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

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<th>Symptom</th>
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<th>See Chart</th>
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<td>Engine detonates/knocks</td>
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<td>9</td>
<td>ECM</td>
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<td></td>
<td>1 2 1 1</td>
<td>Fuel pump</td>
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<td>5 4 3</td>
<td>Mass air flow meter</td>
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<td>8 5 6</td>
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<td>3 3 3</td>
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<td></td>
<td>1</td>
<td>Cruise control switch</td>
<td>P28</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Blocked part-load breather</td>
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<tr>
<td></td>
<td>2</td>
<td>Mechanical guard, VSVs</td>
<td>P30</td>
</tr>
<tr>
<td></td>
<td>1*</td>
<td>EGR</td>
<td>P31</td>
</tr>
</tbody>
</table>

* If the vehicle is to a North American specification, flowchart P31 must be carried out first.
Raise hood and fit fender protection covers. Remove the intake duct.

With assistance, visually observe throttle butterfly operation as the ignition is switched 'ON' for the first time.

Throttle butterfly should fully close, then immediately open to the idle position.

Did butterfly stick closed?

NO

Switch ignition 'OFF'.

Lightly press throttle butterfly with finger to the fully closed position. Reduce pressure on the butterfly that should then return smoothly with no indication of sticking.

Did butterfly stick closed?

NO

NO

NO

YES

Clean throttle/bore following TSB 310-06.

Inspect and clean oil from intake duct.

YES

Does the throttle have sticky/oily deposits?

NO

YES

Does the throttle have sticky/oily deposits?

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.
Using WDS, check for DTCs.

If areas of the harness are damaged, a DTC should be stored, if not, visually check the relevant suspected area.

Check for signs of corrosion in the connectors, backed out pins or damaged pins.

If a problem is found refer to the Jaguar Wiring Harness Repair guide. Publication Number JTP 586

Always use the recommended Jaguar harness repair kit 418-S065 and 418-S411.

If a problem is found with the harness in the areas of the throttle, speed control or ABS you must contact Technical Hotline.

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.
XK Series vehicles

Engine management fusebox
Check 5 amp fuse (No. 4) ECM and TCM located in the engine compartment, passenger side within the bulkhead extension.

Engine compartment fusebox LHS
Check 10 amp fuse (No. 5) starter relay and engine control module. Starter relay and ECM are located in the engine compartment, passenger side within the bulkhead extension.

V8 XJ Series vehicles

Engine management fusebox
Check 5 amp fuse (No. 4) ECM and 5 amp fuse (No. 10) ECM, park neutral switch, VSV 1&2 and EGR if fitted, located in the engine compartment, passenger side within the bulkhead extension.

Engine compartment fusebox LHS
Check 10 amp fuse (No. 5) starter relay coil, EMS & control relays/adaptive damping. ECM and relay are located in the engine compartment, passenger side within the bulkhead extension.

Use WDS and check for logged DTCs and follow the guided routine associated.

For further information on location and removal, refer to JTIS section 303-14 or TSB 303-34.

Was a fault found and rectified?

YES

Proceed to reset adaptations procedure in TSB 303-01.

NO

Related DTCs:
P0603 ECM Data corrupted
P1606 EMS Control relay malfunction.

A
Using WDS from the feature content select engine system, starting, control input, then press the guided tab and carry out the available tests.

Was a fault found and rectified?

YES

Proceed to reset adaptions procedure in TSB 303-01.

NO

Using WDS, from the feature content select engine system, starting, control module, supplies then press the guided tab.

Was a fault found and rectified?

YES

Proceed to reset adaptions procedure in TSB 303-01.

NO

Refer to TSB 303-34 and fill out the engine management questionnaire.

Before replacing an ECM, contact Technical Hotline, with the information from the questionnaire.
Fit a calibrated fuel pressure gauge to the fuel rail adapter valve.

Drive the vehicle under the following conditions:
1. At idle in 'P'.
2. 50 Km/h (30 mph) flat road, steady speed.
3. 80 Km/h (50 mph) flat road, steady speed.

