ITCEMS950
Idle Timer Controller - Engine Monitor Shutdown
2014-2015 Isuzu NPR 6.0L Gasoline Engine

Contact InterMotive for additional vehicle applications

Dual module system
ITC and EMS

Introduction

The ITCEMS950 is a combination Idle Timer Controller (ITC) and Engine Monitor Shutdown (EMS) system.

The ITC portion will shut off the vehicles engine if left idling for an extended period of time. The default timer will shut off the engine after 3 minutes of idling (transmission must be in Park or Neutral).

The EMS portion continuously monitors engine and transmission temperatures and engine oil pressure. If any of these parameters falls outside of its safe operating range, EMS initiates a shutdown warning. After sounding a warning and flashing the display, EMS will shut off the engine when the vehicle comes to a stop (transmission in any gear).

The EMS system also provides auxiliary inputs which can allow a 3rd party system to request an engine shut down, such as a fire suppression system.

EMS Parameters that trigger a Warning and Shutdown:

- Engine Coolant Temperature > 250° F
- Transmission Fluid Temperature > 300° F
- Loss of Engine Oil Pressure
- Auxiliary input activated (connected to 3rd party system)

EMS Data Logger - EMS records shutdown events in memory and what triggered them, along with driver response. The ten most recent events are recorded and can be displayed on a laptop. This requires USB to Serial Communication cable which can be purchased separately from InterMotive.

Installation Instructions

Disconnect vehicle battery before proceeding with installation

WARNING
Disconnect the battery to prevent setting a check engine light.

IMPORTANT—READ BEFORE INSTALLATION

It is the installer's responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts and high heat sources. Failure to do so could result in damage to the system or vehicle and create possible safety concerns for the operator and passengers.
Avoid placing the modules where they could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Avoid radio frequency energy from antennas or inverters next to the module. Avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

ITC and EMS Modules Installation

Remove the lower dash panel below the steering column and find a suitable location to mount the modules. Mount the modules in an area away from any external heat sources (engine heat, heater ducts, etc.). Do not actually mount the modules until all wire harnesses are routed and secure. The last step of the installation is to mount the modules. When installing the harnesses, leave several inches of take-out such that the modules can be removed if necessary.

Data Link Harness (with two 6-Pin Connectors)

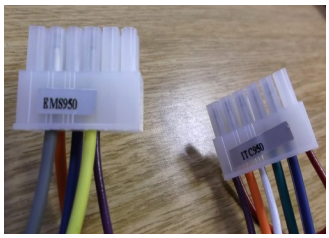
1. Locate the ITCEMS950 data link harness in the kit. See picture. This will "T" into the vehicles OBDII connector.
2. Locate the vehicles OBDII Data Link Connector located below the lower left dash panel under the steering wheel area. See picture.
3. Remove OEM OBDII connector by pinching the sides and pushing it out the rear of the OEM bracket.
4. Install the white ITCEMS950 data link harness OBDII connector into the OEM bracket by pushing it in from the rear.
5. Plug the red connector from the ITCEMS950 data link harness into the vehicles OBDII connector. Ensure the connection is fully seated and secure with the supplied wire tie.
6. Secure the harness so that it does not hang below the lower dash panel.
7. The two 6 pin data link harness connectors are wired identically. Plug one into the ITC module and the other into the EMS module. Modules are labeled appropriately.

ITCEMS950 data link harness

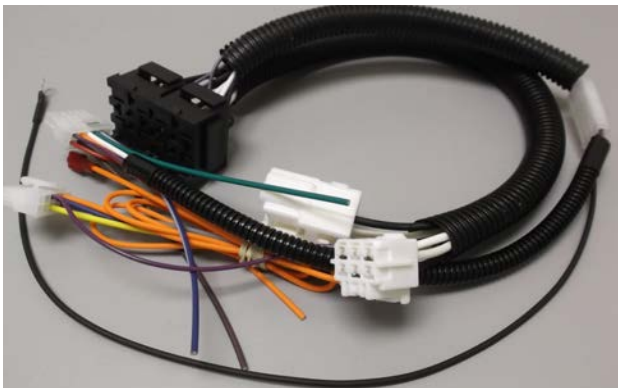
OEM OBDII bracket with White ITCEMS950 connector installed, with Grey OEM connector in lower right

