

automotive testing technology international



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Replication of fuel flow

To achieve precise results in fuel consumption analysis, it is imperative that measurement equipment be installed and operated correctly

Gregory Technology

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Fuel consumption measurement requires more sensitivity and precision than ever. Having a high-quality measuring system and know-how in installation, operation and use is a basis for this.

Gregory Technology's Flowtronic systems are based on a four-piston volume sensor with a very high accuracy measuring range of 0.1-250 l/h with 0.004ml resolution, for both positive and negative fuel flow detection. Compared with other equipment, the Flowtronic sensor is not affected by the mounting position, vibration, acting forces (pressure peaks) and rotational rate. The Flowtronic FCS-D systems are designed for use with closed-loop engines that have fuel supply pump positioned at the engine.

The sensor must be operated with incompressible fluids as it is designed for measuring volume. For this reason it is necessary for the fuel flow through the sensor to remain free from gas bubbles. This avoids incorrect measurement. If there are gas bubbles in the fuel, the sensor cannot distinguish gas volume from liquid volume within the total measured volume.

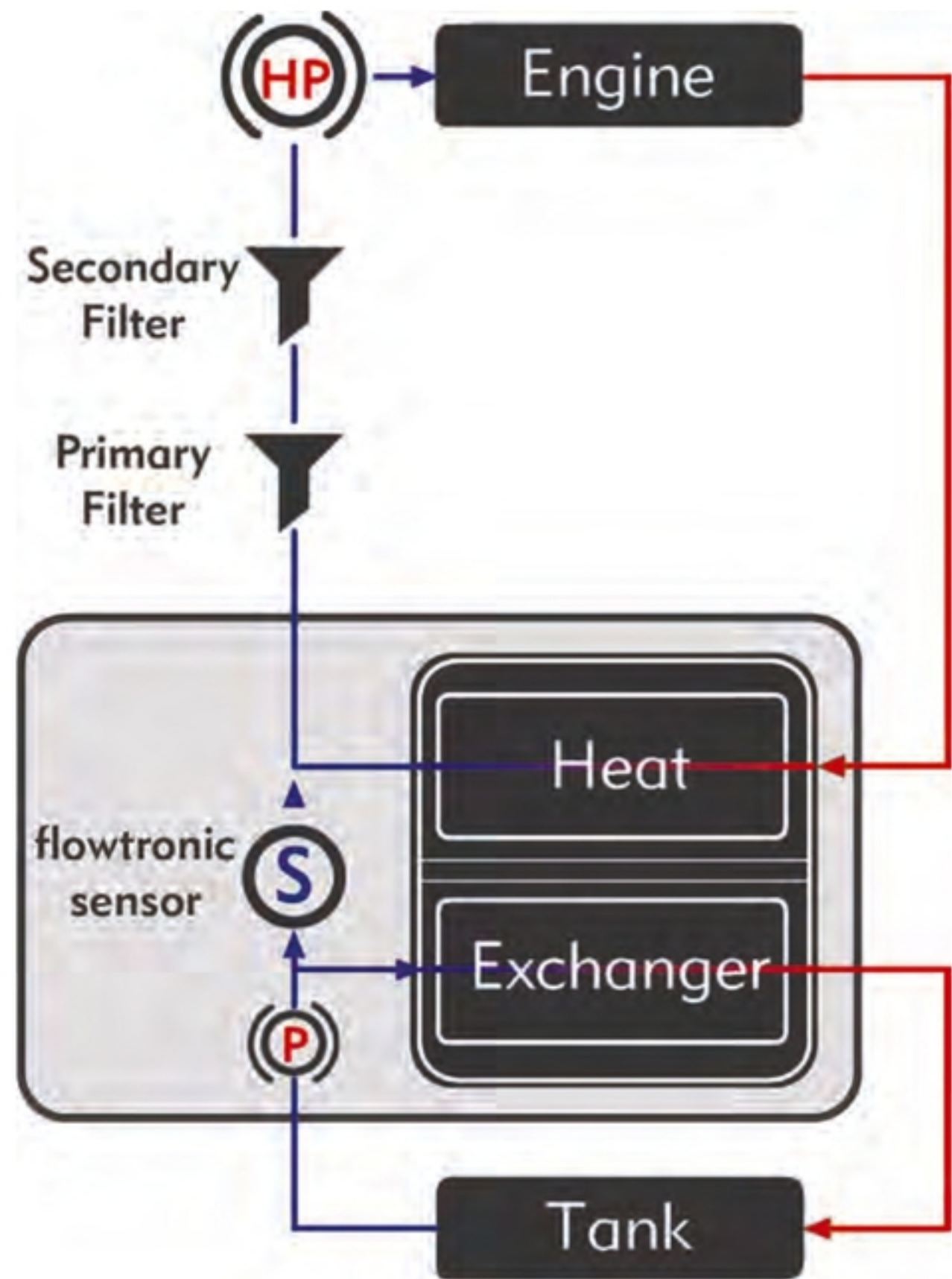
The following can cause air inclusions. When installing the measurement system in an engine with a fuel supply and return line (closed-loop), the original fuel circuit is split into two separate circuits (engine and tank related). This ensures correct

