

# AUTOSTOP® Suspension Meter



Licence ID number: 10242



## DECLARATION OF CONFORMITY

We, AutoTest products Pty Ltd. declare under our sole responsibility that the product AUTOSTOP™ Suspension Meter is in conformity with the provisions of the following Council Directive: 1999/5/EC.

A copy of the Declaration of Conformity is available from <http://www.autotest.net.au>

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# 1 UNPACKING AND FIRST TIME USE

Congratulations on your choice of an AUTOSTOP™ Suspension Meter. Please take the time to read this User's Manual before using the AUTOSTOP™ Suspension Meter in the field. Incorrect or inappropriate use of this instrument may void the warranty.

Please complete the warranty registration card and post it to AutoTest Products Pty Ltd, alternatively visit our website [www.autotest.net.au](http://www.autotest.net.au) and complete your warranty registration on line. Your warranty registration ensures that you are kept up-to-date on any software or hardware changes to your AUTOSTOP™ Suspension Meter.

The packing box of your AUTOSTOP™ Suspension Meter should contain the following:

1. AUTOSTOP™ Suspension Meter
2. User Manual
3. Warranty Registration Card
4. Calibration Certificate
5. Power Adaptor
6. Suspension Meter Data logger software CD-ROM
7. Data Download USB Cable

Optional Accessories:

- Bluetooth printer

AUTOSTOP™ Suspension Meter determines the vertical suspension movement, measuring damping coefficient and counting number of rebounds. AUTOSTOP™ Suspension Meter has a twelve-button operation via a tactile membrane keypad with LCD display. It is lightweight (500grms) and compact (200x90x30mm) and can be installed on the body of the vehicle near the wheel that is to be tested.

## 1.1 Battery Charging

When you receive your new Meter, you should charge the device to full. The device can be easily charged by connecting the provided Power Adaptor.

## 1.2 Self Test and Battery Check

The self-test function is activated each time the AUTOSTOP™ Suspension Meter is powered, it checks the clock, the battery level and other hardware checks. If the battery does not have sufficient charge to be used, then it will display "**Warning: Battery Low**".

## 2 FOR YOUR SAFETY

Read these simple guidelines. Not following them may be dangerous. Read the complete user guide. Further detailed information is given in this manual.



### **SWITCH ON SAFELY**

Do not switch the device on when wireless device use is prohibited or when it may cause interference or danger.



### **INTERFERENCE**

All wireless devices may be susceptible to interference, which could affect performance.



### **SWITCH OFF WHEN REFUELING**

Do not use the device at a refuelling point. Do not use near fuel or chemicals.



### **SWITCH OFF NEAR BLASTING**

Follow any restrictions. Do not use the device where blasting is in progress.



### **USE SENSIBLY**

Use only in the positions as explained in the product documentation.



### **QUALIFIED SERVICE**

Only qualified personnel may install or repair this product.



### **ACCESSORIES AND BATTERIES**

Use only approved accessories and batteries. Do not connect incompatible products.



### **WATER-RESISTANCE**

Your device is not water-resistant. Keep it dry.



### **CONNECTING TO OTHER DEVICES**

When connecting to any other device, read its user's guide for detailed safety instructions. Do not connect incompatible products.

### 3 OPERATION

#### 3.1 Set-Up on Vehicle

The vehicle must be stationary (at a complete stop) prior to commencement of the test. Mount the Suspension Meter to the body of the vehicle, placing it near the wheel that is to be tested. The device uses rubber suction cups that grip onto the body of the vehicle. Please note that dirt particles on suction cups might damage body paint as well as can result in loose grip, which can result in device falling down on ground.

The AUTOSTOP™ Suspension Meter is self-aligning by identifying its orientation at the beginning of each test. The suspension meter can be installed at any angle facing any orientation, but must be well secured for the entire duration of the test as movement can cause erroneous readings. Before commencing the test, give the vehicle a firm shake to bring shock absorbers at their natural position.

#### 3.2 Running the Test

Turn on AUTOSTOP™ Suspension Meter by pressing the ON/OFF button if the device is currently off. The Suspension Meter will go through a start-up procedure and will eventually display Main Menu (a menu of three icons):



Before starting a test, make sure the device has sufficient (over 30%) battery life. To run a suspension test, select “**RUN TEST**” by pressing ‘1’ from the keypad. The device will show the following list of options on the screen:

1. **Run New Test**
2. **Show Last Test**
3. **Print Last Test**
4. **Delete all Tests**
5. **Memory Usage**
6. **Return to Main Menu**

Now select **1. Run New Test** by pressing **1** once again. The device will ask the user to confirm if the shock absorbers are warmed up or if the vehicle has been in motion for at least 5 minutes during the last 30 minutes. Running a suspension test on a cold vehicle may lead to erroneous result.

- Has the vehicle been in motion for at least 5 min within the last 30 min?**
1. **Yes**
  2. **No**

After the warm up confirmation, the device will prompt for **Test Mode**.

Select Test Mode?  
1. By Driving

If you are selecting option **1. By Driving**, please make sure you drive the vehicle forward and suddenly apply foot brake for testing the front two wheels. For testing the rear two wheels, please make sure you reverse the vehicle and suddenly apply hand brake. Please be mindful of other people around while driving the vehicle.

After selecting the **Test Mode**, the device will prompt for **Examiner ID** (Operator Name). Use the device's keypad to type in the name of the person performing the test. The **DEL** key behaves like the **Backspace** key in a PC keyboard and it can be used to erase the last character in the input field.

Enter Examiner ID:

After entering the **Examiner ID**, press **ENTER** to continue. Now the device will prompt for **Vehicle Registration**, type in the registration number of the vehicle that is to be tested. Again, use the keypad to erase and type in the vehicle's registration number.

Enter Vehicle  
Registration:

After entering the Vehicle Registration Number, press **ENTER** to continue. If the registration number you just entered has any wheel that was recently tested, the device will automatically load the **Customer Name** from the database. Otherwise, for a new vehicle's entry, the device will prompt for **Customer Name**. Enter Customer's name using the keypad and press **ENTER**.

Enter Customer Name:

If reference method was used in the device configuration (see Section 3.6), the following dialogue will be displayed:

Vehicle Chassis Type  
1. Soft (Comfortable)  
2. Normal  
3. Hard (Sporty)  
4. Manuf. Defined  
5. Unknown



If the vehicle being inspected has a chassis system that was designed to be soft or comfortable, select option **1**. For normal vehicles such as an average European vehicle, use option **2**. If the chassis system is designed be hard or has characteristics of a sports car, use option **3**. If the reference damping factor for a particular vehicle is known, user can select option **4** (Manufacturer Defined) to specify reference damping data for that vehicle (see Section 3.6). If the user is unsure about the chassis type, select option **5**. By selecting option '5. Unknown', reference method will not be used.

The device will now prompt for wheel selection. Select the wheel that you are currently testing by pressing numbers from **1** to **4** using the keypad. Press **5** to cancel the test and return to the **RUN TEST** menu.

If the vehicle registration number you just typed in has any wheel that was recently tested, the device will not show those wheels that are already tested, instead it will only show wheels that are yet to be tested. If you want to overwrite a test for a particular wheel that is already tested, then select **6. List all wheels\*** and then select the wheel that you want to test again.

- 1. Front Left**
- 2. Front Right**
- 3. Rear Right**
- 4. Rear Left**
- 5. Cancel Test**
- 6. List all wheels\***

\* Option #6 will only be displayed if at least one of the wheels is not displayed. Wheels that are not displayed in the list are those that have already been tested and stored.

After selecting the wheel that is being tested, the device will prompt for a ready trigger **Press any key when ready or press DEL to abort test**. Hit **ENTER** from the keypad when you are ready to run the suspension test.

*Note: Before running a test on a wheel, give a shake to the wheel by bouncing the vehicle down a few times.*

### **Running a push-down test**

Push down test can be conducted in two ways:

1. Single Push Method
2. Multiple Push Method (recommended)

#### 1. Single Push Method

In single push method, push the vehicle a hard push and immediately release it, letting the vehicle bounce up at its natural rate. If the push-down force was large enough for the suspension meter to sense the trigger, the suspension meter will immediately start sampling/recording the vehicle oscillation. After over 1.5 sec, the sampling will end and suspension meter will process the result.

