1975-79 TUNE-UP PROCEDURES
Pontiac V6

1976-79 Pontiac

ENGINE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER

Fifth character of Vehicle Identification Number (VIN), located on plate attached to top left side of instrument panel, is the engine code letter.

VIN CODE

Application	Code
1976-77	
231" V6 2-Bbl.	C
1978-79	
231" V6 2-Bbl.	A
231" V6 2-Bbl. (C-4)	2

ENGINE IDENTIFICATION CODE

Engine identification codes are on a label attached to the front of the left rocker arm cover.

TUNE-UP NOTES

NOTE: In order to comply with emission standards, specifications shown on Emission Control Tune-Up Decal must be used in all instances.

NOTE: The EPA High Altitude emission standards apply to vehicles sold in certain areas outside California which have an elevation above 4000 feet.

CAUTION: Do not remove spark plug wires with engine running. High Energy Ignition (HEI) secondary voltage is higher than standard ignition systems and may inflict harmful electrical shock.

CAUTION: Damage to HEI electronic module and/or ignition coil may result if "TACH" terminal, in distributor cap connector, is directly grounded.

ENGINE COMPRESSION

Test compression with engine warm, all spark plugs removed and throttle and choke valves wide open. Crank engine through at least 4 compression strokes.

NOTE: If using a remote starting switch, disconnect the ignition switch connector (Pink wire) from HEI distributor.

ENGINE COMPRESSION

Application	Specification
Compression Ratio	8.0:1
Recommended Fuel	Unleaded (87 AKI Minimum)
Compression Pressure	100 psi minimum
Max. Variation Between Cylinders	30%

VALVE CLEARANCE

Hydraulic Lifters	Zero Lash

VALVE ARRANGEMENT

E-I-E-I-I-E - (Left Bank - Front-to-Rear).
E-I-I-E-I-E - (Right Bank - Front-to-Rear).

SPARK PLUGS

SPARK PLUG INSTALLATION

Application	Specification
Gap	.060"
Torque	20 ft. lbs.

SPARK PLUG TYPE

Application	AC NO.
1976	R44SX
1977-79	R46TSX

HIGH TENSION WIRE RESISTANCE

Carefully remove ends of wire from spark plug and distributor. Using an ohmmeter, check resistance while gently twisting wire. If resistance is not to specification, or fluctuates from infinity to any value, replace wire.

RESISTANCE (OHMS) PER WIRE

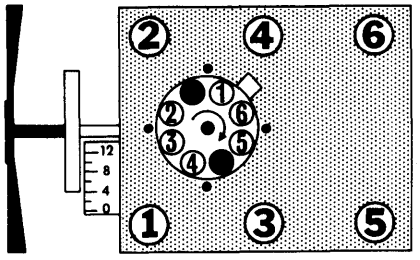
Wire Length	Resistance (Ohms)
1976	3000-7000
1977-79	
Under 24"	30,000 Max.
Over 24"	50,000 Max.

DISTRIBUTOR

All models are equipped with HEI system and no adjustment is required.

IGNITION TIMING

NOTE: Some engines may incorporate a magnetic timing probe hole. This is for use with special electronic timing equipment. Refer to equipment manufacturer's instructions for correct procedures. On models with magnetic timing, time engine to the narrow mark when using a hand-held timing light. Use the wide mark (1/8"), when using a magnetic timing probe.



FIRING ORDER 1-6-5-4-3-2

Fig. 1: 231" Firing Order & Timing Marks

1) Timing is checked and adjusted with engine at normal operating temperature, choke open and air conditioning "OFF".
2) Disconnect and plug hoses from vapor canister and EGR valve. Disconnect and plug vacuum advance hose at distributor. Place automatic transmission in Drive on 1976-77 vehicles. Place transmission in Park or Neutral for all other models.
3) Timing light connection should be made in parallel using an adapter at No. 1 terminal on distributor cap. Check timing and adjust as necessary.

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IGNITION TIMING SPECIFICATIONS [1]

Application	Man. Trans.	Auto. Trans.
1976-77	12°@600	12°@600
1978	[2] 15°@600	15°@600
1979	15°@800	[3] 15°@600

[1] – Specifications are BTDC (±2°) at specified RPM.
[2] – Federal models set at 15°@800.
[3] – Calif. 231" V6 (VIN 2) set timing at 580 RPM.

