



Document Number: NJ-INT023

---

**New Jersey**  
**Enhanced Motor Vehicle**  
**Inspection/Maintenance System**

**NJ RPM**  
**Probe Usage Guide**

---

**Version: 1.1**

**Version Date:**

January 05, 2011

---

Developed by SGS Testcom Inc.



## NJ2009 RPM PROBE USAGE GUIDE

Document: NJ-INT023

Rev.: 1.1

Rev. Date: 01/05/2011

Page: i

### Document Title: NJ2009 RPM Probe Usage Guide

#### Includes:

Revision Level: 1.1

Revision Date: 01/05/2011

Document Status: Final

#### Approvals:

|                     | Printed Name | Signature |
|---------------------|--------------|-----------|
| Author(s)           | Tom McGowan  |           |
| SGS Reviewer        | Eric Morales |           |
| SGS QA Manager      | Scott Borman |           |
| SGS Program Manager | Eric Morales |           |

#### Record of Revision:

| Rev. Number | Rev. Date | Description of Revision  |
|-------------|-----------|--|
| 0.1         | 11/24/10  | Original draft of document   |
| 0.1         | 12/02/10  | Ready for review   |
| 0.2         | 12/03/10  | Addressed comments from review   |
| 1.0         | 12/06/10  | Final  |
| 1.1         | 01/05/11  | Revised:<br>Added section 3 OBD, Table of contents and new section<br>Added 3 new figures, 3-1, 3-2, 4-1, Table of figures needs |

| Rev. Number | Rev. Date | Description of Revision                                |
|-------------|-----------|--|
|             |           | linking to new figures<br>Update section 2, 2nd bullet |

Agencies Acceptance Needed?

Yes

No



## NJ2009 RPM PROBE USAGE GUIDE

Document: NJ-INT023

Rev.: 1.1

Rev. Date: 01/05/2011

Page: iii

### Agency Signatures:

| Signature  |   | Date |
|--|---|------|
| <b>Approved by:</b><br>[Client Acceptor's Name]<br>[Title]<br>[Organization] | William Wanschura<br>VIIS Team Leader<br>NJ DEP |      |
| <b>Approved by:</b><br>[Client Acceptor's Name]<br>[Title]<br>[Organization] |   |      |
| <b>Approved by:</b><br>[Client Acceptor's Name]<br>[Title]<br>[Organization] |   |      |
| <b>Approved by:</b><br>[Client Acceptor's Name]<br>[Title]<br>[Organization] |   |      |
| <b>Approved by:</b><br>[Client Acceptor's Name]<br>[Title]<br>[Organization] |   |      |

## Table of Contents

|   |           |
|---|-----------|
| <b>1. INTRODUCTION</b> .....                                | <b>1</b>  |
| <b>2. RPM PROBE USAGE IMPORTANT NOTES</b> .....             | <b>1</b>  |
| <b>3. OBD</b> .....   | <b>3</b>  |
| <b>4. WIRE CLAMP-ON PROBE</b> .....                         | <b>5</b>  |
| <b>5. SCAN TACH</b> .....                                   | <b>10</b> |
| <b>NJ2009 UNIT RPM PROBE TRAINING ACKNOWLEDGEMENT</b> ..... | <b>15</b> |

## Table Of Figures

|   |    |
|---|----|
| Figure 3-1:“Prepare the Vehicle” OBD RPM.....             | 3  |
| Figure 3-2: Getting RPM Values .....                      | 4  |
| Figure 4-1:Scan Tach .....                                | 5  |
| Figure 4-2: Scan Tach Power Switch in OFF position .....  | 6  |
| Figure 4-3: “Prepare the Vehicle” application screen..... | 7  |
| Figure 4-4: Idle Test RPM Capture .....                   | 8  |
| Figure 4-5: Select “Start Test”.....                      | 9  |
| Figure 5-1: Select "Previous" from RPM Screen.....        | 10 |
| Figure 5-2: Prepare the Vehicle Curb Idle Test .....      | 11 |
| Figure 5-3: Scan Tach Power Switch in ON position .....   | 11 |
| Figure 5-4: Set Scan Tach “SEL” to Low .....              | 12 |



## NJ2009 RPM PROBE USAGE GUIDE

**Document:** NJ-INT023

**Rev.:** 1.1

**Rev. Date:** 01/05/2011

**Page:** ii

|   |    |
|---|----|
| Figure 5-5: Sample Locations for Obtaining RPM Readings ..... | 13 |
| Figure 5-6: Sample Locations for Obtaining RPM Readings ..... | 14 |

## 1. INTRODUCTION

---

This document will be used to train PIFs on how to get RPM measurements.

