

# TB-86

## 3.8 TURBO SFI

### WIRING INSTRUCTION FOR TELORVEK FUEL INJECTION SYSTEMS

Thank you for purchasing the absolute finest of wiring kits for the General Motors fuel injection. 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).

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 keep you from a trouble free start up that you must consider. Use only the 1986-87 Buick ECM. Also you will need a Prom that matches the engine size.

#### 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.

Plug in the computer (ECM) to the wires running from the TELORVEK II panel and mount them in an ACCESSIBLE LOCATION. **For safety, now disconnect the ECM connectors 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 II panel.

After all wires are in place, wire tie them together or use 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 will not be used!

Any sensor that is difficult to hook-up should not be eliminated. All sensors are important if you desire your conversion to run as good as a factory engine. Eliminating any part of this kit WILL cause some portion of the EFI to work improperly.

#### **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.**

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

**Ron Francis Wiring has made every effort to assure a quality product and can assure you that this system works well in your application. Once you have confirmed proper installation and set the timing, any trouble you experience will be a defective part or seat of the pants repair. Your unit can be tested at any General Motors Dealership with no difficulty.**

**Bag #21 COOLANT TEMPERATURE SENSOR** After attaching the plug to the sensor, run the two wires to the panel and connect the yellow wire to #17 and the black wire to #13. The sensor is located in the intake manifold in the water jacket.

**Bag #22 MANIFOLD AIR TEMPERATURE SENSOR (Not Used on 1985 Engines)** Plug in the sensor and run the black wire to #13 and the tan wire to #18. This sensor looks physically like the coolant temp sensor except it is located in the air plenum in the rear of the manifold.

**Bag #23 THROTTLE POSITION SENSOR** Since there are many different physical shapes for these units, it is important that the model used is matched to your computer. Plug into the sensor located near the throttle linkage and run the black wire to #14, Dk Blue to #15 and gray to #16.

**Bag #24 KNOCK SENSOR WIRING** is a single wire hookup to the knock sensor. This will inform the computer of detonation and readjust the timing accordingly. The knock sensor is mounted near the intake manifold on the rear of the engine. Connect the plug to the sensor and run the Dark Green wire to #31.

**Bag #25 CRANK POSITION SENSOR:** This sensor is located on the front of the engine near the harmonic balancer. Plug the connector in and run the wires to the panel. Connect the dark green wire to #1, black to #2 and the gray to #3.

**Bag #26 CAM SHAFT POSITION SENSOR:** This sensor is located on the timing cover behind the water pump. A short harness runs from the sensor and our harness plugs into it. After the connection is made run the wires back to the panel. Connect the red wire to #4, light blue to #5 and the black to #6.

**Bag #27. ELECTRONIC SPARK CONTROL (ESC) & IGNITION MODULE, TACH.** Mount the ESC inside the vehicle. Plug the connector with the dark green, yellow, black and pink wires into the ESC. Connect the pink to #26, black to #28, yellow to #32 and the dark green to #31.

### NOTE!

Following General motors wire color code for the below harness required the use of the same color wires in this connector. Read the printing on the wires carefully before connecting them to the panel.

Connect the remaining plug into the ignition module/coil pack. After running the wires back to the Telorvek panel, connect the white to #8, tan to #9, dark blue to #10, light green to #11, yellow to #12, dark green to #1, black to #2, gray to #3, red to #4, light blue to #5, black to #6 and the two pink wires to #25.

The remaining purple wire out of the connector is for the tach connection if desired. If a tach is not used cut this wire off flush with the connector.

**Bag #28. INJECTORS:** The injector wiring harness is made up in two sections, one for the left side (drivers side) of the engine and one for the right side of the engine. Lay the left injector harness out on the engine. Note the wires running to each injector connector. Following the printing on the wires plug the connectors onto the correct injectors. The same procedure is followed for the right side injector harness.

After all wires are connected to the injectors run the wires to the panel. Connect the two pink wires to #44. Connect the light blue wire to #38, purple to #39, brown to #40, light green to #41, tan to #42 and the gray to #43.

**Bag #29. IDLE AIR CONTROL:** The IAC is located on the throttle body and after plugging in the connector, run light green to #22, dark green to #21, dark blue to #20 and light blue to #19. There are several different, yet similar appearing models of this unit and care should be taken to replace with the correct model if necessary.

**BAG #30. MASS AIR FLOW SENSOR:** The MAF sensor should be located between the air cleaner and throttle body. Plug in the connector and run the gray wire to #7, pink to #24 and the black to #27.

