
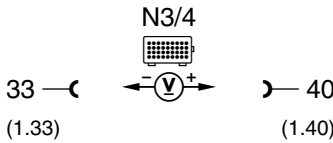
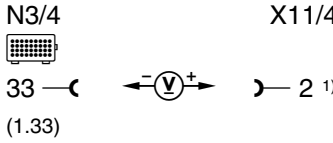
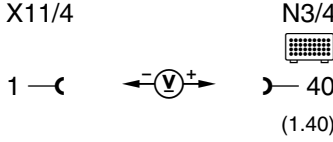

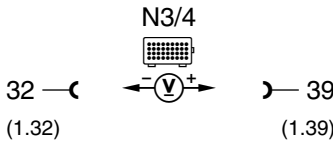
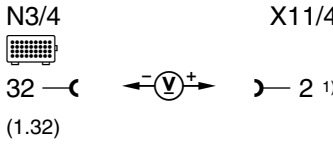
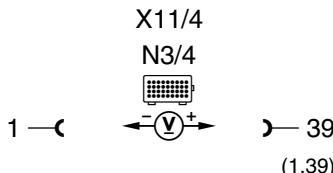


Electrical Test Program – Ignition System Test

⇒		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, Model 124 Battery ground (W10). Model 129 Ground, module box bracket (W27). Model 140 Output ground, right footwell (W15). Model 202, 210 Ground, component compartment - right (W16/4).
1.2		Voltage supply, circuit 30		Ignition: ON	11 – 14 V	Wire to terminal block X4/10 or X4/22.


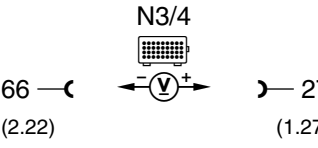
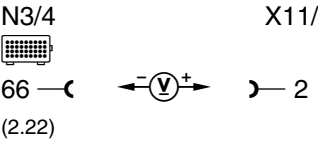
1) On models 129, 140 and 202. On model 124, connect to socket 16.

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		Ignition: ON	11 – 14 V	⇒ 2.1
2.1		Electronics ground		Ignition: ON	11 – 14 V	Wiring, Model 124 Electronics ground (W10/1), Models 129, 140 Electronics ground, right footwell (W15/1), Model 202, 210 Electronics ground, component compartment - right (W16/6), ⇒ 2.2
2.2		Voltage supply, circuit 87		Ignition: ON Ignition: OFF	11 – 14 V < 1 V	Wiring, Overvoltage protection relay module (K1/2), base module (N16/1) or relay module (K40), Ignition/starter switch (S2/1).






1) On models 129, 140 and 202. On model 124, connect to socket 16.

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), base module (N16/1) or relay module (K40), ⇒ 3.1
3.1		Electronics ground		Ignition: ON	11 – 14 V	Wiring, Model 124 Electronics ground (W10/1). Models 129, 140 Electronics ground, right footwell (W15/1). Model 202, 210 Ground component compartment - right (W16/6).

1) On models 129, 140 and 202. On model 124, connect to socket 16.


