SERVICE REPAIR

MANUAL

Hyster G005 (H3.50XL H4.00XL-5 H4.00XL-6 H4.50XL H5.00XL) Forklift

HYSTER

ELECTRONIC ENGINE CONTROL, TROUBLESHOOTING AND REPAIR

GENERAL

This section has the troubleshooting and repair of the electronic engine control designed by General Motors® for use on GM gasoline engines. Users of this section must know the components and operation as described in the section, **ELECTRONIC ENGINE CONTROL, Description And Operation, 2200 SRM 473.**

See sections, **DIAGRAMS, 8000 SRM 494** and **DIAGRAMS, 8000 SRM 519** for the schematic and wire diagrams for this engine.

This electronic engine control has a troubleshooting system built into the ECM to indicate a circuit failure. A "Check Engine" light on the instrument panel will illuminate if a problem is sensed when the engine is running. This light is also used for a light bulb and system check.

The system check is the beginning point for all troubleshooting. The troubleshooting charts in this section must be used with the troubleshooting system built into the ECM. The troubleshooting charts will also indicate if the ECM is operating correctly. The fuel system is also controlled by the ECM and some of the troubleshooting charts will indicate a problem when the ECM displays a code.

Some parts of the electronic engine control can be checked with a simple jumper key installed into the ALDL connector. This jumper key connects terminal "B" in the ALDL connector to ground (terminal "A") and the system will enter the troubleshooting mode. A more complete troubleshooting of the electronic engine control requires special tools and equipment. See "SPECIAL TOOLS" at the end of this section.

A **SCAN TOOL** is a special tool that connects to the ALDL and reads problem codes from the ECM memory. The **SCAN TOOL** can also be used to check and troubleshoot components and the ECM operation of the electronic control system. The **SCAN TOOL** will record data stream information when the engine is operating. This procedure will record information that is not regular nor constant or that only occurs during some operations.

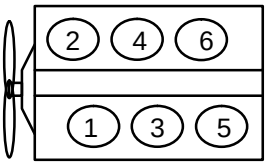
⚠ CAUTION

DO NOT damage the ECM! A voltmeter with a minimum impedance of 10 megohms must be used to make electrical checks and do troubleshooting.

Engine Data

Voltage from the throttle position sensor (TPS) (floor plates must be installed): less than 1.0 volts when the throttle is closed, to 3.5 $\pm$ 0.1 volts when the throttle is fully opened.

The Firing Order for the GM V–6 is 1–6–5–4–3–2.



The basic timing is 0° at idle speed.

Spark plug gap: 0.89 mm (0.035 in)

LIGHT BULB CHECK

When the ignition switch is turned to "ON" and the engine is not running, the "Check Engine " light on the instrument panel will illuminate to indicate that the ECM has completed the circuit. If the "Check Engine" light does not illuminate, see CHART A–1 for troubleshooting. When the engine is started, the "Check Engine" will go "OFF". If the light stays illuminated, when the engine is running, begin troubleshooting at the "SYSTEM CHECK".

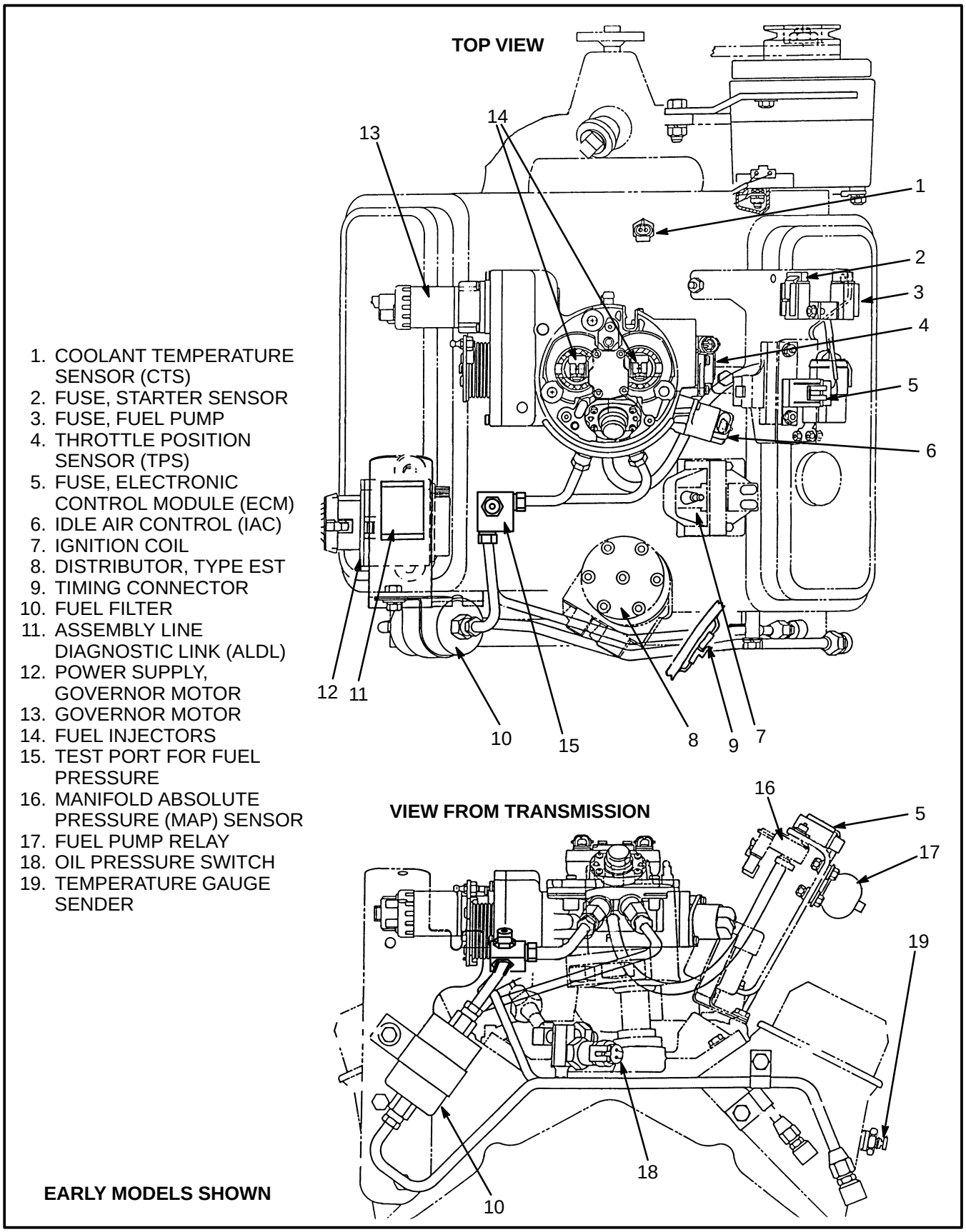


FIGURE 1. ARRANGEMENT OF COMPONENTS FOR ELECTRONIC ENGINE CONTROL

SYSTEM CHECK

The "SYSTEM CHECK" is the beginning point for all troubleshooting. Always begin troubleshooting at the "SYSTEM CHECK" described in FIGURE 2.

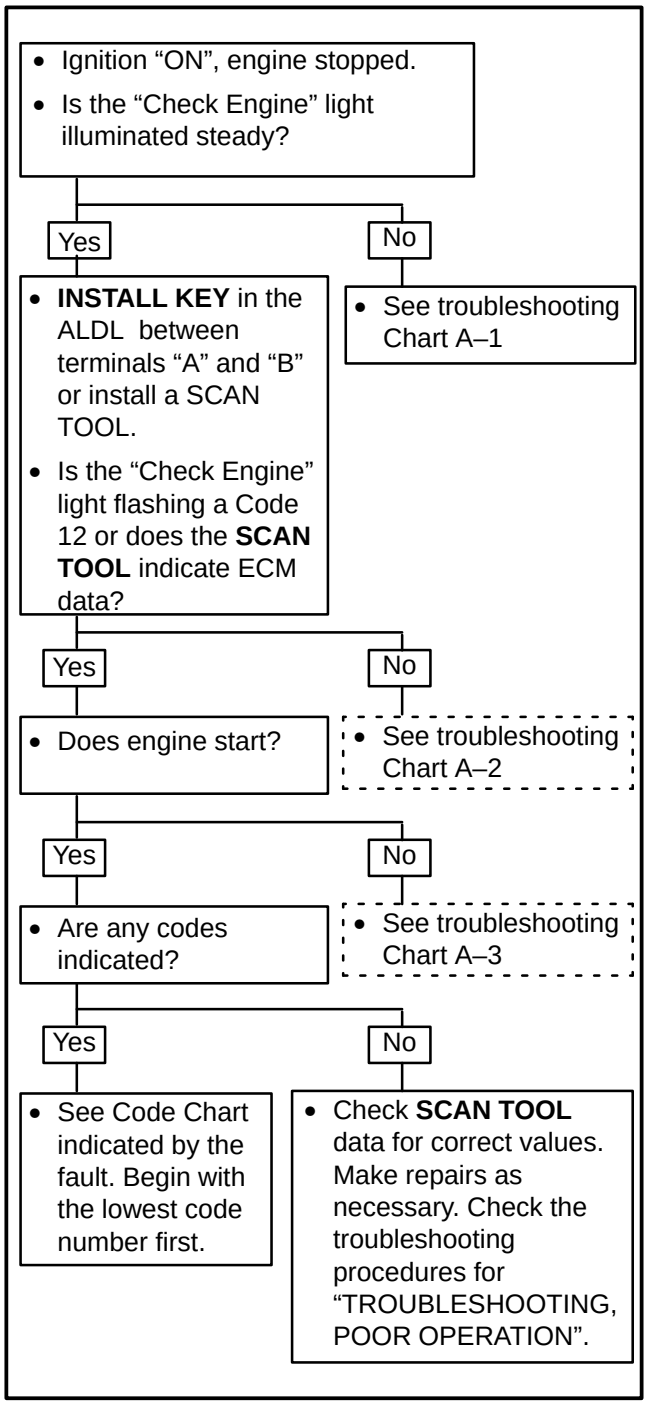


FIGURE 2. SYSTEM CHECK

The "SYSTEM CHECK" is done through the Assembly Line Diagnostic Link (ALDL) which is connected through a wiring harness to the ECM. The ALDL connector is found in the engine compartment. (See Item 11, FIGURE 1.) A power receptacle for battery voltage is also installed next to the ALDL to operate the **SCAN TOOL** when it is connected to the ALDL.

