

TELORVEK III

WIRING INSTRUCTIONS FOR NS-93 4.6 NORTHSTAR Fuel Injection System

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 a high pressure in-tank fuel pump. Custom installations are available from Tanks, Inc. (phone # 320-558-6882) and Rock Valley (phone #800-344-1934).

Computers in automobiles, as well as the computers we use in our home or office, are getting more and more sophisticated. The auto makers have the capability now to incorporate much more computing power into a small package. In complying with federal law automakers have toughened the emission outputs of their engines, which in the future will be even tougher.

In the older TPI engines the computer controlled, but did not look for or set a trouble code if the emissions control devices malfunctioned or were removed. The newer engine computers (like the one you are installing) not only look (sense) for but will set a trouble code and put the ECM into a back-up mode if the emission control devices malfunction or are not installed.

Just like you, I was used to building my street rods over the years without all the plumbing that was necessary for the emissions to function properly. Just for the record, by the 1990 clean air act it is illegal to remove the emission control devices from the engine they were intended to be used on. We have found by talking to customers throughout the country that most states are not enforcing this law, but I promise you in the future they will! It sure will be nice to know that you are prepared.

IMPORTANT: This system is based on the 1993-1995 Cadillac Northstar operating system. If you have a newer engine you must use a 1993-1995 Cadillac Northstar ECM, PROM and throttlebody. Please call if you have any questions regarding these items. 302-475-2907.

IMPORTANT: 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.

DIAGNOSTIC PROCEDURES

It would be impossible to cover all the procedures that GM requires to diagnose all possible problems a fuel injection system could have in a set of installation instructions. If this is the first time you are working with a fuel injection system, we highly recommend purchasing a shop manual from the year, make and model the engine and computer came from. The book will not only help with diagnosing problems but will also teach you about the engine you just installed.

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 the computer (ECM) to the TELORVEK III panel. Mount it in an **ACCESSIBLE LOCATION. For safety, now disconnect the computer until you have 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 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 may 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 well as a factory engine. Eliminating any part of this kit WILL cause some portion of the EFI to work improperly.

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

Ron Francis Wiring has made every effort to ensure 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 due to a defective part or seat of the pants repair. Your unit can be tested at any General Motors Dealership with no difficulty.

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 INTAKE AIR TEMPERATURE SENSOR: This sensor is located under the intake manifold cover on the left side of the engine. Plug in the connector and run the Black wire (IAT A->5) to **#5** and the Tan (IAT B->4) **#4**.

Bag #21 MAP SENSOR: This sensor is located under the intake manifold cover on the left side of the engine. Plug in the connector and run the Black (MAP C->5) to **#5**, Lt Green (MAP B->7) to **#7** and the Gray wire (MAP A->8) to **#8**. **CRITICAL!** After motor is running check this sensor to make sure there are not any vacuum leaks!

Bag #22 THROTTLE POSITION SENSOR: Plug into the sensor located on the left side of the engine on the throttle body and run Black (TPS B->11) to **#11**, Dk Blue (TPS C->10) to **#10** and Gray (TPS A->8) to **#8**. No adjustment is required.

Bag #23 ENGINE COOLANT TEMPERATURE SENSOR: Plug into the sensor and run the two wires to the panel. Connect the Yellow wire (ECT B->13) to #13 and the Black wire (ECT A->12) to #12.

Bag #24 EXHAUST GAS RECIRCULATION VALVE: The valve is located on the top left rear of the engine. Plug in the connector and run the wires to the panel. Connect the Pink wire (EGR SOL E->20) to #20, Black (EGR B->11) to #11, Tan (EGR A->42) to #42, Brown (EGR C->43) to #43 and the Gray wire (EGR D->9) to #9.

