



V8 XJ Series/XK

DATE 10/01

303-47

SERVICE

TECHNICAL BULLETIN

Hesitation, Surging, Detonation, Poor Throttle Response/Acceleration – Diagnostic Flowcharts – AJ 26 Engines

MODEL
1997-98 MY XK8 Range
1998 MY V8 XJ Series
VIN 1998-99 MY XJR

Issue:

This Technical Bulletin provides diagnostic information relating to various engine drivability concerns such as hesitation, backfiring, surging, knocking, poor throttle response, and cruise control inhibited. The diagnosis is organized by the symptoms that the customer experiences.

Action:

Before using the guide, check the Symptom Matrix (next page) for the diagnostic flowchart sequence. For example, if the **cruise control is inhibited or disabled**, work through flowcharts P28, P30 and P27.

Following the flowcharts in the sequence identified will help rectify any concerns while optimizing the utilization of workshop time.

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

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 after 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.

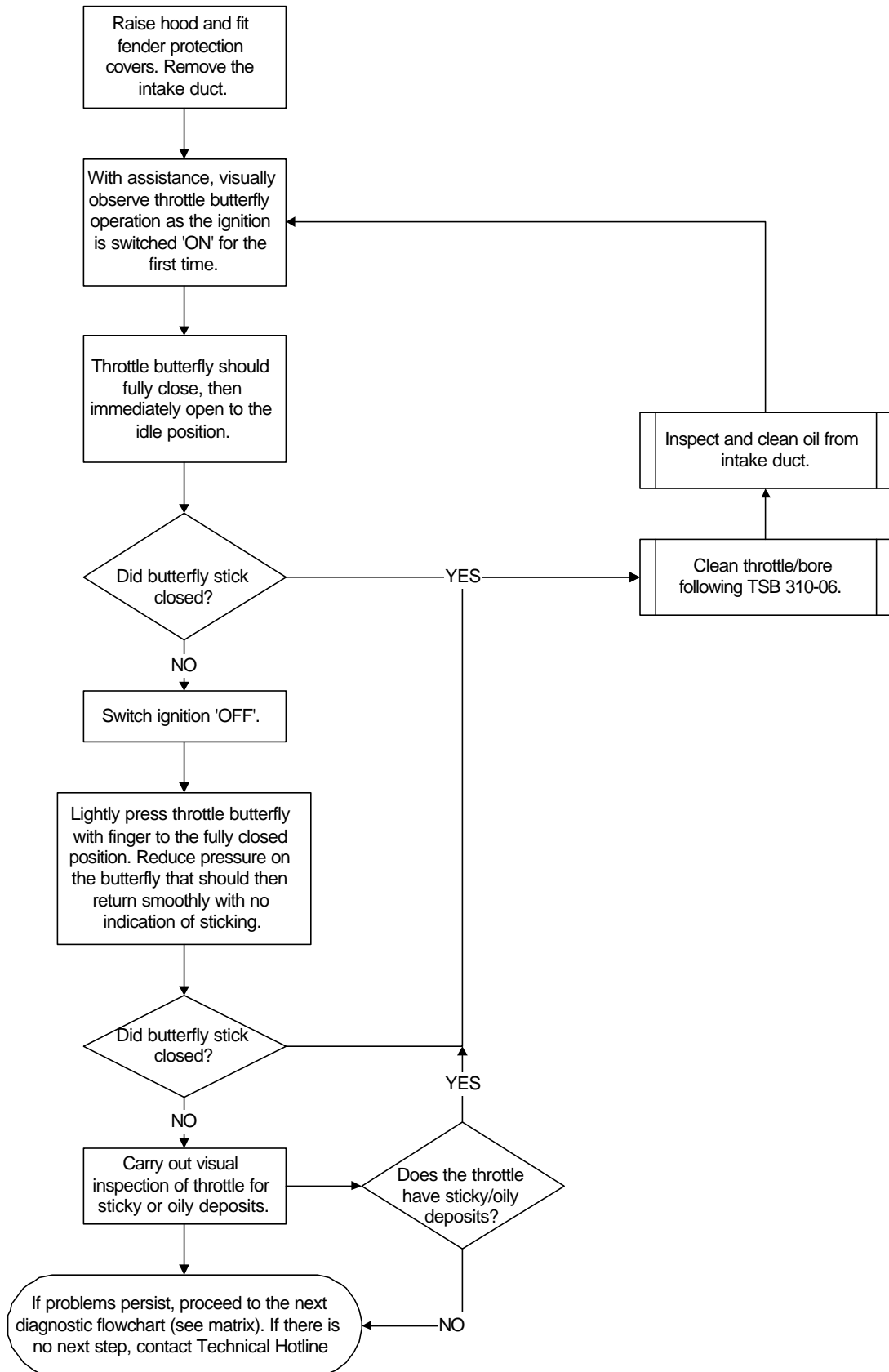
⚠ Warning: Working on the fuel system can result in fuel vapor being emitted into the atmosphere. Fuel vapor is extremely flammable; hence great care should be taken when working on the fuel system. Do not smoke in the working area and ensure that there is a CO2 fire extinguisher close by. The working 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

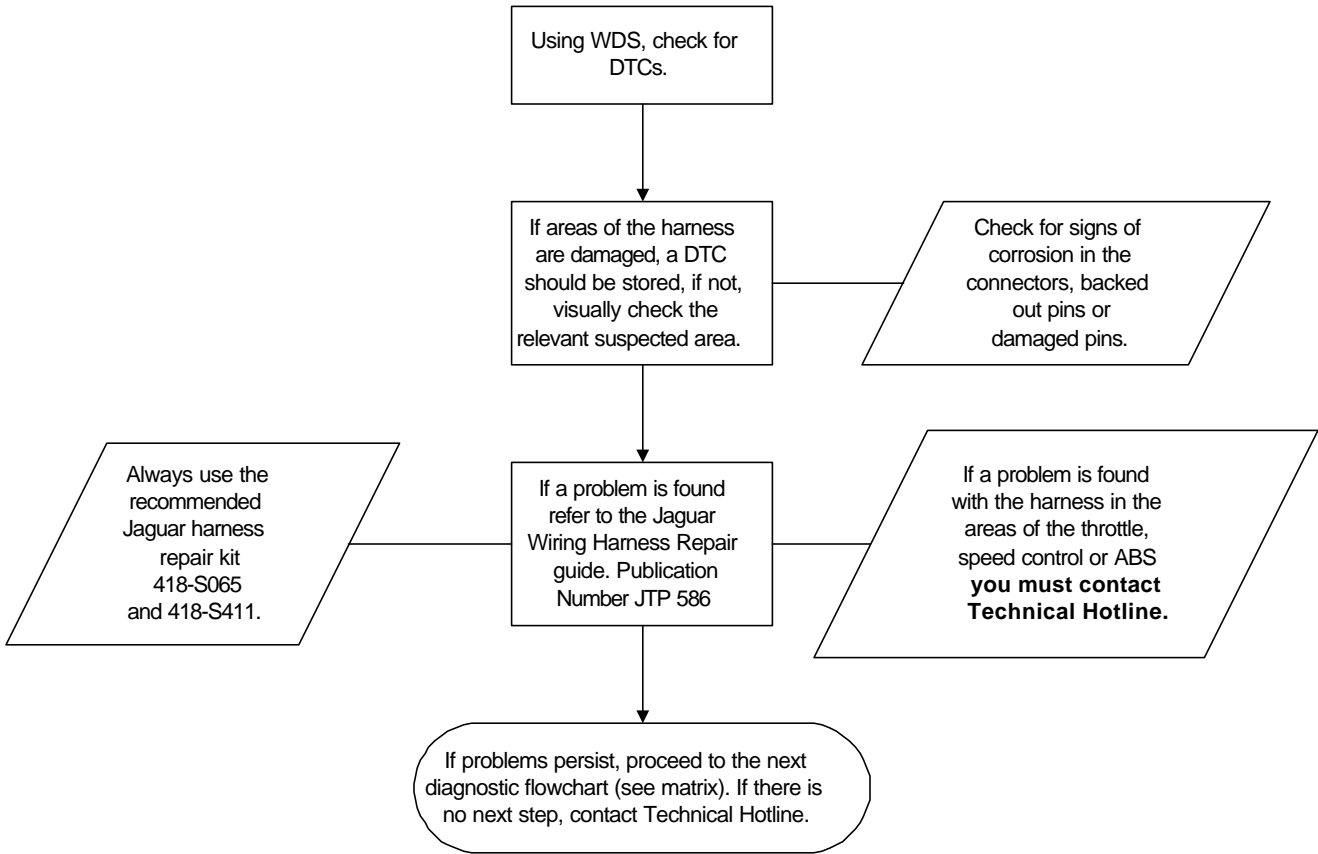
Poor Drivability						Symptom	Suspect Area	See Chart
Cruise control inhibited or disabled	No throttle response	Engine detonates/knocks	Engine surges	Engine backfires	Engine hesitates/poor acceleration			
						Throttle (contaminated)	P1	
			5			Harness	P14	
			9		7	ECM	P15	
		1	2	1	1	Fuel pump	P17	
		5	4	3		Mass air flow meter	P19	
						Fuel pressure regulator	P20	
						Fuel lines	P21	
		2		4		Oxygen sensors	P22	
		3	1	2	2	Air leakage	P23	
	1		6		4	Throttle sensors	P24	
	2		7		5	Throttle motor	P25	
			8	5	6	Spark plugs	P26	
3			3		3	Stop lamp switch	P27	
1						Cruise control switch	P28	
		4				Blocked part-load breather	P29	
2						Mechanical guard, VSVs	P30	
					1*	EGR	P31	

*** If the vehicle is to a North American specification, flowchart P31 must be carried out first.**

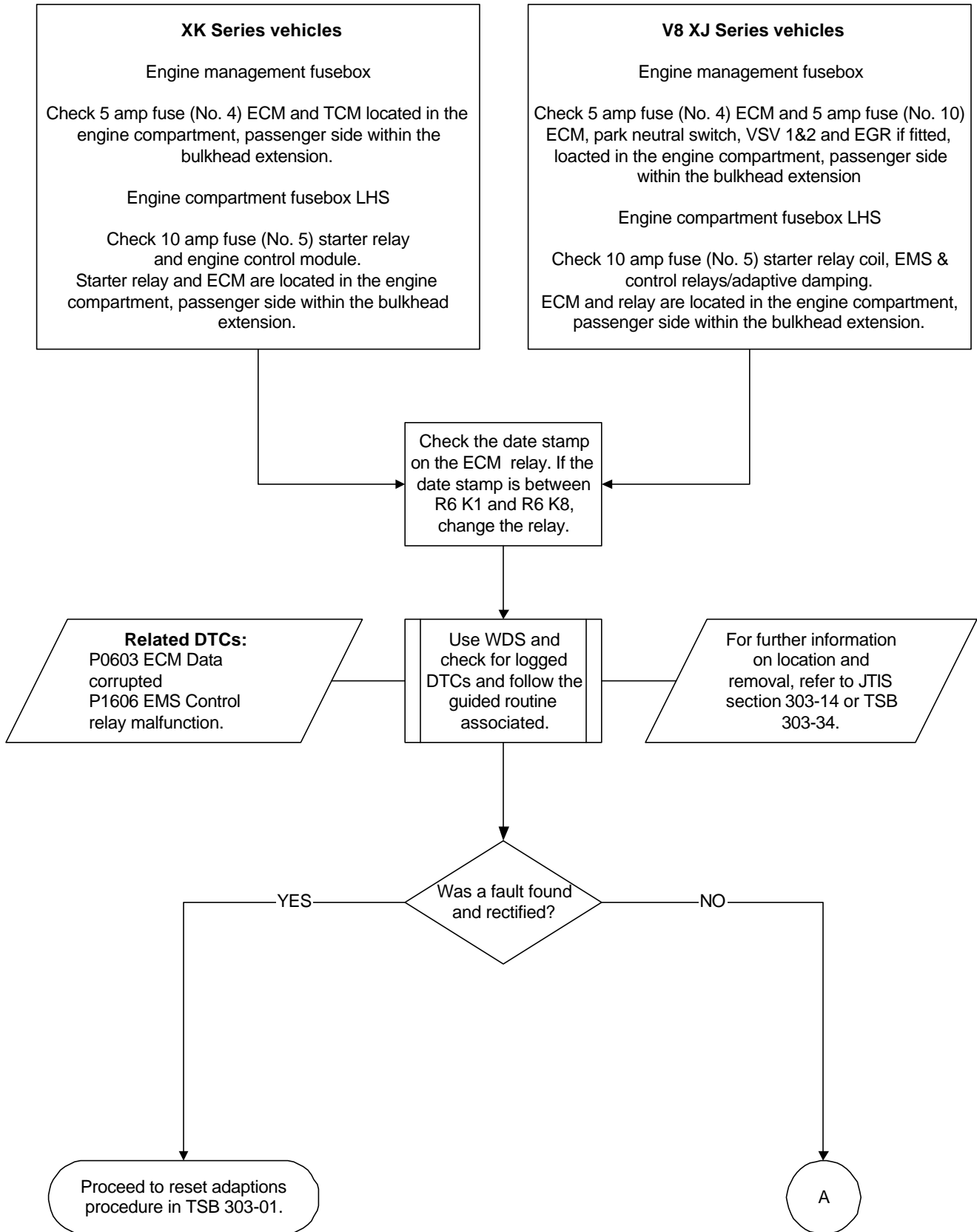
P1 Contaminated Throttle Diagnostic Flowchart



