1966-74 GENERAL MOTORS EXHAUST EMISSION TUNE-UP (Cont.)

PONTIAC

DESCRIPTION

Refer to EMISSION CONTROL APPLICATIONS Section for individual systems as applied to particular combinations of vehicle model, engine, and transmission.

Several systems are used to control emissions of pollutants. Each system is designed to effect particular vehicle emission situations. In addition, specially calibrated carburetors, distributors, modified combustion chambers and valve timing are used with these systems.

SERVICE PROCEDURES

In addition to servicing an individual emission system or component, all ignition system and/or carburetor adjustments necessary must also be correctly performed.

NOTE — Due to late changes and corrections, always refer to Engine Tune-Up decal in engine compartment before beginning Tune-Up. In event of any conflict between decal specifications and given specifications, decal specifications should prevail.

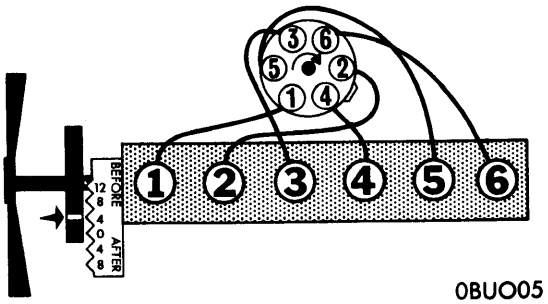
NOTE — To by-pass Starter Interlock, turn ignition "ON" and locate by-pass relay switch in engine compartment. Press and release button on relay. Engine can now be cranked or started. If ignition is turned to "OFF" or "LOCK" position, reactivation of relay button will again be required before engine can be cranked or started.

IGNITION SYSTEM

IGNITION TIMING

Refer to appropriate Tune-Up chart in TUNE-UP SPECIFICATIONS Section for ignition system and timing specifications.

All Engines (1966-74) — Check or adjust ignition timing with distributor cam angle correctly set, idle speed adjusted to specified RPM, and distributor vacuum line disconnected and plugged. After timing is set, reconnect vacuum line and bring idle speed to specified idle RPM.



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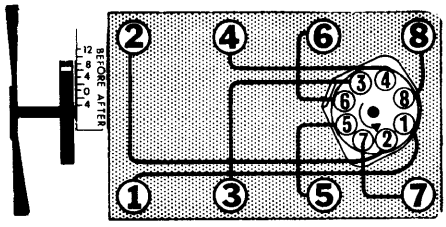
PONTIAC 250" 6-Cyl. (1971-74)



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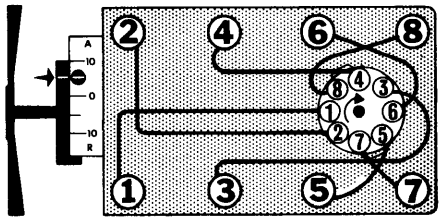
PONTIAC 326", 389", 400", 421" & 428" V8 (1966-67)



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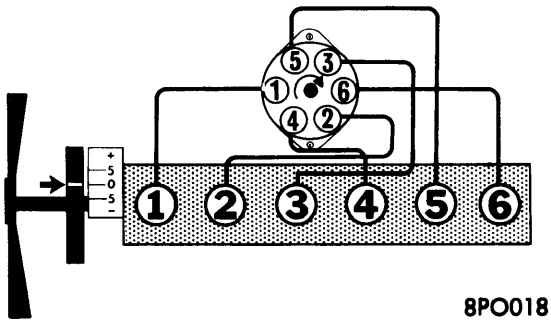
PONTIAC 307" V8 (1971-72)



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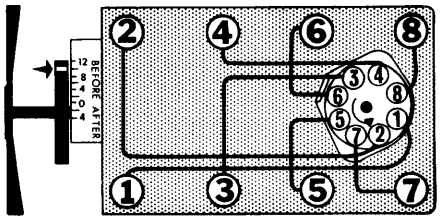
PONTIAC 230" & 250" 6 CYLINDER (1966-70)



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PONTIAC 350", 400", 428" & 455" V8 (1968-74)

1966-74 GENERAL MOTORS EXHAUST EMISSION TUNE-UP (Cont.)

