

Unit 3 Lubrication and Cooling System

Passage A Lubrication System 润滑系统

The engine lubrication system is designed to deliver clean engine oil at the correct temperature and pressure to every part of the engine. (在适当的温度和压力下, 将洁净的机油输送到发动机每个部件中) The job of the lubrication system is to distribute oil to the moving parts to reduce friction between surfaces which rub against each other. (减少每个零部件摩擦面相互之间的摩擦力)

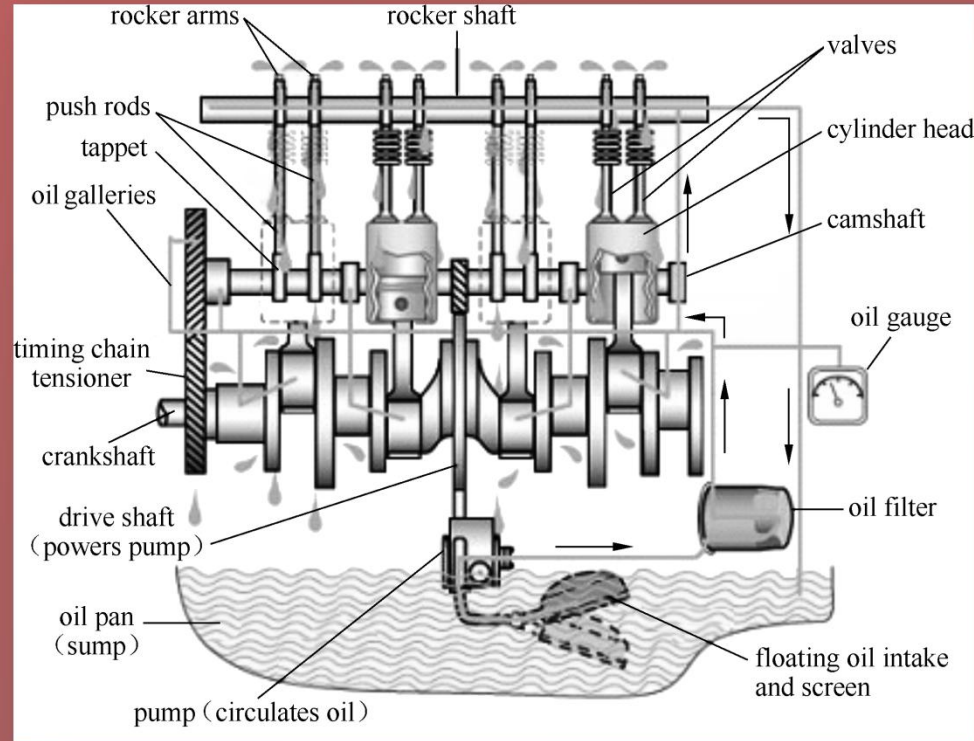


Figure 3-1 Lubrication system

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The lubrication system mainly consists of oil pump, engine oil, oil filter, oil screen and oil pan. (润滑系统主要包括机油泵, 机油, 机油滤清器, 滤油网, 油底壳) See figure 3-1.

Oil Pump

An oil pump being the heart of the system (润滑系统的核心) is located in the oil pan on the bottom of the engine. (位于发动机底部的油底壳中) The pump is connected by a worm gear to either the crankshaft or the camshaft. (通过蜗轮与曲轴或者凸轮轴连接)

Most oil pumps have two small gears that mesh with each other (有两个小齿轮相互啮合). A pressure-regulator valve in the pump is used to prevent the lubrication system from reaching too high a pressure. The oil pump pulls oil up from the oil pan and makes the engine oil circulate through the engine. (油泵将机油从油底壳中吸出, 并使机油在发动机中循环) See figure 3-2.

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Engine Oil

Engine oil is often referred to as **the lifeblood of an automobile engine** (机车发动机的血液). An engine running without oil will be just like a human without blood. See figure 3-3.