Bag #25 INJECTORS: The injectors are fired sequentially (one at a time), unlike in the past when the injectors were fired one bank (four) at a time. According to GM, this did not improve horse power but was done for better emissions at low RPM'S. The injector wiring is in two sections, one for the left side injectors and one for the right side injectors. Note the color of wires running from the injector connectors. The left injector harness has pink, black, gray, white and dk green wires and the right injector harness has pink, lt green, lt blue, yellow and dk blue wires. Follow the paragraphs below on their connections:

LEFT INJECTOR CONNECTIONS: Starting from the front of the engine, plug the injectors in as follows: injector #1 has pink & black, injector #3 has pink & gray, injector #5 has pink & white and injector #7 has pink & dk green wires.

RIGHT INJECTOR CONNECTIONS: Starting from the front of the engine, plug the injectors in as follows: injector #2 has pink & lt green, injector #4 has pink & lt blue, injector #6 has pink & yellow and injector #8 has pink & dk blue wires.

After all the injectors are plugged in run all the wires back to the TELORVEK panel. **Note each injector harness has a pink wire. Using the blue terminals**, connect the pink wire (INJ 1 A->19) to #19 and the other pink wire (INJ 2 A->19) to #19. Using the red terminals, connect the rest of the injector harness wires as follows: black (INJ 1 B->34) to #34, gray (INJ 3 B->35) to #35, white (INJ 5 B->36) to #36, dk green (INJ 7 B->37) to #37, lt green (INJ 2 B->38) to #38, lt blue (INJ 4 B->39) to #39, yellow (INJ 6 B->40) to #40 and dk blue (INJ 8 B->41) to #41.

Bag #26 KNOCK SENSOR WIRING: This sensor will inform the computer of detonation and readjust the timing accordingly. The knock sensor must be used because it advances and retards the timing. Plug the connector onto the sensor which is located on the lower, right side of engine and run the wire to the panel. Connect the dk blue (KNOCK SEN->14) wire to #14.

Bag #27 THROTTLE POSITION SW & IDLE SPEED CONTROL: The throttle position switch and idle speed control allow the ECM to offset the closed throttle signal value of the throttle position sensor. This is necessary because of the manufacturing tolerances during minimum air adjustment, throttle position sensor manufacture and because the throttle position sensor is not adjustable. This sensor is located on the rear of the engine, near the throttle body. After plugging in the connector, run lt blue (TP SW D->24) to #24, dk blue (TP SW C->25) to #25, pink (TP SW B->26) to #26 and black (TP SW A->27) to #27.

Bag #28 IGNITION CONTROL MODULE: The ignition control module is located under the coil packs. There are four different connectors that need to be plugged into this module. Plug in all four connectors and run the wires back to the panel.

WARNING!

READ the printing on the wires carefully before connecting them to the panel. GM has given a connector number to each connector plugged into the ignition control module (C1, C2, C3, C4). We have printed the number of the connector on the wires running from the connector for ease of any trouble shooting down the road.

Connecting any of these wires to the wrong terminal on the panel WILL cause an ignition control module failure.

CONNECTOR "C1": Connect the gray wire (ICM C1 A->65), to #65, brown (ICM C1 B->66) to #66, black (ICM C1 E->67) to #67, and the tan (ICM C1 F->68) to #68.

CONNECTOR "C2": Connect the black (ICM C2 B->69) to #69 and the yellow (ICM C2 A->70) to #70.

CONNECTOR "C3": Using the blue forks, connect the pink (ICM C3 C->22) to #22 and the black (ICM C3 A->27) to #27. The purple wire (ICM C3 B->TACH) runs directly to the tach.

CONNECTOR "C4": Connect the red (ICM C4 F->71) to #71, white (ICM C4 E->72) to #72, tan (ICM C4 D->73) to #73, purple (ICM C4 C->74) to #74, brown (ICM C4 B->75) to #75 and the lt blue (ICM C4 A->76) to #76.

Bag #29 CRANK SHAFT POSITION SENSOR A & B: The two crank shaft sensors are located in the engine block between cylinders four and six. Crank shaft position sensor "A" is located in the upper engine block and crank shaft position sensor "B" is located in the lower engine block. After plugging into the sensors run the wires back to the panel. Connect the gray wire (CPS A B->65) to #65, brown (CPS A A->66) to #66, black (CPS B A->67) to #67 and the tan (CPS B B->68) to #68.

