RON FRANCIS Wiring

# TELORVEK EFI
## *Ford Truck 7.5 Fuel Injection System*
# (ML-93A)
### With the E4OD or Manual Transmission

## WIRING INSTRUCTIONS

Thank you for purchasing the absolute finest of wiring kits for the Ford Motor Co. fuel injection engine. We have taken considerable time to work out the circuitry so that you, the customer will understand at least some of what this is all about. We ask that you follow our instructions closely. We recommend using a high pressure in tank fuel (45 PBS min.) pump. Custom installations are available from Tanks Inc. (phone #320-558-6882) and Rock Valley (phone #800-344-1934).

Should you eliminate a sensor, your injection system will not work at its peak and will probably be in some variation of back up mode. There are many factors that will help you get a trouble free start up that you must consider.

**NOTE!!**

**FORD diagnostic procedures are very detailed, lengthy and impossible to cover in this set of instructions. Purchasing the FORD ENGINE/ EMISSIONS DIAGNOSIS shop manual will help you learn about the engine you installed and guide you through the correct diagnostic procedures Ford recommends. This book is available through your local Ford dealer or Helm Inc. Helm is the distributor for the shop manuals for General Motors and Ford Motor Company. Helm can be contacted at 800-782-4356 or on their web site www.helminc.com**

**WARNING!**

**After the kit installation is complete and it is necessary to diagnose a starting or drive ability problem, follow the procedures recommended in the shop manual. All voltage tests must be preformed using a HIGH impedance, digital voltmeter. DO NOT use a test light on this system! DAMAGE WILL BE DONE to the engine computer if a test light is used on this system.**

**Ron Francis Wiring fuel injection wire harnesses are "ALL" designed to follow the electronic circuitry of the vehicle your engine was removed from! Following this simple procedure allows our fuel injection harness customers to have their vehicles diagnosed by "ANY" FORD dealer or reputable repair facility familiar with diagnosing fuel injection electronic systems.**

**Ron Francis Wiring does not re-engineer electronic circuitry that a vehicle manufacturer has spent millions of dollars on testing and designing. Our goal is to allow an "easy", "neat", "pain free" installation through quality installation instructions and a state of the art wiring kit.**

**If your vehicle experiences starting or runability problems, 99% of the time it is some sort of mechanical, NOT A WIRING PROBLEM. Fuel injection engines still run similar to carbureted engines, the difference being that the engine computer receives "inputs" from various sensors throughout the engine. The computer then uses this information to calibrate fuel delivery and engine timing.**

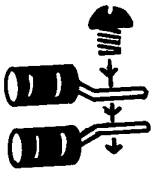
**Diagnosing a NO SPARK situation is the same on a computer controlled fuel injection engine as it is on a carbureted engine. Spark control, even though it may be done slightly different depending on engine year and make, is still essentially the same. A rotor is turned allowing spark to be provided to the plugs, the same as in a carbureted engine.**

**Thank you for purchasing our products!**

## STARTING INSTALLATION

Since there are so many individual circuits to complete, we recommend that you connect them in the order that we prescribe. Disconnect the battery before starting and do not reconnect until instructed.

There will be many connections to the TELORVEK panel so plan the location of the panel in an area with room to work. We suggest mounting the panel in an assessable location, in the trunk, under the seat or under the dash are good. In order to allow for the proper spacing between the computer and the Telorvek panel, plug the connector into the computer (ECM) and mount the panel and computer. **For safety, disconnect the ECM connector until finished the installation.** A poor installation will result in a poor running car. **The number referred to from this point on will be the location on one of the terminal blocks located on the TELORVEK panel.**



Always put the first terminal under a screw with the fat wire side down as in the drawing. Install any second terminals just the opposite as this will allow the screw to hold squarely and tight. The insulation from one terminal should not interfere with the one next to it.

Use a crimping tool that is designed for insulated terminals. If the tool punctures the insulation (plastic) or damages it in any way, you are using the wrong tool. The proper tool will only "flatten" the plastic and if the handles are squeezed completely, the proper crimp has been made. Get in the habit of test pulling at each terminal as you crimp it to the wire.

After all wires are connected to the engine, wire tie them together or use 3/4 inch Zip loom to protect them. This can be done before any connections are made to the panel. Since all wires are marked, running the entire group to the panel at one time is fine. Some terminals on the panel may not be used!

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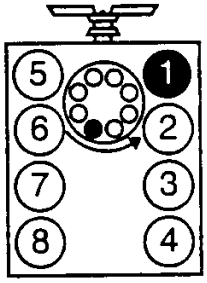
**Important!** We have supplied three sizes of terminals for your use on the panels itself. The Yellow is used on the 10-12 gauge wire, Blue is used on 14-16 gauge wire and Red is used for the bulk of the smaller wires. Each individual bag instructions will be marked as to when to use the yellow or blue, terminals, all other wires will use the red terminals.

