

# 1997 - 2004 Corvette: GM TechLink: Instrument Panel Cluster Function and Diagnosis

Scanning the Instrument Panel Cluster (IPC) while driving the Corvette will tell you the speed of the car, how much fuel is in the gas tank, the temperature of the engine coolant and other vehicle information. But it's not the IPC that's really providing that information. In most cases, the IPC simply is displaying data provided from other control modules in the vehicle. It talks to practically every module in the car.

In addition to displaying the gage readings of the Corvette, the IPC is the primary display unit for other systems in the vehicle that require display functions, such as warning indicators, the odometer, fuel consumption data, the trip computer and various security functions.

It's easy to see that the IPC manages a lot of information on the Corvette. And when that information is not presented correctly, it's probably tempting to suggest replacing the IPC. But before you do, it's important to perform all the necessary diagnostics and understand that the IPC doesn't control all of the information it displays.

When an IPC is replaced, it is sent to component analysis shows that replaced clusters have had no trouble found in up to 50 percent of the cases. Unnecessarily replacing IPCs leads to high warranty expenses and, of course, unsatisfied customers who return when the condition is not repaired correctly.

## The Display

The IPC is capable of displaying system information and driver warning/status messages by vacuum fluorescent (VF) lighting, ultraviolet lighting and air core gages.

The Driver Information Center (DIC) is a 20-character vacuum florescent display that offers driver selectable information and warning/status messages.

The gage display includes the speedometer, fuel gage, tachometer, coolant temperature, oil pressure and voltage.

The indicator illumination and chime functions are either controlled directly by the IPC or by a dedicated circuit to the IPC. The IPC controlled indicators are illuminated when a message to perform that function is received on the Class 2 serial data line. Indicators that are illuminated by a dedicated wire to the IPC are controlled directly by those other systems.

The IPC controls all chime functions and the chime is integrated within the IPC. Since the IPC receives information from other systems to execute some functions, it's important to check those systems during diagnosis.

## **The Diagnosis**

Many IPC malfunctions may be the result of faulty wiring and connectors. The IPC has been found to be very reliable and not the likely cause of a system malfunction in most instances.

One of the first steps in diagnosis is to follow the diagnostic tables in the service manuals while using a scan tool. A scan tool can be used to command many of the IPC's display functions on and off, and to check the input status of the DIC switches. The gages also can be checked for proper operation. All of the IPC gages are driven by data received from the PCM, with the exception of the battery voltage gage. The input and data values from the PCM and other control modules that the IPC communicates with can be reviewed using a scan tool as well. All of this information can be checked without removing any components or interior trim from the vehicle.

If any DTCs are stored in the IPC, refer to the diagnostic procedures for the specific DTC table. Because the IPC communicates with other modules –

including the PCM, BCM, door control module and others -- it will store DTCs when it experiences a communication problem.

All IPC DTCs and related codes are listed on the scan tool. DTCs that begin with a "U" indicate a Class 2 communication error resulting from some other control module not communicating with the IPC.

### **Line of Communication**

The IPC monitors information from many other control modules on the Class 2 serial data line. When there is a communication failure, a DTC may set and the cluster gages will go to a default position. If a vehicle comes to the dealership with improperly working gages, check the PCM and other control modules that send data to the IPC for proper communication.

When the ignition key is turned to the On position, the IPC performs a self-check and fully sweeps the gages. A communication malfunction while driving may result in the cluster gages sweeping again. This indicates a problem with the Class 2 serial data line or related condition, such as a loose connector.

If the fuel tank data coming from the PCM is faulty, for example, the cluster commands the fuel gage to empty and sets a DTC. If this condition does not reoccur, the DTC will be cleared. Without the proper diagnosis and with fuel in the tank, it may look like the cluster is the culprit. A scan tool can be used to sweep the gages and test their function. If the gages sweep, the cluster is operating properly and the problem is elsewhere in the fuel system. On 2000 models, the DTCs will not be cleared, so they will be available to help in diagnosis even if the condition is not currently occurring on the vehicle.

On some early C5 models, there was a calibration concern between the analog voltage gauge and the digital voltage display on the DIC. Using a scan tool, the voltage gage can be recalibrated with a new calibration that is available to better match the readouts between the analog and digital voltage gauges. Only the voltage gauge on the IPC can be recalibrated.

## IPC Replacement

When replacement of the IPC is determined to be necessary, do not set the IPC, either the old or new one, on its face when it is out of the vehicle. This could damage the fluid filled air core gauges.

The IPC can be removed by first removing the knee bolster, lowering the steering column, and removing the four fasteners (two on top and two on bottom) that secure the cluster to the steering column bracket. There also is a tab on the back of the IPC that positions it on the steering column bracket. On vehicles equipped with the Head-Up Display, it is connected to the top of the IPC.

Removing the cluster without removing very much of the interior trim helps minimize possible squeak and rattle concerns.

Before shipping an IPC to a Delco Service Center, the I/P cluster bezel and the I/P dimmer switch must be removed from the IPC. The bezel and switch are to be reused on the replacement IPC.

The IPC can be ordered only from a Delco Service Center, not GM SPO. The Delco Service Center sets the odometer with the correct vehicle mileage before shipping the cluster. If the vehicle is out of service, notify the Delco Service Center so that the new cluster will be shipped as soon as possible.

--Don Begin, GM TechLink, November 1999

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