PONTIAC (Cont.)

CARBURETION

For service procedures and specifications, refer to following individual carburetor articles in CARBURETION Section, or for idle speed and mixture specifications, refer to appropriate TUNE-UP Chart in TUNE-UP SPECIFICATIONS Section.

Application	Carburetor Type
230" 6 Cylinder	
1-Bbl. (1966-67)	Rochester BV
4-Bbl. (1966-67)	Rochester 4MV
250" 6 Cylinder	
1-Bbl. (1968-74)	Rochester BV & MV
4-Bbl. (1968-69)	Rochester 4MV
307" V8	
2-Bbl. (1971-72)	Rochester 2GV
326" V8	
2-Bbl. (1966-67)	Rochester 2GC
4-Bbl. (1966-67)	Carter AFB
350" V8	
2-Bbl. (1968-74)	Rochester 2GC & 2GV
2-Bbl. (1972-74)	Carter WGD
4-Bbl. (1968-74)	Rochester 4MV
389" V8	
2-Bbl. (1966)	Rochester 2GC
4-Bbl. (1966)	Carter AFB
Three 2-Bbls. (1966)	Rochester 2G & 2GV
400" V8	
2-Bbl. (1967-74)	Rochester 2GC & 2GV
4-Bbl. (1967-74)	Rochester 4MV, Carter AFB
421" V8	
4-Bbl. (1966)	Carter AFB
Three 2-Bbls. (1966)	Rochester 2G & 2GV
455" V8	
2-Bbl. (1970-74)	Rochester 2GV
4-Bbl. (1970-74)	Rochester 4MC & 4MV

IDLE SPEED & MIXTURE ADJUSTMENT

NOTE — Correct mixture for emission compliance and idle quality are pre-set by manufacturer. Following procedures should only be used when normal tune-up activities fail to give satisfactory idle performance at specified air/fuel ratio or CO level, or after major carburetor overhaul or component replacement.

All Models (1966-67) — 1) For preliminary adjustment setting, turn idle mixture screw out (counterclockwise) 1½ turns (two turns for 4MV Quadrajet) from lightly seated position, and turn speed screw in (clockwise) ½ to one turn from throttle closed position (1-Bbl. carburetor). AFB 4-Bbl. is set at ½ turn out from lightly seated position, with mixture screw out one turn.

2) Set hand brake securely, block drive wheels and place transmission in Neutral. Connect suitable tachometer to engine. Place automatic transmission selector lever in "D" position, and adjust idle speed screw to obtain specified idle speed.

3) Turn mixture screw to achieve best quality (highest RPM) idle. Reset idle speed screw to specified idle speed if mixture adjustment is necessary.

4) Recheck idle mixture adjustment to ensure smoothest possible idle. *NOTE — Always recheck idle mixture setting after making idle RPM adjustment with idle speed screws.*

5) 6 Cylinder vehicles with air conditioning require adjustment of idle speed-up device by setting hot idle speed and mixture as described. Set air conditioner to "ON" position for maximum cooling. Adjust diaphragm plunger screw to obtain 500 RPM for vehicles with automatic transmission and no Air Injection Reactor device (600 RPM with A.I.R.) or 600 RPM for manual transmission vehicles without A.I.R. device (700 RPM if equipped with A.I.R. device). *CAUTION — Idle speed diaphragm plunger must be restrained from turning while adjusting plunger screw to prevent injury to diaphragm.*

6) All 2-Bbl. carburetors used on Tempest V8 models with automatic transmission have hot idle compensator, during idle adjustment make sure hot idle compensator is closed by depressing spring loaded button. *NOTE — On 1966 engines equipped with three 2-Bbl. option, adjust center carburetor only.*