## 2. RPM PROBE USAGE IMPORTANT NOTES

---



### **IMPORTANT NOTES REGARDING THE USE OF RPM PROBES.....**

- Turn off ALL Accessories (e.g., lights, air conditioning and radio).
- You should always attempt to obtain RPM measurement in the following sequence:
  - 1996 and newer vehicles
    - OBD
    - CLAMP-ON probe
    - SCAN TACH probe
  - 1995 and older vehicles
    - CLAMP-ON probe first; and if that is not successful
    - SCAN TACH probe second.
- Make sure you verify/validate the cylinder count displayed on the NJ2009 workstation to match the number of cylinders of the vehicle you are inspecting. If the cylinder information is not correct, please change the cylinder count by clicking on the pull down

menu and selecting the number of cylinders appropriately. An incorrect cylinder count will cause the RPM measurement to be inaccurate.

- There is no universal RPM probe capable of capturing accurate readings from all vehicles and engines. This is related to the different ignition and engine isolation types. BAR 97 and NJ DEP requires the NJ2009 PIFs Gas Analyzer Equipment to include at least two different types of tachometer probes to be able to capture from most vehicle makes and models.
- The RPM probes can be affected by the condition of the vehicle's electrical components (e.g., faulty wiring, damaged spark plug wires, and defective alternator) and variations in these conditions could result in the inability to capture stable or accurate RPM measurements.
- The phrase "RPM Bypass" means that the computer will continue the cruise and idle emissions test regardless of the RPM signal received from the vehicle. It does not mean that the cruise and idle emissions test themselves are bypassed and that the vehicle is to idle through the cruise test. When an inspector finds it necessary to bypass the RPM signal, the inspector must still raise the engine RPM off idle for the cruise portion of the test.



### 3. OBD

- For 1996 and newer vehicles select “**OBD**” as the RPM Probe. (See Figure 3.1)

