

# **SediGraph III Plus**

## **Installation Instructions and Checklist**

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## Overview

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This six part document describes how to install and verify operation of the SediGraph III Plus analyzer.

- **Part 1: Hardware Installation**, page **2**
- **Part 2: Software Installation**, page **11**
- **Part 3. Instrument Preparation**, page **17**
- **Part 4. Operational Verification**, page **19**
- **Part 5: Installation Checklist**, page **30**

The *Installation Instructions* contain procedures for installing and verifying the operation of the SediGraph III Plus system. Use the installation instructions and the installation checklists to ensure that installation procedures are completed properly.

## Conventions

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This document uses the symbols shown below to identify notes of importance and cautions:



**Notes contain a tip or important information pertinent to the subject matter.**



**Cautions contain information to help prevent actions which could damage the instrument.**



**Warnings contain information to help prevent actions which could cause personal injury.**

## Preparing for Installation

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Before installation, ensure the customer has thoroughly reviewed the SediGraph III Plus Preinstallation Checklist. Ensure all required equipment and supplies are unpacked and the required personnel are available.

## Part 1: Hardware Installation

### Removing Packing Material and Making Internal Connections

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**Before operating the SediGraph, remove the internal packing material. Failure to do so may result in damage to the SediGraph. See the drawing #512/10300/00, which was shipped inside of the analysis module, for details.**

1. Open the analysis compartment door. Remove the instrument drawing and the packing material.



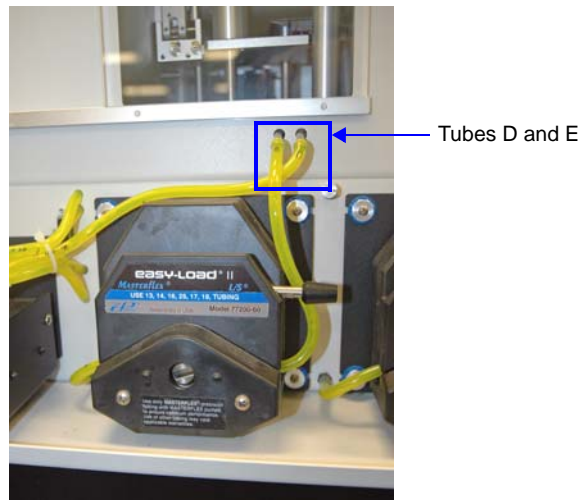
2. Remove the four screws on the top of the cover and the two top screws on the back of the cover. Lift the cover up and remove the cover from the analyzer.



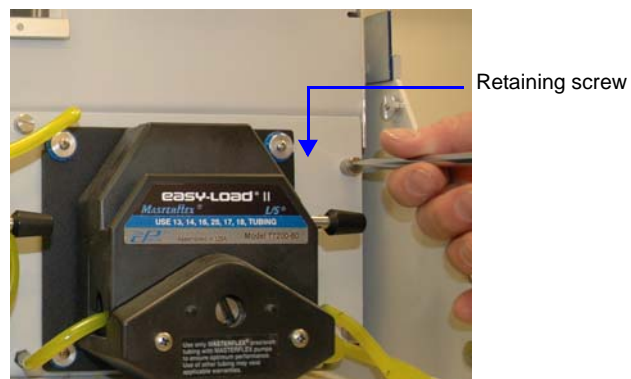
3. Lift up. Then remove the fluid module cover.



4. Remove tubes D and E.



5. Loosen the 5 fluid module retaining screws.



6. Pull out the drip tray, then pull the fluid module forward.



7. Reach up into the analyzer and remove the foam block from under the X-ray lamp.

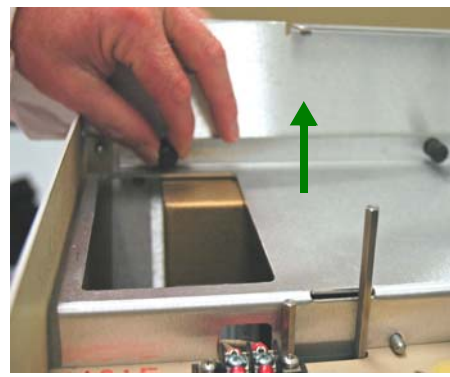


8. Remove 2 X-ray shields:
  - a.) Loosen the screw on the first section of the X-ray shield, then remove the shield.
  - b.) Loosen the two screws on the second section of the X-ray shield, then remove the shield.





*a*



*b*

9. Connect the high voltage line:

- a.) Remove the high voltage line from its holder.
- b.) Insert the male connector into the female connector until it snaps into place.
- c.) Place the high voltage line in its holder.



*a*



*b*

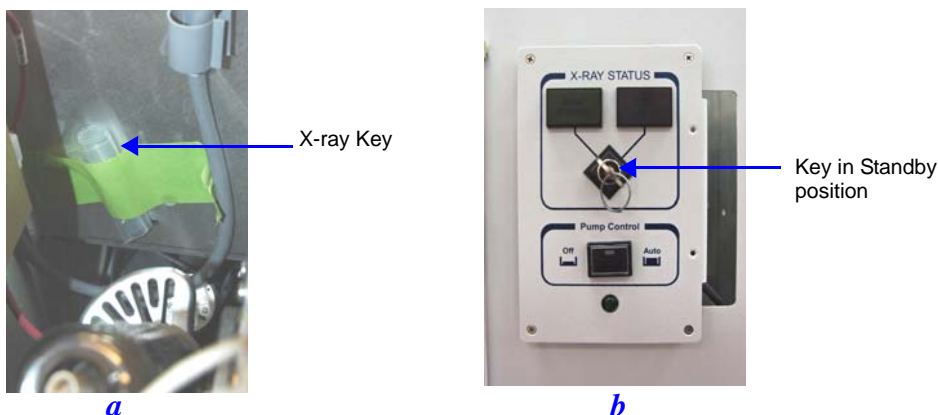


*c*

10. Insert the X-ray key:

- a.) The key is taped to the panel to the left of the high voltage supply. Remove the tape.
- b.) Remove the key from the plastic bag and place the key in the X-ray switch.

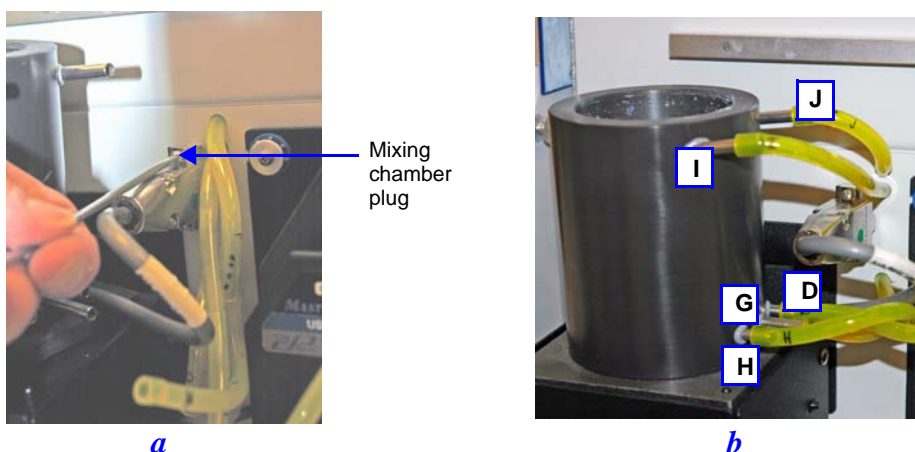
- c.) Turn the key to the left (Standby position).



11. Replace both X-ray shields.
12. Replace the top cover.
13. Replace the fluid module cover.

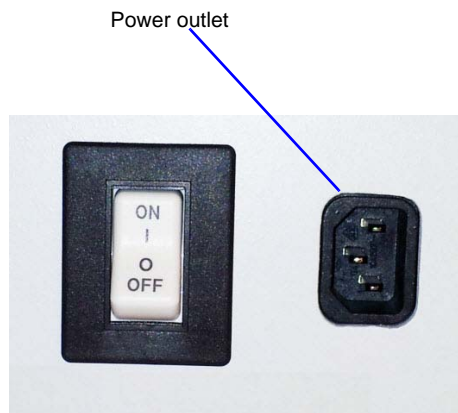
## Attaching Tubes and Cables

1. Attach the mixing chamber:
  - a.) Place the mixing chamber on its stand, then plug the electrical cable into the connector on the analyzer and tighten the screws.
  - b.) Attach the tubing to the mixing chamber as shown below. Ensure the tubing is securely fastened at each port.



2. Connect an Ethernet cable to the port on the side panel of the analyzer and to the computer.

3. Connect the power cable to the connector on the side panel of the analyzer and to a power source.

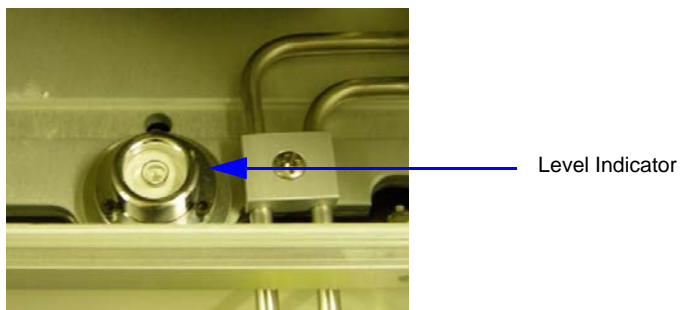


4. Slide out the drip tray under the lower panel of the analyzer.
5. Insert the air filter into the slot provided at the rear of the tray.



6. Close the drip tray.
7. Open the analysis compartment door and locate the level indicator.

8. Look straight down at the indicator. The analyzer is level when the bubble is centered inside the black circle on the level indicator.



If the analyzer is not level, lift the corner of the SediGraph, then turn the appropriate foot counterclockwise to raise the unit or clockwise to lower the unit.

Set the analyzer back down and view the indicator. The bubble should be centered inside the black circle on the level indicator.

9. Place the Pump Control switch (on the front panel) in the AUTO position.
10. Turn on the computer, monitor and printer.
11. Ensure the green light on the front of the analyzer comes on. It will continue to flash until the analysis program is started on the computer.
12. Place the SediGraph ON/OFF power switch (on the side panel) to the ON position.
13. Turn the X-ray key to the X-ray ON position.



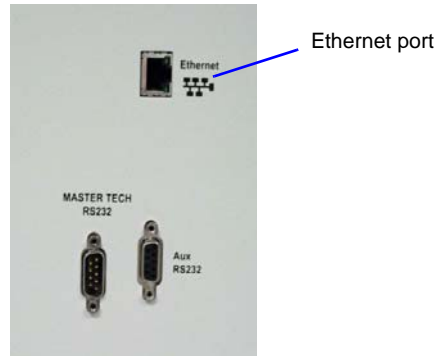
**Warning 13,600VDC is present on the X-ray tubes anode and X-rays are being generated. Ensure all X-ray shields are in place and operational.**

14. Ensure the fans are running.
15. Give the SediGraph at least 30 minutes to warm up before starting the Verification Procedure.

## Connecting Network Cables

### Connecting One Analyzer

1. Plug the Ethernet cable into the port labeled Ethernet on the right side of the analyzer.



2. Plug the other end of the Ethernet cable into the Ethernet port on the computer.

### Connecting Multiple Analyzers

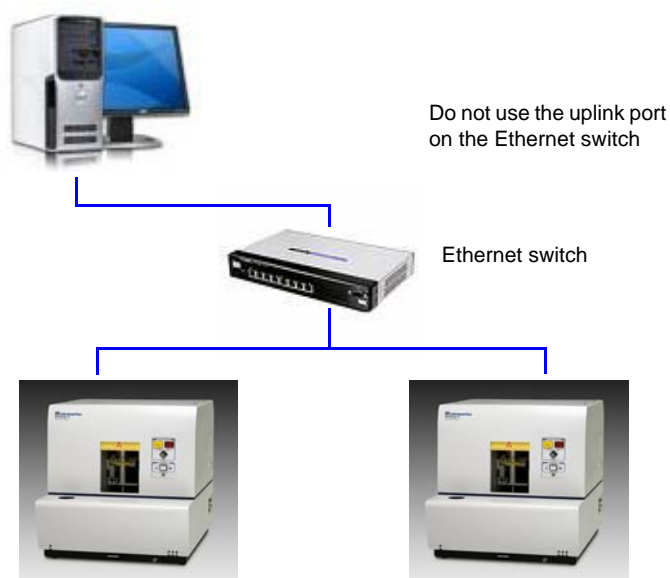


**An Ethernet switch is required when connecting multiple analyzers to the computer.**

#### Ethernet Switch

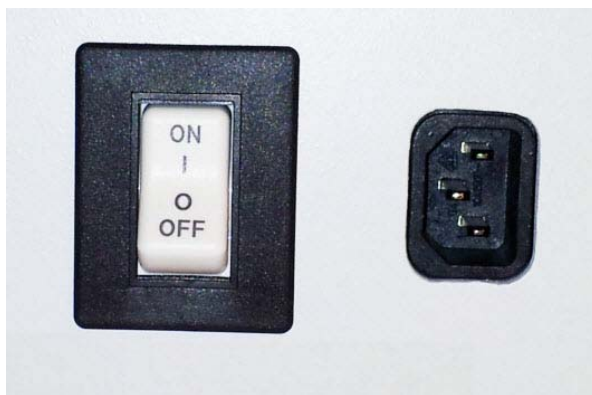
1. Connect the power cord of the Ethernet switch to an appropriate power outlet.
2. For each analyzer, connect an Ethernet cable from the Ethernet port on the rear of each analyzer to a numbered port on the Ethernet switch taking care not to use the uplink port on the switch.
3. Use an Ethernet cable to connect the computer to the Ethernet switch. Do not use the uplink port.
4. Ensure the power is turned on to the computer and the Ethernet switch.