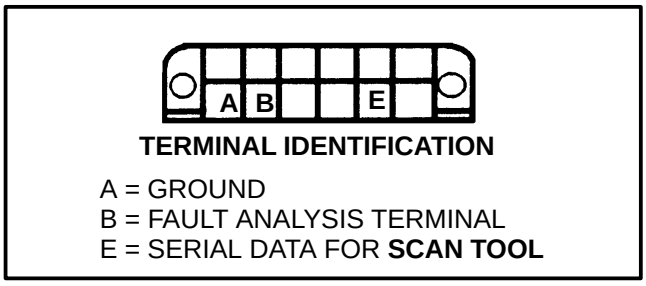


FIGURE 3. ALDL CONNECTOR

Each troubleshooting chart has two parts:

- an electrical schematic of the indicated components.
- a fault tree to troubleshoot the indicated problem.

TROUBLESHOOTING WITH THE FAULT MONITOR SYSTEM IN THE ECM

The ECM is a computer that can sense faults in the electronic engine control and store this fault information in its memory. This troubleshooting sequence describes how to get fault information from the ECM with a key in the ALDL and read the fault code from the "Check Engine" light.

A simple key (PART NO. 1338734) as shown in FIGURE 4. is used to connect Terminal "B" to Terminal "A" in the ALDL connector. If Terminal "B" is connected to Terminal "A" when the ignition switch is "ON" and the engine is stopped, some faults will be indicated by a code (a sequence of illuminations) from the "Check Engine" light. A short piece of wire can also be used as a "key" if carefully used so that the ALDL connector is not damaged.

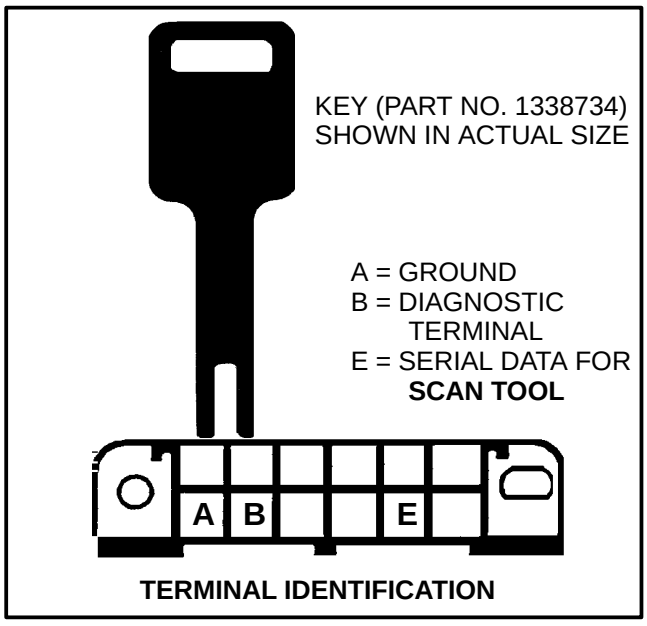


FIGURE 4. KEY FOR ALDL CONNECTOR

When the ignition switch is "ON" and the engine is stopped, the "Check Engine" light will illuminate in a slow sequence to indicate a "Code 12". A Code 12 is indicated by "one flash" of light followed by a pause and then "two flashes" to indicate that the fault monitor system is operating. A Code 12 only indicates that the fault monitor system is operating. The fault monitor system will repeat a Code 12 twice and then send another code sequence if there is a fault. If there are no other fault codes stored in the ECM, a series of two Code 12 sequences will continue to repeat as long as the key is in the ALDL connector and the ignition switch is turned to "ON".

NOTE: The code sequence occurs slowly at a rate of approximately one "flash" per second. Service people must wait long enough to make sure they have the complete and correct code sequences before beginning troubleshooting.

If the ECM has a fault stored in its memory, another code sequence will "flash" after the series of two Code 12 sequences. More than one fault code can be stored in the memory of the ECM. The ECM will send a Code 12 and then the fault codes beginning with the lowest number fault code first. The code sequences will continue to repeat as long as the key is in the ALDL connector and the ignition switch is "ON". The identification of the code sequences are shown in FIGURE 5.

The normal operating conditions of each sensor are stored in the ECM. When a sensor indication is not within the normal operating conditions, the ECM will illuminate the "Check Engine" light on the instrument panel. The code indicates the circuit that has the problem.

If Terminal "B" is connected to Terminal "A" when the engine is running, the "Check Engine" light will indicate a code if the fuel system is not operating correctly.

A code that is not regular nor constant is a code that occurs and then does not repeat when the code is cleared during troubleshooting. This type of code is most often caused by a loose connection. The schematic diagram of the circuit and the troubleshooting suggestions are useful in finding this type of problem.

A "hard" code is a code that continues to indicate a problem while you are working on the lift truck. The code Chart for the code indicated by the ECM will help find the problem.

How To Clear A Code

⚠ CAUTION

DO NOT damage the ECM! The ignition switch MUST be "OFF" before battery voltage is disconnected. Do not disconnect a power cable, fuse, or jumper cable that supplies power to the ECM until the ignition switch is "OFF".

When the ECM senses a problem and sets a code in memory, the "Check Engine" light will illuminate. If the problem is not constant or not regular, the "Check Engine" light will go dark 10 seconds after the fault has stopped. The fault code will stay in the ECM memory until the engine has been started 50 times or the battery voltage has been removed from the ECM. If the battery voltage is removed from the ECM for 30 seconds, all codes in memory will go away. Remove any problem codes from the ECM memory after repairs have been completed. Also, some of the troubleshooting charts will indicate to remove the current codes before using the troubleshooting chart. This procedure permits the ECM to set the code while troubleshooting and can help find the problem more quickly.

Fault In The ECM
(See CODE 51 on page 46)

Begin troubleshooting at the "SYSTEM CHECK" described in FIGURE 2. The code system indicates a prob-

lem in a specified circuit. A Code 55 indicates that the ECM has failed and must be replaced.

If the ECM has been replaced and the malfunction has not been corrected, make the following checks:

a. Make sure the ECM and the PROM (Programmable Read Only Memory) in the ECM are correct for the lift truck (See page 73. A wrong ECM or PROM can cause a malfunction and not indicate a fault code or indicate a wrong fault code.

b. Make sure the connector at the ECM is in good condition. Check for corrosion or damage. If all other checks are completed and the fault is not found, it can be necessary to remove the connectors from the terminal to check their condition.

c. The PROM does not normally fail. The PROM is part of the ECM and a PROM that is not installed correctly or is damaged can cause a fault in the ECM.

d. If you are using a **SCAN TOOL** for troubleshooting, make sure the correct values are set in the instrument.

e. Make sure the replacement ECM is good. This problem almost never occurs, but must be included as part of the troubleshooting.

f. If the problem is not constant or not regular, go to "TROUBLESHOOTING, POOR OPERATION". Make a "CAREFUL VISUAL CHECK" and do the troubleshooting described in that section.

g. A short–circuit in a solenoid, relay coil, or wire harness can cause a fault in the ECM. Check for a possible short–circuit in the solenoids and relay coils before installing a replacement ECM.

Fault In The PROM

A PROM that is not installed correctly or is damaged (page 74) can indicate a Code 51.

CalPak Not Installed

The engine will not start nor run if the CalPak is not installed in the ECM (page 74). A missing CalPak in the ECM will indicate a Code 52.

Fuel Control

The ECM controls the fuel supply to the engine. Troubleshooting of the fuel control begins with Chart A–3 (Engine Cranks But Will Not Run), page 12. This troubleshooting chart will test the fuel system. Additional troubleshooting is described in the following charts:

Chart A–4, page 14 (Fuel Injector Circuit Troubleshooting)
Chart A–5, page 16 (Fuel Pump Relay Circuit Troubleshooting), and
Chart A–6, page 18 (Fuel System Pressure Test).

A bad fuel injector can cause the engine to not start or be difficult to start. A fuel injector that does not close completely can cause "dieseling" because some fuel can be delivered to the engine after the ignition switch is turned to "OFF".

A correct and constant fuel pressure is very important to the operation of the engine. The operation of the fuel pressure regulator and the fuel pump must be within the specifications so that the engine will operate correctly.

Idle Air Control (IAC)

The checks and repairs of the idle air control valve are described in later paragraphs under "Idle Air Control, Repairs". If the idle air control valve is disconnected or connected when the engine is running, the idle speed of the engine can be wrong. If the ignition switch is turned to "OFF" and then to "ON", the idle air control valve will normally reset correctly.

The idle air control valve controls only the idle speed of the engine. If the idle air control valve is fully open, too much air will enter the inlet manifold and cause the idle speed to be too fast. If the idle air control valve is closed, the idle speed will be too slow and the engine can stall. If the idle air control valve can not move freely, the idle speed can be rough and the engine will not adjust to load changes.

Fuel Pump Circuit

A Code 54 indicates a failure in the fuel pump circuit.

