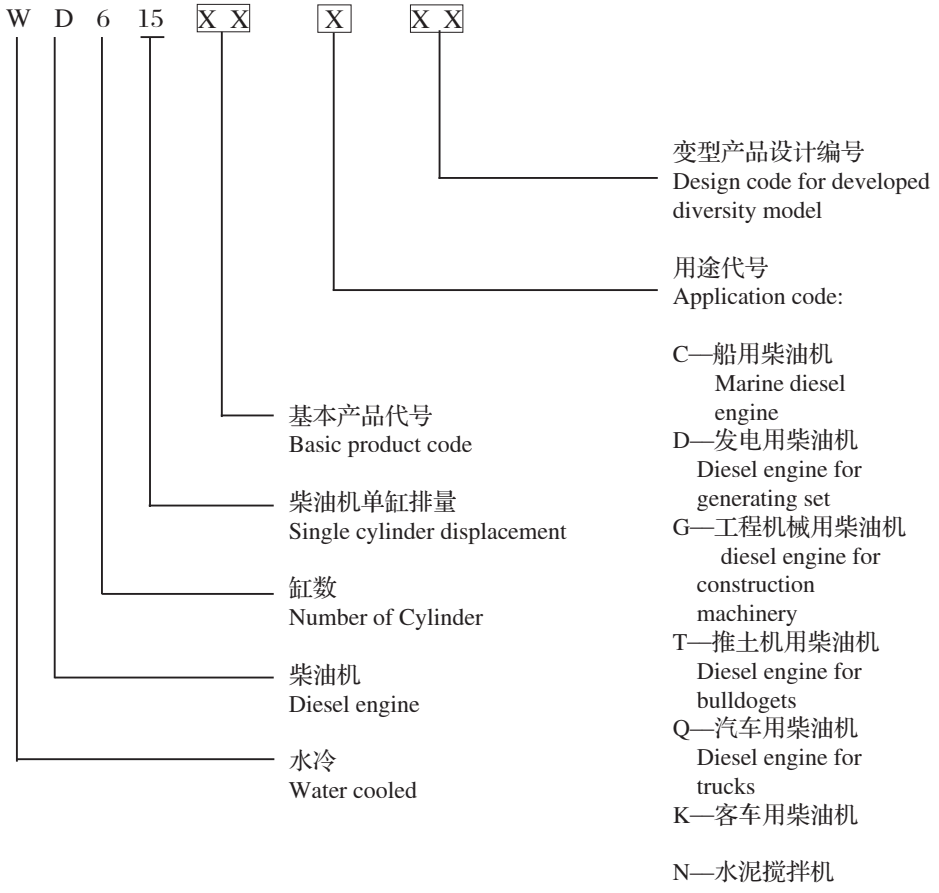
1.柴油机使用说明
Usage Instructions

1.1 WD615系列客车柴油机代号的含义

The signification of the code of WD615 Series Diesel Engines



1.2 新柴油机使用须知

Operating notice for new diesel engine

・汽车用柴油机，在汽车使用的最初2000km（约60h）内应限制柴油机转速不超过标定转速的80%。

For vehicle engines, the engine's rotating speed shoule be limited within 80% of its rated speed during its initial 2000km running (approximately 60h).

· 工程机械用柴油机，在最初使用的 60h 内，柴油机应在部分负荷 (油门在 3 ／ 4 位置以下) 工作。

For construction machinery application，the engine sho. uld be running under part load(the accelerograph should be controlled under 3 ／ 4 full load)during its initial 60h running.

· 新机经初期使用磨合后，需要更换机油，否则可能造成柴油机零件韵过度磨损或损坏。正确地维护保养将使您的柴油机有更好的性能、更经济的运转及更长的寿命。

The lubricating oil should be replaced after the primary running period，otherwise the engine parts possibly be over worn or damaged. Proper protection and maintenance will — ensure your engine with better performance，more economical and longer service life.

· 首次换油期的规定

对于年行驶里程不到 2 万公里的汽车，首次换油期：1000–1500 公里。

对于年行驶里程超过 2 万公里的汽车，首次换油期：1500–2000 公里。

每日检查油温表、油压表、报警装置和其它仪表，确保它们正常能工作。

First oil change period:

For vehicle the annual running mileage is less than 20,000km the first oil change perild is 1,000–1,5000km.

For vehicle the annual running mileage is less than 20,000km the first oil change perild is 1,500–2,000km

按说明书中要求进行日常维护和保养。

Perform daily maintenance work as specified in this manual.

1.3 柴油机的启封工作

Unpacking the Diesel Engine

1、当您 打开您 的柴油机包装箱之后，首先按文件清点柴油机及随机附件，检查柴油机外表有无损伤，然后进行下述工作：

When opening the packing of engine, you should firstly check the surface of engine and the amount of accessoried as per packing list, then proceed on as following;

2、擦试外露件的防锈层、防蚀剂等。

Clean the anticorrosive coating and preservative of outer parts.

3、放出燃油滤清器及燃油系统零件内部油封油 (也允许燃油系统的油封不经入出而启动，但必须等燃油系统油封油消耗完正常柴油已供应到才允许发动机满负荷运行)。

Drain off the seal diesel oil from fuel filters and ruel supply system (the engine is also allowed to be started before seal diesel oil draining, but not allowed to be operated at full

load until the seal diesel iol of fuel supply system has been used up and the usral fuel has been provided)

4、转动飞轮并向进气管内喷溶剂到驱尽气内油封油为止。

Turn the flywheel and inject solvent to air intake manifold till the seal oil of cylinder has been drained off.

5、向增压器排气口溶剂，直到驱尽油封油为止。

Inject solvent to the air outlet of turbocharger till the seal oil has been drained off.

6、根据厂方与用户的协约，对油底内未注油的应按规定注油。

As per the agreement between Weichai and the customer，the engines supplied with empty oilsumps should be filled with oil.

7、按厂方与用户的协议，出厂据用户需要，已加注满冷却液的应检查冷却液的性能，如果防冻能力满足 –30℃或 –35℃时，其 pH 值为 7 – 8（中性），总硬度值为 5 – 1 5 ^{0} d[9–27℃ f(硬度)] 则可以使用这些冷却液，如不合乎要求，则应放出，重新加注含冻剂的冷却液，发动机加约 40 升冷却液。

As per the agreement between Weichai and the customer,and as per customer’s requirementbefore delivery，coolant performance should be checked if the engine has been filled up with coolant.The coolant could be remained to use if its antifreezing performance could meet–30℃ or–35℃ and pH is 7–8(1itmusless)，and its total rigidity number is 5–15° d【9–27of(rigidity)]，otherwise it should be drained off and replaced by new coolant containing antifreeze. Thevolume of coolant filled to engine is approximately 40 liter.

1.4 起动前的检查

Inspection before starting

检查冷却液面

Inspect the coolant level.

检查燃油液面

Inspect the fuel level.

检查发动机机油液面

Inspect the lubricating oil level.

1.5 柴油机的起动

Starting

将电源开关、电钥匙处于起动位置

Put the power switch and starting key at the starting position·

变速杆处于空档位置

Put the gearlever at empty gear–matching position.

踩下离合器踏板和油门踏板，然后拉动过量燃油装置的拉手开关（若装有此装置的

话)，并操纵起动机，当发动机起动后应将过量燃油装置的拉手开关复位，若发动机起动不了，则待约1分钟后再重复上述操作，发动机起动后，机油压力表应立即显示压力，起动热发动机时，可不必使用过量燃油装置。

Step down footplate of clutch and footplate of accelerograph，pull the handle of extra fuelsupply device for starting(if have)，and starting the engine. The handle of the device should bereset after engine's started · If the engine can' t be started，repeat the above operating after about l minute. Oil pressure gauge should immediately indicate number values after engine started. The extra fuel supply device for auxiliary starting device should not to be used during starting in thermal state.

低温起动

Low temperature starting

装有电子控制火焰预热起动装置。

With electronic control flame preheating device

发动机水温低于 –23℃时，打开钥匙开关，预热指示灯亮，电热塞通电加热，经 50S 后预热指示灯自动闪烁。电热塞已加热到 850–950℃，按下起动按钮，接通起动机，电磁阀自动打开油路，给电热塞供油，进行火焰预热起动，可使发动机在 –25℃下顺利起动。

When the temperature of coolant inside the engine is lower than–23 ℃，turn on the electronickey，the preheating indicator lighting，the heating plug is heated，and the preheating indicatorwill be automatically flickered after 50S. When the heating plug is heated to 850–950 ℃，pressdown the start button，connect the starter，the electromagnetic valve will be automaticallyopened，and the heating plug will be provided with fuel to proceed flame preheating，and theengine can be easily started under–25 ℃.

带有低温辅助起动装置

With low temperature auxiliary starting device

装有低温辅助起动装置的汽车上都备有一瓶起动燃料，它不能在 50℃以上的温度下保存，在夏季应将它放在阴凉处，注意防火。

One bottle of starting fuel will be provided with the truck which fitted with low temperatureauxiliary startlng device.It can't be preserved when the ambient temperature is higher than 50℃. To prevent from fire，it should be put at a cool place in summer.

起动过程：

Starting process：

将起动燃料注入驾驶室仪表板下的储液罐里，在接通起动机之前，先将手泵来回泵三下，接通起动机，在发动机转几圈后，连续拉动手泵，直到发动机起动，但不要在发动机起动之前过多拉动手泵；气温很低时，发动机起动后还要继续拉动手泵，直至发动机运转平稳，该装置能使发动机在一 40℃低温时顺利起动。

Input starting fuel to the tank under the instrument plate in the driver–cab, pull the hand pump three times before connecting the starter, after the engine run several rotations continue to pull the hand–pump till the engine started, but don' t pull too many times before starting in the case of very low temperature, continue to pull the hand–pump after starting till the engine runs smoothly. With this auxiliary device, the engine can be started easily under–40℃ .

1.6 柴油机的运转
Engine's running

柴油机在低于最大扭矩的转速下，全油门持续运转不超过 1 min。

When the engine running at the speed lower than the speed of the biggest torque, it is notallowed to continue running on full load over l min.

柴油机全负荷运转后，停车前要怠速运转 3–5 min。

After running on full load, the engine should run in idling speed for 3—5 minutes beforestopped.

经常注视油压表及冷却液温度表：

Often watch and check the oil pressure gauge and coolant temperature meter.

若压力和温度不符合规定要求时应该将柴油机停车。

Stop the engine if the pressure and temperature cannot meet the standard requirement.

注意：在冷却液温度低于 60℃或高于 100℃时连续运转将有损于发动机。

Note：Diesel engine can not continue to run when the coolant temperature is lower than 60℃ or higher than 100℃, because this would damage the engine.

柴油机的停止

Engine'S running stop

拉动喷油泵手油门置于零位，停止发动机，重新调整手油门。

Put the hand–accelerograph of injection pump at zero position, stop the engine, and readjust the hand–accelerograph.

注意：发动机在停止之前以怠速运转 1–2min 后再停车。

Note：The engine should run in idling speed for 1–2 minutes before stopped.

2.柴油机维护保养指南
Maintenance Guide

2.1 日常维护
Daily Maintenance

◆检查；

Inspection；

◆机油液面是否在油尺的刻线范围；

Check the oil level；

◆冷却液液面；

Check the coolant level；

◆燃油液面；

Check the fuel level；

◆风扇有无破损；

Check whether the fan is damaged；

◆传动三角皮带有无裂纹、擦伤；

Check whether the V−belt is cracked or scratched；

◆附件紧固情况是否良好；

Check whether the accessories are fixed well;

◆水油有无泄漏 ;

Check whether the water or oil is leaking;

◆充电指示灯是否正常 ;

Check whether the charging indicator light is in order;

◆水泵油腔内润滑脂是否充足 ;

Inspect sufficient grease;

◆机油压力，水温是否正常 ;

Inspect toil pressure and water temperature are normal condition；

◆柴油机排气温度、声音、振动是否正常 ;

Inspect that exhaust temperature, sound and vibration are normal condition；

◆转速是否平稳。

Inspect rotary speed is stable.

2.2 定期保养

Regular Maintenance

定期保养参照下表进行，若柴油机在多尘环境或在频繁停车情况下工作，须根据情况相应缩短保养周期。

Regular maintenance can be conduct on as per the following table. If the operating condition is heavy dust content or the engine running on started–stopped frequently, the regular maintenance period should be shortened accordingly.

2.2.1 维护保养周期

Maintenance period

表 2–1　汽车配套三类使用条件

Three categories of operating conditions with vehicle

(WGⅠ)	(WGⅡ)	(WGⅢ)
使用条件恶劣(气候严寒或酷热，含尘量高，短距离运输，在工地使用以及公共汽车，市政工程车，扫雪车，消防车)或汽车年行驶里程不足 2×10^4km 或年工作时间不足 600h Under severe operating condition (e.g. cold or hot weather, high dust content, short–distance transportation, service in construction site and bus, municipal engineering vehicle, snow sweeper, fire bridge vehicle), annual running mileage of the vehicle less than 2×10^4km or annual operated time less than 600h.	年行驶里程不足 6×10^4km，短中距离运输(用于送货) Annual running mileage of the vehicle less than 6×10^4km,, for short– or medium–distance transportation (for goods).	年行驶里程超过 6×10^4km 的远距离运输汽车 Annual running mileage of the vehicle more than 6×10^4km for long distance transportation.

表 2–2第一次检查,例行检查和 保养周期

Table 2–2 The first inspection,routine inspection and maintenance period

使用条件 Operating condition / 项目 Item	(WG Ⅰ)	(WG Ⅱ)	(WG Ⅲ)
第1次检查 The first inspection	行使1000 ~ 1500km时 行使30 ~ 50h Running 1,000~1,500km or 30~50h	行使1500 ~ 2000km时 Running 1,500~2,000km	行使1500 ~ 2000km时 Running 1,500~2,000km
例行检查 Routine inspection	每隔5000km 每隔150h Every 5,000km or 150h	每隔1x10^{4}km Every 1×10^4 km	每隔1.5x10^{4}km Every 1.5×10^4 km
1级保养 Level 1 maintenance	每隔1x10^{4}km 每隔300h Every 1×10^4 km or 300h	每隔2x10^{4}km Every 2×10^4 km	每隔3x10^{4}km Every 3×10^4 km
2级保养 Level 2 maintenance	每隔2x10^{4}km 每隔600h Every 2×10^4 km or 600h	每隔4x10^{4}km Every 4×10^4 km	每隔6x10^{4}km Every 6×10^4 km
3级保养 Level 3 maintenance	每隔4x10^{4}km 每隔1200h Every 4×10^4 km or 1,200h	每隔8x10^{4}km Every 8×10^4 km	每隔12x10^{4}km Every 12×10^4 km
4级保养 Level 4 maintenance	每隔8x10^{4}km 每隔2400h Every 8×10^4 km or 2,400h	每隔16x10^{4}km Every 16×10^4 km	每隔24x10^{4}km Every 24×10^4 km

表2–3 斯太尔汽车保养制度的机油换油期

Table 2–3 Oil Replacement Period in SteyrVehicle Maintenance System

使用条件 Operating condition / 项目 Item	(WGⅠ)	(WGⅡ)	(WGⅢ)
	年行使里程 不到2x10^{4}km Annual running mileage <2 × 10^4 km	年行使里程 不到6x10^{4}km Annual running mileage < 6 × 10^4 km	年行使里程 超过2x10^{4}km Annual running mileage > 6 × 10^4 km
第1次检查 The first inspection	行使1000 ~ 1500km时 Running 1000~1500km	行使1500 ~ 2000km时 Running 1500~2000km	行使1500 ~ 2000km时 Running 1500~2000km
例行检查 Periodical inspection	每隔5000km Every 500km	每隔1x10^{4}km Every 1 × 10^4 km	每隔1.5x10^{4}km Every 1.5 × 10^4 km
1级保养 Level 1 maintenance	每隔1x10^{4}km Every 1 × 10^4 km Every 2400h	每隔2x10^{4}km Every 2 × 10^4 km	每隔3x10^{4}km Every 3 × 10^4 km
2级保养 Level 2 maintenance	每隔2x10^{4}km Every 2 × 10^4 km Every 2400h	每隔4x10^{4}km Every 4 × 10^4 km	每隔6x10^{4}km Every 6 × 10^4 km
3级保养 Level 3 maintenance	每隔4x10^{4}km Every 4 × 10^4 km Every 2400h	每隔8x10^{4}km Every 8 × 10^4 km	每隔12x10^{4}km Every 12 × 10^4 km
4级保养 Level 4 maintenance	每隔8x10^{4}km Every 8 × 10^4 km Every 2400h	每隔16x10^{4}km Every 16 × 10^4 km	每隔24x10^{4}km Every 24 × 10^4 km

2.2.2 保养项目
Maintenance Items

保养项目 Items	更 换 Replacement	调 整 Adjustment	检 查 Inspection
第1次检查 The 1st inspection	机油 Oil 机油滤清器 Oil filter	气门间隙 Valve clearance	紧固管路管夹 Tighten pipe clamps 紧固三角皮带 Tighten V–belts
例行检查 Periodical inspection	机油 Oil 机油滤清器 Oil filter		紧固三角皮带 Tighten V–belts
1级保养 WD1	机油 Oil 机油滤清器 Oil filter 燃油滤清器 Fuel filter	气门间隙 Valve clearance	空气滤清器 Air filter 进气系统 Air intake system 紧固管路管夹 Tighten pipe clamps 紧固三角皮带 Tighten V–behs
2级保养 WD2	机油 Oil 机油滤清器 Oil filter 燃油滤清器 Fuel filter	气门间隙 Valve clearance	空气滤清器 Air filter 进气系统 Air intake system 紧固管路管夹 Tighten pipe clamps 紧固三角皮带 Tighten V–belts

保养项目 Items	更 换 Replacement	调 整 Adjustment	检 查 Inspection
3级保养 WD 3	机油 Oil 机油滤清器 Oil filter 燃油滤清器 Fuel filter 冷却液 Coolant 空气滤清器 Air filter	气门间隙 Valve clearance	空气滤清器 Air filter 进气系统 Air intake system 紧固管路管夹 Tighten pipe clamps 紧固三角皮带 Tighten V−belts 在试验台上检查调整喷油泵 Inspect and adjust the injection fuel pump on test bench
4级保养 WD 4	机油 Oil 机油滤清器 Oil filter 燃油滤清器 Fuel filter 冷却液 Coolant 空气滤清器 Air filter	气门间隙 Valve clearance	空气滤清器 Air filter 进气系统 Air intake system 紧固管路管夹 Tighten pipe clamps 紧固三角皮带 Tighten V−belt 检查增压器轴承间隙 Check the bearing clearance of turbocharger 在试验台上检查调整喷油泵 Inspect and adjust the Injection fuel pump on test bench

2.3 维护保养记录
Maintenance Record

柴油机编号 _____
Engine number

柴油机型号 _____
Engine model

用户名称 _____
User name

设备名称 _____
Equipment name

日期 Date	公里小时 或间隔时间 Running Kilometers / hours or interval hours	实际里程 Actual Kilometers	保养内容 Maintenance contents	保养者 Operator	备注 Remark

3 柴油机保养内容
Maintenance Contents

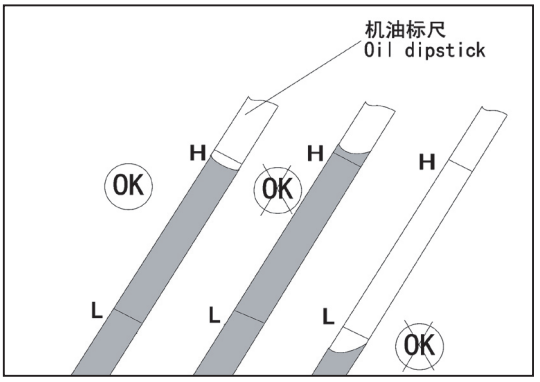
3.1日常保养
Daily Maintenance

预防性保养从每天做起，了解柴油机工作状况。

Preventive maintenance should be done everyday in order to understand the engme's condition.

起动柴油机以前需检查机油液面、冷却液液面和柴油液面。

Before starting the engine should check the oil level 、 coolant level and the fuel level.



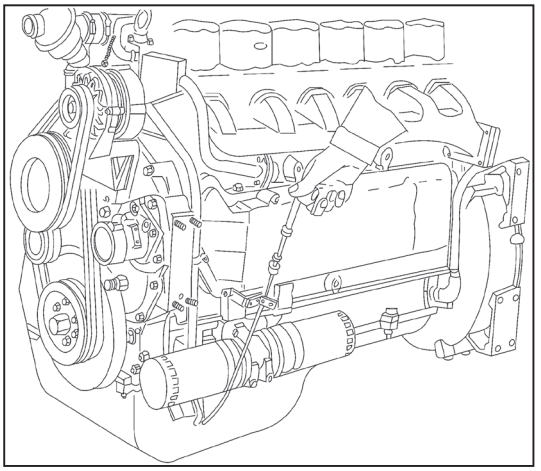
检查：

Inspect：

- 泄漏
  Leakage
- 易损件
  Fast wearing parts
- 柴油机上出现的任何异常
  Any unconventionality

检查机油油面高度

Inspect the oil level height



当油面低于油尺的下刻线或高于油尺的上刻线时，决不允许开动柴油机。

When the oil level is lower than the lower limit or higher than the upper limit, it is not allowed to start the engine.

在柴油机停车后检查油面，至少等 5 分钟后进行，使机油有充分时间流回油底壳。

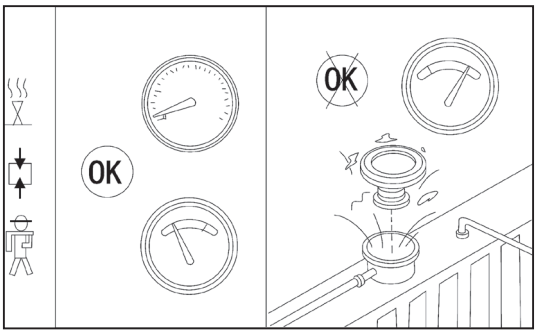
After the engine stopped, inspect the oil level at least 5 minutes later in order to ensure the oil can flow back to the oil sump.

油尺低位至高位的油量差为 3 升。

The oil volume tolerance between the lower limit and the upper limit is 3 liters.

检查冷却液液面

Inspect the coolant level



玻璃视孔观察冷却液面，冷却液不够时，可打开加水口盖加入冷却液。

Inspect the coolant level through the vitreous view hole，if the coolant is not sufficient，open the inlet cover and fill into the coolant.

注意：打开加水. 口盖时，必须先按下排气按钮，以免发动机热状态时热冷却液会伤人。

Note:When opening the inlet cover，must press down the exhaust button firstly to prevent hot coolant from injuring people.

检查燃油液面

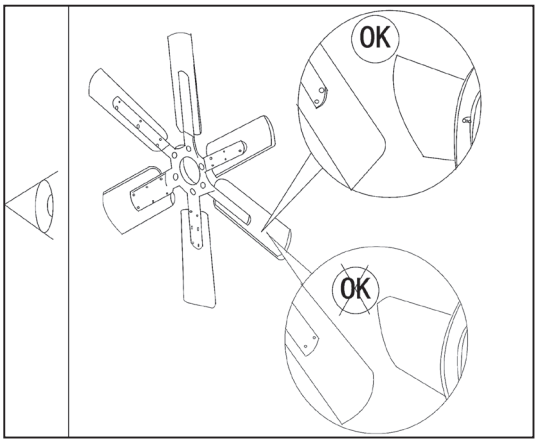
Inspect the fuel level

检查风扇

Inspect the fan

检查塑料风扇是否变形，铁风扇铆钉是否松动，叶片是否弯曲，确保风扇工作可靠。

Check whether the plastic fan is distorted.For steel fan, check whether the rivet loosened and the vane is curved to ensure reliable running

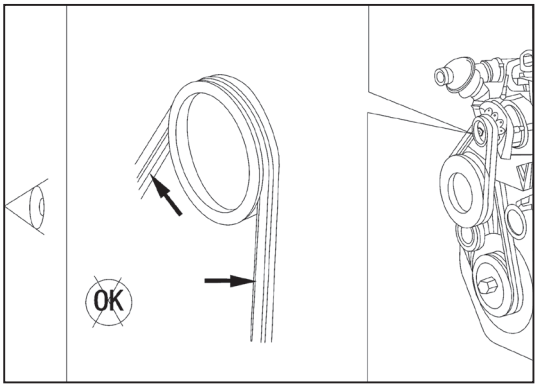


检查三角皮带

Inspect the V–belts

用肉眼检查三角皮带，有无裂纹或擦伤，必要时应更换。

Inspect the V–belts with your eyes to find if there is any crack or scratch on the V–belts. Replace them if necessary.

