



Vehicle Evaporative Emissions Leak Detection System



Nitrogen Smoke Machine with UltraTraceUV_® Solution

CE

Operator's Manual

USA | Canada Patents • 6,392,227 • 6,526,808 | 2,279,147 • Int'l Patents Pending





- Due to the volatile fumes that are present in the vehicle's fuel vapor recovery (EVAP) system, you must use an inert gas, such as nitrogen or argon, when testing the vehicle's EVAP system.
- Use this equipment in the manner specified by the manufacturer.
- Understand operating procedures / Follow all safety precautions.
- Correctly connect power supply to battery and chassis ground.
- Change the smoke-producing solution in the EVAPro[™] once a year.
- Use only UltraTraceUV® Smoke Solution No. P0716UV. Altering the solution, hoses, cables or any other replacement parts will void the warranty; may cause tester malfunction; may cause damage to property or may cause personal injury.
- Do not use with running vehicle engine.
- Do not perform test near source of spark or ignition.
- Never leave the EVAPro[™] hoses or power cables connected to the vehicle for extended periods of time if tests aren't being performed.
- The 12V DC battery source you use to power the EVAPro[™] must be in good condition and fully charged.
- Wear eye protection that meets OSHA standards.
- Follow safety precautions when using ultraviolet light source.
- Operating pressure must be 50-150 PSI (3.4 10.3 bar)
- Store and operate the EVAPro[™] in upright position.

	 ✓ Smoke exiting a very small leak is even easier to see if after filling the system with smoke you cycle the ON / OFF button at about 30-second intervals. This will introduce smoke and allow the system pressure to decrease; making the leak even more visible. ✓ The bright halogen spotlight supplied is an excellent way to highlight the smoke exiting a leak. ✓ Use a good quality UV lamp (not supplied), which includes 400 nanometer (nm) in its ultraviolet range, to look for the fluorescent deposit at the exact location of the leak(s). ✓ When operating the EVAPro™ in near freezing temperatures, cycle the ON / OFF button 30-seconds ON and 30-seconds OFF for approximately the first minute of operation. This will allow the Tester to operating temperature. ✓ When testing an engine's intake or exhaust system for leaks, it is recommended that the engine be cold. Small leaks may be sealed due to thermal expansion.
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Table of Contents

iii	Caution & Usage Tips
1	Introduction
1	Technical Specifications
2	Tester Overview
	Accessories
	Initial Setup
	EVAP System Overview
4	Prior To Performing EVAP Tests
5	Tester Hookup
6	Phase-one
9	Phase-two
11-15	Other Leak Detection Applications
16	Calibrating System-Pressure
17	Troubleshooting Chart
	Contact Info
19	Quick Reference
20	Frequently Asked Questions
	Warranty

<u>Congratulations!</u> You are in possession of the most useful, yet simple to operate Evaporative Emissions (EVAP) System diagnostic tester available today. The EVAPro[™] versatile 12-volt design was specifically developed to diagnose vehicle EVAP systems for leaks. In addition, the EVAPro will also find intake manifold system leaks, exhaust system leaks and under-dash vacuum system leaks. It will also diagnose many other closed systems where you may suspect a leak, as well as pinpointing wind and water leaks entering the vehicle's passenger compartment. Its unique design allows the operator to confirm the integrity of the system being tested by utilizing a metered-air system. If the tool has confirmed a leak in the system being tested, the tool then introduces a special non-toxic non-corrosive diagnostic marked-vapor (smoke) into the system. To locate the source of the leak you simply look for the smoke exiting the leak or use a conventional ultraviolet (UV) lamp to view the UV deposit left behind, pinpointing the exact location of the leak.

Note: The EVAPro arrives filled with a full charge of Smoke-Producing Solution that will last approximately 500 tests before the solution will need to be replenished.

Dual-Phase Operation:

Unique to its patented design, the EVAPro leak tester is a <u>Dual-Phase</u> tool. <u>Phase One</u> is about a two-minute test that utilizes an inert gas, such as Nitrogen, to test the integrity of the vehicle's fuel vapor recovery system determining if in fact a leak exists. <u>Phase Two</u> quickly finds the leak utilizing both visual-vapor (smoke) and UltraTraceUV® technology. UltraTraceUV is a unique patented chemical, that when vaporized, bonds to and is carried with the smoke which then deposits an ultraviolet-activated fluorescent dye 'fingerprint' at the exact location of the leak.

This dual-phase operation is accomplished automatically. The EVAPro automatically sets the critical pressure that must be maintained during EVAP testing. You don't need to set flow rates and you don't need to be concerned with ambient temperatures or barometric pressures. The EVAPro will not spill its solution, regardless of the position you set it in (as long as solution dipstick is secured) and is refillable by the end-user when the smoke-producing solution is depleted. The smoke it produces, as well as the UltraTraceUV dye, is non-toxic and non-corrosive. The EVAPro needs no assembly; is self-calibrating, and requires no maintenance other than an annual smoke solution change.

Read this manual in its entirety prior to performing any actual tests on a vehicle. This leak tester is to be operated by a properly trained and qualified professional only.