**☞ NOTE ☜**

**You will be moving around to different terminals on the TELORVEK panel to make connections. For this reason extra care is needed when making all connections to the panel.**

**Bag #20. INJECTORS:** The injector wiring is made up in a harness with two branches, one branch for the left side (drivers side) injectors and one for the right side injectors. Locate the right side injector connectors (injectors 1 thru 4) and lay them out on the manifold. Now lay the left side injector (5 thru 8) connectors out on the manifold. Note the printing on the wires running from the injector connectors and follow the diagram below making sure the correct connectors are plugged onto the correct injectors: red & tan to INJ 1, red & white to INJ 2, red & white to INJ 3, red & tan to INJ 4, red & tan to INJ 5, red & white to INJ 6, red & white to INJ 7 and red and tan to INJ 8.

Now run the long reds, tan and white wires back to the panel. Connect the reds INJ 1->7 and INJ 6->7 to **#7**, tan INJ 1->13 to **#13** and white
INJ 6->14 to **#14**.




5.8L and 5.0 HO
1-3-7-2-6-5-4-8

**Bag #21. IGNITION COIL:** The ignition coil is mounted on the left side of the engine above the valve cover. Plug in the connector and run the wires back to the Telorvek panel. Using blue terminals connect the Red wire (IGN COIL->10) to **#10** and using red terminals connect the Purple wire (IGN COIL->12) to **#12**. The other purple wire in this bag is for the TACH connection if desired. Plug the wire into the short purple wire running from the ignition coil connector and run it to the tach.

**Bag #22. COOLANT TEMPERATURE SENSOR:** After attaching the plug to the sensor located on the top front of the motor next to the distributor run the two wires to the panel. Connect them using the red terminals, Lt Green wire (ECT->15) to **#15** and the Gray wire (ECT->104) to **#104**.

**Bag #23. INTAKE AIR TEMPERATURE SENSOR (IAT):** Plug the connector onto the IAT sensor located behind the distributor and run the wires to the Telorvek Panel. Using the red terminals connect the Yellow wire (IAT->16) to **#16** and the Gray wire (IAT->104) to **#104**.

**Bag #24. IDLE SPEED CONTROL:** The ISC is located below the throttle body. Plug in the connector and run the wires back to the panel. Using the red terminals, connect the White wire (ISC->17) to **#17** and the Red wire (IAC->8) to **#8**.

**Bag #25A. THROTTLE POSITION SENSOR (TPS):** Plug the connector into the sensor located in the throttle body and run the wires back to the panel. Using the red terminals run the Brown (TPS->36) to **#36**, White (TPS->38) to **#38** and Gray (TPS->106) to **#106**.

**Bag #26. EXHAUST GAS RECIRCULATION VALVE POSITION SENSOR (EGRVP):** Plug the connector onto the EGRVP located on the rear of the engine on the left side of the throttle body. Using red terminals run the Lt Green wire (EGRVP->39) to **#39**, Brown wire (EGRVP->36) to **#36** and the Gray (EGRVP->106) to **#106**.

**Bag #27. IGNITION CONTROL MODULE CONNECTION:** The ICM requires some of the wires to be shielded from any electrical interference, that is why three of the wires (Pink, Gray, Solid Strand) in the connector are wrapped.

Carefully uncoil the harness and plug it into the ICM then run all the wires to the Telorvek panel. Remove the tape and shielding material back only as far as it is necessary for the length of the wire to be cut and allowing enough wire to make the connections on the panel. In the shielded harness there is a solid strand wire with no insulation, install a blue terminal on it and connect it to **#25**. After the connection is made wrap the exposed wire from the shielded harness to **#25** with electrical tape. Using red terminals the other two wires in the shielded harness are connected as follows, Pink (ICM->19) to **#19** and Gray (ICM->20) to **#20**. Connect the four remaining wires running from the ICM connector as follows: Purple (ICM->12) to **#12**, Red (ICM->10) to **#10**, Black (ICM->25) to **#25** and Purple (ICM->18) to **#18**.

An engine crank signal must be provided to the ICM and ECM. Connect the purple wire (18->STARTER) to **#18** on the Telorvek panel and run it to the starter relay. Connect this wire to the (S) post (the wire that engages the relay when the key is turned to crank) on the starter relay.

**SHORTING/SPOUT CIRCUIT:** The SPOUT circuit is the PINK wire that runs from the Ignition Control Module to #19 on the panel. This wire must be disconnected from the panel in order to set the base engine timing. Reconnect it after your timing is set. This procedure may cause a trouble code to set and the check engine light to come on. To clear the trouble code disconnect the battery for 5 minutes.

**Bag #28 DISTRIBUTOR:** The distributor wiring requires the wires to be shielded from any electrical interference, that is why the Orange, Gray and Solid Strand in the connector are wrapped.

Carefully uncoil the harness and plug it into the distributor then run all the wires to the Telorvek panel. Remove the tape and shielding material back only as far as it is necessary for the length of the wire to be cut and allowing enough wire to make the connections on the panel. In the shielded harness there is a solid strand wire with no insulation, install a blue terminal on it and connect it to **#26**. After the connection is made wrap the exposed wire from the shielded harness to **#26** with electrical tape. Using red terminals are connect the remaining wires in the shielded harness as follows, Orange (DIST->21) to **#21** and Gray (DIST->20) to **#20**. Now connect the Black wire (DIST->25 to **#25** and the Red wire (DIST->9) to **#9**.