If the vehicle was not pushed hard enough, or the suspension meter finds some problem with obtained result, the device will display the following error message:



**Abnormal results obtained!**  
**1. Run test again**  
**2. Abort Test**

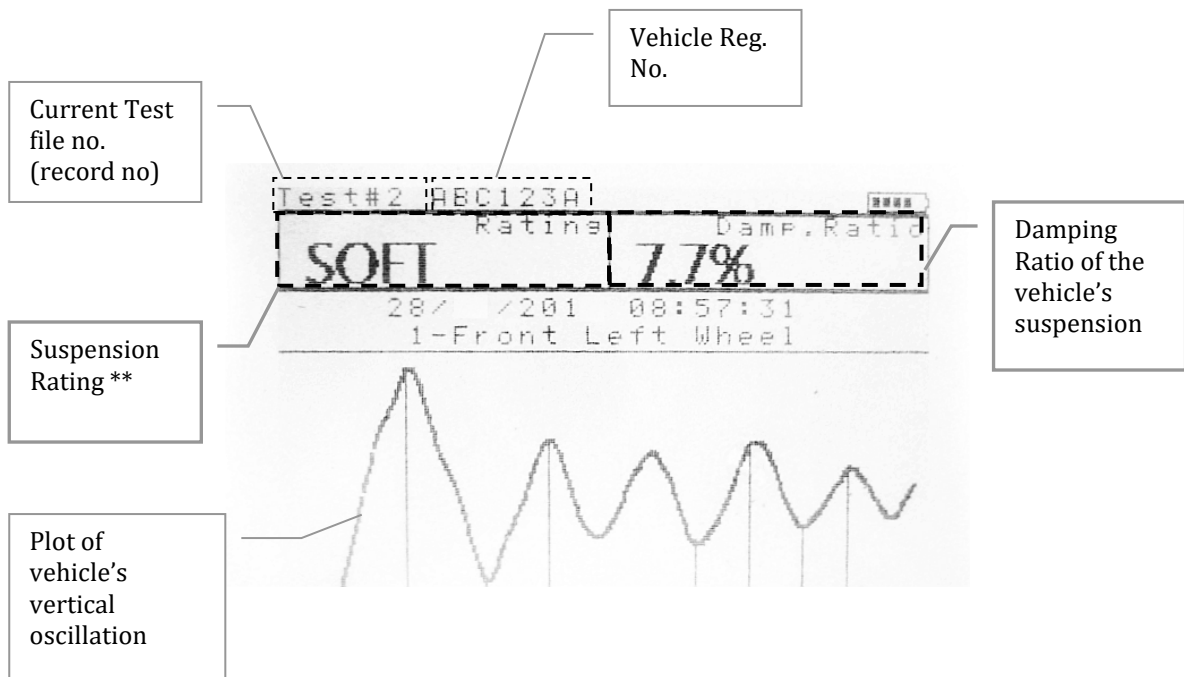
Select **1. Run test again** to redo the test with harder push down force.

2. Multiple Push Method

Multiple Push down method is similar to the single push down test, except the vehicle is pushed down a number of times to excite the suspension system before pushing a final hard push. When running a multiple push down test, be careful not to obstruct the upward bounce of the vehicle. Only push the vehicle down when the vehicle is bounced back to its top height and then release. Take extra care when making the last push. The last push should have the maximum force compared with the previous pushes.

*Note: Do not obstruct the upward motion of the vehicle.  
 For better consistency, multiple push down method is recommended.*

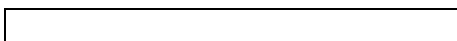
Results will be displayed on the screen after each test. The meter will ask user whether the result should be saved. The user can save the test and continue to the next wheel, or user can redo the test for the selected wheel.



\*\* Suspension rating is evaluated based on Damping ratio., number-of-rebounds, and reference method used (see section 3.6 & 3.7 for more information).


The graph will remain on the screen until the user presses any key from the keypad. Once a key is pressed, the device will display the following menu:

**1. Save test**  
**2. Don't save**  
**3. Redo Test**



Press **1** to save the results obtained for the current wheel. Press **2** to discard and erase results and return to the **RUN TEST** Menu. In case of odd results, press **3** to redo the test.

### 3.3 Test Instructions Summary

Screen Display	Instruction	Keys to Press
Blank Screen	Switch On	ON/OFF
Initial splash screen		Press any key to skip
	Open Test Menu	Press <b>1</b> from the keypad
<b>Examiner ID:</b>	Enter Examiner ID or Operator's name	Use keypad to type <i>Examiner ID</i> . When done, Press <b>ENTER</b> .
<b>Enter Vehicle Registration:</b>	Enter the Registration no	Use keypad to type <i>Vehicle Registration No.</i> and press <b>ENTER</b>
<b>Enter Customer Name:</b>	Enter Customer Name	Use keypad to type <i>Customer Name</i> and press <b>ENTER</b>
<b>Selection Chassis type</b> (only if reference method is used)	Select vehicle chassis type.	Press a key from '1' to '5' to select an option
<b>Wheel to test:</b>	Select a wheel to run test.	Press a key from '1' to '4' to select a wheel
<b>Press any key when ready or press DEL to abort test</b>	Press any key to commence the test or <b>DEL</b> to cancel test and return to Test Menu	Press any key to commence the test
<b>Waiting for a trigger...</b>	<i>Push down the vehicle (or drive)</i>	
<b>Sampling...</b>	Wait for the result	
<b>Processing...</b>	Wait for the result	
<b>Graph Screen</b>	Displays results from the currently conducted suspension test	Press <b>ENTER</b>
<b>1. Save Test?</b>	To save test result	Press <b>1</b> to save
<b>2. Don't Save?</b>	To discard results and abort test	Press <b>2</b> to abort test and results
<b>3. Redo Test?</b>	To Redo the test	Press <b>3</b> to repeat the test

**Must:**

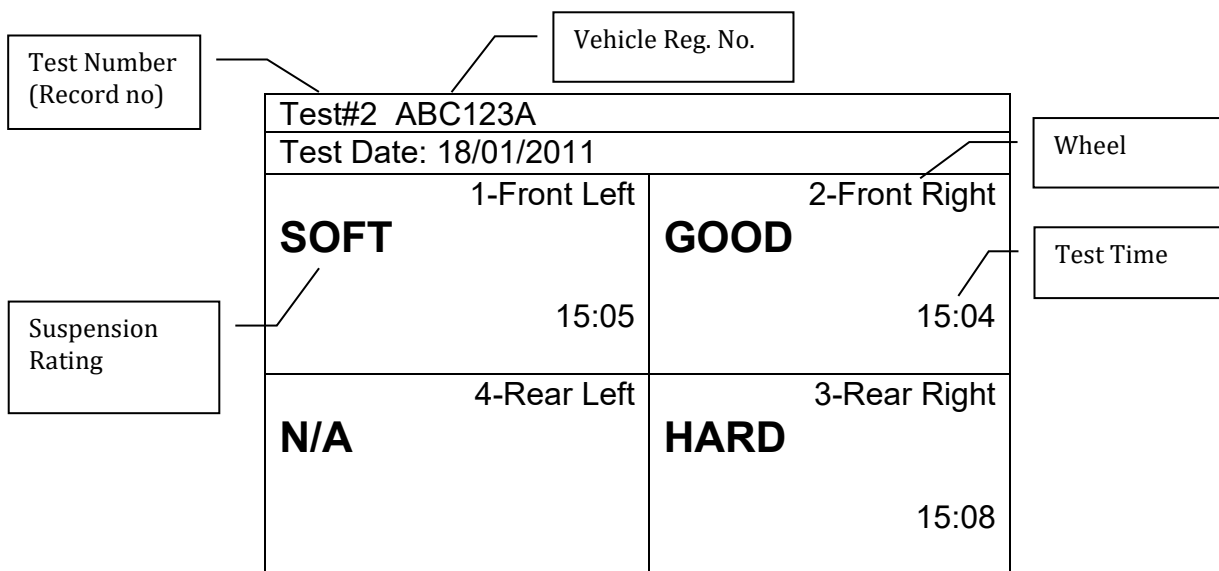
- Fix Suspension Meter securely
- Install in a stationary vehicle
- Place it close to the wheel that is being tested
- Shake (push down) the vehicle before starting the actual test
- For driving test,
  - o For front wheels: must drive the vehicle forward and use foot brake
  - o For rear wheels: must drive the vehicle backward and use hand brake

**Must not:**

- Pull up the vehicle (let the vehicle bounce up naturally)

### 3.4 Display Last Test Result

After running a successful suspension test on a vehicle, the results for that vehicle can be retrieved and a summary of all four wheels can be displayed on the suspension meter's screen. To view the results for all four wheels of the last tested vehicle, select **RUN TEST** from the *Main Menu* by pressing **1**. The device will then display the **Test Menu**. Select [**2. Show Last Test**] from the **Test Menu**.