Vacutec® EVAPro				
Height	17 in. (43.2 cm)	Supply pressure	13.0 in. H ₂ O	
Width	8 in. (20.3 cm)	Supply volume	10 liters per minute	
Length	15 in. (38.1 cm)	Operating temp. range	45°F to 140°F	
Weight	23 lb. (10.4 kg)		(7.2°C to 60°C)	
Shipping weight	26 lb. (11.8 kg)	Smoke supply line	10 feet (3m)	
Power supply	12 volts DC	Power Supply line	10 feet (3m)	
Power consumption	13 amps.	Remote starter cable	10 feet (3m)	
Maximum Relative Humidity>		80% for Temperatures up to	o 140°F (60°C)	
Conditions of Use>		Indoor / Outdoor (if not wet))	
Pollution Degree: 2			, ,	

Technical Specifications:

Tester Overview:



Component Description

System Lights: Green light turns on continuously; indicating sufficient 12-V DC power.Green light blinking; indicates insufficient 12-V DC power.Red light indicates tester is ON.Yellow light turns on continuously; indicating tester may be low on smoke solution.Yellow light occasionally blinking; is a normal temperature-control function of tester.

Flow Meter: with its pointer-flag is used to establish a quick Pass / Fail when determining if the vehicle being tested has a .040" or .020" leak.

Selector Switch: is used to select the functions of the tester as explained in this manual.

ON / OFF Button: is used to operate the tester. The tester stays ON for five (5) minutes after the Start Button is pressed. Press the button again to turn the tester OFF.

Input Supply Hose: Used to connect the tester to inert (i.e. nitrogen) gas source.

Output Supply Hose: used to confirm integrity of an EVAP system, when verifying system for leaks (Phase One), or when introducing smoke into a system being tested for leaks (Phase Two).

Dipstick: used to maintain proper smoke solution level throughout the year, as well as access port to drain and fill the tester with solution during its yearly smoke solution change maintenance.

Accessories Included:

正长年长年	No. WVA-06 – Service Port Adapter (Standard Size)	
	connects to factory service port on most	
	OBD-II vehicles.	
	No. WVA-049 – Schrader Removal / Installation I ool fits	
	Il service port fittings	
	No. WVA-01 – Exhaust Cone is used to either introduce	
	smoke into the exhaust system; into any system that fits	
	the cone's tapered size; is used as an exhaust plug when	
	testing a dual exhaust system; or exhaust plug when	
	testing the intake vacuum system.	
	No. WVA-02 – Cap Plug Kit is used to seal the intake	
00000	ducting of the engine being tested. They may be used to	
0.000	ever and seal the opening at the outside diameter	
no. B	No. HS400AC – Halogen Spotlight highlights the smoke	
	when searching for leaks.	
6.34		
	No. P0716UV – UltraTraceUV M Smoke Solution Unit	
	approximately 500 tests. Top off regularly	
\cup		
	No. WVA-042 – Small Service Port Adapter connects to	
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Initial Setup:

The EVAPro requires NO assembly.

Note: The EVAPro arrives filled with a full charge of Smoke-Producing Solution that will last approximately 500 tests. Though not required, it's not a bad idea to replace the tester's solution once a year in order to keep the solution's fluorescence fresh and in optimal condition.

Evaporative Emissions System Overview:

The vehicle's Fuel Vapor Recovery (EVAP) System is the most neglected part of the vehicle's emission system, according to the Environmental Protection Agency (EPA).

The vehicle's EVAP system is used to collect fuel vapors from the fuel tank. These vapors are stored in a canister filled with activated charcoal. The EVAP system allows the fuel vapors to be drawn from the canister and combust during certain operating conditions. This process is called canister purging since the fuel vapors are purged from the canister. OBD-II requires Powertrain Control Module (PCM) monitoring for proper operation of the EVAP system and for possible leaks to the atmosphere.

A faulty EVAP system will allow hydrocarbons (HC) to escape into the atmosphere. Factory emission tests have determined that an EVAP system with a leak as small as .020" can yield an average of 1.35 grams of HC per vehicle driven mile. <u>This is over 30-times the current allowable exhaust emissions standard</u>. In addition to causing HC emissions, failure of this system wastes fuel and many times creates customer-complaints of "gasoline odors". With the introduction of On Board Diagnostics (OBD), the automotive industry has been capable of determining that a vehicle's evaporative system has a leak. Prior to the technology in the EVAPro, determining <u>where</u> the EVAP leak was had been a difficult and time-consuming challenge.

Prior to performing EVAP tests:

When the vehicle's engine is turned off, the OBD-II EVAP System is generally venting in one form or another. Use a scanner and 'close' the EVAP System in order to perform any leak tests. **Remember that ALL tests with the EVAPro are performed with the engine OFF!**

It is best to perform all testing in calm air, so that the smoke exiting the leak will not be blown away impairing your view of the leak.

Because of the EVAP System's volatile fumes, you must use an inert gas such as Nitrogen when testing the Evaporative System. In addition, the EVAPro is also designed to perform its functions with conventional shop-air, if being used to test systems other than the EVAP System.

