Utah2011 Analyzer System (UTAH2011) Maintenance and Troubleshooting Manual

Part Number 910-0855

Applus+ Applus Technologies, Inc. - 4402 South Century Drive - Suite C-3 - Murray, UT 84123

Tel: (801) 904-2054 - Fax: (801) 904-2115 - Email: SLCStationSupport@applustech.com - www.applustech.com

SAFETY INFORMATION

Overview

For optimum safety, read this manual thoroughly and review the safety information provided with the equipment before performing any maintenance on the equipment. It is the responsibility of the technician to be knowledgeable of the equipment to be worked on. It is essential to use proper service and maintenance methods and to perform them in an appropriate and acceptable manner that does not endanger:

- Personal safety
- The safety of others in the work area
- The equipment being worked on.

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ABOUT THIS GUIDE

This guide uses a number of conventions to quickly help find and understand the information that is needed. Become familiar with these features to save time in the future.

Organization

This manual serves as both a training and a reference manual and thus is designed to accommodate both needs. Topics are presented in a general overview first and then explained more precisely as necessary. Essential tasks are explained using detailed, step-by-step instructions which follow normal operating circumstances. General topics common to all parts of emissions testing are usually presented in a single chapter; for example, pre-inspection procedures are necessary for all emissions tests and presented in its own chapter rather than repeating this information for each test. For the most, the structure of the manual reflects the organization of the software.

Unusual circumstances may be noted during a procedure, but are normally explained in detail in a separate section. This allows for concentration on the proper procedure for normal testing activity and eliminates confusion with special situations.

Chapter, heading, and book references appear in italics. For example: Refer to *"Safety Information" on page i*," for more information.

Document Icons

Throughout the guide icons (pictures) alert the user to crucial information. This information may indicate an alternate method, an unusual situation, a safety hazard, or the potential for unwanted consequences of varying severity. These symbols are explained below.

Cautions and Warnings

Warnings and Cautions also appear between two lines. These items alert to potentially dangerous or damaging situations. Cautions are less severe than warnings, but both must be followed to avoid damaging equipment or the test vehicle or injuring personnel.

WARNING

A RED TRIANGLE ICON MEANS FOLLOW THE INSTRUCTIONS EXACTLY! IGNORING THE WARNING CAN LEAD TO SEVERE INJURY OR DEATH TO SELF OR OTHERS, AS WELL AS DAMAGE TO THE UTAH2011 EQUIPMENT AND OTHER EQUIPMENT.

Caution

A YELLOW TRIANGLE ICON INDICATES ONE SHOULD USE CAUTION WHEN HANDLING A PIECE OF EQUIPMENT OR PERFORMING A PARTICULAR PROCEDURE OR PART OF A PROCEDURE. FAILURE TO HEED THE CAUTION SIGN MAY RESULT IN DAMAGE TO THE UTAH2011 EQUIPMENT OR THE TEST VEHICLE.

Tips and Notes

Tips and notes appear between two lines, as shown below. Tips and notes contain helpful hints or explanations regarding a special circumstance.

Tip

Refer to the instruction manual when in doubt as to how to perform a procedure.

NOTE

Notes contain information that may clarify what to do in special circumstances or if there are unusual results or conditions.

Format Guidelines

Bold

Text that appears in **bold**, such as **Power** or **COMM**, indicates an item that appears on the hardware, such as buttons and ports.

Text that appears in **bold** can also indicate an entry entered from the keyboard, such as **[Enter]**, **[Ctrl+c]**, or **[F4]** + **[h]**.

Italics

Text that appears in *italics*, such as *Licensing Menu*, indicates an item to click on, or select from, the display screen, or signals a screen or window name.

Text in italics can also refer to another publication or a cross-reference in this document. See *"Organization" on page vii*.

Messages and Commands

When a message or command is shown in the manual, it appears in Courier font:

```
Follow all safety messages!
```

Enter Information

- When using a mouse to select items on the monitor display, this action is indicated by the words “click” or “select”.
- When using a keyboard to select items on the monitor display, or to type in data, these actions are indicated by the words “press” and “enter”, respectively.
- The key to press on the keyboard is indicated between square brackets in bold; for example: “press **[Enter]**”.
- If two or more keys need to be pressed at the same time, a plus (+) sign appears between each key, in a single set of bold square brackets: **[Ctrl+c]**.
- Keys that need to be pressed one after the other appear in separate square brackets, separated by a plus (+) sign: **[F4]** + **[h]**.

NOTE

In the last example, **[F4]** is a function key labeled “F4”, not the “F” key and the “4” key.

Tip

“Select” is most often used to refer to choosing items from a list.

1 INTRODUCTION

Overview

Initial planning for equipment preventive maintenance relies on manufacturer guidelines and recommendations. Detailed records of equipment maintenance performed over time, coupled with operational experience accumulated on a day-to-day and month-to-month basis, are used to define schedules that most closely reflect how the UTAH2011 Analyzer System equipment actually performs in field for each program.

In general terms, the preventive maintenance plan and calibration schedule for the emissions testing equipment at each of the stations focuses on:

- Achieving an operational vehicle emissions-testing standard for performing consistent, uniform inspections that ensure the integrity of test results across the entire network.
- Ensuring that routine calibrations, periodic checks, and maintenance procedures are carried out per the equipment manufacturer's recommendations and according to requirements.
- Meeting and/or exceeding all jurisdictional requirements.
- Transmitting all data collected during checks/tests to program Vehicle Information Database (VID) for use in determining potential improvements to the preventive maintenance program. Subsequently, these data are analyzed to determine what, if any, changes are needed to enhance the effectiveness of future preventive maintenance schedules. In addition, all data collected are available for use in statistical analysis.

- Identifying any equipment component that is defective and could adversely affect test results. In such an event, the test bay is not opened until the equipment is repaired or the malfunctioning component replaced.

UTAH2011-initiated prompts to indicate when scheduled maintenance is due and online, context-sensitive access to step-by-step instructions for performing each procedure ensures safe, accurate testing of Utah's motor vehicle fleet.

2 TECHNICIAN-PERFORMED MAINTENANCE

Overview

Technicians perform regular preventive maintenance procedures including inspection and (if necessary) replacement of consumables such as filters, sample hoses, and probes. Technicians also carry out equipment performance checks that exceed automated Workstation checks. These measures are intended to maintain optimal test accuracy and reduce any downtime that could otherwise occur due to equipment or calibration failures.

During the preventive maintenance process, if any component affecting a subsection of the test is replaced or repaired, corresponding calibrations are performed to assure that test integrity has not been affected (for example, repairing a faulty solenoid valve calls for a sample system leak check and a two-point calibration).

FIGURE 2-1: Preventive Maintenance: Parts Repair / Replacement

Responsibility

The Applus team is responsible for coordinating all preventive maintenance and calibration activities throughout the network. In this capacity, duties include:

- Prioritizing and scheduling all work assignments for the technicians based upon achieving minimal disruption to operational effectiveness;
- Maintaining a sufficient inventory of replacement spares and components at the central base as well as in the technician's vehicles;
- Working with equipment manufacturers and component suppliers to resolve performance, maintenance, and support issues;
- Ensuring that all defective equipment and tools are repaired and/or replaced;
- Monitoring the results of all scheduled preventative maintenance and unscheduled maintenance and, based upon the data accumulated over a period of time, identifying what changes should be made to schedules in order to optimize operational effectiveness;
- Analyzing maintenance and calibration data accumulated over time and held in the host computer database, and preparing reports and recommendations for operation's management on maintenance issues.

3 AUTOMATED AND INSPECTOR-PERFORMED MAINTENANCE

Overview

The UTAH2011 incorporates extensive automated functionality to ensure the accuracy of emissions tests and alert inspection personnel when service is required. On-board UTAH2011 workstation functions include regularly scheduled automated calibrations and/or accuracy checks for all of the primary systems. These functions ensure that emissions test hardware operates to specifications and that consistent calibration are performed correctly and regularly (i.e., according to specifications).

The workstation automatically detects malfunctions within the analytical equipment during operation. If critical quality-assurance limits are exceeded during a vehicle test, the UTAH2011 aborts the test and prompts the inspector to take corrective action. For other maintenance/ QA actions, the UTAH2011 prompts the user to initiate or perform the required procedure.

Required calibration/checks also may be initiated manually through the UTAH2011 *Analyzer Maintenance Menu*. These additional quality assurance functions, which are built into workstation software for audit and calibration purposes, are initiated manually and performed with manual data entry.

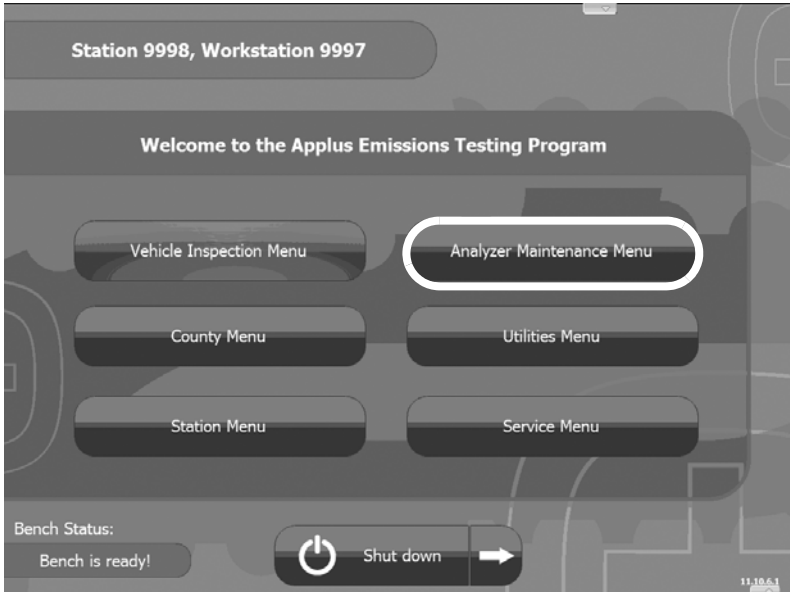


FIGURE 3-1: ***Analyzer Maintenance Menu*** **Button**

TABLE 3-1. UTAH2011 Self Tests & Calibrations, Schedule & Procedures

Procedure	Equipment	Frequency	Performance	Type
Gas Analyzer Zero and HC Hang-up Check	Gas Analyzer	Before every TSI test	Automatic	Built-in QA/QC
Real-time test parameter limits (Low Flow, Sample Dilution, RPM out of Range)	Gas Analyzer	During every test	Automatic	Built-in QA/QC
2-Point Span	Gas Analyzer	Every 72 hours	Automatic	Calibration
Leak Check	Gas Analyzer	Every 72 hours and after any sample system connection break	User Prompt	Calibration

Procedure	Equipment	Frequency	Performance	Type
O_2 Zero	Gas Analyzer	Every test	Automatic	Calibration
Check for paper and toner	Printer	Before every test (If printer health monitor reports that printer is out of paper or toner the UTAH2011 warns Inspector to replenish supply)	Automatic	Built-in QA/QC

Regularly scheduled maintenance and quality assurance functions are described in the following sections.