fuel conditioning and fuel consumption measurement. Cutting fuel tubes during installation usually generates gas bubbles in the fuel tube system. Too long or too large connection tubes will complicate the purging procedure of the whole fuel supply system. During the purge process, the circulating fuel flow cannot sufficiently take the gas bubbles out of the fuel tubes.

The user should also consider further components of the fuel supply system that could have an influence on the measurement, such as integrated filters, additional fuel reservoirs (spring actuator based) and other components. For example, a hidden air volume within an additional filter head can release gas bubbles into the fuel circuit.

To avoid air intake during a coupling process, flat-face couplings are recommended. Flowtronic systems are optionally equipped with flat-face couplings that provide fast and leakage-free connection and disconnection.

After cutting the fuel circuit and mounting the quick-lock couplings during installation, the original fuel supply system requires purging. A second purging is required after installing the measuring system itself. For this procedure, Flowtronic systems are equipped with an integrated purge lever. Manually moving the measuring system helps to extract gas bubbles from



Gregory Technology's Flowtronic sensor can measure fuel flow in both the negative and positive directions

the FCS-D. Purging all fuel supply system components, such as extra fuel filters, is also important to remove any gas bubbles from the whole fuel supply system.

In addition, cavitation-induced gas bubbles, which can be caused by a suction pump, are a possible source of error. Furthermore, the surface flow within the fuel

tank must be considered to avoid additional air intake into the fuel supply line.

Pressure peaks caused by the high-pressure injection pump can cause negative fuel flow via the sensor back to the tank. Again, the Flowtronic sensor is highly precise and offers a wide measuring range in the positive as well as the negative flow directions. Positive and negative flow rates are processed via special software for correct test results. Optionally two signal outputs for both flow rates can be used. ◀

State of the Art High Precision Fuel Consumption Measurement



flowtronic S8005C

- > Compact and modular system
- > Designed for open-loop engines (e.g. motor-bikes, passenger cars etc.)
- > Measuring range: ± 0.1 up to 250l/h
- > Measuring resolution: 0.004ml
- > Optional heat exchanger unit for closed-loop engines
- > Power supply 12V DC from vehicle battery
- > Operational pressure: 5bar, optional 10bar

flowtronic FCS-D

- > All-in-one system
- > Designed for closed-loop engines (e.g. trucks, buses etc.)
- > Measuring range: ± 0.1 up to 250l/h
- > Measuring resolution: 0.004ml
- > Circulation rate: 130 up to 780l/h
- > Power supply 12V or 24V DC from vehicle battery
- > Operational pressure: 0.2bar