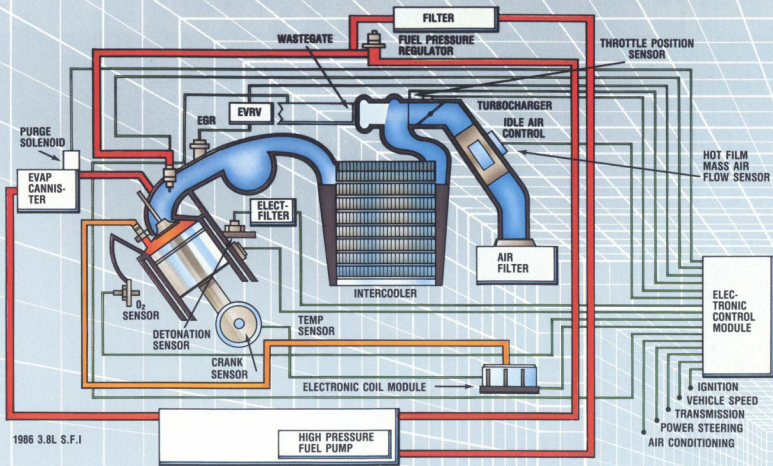


HIGH TECHNOLOGY

FROM BUICK

**INTERCOOLED
3.8 SFI TURBO**



INTERCOOLED 3.8 SFI TURBO

Buick Motor Division has a history of offering sophisticated engines and related control systems. Buick has added an intercooler to the 3.8 litre Sequential Fuel Injected Turbo V6, improving its performance and specific output.

Many innovative features have been incorporated into this engine. The Electronic Control Module (ECM) precisely matches the fuel delivery to engine requirements. Fuel efficiency and emissions are controlled by maintaining a precise fuel to air ratio.

A Mass Air Flow sensor is used to measure incoming air. This sensor is located just ahead of the turbocharger in the intake system and uses a heated film to measure the actual mass of incoming air rather than just the volume. An electronics package is located above the heated film and sends signals to the ECM which are used in calculating the proper fuel to air mixture.

INTERCOOLER OPERATION

The intercooler is mounted directly to the front on the engine, behind the radiator. It is functionally positioned between the turbocharger and the intake manifold. The purpose of the intercooler is to lower the temperature of the air charge.

The intercooler is an air-to-air heat exchanger. Three major parts comprise the unit, including the body which is made of aluminum alloy. It is formed into flattened tubes with cooling fins, which act as cooling passages. At each side of the body are collectors or manifolds, used for ducting the charge air through the intercooler. Manifolds are made of casting alloy, and all of the components are vacuum brazed to form the unit which weighs less than 12 pounds.

Engine vacuum draws air through the air filter. If the air is pressurized by the compressor of the turbocharger, the action of compression and heat diffusion from metal components heats the air

charge. The air charge is then drawn through the intercooler, which is capable of a 27 pounds per minute (350 cubic feet per minute) air flow.

The heat present in the air charge is transferred to the metal walls of the intercooler passages, and to the cooling fins. A cool stream of air from a scoop under the front of the vehicle is ducted to the intercooler, flowing around and through the outside of the body. Heat that has been absorbed by the intercooler is dispersed into the air stream. The air charge is then drawn through the throttle body in a much denser form.

The intake manifold is a two piece cast aluminum construction. It has an open plenum area which gives an air flow that is improved by 10 percent over the 1985 version.



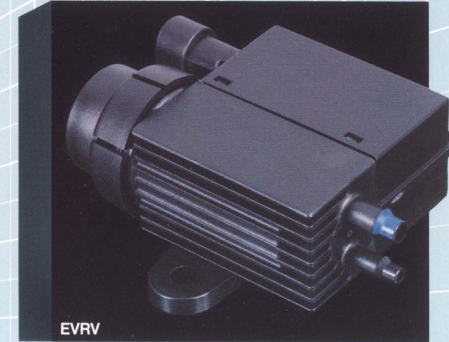
ELECTRONIC CONTROLS

A Computer Controlled Coil Ignition system is used to provide ignition. The system uses an electronic coil module that replaces the conventional distributor and coil. "Hall effect" sensors take position readings from the crank and cam shafts and send the information to the ignition module.

The ignition module and ECM are interconnected. Signals are sent from the module to the ECM, and the calculated spark signals are sent to the module. Digital electronics in the module process the spark signal and trigger the appropriate coil to send an ignition signal to the spark plugs.