Gas Analyzer

Sample System Leak Check

Leaks in the raw sample system can affect the accuracy of the measured emissions levels. To ensure that any such leaks are detected early, leak checks are required by the UTAH2011 workstation with a default frequency of 72 hours. The UTAH2011 is not able to perform vehicle tests until it passes the regularly scheduled leak check.

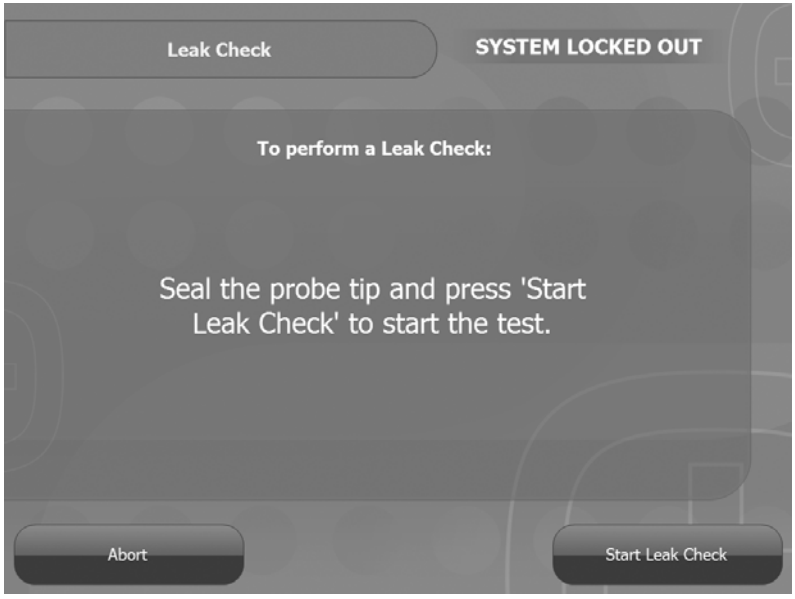


FIGURE 3-2: Start Leak Check

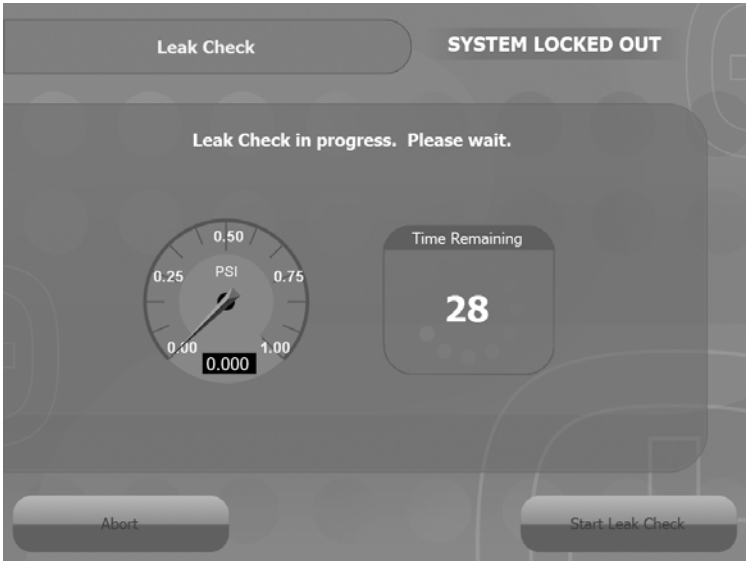


FIGURE 3-3: Leak Check Progress

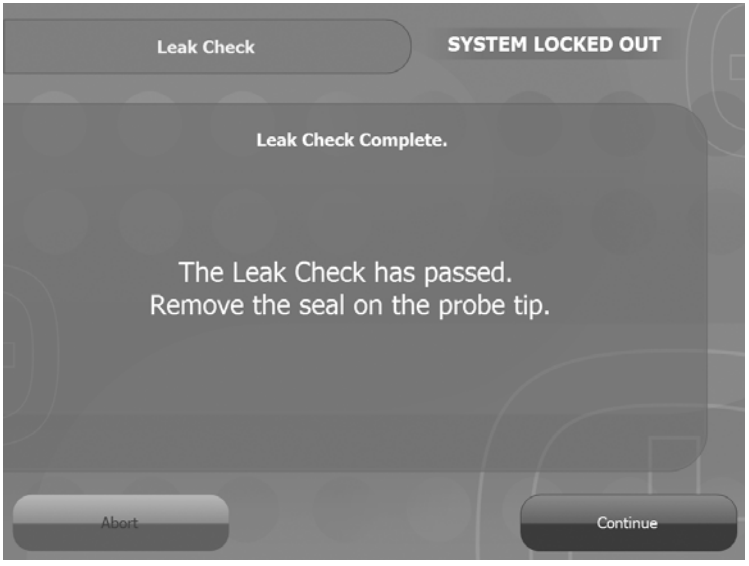


FIGURE 3-4: Leak Check Complete

Gas Analyzer Calibration

The UTAH2011 gas analyzer automatically requires a gas calibration for hydrocarbons (HC), carbon monoxide (CO), carbon dioxide (CO_2), and oxygen (O_2) every 72 hours (or as otherwise configured). If it does not pass the calibration, the gas analyzer is automatically locked out, preventing it from performing TSI emissions tests.

NOTE

Although the gas analyzer test is locked out, the workstation may still be used to perform tasks other than TSI inspections.

Workstation gas analyzers receive a two-point gas calibration with a high-gas blend and a low-gas blend. The span gases used for the calibrations are traceable to U.S. National Institute of Standards and Technology (NIST) standards within 2% of the required span points.

The span points used for the gas analyzer are as close as possible to those listed in the accompanying table.

TABLE 3-2. Calibration Gas Span Points

Gas	Low Point	High Point
Propane	200 ppm	3200 ppm
CO (carbon monoxide)	0.50%	8.0%
CO_2 (carbon dioxide)	6.0%	12.0%
O_2 (oxygen)	0%	0%

