

**Engine 102.961 CFI**

Engine	102.961
CFI system designation	2
<b>On-off ratio/DTC readout (CFI)</b> On-off ratio readout with ignition: <b>ON</b> Engine coolant temperature >80°C ..... % - Engine coolant temperature <70°C ..... % -	
<b>Current at EHA</b> Ignition: <b>ON</b> ..... mA 75 – 85 <sup>1)</sup> After start enrichment and warmup After start enrichment at +20 °C engine coolant temperature ..... mA 20 – 28 Warmup base value at +20°C engine coolant temperature ..... mA 11 – 15 Engine coolant temperature +80°C ..... mA 7 – 9 Enrichment during acceleration and at +20°C engine coolant temperature ..... mA >15 Engine at operating temperature Part load mixture correction ..... mA readout oscillates Wide open throttle enrichment at 2000 rpm ..... mA 7 – 9 Deceleration fuel shut off ..... approx. mA -60	

1) Connector on engine coolant temperature sensor disconnected.

**Engine 102.961 CFI**

Engine	102.961
CFI system designation	2
<b>Ignition timing and dwell</b>	
Closed throttle (idle) speed .....	rpm 800±50
Ignition timing with vacuum .....	BTDC 5
Engine speed .....	rpm 4500
Ignition timing without vacuum .....	BTDC 14 – 18 <sup>2)</sup>
Dwell .....	∠° 27 – 54
Dwell .....	% 30 – 60

<sup>2)</sup> Starting 1984 24-28 °CKA BTDC


**Engine 102.961 CFI**

Engine	102.961	
CFI system designation	2	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	850±50	<850
Control range ..... %	25 – 31	<28
..... °	22 – 28	
Vacuum ..... mbar	550 – 650	
Lambda control ..... ontrol range %	2.1 – 4.8 V <sup>3)</sup>	

<sup>3)</sup> Disconnect oxygen sensor connector. Read control value (Volt). Readout must not oscillate. Reconnect oxygen sensor connector, readout oscillates. Test value must not deviate more than ±0.8 Volt from the control value.

Engine	102.961	
CFI system designation	2	
<b>Engine performance <sup>4)</sup></b>		
Engine speed ..... rpm	5200	
Output, manual transmission, 3rd gear ..... hp	88	
Output, 4-speed AT, transmission range 3 ..... hp	83	

<sup>4)</sup> 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 102.985 CFI up to 08/88**

Engine	102.985 up to 1986	102.985 from 1987
CFI system designation	3	3
<b>On-off ratio/DTC readout (CFI)</b>		
On-off ratio readout with ignition: <b>ON</b>		
Engine coolant temperature >80°C .....	% 50	50
Engine coolant temperature <70°C .....	% 30	30
<b>Current at EHA</b>		
Ignition: <b>ON</b> .....	mA -	20
After start enrichment and warmup		
After start enrichment at +20 °C engine coolant temperature .....	mA 13 – 19	13 – 19
Warmup base value at +20°C engine coolant temperature .....	mA 3 – 9	3 – 9
Engine coolant temperature +80°C .....	mA 0±3	0±3
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >15	>15
Engine at operating temperature		
Part load mixture correction .....	mA readout oscillates	readout oscillates
Wide open throttle enrichment at 2000 rpm .....	mA 8 – 11	7 – 9
Deceleration fuel shut off .....	approx. mA -60	-60

**Engine 102.985 CFI up to 08/88**


Engine	102.985
CFI system designation	3
<b>Ignition timing and dwell</b>	
Closed throttle (idle) speed .....	rpm 700 – 800 <sup>4)</sup>
Ignition timing with vacuum .....	BTDC 8 – 12
Engine speed .....	rpm 3200
Ignition timing with vacuum .....	BTDC 39 – 43
Ignition timing without vacuum .....	BTDC 25 – 29
Dwell .....	∠° 27 – 54
Dwell .....	% 30 – 60

4) Closed throttle (idle) speed up to 1986 = 670-770 rpm.


