
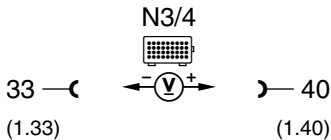
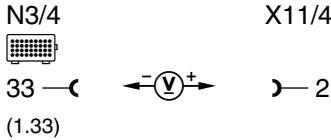
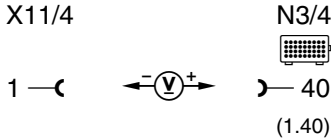


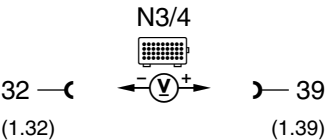
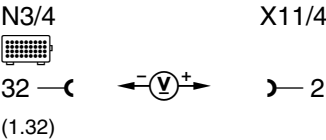
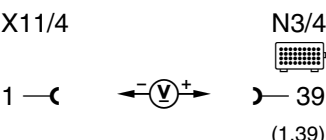



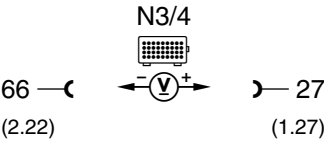
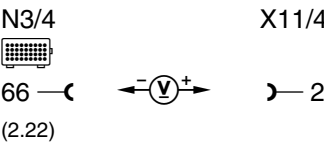
Electrical Test Program – Ignition System Test

| ⇒ |  | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|-----|---|---|---|----------------------|---------------|---|
| 1.0 | | Engine control module (N3/4) Voltage supply, circuit 30 |  | Ignition: ON | 11 – 14 V | ⇒ 1.1 |
| 1.1 | | Ground wire |  | Ignition: ON | 11 – 14 V | Wiring, Ground, component compartment - right (W16/4), ⇒ 1.2 |
| 1.2 | | Voltage supply, circuit 30 |  | Ignition: OFF | 11 – 14 V | Wire to terminal block X4/22, |


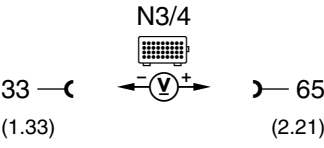
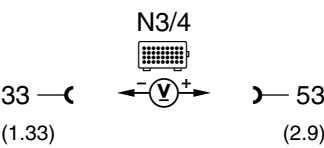
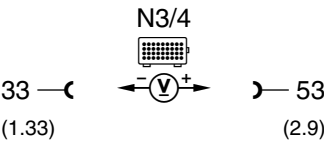
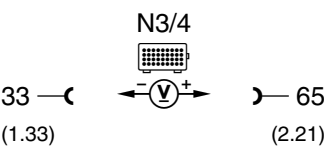
Electrical Test Program – Ignition System Test

| ⇒ |  | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|-----|---|--|--|---------------------|---------------|---|
| 2.0 |  | Engine control module (N3/4) Voltage supply, circuit 87U |  <p>32 —(1.32) ←(V)→ —(1.39) 39</p> | Ignition: ON | 11 – 14 V | ⇒ 2.1 |
| 2.1 | | Electronics ground |  <p>32 —(1.32) ←(V)→ — 2</p> | Ignition: ON | 11 – 14 V | Wiring, Electronics ground, component compartment - right (W16/6), ⇒ 2.2 |
| 2.2 | | Voltage supply, circuit 87 |  <p>1 —(1.39) ←(V)→ — 39</p> | Ignition: ON | 11 – 14 V | Wiring, Overvoltage protection relay module (K1/2), Ignition/starter switch (S2/1). |

Electrical Test Program – Ignition System Test

| ⇒ |  | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|-----|---|---|---|---------------------|---------------|--|
| 3.0 | | Engine control module (N3/4) Voltage supply, circuit 87 |  | Ignition: ON | 11 – 14 V | Wiring, Fuse, Overvoltage protection relay module (K1/2), ⇒ 3.1 |
| 3.1 | | Electronics ground |  | Ignition: ON | 11 – 14 V | Wiring, Electronics ground, component compartment - right (W16/6), |

