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 of the manual is 8000 rpm, while that of the automatic is 7500 rpm.

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 counterweighted 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 rocker arms and 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 low engine rpm, the valves are operated by the outboard lobes. During high-speed operation above 5800 rpm, 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, locking all three rocker arms together. Once locked, the rocker arms are forced to follow the center cam lobe, increasing top end performance. The crossover from low lift to high lift occurs in 0.1 seconds and is virtually undetectable to the driver.

VARIABLE VOLUME INDUCTION SYSTEM

In addition to VTEC, 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. For 1995, a new air-assist mechanism has been adopted to aid fuel atomization for better combustion at low temperatures.

ONBOARD DIAGNOSTIC SYSTEM (OBD-II)

A new onboard diagnostic system has been incorporated into the engine management electronics system. This unit records and stores information on transient engine malfunctions. These can be retrieved through the diagnostic port to facilitate maintenance and repair.

EXHAUST SYSTEM

For 1995, the NSX receives a new and lighter exhaust system. The catalytic converters are now larger, 1.14 liters vs. .96 liters, and have been moved closer to the engine for quicker converter light-up and a consequent reduction in emissions but without any sacrifice in power output. The overall weight of the unit has also been reduced by using spherical joints in the exhaust system rather than conventional flexible tubes. Additionally, the shape of the exhaust tip has been revised from an oval shape to a circular shape.

DIRECT IGNITION SYSTEM

To ensure a hot, stable spark at high rpm operation, the ignition system has 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. Shift throws, in fact, are the shortest of virtually any exotic sports car on the market. A dual-cone synchronizer is used for second gear, for quicker, smoother shifting, and reverse gear is also equipped with synchromesh. For 1995, the second gear ratio has been changed from 1.727:1 to 1.800:1— 4.2% lower. This change was made to improve driveability and provide better response.

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 for quicker throttle response.

SPORTSHIFT AUTOMATIC TRANSMISSION

The optional SportShift 4-speed automatic transmission allows the driver the option of letting the transmission shift automatically in a conventional manner or selecting each gear manually by means of a fingertip control shift lever on the steering column. Inspired by advanced Formula One transmissions, this dual-mode system was created to give the driver of an automatic the same sporting performance feel of a manual. Unlike other similar systems, this one allows the driver to keep both hands on the wheel while selecting a gear. This feature adds to the safety of the vehicle by allowing the driver to concentrate his full attention to the road ahead.

The shift quadrant (PRNDM21) is depicted on the tachometer. SportShift mode is engaged by selecting the M, or manual, position. In M mode, the shift position is illuminated in a window to the right of the shift quadrant. To shift up, the fingertip control lever is moved up, and to shift down, the flipper lever is moved downward. A circuit in the CPU (central processing unit) prevents downshifting that would cause the engine to over-rev.

The automatic is also equipped with a programmed lockup torque converter to improve fuel economy and reduce slippage. In the Sport Shift manual mode, lockup is available in second, third and fourth gear during both acceleration and deceleration.

TORQUE REACTIVE DIFFERENTIAL

A new torque reactive limited slip differential was developed to minimize spinning the inside wheel on NSX models equipped with the manual transmission. This unit uses a multi-plate clutch and new, helical-type planetary gears. When traveling in a straight, the amount of slip between the rear wheels is controlled by the force of a preset spring-loaded disc imparting a force on the multi-plate clutch. In a tight corner, however, the force of the spring-loaded disc is overridden by the thrust force of the new helical-type planetary gears, thus preventing the inside wheel from spinning and enhancing stability. In testing, this unit improved acceleration time out of a corner by 10%.

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 for 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. This differential is on automatic transmission-equipped models only.

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. The TCS uses the wheel-speed sensors of the Anti-Lock Braking System (ABS) to detect the rotational differences between the front and rear wheels as well as a newly developed G-sensor. If the computer determines that the surface is slippery, the 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 the TCS by a switch located on the instrument panel. Refinements in this system increase its sensitivity and lower the threshold at which the TCS is engaged. Using the wheel-speed sensors of the ABS and working in conjunction with the new drive-by-wire throttle system, the TCS engages at impending wheel-slip rather than at the moment of wheel-slip. A new logic circuit also controls stability on sudden deceleration on slippery surfaces.

DRIVE-BY-WIRE THROTTLE

New for 1995 is a drive-by-wire throttle system. This unit replaces the conventional throttle cable arrangement with an all-electronic system that senses the throttle pedal position and relays that information to a computer. The computer, in turn, performs the actual throttle activation instantaneously. The system works by means of a throttle pedal sensor, a throttle angle sensor, an electronic control unit and a step motor to control throttle opening and provide fail-safe throttle operation. This system also helps to enhance the precision of the cruise control system. In addition to this, all electronic control systems have been streamlined to redcue weight and to improve reliability.