**Bag #29. OXYGEN SENSOR:** This area of the vehicle is hot so keep the wires away from the exhaust. **Install the sensor as close to the block as possible.** Plug in the connector into the O2 sensor and run the wires to the Telorvek panel. Using the blue terminals connect the Red wire (02 SENSOR->11) to **#11**. Connect the Black wire (O2 SENSOR->28 to **#28.** Now using the red terminals connect the Lt Blue (O2 SENSOR->22) to **#22** and Gray wire (O2 SENSOR->105) to **#105**.

**Bag #30 MANIFOLD ABSOLUTE PRESSURE SENSOR (MAP):** Mount the MAP sensor in the engine compartment. Plug in the connector and run the wires back to the panel. Connect the Brown wire (MAP->37) to **#37**, Black (MAP->40) to **#40** and Gray (MAP->105) to #105.

**Bag #31.V.I.P. SELF TEST:** Mount both connectors inside the vehicle under the dash and run the wires to the Telorvek Panel. Using the red terminals connect the Tan (VIP 1->42) to **#42**, Gray (VIP 1->107) to **#107**, Pink (VIP 1->43) to **#43**, Lt Green (VIP 1->44) to **#44**, Lt Blue (VIP 1->41) to **#41** and the White (VIP 2->45) to **#45**.

The remaining Lt Green & Red wires are for the dash mounted service engine soon (S.E.S) light. The light must be a two wire un-grounded light. Connect the Lt Green wire (44->SES LT) to **#44** on the Telorvek Panel and run it to a dash indicator light and connect it to one of the wires running from the light. The red wire (65->SES LT) connects to **#65** on the panel and run to the other wire running from the light. This light is not required as the yellow light on top of the Telorvek Panel has the same function.

## E4OD Automatic Transmission Wiring

**NOTE!!**

**If you have decided to run a manual or another type transmission wiring bags #32, #33 and #35 will not be used. The wiring for the vehicle speed sensor (bag #34) will be used.**

**Bag #32 E4OD TRANSMISSION CONNECTIONS:** The E4OD transmission is a electronically controlled four speed automatic transmission. Plug the connector into the transmission and run the wires to the Telorvek panel. Using the red terminals, connect the Orange wire (TRANS 7->70) to **#70**, Yellow (TRANS 4->73) to **#73**, Brown (TRANS 5->71) to **#71**, Gray (TRANS 8->108) to **#108**, Orange (TRANS 3->74 to **#74**, Pink (TRANS 2->72) to **#72** and the White (TRANS 11->75 to **#75** . Using blue terminals, connect the Red (TRANS 1->67) and the Red (TRANS 12->67) to **#67**.

The Purple wire (77->BRK SW) connects to **#77** and runs to the cold side of the brake light switch. This wire should only have 12 volts with the brake pedal depressed.

**Bag #33 TRANSMISSION CONTROL SWITCH (TCS) & TRANSMISSION CONTROL INDICATOR LIGHT (TCIL):** The ECM has the capability to lock-out fourth gear of the transmission with a push of a button. Pushing the momentary contact TCS button will light and blink the TCIL and lock-out fourth gear in the transmission for city driving. Pushing the button again will turn the TCIL off and release the lock-out allowing the transmission to shift into fourth gear for highway driving.

Mount a momentary contact switch in dash or near the shifter lever. Connect the Red wire (66->TCS) to **#66** and the Tan wire (79->TCS) to **#79** and run both wires to the TCS switch. You may connect the wires to either terminal on the switch.

The TCIL light must be a two wire un-grounded light. Mount the light in the dash where it is visible while driving. Connect the White wire (78->TCIL) to **#78** and the Red wire (66->TCIL) to **#66** and run both wires to the TCIL light and make the connections.

**Bag #34.VEHICLE SPEED SENSOR:** On a stock vehicle application the rear anti-lock brake sensor sends a signal to the programmable speedometer/odometer module (PSOM). The module then converts this signal into a standard 8000 pulses per mile (8 pulses per revolution) signal all Ford ECM'S accept. In order for the transmission to function properly this signal must be provided to the ECM.

Speedometer cable driven eight pulse generators are available, however will have to be adapted to your speedometer cable. This service can be preformed at your local speedometer shop.

After mounting the generator connect the (VSS HIGH->80) to **#80** and run it to the signal output wire from the generator. Connect the (VSS LOW->28) wire to **#28** and run it to the VSS low output wire from the generator. Some aftermarket generators require an ignition feed to the unit. If so connect the red wire (VSS IGN->8) to **#8** and run it to the ignition input of the unit.

Electronic speedometers can be connected to terminal **#80** to pick up the VSS signal. This is a standard Ford 8000 pulse per mile signal.

**Bag #35 MANUAL LEVER POSITION SWITCH (MLPS) :** The manual lever position switch is located on the left hand side of the transmission. The MLPS controls neutral safety, back-up and lever position functions. We have included wires in the MLPS connector to allow you to get full use out of the switch. Connect the circuits in the switch as follows:

**NEUTRAL / SAFETY:** The heavier gauge Lt Blue (IGNITION SW->) and the Purple (START SOL->) wires are for the neutral safety circuit. Locate the wire that runs from the ignition switch to the starter solenoid. Cut the wire and connect the Lt Blue wire (IGNITION SW->) to the wire running from the ignition switch and the Purple wire (START SOL->) to the wire running from the starter solenoid. **NOTE:** If you are wiring this circuit to one of our Component Panel wiring kits, these wires will be a color for color match.

