



WORKSHOP MANUAL

HFC4181KR1K3-Y43G2



JAC International

2008.05

JAC Motors

WORKSHOP MANUAL

HFC4181KR1K3-Y43G2

Foreword

This workshop manual was prepared as reference to properly carry out servicing and maintenance on Jianghuai vehicles.

The contents, pictures and technical parameters this manual supplied are the latest data. Because of the continuously development and renewal of technique and products, there may be some difference between the explanation and the vehicles.

This shop manual was prepared for 4 x 2 Tractors. Configurations as follows:

HFC4181KR1K3-Y43G2 , WP10.336 , 12JS160/12JS160A, Steyr rear axle(4.8/5.73).

Please inform Customer Service Department of JAC International if there is any mistake, and you will be highly appreciated.

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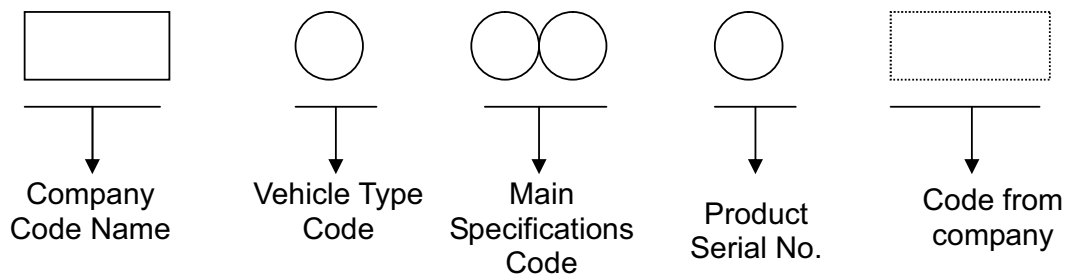
Specifications

HFC4181K3R1(Y43G2) Specifications

高顶/半高顶 High/Half Height Roof Cab, tilt cab	型号 Model	HFC4181KR1K3
	驱动形式 Drive mode	4*2
	结构区别号 Serious number	Y43G2
发动机 Engine	型号 Model	WP10.336
	排量(cc)Displacement	9726
	最大输出功率 (Hp/rpm) Max output power	336/2200
	最大扭矩 (N.m/rpm) Max torque	1250/1200-1600
变速箱 Transmission	12JS160/12JS160A	
驱动桥 Real axle	型号 Model	斯太尔(4.8) Steyr Technology (4.8/5.73)
主参数 Main parameter	外形尺寸 (mm) Overall dimension	6095*2495*3490/3180
	轴距 (mm) Wheelbase	3500
	轮距 (mm) Tread	2040/1860
	悬长 (mm) Suspension arm	1495/790
	总质量 (Kg) Gross Weight	19400
	车架截面尺寸 Frame section sizes(mm)	316 x90x (8+7)
轮胎 Tire		12.00-20/12.00R20
转向 Steering system		动力转向配 ZF 转向器 Power steering with ZF Steering gear
制动系统 Brake system	方式 Mode	双回路气制动 Dual-circuit air brake
	间隙调整 Brake slack adjust	自动调整 Automatic adjust

The above mentioned specifications are subject to change without prior notice.

1.2 Vehicle Model: HFC3251KR1



Company Code Name: HFC-----represents JAC motor

Vehicle Type Code: 1---Cargo truck 2---Off-road vehicle 3---Dumper
4---Tractor 5---Special purpose vehicle 6---Passenger car
7---Sedan 9---Semitrailer

Main Specifications Code: 25---represents the maximum gross weight is 25 tons.

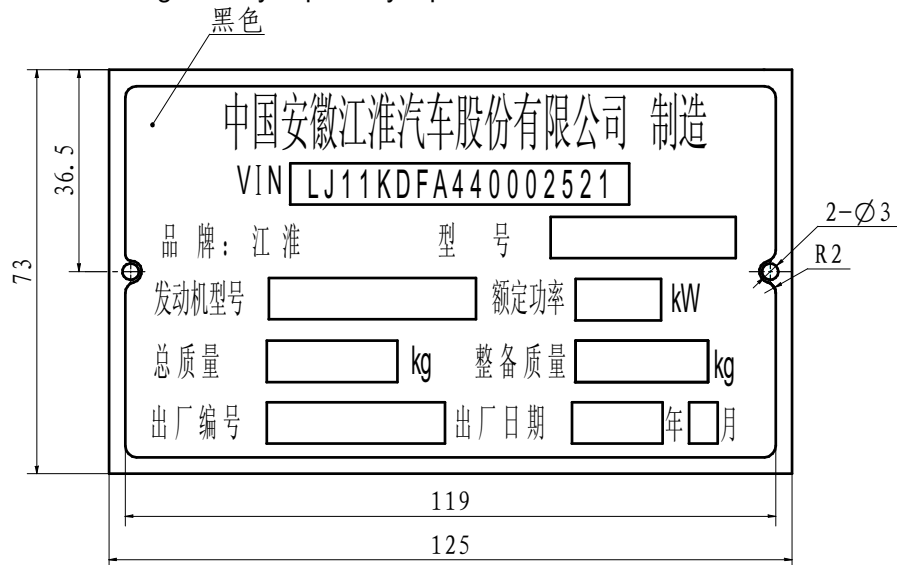
Product serial No.: 1---Product development serial No. (1st change, 2nd development)

Code from company: K---Diesel R1---King cabin

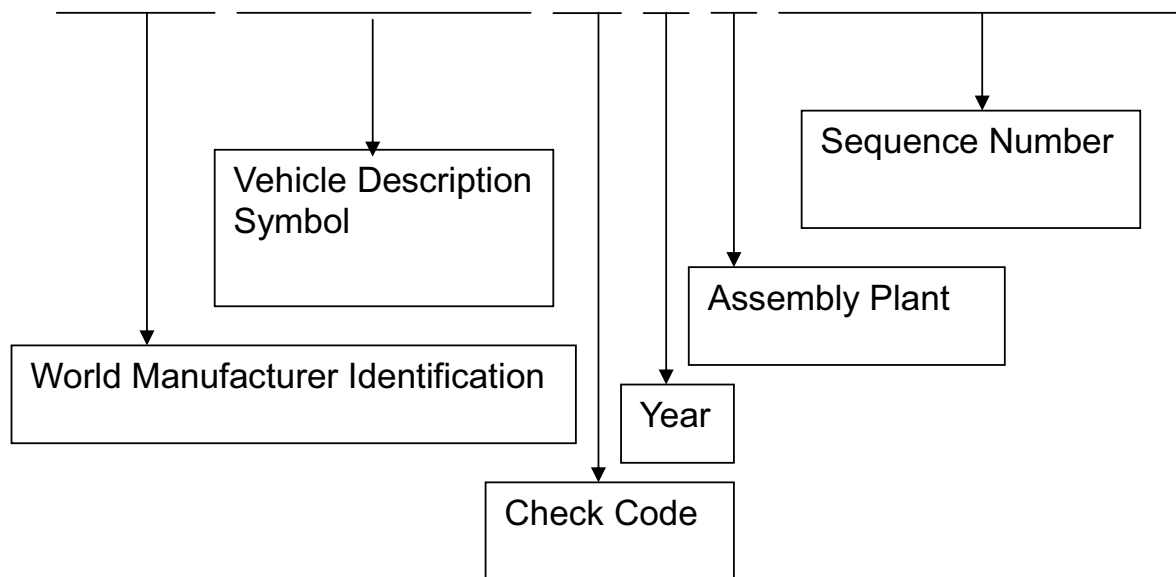
For example: HFC3251KR1 represents JAC vehicle with king cab, 25 tons maximum gross weight, the first change.

1.3 VIN----Vehicle Identification Number

VIN comprises of 17 digits. They separately represent:



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
L	J	1	1	K	D	B	C	X	8	X	X	X	X	X	X	X



1.4 Tightening Torques of Bolts and Nuts for Hyundai

Unless otherwise specified, the parts and equipment of vehicle must be tightened by the following standard bolts nuts. Tightening torques for these bolts and nuts are shown below.

Note:

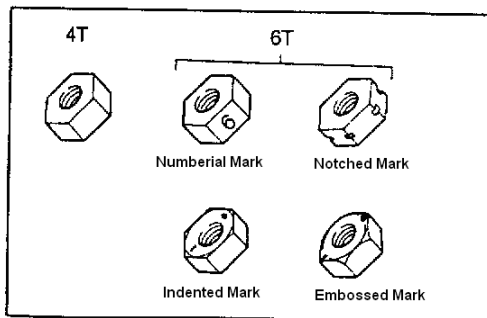
Threads and seat surface must be in dry state.

When there is a difference between the nut and bolt(stud) identification marks, tighten to the torque corresponding to the bolt(stud) identification mark.

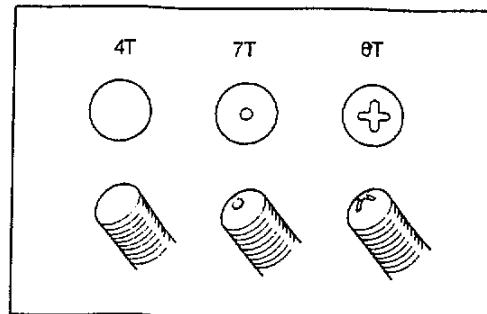
Standard bolts and nuts

Dia /mm	Pitch mm	4T(Head mark 4 or ○)	7T(Head mark 7 or ⊖)	8T(Head mark 8 or ⊕)
5	0.8	2.0-2.9(0.2-0.3)	3.9-5.9(0.4-0.6)	4.9-6.9(0.5-0.7)
6	1.0	3.9-5.9(0.4-0.6)	6.9-10.8(0.7-1.1)	7.8-11.8(0.8-1.2)
8	1.25	8.8-13.7(0.9-1.4)	16.7-25.5(1.7-2.6)	19.6-29.4(2.0-3.0)
10	1.25	18.6-27.5(1.9-2.8)	34.3-53.9(3.5-5.5)	44.1-58.8(4.5-6.0)
	1.5	17.7-26.5(1.8-2.7)	32.4-49.0(3.3-5.0)	42.1-58.8(4.3-6.0)
12	1.25	33.3-49.0(3.4-5.0)	68.6-93.2(7.0-9.5)	83.4-108(8.5-11)
	1.75	30.4-46.1(3.1-4.7)	63.7-83.4(6.5-8.5)	73.5-98.1(7.5-10)
14	1.5	58.8-83.4(6.0-8.5)	118-157(12-16)	127-177(13-18)
	2.0	53.9-73.5(5.5-7.5)	108-137(11-14)	118-167(12-17)
16	1.5	93.2-127(9.5-13)	177-235(18-24)	196-265(20-27)
	2.0	88.3-118(9.0-12)	157-216(16-22)	186-255(19-26)

Identification marks of nut



Identification marks of stud



The mechanic performance table of bolts in China

Quality Grade(mark)	6.8	8.8	9.8	10.9	12.9
Tensile strength limit σ_{bmax} (MPa)	600	800	900	1040	1220
Yield limit σ_{smax} (MPa)	480	640	720	940	1100
Corresponding to Hyundai standards	4T	6T	7T	8T	10T

The number before the radix point represents one percent of the nominal tensile strength;

The number after the radix point represents ten times of the ratio of the nominal yield limit and nominal tensile strength.

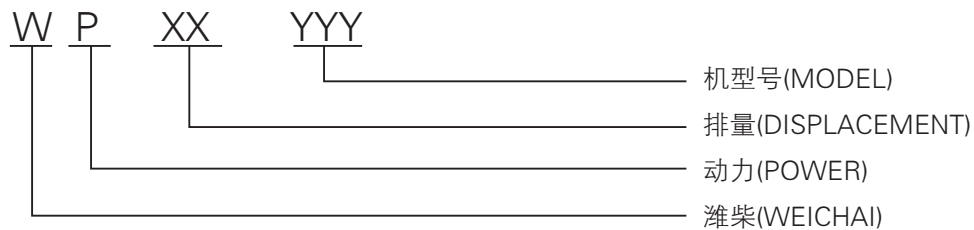


1. 柴油机使用说明

Usage Instruction

1.1 WP10系列柴油机型号含义

Signification of WP10 Series Diesel Engine Type Code



1.2 新柴油机使用须知

Operating notice for new diesel engine

◆新柴油机在使用的最初 60 小时(或 3000 公里)内应限制柴油机的负荷不应超过标定负荷的 75%。

Within the first 60 hours (or 3,000 km), the load of new diesel engine shall not exceed 75% of the rated load.

◆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的过度磨损或损坏。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

Provision of the first oil replacement period

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;

For the vehicle with running mileage less than 20,000 km per year, the first oil replacement period is 1,000~1500 km;

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。

For the vehicle with running mileage more than 20,000 km per year, the first oil replacement period is 1,500~2000 km;



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- ◆每日检查油压表、温度表、报警指示灯和其它仪表，确保它们正常使用。

Check the oil pressure gauge, temperature meter, alarm indicator light and other instrument every day.

- ◆按说明书中要求进行日常维护和保养

Keep daily maintenance as per this manual.

1.3 柴油机的启封工作

Package opening of engine

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 accessories as per packing list, then proceed on as following :

- ◆擦拭外露件的防锈层，防锈剂等；

Clean the anticorrosive coating and preservative of outer parts.

◆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油不经放出而启动，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 fuel 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 oil of fuel supply system has been used up and the usual fuel has been provided).

- ◆转动飞轮并向进气管内喷溶剂到驱尽气缸内油封油为止。

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

- ◆向增压器排气口喷溶剂，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.

- ◆根据厂方与用户的协约，对油底壳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 oil sumps should be filled with oil.

◆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 $-30^{\circ}\text{C} \sim -35^{\circ}\text{C}$ 时，其 pH 值为 7-8(中性)，总硬度值为 $5-15^{\circ}\text{d}[9-27^{\circ}\text{f}(\text{硬度})]$ 则可以使用这些冷却液，如不合乎要求，则应放出，重新加注含防冻剂的冷却液，发动机加约 40 升冷却液。

As per the agreement between Weichai and the customer, and as per customer's requirement



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before 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°C or -35°C and pH is 7-8(litmusless),and its total rigidity number is $5-15^{\circ}\text{d}$ [$9-27^{\circ}\text{f}$ (rigidity)] , otherwise it should be drained off and replaced by new coolant containing antifreeze.The volume 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,转动电钥匙起动柴油机,若发动机在 15 秒内起动不了,则待约 2 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。

Press down clutch pedal and accelerator pedal, turn the electric key to start the engine. If the engine can not be started within 15 seconds, repeat the second starting process after two minute. Upon starting, notice the readings of all instruments. The engine oil pressure gage shall display pressure immediately.

◆ 低温条件下起动柴油机应使用辅助起动装置,通过继电器使电子加热法兰工作,从而实现 -25°C 环境下顺利起动。

Use auxiliary starting device during starting at low temperature. By using relay, enable the electronic heating flange to operate, so as to realize smooth starting at -25°C environment.

1.6 柴油机的运转

Running of Diesel Engine

◆ 柴油机起动后,应先以怠速运行 2-3 分钟,机油压力应高于 100kPa,然后将转速提高到

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1000~1200r/min, 依次使柴油机在低转速空载运转加热, 然后进入部分负荷运转, 当冷却水出水温度达到 60℃后, 才允许提高到最高转速和投入满负荷运行。

After running at idle speed for 2~3min, oil pressure should be higher than 100kPa. Then speed up to 1000~1200r/min, preheat the diesel engine by no-load running at low speed, and then operate with part load. The engine is allowed to run at the highest speed and with full load when temperature of the outlet coolant rises to 60℃.

◆ 柴油机在 60h 磨合期以内, 只宜在中等负荷以下工作。

Diesel engine in the 60h-running-in period shall run with medium load.

◆ 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 not allowed to continue running on full load over 1 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 before stopped.

◆ 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℃时连续运转将有益于发动机。

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.

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.

◆ 在寒冷环境下运转注意事项;

Precautions for running in cold environment:

1、燃料油: 按冬季室外温度不同, 选用不同牌号的柴油。

Fuel: In accordance with different outdoor temperature, select diesel fuel of different brands.

2、润滑油: 按季节选择不同粘度的润滑油。

Oil: According to the season, select the oils of different viscosity.

3、冷却液: 冷却系统加入防冻添加剂, 随室外温度不同, 选用不同的牌号和不同数量。

Coolant: Add anti-freeze additive into cooling system. According to the different outdoor temperature, select different brand and quantity of coolant.



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4、起动：冬季必要时可采用辅助起动器。柴油机起动后待油压水温正常后方能加负荷高速运转。

Starting: In winter, use auxiliary starting device when necessary. After starting, the diesel engine can not be loaded and operate at high speed when the oil pressure of and water temperature of are normal.

5、蓄电池在寒冷季节开始之前，一定检查电解液液位、粘度和单位电压，如果柴油机长期不用并处于很低的温度下，应把蓄电池取下，储存于较温暖的室内。

Prior to starting in cold season, users should inspect the electrolyte level, viscosity and unit voltage of battery. If the diesel engine is stored in cold environment for a long time, remove the battery and store it in a warm room.

6、停车：若环境温度低于 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。

Stopping: If the environmental temperature is lower than 0 °C and the anti-freeze additive is not used, drain all the water from the water tank and the diesel engine.



2. 柴油机维护保养指南

Guide For Maintenance Of Diesel Engine

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 oil 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.

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2.2 定期保养并做好保养记录

Periodic maintenance and Records

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 conducted 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

Oil replacement period during vehicle maintenance

表 2-1 汽车配套三类使用条件

Three categories of operating conditions with vehicle

(WG I)	(WG II)	(WG III)
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 $2 \times 10^4 \text{km}$ 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 $2 \times 10^4 \text{km}$ or annual operated time less than 600h.	年行驶里程不足 $6 \times 10^4 \text{km}$ 的汽车, 短中距离运输(用于送货) Annual running mileage of the vehicle less than $6 \times 10^4 \text{km}$, for short- or medium-distance transportation (for goods).	年行驶里程超过 $6 \times 10^4 \text{km}$ 的汽车, 远距离运输 Annual running mileage of the vehicle more than $6 \times 10^4 \text{km}$ for long distance transportation.