Idle Speed RPM Specifications (1966-67)

Application	Auto. Trans.	Man. Trans.
230" 6 Cylinder		
Standard	500	600
A.I.R.	600	700
Air Conditioning	500	① 700
A.I.R. & A/C	600	700
326" V8 2-Bbl.		
Standard	500	600
A.I.R.	600	700
Air Conditioning	① 575	700
A.I.R. & A/C	① 675	700
326" V8 4-Bbl.		
Standard	500	600
A.I.R.	600	② 700
Air Conditioning	① 575	700
A.I.R. & A/C	600	② 700
389" & 400" V8 2-Bbl.		
Standard	500	600
A.I.R.	600	② 700
Air Conditioning	① 575	700
A.I.R. & A/C	600	② 700
389", 400", & 421" V8 4-Bbl.		
Standard	500	600
A.I.R.	600	② 700
Air Conditioning	① 575	700
A.I.R. & A/C	600	② 700
421" V8 (1966 Model Only)		
Standard	③ 500	③ 600
Air Conditioning	575	700

① — 600 RPM on 1967 models.
② — No RPM specifications given for 1966 models.
③ — Add 100 RPM for 1966 421" HO engine.

1966-74 GENERAL MOTORS EXHAUST EMISSION TUNE-UP (Cont.)

PONTIAC (Cont.)

IDLE SPEED & MIXTURE ADJUSTMENT (Cont.)

All Models (1968-69) – *NOTE – Curb idle is to be set with automatic transmission lever in "D" position or manual transmission in Neutral. Air conditioner (if equipped) is to be "OFF". Set with choke fully open and hot idle compensator closed (all vehicles with air conditioning and/or 4-Bbl. carburetors).*

250" 6 Cylinder (1968-69) – 1) Back carburetor mixture screws out (counterclockwise) five turns from lightly seated position. With idle stop solenoid activated, set solenoid screw to obtain 10 RPM (automatic transmission) or 30 RPM (manual transmission) above specified RPM.

2) Turn mixture screws in (clockwise) to bring engine to specified RPM with idle stop solenoid still active. Do not readjust idle stop solenoid screw.

3) With idle stop solenoid inactive, adjust idle speed screw in carburetor to obtain solenoid inactive speed. Do not readjust mixture or solenoid screws.

350", 400" & 428" V8 (1968-69) – 1) Back carburetor mixture screws out (counterclockwise) four turns (2-Bbl. models) or six turns (4-Bbl. models) from lightly seated position.

2) With idle stop solenoid energized, adjust mixture screws to best lean carburetor setting using solenoid stop screw for idle speed adjustment.

3) Disconnect idle stop solenoid, adjust idle speed screw on carburetor to attain lower solenoid inactive speed RPM. Do not readjust carburetor mixture screws.

Curb Idle Speed RPM Specifications (1968-69)

Application	Solenoid Active	① Solenoid Inactive
250" 6 Cyl. 1-Bbl.		
Auto. Trans.	600	500
Man. Trans.	700	500
250" 6 Cyl. 4-Bbl.		
Auto. Trans.	600	500
Man. Trans.	② 800	600
350" V8 2-Bbl.		
Auto. Trans.	③ 600	500
Man. Trans.	② 700	500
350" V8 4-Bbl.		
Auto. Trans.	650	500
Man. Trans.	④ 850	650
400" V8 2-Bbl.		
Auto. Trans.	③ 600	500
Man. Trans.	② 800	500
400" V8 4-Bbl.		
Auto. Trans.	650	500
Man. Trans.	④ 850	650
400" V8 4-Bbl. Ram Air Option		
Auto. Trans.	650	500
Man. Trans.	1000	650
428" V8 4-Bbl.		
Auto. Trans.	650	500
Man. Trans.	④ 850	650

① – Solenoid Inactive Speed RPM given for 1968 models only.
② – 850 RPM on 1969 models.
③ – 650 RPM on 1969 models.
④ – 1000 RPM on 1969 models.