The fuel pump relay has a terminal to test the operation of the fuel pump. If battery voltage is applied at this terminal, the fuel pump will normally operate. This procedure can also be used to operate the fuel pump and fill the fuel line to the TBI.

The fuel pump will normally operate for two seconds after the key switch is turned to **ON**. The fuel pump will continue to operate if the engine is cranked for starting. If the fuel pump does not operate, the engine will not start. If the fuel pressure is less than approximately 69 kPa (10 psi), the engine will have poor performance.

If fuel pump relay does not operate, the engine will be difficult to start. When the engine is cranked, the oil pressure switch will energize the fuel pump when the engine oil pressure increases to approximately 28 kPa (4 psi).

Coolant Temperature Sensor (CTS)

A Code 14 or a Code 15 indicates a failure in the circuit for the coolant temperature sensor.

See the paragraphs under "Coolant Temperature Sensor, Repairs" to check and replace the coolant temperature sensor. Most **SCAN TOOLS** will indicate the coolant temperature in degrees centigrade or degrees Fahrenheit. After the engine is started, the coolant temperature will normally increase to approximately 82°C (180°F) and then remain constant when the thermostat opens.

Manifold Absolute Pressure Sensor (MAP)

A Code 33 or a Code 34 indicates a failure in the MAP sensor circuit.

See the paragraphs under "MAP Sensor, Repairs" to check and replace the MAP sensor.

Throttle Position Sensor (TPS)

A Code 21 indicates a short–circuit in the circuit for the throttle position sensor. A Code 22 indicates an open–circuit in the circuit for the throttle position sensor. When a Code 21 or Code 22 is entered into the ECM memory, the ECM will select a value for throttle position, but will disable the governor.

A broken throttle position sensor can cause the ECM to sense that the throttle is opening and closing when it is not moving. This problem will cause a variation in engine speed that is not regular and a rough idle speed .

A **SCAN TOOL** will indicate the throttle position in volts. When the throttle is closed at idle speed, the **SCAN TOOL** will normally indicate approximately 0.60 volts. When the throttle is smoothly opened to full open, the voltage normally increases smoothly.

Connect a **SCAN TOOL** to the throttle and turn the ignition switch to "ON". Do not start the engine. Push the accelerator pedal to open the throttle from idle to full open. The normal voltage on the **SCAN TOOL** will be less than 1.0 volts when the throttle is closed, to 3.5 ± 0.1 volts when the throttle is fully opened.

NOTE: The throttle position sensor will indicate approximately 4.5 volts when the throttle plates are fully open. When the accelerator linkage is correctly adjusted in the lift truck, the correct voltage is 3.5 ± 0.1 volts when the accelerator pedal is pushed against the floor plate.

Output Check, Throttle Position Sensor

This check is only done when the TBI, or the throttle position sensor has been replaced, or the minimum air flow through the idle air control valve has been adjusted.

1. Connect a digital voltmeter between terminal "A" and terminal "B" of the throttle position sensor. A jumper cable must be made to fit the connector to the throttle position sensor so that you have access to terminal "A" and terminal "B".

2. Turn the ignition switch to "ON". Do not start the engine. The normal voltage from the throttle position sensor is less than 1.25 volts. If the voltage is greater than 1.25 volts, check the minimum idle speed before you replace the throttle position sensor.

3. When the check is done, remove the voltmeter and the jumper cable. Attach the connector to the throttle position sensor.

Electronic Spark Timing

A Code 42 is indicated if there is an open–circuit or a short–circuit in the electronic spark timing signal (EST) or the by–pass circuit

When the system is running on the ignition module, there is no voltage on the by–pass wire because the ignition module sends the electronic spark timing signal (EST) to ground. If the ECM senses a voltage on the EST wire, a Code 42 will be set and the electronic control system will not go into the EST mode of operation.

When the engine is being started and approximately 400 rpm is sensed, by–pass voltage is applied. The EST will no longer be grounded in the ignition module and the EST voltage will normally have a variation during operation.

If the by–pass wire is open or grounded, the ignition module will not change to EST mode and a Code 42 will be indicated.

If the EST wire has a short–circuit to ground, there will not be an EST signal and a Code 42 will be indicated.

Engine Crank Signal

This circuit is only energized when the starter is cranking the engine. This signal indicates to the ECM that the engine is in the starting mode. The ECM will operate the fuel pump while the starter is cranking the engine. The ECM will increase the fuel mixture for easier starting. Indications of a possible fault in the Engine Crank Signal are if the engine becomes more difficult to start. Troubleshooting for the engine crank signal is described in Chart A–8.

Distributor Reference Signal

Troubleshooting for the distributor reference signal is described in Chart A–9.

The "Check Engine" light will only illuminate if the malfunction occurs during the conditions described below. If the malfunction clears, the light will go dark and the code will be stored in the ECM. Any codes stored will be erased if no problem occurs again within 50 engine starts.

Code And Circuit	Probable Cause	Code And Circuit	Probable Cause
Code 12	Indicates that the fault monitor system is operating	Code 34 — high vacuum, MAP sensor	Low or no output from MAP sensor when the engine is running
Code 13 — Not Used	Not Used	Code 33 — low vacuum, MAP sensor	Indicates that the output of the MAP sensor is too high for 5 seconds or an open–circuit
Code 14 — high temperature indication, Coolant Temperature Sensor	Indicates if the sensor or signal wire has a short–circuit to ground for more than 3 seconds	Code 42 — Electronic Spark Timing (EST)	Indicates an open–circuit or short–circuit in the EST or by–pass circuit
Code 15 — low temperature indication, Coolant Temperature Sensor	Indicates if the sensor or signal wire has as open–circuit for more than 3 seconds	Code 43 — Not Used	Not Used
Code 21 — high voltage signal, Throttle Position Sensor	Throttle position sensor voltage greater than 2.5 volts for 3 seconds with engine speed less than 1200 rpm	Code 44 — Not Used	Not Used
Code 22 — low voltage signal, Throttle Position Sensor	Short–circuit or open circuit for 3 seconds	Code 45 — Not Used	Not Used
Code 24 — Not Used	Not Used	Code 51 — PROM or ECM	PROM or ECM has a fault
Code 31 — governor malfunction, governor responds too slowly or not at all.	Indicates that engine speed will exceed calibrated value	Code 52 — CalPak	CalPak is missing or has a fault,
Code 32 — Not Used	Not Used	Code 54 — low voltage, Fuel Pump	Indicates that the fuel pump voltage is less than 2 volts when reference pulses are being received
		Code 55 — ECM	ECM has a fault

FIGURE 5. ECM CODE IDENTIFICATION CHART

TROUBLESHOOTING CHARTS

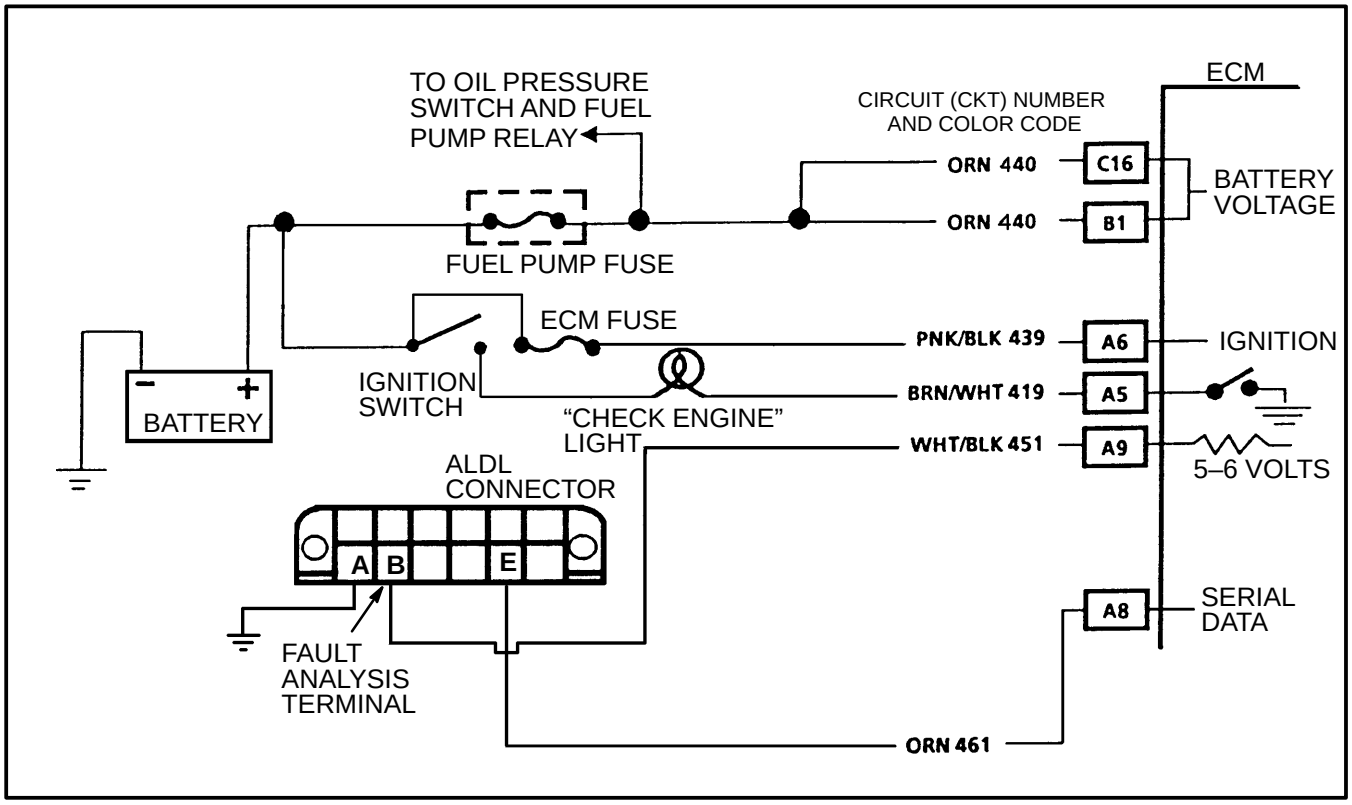


CHART A–1 — No "Check Engine" Light

Circuit Description, "Check Engine" Light

The "Check Engine" light will illuminate when the ignition switch is "ON" and the engine is stopped. Battery voltage is supplied to the light through the ignition switch. The ECM controls the operation of the light. The ECM illuminates the light when it closes a path to ground through CKT 419.