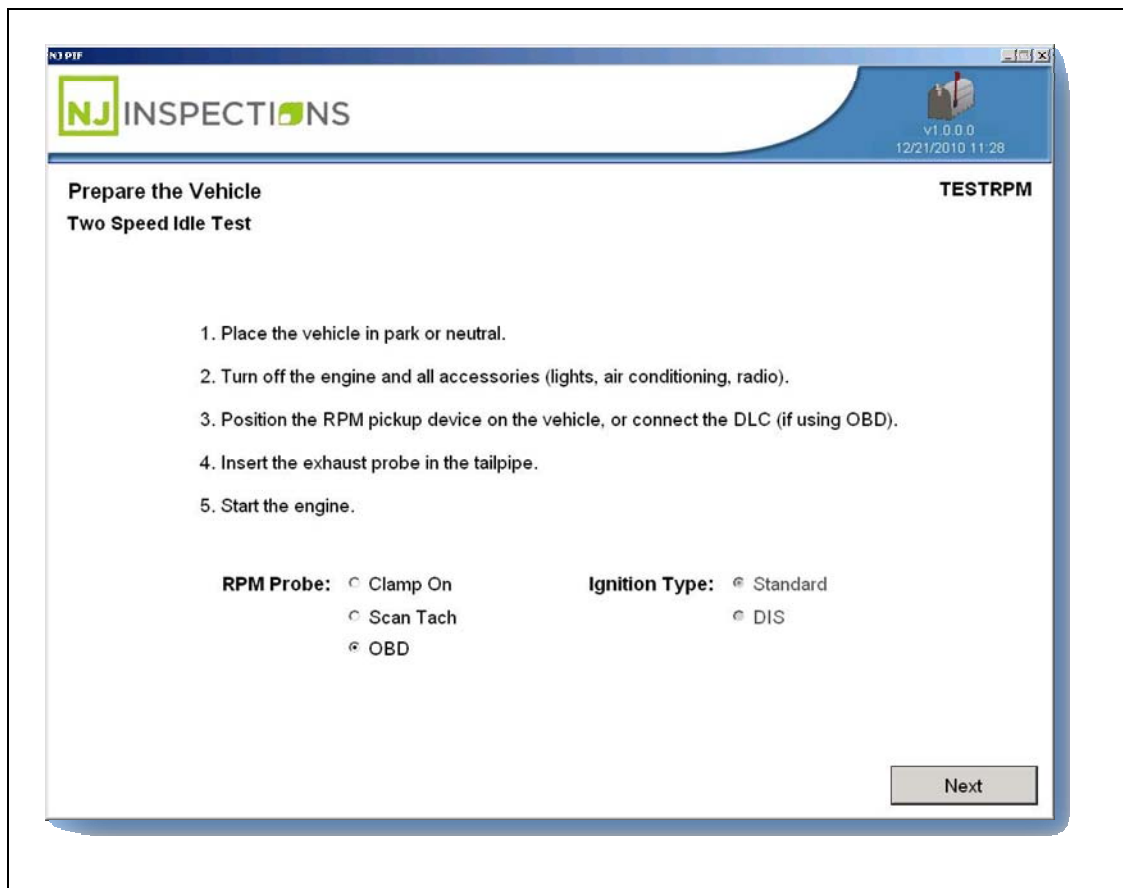


Figure 3-1: “Prepare the Vehicle” OBD RPM

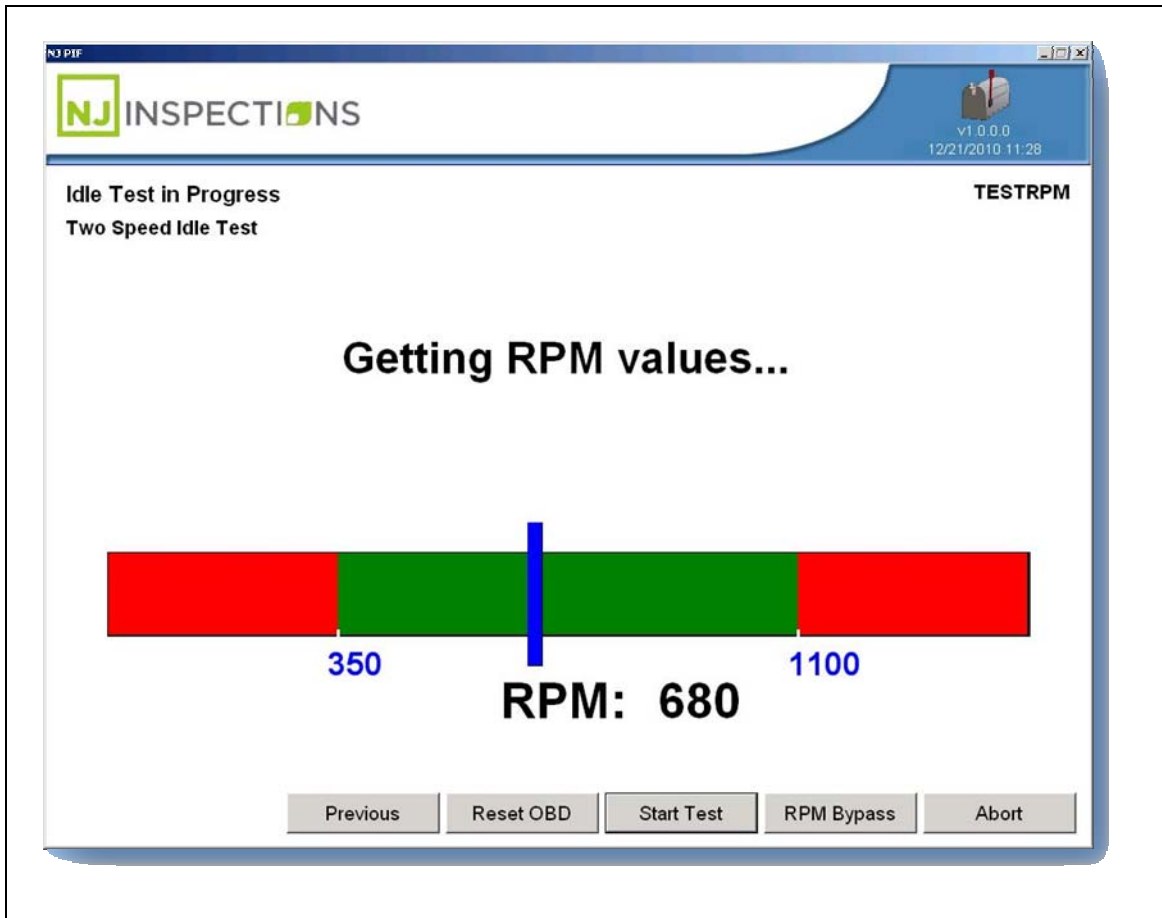


Figure 3-2: Getting RPM Values

- When idle readings stay within the green zone select “Start Test”.
- If no RPM is indicated select “Reset OBD”.
- If OBD RPM is still not indicated select “Previous” and proceed with Clamp-On probe in section 4.

## 4. WIRE CLAMP-ON PROBE

- Scan Tach must be powered off while using the wire clamp-on probe. (See Figure 4-1 and 4-2)



Figure 4-1: Scan Tach



Figure 4-2: Scan Tach Power Switch in OFF position

- On the “**Prepare the Vehicle**” application screen (See Figure 4-3 below), please be sure to:
  - Select “**Clamp On**” as the RPM Probe type and
  - Select the ignition type as “**DIS**” or “**Standard**” depending on the vehicle being tested.