The finished configuration should look similar to the following:



## Applying Power to the Analyzer

1. Place the SediGraph power switch, located on the analyzer's side panel, in the ON ( | ) position.



2. Check the Power indicator on the front of the analyzer. A green light indicates that power is applied to the analyzer. A blinking light indicates that communication has not been made between the computer and the analyzer. When the analysis program is started on the computer, the light no longer flashes.

## Part 2: Software Installation

### Installing the Micromeritics Software

The following prerequisites must be completed prior to installing the software:

- Configure an Ethernet port on the computer to communicate with the analyzer. Refer to [Ethernet Configuration](#), page [A-1](#).
- Attach the analyzer to the computer's configured Ethernet port and turn on the power to the analyzer.

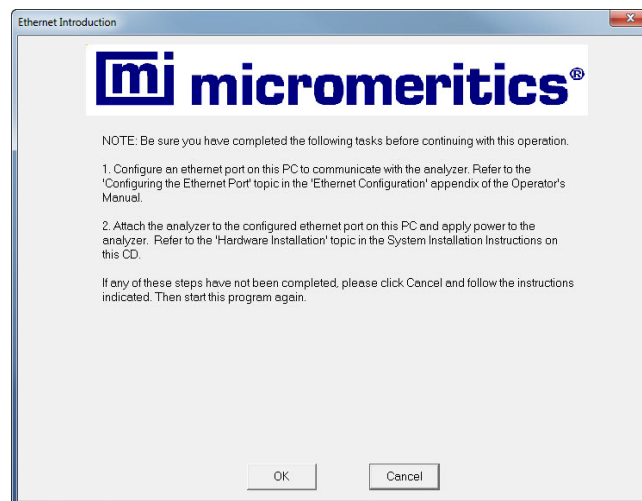


**If installing multiple analyzers, connect the Ethernet switch to the computer's configured port and connect the analyzers to the Ethernet switch. Refer to Connecting Cables [Ethernet Switch](#), page [9](#). Then turn the analyzers on.**

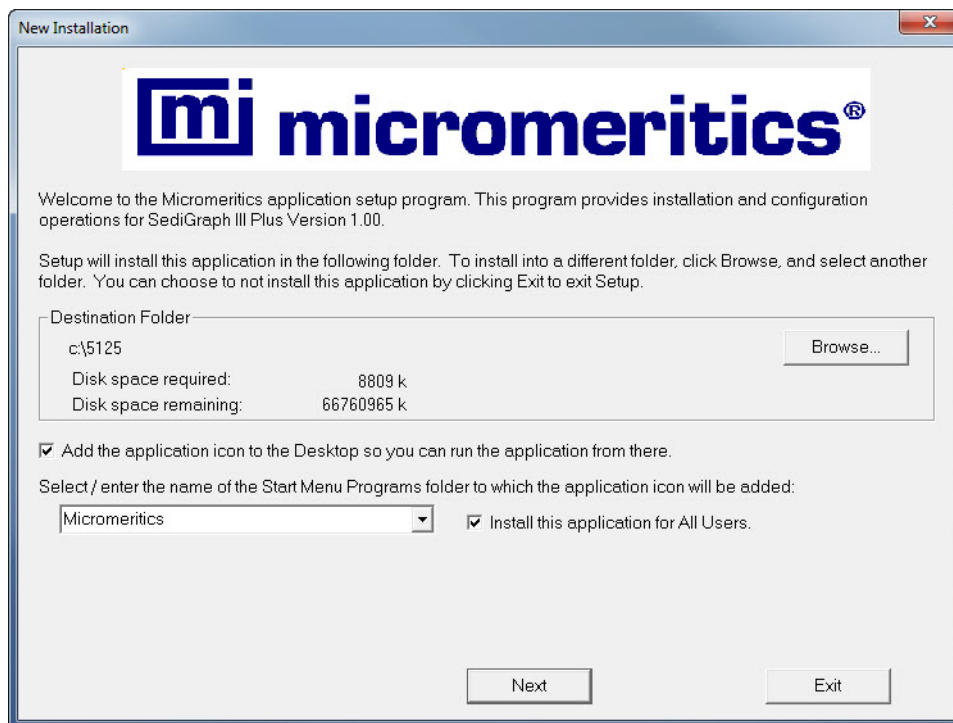


**The application should not be installed on a network drive with shared access. Multiple users cannot operate the application at the same time.**

1. Insert the installation CD into the CD-ROM drive. The program automatically starts the installation. If the installation does not immediately start, navigate to the CD-Rom drive, locate and double-click the **setup.exe** file.
2. On the **Ethernet Introduction** screen, verify that all prerequisites have been met. If not, click **Cancel** and complete the steps, then restart the installation program. Do not proceed with installation until these tasks have been completed. If the prerequisites have been met, click **OK**.



3. The **Destination Folder** group box displays the amount of current disk space, the amount of disk space required for the Micromeritics software, and the default installation folder. To change the default installation location, click **Browse** to select a different folder.



4. To create an application shortcut on the desktop, select the **Add the application icon to the Desktop....** checkbox .
5. The Micromeritics software creates a directory named **Micromeritics** in the **Start Menu Programs** folder. To select a different folder, enter or select one from the drop-down list.
6. Select the **Install this application for All Users** check box to allow all users access to the analysis program. If only the user logged on to the computer have access to the program, leave this box unchecked.
7. Click **Next**.



8. The **Analyzer Configuration** screen is used to configure the system for each analyzer and serial number to be installed.

**Analyzer Configuration**

**micromeritics®**

**Step 1**  
Select the number of analyzers that will be attached to this PC.  
Select 0 in the case that you are doing off-line data reduction on this PC or you are moving an analyzer from another PC to this PC.  
Analyzers: ☐ 0 ☒ 1 ☐ 2

**Step 2**  
For each unit, enter the necessary information below.  
The analyzer serial number is on the analyzer identification label, typically located near the power switch.

Unit #	Analyzer Serial #
1	<input type="text"/>

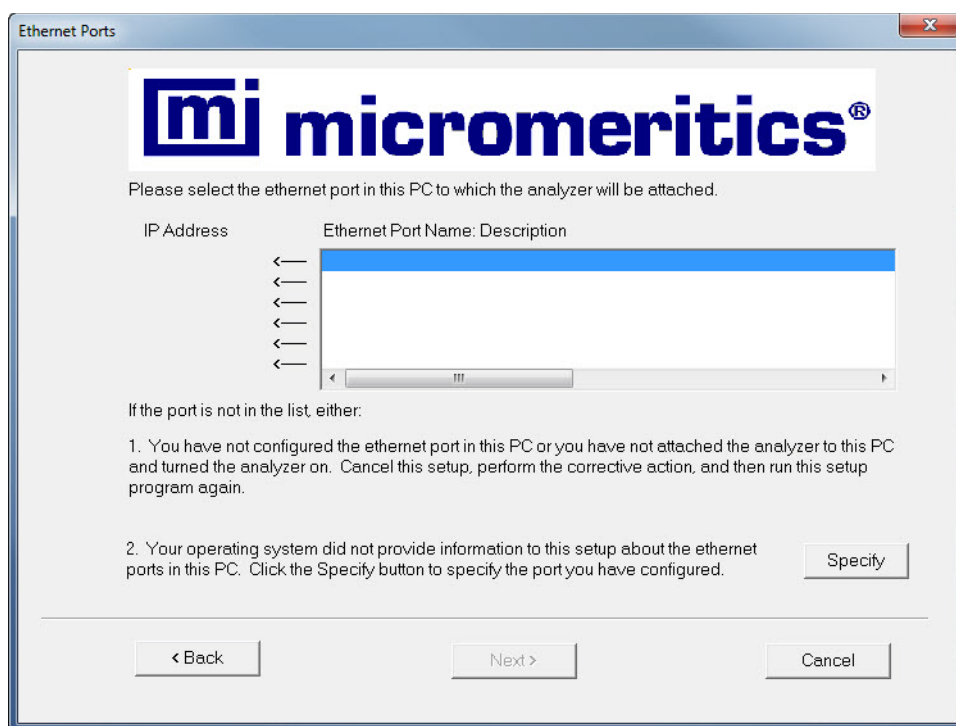
< Back      Next >      Cancel

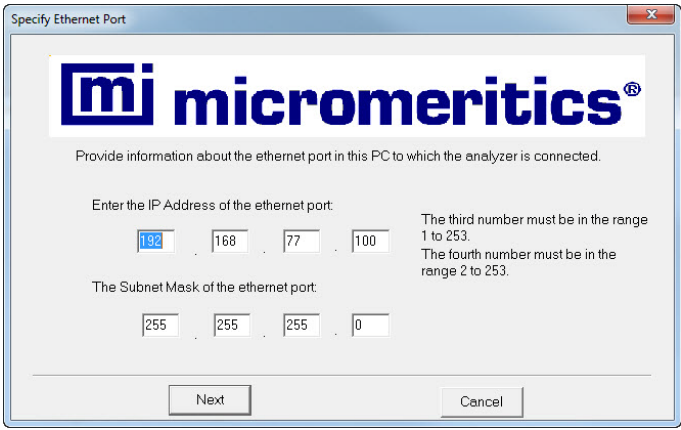
In the **Step 1** group box:

If...	Then...
installing the analysis program during initial installation	select the number of analyzers to be installed
using the analysis program for offline data reduction	select <b>0</b>
moving an analyzer from another computer to this computer	select <b>0</b>

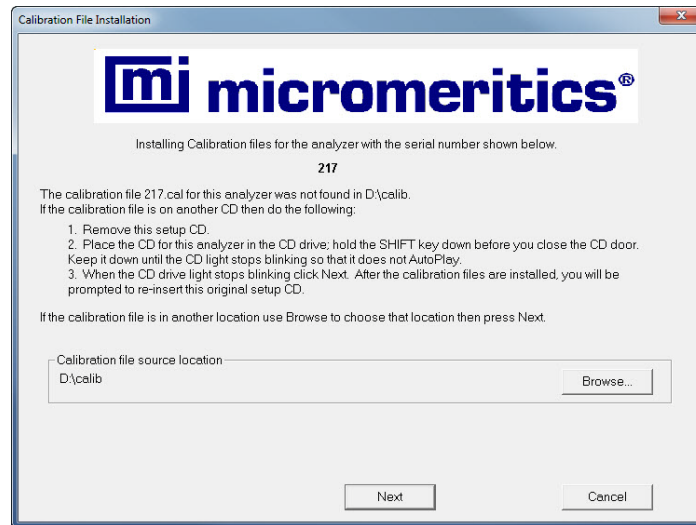
- a.) In the **Step 2** group box, enter the serial number for each analyzer to be attached to this computer.
- b.) Click **Next**.

9. On the **Ethernet Ports** screen, select one option from the following table:



If...	Then...
the configured port is listed	Select the port then click <b>Next</b> to proceed to the next step.
the configured port is not listed	<p>Click <b>Specify</b>.</p> <p>On the <b>Specify Ethernet Port</b> screen, enter the remaining portion of the IP address in the enabled fields, then click <b>Next</b>.</p> 

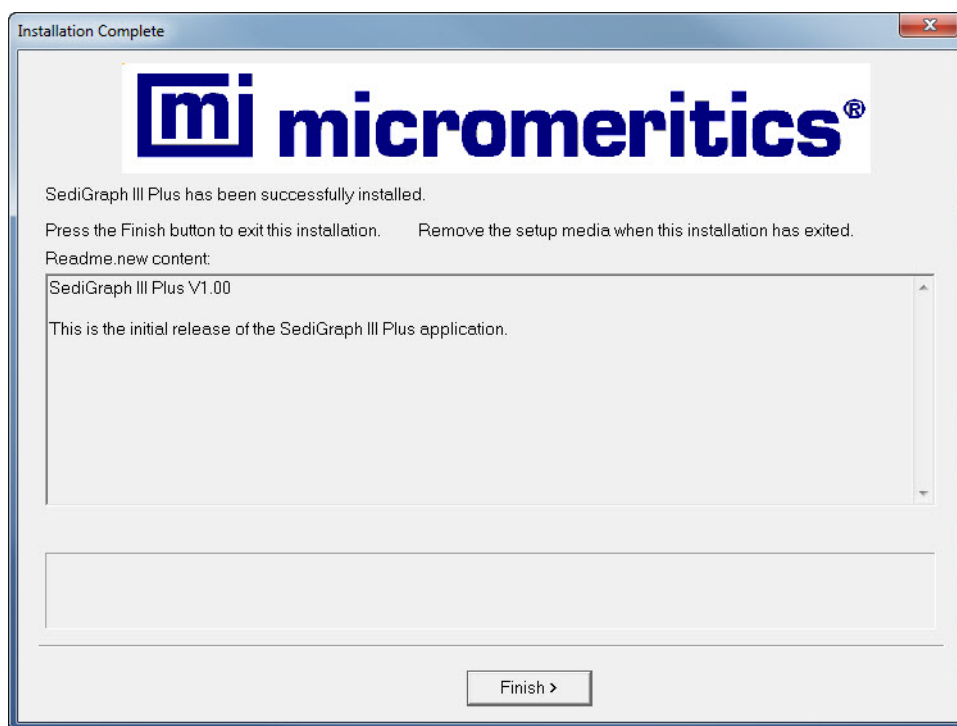
10. The **Calibration File Installation** screen displays.



Calibration files are located on a separate calibration CD. Replace the setup CD with the calibration CD and browse to the **\calib** directory. Select the calib directory and click **Next**.