ITCEMS950 Ignition Switch Harness

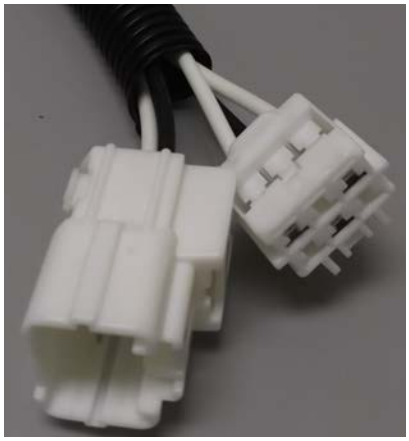
This harness T's into the vehicles ignition switch and runs signals to both the ITC and EMS modules using two 12 pin connectors. ***Note that the two 12 pin connectors are wired differently and MUST be correctly plugged into their respective ITC and EMS modules.*** Each 12 pin connector is labeled indicating which module it plugs into.



Two 12 pin connectors



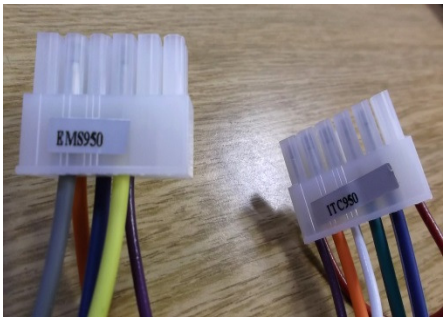
ITCEMS950 Ignition switch harness



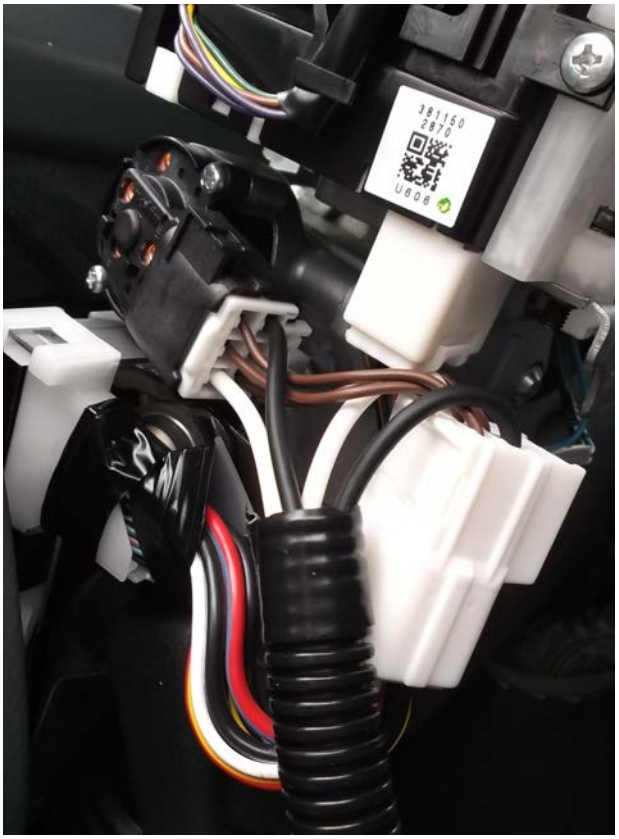
Ignition switch connectors mate with Isuzu switch and harness

ITCEMS950 Ignition Switch harness (cont.)

1. Remove the upper and lower steering column trim covers by removing three torx screws from the bottom cover.
2. Locate the ignition switch connector and unplug it from the switch.
3. Install the ITCEMS950 ignition switch harness between the Ignition Switch and the OEM harness.
4. Route the ITCEMS950 harness down the steering column and secure with cable ties.



12 pin ITC and EMS connectors on ignition switch harness



Back side of Isuzu ignition switch with ITCEMS950 harness "T" installed between the switch and OEM harness.

NOTE: the 12 pin connectors MUST be correctly plugged into their respective module. They are labeled which module they connect to.

1. Plug the 12 Pin ITC connector into the ITC module.
2. Plug the 12 Pin EMS connector into the EMS module.
3. There are two black wires with eyelets which must be connected to chassis ground. Find an appropriate location and ground the harness eyelets with a screw.
4. There are two sections of the ignition switch harness. These are normally supplied already plugged together with their 4 pin in-line connectors, but allow installing these sections separately if desired.

ITC Optional Shutdown indicators and override inputs

There are 3 optional signals with "flying lead" wires provided for connecting to external equipment or devices as described below. These three signal are located on the ITC modules 12 pin connector.