HOT (SLOW) IDLE RPM

Idle speed adjustment procedures will vary with vehicle model and component application. Warm engine to operating temperature. Open choke, disconnect and plug vapor canister and EGR hoses. Set parking brake, place transmission in Park or Neutral and adjust timing.

If procedures differ from Emission Control Tune-Up Decal, use Decal procedures for adjustment preparations, then proceed as follows:

Vehicles W/O Air Cond. & W/O Idle Speed Solenoid – Place idle speed screw on low step of fast idle cam. Adjust idle speed screw to obtain specified curb idle RPM.

Vehicles W/O Air Cond.; W/Idle Speed Solenoid – 1) With solenoid energized, open throttle slightly to allow solenoid plunger to fully extend. Adjust solenoid screw to obtain specified solenoid energized RPM.

2) Disconnect electrical connection at solenoid. With solenoid de-energized, adjust idle speed screw to obtain specified curb idle RPM.

Vehicles W/Air Cond. – 1) Adjust idle speed screw to obtain specified curb idle RPM. Disconnect A/C compressor clutch electrical lead at compressor.

2) Turn A/C "ON" to energize idle speed solenoid. Place automatic transmission in Drive. Open throttle slightly to allow solenoid plunger to fully extend.

3) Adjust idle speed solenoid screw to obtain specified solenoid energized RPM. Reconnect A/C compressor clutch electrical lead.

IDLE SPEED (RPM)

Application	Curb Idle	Solenoid Energized
1976-77		
Man. Trans.	600	800
Auto. Trans.	600	670
1978		
Man. Trans.	800	800
Auto. Trans.	600	670
1979		
Federal		
Man. Trans.	600	800
Auto. Trans.	550	670
Calif.		
Man. Trans.	600	800
Auto. Trans.	[1] 600	.....
Altitude		
Auto. Trans.	600	.....

[1] – Calif. 231" V6 (VIN 2) set at 580 RPM.

IDLE MIXTURE

TACHOMETER (LEAN DROP) PROCEDURE

(1976-77 Only) – 1) Warm engine to operating temperature. Set idle speed. Connect accurate tachometer. All accessories must be off and air cleaner installed. Disconnect all hoses as directed on Emission Control Tune-Up Decal.

2) Remove limiter caps. Lightly seat mixture screws. Turn out equally until engine will run. Set parking brake. Place automatic transmission in Drive or manual transmission in Neutral.

3) Back out each mixture screw equally until maximum RPM is obtained. Set high idle speed to indicated RPM in IDLE MIXTURE (RPM) table.

4) Now turn mixture screws equally clockwise to obtain lean drop RPM. Install replacement limiter caps. Reset idle speed as noted on Emission Control Tune-Up Decal.

5) Emission Control Tune-Up Decal idle speed may not be the same as lean drop idle speed. Always use Emission Control Tune-Up Decal specifications for adjustments. Reconnect vacuum hoses and air cleaner.

IDLE MIXTURE (RPM)

Application	Before Lean Drop RPM	After Lean Drop RPM
1976		
Man. Trans.	1100	800
Auto. Trans. [1]	680	600
1977		
Man. Trans.		
Federal	860	800
Calif. & High Alt.	810	800
Auto. Trans. [1]		
Federal	640	600
Calif. & High Alt.	610	600

[1] – With transmission in Drive.

MIXTURE SCREW PLUG REMOVAL

1) To remove the mixture adjustment plugs, remove carburetor. Turn upsidedown and place on a holding fixture.

2) Place a punch between the two locator marks on throttle body beneath mixture screw plug (manifold side) and break out throttle body to gain access to plug. Use punch to drive out plug. If hardened plug shatters, remove loose pieces.

3) Reinstall carburetor on engine. Use a thin wall 3/16" deep socket to make mixture adjustments.

PROPANE ENRICHMENT PROCEDURE (1978-79 EXCEPT 231" VIN 2)

NOTE: All 1979 carburetors have the idle mixture screws sealed with a metal plug. This plug must be removed before any adjustments can be made.

1978-79 (VIN A) – 1) Mixture is checked or adjusted with engine at normal operating temperature, choke open and air conditioning "OFF" (if equipped).

2) Disconnect and plug hoses as directed on the Emission Control Tune-Up Decal. Set parking brake and block drive wheels.

3) Connect a tachometer to engine. Disconnect vacuum advance and set ignition timing. Reconnect vacuum advance hose.