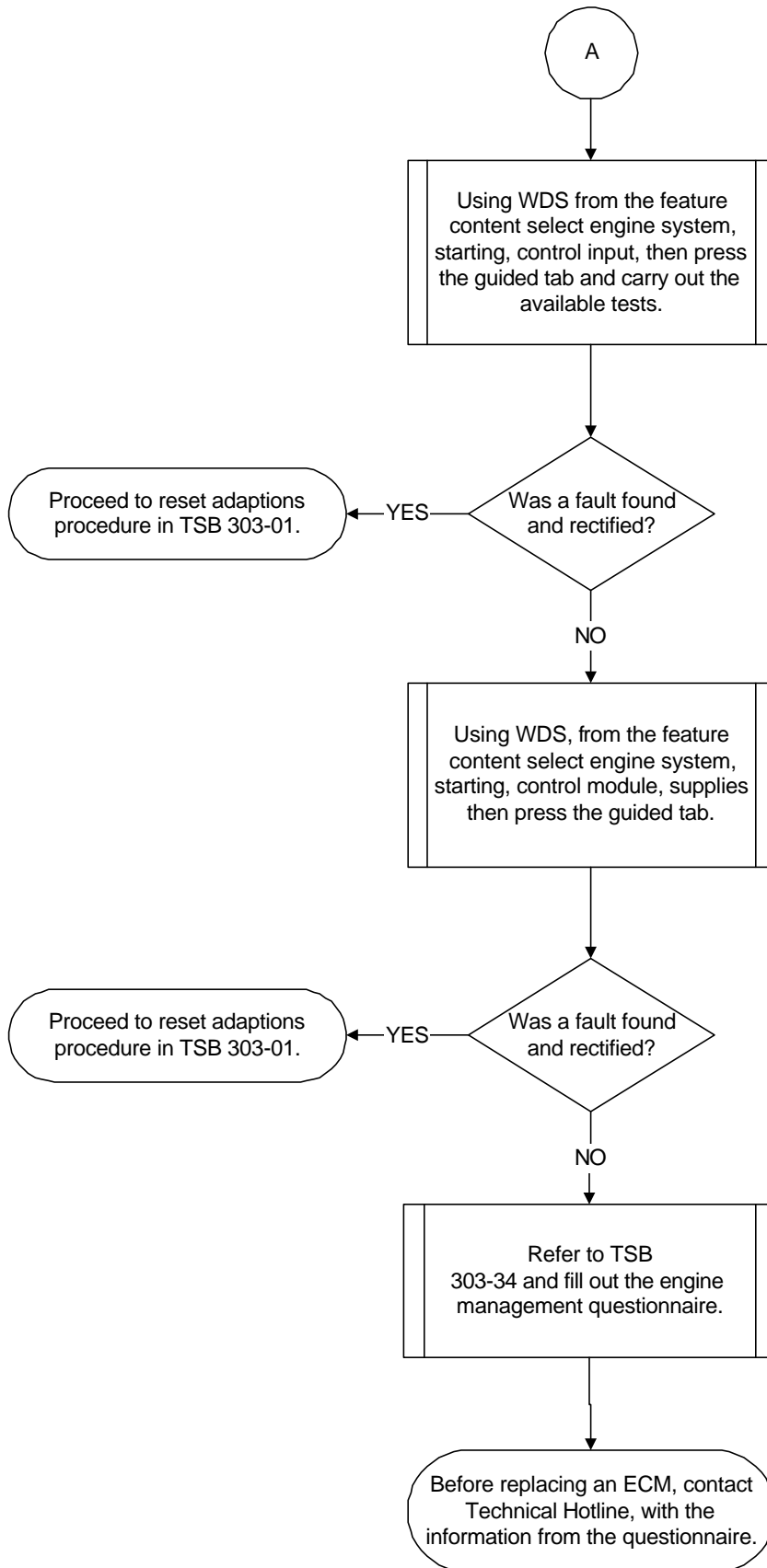
P 14 Engine Harness



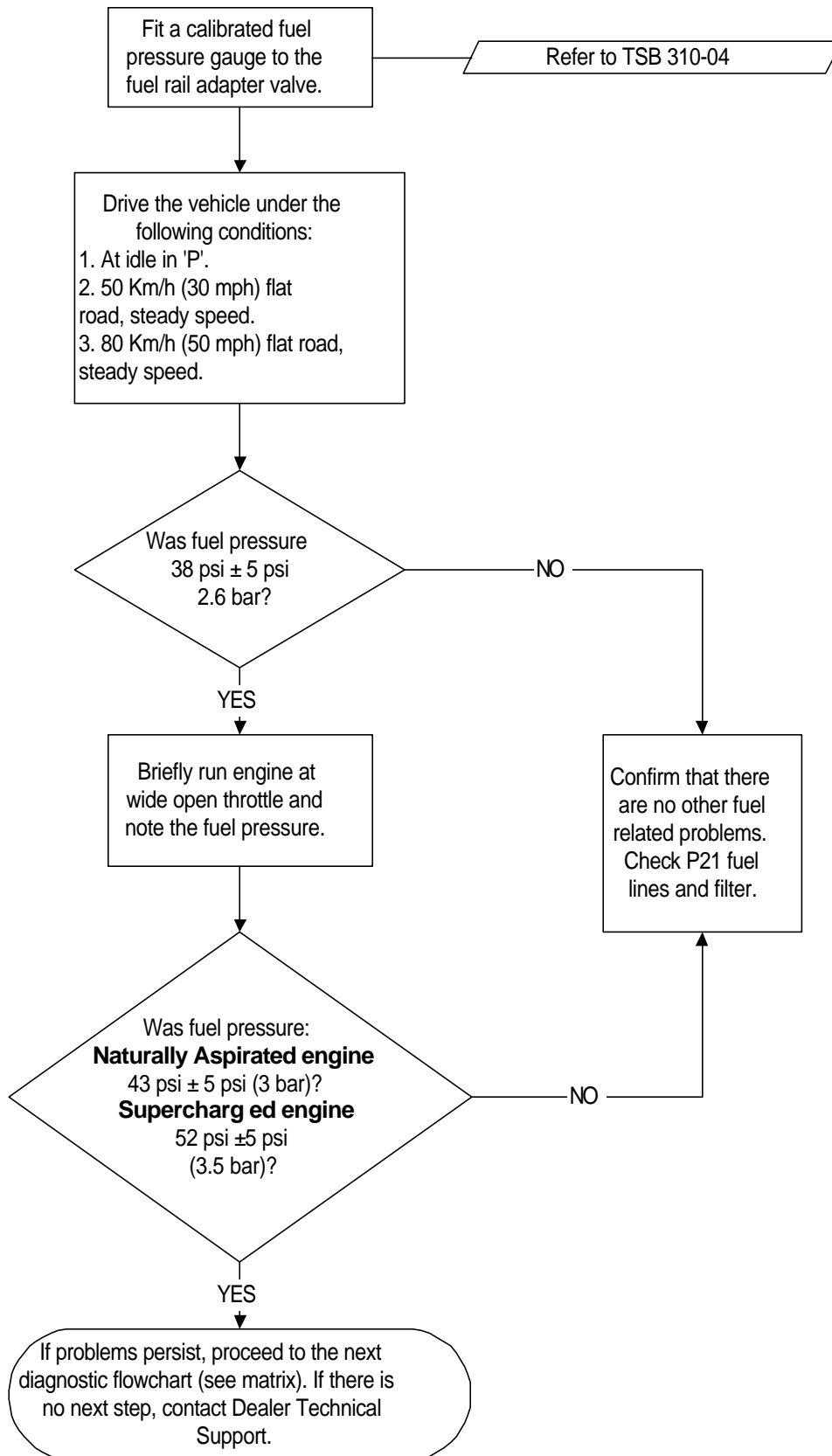
P15 ECM



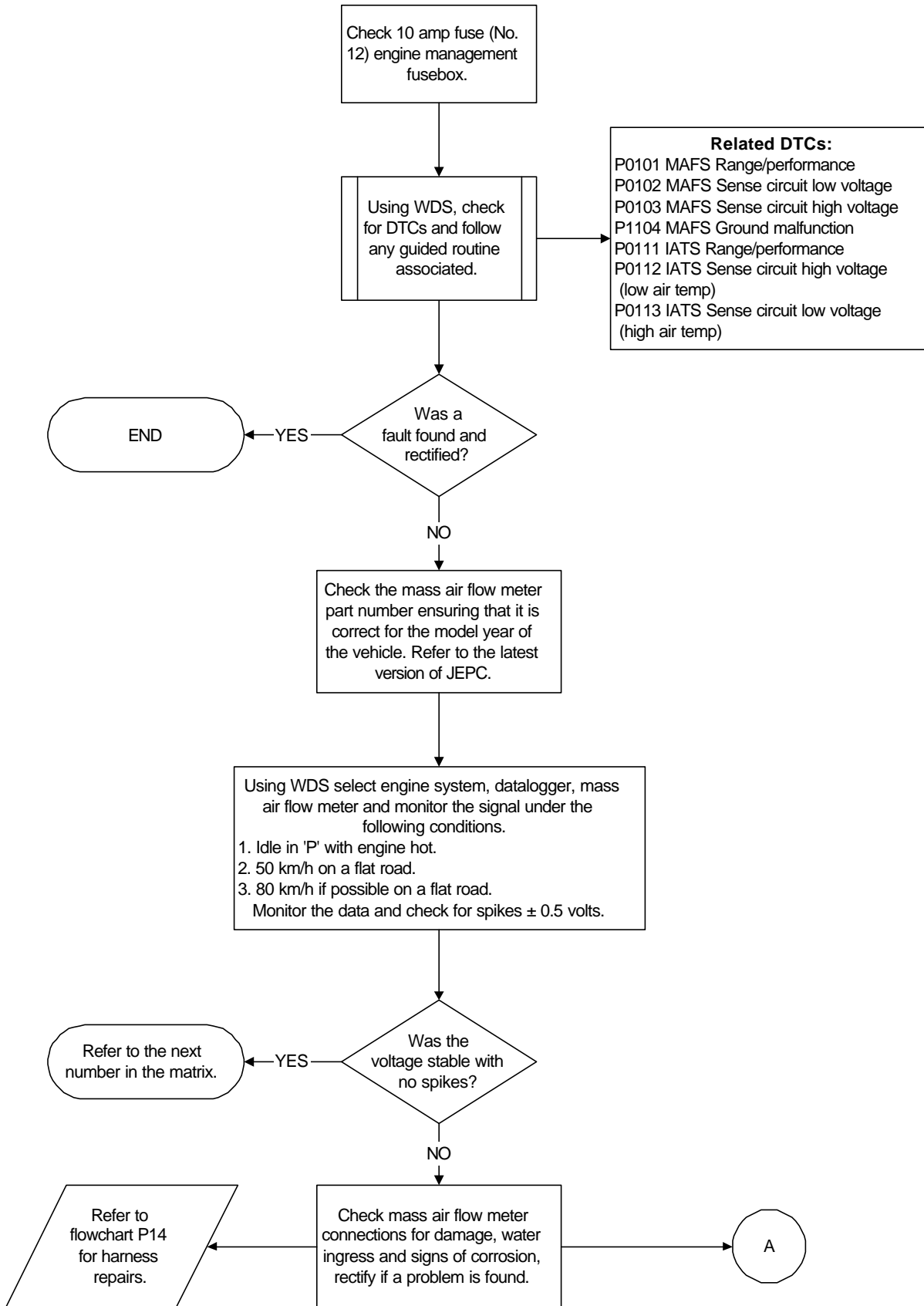
P15 Cont.