ITC Warning beeper, lamp or LED output - (Note: the provided beeper is connected to the EMS module and is not used for ITC functions). Orange wire, Pin #2. This signal provides 12V when active. The maximum allowed draw on this circuit is 1/2 amp. If an LED is used, it must have either an integral resistor or one wired in series. (A typical value would be 13V/0.02A= 650 ohms. 680 ohms is a recommended standard value. Use 1/2W resistor). Attach this Orange wire to the positive input for the LED or beeper. Attach a ground wire to the negative side of the circuit. This output pulses repeatedly during the final 30 seconds leading to idle shutdown.

ITC Override High input - Green wire, pin #4. Applying 12V to this input will prevent engine shut down, and can be connected to equipment such as a PTO, pumps, compressors, etc.

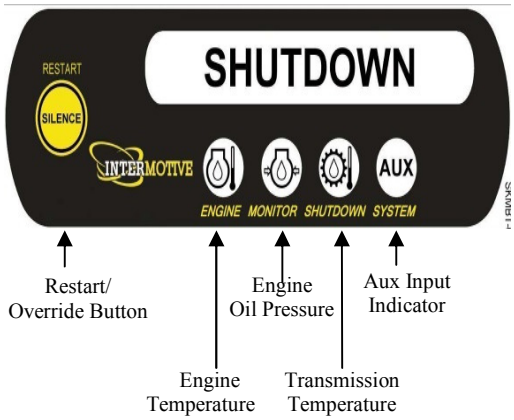
ITC Optional Shutdown indicators and override inputs (cont)

Override Low input - Blue/White wire, pin #5. Applying ground to this input will prevent engine shut down, and can be connected to equipment such as a PTO, pumps, compressors, etc.

Ensure that unused flying leads will never make electrical contact with anything by taping, cutting, or extracting the wires (pin extraction requires Molex tool).

EMS LED Display Panel

1. Locate a suitable position on the dashboard within view of the driver for mounting the EMS LED Display Panel. The length of the display harness is 40". This is the maximum distance the display can be mounted from the EMS module.
2. Drill a 5/8" hole in the dashboard where the center of the display will be located, being careful not to damage anything behind the dashboard.
3. Run the free end of the display harness under the dash and out through the 5/8" hole.
4. Attach the end of the display harness to the EMS LED Display Panel.
5. Ensure panel is level, and secure using the supplied screws.
6. Attach the 4 Pin EMS LED display harness to the EMS Module's 4-pin connector.

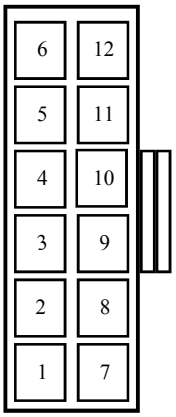


EMS Control Outputs and Input Connections - 12-pin I/O connector

A harness with a 12-pin connector is provided with the following wires. Note that most of these signals are optional and not all of these wires will be used in any given application. Unused wires should be left as "no connects" and taped up to prevent contact. Connect the appropriate wires that your application requires. Solder and tape/heat shrink all connections.

EMS 12-pin connector pin out definition

- Pin #1 - Not Used.
- Pin #2 - Gray - Optional EDR Input - Engine Disable Request Input. (Ground)
- Pin #3 - Not Used.
- Pin #4 - Yellow - Optional EDR Input - Engine Disable Request Input. (12 V)
- Pin #5, #6, #7 - Not Used.
- Pin #8 - Orange - Warning Indicator Output. Connected to beeper.
- Pin #9 - Blue - Optional EDC Output - Engine Disabled Confirmation. (12 V)
- Pin #10 - Connected to ignition relay.
- #11, #12 - Not Used.



Back of the
12 Pin Connector

EMS Control Outputs and Input Connections (cont)

EMS Engine Shutdown Request Input (Optional)

The EMS 12 pin connector Pin #2 Gray wire can be connected to a grounding Engine Disable Request input which will activate the Engine Shutdown System and shut off the engine.

Warning: If the 12 pin connector Pin #2 Gray wire is shorted to ground, the engine will turn off when the vehicle speed equals 0 MPH.

Engine Shutdown Confirmation Signal Output (optional)

The EMS 12 pin connector Pin #9 Blue wire will provide a 12V confirmation output when the Engine is shutdown. This indicates to an auxiliary system that the vehicle has been disabled.

