EGR and Back Pressure Valve System

This system consists of: the EGR Valve, the Back Pressure Valve and the 4-Port Thermal Valve Nipple #3.

The EGR Valve is connected to an aqua striped vacuum hose which is connected to a Black 4-Way Vacuum Tee with a Black Mark. See Fig. 19. The Black 4-Way Vacuum Tee is fed "weak" ported vacuum on another aqua striped vacuum hose. From here, the "weak" ported vacuum can go 3 different places: First, to the EGR Valve (aqua striped hose); Second, to the Thermal Valve Nipple #3 (aqua striped hose); and Third, to the Back Pressure Valve (white striped hose).

Below 149°F, the Thermal Valve will bleed off all the "weak" ported vacuum and the EGR Valve will stay closed. Above 149°F, the Thermal Valve will block the vacuum leak. This will allow the "weak" ported vacuum to go to the EGR Back Pressure Valve. See Fig. 19.

It should be noted that the 4-Port Thermal Valve Nipple #3 has a switch point of 149°F; however, the tolerance of that Nipple is: bleeds vacuum below 104°F, and blocks vacuum above 176°F.

The EGR Back Pressure Valve, depending on engine load, throttle opening, and EGR gas flow, will block some part or all of the vacuum leak on the white striped vacuum hose. So this means that the EGR Valve can be shut off by the Thermal Valve (cold engine), or by the Back Pressure Valve bleeding off vacuum from the white striped hose (light load or small throttle opening).

This is how the Back Pressure works and what it does. First, the Back Pressure Valve has 3 hoses connected to it. See Fig. 19. The large black vacuum hose is connected to the EGR Valve exhaust feed. This means that exhaust gases are in this hose. Second, there is a white striped hose connected to the Back Pressure Valve which bleeds or blocks the "weak" ported vacuum which is "trying" to open the EGR Valve. Third, there is a yellow striped vacuum hose connected to the Back Pressure Valve. This yellow striped hose is connected to a nipple on the carburetor which has "Venturi Type" of vacuum applied to it. It is not "true" venturi vacuum, but it is so high in the throttle body, that it acts like venturi vacuum. That means that the vacuum is very weak (5″–7″ max vacuum) and is only present at large throttle openings (high air flow).

If the engine is started warm (above 149°F), and the throttle valve is opened slightly (about 2,000 RPM), some of the "weak" ported vacuum that is trying to open the EGR Valve, will be bled off by the Back Pressure Valve. This happens because the Back Pressure Valve Diaphragm is designed to bleed vacuum from the white striped vacuum hose. See Fig. 19. It takes exhaust pressure on the black hose to push the diaphragm up. This will block the vacuum leak on the white striped hose. Also, a constant vacuum source on the yellow striped hose will pull the diaphragm up which will also seal the vacuum leak on the white striped hose.

So the diaphragm in the Back Pressure Valve can be pushed up (by exhaust pressure) or pulled up (by "Venturi Type" vacuum). Either one of these will block more of the bleed on the white striped hose, which will result in more EGR.

The EGR Valve opening is regulated by 4 things:

First, the amount of "weak" ported vacuum applied to the EGR Valve.

Second, the load on the engine. The more of a load on the engine will result in more exhaust back pressure. More exhaust pressure closes off more of the bleed on the white striped vacuum hose, resulting in more "weak" ported vacuum applying on the EGR Valve.

Third, large throttle blade openings. If the throttle blade is opened a lot, you will start to build up vacuum on the yellow striped hose (0″ at 4,000 RPM and 5″ at 5,000 RPM with trans. in neutral). So the yellow striped hose will give you EGR based on large throttle openings. When there is vacuum on the yellow striped hose, it will pull the diaphragm in the Back Pressure Valve up. This partially blocks the leak on the white striped hose, which allows more "weak" ported vacuum to open the EGR Valve.

Fourth, EGR gas flow. The exhaust back pressure feed comes from the EGR Valve. This exhaust nipple has a venturi in it. See Fig. 19. Whenever the EGR Valve is closed, there will be exhaust pressure at this nipple. When the EGR Valve opens, there is flow through the EGR Valve and a vacuum is now present at the exhaust nipple on the EGR Valve. The amount of the vacuum is dependent on how far the EGR Valve is open. The further the valve is open, will result in more vacuum at the exhaust nipple. When there is vacuum at this nipple, this will pull the diaphragm in the Back Pressure down. This will bleed all "weak" ported vacuum on the white striped hose and the EGR Valve will close. When the EGR Valve closes, the vacuum on the exhaust nipple will change to pressure. This pressure will now block the bleed and the EGR Valve will open and the cycle will start all over again. This opening and closing of the EGR Valve happens very fast. You can feel this opening and closing of the EGR Valve as a "buzzing" or vibrating of the EGR Diaphragm up and down when the throttle is opened.

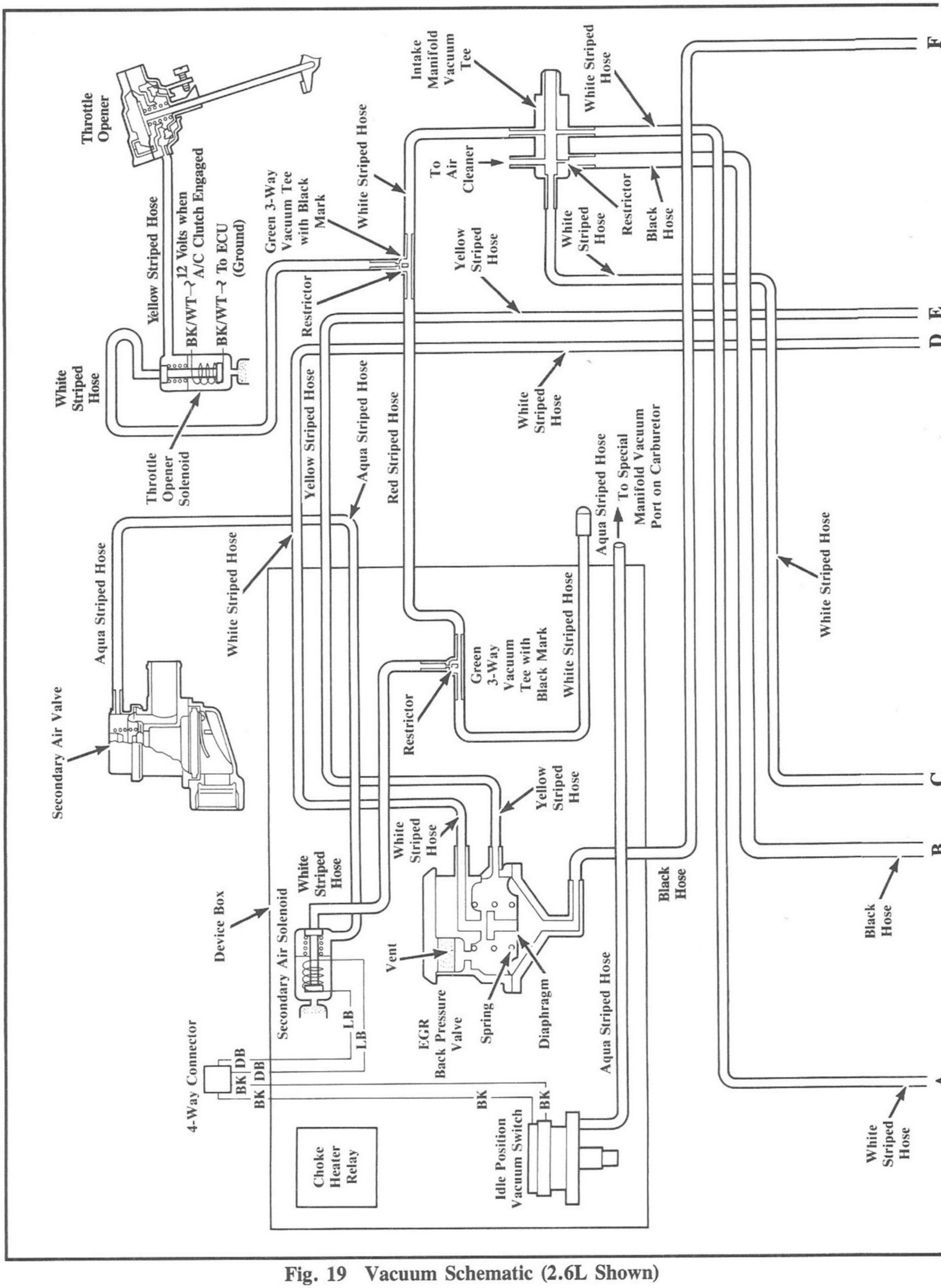


Fig. 19 Vacuum Schematic (2.6L Shown)

