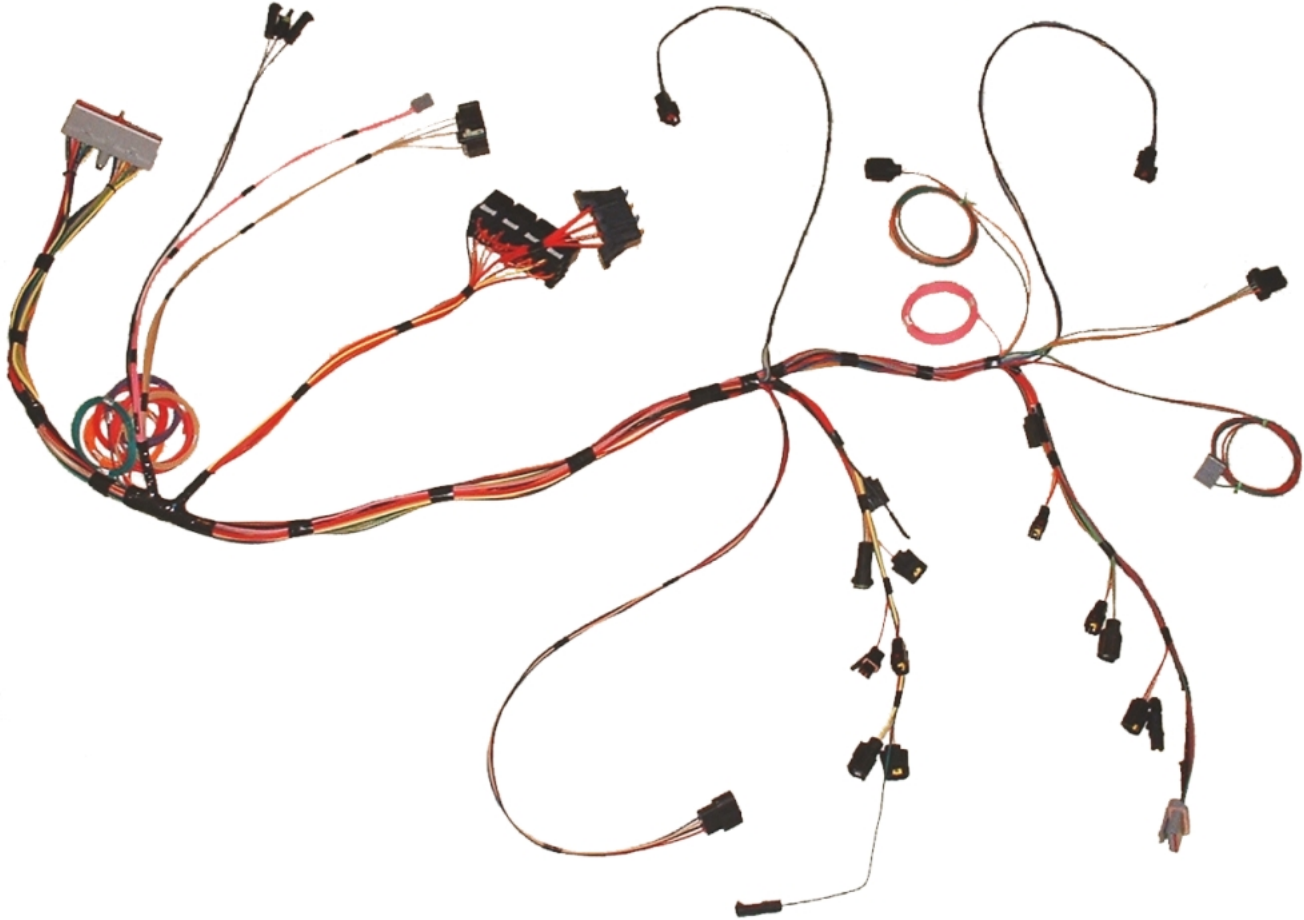


RJM Injection Technologies

EFI Harness Installation Manual

for Universal Applications

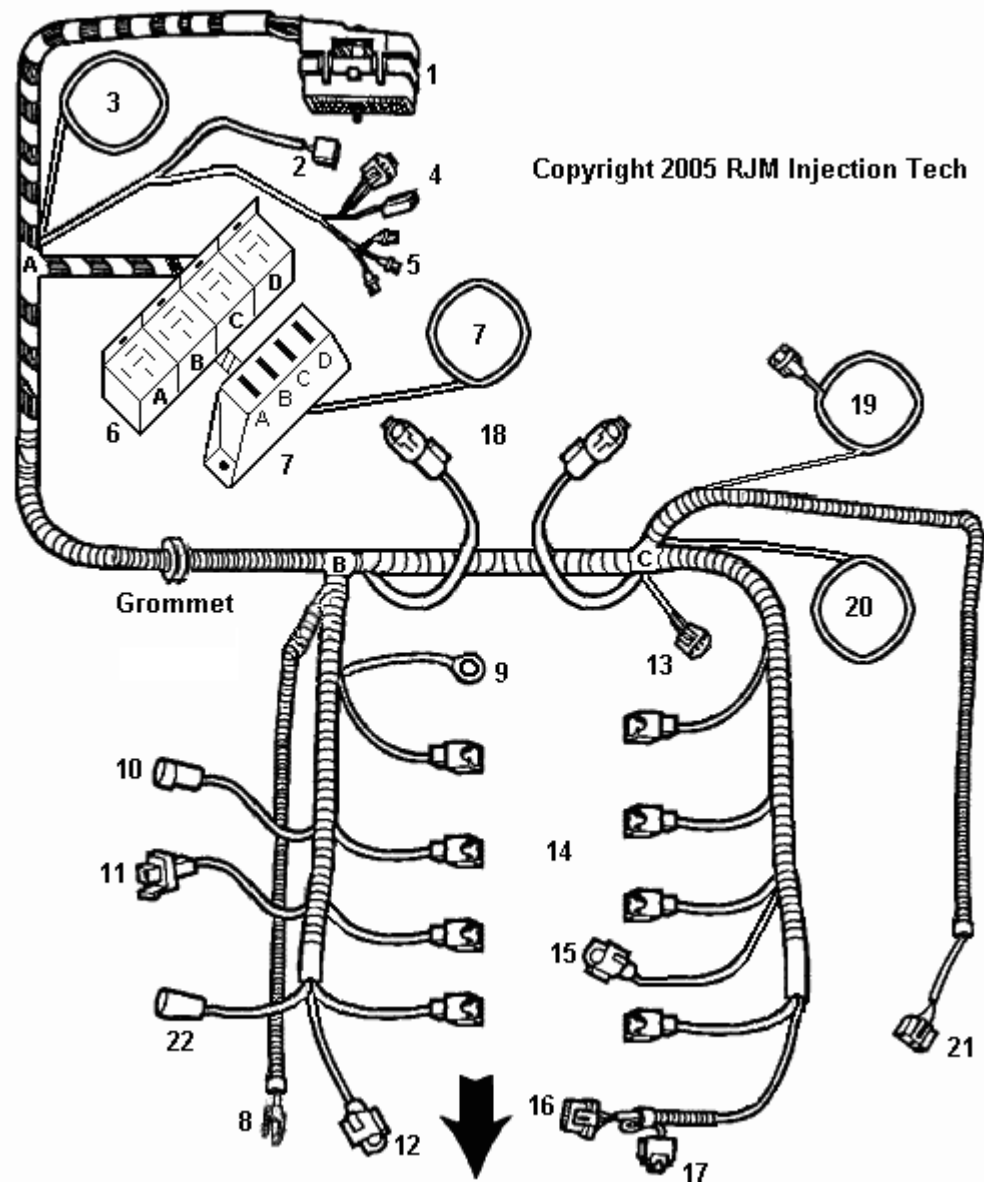


- Make sure that all the components you have are compatible before installing them. Intakes are fairly interchangeable, make sure the upper and lower intakes match, and the lower intake has a port for the Air Charge Temp sensor (ACT) sensor.
- The fuel rail will dictate which side the intake faces, make sure you have the correct one. This harness is set up for a passenger side facing intake when in stock form. Your harness may vary depending upon options selected.
- The distributor should be specific for your engine (5.0L / 5.8L) and have the TFI Ignition Module mounted onto the side.
- The harness is set up for a “High Output” firing order of 1-3-7-2-6-5-4-8 in its stock form. Your camshaft and computer should match this firing order.
