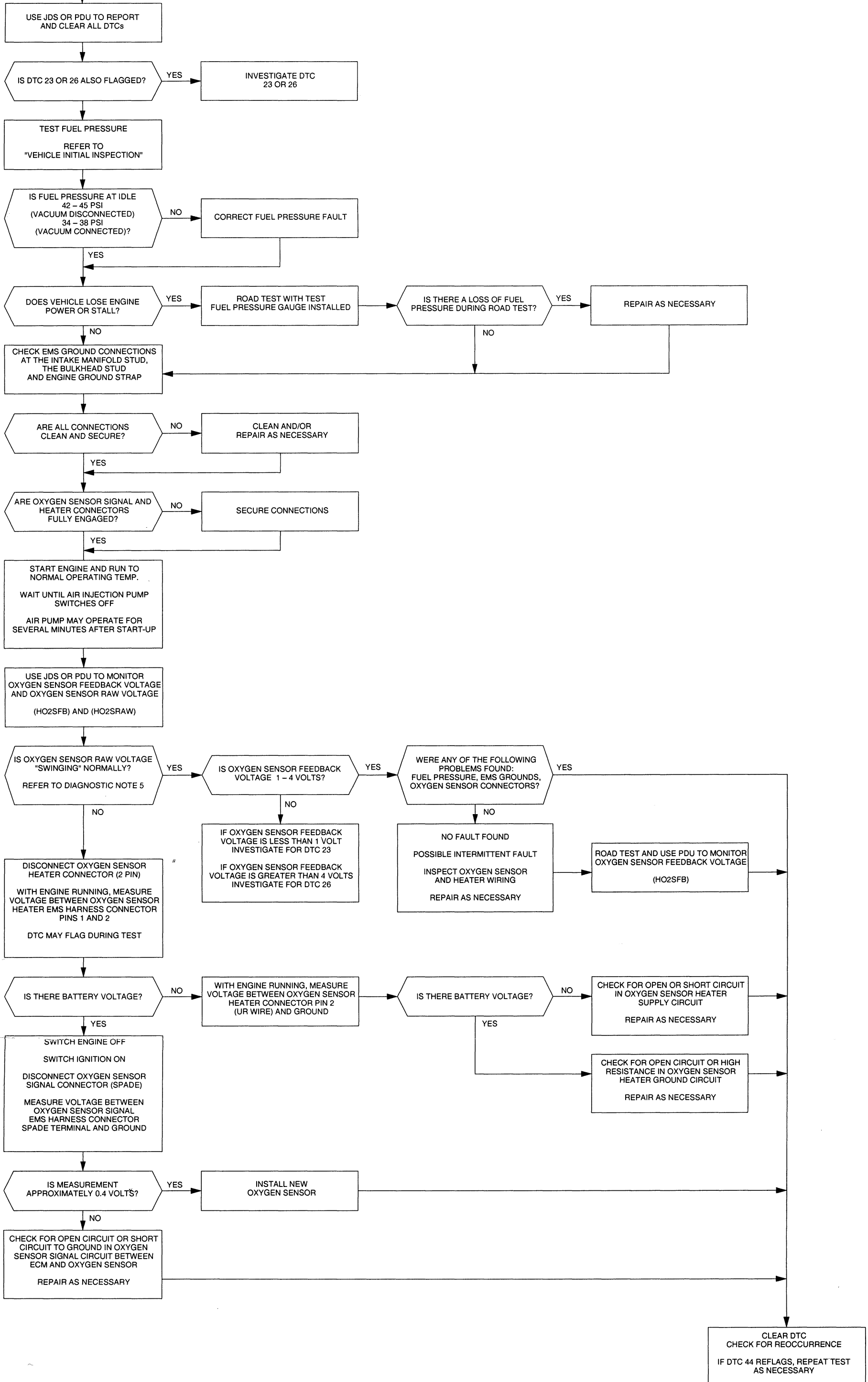


# DTC 44



# DTC 44

## DIAGNOSTIC NOTES (CONTINUED)

- 6 XJ6 Sedan Range vehicles up to VIN 664940 – When replacing an oxygen sensor, install a splash shield (P/N C33139/4). All vehicles after this VIN, including XJS, are equipped with splash shields.
- 7 1992 MY ON vehicles (ECM part number DBC 9622 ON): DTC 26 and 44 are inhibited when the fuel level is