1980 Pontiac V6 Tune-Up

TUNE-UP

ENGINE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER CODE

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

VIN Code

Application	Code
173" 2-Bbl.	7
229" 2-Bbl.	K
231" 2-Bbl.	A

ENGINE IDENTIFICATION NUMBER CODE

Engine code letters are provided on all engines. The 173" engine code is located on labels on both ends of the left valve cover. Engine code on the 229" engine is stamped into the block above the water pump on the right side. The engine code on the 231" engine is stamped into the block on the left rear corner.

TUNE-UP NOTES

NOTE — *In order to comply with emission standards, specifications shown on engine compartment emission control tune-up decal must be used in all instances.*

CAUTION — *Before making a compression test or cranking engine with a remote starting switch, disconnect ignition switch connector (pink wire) from H.E.I. system distributor.*

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

CAUTION — *Damage to H.E.I. electronic module and/or ignition coil may result if "TACH" terminal, in distributor cap connector, is directly grounded.*

ENGINE COMPRESSION

Compression Ratio	
173" & 229"	8.6:1
231"	8.0:1
Recommended Fuel	Unleaded (87 AKI Minimum)
Compression Pressure	100 psi minimum
Max. Variation Between Cylinders	30%

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

NOTE — *If using a remote starting switch, disconnect the ignition switch connector (pink wire) from H.E.I. distributor.*

VALVE TAPPET CLEARANCE

All models have hydraulic lifters.	
173"	1.5 turns down from zero lash
229"	1 turn down from zero lash
231"	Zero lash

VALVE ARRANGEMENT

173"
E-I-I-E-I-E (Left Bank — Front-to-Rear)
E-I-E-I-I-E (Right Bank — Front-to-Rear)
229" & 231"
E-I-E-I-I-E (Left Bank — Front to Rear)
E-I-I-E-I-E (Right Bank — Front to Rear)

SPARK PLUGS

Application	Gap	Torque
173"	.045"	7-15 ft. lbs.
229"	.045"	22 ft. lbs.
231"	.060"	15 ft. lbs.

Spark Plug Type

Application	AC No.
173"	R44TS
229"	R45TS
231"	R45TSX

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
Under 24"	30,000 Max.
Over 24"	50,000 Max.

DISTRIBUTOR

All models are equipped with High Energy Ignition system and no adjustment is required.

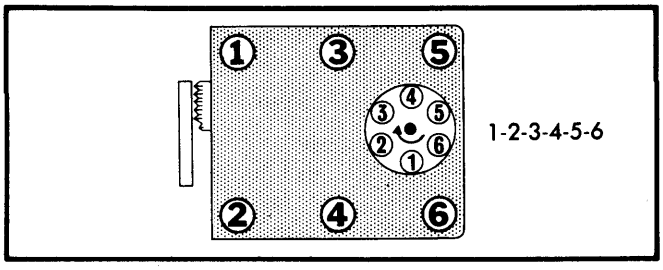

Fig. 1 173" Firing Order and Timing Marks

IGNITION TIMING

NOTE — *Engines are equipped with a receptacle for a magnetic probe timing light, located at 9.5° ATDC. Do not use this probe location with a conventional timing light.*

TUNE-UP (Cont.)

Check or adjust ignition timing with engine at normal operating temperature, choke wide open, air cleaner installed, and air conditioning off. Disconnect and plug distributor vacuum advance, or disconnect electrical connector at distributor base. On 173" engines, also disconnect and plug the EGR and canister purge hoses.

Ignition Timing Specifications (Degrees BTDC@RPM)

Application	Man. Trans.	Auto. Trans.
173"		
Federal	2@750	6@700
Calif.	6@750	10@700
229"	10@700	10@600
231"	15@800	15@550

