



NorTrac 70XTC Tractor

Owner's Manual

Sold By

Northern Tool & Equipment, Inc.

P.O. Box 1299

Burnsville, MN 55337

Tel.: 1-800-222-5381

www.northerntool.com

YFXT70OMAN

Nortrac 70XTC Tractor

Product Identification Data Sheet

Product Part Number	
Product Model	
Machine Serial Number	
Chassis Serial Number	
Engine Model	
Engine Serial Number	
Date of Purchase	
Where Purchased/Contact Information	
Owner Name	

Complete this form carefully at purchase.

All SN's in this form should be recorded completely (including letters).



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User Notices

Thank You

Thank you for purchasing a NorTrac tractor from Northern Tool + Equipment Company. We value you as a customer and wish you many years of safe and satisfied use of your tractor.

Using Your Owner's Manual

This Owner's Manual is an important part of your tractor and should remain with the tractor if you sell it.

Read this Owner's Manual to help you and others avoid personal injury or damage to the tractor. This manual provides information on the safest and most effective use of the tractor. It will help you and others you might train to operate the tractor safely and correctly.

If you use the tractor with an implement or other attachment, use the safety and operating instructions in the owner's manual for that implement or attachment along with this Owner's Manual so you can operate the implement safely and correctly with the tractor.

While the tractor shown in this manual may differ slightly from your tractor model, the instructions in this manual will apply to your manual unless otherwise stated.

Disclaimer

The 70XTC tractor and its components may be changed by the manufacturer at any time without notice and may not correspond to the contents of this Owner's Manual.

Overview

This manual describes safety precautions as well as running-in, proper usage, technical maintenance, adjustment, faults and troubleshooting methods for various parts of the Nortrac XTC tractors. The manual gives an in-depth look and should be used as a reference tool for owners and maintenance personnel.

In this manual, the safety alert symbol  prompts important safety information. When this symbol is seen, you should be alert to possible injuries or affects to the service performance of the machine.



WARNING: Alerts you to safety hazards that could result in serious injury or even death.



NOTICE: Alerts you to actions that could result in minor injuries or could damage the tractor or it's implements and thus result in possible safety hazards.

IMPORTANT ISSUE: Issues that may result in damage to the tractor, related machinery and/or the environment.

NOTE: Provides additional information on a given topic.

Please read the messages that follow the symbol carefully and make other operators aware of any potentially hazardous situations. This manual is an integral part of the product and should be kept with the tractor. Please keep it in a safe, dry place. If you encounter any sections that you do not understand while going over the manual, please call 1-800-222-5381 for assistance.

Only those familiar with this manual and the characteristics of this machine should be allowed to operate, service and maintain the tractor. In addition, some government regulations specify that no one under the age of 16 may be employed to operate power machinery. (Refer to U.S. Department of Labor, Employment Standards Administration, Wage and Hour Division, Child Labor Bulletin #102).

In employment conditions, current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be, involved."

Observe the accident prevention rules as well as other safety regulations and local traffic rules at all times. The manufacturer is not liable for any damage to the machine or personal injury resulting from any unauthorized refitting of this machine or use of the tractor for tasks that are outside the scope of the tractors usage guidelines.

Table of Contents

Table of Contents

1. Safety Precautions	1
1.1 Safety rules and notices of use	1
1.2 Safety warning symbols	6
1.3 Preventing farm machine hazards.....	10
2. Operating Instructions.....	14
2.1 Commonly used identifiers.....	14
2.2 Product description.....	15
2.3 Tractor operating mechanism and instructions	15
2.4 Starting the engine.....	21
2.5 Starting the tractor	24
2.6 Putting the tractor in motion.....	25
2.7 Steering the tractor	26
2.8 Shifting gears.....	27
2.9 Differential lock operation.....	28
2.10 Front drive axle operation	28
2.11 Tractor braking	29
2.12 Stopping the tractor and engine shutdown procedure.....	30
2.13 Tire assembly and disassembly	30
2.14 Counterweight use.....	31
2.15 Driver's seat adjustment	32
2.16 Hydraulic suspension, PTO and electrical system operation.....	33
2.17 Tractor upper chassis	40
2.18 Tractor break-in	44
2.19 Tractor common faults and troubleshooting methods	49
3. Accessories and Consumables	60
3.1 Accessories	60
3.2 Consumable parts	61
4. Maintenance Instructions	63
4.1 Technical maintenance procedures	63
4.2 Clutch adjustment and maintenance	68
4.3 Transmission adjustment	70
4.4 Rear axle adjustment and maintenance	71

