MASK INTEGRITY TEST ACCESSORY (MITA) MODEL 8120

Model 8120 Mask Integrity Tester is patented under U.S. Patents No. 8,312,761 and 8,621,914. Additional patents are pending.

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UNDERSTANDING, ACCELERATED

MASK INTEGRITY TEST ACCESSORY (MITA) MODEL 8120

OPERATOR'S MANUAL

P/N 6006153, REVISION G
AUGUST 2015

Manual History

The following is a history of the Model 8120 Mask Integrity Test Accessory (MITA) Operator's Manual.

Revision	Date
A	September 2012
B	October 2012
C	October 2012
D	May 2013
E	December 2013
F	January 2014
G	August 2015

Warranty

Part Number	6006153 / Revision G / August 2015
Copyright	©TSI Incorporated / 2012-2015 / All rights reserved.
Address	TSI Incorporated / 500 Cardigan Road / Shoreview, MN 55126 / USA
Fax No.	651-490-3824
E-mail Address	answers@tsi.com
Limitation of Warranty and Liability (effective February 2015)	(For country-specific terms and conditions outside of the USA, please visit www.tsi.com.)

Seller warrants the goods, excluding software, sold hereunder, under normal use and service as described in the operator's manual, to be free from defects in workmanship and material for twelve (12) months, or if less, the length of time specified in the operator's manual, from the date of shipment to the customer. This warranty period is inclusive of any statutory warranty. This limited warranty is subject to the following exclusions and exceptions:

a. Hot-wire or hot-film sensors used with research anemometers, and certain other components when indicated in specifications, are warranted for 90 days from the date of shipment;

b. Pumps are warranted for one year or 3000 hours; whichever comes first;

c. Parts repaired or replaced as a result of repair services are warranted to be free from defects in workmanship and material, under normal use, for 90 days from the date of shipment;

d. Seller does not provide any warranty on finished goods manufactured by others or on any fuses, batteries or other consumable materials. Only the original manufacturer's warranty applies;

e. This warranty does not cover calibration requirements, and seller warrants only that the instrument or product is properly calibrated at the time of its manufacture. Instruments returned for calibration are not covered by this warranty;

f. This warranty is **VOID** if the instrument is opened by anyone other than a factory authorized service center with the one exception where requirements set forth in the manual allow an operator to replace consumables or perform recommended cleaning;

g. This warranty is **VOID** if the product has been misused, neglected, subjected to accidental or intentional damage, or is not properly installed, maintained, or cleaned according to the requirements of the manual. Unless specifically authorized in a separate writing by Seller, Seller makes no warranty with respect to, and shall have no liability in connection with, goods which are incorporated into other products or equipment, or which are modified by any person other than Seller.

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W A R N I N G

This instrument contains (1) non-rechargeable Lithium battery which is not user serviceable. Return to factory for replacement.

Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any mal-function is discovered, please contact your nearest sales office or representative, or call TSI at 1-800-874-2811 (USA) or 651-490-2811.

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Patents

Model 8120 Mask Integrity Tester is patented under U.S. Patents No. 8,312,761 and 8,621,914. Additional patents are pending.

Safety and Precautions

This section provides instructions to ensure safe and proper handling of the Mask Integrity Test Accessory (MITA).

<div style="border:1px solid black">

**Please read the entire operator's manual
before operating this equipment.**

</div>

C A U T I O N
TWO PERSON LIFT RECOMMENDED

C A U T I O N
DO **NOT** ALLOW CONTAMINANTS TO FALL INTO ANY OF THE HEADFORM BASE PORTS OR THE AEROSOL MIXER PORT

Do NOT remove or obstruct inlet located in the right hand side of the CEU. There are no user adjustments necessary for this inlet.

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Contents

About This Manual

Getting Help

To obtain assistance with the Model 8120 Mask Integrity Test Accessory (MITA), contact TSI Customer Service:

TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126 USA
Fax: (651) 490-3824
Telephone: 1-800-874-2811 (USA) or (651) 490-2811
E-mail Address: technical.service@tsi.com

Submitting Comments

TSI values your comments and suggestions on this manual; please use the comment sheet on the last page to send us your opinion on the manual's usability, to suggest specific improvements, or to report any technical errors.

If the comment sheet has already been used, please mail your comments on another sheet of paper to:

TSI Incorporated
Particle Instruments
500 Cardigan Road
Shoreview, MN 55126
Fax: (651) 490-3824
E-mail Address: answers@tsi.com

CHAPTER 1

Introduction and Overview

The TSI **M**ask **I**ntegrity **T**est **A**ccessory (MITA) works in tandem with the PortaCount® Respirator Fit Tester to test for leaks or other defects in CBRN gas masks and full-face respirators.

The MITA has been designed for ease-of-use and ease-of-transport. The top half of the carrying case holds the instrument while the bottom half forms the accessory compartment. The updated Headform design includes an enhanced bladder seal system to provide a tight seal for most gas masks and full face respirators of various types and sizes. Masks attach to the Headform using their own head harness for better representative results.

The PortaCount Fit Tester (sold separately) serves as a particle detector for determining the overall integrity of the mask by performing an aerosol leakage test with the MITA accessory. The mask is mounted on the Headform and tested under conditions of high vacuum and high constant flow. The integrated aerosol wand and generator is used to pinpoint source of leaks so they can be assessed quickly. The operator uses the aerosol wand to direct a stream of concentrated particles at specific locations around the mask. When the particle stream is near the leak, PortaCount Fit Tester detects the suddenly elevated particle concentration and alerts the operator. The MITA also tests the integrity of the mask exhalation valve and drink tube train (if applicable).

MITA is easy to use and requires minimum operator training. The display on the MITA guides the first time operator through step-by-step prompts. The display also provides detailed guidance to how to use the various accessories. Experienced operators appreciate the streamlined menu structure. The experienced operator is able to avoid detailed prompts and move through the tests quickly. Experienced operators can test 12 or more good masks per hour. Troubleshooting defective masks is quick and easy using the aerosol wand to pinpoint leaks.

MITA Mask Adapter kits allow you to perform the mask test using a variety of gas masks and full face respirators. MITA Mask Adapter kits for most major brands of CBRN gas masks and full face respirator are available. A complete list of MITA mask test adapter kits is posted on the TSI Web site http://www.tsi.com.

The following acronyms are used in the MITA menu structure and in this manual:

DT	Drink Tube
EV	Exhalation Valve
CEU	Control Electronics Unit
DP1	Differential Pressure Transducer #1
DP3	Differential Pressure Transducer #3
DP5	Differential Pressure Transducer #5

CHAPTER 2
Unpacking and Parts Identification

Carefully unpack the Mask Integrity Test Accessory (MITA) from the shipping container. Use the tables and illustrations below to make certain that there are no missing components. Contact TSI immediately if anything is missing or damaged.

Packing List

Note
Mask testing adapters and accessories are sold separately. Refer to www.tsi.com for more information on the available MITA Mask Adapter kits.

Standard Items MITA (Model 8120)

Qty	Description	Part Number	Item
1	Mask Integrity Test Accessory with General Accessories	8120	
1	Operator's Manual	6006153	

Qty	Description	Part Number	Item
1	Quick Start Guide	6006154	
1	Self Check Components Reference Card	6006218	
1	Hood	801773	
1	Headform	801774	
1	Headform Sample Fitting *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		
1	Headform Mask Sample Plug *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		
1	40/74mm Mask Filter Plug *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		

Mask Integrity Test Accessory (MITA) Model 8120

Qty	Description	Part Number	Item
1	Mixer Port Stopper *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		
1	#3 Rubber Stopper *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		
1	Mask Bypass Hose *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		
1	Twin Tube with 1 inch relief cut on blue tube *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		
1	DT Sample Hose *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		
1	DT/EV Bypass Hose *Refer to MITA Accessory Kit, P/N 801777* *Replacement Parts*		
1	Aerosol Generator	801771	

Qty	Description	Part Number	Item
1	Aerosol Generator Mounting Bracket *Refer Replacement Parts*		
2	Thumbscrew(s) *Refer Replacement Parts*		
1	Aerosol Mixer *Refer to MITA Accessory Kit, P/N 801777 Replacement Parts*		
1	Aerosol Wand	801770	
2	HEPA Filter Cartridge (1 installed on Main Panel, 1 spare)	801772	
1	Power Supply (will include appropriate Line Cord based on destination)	801794	
1	PortaCount Fit Tester Interface Cable (*for Model 8030/8038 ONLY*)	801766	

Qty	Description	Part Number	Item
1	Isolated USB to Serial Converter *Included with PortaCount Interface Cable kit, P/N 801766.* *Refer to Note below for more details.*		
1	MITA Computer Cable	801793	
1	Emery Oil™ Container – 500 ml (Poly-Alpha Olefin)	801776	
1	Software CD	7002343	

Note
Instructions for installing the Isolated USB-to-Serial Converters Device Drivers onto the PC can be found on the CD included in the packaging of each USB-to-Serial Converter and can also be found in <u>Appendix C, StarTech FTDI Driver Installation</u>. This USB-to-Serial converter is commonly used for two separate functions: 1. MITA communications to a PortaCount Pro/Pro+ Models 8030 and 8038. 2. MITA communications to a PC which does not have a 9-pin (male) COM Port installed.

MITA Mask Adapter Kits
(not included with general MITA accessories)

Part Number	Applicable Mask Models
8125-01	M40, FR-M40, M45, MCU2P, Millennium
8125-02	M50, C50
8125-03	M53, FM12
8125-04	C4
8125-05	MSA Ultra Elite (w/ 40mm Threaded, Slide- & Push-To-Connect, CBRN Versions); MSA Advantage 3000
8125-06	3M 6000 Series, 7000 Series, 7800S, 7800B CBRN Versions
8125-07	Scott AV2000, AV3000
8125-08	Draeger Panorama Nova; MSA Ultra Twin
8125-09	North series 5400 & 7600
8125-10	Honeywell (Sperian) Survivair Opti-fit

Optional Accessories

Description	Part Number	Item
PortaCount® Fit Tester Interface Cable (for Model 8020/8020M ONLY)	801767	

System Components
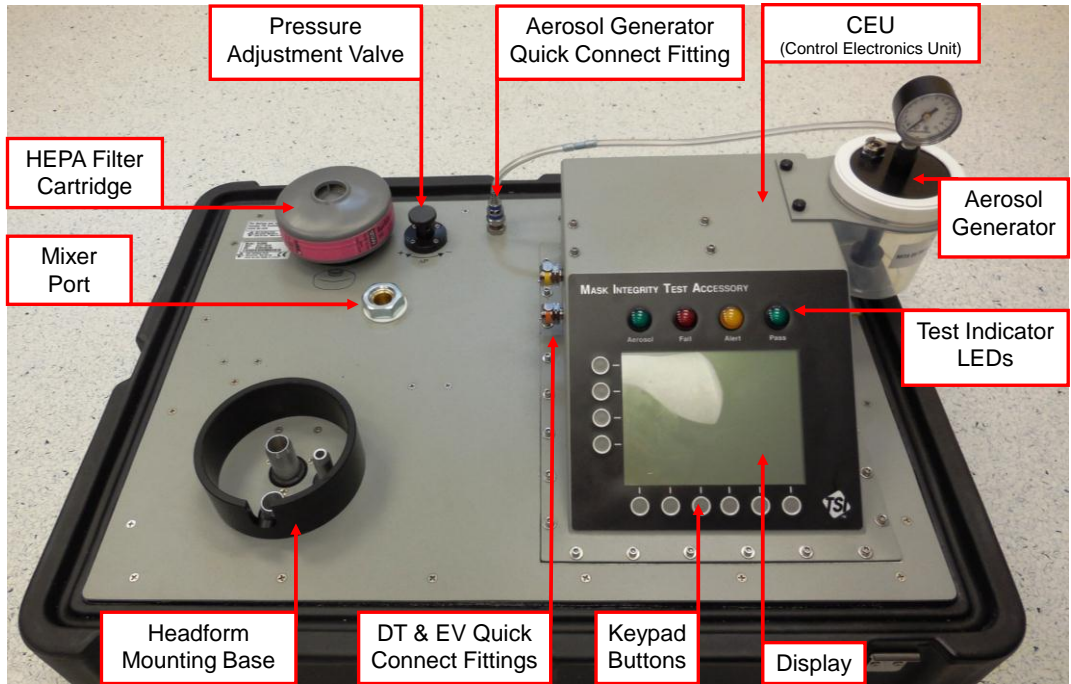
Front View of MITA Lid/Main Panel

Labels:
- Pressure Adjustment Valve
- Aerosol Generator Quick Connect Fitting
- CEU (Control Electronics Unit)
- HEPA Filter Cartridge
- Aerosol Generator
- Mixer Port
- Test Indicator LEDs
- Headform Mounting Base
- DT & EV Quick Connect Fittings
- Keypad Buttons
- Display
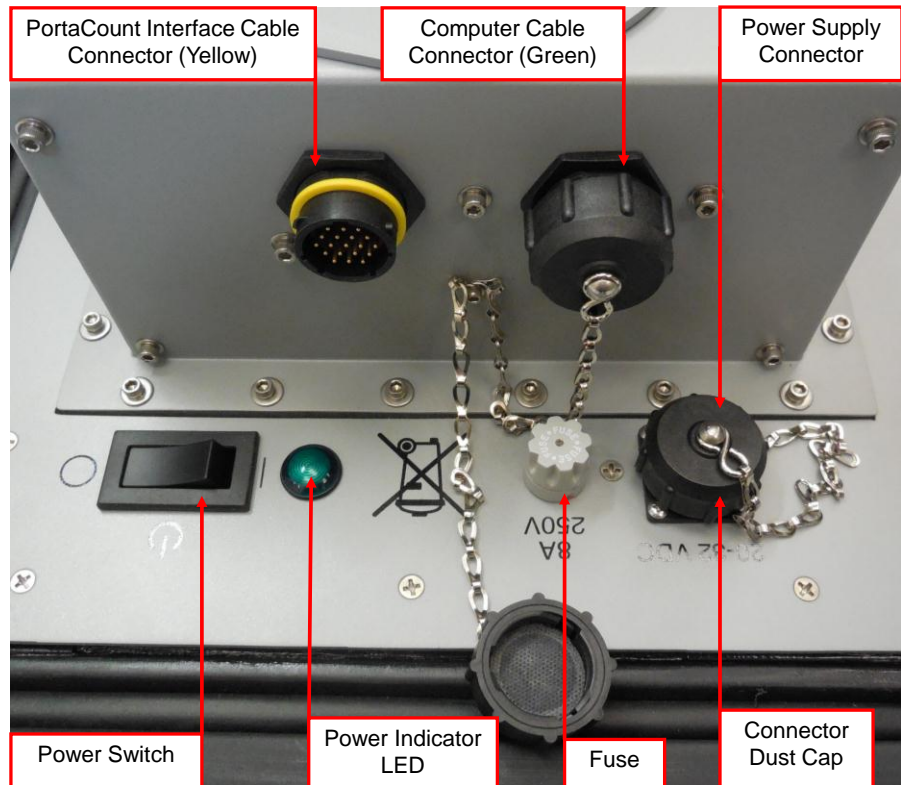
Back View of CEU and Main Panel

Labels:
- PortaCount Interface Cable Connector (Yellow)
- Computer Cable Connector (Green)
- Power Supply Connector
- Power Switch
- Power Indicator LED
- Fuse
- Connector Dust Cap

Unpacking Instructions

1. Open latches on case.

2. Separate the lid/main-panel from the case and place lid/main-panel on work surface (see System Components and Standard Items sections to identify accessories).

3. To remove and expand hood, unfold and pull the white tab outward.

4. Loosen wing-nut fasteners for accessories panel cover on the lower half of the case and open panel.

5. Remove accessories from case.

6. Store lower half of case out of the way.

Power-Up Instructions

Note
If there is an ambient change in temperature greater than 20°F (6.6°C) from the MITA's storage location to operating location, wait at least one hour before operating to allow the internal temperature of the MITA to equalize.

1. Connect Power Line Cord to Power Supply.

2. Remove the Dust Cap and connect Power Supply to the 20 to 32 VDC Connector.
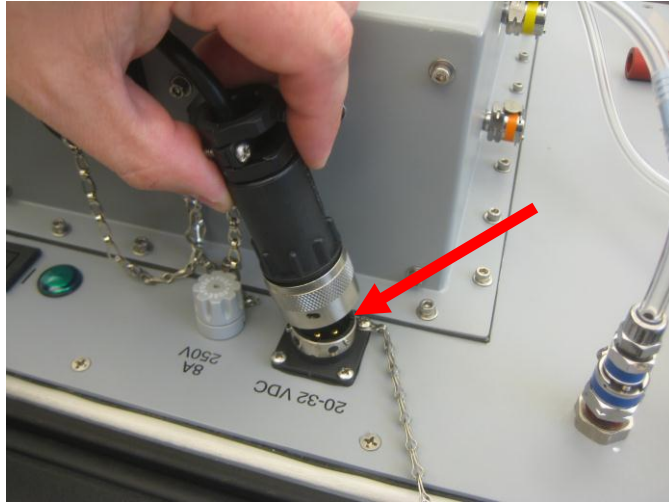
3. Twist knurled locking ring clockwise until it stops.
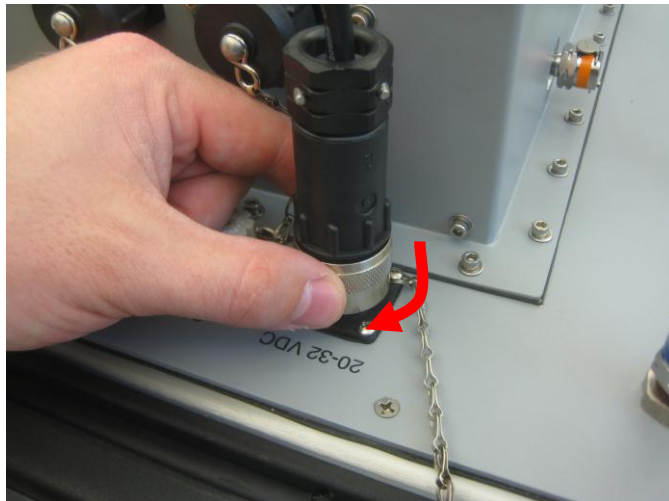
4. Plug Power Line Cord to Power Source (100 to 240 VAC).

5. Turn Power Switch On.

6. Refer to Chapter 3, Getting to Know the MITA for information to operate the MITA.

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C H A P T E R 3

Getting to Know the MITA

The MITA is operated by selecting options from the displayed MENU using the keypad on the Display Panel. The operator also needs to make appropriate hardware configuration changes as prompted from the display during the tests.

The objective of the selected option and instructions are described at the bottom of each screen.

