ENFLY DQ400 DQ404 DQ450 DQ454 DQ550 DQ554 DQ600 DQ604

WHEELED TRACTOR

OPERATE MANUAL

SHANDONG ENFLY GROUP

YANTAI DONGQI AGRICULTURAL EQUIPMENT CO., LTD.

Statement

Dear user:

Thank you for purchase of our DQ 40 Series Wheeled tractors To help you properly and efficiently use the tractor, we hereby state the following information:

1. Please read carefully this instruction before you use the tractor whether you have driving experience or not. It will help you properly and efficiently use the tractor.

2. Please carefully read the instructions for the engine and implements used with the tractor before you use the tractor and properly operate and maintain the tractor as required in the instructions in order to obtain the optimal performance. In this way, you can make more profit and prolong the lifetime of the tractor.

3. The user should not modify the tractor to avoid degradation of performance, occurrence of accidents and voidance of guarantee.

4. The tractor must be operated, maintained and repaired by those who are familiar with the tractor's features and have adequate safety knowledge.

5. Always follow the "Road Traffic Act of The People's Republic of China", "Road Traffic Regulations" and other regulations related to safety and road traffic so as to prevent accident.

6. Always use the tractor in compliance with the instruction. Otherwise, it may cause degradation of performance or faulty.

7. The application, specification and efficiency of the tractor and the farm implements used with the tractor may vary owing to diverse agriculture and earth conditions in different regions. Please choose appropriate data and implements depending on the actual condition.

8. This instruction should not be regarded as a quality guarantee. We provide no guarantee to the data, illustration and information in this instruction.

9. The information in the instruction is updated on the date of publication and is subject to change without notice.

General Information

This instruction describes the precautions, specification, running in, operation, maintenance, adjustment, troubleshooting and repair of the DQ 40 Series wheeled tractors. This instruction is a necessity for operators and repairmen and a reference for users of farm implements

In this instruction, the warning sign means important safety information. When you see this sign, you should be aware of the possible injury and damage.

⚠ **Warning: Inconformity may cause death or serious injury.**

⚠ **Caution: Inconformity may cause medium or slight injury.**

● **Important: Precaution to avoid damage to machine or pollution of environment.**

Carefully read the information following the sign and transfer the information to other operators.

This instruction is an important part of the product and is supplied with the tractor. Please properly keep it.

If you have any questions when you use the instruction, please consult us at 0536-95105501.

Intended Application

DQ 40 series wheeled tractor is a multi-purpose medium-size wheeled tractor. It is characterized with compact structure, easy operation, smooth steering, powerful traction, diverse purposes and easy maintenance. The applications include: tilling, harrowing, seeding and harvesting etc. with suitable farm implements, transport with trailer, the load ratio (mass ratio of trailer and load to the tractor) no greater than 3; return of straw to field by using straw chopper connected to the power output shaft; power source for pumps and thresher. Properly use farm implements in compliance with the instruction to make best cost effectiveness. If the tractor is not used for intended applications, the user must follow the operation and maintenance instructions of the manufacturer.

Content

1. Precautions

1.1 Safety rules and precautions

Read before Operation

1. Must carefully read and understand the instruction and warning signs;
2. Must remember the proper operation procedure.

Qualified Operator

1. The operator must have sufficient consciousness.
2. The machine can not be operated by ill, drunk, sleepy, pregnant, colorblind or childish (younger than 18 years) persons.
3. The driver should be specially trained, officially licensed and regularly examined.
4. The new operator should operate the machine at low speed.

Driver's Clothing

The driver should wear closefitting working clothes. Do not wear loose coat and shirt. Do not put on a necktie.

Warning:

1. Please ensure safe operation in order to protect your life and property and to relieve the worry of your family;
2. Look around to ensure that no obstacles are in the way and no persons stay between the tractor and the trailer before you can start the tractor;
3. Always stay on the driver's seat when you start or operate the tractor. When you start the tractor, ensure all gear levers are at neutral position, power output joystick and drive joystick are at disengaged position, and lifter joystick is at lower position;

4. Do not start the engine by bridge connection. Otherwise, the tractor will move out of control once the gearbox is engaged;

5. The pedals should move smoothly without any obstacle. Do not place any objects that may obstruct the movement of pedals. Do not place any object that may slide or roll when pressing the pedals. Do not place additional blankets or cushions around the pedals. Ensure all pedals can return to the original positions without any obstacle.

6. Never get on or off the tractor when it is running. Never stay under the tractor for inspection or maintenance when the engine is working.

7. The driver should stop the tractor, withdraw the key and place all gear levers to neutral positions before he she can get off the tractor.

8. When the tractor is used for transport purpose. Ensure the left and right brake pedals are interlocked.

9. When the tractor is running at high speed, do not make sharp turn or sudden unilateral braking.

10. Do not operate the tractor in overload condition to avoid damage to parts.

11. Never run downslope with gear level at neutral position or with clutch pedal pressed. Never shift the gear lever when the tractor runs upslope or downslope.

12. When the tractor is running, do not place foot on the rake or clutch pedals.

13. Sufficient lighting should be provided when the tractor is working in nighttime.

14. Spark eliminator should be installed on the tail pipe when the tractor is working at farmland or farmyard.

15. The driver should watch traffic signs and observe traffic rules when he/she is driving the tractor on roads.

16. Do not drive the tractor on the roads near culvert, cave or dike where the roadbed has weak structure. The weight of the tractor may collapse the roadbed. Choose other roads with solid roadbed.

17. Open the drain valve and discharge the retained water every 50 workhours to avoid the clogging of vent which may cause explosion.

18. When recharging the battery, ensure the vent is unclogged and keep away from open flame. After recharging is completed, shut off the power at first to avoid explosion.

19. After every 50 workhours, open the drain valve to discharge water from air storage to avoid explosion due to clogging at vent.

Handling of Fuel

1. The fuel is flammable material. Keep away from fire, flame or spark when handing fuel.
2. Shut down the engine before refilling fuel.
3. Never smoke when you refill fuel or repair fuel system,
4. Use clean cloth to wipe off spilled fuel or engine oil.

Disposal of Waste Oil

1. Properly dispose the waste engine oil.

2. The waste battery electrolyte may pollute electrolyte. Properly dispose it.

In Case of Leakage

Do not touch by band the leaked oil with high pressure. Use paperboard to detect the leakage.

Warning:

1. For new tractors or tractors after major repair, perform running-in as required.

2. Use proper liquid for the tractor. Settlement process for at least 48 hours to clarify the fuel, Use appropriate filter to filter the lubricant for transmission system

3. Regularly inspect guide wheel, steering rod for loose bolting. Tighten the loose connection;

4. Inspect oil, electric and cooling water systems before you start the tractor. Watch the reading of the instruments after the tractor starts working.

5. Counterclockwise rotate the adjusting wheel(under the seat on the right) to lock the farm implement when the driver run the tractor with implement so as to avoid unintentional touch of the lifter joystick that may cause falling of implement. The driver should lower the implement to the ground before he/she leaves the tractor.

6. Shield must be installed for the power output shaft. Persons should keep away from the power output shaft. When the power output shaft is loaded, the tractor should make sharp turn to avoid the damage to the universal joint and the power output shaft. When the power output shaft is out of use, place the lever on disengaged position.

7. If you park the tractor on a slope, you must use the parking brake and chock the rear wheels.

8. Inspect if the tractor and the farm implement are compatible before you drive the implement using the power output shaft. During tilling operation, the angle between the power output shaft and the universal joint transmission shaft should be no greater than 15° ; when the tractor turns and the farm implement is lifted, the angle between the power output shaft and input shaft and transmission shaft should be no greater than 30° ; at this time, the rotary tiller's blade is no less than 250mm above ground; never lower the rotary tiller into earth before the power output is connected so as to avoid the damage to the filler and the tractor clutch.

9. The driver should not leave the tractor until the tractor is parked and the engine is shut down. If you have to park the tractor on a slope, you should engage the gear lever (at forward position for upslope placement, at reverse position for downslope placement). In winter with temperature less than 0℃ , for tractor without antifreeze, you must open the drain valves to discharge all cooling water from water tank and engine with the engine running at idle speed, and then shut down the engine so as to avoid frost of engine and water tank.

10. The front driving axle can be used only on farmland and muddy roads to avoid wheelspin. Never use the front driving axle in other condition. Otherwise, the tires and transmission system may be worn early.

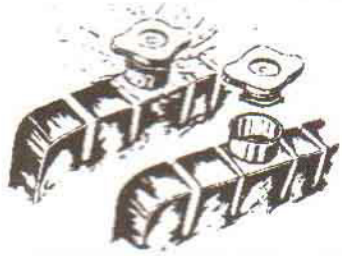
11. The installation and adjustment of tires can only be performed by skillful professional technicians with special tools, Improper installation of tires may cause serious accident.

12. Must use qualified parts for repair of the tractor.

13. Make proper seasonal maintenance of tractor.

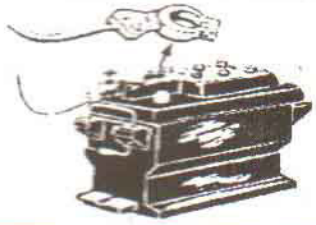
Remove of Radiator Cap

Special care should be taken when you remove the radiator cap if the engine remains hot. Operate the tractor at idle speed for several minutes, then shut down the engine. After that, partially loosen the cap to release pressure. At last, remove the cap.



Repair of Electrical Devices

1. Disconnect the ground wire from the battery before you can repair electrical devices.
2. Or turn off the main switch.



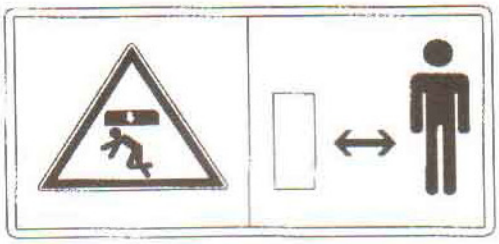
Abnormality of Tractor

Do not operate an "ill" tractor. Especially, in case of no oil pressure, low oil pressure, high water temperature or abnormal sound or odor, you should immediately stop the tractor and repair it. You should shut down the engine before you refill lubricant or make adjustment.

1.2 Warning Signs

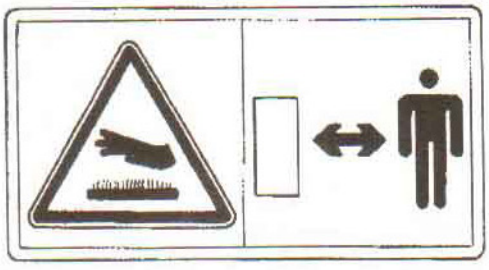
Warning:

1. The warning signs should be clean and legible. If they are contaminated, wash them with soap and water and wipe them with soft cloth.
2. If warning signs are lost or illegible, immediately contact the dealer or manufacturer and ask for new sings.
3. When you replace a part with warning sign attached on it, replace the warning sign together with the part.
4. Must strictly observe the warning signs to ensure personal safety.



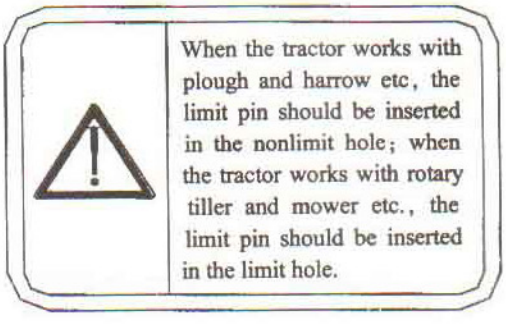
Meaning: When the lifter is working, keep away from the machine! Otherwise, you may be injured by heavy weight!

Position: rear side of splashboard



Meaning: Keep away from the hot surface of a working machine. Otherwise you may be scalded!

Position: on the muffler and water tank



Meaning: Describe the position of limit pin

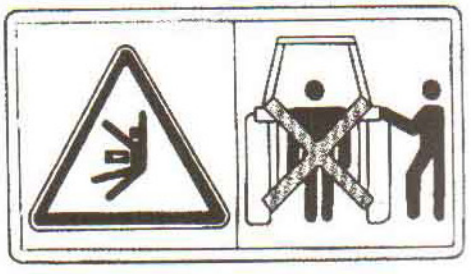
Position: on left limit level

Meaning: Never ride the tractor on positions other than the seat Otherwise, you may fall out of the tractor!

Position: inner side of splashboard

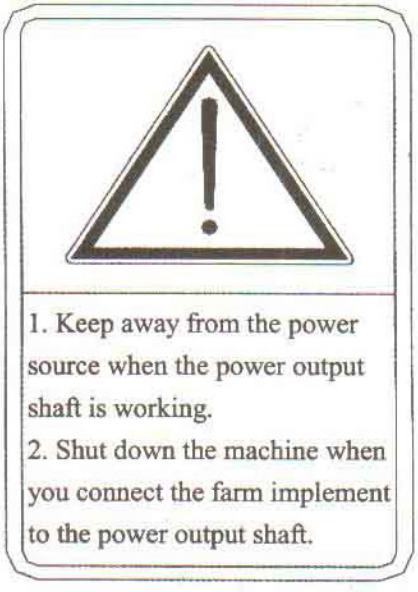
Meaning: Never smoke when you refill fuel or repair fuel system; use clean cloth to wipe off spilled fuel or engine oil; shut down the engine before you refill fuel.

Position: on the cover near the fuel tank



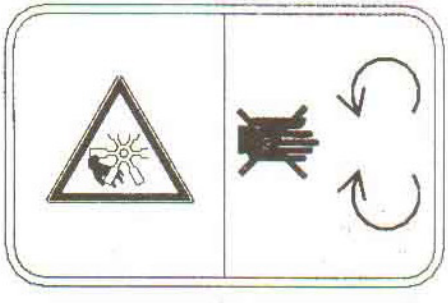
Meaning: When the lifter is working, keep away from the machine. Otherwise, you may be injured by heavy weight!

Position: rear side of splashboard



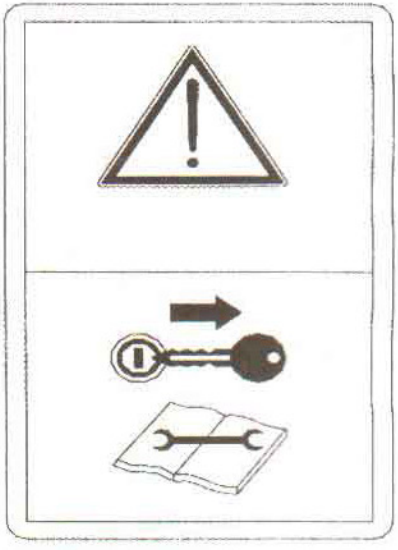
Meaning: Keep away from the power source when the power output shaft is working; shut down the machine when you connect the farm implement to the power output shaft

Position: rear end of rear axle



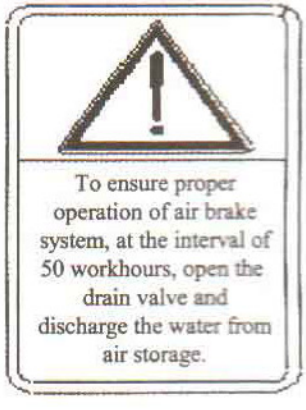
Meaning: When the generator is working and belt is moving, do not reach your hand to the belt to avoid injury.

Position: Shield of generator



Meaning: Shut down engine and withdraw the key before you perform repair, maintenance and adjustment as required by the instruction.

Position: front of instrument panel



Meaning: To ensure proper operation of air brake system, at the interval of 50 workhours, open the drain valve and discharge the water from air storage.

Position: Air storage

1. Operation

Caution: Proper operation of the tractor can get the best performance, reduce the wear and tear and prevent the occurrence of accidents so as to ensure that the operator can successfully complete the task on farmland or roads in an efficient and safe way with low consumption.

2. Product description

2.1.1 Characteristics

This instruction describes the operation, maintenance, adjustment and troubleshooting of DQ 40 series wheeled tractors, including DQ400/404/450/454/550/554/600/604.

DQ 40 series are multipurpose medium-sized wheeled tractors for agricultural use. They are characterized with compact structure, easy operation, smooth steering, powerful lift and easy maintenance etc.

2.2 Controls and instruments

2.2.1 Controls

Controls

1-Instrument panel;

2-Interlock of brake pedals

3-Left and right brake pedal

4-Parking brake lever;

5-Accelerator joystick;

6-Accelerator pedal;

7-Differential lock pedal

8-Distributor joystick

9-Hydraulic output joystick (optional)

10-Front drive joystick (for four wheel drive)

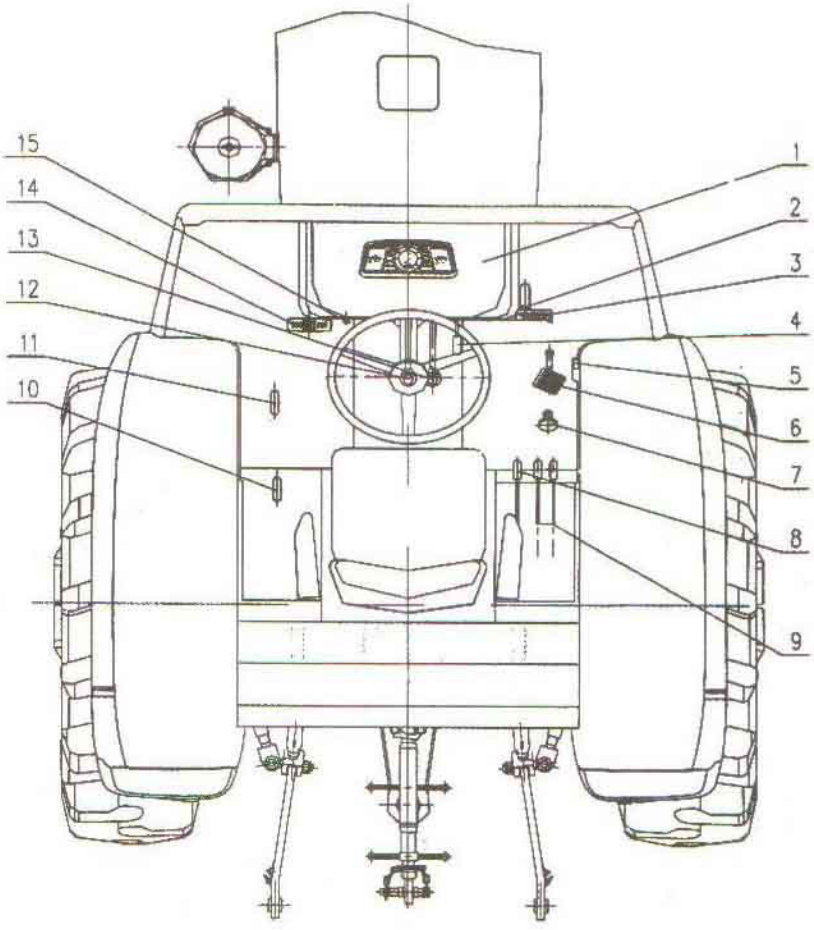
11-Power output joystick;

12-Primary gear lever;

13-Secondary gear lever;

14-Clutch pedal;

15-Shutdown cable.

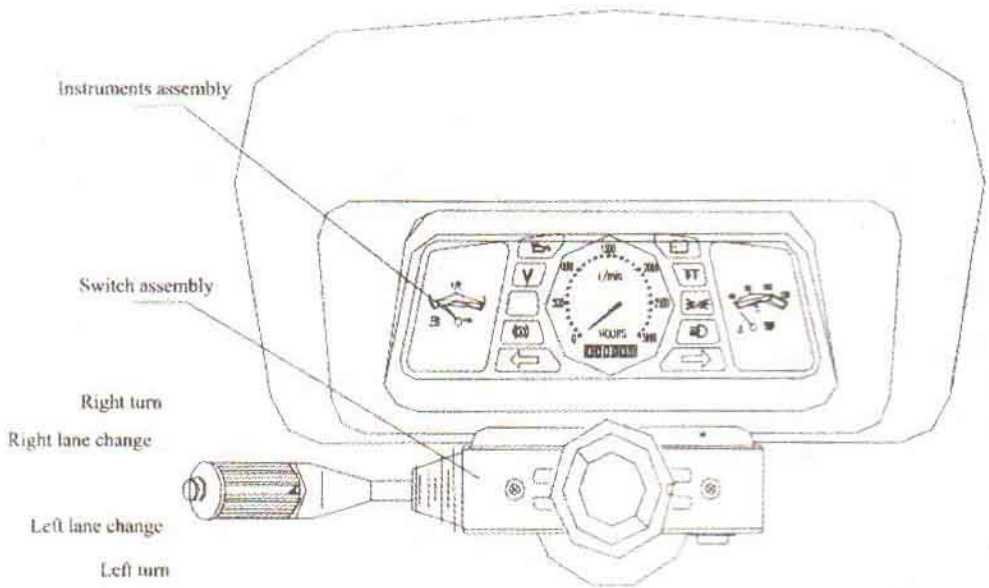


2.2.2 Instruments and switches

Instruments and switches

Instrument assembly and switch assembly are used for this series.

The instrument assembly includes thermometer, fuel gauge, engine tachometer, indicators for turn signal, high/low beam and side light, charging alarm lamp, engine oil pressure alarm lamp, air pressure alarm lamp etc.



Engine Tachometer: Show the RPM of the engine. The number indicates the RPM of the engine (r/min = rotations/minute).

Thermometer: Show the temperature of the coolant for engine. The scales are 40℃, 60℃, 80℃, 100℃, 115℃ in sequence with error ± 5℃.

Fuel gauge: The fuel gauge indicates the fuel fullness in the fuel tank. Pointer to I indicates full fuel tank. Pointer to 0 indicates low fuel level in fuel tank. If the pointer points to 1 but there is no or low fuel in the tank, the fuel level sensor or fuel gauge may be faulty. If the fuel tank is full but the pointer still points to 0, the fuel level sensor or fuel gauge may be faulty, Repair the faulty instrument.

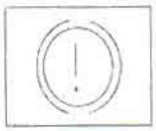
Charging indicator (red)

This lamp lights up before you start the engine. If the lamp does not light up when the engine is starting, repair the lamp. Under normal condition, the lamp is off after the engine starts, If the lamp is still on, repair generator.

Engine oil pressure alarm lamp (red)

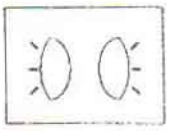
It lights up before you start the engine, After the engine starts, it should be off if the

Lubricant system pressure is in normal condition. When the engine is working at idle speed, the lamp may be on because of low pressure in lubricant system at idle speed. It is a normal condition. If the engine is working at normal speed and the lamp is on, immediately shut down the machine and inspect it.



Air pressure alarm lamp (red)

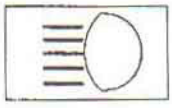
When the air pressure in air brake system is lower than 0.4Mpa, the lamp is on indicating fault in air system. Repair the fault. Before the engine starts, the air pressure is insufficient. So, it is normal that the lamp is on at this time.



Side lights indicator (green)

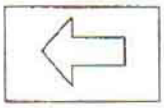
If you park the tractor on a road at night, you should turn on the side lights to remind drivers of other vehicles so as to ensure safety. Place the light switch to "side light" position to light up the side lights.

High beam indicator (blue)



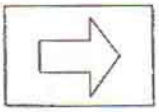
When the light switch is at "headlight" position and the high/low beam switch is at "high beam" position, this indicator lights up.