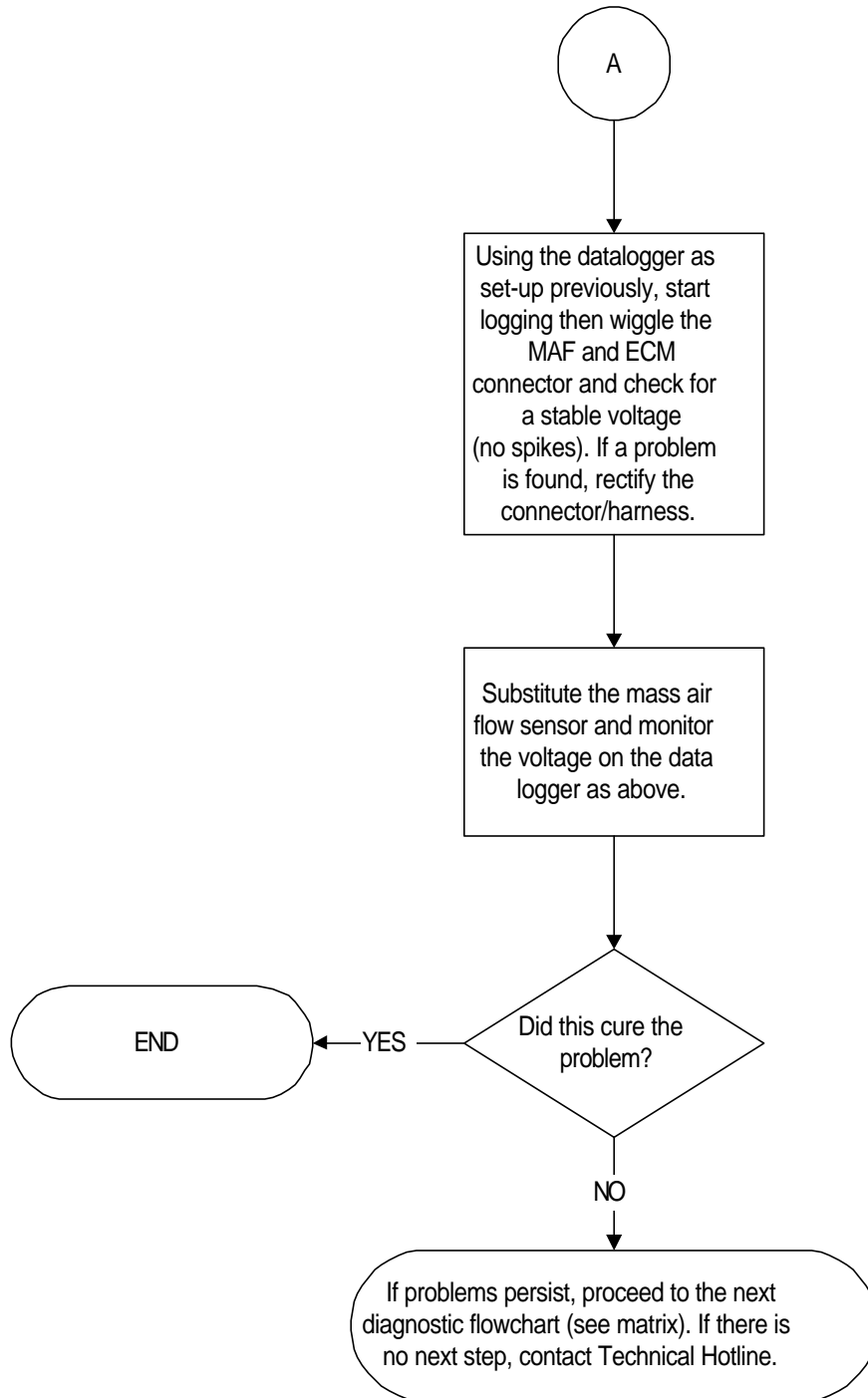
P17 Fuel Pump



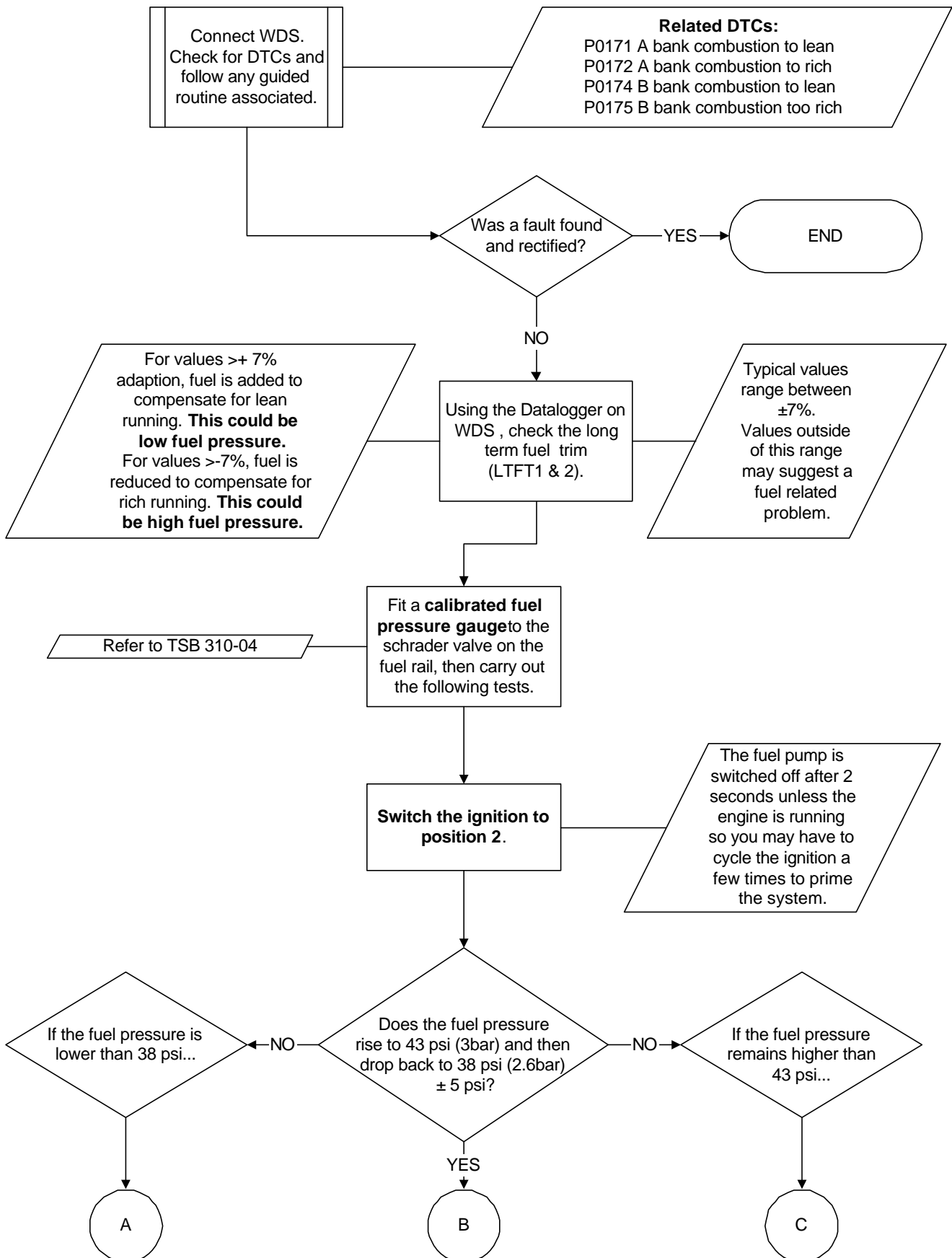
P19 Mass Air Flow Meter



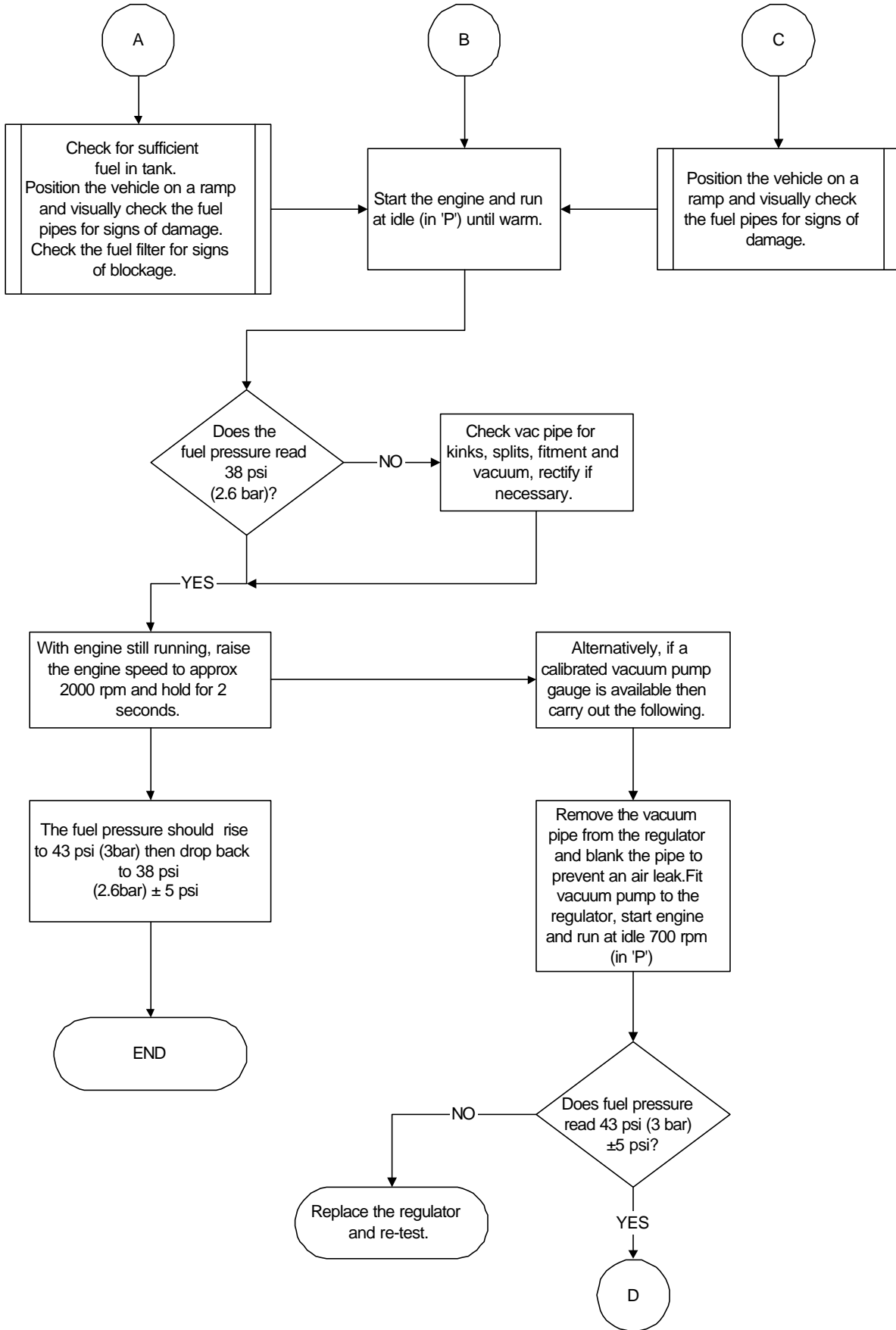
P19 Cont.