**Engine 102.985 CFI up to 08/88**

Engine	102.985 up to 1986		102.985 from 1987	
CFI system designation	3		3	
<b>Closed throttle (idle)</b>				
Selector lever position/Transmission range .....	P/N	D	P/N	D
Engine oil temperature ..... °C approx.	80	80	80	80
Closed throttle (idle) speed ..... rpm	700 – 800	<750	700 – 800	<750
Control range ..... %	25 – 31	<28	36 – 50	<43
Control range ..... °	22 – 28	–	31 – 45	–
On-off ratio readout during <b>deceleration fuel shut off</b> ..... %	50		50	
Vacuum ..... mbar	550 – 650		550 – 650	
Lambda control ..... ontrol range %	2.1 – 4.8 V <sup>5)</sup>		50±10	

5) Disconnect oxygen sensor connector. Read control value (Volt). Readout must not oscillate. Reconnect oxygen sensor connector, readout oscillates. Test value must not deviate more than ±0.8 Volt from the control value.

Engine	102.985	
CFI system designation	3	
<b>Engine performance <sup>6)</sup></b>		
Engine speed ..... rpm	5000	
Output, manual transmission, 3rd gear ..... hp	96	
Output, 4-speed AT, transmission range 3 ..... hp	94	

6) 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 102.985 CFI from 09/88 to 08/89**

Engine	102.985
CFI system designation	3/3.5
<b>On-off ratio/DTC readout (CFI)</b> On-off ratio readout with ignition: <b>ON</b>	
Engine coolant temperature >80°C .....	% 70 (Federal) 85 (California)
Engine coolant temperature <70°C .....	% -
<b>Current at EHA</b>	
Ignition: <b>ON</b> .....	mA 20
After start enrichment and warmup	
After start enrichment at +20 °C engine coolant temperature .....	mA 13 – 19
Warmup base value at +20°C engine coolant temperature .....	mA 3 – 9
Engine coolant temperature +80°C .....	mA 0±3
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >15
Engine at operating temperature	
Part load mixture correction .....	mA readout oscillates
Wide open throttle enrichment at 2000 rpm .....	mA 7 – 9
Deceleration fuel shut off .....	approx. mA -60 (Bosch CFI control module)
Deceleration fuel shut off .....	approx. mA -50 (VDO CFI control module)

**Engine 102.985 CFI from 09/88 to 08/89**

Engine	102.985
CFI system designation	3/3.5
<b>Ignition timing and dwell</b>	
Closed throttle (idle) speed .....	rpm 700 – 800
Ignition timing with vacuum .....	BTDC 8 – 12
Engine speed .....	rpm 3200
Ignition timing with vacuum .....	BTDC 39 – 43
Ignition timing without vacuum .....	BTDC 23 – 27
Dwell .....	∠° 27 – 54
Dwell .....	% 30 – 60

**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
102.985	201	000 540 24 81	0	750 Ω


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




**Engine 102.985 CFI up to 08/88**

Engine	102.985	
CFI system designation	3/3.5	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	700 – 800	<750
Control range ..... %	43±7	<43
Control range ..... °	38±7	–
On-off ratio readout during <b>deceleration fuel shut off</b> .....	%	50 (Bosch CFI control module)
On-off ratio readout during <b>deceleration fuel shut off</b> .....	%	95 (VDO CFI control module)
Vacuum ..... mbar	550 – 650	
Lambda control ..... control range %	50±10	

5) Disconnect oxygen sensor connector. Read control value (Volt). Readout must not oscillate. Reconnect oxygen sensor connector, readout oscillates. Test value must not deviate more than ±0.8 Volt from the control value.

