High Pressure Line – High Pressure Pump

■ Components Descriptions

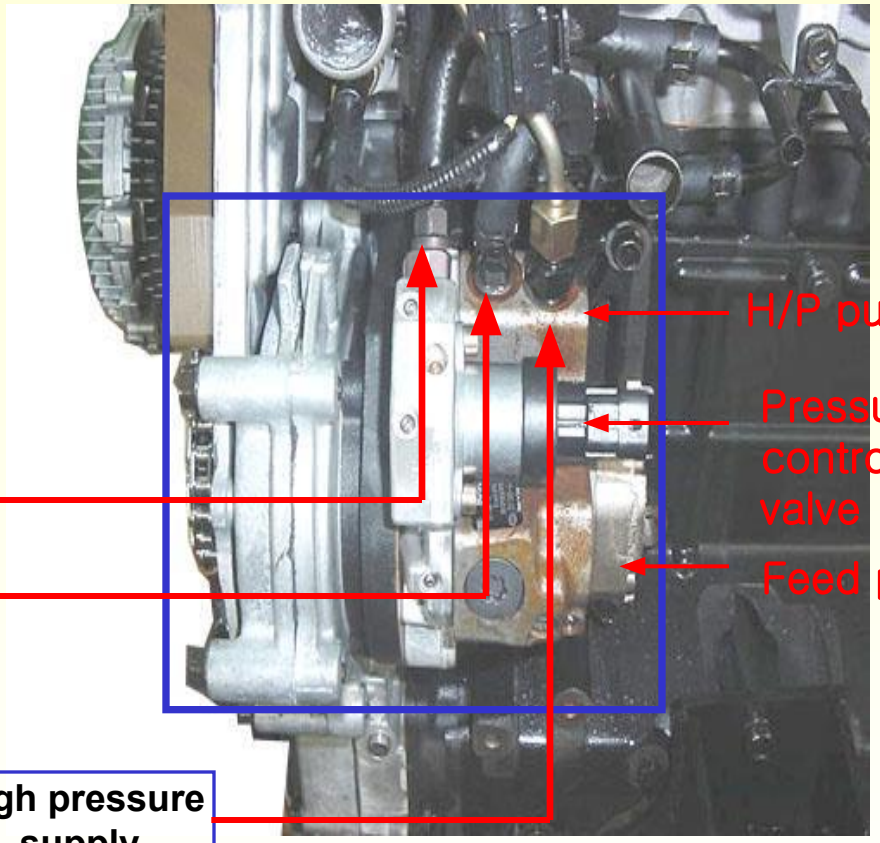
- Main functions :

The high pressure pump is the interface between the low pressure and the high pressure stages. It is responsible to generate adequate high pressure under all operating conditions.

-Type :

① Volumetric blade type driven by timing chain.

② Installed at the same point as a conventional distributor pump.



Low Pressure Line – Feed Pump(Supply Pump)

■ Components Descriptions

- **Main job : maintaining an adequate fuel supply to the high pressure pump**
- **Type : Mechanically driven gear type and integrated in the high pressure pump with which it shares a common drive**
- **Main features :**
  - **① Delivered fuel quantity is practically proportional to the engine speed**
  - **② Maintenance-free**

Low Pressure Line – Feed Pump(Supply Pump)

