Electrical Test Program - Test (Engine Does Not Run)

Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 1.0	**Ignition control module (N1/3)** Voltage supply	N1/3 2 (A.2) — V — 3 (A.3)	Connect socket box to N1/3. Ignition: **ON**	11 – 14 V	Wiring, ⇒ 1.1
⇒ 1.1	Ground connection at (W3) (left front wheelhousing)	W3 — V — N1/3 3 (A.3)	Ignition: **ON**	11 – 14 V	Ground (W3) (left front wheelhousing)
⇒ 2.0	**Engine 104:** **Ignition coil (T1)** Voltage supply	W3 — V — T1 Cir. 15	Ignition: **ON**	11 – 14 V	Wiring
	Engine 119: **Ignition coil 1 (T1/1)** **(right cylinder bank) and** **ignition coil 2 (T1/2)** **(left cylinder bank)** Voltage supply	W3 — V — T1/1 or T1/2 Cir. 15	Ignition: **ON**	11 – 14 V	

Electrical Test Program - Test (Engine Does Not Run)

Test step / DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 3.0 17 3)	**Crankshaft position sensor (L5)**	N1/3 1) 18 — ~ — 17	Starter: **Crank**	Signal, see 24, Figure 6 and 7.	⇒ 3.1
		N1/3 2) 18 — V — 17	Starter: **Crank**	> 0.4 V	
⇒ 3.1 17 3)	Resistance from crankshaft position sensor (L5)	N1/3 18 — Ω — 17	Ignition: **OFF**	680 – 1200 Ω	Wiring, Crankshaft position sensor (L5) ⇒ 3.2
⇒ 3.2 17 3)	Insulation of crankshaft position sensor (L5)	N1/3 2 — Ω — 17	Ignition: **OFF** Unplug connector (2) for crankshaft position sensor (L5) at ignition control module (N1/3).	>20 kΩ	Crankshaft position sensor (L5), segments on starter ring gear (24, Figure 10).

1) Test with oscilloscope.

2) Test with multimeter only if oscilloscope is unavailable.

3) Diagnostic trouble code 17 is implemented in the ignition control modules only as of production code 946.

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Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 4.0	**Dwell angle**	Engine analyzer	Engine: **Start**	**M104** 1 – 30° or 1 – 50 % **M119** 9 – 49° or 10 – 54 %	⇒ 3.0, ⇒ 4.1, Ignition control module (N1/3).
⇒ 4.1	Rest current shut–off **Engine 104:**	T1 Cir. 1 – V + Cir. 15	Ignition: **ON**	0 V	Ignition control module (N1/3) and ignition coil (T1)
		T1 Cir. 1 – V + Cir. 15	Engine: **Start**	0.3 – 0.5 V	**< 0.3 V:** Open circuit in wire from ignition coil (T1) to N1/3, **> 0.5 V:** Ignition coil (T1)
	Engine 119:	T1/1 or T1/2 Cir. 1 – V + Cir. 15	Ignition: **ON**	0 V	Ignition control module (N1/3) and T1/1 (right cylinder bank) or T1/2 (left cylinder bank).
		T1/1 or T1/2 Cir. 1 – V + Cir. 15	Engine: **Start**	0.3 – 0.5 V	**< 0.3 V:** Open circuit in wire from ignition coil (T1/1 or T1/2) to N1/3, **> 0.5 V:** Ignition coil (T1/1 or T1/2).

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Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 5.0	**Ignition coil (T1) or ignition coil 1 (T1/1) (right cylinder bank)** Primary voltage **Engine 104:** T1 **Engine 119:** T1/1	Engine analyzer Primary pattern measurement range 400 V, duration 100%, voltage signal pick-up connected to ignition coil (T1 or T1/1).	Engine: **Start**	> 200 – 350 V	Ignition control module (N1/3), Ignition coil (T1 or T1/1).
⇒ 6.0 **Engine 119 only!**	**Ignition coil 2 (T1/2) (left cylinder bank)** Primary voltage	Engine analyzer Primary pattern measurement range 400 V, duration 100%, voltage signal pick-up connected to ignition coil (T1/2).	Engine: **Start**	> 200 – 350 V	Ignition control module (N1/3), Ignition coil (T1/2).
⇒ 7.0	**Primary voltage limitation**	Engine analyzer Secondary overload	Engine: **Start** Accelerate briefly to 3000 rpm.	see 24, Figure 27.	Ignition control module (N1/3).