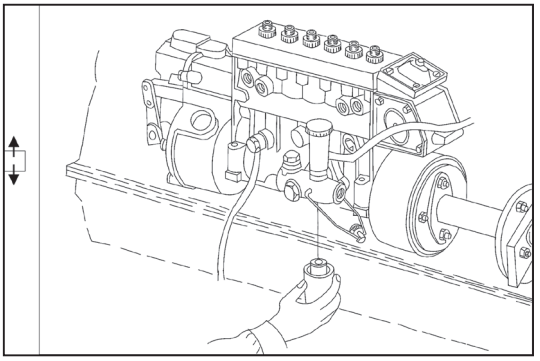


从喷油泵的输油泵小滤杯排出水和沉淀物。

Drain off the water and deposit from the small filtercup fitted on the fuel delivery pump.

拧开输油泵小滤杯底座螺钉，拿下小滤杯，将水和沉淀物排除后重新装好，拧紧。

Unscrew the bottom bolt of the small filter cup，dismount it and drain off the water and deposit，then re–install the cup again



3.2 各级保养的保养内容
Maintencnce items of various maintenances

除完成每日保养外，增加下列检查项目：

The following contents will be added except daily maintenance items：

机油和机油滤清器的更换

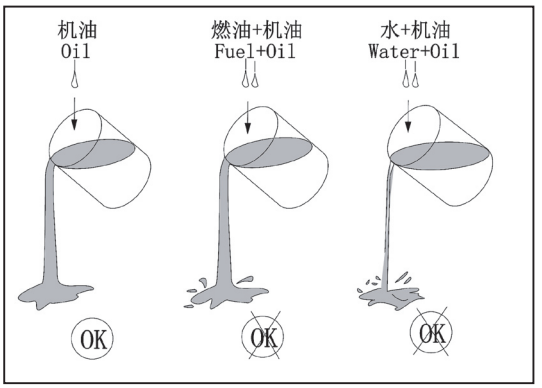
Replacement of the oil and oil filter

柴油机使用后机油将变脏，污染物含量与燃油机油耗总量成正比。

The oil will be polluted after using, the pollution contents is of accordance with the consumption of fuel and oil.

注意：正常使用的柴油机更换机油的周期无论如何不可超过250h(1万公里)。

Note:The replacement period of oil under proper using condition cannot beyond 250h (10,000Kilometers)



更换机油和机油滤清器，以清除悬浮在机油中的杂质。

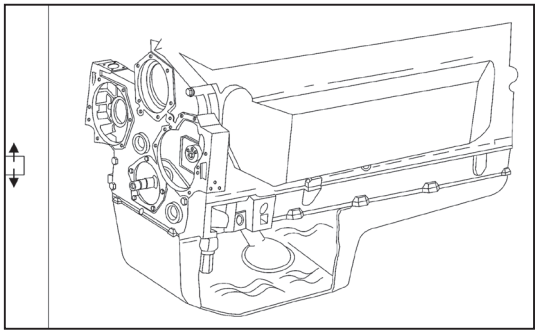
Replace the oil and oil filter to clean the impurities containing in oil.

注意：应在机油是热的时候放油

Note:The oil should be drained off when it iS hot.

32mm 开口扳手

Tool:32mm open–ended wrench

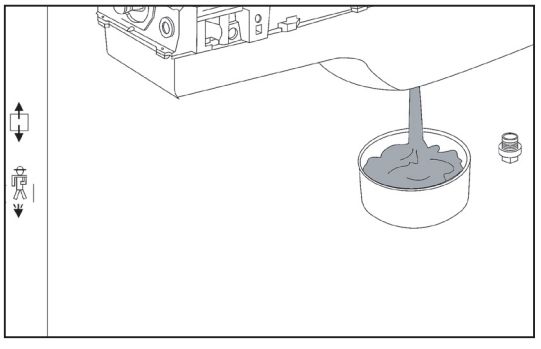


拆下放油螺塞，准备收集 20L 机油。

Remove the whorl plug，prepare a container tocollect 20L of oil.

注意：热机油会伤人

Note：Hot oil can injure people.

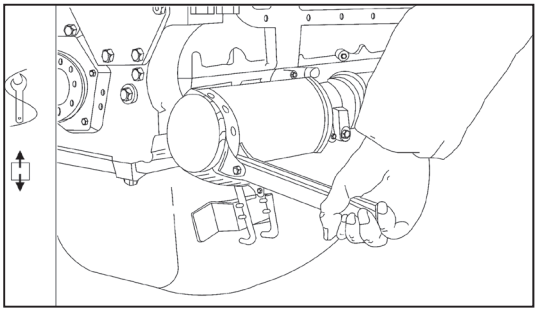


滤清器专用扳手

Tool:The special wrench for filter

清洁滤清器头部四周，拆下滤清器。

Clean the end surrounding of the filter，and remove it·

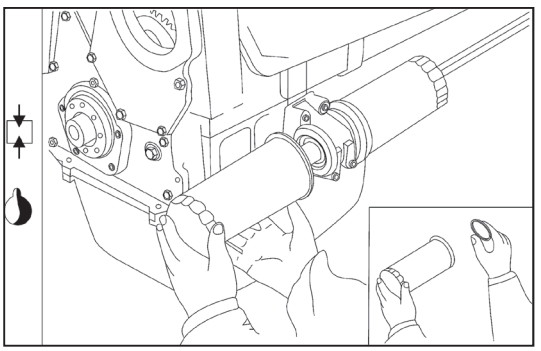


装上新的机油滤清器

Install the new oil filter

注意：安装机油滤清器时，密封圈要校正－且要在密封圈上涂上滑油。

Note：Adjust the seal ring and smear some lubricating oil on it while fitting the oil filter.

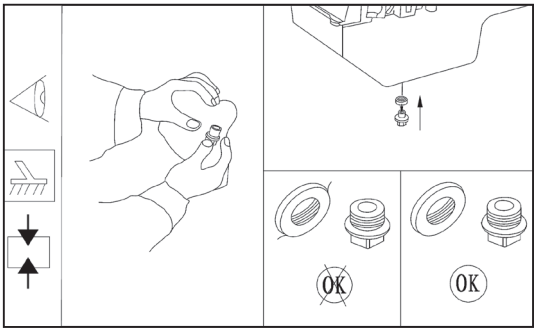


32mm 开口扳手

Tool:32mm open-ended wrench

检查和清洁放油螺塞螺纹及密封表面，并装上放油螺塞。

Check and clean the screw thread and seal ring, and then install the whorl plug .

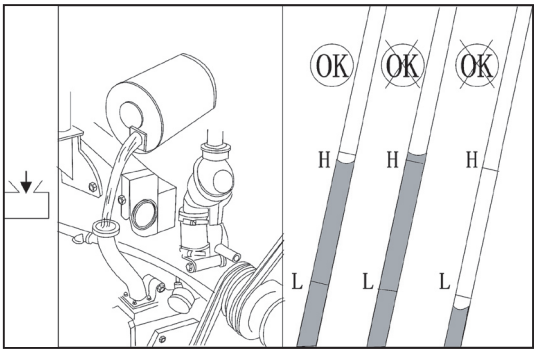


将清洁的机油注入柴油机到油尺的上刻度线，油底壳容量为20L。

Fill the clean oil up to the upper limit, the capacity of the oil sump is 20L.

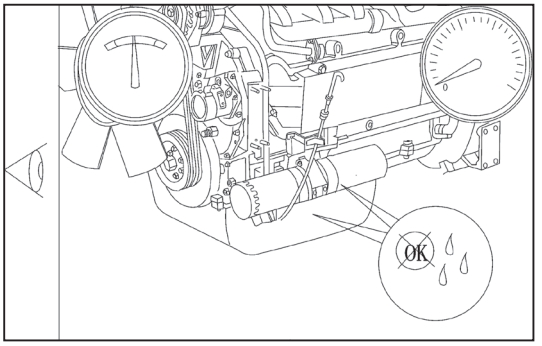
注意：机油选用参见第 55 页

Note:Selection of oil see page 55



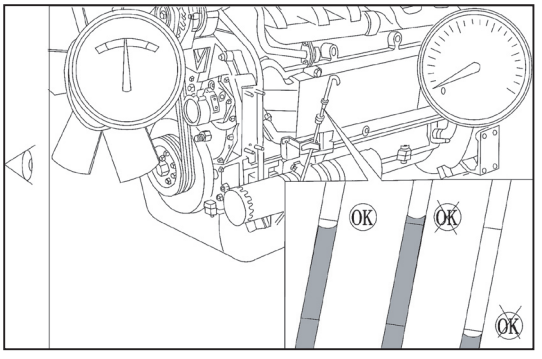
发动机怠速运转，检查滤清器和放油螺塞处是否漏油。

Run the engine at idling speed and check the filter to find whether it leaks or not.



停车后约 5min 让机油自上部零件流人油底壳，再检查油面高度，必要时补充机油至油尺的上刻线。

Stop the engine and make the oil run into the sump from the upper parts 5 minutes later，then check the oil level，fill oil up to the upper limit if necessary.



检查调整气门间隙

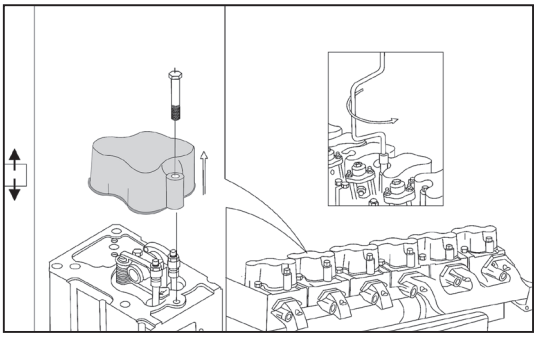
Check and adjust the valve clearance

13mm 套筒扳手

Tool：1 3mm sleeve wrench

拆下 6 个气缸盖罩

Disassemble 6 cylinder head covers.

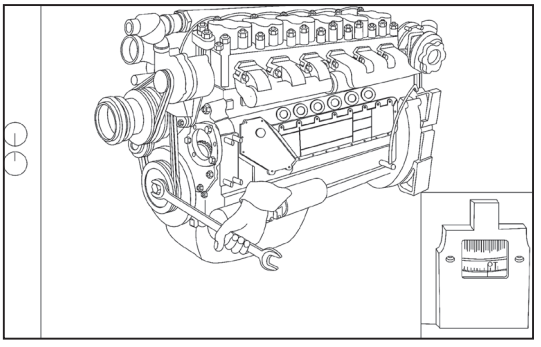


32mm 盘车扳手

Tool: 32mm wrench for turning the crankshaft

用盘车扳手慢慢转动柴油机，使飞轮壳上刻线对准飞轮上的 OT 刻度线，此时使第一缸活塞处于压缩行程的上止点位置（一缸进排气阀处于关闭状态）

Tum the flywheel until its OT scale and the mark on its housing are aligned,push the piston to the position of TDC of compression stroke of 1st cylinder(the intake and exhaust valve of 1st cylinder are dosed).



塞尺

Tool：Clearance guage

进气门间隙 0.30mm

The clearance of intake valve is 0.30mm

排气门间隙 0.40mm

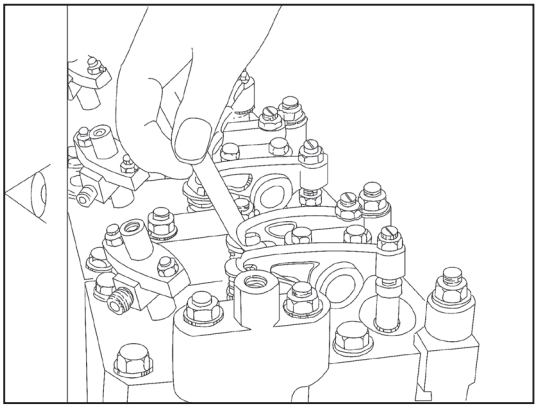
The clearance of exhaust valve is 0.40mm

WEVB 系统间隙 0.25mm

The Clearance of WEVB systerm is 0.25mm

注意：检测气门间隙时，柴油机应为冷态——低于 60℃，塞尺在气门杆顶和摇臂间滑动时，有阻滞发粘感觉时，所测间隙值为准确值。

Note:When check the clearance of valve，the engine should be at the cool condition—its temperature is less than 60℃. When the clearance guage glides between the top of valve rod and rocker arm and can be felt retarded and sticky，the measuring result is proper.



采用 WEVB 系统后，排气门间隙的调整方法 (零件序号参见图 1)：

After WEVB system is used, the adjustment method of exhaust valve clearance is as follows (see Fig. 2 for part serial numbers)

1、所要调整的气缸的活塞位于压缩行程上止点；

1. The cylinder piston to be adjusted is located on the top dead center of the compression travel.

2、如图 2 所示，在序号 2 调节螺栓总成松开，不压紧排气门摇臂封油平面的情况下，先通过调整推杆端序号 10 气门间隙调整螺钉，将总气门间隙调整为 0.4mm, 将防松螺母拧紧。

2. As shown in Fig. 2, loosen No. 2 adjusting bolt assembly. In case that the oil seal plane of exhaust valve rocker arm is not pressed, first by using No. 10 valve clearance adjusting screw at the push rod end, adjust the total valve clearance to 0.4mm. Tighten check nut.

注意：调整过程中应转动气门间隙调整螺钉直到将塞规夹住，从而保证使序号 5 气门摇臂活塞压到底，与排气门摇臂中的活塞安装孔底部平面之间无间隙；

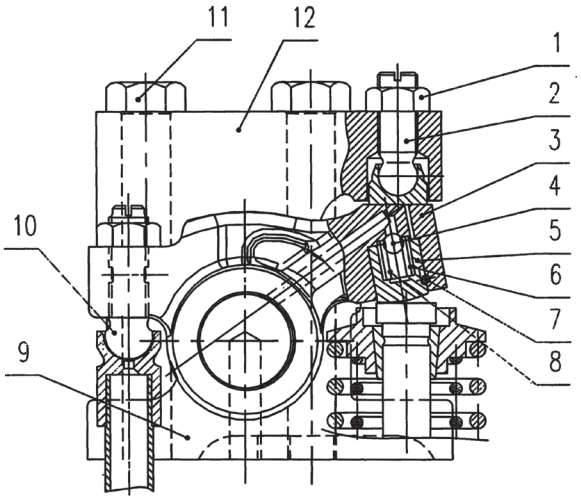
Caution: During adjustment, turn the valve clearance adjusting screw until the clearance gauge is clamped so that No. 5 valve rocker arm piston is pressed to its bottom. There is not clearance between No.5 valve rocker arm piston and the piston installation hole bottom plane in exhaust valve rocker arm.

3、然后如图 3 所示，在序号 5 气门摇臂活塞与排气门杆端或气门杆帽之间再放入 0.25mm 的塞规，通过调整序号 2 调节螺栓总成，将气门端间隙调整为 0.25mm, 将防松螺母拧紧。

3. Then as shown in Fig. 3, insert the clearance gauge between No. 5 valve rocker arm piston and the exhaust valve rod end or valve rod cap. By turning No.2 regulating bolt, adjust the valve clearance to 0.25mm. Tighten check nut.

注意：调整过程中应转动序号 2 调节螺栓总成直到将塞规夹住，从而保证使序号 5 气门摇臂活塞压到底，与排气门摇臂中的活塞安装孔底部平面之间无间隙。

Caution: During adjustment, turn No. 2 regulating bolt until clearance gauge is clamped so that No. 5 valve rocker arm piston is pressed to its bottom. There is not clearance between No.5 valve rocker arm piston and the piston installation hole bottom plane in exhaust valve rocker arm.



1.气门间隙调整螺母 2.调节螺栓总成 3.排气门摇臂总成 4.钢球
5.气门摇臂活塞 6.摇臂活塞弹簧 7.滚针 8.球阀弹簧
9.气门摇臂座总成 10.气门间隙调整螺钉 11.六角头螺栓 12.支撑臂

1. Valve clearance adjusting nut 2. Regulating bolt assembly 3. Exhaust valve rocker arm assembly 4. Steel ball 5. Valve rocker arm piston 6. Rocker arm piston spring 7. Needle 8. Ball valve spring 9. Valve rocker arm seat assembly 10. Valve clearance adjusting screw 11. Hexagonal bolt 12. Support arm

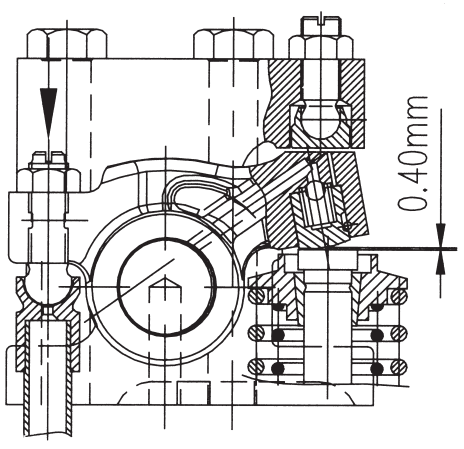


图2 冷态排气门总气门间隙0.4mm

Fig. 2 Total Valve Clearance of Cold–State Exhaust Valve 0.4mm

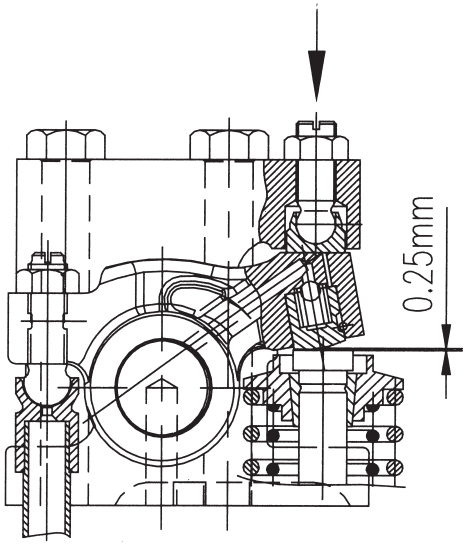


图3冷态排气门端气门间隙0.25mm

Fig. 3 End Valve Clearance of Cold–State Exhaust Valve 0.25mm

6# 螺丝刀、14mm 梅花扳手

Tools：6#screwdriver and14mm double offset ring wrench

第一缸活塞位于压缩行程上止点位置。

The piston of 1 cylinder is at TDC of the compression stroke.

如步骤 A 所示检查或调整气门间隙 (I 表示进气，E 表示排气)。

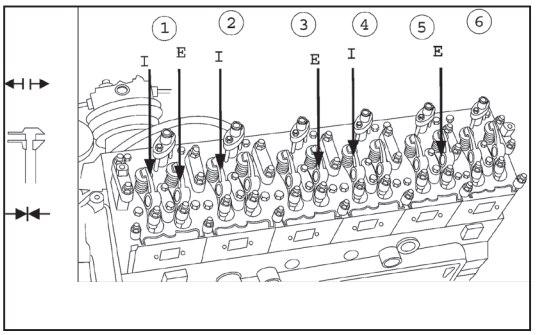
Check and adjust the valve clearance as step A(I–air intake Valve E–air exhaust valve)

用塞尺调整好间隙后拧紧摇臂锁紧螺母，并复查气门间隙，直到到要求为止。

Adjust the clearance by guage and tighten the fixing nut of rocker arm, re–check the clearance till it meets the requirement.

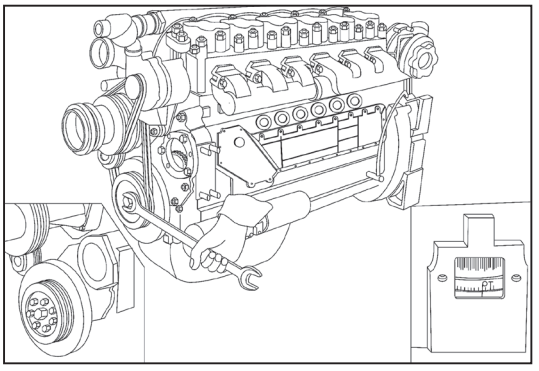
步骤 A

Step A



用盘车扳手再转动曲轴360°；也可以在减震器上做标记后转动360°。

Turn the crankshaft 360° by the spanner; it can also be turned 360° after marking on the vibration damper.

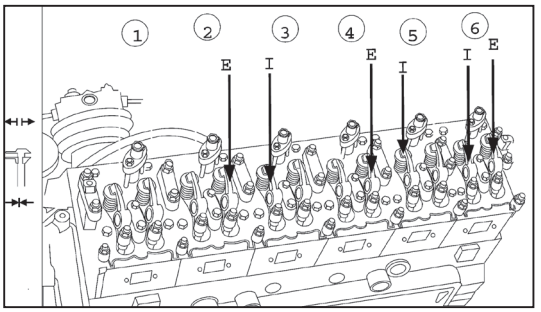


按步骤B所示调整气门间隙

Adjust the valve clearance as step B

同样松动摇臂锁紧螺母，用塞尺调整好后重新拧紧摇臂锁紧螺母。

Loosen the fixing nut of rocker arm, adjust the clearance by guage then tighten the nut again.



13mm 套筒扳手

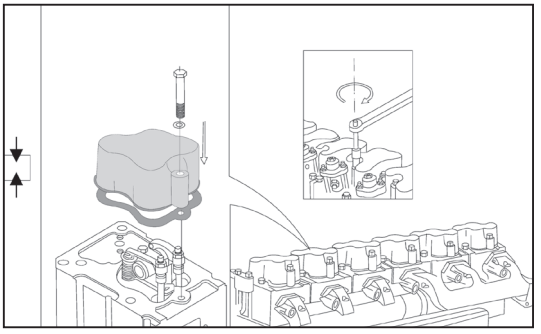
Tool:13mm sleeve wrench

安装气缸盖罩垫片和气缸盖罩。

Install the gasket and cylinder head cover

螺栓拧紧力矩 23N・m(推荐数值)。

The tightening torque of bolt is 23N・m(recommended)

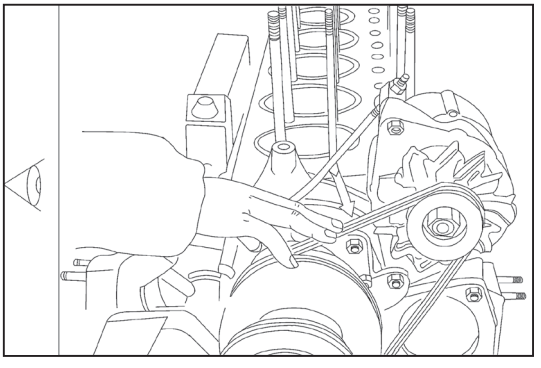


检查三角皮带涨紧力

Check the tension of V–belts

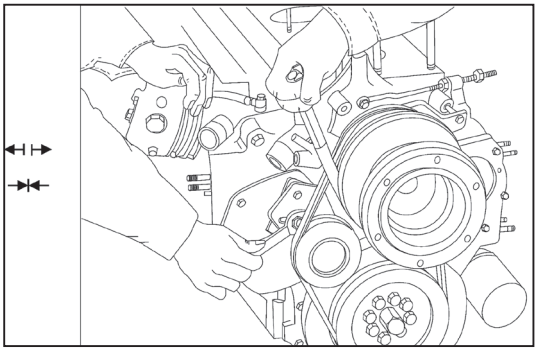
在三角皮带的最大跨距上测量其挠度：一般要求在强有力的大拇指压力下，皮带挠度不大于 l0mm。

Measure the flexibility of the V—belt at the middle of its biggest span，generally the requirement result should be less than l0mm under strong press by your thumb.

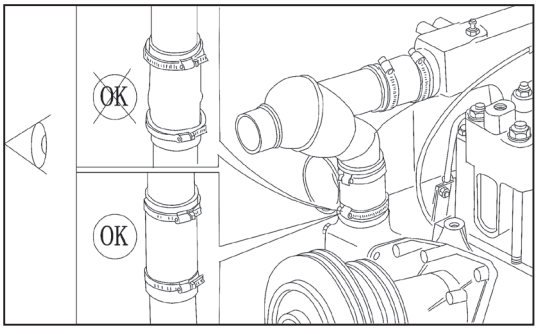


16mm 开口扳手
16mm open–ended wrench

如果挠度大于 l0mm，说明三角皮带松动，需松开张紧轮涨紧螺母，重新涨紧皮带，然后拧紧涨紧螺母。
If the flexibility is more than l0mm，it means the V–belt has been loosen. the nut for tension pulley needs to be relaxed，strain the V—belt again and tighten the nut.

