

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.

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	
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.

Engine 104.990 starting 01/91

Engine	104.990
Models	140.032
LH-SFI system designation	4.1
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.

Engine 104.990 starting 01/91

Engine	104.990
Models	140.032
LH-SFI system designation	4.1
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.



Refer to Parts Microfiche Gr. 54 to identify control modules.

**Engine 119.970/971 starting 01/91, Engine 119.972 starting 09/92, Engine 119.974 starting 01/92,
Engine 119.975 starting 10/92**

Engine	119.970/971/972/974/975	
Models	124.034/036, 129.067, 140.042/043/051/070	
LH-SFI system designation	4.1	
Closed throttle position (CTP), check, adjust (07-2053 or 07-2056) ¹⁵⁾		
Selector lever position	P/N	D
ECT	° C approx.	>80
Engine oil temperature	° C approx.	60 – 80
Engine speed	rpm	600 – 750
		approx. 620 (M119.970/971) approx. 550 (M119.974/975) 500±50 (M119.972)
Ignition timing with premium unleaded fuel (91 posted/95 RON)	°CKA	5 – 20 ¹⁾
On-off ratio ECT < 70° C	%	50
ECT > 70° C	%	50±10 ²⁾
CTP contact (accelerator pedal not depressed)	HHT display	ON ³⁾

- 1) Refer to DI testing.
- 2) In case of complaint, on-off ratio must be measured at idle speed and at 2500 rpm with purge line to engine disconnected and plugged.
- 3) Connecting harness to EA: -with open circuit or short to positive indicates OFF constantly.
-with short to ground indicates OFF constantly.
- 15) Time Guide operation no. and/or SMS job no.

**Engine 119.970/971 starting 01/91, Engine 119.972 starting 09/92, Engine 119.974 starting 01/92,
Engine 119.975 starting 10/92**

Engine	119.970/971/972/974/975
Models	124.034/036, 129.067, 140.042/043/051/070
LH-SFI system designation	4.1
Engine, check, adjust (07-1100) ¹⁵⁾	
Throttle valve angle	° 0.3 – 2
ECT	° C approx. >80
Engine oil temperature	° C approx. 60 – 80
Engine speed (selector lever in P/N position)	rpm 600 – 750
Injection duration	ms 3 – 5
Air mass	kg/h 20 – 28
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	
ECT <70°C	% 30
ECT >70°C	% 50±10 ²⁾
Self adaptation idle air	kg/h 0±2 ⁴⁾
Self adaptation factor lower/upper range of part load	0.9 – 1.1 ⁵⁾
Ignition timing with premium unleaded fuel (91 posted/95 RON)	°CKA 5 – 20 ^{1) 13)}
LH-SFI reference resistor	HHT display – F – ¹⁴⁾
Air pump after start, maximum of 20 seconds	<40° C ON
Purging, >46° C intake air	HHT display ON
EGR, air mass > 130 kg/h	HHT display ON
Fuel shut off > 1100 rpm	HHT display OFF
Cylinder shut off/ignition miss	HHT display ⁶⁾

- 1) Refer to DI testing.
- 2) In case of complaint, on-off ratio must be measured at idle speed and at 2500 rpm with purge line to engine disconnected and plugged.
- 4) Base setting idle, 0.0 kg/h (Bosch) (VDO), mixture tendency **rich**, < 0.0 kg/h, mixture tendency **lean** > 0.0 kg/h.
- 5) Base setting part load = 1.0, mixture tendency **rich** <1.0, mixture tendency **lean** > 1.0.
- 6) Defective cylinder is highlighted. Further tests to be carried out using engine analyzer.
- 13) In case of complaint, check ignition timing at 2500 ± 200 rpm. Nominal value 38 – 45° with vacuum or check ignition timing under load.
- 14) Display – F – is OK for USA vehicles.
- 15) Time Guide operation no. and/or SMS job no.