3.0-LITER, DOHC, 24-VALVE, V-6 ENGINE

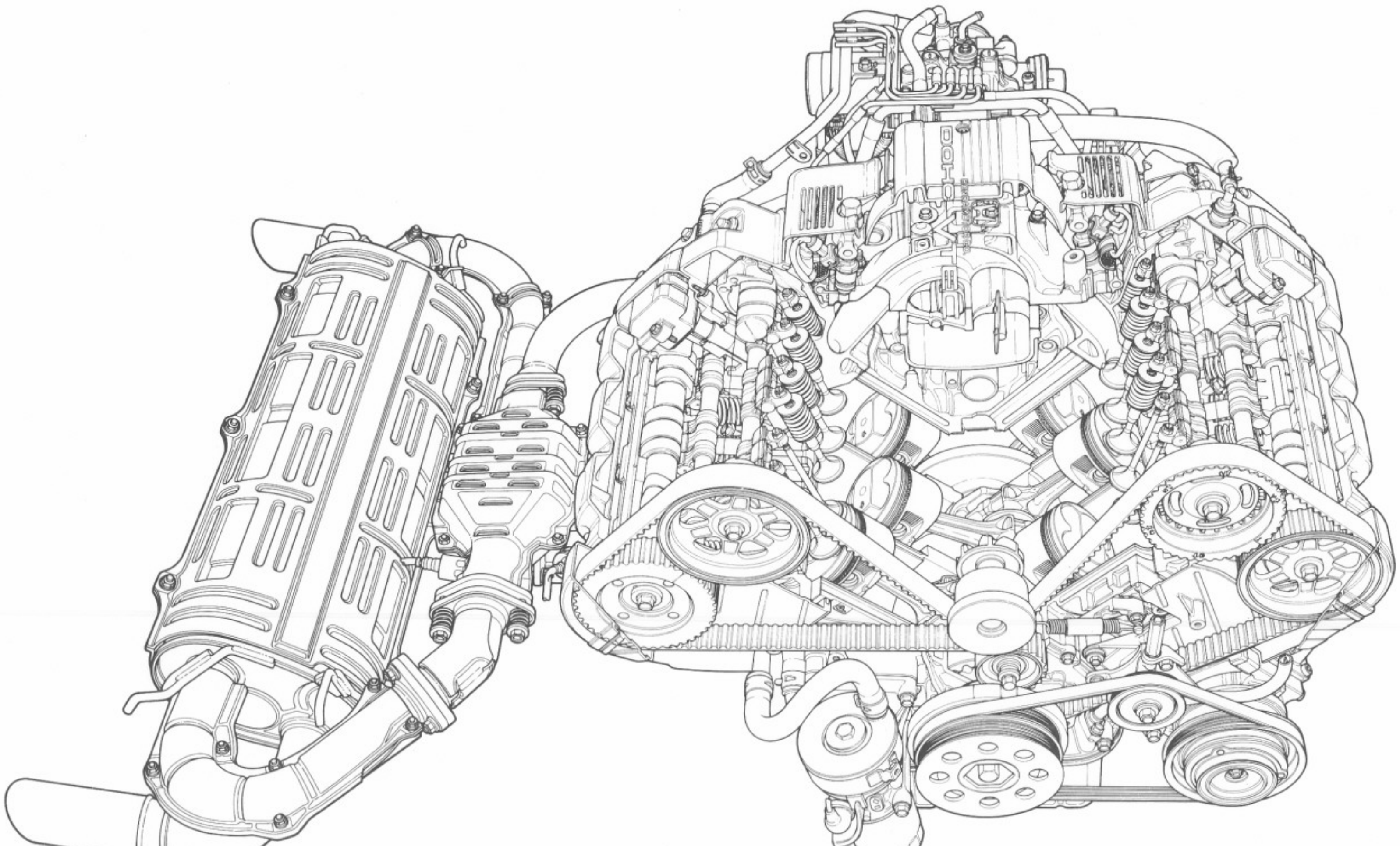
VARIABLE VALVE TIMING AND LIFT ELECTRONIC CONTROL (VTEC) SYSTEM