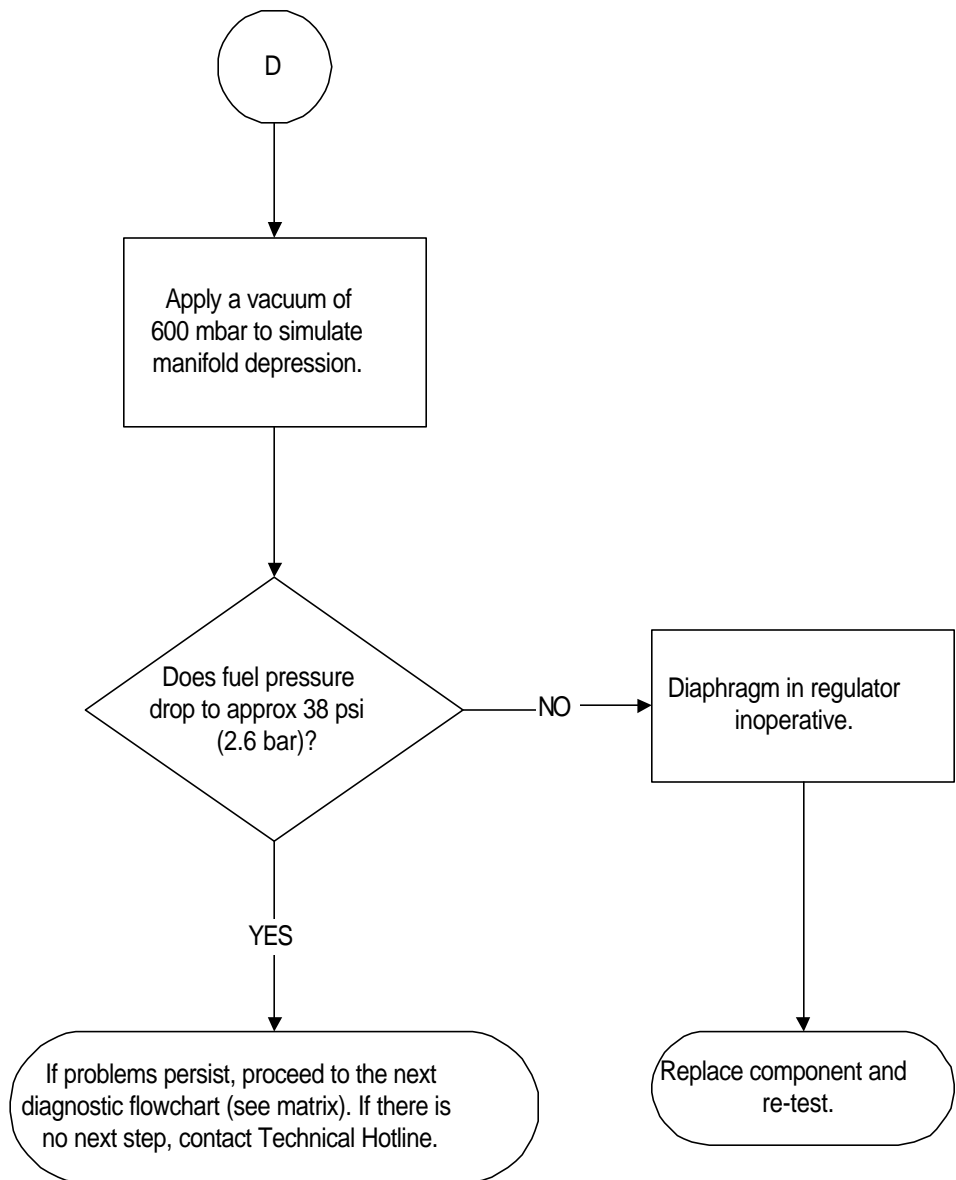
P20 Fuel Pressure Regulator



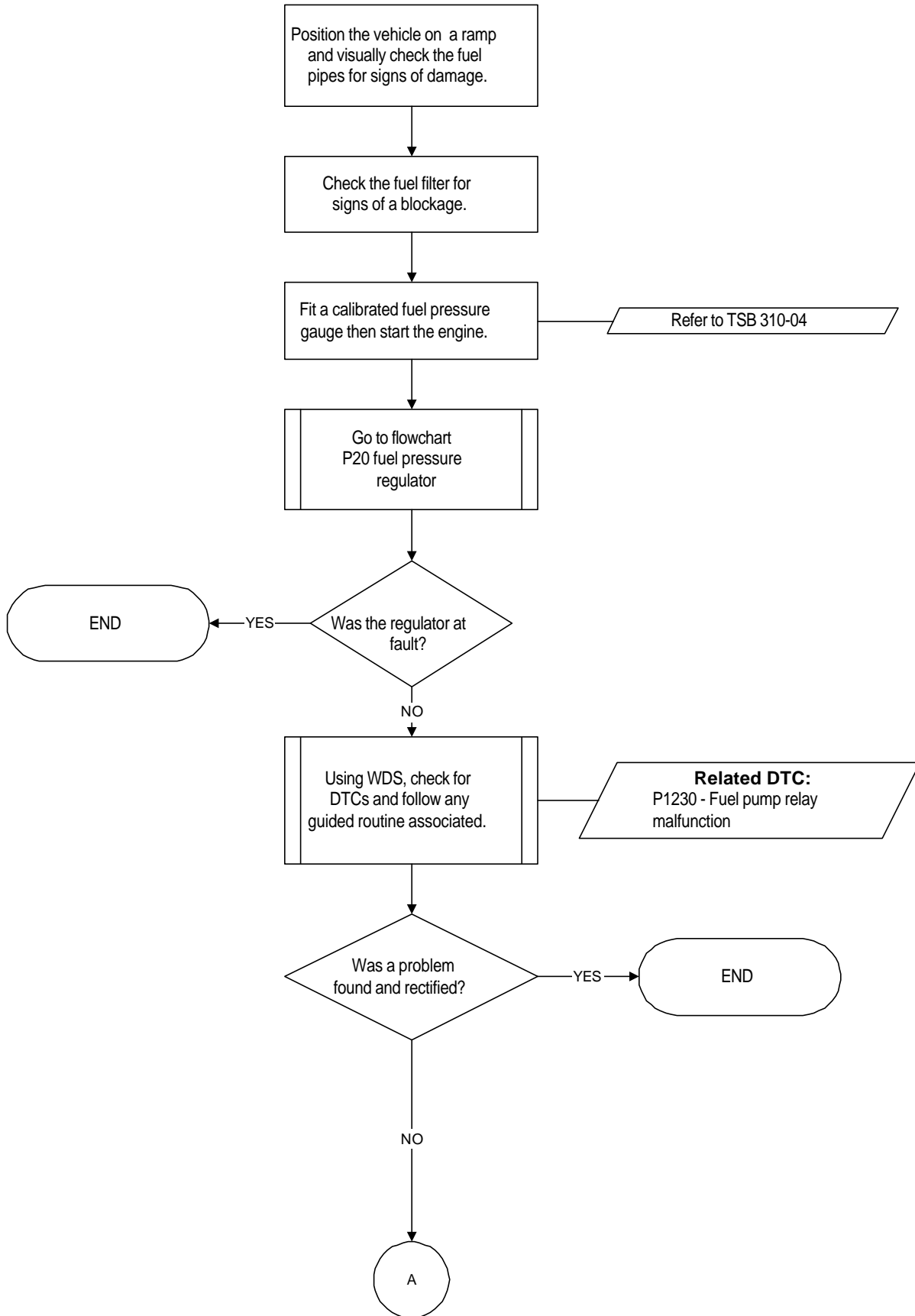
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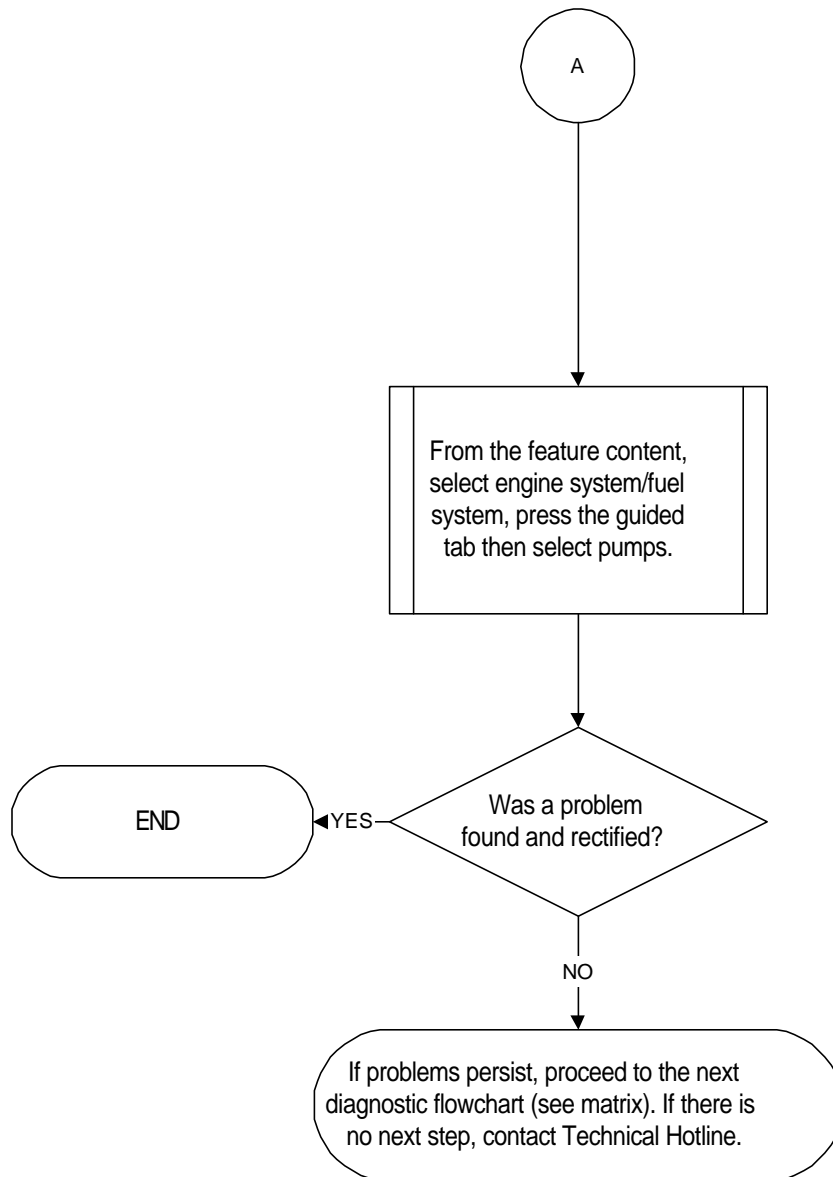
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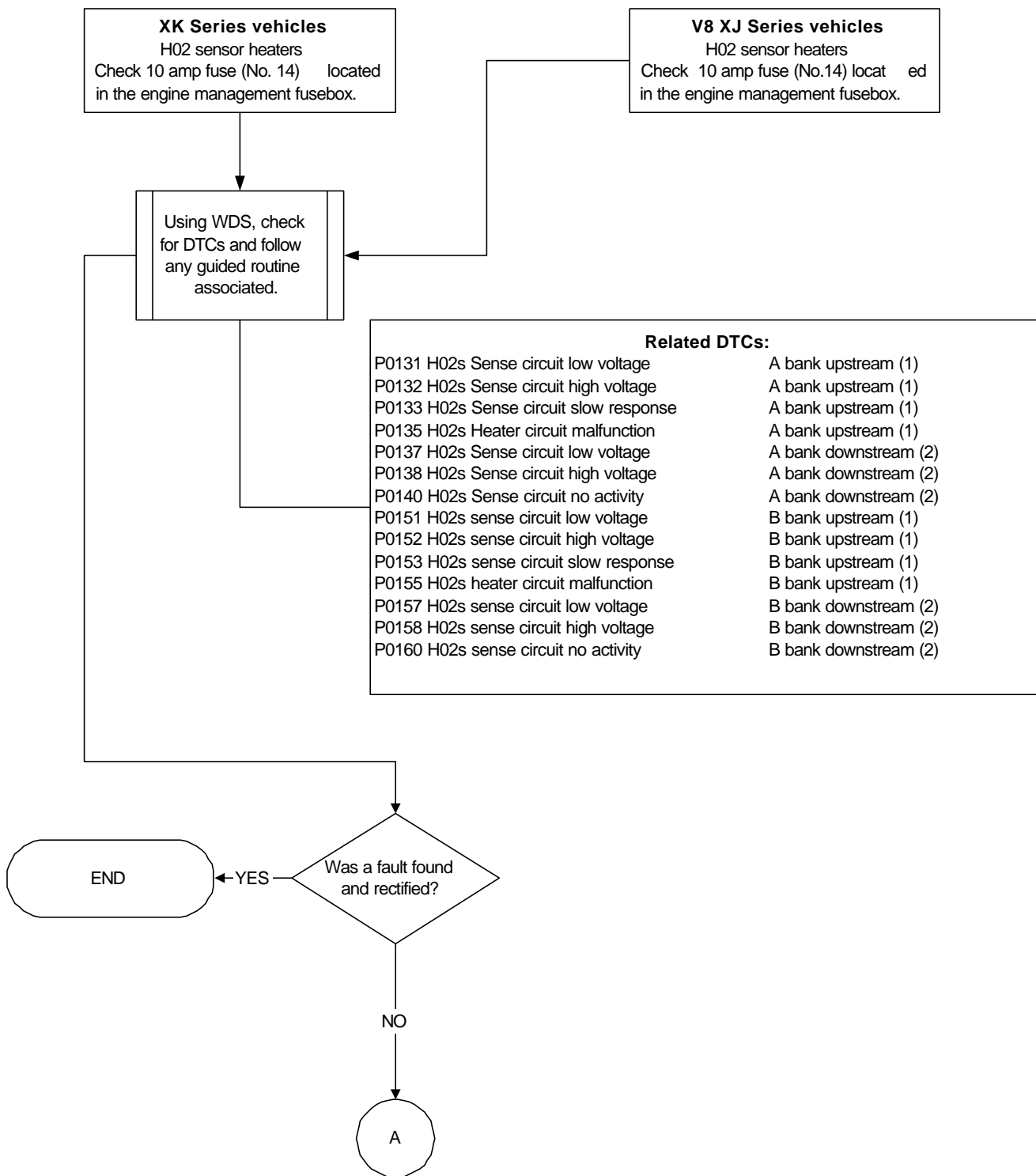
P21 Fuel Lines



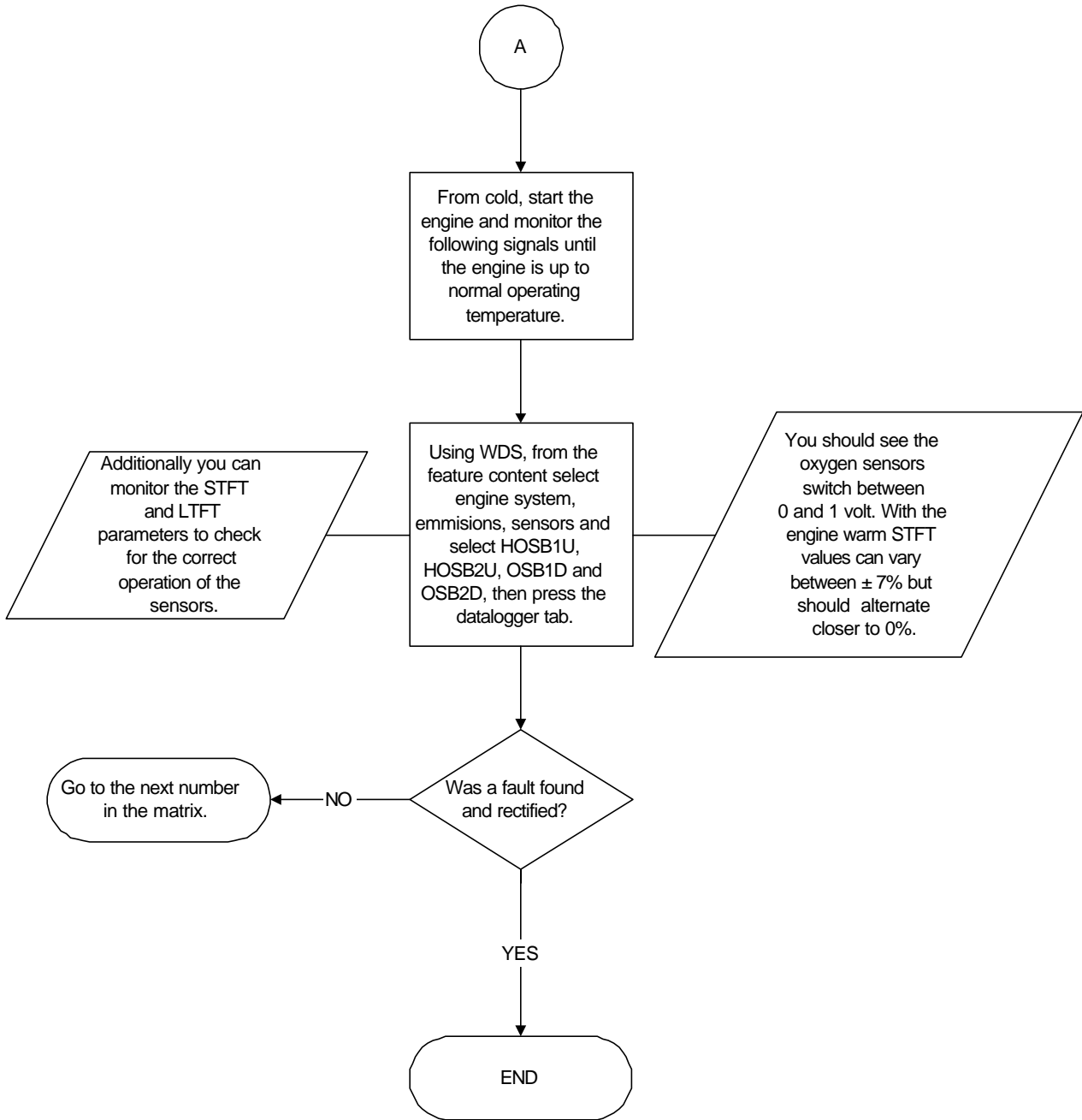
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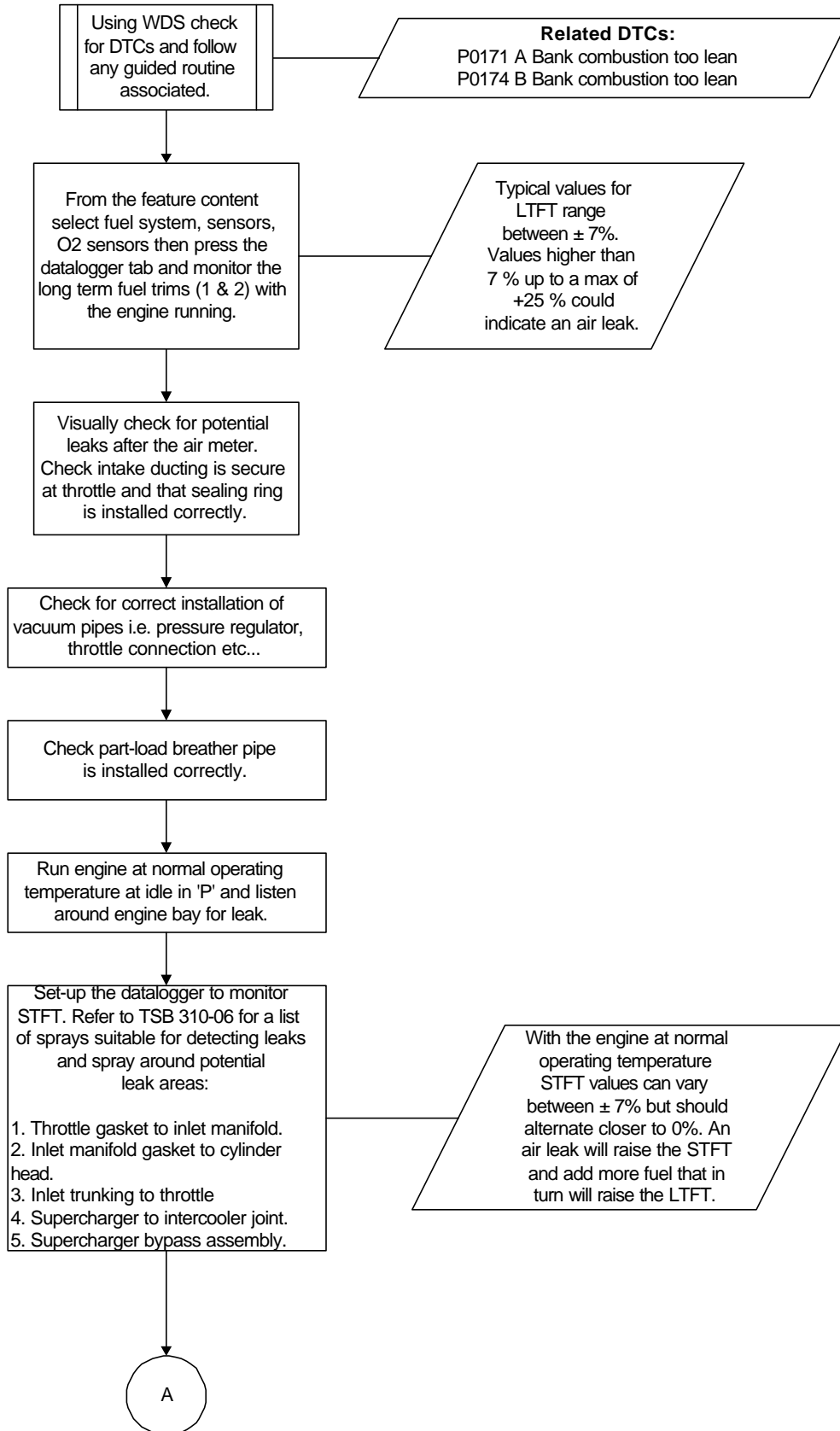
P22 Oxygen Sensors



