



V8 XJ Series/XK

DATE 06/02

303-55

SERVICE

TECHNICAL BULLETIN

Hard Start/Non Start Condition – AJ26 Engines – Diagnostic Flowcharts

MODEL

1997-98 MY XK Range
1998 MY V8 XJ Series

VIN

1998-99 XJR
001001-031302
812256-878717

Issue:

This bulletin provides diagnostic information organized by symptom.

Action:

Before using the guide, check the Symptom Matrix on the next page for the diagnostic flowchart sequence. For example, if the **engine does not crank**, work through flow charts P6, P2, P10, P11 etc... Following the flowcharts in the sequence identified will help rectify any concerns while optimizing the utilization of workshop time.

⚠ Caution: When working on any vehicle ensure that exposed paintwork is protected with the appropriate fender protection covers.

ADDITIONAL INFORMATION

Relay codes and date stamps

Relay date codes come in two forms:

- Relays prior to December 1998 have the format: Letter – Number – Letter i.e. R6 K1
- Relays post December 1998 have the format: Number – Letter – Letter i.e. 2AB

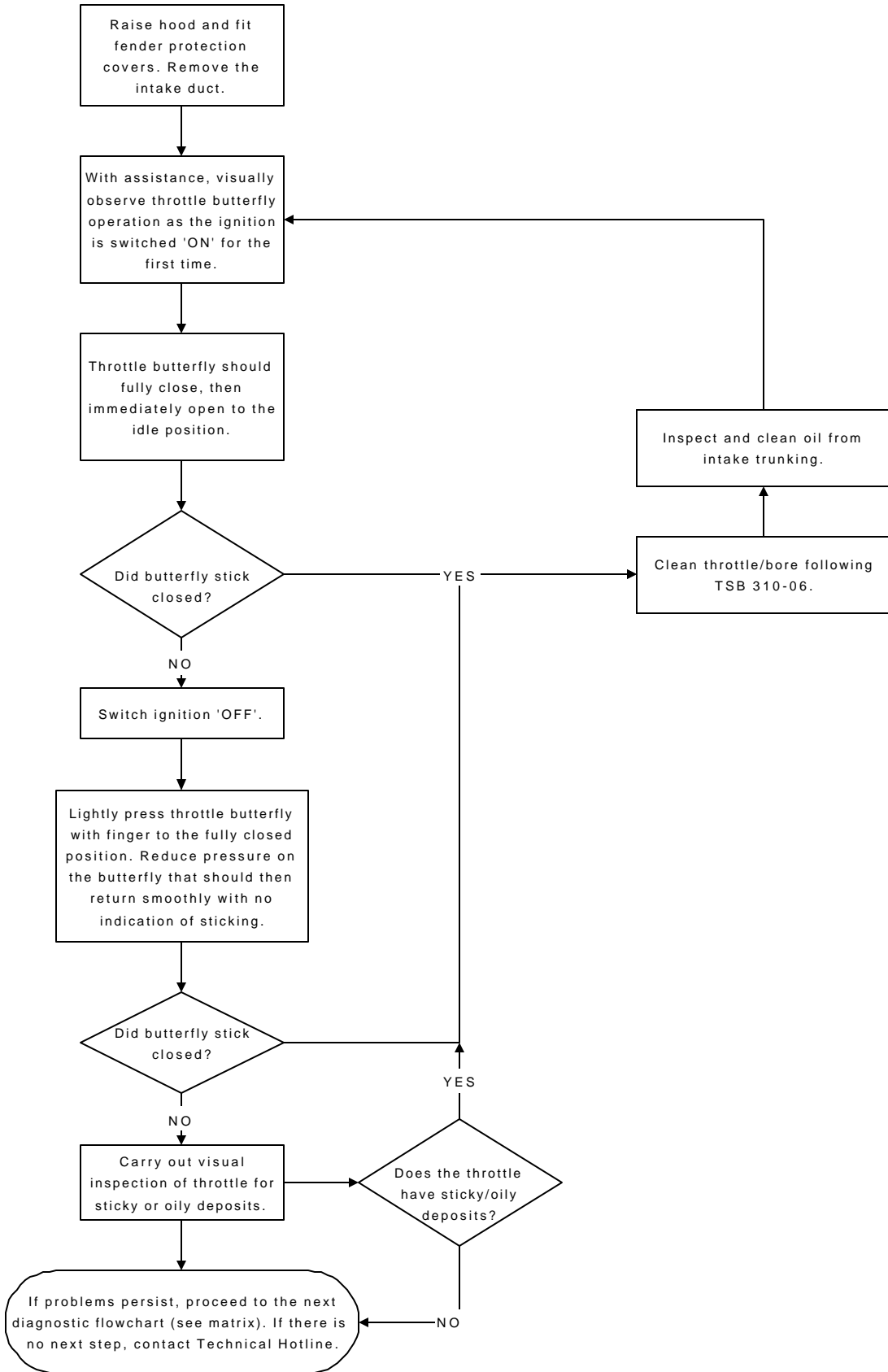
All date codes are printed in white on the top face of the relay, adjacent to the part number.

⚠ Fuel Systems Warning: Working on the fuel system can result in fuel vapor being emitted into the atmosphere. Fuel vapor is extremely flammable; hence great care should be taken when working on the fuel system. Do not smoke in the working area and ensure that there is a CO2 fire extinguisher close by. The working area must be well ventilated and extraction equipment used when appropriate. When emptying fuel, use suitable fireproof equipment and an authorized explosion-proof container.

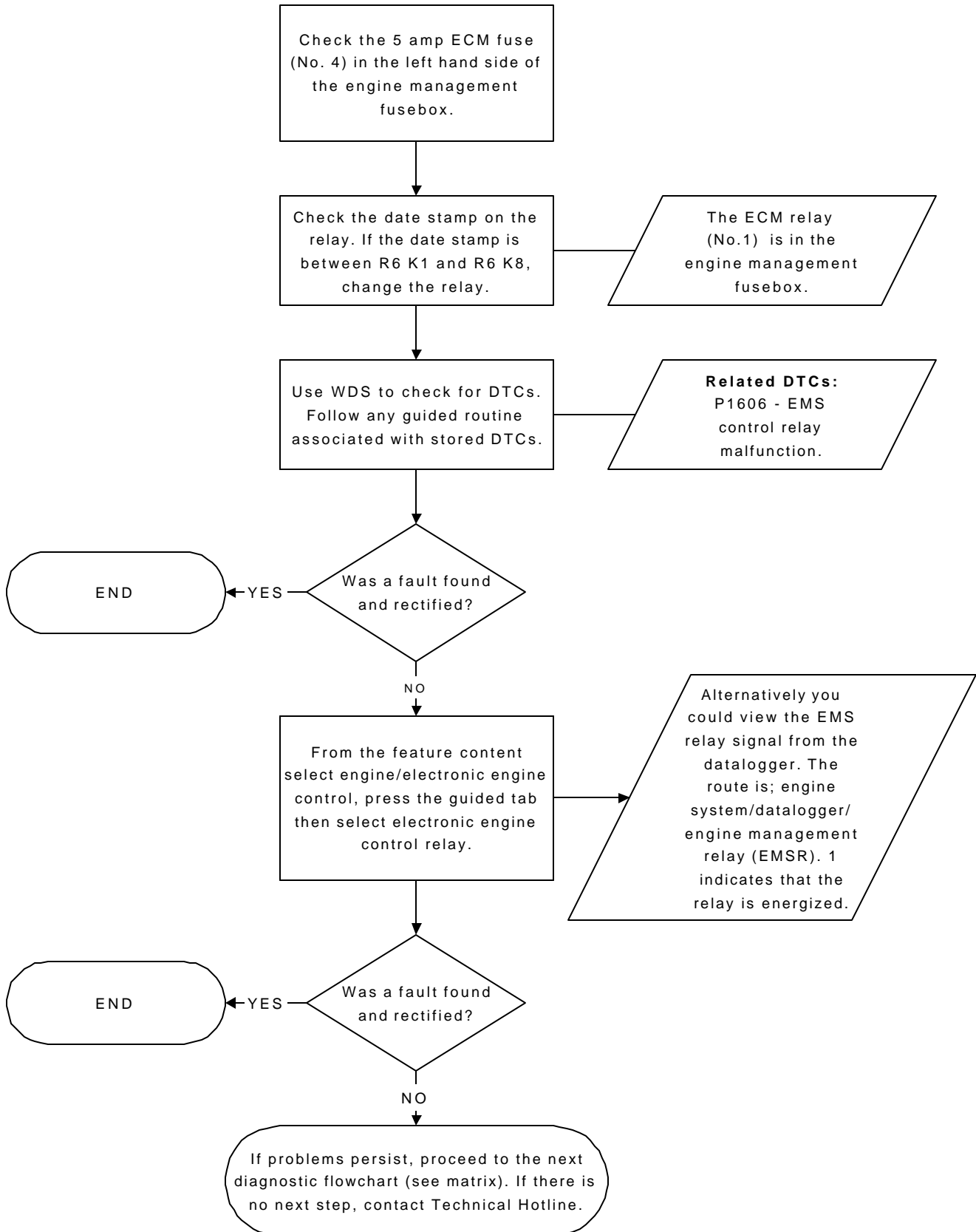
Symptom Matrix

Difficult to Start			Does not Start				Symptom	Suspect Area	See Chart
Difficult to start after hot soak	Difficult to start hot	Difficult to start cold	Engine cranks too fast/too slow	No complete combustion	No combustion	Engine does not crank			
2	3	3		2	2		Throttle (contaminated)	P1	
						2	ECM Relay	P2	
				1	4		Fuel pump relay	P3	
					1	7	Immobilizer	P4a	
							DTC 'P1336'	P5	
			2			1	Starter relay	P6	
1	1	1					Rochester valve	P7	
7	7						Injector leak	P8	
		7	4	8			Cylinder compression	P9	
		2	1			3	Battery	P10	
						4	Park/Neutral switch	P11	
3	2	6		3			Purge valve	P12	
			3			5	Starter motor	P13	
					3	6	Harness	P14	
				7			Ignition coil	P16	
4	4	4		4	5		Fuel pump	P17	
5	5	5		5			Coolant sensor	P18	
							Fuel pressure regulator	P20	
							Fuel lines	P21	
				6			Spark plugs	P26	
6	6	8					Blocked part-load breather	P29	

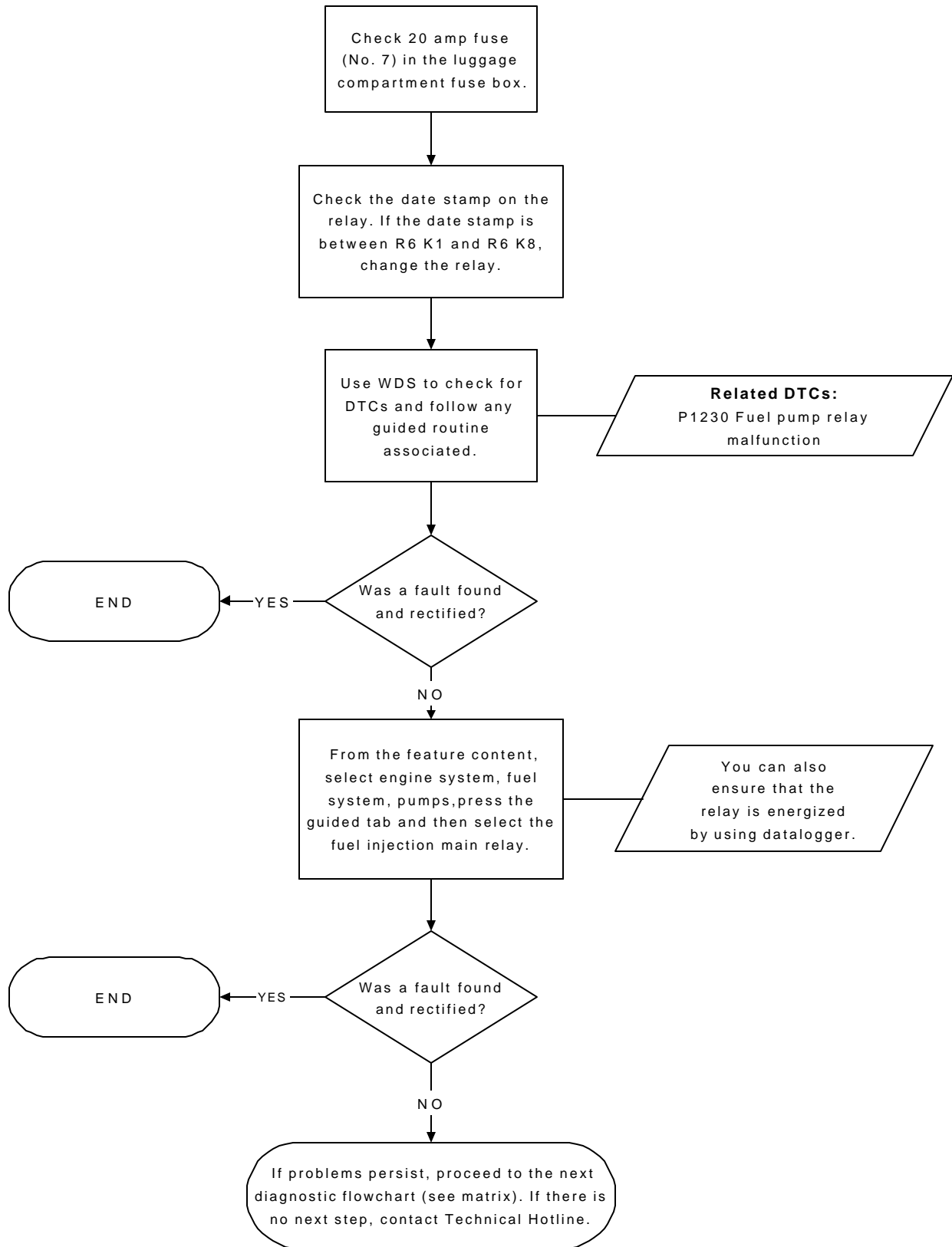
P1 - Contaminated Throttle Diagnostic Flowchart



