■1NR-FE ENGINE

1. General

The major differences between the new 1NR-FE engine and previous 1NR-FE engine are as follows:

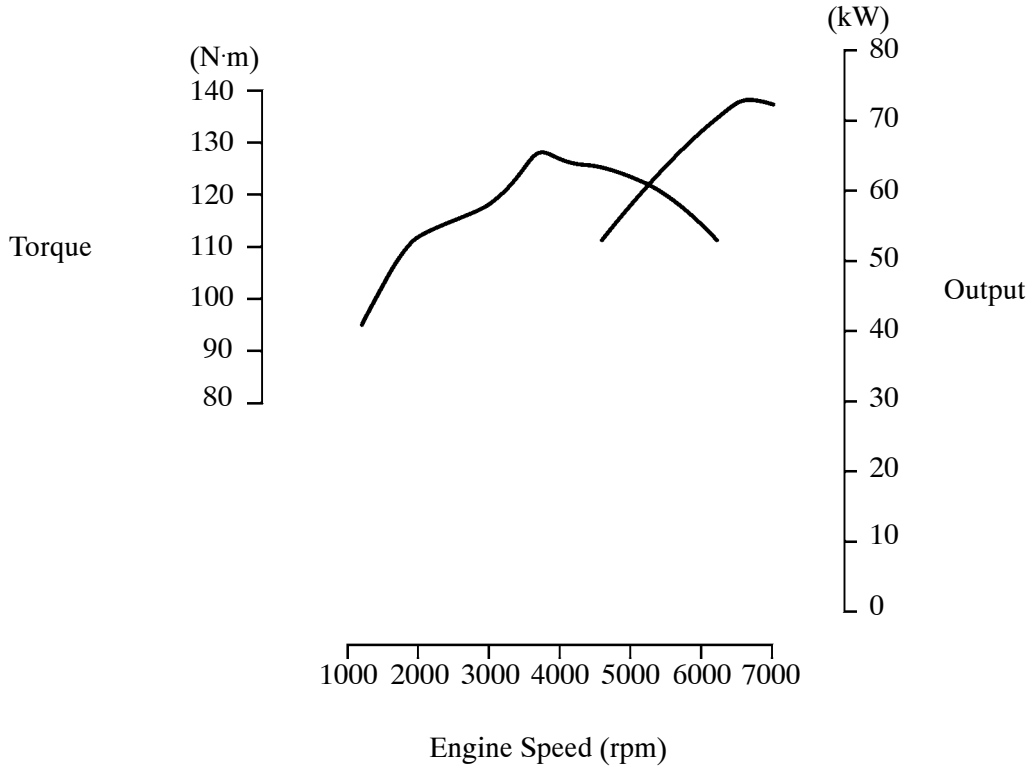
System	Major Difference
Exhaust System	Following changes have been made to meet the EURO 5 regulations. ● The shape of the exhaust manifold has been changed and the size of the port surface area has been made smaller. ● Three-way Catalytic converter (TWC) has been optimized.
Engine Control System	Following changes have been made to meet the EURO 5 regulations. ● The ECM software has been changed. ● A manifold absolute pressure sensor has been added.

▶ Engine Specification ◀

Model			New	Previous
No. of Cyls. & Arrangement			4-cylinder, In-line	←
Valve Mechanism			16-valve DOHC, Chain Drive (with Dual VVT-i)	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross-flow	←
Fuel System			EFI	←
Ignition System			DIS	←
Displacement			1329 cm^3 (81.1 cu. in.)	←
Bore × Stroke			72.5 × 80.5 mm (2.85 × 3.17 in.)	←
Compression Ratio			11.5 : 1	←
Max. Output (EEC)			73 kW @ 6000 rpm	74 kW @ 6000 rpm
Max. Torque (EEC)			128 N·m @ 3800 rpm	132 N·m @ 3800 rpm
Valve Timing	Intake	Open	–10° to 40° BTDC	←
		Closed	69° to 19° ABDC	←
	Exhaust	Open	48° to 3° BBDC	←
		Closed	7° to 52° ATDC	←
Firing Order			1 – 3 – 4 – 2	←
Research Octane Number			95 or higher	←
Emission Regulation			EURO 5	EURO 4
Engine Service Mass* (Reference)			89.5 kg (197 lb)	←

*: The figure shown is the weight of the part including coolant and oil.

