively.

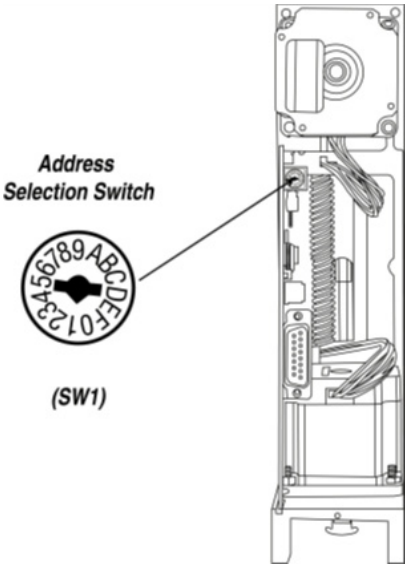


Figure 20: Address Selection Switch

b. The pump modules should be placed on the left hand side of the system. Connect the COM2 cable between the two pumps and connect either one pump to the ***Easy*PREP** Sample Handler via another COM2 cable.

c. Connect the liquid dispensing tubing to port #1 of the syringe pump valve

Figure 21: Washing tubing connection to Syringe pump

d. Port 9 on the syringe pump is reserved for priming. Screw on, to port 9, one of the tube to the syringe valve. A pack of tubing is shipped along with the unit (item number 010-400-020).

e. The following steps are to be done once the software has been installed. (See Section 5)

f. Priming

g. Installing the syringe

4.8 CONNECTING THE CABLES

Make sure that the Power button is turned off.

a. Connect the Power Cable to the receptacle located on the end of the X-arm. (Figure 22)
b. Connect the USB utility cable to the receptacle located on the end of the X-arm (Figure 22).

Do not connect the USB cable to the computer until after the software has been installed and loaded.

Figure 22: Power and USB plugs

5 Software Installation

5.1 CREATING A NEW ADMINISTRATOR ACCOUNT

In order to run the software, your computer must be set to operate from an administrator account.

5.1.1 Windows 7 Or Windows Vista

1. Open CONTROL PANEL from the START menu
2. Click on USER ACCOUNTS
3. Click MANAGE ANOTHER ACCOUNT

NOTE If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

4. Click ADD
5. Type the name and domain you want to give the user account and click NEXT
6. Select ADMINISTRATOR and click FINISH.

5.1.2 Windows 8 Users

1. Hold WINDOWS KEY + Q and type Control Panel
2. Select CONTROL PANEL and click on USER ACCOUNTS
3. Click MANAGE ANOTHER ACCOUNT

NOTE If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

4. Click ADD
5. Type the name and domain you want to give the user account and click NEXT
6. Select ADMINISTRATOR and click FINISH.

5.1.3 Windows Xp Users

1. Open CONTROL PANEL from the START menu
2. Double-click USER ACCOUNTS
3. Click CREATE A NEW ACCOUNT in the Pick a task list box
4. Type the name that you want to use for the account and click NEXT
5. Select ADMINISTRATOR
6. Click CREATE ACCOUNT.

5.2 RUNNING THE SOFTWARE IN DECIMAL PERIOD FORMAT

Windows customizes your PC to suit different national conventions, such as the formatting of dates and currency values. You could use Settings...Control Panel...Regional and Language Options to adjust these settings.

In some places commas are used instead of a period or point to separate the fractional part of decimal numbers. Since 2004, ViewHAR, ViewSOL and the Charter try to follow the conventions set in your Windows environment (unless you over-ride them). More details may be found in the ViewHAR online help topic “Decimal point or Decimal comma”.

Follow these steps in order to inform the ***Easy*PREP** program to run using the period.

1. Open Control Panel from the START menu.
2. Open Regional and Language Options
3. Under “Format” pick additional settings (on the bottom right-side of the window)
4. Under Decimal Symbol, modify the comma (,) to period (.)

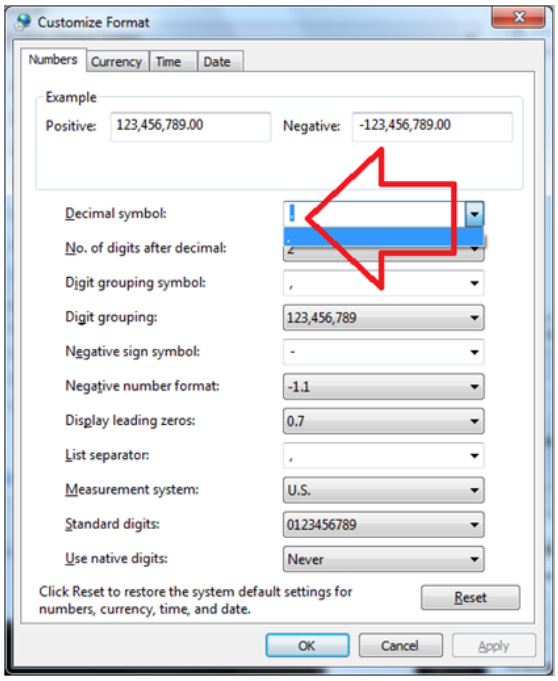


Figure 23: Under decimal symbol, modify the comma (,) to period (.)

5. Press “Apply”
6. Under “Format” pick your original desired locale (ie: Finnish).
7. Press OK.

The modifications will be permanently saved.

5.3 SOFTWARE INSTALLATION

Customer receiving the unit with manufacture issued laptop would already have the software installed. Nevertheless, the customer still receives a USB key, for reference, containing the software, the "param" file and any QC relevant documentation. In the case a manufacture issued laptop was issued, the customers can skip the software installation step.

Install this driver and software before connecting the Sample Handler to the computer.

5.3.1 Identifying the Operating System7

a. Open Computer from the START menu

b. On the top horizontal banner, select SYSTEM PROPERTIES

c. Identify if you are running under a 32 or 64 bits system. This information is located in the System section under Type of System

d. Note this information as it will be needed when installing the software.

5.3.2 From the FTP Site

Where can I find the software installer?

The last version of the software installer can be found in the following links:

For customers and external access:

ftp://www.scpscience.com/Sample%20Handler/Software/1-upToDate/

Username: ftp*Easy*Prep

Password: please obtain the password from your representative

5.3.2.1 Downloading the Zip File

a. Click on Softwareversion installer link (ex. SH-V3.1 installer).

b. Save the Softwareversion installer zip file in your downloads folder.

5.3.2.2 Installing the software Driver

a. Open the downloads folder

b. Open the software version installer folder (ex. SH-V3.1.1)

c. Open the FTDI Driver folder

d. If using a 32 bits operating system, open the CDM 2.08.30 WHQL Certified (32-bits) folder. On the other hand, in the case of a 64 bits operating system, open the CDM 2.08.30 WHQL Certified (64-bits) folder

e. Double click on CDM v2.08.30 WHQL Certified.exe

f. A pop up window will appear. Select EXTRACT ALL

g. Save the extracted files in the downloads folder as such

h. C:\Users\usernameaccout\Downloads\software version installer

i. Click on the extract icon

j. The software installer folder will automatically open under downloads

k. Open the 1-FTDI Driver folder

l. If using a 32 bits operating system, open the CDM 2.08.30 WHQL Certified (32-bits) folder. On the other hand, in the case of a 64 bits operating system, open the CDM 2.08.30 WHQL Certified (64-bits) folder

m. Double click on CDM v2.08.30 WHQL Certified.exe

n. Click on the EXECUTE button

o. The following installation Window will pop up:

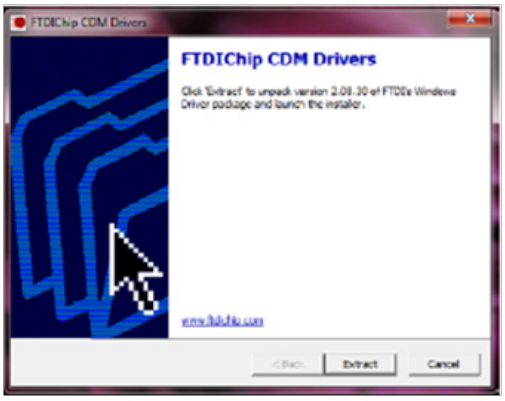


Figure 24: FTDI Driver

p. Click on the EXTRACT button

q. Another window for the Device Driver Installation Wizard will pop up.

r. Click on NEXT

s. The following window will appear notifying that the installation was completed successfully

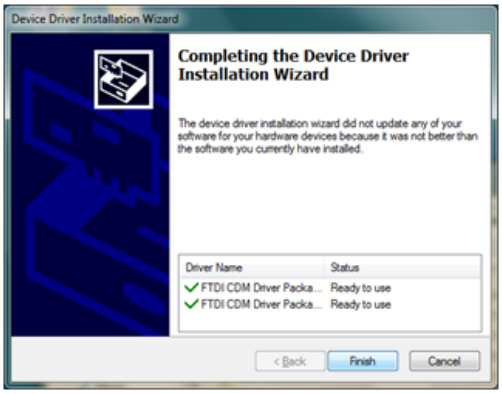


Figure 25: Driver Installation completed

t. Click on FINISH.

5.3.2.3 Installing the Software

a. Open the downloads folder

b. Open the software version installer folder (ex. SH-V3.1.1)

c. Open the Installation Software\2-SampleHandler folder

d. Run the Setup.exe application

e. The Installation Window will pop up

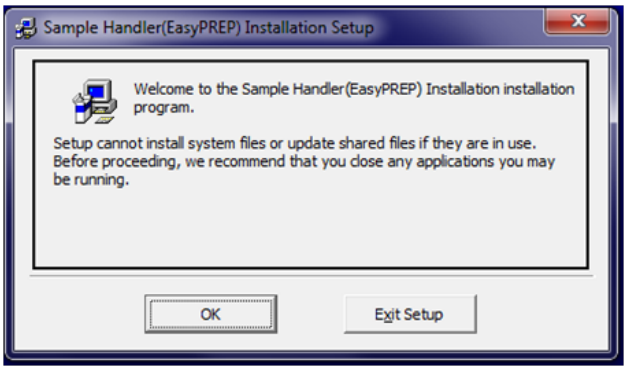


Figure 26: Installation Window

f. Click on OK to continue

g. Click on installation icon

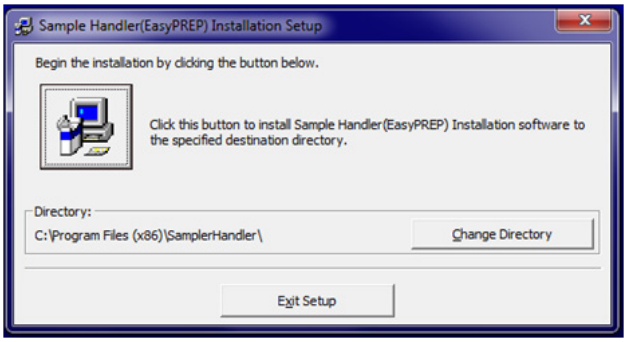


Figure 27: Installation Window

h. Follow the instructions on screen:

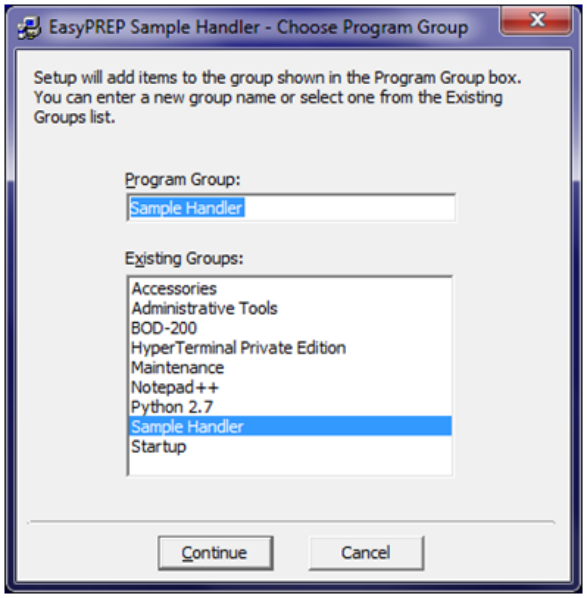


Figure 28: Program Group

i. The following message will pop up notifying that the installation was successful.

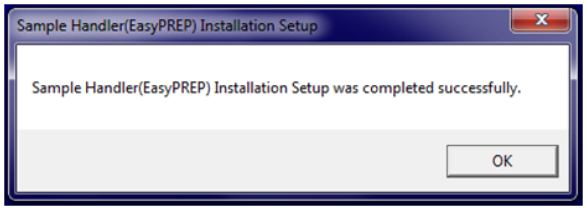


Figure 29: Completed Successfully

5.3.2.5 Ensuring that the software is running in administrator mode

a. Open computer from the START menu

b. Select ALL PROGRAMS

c. Find the installed software in the list of programs

d. Right click on the program name

e. Select SEND TO DESKTOP

f. Right click on the software icon and select RUN AS ADMINISTRATOR

5.3.2.6 Uploading the Parameters File

a. Go to C:\Program Files (x86)\Softwarename\param. The parameters file is specific to each unit sold. It contains specific operating paramters obtained during the QC process of each system.

b. Replace the files in the paramaters folder by the ones on the USB key

   For example, the Sample Handler param folder contains the following files:

   i. Parameters.txt

   ii. rackSets.txt

   iii. racks.txt

   iv. tubes.txt

   v. TiltParam.tech

   vi. Delete the old files and replace them with the ones on the USB key

   vii. Copy and paste the param files located on the USB key.