Evaporative System Test & Diagnosis:

Detailed Instructions

Tester Hookup:

- 1. Connect the EVAPro red power cable to a 12-Volt DC power supply. If you are using a battery, be sure it is in good condition and fully charged!
- 2. Connect the EVAPro black ground cable to the vehicle's chassis ground. Check to see that the EVAPro 'Power Indicator' lamp is on, indicating good battery contact.





CAUSION: To prevent personal injury, do NOT connect EVAPro's black cable to battery ground! A spark in the vicinity of the battery can cause an explosion!

- Depending on the tests you are performing, connect either an inert gas, such as nitrogen, or shop air supply line to the EVAPro water-separator / filter located on the back of the tester.
 > Be sure the supply pressure to the tester is between 50 psi and 150 psi.
- > When testing EVAP systems: Connect the tester to an inert gas source, such as nitrogen.
- > When testing systems other that EVAP: Connect the tester to shop air.



Phase One:

- 1. Verify the vehicle's fuel level is below the base of the fuel tank neck.
- Determine if the vehicle's EVAP system you are testing is governed by a .040" or .020" acceptable leak requirement standard. Position the Selector Switch, on the EVAPro control panel, to the correct standard. (See Figure 1)
- 3. Turn ON the EVAPro by pressing (and releasing) the ON / OFF button and observe the measurement of the flow meter's indicator ball.
- 4. Position the flow meter's red 'pointer flag' so that it aligns with the measurement observed in the previous step (See Figure 2).
- 5. Press the ON / OFF button once again to turn the tester OFF.

Note: This flow meter measurement indicates the vehicle's Pass or Fail line for that particular leak Standard.



NOTE: The 'Future' setting, on the control switch, is reserved for another standard, should future requirements change.

5. Locate the vehicle EVAP Service Port, remove the green cap and the Schrader valve that is inside the Service Port. (Figure 3)

WARNING: The Schrader valve is installed with a left-hand thread!

<u>IMPORTANT</u>: The EVAP Service Port on OBD-II vehicles was designed with a Schrader valve prior to considering Diagnostic Smoke as a means for diagnosing EVAP leaks. It has been determined that this smoke, when passed through this Schrader valve, will have a tendency to partially condense and not be as dense and as effective as when it comes directly out of the EVAPro. For this reason, when testing with smoke, you must <u>remove</u> the Schrader Valve prior to introducing Diagnostic Smoke into the EVAP system. Use the tool provided and turn in a *clockwise* rotation in order to remove it.

- 6. Install the correct EVAP Service Port Adapter that is provided with the tester. (Figure 4)
- 7. Insert the EVAPro supply hose into the EVAP Service Port Adapter. (Figure 5)
- 8. Close the vehicle's EVAP System vent solenoid.



Note: When testing a pre-OBD vehicle, or when testing an OBD vehicle without an EVAP Service Port, you will need to access the EVAP system either by disconnecting the EVAP vent line (at the charcoal canister) leading back to the fuel tank; or access the EVAP system through the fuel tank neck with a fuel cap adapter (not supplied).

9. Set tester's selector switch to TEST. (Figure 6)



10. Press the ON / OFF button to activate the EVAPro. The tester's ON light will turn on. Notice that at the beginning of the test procedure, the flowmeter's indicator-ball is toward the top of the flow meter scale. This indicates that the EVAP System is being filled. Usually in less than 60 seconds of activating the EVAPro -- depending on capacity and fuel system level -- the flow meter's indicator-ball will fall within the meter's visible scale. Continue to fill the system until the ball stops descending. This could take an additional two minutes.

> The timer will automatically turn OFF in five minutes. To turn the tester OFF before the 5-minutes are up, simply press the ON / OFF button again.

- 11. Once the meter's indicator-ball has stopped descending, observe if the indicator-ball is above or below the flow meter's red pointer-flag. (Figure 7)
 - A measurement ABOVE the pointer-flag indicates an unacceptable leak in the EVAP System (FAIL). Proceed to Phase Two testing.
 - A measurement BELOW the pointer-flag indicates an acceptable leak (or no leak) in the EVAP System (PASS).



<u>Helpful Tip:</u> You will find that a common leak in the vehicle's EVAP System is due to an unsecured or faulty fuel cap. For this reason, we recommend you do <u>not</u> disturb the vehicle's fuel cap prior to completing the Phase One test. This way if an unacceptable leak has been determined after completing the Phase One test, you can reposition or test the fuel cap, then perform the Phase One test again. If you discover the leak was due to a fuel cap problem, you will have been able to identify with the symptom. Otherwise if you disturb the fuel cap prior to performing Phase One, and the vehicle passes the test, you will never know for sure if the leak was due to the fuel cap or if you are dealing with an intermittent condition.

Proceed to Phase Two of the test procedure if it has been determined that the vehicle you are testing has FAILED the Phase One EVAP system test.

