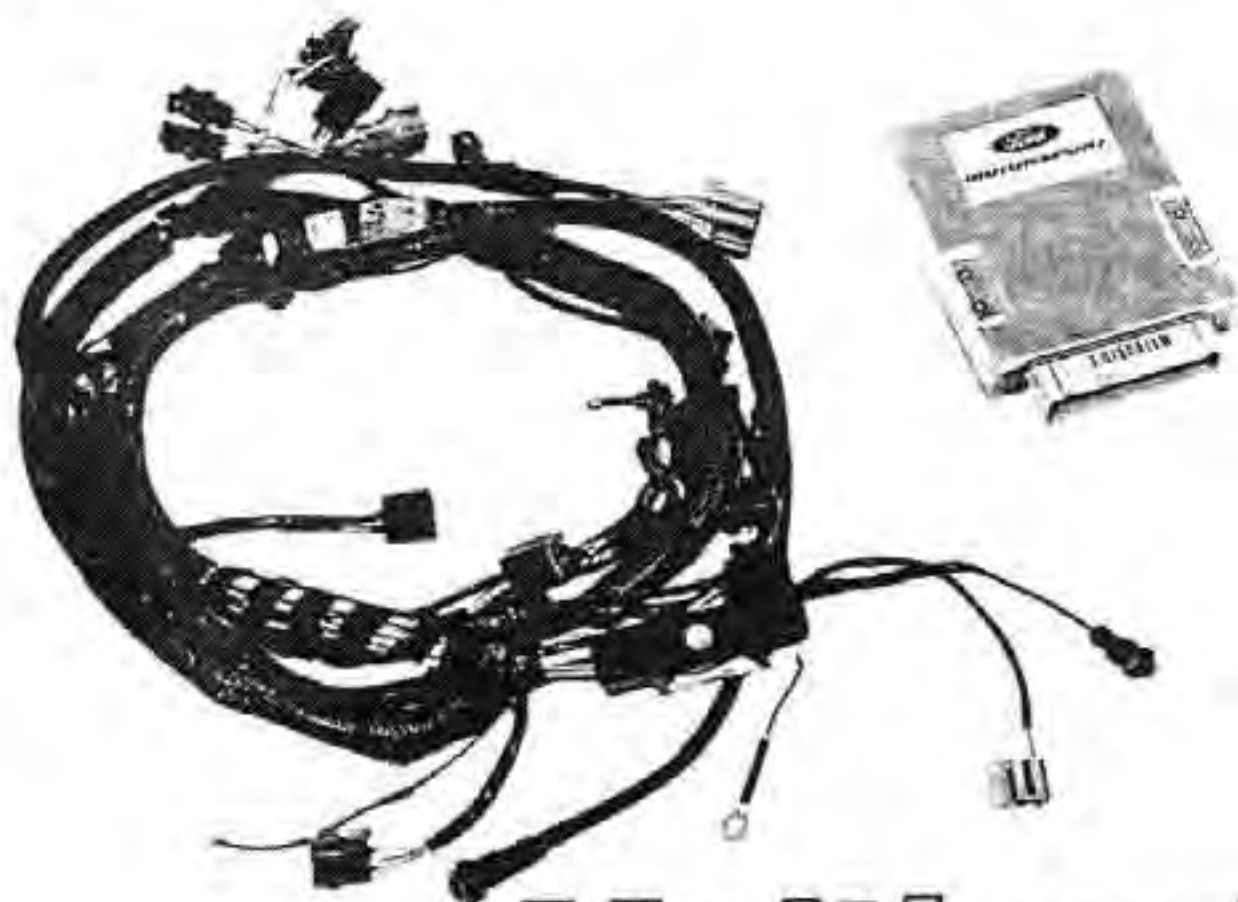




ISM-12071-C302 \$5.00 U.S.A.

Motorsport SVO

PERFORMANCE EQUIPMENT



Multiport EFI Engine Management Harness

Wiring Harness Installation Manual

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1.0 INTRODUCTION

This kit was developed by Ford Motorsport to allow street rodders to take advantage of Ford's latest fuel injection technology. It can be used on 5.0L (302) HO, 5.0L (302) non-HO and 5.8L (351W) engines. You may need to purchase additional support systems or components from Ford Motorsport or your Ford dealer. This will depend on the year and type of engine you start with, as well as how complete your engine is. (Refer to Section 3 for further explanation of other available support kits.)

2.0 OVERVIEW

These instructions will guide you through the preparation, installation, and troubleshooting of all the required parts. Read the instructions thoroughly before starting the actual installation. As you install the parts, read over each step that pertains to the actual installation procedure. If you have any questions concerning this installation or parts you may need, call our Technical Hot Line at (313) 337-1356.

3.0 MULTIPORT ELECTRONIC FUEL INJECTION (EFI) WIRING HARNESS COMPONENTS

**Fuel Injector Kit
 M-9593-C302***

This set of eight 19 lb./hr. fuel injectors works best with stock mass-air-flow meters such as those in the Ford SVO computer kits M-12071-F302 and M-12071-G302.



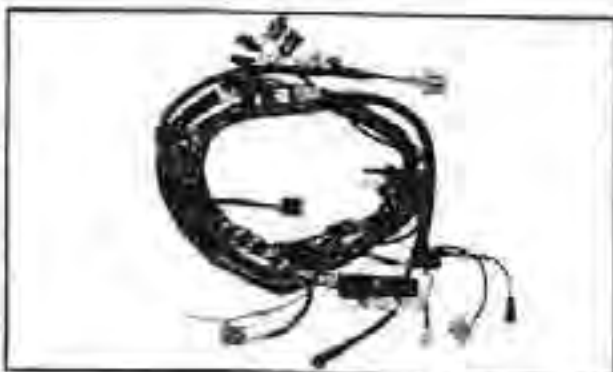
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Not legal for sale or use on pollution-controlled motor vehicles.

Tech "Hot Line" (810) 468-1356

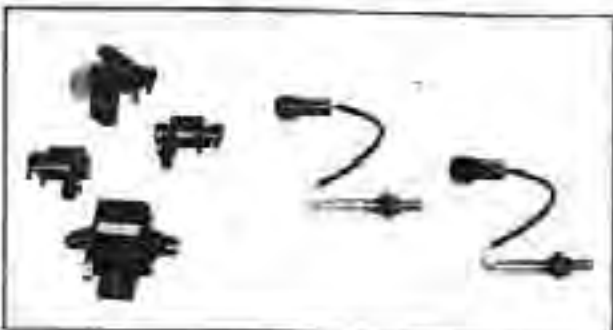
Main Harness
M-12071-C302*

The foundation of Ford SVO's Multiport EFI Wiring Harness System. This harness connects the mass-air-flow computer to the engine, sensors and relays. The harness is designed for underdash computer mounting.



Sensor and Relay Package
M-12071-D302*

All the sensors necessary to use the M-12071-C302 wiring harness are included in this kit, which contains (2) Heated Exhaust Gas Oxygen sensors and a Barometric Absolute Pressure (BAP) sensor, Exhaust Gas Recirculation (EGR), Thermactor Air Diverter (TAD) and Thermactor Air Bypass (TAB) solenoids, fuel, air-conditioning and EEC power relays. Engine mounted sensors NOT included.



**Engine Harnesses and
 Controls Package**
M-12071-E302*

You'll need this package to complete a 5.0L HO engine assembly with EFI. It includes all the sensors and wiring harnesses mounted on the engine. Kit contains Air Charge Temperature (ACT), Engine Coolant Temperature (ECT) and Exhaust Gas Recirculation (EGR) position sensors; Exhaust Gas Recirculation (EGR) valve; H.E.G.O. sensor harness and fuel-injector harness. Use with 351W firing order.



Computer Mass-Air Meter Kit

Manual Transmission
M-12071-F302*

Automatic Transmission
M-12071-G302*

Boost your fuel economy! This mass-air-flow computer system operates with performance engine assemblies and stock high-output engines. Kit includes the EEC-IV computer, mass-air meter, inlet and outlet hoses, plus mass-air meter mounting brackets. Works with C-4, C-6 and A.O.D. Will not work with computer shifted automatic transmissions.



**Engine Harnesses and
Controls Package
M-12071-H302***

You'll need this package to complete a 5.0 non-HO engine assembly with EFI. It includes all the sensors and wiring harnesses mounted on the engine. Kit contains Air Charge Temperature (ACT), Engine Coolant Temperature (ECT) and Exhaust Gas Recirculation (EGR) position sensors; Exhaust Gas Recirculation (EGR) valve; H.E.G.O. sensor harness and fuel-injection harness. Use with 302 firing order.



**Distributor Kit
M-12127-C302***

For EFI 302 Engines Only

This EEC-IV distributor comes with a steel gear so you can use it with a hydraulic roller camshaft. Kit includes a distributor cap assembly and ignition module. (For other applications see Miscellaneous Parts List, Section 5.0)



4.0 PRE-INSTALLATION OF PARTS AND HARNESSSES

- A. Disconnect the battery before doing any wiring.
- B. Install lower intake manifold if it is not already installed. Remove upper intake if installed.
- C. Lay the engine harness M-12071-E302 or M-12071-H302 on the lower intake manifold. (See Figure 1, page 5 and parts description on page 2 and 3)
- D. Position the EEC main computer harness (M-12071-C302) in its intended location in the engine compartment. This harness is designed for the passenger side under dash or kick panel computer mounting. Do not connect the harness to the computer until you have completed the entire installation and are ready to start the vehicle. (See Figure 2, page 7)
- E. Identify where the EEC computer harness can pass through on the passenger side of the firewall.