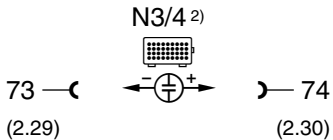
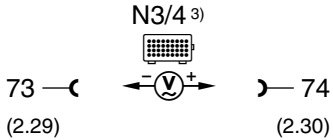
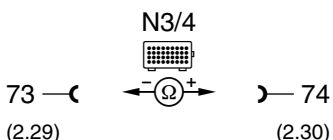
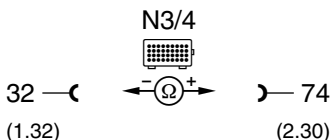
Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0		<p>Ignition coil (T1/1) Voltage supply</p> <p>Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p>	<p>N3/4 </p> <p>33 — ⌋ ← — V — + → — 53 (1.33) (2.9)</p> <p>N3/4 </p> <p>33 — ⌋ ← — V — + → — 65 (1.33) (2.21)</p>	<p>Ignition: ON</p> <p>Starter: Crank</p>	<p>11 – 14 V</p> <p>> 6 V</p>	<p>Wire to T1/1, Ignition coil T1/1, Engine control module (N3/4).</p>
5.0		<p>Ignition coil (T1/2) Voltage supply</p> <p>Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p>	<p>N3/4 </p> <p>33 — ⌋ ← — V — + → — 54 (1.33) (2.10)</p> <p>N3/4 </p> <p>33 — ⌋ ← — V — + → — 53 (1.33) (2.9)</p>	<p>Ignition: ON</p> <p>Starter: Crank</p>	<p>11 – 14 V</p> <p>> 6 V</p>	<p>Wire to T1/2, Ignition coil T1/2, Engine control module (N3/4).</p>

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0		<p>Ignition coil (T1/3) Voltage supply</p> <p>Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p>	<p style="text-align: center;">N3/4 </p> <p>33 —  ←  →  — 65</p> <p>(1.33) (2.21)</p> <p style="text-align: center;">N3/4 </p> <p>33 —  ←  →  — 54</p> <p>(1.33) (2.10)</p>	<p>Ignition: ON</p> <p>Starter: Crank</p>	<p>11 – 14 V</p> <p>> 6 V</p>	<p>Wire to T1/3, Ignition coil T1/3, Engine control module (N3/4).</p>

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.0	064 065 066	CKP sensor (L5)	<p>N3/4 ²⁾</p>  <p>73 — 74 (2.29) (2.30)</p> <p>N3/4 ³⁾</p>  <p>73 — 74 (2.29) (2.30)</p>	<p>Starter: Crank</p> <p>Starter: Crank</p> <p>Engine: at Idle</p>	<p>Signal, see Figure 1 and 2.</p> <p>> 0.4 V</p> <p>> 1 V ⁴⁾</p>	<p>⇒ 7.1, Segments (magnets) on starter ring gear.</p>
7.1		Resistance of L5	<p>N3/4</p>  <p>73 — 74 (2.29) (2.30)</p>	<p>Ignition: OFF</p> <p>Unplug connector 2 on engine control module (N3/4).</p>	700 – 1400 Ω	⇒ 7.2
7.2		Insulation of L5	<p>N3/4</p>  <p>32 — 74 (1.32) (2.30)</p>	<p>Ignition: OFF</p> <p>Unplug connector 2 on engine control module (N3/4).</p>	> 20 kΩ	CKP sensor (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
8.0		Model 124, 129, 140, 202 CMP sensor (L5/1)	<p>N3/4 ²⁾</p> <p>63 — 63 (2.19) 52 (2.8)</p> <p>N3/4 ³⁾</p> <p>63 — 63 (2.19) 52 (2.8)</p>	Engine: at Idle	Signal, see Figure 3.	⇒ 8.1, Check distance between sensor (L5/1) and pickup (Refer to SMS, Engine 111, Engine Combustion, Job No. 15-2143)
8.1		Resistance of L5/1	<p>N3/4</p> <p>63 — 63 (2.19) 52 (2.8)</p>	Ignition: OFF Unplug connector 2 on engine control module (N3/4).	900 – 1600 Ω	Wiring, ⇒ 8.2
8.2		Insulation of L5/1	<p>N3/4</p> <p>32 — 32 (1.32) 52 (2.8)</p>	Ignition: OFF Unplug connector 2 on engine control module (N3/4).	> 20 kΩ	CMP sensor (L5/1).

2) Test with oscilloscope.

3) Test with multimeter only if oscilloscope is unavailable.

4) Voltage increases with increasing rpm.