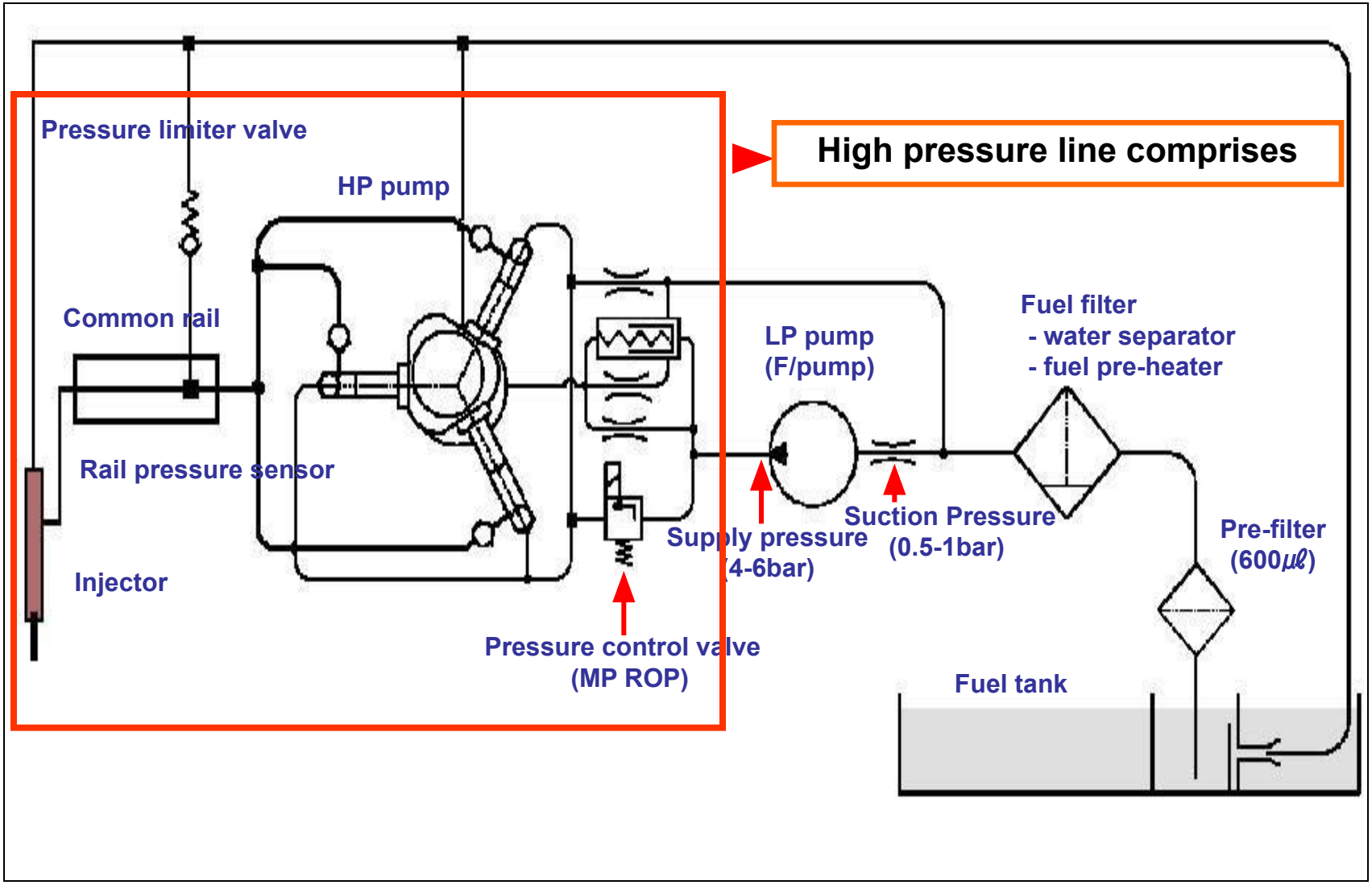
■ Components Descriptions

- Suction pressure : 0.5 ~ 1 bar
- Feed pressure : 4.5 bar

※ Capacity

Feed quantity	2798rpm	1.03ℓ/min
Feed pressure	2798rpm	4.5bar
Max. feed quantity	80ℓ/hr	

Fuel system – High Pressure Line



High Pressure Line – Pressure Control Valve

■ Components Descriptions

- Main function : To control the injection pressure to the engine's requirements which are calculated according to engine speed and load.

① Engine speed and load are high : The degree of turbulence in combustion chamber is very great so the highly pressurized fuel has to optimize combustion.

② Engine speed and load are low : If injection pressure is too high in low load stage, the nozzle's penetration will be excessive and part of the fuel will be sprayed directly onto the sides of the cylinder, causing the formation of smoke and unburned hydrocarbons.