The above screen displays a brief summary of all four wheels of the latest vehicle that is tested. In the above summary screen, the displayed 'N/A' for the 4<sup>th</sup> wheel (Read Left) indicates that 'Not available', or no test was conducted or stored for that wheel.

Press a key from '1' to '4' to view the results for an individual wheel. Alternatively, press **ENTER** to sequentially view results for all wheels. Keep pressing the **ENTER** key to switch to the next screen. At the end of each cycle, the device will prompt "Print Results?". Results can be printed out using an optional Bluetooth printer. For more information regarding the printing process, see Section 3.5. To return to the **Test Menu** screen, select '**3. Return**' once the print dialogue appears on the screen. Alternatively, by pressing any key from '**5**'-'**9**' and '**0**' during an individual result screen will return to the **Test Menu**.

### 3.5 Printing Last Test

Results for all four wheels for the latest tested vehicle can be printed out on a paper slip using an optional Bluetooth printer.

In order to print the latest test results using a Bluetooth printer, first switch on the printer and then place the device close to the Bluetooth printer.



Aligning the infrared port on Suspension Meter and the Bluetooth printer

Turn on the suspension meter if it's switched off. From the Main Menu containing three icons appears, select '**RUN TEST**' by pressing **1** from the keypad. When the **Test Menu** appears, select '**3. Print Last Test**'. The device will display "**Printing Test #n**", where n is the test number for the latest test.

Note: In case if the Bluetooth printer fails to print, please check the printer battery level.

### 3.6 Using Reference Method

Reference method allows results to be generated in reference to the original factory performance of the shock absorbers. Since different vehicles have different factory ratings for shock absorbers, it is impractical to have the factory-rating list for the shock absorbers of all kinds of vehicles and models. Instead, the device groups all vehicles into three categories and assigns reference data to each category:

Category (Chassis type)	Standard Reference Data	
	Front Axle	Rear Axle
<b>Soft (comfortable)</b>	60	60
<b>Normal</b>	70	70
<b>Hard (Sporty)</b>	80	80

The default reference data listed in the above table can be modified in the suspension meter to adopt the local regulations.

The reference method can be turned off from the configuration menu. To change the reference data, or turn off reference method, see Section 3.8.

### 3.7 Changing Test Parameters

AUTOSTOP™ Suspension Meter uses two ways to determine the performance of a shock absorber. The first method uses Damping Ratio factor and the second method looks at the number of rebounds of the suspension system. The device can be configured to use both methods; thereby, the performance of the suspension system using the Damping Ratio method and the Rebound methods is averaged.

The default calculation method for determining the performance of the suspension system is using both 'Damping Ratio' and 'Rebound' methods. Users can change the calculation method by taking the following steps:

- From the Main Menu, select '**CONFIG**' by pressing **2** from the device keypad.
- Select **3. Result calculation** by pressing **3**
- Select **1. Calculation Method** by pressing **1**
- To use the Damping Ratio method only, select '**1. Using Damping Ratio**'
- To use the Rebound method only, select '**2. Using Rebounds**'
- To use both the Damping Ratio method and the Rebound method, select '**3. Using Both**'
- To return, select '**4. Return**'

To quantize and describe the performance of the vehicular suspension system, AUTOSTOP™ Suspension Meter uses a range table for each calculation method. The following table contains default values or parameters for each method that are used to rate or describe the performance of the vehicular suspension system.

Rating	Damping Ratio (zeta, $\zeta$ )	Rebound Method (No. of bounces)
<b>POOR</b>	$0 \leq \zeta < 10\%$	Rebounds > 4
<b>SOFT</b>	$10 \leq \zeta < 15\%$	$3 \leq \text{Rebounds} < 4$
<b>GOOD</b>	$15 \leq \zeta < 35\%$	$2 \leq \text{Rebounds} < 3$
<b>HARD</b>	$35 \leq \zeta < 100\%$	Rebounds $\leq 1$

Users can change these parameter ranges by taking the following steps:

- From the Main Menu, select '**CONFIG**' by pressing **2** from the device keypad.
- Select **3. Result calculation** by pressing **3**
- Select **2. Parameter Range** by pressing **2**
- To change the parameter values for the Damping Ratio method, select '**1. Set Damping Ratio Range**'
- Or, to change parameter value for the Rebound method, select '**2. Set Rebounds Range**'
- Select the Rating for which you want to update the parameter range using keypad (1-4).
- When an input dialogue box appears, enter the new value and press **ENTER**.

Users can always revert back to the default parameters, in case of invalid range entries, using the following steps:

- From the Main Menu, select '**CONFIG**' by pressing **2** from the device keypad.
- Select **3. Result calculation** by pressing **3**
- Select **3. Reset Parameters** by pressing **3**

### 3.8 Menu Reference

Section	Sub Menu	Sub Menu 2	Description	Keys to
---------	----------	------------	-------------	---------

				Press
<b>MAIN MENU</b>				
<b>RUN TEST</b>			Suspension Test Menu. Contains all options related to running and viewing suspension tests	Press <b>1</b>
	<b>1. Run New Test</b>		Starts a new suspension test	Press <b>1</b>
		<b>Warm suspension check</b>	Prompts user to check if the vehicle was in motion recently.	<b>1-Yes</b> <b>2-No</b>
		<b>Examiner ID</b>	Prompts for Examiner ID	Type then press <b>ENTER</b>
		<b>Vehicle Reg. No</b>	Prompts for Vehicle Reg. No.	Type then press <b>ENTER</b>
		<b>Customer Name</b>	Prompts for Customer Name	Type then press <b>ENTER</b>
		<b>Chassis Type</b>	Prompts for Vehicle Chassis Type (only if reference method is used)	Press <b>1-4</b>
		<b>Ready?</b>	Prompts for Ready trigger	Press <b>ENTER</b>
		<b>Graph Screen</b>	Displays the current test's result	Press <b>ENTER</b>
		<b>Save?</b>	Prompts for Save/Discard results	<b>1-Save</b> <b>2-Discard</b> <b>3-Redo</b>
	<b>2. Show Last Test</b>		Displays the results for the latest test.	Press <b>2</b>
		<b>Summary Page</b>	Display the summary of all four wheels for the last tested vehicle	Press <b>1-4</b> or <b>ENTER</b>
		<b>Print Results?</b>	Prompts user to print the current (latest) results using optional IrDA printer	<b>1-Yes</b> <b>2-No</b> <b>3-Return</b>
	<b>3. Print Last Test</b>		Prints the latest results using optional IrDA printer	Press <b>3</b>
	<b>4. Delete all Tests</b>		<b>Warning!</b> Clears the user memory deleting all existing stored tests. Users should upload data prior to deleting all tests.	Press <b>4</b>
		<b>Delete all Tests?</b>	Confirms if user really wants to delete all stored tests.	<b>1-Delete</b> <b>2-Cancel</b>
	<b>5. Memory Usage</b>		Displays the number of stored tests.	Press <b>5</b>
		<b>Memory Usage page</b>		Any key to exit
	<b>6. Return to Main Menu</b>		Returns to the Main Menu	Press <b>6</b>
<b>CONFIG</b>			Displays settings and result calculation options	Press <b>2</b>
	<b>1. Contrast</b>		Adjusts the display brightness level	Press <b>1</b>
	<b>2. Date/Time</b>		Displays the current date and time	Press <b>2</b>
	<b>3. Result Calculation</b>		Allows result calculation parameter adjustments	Press <b>3</b>
		<b>1. Calculation</b>	Displays suspension rating	Press <b>1</b>

		<b>Method</b>	calculation methods	
			1. Using Damping Ratio 2. Using Rebounds 3. Using Both 4. Return	Select <b>1-4</b>
		<b>2. Reference Method</b>	Enables or disables reference method.	Press <b>2</b>
			1. Enable Reference	Press <b>1</b>
			2. Disable Reference	Press <b>2</b>
			3. Return	Press <b>3</b>
		<b>3. Parameter Range</b>	Allows suspension rating parameter alteration	Press <b>3</b>
			1. Set Damping Ratio Range	Press <b>1</b>
			2. Set Rebounds Range	Press <b>2</b>
			3. Reference Damping	Press <b>3</b>
			4. Return	Press <b>4</b>
		<b>4. Reset Parameters</b>	Resets Parameter Range values. Also sets "1. Calculation Method" to "3. Using Both" (i.e. using Damping ratio and Rebounds method)	Press <b>4</b>
		<b>5. Return</b>	Return to the <b>CONFIG</b> menu	Press <b>5</b>
	<b>4. Device Info</b>		Displays device information such as version, serial number, battery level, date and time.	Press <b>4</b>
		<b>Device Information Page</b>		Press any key to exit
	<b>5. Printer</b>		Displays printing options	Press <b>5</b>
		<b>1. Print Graphs</b>	Enables printing of graphs of suspension tests.	Press <b>1</b>
		<b>2. Disable Graphs</b>	Disables printing of graphs. This option can be used to save printer roll.	Press <b>2</b>
		<b>3. Return</b>	Return to the <b>CONFIG</b> menu	Press <b>3</b>
	<b>6. Return to Main Menu</b>		Returns to the Main Menu	
<b>TRANSFER</b>			This menu option allows device to upload suspension test results and to update firmware to a connected PC. The device must be connected to the PC using the optional serial cable.	Press <b>3</b>