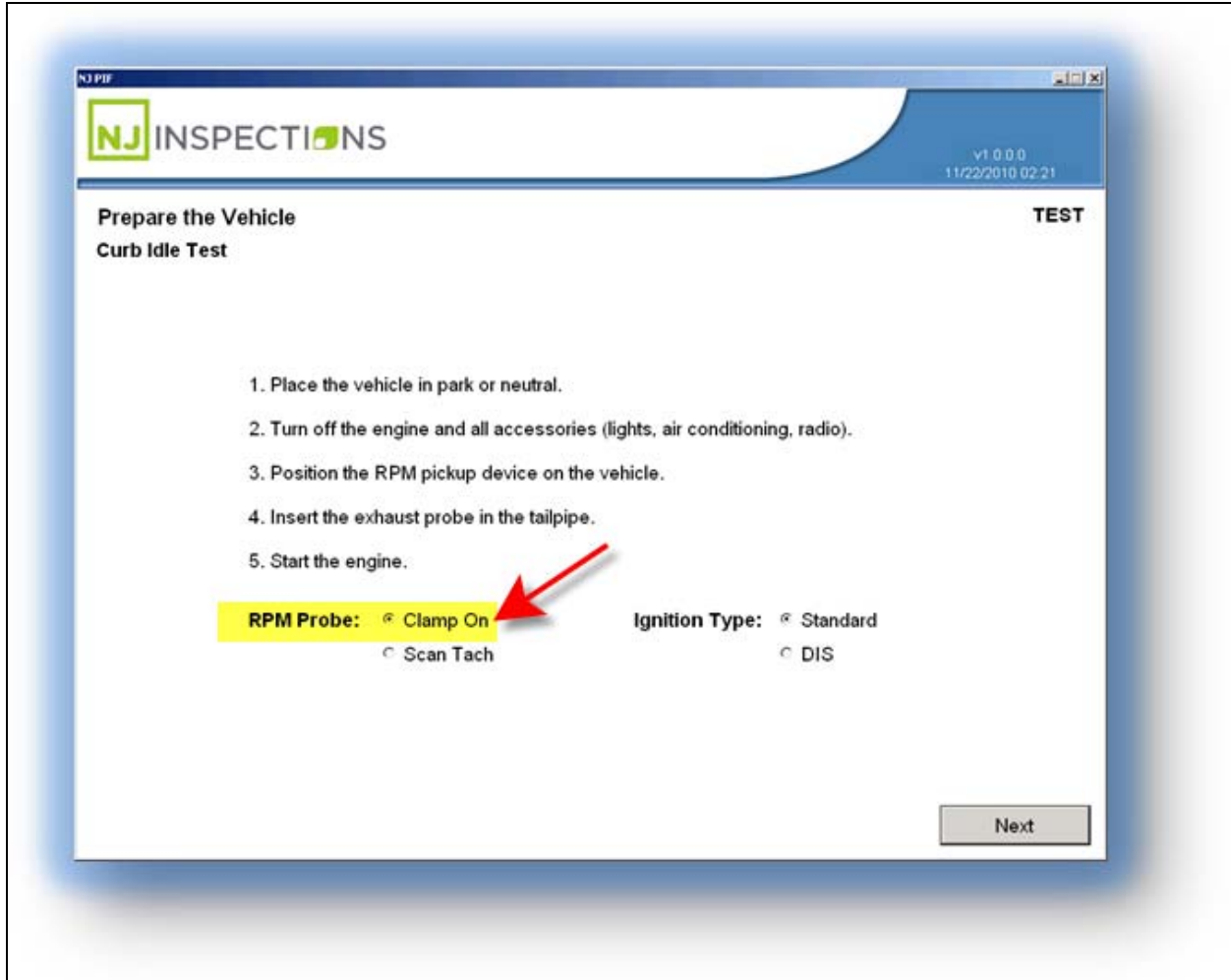


Figure 4-3: “Prepare the Vehicle” application screen



- NOTE: The clamp on probe is directional and must be positioned for correct polarity.
- While performing the Idle RPM capture (Fig 4-4 below), if the RPM readings are not stable (Out of the green zone more than 3 seconds) or no readings at all, please unhook the clamp on probe, rotate it 180°, and reconnect the probe.