5.3.3 From the USB Key

5.3.3.1 Installing the Software Driver

a. Open the downloads folder

b. Open the software version installer folder (ex. SH-V3.1.1)

c. Open the FTDI Driver folder

d. If using a 32 bits operating system, open the CDM 2.08.30 WHQL Certified (32-bits) folder. On the other hand, in the case of a 64 bits operating system, open the CDM 2.08.30 WHQL Certified (64-bits) folder

e. Double click on CDM v2.08.30 WHQL Certified.exe

f. A pop up window will appear. Select EXTRACT ALL

g. Save the extracted files in the downloads folder as such

h. C:\Users\usernameaccout\Downloads\software version installer

i. Click on the EXTRACT button

j. The software installer folder will automatically open under downloads

k. Open the 1-FTDI Driver folder

l. If using a 32 bits operating system, open the CDM 2.08.30 WHQL Certified (32-bits) folder. On the other hand, in the case of a 64 bits operating system, open the CDM 2.08.30 WHQL Certified (64-bits) folder

m. Double click on CDM v2.08.30 WHQL Certified.exe

n. Click on the EXECUTE button

o. The following installation Window will pop up:

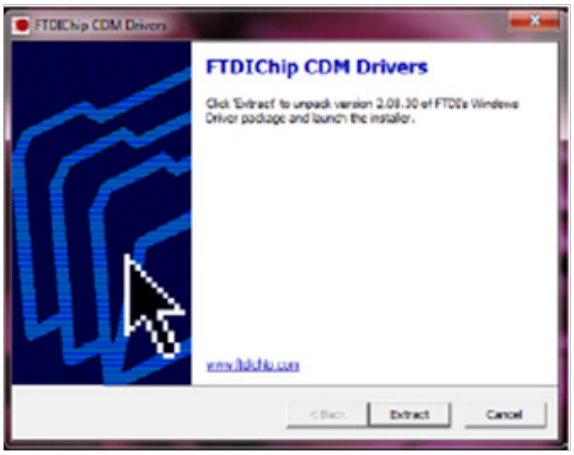


Figure 30: FTDIChip CDM Driver

p. Click on the EXTRACT button

q. Another window for the Device Driver Installation Wizard will pop up

r. Click on NEXT

s. The following window will appear notifying that the installation was completed successfully

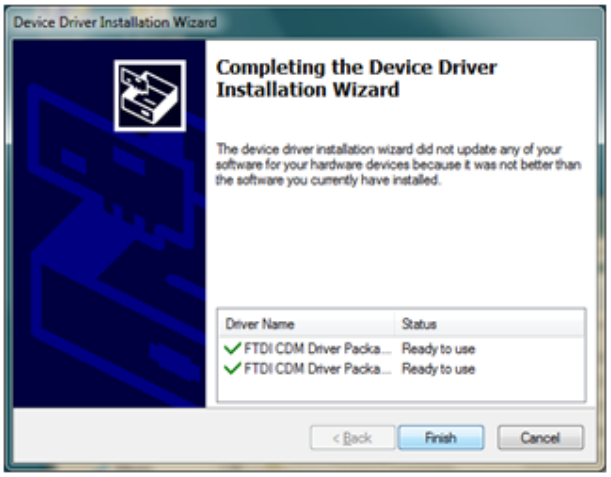


Figure 31: Completeing the Device Driver Installation Wizard

t. Click on FINISH.

5.3.3.3 Installing the Software

a. Open the download folder

a. Open the software version installer folder (ex. SH-V3.1.1)

b. Open the Installation Software\2-SampleHandler folder

c. Run Setup.exe

d. The Installation Window will pop up

e. run the Setup.exe application

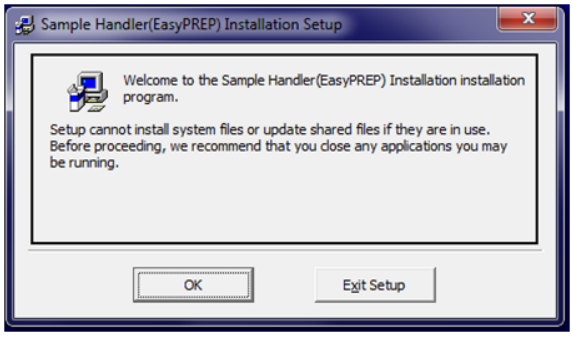


Figure 32: Installation Window

f. Click on "OK" to continue

g. Click on Installation icon

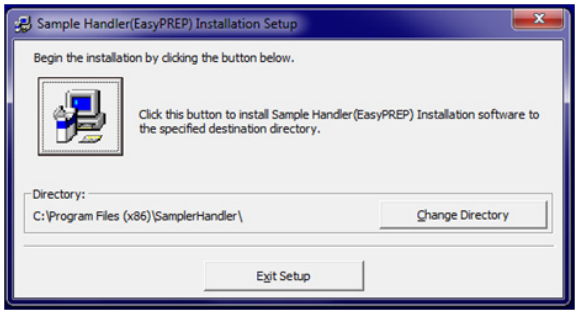


Figure 33: Installation Window

h. Follow the instructions on screen:

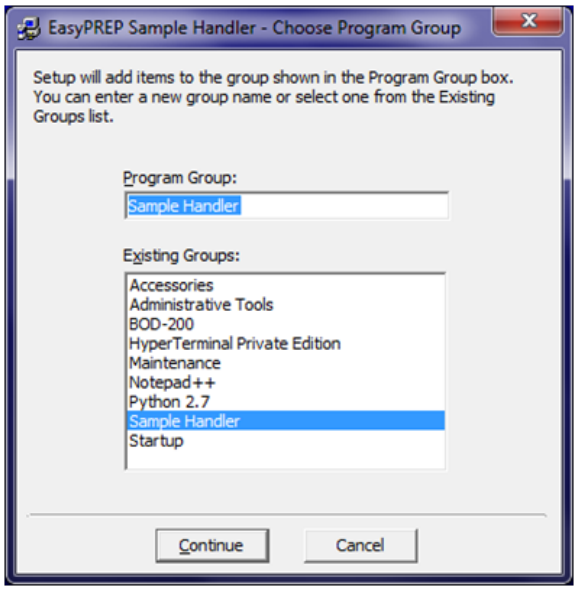


Figure 34: Program Group

i. The following message will pop up notifying that the installation was successful.

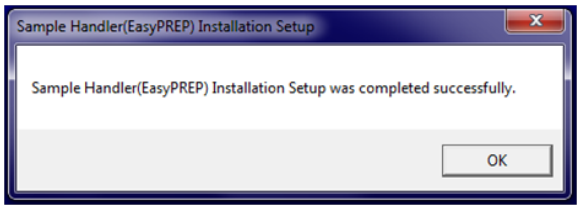


Figure 35: Completed Successfully

5.3.3.4 Ensuring that the software is running in administrator mode

a. Open Computer from the START menu

b. Select ALL PROGRAMS

c. Find the installed software in the list of programs

d. Right click on the program name

e. Select SEND to desktop

f. Rich click on the software icon and select RUN as administrator

5.3.3.5 Uploading the Parameters File

a. Go to C:\Program Files (x86)\Softwarename\param. The parameters file is specific to each unit sold. it contains specific operating paramters obtained during the QC process of each system.

b. Replace the files in the parmaters folder by the ones on the UBS key.

The Sample hander param folder contains the following files:

i. Parameters.txt

ii. rackSets.txt

iii. racks.txt

iv. tubes.txt

v. TiltParam.tech

vi. Delete the old files and replace them with the ones on the USB key.

vii. Copy and paste the param files located on the USB key.

5.3.4 Software Upgrade

If you have a previous version of the software and you want to update it please follow these steps:

5.3.4.1 Uninstall the Current *Easy*PREP Software

a. Open Programs and Features by clicking the START button 

b. Click on CONTROL PANEL

c. Click on PROGRAMS

d. Click the ***Easy*PREP** previous software version

e. Click UNINSTALL. Some programs include the option to change or repair the program in addition to uninstalling it, but many simply offer the option to uninstall. To change a program, click CHANGE or REPAIR.  If you're prompted for an administrator password or confirmation, type the password or provide confirmation.

f. Go to "C:\Program Files (x86)" and make sure the ***Easy*PREP** software folder is not there anymore. If it is, please erase it.

g. Follow all of the steps in section 3.1

5.4 COMPORT ASSIGNMENT

a. Now that the software is installed, power on the ***Easy*PREP** unit

b. Connect the USB cable from the instrument to the computer's USB port

c. Turn on the instrument and open the software

a. Click the START button

b. Right-click on MY COMPUTER

c. In the fly-out menu, click MANAGE

d. In the Computer Management Window, click on DEVICE MANAGER

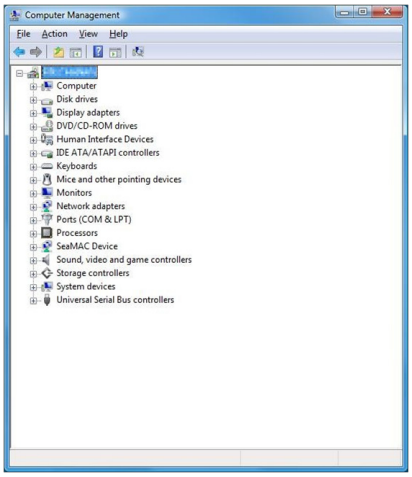


Figure 36: Computer Management Window

e. In the right-hand pane, expand the Ports (COM & LPT) listing by clicking the "+" symbol

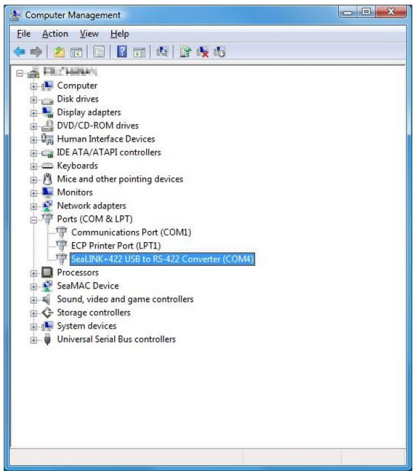


Figure 37: Expand the Ports

f. In the Communications Port Properties window, click the PORT SETTINGS tab and then click the ADVANCED button

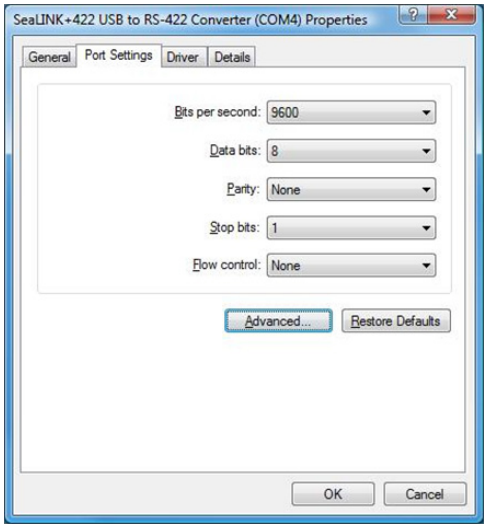


Figure 38: Port Properties window

g. In the Advanced Settings window, you can select the new COM port number from the drop box (be careful not to select aCOM number already in use)

h. In the scroll box "COM Port Number " of the advanced settings window, change the number to one below 15. All COM ports must be equal to or less than 15

i. In Device Manager, the previous COM value is visibly changed

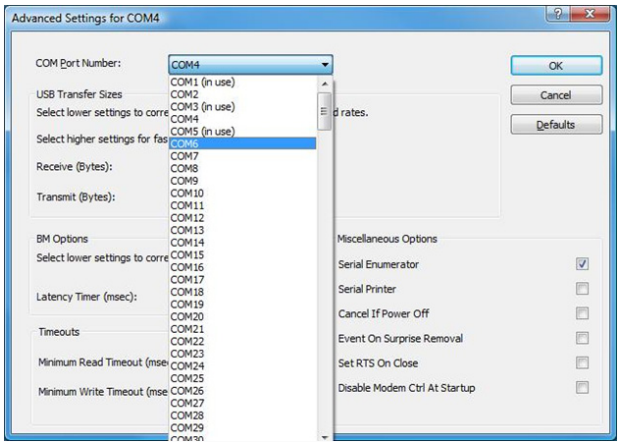


Figure 39: COM Port Number scroll box

j. Click the OK button to confirm your changes. If Windows detects a conflict, choose another COM port number

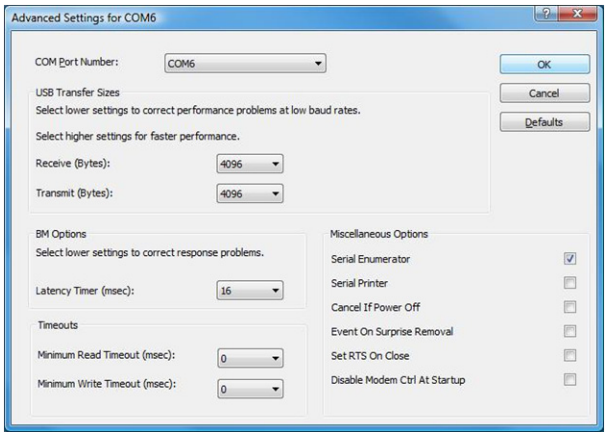


Figure 40: COM port number assignment window

k. Click the OK button to close the Communications Port Properties window

l. Repeat the above steps to change the rest of COM ports if needed. Restart the computer. After reboot, all COM ports are equal to or less than 15

m. When Device Manager refreshes the hardware list, the COM assignment will reflect your changes. To get Device Manager to refresh the window on Windows XP, you may need to click ACTION in the menu and then click SCAN FOR HARDWARE CHANGES in the sub-menu (Note: If 'Scan for hardware changes' isn't listed in the sub-menu, click on the computer name in the right pane and then repeat this step)

n. In Device Manager, the previous COM# is visibly changed

o. You can now open Sample Handler software

p. Reboot the computer.

5.5 STARTING UP THE SYSTEM

You are now ready to operate the ***Easy*PREP** system.

a. In the case of the Sample Handler

b. Place the calibration rod in the assigned slit on the tube platform (there is a hole near the washing station to place it). Remove everything else from the platform

c. Go to the UTILITIES tab, look for the "Tilt Calibration" section and click on the CALIBRATE button. The robotic arm will move and measure the tilt of the platform in specific spots.

6 System Installation

6.1 TURNING THE SYSTEM AND SOFTWARE ON

a. In the start Menu select Sample Handler by right clicking on the mouse and selecting RUN AS ADMINISTRATOR

b. A pop up will ask you if you would like to initialize the axis. Select YES

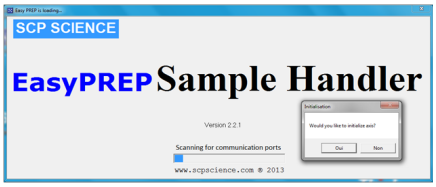


Figure 41: Initialize Robotic System

- Another pop up will ask you if you would like to initialize the syringe pump. Select YES

NOTE This pop up window will appear twice if the system has a dual pump setup.