All Models (1970) – 1) *NOTE – On all California vehicles, fuel filler cap must be removed before following idle settings are made:* Remove and plug vacuum advance hose at distributor.

2) Plug hot idle compensator on all automatic transmission 4-Bbl. Quadrajet carburetor models except Ram Air III and IV options, air conditioned 2-Bbl. models with automatic transmission, and all 1-Bbl. models.

3) On vehicles without idle stop solenoid, back out (counterclockwise) mixture screws three to five turns and adjust carburetor speed screw to obtain initial RPM setting. Lean (turn screws clockwise) equally to obtain final RPM.

4) Vehicles with idle stop solenoid (all Ram Air III & IV, and all 6 cylinder models) must have solenoid energized and engine speed adjusted to initial RPM setting. Adjust mixture screws to give best lean idle at initial RPM setting for Ram Air III and IV models, or to final RPM setting for 6 cylinder models.

5) De-energize solenoid and adjust carburetor idle speed screw to obtain solenoid inactive speed of 400 RPM for 6 cylinder models or 500 RPM for Ram Air models with automatic transmission (650 RPM for Ram Air models with manual transmission). Do not readjust solenoid or mixture screws.

Curb Idle RPM Specifications (1970)

Application	Initial Idle RPM	Final Idle RPM
250" 6 Cylinder		
Auto. Trans.	630	600
Man. Trans.	830	800
350" V8 2-Bbl.		
Auto. Trans.	675	650
Man. Trans.	850	800
400" V8 2-Bbl.		
Auto. Trans.	675	650
Man. Trans.	850	800
400" V8 4-Bbl.		
Auto. Trans.	675	650
Man. Trans.	1050	950
400" V8 4-Bbl. Ram Air III & IV		
Auto. Trans.	750	
Man. Trans.	1000	
455" V8 4-Bbl.		
Auto. Trans.	675	650
Man. Trans.	1050	950

All Models (1971) – Make idle adjustments with engine at normal operating temperature, choke fully open, air conditioner "OFF" (if equipped), and parking brake firmly set with drive wheels blocked.

250" 6 Cylinder (1971) – 1) Disconnect and plug distributor vacuum hose, disconnect and plug fuel tank "Evap" hose from vapor canister.

2) Set RPM to initial idle specifications. Turn mixture screws in (clockwise) equally until final RPM is achieved.

3) If suitable CO meter is available, mixture may be adjusted to given CO specifications, with idle speed set to final idle RPM. Install new plastic limiter caps and unplug and reconnect all vacuum hoses.

1966-74 GENERAL MOTORS EXHAUST EMISSION TUNE-UP (Cont.)

PONTIAC (Cont.)

IDLE SPEED & MIXTURE ADJUSTMENT (Cont.)

NOTE — For Combination Emission Control Valve adjustment on 6 cylinder models, follow instructions as given in Step One, then manually extend CEC Valve plunger to contact throttle lever. Adjust plunger length to obtain 500 RPM with automatic transmission or 550 RPM with manual transmission (RPM set with plunger extended). If CEC solenoid on carburetor is used to set engine idle or is adjusted out of specified limits, a decrease in engine braking may result.

350", 400" & 455" V8 (1971) — 1) Disconnect and plug distributor vacuum hose, disconnect and plug both carburetor "Evap" hose from vapor canister and carburetor to solenoid vacuum hose at solenoid.

2) Remove limiter caps and back idle mixture screws out (counterclockwise) 3½ turns from a lightly seated position. Set RPM to initial idle as specified.

3) Turn mixture screws in (clockwise) equally until final RPM is obtained as specified.

4) If suitable CO meter is available, mixture may be adjusted to CO specifications, with idle speed set to final idle RPM. Install new plastic limiter caps and unplug and reconnect all vacuum hoses.

