Engine - Overview

Overview

The 2.7L Gasoline Turbocharged Direct Injection (GTDI) (4V) is a V-6 engine with the following features:

- Interference design engine
- Dual overhead camshafts
- Four valves per cylinder
- Gasoline Turbocharged Direct Injection (GTDI)
- SFI
- Composite intake manifold
- Aluminum cylinder heads
- Compacted graphite iron cylinder block
- Twin independent variable cam timing (Ti-VCT)
- An electronic ignition system with 6 ignition coils
- Variable displacement oil pump

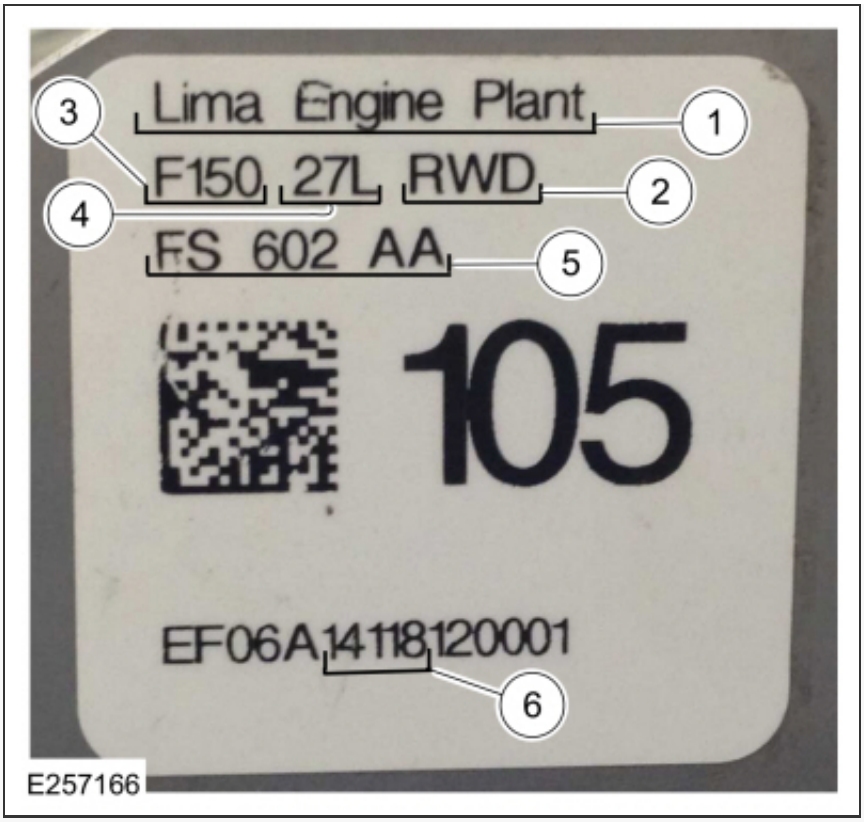
Engine Identification

For quick identification, refer to the safety certification decal.

The decal is located on the LH front door lock face panel.