Left turn indicator (green)



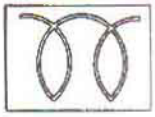
When you turn on the switch for left turn, this indicator lights up.

Right turn indicator (green)



When you turn on the switch for right turn, this indicator lights up.

Preheat indicator (yellow)



When you turn on the switch for preheat, this indicator lights up.

Switch assembly

The switch assembly is intended to control electrical devices. It has the following functions:

1. Turn: Move the switch lever forward or backward for 15° to light up right or left turn signal. After the turn, move the switch lever to the original position. Move the switch lever forward or backward for 8° to light up the right or left lane change signal. As you release the steering wheel, the switch lever automatically returns to the original position.

2. Horn: Press the button at the end of switch lever to sound the horn so as to warn walkers and vehicles.

3. Rear working light: Rotate the sleeve on the switch lever to light up the rear working light for lighting in nighttime.

4. Headlight: Press the toggle switch on the switch assembly. "1" position for side light. "2" position for side light and headlight. Move upward or downward the switch lever to change over between high beam or low beam.

Caution: Before the engine runs, turn the key to the ignition position, Check if the three red alarm lamp is on. If not, the bulb or wire may be faulty. Immediately repair fault. When the tractor is working the driver should keep watching all instruments and indicators. If case of abnormal condition, immediately shut down the tractor and repair it.

2.3 Start of Engine

Caution: Carefully and thoroughly inspect the tractor before use to minimize risk and prevent accident, Regularly remove the debris form water tank to prevent fault due to heat accumulation in engine. The tractor equipped with a reaper works in farmland under an adverse condition for heat radiation. To ensure stable and continuous work of engine, it is recommended to install auxiliary heat radiators.

2.3.1 Preparation before start of engine

1) Carefully inspect the system before start. Ensure tight and reliable connections and proper function of control system. Inspect for leakage of oil, water and air.

2) Check the lubricant level in engine sump, gearbox-rear axle and hydraulic system, Ensure enough cooling water in the water tank radiator. Ensure enought fuel in the fuel tank.

3) Ensure the primary gear lever, power output shaft joystick, front drive axle joystick are at neutral position and the distributor joystick is at lower position.

4) Move the shutdown cable lock to release the shutdown cable and energize the fuel injector. For new tractors and tractors after major repair or long-term shutdown, you should bleed air from the oil lines before start to ensure the smooth start of the diesel engine. The procedure is: loosen the bleed screw at diesel oil filter, suck oil out of oil lines with a manual pump until no air is present in the oil; tighten the bleed screw at diesel oil filter; loosen the bleed screw at fuel injector; bleed the air using the same method.

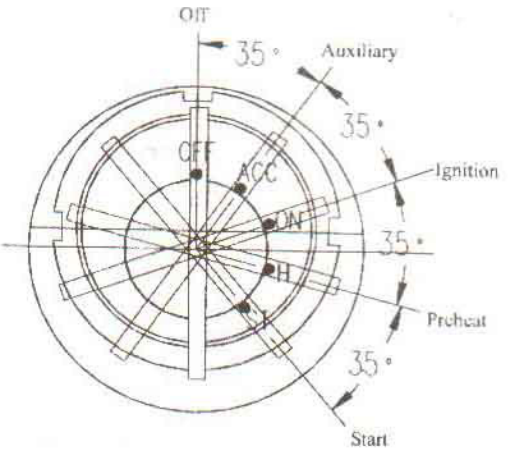
5) Place the accelerator joystick to the half travel position.

2.3.2 Start of engine

Caution: After the engine starts, immediately release the key and it will automatically return to the "On" position (see figure of ignition lock). Otherwise, the running engine will conversely drive the starter motor that may cause damage to the starter motor. A continuous start operation should not last for more than 15s. The interval between two start operations should be no less than 2min. To protect the battery, do not repeatedly start the engine for more than 3 times in a short time. If the engine can not start after three repeated start operations, you should diagnose the tractor before you start it again.

Normal start (ambient temperature above-5℃):

Press the pedal of main clutch. Clockwise rotate the key to "ON" position to power on; rotate the key to "ST" position to start the engine; the key automatically returns to "ON" position.



Start at low temperature (ambient temperature below-5℃):

Preheat the engine when you start it at low temperature (below-5℃). Place the accelerator joystick at high speed level. Clockwise rotate the start switch to "preheat" positoin for 15~20s, then ratate to ST position to start the engine. After engine starts, the key automatically returns. Place the accelerator joystick at low speed level.

Start at very cold weather:

If the above methods fail, you may:

1) Withdraw the engine oil in sump, heat it to (80℃~90℃) and refill it into the sump. Stir the engine oil when you heat it to avoid chemical change of engine oil due to overheat.

2) Fill hot water (80℃~90℃) into cooling system until the discharged water reaches 40℃, Then start the engine as per the procedure for low temperature condition.

Caution:

1) Never start the engine in case of low water in water tank and low oil in engine sump.

2) After the engine start, if you decrease the accelerator and the engine runs too fast, you should immediately shut down the engine. To shut down the engine, use a wrench to remove the nut on the high pressure fuel pipe connecting fuel injector to nozzle, Withdraw the fuel pipe to cut off the fuel supply.

2.3.3 Run of engine

(1) After the engine starts, immediately lighten the accelerator and allow the engine to run at idle speed. Check the engine oil pressure and ensure it is no less than 98kPa (1kgf/cm^2, the oil pressure indicator off).

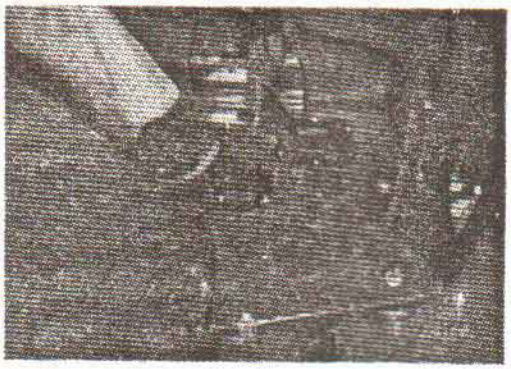
(2) After the engine starts, do not immediately run at full load, You should run the engine at medium speed with on load. When the coolant temperature goes up to 60℃ or more, you can increase the speed for full load operation.

(3) Gradually increase the speed and load. For newly started engine, do not suddenly run at high speed.

(4) When the engine is running, regularly inspect engine oil pressure and coolant temperature. Under normal operation, the coolant temperature is between 85~95℃ and the engine oil pressure is between 294kPa~490kPa.

Important: In no case should the engine oil pressure be less than 98kPa. If so, immediately diagnose the machine and repair it.

2.4 Start of tractor



1. When the engine runs at low speed, press the clutch pedal, then place the gearbox shift lever to the desired position.

2. Press down the manual brake lever to release the parking brake to ensure the proper function of brake.

3. Sound the born and look around for obstacles.

4. Gradually increase the engine speed and release the clutch pedal to make smooth start of the tractor. After the tractor runs, immediately release the clutch pedal to avoid friction on clutch.

5. Gradually enhance the accelerator (1) to allow the tractor to run at the desired speed.

6. When the tractor is running, do not decrease the speed by partial engagement of clutch, and do not always put the foot on the clutch pedal to avoid friction on release lever and friction disc.

Caution: To avoid early damage of transmission gears and clutch, never use high speed level to start the tractor. Before start, must release the parking brake to avoid damage of it.

2.5 Turn of tractor

When you turn the tractor on a road, at first press the horn switch to warn, then turn the tractor. If the tractor is running at a high speed, at first decelerate the tractor. For an obtuse bend, early and slowly rotate the steering wheel with small rotation. For a sharp bend, late and fast rotate the steering wheel with great rotation.

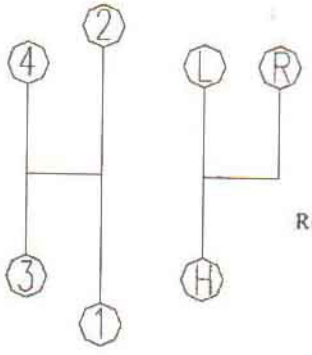
When the tractor turns at s sharp bend or on loose earth, the front wheel may sideslip. You can press the brake pedal on the corresponding side at the same time when you rotate the steering wheel to facilitate the turn operation.

Warning: 1. When the tractor is running at a high speed, never make sharp turn by using unilateral brake. When you make a sharp turn, if the front wheel produces squealing due to the action of safety valve, you should partially return the steering wheel to avoid prolonged overload on the hydraulic steering system.

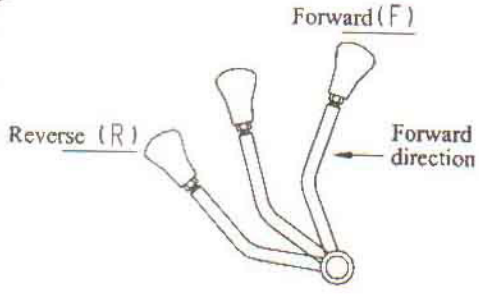
2. When the tractor turns or reverses in a farmland, you must keep the farm implement above the ground to avoid damage of implement or personal injury or death.

2.6 Gear shifting

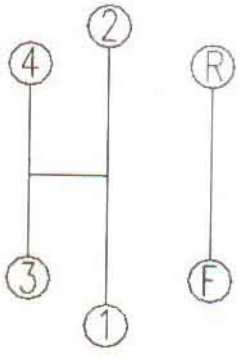
Primary and secondary gear levers are provided for gear shifting. The primary gear lever A has four positions (1, 2, 3, 1). The secondary gear lever B has 2 forward positions (L or low speed and H for high speed) and 1 reverse position R.



Ordinary gear lever positions



Gear lever for shuttle shifting



Shuttle gear lever positions

Press the main clutch pedal; move the secondary gear lever B from the neutral position to the left; then push forward to get the position L or push backward to get position H; move the lever from the neutral position to the right; then push forward to get reverse position R.

Press main clutch pedal; move the primary gear lever A from the neutral position to the right; then push backward to get position 1 or push forward to get position 2; move the lever from the neutral position to the left; then push backward to get position 3 or push forward to get position 4.

For tractor with shuttle gear lever, the middle position is for neutral position; push forward to get reverse position and pull backward to get forward position.

Correct selection of working speed can not only achieve the best efficiency and economy but also prolong the lifetime. The tractor should not often work under excessive load. You should run the engine at moderate load, For farmland application, it is recommended that the working speed be at 80% full load. When the tractor works under light load at low speed, you can use speed level 1 position (low speed) so as to save fuel. The speed levels of the tractor are shown in table 2-1.

Caution:

(1) When the engine is running, fully press the main clutch pedal for a few seconds before you shift the speed level as so to avoid bad engagement.

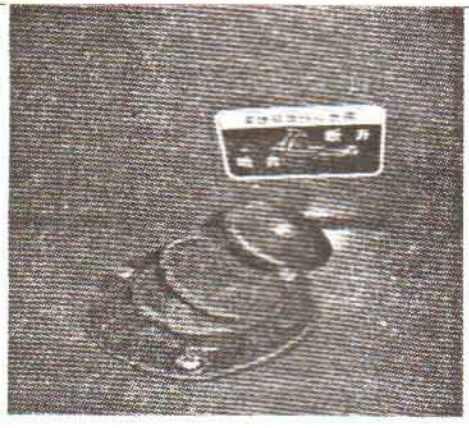
(2) Only when the tractor stops can you shift to the reverse position.

(3) When the tractor is running, do not put your hand on the gear lever. Otherwise, it may cause abrasion of the shifter yoke in the gearbox.

Table 2-1

Position			Speed(km/h)	Purpose
Forward	Low speed	1	2.23~2.54	Implantation, harvesting, rotary tilling
		2	3.23~3.68	
		3	4.41~5.02	Rotary tilling, powing, seeding, harrowing, windowing
		4	6.80~7.74	
	High speed	1	9.58~10.90	Plowing, harrkwing, seeding, transportation on farmland
		2	13.90~15.81	
		3	18.97~21.58	Transportation on road
		4	29.23~33.27	
Reverse		1	3.31~3.77	Connection of farm implement, reverse movement
		2	4.80~5.46	
		3	6.55~7.45	
		4	10.10~11.49	
Power outlet shaft RPM(r/min)		Fast	1000	
		Slow	760(540)	

2.7 Operation of differential lock

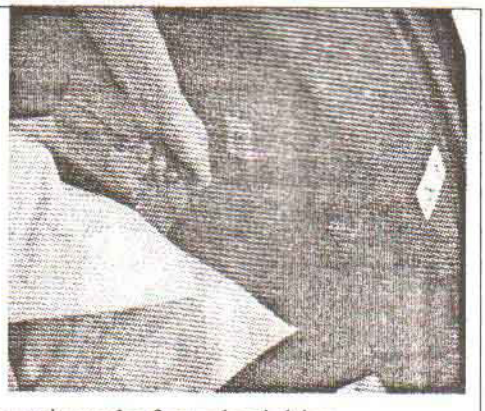


If the tractor is trapped in mud, use the differential lock to make rigid interlock between the left and right drive shaft so as to drive the tractor out of the trap.

1. Press the main clutch pedal. Move the gear lever to the low speed position.
2. Move the accelerator lever to the maximum position.
3. Press with right roof the differential lock pedal.
4. Gradually release the clutch pedal to gradually start the tractor.
5. After the tractor goes out of the trap, release the differential lock pedal.

Caution: When the tractor runs or turns in normal condition, never use the differential lock to avoid the damage of parts and the abrasion of tires.

2.8 Use of front drive axle



When the four wheel drive tractor works on farmland under heavy load or on wet and loose earth, the rear wheel drive only may not provide enough power. Then, additional use of front drive axle can increase the power and reduce the wheelspin so as to facilitate the performance of tractor. Use the front drive axle as per the following procedure:

(1) Press the main clutch pedal and move the gear lever to desired position. Then, gradually release the clutch pedal. When the tractor moves slightly, immediately pull backward the front drive axle lever to activate the four wheel drive.

(2) To disengage the front drive axle, press the main clutch pedal and pull upward the front drive axle lever.

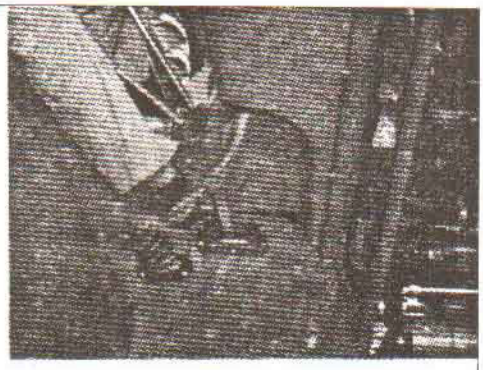
Caution: When the tractor runs on a hard road for transport purpose, do not use the front drive axle. Otherwise, it may cause early abrasion of front wheels and raise the fuel consumption. You can use the front drive axle only in case of rainy or snowy weather, slippery roads or high slope where the rear wheels are prone to wheelspin. After the tractor goes out of the bad condition, disengage the front drive axle.

For a tractor for transport purpose, if the thread of front tires is unevenly worn, you can swap the two front tires.

2.9 Braking of tractor

1. In general cases, at first lighten the accelerator and press the clutch pedal, then gradually press the brakepedal to stop the tractor smoothly.

2. In emergent case, press the clutch and brake pedals at the same time. Do not press the brake pedal only to avoid abrasion of the friction disc or shutdown of the engine.



3. When the tractor is running on roads, you should interlock the left and right pedals.

Warning: Before operation, you should check the oil level in the brake oil tank and inspect the brake oil system for leakage. If case of insufficient brake oil or leakage, immediately diagnose the fault and remedy it. Otherwise, it may cause faulty braking and other serious accidents. When the tractor runs on roads, always interlock the left and right brake pedals to avoid sideslip and even turnover when braking.

2.10 Stop of tractor and shutdown of engine

1. Lighten the accelerator to reduce the running speed of the tractor.

2. Press the clutch pedal, then press the brake pedal, After the tractor stops, place all gear levers to the neutral position.

3. Release clutch and brake pedals. Lighten the accelerator to run the engine at idle speed.

4. Pull backward the shutdown cable to stop the fuel supply. Then the engine shuts down immediately. After that, return the shutdown cable to the fuel supply position.

5. Rotate the key to the "OFF" position to turn of all power supply. Return the manual accelerator lever to the original position.

Caution: The driver should not leave the tractor until the tractor is parked and the engine is shut down. If you have to park the tractor on a slope, you should engage the gear lever (at forward position for upslope placement, at reverse position for downslope placement). If the ambient temperature is less than 0℃, for tractor without antifreeze, you must discharge all cooling water when the engine runs at idle speed and then shut down the tractor. To avoid that the remaining water freezes the water pipe after you discharge the cooling water, it is recommended that you keep the drain valve open and place shutdown handle at "shutdown" position, then use the battery to run the engine for 15s for 2~3 repetitions at interval of 2~3 minutes so as to remove all water from the pipe.

2.11 Use, Assembly and disassembly of tires

2.11.1 Use of tires

Tires are wear parts. Properly use and maintain tires to prolong their lifetime.

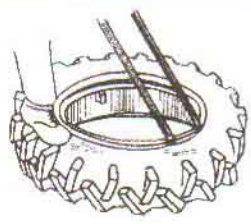
All tires have their rated loads. Overload may cause excessive deformation of tires and loose bonding of tire parts that may result in breakage of tires.

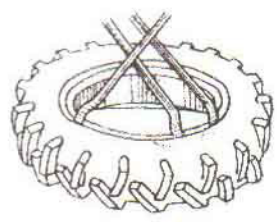
Ensure appropriate air pressure in the tire. Too high or too low pressure will reduce the lifetime. Too low pressure may cause deformation of tires and increase of resistance. For farmland use, relatively low pressure in tires is recommended. Whereas, higher pressure in tires is recommended for road transport. The air pressure in tires should be measured with a pressure gauge at normal temperature to avoid incorrect measurement of hot tires. Improper operation may also cause early abrasion or damage of tries. Do not run over obstacles at high speed. Avoid sudden braking or sharp turning. Minimize wheelspin on gravel roads, Avoid tires from contamination of oil, acid, alkali and other chemicals. Minimize exposure under direct sunshine to avoid deterioration of rubber. Regularly inspect the position of front wheels and toein to prevent abrasion of tires, If the treads are worn unevenly, you can swap the left and right tires.

Important: For four wheel drive tractors, the front and rear wheels should have same air pressure to avoid abrasion of tires.

2.11.2 Disassembly of tire

1) Disassembly of tire



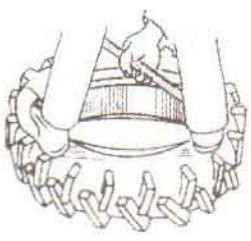


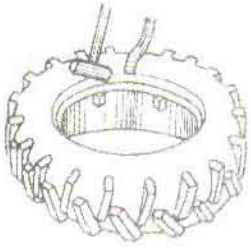
Special tools should be used to disassemble the tire. Never use sharp tool (such as screw driver) or hammer to avoid piercing or tire or damage of bead and rim.

To disassemble a tire, at first bleed off the air and press the bead into the groove of rim. Then use a crowbar to prize the bead out of rim near the tire valve. After that, alternatively use two crowbars to prize the whole bead. Remove the inner tube. Again, with the same procedure, prize the bead of the other tire to remove the outer tube.

2) Assembly of tire

To assembly the tire, at first check the compatibility of rim and tire. Burr and deformation should not exist on the rim edge. Remove the rust on the rim. Inspect the tire for breakage. Clean all parts. Apply a thin layer of talcum powder between the inner and outer tires. Horizontally place the rim and install the outer tire into the rim by feet pressure or using a crowbar. Install the inner tire (slightly prize the outer tire). Secure the tire valve with lead wire. Insert the outer tire into the rim by using a crowbar (the final insert is most difficult. You may slightly knock the crowbar with a hammer as shown in the figure). Finally, check if the tire valve is at right position and if the bead and rim are closely touched. Inspect if the inner tube is damaged when filling air. Know the outer tube with a hammer as you fill the air. It is recommended to half release the full pressure and refill air to the required pressure to get normal expansion and to minimize the wrinkling of the inner tube. Properly install the tires and ensure the correct direction of tread. Otherwise, it may degrade the performance of tires.





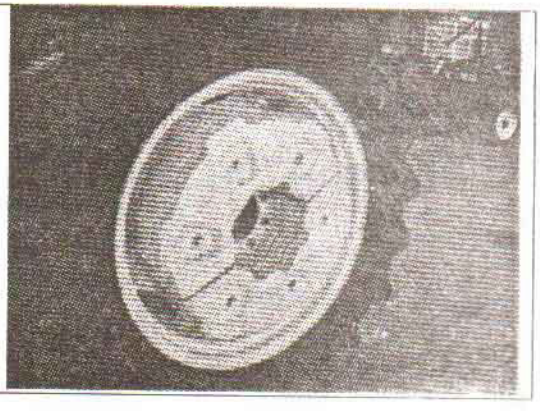
Warning: Never remove the bolts for the tire, hub and rim when the tire is filled with air. Otherwise, the bolts may be shot out to hurt persons!

2.12 Use of ballast

Rear ballast

For farmland use, ballast can be used to improve the tractor's performance. Generally, cast iron ballast are installed on the rear wheel web.

Each piece of cast iron ballast is of 45kg. They can be installed in 2 pieces (90kg), 3 pieces (135kg)on each side.



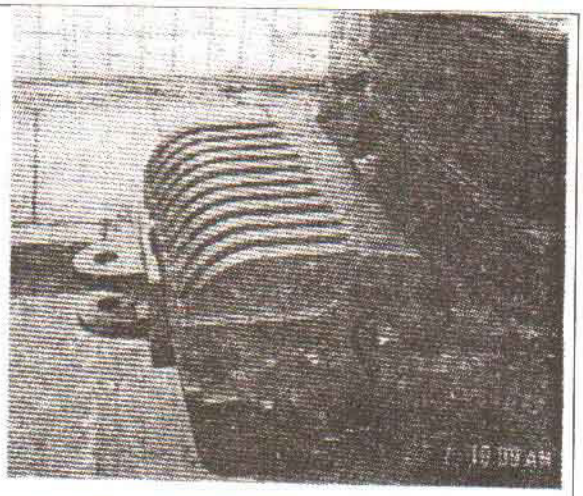
Warning: Remove the ballast from the tire before you remove the tire from the tractor to avoid instability.

Front ballast

It is necessary to install front ballast on the front of the tractor to balance the front and rear weights.

Weight of front ballast base (45kg).

At most 8 pieces of iron steel front ballast (18kg for each piece) can be installed on the tractor.



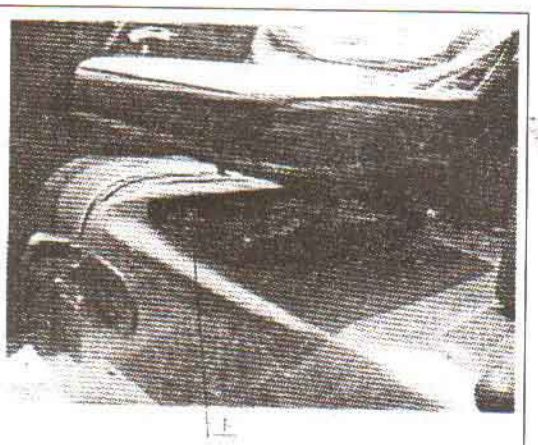
2.13 Adjustment of driver's seat

The position and rigidity of the driver's seat are adjustable. To ensure safety, the seat should not be too soft especially when you drive on a rough road.