below approximately 2.5 gallons. A fuel level signal is input to the ECM on the yellow connector–pin 6 from the fuel level sensor circuit. When the voltage is above 5.7 volts, the codes cannot be flagged.

### FUEL PRESSURE CHECK

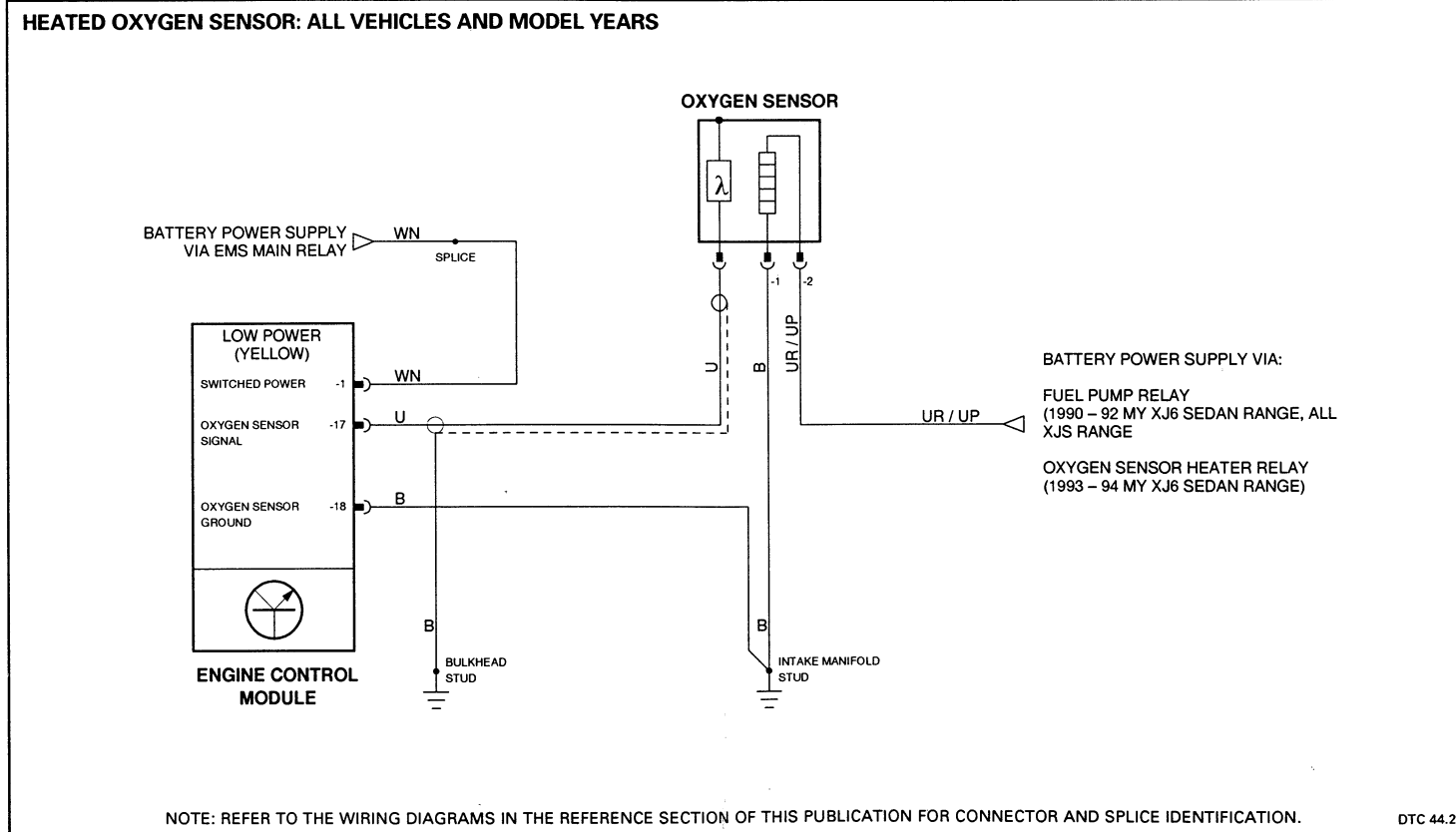
- 42 – 45 psi (vacuum disconnected from fuel pressure regulator)
- 34 – 38 psi at idle (vacuum connected to fuel pressure regulator)