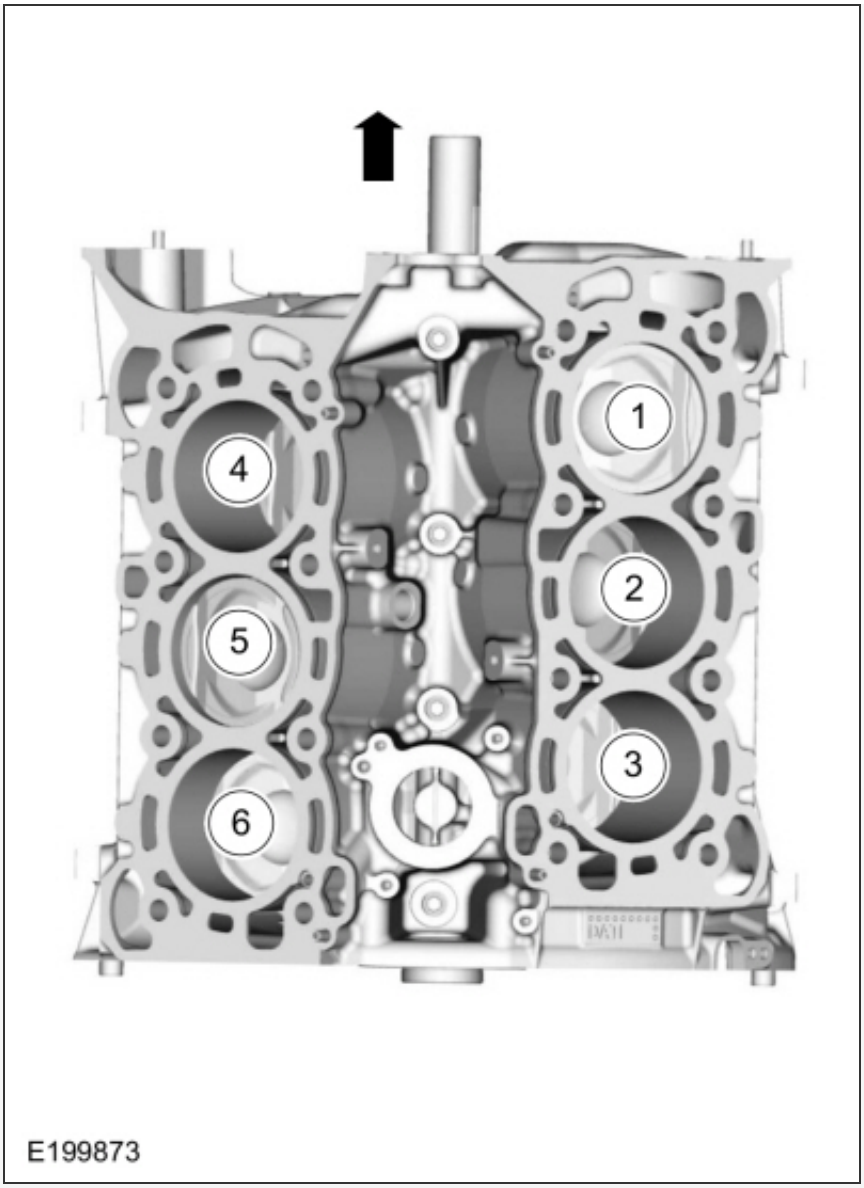
Engine Code Information Label

The engine code information label, located on the rear of the vacuum pump and on the LH



