



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

Engine 111.973 as of 09/96

Engine	111.973
Models	170.447
ME-SFI system designation	2.1
Closed throttle (idle) position, check, adjust 07-2053 or 07-2056	
Engine oil temperature ° C	>60
Selector lever position	P/N
Engine speed rpm	P/N: 680 – 850 D: <650
CTP recognition (accelerator pedal not depressed) HHT display	ON
On-off ratio before TWC %	0±25 ¹⁾
Engine coolant temperature ° C approx.	>80

¹⁾ 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.

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Engine	111.973	
Models	170.447	
ME-SFI system designation	2.1	
Engine, check, adjust	07-1100	Page 1
Engine oil level	HHT display	OK
Fuel tank level	HHT display	OK
Engine oil temperature	° C	>60
Engine speed (selector lever in P/N position)	rpm	650 – 850
Air mass	kg/h	8 – 13
MAF voltage (increasing rpm = increasing voltage)	V	1.1 – 1.7
Ignition timing with premium unleaded gasoline (91 posted/95 RON) ¹⁾	° CKA	5 – 20
Injection duration	ms	2 – 4
Adjustable camshaft timing solenoid	HHT display	Off
Camshaft Hall-effect sensor, value jumps	HHT display	55-AA
ECT	° C	>80
Intake air temperature (IAT)	° C	>20
Purge valve on-off ratio	%	0 – 15
Battery voltage	V	10
Actuator	Actual value potentiometer r1	V 4.0 – 4.6
	Actual value potentiometer r2	V 0.3 – 0.9
Pedal value sensor	Nominal value potentiometer r1	V 0.2 – 0.5
	Nominal value potentiometer r2	V 0.1 – 0.4
CTP recognition (accelerator pedal not depressed)	HHT display	ON
WOT recognition	HHT display	OFF

¹⁾ In case of complaint, check ignition timing at full load.

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Engine	111.973
Models	170.447
ME-SFI system designation	2.1
Engine, check, adjust 07-1100 Page 2	
Torque	Nm –
Throttle valve angle	° 1.8 – 3.0
Throttle valve stop learned	HHT display YES
On-off ratio before TWC, ECT >70°C	% 0 ± 25 ²⁾ oscillates
O2S 1 voltage before TWC	mV – 200 to + 1000 ¹²⁾
Self adaptation at partial load	Factor 0.68 – 1.32 ⁵⁾
Self adaptation at idle	ms – 1 to + 1 ⁴⁾
Driving range (selector lever position)	HHT display P/N
A/C compressor, EC pushbutton depressed	HHT display OFF
Purge system	HHT display OFF/ON
Safety fuel shut off	HHT display OFF
Engine/climate control electric cooling fan	
Fan output requirement	
Climate control system	% 0 – 95
Engine	% 0 – 95
Effective fan output, on-off ratio	% 0 – 95

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 at idle, 0.0 kg/h (Bosch) or 0.0% (VDO). Mixture tendency "rich" < 0.0 kg/h or 0.0%. Mixture tendency "lean" > 0.0 kg/h or 0.0%.

5) Base setting partial load = 1.0. Mixture tendency "rich" < 1.0, mixture tendency "lean" = > 1.0.

12) Oscillates around 300 mV after 2 minutes at idle.

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Cold start 07-2321	
Engine oil level	HHT Display OK
Fuel tank level	HHT Display OK
Engine rpm while cranking	rpm > 200
Battery voltage	V 10
Safety fuel shut off	HHT display OFF
ECT	° C 7)
IAT	° C 7)
ECT at starting	° C 7)
CTP recognition (accelerator pedal not depressed)	HHT display ON

7) Proceed complaint related or temperature related.

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Engine	111.973		
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Warmup	07-2023		
Warmup speed ¹²⁾ ECT < 40 °C	rpm	approx. 1150 ± 100	
Warmup speed ¹²⁾ ECT > 40 °C	rpm	approx. 800	
Engine rpm (raised idle speed temperature dependent)			
ECT approx. <0 °C	rpm	P/N: 1000 ± 100	D: 800 ± 100
ECT approx. 0 to +30 °C	rpm	P/N: 800 ± 100	D: 700 ± 100
ECT approx. +30 ° to 40 °C	rpm	P/N: 750 ± 100	D: 650 ± 100
ECT approx. >40 °C	rpm	P/N: 750 ± 100	D: 600 ± 100
CTP recognition (accelerator pedal not depressed)	HHT display	ON	
After start enrichment < 70 °C maximum 50 seconds	HHT display	ON	
TWC heating at idle < 30 °C maximum 50 seconds	HHT display	ON	
O2S 1 heater before TWC	V	-	
A/C compressor	HHT display	OFF	

¹²⁾ Raised idle speed for max. approx. 50 seconds after starting.

