

Tuning for Porsche 356:
Procedure for Vehicle Check in of Unknown Running Condition

Luke C. Robichaud

Produced for Use by Team CJ. Austin Texas

10/22/2025

The goal of this document is to break down, step by step, the procedure for inspecting, diagnosing faults and ensuring proper running of the Porsche 356. The focus here will be on Porsches of unknown previous running condition, meaning a running car that has not previously been inspected. The following steps can also be applied to non-running cars being assembled.

If access to a lift is available, it should be used. However, all procedures listed are possible with the car on jack stands. Prioritization should be given to locating worn parts and getting replacements coming to ensure lack of parts will not hamper progress of the project.

At the rear of this document is a check list for use when inspecting the vehicle and a list of necessary parts and tools when performing the following procedures. Reference numbers are given at the beginning of each section that correspond to the item on the checklist.

For Running Vehicles

Vehicles arriving in running and diving condition should be driven upon arrival. This establishes a baseline to work from. The car should be brought fully to temperature and driven, safety concerns allowing. Faults should be noted and then the procedure listed followed.

Mechanical Check

1. The engine oil and engine oil filter should be checked. This will give a good indication of any major faults in the mechanical workings of the motor. Check the level and take a sample of oil from the sump by draining a small amount from the drain plug. Inspect and replace oil as necessary.
2. The valve covers, and spark plugs should be removed to begin checking both timing and valve lash but to also to confirm top dead center of piston travel on cylinder #1. This is best done using a dial indicator to locate the top of piston travel. This will also confirm the position of the pulley timing marks and help assure proper timing readings later in the tuning procedure. If the timing mark on the pulley does not line up with timing mark located on the case, the pulley should be inspected and proper marks added. This is done by zeroing the dial indicator at apparent TDC and sweeping the motor via the crank back and forth past zero, re-zeroing as needed until sweep shows an even drop on both sides of zero. The pulley should then be marked at .005 inches past zero both clockwise and counterclockwise. The distance between these marks should then be measured and halved and the pulley marked. This accounts for piston dwell at TDC giving an accurate timing mark. At this stage remove the distributor cap and check alignment of rotor to the cap output for cylinder #1. This ensures the distributor is properly aligned before further checks are made.

3. Now that TDC has been firmly established, valve lash can be checked. Valve lash is checked with the engine fully cool. Assuming stock hardware and components, the intake valves should be set to .004" and exhaust valves set to .006". Set lash beginning with cylinder number at TDC. The crank shaft should then be rotated 180° counterclockwise to TDC on cylinder 2. Rotating the engine counterclockwise allows adjustments to be made in order of cylinder numbering. Valve lash is set on cylinder 2 and the motor rotated another 180° counterclockwise to cylinder 3 and so on. Re-install the valve covers and replace valve cover gaskets. The cork gaskets compress over time and will not seal properly if re-used.
4. Check for exhaust leaks in tubing and at cylinder heads. Exhaust leaks can make a big difference during tuning and can hamper performance. Replace gaskets if soot is found at mating surfaces.
5. With the valves properly adjusted it is now time to perform a compression and leak down check which is also performed with the engine cold. Perform the test with the throttle held wide open. The compression readings should read no more than a 10% differential between them. The evenness of the compression readings should be given more weight than the overall numbers, as modifications to the original compression ratio may not be known, with the obvious exception of overtly low compression numbers. Leak down percentage numbers and location of largest leaks, by sound, should be recorded.

Ignition System

6. The battery voltage of the car should be checked both at the battery and at the positive coil input with the key on. Battery date should be checked and replaced if overdue. Inspect cable ends at battery positive and negative, as well as the positive and negative at the coil. Replace bad connectors and corroded wires. Using a multimeter, check Ohm readings from motor to chassis and motor to battery to ensure proper grounds.
7. The condition of the ignition coil should be checked. Check age, fluid leaks and for obvious damage. Ohm readings for the primary and secondary windings should be checked and compared with manufacturer specifications. Replace coil if any of the following is suspect.
8. Inspect the distributor. Check electrical connections for proper tightness and corrosion. Check for any wear and play in the distributor. It is common with the stock Bosche distributors for the mechanical advance weight springs to wear causing the weights to not properly return. Rotate and slowly release the rotor to check that the advance returns to

zero. If once the rotor is released and it does not return to full zero, the distributor should be removed from the car and be rebuilt or replaced.