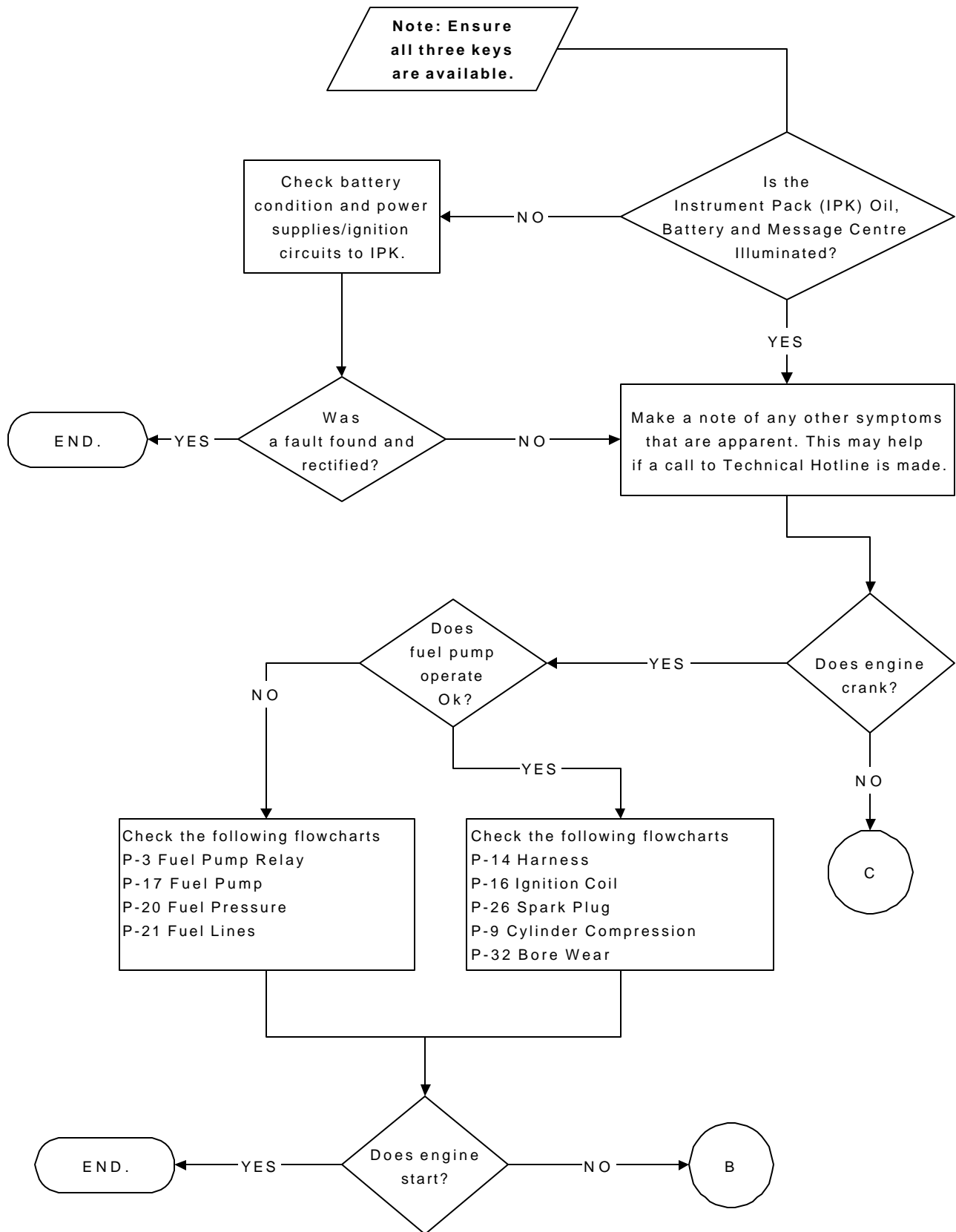
P2 - ECM Relay Diagnostic Flowcharts



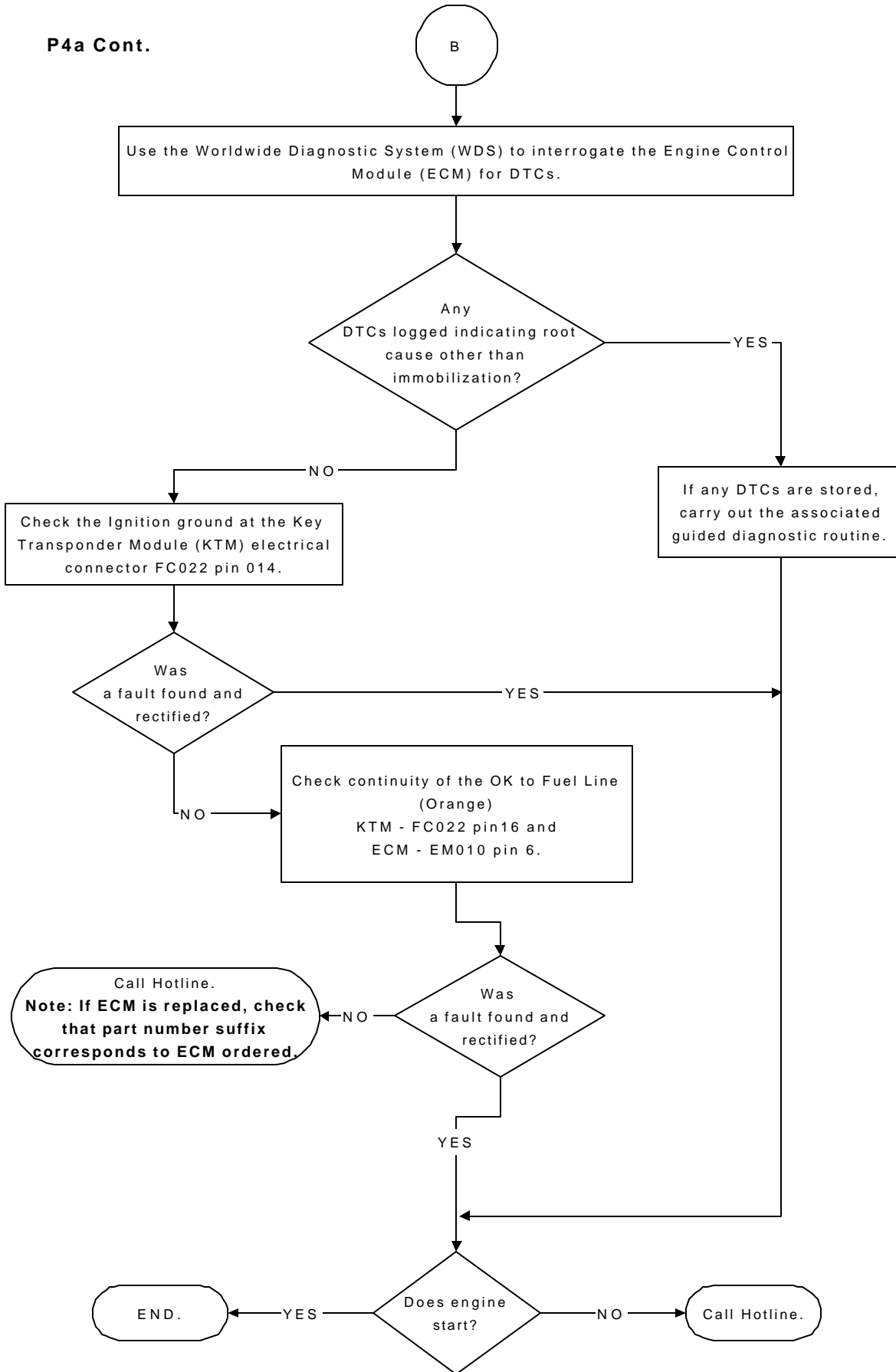
P3 - Fuel Pump Relay Test Diagnostic Flowchart



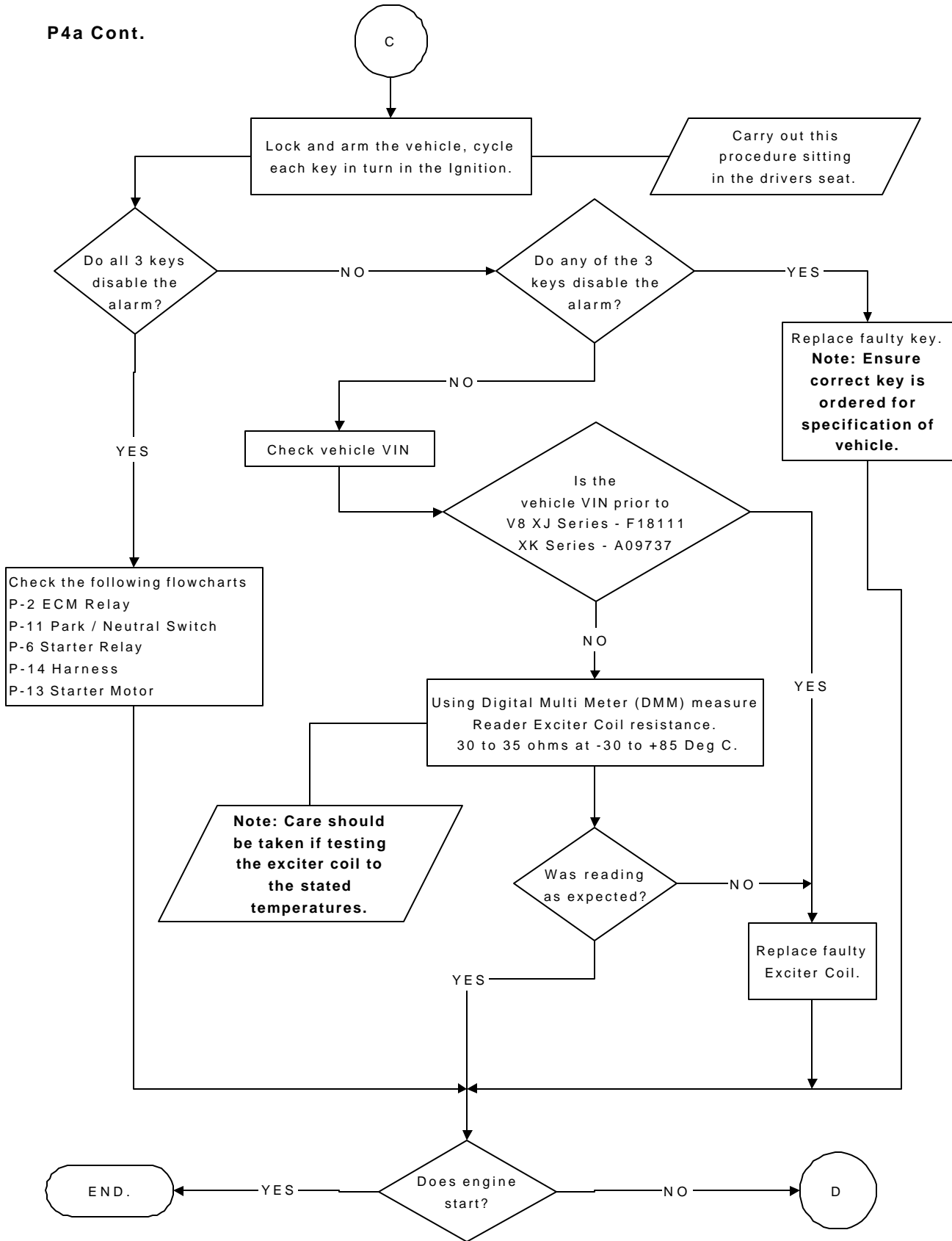
P4a- Immobilization Non Start Diagnostic Flowchart



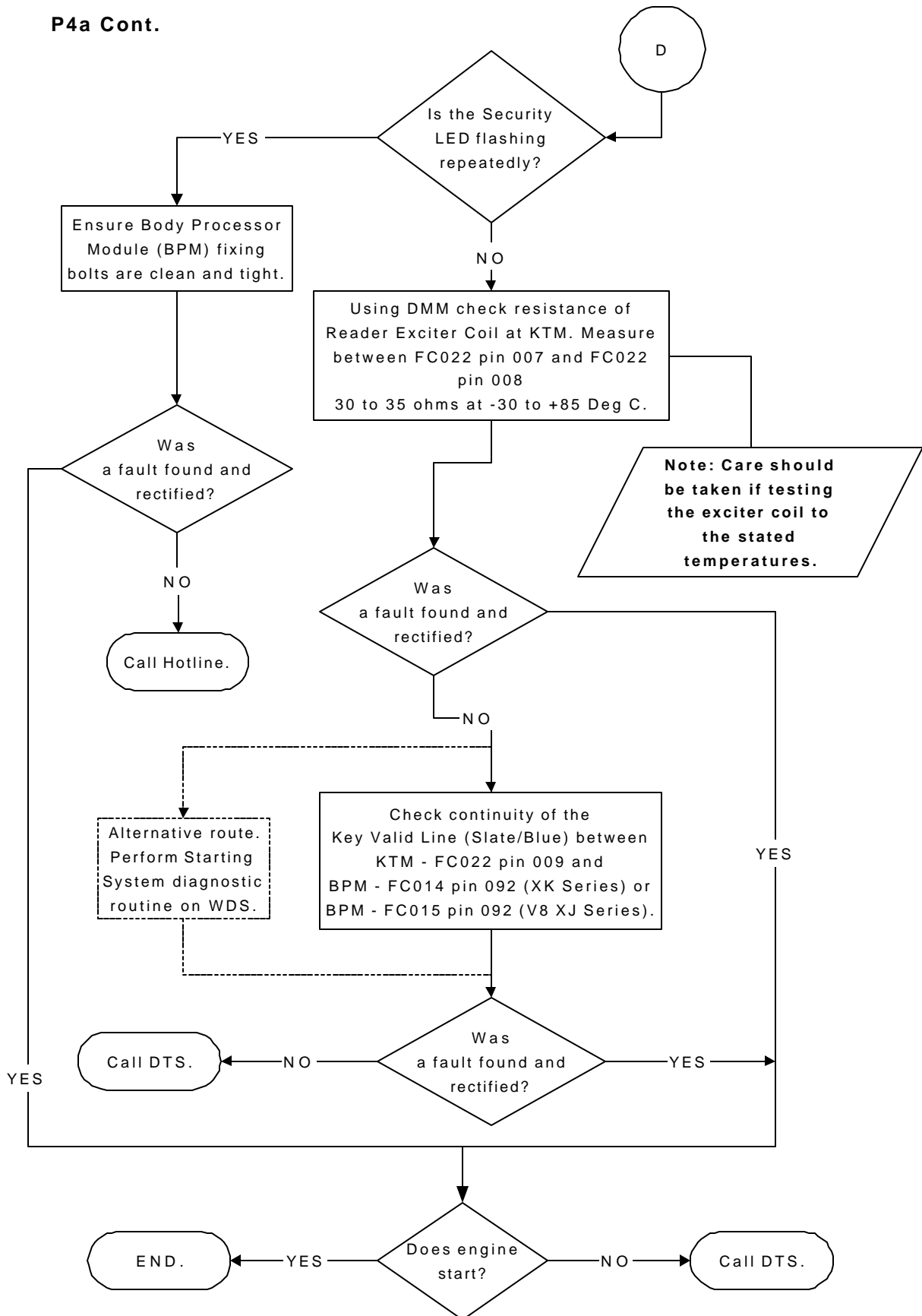
P4a Cont.



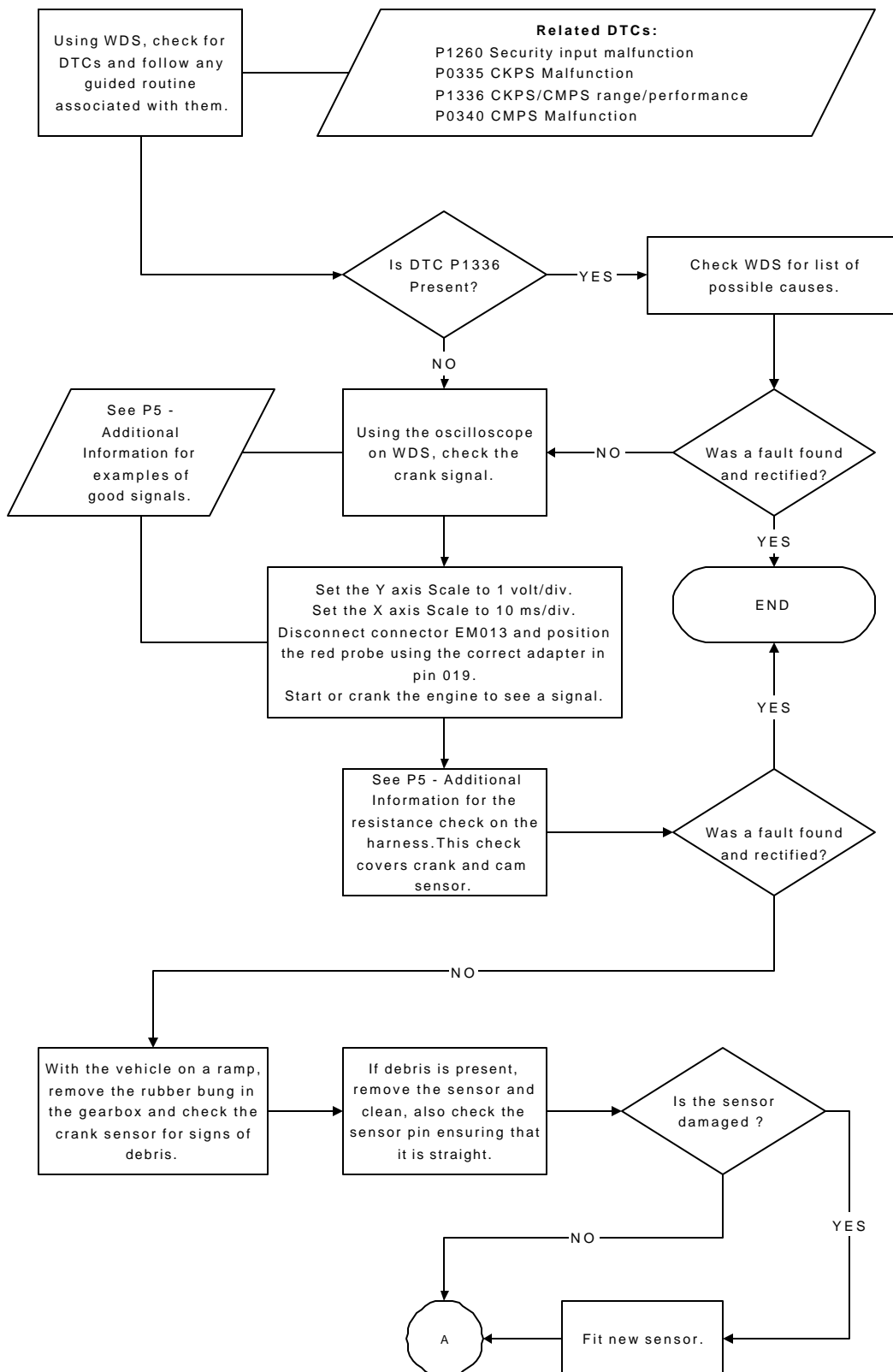
P4a Cont.