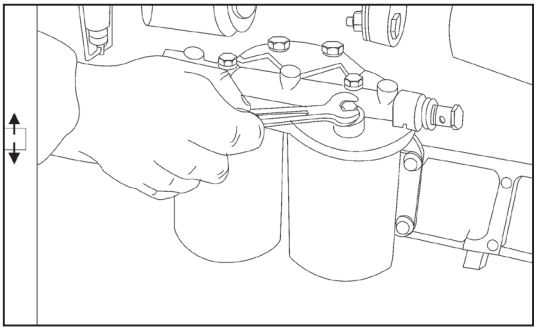


检查冷却管路橡胶管是否老化有裂缝、软管卡箍是否松动，必要时紧固或更换零件，确保其密封性。
Check whether the rubber pipes of cooling system is aging or cracked，the steel wire hoop is loosening. If it is necessary，tighten or replace the parts to ensure good sealing pertormance.



更换燃油滤清器

Replace the fuel filter

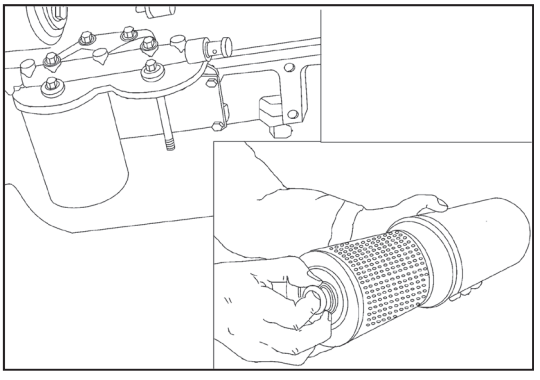


13mm 开口扳手

Tool：13mm open–ended wrench

清洁燃油滤清器头部周围。松开上部螺钉，拆下燃油滤清器。

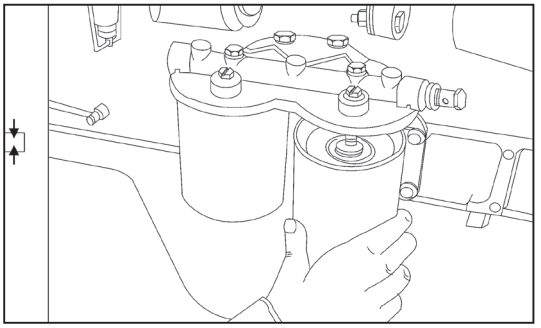
Clean the end surrounding of the fuel filter，unloosen the upper bolt and disassemble the fuel filter.



装上新的燃油粗滤芯和精滤芯。

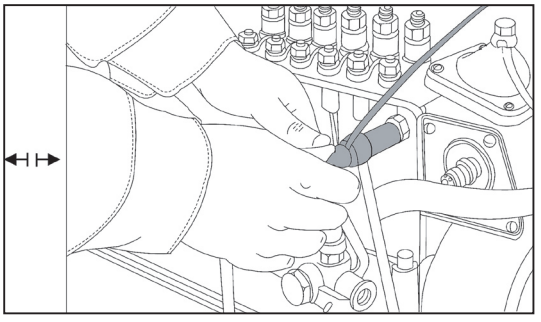
Install the new fuel pre–fiher element and filter element.

将更换的燃油滤清器安装在滤清器支架上，并拧紧螺钉。
Install the replaced fuel filter on the bracket and tighten the bolt.



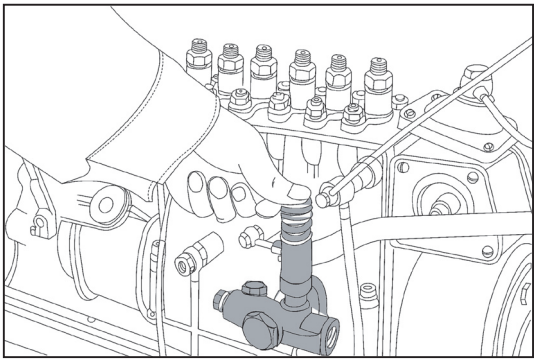
排出低压油路和燃油滤清器中的空气。
Drain off the air from the fuel delivery pipe and fuel tilter

拧开喷油泵进油口放油螺钉。
Open the fuel draining bolt at the inlet of injection pump.



按动输油泵柱塞，直到从放油螺钉处流出的柴油没有空气为止，然后拧紧放油螺钉。

Press the fuel delivery pump plug till the fuel drained off from the draining bolt outlet does not contain air, then tighten the bolt.

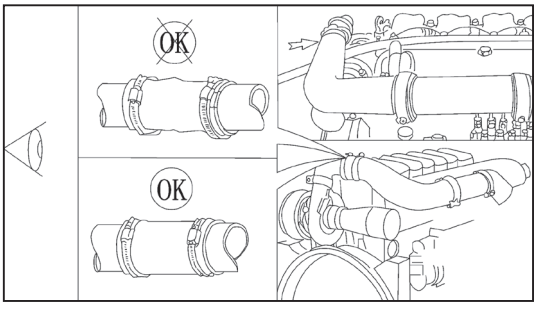


检查进气系统

Check the air intake system

检查进气胶管是否老化有裂缝、环箍是否松动，必要时紧固或更换零件，确保进气系统密封性。

Check whether the air intake rubber pipes are aging or cracked, the steel wire hoop is loosening. If it is necessary tighten or replace the parts to ensure good sealing performance.



检查空气滤清器滤芯

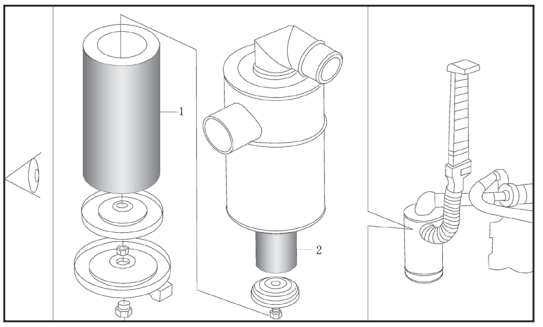
Check the air filter element

柴油机最大允许进气阻力为7kPa，柴油机必须在标定转速和全负荷运转时检查最大进气阻力，当进气阻力达到最大允许极限时，应按制造厂的规定清洁或更换滤芯。

The maximum air intake resistance of the engine should be less than 7kpa，it should be checked while the engine running at rated speed and full load When the resistance reaches the maximum limit or the indicator light glows，the air filter element should be cleaned or replaced as per the maintenance guide from the manufacture.

注意：决不允许在没有空滤器时使用发动机，否则灰尘和杂质进入柴油机会导致发动机早期磨损。

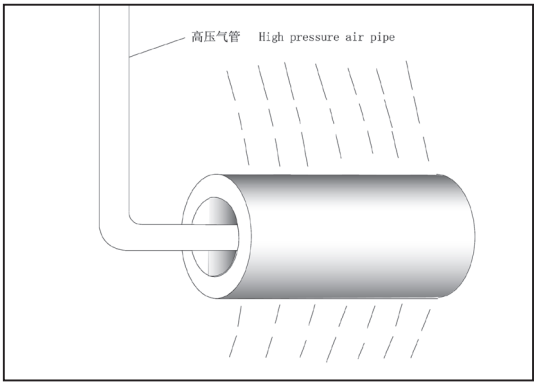
Note：It is not allowed to use the engine without air filter，otherwise the dust and impurity will cause early wearing of the engine.



1、纸质滤芯
Paper foltering element
2、毛毡安全滤芯
Blanketry sofety futering element

从空滤器中拆下空滤芯，轻拍端面使灰尘落下，也可用压缩空气反吹（由内向外吹）。

Remove the filter core from the air filter element and beat the side of the element lightly to make dust fall down,or blow the element backward (blow back from inside to outside)by compressed air.



注意：

Nole：

- **不得吹破滤纸**
- Don't blow off the air filtering paper
- **不得用水和油清洗滤纸**
- Don't clean the air filtering paper by water and oil
- **不得用力拍打或敲打滤芯**
- Don't beat the core forcibly.

3.3 柴油机长期存效时的维护保养

Maintenance of Diesel Engine during Long–term Storage

为防止锈蚀，柴油机出公司时进行油封，一般柴油机的油封期为一年，凡超过一年的应进行检查并采取必要的补充措施。

In order to prevent rust and corrosion, the diesel engine is oil sealed before ex–work. Usually, the oil seal period for the diesel engine is one year. Whenever the oil seal period exceeds one year, check and take necessary supplementary measures.

油封：首先向柴油机加入机油和带防锈剂的冷却液，开机并空转达 15–25 分钟，在停机前 2 分钟向空气压缩机进口喷油封油，停车拆除中冷器与发动机的连接管路，以起动机带动发动机转动，向发动机进气管、涡轮增压器等内腔喷油封油。向所有的裸露表面和轴伸出端涂油封油。

Preservation: First fill the diesel engine with sealing oil and coolant with anti–rust agent, start the engine and run at idling speed for 15~25min. Spray sealing oil to air compressor intake 2min before stopping of the engine. After stop, remove the pipeline connecting intercooler and engine, so that the starter drives the engine to rotate. The sealing oil is sprayed into the cavities of intake pipe, turbo–supercharger, etc. Apply sealing oil on all the exposed surfaces and the extended shaft ends.

存放期间的防护：用盖子或塑料布捆扎封墙各油、气、水的进出口；用气象防锈膜封存整台发动机。

Protection in storage period: Use covers or plastic cloth to tie and block all the intake and outlet ports. Use weather anti–rust film to seal the whole engine.

如果需要运输则应该外加包装。

Pack the engine if transportation is necessary.

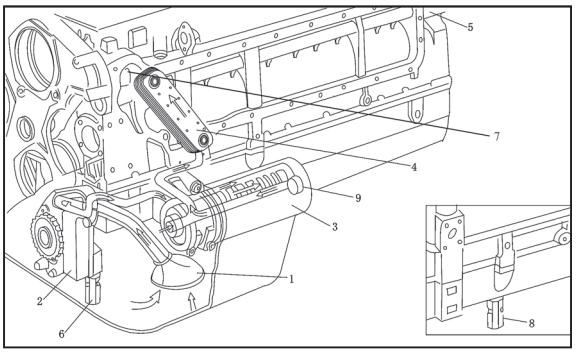
4. 柴油机几大系统示意图
The Main System Flow Chart of Engine

·润滑系统
Lubricating system
·冷却系统
Cooling system
·进排气系统
Intake and exhaust system
·燃油系统
Fuel supplying system

了解斯太尔柴油机的各大系统流程，将为您使用维护保养及故障排除提供帮助。

To understand the main system flow chart of the engine will give help to you for operating and maintaining the engine.

4.1润滑系统
Lubricating system

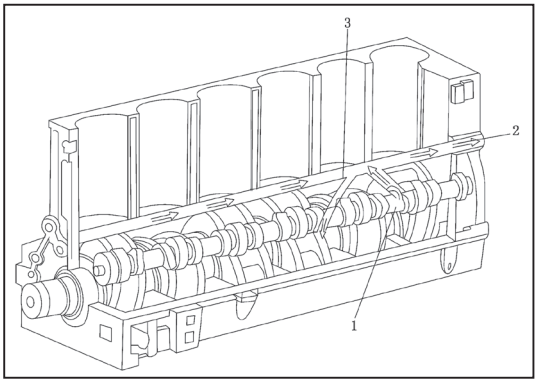


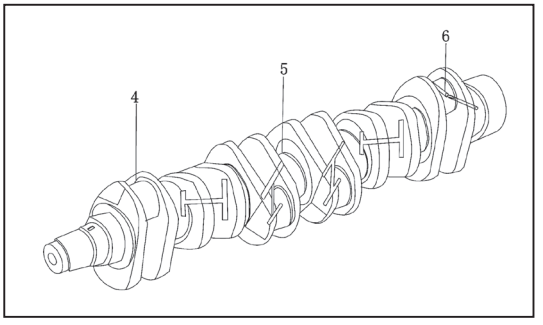
1. 集滤器
   Strainer
2. 机油泵
   Oil pump
3. 机油滤清器
   Oil filter
4. 机油冷却器
   Oil cooler
5. 主油道
   Main oil passage
6. 机油泵安全阀
   Safety valve of oil pump
7. 安全阀
   Safety valve
8. 主油道限压阀
   Oil release valve for main oil passage
9. 机油滤清器旁通阀
   Bypass valve of oil filter

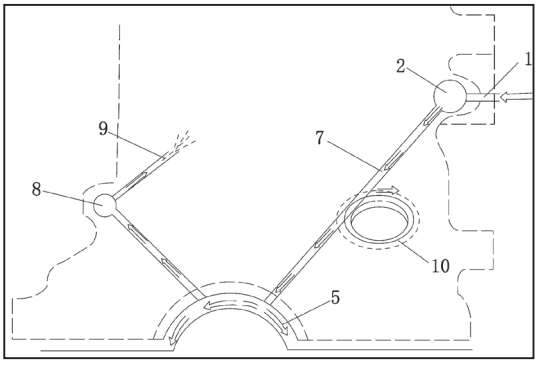
各大运动零件的润滑

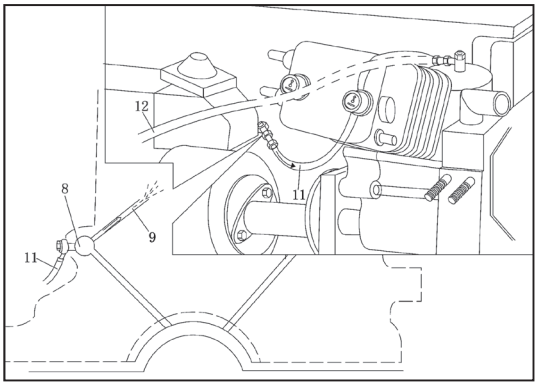
Lubricating for main moving parts

1. 机油冷却器来油
   The oil flowing from the oil cooler
2. 主油道
   Main oil passage
3. 通往主轴颈
   Oil to the main crankshaft joumal
4. 连杆轴颈
   Connecting rod joumal
5. 曲轴主轴颈处
   The main journal of crankshaft
6. 通往连杆轴承
   Oil to connecting rod beating
7. 主油道通向主轴承的斜油道
   The branch oil passage passing to main Dearing
8. 付油道
   Sub–passage of oil
9. 冷却活塞喷油
   Oil injection nozzle to cool piston
10. 凸轮轴轴承
    Camshaft beating
11. 付油道来油润滑空压机
    Lubricating air compressor through the oil from sub–passage
12. 付油道来油润滑喷油泵
    Lubricating fuel injection pump through the oil from sub–passage



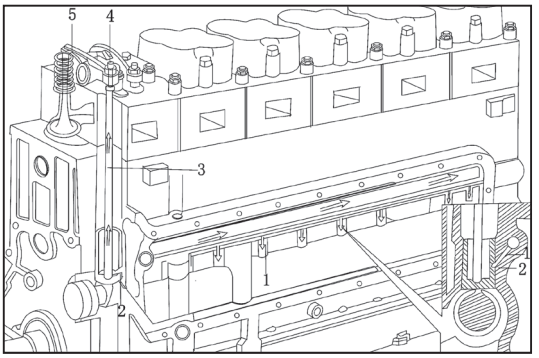


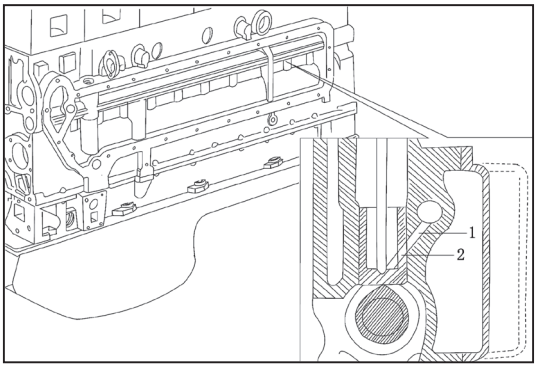




摇臂机构的润滑
Lubricating for rocker arm system

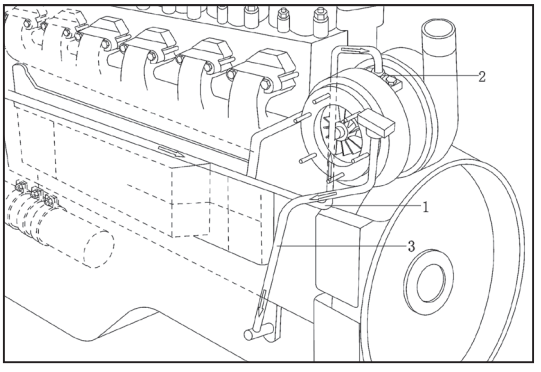
1. 主油道斜油孔来油
   Oil flowing from the oil branch passage
2. 挺柱油孔
   Tappet oil hole
3. 挺杆油孔
   Push rod oil hole
4. 摇臂螺钉油孔
   Oil hole of rocker arm bolt
5. 摇臂油孔
   Oil hole of rocker arm





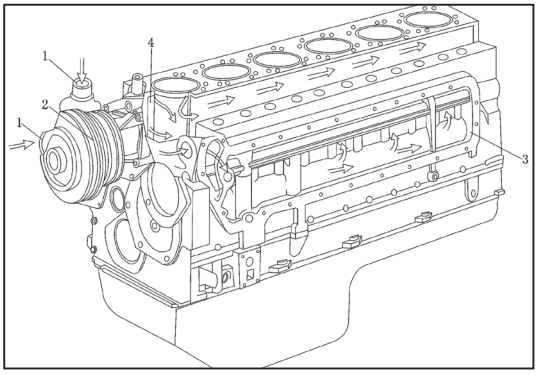
增压器的润滑
Lubricating turbocharger

1. 主油道来油
   Oil from the main oil passage
2. 增压器进油口
   Oil inlet of turbocharger
3. 增压器回油口
   The oil outlet of turbocharger

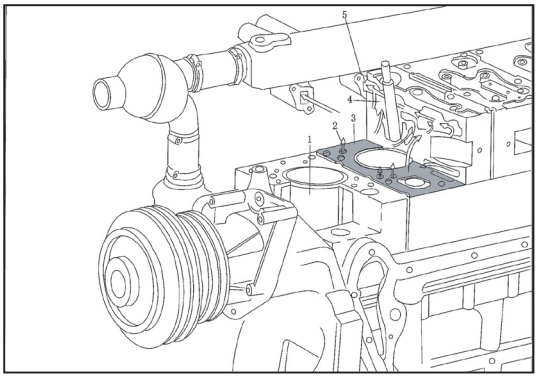


4.2冷却系统

Cooling system

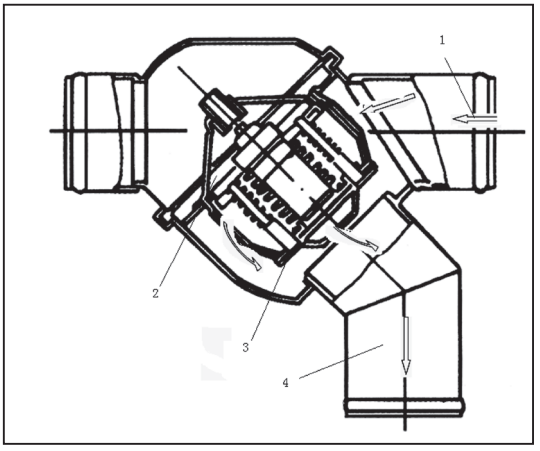


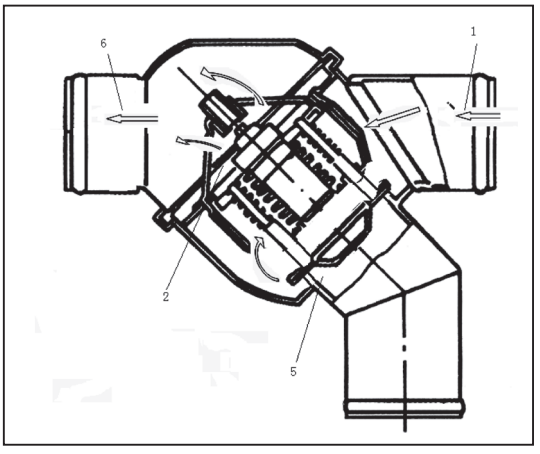
1. 水泵进水口
   Water pump inlet
2. 水泵
   Water pump
3. 机油冷却器水腔
   Water channel of oil cooler
4. 气缸体水套
   Water jacket of cylinder block



1. 气缸体水套
   Water jacket of cylinder block
2. 来自缸体水套之水
   Cooling water flowing from water jacket of cylinder block
3. 气缸垫
   Cylinder head gasket
4. 流经气缸盖水腔
   Cooling water passing through the water passage of cylinder head
5. 出水口
   Cooling water outlet

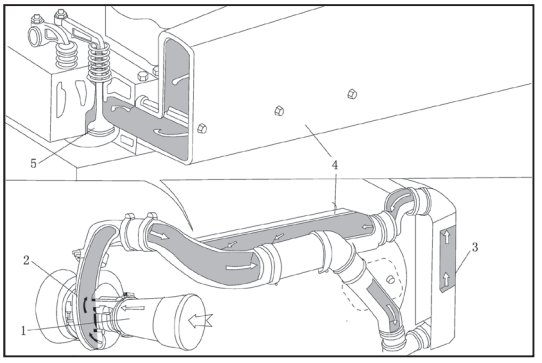
1. 机体流出冷却液
   Coolant flowing from cylinder block
2. 调节器
   Thermostat
3. 旁通阀
   Bypass valve
4. 流入水泵的冷却液
   Coolant flowing into water pump
5. 旁通阀关闭
   Bypass valve closed
6. 冷却液流入散热器
   Coolant flowing into the radiator





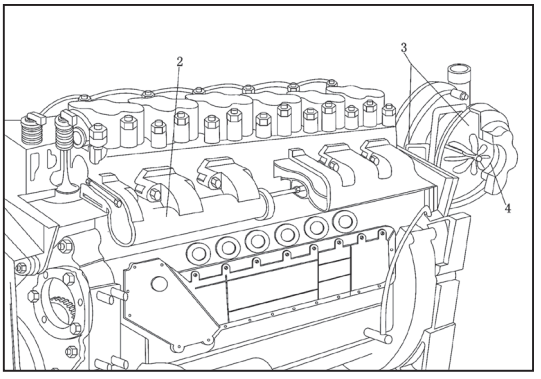
4.3进排气系统

Intake and exhaust system



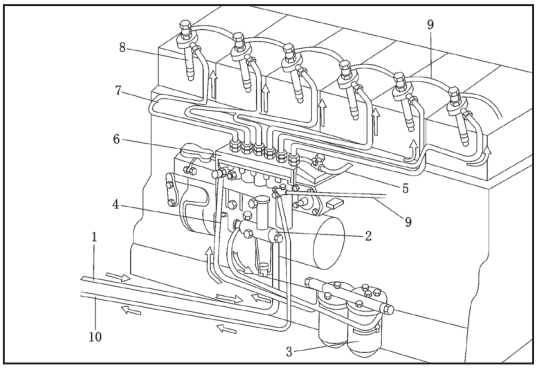
1. 经过滤清器滤清的空气进入增压器
   The fresh air passing through the air filter flows into turbocharger
2. 流经中冷器的增压空气(增压非中冷机无中冷器)
   The turbocharged air passing through intercooler There is no intercooler for turbocharged but not inter–cooled engine)
3. 中冷器(我厂不配带中冷器)
   Intercooler(The engine supplied without intercooler when delivering out of our company)
4. 进气管
   Intake manifold
5. 进气门
   Intake valve

1. 排气门
   Exhaust Valve
2. 排气管
   Exhaust manifold
3. 排气进入增压器涡轮
   Exhausting gas flowing into the turbo of turbocharger
4. 增压器排气出口
   Exhaust outlet of turbocharger



4.4燃油系统
Fuel supplying system

1. 来自油箱的燃油
   Fuel from the fuel tank
2. 输油泵
   Fuel delivery pump
3. 燃油滤清器
   Fuel filter
4. 低压油管
   Fuel delivery pipe
5. 冒烟限制器空气接管
   Air connecting pipe for smoke controlling device
6. 喷油泵
   Fuel injection pump
7. 高压油管
   High pressure fuel pipe
8. 喷油器
   Injector
9. 喷油器回油管
   Fuel returning pipe of injector
10. 回油箱燃油管
    Fuel pipe back to the fuel tank



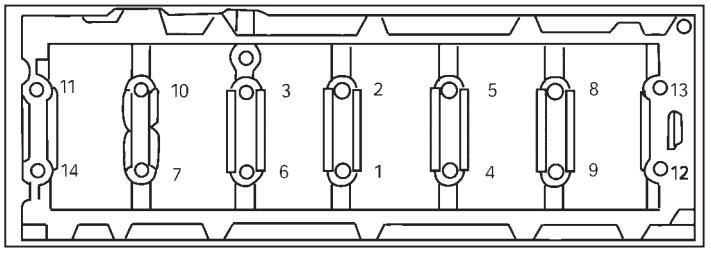
5. 柴油机强力螺栓的拧紧力矩和拧紧方法
Tightening Torque And Tightening Method of High Strength Bolts

1. 主轴承螺栓：

Main–Bearing Bolt

14 根 M 1 8 22 套筒扳手

T0tal nos. ： 14 pcs M 1 8 bolts，Tool：22mm sleeve wrench



分两次拧紧（拧紧顺序按上图所示）第一次：80N·m 第二次：250^{+25}N·m

Tighten bolts in twice(tightening sequence see the figure above) The first time：80N·m The second time：250^{+25} N·m

2. 气缸盖螺栓：

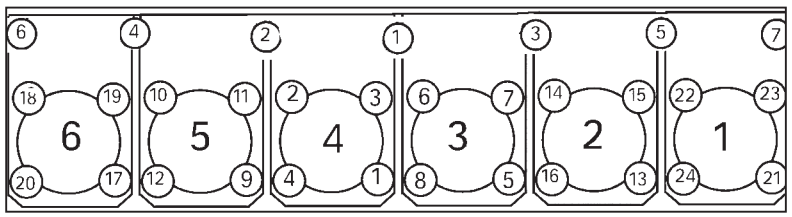
Cylinder Head Bolt：

24根M1 6的主螺栓，22套筒扳手

Total nos：24 pcs M16 main bolts，Tool：22mm sleeve wrench

7根M 12副螺栓的螺母，17套筒扳手

Total nos：7 pcs nuts of M 1 2 auxiliary bolt，Tool：17mm sleeve wrench



按下列顺序拧紧：

Following such tightening sequence：

第一步：气缸盖安装好后须找正，即排气口侧应在一个平面内：所有螺栓按 30N・m 预紧。

Step 1：Align cylinder head after assembly，i. e. the exhaust port side of cylinder heads should be in the same plane. All the bolts should be tightened beforehand，and the torque is 30N・m.

