Product: POWER MODULE
Model: PM3516 POWER MODULE BPD
Configuration: PM3516 Power Module BPD00001-UP

Troubleshooting
3500B Engines For Caterpillar Built Power Modules
Media Number -RENR4929-00 **Publication Date -01/06/2000** **Date Updated -09/10/2001**

i01328798

System Overview

SMCS - 1901-038

The engine is designed for electronic control of most engine operating functions. The electronic system consists of an Electronic Control Module (ECM), wiring harness, switches, sensors, and Electronic Unit Injectors. The ECM monitors parameters during engine operation.

Electronic Controls

Electronic Control Module

The ECM supplies signals to the Electronic Unit Injectors. The ECM signals control the engine operation. The ECM consists of two main components, the control computer (hardware) and the Personality Module (software). The control computer consists of a microprocessor and electronic circuitry. The Personality Module is the software for the control computer which contains operating maps that define power and torque curves.

The ECM governs engine speed. Desired engine rpm is determined by the throttle position sensor signal and certain sensor readings. Diagnostic codes may derate the engine. Actual engine rpm is determined by the Engine Speed/Timing signal.

Fuel Injection

The ECM controls the timing of the injectors. The ECM varies the signals to the injectors. Fuel is injected ONLY while an injector solenoid is energized by a 105 volt signal from the ECM. By controlling the timing and duration of the 105 volt signal, the ECM controls the fuel injection timing, the quantity of fuel and the desired engine rpm.

Injection timing depends on engine rpm, load, and other operational factors. The ECM detects the top center of each cylinder. The ECM sends an injection signal at the desired time. The ECM limits engine power during cold mode operation. The ECM modifies the injection timing and the ECM cuts out the cylinders. This will increase startability and this will reduce warm up time.

Cold Mode is activated whenever the engine coolant temperature falls below a predetermined value.

Cold Mode remains active until the engine has warmed or a time limit is exceeded.

The ECM is programmed at the factory which limits the quantity of fuel that can be injected. The FRC Fuel Position controls the fuel limit for exhaust smoke. The FRC is based on the maximum allowable fuel to air ratio. The FRC Fuel Position is increased when the ECM senses a higher Turbocharger Compressor Outlet Pressure. This will allow more fuel into the cylinder.

The Rated Fuel Position is a limit that is based on the engine power rating. This is similar to the rack stops and the torque spring on a mechanically governed engine. The Rated Fuel Position provides power. The Rated Fuel Position provides the power curves and the torque curves for a specific engine family.

