SAFETY COMPLIANCE TESTING FOR
FMVSS 124H
ACCELERATOR CONTROL SYSTEMS

NISSAN MOTOR CO., LTD.
2004 NISSAN QUEST, MPV
NHTSA NO. C45203

GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443

MAY 18, 2004
FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6115 (NVS-220)
WASHINGTON, D.C. 20590
This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: [Signature]

Approved By: [Signature]

Approval Date: 5/8/04

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: [Signature]

Acceptance Date: 5/21/04
1. Report No. 124H-GTL-04-004
3. Recipient's Catalog No. 10. Work Unit No. (TRAIS) DTNH22-01-C-11025
5. Report Date May 18, 2004 11. Contract or Grant No. DTNH22-01-C-11025
7. Author(s) Grant Farrand, Project Engineer Debbie Messick, Project Manager 13. Type of Report and Period Covered Final Test Report April 23, 2004
15. Supplementary Notes
16. Abstract Compliance tests were conducted on the subject 2004 Nissan Quest MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-124-06 for the determination of FMVSS 124 compliance.
Test failures identified were as follows: NONE
17. Key Words Compliance Testing Safety Engineering FMVSS 124 18. Distribution Statement Copies of this report are available from NHTSA NHTSA Technical Reference Div., Rm. 5108 (NAD-52) 400 7th St., S.W. Washington, DC 20590 Telephone No. (202) 366-4946
20. Security Classif. (of this page) UNCLASSIFIED
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Purpose of Compliance Test</td>
<td>1</td>
</tr>
<tr>
<td>2 Test Procedure and Discussion of Results</td>
<td>2</td>
</tr>
<tr>
<td>3 Compliance Test Data</td>
<td>4</td>
</tr>
<tr>
<td>4 Test Equipment List and Calibration Information</td>
<td>14</td>
</tr>
<tr>
<td>5 Photographs</td>
<td>15</td>
</tr>
<tr>
<td>5.1 Front of Vehicle</td>
<td></td>
</tr>
<tr>
<td>5.2 Left Side View of Vehicle</td>
<td></td>
</tr>
<tr>
<td>5.3 Right Side View of Vehicle</td>
<td></td>
</tr>
<tr>
<td>5.4 Vehicle's Certification Label</td>
<td></td>
</tr>
<tr>
<td>5.5 Vehicle's Tire Information Label</td>
<td></td>
</tr>
<tr>
<td>5.6 View of Throttle Body on Engine</td>
<td></td>
</tr>
<tr>
<td>5.7 Location of TPS and TPM</td>
<td></td>
</tr>
<tr>
<td>5.8 Accelerator Pedal Assembly</td>
<td></td>
</tr>
<tr>
<td>5.9 Accelerator Pedal Assembly Front View</td>
<td></td>
</tr>
<tr>
<td>5.10 Accelerator Pedal Assembly Side View</td>
<td></td>
</tr>
<tr>
<td>5.11 TPS and TPM Connector</td>
<td></td>
</tr>
<tr>
<td>5.12 Accelerator Pedal Connector</td>
<td></td>
</tr>
<tr>
<td>5.13 ECM Connectors #1 and #2</td>
<td></td>
</tr>
<tr>
<td>5.14 Test Set-up to Provide Open and Ground Wires</td>
<td></td>
</tr>
<tr>
<td>5.15 Overall Test Set-up Wiring Vehicle in Test Chamber</td>
<td>33</td>
</tr>
<tr>
<td>5.16 Vehicle in Test Chamber</td>
<td></td>
</tr>
<tr>
<td>5.17 124 Test Instrumentation Set-up</td>
<td></td>
</tr>
<tr>
<td>6 Plots</td>
<td>33</td>
</tr>
<tr>
<td>7 Manufacturer’s Drawings</td>
<td>66</td>
</tr>
</tbody>
</table>
SECTION 1
PURPOSE OF COMPLIANCE TEST

FMVSS 124 specifies requirements for the return of a vehicle's throttle to the idle position when the driver removes the actuating force from the accelerator control, or in the event of a severance or disconnection in the accelerator control system. The purpose of FMVSS 124 is to reduce deaths and injuries resulting from engine overspeed caused by malfunctions in the accelerator control system. This standard applies to passenger cars, multipurpose passenger vehicles (MPV's), trucks and buses.
SECTION 2
TEST PROCEDURES AND DISCUSSION OF RESULTS

Compliance testing was conducted on a 2004 NISSAN QUEST, MPV, NHTSA No. C45203 in accordance with the National Highway Traffic Safety Administration (NHTSA) Laboratory Procedure TP-124-06.