Adjustment of horizontal position

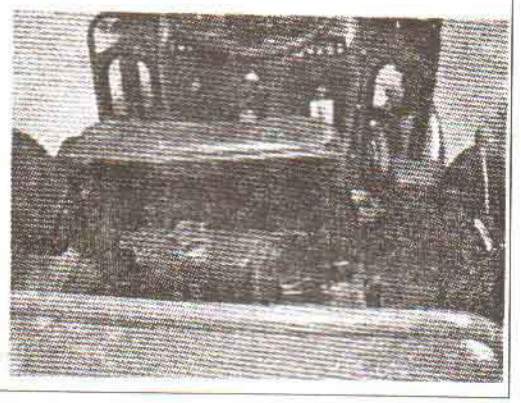
Loosen the bolt (1) under the seat to adjust the horizontal position depending on the driver's body size.

Tighten the bolt after adjustment.



Adjustment of rigidity

Move the handwheel (1) to adjust the rigidity depending on the driver's body weight.



Caution: 1. To ensure safety, the adjustment of seat must be done when the tractor stops.
2. The rigidity of seat should not be too soft especially when you drive on a rough road.

2.14 Coverings

Consist of: engine cover, driver's cabin, splash guard, instrument panel, floor and accessories etc.

a Engine cover: The engine cover is made of streamline metal plate with aesthetic appearance. Pull the handle on the left plate to unlock the engine cover. Then, slightly lift the engine cover by hands. The cover will be automatically opened by the elasticity of the 2 springs. Pell down the handle. The engine cover will be automatically closed and locked when it goes down to a certain position.

b. Instrument panel: All electrical control switches and instruments are installed on the instrument panel. The instrument panel is used as the base and cover for control switches.

2.15 Use of working mechanism

2.15.1 Operation of hydraulic lifter and suspension

The hydraulic lifter and suspension system are operated by joystick.

2.15.1.1 Installation, operation and transportation of farm implement

Before installation of farm implement, start the hydraulic system and place the joystick at "lower" position as shown in figure 2.15.1.1. Slowly reverse the tractor. Connect the left and right lower rod, then connect the upper rod. Fasten the connection with nuts.

Operate the joystick to lift or lower the farm implement. When you drive the tractor with farm implement for a long run, you should lock the implement with a lock pin.

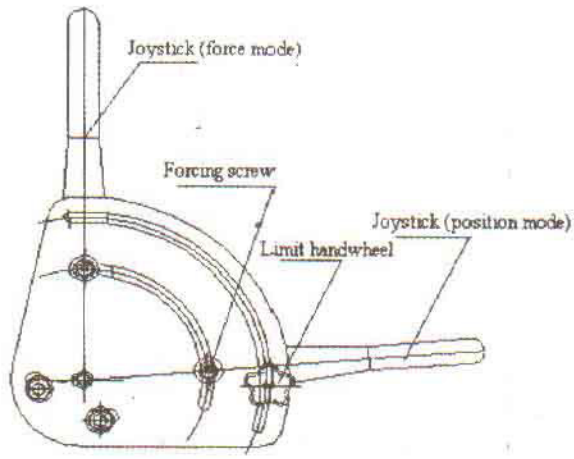


Figure 2.15.1.1 Joystick

2.15.1.2 Adjustment of tilling depth

Two modes for adjusting tilling depth: force mode and position mode:

(1) Force mode

In this mode, the filling depth is automatically controlled depending on the resistance of farm implement. Generally, force mode is used for tilling work.

Move the joystick to the maximum height. Then move forward the joystick (force mode). When the farm implement is lowered to certain depth, the mechanism stops the lowering. You can choose desired tilling depth when the tractor is running. The more you move the joystick forward, the more the tiling depth is. Vice versa. After you choose desired tilling depth, limit the joystick with a limit handwheel so as to ensure same filling depth in each operation. When you use the tractor on rough land or high-resistance soil, the tilling depth may be automatically adjusted.

When resistance increases, the tilling depth may decrease; when resistance decreases, the filling depth may increase. After the tractor runs out of the special area, the tilling depth returns to the original setting.

(2) Position mode

In position mode, the farm implement is controlled depending on the position of implement in relation to the tractor. Generally, position mode is used for rotary filling, reaping, seeding and bulldozing etc. This mode can also be used for plowing in flat farmland.

When you work in position mode, you should move the joystick (force mode) to the maximum height. Move forward the joystick (position mode) to lower the farm implement. The position of the joystick determines the position of the farm implement. The more you move forward the joystick, the more the implement goes down. When the farm implement reaches the desired depth, limit the joystick with the limit handwheel so as to ensure same filling depth in each operation.

2.15.1.3 Choose of hinging point on upper rod

The front end of upper rod is hinged with the rear end of lifter at one of three points: top, middle, bottom.

When you use position mode, you should connect the front end of upper rod at the bottom hinging point. When you use force mode and in case of small resistance or small tilling depth, you should connect at the top point. When you use force mode and in case of great resistance or great tilling depth, you should connect at the middle point.

2.15.1.4 Adjustment of farm implement

Extend or retract the upper rod to adjust the longitudinal position of the farm implement. Extend or retract the diagonal rod to adjust the transverse position of the implement. Take example of plough:

(1) Adjustment of transverse position: Adjust the length of right lifting rod to keep a horizontal plough and ensure the same tilling depth. Extend the right lifting rod to increase the filling depth of the first plowshare. Vice versa. Generally, do not adjust the left lifting rod unless the adjustment of right lifting rod is not enough.

(2) Adjustment of longitudinal position: If the plowshare is lower than the sidecap, you should extend the upper rod. If the sidecap is lower, you should retract the upper rod.

(3) Adjustment of tilling width: By using the filling width adjuster, you can change the position of the left and right suspension point. Move forward the right suspension point to increase the tilling width. Move backward to decrease the tilling width. With the filling width adjuster, you can ensure the proper position of the plough so as to avoid repeated or omitted tilling.

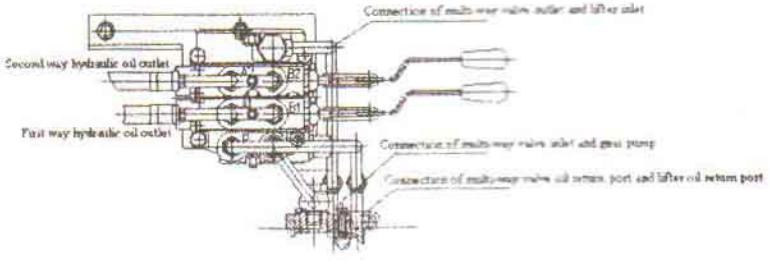


Figure 2.15.1.2 Connection of multi-way valve and pipes

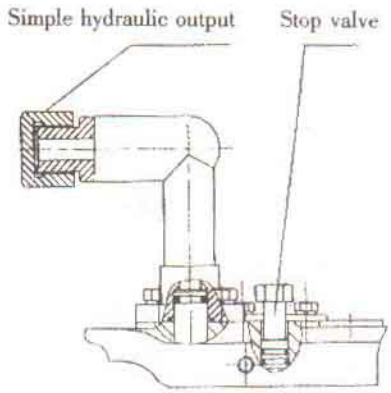
2.15.1.5 Adjustment of lowering speed

Adjust the lowering speed depending on the implement weight and type and the hardness of ground to avoid the damage of the farm implement. Clockwise rotate the regulator valve to decrease the lowering speed; counterclockwise rotate the valve to increase the lowering speed.

2.15.1.6 Adjustment of limit chain

Limit chain is designed to limit the swing of lower rod and farm implement to avoid collision with rear wheel. Adjust the limit chain to proper length so as to avoid undesired collision as well as ensure the normal

movement of the farm implement, The limit chain should not be too tense so as to avoid damage to parts.



2.15.1.7 Hydraulic output

Provide hydraulic oil to the implement or trailer as per the following procedure;

(1) Stop the oil pump (cut off the power supply to oil pump);

(2) Move the joystick (position mode) to the "lower" position. Press the lifter to the minimum height to discharge the oil from the cylinder;

(3)Clockwise rotate the stop valve to cut off the oil supply to cylinder;

(4) Connect the oil pipe of the farm implement or trailer with the hydraulic oil outlet.

(5) Move the joystick (force mode) to the lift position and lock it .

(6) Start the hydraulic pump. Use the joystick (position moved) to control the action of farm implement or trailer.

2.15.1.8 Hydraulic output of multi-way valve

Use 2-plate hydraulic output multi-way slide valve (on the left of rear axle). The 2 plates are respectively operated by C and D joystick to control the two double-action cylinders. 4 M10 bolts are used to fix the multi-way valve assembly on the rear axle. The oil inlet and oil return port are respectively connected with the gear oil pump and lifter. The oil return port is connected with the lifter oil return port (as shown in figure 2.15.1.2). A control valve has 2 M22× 1.5 quick female connector A1 B1 and A2, B2 (as shown in the figure 2.15.1.3). These connectors are covered when they are out of use. If you use them, connect the male connectors (spare parts) with the quick female connectors, and then connect with the inlet and outlet of cylinder for farm implement. The joystick C controls the first hydraulic output A1, A2l; the joystick D controls the second hydraulic output B1, B2. when the two joysticks are at lift position, A1 and B1 are oil inlets, A2 and B2 are oil return port. Operate the Joystick C and D to control the double-action cylinder.

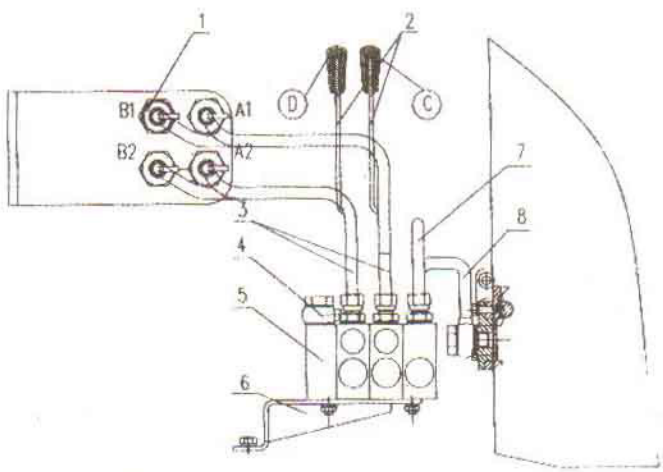


Figure2.15.1.3 Hydraulic output device

1. Quick connector 2. Joystick 3. Oil outlet pipe for multi-way valve 4.oil outlet assembly for multi-way valve 5 Multi-way valve assembly 6. Base plate for multi-way valve 7.Oil inlet pipe assembly for multi-way valve 8. oil return pipe assembly for multi-way valve

The hydraulic output valve can be used for single-action output or double-action hydraulic output by adjusting the changeover screw E on the multi-way valve (as shown in the figure 2.15.1.4). Counterclockwise rotate the screw E to energize single-action hydraulic output; while fully screw in the screw E to energize the double-action hydraulic output.

When you use the quick hydraulic connectors, you should do the following steps before you can connect the male connectors.

(1) Shut down the engine.

(2) Lower the suspended farm implement.

(3) Move forward and backward the joystick for hydraulic output valve to release the pressure in the socket.

(4) Remove the cover above the socket and clean the quick connector.

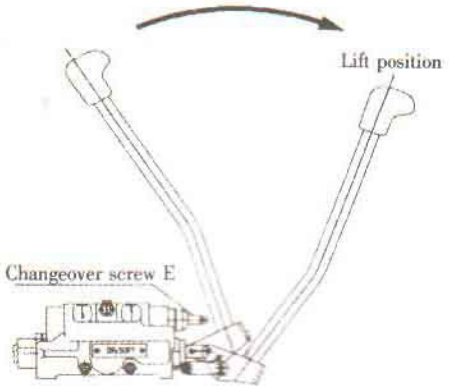


Figure 2.15.1.4 Changeover of single and double action

Caution:

(1) Always cover the socket when the quick connector is out of use.

(2) Do not use the lifter and hydraulic valve at the same time.

(3) After operation of hydraulic output valve, return the joystick to the neutral position to avoid overheat of hydraulic system.

(4) Both joysticks (force mode and position mode) can control the movement of farm implement. You can use only one joystick. Place the other joystick at lift position and limit it with a limit handwheel.

2.15.1.9 Use of double-action towing device

A double-action towing device has two working position: upper position and lower position:

When you use towing device only, you can shoose upper or lower position depending on the implement;

2. When you use an implement connected with the power output shaft, you should choose the lower position. At this time, use traction pin and support sleeve (No. 4 and 5) instead of towing pin (No.2). The traction pin should match with the traction hole of the implement.

In factory, the towing device is set at upper position (as shown in figure), and the traction pin and support sleeve are connected by a elastic pin (No.3,4,5).

2.15.2 Operation of power output

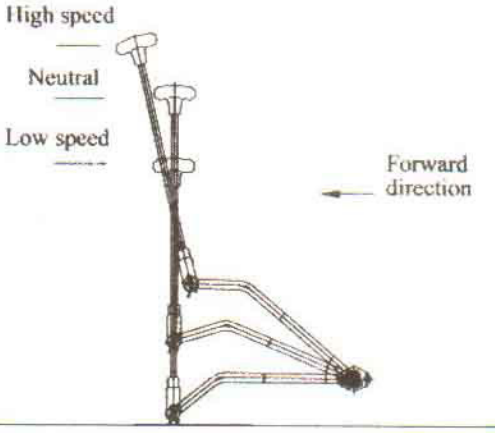
The power output shaft of DQ 40 series tractor is operated at two levels of RPM (r/min) as shown in the following table. To operate the power output shaft:

(1) Move the power output shaft joystick to neutral position; remove protective shield and power output shaft cover; connect the implement with the power output shaft.

(2) Fully press the clutch pedal to disengage the clutch or power output shaft. Then move the joystick to

the desired position.

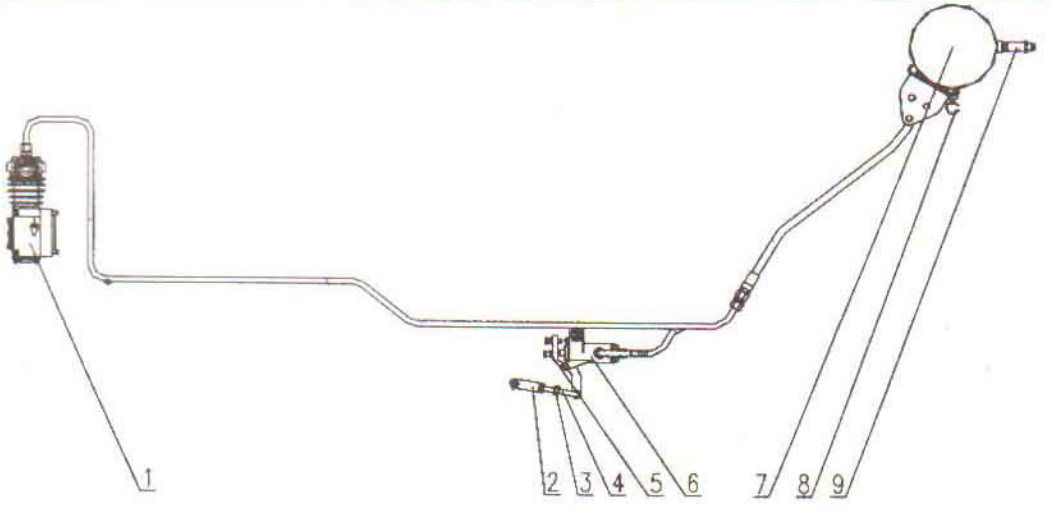
(3) Gradually release the clutch pedal to start the implement. At first, run the implement at low power. Then run at full power.



Speed lever of power output

Model / Speed level	DQ300	DQ304	DQ350	DQ354	DQ400	DQ404	DQ500A	DQ504A
Low/high(r/min)	54/1000 or 760/1000							

2.15.3 Operation and adjustment of air brake for trailer



1. Air compressor 2. Adjuster 3. Lock nut 5. Lock screw
6. Air brake valve assembly 7. Air storage assembly 8. Drain valve assembly 9. Safety valve assembly

2.15.3.1 Composition

Air brake system consists of air compressor, air storage, air brake valve, safety valve and pipes (see figure 2.15.3).

2.15.3.2 Purpose of air brake for trailer

The air brake is used to brake the trailer and ensure safe driving.

2.15.3.3 Adjustment and maintenance of air brake:

a. Ensure no leakage and clogging in the air system. Apply soap water on connections to check for leakage.

b. When the engine works at rated RPM. After 2min, the pressure should increase to 0.54Mpa; after 8min, the pressure should be over 0.7Mpa. If not, check air inlet and outlet valve and drain valve for leakage.

c. When pressure is over 0.8± 0.05MPa, the safety valve should be activated.

d. When the air brake system is under 0.8Mpa, shut down the engine. After 5min, the pressure fall

Repair air system

f. Before you drive the tractor with a trailer, you must inspect the braking system for proper function.

g. Adjustment of brake for trailer: Ensure the trailer is braked 0.3~0.8 second earlier than tractor so as to avoid collision between trailer and tractor: To adjust the brake: loosen the lock nut (3), remove the adjuster (2), extend or retract the adjusting rod (4) to desired position, tighten the lock nut.

h. To protect the air compressor, when the air brake system is out of use for a long time, you should disengage the air compressor's clutch or remove the belt.

Caution:

1. If you brake the tractor before you brake the trailer, the vehicle may turn over.

2. The two set screws on the brake valve have been preset in factory and marked in red color. Do not rotate them.

3. To ensure normal function of braking system, open the drain valve after every 50 workhours to discharge the water in air storage.

2.15.4 Use and regulation of electrical system

The electrical system of the tractor is a 12V two-wire system. The negative poke is grounded. The electrical system is shown in the attached drawing.

2.15.4.1 Electrical devices

Electrical devices are designed to start tractor, monitor the working condition of diesel engine and provide lighting and signal. All instruments and switches are installed on the instrument panel before the drive. The arrangement of electrical devices are shown in figure 2.2.2.

Electrical devices include:

(1) Power supply: consists of silicon rectifier alternator, voltage regulator and battery.

(2) Starter: consists of starter motor, heat plug etc.

(3) Instruments: consist of tachometer, thermometer, fuel gauge, hour meter and indicators.

(4) Lights and signals: consists of headlights, rear lights, front signals, rear signals, flasher, horn etc.

(5) Auxiliary devices: central electric box, receptacle for rear trailer, ignition lock, switch assembly and brake lamp switch etc.

2.15.4.2 Use and maintenance of electrical devices

To ensure the proper functions of electrical system, you should properly use electrical system and regularly maintain it. Regularly inspect electrical parts for proper function. Inspect connectors for loose connection and inspect insulation of wires for damage. In case of fault, immediately repair it. Regularly maintain the following key parts:

(1) Battery

The battery is dry lead and acid battery with capacity of 120Ah (135Ah), Before you fill electrolyte into a new battery. You should remove the sealant at vent to ensure proper venting. Fill electrolyte with density between 1.26 (above 35℃) and 1.28 (below 25℃), Keep the electrolyte lever (10-15)mm above the protective board. Check the electrolyte level to ensure it is between the two marks printed on the battery case.

After you fill electrolyte, perform the initial charging (see battery instruction for charging time and amperage).

In daily use, regular check the electrolyte level and density. Ensure the electrolyte level is between the two marks. In case of low electrolyte level, put distilled water into the battery. Do not fill sulfuric acid or other liquid. Often keep the battery at full capacity. If necessary, charge the battery. If you do not use the tractor for a long time, you should remove the battery. Charge the battery once per month and keep proper electrolyte density and level. Keep clean battery case and terminals. Ensure good connection at terminals and connectors. Remove oxides. Apply vaseline on terminals and connectors to resist rusting.

(2) Generator

Regularly remove the dust and dirt on generator case, especially on terminals, to ensure good connection. Keep moderate tension of V belt. Loose V belt may cause slipping resulting in less generation of electricity. Tense belt may cause abrasion of bearing. To test the tension of belt, press the middle point of belt. (10~15) mm fall indicates proper tension.

Maintain the generator every 1000 workhours:

1. Regularly inspect bolts for reliable bolting, inspect insulator of wires for damage, inspect wires for reliable connection.

2. Inspect commutator and brush every 1000 workhours. If the surface of commutator is burnt, polish it with fine sandpaper. If bush is greatly worn or damaged, replace it. Apply lubricant at shaft sleeve and other moving parts.

(3) Starter motor

1. At each start process, do not activate the ignition switch for more than 10s. The time interval between two start processes should be no less than 2min. In cold weather you should preheat the diesel enginebefore you activate the starter motor. If you fail to start the diesel engine for 3 times successively, do not start it again. Diagnose the fault. Do not activate starter motor for excessive duration or repeatedly so as not to damage starter motor and battery.

2.If you release the start switch but the power supply is not cut off and the starter motor is stilling

running, you should immediately cut off the connection between battery and starter motor, Diagnose the fault and repair it.

(4) Instruments

Tachometer and thermometer are used to monitor the working condition of diesel engine. Fuel gauge is used to monitor the diesel oil level. Hour meter is used to record the workhours of tractor, Charging indicator is used to monitor the working condition of generator. Oil pressure indicator is used to indicate whether the lubricating system for diesel engine works normally. Voltage indicator is used to indicate whether the instruments are operated under normal voltage. Regularly watch the instruments. In case of abnormity, immediately stop the tractor, inspect for fault and repair it.

(5) Lights and signals

Lights and signals are used for lighting when you operate or drive the tractor in nighttime. In case of fault, immediately stop the tractor and diagnose the fault. In case of damage, replace with proper parts with same size. Do not use unapproved parts.

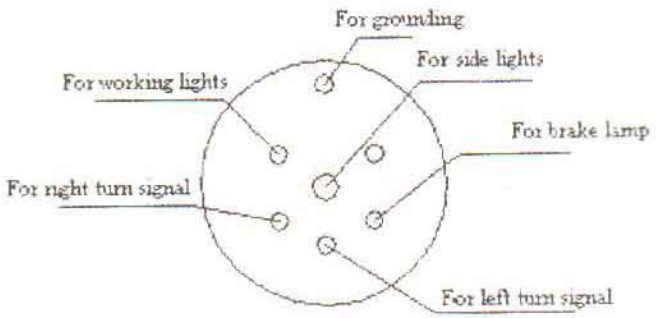
(6) Auxiliary electrical devices

1. Fuse box: A fuse box has 15 terminals 7 terminals are for actual use and other terminals are redundant. Fuse is used to protect electrical devices. Choose proper fuse in compliance with the requirements. In case of frequent burnout, diagnose thee fault and repair it. Always use proper fuse so as not to damage electrical devices.

2. Ignition lock: Ignition lock is used to power on tractor, preheat and start diesel engine. Insert key into the ignition lock. Clockwise rotate key to position I to power on tractor; clockwise rotate to position II to start preheat; clockwise rotate to position III to activate starter motor. After the engine starts, the key automatically returns to the position I. In cold weather, keep the key at position I when you operate the tractor. When the tractor is out of use for a long time, you should withdraw the key and disconnect the circuit.