### PURGE VALVE TEST

To test for a sticking purge valve:

- Disconnect the purge hose at the intake manifold adapter.
- Switch ignition ON; do not start the engine.
- Apply vacuum to purge hose; vacuum should hold.  
If the vacuum does not hold, the purge valve is stuck and should be replaced.
- Switch ignition OFF; vacuum should release after a few seconds.  
If the vacuum does not release, the purge valve is stuck and should be replaced.

## CIRCUIT DIAGRAM



## DTC 44

## OXYGEN SENSOR CIRCUIT

The ECM looks for poor closed loop fuel metering control while correcting for a rich or lean mixture condition.

The heated oxygen sensor, located in the exhaust gas stream, compares exhaust oxygen content to ambient air that is drawn through the heater wires. The heater is powered by the fuel pump relay (1990 – 92 MY vehicles) or oxygen sensor heater relay (1993 MY ON vehicles)

The ECM lengthens or shortens the injector pulse duration in response to the oxygen sensor detecting a rich or a lean mixture. The fuel metering can vary  $\pm 12.5\%$  without flagging a code. If a rich mixture cannot be corrected by the ECM, the oxygen sensor feedback voltage (monitor with JDS or PDU) falls to 0 volt; if a lean mixture cannot be corrected by the ECM, the oxygen sensor feedback voltage (monitor with JDS or PDU) rises to 5 volts. A further 37.5% fuel metering adjustment is then made. If the oxygen sensor signal voltage does not respond, DTC 44 is flagged. In addition, the ECM will flag DTC 44 if the oxygen sensor signal voltage (raw) is not sensed at the ECM (open or short circuit).

### CONDITIONS REQUIRED FOR DTC 44 FLAGGING

- Throttle position ..... Less than 3 volts
- Engine coolant temperature ..... Greater than 167° F
- Closed loop fuel metering ..... Not in control (rich and/or lean) (oxygen sensor feedback)
- Oxygen sensor signal voltage (raw) ..... Not switching
- Condition monitored for ..... 450 consecutive engine revolutions

### LIMP HOME DEFAULT

If DTC 44 is flagged, closed loop fuel metering is canceled and no dynamic fueling correction is applied to the fuel metering strategy. The oxygen sensor feedback voltage will remain stationary at the mid point (2.5 volts).

### POSSIBLE FAULTS

- Fuel pressure fault
- Stuck open purge valve
- Poor ground connections
- Poor oxygen sensor connection
- Open or short circuit oxygen sensor wiring
- Open or short circuit oxygen sensor heater wiring
- “Lazy” or defective oxygen sensor
- Defective air injection pump or circuit
- Intake air leak
- Blocked or inoperative fuel injectors
- Defective mass air flow sensor

## DIAGNOSTIC NOTES

- 1 Engine fueling correction (dynamic) can be monitored by using JDS or PDU to read the oxygen sensor feedback voltage (HO2SFB). If the feedback voltage is between 1 and 4 volts, the fueling is normal and the problem is intermittent. If the feedback voltage stays below 1 volt, look for causes of rich running (DTC 23); if the feedback voltage stays above 4 volts, look for causes of lean running (DTC 26). The PDU Data-logger can be set to trigger upon DTC 44 being flagged.