TEST DESCRIPTION: The numbers below are a reference to the numbers in circles in the troubleshooting chart on the facing page.

1. If the ECM fuse is open (burned), see the troubleshooting chart for Code 54 (Fuel Pump Circuit) for a complete circuit schematic.

2. Use a **TEST LIGHT** connected to 12 volts. Check each of the system ground circuits and connections to make sure that a good ground connection exits. See the chart (FIGURE 53.) for the ECM terminal description for the terminal pin locations of the ground circuits.

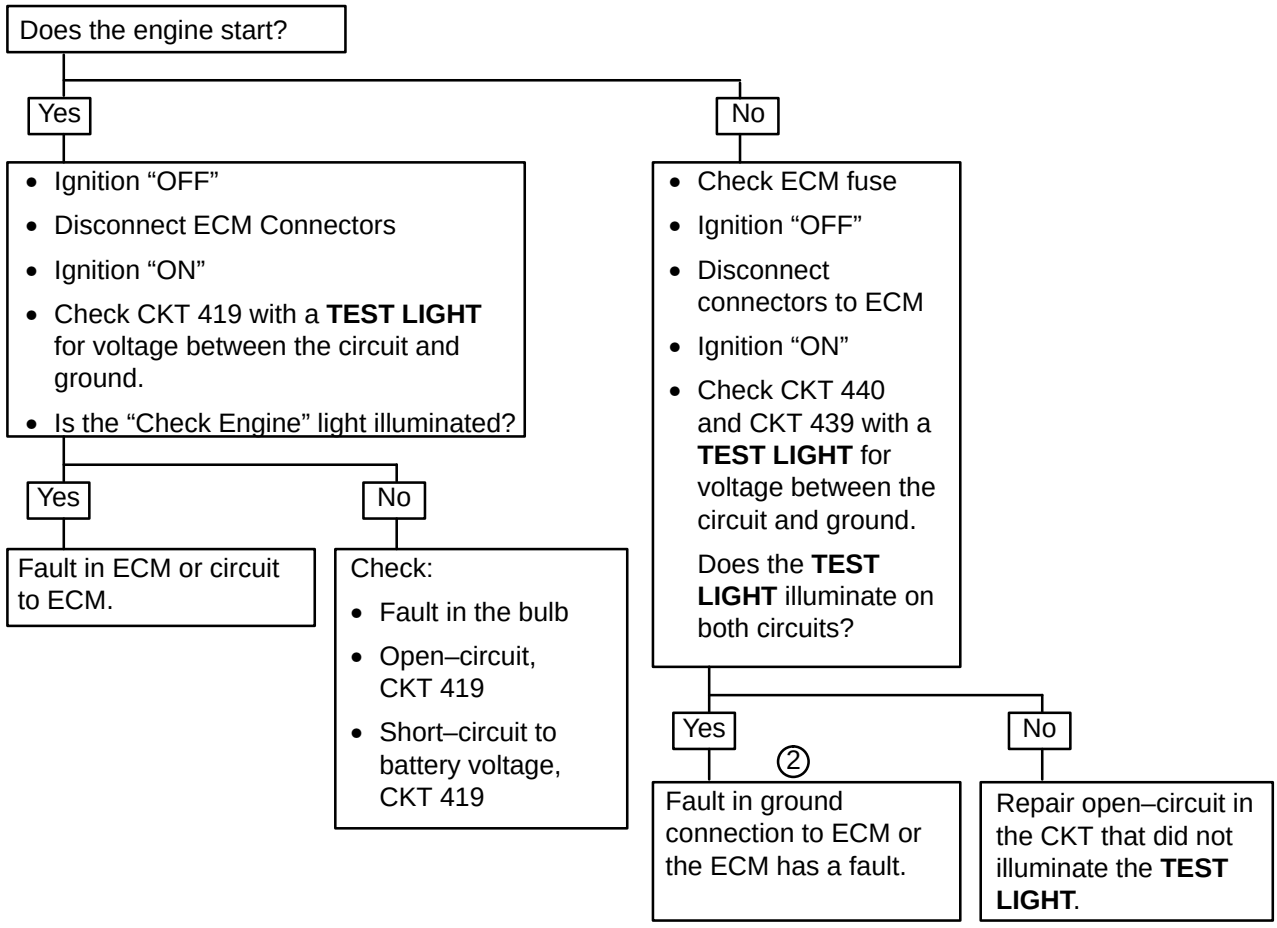
OTHER TROUBLESHOOTING CHECKS:

If the engine will run , check for the following faults:

- bad light bulb.
- open–circuit in CKT 419.

If the engine will crank, but will not run , check for the following faults:

- open in ECM fuse.
- battery circuit CKT 440 to ECM is open.
- ignition circuit CKT 439 to ECM is open.
- poor connection to ECM.



When repairs are complete, clear the codes from the ECM and check that the “Check Engine” light does not indicate another problem.

CHART A–1 — No “Check Engine” Light

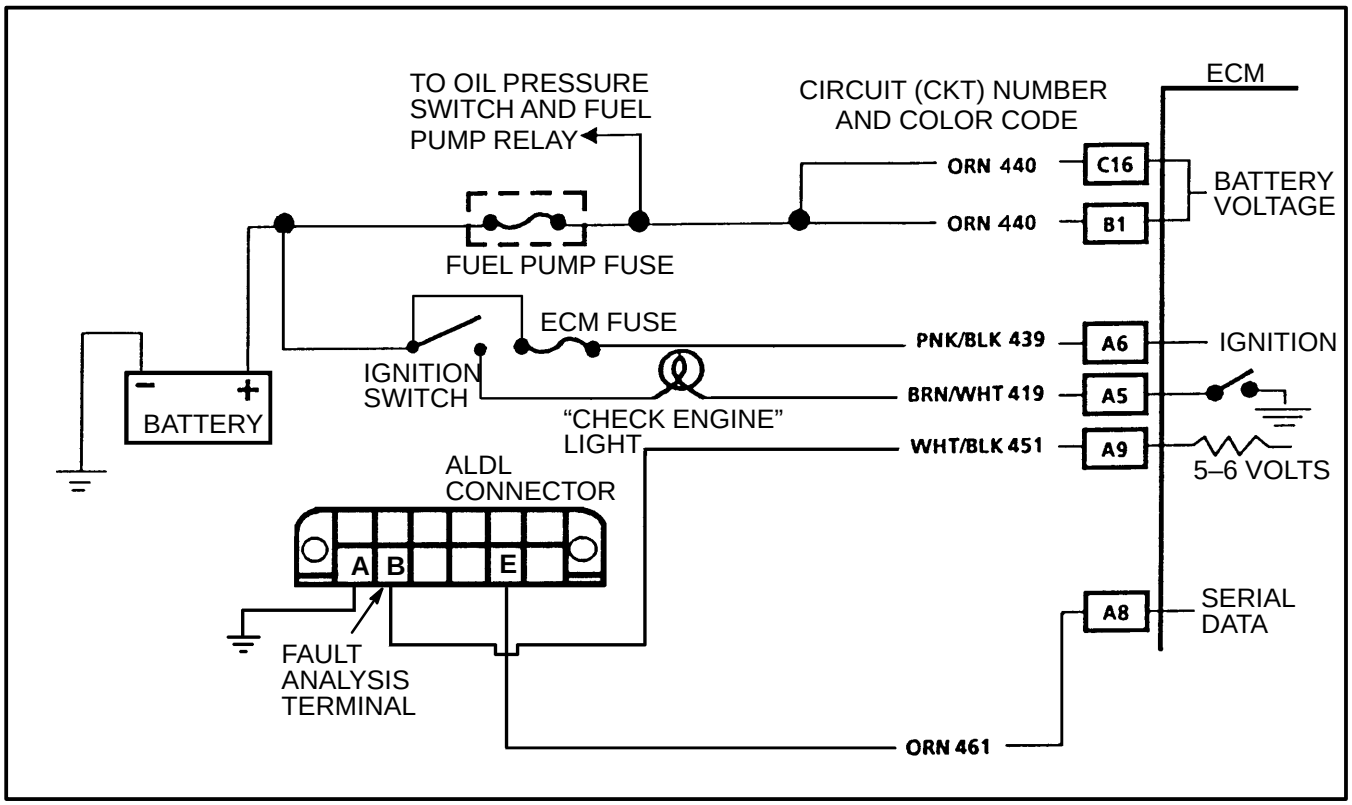


CHART A–2 –– No ALDL Data Or No Code 12 From "Check Engine" Light. The "Check Engine" Light Is Continuously Illuminated

Circuit Description, "Check Engine" Light

The "Check Engine" light will illuminate when the ignition switch is "ON" and the engine is stopped. Battery voltage is supplied to the light through the ignition switch. The ECM controls the operation of the light. The ECM illuminates the light when it closes a path to ground through CKT 419. When the fault analysis terminal "B" is connected to terminal "A", the "Check Engine" light will normally "flash" a Code 12. A Code 12 is then followed by any other problem codes stored in ECM memory.