**CAUTION: DO NOT ROUTE HARNESS NEAR HEAT SOURCE, SHARP EDGES
OR MOVING PARTS.**

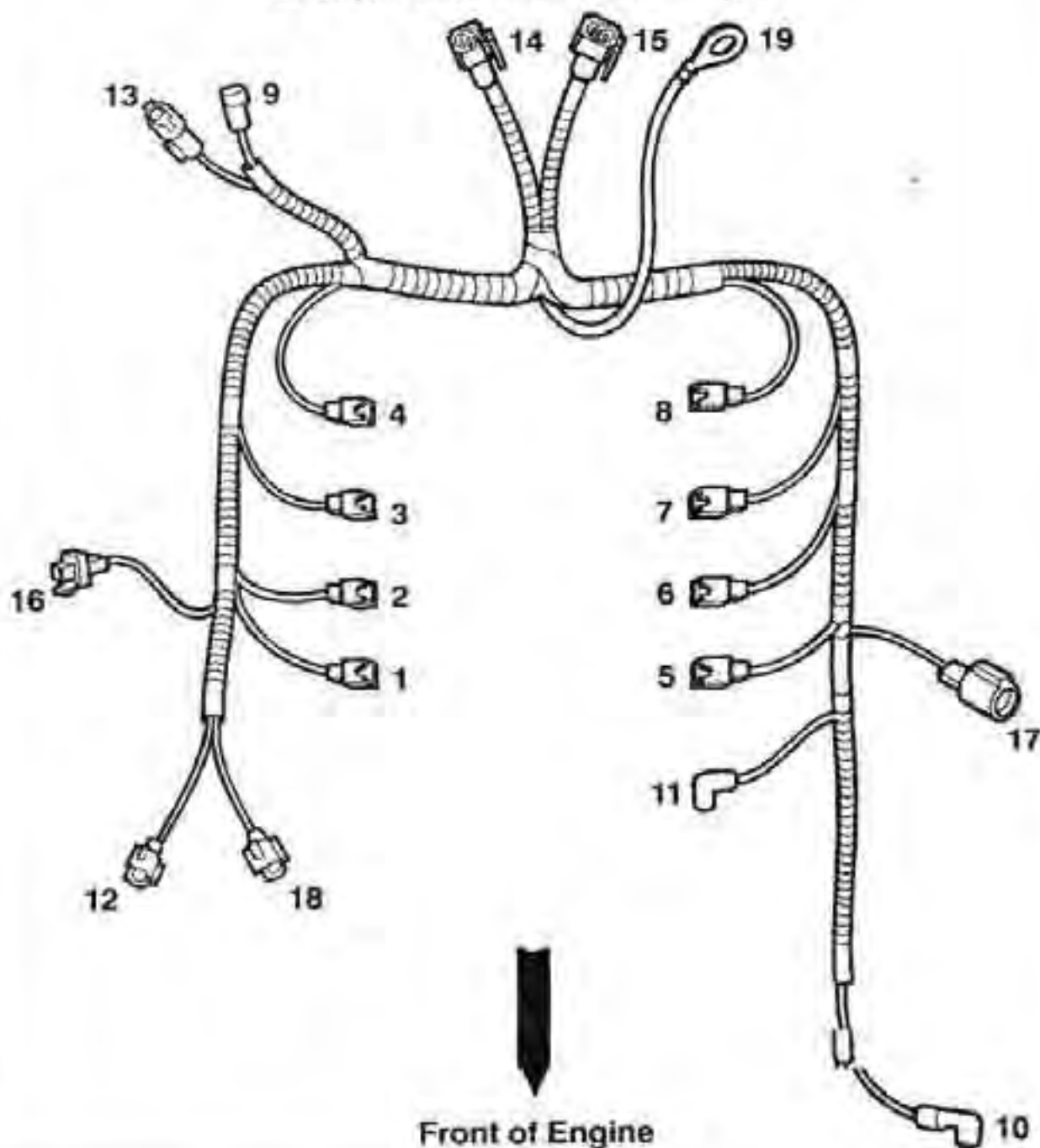
5.0 HARNESS WIRE COLOR AND LOCATIONS

5.1 ENGINE Harness — Part of M-12071-E302 or M-12071-H302 Package (See Figure 1, page 5)

P = Purple	W = White	BR = Brown	GR = Green
PK = Pink	GY = Gray	BK = Black	BL = Blue
LB = Light Blue	Y = Yellow	LG = Light Green	DB = Dark Blue
R = Red	T = Tan	O = Orange	DG = Dark Green

Connector #	Connects to	Wire Colors
1	Fuel Injector #1	T, R
2	Fuel Injector #2	W, R
3	Fuel Injector #3	BR/Y, R
4	Fuel Injector #4	BR/LB, R
5	Fuel Injector #5	T/BK, R
6	Fuel Injector #6	LG/O, R
7	Fuel Injector #7	R, T/R
8	Fuel Injector #8	LB, R
9	Throttle Position	GY/R, GY/W, BR/W
10	Oil Pressure Sender	W/R
11	Coolant Temperature Sender	R/W
12	Canister Purge Solenoid	GY/Y, R
13	EGR Position Sensor	BR/W, GY/R, BR/GR
14	Ten-pin Connector (Black)	—
15	Ten-pin Connector (White)	—
16	Idle Speed Control	R, W/LB
17	Air Charge Temperature Sensor	GR/BK, GY/R
18	Engine Coolant Temperature Sensor	GR/R, GY/R
19	H.E.G.O. Sensor Ground	O

Figure 1
ENGINE HARNESS
M-12071-E302 and M-12071-H302



5.2 Computer Main Harness — M-12071-C302 (See Figure 2, page 7)

P = Purple	W = White	BR = Brown	GR = Green
PK = Pink	GY = Gray	BK = Black	BL = Blue
LB = Light Blue	Y = Yellow	LG = Light Green	DB = Dark Blue
R = Red	T = Tan	O = Orange	DG = Dark Green

Connector #	Connects to	Wire Colors
20	Ten-pin Connector (Black)	
21	Ten-pin Connector (White)	
22	Thermactor Air Bypass Solenoid	LG/BL, R, W/Y
23	Thermactor Air Diverter Solenoid	R, W/G
24	Mass-Air-Flow Meter	BK, R, T/LB, LB
25	EGR Vacuum Regulator Solenoid	R, BR/P
26	EEC Battery Ground	BK/W
27	EEC Power Relay (EJAZ-12A046-A)	R/GR, R, Y, BK/W
28	Thick Film Ignition	R/BL, O/R, G/O, R/GR, T/Y, PK
29	Barometric Pressure Sensor	GY/R, GR/BK, BK/W
30	Self Test Input	GY/R, W/P, LB/O, BL/O, PK/G
31	Brown Eight-pin Connector	P/Y, G/R, R/W, T/Y, W/R, R/G, W/P, R/LB
32	Fuel Pump Relay (FOAZ-14N089-B) (FOAB-14B193-AB)	PK/B, BL/O, GR/Y, R
33	Wide Open Throttle A/C Cut Off Relay (FOAZ-14N089-B) (FOAB-14B193-AB)	BK/Y, PK/LB, R
34	20 Gauge Fuse Link To Starter Relay	BL, BK
35	A/C Pressure Switch	P, P/R, BK/Y
36	Coil	T/Y, R/LG
37	A/C Clutch Connector	BK/Y, BK/W
38	Body Ground	BK/GR
39	Green Eight-pin Connector	PK/O, PK/G, DG/Y, P, GY/Y, G/BK, W/R
40	H.E.G.O. Sensor Connector Main Harness	P/Y, BL/Y, DB/GR, GY/Y, BK/GR, W/PK
41	Spout Connector	PK, PK
42	60-pin Connector	

Note: Connector number 32 and 33 use relay FOAZ-14N089-B

5.3 H.E.G.O. Sensor Harness (See Figure 3, page 8)

Connector #	Connects to	Wire Colors
42	Connector to Main Harness	LB/Y, P/Y, R/BK, W/PK, GY/Y, BL/GR, BK/GR
43	Low Oil Level Sender (Not Used)	W/PK
44	H.E.G.O. Sensor LH	GY/Y, BK/GR, BL/Y
45	H.E.G.O. Sensor RH	GY/Y, BK/GR, R/BK