The drive-by wire vehicle was equipped with an Accelerator Pedal Position Sensor (APS), Throttle Plate Position Sensor (TPS), Electronic Control Module (ECM), and Air Throttle Plate Actuator Motor (TPM).

Output from the throttle position sensor on the air throttle plate shaft was used to measure throttle position and data was recorded at 1000 HZ with GTL’s data acquisition system. Normal operation testing was conducted to simulate the normal removal of the driver’s foot from the accelerator pedal. Return to idle times were determined for various throttle plate positions with the accelerator control system complete and with each of the wires to the TPS and TPM actuator motor independently severed and also shorted to ground. Return to idle times were also determined for severance of the connectors to the APS, and TPS/TPM actuator motor. Removal of two springs in the accelerator pedal was not performed at this time due to the APS unit being a non-serviceable unit which cannot be taken apart without physically cutting apart the sealed unit. Also a motor return spring in the TPM was not removed at this time due to inaccessibility of the unit between the engine and firewall of the vehicle. The ECM connectors were also tested for severance and affect on throttle return times.
Severance and wire shorting of TPS and actuator motor wires in some cases resulted in a Limp Home type RPM mode although the throttle plate return times were within specification. Under certain failed TPS conditions, limited or no data was available as output from the vehicle TPS was used for data recordation. The laboratory by observation did not experience any failures which resulted in a runaway engine. System failures were induced approximately simultaneously with release of pedal force. Some tests were conducted only at 100% W.O.T. as it represented the worst case return time scenario.

This testing was performed at high ambient temperature of 52° C (-5 +0) in accordance with the NHTSA Test Procedure TP-124-06.
SECTION 3
COMPLIANCE TEST DATA

Test data for this test can be found on the following pages. Photographs are found in Section 5 and Test Plots are found in Section 6.
DATA SHEET 1
VEHICLE DESCRIPTION

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST MPV
VEHICLE NHTSA NO.: C45203
VEHICLE VIN: 5N1BV28494N320161
DATE OF TEST: APRIL 23, 2004
TEST LAB: GENERAL TESTING LABORATORIES
VEHICLE ENGINE TYPE: V6
GVWR: 2586 KG
VEHICLE ENGINE SIZE: 3.5 L

VEHICLE ACCEL. CONTROL SYSTEM (ACS) (Air or Fuel Throttled): AIR
MAX. BHP ENGINE SPEED: UNK
MFR. IDLE RPM: COMPUTER CONTROLLED (850)

FUEL METERING DEVICE (Carburetor, fuel injection, etc): FUEL INJECTION

REMARKS:

RECORDED BY: [Signature]
DATE: 04/23/04
APPROVED BY: [Signature]
DATA SHEET 2
NORMAL OPERATION TEST
(fully operational system)

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST, MPV
VEHICLE NHTSA NO.: C45203
DATE OF TEST: APRIL 23, 2004

Check one:

SYSTEM CONDITION: COMPLETE (no modifications) Normal Operation

<table>
<thead>
<tr>
<th>ACCELERATOR POSITION</th>
<th>THROTTLE POSITION SENSOR READING</th>
<th>RPM</th>
<th>TEMPERATURE (°F)</th>
<th>THROTTLE POSITION SENSOR READING @ IDLE (BASELINE)</th>
<th>RETURN TIME TO IDLE (Msec)</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>% WIDE OPEN THROTTLE (WOT)</td>
<td></td>
<td></td>
<td>ENGINE COOLANT</td>
<td>AMBIENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25%</td>
<td>25</td>
<td>4995</td>
<td>121.0</td>
<td>120.5</td>
<td>3%</td>
<td>71</td>
</tr>
<tr>
<td>50%</td>
<td>50</td>
<td>4995</td>
<td>130</td>
<td>120.5</td>
<td>3%</td>
<td>72</td>
</tr>
<tr>
<td>75%</td>
<td>75</td>
<td>4995</td>
<td>135</td>
<td>120.5</td>
<td>3%</td>
<td>77</td>
</tr>
<tr>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>136</td>
<td>121.0</td>
<td>3%</td>
<td>89</td>
</tr>
</tbody>
</table>