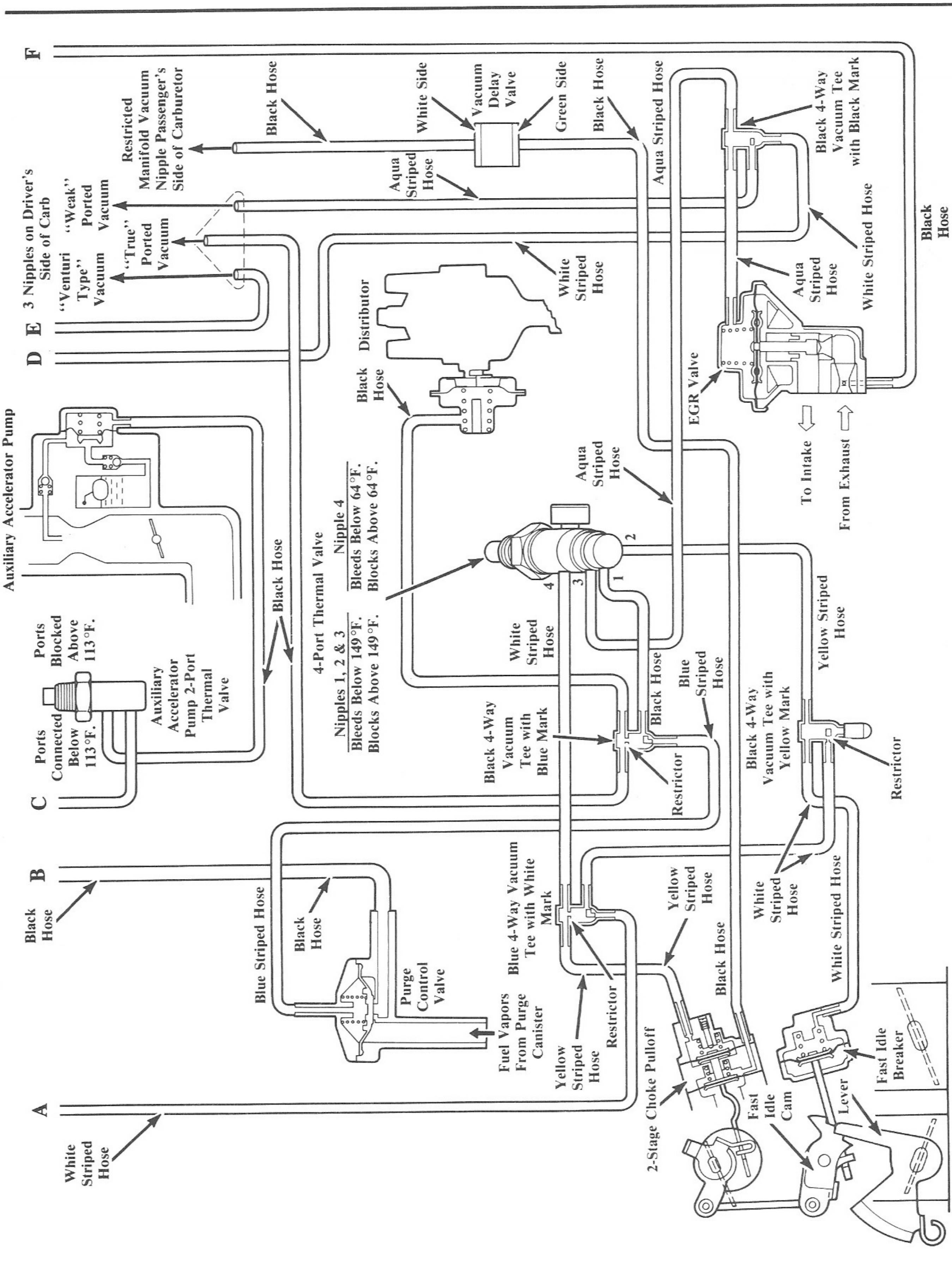


Fig. 19 Vacuum Schematic (2.6L Shown)

EGR and Back Pressure Valve System Continued...

This EGR system reduces the oxides of nitrogen emissions, and also the tendency to spark knock.

Quick Test

CAUTION:
THE EGR VALVE IS EXTREMELY HOT. IF YOU TOUCH THE EGR VALVE TO FEEL IF IT'S WORKING, YOU SHOULD PROTECT YOUR HANDS WITH A SHOP TOWEL OR GLOVES TO PREVENT YOUR HANDS FROM BEING BURNT BY THE HOT EGR VALVE.

To test the EGR System, start a cold engine and open the throttle. Feel with your hand to "see" if the EGR Diaphragm is moving. On a cold engine (below 149°F), the EGR Diaphragm should not move as the throttle is opened.

As the engine warms up, when you open the throttle the EGR Valve should barely open (buzzing up and down). As you open the throttle further, the EGR Valve should still be buzzing, but opening up more. If your system works like this then it is OK. If not, you'll need to do some more testing to see where the problem is. First, we suggest that you make sure that the vacuum hoses are hooked up correctly. Verify this according to the Vacuum Schematic in Fig. 19.

If the vacuum hoses are hooked up right, then you need to go to the following paragraph which applies to your problem:

EGR Valve opens when cold. Check the Thermal Valve Nipple #3. It should bleed vacuum below 104°F. If it blocks vacuum, it is bad and should be replaced.

EGR Valve never opens. Above 176°F, the Thermal Valve Nipple #3 should block vacuum. If it leaks vacuum, it is bad and needs to be replaced. Also, if the white striped vacuum hose to the Device Box has a leak, the EGR Valve will never open.

EGR Valve doesn't buzz when it opens. If you can feel the EGR Valve opening with the throttle blade, but it doesn't buzz, check the black exhaust hose to the Back Pressure Valve (in the Device Box). At idle, you should be able to feel the exhaust gases coming out of the hose. If not, the exhaust hose or the EGR Valve is plugged and needs to be replaced. If the white striped hose to the Device Box is plugged, the EGR Valve will open with the throttle, but here also, the EGR Valve will not buzz. To test this, remove the white striped hose from the Device Box and hook a vacuum gauge to it. At Curb Idle, your vacuum gauge should read 0 (zero). Open the throttle and you should see a "weak" ported vacuum signal. If not, check the white striped hose back to the Black 4-Way Vacuum Tee with a Black Mark, for blockage. If everything you checked so far is OK, but the EGR Valve doesn't buzz as it opens, this tells you that the Back Pressure Valve is not regulating the bleed on the white striped hose and needs to be replaced.

The following is a list of what could cause the Back Pressure Valve not to regulate, and how to test it. The Back Pressure Valve Diaphragm could have a hole. This could be verified by trying to blow into the exhaust nipple on the Back Pressure Valve. If you can blow though the nipple, the diaphragm has a leak. If you try to apply vacuum to the nipple where the yellow hose goes to on the Back Pressure Valve and you can apply vacuum, the Vent or the Nipple where the white striped hose goes, is plugged. If you try to apply vacuum to the Nipple where the white striped hose goes, and vacuum builds up, the Vent **and** the Nipple where the yellow striped hose goes, are plugged. Any one of these things will cause the Back Pressure Valve not to work.

Also, make sure that there is "Venturi Type" vacuum on the yellow striped hose to the Device Box. This can be done hooking up a vacuum gauge to the yellow striped hose and starting the engine. Open the throttle and you should start to see vacuum above 4,000 RPM.

Engine idles rough when warm, and/or EGR Valve doesn't move. This could be caused by a EGR Valve that is stuck open or has a leaky seat. This can be verified by starting the engine and hooking up a vacuum gauge to the exhaust hose connected to the Device Box. If your vacuum gauge reads any amount of vacuum, this tells you that the EGR Valve is open and exhaust gas is flowing into the engine causing the rough idle. In this case, the EGR Valve should be replaced. If the EGR Valve is closed, there should be pressure in this hose at idle. This pressure will bounce the needle on your vacuum gauge. Don't confuse a bouncing needle on your vacuum gauge with vacuum. If you are not sure, put your finger over the hose and feel if it is vacuum or pressure.

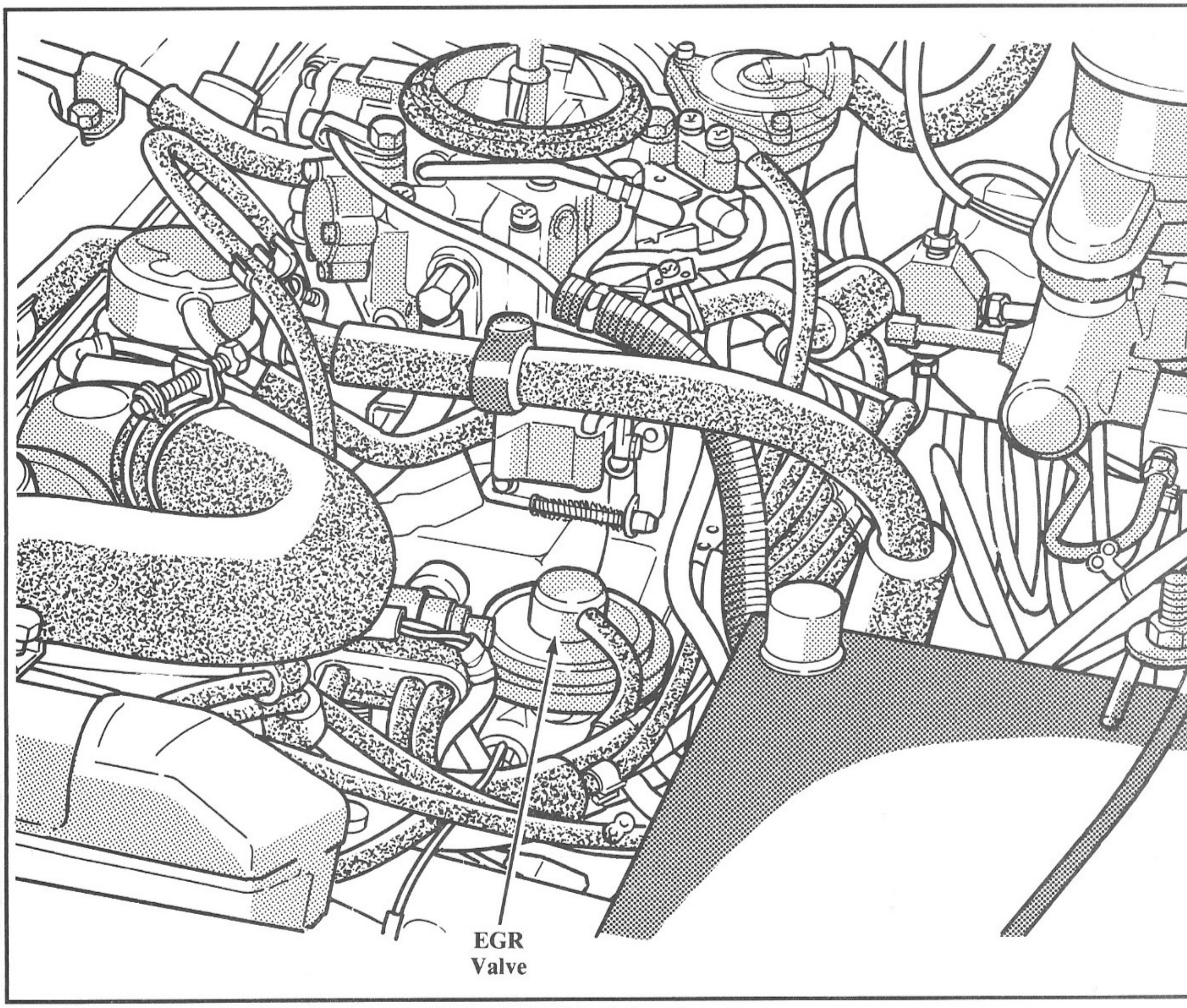


Fig. 20 EGR Valve Location

Notes

Purge Control System

The Purge Control System consists of: the Purge Control Valve, the Black 4-Way Vacuum Tee with a Blue Mark, and the 4-Port Thermal Valve Nipple #1.

The Purge Control System will not allow any of the fuel vapors from the Purge Canister to purge when the engine is cold (below 149 °F) or when the throttle blade is in the Curb Idle position.

The Purge Control Valve is connected through a large vacuum hose to the Purge Canister. **Restricted** manifold vacuum is connected to the Purge Control Valve through a black vacuum hose. See Fig. 19. There is also "true" ported vacuum connected to the Purge Control Valve through the blue striped hose. The blue striped hose is connected to the Black 4-Way Vacuum Tee with a Blue Mark. The other end of the Vacuum Tee goes to the 4-Port Thermal Valve Nipple #1. Below 149 °F, the Thermal Valve Nipple #1 bleeds vacuum and this shuts off the "true" ported vacuum which turns the Purge Control Valve off. With the Purge Control Valve off, the manifold vacuum is blocked from purging the Canister.