## 4 UPLOADING TEST DATA

The AUTOSTOP™ Suspension Meter has a upload facility that allows users to transfer test results from the unit onto a PC via a custom Serial Cable (optional accessory) for analysis and printing. The Suspension Meter can hold up to 100 tests numbered one to a hundred. To upload all tests stored in the suspension meter, AUTOSTOP™ Suspension Meter Datalogger software must be installed and running on the PC.

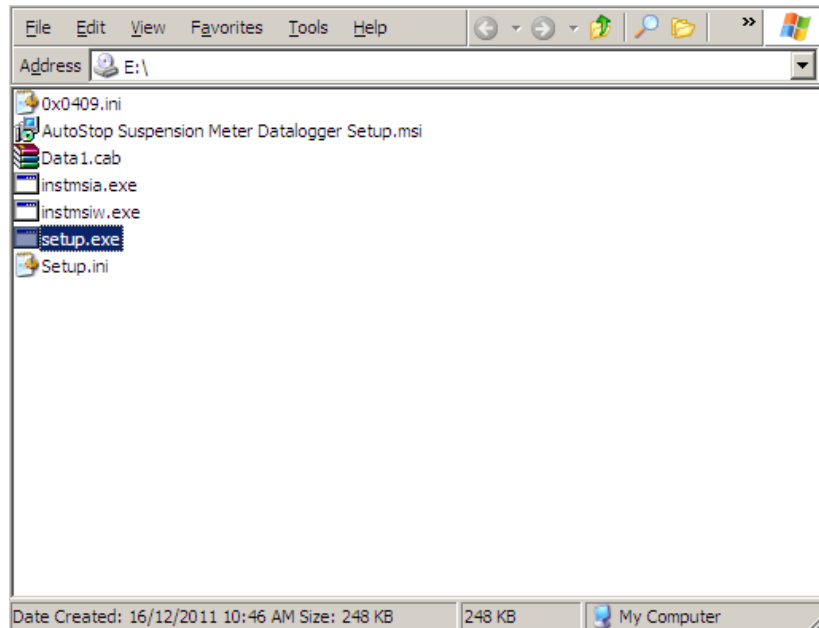
### 4.1 Installing the Data Logger Software

Before installing the AUTOSTOP™ Suspension Meter Datalogger software, make sure your computer meets the minimum system requirements:

- Microsoft Windows XP or greater
- One unused USB port
- At least 50 MB of hard disk space

To install the data logger software from CD, please follow the following steps:

1. Insert the Suspension Test Data Logger Software CD-Rom installation disk into your disk drive.
2. If the Data Logger software setup does not run automatically, then open your CD-ROM drive in Windows Explorer



3. Select and run file “*setup.exe*”
4. Follow Setup prompts.

**Note:** If you already have a copy of an older version of suspension meter software installed, you may have to uninstall it first.

The latest version of the data logger software for AUTOSTOP™ Suspension Meter can be obtained from the Internet by going to the AutoTest website: <http://www.autotest.net.au/> or <http://www.autotest.net.au/products/autostop-suspension-meter/>

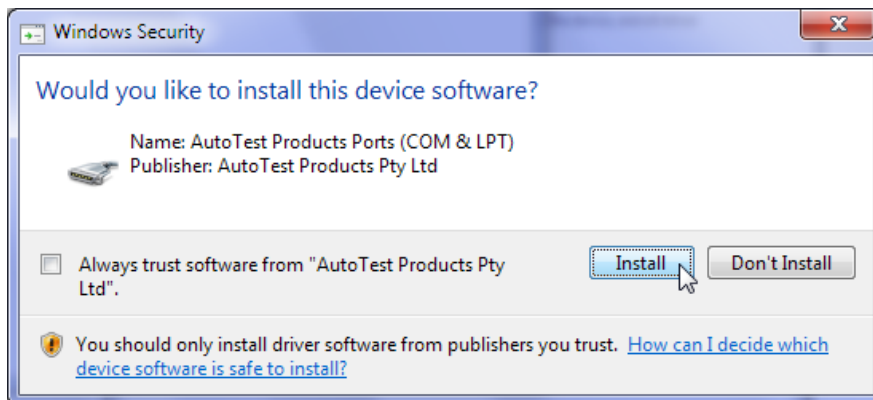
## 4.2 Uploading Tests using the Data Logger Software

After successfully installing the data logger software, run the Data Logger software from the desktop or from the start menu, and perform the following steps:

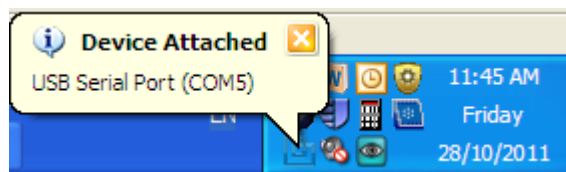
**Step 1:** Use the supplied USB cable and connect one of the cable to the meter and the other end to your PC. Turn ON the suspension meter.



When the suspension meter is first connected, Windows will try to install drivers for it. Please wait until Windows has finished installing drivers. You might see the following message box during the installation of the USB drivers. Please select Install to install the USB drivers.

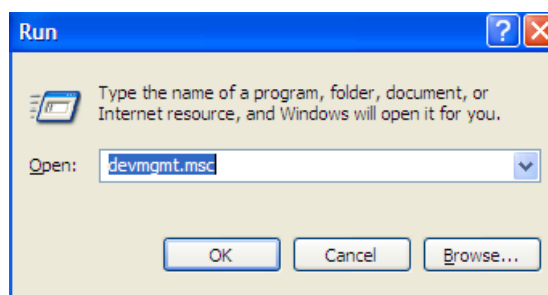


**Step 2:** Once the drivers have been installed, you may see the following pop-up screen near the system clock. The message box will display the COM port to which the suspension meter is connected. You need to know this COM port number (for example COM5 in the following image) when communicating and downloading data from the suspension meter.

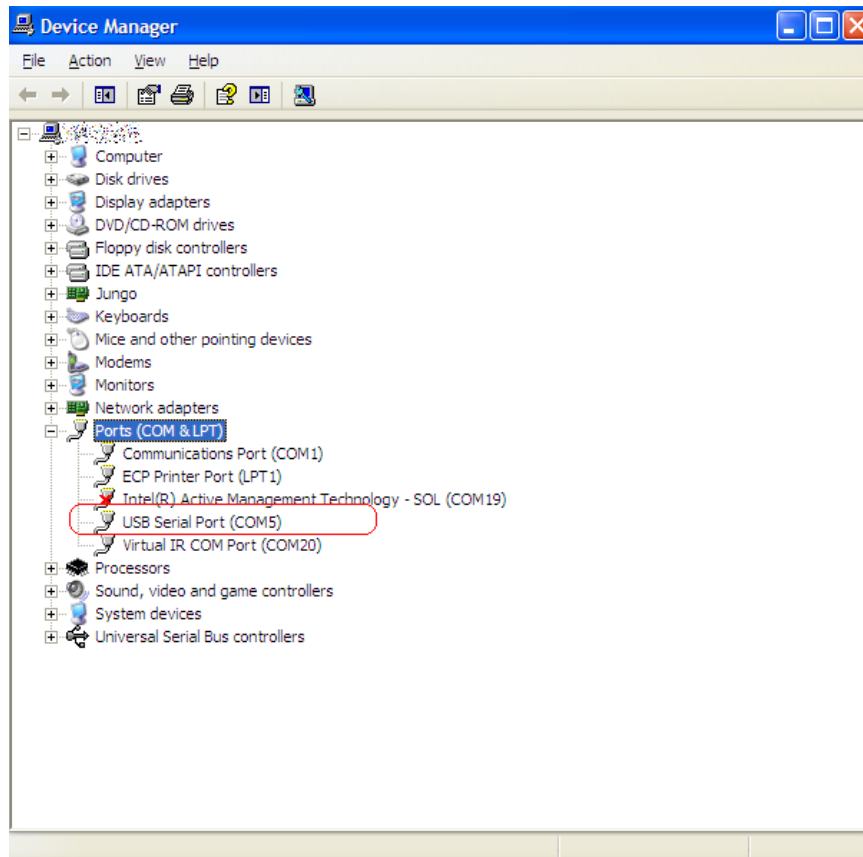


Alternatively, if you did not see the above 'Device attached' pop-up screen, you can check the COM port number by taking the following steps:

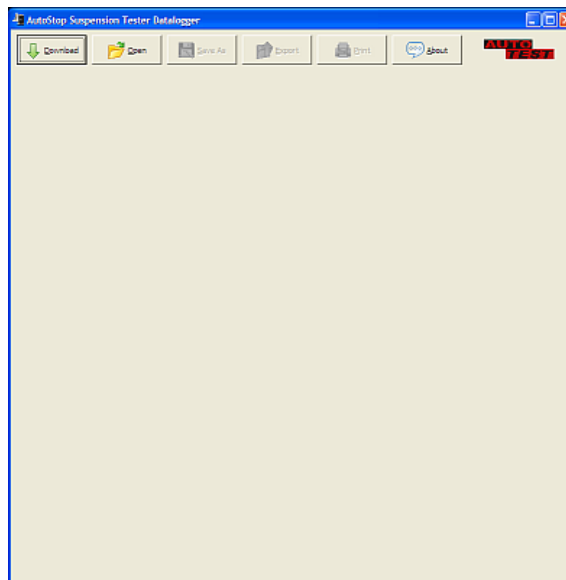
- Open '**Device Manger**' by going to **Start -> Run ->** Type '**devmgmt.msc**' and click OK.



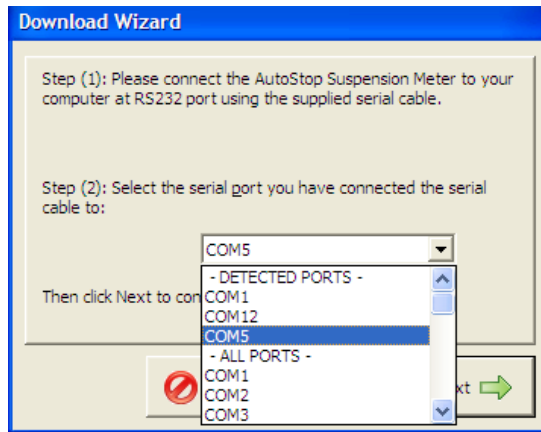
- Then in the Device Manger window, open **Ports (COM & LPT)** node and find '**USB Serial Port**' in the list. Note the COM port number appended next to '**USB Serial Port**'.



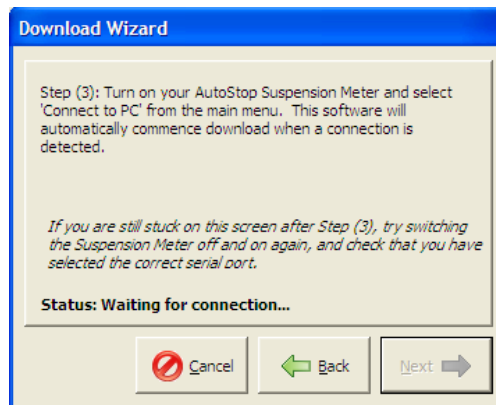
**Step 3:** Open the Suspension Meter Data logger window and click on DOWNLOAD. A Download Wizard window will appear. Follow the download prompts.



**Step 4:** Select the right COM port to which the suspension meter is connected. The software will display a list of detected COM ports. Select the appropriate COM port and click on NEXT.

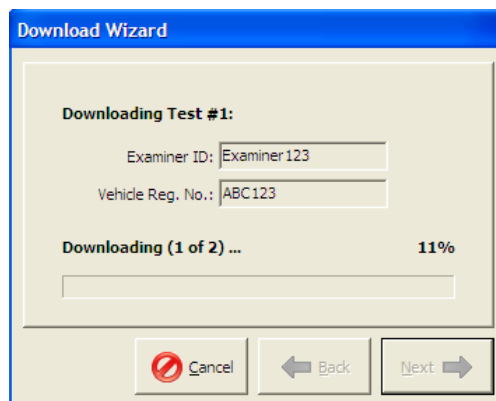


**Note:** For ordinary RS232 cable connection, it is very likely that the COM port would be COM1 or COM2. If you are using a USB cable, you need to select the COM port you would have figured out in **STEP 2**.

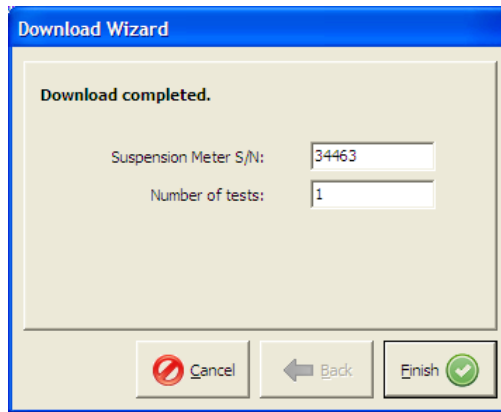


**Step 5:** When you see the above screen on your PC, switch ON the Suspension Meter. When the Main Menu appears, select '**TRANSFER**' by pressing **3** from the keypad on the device. Download will automatically commence once the connection is successfully established.

**Step 6:** The Download Wizard window will display the download progress. Wait until the download finishes.



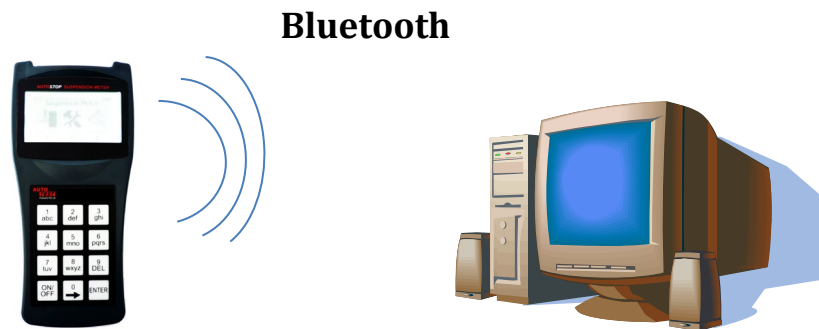
**Step 7:** After test data has been downloaded a small window will appear that says 'Download completed'. Click on FINISH to view the downloaded tests.



#### 4.2.1 Downloading via Bluetooth

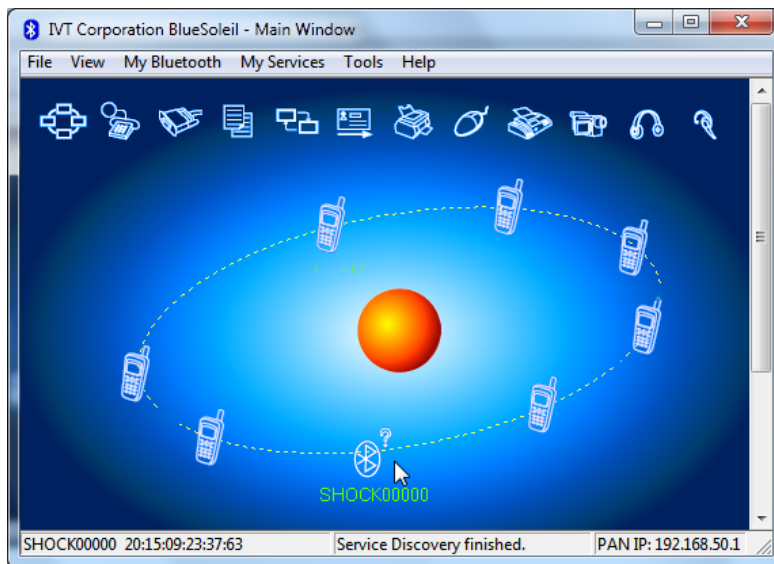
Before connecting the suspension meter to the PC using the Bluetooth interface, make sure the PC supports Bluetooth connectivity.

Once the Data Logger software has been installed, run the software on the PC and switch ON the suspension meter by pressing the ON/OFF key.

