

 **-MF Wheeled tractor**

Main Malfunctions and Troubleshooting

FIRST TRACTOR COMPANY LIMITED

Chapter I Technical Maintenance, Fuel, Lubricant and Water of Tractor

1.1 Technical Maintenance of tractor

It is very important to learn the tractor state before work each time to ensure the tractor is intact and avoid the sudden failures, which otherwise could damage to the machine and lead to personal injuries. Therefore, before work each time, overhaul the tractor and if needed, carry out the maintenance. Please refer to the Appendix of Chapter VIII for the lubrication and maintenance requirements for various locations.

The tractor technical maintenance could be classified into the following grades according to accumulated working hours:

- (1) Work shift technical maintenance - To be fulfilled before and after work shift or once every 10 working hours.
- (2) Every 50h technical maintenance - To be fulfilled once every 50 accumulative working hours.
- (3) Every 200h technical maintenance - To be fulfilled once every 200 accumulative working hours.
- (4) Every 400h technical maintenance - To be fulfilled once every 400 accumulative working hours.
- (5) Every 800h technical maintenance - To be fulfilled once every 800 accumulative working hours.
- (6) Every 1600h technical maintenance - To be fulfilled once every 1600 accumulative working hours.

 **Warning:** To inspect or service the tractor, park it on the flat ground, switch engine off and unplug the key. Shift the gearshift lever to neutral gear and reliably lock the tractor in the parking position by handbrake. At the same time, block with cushion blocks the front and rear of rear wheels of the tractor.

 **Caution:** To prevent the occurrence of personal injury accidents due to operator's incorrect operations during maintenance, the operator shall carefully read this manual and parts catalog, the diesel engine manual and catalogs, and front drive axle operation manual and strictly fulfill all maintenance items of the tractor as per the requirements of operation safety rules for the maintenance of tractor specified in the Chapter I Operation Safety Rules before the maintenance.

 **Caution:** Check and adjust the transmission, check and adjust the front and rear wheels and drive axle, and check and adjust the differential. Please contact a local YTO dealer.

1. Technical maintenance at each shift.

- ① Clean the dust and sludge off the tractor and agricultural implements. If working in the dusty environment, please clean the air cleaner.
- ② Check the main bolts and nuts outside tractor, especially the nuts of front and rear wheels. Tighten them if necessary.
- ③ Check the fluid level in the oil sump, water tank, fuel tank and hydraulic lifter etc and fill them if necessary. To check the level in oil sump, please go ahead after 15min of stopping.
- ④ Check the tractor for leaking of air, oil, water etc. If so, please troubleshoot.
- ⑤ Check tires for normal air pressure and charge any insufficient tire to specified pressure.
- ⑥ Add lubricating grease to all lubrication points once every two work shifts.
- ⑦ Check the lamp, horn and instrument for normal work.

2. Technical maintenance after 50 accumulative working hours.

- ① Each maintenance item should be completed at each shift.
- ② Check the fan V tension by applying 10N to press the mid of longest V belt, and it is proper for the V belt to deflect by 10mm-15mm. If not, adjust it.
- ③ Add grease to the bearing of fan water pump.
- ④ Check the oil level for transmission, rear axle, transfer case, front drive axle, steering gear, and hydraulic oil tank and add oil if insufficient.
- ⑤ Check the free travel for clutch pedal and left and right brake pedals and when necessary adjust.
- ⑥ Service the oil filter, and then use diesel to clean it if necessary.
- ⑦ Check whether the battery electrolyte is higher than the pole plate by 10mm~15mm, if not, fill it with distilled water. If the specific gravity of electrolyte does not meet the normal value, add the electrolyte with specific gravity of 1.28 to the stipulated height.

3. Technical maintenance after 200 accumulative working hours

- ① Fulfill the every 50h technical maintenance items.
- ② Please change oil in oil sump and clean the oil sump and strainer.
- ③ Please change the oil filter element and clean the filter housing;
- ④ Clean the fuel filter element and bleed the air in oil pipeline after assembly;
- ⑤ Replace air filter element.
- ⑥ Clean the oil suction filter of hydraulic hitch system with diesel.

4. Technical maintenance after 400 accumulative working hours

- ① Fulfill the every 200h technical maintenance items.

- ② As per the requirements of diesel engine operation manual, check the valve clearance and pressure and atomization state of fuel injector and adjust when necessary. (These items shall be fulfilled by professional technicians or manufacturer's designated personnel).
- ③ Please clean the fuel tank.
- ④ Replace air cleaner element (Advance or postpone to replace it according to the dust of working area.)
- ⑤ Please change the oil in the fuel injection pump.
- ⑥ Replace the oil for transmission, rear axle, transfer case, front drive axle, hydraulic lifter, and steering gear.
- ⑦ Check the hydraulic hoses for presence of damage due to physical case, kink, aging, and exposure.
- ⑧ Check and adjust the front wheel toe-in.
- ⑨ Please wash and wipe the battery with boiled water. Be sure that the specific gravity of battery electrolyte should not be less than 1.24. If the discharging is abnormal, please repair and charge it outside the machine.



Caution: Please contact a YTO dealer for maintenances.

5. Technical maintenance after 800 accumulative working hours.

- ① Fulfill the every 400h technical maintenance items.
- ② Remove the dusts between the radiator hoses of water tank and thoroughly clean the engine cooling system. After cleaning, add clean soft water.
- ③ Refer to the engine running state to determine whether the gas cylinder needs maintenance or not.
- ④ As per the requirements of engine operation manual, tighten cylinder head bolts in turn and fulfill other relevant maintenance items.
- ⑤ Remove the carbon deposit from the exhaust pipe and muffler.
- ⑥ According the working status of hydraulic suspension, you could decide whether it is to be serviced.
- ⑦ Check and adjust the meshing clearance and contact trace of the central drive bevel gears and the clearance and pretension of the tapered roller bearings within the transmission. (These items shall be fulfilled by professional technicians or manufacturer's designated personnel)
- ⑧ After maintenance, carry out the commissioning for a short time to check the working status of each mechanism.



Caution: Please contact a YTO dealer for maintenances.