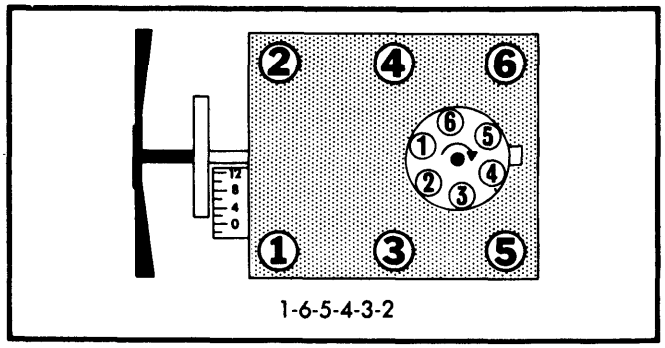

Fig. 2 229" Firing Order and Timing Marks

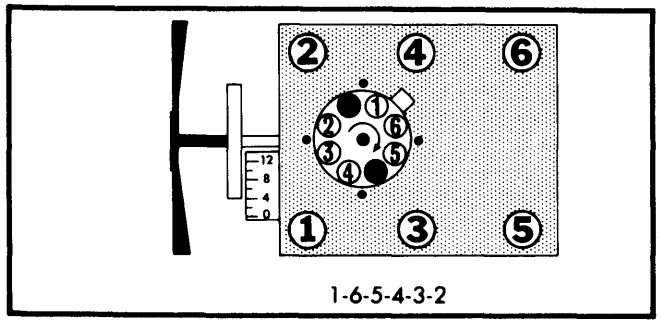

Fig. 3 231" Firing Order and Timing Marks

HOT (SLOW) IDLE RPM

Idle speed adjustment procedures will vary with vehicle model and component application. Refer to Emission Control Tune-Up decal in the engine compartment for adjustment preparations, disconnect purge hose at canister, then proceed as follows:

Without A/C – Adjust solenoid plunger to solenoid RPM. Disconnect solenoid lead and adjust curb idle with idle speed screw.

With A/C – Set idle speed screw to curb idle RPM. Disconnect air conditioning compressor lead at compressor and turn air conditioning on. Open throttle slightly to allow solenoid plunger to extend fully. Adjust solenoid plunger to specified RPM. Reconnect compressor and remove test equipment.

Idle Speed (RPM)

Application	Curb Idle	Solenoid Energized
173"		
Man. Trans.		
Federal	750	1200
Calif.	750	.....
Auto. Trans.		
Federal	700	850
Calif.	700	800
229"		
Man. Trans.	700	750
Auto. Trans.	600	675
231"		
Man. Trans.	600	800
Auto. Trans.		
Federal	550	670
Calif.	550	620

IDLE MIXTURE

NOTE – *Idle mixture screws on all carburetors are covered with hardened steel plugs. Mixture adjustment is not part of a tune-up and should not be performed unless the carburetor has been disassembled or vehicle fails emissions testing.*

MIXTURE SCREW PLUG REMOVAL

1) Remove carburetor, drain fuel, and place upside down on a holding fixture. Place a punch between 2 locator marks on manifold side of throttle body and break out throttle body.

2) Use punch to drive out plug. If it shatters, remove loose pieces. Repeat procedure to remove other plug (if equipped). Reinstall carburetor on vehicle.

PROPANE ENRICHMENT PROCEDURE (FEDERAL VEHICLES ONLY)

1) With engine at normal operating temperature, choke fully open and air conditioning off, set parking brake and block drive wheels. Disconnect and plug hoses as directed on Emission Control Decal.

2) Connect tachometer to engine. Disconnect vacuum advance or electrical connector at distributor and set timing. Reconnect vacuum advance. Disconnect PCV tube from air cleaner and insert propane hose with rubber stopper J-26911 into air cleaner opening.

3) Propane cartridge must be in vertical position. Slowly open propane valve until maximum engine speed is reached with automatic transmission in Drive.

NOTE – *Too much propane will cause engine speed to drop.*

4) Check propane bottle and flow meter to be sure bottle is full. Continue with adjustment procedures for correct vehicle as listed below:

Phoenix Only – 1) Adjust idle speed screw to enriched RPM. Check propane flow and adjust enriched RPM again if necessary. Turn off propane, place in Neutral, and run engine at 2000 RPM for 30 seconds.

TUNE-UP (Cont.)

2) Return engine to idle. If idle speed is correct, no adjustment is necessary. If not correct, remove idle mixture screw plugs. Reinstall carburetor and start engine. Turn screws out 1/8 turn at a time to raise RPM, or in 1/8 turn at a time to lower RPM to idle speed.

3) Turn on propane again to check enriched RPM speed. If necessary, use idle speed screw to adjust. Turn off propane, run engine at 2000 RPM for 30 seconds, and recheck idle speed.

4) If idle is correct, remove propane and test equipment. If not correct, turn mixture screws in until seated. Back out to previous average position and repeat procedure.

