13 ENGINE ELECTRONIC CONTROLS

Section **Page**

13.1 OVERVIEW

DDEC for MBE 900 and MBE 4000 requires several electronic control units and their harnesses.

The engine control system monitors and determines all values which are required for the operation of the engine. The enigne-resident control unit is the DDEC-ECU.

The vehicle control system monitors the vehicle systems. The vehicle control system broadcasts all information on the J1587 and J1939 Data Links, where it can be read by minidiag2 The vehicle control system module is the Vehicle Control Unit (DDEC-VCU).

The harnesses connect the electronic control units to sensors and switches, injectors, and miscellaneous application devices like throttle controls, instrument panel gages and lights.

For additional and in-depth information about DDEC for MBE 900 and MBE 4000, refer to *DDEC for MBE 900 and MBE 4000 Application and Installation* (7SA825) available on the DDC extranet.

13.2 DDEC-ECU – ENGINE-RESIDENT CONTROL UNIT

The DDEC-ECU monitors and determines all values which are required for the operation of the engine.

The DDEC-ECU control unit (see Figure 13-1) is located on the left-hand side of the engine.

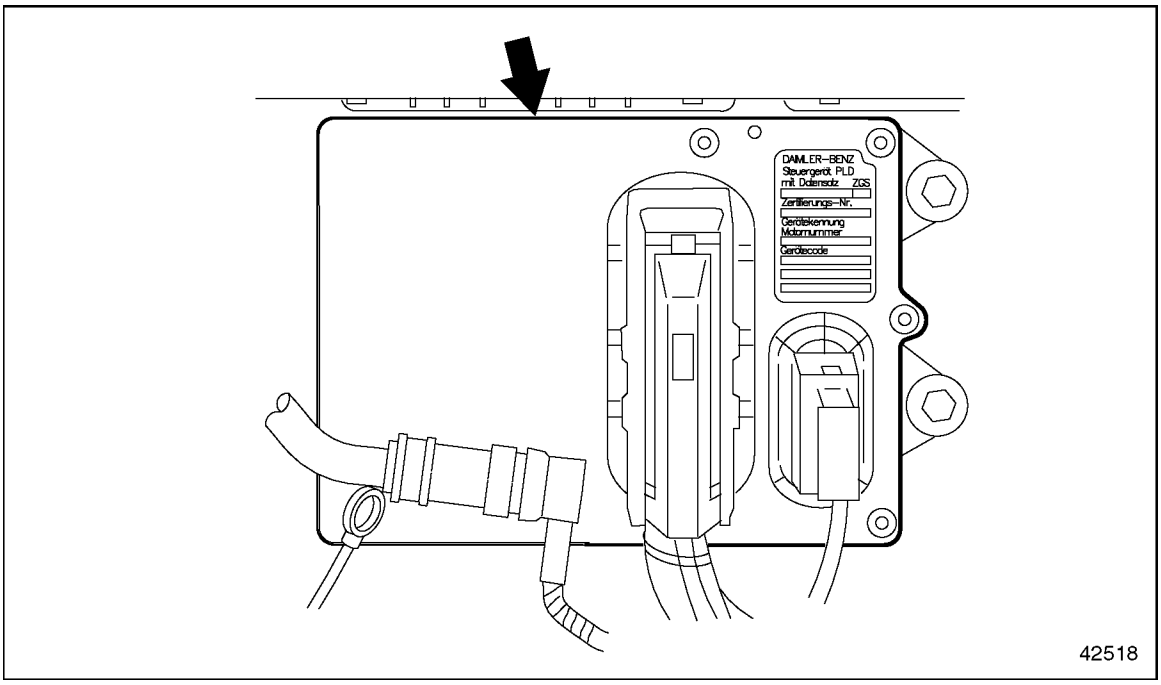


Figure 13-1 DDEC-ECU Control Unit on Engine

The DDEC-ECU processes the data received from the Vehicle Control Unit (DDEC-VCU) for engine control management.

The data is then compared to the parameters stored in the DDEC-ECU.

From these data, quantity and timing of injection are calculated and the unit pumps are actuated accordingly through the solenoid valves.

13.3 VEHICLE CONTROL UNIT — ON-HIGHWAY

The Vehicle Control Unit (DDEC-VCU) is the interface between the DDEC-ECU and the truck for engine control and manages other vehicle functions.