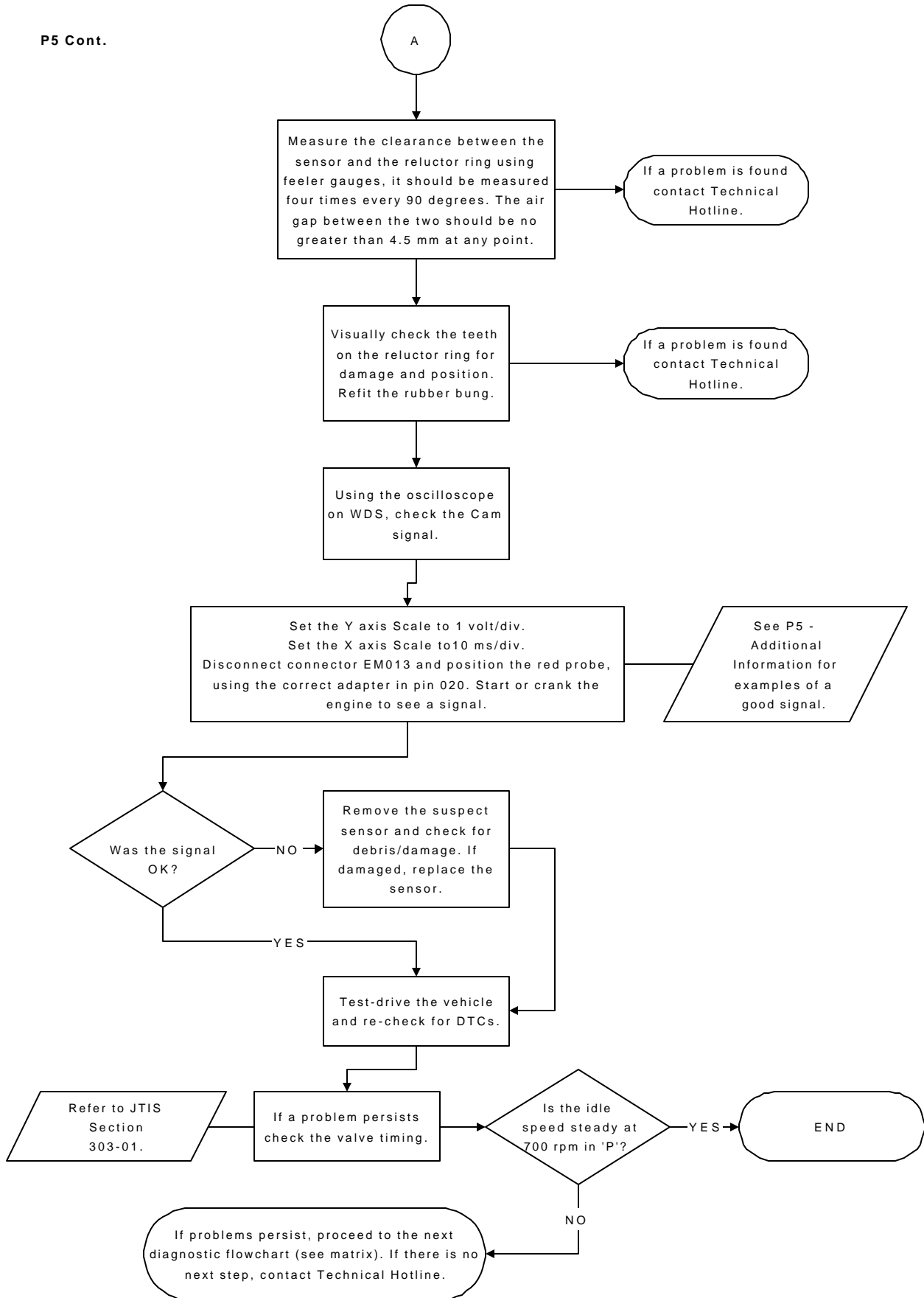
P4a Cont.



P5 - DTC P1336 Crankshaft and Camshaft Sensor Diagnostic Flowchart



P5 Cont.



P5 - Additional Information

Harness resistance check crank/cam sensor

Component	Part Number	+20°C	+10°C ~ +50°C	+50°C ~ +100°C
Crank sensor	LCA 1640AE	950 – 1250 Ohms	835 – 1400 Ohms	1060 – 1645 Ohms
Cam sensor	LCA 1646AD	1850 – 2450 Ohms	1630 – 2740 Ohms	2065 – 3225 Ohms

Resistance is measured in Ohms at the engine management connector EM013:

- 1 Disconnect the engine management connector EM013.
- 2 Check the resistance between pin 019 and pin 028 (sensor ground crankshaft position sensor).
- 3 You should get a reading between the parameters (see table) for the relative temperature.

Resistance is measured in Ohms at the engine management connector EM013:

- 1 Disconnect the engine management connector EM013.
- 2 Check the resistance between pin 020 and pin 029 (sensor ground camshaft position sensor).
- 3 You should get a reading between the parameters (see table) for the relative temperature.

Crank and Cam Sensor signals are displayed on WDS:

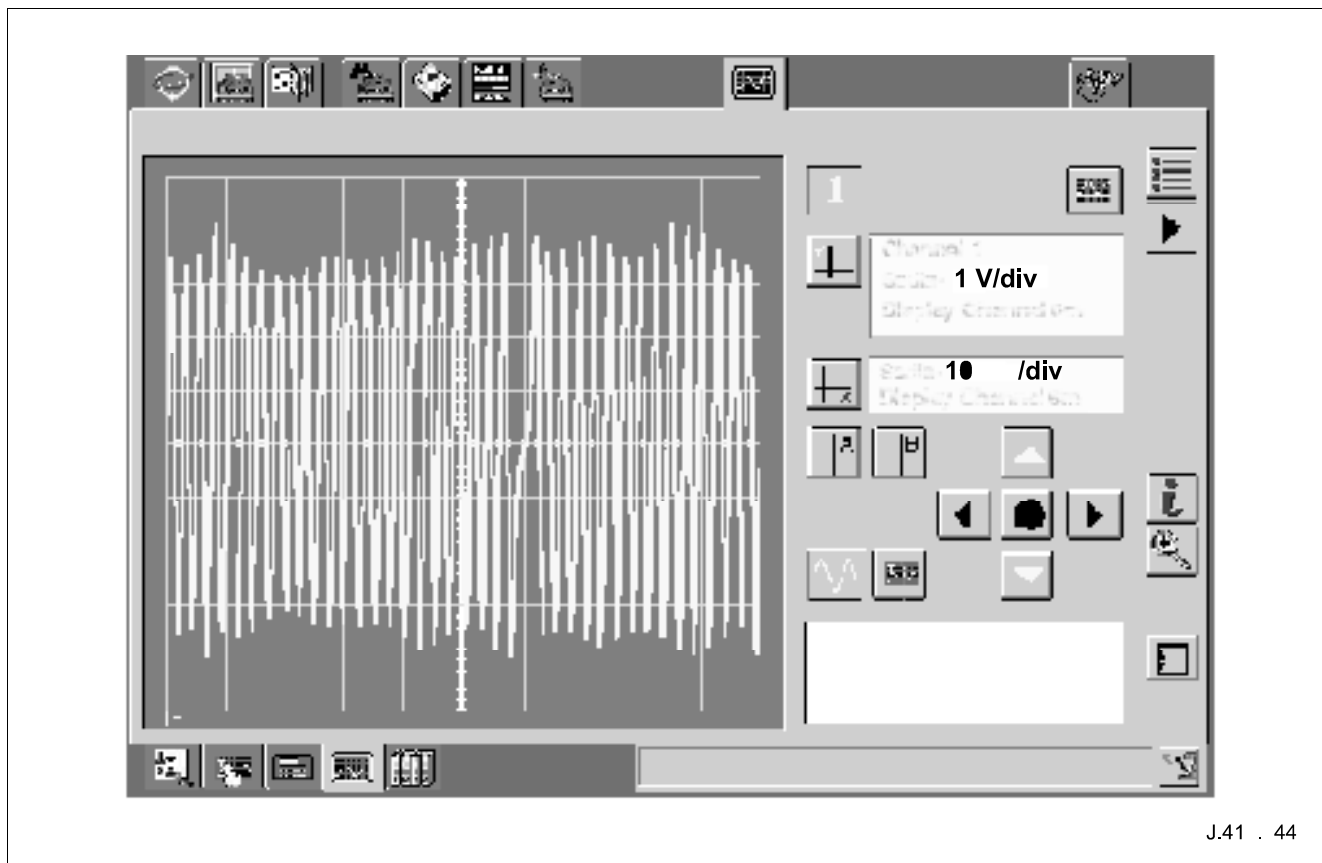


Illustration 1

See Illustration 1 for an example of a good crank signal as seen on the WDS oscilloscope.

Note: The oscilloscope was set to 1 volt/div and 10 ms/div. The gap in the waveform represents the missing tooth on the flywheel.

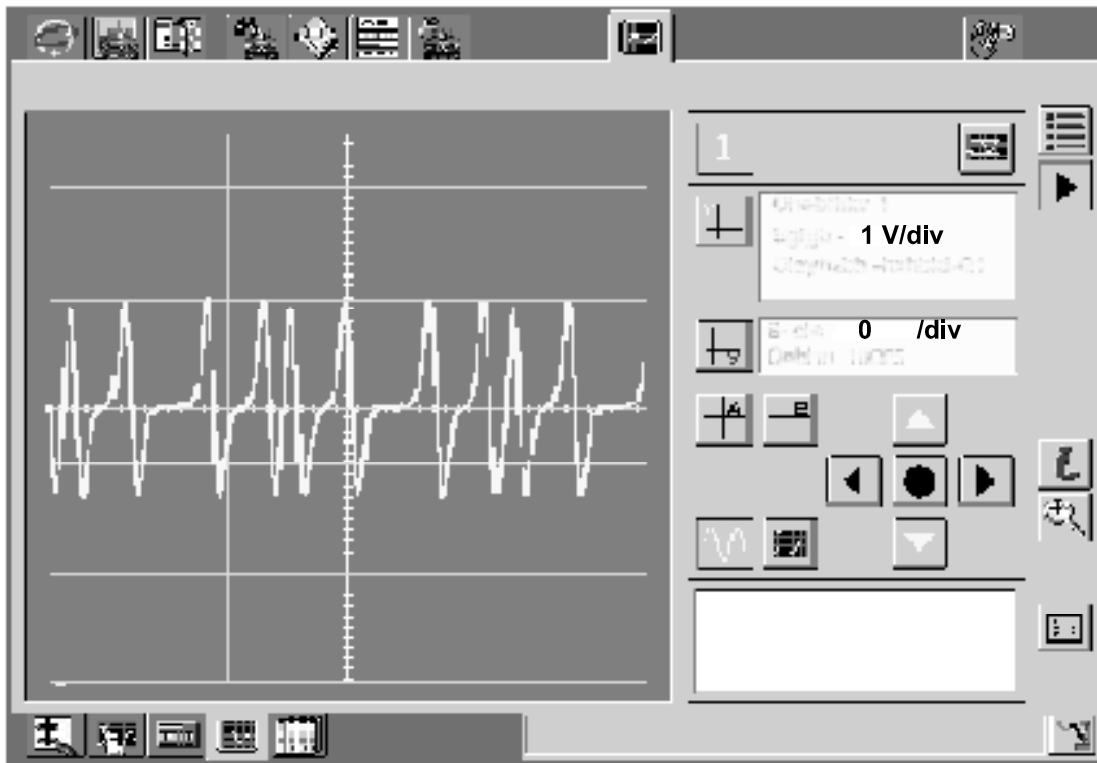
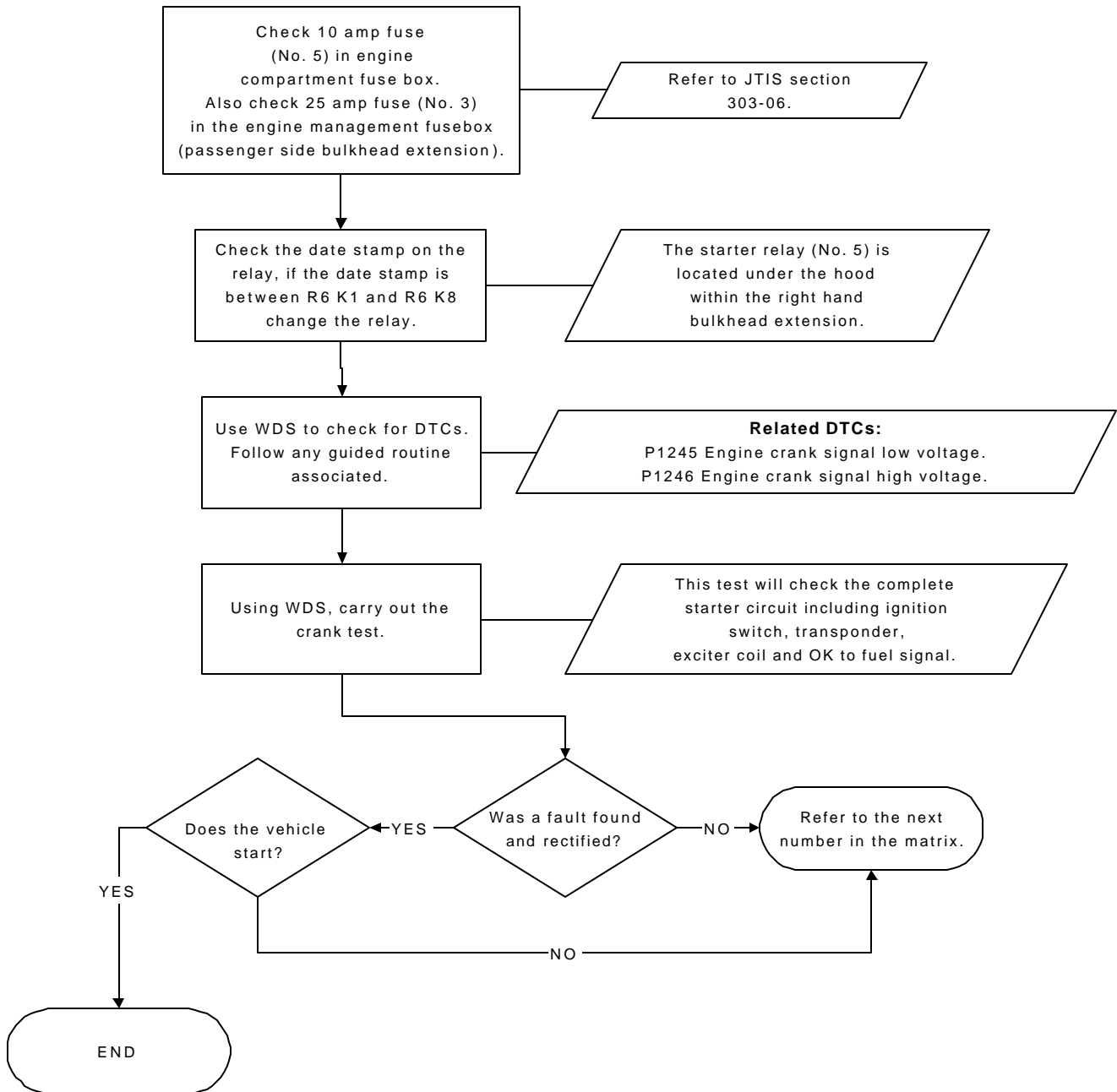