**Bag #31. EXHAUST GAS RECIRCULATION CONTROL:** This sensor is located on the left front of the engine. Plug in the connector and run wires to the panel. Connect the pink wire to #51, gray to #36, yellow to #37 and black to #29

**Bag #32. WASTEGATE SOLENOID:** The Wastegate solenoid controls the Wastegate during boost conditions. The ECM pulsates the solenoid during boost for smooth engine operation. Plug in the connector and run wires to the panel. Connect the pink wire to #24 and white to #34.

**Bag #33 or #33A. OXYGEN SENSOR:** This area of the vehicle is hot so keep the wires away from the exhaust. Only one sensor is required per engine. **Install as close to the block as possible.** O2 Sensors have a 25,000 mile life. Replace used O2 Sensors with new. If you must install an adapter, use The Detail Zone part #OS-30. It works. You must also hookup a ground wire to the exhaust pipe itself so weld a stud for this at the same time. The Purple wire connects to #33 and the Black (ground) to #29.

Bag 33A is for a heated O2 Sensor. Same rules apply as above but you will have some additional wires to run. The Black wire O2 SEN A->14 connects to terminal #14 on the panel. The Purple wire O2 SEN B->33 connects to #33. The Black wire O2 SEN C->29 connects to terminal #29 on the panel. The Orange wire O2 SEN D->45 connects to #45.

**Bag #34. CANISTER PURGE SOLENOID:** Plug the connector into the solenoid and run the wires back to the panel. Connect the pink wire to #26 and the dark green wire to #35.

**Bag #35. OIL PRESSURE SWITCH WIRING (two wire unit) (GM Part #25036553):** The oil switch is located on the right front of the engine above the oil filter. Plug the black connectors onto the oil pressure switch (does not matter which terminal they connect to). **Using blue terminals**, run tan to #57 and red to #59.

**Bag #36 FUEL PUMP:** The fuel pump relay is located in the cover of the TELORVEK panel and is pre-wired. A relay must be installed in the connector (Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455) or the pump WILL NOT operate. Using the blue terminals connect the tan wire to #57 on the panel and run it to the fuel pump. The tan wire then connects to the positive terminal on the pump. Connect a ground wire to the negative terminal on the pump and run it to a good ground. A pump that is capable of producing a minimum of 45 PSI must be used.

**Bag #37 ENGINE GROUND.** Although this wire is marked ground it actually completes individual circuits that happen to be grounded. For this reason this is an important wire in the kit and must be connected properly. The Black wire connects to a bolt in the front of the intake manifold and run to number 30 on the panel.

**Bag #38. PARK/NEUTRAL RELAY:** This system was developed to allow a regular park / neutral switch tell the computer when the vehicle is in park, neutral or drive. Since the signals are different, we have made this small circuit that will plug into a stock GM neutral switch or splice to just about any two wire neutral switch. The signal input controls the idle air control (IAC), vehicle speed sensor diagnostics (VSS) and exhaust gas recirculation (EGR).

If you are using a Ron Francis Wire Works wiring kit, this is a simple, color coded plug-in to GM Neutral Safety Switches. The regular car wiring that normally runs to the neutral safety now plugs into the P/N relay kit with the with the blue and purple wires in the black connector. The plug with the blue and black wires is connected to the original neutral safety switch. Run the black wire with the ring terminal to a good ground.

**NOTE:** Using any other standard neutral switch requires only removing the plug and splicing. Either color wire can be used on either terminal. The black plug with the light blue and black wires is connected into your neutral safety switch. If the connector on the wires doesn't fit your application then remove it and connect the wires to the switch.

- ✓ The **blue wire** in the plug must be connected to the 12 volt supply from the ignition switch. This wire becomes hot (12 Volts) when you turn the key to crank.
- ✓ The **purple wire** is connected to the wire that runs to the starter solenoid.
- ✓ Run the orange wire to **#50** on the panel. Don't forget to install a relay (Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455).

**Bag #39. ASSEMBLY LINE DATA LINK (ALDL) and SERVICE ENGINE LIGHT (Check Engine Light)**

The ALDL is the diagnostic link for computerized testing at your local GM dealer or a hand held scanner. We have supplied a Cover for the ALDL to dress up the appearance. Please consider a very accessible location for this important part. Connect the orange wire to **#48**, white wire to **#47**, tan wire to **#49**, brown wire to **#46**, gray wire to **#36** and the Black wire to **#28**.