Electrical Test Program – Ignition System Test

| ⇒ |  | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|-----|---|--|--|--|------------------------|--|
| 4.0 | 055 056 057 | Ignition coil (T1/1) Voltage supply Up to end of M.Y. 1995 As of M.Y. 1996 |   | Ignition: ON Starter: Crank | 11 – 14 V > 6 V | Wire to T1/1, Ignition coil T1/1, Engine control module (N3/4). Fuse, Ignition coil T1/1, Engine control module (N3/4). |
| 5.0 | 058 059 060 | Ignition coil (T1/2) Voltage supply Up to end of M.Y. 1995 As of M.Y. 1996 |   | Ignition: ON Starter: Crank | 11 – 14 V > 6 V | Wire to T1/2, Ignition coil T1/2, Engine control module (N3/4). Fuse, Ignition coil T1/2, Engine control module (N3/4). |

Electrical Test Program – Ignition System Test

| ⇒ | | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|-----|-------------------|---|---|---|---|--|
| 6.0 | 064 065 066 | CKP sensor (L5) and magnet for CKP sensor on flexplate segment | <p>N3/4 ²⁾</p> <p>73 —((2.29) —(+) (2.30)</p> <p>N3/4 ³⁾</p> <p>73 —((2.29) —(V) (2.30)</p> | <p>Starter: Crank</p> <p>Starter: Crank</p> <p>Engine: at Idle</p> | <p>Signal, see Figure 1</p> <p>> 0.4 V</p> <p>> 1 V ⁴⁾</p> | <p>⇒ 6.1, Segments (magnets) on starter ring gear.</p> |
| 6.1 | | Resistance of L5 | <p>N3/4</p> <p>73 —((2.29) —(Ω) (2.30)</p> | <p>Ignition: OFF</p> <p>Unplug connector 2 on engine control module (N3/4).</p> | 700 – 1400 Ω | <p>Wiring, ⇒ 6.2</p> |
| 6.2 | | Insulation of L5 | <p>N3/4</p> <p>32 —((1.32) —(Ω) (2.30)</p> | <p>Ignition: OFF</p> <p>Unplug connector 2 on engine control module (N3/4).</p> | > 20 kΩ | L5. |

2) Test with oscilloscope.

3) Test with multimeter only if oscilloscope is unavailable.

4) Voltage increases with increasing rpm.

Electrical Test Program – Ignition System Test

| ⇒ | | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|-----|--|--------------------------|---|---|--|---|
| 7.0 | | CMP sensor (L5/1) | <p>N3/4 ²⁾</p> <p>63 — (2.19) 52 (2.8)</p> <p>N3/4 ³⁾</p> <p>63 — (2.19) 52 (2.8)</p> | <p>Engine: at Idle</p> <p>Engine: at Idle</p> | <p>Signal, see Figure 3.</p> <p>> 0.2 V ⁴⁾</p> | <p>⇒ 7.1, Check distance between sensor (L5/1) and pickup (Refer to SMS, Engine 111, Engine Combustion, Job No. 15-2143).</p> |
| 7.1 | | Resistance of L5/1 | <p>N3/4</p> <p>63 — (2.19) 52 (2.8)</p> | <p>Ignition: OFF Unplug connector 2 on engine control module (N3/4).</p> | 900 – 1600 Ω | <p>Wiring, ⇒ 7.2</p> |
| 7.2 | | Insulation of L5/1 | <p>N3/4</p> <p>32 — (1.32) 52 (2.8)</p> | <p>Ignition: OFF Unplug connector 2 on engine control module (N3/4).</p> | > 20 kΩ | L5/1. |

2) Test with oscilloscope.

3) Test with multimeter only if oscilloscope is unavailable.

4) Voltage increases with increasing rpm.