Illustration 2

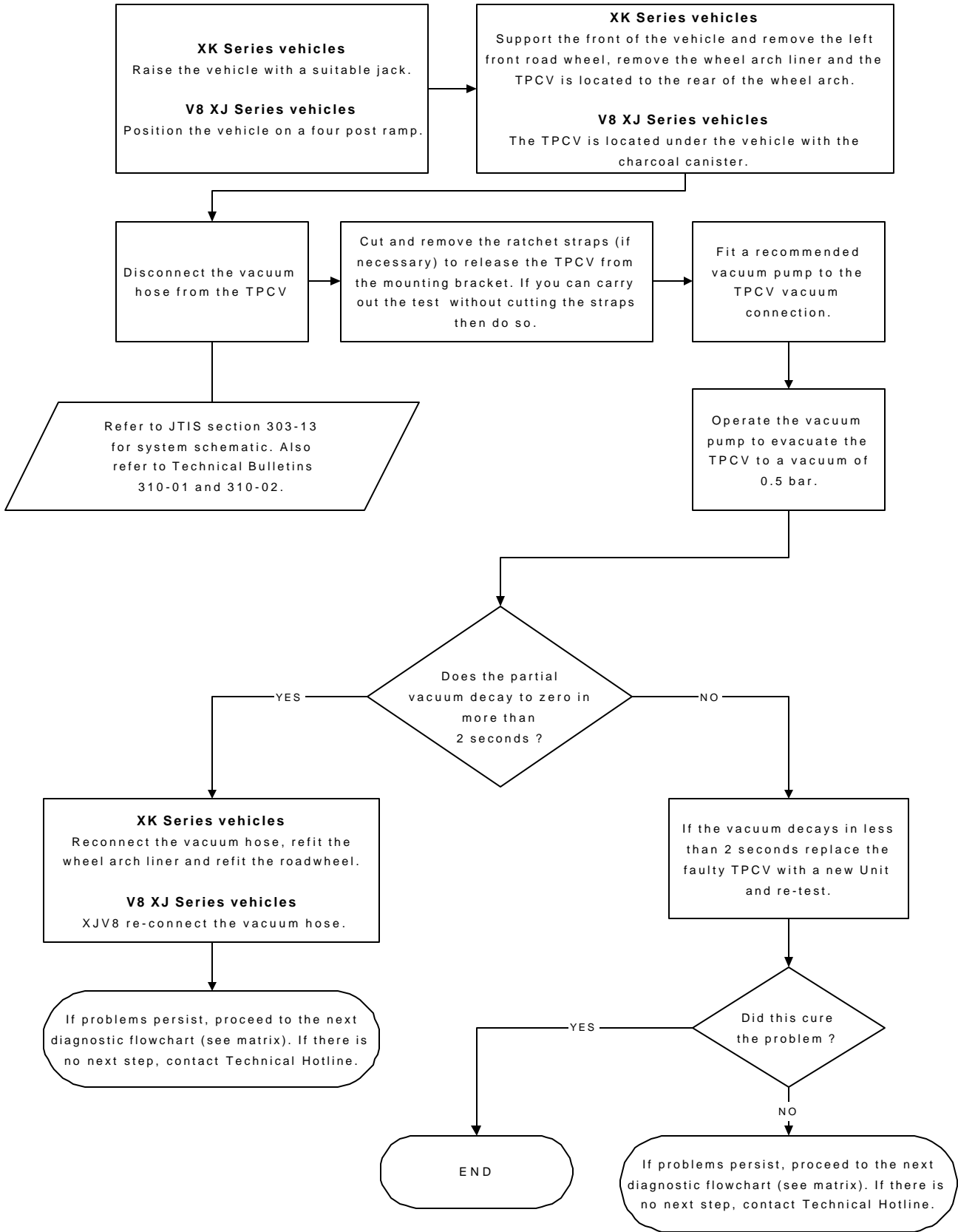
See Illustration 2 for an example of a good cam signal as seen on the WDS oscilloscope.

Note: The oscilloscope was set to 1 volt/div and 50 ms/div.

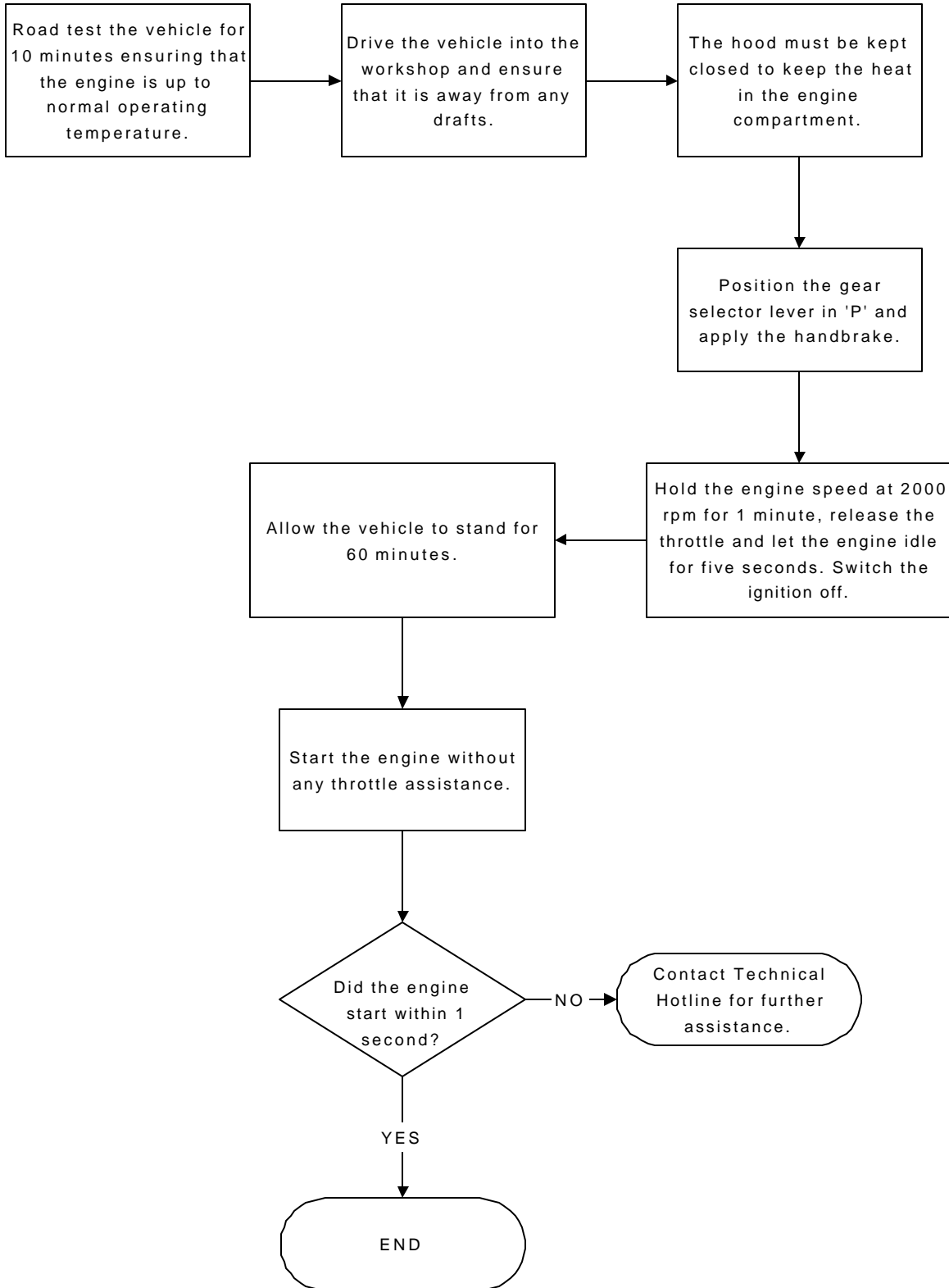
P6 - Starter Relay Diagnostic Flowchart



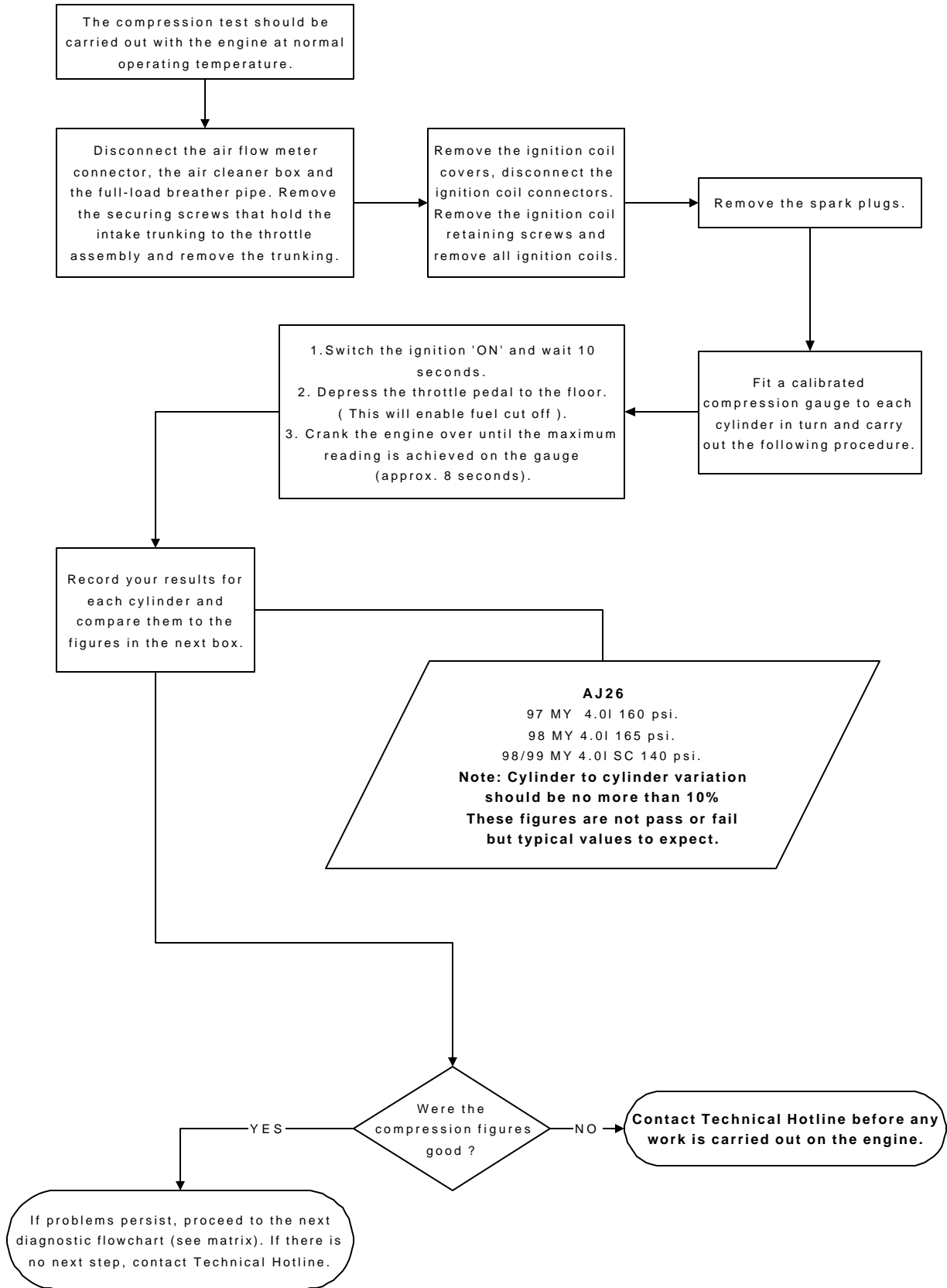
P7 - TPCV Rochester valve Diagnostic Flowchart



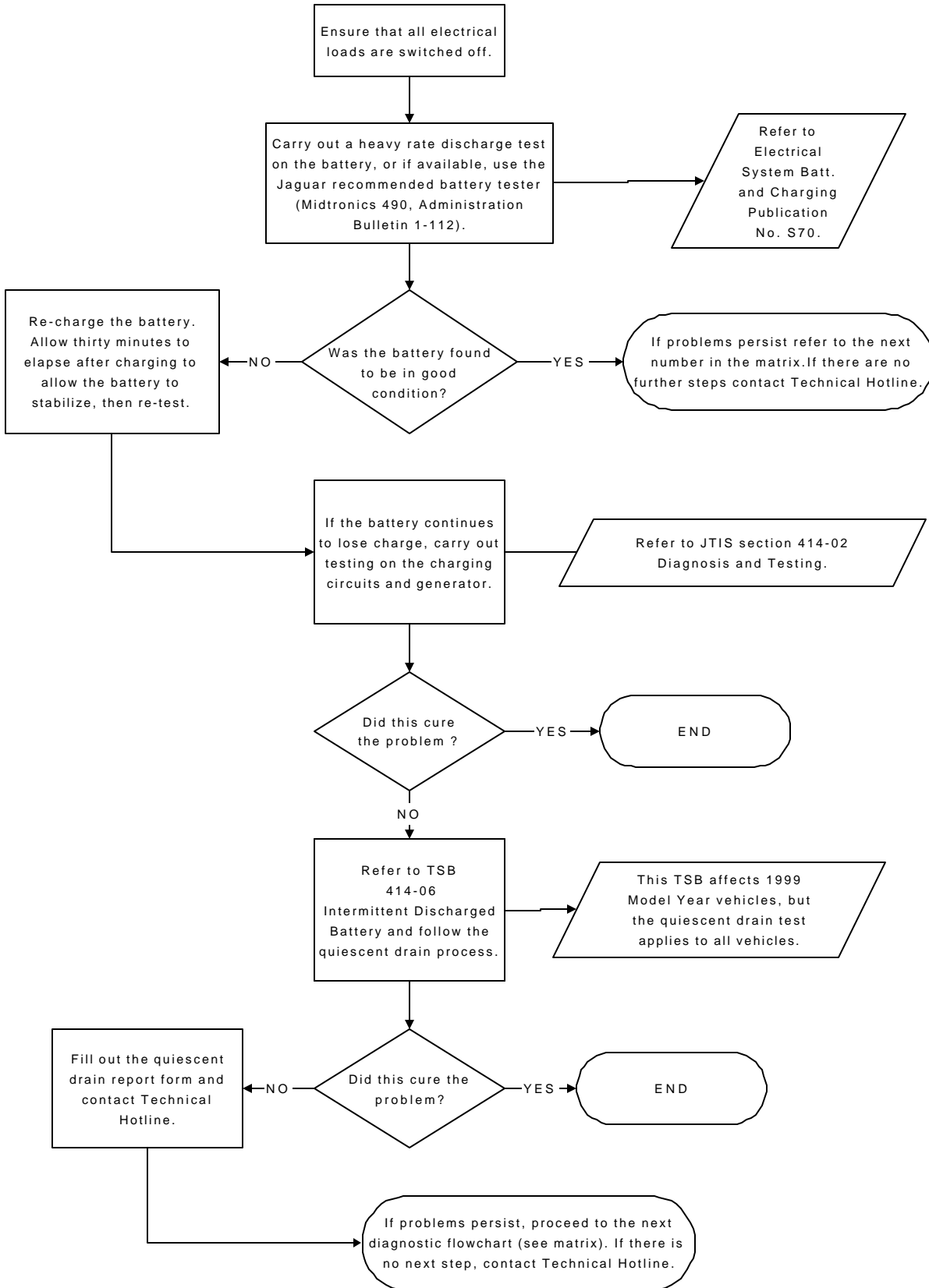
P8 - Injector Leak Diagnostic Flowchart



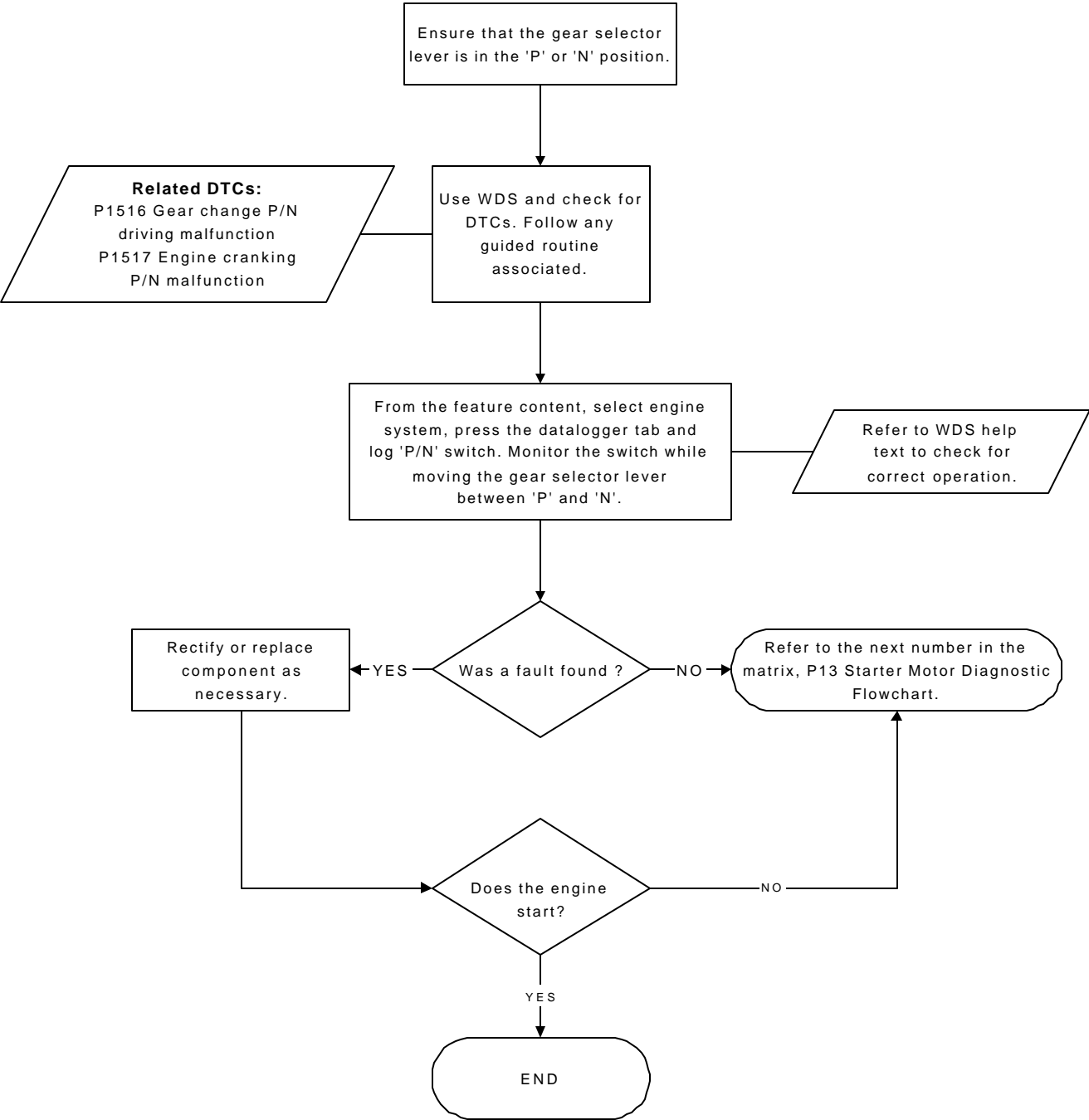
P9 - Cylinder Compression Diagnostic Flowchart



