

DIAGNOSTIC TROUBLE CODES

Cover Page – Slide 1

I welcome you all to this exciting session on Diagnostic Trouble Codes.

Learning Outcomes – Slide 2

At the end of this session, it is my belief that we would have achieved the following Learning Outcomes:

- Explain Diagnostic Trouble Codes
- Describe the types of Diagnostic Trouble Codes, and,
- Discuss how to interpret Diagnostic Trouble Codes.

Introduction – Slide 3

When a vehicle's on-board diagnostics system detects a malfunction, it generates the appropriate diagnostic trouble code and usually alerts the driver via a warning light or other indicator on the vehicle's instrument panel.

These trouble codes are often referred to as DTC codes.

Diagnostic Trouble Codes or DTC codes help you understand what needs to be fixed so you can keep your vehicle operational and safe.

Each trouble code has an assigned message that identifies the circuit, component, or system area where the problem was found.

Diagnostic Trouble Codes are meant to guide you to the proper service procedure in the vehicle's service manual.

Do not replace parts based only on DTCs without first consulting the vehicle service manual for proper testing procedures for that particular system, circuit or component.

Diagnostic Trouble Codes (DTCs) are codes that identify a specific problem area.

Types of Diagnostic Trouble Codes (DTC) – Slide 4

With the sheer number of generic and manufacturer-specific DTC codes that could appear on your vehicle, it can be difficult for anyone, even professional mechanics, to understand all the fault codes.

If you can't fully understand your DTC codes even after reading your vehicle manufacturer's manual, make sure to check with your mechanic instead of purchasing replacement parts for the component or system right away.

DTC codes can be categorized into two types:

Type 1: Critical codes.

These are urgent DTC codes that can cause quick and severe damages to the vehicle.

DTC codes such as high engine temperatures and low coolant levels could mean that engine failure is imminent. With real-time vehicle diagnostics, fleet managers and technicians can act quickly. They can assess the severity, recommend appropriate action immediately, and locate the nearest service center to resolve the issue before it becomes a costly and critical situation.

Type 2: Non-critical codes.

Non-critical codes include those that light up the *Malfunction Indicator Lamp* (MIL), also known as the *Check Engine Light*.

While these DTC fault codes do not need urgent solutions, they still require proper attention. This includes emissions-related faults that don't lead to excessive pollution.

Interpreting Diagnostic Trouble Codes – Slide 5

A DTC code is five characters long. You'll get more familiar with this over time, but there are thousands of different codes, so as a driver or fleet owner, you want to know how to find the definition for any code you see in your vehicle.

If you have a good comprehensive fleet management solution, the meaning of each code will be provided to you each time you are alerted with a code.

Codes are standard, and you'll know what area of your vehicle the code refers to if you understand the structure of the code and the standard abbreviations.

Interpreting Diagnostic Trouble Codes (First Character - Letter) – Slide 6

OBD-II codes start with a letter that denotes the part of the vehicle that has a fault.

- **P** – Powertrain. Includes engine, transmission, and associated accessories.
- **C** – Chassis. Covers mechanical systems and functions: steering, suspension, and braking.
- **B** – Body. Parts mainly found in the passenger compartment area.
- **U** – Network & vehicle integration. Functions managed by the onboard computer system.

Interpreting Diagnostic Trouble Codes (Second Character - Number) – Slide 7

The first letter is followed by a number, usually 0 or 1.

- **0** – Standardized (SAE) code, also known as generic code (sometimes called global)
- **1** – Manufacturer-specific code (sometimes called enhanced)

Interpreting Diagnostic Trouble Codes (Third Character - Number) – Slide 8

For powertrain codes, this number tells you which vehicle subsystem has a fault. There are eight:

- **0** – Fuel and air metering and auxiliary emission controls
- **1** – Fuel and air metering
- **2** – Fuel and air metering – injector circuit
- **3** – Ignition systems or misfires
- **4** – Auxiliary emission controls
- **5** – Vehicle speed control, idle control systems, and auxiliary inputs
- **6** – Computer and output circuit
- **7** – Transmission

You may also see an A, B, or C, which can refer to hybrid propulsion systems.

For other families of codes, refer to the definitions provided by your manufacturer.

Interpreting Diagnostic Trouble Codes (Fourth and Fifth Character - Number) – Slide 9

The final piece of a DTC is a number that defines the exact problem that you're experiencing. It can be a number between zero and 99.

How to Use a Scan Tool for Diagnostic Trouble Codes – Slide 10

You need a diagnostic connector to read DTCs. Most scan tools provide codes in one-line descriptions, and some will include the code definitions.

Basic code readers or scanners typically only give you the five-character code. To get the definition, you'll need to check a standard DTC list or database and your manufacturer's website and reference material for your vehicle's specific model.

To read DTC fault codes using a scan tool, follow these general steps:

- **Find the location of the 16-pin in the vehicle.**

Some connectors are in the center console, and other vehicles might have them hidden behind a knee bolster panel or other types of panels. Consult the manufacturer's vehicle manual to find the OBD-II diagnostic connector if it's not in any of these locations.

- **Plug in your code reader or scanner and turn on the ignition or keep the engine running (depending on your vehicle's OBD requirement).**

This allows the scan tool to communicate with your vehicle's ECU.

- **From the tool's menu, select the option for "read codes."**

You might need to enter specific information such as the vehicle model and year if your scanner isn't set to get this data automatically.

The scan tool will then show any present DTC faults, and usually, in numerical order.

In some tools, these will include the code definitions. Most of the latest scanners allow you to transfer the codes to a smartphone or computer via Wi-Fi, USB code (if available), and Bluetooth.

Conclusion – Slide 11

Hey, so in the past few minutes, we have been able to at the Diagnostic Trouble Code (DTC) and how to interpret the codes and trace faults in any given car.

The introduction of diagnostic trouble codes (DTC) has simplified the process of identifying faults and their sources in vehicles. The diagnostic tool is able to retrieve the DTCs and an interpretation is provided accordingly.

Early detection of defects leads to repairs that improve vehicle performance and fuel economy.

While DTC codes provide valuable information about potential vehicle problems, these are meant to act as guides to find underlying issues and further diagnose the root of the defective and malfunctioning vehicle components.

Also, clearing codes won't make the vehicle issues disappear. This can even be dangerous and lead to massive vehicle failure and expensive liabilities that can cost you thousands of dollars down the line.

Besides an OBD-II or DTC scanner, reliable telematics systems and devices provide more efficient ways to read and monitor engine diagnostics.

Thank you and Stay Safe. Bye.