The row of six circles across the bottom of the display and four circles across the side of the display are softkeys. The function of the softkeys, where applicable, is displayed either immediately next to or above them. If a key action is available, the key function is shown on the display inside a rectangular box. Momentarily press the softkey button to select the corresponding softkey option.
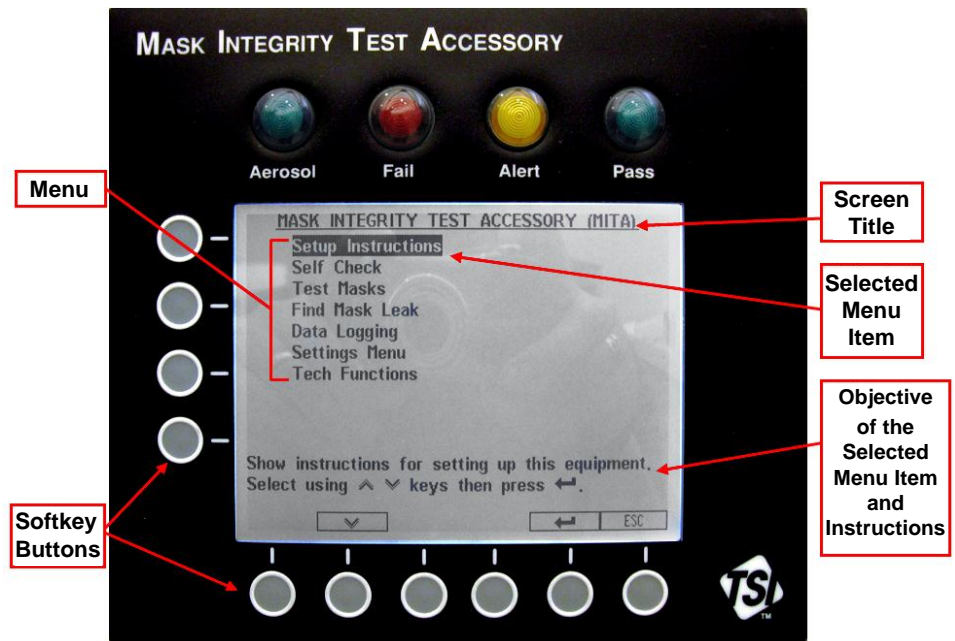
MITA Display Panel with Main Menu

When the instrument is turned on, the initial display screen will appear as shown below:

MITA Initial Display

Note
All the LED's will turn on and then off when the Main Menu is first displayed. If there are any Errors, the Alert LED will remain on, and the Errors will be displayed along with suggestions for resolving them. Press ↵ or **ESC** to continue. Refer to <u>Chapter 10, Troubleshooting</u> if any errors are displayed and more assistance is needed.

After a few seconds the unit will display the MITA Main menu as shown below:
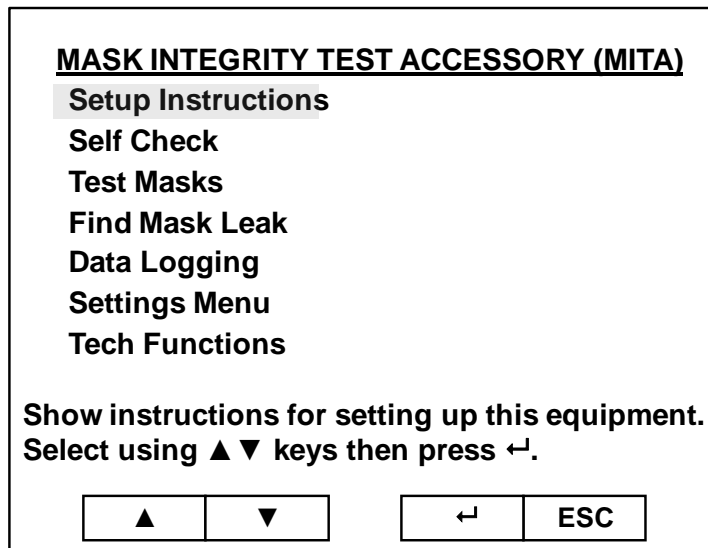
MITA Main Menu

Information for each of the main menu options are described in the following sections:

- [Setup Instructions](#)
- [Self Check Procedure](#)
- [Prepare Masks for Test](#)
- [Find Mask Leak](#)
- [Data Logging](#)
- [Settings Menu](#)
- [Tech Functions](#)

Use the ▲▼ softkeys buttons to highlight the desired option, then press the ↵ softkey button to select the highlighted option. **ESC** can be selected to cancel an option or selection and return to the previous menu without making or saving any changes.

Softkey Buttons

▲	move to the line above
▼	move to the line below
◄	move curser to the left
►	move curser to the right
↵	Enter
ESC	Escape
SAVE & EXIT	Save and Exit

MITA Menu Flowchart

Setup Instructions → Set up Cables and Hoses → Set up Aerosol Generator → Set up the PortaCount Fit Tester → Prepare Masks for Test

Self Check

Adjustable parameters found in Tech Functions menu

Test Masks

Adjustable parameters found in Settings menu

Find Mask Leak

Data Logging → View Mask Tests → Download all Mask Tests → View Self Checks → Download all Self Checks → Delete Data

Settings Menu → Select Mask Protocol → Define Mask Protocol → Upload Mask Protocols → Aerosol Generator Settings → General Settings → Protected Settings

Tech Functions

The following acronyms are used in the MITA menu structure:

DT	Drink Tube
EV	Exhalation Valve
CEU	Control Electronics Unit
DP1	Differential Pressure Transducer #1
DP3	Differential Pressure Transducer #3
DP5	Differential Pressure Transducer #5

Set-Up Instructions

The Setup Instructions guide the operator through setting up of the equipment and the steps needed to prepare the MITA for the Self Check and Mask Testing.

```
MASK INTEGRITY TEST ACCESSORY (MITA)
  Setup Instructions
  Self Check
  Test Masks
  Find Mask Leak
  Data Logging
  Settings Menu
  Tech Functions


Show instructions for setting up this equipment.
Select using ▲▼ keys then press ↵.

┌──────┬──────┐     ┌──────┬──────┐
│  ▲   │  ▼   │     │  ↵   │ ESC  │
└──────┴──────┘     └──────┴──────┘
```

To continue with Setup Instructions, select Setup Instructions from the main menu using the ▲▼ keys to and press ↵. The following menu is displayed:

```
         SETUP INSTRUCTIONS
     Set up Cables and Hoses
     Set up Aerosol Generator
     Set up the PortaCount
     Prepare Masks for Test




Show instructions on how to connect the cables,
Hoses and the HEPA filter.
Select using ▲▼ keys then press ↵.

┌──────┬──────┐     ┌──────┬──────┐
│  ▲   │  ▼   │     │  ↵   │ ESC  │
└──────┴──────┘     └──────┴──────┘
```

The Setup Instructions menu includes the following tasks:

- Set up Cables and Hoses
- Set up Aerosol Generator
- Set up the PortaCount® Respirator Fit Tester
- Prepare Masks for Test

It is recommended that a first-time-user goes through each of the tasks found in the Setup Instructions menu. Each of these Setup tasks is described below with illustrations.

When each task has been performed, press **ESC** to return to the Setup Instructions menu and then select the next available task.

When the tasks for the Setup Instructions are complete, press **ESC** again to return to the main menu, and refer to for information on the next steps to prepare for a mask test.

Set Up Cables and Hoses

1. Remove dust cap from the connector with yellow ring, located on the back right of MITA CEU.

Note
MITA includes the interface cable needed for the 8030/8038 models of the PortaCount Respirator Fit Tester. The 8020/8020M interface cable (P/N 801767) is sold separately.

2. Plug the yellow-ringed PortaCount Fit Tester interface cable to the connector mentioned previously in step 1.

3. If applicable, plug the yellow Exhalation Valve (EV) Adapter sample hose to the yellow EV connector.

Exhalation Valve (EV) Adapter
Sample Hose and connection

Note
The EV Adapters discussed in step 3 are provided in the [MITA Mask Adapter Kits](#) and are specific to the make and model of the respirator being tested. During the Self Check, be sure to use the appropriate EV Adapter according to the respirator being tested.
Not all respirator models will require the use of an Exhalation Valve Adapter, including most APR and SCBA respirators.

4. Plug the orange Drink Tube (DT) sample hose to the orange DT connector.

Drink Tube (DT) Sample Hose
and connection
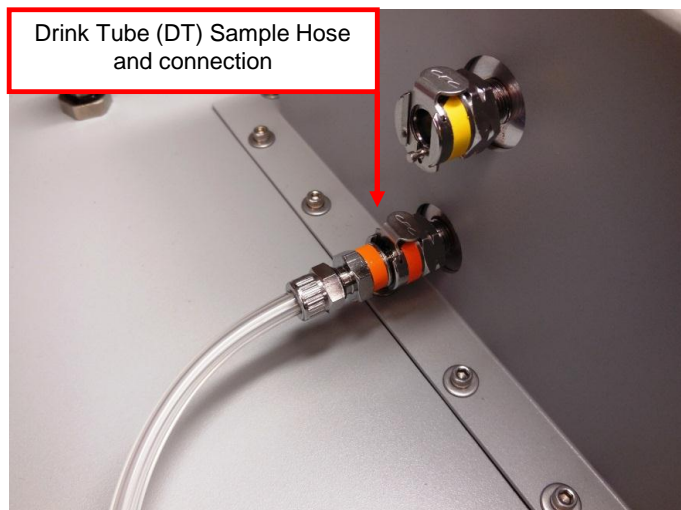
5. (*If not already installed*) Screw in the HEPA Filter cartridge.

6. Install the Headform to the Headform Mounting Base and push down tight.

Note
The ring along the base of the Headform will be below the top of the mounting base collar when the Headform is fully seated.

Set Up Aerosol Generator

1. Remove the Aerosol Generator reservoir and fill with Emery Oil. Emery Oil should be within the indicated minimum and maximum lines on the reservoir.

2. Reattach reservoir to Aerosol Generator assembly. Screw assembly on tight, but do **NOT** over-tighten as this could cause the assembly to leak particles.
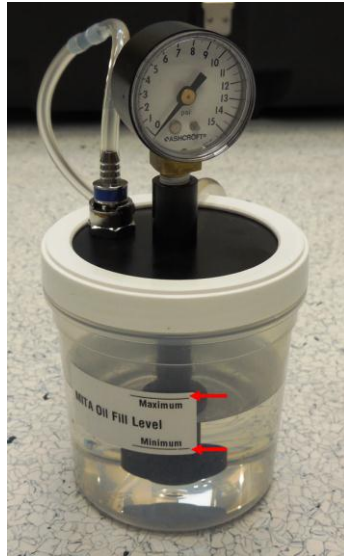
3. Attach the Aerosol Generator Mounting Bracket to the MITA using the Thumbscrews.
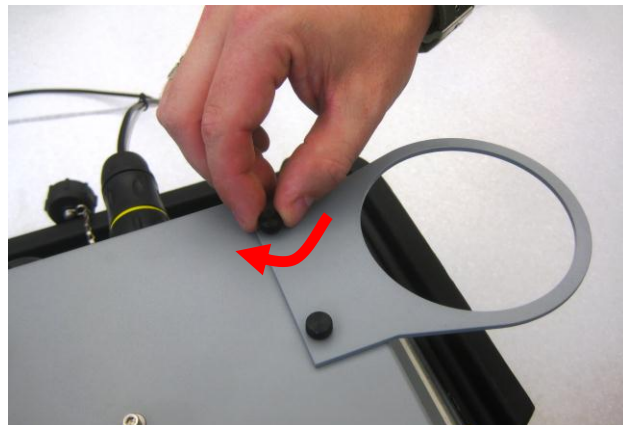
4. Slide the Aerosol Generator into the mounting bracket.

5. Remove the blue air supply hose from its storage location on the Aerosol Generator and connect it to the blue Aerosol Generator quick connect fitting located on the MITA main panel.
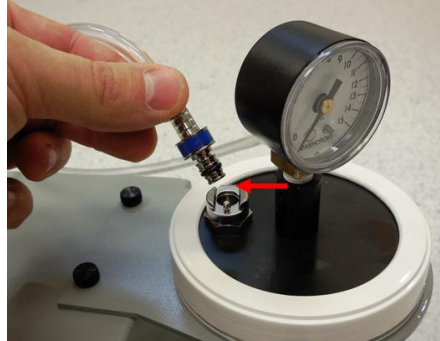
6. Install the Aerosol Mixer between the Aerosol Generator output and the Aerosol Mixer Port.
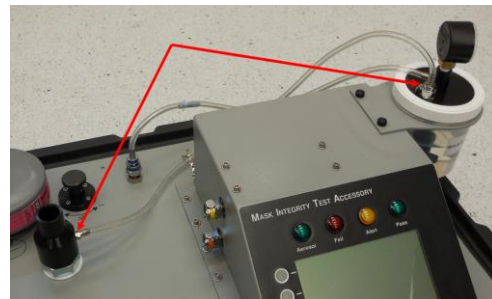
Note
When storing the Aerosol Generator, it must be dry and empty of oil, and the air supply hose must be plugged into the aerosol generator output.

Set up the PortaCount Respirator Fit Tester

Note
The following examples pictured will use the 8030 and 8038 models of the PortaCount Respirator Fit Tester. If you are using the 8030 or 8038 model of PortaCount Fit Tester you must have version 2.6 or greater firmware installed to communicate with the MITA.

1. Plug the yellow-ringed PortaCount Fit Tester interface cable into the yellow connector at the back of the CEU if not already done.
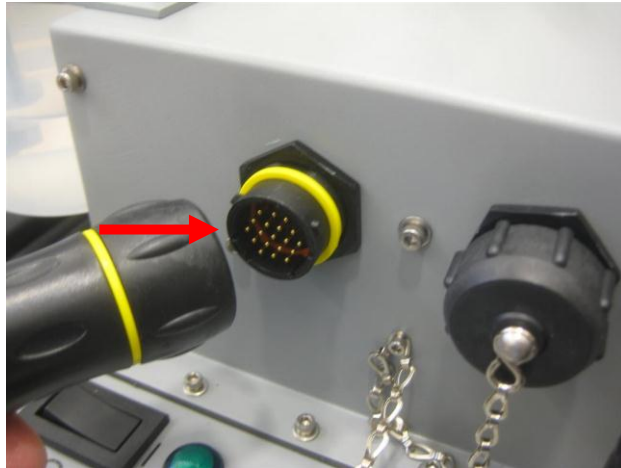
2. Connect the USB-to-Serial Converter to DB9 connection of PortaCount Fit Tester interface cable.

3. Plug the USB end of the USB-to-Serial Converter to either type A USB port located on back of PortaCount unit.

4. Connect the power supply barrel connector from the PortaCount Fit Tester interface cable to the power supply connection on the back of PortaCount unit.

5. Connect the end of the Twin Tube provided with the MITA, which is evenly cut to the color-coded fittings on the PortaCount Fit Tester.
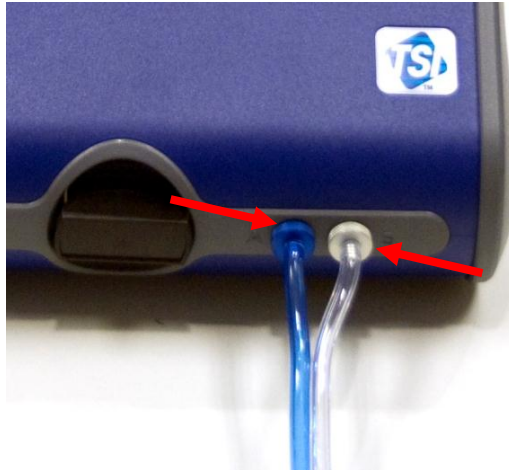
6. Remove the Alcohol Cartridge from the Alcohol Fill Capsule and gently shake it to allow excess alcohol to drip back into the Capsule. Refer to the PortaCount User's Manual for more information on how to properly charge the alcohol cartridge prior to use.

7. Insert the Alcohol Cartridge into the cartridge cavity of the PortaCount Respirator Fit Tester. It should slide in with little effort. **DO NOT FORCE IT**. When almost fully inserted, firmly twist the Alcohol Cartridge clockwise until it locks into position.

8. Perform a PortaCount Daily Check every day before use, as described in the PortaCount Fit Tester User's Manual before using with MITA.

| **Note** |
| --- |
| If operating the model 8038 PortaCount Pro+ Respirator Fit Tester, do **NOT** select the N95 checkbox when performing the Daily Checks. |

9. At the other end of the Twin Tube sample tubing provided with the MITA, the clear hose is approximately 1 inch longer than the blue hose. **AFTER** performing a PortaCount Daily Check, connect the clear hose to the mask sample port at the bottom of the Headform.

Clear Twin Tube sample hose connected to Mask Sample port
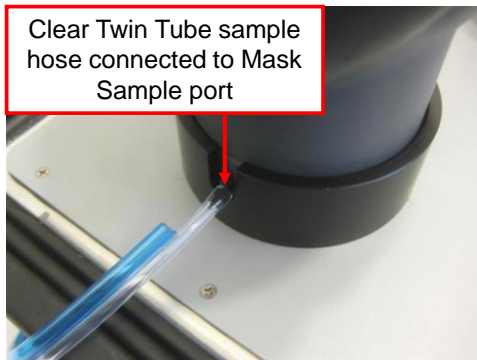
10. If using the 8030 or 8038 models of PortaCount Fit Tester, they must remain on the "Activities" screen. Trying to use the 8030 or 8038 on any other screen will cause intermittent "unexpected response" errors on MITA.

Prepare Masks for Test

This menu option provides information on how to prepare the gas masks and full-face respirators for testing. The Mask Test Protocol is selected and defined in the Settings Menu.

Note
If you have not already performed a Self Check for the day, please complete this process **BEFORE** testing a mask.
WAIT to install the Mask on the Headform until the Mask Protection Factor test prompts to install it. The mask is installed **ON** the Headform **ONLY** during the Mask Protection Factor test.
If the mask being tested has a Drink Tube or Exhalation Valve that will be tested, leave the mask **OFF** the Headform. Both Drink Tube Test and Exhalation Valve Test are done with the mask **OFF** the Headform.

1. Before starting, thoroughly inspect the mask to detect any obvious defects.

2. If the inside of the mask is dirty or contaminated, it should be cleaned.

3. Remove the mask filter before conducting the Mask Protection Factor test.

4. Install the appropriate Mask Filter Plug in place of the mask filter removed in the previous step.

When installing the Mask to the Headform:

1. Loosen the mask straps completely so they will go around the back of the Headform

2. Locate the chin cup of the mask on the chin portion of Headform first, and pull the mask straps up and back over the Headform, making sure to keep it snug to the Headform.

3. Make sure the Mask is centered on the Headform Bladder Seal.

4. Snug the straps tight.

5. Recheck to make sure the mask is centered from side to side.

Note
Typically masks seal better to the headform bladder when placed slightly higher up on the headform, so that the upper sealing surface is less than an inch below the top of the headform bladder. This is not applicable to all models and sizes of masks, and experience will help to determine which masks fit best which way. Try adjusting the mask higher or lower on the headform first when experiencing difficulties passing a Protection Factor test.