Engine	102.985	
CFI system designation	3	
<b>Engine performance</b> 4)		
Engine speed ..... rpm	5000	
Output, manual transmission, 3rd gear ..... hp	96	
Output, 4-speed AT, transmission range 3 ..... hp	94	

4) 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 102.985 CFI with PMP from 09/90**

Engine	102.985 from 09/90	
CFI system designation	3	
<b>On-off ratio/DTC readout (CFI)</b>		
On-off ratio readout with ignition: <b>ON</b>		
Engine coolant temperature >80°C .....	%	50
Engine coolant temperature <70°C .....	%	30
Impulse readout, engine at closed throttle (idle) position .....	1 1)	
<b>Current at EHA</b>		
Ignition: <b>ON</b> .....	mA	20
After start enrichment and warmup		
After start enrichment at +20 °C engine coolant temperature .....	mA	7 – 13
Warmup base value at +20°C engine coolant temperature .....	mA	1 – 5
Engine coolant temperature +80°C .....	mA	0±3
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA	>8
Engine at operating temperature		
Part load mixture correction .....	mA	readout oscillates
Wide open throttle enrichment at 2000 rpm .....	mA	8 – 11
Deceleration fuel shut off .....	approx. mA	-60 (Bosch CFI control module)
Deceleration fuel shut off .....	approx. mA	-50 (VDO CFI control module)

Note: For test conditions refer to Diagnostic Manual, Engine Volume 2.

PMP = Partial intake Manifold Preheater

**Engine 102.985 CFI with PMP from 09/90**

Engine	102.985 from 09/90	
CFI system designation	3	
<b>Ignition timing and dwell</b>		
Closed throttle (idle) speed .....	rpm	750±50
Ignition timing with vacuum .....	BTDC	8 – 12
Engine speed .....	rpm	3200
Ignition timing with vacuum .....	BTDC	39 – 43
Ignition timing without vacuum .....	BTDC	22 – 26
Dwell .....	∠°	27 – 54
Dwell .....	%	30 – 60


**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
102.985	201	000 540 24 81	0	750 Ω


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

**Engine 102.985 CFI with PMP from 09/90**

Engine	102.985 from 09/90	
CFI system designation	3	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature .....	°C approx.	80
Closed throttle (idle) speed .....	rpm	750±50 <750
Control range .....	mA	580±50 <580
On-off ratio readout during <b>deceleration fuel shut off</b> .....	%	50 (Bosch CFI control module)
On-off ratio readout during <b>deceleration fuel shut off</b> .....	%	95 (VDO CFI control module)
Engine coolant temperature .....	°C	20
Closed throttle (increased idle) speed .....	rpm	1200±50 max. 28 sec.
Closed throttle (increased idle) speed .....	rpm	800±50
Engine coolant temperature .....	°C	80
Closed throttle (increased idle) speed .....	rpm	1000±50 max. 28 sec.
Vacuum .....	mbar	550 – 650
Lambda control .....	ontrol range %	50±10

Engine	102.985 from 09/90	
CFI system designation	3	
<b>Engine performance</b> <sup>4)</sup>		
Engine speed .....	rpm	5000
Output, manual transmission, 3rd gear .....	hp	96 
Output, 4-speed AT, transmission range 3 .....	hp	94

<sup>4)</sup> 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 102.983 CFI**

Engine	102.983
CFI system designation	3
<b>On-off ratio/DTC readout (CFI)</b> On-off ratio readout with ignition: <b>ON</b>	none
<b>Current at EHA</b> Ignition: <b>ON</b> .....	mA 50
After start enrichment and warmup	
After start enrichment at +20 °C engine coolant temperature .....	mA 1 – 5
Warmup base value at+20°C engine coolant temperature .....	mA –5 to 15
Engine coolant temperature +80°C .....	mA readout oscillates
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >15
Engine at operating temperature	
Part load mixture correction .....	mA readout oscillates
Wide open throttle enrichment at 2000 rpm .....	mA –
Deceleration fuel shut off .....	approx. mA –60

Note: For test conditions refer to Diagnostic Manual, Engine Volume 2.