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表 2-2 保养周期
Oil replacement period during vehicle maintenance

项目 Item	使用条件 Operating condition	(WG I)	(WG II)	(WG III)
第1次检查 The first inspection	行驶1000 ~ 1500km时 行驶30 ~ 50h Running 1,000~1,500km or 30~50h	行驶1500 ~ 2000km时 Running 1,500~2,000km	行驶1500 ~ 2000km时 Running 1,500~2,000km	
例行检查 Periodical 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	

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表2-3 汽车保养制度的机油换油期
Oil replacement period during vehicle maintenance

使用条件 Operating condition 项目 Item	(WG I)	(WG II)	(WG III)
	年行驶里程 不到 2×10^4 km Annual running mileage $< 2 \times 10^4$ km	年行驶里程 不到 6×10^4 km Annual running mileage $< 6 \times 10^4$ km	年行驶里程 超过 2×10^4 km Annual running mileage $> 6 \times 10^4$ km
第1次检查 The first inspection	行驶1000 ~ 1500km时 Running 1000~1500km	行驶1500 ~ 2000km时 Running 1500~2000km	行驶1500 ~ 2000km时 Running 1500~2000km
例行检查 P Periodical inspection	每隔500km Every 500km	每隔 1×10^4 km Every 1×10^4 km	每隔 1.5×10^4 km Every 1.5×10^4 km
1级保养 WD1 Level 1 maintenance	每隔 1×10^4 km Every 1×10^4 km	每隔 2×10^4 km Every 2×10^4 km	每隔 3×10^4 km Every 3×10^4 km
2级保养 WD2 Level 2 maintenance	每隔 2×10^4 km Every 2×10^4 km	每隔 4×10^4 km Every 4×10^4 km	每隔 6×10^4 km Every 6×10^4 km
3级保养 WD3 Level 3 maintenance	每隔 4×10^4 km Every 4×10^4 km	每隔 8×10^4 km Every 8×10^4 km	每隔 12×10^4 km Every 12×10^4 km
4级保养 WD4 Level 4 maintenance	每隔 8×10^4 km Every 8×10^4 km	每隔 16×10^4 km Every 16×10^4 km	每隔 24×10^4 km Every 24×10^4 km



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2.2.2 柴油机保养项目

Diesel engine maintenance project

柴油机保养项目 Maintenance items	第一次 检查 The first inspection	例行检查 Periodical inspection	1级保养 Level 1 maintenance	2级保养 Level 2 maintenance	3级保养 Level 3 maintenance	4级保养 Level 4 maintenance
更换机油(每年至少1次) Replace oil (once a year at least)	●	●	●	●	●	●
更换机油滤清器或滤芯 Replace oil filter or filter element	●	每次更换机油时 When replacing oil every time				
检查调整气门间隙 Inspect and adjust valve clearance	●		●	●	●	●
更换燃油滤清器芯 Replace fuel filter element			●	●	●	●
检查冷却液容量并加足 Inspect coolant capacity and fill	●	●	●	●	●	●
紧固冷却管路管夹 Fasten cooling pipe clamp	●					
紧固进气管路、软管和凸缘连接件 Fasten connecting parts of air inlet pipe, hose and flange	●		●	●	●	●
检查空滤器保养指示灯或指示器 Inspect air filter maintenance light or indicator			●	●	●	●
清洗空滤器的集尘杯(不包自动排尘式) Clean dust pocket of air filter r(except auto dust exhaust style)		●	●	●	●	●
清洗空滤器主滤芯 Clean air filter main element	当指示灯亮时 When indicator light comes on					
更换空滤器主滤芯 Replace air filter main element	参看说明书有关规定 Refer to the relevant provisions in the manual					
更换空滤器安全滤芯 Replace air filter safety element	清洗5次主滤芯以后 After 5 times of cleaning of main filter element					
检查、紧固三角皮带 Inspect and fasten V belt	●	●	●	●	●	●
检查增压器轴承间隙 Inspect supercharger bearing clearance						●
检查、调整离合器行程 Inspect and adjust clutch travel	●	●	●	●	●	●
注：●需要保养标记 Note: ● requiring maintenance required.						



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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 of Diesel Engine

3.1 日常保养

Daily Maintenance

预防性保养从每天做起，了解柴油机工作状态。

Preventive maintenance should be done everyday in order to understand the engine'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 fuel level.

检查：

Inspect:

- 泄漏

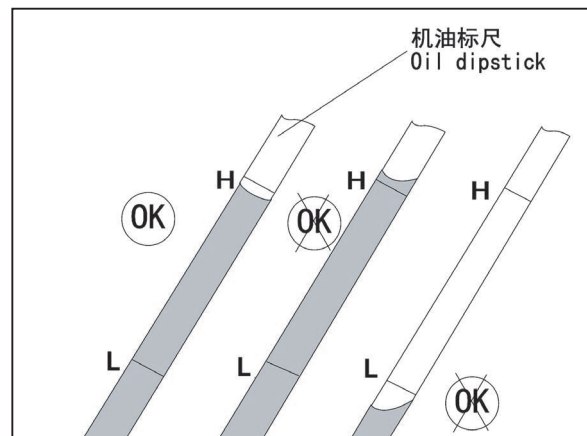
Leakage

- 易损件

Fast wearing parts

- 柴油机上出现的任何异常

Any unconventionality



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● 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。

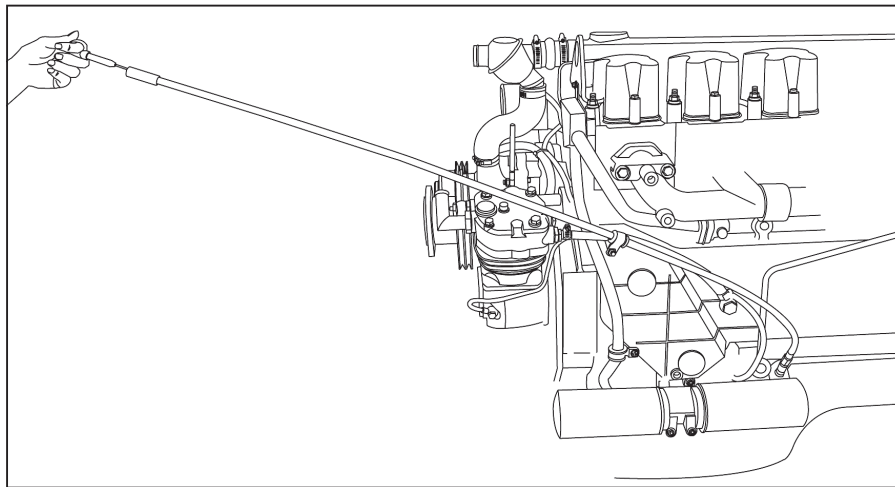
When the oil level is lower than the lower limit or higher than the upper limit, it is not allowed to start the engine.

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.



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● 冷却液液面

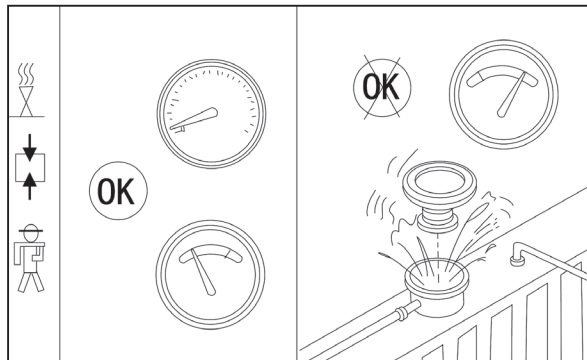
Inspect the coolant level

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。

Check the fuel level.

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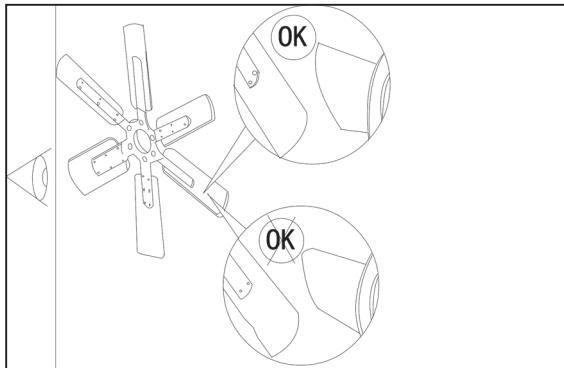
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● 检查风扇

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

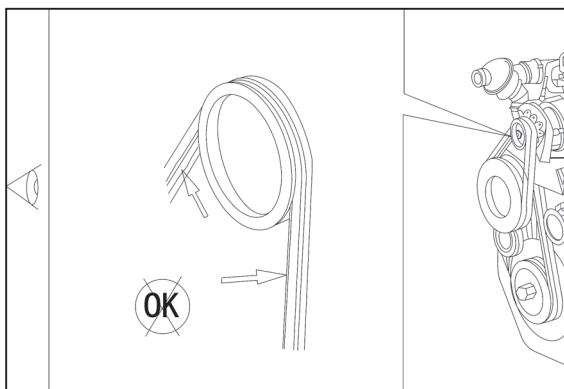


● 检查三角皮带

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



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- 检查排气颜色是否正常。

Inspect exhaust gas for normal color. Attached diagram:

正常排气颜色为淡灰色。颜色出现变化应检查原因并排除。

The normal color is light grey. If the color changes, find the reason and remove it.



- 检查声音是否正常。

Inspect for normal sound.

- 检查转速、振动是否正常。

Inspect for normal speed and vibration.

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3.2 各级保养的保养内容

Maintenance Content of Different Levels

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

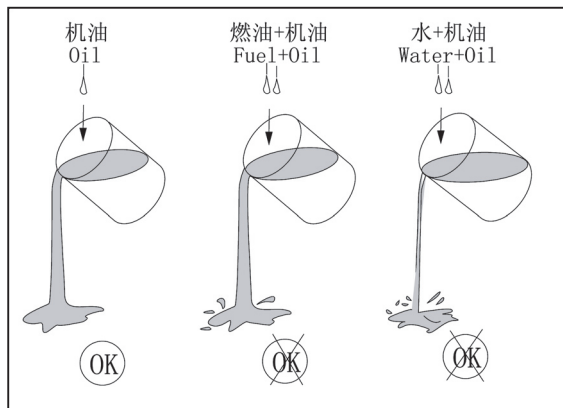
Replacement of the oil and oil filter

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)



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更换机油和机油滤清器，以清除悬浮在机油中的杂质。

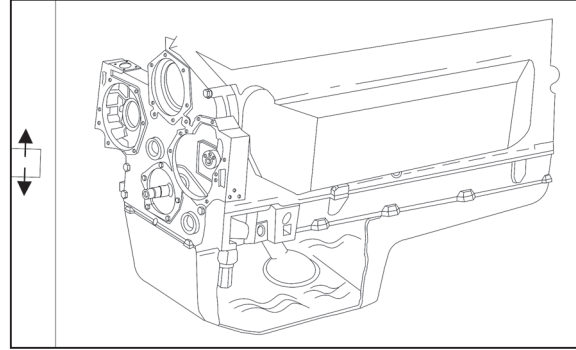
Replace the oil and oil filter to clean the impurities containing in oil.

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

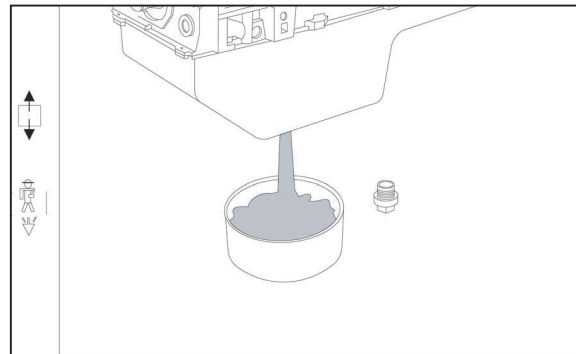


拆下放油螺塞，准备收集 24L 机油。

Remove the whorl plug, prepare a container to collect 24L of oil.

注意：热机油会伤人

Note: Hot oil can injure people.



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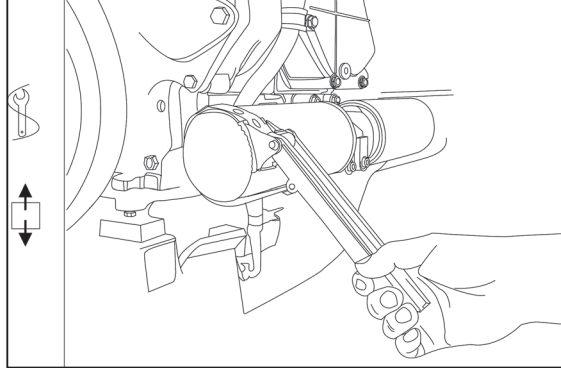
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滤清器专用扳手

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.

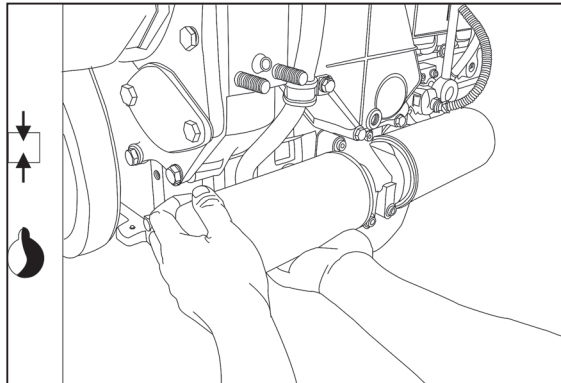


装上新的机油滤清器

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润滑油。

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



WP10系列柴油机维修保养手册

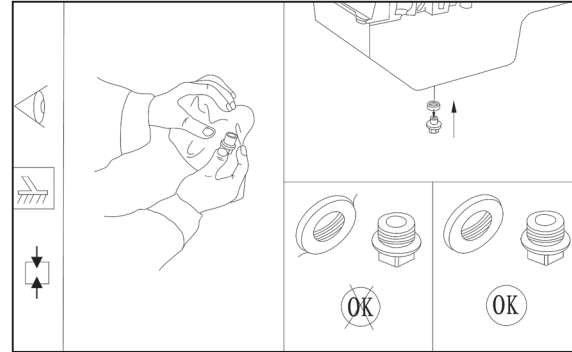
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32mm 开口扳手

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.

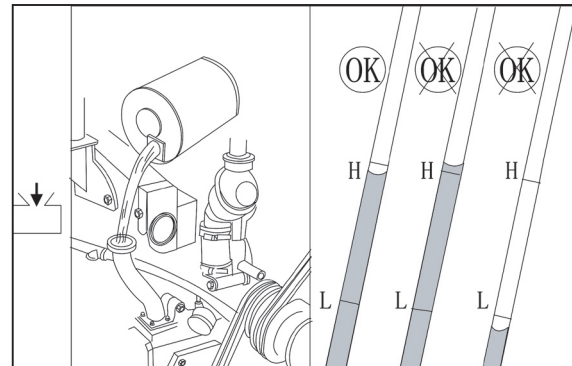


将清洁的机油注入柴油机到油尺
的上刻度线, 油底壳容量为 24L。

Fill the clean oil up to the upper
limit, the capacity of the oil sump is
24L.

注意: 斯太尔柴油机必须使用
CF-4 级 15 W/40 牌号机油。

Note: STEYR engine must use
CF-4 15W/40 oil.



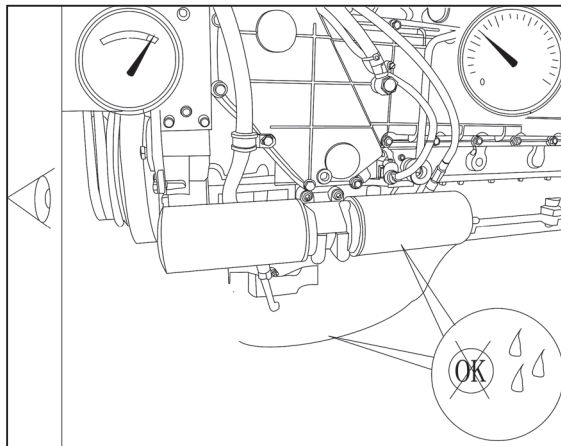
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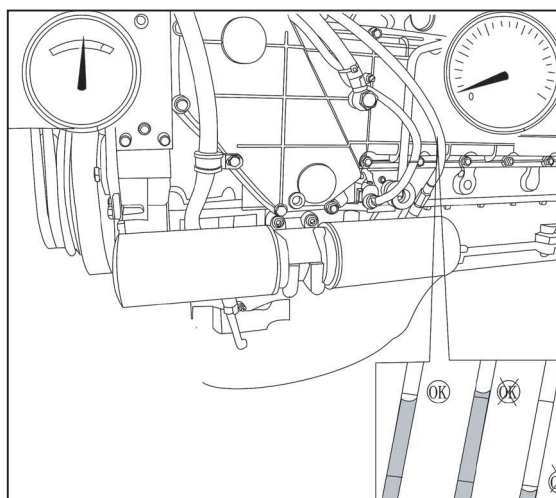
发动机怠速运转，检查滤清器和放油螺塞处是否漏油。

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入油底壳，再检查油面高度，必要时补充机油至油尺的上刻度线。

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.



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检查调整气门间隙

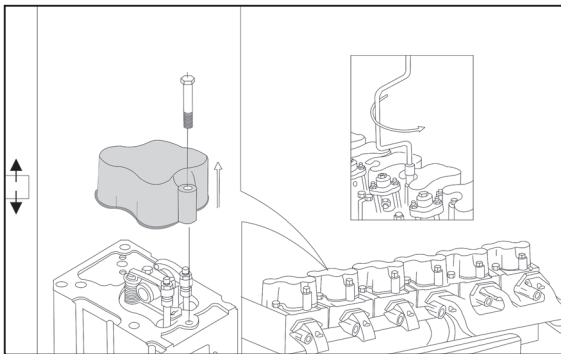
Check and adjust the valve clearance

13mm 套筒扳手

Tool: 13mm sleeve wrench

拆下6个气缸盖罩

Disassemble 6 cylinder head covers.

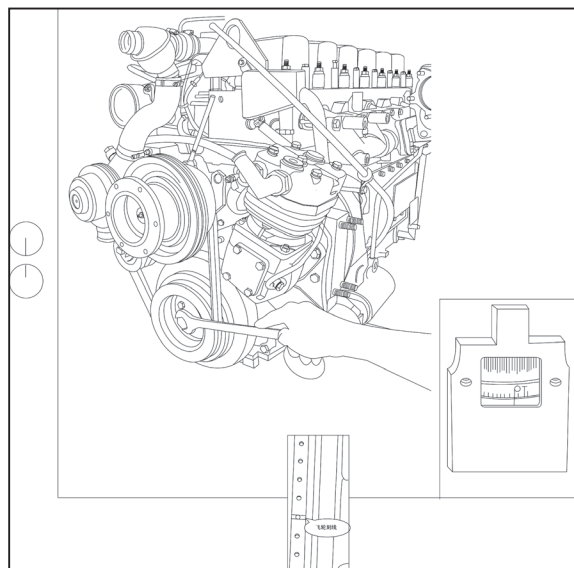


32mm 盘车扳手

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刻槽，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）

Turn the flywheel until its 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 1 cylinder are closed).