3. Receptacle for rear trailer

Receptacle for rear trailer is provided to supply power to the signals on the trailer. Plugs are supplied in the spare parts box. The arrangement of receptacle is shown in the figure.



2.16 Running-in of tractor

2.16.1 Preparation before running–in

1. Inspect and tighten all exterior bolts, Nuts and screws.

2. Refill lubricant and grease.

3. Check the lubricant level at diesel engine, gear box, rear axle, transfer case, final transmission, front drive axle (four wheel drive), steering device, lifter and fuel tank. Refill lubricant in case of shortage.

4. Refill fuel and coolant.

5. Check the deity and level of electrolyte in battery.

7. Place transfer joystick at "on" Position (four wheel drive).

2.16.2 Running-in of engine without load

Run the diesel engine at low speed for 7min, medium speed for 5min and high speed for 3min in sequence. During the running-in of the diesel engine, carefully inspect the engine for abnormity and leakage. Ensure normal engine oil pressure.

In case of abnormal condition, immediately stop running and repair the fault before you run the engine again.

2.16.3 Running-in of power output shaft

Move the diesel engine accelerator joystick at medium position. Run the power output shaft at low speed and high speed each for 5min, Then, return the power output shaft joystick to the neutral position.

2.16.4 Running-in of hydraulic system

After the farm implement is connected, place the engine accelerator at the maximum position and operate the joystick to lift and lower the suspension for 10min and for at least 20 repetitions. After running-in, move the distributor joystick at "lower" Position.

2.16.5 Running-in of whole tractor with/without load(9.5h)

Perform running-in process from low speed to high speed and from light load to heavy load. Under no load or light load, operate the accelerator at 3/4 full travel. In other working condition, operate the accelerator at full travel.

During running-in, you should:

1. Check the working conditions of diesel engine, transmission system and steeing system and the reading of instruments.

2. Inspect clutch, gearbox, transfer case, front drive axle, brake for normal operation.

3. Inspect differential lock for proper engagement and disengagement.

4. Check working condition of electrical device.

5. Inspect for abnormity and fault. Diagnose the fault and repair it.

2.16.5.1 Duration of running-in

Unit: hour

Speed position	I	II	III	IV	V	VI	VII	VIII	R I	R II	R III	R IV
No load	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Light load		2.5	3	3	2.5							
Medium load		3	5	5	3							
Heavy load		3	4.5	4.5	3							

2.16.5.2 Load

Load \ Model	DQ300	DQ304	DQ350	DQ354	DQ400	DQ404	DQ450	DQ454
Light load (N)	1900	2500	1900	2500	2350			
Medium load (N)	3900	4900	3900	4900	4700			
Heavy load (N)	6000	7500	6000	7500	7000			

2.16.6 Work after running-in

After running-in, you must perform the following work before you can use the tractor:

1) After the tractor stops, immediately discharge the engine oil from the engine sump. Clean the sump, engine oil strainer and engine oil filter. Refill new lubricant.

2) After the tractor stops, immediately discharge the oil from gearbox, rear axle, transfer case, final transmission, front drive axle and steering device. Clean drain cock and magnet. Then fill diesel oil and run for (2~3) min at position II and Reverse. After that, discharge all diesel oil and fill new lubricant.

3) Clean diesel oil filter (including screen at fuel tank) and air filter.

4) Discharge cooling water. Clean the cooling system with clean water.

5) Discharge hydraulic oil when it is hot. Clean the hydraulic system and fill new hydraulic oil.

6) Inspect the free travel of front toein, clutch and brake pedal. Adjust them if necessary.

7) Tighten all bolts and nuts.

8) Check the gap between injector nozzle and air valve. Adjust it if necessary.

9) Inspect the working condition of electrical system.

10) Fill lubricant and grease.

2.17 Troubleshooting of tractor

2.17.1 Troubleshooting of chassis

2.17.1.1 Troubleshooting of clutch

Symptom	Cause	Solution
1. Clutch slipping	1. Friction disk and clutch plate are fouled with oil. 2. Friction disk is worn excessively or burned out. 3. Weak disk spring 4. Short free travel; separating levers are not at same plane 5. Deformed driven disk	1. Clean with gasoline and repair oil leakage 2. Replace friction disk 3. Replacement 4. Adjustment 5.Replace driven disk
2. Incomplete Disengagement of clutch	1. Long free travel of pedal while short working travel 2. Warped drive disk 3. Three separating levers are not at same plane	1. Adjustment 2. Replacement 6. Adjustment
3. Shaking when tractor starts	1. Contaminated friction disk and driven disk 2. Damaged friction disk 3. Warped driven disk 4. Separating levers are not at same plane	1. Clean with gasoline 2. Replacement 3. Reshaping 4. Adjustment
4. When you disengage the clutch, the power output shaft stops working (double-action clutch)	1. Wrong position of pedal limit bolt	1. Adjustment
5. When you fully press the clutch pedal, the power output shaft is still running	1. Wrong position of pedal limit bolt 2. Improper disengagement of clutch plate of power output shaft	1. Adjustment 2. Adjustment

2.17.1.2 troubleshooting of gearbox

Symptom	Cause	Solution
1. Noise from gearbox	1. Greatly worn or damaged gear 2. Greatly worn or damaged bearing 3. Insufficient or unapproved lubricant	1. Replace gear 2. Replace bearing 3. Fill or refill lubricant
2. Difficult engagement of gear	1. Incomplete engagement of clutch 2. Worn or damaged sleeve and spline	1. Adjust clutch 2. Repair or replacement
3. Automatically disengagement	1. Worn yoke positioner 2. Weak or damaged lock spring for yoke 3. Worn sleeve or spline	1. Repair or replacement 2. Replace lock spring 3. Replace with sliding gear

2.17.1.3 Troubleshooting of rear axle

Symptom	Cause	Solution
1. Noise from central transmission	1. Windage at bevel gear bearing 2. Improper engagement of gear 3. Worn differential shaft 4. Worn planet gear or washer 5. Worn or damaged differential bearing	1. Adjust gap 2. Adjust the engagement 3. Replacement 4. Replacement 5. Replacement
2. Hot bevel gear bearing and differential bearing	1. Too tense bearing 2. Bad lubrication	1. Adjustment 2. Fill lubricant

2.17.1.4 Troubleshooting of brake

Symptom	Cause	Solution
1. Failure of brake	1. Greatly worn friction 2. Too long travel of brake pedal	1. Replacement 2. Adjustment
2. Uneven braking	1. Different travels of left and right brake pedal 2. Damage brake friction disk at one side 3. Different air pressure in two rear tires	1. Adjustment 2. Replacement 3. Air filling
3. Shaking when tractor starts	1. Too short free travel of brake pedal 2. Weak spring for pedal return	1. Adjustment 2. Replacement
4. Incomplete disengagement of brake; hot brake	1. Parking brake is not released 2. Too short free travel of brake pedal	1. Release parking brake 2. Adjustment

2.17.1.5 Troubleshooting of front drive axle (four wheel drive)

Symptom	Cause	Solution
1. Greatly worn front tire	1. Greatly deformed front wheel rim or web 2. Improper position of toein 3. Greatly worn connecting pin at steering knuckle 4. Insufficient air pressure in front wheel or engaged front drive axle	1. Reshaping 2. Adjustment 3. Replacement 4. Fill air and disengage front drive
2. Swinging front wheel	1. Greatly worn front drive axle bearing 2. Greatly worn supporting sleeve bearing 3. Too great gap between front and rear base 4. Greatly deformed front wheel rim 5. Improper position of toein 6. Greatly worn steering knuckle	1. Replacement 2. Replacement 3. Replacement 4. Reshaping 5. Adjustment 6. Replacement
3. Hot transmission shaft and shield	Bended or deformed transmission shaft and shield	Reshaping
4. High noise	1. Bad engagement of front central transmission gear 2. Too great gap at central transmission bearing or damaged bearing 3. Worn differential shaft 4. Worn planet gear or washer 5. Bad engagement of final transmission gear	1. Adjustment 2. Adjustment or replacement 3. Replacement 4. Replacement 5. Replacement

2.17.2 Troubleshooting of steering device and driving system

Symptom	Cause	Solution
1. Too long free travel of steering device	1. Worn thrust bearing of steering device 2. Worn screw rod, nut and ball of steering device 3. Worn gear	1. Replace or adjust bearing 2. Replace worn parts 3. Adjustment
2. Laborious steering	1. Too tight installation of ball of thrust bearing 2. Too low pressure in front tires 3. Insufficient oil supply for gear oil pump; internal leakage at gear oil pump; fouled strainer at steering oil tank 4. Air trapped in steering system 5. Low oil in steering oil tank 6. Weak spring of safety valve; loose seal 7. High oil viscosity 8. Failed check valve 9. Internal or external oil leakage at steering system	1. Properly install ball 2. Air filling 3. Ensure proper function of gear oil pump, clean strainer 4. Bleed air, avoid air entry 5. Fill enough oil 6. Clean safety valve and adjust spring of safety valve 7. Use acceptable oil 8. Cleaning, maintenance or replacement 9. Repair oil leakage
3. Swinging front wheel	1. Too great gap at front wheel bearing 2. Greatly worn steering knuckle 3. Worn washer between swing shaft and support 4. Improper position of toein 5. Greatly deformed front wheel rim	1. Adjust gap 2. Replacement 3. Replacement 4. Adjustment 5. Reshaping
4. Early worn tire	1. Improper adjustment of toein 2. Improper pressure in tire 3. Wrong installation of drive tire	1. Adjustment 2. Air filling 3. Reinstallation
5. Failure of hydraulic steering	1. Damaged or deformed pin 2. Damaged or deformed interlock shaft 3. Wrong installation of rotor and interlock shaft 4. Damaged steering cylinder piston or piston seal ring	1. Replace pin 2. Replace interlock shaft 3. Reinstallation 4. Replace piston or seal ring
6. Steering wheel does not automatically return to neutral position	1. Damaged spring leaf 2. Misalignment of steering shaft and sleeve 3. Steering shaft obstruct valve core 4. Excessive pressure fall, or excessive load on steering device 5. Misalignment of steering shaft and valve core	1. Replace spring leaf 2. Repair or replacement 3. Repair 4. Repair or replacement 5. Reinstallation
7. Failure of manual steering	1. Too great gap between rotor and stator 2. Loose seal in cylinder piston	1. Replace rotor and stator 2. Replace piston seal ring

2.17.3 Troubleshooting of hydraulic system

Symptom	Cause	Solution
1. Weak lifting or failure of lifting	1. Low oil or unacceptable oil 2. Fouled oil strainer 3. Air trapped in hydraulic system 4. Greatly worn oil pump 5. Obstructed control valve and oil return valve 6. Greatly worn control valve and oil return valve 7. Failure of safety valve 8. Great oil leakage 9. Oil leakage at seal rings of distributor	1. Fill acceptable engine oil 2. Clean strainer 3. Bleed air, tighten connectors and replace seal ring 4. Replace oil pump seal ring 5. Repeatedly operate the lifter joystick, or clean control valve 6. Replace worn parts 7. Adjustment or repair 8. Replace seal ring, replace worn parts if necessary 9. Replace seal ring
2. Failure of lowering of farm implement	1. Obstructed control valve or oil return valve 2. Lowering speed regulator valve or stop valve are closed	1. As1(5) 2. Open valve
3. Shaking when you lift farm implement	1. Worn check valve 2. Oil leakage at seal rings of distributor and cylinder	1. Repair or replace check valve 2. Repair oil leakage, replace seal ring
4. No pressure or low pressure of oil in simple hydraulic output	1. Failure of stop valve 2. Joystick (force mode or position mode) is at "lower" position 3. External lifting lever is at "lift" position 4. Female or male quick connector obstruct valve core	1. Cut off oil supply 2. Place joystick (force mode and position mode) at "lift" position 3. Keep external lifting lever at "lower" position 4. Replace quick connector

2.17.4 Electrical system

Symptom	Cause	Solution
1. Failure of starter motor	1. Loose connection or contact 2. No battery or low battery 3. Carbon brush contacts rectifier; contaminated rectifier 4. Open circuit or short circuit in starter motor	1. Welding or replacement 2. Charge battery 3. Adjust the pressure of carbon brush spring, clean rectifier 4. Remove short circuit and open circuit

Symptom	Cause	Solution
2. Weak or failed start of starter motor	1. Greatly worn bearing 2. Bad contact between carbon brush and rectifier 3. Burnout or contamination on surface of rectifier 4. Bad contact of wire 5. Burnout or bad contact at solenoid switch contact 6. Low battery	1. Replace bearing 2. Adjustment 3. Remove contaminant, polish with "o" size sandpaper 4. Tighten nut 5. Remove contaminant, polish with "0" size sandpaper 6. Charge battery
3. Failure of generator	1. Open circuit at armature	1. Repair faul
4. Low capacity of generator	1. Slipping V belt 2. Loose connection of wire 3. Faulty armature 4. Faulty regulator	1. Proper tension of V belt 2. Tighten screw 3. Repair 4. Repair
5. Frequent low battery	1. Faulty generator or regulator 2. Loose connection of wire 3. Short circuit at electrode	1. Repair generator or regulator. In case of bad contact, polish with size sandpaper 2. Tight connection of wire 3. Repair
6. Overcharge of battery (excessive consumption of distilled water; electrolyte spills from vent)	1. The regulator can not keep normal voltage	1. Adjustment

3. Accessories and spare parts

3.1 Accessories

Accessories of tractor include mainly driving cab, floor mat and swinging traction rod etc.

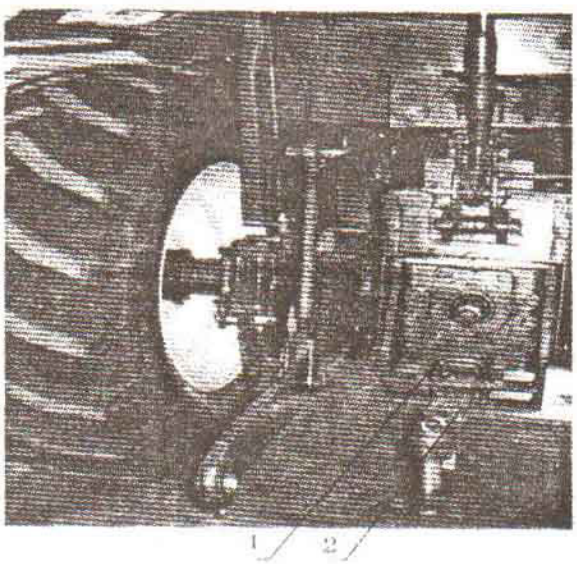
3.1.1 driving cab (optional):

Simple driving cab is designed on this tractor to ensure that driver has a comfortable working situation.

When ventilation is needed in driving cab (especially in summer), start semi-open mechanism on door of tractor to ensure that driver cab be in ventilation condition during traveling.

3.1.2 Floor mat (optional):

Soft and comfortable rubber is molded as floor mat. The whole floor mat includes four blocks with 10mm thickness that is all fastened on the floor by plastic clamps. When remove floor mat, firstly, pry up lightly clamp by screwdriver, and take off according floor mat. When replace floor mat, it needs only clinch original clamp.



3.1.3 Swinging traction rod (optional):

Swinging traction rod is only used in traction farm implements, The rear end of traction rod is connected with farm implements by traction pin. Traction rod can swing transversally so that it is convenient to hitch up farm implements. In working, traction rod can swing from left to right. However, when tractor drags farm implements to reverse, pin 1 must be inserted into hole of traction plate to make traction rod 2 not to swing.

Traction rod is rolled over to change height of traction point so that traction height is fit for matching farm implements.

● **Important items:** If heater unit is used optionally for tractor, in winter, cooling system of engine must use antifreeze.

3.2 Spare parts

3.2.1 Tools with machine

No.	Code	Name	Number	Note
1	GB/T3390.1	Sleeve10× 12.5L	1	
2	GB/T3390.1	Sleeve13× 12.5L	1	
3	GB/T3390.1	Sleeve16× 12.5L	1	

No.	Code	Name	Number	Note
4	GB/T3390.1	Sleeve18 × 12.5L	1	
5	GB/T3390.1	Sleeve21 × 12.5L	1	
6	GB/T3390.1	Sleeve24 × 12.5L	1	
7	GB/T3390.1	Sleeve27 × 12.5L	1	
8	GB/T3390.1	Sleeve30 × 12.5L	1	
9	GB/T3390.3	Handle of sliding head H12.5	1	
10	GB/T3390.3	Extension rod 5G 12.5 × 125	1	
11	GB/T4388	Double open end wrench8 × 10	1	
12	GB/T4388	Double open end wrench13 × 16	1	
13	GB/T4388	Double open end wrench18 × 21	1	
14	GB/T4388	Double open end wrench 24 × 27	1	
15	GB/T4388	Double open end wrench 30 × 34	1	
16	GB/T4388	Double open end wrench 36 × 41	1	
17	GB/T4388	Slip joint pliers 165mm	1	
18	QB/T2349	Cross screw driver 2-150 × 6	1	
19	QB/T2564.4	Slotted screw driver 1 × 5.5 125P	1	
20	JB/T7942.1	Lever type oil gun A200	1	
21	GB5356	Hexagonal wrench M8	1	
22		Tools with engine	set	from fitting factory

3.2.2 Spare parts

No.	Code	Name	Number	Note
1		2W instrument bulb	5	
2		10 A fuse	1	
3		15 A fuse	1	
4		20 A fuse	1	
5	DQ300.38103	Breather filter core	1	Chassis breather use
6	DQ650.40.162	Breather filter core	2	Steering and hydraulic breather use
7	DQ800.38.234	Breather filter core	1	Oil tank breather use
8		Spare parts with engine	set	From fitting factory
9	DJ101	Back trailer pin	1	

No.	Code	Name	Number	Note
10	DQ654.58.010	Quick-joint male connector	4	Metric joint
11	DQ654.58.106a	Washer	4	With metric joint
12	DQ354.58A.030	Quick-joint male connector	4	British system joint

Note:

1、When the ninth spare part is used in trailer, wiring is lead out for back signal lamp of trailer.

2、For multi-ways valve model, according to the notice of being put in storage, optionally fit quick joint of the tenth item and the eleventh item or the twelfth item.

3.2.3 File with machine

No.	Code	Number	Note
1	Operational instruction of tractor	1	
2	Technical file with engine	1	From fitting factory of engine
3	Product qualification certificate	1	
4	Parts catalogue of tractor	1	
5	Service card of "sanbao"	1	
6	Packing list of items with machine	1	
7	Maintenance and care manual of QD tractor	1	
8	Product qualification of engine	1	From fitting factory of engine

Note: Tools with engine, spare parts with machine and files with machine are accepted according to packing list of engine.

4. Instruction of maintenance

Technical maintenance is a collective term for a series technical maintenance measurement including regularly cleaning, checking, lubricating, fastening and adjusting all parts of tractor or replacing some parts. If technical maintenance is done well, it will show deteriorative speed of all parts technical condition, decrease fault and extend lifetime in order to ensure tractor is often in good condition.

4.1 Procedures of technical maintenance

For DQ 40 series tractor, technical maintenance period is determined according to accumulating load working hours that is divided into technical maintenance of each shift (every 10 operating hours), technical maintenance of every 50 operating hours, technical maintenance of every 200 operating hours. technical maintenance of every 400 operating hours, technical maintenance of every 800 operating hours and technical maintenance of every 1000 operating hours.

4.1.1 Technical maintenance of each shift

(1) Clear up dust and oil stain on the tractor. When work in condition of dust, air filter should be cleaned.

(2) Check and fasten outside all fastening of tractor. When find loosening, tighten in time, especially fastening nut of front and rear wheel.

(3) Check level of oil pan of engine, water tank, fuel oil tank, hydraulic steering oil tank, hydraulic lifter and battery. If it is not enough, fill it. When check level of oil pan, tractor should be parking on horizontal ground and engine has been out of work for 15 minutes.

(4) Grease up according to maintenance form 4-1.

(5) Check pressure of front and rear tire. If it is not enough, aerate tire as required.

(6) Check if tractor has leakage of air, oil and water. If above "three leakage" exists, eliminate it in time.

(7) Maintain diesel engine according to requirement of "technical maintenance of daily shift" in "instruction of operation and maintenance of diesel engine".

4.1.2 Technical maintenance o every 50 operating hours

(1) Finish all technical maintenance of each shift.

(2) Grease up according to maintenance form 4-1.

(3) Check the level of oil bath air filter and dust-free.

(4) Check tension of fan V belt. If necessary, adjust it.

(5) Check and adjust free stroke of main and auxiliary clutch and running brake pedal.

(6) Main machine oil filter and suction oil filter and clean filter core with diesel oil.

(7) Screw out air exhaust plug and oil drain plug of fuel oil filter to drain accumulated water and impurity.

(8) Maintain diesel engine according to " I class technical maintenance" of attached" instruction of operation and maintenance of diesel engine".

4.1.3. Technical maintenance of every 250 operating hours

(1) Finish all technical maintenance of 50 operating hours.

(2) Grease up according to maintenance form 4-1.

(3) Change lubricant of diesel engine oil pan and clean oil pan and strainer.

(4) Replace fuel oil filter core. After installing, exhaust air in oil pipeline.

(5) Clean air filter core and change machine oil.

(6) Maintain diesel engine according to "II class technical maintenance" of attached "instruction of operation and maintenance of diesel engine".

4.1.4 Technical maintenance of every 500 operating hours

(1) Finish all technical maintenance of 250 operating hours.

(2) Grease up according to maintenance form 4-1.

(3) Check and adjust valve clearance, injection pressure of injection nozzle and condition of atomization. If necessary, adjust them.

(4) Replace fuel oil filter core.

(5) Replace air filter core (advance pr delay properly according to dust quantity of task area).

(6) Change machine oil inside gear-box, rear drive axle, transfer case, front drive axle (four-wheel drive), hydraulic lifter and steering gear.

(8) Check and adjust toe-in of front wheel.

(9) Adjust free stroke of steering wheel.

(10) Rinse and wipe battery with boiled water and check gravity of electrolyte inside battery should not be less than 1.24. If find that battery charges and discharges abnormally, repair it and charge it outside machine.

(11) Maintain diesel engine according to "III class technical maintenance" of attached "instruction of Operation and maintenance of diesel engine".

4.1.5. Technical maintenance of every 1000 operating hours

(1) Finish all technical maintenance of 500 operating hours.

(2) Grease up according to maintenance form 4-1.

(3) Clean dust between water tank and radiated pipe and clean completely cooling system of diesel.

(4) Decide if remove air cylinder cover to be repaired and maintained and if conduct other maintenance items according to previous usage of diesel.

(5) Tighten bolt of cylinder cover in turn as specified torque.

(6) Clean fuel oil tank.

(7) Decide if maintain and adjust it according to working condition of hydraulic suspension system.

(8) Dismantle and repair generator once.

(9) Decide if remove and check it according to condition of starting motor.

(10) After maintenance is over, assemble the whole machine properly o test run for short term and check and adjust working condition of all mechanism.

4.1.6. Technical maintenance of shelf life

(1) When tractor is in parking for a long time, it is better park in dry garage. Jack up tractor to make front & rear tire leave the ground.

(2) When tractor is parking, clean up outside of tractor and grease up all lubrication points.

(3) Drain cooling water of diesel completely and exhaust pipe orifice properly.

(4) During the period of parking, start up diesel once every other three months. Operate diesel at all RPM for twenty minutes and check if diesel works normally.