Phase Two:

- 1. Verify the vehicle's fuel level is below the base of the tank neck.
- 2. Position the Selector Switch, on the EVAPro control panel, to 'SMOKE'. (Figure 8)



- Remove the vehicle's fuel cap prior to introducing smoke into the EVAP system.
 This assures proper purging of the EVAP system as well as saves time when filling the EVAP System with diagnostic smoke.
- 2. Press ON / OFF button to activate the EVAPro.
 > The 'ON' Indicator Light, on the control panel, will light indicating that the tester is ON.
- 4. Replace the fuel cap once smoke is observed exiting the fuel tank's neck area
 > The timer will automatically turn OFF in five minutes. To turn the tester OFF before the 5-minutes are up, simply press the ON / OFF button again.
- 5. Continue to introduce smoke into the EVAP System until the flow meter's ball stops descending.
 > This assures the EVAP system is filled with smoke and is at proper test pressure.
- 6. Use the halogen light provided and follow the EVAP system path to look for the smoke exiting the leak(s). While looking for the exiting smoke, continue to introduce smoke in approximately 30-second intervals, by turning the tester ON / OFF at 30-second intervals,

until the leak is found.

> This ON / OFF technique allows the EVAP system to achieve test pressure and then allows for the pressure to be relived. Diagnostic Smoke is even more visible at lower test pressures. Use the provided halogen spotlight to follow the EVAP System's path and look for the smoke exiting at the source of the leak(s). See the smoke and you've found the leak! > You can also look for the UltraTraceUV that has been deposited at the exact location of the leak(s). This is especially helpful when the leak is in an area that is not readily visible, as on the top of the fuel tank or behind a panel. Once you gain access to the area of the leak, shine a UV light to identify the exact location of the leak.

> The longer the EVAP system is allowed to fill with diagnostic smoke, the more fluorescent material will be deposited at the exact location of a leak. Be sure to use a good quality ultraviolet lamp source (not supplied).

- 7. Repair the leak(s) and perform the Phase One test again to verify repair, as well as to make sure there are no additional leaks in the EVAP system.
- 8. Reinstall the vehicle's EVAP Service Port schrader valve in a counter-clock rotation. (OBD vehicles only). Reinstall the EVAP service port green cap.

Helpful Tip: For an even quicker test procedure; you can combine the test features of Phase One and Phase Two since the design of this tester is such that the flow meter is operational in both Phases of testing.

If you already know the EVAP system has a leak, start with Phase Two testing. (The leak will still be quantified because the tester's flow meter is active).

Then perform Phase One to verify the repair.

Roll-Over Valve:

> You may not see smoke come out of the fuel tank neck, during the Phase Two testing, if the vehicle you are testing has a fuel roll-over valve designed into the fuel tank. If this is the case, in order to purge the EVAP system with smoke, you may need to introduce smoke from the fuel tank neck using an adapter (not supplied) and vent the non-smoke air out the vehicle's service port fitting using the service port adapter supplied.

It will not be necessary to remove the vehicle's service port Schrader valve when venting the non-smoke air through the service port, during the Phase Two test. Install the service port adapter supplied in order to plunge the Schrader valve open. Introduce smoke through the fuel tank neck and remove the service port adapter **after** smoke is seen exiting the service port adapter. This will assure a proper purging and filling of the EVAP system.

> Otherwise, connect to the vehicles service port but partially fill the system with smoke by introducing smoke into the EVAP system prior to closing the vent solenoid. Then close the vent solenoid after you see smoke exiting the vent area.

Other Leak Detection Applications:

- Vacuum and induction leaks.
- Exhaust leaks.
- EGR valve leaks.
- Oil seals and gasket leaks.
- Idle motors and solenoid leaks.
- Brake booster leaks.
- Component testing (radiators, water pumps and valves).
- Under dash leaks.
- Intercooler and turbo charger leaks.
- Wind and water leaks (windows & sunroofs).
- <u>Vacuum and Induction Leaks</u>: Set the selector switch to SMOKE. Select the correct size cap plug (supplied) to seal the system – but do not seal the system yet. (You should first purge all the non-smoke air out of the system being tester before you seal the system with the cap plug).
- 2. > It is best to seal the engine's intake as close to the air inlet origin as possible to inspect the entire system. This is especially important on engines equipped with mass airflow sensors and related ducting connecting it to the intake system. If the system you are testing cannot be sealed with the kit we have provided, it will become necessary to seal the intake by other means. For example; wrap the vehicle's air filter with cellophane and reinstall into the air filter housing and secure. The cellophane will prevent most of the smoke from exiting the intake system, allowing you to create a satisfactory seal in the system you are testing for leaks. Or you may choose to use a latex rubber glove and a strong rubber band accomplish this task. Simply stretch the wrist of the glove around the air passage and secure with the rubber band. You may choose to plug the tail pipe of the vehicle with the exhaust cone that is provided -- be sure the exhaust cone's hose is also plugged. (It is possible that smoke pressure can be lost out the exhaust if both an intake and exhaust valve are open in the same cylinder at the same time).
- 3. Select a vacuum line on the engine that is easily accessible and insert the tapered brass nozzle into this line.