**Engine 102.983 CFI**

Engine	102.983
CFI system designation	3
<b>Ignition timing and dwell</b>	
Closed throttle (idle) speed .....	rpm 890±50
Ignition timing with vacuum .....	BTDC 14 – 18
Engine speed .....	rpm 4000
Ignition timing with vacuum .....	BTDC 29 – 33 <sup>2)</sup>
Ignition timing without vacuum .....	BTDC 18 – 22 <sup>2)</sup>
Engine speed .....	rpm 3200
Dwell .....	Δ° 27 – 54
Dwell .....	% 30 – 60


<sup>2)</sup> Connector on intake air temperature sensor disconnected.

**Engine 102.983 CFI**

Engine	102.983	
CFI system designation	3	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	890±50	670±50
Control range ..... %	40±5	
Control range ..... Δ°	21 – 27	
On-off ratio readout during <b>deceleration fuel shut off</b> ..... %	50	
Vacuum ..... mbar	550 – 650	
Lambda control ..... ontrol range %	50±10	

Engine	102.983	
CFI system designation	3	
<b>Engine performance</b> <sup>4)</sup>		
Engine speed ..... rpm	5800	
Output, manual transmission, 3rd gear ..... hp	131	
Output, 4-speed AT, transmission range 3 ..... hp	125	

4) 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 103.940/942 CFI**

Engine	103.940/942 up to 08/88	103.940/942 from 09/88	103.940/942 from 09/89
CFI system designation	3.1	3.1	5.2
<b>On-off ratio/DTC readout (CFI)</b> On-off ratio readout with ignition: <b>ON</b>			
Engine coolant temperature >80°C .....	% 70	70	70 (Federal) 85 (California)
Engine coolant temperature <70°C .....	% -	-	-
<b>Current at EHA</b>			
Ignition: <b>ON</b> .....	mA 20	20	20
After start enrichment and warmup			
After start enrichment at +20 °C engine coolant temperature .....	mA 4 – 8	4 – 8; 20 sec. constant	8 – 12; 0 – 8 sec. after start
Warmup base value at +20°C engine coolant temperature .....	mA 0±1	-1 to -5; 60 sec. after start	0 – 1; 14 – 110 sec. after start
Engine coolant temperature +80°C .....	mA 0±3	readout oscillates	readout oscillates
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >15	>15	>15
Engine at operating temperature			
Part load mixture correction .....	mA readout oscillates	readout oscillates	-
Wide open throttle enrichment at 2000 rpm .....	mA 4 – 8	5 – 7	4 – 8
Deceleration fuel shut off .....	approx. mA -60 (Bosch control module)	-60 (Bosch control module)	-40
Deceleration fuel shut off .....	approx. mA -50 (VDO control module)	-50 (VDO control module)	



**Engine 103.940/942 CFI**

Engine	103.940/942
CFI system designation	3.1/5.2
<b>Ignition timing and dwell</b>	
Closed throttle (idle) speed .....	rpm 650 – 750
Ignition timing with vacuum .....	BTDC 7 – 11
Engine speed .....	rpm 3200
Ignition timing with vacuum .....	BTDC 40 – 44
Ignition timing without vacuum .....	BTDC 25 – 29
Dwell .....	∠° 24 – 53
Dwell .....	% 40 – 88

**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
103.940/942	124/201	000 540 24 81	0	750 Ω

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

**Engine 103.940/942 CFI**

Engine	103.940/942	
CFI system designation	3.1/5.2	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	650 – 750	<650
Control range ..... %	35 – 45	<35
Control range ..... $\Delta^\circ$	21 – 27	
On-off ratio readout during <b>deceleration fuel shut off</b> ..... %	95	
Engine coolant temperature ..... °C	–30 to +25	
Closed throttle warm-up speed ..... rpm	1100±30	
Engine coolant temperature ..... °C	>+25 to +80	
Closed throttle warm-up speed ..... rpm	declines continuously to 700±50	
Vacuum ..... mbar	500 – 650	
Lambda control ..... control range %	3)	

3) Check on-off ratio at 2500 rpm and read mean value with the purge line disconnected and plugged. Compare this value with the closed throttle speed value. The mean value at closed throttle speed must not deviate from the value at 2500 rpm by more than ±10, after 1989 +10.