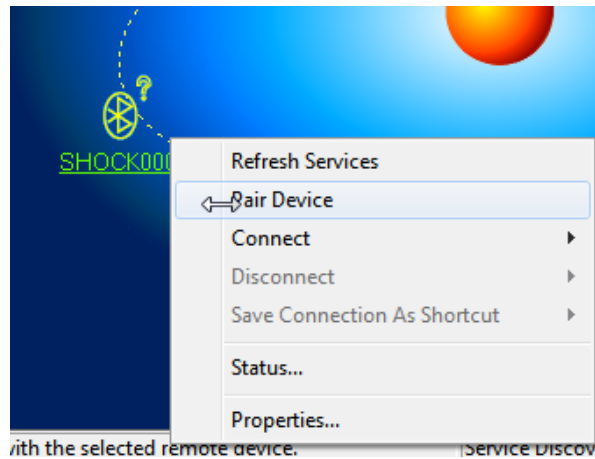


When connecting the Suspension Meter for the first time using the Bluetooth interface, user will need to configure the Bluetooth connection. To configure the Bluetooth connection, open your Bluetooth manager program on your PC and search for Shock##### device, where '#####' is the serial number of the suspension meter.

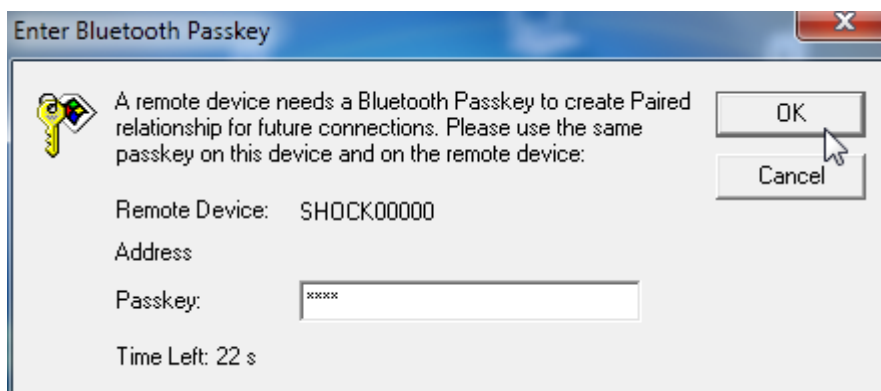
*Note: the screenshots provided below may not be the same on your PC. For information regarding Bluetooth device pairing on your PC, please refer to the documentation of your Bluetooth Manager.*

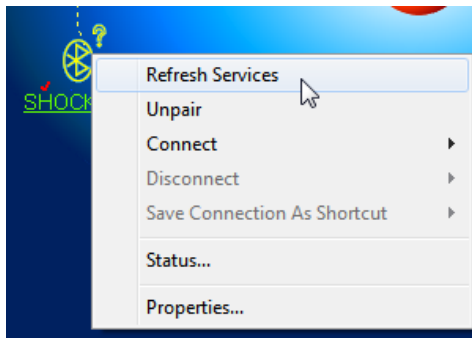


Select the device Shock##### from the list of discovered Bluetooth devices and create pairing.

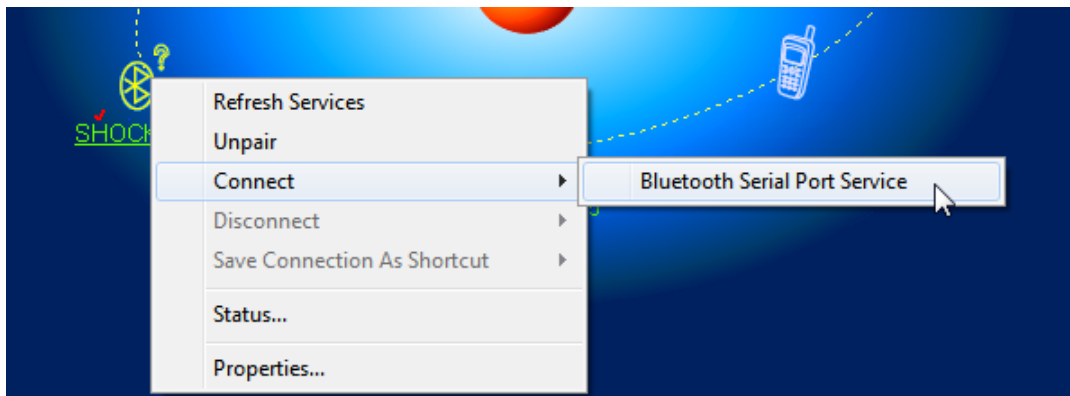


When prompted for the pairing code or pin number, enter "0000".

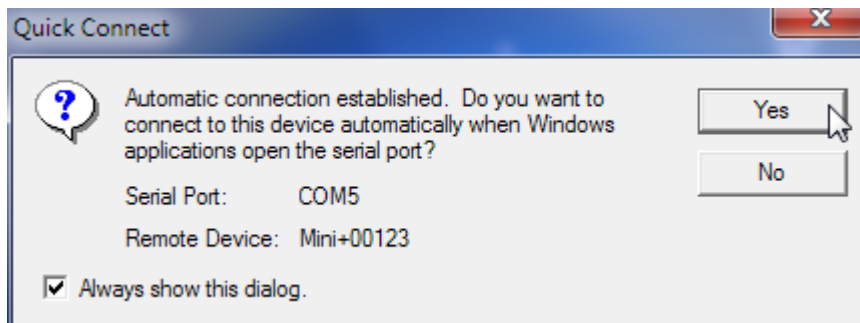




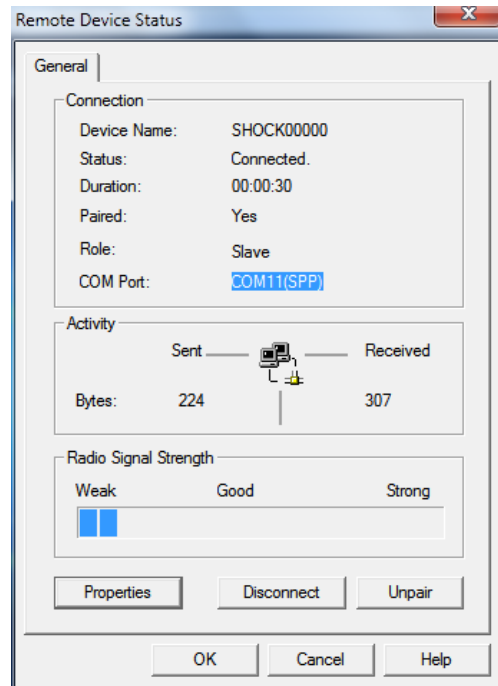
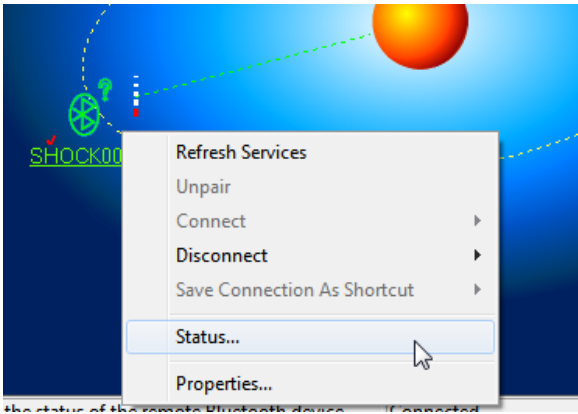
Once the pairing is established, refresh device services and connect using Bluetooth serial port service.



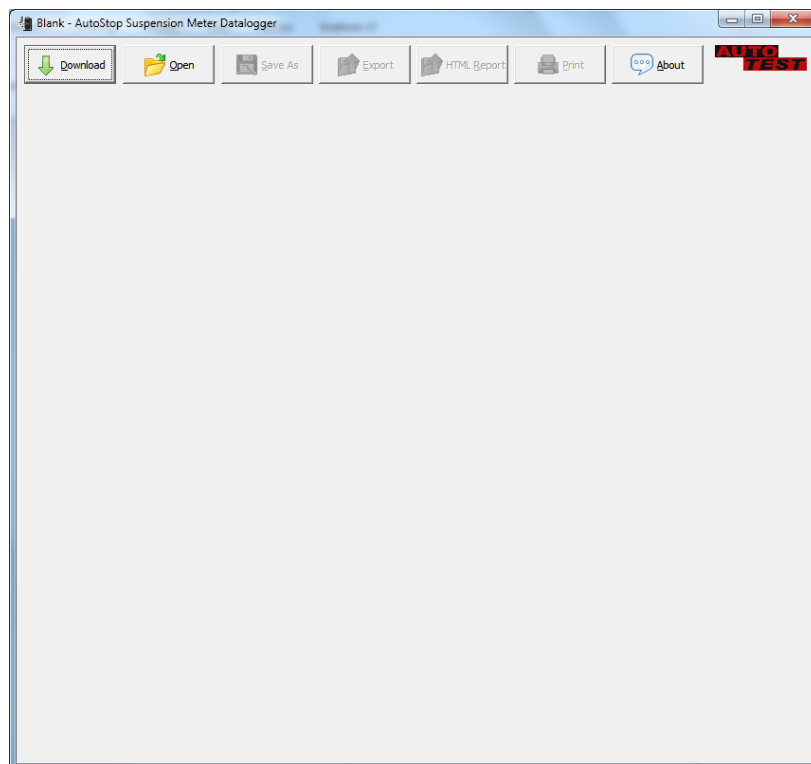
If the following message appears, note down the serial port and press Yes. The serial port will be later used by the datalogger software.