RETURN TIME REQUIREMENTS:

1 second (1000 ms) for vehicles less than 4536 kg.
2 seconds (2000 ms) for vehicles more than 4536 kg.
3 seconds (3000 ms) for vehicles exposed to -18°C or less

PASS ___ X ___ FAIL ____________

REMARKS:

RECORDED BY: [Signature] DATE: 04/23/04
APPROVED BY: [Signature]
FAIL-SAFE OPERATION DISCONNECTION

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST, MPV
VEHICLE NHTSA NO.: C45203
DATE OF TEST: APRIL 23, 2004

Check one:

SYSTEM CONDITION: APS CONNECTOR DISCONNECT

<table>
<thead>
<tr>
<th>ACCELERATOR POSITION</th>
<th>THROTTLE POSITION SENSOR READING</th>
<th>RPM</th>
<th>TEMPERATURE (°F)</th>
<th>THROTTLE POSITION SENSOR READING @ IDLE (BASELINE)</th>
<th>RETURN TIME TO IDLE (Msec)</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>% WIDE OPEN THROTTLE (WOT)</td>
<td>ENGINE COOLANT</td>
<td>AMBIENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>138</td>
<td>120.6</td>
<td>3%</td>
<td>438</td>
</tr>
</tbody>
</table>

RETURN TIME REQUIREMENTS:

1 second (1000 ms) for vehicles less than 4536 kg.
2 seconds (2000 ms) for vehicles more than 4536 kg.
3 seconds (3000 ms) for vehicles exposed to -18° C or less

PASS ___ X ___  FAIL ____________

REMARKS:

RECORDED BY: ______________________  DATE: 04/23/04
APPROVED BY: ______________________
DATA SHEET 3 (2 of 7)
FAIL-SAFE OPERATION DISCONNECTION

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST, MPV
VEHICLE NHTSA NO.: C45203
DATE OF TEST: APRIL 23, 2004

Check one:


SYSTEM CONDITION: TPS/TPM CONNECTOR DISCONNECT

<table>
<thead>
<tr>
<th>ACCELERATOR POSITION</th>
<th>THROTTLE POSITION SENSOR READING</th>
<th>RPM</th>
<th>TEMPERATURE (°F)</th>
<th>THROTTLE POSITION SENSOR READING @ IDLE (BASELINE)</th>
<th>RETURN TIME TO IDLE (Msec)</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>% WIDE OPEN THROTTLE (WOT)</td>
<td></td>
<td></td>
<td>ENGINE COOLANT</td>
<td>AMBIENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>132</td>
<td>120.3</td>
<td>3%</td>
<td>** P</td>
</tr>
</tbody>
</table>

RETURN TIME REQUIREMENTS:

1 second (1000 ms) for vehicles less than 4536 kg.
2 seconds (2000 ms) for vehicles more than 4536 kg.
3 seconds (3000 ms) for vehicles exposed to -18°C or less

PASS ___ X ___  FAIL __________

REMARKS: Went into Limp Home RPM Mode at 1375 RPM.
** No throttle position data due to open circuit

RECORDED BY: [Signature]  DATE: 04/23/04
APPROVED BY: [Signature]
DATA SHEET 3 (3 of 7)
FAIL-SAFE OPERATION DISCONNECTION

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST, MPV
VEHICLE NHTSA NO.: C45203
DATE OF TEST: APRIL 23, 2004

Check one:

SYSTEM CONDITION: TPS/TPM WIRES (INDIVIDUAL OPEN CIRCUIT)

<table>
<thead>
<tr>
<th>WIRE NO.</th>
<th>ACCELERATOR POSITION % WIDE OPEN THROTTLE (WOT)</th>
<th>THROTTLE POSITION SENSOR READING</th>
<th>RPM</th>
<th>TEMPERATURE (°F)</th>
<th>THROTTLE POSITION SENSOR READING @ IDLE (BASELINE)</th>
<th>RETURN TIME TO IDLE (Msec) OR LIMP MODE</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>132</td>
<td>121.0</td>
<td>3%</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>138</td>
<td>121.2</td>
<td>3%</td>
<td>**</td>
</tr>
<tr>
<td>3</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>139</td>
<td>121.5</td>
<td>3%</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>143</td>
<td>121.7</td>
<td>3%</td>
<td>93</td>
</tr>
<tr>
<td>5</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>147</td>
<td>121.8</td>
<td>3%</td>
<td>92</td>
</tr>
<tr>
<td>6</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>148</td>
<td>122.0</td>
<td>3%</td>
<td>56</td>
</tr>
</tbody>
</table>