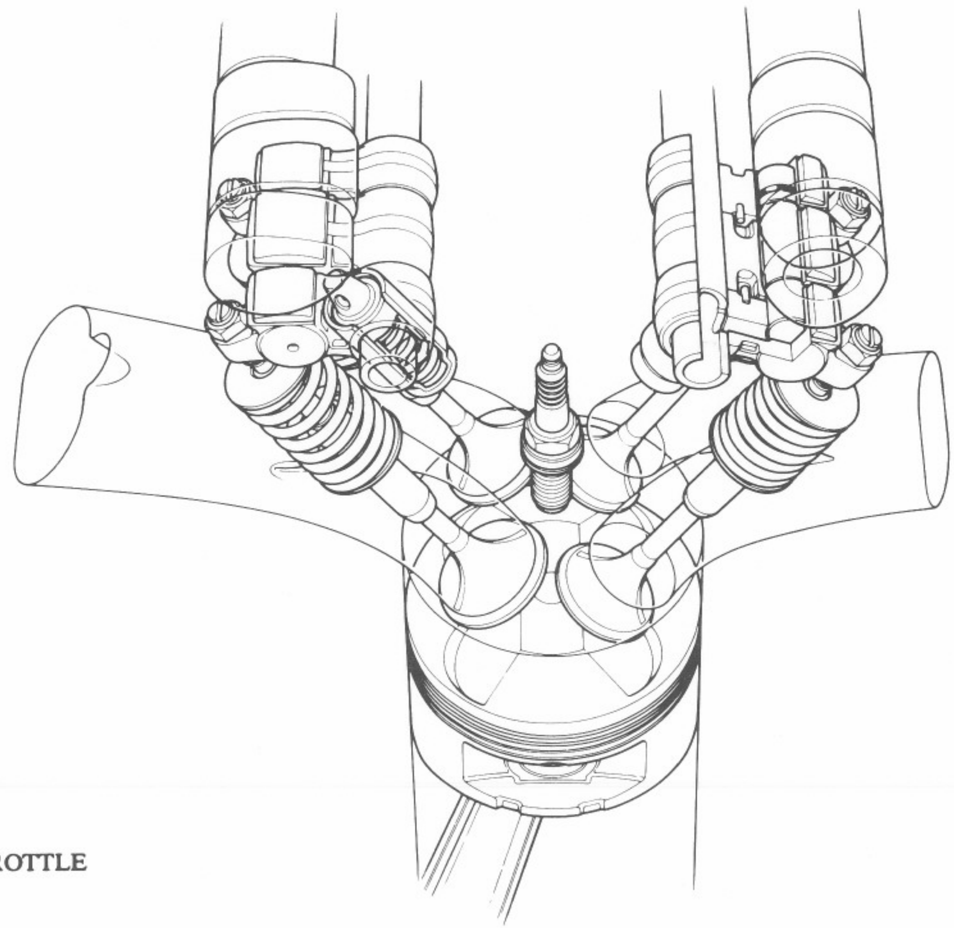
VARIABLE VOLUME INDUCTION SYSTEM

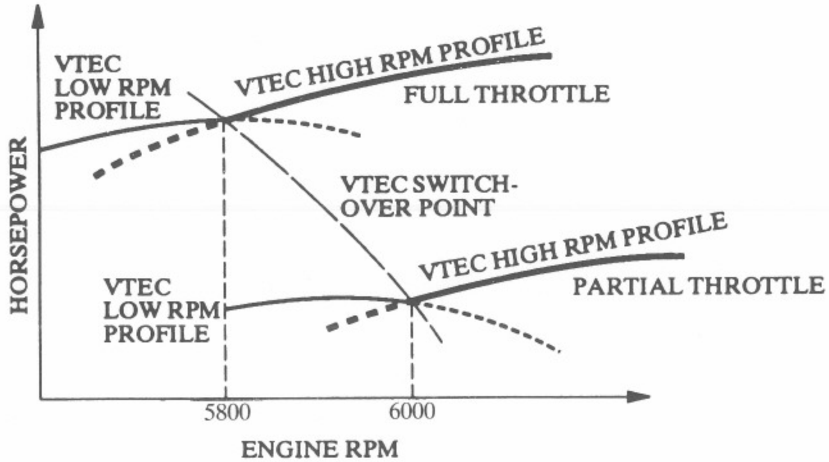
TITANIUM CONNECTING RODS

ONBOARD DIAGNOSTIC SYSTEM (OBD-II)

DIRECT IGNITION SYSTEM (6 INDIVIDUAL COILS)





