

INSTRUCTION & OPERATION MANUAL



VW AG I VAS 523 005
Diagnostic Smoke[®] Machine
with Integrated Nitrogen Generator
and non-contaminating UltraTraceUV[®] Trace Dye Solution



Caution and Usage Tips



- ALWAYS USE WITH VEHICLE ENGINE TURNED OFF.
- DISCONNECT from the vehicle prior to starting the engine or prior to running any on-board monitor. Damage caused by not following proper operating procedures will not be covered by the vehicle warranty or the warranty.



- Use this equipment in the manner specified by the manufacturer.
- Follow common sense safety precautions.
- Use UltraTraceUV® Smoke Solution Part No. ASE 523 006 90 A00. Using a non-approved solution; may cause damage to vehicles being tested; may cause personal injury and may void vehicle and equipment warranties.



- Do not leave hose connected to the vehicle's EVAP system if tests are not being performed. Natural vacuum or pressure created by the fuel in the fuel tank can damage the pressure gauge if it exceeds the pressure limitations of the gauge.
- Do not perform test near source of spark or ignition.



- Wear appropriate eye protection.
- Wear yellow glasses supplied when using ultraviolet light.
- Air pressure supplied to unit can be between 3.4 to 17 bar (50 ~ 250 PSIG).
- When using alternate source of UV light, use light that includes 405 nanometer (nm) UV light range and wear yellow glasses.
- When testing an engine's intake or exhaust system for leaks, it is best if the engine is cold. Small leaks may be sealed due to thermal expansion.
- Be sure supply hose is completely unwound when using or excessive amounts of smoke vapor will condense inside the hose.



Danger from laser beam
The laser beam emitted by the multi-function lamp can blind individuals, cause accidents, or damage the eye.



Please note: It is essential that you maintain a proper filtration system for the compressed air being supplied. Excessive moisture or oil in the air supplied can contaminate its integrated nitrogen generator and voiding its warranty. Proper filtration will insure many years of trouble-free operation.

NOTE: If your compressed air system operates using an automatic air line oiler; it must be removed from the air supply feeding the unit, or it will damage the nitrogen generator.

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Thank You and Congratulations! Your Diagnostic Smoke® Machine VW AG I VAS 523 005 Evaporative Emissions System Tester & Smoke Machine is approved for Evaporative Emissions System (EVAP) leak-testing for both gasoline and ethanol vehicles.

This tester incorporates STAR Diagnostic Smoke® Technology, *inside*. It is the simplest and quickest way to find many vehicle system leaks. Smoke vapor-generating leak detectors containing STAR Technology *inside* are the only leak detectors in the world approved by automakers (OEMs) which meet all safety standards for EVAP testing as well as for other systems.

The patented technology *inside* your Diagnostic Smoke® Machine, including the vapor-producing solution (UltraTraceUV®), was designed in collaboration with major OEMs, in order to establish a standard for leak detection. It is designed to be safe for vehicle systems and will not void factory warranties.

It is also the only smoke technology in the world that meets SAE INTERNATIONAL Published Papers' safety standards recommendation for testing a vehicle's fuel evaporative system [SAE: 2007-01-1235 & 2008-01-0554].

Included with Diagnostic Smoke® Machine VW AG I VAS 523 005

<p>UltraTraceUV®: (ASE 523 006 90 A00) this is the only Automaker-Approved UV smoke-producing solution in the world. This non-contaminating solution's chemistry is designed to not damage vehicle components and contains a special dye that deposits at the exact location of a leak. Each bottle will perform approximately 300 test cycles. (12 oz. / 355 ml). (Part No. is for one bottle. Two bottles included with unit).</p>	
<p>Combination Light: (ASE 523 006 80 B00) white light, for easier smoke location and ultraviolet (UV) light, to highlight the fluorescent dye deposited at the exact location of a leak. Also has laser pointer.</p> <p>Note: For eye safety & UV enhancement; always use yellow glasses when using UV light.</p>	
<p>Filter Assembly: (WVRP-104) Proper filtration helps keep the nitrogen generator clean for many years of high purity nitrogen generation.</p> <p>includes: Complete Housing preassembled with filter elements: > 5 micron > .01 micron > Carbon-activated</p> <p>NOTE: for all 3 filter element kit replacement, order ASE 523 006 80 C00</p>	