All Except Phoenix – 1) If enriched RPM is at specification, mixture is correct. If not, remove carburetor and mixture screw plugs. Reinstall carburetor, turn screws in until seated, then back out until engine will just run.

2) Place in Drive and turn screws out 1/8 turn at a time until maximum RPM is obtained. Turn idle speed screw to set idle at enriched RPM specification.

3) Turn mixture screws in until engine is at curb idle speed. Recheck enriched RPM again with propane. If enriched RPM is correct, remove equipment and reconnect hoses. If not, repeat propane enrichment procedure.

Propane Enrichment RPM

Application	Man. Trans.	Auto. Trans.
173"	825	725
229"	850-900	630-650
231"	830	600-610

MIXTURE CONTROL ADJUSTMENT – C-4 SYSTEM (CALIFORNIA ONLY)

NOTE – *The following procedure should be followed carefully. The C-4 system is sensitive to adjustment and must be properly set to maintain precise control of carburetor air/fuel mixture.*

Phoenix Only – 1) Remove carburetor and mixture screw plugs. Turn screw in until lightly seated, then back out 1 1/2 turns. If plug in air horn has been removed, seat idle air bleed screw and back out 5 turns. If plug is in place, DO NOT remove.

2) Remove vent stack screen. Turn part throttle lean mixture screw in until lightly seated and back out 2 1/2 turns. Reinstall carburetor without air cleaner.

3) Disconnect bowl vent line: disconnect and plug vacuum line at "T" in vent line if used. Disconnect EGR valve and canister purge hoses at carburetor and plug port. Remove secondary vacuum break thermal vacuum switch from air cleaner, disconnect air cleaner hot air valve hose from switch, and plug switch. Leave all other hoses connected.

4) Connect tachometer to brown connector and dwell meter to green test connector near carburetor. Set dwell meter on 6 cylinder scale. Run engine for at least 3 minutes until dwell reading begins to vary.

5) Run engine at 3000 RPM and adjust lean mixture screw (inside vent stack) to achieve 35° dwell. Allow dwell reading to stabilize between adjustments. Return engine to idle and adjust idle speed to 700 RPM in Drive when cooling fan is off.

6) Adjust idle mixture screws to obtain dwell reading of 25°. Allow readings to stabilize between adjustments. Disconnect mixture control solenoid lead while cooling fan is off and check for drop of at least 50 RPM.

7) Repeat 3000 RPM check and adjustment procedures if necessary. When dwell readings are correct, reconnect system hoses, replace vent screen, and remove test equipment.

All Except Phoenix – 1) Mixture control solenoid must be checked before proceeding with adjustment. See *Rochester E2ME Carburetor articles in FUEL SYSTEMS Section*. Set parking brake and block drive wheels. Check ignition timing and adjust as necessary.

2) Connect a dwell meter to lead wire from mixture control solenoid in carburetor, then set meter on 6 cylinder scale. Start engine and run at idle until normal operating temperature is reached and a varying dwell is noted on dwell meter.

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

3) Adjust curb idle speed if necessary. With engine idling, observe dwell reading. If within or varying between 25-35°, no further adjustment is necessary. If dwell does not vary, or falls outside the 10-50° range, perform the following:

4) With engine off, cover air intakes and vents with tape. Drill rivet or remove staking around idle air bleed plug (above primary bores). Remove plug and blow out any metal chips. Remove tape, start engine, and run until warm. Adjust idle air bleed valve with a screwdriver until dwell varies within the 25-35° range.

CAUTION – *Perform this step carefully. The idle air bleed valve is very sensitive in controlling air/fuel ratios and should be turned only in 1/8 turn increments.*

5) 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 and idle mixture screw plugs.

6) Turn screws in until lightly seated. Back out 4 1/2 turns. Reinstall carburetor and run engine until warm. Check dwell reading and repeat idle air bleed valve adjustment if necessary.

7) If dwell is below limits, turn screws out 1/2 turn; if above limits turn screws in 1/2 turn. Reset idle air bleed valve to obtain correct dwell limit specifications. Reset idle speed if necessary, remove equipment, and connect hoses.

COLD (FAST) IDLE RPM

With engine at normal operating temperature, disconnect and plug EGR hose at valve. Disconnect canister purge hose. Position cam follower on highest step of fast idle cam and turn fast idle screw to obtain specified RPM.