> The supply line to the brake booster is a good choice when introducing smoke into the intake manifold. It is important to make sure that you enter this line at a point where the check valve will not interfere with the smoke flow.

- 4. Press the ON / OFF button once to turn the tester ON. Let the tester run until the system is filled with smoke. (30 seconds to 1 minute is usually sufficient time to fill the induction system).
- 5. Seal the system once smoke is observed exiting a leak.
- 6. Turn the tester ON and OFF in 30 second intervals until you pinpoint the leak.
- 7. Use the halogen light supplied to identify the origin of the smoke or use a UV light (not supplied) to look for residual traces of the fluorescent dye that was left behind by the smoke.



Introduce smoke through an easily accessible vacuum line.



Carbureted Engines and Typical Leak Sources



Fuel Injected Engines and Typical Leak Source





Exhaust Leaks: Escaping exhaust gases can be very dangerous to the occupants of a vehicle yet these repairs are neglected — but so easy to find with the EVAPro.

- 1. Set the selector switch to SMOKE.
- Put the vehicle on a lift to expose the underside. With the engine off, simply insert the exhaust adapter cone into the tail pipe of the vehicle being tested (Figure 9). Insert the smoke supply line nozzle into the exhaust cone's hose opening and press the ON / OFF button.

> On dual exhaust systems, install a cone in each tail pipe. Be sure one cone is plugged.

> Most exhaust systems will fill in less than two minutes.

- 3. Look for the smoke exiting wherever there is a leak.
- 4. Even though exhaust leaks are very easy to find with EVAPro, here are two helpful tips to make finding exhaust leaks even easier:

(a) It is best to test a <u>cold</u> exhaust system rather than a hot one. A very hot catalytic converter may consume some of the smoke. But most importantly, many small exhaust leaks are only visible on a cold exhaust system due to 'thermal expansion'.

(b) Seal off the vehicle's intake system in order to achieve proper system pressure in the event both an intake and exhaust valve are open in the same cylinder at the same time.





Figure 9

<u>EGR Valve Leaks</u>: The exhaust gas re-circulating (EGR) valve is at the heart of the emission control system. Since the EGR valve operates in such a hostile environment it is always susceptible to leakage. During a normal test for vacuum leaks, the EGR valve will be exposed to smoke and may show leaks at the seat, diaphragm, or even the base gasket.

If smoke is seen exiting the EGR valve, disconnect the vacuum supply line and introduce smoke directly into the valve. This will verify if the diaphragm is leaking, or if the valve is leaking at the seat.

Smoke may also be used to check the EGR ports for restriction. Open or remove the valve and introduce smoke through the tail pipe to verify that these ports are open.

Tech Tip - Testing the EGR Pintle Shaft: This will help you diagnose a good or bad EGR valve and other "metered" leaks.

- Do not cap off any part of the engine leave it in normal operating state (but NOT running). Insert the EVAPro supply hose into a direct vacuum manifold source, such as a brake booster hose or PCV. Turn the tester ON. Watch for smoke to escape from the EGR valve. If you see a lot of smoke, move on to the next step.
- 2. Cap off the intake using one of the cap plugs supplied with the EVAPro. Insert the exhaust cone into the tailpipe. (The hose on the exhaust cone should be plugged with the cap plug provided.) Now that the system is sealed, press the remote button and watch for smoke. A small amount of smoke indicates an acceptable EGR valve.

<u>Oil Seals and Gasket Leaks</u>: Many oil leaks can be located with the EVAPro. It is important to understand that the EVAPro will only find leaks that will allow air to flow through them. Example: A cam seal may allow air to pass through whereas a drain plug or pressure sensor will not. To locate oil leaks it is necessary to pressurize the crankcase with smoke.

- 1. Remove the dipstick and slip a hose over the dipstick tube, and insert the smoke supply nozzle into the hose.
- 2. Plug the PCV, air breather, and intake. Remove the oil filler cap.
- 3. Introduce smoke into the crankcase until smoke is seen exiting the oil filler port.
- 4. Install the oil filler cap and continue filling the system.
- 5. Use the spotlight to check for leaks, which could appear as seeping smoke, bubbling oil with little or no smoke, or dripping oil with no smoke at all.

<u>Idle Motors and Solenoid Leaks</u>: A small leak in idle motors and solenoid components can make an engine idle rough and even stall. Leaks in these components are usually found during a normal vacuum leak test. It is not unusual to find base gaskets and o-rings leaking in and around motors and solenoids.

Brake Booster Leaks: A leaking vacuum brake booster not only effects engine performance like other types of vacuum leaks, but more importantly, it can seriously affect the stopping power of the vehicle. The brake booster is a simple component to check for leaks.

- 1. Disconnect the vacuum supply line and the check valve from the brake booster.
- 2. Insert the smoke supply nozzle into the brake booster and begin introducing smoke.
- 3. Under the hood, look for smoke exiting around the crimped area of the booster canister. Also look inside the vehicle under the dash.

NOTE: Do not depress the brake pedal while performing this test.