CHAPTER 4
Self Check Procedure

This chapter describes the information for the Self Check option from the main menu.

```
  MASK INTEGRITY TEST ACCESSORY (MITA)
   Setup Instructions
   Self Check
   Test Masks
   Find Mask Leak
   Data Logging
   Settings Menu
   Tech Functions

 Perform a self-test on this equipment.
 Select using ▲▼ keys then press ↵.

     ┌──────┬──────┐      ┌──────┬──────┐
     │  ▲   │  ▼   │      │  ↵   │ ESC  │
     └──────┴──────┘      └──────┴──────┘
```

TSI recommends performing a Self Check each day before the MITA is used. The purpose of the Self Check is to verify that the MITA is working properly and that mask testing can be performed successfully. The user will be prompted, by the MITA display, for the appropriate connections and/or tasks during each of the Self Check tests.

Note
When the Bladder is being inflated the Aerosol Generator will also run, and aerosol will exit from the Aerosol Mixer.

The results of each Self Check test will be logged. The last Self Check log is then checked for a passing result for the 24 hours prior to running Test Masks.

If there was a problem with the Self Check within the last 24 hours, or the Self Check has not been tested within the last 24 hours, a message will be displayed asking the user to run the Self Check or to skip the Self Check. If the last Self Check passed and the instrument is power cycled within the last 24 hours, repeating the Self Check is not prompted, however it may be appropriate to run the Self Check again if the MITA is reset up or in a different location.
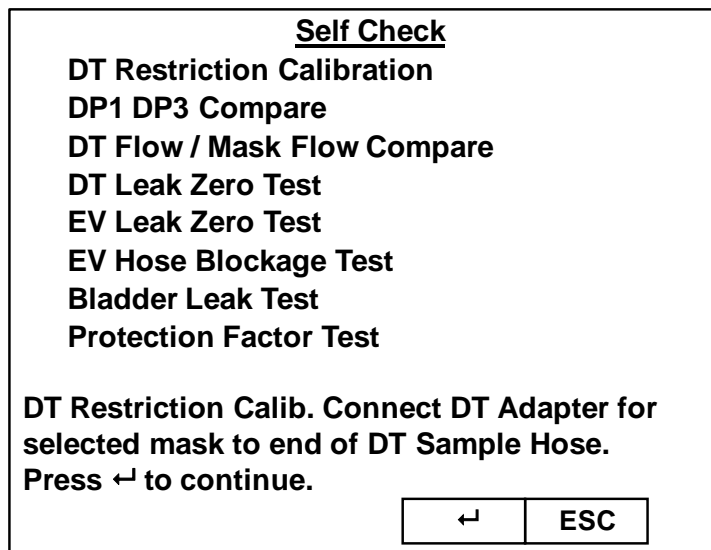
Whether the individual tests performed during the Self Check are enabled or disabled is determined by the Define Mask Protocol menu (Settings

Menu) and the Self Check Parameters menu (Tech Functions). For example, the factory default Mask Test Protocol is "APR," which has the separate DT and EV tests disabled. Because these tests are disabled, the Self Checks will not include additional DT and EV tests. When the "CBRN" Mask Test Protocol is selected, the DT and EV tests are enabled. The Self Checks will then include the DT and EV tests. In the Self Check Parameters menu the "Skip Unused Self Check" must also be set to Enabled.

The numerical value of the test is then compared to the desired pass/fail range for each test, as set in the Self Check Parameters menu, to determine the result of the test.

Starting a Self Check

To start the Self Check option, select **Self Check** from the main menu and press ↵.

```
                      Self Check
         DT Restriction Calibration
         DP1 DP3 Compare
         DT Flow / Mask Flow Compare
         DT Leak Zero Test
         EV Leak Zero Test
         EV Hose Blockage Test
         Bladder Leak Test
         Protection Factor Test


     DT Restriction Calib. Connect DT Adapter for
     selected mask to end of DT Sample Hose.
     Press ↵ to continue.
                                    ┌──────┬──────┐
                                    │  ↵   │ ESC  │
                                    └──────┴──────┘
```

The Self Check starts by zeroing the pressure transducers, the screen momentarily shows the zeroing pressure transducer, and then continues with the following test sequence, with the tests that are enabled:

- Drink Tube Restriction Calibration
- DP1 DP3 Compare
- DT Flow / Mask Flow Compare
- DT Leak Zero Test
- EV Leak Zero Test
- EV Hose Blockage Test
- Bladder Leak Test
- Protection Factor Test

The process for each of these tests is described in more detail later in this section.

The display will indicate the status for each test as either:

- Not Tested
- Test Started
- Test Disabled
- Passed
- Failed
- Test Invalid

Not Tested	Prior to a test being started, the status for each test will be displayed as **Not Tested**.
Test Started	When a test has started, the status is displayed as **Test Started**.
Test Disabled	If a Mask Protocol has a Test Disabled (Settings Menu | Define Mask Protocol), and the Skip Unused Self Checks (Tech Functions | Self Check Parameters) is Enabled, the status will be displayed as **Test Disabled**.
Passed	Upon completion of each test, if the test result is within the desired range, the test status is displayed as **Passed.** The Pass LED will turn on, the status of the test is logged as Passed, and the next test in the Self Check sequence will start.
Failed	Upon completion of each test, if the test result is not within the desired range, the Fail LED will turn on, and the following options to select from are displayed: • Repeat This Test • Fail This Test • Stop Testing Suggest Help (on some tests) If the **Repeat This Test** option is selected the test is run again. The option to restart a test can be selected for as many times as the operator chooses to do so or until the test result is **Passed** or the **ESC**, **Skip This Test**, **Fail This Test**, or **Stop Testing** option is selected. If the **Fail This Test** option is selected, the status for the test is displayed as **Failed**, the status of the test is logged as Failed, and the next test in the sequence will start. If the **Stop Testing** option is selected the MITA will return to the main menu. If **Suggest Help** is selected more information will be provided that may help to identify the cause of the failure. The operator will be prompted to select an option and press ↵ to continue.

Test Invalid	If the **Skip This Test** option is selected, the test will be bypassed and the status of the test result will be displayed as **Test Invalid**, the status of the test is logged as Test Invalid, and the next test in the sequence will start.
	Selecting **ESC** any time during the Self Check will display the options **Skip This Test, Restart this Test,** or **Stop Self Check**.
	If the **Stop Testing** option is selected, the status of the test is logged as "Test Invalid", the remaining tests in the Self Check that have not been tested are logged as **Not Tested**. Any tests that were completed before "Stop Self Check" was selected are logged by their status of the test result. The display will return to the Main Menu.
	When all enabled Self Check tests are finished, the result of the Self Check tests is displayed.
	If the results of the enabled tests are Passed, the Pass LED will turn on.
	If the results of one or more of the enabled tests are **Test Invalid**, the Alert LED will turn on.
	If the result of any enabled test is Failed, the Fail LED will turn on.

Alert Status Indicator

If the result of a test is an Alert, the Alert LED will turn on and the following options to select from are displayed:

- Restart This Test
- Skip This Test
- Stop Testing
- Fail This Test

On certain tests, when the result has an Alert status, there is information displayed to recheck a connection or task that could cause a test to be unable to complete.

The operator will be prompted to select an option and press ↵ to continue.

The following describes the process for each of the Self Check tests.

Drink Tube Restriction Calibration

This test is to calibrate the restriction of the Drink Tube with the DT Adapter.

1. Connect DT adapter to end of DT sample hose.

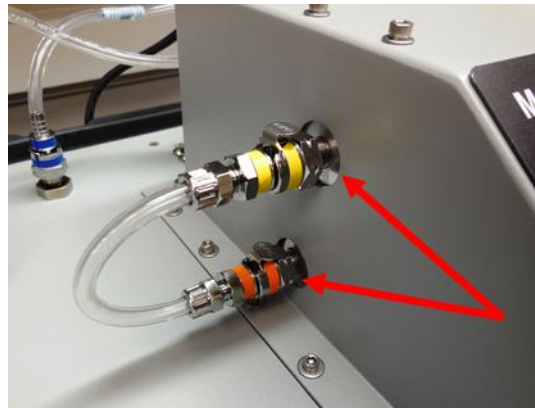2. Press ↵ to continue.

   The DT Sample Hose restriction is measured and the flow is set.

   The result of the DT Restriction Calibration is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start. (The DT adapter can be removed after the DT Restriction Calibration test is complete.)

DP1 DP3 Compare

This test is to compare the pressure transducers to each other.

1. Remove DT and EV sample hoses.

2. Install DT/EV Bypass Hose.

3. Press ↵ to continue.

The pressure is set to 6.00 in H_2O (default) or whatever pressure has been selected by the user in the **Tech Functions** | **Self Check Parameters** menu.

Note
It is recommended that the pressure level remain at 6.00in H_2O during this Self Check test, so that the MITA is tested to the most stringent standards during the Self Checks. Depending on the make and model of the mask being tested, this pressure value may need to be adjusted during the Test Mask portion. The pressure setting for the Test Mask protocol does not affect the pressure setting for the Self Check parameters.

The DP1 vs. DP3 pressure is checked.

The result of the DP1 DP3 Compare is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

Note
If the pressure cannot be set, an alert status is displayed. Turn the Pressure Adjustment Knob (△P) until a pressure of 6.00 in. H_2O (or the value chosen in the Self Check Parameters menu) is displayed on the lower portion of the MITA screen.

DT Flow/Mask Flow Compare

This test is to compare the Drink Tube and Mask Flow to each other.
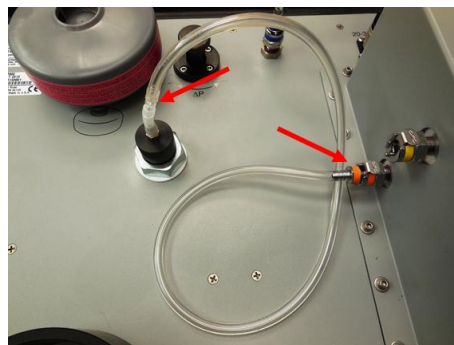
1. Unscrew HEPA Filter Cartridge and screw in the 40/74 mm Mask Filter Plug in its place.

2. Press ↵ to continue

3. Remove the Aerosol Mixer and insert the Mixer Port Stopper into the Aerosol Mixer Port.
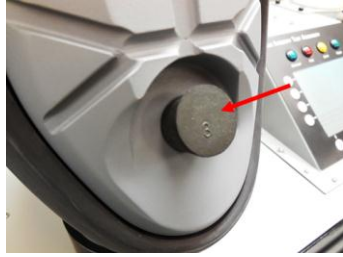

4. Press ↵ to continue.

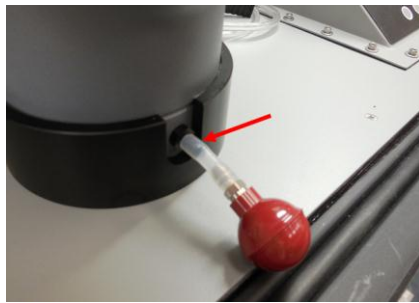5. Plug the DT Sample Hose into the Mixer Port Stopper.

6. Press ↵ to continue.

7. Plug the lower mask inlet on the Headform with the #3 Rubber Stopper. Press firmly.

8. Press ↵ to continue.

9. Remove the Twin Tube sample hose from Headform and install Headform Mask Sample Plug.
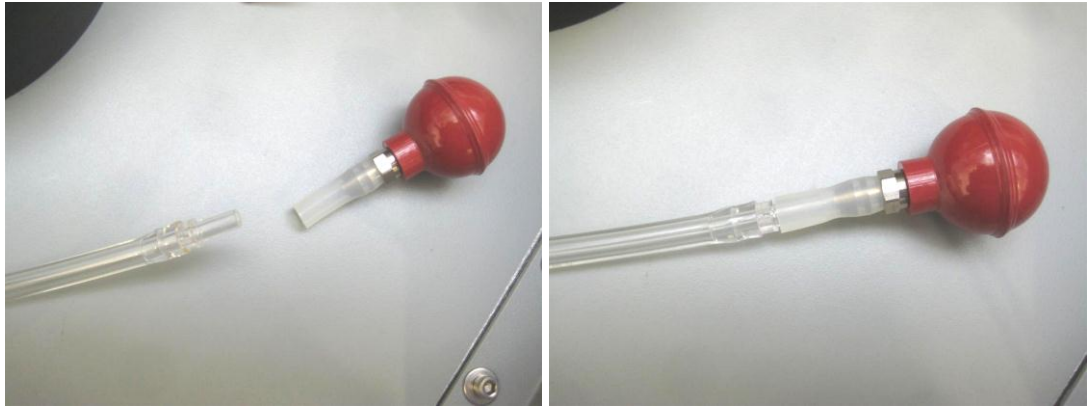

10. Press ↵ to continue.

11. The flow is set. The DT flow and mask flow are then compared.

12. Remove the 40/74mm Mask Filter Plug and reinstall the HEPA Filter Cartridge. Tighten it securely. Press ↵ to continue.

13. Remove all Stoppers installed previously and reinstall the Aerosol Mixer. Press ↵ to continue.

14. Remove the Headform Mask Sample Plug and reinstall the Twin Tube sample hose to Headform Mask Sample Port. Press ↵ to continue.

The result of DT Flow/Mask Flow Compare is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

Drink Tube Leak Zero Test

1. Plug the DT sample hose into the Headform Mask Sample Plug.

2. Press ↵ to continue.

   The vacuum is set and the zero leak is checked.

   The result of the DT Leak Zero Test is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

Exhalation Valve Leak Zero Test

1. Attach the EV adapter to EV Self Check Zero Fixture.

Note
There are different types of EV Adapters. The EV Self Check Zero Fixture is specific to the EV Adapter. The EV Self Check Zero Fixture is provided, along with the EV Adapter, in the MITA Mask Adapter Kits. Refer to instruction guide provided with MITA Mask Adapter Kits for further detail on how to connect the EV and DT adapters.

2. Press ↵ to continue.

   The pressure is set and the zero leak is tested.

   The result of the EV Leak Zero Test is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

Exhalation Valve Hose Blockage Test

1. Make sure the mask end of EV sample hose is not attached to anything.

2. Press ↵ to continue.

3. The blower will start. MITA is now forcing air out through the EV sample hose. The pressure across the EV sample hose must be less than the pass/fail level.

4. The result of the EV Hose Blockage Test is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

5. The DT sample hose and EV adapter can be removed from the self check fixture after the DT and EV leak zero and leak span tests are complete).

Bladder Leak Test

1. Make sure the Headform is installed.

2. Press ↵ to continue.

3. The Headform Bladder is inflated.

Note
When the Bladder is being inflated, the Aerosol Generator will also run, and aerosol will exit from the Aerosol Mixer.

4. Bladder pressure is checked.

5. The result of the Bladder Leak Test is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

Mask Protection Factor

1. Ensure the PortaCount Fit Tester is turned on.

2. Ensure the Twin Tube sampling hose, with a 1 inch relief cut on the blue tube, is plugged into Headform base.

3. Plug Mask Bypass Hose into Headform.

4. Cover the Headform with the Hood.

5. Make sure to cover the Aerosol Mixer but not the HEPA filter cartridge.

6. When the PortaCount Fit Tester has finished warm up, and the procedures discussed in Chapter 3, Set up the PortaCount Respirator Fit Tester are complete, press ↵.

7. The protection factor test runs.

8. The procedure for this test is similar to the procedure outlined under Mask Protection Factor Test in the Test Masks section of this manual.

9. Remove the hood.

10. Remove the Mask Bypass Hose. Press ↵ to continue.

11. The status of the Mask Protection Factor test is displayed, the indicating LED for the test result will turn on, and the status of the test result is logged.

12. The Self Check tests are finished. The results are displayed and the indicating LED for the tests results will turn on.

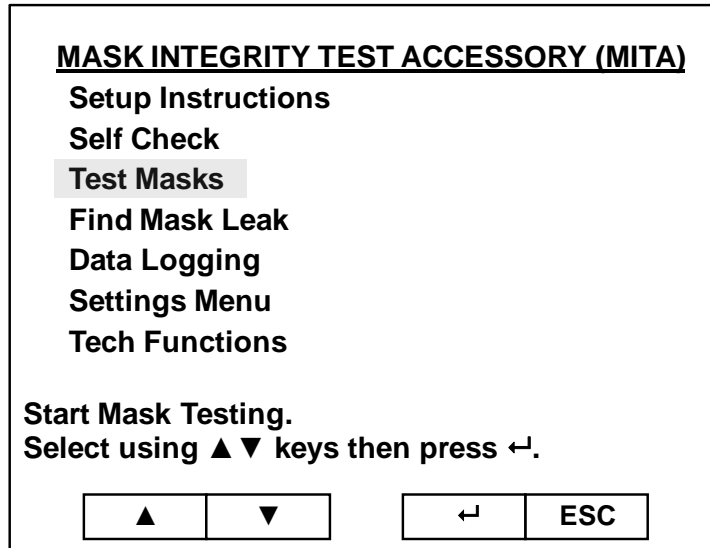13. Press ↵ to continue (this will return to the main menu).

If the overall result of the Self Check is Passed, the unit is ready to continue with Test Masks.

If there is a problem with any of the Self Check tests, identify and correct the problem, then retest. In order for the entire Self Check to be considered a Pass, all of the individual enabled Self Checks must pass without escaping to the main menu during the Self Check process.

CHAPTER 5
Test Masks Procedure

This section describes the information for the Test Masks option from the main menu.

```
 MASK INTEGRITY TEST ACCESSORY (MITA)
   Setup Instructions
   Self Check
   Test Masks
   Find Mask Leak
   Data Logging
   Settings Menu
   Tech Functions

Start Mask Testing.
Select using ▲▼ keys then press ↵.

   ┌─────┬─────┐    ┌─────┬─────┐
   │  ▲  │  ▼  │    │  ↵  │ ESC │
   └─────┴─────┘    └─────┴─────┘
```

For more information on how to prepare the mask and install the mask on the headform prior to test refer to Chapter 3, Prepare Masks for Test.

The mask protocol used for this testing is determined by the mask type. The appropriate mask protocol is selected from **Select Mask Protocol** in the **Settings Menu**.

The mask test sequence and parameters are set by the **Define Mask Protocol** option in the **Settings Menu**. A password is required to access the Define Mask Protocol settings.

If the mask tested does not have a drink tube valve or exhalation valve to be tested then those tests can be disabled according to the **Define Mask Protocol** settings.
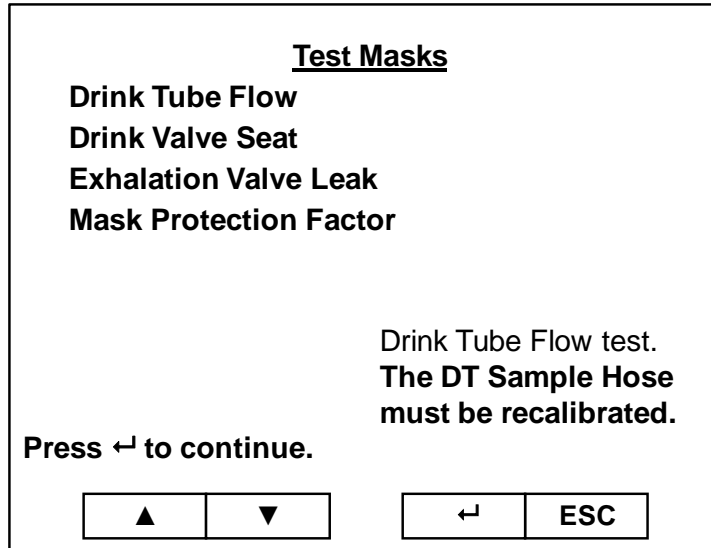
Note
The EV Adapters and DT Adapters discussed in the following Test Masks procedure are provided in the MITA Mask Adapter Kits and are specific to the make and model of the respirator being tested. Refer to instruction guide provided with MITA Mask Adapter Kit for further detail on how to connect the EV and DT adapters.