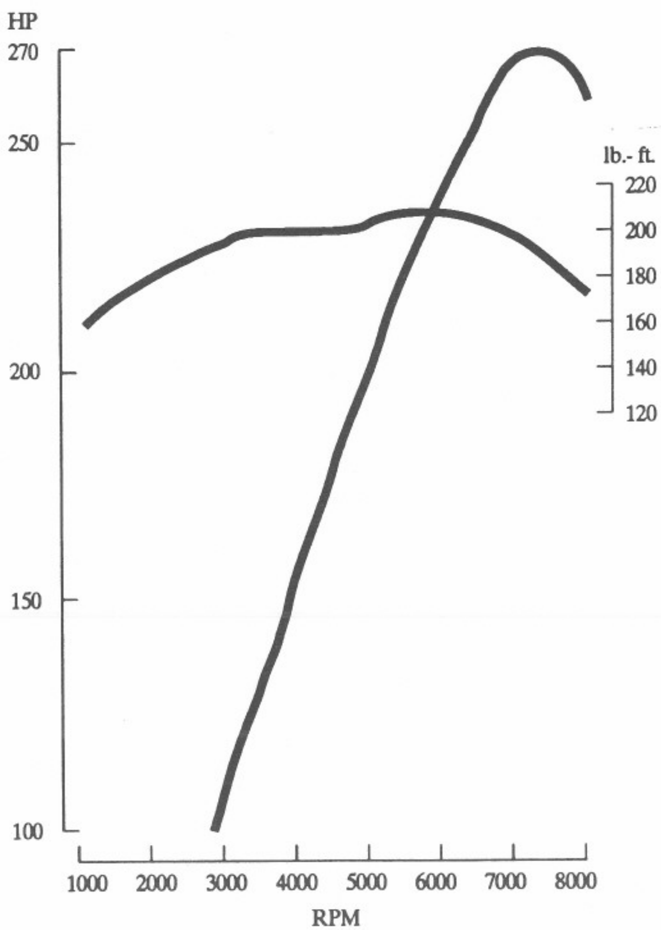

VTEC LOW RPM PROFILE
VTEC HIGH RPM PROFILE
FULL THROTTLE
VTEC SWITCH-OVER POINT
VTEC HIGH RPM PROFILE
PARTIAL THROTTLE
VTEC LOW RPM PROFILE
HORSEPOWER
5800
6000
ENGINE RPM