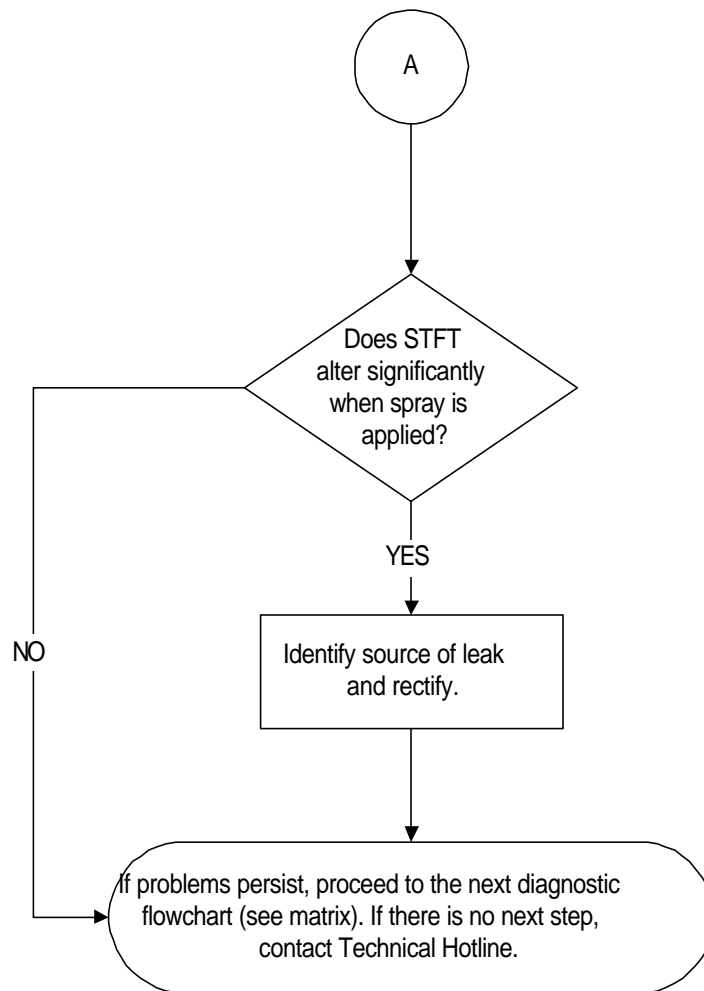
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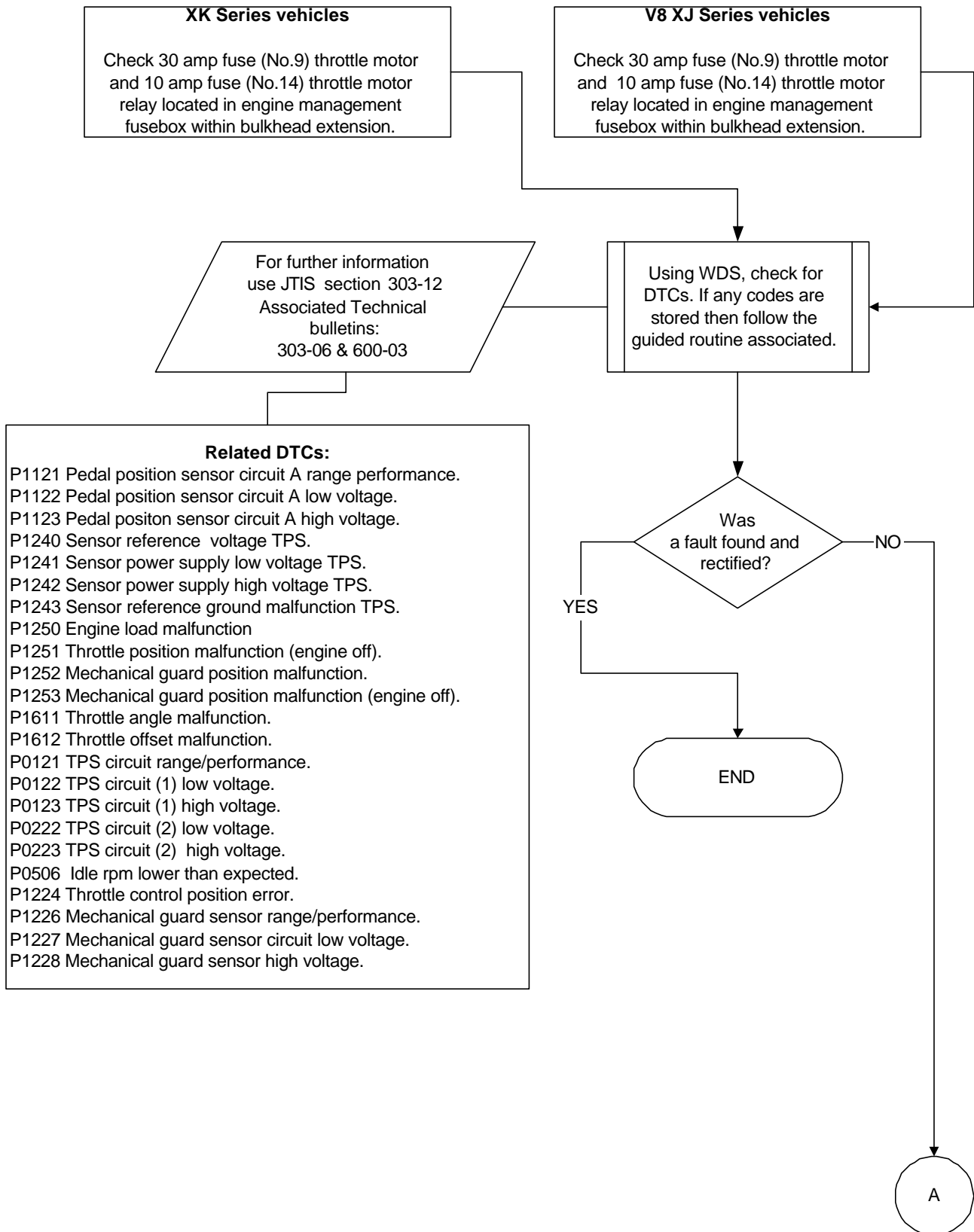
P23 Air Leakage



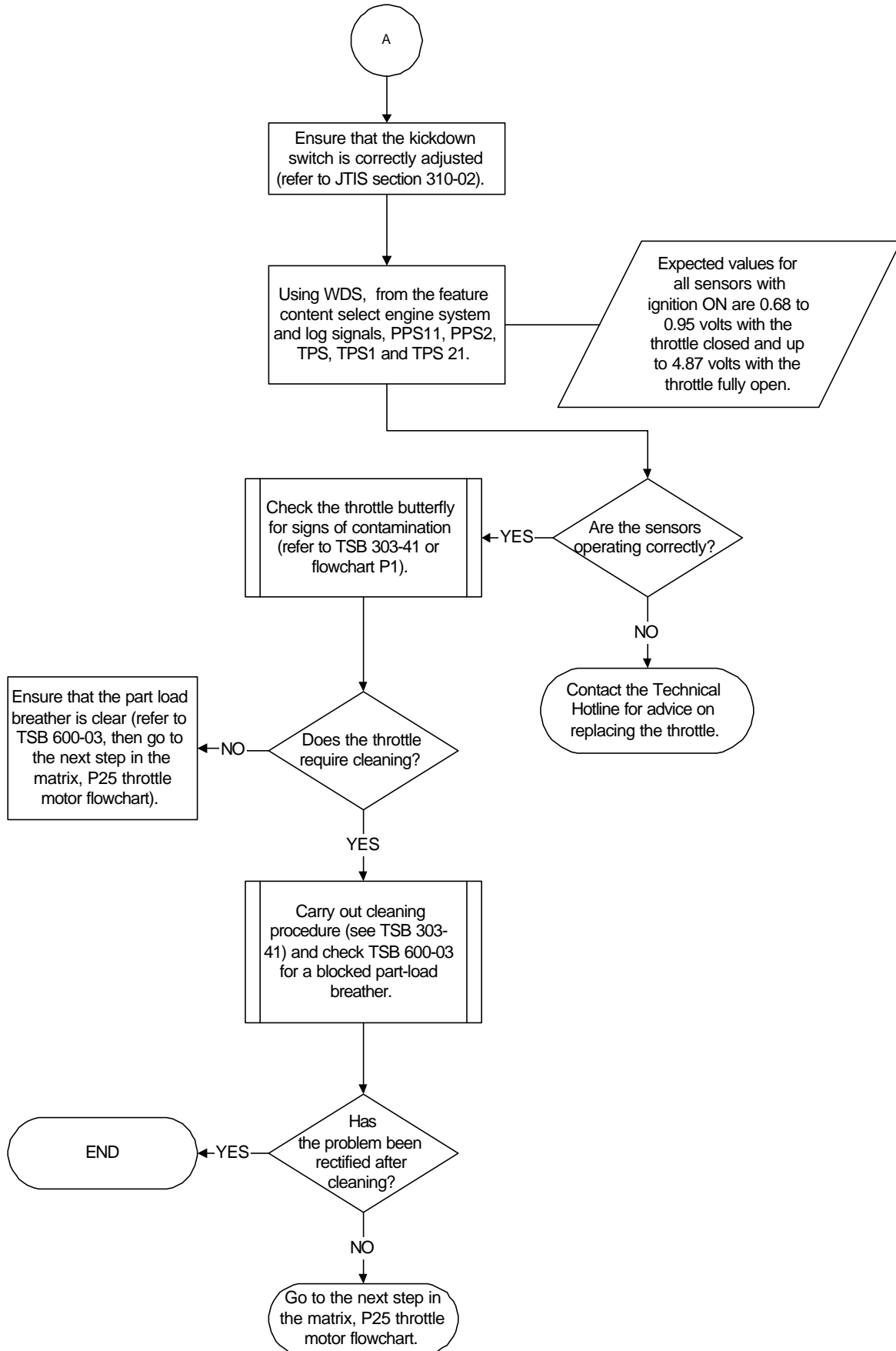
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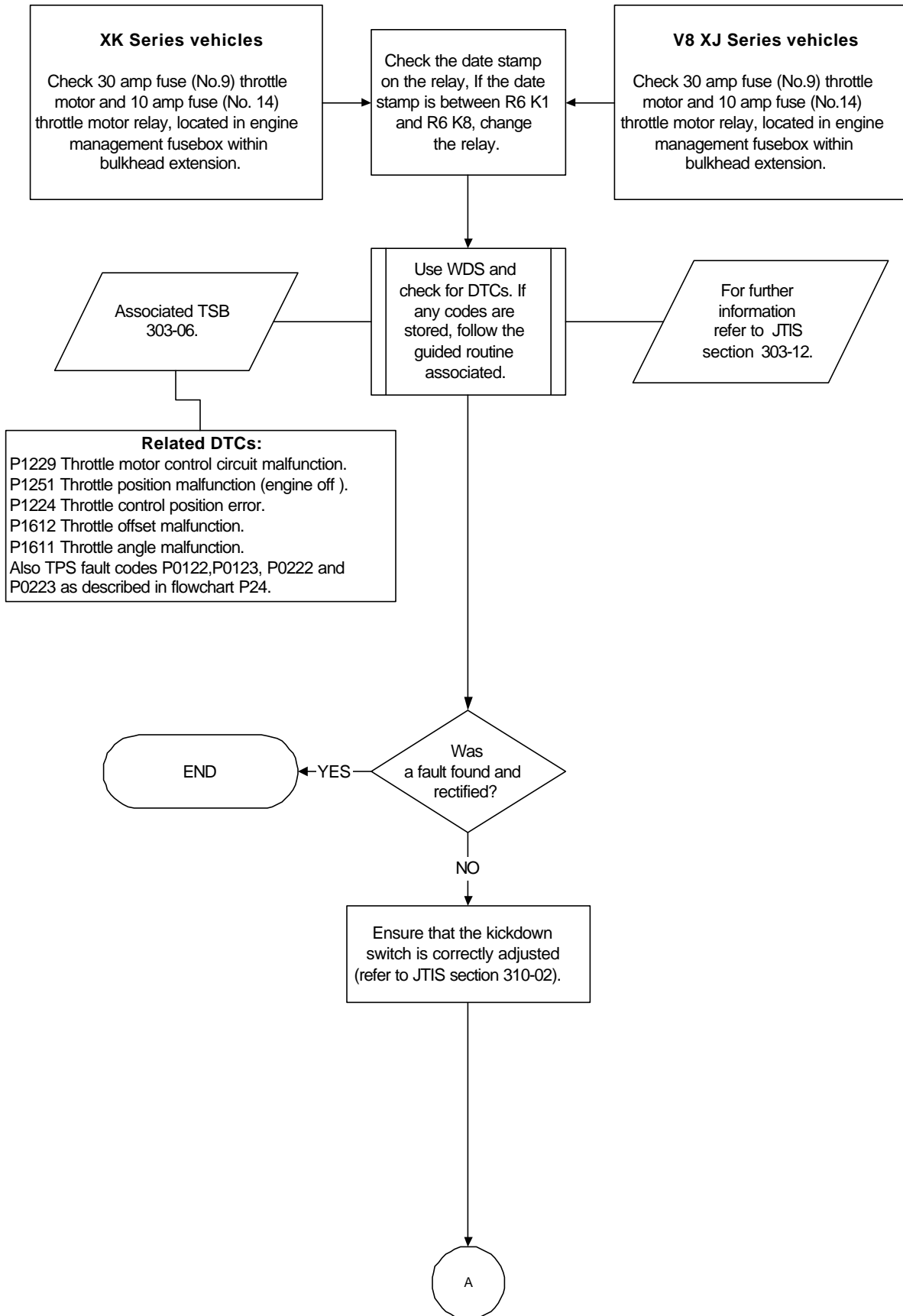
P24 Throttle Sensors