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Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 8.0	**Ignition coil (T1) or ignition coil 1 (T1/1) (right cylinder bank)** Ignition voltage **Engine 104:** T1 **Engine 119:** T1/1	Engine analyzer Secondary pattern measurement range 10 kV, duration 100%, voltage signal pick-up connected to ignition coil (T1 or T1/1).	Engine: **Start**	8 – 20 kV	⇒ 8.1
⇒ 8.1	Primary winding of ignition coil (T1) or ignition coil 1 (T1/1) **Engine 104:** T1 **Engine 119:** T1/1	T1 or T1/1 Cir. 1 – Ω + Cir. 15	Ignition: **OFF** Disconnect wires of circuit 1 and 15 at ignition coil (T1 or T1/1).	0.3 – 0.6 Ω	Ignition coil (T1 or T1/1), ⇒ 8.2
⇒ 8.2	Secondary winding of ignition coil (T1) or ignition coil 1 (T1/1) **Engine 104:** T1 **Engine 119:** T1/1	T1 or T1/1 Cir. 1 – Ω + Cir. 4	Disconnect wire of circuit 4 from ignition coil (T1 or T1/1).	8 – 13 kΩ	Ignition coil (T1 or T1/1), Ignition control module (N1/3).

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Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 9.0 **Engine 119 only!**	**Ignition coil 2 (T1/2) (left cylinder bank)** Ignition voltage	Engine analyzer Secondary Pattern, measurement range 10 kV, duration 100%, voltage signal pick–up connected to ignition coil T1/2.	Engine: **Start**	> 8 kV	⇒ 9.1
⇒ 9.1	Primary winding of ignition coil 2 (T1/2)	T1/2 Cir. 1 – Ω + Cir. 15	Ignition: **OFF** Disconnect circuits 1 and 15 from the ignition coil.	0.3 – 0.6 Ω	Ignition coil (T1/2), ⇒ 9.2
⇒ 9.2	Secondary winding of ignition coil 2 (T1/2)	T1/2 Cir. 1 – Ω + Cir. 4	Disconnect cable for circuit 4 at ignition coil.	8 – 13 kΩ	Ignition coil (T1/2), Ignition control module (N1/3).

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Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 10.0	**High voltage distributor (S5/3) or left high voltage distributor (S5/5)** Ignition voltage **Engine 104:** S5/3 **Engine 119:** S5/5	Engine analyzer Secondary Parade, measurement range 20 kV, voltage signal pick-up connected to ignition cable for cylinder 5.	Engine: **Start**	8 – 20 kV	⇒ 10.1
⇒ 10.1	Distributor cap (individual terminals)	Distributor cap inside ⊖ Ω ⊕ outside center ⊖ Ω ⊕ center outside electrode	Ignition: **OFF** Remove distributor cap. Unplug ignition cables (Disconnect cables one at a time).	700 – 1300 Ω at each connection	Distributor cap, ⇒ 10.2
⇒ 10.2	Rotor	Rotor center ⊖ Ω ⊕ point	Distributor cap removed.	700 – 1300 Ω	Rotor.

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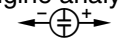
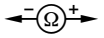
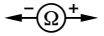
Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 11.0 **Engine 119 only!**	**Right high voltage distributor (S5/6)** Ignition voltage	Engine analyzer  Secondary Parade, Connect voltage signal pick–up to ignition cable for cylinder 1.	Engine: **Start**	8 – 20 kV	⇒ 11.1
⇒ 11.1	Distributor cap (individual terminals)	Distributor cap inside  outside center  center outside electrode	Ignition: **OFF** Remove distributor cap. Unplug ignition cables (Disconnect cables one at a time).	700 – 1300 Ω at each connection	Distributor cap, ⇒ 11.2
⇒ 11.2	Rotor	Rotor center  point	Distributor cap removed.	700 – 1300 Ω	Rotor.
⇒ 12.0	Spark plugs	Visual inspection.	Ignition: **OFF**	Electrode gap 0.8 mm (0.032”)	Replace as required.