6. Technical maintenance after 1600 accumulative working hours

- ① Fulfill the every 800h technical maintenance items.
- ② Clean and maintain the engine cooling system.
- ③ Replace the oil for front drive axle central drive and final drive.

7. Maintenance for long-term storage of tractor

- ① If the tractor is to be stored for a long time, it's better to park the tractor in a dry garage and support the tractor in such manner that both front and rear tires are off the ground.
- ② At the time of parking, thoroughly clean the external surfaces of the tractor and add lubricating oil to all lubricating points.
- ③ Fully drain the engine coolant and cover the exhaust pipe opening.
- ④ During the storage, start the engine once every 3 months, run the engine for 20min at various speeds, and check for presence of any abnormality.



Notice: ①As the exhaust is harmful to your health, do not rotate the engine for long time at poor-ventilation site.

②Before leaving the tractor, please unplug the key to avoid others from driving without permission, which maybe cause accident.

8. Reuse of tractor from storage status

- ① Check the inflation pressure of tires. Lower the tires onto the ground.
- ② Unseal all sealed portions from the storage status.
- ③ Check the levels of engine oil, transmission/hydraulic oil, and engine coolant. Add oil/coolant if required.
- ④ Drain some fuel from the fuel tank to drain the accumulated condensate water.
- ⑤ Add fuel into the fuel tank.
- ⑥ As required, fulfill all maintenance items of every shift, every 50h, every 200h, and 400h maintenances.
- ⑦ Rotate the key switch to position “ON” and check all instruments and indicator lamps.
- ⑧ Run the engine at low idling speed for several minutes.
- ⑨ Check the functions of all other systems.
- ⑩ Wait for the engine to reach the working temperature before applying load onto the tractor.

1.2 Fuel, lubricant and water in tractor

1. Fuel

The engine uses light diesel oil conforming to EN590: 2013 of different grade according to

different environment temperature (refer to 5-1):

Table 5-1 Diesel oil grade for different environment temperature

Environment temperature	Above 20°C	4°C ~20°C	4°C ~-5°C	-5°C ~-14°C	-14°C ~-29°C
Diesel trademark	10# light diesel	0# light diesel	-10# light diesel	-20# light diesel	-35# light diesel

To reduce failure and prolong service life of engine, it is required to use clean fuel and the fuel container shall be clean and specified. Diesel oil in the tank shall keep still for 3-7 days before operation.

2. Engine oil: Grade CF-4 15W-40 oil.

 Caution: The engine lubrication oil shall be CF-4 grade, instead of common oil. It is prohibited to mix fresh oil with used oil and mix oil of different grades or manufacturers. For further information, please refer to operation manual of engine.

3. For lubrication of transmission system, steering gear and hydraulic lifter, use multi-purpose hydraulic transmission oil for Textran TDH large and medium tractor.
4. Lubricating grease: 2# calcium-based lubricating grease.
5. Coolant: The engine coolant shall use clean soft water, such as river water, rain water, or snow water.

To prevent damaging the hydraulic steering system, hydraulic hitch system, and various motion mechanism parts due to incorrect operations, the operator shall add specified lubricants and water to the designated places as per the requirements of Table 2.8 of Chapter II.

Precautions: ①For the filling capacity, the scale mark on the dipstick prevails.

②If it's necessary to use well water or running water from underground water as the engine coolant, boil to soften it before use.

③The battery can be filled with a little of cold boiled water or rain water in emergency rather than salty water, tap water containing chlorine, river and chemical softened water.

1.3 Lubrication of tractor

Checking of engine oil level

Maintenance interval - Daily or every 10h.

1. If the engine is not running, start the engine and run at low idling speed for 2~3min. Stop the engine and wait for 2~3min to allow the return of oil into oil sump.
2. If the engine is running, lower the engine speed to low idling speed and run for 2~3min. Stop the engine and wait for 2~3min.
3. Check engine oil level. Withdraw and wipe clean the oil dipstick and then reinsert it to the end. Withdraw the oil dipstick and check the oil level.

Notice: If necessary, remove the left side plate.

4. The checkered area on the oil dipstick indicates the safety oil level zone. If the oil level is below the lower limit, it's prohibited to run the engine.
5. Add engine oil of viscosity suitable to the current season via the filler port.

Replacement of oil filter

Maintenance interval

First maintenance - 100h

Periodical maintenance - 250h *

Periodical maintenance - 500h **

* If the lubricating oil other than TorqGARD and PLUS 50 is used, the maintenance interval is 250h.

1. Run the engine to warm up the engine oil. Stop the engine.
2. Disassemble the oil drainage plug to drain the oil.

Notice: The protrusion of engine oil filter gasket shall fit with the slot of the filter seat.

3. Replace the engine oil filter during the replacement of engine oil. Check the gasket of engine oil filter and when necessary replace. Apply a film of engine oil to the gasket of engine oil filter and install the filter. Tighten the filter by hand and then tighten for further 1/2 turn.
4. Install and tighten the oil drainage plug.
5. Add the oil of viscosity suitable to the current season.

Checking of transmission/hydraulic system oil level

Daily check the oil level via observation window.

Important Tip: The periodical checking helps avoid the shutdown. The driver's records of all leakage and malfunction problems help the preventative maintenances. As the transmission is immersed in the oil and is running with the help of engine oil, it's really important to maintain the cleanliness and correct level of the engine oil.

1. Park the tractor on a level ground. Shift the gearshift lever to neutral gear and lock together the brake pedals. Depress the pedal and pull up the parking brake handle.
2. Ensure that the rockshaft is at completely downward position.
3. Push down the hand accelerator to idle the engine for 5min. Stop the engine.
4. Wait for at least 5min to allow the stabilization of the oil.
5. Check the hydraulic oil level via observation window. The oil level shall be within the upper and lower markings of the observation window.
6. If the oil level is too low, add oil via the hydraulic oil filler port.
7. Before installing the cover, check and thoroughly clean the ventilation port of the oil filler cap.