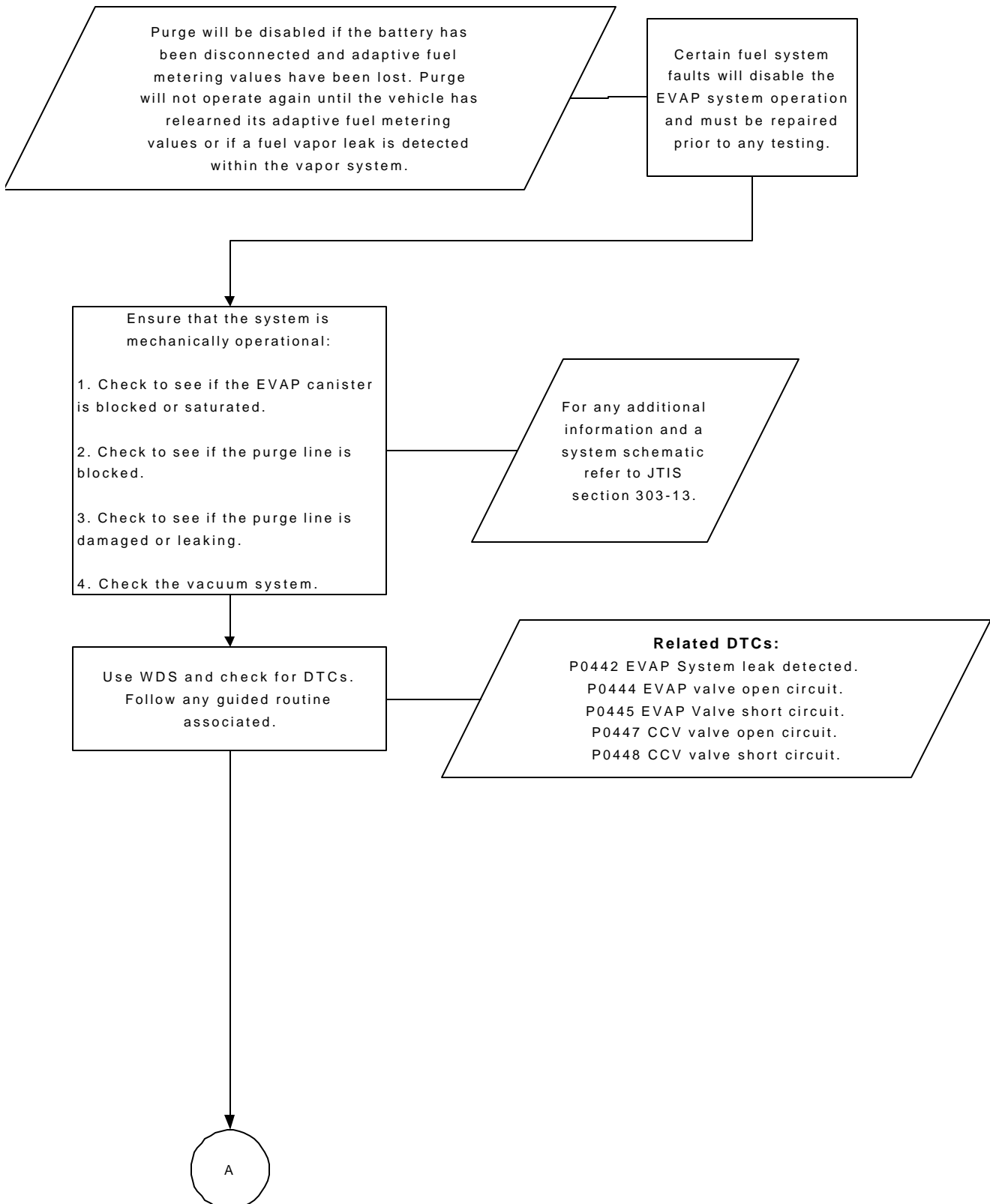
P10 - Battery Diagnostic Procedure



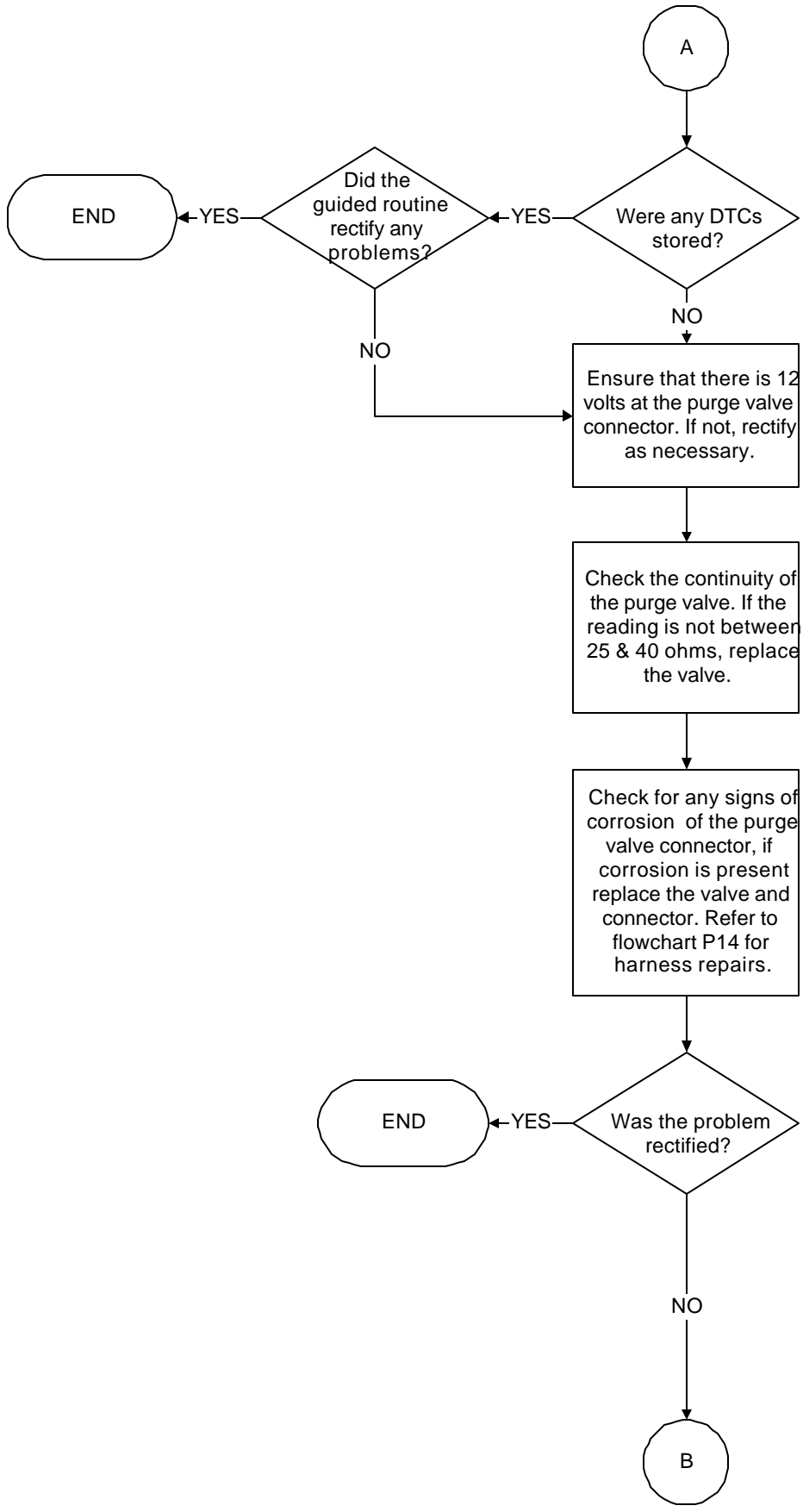
P11 - Park/Neutral Switch Diagnostic Flowchart



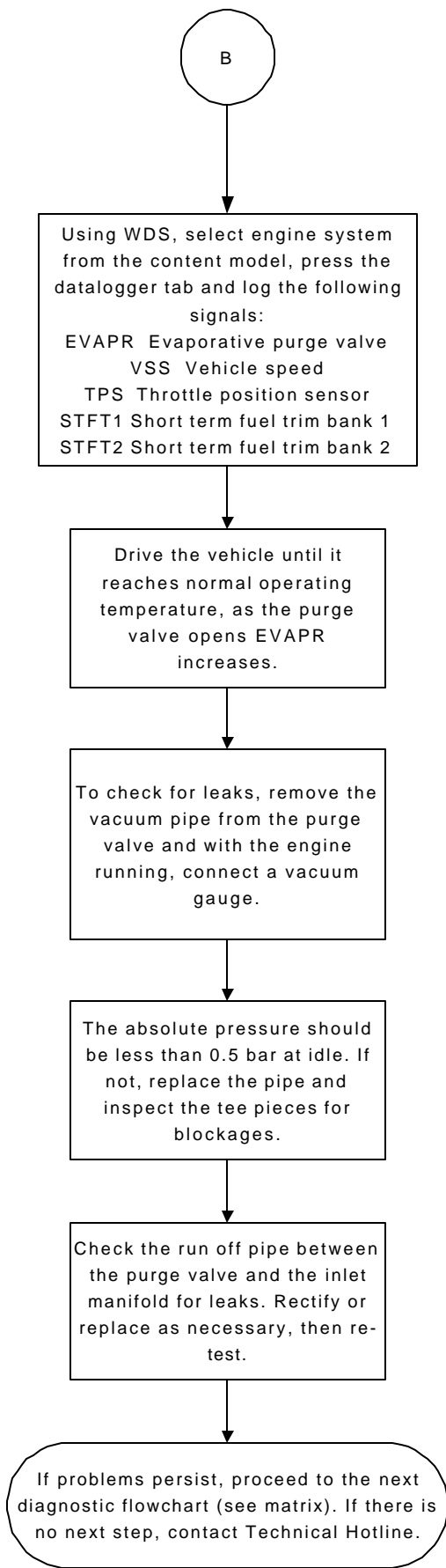
P12 - Purge Valve Mechanical Checks Diagnostic Flowchart



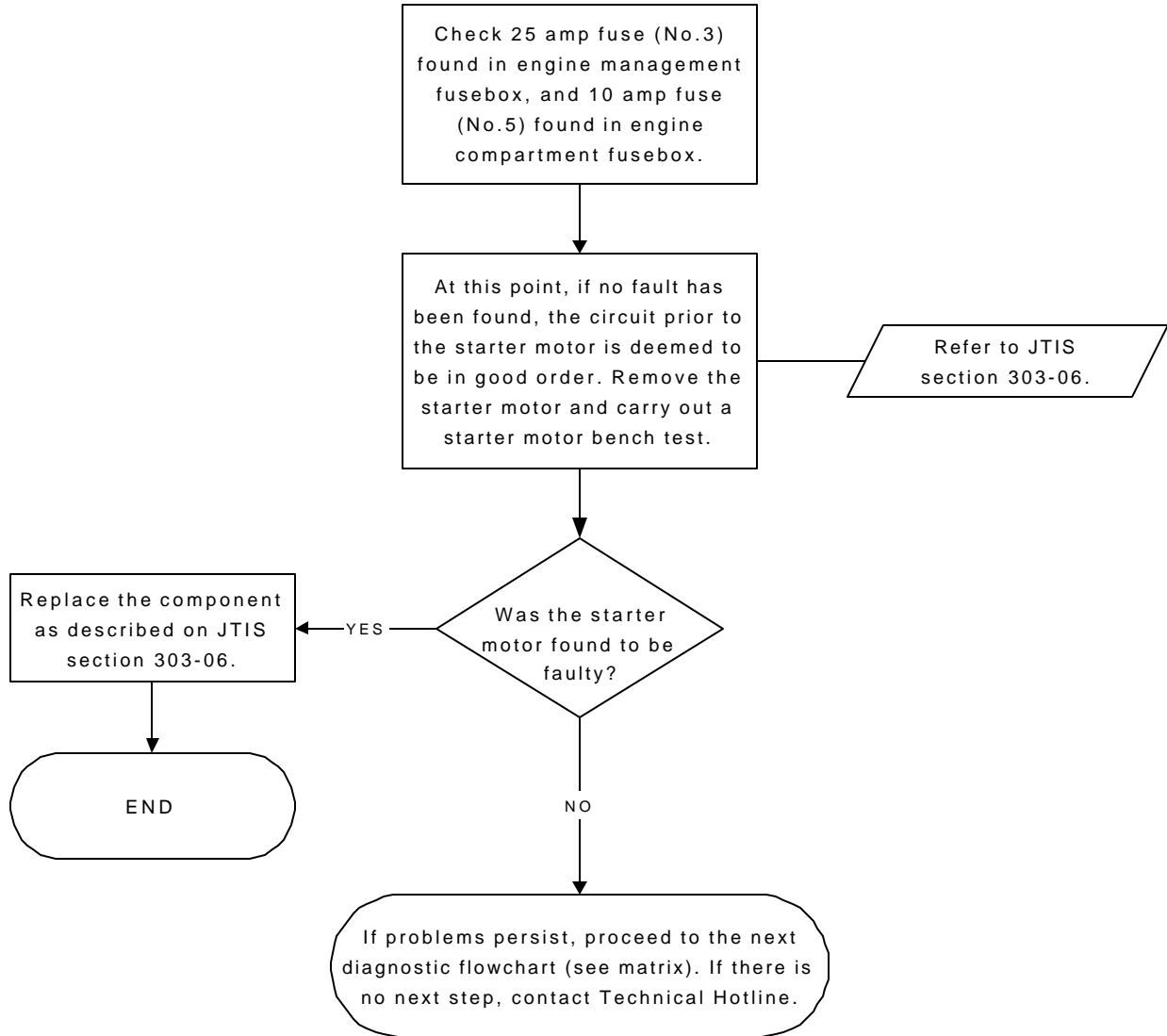
P12 Cont.