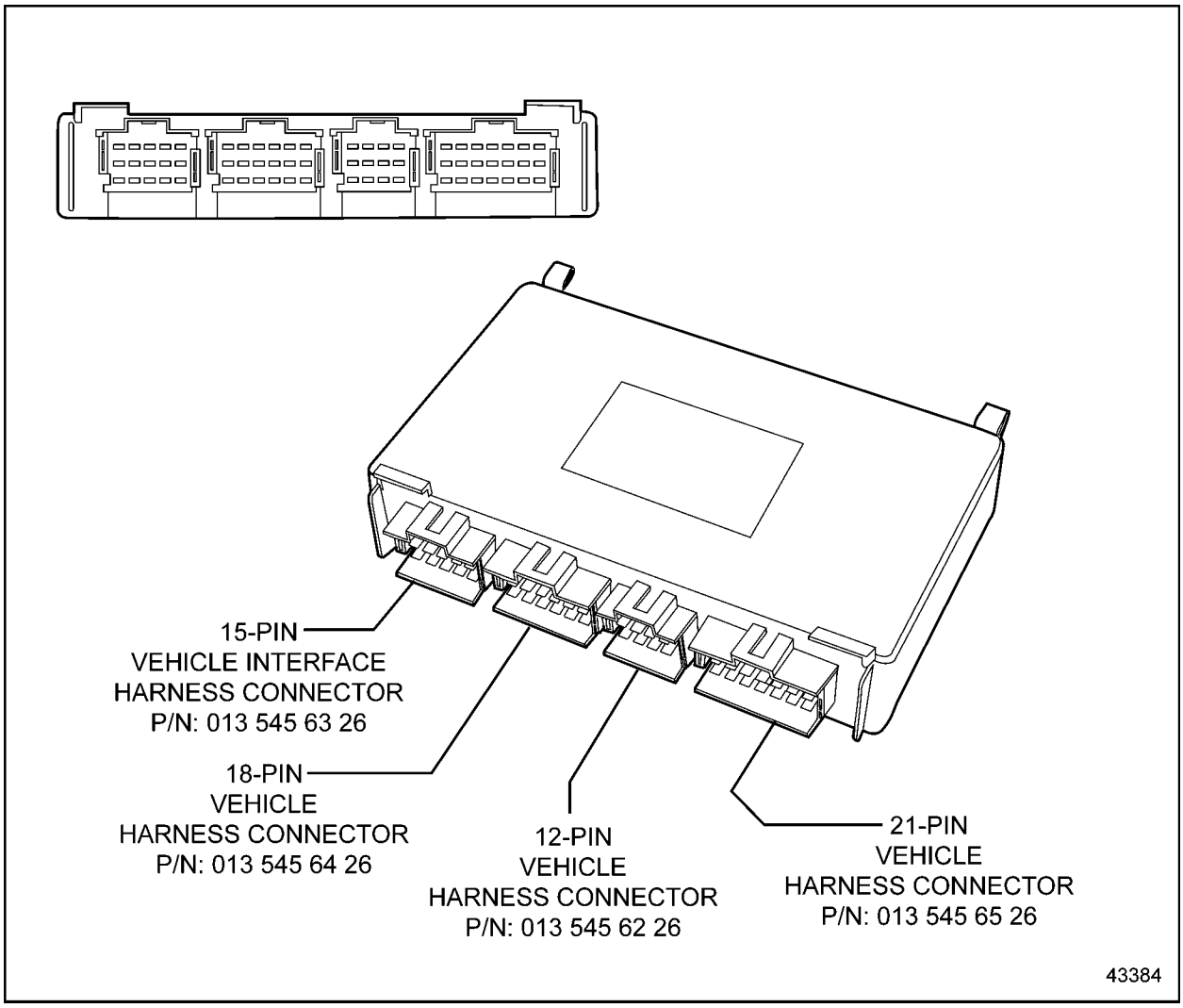


Figure 13-2 The Vehicle Control Unit

The OEM is responsible for mounting this part in a cab environment. The mounting bracket is the responsibility of the OEM. There must be maximum physical separation of the VIH from other vehicle electrical systems. Other electrical system wires should ideally be at least three feet away from the VIH and should not be parallel to the VIH. This will eliminate coupling electromagnetic energy from other systems into the VIH.

