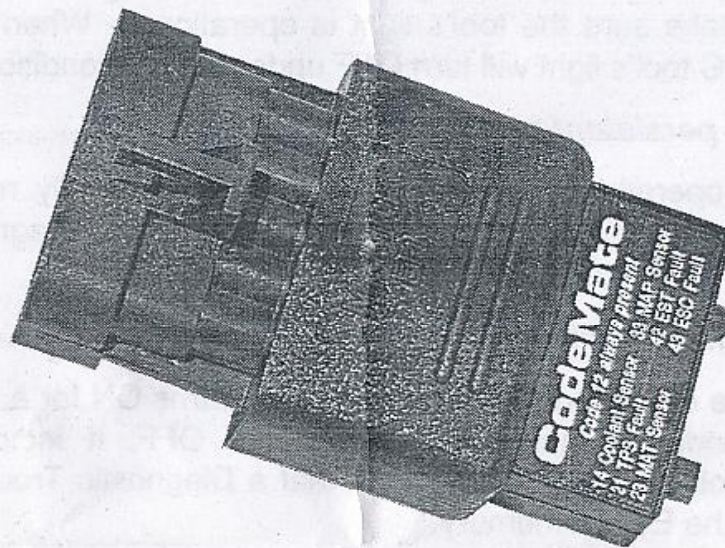


Diagnostic Trouble Code Tool

P/N 12489400



The GM Performance Parts Ramjet Engine Control Module (ECM) continually checks the integrity of its sensors and controls. When a problem is detected, a Diagnostic Trouble Code (DTC) is set and retained in the ECM's computer memory. These stored trouble codes are intended to assist a service technician in diagnosing engine and control system problems.

This diagnostic tool provides the service technician with 3 separate diagnostic functions. It can be used as a Malfunction Indicator Lamp (MIL), a trouble code display & erase tool, and a base spark timing tool.

CONNECTING THE DTC TOOL

- 1) Turn the engine's ignition switch to the OFF position (engine not running).
- 2) Locate the engine's Data Link Connector (DLC).
- 3) Place DTC tool's test switch in the OFF position and plug the DTC tool unit into the Data Link Connector. Be sure to slide the DTC tool completely into the data connector so that the connector's locking tab clicks into place. With this accomplished, the DTC tool unit is now properly connected.

MALFUNCTION INDICATOR

With the DTC tool unit plugged into the Data Link Connector and its test switch set to the OFF position, the tool will function as a Malfunction Indicator. During engine operation, this function informs the service technician that a problem has occurred and that the vehicle should be brought in for service as soon as possible.

When used in this mode of operation, the DTC tool's light will turn ON when the **ignition key is ON** and the **engine is NOT running**. This functions as a "bulb test" to make sure the tool's light is operational. When the engine is started, the DTC tool's light will turn OFF under normal conditions.

Indication of a persistent problem:

During engine operation, if the DTC tool's light continually remains ON, it indicates that a ***persistent*** problem is present and a Diagnostic Trouble Code has been stored in the ECM's memory.

Indication of an intermittent problem:

If, during engine operation, the DTC tool's light turns ON for a brief period of time (10 seconds or more) and then turns OFF, it indicates that an ***intermittent*** problem has occurred and that a Diagnostic Trouble Code has been stored in the ECM's memory.

READING TROUBLE CODES

The DTC tool is capable of reading trouble codes that are stored in the ECM's computer memory. As described in the preceding section, trouble codes are stored when the ECM detects an ***intermittent*** or ***persistent*** problem related to the EFI system. Trouble code read-out should be performed with the ignition **Key ON** and the **Engine OFF**. Use the following steps to read trouble codes.

- 1) Follow the steps described in "Connecting the DTC Tool" to install it onto the engine's Data Link Connector.
- 2) Turn the ignition key ON but DO NOT start the engine. (Key ON - Engine OFF)
- 3) Place the DTC tool's test switch in the ON position. This action puts the EFI system into the *Service Mode*.
- 4) Observe the sequence of flashes on the DTC tool's indicator light.
- 5) When complete, turn the ignition key OFF and disconnect the DTC tool.

Upon the initial activation of the DTC tool's test switch, the indicator light should flash Code 12 three times consecutively. This Code 12 sequence consists of a "**Flash, pause, Flash-Flash, long pause**" and is repeated two more times for a total of three readouts.

Code 12 indicates that the ECM's diagnostic capabilities are working. Following the Code 12 sequence (Code 12 displayed 3 times), any stored trouble codes will be displayed in a similar manner.