Curb Idle Speed RPM Specifications (1971)

Application	Initial Idle RPM	① Final Idle RPM
250" 6 Cylinder		
Auto. Trans.	525	500
Man. Trans.	625	550
350" V8 (All)		
Auto. Trans.	625	600
Man. Trans.	875	800
400" V8 2-Bbl.		
Auto. Trans.	625	600
Man. Trans.		
400" V8 4-Bbl.		
Auto. Trans.	725	700
Man. Trans.	700	600
455" V8 2-Bbl.		
Auto. Trans.	675	650
Man. Trans.		
455" V8 4-Bbl.		
Auto. Trans.	675	650
Man. Trans.		
455" V8 High Output		
Auto. Trans.	725	700
Man. Trans.	700	600

① — Percentage of CO for all models is 1.0%.

All Models (1972) — 1) Make adjustments with engine at normal operating temperature, choke fully open, air conditioner "OFF" (if equipped), parking brake firmly applied with drive wheels blocked, and distributor vacuum advance hose disconnected and plugged.

2) Disconnect and plug fuel tank "Evap" hose from vapor canister. Disconnect and plug vacuum solenoid hose to carburetor at vacuum solenoid. Remove mixture screw limiter caps.

3) With idle stop solenoid energized (if equipped), and idle mixture screws backed out (counterclockwise) approximately 3½ turns from a lightly seated position, adjust carburetor speed screw to obtain Initial Idle RPM as specified.

4) With idle stop solenoid de-engergized (if equipped), turn idle mixture screws in (clockwise) equally to obtain Final Idle RPM as specified.

5) If carburetor is equipped with idle stop solenoid, energize solenoid and adjust to obtain Solenoid Active RPM as specified.

NOTE — For adjustment of Combination Emission Control Valve on 6 cylinder vehicles, manually extend CEC Valve plunger and adjust to obtain 650 RPM for vehicles with automatic transmission, or 850 RPM for vehicles with manual transmissions.

Curb Idle Speed RPM Specifications (1972)

Application	Initial Idle RPM	Final Idle RPM	Solenoid Active RPM
250" 6 Cylinder			
Auto. Trans.	630	450	600
Man. Trans.	800	450	700
307" V8 2-Bbl.			
Auto. Trans.	650	600	600
Man. Trans.	1000	900	900
350" V8 2-Bbl.			
Auto. Trans.	700	625	
Man. Trans.	875	800	
400" V8 2-Bbl.			
Auto. Trans.	700	625	
Man. Trans.			
400" V8 4-Bbl.			
Auto. Trans.	725	500	700
Man. Trans.	1075	600	1000
455" V8 2-Bbl.			
Auto. Trans.	700	625	
Man. Trans.			
455" V8 4-Bbl.			
Auto. Trans.	725	500	650
Man. Trans.			
455" V8 4-Bbl. High Output			
Auto. Trans.	775	500	700
Man. Trans.	1075	600	1000

All Models (1973) — 1) Bring engine to normal operating temperature. Stop engine, disconnect and plug carburetor hose from vapor canister.

2) Remove idle limiter caps. Lightly seat idle mixture screws, then back out (counterclockwise) six turns. Connect suitable CO meter.

3) Start engine, with curb idle set and solenoid energized, place automatic transmission selector lever in "D" or manual transmission in Neutral. Adjust each idle screw equally to obtain satisfactory idle at specified RPM with maximum CO level as given in specifications.

1966-74 GENERAL MOTORS EXHAUST EMISSION TUNE-UP (Cont.)

PONTIAC (Cont.)

IDLE SPEED & MIXTURE ADJUSTMENT (Cont.)

4) Temporarily place air cleaner on carburetor and readjust idle mixture screws if necessary. Install new limiter caps. Reinstall air cleaner, unplug and reconnect vapor canister hose.