Replacement of hydraulic oil filter

Maintenance interval— 500 h

First replacement: First 100h

Notice: The location of hydraulic oil filter differs depending on specific tractor model, replace the hydraulic filter housing and filter together as an assembly.

1. Disassemble the filter housing assembly and filter O-ring.
2. Scrap the filter housing assembly and filter O-ring.
3. Check new filter assembly and filter O-ring for presence of damage.
4. Apply hydraulic oil to new filter O-ring and install the O-ring to the filter housing assembly.
5. Install new filter housing assembly and tighten to the torque specified by the technical specification.

Technical Specification

Filter housing assembly - Torque..... 24N•m (212 lb.in)

6. Run the engine for 5min
7. Stop the engine and check the oil level. Add hydraulic oil if required.

Lubrication of steering main shaft

Maintenance interval— 50 h

Extremely moist or muddy environment - 10h

Inject some lubricating grease to the grease nozzles of steering main shafts on left and right sides.

Lubrication of mechanical front-wheel-drive front axle

Maintenance interval— 50 h

Extremely moist or muddy environment - 10h

- Inject some lubricating grease to the grease nozzles of front axle universal joints on left and right sides.
- The grease nozzles are accessible only from the front side. Therefore, rotate the tires till the grease nozzles are exposed.
- The grease nozzles on the other side are not accessible when the grease nozzles on one side are exposed. Therefore, after the lubrication for one side, rotate the wheels in opposite direction to access the grease nozzles on the other side.

Lubrication of mechanical front-wheel-drive shaft

Maintenance interval— 50 h

Inject some lubricating grease to the grease nozzles of the U-connector of mechanical front-wheel-drive shaft.

Lubrication of three-point suspension bracket pull rods

Maintenance interval— 250 h

Inject lubricating grease to the grease nozzle of three-point suspension bracket pull rods to lubricate the pull rods.

Mechanical front-wheel-drive axle housing oil level

Maintenance interval— 250 h

1. Park the tractor on a level ground.
2. Unplug the plug and check the oil level of the axle housing. Check and ensure that the oil level is level with the bottom of the port.
3. If the oil level is too low, add oil.

Checking of mechanical front-wheel-drive wheel hub oil level

Maintenance interval— 250 h

1. Move the tractor to a level ground.
2. Drive forward the tractor, till the text “OIL LEVEL” is paralleling with the ground.
3. Disassemble the plug. Check and ensure that the oil level is level with the bottom of the plug port.
4. If the oil level is too low, add oil via this port.

Lubrication of rear axle bearings

Maintenance interval— 500 h

Extremely moist or muddy environment - 50h

Inject some lubricating grease to the grease nozzles of rear axle on two sides.

Replacement of transmission/hydraulic system oil

Maintenance interval— 1000 h

- 1 Push forward the rockshaft control lever to the end to lower the suspension bracket.
- 2 Disassemble the oil drainage plug.
- 3 Replace the transmission/hydraulic oil filter.
- 4 Install all plugs.

Important Tip: Do not fill excessive oil into the transmission. Otherwise, it will result in overheating and damage of the transmission.

- 5 Disassemble the oil filler cap and add oil.
- 6 After adding oil, check the oil level via the observation window.
- 7 Install the oil filler cap.
- 8 Start the engine and run for 5min.
- 9 Stop the engine and check the oil level. Add the oil as required.

Replacement of mechanical front-wheel-drive front axle housing oil

Maintenance interval— 1000 h

First replacement: First 100h

- 1 Park the tractor in a level ground and lock together the brake pedals. Depress the parking brake pedal and engage the parking brake.
- 2 Disassemble the housing oil drainage plug to drain the oil. Install the drainage plug and tighten to the torque specified by the technical specification.
- 3 Replace the oil checking/filler plug.
- 4 Add mechanical front-wheel-drive axle oil via oil filler port, till the oil level is level with the lower edge of the port.
- 5 Install the oil filler plug and tighten to the torque specified by the technical specification.

 **Notice:** The tractor operator (unless otherwise specified) must fulfill above-mentioned technical maintenances as per the specification. If you fail to fulfill the maintenances, which resulted in the damage of parts or the deteriorated performances of the machine, the warranty will be voided.

 **Notice:** The user is prohibited to modify, add, or remove any important structure of the tractor or overload the tractor for a long time. Otherwise, the warranty will be voided.

 **Notice:** While installing or disassembling heavy parts such as counterweights and tires, take cautions to prevent the accidental looseness of the counterweights and tires from causing personal injuries. The disassembled counterweights and tires shall be placed steadily, in order to prevent the accidental rollover of these parts from harming any person or object.

 **Notice:** The air pressure of the tractor tires shall be adjusted as per the requirements of this manual. Do not use the tractor for a long time when the tire pressure is too low or too high. The damaged tires shall be repaired by professionals. The scrapped tires shall be recycled by professional organizations and shall not be burned or randomly discarded, in order to prevent environmental pollution.

 **Notice:** When the replacement of parts is required due to expiration of life or the scrap of tractor is required after long-time use, please hand over to the professional personnel or organizations for disposal and do not discard randomly, in order to prevent environmental pollution or causing personal harms.

Chapter II Main Malfunctions and Troubleshooting

2.1 Machine

Malfunction symptom	Malfunction cause	Troubleshooting
1. High coolant temperature (boiling)	<ol style="list-style-type: none"> 1. The tank is blocked. 2. Radiation pipe of the tank is blocked. 3. Low coolant level; 4. Slippery or damaged fan belt; 5. Damaged thermostat; 6. Piston scratches the inner wall of cylinder 	<ol style="list-style-type: none"> 1. Remove straw that blocks the tank. 2. Remove the strew screen and check if the temperature of the radiation pipes is identical; if the temperature is low, it indicates serious blockage and the tank shall be washed or changed. 3. Add coolant 4. Tighten the belt or change the belt; 5. If the instrument shows the coolant temperature is above 85°C, check the temperature of radiation pipe of the coolant tank. If it is below 85°C, it indicates the thermostat is damaged and shall be changed. 6. Full fill the tank with coolant, start the engine (cold) and check if coolant flows out of the pipe. If so, it indicates the piston scratches the inner wall of cylinder. The engine shall be repaired and related components shall be changed.
2. Difficult to start the starter	<ol style="list-style-type: none"> 1. Low battery 2. Air exists in injection pump; 3. Low environment temperature, high oil viscosity, high resistance or wrong diesel grade; 4. The clutch is not separated completely and the start resistance is high; 5. Starter motor failure 	<ol style="list-style-type: none"> 1. Check the battery voltage, change or charge the battery. 2. Press the hand oil pump to check the pressure; if the pressure is small, it indicates poor air tightness of oil channel. Release air in the channel. 3. Check the fuel and oil condition. Change with oil of good performance in low temperature and diesel oil designed for the environment temperature. 4. Shift the transmission lever to a gear and depress the clutch pedal to the end. Check if the fan turns; if it turns, adjust the clutch operation. 5. Repair or change the motor;

