

Foreword

Thank you for choosing JAC. We are pleased to welcome you to the growing number of different people who drive JAC. The advanced engineering and high-quality construction of each JAC we build is something of which we are proud.

This Owner's Manual will introduce you the features and operation of your new vehicle. It is suggested that you read it carefully since the information it contains can contribute greatly to the satisfaction you receive from your new vehicle.

The manufacturer also recommends that all service and maintenance on your vehicle be performed by an authorized JAC dealer. JAC dealers are prepared to provide high-quality service, maintenance and any other assistance may be required.

ANHUI JIANGHUAI AUTOMOBILE CO., LTD.

May, 2008

All information in this Owner's manual is current at the time of publication. However JAC reserves the right to make changes at any time so that our police of continual product improvement may be carried out.

This manual applies to all current JAC models equipped with HFC1020 series engine explanation of option as well as standard equipment. As a result, you may find material in this manual that does not apply to your specific vehicle.

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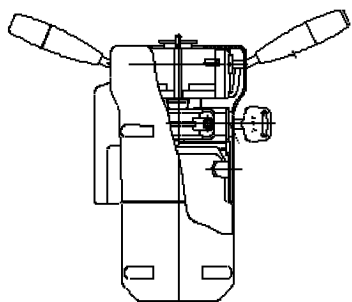
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Use of vehicle

Use of instruments and apparatuses in the cab

Integrated switch and instrument cluster

Integrated switch (figure below) which is composed of steering shaft lock seat ignition start lock and combination switch lies underneath the steering wheel.

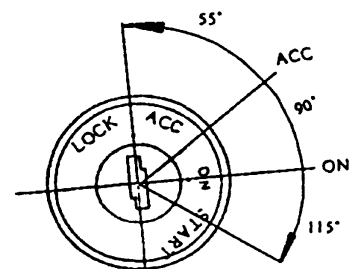


schematic diagram of integrated switch

Ignition switch

Ignition switch is on the right side of integrated switch. It has four functions: LOCK, ACC, ON, START. When the key is on the 'LOCK' position, the ignition switch has been connected to the power source and the lock-up of steering gear has been disengaged. Turn the key to 'ACC' position clockwise, the circuit of accessories like radio and tape player can be connected. Turn to the 'ON' position, and the instrument circuit is connected. If keep on turning until to the 'START' position, the engine can be started. You should unlash the handle of the key immediately after the engine started. And the key can return to the 'ON' position by the ac-

tion of spring. The schematic diagram of ignition switch is as follows.



schematic diagram of ignition switch
Combination switch (left control handle)

Combination switch is under the control of the multifunction handle, which lies in the lower left and inferior place of the steering wheel. It can control small light, headlight, headlight dimmer and turning to the left or

the right by two different movement modes. The symbol and function of the combination switch is as follows:



left control handle

1. The OFF symbol indicates that small light and headlight do not light. (But at this time the high beam can light if you put up the handle.)
2. The  symbol is the indication of small light. Turn the control handle clockwise by 30°, and the front, rear small lights and the instrument light can light.
3. The  symbol is the indication of headlight. Keep on the turning of the left control handle clockwise

by 30°, the front headlight, the rear small light and the instrument light can light.

4. The  symbol is the indication of steering. Forward and backward motion of the control handle can operate the left and right turning lamp and the turn light indicator in the instrument panel. Push the control handle forward in the horizontal direction, the right turning lamp lights and there has the indication of turning right in the instrument panel. On the other hand, pull the control handle backward, the left turning lamp lights and there has the indication of turning left in the instrument panel. If the control handle is in the middle position, then there has no indication

of turning.

5. Dimmer of headlight: Lift the left control handle upwards gently and do the 'uplift-looseness' motion, it can control the dimmer function of the headlight. Uplift the handle once, high beam headlamp lights; loose the handle, it goes out. Repeating the above action can control the work status of the high beam headlamp to obtain the purpose of dimmer function when overtaking or passing in night.

Combination switch (right control handle)



right control handle

1. The  symbol is indication of the scrubber. When the washer control button on the top of the control handle pressed, the cleaning mixture (using antifreeze fluid in winter) in the window washer which lies in the right doorframe and underneath instrument panel can be spouted to the windshield glass through the spout under the window.

2. The  symbol is indication of the wiper. Turning the control handle clockwise in the horizontal direction can control the wiper. Turn the control handle clockwise by 12° to the 'LO' position, then the wiper works with low speed. Keep the turning clockwise for another 12°, the wiper can work with high speed. When the

control handle is on the original position, it can be disconnected or returned automatically.

3. The  symbol is indication of exhaust throttle assistant braking. Lift the right control handle upwards and do the 'uplift-looseness' motion. Uplift the handle, then the switch can be connected and the indicator lamp in the instrument panel lights. This shows that exhaust throttle assistant braking works. If the accelerator pedal or the clutch pedal was stepped, the exhaust assistant braking should cancelled automatically and the indicator lamp in the instrument panel went out.

Other electric appliance switch (seen in the left and below figure)

Other electric appliance switches mainly include horn button, danger warning switch, fog lamp switch, courtesy lamp switch and ceiling light switch.



other electric appliance switch



danger alarm and fog lamp switch

1. The horn button is in the center of steering wheel, when the button is depressed it can hoot.

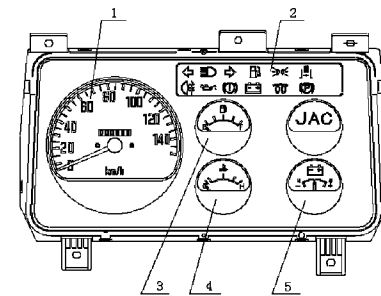
2. The  symbol (the right and above figure) is the indication of danger warning switch. If the button is depressed, the front, rear, left, right turning lamp flash at the same time and send out emergency signal for alarm indication. Press the button again, reset signal of the switch disconnected.

3. The  symbol (the right and above figure) is the indication of the fog lamp. If pressed, the fog lamp lights. If pressed again, the switch resets.

4. Ceiling light signal indicates whether that the door of the vehicle is shut

closely or not. When there is one door open or is not shut closely, the ceiling lamp lights to remind driver.

Instrument cluster



- 1, speedometer
- 2, indicator lamp
- 3, fuel gauge
- 4, water temperature gauge
- 5, ammeter

instrument cluster

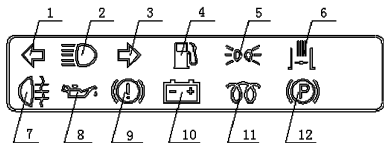
Instrument cluster (figure on the page above):

1. Speedometer indicates the instantaneous running speed. The maximum value is 140 km/h. The figure wheel is used for recording the accumulative running mileage of vehicles. The maximum value is 999999 kilometers. When the mileage exceeds the value the figure wheel can return to 000000 and restart to recording the mileage.

2. Fuel gauge indicates the quantity of fuel in the fuel tank. Fuel gauge for vehicles is pointer type which has a feature that the position indicated by fuel gauge is the actual position of the remained quantity in the fuel tank no matter the ignition switch is on the opening status (ON) or on the closing status (LOCK).

3. Water temperature gauge indicates the temperature of engine cooling water.

4. Ammeter is the indication of the charging and the discharging current. Positive value shows that generator is charging the battery, and negative value shows that the battery is discharging.



- 1, turn left; 2, high beam; 3, turn right
4, fuel alarm; 5, side lamp
6, exhaust assistant brake
7, fog lamp; 8, oil pressure alarm
9, braking fault; 10, charging
11, preheat; 12, parking brake

indicators

Indicators (figure in the above page):

1. Turn indicator lamp (↔): when the turning control handle is on the left (right) turning position, left (right) turning indicator lamp flashes. If the warning switch is pressed, the left and right turning indicator lamps flash at the same time.

2. High beam indicator lamp (≡D): indicates that whether the headlamp is in the status of high beam or not. When the headlamp is on the high beam status, the indicator lamp lights.

3. Fuel warning lamp (⛽): fuel level alarm, when fuel is in shortage, fuel alarm lamp lights.

4. Side lamp indicator lamp (☞☞): indicates whether the side lamp is in the work status. When side lamp

lights, the indicator lamp lights.

5. Exhaust assistant brake indicator lamp (🛑): when exhaust assistant braking operates, the indicator lamp lights. When exhaust assistant brake is disconnected, the indicator lamp goes out.

6. Fog lamp indicator lamp (🌫️): when fog lamp switch is depressed, the indicator lights. Contrarily, the indicator lamp goes out.

7. Oil pressure indicator lamp (🛢️): indicates low - pressure warning of engine oil pressure. When oil pressure is lower than $7.84 \times 10^4 \text{ Pa}$, the oil pressure indicator lamp lights. When oil pressure is higher than the value, the oil pressure indicator lamp goes out.

8. Generator indicator lamp (🔋): indicates the work status of generator. When the battery is on the discharging status, the indicator lamp will light. When the battery is on the charging status and generator is power supply, the indicator lamp goes out.

9. Braking fault indicator lamp (⚠️): when braking fluid is not enough, the indicator lamp lights.

10. Parking brake indicator lamp (🅑): when pull up the parking brake handle, the indicator lamp lights.

Use of components in the cab

Brief description of the structure

The driver cab is forward control cab with full metal enclosed construction. Window glass adopts panoramic camber windshield. In order to improve the comfort, side panel with larger upside width and raised-roof cab have been adopted. Therefore the interior space of the cab can be more commodious and comfortable. Effective measures have taken in reduce noise, heat insulation, sound insulation and sealing. For instances, the section of roof forehead is enclosed and strengthening rib is equipped on the roof. There have three aluminum platinum heat insulating mattress on the upside of the engine. Sealing of the door is double skin construction. At the aspect of

safety, softening has done to the main parts, which can appear knocking easily with passengers.

Door

1. The cab door, which has three - step opening, can improve the convenience for passengers getting on or off. The opening angle of the door can be 30° , 57° and 90° . The former two angles are partially open and the last angle is full open. On all the three positions, the door can be in stable condition.

2. Outside door handle

Pull out the outside door handle, and then the door can be opened. Insert the starting switch key into the door lock and rotary, the door can be locked.



three-step opening door



lock button

3. The door can be locked outside without the key. First press down the lock button (figure in the above page) at the inner side of the door to

the fixed position, then pull the outside door handle outwards and at the same time close the door.

4. Pull out the inside door handle, and the door can be open. After closing the door, the door can be locked if the lock button is pressed down.

Cab seat

Cab seat can be classified as driver seat, assistant driver seat and rear row seat. Driver back seat adopts upright seat. The angle of backrest and the fore-and-aft position of seat can be adjusted. The maximum adjustable angle of the backrest is 56°. The maximum adjustable distance of the seat is 160 mm. The seat adjust system is shown in the right figure.

seat adjuster system



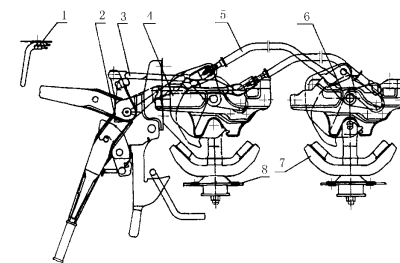
seat adjuster system

When vehicle is in the progress of maintenance, please clean the track assembly of the driver seat, recoat the lithium base grease, and tighten all joint nuts again. If find that the cab track slide seat is shaking or block because of the distortion, it should be repaired or replaced with components.

High quality safety belts have been equipped to the seat in this series truck, please tie the belt without fail

when you are driving or riding the vehicle.