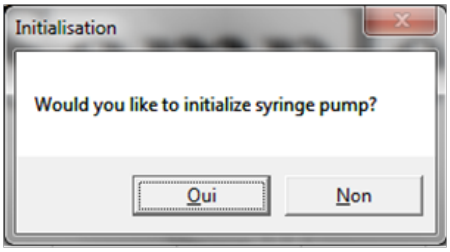


Figure 42: Initialize Pump

c. Make sure that the indicators representing the connected hardware components on the bottom of the screen are all turned on to green.

Now that the hardware and software are both installed correctly, and that the instrument is powered on, the following quick guide will help the user in setting up the instrument and starting an application.

6.2 SOFTWARE TABS

The User Interface has three tabs:

- PROCESS
- VISUALIZATION
- ADMIN-TOOLS /UTILITIES
  - » ADMIN-TOOLS/PUMP1
  - » ADMIN-TOOLS/PUMP2

Figure 43: Three tabs to navigate the software

Figure 44: Vertical sidebar to navigate Admin-Tools tab

6.2.1 The Process Tab

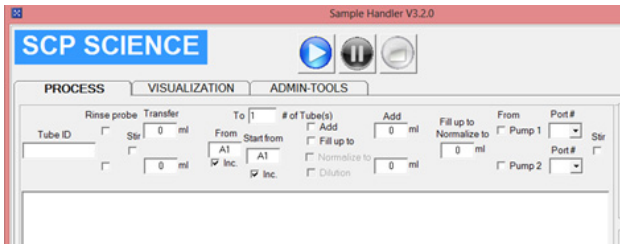


Figure 45: Process table fields

6.2.1.1 The Process Tab Definitions

«IMPORT ID» imports sample IDs from any directory. The imported information fills the Tube ID column in the sequence. This is useful to run the same sequence with new samples.

The **«ADD»** icon, permits to add a new line to the method sequence.

The **«DEL»** icon, deletes the last line or selected line in the input process table.

The **«BREAK»** icon, is used to insert a break during the sequence. When the sequence reaches that point, the instrument stops and the software prompts the operator for validation the reactivate the process. This allows the operator to manually move samples to a digestion block or conduct sample filtration. The method is reactivated by pressing the space bar.

The **"FIX"** icon, corrects the selected line in a sequence.

The **"RECYCLE BIN"** icon, clears the entire method.

The **"OPERATOR'S NAME"** field, stores the information about the operator of the method.

The **"COMMENT"** field, stores information about ther method.

Rinse Probe: allows to rinse probe before the sequence line in question

Stir: activates the homogenization, before or after any operation, through the bubble stirrer apparatus.

From tube: is used during transfer. Indicates the source tube.

To tube: is used during transfer. Indicates the target tube.

There are two fields for **'To tube'** which allow user to specify multiple target tubes in a single step. For example, if you want to dispense to B1, B2, B3, B4, B5, you put 5 = # of tubes and B1 = Start from B1.

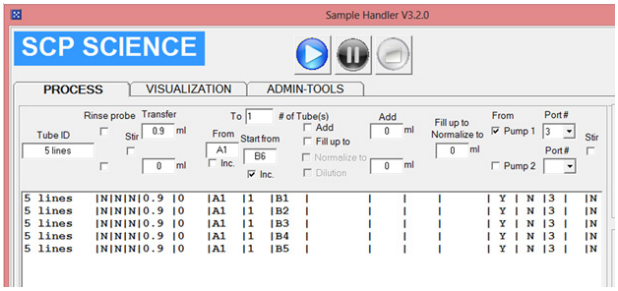


Figure 46: Filed 1 for 'To Tube' process

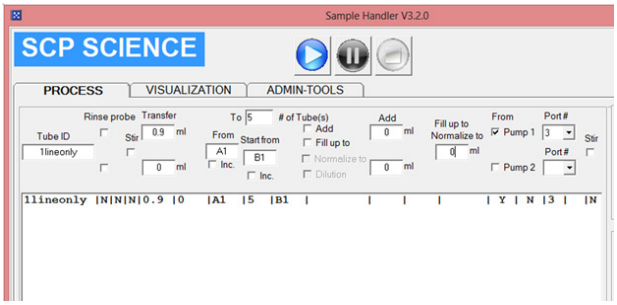


Figure 47: Filed 2 for 'To Tube' process

This compact form is also valid for **Add, Fill up to** or **Normalize to**.

Inc.: is to allow to add sequence lines incrementally based on the setup of the last set sequence line.

Add: Allows to add a user defined reagent volume from a user defined port. There are two boxes, one for each pump.

The **to tube** field defines the target tube for this operation.

Fill up to: Allows to fill the tube up to a target volume based on operations conducted on an empty tube. It calculates and keep track of the sequence of operatonsoperations done on the empty tube in question. This operation does not work if the tube was not originally empty. The user defined reagent volume from a user defined port.

The **to tube** field defines the target tube for this operation.

Normalize to: Allows to fill a tube to a target volume using the *Accu***NORM** Level Sensor. The original sample volume is not known in this case. The user defined reagent volume from a user defined port.

The **to tube** feildfield defines the target tube for this operation.

From pump1 and From pump2: the operation works only for checked pumps. There are three choices: pump1 only, pump2 only, both pumps together.

Port#: drop down selection, is to select the port valve from which the reagent will be picked.

Figure 48: Process Tab Operator's name and Comments feilds

6.2.1.2 Method Building

» Create a Method using a logical task sequence
» INTUITIVE METHOD DEVELOPMENT ALLOWS:
  - Up to 7 reagents; Aliquoting and variable ratio sample dilution, standard addition, reagent dispensing, and sample transfers.
  - Normalization and non-fixed ratio serial dilution functions can also be programed.
  - Flexible method building allow the operator to combine all the listed manipulations as they please.
  - Ability to adjust parameters of the listed manipulation in order to accommodate the operators' specific requirements.
» Program a Pause within the built method,
» Load and save methods.
» Load sample ID list.

6.2.2 The Visualization Tab

There following scenarios could be addressed in the Visualization Tab:

1. Select a predefined rack or rack configuration.
2. Modify a predefined rack or rack combination because its similar to a new rack combination. This allows the user to have a starting point rather than redesign the rack combination from scratch.
3. Create a custom rack or rack combination from scratch.
4. Adjust the depth at which the dispensing tip drops into the rack tubes.
5. Calibrate the level sensor via a specific tube type.
6. Setup the *Nova***WAVE** vessels codes and unique dimentions.

6.2.2.1 The Visualization Tab Definitions

Rack Combination: Defines a set of 2 or more same or diffent racks.

Select a rack combination: Allows you to select from a preset list of common racks or rack combinations.

Edit Rack Combination: allows to edit a preset rack combination as a starting point for custom requirements.

Edit Rack: allows to edit a preset rack as a starting point for custom requirements.

X0: Assigned coordinates of the first tube on the rack in question via the X axis in mm. The washing station is equivalent to X0=0mm.

Y0: Assigned coordinates of the first tube on the rack in question via the Y axis in mm. The washing station is equivalent to Y0=0mm.

Move Z: Allows the user to prompt the system to drop the dispensing tip into a specific depth into the tube in order to evalaute the ideal travel depth into the tube in question.

Add Rack: Allows to add the created to the list of racks that define the rack combination in question.

Modify: Allows to modify the parameters of the selected and already saved rack.

Erase: Allows to delete a rack from the rack combination in question.

Save rack combination: Allows to save the list of racks that constiture rack combination in question.

Create or edit rack: allows to create or edit an exisiting rack. It provides the user with the flexibility to adapt the Sample Handler to the customer's unique type of tubes. As long as the tubes are within the system's physical limitations. Editing an exisitng rack allows the user to customise an exisiting and similar rack rather than starting from scratch. The customer must define the number of tubes by row and column as well as the tube coordinates.

X0- coordinates of the first tube via the X axis in mm. the starting point is the washing station (x=0). The maximum X travel distance of the Sample handler is 450mm.

Y0-coordinates of the first tube via the Y axis in mm. the starting point is the washing station (Y=0). The maximum Y travel distance of the Sample handler is 326 mm.

dXT-coordinates of the first tube via the last tube on the rack in question X axis in mm. the starting point is the first tube X coordinates.

dYT-coordinates of the first tube via the last tube on the rack in question Y axis in mm. the starting point is the first tube Y coordinates.

Zd-the depth at which the dispensing tip will drop into the tube in question (in mm) when dispensing.The maximum drop distance of the dispensing tip is 145mm.

Zp-the depth at which the dispensing tip will drop into the tube in question (in mm) when picking up a defined volume of sample. The maximum drop distance of the dispensing tip is 145mm.

Once a rack has been created or edited, the user must SAVE RACK + SAVE RACK COMBINATION.

If the customer plans of normalizing, they must calibrate the tube in question.

Assign the Varied tube IDs: Used for glass tubes. Glass tubes slightly vary in dimentions as they are built by hand rather than machine. Therefore, it is important to save their individual dimentions in order to conduct normalization. This section allows to set and save each tube's dimentions. Used, for example, on *Nova***WAVE** Vessles.

Tubes/vessels always need to be placed in their assined positions on the rack.

The following racks and rack combinations are already setup in the software and have been aligned during QC:

- GC/LC
- DP Jr 15 ml x2
- DP Jr 50 ml x2
- DP MS/LS x2
- DP MS/LS + Autosampler 21
- Autosampler 50ml,12 positions x5
- Autosampler 21x4
- Autosampler 60 x4
- Autosampler 60 + DP Jr. 50ml
- Autosampler 60 x2 + DP Jr. 50ml
- Autosampler 21 + *Nova***WAVE** 50ml
- Autosampler 21 + *Nova***WAVE** 75ml
- Autosampler 60 + *Nova***WAVE** 50ml
- Autosampler 60 + *Nova***WAVE** 75ml
- Hotblock 50ml x2

In the Visualization tab, rack and rack configurations are created.
Here are a few examples screen shots of the available preset racks and racks combinations

6.2.3 The Utilities Tab

The Utilities tab allows to conduct

» Tilt Calibration of the ***Accu*NORM** level sensor
» Allocate valve ports
» Valves
» Define priming and washing volumes
» Initiate priming/washing
» Visualize pump dispensing parameters
» Initialization of the robotic arm and syringe pump Allocate valve ports

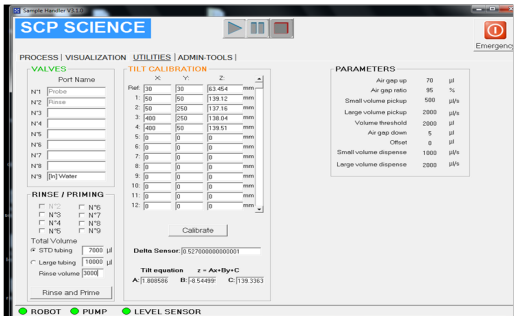


Figure 49: Screenshot of the Utilities tab

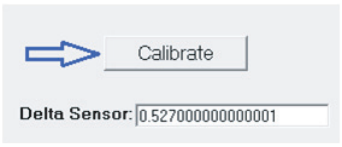


Figure 50: Click on the button "Calibrate"

6.2.3.1 Open The Utilities Tab

The Admin Tools is password protected. The installer provided the lab supervisor with the password during the training session. The reason that the Admin Tools is password protected is to prevent, lab supervisor to set functional parameters to be tempered with. Please obtain the Admin Tools password from your lab supervisor.

- Click the ADMIN-TOOLS tab and enter the password to open it. On the right of the pane, click UTILITIES.

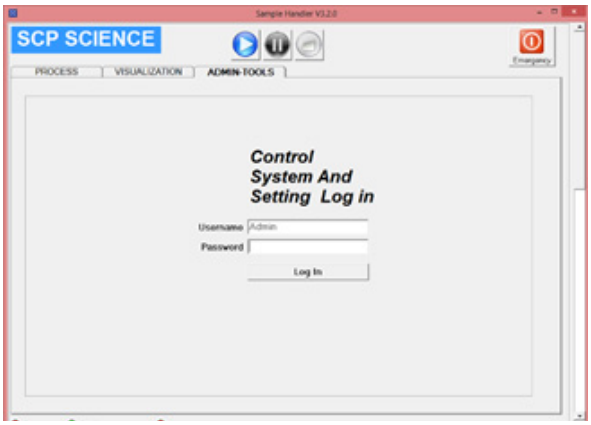


Figure 51: Click the Admin-Tools tab and enter the password to open it

6.2.3.2 The Utilities Tab Definition

- **Parameters:** displays the current dispensing parameter values for the pump.
- **Tilt Calibration:** allows for the calibration of the level sensor.

NOTE

This should be performed when placing the system in its correct location and every time it is moved.

«Normalization» is to select the vessel type being normalized. Once the vessel type has been selected, the according text boxes become active:

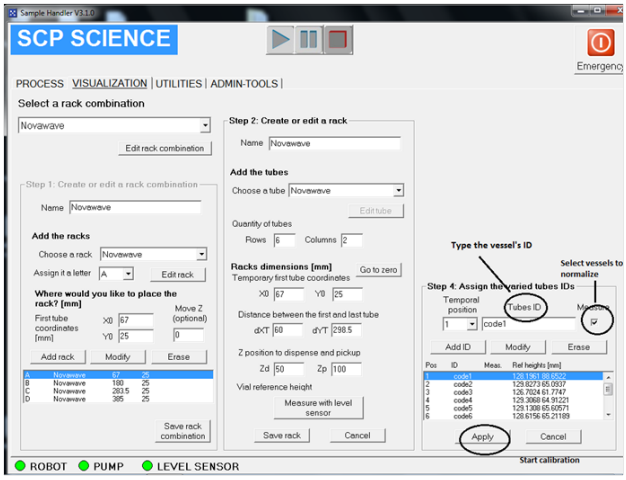


Figure 52: Normalization

NOTE

***Digi*TUBE** vessels parameters have been preprogrammed in the software.

- **"Valves"** indicate the allocated dispensing ports defined by the user based on the application reagents. This function is also used to assign a volume for priming/cleaning of the dispensing tip, and to manually prime the liquid dispensing line and tip.