Optional Accessories

<p>Manifold: (ASE 523 006 80 D00) Use with adapters below.</p>	
<p>Adapter: (ASE 523 006 80 E00) 12 mm Male and female Set with locking clip.</p>	
<p>Adapter: (ASE 523 006 80 F00) 10 mm Male and female Set with locking clip.</p>	
<p>Adapter: (ASE 523 006 80 G00) 8 mm Male and female Set with locking clip.</p>	
<p>DM-TL Plug: (ASE 523 006 80 H00) Seals off /plug the EVAP system at the DM-TL</p>	
<p>Wing Nut Expansion Plug: Part# (ASE 523 006 80 I00) WVA-180 Seals off /plug the EVAP system (NVLD)</p>	

Optional Accessories, continued

Filter Elements Replacement Kit: (ASE 523 006 80 C00)

5 micron, .01 micron and Carbon-activated.



Bladder Plug with Through Hole: (WVA-096)

For sealing irregular sizes (from Ø47-152mm) and to introduce smoke.

Includes spare bladder replacement.



Bladder Plug with Through Hole: (WVA-132)

For sealing irregular sizes (from Ø31-90mm) and to introduce smoke.

Includes spare bladder replacement.



Smoke Diffuser: (WVA-03) locates leaks around doors, windows, sunroofs and trunk compartment seals.



Adapter Cone (standard): (WVA-01) for introducing smoke into the exhaust system or the induction system. Cone is 1" x 3.5" and 6" long (25.4 mm x 89 mm x 152 mm).



Adapter Cone (large): (WVA-067) Cone is 3.5" x 6" and 4.5" long (89 mm x 152 mm x 144 mm).



Standard Size Service Port Adapter: (WVA-06) connects to factory service port on many OBD-II vehicles.



Schrader Removal / Installation Tool: (WVA-049) fits both sizes of Schrader valves in vehicles with factory OBD-II service port fittings.