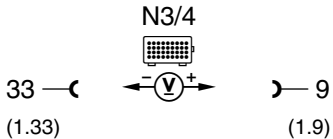
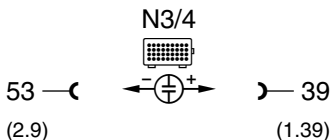
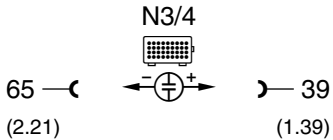
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0		Model 210 Camshaft Hall-effect sensor (B6/1) Signal	<p>N3/4 ²⁾</p> <p>63 —((2.19) —) 52 (2.8)</p> <p>N3/4 ³⁾</p> <p>52 —((2.8) —) 27 (1.27)</p>	<p>Engine: at Idle</p> <p>Engine: at Idle</p>	<p>Signal see Figure 4</p> <p>1.3 – 2 V Value changes</p>	<p>Wiring, ⇒ 9.1, Camshaft Hall-effect sensor (B6/1).</p>
9.1		Camshaft Hall-effect sensor (B6/1) Voltage supply	<p>B6/1</p> <p>1 —(—) 3</p>	<p>Ignition: ON Unplug connector on camshaft Hall-effect sensor and measure at socket 1 (rd/bl) and 3 (pk/gn).</p>	11 – 14 V	Wiring.

²⁾ Test with oscilloscope.


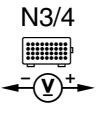
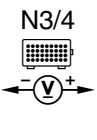
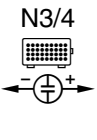
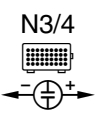
³⁾ Test with multimeter only if oscilloscope is unavailable.

Electrical Test Program – Ignition System Test


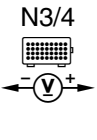
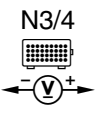
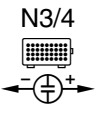
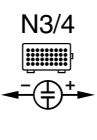
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
10.0	093 094 095 096	Transmission overload protection switch (S65)	 <p>33 — (1.33) 9 — (1.9)</p>	Engine: at Idle Selector lever in transmission range “D” ¹⁾ Selector lever in park/neutral position.	< 1 V > 4 V	Wiring, S65.
11.0	055 056 057	Closure duration for ignition coil (T1/1) Up to end of M.Y. 1995 As of M.Y. 1996	 <p>53 — (2.9) 39 — (1.39)</p>  <p>65 — (2.21) 39 — (1.39)</p>	Starter: Crank Engine: at Idle	20 - 100 ms 2 - 4 ms	⇒ 7.0 Engine control module (N3/4).

¹⁾ Vehicles starting off in first gear must be driven on the dynamometer with selector lever in transmission range “D” at > 12 mph (20 km/h). On vehicles with ASR, sockets 1 and 6 on the data link connector (DTC readout) (X11/4) must be bridged.


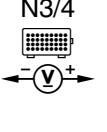
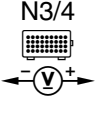
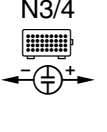
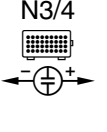
Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
[11.0]		Testing with multimeter: T1/1 Up to end of M.Y. 1995 As of M.Y. 1996	 	Ignition: ON Starter: Crank	0 V 0.3 – 0.5 V	Ignition coil (T1/1), Engine control module (N3/4), < 0.3 V: Open circuit in wire from T1/1 to N3/4, > 0.5 V: T1/1.
12.0	058 059 060	Closure duration for ignition coil (T1/2) Up to end of M.Y. 1995 As of M.Y. 1996	 	Starter: Crank Engine: at Idle	20 – 100 ms 2 – 4 ms	⇒ 7.0, Engine control module (N3/4).