Test Masks

To select the Test Masks option, select **Test Masks** from the main menu and press ↵.

If the last Self Check test did not pass, or if the Self Check has not been performed since the last power cycle, the message "There are problems with today's Self Check. Perform Self Check?" is displayed, select an option to **Start Self Check**, or **Skip Self Check** and press ↵.

<u>Test Masks</u>

Drink Tube Flow
Drink Valve Seat
Exhalation Valve Leak
Mask Protection Factor

Drink Tube Flow test.
The DT Sample Hose must be recalibrated.

Press ↵ to continue.

| ▲ | ▼ | | ↵ | ESC |

The following test sequence is an example of a typical test sequence for a CBRN gas mask with a drink tube valve and exhalation valve to be tested, this is the default protocol:

- Drink Tube Flow
- Drink Valve Seat
- Exhalation Valve Leak
- Mask Protection Factor

The status for each test will be displayed:

- Test Started
- Test Disabled
- Passed
- Failed
- Not Tested

The following is an example of the Test Masks procedure using the default protocol settings for a mask:

Drink Tube Flow

Not all masks require, or will be able, to have the DT Flow tested. This test should only be performed on applicable masks with exhalation valves that can, and ought to be, tested.

1. Plug DT Sample Hose to internal DT mouthpiece.

Example of DT Sample Hose installed on internal DT mouthpiece. This configuration may vary depending on the mask being tested.

2. Connect DT adapter to external DT valve, press ↵ Instructions displaying where the DT Adapter is to be installed are included with each MITA Mask Adapter Kit.

Example of DT Adapter installed on DT Valve. This configuration may vary depending on the mask being tested.

The flow is set.

The result of the Drink Tube Flow test is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

Drink Valve Seat

Not all masks require, or will be able, to have the DT Valve Seat tested. This test should only be performed on applicable masks with exhalation valves that can, and ought to be, tested.

1. Remove the DT adapter from external DT valve.

2. Keep DT sample hose connected to internal DT mouthpiece. Press ↵.

    The vacuum is set.

    The result of the Drink Valve Seat test is displayed (the DT sample hose can be removed after the Drink Valve Seat test is complete).

Exhalation Valve Leak

Not all masks require, or will be able, to have the exhalation valve tested. This test should only be performed on applicable masks with exhalation valves that can, and ought to be, tested.

Note
When operating the MITA in a low humidity environment is may be necessary to wet the exhalation valve. The masks exhalation valve, when donned by a person under normal operating conditions, would be wetted automatically via the humidity from the person's exhaled breath. Wetting the exhalation valve, under low humidity conditions, will simulate the same effect.

1. Connect EV adapter to mask Exhalation Valve. Instructions displaying where the EV Adapter is to be installed are included with each MITA Mask Adapter Kit.

Example of EV Adapter installed on mask exhalation valve.
This configuration may vary depending on the mask being tested.

2. Keep connected until mask test finished. Press ↵.

   The pressure is set.

   The result of the Exhalation Valve Leak test is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

Mask Protection Factor Test

1. Remove mask filter and install appropriate Mask Filter Plug. Instructions displaying where the Mask Filter Plug and EV Adapter (where applicable) are to be installed are included with each MITA Mask Adapter Kit.

EV Adapter (if applicable)

40/74 mm Mask Filter Plug

Example of Mask Filter Plug and EV Adapter installed on mask. This configuration may vary depending on the mask being tested.

2. If testing a CBRN mask using a typical CBRN Test Mask Protocol, then ensure the EV adapter remains installed on mask during the Protection Factor Test. The majority of commercial masks do **NOT** have an EV adapter, and one is **NOT** used for the Protection Factor Test.

   Press ↵ to continue.

3. Mount Mask to the Headform. Refer to Chapter 3, Prepare Masks for Test for more information.

4. Cover the mask and Headform with the Hood.

Ensure hood covers end of
Ambient Sample Hose (blue)

Ensure Hood covers Aerosol
Mixer, and **NOT** HEPA Filter
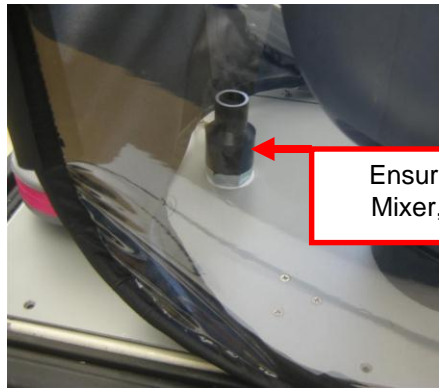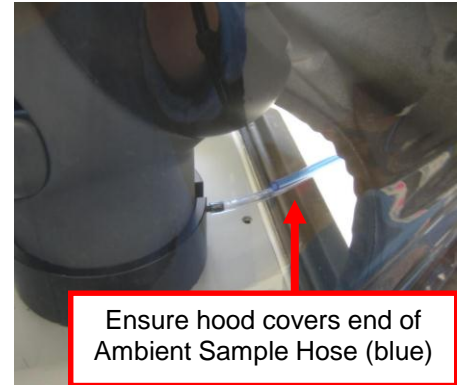
5. Ensure the front of the hood covers end of ambient sample hose (blue)
    and the back of the hood covers the Aerosol Mixer but not the HEPA
    filter. Then press ↵.

    The Mask Protection Factor Test will run.

The Mask Protection Factor Test will go through the following steps:

- Purging mask
- Stabilizing hood particle concentration
- Setting mask flow
- Measuring ambient concentration
- Waiting to sample mask
- Sampling mask
- Preparing to sample ambient
- Measuring second ambient concentration
- The result of the mask protection factor test is displayed

If the Mask Protection Factor Test result is Fail, the operator is prompted to
**Repeat this Test, Probe for Mask Leak, Fail this Test, Test a Different
Mask,** or **Stop Testing**.

The Tests are finished.

The Result for the Mask Test is displayed, the indicating LED for the test result will turn on, the status of the test result is logged, and the next test will start.

```
        TEST MASKS: Mask A
   Drink Tube Flow              Passed
   Drink Valve Seat             Passed
   Exhalation Valve Leak        Passed
   Mask Protection Factor       Passed


                          ┌──────────────┐
                          │ Result for   │
                          │ Mask Test    │
 Tests are finished.      └──────────────┘
 Mark PASSED,
 Press ↵ to test a different mask.

                              ┌──────┬──────┐
                              │  ↵   │ ESC  │
                              └──────┴──────┘
```

The Mask can be removed.

To test a different mask, press ↵.

The Test Masks sequence will repeat, or **ESC** can be selected to return to the Main Menu.

Find Mask Leak

This section describes the information for the Find Mask Leak option from the main menu.

<u>**MASK INTEGRITY TEST ACCESSORY (MITA)**</u>
  Setup Instructions
  Self Check
  Test Masks
  Find Mask Leak
  Data Logging
  Settings Menu
  Tech Functions

Probe the mask to find a leak.
Select using ▲ ▼ keys then press ↵.

▲	▼		↵	ESC

This option is used to identify a leak in a mask. This can be used for troubleshooting a mask that fails the Test Masks test.

Note
Attempt to re-seat the mask to the headform prior to using the Find Mask Leak procedure. Allow the bladder to deflate before re-seating the mask. Reference the instructions found in the <u>Prepare Masks for Test</u> section.

1. To begin the Find Mask Leak option, select **Find Mask Leak** from the main menu and press ↵.

2. Make sure the Aerosol Generator is installed.

3. Disconnect the Aerosol Mixer from the Aerosol Generator output if attached.

4. Plug the Aerosol Wand into the Aerosol Generator output.

5. Press ↵.

6. Ensure the PortaCount Fit Tester is turned on.

7. When the PortaCount Fit Tester finishes warm up, and the steps found in the Setup the PortaCount® Respirator Fit Tester section have been completed, press ↵.

8. Using the aerosol wand, press the button in short bursts (about 1 second) to allow the aerosol to exit, while moving the wand around the mask.

Press button in short bursts (~1 second)
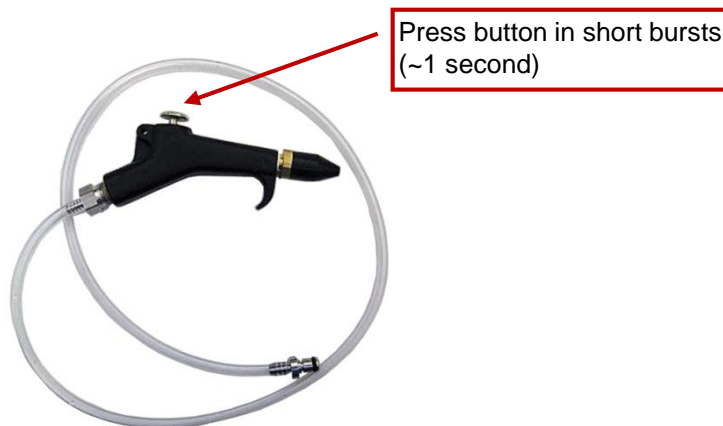
9. Monitor the concentration reading displayed on the MITA screen. As the aerosol enters the leak in the mask, the concentration will increase greatly.

10. Identify and resolve the leak.

    Note: There may be more than one source for a leak.

11. When the concentration does not indicate any further leak, mask can be retested using the Test Masks option.

12. Unplug the aerosol wand from the Aerosol Generator.

13. Reconnect the Aerosol Mixer tubing to the Aerosol Generator output.

14. Press ↵ to continue (this will return to the main menu display).

Data Logging

This section describes the information for the Data Logging option from the main menu.

Note
Data Logging is DISABLED by default. To enable Data Logging refer to the Protected Settings menu.

<div>

MASK INTEGRITY TEST ACCESSORY (MITA)
 Setup Instructions
 Self Check
 Test Masks
 Find Mask Leak
 Data Logging
 Settings Menu
 Tech Functions

Select the data logging functions.
Select using ▲▼ keys then press ↵.

▲	▼		↵	ESC

</div>

To access the Data Logging option, select **Data Logging** from the main menu and press ↵.

```
┌────────────────────────────────────────────┐
│              DATA  LOGGING                   │
│      View Mask Tests                         │
│      Download All Mask Tests                 │
│      View Self Checks                        │
│      Download All Self Checks                │
│      Delete Data                             │
│                                              │
│                                              │
│                                              │
│  Press ↵ to continue.                        │
│                                              │
│                      ┌────────┬────────┐     │
│                      │   ↵    │  ESC   │     │
│                      └────────┴────────┘     │
└────────────────────────────────────────────┘
```
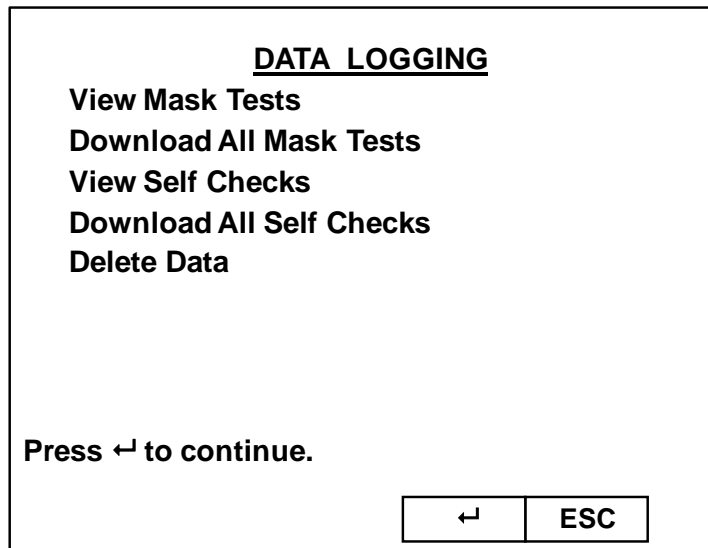
Select one of the following options:

- View Mask Tests
- Download all Mask Tests
- View Self Checks
- Download All Self Checks
- Delete Data

View Mask Tests

This option will display (up to) the last 100 mask tests. Press ↵ to select this option.

The mask tests are saved in a numerical sequence with a time and date stamp. The highest test number is the most recent Mask Test completed. Use the ▲▼ keys to select the **Mask Test** to view and press ↵.

Download All Mask Tests

This option will download all saved Test Masks records to a connected PC. Refer to Chapter 8, MITA Communicator Software for more information.

View Self Checks

This option will display (up to) the last 100 self checks. Press ↵ to select this option.

The results of each Self Check are saved in a numerical sequence with a time and date stamp. The highest test number is the most recent Self Check completed. Use the ▲▼ keys to select the **Self Check** to view and press ↵.

The result for each self check test for the Logged Self Check data will be displayed. Press ↵ to view.

Download All Self Checks

This option will download all saved Self Check records to a connected PC. Refer to Chapter 8, MITA Communicator Software for more information.

Delete Data

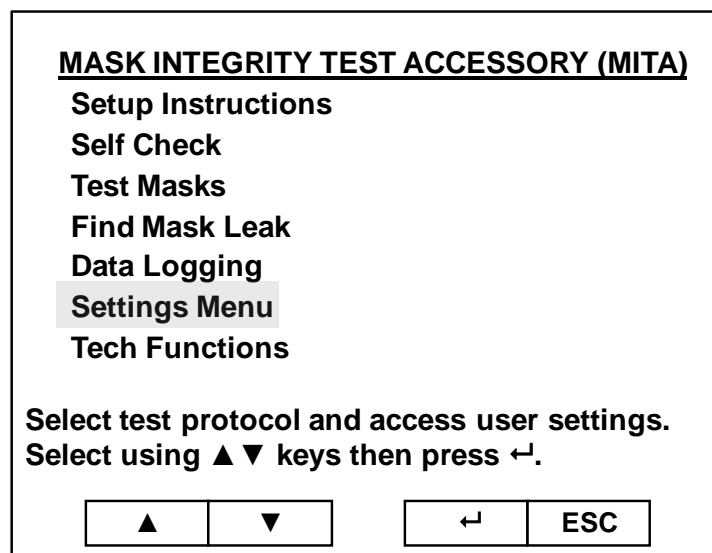This option will allow access to delete Mask Tests and Self Checks logged data. Press ↵ to select this option.

Select from the options the data to delete. There will be a prompt to confirm the deletion before the changes are saved.

User Adjustable Settings

Settings Menu

This section describes the information for the Settings Menu option from the main menu.

<table>
<tr><td>

MASK INTEGRITY TEST ACCESSORY (MITA)

  Setup Instructions

  Self Check

  Test Masks

  Find Mask Leak

  Data Logging

  Settings Menu

  Tech Functions

Select test protocol and access user settings.
Select using ▲ ▼ keys then press ↵.

▲	▼		↵	ESC

</td></tr>
</table>

To enter the Settings Menu option, select **Setting Menu** from the main menu and press ↵.

When **Settings Menu** option is selected, following will appear on the display screen.

```
┌──────────────────────────────────────────────┐
│              SETTINGS  MENU                   │
│     Select Mask Protocol          CBRN        │
│     Define Mask Protocol                      │
│     Upload Mask Protocols                     │
│     Aerosol Gen Settings                      │
│     General Settings                          │
│     Protected Settings                        │
│                                               │
│                                               │
│   Change which protocol is used for mask test.│
│   Select using ▲▼ keys then press ↵.          │
│                                               │
│   ┌──────┬──────┬──────┐  ┌──────┬──────┐     │
│   │  ▼   │  ◄   │  ►   │  │  ↵   │ ESC  │     │
│   └──────┴──────┴──────┘  └──────┴──────┘     │
└──────────────────────────────────────────────┘
```
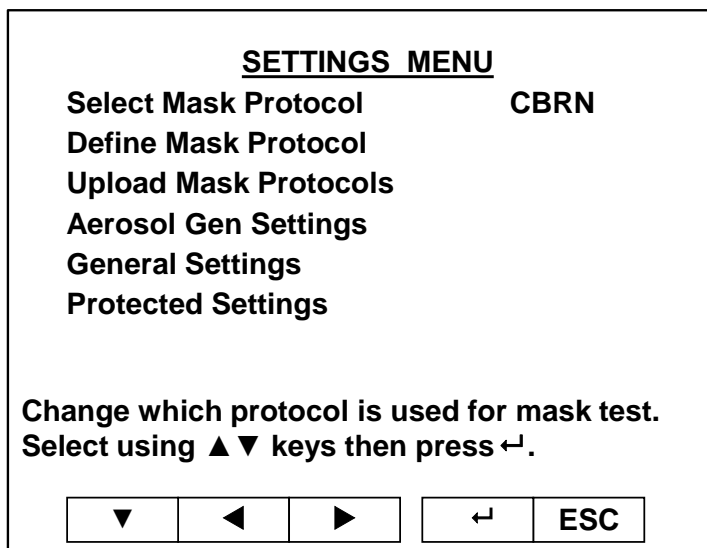
As shown above, the **Settings Menu** gives the following options.

- Select Mask Protocol
- Define Mask Protocol
- Upload Mask Protocols
- Aerosol Generator Settings
- General Settings
- Protected Settings

Each option is described in the following sections.

Select Mask Protocol

Select Mask Protocol allows user to select a mask test protocol from the available options. MITA offers two default protocols; title "CBRN" and "APR". Users may define and save more protocols under a user defined name (See next section – Define Mask Protocol).

When the **Select Mask Protocol** option is highlighted and the ↵ key is pressed, the available Mask Protocol options will be shown on the screen. Any of the options can be highlighted using ▲▼ keys. When the desired option is highlighted, press ↵ key. **Changes Saved** will appear momentarily and screen will returned to the Settings Menu.

MITA also provides the user with some helpful shortcut options. For example, in the Settings Menu, when **Select Mask protocol** is highlighted, one of the available protocol options will be flashing at the right side of the screen. The flashing options can be changed by the use of ◄► keys. Once the desired protocol is flashing, it can be selected using ↵ key. **Changes Saved** will appear momentarily and screen will return to the Settings Menu.

Default Mask Protocol Settings

Mask Tests (Enabled/Disabled)		
	CBRN	**APR**
Drink Tube Test	Enabled	Disabled
Exhalation Valve Test	Enabled	Disabled
Protection Factor Test	Enabled	Enabled

Protection Factor Test Settings		
	CBRN	**APR**
Mask Vacuum	6 in. H_2O	1 in. H_2O
Plug Exhalation Valve	Yes	No
Protection Factor	32,000	3,200

> The default Mask Protocol settings have been defined for general purpose use by TSI. These test settings represent accepted industry standards but are not specific to any regulations.
>
> The default **Protection Factor levels** were calculated by taking the in-mask flow rate of 16 L/min **(**during the Protection Factor Test**)** and dividing this value by the acceptable mask leak rate.
>
> **For example, if a mask had an acceptable leak rate of 0.5 sccm, then to calculate the Protection Factor needed take 16 L/min and divide by 0.5 sccm, which equals 32,000.**

Define Mask Protocol

Select this option to change the test settings for a pre-defined Mask Protocol or define a new mask test protocol mask protocol.