GM Ramjet PFI Trouble Codes	
Code	Description
13	Oxygen Sensor Inactive
14	Coolant Sensor Voltage High (cold)
15	Coolant Sensor Voltage Low (hot)
21	Throttle Position Sensor Voltage High
22	Throttle Position Sensor Voltage Low
23	Manifold Air Temp Sensor High (cold)
24	Speed Sensor Inactive (if installed)
25	Manifold Air Temp Sensor Low (hot)
31	Governor Not Tracking
32	EGR Valve Not Tracking (if installed)
33	Manifold Absolute Pressure Sensor High
34	Manifold Absolute Pressure Sensor Low
41	Electronic Spark Timing Open Circuit
42	Electronic Spark Timing Grounded Circuit
43	Electronic Spark Control Detects Continuous Knock
44	Electronic Spark Control Cannot Detect Knock
45	Coil Driver Fault
51	ECM Calibration Checksum Error
52	ECM Hardware Failure
54	Oxygen Sensor Lean
55	Oxygen Sensor Rich
61	Fuel Pressure Sensor High
62	Fuel Pressure Sensor Low

CLEARING TROUBLE CODES

To clear stored trouble codes with the DTC tool use the following procedure:

- 1) Follow the steps described in "Connecting the DTC Tool" to install it onto the engine's Data Link Connector.
- 2) Turn the ignition key ON but DO NOT start the engine (Key ON - Engine Off).
- 3) Place the test switch in the ON position. This action puts the EFI system into the Service Mode
- 4) Move the throttle, while in neutral, from 0% to 100% then back to 0%
- 5) Turn the ignition key OFF for 5 seconds.
- 6) Perform the "Reading Stored Trouble Codes" procedure to verify that the codes have been cleared.
- 7) When complete, turn the ignition key OFF and disconnect the DTC tool.

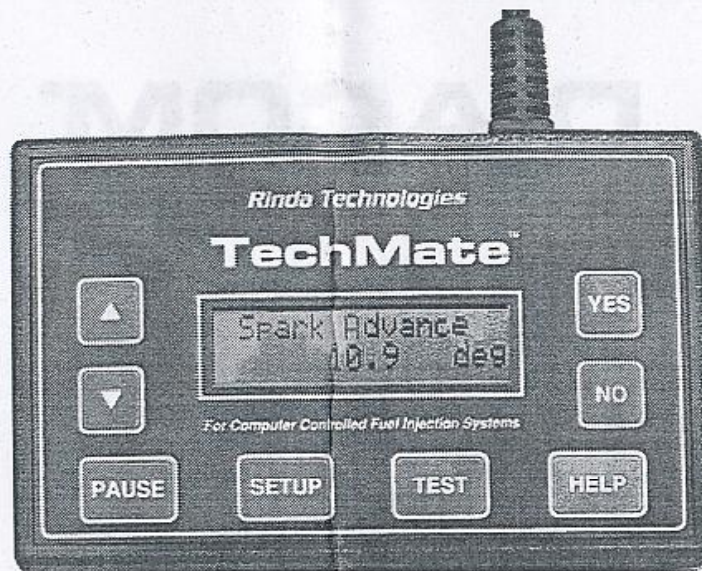
Note: Always be sure that the engine's battery is fully charged before attempting the above procedure. A low battery may impair the ECM's ability to clear its stored trouble codes.

BASE SPARK TIMING FUNCTION

As a result of its ability to place the EFI system in its Service Mode and also hold the Ignition Spark Advance to a fixed value during this mode, the DTC tool provides the technician with a convenient method of setting the engine's Base Spark Timing. The procedure requires the use of an appropriate timing light as well as adherence to the manufacturer's recommended steps for this service. Please refer to the manufacturer's service manual for details on performing this procedure.



GM Ram Jet Diagnostic Tools



TechMate Scan Tool

This self-contained, hand-held scan tool displays complete GM Ram Jet fuel injection system information allowing you to perform component level engine diagnosis like the pros. The TechMate scanner communicates directly with the Ram Jet's fuel injection computer and provides a wealth of system information. If you're serious about engine performance and troubleshooting this is the tool for you.

- Display live sensor readings
- View spark advance and fueling information
- Extract and erase ECM fault codes
- View fault code descriptions
- Read engine operating hours
- Monitor system status indicators
- Scan ECM inputs and activate outputs
- Set base engine timing
- Perform fuel injector leak-down tests

**Rinda
Technologies**

(773) 736-6633
www.rinda.com

GM Ram Jet Diagnostic Tools

DIACOM®

RAMJET PC DIAGNOSTIC SOFTWARE
FOR WINDOWS 98, XP, 2000



Save hours in troubleshooting time with this sophisticated diagnostic software system. Used in conjunction with your PC, Diacom taps into the Ram Jet engine control module allowing you to view and record engine performance information as well as quickly zero in on Ram Jet malfunctions.

Diacom software displays over 30 engine parameters simultaneously allowing you to get the "big picture" during your diagnostic session or performance run. Diacom records and graphs data from all accessible Ram Jet sensors and controls. It also displays and erases system trouble codes, shows engine operating hours and allows base engine timing to be set.

This is the ultimate Ram Jet analysis tool!

**Rinda
Technologies**

(773) 736-6633
www.rinda.com