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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

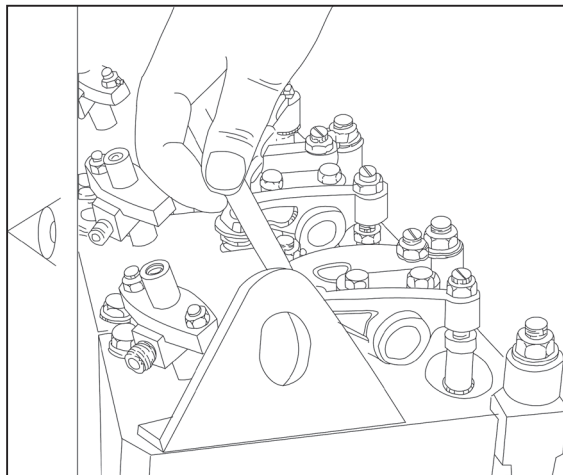
The clearance of exhaust valve is
0.40mm

其中,带 WEVB 系统的间隙
0.25mm。

The clearance for WEVB system 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.





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采用 WEVB 系统后, 排气门间隙的调整方法 (零件序号参见图 7-1):

After WEVB system is used, the adjustment method of exhaust valve clearance is as follows (see Fig. 7-1 for part serial numbers)

1、所要调整的气缸的活塞位于压缩行程上止点;

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

2、如图 7-2 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。

As shown in Fig. 7-2, 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 7-3 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。

Then as shown in Fig. 7-3, 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.

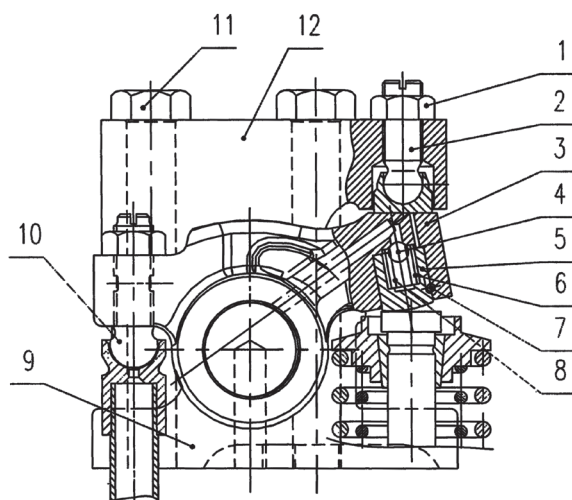


图7-1

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

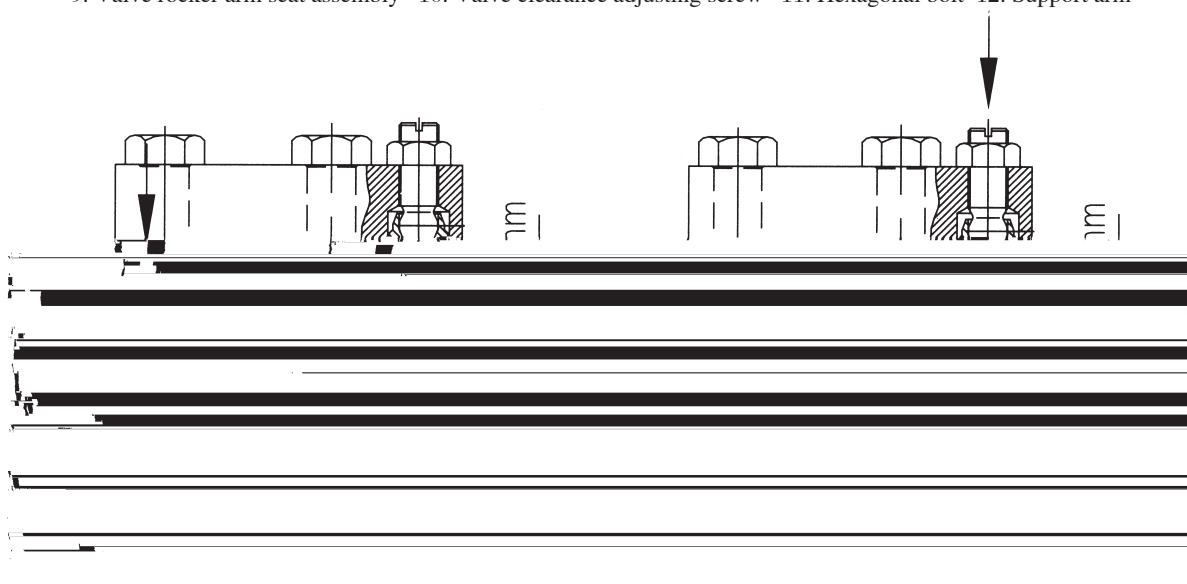


图7-2 冷态排气门总气门间隙0.4mm

Fig. 7-2 Total Valve Clearance of Cold-State Exhaust Valve 0.4mm

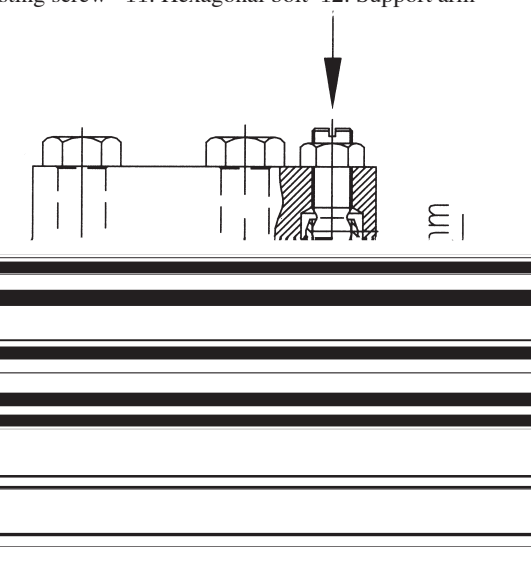


图7-3 冷态排气门端气门间隙0.25mm

Fig. 7-3 End Valve Clearance of Cold-State Exhaust Valve 0.25mm

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6# 螺丝刀、14mm 梅花扳手

Tools: 6#screwdriver and 14mm double offset ring wrench

第一缸活塞位于压缩行程上止点位置。

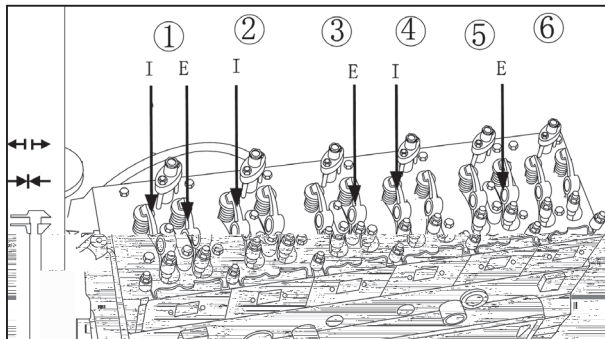
The piston of 1st cylinder is at TDC of the compression stroke.

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, 直到达到要求为止。

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



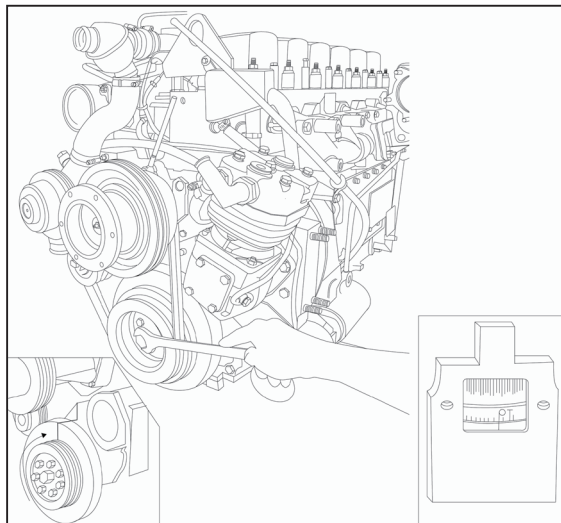
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用盘车扳手再转动曲轴 360° ,
也可以在减震器上做标记后转动
 360° 。

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

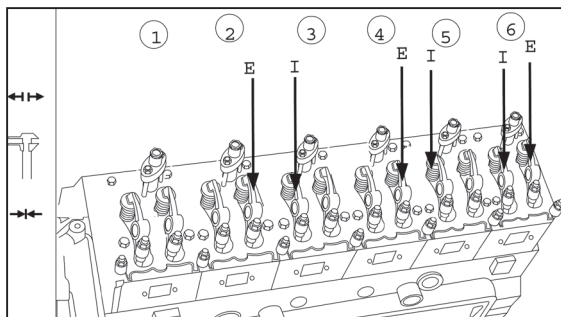


按步骤 B 所示调整气门间隙。

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.



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13mm 套筒扳手

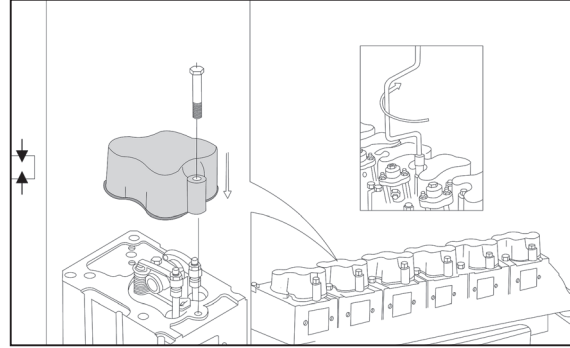
Tool:13mm sleeve wrench

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 $23\text{N} \cdot \text{m}$ (推荐数值)。

The tightening torque of bolt is $23\text{N} \cdot \text{m}$ (recommended).

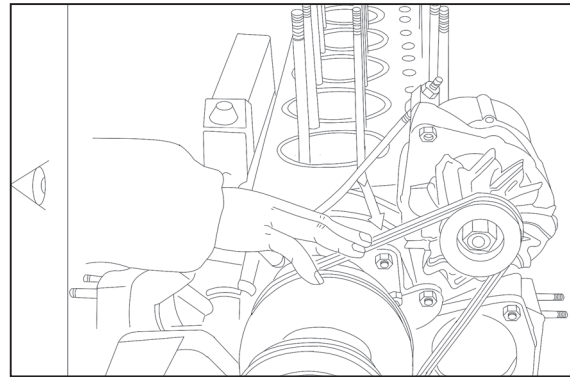


检查三角皮带涨紧力

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10 mm。

Measure the flexibility of the V-belt at the middle of its biggest span, generally the requirement result should be less than 10mm under strong press by your thumb.



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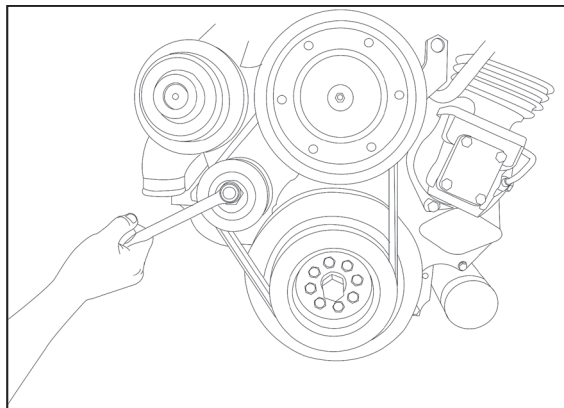
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16mm 开口扳手

16mm open-ended wrench

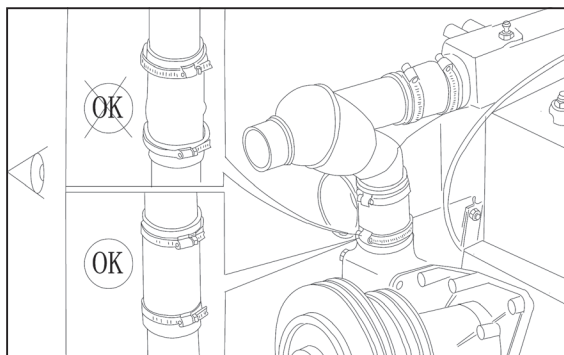
如果挠度大于 10mm，说明三角皮带松动，需松开涨紧轮涨紧螺母，重新涨紧皮带，然后拧紧涨紧螺母。

If the flexibility is more than 10mm, 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 performance.



WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

更换燃油滤清器芯

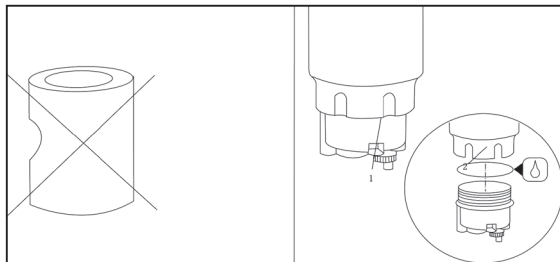
Replace fuel filter element

更换燃油滤清器芯时按以下步骤操作：

Replace fuel filter element in the following steps:

A. 卸下旧的燃油滤清器芯；如果安装在粗滤器上的集水器皿还可以再用，请将集水器皿取下。

Dismantle the old fuel filter element. Remove the water collector installed on coarse filter if reused.

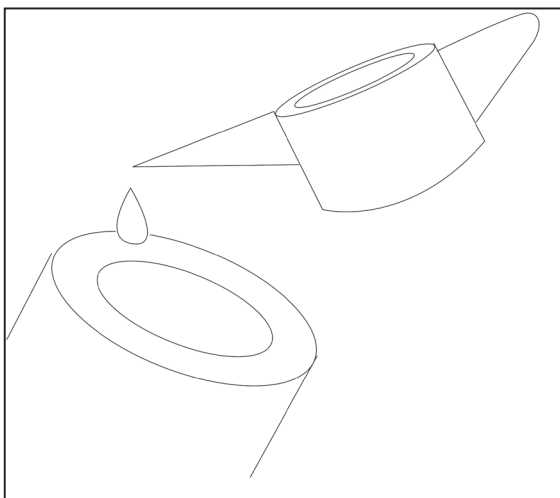


B. 润滑封口。

Lubricate the seal lips.

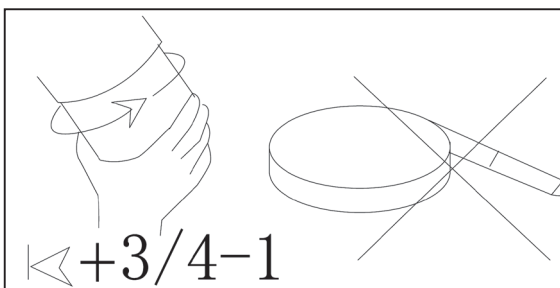
C. 用手拧上滤清器直至封口与接口结合。

Turn the filter by hand until the seal is closed with interface.



D. 继续用手拧滤清器直至滤清器牢固安装(大约 3/4 圈), 不要使用工具。

Continue to turn the filter with hands until the filter is installed solidly (about 3/4 turns),



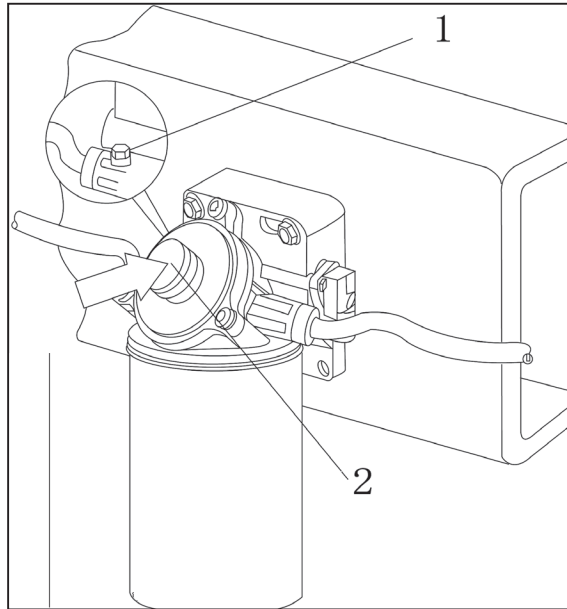
WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine



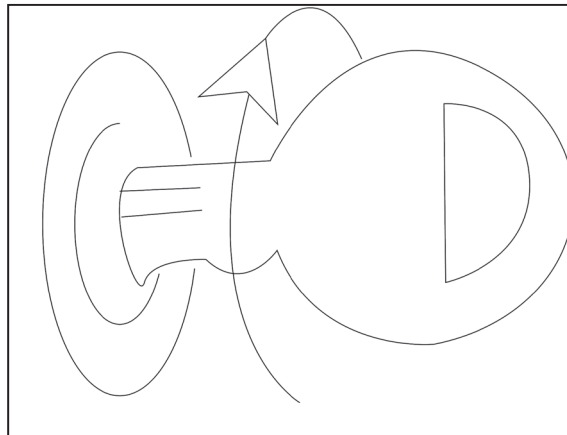
E. 排气直至无气泡出现。

Deflate until there is no bubble.



F. 启动发动机。

Start Engine.



WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

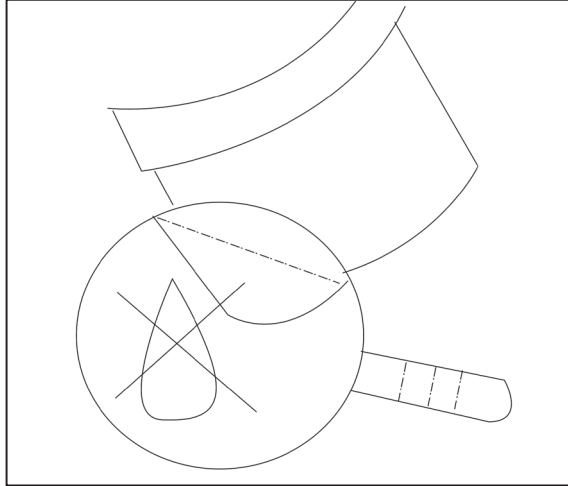


G. 进行泄漏实验。

Conduct leakage test.

H. 必要时重新拧紧。

Retighten when necessary.

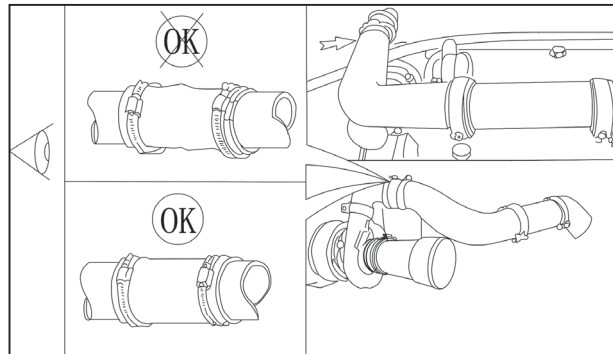


检查进气系统

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.



WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

检查空气滤清器滤芯

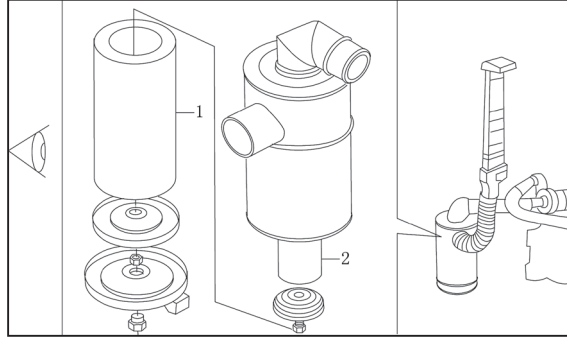
Check the air filter element

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 check 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.纸质主滤芯: Paper filtering element

2.毛毡安全滤芯: Blanketry safety filtering element

WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

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

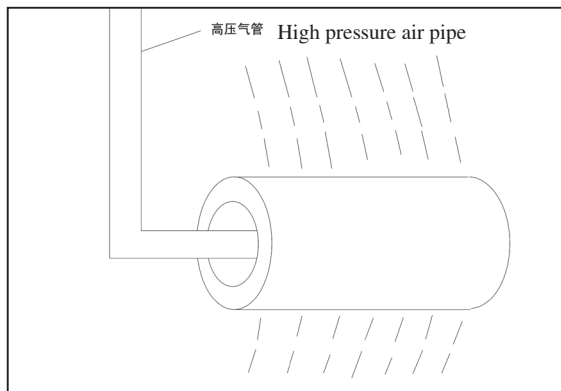
Don't blow off the air filtering paper

- 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.





WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

3.3 柴油机长期存放时的维护保养

Maintenance 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 15-25 分钟,在停机前 2 分钟向空气压缩机进口喷射油封油,停车后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: 用盖子或用塑料布捆扎封堵各油、气、水的进出口; 用气象防锈膜封存整台柴油机。

Protection in storage period: Block all the oil, air and water inlets and outlets with cap or banded plastic cloth; and seal up the whole diesel engine with weather rust proof film.

● 如果需要运输则应该外加包装。

Add external package if transportation is needed.

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

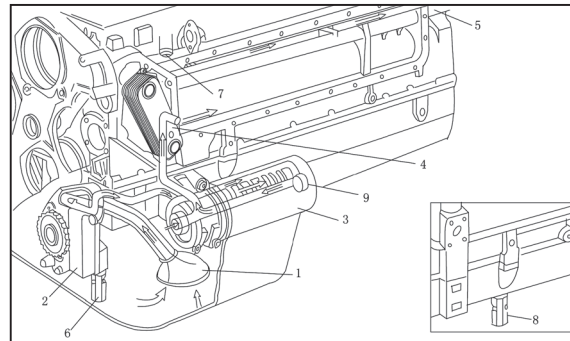
了解 WP10 柴油机的各大系统流程, 将为您使用维护保养及故障排除提供帮助。

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



WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

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 journal

4. 连杆轴颈

Connecting rod journal

5. 曲轴主轴颈处

The main journal of crankshaft

6. 通往连杆轴承

Oil to connecting rod bearing

7. 主油道通向主轴承的斜油道

The branch oil passage passing to main bearing

8. 付油道

Sub-passage of oil

9. 冷却活塞喷油

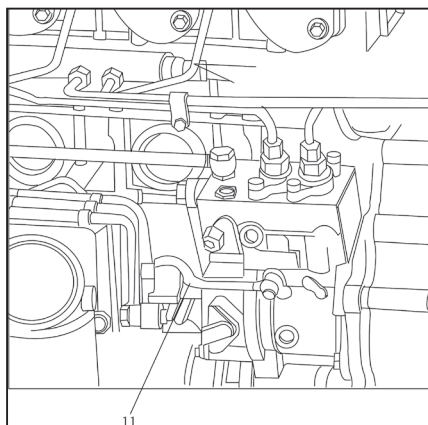
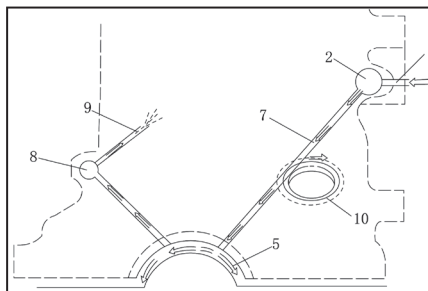
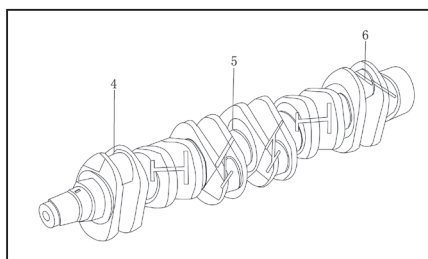
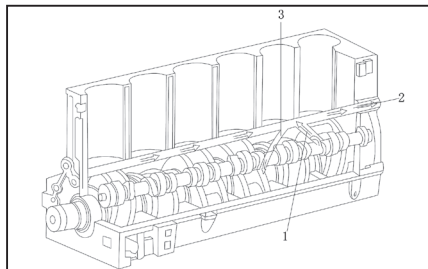
Oil injection nozzle to Cool piston

10. 凸轮轴轴承

Camshaft bearing

11. 付油道来油润滑共轨喷油泵

Lubricating fuel injection pump through the oil from sub-passage



WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

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

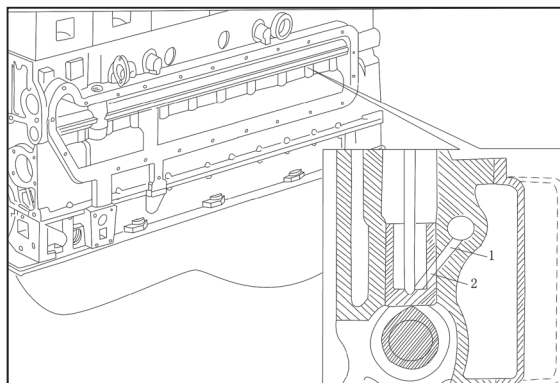
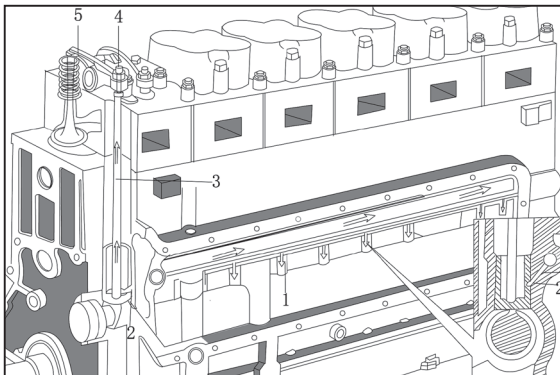
Push rod oil hole

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

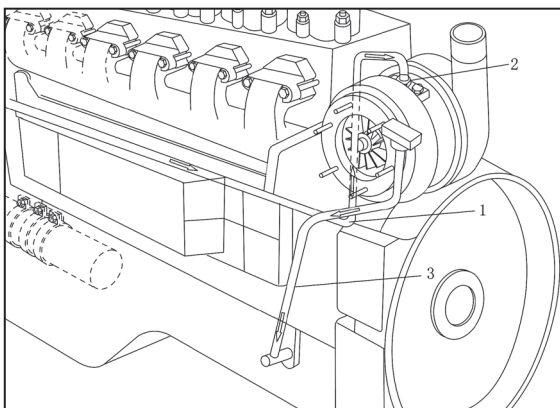
Oil from the main oil passage

2. 增压器进油口

Oil inlet of turbocharger

3. 增压器回油口

The oil outlet of turbocharger



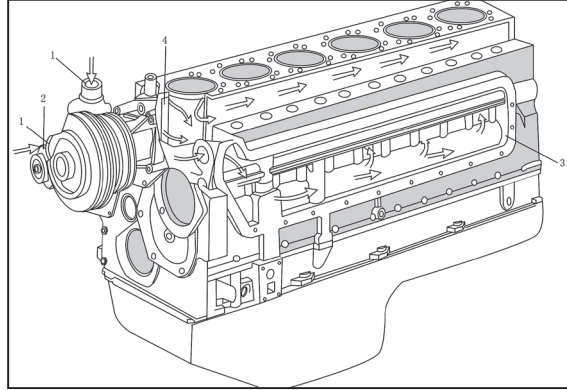
WP10系列柴油机维修保养手册

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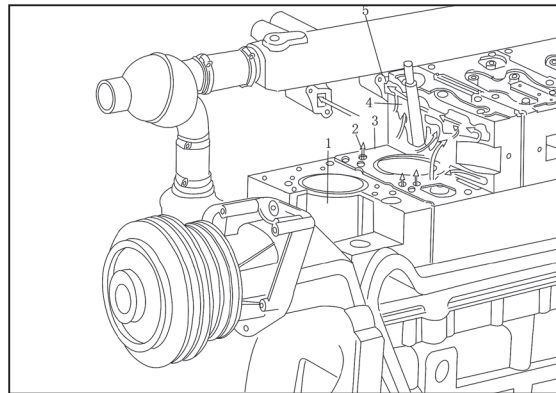
4.2 冷却系统

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



WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

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

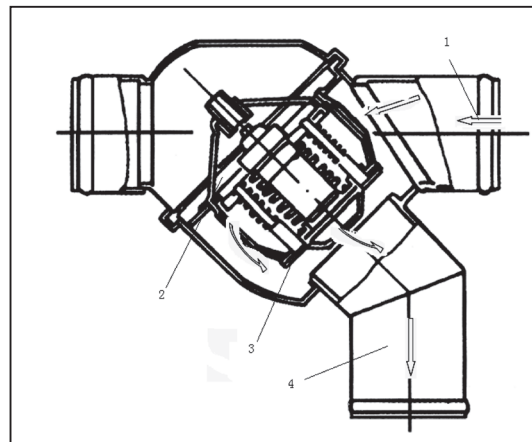
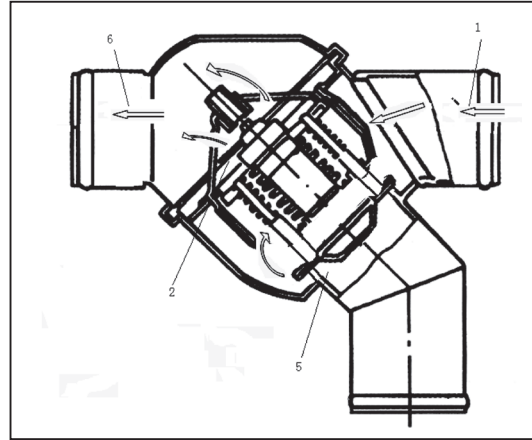
Coolant flowing into water pump

5. 旁通阀关闭

Bypass valve closed

6. 冷却液流入散热器

Coolant flowing into the radiator



WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine



4.3 进排气系统

Intake and exhaust system

1. 经过滤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)

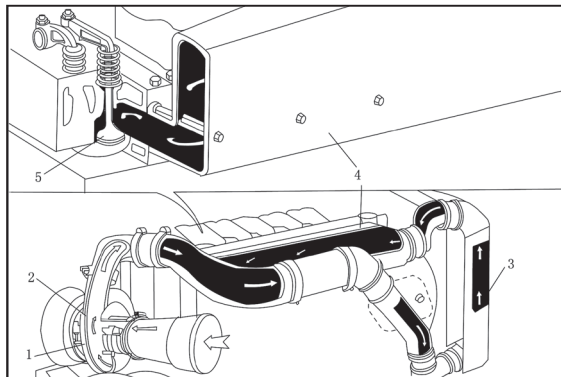
Intercooler(The engine supplied without intercooler when delivering out of our company)

4. 进气管

Intake manifold

5. 进气门

Intake valve



1. 排气门

Exhaust Valve

2. 排气管

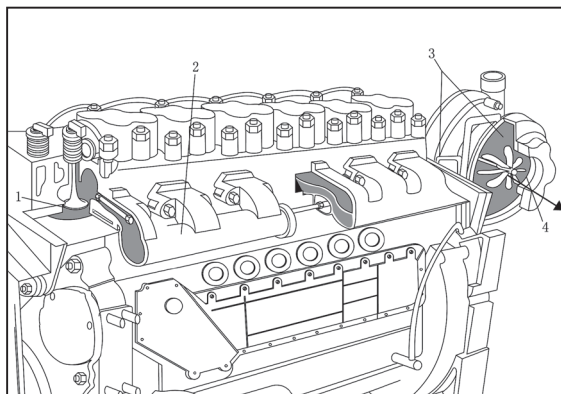
Exhaust manifold

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





WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

4.4 燃油系统

Fuel System

WP10 系列欧Ⅲ柴油机采用了 Bosch 公司的高压共轨系统,使发动机能够满足最高 1600bar 的喷油压力,实现燃油量与正时的灵活控制,达到低排放与低油耗。

WP10 Series Euro III diesel engine applies high pressure common rail system made by Bosch Company, which enables engine to meet the max. fuel injection pressure of 1,600bar, to realize the flexible control of fuel quantity and timing; resulting in low emission and low fuel consumption.

共轨式电控燃油喷射技术是一种全新的技术,因为它集成了计算机控制技术、现代传感检测技术以及先进的喷油结构于一身。它不仅能达到较高的喷射压力、实现喷射压力和喷油量的控制,而且能实现预喷射和后喷,从而优化喷油特性形状,降低柴油机噪声和大大减少废气的排放量。

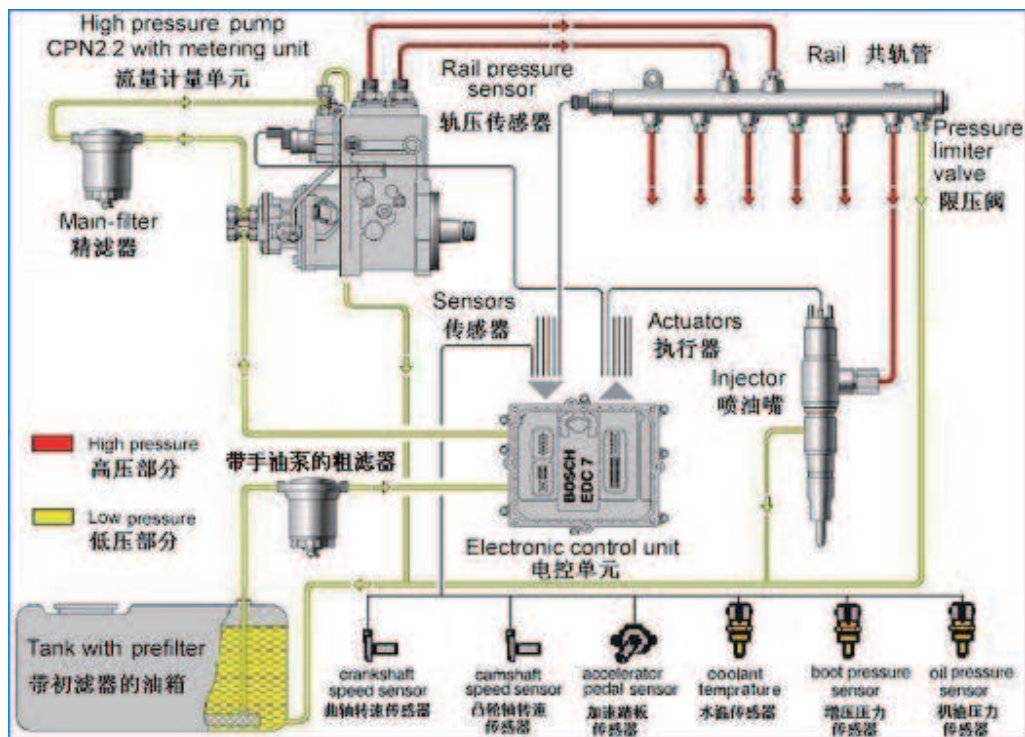
The common-rail electronically-controlled fuel injection technology is a brand-new one, for it combines computer control technology, modern sensing and detecting technology and advanced fuel injection structure. It can not only reach comparatively high injection pressure, and realize the control of fuel injection pressure and quantity, but can also conduct pre-injection and post-injection, so as to optimize the characteristic shape of fuel injection, decrease the noise of diesel engine and reduce emission greatly.

共轨系统对燃油油路要求较高,低压油路(油箱→粗滤→精滤,回油)、高压油路(高压油泵→共轨管→高压油管→喷油器)都要保证密闭。

The rail system has higher standard on fuel lines. The low pressure fuel line (fuel tank → coarse filter → fine filter, scavenge) and high pressure oil line (high pressure fuel pump → rail pipe → high pressure fuel pipe → fuel injector) all need to be sealed.