Electrical Test Program – Ignition System Test

| ⇒ | | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|-----|-------------------|---|--|--|------------------------------------|---|
| 8.0 | 067 | Non-U.S.A vehicles only. Continue to next step | | | | |
| 8.1 | | Non-U.S.A vehicles only. Continue to next step | | | | |
| 9.0 | 055 056 057 | Closure duration for ignition coil (T1/1) Up to end of M.Y. 1995 As of M.Y. 1996 | <p>N3/4 ²⁾</p> <p>65 —((2.21) —) 39 (1.39)</p> <p>N3/4 ²⁾</p> <p>53 —((2.9) —) 39 (1.39)</p> | <p>Starter: Crank</p> <p>Engine: at Idle</p> | <p>20 - 100 ms</p> <p>4 – 6 ms</p> | <p>⇒ 6.0, Engine control module (N3/4).</p> |
| 9.1 | | Testing with multimeter: T1/1 Up to end of M.Y. 1995 | <p>N3/4 ³⁾</p> <p>65 —((2.21) —) 39 (1.39)</p> <p>N3/4 ³⁾</p> <p>53 —((2.9) —) 39 (1.39)</p> | <p>Ignition: ON</p> <p>Starter: Crank</p> | <p>0 V</p> <p>0.3 – 0.5 V</p> | <p>T1/1, < 0.3 V: Open circuit in wire from T1/1 to N3/4, > 0.5 V: T1/1.</p> |

2) Test with oscilloscope.

3) Test with multimeter only if oscilloscope is unavailable.

Electrical Test Program – Ignition System Test





| ⇒ | | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|------|-------------------|--|--|--|------------------------------------|--|
| 10.0 | 058 059 060 | <p>Closure duration for ignition coil (T1/2)</p> <p>Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p> | <p>N3/4</p>  <p>53 — 53 (2.9) 39 — 39 (1.39)</p> <p>N3/4</p>  <p>65 — 65 (2.21) 39 — 39 (1.39)</p> | <p>Starter: Crank</p> <p>Engine: at Idle</p> | <p>20 - 100 ms</p> <p>4 - 6 ms</p> | <p>⇒ 6.0, Engine control module (N3/4).</p> |
| 10.1 | | <p>Testing with multimeter: T1/2</p> <p>Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p> | <p>N3/4</p>  <p>53 — 53 (2.9) 39 — 39 (1.39)</p> <p>N3/4</p>  <p>65 — 65 (2.21) 39 — 39 (1.39)</p> | <p>Ignition: ON</p> <p>Starter: Crank</p> | <p>0 V</p> <p>0.3 - 0.5 V</p> | <p>T1/2, < 0.3 V: Open circuit in wire from T1/2 to N3/4, > 0.5 V: T1/2.</p> |

Electrical Test Program – Ignition System Test




| ⇒ | | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|------|-------------------|---|-------------------------------------|--|---------------------------|--|
| 11.0 | 055 056 057 | <p>Primary voltage of ignition coil (T1/1) for cylinder no. 1 and 4</p> <p>Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p> | <p>N3/4 </p> <p>N3/4 </p> | <p>Note to Test connection: Primary pattern, measurement range 400 V, duration 100%, voltage signal pick-up connected to T1/1.</p> <p>Starter: Crank</p> | 200 – 350 V | ⇒ 11.1, Engine control module (N3/4). |
| 11.1 | | <p>Primary winding of T1/1 and T1/2</p> <p>Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p> | <p>N3/4 </p> <p>N3/4 </p> | Ignition: OFF | 0.9 – 1.9 Ω ⁵⁾ | T1/1 or T1/2. |