Idle Mixture Speed RPM Specifications (1973)

Application	Idle Mixture RPM	Maximum CO Level
250" 6 Cylinder		
Auto. Trans.	700	0.2%
Man. Trans.	800	0.2%
350" V8 2-Bbl.		
Auto. Trans.	700	0.2%
Man. Trans.	1100	0.2%
400" V8 2-Bbl.		
Auto. Trans.	700	0.2%
Man. Trans.		
400" V8 4-Bbl.		
Auto. Trans.	700	0.2%
Man. Trans.	1200	0.2%
455" V8 4-Bbl.		
Auto. Trans.	700	0.2%
Man. Trans.	1200	0.2%

All Models (1974) – 1) Set parking brake firmly and block drive wheels. Disconnect and plug carburetor hose from vapor canister, disconnect and plug distributor vacuum hose at vacuum advance unit.

2) If idle mixture needle cap tabs have been previously broken off, lightly seat mixture screws and back screws out (counterclockwise) six turns. If caps have not been broken off, turn mixture screws counterclockwise against stops.

3) Connect suitable CO meter to exhaust system tail pipe. Start engine and bring to normal operating temperature.

4) Turn air conditioning to "OFF" (if equipped), place transmission selector lever in "D" if automatic, or Neutral if manual. With air cleaner removed and air cleaner vacuum fitting in manifold plugged, adjust speed screw or idle stop solenoid screw as applicable to obtain specified RPM.

5) If cap tabs have been broken off, turn each idle mixture screw in (clockwise) equal amounts until idle CO is 0.2%. Do not remove limiter caps from screws. Reset idle speed if necessary and recheck idle CO with air cleaner in place.

6) If cap tabs are intact, turn mixture screws in equal amounts until 0.2% CO is reached or until tabs hit stop. Reset idle speed if necessary. Remove plugs from vapor canister and distributor vacuum hoses, reconnect hoses to engine.

Idle Speed RPM Specifications (1974)

Application	Auto. Trans.	Man. Trans.
250" 6 Cylinder		
Federal	650	950
California	630	950
350" V8 2-Bbl.		
Federal	750	1150
California	720	
350" V8 4-Bbl.		
Federal	730	1150
California	720	
400" V8 2-Bbl.		
Federal	730	
California	720	
400" V8 4-Bbl.		
Federal	720	1310
California	685	
455" V8 4-Bbl.		
Federal	680	
California	675	
455" V8 4-Bbl. High Output		
Federal	825	1420
California	825	1420

1968-74 GENERAL MOTORS CONTROLLED COMBUSTION SYSTEM

DESCRIPTION & OPERATION

The Controlled Combustion System uses three different controls to regulate ignition timing for optimum emission control.