Component Leak Testing (radiators, water pumps, valves, etc.): When installing new or rebuilt parts nothing is more frustrating than to discover on completion of the job that the component is faulty, or has a leak. It is far easier to inspect a radiator or water pump before it is installed than to find out after the job is completed and the antifreeze is installed, that there is a leak. Component leak testing has endless possibilities; anything from hoses to diaphragms can be tested. Supplied with every EVAPro is an exhaust cone adapter that can be used to access any opening from 1" to 3 ½". Simply introduce smoke into the system being tested, seal any inter-connecting ports or passages and look for the smoke or dye to exit a leak.

<u>Under Dash Leaks</u>: Under dashboard leaks can be very difficult to locate. The EVAPro can confirm or eliminate the possibility of an under dash leak in minutes. Most vehicles have a common vacuum supply line that originates at the engine intake. This vacuum source comes through the firewall to supply the climate control functions as well as other systems in the vehicle. Vacuum systems under the dashboard are intended to be closed systems; any flow through these systems would indicate that there is a leak present.

- 1. Set the selector switch on the tester to TEST.
- 2. Connect the supply nozzle to the main vacuum line (beyond the check valve) leading to the dashboard.
- 3. Introduce air into the system and watch the flow meter's indicator ball. If the ball drops to zero the system is leak-free.
- 4. Continue to introduce air into the system while testing each setting on the climate control. Watch the flow meter for any indication of flow, confirming a leak.

5. Set the selector switch on the tester to SMOKE and introduce smoke into the position determined to have a leak. Use the spotlight to look for the smoke exiting the leak, or use a UV lamp to look for the dye deposited.

Intercooler and Turbo Charger Leaks: Engine compartments with turbochargers tend to run hotter than normally aspirated engines causing hoses and seals to dry out and leak. For turbocharged systems to operate efficiently there can be no leaks in the intercooler, ducting, exhaust or the turbo itself. Intercoolers and turbochargers are tested with the engine off, as with all tests performed with the EVAPro.

- 1. Connect the smoke supply line to the intake system.
- 2. Introduce smoke into the "cold" side of the turbocharger.
- 3. While the intake is under smoke pressure, inspect the intercooler, the ducting, the waste gate, and the cold side of the turbo for leaks.
- 4. To inspect the "hot" side or exhaust side of the turbo for leaks, install the exhaust cone into the exhaust pipe. Introduce smoke and inspect the exhaust, the exhaust manifold, and the hot side of the turbocharger.

<u>Wind and Water Leaks from sunroofs, windows and windshields</u>: One of the toughest leaks to find on an automobile is wind / water leaks around the doors, windows, and sunroofs. It isn't safe or practical to search for these leaks while driving at 65 M.P.H. although that is when they are most noticeable. Old fashioned ways of locating where the wind and water is entering the vehicle may identify the leak, but this does not locate the *origin* of the leak, as you can with EVAPro.

- 1. Park the vehicle in an area that is shielded from the wind (preferably inside a closed facility).
- 2. Turn the vehicle's ignition to the ACCESSORIES position.
- 3. Turn the heater/AC blower to FRESH AIR and HIGH. (Verify the blower is NOT set to the recirculation mode.)
- 4. Close the vehicle's doors and windows. The cabin of the vehicle is now under a slight positive pressure.
- 5. Attach the diffuser to the end of the tester's hose. See Figure 10
- 6. Turn the tester ON with the selector switch set to SMOKE.
- 7. From <u>outside</u> the vehicle, position the tip of the diffuser about 2 3 inches away from the vehicle, and follow a path along the areas you wish to test. The smoke will linger on the path you are following until a leak is present. The air exiting the vehicle will cause the smoke to be disrupted, identifying the source of the leak.



Calibrating System-Pressure:

Calibration Gauge Part No. 060-30IW



Figure 12



Adjuster





Figure 14

The EVAPro has been calibrated at the factory and adjusting the tester's supply pressure is NOT recommended as part of any scheduled maintenance. However, the ability to calibrate the tester in the field had been provided for you.

Confirming if the tester needs adjustment

- For calibration purposes, you will need a water column pressure gauge reading in inches of *water* (H₂O) (such as part # 060-30IW), **not** inches of mercury (Hg).
- 2. Connect tester to air pressure.
- 3. Connect tester to 12-volt power.
- 4. Position tester's control valve to 'METER'.
- 5. Connect tester's supply hose to the water column gauge.
- 6. Press tester's ON/OFF button to turn tester ON.
- Read water column gauge. Be sure it is between 13"-14".
- Proceed to step 9 if the tester's pressure is not between 13"-14" (H₂O).

Adjusting System Pressure

- 9. Remove the plastic cap covering the tester's adjuster. (See figure 13)
- 10. Be sure you have performed steps 1-6 above and that you are now on step 6 with the tester ON.
- 11. Use a flat-blade screwdriver (see figure 14) to adjust the system pressure between 13"-14" H₂O.