A steady "Check Engine" light can be a short–circuit to ground in CKT 419, or an open–circuit CKT 451.

TEST DESCRIPTION: The numbers below are a reference to the numbers in circles in the troubleshooting chart on the facing page.

1. If there is a problem with the ECM that causes the **SCAN TOOL** to not read data, then a Code 12 will not be seen from the "Check Engine" light. If a Code 12 is seen, then check that the **SCAN TOOL** is operating correctly. Check if the **SCAN TOOL** will function correctly on another lift truck. If the **SCAN TOOL** is operating correctly and CKT is good, the PROM or the ECM can have a fault that causes the ALDL problem.

2. If the "Check Engine" light goes "OFF" when the ECM connector is disconnected, then CKT 419 does not have a short–circuit to ground.

3. This step will check for an open–circuit in CKT 451 and fault analysis terminal "B".

4. The "Check Engine" light and circuit is good. The ECM or the PROM has a fault. If there is no Code 12, Replace the ECM, but install the original PROM (See FIGURE 47.) If there is still a fault, replace the PROM. The PROM does not normally have a failure and cause a fault.

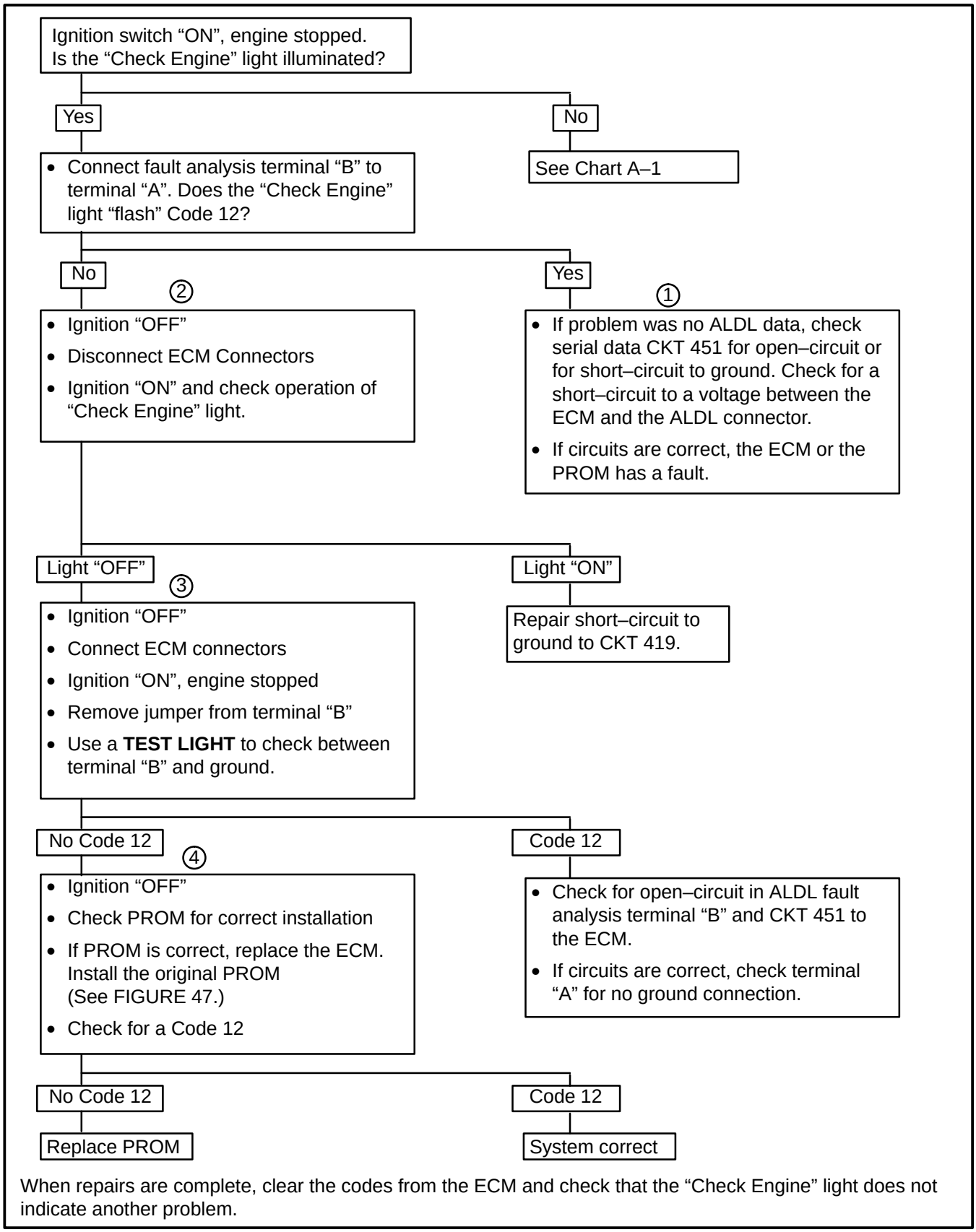


CHART A–2 — No ALDL Data Or No Code 12 From “Check Engine” Light. The “Check Engine” Light Is Continuously Illuminated

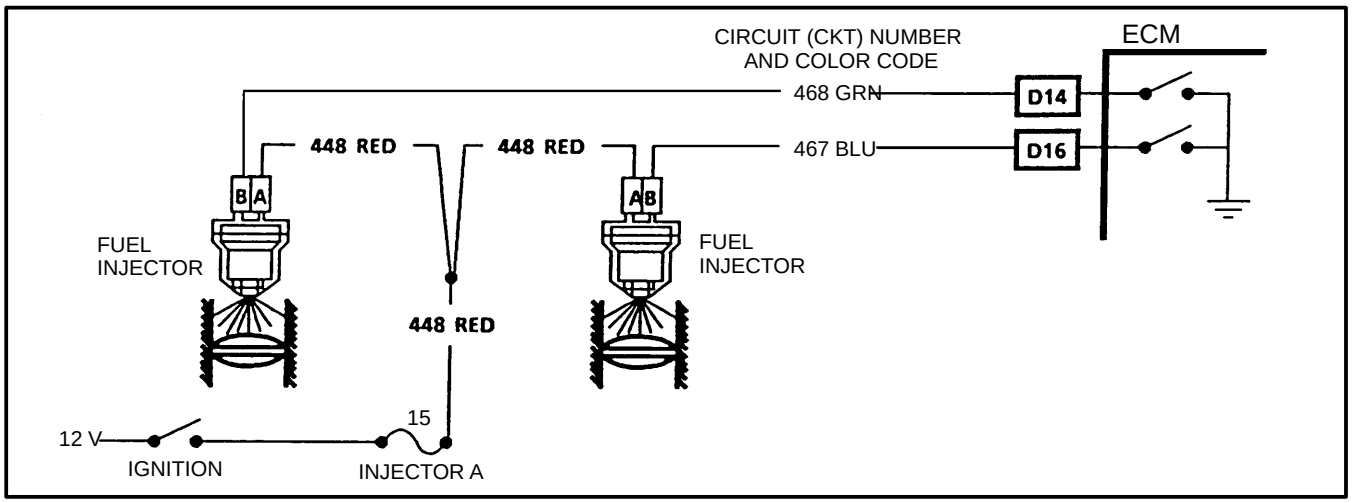


CHART A–3 — Starter Cranks The Engine, But Will Not Run

Circuit Description

The following conditions must be correct before this troubleshooting chart is used:

- battery is charged and in good condition.
- starter speed is good.
- fuel in the fuel tank.

TEST DESCRIPTION: The numbers below are a reference to the numbers in circles in the troubleshooting chart on the facing page.

1. A "Check Engine" light indication is a first test that there is 12 volts (battery voltage) to the ECM and 12 volts through the ignition switch to the ECM. If there is no ALDL data available, the problem can be an ECM problem and troubleshooting must begin with Chart A–2. If the voltage from the throttle position sensor is greater than 2.5 volts, the electronic control system can be in a "clear flood" mode and the engine will be difficult to start. If the coolant temperature sensor is below –30°C (–22°F), or is disconnected, the ECM will send a maximum amount of fuel to flood the engine.

2. The voltage at the spark plug is checked using a spark tester tool. No spark indicates an ignition system problem.

3. If the fuel injectors are disconnected when the engine is rotated with the starter, no fuel spray from the fuel injectors is correct. If a fuel injector has leaks or makes a fuel spray when it is disconnected, replace the fuel injector.

4. A **TEST LIGHT** connected to each fuel injector circuit will illuminate with each pulse if the ECM is correctly controlling the pulses to the fuel injectors.

5. This test will indicate that there is fuel pressure at the fuel injectors and that they are operating.

OTHER TROUBLESHOOTING CHECKS:

If the engine will not run and the fuel pump circuit and the ignition are correct, check for the following faults:

a. bad spark plugs.

b. low fuel pressure. See Chart A–6.

c. water or other material in the fuel system.

d. short–circuit in CKT 423 (EST) that can cause a "No Start" or a "Start and then Stop" condition.

e. damaged engine.

f. idle air control valve fully closed and not operating.

g. dirty fuel filter.