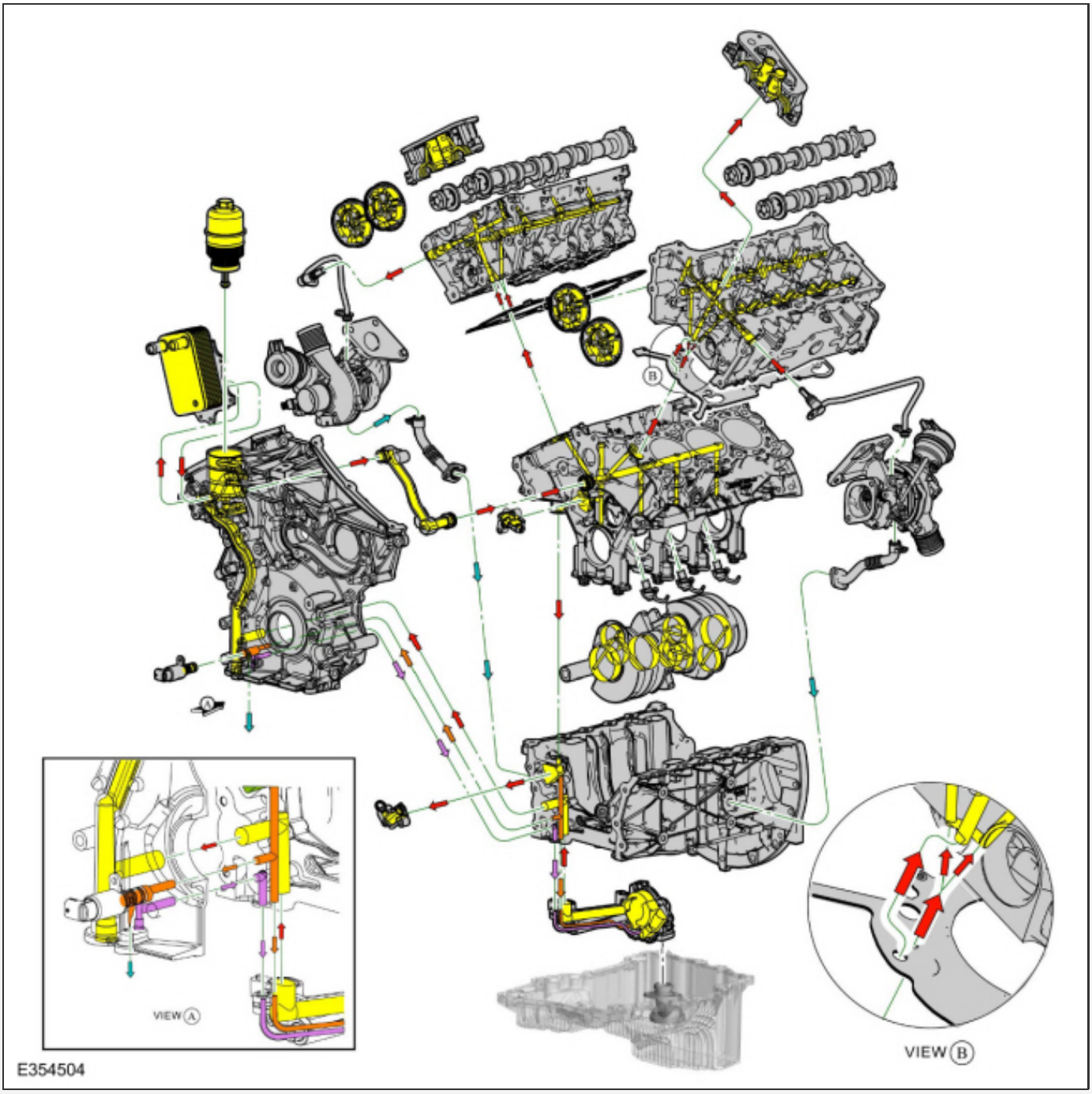
Item	Description
1	Engine plant
2	Drive type
3	Vehicle line
4	Engine displacement
5	Engine part number
6	Engine build date YYDDD **(DDD=Julian Date [001-365])**

Engine Cylinder Identification



System Operation

Oil Flow



Item	Description
Yellow	High pressure oil
Orange	Constant high pressure feedback (55 psi)
Purple	Low pressure (25 psi) control
Blue	Oil return low pressure