The standard dispensing tubing volume is a 2ml loop. The default priming volume for the standard dispensing tubing is of 10ml. As an option a 7ml loop might have been purchased (010-400-048). In that case the required priming volume is 20ml.

6.2.4 Admin-Tool / Pump Set-Up Tab

- The Admin tools is password protected. The installer provided the lab supervisor with the password during the training session. The reason that the Admin Tools is password protect is to prevent, lab supervisor, set functional parameters to be tempered with. Please obtain the Admin Tools password from your lab supervisor.
- Click the ADMIN-TOOLS tab and enter the password to open it. On the right of the pane, click 'Pump1 Setup', or 'Pump2 Setup', up to the user's need.

In the Admin Tools /Pump 1 or Pump2, user could:

» Initialize the robotic arm and syringe pump
» Control movement speed of the robotic arm
» Determine syringe barrel size
» Determine liquid dispensing parameters
» Determine Bubble Stirrer parameters
» Control manual level sensing

NOTE

The XLP 6000 pump is for all borosilicate glass syringe barrels. The Centris pump is for the 5ml teflon syringe barrel and Ceramic valves only.

6.2.4.1 Parameters for Compensation of Pump Gap

The version of SW has the feature of 'one pickup/multiple dispense'.
In order to improve the precision, two parameters for compensation of mechanical hysteresis gap of pumps are introduced, and can be adjusted by the user when needed.

Open the Parameter file: In the line 14. The offset vector now has 4 elements (a,b,c,d). Where a and b = offset in µl for pump1 and pump2 respectively; while c, d = compensation of mechanical gap in µl for pump1 and pump2 respectively.

6.2.4.2 Admin-Tool /Pump Tab Definitions

Admin Tools is a tab where advanced parameters can be configured, that is: robot movement speed, rack positioning, etc. This tab is only accessible with a password to prevent unauthorized personelle from changing the settings. Password: xxxyyy (Contact sales department for password).

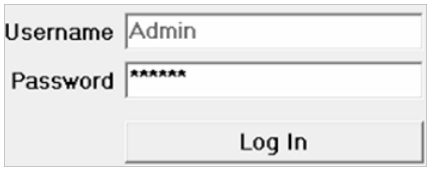


Figure 53: Access protected by password

6.3 SYRINGE INSTALLATION

The sample handler is compatible with 1, 5, 10, 25, or 50ml syringes.

a. Remove the ordered syringe from its protective box.
b. Go to ADMINTOOLS/PUMP
c. Select the corresponding syringe barrel size
d. The syringe pump plunger must be lowered by 50% of its travel length
e. Type 50% of the total volume of the syringe into the field "Volume" (for example, if installing a 10ml syringe, type 5000 ul), then click PICKUP.

The plunger is now low enough to install the new syringe.

f. Remove the screw
g. Screw the new syringe onto the syringe valve
h. Lower the syringe plunger until the screw hole and the syringe hole are aligned
i. Place the crew into its designated hole
j. Initialize the pump
k. Follow step in section 6.4 for offset calculation

6.4 VOLUME ACCURACY CHECK AND OFFSET CALCULATION

The following procedure is a quick guideline on verifying Sample Handler accuracy and precision as well as offset calculation. It can be used to calculate the system's offset whenever installing a new syringe.

- Weigh 9 empty tubes and note weight of tubes.
- Place the 9 tubes at random positions on the Sample Handler rack.
- Have the pump draw and dispense the indicated volumes of DI water into 3 tubes per volume.
- Weigh tubes again and determine actual volume of water dispensed: weight of water / density of water at ambient temperature.
- The Coefficient of variation CV must not exceed 2% for volumes below 1 ml and 1% for volumes above 1 ml, where CV = StDev/Average

Volume of Syringe: (Check at volumes)	☐ 1ml (0.02ml /0.2ml /1ml)	☐ 5ml (0.05ml /1ml /5ml)	☐ 10ml (0.05ml /1ml /10ml)	☐ 25ml (0.1ml /1ml /10ml)

Check of Volume Accuracy

Tube #	Mass of Empty Tube	Mass of Tube / Water	Difference	Volume				
1								
2								
3								
			Avg		**Stdev**		**Cv**	
4								
5								
6								
			Avg		**Stdev**		**Cv**	
7								
8								
9								
			Avg		**Stdev**		**Cv**	

- If the CV does not meet criteria:
  a. Verify all connections (fittings and ferrules) as well as the dispensing tubing to remove any possible air leaks.
  b. Verify and remove any air bubbles in the tubing.
- If the difference between the volumes dispensed and the volumes measured is constant, apply that volume (in µl) to the box Offset of the automated pump dispensing parameters (Admin-Tools).
- If the offset (volume dispensed – average volume measured) is highly variable between each tube, verify the dispensing parameters used (Admin-Tools). Verify that, other than the offset, they match the default dispensing parameters below:

Airgap up (µl)	50	**Airgap down (µl)**	5
Airgap %	70	**Offset (µl)**	
Small volume pickup (µl/s)	500	**Large volume pickup (µl/s)**	2000
Small volume dispense (µl/s)	1000	**Large volume dispense (µl/s)**	2000
Volume threshold (µl)	2000		

6.5 PRIMING

After initialization and before performing any liquid dispensing, the liquid dispensing line must be primed to clean the tubing. Besides priming between reagents for trace metal analysis, a system blank should be performed before using the Sample Handler. Thus ensuring that no trace metals are left in the dispensing lines.

It is recommended that the unit is primed three times using 20 ml of HNO_3 for priming and 3 ml HNO_3 for rinsing.

Priming can be done manually in the Utilities Tab, or automatically in a method in the Process tab.

6.5.1 Manual Priming:

1. Connect the reagent tubing to the valve in ports 3 to 8.
2. Put the end of the reagent dispensing line in a container of the liquid to be dispensed for other reagents.
3. Ensure that the end of the waste tubing that empties the rinsing station is in an appropriate waste container.
4. In Utilities, select the Port to be primed.
5. Press the button “Rinse and Prime”.

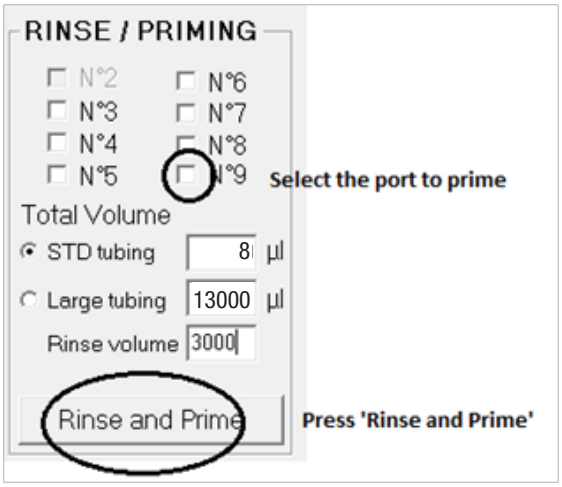


Figure 54: Rinse and Prime

NOTE Standard tubing should be set at 8 ml priming volume and 3 ml rinse volume.

NOTE Large tubing should be set at 13 ml priming volume and 3 ml rinse volume.

NOTE When the dispensing tubing line (from the Sample Handler to the pump) is changed:

I. Ensure that the dispensing tubing is empty of liquid

II. Put the dispensing tubing at port 9 in a container of clean water

III. In Utilities:

- Select Port 9
- Click RINSE AND PRIME

IV. Verify that the rinsing and priming volumes used are sufficient to completely fill the tubing and that the water overflows into the rinsing station.

NOTE Adjust the priming and rinsing volumes if necessary. To empty the dispensing tubing line of liquid

I. Take the dispensing tubing at port 9 out of the container of water

II. Select Port 9

III. Click RINSE AND PRIME

IV. The remaining liquid will be emptied by sending it through the rinsing station

6.5.2 Automated Priming:

To include priming of the dispensing line within a method, select the checkbox Rinse Probe at the start of the sequence. For example, in the following screenshot:

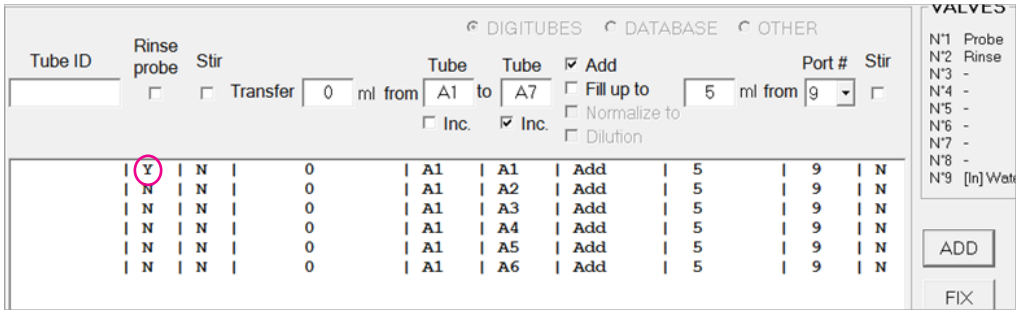


Figure 55: Priming in step one of the sequence

a. 5 ml of reagent from port 9 is being added to each tube in Rack A
b. In the first row, the check box “Rinse probe” has been selected. A “Y” under colomn “Rinse Probe” will appear on the sequence line in question.
c. Because this check box was selected, when the user presses the START button, the robot will first go to the rinsing station and prime the dispensing line. It will use the port selected in this row (Port 9) to do the priming.
d. Additional primings can be added during the sequence, for example when switching to a different reagent, or for rinsing the dispensing tip after transferring samples.

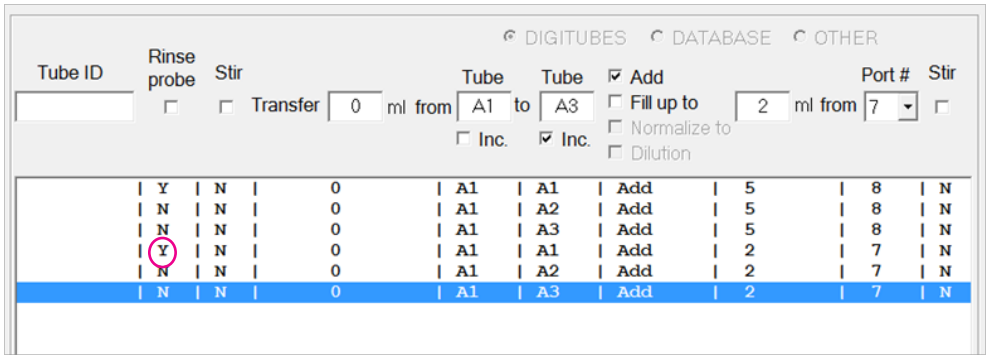


Figure 56: Prime or rinse at anytime during the process

Example 1: Addition of two separate reagents to sample tubes. Priming inserted when switching from Port 8 to Port 7.

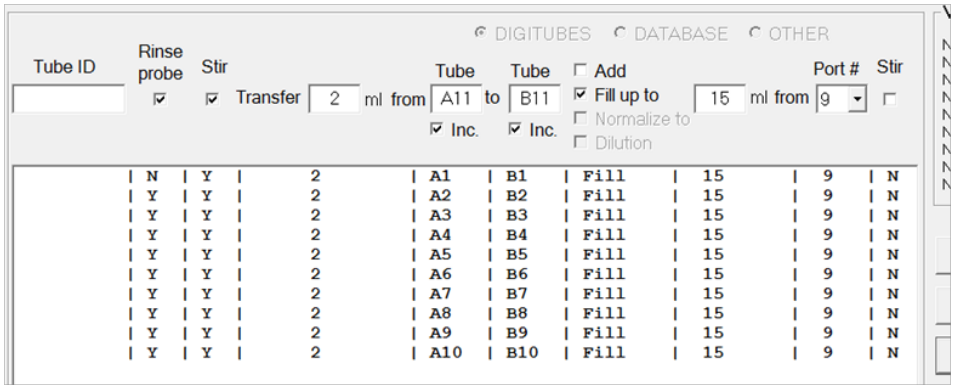


Figure 57: Priming using different reagents within the same process.

Example 2: Samples are homogenized, then 2ml is transferred to a separate vial and diluted to 15ml. Probe rinsing performed between each sample to prevent cross-contamination. Samples are homoginized by stirring, then 2 ml is transfered from Rack A to Rack B and diluted to 15ml.