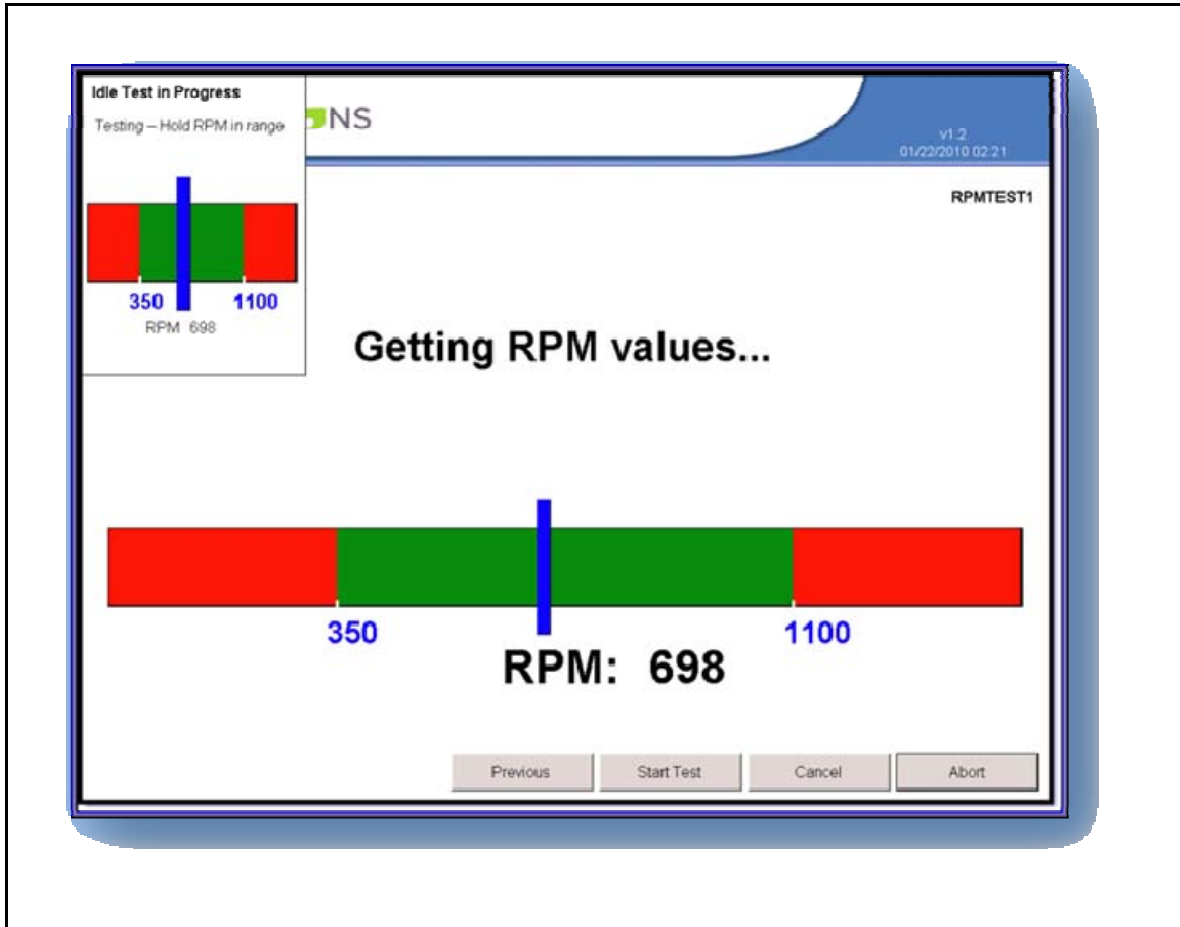


Figure 4-4: Idle Test RPM Capture

- When idle readings stay within the green zone accelerate the vehicle to 2500 RPM.
- Observe the digital RPM reading on workstation to validate it follows the vehicle.
- Return vehicle to idle and begin test by selection “**Start Test**” button shown at bottom of (Fig 4-5 below)