Engine Wiring Diagram for the 3500B Engine with CMS and Without 2301A Loadshare

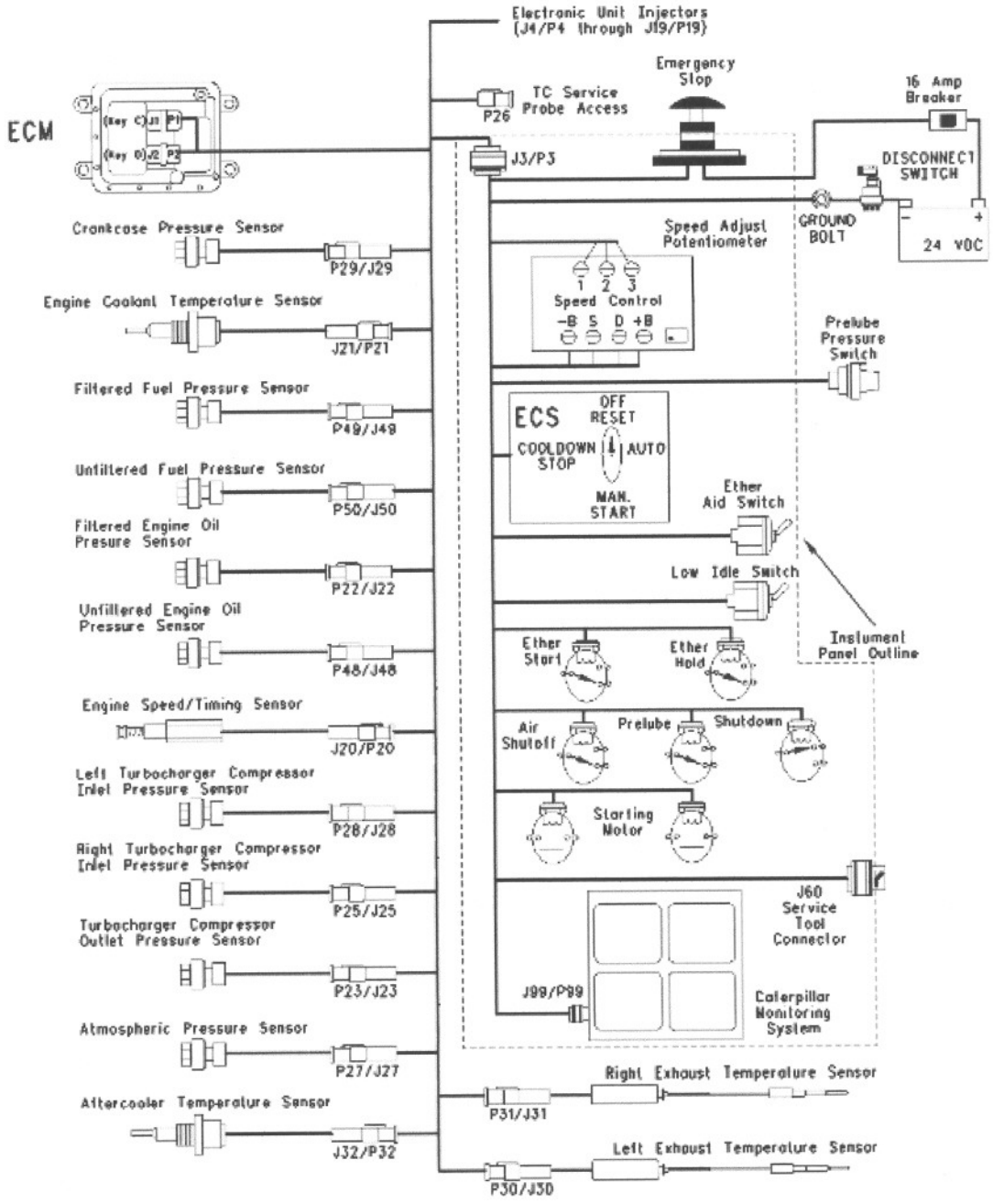

Illustration 1 g00707334

Engine Wiring Diagram for the 3500B Engine with EMCP II and 2301A Loadshare