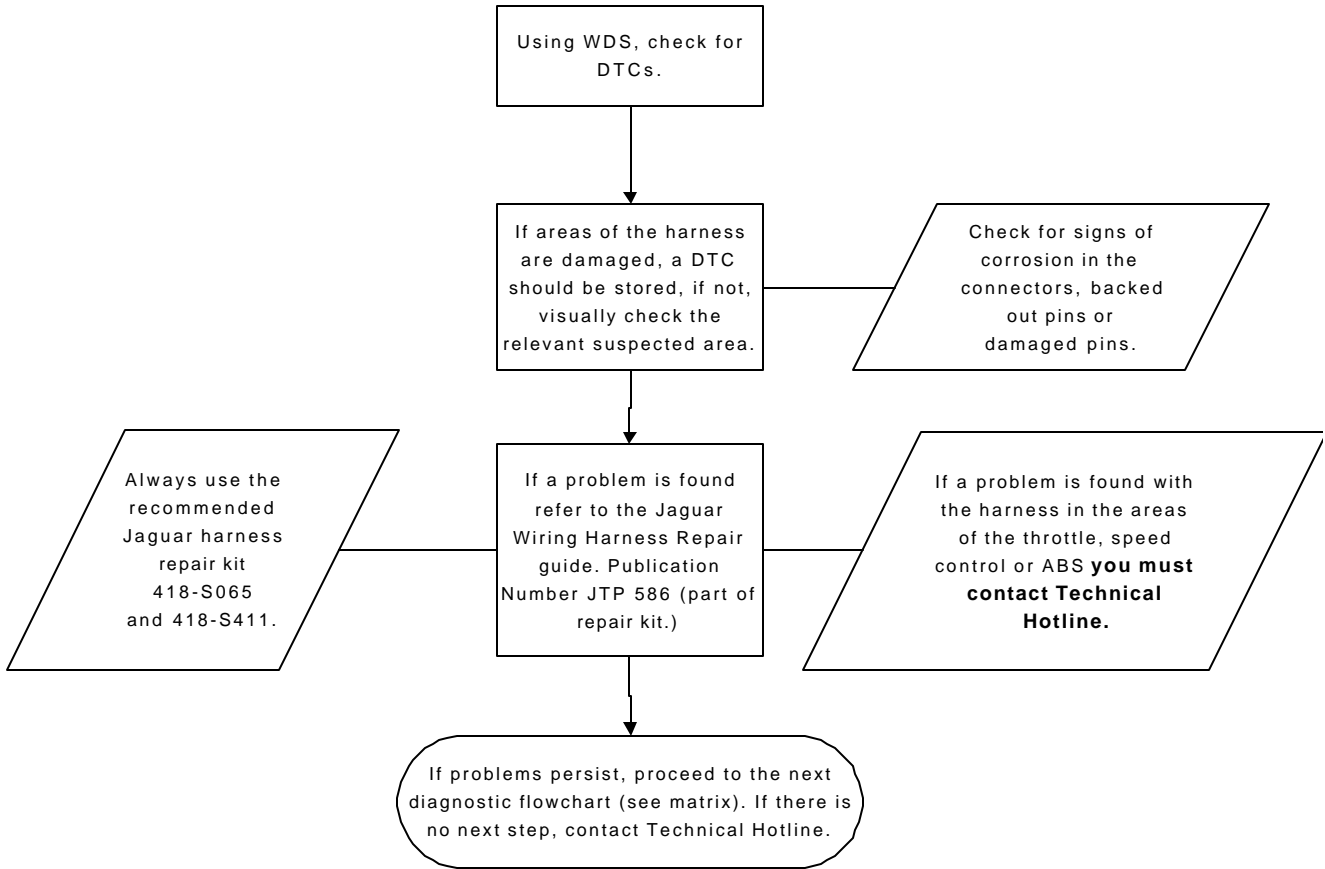
P12 Cont.



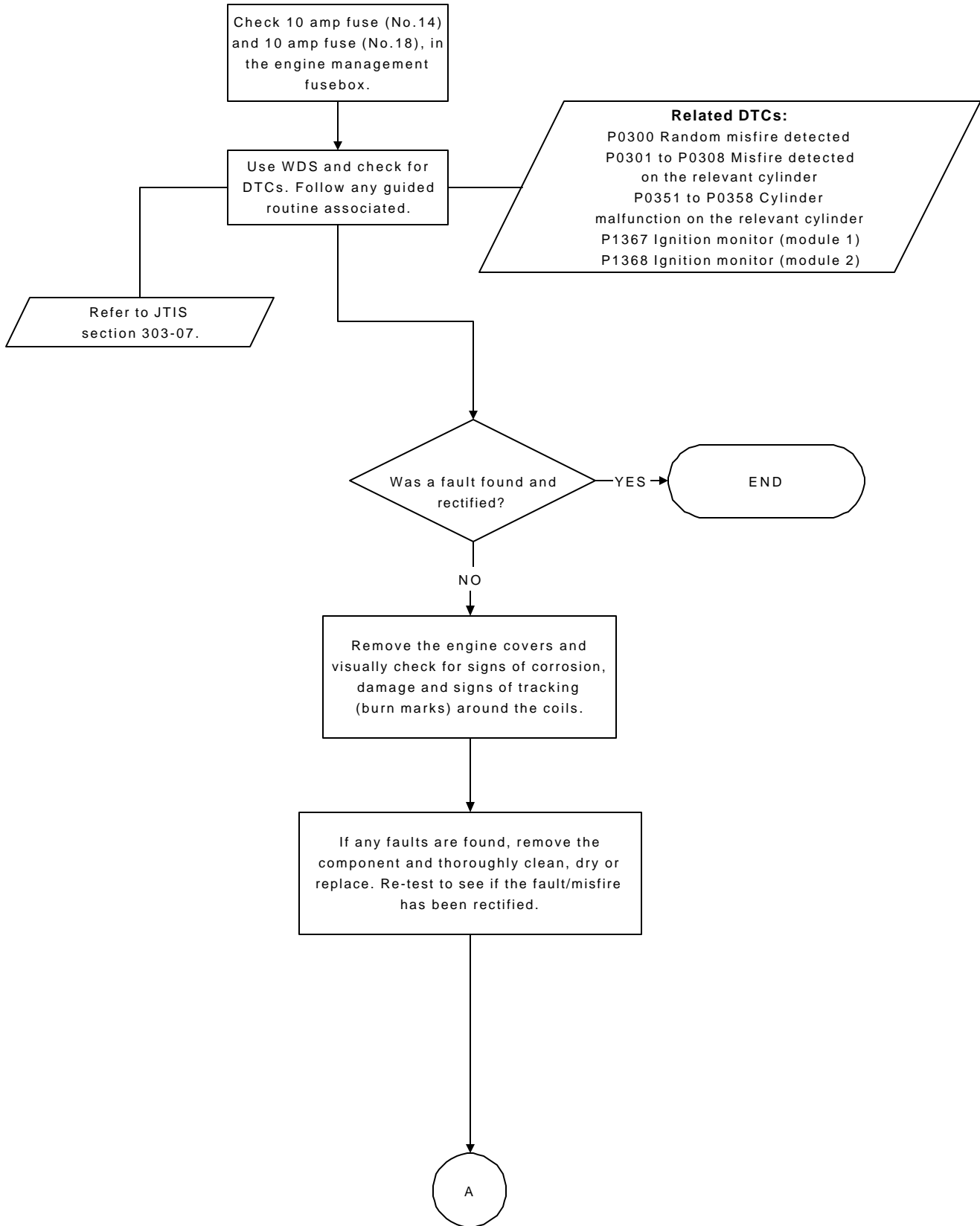
P13 - Starter Motor Diagnostic Flowchart



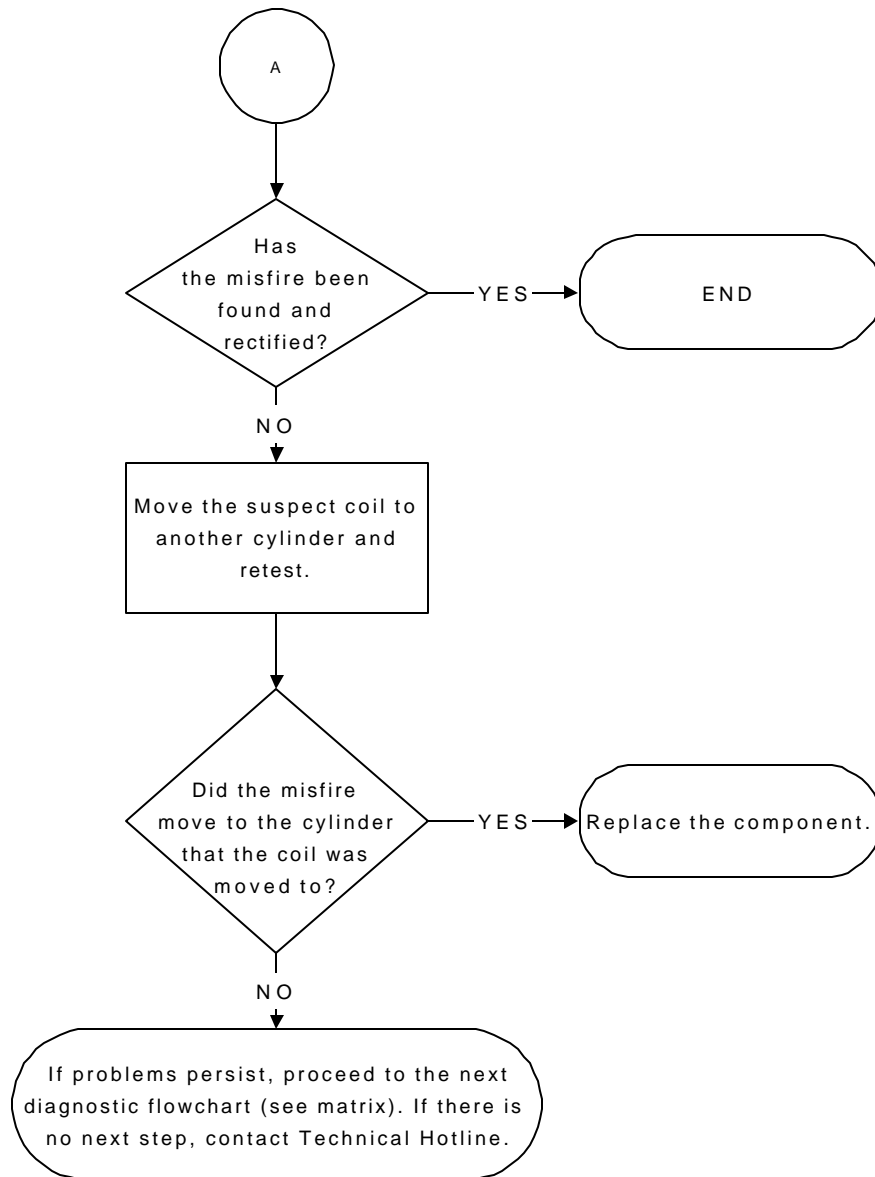
P 14 - Engine Harness Diagnostic Flowchart



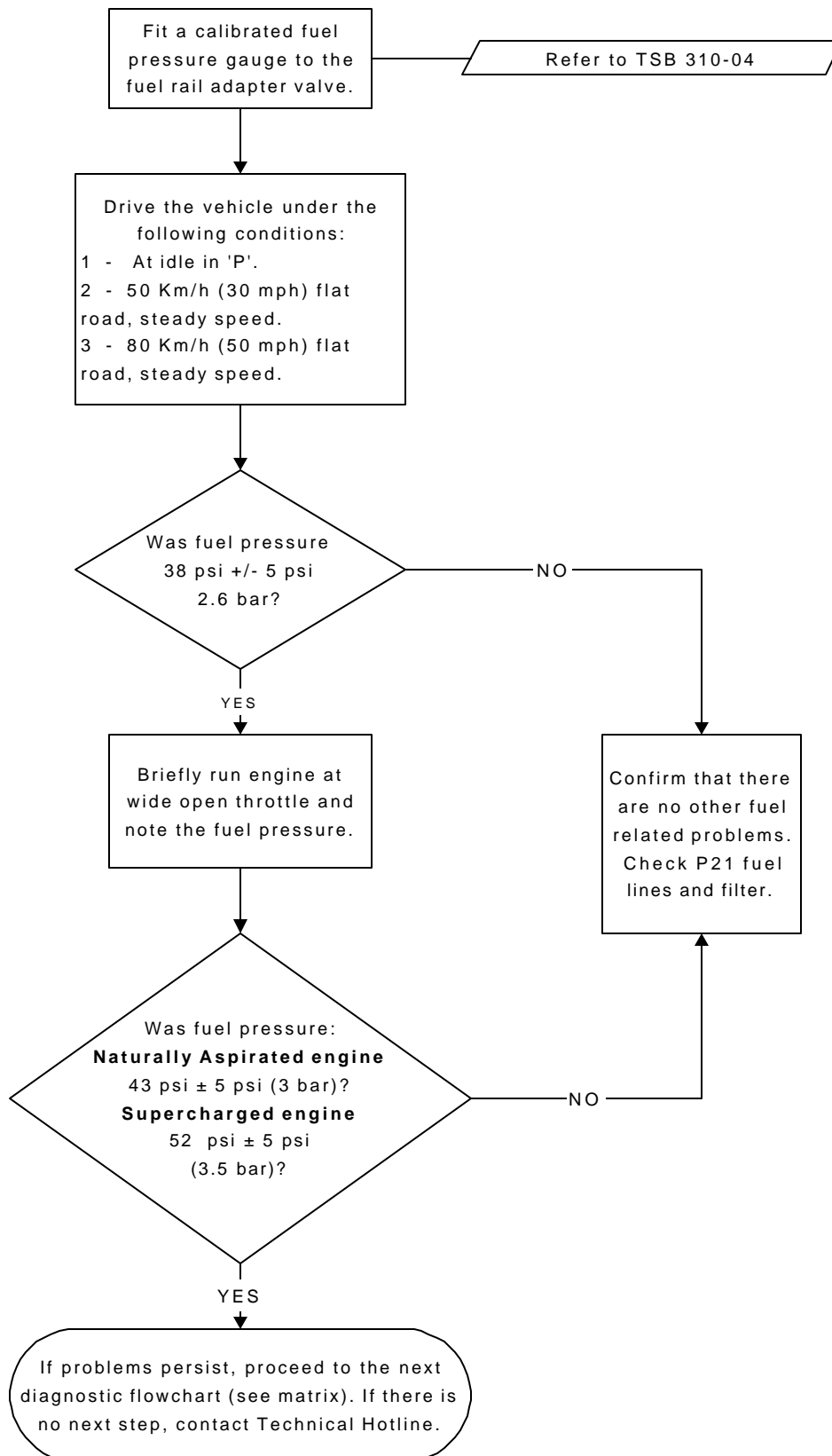
P16 - Ignition Coils Diagnostic Flowchart



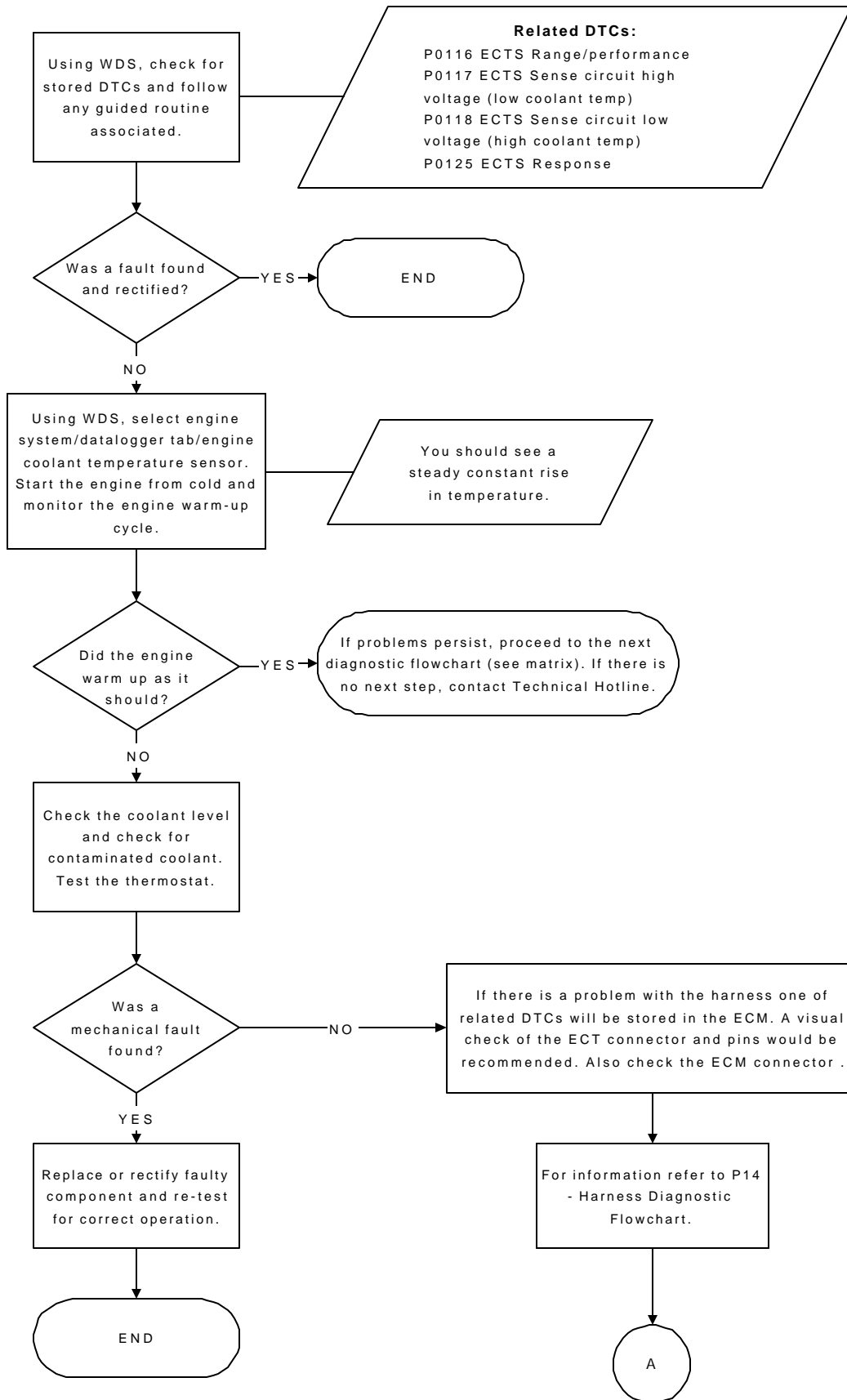
P16 Cont.