Table of Contents

4.5 Brake adjustment and maintenance	72
4.6 Steering system adjustment and maintenance	74
4.7 Four wheel drive adjustment and maintenance	74
4.8 Transfer case adjustment and maintenance.....	75
4.9 Tire adjustment and maintenance	75
4.10 Electrical system adjustment and maintenance	76
4.11 Hydraulic suspension system maintenance.....	79
4.12 Air filter use and maintenance	82
4.13 Electrical schematic.....	84
5. Storage	85
5.1 Causes of damage	85
5.2 Tractor storage	85
5.3 Storage period maintenance of the tractor	86
5.4 Removing tractor from storage.....	87
6. Transportation	87
7. Technical Specifications	89
7.1 Four wheel drive tractor technical specifications	89
8. Disassembly and Disposal	95
9. Warranty Terms.....	96
10. Appendixes	98
10.1 Tractors fuel, oils and solutions	98
10.2 Torque table of major bolts and nuts	99
10.3 Tractor roller bearing.....	100
10.4 Seals of the tractor chassis.....	101

Safety Precautions

1. Safety Precautions

1.1 Safety Rules and Notices of Use

Reading Prior to Use

1. The instructions for use, maintenance, and the safety warning identifiers should be fully read and understood.
2. The correct usage and operating method should be observed.
3. Local traffic rules and safety regulations must be observed at all times.

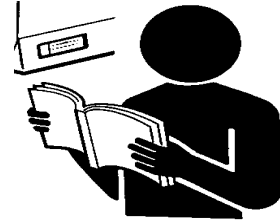


Fig. 1-1 Reading prior to use

A Qualified Operator

1. When operating the machine, the driver must use sound judgment.
2. Never operate the tractor if you have been drinking or are tired.
3. The driver should read and understand this operator's manual.
4. Drive slowly at first in order to test your skill level.



Fig.1-2 A qualified operator

Clothing

During the operation, the driver should avoid loose fitting clothing. Baggy and bulky clothes are not recommended.



Fig.1-3 Driver's clothes

Fuel Usage

1. Diesel fuel is a combustible substance. Keep all fuel away from open flames.
2. The engine should be shut down prior to refueling.
3. Smoking is strictly prohibited when the fuel system is being refueled and overhauled.
4. Use a clean rag to wipe off any fuel or machine oil overflow.
5. The requirements set out in the "Appendix" must be strictly complied with for fuel and lubricating oil quality assurance.



Fig.1-4 Use of fuel

Safety Precautions

Waste Oil Disposal

1. Used machine oil is a hazardous waste. Dispose of it properly.
2. The used acid from the battery is also a hazardous waste. Dispose of it properly.



Fig.1-5 Waste oil disposal

Hydraulic Line Leaks

Do not use your hand to check for leaks in the high-pressure hydraulic oil lines. You may use a piece of cardboard or a wooden board to test for possible leaks.



Fig. 1-6 Hydraulic line leaks

Removing the Radiator Cap

Never remove the radiator cap when the engine is hot. Turn the engine off and wait until the engine has cooled, then turn the cap to the first position. Once pressure has been reduced, you can then remove the cap.

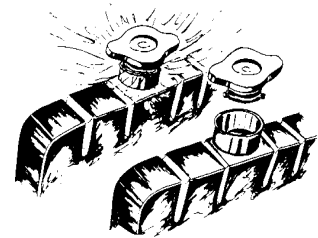


Fig. 1-7 Removing the radiator cap

Electric Parts Maintenance

1. Remove the ignition switch key.
2. Never service any of the tractor's electrical components without first removing the ground wire from the battery.

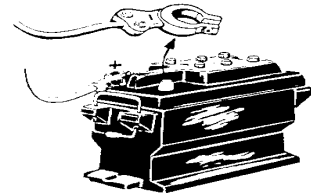


Fig. 1-8 Electric parts maintenance

In Case of Defects or Abnormal Operation

1. The tractor should not be operated "in spite of defects." In case of a lack of oil pressure, excessively low oil pressure, an overly high water temperature or unusual sounds and smells, stop the tractor and troubleshoot the problem.
2. During lubrication maintenance and for any on-field adjustment, the engine should be shut down.