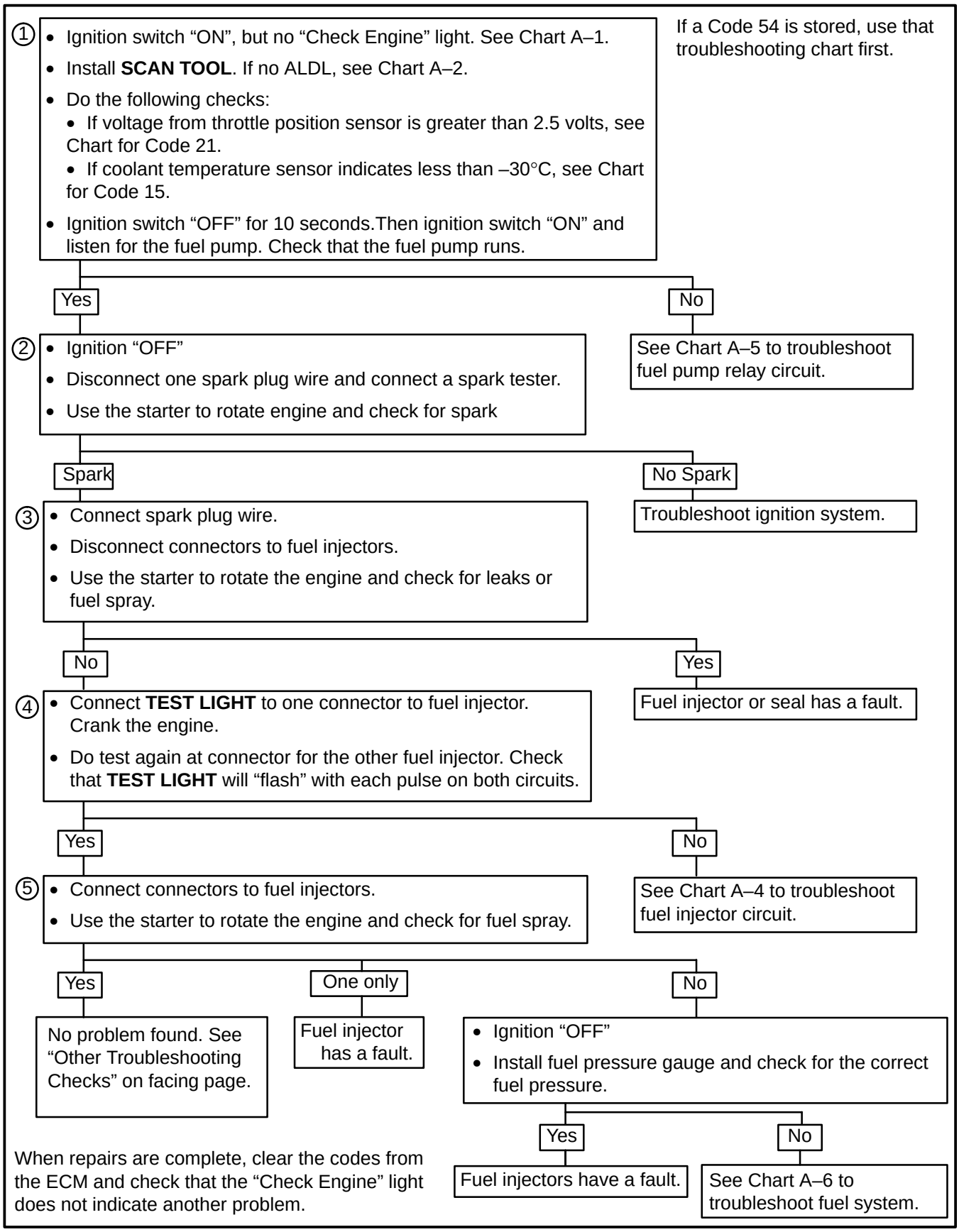


CHART A–3 — The Starter Cranks The Engine, But Will Not Run

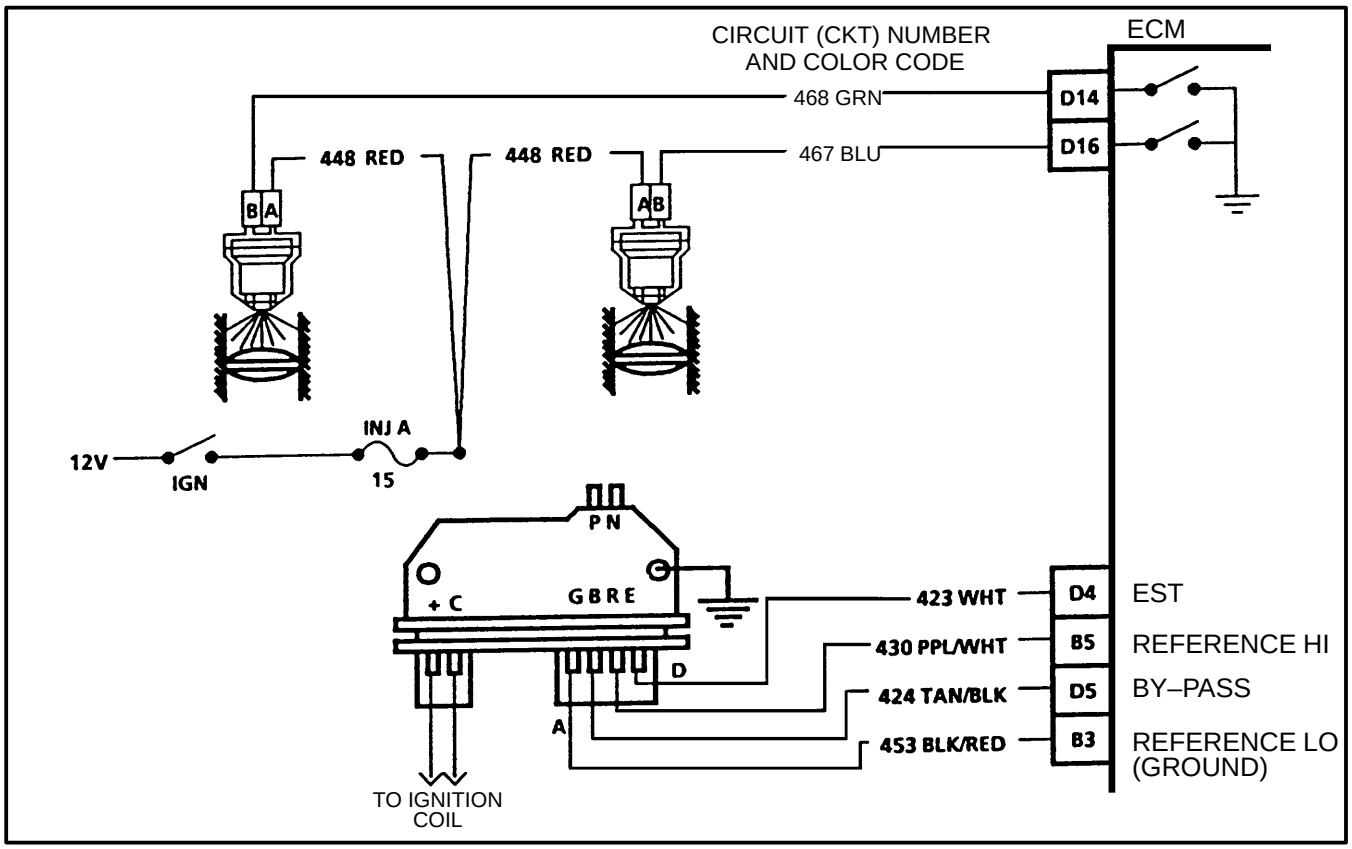


CHART A–4 — Fuel Injector Circuit

Circuit Description

This troubleshooting chart is used if the troubleshooting Chart A–3 indicates a fuel injector problem. If both fuel injector circuits indicate a problem, test one circuit at a time.

TEST DESCRIPTION: The numbers below are a reference to the numbers in circles in the troubleshooting chart on the facing page.

1. This test will determine if the ignition module is generating a reference pulse and check the wires and ECM for a fault. If a 12 VOLT **TEST LIGHT** is connected to 12 volts and then touched and removed from CKT 430, a reference pulse is normally generated. If the **TEST LIGHT** connected to the fuel injector circuit momentarily illuminates, the ECM and wires are correct.

2. This step checks for 12 volts to the fuel injector. This test will also determine if there is a short–circuit to a voltage source on the ECM side of the circuit.