6.6 CREATING CUSTOM RACKS IN THE VISUALIZATION TAB

Select Custom in the Choose a rack drop down list

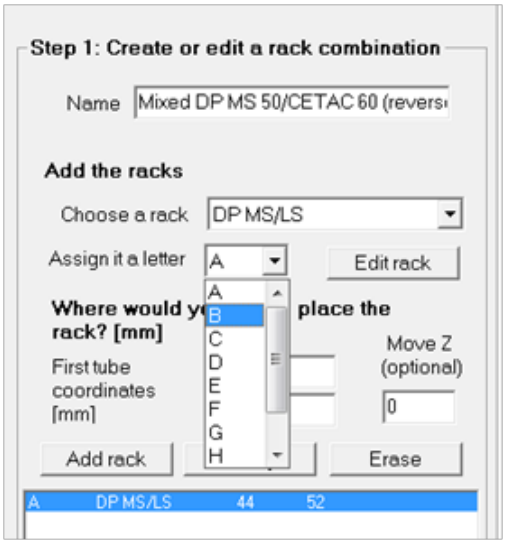


Figure 58: Create or edit a rack combination

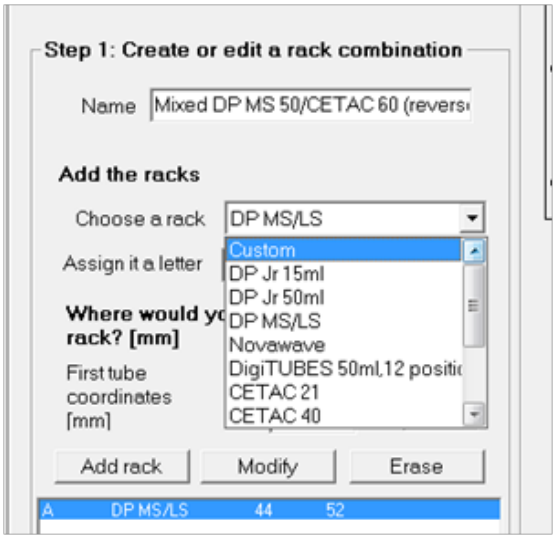


Figure 59: Create or edit a rack combination

e. Press CREATE RACK to open the rack creation and editing window

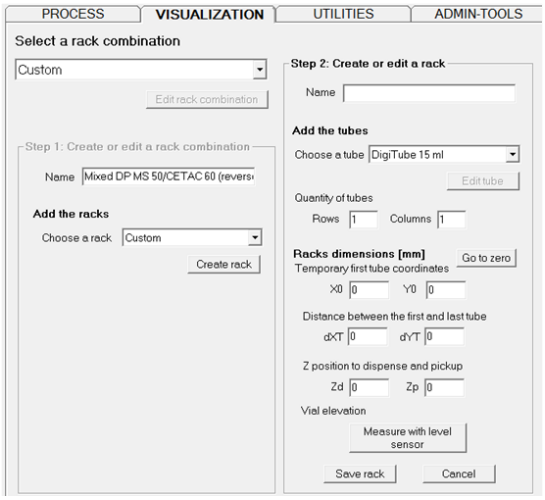


Figure 60: Visualization Tab

f. Enter a name for the new rack type

g. Enter the number of Rows and Columns

h. Enter estimated values for the distance between the first tube and the last tube on the rack under dXT and dYT

i. If the ***Accu*NORM** was purchased, VERIFY THAT THE ***Accu*NORM** IS CENTERED IN THE MIDDLE OF THE **TUBE** using the ***Accu*NORM** centering tool.

j. Select Measure level sensor

k. Select Save rack

6.7 SETTING UP COMBINATION RACKS

Customizable rack configurations are possible on the Sample Handler. This allows to:

» Accommodate most vessels and capacity requirements. The intruments is a plug and play solution that adapts to the operators' curent practices

» Compatible to most sample vessels with a min width of 0.40" (10mm) and maximum height of 8.0" (203mm)

» Samples can be batched and transferred to or from the Sample Preparation

» Instrument using any of the following Digestion, microwave or ICP rack or tubes

» Preconfigured to accommodate transfer of ***Digi*PREP**/***Nova*WAVE** tube contents to

Autosampler racks.

TO CREATE THE RACK COMBINATION is applicable using software versions 3.1.0 and above.

a. In the Visualization Tab select the Rack Combination drop down menu and select Custom.

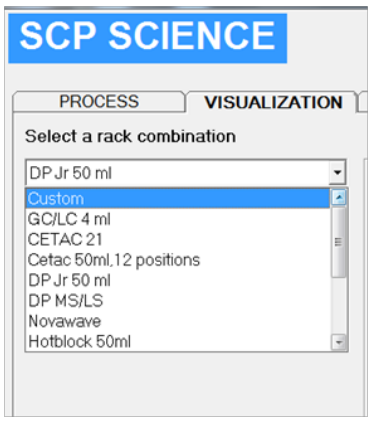


Figure 61: Selecting custom rack option

The Rack Combination Creation window will show on screen.

b. Enter the name for the new rack configuration

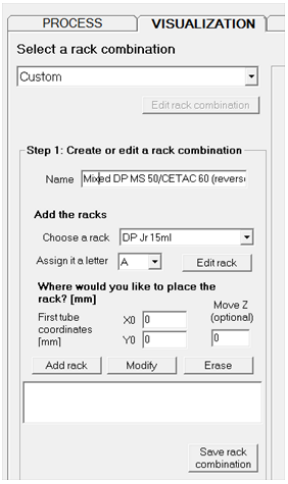


Figure 62: Naming the custom rack

c. Select an existing rack in the “Choose a rack” drop down list. If the rack doesn’t exisit, please create the rack and save prior to creating rack combinations. (refer to the Rack Positioning section)

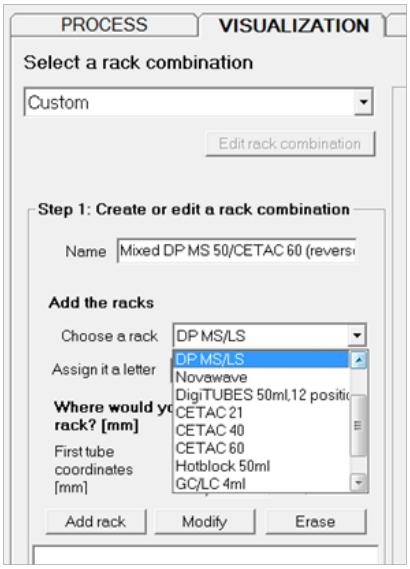


Figure 63: Drop down menue of programed racks and rack combinations

d. Select ADD RACK

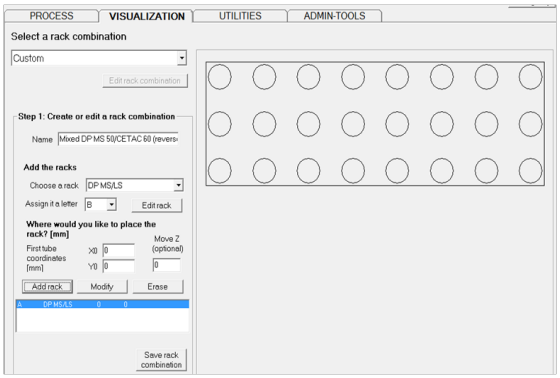


Figure 64: Add Rack

e. Move the robot to the first tube position of the rack

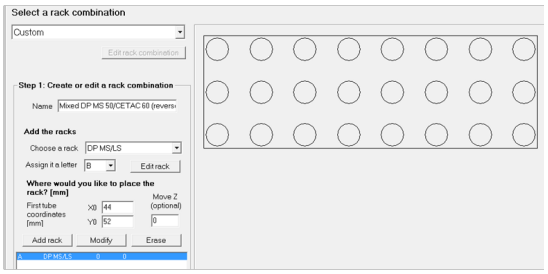


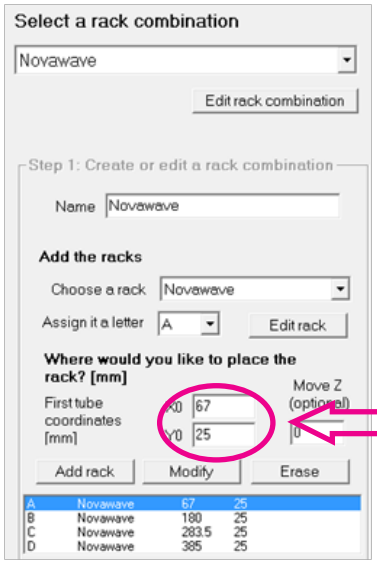
Figure 65: Ensuring alignment of the rack tubes

f. Move the robot to the first position on the rack along the X and Y axes until the dispensing tip is centered

» Close to the near edge of the tube for tubes of diameter >20mm

» At the center of the tube for tubes of diameter < 20mm

g. Move the robot by entering a value in the X0 or Y0 field and then pressing ENTER



Enter a position (in mm) and press ENTER to move the robot along the X and Y axes

Figure 66: Position the robot in the center of the rack’s first position

h. This position is the X0, Y0 location for the rack.

i. If the ***Accu*NORM** was purchased, VERIFY THAT THE ***Accu*-NORM** IS CENTERED IN THE MIDDLE OF THE **TUBE** by using the ***Accu*NORM** centering tool.

j. Click MODIFY

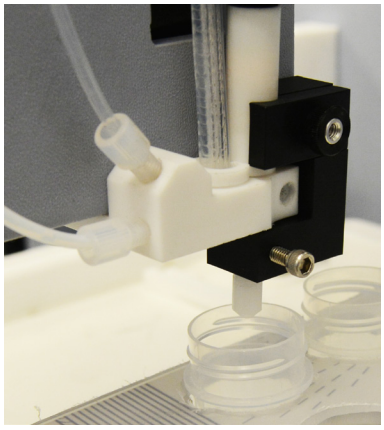


Figure 67: AccuNORM Centering Tool

k. Y Send the robot to the tube's position

l. Check that the middle of the ***Accu*NORM** sensor is aligned with the center of the cap

m. Press MODIFY to save the X0, Y0 position.

n. Select EDIT RACK

o. Go under Distance between first and last tube and the fields dxT and dyT

p. This is to set the positioning of the last tube on the selected rack

q. Move the rack to the set values by selecting the field and then enter

r. Adjust the field x and Y values until the ***Accu*NORM** is centered on top of the tube. Use the center ***Accu*NORM** centering tool as a reference. A black dot is sticking out of the bottom dispensing guide. That is the ***Accu*NORM** sensor.

s. Follow steps 6.5.3 in order to verify if the ***Accu*NORM** is centered on top of the tube.

t. Your first rack is now created. On to the second.

u. Follow steps a to m for in order to create the second rack.

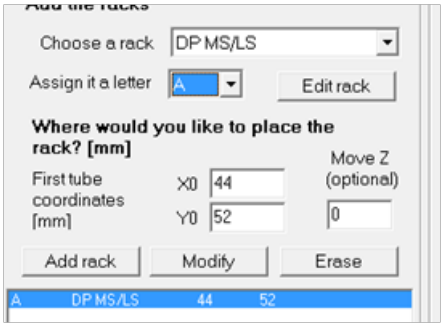


Figure 68: Configuring second rack

v. Select Rack B in the Assign it a letter box

w. Skip to step ee. if the second rack already exists. Otherwise, go to the next step.

x. Select Custom in the Choose a rack drop down list

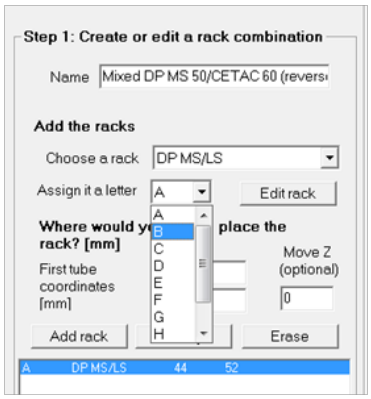


Figure 69: Selecting the desired rack

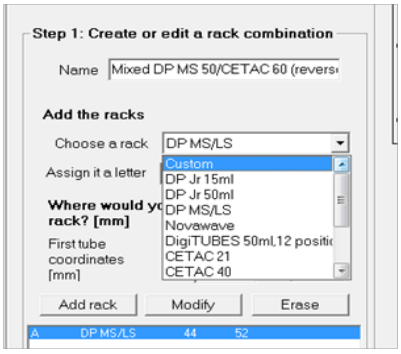


Figure 70: Creating or editing a Rack Combination

y. Press CREATE RACK to open the rack creation and editing window

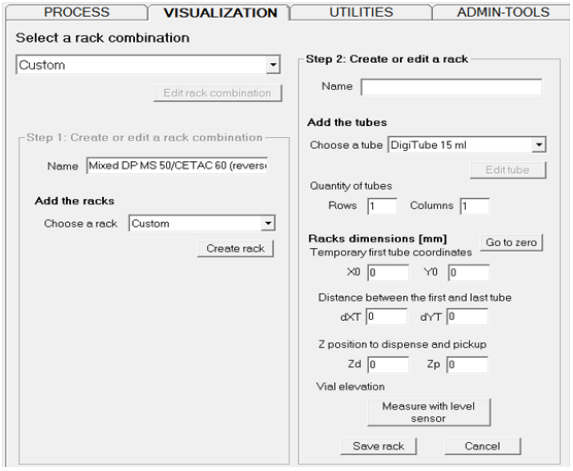


Figure 71: Rack creations and editing window

z. Enter a name for the new rack type

aa. Enter the number of Rows and Columns

ab. Enter estimated values for the distance between the first tube and the last tube on the rack under dxT and dyT

ac. Adjust the robotic arm by moving the robotic arm via the X and Y axis until the ***Accu*NORM** is centered.

ad. Select MEASURE LEVEL SENSOR

ae. Select SAVE RACK

af. Select the newly created rack in the rack drop down list

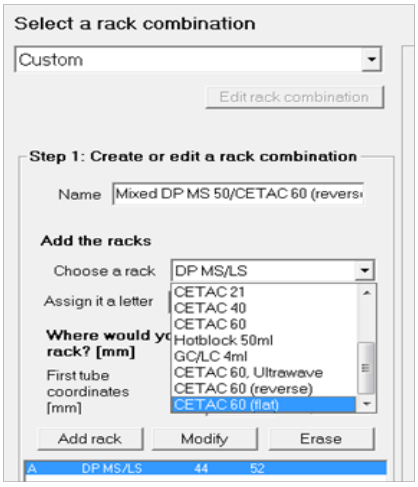


Figure 72: Select rack combination

ag. Press ADD RACK

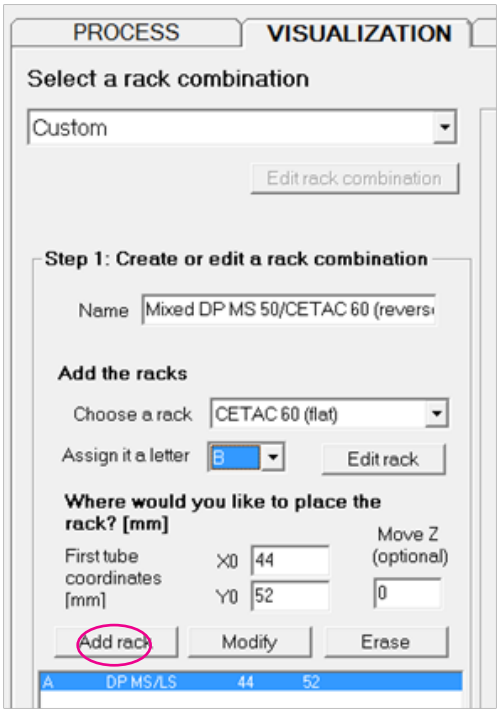


Figure 73: Assign letter and add rack

ah. Find the X0 Y0 position for this rack following the instructions in section 5. It should be around X0=110, Y0=210. Press Modify to save the X0, Y0 position.