**Engine 119.970/971 starting 01/91, Engine 119.972 starting 09/92, Engine 119.974 starting 01/92,
Engine 119.975 starting 10/92**

Engine	119.970/971/972/974/975
Models	124.034/036, 129.067, 140.042/043/051/070
LH-SFI system designation	4.1
Engine, check, adjust (DI) (07-1100) ¹⁵⁾	
ECT	° C approx. >80
Engine oil temperature	° C approx. 60 – 80
Engine speed (selector lever in P/N position)	rpm 600 – 750
IAT	° C <30
Altitude	mbar check barometer
Ignition timing with premium unleaded fuel (91 posted/95 RON)	°CKA 5 – 20 ¹³⁾
Reference resistor DI	HHT display ⁷⁾
Transmission overload protection switch (selector lever in P/N position) .	HHT display OFF
LH-SFI control module voltage, circuit 30	V 11 – 14
MAP	mbar 550-650
KS active	HHT display OFF
Knock retard/cylinder	°CKA 0.0
Combustion voltage/cylinder	V 25 – 70 ⁸⁾
Combustion duration/cylinder	ms 1.5 – 1.9 ⁸⁾
Combustion duration difference between cylinders	ms ≤0.3 ⁸⁾

7) Refer to DI reference resistors.

8) Display only on Bosch control modules.

13) In case of complaint, check ignition timing at 2500 ± 200 rpm. Nominal value 38 – 45° with vacuum or check ignition timing under load.

15) Time Guide operation no. and/or SMS job no.


**Engine 119.970/971 starting 01/91, Engine 119.972 starting 09/92, Engine 119.974 starting 01/92,
Engine 119.975 starting 10/92**

Engine	119.970/971/972/974/975	
Models	124.034/036, 129.067, 140.042/043/051/070	
LH-SFI system designation	4.1	
Cold start		
ECT	° C approx.	⁹⁾
Engine speed	rpm	⁹⁾
Starter signal circuit 50, during cranking	HHT display	ON
After start enrichment < 70° C maximum of 20 seconds	HHT display	ON
CTP contact (accelerator pedal not depressed)	HHT display	ON
LH-SFI control module voltage, circuit 30	V	11 – 14
Fuel pump	HHT display	ON
Warmup		
Transmission selector lever position		P/N
ECT	° C approx.	up to 65
CTP warmup speed	rpm	1000±100
		declines continuously to 600 – 750
Warmup	HHT display	<70° C ON >70° C OFF
CTP contact (accelerator pedal not depressed)	HHT display	ON ³⁾
AIR pump after >20 seconds	HHT display	OFF
IAT	° C	>20


³⁾ Connecting harness to EA: -with open circuit or short to positive indicates OFF constantly.
-with short to ground indicates OFF constantly.

⁹⁾ Temperature at which complaint occurs.

**Engine 119.970 starting 01/91
Engine 119.972 starting 09/92**

Engine	119.970	119.972
Models	140.051/070	129.067
LH-SFI system designation	4.1	4.1
Engine performance ¹⁰⁾ (07-1203 or 07-1206) ¹⁵⁾		
Engine speed	rpm 5500	5500
Ignition timing with premium unleaded gasoline (91 posted/95 RON)	°CKA 23 – 28	23 – 28
Injection duration	ms 12 – 17	12 – 17
Air mass	kg/h 910 – 990	910 – 990
Hot wire voltage	V –	–
Altitude	mbar refer to barometer	refer to barometer
WOT recognition	HHT display ON	ON
Acceleration enrichment	HHT display ON	ON
Deceleration shut off >2100 rpm	HHT display ON	ON
Camshaft timing adjustment >2000 rpm	HHT display OFF	OFF
VSS	mph (km/h) >62 (100)	>62 (100)
Delayed shift point	HHT display OFF	OFF
Output, TR 3	hp 244 ¹¹⁾	237 



¹⁰⁾ These are minimum performance values. Do not exceed speed of 80 mph.

 Check performance only at simulated engine coolant temperature of 80 °C and intake air temperature of 20 °C (use 2 resistance substitution units).


¹¹⁾ Without wide open throttle enrichment.

¹⁵⁾ Time Guide operation no. and/or SMS job no.

Engine 119.971 starting 01/91, Engine 119.974 starting 01/92, Engine 119.975 starting 10/92

Engine	119.971	119.974	119.975
Models	140.042/043	124.036	124.034
LH-SFI system designation	4.1	4.1	4.1
Engine performance ¹⁰⁾ (07-1203 or 07-1206) ¹⁵⁾			
Engine speed rpm	5500	5500	5500
Ignition timing with premium unleaded gasoline (91 posted/95 RON) °CKA	23 – 28	18 – 22	18 – 22
Injection duration ms	12 – 17	12 – 17	12 – 17
Air mass kg/h	910 – 990	910 – 990	910 – 990
Hot wire voltage V	–	–	–
Altitude mbar	refer to barometer	refer to barometer	refer to barometer
WOT recognition HHT display	ON	ON	ON
Acceleration enrichment HHT display	ON	OFF	ON
Deceleration shut off >2100 rpm HHT display	ON	ON	ON
Camshaft timing adjustment >2000 rpm ... HHT display	OFF	ON	OFF
VSS mph (km/h)	>62 (100)	>62 (100)	>62 (100)
Delayed shift point HHT display	OFF	OFF	OFF
Output, TR 3 hp	212 ¹¹⁾	237 	205 

¹⁰⁾ These are minimum performance values. Do not exceed speed of 80 mph.