3. This test checks for a good circuit to the ECM.

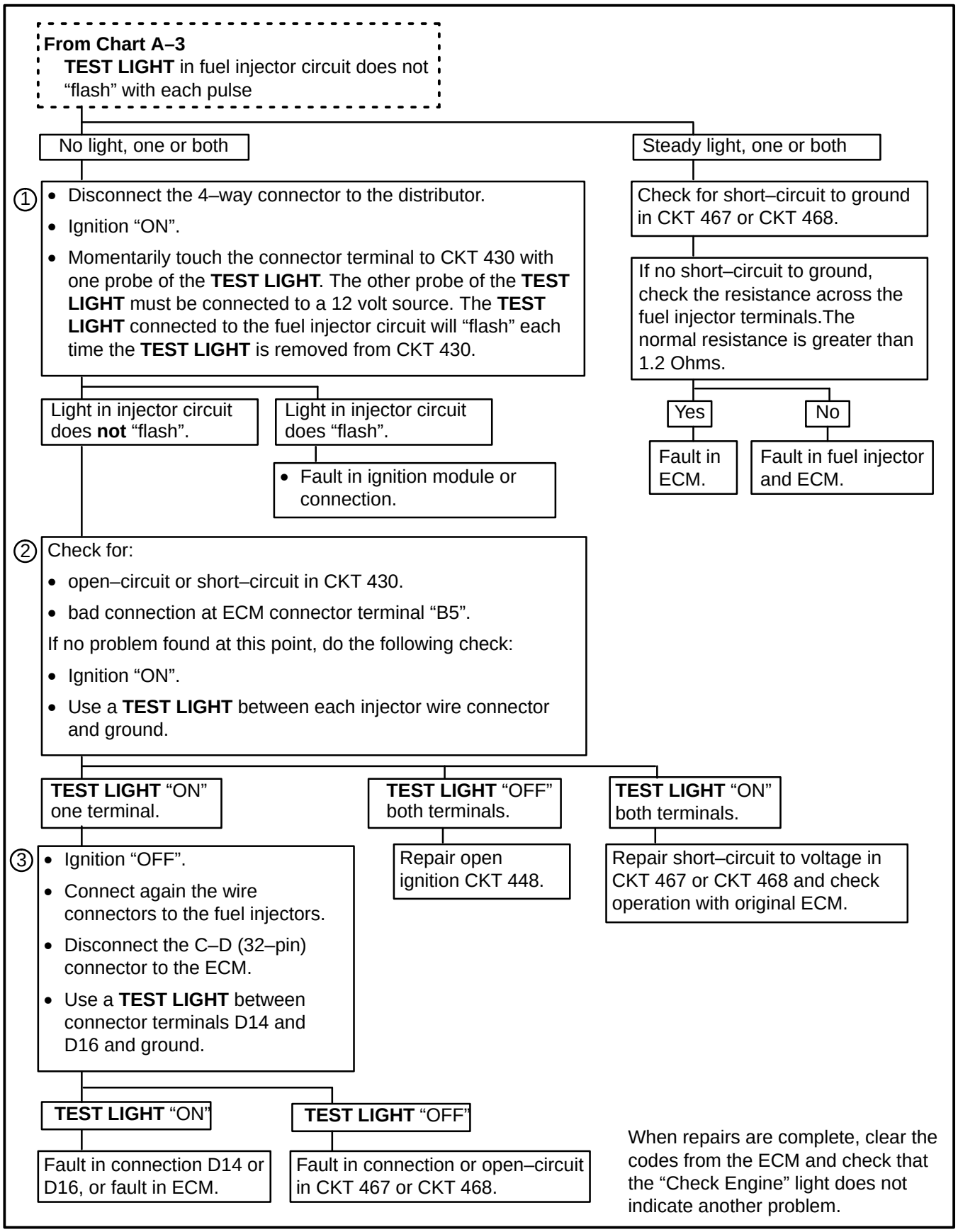


CHART A–4 — Fuel Injector Circuit

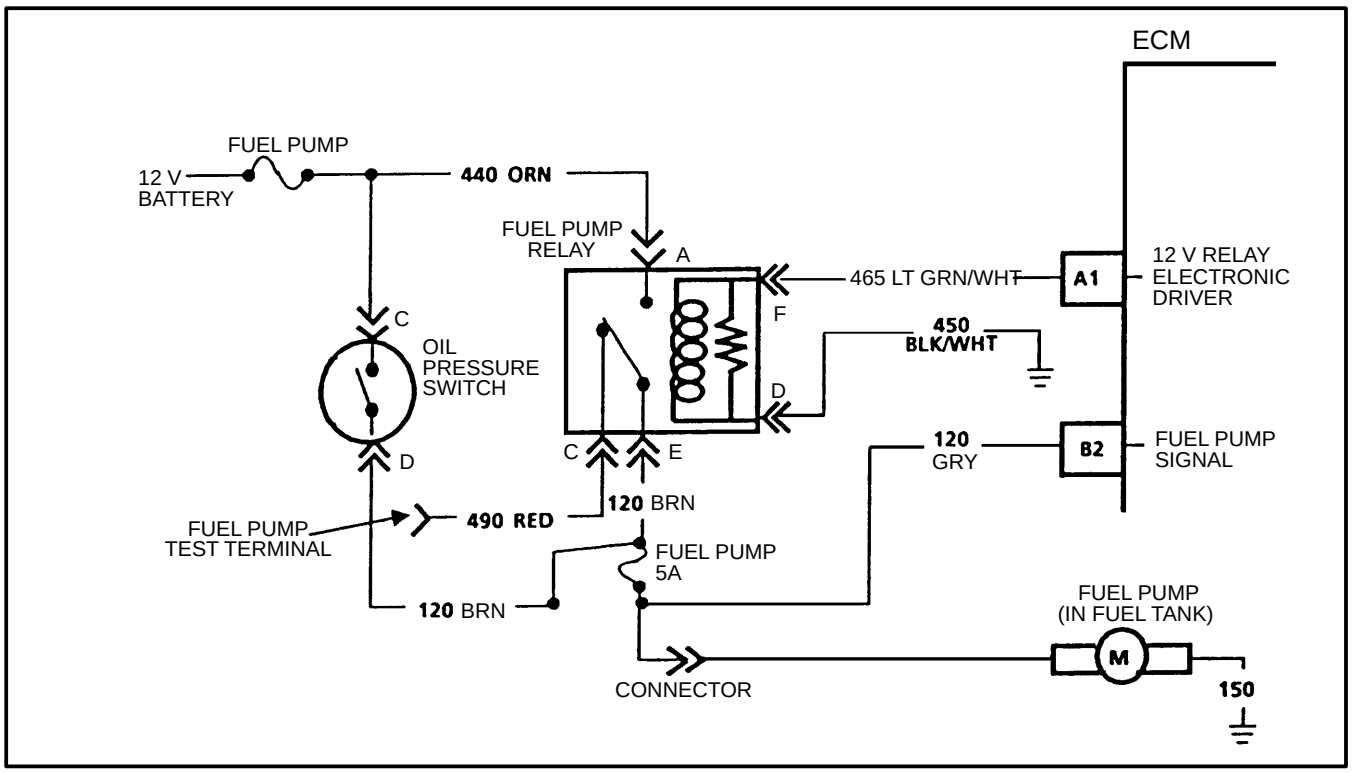


CHART A–5 — Fuel Pump Relay Circuit

Circuit Description

When the ignition switch is turned to "ON", the ECM will start the fuel pump. The fuel pump will operate when the engine is being cranked with the starter or is running, and the ECM is receiving distributor reference pulses. If there are no distributor reference pulses, the ECM will deenergize the fuel pump within two seconds after the ignition switch is turned to "ON" or the engine stops.

The fuel pump sends fuel to the TBI unit. The fuel pressure is controlled by the fuel pressure regulator in the TBI at 69 kPa (10 psi). Fuel that is not used at the TBI is returned to the fuel tank.

TEST DESCRIPTION: The numbers below are a reference to the numbers in circles in the troubleshooting chart on the facing page.

1. This procedure applies direct voltage to energize the fuel pump. If the fuel pump operates, the fault can be in the fuel pump relay which will be checked in the following steps.

2. This step checks voltage from the battery and the ground circuit to the fuel pump relay.

3. This test determines if there is voltage from the ECM terminal "A1" to terminal "D" on the connector for the fuel pump relay.

4. This step completes troubleshooting of the fuel pump relay circuit. If the troubleshooting chart was used because the engine will not run, check the oil pressure switch