Figure 2
MAIN HARNESS
M-12071-C302

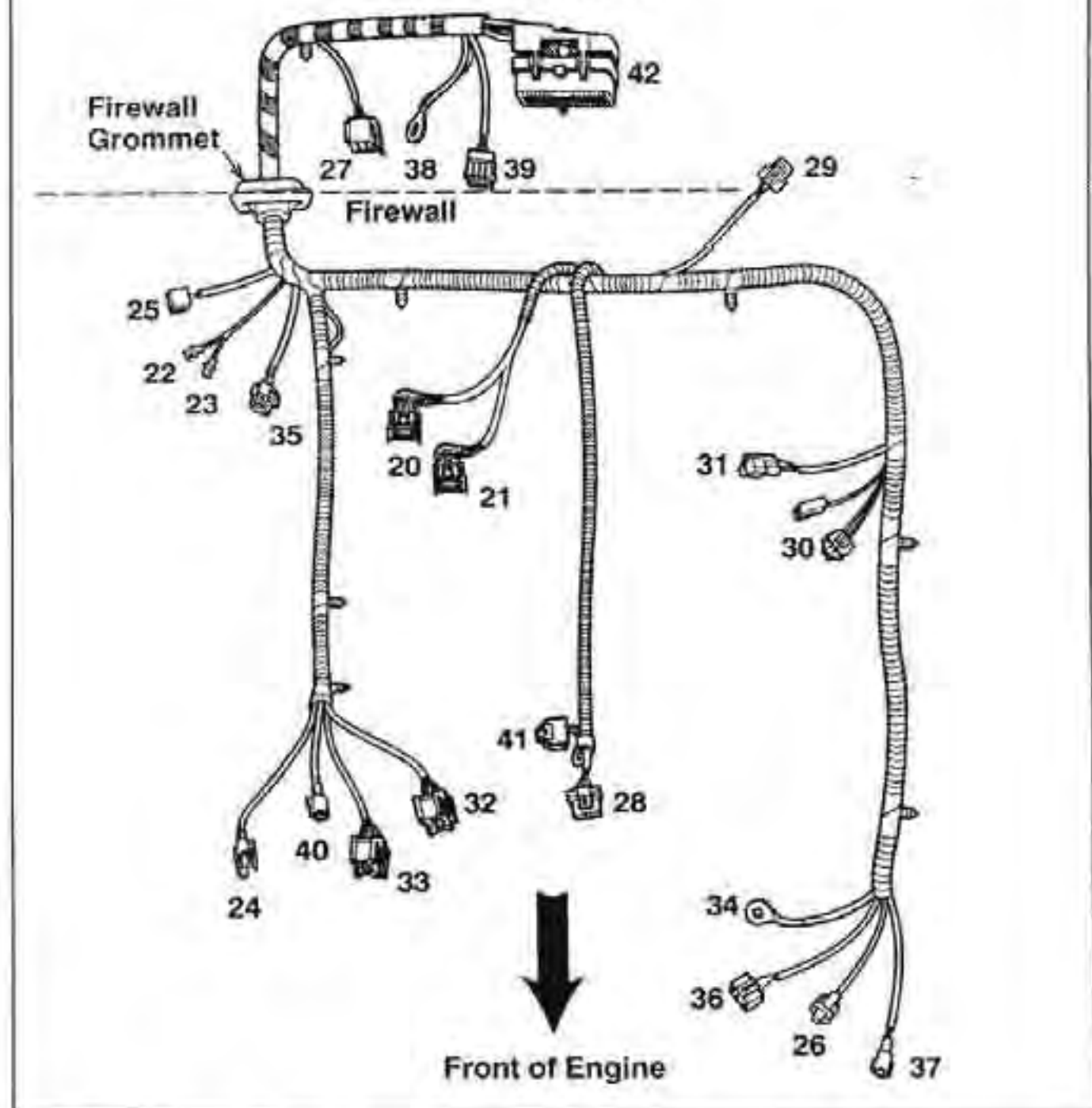
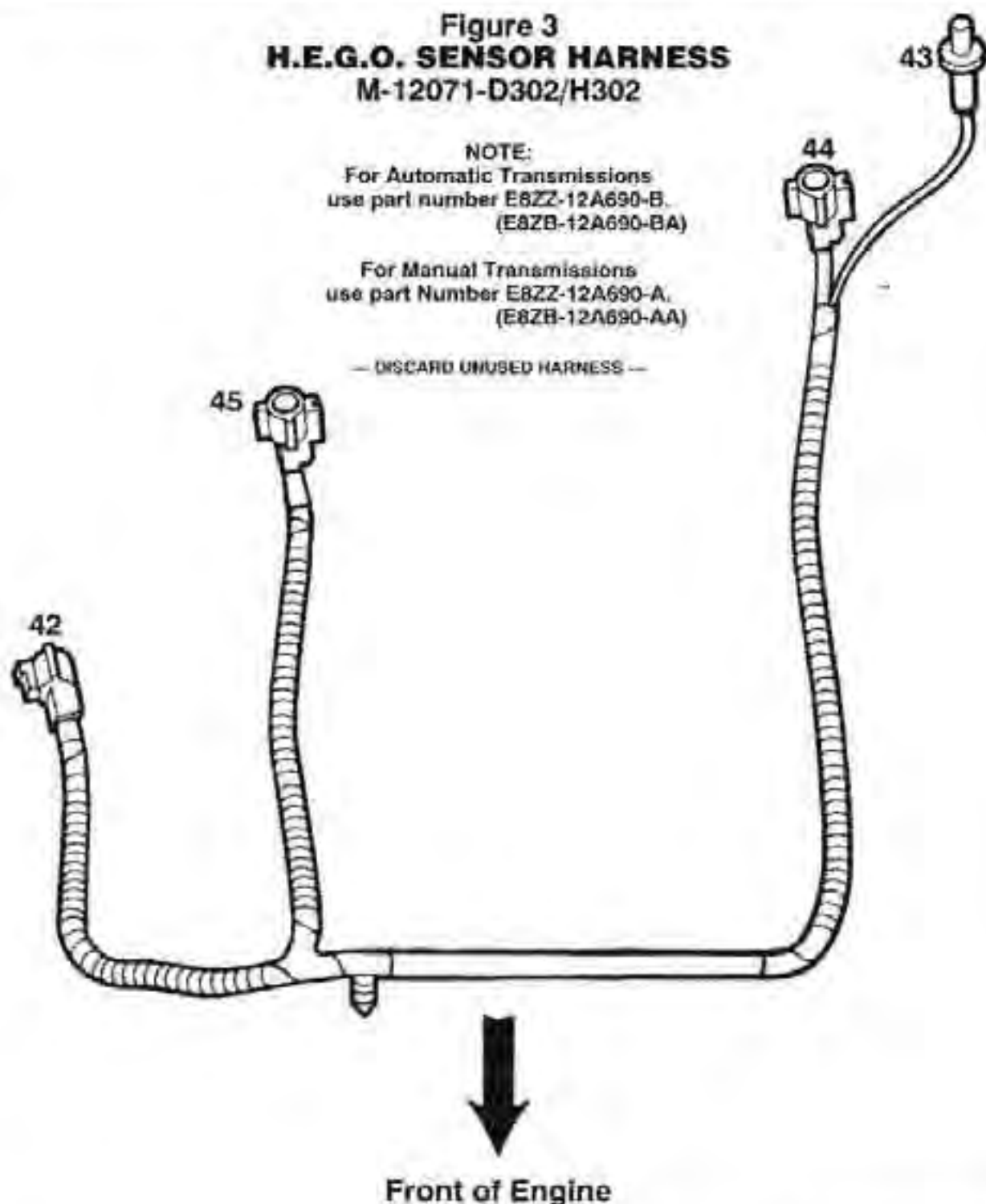


Figure 3
H.E.G.O. SENSOR HARNESS
M-12071-D302/H302

NOTE:
For Automatic Transmissions
use part number E8ZZ-12A690-B.
(E8ZB-12A690-BA)

For Manual Transmissions
use part Number E8ZZ-12A690-A.
(E8ZB-12A690-AA)

— DISCARD UNUSED HARNESS —



6.0 TOOLS REQUIRED

In addition to your regular assorted sockets, wrenches and screwdrivers, you will need the following:

- A. Wire Strippers
- B. Digital Multimeter
- C. Analog Multimeter
- D. Drill Motor
- E. Assorted Drill Bits
- F. Assorted Hole Saws
- G. Soldergun/Solder

7.0 SENSORS AND RELAYS

It is necessary to install the correct sensors and relays, as the EEC computer system will manage the engine requirements correctly. You will need 2 H.E.G.O. sensors, a BAP sensor, EGR position sensor, EGR valve, TIB and TAD solenoids, fuel pump relay, A/C and EEC power relays. When purchasing a used engine, there isn't any way to know, for sure, what shape the engine mounted sensors and relays will be in. For this reason Ford Motorsport recommends that you replace all of the engine sensors and relays with new parts available from the performance equipment catalog.

8.0 ENGINE HARNESS INSTALLATION

8.1 After the lower intake has been installed, the EFI engine harness can be installed.

8.2 Lay the engine harness on the lower intake with the water temperature, throttle position, EGR, and ISC solenoid connectors on the passenger side of the motor. **NOTE:** If your application requires that you reverse the upper intake to place the throttle body on the drivers side of the engine, you will need to lengthen some of the wires in the engine harness to reach their new location. Always lengthen one wire at a time, to avoid mistakes and use the proper method of splicing and re-insulating. (See Figure 1, page 5)

WARNING: When you solder two or more wires together, make sure that you "tin" the bare ends to be soldered. This will prevent cold solder joints and make the process easier. Crimp or "solderless" connectors are not recommended as with time these have a tendency to loosen and permit corrosion as well as shorts in the connection. Shorts or lack of connection in the harness can create many untraceable problems.

8.3 Motorsport sensors have thread sealant pre-applied and are ready for installation. Install the engine coolant temperature sensor (ECT) into the sensor mount in the black coolant tube. **NOTE:** If the factory coolant tubes are not used, the ECT sensor must be installed inline in the heater hose going from the intake manifold to the heater core, or directly into the coolant passage threaded boss in the intake manifold near the thermostat. (See Figure 4, page 10)

8.4 Connect the wiring connector to the ECT sensor. (See Figure 1, Connector #18, page 5)

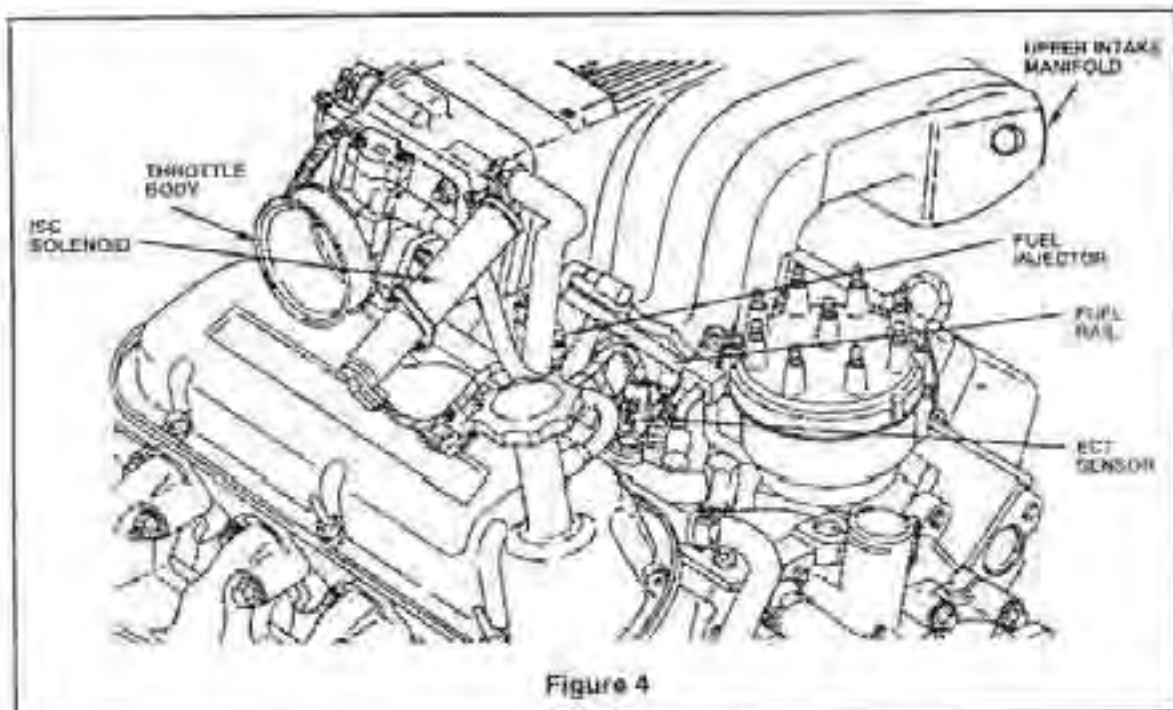


Figure 4

- 8.5 Connect the oil pressure gauge W/T wire connector to the oil sender, located on the drivers side of the block. (See Figure 5)