Lubrication System

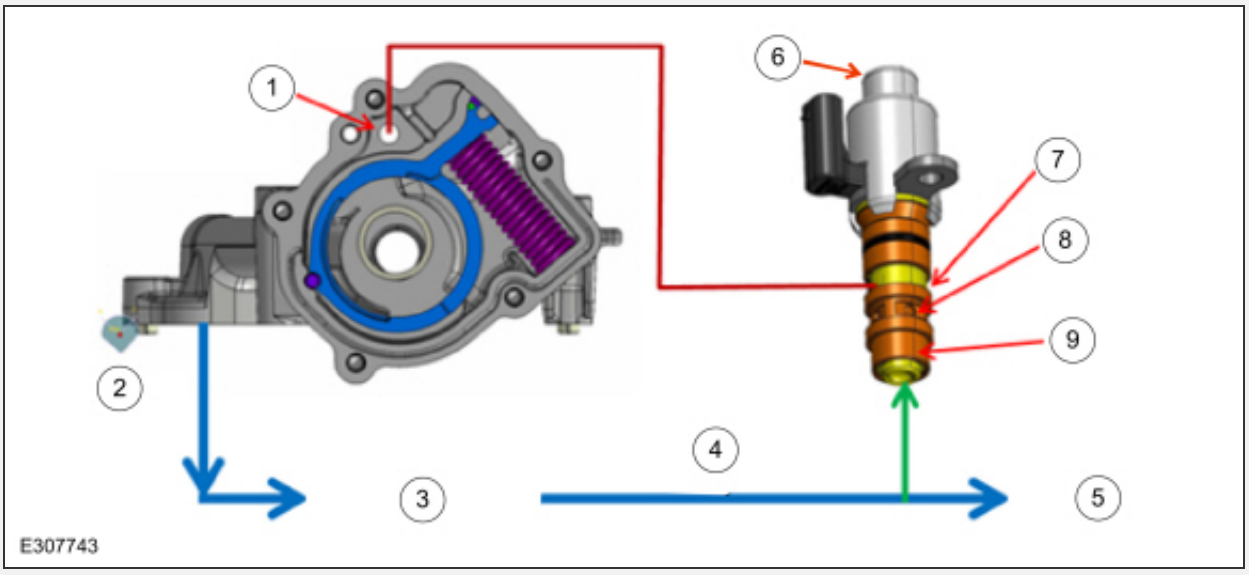
Continuous Variable Displacement Oil Pump

The variable displacement oil pump is designed to have the ability to change its running displacement upon command. Working together with a pressure regulation proportional solenoid valve, it can vary its displacement to produce the required oil pressure without wasting energy through bypassed oil flow or excessively high oil pressure. Therefore, its power consumption is reduced for a better fuel economy, comparing to a fixed displacement oil pump.

The oil pressure in the control chamber is balanced by the force from the pump spring in a running pump. When a given duty cycle control signal is sent to the solenoid valve, it will command a given oil pressure. If the actual oil pressure is higher than the commanded oil pressure, the solenoid valve will supply more oil to the control chamber, produce more pressure in the chamber, push the spring and the eccentric ring down, and reduce its running displacement and the oil pressure till the pressure is at the commanded level. Or vice versa, if the actual oil pressure is lower than the commanded oil pressure, the solenoid valve will supply less oil to the control chamber or even vent the chamber, produce less pressure in the chamber, bring the spring and the eccentric ring up, and increase its running displacement and the oil pressure till the pressure is at the commanded level.