**Engine 103.940/942 CFI**

Engine	103.940/942	
CFI system designation	3.1/5.2	
<b>Engine performance</b> <sup>4)</sup>		
Engine speed .....	rpm	5500
Output, manual transmission, 3rd gear .....	hp	119
Output, 4-speed AT, transmission range 3 .....	hp	115



<sup>4)</sup> 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 103.981/983/985 CFI**

Engine	103.981/983/985 up to 08/88	103.981/983/985 from 09/88	103.981/983/985 from 09/89
CFI system designation	3.1	3.1	5.2
<b>On-off ratio/DTC readout (CFI)</b>			
On-off ratio readout with ignition: <b>ON</b>			
Engine coolant temperature >80°C .....	% 70	70	70
Engine coolant temperature <70°C .....	% 30	30	30
<b>Current at EHA</b>			
Ignition: <b>ON</b> .....	mA 20	20	20
After start enrichment and warmup			
After start enrichment at +20 °C engine coolant temperature .....	mA 4 – 8	4 – 8; 20 sec. constant	8 – 12; 0 – 8 sec. after start
Warmup base value at +20°C engine coolant temperature .....	mA 0±1	-1 to -5; 60 sec. after start	±0 – 1; 14 – 110 sec. after start
Engine coolant temperature +80°C .....	mA 0±3	readout oscillates	readout oscillates
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >15	>15	>15
Engine at operating temperature			
Part load mixture correction .....	mA readout oscillates	readout oscillates	–
Wide open throttle enrichment at 2000 rpm .....	mA 4 – 8	5 – 9	4 – 8
Deceleration fuel shut off .....	approx. mA -60 (Bosch control module)	-60 (Bosch control module)	-40
Deceleration fuel shut off .....	approx. mA -50 (VDO control module)	-50 (VDO control module)	

**Engine 103.981/983/985 CFI**

Engine	103.981/983/985	
CFI system designation	3.1/5.2	
<b>Ignition timing and dwell</b>		
Engine speed .....	rpm	650 – 750
Ignition timing with vacuum .....	BTDC	6 – 11
Engine speed .....	rpm	3200
Ignition timing with vacuum .....	BTDC	40 – 44
Ignition timing without vacuum .....	BTDC	27 – 31
Dwell .....	∠°	24 – 53
Dwell .....	%	40 – 88

**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
103.981/983/985	124/126	000 540 24 81	-6	750 Ω

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

**Engine 103.981/983/985 CFI**

Engine	103.981/983/985	
CFI system designation	3.1/5.2	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	700±50	<700
Control range ..... %	35 – 45	<35
Control range ..... ∠°	21 – 27	
On-off ratio readout during <b>deceleration fuel shut off</b> ..... %	95	
Engine coolant temperature ..... °C	–30 to +25	
Closed throttle warm-up speed ..... rpm	1100±30	
Engine coolant temperature ..... °C	>+25 to +80	
Closed throttle warm-up speed ..... rpm	declines continuously to 700±50	
Vacuum ..... mbar	500 – 650	
Lambda control ..... control range %	2)	

2) Check on-off ratio at 2500 rpm and read mean value with the purge line disconnected and plugged. Compare this value with the closed throttle speed value. the mean value at closed throttle speed must not deviate from the value at 2500 rpm by more than ±10, after 1989 +10.