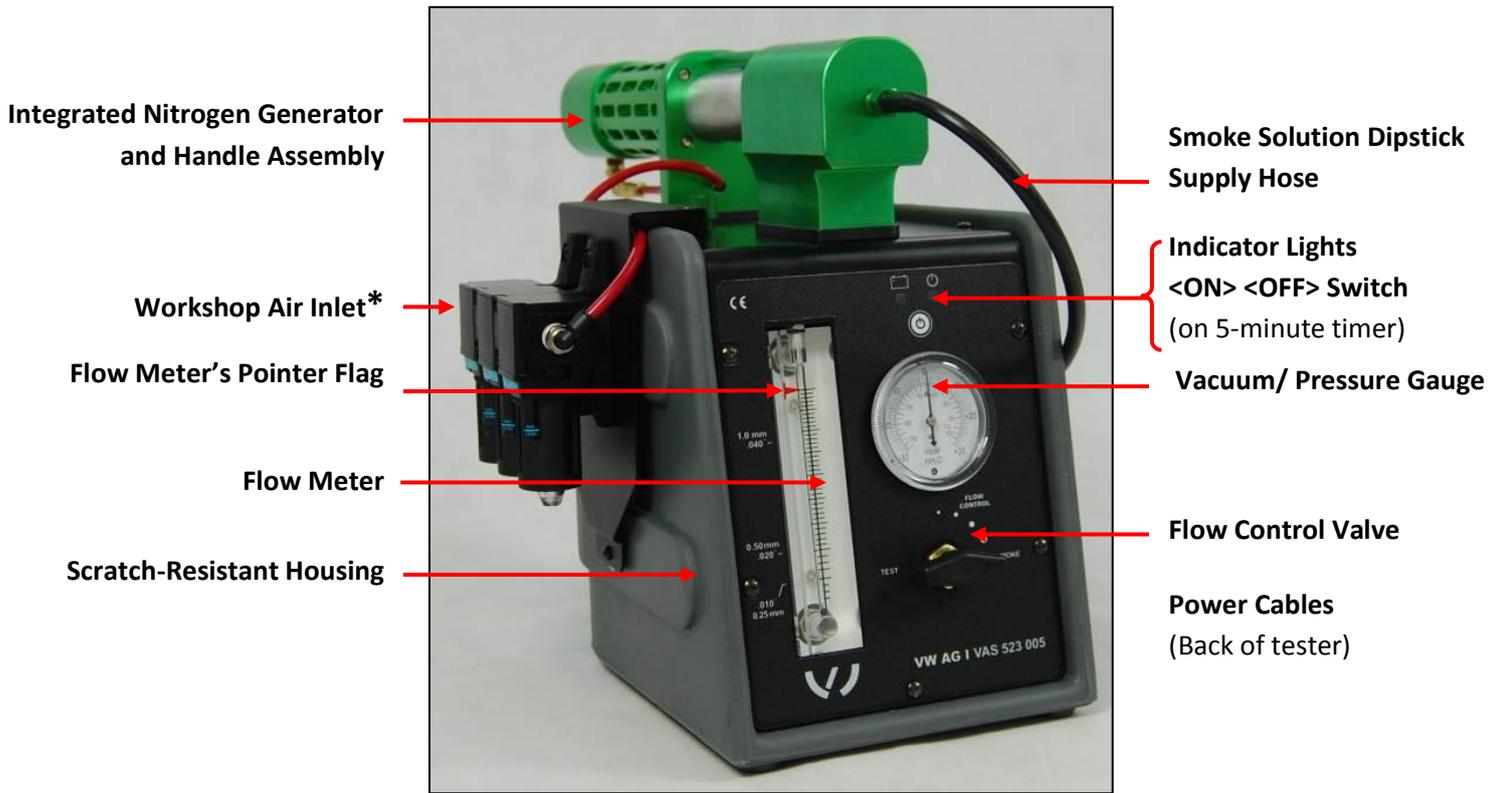
Assorted Cap-plug Set (WVA-002) in sizes from 1 3/4" to 4 1/2" and 1/8" to 3/16", these accessories are designed to seal a wide range of openings. Useful for inside and outside diameter openings, each cap plug is made from molded vinyl.



Optional Accessories, continued

<p>Fuel Neck Cap Adapter, Threaded: (WVA-142) [Fits many VW fuel necks] (Same as K-Line Part No. 4410000-80)</p>		
<p>Fuel Cap Receiver Assembly: (WVA-143) [Receiver for item WVA-142] (Same as K-Line Part No. 4410000-81)</p>	 <p style="text-align: center;">Outside view</p>	 <p style="text-align: center;">Inside view</p>
<p>Vehicle/Cap Test Hose: (WVA-144) [designed to work in combination with WVA-142 and WVA-143] (Same as K-Line Part No. 4410000-82)</p>		
<p>Universal Adapter (Standard): (WVA-063) Brilliantly simple</p> <ul style="list-style-type: none"> • Quickly pops-on most fuel tank filler necks • Reusable • Use with any smoke machine or other leak detection device • 5-year warranty 		

Product Overview



Technical Specifications

Height	13.5 in. (34 cm)	Solution Max. Volume	12 oz. (355 ml)
Length	13 in. (33 cm)	Supply pressure	14 in. H ₂ O (34.9 mbar 3.49 kPa)
Width	9 in. (23 cm)	Supply volume	10 liters per minute
Weight	20 lb. (9 kg)	Smoke supply line	15 feet (4.6 m)
Shipping weight	25 lb. (11.3 kg)	Power supply line	15 feet (4.6 m)
Power supply	12 volts DC	Power consumption	15 amps.