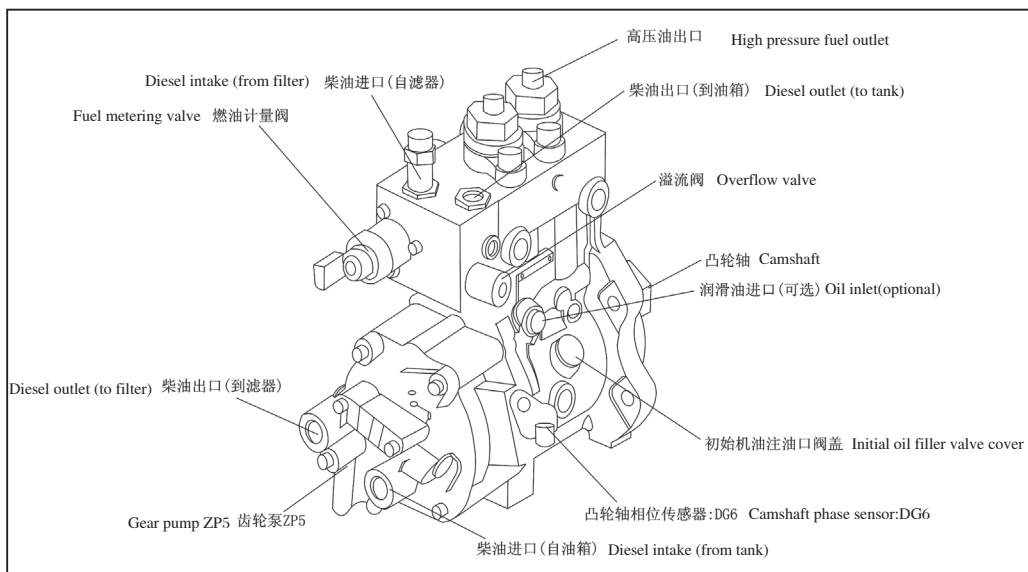
WP10系列柴油机维修保养手册

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WP10系列欧Ⅲ柴油机电控共轨系统

WP10 series Euro III diesel engine with electronically controlled common rail system



WP10系列欧Ⅲ柴油机高压油泵

High pressure fuel pump of WP10 Series Euro III diesel engine

WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

4.1.2 柴油粗滤器组件

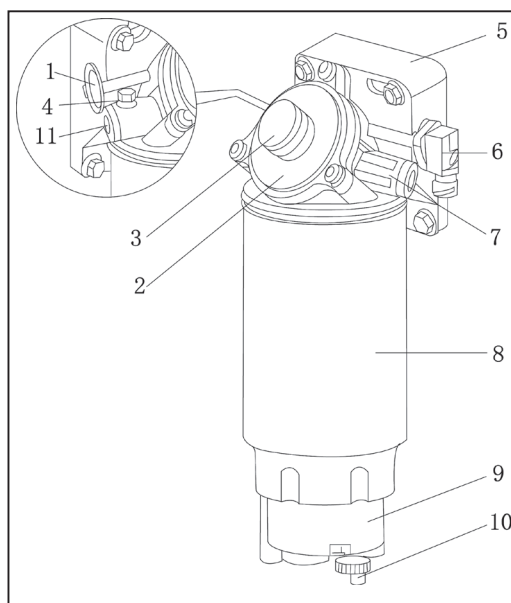
Fuel coarse filter assembly

柴油粗滤器功能

Function of fuel coarse filter

粗滤系统是安装在油箱油路的下游, 它会将流过它的水和微小颗粒从柴油中分离出来(利用它的多层介质构造)。分离出来的水会被收集到位于过滤器底部的集水器皿之中。然后通过放水塞流出。如果在粗滤器顶部安装了电加热器, 那么当油流过粗滤器的时候, 它将会被 350W 的加热器加热。

The coarse filter system is installed in the downstream of fuel tank line. It is used to separate the water and minor granules passing it from the fuel (with its multilayer medium structure). The separated water is collected in a water collector at the bottom of filter, and then flows out through drain plug. Provided an electric heater is installed on the top of coarse filter, the fuel, when passing the coarse filter, is heated by 350W heater.



柴油滤清器组件

Diesel fuel filter assembly

- 1.进油口 Fuel inlet 2.过滤器盖 Filter cap 3.手泵 Hand pump 4.放气螺丝 Deflating screw
5.安装用法兰 Flange for installation 6.加热器 Heater 7.出油口 Fuel outlet 8.旋压过滤器 Spinning filter
9.集水器 Water collector 10.排水螺丝 Drain screw 11.出油口 Fuel outlet

WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

注意：当更换旋压粗滤器或对输油管进行重装时，那么需要给粗滤器进行排气。

Caution: When replacing spinning coarse filter or re-installing fuel delivery pipe, deflate the coarse filter first.

粗滤器排气步骤：

Deflate the coarse filter in following steps:

1、停止发动机

Stop the engine.

2、卸下放气螺丝

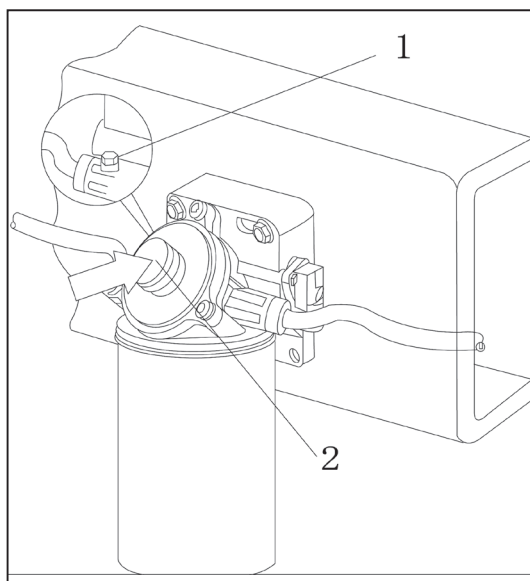
Remove the deflating screw.

3、使用手泵打气直到有油从放气螺丝中冒出

Pump with hand pump until there is fuel belching out from deflating screw.

4、重新上紧放气螺丝

Tighten deflating screw again.



粗滤器排气
Deflating of coarse filter

WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

注意：当集水器满了或旋压过滤器已经替换,则需要将收集到的水放出

Caution: When water collector is full or the spinning filter has been replaced, drain the collected water from the water collector.

集水器放水步骤:

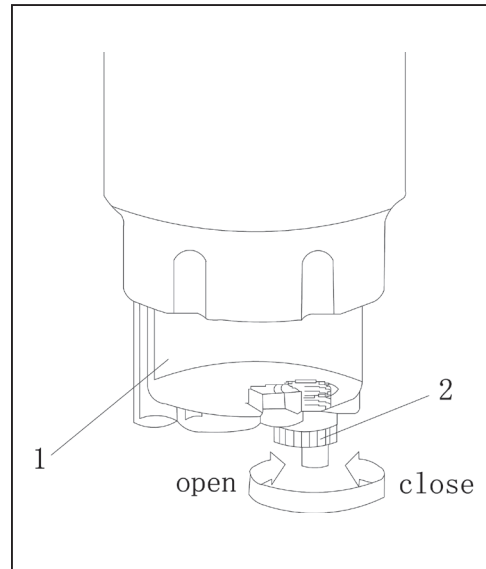
Drain water from water collector in the following steps:

1. 打开集水器 (1) 底部的放油塞 (2) 让水排净;

Open drain plug (1) at the bottom of water collector, (2) to drain off the water;

2. 重新上紧放油塞。

Tighten the drain plug again.



集水器放水
Water drain from water collector

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M18 22套筒扳手

Total nos.: 14 pcs M 1 8 bolts, Tool:

22mm sleeve wrench

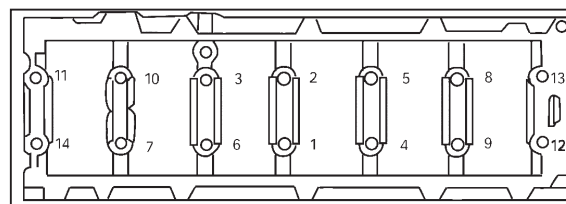
分两次拧紧(拧紧顺序按上图所示) 第一

次: $80\text{N} \cdot \text{m}$ 第二次: $250^{+25}\text{N} \cdot \text{m}$

Tighten bolts in twice(tightening sequence see the figure above)

The first time: $80\text{N} \cdot \text{m}$

The second time: $250^{+25}\text{N} \cdot \text{m}$



2. 气缸盖螺栓:

Cylinder Head Bolt:

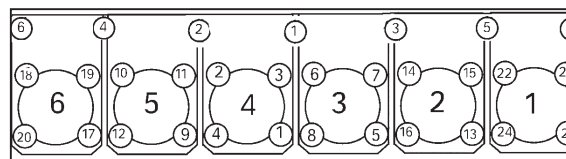
24根M16的主螺栓, 22套筒扳手

Total nos: 24 pcs M16 main bolts,

Tool: 22mm sleeve wrench

7根M12副螺栓的螺母, 17套筒扳手

Total nos: 7 pcs nuts of M 12 auxiliary bolt, Tool: 17mm sleeve wrench





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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 $30\text{N} \cdot \text{m}$ 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 $30\text{N} \cdot \text{m}$.

第二步：24 根主螺栓用 $200\text{N} \cdot \text{m}$ 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 $200\text{N} \cdot \text{m}$

第三步：7 根副螺栓螺母用 $100\text{N} \cdot \text{m}$ 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 $100\text{N} \cdot \text{m}$

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 $240\text{--}340\text{N} \cdot \text{m}$ 。

Step 6: Turn the main bolts 90° as the sequence in above figure again, and the torque range is $240\text{--}340\text{N} \cdot \text{m}$.

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 $120\text{--}160\text{N} \cdot \text{m}$ 。

Step 7: Turn the auxiliary bolts 90° as the sequence in above figure again. the torque range is $120 \sim 160\text{N} \cdot \text{m}$.

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.



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3. 连杆螺栓:

Connecting rod Bolt: Connecting rod Bolt:

两根M14x1.5 19mm套筒扳手

Total nos. : 2 pcs M14x1.5 for each connecting rod Tool: 19 mm 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·m.

第二步: 旋扭 $90^\circ \pm 5^\circ$, 扭矩须在170–250 N·m范围内

Step 2: Turn these bolts $90^\circ \pm 5^\circ$. 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 M14 × 1.5 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 $180^\circ \pm 5^\circ$, 扭矩同时达到230–280 N·m

Step 2: Turn these bolts $180^\circ \pm 5^\circ$, 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.



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5. 飞轮壳螺栓:

Bolt for Flywheel Housing

13根M12螺栓 套筒扳手

Total nos. : 13 pcs M12 bolts Tool: box wrench

第一步: 40N·m力矩拧紧

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

第二步: 分别旋转 $120^\circ \pm 5^\circ$, 同时达到110~140N·m

Step 2: Turn these bolts $120^\circ \pm 5^\circ$ 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 the 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.

达不到扭矩要求的螺栓应更换

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。

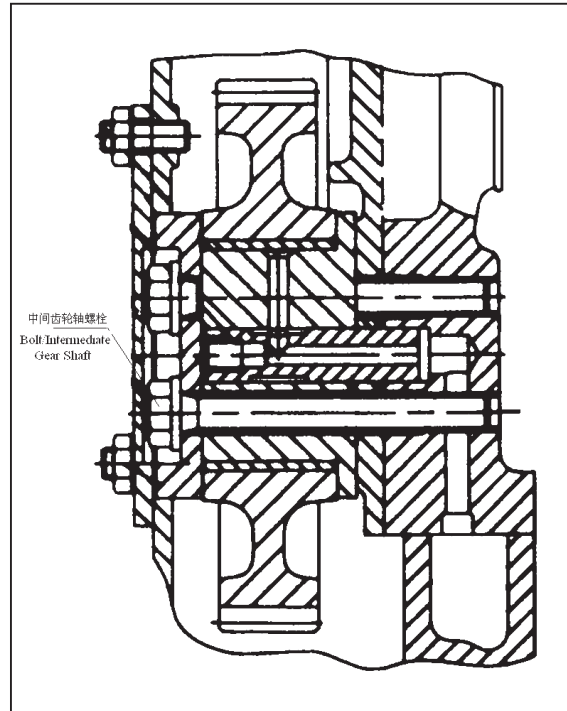
Smear the thread with LOCTITE 242 THREADLOCKER before tightening.

中间齿轮轴螺栓允许重复使用3次。

The bolt of intermediate gear shaft is allowed to be reused for three times.

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7. 机油泵惰轮轴螺栓：

Bolt/Oil Pump Idler Gear Shaft

M10 16mm套筒扳手

Total nos. : 1 piece M10 bolt

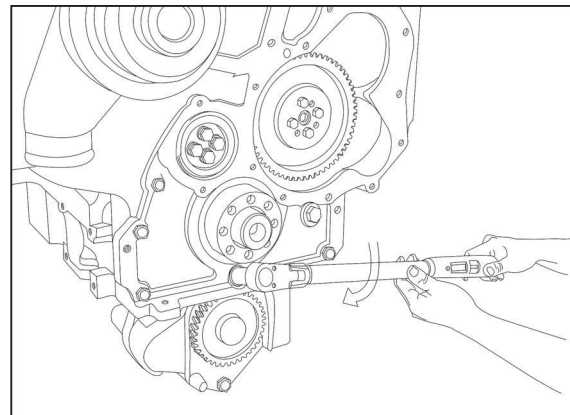
Tool: 16mm sleeve wrench

一次拧紧到 $60^{+5} \text{ N} \cdot \text{m}$

Tighten the bolt with a torque of $60^{+5} \text{ N} \cdot \text{m}$.

拧入前螺纹部位涂乐泰密封胶242。

Coat the thread with LOCTITE 242
THREADLOCKER before tightening.



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8. 摇臂座螺栓:

Bolt / Rocker-Arm Support

12根M12

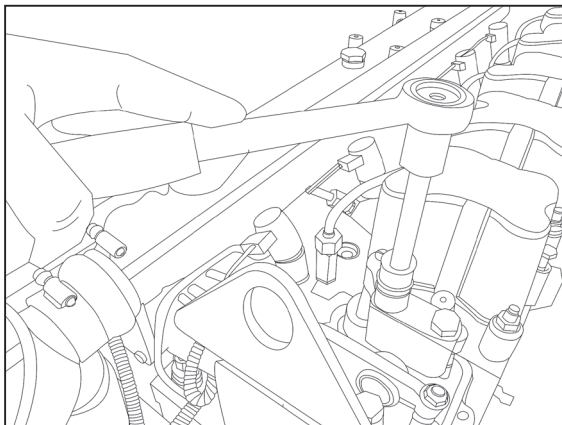
Total nos. : 12 pcs M12 bolts

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. 高压油管紧固螺母拧紧力矩 油器端20~25N·m, 轨端、油泵端 25~35N·m:

Tighten the high pressure pipe nuts to the torque of 20~25N·m for the injector side, and 25~35N·m for the rail end and fuel pump end.



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10. 共轨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

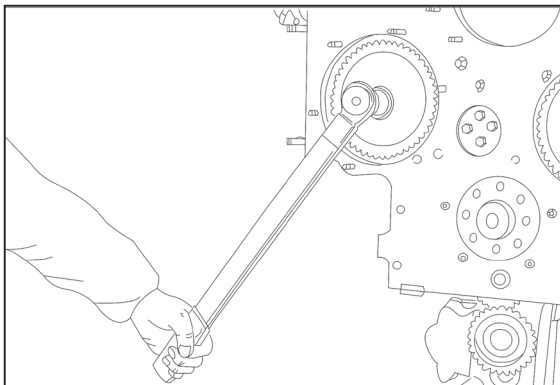
Tool: 36mm sleeve wrench

一次拧紧到300N·m

Tighten the nut with a torque of 300N·m.

拧入前螺纹部位涂乐泰密封胶 242。

Coat the thread with LOCTITE 242 THREADLOCKER before tightening.



11. 凸轮轴齿轮螺栓:

Bolts 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 bolts symmetrically with a torque of 35N·m.

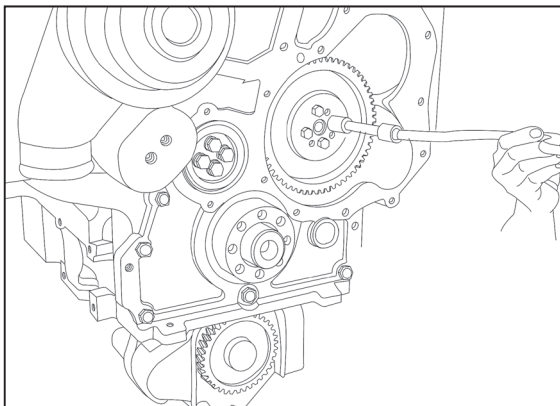
拧入前螺纹部位涂乐泰密封胶 242。

Coat the thread with

LOCTITE 242

THREADLOCKER

before tightening.



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12. 减振器皮带轮与曲轴连接螺栓:

Bolt / Attaching Damper

Pulley and Crankshaft

8 根 M10

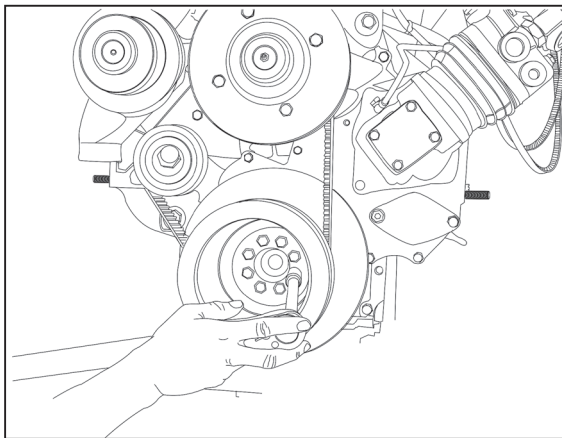
Total nos: 8 pcs M10 bolts

16mm 套筒扳手

Tool: 16mm sleeve wrench

对称拧紧到 $60^{+5} \text{N} \cdot \text{m}$

Tighten these bolts symmetrically
with a torque of $60^{+5} \text{N} \cdot \text{m}$.



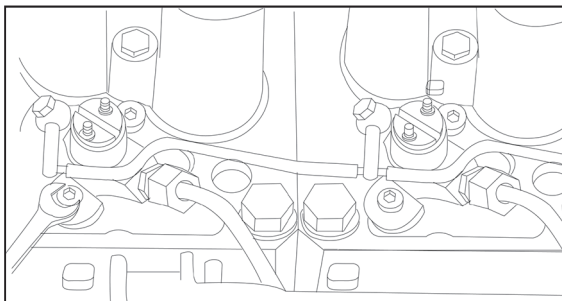
13. 喷油器紧固螺栓M8(2根):

对称拧紧并注意侧螺一致10-12

$\text{N} \cdot \text{m}$ injector bolts M8 (2 pieces):

Symmetrically tighten them to a torque of

10-12mm with same side clearance.



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14. 排气管螺栓:

Bolts/Exhaust manifold

12 根 M10

Total nos. : 12 pcs M 10 bolts

对称拧紧到 $(65 \sim 80)N \cdot m$

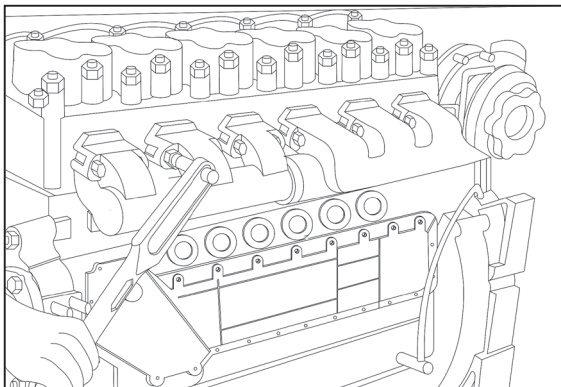
Tighten these bolts symmetrically
with a torque of $(65 \sim 80)N \cdot m$.

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 tightening.

排气管螺栓允许重复使用 2 次。

The exhaust pipe bolt is allowed to be
reused for twice.



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 -20°C ，选用 -20 号柴油；冬季温度低于 -30°C ，采用 -35 号柴油。

In winter, when the temperature is -20°C , you should use No.-20 Diesel Fuel. If the temperature is below -30°C , you should use No.-35 Diesel Fuel.