Refer to Chapter 8, MITA Communicator Software for more information on how these protocols can be defined and saved using a PC.

The password required to access this option is "PROTO". Enter the password, and then press SAVE & EXIT .

The following options are available in the **Define Mask Protocol** menu. For each option, MITA then either gives an Enable or Disable option or the option of entering a number.

(Press ↵ to select the option, change the option or enter the value (if required), and press ↵ to make the change):

- **Name Protocol** (Select **User Defined** in **Select Mask Protocol** menu before entering this menu)
    - ○ Press ↵, key pad shows up. Enter the Name for the Protocol using key pad. Press SAVE & EXIT to save the new name.
- **Drink Tube (DT) Test** *(not applicable to all mask types)*
    - ○ Disable or Enable

- **Exhalation Valve (EV) Leak Test** *(not applicable to all mask types)*
  - Disable or Enable
- **Protection Factor (PF) Test**
  - Disable or Enable
- **Set DT Test Parameters**.
  - **DT Flow** (enter value)
    DT flow is controlled by this value during the DT flow test
  - **DT Unplugged Restriction** (enter value)
    For DT restriction below this value, the DT is flagged as not connected
  - **DT Restriction** (enter value)
    For DT restriction above this value, the DT is flagged as blocked
  - **DT Leak** (enter value) (If DT leak measures above this value, the DT fails the leak test). Leak rates values can be set as appropriate for your mask. MITA allows a wide range of leak rates to accommodate a variety of available masks.
  - **DT Full Volume** (enter value)
    Volume of the drink tube from inside the mask up to the automatic drink value
  - **DT Volume to Valve** (enter value)
    Volume of the drink tube from inside the mask up to the manual drink valve (if any)
  - **DT Vacuum** (enter value)
    The DT leak test starts at this vacuum
- **Set EV Test Parameters**.
  - **Exhalation Valve Leak** (enter value). Leak rates values can be set as appropriate for your mask. MITA allows a wide range of leak rates to accommodate a variety of available masks.
  - Exhalation Valve Test Press (enter value)
- **Set PF Test Parameters**.
  - **Bladder Pressure** (enter value)
    - Range is 0.2 psi to 1.8 psi.
  - **Mask Flow** (enter value)
    - Range is 10 L/min to 25 L/min.
  - **Mask Vacuum** (enter value)
    - Range is 1.0 in. H_2O to 6.0 in. H_2O.
  - **Mask Min. Purge Time** (enter value)
    - Range is 5 Sec to 60 Sec.
  - **Mask Max. Purge Time** (enter value)
    - Range is 5 Sec to 60 Sec.
  - **Mask Test Presample Time** (enter value)
    - Range is 10 Sec to 180 Sec.
  - **Mask Min Sample Time** (enter value)
    The mask sample time is shortened if particle concentration is high, but the sample will be at least this many seconds
    - Range is 5 Sec to 120 Sec.

- ○ **Mask Max Sample Time** (enter value)

  If the calculated mask sample time exceeds this many seconds, a low particle concentration warning will be displayed
  - Range is 30 Sec to 600 Sec.
- ○ **Protection Factor** (enter value)

  If the measured Protection Factor is less than this value, red fail turns on. If the measured Protection Factor is higher than this value, green pass light turns on.
  - Range is 1 to 999,000 (but could be limited by ambient concentration)
- ○ **Mask Sample CV** (select 0.05 or 0.10)

  Coefficient of Variation for the mask sample, Lower CV is more accurate but at lower particle concentrations will lengthen mask sample time
- ○ **Plug Exhalation Valve** (enter value)

  Controls whether the Exhalation Valve (EV) must be plugged during Protection Factor Test
  - No or Yes
- ○ **Mask Sample Time Notes**

  This menu option provides information on how the Mask Sample Time is calculated and describes the conditions that will effect this value. For more detailed information on this calculation refer to the text found under this menu option on the MITA unit.

  The Mask Sample Time, is the time in which a sample is taken from inside the mask during the Mask Protection Factor Test, the length of time is calculated from:
  - The required mask protection factor. (PF)
  - Ambient aerosol concentration.
  - The required accuracy of the mask sample (CV).

Note
• A higher PF setting may cause the Mask Sample Time to be extended, and the overall test process may take longer.
• A lower CV setting (more accuracy) may cause the test to be longer
• A higher aerosol concentration allows the test to be shorter.

- **Manual Drink Tube valve**
  - ○ No or Yes (Yes if there is a manual valve on the drink tube assembly)

Upload Mask Protocols

This function allows the user to upload a Test Mask Protocol, which was created via the MITA menu interface, to a PC with the MITA Communicator Software installed, where it can then be saved to the PC's memory. Note, this function does require the MITA to be connected to a PC.

Refer to Chapter 8, MITA Communicator Software for more information on this function.

The password required to access this option is "MITACOM". Enter the password, and then press **SAVE & EXIT**.

Aerosol Generator Settings

Select this option to set the operating parameters of the Aerosol Generator. The Aerosol Generator is used to generate aerosol during the Self Check, **Test Masks** and **Find Mask Leak** procedures. The Aerosol Generator Pump *Voltage* is the voltage setting of the pump that supplies compressed air to the aerosol generator. Pump voltage directly relates to aerosol concentration produced, and increase in voltage will increase the aerosol concentration. This menu also allows the operator to set two different Aerosol Generator Pump Voltage values:

1. Aero Gen Pump V: Purge

2. Aero Gen Pump V: Test

The purpose of these two voltage settings is to stabilize the aerosol concentration during the Mask Test. It is very desirable that the aerosol concentration measured at the beginning of the Protection Factor test and at the end of the Protection Factor test are similar. This is achieved by setting the "Aero Gen Pump V: Test" slightly (about 1.25 volts) lower than the **"**Aero Gen Pump V: Purge" voltage.

The recommended ambient aerosol range during operation is 100,000 pt/cc to 300,000 pt/cc.

These voltage values may need to be adjusted depending on the ambient temperatures, especially in colder environments. Use the real-time particle concentrations displayed on the screen to determine which voltage settings are best for each particular environment. While tuning the voltage settings, target a concentration of 150,000 pt/cm^3. An effective technique is to first remove the hood from the headform and allow the concentration inside to deplete. Make an incremental change to the pump voltage (~0.20 V) and replace the hood. Allow the concentration inside the hood to stabilize for one to two minutes afterwards. Repeat this process until the desired concentration is reached.

Aero Gen Pump V: Purge

This is the voltage setting during the mask purge cycle. At the beginning of each Test Mask function, the blower voltage is set to maximum voltage in order to blow about 50 liters per minute of air though the mask. This is called the mask purge cycle. The air from the mask is mixed with the output of the Aerosol Generator and this mixture is supplied to the Hood.

Since the volume of the hood is about 10 liters, it takes about 12 seconds to get one air exchange. For this reason, the aerosol concentration continues to build up inside the hood. After about 30 seconds, the blower voltage is set to the "sample mask" mode. In this mode, the blower is supplying about 16 liters per minute of clean air to the mask, the voltage setting for this mode is determined by the "Aero Gen Pump V: Test" value. This air then exits the mask and mixes with the output of the aerosol generator and enters the Hood.

Aero Gen Pump V: Test

This is the voltage setting during the mask sampling or "sample mask" mode. Normally this will be about 1.25 volts lower than the "Aero Gen Pump V: Purge". The difference between two voltage settings can be adjusted to assure similar aerosol concentration at the beginning and at the end of the mask sampling. If the aerosol generator voltages were kept at same value, the aerosol concentration inside the hood would continue to build up during the mask test cycle. If this were to occur, the aerosol concentration at the end of the mask test would be significantly higher than at the beginning of the mask test. This is avoided by reducing the Aerosol Generator Pump V slightly.

Note
Voltage levels may need to be adjusted to accommodate different ambient and environmental conditions

General Settings

This option allows the operator to make changes to the General Settings.

The following General Settings are user adjustable (press ↵ to select the setting, change the option or enter the value (if required), and press ↵ to make the change.):

- **Beeper**
  - Disable or Enable
- **Contrast**
  - 1 through 10
- **Set Time** (used to time stamp the logged data)
- **Set Date** (used to time stamp the logged data)
- **Time Format**
  - 12 hr option is AM or PM Format , 24 hr option is 00:00 to 23:59 Format
- **Date Format**
  - Three options available - MM/DD/YY, DD/MM/YY or YY/MM/DD
- **Select Units**
  - Temp. (°F or °C)
  - Pressure (in. H_2O, Pa, hPa, kPa, mm. Hg, cm. Hg, in. Hg, mm. H_2O, or cm. H_2O)
  - Baro Press (in. Hg, hPa, kPa, mm. Hg, cm. Hg, cm. H_2O, or in. H_2O)
- **Number Format**
  - Two options available – XX,XXX.YY or XX.XXX,YY
- **Show Protection Factor**
  - Disable or Enable (Displays current setting, adjustable in Protected Settings menu)
- **Allow Skip 2nd Ambient**
  - Disable or Enable (Displays current setting, adjustable in Protected Settings menu)
- **Logging Enable**
  - Disable or Enable (Displays current setting, adjustable in Protected Settings menu)
- **Logging Report Enable**
  - Disable or Enable (Displays current setting, adjustable in Protected Settings menu)
- **Data Report Length**
  - Short or Long (Displays current setting, adjustable in Protected Settings menu)

Protected Settings

This option will allow access to make changes to the Protected Settings.

The password required to access this option is "SHOWPF". Enter password and then press **SAVE & EXIT**.

The following Protected Settings are user adjustable (press ↵ to select the setting, change the option or enter the value (if required), and press ↵ to make the change.):

- **Show Protection Factor**
  ○ Disable or Enable
- **Allow Skip 2nd Ambient**
  ○ Disable or Enable
- **Logging Enable**
  ○ Disable or Enable
- **Logging Report Enable**
  ○ Disable or Enable
- **Data Report Length**
  ○ Short or Long

Tech Functions

This section describes the information for the Tech Functions option from the main menu.

```
┌─────────────────────────────────────────────┐
│  MASK INTEGRITY TEST ACCESSORY (MITA)        │
│    Setup Instructions                        │
│    Self Check                                │
│    Test Masks                                │
│    Find Mask Leak                            │
│    Data Logging                              │
│    Settings Menu                             │
│    Tech Functions                            │
│                                              │
│  Advanced functions to test and adjust the MITA. │
│  Select using ▲▼ keys then press ↵.          │
│                                              │
│      ┌──────┬──────┐     ┌──────┬──────┐     │
│      │  ▲   │  ▼   │     │  ↵   │ ESC  │     │
│      └──────┴──────┘     └──────┴──────┘     │
└─────────────────────────────────────────────┘
```

The Tech Functions values are set by the manufacturer. The typical user would not have need to access to the Tech Functions menu.

From the Main Menu select the Tech Functions option and press ↵

The password required to access this option is "TSI". Enter the password then press **SAVE & EXIT**.

The following Menu options are accessed in the Tech Functions menu.

- [Calibration](#)
- [Manual Controls](#)
- [View Measurements](#)
- [Self Check Parameters](#)
- PF Array Test Print
- PF Concentration Test Print
- UART0 CTS enable
- UART0 CTS state
- UART0 baud rate
- UART3 baud rate (UART3 is used to interface to a future accessory device)
- Pump Run Hours
- Pump Hours Weighted
- Reset Pump Run Hours
- Blower Run Hours
- Reset Blower Run Hours
- Test LEDs
- Restore Mask Protocols
- Restore Self Check Parameters
- Restore User Configuration
- Set MITA Serial Number

The following describes the information for each of the Tech Functions option.

To access a given option, select it with the ▲▼ keys, and press ↵.

Most of the options are self-explanatory and are not described below. The options that require more clarifications are described below.

Calibration

This menu is used to save the calibration values of the components used in MITA. Select the calibration parameter to change with the ▲▼ keys, change the value by pressing ↵ or using the ◄► keys, and press ↵ to save change.

- Set DT Leak Test Volume (enter value) liters
- Set EV Leak Test Volume (enter value) liters
- DT Flow Calibration Factor (enter value)
- Mask Flow Calibration Factor (enter value)
- Thermistor J201 Offset (enter value) °F
- Thermistor J202 Offset (enter value) °F
- Barometric Pressure Calib (enter value) in.Hg
- Pressure Sensor DP1 Calib (enter value)
- Pressure Sensor DP3 Calib (enter value)
- Pressure Sensor DP5 Calib (enter value)

Manual Controls

This menu is used primarily to troubleshoot MITA. Each component of the MITA can be independently exercised and the result observed.

Select the option to control:

- Apply Manual Settings (press ↵ to Apply Manual Settings)
- Zero Pressure Sensors (press ↵ to Zero the Pressure Transducers)
- Turn Purge On (press ↵ to Turn Purge On)
- Turn Purge Off (press ↵ to Turn Purge Off)
- Bladder Inflate (press ↵ to Inflate the Bladder)

For the following options the operator must select **Apply Manual Settings** and press ↵ to make the control change take effect. "**Manual settings have been applied**" will display momentarily and then MITA will return to the **MANUAL CONTROLS** menu.

- Pump Mode (press ↵ to toggle between Off, Fixed V, DT Restriction, DP1 vs. DP3, DT Flow Actual, DT Flow Std, DT Leak Ctrl, Bladder Infl, or V Rising)
- Pump Control Value (press ↵ to set value, This setting must be entered if pump mode set to DT Flow Control, DT Leak Control, or Bladder Inflation)
- Pump Control Voltage (press ↵ to enter the pump control voltage)
- Blower Mode (press ↵ to toggle between Off, Fixed V, Full On, Mask Flow Ctrl, EV Press. Ctrl, and DP3 Ctrl)
- Blower Control Value (press ↵ to set the Blower Control Value, this setting must be entered based on the Blower Mode selected previously)
- Blower Voltage (press ↵ to enter voltage)
- Valve 1 (press ↵ to toggle between Off and On)

- Valve 2 (press ↵ to toggle between Off and On)
- Valve 3 (press ↵ to toggle between Off and On)
- Valve 4 (press ↵ to toggle between Off and On)
- Valve 5 (press ↵ to toggle between Off and On)
- Valve 6 (press ↵ to toggle between Off and On)
- Valve 7 (press ↵ to toggle between Off and On)
- Valve 8 (press ↵ to toggle between Off and On)

View Measurements

Select this option to view the current measurements of the instrument.

Self Check Parameters

This menu allows the operator to change the parameters used for *pass/fail* values during the MITA Self Check function described in Chapter 4, Self Check Procedure.

Adjust the following values using ◀ ▶ keys then press ↵ to save those changes.

- **Skip Unused Self Checks** (select Enabled or Disabled)

  For skipping those Self Checks tests which are not utilized based on the mask configuration, or the defined Test Masks protocol.

- **DT Sample Hose Max** (enter value) in.H_2O

  For DT sample tube restriction above this value, the DT sample tube is flagged as blocked

- **DT Sample Hose Min** (enter value) in.H_2O

  For DT restriction below this value, the DT sample tube is flagged as unplugged

- **DP1-DP3 Target Pressure** (enter value) in.H_2O

  The pressure transducers will be compared at this pressure

- **DP1-DP3 Tolerance** (enter value) %

  To pass the self check, the pressure transducers must compare within this tolerance

- **DT / Mask Target Flow** (enter value) SLPM

  The flowmeters will be compared at this flow)

- **DT / Mask Flow Tolerance** (enter value) %

  To pass the self check, the flowmeters must compare within this tolerance

- **DT Flow Temp Coefficient**

  For information/troubleshooting purposes only.

- **Mask Flow Temp Coefficient**

  For information/troubleshooting purposes only.

- **DT Target Vacuum** in.H_2O

  The DT leak test starts at this vacuum

Mask Integrity Test Accessory (MITA) Model 8120

- **DT Zero Leak Volume** (enter value) cc.

  Volume of the drink tube zero leak

- **DT Zero Leak Max** (enter value) sccm

  If leak measures above this value the test fails

- **EV Target Pressure** in.H_2O

  The EV leak test starts at this pressure

- **EV Zero Leak Max** (enter value) sccm

  If leak measures above this value, the test fails

- **EV Blockage Press** (enter value) in.H_2O

  If backpressure measures above this value, the test fails

- **Bladder Test Pressure** (enter value) psi

  The starting pressure the bladder is inflated to during the bladder self check

- **Bladder Inflate Time** (enter value) sec

  The maximum time allowed for the bladder to inflate during the bladder self check

- **Bladder Decay Pressure** (enter value) psi

  The maximum pressure the bladder is allowed to decay during the bladder self check

- **Bladder Decay Time** (enter value) sec

  The time allowed for the bladder pressure to decay during the bladder self check

- **Mask Min. Purge Time** (enter value) sec

  The minimum time required to purge the mask of aerosol concentration

- **Mask Max. Purge Time** (enter value) sec

  The minimum time required to purge the mask of aerosol concentration

- **Mask Test Presample Time** (enter value) sec

  The Mask PF test will delay for this may seconds before staring the mask sample

- **Mask Min Sample Time** (enter value) sec

  The Mask PF test will sample the mask port for at least this many seconds

- **Mask Max Sample Time** (enter value) sec

  If the calculated mask sample time exceeds this many seconds, a low particle concentration warning will be displayed

- **Mask Test Flow** (enter value) L/min

  The Mask PF test will run at this flow

- **Mask Vacuum** (enter value) in.H_2O

  The Mask PF test will run at this vacuum

- **Protection Factor** (enter value)

  The Mask PF must read at least this high to pass the self check using Mask Bypass Adapter

The Tech Functions that require less clarification are mentioned in the table below.

Press Array Test Print	Press ↵ to enable a special test printout of leak test pressures, transmitted through UART0.
PF Concentration Test Print	Select whether to transmit ambient aerosol concentration on UART0 during mask Protection Factor test.
UART0 CTS enable	Select **Enable** when using a COM port to interface MITA to a computer. Select **Disable** when using the USB-to-Serial converter.
UART0 CTS state	Displays transmit state to PC on UART0.
UART0 Baud Rate	Set the MITA baud rate and the computer baud rate to match when using a COM port to interface MITA to a computer. Also note on the computer, Flow Control should be set to "Hardware"
UART3 Baud Rate	(reserved for future use)
Pump Run Hours	Counts total hours of pump operation
Pump Hours Weighted	Counts hours of pump operation, weighted by the pump operating voltage.
Reset Pump Run Hours	Press ↵ to reset pump run hours
Blower Run Hours	Counts total hours of blower operation
Reset Blower Run Hours	Press ↵ to Reset the Blower Run Hours
Test LEDs	Press ↵ to test the LEDs. The Name of the LED will be displayed and its LED will light. After the LED is lit, it will stay on until all the LEDs are tested.
Restore Mask Protocols	Press ↵ to erase all changes made to mask test protocols and restore mask test protocols to factory defaults.
Restore Self Check Parameters	Press ↵ to erase all changes made to self check parameters and restore self check parameters to factory defaults.
Restore User Configuration	Press ↵ to erase all changes made to user configuration and restore user configuration to factory defaults.
Set MITA Serial Number	Press ↵ to change the serial number displayed when the MITA is first powered on.