- Ford EFI systems were not intended for use with long tube headers. The Oxygen Sensors will be less accurate due to dissipated exhaust heat further down stream from the cylinder head. However this harness will work with all exhaust systems.
- Always disconnect battery when working on vehicles fuel or electrical systems. Any electrical spikes can damage parts of the fuel injection system.
- Use extreme caution if and when welding on any vehicle with a fuel injection system.

Pre-Installation Instructions:

Install the lower intake, fuel injectors, and fuel rail on the engine if it is not already installed. Remove the upper intake if it is installed; install stock fuel pressure regulator and plumb fuel lines with appropriately rated line. Use caution when working on fuel system, 40-100PSI can be held within system. To release fuel pressure, remove fuse or relay to fuel pumps, then start engine and allow it to stall. Crank starter for several seconds to insure all pressure has been released.

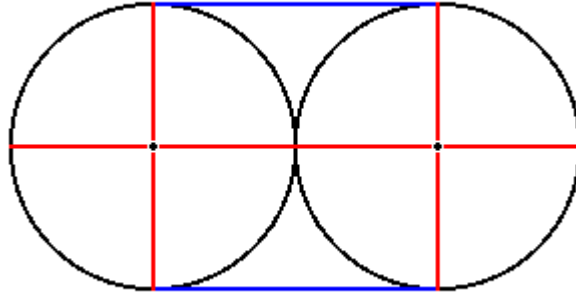
Before installation spread out the harness in a well lighted open area to identify all the connectors and become familiar with what will need to be done.



- | | | |
|---|--------------------------------|-------------------------------|
| 1) EEC Computer connector | 8) Mass Air sensor | 16) TFI Distributor connector |
| 2) Inertia Fuel Cutoff Switch | 9) Ground | 17) SPOUT Connector |
| 3) Ignition, Start, Tachometer & Check Engine Light connections | 10) Throttle Position sensor | 18) R & L Oxygen sensors |
| 4) Self-Test connectors | 11) Idle Air Bypass | 19) Vehicle Speed sensor |
| 5) Transmission ID Plugs | 12) Engine Coolant Temp Sensor | 20) Fuel Pump Connection |
| 6) Relay Block | 13) Barometric Pressure sensor | 21) Ignition Coil plug |
| 7) Fuse Block and Battery connection | 14) Injectors | 22) Alternator connection |
| | 15) Air Charge Temp sensor | |

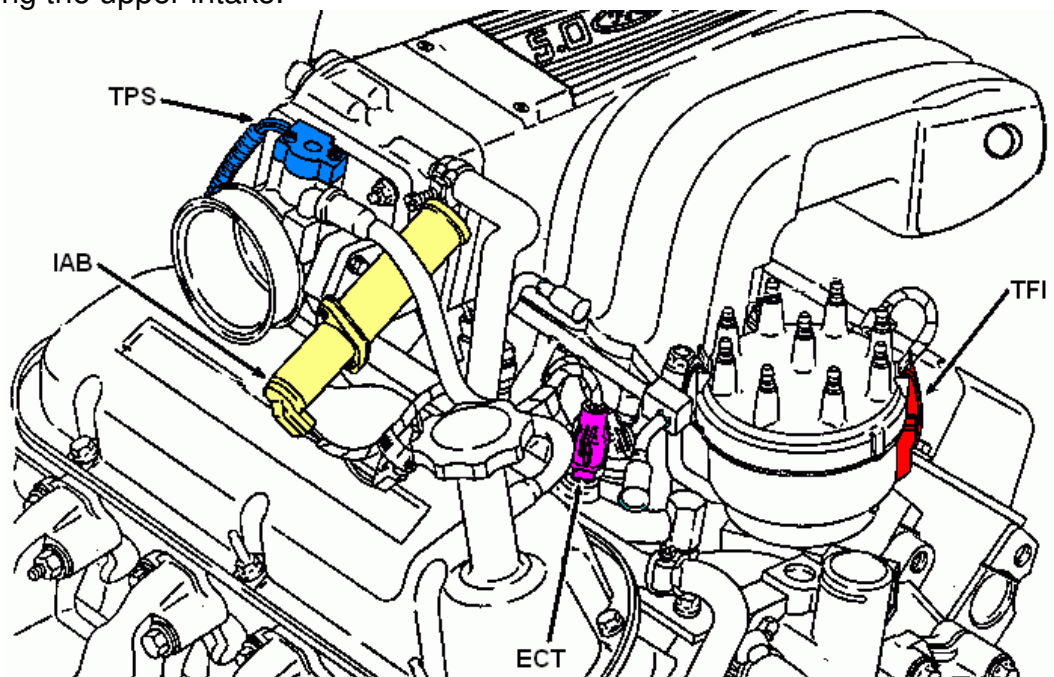
Installation Instructions:

- 1 Cut a 1.5" X 2.75" oval hole, using the template provided below. Use a 1.5" hole saw, and then connect the 2 round holes to make an oval. Mount the computer and feed the under dash section of the harness into place.



- 2 Pass the engine section of the harness through the firewall. Route as much of the harness as possible before mounting the computer or covering the harness. This insures a quality installation.
- 3 Remove the last bolt holding the lower intake down on the passenger side. Install #13 engine ground and torque the bolt back down to specifications. This is extremely important and should be the first connections made!
- 4 Install all eight fuel injector connectors starting with cylinder #1 and working your way around. Connecting the injectors now helps get the majority of the harness into position.
- 5 Connect #12 Engine Coolant Temp sensor and #15 Air Charge Temp sensor before moving away from the intake.
- 6 Mount the Barometric Pressure sensor to the firewall or inner fender and connect it to the harness #13.
- 7 Carefully route #21 Ignition Coil connector along firewall and fender to the coil. Keep Radio power wires and antenna cables away from Ignition Coil to prevent future distortion or interference.
- 8 Route #19 Vehicle Speed sensor, and #20 Fuel Pump power wires down to their locations under vehicle. Keep them away from hot exhaust moving parts like driveshaft.

- 9 Weld exhaust bungs into both sides of the exhaust approximately 9-12 inches from the last cylinder head exhaust port or 3" from the collector. Clean any debris from oxygen sensor ports and threads.
 - a) Use a small amount of anti-seize on the O2 sensors threads when installing. Use 8in long Oxygen sensors with shorty headers. Use 16.5in long Oxygen Sensors with long tube headers.
 - b) Connect #18, oxygen sensors to their connectors and attach any free harness to the firewall or frame to keep them from falling against the exhaust.
- 10 Install Vehicle Speed Sensor into the between transmission and speedometer cable. Then plug connector #19 to the Vehicle Speed Sensor.
- 11 #20 is a 14Ga pink wire marked "INERTIA → F-P" to power your fuel pump(s); you will need to splice this wire if you are using 2 fuel pumps that are not mounted together. Make sure the fuel pump(s) are well grounded.
- 12 Before you install the distributor make sure the engine is at TDC for cylinder one, and you have mounted the TFI to the side of the distributor. Drop the distributor so the rotor is aligned with the 1 molded into the cap. Make sure there is enough room to rotate the distributor in the block 1/8th turn. You will need to rotate it to set the base timing of 10° BTDC. Connect #16 to the TFI on the Distributor to the harness and make sure that #17 SPOUT connector is connected firmly. Only disconnect the SPOUT to check and set the base timing.
- 13 Install the upper intake plenum onto the lower intake, and install the throttle body to the upper intake. Now would also be a good time to finish the vacuum system. Connect #10 Throttle Position sensor and #11 Idle Air Bypass before leaving the upper intake.