**Engine 103.940/942 CFI**

Engine	103.940/942
CFI system designation	3.1/5.2
<b>Engine performance</b> <sup>4)</sup>	
Engine speed .....	rpm 5500
Output, manual transmission, 3rd gear .....	hp 134
Output, 4-speed AT, transmission range 3 .....	hp 130



4) 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 104.980/981 CFI from start of production**

Engine	104.980/981
CFI system designation	5.2
<b>On-off ratio/DTC readout (CFI)</b>	
On-off ratio readout with ignition: <b>ON</b>	
Engine coolant temperature >80°C .....	% 50
Engine coolant temperature <70°C .....	% 30
DTC readout, engine at closed throttle .....	1 <sup>1)</sup>
<b>Current at EHA</b>	
Ignition: <b>ON</b> .....	mA 20
After start enrichment and warmup	
After start enrichment at +20 °C engine coolant temperature .....	mA 1 – 3; >0 to <8 sec.
Warmup base value at +20°C engine coolant temperature .....	mA 0 – 1; >12 to 120 sec.
Engine coolant temperature +80°C .....	mA readout oscillates
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >15
Engine at operating temperature	
Part load mixture correction .....	mA readout oscillates
Wide open throttle enrichment at 2000 rpm .....	mA 2 – 4
Deceleration fuel shut off .....	approx. mA –40

1) For test conditions refer to Diagnostic Manual, Engine Vol. 2.



**Engine 104.980/981 CFI from start of production**

Engine	104.980/981	
CFI system designation	5.2	
<b>Ignition timing and dwell</b>		
Engine speed .....	rpm	650–750
Ignition timing with vacuum .....	BTDC	6 – 10
Engine speed .....	rpm	3200
Ignition timing with vacuum .....	BTDC	34 – 38
Ignition timing without vacuum .....	BTDC	21 – 25
Dwell .....	∠°	24 – 53
Dwell .....	%	40 – 88

**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
104.980/981	124/129	015 545 67 28	0	2.4 kΩ

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

**Engine 104.980/981 CFI from start of production**

Engine	104.980/981	
CFI system designation	5.2	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	650 – 750	<700
Control range ..... mA	600±50	<600
On-off ratio readout during <b>deceleration fuel shut-off</b> .....	%	95
Engine coolant temperature ..... °C	–30 to +25	
Closed throttle warm-up speed ..... rpm	1100±30	
Engine coolant temperature ..... °C	>+25 to +80	
Closed throttle warm-up speed ..... rpm	declines continuously to 700±50	
Vacuum ..... mbar	500 – 650	
Lambda control ..... control range %	50±20 <sup>2)</sup>	

<sup>2)</sup> This value must be measured at idle and at 2500 rpm with the purge line disconnected and plugged.

**Engine 104.980/981 CFI from start of production**

Engine	104.980/981	
CFI system designation	5.2	
<b>Engine systems control module (ESCM)</b>		
Cut off speed .....	rpm	7000±50
Kickdown, automatic transmission .....	rpm	6700±50

Engine	104.980/981	
CFI system designation	5.2	
<b>Engine performance</b> <sup>4)</sup>		
Engine speed .....	rpm	5500
Output, manual transmission, 3rd gear, Model 129 .....	hp	176
Output, 4-speed AT, transmission range 3, Model 124 .....	hp	158
Output, 5-speed AT, transmission range 3, Model 129 .....	hp	166



4) 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 116.965 CFI**

Engine	116.965/Federal	116.965/California
CFI system designation	3.1	3.1
<b>On-off ratio/DTC readout (CFI)</b>		
On-off ratio readout with ignition: <b>ON</b> .....	% 70	85
<b>Current at EHA</b>		
Ignition: <b>ON</b> .....	mA 75	75
After start enrichment and warmup		
After start enrichment at +20 °C engine coolant temperature .....	mA 5 – 9; 1100 rpm/40 sec.	5 – 9; 1100 rpm/40 sec.
Warmup base value at +20°C engine coolant temperature .....	mA 0	0
Engine coolant temperature +80°C .....	mA readout oscillates	readout oscillates
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >20	>20
Engine at operating temperature		
Part load mixture correction .....	mA readout oscillates	readout oscillates
Wide open throttle enrichment at 2000 rpm .....	mA 4 – 6	4 – 6
Deceleration fuel shut off .....	approx. mA –60 (Bosch control module)	–60 (Bosch control module)
Deceleration fuel shut off .....	approx. mA –50 (VDO control module)	–50 (VDO control module)