Mask Integrity Test Accessory (MITA) Model 8120

CHAPTER 7
Maintenance

Suggested Maintenance Schedule for Routine Maintenance Operations

Maintenance Operation	Frequency	User/Factory
Perform Self Check	Daily	User
Refill oil in Aerosol Generator	Daily or As Needed	User
Dump oil from Aerosol Mixer	Daily	User
Replace HEPA Filter Cartridge	Annually or As Needed	User
Clean Hood	Monthly	User
Wash Off Oil Residue	As Needed	User
Replace Headform Bladder	As Needed	User
Recalibrate MITA Unit	Annually	Factory
Clean PortaCount Ambient Sample Port Inlet screen	Monthly	User

Cleaning of the hood and washing off of the oil can be accomplished with soapy water or other various non-corrosive commercially available cleaning fluids. There are no specific recommended procedures.

Cleaning of the inlet screen is recommended to remove any accumulation of oil. The steel screen assembly is located behind the Ambient (blue) Sample port. Remove the Port by turning it counterclockwise. The screen can be pulled out using the wooden dowel supplied with the spare screens in the PortaCount Fit Tester accessory kit. Do **NOT** damage the gasket by using sharp objects. Use clean compressed air to blow oil away from the end of the screen. Replace the screen using the dowel. Make sure it is fully inserted and replace the Ambient port, screwing clockwise until tight.
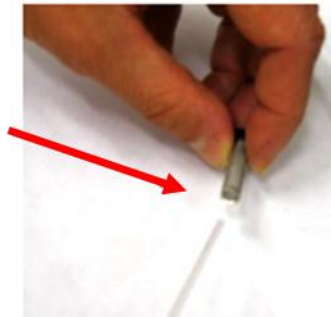
Consumable Parts

Description	Part Number	Item
Emery Oil™ Container – 500 ml (Poly-Alpha Olefin)	801776	
HEPA Filter Cartridge (1 installed on Main Panel, 1 spare)	801772	

Replacement Parts

Description	Part Number	Item
Bladder Kit (includes 1x Bladder, 2x Face Sampling Gaskets, 3x Headform base O-rings)	801769	
Aerosol Generator Mounting Bracket and Thumbscrews (Qty 4)	801789	
Headform Sample Fitting *Refer to MITA Accessory Kit, P/N 801777 Replacement Parts*		
Fuse - 250V, 8.0A If the fuse (qty. 1 used) needs to be replaced, first identify the original fault, before replacing.	Not available from TSI	

Description	Part Number	Item
MITA Accessory Kit (includes Headform Mask Sample Plug, 40/74mm Mask Filter Plug, #1 & #3 Rubber Stoppers, Mask Bypass Hose, MITA Twin Tube, DT Sample Hose, DT/EV Bypass Hose, and Aerosol Mixer.)	801777	

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Mask Integrity Test Accessory (MITA) Model 8120

CHAPTER 8
MITA Communicator Software

Introduction

The MITA Communicator software is designed to be used with the model 8120 Mask Integrity Test Accessory. MITA Communicator software features include:

- Ability to easily create and manage multiple mask protocols.

- Uploading from the PC and/or downloading from the MITA user created mask protocols.

- Downloading saved Mask Test records and Self Check records from MITA to the PC.

Contents of MITA Communicator Software CD-ROM

- MITA Communicator software installation files.

- MITA Communicator software User's Manual in PDF format.

- Links to the TSI web site (http://www.tsi.com).

Installation

A personal computer running Windows® XP (32-bit), or Windows® 7 (32-bit and 64-bit) operating system is required to install the MITA Communicator software. **Only an Administrator can install the MITA Communicator software**.

1. Insert the CD-ROM "*MITA Communicator Software CD*" into a CD-ROM drive.

Note
The CD should automatically start running after about 30 seconds. If it does not, select **My Computer** and view the root folder on the CD. Double-click the file "**autorun.exe**."

2. The following screen will display:
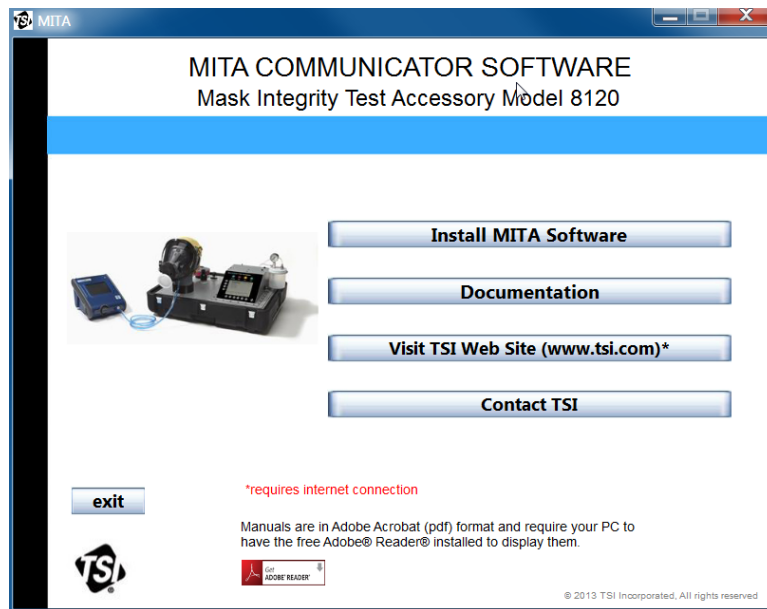
® Windows is a registered trademark of Microsoft Corporation.

Mask Integrity Test Accessory (MITA) Model 8120

3. When the main installation screen appears, click on **Install Software**. The following screen will display:
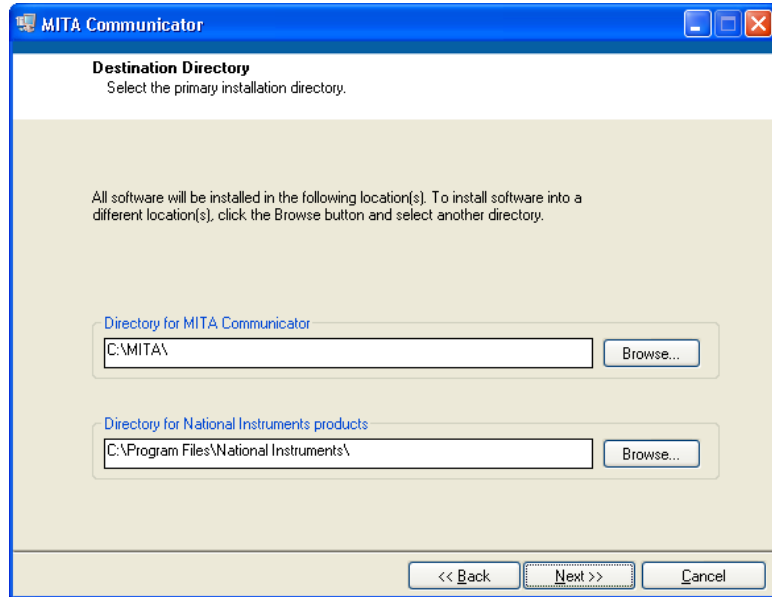
4. Either accept the default installation folder as displayed, or choose a different preferred installation location. TSI recommends that you accept the default location.

5. Select **Next** and the following screen will display:
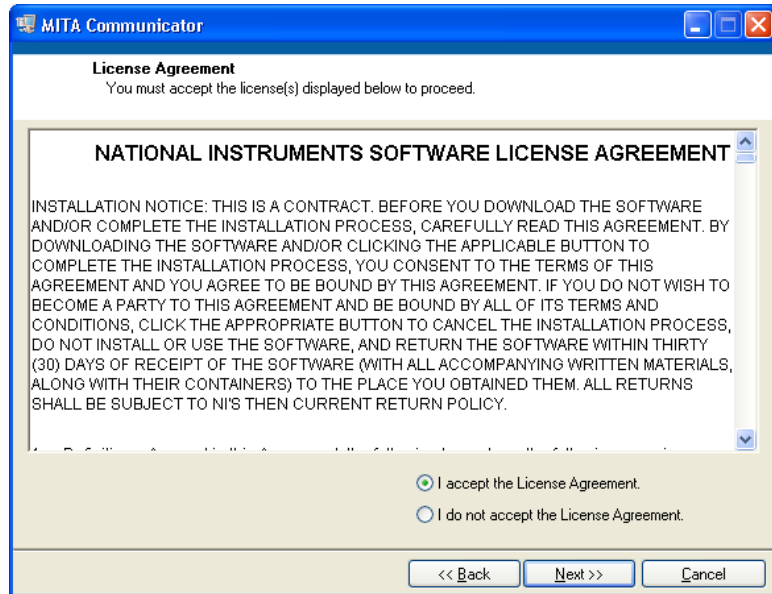
6. Select **I accept the terms of the License Agreement**.

7. Select **Next**. A similar screen will appear with the TSI license agreement, repeat this step. After both license agreements screens, the following screen will display:
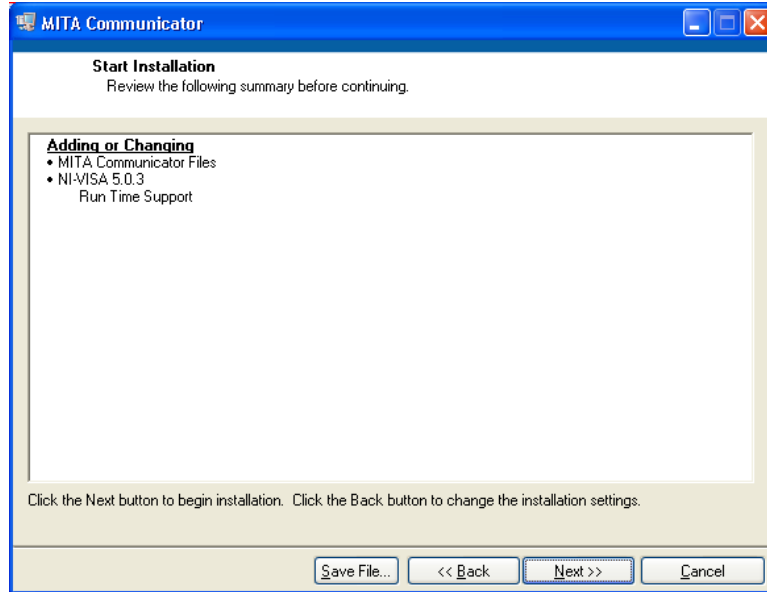
8. Select **Next**. The next screen will display the progress of the MITA Communicator installation.

9. Once the installation is complete, the following will display:
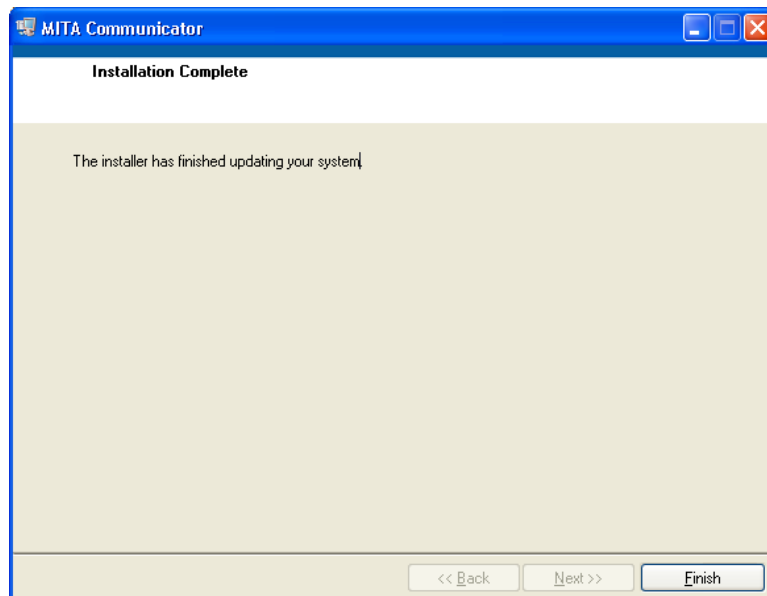
10. Select **Finish** and the following screen will display:

MITA Communicator

You must restart your computer to complete this operation.

If you need to install hardware now, shut down the computer. If you choose to restart later, restart your computer before running any of this software.

[Restart]   [Shut Down]   [Restart Later]
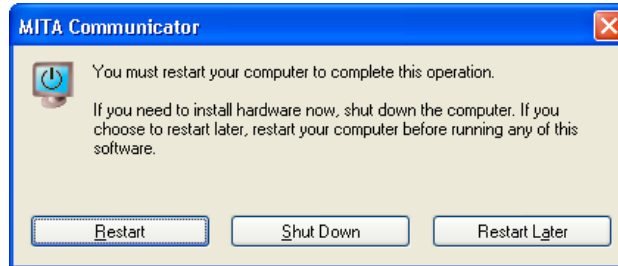
11. Restart computer to finish installing MITA Communicator software.

MITA to PC Communications Configuration

Setup

1. Remove the dust cap on the Computer connector on the back of the MITA. Install the green MITA computer cable.

2. Connect this cable to the 9-pin (male) COM (RS232) port on the personal computer (PC). If the PC does not have a 9-pin serial connector then use the USB to Serial converter to connect with a USB port. Install the drivers for the converter following the instructions located in Appendix C.

3. Turn the MITA on. Select and open the Tech Functions menu. The password required to access this menu is "TSI". Enter the password then press **SAVE & EXIT**.

   Configure Tech Functions menu as follows:

   - If USB to Serial converter is not used, set UART0 CTS Enable to ENABLE.

   - If USB to Serial converter is used, set UART0 CTS Enable to DISABLE.

4. Ensure the UART0 Baud Rate on the MITA Tech Functions screen matches that shown in the MITA Communicator Software Setup tab. The factory default for both settings is 115200. For slower PCs the Baud rate may need to be lowered in both locations to ensure data records are transmitted properly.

5. Determine the COM Port number assigned by the PC to the USB-to-Serial connection. Locate Ports (COM & LPT) in Device Manager. To access Device Manager for Windows® XP operating system, go to Start menu and right-click on **My Computer** to access System Properties. On the Hardware tab of the System Properties window select **Device Manager.** To access Device Manager for Windows® 7 operating system, go to **Start | Control Panel | Device Manager.**
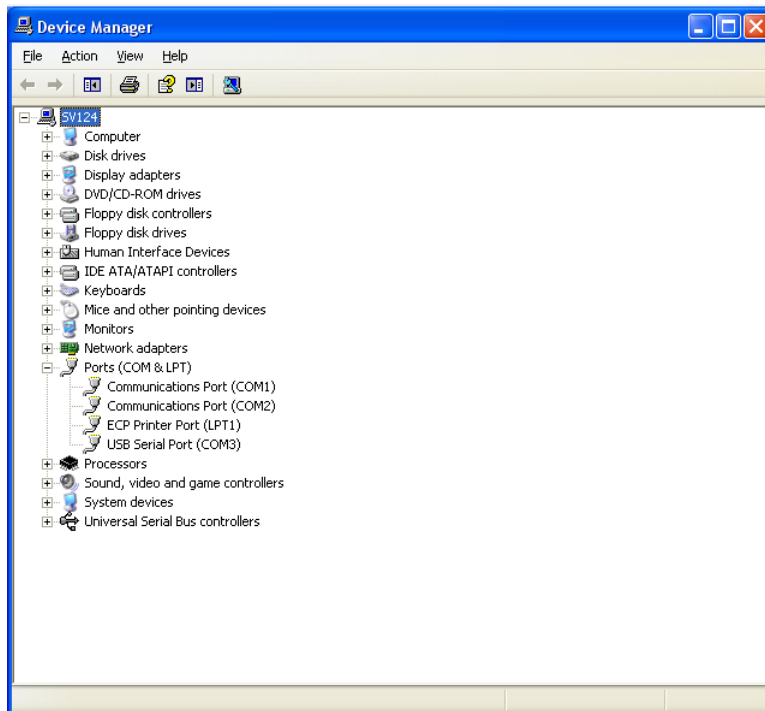
6. Right-click on the COM port associated with the USB-to-Serial converter and make sure Flow Control is set to **Hardware**.

7. Locate the MITA icon on your Windows® desktop or select **Programs** from the Start menu then go to MITA Communicator and select **MITA.** Informational window on MITA Communicator asks to select "UPLOAD MASK PROTOCOLS" screen on MITA and enter the password. The password for "UPLOAD MASK PROTOCOLS" screen on MITA is "MITACOM". Select **OK** to proceed.
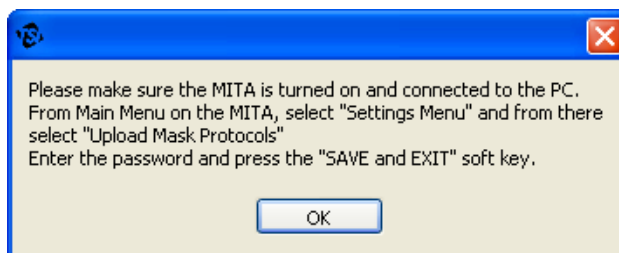
8. Go to the Setup tab and verify the COM Port number.
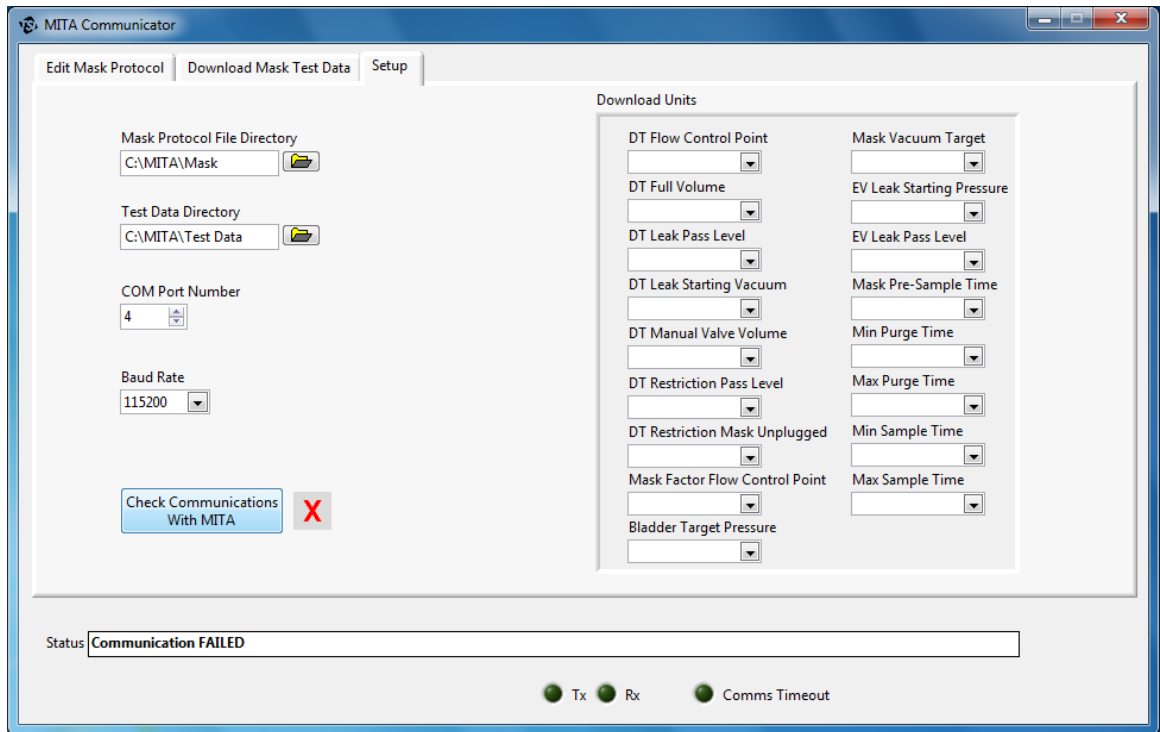
9. Press the **Check Communications with MITA** button to initiate communication. A green check should appear momentarily.
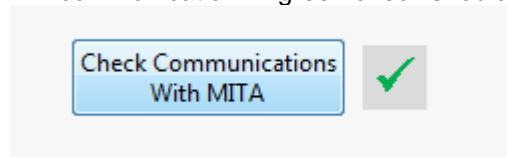
10. Exit MITA Tech Functions and proceed with the Settings Menu options described in the Software Operation section.