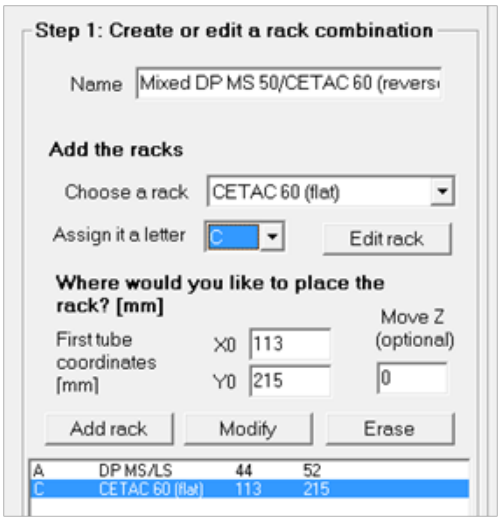


Figure 74 : Create or edit rack combination

ai. Press SAVE RACK COMBINATION. The new rack configuration is now available.

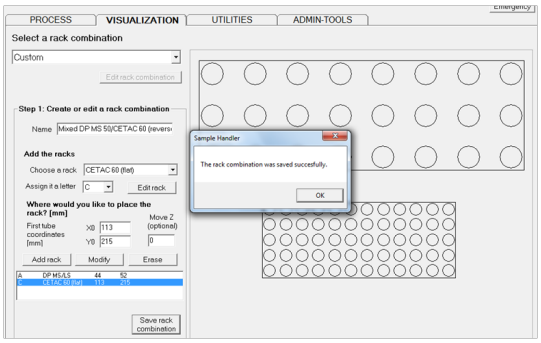


Figure 75: Visualization Tab- successful rack combination setup

6.7.1 Examples of Rack Placements

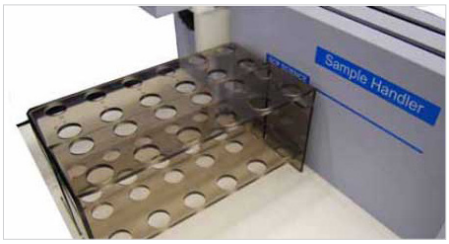


Figure 76: Sample Handler Stand for NovaWAVE 50 ml and 75 ml Vessels

*Figure 77: Rack combination, dual, **DigiPREP** Jr, 50ml tubes*

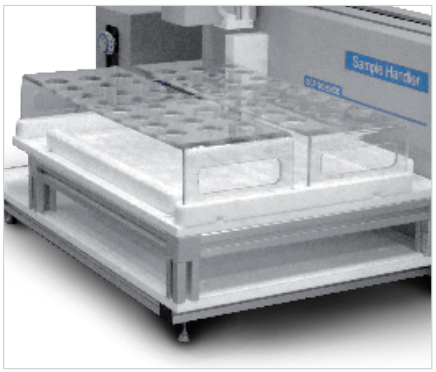


*Figure 78: Rack combination, dual, **DigiPREP MS/LS**, 50ml tubes*

Figure 79: Rack, Hotblock, 50ml tubes

*Figure 80: Rack combination, single Autosampler racks and Dige**PREP** Jr*

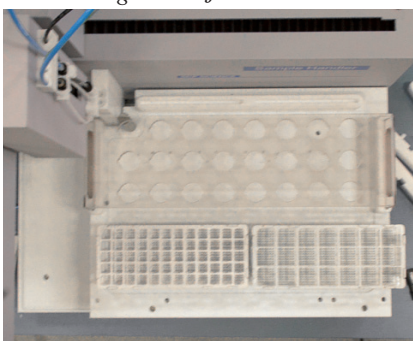


Figure 81: Rack combination, dual Autosampler racks and DP MS/LS

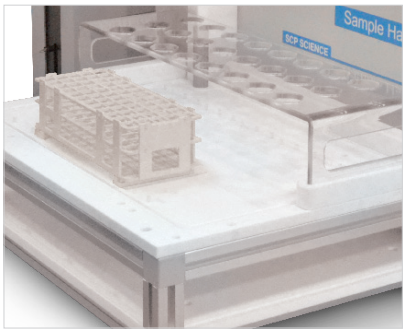


*Figure 82: Rack combination, single Autosampler racks and **DigiPREP** MS/LS*

The last column of the right autosampler rack will not be reachable by the Sample Handler when working with dual autosampler and MS/LS ***Digi*PREP** combination.

6.8 *Accu*NORM

6.8.1 Tilt Calibration

***Accu*NORM** calibration ensured that normalization will be performed accurately in the different vessel types used on the Sample Handler. It is used to compensate for factors such as wall thickness of the bottom of the vessel, vessel elevation (i.e. distance between the bottom of the vessel and the upper platform), etc.

Conducting a tilt calibration is essential to operating the ***Accu*NORM**. A rod is issued with each unit to allow the tilt calibration process.

a. Ensure that then upper platform is installed in place.

b. Remove any rack and rack adaptors from the upper platform.

c. Place the calibration rod in its designated hole. The hole is located on the top left side of the upper tray beside the washing station (X,Y position: 30, 30).

d. Use the centering tool in order to ensure that the ***Accu*NORM** is centered on top of the rod. If not, adjust values in positions X and Y.

e. Go to the Utilities page and click on the “Calibrate” button.

NOTE

If operating with the half tray, change the calibration coordinates (in the param file) before clicking the button ‘’Calibrate “. That is, change TILT CALIBRATION>Line 2 and Line 3 from x =400 to x=195.

f. The robotic arm will move around and measure 5 calibration points on the platform.

g. The tilt calibration values will automatically populate once the process is completed.

NOTES:

- The five readings of the Z-values (ref, 1, 2, 3, 4) must have two digits after the decimal point.
- The values of A and B are not completely displayed due to the space limitation; there is an exponential part (e-3, for example) that is NOT displayed. If in doubt, open the calibration file to check these values.

h. Once the robot finishes taking the measurements, the parameters file will be updated as follows:

i. reference line :40, 30, 6x.xx

j. line 1: 85, 250, 1xx.xx

k. line 2: 400, 250, 1xx.xx (For full table; and 195, 250, 1xx.xx, for half table)

l. line 3: 400, 50, 1xx.xx (For full table; and 195, 50, 1xx.xx, for half table)

m. line 4: 85, 50, 1xx.xx

6.8.2. Centering the *Accu*NORM

It can be difficult to see if the ***Accu*NORM** is centered in the middle of the tube.

Here is how to determine if the ***Accu*NORM** is centered via your tube:

a. The centering tool on top of the tube with the white pin pointing down . Make sure that it can move freely above the tube but close enough to clearly observe the center of the tube.

b. Adjust the X and Y values until you observe that the white pin is centered on top of the tube.

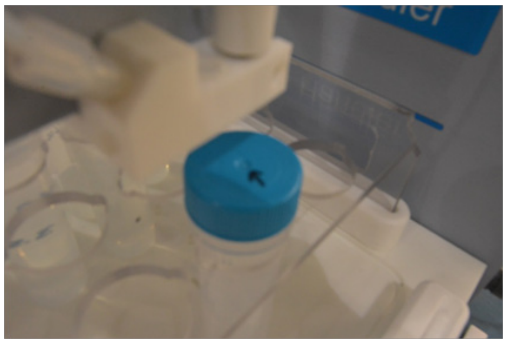


Figure 83

c. Send the robot to the tube's position

d. Check that the middle of the ***Accu*NORM** sensor is aligned with the center of the cap.

e. If needed, change the X0 and Y0 values so that the ***Accu*NORM** is centered

f. Click on Modify to save the new X0, Y0 location.

g. Press on Save Rack Combination to save all changes.

NOTE

For vessel volumes other than 50ml, use the Class A tolerances on volume dispensed/contained as a reference for the expected accuracy of the ***Accu*NORM**.

For example, for a 10ml normalization volume, expect an accuracy of ±0.1ml (i.e. ±1%).

TABLE 1 Dimensions and Tolerances

Capacity, mL	Main	Graduations, Intermediate	Least[A]	Distance From Scale to Top, mm		Minimum Wall Thickness, mm	Maximum Inner Diameter, mm	Standard Taper () Stopper Number[B]	Tolerances to Contain or to Deliver ± mL	
				max	min[C]				Class A	Class B
5	1.0	0.5	0.1	50	20	0.9	11.2	9	0.05	0.10
10	1.0	0.5	0.1	60	20	1.0	15.2	9	0.10	0.20
10	1.0	...	0.2	60	20	1.0	15.2	13	0.10	0.20
25	2.0	1.0	0.2	80	20	1.1	18.5	13	0.17	0.34
25	5.0	1.0	0.5	60	20	1.1	19.3	13	0.17	0.34
50[D]	5.0 or 10.0	5.0	1.0	80	20	1.2	23	16	0.25	0.50
100	10.0	5.0	1.0	80	20	1.3	29.6	16 or 22	0.50	1.00
250	20.0	10.0	2.0	100	30	1.5	42.4	22 or 27	1.00	2.00
500	50.0	25.0	5.0	100	35	1.6	50.8	27 or 32	2.00	4.00
1000	100.0	50.0	10.0	110	45	2.0	63	32	3.00	6.00
2000	200.0	100.0	20.0	125	50	2.0	82.1	38	6.00	12.00
4000	500.0	250.0	50.0	130	50	2.2	110	...	14.50	29.00

Figure 84

6.8.3. *Accu*NORM Calibration

6.8.3.1. General Calibration

Data on dimensions of the most commonly used tubes (15ml, 50ml, 100ml ***Digi*TUBE**s) is already saved in the Sample Handler software. Further calibration may not be required when using those vessel types with ***Digi*PREP** digestion blocks. Before performing calibration, check if your tubes are located amongst the saved tubes.

a. Go to the drop down window of the Vizualization Tab and locate the racks designed for your tube type.

b. If it is not in the list, then you must create the racks and tubes using the software wizard. Please refer to section 6.2 and 6.3 before proceeding to the calibrations. All ***Digi*TUBE** and ***Nova*WAVE** racks have already been configured in the software.

c. In the Utilities Tab, select the rack combination that you wish to calibrate or just created.

a. Press on Edit Rack Combination, then on Edit Rack

b. Place an empty, dry tube in the first position of the first rack (position A1).

c. Press on 'Measure with level sensor'.

The following pop up windows will appear:

For custom tubes

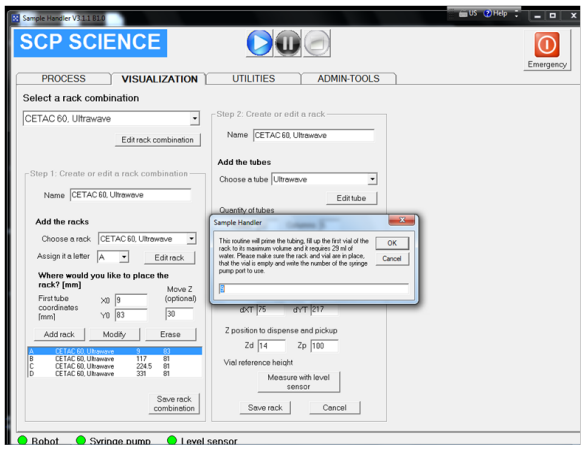


Figure 85

For ***Digi*TUBE**s:

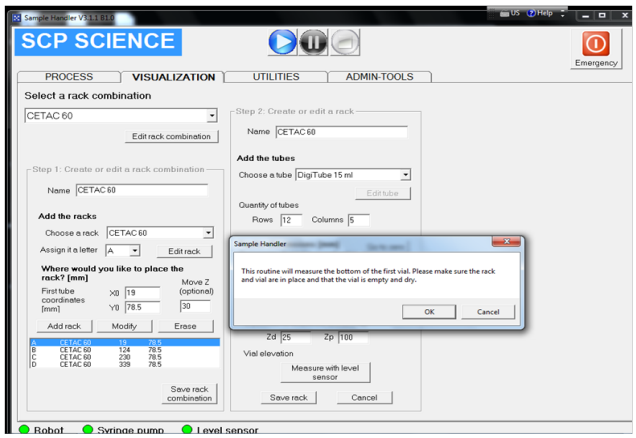


Figure 86

d. You will be asked to select a port from which the robot will draw liquid to fill the tube being calibrated. Make sure that the dispensing tube attached at this port is placed in a container of water

e. The robot will now:

- » Prime the port selected using the priming/rinsing volumes indicated in the Utilities tab.
- » Fill the tube to ½ of its total volume.
- » The ***Accu*NORM** will measure the depth to ½ total volume
- » Fill the tube to its total volume
- » The ***Accu*NORM** will measure the depth to total volume

f. The robot will then move back to the rinsing station. A pop-up window will open. It will indicate the depths for half and total volume within the tube. Press Ok to close the window.

g. Remember to press on 'Save rack' then 'Save rack combination' otherwise the changes will not be saved.

NOTE

If the tube is lying flat on the platform (i.e., no elevation), then the measurement indicated in the pop-up window should be <0.5mm. If the value is abnormally high (over 1mm), then the positioning of the rack should be adjusted since the ***Accu*NORM** is not aligned with the middle of the tube. You can find rack positioning instructions written further down in this document.

6.8.3.2. Calibration of *Nova*WAVE Vessels

Quartz Vessels are manmade. Consequently there is place for slight manufacturing variations compared to a machine made plastic tube. This is the case of ***Nova*WAVE** quartz vessels compared to injection molded ***Digi*TUBE**s. Given that the Sample Handler is compliant with stringent Call A normalization accuracy and precision, each vessel must be evaluated individually. The data is then saved into a database for usage during ***Nova***Wave vessels normalizations.

