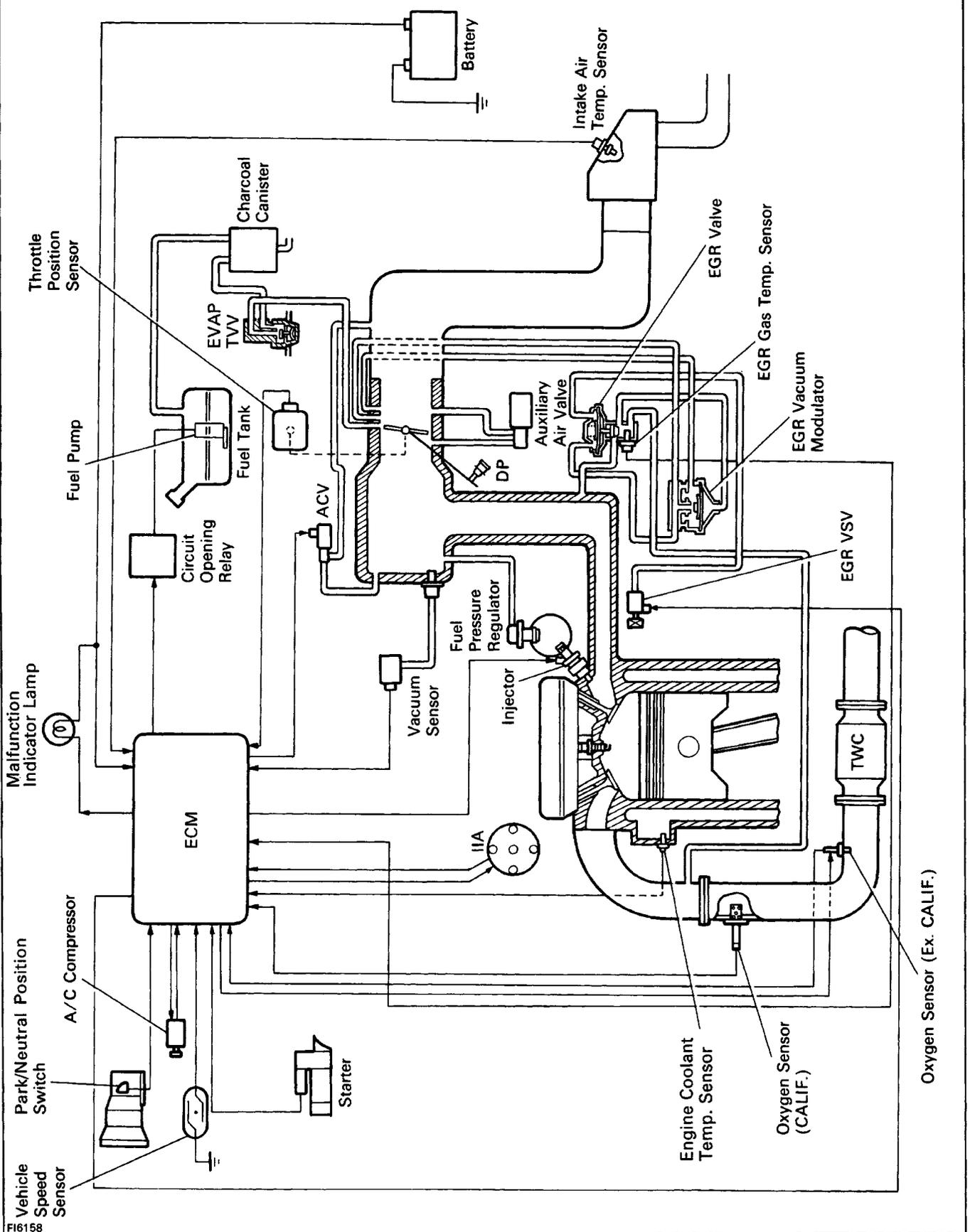


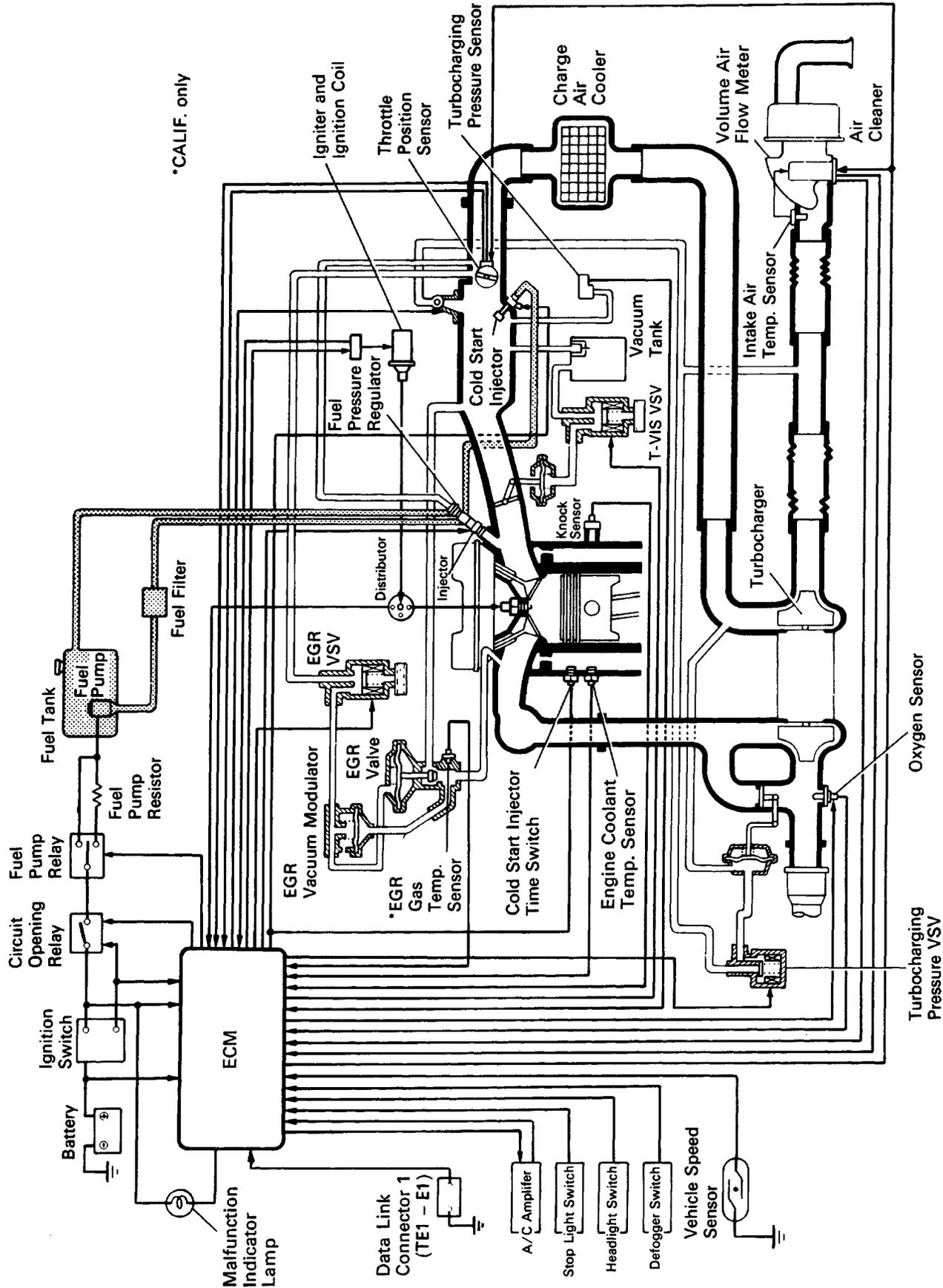
# MFI AND SFI SYSTEMS

# DESCRIPTION

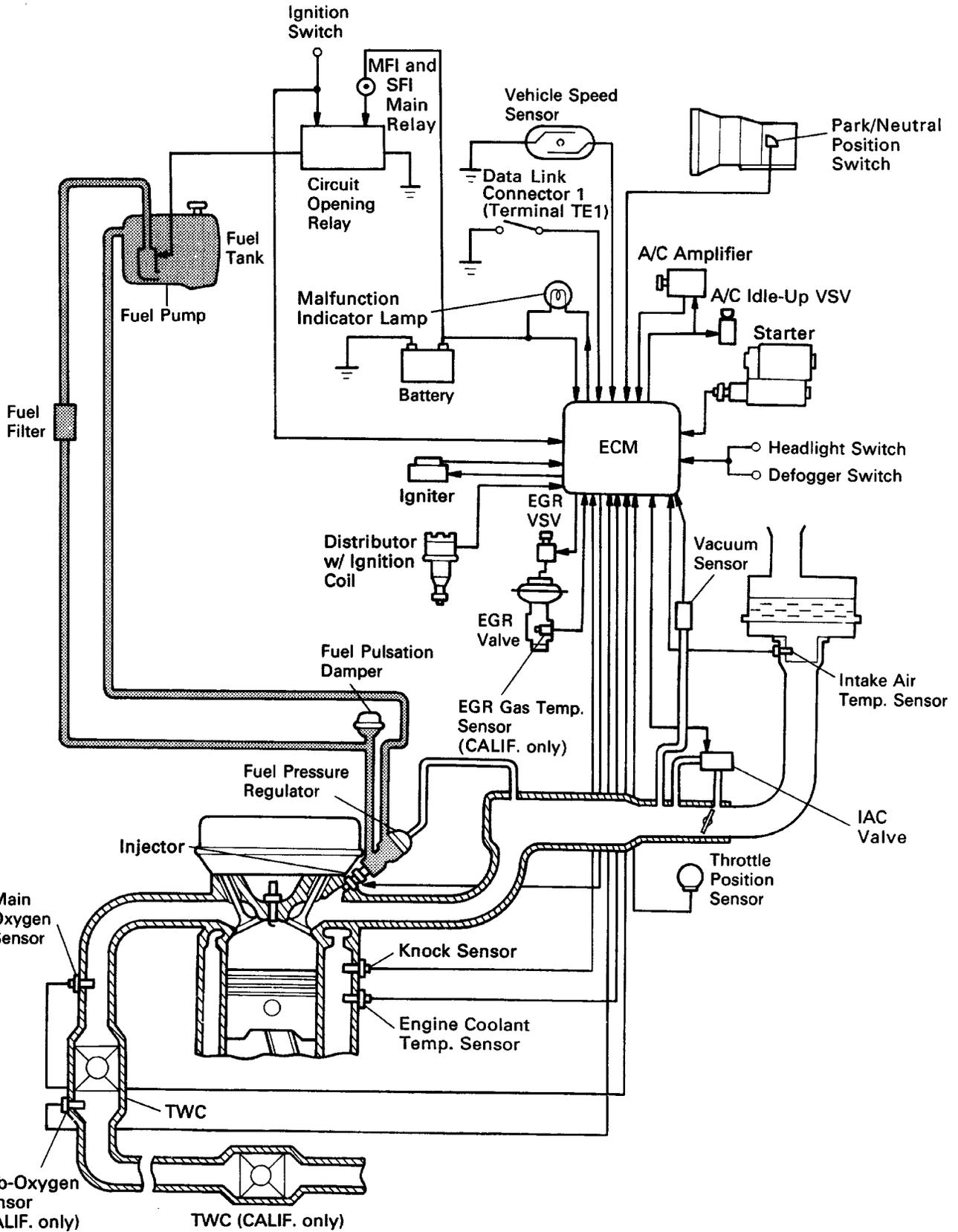
4A-FE



3S-GTE



5S-FE



The MFI and SFI systems are composed of three basic sub-systems: Fuel, Air Induction and Electronic Control Systems.

## FUEL SYSTEM

Fuel is supplied under constant pressure to the MFI and SFI injectors by an electric fuel pump. The injectors inject a metered quantity of fuel into the intake port in accordance with signals from the ECM (Engine Control Module).

## AIR INDUCTION SYSTEM

The air induction system provides sufficient air for engine operation.

## ELECTRONIC CONTROL SYSTEM

The CELICA 4A-FE, 3S-GTE and 5S-FE engines are equipped with a TOYOTA Computer Controlled System (TCCS) which centrally controls the MFI and SFI, ESA, IAC, diagnosis systems etc. by means of an Engine Control Module (ECM—formerly MFI and SFI computer) employing a microcomputer.