⁵⁾ Resistance of coil T1/1 and T1/2. Resistance of single coil is 0.3 - 0.6 Ω

Electrical Test Program – Ignition System Test

| ⇒ |  | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|------|---|--|--|--|---------------|---|
| 12.0 | 058 059 060 | <p>Primary voltage of ignition coil (T1/2) for cylinder no. 2 and 3 Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p> | <p>N3/4 </p> <p>53 —┘ ← ⊕ → ┘— 39 (2.9) (1.39)</p> <p>N3/4 </p> <p>65 —┘ ← ⊕ → ┘— 39 (2.21) (1.39)</p> | <p>Note to Test connection: Primary pattern, measurement range 400 V, duration 100%, voltage signal pick-up connected to T1/2.</p> <p>Starter: Crank</p> | 200 – 350 V | ⇒ 11.1, Engine control module (N3/4). |
| 13.0 | 055 056 057 | <p>Firing voltage of ignition coil (T1/1) for cylinder no. 1 and 4</p> | <p>Engine analyzer </p> | <p>Note to Test connection: Secondary pattern, measurement range 20 kV, duration 100%, voltage signal pick-up connected to ignition coil (T1/1).</p> <p>Starter: Crank</p> | 8 – 30 kV | ⇒ 13.1, Spark plug cables, Spark plug connector, Spark plugs, N3/4. |
| 13.1 | | Secondary winding of T1/1 | <p>T1/1 ter. 4a ← ⊗ → ter. 4b</p> | Unplug both ignition cables on T1/1. | 5.2 – 8.5 kΩ | T1/1. |

Electrical Test Program – Ignition System Test

| ⇒ |  | Test scope | Test connection | Test condition | Nominal value | Possible cause/Remedy |
|------|---|--|---|---|---------------|---|
| 14.0 | 058 059 060 | Firing voltage of ignition coil (T1/2) for cylinder no. 2 and 3 | Engine analyzer  | Note to Test connection: Secondary pattern, measurement range 20 kV, duration 100%, voltage signal pick-up connected to ignition coil (T1/2). Starter: Crank | 8 – 30 kV | ⇒ 14.1, Spark plug cables, Spark plug connector, Spark plugs, Engine control module (N3/4). |
| 14.1 | | Secondary winding of T1/2 | ter. 4a  ter. 4b | Unplug both ignition cables on T1/2. | 5.2 – 8.5 kΩ | T1/2. |

Electrical Test Program – Ignition System Test

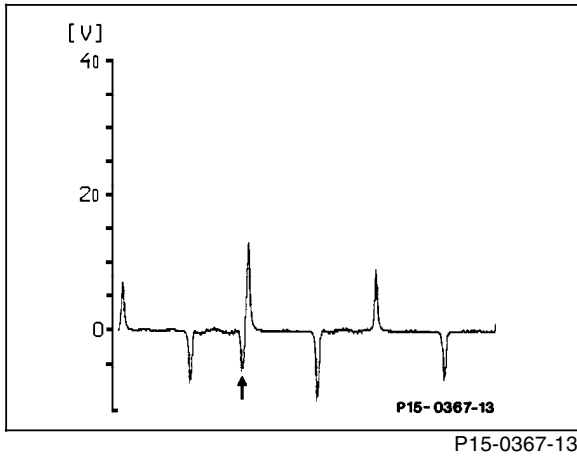


Figure 1
CKP sensor (L5) signal

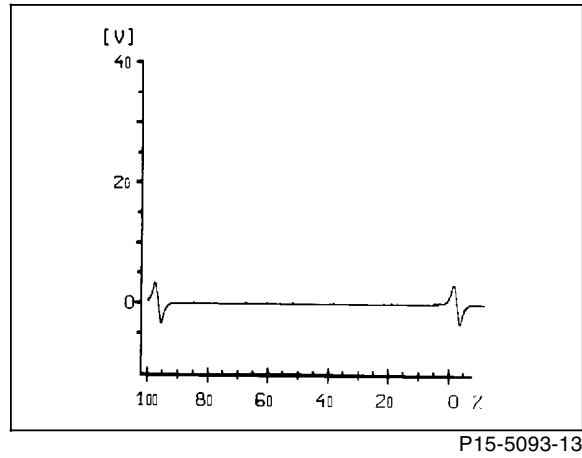


Figure 2
CMP sensor (L5/1) signal