The Check Engine light can be any low amperage 12 volt lamp located on the dash board or where ever desired. The Brown wire from **#46** and the Pink wire from **#45** make these connections. This light is not required as the yellow light on top of the TELORVEK II Panel has the same function.

**VEHICLE SPEED SENSOR (VSS):** A VSS signal input is needed on all General Motors TPI engines. If the ECM does not see that input a **CODE 24 WILL SET**. The VSS input helps control some of the EGR and IAC functions. You need to provide this input and prevent this code one of two ways.

#### **Using a 700 R4 Transmission**

The first is most 700 R4 transmissions have the factory pulse generator located in them. This can be connected into the computer to provide this signal. This transmission also requires a torque converter lock-up signal which is given by the ECM from the input it receives from the pulse generator. The Ron Francis Wiring part number TC-60 wiring kit includes the wiring for the TCC lock-up and the correct connectors to plug into the factory pulse generator to make this connection easy.

**NOTE:** If you are using the stock speed sensor located in the 700 R4 transmission with an electric speedometer will require you to purchase a buffer (DRAC MODULE) from your local Buick dealer.

#### **Other Transmissions**

A speed signal into the computer can done simply by sourcing a pulse generator. It installs into the speedometer cable and following the instructions will wire into the harness.

## Remaining Terminals

Ron Francis Wiring runs all computer connections out of the computer to a terminal on the Telorvek panel even if they are not used in an aftermarket application. This is done to allow easy access to these circuits. Ron Francis Wiring only provides external wiring for circuits we feel can be wired in aftermarket applications. If you need further information on these circuits refer to your shop manual. For the availability of wiring kits call our tech line.

#52 (A/C Request)  
#55 (VSS Signal)  
#49 (TCC D)

#53 (TCC B 4TH Gear)  
#56 (Cooling Fan Relay)

#54 (TCC C 3RD Gear)  
#58 (A/C Clutch)

## Final Hookups

Connect the large prewired **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 prewired **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. Do not consider grounding the battery to the frame and then the engine to the frame. Run the battery ground directly to the engine.

If you turn the key on but do not crank engine, you will hear the fuel pump for about 2 to 4 seconds before it stops. This will indicate the pump is ready. During normal operating it is best if you do not wait till the pump stops as this is not an indication that the pressure is up. There is no need to "pump" the throttle on fuel injection cars.

## POSSIBLE PROBLEMS ARE:

Wrong Prom, ECM or Vacuum leaks. No fuel, IAC adjustment, Dirty injectors or fouled plugs if engine runs rich too long. Clogged injectors may need cleaning for proper operation. This can be accomplished with several methods with commercially available cleaners. Less than 45 PSI fuel pressure. Less than 195° thermostat.

## TROUBLE CODES

Listed below are trouble codes the ECM will store in the event of a sensor failure. Inserting the code key attached to the ALDL connector into terminal A to terminal B (white and black wires) will allow the computer to "flash" trouble codes in the "CODES" light mounted on the TELORVEK panel and (or) on the dash mounted light.

Each code will flash 3 times. Each number is flashed separate. Example: Thirteen is flashed as a single flash followed by three flashes. This will repeat three times before moving on to any addition codes. Not all that can go wrong on an EFI computer controlled system will set a service code. If no codes are present and there is a runability problem it may be necessary to connect a scan tool to the system or have it serviced at a qualified repair facility.

**13 Oxygen Sensor**  
**14 High temp**  
**15 Very low temp**  
**21 TPS high voltage**  
**22 TPS low voltage**  
**23 MAT low temp**  
**24 Speed Sensor**  
**25 MAT high temp**  
**31 Wastegate**  
**32 EGR**

**33 MAF high voltage**  
**34 MAF low voltage**  
**41 Cam Sensor**  
**42 Bypass Circuit**  
**43 ESC**  
**44 Oxygen Lean**  
**45 Oxygen Rich**  
**51 Replace Prom**  
**52 Replace**

**Calpack**  
**55 ECM Error**

**RESETTING IAC VALVE PINTLE POSITION:** If the IAC was completely out of the manifold for any reason like polishing, replacement or whatever, resetting will be necessary. Carefully follow the following instructions.