Form 4–1 maintenance of 40 series tractor of FOTON EUROPARD

No.	Part of maintenance	Operation	Points	Maintenance period
1	Oil pan of engine	Check level	1	Each shift
2	Oil bath air filter	Check level	1	Each shift
3	Battery	Check level	1	Each shift
4	Hydraulic steering oil tank	Check level	1	Each shift
5	Radiator (water tank)	Check level	1	Each shift
6	Water pump shaft of engine	Grease up	1	Each shift
7	Injection pump	Check level	1	Each shift
8	Brake oil tank	Check level	1	Each shift
9	Rear hub	Grease up	2	Each shift
10	Main clutch	Adjust free stroke	1	Each shift
11	Auxiliary clutch	Adjust free stroke	1	Each shift
12	Running brake	Adjust free stroke	2	Each shift
13	Fan tape	Check tension	1	Every 50 operating hours
14	Steering oil cylinder	Grease up	1	Every 50 operating hours
15	King pin sleeve of front shaft	Grease up	2	Every 50 operating hours
16	Pendulum shaft of four-wheeled front drive axle	Grease up	2	Every 50 operating hours
17	Central oscillating pin sleeve of front shaft	Grease up	1	Every 50 operating hours
18	Diesel filter	Replace filter core	1	Every 200 operating hours
19	Spin-on machine oil filter	Replace filter	1	Every 200 operating hours
20	Machine oil filter of liter	Clean or replace filter core	1	Every 200 operating hours
21	Injection pump	Change lubricant	1	Every 200 operating hours
22	Oil pan of engine	Change lubricant	1	Every 200 operating hours
23	Oil basin of oil bath air filter	Maintain and clean	1	Every 200 operating hours
24	Transmission system and lifter	Check oil level	1	Every 400 operating hours
25	Parking brake	Adjust free stroke	1	Every 400 operating hours
26	Front wheel	Grease up	2	Every 400 operating hours
27	Pedal hub of main clutch	Grease up	1	Every 400 operating hours
28	Pedal hub of auxiliary clutch	Grease up	1	Every 400 operating hours
29	Brake pedal hub	Grease up	2	Every 400 operating hours
30	Central drive of front drive axle	Check oil level	1	Every 400 operating hours
31	King pin oil cup of front drive axle	Grease up	2	Every 400 operating hours
32	End drive of front drive axle	Check oil level	2	Every 400 operating hours
33	Filter of hydraulic steering oil tank	Clean and maintain	1	Every 400 operating hours
34	Hydraulic steering oil tank	Change lubricant	1	Every 800 operating hours
35	Fuel oil tank	Clean and maintain	1	Every 400 operating hours

No.	Part of maintenance	Operation	Points	Maintenance period
36	Inlet and outlet valve of engine	Adjust valve clearance	8	Every 800 operating hours
37	Injection pump	Adjust injection pressure	4	Every 800 operating hours
38	Driving system and lifter	Change lubricant	1	Every 800 operating hours
39	Cooling system of engine	Clean and maintain	1	Every 1600 operating hours
40	Cooling system of engine using antifreeze	Change antifreezee	1	Every 1600 operating hours
41	Central drive of front drive axle	Change lubricant	1	Every 1600 operating hours
42	End drive of front drive axle	Change lubricant	1	Every 1600 operating hours

4.2 Operation of technical maintenance

Maintenance of battery

(1) Check status of battery

Normal electrolyte level should be 10~15mm higher than that of plate. If it is not enough, fill up it.

The method of checking electrolyte level is showed in figure. Tractor must be parking on the horizontal ground and engine is in flame out. Wait battery to be cool down then check level.

(2) When following condition is occurring in battery, battery need be charged.

a) Starting engine is underpowered. Or light is dim.

b) Voltage is not enough. When discharge battery, measure its terminal voltage. 6V voltage of battery is less than 5.25V. 12V voltage of battery is less than 10.5V.

c) When battery is in storage with electrolyte, battery must be charged once each month.

When battery is charged, keep away from open fire and electrolyte cannot be splashed human body or clothes. Besides, ensure that room is kept ventilation. During the course of charging, the temperature of electrolyte is less than or equal to 45℃. When the temperature is up to 45℃, halve current and stop charging. All that is to achieve the purpose of lowering temperature. However, it need extend accordingly the time of charging. When charging is over, firstly, shut off power. Then disconnect power and polar pole in order to prevent striking a light and causing fire or explosion.

(3) Maintenance of battery

a) Battery should be stored in stock house that is clean, dry, ventilated and has the temperature of 10~40℃. Handle with care and prevent collision and keep upright.

b) Before use dry charged battery, it is prohibited loosening charging plug to prevent battery from losing dry charged performance.

c) It is prohibited using well water, tap water or other electrolytes dispensed with impure water as supply water of battery.

d) Terminal of battery should be connected firmly with connector of power cord in order to prevent fusing terminal when start up. To prevent oxidation corrosion of terminal, soft paraffin should be coated outside of connecting terminal.

e) Keep outside terminal of battery clean, Check often if exhaust vent on charging plug is free.

f) Check regularly if voltage of voltage regulator is in accord with standard. The voltage of regulator is 14.2± 0.2V.

Warning: Electrolyte of battery is corrosive. So it is prohibited splashing into eyes, skin or clothes. If splashed acid liquor, clean up with fresh water at once.

Notice:

(1) Right level of brake fluid is very important for normal work of braking system.

(2) Hydraulic braking oil must be composite type and cannot be replaced by braking oil containing alcohol or other machinery oils.

(3) Because right operation of air filter is directly related to lifetime of engine, clean must be kept always. When working in farm, check and clean is task of each shift. When tractor is matched with reaper, operation effect in the position of higher-level filter is better.

4.2.2.2 Check and maintenance of hydraulic steering oil tank

Steering oil tank is located on the right of the lower of bonnet body. Open cover of oil tank (with dipstick)and observe if oil trace is on the dipstick. If no oil trace is on the dipstick, it show oil content inside steering oil tank is not enough. Check reason of oil leakage. Then fill up oil tank with oil till middle scale of dipstick and reinstall respirator assembly in original position. When check, it is necessary to check systematically hydraulic steering cylinder, oil pipe and all connectors and ensure they do not leak. Otherwise, it is easy to cause failure steering. Strainer inside oil tank should be cleaned or replaced regularly.

When check oil level, at the same time, check if breather valve (like rivet) on central position of top of oil tank cover is rising and falling flexibly. If there is oil stain on the breather valve to influence rising and falling, clean up breather valve.

4.2.2.3 Maintenance of oil bath air filter

Open spade hook on the lower of filter and remove bottom oil basin. Then empty dirty oil and clean with kerosene or diesel oil. At the same time, clean filter core and fill up fresh machine oil till specified oil level. Finally, reinstall oil basin.

4.2.2.4 Operation and maintenance of dry air filter

Operation instruction of dry air filter

1、When choke alarm of filter indicates warning signal or filter has been in work for 50~100 hours, main filter core need be maintained.

2、When there is more dust in working condition, maintain main filter core every 8 operating hours or each shift.

3、After maintain, dust on the main filter core cannot still be cleared up or main filter core is damaged, replace filter core.

Maintenance of dry filter

1、Take out of filter core and clean inside housing of air filter by hair brush. Then empty dust from rubber dust cleaner bag.

2、On the one hand turn filter core, on the other hand blow off dust from inside filter core with less than 500Kpa compressed air.

3、Reinstall filter core.

Notice: It is prohibited rinsing filter core with oil and water.

4.2.2.5 Adjust tension of fan tape

Press on the middle part of fan tape by thumb. The forcing is 29.4N~49.0N and the sunk distance is

15mm± 3mm. If above requirement cannot be meet, adjust the tape. The method is as following:
Loosen fastening nut on the adjusting support. Of engine and turn engine outwards to make the tape tensile. Then retighten fastening nut on the support of engine.

4.2.2.6 Check oil quantity of engine oil pan and change oil

Pull out dipstick set in left front of engine oil pan and check if oil level is between up and down scale, If oil level cannot reach the down scale, oil filler cap on the cover of timing gear cage of engine should be taken off and oil is filled.

When maintaining and changing oil, tighten off drain plug on the lower of oil pan and drain dirty oil completely. Then clean oil pan and refill fresh oil.

4.2.2.7 Maintenance of front drive axle

Grease up sleeve of main pin, sleeve of front drive axle central swing pin, ball connectors on the both ends of steering cylinder and ball head of tie rod as requirement of maintenance. And check if ball pin nut of tie rod and pin nuts on the both ends of oil cylinder are loosening.

4.2.2.8 Maintenance of machine oil filter

Machine oil filter of lifter is located in the lower right of engine. Maintain as technical requirement. The method is as following: turn on rear cover of machine oil filter and take out of net filter core. Then clean up net filter core with gasoline and blow off net filter core with compressed air. When filter core is difficult to be cleaned up or filter core has been damaged, replace new filter core.

4.2.2.9 Maintenance of transmission system

When check oil level, tractor should be parking on the horizontal ground, Engine is in flame out. And screw out dipstick on the right side of main shift lever and clean up. Then insert dipstick. If oil level is off scale, fill up driving oil till between up & down scale of dipstick (measure oil level in more than 5 minutes after filling up machine oil). When change lubricant, remove oil drain plug that is at the bottom of rear drive axle housing and drain dirty oil completely. Then clean with diesel oil and tighten oil drain plug fill up fresh oil.

4.2.2.10 Maintenance of lifter

Firstly, tractor will be parking on the horizontal ground, And lower loft arm to the lowest position, Engine is in flame out, Then screw out dipstick on the top cover of lifter and check oil level. If oil level is off lower scale, fill up oil till between up & down scale of dipstick. When change hydraulic oil, remove oil drain plug and drain oil completely. Then fill up fresh machine oil as required.

4.2.2.11 Maintenance of fuel oil tank

Tractor is parking on the horizontal round and engine is in flame out. Remove oil drain plug that is at the below of fuel oil tank and empty deposition that is at the bottom of oil tank. Oil tank has the function of storing oil plants, depositing moisture and impurity. During using, clean and clear up dirt regularly.

4.2.2.12 Maintenance of engine cooling system

Engine coolant is either boiled tap or antifreeze. The expiration date of antifreeze is two years or 1600 hours. Beyond this expiration date, replace and rinse off cooling system. Then fill up fresh antifreeze.

Clean scale of cooling system: In shift before maintenance, fill up cooling system with solution in which 750g sodium hydroxide and 150g kerosene are added in 10L water. Besides, Engine runs for (5~10) min at intermediate speed and solution is kept (10~12) h. (Notice: keep warm to prevent freeze in winter). Then restart engine to run for 20min at intermediate speed and shut off to drain cleaning liquid.

After wait engine to be cooled down, open water drain valve on the bottom of water tank and insert hose into water tank to be rinsed. Check regularly if damping block is aging. If it is aging, replace it in time to avoid influencing water tank's lifetime. After cleaning, close water drain valve and fill up water to let engine run several minutes. Then drain water completely. Wait engine to be cooled down, full up new antifreeze or cooling water again as regulation.

4.2.2.13 Exhaust air of fuel oil system

If tractor is parking or a long time or replaced diesel oil filter core, and oil tank in emptied, air is possible to intake fuel oil pipe. However, air of fuel oil system can make engine start difficultly. When oil tank in filled fully and switch of oil pipe is switch on, exhaust air as following steps: loosen air bleed screw of fuel oil filter and lift up and down pull button of fuel supply pump and hand pump till diesel oil is flowing out of air bleed screw hole without air bubble. Then retighten air bleed screw. Loosen air bleed screw of injection pump and lift up and down pull button of fuel supply pump and hand pump till diesel oil is flowing out of air bleed bolt hole without air bubble. Then retighten air bleed screw.

Important items:

(1) In winter, check often density of antifreeze according to climate condition. If in is not proper, restore normal density at once. For tractor without using antifreeze, when water temperature is falling below 70℃ and engine runs at idle speed, drain water completely to prevent cooling water frozen and body frosted crack.

(2) High quality light diesel oil that is in accord with specification must be used in engine. As usual, No .0 light diesel oil is used in summer and No. –10 light diesel oil is used in winter (details refer to this instruction 3.1.1). Diesel oil must be pure and deposited and purified for 48 hours before using. Check often lubrication surface of ZHB type injection pump. When lubricant is not enough, fill up lubricant in time till scale. Besides, change lubricant once every 200 operating hours. Lubricant brand used in injection pump is the same as lubricant brand used in diesel engine.

Warn: if air is not exhausted completely, brake system may be failure!

4.3 Adjust tractor chassis

4.3.1 Adjust clutch

1. Single action clutch of DQ40 series tractor

Construction of clutch is showed in figure 4.3.1.1:

(1) Adjust clutch

During the course of using clutch, because friction disk are worn, the clearance between release lever head and end face of release thrust bearing is reduced gradually. Even cause release lever head to touch end face of release thrust bearing. If such condition is kept for a long time, release thrust bearing is burnt and clutch cannot work normally. Therefore, during using, check and adjust often as following:

1) The clearance between release lever of clutch and end face of release thrust bearing is $2.5^{\circ}{}_{-0.5}$ mm. The adjusting height between base surface of clutch pressure plate and plane of claw is

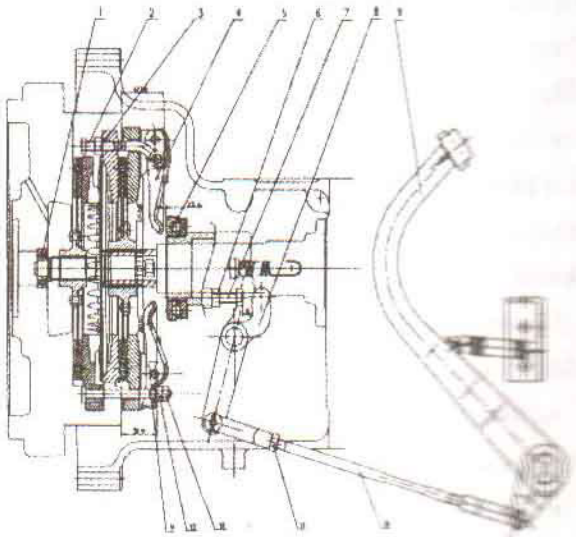


Figure 4.3.1.1 Single action clutch of DQ40 series tractor

1-Bearing 2-Release lever 3-Adjusting nut 4-locking nut 5-Release thrust bearing 6-Locking nut 7-Bolt 8-Release fork rocker arm 9-Clutch pedal assembly 10-Pull rod 11-Locking nut

39mm. And height difference of three release lever ends should not be more than 0.2mm.

Adjusting method: Loosen locking nut and screw adjusting nut to make the clearance between three release levers and end face of release thrust bearing be 2.5° $^{-0.5}$ mm. And the height difference between three release lever ends should not be more than 0.2 mm. Then tighten locking nut and adjusting nut.

2) Pedal free stroke of clutch is 15~20mm.

Adjusting method: Loosen locking nut on the pull rod of clutch and turn pull rod to change length of pull rod and make free stroke of pedal be 15~20mm, Then lock locking nut on the pull rod.

3) Limit distance H=7~8mm.

Adjusting method: Loosen locking nut and adjusting bolt to make the distance between six square heads and release fork rocker arm of clutch be H=7~8mm. Then lock nut.

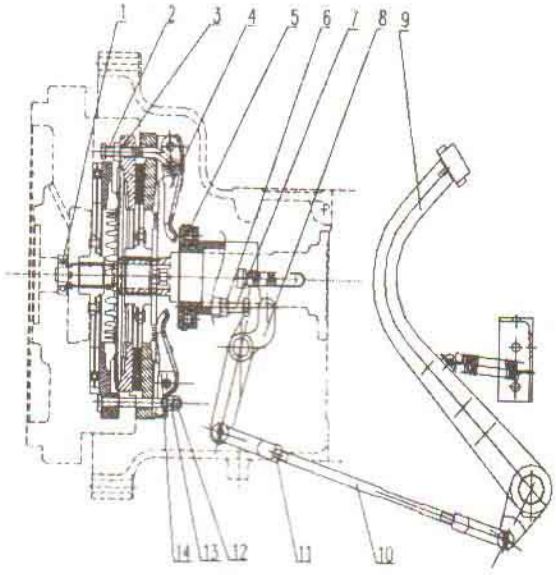


Figure 4.3.1.2 Double action clutch of DQ40 series tractor
1-Bearing 2-Adjusting screw of main clutch 3-Locking nut 4-Release lever of main clutch 5-Release bearing 6-Locking nut 7-Adjusting screw 8-Release fork rocker arm 9-Clutch pedal assembly 10-Pull rod 11-Locking nut 12-Locking nut 13-Ball nut 14-Release lever of auxiliary clutch

(2) Lubrication of clutch bearing

When install, front bearing of clutch is greased fully. And release thrust bearing need not be greased in normal condition. After tractor has been in working for 1000 hours or bearing is found to produce abnormal noise during using, remove bearing and clean up. Then immerse it into molten lithium base grease with high temperature till grease is filled in bearing fully. Wait bearing to be cooled down, clean its surface and install it in original position.

(3) Operation precautions of clutch

1) Using clutch must be noticed: disengaging should be quick and complete and engaging should be soft.

2) When tractor is running, foot cannot be put on the clutch pedal. It is prohibited lowering running speed of tractor by semi-engaged clutch and rushing hillside or going over obstacle by engaging clutch suddenly.

3) It is prohibited oil strain sticking on the surface of clutch friction disk. Once clutch friction disk is stuck to oil strain, clean it with gasoline and use it after being dried up.

2、Double action clutch of DQ40 series tractor

Construction of clutch is showed in figure 4.3.1.2

(1) Adjust clutch

Adjusting Double action clutch includes adjusting main clutch and auxiliary clutch.

1) Adjust main clutch

a. The clearance between release lever of main clutch and end face of release thrust bearing is 2.5° $^{-0.5}$ mm. The height difference between thee release lever ends should not be more than 0.2 mm.

Adjusting method: Loosen locking nut and adjust adjusting screw of main clutch to make the clearance between release lever of main clutch and end face of release thrust bearing be 2.5° $^{-0.5}$mm and the height difference between three release lever ends should not be more than 0.2 mm.

b. Pedal free stroke of clutch is (15~20)mm.

Adjusting method: Loosen locking nut on the pull rod of clutch and turn pull rod to change length of pull rod and make free stroke of pedal be 15~20mm. Then lock locking nut on the pull rod.

c. Limit distance H=9.5~11mm

Adjusting method: Loosen locking nut and adjusting bolt to make the distance between six square heads and release fork rocker arm of clutch be H=9.5~11mm, Then lock nut.

2) Adjust auxiliary clutch

The distance between release lever of DQ300/304/350/354 main clutch and release lever end of auxiliary clutch is 8.5mm. The height difference between release lever ends of auxiliary clutch should not be more than 0.2mm.

The distance between release lever of DQ400/DQ404 main clutch and release lever end of auxiliary clutch is 8mm. The height difference between release lever ends of auxiliary clutch should not be more than 0.2 mm.

Adjusting method: Loosen locking nut and adjust ball nut to make the distance between release lever ends of main and auxiliary clutch be 8.5mm (DQ300/304/350/354) or 8mm (DQ400/DQ404). The height difference between release lever ends of auxiliary clutch should not be more than 0.2 mm. Then lock locking nut.

(2) Lubrication of Double action clutch bearing of DQ40 series tractor is the same with that of Single action clutch of DQ40 series tractor.

(3) Operation precautions of Double action clutch of DQ300/304/350/354 type tractor are the same with those of Single action clutch of DQ300/304/350/354 type tractor.

4.3.2 Adjust brake

Pedal free stroke of brake is 120-130mm.

when brake friction disk is worn, free stroke of brake pedal will be enlarged in order that braking effect is poor. Therefore, it is necessary to adjust free stroke of brake pedal.

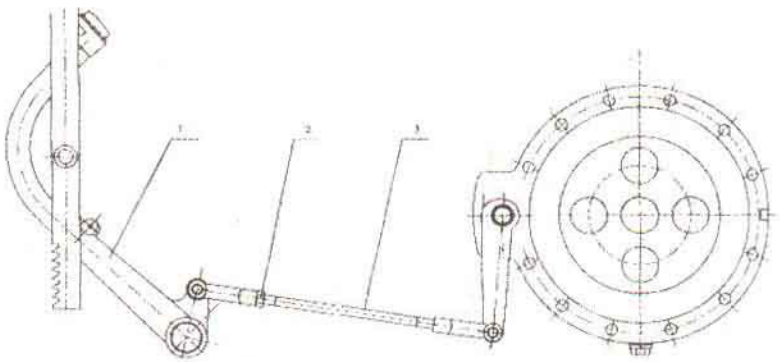


Figure 4.3.2 Adjust brake

1-Brake pedal weldment 2-Nut 3-Pull rod

As the figure is showed: Loosen nut and adjust pull rod to make free stroke of brake pedal reach 120~130 mm and free stroke of left & right pedal be consistent. After adjust properly, lock nut.

4.3.3 Construction and adjustment of rear drive axle

Rear drive axle is composed of central drive, differential gear, differential lock and PTO shaft etc.

4.3.3.1 Construction of rear drive axle

Central drive is composed of a pair of spiral bevel gear (figure 4.3.3.1). Rear end of taper pinion shaft is carried by taper roller bearing. Front end of taper pinion shaft is carried by cylindrical roller bearing. The integral key of shaft end is connected with the integral key of gearbox

4.3.3.2 Main adjustment of rear drive axle

(1) Adjust bearing of taper pinion (figure 4.3.3.1)

Two taper roller bearings on the taper pinion shaft are preloaded. During using, because bearing is worn, taper pinion produces axial free play. And preload is also reduced. Therefore, check regularly (each time III maintenance) and adjust again. When adjust, measure the width A between two bearings and enforce350 N axial force to measure the width B between two deformed bearings. Then choose the thickness of adjusting shim to be =A-B and install them in original position. After adjust properly, tighten round nut and lock by washer.

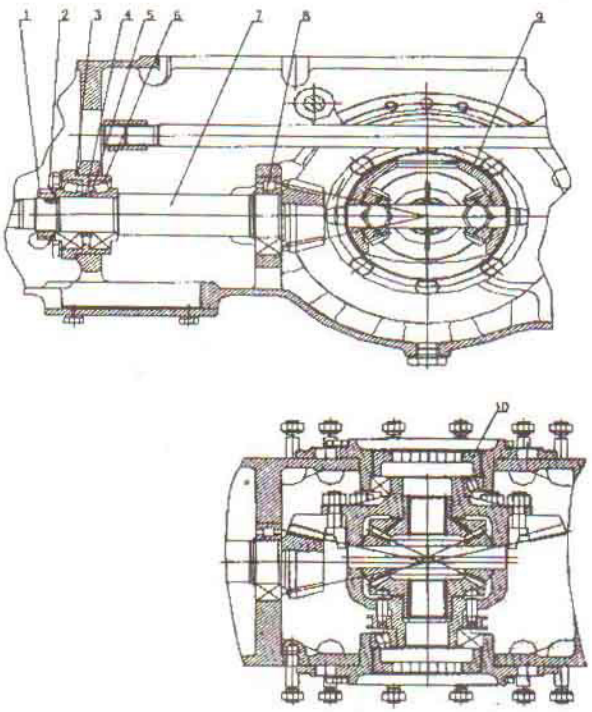


Figure 4.3.3.1 Central drive

1-Round nut 2-Locking washer 3-Adjusting shim 4-Spacer 5-Adjusting shim 6-Taper roller bearing 7-Taper pinion shaft 8-Cylindrical roller bearing 9-Differential gear 10-Adjusting nut

(2) Adjust differential gear bearing (figure 4.3.3.2)

Left and right bearing of differential gear are preloaded, During the course of using, because bearing is worn, taper wheel produced axial free play and preload is reduced. Therefore, check regularly (each time III maintenance). When adjust, tighten left & right adjusting nut (figure 4.3.3.1) to make axial pressure of bearing be kept about 350N.