第二步：24 根主螺栓用 200N・m 力矩按上图所示主螺栓次序拧紧。

Step 2：Tighten 24 pcs main bolts as the sequence in above figure，and the torque is 200N・m

第三步：7 根副螺栓螺母用 100N・m 力矩按上图所示副螺栓次序拧紧。

Step 3：Tighten 7 pcs auxiliary bolts as the sequence in above figure，and the torque is 100N・m

第四步：主螺栓按上图次序旋转 90°。

Step 4：Turn the main bolts 90° as the sequence in above figure.

第五步：副螺栓螺母按上图次序旋转 90°

Step 5：Turn the auxiliary bolts 90° as the sequence in above figure.

第六步：主螺栓按上图次序再次旋转 90°。扭矩达到 240–340 N・m。

Step 6：Turn the main bolts 90° as the sequence in above figure again，and the torque range is 240—340 N・m.

第七步：将副螺栓螺母按上图次序再次旋转 90°，扭矩同时达到 120~160N・m。

Step 7：Turn the auxiliary bolts 90° as the sequence in above figure again. the torque range is 120 ~ 160 N・m.

对达不到最终扭矩要求的螺栓应更换，主螺栓允许重复使用 3 次，副螺栓允许重复使用 2 次。

Replace those bolts that cannot reach required torque range. The main bolt is allowed to be reused for 3 times. and the auxiliary bolt is allowed to be reused for 2 times.

3. 连杆螺栓：

Connecting rod Bolt：

两根 M14x1.5 19mm 套筒扳手

Total nos. ：2 pcs M14x1.5 for each connecting rod Tool：19mm sleeve wrench

第一步：先拧靠，再用120N・m的力矩对称扭紧。

Step 1：Tighten tightly，then tighten these bolts symmetrically with a torque of 120N

第二步：旋扭 90° ± 5°，扭矩须在 170~250 N・m 范围内

Step 2：Turn these bolts 90° ± 50° and the torque range is 170~250 N・m.

对达不到扭矩要求的螺栓应更换

Replace those bolts that can not reach required torque range.

注意：经过拆卸后的连杆螺栓不得再使用。

Note：The connecting rod bolts that have been used should not be reused.

4. 飞轮螺栓：

Flywheel Bolt：

9根M14x1.5 22套筒扳手

Total nos. ：9 pcs M14x1.5 Tool：22mm sleeve wrench

第一步：60N・m力矩对称扭紧

Step 1：Tighten these bolts symmetrically with a torque of 60N・m.

第二步：转180° ± 50° ，扭矩同时达到230~280 N・m

Step 2：Turn these bolts 1 80° ± 5°，and the torque range is 230~280 N・m.

对达不到扭矩要求的螺栓应更换

Replace those bolts that can not reach required torque range.

注意：飞轮螺栓只许使用2次。

Note：The flywheel bolt is only allowed to be reused for 2 times.

5. 飞轮壳螺栓：

Bolt for Flywheel Housing

13根M12螺栓 套筒扳手

Total nos. ：1 3 pcs M 12 bolts Tool：box wrench

第一步：40N・m力矩拧紧

Step 1：Tighten these bolts with a torque of 40N・m.

第二步：分别旋转120° ± 50° ，同时达到110~140N・m

Step 2：Turn these bolts 1 20° ± 5° respectively，and the torque range is 110~140 N・m.

不在扭矩范围内的螺栓应更换

Replace those bolts that can not reach required torque range.

飞轮壳螺栓允许重复使用2次。

The flywheel housing bolt is allowed to be reused for 2 times.

注意：以上几种强力螺栓拧入前均要在螺纹及支撑面上涂润滑油。

Note：Smear thread and bearing surface of high strength bolts described above with lubricating oil before tightening.

6. 中间齿轮轴螺栓：

Bolt for Intermediate Gear Shaft

4 根 M10 套筒扳手

Total nos. ： 4 pcs M10 bolts　　Tool:sleeve wrench

第一步：60N・m 力矩对称拧紧

Step 1：Tighten these bolts symmetrically with a torque of 60N・m.

第二步：分别旋转 90°，扭矩达到 100~125 N・m

Step 2：Turn these bolts 90°，and the torque range is 100~125 N・m.

达不到扭矩要求螺栓应更换

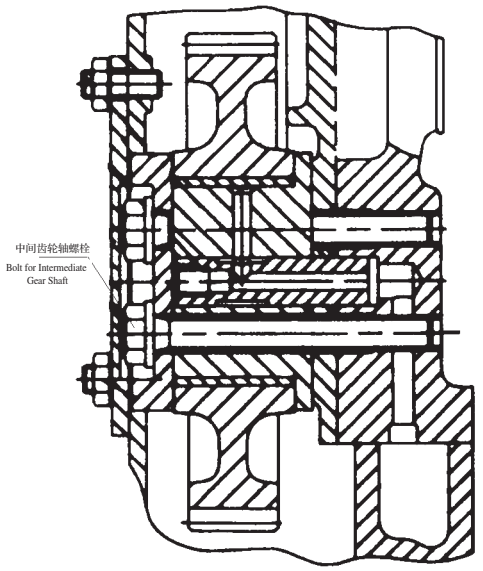
Replace those bolts that can not reach required torque range.

螺栓拧入前螺纹部位涂乐泰密封胶 242。

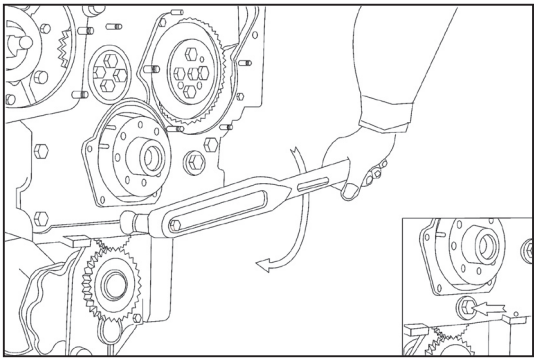
Smear the thread with LOCTITE 242 THREADLOCKER before tightening.

中间齿轮轴螺栓允许重复使用 3 次。

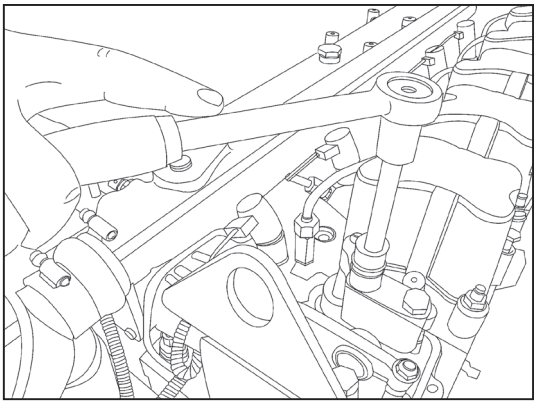
The bolt for intermediate gear shaft can only be used three times.



7. 机油泵惰轮轴螺栓：
Bolt / Oil Pump Idler
Gear Shaft
M10 16mm套筒扳手
T0tal nos. ：1 piece M10 bolt
Tool：16mm sleeve wrench
一次拧紧到60 $^{+5}$N・m
Tighten the bolt with a torque of
60 $^{+5}$N・m.
拧人前螺纹部位涂乐泰密封胶242。
Coat the thread with LOCTITE 242 THREADLOCKER before tightening.



8. 摇臂座螺栓：
Bolt / Rocker–Arm Support
12根M12
Total nos. ：12 pcs M12 bolts
18mm套筒扳手
Tool：18mm sleeve wrench
一次拧紧到100N・m
Tighten these bolts with a torque of 100N・m.



9. 喷油泵连轴器与喷油泵紧固的六角头螺栓：

Hex head Bolt / Binding Coupling and Injection Pump：

M14x1. 5

Total nos. ： 1 piece M14x1. 5 bolt.

18mm套筒扳手

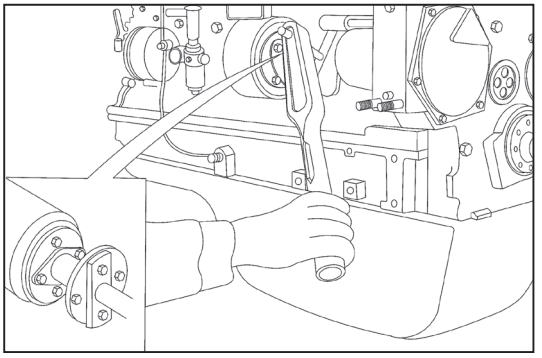
Tool：18mm box wrench

一次拧紧到150_{0}^{+15}N·m

Tighten the boh with a torque of 150_{0}^{+15}N·m

拧人前螺纹部位涂乐泰密封胶242。

Coat the thread with LOCTITE 242 THREADLOCKER before tightening



10. 喷油泵驱动齿轮紧固螺母：

Tight Nut / Injection Pump Driving Gear M24x1.5.

Total nos. :1 piece M24x1.5 nut

36mm套筒扳手

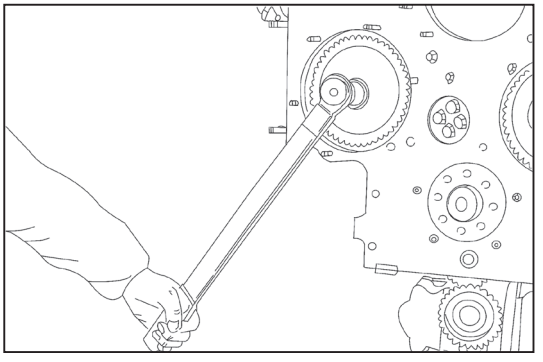
Tool：36mm sleeve wrench

一次拧紧到450~500N·m

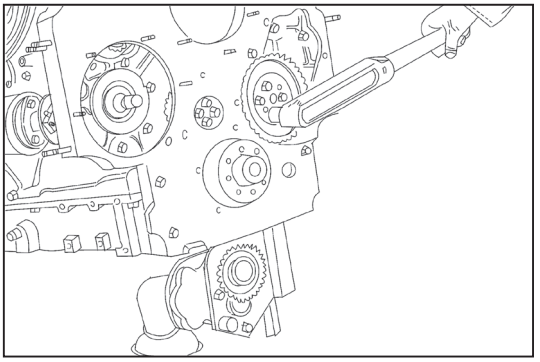
Tighten the nut with a torque 0f 450~500N·m.

拧人前螺纹部位涂乐泰密封胶242。

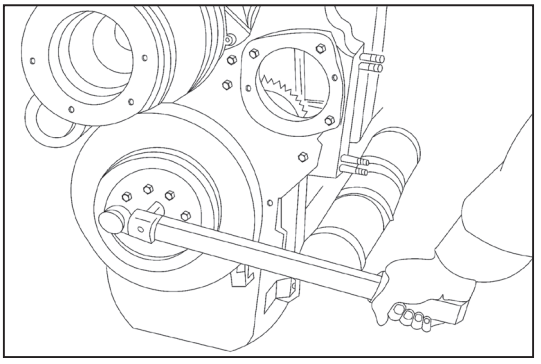
Coat the thread with LOCTITE 242 THREADLOCKER beforetightening



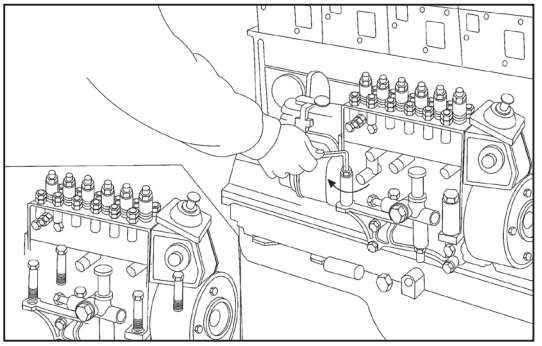
11. 凸轮轴齿轮螺栓：
Bohs|Camshaft Gear
4根M8
Total nos. ： 4 pcs M8 bolts
13mm套筒扳手
Tool：13mm sleeve wrench
对称拧紧到35N・m
Tighten these bohs aymmetrically with a torque of 35N・m.
拧入前螺纹部位涂乐泰密封胶242。
Coat the thread with LOCTITE 242 THREADLOCKER before tightening.



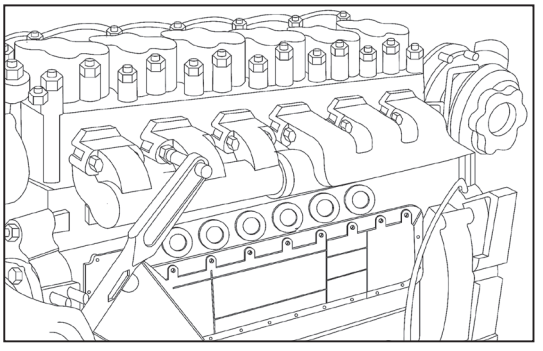
12. 减振器皮带轮与曲轴连接螺栓：
Bolt / Attaching Damper Pulley and Crankshaft
8根M10
Total nos：8 pcs M10 bolts
16mm套筒扳手
Tool：16ram sleeve wrench
对称拧紧到60^{+5}N・m
Tighten these bolts symmetrically with a torque 0f 60^{+5} N・m.



13. 喷油泵与托架紧固螺栓：
Tight bolts / Attaching
Injection Pump and Bracket
4根M10内六角螺栓
Total nos.：4 pcs M10 socket head bolts
6mm内六方扳手
Tool：6mm inner hexagon wrench
按次序拧紧到45_{0}^{+5}N·m
Tighten these bolts in sequence, and the torque is 45_{0}^{+5}N·m



14. 排气管螺栓：
Bolts / Exhaust manifold
12根M10
Total nos. ： 12 pcs M 10 bolts
对称拧紧到(65–80)N·m
Tighten these bolts symmetrically with fl torque of (65–80)N·m.
注意：螺栓拧入前在螺纹部位及螺纹支撑面上涂二硫化钼油剂。
Note:Coat the thread and bearing surface with Molybdenum disulfide Lube before tightenin.
排气管螺栓允许重复使用2次
The bolt for exhaust manifold can only be used two times



6. 柴油机所用的燃料油、润滑油、冷却液和辅助材料
Fuel，lubricant，coolant and Auxiliary Materials

6.1 燃料油

Fuel：

夏季　　0号柴油　　GB252　　冬季　　–10号柴油　　GB252

In Summer No.0 Diesel Fuel GB252 In Winter No.–10 Diesel Fuel GB252

当冬季温度为–15℃，选用–20号柴油。冬季温度低于–30℃，采用–35号柴油。

In winter，when the temperature is–15 ℃，you should use No.–20 Diesel Fuel. If the temperature is below–30℃，you should use No.–35 Diesel Fuel.

6.2 润滑油：

Lubricant：

6.2.1 300PS以下机型推荐选用CD级机油，300PS以上机型推荐选用CF–4级

For engines with power of lower and higher than 300PS,grade CD and CF–4 oil are recommende respectively.

6.2.2 允许以高品位的机油代替较低品位的。

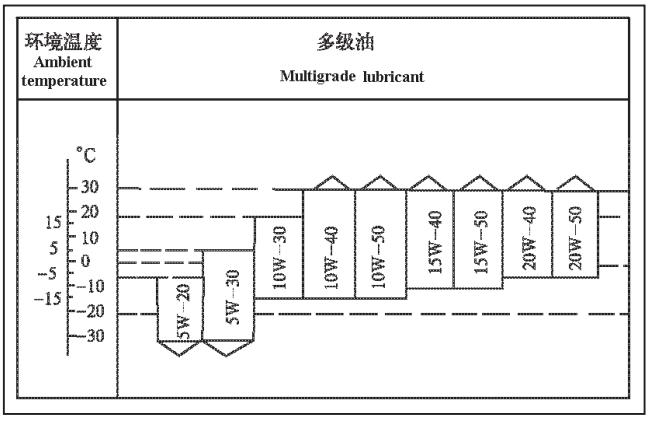
It is allowed to replace low–grade oil with high–grade oil.

6.2.3环境温度–15℃以上用CD15W/40，–15℃以下用5W/20级机油

CD15W/40 oil showld be used when the ambient temperature is higher than –15℃,and 5W/20 oil when the temperature is lower than –15℃.

6.2.4 发动机润滑油的粘度可参照下图选用。

Please reference the following chart to choose viscosity of lubricant.



6.2.5 油面处于油标尺上限位置时，机油容量约20升，油标尺上下刻度间的落差约3升；根据用户协约，出厂时油底壳内，可以是充油，也可以是不充油的。当充油时，该油内含有特种磨合(防蚀)剂，用户可在运行2000公里(或50小时)时将机油全部放出，更换新机油。

The approximate volume of the oil sump is 20 litres when the oil level stays at the upper limit of oil dipstick. The fall between upper and lower limit of oil dipstick is about 3 litr. According to the agreement between Weichai and customers, the engine could be supplied with or without the oil in the sump of the engine. If the engine was supplied with the oil in the sump, some special anticorrosive agent was contained. The customer can replace it with new oil after running 2000km or 50hs).

6.3 润滑脂：水泵油杯注入锂基脂，符合GB/T5671的要求。

Grease：Fill GB/T5671 lithium grease into the grease cup of the water pump.

6.4 冷却液：冷却系统加入防冻液约40升，此液体具有防锈防冻的能力。(配比请参阅防冻液使用说明)

Coolant：Fill the cooling system with 40 litres anti–freeze coolant which can prevent rust and frostbite. (Please reference the Operating Instruction Manual of Coolant for mixture ratio)

6.5 辅助材料：

Auxiliary Materials：

6.5.1 本机在装修过程中，可使用乐泰510、242、271、277,262等规格的密封胶和粘接剂。

LOCTITE 510、242、271、277、262 sealing glue and cohesive material can be used during tne process of mounting and repalnng.

6.5.2 细钼粉

Fine molybdenum powder.

6.5.3 各种辅助材料的使用部位见下表。

Please reference the following table for detailed application of auxiliary materials.

WD615系列柴油机所用的辅助材料表
Auxiliary Materials List of WD615 Series Diesel Engine

序号 Serial No	名称 Name	颜色 Color	用途与应用 Purpose and Application
1	细钼粉 Fine Molybdenum Powder	黑色 Black	涂在平滑的金属表面防止咬合 Apply to smooth surface of metal to prevent biting. 例如：涂在气缸套外表面 eg，Apply to exterior surface of cylinder liner.
2	二硫化钼膏剂 Molybdenum disulphide ointment Lube	深灰色 Deep gray	零件处在较高温度下防粘着 To prevent adhesion of parts under higher temperature. 例：增压器排气口螺栓等 eg，Apply to the bolts of exhaust outlet of turbocharger.
3	乐泰242 LOCTITE 242 glue	兰色 Blue	涂在螺纹部位固持、密封 Apply to thread to seal. 例：各种螺栓、螺纹部位 eg，Apply to bolts and thread.
4	乐泰262 LOCTITE 262 glue	红色 Red	涂在螺纹部位锁紧密封、高力度 Apply to thread to lock and seal. 例：气缸盖副螺栓 eg，Apply to auxiliary bolts of cylinder head.
5	乐泰510 LOCTITE 510 glue	红色 Red	涂在金属表面起密封作用 Apply to surface of metal to seal. 例：气缸体与曲轴箱结合面 eg，Apply to bond surface of"cylinder block and crankcase.
6	乐泰271 LOCTITE 271 glue	红色 Red	涂在金属表面起密封作用 Apply to surface of metal to seal. 例：油道碗形塞 eg，Apply to oil channel plug.
7	乐泰962 LOCTITE 962	红色 Red	芯子与孔之间的密封 Sealing of plug and hole. 例：机身水腔碗形塞 eg，Apply to the water reservoir plug of cylinder block.
8	锂基脂 Lithium grease glue	红色 Red	水泵润滑脂 Grease for Water Pump

本章注意：为确保您所购的柴油机的正常使用，必须按本说明中规定，使用正确牌号的燃油、机油。

Note：To ensure the proper operation of our diesel engines，please use the correct brand fuel and oil as this manual described.

7. 电气部分
Electrical Appliance

电机部分包括发电机、起动机、水温表传感器、机油压力感应塞等。

This section consists of generator, starter, sensor of water temperature indicator, induction plug of oil pressure, etc.

发电机

Generator

发电机为三相交流发电机，经硅整流为直流。

The generator is three-phase alternator, after silicon rectification the current change into direct current.

输出电压28V电流27A(根据用户需要也可配有35A、55A)旋转方向右旋。

Output Voltage：28V DC, Current：27A(In order to meet customer's demand, the currents of 35A and 55A are available for option), Rotation Direction：clockwise

最大允许转速11000转/分

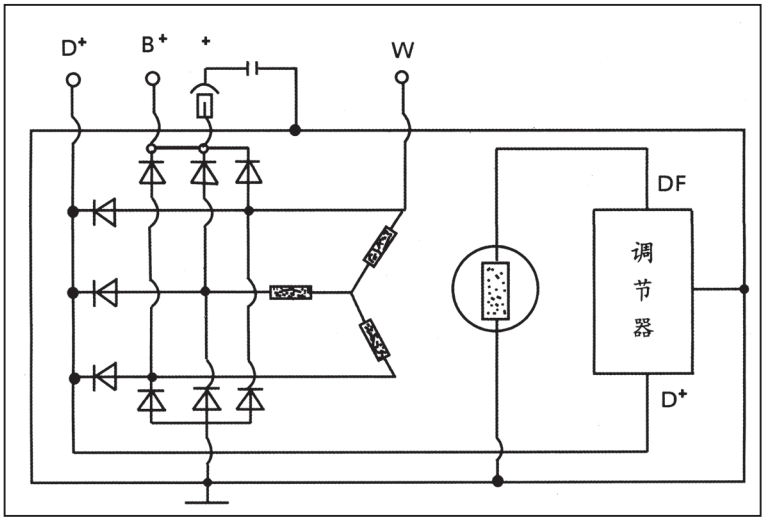
Maximum Allowable Speed：11000 r / min

额定负荷转速6000转/分

Rated Load Speed：6000 r / min

电路图：

Circuit Diagram：



接线柱

Connection Pole

D+接充电指示灯　螺纹规格M4

D+connect to Charging(electri6cation)Indicating Lamp，the screw specification：M4

W接测速电机　螺纹规格M5

Wconnect to Speed Measuring Motor，the screw specification：M5

B+接蓄电池正极负载，电机外壳接地　螺纹规格M6

B+connect to the positive electrode of battery，generator shell is grounded，the screw specification：M6

起动机

Starter

直流起动机电压24V,功率5.4kW,7.5kW或8.1kW旋转方向右旋(面向柴油机输出端看)

The starter is DC starter，Voltage：24V,Power：5.4kW,7.5kW or 8.1 kW，Rotation Direction：clockwise(View direction：face to the output end of the engine)

模数为3的起动机齿数为9齿(用于SAE II飞轮壳)和11齿(用于SAE1和6I 35飞轮壳)两种(目前7.5kW和8. 1kW无9齿的起动机)模式数为3.5的起动机分10齿和11齿两种，11齿为Bosch预齿合起动机。模数为3.5的起动机分10齿和11齿两种，11齿为Bosch预齿合起动机

There are two types of starter with modulus is 3：9 teeth(apply to SAE II flywheel housing)；11 teeth(apply to SAEI and 6I 35 flywheel housing). 7. 5kW and 8.l kW starters with 9 teeth are not available currently.