Assign specific positions to your ***Nova*WAVE** vessels on the rack. Always use the vessel's designated position during normalization. Therefore, unique ID for each tube needs to be created and set as reference ID for each ***Nova*WAVE** vessels.

a. In the Visualization tab, select the ***Nova*WAVE** racks form the drop down menue

b. Select Edit rack configuration (Figure 81)

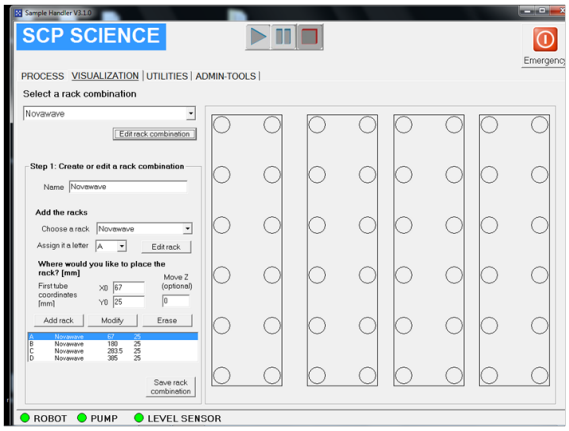


Figure 87: Edit ***Nova*WAVE** *Rack Configuration*

c. Place each vessel on the rack, empty and dry.

d. For each ***Nova*WAVE** vessel to be normalized, mark the vessel's ID and location on the rack.

e. Press Measure with level sensor

f. A list of Tube with their IDs and dimensions is located under Step4: Assign the varied tube IDs. In order to calibrate each vessel, select a vessel at a time, select measure and then press apply (Figure 82).

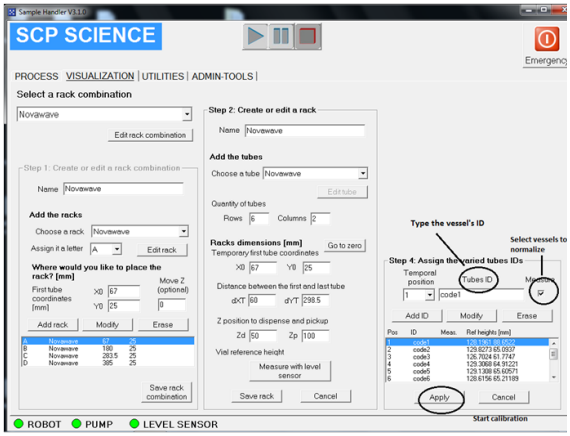


Figure 88: ***Accu*NORM** *Calibration Of* ***Nova*WAVE** *Vessels*

The Sample Handler will record and store the data for each vessel. With each vessel having a unique ID, one can recall them as required in the normalization routine at a later date.

NOTE

***Nova*WAVE** tubes are individually calibrated to class 'A' specifications.

NOTE

***Nova*WAVE** 75 ml tubes require at least 25ml of liquid in the tube when performing normalization – do not normalize vessels with lesser volumes of liquid.

6.8.4 Level Sensor *Accu*racy Check

Here is an example of how to verify the ***Accu*NORM**'s accuracy for 50ml ***Digi*TUBE**s. Use this protocol to test ***Accu*NORM** accuracy for any t ube/vessel.

a. Fill 3 50ml ***Digi*TUBE**s tubes with exactly 50ml of DI water (for best accuracy, use a balance to measure [50ml * density of water at room temperature] of water in the tube).

b. Put the 3 tubes in different positions on the Sample Handler platform.

c. Use the Level Sensor to evaluate the volume in each tube.

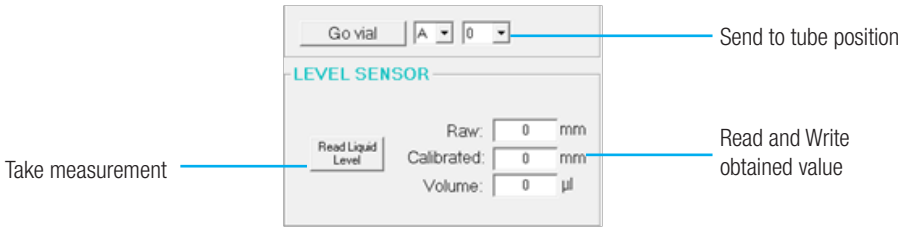


Figure 89

» Tube 1 reading: ml

» Tube 2 reading: ml

» Tube 3 reading: ml

a. Verify that the results are acceptable: 50ml +/-0.25ml (i.e. 0.5%)

b. If the results are not acceptable:

c. Verify the positioning of the rack combination used, following the procedure described below;

d. Redo a tilt calibration and ***Accu*NORM**calibration for the vessel used then retest the ***Accu*NORM** on the same tubes;

e. Verify that the instrument platform is level;

f. Verify that there is no warping of the rack used that would affect the elevation of the tubes;

g. If none of the above resolves the issue, contact SCP Science for additional troubleshooting guidance.

6.9 ADJUSTING THE HIGHT OF THE DISPENSING OR DEPTH OF THE PICKUP

Users could adjusted the Z coordinate in order to set the maximum depth at which the dispensing tip will go down. This allows to pick up the smallest amounts of liquid in the bottom of the tube.

In the same token, you can adjust the hight at which the dispensing tip could dispense without touching the liquid inside the tube yet ensuring that there are no microparticles splatered outside the tube.

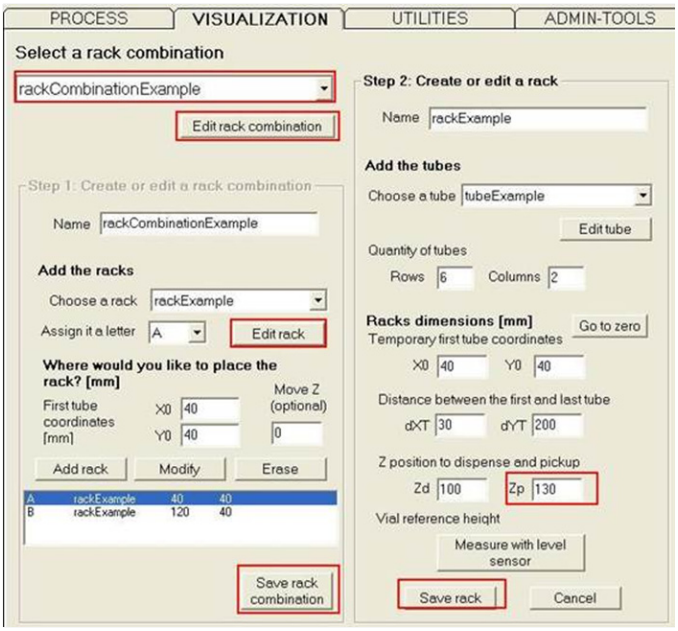


Figure 90

a. Click on the visualization tab and choose the rack combination you want to work with.

b. Click on “edit rack combination”.

c. Click on “edit rack”.

d. Change the Zp coordinate to the value you want. You can press enter to make move the Z axis if you want. CAUTION: make sure you have space to move the Z axis first.

e. Click on save rack.

f. Click on “save rack combination”.

6.10 ACCURACY AND PRECISION VERIFICATION OF THE LIQUID DISPENSING (ISO 8655-5)

This section describes the protocol for verification of the accuracy and precision of liquid dispensing of the Sample Handler. The following information is an excerpt of SCP Science internal protocol EP-WIN004-DAPP-1.0-E and can be used for internal quality control or for auditing purposes.

Required EQUIPMENT

1. Analytical balance (Resolution = 0.1 mg, repeatability and linearity = 0.2 mg, uncertainty = 0.2 mg)
2. Sample Handler
3. Thermometer, maximum uncertainty = 0.2°C
4. Barometer, maximum uncertainty = 0.5 kPa
5. Hygrometer, maximum uncertainty = 10% (%humidity in air)
6. Deionized water, at equilibrium with air and at room temperature
7. 30 clean and dry *Digi*T**TUBE**s + 30 caps

TESTING CONDITIONS

1. The analytical balance, Sample Handler and deionized water must all be placed in the same room/testing environment for at least 2 hours before the start of testing.
2. The testing environment must be free of air currents, have a maximum % humidity of 50% and a constant temperature (±0.5°C) between 15°C and 30°C.
3. The time between dispensing of the liquid and weighing of the liquid dispensed should be minimized (<60 seconds).

NUMBER OF REPLICATE MEASUREMENTS

1. To establish the conformity of the liquid dispensing to ISO 8655-5, 10 replicate measurements must be performed at the 3 volumes described below.
2. For quality control purposes, the number of replicate measurements and volumes to test can be modified and adapted as long as statistically significant.

CHECK OF ACCURACY OF LIQUID DISPENSING:

1. At the start and end of the test, room temperature, barometric pressure and % relative humidity must be noted.
2. Weigh 30 empty *Digi***TUBE**s and note weight of tubes.
3. Place the empty tubes on the Sample Handler platform using a *Digi***PREP** rack.
4. In the Sample Handler software, prime the instrument using the prepared deionized water. Ensure there are no air bubbles in the dispensing line and dispensing tip.
5. Dispense the indicated volumes of DI water into 10 tubes per volume.
    i. Volumes of DI water to use depend on syringe barrel size:

Volume of Syringe: (Check at volumes)	1ml (0.02ml /0.5ml /1ml)	5ml (0.05ml /2.5ml /5ml	10ml (0.05ml /5ml /10ml)	25ml (0.1ml /12ml /25ml)

    i. Perform testing on the smallest volume syringe used with the unit.

6. Weigh tubes again within 60 seconds of dispensing

	START	END
TEMPERATURE		
BAROMETRIC PRESSURE		
% RELATIVE HUMIDITY		

Correction factor Z =

RESULTS TABLE:

Tube #	Wt Empty Tube (g)	Wt Tube + Water (g)	Weight of water (g)	Volume of water (ml)
	A	B	C = B-A	D = C * Z
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
			AVERAGE	

e_s		STDEV	

7. Calculate the weight of water dispensed (column C).
8. Determine the density correction factor Z using the water temperature, barometric pressure and % relative humidity (see following table).
9. Determine the actual volume of water dispensed: multiply the weight of water by the correction factor Z. Type in the result in column D.
10. For each volume dispensed, calculate the average volume dispensed.
11. For each volume dispensed, calculate the systematic error es:

e_s = average volume dispensed - target volume (in ml)

12. For each volume dispensed, calculate the standard deviation of the 10 measurements:

Standard deviation si: (in ml)

$$s_i = \sqrt{\frac{\sum_{i=1}^{n} (V_i - \overline{V})^2}{n-1}}$$

This standard deviation is the random error of the liquid dispensing system.

13. Compare the obtained systematic error (i.e., accuracy) and standard deviation (i.e., precision) to the tolerance limits of ISO 8655-5:

SYRINGE VOLUME	Testing volume (ml)	Accuracy	Precision
		(systematic error, in ml)	(standard deviation, in ml)
50	50		
	25		
	1		
25	25		
	12		
	0.1		
10	10		
	5		
	0.05		
5	5		
	2.5		
	0.05		
1	1		
	0.5		

14. If the standard deviation does not meet criteria:
    a. Verify all connections (fittings and ferrules) as well as the dispensing tubing to remove any possible air leaks.
    b. Verify and remove any air bubbles in the tubing.
15. If the systematic error (volume dispensed – average volume measured) is constant, apply that volume (in µl) to the box Offset of the automated pump dispensing parameters (Admin-Tools).
16. If the offset (volume dispensed – average volume measured) is variable, verify the dispensing parameters used (Admin-Tools). Verify that, other than the offset, they match the default dispensing parameters below:

Airgap up (µl)	50
Airgap %	70
Small volume pickup (µl/s)	500
Small volume dispense (µl/s)	1000
Volume threshold (µl)	2000
Airgap down (µl)	5
Offset (µl)	
Large volume pickup (µl/s)	2000
Large volume dispense (µl/s)	2000

Correction factor Z:

Temperature °C	Barometric Pressure kPa						
	80	85	90	95	100	101,3	105
15,0 15,5	1,001 7 1,001 8	1,001 8 1,001 9	1,001 9 1,001 9	1,001 9 1,002 0	1,002 0 1,002 0	1,002 0 1,002 0	1,002 0 1,002 1
16,0 16,5	1,001 9 1,002 0	1,002 0 1,002 0	1,002 0 1,002 1	1,002 1 1,002 1	1,002 1 1,002 2	1,002 1 1,002 2	1,002 2 1,002 2
17,0 17,5	1,002 1 1,002 2	1,002 1 1,002 2	1,002 2 1,002 3	1,002 2 1,002 3	1,002 3 1,002 4	1,002 3 1,002 4	1,002 3 1,002 4
18,0 18,5	1,002 2 1,002 3	1,002 3 1,002 4	1,002 3 1,002 4	1,002 4 1,002 5	1,002 5 1,002 5	1,002 5 1,002 6	1,002 5 1,002 6
19,0 19,5	1,002 4 1,002 5	1,002 5 1,002 6	1,002 5 1,002 6	1,002 6 1,002 7	1,002 6 1,002 7	1,002 7 1,002 8	1,002 7 1,002 8
20,0 20,5	1,002 6 1,002 7	1,002 7 1,002 8	1,002 7 1,002 8	1,002 8 1,002 9	1,002 8 1,002 9	1,002 9 1,003 0	1,002 9 1,003 0
21,0 21,5	1,002 8 1,003 0	1,002 9 1,003 o	1,002 9 1,003 1	1,003 0 1,003 1	1,003 1 1,003 2	1,003 1 1,003 2	1,003 1 1,003 2
22,0 22,5	1,003 1 1,003 2	1,003 1 1,003 2	1,003 2 1,003 3	1,003 2 1,003 3	1,003 3 1,003 4	1,003 3 1,003 4	1,003 3 1,003 4
23,0 23,5	1,003 3 1,003 4	1,003 3 1,003 5	1,003 4 1,003 5	1,003 4 1,003 6	1,003 5 1,003 6	1,003 5 1,003 6	1,003 6 1,003 7
24,0 24,5	1,003 5 1,003 7	1,003 6 1,003 7	1,003 6 1,003 8	1,003 7 1,003 8	1,003 7 1,003 9	1,003 8 1,003 9	1,003 8 1,003 9
25,0 25,5	1,003 8 1,003 9	1,003 8 1,004 0	1,003 9 1,004 0	1,003 9 1,004 1	1,004 0 1,004 1	1,004 0 1,004 1	1,004 0 1,004 2
26,0 26,5	1,004 0 1,004 2	1,004 1 1,004 2	1,004 1 1,004 3	1,004 2 1,004 3	1,004 2 1,004 4	1,004 3 1,004 4	1,004 3 1,004 4
27,0 27,5	1,004 3 1,004 5	1,004 4 1,004 5	1,004 4 1,004 6	1,004 5 1,004 6	1,004 5 1,004 7	1,004 5 1,004 7	1,004 6 1,004 7
28,0 28,5	1,004 6 1,004 7	1,004 6 1,004 8	1,004 7 1,004 8	1,004 7 1,004 9	1,004 8 1,004 9	1,004 8 1,005 0	1,004 8 1,005 0
29,0 29,5	1,004 9 1,005 0	1,004 9 1,005 1	1,005 0 1,005 1	1,005 0 1,005 2	1,005 1 1,005 2	1,005 1 1,005 2	1,005 1 1,005 3
30,0	1,005 2	1,005 2	1,005 3	1,005 3	1,005 4	1,005 4	1,005 4

Figure 91

6.11 BUBBLE STIRRER

The bubble stirrer allows sample homogenization. The speed and duration is user controlled.