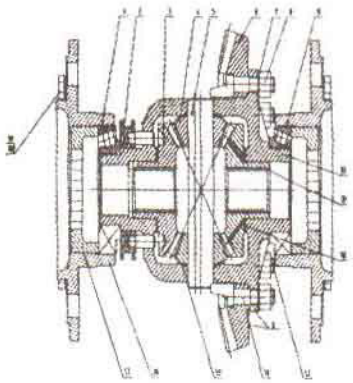


Figure 4.3.3.2. Differential gear

1-earing 7211E 2-Differential lock assembly 3-Left half shaft gear 4-Planet gear 5-Planet gear shaft 6-Taper wheel 7-Locking washer 8-Nut 9-Bearing 2007113 10-Differential gear housing 11-Right half shaft gear 12-Half shaft gear washer 13-Taper wheel fastening bolt 14-Planet gear shaft thrust bolt 15-Planet gear washer 16-Differential gear baring seat 17-Adjusting nut 18-Bolt M10X25 19-Gasket 10

(3) Engaged adjustment of central driving bevel gear (figure 4.3.3.1)

During the course of using, increasing backlash produced by wearing gear cannot influence normal work of gear. However,

wearing bearing will make bevel gear pair offset original engaging position. As usual, if such off setting does not influence normal work of gear, it need not be adjusted during using. However, when machine is overhauled and gear works abnormally or when replace bearing (differential bearing and taper pinion bearing) and bevel gear pair, engaging adjustment should be done (After preload and adjust bearing).

1) Check backlash. Insert lead sheet between non-working flank of taper pinion and taper wheel and turn gear to squeeze lead sheet. Then take out lead sheet and measure thickness near the big end of gear (i.e. backlash) that should be (0.15~0.3)mm. By the same method, measure evenly three points on the whole circle of gear. The difference of backlash should be less than or equal to 0.1mm. If engaging clearance cannot meet the requirement, turn adjusting nut to adjust engaging clearance. The setting sum of left & right adjusting nut should be zero.

(2) Check engaged mark. Coat a layer of thin and even catsup on the tooth surface of taper wheel. When go forward, concave of taper pinion shaft is subject to force. Coat catsup on the tooth surface of taper wheel and turn gear to obtain engaged mark on the taper pinion. Right-engaged mark should be near tooth depth middle pitch cone and near slightly small end.

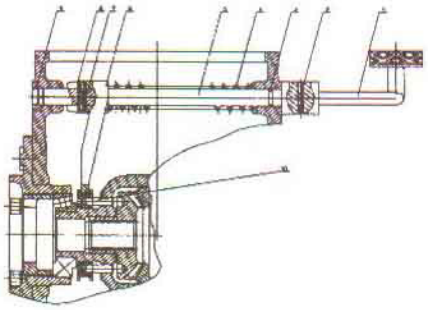


Figure 4.3.3.3 Control position of differential lock
1-Lock and pedal weldment 2-Elastic pin 3-O-ring 4-Differential lock return spring 5-Differential lock fork shaft 6-Differential lock fork 7-Elastic pin 8-Elastic pin 9-Cap sealing 10-Differential lock assembly

The distance between right engaged mark and end edge should be more than or equal to (3~4)mm and the length should be more than or equal to 60% of tooth length and the height should be more than or equal to 50% of tooth height. When adjust, change the thickness of adjusting shim to make taper pinion move in axial direction and turn adjusting nut to make taper wheel move in axial direction to obtain the right engaged mark, Not to damage preload of differential gear bearing, the setting sum of left & right adjusting nut of differential gear should be zero. (Figure 4.3.3.1)

During the course of adjusting, when there is contradiction between engaging clearance and engaged mark (i.e. engaged mark is proper and clearance is not proper), engaged mark should be as reference. But engaging clearance should be more than or equal to 0.15mm.

Taper wheel (figure 4.3.3.2) is fastened on the differential housing by six bolts and two thrust bolts of planet gear shaft. Taper roller bearings are installed on the both ends of differential gear housing that is installed on the rear drive axle housing by six screws and through differential gear and bearing seat. Two planet gears and two half-shaft gears are installed inside differential gear housing. Washers are installed between planet gears & half shaft gears and differential gear housing. Besides, planet gears are sleeved on the planet gear shaft. The slitting is on the one end of planet gear shaft on the both ends of which are pressed by thrust bolts to avoid turning and drunkenness of planet gear shaft.

Differential lock controls that are composed of differential lock pedal, fork shaft, fork, return spring and differential lock are on the right of tractor (figure 4.3.3.3).

4.3.4 Construction and adjustment of final drive

4.3.4.1 Construction of final drive

Final drive uses planet gear mechanism drive (figure 4.3.4.1). The whole planet gear mechanism is composed of drive sun gear, fastening gear ring, driven planet carrier and planet gear. The sun gear and half shaft are integral. Besides, front integral key is connected with half shaft gear. And gear ring is fastened between drive shaft housing and brake housing. Three planet gears engeged with sun gear and gear ring are installed planet carrier by needle roller bearing and planet gear shaft. Drive shaft is carried in drive shaft housing by two centripetal ball bearings and connected with planet carrier by integral key and fastened by locking screw of drive shaft. To change meshing condition of sun gear and planet gear and make meshing loading distribution be even, sun gear has not fixed bearing and is in floating condition. The floating clearance of G=(0.2~0.3) mm is between planet carrier and space band.

4.3.4.2 Adjust final drive

The clearance between planet carrier and space band is G=(0.2~0.3) mm and has been adjusted. So no adjustment is needed during using. However, it need adjust when overhaul or replace planet gear mechanism.

When adjust, firstly, measure the distance A between the end face of drive shaft and bearing 6. Then measure the depth B of spout hole on the planet carrier and the thickness C of space band. Choose the thickness of adjusting shim is δ =A-(B+C+0.2~0.3mm). Place shim with the thickness δ on the position showed in figure. Then tighten locking screw of drive shaft and lock by locking plate of drive shaft.

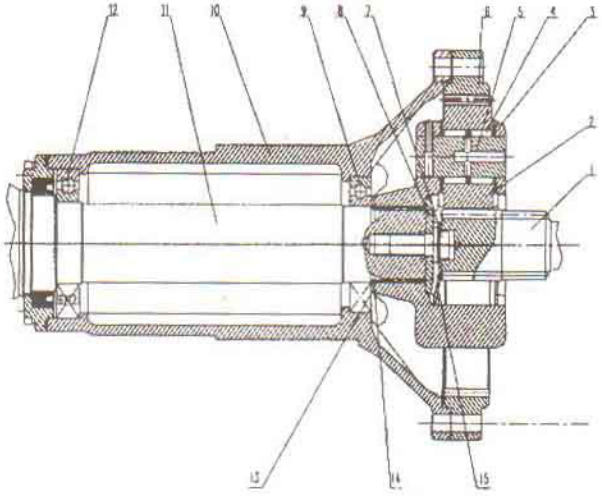


Figure 4.3.4.1 Final drive.

1-Sun gear 2-planet gear 3-Planet carrier 4-Needle 5-Planet gear shaft 6-Gear ring 7-Screw 8-Space band 9-Roller bearing 10-Drive shaft housing 11-Drive shaft 12-Roller bearing 13-Space band 14-Adjusting shim 15-Locking plate

4.3.5 Construction and adjustment of front shaft

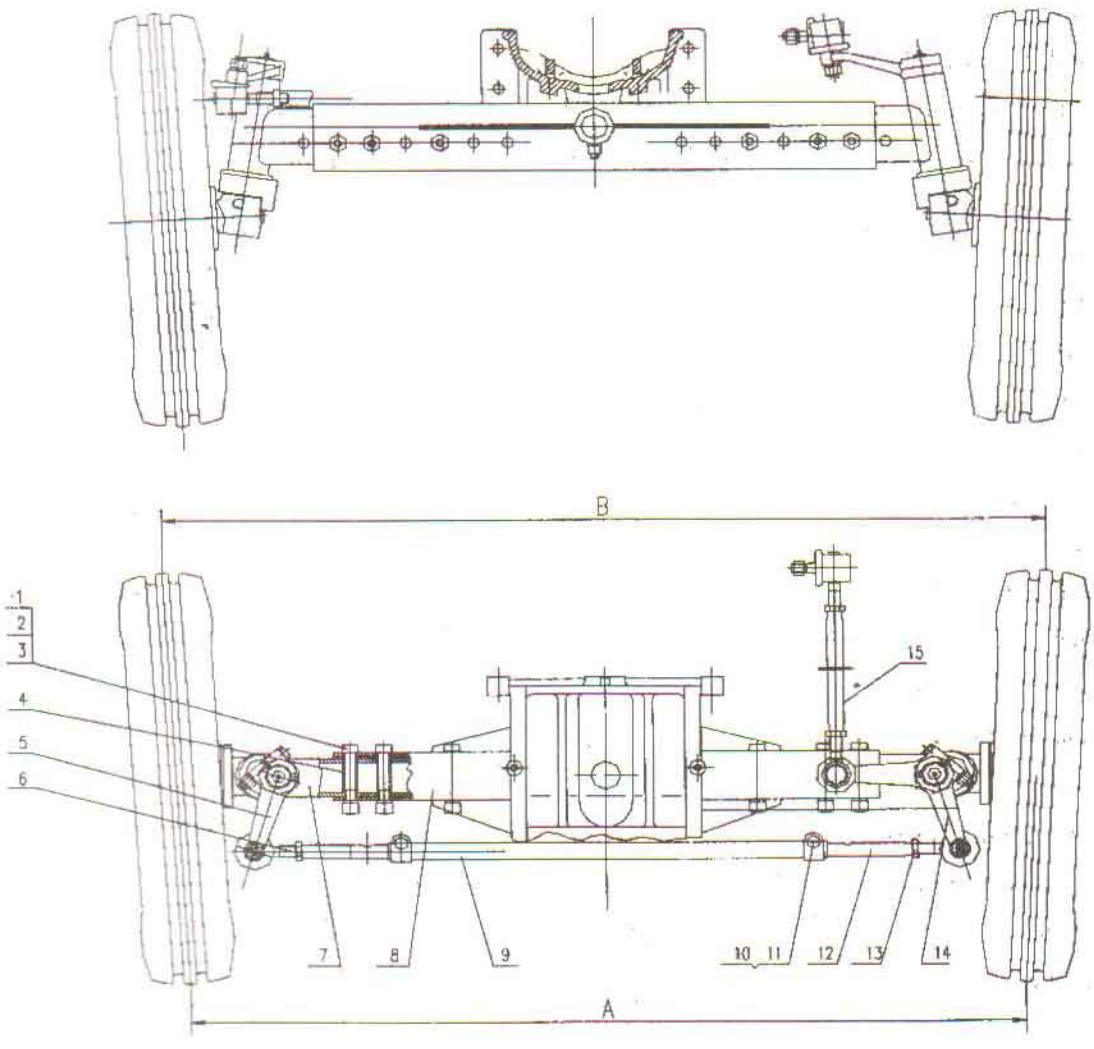


Figure 4.3.5.1 Front shaft

1-Bolt 2-Nut 3-Gasket 4-Cushion 5-Left steering arm 6-Nut 7-Auxiliary sleeve 8-Sleeve 9-Tie rod 10-Bolt 11-Nut 12-Left tie rod 13-Counterclockwise nut 14-Left steering arm 15-Longitudinal tie rod

4.3.5.1 Construction of front shaft (see figure 4.3.5.1)

Tractor front shaft is tubular front axle whose wheelbase is adjustable. And it is set in front of diesel. Besides, bracket is connected with diesel by six bolts. Sleeve weldment is covered on the pendulum shaft that is supported by front & rear end of bracket. Left & right auxiliary sleeve assembly fastened by three bolts is respectively in both sides of sleeve.

4.3.5.2 Adjust front shaft

(1) Adjust axial clearance of front wheel bearing bearing, as figure 4.3.5.2 is showed

Normal axial clearance of front wheel bearing is (0.05~0.15) mm. When using in short range, if the clearance is increased up to 0.4 mm, adjust clearance. When adjust, jack up front wheel and remvoe bearing cover.

Then pull out split pin and screw castle nut till he bearing clearance is eliminated. And withdraw 1/30~1/10 circle again. Then insert split pin and lock split pin and install bearing cover.

(2) Adjust toe-in of front wheel (figure 4.3.5.1): Each time tractor has been in working for 500 hours or

front wheel is found to be sloshing obviously and tire of front wheel is worn too quickly, check toe-in of front wheel. Right toe-in value is adjust toe-in. The method is: tractor is parking on the horizontal ground and turn steering wheel in neutral position to make two front wheels be in the condition of straight running. Then loosen left & right locking nut of tie rod and turn tie rod. based on the same horizontal height through center line of front wheel, measure the distance of two front ends and two rear ends from the middle position of tire width and make the difference of B-A=(4~8)mm. After adjust properly, tighten left & right locking nut.

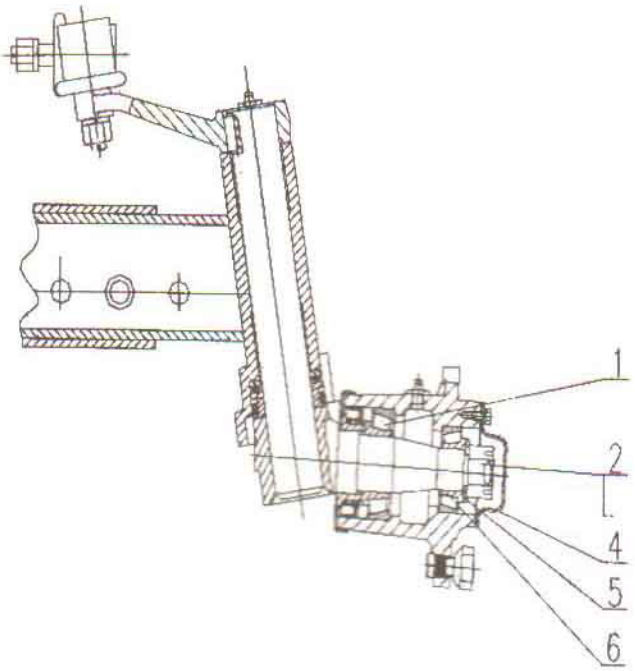


Figure 4.3.5.2 Adjust axial clearance of front wheel hearing
1-Bevel wheel bearing 2-Castle nut 3-Split pin 4-Bearing cover
5-Check ring 6-Bevel pinion bearing

(3) Adjust front wheel base

Adjusting wheelbase is conducted by collapsible sleeve and used by inner and outer sleeve type. The adjusting range is (1150~1450) mm and the clearance of each grade is 100 mm. When adjust, firstly, loosen fastening nut of front girder inner arm. Then pull out fastening bolt and liner bushing, fastening nuts and bolts of tie rod. Move deputy sleeve and subtle tie rod to the required position and fasten them by bolts and nuts.

4.3.6 Construction and adjustment of steering gear

4.3.6.1 Steering gear of DQ300/350 type tractor

1、Construction: steering gear is cone-worm and roller type and is fastened on the gearbox housing by four bolts. The included angle between steering shaft and longitudinal axis of tractor is 65° . Its construction is showed in figure 4.3.6.1. Steering shaft with worm assembly is installed in steering gear housing and is supported on No.977907 bearing that is installed on the steering gear housing. Steering rocker arm shaft with accessory liner bushing assembly is installed in steering gear housing. And its left end is supported on the liner busing and its right end is supported on the 205 bearing of steering gear cover that is installed on the steering gear housing. So roller wheel installed on the steering rocker arm shaft (bearing 776701) is engaged with worm.

2、Adjust: When install steering gear, it need preload worm bearing. The method is: increase and decrease adjusting shim between steering gear housing and steering gear lower cover. After tighten four bolts of steering gear lower cover, steering gear lower cover will press bearing. The preload of worm bearing is: when rocker arm shaft and roller wheel are not installed, at the 210 m.n radius of steering wheel, the force turning steering wheel should be within 2.5~5N.

The distance between centerline of roller wheel and centerline of worm is 6mm that is used to adjust engaging clearance of roller wheel and worm. When adjust, screw out adjusting nut on the right side and rotate

adjusting screw of steering rocker arm by special wrench and move in axial direction steering rocker arm shaft left & right. At the position of tangent along 210 mm radius of steering wheel, enforce 8~13 N to rotate steering wheel from the middle position to left & right respectively 200° and check steering wheel. When roller wheel of rocker arm shaft is on the both ends, engaging clearance of steering gear assembly is allowed to be within such range that is up to racing 30° of steering wheel. When roller wheel of rocker arm shaft is in neutral position and steering wheel rotates respectively left & right within 45°, steering gear assembly cannot has engaging clearance.

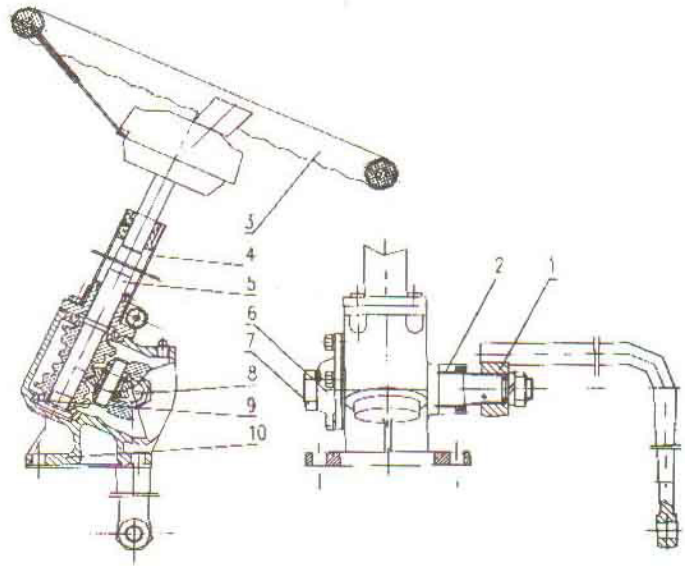


Figure 4.3.6.1 Steering gear assembly

1-Steering vertical arm 2-Liner bushing 3-Steering wheel assembly 4-Steering sleeve 5-Steering shaft with threaded rod assembly 6-Steering gear side cover 7-Nut 8-Steering rocker arm shaft 9-Bearing 977907 10-Steering housing

4.3.6.2 Steering gear of DQ400/DQ450 type tractor

1、Construction

Steering gear is re-circulating ball-rack and sector type and is composed of steering shaft, steering threaded rod, steering nut, plumbing arm shaft and steering gear housing etc (figure 4.3.6.2). Steering threaded rod is installed on the housing by two 32206-bevel bearings. When turn steering wheel, turn steering threaded rod and move up & down steering nut by two rows of steel ball. Racks on the steering nut push sector to turn and make steering plumbing arm swing left & right. Plumbing arm shaft whose axial position is fastened by adjusting nuts is supported in steering gear housing.

Oil filler is on the steering gear that should be filled up driving and hydraulic oil to ensure lubrication.

2、Adjust

a) Adjust bearing clearance

To make steering gear work normally, the 32206 bevel bearing on the both ends of steering threaded rod must be preloaded. When bearing is worn to produce the clearance, eliminate the clearance by increasing and decreasing adjusting shims. Preload is adjusted till 3~5N is enforced on the steering wheel during turning threaded rod without installing vertical arm shaft assembly.

b) Adjust engaging clearance of sector

During using, rack and sector are worn to cause engaging clearance to be increased and make idle stroke of steering wheel enlarge. When idle stroke is more than 20°, adjust them.

When adjust, loosen nut on the right side of steering gear housing and turn adjusting screw in clockwise to decrease engaging clearance. When steering vertical arm is adjusted to the middle position, steering wheel

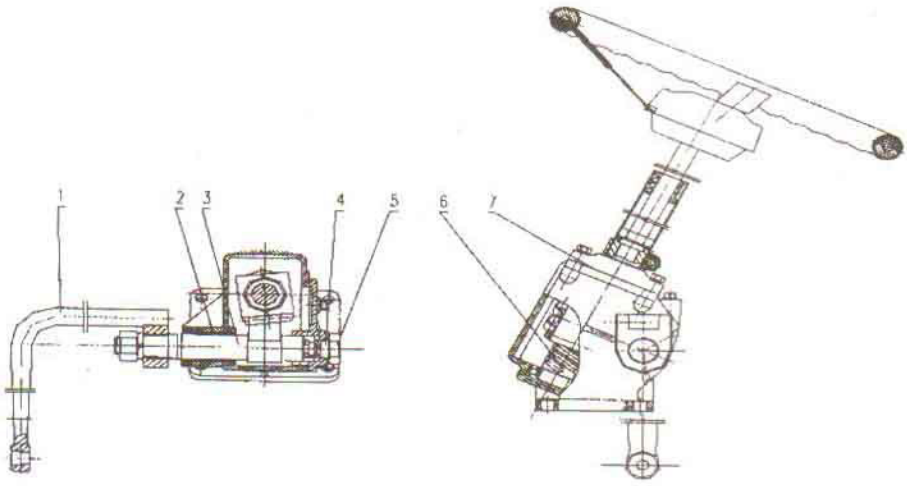


Figure 4.3.6.2 DQ400 steering gear

1-Steering vertical arm 2-Steering gear housing 3-Steering vertical arm shaft 4-Adjusting screw 5-Adjusting nut 6-Steering threaded rod 7-Adjusting shim

rotates left & right 45° and to engaging clearance is between rack an sector. After adjust properly, lock nut to prevent leaking oil.

4.3.6.3 Operational precautions of the full hydraulic steering system

The construction of the full hydraulic steering system is showed in figure. When tractor leaves the factory, steering system has been adjusted properly. During using, users should pay attention to following items:

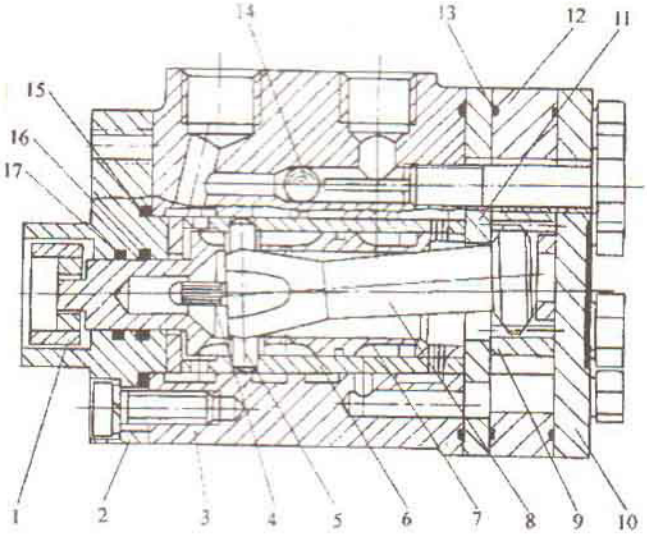
(1) Check often all connection of screw thread. If connection is loosening, tighten in time. When the full hydraulic steering system is working, oil leakage is not allowed in all connection.