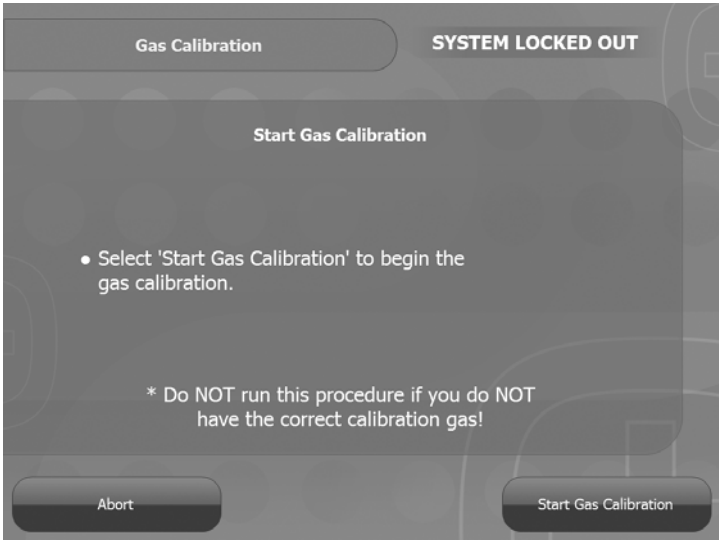


FIGURE 3-5: Start the Gas Calibration

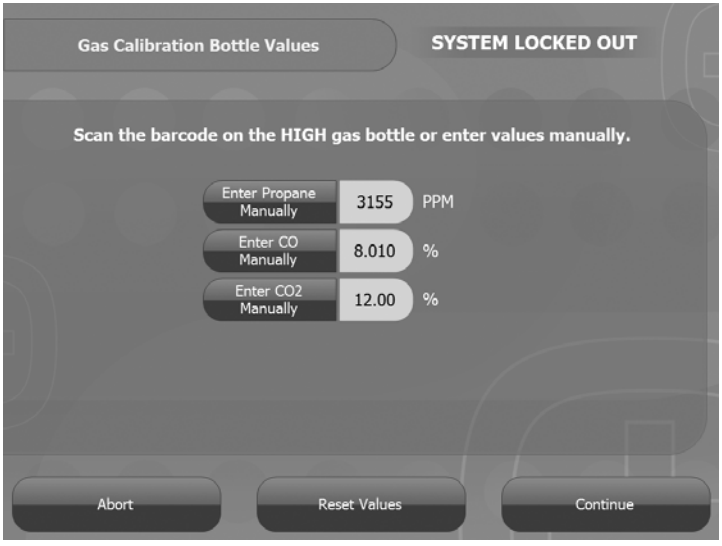


FIGURE 3-6: Gas Calibration Step

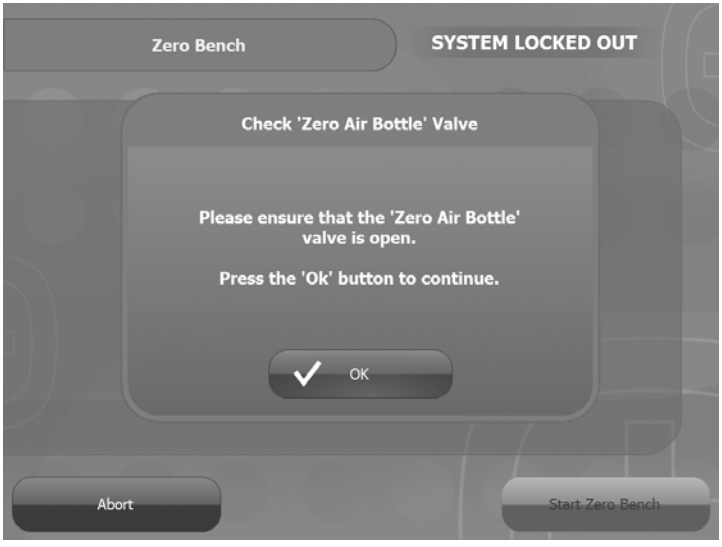


FIGURE 3-7: Gas Calibration Step

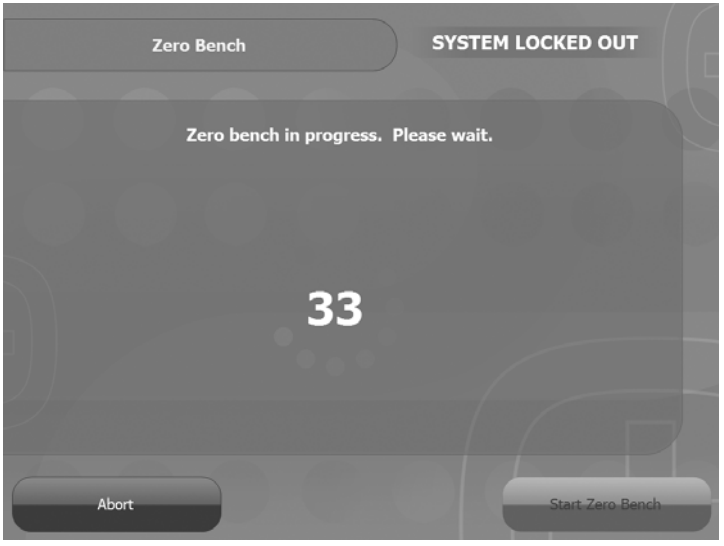


FIGURE 3-8: Gas Calibration Timer

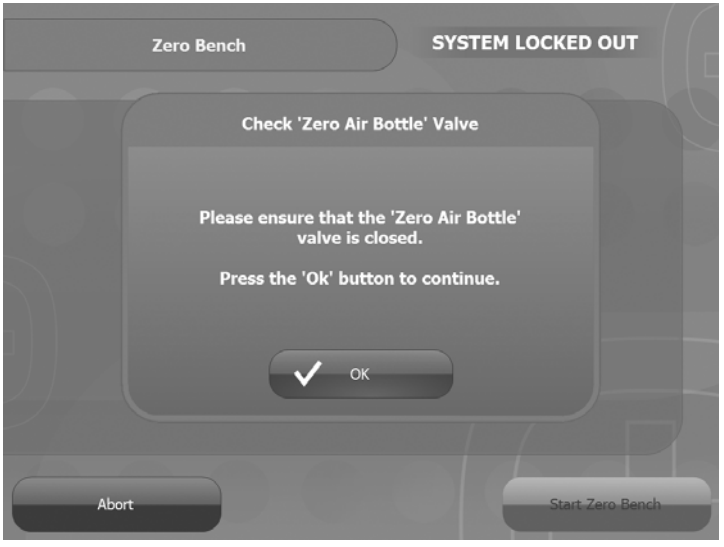


FIGURE 3-9: Gas Calibration Step

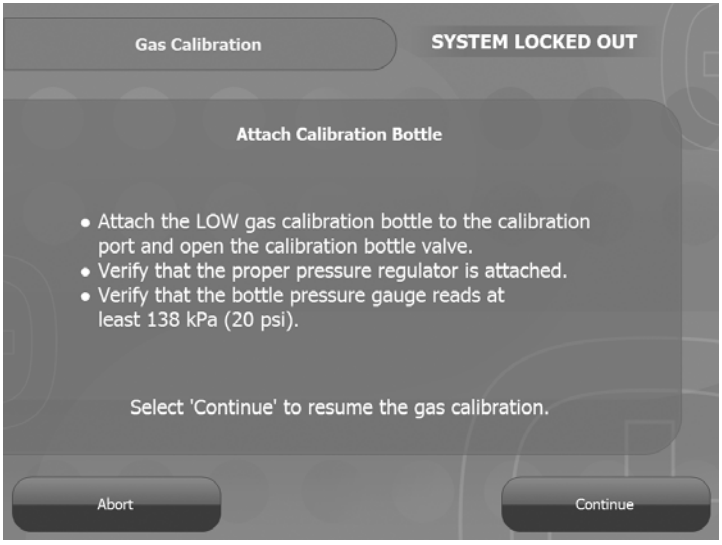


FIGURE 3-10: Gas Calibration Step

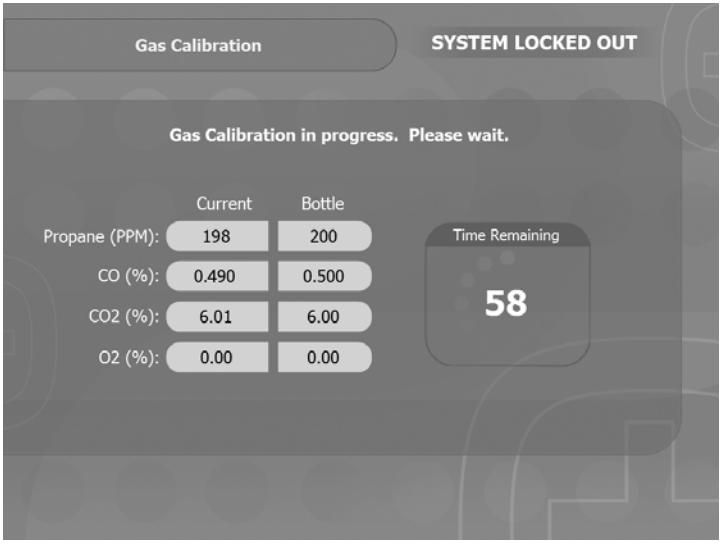


FIGURE 3-11: Gas Calibration Timer

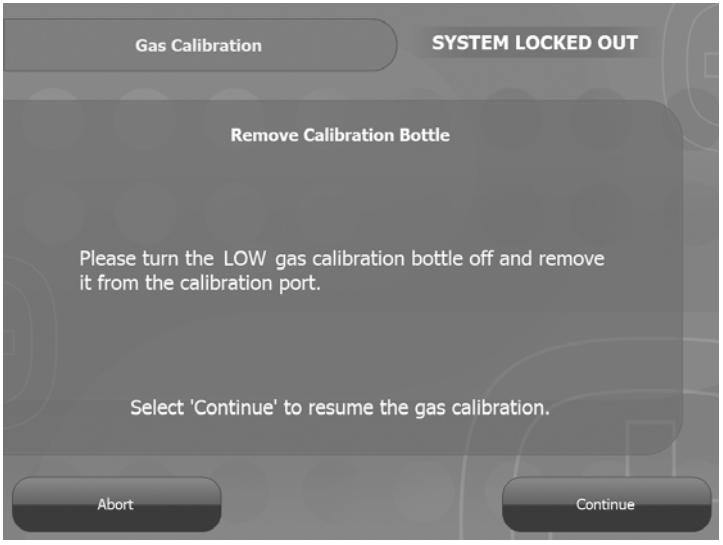


FIGURE 3-12: Gas Calibration Step

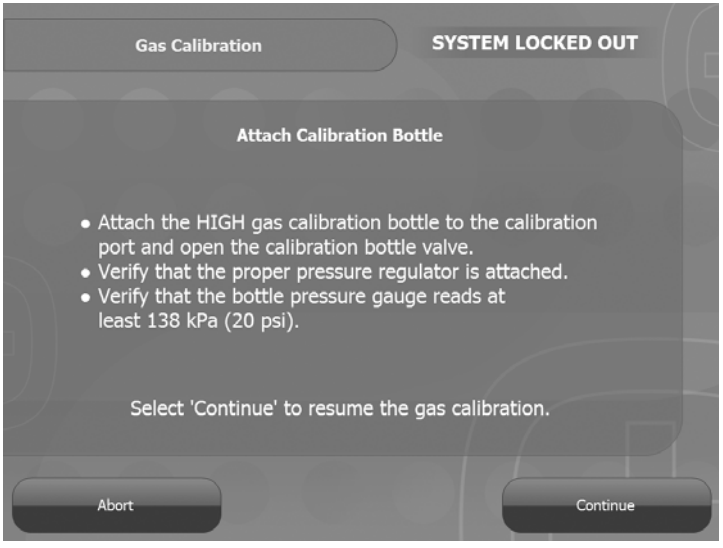


FIGURE 3-13: Gas Calibration Step

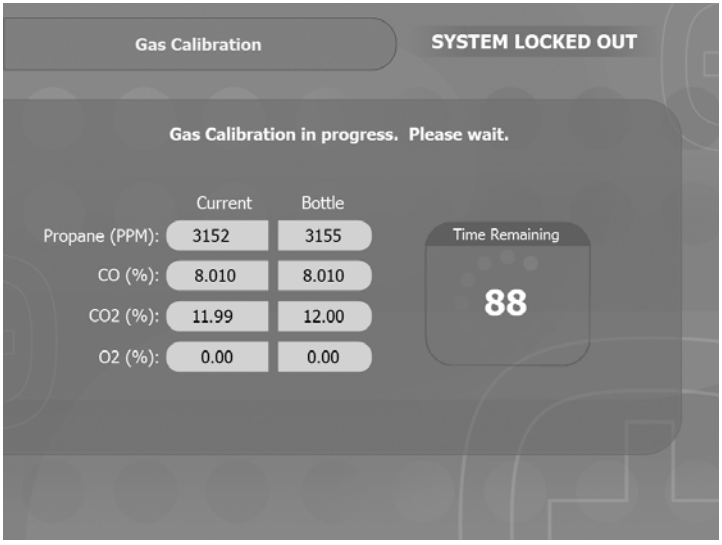


FIGURE 3-14: Gas Calibration Timer

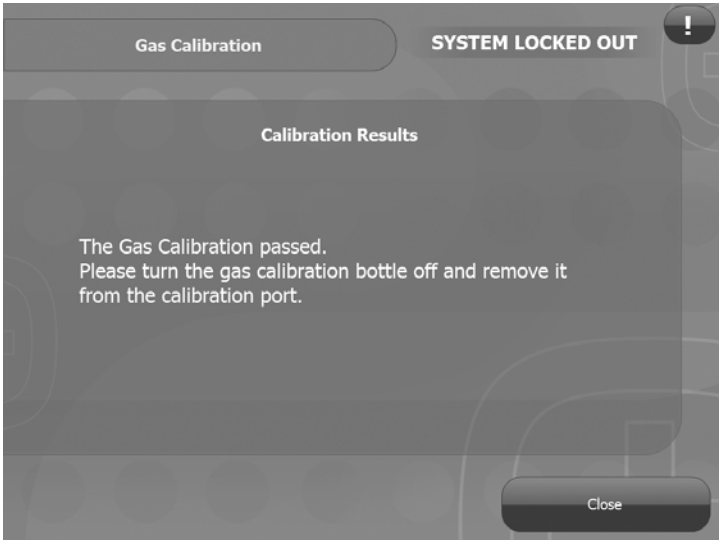


FIGURE 3-15: The Unit Passed the Gas Calibration

Low Sample Flow

If a low flow condition exists in the sample system when the sample pump is operating, the workstations notify the Inspector by setting a STAT4 error message. This typically occurs if the filters are excessively dirty and need to be changed or if the sample hose or the pump discharge tubes are restricted.

NOTE

If the probe tip cap is left on after a leak check is performed, a STAT4 error message displays.

This quality assurance monitor runs continuously in the background during operation of inspection equipment. Test restarts or aborts automatically occur if the UTAH2011 detects equipment problems.

Dilution Factor

Workstation software detects and compensates for dilution by adjusting concentrations based on an expected carbon dioxide (CO_2) and carbon monoxide (CO) balance. If leaks in the probe or other user errors create dilution levels beyond pre-set limits, the test is invalidated, and a retest and appropriate repairs are required.

This quality assurance monitor runs continuously in the background during operation of inspection equipment. Test restarts or aborts automatically occur if the UTAH2011 detects equipment problems.

4 VISUAL CHECKS AND MANUAL PREVENTIVE MAINTENANCE TASKS

Overview

TABLE 4-1. Inspector-Performed Preventive Maintenance: Visual Checks and Manual Tasks

OBD	Cable:	Check daily for damage
Gas Analyzer System	Water Trap/Filter:	Inspect after every TSI test and clean as needed
	Calibration Gas Regulators:	Inspect daily for damage
	Cabinet Intake Air Filter:	Inspect weekly, clean/replace as needed
	Exhaust Probes:	Inspect daily for damage and replace as needed
RPM/Tachometer	RPM Kit/ Tachometer:	Check periodically for accuracy

OBD

Inspect the OBD cable daily for damage, in particular looking for burns, cuts, slices, or bad connections. Cables should not be twisted or kinked, as this can hinder their ability to read properly. When not in use, roll and hang up cables so they are off the shop floor.

Gas Analyzer

Sample and In–line Filters

Visual inspection of the sample and in–line filter assemblies entails:

- Checks for damage to any elements of the sample filter housings or in–line filters, for example, cracks in filter bowls
- Checks for excessive dirt or debris on filter elements
- Checks for water accumulation in the bottom of the filter bowls after every TSI test

Primary Filter with Water Separator

The primary filter assembly on the UTAH2011 is equipped with a bonded microfiber filter that requires routine evaluation and replacement. The filter housing or bowl (also known as a water trap) collects water and small particles that may be drawn in through the holes on the exhaust sample probe. The primary filter requires replacement at least monthly (or more frequently, depending on the number of tailpipe tests performed).

The primary filter must be replaced when the element is dirty, discolored, or otherwise contaminated or when it is water soaked or damaged. Because this filter keeps debris from entering the gas analyzer, keeping it clean supports accurate emissions samples.

- If the primary filter or the water separator is clogged, it can cause low flow
- If the primary filter or the water separator is contaminated, it could result in HC hang up

NOTE

Check the primary filter first as that is more likely to clog or become contaminated.

When replacing the primary filter, also clean the filter bowl with a clean rag or paper towel and warm soapy water.

