



TELORVEK IV
Ford Sequential Fuel Injection
System **(MG-38)**

WIRING INSTRUCTIONS

Thank you for purchasing the absolute finest of wiring kits for the Ford Motor Co. fuel injection. This kit fits the 1989 - 1993 Ford Thunderbird Super Coupe Supercharged 3.8 V6. 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 an high pressure in tank fuel pump. Custom installations are available from Tanks Inc. (phone 320-558-6882) and Rock Valley (phone 800-344-1934).

Regarding emissions, the Canister Purge solenoid located in bag 75 can be eliminated if your vehicle does not need to pass emissions testing. The EGR (located in bag 62) can be eliminated but will set codes that will retard the timing UNLESS the computer receives some kind of signal from that circuit. Should you eliminate any additional 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 keep you from a trouble free start up that you must consider. Please call for more information should you have any questions.

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 run-ability 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 sensor sends a signal to the engine computer allowing spark to be provided to the plugs, similar to a carbureted engine.

Thank you for purchasing our products!

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

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.

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 TELORVEK panel and computer in an accessible location anywhere you desire out of the weather. **For safety, disconnect the ECM connector until finished the installation. Under the dash, under the seat or in the trunk are good. There are a lot of wires so allow room to work. 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.**

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!

Important! We have supplied two sizes of terminals for your use on the panels itself. The Blue, used for the larger sizes of wires and red for the bulk of the smaller wires. Each individual bag instructions will be marked as to when to use the blue terminals. All others will use the red terminals. Time to start the installation.

Bag #60. INJECTORS: The injector wiring is made up in two harnesses, one for the left bank of injectors and one for the right bank. Locate the injector connector with the Red and Tan wires and connect it to cylinder number (1) injector one (should be passenger side front cylinder). Now plug in the rest of the injector connectors (injectors 2, 3) in that half of the harness. In the other half of the injector harness locate the injector connector with the Red and Lt Blue wires and connect it to injector number (4). Plug in the rest of the injector connectors (injectors 5, 6) and run all the wires from both halves of the harness to the Telorvek Panel. Using the blue terminals connect the Red wires (INJ 1->1) and (INJ 4->1) to **#1**. Now connect the remaining six wires as follows using the red terminals, Tan (INJ 1->23) to **#23**, White (INJ 2->24) to **#24**, Brown (INJ 3->25) to **#25**, Lt Blue (INJ 4->26) to **#26**, Black (INJ 5->27) to **#27** and Lt Green (INJ 6->28) to **#28**.

Bag #61 ENGINE GROUNDS: The Black wire marked (FRT ENG GRD->22) is connected to a bolt in the front of the intake manifold and using the blue terminal run it to number **#22** on the panel. The Black wire marked (REAR ENG GRD->22) is run from a rear manifold bolt and using a blue terminal connect it to number **#22** on the panel.

Bag #62. EXHAUST GAS RECIRCULATION VALVE POSITION SENSOR & EGR

SOLENOID: Plug in the connector to the EGRVP. Using red terminals run the Brown wire (EGRVP-> 29) to **#29**, Lt Green wire (EGRVP-> 38) to **#38** and the Gray (EGRVP-> 57) to **#57**. Plug the connector into the EGR solenoid and using a red terminal run the Red wire (EGR SOL->2) to **#2** and use a red terminal on the Brown (EGR SOL->39) to **#39**.

Bag #63. THROTTLE POSITION SENSOR: Plug into the sensor located on the side of the throttle body and using red terminals run the Grey (TPS-> 56) to **#56**, White (TPS->36) to **#36** and Dk Brown (TPS-> 29) to **#29**.

Bag #64. IDLE SPEED CONTROL: The ISC is located on the side of the throttle body and after plugging in the connector, run the White (ISC-> 51) to **#51** and the Red (ISC-> 3) to **#3** using red terminals to connect them to the panel.

Bag #65. COOLANT TEMPERATURE SENSOR: After attaching the plug to the sensor located in the right front of the engine, run the two wires to the panel and connect them using the red terminals, Lt Green wire (ECT-> 35) to **#35** and the Gray wire (ECT-> 56) to **#56**.

Bag #66. MASS AIR FLOW SENSOR: Attach the connector to the M.A.F sensor. Using a blue terminals run the Red wire (MAF-> 2) to **#2**. Now using the red terminals run the Black (MAF-> 21) to **#21**, Tan (MAF-> 18) to **#18** and the Lt Blue (MAF-> 17) to **#17**.