Cab tilt lock mechanism



- 1, handle; 2, tilt locking mechanism;
- 3, short pull rod; 4, left locking mechanism;
- 5, long pull rod;
- 6, right locking mechanism;
- 7, cab rear support;
- 8, rubber pad of cab rear support

schematic diagram of
cab tilt locking device

Brief description of the structure
This series truck has two configurations: tilting cab and make it cannot tilt. According to the latter configuration, the cab cannot tilt, so it does not have cab tilt lock mechanism. In order to improve the riding comfort, the linkage between cab and vehicle frame is flexible.

To the tilt cab, there are tilt and locking mechanisms. Tilt mechanism is composed of torsion bar, support axle tube assembly, left and right brackets in the foreside and rear support rod assembly in the cab. The tilting of cab is achieved with torsion. The locking mechanism is composed of left and right locking mechanism assemblies, tilt locking

mechanism assembly, short pull rod, long pull rod, rear support bracket assembly in the cab and rubber pad assembly of rear bracket. It has triplication locking function which are self locking of left, right locking mechanism, lock of tilt locking mechanism assembly and lock of safety lock hook. Its purpose is locking the cab reliably and make sure that the cab can not tilt automatically when the vehicle is running. The tilt lock mechanism is shown in the figure on the above page.

Please read the tilting notes on the left door of the cab and on the upper flange of the wheel seriously before tilting the cab. The notes are shown in the below figure.



tilting notes

Use and maintenance

In order to tilting the cab reliably and running the vehicle safely, please pay attention to the following contents.

1. Cab tilting method and relative attentive notices.

1) When the vehicle is stopped on the horizontal road, you should make sure that there has enough space around the cab before tilting. Or else, the cab may be damaged while tilting.

2) Pull up the parking brake; push the shifting lever into the neutral posi-

tion to avoid the self-sliding of the vehicle.

3) The cab door must be fastened up. You should take all goods on the instrument panel, seat and floor away to avoid the damage of the door and the front windshield.

4) First disengaged the locking function of the cab locking mechanism when tilting the cab.

5) After the locking function disengaged, hold the tilting rod with hand and pull up the safety lock hook at the same time to avoid the sudden uplift of the cab.

6) Raise the cab slowly until it is tilted to the maximum position, then lock it reliably with lock arm on the rear bracket. It is shown in the right

figure.

7) When lowering the cab down, first hold the tilting rod and disengage the locking function of lock arm on the rear bracket, then lower the cab down slowly. After the safety lock locked, fasten the locking mechanism.

2. Inspection and maintenance

1) Check periodically the rubber pad assemblies which are used to strengthen the front, rear support, if find damaged, it should be replaced instantly.



support rod assembly

2) Check periodically the locking situation of the locking mechanism, if invalidation of locking function found, it should be repaired or replaced immediately.

3) If feel arduous when tilting up the cab or heavy when dropping down the cab, the torsion rod is invalid. Replace the torsion rod.

4) When repairing the chassis,

before removing of the cab, disengage the force of the torsion rod and operate with following steps.

① Disengage the locking state, and tilt up the cab to the utmost position.

② Remove the shaft pin connected the rear support rod and the base board support of the cab.

③ Push the cab forwards for some angle until the bolt on the torsion rod arm can be loosened.

④ After the bolt removed, the torsion rod cannot work. Now the cab can be removed (The torsion rod can not be pulled out).

Note: The above -mentioned work must be done by three persons at least because two or three persons cannot push the cab forward after

the force of the torsion rod is disengaged.

5) Before reverting the cab to the original position, return the force of the torsion rod and operate with the following steps:

- Put the tooth part of the spline which is cut at the bottom on one end of the torsion rod in alignment with '1' position on the support axle tube and the spline tube, and insert the torsion rod into the support axle tube (for the rod which is pulled out).

- After mounting the cab with support axle tube and the left, the right bracket together to the frame, put the '1' of hub splines on the torsion rod in alignment with the

spline tooth which is cut at the bottom on the other end of the torsion rod, cover the hub splines on the torsion rod and insert the spline axle tube into the right bracket in the cab.

- Tilt the cab forwards until the bolt hole on the torsion rod arm aimed at the screwed hole on the right bracket in the cab, screw the bolt and tighten it.

- Put the cab down slowly, and check whether the cab is on the state of suspending at the horizontal direction after dropped down. If normally, then lock the cab.

6) If find invalidation of the torsion rod, when replacing, operates according to 4) 5).

Starting and running of the vehicle

Starting of the vehicle

Inspection before starting

1. Check the volume of residual water of the radiator; check the lubricating oil quantity in the engine, gear box, rear axle, steering gear, check electrolyte quantity of the battery, check the liquid level in the oil tank, check the joint of pipe line for leak.

2. Check the brake system: Depress the brake pedal and pull the parking brake-operating lever and check the braking effect.

3. Check the transmission system: check the linkage of the transmission

system.

4. Check the steering mechanism: check the free turning angle and free play of the steering wheel, check the bolt for looseness.

5. Check the electrical system: check electrical equipments, strip lamps, instruments.

6. Check the gear and operating mechanism of the transmission, check the indicator of gear and shifting.

7. Check the air pressure of the tire.

8. Check the driver tools and accessories.

9. Check the window glass for cleaning and clarity.

Starting of the engine

When starting the engine, put the

shift bar on the neutral position, turn on the ignition switch, check horns, instruments on the instrument panel, turning lamps, braking lamps, the angle and position of the rear view mirror.

1. Routine start

Turn the key to the START position (shown in the right figure), the engine can start. After starting, loosen the accelerator pedal immediately and keep the engine working in low speed. Depressing the accelerator pedal violently is forbidden.

2. Start in winter

When the weather is very cold, the start of diesel engine can take following measures:

- Cooling water use hot water, and

unclose the drain switch when adding hot water. When the hot water flowed out and the engine body became warmer, close the drain switch.



starting switch

- Heat up the oil up to 80°C~90°C, and then add it into the oil pan.

- The engine equipped with glow plug starts by preheating of glow

plug. When using glow plug, the time connected to the power supply should be less than 30 seconds every time.

After starting the engine, check the operating state of the engine and instruments at different rotating speed. Especially check the oil pressure. Check if there have leakage of water, oil and gas, check whether the oil level is normal and the engine have abnormal noise. Check whether the color of exhaust is normal.

3. After starting the engine, do not depress the accelerator pedal violently, loosen the accelerator pedal to keep the engine operating on idle for some time. After the temperature of engine rises and the engine operates

stably, uplift the clutch pedal slowly.

4. Generally after the temperature of engine become more than 60°C and the operating (sound) of the engine components、the reading of instruments are normal, the vehicle can run. Do not run the vehicle in low temperature to avoid intense wear of the engine.

Starting and shifting of the vehicle

After engine operates normally, depress the clutch pedal, shift into low gear, loosen the parking brake, and press the horn once. Making sure that the vehicle can be operated safely, loosen the clutch pedal slowly and depress the accelerator pedal properly at the same time to start the vehicle. After starting the vehicle, the

foot should get away from the clutch pedal. Do not keep the foot on the pedal to avoid the burning out of the clutch friction disc. Loosen the clutch pedal rapidly or depress the accelerator pedal insufficiently, the engine can stop.

Note: Do not let the vehicle running in the first or the second gear position for long time to prevent from increasing the wear and the fuel consumption.

When running the vehicle, shift the gear position according to the change of the road and landform. If find that the engine power is in abundance and the rotating speed rises, it illustrates that the primary gear position is not appropriate, the

vehicle should be shifted to the next fast gear position in time. After shifting, if not finding shortage of power and chattering of transmission, the shifting operation can be considered right. If find shortage of power or the vehicle speed decreases, the vehicle should be shifted to a low gear position. If the vehicle runs normally after shifting, the shifting into low gear is right.

For safety, when swerving, passing bridge and meeting, the vehicle can run in moderate speed. On better running condition, the vehicle can operate in fast gear, and at this time the vehicle speed is high, the fuel consumption is low, the economy of fuel is good.

When shifting, do not just see the shifting lever. You should watch forwards, hold the steering wheel steadily with your left hand, let the center of the palm in your right hand stick to the top part of the shifting lever and push or pull it to the right position with the force of your right wrist.

Running、swerving、turnaround、backing and braking of the vehicle

Running

Keep enough distance to the foregoing vehicle when running on flat road. Select vehicle speed according to the vehicle model、mission and concrete condition of road, generally select the speed of 50~70 km/h.

Let the vehicle running in the first or the second gear position when starting, upgrading under heavy load and running on bumpy road or on the road having obstacles. But the vehicle can not running in the first or the second gear too long in normal running. When upgrading with heavy load, shift the shifting lever into low gear to avoid overloading of the engine.

When running, do not increase or decrease the vehicle speed abruptly and not shake the steering wheel without reason, listen whether there is abnormal noise or not, check the reading and indicator lamp of all instruments for normalization. If find abnormal noise or abnormal events,

stop the vehicle immediately and check it, take necessary adjustment and repair.

When downgrad, do not stall the engine. When downgrading steep ramp, shift the shifting lever into low gear and take braking operation at intervals to avoid the over fast of the vehicle speed.

When running across shallow river or lobbolly, prevent the water from entering into air intake lines of the engine、rear axles and transmission case. Check rear axles and transmission case for entering water after paddling. If find water, drain it and add gear oil with specified quantity. After paddling, the vehicle can not run in high speed. You should depress the

braking pedal every now and then to resume the braking performance as soon as possible.

When running on the ice or snow road, run with steady speed. Do not take emergency braking and not turn the steering wheel fiercely to avoid the danger of skidding. Keep long safety distance from the foregoing vehicle. When running in heavy rain, drive the vehicle more carefully to avoid decreasing the braking performance of the brake because of moist.

Swerve

Swerve of the vehicle produces centrifugal force which can be bigger when the vehicle speed becomes higher. The force can bring turning

over in the transverse direction in serious condition. Therefore, at the 50~100 meters position before turning the vehicle, you should ring the horn, turn on the turning lamp and reduce the vehicle speed. When running on the freezing and muddy road or in the weather of heavy rain, fog, wind, sand, reduce the vehicle speed to less than 10 km/h, swerve the vehicle slowly alongside the right side of the road. When swerving, turn the steering wheel uniformly according to the situation of road, the swerving track should be transited smoothly, the turning motion should not be too great or too small. Do not turn or return the steering wheel suddenly. Try your best to avoid taking

braking operation while turning the steering wheel, especially emergency braking.

When steering, if find skidding of front wheels, put up the accelerator pedal and turn the steering wheel in the contrary direction; if find skidding of the rear wheels, turn the steering wheel properly along the skidding direction, and after the skidding stops, correct the running direction.

Turning around

When turning around for 180°, select the square, large-scale crossing or flat broad road which have little traffic flux and turn around the vehicle at a time along the running direction. At the 50~100 meters position in front of the turning spot, reduce the vehicle

speed, shift into low gear and send out the turning around signal.

When turning around with running forwards and backwards, first send out the turning around signal, reduce the vehicle speed and run towards the right side of road. When approaching the preset spot for turning around, observe the situation of road, turn the steering wheel to the left extreme position rapidly and let the vehicle running to the left side of road slowly. When approaching the roadside, return the steering wheel rapidly. After observing the situation behind the vehicle, start and turn around the vehicle, turn the steering wheel to the right extreme position at the same time. When approaching

the roadside, return the steering wheel rapidly and stop the vehicle. If the turning around operation can not be done once time, repeat the above operations.