Was fuel pressure 38 psi ± 5 psi 2.6 bar?

Briefly run engine at wide open throttle and note the fuel pressure.

Was fuel pressure:
- **Naturally Aspirated engine** 43 psi ± 5 psi (3 bar)?
- **Supercharged engine** 52 psi ±5 psi (3.5 bar)?

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Dealer Technical Support.
P19 Mass Air Flow Meter

Check 10 amp fuse (No. 12) engine management fusebox.

Using WDS, check for DTCs and follow any guided routine associated.

Was a fault found and rectified?

Check the mass air flow meter part number ensuring that it is correct for the model year of the vehicle. Refer to the latest version of JEPC.

Using WDS select engine system, datalogger, mass air flow meter and monitor the signal under the following conditions.
1. Idle in 'P' with engine hot.
2. 50 km/h on a flat road.
3. 80 km/h if possible on a flat road.
Monitor the data and check for spikes ± 0.5 volts.

Was the voltage stable with no spikes?

Related DTCs:
P0101 MAFS Range/performance
P0102 MAFS Sense circuit low voltage
P0103 MAFS Sense circuit high voltage
P1104 MAFS Ground malfunction
P0111 IATS Range/performance
P0112 IATS Sense circuit high voltage (low air temp)
P0113 IATS Sense circuit low voltage (high air temp)

Using WDS, check for DTCs and follow any guided routine associated.

Refer to the next number in the matrix.

Check mass air flow meter connections for damage, water ingress and signs of corrosion, rectify if a problem is found.

Refer to flowchart P14 for harness repairs.
Using the datalogger as set-up previously, start logging then wiggle the MAF and ECM connector and check for a stable voltage (no spikes). If a problem is found, rectify the connector/harness.

Substitute the mass air flow sensor and monitor the voltage on the data logger as above.

Did this cure the problem?

END

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.
Using the Datalogger on WDS, check the long term fuel trim (LTFT1 & 2). Typical values range between ±7%. Values outside of this range may suggest a fuel related problem.

For values >+ 7% adaption, fuel is added to compensate for lean running. This could be low fuel pressure. For values >-7%, fuel is reduced to compensate for rich running. This could be high fuel pressure.

Fit a calibrated fuel pressure gauge to the schrader valve on the fuel rail, then carry out the following tests.

Switch the ignition to position 2.

The fuel pump is switched off after 2 seconds unless the engine is running so you may have to cycle the ignition a few times to prime the system.

If the fuel pressure is lower than 38 psi...

A

If the fuel pressure remains higher than 43 psi...

C

Was a fault found and rectified?

YES

END

NO

For values >+ 7% adaption, fuel is added to compensate for lean running. This could be low fuel pressure. For values >-7%, fuel is reduced to compensate for rich running. This could be high fuel pressure.

If the fuel pressure rise to 43 psi (3bar) and then drop back to 38 psi (2.6bar) ± 5 psi?

YES

B

Related DTCs:
P0171 A bank combustion to lean
P0172 A bank combustion to rich
P0174 B bank combustion to lean
P0175 B bank combustion too rich

A

Refer to TSB 310-04

Connect WDS. Check for DTCs and follow any guided routine associated.

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Remove the vacuum pipe from the regulator and blank the pipe to prevent an air leak. Fit vacuum pump to the regulator, start engine and run at idle 700 rpm (in 'P').

Does fuel pressure read 43 psi (3 bar) ± 5 psi?

YES

Check vac pipe for kinks, splits, fitment and vacuum, rectify if necessary.

NO

Check for sufficient fuel in tank. Position the vehicle on a ramp and visually check the fuel pipes for signs of damage. Check the fuel filter for signs of blockage.

Start the engine and run at idle (in 'P') until warm.

Position the vehicle on a ramp and visually check the fuel pipes for signs of damage.

Does the fuel pressure read 38 psi (2.6 bar)?

NO

Check vac pipe for kinks, splits, fitment and vacuum, rectify if necessary.

YES

With engine still running, raise the engine speed to approx 2000 rpm and hold for 2 seconds.