EMS Shutdown Request

The EMS 12 pin connector Pin #4 Yellow wire input can be connected to a 12V Engine Shutdown Request which will activate the Engine Shutdown System and shut off the engine. (For use with auxiliary systems, such as fire suppression, that require an engine shutdown).

EMS Warning Indicator Beeper

1. Locate an accessible location to mount the warning indicator beeper so that it is audible to the driver.
2. Drill a 1 1/8 inch hole to mount the beeper or wire tie it up under the dash.
3. Connect the EMS 12 pin connector Pin #8 Orange wire to the beeper positive (+) terminal.
4. Connect the Black wire to the beeper negative (-) terminal.
5. Attach the beeper Black wire eyelet to chassis ground.
6. The bezel on the beeper can be rotated for volume control.

Mounting the EMS Module

Ensure all the harnesses are properly connected and routed, and are not hanging below the dash area. Mount the EMS module as described on page two and secure using screws or double sided tape.

Do not mount the ITC at this time but leave it visible for the final testing procedure.

Reconnect the vehicle battery

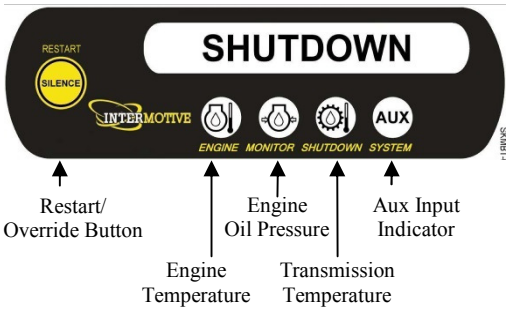
Post Installation Testing

ITC Testing (ITC module must be visible for this test)

1. Start the engine.
2. Enter ITC Test Mode by pushing and holding the Service Brake while setting and releasing the Park Brake 4 times within 10 seconds. When successful, LED10 on the ITC module will be lit.
3. Release the Service Brake. When this mode is active, the shut off timer is reduced to 15 seconds. LED 9 will come on for 1 second at the start of the shut off timer. Confirm that Park Brake, Service Brake, or Accelerator Pedal input will reset the timer. LED 9 will light to verify each input.
4. Verify function of any lamp or buzzer connected to the optional indicator output. During the final 5 seconds the optional indicator will flash or sound multiple times until the engine is shut off.
5. Verify engine shuts off and LED10 goes off.
6. Turn off the ignition. Status LED will light briefly.
7. Mount the ITC module after the above post installation checks are successfully completed.

EMS testing: (Ensure vehicle is safe to drive for this test)

1. With transmission in Park and Park Brake set, key up and start the engine.
2. Verify the LEDs prove-out for approximately two seconds on EMS LED Status Panel.
3. Push and hold down the yellow Restart/Silence button for 10 seconds to enter test mode. Release the button once the warning sounds.
4. The Shutdown LED will flash and Beeper will sound for three seconds.
5. The Shutdown LED will illuminate solid and the engine will shut down.
6. Push and release the Restart/Silence button to restore ignition function.

