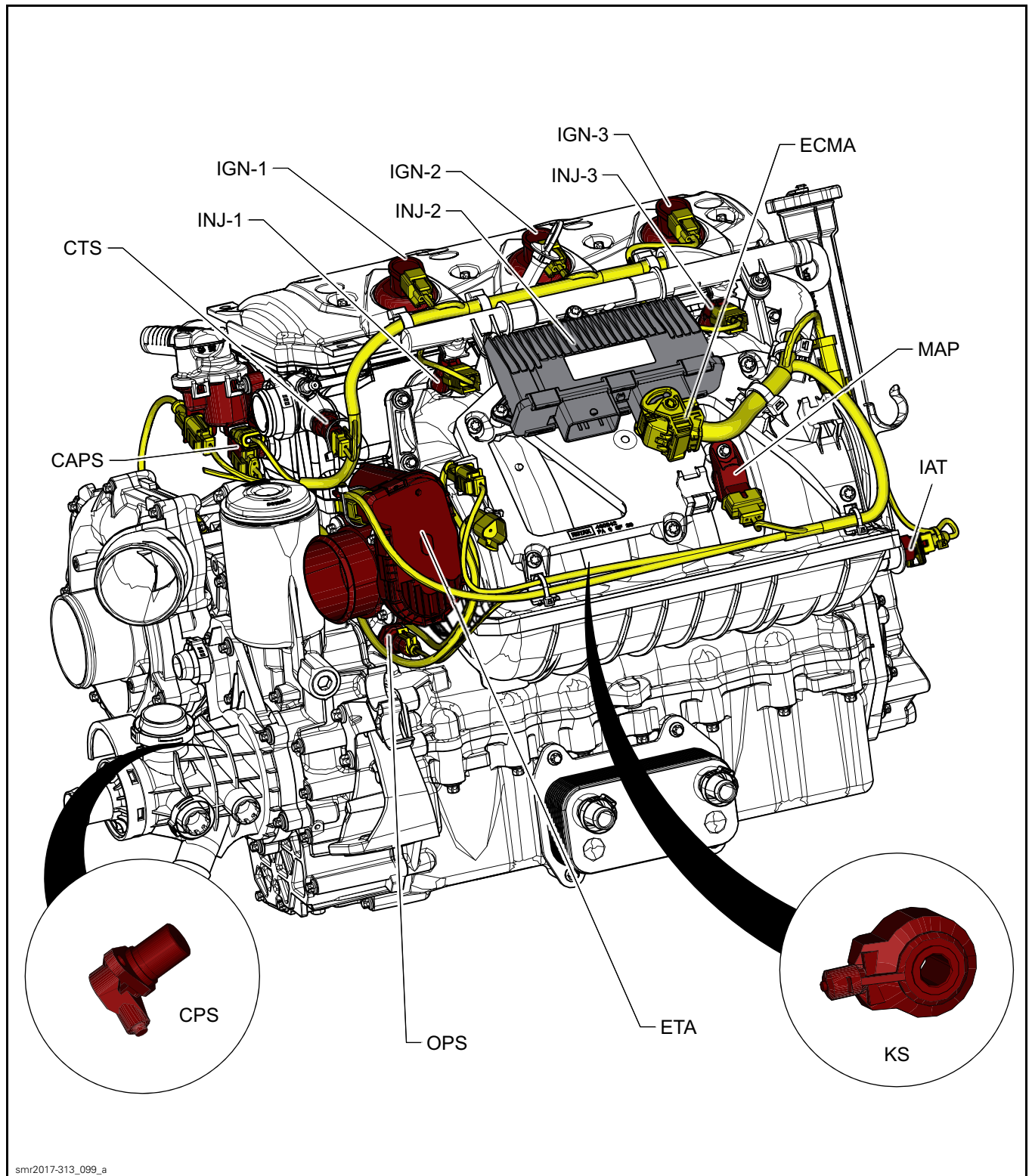