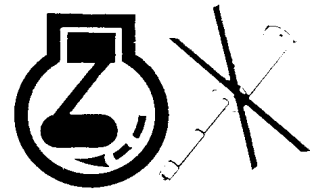


Fig. 1-9 In case of defects or abnormal operation

Safety Precautions

Emergency Procedures

1. In case of a brake failure, hold the steering wheel firmly, wait until the tractor has come to a complete stop and then shut down the engine.
2. If the steering malfunctions, brake immediately and shut down the engine.
3. If fire should occur, immediately shut down the engine and get off the tractor. If a fire extinguisher is available, put out the flames at the source of the flame. If a fire extinguisher is not available, use sand or other non-flammable substance to fight the fire.
4. After any safety incident, immediately dial any necessary emergency services (hospital, fire department) according to the situation and administer first-aid as necessary.



WARNING:

1. Always operate the tractor in a safe and responsible manner to avoid injury and possible death.
2. Pay special attention to any obstacles that may impede progress or cause an accident before starting the tractor. Also check for obstacles and impediments that may be covered by the tractor, an implement or a trailer.
3. Never leave the driver's seat to start and operate the tractor. Prior to the startup, make sure that various shift levers are in the neutral position, the throttle lever and the front drive control handle are disengaged, and the lifter operating handle is in neutral to prevent the sudden start up of accessories.
4. Do not start the engine by bridging-over the starter solenoid. If you do this, the tractor could lose control and cause a dangerous situation, which could lead to injury or death.
5. Make sure that the pedals are free from obstacles and able to move unhindered to their home position. Never keep anything on the floor or around the pedals that could hinder pedal travel. An extra foot blanket or non-standard floor mats should not be used as they can hinder pedal movement and cause serious injury or damage.
6. Never get on or off the tractor while it is in motion.
7. Never climb under the tractor while the engine is running.
8. Always remove the keys, set all shift levels to neutral and lock the auxiliary brake handle before exiting the cab to avoid accidental start up and to keep the tractor from moving unattended.
9. Keep your speed under control at all times. Brake prior to turning in order to maintain your load and

Safety Precautions

avoid tipping.

10. When crossing or going under a bridge or going through a tunnel, pay full attention to the load height.
11. Use the lowest gear with the clutch enabled on a down slope. Never put the tractor in neutral and coast downhill as this can cause instability. Never change gears on a down slope as this can cause instability and a possible rollover.
12. Avoid sudden turns at high speed or using unilateral braking to turn as this can result in instability.
13. When driving on roads, obey all local traffic indicators and laws.
14. Keep a safe distance between the tractor and any other vehicles that may be on the road.
15. Roadbeds along the ditch line tend to be more fragile. Pay specific attention to the weight of your vehicle when riding on the road shoulder.
16. Never overload the tractor. Running the tractor over the specified limits can cause damage to the tractor and can result in injury.
17. When driving at night, make sure that you have proper lighting to avoid any collisions.
18. When working in tall grass or hay, a spark-extinguishing device must be affixed to the exhaust pipe to avoid accidental fires.
19. Always slow down when working in wet or rainy conditions to avoid slippage and instability.
20. Always operate the tractor at a safe speed.
21. When attaching implements, make sure all 3-Point hitch pins are securely fastened. When disconnecting implements assure all 3-Point hitch pins are disconnected.
22. When lifting, reduce engine speed to avoid damage to tractor and personal injury.
23. Upon charging the battery, insure proper ventilation.
24. Beware of overhead high voltage transmission lines!



Caution:

1. Check nuts, bolts and other loose components regularly and tighten as required. This could prevent a potentially dangerous situation.
2. When the tractor runs the power take-off (PTO), make sure that there is a safety shield installed.

Safety Precautions

Never approach the PTO shaft when it is running. Never take sudden turns when the PTO shaft is under load, as this can damage the universal joint or the PTO shaft. When the PTO shaft is not in use, the PTO lever should be returned to the neutral position.

3. After parking and before shutting down the tractor, the driver should remove the key from the ignition, set all gearshift levers to the neutral position, and lock the brake handle. This will prevent the tractor from accidental startup and unattended movement.
4. When parking the tractor on an incline, the auxiliary brake should be engaged and the engine shut down. Put the tractor in gear, apply the auxiliary brake and use the triangle chocks to block the rear wheels.
5. Tire installation and adjustment should be done by trained personnel only, using special tools. Faulty tire installation may cause a serious accident or damage.
6. When cleaning the radiator, shut down the tractor and allow the tank to cool for 30 minutes.
7. Pay attention to all safety precautions when replacing or installing new parts on your tractor.