- Pressure control process :

① Measure the current rail pressure by rail pressure sensor
② Signal to EDC(Electronic Diesel Control)
③ Calculate the adequate fuel demand by engine speed and load
④ Control the "pressure control valve to reach the required value by PWM (Pulse-width modulation)

High Pressure Line – Pressure Control Valve

■ Components Descriptions

- Types :

① Outlet control : located at the end of accumulator line and control the output pressure from H/P pump by increasing or decreasing the total return fuel quantity

② Inlet control : integrated with H/P pump and control the fuel quantity from feed pump to high pressure pump

※ Merit of outlet control type

ⓐ minimize the increasing fuel temperature only supplying optimized fuel volume

ⓑ driving torque is decreased by 3~4kg-m

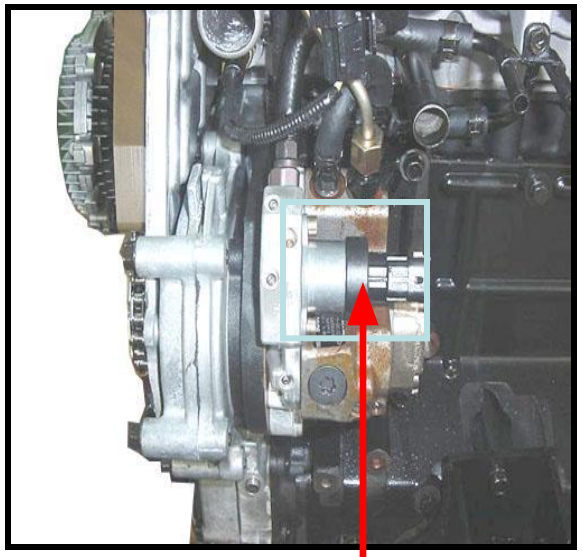
Demerit

ⓐ difficult to release unneeded rail pressure in sudden deceleration condition

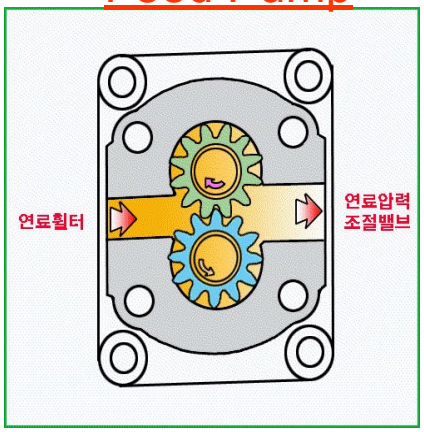
High Pressure Line – Pressure Control Valve

■ Components Descriptions

- **Sorento uses the inlet control type pressure control valve.**



Feed Pump



Pressure control valve

H/P pump

High Pressure Line – Pressure Control Valve

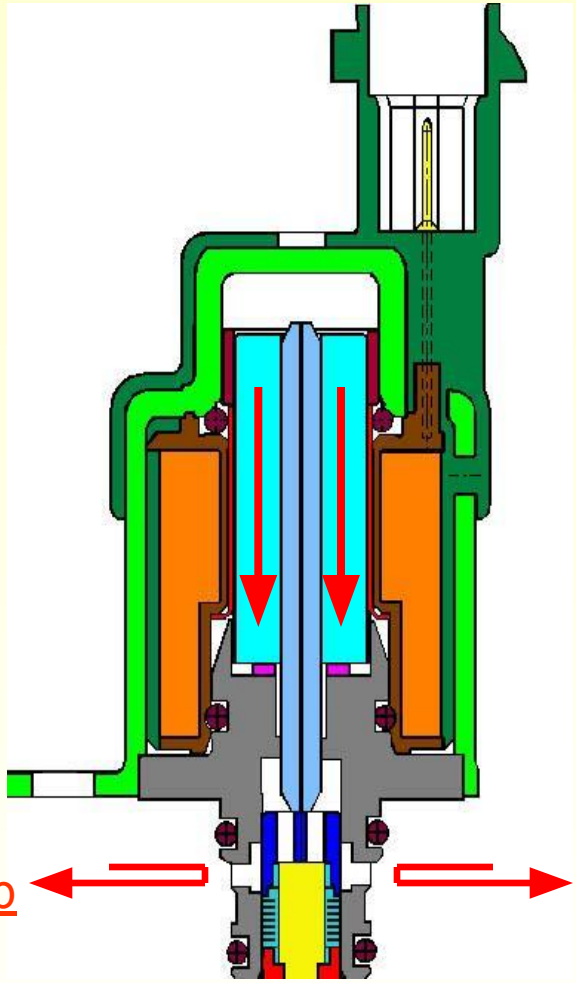
■ Components Descriptions

- **Pressure-control valve energized** :

When the pressure control valve is energized it remains closed until equilibrium is reached between the high pressure forces and spring force with energized electromagnet force

The fuel from feed pump side can not go through the pressure control valve and only return through the return passage inside of the pump.