6.2 润滑油：

Lubricant:

6.2.1 选用 CF-4 级机油。

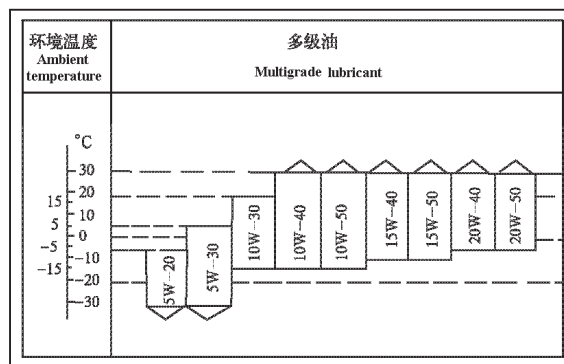
Select CF-4 oil.

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 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.





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6.2.4 油面处于油标尺上限位置时，机油容量约24升，油标尺上下刻度间的落差约3升；根据用户协议，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(防锈)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 24 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 litres. 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 the grease cup of the water pump with lithium grease that meets the requirements of GB/T5671.

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 the process of mounting and repairing.

6.5.2 细钨粉

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.



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WP10 系列柴油机所用的辅助材料表 Auxiliary Materials List of WP10 Series Diesel Engine

序号 Serial No.	名称 Name	颜色 Color	用途与应用 Function 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	二硫化钼油剂 Molybdenum disulfide Lube	深灰色 Dark Grey	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277 Loctite 277 glue	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	无色 Achromatic Color	水泵润滑脂 Grease for Water Pump

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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

Electric System

电气系统包括发电机、起动机、电子控制单元(ECU)、电加热法兰、水温表传感器(另有 Bosch 生产的水温传感器与 ECU 直接相连)、机油压力传感器、进气温度压力传感器(另有 Bosch 生产的机油压力表与 ECU 直接相连)、转速传感器及继电器等。

The electric system is composed of generator, starter, electronic control unit (ECU), water temperature gauge sensor (additionally a water temperature sensor produced by BOSCH is directly connected with EW), oil pressure sensor (additionally an oil pressure and temperature sensor produced by BOSCH is directly connected with EW), intake air temperature and pressure sensor, speed sensor, relay, etc.)

7.1 ECU

ECU

采用 BOSCH 的电子控制单元(图 7-1), 具有稳定的系统处理能力; 多层次的系统保护和纠错措施, 提高发动机的可靠性和安全性; 采用 CAN 和 K 总线可以实现与整车电控单元的自由通信, 更人性化地实现整车故障诊断和报警处理。

BOSCH ECU (Figure 7-1) has the stable system processing ability; and multi-layer system protecting and correcting measures, so as improve the reliability and safety of the engine. The CAN and K bus can communicate with the whole vehicle ECU freely, and realize the fault diagnosis and alarm treatment of the whole vehicle much more humanly.

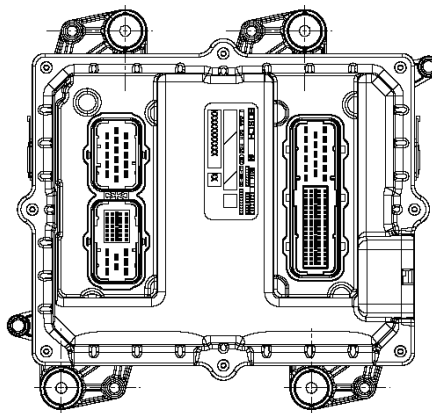


图7-1 ECU外形图
Fig 7-1 External view of ECU

7.2 发电机

Generator

WP10 系列柴油机的发电机额定电压为 28V，带有晶体管调节器。发电机在汽车上与蓄电池并联工作，工作时发电机自激磁。发电机电路图见图 7-2。

The generator of WP10 Series diesel engine is of 28V rated voltage and with transistor regulator. On the vehicle, the generator operates in parallel with battery and is self-excited during operation. The generator circuit diagram is as shown in Figure 7-2.

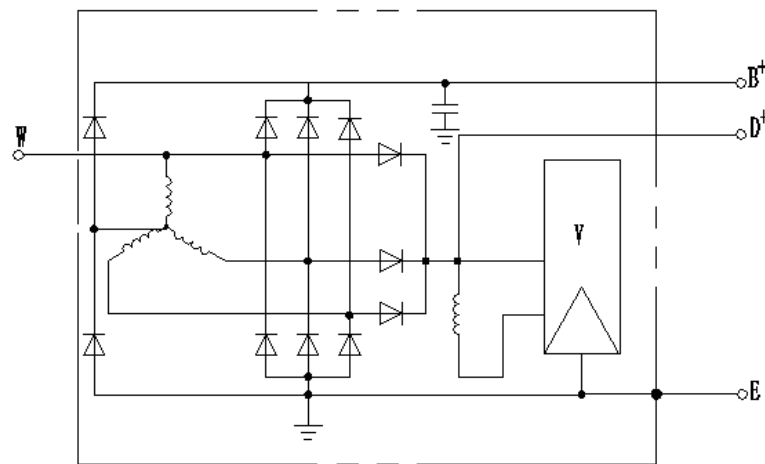


图7-2 发电机原理图

Fig 7-2 Schematic diagram of generator

发电机在安装、接线时要注意：

During generator installation and wiring, pay attention to:

◆必须充分冷却

Cool fully.

◆必须防尘、防溅、防油

Prevent dust, splashing and oil.

◆检查电机皮带的涨紧

Inspect the tension of generator belt.

◆只能与电压调节器和蓄电池连接运行

Operate only when connected with voltage regulator and battery.

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7.3 起动机

Starter

WP10 系列柴油机起动机为电磁控制、齿轮传动、以摩擦片式单向器传递扭矩的直流起动机，功率 5.4kW。起动机电路图见图 7-3。

The starter of WP10 Series diesel engine is a electromagnetically controlled, gear-driven, direct current starter, which transmits torque by friction plate type isolator. Its power is 5.4kW. The circuit diagram of starter is as shown in Figure 7-3.

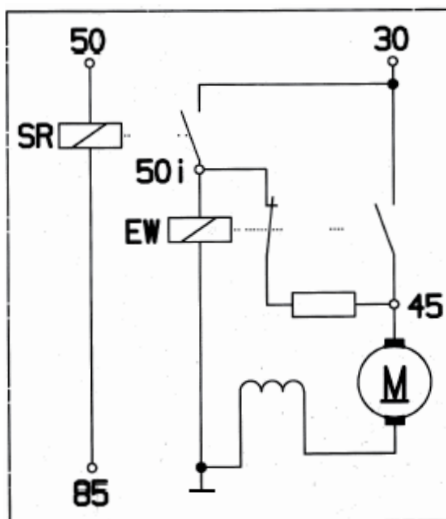


图7-3 起动机电路图
Fig 7-3 Circuit diagram of starter



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为了保证起动机无故障运行, 应注意:

In order to guarantee the fault-free operation of starter, pay attention to:

◆对喷溅水、道路泥浆、机油加以防护, 必要时装防护板

Protect it from splashing water, roadway mud and oil, and install baffle if necessary

◆防高温, 起动机壳体的许用温度不大于 100℃

Protect it from high temperature. The permissible temperature for starter housing is not more than 100℃

◆如果驾驶员监控不到起动过程(例如发动机安装在尾部的商用车), 为保护起动机和防止打齿, 必须安装起动继电器, 起动继电器电流容量应大于 80A, 在柴油机开始正常运转后立即切断起动机电路; 起动继电器的轴线应与地面平行, 且垂直于车辆运行方向, 以防由于振动和冲击等原因而使起动机意外啮合。

If the driver can not monitor the starting process (for example, for the commercial vehicle, whose starter is mounted at the afterbody), in order to protect the starter and avoid gear damage, mount a starting relay. The current capacity of starting relay shall be more than 80A. Once the diesel engine operates normally, cut off the circuit of starter immediately. The axis of starting relay shall be paralleled with the ground, and vertical to the driving direction of vehicle, in order to prevent starter from accident engagement due to vibration and shock.

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7.4 机油压力传感器

Oil pressure sensor

机油压力感应塞的工作温度为 $-25 \sim 100^{\circ}\text{C}$, 测量范围 $0 \sim 500\text{kPa}$, 报警压力为 $45 \sim 75\text{kPa}$ (当压力降低时触点闭合), 报警器通断功率最大 5W , 额定电压 $6 \sim 24\text{V}$, 感应塞的接口尺寸见图7-4。

For oil pressure sensing plug, the working temperature of is $-25\sim 100^{\circ}\text{C}$; the measuring range $0\sim 550\text{kPa}$; the alarm pressure $25\sim 40\text{kPa}$ (contact is closed when the pressure decreases); max. switching power for alarm device 5W ; and the rated voltage $6\sim 24\text{V}$. The interface dimension of sensing plug is as shown in Figure 7-4.

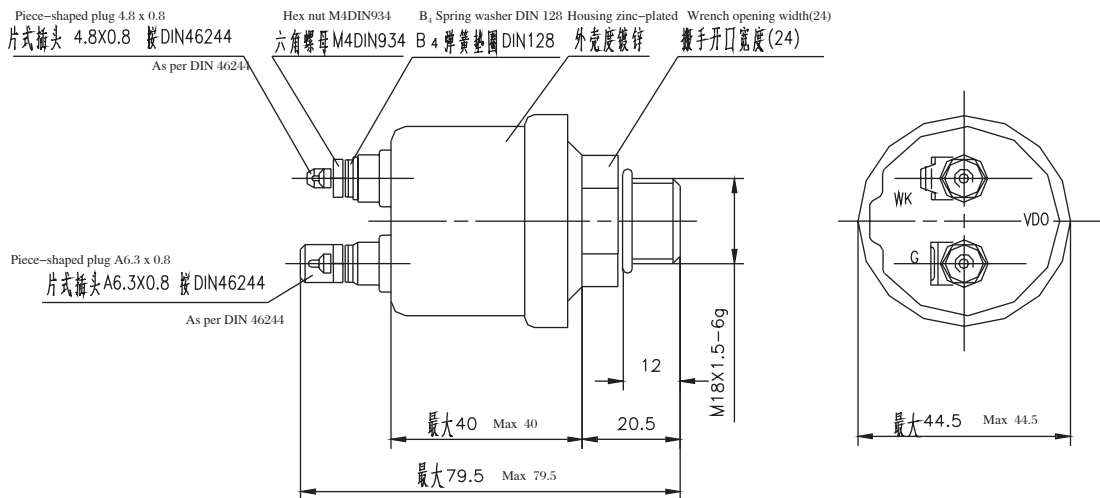


图7-4 机油压力感应塞接口图

Fig 7-4 Interface graph of oil pressure sensing plug

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7.5 水温表传感器

Water temperature sensor

水温表传感器的工作温度为 $-25 \sim 120^{\circ}\text{C}$ ，分为普通和带报警两种结构，带报警的传感器报警温度 $96 \pm 3^{\circ}\text{C}$ 。水温表传感器允许外力扭矩 $19.6\text{N} \cdot \text{m}$ ，额定电压 $6 \sim 24\text{V}$ ，水温表传感器的接口尺寸见图 7-5。

The water temperature sensor operates at temperature of $-25 \sim 120^{\circ}\text{C}$, and is constructed in two styles, ordinary and alarm. The alarm temperature of the alarm sensor is $96 \pm 3^{\circ}\text{C}$. The permitted external force torque of water temperature sensor is $19.6\text{N} \cdot \text{m}$, and its rated voltage is $6 \sim 24\text{V}$. The interface dimension of water temperature sensor is as shown in Figure 7-5.

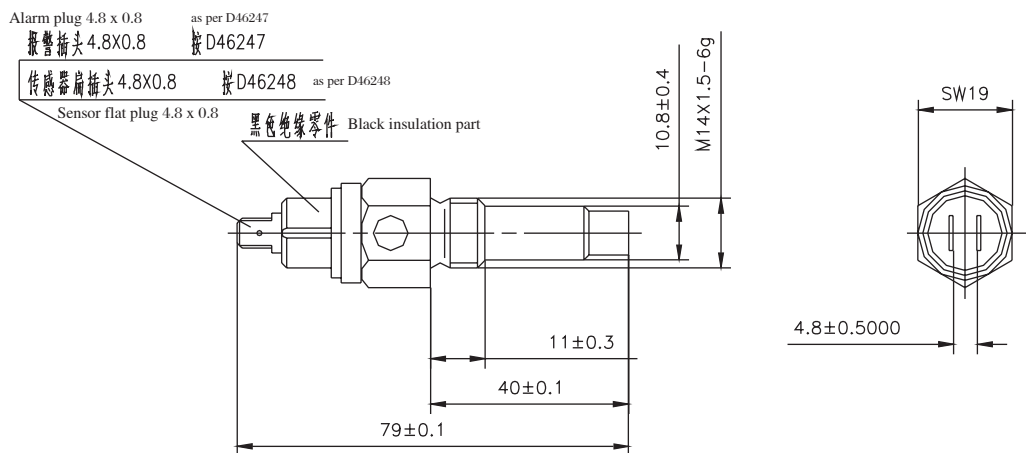


图7-5水温表传感器接口图

Fig 7-5 Interface graph of water temperature sensor

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

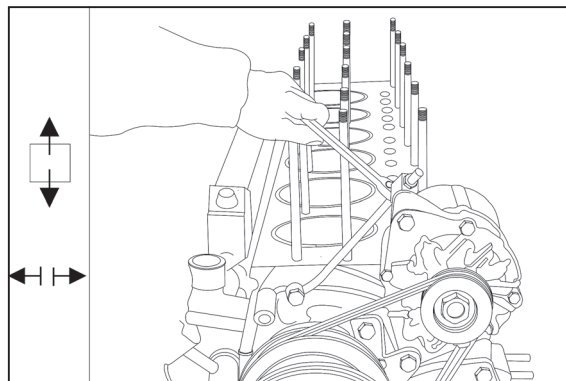
Replace the V-belts

16mm 开口扳手

Tool: 16mm open-ended wrench

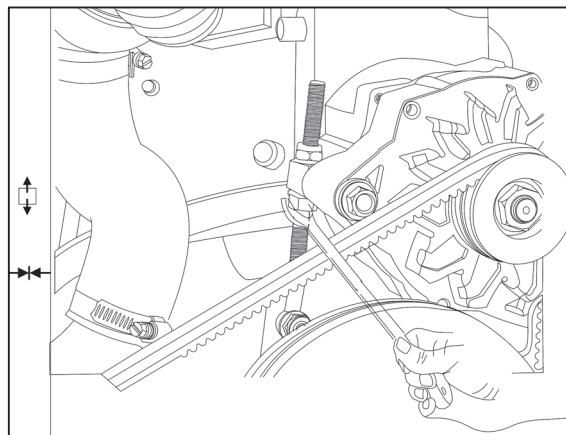
松开发电机拉紧螺栓螺母，拿下发
电机皮带。

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



换上三角皮带，涨紧合适后重新拉
紧螺栓螺母。

Replace the V-belts, tighten the nuts
of tension bolts again.



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更换水泵

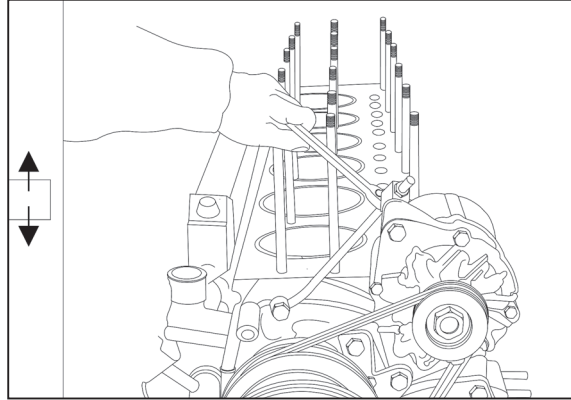
Replace Water Pump

16mm 开口扳手

Tool: 16mm open-ended wrench

松开发电机拉紧螺栓。

Loosen the tightening bolts of generator .

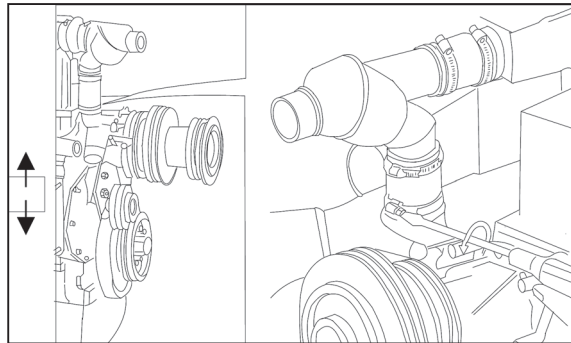


6# 螺丝刀

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.



WP10系列柴油机维修保养手册

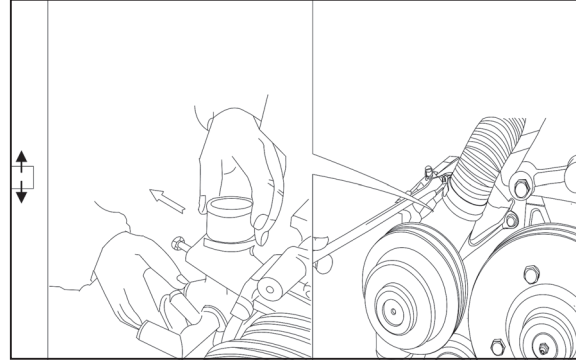
Maintenance Manual for WP10 series Diesel Engine

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.

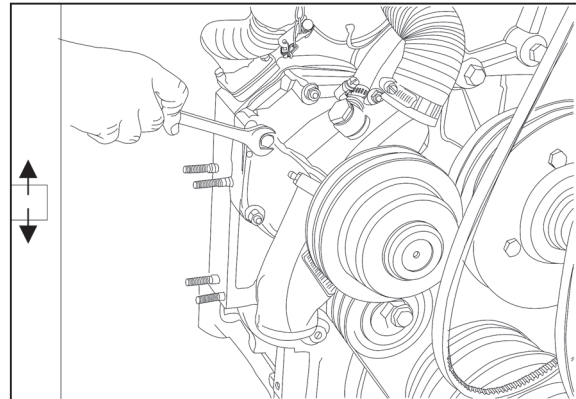


13mm 开口扳手

Tool: 13mm open-ended wrench

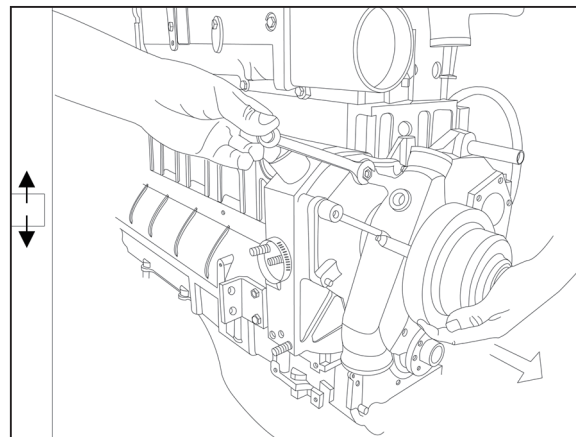
拆下水泵与齿轮室连接的 6 个六角螺母。

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



拆下水泵。

Remove water pump.