2.2 Clutch

Malfunction symptom	Malfunction cause	Troubleshooting
1. Clutch slips.	<ol style="list-style-type: none"> 1. Oil dirt on friction plate and pressure plate 2. Uneven or serious wear of friction lining that exposes the rivet. 3. Weakened spring; 4. Small free travel; the release levers are not on a same plane and touch the release bearing; 5. Deformed driven plate 	<ol style="list-style-type: none"> 1. Wash with gasoline and remove failure of oil leak; 2. Change the friction lining; 3. Replace 4. Readjust it to specification 5. Change driven plate.
2. Clutch is not thoroughly released.	<ol style="list-style-type: none"> 1. Excessive free travel and small working travel of pedal 2. Excessive deflection of main clutch driven plate 3. Heads of three release levers not within one same plane 	<ol style="list-style-type: none"> 1. Readjust it to specification 2. Replace 3. Adjust it
3. Tractor is jouncing when pulling out.	<ol style="list-style-type: none"> 1. Oil contamination of main friction plate and driven plate 2. Breakage of friction plate 3. Deflection of driven plate 4. Heads of release levers not within one same plane 	<ol style="list-style-type: none"> 1. Clean by gasoline. 2. Replace 3. Correct it 4. Adjust it
4. Depressing the clutch pedal to the floor could not yet stop the PTO.	<ol style="list-style-type: none"> 1. The position of limit bolt on the pedal is improper. 2. The clutch cover of PTO can not be thoroughly released. 	<ol style="list-style-type: none"> 1. Adjust it 2. Readjust it to specification

2.3 Gear box

Malfunction symptom	Malfunction cause	Troubleshooting
1. There is noise or knock in gearbox.	<ol style="list-style-type: none"> 1. Gear teeth flank excessively wears out or peels off or cracks, or the teeth are fractured. 2. Serious wear or damage of bearings 3. Lubricant is insufficient or the lubricant quality does not satisfy the regulations. 	<ol style="list-style-type: none"> 1. Replace with new gear. 2. Replace bearing. 3. Add lubricating oil or replace.

Malfunction symptom	Malfunction cause	Troubleshooting
2. Gear engagement is difficult, or failure	<ol style="list-style-type: none"> 1. Clutch is not thoroughly released. 2. Engagement sleeve and spline end are worn or notched. 3. The shift fork is seriously deformed. 	<ol style="list-style-type: none"> 1. Adjust clutch. 2. Use fine oil stone to repair or replace it. 3. Replace fork
3. Auto disengaging	<ol style="list-style-type: none"> 1. Shift fork shaft groove seriously wears out. 2. Shift fork shaft spring force is weak or fractured. 3. Spline of engagement sleeve wears out. 	<ol style="list-style-type: none"> 1. Repair or replace. 2. Replace lock spring. 3. Replace
4. It is impossible to disengage the transmission gears of the tractor	<ol style="list-style-type: none"> 1. The elastic cylindrical pin in the upper cover of transmission case is broken. 2. The shift head of main or auxiliary transmission is broken. 3. The elastic cylindrical pin at the connection of main and auxiliary transmission shift fork and sliding rod is broken. 4. The shift fork is seriously deformed. 	<ol style="list-style-type: none"> 1. Change elastic cylindrical pin 2. Change the operation shift head of main or auxiliary transmission case; 3. Change the elastic cylindrical pin 4. Change fork
5. Although the transmission gears are engaged, the tractor does not move forward or backward.	<ol style="list-style-type: none"> 1. The elastic cylindrical pin in the upper cover of transmission case is broken. 2. The shift head of main or auxiliary transmission is broken. 3. The elastic cylindrical pin at the connection of main and auxiliary transmission shift fork and sliding rod is broken. 4. The shift fork is seriously deformed. 	<ol style="list-style-type: none"> 1. Change elastic cylindrical pin 2. Change the operation shift head of main or auxiliary transmission case; 3. Change the elastic cylindrical pin 4. Change fork

2.4 Rear Axle

Malfunction symptom	Malfunction cause	Troubleshooting
1. Main drive gives loud noise.	<ol style="list-style-type: none"> 1. The drive spiral bevel gear bearings has too wide play. 2. Abnormal engagement of gears 3. Wear or seizure of differential shaft 4. Wear of planetary gear or shim 5. Wear or damage of differential bearings 	<ol style="list-style-type: none"> 1. Adjust gap. 2. Adjust the engagement pattern and backlash in accordance with the operation manual. 3. Replace 4. Replace 5. Replace

Malfunction symptom	Malfunction cause	Troubleshooting
2. Overheating of drive spiral bevel gear bearings and differential bearings	<ol style="list-style-type: none"> 1. Excessive preload of bearings 2. Poor lubrication 	<ol style="list-style-type: none"> 1. Re-adjust. 2. Check the oil level, fill it if necessary.