An Electronic Spark Control (ESC) is used to modify the calculated spark if detonation is detected. Spark timing is adjusted in a range of up to 30 degrees.

An electronic wastegate is used to control boost pressures. It regulates the amount of exhaust gases that are directed against the turbine. This determines the boost pressure, or amount of



HIGH EFFICIENCY COMPONENTS

A single belt is used to drive all accessory components. This is a Poly-V belt, running on crowned and Poly-V pulleys. This serpentine belt system uses an idler pulley and spring tension to keep constant pressure on the belt. Adjustments are unnecessary, and service life is increased.

An electric cooling fan is mounted directly behind the radiator. It replaces the traditional engine driven cooling fan, functioning in the same role, to draw ambient air through the radiator for engine cooling. It is 15" in diameter, and has a two speed, 200 watt motor to drive the shrouded seven bladed fan.

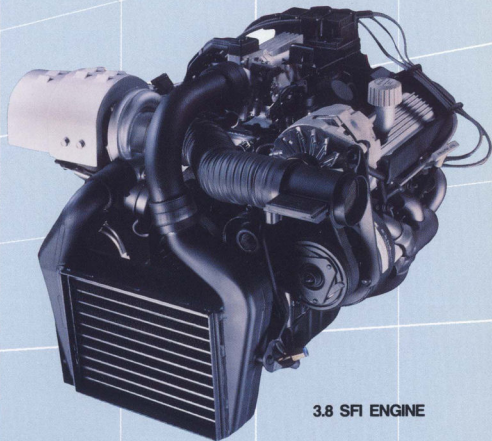
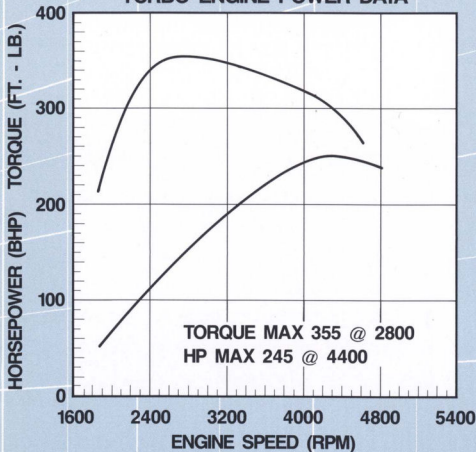
The Sequential Fuel Injection (SFI) system uses a Bosch fuel rail and injectors to precisely meter the injection of fuel into the intake port of each cylinder at the intake stroke.

compressed air that is fed into the engine cylinders. A pulse width modulated solenoid is used to vary the boost rate, providing the maximum boost that is allowable under varying engine and environmental conditions. Boost pressure peaks between 13 and 14 psi.

Buick's Electronic Vacuum Regulator Valve (EVRV) is used to control the Exhaust Gas Recirculation (EGR) system. It has been redesigned for ease of installation in the vehicle manufacturing process. Formerly being of two piece construction, the new EVRV is a single, self-contained integrated unit. All previous internal parts are present in the new model, and functions are the same.

Signals from the ECM are sent to the Constant Current Electronic Circuit (CCEC), which assures the integrity of the output signal. This signal is sent to the vacuum regulator which controls the amount of vacuum that is allowed to act on the EGR valve. The range of working vacuum is from .5 to four inches of mercury.

3.8L (LC2)
TURBO ENGINE POWER DATA



3.8 SFI ENGINE

**HIGH EFFICIENCY
COMPONENTS [CONT'D]**

A high pressure positive displacement roller vane fuel pump located in the fuel tank feeds fuel to the injectors. Fuel pressure range is from 28 psi at idle to 51 psi under full boost conditions; the pressure being regulated by the amount of manifold vacuum/pressure.

As a result of the intercooling process, the intake air charge is cooler and therefore denser when it reaches the cylinders, resulting in an increase in output.

The intercooled turbo engine develops 245 horsepower at 4400 RPM, and 355 foot-pounds of torque at 2800 RPM. This compares with 200 horsepower and 300 foot-pounds of torque for the non-intercooled version.

Buick's addition of the intercooler to the 3.8 litre SFI turbo makes one of the world's most sophisticated turbocharged engines even more potent.



PRINTED IN U.S.A.