**BACK-UP LIGHTS:** Connect the Dk Green wire (BACK UP LT FEED) to a 12 volt ignition source. This wire should have 12 volts only with the key in the run position. Run the other Dk Green wire (TO BACK UP LTS) to the rear of the vehicle and connect it to both back-up lights. The lights must be grounded.

**LEVER POSITION CIRCUIT:** Run the Yellow and Gray wires to the Telorvek panel. Using the red terminals, connect the Yellow wire (MLPS->76) to **#76** and the Gray wire (MLPS->107) to **#107**.

**Bag #36 FUEL PUMP, INERTIA SWITCH & FUEL PUMP RELAY:** We have included the wiring necessary for the Ford inertia switch. The inertia switch cuts off the electric fuel pump in the advent of an accident. Mount the inertia switch in the rear of the vehicle in a dry area. Using the blue terminals, plug in the connector to the inertia switch and run the Tan wire (INERTIA SW->81) to **#81** on the Telorvek panel. Run the other Tan wire (INERTIA SW->PUMP) to the electric fuel pump. Hook the wire to the positive terminal on the pump. From the negative terminal on the pump connect a wire and run it to a good ground.

**NOTE:** The inertia switch has a red button on top of it that must be set (pushed down) in order for the fuel pump to operate. If the pump fails to operate check the inertia switch making sure the red button is in the down position.

**FUEL PUMP RELAY:** Mount the relay within "30" inches of the Telorvek panel. Connect the Yellow wire (FP RELAY->68) to **#68**, Tan (FP RELAY->81) to **#81**, Red (FP RELAY->64) to **#64** and Lt Blue (FP RELAY->41) to **#41**.

For fuel pump relay use Ford part number F8PZ-14N135-AA or Motorcraft DY-864.

**Bag #37 EGR SOLENOID (EGR), AIR DIVERT & AIR BYPASS SOLENOIDS, CANISTER PURGE SOLENOID:**

**EGR:** Plug the connector into the EGR solenoid. Using the red terminals run the Red wire (EGR SOL->6) to **#6** and the Brown wire (EGR SOL->46) to **#46**.

**AIR DIVERT & AIR BYPASS SOLENOIDS:** Controlled by the ECM, these solenoids control the fresh air flow into the exhaust reducing the hydrocarbon and carbon monoxide content of the exhaust.

**BYPASS SOLENOID:** Plug the connector into the bypass solenoid and run the wires to the panel. Using the red terminals connect the Red wire (BYPASS SOL->5) to **#5** and the White wire (BYPASS SOL->48) to **#48**.

**AIR DIVERT SOLENOID:** Plug the connector into the air divert solenoid and run the wires to the panel. Using the red terminals connect the Red wire (DIVERT SOL->6) to **#6** and the Brown wire (DIVERT SOL->47) to **#47**.

**CANISTER PURGE SOLENOID:** Plug the connector into the Canister Purge Solenoid. Using red terminals connect the Red wire (CAN PURGE->5) to **#5** and the Gray wire (CAN PURGE->49) to **#49** using a red terminal.

## FINISHING UP

Connect the large pre-wired **orange** wire to the ignition circuit of your ignition switch. This is an ignition feed that is controlled by the ignition switch. This is not an accessory feed and must remain hot even when the engine is cranking.

Connect the large pre-wired **red** battery feed wire to a battery feed. This is a battery feed that must remain hot even with the key off. Make sure this is a good connection. If you have a Master Disconnect switch, install this wire on the battery side of the switch so it will remain hot with the Disconnect off.

The **black** ground wire from the TELORVEK Panel runs direct to the battery. Run the battery ground directly to the engine not the frame first.This includes rear mounted batteries.

## STARTING THE ENGINE

You have now made all of the connections necessary to TRY to start your car. If you try now, you will be disappointed since you did not hook up the battery. You can do so now.

### Priming the Fuel System

The fuel system can be primed by grounding the fuel pump lead in the V.I.P Self Test Connector. This lead is a Lt Blue wire (VIP 1->41) located in the large V.I.P Test connector on the short end of the connector. With the key off, run a jumper wire from the connector to ground. Turn the key on and carefully bleed off any air pressure at the schrader valve until fuel runs out. **CARE SHOULD BE TAKEN TO AVOID ANY SPILLAGE WHILE FOLLOWING THIS PROCEDURE.** After making sure all the air is out of the lines, turn the key off and remove the jumper wire.

### Initial Timing Procedure

(1) Transmission in Park.
(2) Connect an inductive timing light.
(3) Disconnect the PINK wire connected to panel number 19. Do not let it touch anything.
(4) With the engine running check/adjust timing.
(5) Shut the engine off, reconnect the PINK wire to panel number 19 and check for timing advance to verify distributor is advancing beyond the initial setting.