Parameter	
The speed	3.1litre/min at atmospheric pressure
Duration	1 and 3700 seconds
Speed adjustment	Recommended between 25% and 100%
Volume threshold (µl)	2000

7 Servicing

7.1 VIAL HOLDER REPLACEMENT

1. Loose the screw that is holding the level sensor (a) and remove the clear nut (b)

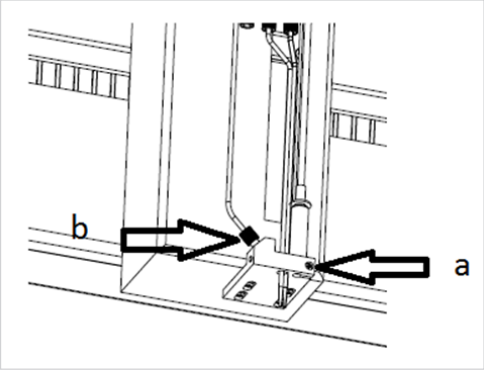


Figure 92

2. Remove the 4 screws located under the Z axis and replace the vial holder.

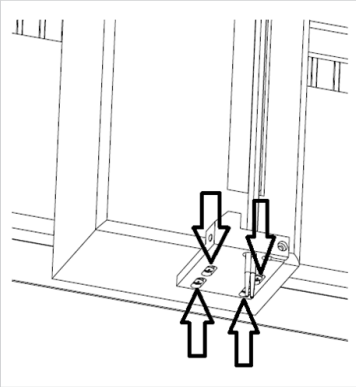


Figure 93

3. Put back the clear nut and the sensor in place.

7.2 NEW PROBE INSTALLATION

1. Loose the tubing guide on the back of the Y axis

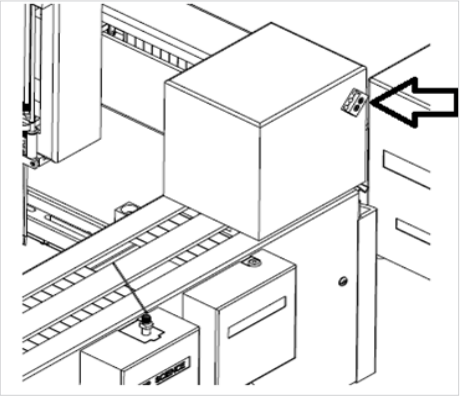


Figure 94

2. Remove the clear plastic nut

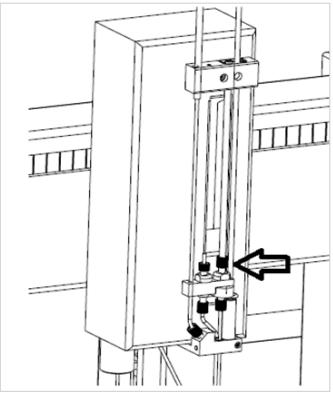


Figure 95

3. Remove the two probes by removing the two clear nuts at the bottom of the holder

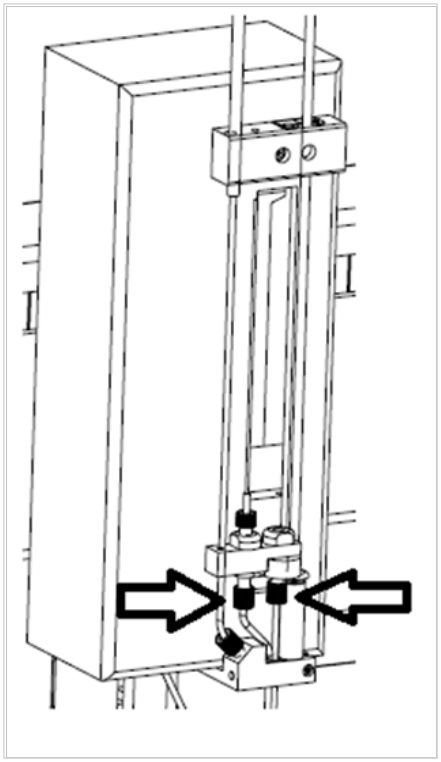


Figure 96:

4. Remove the black adaptor (a), then slide up the bubble adaptor (b)

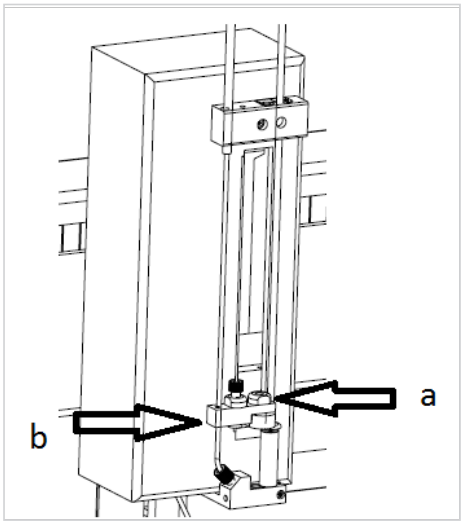


Figure 97:

5. Pull the Z axis front cover to the front
6. Remove the 4 screws that are holding the probe holder

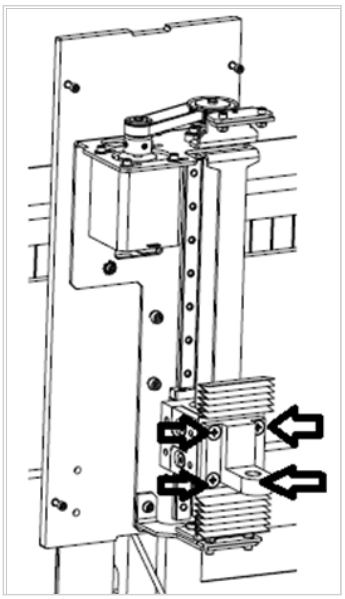


Figure 98:

7. Replace the new probe holder

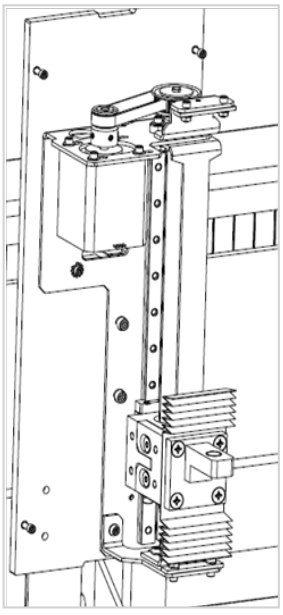


Figure 99:

8. Put back the cover, the bubble adaptor the black adaptor and replace the probes.

8 Troubleshooting

8.1 RACK POSITIONING

Verification of the position accuracy of the racks onto the Sample Handler platform is performed at SCP Science during the final Quality Control of the instrument. In cases however where the positioning of one or more rack is faulty (i.e., the dispensing tip fails to go into the tube, or normalization within the tube fails), the following procedure may be used to resolve the issue:

8.1.1 Verify the positioning of the racks:

- In Visualization, select the rack configuration to be tested
- Place tubes at the far corners of the racks, for example in positions A1, A24, B1, B24 for the *Digi*Prep Jr (50ml) racks
- In AdminTools/Robot ⇨ <Go vial>, send the robot to these locations.
- For tubes with opening diameter ≥ 20mm, verify that the head (dispensing tip + *Accu***NORM**) is centered such that the dispensing tip is located at the near edge of the tube while the *Accu***NORM** is located in the center of the tube.
- For tubes with opening diameter < 20mm, verify that the dispensing tip is centered in the middle of the tubes at each position.
- If no *Accu***NORM** level sensor is installed, the dispensing tip should be centered in the middle of the tubes.

8.1.2 If the positioning of the racks needs to be modified:

- In Visualization, select the rack combination to be modified and press Edit Rack Combination.
- Select the rack to be adjusted.
- Move the robot to the first position on the rack along the X and Y axes until the dispensing tip is centered
  - » Close to the near edge of the tube for tubes of diameter >20mm
  - » At the center of the tube for tubes of diameter < 20mm

Enter a position (in mm) and press Enter to move the robot along the X and Y axes

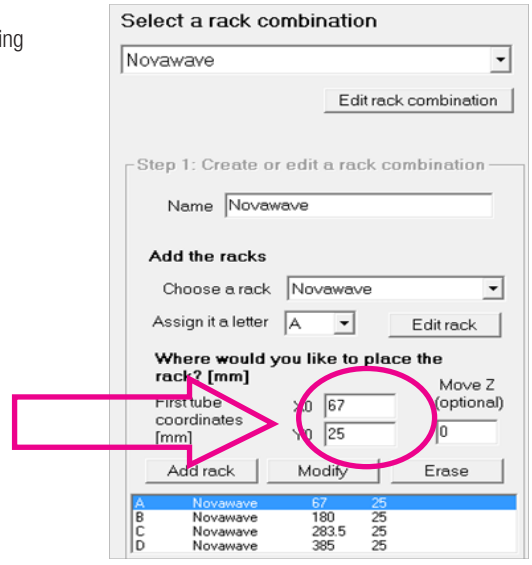


Figure 100:

- This position is the X0, Y0 location for the rack.
- Click on Modify to save the new X0, Y0 location.
- Press on Save Rack Combination to save all changes.

Verify the effectiveness of the modification by going over step 9.2.1 again.

8.1.2.1 For software versions before 3.1.0:

- In Visualization, select the rack combination to be modified.
- Open the racks file (c:\Program Files\Sample Handler\param\racks.txt.
- In Admin-Tools, send the head (dispensing tip + level sensor) to the first position of the rack requiring adjustment, (e.g. Go Vial> A01).
- Manually move the robot along the X and Y axes until the dispensing tip is centered
  - » Close to the near edge of the tube for tubes of diameter >20mm
  - » At the center of the tube for tubes of diameter < 20mm
  - » If no ***Accu*NORM** level sensor is installed, then center the dispensing tip at the center of the tube.

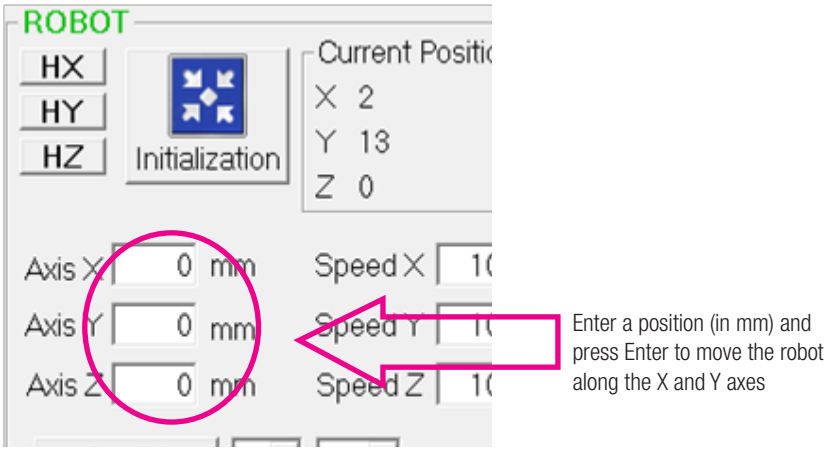
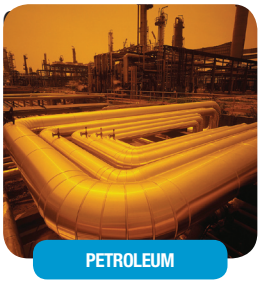
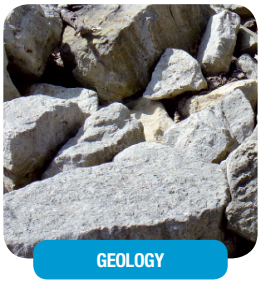


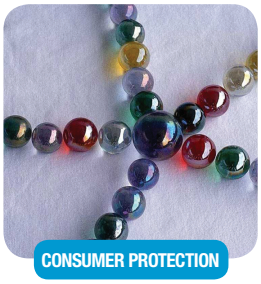
Figure 101: Position the Robot in the Center of the Rack's First Position

- This position is the X0, Y0 location for the rack.
- Enter these values in the racks file for the given Rack Configuration and Rack #.
- Save the Racks file.
- Load the modified racks file by pressing the button Reload Racks in the AdminTools tab.
- Verify the effectiveness of the modification by going to the first and last positions of the rack.
- If, at the last rack position, the dispensing tip is not centered adequately, modify dX and/or dY in the racks file. For example:
  - » If the dispensing tip is too far to the right of the tube, decrease dX (generally, a decrease of 0.5 or 1mm will be sufficient).
  - » If the dispensing tip is too forward, decrease dY.
  - » To verify the effectiveness of the modifications, save the Racks file, press Reload Racks and send the robot to these positions again.


PETROLEUM


AGRICULTURE


GEOLOGY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