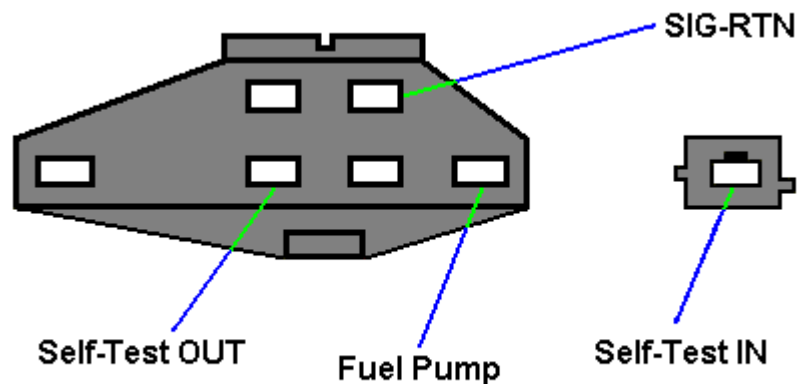


- 14** Install the Mass Air Flow sensor, air filter and air tubes. Connect the MAF to the harness #8.
- 15** After the engine connections are made, you can route the under dash section and mount the EEC Computer, Inertia Switch, Relay & Fuse blocks.
- 16** You must use an Inertia Switch to turn off the fuel pumps in the event of a crash. Under the dash is connector #2 for the Inertia Fuel Cutoff Switch. Mount the Inertia Switch completely upright and connect it to the harness. Mounting the switch any other way or bypassing this switch can cause risk of fire or loss of life. Before moving on, tap the switch until the red button springs up, and then reset it. This will get you familiar with how it works.
- 17** #3 is a group of 5 wires under the dash:

| Color | Marked | Purpose |
|--------------|---------------|---------------------------------------|
| Orange | KEYED RUN | Ignition Power Supply for EFI Harness |
| Purple | START | Start Signal for Computer |
| Green | TACH | Tachometer |
| Tan | MIL | Check Engine Light Negative from EEC |
| Red | MIL PWR | Check Engine Light Positive |

- a)** Connect the Orange wire marked “KEYED RUN” to the keyed ignition switch. This wire must have +12 volts with the key in RUN and START positions.
- b)** Connect the Purple wire marked “START” to the keyed ignition switch. This wire must have +12 volts only when the key is in the START position.
- c)** The Green wire marked “TACH” is for your tachometer. Consult your tachometers installation manual for further instructions.
Do not leave bare wires open under the dash if you don’t have a tachometer!
- d)** Connect the Tan and marked “MIL” and Red wire marked "MIL PWR" to the check engine light. It does not matter which wire is connected to which side of the light.
Do not leave bare wires open under the dash if you skip the check engine light!
- 18** Locate #5 the transmission identification terminals near the Self-Test connectors. You need to plug the male terminal into one of the female terminals, depending on which computer type you are using. The male plug is labeled “TRANS” and the female plugs are labeled “AUTO” & “MAN.” You need to identify your computer as an automatic or manual transmission computer by its sticker. If you are unsure of which computer you have your local Ford dealer should be able to help.
- a)** If your computer is for an automatic transmission; connect “TRANS” plug to the Black “AUTO” plug.
- b)** If your computer is for a manual transmission; connect “TRANS” plug to the Gray “MAN” plug.

- 18** Connector #1 is for the computer, make sure the computer pins are not bent or damaged. Then connect the harness with a 10mm socket. DO NOT use air or power tools to install this connector!
- 19** Next to the Fuse block is a large 10Ga Red power supply wire. Connect this wire to Battery positive or the starter solenoid. You do not need to add a fuse; the harness is 100% protected.
- 20** #22 supplies ignition power for your alternator. It is not meant to charge the vehicle, but to turn the alternator ON when you turn the key to RUN. Consult your alternator installation manual for further instructions.
- 21** If this is the first fuel injection installation on this vehicle run the fuel pump(s) for 30-60 seconds to prime the fuel system. To do this, ground the terminal on the end of the larger Self-Test connector.
- 22** Please take the time to run a Self-Test at #6 prior to starting the engine. This will clue you in to any connections you missed, and give you a base line to compare future tests against. To do this, ground the terminal in the single smaller Self-Test connector.