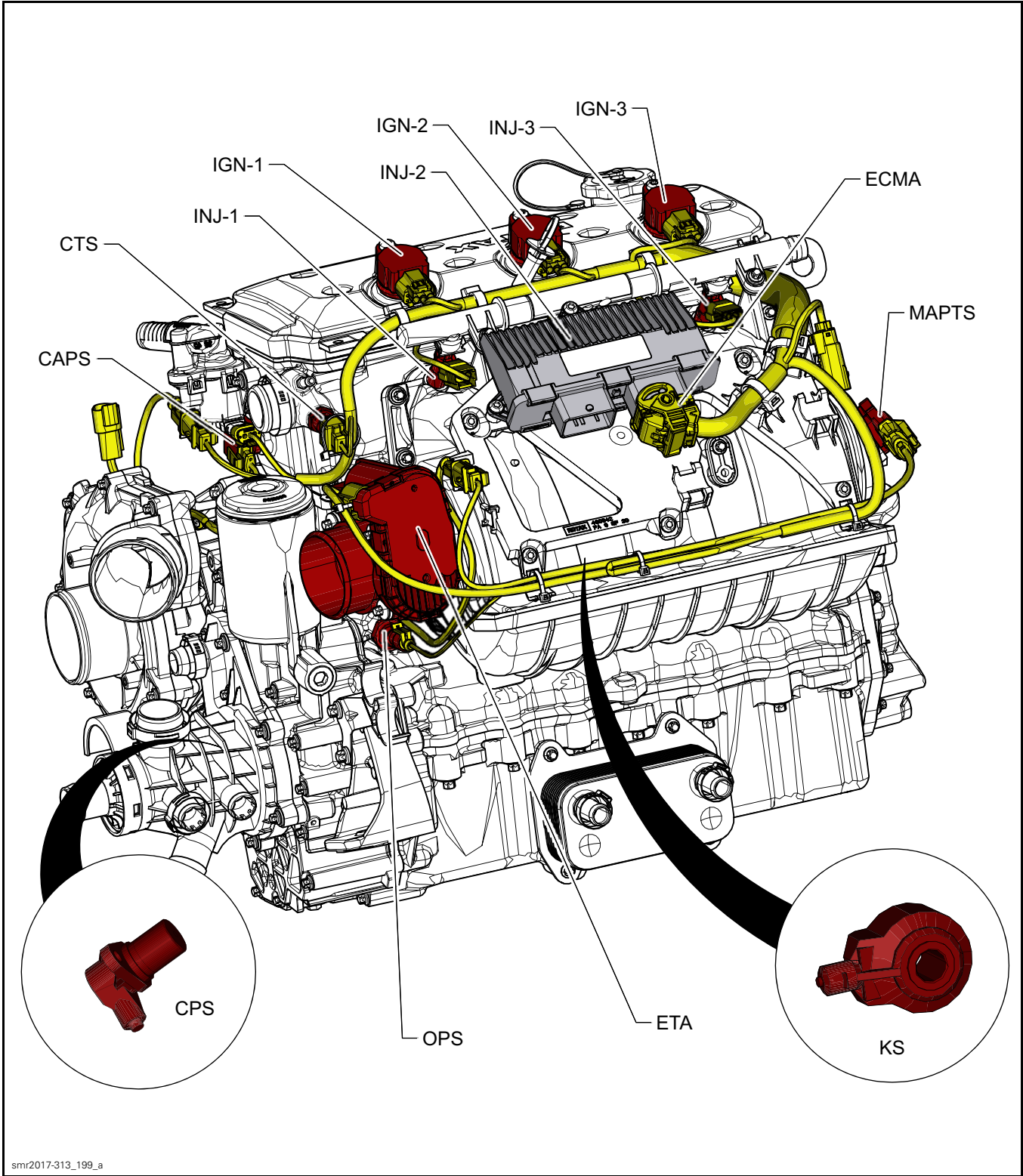