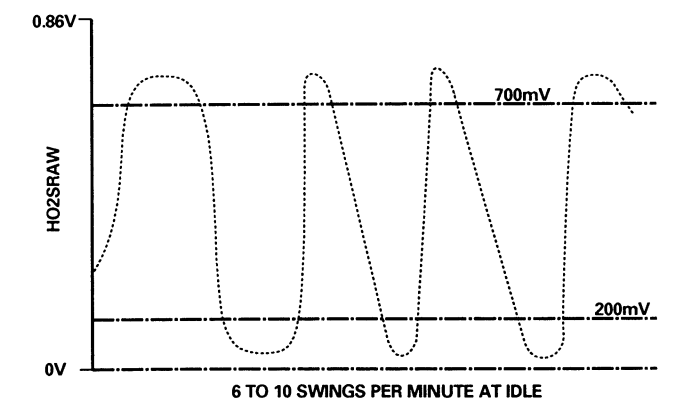
### PDU DATALOGGER TRIGGER

FF 44

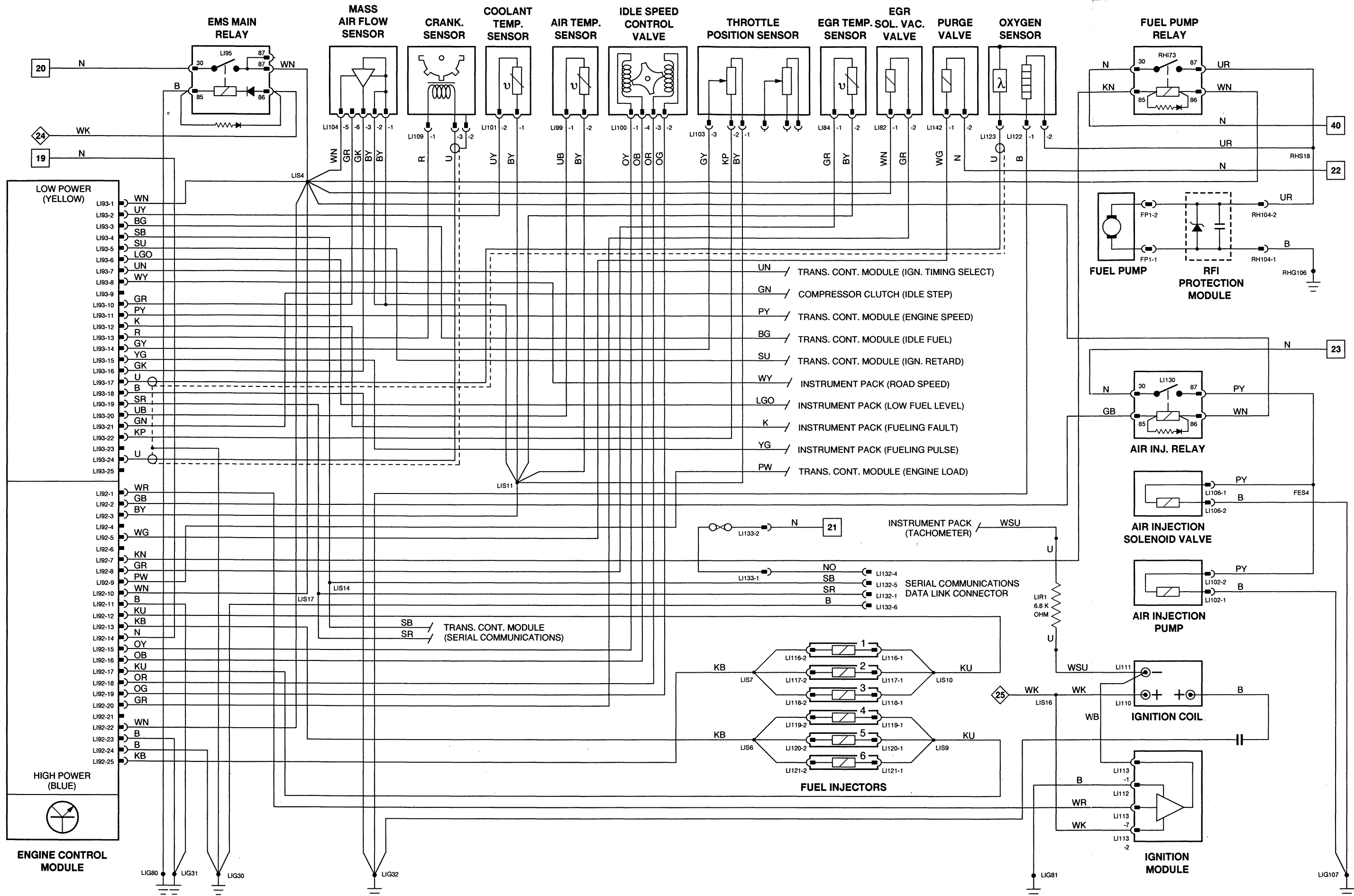


- 2 Test for a DTC recurrence by bringing the engine to normal operating temperature then holding the speed at 2000 rpm for 1 minute.
- 3 1993 MY ON vehicles (with adaptive idle fueling trim) The ECM automatically corrects for small fueling errors by adding to or subtracting from the “base line” injector pulse duration. To determine if a base line correction has occurred, first monitor the oxygen sensor feedback voltage and record the value. Then disconnect and reconnect the ECM and recheck the oxygen sensor feedback voltage. A change in the feedback voltage indicates that a correction had been applied. (Disconnecting the ECM erases the correction.)
- 4 A rich mixture condition can be caused by the engine coolant thermostat sticking open. At high road speed, the coolant temperature decreases, causing enriching from the coolant temperature sensor input to the ECM. To test the thermostat, check the engine setup using JDS or PDU. If the coolant temperature does not reach 190° F (88° C) (as monitored by JDS or PDU), replace the thermostat.
- 5 During closed loop fueling, the oxygen sensor “raw” voltage (signal voltage to the ECM) normally swings between 0.2 and 0.8 volt. If the oxygen sensor becomes contaminated or the heater is inoperative, the sensor can be “lazy”. A lazy sensor may show a voltage swing of 0.3 – 0.7 volt or even less. The oxygen sensor raw voltage can be monitored using PDU (HO2 S RAW).

### OXYGEN SENSOR VOLTAGE TRACE: PDU HO2S RAW



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BATTERY POWER SUPPLY     
  IGNITION SWITCHED POWER SUPPLY     
 CONSULT APPROPRIATE ELECTRICAL GUIDE