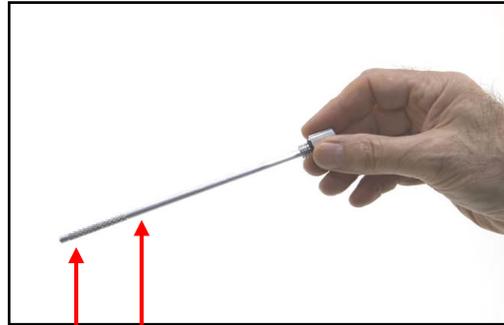
This product contains
STAR licensed technologies, *inside*.



Initial Setup

1. Pour entire contents of one 356 ml. (12 oz.) UltraTraceUV® solution bottle into the smoke chamber.

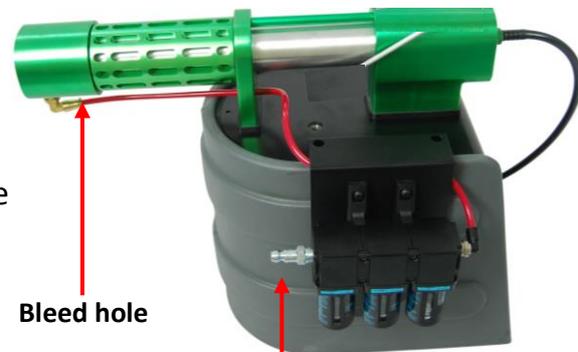
NOTE: Use second bottle supplied to regularly maintain at or near FULL mark.



Low Full

2. If not supplied; install correct air fitting. Use Teflon® thread-sealer and be sure sealer is not allowed to enter the filter housing.

3. Connect workshop air to air fitting. Air pressure can be between 3.4 to 12 bar (50 ~ 175 PSIG).



Bleed hole

Air fitting

NOTE: The nitrogen generator naturally expels oxygen during the nitrogen-generation process. It is normal to hear a small amount of oxygen exiting the generator's **bleed hole** when connected to workshop air.

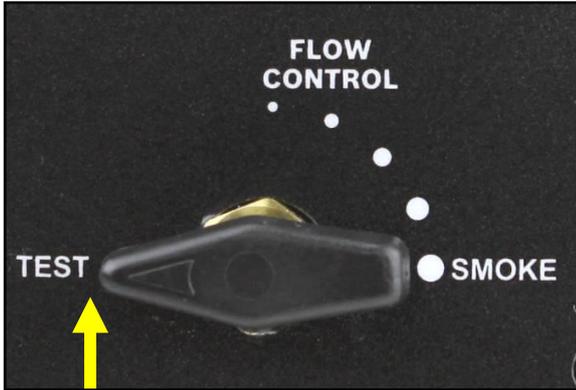


It is very important to keep the nitrogen generator assembly free of oil, water and other contaminants, in order to maintain high nitrogen purity and long service life. Therefore maintain a clean filter system on your workshop air compressor.

Under normal use, we recommend you replace the filter elements inside Filter Assembly Kit WVRP-104 once a year and use only approved Filter Elements Kit Part No. ASE 523 006 80 C00, as noted in Optional Accessories page in this manual. Turn filter bowl ¼ turn in counter-clock direction to gain access to the filter elements.

IMPORTANT NOTE: In order for the moisture and contaminants that collect in the filter bowls to drain, air must be disconnected and re-connected to the tester's Air Fitting. Do not leave air source to the machine connected for days at a time, or the filters will never drain, which can damage the nitrogen generator system. An occasional disconnect and reconnect to workshop air is sufficient.