Software Operation

1. Ensure MITA is turned on and connected to the PC.

2. To open the MITA Communicator software, locate the MITA icon on your Windows® desktop or select **Programs** from the Start menu then go to MITA Communicator and select **MITA**.

3. When MITA Communicator software starts it displays the following informational window. Select **OK** to proceed.
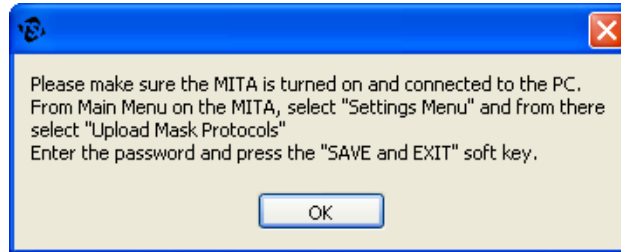
4. Communication can be verified from the Software Setup tab. Press on **Check Communications with MITA** and verify the green check mark momentarily appears. If the green check mark never appears, make sure the configuration steps outlined in the MITA to PC Communications Configuration section are complete.
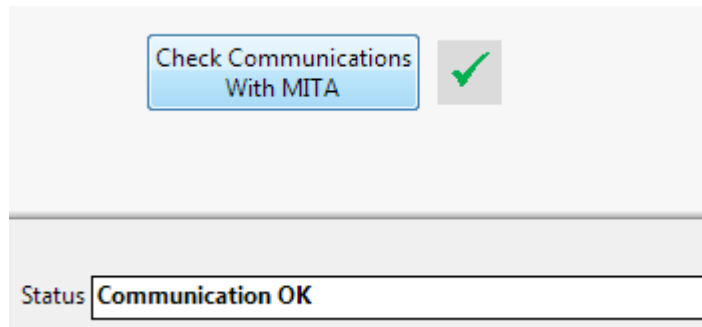
5. Proceed to use the MITA Communicator software functionality: Download Mask Test data or Edit Mask Protocols. Note that the software will report "Error in communicating with MITA" when MITA is not on the expected screen and it will prompt for the correct screen.

Download Mask Test Data

The Download Mask Test Data tab in the MITA Communicator software allows the user to download logged Test Mask data and logged Self Check data from the MITA device.

Download All Tests from MITA	Downloads all of the Mask Test and Self Check data logged on the MITA device.
Save Mask Test Data to File	Saves the Mask Test data and the Self Check data to a ".TSV" (Tab Separated Values) file. This file can then be imported into various commercially available spreadsheet programs.

Edit Mask Protocol

The Edit Mask Protocol tab in the MITA Communicator software allows the user to create new, and edit existing, Test Mask protocols. These user defined protocols can then be uploaded to, or downloaded from, the MITA device. The Edit Mask Protocol screen will be blank when first opening this tab in MITA Communicator, or after pressing the **New Mask Protocol** button.

Note: *These options are password protected on MITA, refer to [Chapter 6: User Adjustable Settings](#) for passwords and additional information.*

Select Mask Protocol Name	Select previously saved Test Mask protocols from the drop down menu.
New Mask Protocol	Clears all Test Mask protocol fields so that a new protocol can be created.
Download Mask Protocol from MITA	Downloads current Test Mask protocols saved on the MITA device to the MITA Communicator software.
Upload Mask Protocol to MITA	Uploads current Test Mask protocols from the MITA Communicator software to the MITA device.
Read Mask Protocol from Disk	Populates the Test Mask protocol fields with test parameters from protocols saved on the PC.
Save Selected Mask Protocol to Disk	Saves selected Test Mask protocol to the PC under the "Mask Protocol" folder (by default). When a Test Mask protocol is saved to disk, it is saved under the same name as "Mask Protocol Name" given in the Setting column of the Mask Protocol Name row. All parameters in the Edit Mask Protocol tab can be edited. In order to save a Test Mask protocol to disk under a new name, edit the Mask Protocol Name field in the Setting column and then press the **Save Selected Mask Protocol to Disk** button.

CHAPTER 9
Packing and Shipping

1. Remove the Hood.

2. Wipe off any oil residue from the Hood.

3. Collapse the Hood.

4. Disconnect the Twin Tube sample hose from the Headform.

5. Disconnect the power and communication cables to the PortaCount Fit Tester.

6. Remove the Headform.

7. Disconnect the Aerosol Generator (when storing, the aerosol generator must be stored dry and empty, so the oil doesn't leak into the MITA. The oil from the Aerosol Generator can be returned to the Emery Oil Container).

8. Disconnect the DT sample hose.

9. Disconnect the EV Adapter.

10. Disconnect the PortaCount Fit Tester cable.

11. Disconnect the power supply.

12. Disconnect the power cable.

13. Return the components back to the accessory kit, or case (hood is stored on top of the closed cover panel in the lower case).

14. Secure the fasteners for the cover panel in the lower half of the case.

15. Place the hood on the cover panel in the lower case.

16. Re-install the dust caps for the connectors on the back of the MITA CEU.

17. Place the base unit of the MITA onto the lower part of the case and secure the latches. Make sure the CEU is opposite the hood when stored.

18. Store the PortaCount Fit Tester as instructed by the PortaCount Fit Tester manual.

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CHAPTER 10
Troubleshooting

Most error messages displayed on the MITA include a description of the error and on screen hints for helping to resolve it. This section provides additional troubleshooting information related to the following issues:

Problem	Possible Cause	Action
Does not power on	AC Adapter not plugged into unit or AC outlet.	Connect AC Adapter.
Headform Bladder does not inflate or reach pressure	Bladder has leak.	Replace Bladder.
	Bladder has pulled away from Headform.	Reseat Bladder.
	Headform not fully seated.	Make sure Headform is fully seated.
Low Aerosol Concentration (less than 25,000 pt/cc)	Refer to the PortaCount User's Manual for troubleshooting the Low Particle message. Possible PortaCount Fit Tester related issues include:	
	• Low on alcohol.	• Replenish alcohol.
	• Hoses are reversed on Twin Tube Assembly.	• Verify the hoses are connected properly to the PortaCount Fit Tester.
	• Twin Tube Assembly is kinked, pinched, or blocked.	• Straighten out the Twin Tube Assembly or remove the obstruction.
	• Moisture build-up inside the Twin Tube sample tubing.	• Change Alcohol Wick inside the Alcohol Cartridge. Dump old alcohol from the Alcohol Fill Capsule and add fresh alcohol. Run 2 hours to dry optics (remove the alcohol cartridge and install storage cap).
	• Inferior or contaminated alcohol.	• Change Alcohol Wick inside the Alcohol Cartridge. Use only approved alcohol (99.5 % or better isopropyl).
	• Plugged internal nozzle.	• See Nozzle Cleaning in Service and Maintenance chapter of the PortaCount Fit Tester Operators Manual.
	• Incorrect (blue/clear) Twin Tube sample tubing being used.	• Ensure that the MITA supplied blue/clear tubing is used, **NOT** the blue/clear tubing supplied by the PortaCount Fit Tester. The opening for the blue (Ambient Sample) tubing must be located within the Hood during the Protection Factor Test.
	• MITA Pump Voltage too low.	• Increase pump voltage. Refer to Aerosol Generator Settings found under the Settings menu.

Problem	Possible Cause	Action
Low Aerosol Concentration (less than 25,000 pt/cc) – *continued*	Restriction in Orifice of Aerosol Generator.	Clean or Replace orifice in Aerosol Generator. Isopropyl Alcohol can be utilized as a cleaning agent.
	Clogged Aerosol Mixer.	Clean the Aerosol Mixer.
	Aerosol Generator Inline Coarse Filter Plugged.	Clean or Replace the Aerosol Generator inline coarse filter (p/n 1602088).
	There was an ambient change in temperature greater than 20°F (6.6°C) from the MITA's storage location to operating location.	Wait at least one hour before operating to allow the internal temperature of the MITA to equalize.
High Aerosol Concentration (more than 500,000 pt/cc)	Pump Voltage too high.	Decrease pump voltage. Refer to Aerosol Generator Settings found under the Settings menu.
"Unexpected Response" or "Portacount did not respond" displayed on screen	PortaCount Pro/Pro+ is not on the "Activities" tab/screen.	Touch the "Activities" tab on the PortaCount Pro/Pro+ touch screen and retry.
	PortaCount® fit tester Interface Cable or the USB-to-Serial adapter is disconnected.	Check the communication cables and retry. *Note: On the Model 8030 or 8038 this may require a 7-second delay while the PortaCount Fit Tester reinitializes the USB cable.*
Alert LED is illuminated	Skipped Self Check.	Rerun a Self Check.
	Skipped Tests.	Run all tests (if applicable) or adjust Self Check parameters so Skip Unusued Self Check is disabled.
	Self Check Params were changed but a new Self Check with a Pass result was not performed.	Rerun a Self Check.
	Self Check Fail, LED during Mask Test only.	Rerun a Self Check.
	There was an ambient change in temperature greater than 20°F (6.6°C) from MITA's storage location to operating location	Wait at least one hour before operating to allow the internal temperature of the MITA to equalize.
EV Leak Zero Test failure	Leak in the Exhalation Valve Adapter	Disconnect the EV Adapter (yellow connection) from the MITA. Rerun the EV Leak Zero Test. A passed test at this point signifies a potential leak in the EV Adapter. Replace the EV Adapter. A failure, with the EV Adapter removed, could signify an internal issue with the MITA.
	O-ring on EV Adapter has dried out.	Apply a small amount of O-ring grease or moisture to the O-ring on the EV Adapter.

Problem	Possible Cause	Action
DT Leak Zero Test failure	Leak in the Drink Tube Adapter Hose	Disconnect the DT Adapter Hose (orange connection) from the MITA. Rerun the DT Leak Zero Test. A passed test at this point signifies a potential leak in the DT Adapter Hose. Replace the DT Adapter Hose. A failure, with the DT Adapter Hose removed, could signify an internal issue with the MITA.
DT Flow Test failure	DT flow calibration was skipped during Self Checks or a different adapter was used.	Recalibrate DT flow by running the Self Checks.
Protection Factor Test failure or Excessive Leak.	Dry Exhalation Valve. Mask not properly fitted to Headform or a fold in the bladder.	Wet the sealing surface of the Exhalation Valve. This better replicates real-life operations. Refit mask to Headform. Allow bladder to deflate before refitting. Use Aerosol Wand to locate leak, refer to Find Mask Leak section. Try different bladder pressures.
1" H_2O cannot be achieved when adjusting the ΔP valve.	Pressure drop in the flow path has increased. Mask not properly fitted to Headform or a fold in the bladder.	Replace the HEPA filter. Remove the headform and observe the three exposed ports. One has a screen. If particulate matter has built up on the screen, remove contaminants with a lint free swab. Refit mask to Headform. Allow bladder to deflate before refitting. Use Aerosol Wand to locate leak, refer to Find Mask Leak section. Try different bladder pressures.
Lost data records during download from MITA to computer		Lower baud rate setting on MITA and computer. Refer to MITA-to-PC Communications Configuration.

Technical Contacts

- If you have any difficulty installing the Model 8120, or if you have technical or application questions about this instrument, contact an applications engineer at TSI Incorporated, 1-800-874-2811 (USA) or (651) 490-2811 or e-mail technical.service@tsi.com.

- If the Model 8120 does not operate properly, or if you are returning the instrument for service, visit our website at http://rma.tsi.com, or contact TSI Customer Service:

  TSI Incorporated
  500 Cardigan Road
  Shoreview, MN 55126 USA

  Phone: +1-800-874-2811 (USA) or +1 (651) 490-2811
  E-mail: technical.service@tsi.com

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  Fax: +49 241-52303-49
  E-mail: tsigmbh@tsi.com
  Web: www.tsiinc.de

  TSI Instruments Ltd.
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  Fax: +44 (0) 149 4 459700
  E-mail: tsiuk@tsi.com
  Web: www.tsiinc.co.uk

APPENDIX A
Specifications

Table A-1 contains the operating specifications for the Model 8120 Mask Integrity Accessory (MITA). These specifications are subject to change without notice.

Overall Mask Integrity Test	
Technique.......................................	Aerosol leak test on headform
Aerosol Detector..............................	PortaCount Respirator Fit Tester models; 8020, 8020M, 8030 or 8038 (sold separately)
Protection Factor Range..................	1 to 999,000
Mask Flow Rate...............................	Adjustable, 10 to 25 L/min
Test Pressure	Adjustable, -1 to -6 in. H_2O
Exhalation Valve Test	
Technique.......................................	Pressure decay
Pass/Fail Criterion	Adjustable, 5 to 50 cm^3/min
Test Pressure	Adjustable, 0.5 to 1.5 in. H_2O
Drink Tube Leak Test	
Technique.......................................	Pressure decay
Pass/Fail Criterion	Adjustable, 0.2 to 1 cm^3/min
Test Pressure	Adjustable, 4 to 6 in. H_2O
Drink Tube Flow Test	
Technique.......................................	Pressure drop at known flow rate
Pass/Fail Criterion	Adjustable, 0.5 to 3 in. H_2O
Test Flow Rate	Adjustable, 1.5 to 2.5 L/min
Leak Location Detection	
Technique.......................................	Aerosol generation with aerosol wand and particle counter
Aerosol..	Emery Oil (PAO)
Aerosol Detector..............................	PortaCount Respirator Fit Tester models; 8020, 8020M, 8030 and 8038 (sold separately)
Operating/Storage Conditions	
Operating Temperature	32° to 120°F (0° to 38°C)
Operating Humidity..........................	0 to 90% RH
Max. Operating Altitude...................	10,000 ft. (3,000 m)
Storage Temperature	-40° to 160°F (-40° to 70°C)

User Interface	
Display..	5.7 in. diagonal (320 x 240 pixels) monochrome LCD (backlit)
Keypad	Membrane switch
LED Indicators................................	Power, pass, fail, aerosol, and alert
Physical (not including PortaCount Fit Tester)	
Instrument Size	26 in. wide x 20 in. deep x 16 in. high (66 cm wide x 50 cm deep x 40 cm high) carrying case top lid with headform installed
Carrying Case Size (W x D x H).......	ATA certified, 26 in. x 20 in. x 22 in. (66 cm x 50 cm, x 56 cm)
Weight	65 lbs (29.5 kg) with carrying case and accessories
Power	100 to 240 VAC, 50/60 Hz, also supplies power to PortaCount Fit Tester
Data Storage Capabilities Range	
4,000 mask tests and 100 Self Check tests	
MITA Communicator Software	
User programmable mask test protocols and logged data downloading. Minimum PC hardware requirements are Microsoft® Windows® XP, or Windows® 7 (32- and 64-bit) software.	

* The MITA requires connection to a PortaCount Respirator Fit Tester (sold separately).

** Other fixtures and adapters to accommodate additional gas masks and full face respirators are possible. Contact TSI for further information.

Model 8120 Mask Integrity Tester is patented under U.S. Patents No. 8,312,761 and 8,621,914. Additional patents are pending.

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APPENDIX B
How to Determine Mask DT Volume

The mask DT volume is determined by injecting known volume of water accounting for any extra volume added due to adapters. Following is the procedure to determine mask DT volume:

1. Draw distilled or filtered water in to syringe and fill it with a known volume of water (10 ml or higher)

2. Connect the DT adapter to the mask DT

3. Hold the other end of the drink tube vertically up so that you can see the injected water as it starts to overflow

4. Start injecting water in to the DT adapter slowly until water starts to overflow on the other end of the DT

5. Measure the volume of water injected in to the DT. This is the volume of the DT adapter + DT

6. Remove the DT from the mask

7. Repeat the steps 4-5 for the DT adapter alone

8. Subtract the volume of DT adapter + DT volume from DT adapter alone to determine the DT volume.

9. Enter the DT volume for the Define Mask Protocol DT Full Volume value.

If the Mask has a Manual Valve, determine the DT Volume to Manual Valve value in a similar manner.

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APPENDIX C
StarTech™ FTDI Driver Installation

Windows® XP Operating System

1. Insert the StarTech™ Driver Installation CD into your computer.

2. Plug the StarTech USB to Serial Adapter Cable into your computer. It is not necessary to connect to MITA at this point.

3. The **Found New Hardware Wizard** auto-launches.

4. Select **No** if prompted to search web.

5. Select **Next** to install the driver for the USB serial converter.

6. The **Found New Hardware Wizard** auto-launches a second time. Select **Next** to install the driver for the USB Serial Port.

™StarTech is a trademark of Star Technologies, Bowling Green, KY
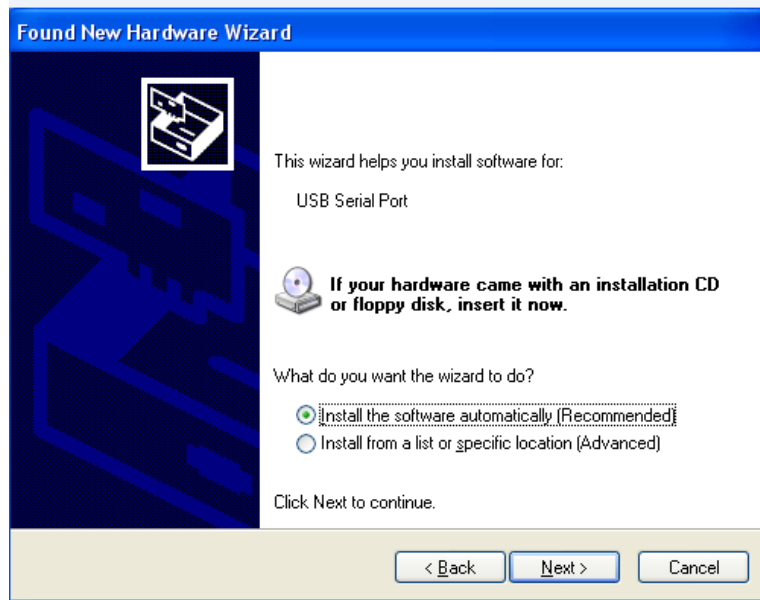
7. Go to Start menu and right-click on **My Computer** to access System Properties. On the Hardware tab select **Device Manager**.