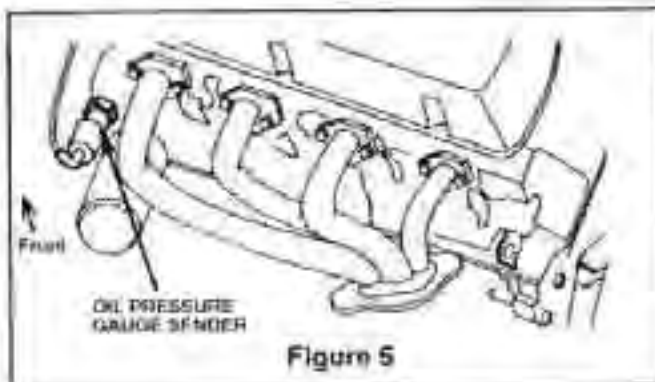


Figure 5

- 8.6 Connect the coolant temperature gauge sender R/W wire to the temperature sender located at the drivers side, front of the intake manifold. (See Figure 1, Connector #11, page 5 and Figure 6)

NOTE: These wires are not part of the EEC system, they are included in the harness for ease of dash gauge wiring installation.

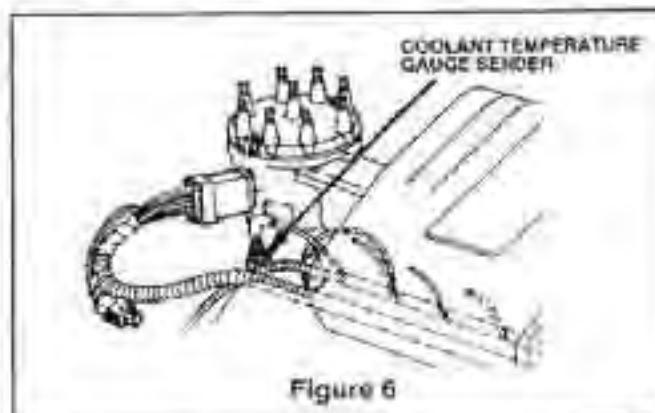


Figure 6

- 8.7 The front, two-pin connector on the passenger side is the number one fuel injector connector. Connect all fuel injectors at this time. (See Figure 7)

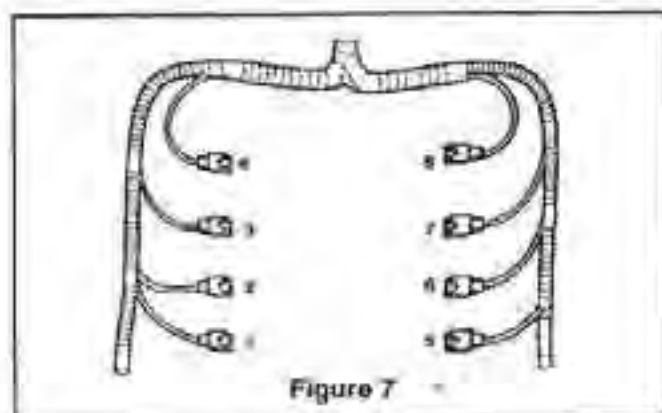


Figure 7

- 8.8 Install the ACT sensor in lower intake manifold. Connect the wiring to the ACT sensor. (See Figure 1, Connector #17, page 5 and Figure 8)

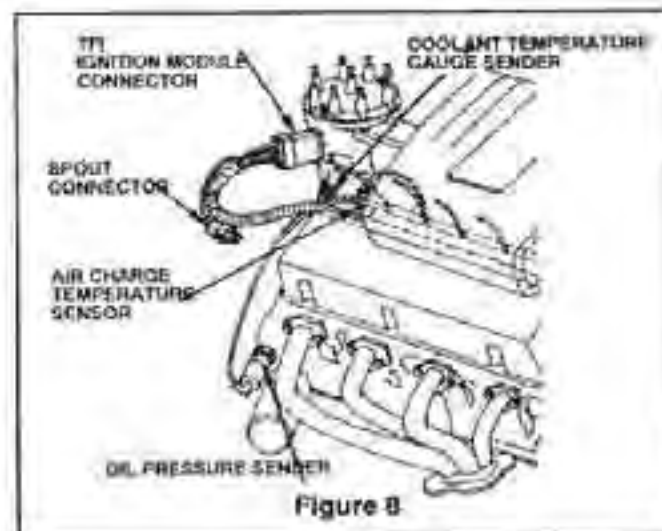


Figure 8

- 8.9 Connect the engine harness ground eyelet to the ground bolt on the rear of the drivers side cylinder head, in the most outward hole or closest to the (H.E.G.O.) sensor. (See Figure 1, Connector #19, page 5)
- 8.10 Install the upper intake manifold, with vacuum hoses installed, following the manufacturers shop manual procedure.
- 8.11 Connect the throttle position sensor wiring connector to the TPS Sensor. (See Figure 1, Connector #9, page 5 and Figure 9)

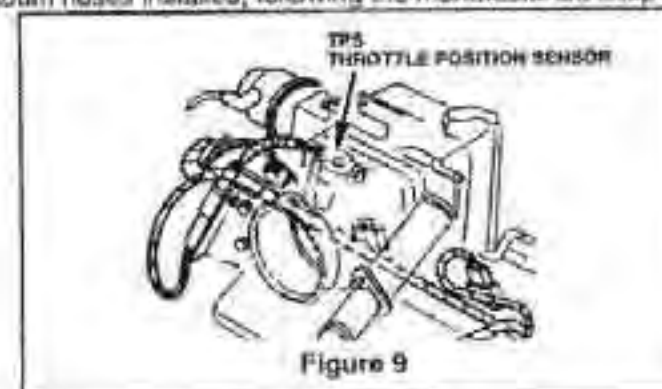


Figure 9

8.12 Install the Exhaust Gas Recirculation (EGR) valve on the EGR spacer.

8.13 Connect the EGR valve wiring connector to the EGR valve position sensor.
 (See Figure 1, Connector #13, page 5 and Figure 10)

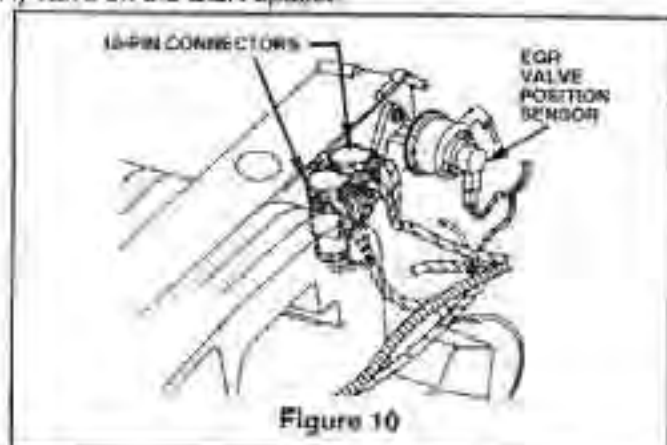


Figure 10

8.14 Connect the ISC wiring connector to the ISC solenoid.
 (See Figure 1, Connector #16, page 5 and Figure 11)

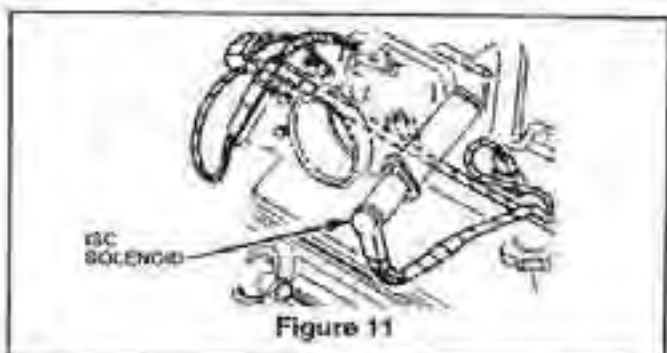


Figure 11

8.15 Connect the canister purge solenoid connector to the canister purge solenoid.
 (See Figure 1, Connector #12, page 5 and Figure 12. See Section 15, page 25 for Part Numbers)

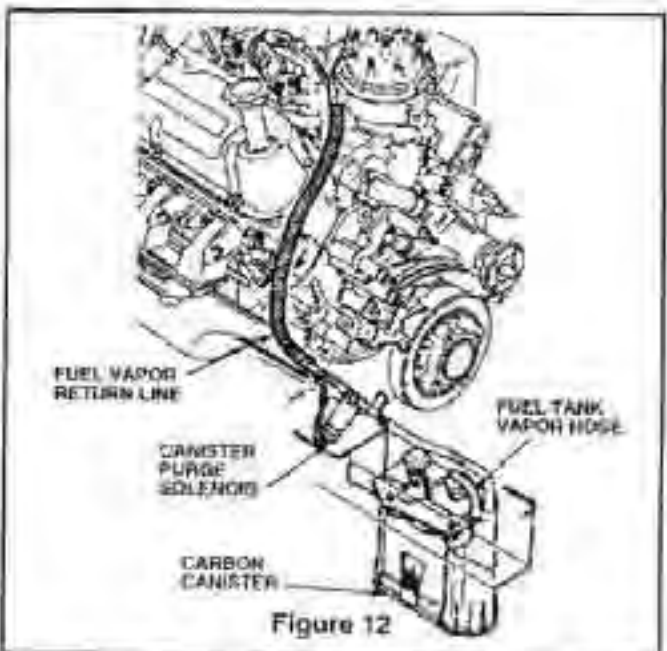
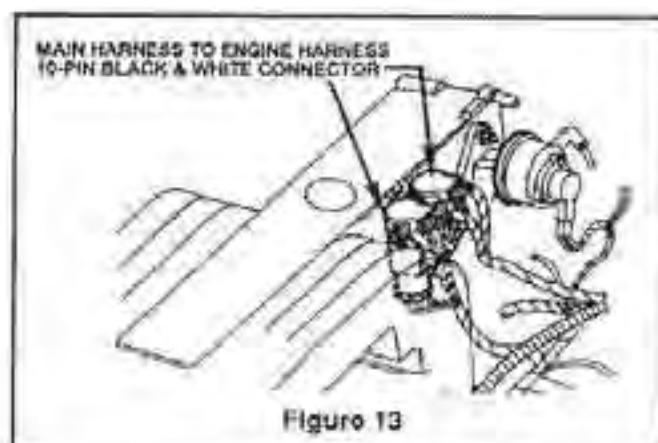