RETURN TIME REQUIREMENTS:

1 second (1000 ms) for vehicles less than 4536 kg.
2 seconds (2000 ms) for vehicles more than 4536 kg.
3 seconds (3000 ms) for vehicles exposed to -18° C or less

PASS ___ X ___ FAIL ___________

REMARKS: * Went into Limp Home RPM Mode at 1375 RPM
** No Throttle Position Data Due to Open Circuit

RECORDED BY: ___________________________ DATE: 04/23/04
APPROVED BY: ___________________________
DATA SHEET 3 (4 of 7)
FAIL-SAFE OPERATION DISCONNECTION

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST, MPV
VEHICLE NHTSA NO.: C45203
DATE OF TEST: APRIL 23, 2004

Check one:

SYSTEM CONDITION: TPS/TPM WIRES SHORTED TO GROUND

<table>
<thead>
<tr>
<th>WIRE NO.</th>
<th>ACCELERATOR POSITION % WIDE OPEN THROTTLE (WOT)</th>
<th>THROTTLE POSITION SENSOR READING</th>
<th>RPM</th>
<th>TEMPERATURE (°F)</th>
<th>THROTTLE POSITION SENSOR READING @ IDLE (BASELINE)</th>
<th>RETURN TIME TO IDLE (Msec) OR LIMP MODE</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>138.5</td>
<td>121.0</td>
<td>3%</td>
<td>161</td>
</tr>
<tr>
<td>2</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>140</td>
<td>121.2</td>
<td>3%</td>
<td>159</td>
</tr>
<tr>
<td>3</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>145</td>
<td>121.2</td>
<td>3%</td>
<td>85</td>
</tr>
<tr>
<td>4</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>148</td>
<td>121.3</td>
<td>3%</td>
<td>188</td>
</tr>
<tr>
<td>5</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>150</td>
<td>121.3</td>
<td>3%</td>
<td>181</td>
</tr>
<tr>
<td>6</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>156.6</td>
<td>121.3</td>
<td>3%</td>
<td>14</td>
</tr>
</tbody>
</table>

RETURN TIME REQUIREMENTS:

1 second (1000 ms) for vehicles less than 4536 kg.
2 seconds (2000 ms) for vehicles more than 4536 kg.
3 seconds (3000 ms) for vehicles exposed to -18° C or less

PASS X FAIL

REMARKS: * Went into Limp Home RPM Mode at 1375 RPM

RECORDED BY: [Signature]  DATE: 04/23/04
APPROVED BY: [Signature]
DATA SHEET 3 (5 of 7)
FAIL-SAFE OPERATION DISCONNECTION

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST, MPV
VEHICLE NHTSA NO.: C45203
DATE OF TEST: APRIL 23, 2004

Check one:

SYSTEM CONDITION: APS INDIVIDUAL WIRES SHORTED TO GROUND

<table>
<thead>
<tr>
<th>WIRE NO.</th>
<th>ACCELERATOR POSITION % WIDE OPEN THROTTLE (WOT)</th>
<th>THROTTLE POSITION SENSOR READING</th>
<th>RPM</th>
<th>TEMPERATURE (°F) ENGINE COOLANT</th>
<th>AMBIENT</th>
<th>THROTTLE POSITION SENSOR READING @ IDLE (BASELINE)</th>
<th>RETURN TIME TO IDLE (Msec) OR LIMP MODE</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>152</td>
<td>120.0</td>
<td>3%</td>
<td>19</td>
<td>P*</td>
</tr>
<tr>
<td>12</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>151.5</td>
<td>121.5</td>
<td>3%</td>
<td>49</td>
<td>P*</td>
</tr>
<tr>
<td>13</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>151.4</td>
<td>121.7</td>
<td>3%</td>
<td>162</td>
<td>P</td>
</tr>
<tr>
<td>14</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>151.4</td>
<td>122.0</td>
<td>3%</td>
<td>43</td>
<td>P*</td>
</tr>
<tr>
<td>15</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>153.5</td>
<td>120.6</td>
<td>3%</td>
<td>82</td>
<td>P</td>
</tr>
<tr>
<td>16</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>154.8</td>
<td>120.0</td>
<td>3%</td>
<td>110</td>
<td>P</td>
</tr>
</tbody>
</table>

