AGCO SISU POWER

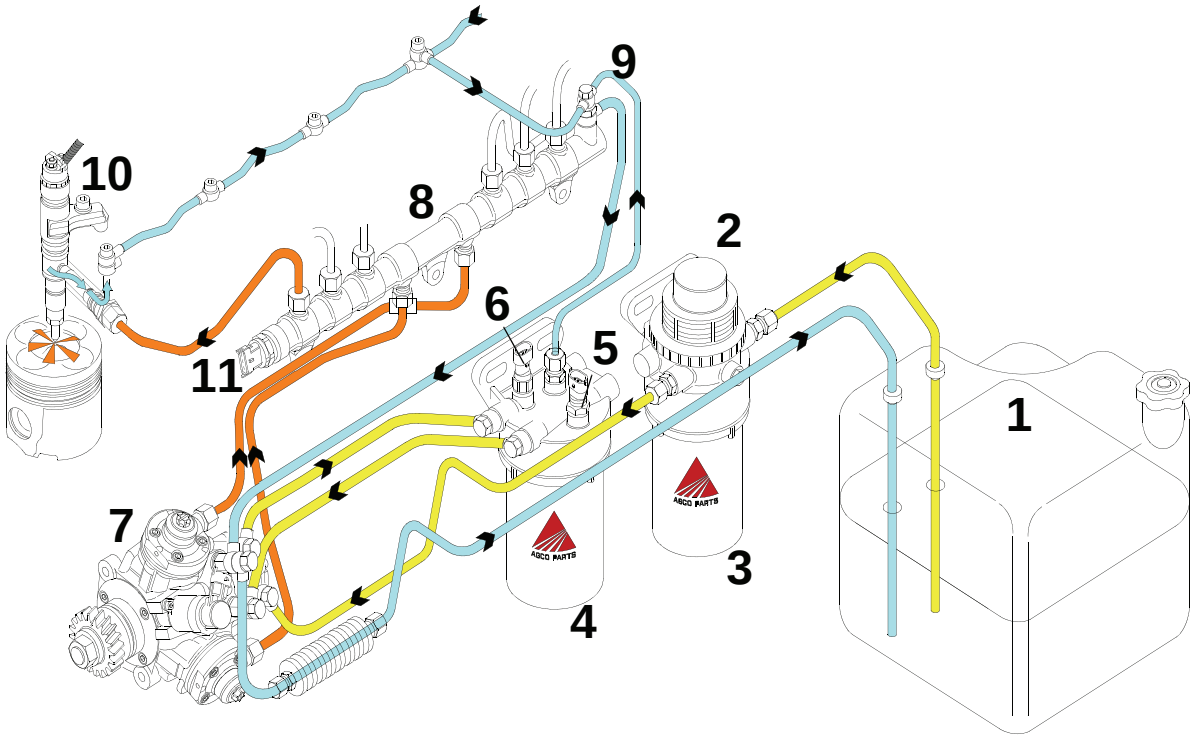
Instruction Manual

4th Generation Engines

V837079421

FUEL SYSTEM

4th Generation engines are equipped with common rail system which is controlled by EEM4 electronic control unit.



Parts of Fuel System

1. Fuel tank
2. Hand pump
3. Pre-filter
4. Fuel filter
5. Temperature sensor
6. Feed pressure sensor
7. High pressure pump
8. Rail
9. Overflow valve
10. Injector
11. Pressure sensor

Fuel is drawn from the tank via the pre-filter, through the main fuel filter to the high pressure pump. From the high pressure pump, fuel is pumped up into the rail. This high pressurized fuel is lying in a high pressure pipe where it is controlled and injected through electronic injectors that are controlled by EEM4. The injection is optimized in terms of emissions, efficiency and operation noise and takes place in four steps (maximum). Excess fuel returns from the injectors and pressure regulating valves of the high pressure pump and rail back to the fuel tank.The overflow pipe from the filter helps the bleeding of the system.

The fuel is diesel fuel according to the norm EN 590:2009 and it must be clean and free from water after storage (see fuel quality requirements, page 41).

NOTE! Use of anti-freeze solution is not allowed and not useful at all!

Water is removed from the system by draining the water trap periodically and by cleaning the fuel tank before frost season (see also actions before winter, page 39).

Do not open high pressure pipe connectors of the fuel system when the engine is running. Wait at least 30 sec. after stopping the engine. If the jet of high pressure fuel contacts your skin, fuel penetrates the skin causing severe injuries. Get medical help immediately!

When re-starting, it is recommended to change the Diesel Exhaust Fluid (DEF) because of aging effects (condensed water could change the concentration of the DEF and thus affect the emissions. It is recommended to change the main filter element (see page 35) before starting the engine.

COLD START

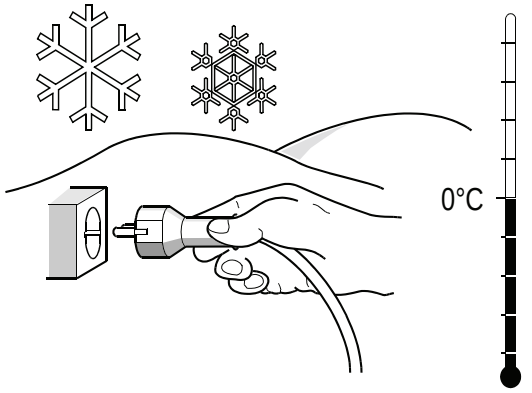
Always use, if possible, the coolant heater when the temperature is below 0°C

See starting instructions of the appliance.