When a component related to the primary filter assembly needs to be removed for maintenance or service:

1. Perform a Leak Check Calibration and verify that the sampling system is leak-free.
2. Once the UTAH2011 has passed its leak check, disassemble the primary filter assembly by disconnecting the hose from the plastic 90-degree elbow (located on the base of the filter bowl).
3. Loosen/remove the filter bowl from the filter bowl head, making sure that the O-ring stays on the filter bowl.
4. Loosen/remove the Tie Rod Element Retainer.
5. Remove and replace the Primary Filter.
6. Clean the filter bowl with warm, soapy water, rinse, and dry using a clean rag or paper towel.

NOTE

Never use chemicals such as brake/carburetor cleaner or industrial solvents such as 409®, Fantastik®, or Windex® to clean the filter or bowl. Their residual vapors contaminate the gas analyzer.

7. Reverse steps 3 thru 5 for reassembly.
8. Perform a Leak Check Calibration to verify the sampling system is once again intact and has no leaks from any of the steps above.

Secondary Filter

The smaller of the two filter assemblies, the secondary filter assembly is located on the back of the UTAH2011. This secondary filter requires inspections after each TSI test (with replacement as necessary) and must be changed at least every two months (or more frequently depending on the number of tailpipe tests performed).

The primary filter must be replaced when the element is dirty, discolored, or otherwise contaminated or when it is water soaked or damaged. Because this filter keeps debris from entering the gas analyzer, keeping it clean supports accurate emissions samples.

- If the filter is clogged, it can cause low flow
- If the filter is contaminated, it could result in HC hang up

This filter accumulates dirt from the inside of the filter. Therefore it must be removed to inspect and evaluate its condition.

When replacing the primary filter, also clean the filter bowl with a clean rag or paper towel and warm soapy water.

When a component related to the secondary filter assembly needs to be removed for maintenance or service:

1. Perform a Leak Check Calibration and verify that the sampling system is leak-free.
2. Once the UTAH2011 has passed its leak check, disassemble the secondary filter assembly by disconnecting the hose from the plastic 90-degree elbow (located on the base of the filter bowl).
3. Loosen/remove the filter bowl from the filter bowl head, making sure that the O-ring stays on the filter bowl.
4. Loosen/remove the Tie Rod Element Retainer.
5. Remove and replace Secondary Filter.
6. Clean the filter bowl with warm, soapy water, rinse, and dry using a clean rag or paper towel.

NOTE

Never use chemicals such as brake/carburetor cleaner or industrial solvents such as 409®, Fantastik®, or Windex® to clean the filter or bowl. Their residual vapors contaminate the gas analyzer.

7. Reverse steps 3 thru 7 for reassembly.
8. Perform a Leak Check Calibration to verify the sampling system is once again intact and has no leaks from any of the steps above.

Probes and Hoses

Perform a visual examination to:

- Check the probe's flex and solid sections for visible damage. The probe is considered damaged if it is pinched so that flow could be restricted or leaking.
- Check the hose for damage. The hose is considered damaged if it is kinked or melted so that flow could be restricted or leaking, or if the quick-connect fitting for the auxiliary hose is damaged or leaking.
- Verify that the probe is connected to the main hose or the workstation cabinet.
- Verify that the auxiliary hose and sample probe (for testing dual-exhaust vehicles) are not damaged or modified in a way that could affect the accuracy of the readings.

Replace parts as required.

Engine RPM

The Engine RPM must remain within defined limits for TSI tests. If higher or lower RPM levels are obtained, emissions may be affected. The UTAH2011 provides a warning and automatically restarts the test if an RPM is outside of target levels for too long.

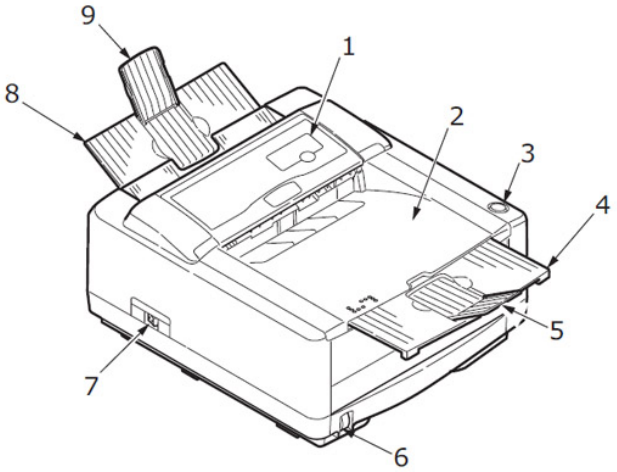
This quality assurance monitor runs continuously in the background during operation of inspection equipment. Test restarts or aborts automatically occur if the UTAH2011 detects equipment problems.