ENGINE PERFORMANCE CURVE

MANUAL TRANSMISSION

MAXIMUM HORSEPOWER: 270 @ 7100 RPM

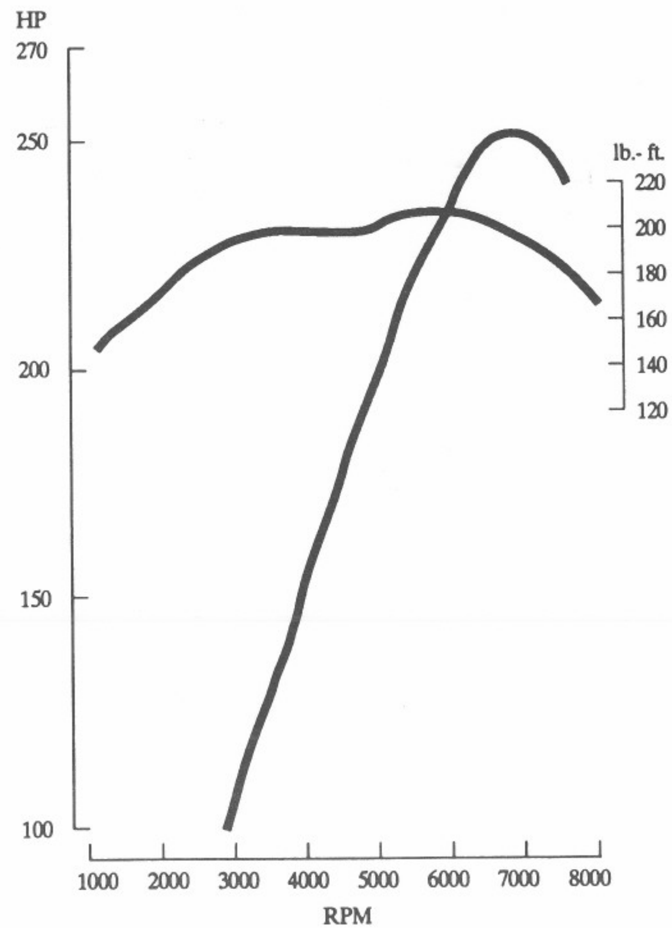
MAXIMUM TORQUE: 210 LBS-FT
@ 5300 RPM



AUTOMATIC TRANSMISSION

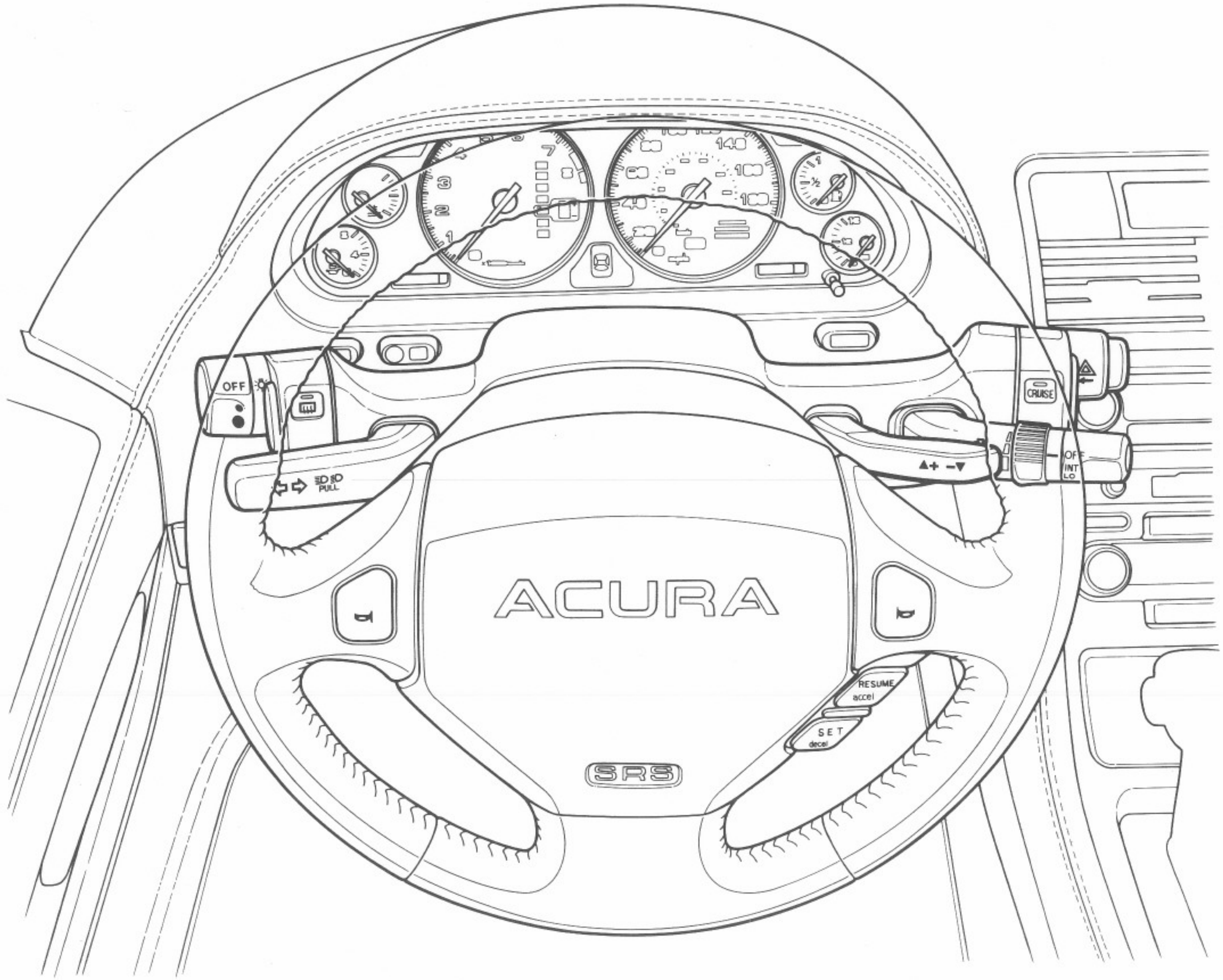
MAXIMUM HORSEPOWER: 252 @ 6600 RPM

MAXIMUM TORQUE: 210 LBS-FT
@ 5300 RPM



COLUMN-MOUNTED FINGER TIP SHIFT CONTROL

GEAR INDICATOR LOCATED IN SHIFT QUADRANT IN TACHOMETER FACE



THROTTLE STEP MOTOR

THROTTLE SENSOR

DRIVE-BY-WIRE ELECTRONIC CONTROL UNIT

1) PROGRAMMED FUEL INJECTION (PGM-FI) ELECTRONIC CONTROL UNIT
2) FUEL INJECTION CENTRAL PROCESSING UNIT
3) DRIVE-BY-WIRE CENTRAL PROCESSING UNIT
4) AUTOMATIC TRANSMISSION ELECTRONIC CONTROL UNIT
5) TRACTION CONTROL ELECTRONIC CONTROL UNIT