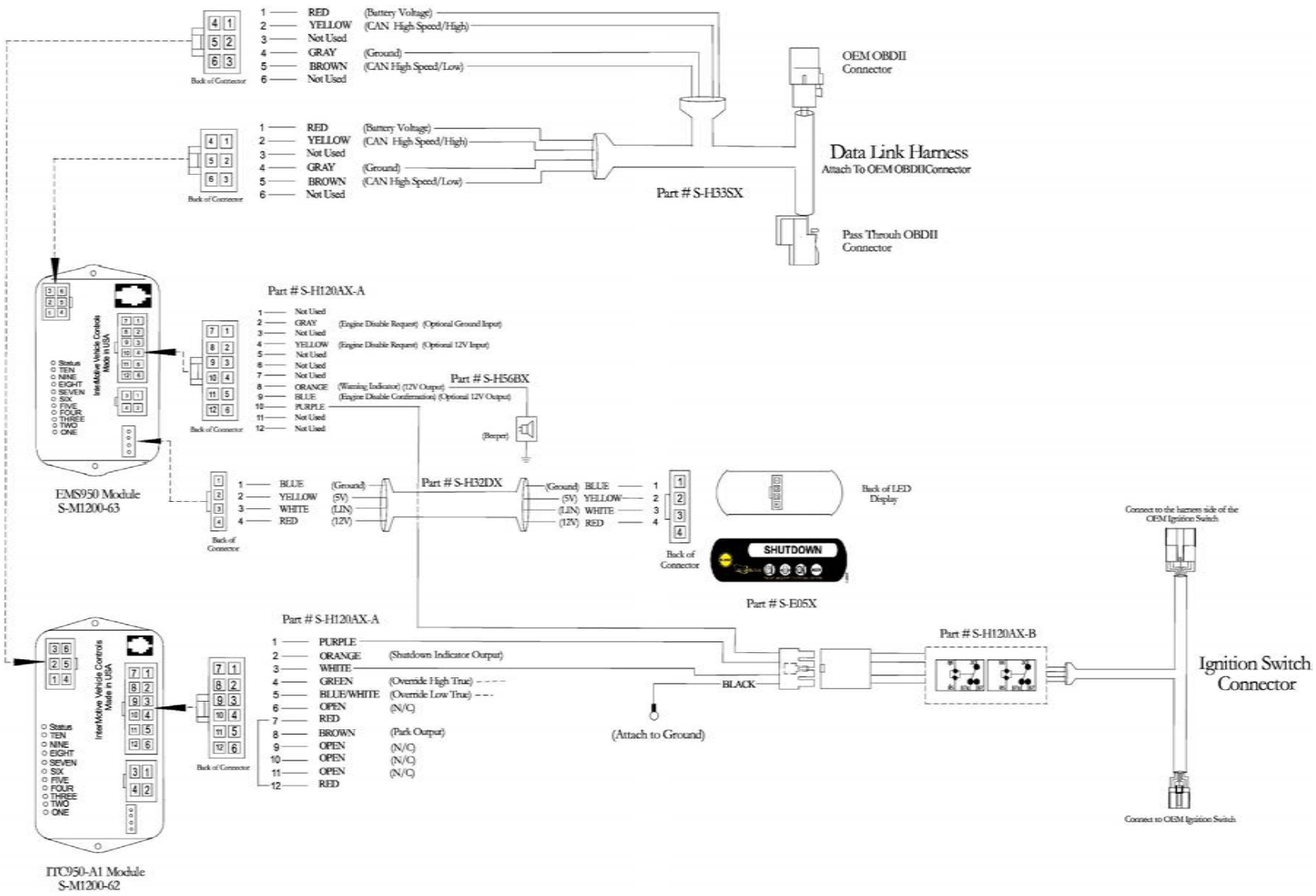


7. Restart the vehicle. Test drive vehicle, maintaining a speed above 5 MPH.
8. While driving vehicle, push and hold down Restart/Silence button for 10 seconds to enter test mode again.
9. Briefly push Restart/Silence button to silence the beeper.
10. Slow the vehicle speed to 0 MPH. Verify the Shutdown LED illuminates solid and the engine shuts down.
11. Push the Restart/Silence button to regain ignition control. Verify engine will restart using the key.
12. In vehicles with auxiliary systems which connect to EMS to request engine shut down, a shutdown request can be simulated by either grounding the pin #2 Gray wire, or applying 12V to pin #4 Yellow wire. Verify the system shuts down the engine when requested.

The ITCEMS950 system is properly installed only if it passes all of the above steps. If any irregular operation is observed, contact InterMotive at 530-823-1048 for technical assistance.

Final assembly

Ensure all harnesses are properly routed, and are not hanging below the dash area.
Reinstall the steering column trim cover and under dash panel. Installation is complete.



Submit product registration at www.intermotive.net

If the ITCEMS950 fails any step in the Post Installation Check List, review the installation instructions and check all connections.
If necessary, call InterMotive Technical Support at (530) 823-1048.

Appendix A

Reconfiguring the minimum engine shut down temperature and shut down times (optional)

Requirements

- USB to Serial Communication cable (Intermotive part number s-h37a1) which is a one time purchase. This is required for all programming.
- Laptop computer (programming is done while the module is on the vehicle).