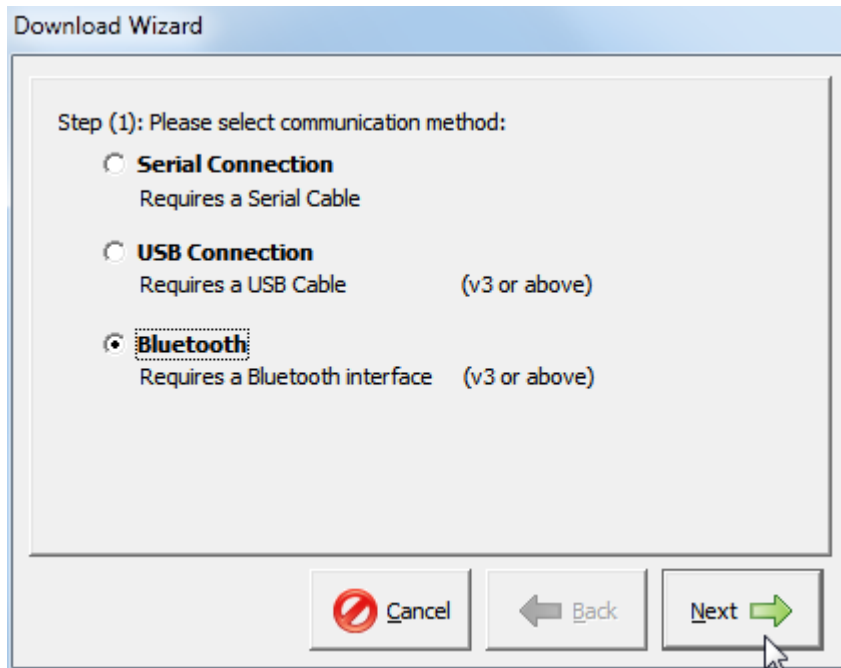
Users can also check the COM port of the Bluetooth device by viewing the status of the device.



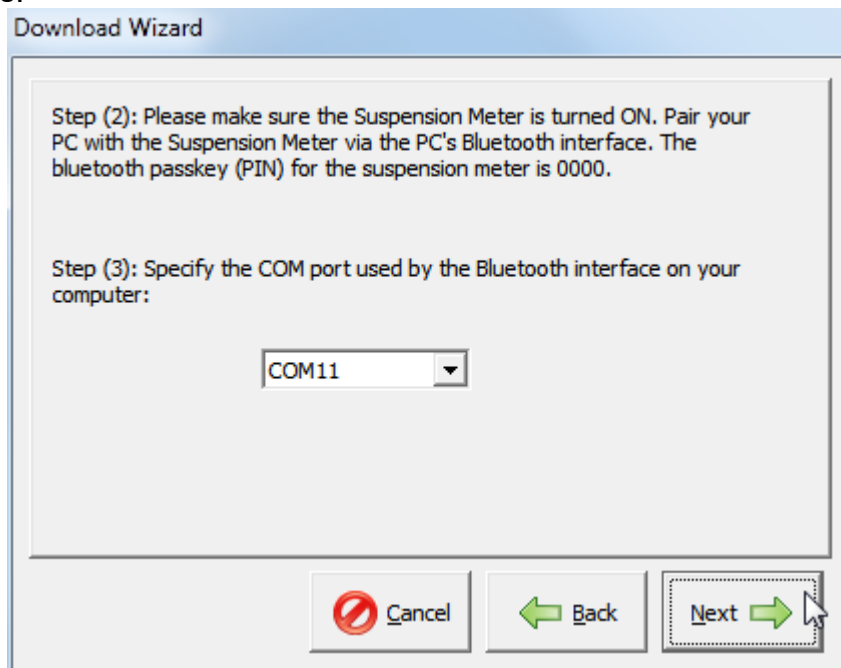
Once the Bluetooth connection is setup, the user can now download test results from AutoStop Suspension Meter using the Bluetooth interface. To download the results, open AutoStop Suspension Meter Datalogger software and click on “Download” button.



When the following connection window appears, select “Bluetooth” connection and press Next.

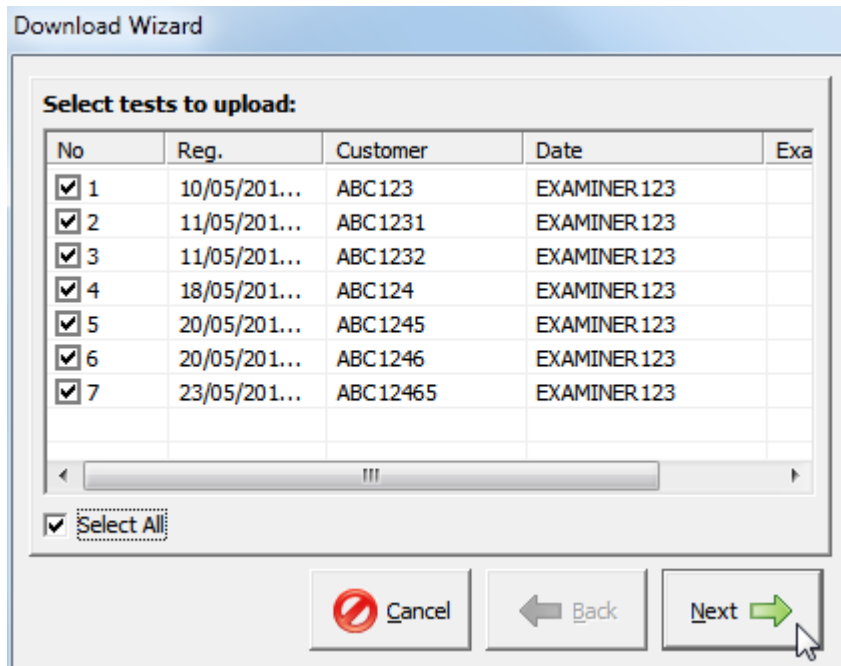


Select the COM port number of the Bluetooth connection connected with the suspension meter. The COM port number is the same COM port obtained during the Bluetooth pairing process.

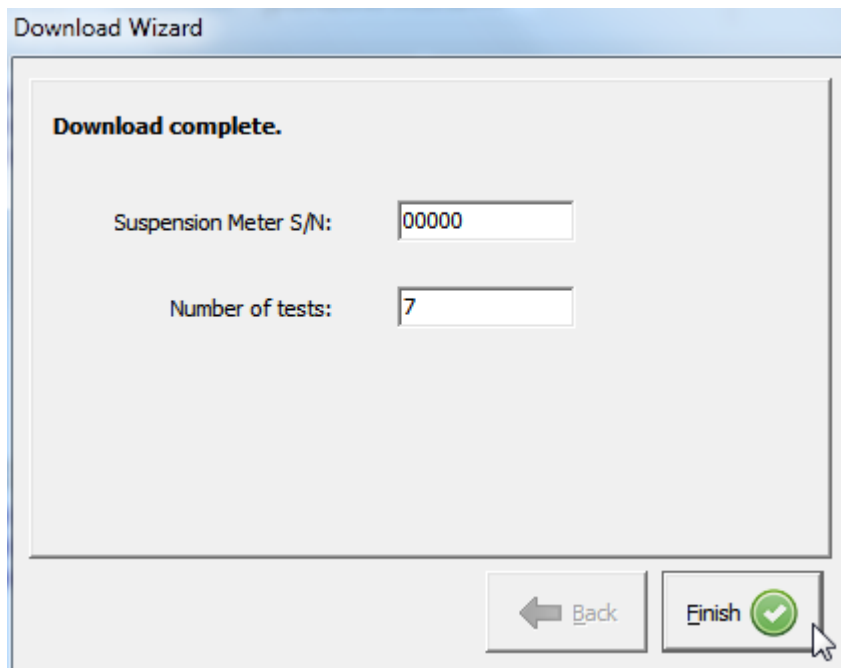


Make sure the suspension meter is ON. Press Next to continue. Once the connection is established, the datalogger software will acquire a list of all tests currently stored on the device.