The fuel pressure should rise to 43 psi (3 bar) then drop back to 38 psi (2.6 bar) ± 5 psi.

END

Alternatively, if a calibrated vacuum pump gauge is available then carry out the following.

Remove the vacuum pipe from the regulator and blank the pipe to prevent an air leak. Fit vacuum pump to the regulator, start engine and run at idle 700 rpm (in 'P').

Does fuel pressure read 43 psi (3 bar) ± 5 psi?

NO

Replace the regulator and re-test.

YES

D

YES
Apply a vacuum of 600 mbar to simulate manifold depression.

Does fuel pressure drop to approx 38 psi (2.6 bar)?

Diaphragm in regulator inoperative.

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.

Replace component and re-test.
Position the vehicle on a ramp and visually check the fuel pipes for signs of damage.

Check the fuel filter for signs of a blockage.

Fit a calibrated fuel pressure gauge then start the engine.

Go to flowchart P20 fuel pressure regulator

Was the regulator at fault?

Using WDS, check for DTCs and follow any guided routine associated.

Related DTC:
P1230 - Fuel pump relay malfunction

Was a problem found and rectified?

A
From the feature content, select engine system/fuel system, press the guided tab then select pumps.

Was a problem found and rectified?

YES

END

NO

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.
**P22 Oxygen Sensors**

**XK Series vehicles**
H02 sensor heaters
Check 10 amp fuse (No. 14) located in the engine management fusebox.

Using WDS, check for DTCs and follow any guided routine associated.

**V8 XJ Series vehicles**
H02 sensor heaters
Check 10 amp fuse (No.14) located in the engine management fusebox.

**Related DTCs:**
- P0131 H02s Sense circuit low voltage A bank upstream (1)
- P0132 H02s Sense circuit high voltage A bank upstream (1)
- P0133 H02s Sense circuit slow response A bank upstream (1)
- P0135 H02s Heater circuit malfunction A bank upstream (1)
- P0137 H02s Sense circuit low voltage A bank downstream (2)
- P0138 H02s Sense circuit high voltage A bank downstream (2)
- P0140 H02s Sense circuit no activity A bank downstream (2)
- P0151 H02s sense circuit low voltage B bank upstream (1)
- P0152 H02s sense circuit high voltage B bank upstream (1)
- P0153 H02s sense circuit slow response B bank upstream (1)
- P0155 H02s heater circuit malfunction B bank upstream (1)
- P0157 H02s sense circuit low voltage B bank downstream (2)
- P0158 H02s sense circuit high voltage B bank downstream (2)
- P0160 H02s sense circuit no activity B bank downstream (2)

**Was a fault found and rectified?**

- **YES**

**END**

- **NO**

**A**
Using WDS, from the feature content select engine system, emissions, sensors and select HOSB1U, HOSB2U, OSB1D and OSB2D, then press the datalogger tab.

Was a fault found and rectified?

No

Go to the next number in the matrix.

Yes

You should see the oxygen sensors switch between 0 and 1 volt. With the engine warm STFT values can vary between ±7% but should alternate closer to 0%.

Additionally you can monitor the STFT and LTFT parameters to check for the correct operation of the sensors.
P23 Air Leakage

Using WDS check for DTCs and follow any guided routine associated.

From the feature content select fuel system, sensors, O2 sensors then press the datalogger tab and monitor the long term fuel trims (1 & 2) with the engine running.

Visually check for potential leaks after the air meter. Check intake ducting is secure at throttle and that sealing ring is installed correctly.

Check for correct installation of vacuum pipes i.e. pressure regulator, throttle connection etc...

Check part-load breather pipe is installed correctly.

Run engine at normal operating temperature at idle in 'P' and listen around engine bay for leak.

Set-up the datalogger to monitor STFT. Refer to TSB 310-06 for a list of sprays suitable for detecting leaks and spray around potential leak areas:

1. Throttle gasket to inlet manifold.
2. Inlet manifold gasket to cylinder head.
3. Inlet trunking to throttle.
4. Supercharger to intercooler joint.
5. Supercharger bypass assembly.