Bag #30 CAM SHAFT POSITION SENSOR: This sensor is located in the rear of the engine in the cylinder head. Plug in the connector and run the wires to the panel. Connect the black wire (CSPS A->69) to #69 and the yellow wire (CSPS B->70) to #70.

Bag #31 OIL LEVEL SWITCH: The ECM monitors the engine oil level through the oil level switch. The switch is located in the oil panel towards the front of the engine. Plug in the connector and run the wires back to the panel. Connect the black wire (LEVEL SW A->29) to #29 and the pink wire (LEVEL SW B->101) to #101.

Bag #32 OXYGEN SENSOR (2): This area of the vehicle is hot so keep the wires away from the exhaust. Two sensors are required per engine. **Install a sensor in the left and right exhaust pipe as close to the block as possible.** If you must install an adapter, use The Detail Zone part # OS-30. It works. Plug the left O2 connector harness into the left O2 sensor. Now plug in the right O2 connector harness into the right O2 sensor and run both set of wires back to the panel. Connect the Purple wire (LF O2 A->58) to #58, pink (LF O2 B->21) and pink (RT O2 B->21) to #21, tan (LF O2 C->57) to #57, black (LF O2 D->28) and black (RT O2 D->28) to #28, lt blue (RT O2 A->56) to #56 and the dk blue (RT O2 C->55) to #55.

Bag #33 POWER STEERING SWITCH: The power steering switch allows the ECM to increase the engine idle during a heavy steering load (such as backing into a parking space) for easier maneuverability. Plug the connector into the switch and run the wires to the panel. Connect the pink wire (PWR STR B->18) to **#18**, and the dk blue wire (PWR STR A->111) to **#111**.

Bag #34 4T80-E TRANSMISSION & TORQUE CONVERTER CLUTCH RELAY

(TCC) RELAY: The 4T80-E is a fully automatic electronically controlled transmission. Shift points and torque converter lock-up are controlled by the ECM and are influenced by many sensor inputs. The TCC signals that the brakes have been applied and is needed to disengage the torque converter clutch when braking.

4T80-E TRANSMISSION: Plug in the connector into the transmission and run the wires to the panel. Connect the lt green (TRANS C->87) to **#87**, dk green (TRANS D->88) to **#88**, gray (TRANS S->78) to **#78**, dk blue (TRANS R->85) to **#85**, yellow (TRANS B->110) to **#110**, tan (TRANS M->83) to **#83**, orange (TRANS U->112) to **#112**, orange (TRANS A->109) to **#109**, pink (TRANS E->23) to **#23**, black (TRANS L->6) to **#6**, black (TRANS N->84) to **#84**, red (TRANS P->86) to **#86**, dk blue (TRANS V->79) to **#79** and the tan (TRANS T->114) to **#114**.

TORQUE CONVERTER CLUTCH RELAY: Mount the relay near the Telorvek panel. Connect the pink wire (TCC RELAY->15) to **#15**, black (TCC RELAY->29) to **#29** and the yellow (TCC RELAY->113) to **#113**. The long purple wire (TCC RELAY->BRK SW) connects to the "COLD" side of the brake switch. This wire should only be hot with the brake pedal applied.

Bag #35 VEHICLE SPEED SENSOR: The vehicle speed sensor is located in the rear portion of the transmission. Plug the connector into the sensor and run the wires back to the panel. Connect the yellow wire (VSS A->81) to **#81** and the purple wire (VSS B->82) to **#82**.

Bag #36 BRAKE BOOSTER VACUUM SENSOR: This sensor monitors the amount of vacuum in the brake booster. **NOTE: If this sensor is not used, a code will set and light the service engine soon light. This WILL NOT put the ECM in a back-up mode but will light the S.E.S light.** Mount this sensor (not supplied) in the brake booster canister. Plug in the connector and run the wires back to the panel. Connect the gray (BBV C->9) to **#9**, black (BBV A->12) to **#12** and the yellow (BBV B->77) to **#77**.