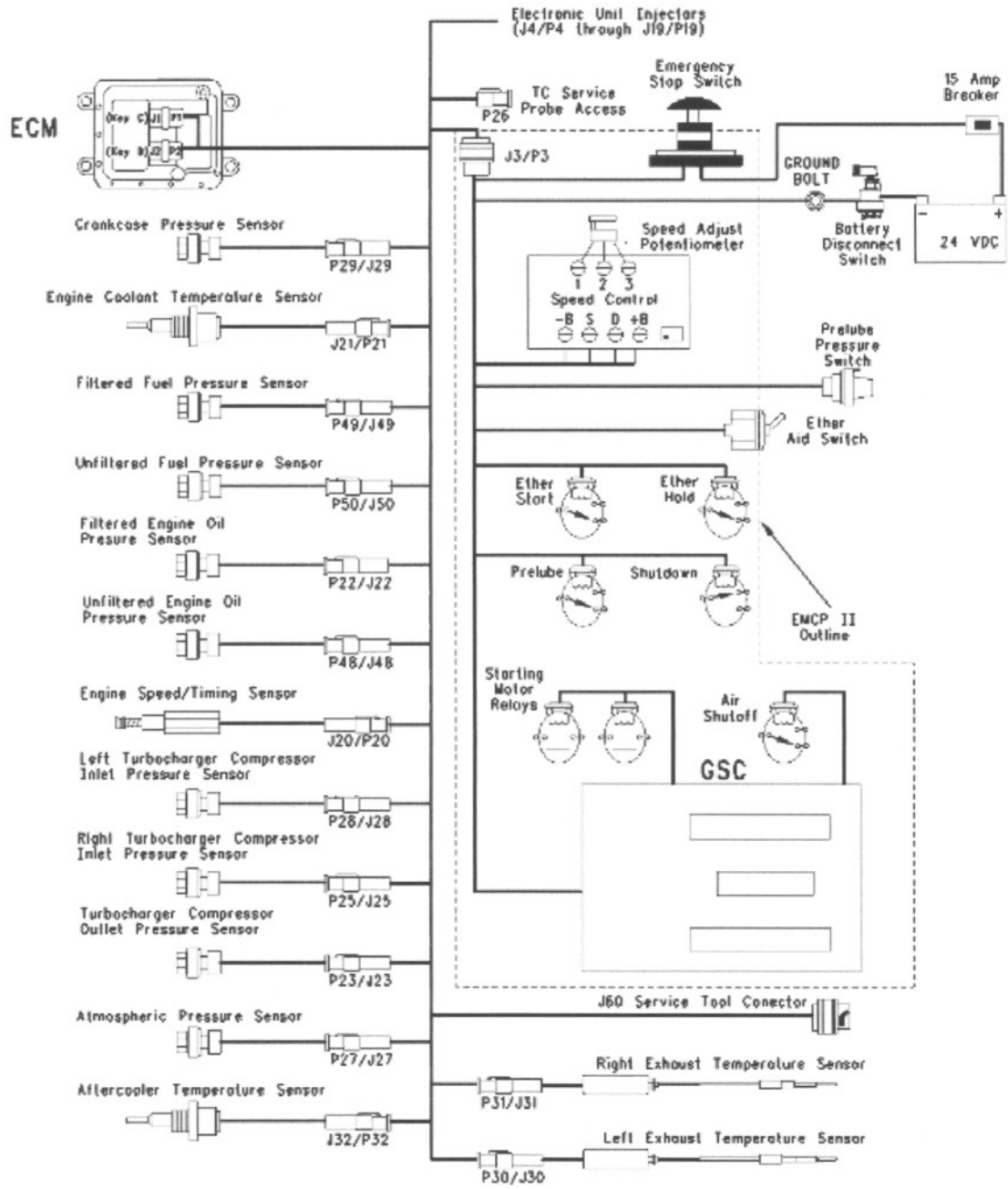

Illustration 2 g00707335

Location Of The Engine Sensors

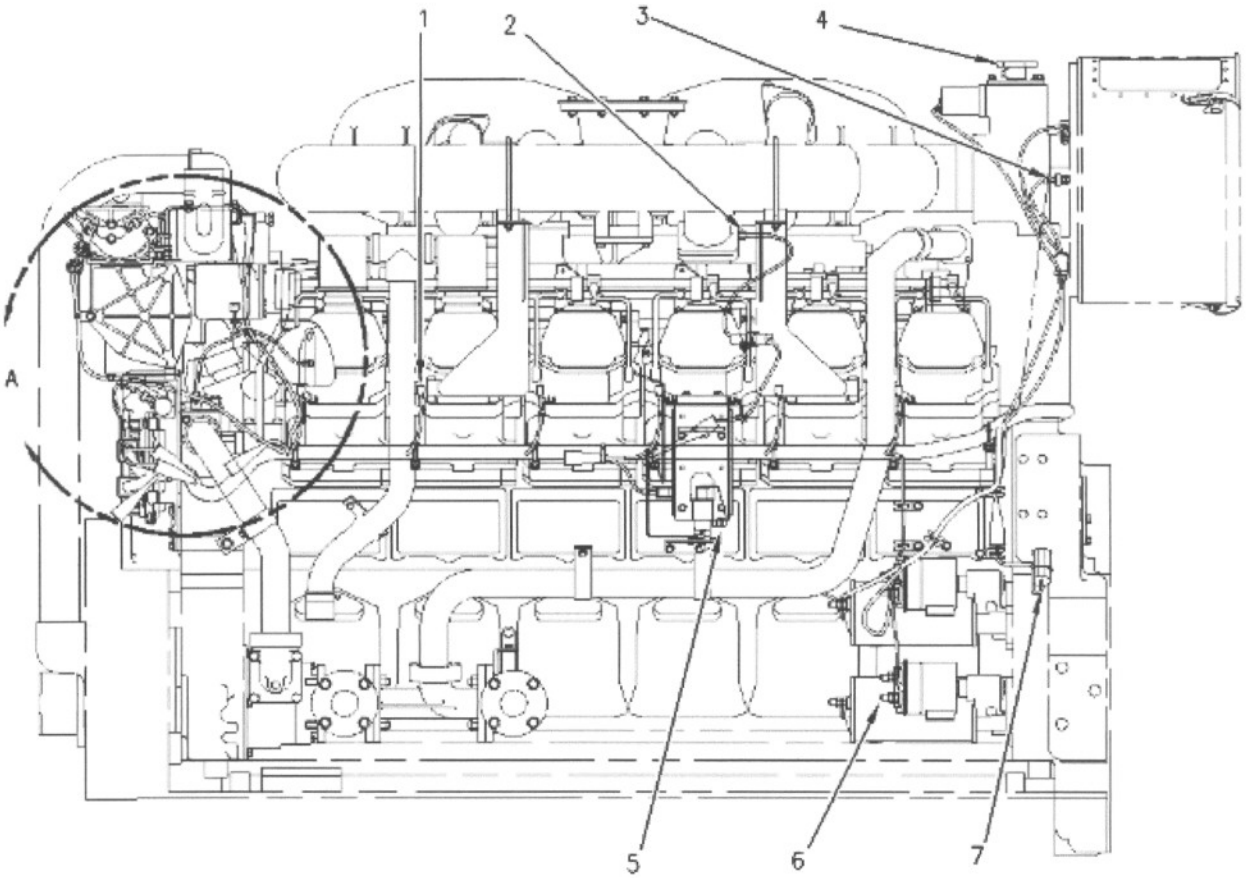

Illustration 3 g00594440
Left Side View (Typical Example)

(1) Connector for the electronic unit injector. (2) Left exhaust temperature sensor. (3) Left turbocharger compressor inlet pressure sensor. (4) Air shutoff. (5) Ether starting aid. (6) Electric starting motor. (7) Engine speed/timing sensor.

