MARYLAND

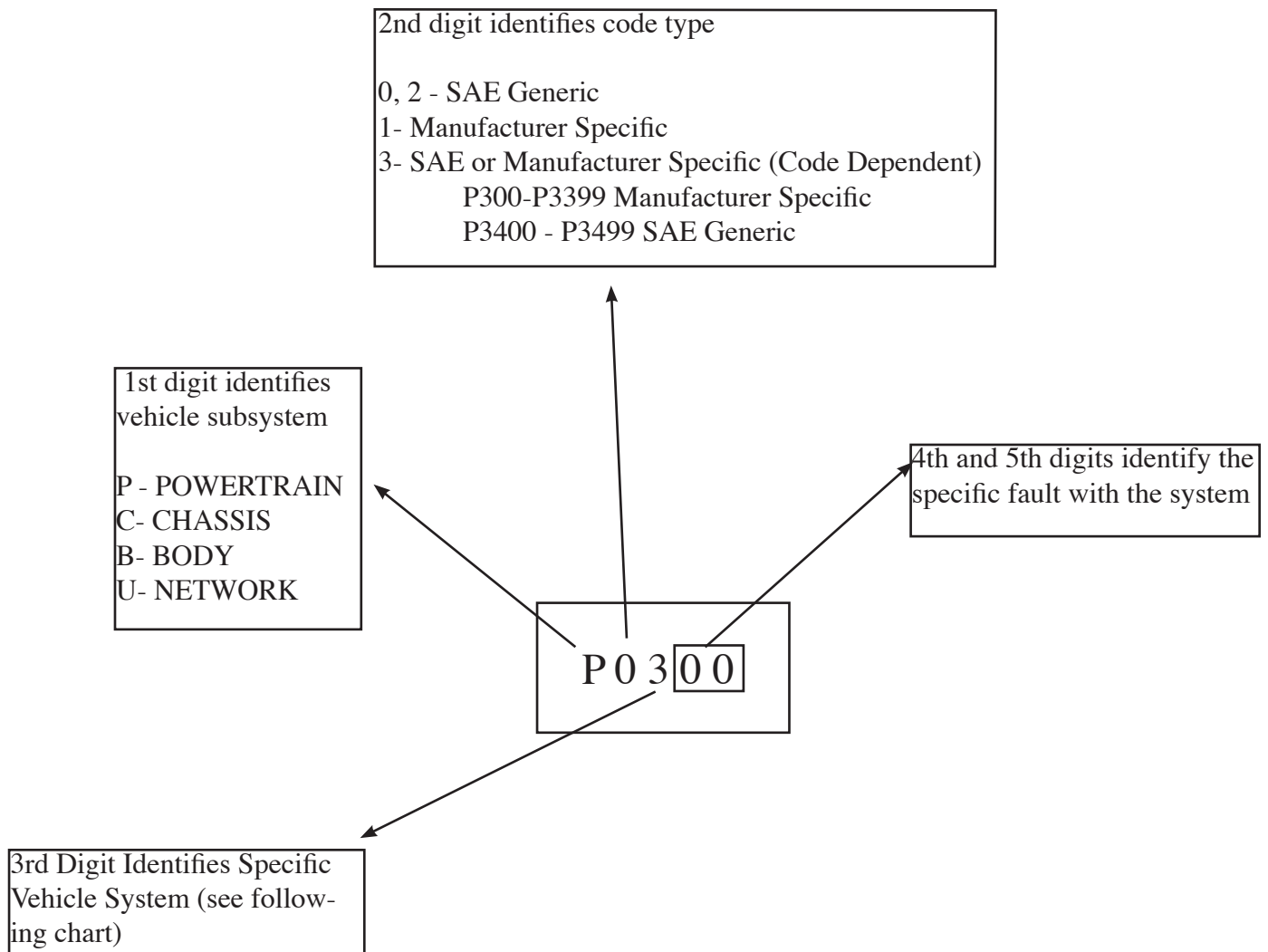## Vehicle Emissions Inspection Program

REP**AIR**CARE
Decoding DTCs

Modern vehicles contain a network of computers and sensors which assist with maintaining a low level of pollutant emissions. This system of computers and sensors is better known as on-board diagnostics (OBD). When a vehicle's OBD system identifies a problem that increases emissions levels 1.5 times beyond the federal certification level, the system stores the fault identification code(s) and illuminates the check engine light. That stored code is more commonly referred to as a Diagnostic Trouble Code or DTC. DTCs are in a five digit alpha numeric format. Each DTC has a specific problem associated with it.

DTCs will be one of two types, generic or manufacturer specific. Generic codes have had their definitions standardized by the Society for Automotive Engineers (SAE) and vehicle manufacturers have agreed to use these definitions. While every manufacturer is supposed to use the same definitions, you should always verify the code (s). Some manufacturers do vary from these agreed-upon definitions for some codes. This may save you from tracing the cause of a wrong code definition.

 The manufacturer specific code is just that, the DTC is unique to that vehicle manufacturer. These codes follow the same alpha numeric format as the SAE generic codes. Both code types, generic and manufacturer, will illuminate the check engine light if the code is emissions related.

How to interpret a DTC

When OBD II was first incorporated into 1996 and newer vehicles, the DTCs were composed of a five digit alpha numeric format. This format consisted of a letter followed by four numbers. As vehicle systems have become more complex, so has the DTC format. The codes being used currently are still the five digit alpha numeric format, but now letters are intermixed with the numbers which follow the system identification letter at the beginning of the DTC, for example P042A. This was done to further isolate the cause of the code. The formula for deciphering a DTC is still the same. The above diagram explains how to decipher a DTC.