Reconfiguration

Ensure that the proper drivers are installed for the USB to Serial Communication cable provided by InterMotive. All drivers files are located online at http://www.ftdichip.com/Drivers/VCP.htm

1. Find the correct drivers for your PC and follow the steps to download the latest version (located under the "Driver Version" heading). If unsure about the installation process, contact InterMotive for further assistance.
2. Once the installation process is complete, plug one end of the cable into the PC's USB port.
3. Ensure the vehicle key is off and plug the other end into the ITC950 module's COM port.
4. Open the Microsoft communication application HyperTerminal. This program can be found under: Start > All Programs > Accessories > Communications > HyperTerminal.
5. A prompt will appear to give this connection setup a name. It is recommended to use something meaningful such as "ITC Config", which may be reused in the future.

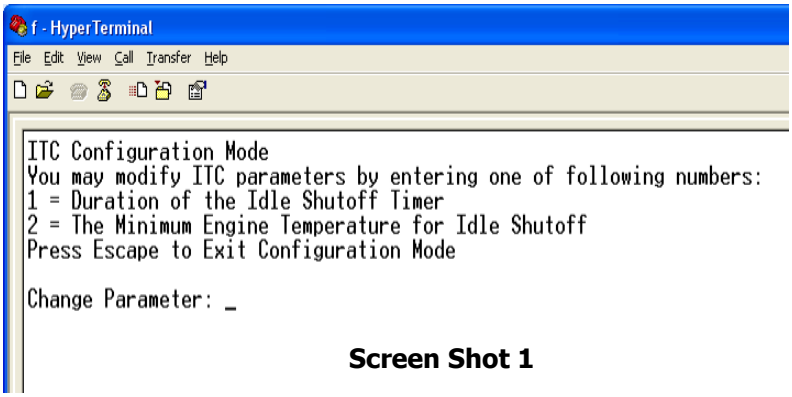
The next window will prompt to select the "COM port" to use for communicating with the module. Even though this download cable plugs into a USB port, it is treated like a serial COM port by HyperTerminal. Typically, the highest numbered COM port will be the InterMotive Communication cable.

Note: The COM port number can be confirmed in Windows XP by right-clicking on 'My Computer' and selecting 'Properties.' From this window select the 'Hardware' tab and click on 'Device Manager.' In the Device Manager window, expand the 'Ports' menu and the download cable connection will be displayed as 'USB Serial Port.'

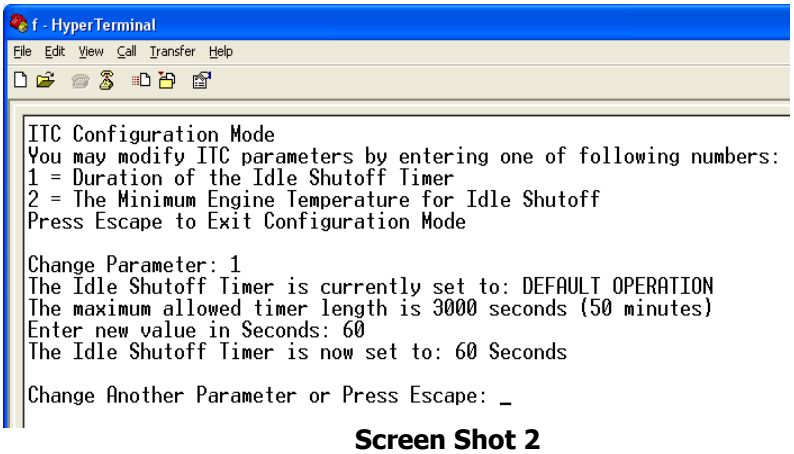
Reconfiguring the Minimum Engine Shut Down Temperature and Shut Down Times (cont)

In the next HyperTerminal window, several of the default parameters for the Port Settings need to be changed. Change the Bits per second to: **57600**, Data bits to: **8**, Parity: **None**, Stop bits: **1** and Flow control: **None.** HyperTerminal setup is now complete. The above setup information will be stored under the connection name. This step will not need to be done again in HyperTerminal.