TUNE-UP (Cont.)

Fast Idle RPM

Application	Man. Trans.	Auto. Trans.
173"		
Federal	1900	2250
Calif.	2000	2000
229"	1750	1750
231"		
Federal	2200	2000
Calif.	2200	2200

AUTOMATIC CHOKE

The choke cover is riveted in place on all models and no adjustment is possible.

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).

Pressure	
173"	6.0-7.5 psi
All Others	4.5-6.0 psi
Volume	
All Models	One pint in 30 seconds

EXHAUST EMISSION SYSTEMS

See EXHAUST EMISSION SYSTEMS section.

GENERAL SERVICING

IGNITION

DISTRIBUTOR

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

Resistance	
Primary (at 75°F)	0-1.0 ohms
Secondary (at 75°F)	6,000-30,000 ohms
Coil Output	
At all engine speeds	25-35 KV Minimum①

① – Replace if below 25 KV.

CARBURETION

CARBURETORS

Application	Model
173"	
Federal	Rochester 2SE
Calif.	Rochester E2SE
229" & 231"	
Federal	Rochester M2ME
Calif.	Rochester E2ME

Other Data & Specifications – *See Tune-Up and Rochester Carburetors in FUEL SYSTEMS Section.*

ELECTRICAL

BATTERY

12 Volt – Negative Ground.

Application	Cold Crank Amps@0°F	Reserve Capacity Minutes
Phoenix		
Standard	350	80
Optional	465	125
All Others		
Standard	275	60
Optional	350, 465	80, 125

STARTER

Delco-Remy solenoid actuated with overrunning clutch.

Application	Volts	Amps	Test RPM
Phoenix	9	45-70	7000-11,900
All Others	9	60-85	6800-10,300

ALTERNATOR

Application	Standard Amps	Optional Amps
Sunbird	37	55, 63
All Others	42	63, 70

ALTERNATOR REGULATOR

Delco-Remy nonadjustable, integral with alternator.

Operating Voltage (at 85°F)	13.8-14.8

GENERAL SERVICING (Cont.)

ENGINE

INTAKE MANIFOLD TIGHTENING

Tighten intake manifold bolts alternately, starting in center of manifold and working toward ends. On 173" engines, tighten bolts to 20-25 ft. lbs. On 229" engines, tighten bolts to 30 ft. lbs. On 231" engines, tighten bolts to 45 ft. lbs.

BELT ADJUSTMENT

Tension (Lbs.) Using Strand Tension Gauge

Application	New	Used
173"		
Air Conditioning	145-155	75-85
All Other Belts	130-140	50-60
229"		
Air Conditioning	135-145	85-95
All Other Belts	120-130	70-80
231"		
Alternator	145	80
Sunbird A.I.R. Pump	80	55
All Other Belts	165	100

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (In Miles)
Oil Filter	Replace every 2nd oil change
Air Cleaner	Replace every 30,000
Fuel Filter	Replace every 15,000
PCV Filter	Replace every 30,000
PCV Valve	Replace every 30,000
Vapor Canister Filter	Replace every 30,000

CAPACITIES (EXCEPT COOLING)

Application	Quantity
Crankcase	
173" (With or without filter)	4.0 qts.
All Others (Add 1 qt. with filter)	4.0 qts.
Man. Trans. (SAE 80W-90)	3.5 pts.
Man. Transaxle (Dexron II)	6.0 pts.
Auto. Trans. (Dexron II)	
THM 200C	7.0 pts.
THM 250C & 350C	5.5 pts.
Auto. Transaxle (Dexron II)	10.0 pts.
Rear Axle (SAE 80W-90)	
7.5" Ring Gear	3.5 pts.
8.5" & 8.75" Ring Gear	4.25 pts.
Fuel Tank	
Catalina & Bonneville	
Sedan	25.0 gals.
Station Wagon	22.0 gals.
Firebird	20.8 gals.
Phoenix	14.0 gals.
Sunbird	18.5 gals.
All Others	18.1 gals.

CAPACITIES (COOLING)

Application	Std. (Qts.)	Opt. or A/C (Qts.)
Phoenix	11.5	11.7
Sunbird	11.7	11.7
Firebird	13.2	13.2
All Other Models	12.6	12.6