IMPORTANT ISSUES:

1. Always operate the tractor according to the specified running-in requirements. This will prolong the life of your tractor.
2. Prior to starting the tractor, the oil system, cooling system and electric circuits must be examined. After startup, strict attention should be paid to the various instruments.
3. Before activating the power take-off (PTO) shaft, make sure that the equipment is properly inspected. When using PTO driven implements, the angle between the PTO shaft and the universal joint drive shaft should be no more than a 15° angle; and the hydraulic operating control should be in neutral. After the farm tool has been lifted, the included angle between the PTO shaft and the universal joint drive shaft should be at no more than a 20° angle. Never use the implement without checking for a proper connection with the PTO. This can cause damage to the implement and severe damage to the tractor

Safety Precautions

clutch and power train. To increase work efficiency, the power supply should never be shut off during a turn, and the lifting height must be maintained at 200 mm. (7.88 in.) above the ground.

4. Hanging farm implements can shift tractor weight. They should be low to the ground before exiting the tractor.
5. Antifreeze should always be used in the engine cooling system in a 50/50 water/antifreeze mix.
6. The front driving axle of tractor should only be engaged in agricultural instances and when roads are muddy. Overuse of the front drive axle may result in premature wear of the tires and transmission problems.
7. Only use parts recommended by the manufacturer to replace worn or broken components.
8. Never rest your foot on the brake or clutch pedal when the tractor is in motion as this can cause premature wear of the brakes and clutch system.
9. When detaching the tractor from any implements, the upper lever of the suspension unit should be adjusted to the shortest travel and the limit lever adjusted to prevent the implements from swinging out of control. The locking nuts on the upper and limit levers must be tightened in order to guarantee travel safety and to avoid damage to the tractor and the machinery.

1.2 Safety Warning Symbols



Caution:

1. All safety identifiers should be visible and easy to read. When dirty, wash with soapy water and wipe them with a soft rag.
2. When the safety identifiers are lost or damaged, contact the dealer or the manufacturer for replacement stickers.
3. When replacing parts with attached safety warning symbols, the safety identifiers that correspond to that specific part need to be updated as well.
4. To prevent injury, accidents and damage, always comply with safety warning identifiers.

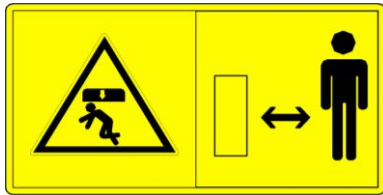
Safety Precautions



During machine operation, keep a safe distance from the hot surface of the machine, as it can cause serious burns.

Location: outer side of damper, water tank flank.

Fig. 1-10 Safety warning identifier



Please keep a safe distance from the tractor when it operating, to avoid any personal injuries.

Location: left from the rear side of mudguard.

Fig. 1-11 Safety warning identifier



Never sit on the fender when the tractor is operating as this could result in falling from the vehicle and possible injury.

Location: front side of the mudguard.

Fig. 1-12 Safety warning identifier



To avoid injury, stay a safe distance from the lifting lever when the lifting lever control system is in operation.

Location: right rear side of the mudguard.

Fig.1-13 Safety warning identifier



Always shut down the engine and remove the key prior to maintenance and adjustment.

Location: in front of the instrument panel.

Fig. 1-14 Safety warning identifier

Safety Precautions



Do not open or dismantle the safety hood and keep your hands away from the engine when it is running.

Location: on the engine hood.

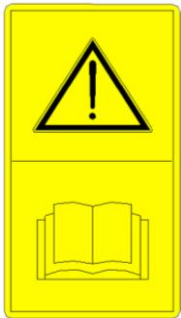
Fig. 1-15 Safety warning identifier



Always start the engine from a secure position in the driver's seat.

Location: in front of the instrument panel.

Fig. 1-16 Safety startup symbol



Read and understand all instruction for use, including the meaning of all non-lettered safety symbols.

Location: in front of the instrument panel.

Fig. 1-17 Read the instruction identifiers

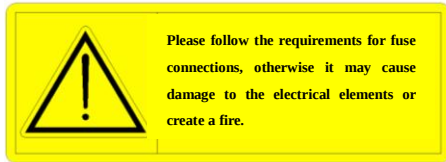


Never touch moving parts when the tractor is in motion.

Location: on the PTO shield.

Fig. 1-18 PTO safety identifiers

Safety Precautions



Please follow the requirements for fuse connections, otherwise this may cause damage to the electric components or start a fire.

Location: near the electric fuse box.

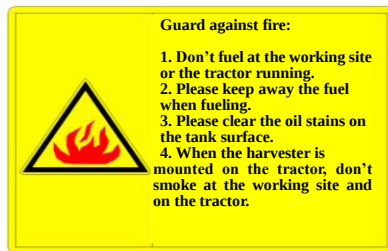
Fig. 1-19 Fuse safety warning symbol



For battery service, carefully read the instructions in order to understand the correct maintenance procedures.