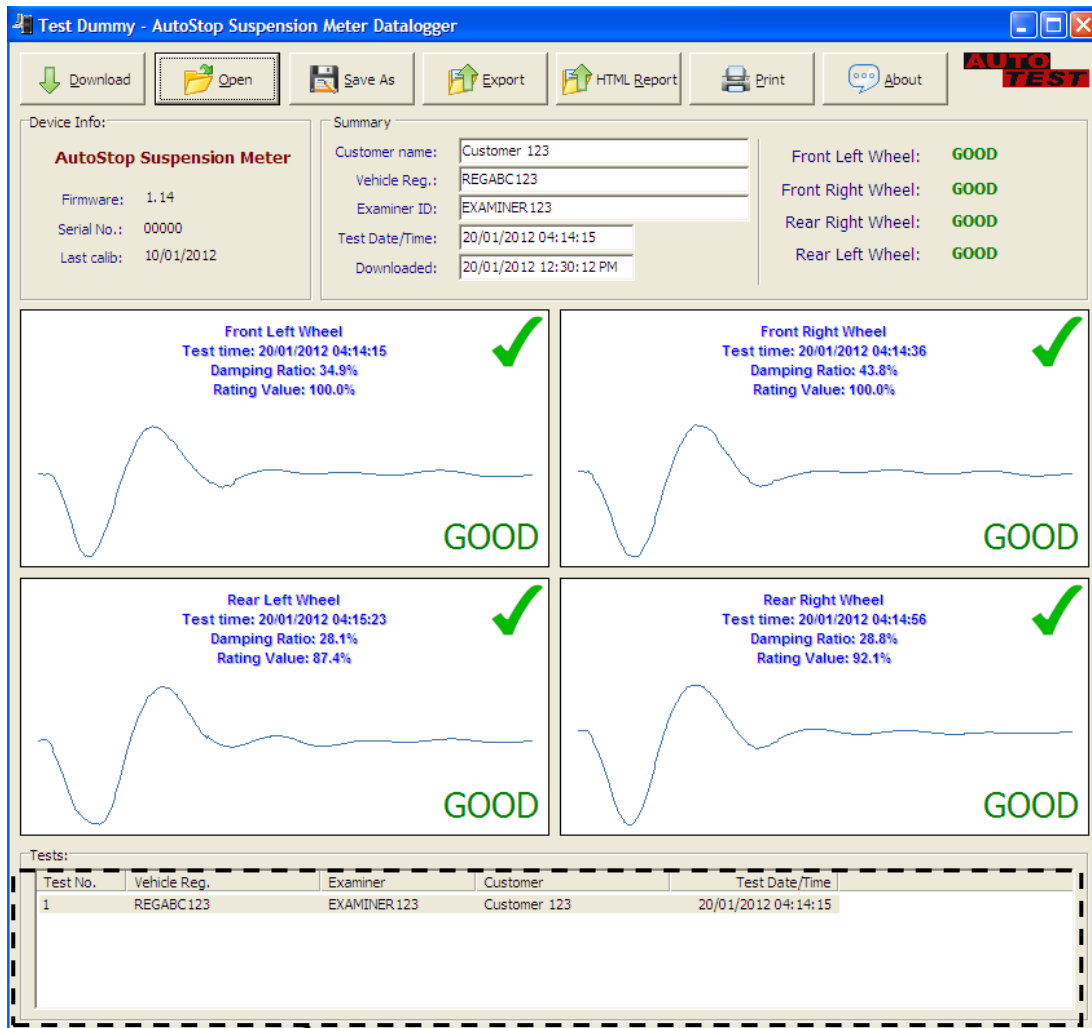
Select the tests that need to be downloaded and press Next. Datalogger software will then download the selected tests.



Once the desired tests have been downloaded, press Finish to return to the main window and view test results.

### 4.3 Using the Data Logger software

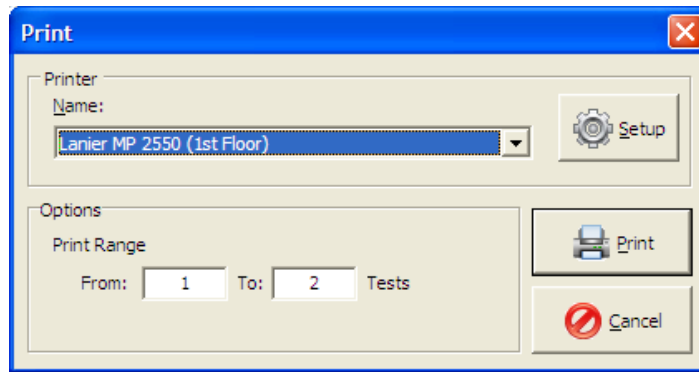
The Data logger will display all the saved tests and you can view the results of the particular test and view corresponding graph for each test.



List of all uploaded tests

There are options on the data logger such as:

1. **Open:** in order to open a saved file on your PC
2. **Save:** to save the results onto your PC
3. **Export:** this option can be used to view and save the test result in Microsoft Excel compatible format.
4. **HTML Report:** displays the suspension test report for the selected vehicle in a text format that can be selected and copied to another application such as Microsoft Word.
5. **Print:** this option can be used to print the test result. There are options to print unit details, test details and the data table.



6. **About:** to view information about Data logger.

## 5 TROUBLESHOOTING

Problem	Potential Cause and Action Necessary
Suspension Meter will not turn on	Internal electronics have failed - return unit for servicing.
Suspension Meter not recording keypad input	Keypad damaged- return unit for servicing.
Suspension Meter turns itself off during use	Battery flat-battery needs to be recharged.
Suspension Meter Displays " <b>Battery Flat</b> "	Battery flat-battery needs to be recharged.
Suspension Meter displays <b>Clock failed</b>	The in-built clock has failed. It might be an electronic fault, or the unit needs to be recalibrated. Please return unit for servicing & inspection.

## 6 WARRANTY

To ensure prompt warranty service should it be required, please complete warranty registration form, and return to AutoTest Products Pty Ltd within 10 days of purchase of the product.

AutoTest Products Pty Ltd or any Authorised AutoTest Service Centre warrants this product against defects in material and workmanship for a period of 12 months from the original date of purchase. This warranty applies only to products and components supplied by AutoTest Products which can be identified by the trade name or logo affixed to them or by other documents. AutoTest Products does not warrant any products not supplied by AutoTest Products.

During the warranty period, AutoTest Products or any Authorised Service Centre will repair (or at its option replace) any defective component(s) without charge for parts or labour, provided the product is returned freight prepaid to an authorised AutoTest Service Centre. Transit insurance and return freight will be at the owner's expense.

In order to obtain calibration, warranty or non-warranty service, ship the product, freight and insurance prepaid go to your nearest AutoTest Service Centre. Attach to the product your name, address, contact phone numbers, description of the problem and if a warranty claim, proof of purchase (dated sales receipt or invoice).

AutoTest Products or any Authorised AutoTest Service Centre reserves the right to refuse warranty repair if accident, abuse, misuse or misapplication has damaged the product. In transit or as a result of service or modification by other than an Authorised Service Centre, nor are any other warranties expressed or implied, including any regarding merchantability or fitness for any other particular purpose.

AutoTest Products or any Authorised Service Centre is not responsible for incidental or consequential damages resulting from the breach of any express or implied warranty, including damage to property and, to the extent permitted by law, damages for personal injury.

(Express exclusions from warranty) Unless otherwise specified, this warranty does not cover:

- a) modified, abused, neglected, accidentally damaged or excessively worn products, or products that have become damaged or defective as a result of improper use;
- b) repairs attempted or made by other than our regional repair centre or authorised warranty service centre;
- c) conditions or malfunctions caused by the reasonable effects of fair wear and tear or the malfunction of normally wearing parts, which include but are not limited to: Batteries, plugs and leads;
- d) consumable items, such as batteries (beyond 6 months from date of purchase);
- e) AutoTest products that are not distributed through AutoTest's authorised distributors and resellers.

(Warranty non-transferrable) This warranty is not transferrable beyond the original purchaser.

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