Bag #67. BAROMETRIC/MANIFOLD PRESSURE SENSOR (BAP/MAP): Mass Air Flow engines used the BAP sensor and did not have vacuum connected to it. **Non** Mass Air Flow engines used the MAP sensor and had vacuum running to it. Be sure to use the correct sensor. The sensors look nearly identical. (**HINT:** The BAP sensor had a ferrule that would prevent you from attaching a vacuum hose to it). Locate the sensor on the firewall of the engine compartment. Attach the connector and using the red terminals run the Orange wire (MAP/BAP-> 30) to **#30**, Lt Green (MAP/BAP-> 37) to **#37** and the Black (MAP/BAP-> 60) to **#60**. The print on the wires for this sensor might be labeled MAP instead of BAP.

Bag #68. OXYGEN SENSOR (2) 1989-1990: This area of the vehicle is hot so keep the wires away from the exhaust. Two sensors are required per engine. **Install each sensor as close to the block as possible.** Plug in both connectors into the O2 sensors following the wording printed on the wires (Left to the left O2, Right to right O2) and run the wires to the Telorvek panel. Using the blue terminals connect the Orange wires (LEFT O2-> 5) and (RIGHT O2->5) that runs from both sensors to **#5**. Now using the red terminals the other two wires on the left O2 are installed as follows, Dk Blue (LEFT O2-> 42) to **#42** and the Black (LEFT O2-> 20) to **#20**. The other two right O2 sensor wires, Lt Blue (RIGHT O2-> 43) to **#43** and the Black (RIGHT O2-> 20) to **#20**.

Bag #68A. OXYGEN SENSOR (2) 1991-1993: This area of the vehicle is hot so keep the wires away from the exhaust. Two sensors are required per engine. **Install each sensor as close to the block as possible.** Plug in both connectors into the O2 sensors following the wording printed on the wires (Left to the left O2, Right to right O2) and run the wires to the Telorvek panel. Using the blue terminals connect the Orange wires (LEFT O2-> 5) and (RIGHT O2->5) that runs from both sensors to **#5**. Now using the red terminals the other three wires on the left O2 are installed as follows, Dk Blue (LEFT O2-> 42) to **#42**, Grey (LEFT O2->57) to **#57** and the Black (LEFT O2-> 20) to **#20**. The other three right O2 sensor wires, Lt Blue (RIGHT O2-> 43) to **#43**, Grey (RIGHT O2->59) to **#59** and the Black (RIGHT O2-> 20) to **#20**.

Bag #69. CAM AND CRANK POSITION SENSORS: Both sensors require the wires to be shielded from any electrical interference, that is why you will find the wires in the connector are wrapped. The Camshaft position sensor is located on the rear passenger side and the Crankshaft position sensor is located on the front of the engine.

Carefully uncoil the harnesses and plug into their correct locations and 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 harnesses there is a solid strand wire with no insulation, install a blue terminal on each and connect one of them to **#21** and the other to **#19**. Using red terminals the four wires for each sensor get connected as follows, Orange (CRANK SENSOR->13) to **#13**, Lt Blue (CRANK SENSOR->15) to **#15**, Red (CRANK SENSOR->4) to **#4**, Dark Blue (CRANK SENSOR->14) to **#14**, Pink (CAM SENSOR->12) to **#12**, Lt Blue (CAM SENSOR->16) to **#16**, Red (CAM SENSOR->4) to **#4** and the Dk Green (CAM SENSOR->40) to **#40**.

Bag #70. IGNITION CONTROL MODULE (DIS) AND COIL: The ignition control module was originally mounted on the passenger side front of the engine on a bracket. There are two connectors that plug into this unit. Both connectors require wires to be shielded from any electrical interference, that is why you will find the wires in the connectors are wrapped.

Carefully uncoil the harnesses and plug into their correct locations and 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 harnesses there is a solid strand wire with no insulation, bring both solid strand wires together and install one blue terminal on both wires and connect them to **#19**. Using red terminals the rest of the wires get connected as follows, Red (DIS->6) to **#6**, Tan (DIS->7) to **#7**, Lt Green (DIS->8) to **#8**, Lt Blue (DIS->15) to **#15**, Pink (DIS->12) to **#12**, Orange (DIS->13) to **#13**, White (DIS->9) to **#9**, Yellow (DIS->10) to **#10** and the Black (DIS->11) to **#11**.

