

Engine 104.990 starting 01/91

Engine	104.990
Models	140.032
LH-SFI system designation	4.1
Closed throttle (idle) position, check, adjust SMS job No. 07-1100	
Throttle valve angle	° 0.3 – 2
Engine coolant temperature	° C approx. >80
Engine oil temperature	° C approx. 60 – 80
Engine speed (selector lever in P/N position)	rpm 650 – 800
Injection duration	ms 3 – 5
Air mass	kg/h 18 – 22
Hot wire voltage	V 1.3 – 1.7
O2S voltage (oscillates around 300mV after 2 min.)	mV –200 to +1000
On-off ratio readout with ignition: ON	
Engine coolant temperature <70°C	% 50
Engine coolant temperature >70°C	% 50±10 ¹⁾
Self adaptation idle air	kg/h 0±1.5 ²⁾
Self adaptation factor upper/lower range of part load	0.9 – 1.1 ³⁾
Ignition timing with premium unleaded fuel (91 posted/95 RON)	°CKA 6 – 10 ⁴⁾
Air pump after start, max. 20 sec.	<40° C ON
Purging, >46° C intake air	HHT display ON
Exhaust gas recirculation. air mass > 130 kg/h	HHT display ON
Safety fuel shut off > 1100/min	HHT display OFF
Cylinder shut off/ignition miss	HHT display ⁵⁾

- 1) In case of complaint, lambda must be measured at idle speed and at 2500 rpm with purge line to engine disconnected and plugged. Display jumps.
- 2) Base setting idle, 0.0 kg/h (Bosch), mixture tendency **rich**, 0.0 kg/h, mixture tendency **lean** > 0.0 kg/h.
- 3) Base setting part load = 1.0, mixture tendency **rich** <1.0 mixture tendency **lean** > 1.0.
- 4) Refer to DI testing.
- 5) Defective cylinder is highlighted. Further tests to be carried out using engine tester.

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Engine coolant temperature	° C approx. >80
Engine oil temperature	° C approx. 60 – 80
Engine speed (selector lever in P/N position)	rpm 650 – 800
Intake air temperature	° C <30
Altitude	mbar check barometer
Ignition timing with premium unleaded fuel (91 posted/95 RON)	°CKA 6 – 10
Reference resistor DI	HHT display ¹⁾
Transmission overload protection switch (selector lever in P/N position) .	HHT display OFF
LH-SFI control module voltage circuit 30	V 11 – 14
Manifold absolute pressure	mbar 500-650
Knock sensing active	HHT display OFF
Knock retard/cylinder	°CKA 0.0
Combustion voltage/cylinder	V 25 – 70 ²⁾
Combustion duration/cylinder	ms 1.5 – 1.9 ²⁾
Combustion duration difference between cylinders	ms ≤0.3 ²⁾

- 1) Refer to DI reference resistors.
- 2) Display only on Bosch control modules.

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Cold start	
Engine coolant temperature ° C approx.	1) 1)
Engine rpm	1)
Starter signal circuit 50, during starting process HHT display	ON
After start enrichment < 70° C max. 20 sec. HHT display	ON
Closed throttle contact (accelerator pedal not depressed) HHT display	ON
LH-SFI control module voltage circuit 30 V	11 – 14 2)
Fuel pump HHT display	ON
Warmup	
Transmission selector lever position	P/N
Engine coolant temperature ° C approx.	-30 to +30
Closed throttle warmup speed rpm	1100 +100 -50
Engine coolant temperature ° C approx.	> +30 to +80
Closed throttle warmup speed rpm	declines continuously to 650 – 750
Warmup HHT display	<70° C ON >70° C OFF
Closed throttle contact (accelerator pedal not depressed) HHT display	ON 2)
AIR pump after >20 sec. HHT display	OFF
Intake air temperature ° C	>20

1) Temperature at which complaint occurs.

2) Connecting harness to EA: -with open circuit or short to positive indicates OFF constantly.
-with short to ground indicates OFF constantly.

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Engine performance ¹⁾	
Engine speed	rpm 5800
Ignition timing with premium unleaded gasoline (91 posted/95 RON)	°CKA 16 – 20
Injection duration	ms 12 – 17
Air mass	kg/h 360 – 420
Hot wire voltage	V 18 – 22
Altitude	mbar refer to barometer
Wide open throttle recognition	HHT display ON
Acceleration enrichment	HHT display ON
Deceleration fuel shut off >2100 rpm	HHT display ON
Camshaft timing adjustment	HHT display OFF
Vehicle speed signal	km/h >100
Raised shift point 2GR	HHT display OFF
Output, 5-speed AT, transmission range 3	hp 162



¹⁾ These are minimum performance values. Do not exceed speed of 80 mph.

Check performance only at simulated engine coolant temperature of 80 °C (use 2 resistance substitution units).

Engine 104.990 starting 01/91**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
104.990	140	015 545 67 28	0	2.4 kΩ

Note: If the reference resistor is missing, the ignition is retarded 3° at wide open throttle.