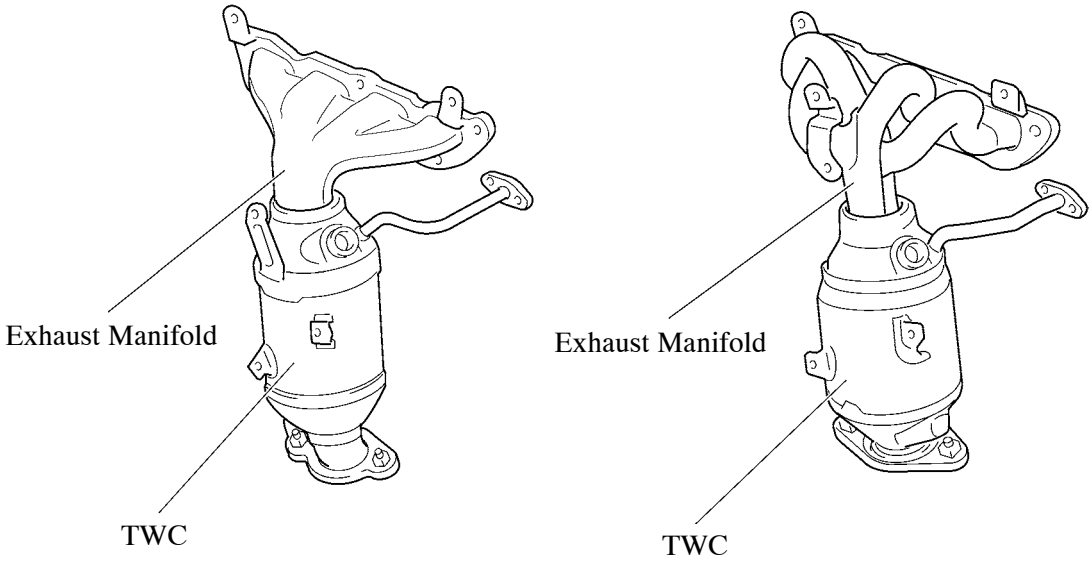
▶ Performance Curve ◀



00SEG324S

2. Exhaust Manifold

- The exhaust manifold has been reduced in length and the port shape has been modified to shorten the period of time required to warm up the catalyst.
- The internal coating material of the Three-way Catalytic converter (TWC) has been optimized, achieving the improvement of exhaust emissions.