电路图：

Circuit Diagram：

外部接线柱：

Extemal Connection Pole：

30接蓄电池正极 螺纹规格M10

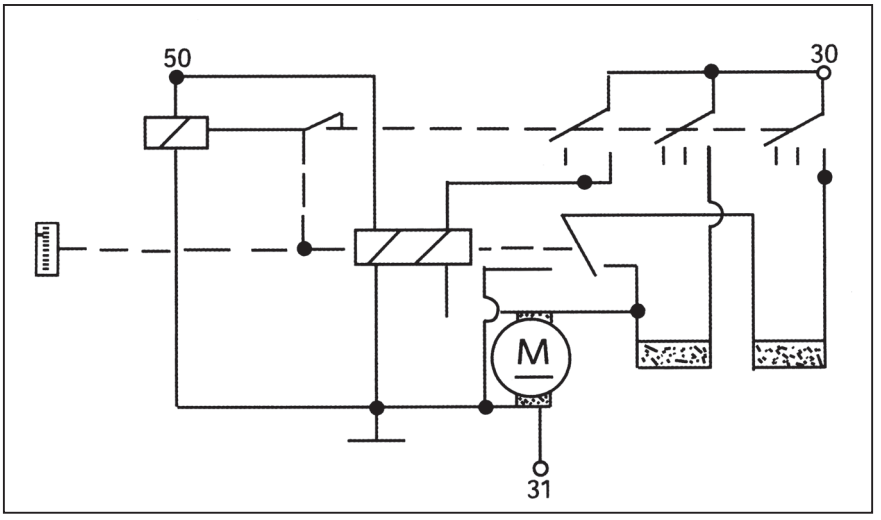
30 connect to the positive electrode of battery，the screw specification：M10

3 1接地 螺纹规格M10

3 1 grounding the screw specification：M10

50接电磁开关 螺纹规格M6

50 connect to the electromagnetic switch the screw specification：M6



机油压力感应塞：
Induction plug of oil pressure
工作温度 –25~100℃
Operating Temperature：–25~100℃
测量范围 0~500kPa
Measurement Range：0~500kPa
报警压力 45~75kPa
Alarm Pressure：45~75kPa
额定电压 6~24V
Rated Voltage：6~24V
水温表传感器
Sensor of water temperature meter
工作温度 –25~120℃
Operating Temperature：–25 ~ 120℃
额定电压 6~24V
Rated Voltage：6~24V
蓄电池
Battery
2x12V 135Ah 可选用 165Ah 或 195Ah
2 × 12V 135Ah or 165Ah or 195Ah

8. 主要零部件的调整与更换
Adjustment and Replacement of Main Components

8.1 冷却系统
Cooling System

更换三角皮带

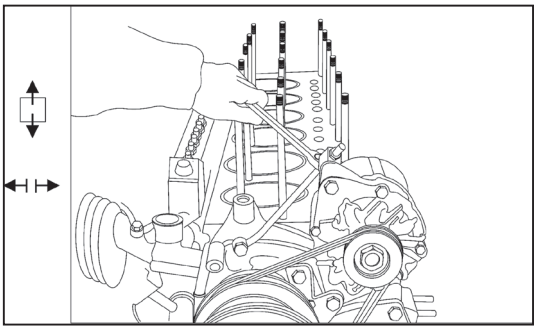
Replace the V-belts

16mm开口扳手

Tool：16mm open-ended wrench

松开发电机拉紧螺栓螺母，拿下发电机皮带。

Loosen the tightening nut of the generator to remove generator belt.

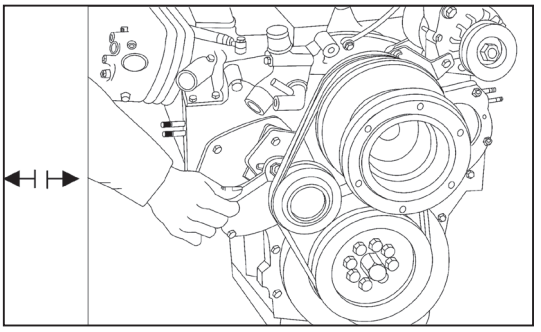


16mm开口扳手

Tool：16mm open-ended wrench

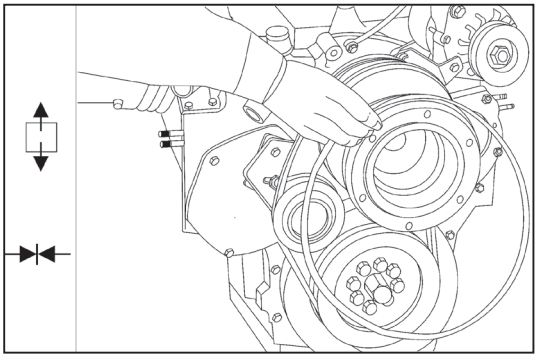
松开涨紧轮M10的2型全金属六角锁紧螺母，就可拆下水泵三角皮带。

Loosen the M10 self-lock nut (2)of tension pulley，remove the V-beh of water pump.



换上三角皮带，涨紧合适后重新拧紧2型六角螺母和拉紧螺栓螺母。

Replace the V–belts，tighten self–lock nuts (2)and the nuts of tension bolts again.



更换水泵

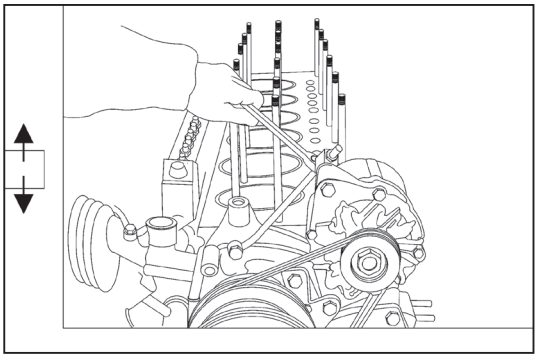
Replace Water Pump

16mm开口扳手

Tool：16mm open–ended wrench

松开发电机拉紧螺栓，拆下三角皮带。

Loosen the tightening bolts of generator to remove the V— beIt.

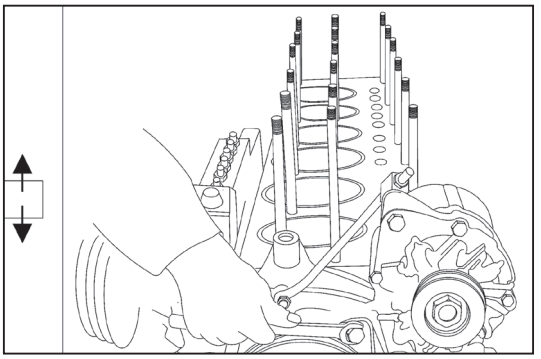


13mm 开口扳手

Tool：13mm open–ended wrench

松开发电机固定板处螺栓。

Loosen the bolt from the generator mounting plate.

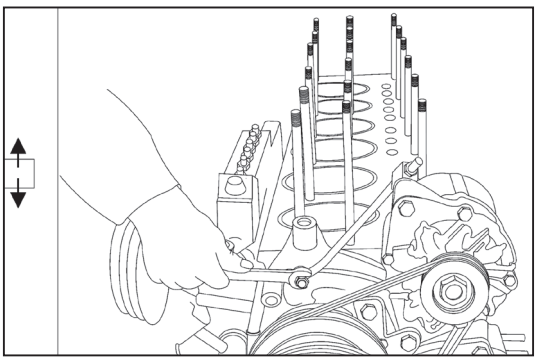


13mm 开口扳手

Tool：13mm open cnded wrench

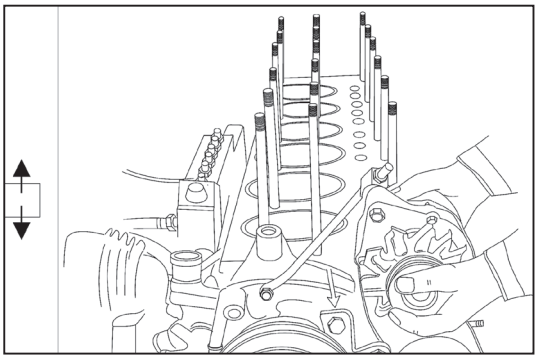
拆下拉紧螺栓和齿轮室连接的六角螺母。

Remove the tightening bolts and hexagon nuts attaching gear case。



拆下发电机

Remove generator.

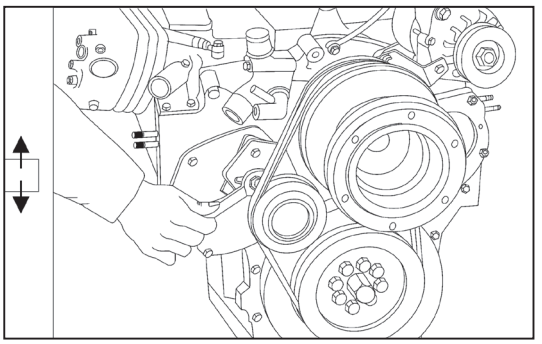


16mm开口扳手

Tool：16mm open–ended wrench

松开涨紧轮六角锁紧螺母，拆下水泵三角皮带。

Loosen the hexagon lock nuts of tension pulley to remove the V–belt of water pump.

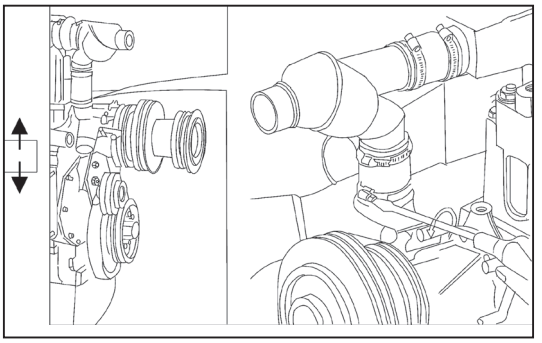


6# 螺丝刀

Tool：6# Screwdriver

松开水管接头处橡胶软管卡箍。

Loosen the rubber hose clamp of water pipe joint.

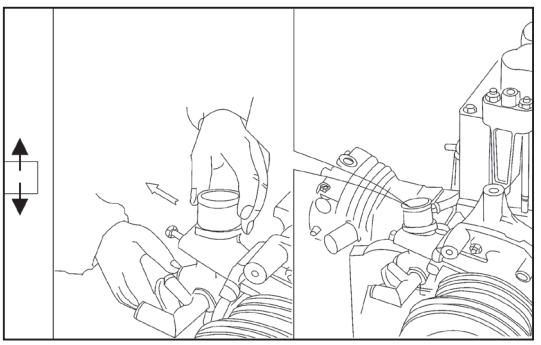


13mm 套筒扳手

Tool：13mm sleeve wrench

松开水管接头螺栓，并拆下水管接头。

Loosen the bolt of water pipe joint to remove water pipe joint.

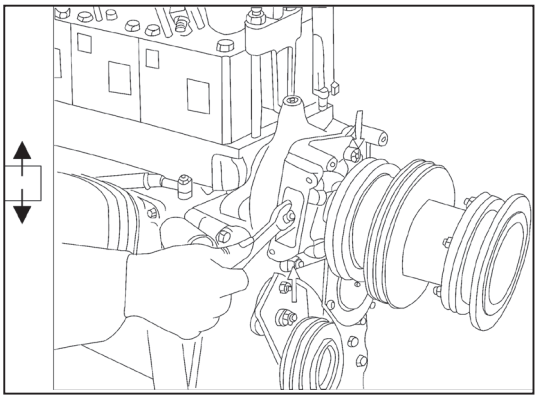


13mm开口扳手

Tool：13mm open-ended wrench

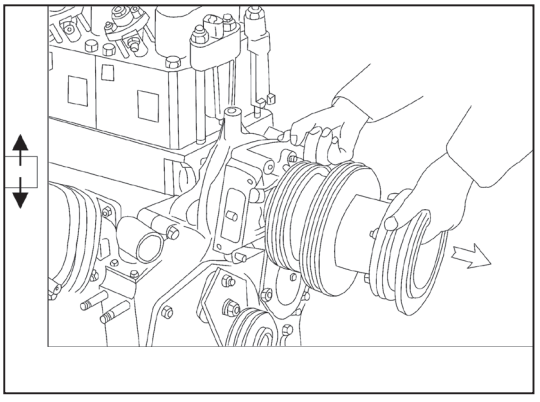
拆下水泵与齿轮室连接的6个六角螺母。

Loosen the 6 hexagon nuts attaching water pump and gear case。



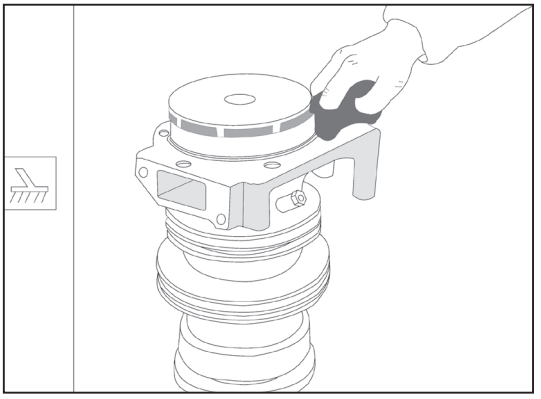
拆下水泵。

Remove water pump.



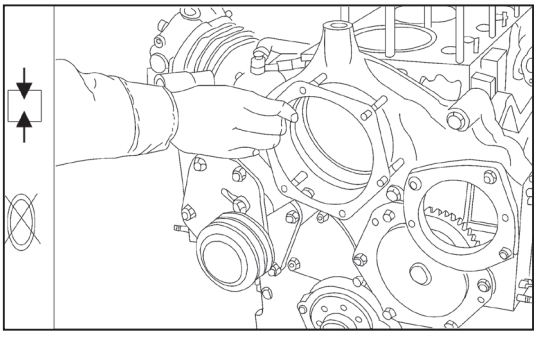
擦净水泵密封平面。

Clean the seal surface of water pump.



更换水泵密封垫片。

Replace the seal gasket of water pump.

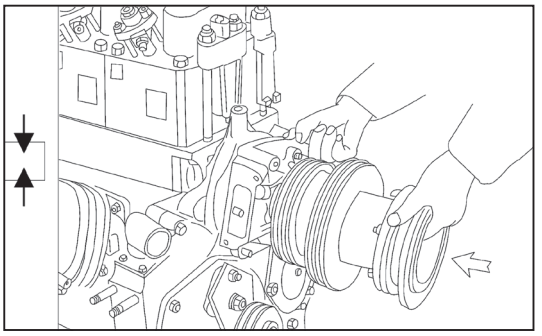


13mm开口扳手

Tool：13 mm open-ended wrench

换上新的水泵总成，拧紧6个六角螺母(注意水管接头内侧有一螺母)。

Install the new water pump assembly, tighten 6 hexagon nuts.(There is a nut in the inner side of water pipe joint)



注意：水泵内腔内装入约120cm^{3}汽车通用锂基润滑脂。需定期从小油杯处补充。

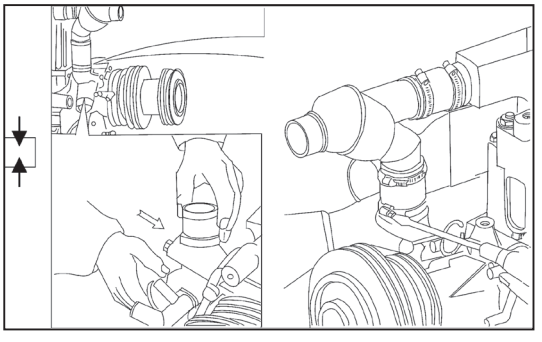
Note：Fill the lumen of water pump with 120cm^3 general lithium grease. Refill lithium grease with grease cup periodically.

13mm开口扳手

Tool：13mm open-ended wrench

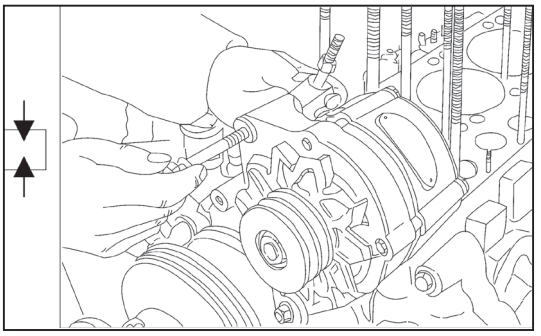
安装水管接头，并拧紧水管接头上两M8螺栓，并安装好橡胶软管。

Install the water pipe joint，tighten two M8 bolts of water pipe joint，then i nstall the rubber hose.



装上发电机

Install generator.

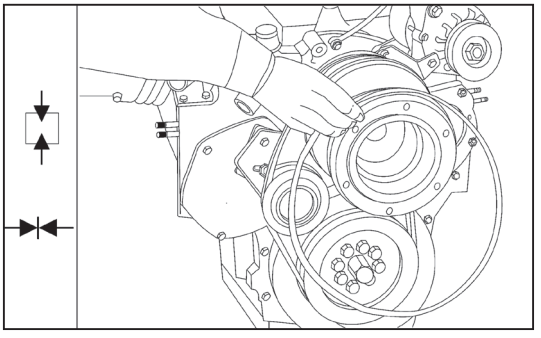


16mm开口扳手，铁棒

Tool：16mm open–ended wrench and pontil

安装三角皮带，调好涨紧度拧紧涨紧轮上M10六角锁紧螺母。

Install the V–belt and adjust the tensity, tighten M10 hexagon lock nuts of tightening pulley.

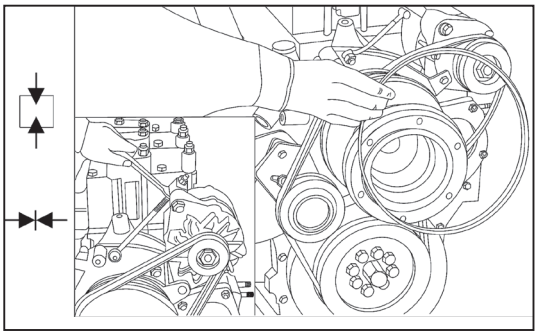


13mm开口扳手，16mm开口扳手

Tool：13mm and 16mm open-ended wrench

安装发电机三角皮带，涨紧适度后拧紧拉紧螺栓上螺母和固定板处螺母。

Install the V-belt of generator and adjust the tensity, tighten top nuts of tightening bolts and nuts of mounting plate.



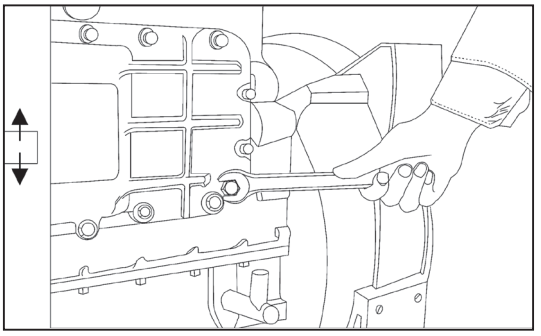
8.2 润滑系统
Lubricating System

更换机油冷却器芯

Replace the oil cooler core

13mm套筒扳手

Tool：13mm sleeve wrench

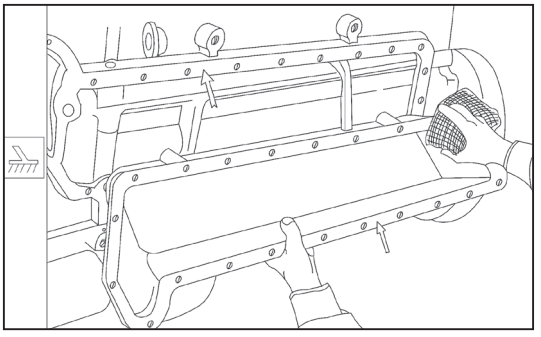


松开机油冷却器盖上的一圈M8螺栓，并拆下机油冷却器盖。(拆卸前要放掉发动机内的冷却液)

Loosen all of the M8 bolts on the oil cooler cover to remove oil cooler cover. (Discharge coolant before demounting the oil cooler cover)

清理机油冷却器盖和机身密封结合面并更换新的机油冷却器盖垫片。

Clean the oil cooler cover and seal surface of the cylinder block,replace with new gasket of oil cooler cover.

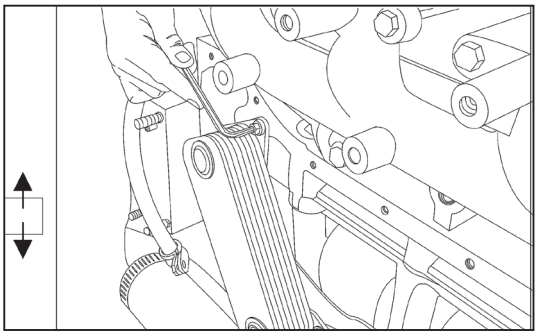


6mm套筒扳手

Tool：6mm sleeve wrench

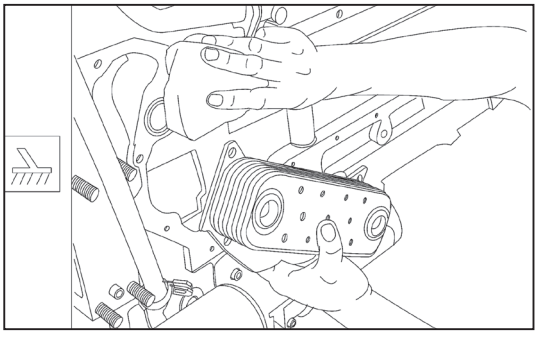
松开机油冷却器芯4根M8螺栓。

Loosen the 4pcs M8 bolts of oil cooler element.



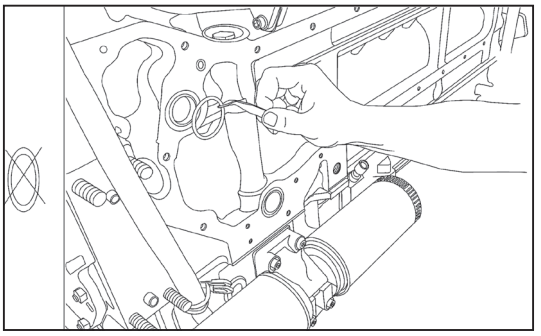
拆下机油冷却器芯，并清理干净机身上机油冷却器芯法兰结合面。

Remove element of oil cooler and clean the bonding surface of flange of oil cooler element.



更换机油冷却器芯密封热圈。

Replace seal ring of oil cooler element.



13mm 套筒扳手

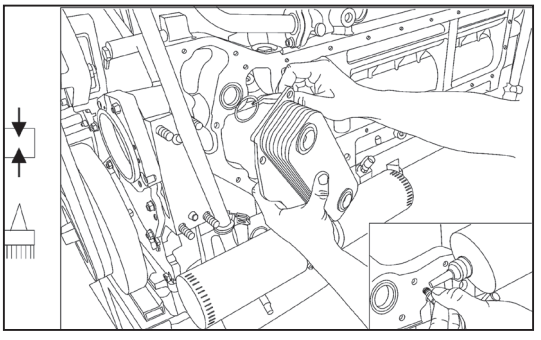
Tool：13mm sleeve wrench

安装新的机油冷却器芯，并拧紧 M8 六角螺栓。

Install the new oil cooler element and tighten the M8 hexagon bolts.

注：螺栓拧紧前须在螺纹部位涂乐泰 242 密封胶。

Note：Coat the thread with LOCTITE 242 THREADLOCKER before tightening.

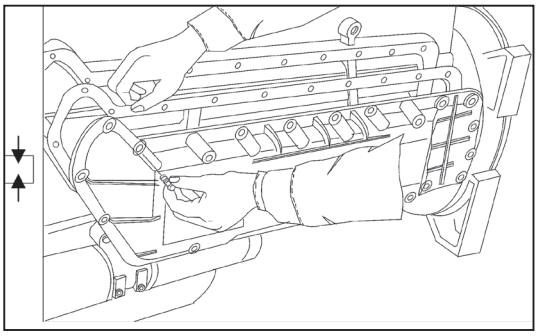


13mm 套筒扳手

Tool：13mm sleeve wrench

安装机油冷却器盖，并拧紧外围所有 M8 六角头螺栓。

Install the oil cooler cover and tighten all the peripheral M8 hex head bolts.