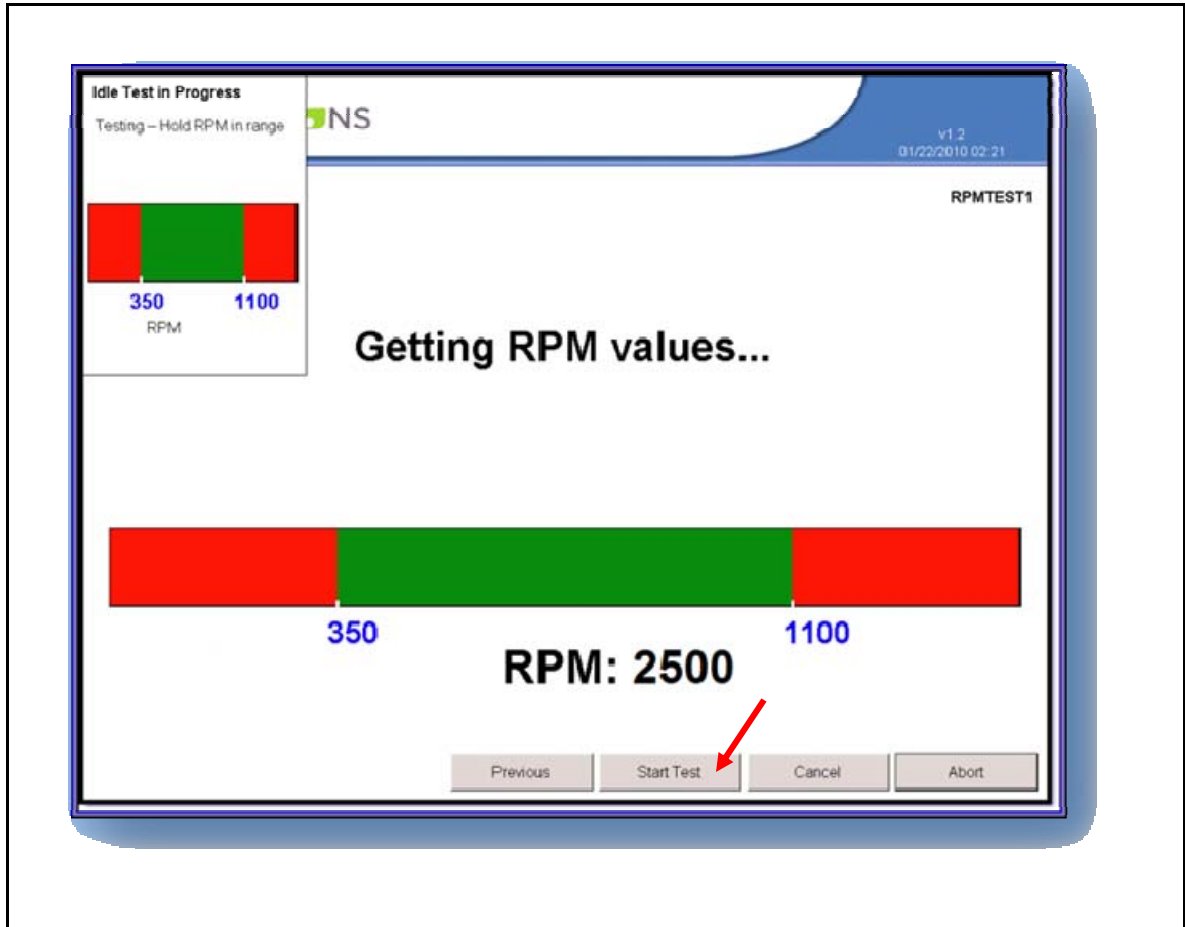


Figure 4-5: Select “Start Test”

- For DIS ignition with a **“Coil on Plug”** configuration, you should attach the clamp to the coil control wires leading into an individual coil. Placing the clamp around the bundled housing of multiple coil wires will give false readings.
- If RPM's cannot be captured using the clamp-on probe, proceed to the next section (Scan Tach).

## 5. SCAN TACH

- From the bottom of the RPM capture screen select the **“Previous”** button to return to the **“Prepare the Vehicle”** screen, and select **“Scan Tach”** as the RPM Probe type.
- See Figures 5-1 and 5-2 below.