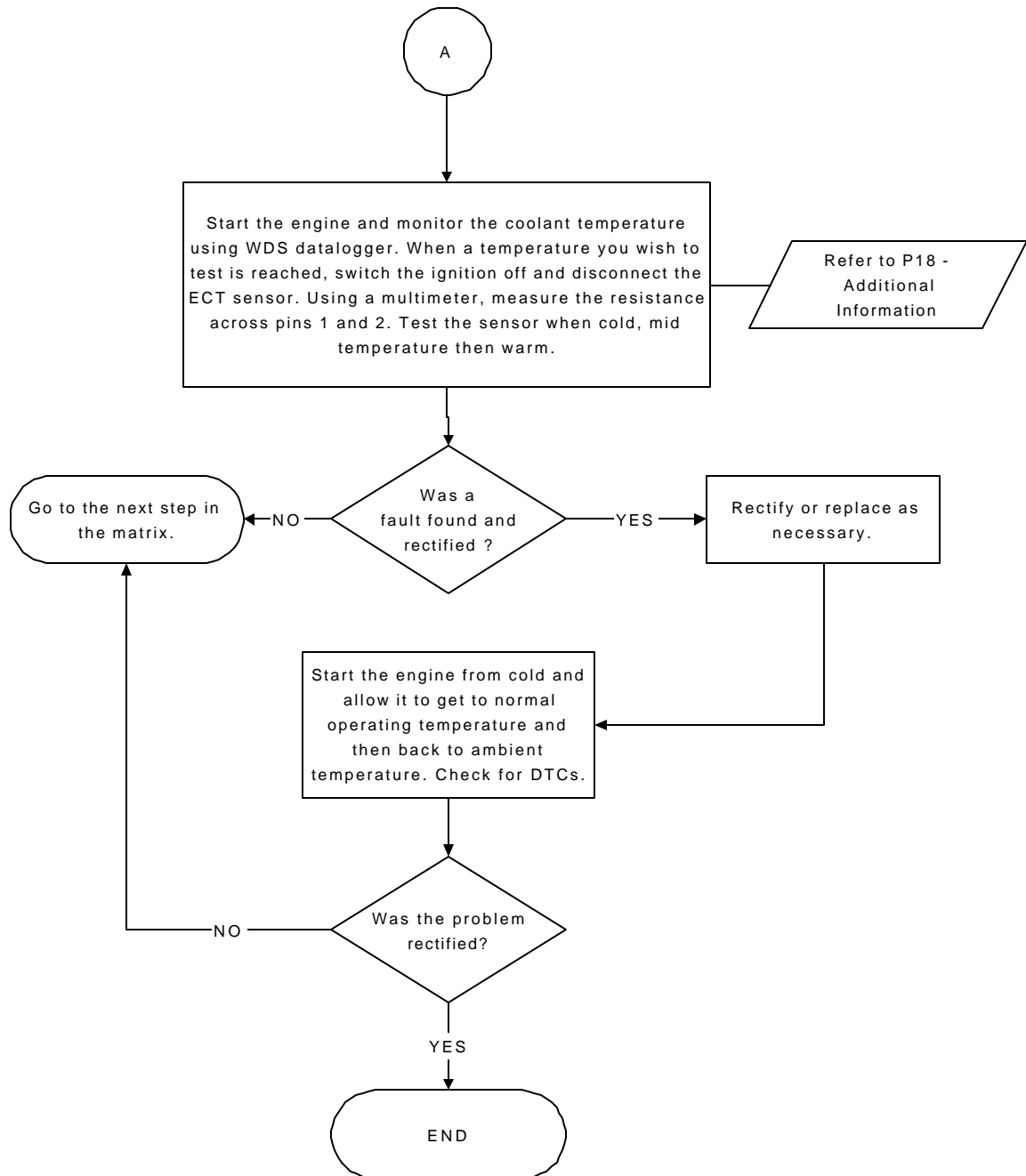
P17 - Fuel Pump Diagnostic Flowchart



P18 - ECT Sensor Diagnostic Flowchart



P18 Cont.

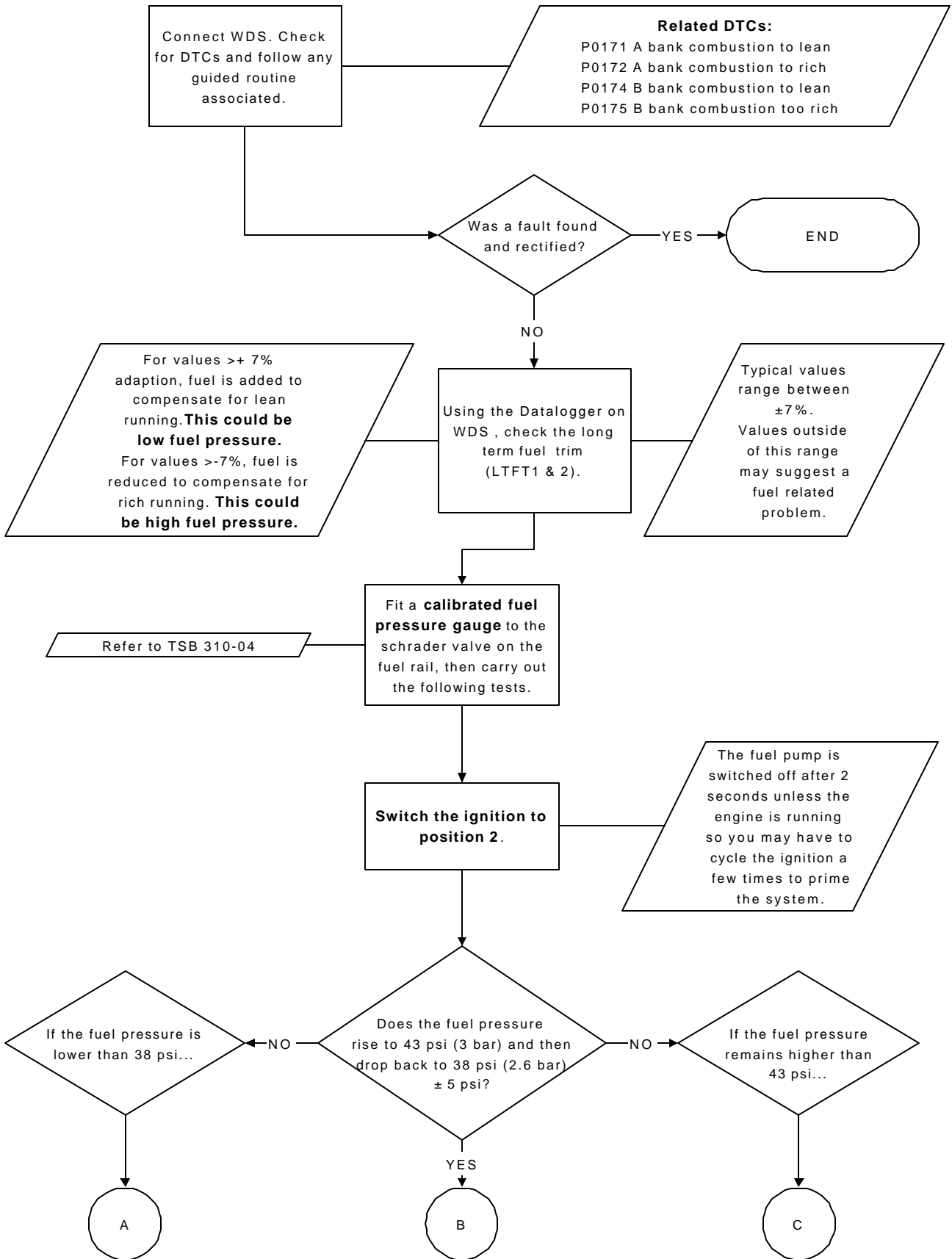


P18 – Additional Information

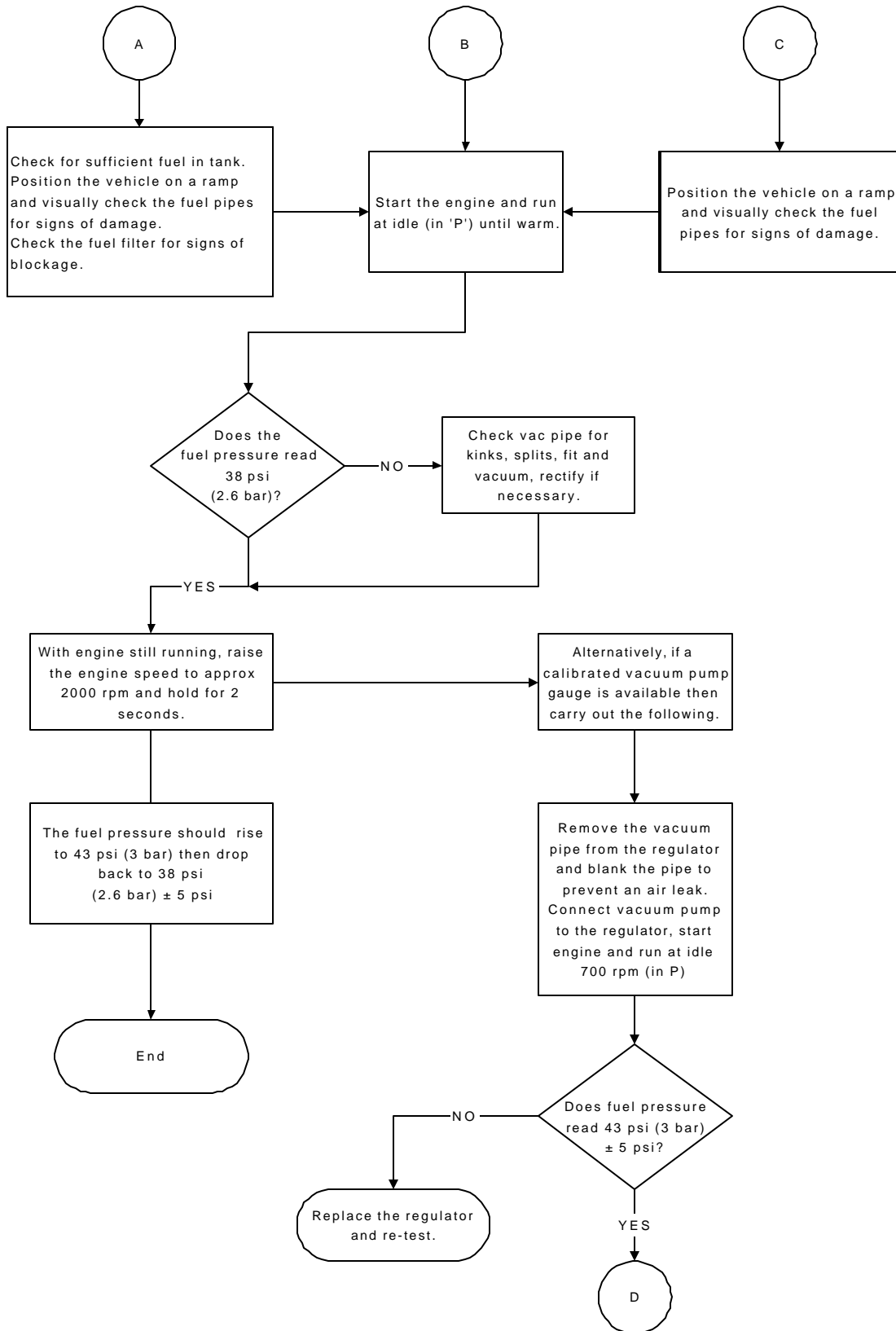
Engine coolant temperature sensor/resistance relationship

Engine coolant temperature °C	Resistance K ohms	Voltage V
-10	9.20	4.05
0	5.90	3.64
10	3.70	2.89
20	2.50	2.42
30	1.70	2.20
40	1.18	1.78
50	0.84	1.44
60	0.60	1.17
70	0.435	0.95
80	0.325	0.78
90	0.25	0.65
100	0.19	0.55

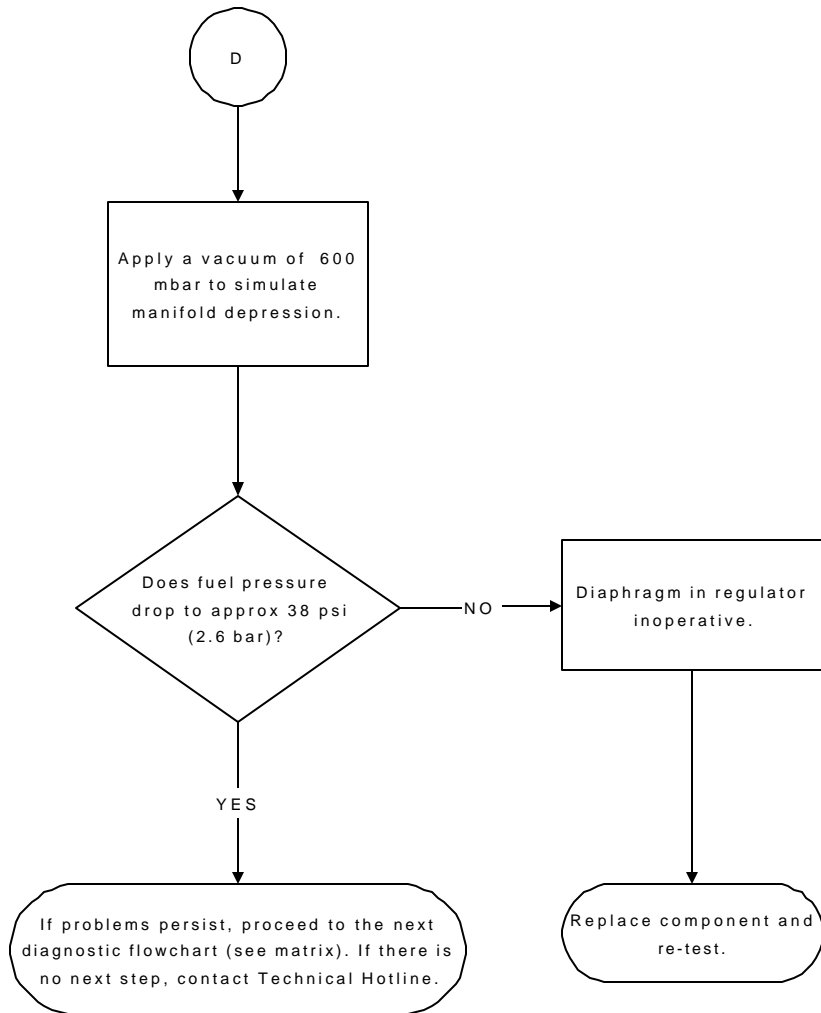
P20 - Fuel Pressure Regulator Diagnostic Flowchart