Bag #37 FUEL PUMP & OIL SWITCH: The fuel pump relay connector is mounted in the cover of the Telorvek panel (the housing closest to the fuses) and is prewired. Install a relay (Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455 in the housing. Connect the Tan wire (53-> FUEL PUMP) from **#53** to the fuel pump. The fuel pump must be grounded.

OIL SWITCH: GM uses the oil switch as a back up to the fuel pump relay. If the relay fails, cranking the engine to build up oil pressure will allow the fuel pump to operate. Plug in the connector into the oil pressure switch located down by the oil filter. Run the wires back to the panel and connect the red wire (OIL SW C->54) to **#54** and the tan wire (OIL SW D->53) to **#53**

Bag #38 PARK/NEUTRAL RELAY or TRANSAXLE RANGE SWITCH:

Packaged in this bag is a park neutral relay system which was developed to allow a regular park / neutral switch tell the computer when the vehicle is in park, neutral or drive and also the correct connector to plug into the transaxle range position switch located on the 4T80-E transmission.

Use the park neutral relay system if you are using any other type transmission other than the 4T80-E transmission. Use the transaxle range connector if you are using the 4T80-E transmission. Follow the paragraph below that pertains to the type of transmission you are using.

PARK/NEUTRAL RELAY INSTALLATION: Since the signals are different from normal neutral switches and fuel injection neutral switches, 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 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 Lt 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 (RELAY ->100) to **#100**.

Install a relay (Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455) in the Connector. Don't forget to install a relay.

TRANSAXLE RANGE SWITCH: This switch is located on the left side of the transaxle. Plug in the connector and run the wires to the Telorvek panel. Connect the orange wire (TRANS SW A->100) to **#100** and the black wire (TRANS SW B->30) to **#30**.

Bag #39 RADIATOR COOLING FANS: The Northstar system requires the use of two electric radiator cooling fans. The ECM controls the fans at two speeds (low & high) depending on certain sensor inputs. The fans must be wired as follows for them to function properly. This system also requires three cooling fan relays which are pre-wired and mounted in the Telorvek cover. Three relays (GM Part No.14100455) will have to be installed or the fans will not function. **(CAUTION THE FANS WILL NOT WORK WITHOUT THE RELAYS-USE Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455)**

Connect the pink wire (115->FAN 1 POS) to **#115** and the brown wire (116->FAN 1 NEG) to **#116** and run both wires to the primary cooling fan. Connect the pink wire to the positive terminal (wire) on the fan and the brown to the negative terminal (wire) on the fan. Connect the red wire (117->FAN 2 POS) to **#117** and the black (30->FAN 2 NEG) to **#30** and run both wires to the secondary cooling fan. Connect the red wire to the positive terminal (wire) on the fan and the black to the negative terminal (wire) on the fan.

Bag #40 SERVICE ENGINE SOON LIGHT and ASSEMBLY LINE DATA LINK.

(ALDL): 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 black wire (ALDL A->59) to **#59**, tan wire (ALDL M->97) to **#97** and the brown wire (ALDL L->96) to **#96**.

The Check Engine light can be any low amperage 12 volt lamp located on the dash board or where ever desired. The Brown wire (99->SES LT) runs from the light to **#99** and the Pink wire (17->SES LT) runs from **#17** to the light. This light is not required as the yellow light on top of the TELORVEK III Panel has the same function.

Bag #41 CANISTER PURGE SOLENOID: The canister purge solenoid regulates the fuel vapor consumption stored in the charcoal canister. Plug in the connector into the canister purge solenoid and run the wires to the panel. Connect the pink wire (CAN PURGE A->17) to **#17** and the dk green (CAN PURGE B->52) to **#52**.

Bag #42 ALTERNATOR

NOTE-- The Northstar computer is designed to operate and monitor the engine alternator. If you are rewiring your complete vehicle and supplied wiring for the alternator or planned to wire it yourself, disregard all other alternator wiring information and follow the alternator wiring information below.