To verify that the UTAH2011 RPM kits are properly functioning, compare the vehicle's tachometer reading to that of the UTAH2011-reported RPM. This process applies to inductive and battery kits.

Printer

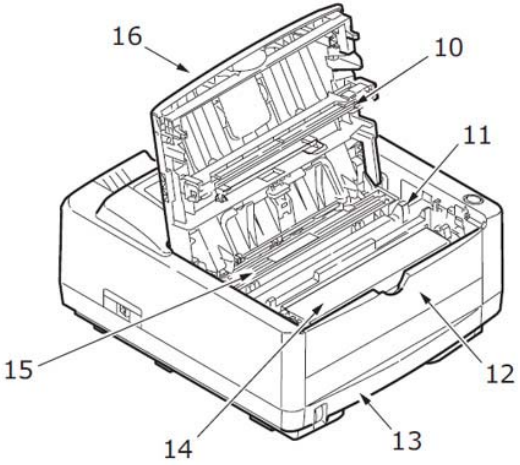
The system uses an Okidata® B4600 printer.

Overview



1. **Operator Panel**
2. **Output Stacker**
3. **Top Cover Release Button**
4. **Output Stacker Extension**
5. **Output Stacker Extension Paper Guide**
6. **Paper Tray Content Indicator**
7. **ON/OFF Switch**
8. **Rear Output Stacker**
9. **Rear Output Stacker Paper Guide**

FIGURE 4-1: Overview, Outside



10. **LED Array**
11. **Image Drum**
12. **Manual Feed Tray (Shown Closed)**
13. **Paper Tray**
14. **Toner Cartridge**
15. **Fuser Unit**
16. **Top Cover**

FIGURE 4-2: Overview, Inside

Replacing Paper

1. Remove the paper tray from the bottom of the printer and place plain paper in the tray, keeping the level of the paper in the tray below the guide arrowheads (1) shown on the paper guides.

   When topping up the paper in the paper tray, first remove the remaining paper from the tray, then add the new paper stock followed by the old stock. (Ensuring that the oldest paper is used first can help prevent jams.)

2. Adjust the rear paper support (2) to the size of the paper you are using by gripping the lugs (3), tilting and sliding the support forward or backward as necessary.

3. Adjust the paper guides (1) to ensure that paper is not skewed in the print process.

4. Replace the tray in the printer. The paper level indicator (4) provides a visual indication of how much paper is left in the tray.

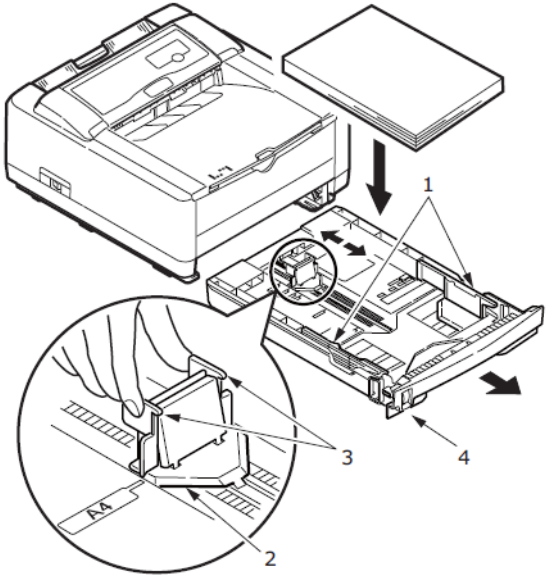


FIGURE 4-3: Installing Paper in the Printer

Clearing Paper Jams

Input Jam

1. Remove the paper tray from the printer.
2. Remove any crumpled or folded paper.
3. Remove any paper from the underside of the printer.
4. Replace paper tray.

After successfully removing any damaged or mis-fed paper, the printer automatically continues printing.

Feed Jam or Exit Jam

1. Remove the paper tray from the printer.
2. Remove any crumpled or folded paper.
3. Remove any paper from the underside of the printer.

Caution

IF THE PRINTER HAS BEEN OPERATING, THE FUSER MAY BE HOT. AVOID CONTACT WITH THE AREA LABELED “DO NOT TOUCH.”

4. Open the top cover.

Caution

BE CAREFUL NOT TO TOUCH OR SCRATCH THE GREEN DRUM SURFACE. ALWAYS HOLD THE IMAGE DRUM UNIT BY THE ENDS OR FROM THE TOP. NEVER TOUCH THE SURFACE OF THE GREEN DRUM INSIDE THE IMAGE DRUM UNIT.

Caution

NEVER EXPOSE THE IMAGE DRUM UNIT TO LIGHT FOR MORE THAN 5 MINUTES. NEVER EXPOSE THE IMAGE DRUM UNIT TO DIRECT SUNLIGHT OR VERY BRIGHT ROOM LIGHT.

5. Carefully lift out the image drum, complete with the toner cartridge.
6. Remove any jammed sheets from the paper path.
7. Re-install the image drum complete with toner cartridge. Make sure that it correctly locates into the slots on each side of the printer.
8. Close the top cover and press down to latch it closed.
9. The printer warms up and begins printing when ready. The page lost through the jam is normally reprinted.

Replacing the Toner Cartridge

When toner is running low, *TONER LOW* displays on the operator panel LCD. If printing continues without changing the toner cartridge, *CHANGE TONER* displays and printing is cancelled. Printing resumes after a new cartridge is installed.

The toner used in this printer is a very fine, dry powder, so it is recommended that the LED be cleaned at the same time as the toner cartridge is changed.

1. Switch off the printer
2. Allow the fuser to cool for about 10 minutes before opening the top cover.

Caution

IF THE PRINTER HAS BEEN OPERATING, THE FUSER MAY BE HOT. AVOID CONTACT WITH THE AREA LABELED “DO NOT TOUCH.”

3. Press the top cover release button and open the printer’s top cover fully.

4. Pull the colored lever on the right side of the toner cartridge toward the front of the printer. Remove the used toner cartridge.
5. To install the new cartridge, follow the instructions on or inside the box containing the new toner cartridge.
6. Gently wipe the LED array surface with a soft tissue.
7. Close the top cover and press down to latch it closed.

Replacing the Drum

When the drum reaches 90% of its life, a *CHANGE DRUM* message displays on the printer's **Status Monitor**. Change the drum when the print becomes faint or begins to deteriorate.

Caution

NEVER EXPOSE THE IMAGE DRUM UNIT TO LIGHT FOR MORE THAN 5 MINUTES. NEVER EXPOSE THE IMAGE DRUM UNIT TO DIRECT SUNLIGHT OR VERY BRIGHT ROOM LIGHT.

Caution

ALWAYS HOLD THE IMAGE DRUM UNIT BY THE ENDS OR FROM THE TOP. NEVER TOUCH THE SURFACE OF THE GREEN DRUM INSIDE THE IMAGE DRUM UNIT.

To replace the image drum:

Caution

IF THE PRINTER HAS BEEN OPERATING, THE FUSER MAY BE HOT. AVOID CONTACT WITH THE AREA LABELED "DO NOT TOUCH."

1. Press the cover release and fully open the printer's top cover.
2. Remove the used image drum.

3. To install the new drum, follow instructions on or inside the box containing the new image drum.
4. Gently wipe the LED array surface with a soft tissue.
5. Close the top cover and press down to latch it closed.
6. To reset the drum counter for a correct count of pages printed on the newly installed drum (and an accurate prompt to change the drum when it nears its life expectancy), press the **Online** button to put the printer in Offline status.
7. Press the **Menu** button repeatedly until *MAINTENANCE MENU* displays.
8. Press the **Item** button until *DRUM COUNT RESET* displays.
9. Press **Select** to reset the Drum Counter.
10. Press the **Online** button to return the printer to online status.

Cleaning the LED Array

Clean the LED array whenever a new toner cartridge is installed or if there are faded vertical areas or light printing down a page.

Wipe the LED array gently with an anti-static cloth (e.g., those used for computer cleaning).

Cabinet and PC Input and Display Devices

UTAH2011 Cabinet

Exterior

Wipe with soft cloth as needed to remove dust and debris. Keep power switch free of grease and other debris.

Air Intake Filter

Shop dust floating around in the cabinet likely has an oily film that causes it to stick to whatever it lands on. Inspect weekly and clean as needed.

1. Remove filter from the cabinet.

Caution

DO NOT USE SOLVENTS.

2. Submerge the filter in a grease-cutting soap and water solution.
3. Agitate the filter while submerged to remove embedded dirt.
4. Allow the filter to air dry.

Replace the filter annually or when cleaning fails to remove dirt and debris.

Monitor

Use an antistatic cloth as needed to remove dust from the LCD screen.

Keyboard and Mouse

Keyboard

To keep dust and debris from lodging under keys and affecting performance, clean the UTAH2011 keyboard weekly.

FIGURE 4-4: Clean the Keyboard

1. Shut down the UTAH2011.
2. Use compressed air to clean between the keys. Spray at an angle to dislodge dust and grime.
3. Shake loose dust gently out of the keyboard.
4. If using an aerosol cleaning fluid developed for cleaning electronics, follow the spray manufacturer's instructions. Otherwise, spray a small amount of fluid onto a rag.
5. Wipe the keys and chassis.
6. Wait until the keyboard is dry before restarting the workstation.

Mouse

As surface dust collects on the soft pads located near the light emitter, the UTAH2011 optical mouse can get stick. This causes slow or erratic cursor movement or complete failure to operate.

Caution

DO NOT OPEN THE BODY OF THE MOUSE. DO NOT USE A SHARP INSTRUMENT LIKE A SHAVING BLADE, KNIFE, OR TOOTHPICK TO CLEAN THE MOUSE AS THESE ITEMS CAN DO PERMANENT DAMAGE TO THE SOFT PADS.