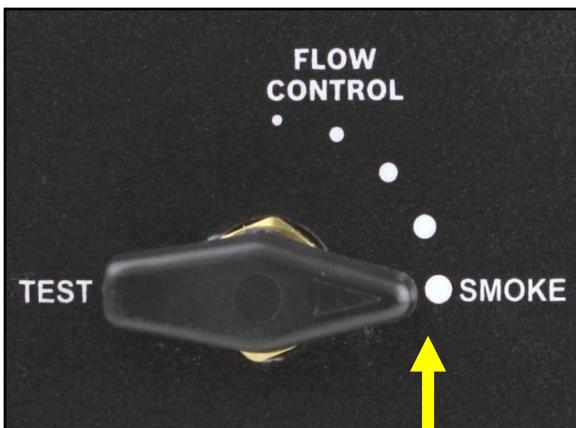
Control Valve Overview



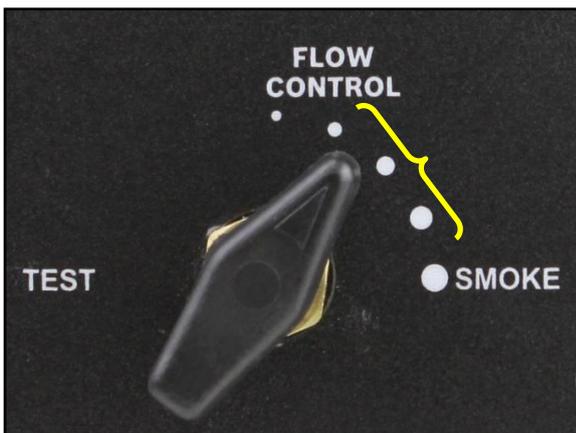
TEST: Delivers nitrogen, without smoke, and a very accurate flow meter reading. This setting is for determining if a leak exists and how large it is.

NOTE: Leak size is discussed in **Flow Meter Overview** section of manual.

SMOKE: Delivers maximum smoke volume.



FLOW CONTROL: Controls smoke volume.
> Locating the leak source is sometimes easier with less smoke volume. First, fill system with smoke at full volume and then reduce volume while still introducing smoke.



Note: Flow Control does not affect delivery pressure; it only affects flow volume.



Flow Meter Overview

A flow meter ball indicating flow means there is flow going into (or through) the system being leak-tested. This is normal while the system is being filled. If flow meter indicates flow after the system is filled, this indicates a leak. The higher the ball is in the flow meter, the larger the leak size. No flow indicates no flow through the system, or no leak.

Leak Size Reference Points – Essential for EVAP testing

The flow meter has leak size reference points which quantifies the leak size in the system being leak tested. The 0.25 mm (.010"), 0.50 mm (.020") and 1.0 mm (.040") reference points are equivalent to leaks of those sizes in the EVAP system being tested.

Once the system is filled (either in TEST (no smoke) or SMOKE setting) and the flow meter ball stops descending, compare the level of the ball with the reference points in order to determine a leak size or pass/fail.

- > Above reference point = FAIL.
- > Below reference point = PASS.

NOTE: This Flow Meter reading is most accurate when the tester's Control Valve is in TEST setting.



Vacuum / Pressure Gauge Overview

The pressure gauge serves two basic functions:

1. Monitoring system test pressure, while performing a leak test in either TEST (no smoke) or SMOKE mode.
2. Measuring system pressure-decay (pressure loss) once system undergoing a leak test has been filled in either TEST or SMOKE mode.

NOTE: the pressure decay test is best performed immediately after the system undergoing a leak test has been filled in either TEST or SMOKE setting, since the system has already built up pressure.

Test Procedure:

1. Be sure the Diagnostic Smoke® Machine has completed filling the system being leak tested, with Control Valve in either TEST setting or SMOKE (full flow) setting.
> A filled system is confirmed when the flow meter ball stops descending and the pressure gauge stops increasing in pressure.
2. If the Diagnostic Smoke® Machine is still turned ON; turn it OFF (by pressing the button on the control panel) and immediately observe the pressure gauge for any decay, which would indicate a leak in the system being leak tested.