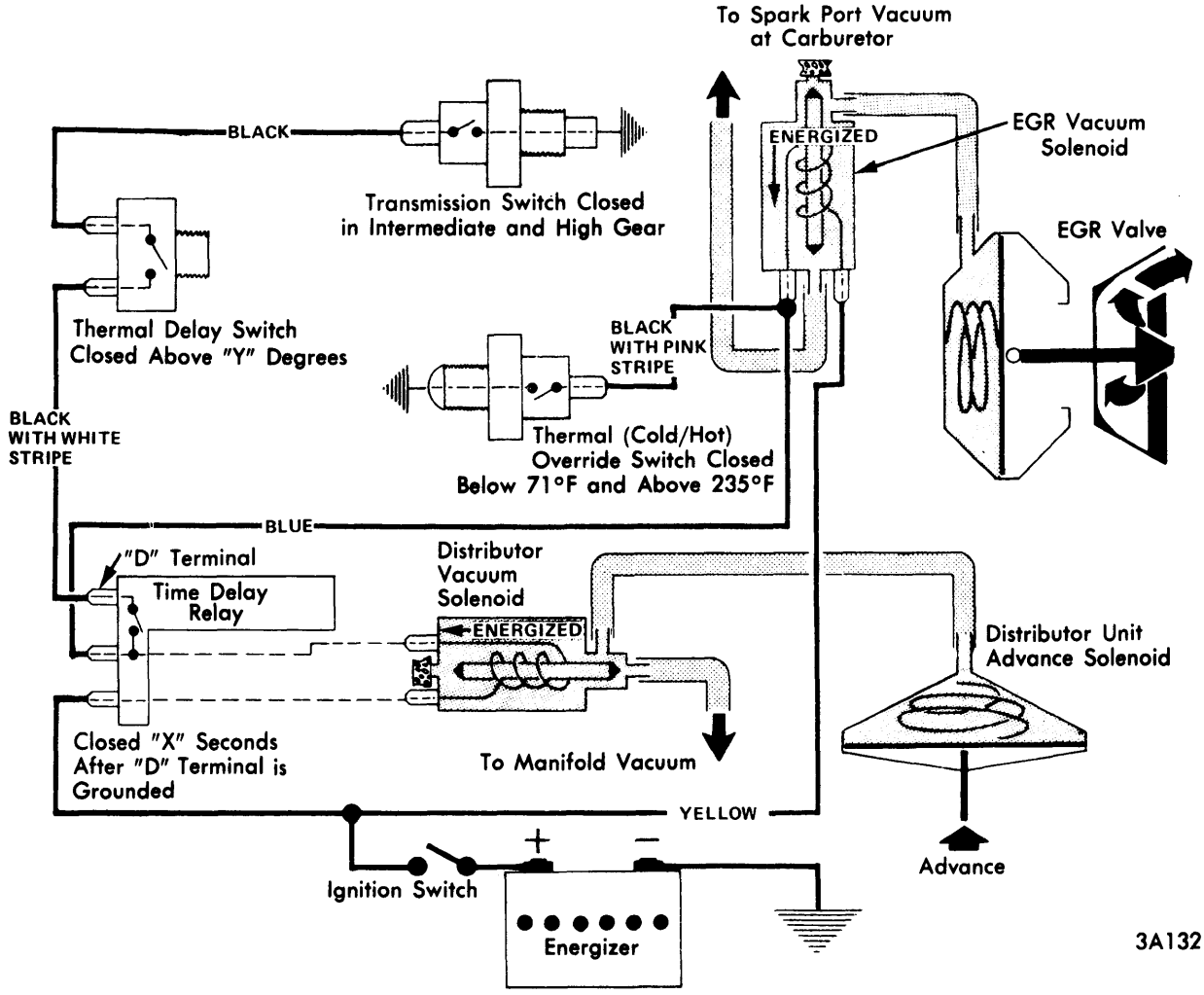
1) Transmission Controlled Spark with Exhaust Gas Recirculation (TCS/EGR) – Used on all V-8 engines with manual transmission and some V-8 engines with automatic transmission.

2) Combined Emission Control with Exhaust Gas Recirculation (CEC/EGR) – Used on all 6 cylinder engines with manual transmission and all Calif. Vega models with manual transmission and non-Calif. Vegas with 2-Bbl. and manual transmission.

3) Ported Vacuum Advance with Exhaust Gas Recirculation (PVA/EGR) – Used on all 6 cylinder engines with automatic transmission.

Function of all three systems is to eliminate distributor vacuum advance when driving in low speeds. Although component usage varies between vehicles, their operation is basically the same. Distributor vacuum advance is governed by a distributor vacuum solenoid or CEC solenoid. On ported vacuum advance applications, a ported vacuum line directly from carburetor to vacuum advance unit allows retarded vacuum advance at idle or closed throttle.

NOTE – Each system is tied together (electrically or by vacuum) with an EGR system. For more information on EGR system see "General Motors Exhaust Gas Recirculation System" in this Section.



Y	
DEGREES	COLOR CODE
125°	BLACK
140°	GREY
155°	GREEN

X	
SECONDS DELAY	COLOR CODE
30	WHITE
50	BLUE

TCS/EGR SYSTEM COMPONENTS (TYPICAL)