To remove dust stuck to the mouse's soft pads:

1. Dip a soft cloth in a mild soap and water solution.
2. Invert the mouse and gently rub the cloth over the soft pads to dampen them.
3. When the pads are slightly wet but not soaked, run the mouse over a sheet of clean white paper to absorb any remaining dust or grease.

Optional Barcode Scanner

The optional Honeywell® Xenon™ 1900 barcode scanner requires minimal maintenance, although the following periodic checks are recommended.

Cleaning the Scanner

Caution

DO NOT SUBMERGE THE SCANNER IN WATER. AVOID USING SOLVENTS (SUCH AS ACETONE) ON THE HOUSING OR WINDOW. DO NOT USE ABRASIVE WIPES THAT CAN SCRATCH THE WINDOW.

Use a soft cloth dampened with water or a mild detergent and water solution. If using a detergent solution, wipe with a clean tissue dampened with water only to remove any detergent residue after cleaning.

Cleaning the Scanner Window

Reading performance may degrade of the scanner's window is not clean. If the window is visibly dirty or if the scanner isn't operating well, clean the window using:

- Isopropyl alcohol wipe (70%)
- 409 Glass and Surface Cleaner
- Windex blue
- Gentle dish soap and water

Inspecting Cords and Connectors

A badly worn cable or damaged connector may interfere with scanner operation. Inspect the interface cable and connector for wear or other signs of damage.

5 REQUESTING SERVICE

Overview

During training and upon equipment delivery, a factory-trained technician provides inspectors with clear instructions on performing basic user maintenance and service. For UTAH2011 issues that cannot be resolved at the shop level, inspector can call the Program hot-line where a Tier 1 Customer Service Representative (CSR) either provides the required assistance or escalates the issue to the appropriate level through a predetermined sequence of events.

Procedure

1. Station personnel places call to Program hotline.
2. Tier 1 CSR attempts to assist with most basic questions and consumable orders.
3. Tier 2 CSR attempts to determine if remote access service, parts replacement, or field service is required, creates work order in database.
4. Tier 3 CSR may logon to UTAH2011 and attempt remote access service for a variety of computer related issues; if unsuccessful the service call is routed to the Field Service Technician.
5. Field Service Technician receives service request on smart phone and responds to the station to repair or replace components to restore the UTAH2011 tester to service.

Each UTAH2011 workstation has an easy-to-read sticker prominently displayed on the outside of the cabinet that clearly states the number to call for equipment service. The UTAH2011 user manual also has the service number printed on the first page after the cover page.

6 USER MANUAL AND IN-SHOP SERVICE

Overview

Detailed procedures for activities related to each UTAH2011 configuration are provided to inspection stations as part of the comprehensive operations and preventive maintenance manual.

The user manual, provided with the UTAH2011 workstation and available online, includes useful information on how an inspector can perform maintenance and service. Inspector-performed maintenance is required only for easily user-serviceable items, for example:

- Replacing or cleaning cabinet intake air filters
- Replacing sample particulate filters
- Replacing high and low calibration gas bottles
- Conducting sample leak checks
- Cleaning exterior UTAH2011 surfaces
- Replacing worn or broken exhaust sample probe tips and/or handles
- Replacing worn or broken UTAH2011 exhaust sample hoses
- Replacing of printer paper and printer inking/imaging devices

Additionally, each manual contains a troubleshooting guide that offers solutions for the most common problems and directs users to call for service when a problem is beyond their means to resolve.

Troubleshooting Guide

TABLE 6-1. Troubleshooting Guide

Area:	Problem:	Solution:
Bar code scanner	Bar code scanner not working	1 Verify connections. 2 Call service.
Bar code scanner	Bar code scanner does not scan correctly	Verify bar code scanned is a Utah registration document or the VIN bar code on vehicle.
Buttons	Cannot select Vehicle Inspection button	Ports are improperly assigned. Please call service.
Dilution	Sample dilution message appears during TSI	Major leak in hose, probe or filter bowls.
Dilution	Sample dilution message appears during TSI	Major leak in vehicle's exhaust system.
Dilution	Sample dilution message appears during TSI	Probe tip is not in tail pipe.
Dilution	Sample dilution message appears during TSI	Second probe is installed but not in tailpipe.
VID comm	VID communication error	Disconnect network connection/phone line and reconnect. Wait for 2 minutes and retry communication cycle.
Gas Cap Tester	Gas cap tester fails to initialize or respond	Unit needs to be completely powered down for 5 full minutes.

Area:	Problem:	Solution:
Gas Calibration	Gas calibration fails	1 Check if all three gas bottles (Zero, Low Cal, and High Cal) are open (turn counter-clock wise). 2 Check if all three bottles are set to 5 - 7 psi. 3 Verify that bottle values are entered correctly. If not scan or enter manually again. 4 Verify that Low Cal and High Cal bottles are connected to the correct gas ports on the back of the unit.
Gas Calibration	CO or CO_2 error	Verify Low Cal and High Cal bottles are not empty: 1 Log in to *Utilities Menu.* 2 Select *Gas Bench Meters.* 3 Select *System.* 4 Select *Analyzer Reset Span.* 5 Select *Subsystem Reset.* 6 Continue back to *Main Menu.* 7 Log into *Analyzer Maintenance Menu* and perform bench calibration.
Gas Calibration	O_2 error	Verify Zero Air is properly attached to Zero Air port on the back of the unit and that there is adequate pressure (50psi or higher) in the bottle.
TSI	Message "*Failed to Initialize*" appears at beginning of test	Perform Refresh Others (*Station Menu*). If message appears again, call service.

Area:	Problem:	Solution:
Lockout	Lockout after test type is selected	Calibration for a particular component is required that does not affect all test types, i.e. gas calibration lockout.
Lockout	Lockout after test type TSI is selected	Gas Bench is still in warm-up. Allow more time for UTAH2011 to warm up.
Lockout	Lockout after selecting *Vehicle Inspection Menu*	Maximum number of inspections is exceeded. Please perform a successful data file refresh. Also check your phone line is properly connected.
OBD	Cannot connect to vehicle	1 Verify OBD connector is properly connected to vehicle's DLC. 2 Verify engine is running while UTAH2011 is connecting to vehicle. 3 Verify OBD harness is properly connected to UTAH2011.
OBD	Message "*Failed to Initialize*" appears at beginning of test	Perform Refresh Standards and Refresh Others (*Station Menu*). If message appears again, call service.
Printer	Printout not very visible	Check printer toner, shake toner or replace.

Area:	Problem:	Solution:
Printer	No printout	• Verify printer is not out of paper. • Verify green LED on top of printer is on. • Verify printer cables (power and parallel cables) are connected. • Verify printer does not display error LED, i.e. out of toner.
RPM	RPM does not work	1 Verify selected RPM device is properly connected to UTAH2011. 2 Verify RPM pickup is properly connected to vehicle. Ideally, choose cylinder 1 spark wire. Use sensitivity switch on Inductive Clamp. Make sure the clamp is facing the correct direction on the spark plug wire. Re-click on the *Inductive Pickup* button and wait for a signal. 3 Verify magnets in the metal frame are not broken.
Gas Bench	STAT4	Verify no restriction in the sample hose exists, including the probe tip cap has not been left on. Verify the two exhaust tubes on the back of the unit are not restricted.

APPENDIX A GLOSSARY

This appendix contains a glossary of terms commonly used in the emissions testing industry, as well as terms used specifically by the Salt Lake County vehicle emissions inspection program. All terms are listed alphabetically.

A

Abort Document: A document that details why an inspection was aborted.

Acceleration: The change in velocity of an object over a specified period of time. Commonly expressed as **m.p.h./sec.** or **ft./sec2**.

Access Code: A password used to limit access to authorized personnel.

Air / Fuel Ratio: The mixture of air and fuel at the time of combustion, expressed as a proportion. The ideal air /fuel mixture is 14.7 pounds of air to 1 pound of fuel, or 14.7:1.

Air Injection: A process be which outside air is brought in to the exhaust system to aid in the burning of residual fuel left in the exhaust. A pump or metering device injects air into the exhaust manifold or the carbon monoxide (CO) / hydrocarbon (HC) section of a three-way catalytic converter.

All Wheel Drive (AWD): Describes a "full-time" 4WD that may be used on dry pavement without damaging the differentials.

Ambient: The surrounding atmosphere or environment. For example, “ambient air” is the air present in the testing facility.

AWD: See *“All Wheel Drive (AWD)”*.

B

Bar Code: Printed series of vertical lines of varying widths encrypted with information. For the purposes of the Salt Lake County Emissions Testing Program, information contained in a bar code can include VIN, inspector User ID numbers, license plate numbers, etc. Bar codes are scanned using an instrument called a bar code reader.

Bar Code Reader: A device that uses an infrared beam of light to transmit data encrypted in a bar code. For the Salt Lake County Emissions Testing Program, the bar code reader is a hand-held device that is attached to the analyzer unit.

C

Calibration: A comparison between measurements – one of known magnitude or correctness made or set with one device and another measurement made in as similar a way as possible with a second device. The device with the known or assigned correctness is called the standard. The second device is the unit under test, test instrument, or any of several other names for the device being calibrated.

Carbon Dioxide (CO_2): A non-toxic gas formed as a product of combustion. CO_2 results when hydrocarbons (fuel) undergo a complete burn. Measured in %.

Carbon Monoxide (CO): A toxic gas formed as a product of incomplete combustion. CO results when hydrocarbons (fuel) burn in an environment with low oxygen concentration. Only part of the hydrocarbons in the fuel are converted to power; the rest form CO molecules, which do not burn normally. CO is an odorless, colorless, tasteless, poisonous gas. Prolonged exposure to CO at certain levels can be fatal. Measured in %.

Carbon Monoxide (CO) Detector: A device which detects the presence of CO once it reaches a pre-set level. CO is an odorless, colorless, tasteless, poisonous gas. Prolonged exposure to CO at certain levels can be fatal; therefore it is recommended that testing facilities install a CO detector.