# XJS (4.0L) 1993 Model Year Engine Management System

## CONNECTORS

CODE	DESCRIPTION	LOCATION / INTERFACE
FP1	2-WAY ECONOSEAL III HC (BLACK)	ABOVE FUEL TANK / FUEL PUMP
LI82	2-WAY NIPPON DENSO (BLUE)	BETWEEN INJECTOR #5 & 6 / EGR SOLENOID VACUUM VALVE
LI84	2-WAY ECONOSEAL III LC (BLACK)	ABOVE ENGINE OIL FILTER / EGR TEMPERATURE SENSOR
LI92	25-WAY ECM CONNECTOR (BLUE)	PASSENGER'S FOOTWELL TRIM / ENGINE CONTROL MODULE, LOW POWER
LI93	25-WAY ECM CONNECTOR (YELLOW)	PASSENGER'S FOOTWELL TRIM / ENGINE CONTROL MODULE, HIGH POWER
LI95	RELAY BASE (RED)	RIGHT 'A' POST TRIM / ECM MAIN RELAY
LI98	2-WAY LUCAR (BROWN)	AIR INTAKE ELBOW / ENGINE BREATHER HEATER
LI100	4-WAY PACKARD (BLACK)	BETWEEN INJECTOR #2 & 3 / IDLE SPEED ACTUATOR
LI101	2-WAY LUCAR (BROWN)	ON THERMOSTAT HOUSING / COOLANT TEMPERATURE SENSOR
LI102	3-WAY PM 5 (BLACK)	ABOVE AIR PUMP / AIR INJECTION PUMP
LI103	6-WAY SUMITOMO SEALED (BLACK)	ADJACENT TO THROTTLE BODY / THROTTLE POSITION SENSOR
LI104	6-WAY LUCAR (BLACK)	ADJACENT TO MASS AIR FLOW METER / MASS AIR FLOW METER
LI106	2-WAY LUCAR (BLUE)	ABOVE AIR INJECTION PUMP / AIR INJECTION SOLENOID VACUUM VALVE
LI109	3-WAY PM 5 (BLACK)	FRONT OF ENGINE / CRANKSHAFT SENSOR
LI110	EYELET (WHITE)	BEHIND RIGHT HEADLIGHT ON INNER FENDER / IGNITION COIL "+"
LI111	EYELET (WHITE)	BEHIND RIGHT HEADLIGHT ON INNER FENDER / IGNITION COIL "-"
LI112	EYELET (WHITE)	BEHIND RIGHT HEADLIGHT ON INNER FENDER / IGNITION AMPLIFIER GROUND
LI113	7-WAY LUCAR (BLACK)	BEHIND RIGHT HEADLIGHT ON INNER FENDER / IGNITION AMPLIFIER
LI116	2-WAY LUCAR (SLATE)	INTAKE MANIFOLD / INJECTOR #1
LI117	2-WAY LUCAR (SLATE)	INTAKE MANIFOLD / INJECTOR #2
LI118	2-WAY LUCAR (SLATE)	INTAKE MANIFOLD / INJECTOR #3
LI119	2-WAY LUCAR (SLATE)	INTAKE MANIFOLD / INJECTOR #4
LI120	2-WAY LUCAR (SLATE)	INTAKE MANIFOLD / INJECTOR #5
LI121	2-WAY LUCAR (SLATE)	INTAKE MANIFOLD / INJECTOR #6
LI122	2-WAY LUCAR (BLACK)	RIGHT PLENUM DRAIN PIPE / OXYGEN SENSOR HEATER
LI123	250 BLADE (WHITE)	RIGHT PLENUM DRAIN PIPE / OXYGEN SENSOR FEEDBACK
LI130	RELAY BASE (GREEN)	LEFT FRONT COMPONENT PANEL / AIR INJECTION RELAY
LI131	RELAY BASE (BLACK)	LEFT FRONT COMPONENT PANEL / BREATHER HEATER RELAY
LI132	6-WAY PM 4 (BROWN)	BELOW RIGHT A/C OUTLET / DIAGNOSTIC DATA LINK CONNECTOR (JDS)
LI133	IN-LINE FUSE CONNECTOR (BLACK)	BELOW RIGHT A/C OUTLET / DIAGNOSTIC DATA FUSE (JDS)
LI134	20-WAY MULTILOCK 70 (WHITE)	RIGHT DASH UNDER PANEL / FUEL INJECTION HARNESS
LI135	4-WAY ECONOSEAL III LC (BLACK)	RIGHT DASH UNDER PANEL / FUEL INJECTION HARNESS
LI142	2-WAY LUCAR (BLACK)	ADJACENT TO AIR INJ. PUMP / CHARCOAL CANISTER PURGE VALVE
RH104	2-WAY ECONOSEAL III HC (BLACK)	ABOVE FUEL TANK, RIGHT / FUEL PUMP HARNESS
RH160	14-WAY SUMITOMO BLOCK (WHITE)	BY LEFT LOWER A/C OUTLET / RIGHT SIDE INJECTION HARNESS
RH173	RELAY BASE (YELLOW)	ABOVE RIGHT REAR WHEEL ARCH / FUEL PUMP RELAY

