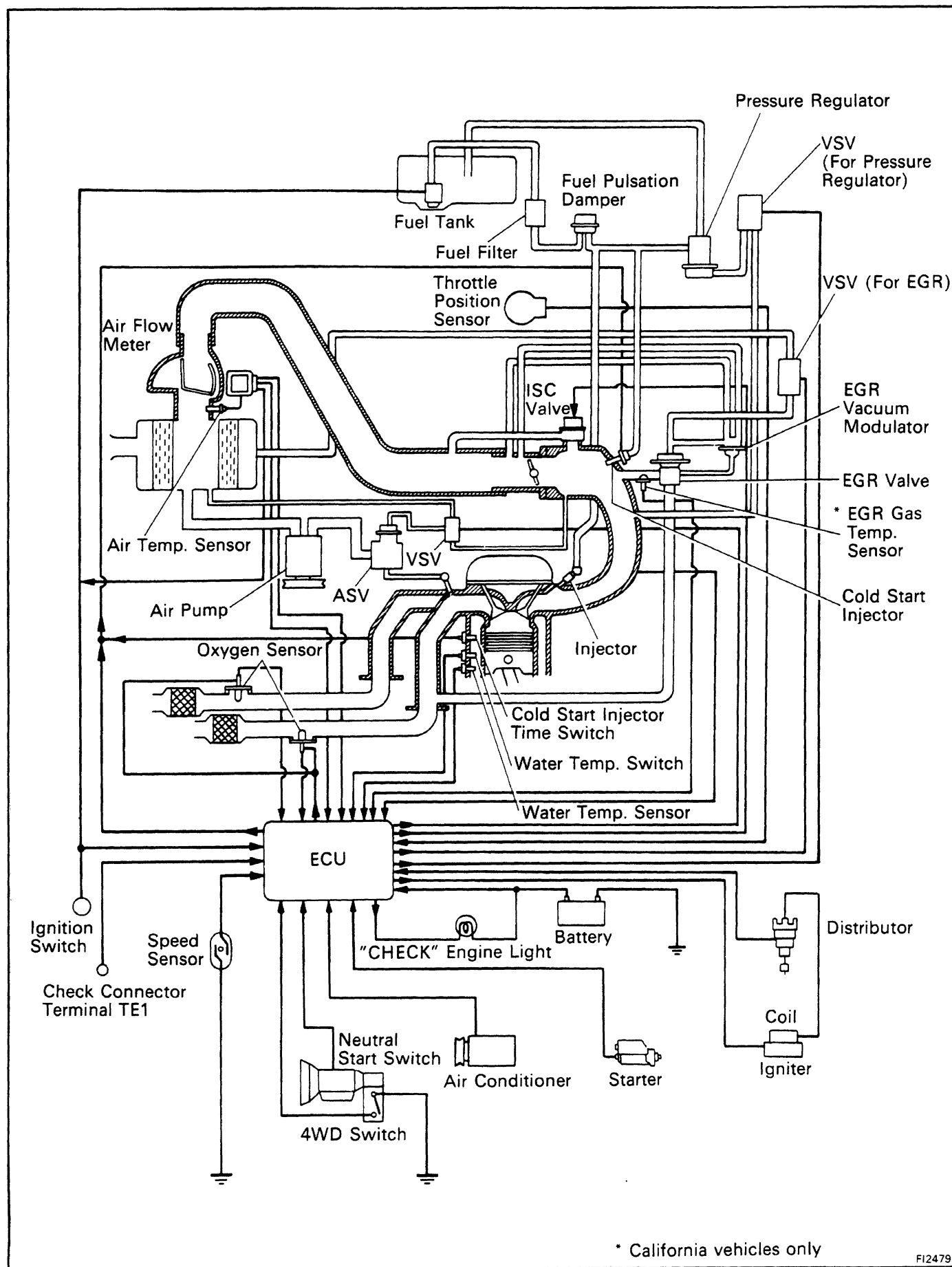


# EFI SYSTEM

# SYSTEM DESCRIPTION



**The EFI system is composed of three basic subsystems: Fuel Induction, Air Induction and Electronic Control Systems.**

## FUEL SYSTEM

Fuel is supplied under constant pressure to the EFI injectors by an electric fuel pump. The injectors inject a measured quantity of fuel into the intake manifold in accordance with signals from the ECU (Electronic Control Unit).

## AIR INDUCTION SYSTEM

The air induction system provides sufficient air for engine operation.

## ELECTRONIC CONTROL SYSTEM

The 3F-E engine is equipped with a Toyota Computer Control System (TCCS) which centrally controls the EFI, ESA, ISC, Diagnosis systems, etc. by means of an Electronic Control Unit (ECU formerly EFI computer) employing a microcomputer.

By means of the ECU, the TCCS controls the following functions:

### 1. Electronic Fuel Injection (EFI)

The ECU receives signals from various sensors indicating changing engine operating conditions such as:

- Intake air volume
- Intake air temperature
- Coolant temperature
- Engine rpm
- Acceleration / deceleration
- Exhaust oxygen content etc.

These signals are utilized by the ECU to determine the injection duration necessary for an optimum air-fuel ratio.

### 2. Electronic Spark Advance (ESA)

The ECU is programmed with data for optimum ignition timing under any and all operating conditions. Using data provided by sensors which monitor various engine functions (rpm, coolant temperature, etc.), the microcomputer (ECU) triggers the spark at precisely the right instant. (See IG section)

### 3. Idle Speed Control (ISC)

The ECU is programmed with target idling speed values to respond to different engine conditions (coolant temperature, air conditioner on/off, etc.). Sensors transmit signals to the ECU which control the flow of air through the bypass of the throttle valve and adjust idle speed to the target value.

(See pages FI-40, 71)

### 4. Exhaust Gas Recirculation (EGR)

The ECU controls the EGR system according to coolant temperature, engine rpm, throttle angle, vehicle speed and inlet air flow rate.

### 5. Air Injection (AI)

The ECU controls the AI system according to coolant temperature, engine rpm, throttle angle, vehicle speed and inlet air rate.

### 6. Diagnosis

The ECU detects any malfunctions or abnormalities in the sensor network and lights a "CHECK" engine warning light on the instrument panel. At the same time, the trouble is identified and a diagnostic code is recorded by the ECU. The diagnostic code can be read by the number of blinks of the "CHECK" engine warning light when terminals TE1 and E1 are short-circuited. The diagnostic codes are referred to in a later page.

(See pages FI-24, 25)

### 7. Fail-Safe Function

When an abnormality occurs in any of the ECU input signals, the ECU substitutes a standard value stored in the microcomputer memory in order to prevent engine malfunction. Also, if the abnormality is serious, the ECU stops the engine.

### 8. Back-Up Function

Even when an abnormality occurs in the ECU, it provides regular fuel injection and control of the ignition timing to provide vehicle driveability.