- a.) If the original CD was removed so that a calibration CD could be used, remove the calibration CD and insert the original setup CD.
- b.) To disable AutoPlay, hold down the **Shift** key before closing the CD door. Keep the **Shift** key down until the CD light stops blinking.
- c.) Press **OK** when the original setup CD has been recognized by the system (or when the drive light stops blinking).

11. When installation completes, the **Installation Complete** screen displays. Click **Finish**.



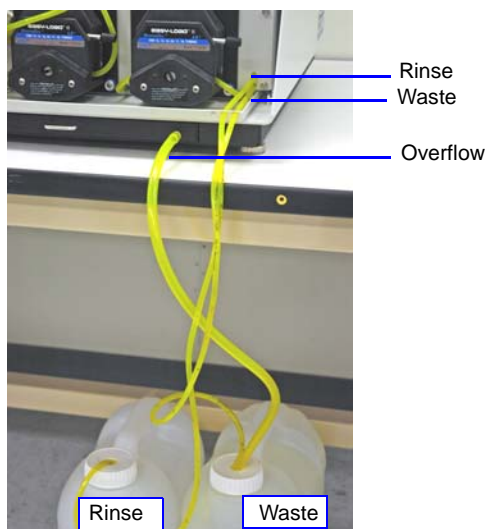
## Starting the SediGraph III Plus Application

To start the SediGraph III Plus application, click the SediGraph III Plus shortcut on the desktop or select the SediGraph III Plus application from the Windows program list.

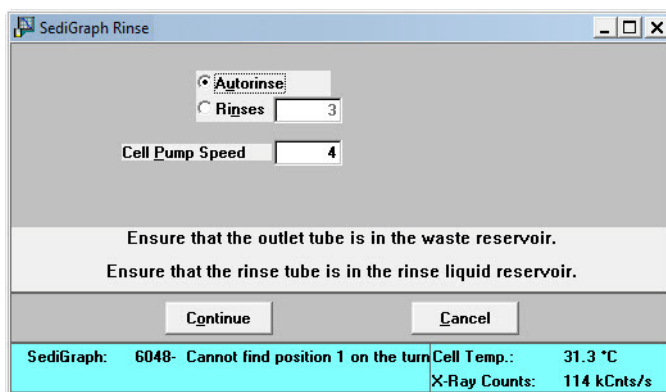
## Part 3. Instrument Preparation

### Preparing the Analysis Fluids

1. Pour approximately 2 1/2 liters of 0.05% sodium metaphosphate and de-ionized water into the rinse container.
2. Insert the rinse, waste, and overflow tubes into the appropriate container cap, and attach the tube weights.
3. Insert the rinse tube into the rinse container. Insert the waste and overflow tubes into the waste container.

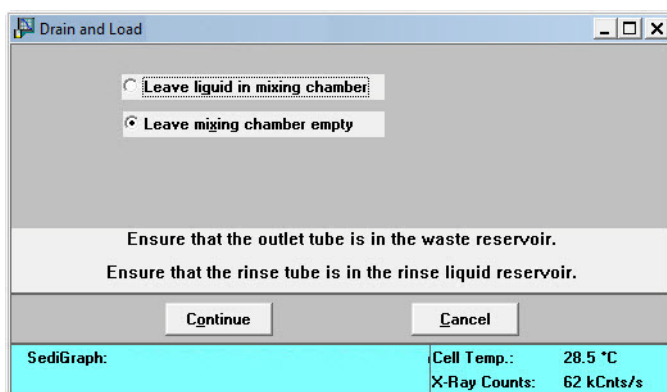


4. Go to *Unit [n] > Rinse > SediGraph*.

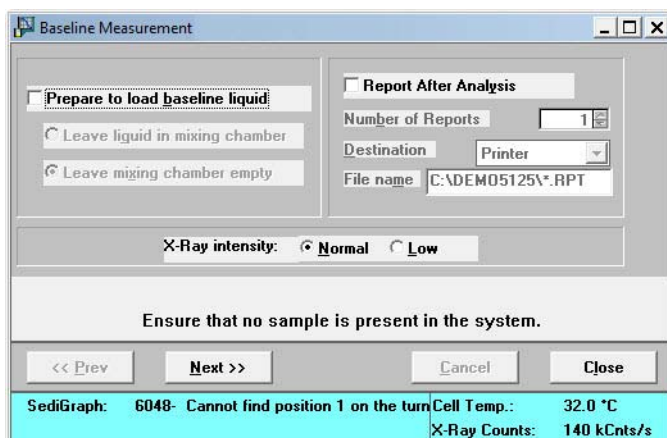


5. Click **Continue**.

6. When the rinse operation is complete, go to *Unit [n] > Drain and load*.



7. Click **Continue**.
8. Fill the mixing chamber with baseline solution when instructed.
9. When the drain and load operation is complete, go to *Unit [n] > Baseline*.



10. Deselect **Prepare to load baseline liquid**. Click **Next**.
11. Select **Report After Analysis** and select **Printer** in the **Destination** dropdown list to view the Baseline.
12. Click **Close** when the baseline operation is complete.

## Part 4. Operational Verification

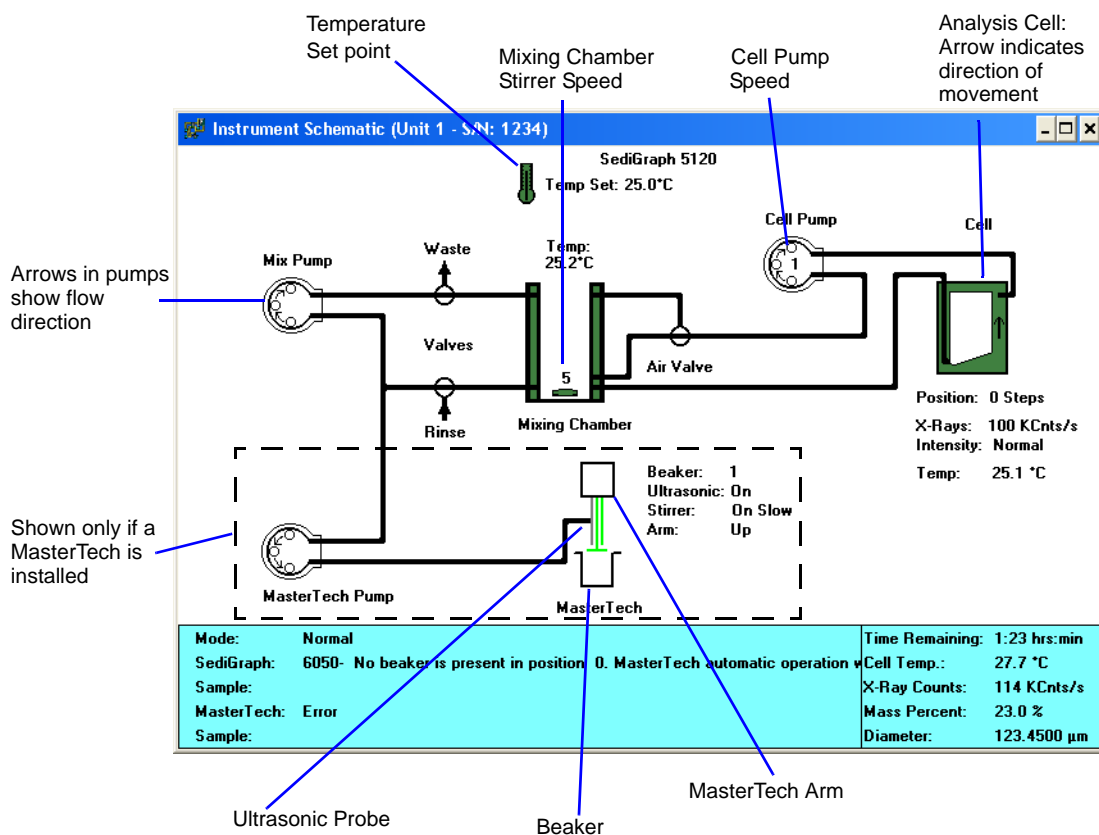
### Installing the MasterTech 052 (Optional)

The MasterTech is an optional device for use with the SediGraph. If the customer purchased a MasterTech, install it before proceeding. Refer to [MasterTech Installation](#), page [B-1](#).

### Verifying Operation

#### Verifying SediGraph Operation

1. Go to *Unit [n] > Show Instrument Schematic*.



2. Go to *Unit [n] > Enable Manual Control*. Use the following chart to test parts on the schematic:

To test this...	Right click this icon on the schematic....	Select each of these....
Elevator assembly	Cell	<ul style="list-style-type: none"> <li>• Move Up Slow</li> <li>• Move Down Slow</li> <li>• Move Up Fast</li> <li>• Move Down Fast</li> <li>• Move to Zero</li> <li>• Move to Load</li> <li>• Move Cell Position</li> <li>• Stop Motion</li> </ul>
X-ray	Cell	<ul style="list-style-type: none"> <li>• X-Ray Intensity Low</li> <li>• X-Ray Intensity Normal</li> </ul>
Cell pump	Cell pump	<ul style="list-style-type: none"> <li>• Turn On</li> <li>• Flow Up in Cell</li> <li>• Flow Down in Cell</li> <li>• Increase and Decrease Speed</li> <li>• Turn Off</li> </ul>
Mixer pump	Mixing chamber	<ul style="list-style-type: none"> <li>• Turn On</li> <li>• Turn Off</li> </ul>
Air valve	Air valve	<ul style="list-style-type: none"> <li>• Top</li> <li>• Bottom</li> </ul>
Waste valve	Waste valve	<ul style="list-style-type: none"> <li>• To Waste</li> <li>• To Mixing Chamber</li> </ul>
Rinse valve	Rinse valve	<ul style="list-style-type: none"> <li>• From Rinse</li> <li>• From Mixing Chamber</li> </ul>
Stirrer magnet	Stirrer magnet	<ul style="list-style-type: none"> <li>• Increase Speed</li> <li>• Decrease Speed</li> <li>• Turn On</li> <li>• Turn Off</li> </ul>



## Verifying MasterTech Operation (Only if MasterTech 052 is installed)

1. Fill at least one of the supplied beakers with approximately 80 mL of water.
2. Place the beaker in the position numbered **1** on the tray.
3. To test the ultrasonic probe, remove it from the holder and insert the tip of the probe well into the water.



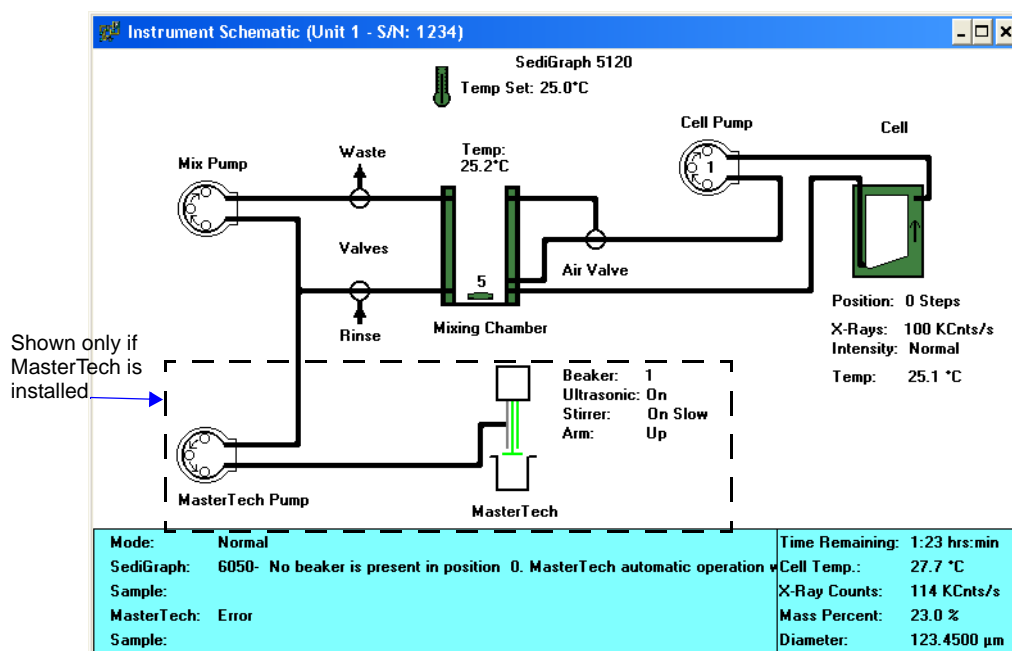
**NEVER operate the ultrasonic probe without having the tip immersed into a liquid. Doing so may harm the probe and/or the driving electronics. DO NOT let the tip of the probe come in contact with a glass beaker. Doing so may shatter the beaker.**

4. While holding the probe tip under water, press the **Ultrasonic Probe Auto/On** switch. A high-pitched sound indicates that the probe is working properly.



**DO NOT press the ultrasonic probe Auto/On switch unless the probe and cable are properly connected to the MasterTech. Doing so may harm the driving electronics.**

5. Press the ultrasonic probe Auto/On switch again to turn off the probe.
6. Place the probe back into the holder.
7. Ensure the schematic is displayed and there is a checkmark to the left of **Unit > Enable Manual Mode**.



8. If the arm is in the Load position, press the **Arm Auto/Load** switch on the front panel of the MasterTech to release it.

9. Go to **Unit [n] > Initialize MasterTech**.

A message is displayed indicating that initialization is in process. The tray on the MasterTech rotates in a counterclockwise direction for one position, and the arm lowers to the **Rinse** position and returns.