There is a single purple wire coiled separately and not in the shielding. It is marked START SOL. This wire runs to the small post of your starter solenoid. Connect this wire to the post that gets hot when the ignition switch is in the CRANK position. This input retards the timing at start up so that the engine starts quicker.

The coil was originally mounted on the driver side front of the engine. Plug the connector into the coil and run the four wires back to the panel. Using red terminals the wires get connected as follows, Red (COIL->6) to **#6**, White (COIL->9) to **#9**, Yellow (COIL->10) to **#10** and Black (COIL->11) to **#11**.

The other Tan wire in this bag is for the TACH connection if desired. Connect the wire to **#7** and run it to the tach.

Bag #71. SPEED SENSOR: Install the connector onto the speed sensor located in the speedometer assembly on the transmission and run the wires back to the Telorvek panel. Using the red terminals connect the Orange wire (VEH SPD SEN->53) to **#53** and the Dk Green wire (VEH SPD SEN->45) to **#45**.

Bag #72.V.I.P. SELF TEST: Mount the connector inside the vehicle under the dash and run the wires to the Telorvek Panel. Using the red terminals connect the Tan (VIP 1->47) to **#47**, Gray (VIP 1->58) to **#58**, Pink (VIP 1->46) to **#46**, Light Green (VIP 1->49) to **#49**, Light Blue (VIP 1->48) to **#48** and the White (VIP 2->50) to **#50**.

The remaining two wires are for the service engine soon (SES) light. You must use a wire ungrounded light.

S.E.S LT: Connect the Lt Green wire (49->SES LT) to **#49** 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 (3->SES LT) connects to **#3** 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.

Bag #73.FUEL PUMP & INERTIA SWITCH: We have included the wiring necessary for the Ford inertia switch. The inertia switch cuts off the electric fuel pump in the event 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->33) to **#33** on the Telorvek panel. Run the other Tan wire (INERTIA SW->F/P) 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 1: 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.

NOTE 2: There are two relay sockets in the cover of the panel. The one closest to the fuses is for the fuel pump relay. Relays are not supplied with our wiring kit. The proper can be ordered locally under Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455.

Bag #74. AIR CHARGE TEMPERATURE SENSOR: Install the connector onto the air charge temperature sensor. Run the wires to the Telorvek Panel and using the red terminals connect the Lt Yellow Wire (IAT->41) to **#41** and the Grey wire (IAT->58) to **#58**.

Bag #75. CANISTER PURGE SOLENOID: Plug the connector into the Canister Purge Solenoid. Using blue terminals connect the Red wire (CAN PURGE->2) to **#2** and the Gray wire (CAN PURGE->44) to **#44**.

Bag #76. SUPERCHARGER BYPASS SOLENOID: Plug the connector into the S/C Bypass Solenoid. Using blue terminals connect the Red wire (S/C BYPASS->1) to **#1** and the Lt Green wire (S/C BYPASS->54) to **#54**.

Bag #77. OCTANE ADJUST: The ECM measures voltage across the octane adjust connector and uses this information to modify ignition spark advance. Leave this connector plugged together but if you experience detonation while driving, un-plug this connector or use higher octane gasoline. Using the red terminals connect the Gray (OCTA ADJ->60) to **#60** and the Dk Green (OCTA ADJ->52) to **#52**.

Bag #78. KNOCK SENSOR: Plug the connector into the Knock Sensor. Using blue terminals connect the Yellow wire (KNOCK SENSOR->55) to **#55** and the Grey wire (KNOCK SENSOR->59) to **#59**.

Bag #79. ELECTRIC FAN: Connect the Lt Blue wire (PRIMARY FAN->34) to terminal **#34** and run to the electric cooling fan. We have provided a ground wire as well, Run the Black wire (FAN GROUND) from your electric radiator cooling fan to a good ground.

NOTE: There are two relay sockets in the cover of the panel. The one furthest from the fuses is for the fan relay. Relays are not supplied with our wiring kit. The proper can be ordered locally under Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455.

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.

NOTE: The short orange and pink wires with the gray connector running out of the computer connector is for the wide open throttle air conditioning compressor clutch disengagement connection. This does not need to be used in an aftermarket application.