The electromagnet's forces are proportional to its energizing current which is varied by pwm(pulse-width modulation) pulsing.



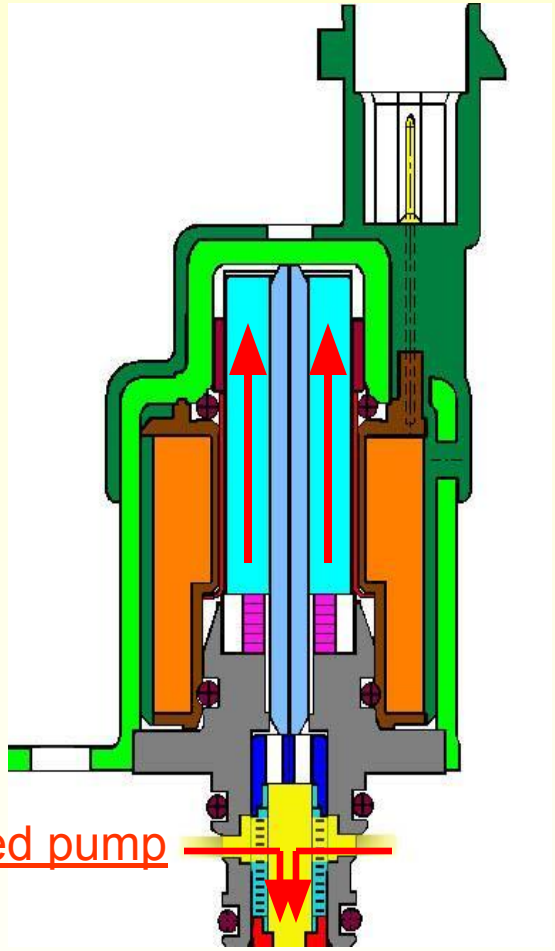
High Pressure Line – Pressure Control Valve

■ Components Descriptions

- **Pressure control valve non-energized :**

The fuel pressurized from feed pump exceeds the spring force so that the control valve remains open.

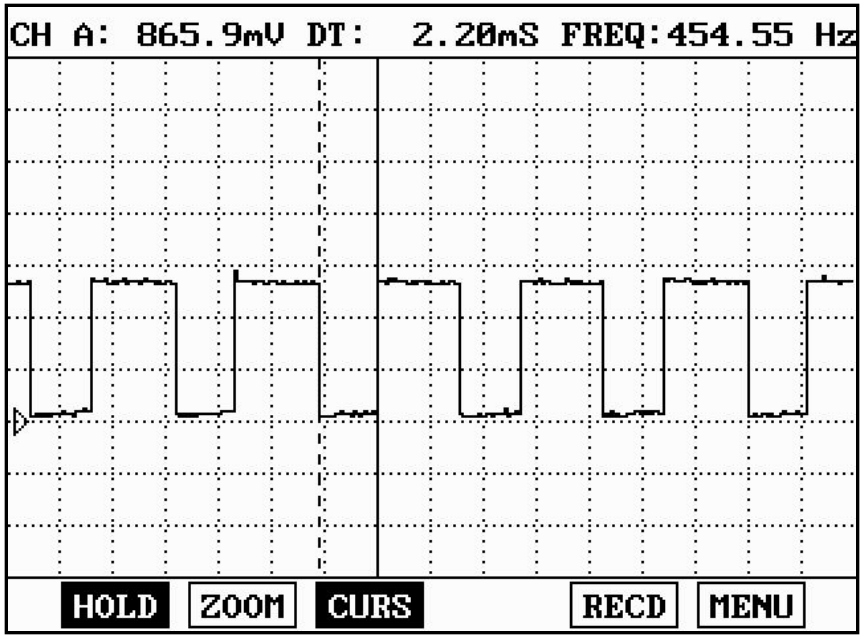
The small fuel is used for pump lubrication and last of fuel goes through the pressure control valve and pressurized by high pump.



High Pressure Line – Pressure Control Valve

■ Components Descriptions

- Idle (800rpm) :
  Close duty ≒ 45%
  Rail pressure ≒ 270bar



- loaden condition (4500rpm):
  Close duty ≒ 35%
  Rail pressure ≒ 1350bar