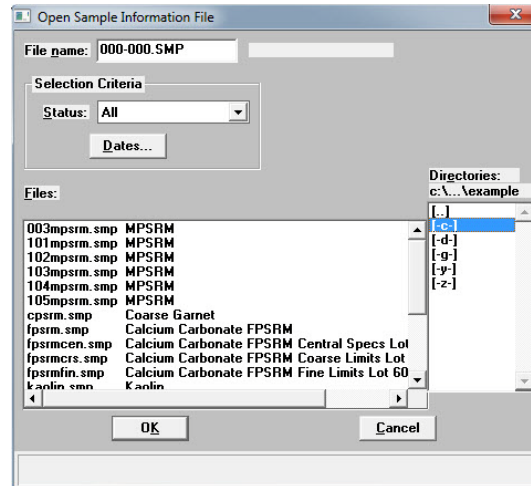
The tray then continues to rotate until position 1 is reached. The beaker inserted in the tray in Step 2 should now be directly under the head of the MasterTech. Ensure that the beaker contains approximately 80 mL of water.

10. On the instrument schematic, for each of the following steps, right-click on the cell icon to display the pop-up menu, then select:
- a.) **Move Arm Down**. Then repeat the step.
  - b.) **Ultrasonic On**. A high-pitched sound indicates that the probe is operational. Select **Ultrasonic Off**.
  - c.) **Stirrer On**. The stirrer begins to operate.
  - d.) **Speed**.
  - e.) **Move Arm Up**.
  - f.) **Stirrer Off**.
  - g.) **Move Arm Up**.
  - h.) **Move To Next Beaker**. The display is updated to reflect the position of the beaker tray. The screen should reflect whether or not a beaker is present.
11. For each of the following steps, right-click on the MasterTech pump to display the pop-up menu, then select:
- a.) Select **Turn On**. The MasterTech pump should begin operating (a whirring sound indicates the pump beginning to operate).
  - b.) Select **Flow Direction Load**. Allows suspension to flow from the MasterTech to the SediGraph. This direction is used to load the sample into the mixing chamber of the SediGraph.
  - c.) Select **Flow Direction Rinse**. Allows suspension to move from the SediGraph to the MasterTech. This direction is used to rinse the sample from the stirrer and transfer tube on the MasterTech.
12. If problems are encountered, refer to Chapter 7 of the **SediGraph III Plus Operator's Manual** for troubleshooting procedures.

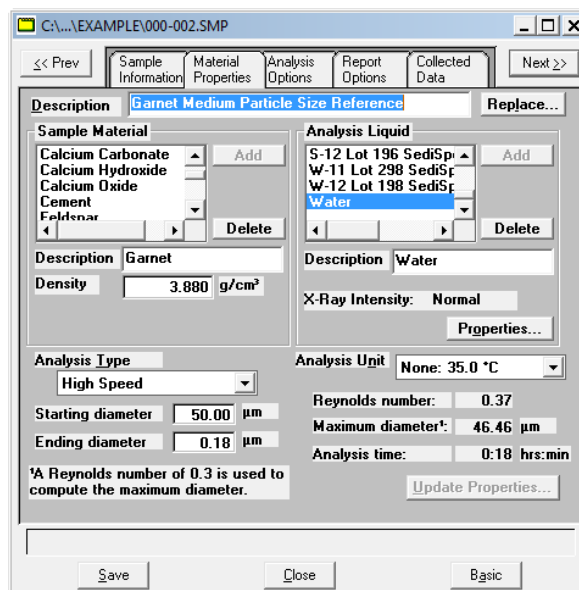
## Performing Reference Material Analysis

### Creating a Sample File

1. Go to **File > Open > Sample Information**.



2. Enter REF [sn].SMP for File name. For example: REF101.SMP indicates that this is a test of Reference Material on an analyzer with serial number 101.
3. Click **OK**, then click **YES** to create the file.
4. Go to the **Material Properties** tab and click **Replace**.
  - If running Garnet, select the **mpsrn.smp** file.
  - If running Calcium Carbonate, select the **fpsrm.smp** file..



5. Click **OK**.
6. Go to the **Sample Information** tab to enter your name in the **Operator** field.
7. Click **Save**, then **Close**.

## Performing the Analysis

1. Go to *Unit [n] > Sample Analysis*.

2. Click **Browse**. Enter the name of the sample file created in the previous procedure. Click **OK**.
3. Click **Next**.

4. Ensure the **Prepare SediGraph to load sample** box is checked and **Leave liquid in mixing chamber** is deselected.
5. To generate the report, select **Report After Analysis** then indicate **Printer** in the Destination dropdown list.
6. Pour approximately 50 mL of 0.05% sodium metaphosphate in water into a beaker.
7. Weigh 1.5 g of garnet into a sample cup. Disperse this mixture using one of the following methods.
  - If an ultrasonic probe is available:
    - a.) Transfer the garnet into the beaker of sodium metaphosphate and water.
    - b.) Insert the probe and operate according to the manufacturer's instructions (about 30 seconds).
    - c.) Pour the dispersed sample into the mixing chamber.
  - If an ultrasonic bath is available:
    - a.) Transfer the garnet into the beaker of sodium metaphosphate and water.
    - b.) Place the beaker into the bath and sonicate for 3 minutes
    - c.) Pour the dispersed sample into the mixing chamber.
  - If an ultrasonic probe or bath is unavailable (make a note of this on SRO).
    - a.) Pour the measured sodium metaphosphate in water into the mixing chamber.
    - b.) Add one drop of Photo-Flo 200. **DO NOT USE MORE THAN ONE DROP.**
    - c.) Pour the garnet into the mixing chamber and let stir for 5 minutes.
8. Click **Start**.
9. Click **Next**.
10. The instrument will now perform the **Load** procedure. Next it will start a **Full Scale Scan** and then start the actual sample run.

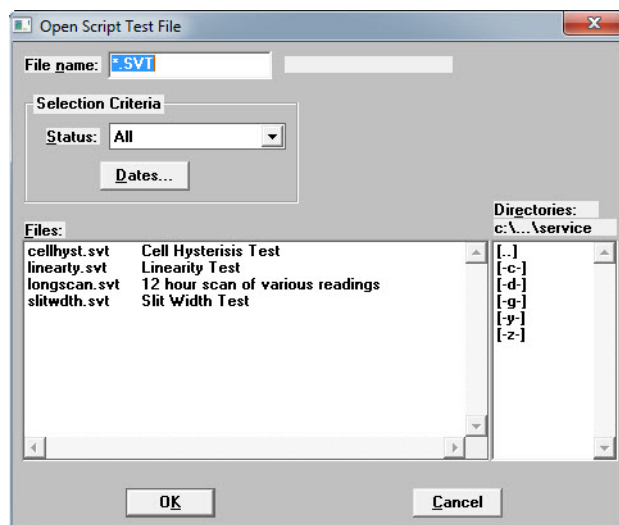


If the message "Bubble elimination in progress" appears, place one (1) drop of Photo-Flo 200 solution into the mixing chamber to help eliminate bubbles. **DO NOT USE MORE THAN ONE DROP.**

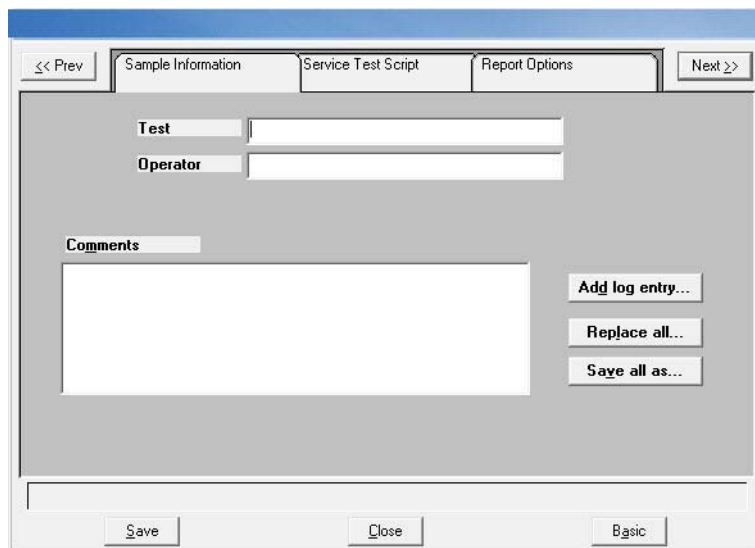
11. Let the instrument run the sample automatically.
12. Record the results in the Installation Checklist and verify that data are within limits specified in the checklist.

## Performing a Long Scan

1. Raise the cell to about 100-1500 steps.
2. Ensure the cell is filled with water.
3. Go to **Options > Service Test Mode** and enter the password. Click **OK**.
4. Select **Unit [n] > Service Test > Open**.



5. In the File name field, enter LS[sn]Y.SVT where LS= indicates a Long Scan, [sn]= unit serial number and Y= sequence number of the test. For example: LS01011.svt states this is a Long Scan performed on unit number 0101 and it is the first test performed.
6. Click **OK**. Click **Yes** to create the file and display the Service Test screen.+



7. Click **Replace All**. Select the file LONGSCAN.SVT. Click **OK**.

The screenshot shows the 'Sample Information' tab of the SediGraph III Plus software. The 'Test' field contains '12 hour scan of various readings'. The 'Operator' field is empty. Below these fields is a large 'Comments' text area. To the right of the comments area are three buttons: 'Add log entry...', 'Replace all...', and 'Save all as...'. At the bottom of the window are three buttons: 'Save', 'Close', and 'Basic'.

8. In the **Test** field, change the 12 hour scan to read a 2 hour scan.
9. Enter your name in the **Operator** field.
10. Click the **Service Test Script** tab.

The screenshot shows the 'Service Test Script' tab of the SediGraph III Plus software. The 'Script' field contains 'Script Test Conditions'. To the right of the script field are two buttons: 'Replace...' and 'Save as...'. Below these are three buttons: 'Insert...', 'Delete', and 'Duplicate...'. Below those are two buttons: 'Edit...' and 'Clear'. To the right of the script list is a 'Step detail' text area. At the bottom of the window are three buttons: 'Save', 'Close', and 'Basic'.

Script: Script Test Conditions

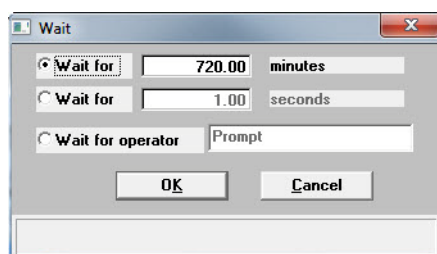
1 Start recording into Continuous every 10.00 sec.  
2 Wait for 720.00 min.  
3 End recording

Step detail

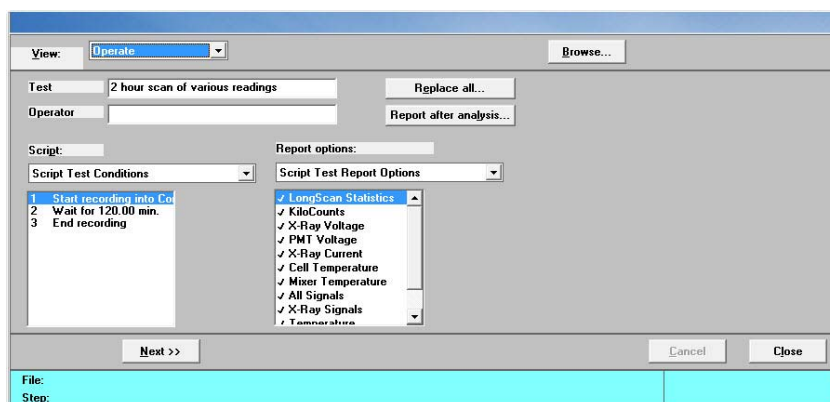
Start recording into Continuous every 10.00 sec. Signals: Cell Temp., Mix Temp., Intensity, X-Ray Volt, PMT Volt, X-Ray Curr..

'Ctrl-Arrow' moves a step

11. Select step 2 and click **EDIT**.



12. Change the 720 minutes to 120 minutes, then click **OK**.
13. Click **Save**, then **Close**.
14. Go to *Unit [n] > Service Test > Start*.
15. Select the file just created. Click **OK**.



16. Click **Next**.

The test will run unattended for 2 hours. Print the test results and attach to the paperwork.

The Long Scan test results in several pages of data. Locate and record the coefficient of variation under KiloCounts Statistics. The Coefficient of variation % should be within the specifications on the installation checklist.

At this time X-Ray Voltage Statistics, PMT Voltage Statistics, X-ray Current Statistics, Cell & Mixing Chamber Statistics, require further collection of data prior to establishing limits.



## Final Documentation

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**In order to provide consistent instrument service, Micromeritics retains records of installation, operational verification, and calibration data in its Service Support Center in Norcross, Georgia, USA. After completing the installation process, representatives of Micromeritics who install instruments are required to send the documents listed below to Micromeritics for inclusion in the customer's instrument history.**

1. Complete Service Repair Order with any notes and all parts, labor, and transactions made.
2. Attach copies of all runs and checklists to the SRO. The documents to be sent to the Micromeritics Service Support Center are:
  - Completed and signed SediGraph III Plus Installation Checklist.
  - Completed Reference Material Analysis Sample File. Returning the .SMP is preferred over printed pages. This is the file created in the section [Performing Reference Material Analysis](#), page [23](#).
  - Completed Long Scan Test File. Returning the long scan test file (.SVT) is preferred over printed pages. This is the file created in the section [Performing a Long Scan](#), page [26](#).
  - Calibration files if instrument calibration data is changed during installation.