Above about 149 °F, the vacuum leak at the Thermal Valve is blocked. This allows "true" ported vacuum to open the Purge Control Valve whenever the throttle blade is off idle. With the Purge Control Valve open, manifold vacuum will purge the Canister.

It should be noted that the switch point of the 4-Port Thermal Valve Nipple #1 is 149 °F; however, the tolerance of that Nipple is: bleeds vacuum below 104 °F, and blocks above 176 °F.

Notes

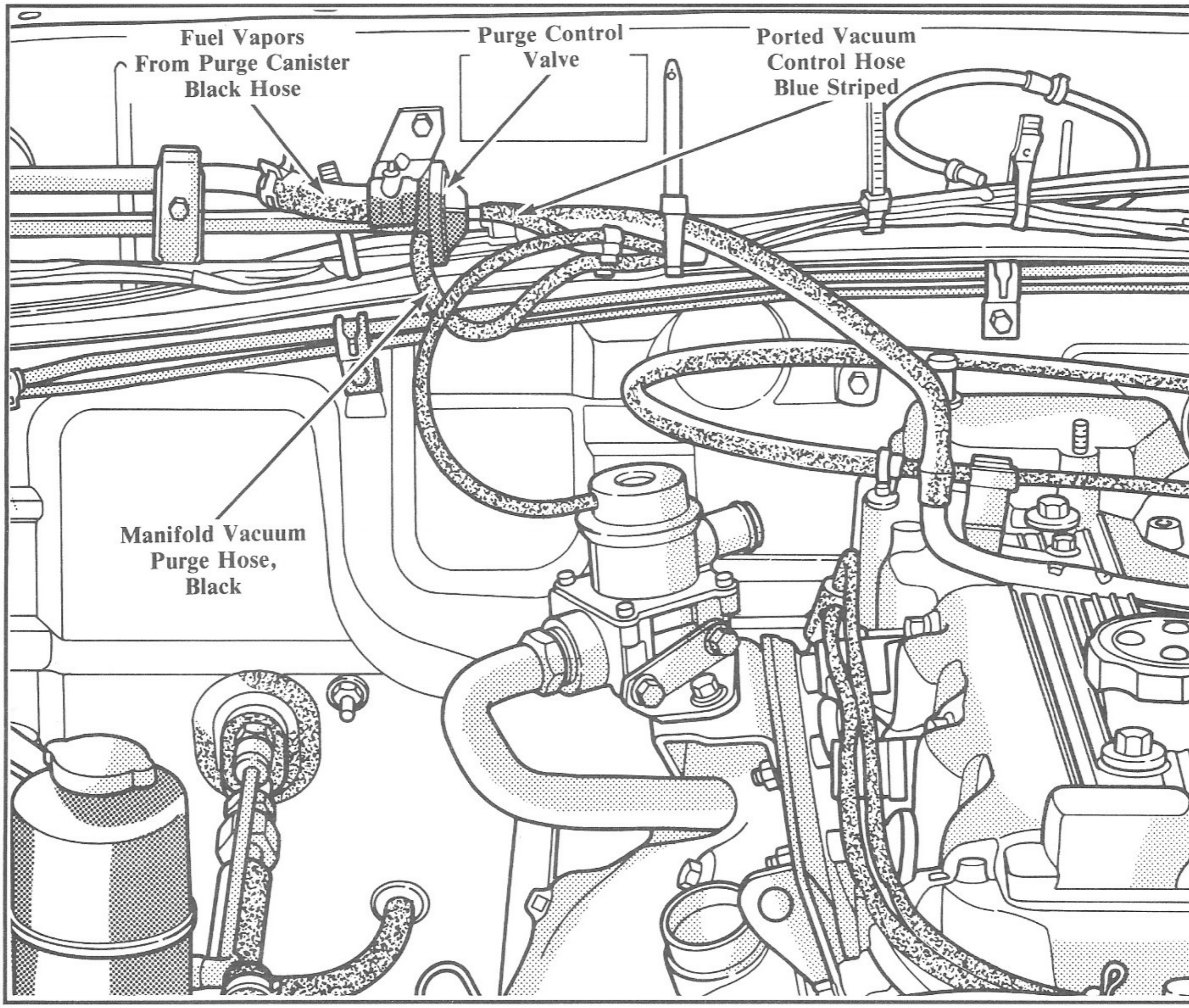


Fig. 21 Purge Control Valve Location

Notes

2-Stage Choke Pulloff System

The 2-Stage Choke Pulloff consists of: the 2-Stage Choke Pulloff, the 4-Port Thermal Valve Nipple #4, the Vacuum Delay Valve, and a Restricted Manifold Vacuum Source.

The purpose of the 2-Stage Choke Pulloff, is to open the choke to 2 different openings at different temperatures. When the engine is first started cold (below 64 °F), restricted manifold vacuum is applied to the Vacuum Delay Valve. See Fig. 22. After being restricted and delayed, the manifold vacuum then goes through a black vacuum hose to the outer nipple of the 2-Stage Choke Pulloff. This is the First Stage of opening. The choke then should open the specified amount (.087″–.094″ for 2.0L, and .098″–1.06″ for 2.6L). Once above 64 °F, Nipple #4 of the 4-Port Thermal Valve blocks the vacuum leak.

Again here it should be noted the 4-Port Thermal Valve Nipple #4 will switch at 64 °F, but the tolerance of that Nipple is: bleeds vacuum below 50 °F, and blocks vacuum above 77 °F.

For the 2nd Stage of opening, once above 64 °F, this allows manifold vacuum from the white striped vacuum hose to go through the Blue 4-Way Vacuum Tee with a White Mark. See Fig. 23. From here the vacuum hose changes colors to a yellow striped vacuum hose. This yellow hose then goes to the inner nipple of the 2-Stage Choke Pulloff. With manifold vacuum applied to the inner nipple of the 2-Stage Choke Pulloff this will open the choke to the 2nd stage (.144″–.122″ for 2.0L, and .126″–.133″ for 2.6L).

Notes

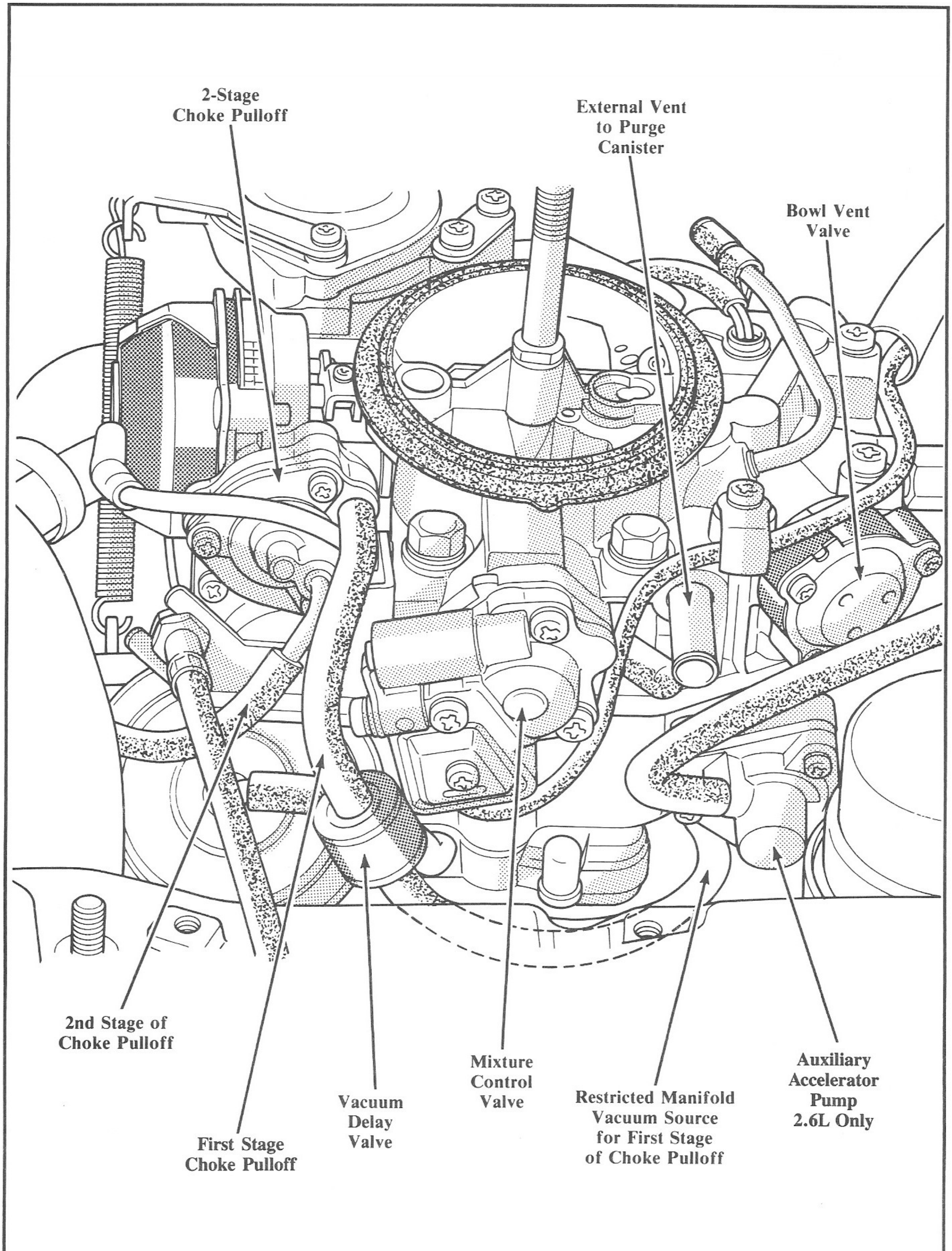


Fig. 22 2-Stage Choke Pulloff Location

Fast Idle Breaker System

The Fast Idle Breaker System consists of: the Fast Idle Breaker, and the 4-Port Thermal Valve Nipple #2.

Since this Carburetor uses an electric choke, MMC decided to add a feature that "kicks-down" the Fast Idle at 149°F automatically. The Fast Idle Breaker is simply a diaphragm and lever, that when manifold vacuum is applied, it will pull on the Fast Idle Cam. This lowers it to the lowest step. See Fig. 23.

The Fast Idle Breaker vacuum circuit starts at the Manifold Vacuum Tee. From there, manifold vacuum goes through a white striped vacuum hose to the Blue 4-Way Vacuum Tee with a White Mark. From there the manifold vacuum passes unrestricted to the Black 4-Way Vacuum Tee with a Yellow Mark. Here, the manifold vacuum gets restricted and can go 2 places. First, it can go through a yellow striped vacuum hose at Nipple #2 of the 4-Port Thermal Valve. Second, the restricted manifold vacuum can go through a white striped vacuum hose to the Fast Idle Breaker.