4) Disconnect PCV hose from air cleaner. Insert hose from propane valve (using a rubber stopper) into PCV hose.

5) Slowly open propane control valve until maximum engine RPM is reached. Automatic transmission models should be in Drive and manual transmission in Neutral.

NOTE: Propane bottle must remain in a vertical position.

NOTE: Too much propane will cause engine speed to drop.

6) Watch propane flow meter to make sure propane bottle is full. With propane flowing, adjust idle speed screw to the enriched RPM See PROPANE ENRICHED IDLE MIXTURE RPM table.

7) Readjust propane flow to make sure of maximum engine speed. Adjust idle speed RPM if necessary. Turn off propane.

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8) Place transmission in Neutral and run engine at 2000 RPM for 30 seconds. Place automatic transmission in Drive manual transmission in Neutral.
9) Check idle speed. If idle speed is to specification on Emission Control Tune-Up Decal, idle mixture is correct. Proceed to step **14)**.
10) If idle speed is toolow, carefully remove caps from mixture screws. Back screws out ⅛ turn at a time until specified idle speed is obtained.
11) If idle speed is too high, carefully remove caps from mixture screws. Turn screws in ⅛ turn at a time until specified idle speed is obtained.

NOTE: It may be necessary to remove air cleaner to reach idle mixture screws. Reinstall air cleaner to check speed.

12) Turn propane on again and check engine maximum idle speed. If idle speed differs from specification, readjust idle speed to enriched RPM with propane flowing.
13) Turn off propane and accelerate engine to 2000 RPM for 30 seconds. Recheck idle speed. If idle speed is not to specification, repeat procedure starting with step **10)**.
14) If idle speed is correct, turn engine off and remove propane equipment. Connect PCV hose and all other hoses disconnected.

PROPANE ENRICHED IDLE MIXTURE RPM (ALL EXC. 231" VIN 2)

Application	Enriched RPM
1978	
Federal	
Man. Trans.	940
Auto. Trans.	650
California	
Man. Trans.	880
Auto. Trans.	615
1979	
Federal	
Man. Trans.	1000
Auto. Trans.	575
California	
Man. Trans.	840
Auto. Trans.	615

MIXTURE CONTROL ADJUSTMENT

NOTE: The Computer Controlled Catalytic Converter System (C-4) used on the 1979 231" VIN 2 engine is sensitive to any change in mixture. Improper adjustment can impair the ability of the system to maintain precise control of carburetor air/fuel mixtures. Do not use the propane enrichment method of idle mixture adjustment on carburetors with the "C-4" system.

NOTE: The following mixture control adjustment procedure should never be performed unless diagnosis indicates the carburetor to be the cause of driver performance complaint or emission failure, or when critical parts such as air horn, float bowl, throttle body, needle and seat or float are replaced.

Idle Air Bleed Valve Adjustment (231" VIN 2) - 1) Before adjusting idle air bleed valve, mixture control solenoid adjustment must be checked and corrected as necessary. See Rochester E2ME 2-Bbl. Carburetor article in FUEL SYSTEMS section.
2) To adjust idle air bleed valve, set parking brake and block drive wheels. Disconnect and plug hoses as directed on Emission Control Tune-Up Decal. Check ignition timing and adjust if necessary.
3) Connect a dwell meter to lead wire from mixture control solenoid in carburetor. Set dwell meter on 6-cylinder scale. Start and run engine at idle until normal operating temperature is reached and a varying dwell is noted on dwell meter.

NOTE: It is absolutely essential that engine is operated for a sufficient length of time to ensure that engine coolant sensor and the oxygen sensor in the exhaust are at full operational temperature.

4) Adjust curb idle speed, if necessary. With engine idling, observe dwell reading. If within or varying between 10-50 degree range (25-35 degrees is ideal), no further adjustment is necessary. If dwell does not vary and/or falls outside of the 10-50 degree range, see DIAGNOSTIC CIRCUIT CHECK and SYSTEM PERFORMANCE CHECK flow charts of GM C-4 article in the COMPUTERIZED ENGINE CONTROLS section.
5) If dwell meter varies between 10-24 or 36-49 degrees, ensure no other causes of a rich or lean condition such as mechanical problems, weak ignition, poor fuel quality, vacuum leaks, flooding carburetor, emission control devices, PCV, canister purge control, etc. are present. If no other problems are found, go to next step.
6) With the engine off, remove staking around the plug covering idle air bleed valve and remove plug. Using a screwdriver that fully fits slot in valve, slowly turn valve up or down until dwell reading varies and falls within a 25-35° range, attempting to be at or as close to 30° as possible.
7) Perform this step very carefully. The idle air bleed valve is very sensitive in controlling air/fuel mixture ratios and the valve should be turned only in ⅛ turn increments.
8) If after performing this adjustment, the dwell reading does not vary and is not within the 25-35° range, it will be necessary to remove the carburetor to gain access to the idle mixture needles and adjust the idle mixture as follows:

NOTE: See MIXTURE SCREW PLUG REMOVAL in this article for removal of plugs covering idle mixture screws.

Idle Mixture Adjustment (231" VIN 2) - 1) With the idle mixture needle plugs removed, use a $^{3}/_{16}$" thin wall deep socket and turn each idle mixture needle inward until lightly seated. Then, back out needles 4½ turns.
2) Reinstall carburetor (without air cleaner and gasket). Start and run engine until fully warm, and repeat idle air bleed valve adjustment until dwell reading is varying and within limits. If unable to achieve varying dwell and specified limits, turn each mixture screw out an additional ½ turn. Then reset idle air bleed valve to obtain dwell limit specifications.
3) If necessary, reset curb idle and fast idle speed to specifications. Disconnect dwell meter and tachometer. Unplug and reconnect vacuum hoses. Reinstall air cleaner and gasket.

COLD (FAST) IDLE RPM

1979 Only - With engine at normal operating temperature, disconnect and plug hose at EGR valve. Position cam follower on cam step specified on Emission Control Tune-Up Decal in engine compartment and turn fast idle screw to obtain specified RPM.

FAST IDLE RPM

Application	RPM
231" 2-Bbl.	2200

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NOTE: Some 1978 Federal models with V6 engines may develop cold driveability problems such as stalling or rough running. This may be caused by the auxiliary vacuum break opening too soon. To correct this, install a thermal vacuum valve (3031518) to rear of air cleaner housing.
To install thermal vacuum valve, remove air cleaner and drill a 3/4" hole at rear of housing. Locate hole about 2-6" to right side of rear center (passenger side). Install thermal vacuum valve and secure in place with retainer clip (497548).
Remove hose between auxiliary vacuum break and vacuum source. Connect a new 11" hose between auxiliary vacuum break and OUTBOARD fitting on thermal vacuum valve. Connect another 11" hose between INBOARD fitting and vacuum source. Install air cleaner.

AUTOMATIC CHOKE

Set idle speed screw on highest step of cam, loosen choke cover retaining screws and align marks on cover and housing as specified.

AUTOMATIC CHOKE SETTING

Application	Setting
1976-78	1NR
1979	
Federal	2NR
Calif.	
Man. Trans.	1NR
Auto. Trans.	2NR
Altitude	1NR

FUEL PUMP

Sunbird - An electric fuel pump is located in fuel tank.

All Others - Make all tests at idle speed. For pressure test, pinch off fuel return line (if equipped).

FUEL PUMP SPECIFICATIONS

Application	Specification
Pressure	
Sunbird	4.0-6.5 psi
Firebird	4.25-5.75 psi
All Others	4.5-5.7 psi
Volume	
All Models	One pint in 30 seconds

IGNITION

DISTRIBUTOR

All models are equipped with Delco-Remy - High Energy Ignition.

NOTE: Module must be replaced as a unit. A liberal coat of silicone grease MUST be applied to the surface on which module will be mounted.

IGNITION COIL

IGNITION COIL

Application	Specification
Resistance	
Primary (at 75°F)	0-1.0 ohms
Secondary (at 75°F)	6000-30,000 ohms
Current Draw (Engine Running)	
1976-77	.5-1.5 amps
1978-79	4.5-5.0 amps
Coil Output	
At all engine speeds	25-35 KV

Other Data & Specifications - Also see Delco Ignition Systems in DISTRIBUTORS & IGNITION SYSTEMS section.

CARBURETION

CARBURETORS

Application	Model
1976	Rochester 2GC
1977-78	Rochester 2GE
1979	
VIN "A"	Rochester M2MC
VIN "2"	Rochester E2ME

Other Data & Specifications - Also see Rochester Carburetors in FUEL SYSTEMS section.