Location: on the surface of the battery.

Fig. 1-20 Battery symbol



Guard against fire:

1. Don't fuel at the working site or the tractor running.
2. Please keep away the fuel when fueling.
3. Please clear the oil stains on the tank surface.
4. When the harvester is mounted on the tractor, don't smoke at the working site and on the tractor.

To prevent the risk of fire, never refuel the tractor while it is running. Clean grease, fuel, and oil spills immediately.

Location: near the fuel tank.

Fig. 1-21 Refueling fire protection identifiers



To prevent personal injury, please install the safety shield on the PTO shaft when it is not in use.

Location: on the pneumatic brake cylinder.

Fig. 1-22 PTO safety identifiers

Preventing Farm Machine Hazards

The following article describes important general safety precautions for machinery such as the NT-204C/NT-254 tractor. It is reprinted here with permission from Professor Thomas L. Bean, Safety Leader and Professor, Department of Food, Agricultural, and Biological Engineering, The Ohio State University Extension, The Ohio State University.

AEX-593-91

Thomas L. Bean

Each year, 2,600 farm residents are killed and 230,000 disabled in farm-related injuries, many due to farm machinery. Farm machinery uses mechanical power to do work. This creates a number of possible hazards for both operators and bystanders. Even though manufacturers take many steps to make machinery safe, all hazards cannot be removed. Some machine parts cannot be completely shielded and still do their job. For instance, a totally enclosed cutting blade could not cut.

Many machinery-related accidents result from human error. The operator either forgot something, took a shortcut or a risk, ignored a warning, wasn't paying close attention, or failed to follow safety rules. In addition, guards removed for maintenance often aren't replaced.

There are many different kinds of farm machinery: mowers, tractors, shredders, harvesters, grinders, blowers, augers, balers, etc. They all have similar characteristics and hazards. You can be cut, crushed, pulled in or struck by an object thrown by these machines. They have cutting edges, gears, chains, revolving shafts, rotating blades, pinch points and other hazards. You can also be injured if you fall while working on or near any of these machines.

Accidents with farm machinery are often serious, even fatal. It is important to recognize and be alert for machine hazards and to take precautions to avoid injury.

Shear and Cutting Points

Shear points (Fig. 1 below) are created when the edges of two objects are moved together closely enough to cut a soft material, as with a pair of shears or an auger. Cutting points are created when a single object moves forcefully or rapidly enough to cut, as with a rotary mower blade.

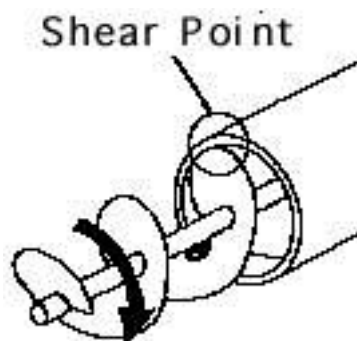


Figure 1

Safety Precautions

Both shear and cutting points are created on machinery designed to cut, such as harvesters, and on those that are not designed to cut, such as augers. They are hazardous because of their cutting force and they often move so rapidly that they may not be visible, so it is easy to forget they are operating or to underestimate the hazard.

Because some shear and cutting points cannot be guarded, it is important to be aware of their hazard and stay alert when they are operating. It is also important to warn others and to look out for their safety. This is especially true if there is a danger of thrown objects while using cutting-type equipment.

Pinch Points

Pinch points are another hazard of farm machinery (Fig. 2 below). Pinch points (which should be more appropriately named mangled or maimed points) are formed when two rotating objects move together and at least one of them moves in a circle. For example, the point at which a belt runs into a pulley is a pinch point. Belt drives, chain drives, and gear drives are other sources of pinch points in power transmission devices. Feed rolls, gathering chains and similar equipment designed to draw crops into the machine also create pinch points.

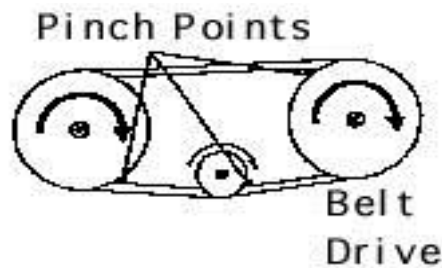


Figure 2

Fingers, hands and feet can be caught directly in pinch points, or they may be drawn into the pinch points by the inertia of the moving part or loose clothing that becomes entangled. Contact may be made by falling or brushing against unshielded parts. You can become entangled in pinch points if you take chances and reach or work near rotating parts. Machines move too fast to get out of a pinch point once you become caught.