2.5 Brake

Malfunction symptom	Malfunction cause	Troubleshooting
1. Loss of braking	<ol style="list-style-type: none"> 1. Disc are excessively or eccentrically worn out. 2. Free travel of brake pedal is excessive. 	<ol style="list-style-type: none"> 1. Replace 2. Adjust it
2. When braking, the tractor defection occurs.	<ol style="list-style-type: none"> 1. Inconsistent travel between left and right brake pedals 2. Damage of one-sided brake friction plate 3. Inconsistent air pressure between rear tires 	<ol style="list-style-type: none"> 1. Adjust it 2. Replace 3. Inflate to specified pressure.
3. Tractor is jouncing when pulling out.	<ol style="list-style-type: none"> 1. Free travel of brake pedal is too short. 2. Return spring of pedal is too weak 	<ol style="list-style-type: none"> 1. Adjust it 2. Replace
4. Incomplete disengagement and heating of brake	<ol style="list-style-type: none"> 1. Free travel of brake pedal is too short. 	<ol style="list-style-type: none"> 1. Adjust it

2.6 Steering gear and traveling system

Malfunction symptom	Malfunction cause	Troubleshooting
1. Oil flows in constant flow pump	<ol style="list-style-type: none"> 1. The oil is dirty and the gear is seriously worn. 2. Air gets into the pipeline and the steering pump is burnt. 	<ol style="list-style-type: none"> 1. Change the hydraulic oil. 2. Remove air leak of the pipe;
2. Heavy steering	<ol style="list-style-type: none"> 1. Front tire pressure is low; 2. System oil leak, steering cylinder oil leak and pipe oil leak; 3. Low oil level; 4. Air exists in the pipeline; 5. High oil viscosity 6. One-way valve in the valve failed, leading to powerless steering; 7. Steering pump failure 	<ol style="list-style-type: none"> 1. Charge the tire; 2. Repair or change the defected parts; 3. Fill oil to specified level. 4. Release air in the system; 5. Use specified hydraulic oil; 6. Wash, repair or change the part; 7. Change the steering pump;

Malfunction symptom	Malfunction cause	Troubleshooting
3. Front wheel swings.	<ol style="list-style-type: none"> 1. Large clearance of front wheel cone bearing; 2. The steering connector is seriously worn; 3. The swing shaft or steering knuckle bushing is worn; 4. Improper adjustment of toe-in 5. Front rim is deformed seriously; 	<ol style="list-style-type: none"> 1. Adjust the clearance; 2. Replace 3. Replace 4. Adjust it 5. Correct it
4. The tractor turns left only during traveling	The steering gear safety valve fails and the high pressure oil returns	Change the safety valve or change the steering gear;
5. The steering wheel does not return	<ol style="list-style-type: none"> 1. The steering column and valve core are not coaxial; 2. The valve core is stuck by steering column; 3. High resistance of steering column; 4. Broken or deformed spring piece; 	<ol style="list-style-type: none"> 1. Adjust the steering gear; 2. Ditto 3. Ditto 4. Change the steering gear;
6. Powerless turning	<ol style="list-style-type: none"> 1. Low oil level; 2. Air gets into the pipe; 3. Large clearance between the rotor and stator; 4. Poor sealing of cylinder piston; 5. One-way valve is damaged; 6. Safety valve of cylinder is damaged or stuck; 	<ol style="list-style-type: none"> 1. Fill oil to specified level. 2. Bleed the air. 3. Replace 4. Replace 5. Repair or replace. 6. Repair or replace.
7. The steering wheel is not agile	<ol style="list-style-type: none"> 1. The steering column and valve core are not coaxial; 2. The valve core is stuck by steering column; 3. High resistance of steering column; 4. Broken or deformed spring piece; 	<ol style="list-style-type: none"> 1. Adjust the steering gear; 2. Ditto 3. Ditto 4. Change the steering gear;
8. Steering failure.	<ol style="list-style-type: none"> 1. The safety valve of steering pump is stuck or fails; 2. The safety valve of steering gear is stuck or fails; 	<ol style="list-style-type: none"> 1. Change the steering pump; 2. Change the steering gear;

Malfunction symptom	Malfunction cause	Troubleshooting
9. Tires are worn in early period.	<ol style="list-style-type: none"> 1. Improper adjustment of toe-in 2. Improper tire pressure; 3. Patterns of drive tires are reversed; 4. The wear of paddy filed tires is accelerated when the tractor is running on hard road or dry land; 5. Indifferent front and rear tire pressure causes changing tire diameter; therefore the front and rear speed ratios are not match and tire wear is accelerated; 6. Unqualified tire material, poor resistance to wear of tires and different performance of tires provided by different suppliers; 	<ol style="list-style-type: none"> 1. Adjust it 2. Inflate to specified pressure. 3. Re-install the tires; 4. The paddy field tire shall not travel on hard road or dry land; 5. Charge the front and rear tires to same pressure as specified; 6. Use high quality tires of well-known brand;
<p>How to comment the operation of steering pump at working site?</p> <p>1. Inspect the gear pump for leak, crack and appearance color (dark or smoke); 2. Listen if the gear pump makes too much noise; 3. Smell the gear pump for abnormal smell; 4. Touch the gear pump to check the temperature (be careful not to be burnt); In case of no abnormal symptoms, it indicates the steering pump works well.</p>		

2.7 Front drive axle (4-wheel-drive)

Malfunction symptom	Malfunction cause	Troubleshooting
1. Front tires are seriously worn out	<ol style="list-style-type: none"> 1. Serious deformation of front wheel steel ring or wheel disc 2. Improper adjustment of toe-in 3. The connection of steering knuckle and pin is seriously worn. 4. The front tires pressure is low or the lever of the front drive axle is not disengaged. 5. The front axle speed ratio does not match with speed ratio of transmission system, resulting in abnormal wear of tires. 	<ol style="list-style-type: none"> 1. Correct it 2. Adjust it 3. Replace 4. Charge the tire to specified pressure and disengage the front drive axle. 5. Match with proper ratio;
2. Front wheel swings.	<ol style="list-style-type: none"> 1. The front drive axle bearing is seriously worn. 2. The bushing bearing of steering knuckle is seriously worn. 3. Large clearance between front and rear support seats; 4. The front wheel ring is seriously deformed. 5. Improper adjustment of toe-in 6. Serious wear of steering ball joint 	<ol style="list-style-type: none"> 1. Replace 2. Replace 3. Adjust it 4. Correct it 5. Adjust it 6. Replace