Catalytic Converters: An anti-pollution device that is used to ensure that vehicle exhaust undergoes a chemical reaction to combust as much unburned fuel as possible before it exits the tailpipe. Catalytic converters come in two-way and three-way varieties: the two-way converts HC (hydrocarbons, or fuel) and CO (carbon monoxide) into carbon dioxide and water vapor. A three-way converter also handles HC and CO, as well as NOx (oxides of nitrogen). In a three-way converter, NOx is converted into non-toxic nitrogen gas (N_2) and oxygen (O_2), the two largest naturally occurring elements of the atmosphere.

Certificate of Compliance: Documents that are printed and given to the motorist at the completion of a test. Every test produces a Vehicle Inspection Report (VIR). Failing vehicles also receive print outs of the Certified Repair Facility List and the Repair Information.

CO: See *"Carbon Monoxide (CO)"*.

CO_2: See *"Carbon Dioxide (CO_2)"*.

Combustion: A chemical reaction that produces light and heat; for the purpose of the Emissions Testing Program, it is the chemical reaction that occurs inside the engine cylinders of a vehicle when fuel is burned. Engine temperature and other factors affect the efficiency and quality of combustion inside the cylinder. The ideal products of combustion are heat, CO_2, and water.

CSR: See *"Customer Service Representative (CSR)"*.

Customer Service Representative (CSR): Provides required assistance or escalates an issue to the appropriate level through a predetermined sequence of events.

D

Date (DD): The calendar portion that comprises a 24 hour space of time.

DCF: See *"Dilution Correction Factor (DCF)"*.

DD: See *"Date (DD)"*.

Department: The Salt Lake Valley Health Department, who is the regulatory department s tasked with overseeing the Salt Lake County Vehicle Emissions Testing Program and related motor vehicle issues.

Diagnostic Link Connector (DLC): The device on the vehicle which enables the UTAH2011 to connect and communicate with the vehicle's onboard computer during an OBDII emissions test. The DLC is normally located under the dashboard.

Diesel: Also known as a compression-ignition engine, is an internal combustion engine that uses the heat of compression to initiate ignition to burn the fuel, which is injected into the combustion chamber. This is in contrast to spark-ignition engines such as a petrol engine (gasoline engine) or gas engine (using a gaseous fuel as opposed to gasoline), which uses a spark plug to ignite an air-fuel mixture. The engine was developed by Rudolf Diesel in 1893.

Dilution Correction Factor (DCF): A formula applied to emissions readings to compensate for different engine sizes producing different quantities of emissions. Application of the DCF to emissions readings ensures that measurements are consistent between vehicles with engines of different sizes.

DLC: See *"Diagnostic Link Connector (DLC)"*.

E

e.g. See *"exempli gratia (e.g.)"*.

Emissions: See *"Exhaust"*.

Emissions Control System: The group of emissions control equipment on a vehicle, normally consisting of a catalytic converter, positive crankcase ventilation valve, fuel inlet restrictor, air injection system, thermostatic air cleaner, evaporative fuel recovery system, and exhaust gas recirculator.

Emissions Specifications: Official standards for particular gases produced through motor vehicle combustion, that exit at the tailpipe. Government regulatory agencies working in conjunction with automobile manufacturers set these standards for the purpose of improving air quality, fuel economy, and engine efficiency.

Emissions Testing: The analyzing of exhaust gases or computer codes as they are produced by a motor vehicle. The analyzer can either extract information from some vehicles' onboard computers to evaluate emissions or measure the actual emissions at the tailpipe during an emissions test.

Environmental Protection Agency (EPA): The federal agency charged with the duty to oversee, regulate, and enforce environmental policies at the federal level. Vehicle emissions is one such area that falls within EPA jurisdiction.

EPA: See *"Environmental Protection Agency (EPA)"*.

Evaporative Emissions: Emissions that do not leave the vehicle at the tailpipe. Evaporative emissions originate from leaks, seepage, evaporation, and permeation of the vehicle's fuel system. For example, a gas cap with poor sealing allows evaporative emissions to escape.

exempli gratia (e.g.): Latin phrase meaning "for example".

Exhaust: Gas leaving the cylinder after combustion has taken place. Exhaust gases are made up of many chemicals, including CO, CO_2, HC, O_2, and NOx (oxides of nitrogen). The type and quantity of each gas produced is greatly dependent on the air/fuel ratio. The most damaging exhaust gases are HC, CO, and NOx. The Salt Lake County Emissions Testing Program is designed to check vehicle emissions to ensure they are within acceptable ranges.

F

Federal Test Procedure: The test used by the Environmental Protection Agency (EPA) to certify that new vehicles meet current emissions standards.

Four Wheel Drive (4WD): Used in larger passenger vehicles that may allow the driver to manually switch (sometimes with an automatic option) between two-wheel drive mode (if available) for streets and four-wheel drive mode for low-traction conditions such as ice, mud, snow, or loose gravel.

G

Gas Calibration: A process by which the analyzer creates a baseline from which to measure vehicle emissions. During calibration, known concentrations of HC, CO, NO, and CO_2 are passed through the analyzer gas sample cell. The analyzer must be calibrated on a regular basis to ensure accurate readings and to avoid a lockout.

Gas Cap Test: An emissions test designed to evaluate the sealing integrity of a gasoline-fueled vehicle's gas cap. Poor sealing allows evaporative emissions to escape, releasing pollutants into the air.

Gas Cap Tester Check: Ensures the UTAH2011 correctly assesses the sealing integrity of a test vehicle's fuel cap.

Gasoline Engine: An internal combustion engine with spark-ignition, designed to run on petrol (gasoline) and similar volatile fuels. Also called a Petrol Engine or Otto engine. Nikolaus August Otto created the Otto engine in 1876. Otto engines were used primarily for stationary uses, as Otto had no interest in transportation. Other makers such as Daimler perfected the Otto Engine for transportation use.

Graphical User Interface (GUI): A type of user interface that allows users to interact with electronic devices with images rather than text commands.

Gross Vehicle (weight) Axle Front (GVAF): The gross axle weight rating (GAWR) is the maximum distributed weight that may be supported by an axle of a road vehicle. Typically, GAWR is followed by either the letters FR or RR, which indicate front or rear axles respectively.

Gross Vehicle (weight) Axle Rear (GVAR): The gross axle weight rating (GAWR) is the maximum distributed weight that may be supported by an axle of a road vehicle. Typically, GAWR is followed by either the letters FR or RR, which indicate front or rear axles respectively.

Gross Vehicle Weight Rating (GVWR): The estimated loaded weight of a vehicle, as set by the automotive industry. This number can usually be found under the hood or on the driver's side door jamb.

GUI: See *"Graphical User Interface (GUI)"*.

GVAF: See *"Gross Vehicle (weight) Axle Front (GVAF)"*.

GVAR: See *"Gross Vehicle (weight) Axle Rear (GVAR)"*.

GVWR: See *"Gross Vehicle Weight Rating (GVWR)"*.

H

HC: See *"Hydrocarbons (HC)"*.

Horsepower (HP): Work performed per unit of time. Work is a force applied to an object that causes it to move over a distance. For example, dynamometers are rated in HP. HP is related to Newton's second law, in which an unbalanced force (F) is equal to the mass of an object multiplied by acceleration (ma). HP = Fv (Force x Velocity). Therefore, HP = mav.

HP: See *"Horsepower (HP)"*.

Hydrocarbons (HC): Hydrocarbons are on organic substance comprised of hydrogen (H_2), oxygen (O_2), and carbon (C_2). Gasoline is mostly made up of hydrocarbons and a few other elements. Fuel (hydrocarbons) releases its energy when combined with O_2 during combustion. Ideally, combustion completely oxidizes fuel (HC) resulting in heat, carbon dioxide (CO_2) and water. In actuality, ideal combustion isn't possible and some unburned hydrocarbons escape through the vehicle's tailpipe. The Salt Lake County Emissions Testing Program is designed to measure these hydrocarbons to ensure they are within acceptable levels.

I

id est (i.e.): Latin for "that is", used when introducing an example.

i.e. See *"id est (i.e.)"*.

Initial Inspection: The first inspection of a vehicle, or an inspection performed 30 days after the most recent inspection.

Inspection Facility: See *"Inspection Station"*.

Inspection Station: A business approved by the Salt Lake Valley Health Department to administer emissions inspections.

J

Joint Photographic Experts Group (JPEG and JPG): A commonly used method of lossy compression for digital photography (image). The degree of compression can be adjusted, allowing a selectable trade-off between storage size and image quality. JPEG typically achieves 10:1 compression with little perceptible loss in image quality. JPEG compression is used in a number of image file formats. The term "JPEG" is an acronym for the Joint Photographic Experts Group which created the standard.

JPEG: See *"Joint Photographic Experts Group (JPEG and JPG)"*.

JPG: See *"Joint Photographic Experts Group (JPEG and JPG)"*.

K

Key On, Engine Off (KOEO): A test where the key in the ignition is in the "on" position but without starting the engine.

Key On, Engine Running (KOER): A test where the engine is running.

Kilometers Per Hour (KPH): A metric unit of speed expressing the number of kilometers covered in one hour. It is currently a standard unit used for speed limits, and to express speeds generally, on roads outside of the United Kingdom and the United States.

KOEO: See *"Key On, Engine Off (KOEO)"*.

KOER: See *"Key On, Engine Running (KOER)"*.

KPH: See *"Kilometers Per Hour (KPH)"*.

L

Leak Check: Ensures the integrity of the sample probe and hose.

Lockout: A mechanism which the UTAH2011 uses to prevent the performing inspections in the event of system dysfunction, expiration of licenses, when limits are exceeded, or a system bypass is attempted.

M

Mass: The property of a body that is the quantity of matter that comprises it.