RETURN TIME REQUIREMENTS:

1 second (1000 ms) for vehicles less than 4536 kg.
2 seconds (2000 ms) for vehicles more than 4536 kg.
3 seconds (3000 ms) for vehicles exposed to -18° C or less

PASS X FAIL

REMARKS: *Went into Limp Home RPM Mode at 1375 RPM

RECORDED BY: [Signature] DATE: 04/23/04
APPROVED BY: [Signature]
DATA SHEET 3 (6 of 7)
FAIL-SAFE OPERATION DISCONNECTION

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST, MPV
VEHICLE NHTSA NO.: C45203
DATE OF TEST: APRIL 23, 2004

Check one:


SYSTEM CONDITION: APS INDIVIDUAL WIRES OPEN

<table>
<thead>
<tr>
<th>WIRE NO.</th>
<th>ACCELERATOR POSITION % WIDE OPEN THROTTLE (WOT)</th>
<th>THROTTLE POSITION SENSOR READING</th>
<th>RPM</th>
<th>TEMPERATURE (°F)</th>
<th>THROTTLE POSITION SENSOR READING @ IDLE (BASELINE)</th>
<th>RETURN TIME TO IDLE (Msec) OR LIMP MODE</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>167.6</td>
<td>120.2</td>
<td>3%</td>
<td>53</td>
</tr>
<tr>
<td>12</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>160.3</td>
<td>120.4</td>
<td>3%</td>
<td>87</td>
</tr>
<tr>
<td>13</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>164.5</td>
<td>120.6</td>
<td>3%</td>
<td>83</td>
</tr>
<tr>
<td>14</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>165.0</td>
<td>121.0</td>
<td>3%</td>
<td>70</td>
</tr>
<tr>
<td>15</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>166.5</td>
<td>120.9</td>
<td>3%</td>
<td>199</td>
</tr>
<tr>
<td>16</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>168.8</td>
<td>119.8</td>
<td>3%</td>
<td>92</td>
</tr>
</tbody>
</table>

RETURN TIME REQUIREMENTS:

1 second (1000 ms) for vehicles less than 4536 kg.
2 seconds (2000 ms) for vehicles more than 4536 kg.
3 seconds (3000 ms) for vehicles exposed to -18° C or less

PASS X  FAIL

REMARKS: * Went into Limp Home RPM Mode at 1375 RPM

RECORDED BY:  DATE: 04/23/04
APPROVED BY:
DATA SHEET 3 (7 of 7)
FAIL-SAFE OPERATION DISCONNECTION

VEHICLE MY/MAKE/MODEL/BODY STYLE: 2004 NISSAN QUEST, MPV
VEHICLE NHTSA NO.: C45203
DATE OF TEST: APRIL 23, 2004

Check one:


SYSTEM CONDITION: ECM CONNECTOR DISCONNECT

<table>
<thead>
<tr>
<th>CONN #</th>
<th>ACCELERATOR POSITION % WIDE OPEN THROTTLE (WOT)</th>
<th>THROTTLE POSITION SENSOR READING</th>
<th>RPM</th>
<th>TEMPERATURE (°F)</th>
<th>THROTTLE POSITION SENSOR READING @ IDLE (BASELINE)</th>
<th>RETURN TIME TO IDLE (Msec) OR LIMP MODE</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>149.8</td>
<td>119.8</td>
<td>3%</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P</td>
</tr>
<tr>
<td>2</td>
<td>100%</td>
<td>100</td>
<td>4995</td>
<td>151.7</td>
<td>119.8</td>
<td>3%</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P</td>
</tr>
</tbody>
</table>

RETURN TIME REQUIREMENTS:

1 second (1000 ms) for vehicles less than 4536 kg.
2 seconds (2000 ms) for vehicles more than 4536 kg.
3 seconds (3000 ms) for vehicles exposed to -18° C or less

PASS X  FAIL __________

REMARKS:

RECORDED BY: [Signature]  DATE: 04/23/04
APPROVED BY: [Signature]
## SECTION 4
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>DESCRIPTION</th>
<th>MODEL/ SERIAL NO.</th>
<th>CAL. DATE</th>
<th>NEXT CAL. DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTINUOUS RECORDER</td>
<td>OMEGA</td>
<td>55662</td>
<td>03/04</td>
<td>03/05</td>
</tr>
<tr>
<td>ENGINE RECORDING</td>
<td>FLUKE</td>
<td>7471026</td>
<td>03/04</td>
<td>03/05</td>
</tr>
<tr>
<td>ENGINE RECORDING</td>
<td>MONARCH</td>
<td>1444664</td>
<td>01/04</td>
<td>07/05</td>
</tr>
<tr>
<td>SOFTWARE</td>
<td>GTL</td>
<td>N/A</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
</tr>
<tr>
<td>CHAMBER</td>
<td>GTL</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>EXHAUST DUCT</td>
<td>GTL</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
SECTION 5
PHOTOGRAPHS
2004 NISSAN QUEST
NHTSA NO. C45203
FMVSS NO. 124H

FIGURE 5.4
CLOSE-UP VIEW OF VEHICLE'S CERTIFICATION LABEL
<table>
<thead>
<tr>
<th>TIRE AND LOADING INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNEU ET INFORMATION DE CHARGEMENT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEATING CAPACITY</th>
<th>TOTAL</th>
<th>7</th>
<th>FRONT AVANT</th>
<th>2</th>
<th>REAR ARRIERE</th>
<th>5</th>
</tr>
</thead>
</table>

THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED 546 kg OR 1204 lbs.
LE POIDS COMBINE D'OCCUPANTS ET DE CARAISON NE DEVRAIT JAMAIS EXCEDER 546 kg OU 1204 lb.

| RECOMMENDED COLD TIRE INFLATION PRESSURE |
| PRESSION DE GonFLAGE RECOMMANDee DES PNEUS FROIDS |

<table>
<thead>
<tr>
<th>ORIGINAL TIRE SIZE</th>
<th>FRONT AVANT</th>
<th>REAR ARRIERE</th>
<th>SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAILLE DU PNEU D'ORIGINE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| P225/60R17 | 240 kPa (35 psi) |
| SPARE TIRE | ROUE DE SECOURS |
| T135/80D16 | 420 kPa (60 psi) |

FIGURE 5.5
CLOSE-UP VIEW OF VEHICLE'S TIRE INFORMATION LABEL

2004 NISSAN QUEST
NHTSA NO. C45203
FMVSS NO. 124H
FIGURE 5.6
VIEW OF THROTTLE BODY ON ENGINE
FIGURE 5.13
ECM CONNECTORS #1 AND #2
FIGURE 5.14
TEST SET-UP TO PROVIDE OPEN AND GROUND WIRES
SECTION 6
PLOTS
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ NORMAL/ 25 % WOT 10:53:51 AM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: 32.994 %  Y2: 2.961 %
t1: -34449.559 ms  t2: -34378.559 ms
dt: 0.071 s  f: 14.095 Hz
NHTSA C45203 NISSAN QUEST

Channel: Throttle Position
Y1: 54.208 %  Y2: 3.171 %
t1: -24155.559 ms t2: -24083.559 ms
dt: 0.072 s  f: 13.889 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ NORMAL/ 75% WOT 11:00:14 AM 4/23/04

NHTSA C45203 NISSAN QUEST

TRIGGER

THROTTLE POSITION %

RPM

Channel: Throttle Position

Y1: 76.496 %  
Y2: 2.780 %  

t1: -13312.559 ms  
t2: -13235.559 ms  

dt: 0.077 s  
f: 12.987 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ NORMAL/ 100% WOT 11:07:46 AM 4/23/04

NHTSA C45203 NISSAN QUEST

V % RPM

THROTTLE POSITION %

Channel: Throttle Position

Y1: 95.476 %
T1: -5460.559 ms
dt: 0.069 s

Y2: 1.032 %
T2: -5371.559 ms
f: 11.236 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ APS DISCONNECT/ 100% WOT 11:19:32 AM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position
Y1: 89.332 %
t1: -5250.622 ms
dt: 0.438 s
Y2: 3.772 %
t2: -4512.622 ms
f: 2.263 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ TPS, TPM DISCONNECT/ 100% WOT  12:07:34 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Engine RPM