33, 81, 82, 84, 85, 44 & 94 are what's called "Soft Codes" which do not effect the engines fuel / spark programming. Soft Codes harmlessly stay dormant in the computer. They're only purpose is to help you repair those systems back to original factory specs. Soft Codes will not turn on the Check Engine Light.

There is a resistor pack already built into the harness for the EGR Valve Position Sensor. No other resistors are required.

Again, codes 33, 81, 82, 84, 85, 44 & 94 are normal when the smog solenoids CANP, EGR, TAB & TAD are deleted.

| | | |
|----|---|----------------------------|
| 11 | Self-Test passed | |
| 12 | RPM too high during Engine Running Self-Test. | Engine Running test failed |
| 13 | RPM too low during Engine Running Self-Test. | Engine Running test failed |
| 14 | Erratic PIP signal occurred, resulting in a possible engine miss or stall. | Hard Fault |
| 15 | Computers memory test failed. | Hard Fault |
| 16 | IDM signal not received. | Hard Fault |
| 17 | RPM too low before Engine Running Self-Test. | Engine Running test failed |
| 18 | IDM circuit failure or SPOUT connector open | Hard Fault |
| 19 | RPM too erratic for Engine Running Self-Test. | Engine Running test failed |
| 21 | ECT sensor out of self test range 0.3 to 3.7 volts. | Hard Fault |
| 22 | MAP/BP sensor out of self test range. | Hard Fault |
| 23 | Closed throttle TPS voltage higher or lower than expected. | Hard Fault |
| 24 | ACT sensor out of self test range 0.3 to 3.7 volts. | Hard Fault |
| 26 | MAF sensor was out of self test range. | Hard Fault |
| 29 | Insufficient input from vehicle speed sensor. | Soft Code |
| 31 | EVP circuit below minimum voltage of 0.24 volts. | Hard Fault |
| 32 | EVP circuit below minimum voltage of 0.24 volts. | Hard Fault |
| 33 | EGR valve inoperative. | Soft Code |
| 34 | EVP circuit above the closed limit of 0.67 volts. | Hard Fault |
| 35 | EVP circuit above the maximum limit of 4.81 volts. | Hard Fault |
| 41 | Right HEGO sensor circuit indicates system lean | Hard Fault |
| 42 | Right HEGO sensor circuit indicates system rich | Hard Fault |
| 43 | HEGO lean at Full Throttle. | Hard Fault |
| 44 | Right HEGO sensor circuit indicates Smog Pump inoperative. | Soft Code |
| 45 | Smog Pump inoperative. | Soft Code |
| 46 | Smog Pump inoperative during self-test. | Soft Code |
| 47 | Measured air flow too low during Engine Running Self-Test. | Engine Running test failed |
| 48 | Measured air flow too high during Engine Running Self-Test. | Engine Running test failed |
| 51 | ECT sensor has failed above 4.6 volts, 20 °F | Hard Fault |
| 53 | TPS circuit has failed above maximum 4.5 volts. | Hard Fault |
| 54 | ACT sensor has failed above 4.6 volts, 20 °F | Hard Fault |
| 56 | MAF circuit above maximum voltage of 4.5volts. | Hard Fault |
| 61 | ECT sensor has failed below 0.2 volts, 250 °F | Hard Fault |
| 63 | TPS circuit has failed below minimum 0.6 volts. | Hard Fault |
| 64 | ACT sensor has failed below 0.2 volts, 250 °F | Hard Fault |
| 66 | MAF sensor went below 0.4 volts during the last 80 drive cycles. | Hard Fault |
| 67 | Neutral safety circuit failure. | Soft Code |
| 72 | Insufficient MAF/MAP change during Dynamic Response Test (user error). | Engine Running test failed |
| 73 | TPS sensor did not exceed 25% rotation during Dynamic Response Test (user error). | Engine Running test failed |
| 77 | System failed to recognize brief WOT during Dynamic Response Test (user error). | Engine Running test failed |
| 81 | Smog Pump Solenoid 2 inoperative. | Soft Code |
| 82 | Smog Pump Solenoid 1 inoperative. | Soft Code |
| 84 | EGR Vacuum Solenoid inoperative. | Soft Code |
| 85 | Canister Purge Solenoid inoperative. | Soft Code |
| 87 | Fuel pump relay failure | Hard Fault |
| 91 | Left HEGO sensor circuit indicates system lean | Hard Fault |
| 92 | Left HEGO sensor circuit indicates system rich | Hard Fault |
| 94 | Left HEGO sensor circuit indicates Smog Pump inoperative. | Soft Code |
| 95 | The fuel pumps are disconnected | Hard Fault |
| 96 | The fuel pump relay did not send power to the fuel pumps | Hard Fault |
| 98 | Hard fault present. | Hard Fault |
| 99 | EEC system hasn't learned to control idle. | Hard Fault |