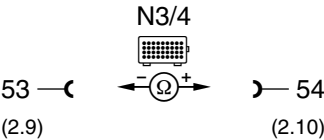
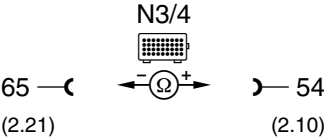
Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
[12.0]		Testing with multimeter: T1/2 Up to end of M.Y. 1995 As of M.Y. 1996	 	Ignition: ON Starter: Crank	0 V 0.3 – 0.5 V	Ignition coil (T1/2), Engine control module (N3/4), < 0.3 V: Open circuit in wire from T1/2 to N3/4, > 0.5 V: T1/2.
13.0	061 062 063	Closure duration for ignition coil (T1/3) Up to end of M.Y. 1995 As of M.Y. 1996	 	Starter: Crank Engine: at Idle	20 – 100 ms 2 – 4 ms	⇒ 7.0, Engine control module (N3/4).

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
[13.0]		Testing with multimeter: T1/3 Up to end of M.Y. 1995 As of M.Y. 1996	 	Ignition: ON Starter: Crank	0 V 0.3 – 0.5 V	Ignition coil (T1/3), Engine control module (N3/4), < 0.3 V: Open circuit in wire from T1/3 to N3/4, > 0.5 V: T1/3.
14.0	055 056 057 107	Primary voltage of ignition coil (T1/1) for cylinder no. 2 and 5 Up to end of M.Y. 1995 As of M.Y. 1996	 	Note to test connection: Primary pattern, measurement range 400 V, duration 100%, voltage signal pick-up connected to T1/1. Starter: Crank	200 – 350 V	⇒ 14.1, Engine control module (N3/4).

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
14.1		Primary winding of T1/1 and T1/2 Up to end of M.Y. 1995 As of M.Y. 1996	<div style="text-align: center;">  </div> <div style="text-align: center; margin-top: 20px;">  </div>	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
15.0	058 059 060 107	<p>Primary voltage of ignition coil (T1/2) for cylinder no. 3 and 4 Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p>	<p>N3/4 54 —((2.10) —(39 (1.39)</p> <p>N3/4 53 —((2.9) —(39 (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	⇒ 15.1, Engine control module (N3/4).
15.1	107	<p>Primary winding of T1/2 and T1/3 Up to end of M.Y. 1995</p> <p>As of M.Y. 1996</p>	<p>N3/4 54 —((2.10) —(65 (2.21)</p> <p>N3/4 53 —((2.9) —(54 (2.10)</p>	Ignition: OFF	0.9 – 1.9 Ω ⁵⁾	Ignition coils (T1/2 or T1/3).

⁵⁾ Resistance of coil T1/2 and T1/3. 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
18.0	058 059 060	Firing voltage of ignition coil (T1/2) for cylinder no. 3 and 4	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	⇒ 18.1, Spark plugs, Spark plug cable, Spark plug connector, Engine control module (N3/4).
18.1		Secondary winding of T1/2	ter. 4a  ter. 4b	Unplug both ignition cables on T1/2.	5.2 – 8.5 kΩ	Ignition coil (T1/2).
19.0	061 062 063	Firing voltage of ignition coil (T1/3) for cylinder no. 1 and 6	Engine analyzer 	Note to test connection: Secondary pattern, measurement range 20 kV, duration 100%, voltage signal pick-up connected to ignition coil (T1/3). Starter: Crank	8 – 30 kV	⇒ 19.1, Spark plugs, Spark plug cable, Spark plug connector, Engine control module (N3/4).
19.1		Secondary winding of T1/3	ter. 4a  ter. 4b	Unplug both ignition cables on T1/3.	5.2 – 8.5 kΩ	Ignition coil (T1/3).