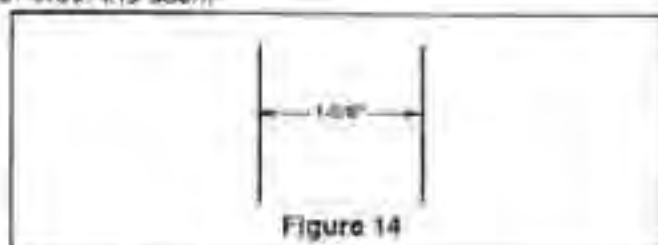
Figure 12

9.0 MAIN HARNESS INSTALLATION

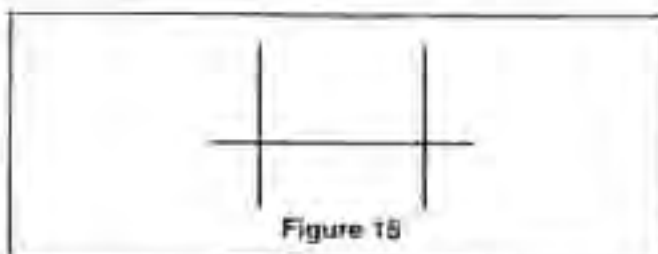
- 9.1 Connect the male black and white 10-pin connectors to the female 10-pin connectors. (See Figure 1, Connectors #14 and #15, page 5, Figure 2, Connectors #20 and #21, page 7 and Figure 13)



- 9.2 Position the main wire harness around the engine compartment to determine actual placement of engine compartment sensors and route them appropriately.
- 9.3 After identifying the computer harness pass thru location, check for any wires, hoses, etc. that could get in the way of the hole saw. **NOTE:** The EEC control module should be inside the vehicle near the right hand kick panel or under the dash.
- 9.4 Place two vertical parallel center lines 1-5/8" apart. (See Figure 14)

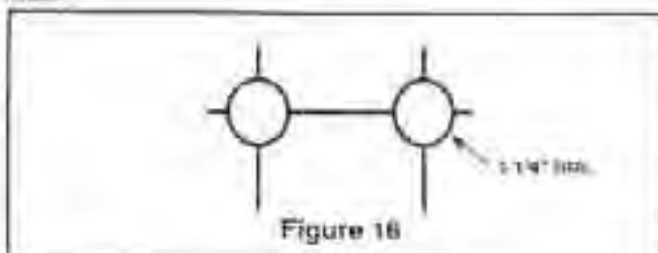


- 9.5 Place a horizontal line through the two vertical lines. (See Figure 15)



- 9.6 Center punch the intersection point of the lines.
- 9.7 Drill two 1-1/4" diameter holes with a hole saw at each of the center punch marks. (See Figure 16)

NOTE: Always wear eye protection when drilling or cutting.



- 9.8 Scribe or draw a line from the bottom of each 1-1/4" diameter hole.
 (See Figure 17)

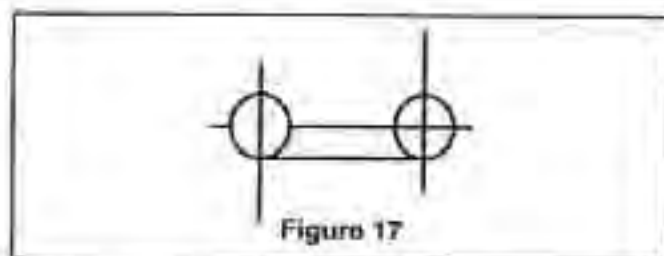


Figure 17

- 9.9 Repeat 9.8 for the top of each 1-1/4" diameter hole.

- 9.10 Remove the remaining material (shaded area) between the scribe lines and the hole outputs.
 (See Figure 18)

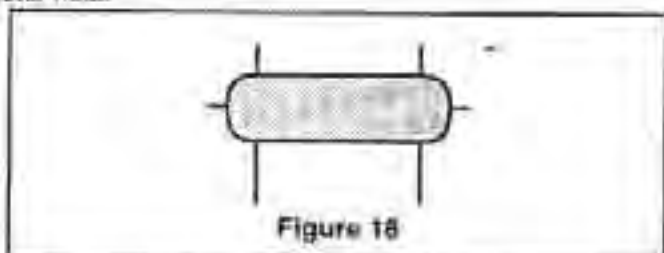


Figure 18

- 9.11 Clean up any sharp edges or burrs with a file or small die grinder.

- 9.12 Place the EEC control module 60-pin connector, EEC power relay, and the green connector through the firewall opening. Install the EEC control module. It is recommended to use the Ford factory type mounting bracket, (E9ZZ-12A659-A). Install the EEC control module ground strap to an interior metal frame. Make sure the ground area is free of rust or paint.
 (See Figure 19)

NOTE: The connector should be on the bottom to avoid trapping water. Do not connect the 60-pin connector at this time.

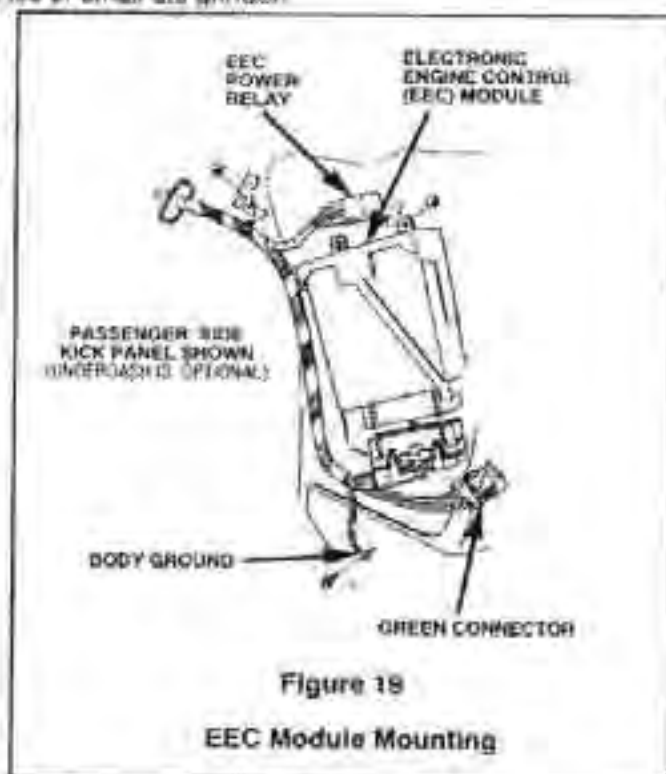


Figure 19

EEC Module Mounting

- 9.13 Connect all engine compartment mounted sensors. Attach and connect coil (E73Z-12029-A or equivalent). (See Figure 20, page 15 and Figure 2, page 7)

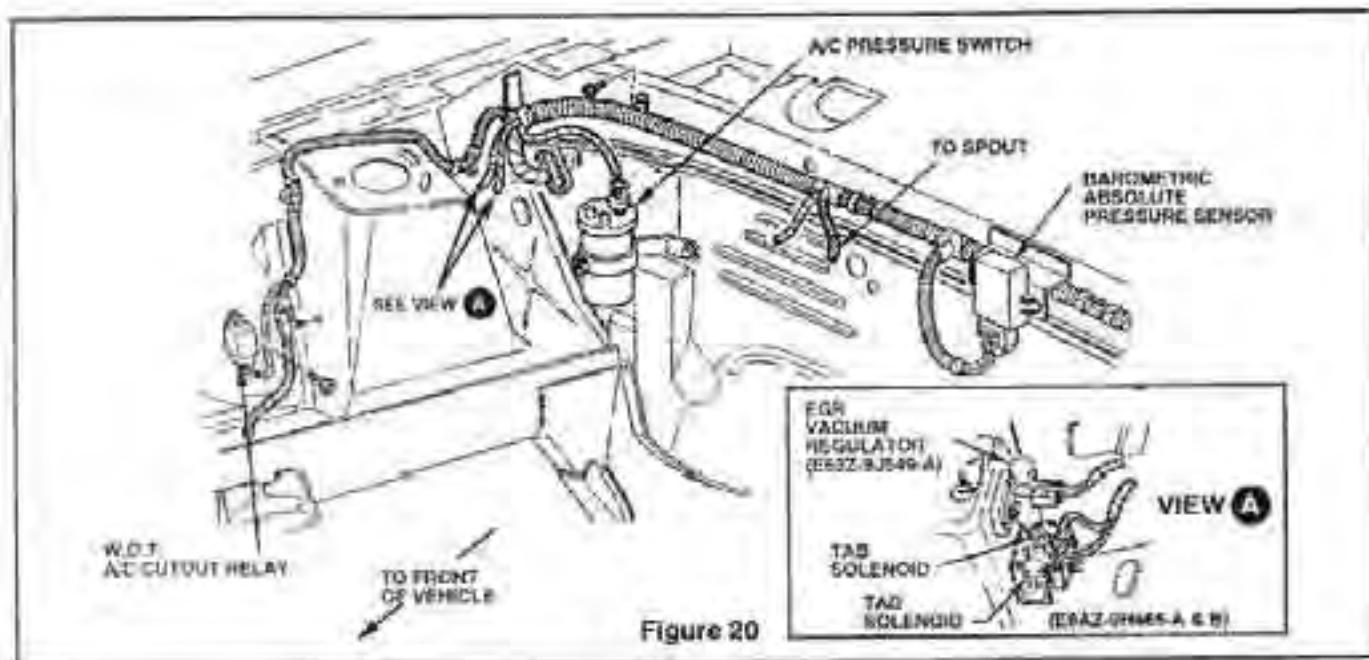


Figure 20

- 9.14 Locate the eight-pin Brown connector on the computer harness. It is near the EEC computer test lead. (See Figure 2, Connector #31, page 7)
- 9.15 The wires in this connector will have to be cut and spliced into the appropriate wire in your vehicle's harness.