CAUTION: Carefully adjust the system pressure regulator by turning the adjuster in only 1/8 turns at a time. Turning the regulator plunger too far clockwise will cause the plunger to lock up; turning the regulator plunger too far counterclockwise will cause the plunger and spring to fall out of the regulator.

- 12. Disconnect the tester's supply hose from the calibration gauge and reconnect it again. Verify that system pressure is between 13"-14" H₂O; if not, repeat steps 10 and 11, as necessary.
- 13. Turn tester OFF.
- 14. Replace the plastic cap as shown on Figure 13.

Diagnostic Lights

The EVAPro has three lights on the control panel that indicate if the tester is working correctly. The following table describes the tester's trouble codes.

Green	Red	Yellow	Interval	Probable Cause
		~	Constant ON (switch in SMOKE position; smoke venting into atmosphere; flow meter ball indicates flow)	Low oil level
		~	Constant ON (switch in SMOKE position; system being tested; flow meter ball near zero)	Normal temperature control function
		~	Occasionally blinks	Normal temperature control function
\checkmark			Constant ON	Sufficient power
√			Blinks every one (1) second	Insufficient power
~	~		Blink simultaneously every one (1) second	Power connection at battery is loose or there is short in heating circuit
✓	✓		Blink simultaneously @ 4 blinks per second	Open heating circuit
\checkmark	✓		Blink alternately @ 1 blink per second	Circuit board failure *
* If this occurs; first try disconnecting power to the tester for 10 seconds; then reconnect power. If this failure code occurs a second time during operation, disconnect tester and contact manufacturer.				

Troubleshooting Guide

Symptom	Likely Cause	Solution
The green power indicator lamp on the	 The power cables are reversed. Poor power-supply cable 	 Correctly position the power cables. Secure the connection at the positive terminal and chassis ground.
tester does not come ON.	connection.3. Battery providing power is too weak.	3. Verify the battery is in good condition and fully charged.
	1. Tester is not connected to inert gas or shop air.	 Connect tester to gas or shop air. Secure the connection at the positive
I turn the tester on but there is no air or smoke coming out of the supply	 2. Poor power-supply cable connection. 3. Battery providing power is too 	3. Verify the battery is in good condition and fully charged.
	weak. 4. Tester's internal solenoid is stuck closed.	4. Disconnect the air or nitrogen quick- release at the tester's water separator and then reconnect it.
Smoke does NOT come out of the vehicle's fuel neck area when filling	1. Fuel tank level is too high and is blocking the fuel neck passage.	 Reduce the fuel level in the tank so it is below the base of the fuel tank neck. Introduce smoke from the fuel tank
the EVAP system with smoke during Phase Two.	2. Vehicle has a roll-over valve preventing pressure relief through the tank neck.	neck with appropriate adapter (not supplied).

See your tool dealer to order smoke solution or accessories.

To speak to Technical Support:

1-888-822-8832 (Option 2)

(same as: 1-888-VACUTEC)

In the unlikely event this product has a problem, we would like you to contact the manufacturer directly. This will insure a faster handling of your service needs.

Manufacturer:

Worldwide Vapor, Inc. Tel - 1.888.822-8832 (Option 2) or 714.438.1387

Fax - 714.433.2840

info@vacutec.com

Quick Reference

A: Tester Hookup. B: Phase One; Verify System Leak(s). C: Phase Two; Find Leak(s).

A: Tester Hookup

- 1. Connect red power cable to 12V DC power.
- 2. Connect black ground cable to chassis ground.
- 3. Connect inert gas to tester.

B: Phase One

- 1. Set selector switch to correct calibration.
- 2. Turn tester ON and align meter's pointer flag with ball. > This sets PASS / FAIL mark.
- 3. Turn tester OFF.
- 4. Remove vehicle's service port Schrader valve. > Schrader valve has left-hand thread!
- 5. Install service port adapter onto vehicle.
- Connect Tester's supply line to service port.
 For non-OBD-II vehicles read Detailed Description in this manual.
- 7. Close vehicle's EVAP vent solenoid.
- 8. Set Tester's selector switch to TEST.
- 9. Turn Tester ON and fill system.
 - > Fill time 1-4 minutes due to system volume.
- 10. Compare flow meter ball reading to pointer flag, once ball stops descending.
 - > ABOVE flag is FAIL; go to Phase Two.
 - > BELOW flag means PASS; test completed.

C: Phase Two

- 1. Remove the vehicle's fuel cap.
- 2. Set selector switch to SMOKE.
- 3. Press ON button to fill system.
 - > Fill time 1-4 minutes due to system volume.
- 4. Install fuel cap once smoke is seen exiting the fuel tank neck.
- 5. Continue to introduce smoke until the flow meter ball stops descending.
- 6. Continue to introduce smoke in 30-second intervals until leak is found.
- 7. Use halogen light to follow EVAP system path and look for the smoke exiting a leak.
- 8. Use ultraviolet (UV) light and wear yellow glasses to look for the dye.
- 9. Repair leak(s) and perform Phase One test again to verify problem has been resolved.
- 10. Reinstall Schrader valve into service port.
 - > Schrader valve has left-hand thread!