ENGINE MANAGEMENT SYSTEM (1500 SERIES)

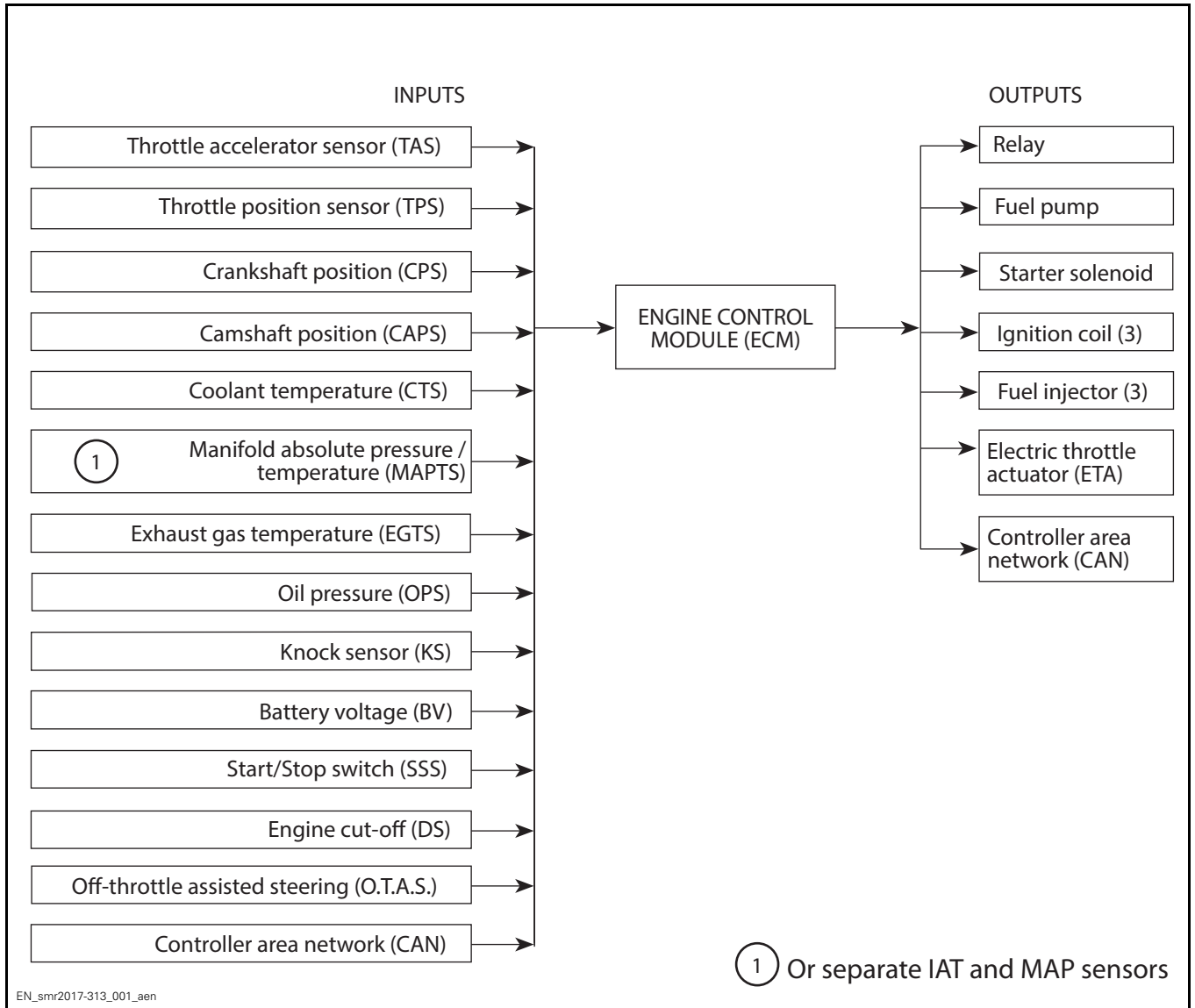
1503 4-TEC HO (260)



1500 HO ACE (230)



EMS INPUTS AND OUTPUTS



GENERAL

SYSTEM DESCRIPTION

An engine management system (EMS) is used to ensure a high power output with cleaner combustion.