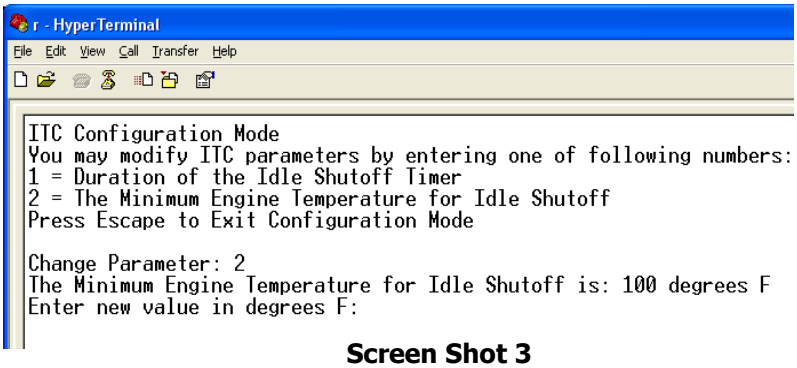
1. Turn the vehicle key to the ON position. The ITC950 module will wakeup and text will be displayed on the open HyperTerminal window.
2. If nothing appears, unplug the 6 pin Data Link connector going into the ITC950 module, wait several seconds, and plug the connector back in.
3. If still nothing appears, go to File > New Connection and try re-configuring the HyperTerminal as described above. If unsuccessful, contact InterMotive for further assistance.
4. With communication established, type in the word "config" (followed by the enter key) and the screen will look like Screen Shot 1
5. Enter the Parameter to be changed: 1 or 2.
6. If 1 is selected, the screen will look like Screen Shot 2. Key in a new Idle Shutdown Time in seconds. This new shut down time will be used regardless of Park Brake on or off. Restoring the default 5/15 minute timing can be done by setting this time to 10,000.
7. If 2 is selected, the screen will look like Screen Shot 3. Key in a new minimum warm up temp in degrees F. ITC950 will not shut the engine off until this temperature is reached.
8. Press escape when parameters are set correctly.
9. When finished, key off ignition and disconnect the Communication cable.



Screen Shot 1



Screen Shot 2



Screen Shot 3

Appendix A (cont)

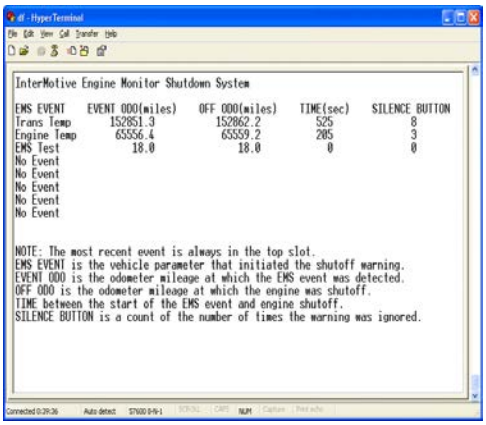
Viewing EMS950 Shutdown Record

Follow these steps to view the record of the 10 most recent engine shutdown events:

- Ensure that the proper laptop drivers are installed for the USB to Serial Communication cable (P/N S-H37A1). All driver files are located online at: http://www.ftdichip.com/Drivers/VCP.htm
- Find the correct drivers for your system and follow the steps to download the latest version (located under the "Driver Version" heading). If unsure about the installation process, please contact InterMotive for further assistance.
- Once the installation process is complete, plug the Communication cable into one of the computer's USB ports.

1. Ensure the vehicle's key is off and plug the other end of the download cable into the EMS950 port labeled 'COMM'.
2. Open the Windows communication application HyperTerminal. This program can be found under: Start > All Programs > Accessories > Communications > HyperTerminal
3. You will be prompted to give this connection setup a name. It's suggested to use something meaningful such as EMS Viewer.
4. The next window will prompt you to select the COM port for this connection. Typically, the highest numbered COM port will be the InterMotive Communication cable.

Note: This can be double-checked on Windows XP by right-clicking on 'My Computer' and selecting 'Properties.' From this window select the 'Hardware' tab and click on 'Device Manager.' In the Device Manager window, expand the 'Ports' menu and the download cable will display as



In the next window, several of the default parameters for the Port Settings need to be changed. Change the Bits per second to: **57600**, Data bits: **8**, Parity: **None**, Stop bits: **1**, and Flow control: **None**. HyperTerminal setup is now complete.

1. Turn the vehicle key to the ON position. The EMS module will wakeup and text will display on the open HyperTerminal window.
2. If nothing appears, unplug the 6 pin connector going into the EMS module, wait several seconds and plug the connector back in.
3. If still nothing appears, go to File > New Connection and re-configure the HyperTerminal as described above. If unsuccessful, contact InterMotive for further assistance.
4. With communication established, type in the words "get data" followed by the enter key. A record of the 10 most recent engine shutdown events will display.
5. The screen data can be captured to the Windows clipboard for later printing by using the Edit copy command.
6. When finished, key off and disconnect the Communication cable.