(2) Check often oil level of steering oil tank. If oil is not enough, fill up oil as required.

(3) During using, if steering is heavy or failure, firstly, check reasons carefully (details refer to the chapter 2 of this instruction). Don't turn steering wheel toughly with force. It is not even allowed to remove steering system to avoid parts damaged. It is prohibited two persons turn steering wheel simultaneously.

(4) When install the full hydraulic steering system, ensure that steering gear should be coaxial with steering shaft and clearance is in axial. After install, check if steering wheel returns flexibly.

(5) Oil must be assured clean. So check often the condition of filter core and oil. The method: one



The full hydraulic steering gear

1-Cross connection block; 2-Front cover; 3-Valve body; 4-Spring leaf; 5-Pin extractor; 6-Valve sleeve; 7-Valve core; 8-Linked axes; 9-Rotor; 10-Rear cover; 11-Diaphram plate; 12-Stator; 13-O ring; 14-Steel ball; 15-O ring; 16-X ring; 17-O ring

drop of oil is dropped on the blotter. If blank is in the center of oil patch, change oil at once. (6) After fresh machine oil, exhaust air of oil cylinder completely. The method: loosen connector of steering oil cylinder bolt and exhaust air by running oil pump with low speed till no air bubble is in flowing oil.

Remove connection between piston rod of steering oil cylinder and turning wheel and turn steering wheel to make piston reach the left limitation or the right limitation (don't stay in two extreme position). Then fill up oil tank with oil till the specified highest oil level.

Tighten all connection of screw thread (don't tighten under the condition of pressure) and connect piston rod. Check if steering system works normally under all kinds of working condition.

(7) Permanent overflow pump is the precise part. As usual, it is not allowed to remove at random. When remove, it must choose clean location and clean with fresh gasoline or kerosene.

● **Important items: Before leave the factory, safe overflow pressure of relief valve on the permanent overflow pump has been adjusted. Do not remove and adjust of one's own.**

4.3.7 Adjust rear wheelbase

Adjusting rear wheelbase is realized by different installing position of web and rim. The adjusting range is 1150~1450mm that is divided into four grades: 1150、1250、1350、1450mm (see figure 4.3.7.1)

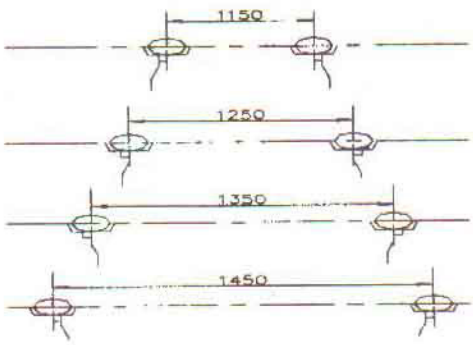


Figure 4.3.7.1 Schematic of adjusting rear wheelbase

4.3.8 Adjust hydraulic suspension system

Adjust lifter

1、Adjust adjusting spring (figure 4.3.8.1)

Before force adjusting spring assembly is installed into lifter housing, it should be adjusted as following: turn relatively upper pull rod connecting joint and spring rod and eliminate the clearance among all parts to ensure the clearance between A face of spring pressure plate and B face of spring rod to be 2 mm. Then insert pin. Besides, install force adjusting spring assembly into lifter housing and screw nut to make front end of force adjusting spring assembly touch E face of lifter housing. Finally, insert pin from nut hole (figure 4.3.8.1).

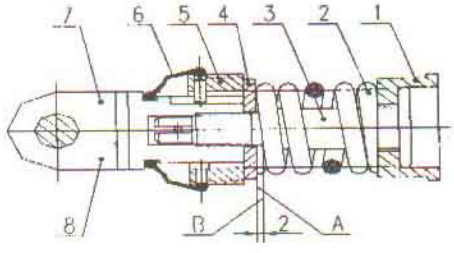


Figure 4.3.8.1 Adjusting spring
1-Spring seat 2-Force adjusting spring 3-Spring rod 4-Spring pressure plate 5-Nut 6-Dustproof cover 7-Upper pull rod connecting joint 8-pin

2、Adjust force adjusting lever and position adjusting cam of lifter (figure 4.3.8.2). Firstly, place handle of adjusting automatic draft and position on the connecting position with cut on the sector plate (i.e. the position that is vertical with base surface of lifter housing) and make the clearance between inner lifting arm and inner surface in the rear of lifter housing be 4 mm. At this time, the included angle between outer lifting arm and base surface of lifter housing is 60 ° . Then adjust respectively force adjusting lever and position adjusting cam.

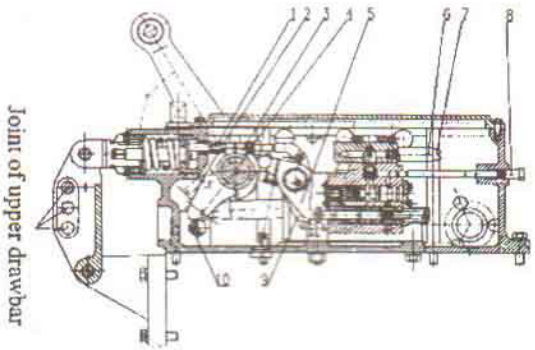


Figure 4.3.8.2 Adjusting mechanism of lifter
1.Force adjusting push rod 2.Force adjusting seal sleeve 3.Position-adjusting cam 4.Bolt 5.Position adjusting lever 6.Locking nut 7.Pressure regulating bolt 8.Block valve and adjusting rod of low valve 9.Force adjusting lever 10.Locking shaft assembly

(1) Adjust force adjusting lever

Adjust force adjusting push rod to make force adjusting seal sleeve head touch A face. Then adjust the length of force adjusting push rod to make the clearance between control end G of force adjusting lever and end face of main control valve be 1.5 mm (at this time, main control vale is on the outmost position). After adjust properly, lock nut.

(2) Adjust position adjusting cam

Firstly, make control end of position adjusting lever touch the outmost position of main control valve. Then turn position-adjusting cam and make it touch roller wheel of position adjusting lever assembly. Under the condition of keeping contact between position adjusting lever roller wheel and cam, turn position-adjusting cam in clockwise till control end of position adjusting lever pushes main control valve to the neutral position (i.e. main control valve moves 5 mm inwards from the outmost position). At this time, the distance between control and of force adjusting lever and end face of main control valve is 6.5 mm. Then position-adjusting cam is fastened on the lifting shaft by bolts.

4.3.9 Construction and adjustment of DQ304/354/DQ404/DQ454 type tractor front drive axle

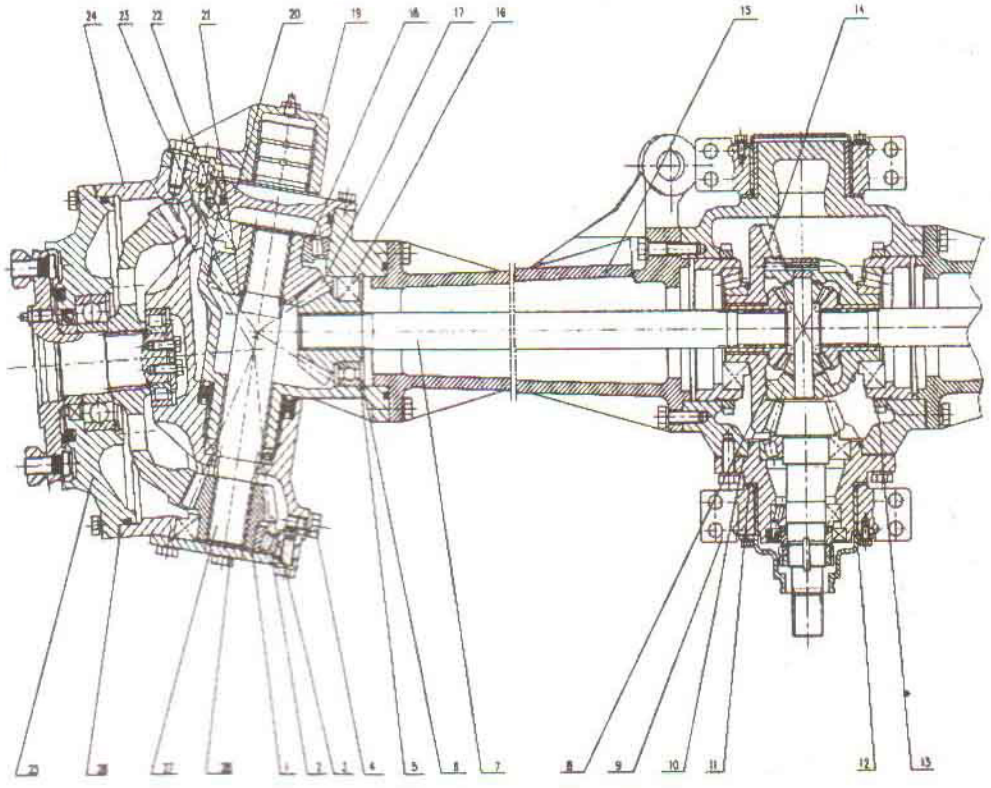


Figure 4.3.9.1 Front drive axle

1-Adjusting shim 0.2、0.5、1.0 2-Bearing 36210 3-Front end transmission pinion 4-Oil drain plug 5-Adjusting shim 0.2、0.5、1.0 6-Check ring 85 7-Half shaft 8-Differential gear assembly 9-Oscillating seat 10-Adjusting shim 11-Thrust washer 12-Oscillating line 13-Adjusting screw 14-Driven gear 15-Half shaft housing 16-Bearing 209 17-Bevel gear (1) 18-Bearing 36208 19-Steering arm 20-King pin shaft seat 21-Bearing sleeve 22-Adjusting shim 0.2、0.5、1.0 23-Bevel gear (2) 24-End transmission housing 25-Front drive end cover 26-Aadjusting shim 0.2、0.5、1.0 27-King pin 28-Lower end cover

1、Adjust toe-in

Adjusting method is the same with relevant content of two-wheel drive front shaft assembly.

2、Construction and adjustment of front drive axle assembly (figure 4.3.9.1)

Power of front drive is conducted into front central drive through transmission shaft by transfer case. And power is distributed half shafts on the both sides by front central drive and is conducted front end transmission to make front drive wheel turn.

After two bearings on the front central transmission drive gear has been used for a period, axial movement is enlarged. So it need tighten small round nut to decrease axial movement of bearing. However, if do so, the engaging clearance between front central transmission drive gear and driven gear will be increased. So adjusting shim with proper thickness should be drew out. If necessary, adjust also adjusting nuts on the both sides of front differential gear to make the clearance recover normal condition.

When work in field, especially when condition of paddy field task is rather execrable and turbid water is easy to invade end face of front & rear oscillating line and make end face be worn and cause axial movement to be enlarged. Keep normal axial movement by adjusting the thickness of thrust washer.

Front- end transmission pinion and bearing installed on the king pin and bevel gear and bearing installed

on the half shaft will be worn after turning for a long time. So engaging clearance of bevel gear pair will be enlarged and it need adjust. Adjusting method is as following: loosen oil drain plug on the lower right of end transmission housing to drain lubricant.

(1) Top of kingpin: remove steering arm and king pin shaft seat. Wear down bearing sleeve installed on the lower of bevel gear and make it shorten according to the gear-engaging clearance. At the same time, draw out adjusting shim to decrease engaging clearance. If wearing of bearing causes engaging clearance, only draw out adjusting shim and reinstall removed parts.

(2) Lower of king pin: jack up half shaft housing of front drive axle by lifting jack to let front wheel leave the ground. Then remove front wheel and end cover. According to the gear-engaging clearance, increase adjusting shim or draw out adjusting shim on the front drive end cover to decrease the gear-engaging clearance. Then reinstall removed parts.

(3) Half shaft end: remove the whole front-end transmission assembly and check ring 85. According to the gear-engaging clearance, increase adjusting shim to decrease the engaging clearance. Then reinstall removed parts and install it on the front drive axle assembly.

After finishing above steps, turn front wheel by hand and keep it turn freely without abnormal noise. Then fill up lubricant fill specified level and tighten plug of oil filler.

Preload of front central transmission drive bevel gear carrying bearing (see figure 4.3.9.2). The axial clearance sum between bearing 7208 and bearing 2007107 should be adjusted up to (0.06~0.10) mm. When adjust, bearing cannot be burdened with load and tighten small round nut. Then withdraw 1/30~1/50 circles and lock gasket with fin. Turn gear by hand and keep it turn flexibly.

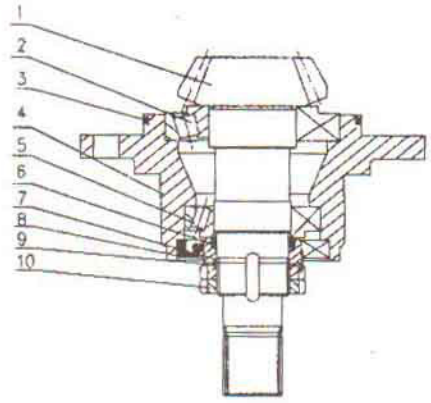


Figure 4.3.9.2 Preload of front central transmission drive bevel gear bearing
1-Front drive bevel gear 2-Bearing 7208 3-O-ring 4-Shaft seat 5-Bearing 2007107 6-O-Ring 7-Bearing sleeve 8-Frame oil seal 9-Gasket 10-Small round nut

Engaging clearance and engaged mark of front central transmission bevel gear refers to "engaged adjustment of central transmission bevel gear " in construction and adjustment of rear drive axle (figure 4.3.31 is showed).

5 Seal up and unpack of tractor

After tractor finishes farm work or need be parking for a long time because some reason, it must be kept and preserved properly. Tractor should be kept in good condition to prevent corrosion, aging and deformation of parts.

Before tractor is seal up, it must be cleaned completely and adjusted. All connectors must be fastened. Besides, specified technical maintenance is finished within working time in order to make tractor keep good technical condition (see chapter 4 of this instruction).

5.1 Damage reason of tractor in storage

Damage reason of tractor in storage is mainly as following:

5.1.1Corrosion: during parking, dust and water vapor in air are easy to leak inside machine from crevice or orifice etc. so that parts are contaminated and rusted, Surface of relative movement like piston, air valve, bearing and gear etc. lose protection of lubricant membrane with fluidity and pressure to produce erode, rusty spot, cementing choke or seizure that cause rejection.

5.1.2 Aging: Some parts like rubber or plastics will be ageing, deteriorative, fragile, non-functional, corrosive or rotten.

5.1.3 Deformation: some parts like driving tape or tire etc. produce plastic deformation because they are stressed for a long time.

5.1.4 Others: electric components are damped or battery is discharged by itself.

5.2 Seal up of tractor

5.2.1 Before seal up of tractor, check tractor carefully and eliminate existing faults and keep good technical condition. Clean up outside of tractor.

5.2.2 Drain antifreeze, rust prevention liquid of radiator, cylinder block and water pump and machine oil of lubricant system and hydraulic system completely.

5.2.3 Remove battery and grease up the piles. Then store it in room that is away from light, ventilated and has temperature of more than or equal to 10℃.

5.2.4 When engine is still hot; drain machine oil of engine completely. Then fill up fresh machine oil and let engine run several minutes at a small throttle opening to make machine oil attach surfaces of all moving parts evenly.

5.2.5 Grease up all lubricant points.

5.2.6 Dehydrating soft paraffin (heated to 100℃~200℃) is used in electric contacts, connectors and surface of metal parts without paint.

5.2.7 Loosen fan belts of engine, if necessary, take off belts and wrap them properly and store separately. Rust prevention liquid is sprayed inside pulley groove. Spray paint again on the surface of tractor on which paint falls off.

5.2.8 Drain diesel oil of diesel tank completely and clean oil tank.

5.2.9 Seal unclosed pipe orifice like inlet and outlet by proofing material (like canvas, waterproof cloth or oil paper etc.) to prevent foreign matter, dust and water.

5.2.10 Put all jog sticks in free shift (include switch of electric system) and set front wheel of tractor right. Suspended rod is placed the lowest position.

5.2.11 Raise tractor by wood holder and make tire release load. Check regularly pressure of tire.

5.2.12 Tractor should be parking in garage or car shed in which should be ventilated and dried. It is prohibited storing tractor with corrosive items and gas. If condition is not available, when parking in open air, parking must choose dry platform that has higher topography and is covered by waterproof cloth.

5.2.13 Clean and wrap parts removed from tractor and tools with machine and store in dry stock house.

5.3 Maintenance of tractor during seal up

5.3.1 During seal up, tractor must meet above requirement of sealing up tractor.

5.3.2 Check monthly if tractor and parts are rusty, corrosive, aging and deforming etc. If find problem, eliminate in time.

5.3.3 Rotate engine crank 10~14 cycles every other two months to prevent inside corrosion. For lubricant position that need be greased up, clear up old grease and change fresh grease.

5.3.4 Start up tractor every other three months and let it run at low speed for 20~30 minutes. Then check if all parts are normal.

5.3.5 Clean regularly dust on the top of battery by dry cloth and check regularly level and density of battery electrolyte according to "operational instruction of battery". Even if battery is not used, it discharges also by itself. So battery should be charged once each month.

5.3.6 When tractor is transported long distance by train or automobile, it cannot be in gear because train or automobile shake continuously in order to make tires of transported tractor move front and back continuously in transportation. Once tractor is in gear, movement of tires will bring gears. bearing, crank and piston etc. to wear continuously without lubricant, which causes parts burnt through.

5.4 Unpack of tractor

5.4.1 Clear up grease used fro rust proofing.

5.4.2 Open all close pipe orifices and clean tractor.

5.4.3 Fill up coolant, machine oil and diesel as required and grease up all lubrication points.

5.4.4 Check electrolyte of battery according to "operational instruction of battery" and install battery.

5.4.5 Clear up rust inhibitor inside fan pulley groove and fit belts. Adjust elasticity of driving belt according to technical requirement (refer to operation and maintenance instruction of engine).

5.4.6 Install battery then coat soft paraffin on the connector.

5.4.7 Check fastening of all circuits and pipes.

5.4.8 Control the tractor as above requirement 2.2.

Because DQ 40 ;series tractor can be matched with all kinds of engines, relevant details of seal-up and unpack of engine refer to "operation and maintenance instruction of engine".

● Important items:

1、It is very important for tractor to be stored scientifically and be maintained specially during a long parking period. Otherwise, deteriorative speed of tractor's technical condition will faster than that of working period.

2、If users have not ability of rust proofing and tractor need be set aside for several months or longer time, at lease, machine oil and machine oil filter should be changed. Start up tractor once every other one month and run at low speed for 20~30 minutes and check if all parts are normal. Besides, keep outside of tractor clean and dry. If protect tractor as above requirement, as usual, corrosion or damage will not occur. After tractor is used for a period, our company is not responsible for any possible damage occurring during the duration of parking.

6.Delivery, acceptance and transportation

6.1 Delivery and acceptance

When customers purchase tractor, they should check and accept purchased machine and check mainly following several aspects:

1. If the files with machine are complete

The files with machine include: "Operation instruction of tractor", "Product qualification certificate", "Service card of 'sanbao'", "Packing list of items with machine", "Technical file with engine" (From fitting factory of engine), "Parts catalogue of tractor" and "list of point of network for 'sanbao' service", Check if corresponding number on "Product qualification certificate", "Service card of 'sanbao'" and "Technical file with engine" is accord with real objects.

2. If items with machine are complete.

Check off items with tractor as "Packing list of items with machine". Items with machine include spare parts and tools with machine. Items with engine should be based on the regulation of "Technical file with engine" (if there is question, contact with dealers).

3. If machine condition is good.

After machine is consigned or transported, its technical condition is possible to be changed. Therefore, When customers purchase it, they should determine further machine condition.

6.2 Transportation

When transfer tractor, if move tractor by driving tractor, it should obey strictly traffic rules. Besides, traveling distance between two tractors should be kept at least 60 m in order to avoid accident that can cause collision happening. If transfer tractor by on loading transportation, it should do following several points:

1. When load and unload tractor, choose flat place.
2. When load and unload tractor, use special unloading platform.
3. In site, require assistant to direct the course and prevent personnel without relationship closing.
4. After load tractor, place suspension rod on the lowest position and pull to hand brake. Reversed gear is in gear. Pull out start-up key and lock door and shut off power main switch.
5. Fasten front & rear four tires in the formation of "8" by iron wire. Dam reliably front & rear tires by wedges and hold on rear drive axle girder by iron wire.
5. Tum back mirror inwards as it can as possible. If necessary, take off it.
7. When pass culvert and bridge, pay fully attention if it will exceed height. When turn the corner, slow down fully.
8. When unload tractor, release hand brake. Forward gear is in gear. Drive down slowly at the minimum speed.

Notice:

1. When load and unload tractor, parking brake of shipping truck should be skidded reliably and front & rear wheel are dammed reliably.