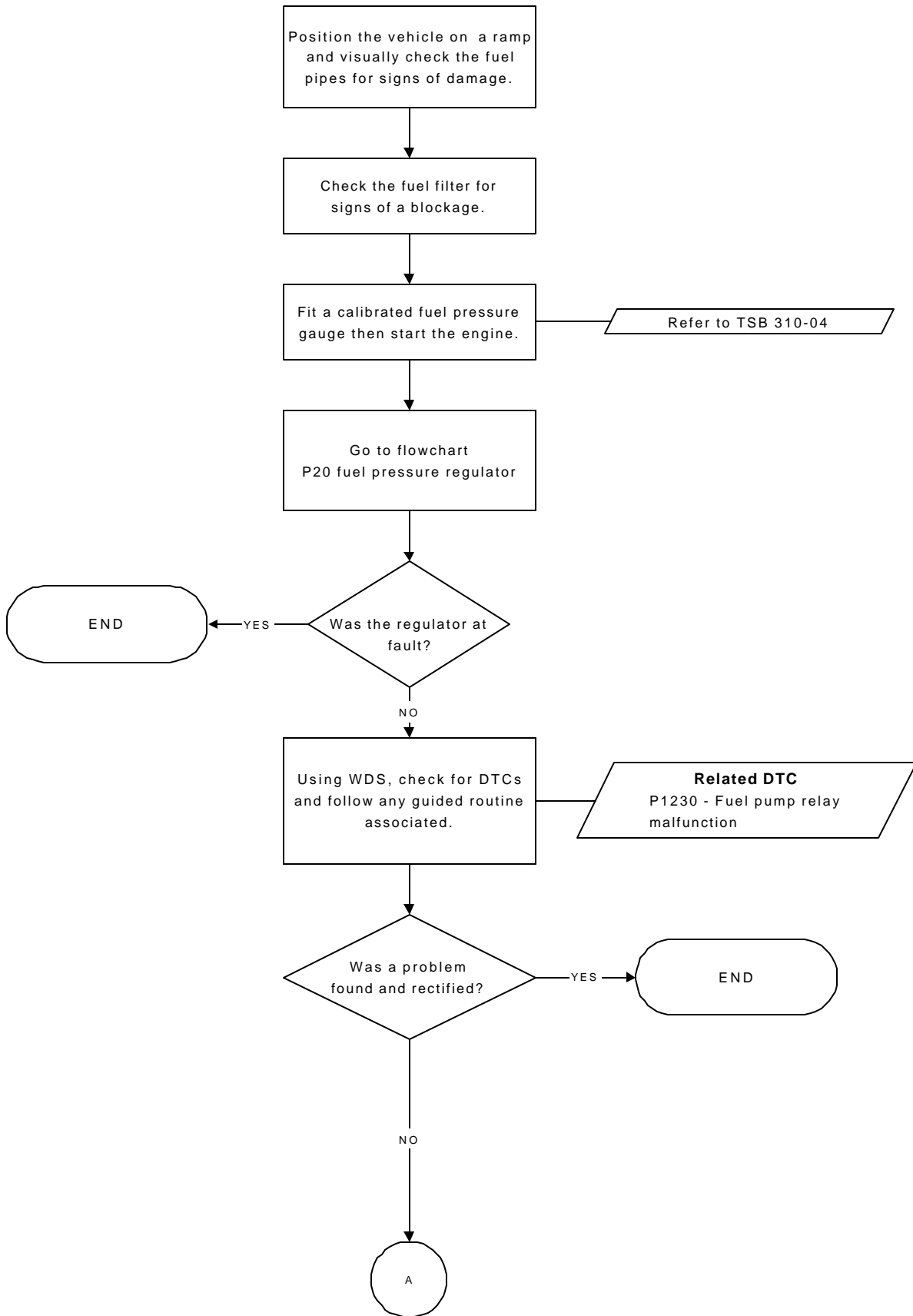
P20 Cont.



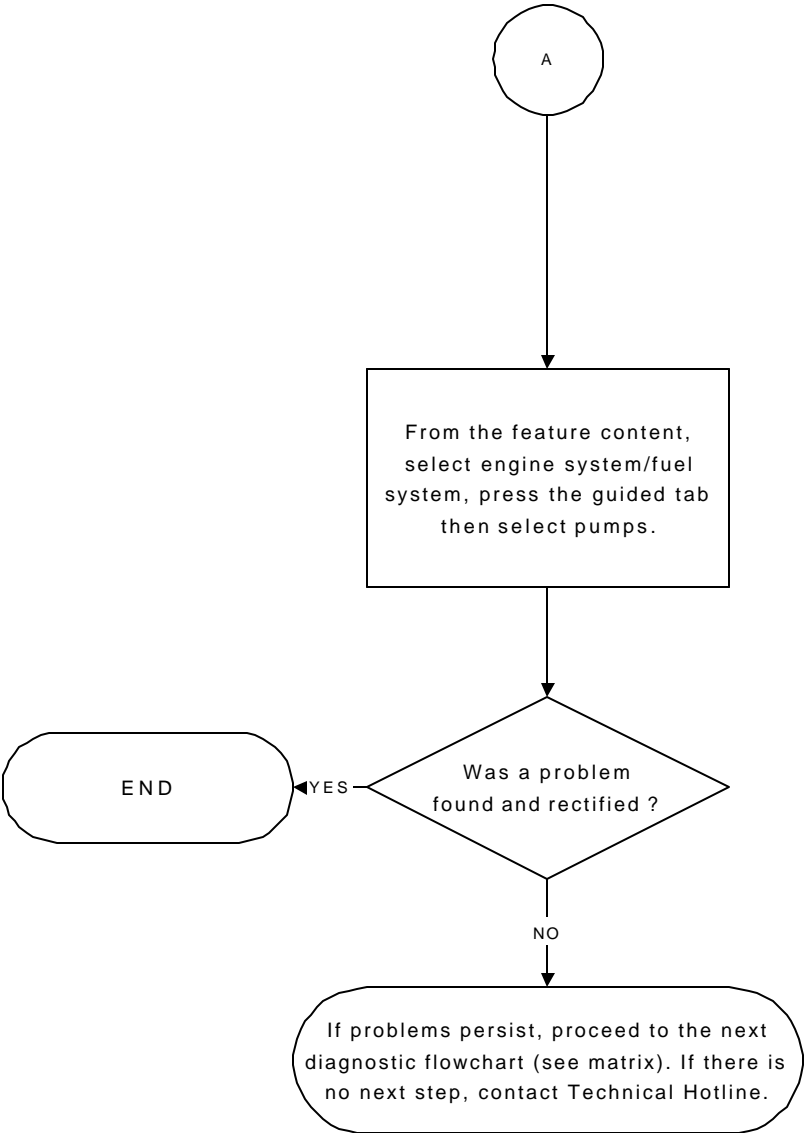
P20 Cont.



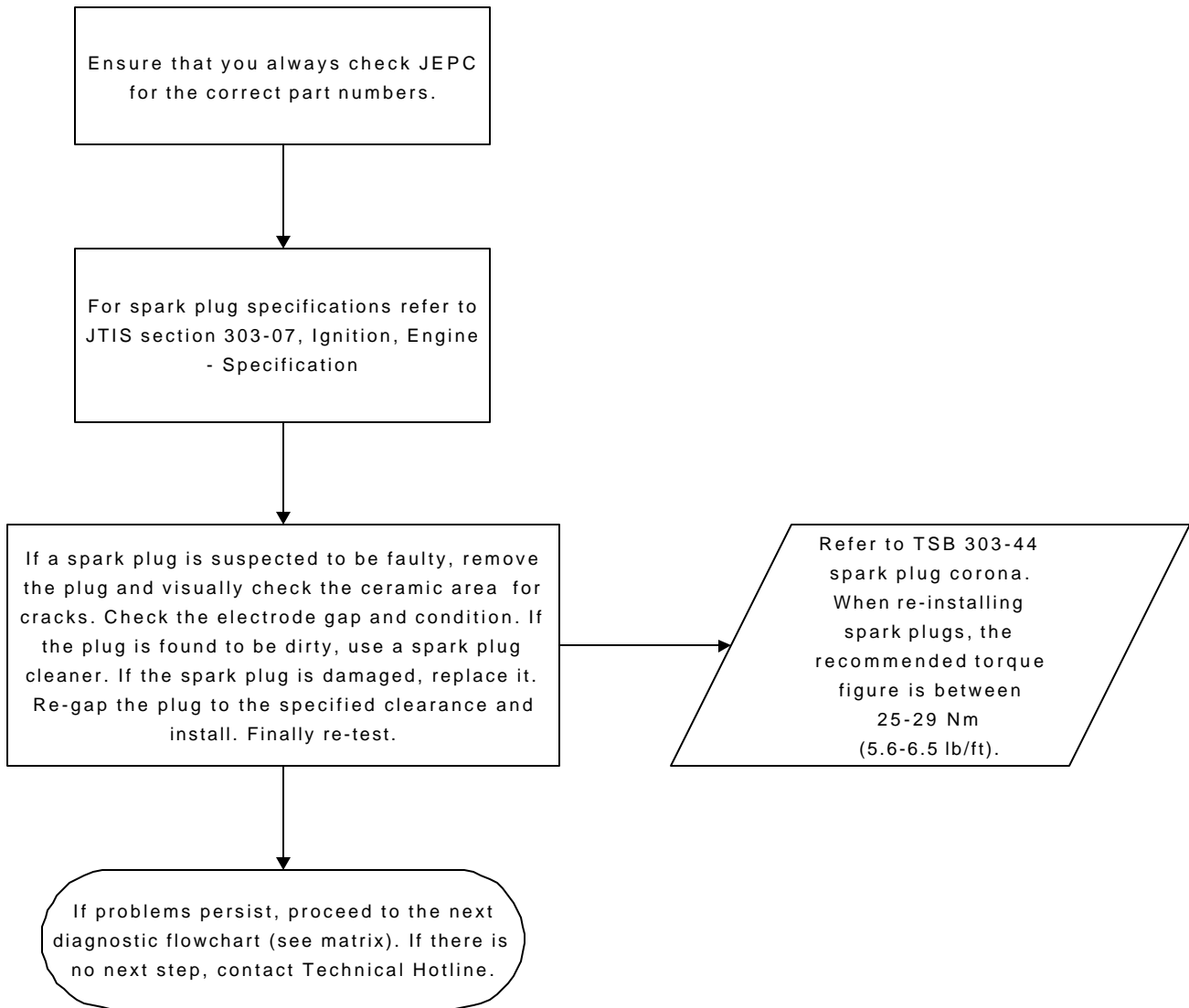
P21 - Fuel Lines Diagnostic Flowchart



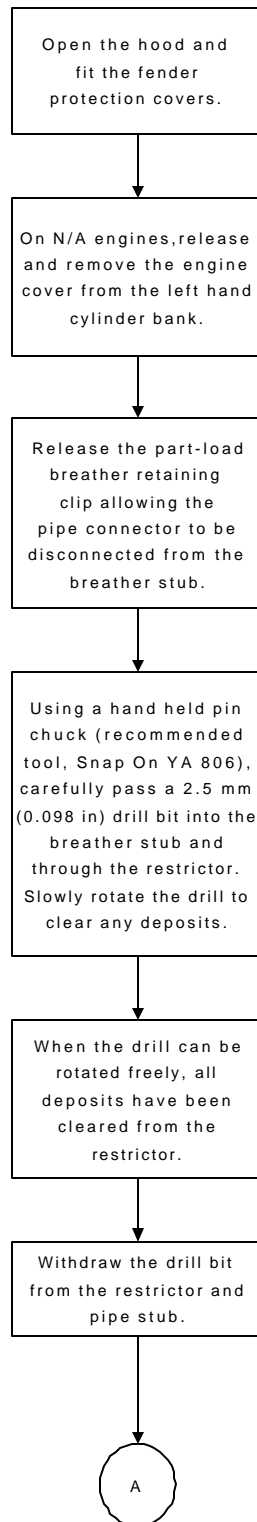
P21 Cont.



P26 - Spark Plugs Diagnostic Flowchart

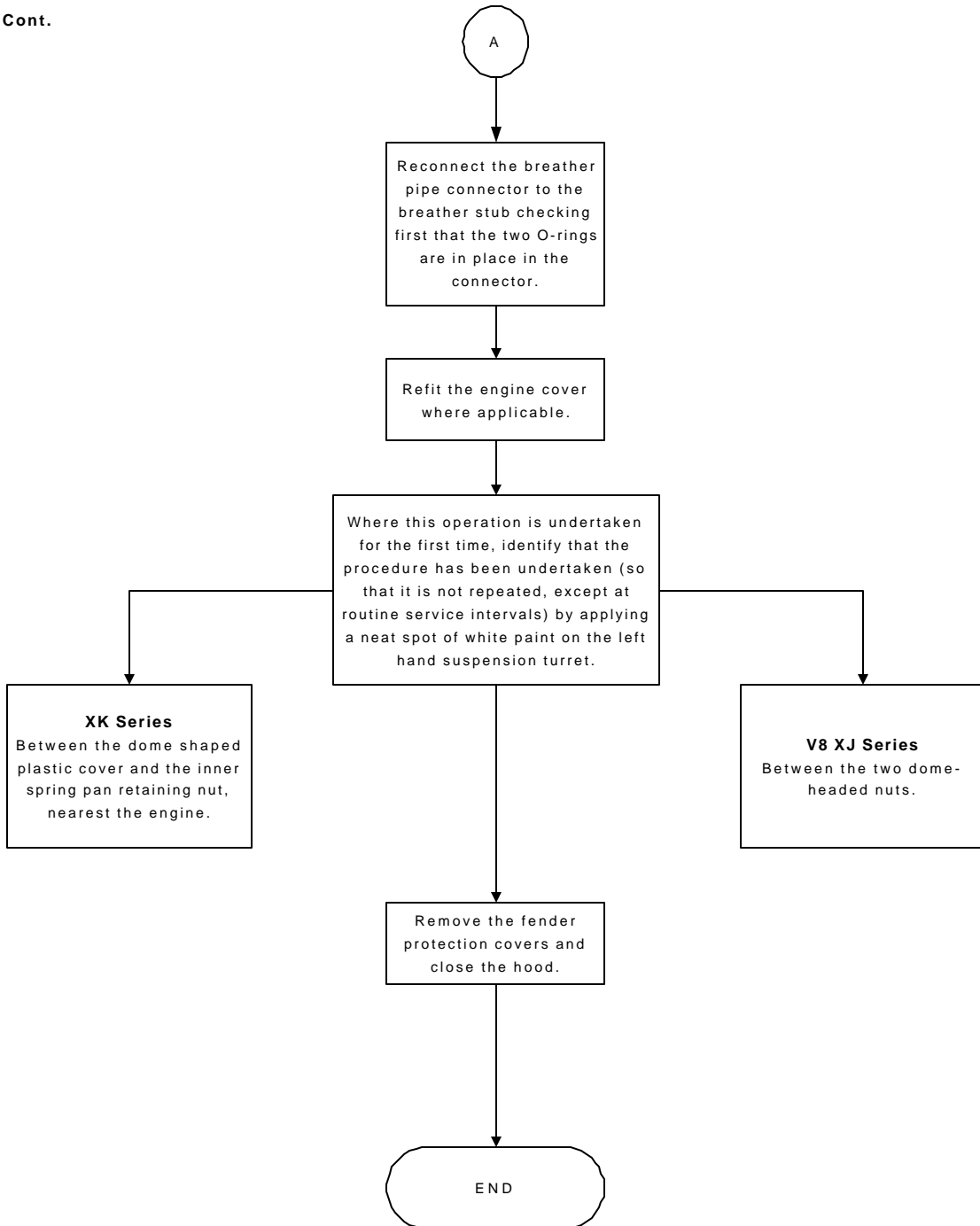


P29 - Blocked Part-Load Breather Diagnostic Flowchart



Note: In no circumstances must a power drill be used, it should always be rotated by hand. The drill bit should never exceed 2.5 mm (0.098 in)

P29 Cont.



Note: The information in this flowchart has been taken from Service Action S474. Use the chart in conjunction with Service Action S474 Technical Bulletin 600-03.