NOTE: to perform a 'vacuum' test on a system; use a tee connection at the end of the Diagnostic Smoke® Machine supply hose and connect to a vacuum pump. When pumping the system to create vacuum, pump slowly to prevent damaging the vacuum gauge.



NEVER run the vehicle's engine with the Diagnostic Smoke® Machine supply hose connected to the vehicle. Normal engine vacuum will damage the pressure/vacuum gauge.

Disconnect the supply hose from the vehicle after performing any test.

Basic EVAP Test Procedure

NOTE: An EVAP test can be performed with the Flow Control Valve in either TEST position or in SMOKE position.

TEST performs a test without smoke, so this position is used when you only want to *quantify* a leak size, in order to determine a Pass or Fail. The flow meter is most accurate in this TEST position.

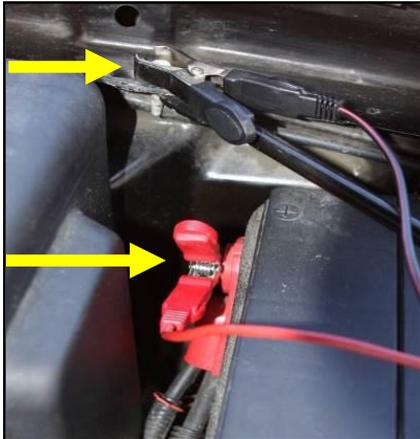
SMOKE (in full open position) performs a test with smoke, so this position is used when you want to both *quantify* and *identify* leaks.

Quantify and identify leaks:

1. Connect tester to 12V DC power and chassis ground.
2. Connect tester's smoke supply hose to EVAP system (refer to automaker instructions).
3. Set Flow Control Valve to SMOKE (in full open position) and turn <ON> tester.
4. Close EVAP's vent valve after smoke is seen exiting the vent valve, (refer to automaker instructions).
 - Note: EVAP system will fill with smoke quicker by leaving vent valve open until smoke is seen exiting the vent valve. Plus, you can perform a vent valve test by opening and closing the vent valve while smoke is exiting in order to determine if vent valve is properly closing
5. Continue to fill the system with smoke.
 - An indication that the system is full is when the flow meter ball stops descending and the pressure gauge stops increasing in pressure.
6. Position the flow meter's red flag so that it aligns with the flow meter ball position, once the ball stops descending. Compare flow meter ball position with flow meter's Leak Size Reference Points.
 - A flow meter ball *above* Leak Size Reference Point = FAIL.
 - A flow meter ball *below* Leak Size Reference Point = PASS.
7. If system failed; continue to introduce smoke and use white light supplied to look for exiting smoke. Use UV light supplied to see UV dye deposited at the exact location of leaks.
 - Note: the longer smoke is allowed to exit a leak, the more UV dye will deposit at the leak.

Intake Leak Test Procedure

1.



- a. Connect red clip to 12V-DC power.
- b. Connect black clip to chassis ground.

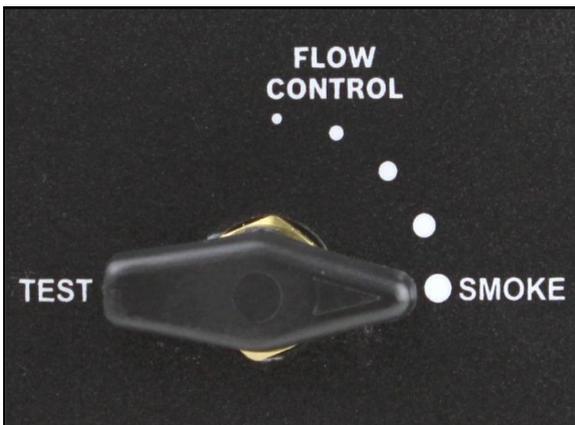


- c. Use optional adapter cone WVA-01 to access intake/ induction system and connect smoke supply hose to adapter cone. Or use optional bladder WVA-096 or WVA-132.