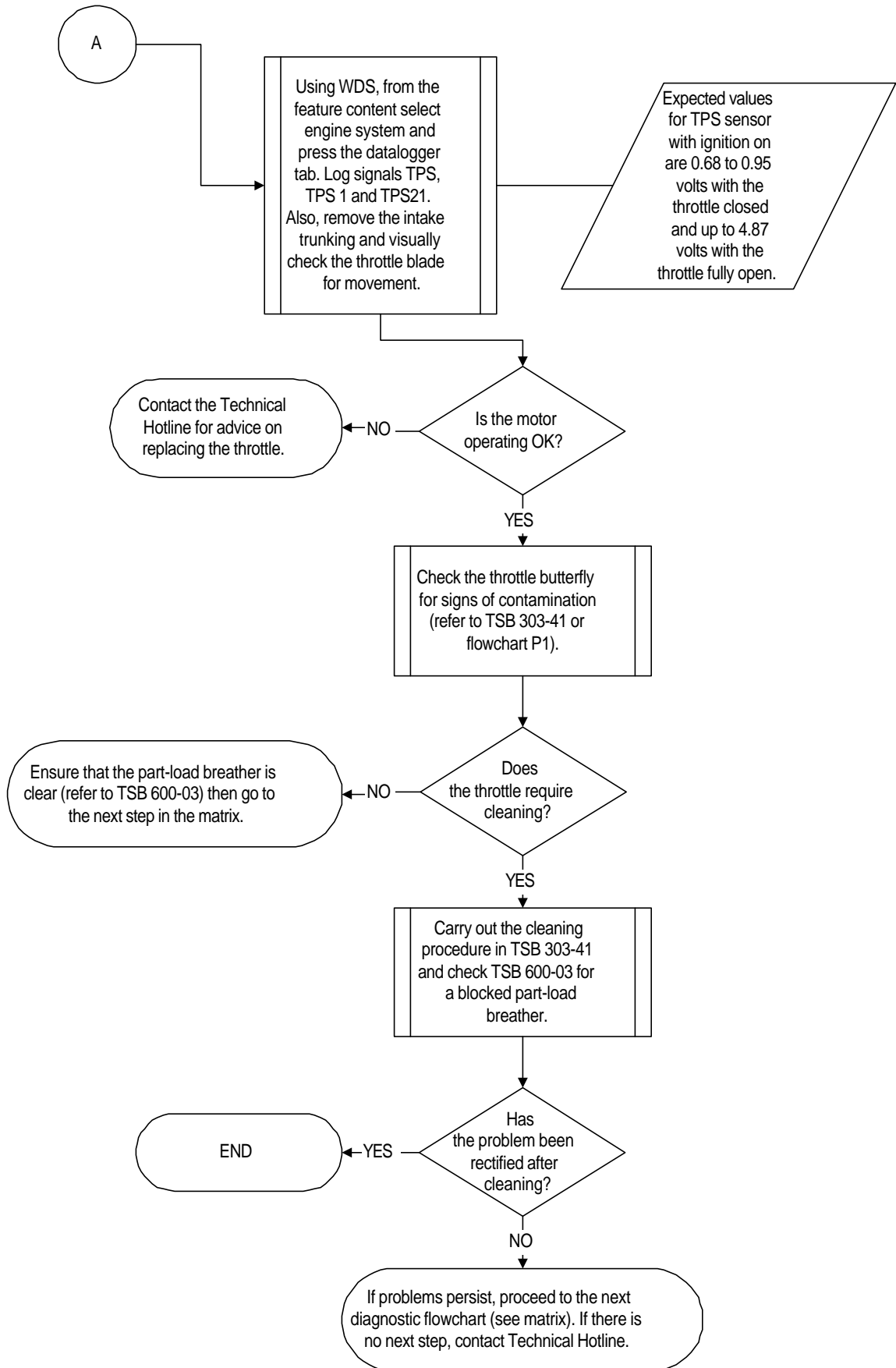
P24 Cont.



P25 Throttle Motor



P25 Cont.



P24 and P25 Additional information

Throttle system failure modes

Fault	DTCs	Warning Light Color	Default Mode	Effect	Message Center
Throttle position sensor 1	P0123 P0121 P1224	Red	Mechanical guard and fuel intervention	Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited	Failsafe engine mode
Throttle position sensor 2	P0121 P0222 P0223 P1224	Red	Mechanical guard and fuel intervention	Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited	Failsafe engine mode
Throttle sensor 2 different to sensor 1	P0121 P1229 P1122 P1121 P0506	Red	Mechanical guard and fuel intervention	Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited	Failsafe engine mode
Pedal sensor 1	P1122 P1121	Amber	Redundancy	Runs normally, cruise active	Failsafe engine mode
Pedal sensor 2	P1122 P1121	Amber	Redundancy	Runs normally, cruise active	Failsafe engine mode
Mechanical guard sensor	P1226 P1227 P1228	Red	Full authority and cruise inhibited	Runs normally	Restricted performance
Pedal sensor 1 different to Mechanical guard sensor	P1226 P1222 P1221	Red (Intermittent)	Full authority (Intermittent)	Poor pedal response	Restricted performance
Mechanical guard or actuator stuck open	P1226 P1252	Red	Full authority and cruise inhibited	Runs normally	Restricted performance
Mechanical guard or actuator stuck closed	P1235	Amber	Cruise inhibited	Runs normally	Failsafe engine mode
Throttle motor fault	P1224	Red	Mechanical guard and fuel intervention	Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited	Failsafe engine mode
Throttle motor high resistance (engine idling)	P0507	Amber	Redundancy (on second trip)	Idle speed increase, poor throttle response	Failsafe engine mode
Throttle motor	P1229	Red	Mechanical	Fuel intervention,	Failsafe

high resistance (driving)	P1612		guard and fuel intervention	idles between 950 rpm and 1150 rpm, cruise control inhibited	engine mode
VSV1 Fault	P1235 P1236	Amber	Cruise inhibited	Runs normally	Failsafe engine mode
VSV2 Fault	P1235 P1237 P1252	Amber	Cruise inhibited	Runs normally	Failsafe engine mode
VSV3 Fault	P1235 P1238	Amber	Cruise inhibited	Runs normally	Failsafe engine mode
Vac pipe leak	P1235	Amber	Cruise inhibited	Runs normally	Failsafe engine mode
Throttle motor relay stuck closed	P1251	Amber	Redundancy	Runs normally cruise active	Failsafe engine mode
Throttle motor relay stuck open	P1224	Red	Mechanical guard and fuel intervention	Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited	Failsafe engine mode
Throttle motor relay open circuit	P1224	Red	Mechanical guard and fuel intervention	Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited	Failsafe engine mode

Throttle Control Modes:

- 1 Normal
- 2 Cruise
- 3 Mechanical guard
- 4 Fixed idle
- 5 Redundancy
- 6 Full authority
- 7 Engine shut down

Normal mode occurs when the ECM uses the mechanical and monitoring arrangement of the throttle valve to control throttle opening. The ECM does not permit driver demand to be exceeded but it can be restricted to allow for such features as stability, traction control or engine power limitation. The ECM determines engine idle speed by controlling the throttle valve motor to vary the blade angle between the non-adjustable preset limits of the mechanical guard and the throttle valve motor.

Cruise mode is engaged as a result of the ECM calculating and controlling the required throttle valve. The vacuum system controls the mechanical guard. When the driver releases the throttle pedal the input shaft disengages from the mechanical guard or the vacuum actuator pulls the guard away from the throttle valve. The throttle pedal will feel light should it be pushed again to accelerate (pressing the pedal further will re-engage the input shaft with the mechanical guard and restore normal feel). The ECM utilizes sensors to monitor the relative positions of the mechanical guard and throttle valve and adjusts them to maintain the set cruise speed.

Mechanical guard mode permits full mechanical operation of the throttle if the ECM detects that a problem has been encountered with the throttle valve position sensor, DC motor, associated harness, connectors or the ECM.

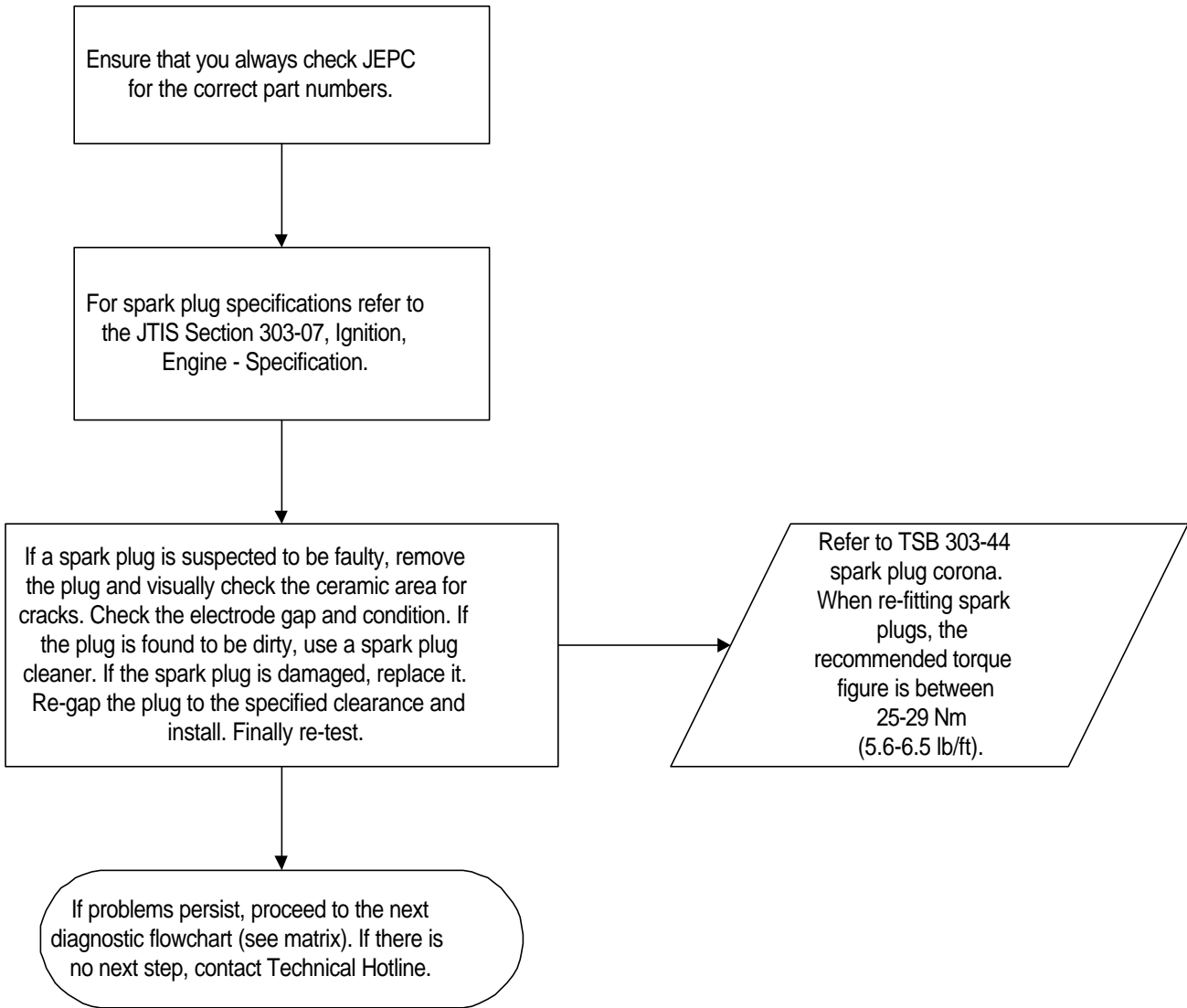
Fixed idle mode occurs when any two of the three sensors (two input shaft sensors and the mechanical guard sensor) fail. The ECM will assume values, which represent a blade angle of approximately 2.5 degrees and 1200 rpm (unloaded) maximum engine speed.

Redundancy mode occurs when any one of the three sensors (two input shaft sensors and the mechanical guard sensor) fails. The operational pair will be deemed to be safe to continue without intervention, but cruise will be inhibited.