The DDEC-VCU also communicates over the J1587 and J1939 Data Links to the vehicle (see Figure 13-3).

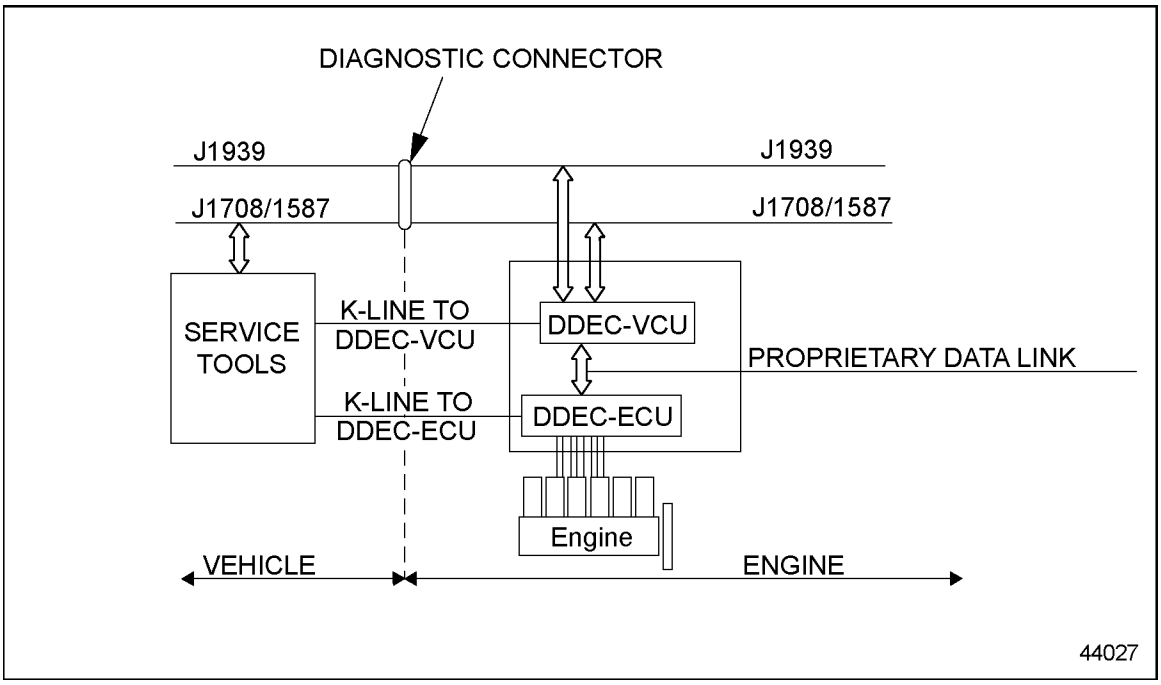


Figure 13-3 NAFTA Architecture

Within the DDEC-VCU, sets of data for specific applications are stored. These include idle speed, maximum running speed, and speed limitation.

The DDEC-VCU receives data from the operator (accelerator pedal position, switches, various sensors) and other electronic control units (for example, the anti-lock brake system, transmission controllers).

From this data, instructions are computed for controlling the engine and transmitted to the DDEC-ECU via the proprietary datalink.

13.4 VEHICLE INTERFACE HARNESS

The VIH must contain the wires, fuses, relays, switches, connectors, and communication link necessary to perform the aforementioned roles. The VIH must be completely detachable from the engine and all devices it connects to with locking weather-proof connectors. A schematic of a on-highway VIH is shown in the following illustration (see see Figure 13-4).