- |  |  |
|--|--|
| <p><b>(1) Slightly depress accelerator pedal.</b></p> <p><b>(2) Start and run the engine for five seconds.</b></p> | <p><b>(3) Shut engine off for ten seconds.</b></p> <p><b>(4) Start the engine and check for proper idle.</b></p> |
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<b>Telorvek Panel Fuse Designation and Size Layout</b>
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### 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 Block #1
(IGNITION FEED) ECM, MAF, Wastegate	20 AMP
(IGNITION FEED) Coil	20 AMP
(IGNITION FEED) Canister Purge Solenoid, ESC	10 AMP
(IGNITION FEED) Injectors	20 AMP

Fuse Row #2	
Fuse Designation	Fuse Size Block #2
(IGNITION FEED) <Heated O2> S.E.S Light	20 AMP
(IGNITION FEED) E.G.R, Buffer	10 AMP
(BATTERY FEED) Oil Switch, Fuel Pump Relay	15 AMP
(BATTERY FEED) ECM	10 AMP

### Telorvek Options

- |  |   |
|--|---|
| <p>OS-30</p> <p>TC-70</p> <p>TC-60</p> | <p>Oxygen Sensor Adapter (Weld In)</p> <p>Torque Converter Lock-Up (Stand Alone)</p> <p>Torque Converter Lock-up Computer Controlled<br/>(Square Four Pin Connector) Pulse Generator Required</p> |
|--|---|

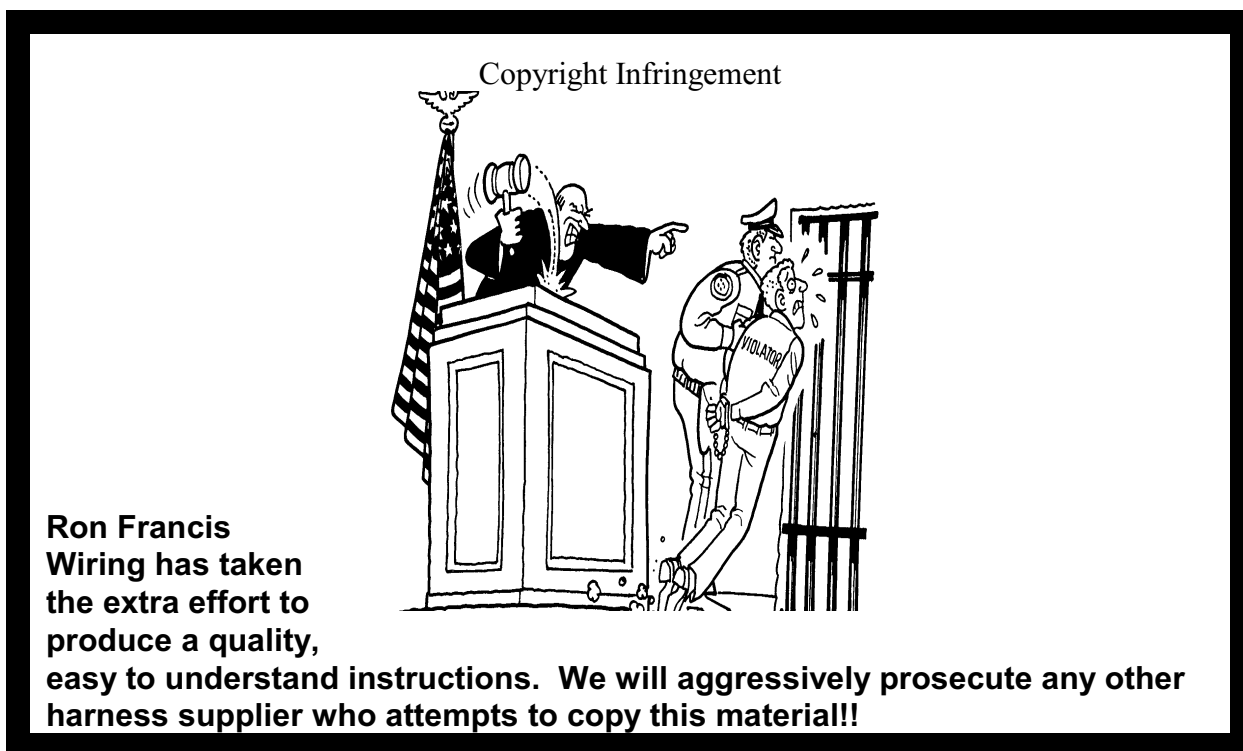
## General Motors Part Numbers

Oil Switch (Two Wire Unit)  
Fuel Pump & Park Neutral Relays

25036553  
14100455

**Note:**

If you are in need of the clips with studs and nuts to used properly bolt down the computer, The clips are available from a GM dealer in packs of 10 under part number 12337892 and the nuts are available individually under part number 11502702.



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