更换主油道限压阀

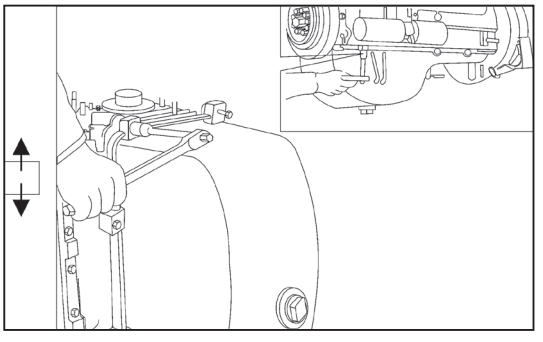
Replace the release valve of main oil channel

13mm 套筒扳手

Tool：13mm sleeve wrench

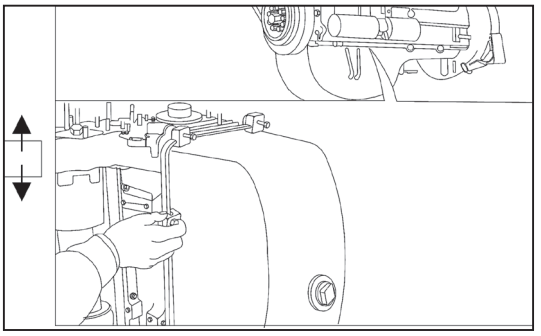
松开油底壳外围 M8 六角头螺栓。

Loosen all peripheral M8 hex head bolts of oil pan.



拆下油底壳托块，并拿下油底壳。

Remove retainer, then remove 0il pan.



27mm 开口扳手

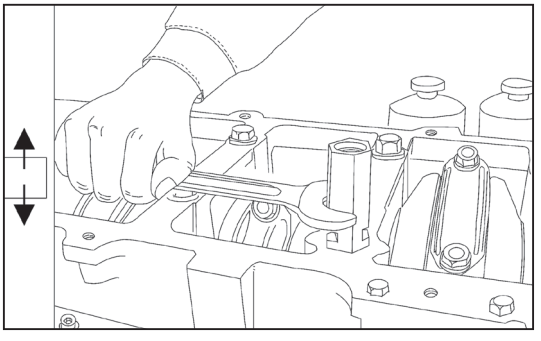
Tool：27mm open-ended wrench

拆下主油道限压阀。

Remove the release valve of main oil channel.

拆下主油道限压阀时应搬动阀体六方的外螺纹端部分。

When removing the release valve of oil channel,move the male end of hexagonal part on valve body.



27mm 开口扳手

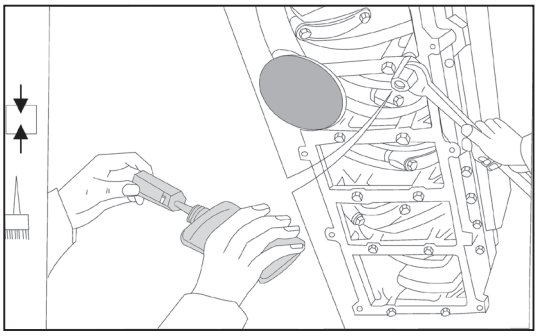
Tool：27mm open–ended wrench

安装新的限压阀，拧入前需在螺纹部位涂乐泰242密封胶。

Install new release valve, coat the thread with LOCTITE 242 THREADLOCKER before tightening.

安装新的限压阀时应搬动阀体六方的外螺纹端部分。

When installing new release valve, move the male end of hexagonal part on valve body.



13mm开口扳手

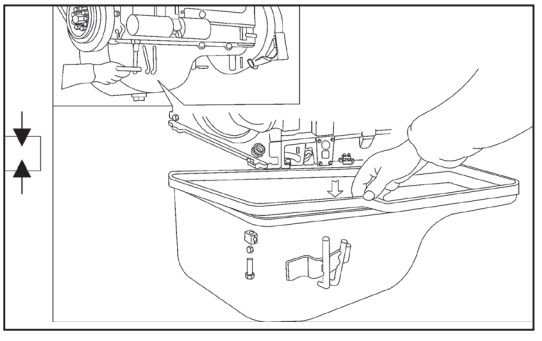
Tool:13mm open–ended wrench

安装油底壳，拧紧M8六角头螺栓。

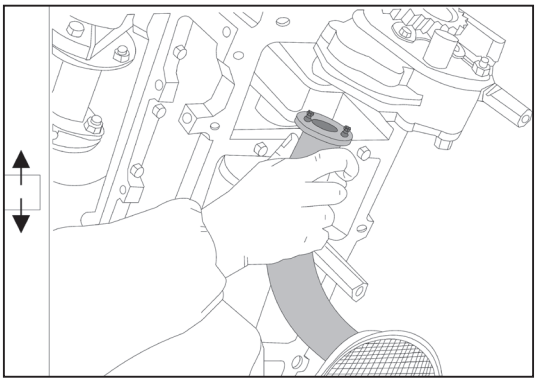
Install oil pan and tighten the M8 hex head bolts.

注意：压好油底壳密封垫圈

Note：Make sure packing washer of oil pan was pressed well.



更换机油泵
Replace Oil Pump

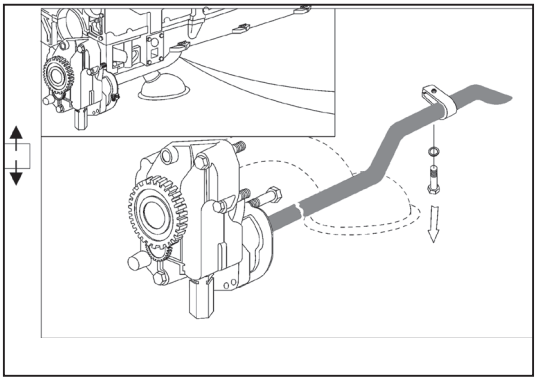


13mm 套筒扳手　16mm 开口扳手

Tool：13mm sleeve wrench and 16mm open–ended wrench

拆下油底壳，拆机油集滤器。

Remove oil pan and suction pipe.



10mm 开口扳手

Tool：10mm open–ended wrench

松开吸油管固定压板（双级机油泵）。

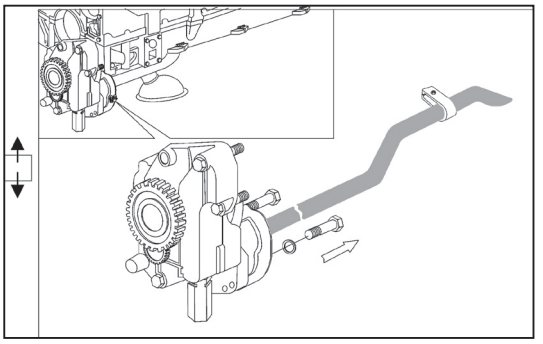
Loosen the mounting plate of oil suction pipe(two–stage oil pump)

16mm 开口扳手 (双级机油泵)

Tool：16mm open-ended wrench(two-stage oil pump)

松开吸油管 M10 六角螺栓，并拆下吸油管。

Loosen the M10 hex head bolts of oil suction pipe to remove oil suction pipe.

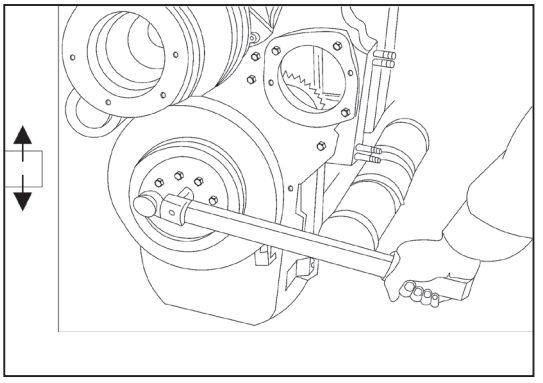


16mm 开口扳手，16mm 套筒扳手

Tool：16mm open-ended wrench and 16mm sleeve wrench

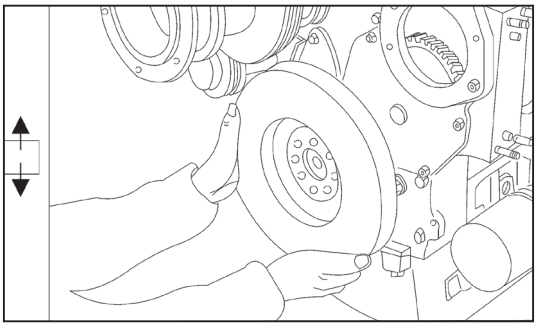
松开涨紧轮六角螺母和曲轴皮带轮螺栓。

Loosen the hex head bolts of tension pulley and the bolts of crankshaft pulley.



拆下皮带轮和减振器，减振器和曲轴为过渡配合，必要时可以轻击减震器。

Remove the pulley and damper, the damper and crankshaft is transition fit, the damper can be knocked slightly if it is necessary for removing.

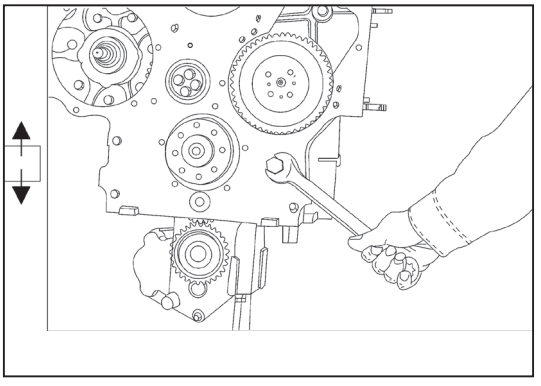


22mm 开口扳手

Tool：22mm open-ended wrench

拆下齿轮室处六角螺塞。

Remove the hex head plug screws of gear case.

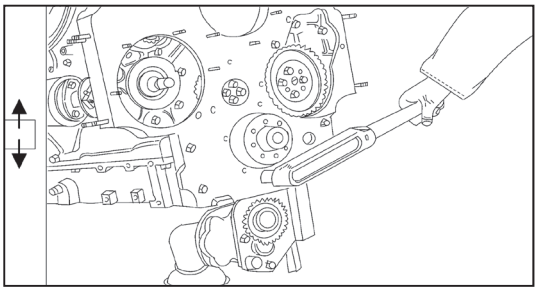


16mm 套筒扳手

Tool：16mm sleeve wrench

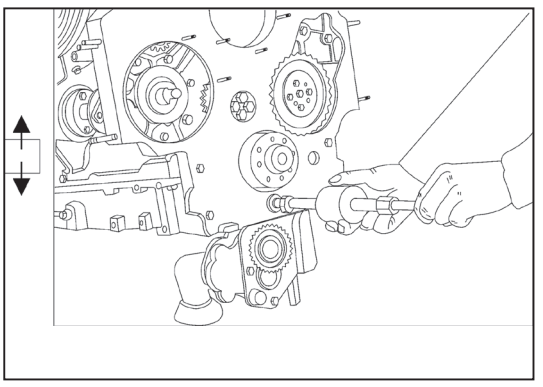
拆下机油泵中间齿轮轴螺栓。

Remove the bolts of intermediate gear shaft of oil pump.



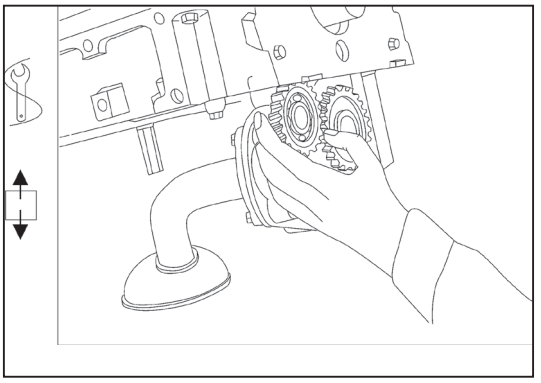
用专用工具拆下机油泵中间齿轮轴。

Remove intermediate gear shaft of oil pump with special tool.



拆下机油泵中间齿轮

Remove intermediate gear of oil pump .

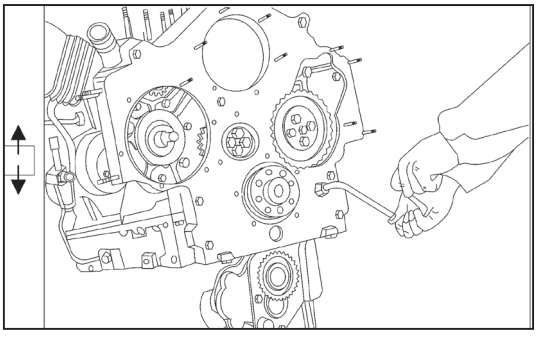


16mm 套筒扳手

Tool：16mm sleeve wrench

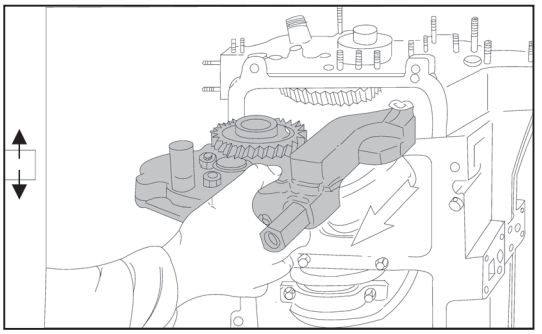
拆下六角螺塞处六角头螺栓和另外一个六角头螺栓。

Remove the hex head bolts from the hex plug and another hex head bolt.



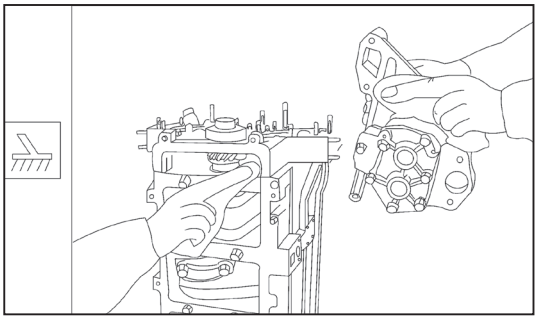
拆下机油泵。

Remove oil pump.



清理曲轴箱与机油泵结合面处。

Clean the seal Surface between crankcase and 0il pump。

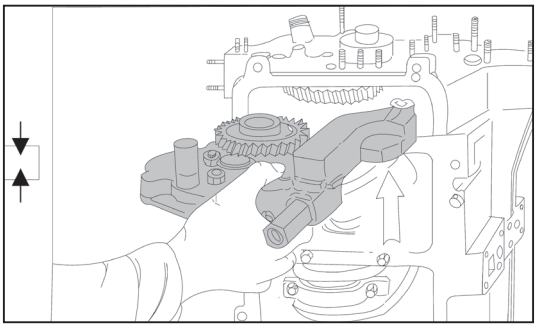


16mm套筒扳手

Tool:16mm sleeve wrench

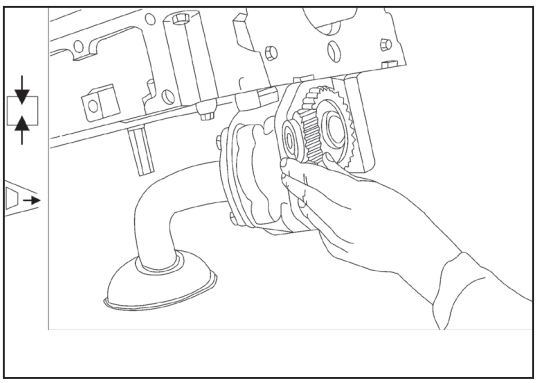
安装新的机油泵和机油泵垫片，并拧紧六角螺栓(一个在六角螺塞处)。

Install new oil pump and gasket，tighten the hex head bolts.(one of them is in the hex head plug)

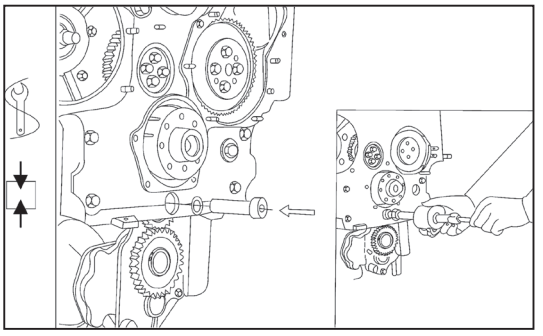


安装机油泵中间齿轮(注：凸面朝里)。

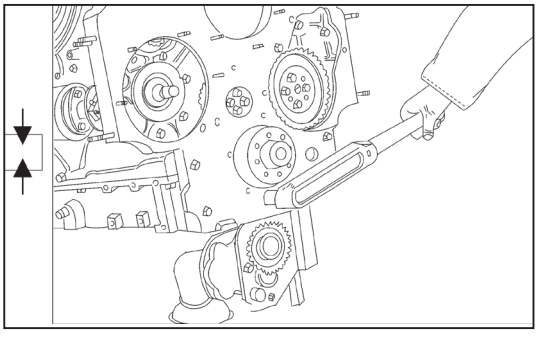
Install intermediate gear of oil pump
(Note：convex towards inside)



安装机油泵中间齿轮轴。
Install intermediate gear shaft of oil pump.

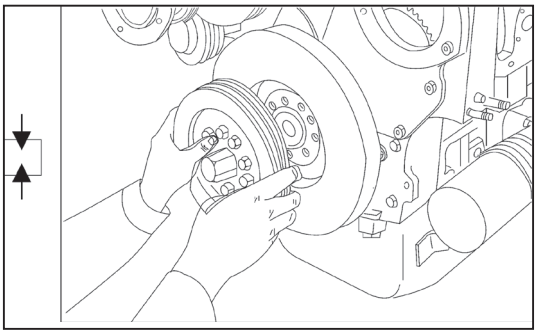


16mm套筒扳手
Tool：16mm sleeve wrench
安装中间齿轮轴螺栓，并拧紧。
Install the bolts of intermediate gear shaft and tighten them.
拧紧力矩：60。$^{+5}$N·m
Tightening torque：60。$^{+5}$N·m



安装减振器和皮带轮。

Install damper and pulley.



16mm套筒扳手

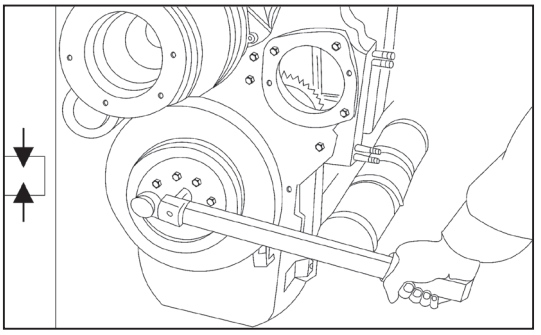
Tool：16mm sleeve wrench

安装皮带轮螺栓,并拧紧。

Install the bolts of pulley and tighten them.

拧紧力矩：60。$^{+5}$N・m

Tightening torque：60。^{5}N・m

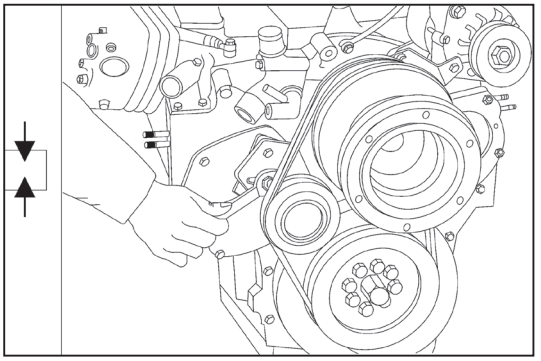


16mm 开口扳手

Tool：16mm open-ended wrench

装好三角皮带涨紧适度后拧紧涨紧六角锁紧螺母。

Install the V—belt pulley and adjust the tensity, then tighten the hex head lock nuts.



8. 3 供油系统
Fuel Supplying System

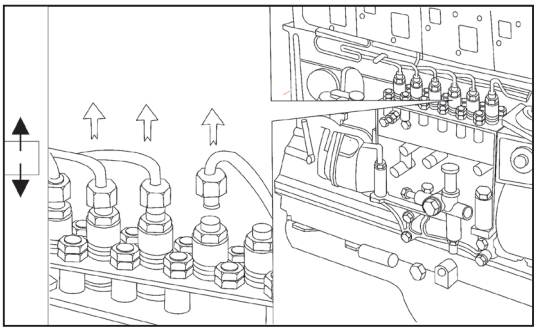
更换喷油泵
Replace injection pump

16mm 开口扳手

Tool：16mm open-ended wrench

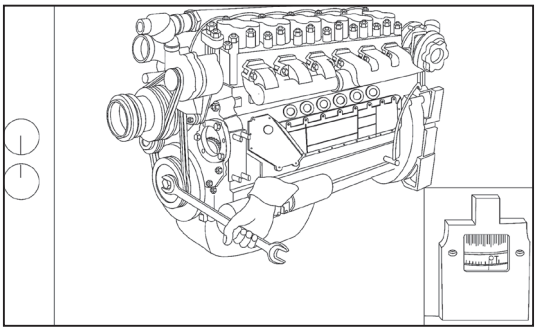
拆下高压油管与喷油泵连接接头。

Remove the joint between the high pressure pipe and injection pump.



缓慢盘车，使飞轮壳上的刻线对准飞轮上“OT”刻线，确定第一缸活塞压缩行程上止点位置。

Rotate flywheel slowly, align the calibrating line of flywheel housing to “OT” calibrating line, to fix the position of TDC of compression stroke of the first cylinder.

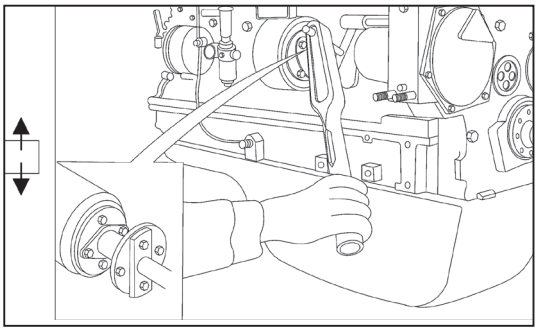


16mm 套筒扳手

Tool：16mm sleeve wrench

拆下连轴器与驱动轴紧固螺钉。

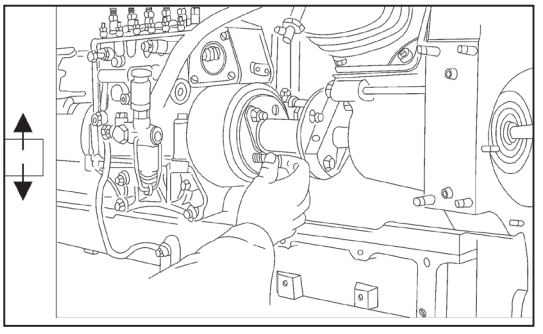
Remove the screws attaching shaft coupling and driving shaft.



16mm 开口扳手 16mm 梅花扳手

Tool：16mm open-ended wrench and 16mm double offset ring wrench

拆下连轴器与喷油泵法兰连接螺栓。

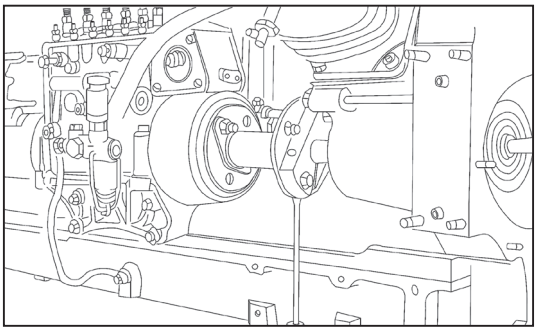


6# 螺丝刀 0.5kg

Tool：6# screwdriver O.5 kg

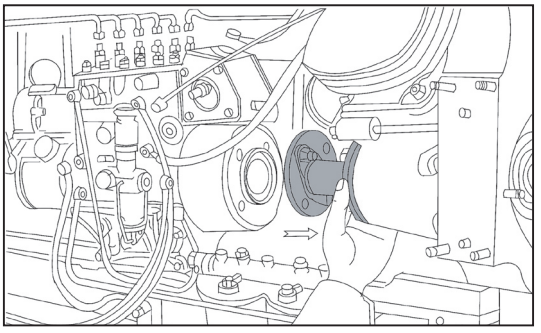
撑开连轴器与驱动轴连接角度调节板上的缺口。

Open the gap on the angle regulating plate connecting the coupler and the driving shaft.



后推连轴器。

Push shaft coupling backward.