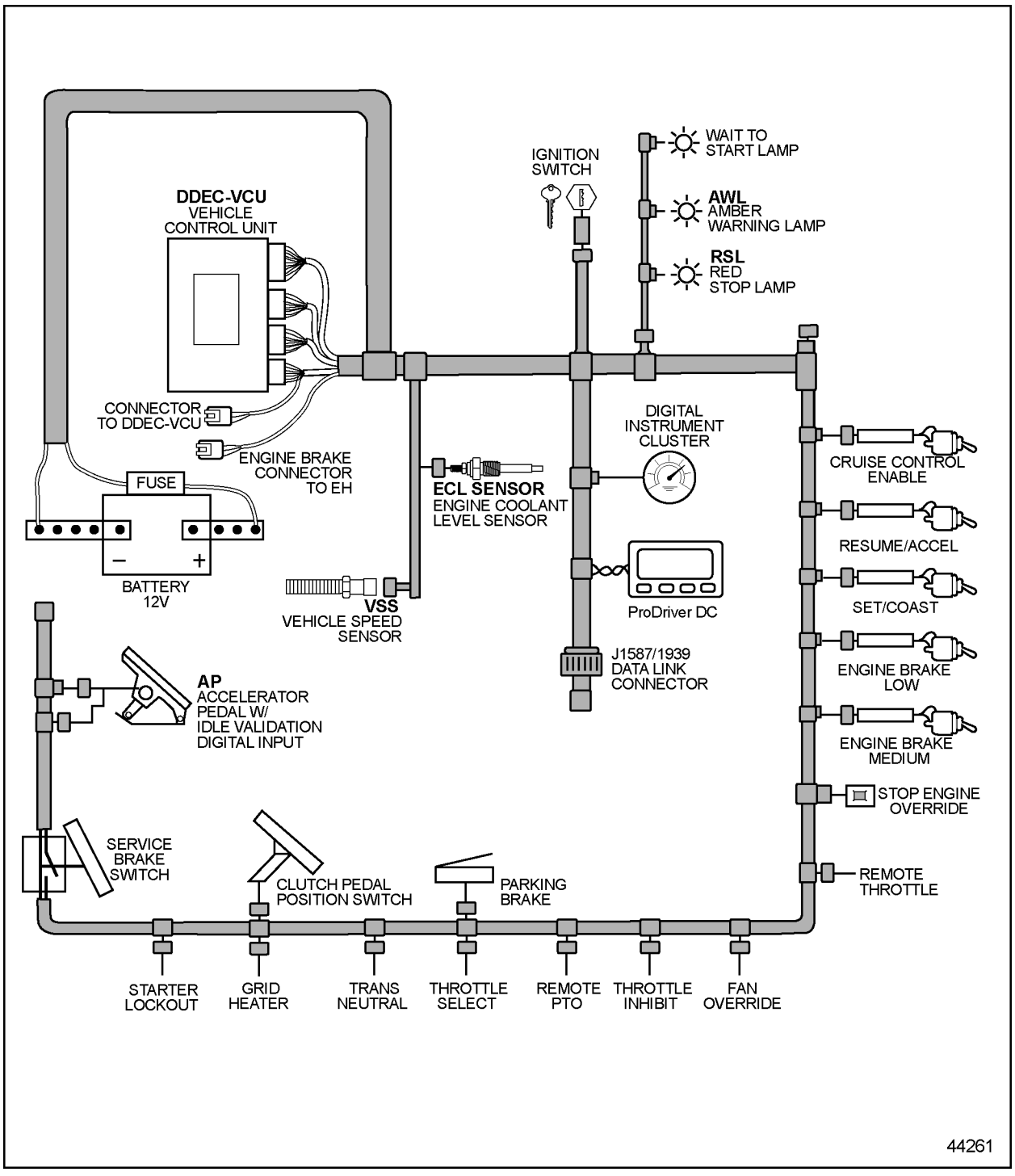


Figure 13-4 Typical MBE 4000 Vehicle Interface Harness

13.5 ENGINE HARNESS

The Engine Harness (EH) facilitates the communication of engine sensor input to the DDEC-ECU (Figure 13-5 for the EGR engine).