Backing

The operation of shifting into reverse gear or shifting from reverse gear to onward gear can be done after the vehicle is stopped completely. After shifting into the reverse gear, the back-up lamp lights. The vehicle speed must be less than 5 km/h when backing. If the driver can not discern the situation behind the vehicle because the vehicle is loading or other reasons, the backing operation must be commanded by one person who is outside the vehicle.

Do not back the vehicle blindly.

Parking of the vehicle and stop of the engine

When prepare for parking the vehicle, the vehicle speed reduces or the vehicle slides out of gear and indicates with turning lamp. After the vehicle parked, pull up the parking brake lever. If the vehicle must be parked on the road for some reasons, park the vehicle near the roadside and not park the vehicle on the running lane. Under the exceptional condition like breaking down in the middle of the road, two caution plates should be placed on the position of 200 meters in front and behind of the vehicle.

Avoid parking on the ramp. If the

vehicle must be parked on the ramp, pull up the parking brake lever to the extreme position, shift into low gear and block the vehicle with triangular chocks or stones to prevent it from sliding. Note: Make sure that the parking brake can work reliably when parking on the ramp, at the same time turn on the emergency warning signal indicator lamp.

After parking, especially after the engine operates with heavy load, do not stall the engine immediately, but keep the engine operating in low speed for several minutes. After the temperature of water decreases less than 70°C, then stop the engine.

When parking midway in winter, take the heat preservation and antifreeze-

ing measures for the engine. Prevent the oil tank from insolation in summer.

After the vehicle runs a day, routine service and inspection should be done on the entire vehicle.

Engine

The details of the engine structure, assembling, adjustment, using and maintenance can be consulted in the operating specification of relevant engines.

Inlet air, exhaust systems

Brief description of the structure

Inlet system includes air inlet pipe assembly, air filter assembly, air intake of engine and intake manifold, some has intermediate transition pipe in addition. Exhaust system includes exhaust pipe, muffler and exhaust tailpipe.

Air filter

The linkage between the air inlet pipe and the air filter assembly is flexible.

The pipe is fixed on the rear part of the cab, and it can be moved together with the cab when tilting the cab. It is shown in the figure on the next page. The function of air filter is to filter out the dust and the sand in the air entered into the engine.

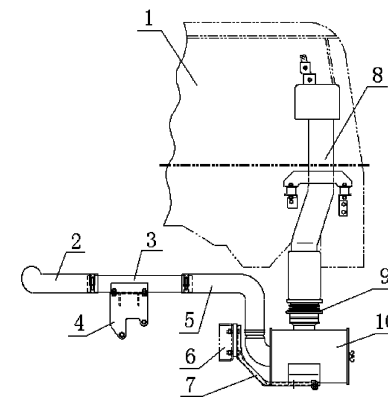
Air filter is cyclone dust gathering air cleaner with paper filter element. After external air enters into the air filter through the air inlet pipe, larger dust particle can be separated from the air by the function of cyclone vane, then can be thrown into the dust gathering plate, the separated air keep on moving and enter into the cylinder by the filtering function of the paper element.

For every 1000km running, check

and maintain the air filter. When running in the condition of excessive dust, the running mileage interval for inspection and maintenance should be shortened suitably.

Cleaning of the air filter:

1. Remove the dish-shaped nut from the end cover. Take away the end cover, remove the inner nut and take off the filter element assembly.
2. Clean the cover cap and the inner part of the housing with dry and clean cloth. When cleaning, do not let the moisture enter into the air filter.



- 1, cab; 2, vent hose(1) of the air filter;
3, intermediate connecting pipe;
4, connection board; 5, vent hose of the air filter; 6, right longitudinal member of the frame; 7, air filter bracket; 8, intake pipeline of the air filter;
9, connecting hose; 10, air filter

schematic diagram of air filter

3. Check and clean up the dust exhaust bag on the end cover, make sure that it is not in disrepair and invalidation.

4. Clean the air filter element: clear away the dry dirt or dust with compressed air gun (air pressure should be less than 690kpa), blow from the inner side of filter element towards outside, or pat the end surface on the flat board. Do not clear away the dirt or the dust with beating or knocking. If found blocking of the filter element because of long use, dilapidation on the surface of filter element or the element is polluted badly by the oily soil, the filter element must be replaced.

Using and inspection of inlet

and exhaust systems

1. The service life of the engine has great relationship to the workmanship of the air filter. Absolutely forbid that the engine works without air filter or on the condition that the air filter is disabled. Taking the intake opening of air filter as the original intake opening is forbidden.

2. For every 1000km running, check the inlet and exhaust manifold for the following:

- Check nuts for looseness, when tightening the nut on the inlet and exhaust manifold, the torsion force should be equable, or else the air leakage can occur.
- Check the inlet and exhaust manifold for crack and hole, check the

gasket for damage and erosion, if found, replace it with a new one.

Cooling system

Brief description of the structure

Cooling system is closed to water cooling pressure cycle type. It is composed of radiator, fan cowl and water inlet and outlet pipes of radiator. The radiator is uniflow draper type radiator.

The concrete structure and type of the cooling system components can be consulted in detail in the operating specification of relevant engines.

Using and maintenance of cooling system

1. Recommend using ethylene glycol

base long effective antifreeze preservative liquid for cooling fluid. In the north, it can avoid the damage of engine because of the freezing of cooling fluid in winter; in the south, it can increase the boiling point of cooling fluid in summer to avoid the damage of engine overheating because of air resistance in high temperature.

2. Before dispatch the vehicle every time, check the liquid level in the radiator, if found it is not enough, add liquid to the specified height.

3. Drainage of cooling system. In cold region and in winter, without using antifreeze preservative liquid, if long time parking or receiving the vehicle everyday, the cooling system

must be drained. And you should open the water filler cap of the radiator to avoid the incomplete drainage of cooling water.

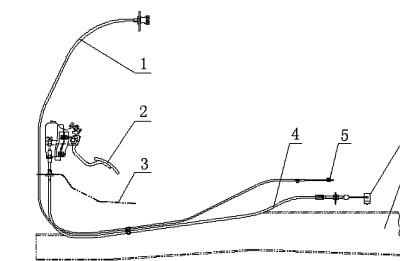
4. After engine operating for long time, furring can produce in the cooling water and it should be cleaned in time. Clean it with the following method: mix 700~800 gram caustic soda and 150 gram kerosene, add the mixture liquid into the cooling water, run in medium speed for 5~10 minutes, then after stopping for 10~12 hours, restart the engine and run for 10~15 minutes. Then drain the aqueous solution and clean the cooling system with cleaned water.

Advertent proceedings in using long effective antifreeze preservative liquid

1. Choose suitable antifreeze liquid according to the minimum temperature of the region, if the minimum temperature of the region is -25°C , antifreeze liquid whose solidifying point is -30°C should be chosen.
2. When compensating antifreeze preservative liquid, choose the same model to avoid deposition.
3. If find deterioration of antifreeze preservative liquid, replace it entirely at once. The color of antifreeze liquid is green or blue, if it is deteriorated, the color change to dull red because of impurity infiltration.

Accelerating transmission system

Brief description of the structure



- 1, stalling wire drawing; 2, assembly of accelerator mechanism and pedal;
 - 3, front floor of the cab; 4, acceleration wire drawing; 5, stalling oscillating arm of the engine; 6, acceleration oscillating arm of the engine; 7, frame
- schematic diagram of accelerating transmission equipment

Accelerating transmission equipment is composed of accelerator pedal mechanism, accelerator wire drawing and acceleration oscillating arm of the engine. It is shown in the figure in the above page.

When depress the pedal, driving medium of the mechanism pull the wire drawing, control the quantity of oil supplied by oil spray system to increase or decrease the speed.

1. Accelerator pedal mechanism: Accelerator mechanism take the newest structure of ISUZU truck. It operates simply and reliably and has accelerating wire drawing and hand throttle wire drawing; the pedal is the structure with injected molding and it has the trait of convenient assem-

bling and little operating noise.

2. Accelerating wire drawing:

It operates by the soft wire drawing. And it has traits of reliable structure、convenient layout、little frictional resistance and stable transmission.

3. Hand throttle wire drawing:

Using with the foot throttle can quicken the preheating of the engine or increase the idling speed.

Using and adjustment

1. Check the chucking position of the linkage rod and the accelerator mechanism for rightness and reliability, check the direction of the wire drawing for straight and check on the cornering for smooth transition.

2. The pedal should be depressed easily and to the extreme position

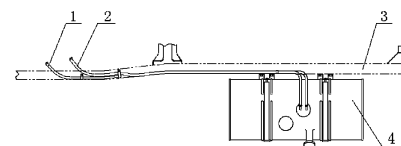
without jamming. When releasing the pedal, it should be returned freely.

3. When depressing the pedal, if the free play is too big or the opening extent of the accelerator is not enough, adjust the position of bolts.

Fuel supply system

Brief description of the structure

Fuel supply system is composed of fuel tank、fuel filter、fuel pump、fuel injection pump、fuel inlet line and fuel return line. The schematic diagram of fuel supply system is shown in the below figure.



1、fuel return line; 2、fuel inlet line;
3、frame; 4、fuel tank

schematic diagram of
fuel supply system

The function of the fuel supply system is to inject the specified quantity diesel fuel of specified pressure and good atomization into the cylinder at the correct time with definite interval of injection according to the operating requirement, and take good compression ignition with the air rapidly. Its operating state has important influence on the power and economical

performance of the engine.

1. Diesel fuel filter: the filter which is mounted on the left side of the engine body can filter out impurity of small particle to ensure the cleaning of diesel fuel.

2. Fuel tank: the fuel tank volume of this series trucks is 90 liters, the tank cap has lock. And install the filter gauze inside the fuel filler port to prevent impurity of large particle entering into the fuel tank, set oil drain plug on the bottommost position of the fuel tank to drain the deposit and water on the bottom of tank when cleaning the fuel tank.

Using and maintenance

1. Check the chucking position of pipeline interface for sealing, reliabil-

ity and air leakage.

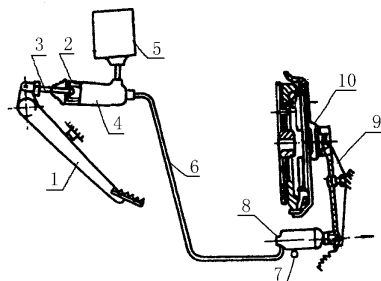
2. Clean or replace the filter element of diesel fuel filter periodically according to rules in the operating specification of the engine.

Chassis

Clutch

Brief description of the structure

The clutch equipped for this series truck is single -plate dry type diaphragm spring clutch, outside diameter of the driven plate is $\Phi 254$. The hydraulic control unit of the clutch is composed of the clutch pedal, oil storage cup, release cylinder (master cylinder), wheel cylinder and oil pipe. It is shown in the below figure.



1, pedal 2, piston 3, push rod
4, release cylinder 5, oil storage cup
6, oil pipe 7, air bleed plug
8, wheel cylinder 9, release fork
10, release bearing

schematic diagram of the hydraulic control unit on the clutch

The clutch pressure plate and cover assembly is fixed to the pressure cover with a diaphragm spring through a set of rivet and press out

the pressure plate on the outside edge. The diaphragm spring is both pressure element and release element. Because the diaphragm spring has good nonlinear characteristic, the pressure of the diaphragm spring keep steady, transfer the engine torque stably, and the releasing force is small, if equipped with hydraulic control unit the force should be less. The two -stage torsion damper and autocompensation absorbing shock deoscillator have been fixed on the driven plate assembly to decrease the idling vibration and vibration at ordinary speed commendably. The spline of the inner hole on the driven plate is involute type, the small inter-tooth space, stable transmission and

wavy spring mounted between two friction linings effectively decrease the impact force because of fast linkage of the clutch. The release bearing of the clutch is radial thrust bearing with closed spherical surface. It does not need to add oil. And after wear the clearance can be eliminated automatically.