Related DTCs:
P0171 A Bank combustion too lean
P0174 B Bank combustion too lean

Typical values for LTFT range between ± 7%. Values higher than 7 % up to a max of +25 % could indicate an air leak.

With the engine at normal operating temperature STFT values can vary between ± 7% but should alternate closer to 0%. An air leak will raise the STFT and add more fuel that in turn will raise the LTFT.

A
Does STFT alter significantly when spray is applied?

YES

Identify source of leak and rectify.

NO

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.
P24 Throttle Sensors

**Related DTCs:**
P1121 Pedal position sensor circuit A range performance.
P1122 Pedal position sensor circuit A low voltage.
P1123 Pedal position sensor circuit A high voltage.
P1240 Sensor reference voltage TPS.
P1241 Sensor power supply low voltage TPS.
P1242 Sensor power supply high voltage TPS.
P1243 Sensor reference ground malfunction TPS.
P1250 Engine load malfunction
P1251 Throttle position malfunction (engine off).
P1252 Mechanical guard position malfunction.
P1253 Mechanical guard position malfunction (engine off).
P1611 Throttle angle malfunction.
P1612 Throttle offset malfunction.
P0121 TPS circuit range/performance.
P0122 TPS circuit (1) low voltage.
P0123 TPS circuit (1) high voltage.
P0222 TPS circuit (2) low voltage.
P0223 TPS circuit (2) high voltage.
P0506 Idle rpm lower than expected.
P1224 Throttle control position error.
P1226 Mechanical guard sensor range/performance.
P1227 Mechanical guard sensor circuit low voltage.
P1228 Mechanical guard sensor high voltage.

### XK Series vehicles
Check 30 amp fuse (No.9) throttle motor and 10 amp fuse (No.14) throttle motor relay located in engine management fusebox within bulkhead extension.

### V8 XJ Series vehicles
Check 30 amp fuse (No.9) throttle motor and 10 amp fuse (No.14) throttle motor relay located in engine management fusebox within bulkhead extension.

For further information use JTIS section 303-12
Associated Technical bulletins:
303-06 & 600-03

Using WDS, check for DTCs. If any codes are stored then follow the guided routine associated.

Was a fault found and rectified?

YES ➔ END

NO ➔ A
Using WDS, from the feature content select engine system and log signals, PPS11, PPS2, TPS, TPS1 and TPS 21.

Expected values for all sensors with ignition ON are 0.68 to 0.95 volts with the throttle closed and up to 4.87 volts with the throttle fully open.

Are the sensors operating correctly?

YES

Check the throttle butterfly for signs of contamination (refer to TSB 303-41 or flowchart P1).

NO

Contact the Technical Hotline for advice on replacing the throttle.

YES

Does the throttle require cleaning?

NO

Ensure that the part load breather is clear (refer to TSB 600-03, then go to the next step in the matrix, P25 throttle motor flowchart).

END

Has the problem been rectified after cleaning?

NO

Go to the next step in the matrix, P25 throttle motor flowchart.

YES

Carry out cleaning procedure (see TSB 303-41) and check TSB 600-03 for a blocked part-load breather.

Ensure that the kickdown switch is correctly adjusted (refer to JTIS section 310-02).
**P25 Throttle Motor**

**XK Series vehicles**
Check 30 amp fuse (No.9) throttle motor and 10 amp fuse (No. 14) throttle motor relay, located in engine management fusebox within bulkhead extension.

**V8 XJ Series vehicles**
Check 30 amp fuse (No.9) throttle motor and 10 amp fuse (No.14) throttle motor relay, located in engine management fusebox within bulkhead extension.

**Use WDS and check for DTCs. If any codes are stored, follow the guided routine associated.**

**For further information refer to JTIS section 303-12.**

**Related DTCs:**
P1229 Throttle motor control circuit malfunction.
P1251 Throttle position malfunction (engine off).
P1224 Throttle control position error.
P1612 Throttle offset malfunction.
P1611 Throttle angle malfunction.
Also TPS fault codes P0122, P0123, P0222 and P0223 as described in flowchart P24.