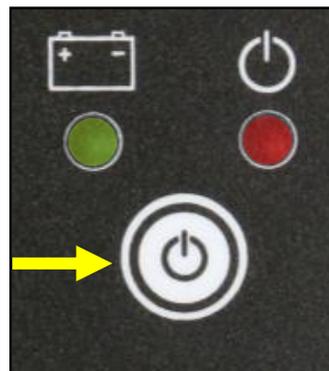


Be sure and completely unwind smoke supply hose when connecting to the vehicle. A hose that is left wound up will collect excessive smoke vapor inside the hose which may impede smoke vapor flow through the hose. If this occurs, allow the supply hose to drain prior to its next use.

2.



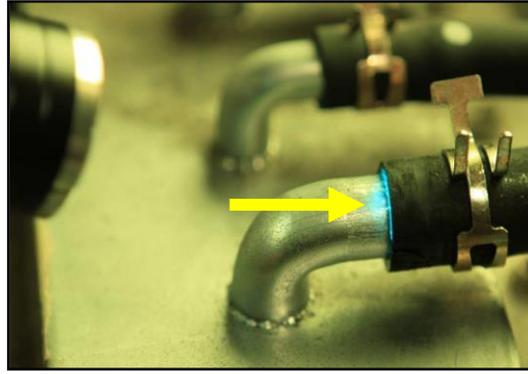
- a. Position to SMOKE (full flow).



- b. Press START button.
 - > Green and red lights turn <ON>.
 - > A *blinking green light* indicates a weak battery.
 - > System is on a 5-minute timer.

Intake Leak Test Procedure, *continued*

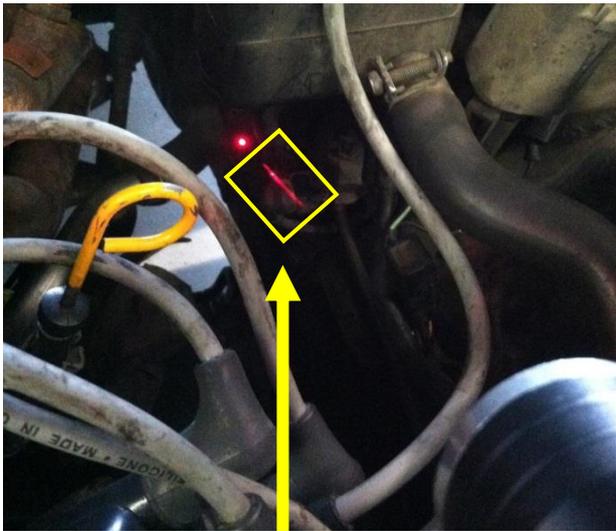
3.



Use white light to find the smoke.



Use UV light and yellow glasses to find the dye.



'A'



'B'



> The laser light can 'see' the smoke vapor even if the naked-eye cannot as demonstrated by this difficult to see smoke vapor leak. Notice the yellow box in image 'A' showing where the laser light is reflected by the small almost invisible smoke vapor leak. Then image 'B' finds the leak with the UV light.

Other Leak Samples

This Diagnostic Smoke® Machine can be used in virtually any vehicle low pressure system suspected of having a leak, such as; intake / induction, intercooler and turbocharger, vacuum, exhaust, EVAP and even wind/water leaks. Can also be used to verify air solenoid functions and test components prior to assembly.