Location Of The Engine Sensor

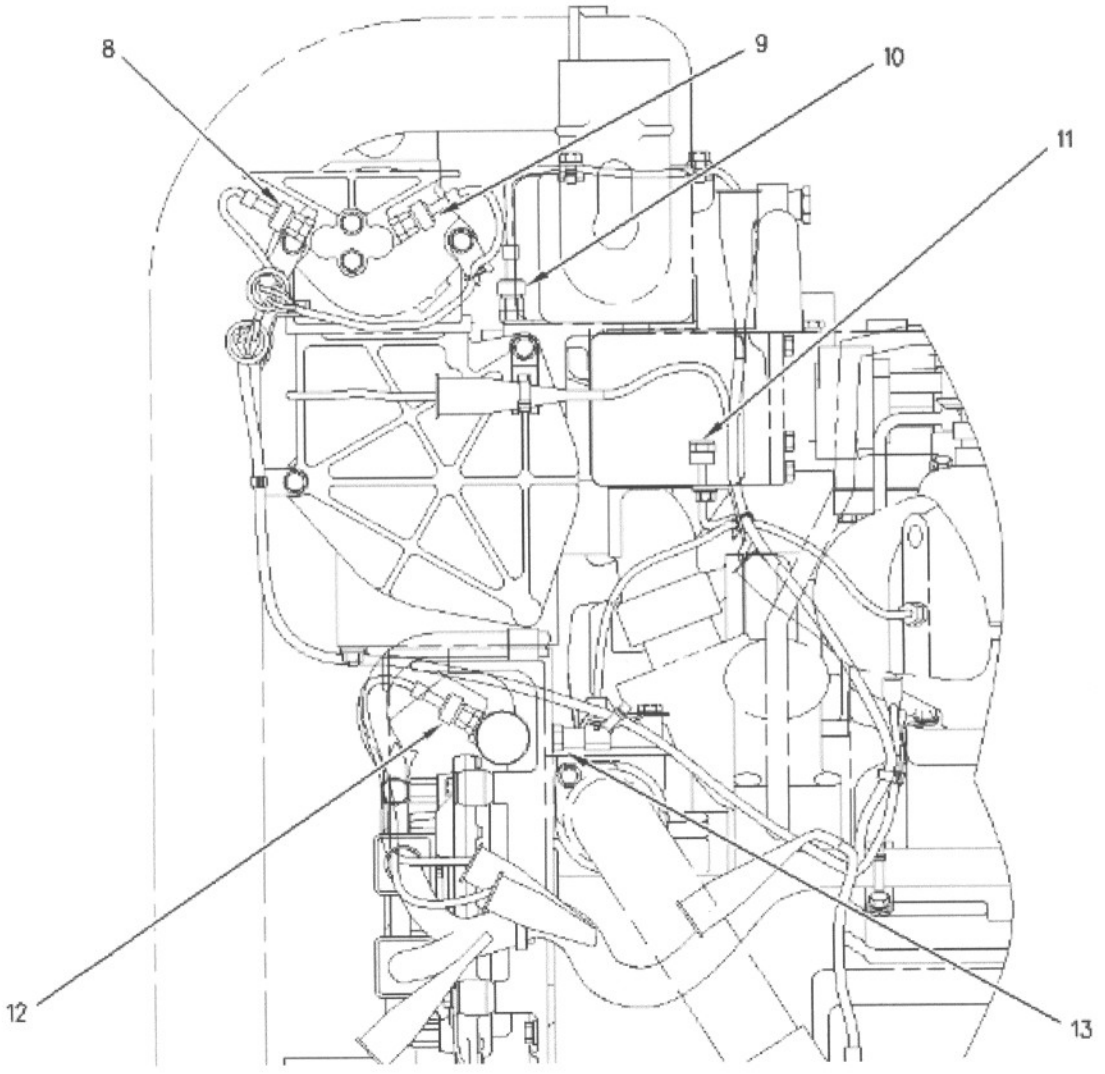

Illustration 4 g00707047
View A (Typical Example)

(8) Unfiltered fuel pressure sensor. (9) Filtered fuel pressure sensor. (10) Filtered engine oil pressure sensor. (11) Engine coolant temperature sensor. (12) Atmospheric pressure sensor. (13) Aftercooler temperature sensor.