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->48) 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 OR INJURY 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 Light Green wire running from the distributor to **#8** on the Telorvek panel. Simply remove the wire from that terminal of the panel temporarily.
- (4) With the engine running check/adjust timing.
- (5) Shut the engine off, reconnect the shorting connector 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. Once you have confirmed our simple electrical tests are OK, set the timing and any trouble you experience will be a defective part or seat of the pants repair.

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 till 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: For this test the fault must be present at the time of testing. For intermittent , refer to continuous memory codes.

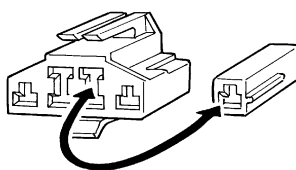
ENGINE RUNNING SELF TEST: The sensors are checked under operating conditions and at normal operating temperatures.

CONTINUOUS 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 two digit numbers, such as 2-3. The light will display two flashes, then, after a two second pause, the light will flash three 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 grey wire (VIP 1->58) located in the large VIP connector and the white wire (VIP 2->50) located in the single connector as shown in the drawing below.



Trouble Codes

11	System PASS	53	TP circuit above maximum voltage
12	High RPM	54	ACT indicated -40°F/circuit open
13	Low RPM	56	MAF circuit above max voltage
14	PIP circuit failure	61	ECT indicated 254°F/circuit grounded
15	ECG memory failure	63	TP circuit below minimum voltage
16	RPM low for EGO test	64	ACT indicated 254°F/circuit grounded
18	SPOUT /IDM circuit failure	66	MAF circuit below minimum voltage
19	ECG internal voltage failure	67	Neutral drive switch circuit open
21	ECT out of test range	74	Brake on/off circuit open during self test
22	MAP /BP out of test range	75	Brake on/off circuit closed/ ECG input open
23	TP out of test range		
24	ACT of test range	77	Brief WOT not sensed during self test
26	MAF out of test range	79	A/C on defrost on during self test
29	Vehicle speed sensor problem	81	Air management 2 circuit failure
31	EVP voltage below minimum	82	Air management 1 circuit failure
32	EVP voltage below closed limit	84	EGR Vacuum Regulator circuit failure
33	EGR valve opening not detected	85	Canister purge circuit failure
34	EVP voltage above closed limit	87	Fuel pump primary circuit failure
35	EVP voltage above maximum	91	HEGO (L) sensor lean or defective
41	HEGO (R) sensor lean or defective	92	HEGO (L) sensor rich
42	HEGO (R) sensor rich	94	Thermactor air system inoperative (L)
44	Thermactor air system defective (R)	95	Fuel pump secondary circuit failure
45	Thermactor air upstream during self test	96	Fuel pump secondary circuit failure
46	Thermactor air not bypassed during self test	98	Hard fault present FMEM mode
51	ECT indicated -40°F/open circuit		

No codes = unable to indicate self test
Code not listed = Not applicable to this engine

Telorvek Panel Fuse Designation & Size

The harness has a total of eight fuses. Shown below is a diagram of what each fuse protects.

Top, Front View Of Fuse Blocks

Fuse Row #1	
Fuse Designation	Fuse Size
Ignition Injectors, S/C Bypass	15 AMP
Ignition MAF, Can Purge, EGR	10 AMP
Ignition ISC, SES Lt	10 AMP
Ignition Cam, Crank Sensors	15 AMP


Fuse Row #2	
Fuse Designation	Fuse Size
Ignition Oxygen Sensors	20 AMP
Ignition DIS & Coil	20 AMP
Fan Power	30 AMP
Battery Fuel Pump Relay, ECM	20 AMP

FUEL PUMP and ELECTRIC FAN RELAYS

The relay housings mounted in the cover of the Telorvek panel is for the FUEL PUMP and ELECTRIC FAN. The relay can be ordered under Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455



Copyright Infringement



Ron Francis Wiring has taken the extra effort to produce a quality, easy to understand instructions. We will aggressively prosecute any other harness supplier who attempts to copy this material!!

The cartoon depicts a judge in a black robe sitting on a bench, holding a gavel and pointing towards a man in a white uniform. The man has a large 'V' on his chest and the word 'VIOLATOR' written on his back. He is standing in front of a set of prison bars. An American flag is visible behind the judge.