Leave in vehicle
ITCEMS 950
Operating Instructions
Idle Timer Controller-Engine Monitor Shutdown

System Overview

The ITCEMS950 is a combination **anti-idle** and **engine monitor shutdown** system. It automatically shuts off the engine if the vehicle is left idling for an extended period of time with no operator input. It will also sound a warning beeper and flash an indicator if the temperatures get too hot or the engine loses oil pressure. It will then shut down the engine when the vehicle comes to a stop. The system also provides data logging whenever an engine shutdown event occurs.

Idle Timer Controller (ITC) Operation

Default operation - the engine will shut off after 3 minutes of idling if the transmission is in either Park or Neutral.

Custom operation - A different idle shutoff time may have been programmed into the system by the final stage manufacturer.

Ignition Power Restore and Restart - After an automatic idle shutoff, the ignition key must be cycled off, then back to Run, before ignition power will be restored, and the vehicle can be restarted by turning the key to Start.

When ITCEMS950 has switched off Ignition power, there is still a small power draw from the vehicle battery. This draw could potentially result in a dead battery if the key is left ON and in the vehicle for several days. For this reason, as well as to prevent theft, the key should always be removed from the Ignition once the operator has finished with the vehicle.

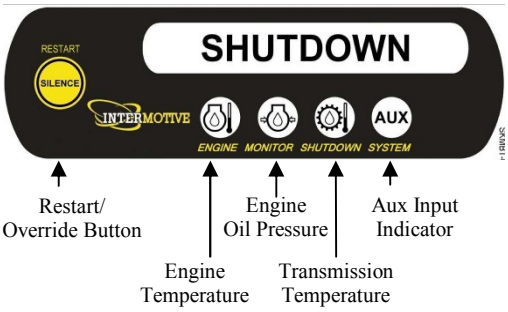
Optional Shutdown Indicators - The vehicle's final stage manufacturer may have installed an optional indicator lamp or beeper which ITC can use to warn of impending idle shut down. If installed, it will flash or sound repeatedly during the final 30 seconds prior to shut down.

Applying Service Brake, Accelerator pedal or Park Brake will restart the shut down timer back to the beginning.

Timer Override Inputs - The ITCEMS950 provides Timer Override inputs which the final stage vehicle manufacturer may have wired to other equipment (PTO, compressor, inverter, etc….). This allows certain equipment on the vehicle to prevent idle shut down as necessary.

Once the optional equipment is switched off the ITCEMS950 will resume Idle Timer shut down operation.

Engine Monitor Shutdown (EMS) Operation



The system consists of a control module, a beeper, an LED panel with several indicators, and a "silence" button for the beeper.

The Engine Monitor and Shutdown (EMS) System monitors Engine Coolant Temperature, Transmission Coolant Temperature, and Engine Oil Pressure. If any of these parameters transition above their normal operating range, the system will initiate a flashing and beeping warning to alert the driving to the problem. If the vehicle is stopped, the EMS system will shut down the engine. If the vehicle is being driven, it will not shut down the engine until the vehicle comes to a stop.

When the ignition is turned on, the EMS powers up and the LED panel lights up for several seconds as part of a "prove out" sequence. Once prove out is complete, the module begins monitoring the vehicle's parameters. It uses this information to determine whether operating conditions are safe or potentially damaging to the engine. If any parameters are above their normal operating range, the EMS system will issue a shutdown warning which consists of beeping and flashing the LED panel.

The driver is able to silence the beeper for 30 seconds by pushing the "Silence" button.

The driver should immediately move the vehicle to a safe location and bring it to a stop.

Once the vehicle comes to a stop, EMS will shut off the engine in an effort to prevent further engine damage.

Additionally, there are several inputs to the EMS system which can allow auxiliary equipment to shut the engine down (i.e. fire suppression systems).

The EMS records the shutdown event and why it was triggered. It also logs silence button activations. The ten most recent events are stored in the module's memory. To extract this information, the USB to Serial Communication cable (part number S-H37A1) is required, and can be purchased separately from InterMotive.

Engine Shutdown can be triggered from any one of the following conditions:

- Engine Coolant Temperature greater than 250° F. Engine Temperature LED illuminates.
- Transmission Fluid Temperature greater than 300° F. Transmission Temperature LED illuminates.
- Low Engine Oil Pressure. Engine Oil Pressure LED illuminates.
- Auxiliary Engine Disable Request input will illuminate Auxiliary LED.