**Was a fault found and rectified?**

**END**

**YES**

**NO**

Ensure that the kickdown switch is correctly adjusted (refer to JTIS section 310-02).

**Associated TSB 303-06.**

**Check the date stamp on the relay. If the date stamp is between R6 K1 and R6 KB, change the relay.**
Check the throttle butterfly for signs of contamination (refer to TSB 303-41 or flowchart P1).

Does the throttle require cleaning?

Ensure that the part-load breather is clear (refer to TSB 600-03) then go to the next step in the matrix.

Using WDS, from the feature content select engine system and press the datalogger tab. Log signals TPS, TPS 1 and TPS21. Also, remove the intake trunking and visually check the throttle blade for movement.

Expected values for TPS sensor with ignition on are 0.68 to 0.95 volts with the throttle closed and up to 4.87 volts with the throttle fully open.

Contact the Technical Hotline for advice on replacing the throttle.

Is the motor operating OK?

Check the throttle butterfly for signs of contamination (refer to TSB 303-41 or flowchart P1).

Does the throttle require cleaning?

Carry out the cleaning procedure in TSB 303-41 and check TSB 600-03 for a blocked part-load breather.

Has the problem been rectified after cleaning?

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.

YES

A

YES

NO

YES

NO

NO

YES

END

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# Throttle system failure modes

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<th>Effect</th>
<th>Message Center</th>
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<td>Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited</td>
<td>Failsafe engine mode</td>
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<td>Throttle position sensor 2</td>
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<td>Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited</td>
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<tr>
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<td>Red</td>
<td>Mechanical guard and fuel intervention</td>
<td>Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited</td>
<td>Failsafe engine mode</td>
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<td>Runs normally, cruise active</td>
<td>Failsafe engine mode</td>
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<tr>
<td>Pedal sensor 2</td>
<td>P1122, P1121</td>
<td>Amber</td>
<td>Redundancy</td>
<td>Runs normally, cruise active</td>
<td>Failsafe engine mode</td>
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<tr>
<td>Mechanical guard sensor</td>
<td>P1226, P1227, P1228</td>
<td>Red</td>
<td>Full authority and cruise inhibited</td>
<td>Runs normally</td>
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</tr>
<tr>
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<td>Red (Intermittent)</td>
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<td>Restricted performance</td>
</tr>
<tr>
<td>Mechanical guard or actuator stuck open</td>
<td>P1226, P1252</td>
<td>Red</td>
<td>Full authority and cruise inhibited</td>
<td>Runs normally</td>
<td>Restricted performance</td>
</tr>
<tr>
<td>Mechanical guard or actuator stuck closed</td>
<td>P1235</td>
<td>Amber</td>
<td>Cruise inhibited</td>
<td>Runs normally</td>
<td>Failsafe engine mode</td>
</tr>
<tr>
<td>Throttle motor fault</td>
<td>P1224</td>
<td>Red</td>
<td>Mechanical guard and fuel intervention</td>
<td>Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited</td>
<td>Failsafe engine mode</td>
</tr>
<tr>
<td>Throttle motor high resistance (engine idling)</td>
<td>P0507</td>
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<td>Redundancy (on second trip)</td>
<td>Idle speed increase, poor throttle response</td>
<td>Failsafe engine mode</td>
</tr>
<tr>
<td>Throttle motor</td>
<td>P1229</td>
<td>Red</td>
<td>Mechanical</td>
<td>Fuel intervention,</td>
<td>Failsafe</td>
</tr>
<tr>
<td>high resistance (driving)</td>
<td>P1612</td>
<td>guard and fuel intervention</td>
<td>idles between 950 rpm and 1150 rpm, cruise control inhibited</td>
<td>engine mode</td>
<td></td>
</tr>
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<td>-------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>VSV1 Fault</td>
<td>P1235 P1236</td>
<td>Amber</td>
<td>Cruise inhibited</td>
<td>Runs normally</td>
<td>Failsafe engine mode</td>
</tr>
<tr>
<td>VSV2 Fault</td>
<td>P1235 P1237 P1252</td>
<td>Amber</td>
<td>Cruise inhibited</td>
<td>Runs normally</td>
<td>Failsafe engine mode</td>
</tr>
<tr>
<td>VSV3 Fault</td>
<td>P1235 P1238</td>
<td>Amber</td>
<td>Cruise inhibited</td>
<td>Runs normally</td>
<td>Failsafe engine mode</td>
</tr>
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<td>Vac pipe leak</td>
<td>P1235</td>
<td>Amber</td>
<td>Cruise inhibited</td>
<td>Runs normally</td>
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</tr>
<tr>
<td>Throttle motor relay stuck closed</td>
<td>P1251</td>
<td>Amber</td>
<td>Redundancy</td>
<td>Runs normally cruise active</td>
<td>Failsafe engine mode</td>
</tr>
<tr>
<td>Throttle motor relay stuck open</td>
<td>P1224</td>
<td>Red</td>
<td>Mechanical guard and fuel intervention</td>
<td>Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited</td>
<td>Failsafe engine mode</td>
</tr>
<tr>
<td>Throttle motor relay open circuit</td>
<td>P1224</td>
<td>Red</td>
<td>Mechanical guard and fuel intervention</td>
<td>Fuel intervention, idles between 950 rpm and 1150 rpm, cruise control inhibited</td>
<td>Failsafe engine mode</td>
</tr>
</tbody>
</table>