Frequently Asked Questions for models EELD601 and EVAPro 2000E:

Why do I need a special smoke machine like this Vacutec®?

The Vacutec® smoke machine contains smoke technology approved by the OEMs for EVAP and other testing. Extensive tests were conducted to make sure the smoke vapor (and the dye marker in the vapor) did not harm any vehicle components – especially the EVAP's activated charcoal. OEMs have determined that this patented technology is safe to use in their vehicles and will not void their vehicle factory warranties. This technology was also designed so that the smoke vapor could be produced with Nitrogen, in order to meet the OEMs' and industry safety requirements for EVAP testing. Additional safety features are built in.

Why should I use Nitrogen when testing an EVAP system?

Adding air containing 21% oxygen to a vehicle's vapor space can render it flammable. Only a volume of 11% oxygen is required to sustain combustion. See SAE document <u>http://www.sae.org/technical/papers/2007-01-1235</u>

Can I use a basic generic mineral oil, such as 'Baby Oil', in the Tester to create the smoke.

You can if you want to, but we do not recommend it. The patented UltraTraceUV® smoke solution supplied with this Tester; will perform hundreds of tests that only cost pennies per test; is the <u>only</u> solution in the world approved by the auto manufacturers; and will not void any vehicle factory warranties. In addition, you have the added benefit of the trace dye that marks the exact location of a leak, increasing diagnostic accuracy unlike any other. This special solution is not a "generic" mineral oil. In fact, generic mineral oils are <u>not</u> intended for this type industrial use. The generic mineral oils break down, evidenced by its foul odor and could damage vehicle components.

Why didn't you incorporate a pressure gauge into the machine for testing pressure-decay?

Pressure decay has serious limitations and cannot indicate a 0.040" / 0.020" leak. With pressure decay you could be wasting your time looking for a leak that **didn't** cause that MIL lamp problem you are trying to fix. It's best to use the machine's flow meter and calibrate for an exact leak size.

Why doesn't this smoke machine offer a way to adjust the smoke delivery pressure?

One major safety feature requirement was to design the machine so that its delivery pressure was <u>not</u> adjustable. That avoids mistakes of setting the pressure to dangerous levels when testing EVAP systems.

Why doesn't this smoke machine offer a way to adjust the smoke volume?

Adjusting the smoke volume (or flow) merely reduces the amount of smoke the machine can flow and does little to assist in finding leaks. Leaks are easier to see by reducing the <u>pressure</u> of the smoke in the system being tested, not by reducing the <u>volume</u> of the smoke while maintaining the same pressure. A simple way to reduce the pressure in the system being tested is to toggle the smoke machine OFF for a few seconds after filling. That reduces the pressure in the system, making smoke exiting a small leak even easier to see.

In operating the tester, how can I be sure I am not connected to a plugged or restricted line and think I am introducing smoke into the system being tested but really I am not?

Simply by looking at the flow meter. If the flow meter's ball is at zero, that indicates there is no flow.

How long will the tester continue generating smoke?

One 16-oz. container should last about 500 tests. However, you should top off the solution level regularly.

Does the EELD601 require any assembly?

NO! The tester arrives ready for work, fully assembled and with a full charge of smoke-producing solution. Simply connect it to shop air or nitrogen and 12-volt DC power.

Wouldn't a smoke machine that generates a higher smoke pressure detect leaks better?

First of all, the pressure this tester delivers has been determined by the automotive industry as the required pressure when testing their EVAP systems and must not be exceeded. In addition, trying to detect a leak with vapor/smoke pressure much higher than this tester is actually less effective. The lower the smoke pressure, the more visible the smoke becomes.

LIMITED TWO (2) YEAR WARRANTY Manufacturer Model Numbers: Vacutec® EVAPro 2000E and EELD601

Worldwide Vapor, Inc. warrants the Vacutec® to the Original Purchaser that under normal use, care and service, the Equipment (except as otherwise provided herein) shall be free from defects in material and workmanship for TWO YEARS from the date of original invoice.

This Warranty does not cover (and separate charges for parts, labor and related expenses shall apply to) any damage to, malfunctioning, inoperability or improper operation of the Equipment caused by, resulting from or attributable to (A) abuse, misuse or tampering; (B) alteration, modification or adjustment (other than calibration) of the Equipment; (C) installation, repair or maintenance (other than specified operator maintenance) of the Equipment or related equipment, attachments, peripherals or optional features by other than Seller's authorized representatives; (D) improper or negligent use, application, operation, care, cleaning, storage or handling; (E) fire, water, wind, lightning or other natural causes; (F) adverse environmental conditions, including, without limitation, excessive heat, moisture, corrosive elements, or dust or other air contaminants; radio frequency interference; electric power failure; power line voltages beyond those specified for the Equipment; unusual physical, electrical or electro-magnetic stress; and/or any other condition outside of Seller's environmental specifications; (G) use of the Equipment in combination or connection with other equipment, attachments, supplies or consumables not manufactured or supplied by Seller.

NO OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY, AND ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY EXCLUDED.

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.



This product contains licensed technology:



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