## We're trying...

Ron Francis Wiring has made every effort to assure a quality product and can assure you that this system works well in your application. Most of the 'problem' calls we have had to date are basic trouble shooting questions which have nothing to do with the TELORVEK system we sold you.

We are committed to offering the most user friendly wiring systems available and support this with many years experience in the wiring and fuel injection fields. Please be certain that all connections are correct and tests run before calling. Your unit can be tested at any Ford Motor Company Dealership with no difficulty.

## USING THE CHECK ENGINE LIGHT

The check engine light performs just the same as it would in any newer car, when the key is turned on (engine not running) the light will stay on until the engine starts. When the check engine light comes on during engine operation, it is an indication of a fault in the system. It will be necessary to have the computer perform a self test diagnostic procedure. The self test is divided into three specialized tests:

**KEY ON ENGINE OFF SELF TEST (KOEO) :** For this test the fault must be present at the time of testing. For intermittent , refer to continuous memory codes.

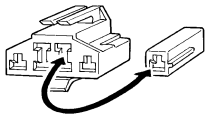
**ENGINE RUNNING ("R") SELF TEST:** The sensors are checked under operating conditions and at normal operating temperatures.

**CONTINUOUS ("C") MEMORY CODES:** These codes are issued as a result of information stored while the vehicle was in normal operation.

**READING THE CHECK ENGINE LIGHT:** A service code is reported by a flash of the check engine light. All service codes are three digit numbers, such as 112. The light will display one flash, then, after a two second pause, the light will flash twelve times. All self test codes (if any) will be displayed and then a delay of six seconds, a single half second separator flash and another six second delay and then the continuous memory codes will be flashed.

If the light remains on after the engine is running then follow the procedures below to have the check engine light flash trouble codes.

Locate the V.I.P self test connectors and connect a jumper wire between the gray wire (VIP 1->107) located in the large VIP connector and the white wire (VIP 2->45) located in the single connector as shown in the drawing below.



### Trouble Code Chart

| ECM CODE | CONDITIONS<br>KEY:<br>O= Key On Engine Off<br>R= Engine Running<br>C= Continuous Memory | | | Definition |
|---|---|---|---|---|
| 111 | O | R | C | System Pass |
| 112 | O | | C | Intake Air Temp sensor circuit below minimum voltage |
| 113 | O | | C | Intake Air Temp sensor circuit above maximum voltage |
| 114 | O | R | | Intake Air Temp higher or lower than expected |
| 116 | O | R | | Engine Coolant temp higher or lower than expected |
| 117 | O | | C | Engine Coolant temp sensor circuit below minimum voltage |
| 118 | O | | C | Engine Coolant temp sensor circuit above maximum voltage |

| ECM CODE | CONDITIONS<br>KEY:<br>O= Key On Engine Off<br>R= Engine Running<br>C= Continuous Memory | | | Definition |
|---|---|---|---|---|
| 121 | O | R | C | Closed throttle voltage higher or lower than expected<br>Indicates throttle position voltage inconsistent with the MAF sensor |
| 122 | O | | C | Throttle position sensor circuit below minimum voltage |
| 123 | O | | C | Throttle position sensor circuit above maximum voltage |
| 124 | | | C | Throttle position sensor voltage higher than expected |
| 125 | | | C | Throttle position sensor voltage lower than expected |
| 126 | O | R | C | MAP / BARO sensor higher or lower than expected |
| 128 | | R | | MAP sensor vacuum hose damaged or disconnected |
| 129 | | R | | Insufficient MAP / Mass Air Flow change during dynamic response test |
| 136 | | R | | Lack of heated oxygen sensor switch during KOER, indicates lean (Bank #2) |
| 137 | | R | | Lack of heated oxygen sensor switch during KOER, indicates rich (Bank #2) |
| 139 | | | C | No heated oxygen sensor switches detected (Bank #2) |
| 144 | | | C | No heated oxygen sensor switches detected (Bank #1) |
| 157 | | | C | Mass Air Flow sensor circuit below minimum voltage |
| 158 | O | | C | Mass Air Flow sensor circuit above maximum voltage |
| 159 | O | R | | Mass Air Flow higher or lower than expected |
| 167 | | R | | Insufficient throttle position change during dynamic response test |
| 171 | | | C | Fuel system at adaptive limits, heated O2 sensor unable to switch (Bank #1) |
| 172 | | R | C | Lack of heated O2 switches, indicates lean (Bank #1) |
| 173 | | R | C | Lack of heated O2 switches, indicates rich (Bank #1) |
| 175 | | | C | Fuel system at adaptive limits, heated O2 sensor unable to switch (Bank #2) |
| 176 | | | C | Lack of heated O2 switches, indicates lean (Bank #2) |
| 177 | | | C | Lack of heated O2 switches, indicates rich (Bank #2) |
| 179 | | | C | Fuel system at lean adaptive limit at part throttle, system rich (Bank #1) |
| 181 | | | C | Fuel system at lean adaptive limit at part throttle, system lean (Bank #1) |
| 184 | | | C | Mass Air Flow higher than expected |
| 185 | | | C | Mass Air Flow lower than expected |
| 186 | | | C | Injector pulsewidth higher than expected |