To avoid injury from pinch points, be aware where pinch points occur and avoid them. Wear clothing that fits well and is not loose or floppy. Never reach over or work near rotating parts. Turn off machinery to work on it. Always replace shields removed for maintenance.

Wrap Points

Rotating shafts are the most common source of wrap-point accidents, although any exposed machine part that rotates can be a wrap point. A cuff, sleeve, pant leg, long hair or just a thread can catch a rotating part and result in serious injury. Entanglement with a wrap point can pull you into the machine, or clothing may become so tightly wrapped that you are crushed or suffocated. In other cases, you could be thrown off balance and fall into other machinery parts.

Even a perfectly round shaft can be hazardous if there is enough pressure to hold clothing against the shaft. Hazards increase with shafts that are not round. Clothing is more likely to catch if there is dried mud or manure on the shaft,

Safety Precautions

or if the shaft is nicked. Ends of shafts that protrude beyond bearings are also dangerous. Universal joints, keys and fastening devices can also snag clothing.

Check all equipment for potential wrap points and, if possible, shield those that can be shielded. Replace any damaged manufacturer-installed warning labels and place warnings on equipment parts not previously labeled. In addition, consider painting them a bright color, perhaps with wide stripes. Be aware of wrap points and be alert to their danger.

Crush Points

Crush points are created when two objects move toward each other or one object moves toward a stationary object. For example, hitching tractors to implements (Fig. 3 below) creates a potential crush point.

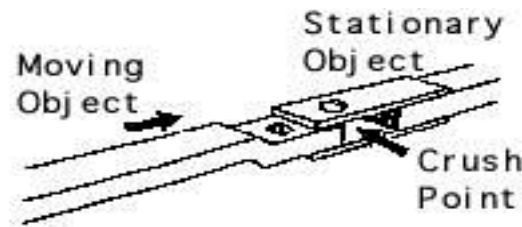


Figure 3

Hitch accidents most commonly occur to fingers placed at the hitching point. Wait until the tractor has stopped before stepping into the hitching position. If possible, arrange the hitch point so that the tractor can be backed into position without anyone between. Always know what the other person is doing.

Failure to safely block up equipment can result in a fatal crushing injury. A jack may slip, a hose or overhead support may break, or the equipment may roll. Take extra precautions when working with machinery that is raised for any reason. The operator's head or chest can be crushed between the equipment and a low beam or other part of a farm building. These accidents usually occur when the machine is being operated in reverse. Tree limbs are also potential hazards when working with tractors and other machinery.

To prevent being crushed or pinned, recognize and avoid potentially dangerous situations. Block all machinery securely if you must work under it. If an implement can roll freely, block its wheels so it cannot roll.

Free-Wheeling Parts

Many machine parts continue to spin after the power is shut off, including cutter heads of forage harvesters, hammer mills of feed grinders, rotary mower blades, fans and flywheels. Never touch these parts until they have stopped moving. This could take 2 to 2 1/2 minutes.

Springs

Compressed springs (Fig. 4 below) will expand with great force when released, and springs that are stretched will contract rapidly when released. Know what direction a spring will move and how it might affect another machine part when released, and stay out of its path.



Figure 4

Burn Points

Be aware of burn points: mufflers, manifolds and even gear cases under adverse climatic conditions. They may not be severe enough to seriously maim, but they can startle the operator enough to cause him or her to “jump” into more deadly danger.

Hydraulic Systems

Hydraulic systems contain fluid under extreme pressure. Before loosening, tightening, removing or otherwise working with any fittings or parts, relieve this pressure. Jet streams from even pinhole leaks can penetrate flesh. In addition, the liquid is often hot.

Before attempting any service on hydraulic systems, shut off the engine that powers the hydraulic pump. Lower the implement to the ground and relieve the pressure. Follow instructions in the operator’s manual because the specific procedures for servicing the systems are very important to your safety.

Funded in whole or in part from Grant Number U05/CCU506070-01, "Cooperative Agreement Program for Agricultural Health Promotion Systems," National Institute for Occupational Safety and Health.

Reviewed by Dr. Randall Wood and Dr. Warren Roller.

2. Operating Instructions



NOTE: Operating the tractor properly will result in maximum performance efficiency, reducing tractor wear and helping to prevent accidents.