**Engine 116.965 CFI**

Engine	116.965
CFI system designation	3.1
<b>Ignition timing and dwell</b>	
Engine speed .....	rpm 600 – 700
Ignition timing with vacuum .....	BTDC 10 – 14
Ignition timing without vacuum .....	BTDC 3 – 7
Engine speed .....	rpm 3500
Ignition timing with vacuum .....	BTDC 41 – 45
Ignition timing without vacuum .....	BTDC 28 – 32
Dwell .....	Δ° 27 – 40
Dwell .....	% 60 – 89

**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
116.965	126	000 540 24 81	-6	750 Ω


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

**Engine 116.965 CFI**


Engine	116.965	
CFI system designation	3.1	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	650 <sup>+100</sup> -50	<650
Control range .....	mA 700 – 1000	<700
On-off ratio readout during <b>deceleration fuel shut off</b> .....	% 95	
Vacuum .....	mbar 550 – 650	
Lambda control .....	ontrol range % <sup>2)</sup>	

<sup>2)</sup> Check on-off ratio at 2500 rpm and read mean value with the purge line disconnected and plugged.  
 Compare this value with the closed throttle speed value. The mean value at closed throttle speed must be higher by 5 but not more than 15.  
 From 1988 the mean value at closed throttle speed must not deviate from the value at 2500 rpm by more than ±10.

**Engine 116.965 CFI**

Engine	116.965
CFI system designation	3.1
<b>Engine performance</b> <sup>4)</sup>	
Engine speed .....	rpm 5200
Output, 4-speed AT, transmission range 3 .....	hp 162 

<sup>4)</sup> 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 117.967/968 CFI**

Engine	117.967/968 - Federal	117.967/968 - California
CFI system designation	3	3
<b>On-off ratio/DTC readout (CFI)</b>		
On-off ratio readout with ignition: <b>ON</b> .....	% 70	85
<b>Current at EHA</b>		
Ignition: <b>ON</b> .....	mA 75	75
After start enrichment and warmup		
After start enrichment at +20 °C engine coolant temperature .....	mA 5 – 9; 1100 rpm/40 sec.	5 – 9; 1100 rpm/40 sec.
Warmup base value at +20°C engine coolant temperature .....	mA 0	0
Engine coolant temperature +80°C .....	mA readout oscillates	readout oscillates
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >20	>20
Engine at operating temperature		
Part load mixture correction .....	mA readout oscillates	readout oscillates
Wide open throttle enrichment at 2000 rpm .....	mA 4 – 6	4 – 6
Deceleration fuel shut off .....	approx. mA –60 (Bosch control module)	–60 (Bosch control module)
Deceleration fuel shut off .....	approx. mA –50 (VDO control module)	–50 (VDO control module)



**Engine 117.967/968 CFI**

Engine	117.967/968	
CFI system designation	3	
<b>Ignition timing and dwell</b>		
Engine speed .....	rpm	650 <sup>+100</sup> -50
Ignition timing with vacuum .....	BTDC	10 – 14
Ignition timing without vacuum .....	BTDC	3 – 7
Engine speed .....	rpm	3500
Ignition timing with vacuum .....	BTDC	40 – 44
Ignition timing without vacuum .....	BTDC	24 – 28
Dwell .....	Δ°	27 – 40
Dwell .....	%	60 – 89

**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
116.965	126	000 540 24 81	-6	750 Ω


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

**Engine 117.967/968 CFI**


Engine	117.967/968	
CFI system designation	3	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	650 <sup>+100</sup> -50	<650
Control range .....	mA 700 – 1000	<700
On-off ratio readout during <b>deceleration fuel shut off</b> .....	% 95	
Vacuum .....	mbar 550 – 650	
Lambda control .....	ontrol range % <sup>3)</sup>	

<sup>3)</sup> Check on-off ratio at 2500 rpm and read mean value with the purge line disconnected and plugged.  
 Compare this value with the closed throttle speed value. The mean value at closed throttle speed must be higher by 5 but not more than 15.  
 From 1988 the mean value at closed throttle speed must not deviate from the value at 2500 rpm by more than ±10.