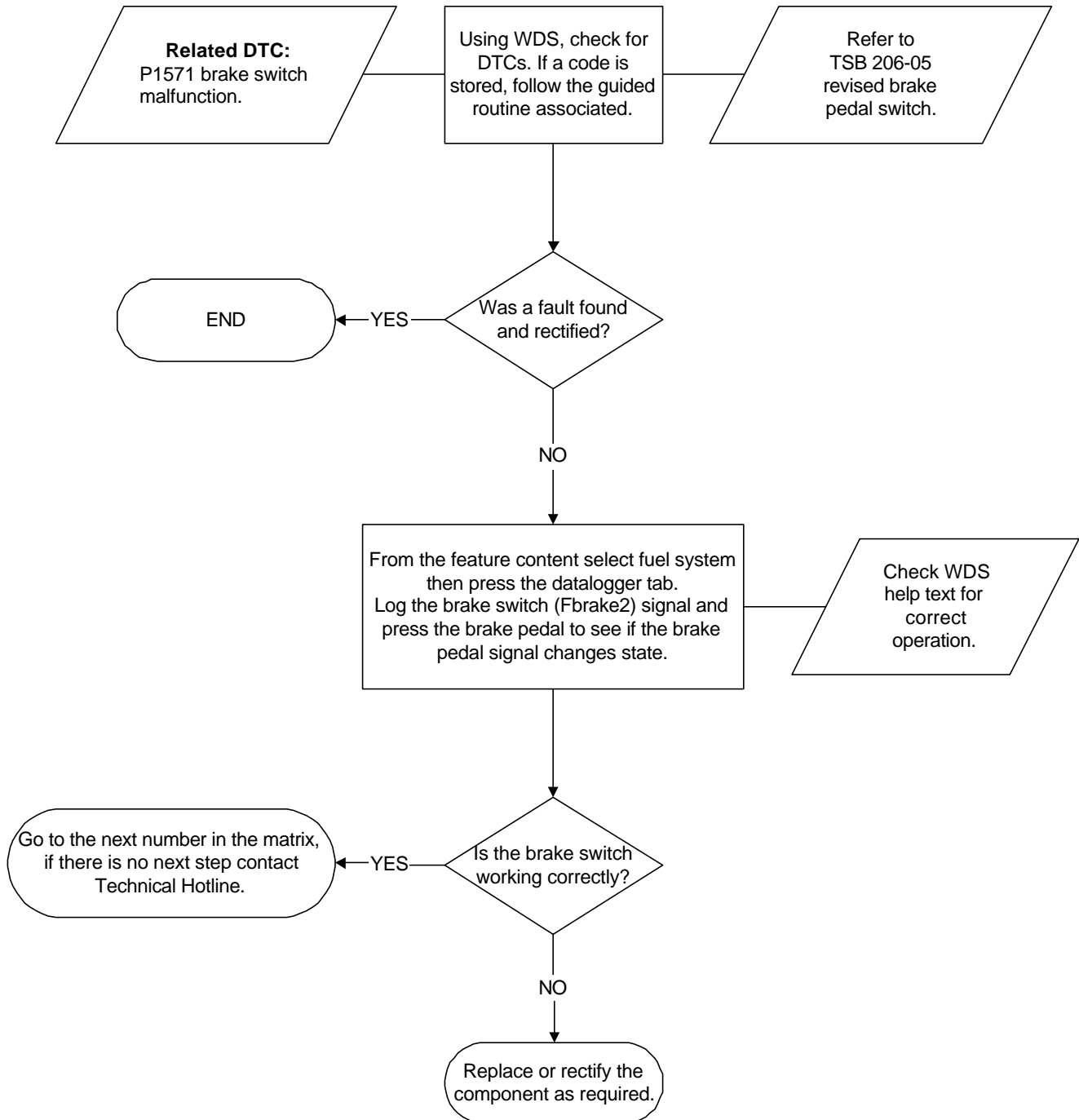
Full authority mode is invoked when a mechanical guard failure occurs which indicates that the guard is stuck fully open. The red warning lamp will be lit and road speed will be limited to 120 km/h (75 mph).

Engine shutdown mode (engine stops) will occur following multiple failures, such as mechanical guard mode following full authority mode (or vice versa) or the throttle blade sticks.