Adjustment of the clutch operating system

1. Adjust the limit screw of the clutch pedal (below figure) to make sure that the free play of the pedal is 3~5mm.
2. Adjust the master cylinder of the clutch: loosen the locknut on the push rod of the master cylinder, rotate the end of the push rod to con-

tact gently with the piston of the master cylinder, then rotate the push rod for 3/4 circle in the contrary direction, tighten the locknut of the push rod, now the clearance between the push rod and the piston is about 0.5~1mm.

3. Adjust wheel cylinder of the clutch
Take off the return spring of the release fork, push the wheel cylinder piston to the bottom of the cylinder, loosen the locknut on the push rod, push the release fork towards the backside of the engine to the position where the release bearing and the release fork contact barely, turn the spherical nut until it contacts with the release fork, then turn back the spherical nut on the push rod for 3

circles, tighten the nut, install the return spring of the release fork.



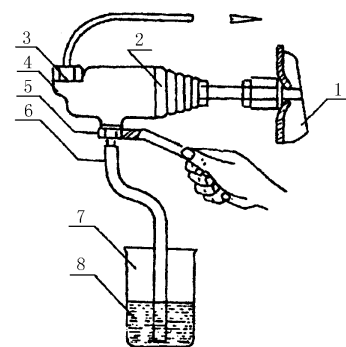
clutch pedal

4. Bleed air from wheel cylinder of the clutch
Having air or oil leakage in the hydraulic pipeline of the clutch is unallowed, or else, it can result in the disability of the pedal, deficiency of

the effective travel and incomplete release of the clutch etc. So the clutch can not work normally. The work of air bleeding should be completed by two person in the best, one person depress the clutch pedal in the cab, the other bleed the air in the wheel cylinder. The schematic diagram of air bleeding for the clutch wheel cylinder is shown below.

Take off the rubber cap of the air bleed screw on the wheel cylinder, link a plastic pipe on the air bleed screw, put the other end of the pipe into the container filled with brake fluid, depress the clutch pedal several times, fill the master cylinder and hydraulic pipeline with brake fluid, then loosen the air bleed screw, air

bubble can be puffed from the oil ring if there are air in the pipeline. Depress the clutch pedal several



- | | |
|-----------------|---------------------|
| 1.release fork | 2.dust cover |
| 3.copper washer | 4.wheel cylinder |
| 5.wrench | 6.soft plastic pipe |
| 7.container | 8.braking fluid |

schematic diagram of air
bleedingfor clutch wheel cylinder

times again when the pedal has not reached the floor in the cab, keep the pressure state of the pedal, loosen the air bleed screw again and bleed the air. Repeat the abovementioned operation until the air bubble disappear from the container filled with brake fluid, tighten the air bleed valve and cover the rubber cap. In the progress of air bleeding, compensate the brake fluid into the oil storage cup until the fluid level reach the sign of MAX.

Sometimes shortly after air bleeding, the pedal is disable and found that there is air bubble discharge when bleeding air again, the reason is that there is unsealed place in the pipeline from the master cylinder to

the wheel cylinder. In maintenance, check the aluminum washer on the oil inlet pipe union of the wheel cylinder for warp, the washer can not be replaced by the steel cushion. The air should be bled after every dismantlement of the master cylinder, the wheel cylinder or the oil pipe.

Maintenance and adjustment

Long time use or incorrect adjustment and incomplete air bleeding of the clutch can bring the halfway release of the clutch, let the clutch on the half contact state for a long time, aggravate the wear of the clutch pressure plate and friction linings. The decrepitation, burnt and exfoliation of the friction lining, and the burnout of the release bearing also

can result in the abnormal operation of the clutch. When maintaining, all kinds of clearance of the clutch must be adjusted.

Transmission

Brief description of the structure

The transmission equipped for the chassis of this series truck is manual discontinuously variable transmission with fixed shaft gear, and it has five driving gear position and one reverse gear position. The synchronizer has been equipped on the second, the third, the fourth and the fifth gear position. And the synchronizer is synchromesh gear system. The synchronizer for the first gear position

and the reverse gear is holding mesh gear. Using of the synchronizer on the transmission can make the shifting operation conveniently, decrease the wear and shock on the gear end, extend the service life of the gear tooth, shorten the shifting time, increase the average vehicle speed and reduce the working intensity of the driver. The gear shifting operation is accomplished with the shifting control device of the transmission, which is shown in the figure on the next page.

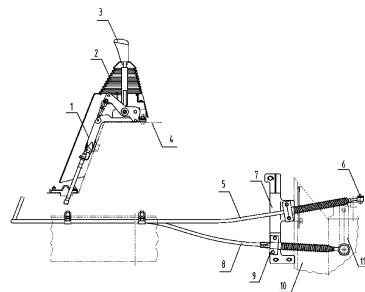
Shifting control device of the transmission

The shifting control device of the transmission is long distance soft cable type with high floor and short

lever, and it take two flexible shaft to implement the gear selecting and shifting which is shown in the figure on the next page. It is composed of operating lever seat, flexible shaft for gear selecting or shifting and the bracket. The core shaft of the interior flexible shaft is steel cable, the operation of gear selecting or shifting is completed by the pushing or pulling



control handle of transmission



- 1、gear shift control lever 2、dust cover
3、handle 4、floor of the cab 5、flexible
shaft for gear selecting
6、transmission rocker arm for gear select-
ing 7、side bracket for gear selecting 8、
flexible shaft for gear shifting 9、fixed
bracket of the gear shifting flexible shaft
10、rear cover of the clutch 11、transmis-
sion rocker arm for gear shifting

schematic diagram of the
transmission gear shift control device

motion of the steel cable. The ball on the flexible shaft and adjusting screw are used for adjusting the total length of the flexible shaft to ensure that the gear selecting or shifting can be to the correct position. There are symbols of each gear on the control handle of the transmission, it is shown in the below figure.

Using and maintenance

1. If find the gear shifting can not operate or operate difficultly when the engine is not working, it shows that the gear shifting lever (or the flexible shaft) have bad adjustment or the bolt becomes loose, now you must adjust the control lever (or the flexible shaft), check and tighten every bolt and every nut.

2. If find out -of -gear when running on the rough road, the control lever (or the flexible shaft) have bad adjustment, and it should be adjusted correctly.
3. If is find free play of the control lever too large, check and tighten every bolt and every nut.
4. Do not take gear shifting operation when the engine work at over fast speed to avoid accelerating the wear of the synchronizer.
5. When shifting, the force should be gentle. The hand force must be acted on the control lever until the gear reaches the correct position. Shifting with flap of one push and one loosen is inappropriate and the shifting operation can not be accomplished

easily in this way.

6. Only after the vehicle stop and keep steady, the shifting from driving gear to reverse gear or from reverse gear to driving gear can be done, or else, the gear can be damaged.
7. As the fifth gear position is over -speed gear, in order to avoid the damage of the overspeed gear spoke because of overload, when the vehicle is not in heavy load, run on good road and its running speed is under 50 km/h, the fifth gear can be used to prevent the overspeed gear from damage because of overload. When running in the fifth gear position, if encountering some circumstance, the vehicle speed become under 50 km/h, the vehicle

should be shifted into low gear position.

8. When running, if find there is abnormal noise in the transmission, stop the vehicle and check it, eliminate the malfunction.

9. When sliding on the downgrade, stalling of the engine is unallowed, starting the engine with the inertia of sliding on the downgrade is forbidden to avoid the damage of the gear and the synchronizer.

10. In the running -in period of the new vehicle, because the metal chipping which was produced by the frictional function between new parts is bad to components in the transmission, especially to the life of the conical ring on the synchronizer, so

the lubricating oil should be replaced after the running -in period of the new vehicle expires. Under the general condition, for every 6000 km running, replace the lubricating oil once. When replacing the lubricating oil, first drain the oil in the transmission, prop up the rear axle, shift the transmission into the reverse gear, add the kerosene, rotate the transmission for 2 ~3 minutes, then drain the kerosene, add the pure gear oil.

11. Check the oil level in the transmission frequently, if found the level is under the lower edge surface of the oil filler bolt hole, sufficient oil should be added.

12. Check the outside bolt of the transmission and the flange of the

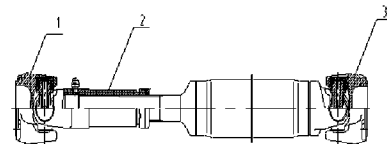
second shaft for tightness and the operating state of the component in the transmission frequently, because the vent plug is blocked by dust and pressure in the transmission increases, the oil seepage or leakage may be found, so the vent plug should be cleaned periodically.

13. The movement parts of shifting operation should be kept good lubricating, or else, the shifting operation may become difficult because of the wear of the movement parts. If find the position of gear selecting is incorrect, or gear shifting become difficult or the transmission is out of gear automatically in using, firstly you should readjust the gear selecting and the gear shifting mechanism.

Driveshaft

General structure

The two -piece driveshaft, made up of front driveshaft and rear driveshaft, as the follow figure, connected with transmission on the front end and with rear axle on the back end.



- 1、front flange yoke
- 2、rear axle drivingshaft
- 3、rear flange yoke

Front flange yoke is connected with the drum of parking brake and flange of transmission, while rear flange yoke is connected with rear driving

gear flange. A spline shaft with a universal joint is welded on the front end of rear driveshaft, so that the driveshaft can stretch and rotate freely. The spline which is involute have a small clearance and can effectively cut down impact resulting from variety of rotate speed of driveshaft.

Use & Inspection

1. Driveshaft has been counterpoised in factory, it should be ensured not to be impacted in use or knocked and stacked in disassemble and carry. Replace if the shaft is distorted or the balancer is desquamated, otherwise there will be vibration, noise, and extra impact in travel, it can damage power train and endanger

driver.

2. Regularly check the cross shaft needle bearing, check the sealing of the slide spline and replace the oil seal when necessary.

Rear axle

General structure

Single reduction rear axle (see the right figure) , as the final part of power train of truck, is the driving axle, and it is composed of final drive and differential and axle housing.

Final drive can not only change the direction of driving force, but also reduce the rotate speed. It's composed of drive pinion and driven gear and final drive. The drive pinion is connected with drive shaft, whose

end with spline is connected with universal joint assembly by coupling flange. Center support is mounted in two opposite conical bearing, so that it can suffer not only radial but also axial force.



rear axle

Drive pinion, whose small-end journal mounted in direct tapered roller bearing, can only support radial force. It is fixed on the flange which located on top left of differential case by several bolts.

A differential, composed of differen-

tial case and cross of four side pinions, let the left wheel rotate at a different speed from the right wheel. Rear one-piece banjo style axle housing is made by means of welding punched armor plate.

Assembly & Adjustment

1. Meshing of tooth face and clearance adjustment of final drive

1) Check drive pinion bearing for pretension

The pretightening force of drive pinion bearing should be adjusted. Measuring in the bolt hole of drive pinion bearing case, the tangential pull should be 15~30N.