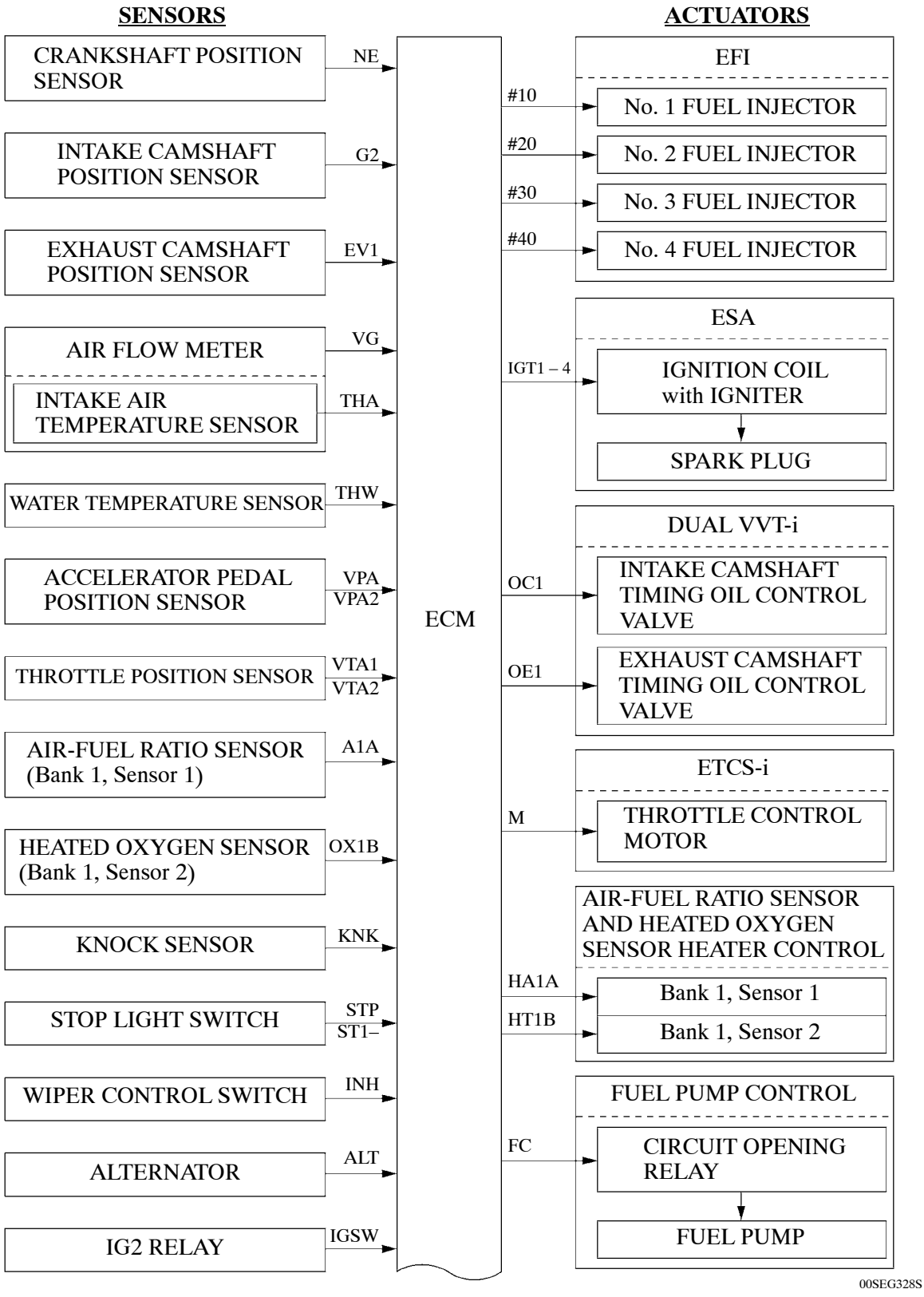
New **Previous**

00SEG323S

3. Engine Control System

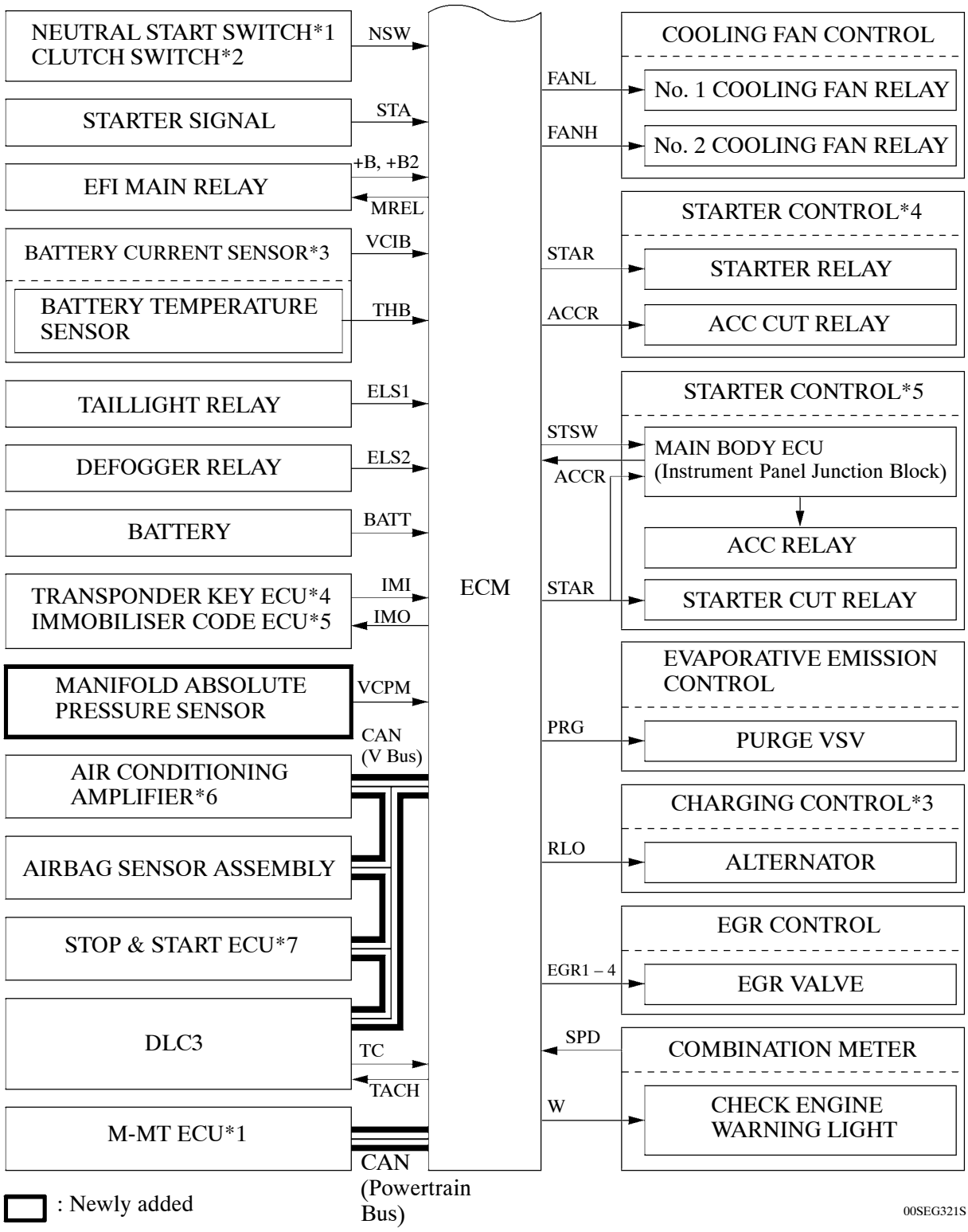
The ECM software has been changed, and a manifold absolute pressure sensor has been added.

▶ Construction ◀



00SEG328S

(Continued)



*1: Models with multi-mode manual transmission
*2: Models with manual transaxle
*3: Models with charging control system
*4: Models without entry and start system
*5: Models with entry and start system
*6: Models with air conditioning system
*7: Models with stop and start system

4. Manifold Absolute Pressure Sensor

- A manifold absolute pressure sensor is used to measure the intake manifold pressure for the purge flow control.
- The sensor consists of a silicon chip that detects the intake pressure.
- The manifold absolute pressure sensor is a semi-conductor type pressure sensor. This type of sensor takes advantage of the electrical resistance change of crystals that occurs when pressure is applied to the crystals (silicon). Using this, the sensor converts the intake pressure to an electrical signal, amplifies it and then sends it to the ECM as an intake pressure signal.