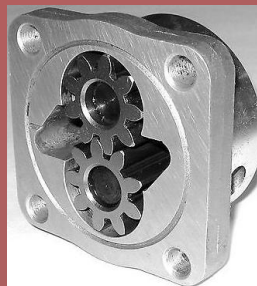


Figure 3-2 Oil pump



Figure 3-3 Engine oil

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Engine oil has several important jobs in the engine. **First, it must be circulated between moving engine parts to prevent metal-to-metal contact.** (它必须在运转的发动机部件之间循环, 以防金属间的接触) Without oil, metal-to-metal contact produces wear. Oil between moving parts allows them to move easily, with less friction. The lower the friction of an engine, the more power it can develop.

The circulating oil also cools the engine by carrying heat away from hot engine components, and cleans or flushes dirt and deposits off the engine parts. (通过将热量从发动机零部件带走使其运行更轻松)

Finally, oil circulated on the cylinder walls seals the rings, improving the engine' s compression. (在汽缸壁循环的机油密封活塞环, 提高了发动机的压缩冲程能力)

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Oil Filter (机油滤清器)

If engine oil is the lifeblood of an automobile engine, then **the oil filter is the liver.** (是发动机的肝脏) Like the liver, the oil filter **takes in dirty oil and removes the particulates and crud.** (收集油污, 滤去机油中的颗粒和杂质) This damaging crud remains trapped in the filter media and the oil filter **returns the clean oil back into the engine** (将洁净的机油送回到发动机中). In addition to **providing essential engine lubrication oil, this is also important for scrubbing the inside of the engine clean.** (除了提供必要的发动机润滑油, 还将发动机内部清洗干净) Changing the oil and filter on a regular interval gives the engine a fresh transfusion for longer life. See figure 3-4.



Figure 3-4 Oil filter

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Oil Screen (滤油网)

The oil pump pulls oil up from the oil pan through the oil screen. (机油泵通过滤油网将机油从油底壳泵出,) The oil screen collects any large particles of dirt (滤油网收集大粒污垢,) so that the oil entering the pump is fairly clean. The pump then directs the oil through an oil filter, which strains any remaining dirt out of the oil, (机油泵将机油引入机油滤清器, 机油滤清器将残留在油中的污垢滤去) as the oil entering the engine lubrication passages should be clean. See figure 3-5.



Figure 3-5 Oil screen

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Oil Pan (油底壳)

So long as engines require engine oil for them to run smoothly, engines will be equipped with oil pans to act as storage for such engine oil. Therefore, the main function of the oil pan is to store the engine oil before it is pumped back again to the various engine parts. (油底壳作为机油的储存室。油底壳的主要功能是将机油重新泵回到各个发动机的部件之前储存在油底壳中) See figure 3-6.



Figure 3-6

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Most engine oil pans have baffles that help control the flow direction of the oil, bringing it close to the oil pump for easier circulation. **Oil pans are often made from thin steel sheet with a coat of alloy materials that allow the engine oil to cool faster.** (油底壳由薄钢板制成, 钢板外涂一层合金材料, 使机油冷却更快) Further, most oil pans are equipped with magnetic drain plugs that not only allow the exit of old oil out of the pan, but also attracts the metal fragments that mixes with the oil. (油底壳有磁力放油塞, 不仅将旧机油排出油底壳, 还吸住与机油混在一起的金属屑)

Two methods for lubrication are used to circulate oil through an engine (机油在发动机循环采用两种润滑方式): **pressure lubrication and splash lubrication.** (压力润滑和飞溅润滑) In modern engine designs, these two methods are often combined. Pressure is developed by the oil pump, which delivers oil to the filter for cleaning before it is sent to the camshaft and valve train components at the top of the engine. Other components are lubricated by splashing oil and by a net-work of passages.

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Notes

1. The circulating oil also cools the engine by carrying heat away from hot engine components, and cleans or flushes dirt and deposits off the engine parts. 循环的机油从发动机上带走热量，并清洁或冲刷发动机部件上的沉积物。
2. This damaging crud remains trapped in the filter media and the oil filter returns the clean oil back into the engine. 该有害杂质被截留在过滤芯中，机油滤清器将洁净的机油送回到发动机中。
3. In addition to providing essential engine lubrication oil, this is also important for scrubbing the inside of the engine clean. 除了提供必要的发动机润滑油之外，其重要性还在于将发动机内部清洗干净。