The pretightening force of drive pinion bearing can be adjusted by means of adding and reducing ad-

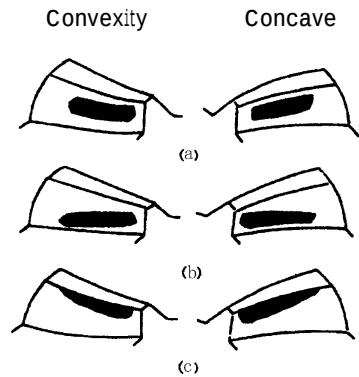
justing shim. Add shim can decrease friction torque, while reducing shim can increase it. There are three kind of shim according to thickness (0.10mm, 0.15mm, 0.25mm).

2) Check final drive for meshing between drive pinion and driven gear.

The contact area and side play between drive pinion and driven gear can be adjusted by means of adjusting shim and adjusting collar of differential bearing. There are three kind of shim according to thickness, 0.80mm and 0.25mm and 0.10mm, and the 0.80mm-kind shim should not be more than one piece. Normally, the clearance between these two gears is 0.15~0.25mm, while the side play ranges under 0.07mm. To adjust

side play, measure four points with equal angle around the driven gear, and the gauge outfit of micrometer should be in a vertical position. To adjust tooth contact area, driven gear should be coated with red lead at three points, and 2~3 teeth should be coated at every point. Then rotate gears clockwise and anti-clockwise to get the trace of contact area (see the right figure).

Normal trace should be near the small end, as figure (a); Add shim if trace near the convex or concave tooth root, as figure (b); Reduce shim if trace near convex or concave tooth top, as figure (c).



trace of contact area between two gears

2. Adjustment of differential bearing
Normally, differential bearing should have pre-torque, and the value is 10~15N in bolt hole where the left housing of differential fixed to driven gear. To adjust the pre-torque of differential bearing, adjust the torque of differential bearing collar. Close the

bearing cover temporarily, then tighten the bearing cover bolt when the bearing collar can be tightened and adjust its pre-torque. The locking plate should be overlap with the locking groove, and the driven gear shouldn't move in axial direction.

Use & Maintenance

1. Lubricate for hyperbola bevel gear is very strict, can be only specified gear oil. Don't use or mix with other gear oil, or will result in quickened scratch and wear.

2. Don't remove or adjust the gears and bearings of final drive, for they have been matched and adjusted in factory. Do these only when gear worn and free play is beyond the limit value, or when bearing axial

clearance is beyond the limit, or when some of parts damaged.

3. Clean the vent plug regularly, make sure that ventilation is expedite. A jammed air drain can bring higher air pressure in rear axle, and it will result in lubricant leak from the drive pinion seal and other welding line.

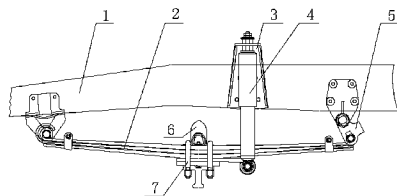
4. Check the lubricant level in axle housing regularly. Check the lubricant for quality regularly, and replace if the chroma and viscosity is abnormal.

Suspension set

General structure

The suspension of this series of trucks is composed of leaf spring and bidirectional hydraulic telescopic

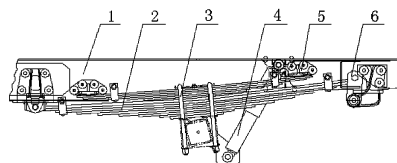
shock absorber. Rear leaf spring is composed of main spring and secondary spring, its stiffness changes little by little, so that vehicle is more comfortable for ride. The next figure shows our front suspension assembly.



- 1, frame 2, front leaf spring
3, upper bracket of front suspension
4, front absorber 5, front shackle
6, front bumper 7, front center bolt

front suspension assembly

The next figure shows our rear suspension assembly.



- 1, frame 2, rear leaf spring
3, rear center bolt 4, rear absorber
5, secondary spring bracket
6, rear shackle clamp

rear suspension assembly

Use & Maintain leaf spring

1. At the beginning of running -in period, check the nut on U -type fastening bolt and tighten it with specified torque when trochometer points to 200km and 500km. The specified torque value is 156.8 ~ 196N·m.

2. After running -in period, tighten the nut on U -type fastening bolt with specified torque (with vehicle fully loaded). Do it also when leaf spring is replaced or reset.

3. Tighten the nut on U -type fastening bolt with specified torque (with vehicle fully loaded) every 2000 ~ 3000km.

4. Check and tighten bolts and nuts in your touch on suspension. Check the rubber parts on the suspension and replace if too much wear.

5. Take notice of the orientation when replace leaf spring or operate on the center bolt. Tighten each nut first, then tighten nuts on front U -type fastening bolt with specified torque before tighten the rear ones.

Use & Check absorber

1. Check the absorber for temperature after running a length on bad road surface (commonly more than 10km). Absorber don't have resistance if the temperature lower than condition temperature; if one absorber has much lower temperature than the symmetrical one, the lower one's resistance is much more smaller. Lower resistance result from lack in oil or from damage of some important part, and the absorber that lack in resistance should be removed to inspect.

2. Check the absorber for oil leak if continuous abnormal vibration is detected. Oil leak should be dealt with on time, so that the absorber can

work normally.

3. Check absorber when maintaining vehicle. To check absorber, stick up it and hold its lower end by vise, then pull and press it for several times. Normally the resistance is bigger when pulled, otherwise the absorber is damaged or lack in oil.

4. Repair or replace parts according to its status and add oil to protect parts from deep worn even ruined.

5. Always replace the oil seal when you replace absorber rod. Don't disassemble parts such as valve if unnecessary.

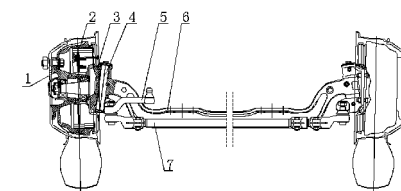
Front axle

General structure

Front axle assembly is composed of front axle, steering knuckle, steering

knuckle king pin, hub and tie rod. See the next figure.

The front axle is I -beam. The toeing -in is 3~6mm (diagonal tire) and 1~3mm (radial tire). Proper orientation can make sure the vehicle stable and easy to control, so that can lessen driver's fatigue and slower tire wear.



- 1, front hub 2, brake drum
3, steering knuckle 4, king pin
5, pitman arm 6, front axle 7, tie rod

front axle assembly

Adjustment

1. Adjustment of front hub bearing. To adjust front hub bearing in axial retightening force, tighten fastening nut with wrench, and loosen knuckle nut for about 120° . Rotate the hub clockwise and anti-clockwise, make sure that roller against the tapered face of bearing outer race properly, then tighten nut to the position where the rabbet aims the split pin hole. Check the hub if it can rotate freely and don't swing a lot. Now, distort the split pin and fix it.
2. Adjustment of clearance between knuckle and front axle. The clearance is adjusted via adjusting shim, it should less than 0.1mm , and the number of shim should not more than

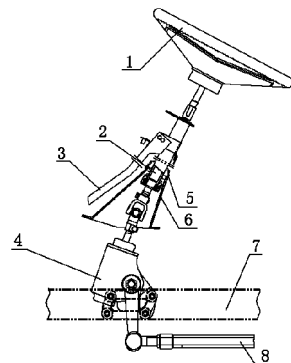
2 pieces.

3. Adjustment of toeing-in. The toeing-in can be adjusted via adjusting tie rod. Park the vehicle on a flat ground, jack up its header and orient front wheels just as vehicle run forward. Loosen locking nuts of tie rod, rotate the tie rod until the toeing-in fit the specified size. Then tighten the locking nuts with torque of $107 \sim 127\text{N}\cdot\text{m}$.

Steering system

General structure

The steering system of this series of truck is non-power steering system. The steering system composed of steering control mechanism, linkage mechanism and steering gear. See the figure on the right.



- 1, steering wheel; 2, steering shaft and universal joint assembly
3, adjustable bracket; 4, steering gear
5, dust cover; 6, column cover
7, longitudinal member; 8, drag link

steering system

Operation inspection for steering mechanism

1. Put front wheels on a swivel table.
2. Rotate steering wheel clockwise

and anti-clockwise to its limit position, to detect if it is fluent.

3. Let engine run in idle speed and check steering wheel for free play. The limit value of this free play is $10 \sim 15\text{mm}$. Rotate the adjusting screw clockwise to decrease the free play, while rotate anti-clockwise to increase.
4. When engine run in idle speed, the torque of steering wheel should be around 19.5N .

Use & Maintenance

1. Don't steer when parking, since it will shorten useful life of parts.
2. Check free play of steering wheel every 1000km (always let engine run in idle speed when do this operation). The limit value of this free play

is $10 \sim 15\text{mm}$. Rotate adjusting screw if the free play beyond this limit. Rotate it clockwise to decrease the free play, while rotate anti-clockwise to increase.

3. Check steering gear box for oil level every 3000km . Oil level should not be 20mm below the lower edge of filler hole. Disassemble and clean steering wheel two times every year at beginning of spring and autumn, replace oil and adjust seasonally.
4. The free play of steering play should not be too small, since a small free play will make it hard to return and bring a worse stability in high speed.

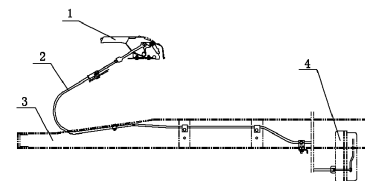
5. Fill the steering gear box with hypobolic-gear oil, don't mix it add

other oil.

Brake system

The brake system of this series truck is composed of parking brake system and running brake system.

Parking brake system



- 1, control lever 2, pull wire
3, frame 4, parking brake

parking brake system control mechanism

General Structure

The parking brake system includes control lever, pull wire, and parking brake, as the last figure. Parking

brake, which is mounted next to transmission, is center drum brake. It can act on drive shaft when vehicle is parking. Also it can operate with running brake together in emergency. The control handle is connected with brake by cable whose core is a steel wire of $\Phi 3.5\text{mm}$. The parking brake is composed of back plate, brake shoe set with pad, adjusting bolt set, and return spring.

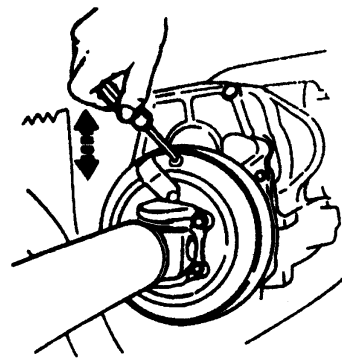
Adjustment

Normally, the clearance between parking brake drum and brake pad is 0.65mm , and it is homogeneous in upper and lower parts. The pad should be replaced often. Following these steps.

1. Jacking up rear axle until one

wheel deviate from ground.

2. Release the brake handle completely, shift gears to neutral position.



adjustment of the clearance between
brake pad and drum

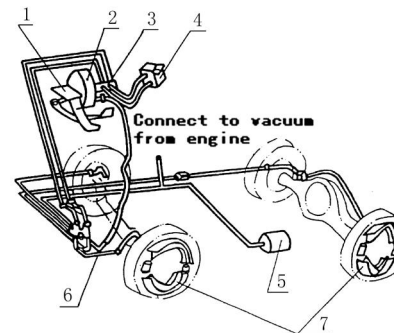
3. Rotate brake drum until the hole gets its lowest position. Insert a screwdriver through this hole to stir the adjusting nut upward until brake

drum braked completely. Then return the adjusting nut for 2~6 teeth. See the right figure.

Adjusted according to these steps, vehicle can parking on road with 20% gradient and can not start even transmission shifted to 2nd.

Use & Check

Check and adjust the clearance between brake pad and drum.