2.1 Commonly Used Identifiers

Table 2-1 Common Symbols

Symbols	Definition	Symbols	Definition	Symbols	Definition
	Safety warning identifier		Four-wheel drive		Horn
	High beam headlights		Low beam headlights		Quick
	Engine oil pressure		Charging and discharging indicator		Slowly
	Turn signal indicator		Windshield washer		Position lights
	Engine preheat		Rear windshield wiper		Front windshield wiper
	Air filter blockage warning		Hydraulic oil air separator		Pneumatic braking invalid/failure
	Engine coolant temperature		Fuel quantity		Parking brake
	Differential lock		Danger warning		Warning light

Operation Description

2.2 Product Description

The following information will help you use, maintain, adjust and troubleshoot the 70XTC tractor.

This series of wheeled tractor are medium-sized tractors that can be used in a variety of land types. The tractors have a compact structure and are easy to control with responsive steering, a high lift capacity and low maintenance.

2.3 Tractor Operating Controls and Instrumentation

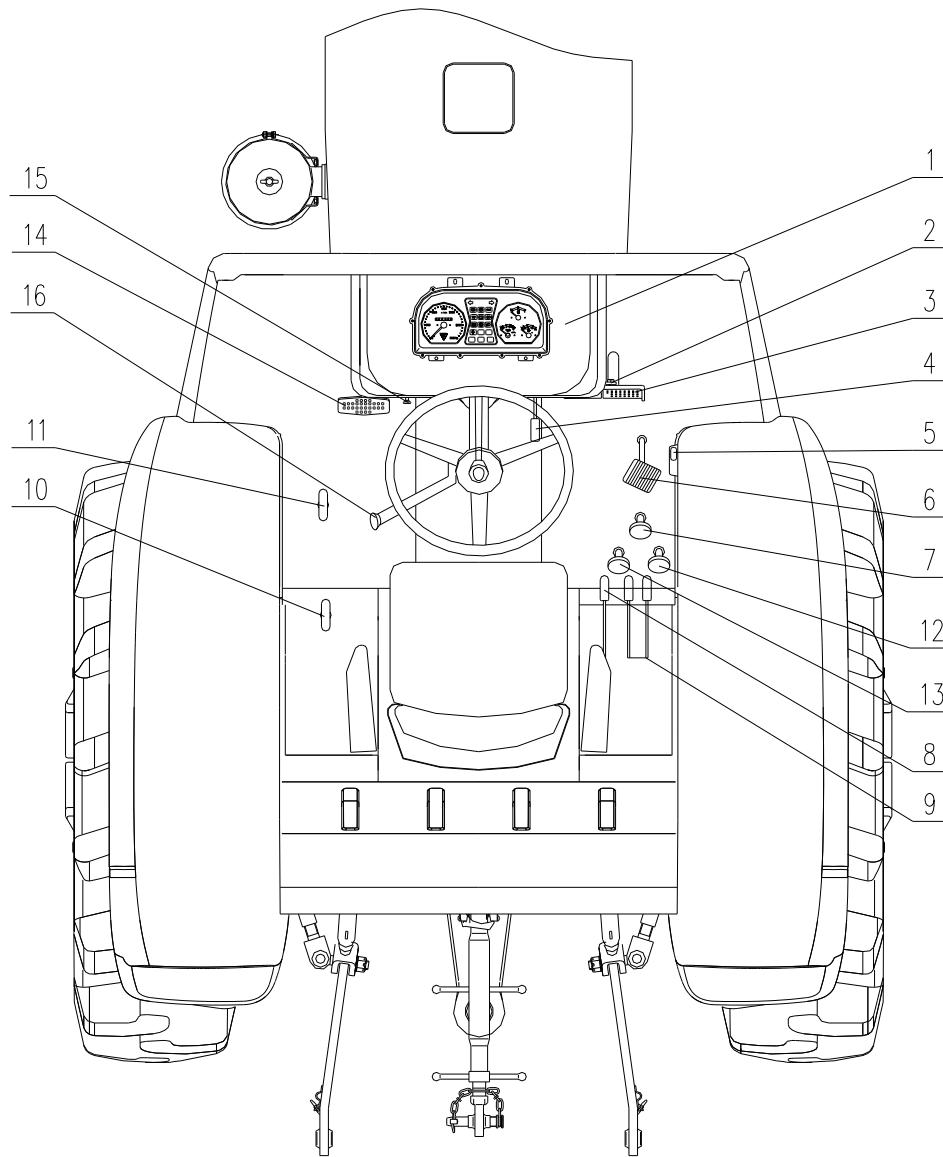


Figure 2-1 Operating Controls Diagram

1. Instrument Panel 2. Brake Pedal Interlock 3. Left/Right Brake Pedals 4. Parking Brake Handle
5. Hand Throttle Handle 6. Foot Throttle Pedal 7. Differential Lock Pedal 8. Distributor Handle
9. Hydraulic Output Handle 10. Drive Handle (four-wheel drive engage) 11. Draft Output Handle
12. Main Gear Shift 13. High/Low Gear Shift Lever 14. Clutch Pedal 15. Engine Fuel Shutoff Knob
16. Shuttle Shift Lever

Operation Description

Tractor Instrumentation

The instrument panel includes operating indicators for the electrical system such as the engine tachometer, engine coolant temperature gauge, fuel gauge, oil pressure gauge, engine oil pressure warning light, charge warning light, headlight on/off indicator, headlight high/low beam indicator, and turn signal indicator.