WARNING When you solder two or more wires together, make sure that you "tin" the bare ends to be soldered. This will prevent cold solder joints and make the process easier. Crimp or "solderless" connectors are not recommended as with time these have a tendency to loosen and permit corrosion as well as shorts in the connection. Shorts or lack of connection in the harness will create all sorts of untraceable problems.

Cut the Brown connector from the harness. You may need to remove some tape or wire wrap to make the cutting process easier.

Starting with the BROWN connector #31, Figure 2, page 7, connect the wires as follows:

- Red/Light Blue wire connect to 12 volt crank only source.
- White/Purple wire connect to 12 volt crank only source.
- Red/Green wire connect to 12 volt crank and run source.
- White/Red wire connect to oil pressure dash gauge.
- Purple/Pink wire connect to water temperature dash gauge.
- Tan/Yellow wire connect to "trigger wire" on voltage triggered tachometers.
- Green/Purple and the Purple/Yellow connect to the Manual Transmission neutral safety switch (not used with Automatic Transmission). The switch is open when the clutch is disengaged or the transmission is in neutral. The T-5 Manual Transmission has a neutral switch on the top cover. (See Figure 21)

(See Figure 22, Connector #31, page 17)

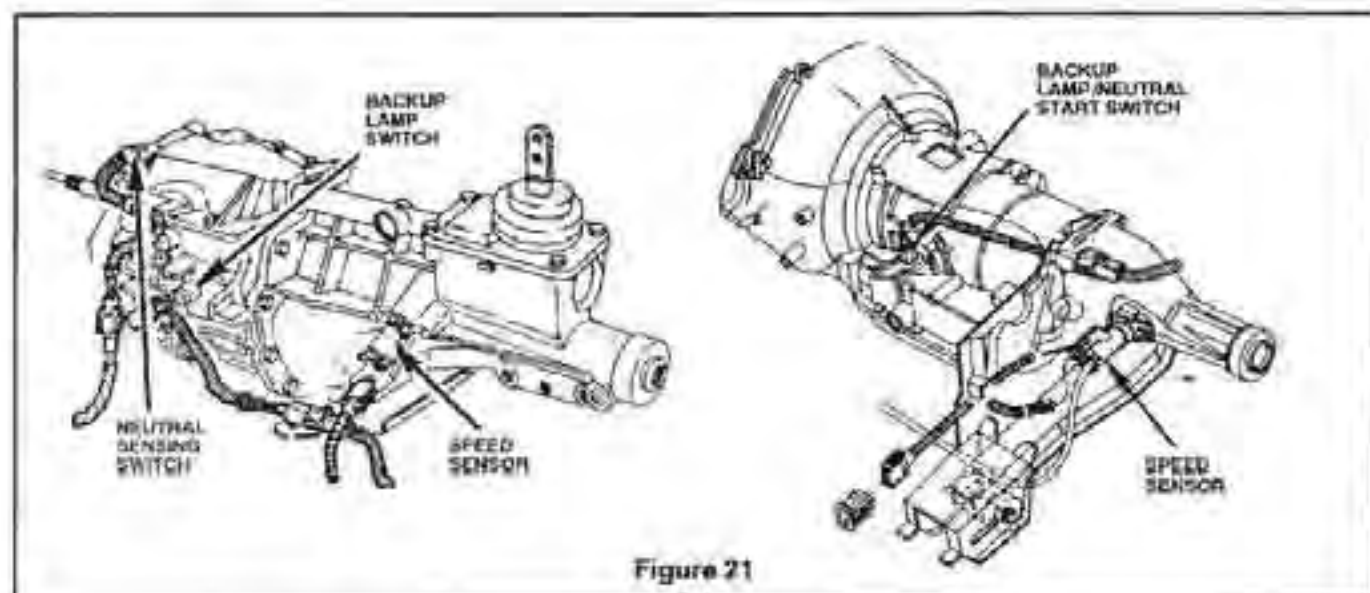


Figure 21

Continuing with the GREEN connector found near the computer.
 (See Figure 2, Connector #39, page 7)

- a) White/Red — not used
- b) Gray/Yellow wire connect to "Run" only 12 volt
- c) Purple wire connect to power supply for the A/C compressor clutch from the dash controls. This wire is to have power when the A/C is "ON" to engage the compressor clutch and maintain proper idle speed.
- d) Dark Green/Yellow wire connect to the inertia switch then to the fuel pump positive.
- e) Pink/Orange wire connect to the speed sensor negative and to ground.
- f) Green/Black wire connect to speed sensor positive.
- g) Pink/Green wire connect to check engine light. Connect other side of the light to a "Crank" and "Run" power source. **This must be used.**

(See Figure 22, Connector #39, page 17)

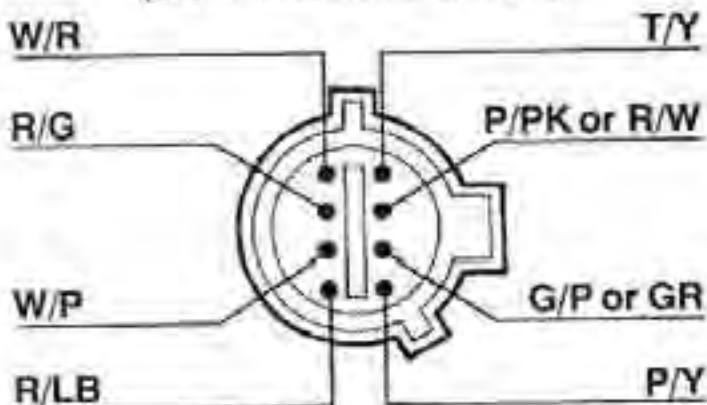
NOTE: The following A/C connections should be made if the vehicle is A/C equipped, to prevent computer damage as well as to maintain proper idle speeds at all times. If your vehicle does not have A/C, skip 9.16 through 9.18, leave connector loose.

- 9.16 In the engine compartment, near the harness grommet, find the A/C pressure switch connector. Attach connector to switch. (See Figure 2, Connector #35, page 7)
- 9.17 Install the WOT relay connector to the WOT relay and the fuel pump relay connector to the fuel pump relay located on the passenger side fender well area.
 (See Figure 2, Connectors #32 and #33, page 7)
- 9.18 Located near the drivers side fender well area, is a black two wire connector. This is the connector for the A/C clutch. You will need a jumper harness (E62Z-19D887-A) from your Ford dealer. This harness is designed to fit the factory (Nippondenso type) compressor. It could be modified to fit other types of compressors if so desired.
 (See Figure 2, Connector #37, page 7)

Figure 22

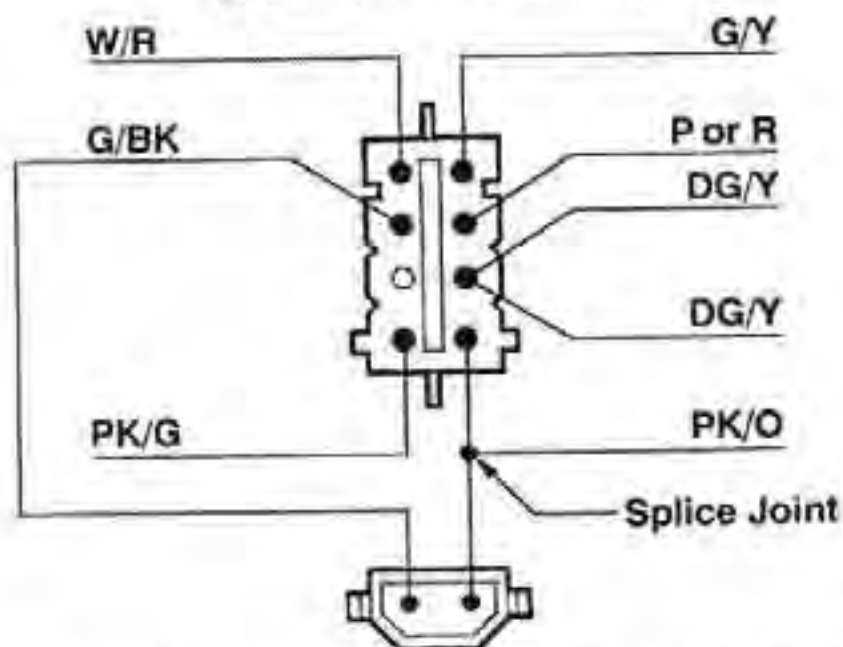
BROWN CONNECTOR #31

(shown from the harness end)



GREEN CONNECTOR #39

(shown from the harness end)



VEHICLE SPEED SENSOR CONNECTOR

(Not Supplied)

- 9.19** Locate the EEC computer ground cable, remove weathertight connector. Attach directly to battery ground post. Do not attach to any other ground source. If you do not follow these instructions exactly the engine may not start and will not run correctly. The entire system depends on this ground. Be sure to solder all splices. This ground cable is located in the drivers side front inner fender. (See Figure 2, Connector #26, page 7)
- 9.20** The TFI module is attached to the distributor with two screws torqued to 15-35 in./lbs. Be sure to apply heat transfer grease to the contact area. Install the distributor. Coming out of the main loom, near the center of the firewall, you will find the TFI harness. Route this under the upper intake manifold and connect to the TFI module.

DISTRIBUTOR GEAR

The distributor gear for the 5.0 Sequential Electronic Fuel Injection (SEFI) is machined from high grade steel. The camshafts used in 5.0 SEFI are hydraulic roller lifter camshafts machined from steel. Flat tappet camshafts are made from cast iron. Distributor gears for use with flat tappet camshafts are made from cast iron.

CAUTION: Do not attempt to use a flat tappet type distributor gear on a roller tappet camshaft. The steel, roller camshaft will destroy the cast distributor gear, causing damage to the camshaft and possibly internal engine components. See Miscellaneous Parts List for alternate distributor applications.