If the Thermal Valve is below 149°F, Nipple #2 will bleed off the restricted manifold vacuum, preventing the Fast Idle Breaker from moving. If the Thermal Valve is above 149°F, Nipple #2 will block the vacuum leak and allow the Fast Idle Breaker to lower the Fast Idle Speed.

Here also, it should be noted that the switch point of the 4-Port Thermal Valve Nipple #2 is 149°F; however, the tolerance of that Nipple is: bleeds vacuum below 104°F, and blocks above 176°F.

Notes

Auxiliary Accelerator Pump System
(2.6L Only)

The Auxiliary Accelerator Pump consists of: the Auxiliary Accelerator Pump and the 2-Port Thermal Valve.

The purpose of the Auxiliary Accelerator Pump is to add extra accelerator pump fuel during cold (below 113 °F) operation. When the 2-Port Thermal Valve is below 113 °F, both of its nipples are connected together. This allows manifold vacuum which is applied to the 2-Port Thermal Valve through a white striped vacuum hose to go to the Auxiliary Accelerator Pump through a black hose. See Fig. 23.

When manifold vacuum is applied to the Auxiliary Accelerator Pump, this pulls the diaphragm back compressing its spring. By pulling the diaphragm back, this unseats the inlet check ball and "draws" in fuel from the Float Bowl. See Fig. 23. When the driver accelerates hard, manifold vacuum drops. This allows the spring to push the diaphragm back. This unseats the discharge check ball and "squirts" fuel into the Primary Bore of the Carburetor through a separate brass tube. The shorter of the two brass "tubes" in the Primary Bore is for the "Normal" Accelerator Pump. The longer of the two brass "tubes" is for the Auxiliary Accelerator Pump.

Once the 2-Port Thermal Valve is above 113 °F, it will block manifold vacuum from applying to the Auxiliary Accelerator Pump.

Here also, it should be noted that the switch point of the 2-Port Thermal Valve is 113 °F; however, the tolerance of this valve is: bleeds vacuum below 86 °F, and blocks above 122 °F.

Quick Test

Below 86 °F engine coolant temperature, disconnect the white striped vacuum hose from the 2-Port Thermal Valve and hook up a hand held vacuum pump. Pump up vacuum and look down the Primary Bore of the Carburetor. Release the vacuum and you should see fuel being squirted out of the "longer" brass tube in the Carburetor. If your system does this, then go to the next paragraph. If not, disconnect the black vacuum hose from the 2-Port Thermal Valve and apply vacuum and bleed it off. If the Auxiliary Accelerator Pump now squirts out fuel, the 2-Port Thermal Valve is bad and must be replaced. If Auxiliary Accelerator Pump still doesn't squirt out fuel, the problem is the black hose being plugged or you have a problem inside the Carburetor.

Start the engine and let it warm up. Once the coolant is above 122 °F, if you apply vacuum to the white Nipple of the 2-Port Thermal Valve and release it, no fuel from the Auxiliary Accelerator Pump will be squirted into the engine. If your system does this, then its OK. If not, then the 2-Port Thermal Valve is bad and must be replaced.

Notes

Electric Choke Heater System

The Electric Choke Heater System consists of: a PTC Choke Heater, the Choke Heater Relay, and the ECU pin 56.

The Choke Heater Relay is a normally closed Relay. See Fig. 24. When the key is "ON," 12 volts is sent to the Relay on the BK/WT Wire. Below 400 RPM, the ECU will provide a ground on the DG Wire. This will open the contacts, preventing voltage from reaching the Choke Heater.

When the engine is started, the ECU will unground the DG Wire, which allows the Relay to close. This will feed 12 volts to the Choke Heater. There is a fourth wire hooked up to the Relay. This is a DB Wire. This wire is for voltage spike protection. It will prevent the ECU from getting "hit" with the high voltage spike due to the collapse of the Relay Coil magnetic field when the ECU ungrounds it. Any voltage above charging system voltage, will forward bias the diode in the Relay and "dump" high voltage into the Alternator circuit. See Fig. 24.

So the Choke Heater will always be fed 12 volts when the engine is running. The Choke Heater is a 2-Stage PTC Heater. There are 2 heaters inside the Choke. Below 73 °F, only the small heater (45 ohms) is used. At 73 °F, there is a bi-metal disc that "pops" and makes contact with the large heater (7 ohms). The large heater helps to open the Choke faster.

PTC refers to Positive Temperature Coefficient. This means that the heaters resistance will go up with temperature. This will regulate the current flow and the temperature of the heaters.

Quick Test

With the key "OFF," use a digital ohmmeter and measure the resistance from the RD Wire at the Choke to ground. If the temperature of the Choke Coil is below 73 °F, you should measure about 45 ohms of resistance. If the temperature of the Choke Coil is above 73 °F, you should measure about 7 ohms of resistance. If not, the heater is bad and needs to be replaced.

If the resistance readings are good, then start the engine and measure the voltage on the RD Wire at the Choke. It should be 12–14 volts. If not, check the voltage on the BK/WT Wire that feeds the Choke Heater Relay. It should be 12–14 volts.

If there is no voltage feeding the Relay, trace the circuit back to the ignition switch to find the problem.

If there is 12–14 volts feeding the Relay on the BK/WT Wire, you need to check the voltage on the DG Wire of the Choke Heater Relay. It should be 12–14 volts (live ungrounded). If there is 0–1 volt on the DG Wire, this means that the wire is shorted to ground, or that the ECU is grounding the wire when its not supposed to. In either case, this would open the Relay preventing the heating of the Choke.

If the voltage on the DG Wire is 0–1 volt, turn off the ignition key and unplug the Relay. Measure the resistance from the DG Wire to ground. If you find continuity to ground, the wire is shorted and must be repaired. If there is no continuity, turn the ignition key on while leaving your ohmmeter hooked up to the DG Wire. You should see continuity to ground (about 25 ohms). This is normal. This is the ECU providing a ground because the RPM is less than 400. With the ohmmeter still hooked up, start the engine. If you still have continuity (you should have infinite resistance), the ECU is bad and must be replaced.