**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.
Ensure that you always check JEPC for the correct part numbers.

For spark plug specifications refer to the JTIS Section 303-07, Ignition, Engine - Specification.

If a spark plug is suspected to be faulty, remove the plug and visually check the ceramic area for cracks. Check the electrode gap and condition. If the plug is found to be dirty, use a spark plug cleaner. If the spark plug is damaged, replace it. Re-gap the plug to the specified clearance and install. Finally re-test.

Refer to TSB 303-44 spark plug corona. When re-fitting spark plugs, the recommended torque figure is between 25-29 Nm (5.6-6.5 lb/ft).

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.
Using WDS, check for DTCs. If a code is stored, follow the guided routine associated.

Was a fault found and rectified?

END

From the feature content select fuel system then press the datalogger tab.
Log the brake switch (Fbrake2) signal and press the brake pedal to see if the brake pedal signal changes state.

Check WDS help text for correct operation.

Go to the next number in the matrix, if there is no next step contact Technical Hotline.

Is the brake switch working correctly?

YES

Replace or rectify the component as required.

NO

Related DTC:
P1571 brake switch malfunction.

Refer to TSB 206-05 revised brake pedal switch.
Cruise control can be inhibited by other EMS faults, ensure that any EMS faults are rectified before investigating the cruise system.

**Check 10 amp fuse (No.14)**
- **XK Series vehicles**
  - Facia fuse box drivers side.
- **V8 XJ Series vehicles**
  - LH heelboard fusebox.

Using WDS, check for DTCs and follow any guided routine associated.

Was a fault found and rectified?

YES → END

NO

From the content model select fuel system, then press the datalogger tab.

- CRUISE A (Resume/cancel)
- CRUISE B (Accel/decel)
- CRUISE C (Speed control cancel)
- CRUISE D (Set/inch decel)
- CRUISE O (On/Off switch)
- CRUISE R (Speed control resume)
- CRUISES (Set/inch accel)
- CRUISEC1 (Speed control cancel)
- Fbrake2 (Brake switch)

**Related DTCs:**
- P0566 Cruise control cancel switch on fault
- P0567 Cruise control resume switch on fault
- P0568 Cruise control switch ground malfunction
- P0569 Cruise control decel/set (set-) switch on fault
- P0570 Cruise control accel/set (set+) switch on fault
- P1571 Brake switch malfunction
- P1642 CAN Circuit malfunction

Refer to flowcharts P24 and P25 and additional information for EMS failures that would inhibit the operation of cruise.