Malfunction symptom	Malfunction cause	Troubleshooting
3. Drive shaft and protective bushing are hot	1. Protective bushing of drive shaft is bent or seriously distorted.	1. Correct it
4. The noise is loud	1. Poor meshing trace of front main drive gears 2. Excessive gap or damage of main drive bearing 3. Wear or seizure of differential shaft 4. Wear of planetary gear or shim 5. Change	1. Re-adjust. 2. Re-adjust or replace. 3. Replace 4. Replace 5. Replace

2.8 Electrical system

1. Battery

Malfunction symptom	Malfunction cause	Troubleshooting
1. Insufficient capacity for start of engine	1. Sulfurization of electrode plate (long-term insufficient charging or long-term storage of battery) 2. Poor contact of electrode posts or insufficient charging 3. Dirty battery surfaces, leading to short-circuit between positive and negative posts 4. External circuit connection or short-circuit during parking of vehicle 5. Serious short-circuit due to accidental placement of a metal rod between positive and negative posts 6. Discharge of electrode plates due to excessive deposit of fallen active substances, short-circuit of electrode plates due to damaged separator, or short-circuit of electrode plate due to deflection of electrode plate	1. Frequently maintain it under fully charged state. 2. Frequently maintain it under fully charged state. 3. Remove dirt, ensure reliable connection, and apply a film of Vaseline to electrode posts for rusting prevention. 4. Clean external surfaces of battery by warm alkaline water or warm water and guard against water leakage into battery. 5. Check and repair. It's prohibited to place any metal rod on battery surfaces. 6. Replace it

Malfunction symptom	Malfunction cause	Troubleshooting
2. Brown substance in battery electrolyte during charging and insufficient battery capacity	<ol style="list-style-type: none"> 1. Long-time running of starter motor 2. Deflection of electrode plates or falloff of active substance due to excessive charging current or long charging time 3. Strong vibration of electrode plates due to insecure fixing of battery 	<ol style="list-style-type: none"> 1. Operate strictly as per requirements and do not discharge at high current for a long time. 2. Strictly follow the supplemental charging procedure. 3. Fix battery reliably.
3. Damage of battery casing	<ol style="list-style-type: none"> 1. Escape failure of gas generated during charging and increased internal pressure of battery due to blocked ventilation hole 2. Rapid discharging of battery, sudden temperature rise of electrolyte, and rapid expansion of electrolyte and gas 3. Insecure fixing of battery and high vibration during traveling of tractor 	<ol style="list-style-type: none"> 1. Frequently check ventilation holes to prevent blockage. 2. Check circuits and solve short-circuit malfunctions. 3. Cushion battery bottom with shock pad and fix it reliably.

2. Generator

Malfunction symptom	Malfunction cause	Troubleshooting
1. Lighting failure of battery charging warning indicator after turn-on of ignition switch	<ol style="list-style-type: none"> 1. Burnout of fuse 2. Open-circuit of excitation circuit 3. Broken filament of charging warning indicator 4. Open-circuit of excitation coil 5. Damage of electric voltage regulator 	<ol style="list-style-type: none"> 1. Check and repair. 2. Check and repair. 3. Replace with bulb of same specification. 4. Repair and replace. 5. Replace with voltage regulator of same model.
2. Constant turn-on of battery charging warning indicator and no power generation of alternator after start of engine by ignition switch	<ol style="list-style-type: none"> 1. Damage of electric voltage regulator 2. Short-circuit of alternator excitation coil 3. Damage of alternator rectifier diode 4. Other malfunction of alternator 	<ol style="list-style-type: none"> 1. Replace with voltage regulator of same model. 2. Repair and replace. 3. Repair and replace. 4. Repair and replace.
3. Insufficient charging of alternator	<ol style="list-style-type: none"> 1. Loose alternator belt 2. Poor contact or oil contamination of exciting carbon brush 3. Damage of electric voltage regulator 4. Insufficient electrolyte and serious sulfurization of battery 	<ol style="list-style-type: none"> 1. Adjust belt tension as per specification. 2. Repair and replace. 3. Replace with voltage regulator of same model. 4. Adjust electrolyte to specified level as per specification and replace battery incapable of complete capacity recovery due to serious sulfurization.

Malfunction symptom	Malfunction cause	Troubleshooting
4. Easy burnout of tractor bulbs	1. Damage or maladjustment of electric voltage regulator 2. Low quality of bulbs	1. Replace with voltage regulator of same model. 2. Replace with high quality bulbs.
5. Abnormal noise of alternator	Improper installation of alternator and damage of bearings	Repair and replace.

3. Instruments

Malfunction symptom	Malfunction cause	Troubleshooting
1. Abnormal indication of coolant temperature gauge	1. Open-circuit of circuit between instrument to coolant temperature sensor and poor contact of connector 2. Internal open-circuit of coolant temperature sensor 3. Internal malfunction of coolant temperature gauge 4. Short-circuit of circuit between instrument and coolant temperature sensor 5. Internal short-circuit of coolant temperature sensor 6. Internal malfunction of coolant temperature gauge	1. Check and repair. 2. Replace it 3. Check and repair or replace. 4. Check and repair. 5. Replace it 6. Check and repair or replace.
2. Abnormal indication of fuel gauge	1. Short-circuit or open-circuit of circuit or poor contact of connector 2. Malfunction of oil level sensor 3. Internal malfunction of fuel gauge	1. Check and repair. 2. Check and repair or replace. 3. Check and repair or replace.
3. Abnormal indication of tachometer	1. Short-circuit or open-circuit of circuit or poor contact of connector 2. Internal malfunction of tachometer 3. No output voltage at contact W of alternator	1. Check and repair. 2. Check and repair or replace. 3. Replace alternator.

4. Lighting

Malfunction symptom	Malfunction cause	Troubleshooting
1. No high/low beam of headlamp	1. Burnout of fuse 2. Open-circuit of circuit 3. Damage of lamp bulb 4. Damage of lighting switch and ablation of contact	1. Replace it 2. Check and repair. 3. Replace with high quality bulbs. 4. Repair and replace.