Electrical Test Program – Ignition System Test

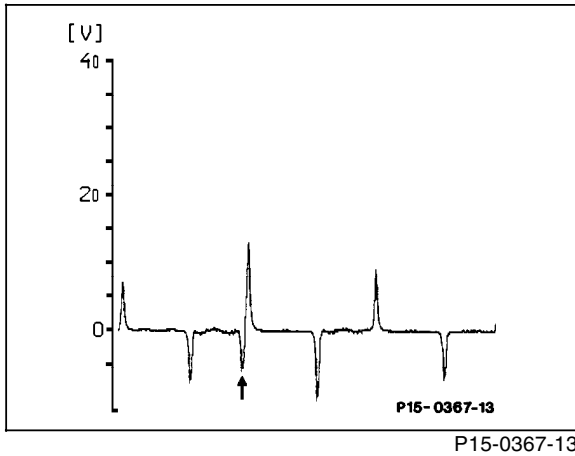


Figure 1
 Model 124, 129, 140, 202
 Crankshaft position sensor (L5) signal
 (arrow = magnet for control of ignition coil T1/1 for cylinder no. 1 and 6)

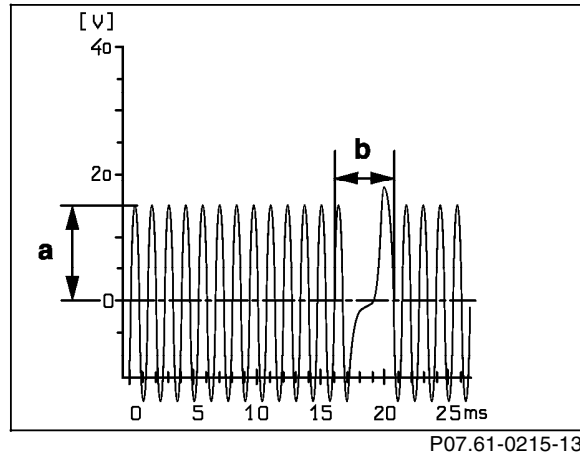


Figure 2
 Model 210
 Crankshaft position sensor (L5) signal
 (b = 2 missing teeth for control of ignition coil T1/1 for cylinder no. 1 and 6)

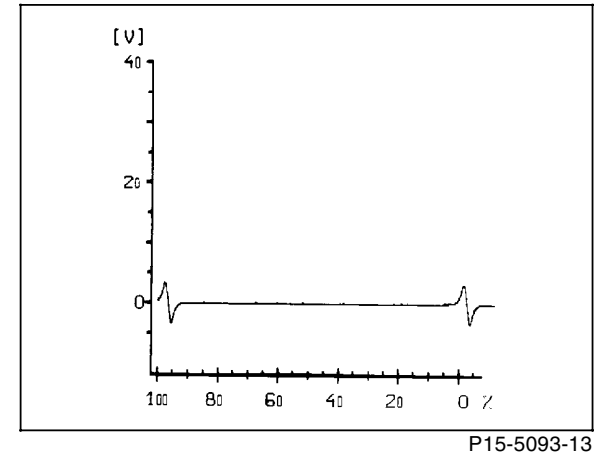


Figure 3
 Model 124, 129, 140, 202
 Camshaft position sensor (L5/1) signal

Electrical Test Program – Ignition System Test

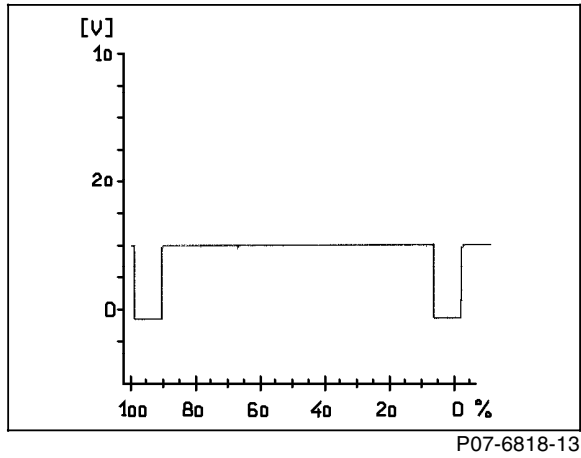


Figure 4
Model 210
Camshaft Hall-effect sensor (B6/1) signal