## Part 5: Installation Checklist

### Checklist Distribution

The tables in the checklist contain the columns described below:

Procedure	Description / Action
<b>Evaluation Code</b>	<p>Circle an evaluation code for each procedure according to the following criteria:</p> <ul style="list-style-type: none"> <li>• <b>P = Pass</b> - indicates that this procedure has been successfully completed without error.</li> <li>• <b>F = Fail</b> - indicates that this procedure has been unsuccessful and prevents the instrument from being installed for use.</li> <li>• <b>N/A = Not Applicable</b> - indicates that this procedure does not apply to your system.</li> </ul>
<b>Yes / No / NA</b>	<p>Circle the appropriate response to each question.</p> <ul style="list-style-type: none"> <li>• <b>Y = Yes</b> - indicates that this procedure has been performed.</li> <li>• <b>N = No</b> - indicates that this procedure has not been performed.</li> <li>• <b>N/A = Not Applicable</b> - Indicates that this procedure does not apply to your system.</li> </ul>
<b>Initial/Date</b>	<p>Enter your initials and the date.</p> <p>If the procedure was completed by another person, that person should enter his or her initials and the date.</p>

## Preparing for Installation

Procedure	Evaluation Code (P / F / NA)	Initial / Date
Review the Preinstallation Instructions and Checklist and ensure that the laboratory is prepared for installation.		
Ensure that the required personnel are available.		
Ensure that all equipment has been unpacked and verified using the packing list.		

## Removing Packing Material and Making Internal Connections

Procedure	Evaluation Code (P / F / NA)	Initial / Date
Remove the instrument drawing and packing material from the analysis compartment.		
Remove the top panel.		
Remove the fluid module cover.		
Remove the foam block from under the X-ray lamp.		
Remove the X-ray shields.		
Connect the high voltage line.		
Insert the X-ray key in the keyswitch.		
Replace the X-ray shields.		
Replace the top cover.		
Replace the fluid module cover.		

## Attaching Tubes and Cables

Procedure	Evaluation Code (P / F / NA)	Initial / Date
Attach the mixing chamber.		
Connect the Ethernet cable to the analyzer and the computer.		
Connect the power cable to the analyzer and to a power source.		
Insert the air filter in the drip tray.		
Level the analyzer.		
Place the PUMP CONTROL switch in the AUTO position.		
Turn on the computer, monitor, and printer.		
Place the SediGraph power switch in the ON position.		
Turn the X-ray key to the X-ray ON position.		
Ensure the green light on the analyzer turns on.		
Ensure the fans are running.		
Allow the analyzer to warm up for 30 minutes before starting the verification procedure.		

## Installing the Analysis Program

Procedure	Evaluation Code (P / F / NA)	Initial / Date
Install the SediGraph application software.		
Start the SediGraph application.		

## Preparing the Analysis Fluids

Procedure	Evaluation Code (P / F / NA)	Initial / Date
Make the proper solution of sodium metaphosphate and de-ionized water and place in rinse container.		
Insert the rinse, waste, and overflow tubes into the appropriate containers.		
Perform a baseline measurement.		

## Installing the MasterTech 052 (Optional)

Procedure	Evaluation Code (P / F / NA)	Initial / Date
Remove the packing material.		
Select the line voltage.		
Install the fuse(s).		
Turn on the MasterTech.		
Install the beaker tray.		
Connect the cable from the SediGraph to the MasterTech.		
Install the ultrasonic probe.		
Install the sample transfer tubing.		

## Verifying Operation

Procedure	Evaluation Code (P / F / NA)	Initial / Date
Test the SediGraph elevator assembly.		
Test the cell pump.		
Test the mixer pump.		
Test the air valve.		
Test the waste valve.		
Test the rinse valve.		
Test the MasterTech operation (if installed).		

## Performing a Reference Material Analysis

Perform a garnet reference material analysis. In the following table, record the results listed in the Reference Material Kit in the **Expected Results** column and record the analysis results in the **Actual Results** column.

The results must fall within the tolerances in the **Expected Results** column for the test to pass.

Reference material lot number: \_\_\_\_\_

Mass % Finer	Expected Results	Actual Results	Evaluation Code (P / F / NA)	Initial / Date
Mass median equivalent spherical diameter				
90% Mass	_____ $\mu\text{m} \pm$ _____ $\mu\text{m}$			



Mass % Finer	Expected Results	Actual Results	Evaluation Code (P / F / NA)	Initial / Date
10% Mass	_____ $\mu\text{m}$ $\pm$ _____ $\mu\text{m}$			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			
_____ $\mu\text{m}$	_____ % $\pm$ _____ %			

## Running a Long Scan

Run a Scan for a minimum of two hours. Record the coefficient of variation below.

Expected Results	Actual Results	Evaluation Code (P / F / NA)	Initial / Date
Coefficient of variation % should be < 0.7%.	Coefficient of variation% _____		

## Exceptions

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Procedures categorized as **Fail** or **No** should be explained below.

Procedure	Comments	Initial / Date

## Signatures

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### Installer *(Please print)*

Name:	Signed:
Position:	Date:
Company:	Service Repair Order Number:

### Customer Representative *(Please print)*

Name:	Signed:
Position:	Date:
Company:	Service Repair Order Number:

## Final Documentation

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In order to provide consistent instrument service, Micromeritics retains records of installation, operational verification, and calibration data in its Service Support Center in Norcross, Georgia, USA. After completing the installation process, representatives of Micromeritics who install instruments are required to send the following documents to Micromeritics for inclusion in the customer's instrument history.

- Completed Service Repair Order
- Completed and signed SediGraph Installation Checklist
- Reference Material Analysis Sample Files



## A. ETHERNET CONFIGURATION

This section contains instructions for configuring an Ethernet port in either Microsoft® Windows 7 or Windows Vista. The instructions do not apply to any other operating system.



**Windows 7 Professional is recommended for the best user experience.**

### Configuring the Ethernet Port

The computer and analyzer communicate by means of an Ethernet connection. This appendix contains instructions for ensuring that the Ethernet connection operates properly.

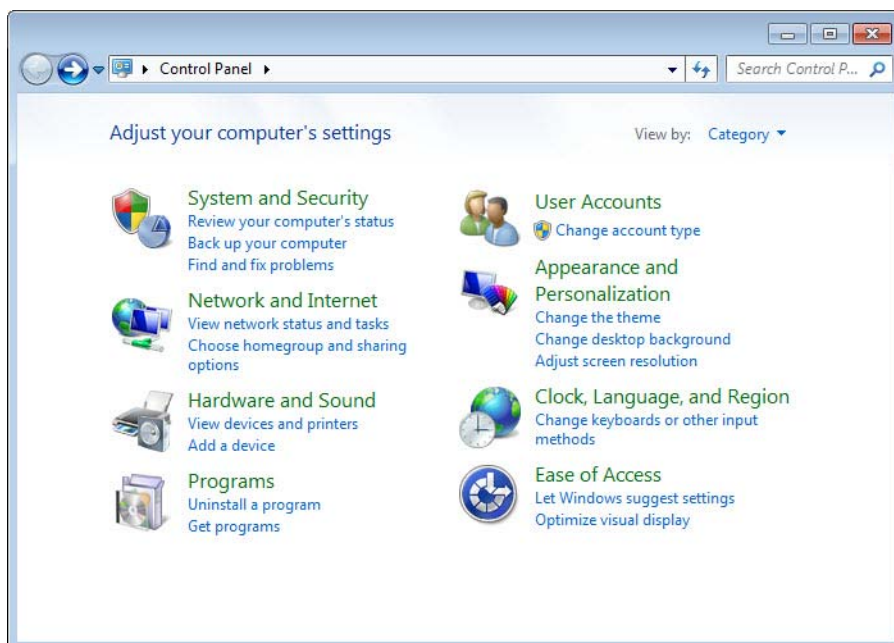


**The windows in this section are Microsoft operating system windows, which may be subject to change. The windows are included for reference purposes only.**

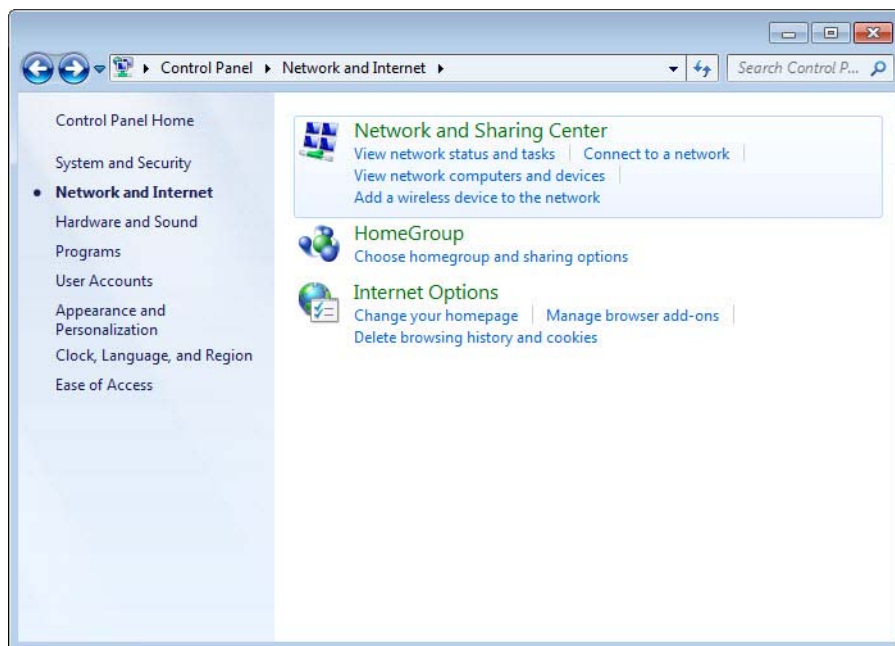
**Methods to access to these windows may vary. Refer to the Windows help system for assistance, if necessary.**

### Windows 7

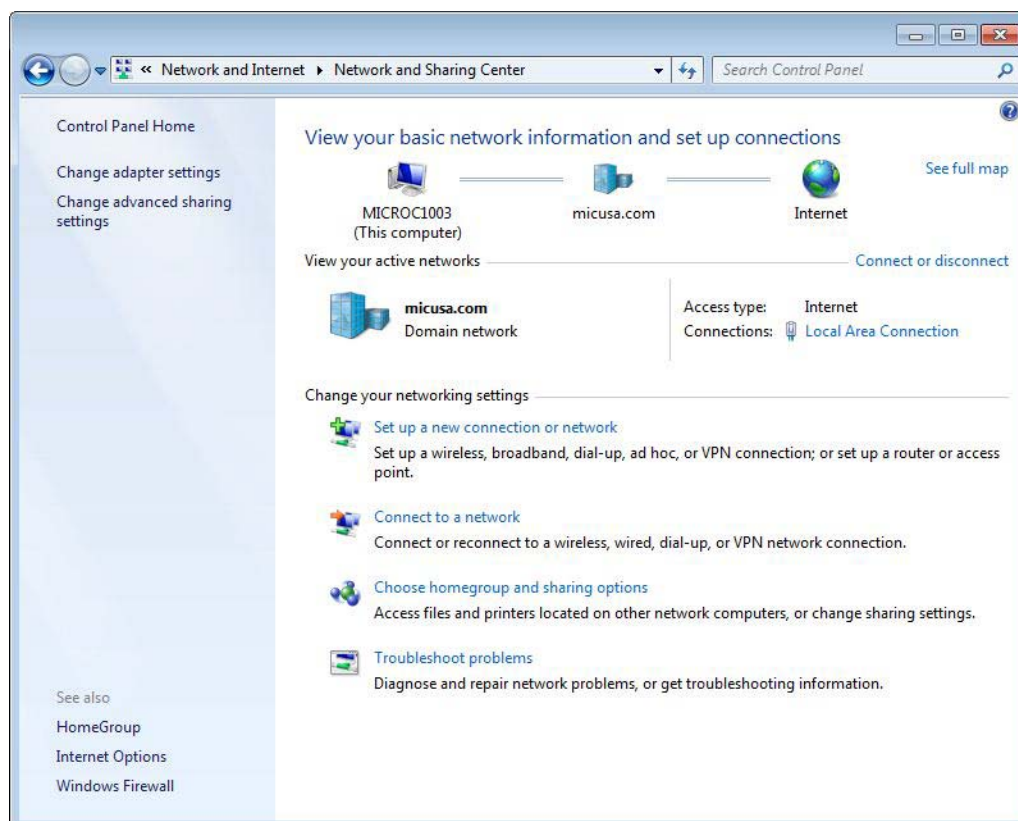
1. Select the **Windows icon** from the Status bar at the bottom of the screen, then select **Control Panel**.
2. Click **Network and Internet**.



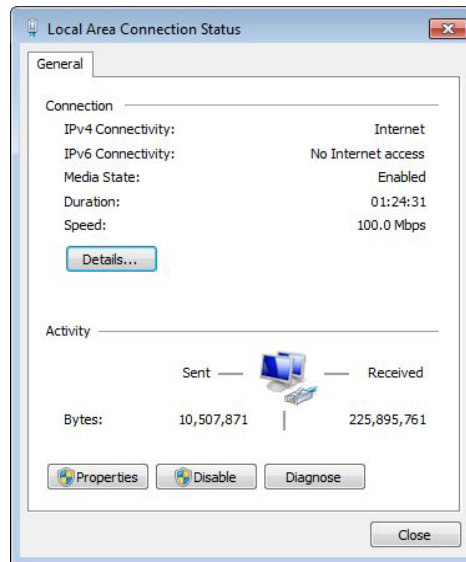
3. Click **Network and Sharing Center**.