Notes

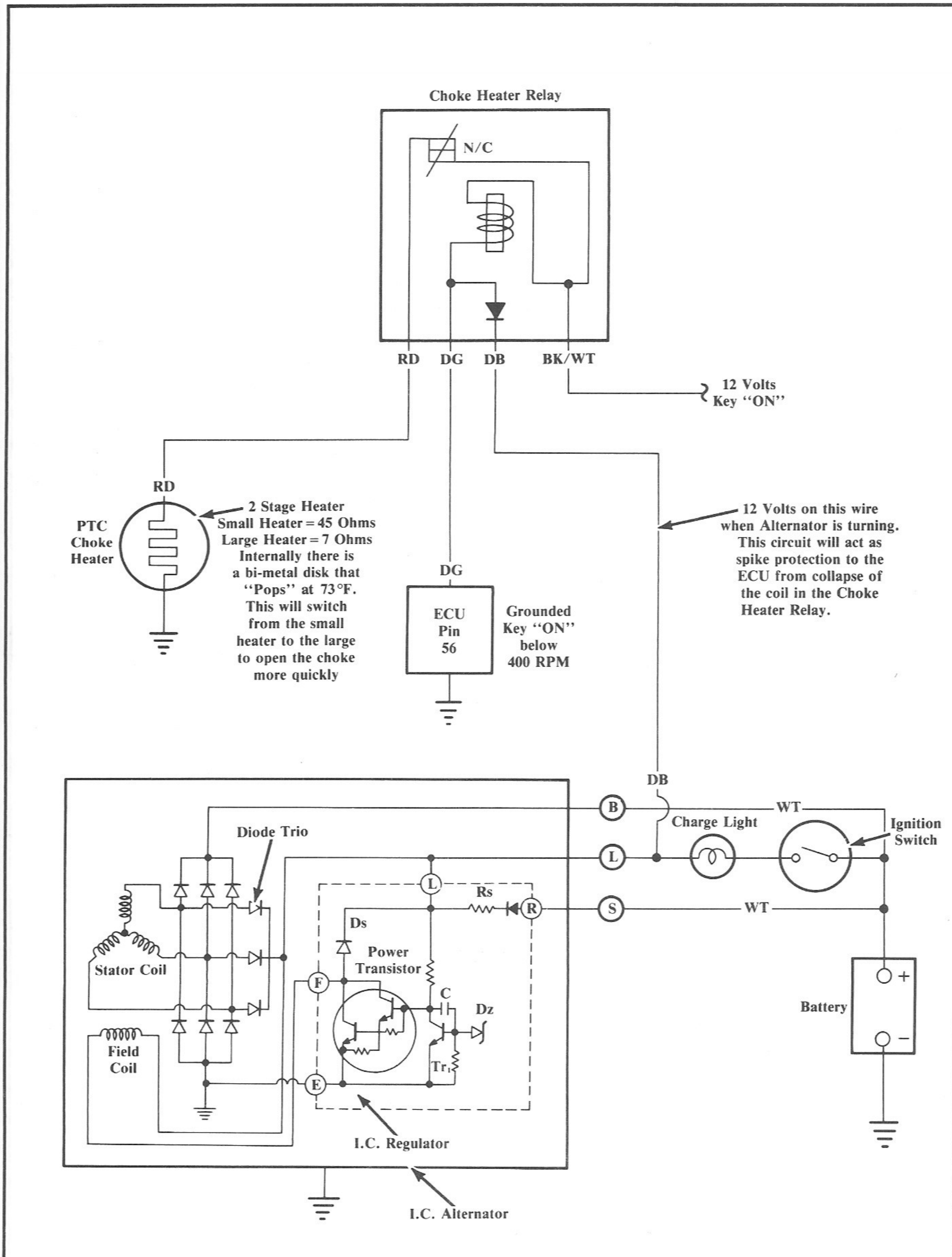


Fig. 24 Choke Heater Relay Schematic

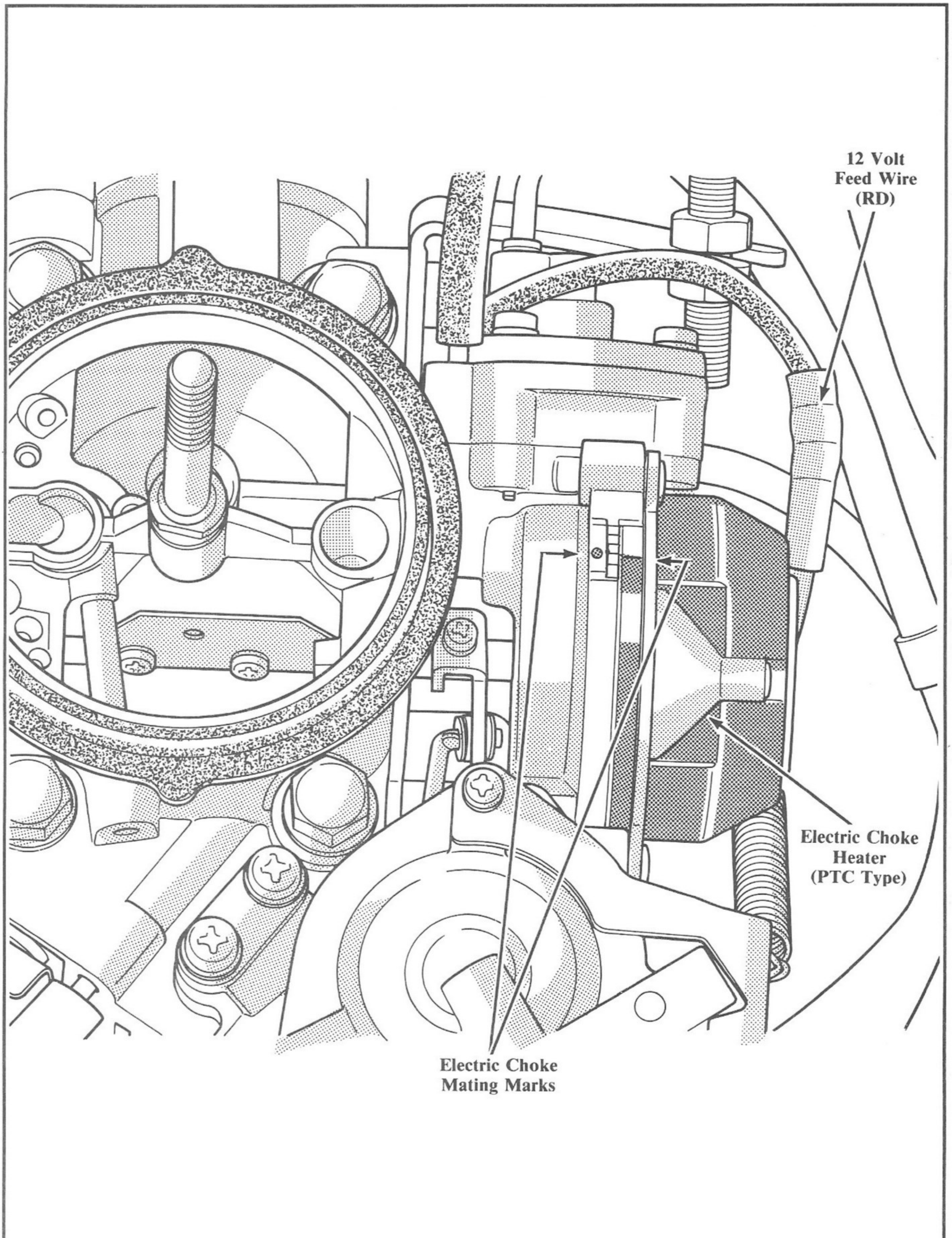


Fig. 25 Choke Mating Marks

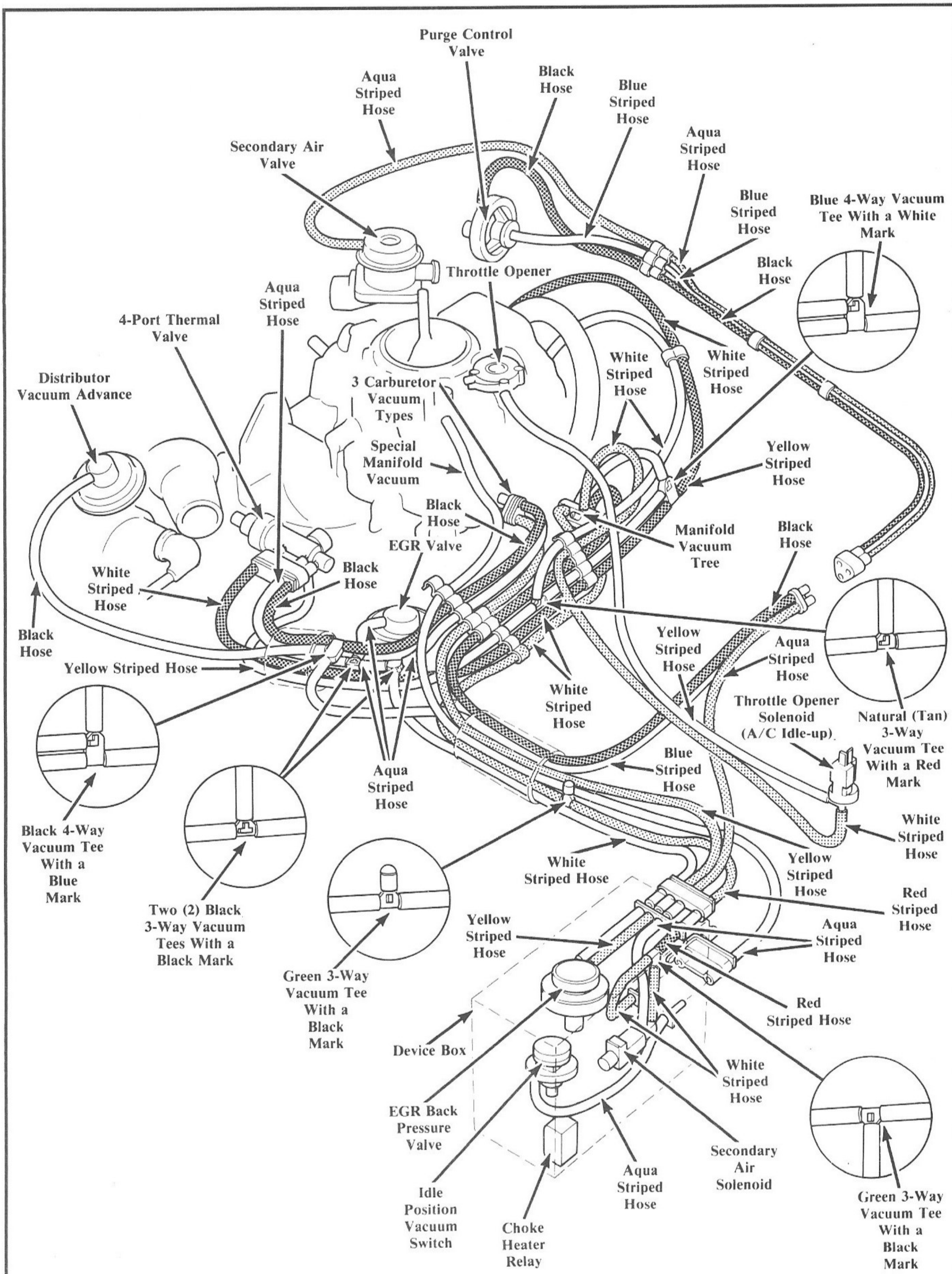


Fig. 27 Vacuum Hose Routing, Federal 2.0L

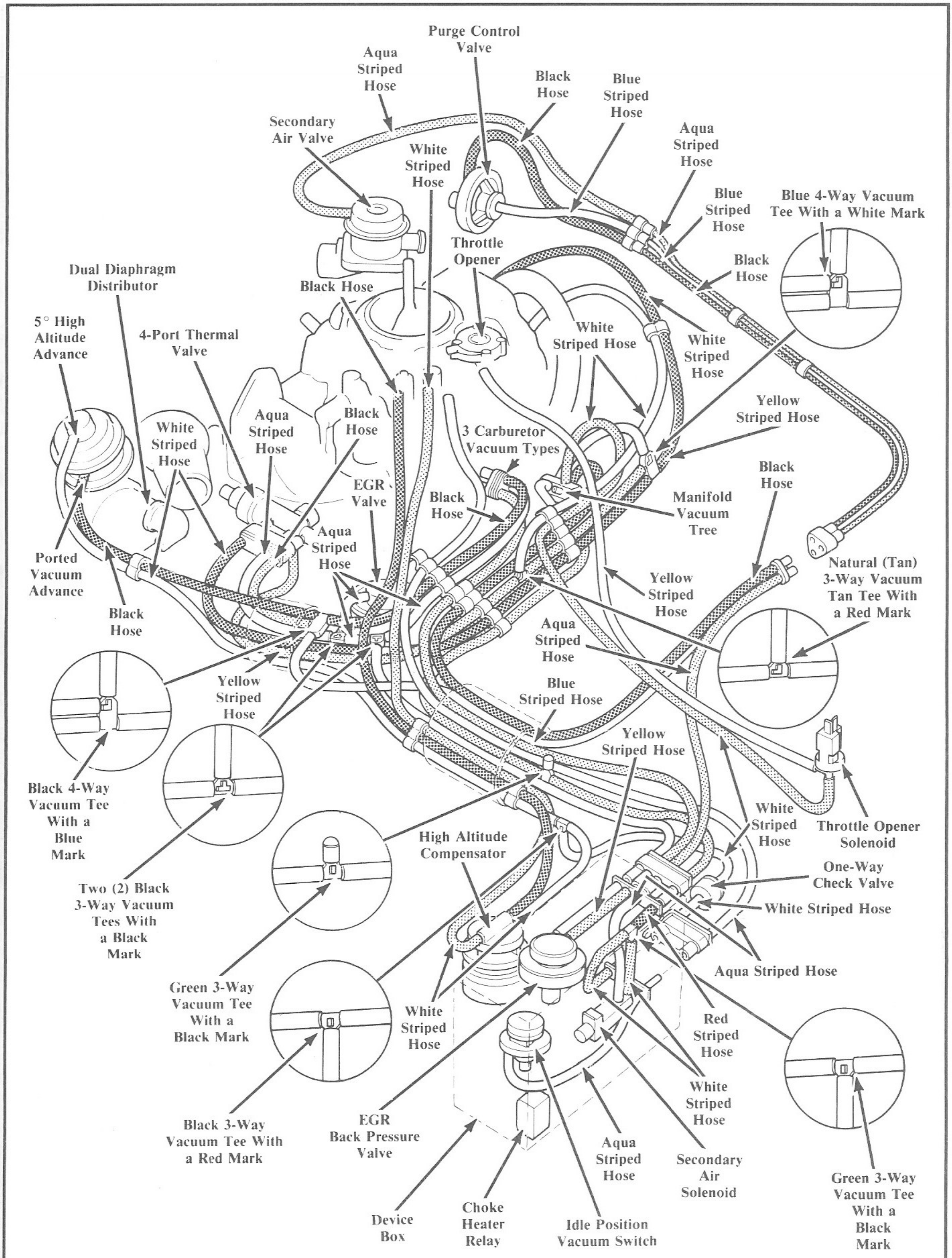