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Notes

4. Most engine oil pans have baffles that help control the flow direction of the oil, bringing it close to the oil pump for easier circulation. 大多数发动机油底壳都有折流板来控制机油流动方向，使其接近机油泵以便更好地循环。

5. Further, most oil pans are equipped with magnetic drain plugs that not only allow the exit of old oil out of the pan, but also attracts the metal fragments that mixes with the oil. 此外，大多数油底壳都有磁力放油塞，不仅将旧机油排除出油底壳，还吸住与机油混在一起的金属屑。

6. Pressure is developed by the oil pump, which delivers oil to the filter for cleaning before it is sent to the camshaft and valve train components at the top of the engine. Other components are lubricated by splashing oil and by a network of passages. 机油泵产生压力，将机油输送到滤清器过滤，再输送到发动机顶部的凸轮轴和气门机构部件中润滑。其他部件靠飞溅机油和油路网络来润滑。

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New Words

lubricate ['lu:brikeit] v. 润滑, 涂油

distribute [dis'tribju(:)t] v. 分配, 散布

filter ['filtə] n. 筛选, 滤波器, 过滤器

reduce [ri'dju:s] v. 减少, 分解, 减低

circulate ['sə:kjuleit] v. 循环, 流通(使)流传

lifeblood ['laifbl d] n. 鲜血, 活力源泉, 生命线

flush [fl ʃ] v. 冲洗

dirt [də:t] n. 污垢, 泥土

deposit [di'pɔ:zɪt] n. 沉淀, 沉积物

liver ['livə] n. 肝脏

particulate [pə'tɪkjulɪt] n. 微粒子, 微粒, 微尘

crud [kr ʌd] n. 杂质, 掺和物, 脏东西

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New Words

scrub [skr b] v. 使净化

baffle ['bæfl] n. 折流板（或挡板）

transfusion [træns'fju: n] n. 输血，输液

trapped [træpt] adj. 收集的，截留的

interval ['intəvəl] n. 间隔

drain [drein] n. 排水，排水管

fragment ['frægmənt] n. 碎片，破片，断片

splash [splæʃ] n. 溅的水，污点

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Phrases and Expressions

lubrication system 润滑系统
oil pump 机油泵, 油泵
engine oil 机器润滑油
oil filter 机油滤清器
oil screen 滤油网
sheet steel 薄钢板
worm gear 蜗轮传动装置, 蜗轮
pressure regulator valve 压力调节阀, 调压阀
filter media 滤料, 过滤介质
drain plug 放油塞, 排泄螺塞
pressure lubrication 压力润滑
splash lubrication 飞溅润滑

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EXERCISE 1

Mark the following statements with T (True) or F (False) according to the passage.

1. The oil pump is located in the oil pan in the front of the engine. **F**
2. Engine oil is often regarded as the important part of an engine. **T**
3. The more the friction of an engine, the more power it can develop. **F**
4. Oil pans are often made from heavy steel sheet and metal. **F**
5. We can use two ways to circulate oil through an engine: pressure and splash. **T**

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EXERCISE 2

Translate the following phrases into Chinese or English.

- | | |
|------------------------------------|-----------|
| 1. lubrication system | 润滑系统 |
| 2. oil filter | 机油滤清器 |
| 3. oil screen | 滤油网 |
| 4. pressure regulator valve | 压力调节阀 |
| 5. splash lubrication | 滤料, 过滤介质 |
| 6. engine oil | 机器润滑油 |
| 7. oil pump | 机油泵/油泵 |
| 8. drain plug | 放油塞/排泄螺塞 |
| 9. reserve tank | 储液罐, 冷却液罐 |
| 10. steel sheet | 压力润滑 |

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EXERCISE 3

The following are some expressions for the famous brands. Match the following brands in Column A with their Chinese equivalents in Column B.

A		B
1. 	D	A. Daewoo 
2. 	F	B. Dodge 
3. 	A	C. Fiat 


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4.		H	D. Citroen	
5.		B	E. Ford	
6.		J	F. Dacia	
7.		C	G. Galloper	

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EXERCISE 3

8.		E G I	H. Daihatsu	
9.			I. Honda	
10.			J. Ferrari	