OVERVIEW

The NSX engine is an all-aluminum, 90-degree, 3.0-liter (2977 cc), dual overhead cam, 4-valve per cylinder, V-6 which produces 270 hp at 7100 rpm when mated to the manual transmission, and 252 hp at 6600 rpm when mated to the automatic transmission. The torque rating is 210 lbs-ft at 5300 rpm for both manual and automatic transmissions. The redline for the manual is 8000 rpm, while that for the automatic is 7500 rpm. Fuel cutoff is 8300 rpm for the manual and 7800 rpm for the automatic.

An exclusive electronically controlled Variable Valve Timing and Lift Electronic Control (VTEC) system optimizes volumetric efficiency at both high and low engine speeds. A unique Variable Volume Induction System changes the configuration of the intake system with varying engine speeds, working with the VTEC system to broaden the torque curve and increase peak power output.

ENGINE BLOCK, CYLINDER HEADS, CRANKSHAFT

To achieve both light weight and durability, the block is made of aluminum alloy with cast-in iron cylinder liners. The crankshaft is a fully counter-weighted forged-steel unit. The cylinder heads are low-pressure cast aluminum. The combustion chamber is a pent-roof design with generous squish area to promote swirl and enhance combustion efficiency. The spark plug is centrally located for optimum flame propagation, and features a platinum tip for improved durability and longer service life.

TITANIUM CONNECTING RODS

The connecting rods are made of a specially patented titanium alloy. While titanium rods are common in Formula One and other race engines, this is the first application of titanium in a production car. Compared to a steel connecting rod for the same engine, these titanium rods each weigh 190 grams less and are significantly stronger.

VARIABLE VALVE TIMING AND LIFT ELECTRONIC CONTROL (VTEC) SYSTEM

Without question, the Variable Valve Timing and Lift Electronic Control (VTEC) system is a breakthrough in engine technology. It convincingly solves the age-old trade-offs between low-end torque and high-end power.

The heart of the VTEC system is a unique camshaft and rocker arm system. For each cylinder's set of two intake (or exhaust) valves, there are three corresponding lobes on the camshaft. The two outboard lobes each have a profile suited for low- to mid-rpm operation. The third, or center, cam lobe has a dramatically different profile designed for longer duration and higher lift; this lobe profile is designed to optimize breathing and horsepower production at high engine speeds. At part throttle and low load operation, this third lobe is inactive and doesn't act on the valves. During high-speed operation, the VTEC computer sends a signal to a spool valve, which in turn delivers engine oil to small pistons in the rocker arms. Oil pressure causes the pistons to slide outward, locking all three rocker arms together. Once locked, the rocker arms are forced to follow the center cam lobe. The cross-over from low lift to high lift occurs in 0.1 second and is virtually undetectable to the driver.

VARIABLE VOLUME INDUCTION SYSTEM

In addition to variable valve timing, the NSX engine also uses a Variable Volume Induction System. This system uses a separate intake air plenum, located beneath the main intake manifold. This second plenum is separated from the primary manifold by six butterfly valves, which open between 4600 and 4900 rpm and are actuated by manifold vacuum.

When the valves open, the added volume of the secondary plenum creates a higher resonance frequency, which in turn creates a sonic pressure wave. This sonic pressure wave hits each pair of intake valves just as they open, promoting more rapid and complete cylinder filling. This system was designed to work in concert with VTEC to improve both low-end torque and high rpm power.

FUEL INJECTION

Programmed Fuel Injection (PGM-FI) ensures that each cylinder receives the precise amount of fuel necessary for the present load and speed conditions. This system has been specially tailored to the unique capabilities of the induction and VTEC systems.

DIRECT IGNITION SYSTEM

To ensure a hot, stable spark at high rpm operation, the single-coil ignition system has been superseded by a coil mounted atop each spark plug, a design similar to that used in Formula One racing engines.

MANUAL TRANSMISSION

The standard manual transmission is designed to provide impressive durability, with short shift throws and quick, precise response. A dual-cone synchronizer is used for second gear, for quicker, smoother shifting, and reverse gear is also equipped with synchromesh. For 1994, the transmission gears have been redesigned for even smoother, quieter operation.

TWIN-DISC CLUTCH

To handle the high torque and power output of the NSX engine, a twin-disc clutch was developed. The twin-disc design increases the torque capacity of the unit, while retaining a light clutch feel and reducing rotating inertia.

AUTOMATIC TRANSMISSION

The optional 4-speed automatic transmission allows the driver to select and hold each gear manually. To enhance smoothness during upshifts and downshifts, an ignition retard control system is used to momentarily reduce engine output. The automatic is also equipped with a programmed lockup torque converter to improve fuel economy and reduce slippage. Lockup is available in third and fourth gear and, unlike other automatic transmissions, it occurs in four increments, rather than one abrupt transition, to provide smooth operation. The transmission is unique in that it maintains lockup while the car is decelerating.

TORQUE CONTROL DIFFERENTIAL

The torque control differential employs a multi-plate clutch and planetary gearset to help maintain vehicle stability at speed in crosswinds and when driving over split-friction surface conditions. The unit reacts to the rotational difference between the rear wheels and attempts to maintain the same rate of rotation at both wheels.

If the NSX should be forced off the intended direction in a crosswind, the differential will detect the rotational difference between the two rear wheels and transfer torque to the slower rotating wheel. This has the effect of directing the car back into the desired path.

TRACTION CONTROL SYSTEM (TCS)

The goal of the Traction Control System (TCS) was to minimize rear wheelspin on slippery or uneven road conditions. This unique development was created as a high-performance system rather than a pure low-speed traction enhancing device. TCS uses the wheel-speed sensors of the Anti-Lock Braking System (ABS) to detect the rotational differences between the two rear wheels. If the computer determines that the surface is slippery, CPU (central processing unit) signals are sent to decrease the amount of air and/or fuel delivered to the engine. The driver can elect to disengage TCS by a switch located on the instrument panel.