For additional information refer to JTIS section 310-03.
Log the signals shown on the previous page. Depress each switch in turn (holding them down for a couple of seconds) and monitor the status on WDS.

Were all switch positions operating correctly?

If the steering wheel switches are at fault, the steering wheel will have to be replaced. Refer to the latest JEPC for part numbers.

Note: The ECM cannot detect an open circuit with the steering wheel switches as the open circuit is in the OFF state.

END
Open the hood and fit the fender protection covers.

On N/A engines, release and remove the engine cover from the left hand cylinder bank.

Release the part-load breather retaining clip allowing the pipe connector to be disconnected from the breather stub.

Using a hand held pin chuck (recommended tool, Snap On YA 806), carefully pass a 2.5 mm (0.098 in) drill bit into the breather stub and through the restrictor. Slowly rotate the drill to clear any deposits.

When the drill can be rotated freely, all deposits have been cleared from the restrictor.

Withdraw the drill bit from the restrictor and pipe stub.
Reconnect the breather pipe connector to the breather stub checking first that the two 'O' rings are in place in the connector.

Refit the engine cover where applicable.

Where this operation is undertaken for the first time, identify that the procedure has been undertaken (so that it is not repeated, except at routine service intervals) by applying a neat spot of white paint on the left hand suspension turret.

**XK Series vehicles**
Between the dome shaped plastic cover and the inner spring pan retaining nut, nearest the engine.

**V8 XJ Series vehicles**
Between the two dome-headed nuts.

Remove the fender protection covers and close the hood.

END
**P30 Mechanical Guard and VSVs**

**XK Series vehicles**
Check 5 amp fuse (No.10) engine management fuse box.

**V8 XJ Series vehicles**
Check 5 amp fuse (No.10) engine management fusebox.

Using WDS, check for DTCs. The guided routines for VSVs/mechanical guard are only available from the P Codes shown. If any codes are stored, follow the guided routine associated.

Was a fault found and rectified?

YES ➔ END

NO ➔ From the feature content select engine system then press the datalogger tab. Log the signals VSVRM, VSVAM, VSVVM, Guard 1 and Guard 2. To see the VSV signals change state you have to drive the car with cruise enabled.

Refer to WDS help text.

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**Related DTCs:**
P1235 VSV1 Circuit range/performance (mechanical guard position).
P1236 VSV1 (Vacuum) circuit failure.
P1237 VSV 2 (Atmosphere) circuit failure.
P1238 VSV 3 (Release) circuit failure.
P1252 Mechanical guard position malfunction (cruise control).
P1226 Mechanical guard sensor range/performance.
P1227 Mechanical guard sensor circuit low voltage.
P1228 Mechanical guard sensor circuit high voltage.
Was a fault found and rectified?

YES

Visually check the vacuum system for damaged pipe work and leaks.

Was a fault found and rectified?

YES

NO

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.
XK Series vehicles
Check 10 amp fuse (No.14) engine management fuse box.

V8XJ Series vehicles
Check 5 amp fuse (No.10) engine management fuse box.

Use WDS and check for DTCs. The guided routines for EGR are only available from the P Codes shown. If any of the codes are stored follow the guided routine associated.

Related DTCs:
P0400 EGR Flow malfunction
P0405 EGR Drive circuits open circuit
P0406 EGR Drive circuits short circuit

Was a fault found and rectified?

Related DTCs:
P0400 EGR Flow malfunction
P0405 EGR Drive circuits open circuit
P0406 EGR Drive circuits short circuit

For additional information refer to JTIS section 303-08.

Was a fault found and rectified?

EGR was deleted on XK8 series vehicles from VIN 11462 and only used on XJR vehicles, North American specification 98 MY.

From the feature content, select engine system then press the datalogger tab, then select EGR.

Refer to WDS help text for good values.
Visually check the EGR pipe work for damage and leaks. Listen for any exhaust blow and rectify if necessary, also check for carbon around the EGR valve.

Was a fault found and rectified?

END

If problems persist, proceed to the next diagnostic flowchart (see matrix). If there is no next step, contact Technical Hotline.