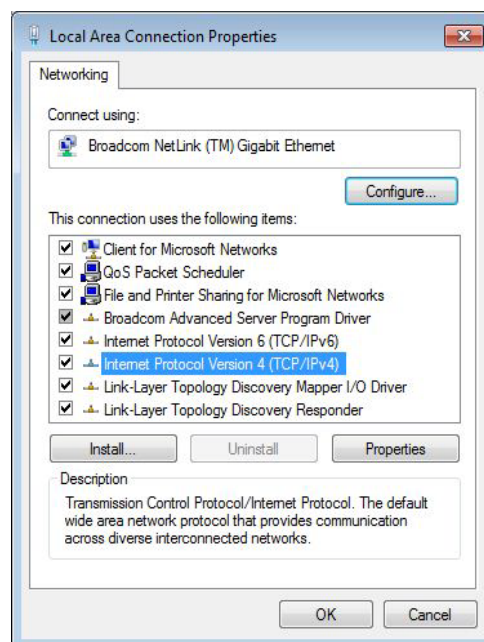
4. Click the **Local Area Connection** for your analyzer.



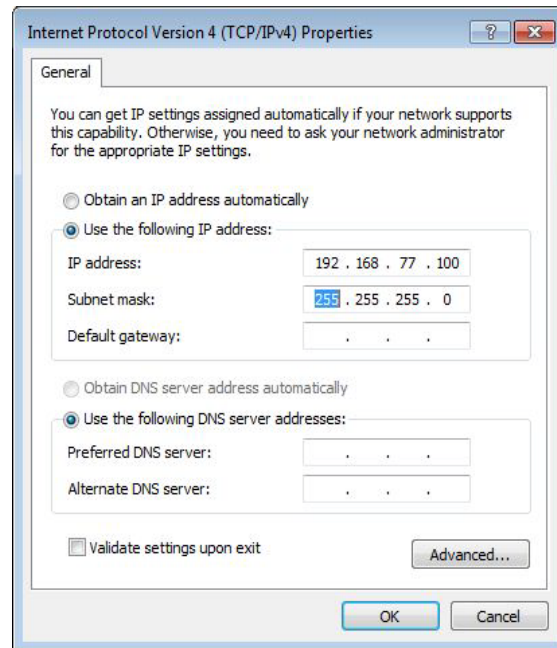
5. Click **Properties**.



6. Highlight **Internet Protocol Version 4** then click **Properties**.



7. Click **Use the following IP address** then enter the following in the **IP address** field:  
**192 168 77 100**.



8. The following numbers should display in the **Subnet mask** field: **255.255.255.0**. If not, enter them. Leave all other fields blank.
9. Click **OK** then click **Close** until all windows are closed.



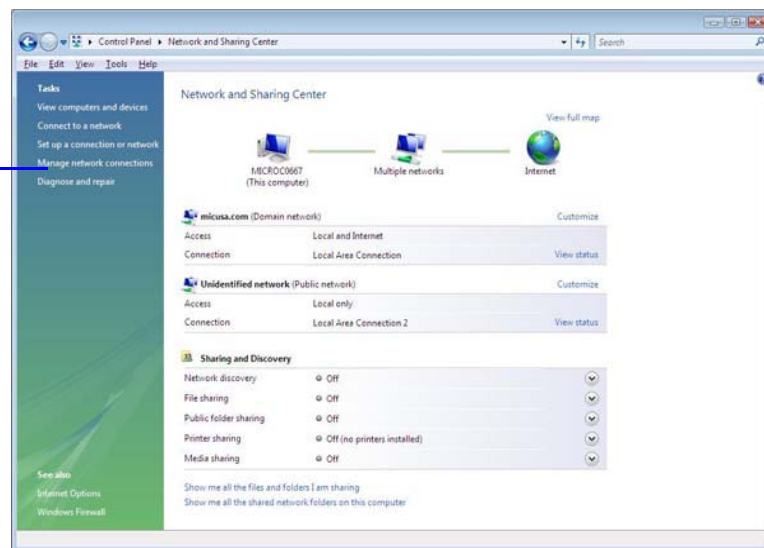
## Windows Vista



**Windows 7 Professional is recommended for the best user experience.**

1. Select the **Windows icon** from the Status bar at the bottom of the screen, then select **Control Panel**.
2. Double-click **Network and Sharing Center**.

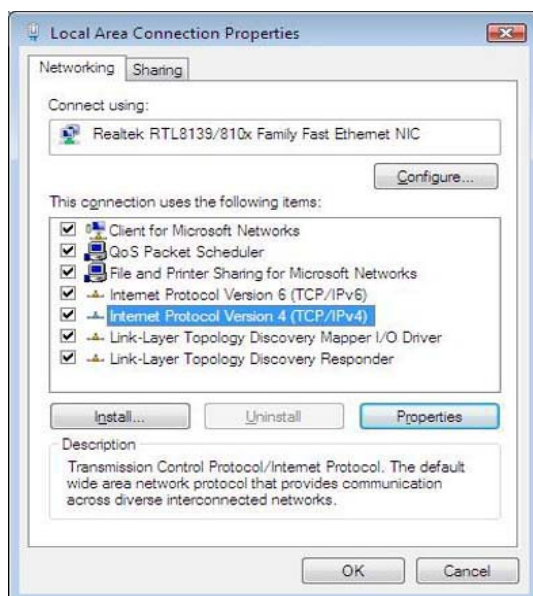
Click here



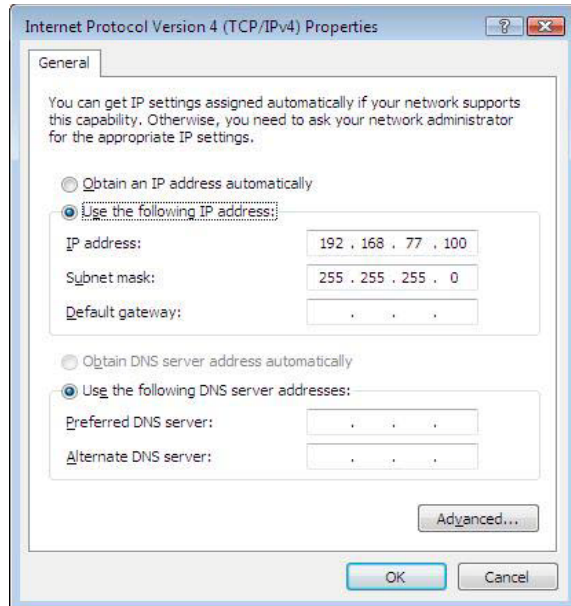
3. Click **Manage network connection** from the **Tasks** list on the left side of the window then click **Local Area Connection** for your analyzer.



4. Click **Properties**.



5. Highlight **Internet Protocol Version 4** then click **Properties**.
6. Click **Use the following IP address** and enter the following in the **IP address** field:  
**192 168 77 100**.



7. The following numbers should display in the **Subnet mask** field: **255.255.255.0**. If not, enter them. Leave all other fields blank.
8. Click **OK** then click **Close** until all windows are closed.

## B. MasterTech Installation

The MasterTech should be correctly installed and checked to make sure that it is operating properly before actual analyses are attempted.

### Removing Packing Material From the Unit

After removing the MasterTech from the shipping carton, remove all foam packing material from the unit before proceeding with installation.

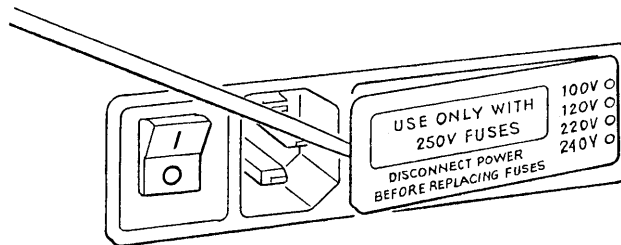
### Selecting the Voltage

The MasterTech 052 leaves the factory set for 120 VAC and with the line fuse removed. The correct setting of the universal power entrance must be checked and the appropriate fuse installed before the MasterTech can be operated. The MasterTech is designed to operate with either 100, 120, 220 or 240 VAC at 50 or 60 Hz. Voltage selection and fusing are made at the power connector which is located on the rear panel of the unit.

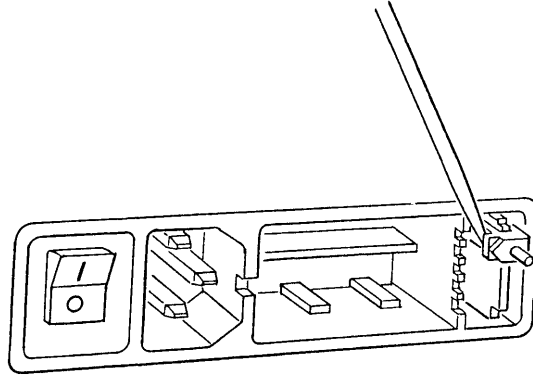


**The power cord should be disconnected from the MasterTech before removing the cover from the power input connector. Failure to disconnect the power cord could result in electrical shock.**

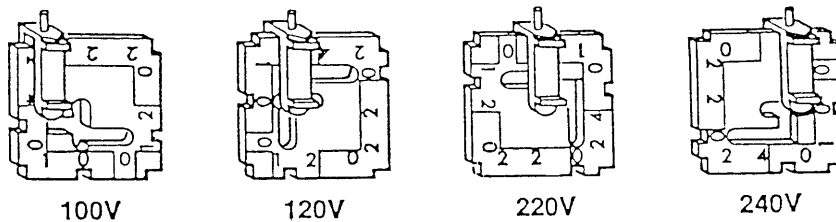
1. Ensure the power cord is disconnected from the MasterTech.
2. Using a pointed object, remove the fuse block and cover assembly from the power connector at the rear of the MasterTech.



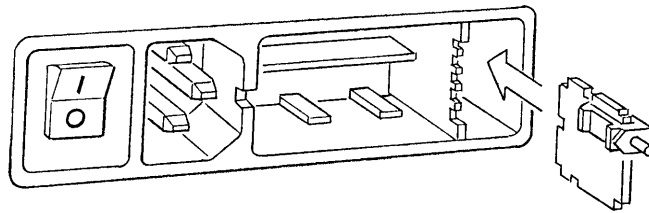
3. Pull the voltage selector card straight out of the power connector housing.



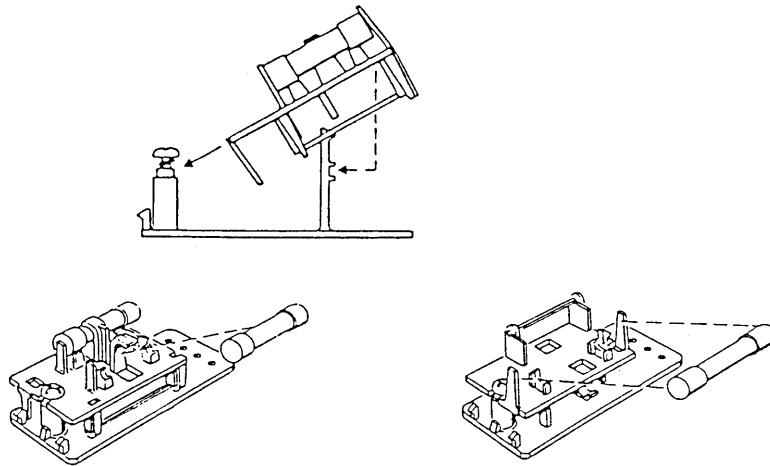
4. Orient the voltage selector card so that the proper voltage is indicated at the bottom. Orient the indicator pin so that it points upward as shown in the following illustration.



5. Insert the voltage selector card into the power connector housing with the edge containing the proper voltage first and with the printed side facing the power ON/OFF switch.



6. Fuse the input power line according to local safety practices. The input power connector can be used with either a single-fuse arrangement or a double-fuse arrangement, as shown in the following illustration.



**The power cord should be disconnected from the MasterTech when installing or replacing fuses. Failure to do so could result in electrical shock.**

- a.) Observe the position of the fuse block, using the previous figure for reference. If the single-fuse arrangement is preferred, position the fuse block so that the side with the single-fuse slot and the jumper bar is away from the cover.

If the double-fuse arrangement is preferred, position the fuse block so that the side with the double-fuse slots is away from the cover.

- b.) If the fuse block is positioned properly for the fusing, proceed to Step c.

If the fuse block is not positioned properly for the fusing:

- 1) Remove the fuse block retaining screw.
- 2) Lift the fuse block from the cover.
- 3) Rotate the fuse block.
- 4) Mount the fuse block to the cover.
- 5) Replace the retaining screw.

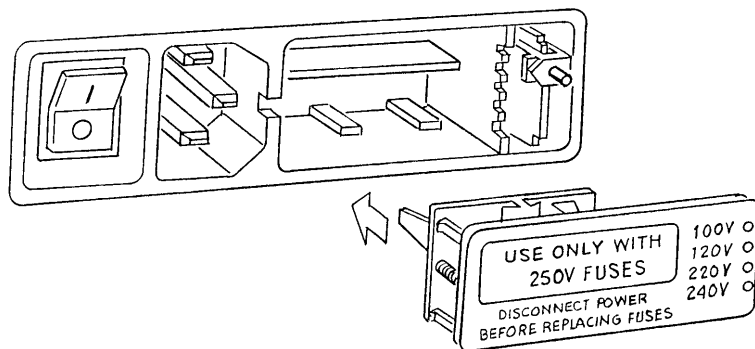


**The fuses used in the MasterTech must be identical in type and rating to that specified. Use of other fuses could result in electrical shock and/or damage to the MasterTech.**

- c.) Insert appropriate fuse(s) for the input power source. Refer to the chart below for the appropriate fuse rating.