**Engine 117.967/968 CFI**

Engine	117.967/968
CFI system designation	3
<b>Engine performance</b> <sup>4)</sup>	
Engine speed .....	rpm 4800
Output, 4-speed AT, transmission range 3 .....	hp 180 

<sup>4)</sup> 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 119.960 CFI since start of production**

Engine	119.960
CFI system designation	5.1
<b>On-off ratio/DTC readout (CFI)</b>	
On-off ratio readout with Ignition: <b>ON</b>	
Engine coolant temperature >80°C .....	% 50
Engine coolant temperature <70°C .....	% 30
On-off ratio readout during <b>deceleration fuel shut off</b> .....	% 95
DTC readout, engine at idle .....	1 <sup>1)</sup>
<b>Current at EHA</b>	
Ignition: <b>ON</b> .....	mA 75
After start enrichment and warm up	
After start enrichment at +20°C engine coolant temperature .....	mA 5 – 8; >0 to <15 sec.
Warm up base value at +20°C engine coolant temperature .....	mA 0; >120 sec. after start
Engine coolant temperature +80°C .....	mA Readout fluctuates
Enrichment during acceleration and at +20°C engine coolant temperature .....	mA >20
Engine at operating temperature	
Part load mixture correction .....	mA Readout fluctuates
Wide open throttle enrichment at 2000/rpm .....	mA 5 – 8
Deceleration fuel shut off .....	mA –40 to –60

1) For test conditions, see Diagnostic Manual, Engines Vol. 2.

**Engine 119.960 CFI since start of production**

Engine	119.960
CFI system designation	5.1
<b>Ignition timing and dwell</b>	
Engine speed (Idle) .....	rpm 600 – 750
Ignition timing with vacuum .....	°BTDC 14 – 18
Ignition timing without vacuum .....	° -1 to +3
Engine speed .....	rpm 3200
Ignition timing with vacuum .....	°BTDC 35 – 39
Ignition timing without vacuum .....	°BTDC -
Dwell (in distributor °) .....	◀° 27 – 54
Dwell %	30 – 60

**Reference Resistor (DI)**

Engine	Model	MB Part No.	Ignition adjustment ° CA	Resistance Ω/kΩ
119.960	129	015 545 67 28	0	2.4 kΩ

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

**Engine 119.960 CFI since start of production**

Engine	119.960	
CFI system designation	5.1	
<b>Closed throttle (idle)</b>		
Selector lever position/Transmission range .....	P/N	D
Engine oil temperature ..... °C approx.	80	80
Closed throttle (idle) speed ..... rpm	600 – 750	<650
Control range ..... mA	700 – 1000	<900
On-off ratio readout during <b>deceleration fuel shut off</b> ..... %	95	
Engine coolant temperature ..... °C	to 65	
Closed throttle warm-up speed ..... rpm	1000±100	
Engine coolant temperature ..... °C	>+30 to +80	
Closed throttle warm-up speed ..... rpm	declines continuously to 600 – 750	
Vacuum ..... mbar	550 – 650	
Lambda control ..... Control range %	50±20 <sup>2)</sup>	

<sup>2)</sup> This value must be measured at idle and at 2500 with the purge line disconnected and plugged.

**Engine 119.960 CFI since start of production**

Engine	119.960
CFI system designation	5.1
<b>Engine systems control module (ESCM)</b>	
Cut off speed .....	rpm 6000±50
Temporary max. engine speed .....	rpm 6300±50
Kickdown, automatic transmission .....	rpm 5850±50

Engine	119.960
CFI system designation	5.1
<b>Engine performance</b> <sup>4)</sup>	
Engine speed .....	rpm 5500
Output, 4-speed AT, transmission range 3 .....	hp 244
Ignition timing with premium unleaded gasoline .....	°CKA 18 – 22



<sup>4)</sup> 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)