Fig. 28 Vacuum Hose Routing, California 2.0L

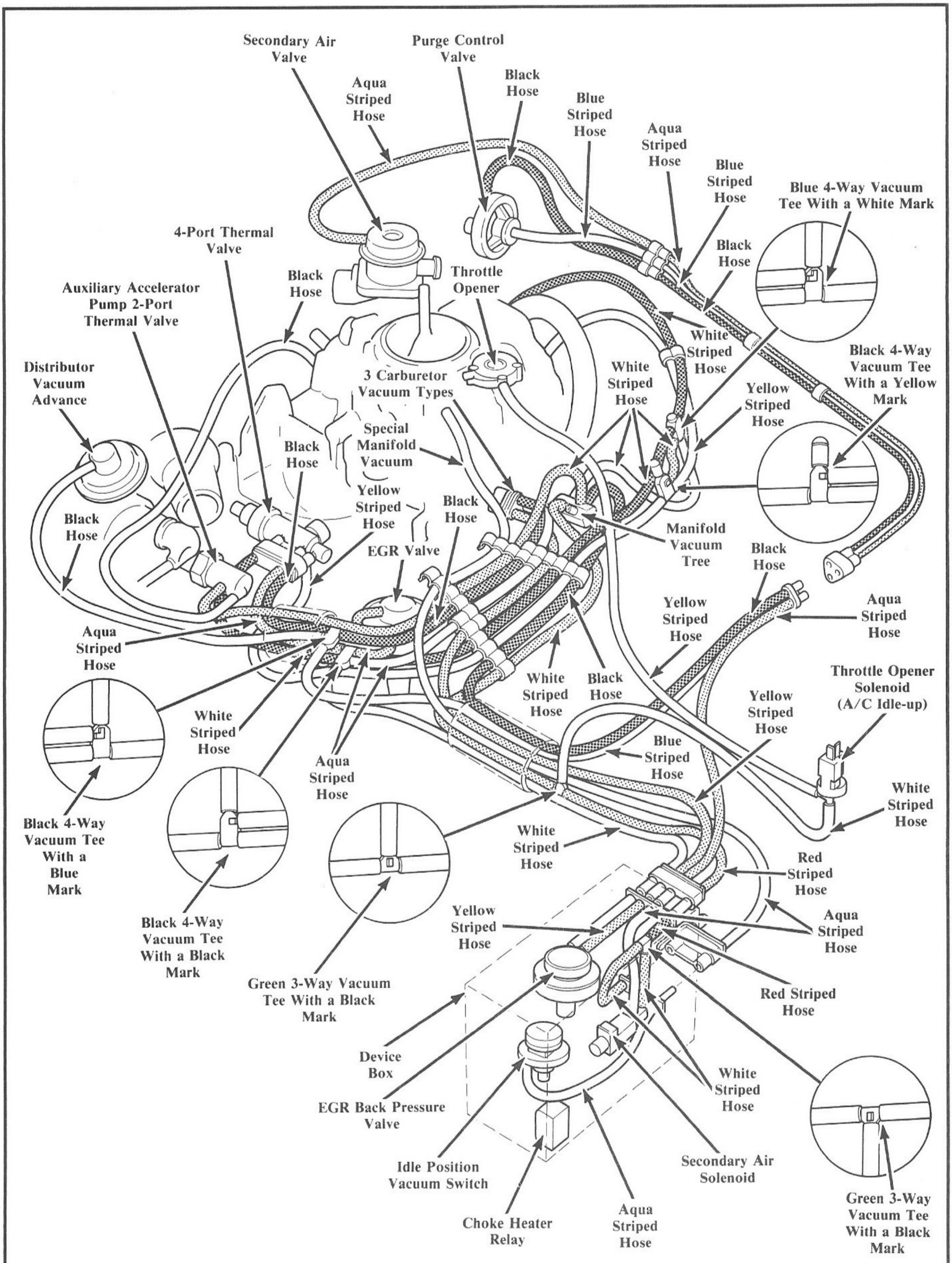


Fig. 29 Vacuum Hose Routing, Federal 2.6L

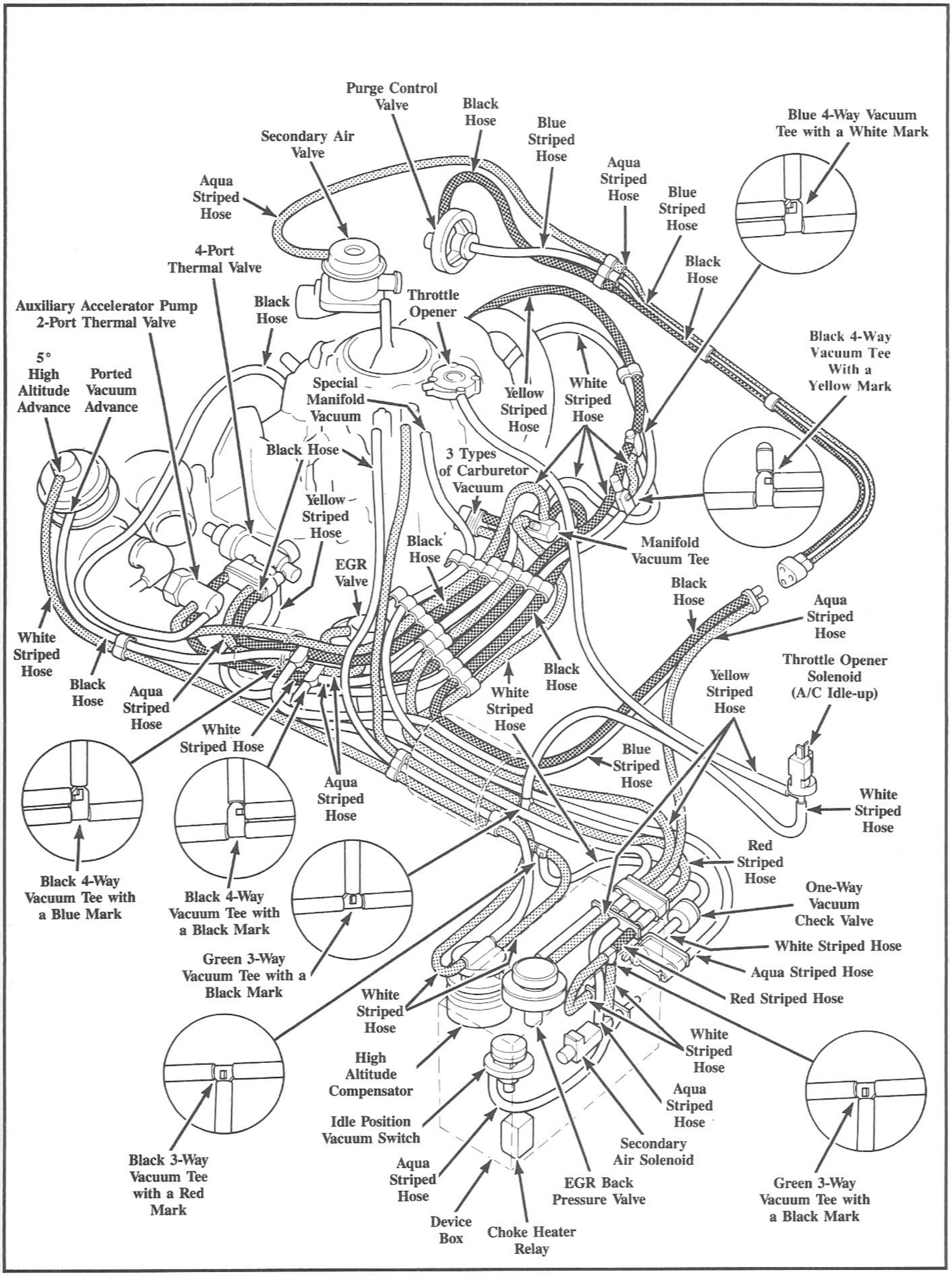


Fig. 30 Vacuum Hose Routing, California 2.6L

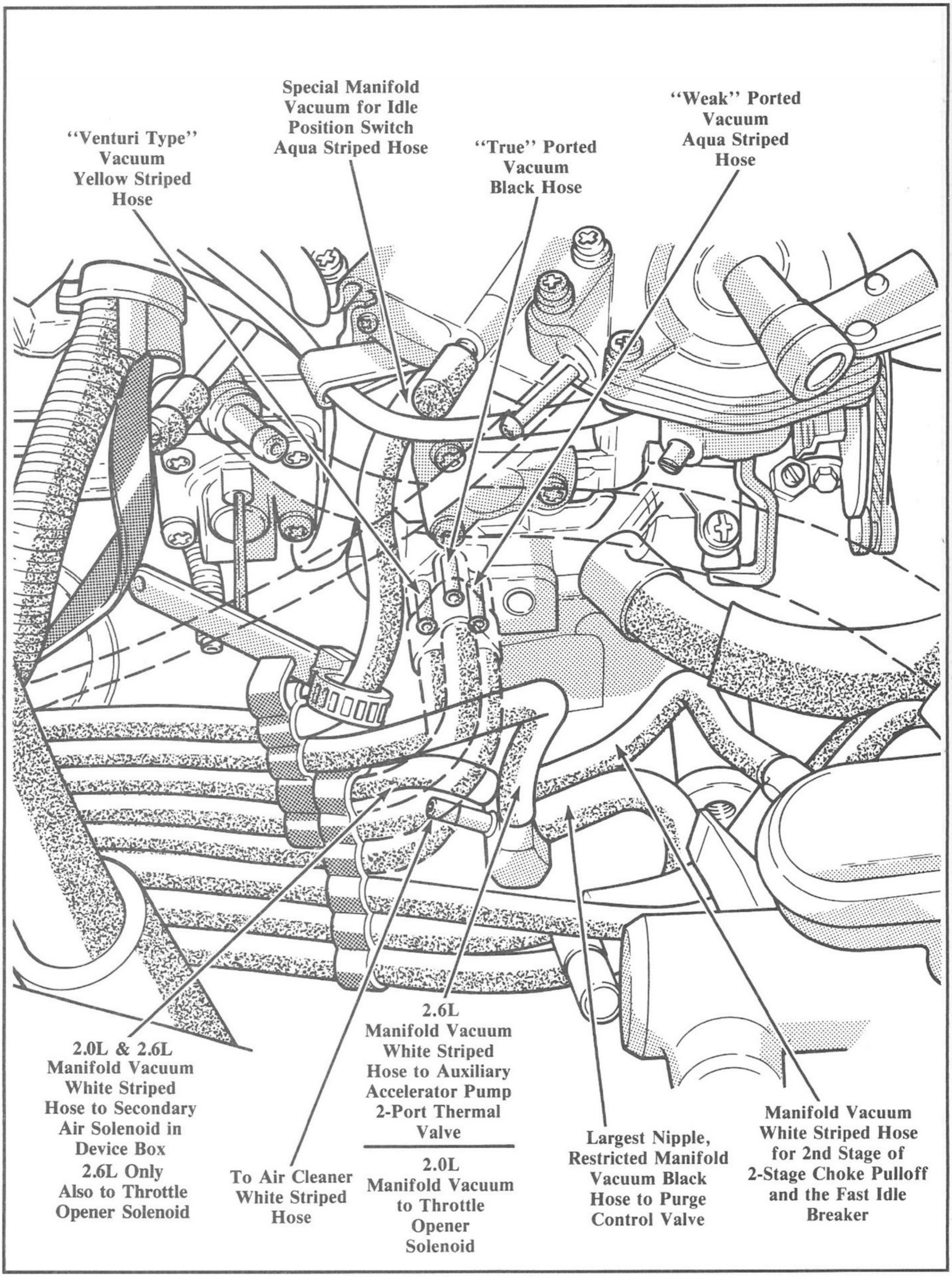
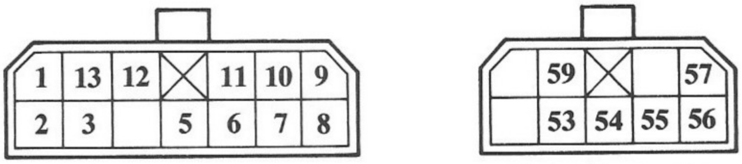