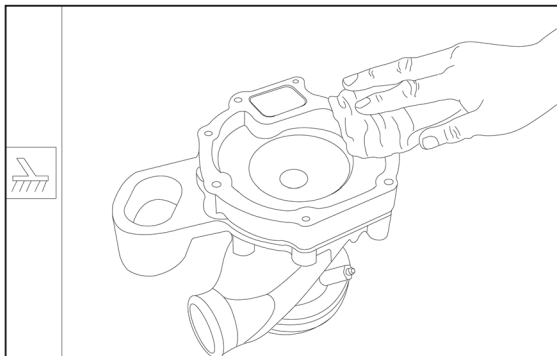
WP10系列柴油机维修保养手册

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擦净水泵密封平面。

Clean the seal surface of water pump.



13mm 开口扳手

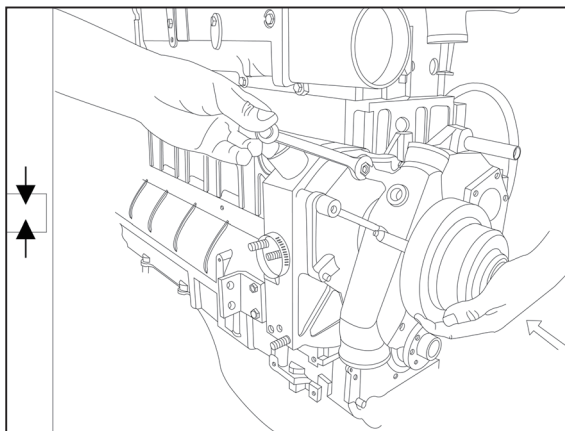
Tool: 13 mm open-ended wrench

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 120cm³ 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 120cm³ general lithium grease. Refill lithium grease with grease cup periodically.



WP10系列柴油机维修保养手册

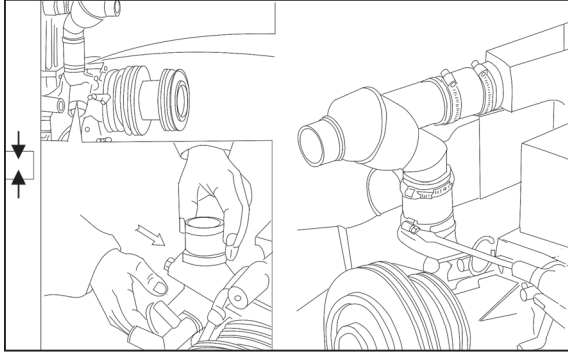
Maintenance Manual for WP10 series Diesel Engine

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.

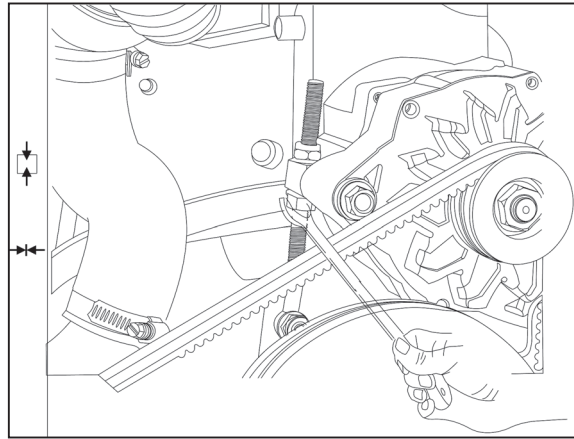


16mm 开口扳手，铁棒

Tool: 16mm open-ended wrench and
pontil

安装三角皮带，调好涨紧度拧紧发
电机拉紧螺栓。

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



WP10系列柴油机维修保养手册

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8.2 润滑系统

Lubricating System

更换机油冷却器芯

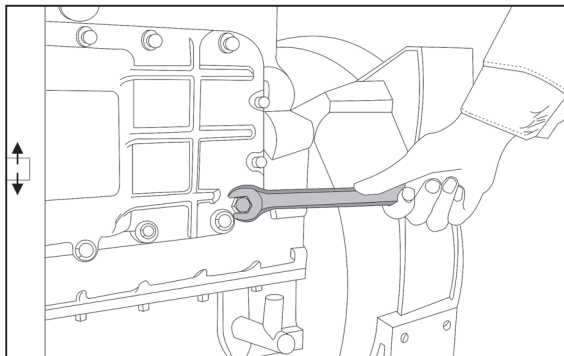
Replace the oil cooler core

13mm 套筒扳手

Tool: 13mm sleeve wrench

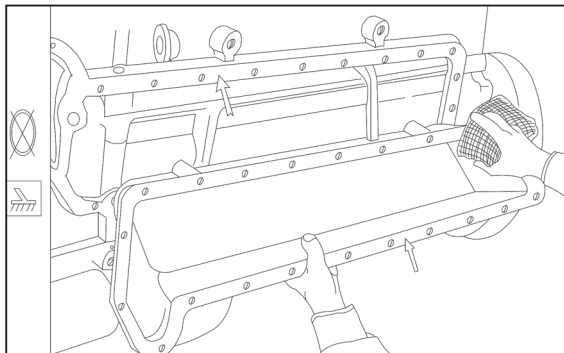
松开机油冷却器盖上一圈 M8 螺栓，并拆下机油冷却器盖。(拆卸前要放掉发动机内的冷却液)

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



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



WP10系列柴油机维修保养手册

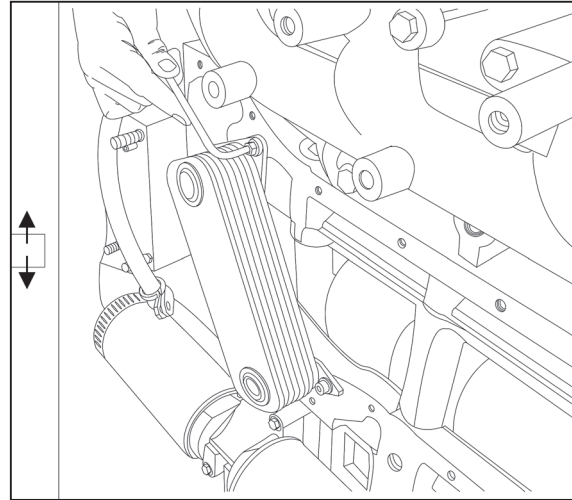
Maintenance Manual for WP10 series Diesel Engine

13mm 套筒扳手

Tool: 13mm sleeve wrench

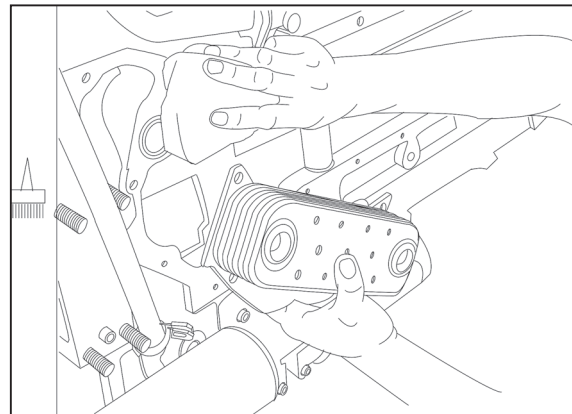
松开机油冷却器芯 4 根 M8 螺栓。

Loosen the 4 pcs 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.

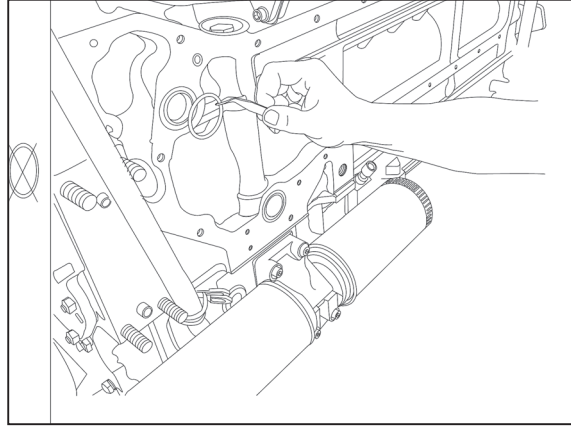


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更换机油冷却器芯密封垫圈。

Replace the sealing gasket of oil cooler flange.



13mm 套筒扳手

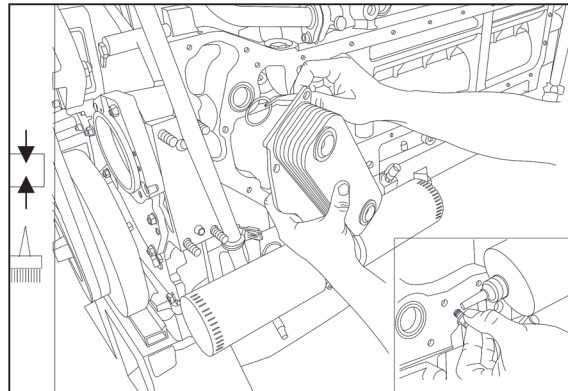
Tool: 13mm sleeve wrench

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.



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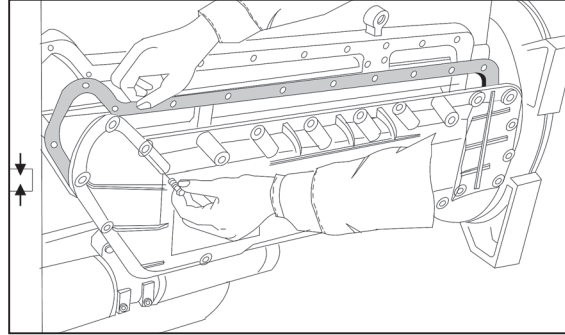
Maintenance Manual for WP10 series Diesel Engine

3mm 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

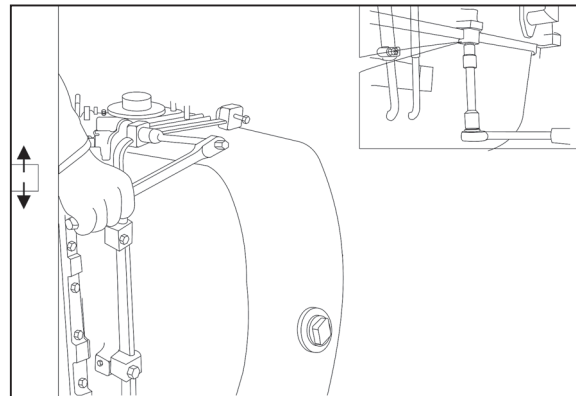
Replace the release valve of main oil channel

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.

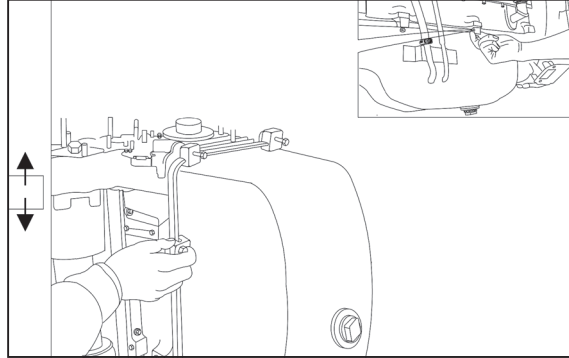


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拆下油底壳托块,并拿下油底壳。

Remove retainer, then remove oil pan.



27mm 开口扳手

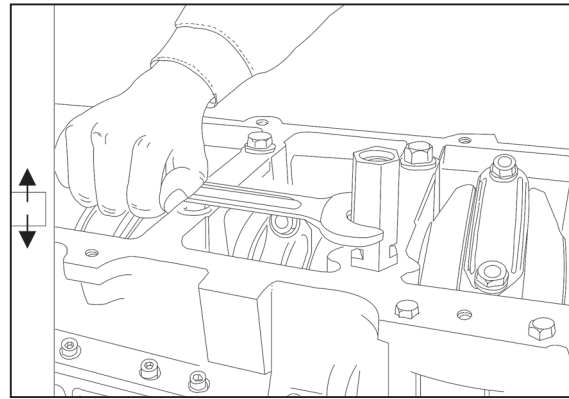
Tool: 27mm open-ended wrench

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.



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27mm 开口扳手

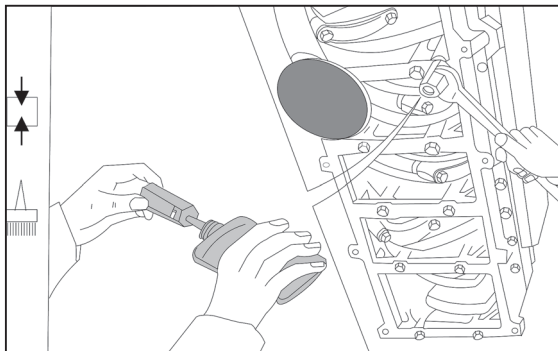
Tool: 27mm open-ended wrench

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

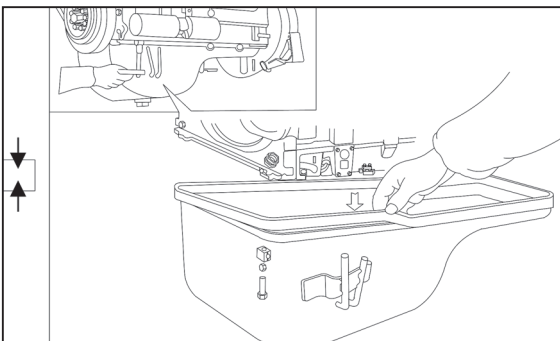
Tool: 13mm open-ended wrench

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.



WP10系列柴油机维修保养手册

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更换机油泵

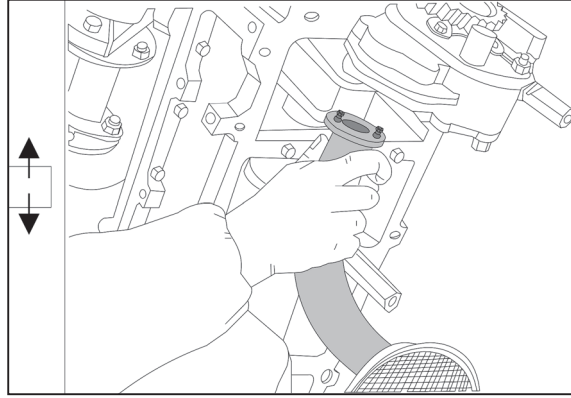
Replace Oil Pump

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。

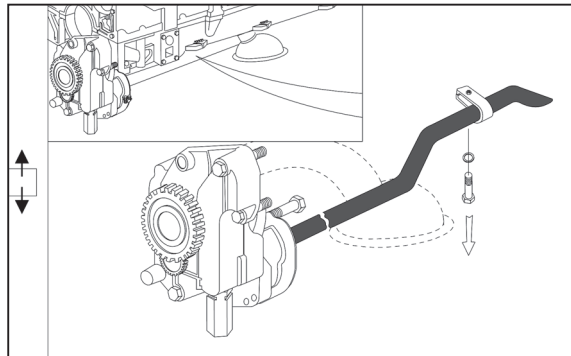


10mm 开口扳手

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).



WP10系列柴油机维修保养手册

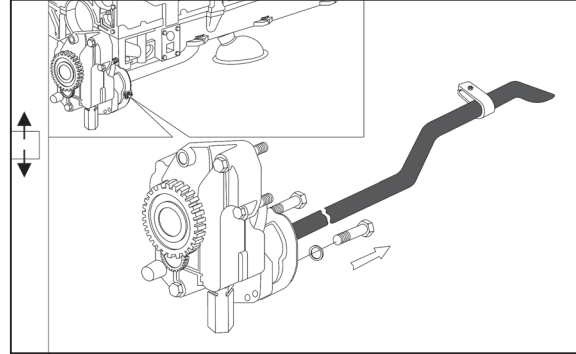
Maintenance Manual for WP10 series Diesel Engine

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.

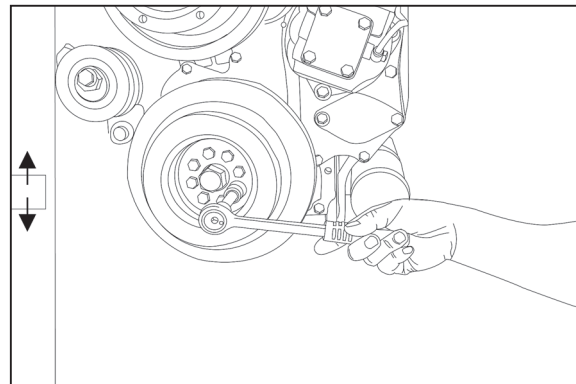


16mm 开口扳手, 16mm 套筒扳手

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.



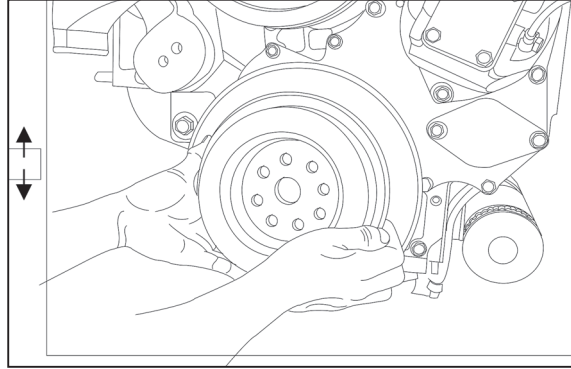
WP10系列柴油机维修保养手册

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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.

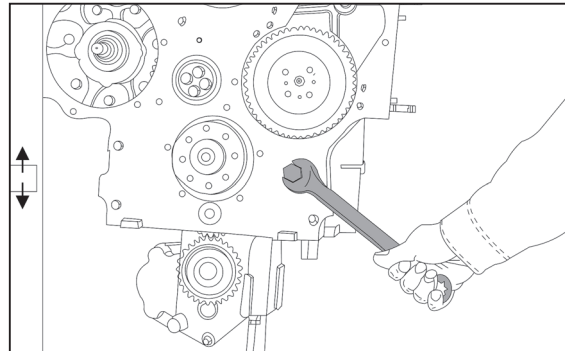


22mm 开口扳手

Tool: 22mm open-ended wrench

拆下齿轮室处六角螺塞。

Remove the hex head plug screws of gear case.