- 1. control mechanism
- 2. vacuum booster
- 3. master cylinder
- 4. reservoir
- 5. vacuum cylinder
- 6. brake tube
- 7. front & rear brake

running brake system

Running brake system

General Structure

The running brake system is hydraulic.

It is composed of vacuum booster, vacuum cylinder, master cylinder, control mechanism, brake tube, front brake and rear brake. It is sensitive and reliable, and it is simple to manipulate. See the last figure.

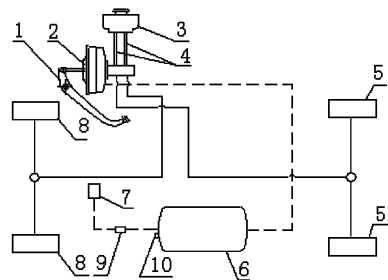
If you feel braking power is not sufficient when brake pedal is depressed completely and oil level is normal, there may be air in brake system. Bleed system in the following sequence. Firstly, bleed RR brake; secondly, bleed LR brake; thirdly, bleed RF brake; then bleed LF brake. Following these steps:

1. Clean air - drain screw of main cylinder and wheel cylinder;
2. Remove oil - drain plug of main cylinder or reservoir and fill it with

brake fluid until fluid level reach the edge.

3. Depress the brake pedal several times before hold it depressed and release the air - drain screw to bleed. Repeat doing this until air in tube be bled completely. Keep a little oil left, or air can reenter the system.

4. Fill reservoir with brake fluid.



- 1, brake pedal 2, vacuum booster and main cylinder assembly
3, reservoir 4, connection hose
5, rear brake 6, vacuum cylinder
7, intake manifold 8, front brake
9, vacuum check valve
10, connect to vacuum-alarm

—hydraulic tube- - - vacuum tube
Schematic diagram hydrostatic
brake system

Note When Use Brake Fluid

1. The specified brake fluid of this

series truck is synthetic brake fluid of class JG3 (GB10830).

2. Never use mixed brake fluid.

3. Synthetic brake fluid is good at sopping up. They should be storage in a clean sealed dry container, keep away from water, organic solvent, petroleum, and dust. Otherwise the vehicle's capability of brake would be cut down seriously.

4. Clean system with alcohol before replacing brake fluid with different brand. Following these if alcohol is unavailable.

(1) After drain all old brake fluid, fill reservoir with new fluid near to the opening and bleed system again, in order to sweep old fluid away.

(2) Fill system with brake fluid.

5. Brake pedal's free play should be 5 ~8mm after adjusted, or it will cause main booster work abnormally and make brake drum over hot.

Running brake

1. General Structure

The running brake is hydraulic drum, both front and rear are two leading shoe brake. It is composed of bottom plate, wheel cylinder, brake shoe set with pad, and return spring set.

2. Adjustment of Running Brake

The clearance between pad and drum will be bigger and bigger due to wear. In order to ensure brake work well, adjust it regularly follow these steps.

Jack up the wheel which you want to adjust and remove the seal plug. Dial

the adjusting gear of wheel cylinder piston accord the arrow near the adjusting hole on bottom plate that with special adjusting screw and at the same time rotate the brake drum until the drum can not rotated by hands. Then rotate the adjusting gear back for 5 ~9 teeth, keep the pad 0.2 ~ 0.45mm away from the drum, so that the drum can rotate freely again.

3. Use & Check

Replace the pad which is worn out or damaged. Before installed, the new pad should be ground. Make sure that the new pad has not oil coat, also has not crack and chap and other flaw.

The clearance should be adjusted in every time of maintenance. Check

drums with hands for temperature every time you park, adjust the clearance if the temperature is too high. Check wheel cylinders for leak, and replace the leather gasket if leak is detected. Protect drums from being wrong result from over heat and other reasons.

Vacuum booster

1. General Structure

Booster of this series truck is dual diaphragm vacuum booster, which is composed of return spring, control valve, rubber diaphragm, noise elimination board, and so on.

2. Adjustment

Booster have been adjusted in factory, don't disassemble it and protect the diaphragm from been damaged.

Wheel & Spare wheel riser Wheel

1. General

Every truck has seven wheels, one of which is spare and mounted underneath rear frame. One kind of tire whose specified pressure is 460 ~ 490Kpa is 6.50-15 type..

2. Use & Check

In order to use for a longer time, please charge tire according to specified pressure value. Never drive when pressure is insufficient. It is normal that pressure increases during the travel, and don't try to reduce it by deflating. Check the tire pressure when tire is not hot. If the two center patterns on tire tread touch against ground under fully loaded, the

pressure is normal.

Clean the rust and other dirty on rim before installed. It should be talced on the surface between inner tube and outer tire. Wheel nuts should be tightened for two steps. Tighten all of them first before tighten them with specified torque according to diagonal sequence.

Check wheel nuts regularly, and retighten them with torque if loose is detected.

3. Transposition of Wheel

In order to make tires wore uniformly, exchange wheels each other according to the next figure.

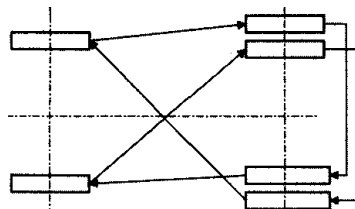


diagram for exchange position

Spare wheel riser

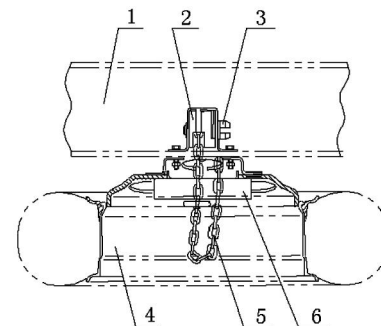
1. General Structure & Use

The spare wheel riser is driven by catenary suspension internal geared wheel, see the next figure. It is mounted underneath the frame. To operate it, fix it on the frame and tighten it with hand before rock back for 15 degree.

2. Maintenance of Riser

Check riser for loose every time before drive. Check chain and carrier

spring for crack and replace if necessary. In order to prevent it from rust, grease the gearing regularly, so that it can be easily to operate.



- 1, frame
- 2, spare wheel riser assembly
- 3, eccentric wheel
- 4, spare wheel
- 5, chain
- 6, carrier

spare wheel riser set

Electrical equipment

Starter, generator, adjuster

Starter

Note:

1. Starter should be connected with battery correctly.
2. Every time start, don't keep starter work continuously for more than 15s or stop for 1-2 seconds in the interval, since over hot may damage it. Rest it before try start once again.
3. After several continuative failures, check starter, solenoid switch, battery, wires, and also oil supply system. Retry after trouble is shot.

Generator and adjuster

Note:

1. Generator should be connected with adjuster correctly, and the po-

larities of generator and adjuster should be matched properly.

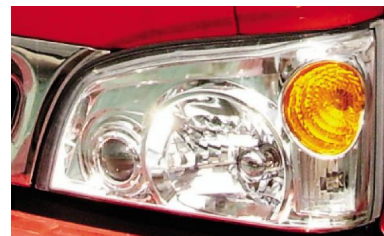
2. Never check generator by short-circuit fire wire and magnetic field.
3. The diode and insulation of generator can be inspected with multimeter and ohmmeter. Don't use megohmmeter to inspect, also AC power whose voltage exceeds 200v.

Illumination

Headlamp

These series truck have two headlamps which are embedded in front of cab symmetrically. The headlamp which is called double filament bulb has two different pieces of filament and can shine two different kinds of ray, the brighter one is used as high

lamp while the dimmer one is used as low lamp. Running in night, turn on the high lamp to lighten the road, but switch to low lamp when two vehicles pass each other.



headlamp(new series)



headlamp(old series)

Small light

Two small lights are embedded on the two symmetrical corner of front panel. They should be turned on when vehicle park in dark or fog, also when run in day they are to show the position and the width of the vehicle.

Fog lamp

Fog lamp can light further in fog than other lamp. They should be turned on when vehicle run or park in fog or in dark, so that vehicle can be seen clearly. Fog lamp is combined with headlamp.

Ceiling lamp

The ceiling lamp is installed on the ceiling, and it is combined with in-

side rear mirror together. It can light- en the cab, and also it can observe the condition behind.

Battery

General

The battery of this series of truck is 6-QA-60 (2 units) aneroid, and it is sealed by a plastic case. This kind of battery has a big capacity and a light weight.

Use & Note

1. Keep the case clean, and protect battery from leak.
2. Make sure that the hole on the upper cap not choked, or the plate will be damaged by the vapor produced own to electrolyzing.



battery

3. The electrolyte level should be 10~15mm higher than plate. Only distilled water can be filled into battery. Never fill battery with fountain or river water, for them will do harm to it.
4. Check the electrolyte for specific gravity and level. Do it every 10~15 days in winter, while do it every 5~10 days in summer. Specific gravity is measured with gravimeter. Table 1 shows normal specific gravity of electrolyte.

5. The battery should always being

charged. Check battery for electrical voltage if engine is hard to be started. Additional charging if it is detected that specific gravity of electrolyte is lower than 1.18~1.20, or battery plates will be vulcanized and it will do harm to the plates. Additional charging should be held for 13~16 hours, and it can breathe 1/10 of capacitance into battery. Cut down the charging current for half after single cell's voltage reaches 2.4V. After charging battery for 3~5 hours, if the specific gravity of electrolyte don't rise any more, keep on charging for 2~3 more hours. Table 2 shows the relationship between temperature and the corrected specific gravity value of electrolyte.

6. Protect the joint of terminal post and wire from dirt and loose, or the terminal post will be burnt. Applying a Vaseline coat on the terminal post after tighten the joint which can protect joint from rust and loose contact, so that engine can be started easily.

7. If left unused for a long time, battery should be removed and preserved in a place where is dry, shady, cool, and ventilative. And do the additional charging every month.

Table 1 Specific gravity of electrolyte

Loca	Specific gravity of fully charged battery under 15°C	
	Winter	Summer
Where temp below -40°C in winter	1.310	1.270
Where temp above -30°C in winter	1.290	1.260
Where temp above -20°C in winter	1.280	1.250
Where temp above -10°C in winter	1.270	1.240
Where temp below 0°C in winter	1.270	1.240

Table 2 Corrected specific gravity value of electrolyte under 15°C

Measured temp of electrolyte	+45°C	+30°C	+15°C	0°C	-15°C	-30°C	-45°C
Corrected value on hydrometer	+0.02	+0.01	0	-0.01	-0.02	-0.03	-0.04

Sensor

Fuel level gauge sensor

The fuel level sensor is sliding resistor. Floating on the fuel level, the float rises and drops with the level's change. This change causes the resistor connected in circuit and shorted, and make the electromagnetic fuel level gauge changes. Connecting the fuel level alarm lamp's terminal with the indicator light can shows the lowest fuel level.

Water temp sensor

The temp sensor is a thermistor which is mounted in water jacket to detect the temp of cooling water. It is connected with the water temp gauge on instrument board. The wa-

ter temp sensor has a negative temperature coefficient and its resistance decreases with the increase of water temperature. Don't replace the sensor with a positive temperature coefficient one, or the water temp gauge can not work correctly.

Oil pressure alarm

Oil pressure alarm is a normal closed switch. It will be opened when oil pressure reaches and over the lowest pressure, so that circuit is disconnected and indicator goes out.

Vehicle service and maintenance

After the running-in period, the vehicle should be maintained daily and regularly according to its running condition and the driver's road sense. Normally, the advised mileage beyond which we should make vehicle maintained is 2000~2500km for first -class maintenance and 15000km for second -class maintenance. Do seasonal maintenance when spring or autumn is coming.