9. Check the ignition points for proper gap and wear. If the points are worn, replace them. These parts are inexpensive, and a new set of points will better ensure proper dwell once gap is adjusted. Check the condition of the ignition condenser. If this component is old, replace it. This is another inexpensive part and old condensers can fail even if they test in their proper uF range.

10. Remove the distributor cap, rotor and leads. Inspect the distributor cap for wear and carbon tracking. Inspect the center contact and contact spring for wear. If wear is found in the housing for the center brush or excessively at the contacts the cap should be replaced. Check the rotor for wear and proper spacing to the distributor cap; it is surprisingly common to find aftermarket or new production rotors that do not sit properly and can contact the cap.

11. Check the condition of the spark plug leads. Ensure that the lead ends are clean and make proper contact with both the lead and the plug when installed. Take an Ohm reading with a multimeter to check for even readings between wires and for continuity issues. Replace wires if they are old or show faults with any of the previous checks. Spark plugs removed during timing check should be inspected, cleaned or replaced if necessary. Ensure the plugs are in the proper heat range. This can vary with engine modifications and carburetion type but should lean to the cool side as air cooled engines require.

12. Set the static timing of the motor. This does not need to be exact as timing will be checked and adjusted later when the motor is running. Set the motor to TDC on the #1 cylinder. Disconnect the lead coming into the distributor and connect a multimeter between this and ground. Setting the meter to continuity check, rotate the distributor until continuity is broken. Slightly advance the distributor beyond this point and the static timing will be close enough to start the vehicle and allow for proper adjustment once the motor is running. Re-install the rotor, cap and plug wires in the correct positions.

Fuel System

13. The condition of gasoline and fuel system should be checked. This includes the tank itself, filters and rubber lines from tank to carburetors. The fuel tank petcock valve should be checked for proper operation by removing a line downstream of the valve, running the line into a catch can and cycling the valve through its three positions. In the off position, no fuel should drain. Any fuel that continues to drain in this position indicates improper adjustment of petcock linkage or failure of the valve. Old fuel should be drained if found. All the following steps are moot if the fuel has gone bad.

14. Remove and inspect the carburetors for leaks, wear and fouling. Disassemble and clean thoroughly. Check that each passage has no blockages. Check for throttle shaft wear as this can cause a vacuum leak that will make the tune difficult and optimal running impossible. Record the jetting numbers for all components and check for wear or damage. Compare the jetting numbers to stock jetting for the carburetor type. Check that all jets flow freely and have no blockages. Replace fuel needle and seat as supplied in carburetor kit.
15. Check float condition. If brass, check that there is no liquid in the float cavity. For plastic or other solid type floats, check buoyancy in fuel to assure that fuel has not saturated the float. Checking in water will not give an accurate reading of buoyancy as the water is denser than the gasoline that the float will be operating in. Bench set float level height following directions for specific carburetor. Reassemble carburetors and replace gaskets. Check for proper accelerator pump function on bench.
16. Inspect fuel rail for sediment and damage. Check rubber portions of fuel rail for condition. Replace rubber if it has gone hard as it is prone to cracking with vibration.
17. Inspect carburetor linkage. Replace worn components as necessary. Check for excessive play in the carburetor cross linkage. This can be caused by worn end pivots or loose bolts on the right hand side of the cross throttle mount.
18. Re-install carburetors and base line screw settings for carburetor. Connect carburetor linkage and fuel rail.
19. Check throttle for full actuation. Look down the throat of the carburetor and check that the butterfly valve is fully opening with the throttle peddle depressed. Check that the peddle has smooth actuation with little free play and no side to side wobble.
20. Install fuel pressure gauge at right hand carburetor. Fuel preferentially flows to the left-hand carburetor so reading should be taken from the side with weaker fuel flow. If tooling to read from this side is unavailable, a pressure reading can be taken by placing a tee at the rubber cross line at the back of the motor. Crank over the car and record pressure reading to confirm function of fuel pump. The pressure should be between 3PSI and 5PSI for most carburetors to function properly.