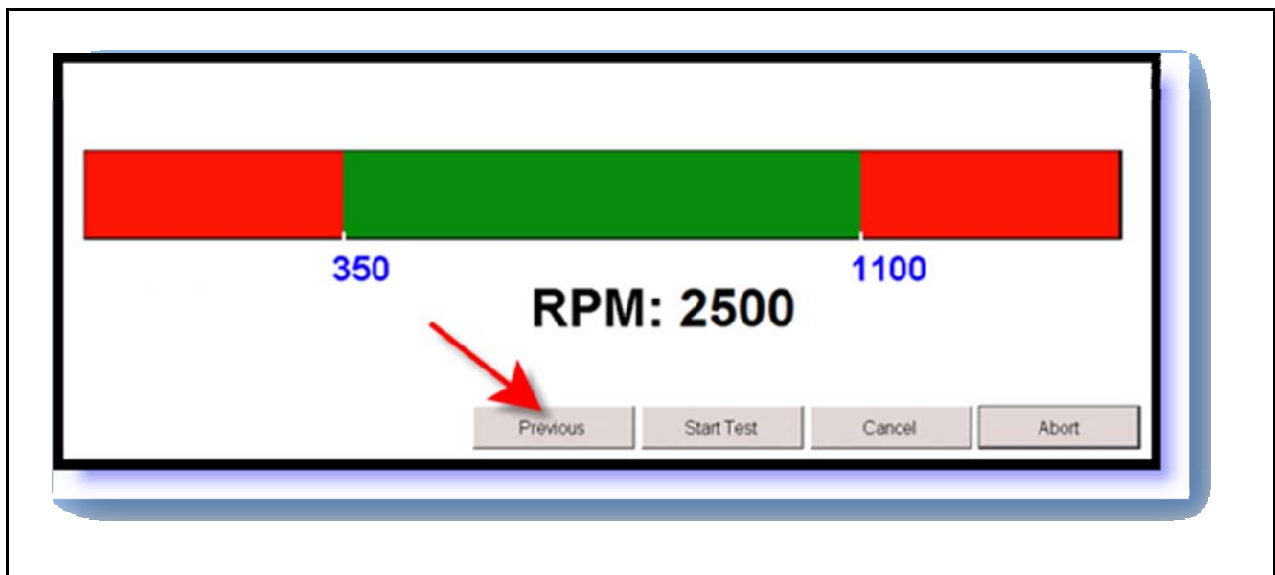


Figure 5-1: Select "Previous" from RPM Screen



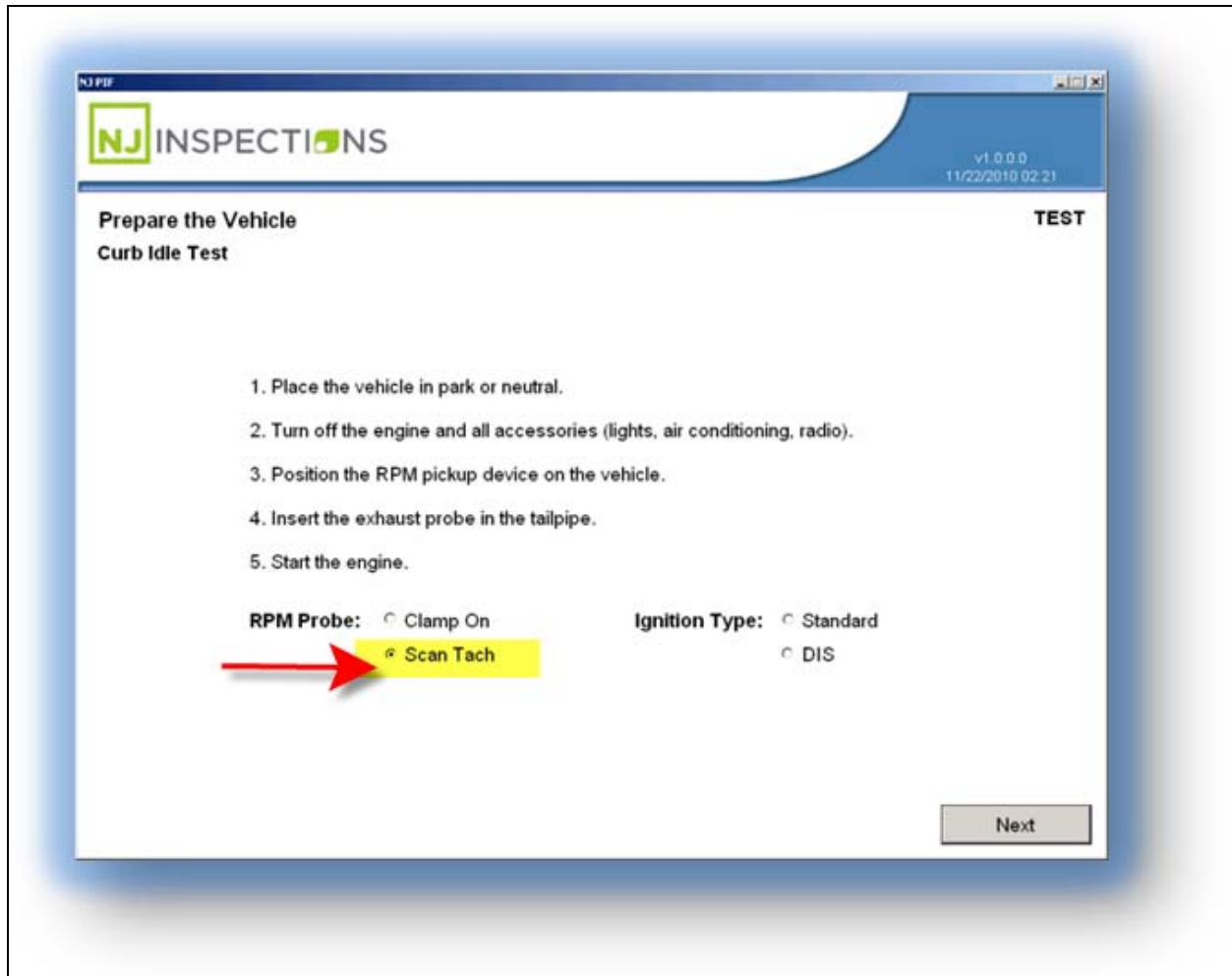


Figure 5-2: Prepare the Vehicle Curb Idle Test

- Turn the power switch to the “ON” position at the bottom of the Scan Tach unit prior to trying to capture RPM on the vehicle, and proceed to the next section below.



Figure 5-3: Scan Tach Power Switch in ON position

- The Scan Tach is a highly-sensitive antenna designed to detect the radio frequencies of the vehicle's ignition system each time a trigger powers a spark plug. There is no one specific location that will work on every vehicle due to the different engine designs and shielding under the hood. In general RPM's cannot be detected by placing the Scan Tach directly on top of a closed hood, or on the radiator in vehicles that are equipped with electric fans.

- Set the sensitivity of the Scan Tach unit at “**LOW**” by pressing the **SEL** button pictured (See Figure 5-4) until the **LED** next to “**LOW**” is illuminated.