Malfunction Indicator Lamp (MIL): Commonly referred to as the "Check Engine Light", is a tell-tale to indicate malfunction of a computerized engine management system. It is found on the instrument panel of most automobiles. When illuminated, it is typically either an amber or red color. On vehicles equipped with OBD-II, the light has two stages: steady (indicating a minor fault such as a loose gas cap or failing oxygen sensor) and flashing (indicating a severe fault, that will eventually destroy the catalytic converter, such as a misfire). When the MIL is lit, the engine control unit stores a fault code related to the malfunction, which can be retrieved with a scan tool and used for further diagnosis. The malfunction indicator lamp usually bears the legend check engine, service engine soon, or a pictogram of an engine. In the United States, specific functions are required of the MIL by EPA regulations.

MIL: See *"Malfunction Indicator Lamp (MIL)"*.

Mileometer: See *"Odometer"*.

Miles Per Hour (MPH): An imperial unit of speed expressing the number of statute miles covered in one hour. It is currently the standard unit used for speed limits, and to express speeds generally, on roads in the United Kingdom and the United States.

Milometer: See *"Odometer"*.

MM: See *"Month (MM)"*.

Model Year (MY): A number used worldwide, but with a high level of prominence in North America, to describe approximately when a product was produced, and indicates the coinciding base specification of that product. The model year and the actual calendar year of production do not always coincide. For example, a 2009 model year automobile is available during most of the 2009 calendar year, but is usually also available from the third quarter of 2008 because production of the 2009 model began in July and August 2008. When a brand new model is introduced there may be an additional delay to retool and retrain for production of the new model.

Month (MM): The calendar portion that comprises a space of time 1/12th of a year.

MPH: See *"Miles Per Hour (MPH)"*.

MY: See *"Model Year (MY)"*.

N

Network Diagnostics: A diagnostics tool used to make sure the modem and network communications are working correctly.

NOx: See *"Oxides of Nitrogen (NOx)"*.

O

O_2: See *"Oxygen (O_2)"*.

OBDII: See *"On-Board Diagnostics, Second Generation (OBD II)"*.

Odograph: See *"Odometer"*.

Odometer: May also be called an odograph. An instrument that indicates distance traveled by a vehicle. The device may be electronic, mechanical, or a combination of the two. The word derives from the Greek words "hodós" (for "path" or "gateway") and "métron" (for "to measure"). In countries where Imperial units or US customary units are used, it is sometimes called a mileometer or milometer.

On-Board Diagnostics, Second Generation (OBD II): On modern vehicles, the onboard computer monitors and records vehicle data from various vehicle systems and equipment. This information can be used to diagnose malfunctioning or inefficient performance of vehicle components, such as the effectiveness of various emissions control systems, fuel-metering components, and ignition systems. The principle at play here is that improperly functioning emissions control systems will be detectable by the codes they set and the data they provide to the onboard computer. The OBDII can be used to test gasoline-fueled vehicles whose model year is 1996 or later, and diesel-fueled vehicles whose model year is 1998 or later.

Offline: A state in which the UTAH2011 is unable to electronically communicate with the Vehicle Information Database (VID) for the purpose of transmitting or receiving vehicle test data or other information. There is a limit as to the number of offline inspections that can be performed without connecting to (electronically communicate) with the VID over a limited number of days.

Online: A state in which the UTAH2011 is able to electronically communicate with the Vehicle Information Database (VID) for the purpose of transmitting or receiving vehicle test data or other information.

Otto Engine: See *"Gasoline Engine"*.

Oxides of Nitrogen (NOx): A broad category of chemical compounds composed of nitrogen (N_2) and oxygen (O_2). In sufficient quantities, NOx combines with other elements in the air. When sunlight is present, these compounds form smog.

Oxygen (O_2): An essential element present in the earth's atmosphere. Oxygen accounts for approximately 21% of the earth's atmosphere; the rest is mainly nitrogen (N_2). Oxygen easily combines with other materials, when heated sufficiently, to release heat energy.

P

Petrol Engine: See *"Gasoline Engine"*.

R

Re-inspection: An inspection given to a vehicle that failed one or more tests in an inspection performed within the last 30 days. Normally, a vehicle is only tested on the portions of the inspection that were failed previously.

Repair Data: Data printed for failing vehicles only. This form details repairs necessary to complete before a re-inspection.

Retrieve: A function of the system that allows a technician to bring up a specific test from the system.

Revolutions Per Minute (RPM): A measure of the frequency of a rotation. It annotates the number of full rotations completed in one minute around a fixed axis. It is used as a measure of rotational speed of a mechanical component.

RPM: See *"Revolutions Per Minute (RPM)"*.

S

Search: A function of the system that allows a technician to find a specific test.

Search Criteria: Parameters and data that are used to locate a specific test or VIR.

Speed: Distance traveled per unit of time; the magnitude of velocity.

Speedometer: A gauge that measures and displays the instantaneous speed of a land vehicle.

STAT4 Error: A message that indicates a low flow condition. Check to make sure the prope is not capped

T

Tachometer: An instrument that measures the rotation speed of a shaft or disk, as in a motor or other machine. The device usually displays the revolutions per minute (RPM) on a calibrated analogue dial, but digital displays are increasingly common. The word comes from Greek *tachos* (for "speed") and *metron* (for "to measure").

TeamViewer: Remote support and servicing software on each Applus+ UTAH2011 that allows technicians to assess and repair some common UTAH2011 PC issues without requiring a trip to the station.

Technical Service Bulletin (TSB): The recommended procedures for repairing vehicles. A TSB is issued by a vehicle manufacturer when there are several occurrences of an unanticipated problem. TSBs can range from vehicle-specific to covering entire product lines and break down the specified repair into a step-by-step process.

Test Record: The data, stored digitally or printed out, that details the results of an inspection.

Three-Way Catalytic Converter: See *"Catalytic Converters"*.

TIN: See *"Transaction Identification Number (TIN)"*.

Transaction Identification Number (TIN): The number assigned to each transaction.

Transistor Transistor Logic (TTL): A method of constructing electronic logic circuits.

TSB: See *"Technical Service Bulletin (TSB)"*.

TSI: See *"Two-Speed Idle (TSI)"*.

TTL: See *"Transistor Transistor Logic (TTL)"*.

Two-Speed Idle (TSI): An emissions test used on certain gasoline-fueled vehicles. The PCTSI analyzes vehicle exhaust generated at two different engine idle speeds. In some cases, a "pre-conditioning" phase is required to ensure the vehicle is at operating temperature and ready for testing.

Two-Way Catalytic Converter: See *"Catalytic Converters"*.

Two Wheel Drive (2WD): A vehicle with a drivetrain that allows two wheels to receive power from the engine simultaneously.

U

UTAH2011: See *"Utah Analyzer System (UTAH2011)"*.

Utah Analyzer System (UTAH2011): A sophisticated piece of software-driven equipment that enables a technician to sample and analyze vehicle emissions at the tailpipe, and / or the downloading of data from eligible test vehicles' on-board computers for the purpose of evaluating the vehicles' emissions control systems.

V

Velocity: The measurement of the speed and direction of an object's motion.

Vehicle: A device that is designed or used to transport people or cargo. Most often vehicles are manufactured, such as bicycles, cars, motorcycles, trains, ships, boats, and aircraft. Land vehicles are classified broadly by what is used to apply steering and drive forces against the ground: wheeled, tracked, railed, or skied. ISO 3833- 1977 is the standard, also internationally used in legislation, for road vehicles types, terms and definitions. (from Latin: *vehiculum*)

Vehicle Fitness Check: A visual check to verify the mechanical fitness of a vehicle.

Vehicle Lookup Table (VLT): A table that contains specific information for each vehicle model and engine combination available.

Vehicle Identification Number (VIN): A unique serial number used by the automotive industry to identify individual motor vehicles. VINs were first used in 1954. From 1954 to 1981, there was no accepted standard for these numbers, so different manufacturers used different formats. In 1981, the National Highway Traffic Safety Administration of the United States standardized the format and required all over-the-road-vehicles sold to contain 17-character VINs, which do not include the letters I (i), O (o), or Q (q) (to avoid confusion with numerals 1 and 0).

Vehicle Information Database (VID): A centralized repository of vehicle, testing and related information that supports web-based, real-time communication with the UTAH2011 workstations, and features enhanced reporting capabilities.

Vehicle Inspection Report (VIR): A form generated upon the completion of the test that details the vehicle tested, the results of the testing (pass or fail), who administered the test, the safety of the vehicle, and any remarks about the vehicle tested.

VID: See *"Vehicle Information Database (VID)"*.

VIN: See *"Vehicle Identification Number (VIN)"*.

VIR: See *"Vehicle Inspection Report (VIR)"*.

Virtual Private Network (VPN): A secure way of connecting to a private Local Area Network at a remote location, using the Internet or any unsecure public network to transport the network data packets privately, using encryption. The VPN uses authentication to deny access to unauthorized users, and encryption to prevent unauthorized users from reading the private network packets. The VPN can be used to send any kind of network traffic securely, including voice, video or data. VPNs are frequently used by remote workers or companies with remote offices to share private data and network resources.

VLT: See *"Vehicle Lookup Table (VLT)"*.

VPN: See *"Virtual Private Network (VPN)"*.

W

X

Window: An opening in an otherwise solid, opaque surface, through which light can pass. Also, a display rectangle used by a graphical user interface (GUI).

Y

Year (YYYY or YY): The calendar portion that comprises a 365 day space of time. Can be noted in two or four digits; when using the two digit format it is the final two digits.

YY: See *"Year (YYYY or YY)"*.

YYYY: See *"Year (YYYY or YY)"*.

Z

Zero Air & HC Hang Up: Before the analyzer begins an emissions test that requires exhaust sampling, it needs to be sure that the ambient (surrounding air) and analyzer components are relatively free of lingering exhaust from a previous inspection.

Numeric

2WD: See *"Two Wheel Drive (2WD)"*.

4WD: See *"Four Wheel Drive (4WD)"*.