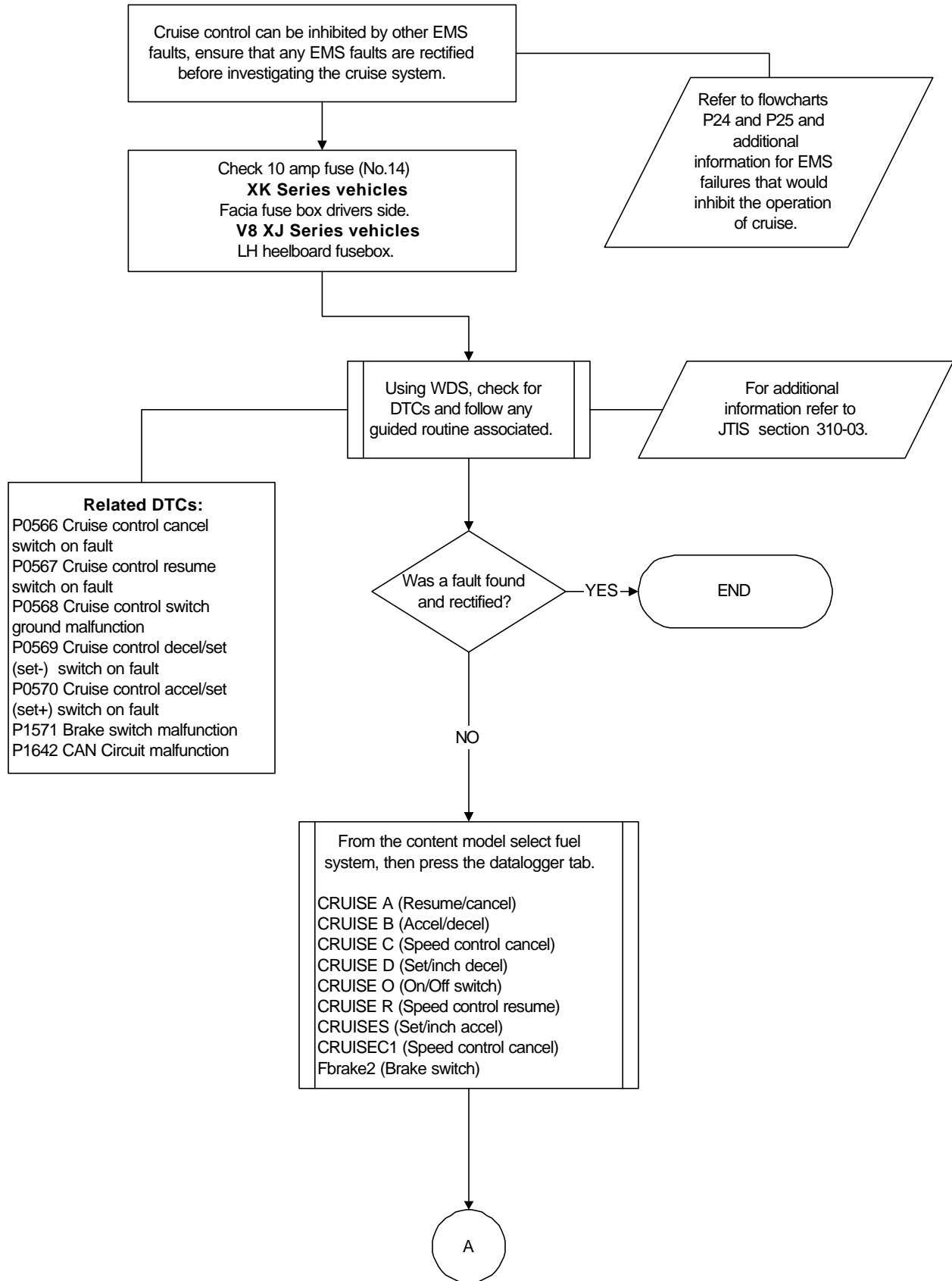
P26 Spark Plugs



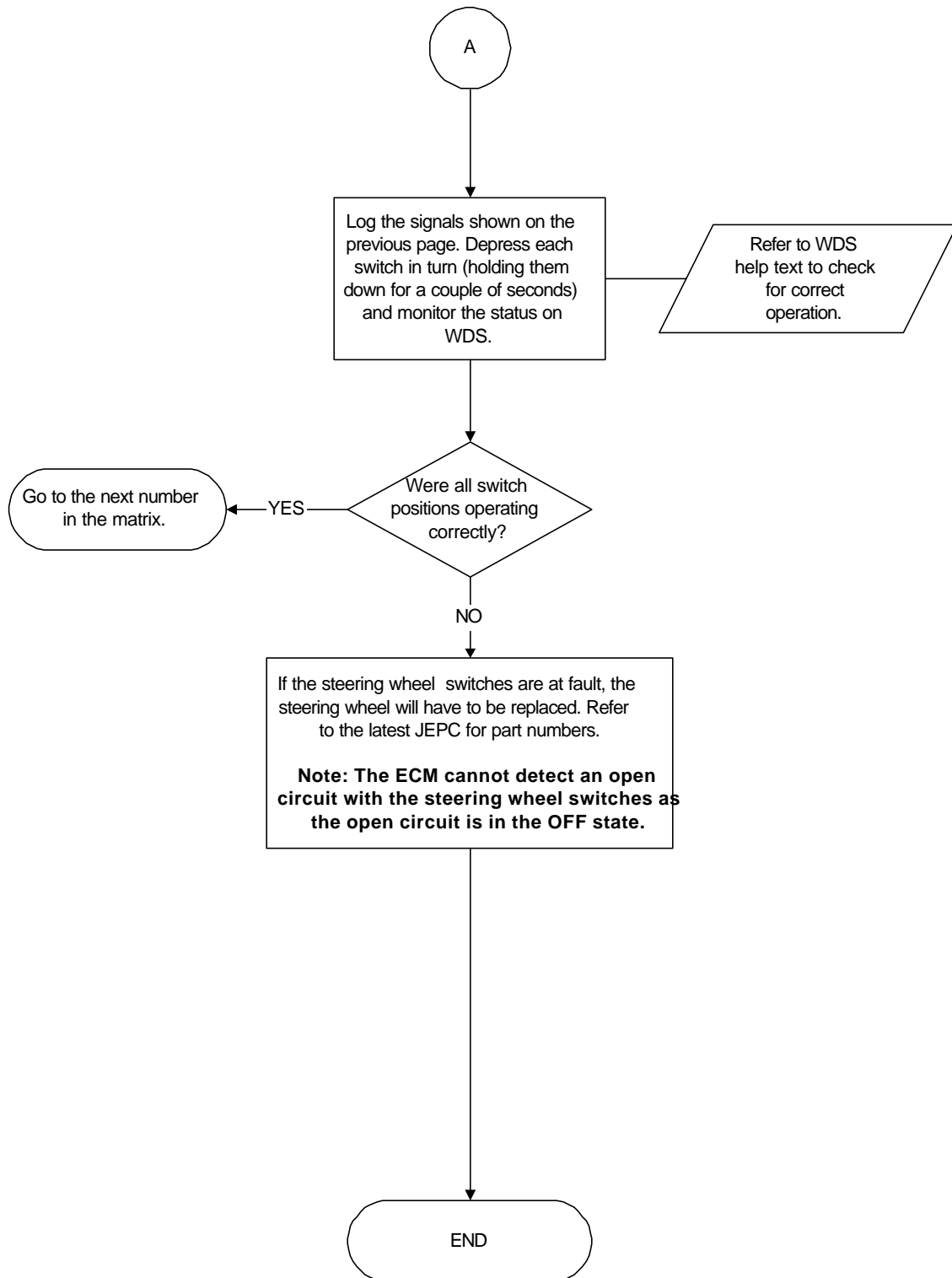
P27 Stop Lamp Switch



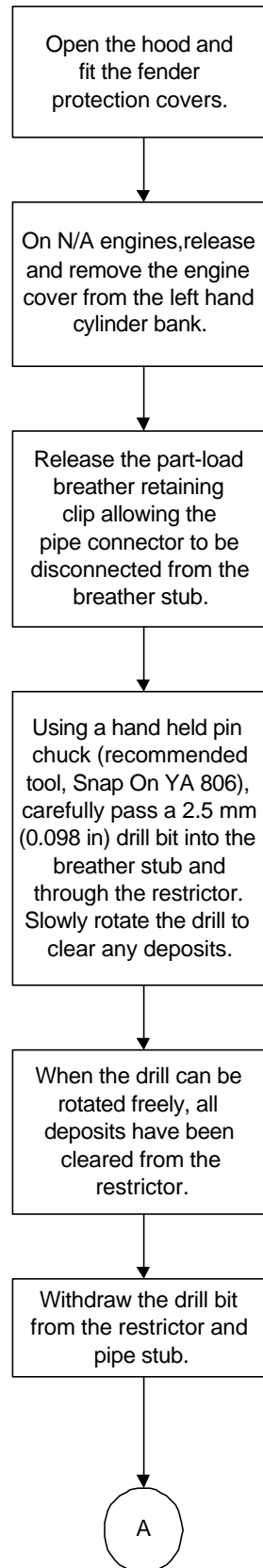
P28 Cruise Control Switches



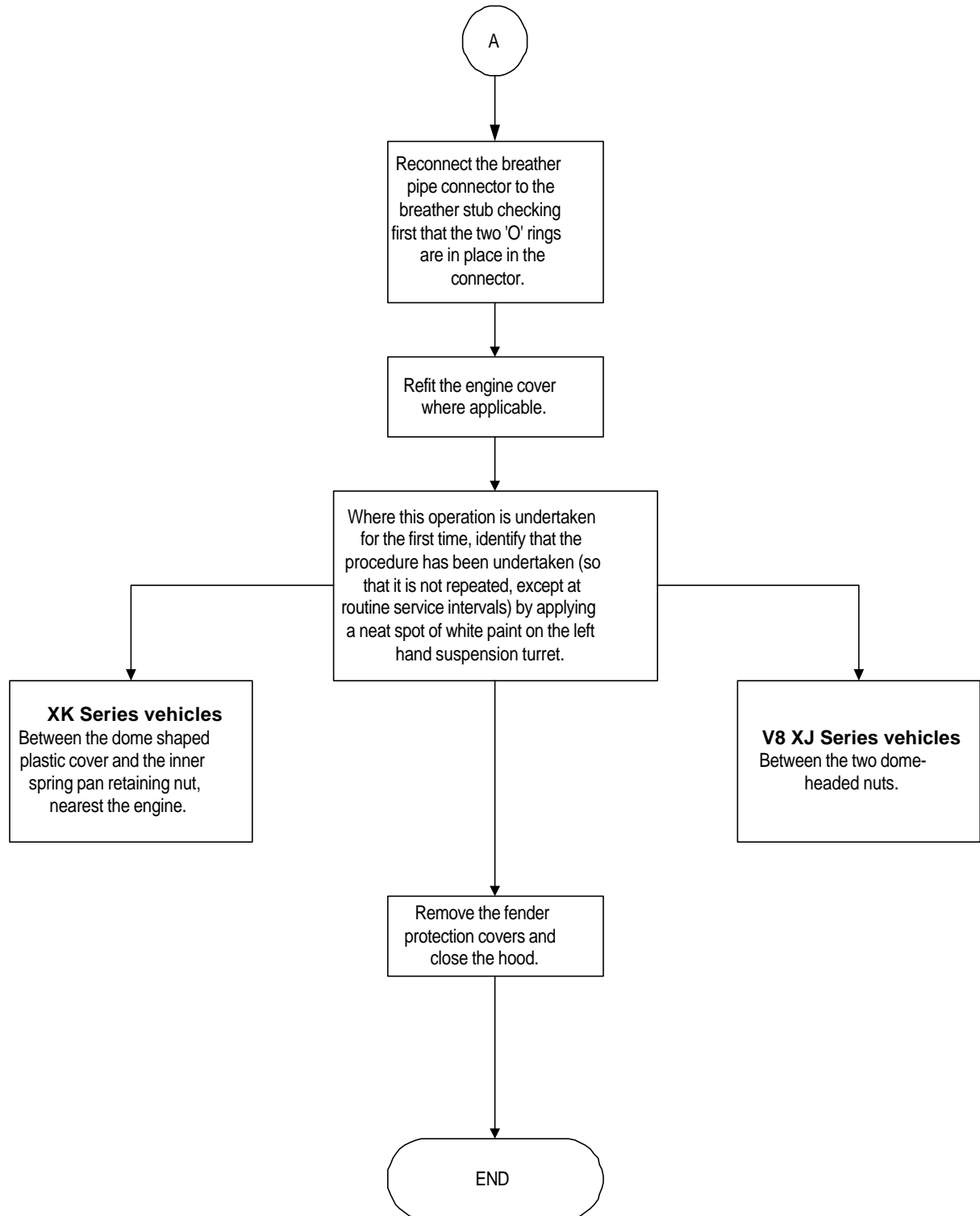
P28 Cont.



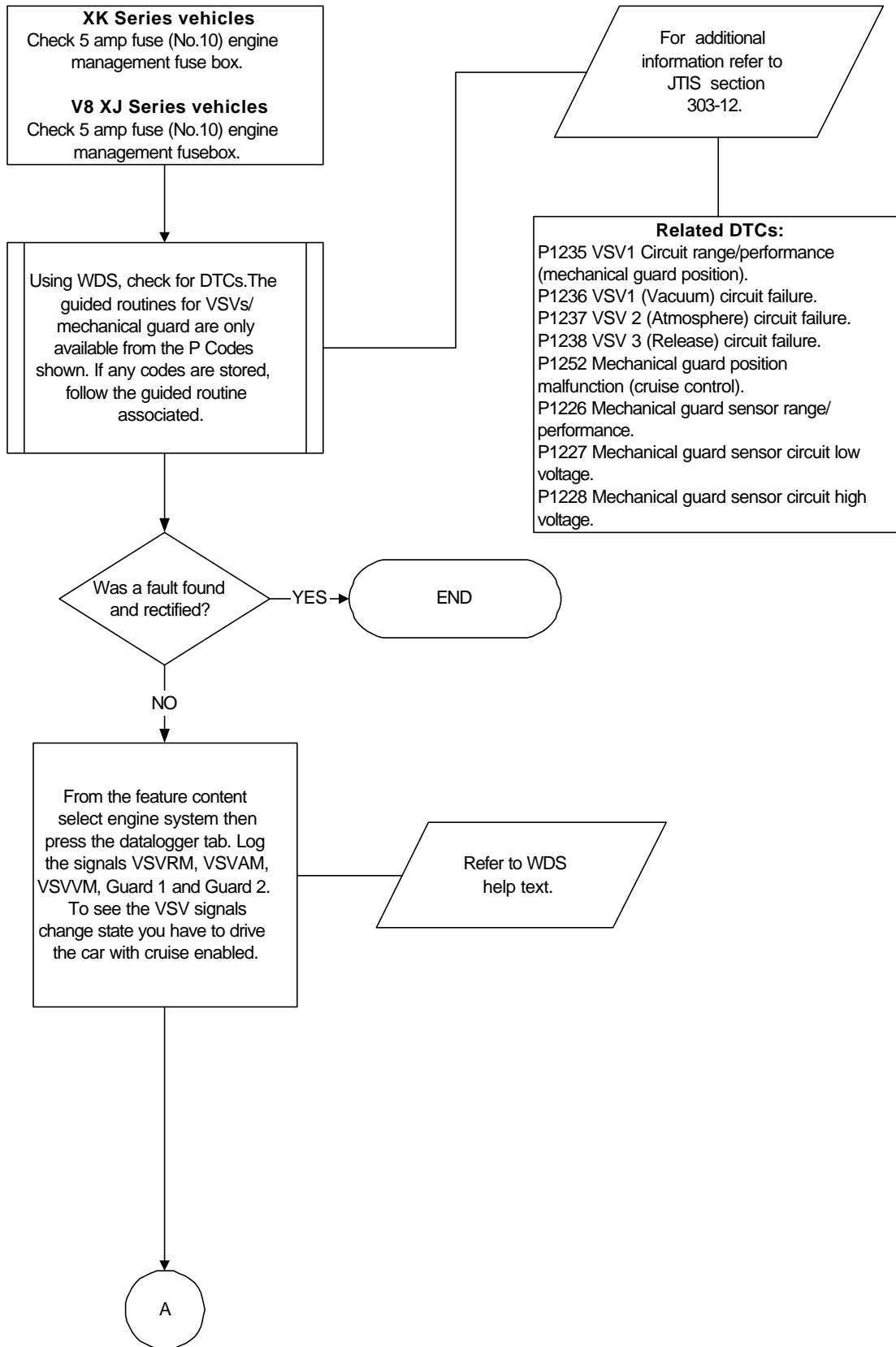
P29 Blocked Part-Load Breather



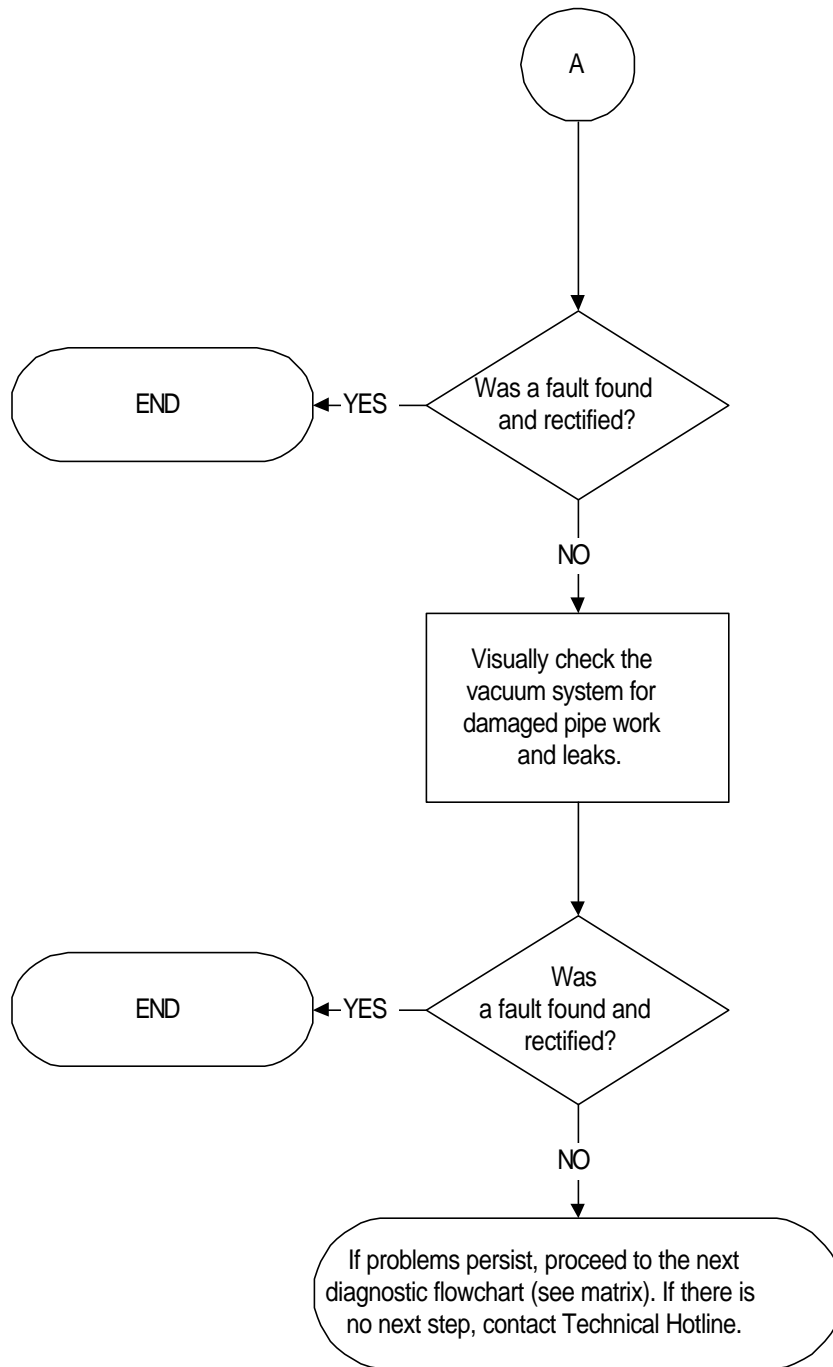
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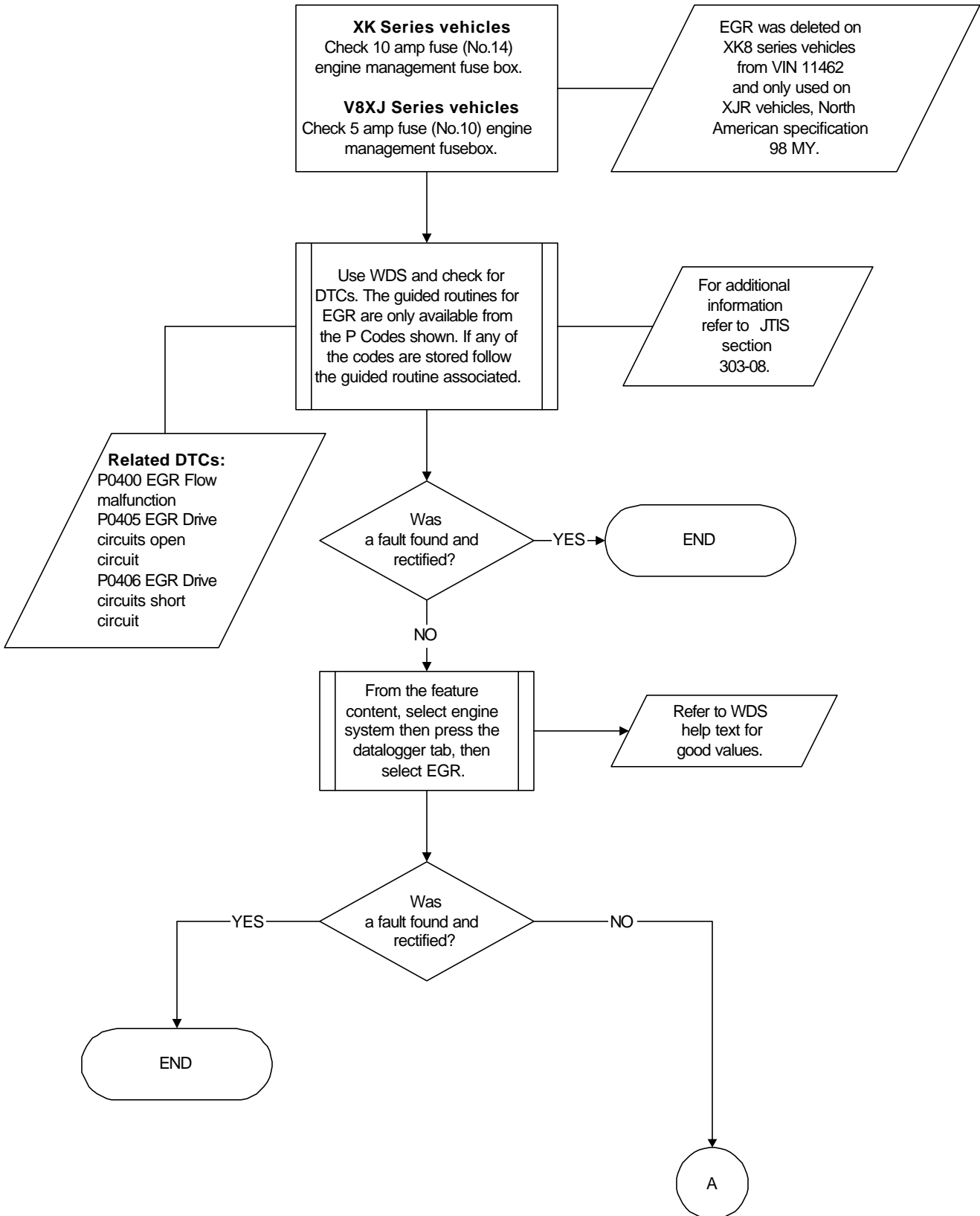
P30 Mechanical Guard and VSVs



P30 Cont.



P31 EGR



P31 Cont.