9.21 H.E.G.O. SENSOR INSTALLATION

INSTALLATION NOTE: In order for the EEC control module to operate correctly, you will need to install the two supplied H.E.G.O. sensors in the exhaust system. (Supplied in kit M-12071-D302)

- 9.22** Measure three inches past the header collector on your exhaust system. Be sure the oxygen sensors will have one inch clearance in all directions before continuing.
- 9.23** Center punch the hole locations in both exhaust pipes.
- 9.24** Use an appropriate size hole saw and drill the H.E.G.O. sensor boss holes.
- 9.25** Mig or Tig weld the bosses to the exhaust pipes.

NOTE: Use a 18 x 1.5mm tap to clear the threads of any weld splatter or burrs that could damage the sensor or sensor threads.

- 9.26** Install H.E.G.O. sensors, then connect the harness to the sensors.

NOTE: Do not alter the H.E.G.O. sensor wires. If any shortening or lengthening is required, you must do it to the harness not the wires attached to the H.E.G.O. sensors. Connect the sensors and check wire routing to be sure harness is clear of any heat source, sharp edges or moving parts to avoid damage to harness.

- 9.27 Locate the H.E.G.O. sensor main connector near the passenger side front fenderwell area. Connect the H.E.G.O. sensor harness to the eight-pin connector on the main harness. (See Figure 2, Connector #40, page 7 and Figure 3, Connector #42, page 18)

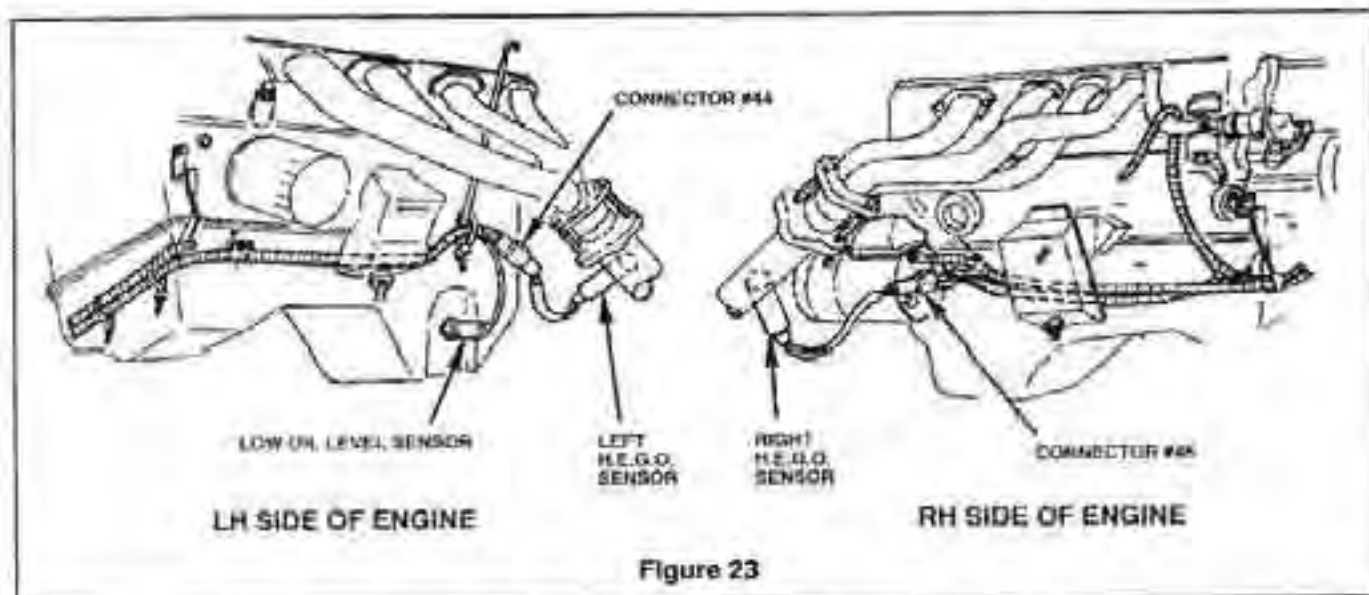


Figure 23

- 9.28 Mount the MAF Meter securely to the vehicle body. Install bellows type rubber hose between the throttle body and mass-air meter to reduce the effects of engine movement (supplied in kit M-13071-F302/G302). Attach air filter assembly to inlet side of air meter. Air filter must be shielded from direct fan air to avoid false readings. Attach MAF meter connector to MAF meter. (See Figure 2, Connector #24, page 7)
- 9.29 Locate the 20 gauge, inline, fuse link and install it on the starter relay stud or battery positive terminal. This is a constant draw, computer memory circuit. It is recommended to use starter solenoid E9TZ-11450-B to prevent computer damage. (See Figure 2, Connector #34, page 7)
- 9.30 Locate Barometric Absolute Pressure (BAP) sensor connector near center of firewall. Install BAP sensor and install connector. Do not attach a vacuum hose to the BAP sensor port. This must remain open to atmosphere. (See Figure 2, Connector #29, page 7)
- 9.31 Attach the harness to surrounding sheet metal securely. Make sure all sensors and relays are properly mounted.
- 9.32 Refer to the Vacuum Hose Routing Schematic for proper vacuum line routing. (See Section 11, Figure 24, page 22)

9.33 CAUTIONS: Disconnect the battery

- A. Disconnect the battery before doing any wiring.
- B. Do not disconnect the battery cables while the ignition is on.
- C. Do not shorten or lengthen any wires unless the instructions tell you to do so.
- D. Do not use leaded fuel or leaded high octane racing fuel, as this will damage the H.E.O. sensors.
- E. Do not use a test light when testing computer sensors or circuits. Damage to the computer may result.
- F. Be careful when routing wires or harnesses around moving parts, sharp edges or heat sources.
- G. Always disconnect the computer 60-pin Connector whenever welding is to be done on the vehicle.

9.34 INSTALLATION NOTES:

- A. It is normal to have a small current draw on fuel injected systems. The computer memory causes the voltage drain.
- B. The Harness connectors are keyed to fit one way only. Do not remove any connector(s) unless you are instructed to do so.
- C. When connecting the 60-pin connector to the EEC computer (module), be careful not to bend or break any of the pins on the computer.

9.35 GROUNDS:

- A. Install a ground strap/cable (4 gauge), from the negative battery terminal to the vehicle's frame.
- B. Install a ground strap/cable from the engine to the frame.
- C. If your vehicle has a fiberglass body it is required that you install a terminal strip to ground all of your gauges, lights, and accessories. Ground the terminal strip to the battery ground terminal and to the engine block.
- D. Install a ground strap/cable from the firewall to the engine.

NOTE: All grounds must be made on rust and paint free surfaces.

10.0 Fuel Pump System

A. Fuel Pump Circuit

The electric fuel pump is energized through a pump relay in series with an inertia switch. To avoid fuel system problems, it will be necessary to retain these "Run" features. The fuel pump relay is energized by the computer. When the key is turned to the run position, the fuel pump will run a short cycle to pressurize the system. If the engine is not running, the fuel pump will shut off. Upon start up of the engine, the pump will restart. This is a safety feature which will prolong the life of the pump. The inertia switch will trip in the event of a collision. This will prevent a fuel spill in the case of a ruptured fuel line, tank or filter. The inertia switch can easily be reset by depressing its plunger. The inertia switch should be mounted on a flat surface on the vehicles rear bulkhead with the plunger pointing upwards.

B. Fuel Pump and Regulator

The Ford EFI system will require an electric fuel pump capable of pumping fuel throughout the system at 90 psi. The pump will also need to produce a minimum flow rate of 88 liters per hour. EFI electric fuel pumps are available from a variety of aftermarket suppliers such as Bosch, Walbro, Carter and Holley. A pressure regulator is employed to control the fuel pressure to the fuel rails and injectors. The regulator will have a vacuum port on the top which must be connected to an intake manifold vacuum source. The regulator will decrease fuel pressure at idle and deceleration. **NOTE:** The inside diameter of the fuel return line should be at least 80% of the size of the inside diameter of the pressure line.

NOTE: Whenever possible, a factory in tank pump is recommended.