2. When load and unload tractor, tractor runs at the lowest speed.

7 Specification of the whole machine

7.1 Product execution standard

Execution standard of 40 series wheeled tractor of DQ EUROPARD: Q/SFZ2002-2004;

License number of 40 series wheeled tractor of DQ EUROPARD: QT2001050 "Agriculture Machinery Extension License"

7.2 Main technical parameters

Table 6-1 Parameters of the whole machine

Parameter \ Tractor type		DQ400	DQ404	DQ550	DQ554	DQ600	DQ604
Model		4×2 2WD	4×4 4WD	4×2 2WD	4×4 4WD	4×2 2WD	4×4 4WD
Dimension mm	Length(with front ballast)	3513	3513	3579	3579	3579	3579
	Width	1820	1750	1750	1750	1750	1750
	Height(to air outlet)	2130	2130	2130	2130	2130	2130
Wheel base mm		1880	1924	1996	2040	1996	2040
Front track mm		1200–1500 (usual 1300)	1250	1200–1500 (usual 1300)	1250	1200–1500 (usual 1300)	1250
Rear track mm		1200–1500(usual 1300)					
The min.ground clearance mm		400	325	400	325	400	325
Agriculture ground clearence mm		450	375	450	375	450	375
Readius of turning circle m	Single side Brake	3.1	3.4	3.1	3.4	3.1	3.4
	No single side brake	3.5	4.1	3.5	4.1	3.5	4.1
Mass of the whole machine kg	Structure mass	1665	1890	1665	1890	1665	1890
	The minimum operational mass	1840	2080	1840	2080	1840	2080
Mass of ballast(kg)	Front shaft(optional)	108	144	108	144	108	144
	Rear shaft(optional)	360	360	360	360	360	360
Rated traction KN		9	12	9	12	9	12

40 Series 8+4/16+8 gear speed				
Number		Low	High	Back
General gear	1	2.65	11.4	3.94
	2	3.85	16.53	5.71
	3	5.25	22.57	7.79
	4	8.1	34.78	12.1

Note: 1. The parameters that are behind "/" in the row of shaft base are parameters of shaft base with three cylinders engine

Form 6-2 Parameters of engine

Engine parts and parameter \ Tractor type	DQ400/DQ404	DQ450/DQ454	DQ550/DQ554	DQ600/DQ604
Engine type	See the details in the Engine Operation Manual			
Cylinder dia. Xstroke	See the details in the Engine Operation Manual			
Rated power(KW)	29.4	33.1	40.4	44.1
Rated RPM r/min.	See the details in the Engine Operation Manual			
Rated perating condition fuel oil specific consumption g/kw.h	See the details in the Engine Operation Manual			
Rated operating condition machine oil specific consumption g/kw.h	See the details in the Engine Operation Manual			

Form 6–3 Tansmission system

Parameter \ Tractor type	DQ400	DQ404	DQ450	DQ454	DQ550	DQ554	DQ600	DQ604
Clutch	10 inches dry single action or double action							
Gear box	2 shaft 4×(2+1) gear unitized, or 4×3×3 or 4×2×2 meshing sleeve shifting							
Central drive	Spiral taper gear pair							
Differential gear	Two planet wheel, close							
Differential lock	Dowel pin							
Final drive	Planet gear type							
Front drive axle	Full closure bevel gear type(fou–wheel drive model use)							
Transfer case	Straight toothed spur gear(fou–wheel drive model use)							

Form 6–4 Running gears and undercarriages, Steering and Braking

Parts&Parameter \ Tractor type	DQ400	DQ404	DQ450	DQ454	DQ550	DQ554	DQ600	DQ604
Frame model	Without frame							
Front shaft(front drive axle model)	Upside–down Utype balance type				Bevel gear reduction three section separable axle housing			
Toe–in of front wheel(mm)	4–8				4–11			
Specification of front wheel tire	6.0–16				8.3–20			
Specification of rear wheel tire	12.4–28	13.6–28	14.9–28		12.4–28	13.6–28	14.9–28	
Specification of front wheel tire(grassland tire)	31×9.5–16							
Specification of rear wheel tire(grassland tire)	13.0–20							
Pressure of front wheel tire (kpa)	90–120							
Pressure of rear wheel tire (kpa)	80–120							
Steering gear type	Hydraulic steering							
Steering gear	Cycloid rotation valve type static–hydraulic steering unit							
Hydraulic steering constant overflow pump	CBT–E306FHL06							
Hydraulic steering safety opening pressure	6.3							
Brake model	Double plate oil bath pan type brake		Three plate oil bath pan type brake		Double plate oil bath pan type brake		Three plate oil bath pan type brake	

Form 6-5 Work device

Parts and Parameter \ Tractor type		DQ400/DQ404	DQ450/DQ454	DQ500/DQ504	DQ550/DQ554	DQ600/DQ604
Lifter model		Semi-detached mode				
Oil pump type		CB-F312				
Distributor type		Built-in unloading control type				
Cylinder(diameterxstroke) mm		90×110 or 95×120				
System and cylinder safety valve model		Gaping damping valve direct action and cone valve direct action				
Set pressure of system safe valve (Mpa)		17.5+0.5 0				
Tilling depth control		Automatic draft, position control and float control				
The maximum lifting of 610mm behind lower suspension point(KN)		11				
Hydaulic output connector of lifter	Specification	M22×1.5(Outer screw thread)				
	Output flow(L/min)	26.4				
Hydraulic output connector of multi-way valve	Number	2 sets				
	Nominal pressure (Mpa)	17.5+0.5 0				
	Nominal flow (L/min)	50				
Suspension model		Rear, three points suspension				
Suspension and connection triangle(mm)		460×683±15				
Connection aperture of top suspension point(mm)		25.2+0.2				
Connection aperture of lower suspension point(mm)		28.7+0.3				
PTO shaft type		Semi-independence				
RPM(r/min)		540(760)/1000				
Rotary direction		Clockwise				
Shaft extension model and specification		1type (φ35×6 tooth or φ38×8 tooth)[GB1592-89]				
Hitch Mechanism	Connecting pin diameter(mm)	40				
	Connecting pin ground clearance(mm)	557				

6. Air brake unit

	DQ400/DQ404/DQ450/DQ454/DQ500/DQ504/DQ550/DQ554/DQ600/DQ604
Air storage tank volume L	15.8
Nominal pressure of air storage tank kPa	700
Air brake type	QFJ-10/0.63
Working pressure of air brake kPa	630

7 Electric system

tractor type / Parts and parameters	DQ400/DQ404	DQ550/DQ554/DQ604
Elaectric system	12V nubys eartg and single wire system	
Battery	3-Q-135 lead-acid battery	6-QW-100 battery without maintennce
Start-up relay	Jd133D	
Head lamp	45/40W double-filament bult	
Rear light	35W	
Trumpet	Single tone trumpet	
Front turn sihnal	21W	
Rear tail lights assembly	Turn single 10W、Brake light 10W、width lamp 10W	
Combined instrument	tachometer、water thermometer、oil gauge	
Fuse box	Blade fuse box	

Form 6-8 Oil, water filling volume

tractor type / Parts and parameters	DQ400/DQ550	DQ404/DQ454/DQ504/DQ554/DQ604
Fuel Oil tank Volume L	38	
Engine oil tank volume L	7	
Gear-box, rear drive axle, transfer case, final drive volume L	20	27
Front drive axle volume L	/	7
Steering gear volume L	0.8	
Lifter volume L	12	
Cooling water volume L	2008-8-9	2008-8-9

8 Warranty

7.1 Reference of product warranty

Wheeled tractor of DQ 40 series DQ300/DQ304 DQ350/DQ354 DQ400/DQ404 DQ450/DQ454 are guaranteed according to following files and regulation.

"Regulations Regarding Responsibility for the Repair, Replacement or Return of agricultural machinery products" Guojingmaozhi [1998] No.123

"Product Quality Law of the people's Republic of China"

7.2 Conditions without warranty

According to relevant regulation, following condition will not be responsible for warranty. For details, see relevant sections of "Maintenance and service manual of DQ tractor"

● **Important items: Some behavior may cause warranty condition failure. For details, see "Maintenance and service manual of DQ tractor".**

● **Important items: if customers modify tractor by themselves without acquiring DQ admission or use tractor beyond of regulation of operational instruction, DQ will not be responsible for such warranty. Please pay attention!**

9. Appendix

9.1 Tractor oil and soulution

<table>
<tr><td>Parts oil and solution</td><td colspan="7">Oil and solution</td></tr>
<tr><td rowspan="3">Oil pan of engine</td><td rowspan="2">Domestic Standard</td><td rowspan="2">Light diesel oil according with GB/T 252</td><td>Over 20 ℃</td><td>4℃~20℃</td><td>-5℃~4 ℃</td><td>-14℃~-5 ℃</td><td>-29℃~-35 ℃</td></tr>
<tr><td>No.10</td><td>No.0</td><td>No.-10</td><td>No.-20</td><td>No.-35</td></tr>
<tr><td>International standard</td><td colspan="6">Use fuel oil D-975 of American Society for Testing and Material (ASTM). In general temperature, use 2-D class. Below +5℃ of ambient temperature, use 1-D class.</td></tr>
<tr><td rowspan="2">Oil pan of engine</td><td>Domestic Standard</td><td colspan="6">Fill up oil as operation instruction of engine</td></tr>
<tr><td>International standard</td><td colspan="6">Viscosity class of machine oil used by oil pan of engine, injection pump, governor and oil bath type air filter is accord with viscosity classification of the Society of Automotive Engineer (SAE). Use SAE 10W below -5℃ . Use SAE 15W/40 multilevel oil that can be used in four seasons over -5℃ . Quality class is accord with CD standard of American Petroleum Institute (API).</td></tr>
<tr><td>Water radiator</td><td colspan="7">Tape water or clean soft water, recommend using antifreeze.</td></tr>
<tr><td rowspan="2">Gear box-rear drive axle, hydraulic lifter oil, front drive axle</td><td>Domestic Standard</td><td colspan="6">N100D driving and hydraulic oil</td></tr>
<tr><td>International standard</td><td colspan="6">Drive system, central drive and final drive of lifter, hydraulic steering and front drive axle can use MF1135 of Massey Ferguson company of M2C 86A of Ford company or J20A multi-service oil of John Deer company.</td></tr>
<tr><td rowspan="2">Oil cup</td><td>Domestic Standard</td><td colspan="6">American general purpose lithium lubricating grease that is accord with GB/T 7324</td></tr>
<tr><td>International standard</td><td colspan="6">Use D -217 grease of National Lubricating Grease Institute (NJGI). The viscosity class is II.</td></tr>
</table>

- **Important items:**

1. Driving and hydraulic oil, diesel oil and diesel machine oil must be deposited at lease 48 hours before they are used.

2. It is prohibited mixing oil plants with different brands and different manufacturers!

3. For tractor that uses optionally heater unit must be used in winter.

9.2 Tightening torque list of main bolts and nuts

Connection part	Connecting piece	Specification	Tightening torque N.m
Transmission system	Connection bolt between diesel and clutch housing	M12	77.7
	Connection bolt between gear-box and rear drive axle housing	M12	77.7
	Fastening bolt of differential gear bearing	M12	77.7
	Fastening bolt of taper wheel	M10	44.5
	Connection bolt between drive shaft housing and rear drive axle housing	M12	77.7
Running gears and undecarriages system and steering system	Connection bolt between driving wheel hub and web	M14	123.6
	Connection bolt between front drive wheel & front wheel hub and web	M14	123.6
	Connection bolt between steering gear and gear-box housing	M12	77.7

Connection part	Connecting piece	Specifica-tion	Tightening torque N.m
ststem	Fastening bolt of steering ball head	M12	77.7
Front shaft assembly	Connection bolt between frame and diesel	M16	192.9
Hydraulic suspension system	Connection bolt between lifter housing and rear drive axle housing	M12	109.3
	Connection bolt between oil cylinder head and lifter housing	M14	173.9
	Connection bolt between rocker arm support of upper pull rod and rear drive housing	M12	77.7
Front drive axle	Connection bolt between driven bevel gear of front differential gear assembly and differential gear	M10	44.5
	Connection bolt of left & right half shaft housing	M10	44.5
	Connection bolt between three through housing and three through housing top cover	M8	31.6
	Connection bolt between final drive housing and final drive housing lower cover	M10	62.6
	Connection bolt between final drive housing and final drive housing cover	M10	44.5
	Connection bolt between steering arm with liner bushing weldment and final drive housing	M12	77.7
	Connection bolt between bracket and diesel	M16	192.9
	Connection bolt between oscillating seat assembly and bracket	M12	77.7

Note: the deviation of torque valve listed in form is ±10%

● Important items: When tighten main bolts and nuts of tractor, torque spanner must be used

9.3 Specification of framework oil seal and rubber O-ring

No.	Standard code	Name and type	Position of installation	Number
1	GB/T 9877.1-1988	Oil seal FB50×72×8D	Rear end of rear drivew axle power ouput shaft	2
		Oil seal B55×80×8	Mate of steering knuckle and hub	2
		Oil seal 30×52×7	Transfer case seakling	1
		Oil seal SG70×95×10	Inside outer end of rear drive axle long half shaft	2
2	JB2600-80	Oil seal PG40×62×10	I shaft middle end of gear-box	1
		Oil seal SD65×90×12	Front drive double reduction driven bevel gear	2
		Oil seal SD45×70×10	Rear end of front drive driving bevel gear support	1
3	GB13871-1992	Oil seal B32×45×8	Mate of steering rocker shaft and housing	1
4	GB/T3452.1	O-ring 23.6×1.8	Rear end of gear-box auxiliary clutch shaft	2
		O-ring 15×2.65	Differential lock control bearing	1
			Mating face of pressure oil pipe and gear pump	1
		O-ring 11.2×2.65	PTO control rod	1
		O-ring 115×3.55	Inside outer end of rear drive axle long half shaft	2
		O-ring 61.5×5.3	Front drive double reduction driving bevel gear	2
		O-ring 19×2.65G	Mating face of suction oil pipe and gear pump	1
			Mating face of pressure oil pipe and gear pump	1
		O-ring 17×2.65G	Connectio between junction plate of oil inlet pipe and lifter housing	1
		O-ring 20×2.65G	Lock spindle of lifter	3
			Sealing of brake crank shaft	2
		O-ring 132×3.55G	Sealing of transfer case and rear drive axle housing	1
		O-ring 25×2.65G	Sealing of tracnsfer case shift fork axle	2
		O-ring 43.7×2.65G	Between transfer case transmission shaft and sheath	4
		O-ring 18×2.65G	Sealing of brake crank shaft	2
5	GB 1235-76	O-ring 50×3.5	Steering arm of front drive	2
		O-ring 90×5.7	Front drive single-grade reduction driven bevel gear	2

No.	Standard code	Name and type	Position of installation	Number
		O-ring 110×5.7	Front drive single-grade reduction drive bevel gear	2
		O-ring 95×3.1	Front drive double reduction drive bevel gear	2
		O-ring 54×3.5	Front drive double reduction drive bevel gear	2
		O-ring 270×5.7	Front drive double reduction driven bevel gear	2
		O-ring 16×2.4	Front drive double reduction drive bevel gear	2
			front drive oil drain plug	1
		O-ring 30×3.1	Front drive dipstick	1
		O-ring 100×3.1	Front end of front drive driving bevel gear support	1
		O-ring 32.5×3.1	Rear end of front drive driving bevel gear support	2
			Front end of front drive driving bevel gear support	2
		O-ring 85×3.1	Rear end of front drive driving bevel gear support	2
		O-ring 83.6×3.5	Rear end of front drive driving bevel gear support	2
		O-ring 19×2	Automatic draft adjustment gland	1
		O-ring 11×1.9	Push rod sleeve	1
		O-ring 13×1.9	Block valve and adjusting rod of low valve	4
		O-ring 22×2.4	Connector of oil pressure output pipe	1
		O-ring 16×2.4	Hydraulic ouput oil pipe	4
		O-ring 24×2.4	Spring hanger	1
		O-ring 52×5.7	Lifting shaft	2

Note: Non-standard oil seal and O-ring are included in form.

9.4 Roller bearing

No.	Standard code	Name and type	Position of installation	Number	No.
1	GB 276-1994	Bearing 6208	I shaft middle end of gear-box	1	
		Bearing 6305	Rear end of I shaft gear-box (single function clutch)	1	
		Bearing 6107	Rear end of I shaft gear-box (double function clutch)	1	
		Bearing 6210	Auxiliary gear shift drive shaft front end of gear-box	1	
		Bearing 6308N	Auxiliary gear shift drive shaft rear end of gear-box	1	
		Bearing 6306N	II shaft front end of gear-box	1	
		Bearing 6207	II shaft rear end of gear-box	1	
		Bearing 6307	Auxiliary gear shift driven shaft rear end of gear-box	1	
		Bearing 6305	PTO drive shaft middle end of rear drive axle	1	
		Bearing 6404N	PTO drive shaft rear end of rear drive axle	1	
		Bearing 6306	PTO shaft front end of rear drive axle	1	
			Inside housing of transfer case	1	
		Bearing 6308	PTO shaft rear end of rear dive axle	1	
		Bearing 6212	Inside outer end of rear drive axle long half shaft	2	
		Bearing 6211	Inside inner end of rear drive axle long half shaft	2	
		Bearing 6211N	II shaft rear end of gear-box	1	
		Bearing 6309	Rear end of rear drive axle power output shaft	1	
		Bearing 6209	Front drive single-grade reduction drive bevel gear	2	
		Bearing 6310	Front drive double reduction driven bevel gear outside	2	
		Bearing 6203-Z	Inside engine flywheel	1	30、35 use
		Bearing 6204-Z	Inside engine flywheel	1	40 use
2	GB 283-1994	Bearing NUP2210	Rear end of rear central drive bevel gear pinion	1	
		Bearing N208	Front drive double reduction driven bevel gear inside	2	
3	GB/T301-1995	Bearing 51108	Mate of steering knuckle and upright shaft sleeve	2	
4	GB/T297-1994	Bearing 32208	Drive spiral taper gear front end of rear drive axle	2	

No.	Standard code	Name and type	Position of installation	Number	No.
		Bearing 2007113	Differential gear of rear drive axle	1	
		Bearing 30211	Differential gear of rear drive axle	1	
		Bearing 30208	Front drive single-grade reduction driven bevel gear	2	
		Bearing 30210	Front drive double reduction drive bevel gear	2	
		Bearing 30210	Front drive double reduction drive bevel gear	2	
		Bearing 7211	Front central differential gear	2	
		Bearing 2007107	Rear end of front central drive bevel gear	1	
		Bearing 7208	Front end of front central drive bevel gear	1	
		Bearing 32206	Mate of steering knuckle and hub	2	
			Mate of steering rocker arm shaft and housing	2	
			Mate of steering knuckle and hub	2	
		Bearing 32208	Mate of steering knuckle and hub	2	
			Mate of steering knuckle and hub	2	
		Bearing 6205	Mate of steering column and housing	1	
5	Clutch Release bearing	688908	Clutch thrust bearing seat	1	Single function
		9688213	Clutch thrust bearing seat	1	Doublefunction
6	Non-standard	977907	Mate of steering column and housing	1	
	Non-standard	776701	Mate of steering column and housing	1	
7	GB/T308-1999	Steel ball 8.0000G100b	Shifting shaft of gear-box	4	
		Steel ball 9.5V	PTO shaft shifting shaft of rear drive axle	1	
		Steel ball 8.7312G400b	Steering arm of front drive	2	
			Lock spindle of lifter	1	
		Steel ball 18.0000G100b	Brake pressure plate and differential gear bearing seat	12	
8	GB 309-84	Needle roller Φ5×23.8	Final drive planet gear shaft	264	
9	GB/T5846	Bearing K20×26×20	Between auxiliary gear shift driven shaft and II shaft	1	

9.5 Farm implements matching with tractor

Classification	Type of tractor	Mating implement	Type of implement	Main technical parameters	Manufacturers
Cultivated machinery	DQ400/DQ404	Suspension five bottom plough	1L-520	Tilling depth 16cm-18cm	Baoding Shuangying Agricultural Machinery Co., Ltd Shandong Dezhou baofeng Agricultural Machinery Manufacturing Co., Ltd. Henan province Weishi County Baichuan Plough Factory Liaoning Heishan county Machinery Manufacturing Co., Ltd Shanxi Qishan Agricultural Machinery Manufacturing Co., Ltd. Shanxi Jishan Agricultural Machinery Manufacturing Co., Ltd.
		Suspension three bottom plough	1L-325	Tilling depth 20cm-22cm	
		Suspension three bottom plough	1L-327	Tilling depth 20cm-22cm	
		Suspension four bottom plough	1L-425	Tilling depth 20cm-22cm	
	DQ500/DQ504A DQ600/DQ604	Suspension four bottom plough	1L-425	Tilling depth 20cm-22cm	
			1L-427	Tilling depth 20cm-22cm	
		Suspension five bottom plough	1L-520	Tilling depth 16cm-18cm	
	DQ404/DQ400	Rotary tiller	1GQN-160	Tilling depth 12cm-16cm, width of tillage 160 cm	Nanchang rotary factory Lianyungang rotary factoy Xi'an Sowing-machine factory Haofeng Machinery Manufacturing Joint stock Co., Ltd
			1GQN-150		
	DQ500A/DQ504A DQ600/DQ604		1GQN-180	Tilling depth 12cm-14cm, width of tillage 170/180 cm	
Machinery	DQ400/DQ404	24 blades suspension light harrow	1BQX-2.0	Tilling depth 8cm-12cm,	Jiamusi North Machinery

classification	Type of tractor	Mating implement	Type of implement	Main technical parameters	Manufacturers
for Land Preparation	DQ500A/DQ504A DQ600/DQ604	34 blades suspension light barrow	IBY-3.4	Tilling depth 8cm-12cm, tilling width 340 cm	Manufacturing Co., Ltd Xuzhou Huaxing Agricultural Machinery Co., Ltd Heilongjiang Nenjiang Agricultural Machinery Factory Zhumadian Agricultural Machinery factory
Machinery for Seeding	DQ400/DQ404 DQ500A/DQ504A	Seeder	2BSW-2.4 (Wheat)	Seeding four rows, row spacing 50cm~70cm Seeding width 2.4m	Heilongjiang Province Bo'nong Machinery Co., Ltd Heilongjiang Baihua Industrial Group Baihua Farm Machinery Factory Heilongjiang Province Dongxing Yongji Agricultural Machinery Manufacturing Co., Ltd
			2BJ-4W (Soybean)	Seeding four rows, row spacing 50cm~70cm	
			2BG-4 (Soybean)	Seeding four rows, row spacing 50cm~70cm	
	DQ400/DQ404 DQ450/DQ454	Rotary seeder	SGTNB-150 Z3/6	Fit for middle low yield soil, proper tilling depth 10cm-16cm	Xi'an Sowing-machine factory
Stalk return field	DQ400/DQ404 DQ300/DQ304 DQ500/DQ504 DQ600/DQ604	Field straw chopper	4JF-Tc	Straight blades, working width: 120cm	Dingzhou Kaiyuan Machinery Manufacturing Co., Ltd
			4Q-1.2	Working width: 120cm, stubble height 2cm-8cm,	Shijiazhuang Agricultural Machinery Joint stock co., ltd
			4J-110	Working width: 110cm, stubble height 2cm-8cm,	Shandong Dezhou North China Agricultural Machinery Factory
			4Q-1.5	Working width: 150cm, stubble height 2cm-8cm,	Dingzhou Kaiyua Machinery Manufacturing Co., Ltd
Multiple system implement	DQ550/DQ554 DQ400/DQ404 DQ600/DQ604	Stubble-cleaning, rotary tilling, ridge forming and tamping machine	SGTN-140	Working width: 140cm, ridge forming two ridges, tilling depth 12cm~16cm	Sehnyang Huayuan Agricultural Machinery and Implement Manufacturing Co., Ltd Liianyungang rotary factory Nanchang rotary factory

● Important items:

1、Before purchasing farm implements, choose primarily varieties and types of matching agricultural machinery and implement according to reference list of operational condition of future operational zone (soil resistance, agriculture requirement etc) and consult dealers and implement manufactures. Besides, read carefully "instruction of operation and maintenance" of agricultural machinery and implement and know well structure, performance, method and application scope of agricultural machinery and implement.

2、According to operational condition of future operational zone (soil resistance, agriculture requirement etc), refer to advisory opinion to determine types and other main parameters of agricultural machinery and implement in order to achieve reasonable matching. If matching is not reasonable, negative influence will be on the machine sets.

When operational condition (soil resistance, agriculture requirement etc) is different, operational efficiency and effect of the same implement are different. Please users determine properly operational speed and operational width depending on local operational condition.

Dear customer,

Thank for your patronizing, purchasing and using 40 series tractor of ENFLY. We are willing to serving for you and solving problem occurring in using efficiently and in time. Besides, we will meet your requirement to our best and do well in service.

Now send "feed back form of customer information" with instruction to you. Please you fill it in print and send by registered mail to Longmao Street, The Economic Development Zone, Laiyang City, Shangdong Province Yantai Dongqi Agricultural Equipment Co.,Ltd, Postal code: 265200". Your "feed back form of customer information" will be input into computer and stored in order to offer you with service of "Sanbao".

We will be grateful heartily for your cooperation and great support.

Feed back form of customer information

Product type		Serial number of tractor			Manufacturer of engine		
Number of engine		Date of shipment			Date of purchase		
Customer name		Age		Educational level		Driving longevity	
Family address				Telephone number		Post code	
Main purpose of purchase				Load of tractor			
Time and reason of fault							
Name and condition of damaged parts							
Opinion and suggestion for improvement							

Note: Owner (or operator) will fill in this feed back form faithfully. We can learn using of tractor and do well in service according to this feed back form. And filling in printed feed back form of customer information is still valid.