Tuning

21. Start the car and make basic adjustments to achieve idle without input. Check timing with timing light on #1 cylinder. Timing should be between 3° and 6° advanced below 1000 RPM. Set timing and lock down distributor.
22. Bring car fully to temperature
23. Disconnect carburetor linkage from both carburetors. Using a synchrometer, air balance the carburetors at idle. Adjust mixture screws as necessary to achieve desired idle speed. A tail pipe mounted air fuel ratio meter can be employed for optimal adjustment.
24. Re-connect the throttle linkage. Adjust throttle linkage to match flow rate of the carburetors when the linkage was disconnected.
25. Check carburetor air flow synchronicity at 2500 RPM. Adjust as necessary.
26. Check total advance of ignition at 3200 RPM. The total advance should be between 28° and 32° BTDC. Adjust as necessary and check advance curve by recording advance measurements at increasing RPMs. If advance curve is improper, make distributor adjustments as necessary and repeat previous steps.
27. Install air cleaners and test drive the vehicle. Make carburetor adjustments and jetting changes as needed. Only make one adjustment at a time to avoid confusing the cause of tune change. Having a mobile AFR gauge during the driving steps allows for accurate jetting changes for optimal tuning. If access to a Dynamometer is available, this is the optimal way to tune. Continue adjustments until desired performance is achieved.

Inspection and Tuning Checklist

Mechanical:

- #1 Oil Level Check, Sample and Change
 - Notes:

- #2 Confirm TDC
 - Notes:

- #3 Perform Valve Check and Adjustment
 - Notes:

- #4 Check Exhaust Leaks
 - Notes:

- #5 Compression and Leak Down Test
 - Notes:

- #10 Distributor Cap, Rotor Check/Replace
 - Notes:

- #11 Ignition Lead/Spark Plug Check/Replace
 - Notes:

- #12 Set Static Timing
 - Notes:

Fuel System

- #13 Check Condition of Gas, Gas Tank and Fuel Filters
 - Notes:

- #14 Carburetor Check/Cleaning
 - Notes:

- #15 Fuel Needle Replace, Check Float Condition and Set Float Height
 - Notes:

- #16 Inspect Fuel Rail and Rubber Lines
 - Notes:

- #17 Inspect Carb Linkage
 - Notes:

- #18 Install Carburetors and Baseline Settings
 - Notes:

- #19 Check for Full and Even Throttle Actuation from Throttle Peddle
 - Notes:

- #20 Fuel Pressure Check
 - Notes:

Tune

- #21 Start, Achieve Idle with No Input and Set Initial Timing
- #22 Bring Engine to Temperature
- #23 Balance Carburetor Airflow and Mixture with Linkages Disconnected
- #24 Balance Carburetor Airflow with Linkages Connected
- #25 Balance Carburetor Airflow at 2500 RPM
- #26 Check and Set Total Advance
- #27 Test Drive and Make Jetting Adjustments as Necessary
 - Notes

Necessary Parts List:

- 4.5 Quarts of Desired Weight of Oil
- 1 Oil Filter (check which oil filter housing is on the car)
- 2 Valve Cover Gaskets
- 4 Spark Plugs of Desired Heat Range
- 1 Set of Ignition Points
- 1 Ignition Condenser
- Carburetor Seal Kits for Number of Carburetors (type and number vary with build)
- Air Cleaner Element (if replaceable)

Necessary Tools:

- Feeler Gauges
- Compression Test Gauge
- Leak Down Test Gauge
- Multimeter
- Timing Light
- Carburetor Synchrometer