Y1: 4999.796 RPM  
Y2: 1372.986 RPM  

Y1: -3838.066 ms  
Y2: -1565.096 ms  

dt: 2.273 s 

f: 0.440 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/TPS,TPM OPEN WIRE 1 1:31:47 PM 4/23/04

NHTSA C46203 NISSAN QUEST

Channel: Engine RPM

Y1: 4997.406 RPM  Y2: 1359.558 RPM
f1: -54831.958 ms  t2: -52478.958 ms
dt: 2.353 s  f: 0.425 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/TPS, TPM OPEN WIRE 3
1:50:21 PM 4/23/04

NHTSA C46203 NISSAN QUEST

Channel: Throttle Position
Y1: 90.097 %
t1: -35020.958 ms
dt: 0.100 s
Y2: -2.971 %
t2: -34920.958 ms
f: 10.000 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/TPS, TPM OPEN WIRE 4
1:53:15 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: 82.328 %
t1: -25541.958 ms
dt: 0.093 s

Y2: -3.924 %
t2: -25448.958 ms
f: 10.753 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ TPS, TPM OPEN WIRE 6

NHTSA C46203 NISSAN QUEST

Channel: Throttle Position

Y1: 55.730 %
Y2: 4.606 %
I1: -5830.958 ms
t2: -5774.958 ms
dt: 0.056 s
f: 17.857 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT / TPS, TPM SHORT WIRE 1
2:14:53 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position
Y1: 89.348 %
t1: -53669.314 ms
Y2: 3.208 %
t2: -53509.314 ms
dt: 0.161 s
f: 6.211 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ TPS, TPM SHORT WIRE 2
2:17:28 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: 89.982 %
Y2: 1.423 %
t1: -35201.314 ms
t2: -35042.314 ms
dt: 0.159 s
f: 6.289 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ TPS,TPM SHORT WIRE 3

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: 73.000 %
y1: -26120.314 ms
dt: 0.085 s

Y2: -7.592 %
y2: -26035.314 ms
f: 11.765 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ TPS,TPM SHORT WIRE 4

2:22:09 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: 91.059 %
t1: -16223.314 ms
dt: 0.188 s

Y2: 0.411 %
t2: -16035.314 ms
f: 5.319 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ TPS, TPM SHORT WIRE 5 2:29:02 PM 4/23/04

NHTSA C45203 NISSAN QUEST

TRIGGER

THROTTLE POSITION %

RPM

Channel: Throttle Position

Y1: 86.592 %
Y2: 3.776 %

i1: -45965.314 ms
t2: -45804.314 ms
dt: 0.181 s
f: 5.525 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ TPS,TPM SHORT WIRE 6

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: -17.817 %
t1: -4309.314 ms
dt: 0.014 s

Y2: -17.998 %
t2: -4295.314 ms
f: 71.429 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ APS SHORT WIRE 12
2:53:55 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: 82.155 %
t1: -44828.052 ms
dt: 0.049 s

Y2: 3.854 %
t2: -44779.052 ms
f: 20.408 Hz
NHTSA C45203 NISSAN QUEST

FMVSS 124 THROTTLE RETURN TEST
124 HOT/ APS SHORT WIRE 13
2:56:09 PM 4/23/04

Channel: Throttle Position

Y1: 90.072 %
t1: -34555.052 ms
dt: 0.162 s

Y2: 3.146 %
t2: -34493.052 ms
f: 6.173 Hz
NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: 52.731 %
t1: -24771.052 ms
dt: 0.043 s

Y2: 2.957 %
t2: -24728.052 ms
f: 23.256 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ APS OPEN WIRE 12
3:20:25 PM 4/23/04

NHTSA C45203 NISSAN QUEST

V % RPM

TRIGGER

THROTTLE POSITION %

RPM


Channel: Throttle Position

Y1: 76.816 %  Y2: 3.459 %
t1: -45127.563 ms  t2: -45040.563 ms
dt: 0.087 s  f: 11.494 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/APS OPEN WIRE 13

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position
Y1: 93.523 %
t1: -34658.563 ms
ct: 0.083 s