See also actions before winter, page 39.

Engine is equipped with an electric pre / post heater of the intake air. The post heating operates automatically.

The DEF tank and pipes are heated so the SCR system works also at low temperatures. If DEF freezes, it is defrosted when the engine is started. The congealing point of DEF is -11°C.



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Never use starting aerosol to start the engine! The intake air heater causes an explosion in the intake manifold. This can result in serious damage to the engine and personal injuries. Use of starting aerosol invalidates the engine warranty.

- Make sure the battery is sufficiently charged.
- Release the engine of all extra load (move the gear to neutral position, depress the clutch pedal, do not turn the steering wheel etc.).
- Keep the gas pedal on idling position. Heat the time when the alarm light is on and start the engine. If the engine doesn't start during ten seconds, stop the starting and heat again. (The preheating of intake air doesn't work during the starting.) When the engine starts, you can support it with the starter until the engine runs complete.
- Watch the oil pressure.
- Do not race the cold engine because the lubrication is not sufficient while the oil is cold.

Warming up the engine

Since the engine wear is greatest when the engine is running cold, warm up the engine quickly with a light load for a couple of minutes after starting. However, you must not load the engine heavily and the rotation speed must not exceed 2000 rpm when the engine temperature is below 50°C.

NOTE! The fuel system is equipped with a pressure sensor that alarms before interference has developed. Reasons can be for instance:

- Empty fuel tank.
- Clogged fuel filters.
- Suction piping clogged or leaking air.
- Unsuitable fuel (e.g. summer fuel in the winter).

NOTE! Use of spirits as antifreeze is not useful or recommended at all. It makes the fuel solidify and weakens the lubricating qualities of the fuel and increases the possibility of corrosion.

11. Drain Fuel Tank

The fuel tank should be cleaned before the winter. Thus you avoid troubles caused by the water in the fuel system. The best way to prevent condensation is to always keep the fuel tank as full as possible.

- Empty the fuel tank and rinse it with pure fuel.
- Fill the fuel tank with fuel for winter conditions. The fuel must be according to norm EN 590, see page 41.

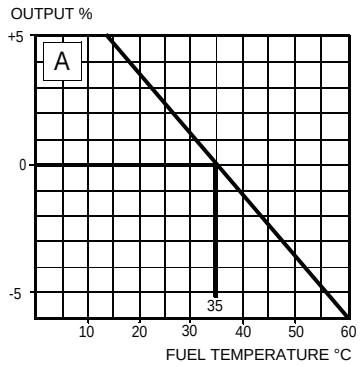

FIG. A. Engine output dependence on fuel temperature. +35°C is the reference temp (correction 0%). The fuel temperature is not only a function of ambient conditions but also varies according to the fuel system of the application (tank size and location, return flow etc.).

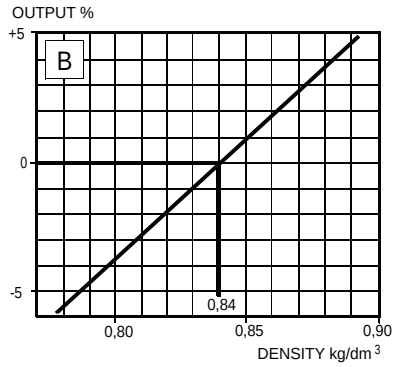

FIG. B. Engine output dependence on fuel density. Normal value is 0,84 kg/dm^3 at +15°C.

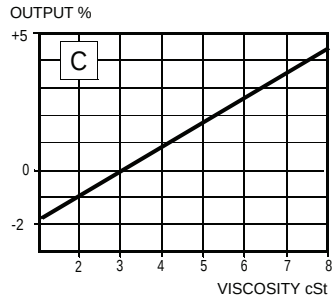

FIG. C. Engine output dependence on fuel viscosity. Normal value is 3 cSt at +20°C.

Note fig. B and C only if the fuel quality is changed.

In fig. A there are all the quality dependencies caused by the change of the temperature. The fuel density and viscosity can be seen in the produce declaration given by the manufacturer.

The output correction is made as follows: Correction percentages from figures A, B and C are summed up. The given rated power is then corrected with the resulting percentage.

Alternative Fuels

Using diesel fuel according to European norm EN 590:2009 or ASTM D 975-09b 1-D or 2-D, all AGCO Sisu Power engines have full warranty for the specified warranty period and the engines will work well with good reliability and long life time.

NOTE! Use of fuel not meeting these requirements may result as reduced performance and shorter engine life. It also invalidates he engine warranty.

Fuels according to EN 590:2009 may contain up to 7% FAME (fatty acid methyl ester) type biodiesel according to EN 141214:2008. Fuels according to ASTM D975-09b may contain up to 5% FAAE (fatty acid alkyl ester) type biodiesel according to ASTM D6751-08.Contact AGCO SISU POWER R&D for more information of using different types of biodiesel!