The ECM controls the following functions:

### 1. Multiport Fuel Injection and Sequential Multiport Fuel Injection (MFI and SFI)

The ECM receives signals from various sensors indicating changing engine operation conditions such as:

- Intake manifold pressure (4A-FE and 5S-FE)
- Intake air volume (3S-GTE)
- Intake air temperature
- Engine coolant temperature
- Engine rpm
- Throttle valve opening angle
- Exhaust oxygen content etc.

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

### 2. Electronic Spark Advance (ESA)

The ECM 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, engine coolant temperature, etc.), the microcomputer (ECM) triggers the spark at the precisely right instant. (See IG section)

### 3. Idle Air Control (IAC)

The ECM is programmed with target idling speed values to respond to different engine conditions (Engine coolant temperature, air conditioning ON/OFF (3S-GTE and 5S-FE), etc.). Sensors transmit signals to the ECM which controls the flow of air through the by-pass of the throttle valve and adjust idle speed to the target value.

### 4. Diagnosis

The ECM detects any malfunctions and abnormalities in the sensor network and lights a malfunction indicator lamp on the combination meter. At the same time, the trouble is identified and a diagnostic trouble code is recorded by the ECM. The diagnostic trouble code can be read by the number of blinks of the malfunction indicator lamp when terminals TE1 and E1 are connected. The diagnostic trouble codes are referred to the later page. (See page [FI-31](#), 44 or 50)

### 5. Fail-Safe Function

In the event of the sensor malfunctioning, a back-up circuit will take over to provide minimal drivability, and the malfunction indicator lamp will illuminate.