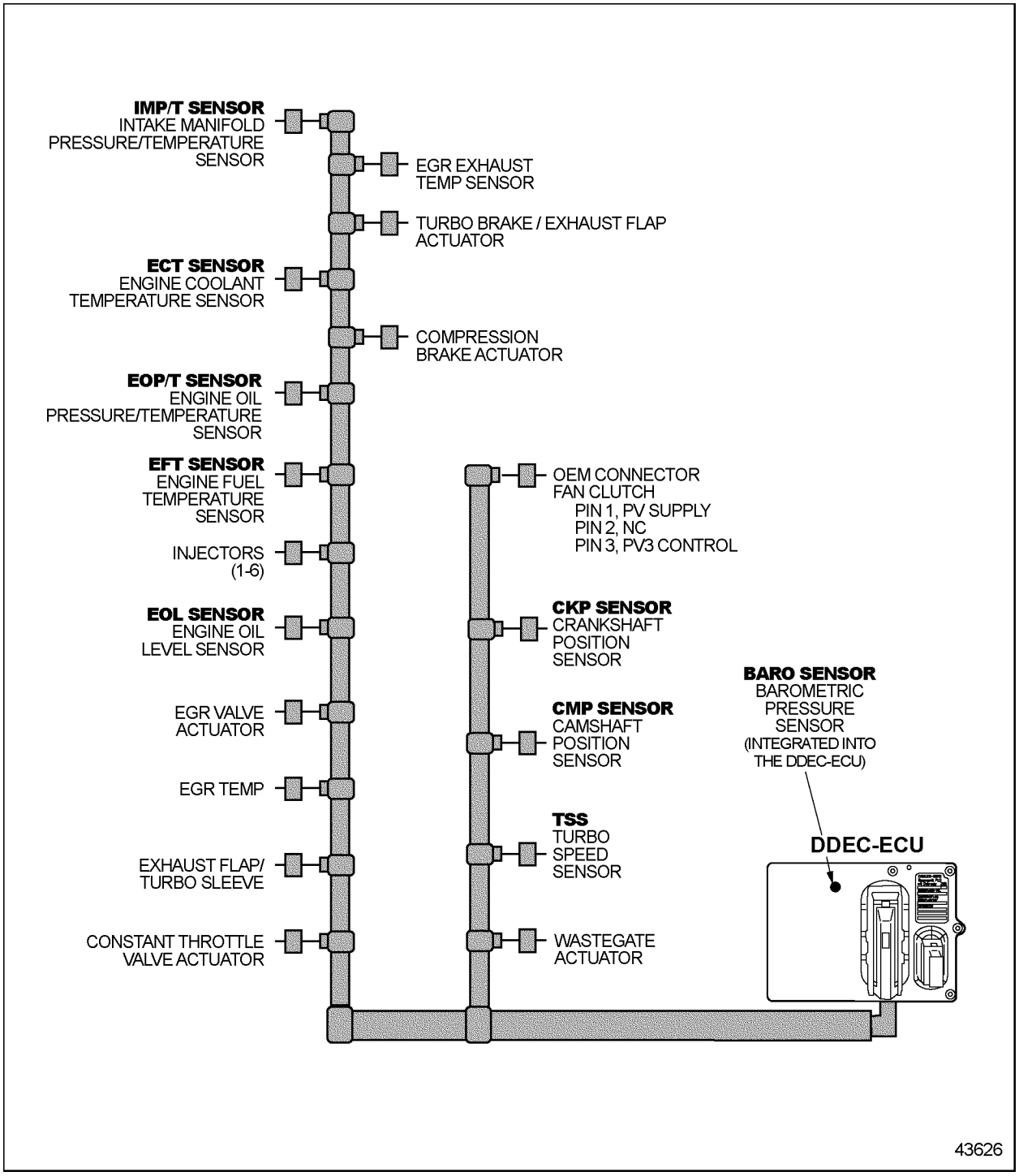
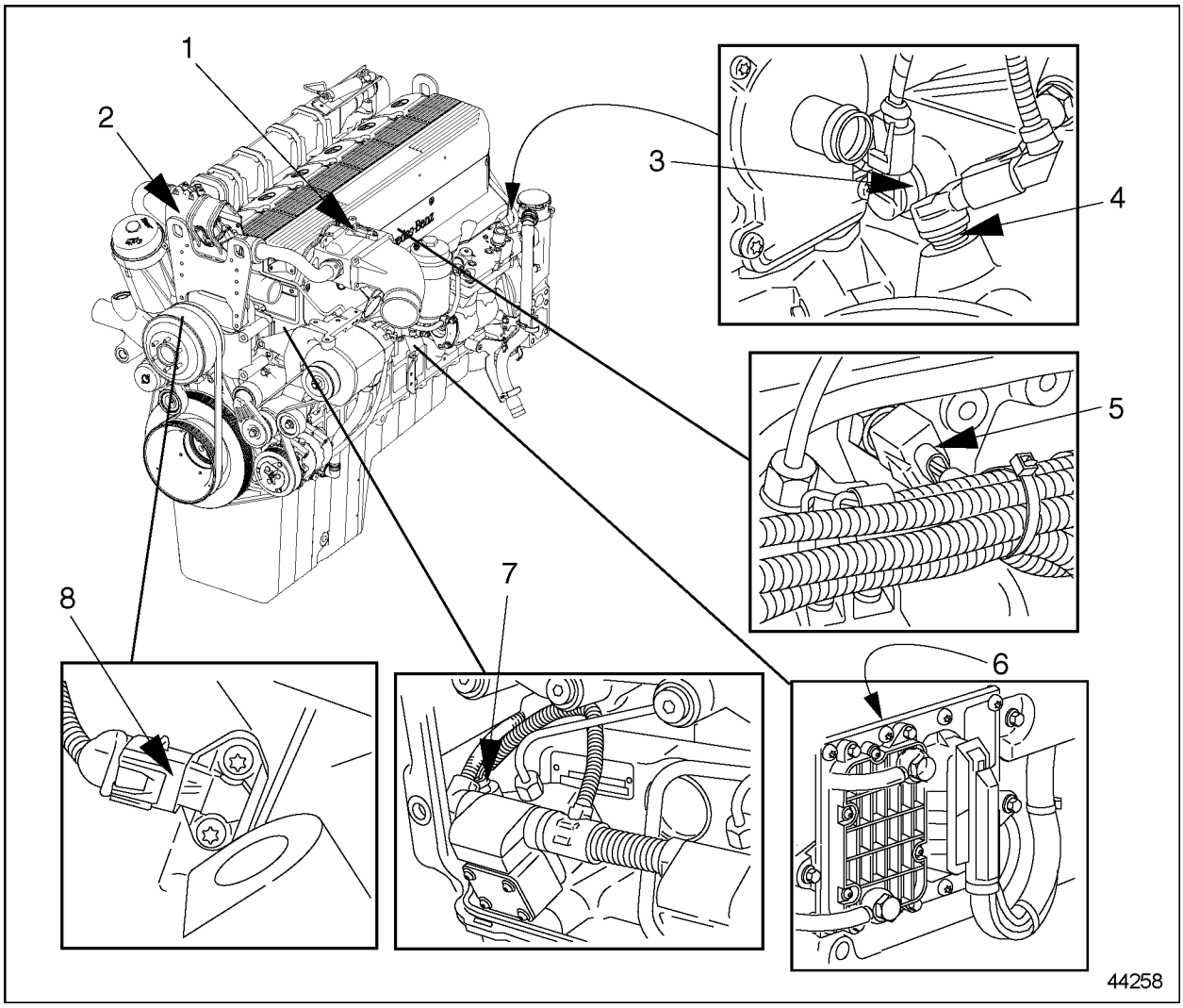


Figure 13-5 A Typical MBE 4000 EGR Engine Harness

13.6 SYSTEM SENSORS

System sensors provide information to the DDEC-ECU regarding various engine performance characteristics. The information is used to regulate engine performance, provide diagnostic information, and activate the engine protection system. See Figure 13-6 for sensor locations on the MBE 4000 engine.



1. Intake Air Pressure/Temperature Sensor
2. EGR Temperature Sensor
3. Camshaft Position Sensor (on camshaft)
4. Crankshaft Position Sensor
5. Engine Coolant Temperature Sensor
6. Barometric Pressure Sensor (integrated into DDEC-ECU)
7. Supply Fuel Temperature Sensor
8. Engine Oil Pressure/Temperature Sensor

Figure 13-6 Sensor Location on the MBE 4000 EGR Engine

Two sensors are not easily visible from the left-hand side of the MBE 4000 engine. The Intake Manifold Pressure/Temperature Sensor is located on the right-hand side of the charge air manifold, behind the #2 cylinder head. The Engine Oil Pressure/Temperature Sensor is located at the base of the oil filter. See Figure 13-6 for sensor locations on the MBE 4000 engine.

NOTE:
The Engine Oil Level Sensor, if used, is located at the bottom of the oil pan.

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