There are 7 main systems that interact with the engine management system:

1. Electronic fuel injection
2. D.E.S.S. System
3. Ignition System
4. Starting System
5. O.T.A.S.
(Off-Throttle Assisted Steering)
6. T.O.P.S.
(Tip-Over Protection System)
7. iControl System

Air management

The quantity of air admitted into the engine is calculated by the throttle angle (TPS), the intake air temperature (IAT) and the manifold pressure/vacuum sensor (MAP) on the intake manifold.

NOTE: the MAPTS combines the pressure and temperature sensors into one sensor.

The operator's demands on the throttle lever are captured by the throttle accelerator sensor (TAS) and result in the movement of the electronic throttle actuator (ETA).

Fuel management

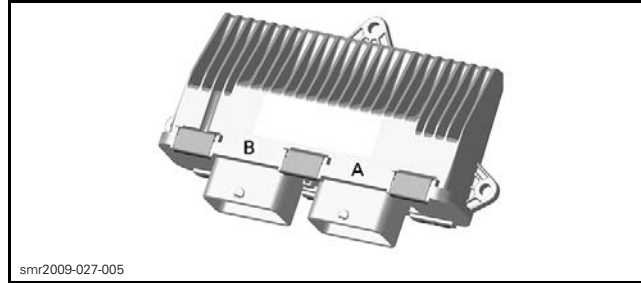
The coolant temperature sensor (CTS) is used to determine engine temperature. The ECM will slightly lean out the fuel mixture to bring a cold engine to operating temperature faster. Once the engine is at operating temperature, this stops.

NOTE: On some engines the oil temperature sensor is also used to calculate engine temperature.

In response to changes in air management, the ECM will adjust the quantity of fuel injected to optimize combustion.

The ECM will vary injection duration and timing to minimize emissions and maximize power.

Engine Control Module (ECM)



ECM

The ECM is the main component of the engine management system. It controls the electrical system and the engine management functions by processing the information obtained from various switches, controls and sensors that it compares to predetermined parameters stored in the ECM.

It also interacts with the other electronic systems through the CAN bus (information center and iControl System) for various functions that affect engine management.

It features a permanent memory that will store fault codes, customer information and other engine information, even when the battery is removed from the vehicle.

The ECM controls the following engine management functions:

Engine RPM Limiter

The ECM limits maximum engine speed. It monitors engine RPM through the CPS and varies fuel injection, ignition and throttle plate opening as necessary.

Engine Speed Control

The ECM controls the engine idle RPM. In addition, it can vary the engine speed by commanding the electronic throttle actuator (ETA) to open or close based on throttle position and various other inputs. The ETA also allows for other functions of the iControl system.

Drowned Mode

If the engine is flooded and does not start, this special mode can be activated to prevent fuel injection and ignition while cranking in order to ventilate the engine to dry the cylinder walls.

NOTE: This mode can also be used if the engine is water-flooded.

To activate DROWNED MODE, proceed as per following steps.

1. Install the tether cord cap on the engine cut out switch.

2. While the engine is stopped, fully pull and HOLD the throttle lever.
3. Press the START/STOP button. DROWNED MODE is now on.

Releasing the throttle lever will allow the ECM to revert back to normal mode.

If the engine does not start, it may be necessary to remove the spark plugs and crank the engine with rags over the spark plug holes. Refer to *IGNITION SYSTEM* subsection.

Monitoring System

The ECM monitors:

- The electrical and electronic components of the engine system
- The iControl system
- The information center (gauge)
- Some components of the electrical system
- Signals from other electronic modules

For more information, refer to *DIAGNOSTIC AND FAULT CODES*.

Limp Home Mode

The ECM may automatically set the engine in LIMP HOME MODE using default parameters when certain major faults are detected. For more information, refer to *DIAGNOSTIC AND FAULT CODES*.

Diagnostic Mode

The ECM features a self-diagnostic mode that is initiated on system power up for certain systems and components (when pressing the START button), and when the engine is running for others. Refer to *DIAGNOSTIC AND FAULT CODES* subsection for more information.