

■ 1UZ-FE ENGINE

1. Description

The 1UZ-FE engine for the '98 SC400 is basically the same in construction and operation as those of the '98 LS400. Therefore, this section describes the areas in which they differ from those of the '98 LS400.

2. Engine Specifications

1UZ-FE Engine			'98 SC400	'97 SC400
Item				
No. of Cyls. & Arrangement			8-Cylinder, V Type	←
Valve Mechanism			32-Valve DOHC Belt & Gear Drive	←
Combustion Chamber			Pentroof Type	←
Manifold			Cross-Flow	←
Fuel System			SFI	←
Displacement		cm ³ (cu. in.)	3969 (242.1)	←
Bore×Stroke		mm (in.)	87.5×82.5 (3.44×3.25)	←
Compression Ratio			10.5 : 1	10.4 : 1
Max. Output		[SAE-NET]	216 kW @ 6000 rpm (290HP @ 6000rpm)	194 kW @ 5300 rpm (260HP @ 5300 rpm)
Max. Torque		[SAE-NET]	407 N·m @ 4000 rpm (300 ft·lbf @ 4000 rpm)	366 N·m @ 4500 rpm (270 ft·lbf @ 4500 rpm)
Valve Timing	Intake	Open	-14°~36° BTDC	6° BTDC
		Close	64°~14° ABDC	46° BTDC
	Exhaust	Open	46° BBDC	←
		Close	3° ATDC	←
Fuel Octane Number (RON)			96	←
Oil Grade			API SH EC-II, SJ EC or ILSAC	API SH EC-II or ILSAC

3. Major Differences

The features of the 1UZ-FE engine and differences between '98 SC400 and '98 LS400 are listed below.

System	Features	'98 SC400	'98 LS400
Engine Proper	<ul style="list-style-type: none"> ● An upright intake port has been adopted to improve the intake efficiency. ● A taper squish configuration has been adopted to improve the combustion efficiency. ● A steel laminate type cylinder head gasket has been adopted to improve its reliability. ● The cylinder block and the crankshaft have been made more rigid to realize a quieter operation. ● The skirt portion of the piston has been changed in shape and applied with resin coating to reduce friction. 	○	○
Valve Mechanism	<ul style="list-style-type: none"> ● The VVT-i system is used to improve fuel economy, engine performance and exhaust emissions. ● The valve adjusting shim has been changed from the outer shim type to the inner shim type. ● The valve diameter of the intake and exhaust valves has been increased to reduce intake and exhaust resistance. 	○	○
Lubrication System	Reinforcement ribs have been added to the No. 1 oil pan to improve the rigidity of the coupling of the engine with the transmission, and to reduce noise.	○	○
	The inlet of oil strainer has been compacted for weight reduction.	○	○*1
Cooling System	The opening valve diameter of the thermostat has been increased to improve the cooling performance.	○	○
Intake and Exhaust System	<ul style="list-style-type: none"> ● A long port intake manifold is used to improve the engine's torque in the low-to mid speed range. ● ACIS (Acoustic Control Induction System) is used to deliver high power output in all engine speed ranges. 	○	○
	A long tail muffler is used to ensure quieter operation during idling.	—	○
	The construction of the sub-muffler has been changed for quieter operation.	○	—
Fuel System	<ul style="list-style-type: none"> ● A fuel returnless system has been adopted to prevent the internal temperature of the fuel tank from rising and to reduce evaporative emissions. ● An air assist fuel injection system is used to promote atomizing of the fuel for improved fuel economy. ● 4-hole type fuel injectors have been adopted to improve the atomization of fuel. 	○	○
Ignition System	<ul style="list-style-type: none"> ● The DIS (Direct Ignition System) is used to enhance the reliability of the ignition system. ● Iridium-tipped spark plugs have been adopted to improve ignition. 	○	○
Engine Control System	ETCS-i has been adopted to realize excellent controllability and comfort of the vehicle.	○	○
	A diagnosis function for the evaporative emission control system has been added to the diagnosis system.	○	○*2
	The cruise control system and the engine immobiliser system have been integrated with the ECM.	○	○