Location Of The Engine Sensors

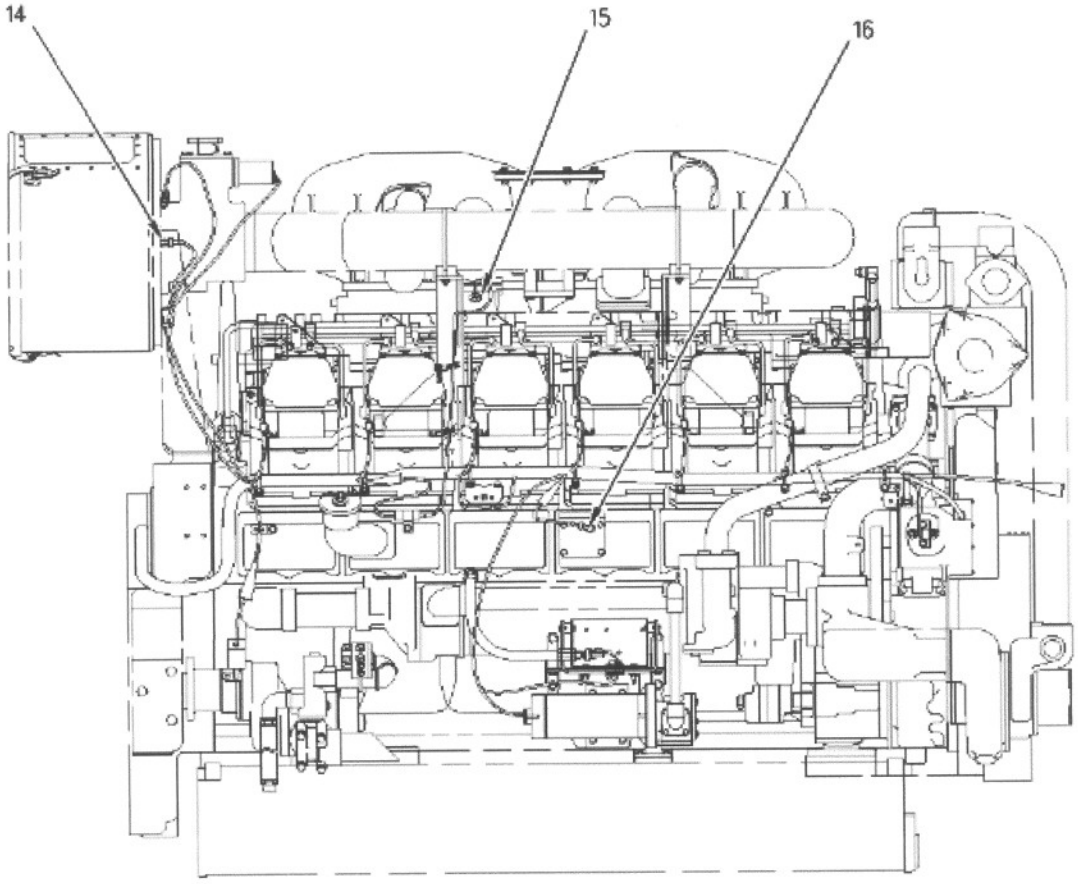

Illustration 5 g00707098
Right Side View (Typical Example)

(14) Right turbocharger compressor inlet pressure sensor. (15) Right exhaust temperature sensor. (16) Crankcase pressure sensor.

Location Of The Engine Sensors

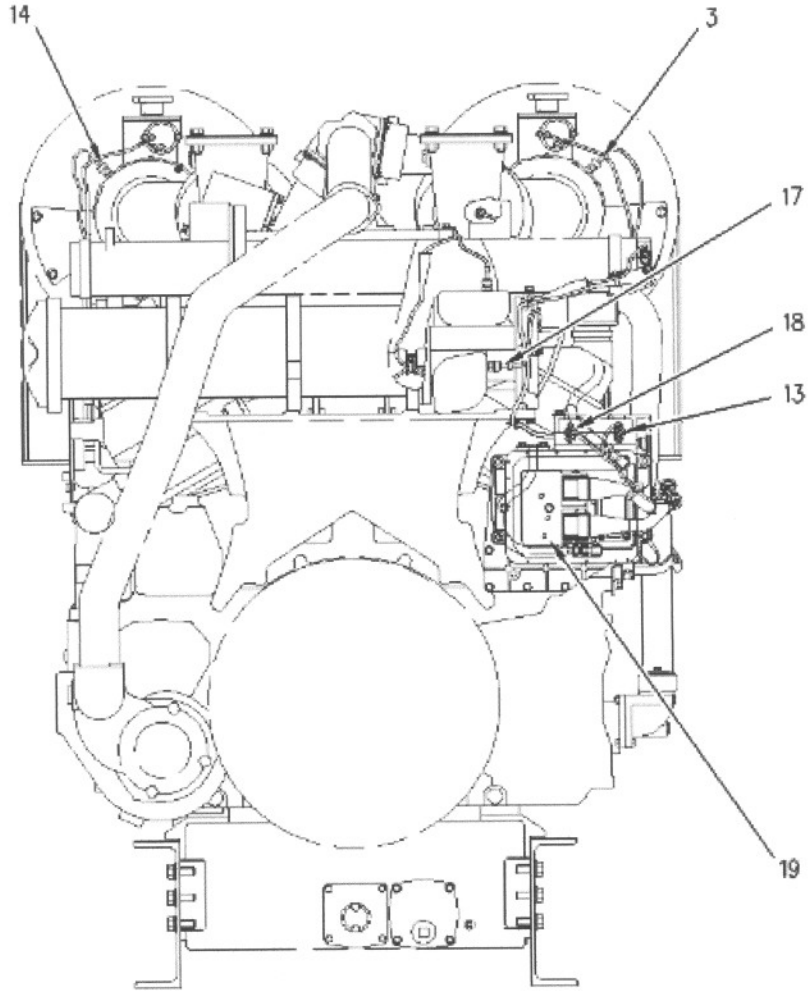

Illustration 6 g00707108

Front View (Typical Example)

(14) Right turbocharger compressor inlet pressure sensor. (3) Left turbocharger compressor inlet pressure sensor. (17) Filtered engine oil pressure sensor. (18) Turbocharger compressor outlet pressure sensor. (13) Atmospheric pressure sensor. (19) ECM.

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