| ECM CODE | CONDITIONS KEY: O= Key On Engine Off R= Engine Running C= Continuous Memory | | | Definition |
|---|---|---|---|---|
| 187 | | | C | Injector pulsewidth lower than expected |
| 188 | | | C | Fuel system at lean adaptive limit at part throttle, system rich (Bank #2) |
| 189 | | | C | Fuel system at rich adaptive limit at part throttle, system lean (Bank #2) |
| 193 | | | C | Flexible fuel sensor circuit failure |
| 211 | | | C | Profile ignition pick up circuit failure |
| 212 | | | C | Loss off ignition diagnostic monitor input to PCM/Spout circuit grounded |
| 213 | | R | | Spout circuit open |
| 214 | | | C | Cylinder identification circuit failure |
| 215 | | | C | PCM detected coil #1 primary circuit failure |
| 216 | | | C | PCM detected coil #2 primary circuit failure |
| 217 | | | C | PCM detected coil #3 primary circuit failure |
| 218 | | | C | Loss of ignition diagnostic monitor signal left side |
| 219 | | | C | Spark timing defaulted to 10 degrees - Spout circuit open |
| 221 | | | C | Spark timing error |
| 222 | | | C | Loss of ignition diagnostic monitor signal right side |
| 223 | | | C | Loss of dual plug inhibit control |
| 224 | | | C | PCM detected coil 1,2,3 or 4 primary circuit failure |
| 225 | | R | | Knock not sensed during dynamic response test |
| 226 | O | | | Ignition diagnostic module signal not received |
| 232 | | | C | PCM detected coil 1,2,3 or 4 primary circuit failure |
| 238 | | | C | PCM detected coil 4 primary circuit failure |
| 241 | | | C | ICM to PCM pulse width transmission error |
| 244 | | | C | CID circuit fault present when cylinder balance test requested |
| 311 | | R | | Air system inoperative (Bank #1) |
| 312 | | R | | Air system misdirected |
| 313 | | R | | Air system not bypassed |
| 314 | | R | | Air system inoperative (Bank #2) |
| 326 | | R | C | EGR circuit voltage lower than expected |
| 327 | O | R | C | EGR circuit below minimum voltage |
| 328 | O | R | C | EGR closed valve voltage lower than expected |

| ECM CODE | CONDITIONS KEY: O= Key On Engine Off R= Engine Running C= Continuous Memory | | | Definition |
|---|---|---|---|---|
| 332 | | R | C | Insufficient EGR flow detected |
| 334 | O | R | C | EGR closed valve voltage higher than expected |
| 335 | O | | | EGR sensor voltage higher or lower than expected |
| 336 | | R | C | Exhaust pressure high / EGR circuit voltage higher than expected |
| 337 | O | R | C | EGR circuit above maximum voltage |
| 338 | | | C | Engine coolant temperature lower than expected (thermostat test) |
| 339 | | | C | Engine coolant temperature higher than expected (thermostat test) |
| 341 | O | | | Octane adjust service pin open |
| 411 | | R | | Cannot control RPM during KOER low RPM check |
| 412 | | R | | Cannot control RPM during KOER high RPM check |
| 415 | O | R | | Idle air control system at maximum adaptive lower limit |
| 416 | O | R | | Idle air control system at upper adaptive learning limit |
| 452 | | | C | Insufficient input from vehicle speed sensor |
| 511 | O | | | PCM read only memory test failure |
| 512 | | | C | PCM keep alive memory test failure |
| 513 | | | C | PCM internal voltage failure |
| 519 | O | | | Power steering pressure switch circuit open |
| 521 | | | C | Power steering pressure switch circuit did not change states during KOER |
| 522 | O | | | Vehicle not in park or neutral during KOEO test |
| 524 | O | | C | Low speed fuel pump circuit open (battery to PCM) |
| 525 | O | | | Vehicle was either in gear or A/C was on during self test |
| 527 | O | | | Park / neutral position switch circuit open or A/C on during self test |
| 529 | | | C | Data communication link or PCM circuit failure |
| 532 | | | C | Cluster control assembly circuit failure |
| 533 | | | C | Data communication link or electronic instrument cluster circuit failure |
| 536 | | R | C | Brake on / off circuit failure / not actuated during KOER test |
| 538 | | R | | Insufficient RPM change during KOER dynamic response test |
| 539 | O | | | A/C on during self test |