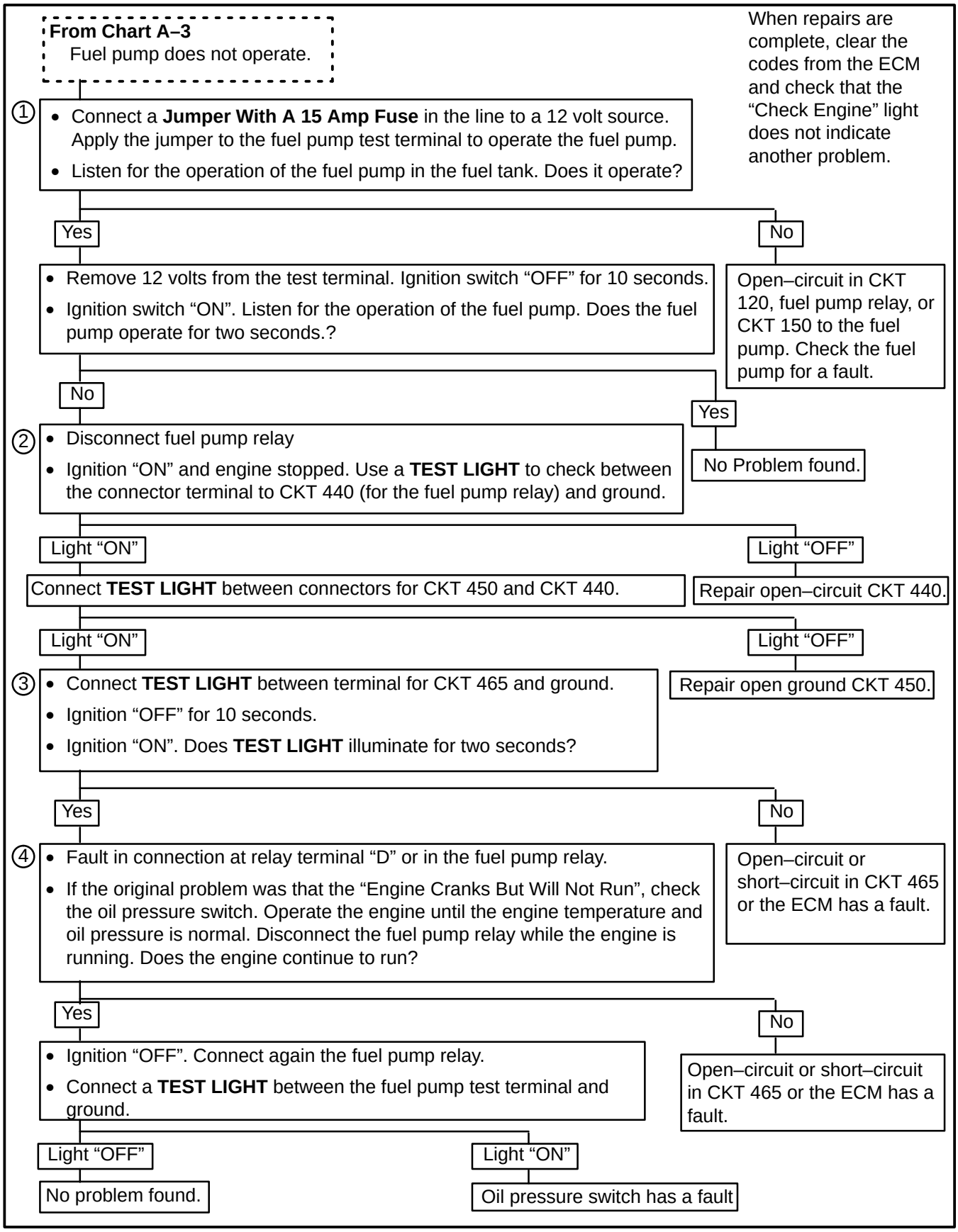


CHART A–5 — Fuel Pump Relay Circuit

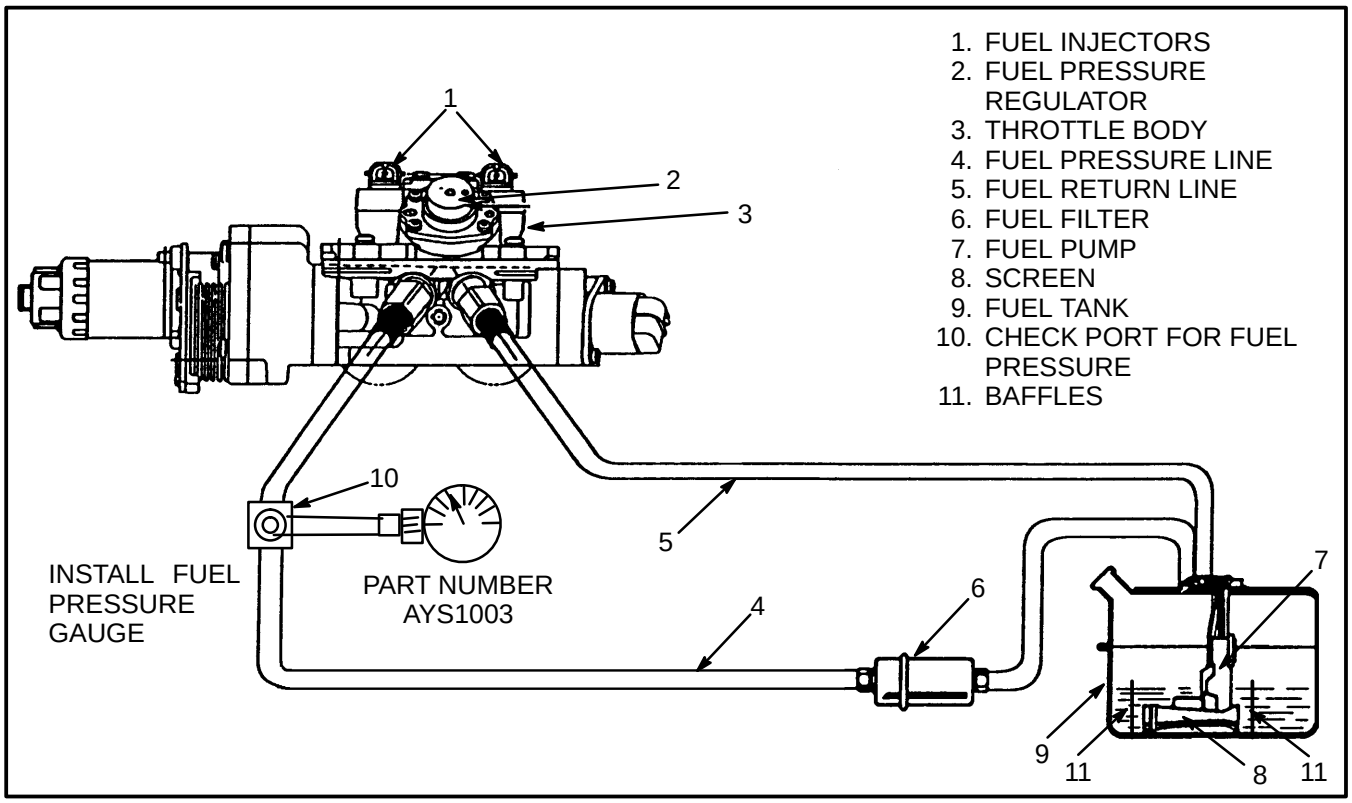


CHART A–6 — Fuel System Pressure Test

Circuit Description

When the fuel pump is operating, fuel is sent to the fuel injectors and then to the fuel pressure regulator. The fuel pressure is controlled at approximately 69 kPa (10 psi). Fuel that is not used in the TBI is returned to the fuel tank.

TEST DESCRIPTION: The numbers below are a reference to the numbers in circles in the troubleshooting chart on the facing page.

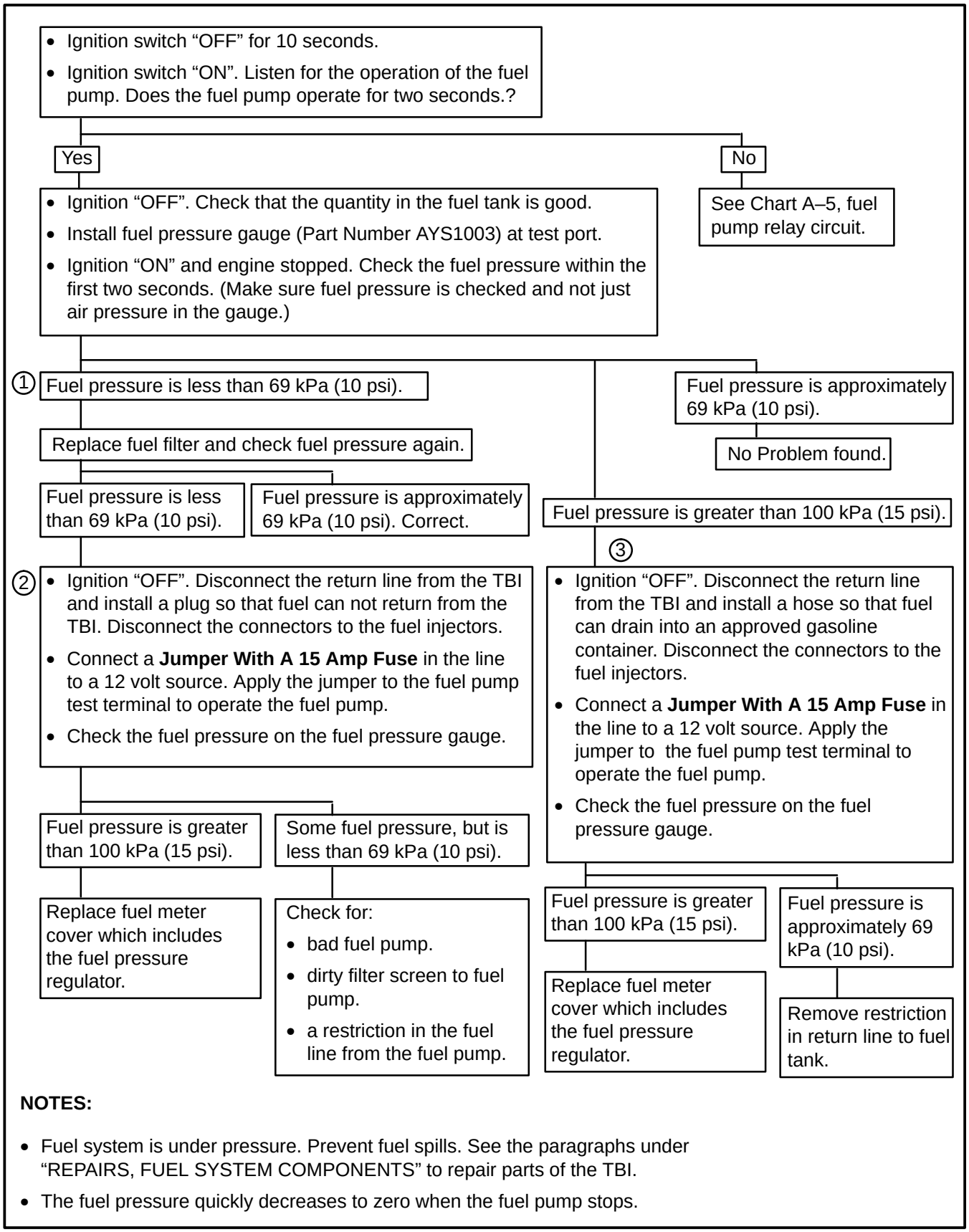
1. Fuel pressure less than 69 kPa (10 psi) can cause two different faults:

   a. The quantity of fuel to the fuel injectors is enough to permit some operation. The engine will be difficult to start and have poor performance. The ECM will normally set a Code 44.

   b. A restriction causes a decrease in fuel pressure. An engine with less than 69 kPa (10 psi) can not normally be operated. If the fuel pressure decreases only while the lift truck is moving, the operation of the engine will not be regular and will often suddenly stall.

2. This test will indicate if the the fuel pressure regulator has a problem or if there is a problem in the fuel pump and fuel supply.

3. This test will determine if the fuel pressure regulator has a problem or if there is a restriction in the fuel return line.



NOTES:

- Fuel system is under pressure. Prevent fuel spills. See the paragraphs under “REPAIRS, FUEL SYSTEM COMPONENTS” to repair parts of the TBI.
- The fuel pressure quickly decreases to zero when the fuel pump stops.

CHART A–6 — Fuel System Pressure Test