Fig. 31 Vacuum Sources

D50 ECU Terminals
For Use With a Digital and Analog Voltmeter

View from Harness or Wire End



Blue Connector **White Connector**

Blue Connector

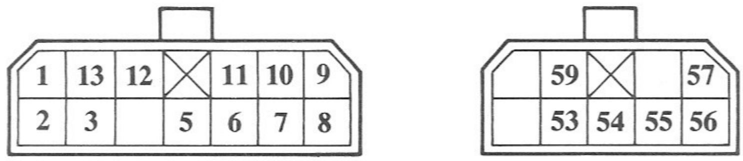
Cavity	Color	Function
1	WT	Oxygen Sensor Voltage (0–1 Volt with Digital Voltmeter)
2	DG/YL	Ground for Coolant Sensor and TPS
3	DG	5 Volt Supply for TPS
4		
5	DG/BK	12 Volts Sent to Idle Position Vacuum Switch
6	BK	ECU Ground
7	BK/WT	12 Volts Key "ON" Power Supply to ECU
8	BK/WT	12 Volts Key "ON" Power Supply to ECU
9	RD/DB	Battery Voltage to ECU (Memory)
10	WT	Tachometer Signal, Coil (−) Negative
11	BK	ECU Ground
12	YL/DG	Coolant Sensor Output Voltage
13	YL/RD	TPS Output Voltage

White Connector

Cavity	Color	Function
51		
52		
53	YL/DB	Decel Solenoid (Slow Cutoff Solenoid) Ground
54	BK/WT	Throttle Opener Solenoid Ground (For A/C Idle Up)
55	RD/WT	Secondary Air Solenoid Ground
56	DG	Electric Choke Relay Ground (only below 400 RPM)
57	BK/YL	Automatic Trans only, A/C Clutch Relay Ground, Ungrounded at W.O.T.
58		
59	YL/DG	Feedback Solenoid (Duty Cycle Solenoid) Ground

Fig. 32 ECU Connectors

D50 ECU Terminals
For Use With ECI Checker With Harness E (MD998456)



Blue Connector **White Connector**

ECI Checker Operation: Select Switch	ECI Checker Operation: Check Switch	Check Item	ECU Terminal # Checked	Condition		Test Specification
Set to "A"	1	Power supply	7 BK/WT	Ignition switch "LOCK→ON"		11V to 13V
	2	Ignition pulse	10 WT	Ignition switch "LOCK→START"		2V to 8V
	3	Throttle position sensor (TPS)	13 YL/RD	Ignition switch "LOCK→ON"	Accelerator fully closed	0.4V to 0.7V
					Accelerator fully opened	4.5V to 5.5V
	4	Coolant temperature sensor	12 YL/DG	Ignition switch "LOCK→ON"	0°C (32°F)	3.4V to 3.6V
					20°C (68°F)	2.4V to 2.7V
					40°C (104°F)	1.5V to 1.8V
					80°C (176°F)	0.5V to 0.7V
	5	Power supply for sensor	3 DG	Ignition switch "LOCK→ON"		4.5V to 5.5 V
	6					
	7	Vacuum switch for idle position	5 DG/BK	Ignition switch "LOCK→ON"		9V to 13V
				Idling (Curb Idle)		0V to 0.6V
	8					
	9	Feed back solenoid valve (FBS)	59 YL/DG	Ignition switch "LOCK→ON"		11V to 13V
				Idling (warm engine)		2V to 12V
	10	Slow cut-off solenoid valve (SCS)	53 YL/DB	Idling		0V to 0.6V
				Quick deceleration from above 4000 rpm to idling with Trans in the "N" position		Momentarily 13V to 15V
	11					
	12					
Set to "B"	1	Idle up solenoid	54 BK/WT	Idling	A/C switch ON*1	0V to 0.6V
				2000 rpm		9V to 15V
	2	Automatic Trans only, A/C cut-off	57 BK/YL	Ignition switch "LOCK→ON" and A/C switch "ON"*1	Accelerator fully closed	0V to 0.6V
					Accelerator fully opened	11V to 13V
	3					
	4	Secondary air control solenoid valve	55 RD/WT	Idling, after 70 seconds from start of warm engine		0V to 0.6V then 13V to 15V
				Quick deceleration from above 2000 rpm to idling with Trans in the "N" position		Momentarily drop
	5					
	6	Electric choke relay	56 DG	Ignition switch "LOCK→ON"		0V to 0.6V
				Idling		13V to 15V
	7					
	8	Oxygen sensor	1 WT	Hold rpm constant above 1300 rpm, after 70 seconds from start of warm engine		0V to 1V ↑ (pulsates) ↓ *2 2V to 3V
	9					
	10					
	11					
	12					

NOTE: *1 "ON" means A/C compressor clutch engaged.
*2 Failure of parts other than the oxygen sensor can also cause bad readings. Also check other parts related to air-fuel ratio control.

Fig. 33 ECI Checker Chart

Procedure for Checking and Setting Specifications for 2.0L and 2.6L

The following is a list of checks that should be done in the order that they are listed.

1. Ignition Timing:

Engine up to operating temperature, all accessories off, disconnect and plug vacuum hose from the Distributor. Check Curb Idle RPM (750 for 2.0L and 800 for 2.6L). If not at spec., turn SAS-1 till Curb Idle RPM is reached. Then check timing. Spec. 2.0L is 8°, 2.6L is 7°.

2. TPS Voltage Check:

With choke fully open, turn ignition key "ON," hook up the positive lead a digital voltmeter to the YL/RD Wire of the 8-Way Connector by the Ignition Coil and ground the negative lead. Back out SAS-1 (Curb Idle Screw). Use an 8mm socket and loosen the SAS-2 locknut and back out SAS-2 till throttle fully closes. See Fig. 34. Make sure the accelerator cable is not tight. If it is, loosen the tension by turning the lock nuts. The TPS Voltage should be .250 volts. If not, use a "stub" (short) phillips screwdriver and loosen both phillips screws. See Fig. 35. Rotate the TPS till .250 volts. Tighten the TPS screws once the voltage is reached.

3. Propane and Idle RPM Check:

A. Hold the throttle open and start the engine.

B. Turn in SAS-1 Screw to 750 RPM for a 2.0L and 800 RPM for a 2.6L (Curb Idle RPM).

C. Turn all accessories off.

D. Turn engine off and disconnect negative battery cable for 10 seconds and reconnect.

E. Disconnect Oxygen Sensor Connector.

F. Start engine and run at 2,000–3,000 RPM for more than 5 seconds with trans. in neutral.

G. Let engine idle for 2 minutes.

H. With the Air Cleaner installed, insert propane hose into snorkel.

I. Open the main propane valve and then open the fine tuning valve and add propane till the highest RPM is reached. If the RPM goes down with any amount of propane, the Idle Mixture Screw (MAS) should be turned in and step I (eye) repeated.

J. With propane still flowing, turn SAS-1 (Curb Idle Screw) in till the Propane RPM of 830 for 2.0L or 870 for 2.6L is reached. Fine tune RPM again to make sure the RPM hasn't changed.

K. Shut off the main propane valve. The RPM should now be at Curb Idle 750 RPM for a 2.0L of 800 RPM for a 2.6L. If not, turn the Idle Mixture Screw (MAS) to obtain Curb Idle RPM.

L. Recheck propane RPM again. If it has changed, go back to step I (eye).

M. Shut off the propane.

N. Install the Concealment Plug into the hole to seal the Idle Mixture Screw.

4. Set Throttle Opener RPM:

Since SAS-2 was backed out to check the TPS Voltage, it will have to be reset now to be able to set the Throttle Opener RPM.

A. Warm engine, all accessories off,

B. Turn the Throttle Opener Screw all the way in.

C. Apply 16″ of vacuum to the Throttle Opener vacuum nipple.

D. Turn SAS-2 to Curb Idle RPM 750 for 2.0L or 800 for 2.6L. Tighten the SAS-2 lock nut.

E. With vacuum still applied to Throttle Opener nipple, back out Throttle Opener Screw to Throttle Opener RPM of 850–950 RPM.

5. Check Dash Pot RPM (SAS-3):

Pull up on the Free Lever and check the RPM. The RPM should be about 1500 RPM for an Auto Trans. and 2,000 RPM for a Manual Trans. If not, while pulling up on the Free Lever, turn SAS-3 till the RPM is reached.

Reconnect the Oxygen Sensor. Leaving the Oxygen Sensor disconnected during the RPM checks stabilizes the RPM.

To check tps voltage, disconnect Dash pot shaft from free lever. Same as backing out SAS-2.