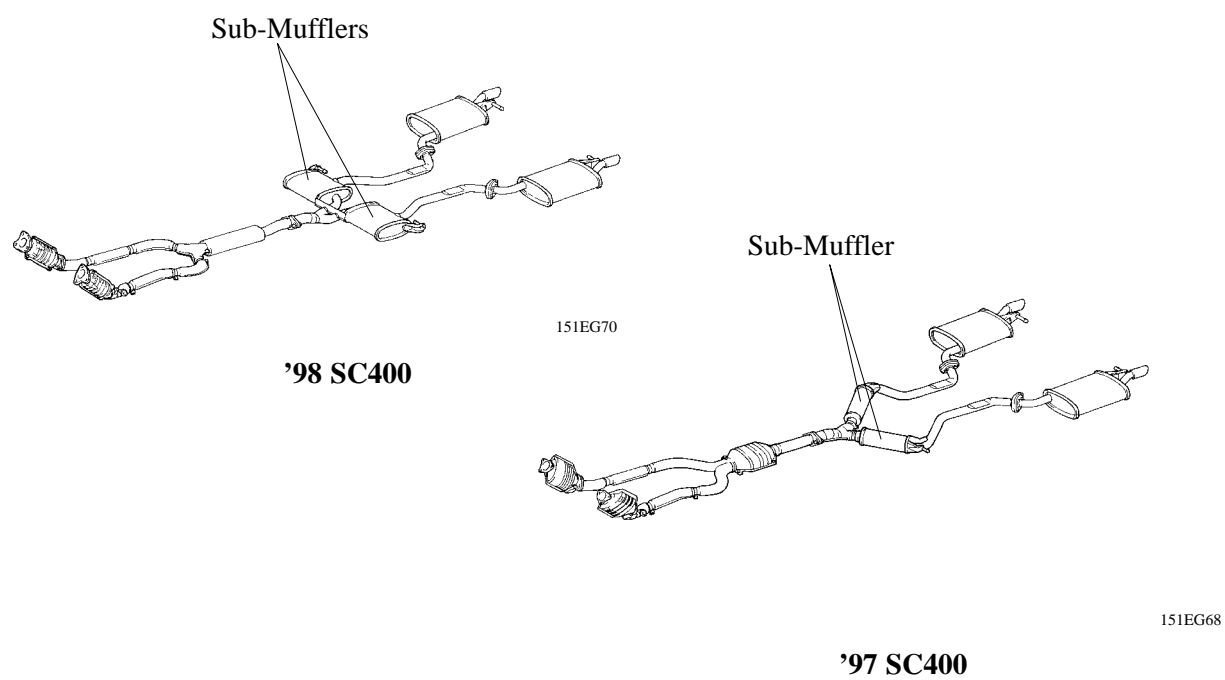
*1: Already in use starting with the '95 model

*2: Already in use starting with the '96 model

4. Intake and Exhaust System

Exhaust Pipe

The configuration of the sub-muffler has been revised to ensure quieter operation.



5. Engine Control System

General

The engine control system of the 1UZ-FE engine for the '98 SC400 is basically the same in construction and operation as that of the 1UZ-FE engine for the '98 LS400.


Comparison of the engine control system between the 1UZ-FE engine for the '98 SC400, '98 LS400 and '97 SC400 is as follows.