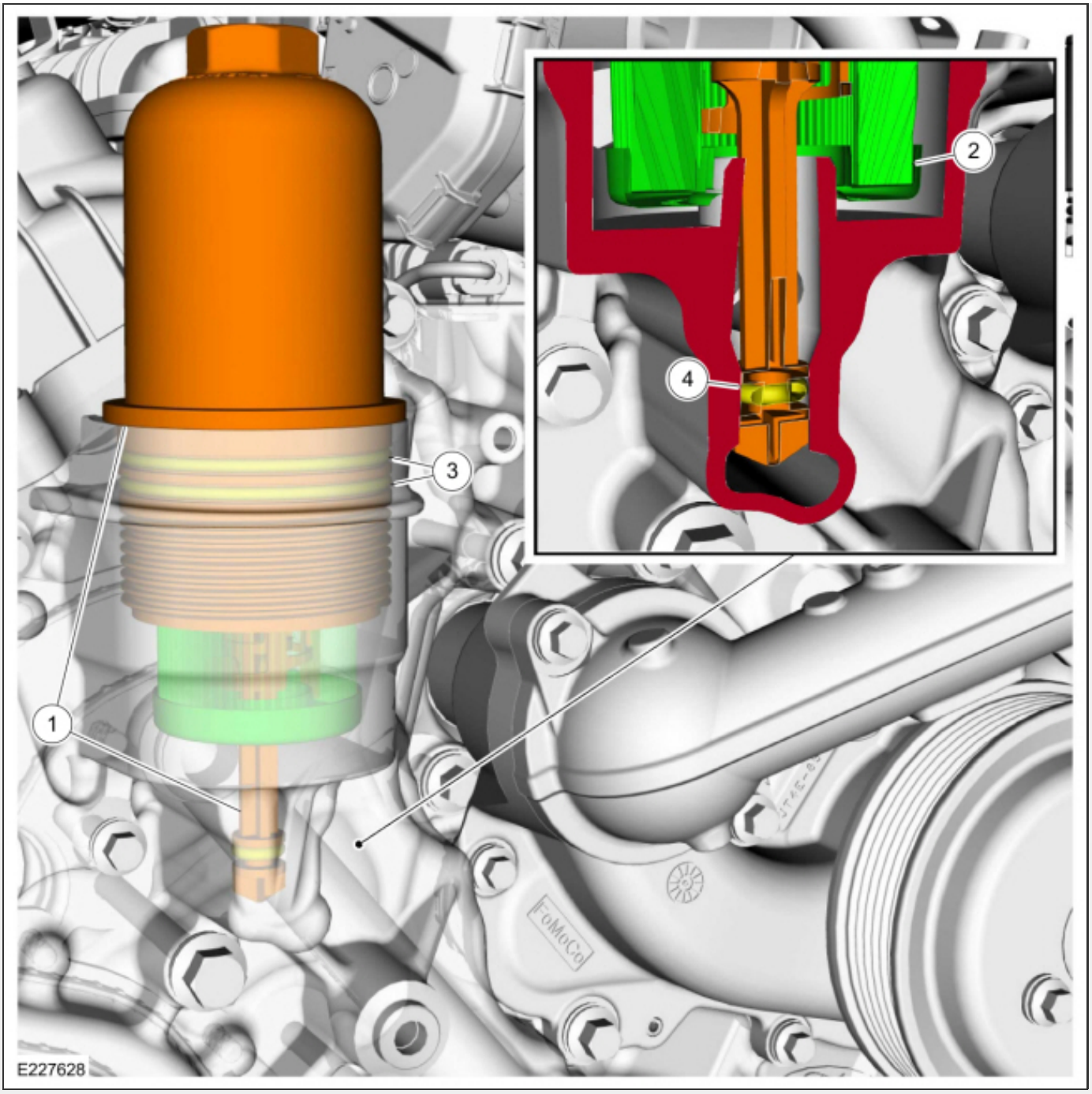
The required oil pressure, i.e. the commanded oil pressure, depends on the operation conditions of the engine. Therefore, the engine runs with oil pressure at its required level without waste in such a system in order to minimize its parasitic energy loss

Continuous Variable Displacement Oil Pump



Item	Description
1	Pump control chamber
2	Pump-Out
3	Oil filter and cooler adapter flow resistance
4	Oil gallery
5	Engine oil flow resistance
6	Solenoid valve
7	A port - connect to pump control chamber
8	T port - tank/vent port, vent to crankcase
9	P port - control pressure, connect to main oil gallery

Engine Oil Filter and Housing



Item	Description
1	Oil filter housing assembly (includes oil filter reservoir and stem)
2	Oil filter
3	Oil filter housing-to-engine front cover seals (requires 2, included with service filter)

4	Oil filter housing stem-to-oil reservoir drain port seal (included with service filter)

During oil filter removal and installation:

- The oil filter housing and stem must be inspected for damage including cracks or separation of the stem from the housing. If damaged, a new oil filter housing assembly must be installed.
- The 2 oil filter housing-to-engine front cover seals are included with the service filter and must be replaced to prevent oil leakage.
- The oil filter housing stem-to-oil reservoir drain port seal is included with the service filter and must be replaced. If this seal or filter housing stem is damaged or missing, the oil will flow through the reservoir drain port and a **loss** of engine oil pressure will occur.

Twin Independent Variable Cam Timing (Ti-VCT)

The twin independent VCT system allows variable control of the valves which optimizes combustion at full load providing improved power and low speed torque (broadening the torque curve) which enables variable valve overlap which provides better fuel economy and emissions and provides optimized cold start operation with improved exhaust emissions.