C. Fuel Filter and Rails

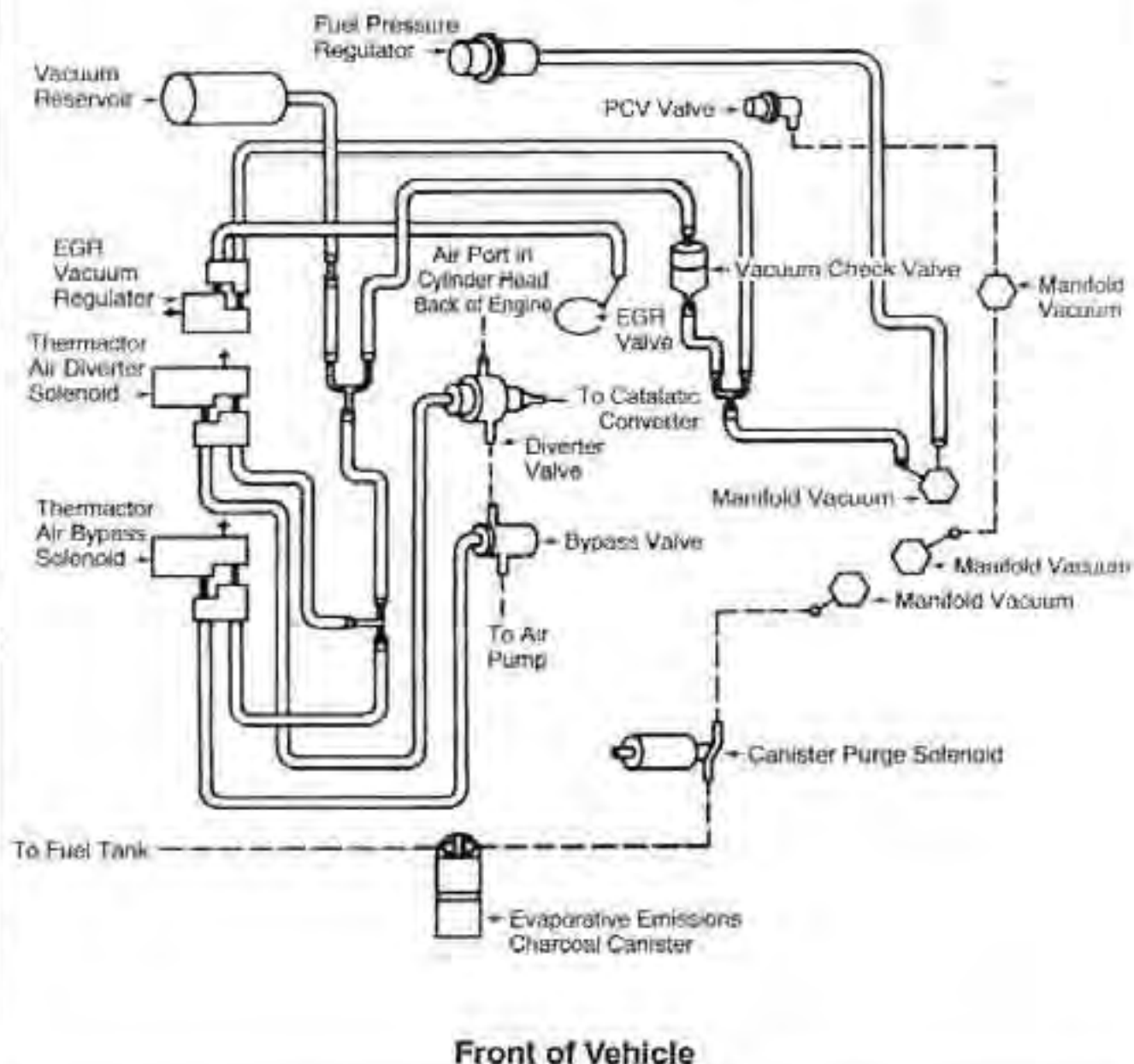
It is recommended to use a factory EFI type fuel filter for best results. Ford part number E7DZ-9155-A contains a fine filtration mesh to successfully filter out small particles from the system. The fuel rail is designed to accept spring lock, quick connect line fittings. These are available in barbed form from your Ford dealer (Refer to Miscellaneous Parts List in Section 15). A Schrader valve is found on the fuel rail feed line. The valve provides a point for service technicians to monitor fuel pressure or bleed down the system for repairs. Replace fuel filter after 500 miles.

NOTE: Refer to Miscellaneous Parts List Section 15 for Fuel Rail Applications and Part Numbers.

CAUTION: It is very important to follow fuel pressure relief procedures listed in the shop manual to prevent injury. The fuel system is under high pressure, and pressure must be released correctly before beginning any type of test or service procedures.

11.0 VACUUM HOSE ROUTING SCHEMATIC

Figure 24
VACUUM HOSE ROUTING SCHEMATIC
 (Typical Routing, Similar to 1987-93 5.0L H.O. Mustang)



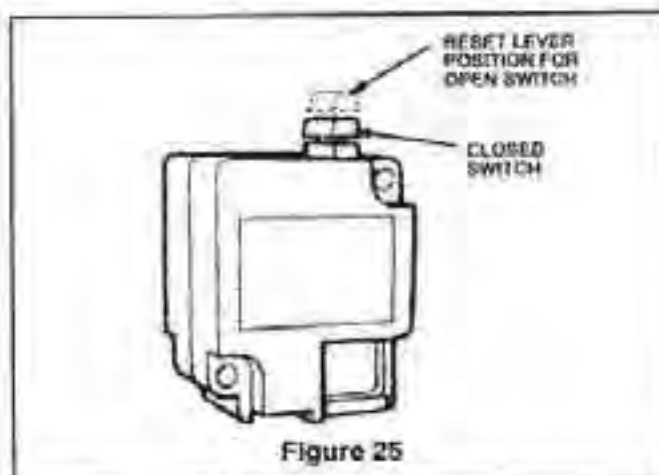
12.0 START UP

- 12.1 Slide the main harness connector into the EEC control module. To complete the connection you must hand tighten the lock bolt using a 10mm socket 1/4" drive. The pin connector is keyed to fit only one way. Do not force the connector onto the module. Do not use air power tools to tighten the lock bolt.
- 12.2 Pressurize the fuel system. Turn the key from off to on several times to fully prime the system. Inspect entire fuel system (from tank to engine) for leaks.
- 12.3 Check all fluid levels, electrical and fluid connections. It is recommended to prime the oil pump to insure adequate delivery of oil to all moving parts for initial start up.
- 12.4 Start engine. Check for leaks and/or noises that would indicate a problem. If no leaks or noises are present, prepare to set initial engine timing.
- 12.5 Before attempting to set the timing, you must unplug the spout connector which is located approximately six inches from the TFI module. Loosen the distributor hold down bolt. Set initial timing to factory setting of 10° BTDC. Tighten the distributor hold down bolt, check timing. Reinstall spout connector. Timing should advance somewhat at this time. (See Figure 2, Connector #41, page 7)
- 12.6 Check the H.E.G.O. sensor bosses for exhaust leaks while the vehicle is running.

CAUTION: Run vehicle in a well ventilated area.

13.0 TROUBLESHOOTING

- 13.1 Some of the main things that can cause problems are listed below.
- 13.2 **Inertia Switch**
The inertia switch can cause a "no start" problem if the reset button is not depressed. (See Figure 25)



13.3 EGR Valve

Carbon build-up on the EGR valve seat, or on the pintle (pivot pin), can cause the valve to stick open, triggering a fault code and poor drivability.

13.4 Harness Connectors

Harness connectors can become corroded which can alter electrical signals, which can cause poor engine performance. Look for any indication of corrosion damage. If corrosion damage is found, clean the terminals and repair the area to prevent future exposure to moisture.

13.5 Tape Splices

WIRE SPLICES:

Tape splices are not recommended, since they deteriorate over time and can cause untraceable problems. It is advised to solder all splices and insulate them with glue filled shrink tubing, commonly available at most electronics stores.

When splicing two or more wires together, be sure the joints are solidly and thoroughly soldered. Be sure to double check the insulation for complete coverage.

GROUNDS:

Chassis ground wires will need to be connected to clean bare metal surfaces to avoid electrical faults. Battery grounds must be attached directly to the battery.

14.0 GENERAL INFORMATION

For testing the EEC system, refer to the 1993 Engine Emissions and Diagnosis manual. This manual outlines test procedures, accessing trouble codes and pin point testing. The manual is available from HELM Inc. VISA or MasterCard orders can be placed at 1 (800) 782-4356. Another source of technical information is the Ford Fuel Injection and Electronic Engine Control manual M-1832-Z1 available from your Motorsport dealer. Diagnostic testing or general servicing of this system will be the same as any '89 through '93 5.0 HO Mustang.

If you wish to use a Ford "two wire hook-up" internally regulated alternator, as used on most late model Ford vehicles, call the Tech "Hot Line" (810) 468-1356 for information and part numbers.

Alternator Harness F3TZ-14305-F (F3TB-14305-BA), green w/red small wire, 12V key on, big terminal end to starter relay with 87-93 type alternator.

15.0 MISCELLANEOUS PARTS LIST (See your local Ford Dealer to purchase these parts)

Description	Part Number
EGR Vacuum Reservoir	D4DZ-9E453-A
EGR Vacuum Check Valve	D9AZ-12A197-A
Passenger Side Throttle Body, Fuel Rail 302	F2TZ-9F792-A
Driver Side Throttle Body, Fuel Rail 302	E6AZ-9F792-D
Driver Side Throttle Body, Fuel Rail 351	F2TZ-9F792-C
Vehicle Speed Sensor (Any Ford Transmission)	E3AZ-9E731-A
Starter Relay (with Diode)	E9TZ-11450-B
Ignition Coil	E73Z-12029-A
Fuel Filter	E7DZ-9155-A
Barbed Fuel Filter Fitting (5/16)	N806187-S190
Barbed Fuel Filter Fitting (3/8)	N806796-S190
Fuel Filter Duckbill Clip (5/16)	N802239-S
Fuel Filter Duckbill Clip (3/8)	N802241-S
Fuel Line Fitting, Male, Pressure Line	N806207-S190
Fuel Line Fitting, Male, Return Line	390417-S190
Fuel Line Fitting, Female, Pressure Line	N806205-S190
Fuel Line Fitting, Female, Return Line	390417-S190
Distributor, Flat Tappet EFI 5.0L Type	E5TZ-12127-B
Distributor, Flat Tappet EFI 5.8L Type	E7TZ-12127-D
Canister Purge Solenoid	E4ZZ-9C915-A
Canister Purge Solenoid Harness	E6VZ-9D857-A
EVSP Emission Canister	E2ZZ-9D653-A
Speedometer Cable for Speed Sensor	E9BZ-9A820-B

15.1 Miscellaneous Parts List continued

Quantity	Description	Part Number
1	H.E.G.O. Ground Wire Bolt	N802626-S100
4	Fuel Injector Rail Bolts	56703-S2
6	Flywheel Bolts (Manual)	F1ZZ-6379-A
6	Flywheel Bolts (Auto.)	D2AZ-6379-B
4	Motor Mount Bolts	391096-S100
12	Intake Bolts	388058-S
4	T-5 Trans to Bellhousing Bolts	N605935-S2
3	Cylinder Head Smog Plugs	F4ZZ-6E088-A
1	Distributor Hold Down and Bolt	M-12270-A302
6	Valve Cover Bolts Stamped Steel	390819-S2
6	Valve Cover Bolts Cast Aluminum	390820-S8
6	Valve Cover Studs Stamped Steel	390822-S2
6	Valve Cover Studs Cast Aluminum	390823-S8
4	GT-40 Upper to Lower Mounting Bolts (Short)	390395-S32
2	GT-40 Upper to Lower Mounting Bolts (Long)	390858-S8
4	EFI Cover Bolts	57357-S2
1	EFI Throttle Cable	E6ZZ-9A758-A
4	Throttle Body Attaching Studs	390788-S8
4	Throttle Body Attaching Nuts	45338-S2
6	Pressure Plate Bolts	N602549-S51M
3	Pressure Plate Dowels	D1FZ6397-B
1	EEC Power Relay	E3AZ-12A646-A (E3AF-12A646-A)
1	AC and Fuel Pump Relays	F0AZ-14N089-B (F0AB-14B193-AB)