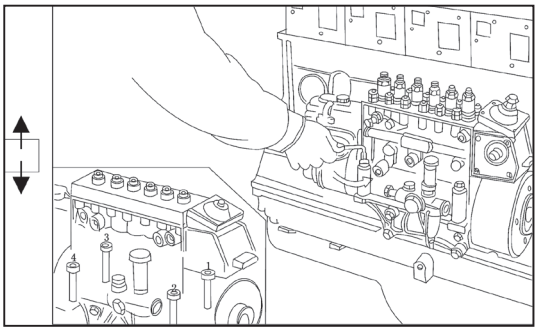


8mm 内六角套筒扳手

Tool：8mm inner hexagon wrench

拆下喷油泵与托架连接的 4 个内六角头螺栓。

Remove the 4 pcs socket head bolts attaching injection pump and bracket

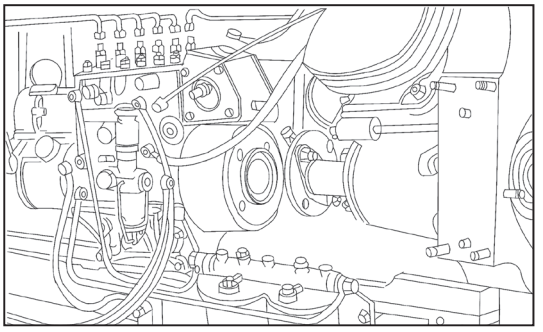


19mm 开口扳手

Tool：19mm open-ended wrench

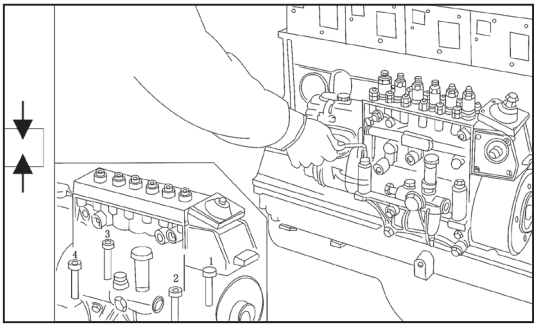
拆下喷油泵连接油管。

Remove all the connecting pipes from the injection pump.



拆下喷油泵并安装新的喷油泵和喷油泵内六角头螺栓。

Remove the injection pump and install new injection pump and socket head bolts.



8mm 套筒扳手

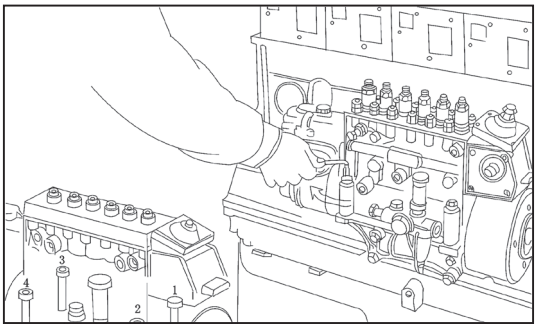
Tool：8mm sleeve wrench

拧紧喷油泵内六角头螺栓，并连接好管路。

Tighten socket hexagon bolts of injection pump，connect pipeline.

拧紧力矩 45。$^{+5}$N・m

Tightening torque：45。$^{+5}$N・m

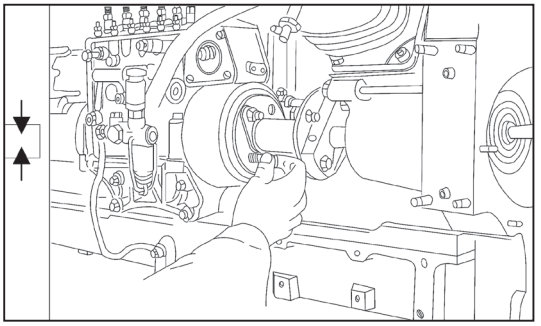


16mm 开口扳手，16mm 梅花扳手

Tool：16mm open-ended wrench and 10mm(double offset ring wrench.

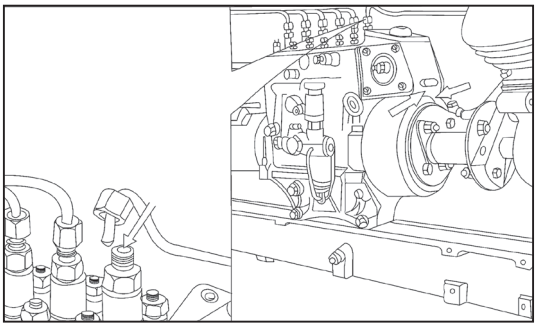
安装喷油泵与连轴器连接螺栓，螺栓拧入前在螺纹部位涂乐泰 242 密封胶，拧紧力矩为 110N·m。

Install bolts attaching injection pump and shaft coupling, coat the thread with LOCTITE 242 THRERADLOCKER before tightening. Tightening torque：
110 N·m.



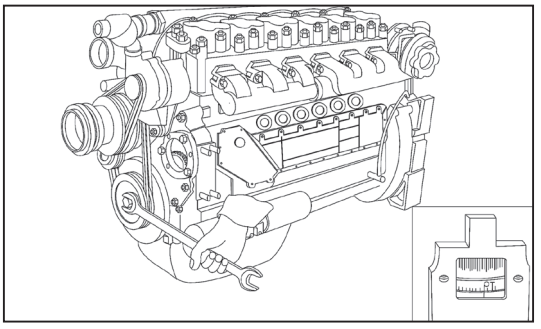
转动连轴器至一缸出油口油面微动时止。

Rotate shaft coupling to watch the fuel oil jiggle at the outlet of any cylinder of the injection pump,then stop rotation.



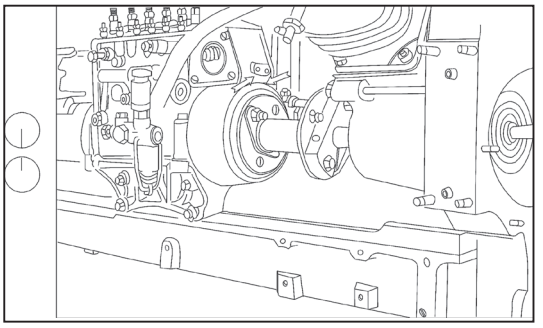
盘车使飞轮刻线至上死点前供油始点位置。(各缸供油提前角见燃油系统配套表)

Rotate flywheel to align the indicated needle of flywheel to fuel supply advance angle.(Please reference fuel system mating list for fuel supply advance angle of each cylinder)



此时喷油泵上的刻线和喷油提前器（或法兰）上的刻线基本对齐。

The calibration tails of injection pump is aligned with calibration tails of tining adwance unit(or flange).

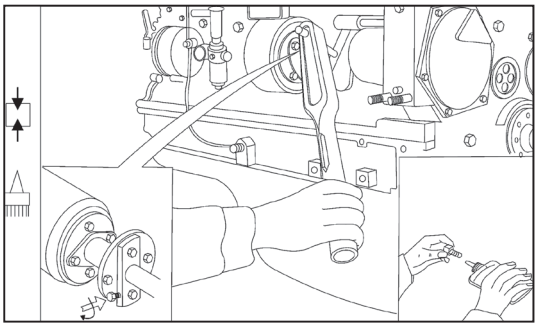


16mm 套筒扳手

Tool:16mm sleeve wrench

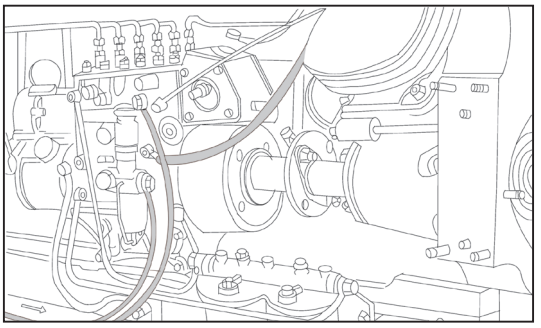
装上连轴器与驱动轴连接螺栓。螺栓旋入前螺纹部位涂乐太胶242密封胶，拧紧力矩 150_{0}^{+5}N·m。

Install bolts attaching shaft coupling and driving shaft. Coat the thread with LOCTITE 242 THREADLOCKER before tightening.Tightening torque:150_{0}^{+5}N·m.



盘车复查供油提前角，必要时拆开连轴器与驱动轴紧固螺栓重新调整。

Rotate flywheel to recheck the advance angle of fuel supply, remove bolts attaching shaft coupling and driving shaft for readjustment if necessary.



更换喷油器

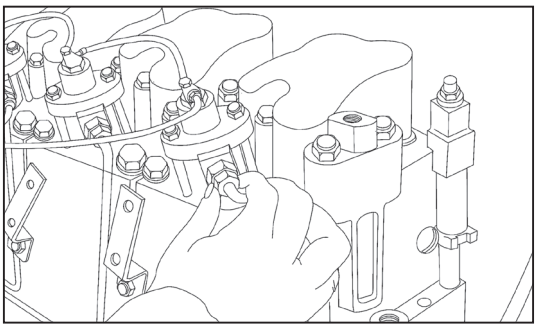
Replace Injection Pump

17mm 开口扳手

Tool：17mm open-ended 具 wrench

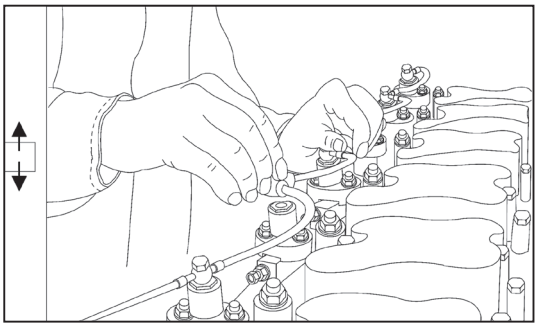
清理喷油器四周并拆下高压油管与喷油器连接接头。

Clean all round of the injector, remove the joint attaching high pressure fuel pipe and injector.



拆下喷油器回油管。

Remove fuel return pipe of the injector.

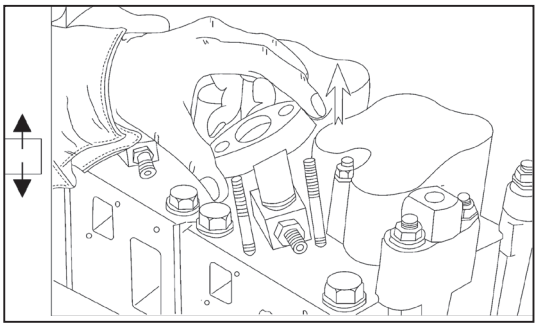


13mm 开口扳手

Tool：13mm open-ended wrench

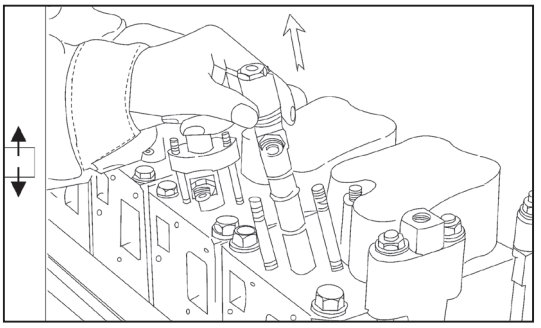
松开紧固压板螺栓，拿下紧固压板。

Loosen bolts of mounting plate, then remove mounting plate.



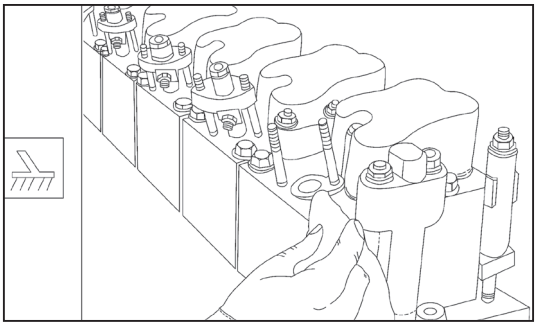
拆下喷油器。

Remove injectors.



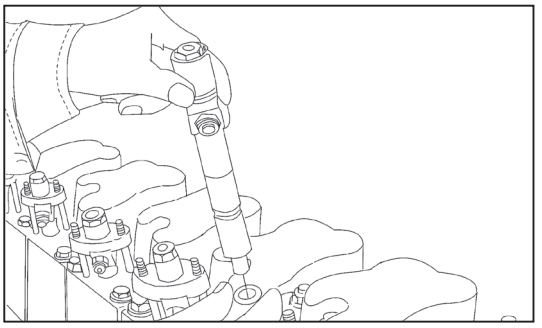
清洁喷油器座孔。

Clean seat hole of injector.



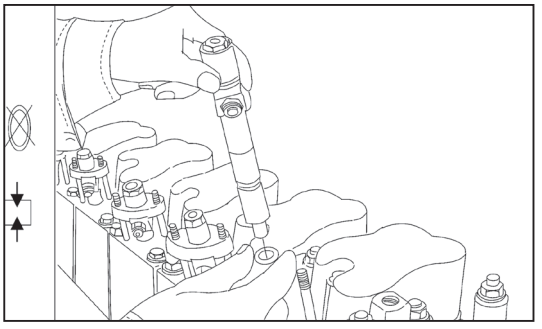
更换新的铜质密封垫圈。

Replace with new copper washer.



更换新的喷油器然后装上新的橡胶密封圈。

Replace with new injector and install new rubber seal ring.

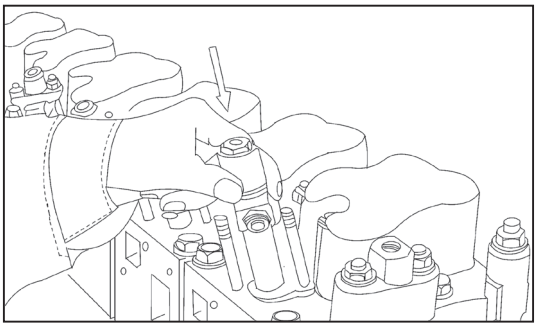


将新的喷油器装入喷油器座孔。

Install new injector into the seat hole.

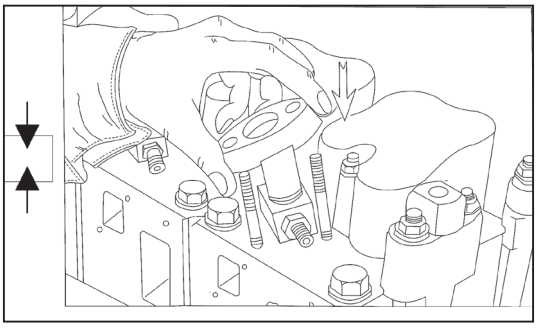
注意：装好喷油器后胶圈不得有压挤现象。

Note：It is not allowed to appear any mark of pressing rubber cushion after mounting injector.



安装喷油器固定板。

Install the mounting plate of injector.

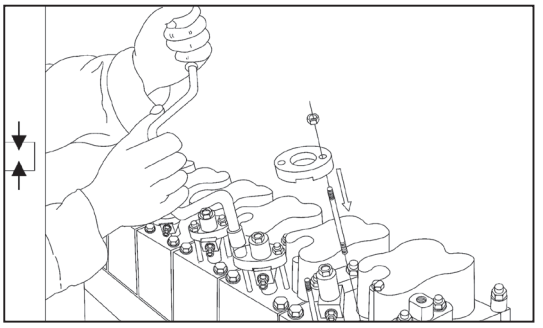


13mm 套筒扳手

Tool：l3mm sleeve wrench

安装喷油器压板螺栓或六角螺母，拧紧力矩 25N・m。

Install bolts or hex head nuts of mounting plate. Tightening torque：25N・m

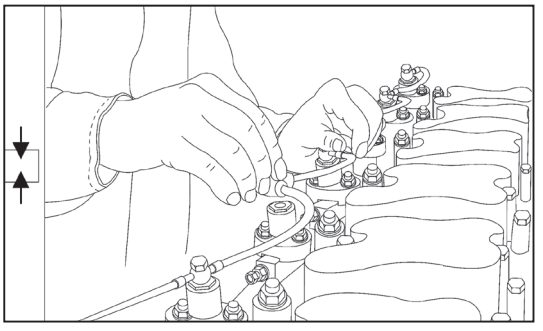


13mm 开口扳手 17mm 开口扳手

Tool：13mm and 17mm open ended wrench

拧紧喷油器与高压油管连接接头及安装好回油管。

Tighten the joint attaching injector and high pressure fuel pipe，install fuel return pipe.



8.4 进气系统
Air Intake System

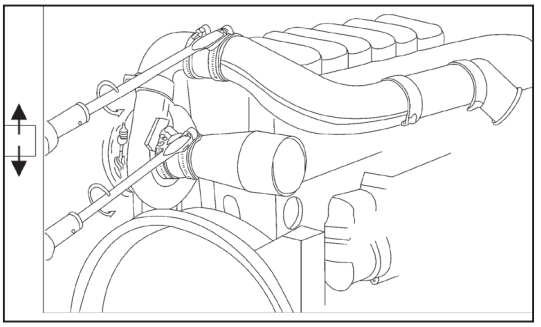
更换涡轮增压器
Replace Turbocharger

6mm螺丝刀

Tool：6mm screwdriver

松开压气进气管处的橡胶软管卡箍和压气机出气管软管卡箍。

Loosen rubber hose clamps from the inlet and outlet of compressor。

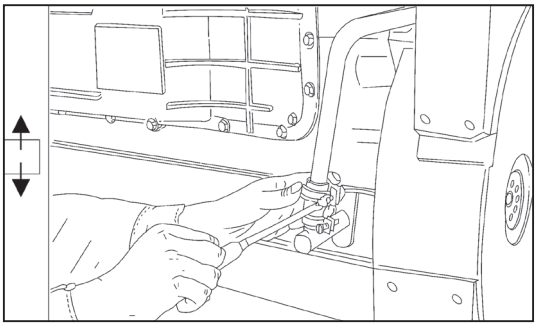


6mm 螺丝刀

Tool：6mm screwdriver

松开增压器回油管软管卡箍。

Loosen hose clamp from turbocharger oil retum pipe.

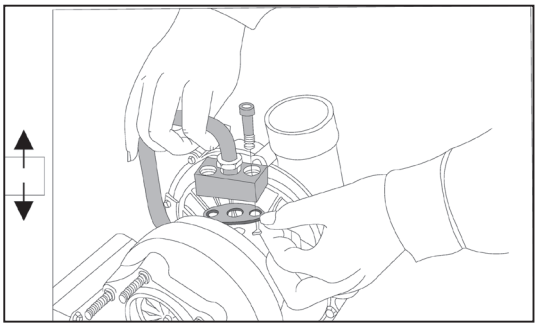


6mm 内六角扳手

Tool：6mm inner hexagon wrench

拆下增压器进油管内六角螺栓，抬起进油管法兰。

Remove inner head bolts from turbocharger oil inlet sucker, raise flange of sucker.

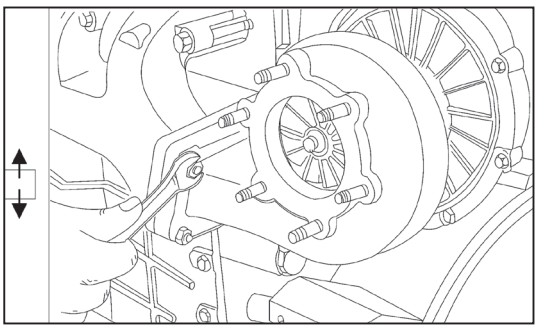


16mm 开口扳手

Tool：16mm open–ended wrench

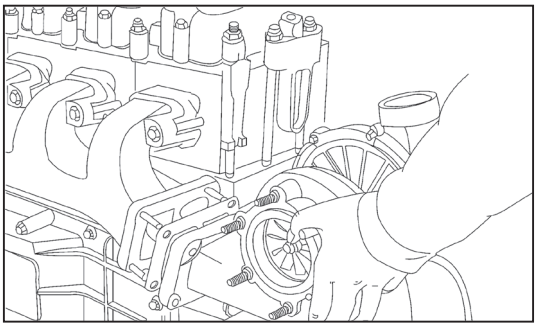
拆开排气管和增压器连接法兰自锁螺母，拿下增压器。

Remove the self–locking nuts from exhaust manifold to remove turbocharger.



更换新的增压器

Replace with new tu rbocharger

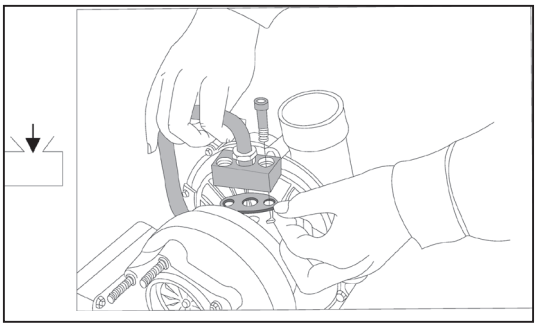


注意：如果涡轮增压器不是立即更换. 则应盖好各进出气口。以防止任何物品掉入气缸里。

Note：If the turbocharger is not replaced immediately，the intake and exhaust manifolds should be cove red to prevent anything falling into cylinder.

6mm 内六角扳手

Tool：6mm inner hexagon wrench



更换新的进油管垫片，并拧紧进油管螺栓。

Replace with new gasket for inlet pipe,fighten bolts of oil inlet pipe.

注意：安装进油管垫片时，一定对正垫片油孔和增压器法兰处油孔，且加入干净的机油并转动涡轮叶轮. 使机油流入轴承室。

Note：Make sure to adjust the gasket oil hole and tu rbocharger flange oil hole，add some clean oil and rotate turbo impeller to let oil flow into bearing Case.

