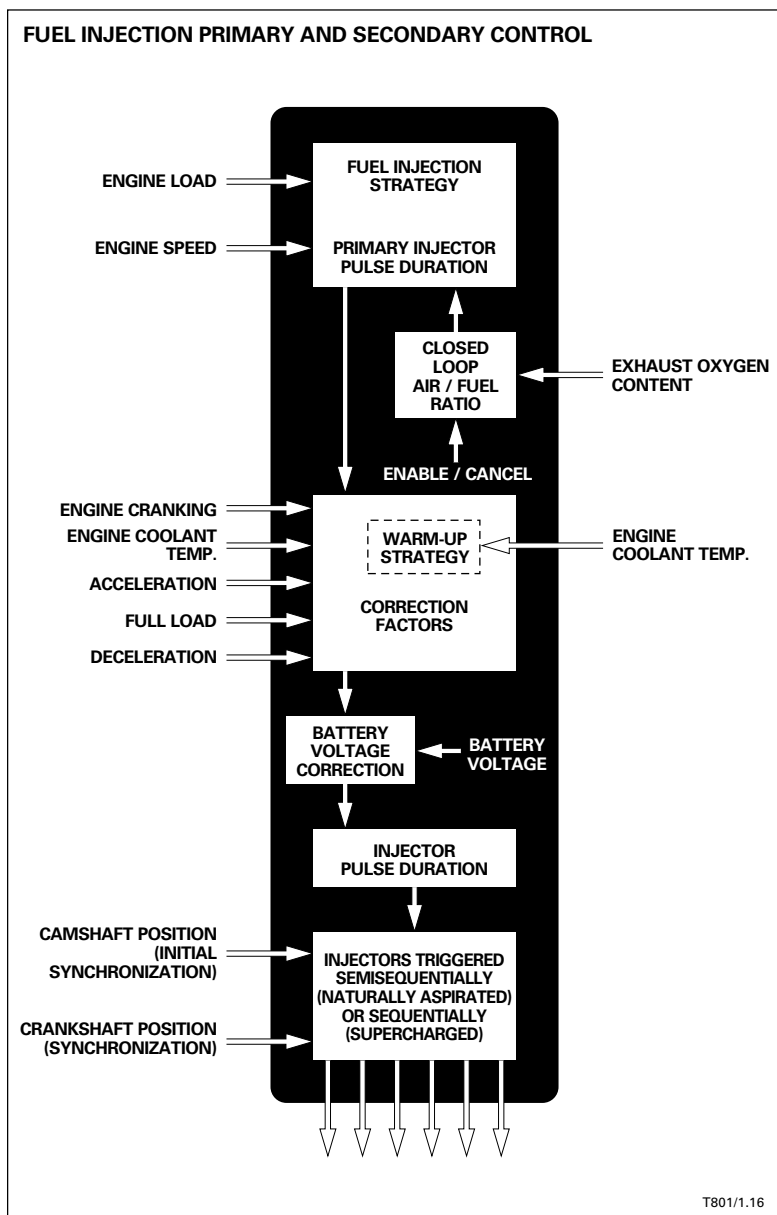


AJ16 4.0 Liter Engine Management System

Fuel Injection

Fuel metering is obtained by controlling the injector pulse duration during each engine cycle (two crankshaft rotations). The pulse duration is varied by the engine control module (ECM) according to several sensor inputs. The sensed control inputs form two groups — primary and secondary. Primary control inputs are intake mass air flow (engine load) and engine speed; secondary control inputs consist of engine coolant temperature, cranking signal, throttle movement and position and exhaust oxygen content. The injector pulse is then corrected for actual battery voltage. On normally aspirated engines, the injectors are pulsed semisequentially. Semisequentially means twice per engine cycle (once per engine revolution) in the engine firing order. On supercharged engines, the injectors are pulsed sequentially. Sequentially means once per engine cycle (once every two engine revolutions) in the engine firing order.

Fuel metering strategies are held in memory (EPROM) in the ECM and form an engine load versus engine speed matrix. The load and speed range of the engine is divided into 16 loads and 16 speeds (256 memory sites). Digital numbers representing injector pulse duration in milliseconds fill each site and cover the entire engine load and speed range. Fuel metering correction is applied for all six cylinders simultaneously, not for individual cylinders.



Sequential fuel injector pulsing is ECM controlled. The ECM “learns” the compression stroke synchronization at each engine start from the camshaft position sensor (CMPS) and crankshaft position sensor (CKPS) inputs. After the firing synchronization is learned, the ECM uses the CKPS input for engine speed and position. Refer to the CMPS description on page 27 and the CKPS description on page 26.

Additional fuel injection controls are used for overrun fuel cutoff, engine overspeed prevention and fuel cutoff during wide-open-throttle cranking.

Fuel Injection Primary Control

Fuel metering is controlled primarily as a function of engine load and speed. Engine load is sensed by a mass air flow sensor (MAFS) located in the engine air intake before the throttle housing. Engine speed is sensed by a crankshaft position sensor (CKPS) located behind the front pulley. The ECM processes the input from the MAFS and the CKPS to access pulse duration from the fuel metering strategy.

NOTES