Malfunction symptom	Malfunction cause	Troubleshooting
2. Lighting failure of brake lamp	<ol style="list-style-type: none"> 1. Burnout of fuse 2. Open-circuit of circuit 3. Damage of lamp bulb 4. Damage of brake lamp switch 	<ol style="list-style-type: none"> 1. Replace it 2. Check and repair. 3. Replace with high quality bulbs. 4. Replace it
3. Lighting failure or no flashing of turn signal lamp	<ol style="list-style-type: none"> 1. Burnout of fuse 2. Open-circuit of circuit 3. Damage of lamp bulb 4. Damage of turn signal lamp switch or flasher 	<ol style="list-style-type: none"> 1. Replace it 2. Check and repair. 3. Replace with high quality bulbs. 4. Repair and replace.
4. Failure or low tone quality of electric horn	<ol style="list-style-type: none"> 1. Burnout of fuse 2. Open-circuit of circuit 3. Maladjustment of electric horn 4. Ablation of electric horn switch contacts 	<ol style="list-style-type: none"> 1. Replace it 2. Check and repair. 3. Adjust tone adjustment screw. 4. Repair
5. The buzzer sounds constantly after stop of engine.	<ol style="list-style-type: none"> 1. Malfunction of seat switch or parking bracket switch 2. Malfunction of buzzer control circuit 	<ol style="list-style-type: none"> 1. Replace it 2. Check electric circuit and safety controller and ensure reliable connection.
6. Lighting failure of rear working lamp	<ol style="list-style-type: none"> 1. Burnout of fuse 2. Open-circuit of circuit 3. Damage of lamp bulb 4. Damage of working lamp switch and ablation of contact 	<ol style="list-style-type: none"> 1. Replace it 2. Check and repair. 3. Replace with high quality bulbs. 4. Repair and replace.

5. Starter Motor

Malfunction symptom	Malfunction cause	Troubleshooting
1. No rotation of starter motor	<ol style="list-style-type: none"> 1. Low capacity of battery or short-circuit of battery electrode plates 2. Dirty electrode posts of battery 3. Loose cable connectors and rusting at grounding cable 4. Internal malfunction of starter motor 5. Seat switch not engaged 6. Clutch neutral gear switch not engaged 7. Shuttle gear reversing switch not engaged 8. PTO not in neutral position 9. Rear lifter safety switch not engaged 10. Open-circuit of starter control circuit 	<ol style="list-style-type: none"> 1. Charge as per specification or replace with good battery. 2. Remove dirt and secure connection. 3. Remove rust and secure connection. 4. Maintain and replace. 5. Check seat switch and related circuits 6. Check clutch neutral gear switch and related circuits 7. Check shuttle gear reversing switch and related circuits. 8. Check PTO switch and related circuits. 9. Check rear lifter safety switch and related circuits. 10. Check electric circuit and safety controller and ensure reliable connection.
2. Low speed of starter motor for start of engine	<ol style="list-style-type: none"> 1. Low battery capacity 2. Poor contact of starter circuit 3. Oil contamination or burning of commutator surfaces 4. Excessive wear of carbon brush or insufficient pressure of carbon brush spring 5. Burnt main contacts of electromagnetic switch 6. Serious wear of bearings 	<ol style="list-style-type: none"> 1. Charge the battery as per the specification. 2. Check and repair. 3. Remove dirt and polish commutator surfaces. 4. Adjust and replace. 5. Polish, repair and replace. 6. Replace bearing.
3. Further running of starter motor upon release of starter switch	Bonding of electromagnetic switch main contact due to long running time	Rapidly cut off starter circuit and repair electromagnetic switch or replace with electromagnetic switch of same model.

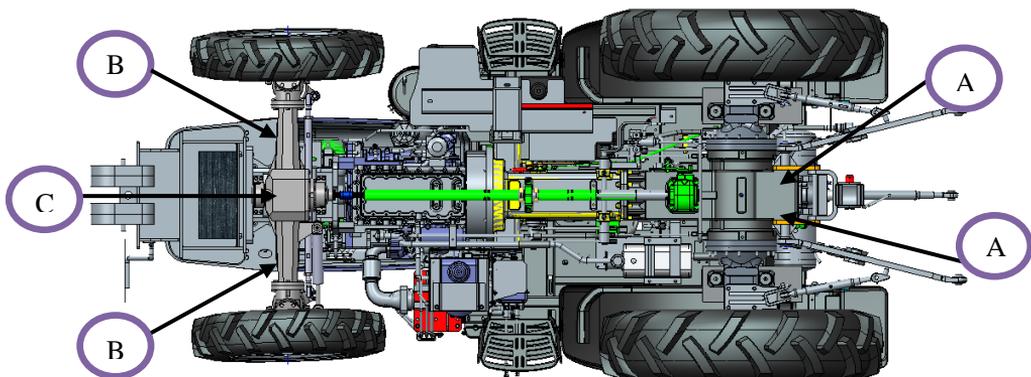
2.9 Hydraulic hitch system

Malfunction symptom	Malfunction cause	Troubleshooting
1. Powerless lifting or failed lifting	<ol style="list-style-type: none"> 1. Low oil level or wrong oil grade; 2. Blockage of oil suction filter screen 3. The hydraulic sucks air; 4. The oil pump is worn or serious oil leak inside; 5. The main control valve or the oil return valve is stuck (the oil is dirty); 6. The main control valve or the oil return valve is worn seriously; 7. Safety valve failure; 8. Serious oil leak of cylinder; 9. Oil leak at each sealing ring of the distributor; 10. The cut-off valve is closed; 	<ol style="list-style-type: none"> 1. Add qualified oil as specified; 2. Wash the screen; 3. Discharge the air and tighten the connector or change the sealing ring; 4. Change the oil pump or sealing ring; 5. Operate the lever of lifter for several times or drive the main control valve with a screwdriver to remove blockage; if it does not work, remove the valve to wash it; 6. Change worn parts. 7. Re-adjust or repair 8. Replace seal rings. 9. Replace seal rings. 10. Left turn the cut-off valve regulation rod;
2. Deviated lifting	<ol style="list-style-type: none"> 1. The main control valve or the oil return valve is stuck 	<ol style="list-style-type: none"> 1. Operate the lever of lifter for several times or drive the main control valve with a screwdriver to remove blockage; if it does not work, remove the valve to wash it;
3. The implement does not descend	<ol style="list-style-type: none"> 1. The main control valve or the oil return valve is stuck 2. Descending speed regulation valve or cut-off valve is closed. 	<ol style="list-style-type: none"> 1. Operate the lever of lifter for several times or drive the main control valve with a screwdriver to remove blockage; if it does not work, remove the valve to wash it; 2. Left turn each valve rod;