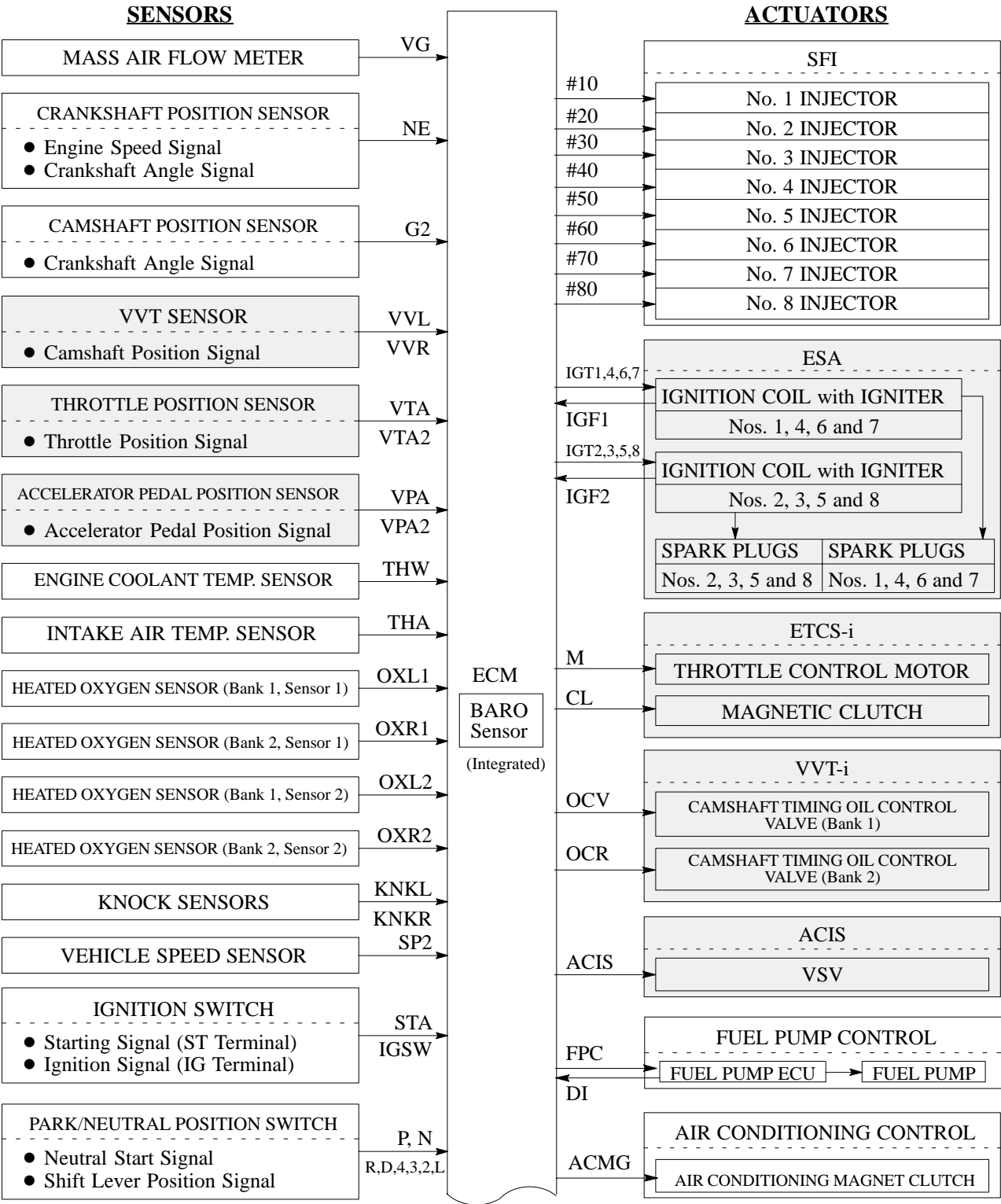
System	Outline	'98 SC400	'97 SC400	'98 LS400
SFI (Sequential Multiport Fuel Injection)	A L-type SFI system directly detects the intake air volume with a hot-wire type mass air flow meter.	○	○	○
	The fuel injection system is a sequential multiport fuel injection system.	○	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. Corrects ignition timing in response to engine knocking.	○	○	○
	The torque control correction during gear shifting has been used to minimize the shift shock.	○	○	○
	2 knock sensors are used to further improve knock detection.	○	○	○
IAC Idle Air Control	A step motor type IAC system controls the fast idle and idle speeds.	—	○	—
VVT-i (Variable Valve Timing-intelligent)	Controls the intake camshaft to an optimal valve timing in accordance with the engine condition.	○	—	○
ETCS-i (Electronic Throttle Control System-intelligent)	Optimally controls the throttle valve opening in accordance with the amount of the accelerator pedal effort, and the conditions of the engine and the vehicle, and comprehensively controls the ISC, cruise control, and the TRAC system.	○	—	○
ACIS (Acoustic Control Induction System)	The intake air passages are switched according to the engine speed and throttle valve opening angle to provide high performance in all speed ranges.	○	—	○
Fuel Pump Control	Under light engine loads, pump speed is low to reduce electric power loss.	—	—	○
	Uses a fuel pump relay and a fuel pump resistor.	○	○	—
Fuel Pressure Control	In hot engine condition, the fuel pressure is increased to improve restartability.	—	○	—
Oxygen Sensor Heater Control	Maintains the temperature of the oxygen sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○	○
Air Conditioning Cut-Off Control	By controlling the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	○	○
EGR Control	Drives the EGR valve with step motor, controlling the EGR volume in accordance with the engine conditions.	—	○	—

(Continued)

System	Outline	'98 SC400	'97 SC400	'98 LS400
Evaporative Emission Control	The ECM controls the purge flow of evaporative emissions (HC) in the charcoal canister in accordance with engine conditions.	○	○	○
Engine Immobiliser	Prohibits fuel delivery and ignition if an attempt is made to start the engine with an invalid ignition key.	○	—	○
Function to communicate with multiplex communication system	Communicates with the body ECU, A/C ECU, etc., on the body side, to input/output necessary signals.	—	—	○
Diagnosis	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	○	○
	The diagnosis system includes a function that detects a malfunction in the evaporative emission control system.	○	○	○
Fail-Safe	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.	○	○	○

Construction

The configuration of the engine control system in the 1UZ-FE engine of the '98 SC400 is as shown in the following chart. Shaded portions  differ from the 1UZ-FE engine of the '97 SC400.



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