| ECM CODE | CONDITIONS KEY: O= Key On Engine Off R= Engine Running C= Continuous Memory | | | Definition |
|---|---|---|---|---|
| 542 | O | | C | Fuel pump secondary circuit failure |
| 543 | O | | C | Fuel pump secondary circuit failure |
| 551 | O | | | Idle air control circuit failure |
| 552 | O | | | Secondary air injection bypass circuit failure |
| 553 | O | | | Secondary air injection diverter circuit failure |
| 554 | O | | | Fuel pressure regulator control circuit failure |
| 556 | O | | C | Fuel pump relay primary circuit failure |
| 557 | O | | C | Low speed fuel pump primary circuit failure |
| 558 | O | | | EGR vacuum regulator circuit failure |
| 559 | O | | | A/C on relay circuit failure |
| 563 | O | | | High speed fan control circuit failure |
| 564 | O | | | Fan control circuit failure |
| 565 | O | | | Canister Purge circuit failure |
| 566 | O | | | 3-4 shift solenoid circuit failure |
| 578 | O | R | | A/C pressure sensor circuit shorted (VCRM) |
| 579 | O | R | | Insufficient A/C pressure change (VCRM) |
| 581 | O | R | | Power to fan circuit over current (VCRM) |
| 582 | O | R | | Fan circuit open (VCRM) |
| 583 | O | R | | Power to fuel pump over current (VCRM) |
| 584 | O | R | | Power ground circuit open (pin #1) (VCRM) |
| 585 | O | R | | Power to A/C clutch over current (VCRM) |
| 586 | O | R | | A/C clutch circuit open (VCRM) |
| 587 | O | R | C | Variable control relay module communication failure |
| 617 | | | C | 1-2 shift error |
| 618 | | | C | 2-3 shift error |
| 619 | | | C | 3-4 shift error |
| 621 | O | | | Shift solenoid 1 circuit failure |
| 622 | O | | | Shift solenoid 2 circuit failure |
| 624 | O | | C | Electronic pressure control circuit failure |
| 625 | O | | | Electronic pressure control driver open in PCM |
| 626 | O | | | Coast clutch solenoid circuit failure |
| 627 | O | | C | Torque converter clutch solenoid circuit failure |
| 628 | O | | C | Excessive converter clutch slippage |

| ECM CODE | CONDITIONS KEY: O= Key On Engine Off R= Engine Running C= Continuous Memory | | | Definition |
|---|---|---|---|---|
| 629 | O | | | Torque converter clutch solenoid circuit failure |
| 631 | O | | | Transmission control indicator lamp circuit failure |
| 632 | | R | | Transmission control switch circuit did not change states during KOER test |
| 634 | | | C | Manual lever position switch voltage higher or lower than expected |
| 636 | O | R | | Transmission oil temp higher or lower than expected |
| 637 | O | | C | Transmission oil temp sensor circuit above maximum voltage (-40 F indicated circuit open) |
| 638 | O | | C | Transmission oil temp sensor circuit below minimum voltage (-290 F indicated circuit shorted) |
| 639 | | R | C | Insufficient input from transmission speed sensor |
| 641 | O | | | Shift solenoid 3 circuit failure |
| 643 | O | | C | Torque converter clutch circuit failure |
| 645 | | | C | Incorrect gear ratio obtained for first gear |
| 646 | | | C | Incorrect gear ratio obtained for second gear |
| 647 | | | C | Incorrect gear ratio obtained for third gear |
| 648 | | | C | Incorrect gear ratio obtained for fourth gear |
| 649 | | | C | Electronic pressure control higher or lower than expected |
| 651 | | | C | Electronic pressure control circuit failure |
| 652 | O | | | Torque converter clutch solenoid circuit failure |
| 654 | O | | | Manual lever position sensor not indicating park |
| 656 | | | C | Torque converter clutch continuous slip error |
| 657 | | | C | Transmission over temperature condition occurred |
| 998 | | | C | Hard fault present (FMEM mode) |
| | | | | |

# Breakout Box Circuit Diagnosis

The Telorvek panel can be used as a BREAKOUT BOX for testing circuits running to and from the EEC Processor. Listed below is the Ford circuit number, circuit description, E.E.C processor pin number, Telorvek panel number the circuit runs to, Ford wire color and the color of wire we used. Following the diagnostic procedures that can be found in the ENGINE / EMISSIONS DIAGNOSIS SHOP MANUAL that can be purchased at your local Ford dealer all trouble codes can be diagnosed.