9. 柴油机典型故障及处理
Common Troubles and Remedy

9.1 柴油机不能起动
Diesel engine can not start

故障原因 Cause	排除方法 Remedy
1.输油泵进油滤网或软管等油路堵塞 Fuel intake filter screen of supply pump or hose clogged	检查清除污物，检查燃油的清洁度 Clear away the dirt and check if the fuel is clean
2.燃油系统内有空气 Air entered into the fuel system	排除空气，检查接头密封性，修复之 Drain off the air, check the sealing of the connector and repair it
3.喷油泵有故障 Injection pump damaged	检查柱塞、出油阀修理或更换损件 Check plunger, fuel outlet valve and repair or replace the broken parts
4.喷油器有故障 Injector damaged	检查喷油器物化情况 Check the atomization of injector, and repair it
5.配气或供油管损坏及漏油 Initial angles of valve gear or fuel delivery is wrong	检查并调整之 Cheek and adjust it
6.高压油管损坏及漏油 High pressure line damaged or leaked	修复与更换 Repair or replace
7.气缸压缩压力不足 Insufficient pressure in cylinder	检查气门密封性，缸垫的密封性，活塞坏的磨损，修理或更换 Check the sealing of the valve and cylinder gasket and the wear of the piston ring. Repair or replace them
8.气温过低 The temperature is too low	增加起动辅助设备措施 With the addition of start–assist device

9.2起动不久就停车

Stop soon after starting

1.燃油滤清器堵塞 Fuel filter clogged	拆卸滤清器体，清除内部污染物及水份，必要时更换滤芯 Dismantle and clean away dirt and water, replace the filter element if necessary
2.燃油系统内进入空气 Air entered into fuel system	检查油管及接头密封性，放气螺钉是否拧紧，排斥贮留空气 Check fuel pipe and sealing of the connector,tighten air venting bolt, and drain off the air
3.输油泵不工作 Supply pump doesn't work	检查输油泵活塞、阀门，清理及修复 Check piston and valve of supply pump, clean and repair
4.燃油质量差，含水过多 Poor quality of fuel	清洗滤清器，更换燃油 Clean fuel filter and renew fuel
5.怠速调速过低 Idling speed is too low	重新调整 Readjust it

9.3 功率不足
Insufficient output

1.进气堵塞(空滤器堵塞) Air intake clogged (air cleaner choked)	检查空滤器，进气管、清理或更换滤芯 Check the air cleaner and air intake pipe,clean or replace filter element
2.排气背压过高 Exhaust back pressure is too high	检查气门定时，排气管道有否堵塞，调整及修理之 Check the valve–timing and exhaust pipe, adjust and repair
3.增压系统压力不足 Insufficient pressure in supercharging system	检查，排除管路连接处泄漏 Check and block up the leakage of pipeline
4.增压器工作失常 Faults in turbocharger	更换总成 Replace the turbocharger assembly
4.1压气机，涡轮流道污塞 Compressor and turbine streets choked up	清洗或更换 Clean or replace
4.2浮动轴承失效 Floating bearing cease to be in effect	更换 Replace
4.3涡轮，压力机背面间隙处积炭，油泥 Carbon deposit or greasy filth in clearance of turbine and compressor back	清洗 Clean
5.中冷器损坏，漏气 Intercooler damaged	更换或修补 Replace or repair
6.燃油管路漏油或堵塞 Leakage or choke of fuel line	检查油管及接头密封性，滤清器的污染度及燃油管道修复或清除污塞，更换滤芯 Check the sealing of fuel pipe and connector, fuel filter and fuel line, repair, clean or replace the filter element
7.燃油质量差 Poor quality of fuel	清洗油箱，滤清零件及油管，更换燃油 Clean the fuel tank, filter parts and fuel pipe. Renew the fuel
8.喷油泵或调速器磨损过大 Excessive wear for injection pump or gover–nor	修理或更换 Repair or replace
9.喷油泵冒烟限制器膜片破损 Smoke –limiter diaphragm of injection pump damaged	更换修理 Repair or replace
10.冒烟限制器空气管损坏漏气 Air pipe of smoke–limiter damaged	更换Replace
11.喷油嘴物化不良 Poor atomizing	检查喷油压力，喷油嘴积炭，调整及修理之 Check the injecting pressure, clean away the carbon deposit in nozzle, adjust and repair in–jector
12.配气或供油定时不对 Incorrect timing of valve gear or fuel deliv–ery	检查并调整之 Check and adjust it
13.调速器高速调整过低 High–speed of governor is adjusted too low	检查调速特性，调整之 Check the speed–governing and adjust
14.油底壳机油面过高 Oil level in the oil sump is too high	检查油尺，放出多余机油 Check the oil–dipstick, and drain off unnec– essary oil
15.气缸垫漏气 Leakage in cylinder gaskets	热车时检查压缩压力，更换损坏气缸垫 Check the compressed pressure at hot state, replace cylinder gaskets
16.活塞环磨损断裂，轴瓦间隙过大 Piston ring broken, the clearance of main bearing is too large	更换磨损零件，或大修发动机 Replace worn parts or overhaul the engine
17.缸套或活塞磨损或拉缸 Cylinder liner or piston worn, or piston scuffing	大修发动机 Overhaul the engine

9.4燃油消耗过大

Fuel consumption is too high

1.进气堵管 Air intake clogged (air cleaner choked)	检查空滤器、进气管路，清理之 Check air cleaner and air intake pipe, then clean them
2.排气背压过高 Exhaust back pressure is too high	检查排气管道及制动阀，清理之 Check exhaust pipe and brake valve, then clean them
3.燃油质量差 Poor quality of fuel	按规定更换燃油 Renew the fuel according to requirements
4.燃油管路堵塞 Fuel line choked	检查并修复之 Check and repair
5.燃油管路漏油 Fuel line leaked	检查并修复之 Check and repair
6.喷油器物化不良 Poor atomizing	检查并调整或修复之 Check, adjust and repair
7.配气或供油定时不对 Incorrect timing of valve gear or fuel delivery	按规定调整气门间隙及供油提前角 Adjust valve clearance and injection ad−vance angle according to requirements
8.缸垫漏气 Leakage in cylinder gasket	检查压缩压力 Check compressed pressure
9.轴瓦间隙过大，发动机需大修 The clearance of main bearing shell is too large Engine need to overhaul	检查及大修 Check and overhaul
10.活塞涨缸 Piston scuffing	更换气缸套、活塞及活塞环 Replace cylinder liner, piston and piston ring
11.增压系统压力不足 Insufficient pressure in supercharging system	检查排除管路和连接处泄漏 Check and block up the leakage of pipeline
12.增压器工作失常 Faults in turbocharger	检查并更换 Check and replace
13.中冷器损坏或漏气 Intercooler damaged or leaked	更换或修补 Replace or repair

9.5排气冒黑烟

Black smoke exhaust

1.进气堵管或排气背压高 Air intake isn't free or exhaust back pressure is too high	清理之 Clean
2.燃油质量差 Poor quality of fuel	清洗及更换 Clean and renew
3.配气或供油定时不对 Incorrect timing of valve gear or fuel supply	按规定调整 Adjust according to requirements
4.喷油嘴物化不良 Poor atomizing	检查，修复或更换 Check, repair or replace injector
5.喷油泵油量过多 Excessive injection quantity	检查并调整(由专业厂进行) Check and adjust (by manufacturer)
6.增压系统压力不足 Insufficient pressure in supercharging system	检查排除管路和连接处漏 Check and block up the leakage of pipeline and connector
7.增压器工作失常 Faults in turbocharger	检查更换总成 Check and replace
8.中冷器损坏，漏气 Intercooler damaged or leaked	更换或修补 Replace or repair
9.冒烟限制器起作用点不对 Incorrect working point of smoke–limiter	重新调整(由专业厂进行) Readjust (by manufacturer)

9.6排气冒白烟、蓝烟

White, blue smoke exhaust

1.燃油质量差，含水份多 Poor quality of fuel, contains water	更换燃油 Renew fuel
2.冷却水温过低 Temperature of cooling water is too low	检查节温器工作温度，必要时更换 Check working temperature of thermostat, replace if necessary
3.配气或供油定时不对 Incorrect timing of valve gear or fuel delivery	检查并调整 Check and adjust
4.喷油嘴物化不良 Poor atomizing	检查并修复 Check and repair
5.压缩压力低，燃烧不完全及活塞涨缸 Incomplete combustion, scuffing and the compressed pressure is too low	检查活塞环、气缸套、缸垫、修复之 Check piston ring,cylinder liner,cylinder gasket,and repair them
6.活塞环，缸套未磨合好 Wear–in between the piston rings and cylinder liners is not good	继续磨合 Go on wearing–in
7.活塞环开口未错开 The gaps of the piston rings are not staggered	调整重新装配 Adjust, reassembly
8.活塞油环失效 Piston oil rings cease to be in effect	更换 Replace
9.活塞缸套配合间隙过大 The fit clearance between piston and cylinder liner is too large	修理，更换 Repair or replace
10.增压器密封环磨损 The sealing ring of turbocharger worn	检查，更换 Check and replace
11.增压器止推轴承磨损 The thrust bearing of turbocharger worn	检查，更换 Check and replace
12.增压器回油管路阻塞 The oil return pipe of turbocharger choked.	清洗或修理 Clean or repair

9.7增压器进气口，进气管富集机油
Lub–oil gathered in air intake port and air intake pipe of turbocharger

1.增压器密封失效 The sealing of turbocharger cease to be in effect	修理或调换增压器 Repair or replace turbocharger
2.油气分离器失效 The gas–oil separator cease to be in effect	调换 Replace
3.油底壳机油面过高，加入机油过多 Lub–oil level in oil sump is too high	检查放出适量机油符合规定 Drain off unnecessary oil according to re–quirements

9.8转速不稳定
Uneven engine speed

1.燃油质量差，含水或蜡质 Poor quality of fuel, mingled with water or wax	更换燃油 Clean fuel system, and renew fuel
2.燃油吸油管漏入空气 Air entered into fuel suction pipe	检查油管及接头密封性，排除空气 Check the sealing of fuel pipe and connector, drain off air
3.调速器重锤、调速弹簧工作不正常 Faults in flyweight of governor and speed governing spring	检查并调整(由专业厂进行) Check and repair (by manufacturer)
4.供油不均匀 Uneven fuel delivery	检查并调整(由专业厂进行) Check and adjust (by manufacturer)
5.喷油嘴物化不稳定 Unstable atomizing	检查并修复 Check and repair
6.增压器发生喷振 Surge in turbocharger	检查，清洗压气机流道，排除污塞，清除废气通道积炭 Check, Wash compressor streets, clean a–way the carbon deposit from exhaust passage
7.增压器轴承损坏 Bearing of turbocharger damaged	更换 Replace it

9.9既有压力过低

Lub–oil pressure is too low

1.油底壳油面过低或缺油 Oil level in oil sump is too low	检查油面及有否漏油处，添加机油 Check oil leakage, add oil
2.主油道调压阀有故障 Faults in pressure regulating valve of main oil passage	检查阀门，清洗并修复 Check valve, clean and repair
3.集滤器、机油管路、接头垫片等，有否堵塞或破裂 Strainer, oil pipes, connector gasket choked or broken	检查，清洗压气机流道，排除污塞，清除废气通道积炭 Check strainer and connector , check if there is any sponge in oil passage, repair
4.机油牌号不符合规定 Lub–oil doesn't conform to specifica–tions	按规定更换机油，选用合适牌号机油 Renew the lub–oil according to requirements
5.机油泵进油管漏 Intake pipe of oil pump leaked	检查油管、接头，修复或更换 Check the oil pipe and connector, repair or replace
6.冷却系统水温过高，机油温度过高 Water temperature in cooling system and oil temperature are too high	检查冷却系统工作，纠正之 Check cooling system, and correct it
7.机油滤清器阻力过大 Excessive resistance of oil filter	更换新滤芯 Renew the filter element
8.机油冷却器堵塞 Oil cooler choked	检查并清理 Check and clean
9.主油道堵塞 Main oil passage choked	检查并清理 Check and clean
10.轴瓦间隙过大,或轴瓦损坏 The clearance of bearing is too large or bearing damaged	检查并更换 Check and replace
11.部件磨损过大,要大修11. Excessive wear of parts, need to over–haul	检查发动机工作实数,大修 Check the working time of the engine, over haul

9.10冷却水温过高

Cooling water temperature is too high

1.水箱水面过低 Water level in water tank is too low	检查有无漏水处，加水 Check water leakage, add water
2.水箱堵塞 Water tank clogged	检查水箱，清理或修复 Clean or repair
3.水泵皮带松弛 The belt of water pump loosened	按规定调整张紧力 Adjust tension according to requirements
4.水泵垫片损坏，水泵叶轮磨损 Water pump gasket damaged, water pump impeller worn	检查并修复或更换 Check and repair, or replace
5.节温器故障 Faults in thermostat	更换 Replace it
6.水管损坏，漏入空气 Water pipe damaged and air entered	检查水管、接头、垫片等，更换损坏件 Check the water pipe, connector and gasket. Renew the damaged parts
7.油底壳油面过低或缺油 The oil level in oil sump is too low	检查油面及漏油处，修复并加油 Check oil leakage, repair and add oil

9.11零件磨损过快

Parts wore quickly

1.空滤器滤芯不合格，或破损1. Filter element of air cleaner is unqualified or damaged	检查，更换合格滤芯Check and replace filter element
2.进气系统短路2. Air leakage in air intake system Check air intake pipe, gasket and connecting sleeve, repair or replace	检查进气管、垫片、连接管套，修复或更换
3.油底壳油面过低或缺油	检查油面及漏油处，修复并加油
4.油道堵塞	清理油道
5.机油牌号不合规定	按规定更换机油
6.活塞环断裂或磨损	更换坏件
7.缸套或活塞磨损或拉缸	拆检活塞及缸套，修复或更换
8.机油滤清器滤芯没及时更换	按要求更换
9.部件磨损过大，要大修	检查里程数，确定大修
10.曲轴与从动建筑州不同心	检查安装支架，修复
11.使用机油品质不符合要求	采用符合标准规定牌号机油

9.12 噪音过大
Noise is too high

1. 燃油质量差 Poor quality of fuel	更换燃油 Renew fuel
2. 冷却水温过低 Temp of cooling water is too low	检查节温器，必要时更换 Check thermostat, replace it if necessary
3. 配气或供油定时不对 Incorrect timing of valve gear or fuel delivery	检查并修复调整 Check, repair and adjust
4. 喷油嘴物化不良 Poor atomizing	检查并修复调整 Check, repair and adjust
5. 喷油泵油量过大 Excessive injection quantity	检查并调整(由专业厂进行) Check and adjust (by manufacturer)
6. 减震器磨损 Vibration damper damaged	检查有否损坏，连接螺栓情况，更换损坏件 Check connecting bolt and replace damaged parts
7. 气门漏气或调整不当 Leakage in valve or adjusted unsuitably	拆检气门，调整 Dismantle and check valve, readjust it
8. 齿轮间隙过大或齿断裂 Excessive gear clearance or tooth broken	检查并更换损坏件 Check and replace damaged parts
9. 缸套或活塞磨损或拉缸 Cylinder liner or piston worn, or piston scuffing	检查并修复或更换 Check and repair, or replace
10. 推杆弯曲或断裂 Push rod bended or broken	更换 Replace it
11. 活塞环断裂或磨损 Piston rings broken or worn	检查或更换损坏件 Check and replace damaged parts

9.13 起动电机不工作

Starting motor doesn't work

1. 蓄电池充电不足 Insufficient charging for battery	检查，充电或更换电池 Check, charge or replace
2. 连接线接触不良 Bad contact in connecting wire	清理线路，旋紧接柱 Check up circuit, tighten terminal
3. 熔断器熔断 Fuse broken	更换熔断器 Replace
4. 电刷接触不良 Bad contact in brush	清洁电刷表面或更换电刷 Clean brush surface or replace brush
5. 起动电机本身短路 Short circuit in starting motor	修检电机或更换总成 Check and repair it, or replace the motor assembly

9.14 起动电机无力

Starting motor is powerless

1. 蓄电池充电不足 Insufficient voltage of battery	充电或更换电池 Charge or replace
2. 轴承衬套磨损 Bearing bush worn	更换总成 Replace bearing assembly
3. 电刷接触不良 Bad contact in brush	清洁电刷表面或更换电刷 Clean brush surface or replace brush
4. 换向器不洁或烧毛 Commutator unclean or sintered	清除油污并用砂纸磨光或更换总成 Clean away the dirt and furbished using sandpaper, or replace commutator assembly
5. 线端脱焊 Sealing off at wire end	重新焊接 Reweld
6. 开关接触不良 Bad contact for switch	检查开关并修复 Check and repair
7. 磨损离合器打滑 wore clutch slipped	调整离合器工作力矩或更换总成 Adjust working moment of clutch or replace

9.15 发电机完全不发电
Generator doesn't work

1. 接线断路、短路、接头松动 Wire connecting broken, short circuit, joint loosened	检查发电机及电流表接线，修复 Check the connecting wire of generator or galvanometer repair
2. 转子、定子线圈断路、短路或搭铁 Coil of rotator and stator shorted, broken	修复或更换总成 Repair or replace
3. 整流管损坏 Rectifier tube damaged	更换总成 Replace
4. 柱头纸绝缘损坏，导线断开 Terminal damaged, wire broken	修复 Repair
5. 调节器调整电压过低 Voltage regulated by regulator is too low	修复 Repair
6. 调节器触点烧熔 Contact of regulator fused	修复或更换总成 Repair or replace

9.16 发电机充电不足
Insufficient charging of generator

1. 接线断路、短路、接头松动 Connecting wire broken or shorted, terminal loosened	修复 Repair
2. 转子、定子线圈断路、短路或搭铁 Coil of rotator and stator shorted or broken partially	修复或更换总成 Repair or replace
3. 发电机皮带松弛 Belt of generator loosened	检查并调整皮带张紧力 Check and adjust tension
4. 发电机整流管损坏，电池接触不良 Rectifier tube damaged,bad contact in brush	修复 Repair
5. 调节器电压调整过低 Insufficient voltage of regulator	调整 Regulate
6. 调节器磁场线圈或电阻接线断开 Field coil or resistance connecting wire broken	修复或更换 Repair or replace
7. 蓄电池电解液太少，或电池陈旧 Insufficient electrolyte of battery or battery is too old	加注电解液，或更换电池 Add electrolyte or renew battery

9.17 充电电流不稳定
Uneven charging current

1. 定子或转子线圈即将断路、短路 Coil of rotator or stator will short or break	修复或更换 Repair or replace
2. 电刷接触不良 Bad contact in brush	修复 Repair
3. 接线柱头松动，接触不良 Terminal loosened and bad contact	修复 Repair
4. 电压调节器损坏 Voltage regulator damaged	修复 Repair
5. 电压调整不当 Incorrect regulated voltage	检查并调整 Check and regulate

9.18 发电机充电过多
Generator over–charged

1. 蓄电池内部短路 Shorted in battery	修复或更换 Repair or replace
2. 调节器电压过高 Voltage of regulator is too high	修复并调整 Repair and regulate
3. 调节器搭铁不良 Bad contact in regulator	修复 Repair
4. 调节器触头失灵, 污染, 电压线圈或电阻接线断开 Faults in regulator contact, voltage coil or resistance connecting wire broken	修复或更换 Repair or replace

9.19 发电机有不正常声音
Abnormal sound in generator

1. 发电机安装不当 Incorrect mounting for generator	修复 Repair
2. 轴承损坏 Bearing damaged	更换轴承 Replace
3. 转动部分已触及固定部分 Moving parts bumping to fixed parts	修复或更换 Repair or replace
4. 整流器短路 Rectifier shorted	更换 Replace
5. 定子线圈短路 Stator coil shorted	修复或更换 Repair or replace

WD615欧Ⅱ系列柴油机维修保养手册
编校：魏红珍
2007年7月版

⚠ 特 别 提 示
Special Attention

· 柴油机的操作人员在操作之前，必须认真阅读柴油机的使用保养说明书，严格遵守使用保养说明书规定的操作与保养规程；

Prior to the operation, the operator shall read the Diesel Engine Operation and Maintenance Manual carefully, and comply with the operation and maintenance procedure thereof strictly.

· 为使您的合法权益得到保护，严禁私自拆开油泵油量铅封。

In order to protect legitimate right and interests of user, it is forbidden to dis-mantle lead sealing of injection pump privately.

· 喷油泵调整或拆除铅封时公司的保证就失效。

Once injection pump is adjusted or lead sealing is dismantled, the guarantee ceases to be in effect.

· 喷油泵为精密部件，用户不得拆解，否则公司保证失效。

Injection pump is of precision parts,it is forbidden to dismantle by user,or the guarantee cease to be in effect.

· 增压器转子为高速旋转部件，在机器运转时，严禁任何可移动物件（例如手、工具、棉纱等）接近涡轮增压器的进口，以免对人身或机器造成损害；对转子组件除涡轮增压器专业维修人员或经潍柴特许的专业维修站点，不得拆卸。

The rotator of turbocharger is a high speed rotating component. It is prohibited to allow any moving objects (such as hands, tools, cotton yarn) to approach the inlet of supercharger for prevention of the people from injury or of machine from damage. No one other than the professional maintenance personnel on supercharger or professional maintenance station authorized by

Weichai is entitled to dismantle the rotator assembly;

· 柴油机主轴承螺栓和连杆螺栓有严格的扭矩和转角要求，用户不得松动和拆卸，否则公司保证失效。

There are strict demands on torque and turned angle for main bearing bolts and connecting rod, loosening and dismantling is forbidden, or the guarantee cease to be in effect.

· 柴油机每次开车前，必须检查冷却液是否加满，机油是否加足。

Before starting the diesel engine, check whether the coolant is full and whether the lub-oil is enough.

· 连杆螺栓为一次性使用螺栓，不得重复使用。

Connecting rod bolts can be used only once time.

注 意 事 项
Points for Attention

1、本柴油机出公司时已按试验规范严格进行出公司试验，油门已铅封限位，不得随意拆除铅封，加大油门。否则，我公司将不实行三包，敬请用户注意。

1.This diesel engine has been tested strictly in accordance with the test stipulations before delivery. The accelerator is lead sealed and limited. It is not allowed to remove the lead seal and to expand the accelerator privately. Or our company will not be responsible for guarantee of repair, placement and return of the product. Please pay your attention to it.

2、用户在使用新机时，应进行 50 小时试运转 .

The user shall conduct a 50 hours run-in of the new engine before operation.

3、柴油机冷车起动后应慢慢提高转速，不要猛然使它高速运转，也不要长时间空转。大负荷运转后，不要立即停车，应低速空载运转 5 ~ 10 分钟后停车。

Provided the diesel engine is started from the cold state, its rotary speed shall be increased gradually, rather than making it operate at high speed suddenly or idle for a long time. At the end of running with heavy load, do not shut down the engine immediately (other than under particular circumstance), but run at low speed for 5 to 10 minute, then shut it down.

4、停车后，如果环境温度有可能低于 0℃而且未使用防冻添加剂时，应将水箱和柴油机内的水放净。

After the engine is stopped, if the environmental temperature is lower than

0 ℃ and no anti-freeze additive is used, the water in water tank and in diesel engine should be drained off.

5、禁止柴油机在无空气滤清器的情况下工作，防空气未经过滤就进入气缸。

Do not allow the diesel engine to operate without air filter for the sake of avoiding the air from entering into the cylinder directly without filtering.

6、向柴油机添加燃油和机油时，必须选用规定的牌号，并采用专用的清洁容器，加入时都要经过滤网过滤。燃油要经过沉淀 72 小时以上。

The brands of engine oil or fuel added to the diesel engine shall comply with the provision of Operation and Maintenance Manual, and be filtered by the special filters. The fuel needs more than 72 hours sediment.

7、电气系统各部件的检修必须由熟悉电气知识的人员进行。

The inspection and repair of all the components in electric system shall be done by professional electric technical personnel;

8、为防止锈蚀，柴油机出公司时进行油封，一般柴油机的油封期为一年，凡超过一年的应进行检查并采取必要的补充措施。

For the sake of preventing corrosion, the diesel engine is oil sealed before delivery from our company. Generally the oil seal period is one year. If the oil seal period exceeds one year, inspection and necessary actions should be taken.

9、柴油机的功率修正按 GB ／ T18297，参见表 16。

The power of diesel engine is correct as per GB/T18297 by referring Table 16.

10、发动机质量信息反馈

Feedback of engine quality information

我公司对 WD615 系列柴油机产品实行质量跟踪建档，用户在使用产品时请按卡片要求填写寄回我公司。凭卡建立用户联系关系。

The manufacturer has established quality files for WP615 series diesel engine. Please fill in the card and post it to us, we will contact with user according to the card.

11、在维修、更换发动机零配件时须知：

Notice to repairing and replacing parts:

WD615系列柴油机产品，是高性能的柴油机，用户在维修时请按WD615系列柴油机零件图册和维修手册的诸项要求进行工作，但购买有关零配件，必须采用主机厂鉴定认可的产品，以确保其性能，可靠性和寿命。

WP615 series diesel engine is of high performance product. Maintenance should be done in accordance with WP615 series diesel engine parts catalogue and specifications of maintenance manual. Purchased parts must have approved by us in order to ensure performance, reliability and service life.

前　言

WD615 系列柴油机为引进国外技术在国内制造的高速柴油机，可供重型载重汽车、大型客车、工程机械、起重机械、渔船和快艇使用，本机使用可靠，经济技术指标优良，起动迅速，操作简单和维修方便，为满足市场的要求，开发的变型品种已达几百余种，在市场上占有很大的保有量，为使广大用户更快了解和正确使用 WD615 系列柴油机，特编制此以图片为主的维修保养手册。

随着产品不断发展，其结构还会有所改进，如果您发现您的柴油机与本手册所述内容不符时，请访问潍柴网站 http://www.weichai.com, 本公司欢迎用户对产品提出进一步改进的意见或建议。

2007 年 4 月

FOREWORD

WD615 series high-speed diesel enslnes are manufactured in China through introducing advanced technology from Austria With the advantages of high reliability, good economy, rapid starting, simple operation and easy maintenance, it is an ideal power for heavy—duty trucks, hixm7 busses, construction machinery, generating sets, fishing vessels, speed boats and so on The new model engines developed by our company have reached over hundreds to meet the market needs and thus we have goaen a big market share tm now In order to help customers understand WD615 series diesel engines well and operate correctly, we especially provide this maintenance manual.

With continuous development, the engine structure will be improved accordingly. So if there are any differences between your engines and this manual, please do not hesitate to visit WEICHAI Website: http://www.weicai.com.You are welcome to offer your comments and recommendations for further improvement of the products.

April, 2007

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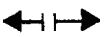
图 示 标 记 说 明

Description Of The Illustration Marks

	拆卸(组合件) Dismounting (assembly parts)		涂润滑油 Oil coating
	装配(组合件) Fitting (assembly parts)		专用工具，如S K……， KUKKO,……，TS……W Special tools, such as K––– –––, KUKKO, ––– –––, TS––– –––W
	打记号（分解前打上，重新装配时注意对正） Marking (do before disassemble, adjust when assemble)		注意装配方向 Pay attention to assembly direction
	注入 – 充满（如润滑油，冷却水等） Filling– full charge (such as lubricating oil, cooling water etc.)		放气 Deflating
	排出（例如润滑油、冷却水等） Draining off (lubricating oil or cooling water)		松开（例如：夹紧装置的松开） Unloosing (such as: unloose clamping equipment)
	（防松 – 粘固）涂液态密封剂 (loose–proof–fixed) Coat fluid sealant		夹紧（例如：夹紧装置的紧固） Clamping (such as: reinforcing clamp equipment)
	防止人身事故（危险场合标记） Accident preventing (marks for dangerous occasion)		检测 – 调整（例如：拧紧力矩，尺寸，压力，间隙等） Inspecting–adjusting (such as: tightening torque, dimension pressure and clearance)
	每次装配都要更换 Replacement when re–assembly		检查 Inspecting