<b><u>Power Source</u></b>	<b><u>Fuse</u></b>
100-120 VAC	3AG, 2.00 Amp Slow-Blow
200-240 VAC	5 × 20 mm, 1.00 Amp Slow-Blow (Type T)

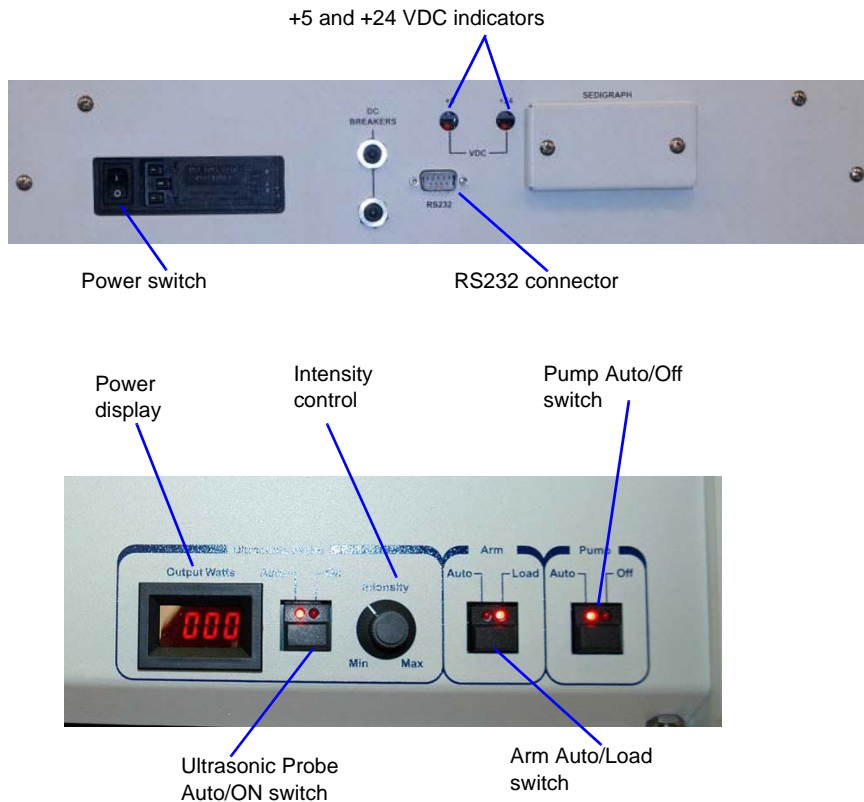
7. Insert fuse block and cover assembly into input power connector (as shown in the following illustration) and snap it into place. Once the fuse block and cover assembly are in place, the position of the indicator pin shows the input power selected.



## Turning on the MasterTech

1. Ensure the proper operating voltage and fuse are selected and in place.

Place the POWER ON/OFF switch, located on the MasterTech rear panel, in the ON ( | ) position. The +5 and +24 LEDs on the rear panel and some of the LEDs in the front panel switches should illuminate.



**The ultrasonic probe should not be turned on at this point. Check the indicator on the ULTRASONIC PROBE AUTO/ON switch on the front panel of the MasterTech. If the ON indicator is illuminated, press the switch to turn off the probe. The indicator below AUTO should illuminate.**

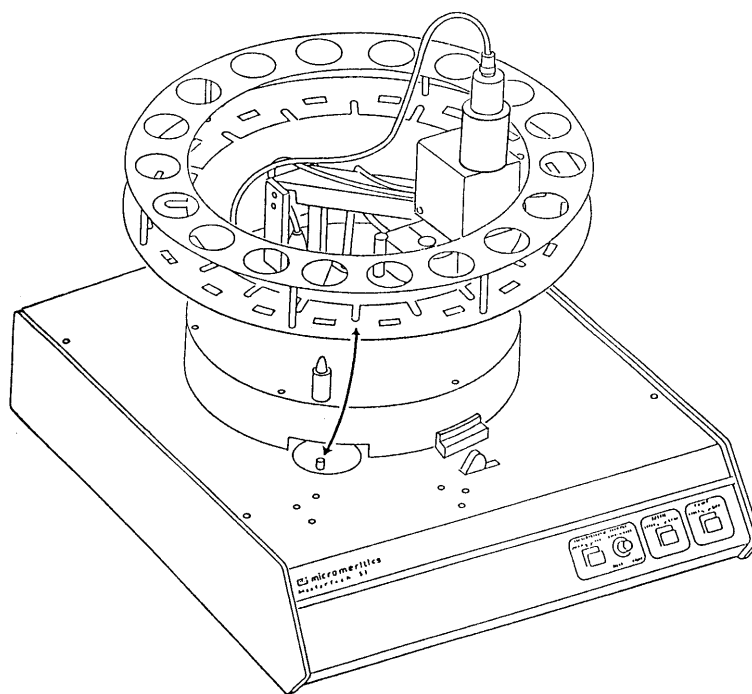
2. Press the ARM AUTO/LOAD switch on the front panel of the MasterTech. The arm should rise to the Load position, which is used for removal and replacement of the tray.

## Installing the Beaker Tray

1. Ensure the arm of the MasterTech is in the Load (uppermost) position. When the arm is in the Load position, the Load LED is illuminated. If the Load LED is not illuminated, press the ARM AUTO/LOAD switch.
2. Hold the tray firmly by the outside edge. The bottom of the tray has small slots positioned radially outward from the inside edge. Place the tray on the MasterTech so that the arm passes through the center opening of the tray.
3. Ensure the drive pin is lined up into a radial slot on the bottom of the tray. The position of the tray does not matter at this point.



**The front panel on your MasterTech may differ slightly from your MasterTech.**



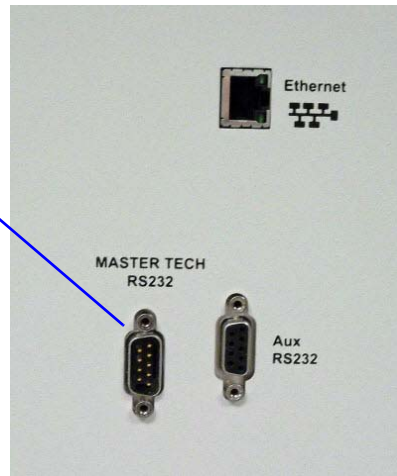


## Connecting Cables

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1. Position the MasterTech next to the SediGraph. Ensure the units are level and their bases are at the same height. Alternately, the MasterTech may be placed on top of the SediGraph.
2. Ensure that the power switches on the SediGraph and MasterTech are in the OFF position.
3. Insert one end of the serial cable into the MasterTech connector on the side panel of the SediGraph.

MasterTech to  
SediGraph  
connection



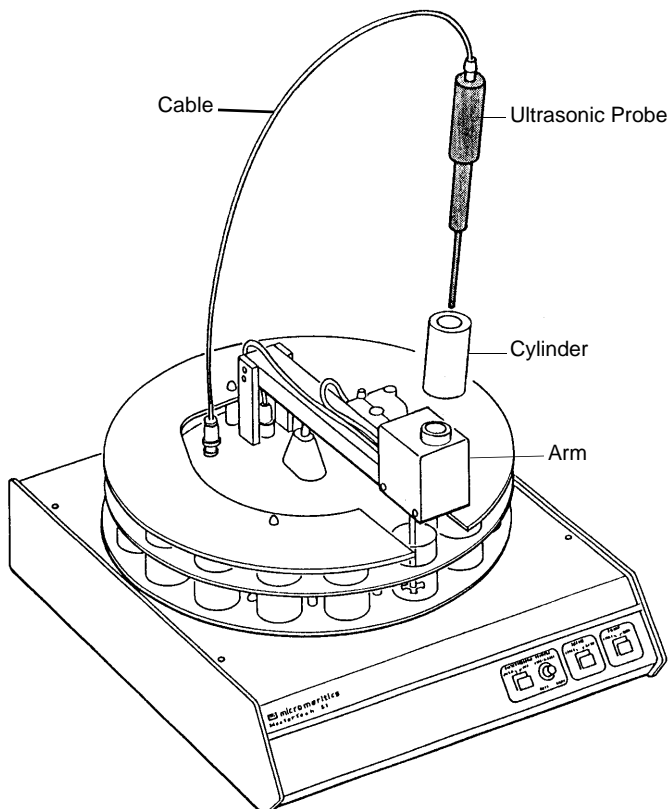
4. Insert the other end of the cable into the connector labeled **MasterTech RS232** on the back of the MasterTech.

## Installing the Ultrasonic Probe



Ensure that no power is supplied to the unit before starting this procedure.

1. The ON/OFF power switch on the rear panel of the MasterTech should be in the OFF (O) position.
2. Attach the probe cable to the connector labeled **Ultrasonic Probe**.



3. Ensure that the probe tip is attached to the probe; if not, attach it. A 1/4 in. probe tip is supplied with the MasterTech 052. A 1/8 in. tip is also available.
4. Insert the cylinder into the arm. Position the cylinder so that the longer slots slide over the protrusions inside the arm.



Position the shorter slots of the cylinder over the protrusions if using the 1/8 in. probe.

5. Insert the probe into the cylinder.

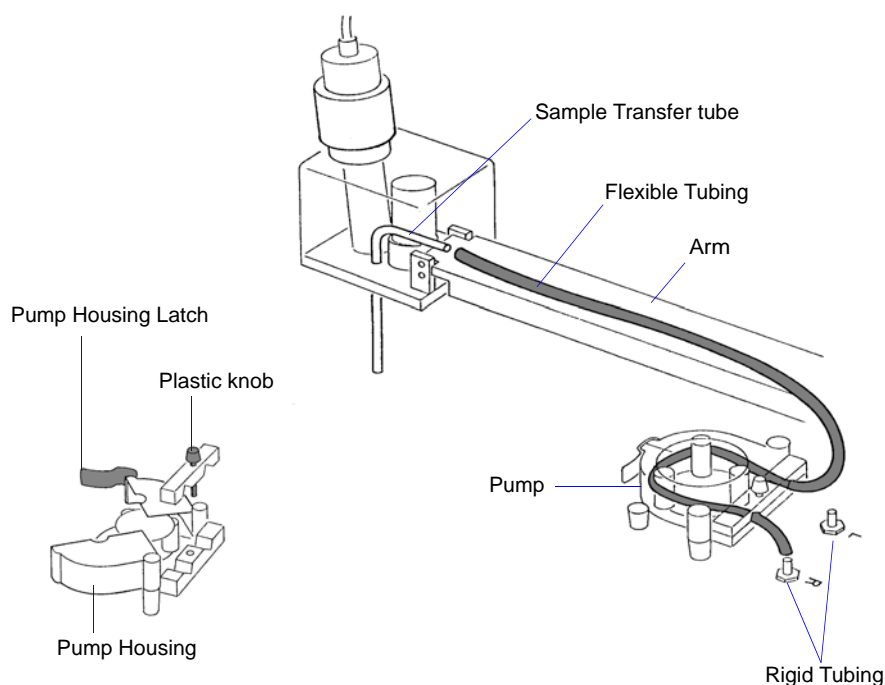
## Installing Sample Transfer Tubing

Separate instructions are provided for installing sample transfer tubing into:

- a MasterTech with a serial number 500 or below, and
- a MasterTech with a serial number 501 or above.

### MasterTech with Serial Number 500 or Below

1. Ensure that the MasterTech POWER switch is in the ON position and that the the arm is in the LOAD (uppermost) position; the LOAD LED is illuminated. If the LED is not illuminated, press the ARM AUTO/LOAD switch.
2. Several segments of flexible tubing are supplied with the MasterTech. Press the end of one segment of flexible tubing over the sample transfer tube until there is at least 1/2 in. (1.27 cm) overlap.



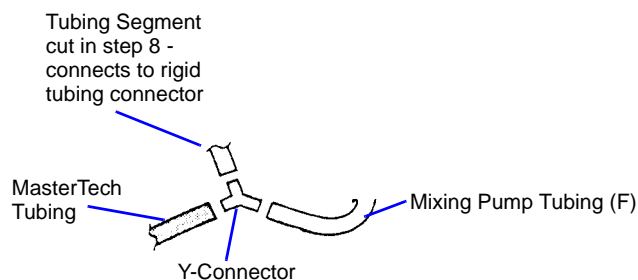
3. Unlatch the pump housing and unscrew the plastic knob on the rear of the pump.
4. Thread the tubing through the pump as shown above and attach it to the rigid tubing labeled **L** (left) or **R** (right). Choose the rigid tubing labeled with the side of the MasterTech from which you want the fluid to be discharged.
5. Close and latch the housing. Tighten the plastic knob on the rear of the pump sufficiently to prevent tubing slippage but not enough to restrict flow through the tubing.
6. Open the pump chassis cover on the SediGraph by pulling it forward.

7. Drain the system.
8. Cut the flexible tubing labeled **F** midway between the mixing pump and the rigid tubing connector on the SediGraph. Remove and discard the segment remaining on the rigid tubing connector.
9. Remove a segment of flexible tubing from the accessories kit and cut a length of tubing approximately 1 1/2 in. (3.81 cm).
10. Attach the end of another segment of tubing to the Discharge Tube connector on the front of the MasterTech.