| 1993 Mustang 5.0L Compatible Parts | | Brand | Part # |
|---|-------------------------------------|-----------------|----------------|
| A9L equivalent computer (manual trans) | | Ford | F3ZF-12A650-DB |
| | | Standard | EM073 |
| | | Cardone | 78-4352 |
| A9P equivalent computer (auto trans) | | Ford | F3ZF-12A650-FB |
| | | Standard | EM680 |
| | | Cardone | 78-5611 |
| Mass Air Flow Sensor (stock 1988-93 55mm) | | Ford | E9ZF-12B579-AA |
| | | Standard | MF0872 |
| | | Cardone | 74-9502 |
| Idle Air Bypass (IAB) | | Ford | F0AE-9F715-BA |
| | | Ford Motorcraft | CX1824 |
| | | Standard | AC21 |
| Air Charge Temperature Sensor (ACT) | | Ford | F2DZ-12A697-A |
| | | Ford Motorcraft | DY674 |
| | | Standard | AX3 |
| Barometric Pressure sensor (BP) | | Ford Motorcraft | DY530 |
| | | Standard | AS13 |
| Engine Coolant Temperature sensor (ECT) | | Ford | F2AF-12A648-AA |
| | | Ford Motorcraft | DY681 |
| | | Standard | TX6 |
| Heated Oxygen Sensor (HEGO) 8" pigtail | | Ford | E9SF-9F472-AA |
| | | Ford Motorcraft | DY605 |
| | | Standard | SG23 |
| | | Bosch | 13942 |
| Heated Oxygen Sensor (HEGO) 16.5" pigtail | | Ford | E7TF-9F472-CA |
| | | Standard | SG40 |
| | | Bosch | 13953 |
| Throttle Position Sensor (TPS) | | Ford | E8ZF-9B989-AA |
| | | Standard | TH72 |
| Vehicle Speed Sensor (VSS) | | Standard | SC37 |
| Fuel Inertia Cutoff Switch | | Ford | XF3Z-9341-AA |
| Fuel Injector stock 19lb/hr (single) | | Ford | F1ZZ-9F593-C |
| | | Standard | FJ68 |
| Fuel Injector stock 19lb/hr (set of 8) | | Ford Racing | M-9593-C302 |
| Fuel Pressure Regulator | | Ford | F4CZ-9C968-A |
| | | Ford Motorcraft | CM4764 |
| | | Standard | PR15 |
| Distributor 5.0L Roller Cam | | Ford Racing | M-12127-C302 |
| | | Cardone | 302892 |
| Distributor 5.0L Standard Cam | | Cardone | 302880 |
| Distributor 5.8L Standard Cam | | Cardone | 302884 |
| Distributor 7.5L Standard Cam | | Cardone | 302886 |
| Distributor Steel Gear for Roller Cams | | Ford Racing | M-12390-F |
| Distributor Iron Gear for standard Cams | | Ford Racing | M-12390-D |
| Distributor Cap, Rotor, and Base Kit | | Ford Racing | M-12106-B302 |
| Cap | | Standard | FD168X |
| Cap Base | | Standard | FD166 |
| Rotor | | Standard | FD307X |
| Coil | | Standard | FD478 |
| Distributor Module (TFI) | ! Replace ! ! Together ! | Ford Motorcraft | DY425 |
| Distributor Stator (PIP) | | Ford Motorcraft | DU30C |