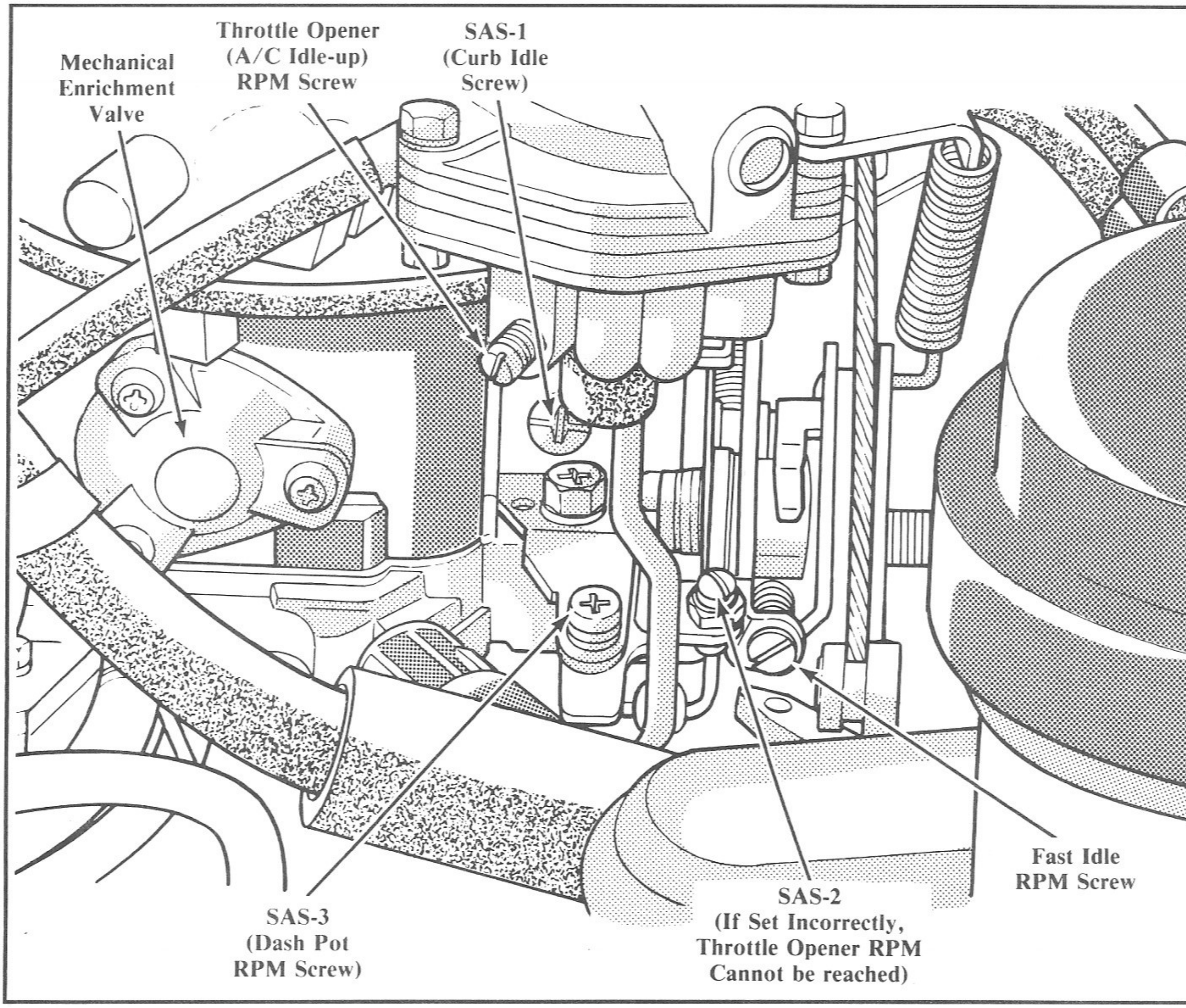


Fig. 34 SAS Screws

orange / grn / rd

Notes

TSP Ω Throttle Closed 5.28 kΩ Throttle open (max) .655 Ω #1

5.09 .515 #2

4.20 .285 #3

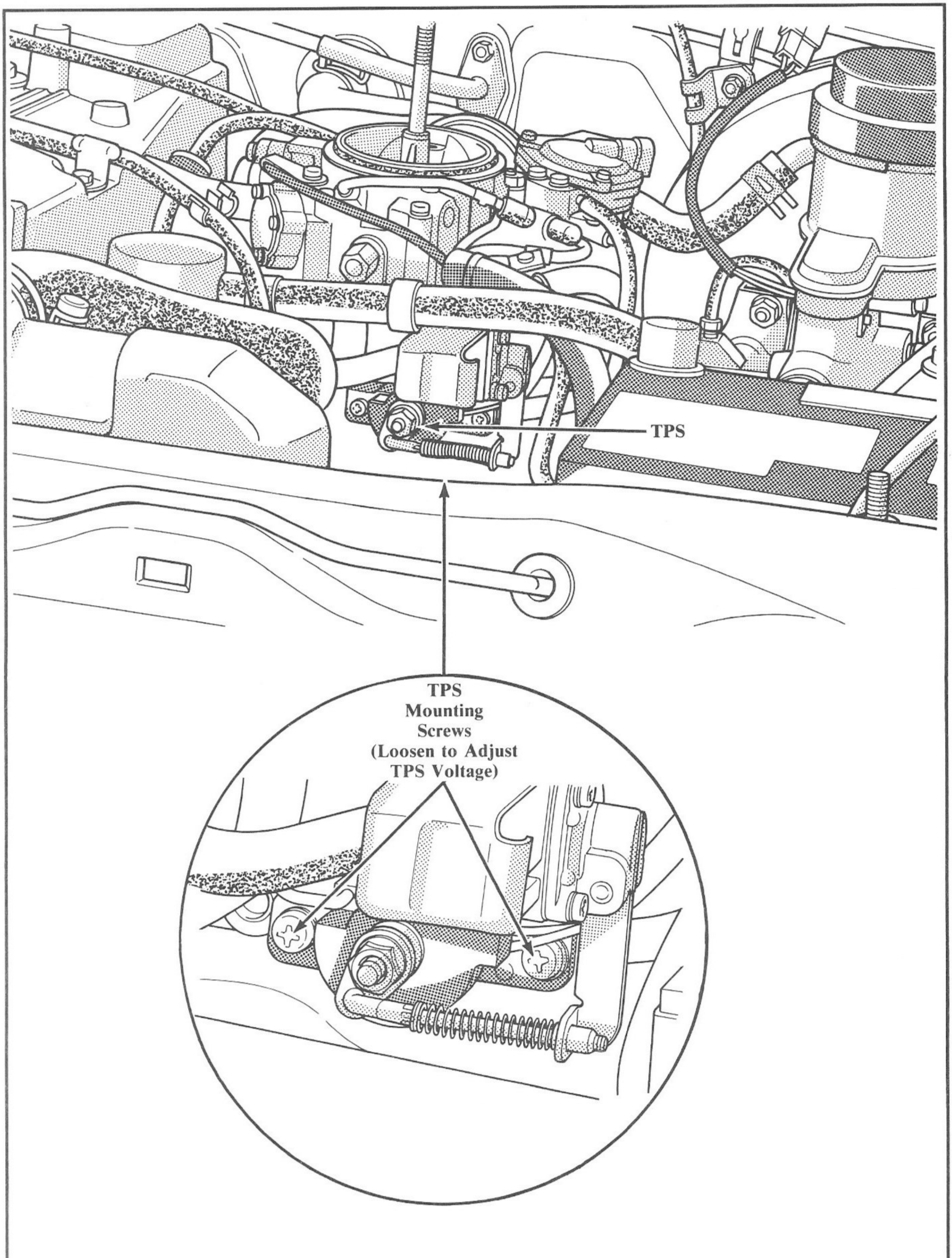


Fig. 35 TPS Voltage Adjustment

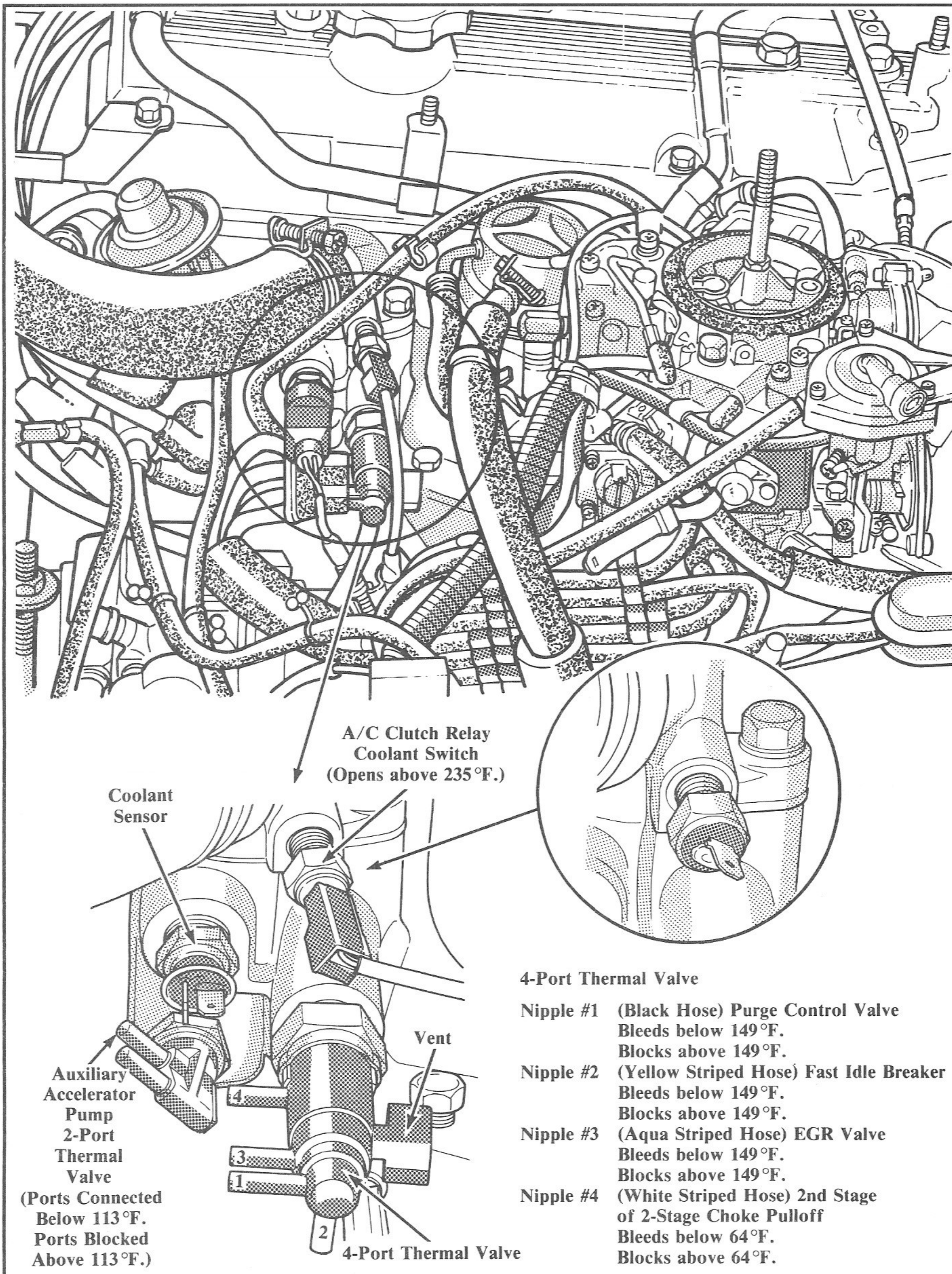


Fig. 36 Coolant Sensor & Switch and 2- & 4-Port Thermal Valves