Malfunction symptom	Malfunction cause	Troubleshooting
4. The lifted implement shakes and hydrostatic settling is fast	<ol style="list-style-type: none"> 1. Low hydraulic oil level; 2. Poor sealing of one-way valve of distributor; 3. Poor sealing of descending valve; 4. Non-tight sealing of cylinder safety valve 5. Poor sealing of hydraulic output plug; 6. Sealing of descending speed control valve is damaged; 7. Improper sealing ring or damaged sealing ring between the distributor, cylinder head and lifter housing; 8. Sealing ring of cylinder piston is worn. 	<ol style="list-style-type: none"> 1. Check the oil level and add oil; 2. Wash the valve and polish it if necessary; 3. Ditto 4. Ditto 5. Ditto 6. Change seal rings. 7. Check and replace seal rings. 8. Replace piston seal rings.
5. Farm implement can not lower	<ol style="list-style-type: none"> 1. The descending speed control valve is screwed on too much; 2. The lowering valve is stuck; 3. The push pin is short or descending valve assembly is loose that makes it impossible to open the valve. 	<ol style="list-style-type: none"> 1. Loose the hand wheel of the valve to screw off the valve for several rounds. 2. Wash the valve; 3. Remove the plug screw, adjust the clearance of push pin or tighten the valve assembly;
6. Oil temperature rises	<ol style="list-style-type: none"> 1. The lever stays high during transport; 2. Wrong adjustment of highest position of outside lifting arm and the safety valve is open; 3. The descending speed regulation valve is got stuck. 4. Leak inside the pump, valve and cylinder, low volume efficiency; 	<ol style="list-style-type: none"> 1. Fix the lever at transport position; 2. Adjust the outside lifting arm for proper clearance; 3. Loose the descending speed regulation valve; 4. Inspect the sealing, change the worn component is necessary;
7. It is hard to shift control lever	<ol style="list-style-type: none"> 1. Main valve or push pin is stuck by dirty oil and the main valve movement is awkward; 	<ol style="list-style-type: none"> 1. Shift the lever for service times, wash the main valve or push pin;
8. The turnover plow stops during plowing.	<ol style="list-style-type: none"> 1. Optional mechanism of turnover plow is tuck; 2. Air gets into the hydraulic pipeline; 3. Oil filter is blocked; 4. The multi-way valve pressure is set low; 5. Leak inside the cylinder of turnover plow 6. Leak inside the multi-way valve; 7. Leak inside the gear pump; 	<ol style="list-style-type: none"> 1. Repair the turnover plow 2. Bleed the air. 3. Clean filter 4. Adjust the pressure; 5. Change the sealing component or change the cylinder; 6. Change the sealing component or change the multi-way valve 7. Change the sealing components of gear pump or change the gear pump;

Malfunction symptom	Malfunction cause	Troubleshooting
9. The hydraulic system is hot during the operation that burns the pump	<ol style="list-style-type: none"> 1. System overloaded: high system pressure or high engine rpm; 2. Low hydraulic oil level; 3. Dirty oil; 4. Air gets into the oil suction pipe; 5. Oil filter is blocked; 	<ol style="list-style-type: none"> 1. The engine shall not work above rated rpm for a long period and the multi-way valve shall not stay in non-neutral position for a long period; 2. Add oil; 3. Change the oil; 4. Inspect the oil suction pipe for air tightness; 5. Wash the filter element or change the element; the sealing ring shall be well placed and shall not be damaged;
10. Hydraulic gear pump is hot and the pump is burnt	<ol style="list-style-type: none"> 1. The system lacks oil; 2. Blocked pipeline fails in sucking oil; 3. The connection of gear pump and engine is not coaxial that the pump suffers heavy axial and radial force. 	<ol style="list-style-type: none"> 1. Add oil; 2. Wash the oil filter; 3. Adjust or change the connection component
11. The provided implement does not penetrate the soil	<ol style="list-style-type: none"> 1. The implement is stuck; 2. Wrong penetration angle; 	<ol style="list-style-type: none"> 1. Repair the implement; 2. Adjust the penetration angle of plough;

2.10 Diagram for use of jack during repairs



Notice: Disassemble the front counterweight before jacking up the front end of tractor.

The figure shows the recommended jacking points of tractor by a jack. Use a steady jack of sufficient lifting capacity. Refer to the masses and counterweights of the technical specification in Chapter I.

A—Rear jacking point of tractor

B—Front jacking point of tractor

C—Middle jacking point of axle (Use wooden wedge to prevent inclination of axle)

2.11 Hoisting and towing of tractor

When the hoisting of tractor is required:

1. Bundle up the hoisting slings securely to four front and rear hoisting points of tractor. Two front hoisting points are located on the front axle on the inner side of front wheels and two rear hoisting points are located on the left and right limit rod supports.
2. After the secure bundling of hoisting slings is confirmed, hoist slowly the tractor, move, and lower it to an appropriate position.

 **Notice: The minimum carrying capacity of the hoisting slings used for hoisting shall be no less than 5,000kg.**

When the towing of tractor is required:

1. When the towing of tractor is required due to power failure, fix the towing rope to the front traction seat. If the tractor brake is normal, the flexible connection can be used between the towing truck and the tractor. If the tractor brake system fails, the hard connection shall be used. The tractor speed shall not exceed 10km/h during towing.
2. When the towing of tractor is required due to entrapment in mud, fix the towing rope to the front traction seat or swing drawbar of the tractor and slowly start the towing truck to drag the tractor out of the mud.