You will hookup the large red wire (ALT POWER) to the 'bat' terminal of the alternator and run the other end to the starter solenoid. Install the sleeve & ring and connect it to the battery cable post of the starter solenoid. **NOTE: This is an important connection, the proper crimp tool is required.** The black plug is connected to the alternator and the lt blue wire (ALT FEED->120) to **#120** on the panel.

FINISHING UP

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 III 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.

STARTING THE ENGINE

Reconnect the engine control computer. 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. 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 injected cars.

TROUBLE CODES:

If the S.E.S light stays on after the engine is running, it means the ECM has detected a problem. Unlike in the past when you could jump two terminals together in the ALDL connector to get a code read out through the S.E.S light, the Northstar systems requires a scanner to read the trouble codes. Any GM dealership or service station can perform this service for you.

The following is a list of the 4.6 Northstar ECM trouble codes. Purchasing a shop manual will give you much more detail on the codes as well as how to diagnose the problem.

PO12 No 4X reference signal from ignition control module.	PO61 Cruise control vent solenoid problem
PO13 Right oxygen sensor not ready.	PO62 Cruise control vacuum solenoid problem
PO14 Shorted coolant temperature Sensor	PO63 Set vs vehicle speed difference
PO15 Open coolant temperature sensor	PO64 Vehicle acceleration too high
PO16 Generator voltage out of range	PO65 Cruise control servo position sensor failure
PO17 Left oxygen sensor not ready	PO66 Cruise control engine RPM too high
PO19 Shorted fuel pump circuit	PO67 Set/coast or resume/accel input shorted
PO20 Open fuel pump circuit	PO68 Cruise control servo position out of range
PO21 Shorted throttle position sensor or transaxle pressure control	PO69 Traction control active while in cruise
PO22 Open throttle position sensor	PO70 Intermittent throttle position sensor
PO23 Ignition control circuit problem	PO71 Intermittent manifold absolute pressure sensor
PO24 Vehicle Speed Sensor	PO73 Intermittent engine coolant temperature sensor
PO25 24X reference signal low	PO74 Intermittent intake air temperature sensor
PO26 Shorted throttle position switch or EGR	PO75 Vehicle speed sensor signal interrupt
PO27 Open throttle position switch or EGR	PO76 Transaxle pressure control solenoid circuit malfunction
PO28 Transaxle pressure switch circuit problem	PO80 TP sensor/Idle learn not complete
PO29 Transaxle shift "B" solenoid problem (1st,3rd,4th gear)	PO81 Cam to 4X reference correlation problem
PO30 Idle speed control rpm out of range	PO83 24X reference signal high
PO31 Shorted manifold absolute pressure sensor	PO85 Idle throttle angle too high
PO32 Open manifold absolute pressure sensor	PO86 Undefined gear ratio
PO33 Extended travel brake switch input circuit problem	PO88 Torque converter clutch not disengaging
PO34 Manifold Absolute Pressure Signal to high	PO89 Long shaft and maximum adapt (transmission)
PO35 Ignition ground voltage out of range	PO90 TCC brake switch input circuit problem
PO36 EGR valve prntle position out of range	PO91 Transaxle range switch problem
PO37 Shorted intake air temperature sensor	PO92 Heated windshield request problem
PO38 Open intake air temperature sensor	PO93 Traction control system link failure
PO39 Torque converter clutch engagement problem	PO94 Transaxle shift solenoid "A" problem
PO40 Power steering pressure switch open	PO95 Engine stall detected
PO41 No cam reference signal from ignition control module	PO96 Torque converter overstress
PO42 Left O2 sensor lean	PO97 P/N to D/R at high throttle angle
PO43 Left O2 sensor rich	PO99 Cruise control servo applied not in cruise
PO44 Right O2 sensor lean	PO102 Shorted brake booster vacuum sensor
PO45 Right O2 sensor rich	PO103 Open brake booster vacuum sensor
PO46 Left to right bank fueling difference	PO105 Brake booster vacuum too low
PO47 PCM/BCM link problem	PO106 Stop lamp switch input circuit problem
PO48 EGR system malfunction	PO107 ECM/BCM link problem
PO51 Prom checksum mismatch	PO108 PROM checksum mismatch
PO52 ECM memory reset	PO109 ECM memory reset
PO53 4X reference signal interrupt from ignition control module	PO110 Generator "L" terminal circuit problem
PO55 Closed throttle angle out of range	PO112 Total E Prom failure
PO56 Transaxle input speed sensor circuit problem	PO117 Shift "A"/"B" circuit output open or shorted
PO57 Shorted transaxle temperature sensor circuit	PO119 Openor shorted fuel injector
PO58 Pass key circuit problem	PO131 Knock sensor failure
PO59 Open transaxle temperature sensor circuit	PO132 Knock sensor circuitry failure
PO60 Cruise control-transaxle not in drive	PO137 Loss of ABS/TCS data