| Circuit | Description | EEC pin# | Panel # | Ford Color | TDZ Color |
|---|---|---|---|---|---|
| 361 | Ign, Air By-Pass/Canister Purge Sol | | 5 | Red | Red |
| 361 | Ign, EGR Sol/Air Divert Sol | | 6 | Red | Red |
| 361 | Ign, Injectors | | 7 | Red | Red |
| 361 | Ign, ISC | 37,57 | 8 | Red | Red |
| 16 | Ign, Distributor | | 9 | Red | Red |
| 361 | Ign, Positive Coil,ICM | | 10 | Red | Red |
| 687 | Ign, O2 Sensor | | 11 | Gray/Yellow | Orange |
| 11 | ICM, NEG Coil | | 12 | Tan/Yellow | Purple |
| 555 | Inj #1, #4, #5, #8 | 58 | 13 | Tan | Tan |
| 556 | Inj #2, #3, #6, #7 | 59 | 14 | White | White |
| 354 | ECT | 7 | 15 | Lt Green/Red | Lt Green |
| 743 | IAT | 25 | 16 | Gray/Yellow | Yellow |
| 264 | ISC | 21 | 17 | White/Lt Blue | White |
| 32 | ICM, Starter Relay | | 18 | Red/Lt Blue | Purple |
| 929 | ICM | 36 | 19 | Pink | Pink |
| 395 | ICM, Distributor | 56 | 20 | Gray/Orange | Gray |
| 259 | Distributor | 16 | 21 | Orange/Red | Orange |
| 74 | O2 Sensor | 29 | 22 | Gray/Lt Blue | Lt Blue |
| 310 | Knock Sensor (5.0 ONLY) | 23 | 23 | Yellow/Red | Yellow |
| 330 | PW Steer SW (5.0) ONLY) | 24 | 24 | Yellow/Lt Green | |
| 570 | GRND, Dist, ICM | | 25 | Black/White | Black |
| 48 | GRND, ICM,Dist Shield | 20,40 | 26 | Clear & Black | Solid & Black |
| 969 | GRND | 6,60 | 27 | Black | Black |
| 57 | GRND, VSS, O2 Sensor | | 28 | Black | Black |
| 351 | EGRVP, TPS | 26 | 36 | Brown/White | Brown |
| 351 | MAP Sensor | 26 | 37 | Brown/White | Brown |
| 355 | TPS | 47 | 38 | Gray/White | White |
| 352 | EGRVP | 27 | 39 | Brown/Lt Green | Lt Green |
| 264 | MAP | 45 | 40 | Lt Green/Black | Black |
| 926 | VIP 1, FP Relay | 22 | 41 | Lt Blue/Orange | Lt Blue |
| 914 | VIP 1 | 28 | 42 | Tan/Orange | Tan |
| 915 | VIP 1 | 9 | 43 | Pink/Lt Blue | Pink |
| 658 | VIP 1, SES LT | 17 | 44 | Pink/Lt Green | Lt Green |
| 209 | VIP 2 | 48 | 45 | White/Pink | White |
| 360 | EGR | 33 | 46 | Brown/Pink | Brown |
| 200 | Air Divert | 11 | 47 | Brown | Brown |
| 190 | Air By-Pass | 51 | 48 | White/Orange | White |
| 101 | Canister Purge Sol. | 31 | 49 | Gray/Yellow | Gray |

| Circuit | Description | EEC pin# | Panel # | Ford Color | TDZ Color |
|---|---|---|---|---|---|
| 361 | FP Relay IGN | | 64 | Red | Red |
| 361 | IGN, S.E.S LT | | 65 | Red/Yellow | Red |
| 361 | IGN, TCIL, TCS | | 66 | Red | Red |
| 361 | IGN, Trans 1, Trans 12 | | 67 | White/Red | Red |
| 37 | Battery, FP Relay | 1 | 68 | Yellow | Yellow |
| | | | 69 | | |
| 923 | Trans 7 | 42 | 70 | Orange/Black | Orange |
| 924 | Trans 5 | 55 | 71 | Brown/Orange | Brown |
| 315 | Trans 2 | 19 | 72 | Pink/Orange | Pink |
| 480 | Trans 4 | 53 | 73 | Pink/Yellow | Yellow |
| 237 | Trans 3 | 52 | 74 | Orange/Yellow | Orange |
| 925 | Trans 11 | 38 | 75 | White/Yellow | White |
| 199 | MLPS | 30 | 76 | Lt Blue/Yellow | Yellow |
| 511 | Brake Input | 2 | 77 | Lt Green | Purple |
| 911 | TCIL | 32 | 78 | White/Lt Green | White |
| 224 | TCS | 41 | 79 | Tan/White | Tan |
| 679 | VSS | 3 | 80 | Gray/Black | Gray |
| 238 | FP Relay, Inertia SW | 8 | 81 | Dk Green/Yellow | Tan |
| 883 | AC Pressure SW | 10 | 82 | Pink/Lt Blue | -- |
| 348 | AC Panel Input | 43 | 83 | Pink | -- |
| 359 | Knock, Pwr Steer Sen 5.0 ONLY | 103 | Gray/Red | Gray | |
| 359 | IAT, ECT | 46,49 | 104 | Gray/Red | Gray |
| 359 | O2, MAP Sensor | | 105 | Gray/Red | Gray |
| 359 | TPS, EGRVP | | 106 | Gray/Red | Gray |
| 359 | VIP 1, MLP | | 107 | Gray/Red | Gray |
| 359 | Trans 8 | | 108 | Gray/Red | Gray |

## Fuse Designation & Size

The harness has a total of eight fuses. Shown below is a diagram of what each fuse protects. The illustration is the front view of the Telorvek panel.

| Fuse Block #1 | |
|---|---|
| Fuse Designation | Fuse Size Block #1 |
| **IGNITION** Air By-Pass, Canister Purge Solenoids | 10 AMP |
| **IGNITION** EGR, Air Divert Solenoids | 10 AMP |
| **IGNITION** Injectors | 15 AMP |
| **IGNITION** ISC, Distributor, Coil, ICM, ECM | 20 AMP |

| Fuse Block #2 | |
|---|---|
| Fuse Designation | Fuse Size Block #2 |
| **IGNITION** Oxygen Sensor | 10 AMP |
| **IGNITION** Fuel Pump Relay (IGN), S.E.S Lt, TCIL, TCS | 20 AMP |
| **IGNITION** Transmission | 10 AMP |
| **BATTERY** Fuel Pump Relay, ECM | 20 AMP |

## Numbered terminal block cover strip reference.

The drawing below is for your reference on the correct positioning of the Telorvek fuel injection panel terminal block cover strips.

When connecting wires to the panel be sure the numbered terminals match the drawing below.