 Check performance only at simulated engine coolant temperature of 80 °C and intake air temperature of 20 °C (use 2 resistance substitution units).

¹¹⁾ Without wide open throttle enrichment.

¹⁵⁾ Time Guide operation no. and/or SMS job no.

Engine 119.971 starting 01/91, Engine 119.974 starting 01/92, Engine 119.975 starting 10/92

Reference Resistor (DI)

Engine	Model	MB Part No.	Ignition adjustment ° CKA	Resistance Ω/kΩ
119	124 129 140	015 545 67 28	0	2.4 kΩ (premium unleaded 91 posted/95 RON)

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

Engine 120.980 starting 01/91
Engine 120.981 starting 03/92

Engine	120.980/981
Models	140.057/076, 129.076
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 600 – 750
Injection duration	ms 2.8 – 3.2
Air mass	kg/h 14 – 20
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	0.85 – 1.15 ³⁾
Ignition timing with premium unleaded fuel (91 posted/95 RON)	°CKA 5 – 15 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.
- 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.

Engine 120.980 starting 01/91
Engine 120.981 starting 03/92

Engine	120.980/981
Models	140.057/076, 129.076
LH-SFI system designation	4.1
Closed throttle (idle) position, check, adjust SMS job No. 07-1100	
Engine coolant temperature	° C approx. >80
Engine oil temperature	° C approx. 60 – 80
Engine speed (selector lever in P/N position)	rpm 600 – 750
Intake air temperature	° C <30
Altitude	mbar check barometer
Ignition timing with premium unleaded fuel (91 posted/95 RON)	°CKA 5 – 15
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 580-630
Knock sensing active	HHT display OFF
Knock retard/cylinder	°CKA 0.0
Combustion voltage/cylinder	V 25 – 70 ²⁾
Combustion duration/cylinder	ms 1.2 – 1.7 ²⁾
Combustion duration difference between cylinders	ms ≤0.3 ²⁾

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



Engine 120.980 starting 01/91
Engine 120.981 starting 03/92

Engine	120.980/981
Models	140.057/076, 129.076
LH-SFI system designation	4.1
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	850 ⁺¹⁰⁰ -50
Engine coolant temperature ° C approx.	>+30 to +80
Closed throttle warmup speed rpm	declines continuously to 600 – 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.

Engine 120.980 starting 01/91 - 09/92, starting 10/92 2)
Engine 120.981 starting 03/92

Engine	120.980	120.981
Models	140.057/076	129.076
LH-SFI system designation	4.1	4.1
Engine performance 1)		
Engine speed	rpm 3800/4000	4000
Ignition timing with premium unleaded gasoline (91 posted/95 RON)	°CKA 18 – 22	18 – 22
Injection duration	ms 12 – 17	12 – 17
Air mass	kg/h 360 – 420	360 – 420
Hot wire voltage	V 18 – 22	18 – 22
Altitude	mbar refer to barometer	refer to barometer
Wide open throttle recognition	HHT display ON	ON
Acceleration enrichment	HHT display ON	ON
Deceleration fuel shut off >2100 rpm	HHT display ON	ON
Camshaft timing adjustment >2000 rpm	HHT display OFF	OFF
Vehicle speed signal	mph (km/h) >62 (100)	>62 (100)
Raised shift point	HHT display OFF	OFF
Output, transmission range 3	hp 228/248 2) 	243 

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

 Check performance only at simulated engine coolant temperature of 80 °C and intake air temperature of 20 °C (use 2 resistance substitution units).

2) Without wide open throttle enrichment.

Reference Resistor (DI)

Engine	Model	MB Part No.	Ignition adjustment ° CKA	Resistance Ω/kΩ
120.980 120.981	129.076 140.057	015 545 67 28	0	2.4 kΩ (premium unleaded 91 posted/95 RON)

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