## GROUNDS

CODE	DESCRIPTION	LOCATION / INTERFACE
LI630	EYELET	ENGINE COMPARTMENT, BEHIND ABS PUMP ON BULKHEAD / POWER GROUND
LI631	EYELET	ENGINE COMPARTMENT, BEHIND ABS PUMP ON BULKHEAD / POWER GROUND
LI632	EYELET	ENGINE COMPARTMENT, BEHIND ABS PUMP ON BULKHEAD / POWER GROUND
LI680	EYELET	ENGINE COMPARTMENT, BEHIND ABS PUMP ON BULKHEAD / POWER GROUND
LI681	EYELET	ENGINE COMPARTMENT, BEHIND ABS PUMP ON BULKHEAD / POWER GROUND
LI6107	EYELET	ABOVE #1 INTAKE RUNNER ON ENGINE / POWER GROUND
RHG106	EYELET	RIGHT OF BATTERY AT WHEEL ARCH / BATTERY NEGATIVE CABLE

## INPUTS / OUTPUTS

### ENGINE CONTROL MODULE

CODE	IN / OUT	CIRCUIT	ACTIVE	INACTIVE
LI92-1	OUTPUT	IGNITION AMPLIFIER DRIVE	PULSED DRIVE: 0.5V CRANKING; APPROX. 0.6V @1000 RPM;	1.5V @2000 RPM
LI92-2	OUTPUT	AIR INJECTION PUMP RELAY	GROUND	12V
LI92-3	OUTPUT	AIR MASS AND SENSOR GROUNDS	GROUND	GROUND
LI92-4	NOT USED			
LI92-5	OUTPUT	CANISTER PURGE	GROUND	12V
LI92-6	NOT USED			
LI92-7	OUTPUT	FUEL PUMP RELAY	GROUND	12V
LI92-8	INPUT	EGR TEMPERATURE SENSOR	2000 RPM, EGR VALVE CLOSED: 4.9V	2000 RPM, VALVE OPEN: VOLTAGE DROPS
LI92-9	OUTPUT	ENGINE LOAD TO TRANSMISSION CONTROL MODULE	PULSED SIGNAL: 13V AT IDLE, DECREASES WITH ENGINE LOAD	LOAD
LI92-10	INPUT	IGNITION SWITCHED POWER	KEY ON: 12V	KEY OFF: OPEN CIRCUIT
LI92-11	INPUT	POWER GROUND	GROUND	GROUND
LI92-12	OUTPUT	INJECTOR SUPPLY	ENGINE RUNNING: 12V	KEY OFF: OPEN CIRCUIT
LI92-13	OUTPUT	INJECTOR DRIVE	PULSED SIGNAL: 2.6 MS @ IDLE	KEY OFF: OPEN CIRCUIT
LI92-14	INPUT	BATTERY POWER	12V	12V
LI92-15	OUTPUT	IDLE SPEED ACTUATOR	STEPPER MOVING: 12V - 0.8V	NOT MOVING: OPEN CIRCUIT
LI92-16	OUTPUT	IDLE SPEED ACTUATOR	STEPPER MOVING: 12V - 0.8V	NOT MOVING: OPEN CIRCUIT
LI92-17	OUTPUT	INJECTOR SUPPLY	ENGINE RUNNING: 12V	KEY OFF: OPEN CIRCUIT
LI92-18	OUTPUT	IDLE SPEED ACTUATOR	STEPPER MOVING: 12V - 0.8V	NOT MOVING: OPEN CIRCUIT
LI92-19	OUTPUT	IDLE SPEED ACTUATOR	STEPPER MOVING: 12V - 0.8V	NOT MOVING: OPEN CIRCUIT