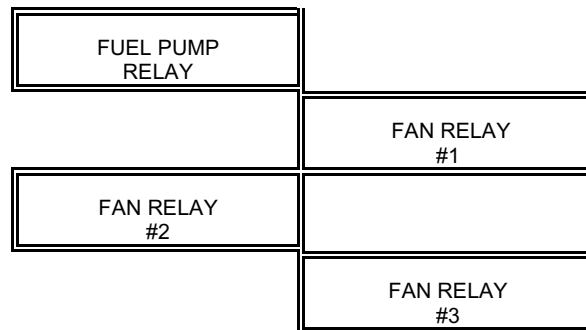
Telorvek Panel Fuse Designation, Size and Relay Center Layout

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

Ignition Feed Fuse Row #1		Battery Feed Fuse Row #2	
Fuse Designation	Fuse Size Block #1	Fuse Designation	Fuse Size Block #2
TCC RELAY, COOLING FAN RELAY #1 & #2, S.E.S LT CANISTER PURGE SOLENOID	15 AMP	FUEL PUMP RELAY, OIL PRESSURE SWITCH, ALDL	20 AMP
LEFT & RIGHT INJECTORS, POWER STEERING SWITCH, EGR SOLENOID	10 AMP	COOLING FAN RELAY #1	30 AMP
LEFT & RIGHT O2 SENSORS IGNITION CONTROL MODULE	20 AMP	COOLING FAN RELAY #3	30 AMP
TRANSAXLE	10 AMP	ECM	10 AMP



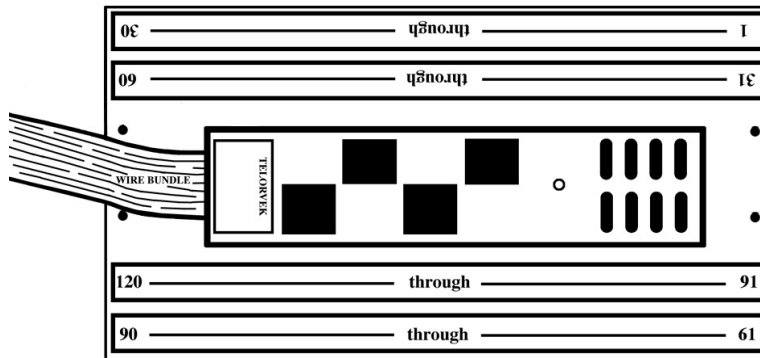
RELAY CENTER: In the cover of the TELORVEK panel are four relays the ECM uses to control fuel pump and cooling fan circuits. The ECM can not handle heavy load items and it requires a relay to handle the load and the ECM then controls the relay. The harness has a total of six relays, four in the cover of the TELORVEK panel and two that are mounted remotely. All relays in the harness require Airtex part #1R1061, Standard Motor Products part #RY116 or GM part #14100455

WARNING: All relays must be installed in the connectors. Eliminating any of them will cause damage to the engine.

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.



Optional Accessories

	GM Part No.	Ron Francis Wiring Part #
Fuel Pump Relay	14100455	FP-25
Cooling Fan Relay (3)	14100455	FP-25
Park Neutral Relay	14100455	FP-25
TCC Relay	14100455	FP-25

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!!