**Figure 5-4: Set Scan Tach “SEL” to Low**



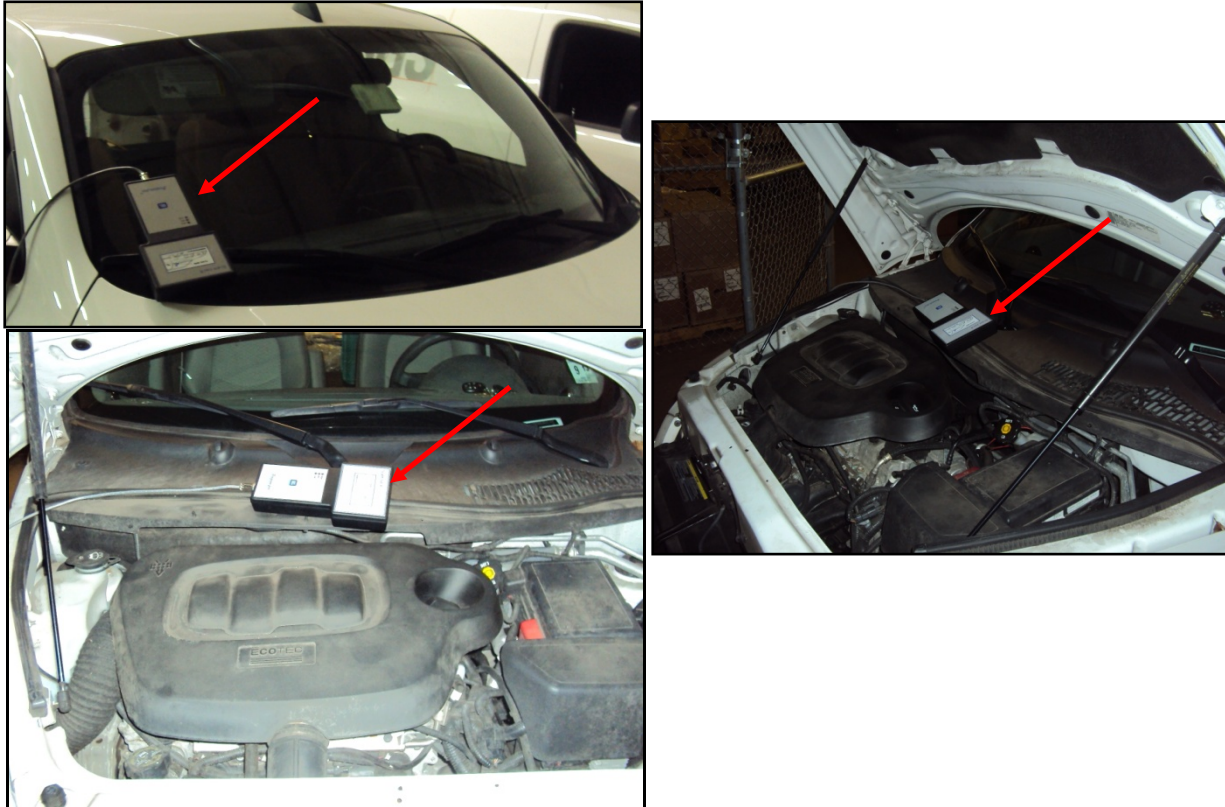
- When positioning the Scan Tach to read RPM, set the probe in one place for at least 3-5 seconds to allow for the RPM signal to be processed and transmitted. Continuous movement of the Scan Tach to different locations on the vehicle will prevent you from finding a stable RPM reading.
- As a starting reference point, place the Scan Tach unit in the center of the wiper cowl below the windshield. Move the unit in 2-inch increments from center of vehicle to passenger side leaving unit in place for 3-5 seconds at each point and observe RPM's displayed on work station. If RPM is not detected, change sensitivity to medium by pressing the blue SEL button on the Scan Tach, and repeat this step at each location.
  - Other locations where RPM measurements may be achieved with the Scan Tach (can vary by individual vehicle) are shown in Figure 5-5 below, and include:
    - Inside vehicle on dashboard;

- Floorboard;
- Windshield; and
- Van (inside vehicle on the engine cover or “dog house”).



Figure 5-5: Sample Locations for Obtaining RPM Readings

**Note:** Placing the **Scan Tach** directly on top of a closed hood **may not** detect RPM's.



**Figure 5-6: Sample Locations for Obtaining RPM Readings**

- When idle readings stay within the green zone, accelerate vehicle to 2500 RPM. Observe the digital RPM reading on workstation to validate it follows the vehicle. Return vehicle to idle and begin test by selection “**Start Test**” button.
- If you are unable to capture RPM measurements after following the steps outlined in this document, you will have the option to choose “**RPM Bypass**” on the workstation and continue on with the inspection process. Use of RPM bypasses will be monitored and limited, and excessive use may result in the lockout of your NJ2009 workstation.



---

## NJ2009 UNIT RPM PROBE TRAINING ACKNOWLEDGEMENT

---

I acknowledge that SGS has visited my station and demonstrated the proper use of the Clamp-On and Scan Tach RPM probes. I have also received a copy of this RPM capture instruction manual to keep with my NJ2009 unit for future reference.

PIF# \_\_\_\_\_

Date: \_\_\_\_\_

Station Representative Printed Name: \_\_\_\_\_

Station Representative Signature: \_\_\_\_\_

### **SGS USE ONLY**

SGS Training Representative Printed Name: \_\_\_\_\_

SGS Training Representative Signature: \_\_\_\_\_

FSR Retain signature page