LI92-20	OUTPUT	EGR SOLENOID VACUUM VALVE	GROUND	12V
LI92-21	NOT USED			
LI92-22	INPUT	ECM MAIN RELAY	KEY ON: 12V	KEY OFF: OPEN CIRCUIT
LI92-23	INPUT	POWER GROUND	GROUND	GROUND
LI92-24	INPUT	POWER GROUND	GROUND	GROUND
LI92-25	OUTPUT	INJECTOR DRIVE	2.6 MS @ IDLE	KEY OFF: OPEN CIRCUIT
LI93-1	INPUT	ECM MAIN RELAY	KEY ON: 12V	KEY OFF: OPEN CIRCUIT
LI93-2	INPUT	COOLANT TEMPERATURE SENSOR	APPROX. 2.2V AT 70°F (21.1°C)	APPROX. 0.5V AT 200°F (94°C)
LI93-3	INPUT	IDLE FUEL DEMAND	"P", "N": GROUND; "R", "D", "3", "2": 5V	
LI93-4	INPUT	SERIAL COMMUNICATIONS DATA LINK	JDS	-
LI93-5	INPUT	TRANSMISSION CONTROL (IGNITION RETARD)	PULSED SIGNAL	0V
LI93-6	INPUT	INSTRUMENT PACK - LOW FUEL LEVEL	LOW FUEL: 12V	GROUND
LI93-7	INPUT	IGNITION TIMING SELECT	PULSED SIGNAL	GROUND
LI93-8	INPUT	INSTRUMENT PACK - ROAD SPEED	PULSED SIGNAL	GROUND
LI93-9	NOT USED			
LI93-10	INPUT	MASS AIR FLOW METER	KEY ON: 5V	KEY OFF: OPEN CIRCUIT AFTER 15 SEC.
LI93-11	OUTPUT	ENGINE SPEED SIGNAL	PULSED SIGNAL: 0.67V DC @800 RPM; 0.59V DC @2000 RPM	DECREASES WITH RPM
LI93-12	OUTPUT	INSTRUMENT PACK - FUELING FAULT	FAULT: GROUND	NO FAULT: 12V
LI93-13	INPUT	CRANKSHAFT SENSOR	PULSED SIGNAL: 1.0V AC CRANKING; 2.7V AC @1000 RPM;	5.3V AC @2000 RPM
LI93-14	INPUT	THROTTLE POSITION SENSOR WIPER	MIN: 0.58V - 0.62V IDLE POS.	MAX: 4.9V WOT
LI93-15	OUTPUT	TRIP COMPUTER FUEL PULSES	PULSED SIGNAL	OPEN CIRCUIT
LI93-16	INPUT	MASS AIR FLOW METER LOAD	IDLE IN 'N': APPROX. 1.4V	0V
LI93-17	INPUT	CRANKSHAFT SENSOR	SENSOR GROUND	GROUND
LI93-18	INPUT	POWER GROUND	GROUND	GROUND
LI93-19	OUTPUT	SERIAL COMMUNICATIONS DATA LINK	JDS	-
LI93-20	INPUT	AIR TEMPERATURE SENSOR	SENSED VOLTAGE: 2.0V @ 70°F (21°C)	0V
LI93-21	INPUT	A/C COMPRESSOR CLUTCH LOAD	CLUTCH ON: 12V	CLUTCH OFF: OPEN CIRCUIT
LI93-22	OUTPUT	THROTTLE POSITION SENSOR REFERENCE VOLTAGE	KEY ON: 5.0V	KEY OFF: OPEN CIRCUIT
LI93-23	NOT USED			
LI93-24	INPUT	CRANKSHAFT SENSOR SHIELD	GROUND	GROUND
LI93-25	NOT USED			