Daily maintenance

1. Do the following things before every time you dispatch vehicle. Check the fuel, oil and water for leak, and check if there are filled enough. Bleed each oil tube. Check that whether engine and instruments work correctly under different rotate

speed. Check steering system if it works correctly, and also brake system, tires, lamps, horn, wipers, and drag device. Check that if driver tools and accessories are taken and the loading is reasonable and reliable.

2. Keep it in mind when running that stop the vehicle and do some checking often. Check the engine and every instrument and other parts of chassis. Check the hubs, brakes, transmission, and rear axle for normal temperature. Check the driveshaft, hubs, leaf springs, steering system, and brake system for fixing. Check the tire for pressure. Check the wheel if there are nails in the tire tread and the wheel nuts are loose.

3. After drive for one day, following these. Clean the interior and exterior of the body and every parts of the chassis. Switch off the power. Fill in fuel, lubrication, cooling water. Apply lubricate on each oil site according to the condition. Cooling water without antifreeze should be drain away in frigid winter. Check the tire for pressure and inflate it if necessary. Clean the outside of the battery and check if it is fixed properly. The battery should be removed and taken to warm place if it is too cold. Five things should always be sufficient, which are water, fuel, lubrication, distilled water in battery, and tire pressure. At the same time, four things should be never leaks, which

are water, fuel, air in tires, and power.

First-class maintenance

The first-class maintenance includes retightening and lubricating. Besides items in daily maintenance, the following things should be done in first-class maintenance.

1. Check the air filter and fuel filter.
2. Check the engine, brakes, rear axle, steering gear, injection pump, and regulator for leak. Check oil and gear oil for sufficient. Clean every vent hole.
3. Clean the battery external surface and the hole on cover. Check the electrolyte for specific gravity and level. Check the wires for fix.
4. After cleaning the brush of the generator and the starter and the

dust of the commutator, check the generator switch's situation and lubricate the bearings. Check the timing line on injection for alignment. Check operating valve and wire for mobility.

5. Check the joints of fuel hose, brake hose, vacuum hose, and coolant water tube. Check the radiator and water pump for loose and leak, and retighten if necessary.

6. Check all pedal for free play and all control mechanism for fix, and adjust if necessary. Check and adjust the clearance of clutch friction plate, parking brake shoes, and running brake shoes. Check and fill up the brake fluid.

7. Check and adjust the steering gear. Adjust the free play of steering

wheel. Adjust the wheel for toe in and hub fixed. Check the rear axle drive gear nuts for fix.

8. Check leaf springs for fix. Lubricate the spring pin. Check the engine mounting, driveshaft center bracket, and universal joints for fix, retighten if necessary.

9. Check the wheel for facial pressure and fix (also the spare wheel).

10. Check the horn, turn signal lamps, stop lamps, higher & lower lamps, illuminations, and other instruments.

11. Apply lubrication to water pump, driveshaft, tie rod & drag rod, king pin, clutch release bearing, parking brake, door hinge, and other point need lubricated.

Second-class maintenance

The second -class maintenance includes checking, adjustment, and lubricating. Besides items in first -class maintenance, the following things should be done in second -class maintenance.

1. Check the engine cylinder for pressure, sweep out the remainder of combustion chamber. Then measure the wear degree of cylinder.
2. Check air gates for seal, adjust the clearance of them. Then do repairing, grinding, or adjusting.
3. Replace engine oil, oil filter element, and seal ring, clean the lubrication system of the engine.
4. Check and adjust the advance angle of injection. Check the injector

for pressure and atomization. Wash the fuel tank.

5. Check the thermostat before check the water drain on water pump.
6. Check the breather pipe on crankshaft case for damage and fix.
7. Check the engine and starter if they work normally. Especially check the brush and commutator for wear.
8. Check and adjust the release clearance of clutch.
9. Adjust the clearance between brake pad and brake (parking & running brake).
10. Tighten the transmission bearing cap. Check transmission for correct shift. Check and lubricate the trochometer flexible shaft.

11. After clean the transmission, rear axle, and steering gear, replace oil.

12. Check the frame for crack. Check bolts for loose. Check parts of cab and body for desquamation, and if all parts are fixed well.

13. After jack up vehicle so that all wheels move away from ground, start the engine and keep it running until felt hot. Then run it faster and slower discontinuously and listen carefully on the other hand to detect abnormal sound. Check the drive system and wheels for shake. Also check the other parts for loose and abnormal sound.

Seasonal maintenance

In order to keep some parts meet the requirements of climate on aspects

of technique and work request, do seasonal maintenance.

At the beginning of summer:

1. Cleanout water scale in the coolant system.
2. Replace lubrication for summer.
3. Fueling with #0 diesel oil specified in GB252.
4. Clean up the battery and adjust the specific gravity of electrolyte.

At the beginning of winter:

1. Clean up the battery and adjust the specific gravity of electrolyte. Then remove and charge it.
2. Install cold proofing devices, also skid prevention devices if necessary.
3. Fueling with #10 diesel oil specified in GB252.

Notice during runningin period

To improve vehicle's reliability and economical efficiency and also to use it longer, follow these during running-in period which is specified as 2000~2500km.

Before running-in period

1. Wash vehicle with water, and check all bolts and nuts for tighten.
2. Check the radiator for enough water, and check the engine, transmission, rear axle, and steering gear box for enough lubrication, also check battery and reservoir for liquid level. Check all tube conjunctions for leak.
3. Check the start system, drive sys-

tem, and steering system for correct operation.

4. Check electrical equipments and lamp instruments for correct operation, and check brake system for normal air pressure.

5. Check the shift gears for right; the control parts for normality, transmission for shifting smoothly, and the indicator should works correctly.

6. Check tires for proper air pressure.

7. Check that if driver tools and accessories are taken.

During the running-in period

1. The new truck should run on smooth road, and don't make it load more than 50% of its rated load before it traveled 800km and don't load

more than 75% before 1500km, or it will shorten truck's life and bring driver danger.

2. Don't run faster than the following speed.

First gear	7km/h
Second gear	14km/h
Third gear	26km/h
Forth gear	40km/h
Fifth gear	56km/h

3. At the beginning, check the rear axle, transmission case, driveshaft, and brake drum for temperature. Give ear to the sound of chassis when driving and stop to inspect if abnormal noise is heard, then shoot trouble before drive again.

4. Both the cooling water temp and oil pressure should be noticed very

well. Don't drive when the cooling water temp below 60°C, and don't drive in high speed when the temp is below the normal temp (between 80°C and 90°C).

5. Regularly check the engine cylinder cover, wheel nuts, car body, and the U-bolt of leaf spring for tighten. Check the steering system, brake system, and clutch for normal operation. Check steering wheel for free play. Check the brake pedal and clutch pedal for operating stroke and free play.

Note: Cylinder cover bolts should be tightened twice when the cylinder is cool, according to diagonal sequence from the center to sides.

6. The oil should be replaced after

2500km (do it when engine is hot), then it will be replaced again in second-class maintenance.

After running-in period

1. Replace engine oil and oil filter core. Replace oil in transmission case and rear axle, and replace lubrication in steering gear, also hub bearing grease.
2. Check all external bolts and nuts with specified torque.
3. Apply lubrication on all points where should be lubricated.
4. Do items of first-class maintenance.

Trouble shooting

Being used, the vehicle will often be broke along with it travels longer and longer. In order to recover vehicle to normal proper situation, also to prolong its life, the trouble must been find out and then been disposed in an effective way.

* To shoot troubles of engine, see Engine Operating Instruction Manual which every vehicle have been equipped.

Drive shaft trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Noise or vibration of driveshaft a. Worn universal joint b. Bending of driveshaft c. Loose couple flange or center bracket bolts d. Defective center bracket rubber sleeve e. Insufficient lubrication	a. Change spider direction or replace universal joint assembly b. Align or replace c. Retighten d. Replace e. Fill up after cleaning
2. Overheating center bracket a. Too much tight of oil seal b. Too bigger a inclination between driveshaft and crankshaft c. Insufficient lubrication	a. It will disappear along with travel longer b. Check and adjust the inclination c. Fill up regularly

Clutch trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Shaking clutch a. Overloading too much vehicle b. Not start in low gear c. Defective release bearing or insufficient oil d. Corrugated fin cracked, friction lining worn, loose rivet, damper spring broken, or damper fin broken down.	a. Load by rated load b. Start in first gear when loading much c. Clean, lubricate or replace d. Replace
2. Clutch Slip a. Thin friction lining, rivet reveal, or oil coat b. Weak pressure of diaphragm spring c. Too short free play of pedal d. Vehicle loads too much e. Not start in low gear f. The pedal is hold pressed when running	a. Clean, or rivet a new friction lining b. Replace c. Adjust to 3~5mm d. Load accord the rated load e. Start in low gear f. Change your bad driving habit
3. Clutch can't release completely a. Too long free play of pedal b. Wear or crack locking collar c. Crack or distort of wave sheet d. Broken damper spring	a. Adjust to 3~5mm b. Replace c. Replace d. Replace

Front axle trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Hard steering, steering wheel doesn't return well a. Insufficient lubrication of steering linkage mechanism b. Improper alignment of front wheel c. Improper toe in of front wheel d. Improper camber and caster of king pin e. Worn thrust bearing f. Insufficient pressure of tire	a. Apply lubrication on king pin and ball stud b. Adjust c. Adjust d. Check the linear for wear, and check knuckle and tie rod for deviation, replace if necessary e. Replace f. Inflate properly
2. Abnormal worn tire a. Improper position fix of front wheel b. Improper pressure of front tire	a. Adjust, and replace if necessary b. Adjust, and inflate

Trouble symptom and probable cause	Checking and remedy
3. Vibrate or oscillate a. Improper position fix of front wheel b. Worn king pin linear c. Improper pretightening of hub bearing d. Worn hub bearing e. Loosen ball stud of tie rod f. Loosen nuts on U-type bolt g. Loosen hub nuts h. Distorted wheel i. Unbalance wheel j. Wheel deviation k. Asymmetry or insufficient inflation of tire	a. Adjust, and replace if necessary b. Replace linear c. Adjust d. Replace e. Replace all end parts of tie rod f. Tighten g. Tighten h. Replace i. Adjust and balance j. Adjust k. Adjust, inflate
4. Grease leak from hub a. Worn seal b. Loosen hub cover c. Too much grease	a. Replace b. Tighten c. Apply grease with specified volume

Transmission trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Gears break off a. Worn or damaged coupling b. Loosen nuts or bolts c. Improperly adjusted linkage d. Distorted, worn, or crack spring or locking ball e. Worn shift fork and groove face f. Worn synchronizer hub and sleeve g. Worn or damaged synchronizer hub and engagement sleeve h. Worn or damaged bearing of input shaft and output shaft i. Worn or damaged thrust ring and thrust washer j. Loosen bolts which mount transmission to engine	a. Replace the coupling b. Tighten c. Readjust d. Repair or replace parts e. Replace shift fork f. Replace g. Replace h. Replace bearing i. Replace j. Tighten
2. Gears hard to mesh a. High speed idle speed of engine b. Improper meshing of clutch c. Coherence of clutch plate d. Bend clutch slip sleeve	a. Adjust the idle speed b. Adjust clutch c. Repair or replace d. Replace