Exhaust

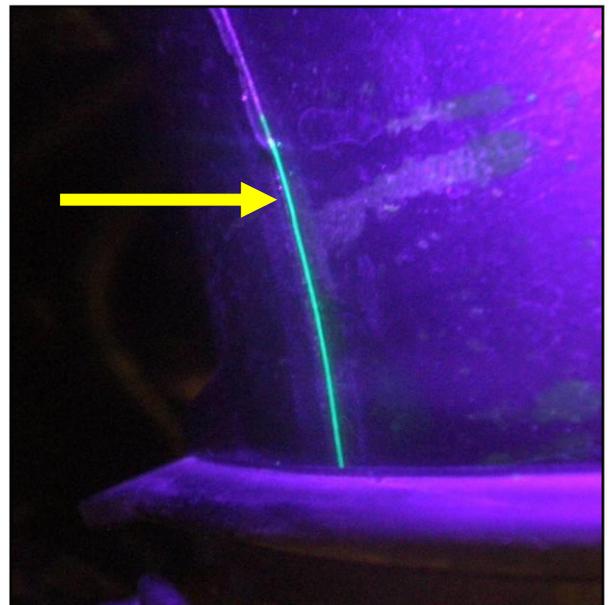


Fluorescent Dye Deposit

The UltraTraceUV® smoke solution contains a special ultraviolet-activated fluorescent dye that deposits at the exact location of a leak. Use the UV light and wear the yellow glasses provided to highlight the dye.

> *The longer the smoke is allowed to exit a leak, the more dye will be deposited.*

> *This technology has been designed so that the dye deposits only if there is pressure-differential. So for instance; the dye will deposit when exiting a leak but will not deposit during a wind and water leak test.*



Leak Samples, *continued*

Wind and Water Leaks

1. Set vehicle's climate control to 'Fresh Air' (not to re-circulate). Set blower on full speed.

> *This creates positive cabin pressure.*

2. Connect supply hose nozzle to optional Smoke Diffuser WVA-03.

3. Lay smoke path along seals.

4. Look for smoke disturbance indicating a leak.

No smoke disturbance means 'No Leak' >



< Smoke disturbance pinpoints the leak

Troubleshooting Guide

Two lights on the control panel double as diagnostic lights.

Green	Red	Interval	Cause
✓		Blinks: 1 per second	Indicates weak battery power.
✓	✓	Blink simultaneously: 1 per second	Bad ground or power connection at smoke canister or short in circuit
✓	✓	Blink simultaneously: 4 times per second	Bad ground at smoke canister or open heating circuit
✓	✓	Blink alternately: 1 per second (System shuts down)	Bad ground or circuit board failure *

* If circuit board failure occurs, first disconnect power to your Tester for 10 seconds and reconnect. If failure code occurs a second time, disconnect Tester and contact Tech Support.

Symptom	Likely Cause	Solution
The green power indicator lamp on the Tester does not turn ON.	1. Bad power-supply cable connection.	<i>1. Secure power connection at the machine and wall outlet.</i>
There is no air or smoke coming out of the supply hose.	1. Flow Control valve is closed. 2. Air/gas supply to tester is insufficient. 3. Bad power-supply cable connection or optional power converter is set too low.	<i>1. Open flow control valves. 2. Check for sufficient air/gas supply. 3. Secure power converter connections and/or increase power converter setting.</i>
Very little smoke coming out of the smoke hose or oil dripping from the smoke hose.	1. There is too much smoke condensation inside the smoke supply hose. > This usually does <u>not</u> indicate a failure.	<i>1. Position the hose lower than the Tester. Set control valve to TEST and turn Tester <ON> for one cycle, or until oil has drained from hose. Note: Completely unwind the nitrogen/smoke hose to reduce condensation and optimize the tester's performance.</i>

Warranty

LIMITED ONE (1) YEAR WARRANTY

Leakfinder[®] Evaporative Emissions System Tester & Smoke Machine

CPS Produces Inc. warrant to the original purchaser; under normal use, care and service, tester shall be free from defects in material and workmanship for one year from the date of original invoice.

Seller's obligations under this warranty are limited solely to the repair or, at Seller's option, replacement of or refund of the original purchase price for, Equipment or parts which to Seller's satisfaction are determined to be defective and which are necessary, in Seller's judgment, to return the equipment to good operating condition.

Repairs or replacements qualifying under this Warranty will be performed or made on regular business days during Seller's normal working hours within a reasonable time following Buyer's request. All requests for warranty service must be made during the stated warranty period.