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Engine performance ⁷⁾	07-1203 or 07-1206
Engine oil level	HHT display OK
Fuel tank level	HHT display OK
Engine speed	rpm 5200
Air mass	kg/h 440 – 540
MAF sensor voltage	V 4.1 – 4.5
Ignition timing with premium unleaded gasoline (91 posted/95 RON)	°CKA 9 – 13
Injection duration	ms 14 – 17
Adjustable camshaft timing solenoid 4000 rpm	HHT display ON
Adjustable camshaft timing solenoid >4300 rpm	HHT display OFF
Camshaft Hall-effect sensor, value jumps	HHT display 55 – AA
ECT	°C 80 – 100
IAT	°C < 30
Purge valve on-off ratio	% –
Battery voltage	V 10
Driving range 3	hp 147
Altitude (correction value)	Factor –

⁷⁾ These are minimum performance values. Do not exceed speed of 80 mph.
 Simulating engine coolant temperature and intake air temperature is not possible with ME-SFI. When testing WOT position be sure to use an external cooling fan to ensure adequate engine cooling.

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ME-SFI system designation	2.1
Engine performance ⁷⁾ 07-1203 or 1206 Page 2	
Exhaust gas back pressure at 5300 rpm	mbar < 200
Actuator Actual value potentiometer r1	V 0.5 – 1.1
Actual value potentiometer r2	V 3.9 – 4.5
Pedal value sensor Nominal value potentiometer r1	V 4.1 – 4.7
Nominal value potentiometer r2	V 4.1 – 4.7
Throttle valve angle	° 80 – 83
CTP recognition	HHT display OFF
WOT recognition	HHT display ON
Torque	Nm 280 – 300
Knock control approved	HHT display OFF/ON ¹⁴⁾
Knock ignition angle/cylinder	°CKA 0
Knock sensor	V > 0.5
Driving range (selector lever position)	HHT display R, D – 1
A/C compressor, EC pushbutton depressed	HHT display OFF
Transmission overload protection	HHT display OFF
Deceleration shut-off	HHT display OFF
Front axle VSS	mph (km/h) –
Rear axle VSS	mph (km/h) > 62 (100)

⁷⁾ These are minimum performance values. Do not exceed speed of 80 mph.
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¹⁴⁾ HHT display ON if knock control is required.

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Engine	111.973
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Cruise control Brake switch, brake pedal not depressed HHT display Stop lamp switch, brake pedal not depressed HHT display Move CC switch to corresponding position HHT display Safety contact, CC switch actuated HHT display Safety contact, CC switch not actuated HHT display Cruise control HHT display Maintain transmission range HHT display Cruise control shut-off, function HHT display Cruise control shut-off, safety HHT display	OFF OFF V/SP/B/A ON OFF – – – –
Drive authorization system (DAS) DAS and ME-SFI control modules compatible HHT display Engine control module identified HHT display Engine control module locked HHT display Drive authorization activated HHT display Vehicle locked with RCL HHT display Number of starts with not locked control module Number	YES YES YES YES NO 0
Supercharger Air flap/air filter angle ° Magnetic supercharger clutch HHT display Supercharger output efficiency Factor	> 85 ON > 1.3

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Idle Quality	
Rpm deviation/cylinder	revolution/s ² 1)
Rpm deviation cut out threshold	revolution/s ² 0.5 2)
Idle quality failure counter as of 02/96	Number 0
On-off ratio	
Idle speed	rpm 650 – 850
Engine speed	rpm 3500
On-off ratio at WOT and transmission selector lever position 3	% 0±25 constant
On-off ratio at upper partial load and transmission selector lever position “D”, 75 mph (120 km/h), 32 hp (24 kW)	% 0±25 oscillating
On-off ratio at lower partial load and transmission selector lever position “D”, 31 mph (50 km/h), 9 hp (7 kW),	% 0±25 oscillating
Exhaust gas back pressure	mbar <200

1) Entry if value is larger than cut out threshold.

2) Temporary test value.