8. Locate Ports (COM & LPT).

Mask Integrity Test Accessory (MITA) Model 8120
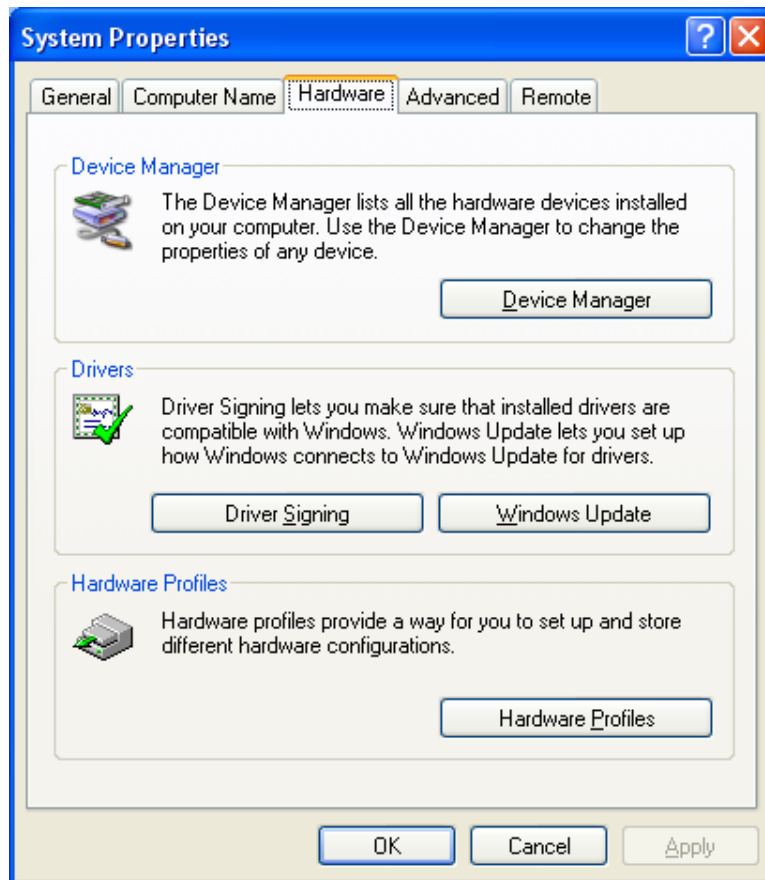
9. Determine the USB Serial Port COM number assigned for the adapter. This will vary by computer.
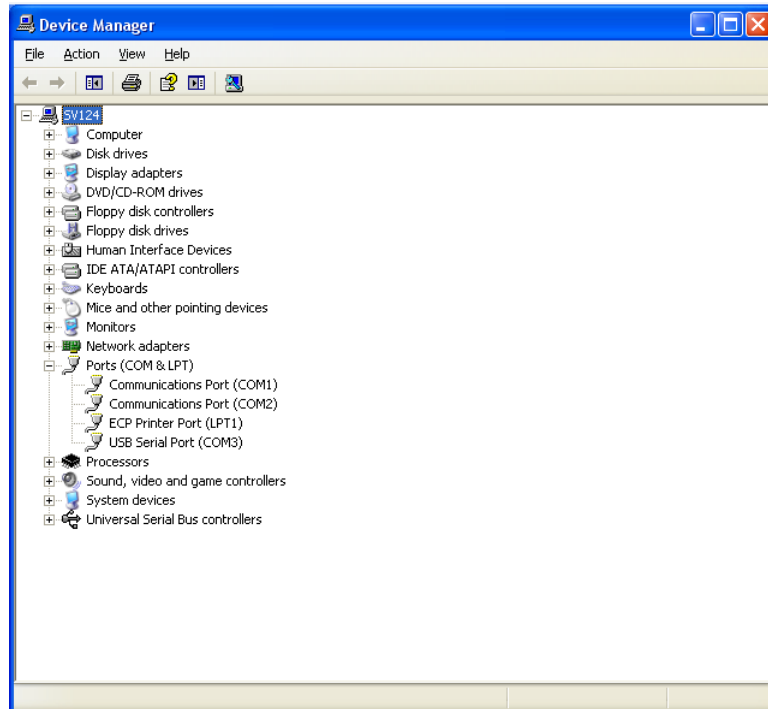
Windows® 7 Operating System

1. Insert the StarTech Driver Installation CD into your computer.

2. Plug the StarTech USB to Serial Adapter Cable into your computer. It is not necessary to connect to MITA at this point.

3. Access Device Manager: **Start | Control Panel | Device Manager**.

4. Locate Ports **(COM & LPT)**.

5. Determine the USB Serial Port COM number assigned to the adapter. This will vary by computer.

    Note: *Depending on your computer's Windows 7 operating system configuration, the drivers may not install automatically and the following steps will be needed to complete installation.*
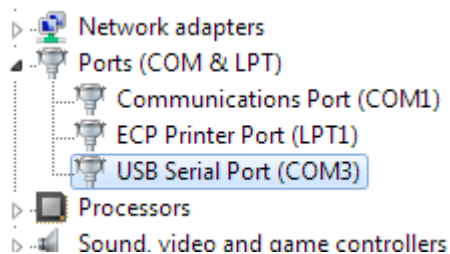
6. Access Device Manager: **Start | Control Panel | Device Manager**.

7. Locate **Other devices | FT232R USB UART**.

8. Right-click to access **FT232R USB UART** properties.

Mask Integrity Test Accessory (MITA) Model 8120
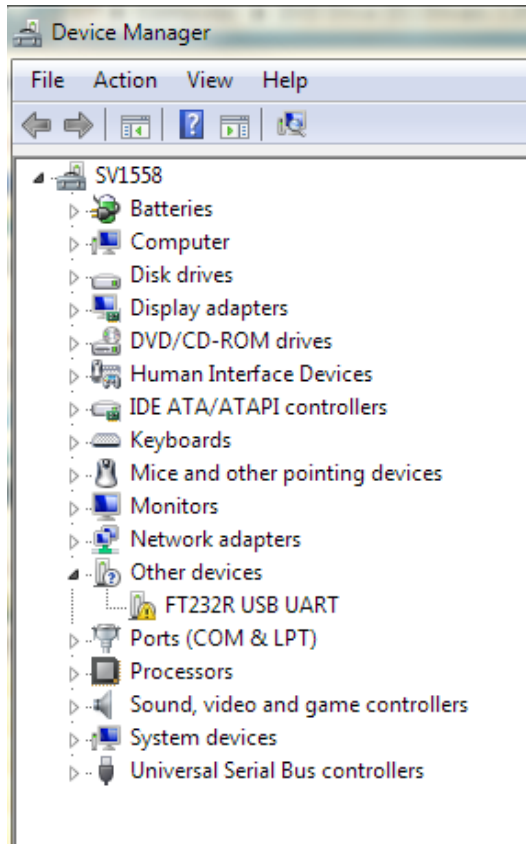
9. Select **Update Driver…**
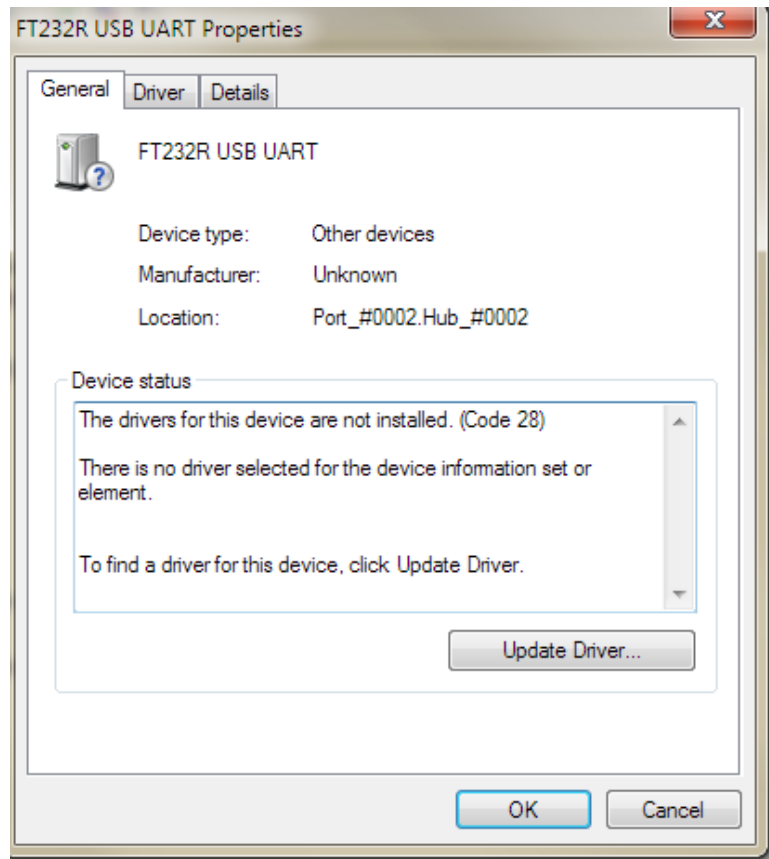
10. Select **Browse my computer for driver software**.
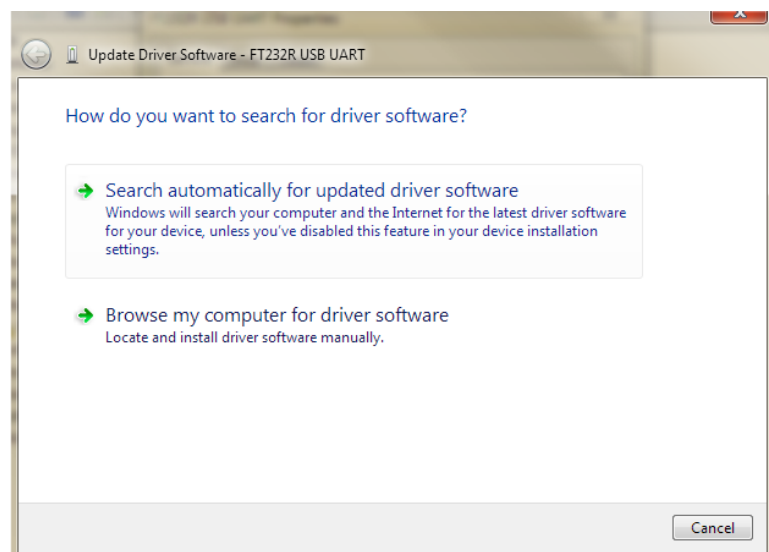
11. Browse to the folder containing the Windows 7 FTDI driver. The folder structure may change; refer to the StarTech adapter instructions for current information.

12. Click **OK** to start driver installation.
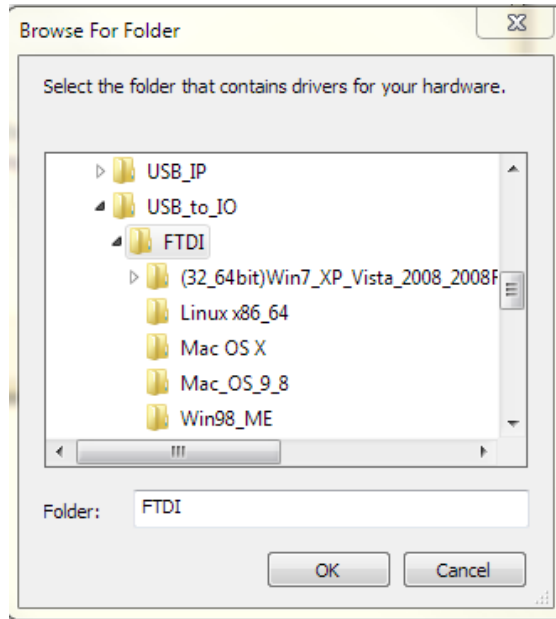
13. Access Device Manager: **Start | Control Panel | Device Manager**.

14. Locate **Other devices | USB Serial Port**.

15. Right-click to access **USB Serial Port** properties.

Mask Integrity Test Accessory (MITA) Model 8120
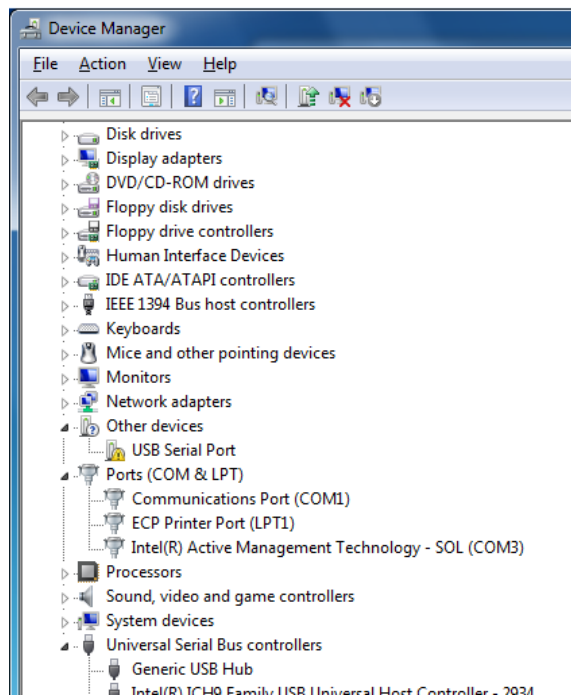
16. Select **Update Driver**...
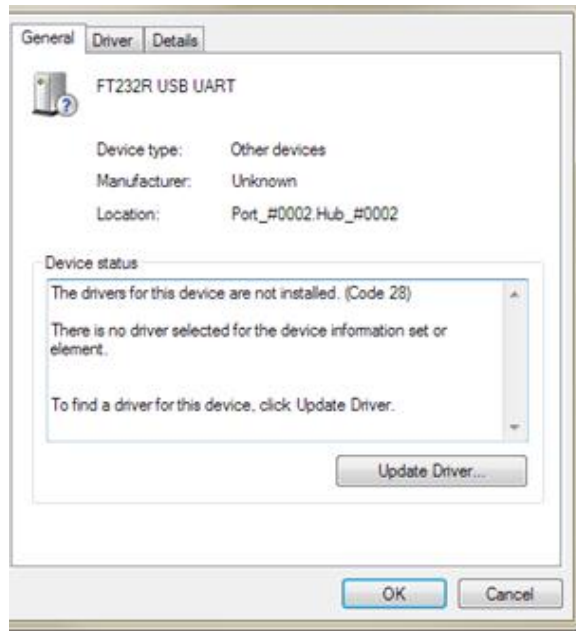
17. Select **Browse my computer for driver software.**
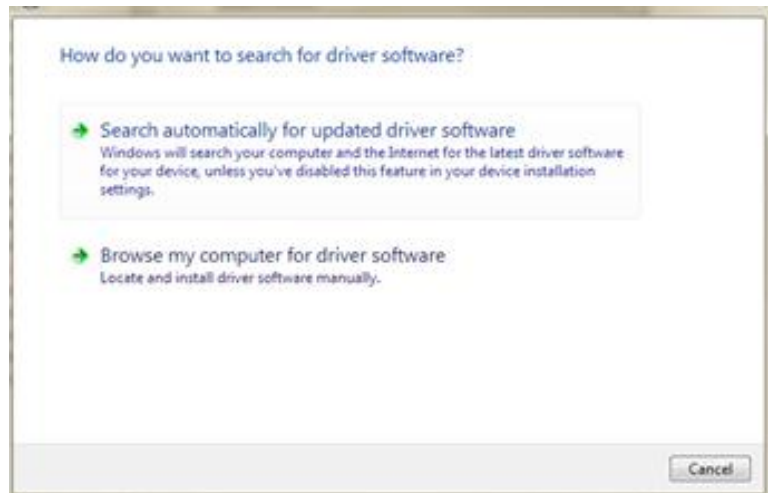
18. Browse to the folder containing the Windows 7 FTDI driver. The folder structure may change; refer to the StarTech adapter instructions for current information.

19. Click **OK** to start driver installation.
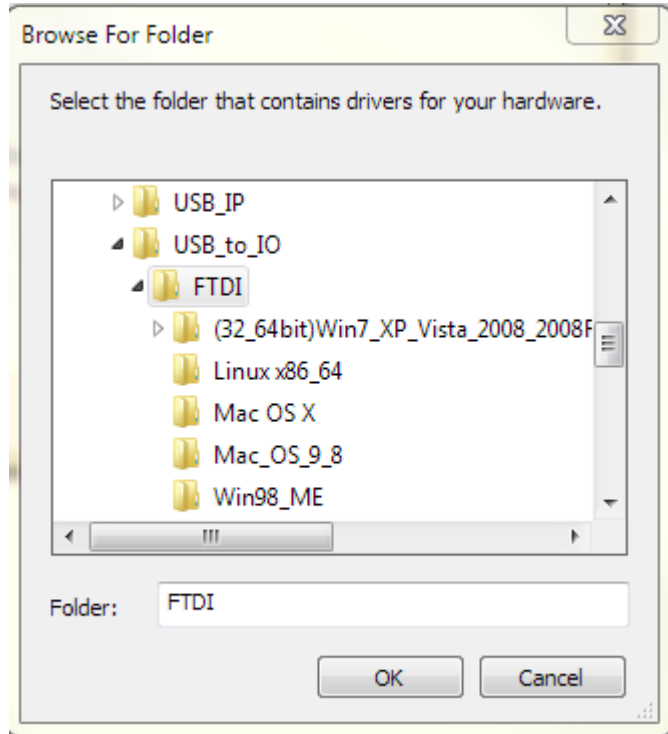
20. Access Device Manager: **Start | Control Panel | Device Manager**.

21. Locate **Ports (COM & LPT)**.

22. Determine the USB Serial Port COM number assigned to the adapter. This will vary by computer.

Mask Integrity Test Accessory (MITA) Model 8120

Index

Reader's Comments Sheet

Please help us improve our manuals by completing and returning this questionnaire to the address listed in the "About This Manual" section. Feel free to attach a separate sheet of comments.

Manual Title: <u>Mask Integrity Test Accessory (MITA) Model 8120 Operator's Manual</u>   P/N <u>6006153</u>

1. Was the manual easy to understand and use?

   ☐ Yes   ☐ No

   Please identify any problem area(s) _____

   _____

   _____

2. Was there any incorrect or missing information? (please explain) _____

   _____

   _____

3. Please rate the manual according to the following features:

	Good	**Adequate**	**Poor**
Readability	☐	☐	☐
Accuracy	☐	☐	☐
Completeness (is everything there?)	☐	☐	☐
Organization (finding what you need)	☐	☐	☐
Quality and number of illustrations	☐	☐	☐
Quality and number of examples	☐	☐	☐

   Comments: _____

   _____

   _____

4. Which part(s) of this manual did you find most helpful? _____

   _____

   _____

5. Rate your level of experience with the product:

   ☐ Beginning   ☐ Intermediate   ☐ Expert

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   Company _____   _____