Y2: 3.730 %
t2: -34575.563 ms
f: 12.048 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ APS OPEN WIRE 15
3:30:09 PM 4/23/04

NHTSA C46203 NISSAN QUEST

Channel: Throttle Position

Y1: 90.418 %
t1: -14383.563 ms

t2: -14639.563 ms
dt: 0.199 s

Y2: 1.937 %
f: 5.025 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ APS OPEN WIRE 16
3:31:52 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position
Y1: 94.099 %
t1: -5236.563 ms
dt: 0.092 s

Y2: 2.817 %
t2: -5144.563 ms
f: 10.870 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ ECM CONNECTOR 1
4:08:13 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position
Y1: 93.909 %
t1: -6586.536 ms
Y2: -19.417 %
t2: -6585.536 ms
dt: 0.001 s
f: 1000.000 Hz
FMVSS 124 THROTTLE RETURN TEST
124 HOT/ ECM CONNECTOR 2
4:06:03 PM 4/23/04

NHTSA C45203 NISSAN QUEST

Channel: Throttle Position

Y1: 95.715 %
Y2: -17.426 %
t1: -16369.536 ms
t2: -16290.536 ms
dt: 0.079 s
f: 12.658 Hz
VEHICLE INFORMATION/TEST SPECIFICATIONS
FMVSS 124 - Accelerator Control Systems

Requested Information:

1.) A sketch of the driver operated accelerator control system (ACS) starting from the accelerator pedal up to and including the fuel metering device (carburetor, fuel injectors, fuel distributor, or fuel injection pump).

Ans.

![Diagram of ACS system]

2.) For Normal ACS operation, the method utilized to determine the engine idle state (air throttle plate position, fuel delivery rate, other).

Ans. Air throttle plate position

3.) For Fail-Safe operation of the ACS (disconnection or severance), the method utilized to determine return of engine power to the idle state (air throttle plate position, fuel delivery rate, air intake, engine rpm, other)

Ans. Air throttle plate position

4.) Is the vehicle ACS equipped with any of the following:
   A. Accelerator Pedal Position Sensor (APS)
   B. Throttle Plate Position Sensor (TPS)
   C. Electronic Control Module (ECM)
   D. Air throttle plate actuator motor

Ans. A-D all.
5.) If air throttle plate equipped, is there a procedure which can be utilized by the test laboratory to measure the position of the throttle plate by tapping into the TPS or ECM? If so, please describe.

Ans. Throttle plate position can be utilized by measuring the voltage of TPS output.

6.) Point(s) chosen to demonstrate compliance with FMVSS 124 for single point disconnect and severance.

Ans.
For severances: (each tested separately)

1. Accel Pedal Inner Spring
2. Accel Pedal Outer Spring
3. Throttle Motor Return Spring (motor power off)
4. Throttle Motor only (return spring removed)

For Disconnections (each tested separately - wiring disconnected)

1. Throttle Control Motor Asy
   a. Monitor Sensor 1
   b. Disconnect Sensor 2
2. Throttle Position Sensor Asy
   a. Monitor Sensor 1
   b. Disconnect Sensor 2
3. Accelerator Pedal Position Sensor Asy
   a. Monitor Sensor 1
   b. Disconnect Sensor 2

7.) Where applicable, were connections in the ACS beyond the ECM such as the fuel injectors tested for disconnection and severance. If yes, provide details.

Ans. No.

8.) Where applicable, were idle return times tested for electrical severance accompanied by shorting to ground? If yes, please provide details.

Ans. No.

9.) All sources of return energy (springs) for the accelerator pedal and if applicable, the air throttle plate.

Ans. The accelerator Pedal has 2 (redundant) return springs.

10.) If fuel delivery rate is used to demonstrate return to idle state, provide:
   A. The method used to measure this signal i.e. connection to standard SAE J1587 data bus.
   B. Equipment required to measure signal.
   C. Fuel rate signal output range at the idle state.

Ans. Not applicable.
11.) Is the ACS equipped with a limp home mode? If yes, provide operation description.

Ans. ACS has a limp home mode.
   If ACS detects the failure, the system turns throttle motor off and return throttle plate to default position.

12.) Please describe a method by which the test laboratory can measure the engine RPM by tapping into the ECM, OBD connector, etc.

Ans. We could take a signal from the ECM via a CONSULT (Nissan's diagnostic system), or from the meter signal.