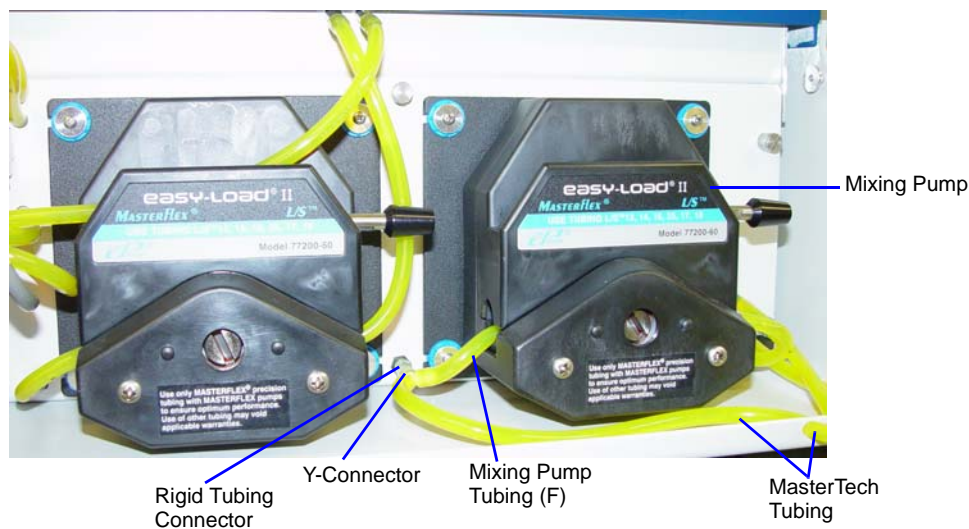


**If the MasterTech is located on top of the SediGraph, use the longer segment of tubing (P/N 052-32802-00).**

11. Thread the other end of the tubing through the hole in the analyzer lower front panel.
12. Attach tubing to the Y-connector as shown below.



13. Attach the tubing from the Y-connector to the rigid tubing connector on the analyzer.



14. Close the pump chassis cover.

## MasterTech with Serial Number 501 or Above

1. Ensure that the arm is in the Load (uppermost) position. When the arm is in the Load position, the Load LED is illuminated. If the LED is not illuminated, press the ARM AUTO/LOAD switch.

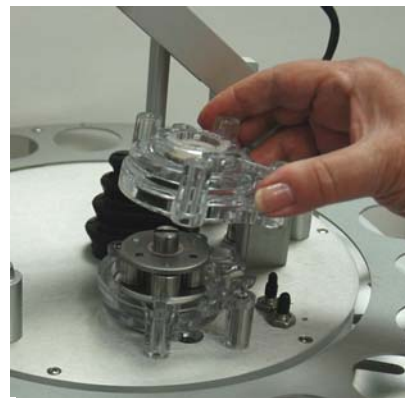


Load position

2. Unscrew the two thumbscrews from the cover of the pump housing, then remove the cover.



A



B

3. Remove the cover from one of the steel tubes labeled **L** (Left) or **R** (Right). Choose the steel tube labeled with the side of the MasterTech from which you want the fluid to be discharged. Attach one end of the flexible tubing to the steel tube. A 21 in. segment of flexible tubing is shipped with the MasterTech.



A



B

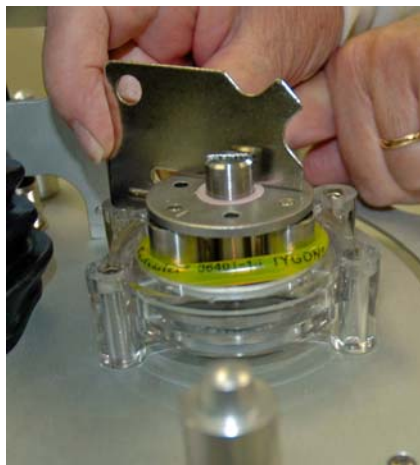
4. Loop the tubing around the pump rollers in a clockwise direction. Use one hand to hold the two ends of the tubing loop in the two grooves at the base of the pump.



5. Insert the key between the pump rollers near the left side of the pump base. The key blade must be between the tubing and the plate on the top of the rollers.

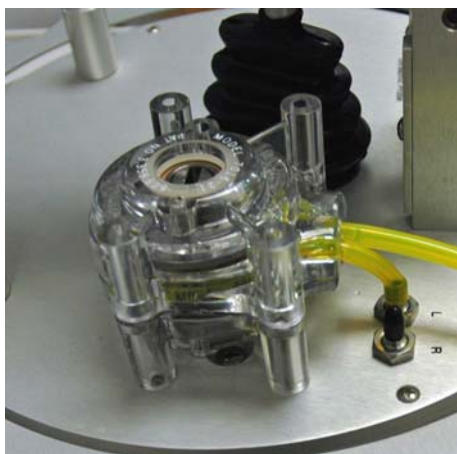


6. Turn the key clockwise so the tubing presses into the groove until the key is stopped by the peg in the right side of the pump body.





7. Slide the key out, then place the cover over the pump, wiggling it slightly to align it with the pump body and press it into place. Insert and tighten the two thumbscrews only tight enough to secure the cover.

**A****B**

8. Attach the other end of the flexible tubing to the Sample Transfer tube on the front of the MasterTech.



9. With the instrument schematic displayed, enable Manual Mode. Right-click the **MasterTech Pump** icon and select **Turn On**.
10. The pump should begin operating. If the pump does not start or is sluggish, pull on the long end of the tubing to create tension and pull excess tubing out of the pump, no more than 1/4 in. should be

required. (Loosen the thumbscrews if necessary.) When the pump is operating freely, hand-tighten the two thumbscrews, then turn the pump off.



11. Press the ARM AUTO/LOAD switch to place the arm in the AUTO position.
12. Open the pump chassis cover on the SediGraph by pulling it forward.
13. Drain the system.
14. Cut the flexible tubing labeled **F** midway between the mixing pump and the rigid tubing connector on the SediGraph. Remove and discard the segment remaining on the rigid tubing connector.
15. Remove a segment of flexible tubing from the accessories kit and cut a length approximately 1 1/2 inches (3.81 cm).
16. Attach the end of another segment of tubing to the Discharge Tube connector on the front of the MasterTech.

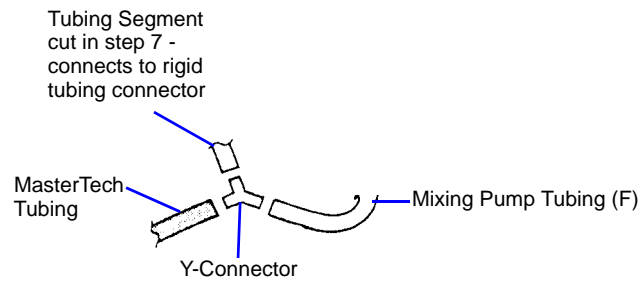


**If the MasterTech is located on top of the SediGraph, use the longer segment of tubing (P/N 052-32802-00).**

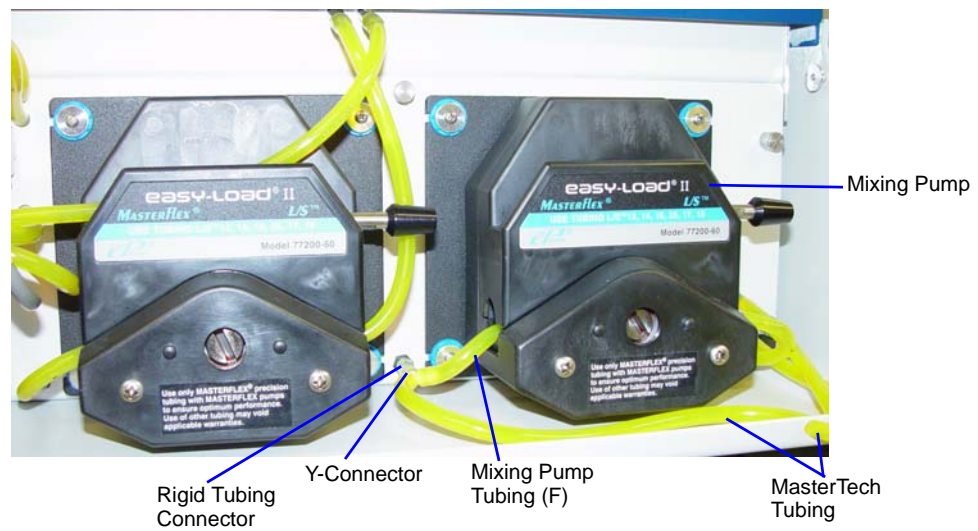
17. Thread the other end of the tubing through the hole in the analyzer lower front panel.



18. Attach tubing to the Y-connector as shown below.



19. Attach the tubing from the Y-connector to the rigid tubing connector on the analyzer.



20. Close the pump chassis cover.

## Verifying Operation

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To verify operation, manually move each subsystem using the manual control option of the SediGraph analysis program.

1. Ensure that the SediGraph and MasterTech are turned on. Start the SediGraph analysis program if it has not been started.
2. Fill at least one of the supplied beakers with approximately 80 mL of water.
3. Place the beaker in the position numbered **1** on the tray.
4. To test the ultrasonic probe, remove it from the holder and insert the tip of the probe well into the water.



**NEVER operate the ultrasonic probe without having the tip immersed into a liquid. Doing so may harm the probe and/or the driving electronics. DO NOT let the tip of the probe come in contact with a glass beaker. Doing so may shatter the beaker.**

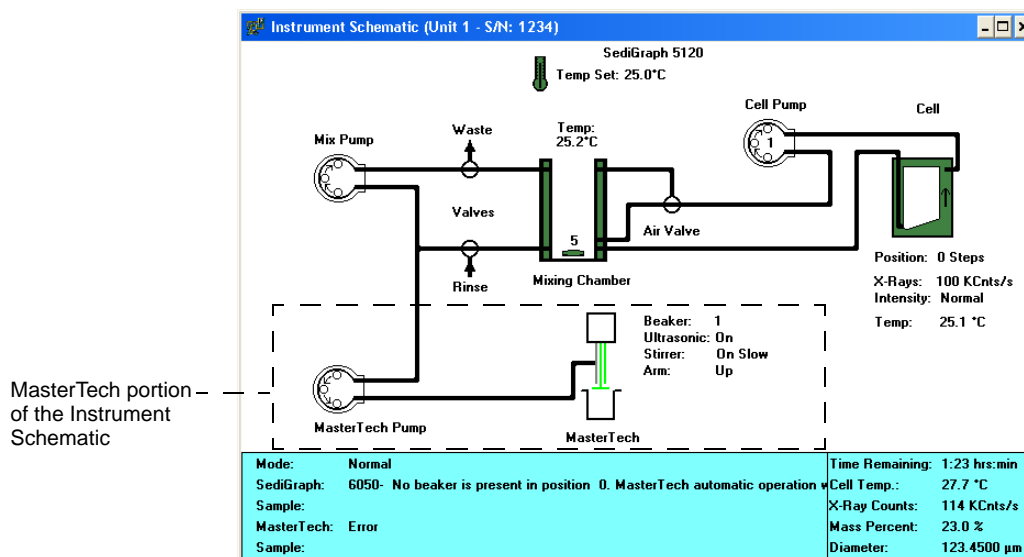
5. While holding the probe tip under water, press the ULTRASONIC PROBE AUTO/ON switch. A high-pitched sound indicates that the probe is working properly.



**DO NOT press the ultrasonic probe AUTO/ON switch unless the probe and its cable are properly connected to the MasterTech. Doing so may harm the driving electronics.**

6. Press the ultrasonic probe AUTO/ON switch again to turn off the probe.
7. Place the probe back into the holder.

8. Go to **Unit [n] > Enable manual control**. If necessary, go to **Unit > Show Instrument Schematic** to display the instrument schematic.

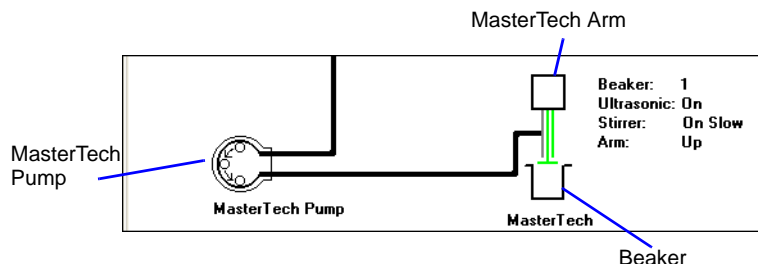


9. If the arm is in the Load position, press the ARM AUTO/LOAD switch on the front panel of the MasterTech to release it.
10. Go to **Unit [n] > Initialize MasterTech** to initialize the MasterTech. Click **Continue** on the popup message.

A message is displayed indicating initialization is in process. The tray on the MasterTech rotates in a counterclockwise direction for one position, and the arm lowers to the Rinse position then returns.

The tray continues to rotate until position 1 is reached. The beaker inserted in the tray in Step 3 should now be directly under the head of the MasterTech. Ensure that the beaker contains approximately 80 mL of water.

11. On the instrument schematic, select the symbol representing the MasterTech arm.



When manual mode is enabled, components on the instrument schematic have pop-up menus displaying the options available for that component. Right click a component to display pop-up menus.

In each of the following steps, first access the pop-up menu:

- a.) Select **Move Arm Down**; then repeat the step.
  - b.) Select **Ultrasonic On**. A high-pitched sound indicates the probe is operational. Select **Ultrasonic Off**.
  - c.) Select **Stirrer On**. The stirrer begins to operate.
  - d.) Select **Stirrer Speed Fast**.
  - e.) Select **Ultrasonic Off**.
  - f.) Select **Stirrer Off**.
  - g.) Select **Move Arm Up**.
  - h.) Select **Move Arm Up**.
  - i.) Select **Move To Next Beaker**. The display updates to reflect the position of the beaker tray. The picture on the screen should reflect whether or not a beaker is present.
12. Select the MasterTech pump. In each instruction in this step, first access the pop-up menu:
- a.) Select **Turn On**; the MasterTech pump should begin operating. A whirring sound can be heard then the pump will begin to operate.
  - b.) Check the direction of the flow of the MasterTech pump:
    - **Flow Direction Load** - allows suspension to flow from the MasterTech to the SediGraph. This direction is used to load the sample into the mixing chamber of the SediGraph.
    - **Flow Direction Rinse** - allows suspension to move from the SediGraph to the MasterTech. This direction is used to rinse the sample from the stirrer and transfer tube on the MasterTech.