2nd digit identifies code type

0, 2 - SAE Generic
1- Manufacturer Specific
3- SAE or Manufacturer Specific (Code Dependent)
      P300-P3399 Manufacturer Specific
      P3400 - P3499 SAE Generic

1st digit identifies vehicle subsystem

P - POWERTRAIN
C- CHASSIS
B- BODY
U- NETWORK

4th and 5th digits identify the specific fault with the system

P 0 3 0 0

3rd Digit Identifies Specific Vehicle System (see following chart)

The following is a list of numbers found for the specific system (3rd digit of DTC) digit of the trouble code.

0- Fuel, Air Metering & Auxiliary Emission Controls
1- Fuel and Air Metering
2- Fuel and Air Metering
3- Ignition System or Misfire
4- Auxiliary Emission Controls
5- Vehicle Speed, Idle Control, and Auxiliary Inputs
6- Computer and Auxiliary Inputs
7- Transmission
8- Transmission
9- Transmission
A- Hybrid Propulsion
B-F SAE reserved for future use

No matter what vehicle subsystem code is being diagnosed, the format and deciphering method is the same.

With the introduction of computer networks to vehicles, a new subsystem identification letter of "U" has been introduced for these networks. These codes use the same five digit alpha numeric format as all the other DTCs. Here are the definitions for these codes:

U00XX – Network Electrical
U01XX – Network Communication
U02XX – Network Communication
U03XX – Network Software
U04XX – Network Data

Please remember that any DTC that has been identified as a source of excessive emissions will illuminate the check engine light. This applies to all DTCs, no matter if they are generic or manufacturer specific.

If you want to learn more about DTCs or just to have a reference listing all of the SAE DTC codes, you may purchase the following document from SAE:

Document Number: SAE J2012
Telephone Number: 1-877-606-7323
Web: http://www.sae.org
e-mail: CustomerService@sae.org

MDE has added to our repair industry section, of the VEIP webpage, a reference document explaining the process of DTC interpretation with a list of all the DTC codes. The document can be found on the VEIP repair industry webpage. This reference document was created by the Arizona Department of Environmental Quality.