Trouble symptom and probable cause	Checking and remedy
e. Worn or damaged bearing or input shaft or output shaft f. Worn or damaged guide bearing of crankshaft g. Worn cone and cone ring of synchronizer h. Loose control mechanism or improper adjustment i. Worn shift lever j. Improper lubricated knob k. Insufficient or low viscosity lubrication	e. Replace bearing f. Replace bearing g. Replace h. Tighten or adjust i. Replace j. Apply lubrication k. Fill up or replace
3. Noise from transmission a. Loosen bolts which mount transmission to engine b. Worn gear or bearing	a. Tighten b. Replace
4. Hard to shift a. Improper adjustment of shift knob b. Worn hinge joint or pin c. Worn control mechanism d. Loosen bolts or nuts	a. Adjust shift knob b. Replace c. Replace d. Check and tighten

Rear axle trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Abnormal noise from rear axle a. Worn or damaged pinion bearing b. Worn or damaged side bearing of differential c. Loosen pinion bearing d. Loosen differential bearing e. Worn pinion and ring gear f. Worn thrust washer g. Worn differential spider h. Worn pinion and ring gear i. Worn or damaged side gear and planetary gear j. Loosen tightening bolts of ring gear k. Improper contact between ring gear and pinion l. Worn pinion spline m. Worn rear half shaft spline n. Loosen hub bearing o. Worn hub bearing	a. Replace bearing b. Replace bearing c. Adjust preload d. Adjust preload e. Adjust tooth space f. Replace g. Replace h. Replace i. Replace j. Tighten k. Replace or adjust l. Replace m. Replace n. Replace o. Adjust bearing preload

Trouble symptom and probable cause	Checking and remedy
p. Loose tightening bolts of differential case q. Insufficient oil r. Bad oil	p. Tighten q. Fill up r. Replace
2. Half shaft seal Leaking a. Jammed rear axle vent hole b. Bad lubrication c. Tight between pinion and driven gear, tight bearing, and tight over on bearing	a. Fill up and readjust b. Replace lubrication accord the season c. Readjust
3. Hot rear axle a. Oil leak because of damaged seal gasket, loosen oil drain plug, and jammed vent hole, result in insufficient lubrication b. Bad lubrication c. Tight over between pinion and driven gear, tight over on bearing	a. Fill up and readjust b. Replace lubrication accord the season c. Readjust

Steering mechanism trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Hard to steer and steering wheel with bad return a. Distorted main shaft, sliding shaft or column b. Loosen universal joint or column cover c. Improper rotation of steering wheel bearing d. Insufficient lubrication of steering linkage mechanism e. Low pressure tire	a. Replace parts b. Replace universal joint c. Replace parts d. Fill up lubrication e. Inflate properly
2. Shake of steering wheel, instable steering a. Loosen steering linkage mechanism b. Unbalance front wheel c. Pendulate too much d. Damaged grinding wheel e. Heavy wear or too big clearance of steering linkage mechanism	a. Tighten properly b. Balance the wheel c. Adjust d. Replace e. Replace parts

Trouble symptom and probable cause	Checking and remedy
3. Wander front wheel a. One of the front brake or damper is disabled b. One of the front tire low pressure c. Disalign or break of the front leaf spring d. Damaged grinding wheel e. Improper toe in of front wheel	a. Adjust the brake clearance or replace damper b. Inflate tires c. Check front spring assembly d. Adjust or replace e. Readjust
4. Power steering bump leaking a. Damaged oil seal or O ring b. Damaged oil seal locking nuts or oil-drain plug	a. Replace b. Repair
5. Heavy steering a. Bad steering gear b. Bad steering gear c. Improper preload sector gear bearing	a. Replace piston set b. Check pump for output pressure, replace if necessary c. Adjust the pretightening force of bearing

Parking brake failure shooting

Trouble symptom and probable cause	Checking and remedy
a. Big clearance between brake pad and drum b. Oil coat on brake pad or drum c. Badly worn friction pad d. Brake cable's maladjustment, break joint, or circlip drop out	a. Adjust the clearance until both its upper and lower is 0.65mm b. Clean with water c. Replace d. Adjust, weld the joint, install a circlip

Running brake trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Running brake failure a. Crack of brake hose or tube b. Failed valve in master cylinder c. Failed vacuum parts	a. Repair or replace b. Check and replace c. Check the check valve and vacuum pump for leak; Weld the vacuum pump, replace joints of hoses and tubes
2. Bad brake effect a. Big pedal free play b. Air in brake system, oil leaking from the joints, or jammed brake tube c. Improper clearance between brake pad and drum d. Jammed piston in wheel cylinder or main cylinder	a. Adjust until it is 5~8mm b. Bleed system, deal with leak, or repair c. Adjust the wheel cylinder piston d. Repair or replace

Trouble symptom and probable cause	Checking and remedy
3. Wander when brake a. The clearances between brake pad and drum are not equal from wheel to wheel d. Distorted brake drum c. Oil coat on brake pad or drum d. Unequal tire pressure e. Broken return spring f. Swelling leather ring in wheel cylinder g. Distorted frame, disalign front suspension, or improper orientation of front wheel	a. Adjust clearances to the same b. Replace c. Snag the brake pad with emery cloth after clean it with petrol or soda water d. Inflate by specification e. Replace f. Replace g. Repair, replace, or dispose by fitting way
4. Hot brake a. Small clearance between brake pad and drum b. Broken or failed return spring c. Swelling leather ring in wheel cylinder	a. Adjust b. Replace c. Replace

Wheel trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Badly worn tire a. High or low tire pressure b. Too much overloading or dissymmetrical loading c. Loosen wheel hub bearing d. Improper toe-in of front wheel e. Frequent emergency brake, flare up when starting, or accelerate suddenly f. No wheel transposition	a. Inflate by specification b. Load as rated c. Adjust d. Adjust the toe-in until it is 3~6mm (for diagonal tire) and 1~3mm (for radial tire) e. Drive stably, don't drive too fast f. Transposition regularly

Suspension trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Broken leaf spring a. Load too much or partial to one wheel b. Frequent emergency brake, drive too fast on uneven road c. Loosen U-bolt. Loosen or broken spring clamp d. Failed damper	a. Load properly as rated b. Keep your mind on driving, so that avoid emergency brake and slower speed on uneven road c. Tighten U-bolt. Tighten or replace spring clamp. d. Repair or replace
2. Noise in driving	Check and replace rubber suspension part
3. Bad absorption a. Insufficient damping fluid b. Having no maintaince regularly c. Damaged rubber collar	a. Fill up as rated b. Maintain regularly c. Replace

Electrical parts trouble shooting

Trouble symptom and probable cause	Checking and remedy
1. Horn brows continuously a. Incorrect connection b. Failed grounding or spring in circuit	a. Check and connect again b. Disassembly and replace
2. Insufficient electric capacity a. New battery without circulation of charge and discharge, or not been charged to rated quantity b. Generator without charge or enough charge c. Damaged pole plate d. Low level or improper specific gravity of electrolyte	a. Charge as specified b. Check connections and repair c. Check and repair d. Fill up electrolyte and charge battery with it separated form vehicle
3. Too much waste of electrolyte a. High charging amperage. Electrolyte vaporize or overflow b. Leak battery c. Damaged or breakdown cell divider	a. Reduce the frequency of starting and shorten the starting time. Decrease amperage of charging current. b. Replace battery case c. Check and repair
4. Self-discharge of battery a. Battery output cable short to ground b. a short circuit between pole plates c. Damaged or breakdown cell divider d. Dirt external surface of battery case. Metal impurities mixed into electrolyte	a. Clean the output cable, dispose the short b. Check and repair c. Check and repair d. Clean the battery case. Tighten shield. Replace electrolyte if necessary

Appendix one

Automotive model table of HFC1020 series trucks

No.	Vehicle type	Engine type	Overall size (l×w×h) (mm)	Rear body size (l×w×h) (mm)	Wheel base (mm)	Tyre	Max load capacity
1	HFC1020K type truck	YSD490Q	5270×1868×2100/ 5090×1868×2100	3580×1770×370/ 3330×1770×370	2600/2800	6.50 - 15/ 6.50 - 16	1500/1800/1700
		YND485Q	5090×1868×2100	3330×1770×370	2600	6.50 - 16	1500
		YND485Z	5090×1868×2100	3330×1770×370	2600	6.50 - 15	1500
		HFC4DA1	5400×1868×2200	3580×1710×370	2800	6.50 - 16	1700
2	HFC1020KR1 type truck	YSD490Q	5090×1868×2100 5270×1868×2100	3000×1770×370/ 3580×1770×370/ 3250×1770×370	2600/ 2800	6.50 - 15/ 6.50 - 16	1500/1800/1700
		YND485Q	5090×1868×2100	3000×1770×370	2600	6.50 - 16	1500
		YND485Z	5090×1868×2100	3000×1770×370	2600	6.50 - 15	1500
		HFC4DA1	5400×1868×2200	3250×1710×370	2800	6.50 - 16	1700
3	HFC1020KW1 type truck	YZ485ZLQ YD480Q	4660×1742×2100	2920×1600×350	2400	6.00 - 14	980
4	HFC1020KWD type truck	YD480Q	4660×1742×2100	2920×1600×350	2400	6.00 - 14(single rear tire)	980

Appendix two

Lubricating table of the entire vehicle and tightening torque table of main fastening pieces

Table one: Main lubricating position and the lubricant name(for reference)

No.	Lubricating position	Symbol of the lubricant	Number of the ubricating point	Dosage for each vehicle	Remark
1	front、rear leaf spring pin and shackle pin	G	2		
2	universal joint of the driveshaft	G	3		
3	spline of the driveshaft	G	4		
4	supporting bearing of the intermediate driveshaft	ZL	4		
5	battery terminal	H	4	suitable	
6	transmission	Z		1.7L	
7	oil cup of the brake master cylinder	Y	4		
8	clutch pedal shaft and brake pedal shaft	G	4		

No.	Lubricating position	Symbol of the lubricant	Number of the ubricating point	Dosage for each vehicle	Remark
9	steering knuckle pin and ball pin of the drag link and the tie rod	G	each 2		
10	steering gear	Z	4	suitable	
11	bearing of the front、rear hub	ZL	each 2	suitable	
12	front bearing of transmission primary shaft	G	4		
13	hinge of the door	G			
14	lock of the door	G	2		
15	power wiper	G	2		
16	rear axle	Z	4	1.75L	
17	ground wire of the chassis wiring harness	H	4-2	suitable	
18	ground wire of the engine	H	4	suitable	
19	engine	J	1	5.5L	

Table two: Description of the oil in lubricating table (for reference)

Symbol in the table	Lubricant
J	L-ECC grade GB11122-89
G	GB491-87 2# lime base grease
ZL	GB5671-85 universal lithium base grease
B	half HV-20 gasoline engine oil (GB2537) and half 45# transformer oil (GB2536)
Y	brake fluid JG3(GB10830)
Z	medium-load vehicle gear oil(GL-4) 85W/90
H	industrial vaseline

Table three: Tightening torque of main fastening pieces (for reference)

Number	Name	Tightening torque(N·m)
1	Nuts connected the transmission and the clutch housing	80-110
2	Intermediate driveshaft flange nuts	46-62
3	Nuts of steering tie rod ball pin	98-127
4	Nuts of steering drop arm	196-250
5	Transmission flange nuts	180-220
6	Diving gear flange nuts	245-274.4
7	Nuts on the tyre	287-346
8	U-bolt of the front leaf spring	157-216
9	U-bolt of the rear leaf spring	157-216
10	Fixing nuts of the steering straight arm	316±35
11	Fixing nuts of steering flexural arm	316±35
12	Fixing nuts of steering wheel	54-68.6

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