WP10系列柴油机维修保养手册

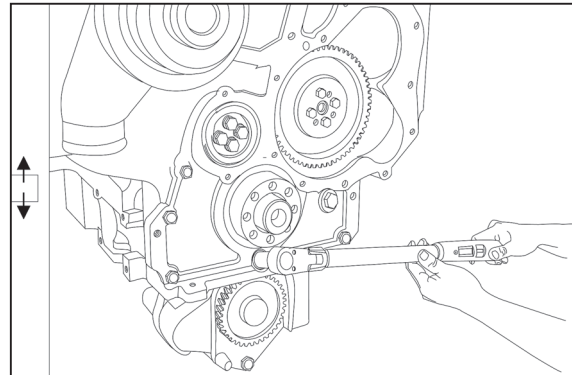
Maintenance Manual for WP10 series Diesel Engine

16mm 套筒扳手

Tool: 16mm sleeve wrench

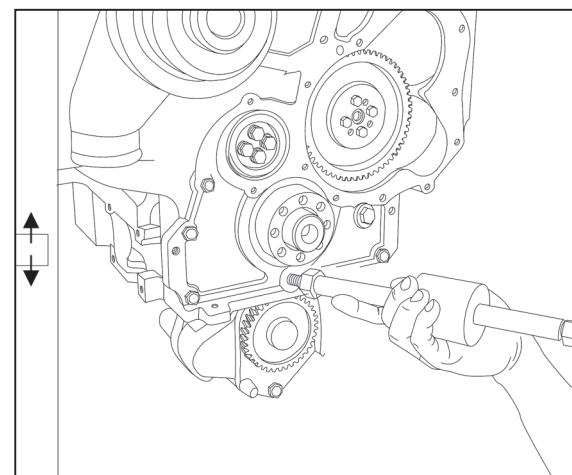
拆下机油泵中间齿轮轴螺栓。

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.

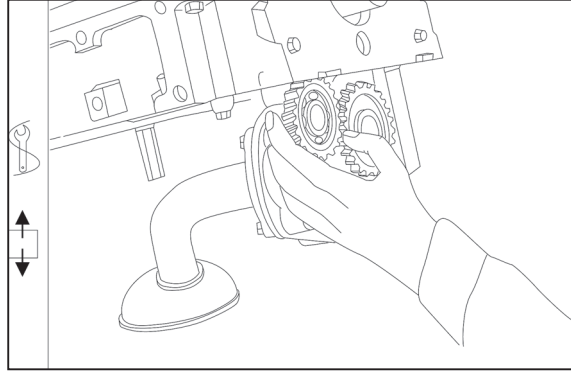


WP10系列柴油机维修保养手册

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拆下机油泵中间齿轮。

Remove intermediate gear of oil pump.

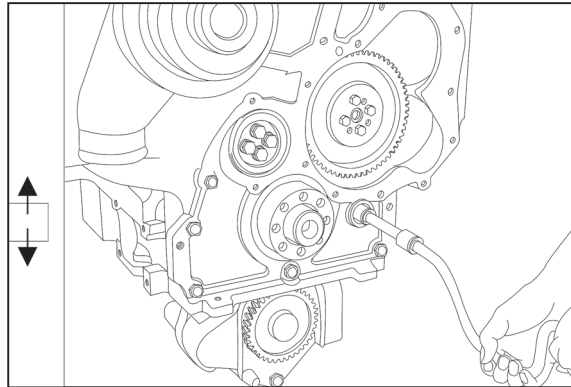


16mm 套筒扳手

Tool: 16mm sleeve wrench

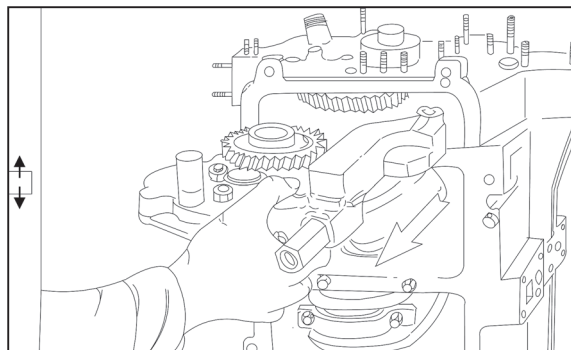
拆下六角螺塞处六角头螺栓和另外一个六角头螺栓。

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



拆下机油泵。

Remove oil pump.

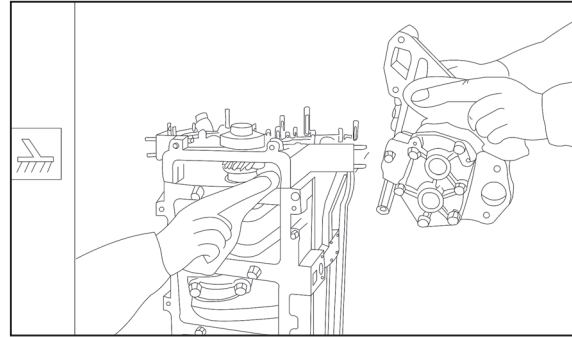


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清理曲轴箱与机油泵结合面处。

Clean the seal Surface between
crankcase and oil pump.

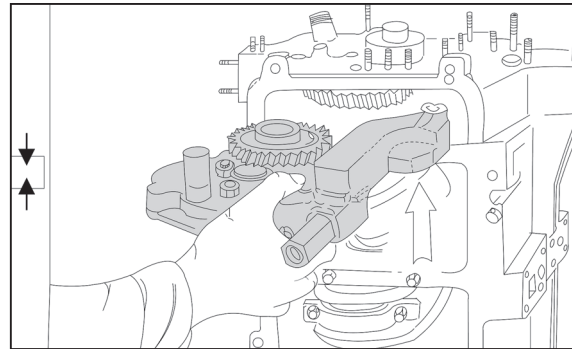


16mm 套筒扳手

Tool:16mm sleeve wrench

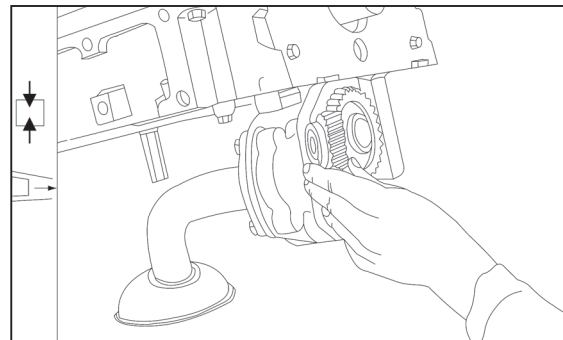
安装新的机油泵和机油泵垫片, 并
拧紧六角螺栓 (一个在六角螺塞处)。

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).

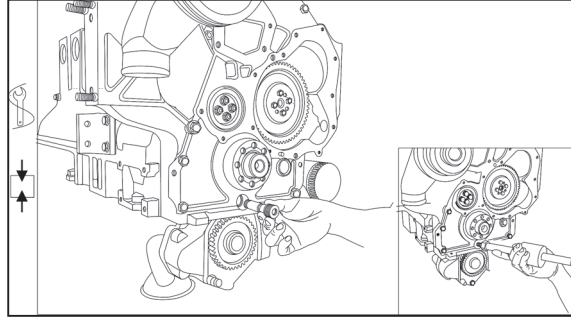


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安装机油泵中间齿轮轴。

Install intermediate gear shaft of oil pump.



16mm 套筒扳手

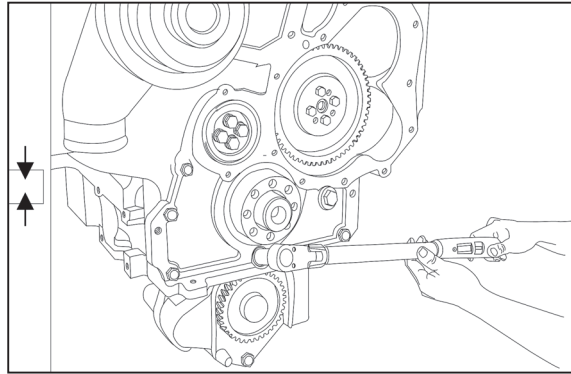
Tool: 16mm sleeve wrench

安装中间齿轮轴螺栓，并拧紧。

Install the bolts of intermediate gear shaft and tighten them.

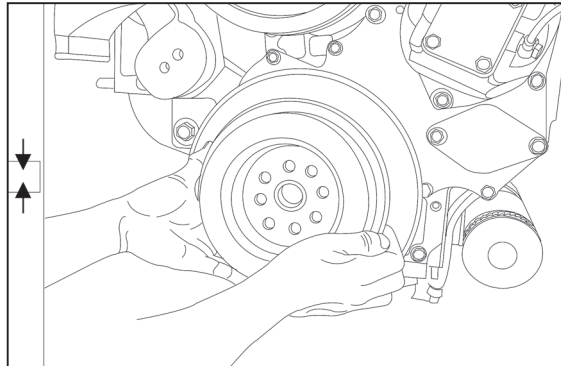
拧紧力矩: $60^{+5} \text{N} \cdot \text{m}$

Tightening torque: $60^{+5} \text{N} \cdot \text{m}$



安装减振器和皮带轮。

Install damper and pulley.



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16mm 套筒扳手

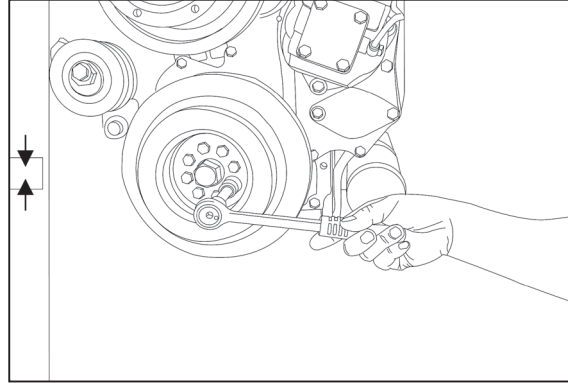
Tool: 16mm sleeve wrench

安装皮带轮螺栓，并拧紧。

Install the bolts of pulley and tighten them.

拧紧力矩: $60^{+5} \text{N} \cdot \text{m}$

Tightening torque: $60^{+5} \text{N} \cdot \text{m}$

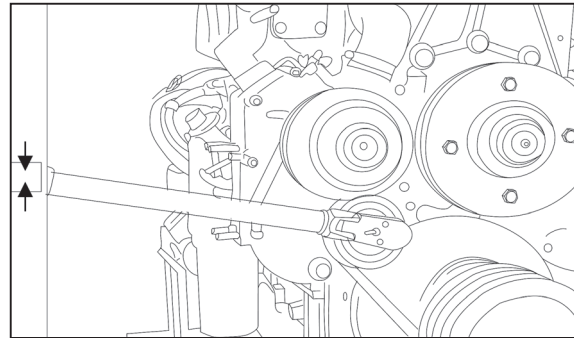


16mm 开口扳手

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.



WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

更换喷油器

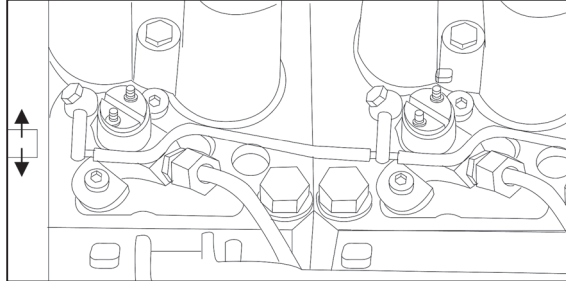
Replace injector

17mm 开口扳手

Tool: 17mm open-ended wrench

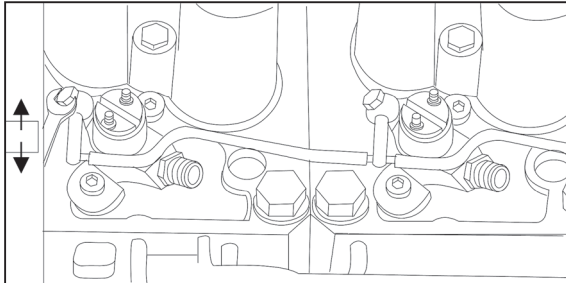
清理喷油器四周并拆下高压油管与
喷油器连接接头。

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.



WP10系列柴油机维修保养手册

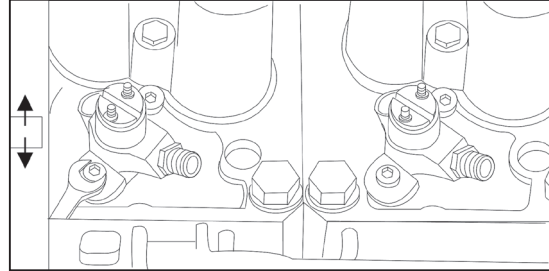
Maintenance Manual for WP10 series Diesel Engine

13mm 开口扳手

Tool: 13mm open-ended wrench

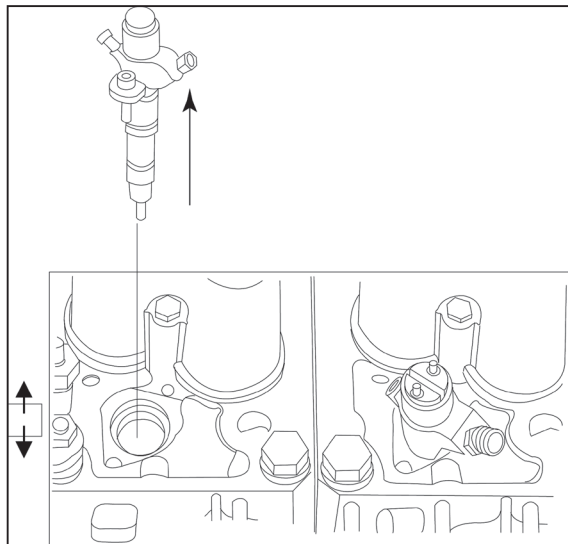
松开紧固压板螺栓，拿下喷油器压紧块和喷油器垫块。

Loosen bolts of mounting plate and then remove injector mounting blocks and padding blocks.



拆下喷油器。

Remove injectors.



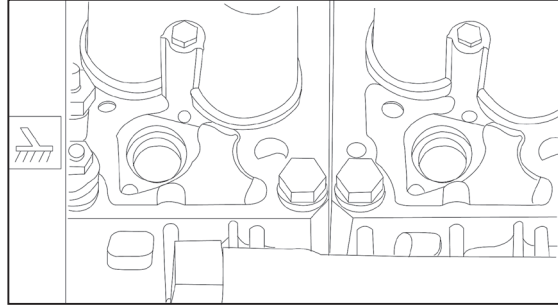
WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine



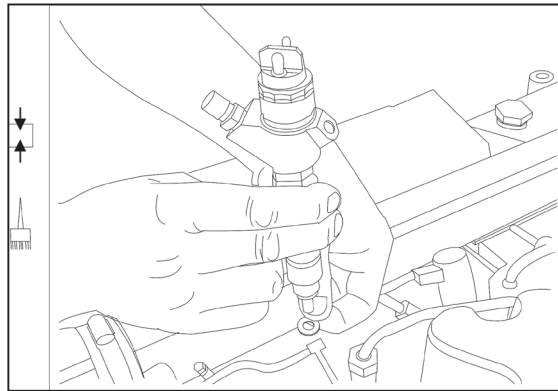
清洁喷油器座孔。

Clean seat hole of injector.



更换新的铜质密封垫圈。

Replace with new copper washer.

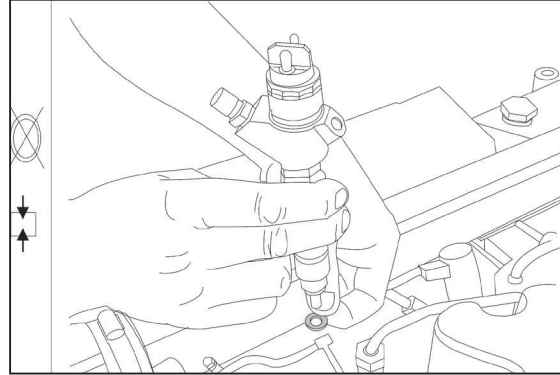


WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

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.

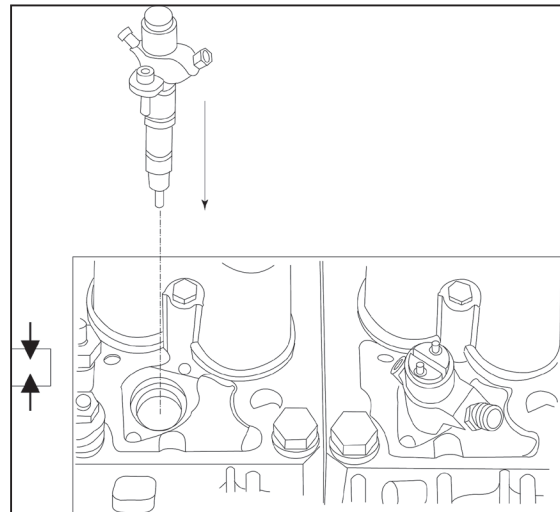


将新的喷油器装入喷油器座孔。

Install new injector into the seat hole.

注意：装好喷油器后胶圈不得有挤压现象。

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

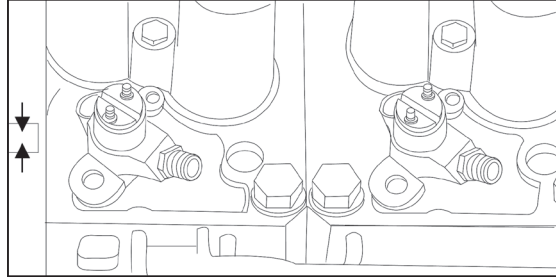


WP10系列柴油机维修保养手册

Maintenance Manual for WP10 series Diesel Engine

安装喷油器固定板。

Install the mounting plate of injector.

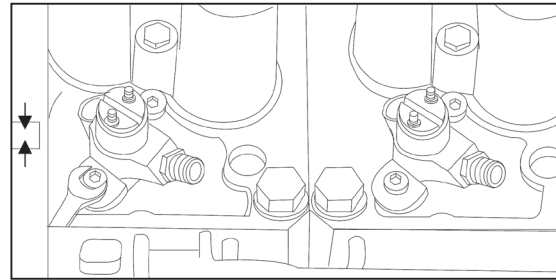


安装喷油器。

Install bolts.

紧固螺栓对称拧紧并注意侧隙一致，拧紧力矩 $10 \sim 12\text{N} \cdot \text{m}$ 。

Install fuel injector bolts and tighten them symmetrically. Pay attention to the uniformity of the side clearance. Tightening torque: $10 \sim 12\text{N} \cdot \text{m}$.



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.