Instruments and gauges

1. Instrument Panel
2. Right Side Rocker Switch Combination
3. Ignition Switch
4. Left Side Rocker Switch Combination



Figure 2-2 Instrumentation and Switches

Engine Tachometer

After the engine is started, this indicates the operating speed of the engine in rpm.

The value in the box is the operating hours of the engine.

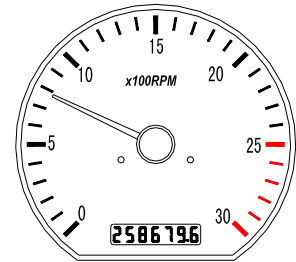


Figure 2-3 Engine Tachometer

Engine Coolant Temperature Gauge

The engine coolant temperature gauge displays the engine coolant temperature, with the pointer moving from left to right with increasing temperature. The red area is the high temperature zone.

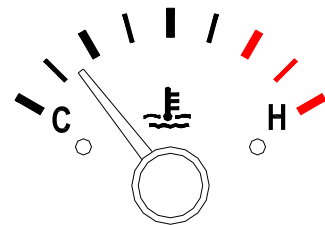


Figure 2-4 Water Temperature Gauge

Operation Description

Fuel Gauge

The fuel gauge indicates the level of diesel fuel in the fuel tank.

Direction of the pointer:

Rightmost position: Indicates that fuel tank is filled. Leftmost position:

Indicates that there is not enough fuel in the tank and it should be filled immediately.

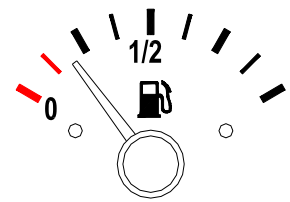


Figure 2-5 Fuel Gauge

Oil Pressure Gauge

The oil pressure gauge indicates the oil pressure in the engine in Mpa.

Direction of the pointer:

Increasing oil pressure is indicated as the pointer moves to the right.



Figure 2-6 Oil Pressure Gauge

Oil Pressure Warning Light (red)

When the engine oil pressure is normal, the light is off. If the pressure is too low, the light is illuminated.

When this is the case, check the engine. Add oil if necessary.

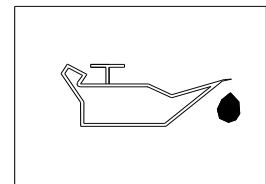


Figure 2-7 Engine Oil Pressure Warning Light

Charge Warning Light (red)

After the engine is started, the indicator turns off, which means the battery is charging normally.

When the alarm light is on, the battery is not charging normally and it should be checked.

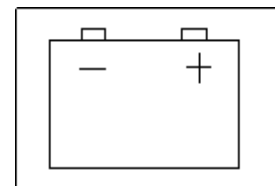


Figure 2-8 Charge Warning Light

Operation Description

IMPORTANT NOTES:

Before starting the engine turn the ignition switch to ON. This turns on the engine warning lights. Check if the above two lights are illuminated. If they are not illuminated, the bulbs may be damaged or the circuit may be faulty. Troubleshoot immediately.

Headlight Indicator Light (green)

When running the tractor on the road at night, in order to make other drivers aware, the headlights should be turned on and this indicator should be illuminated (switch position 1).

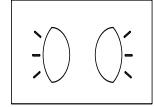


Figure 2-9 Headlight Indicator Light

High/Low Beam Indicator Light (blue)

When the light switch is in the “2” position and the dip switch is in the “2” position, the light is illuminated, indicating high beams are on.

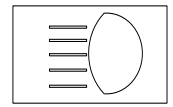


Figure 2-10 High Beam Indicator Light

Left Turn Indicator Light (green)

When the left turn indicator is turned on this light will be lit and flashing.

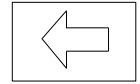


Figure 2-11 Left Turn Indicator Light

Right Turn Indicator Light (green)

When the right turn indicator is turned on this light will be lit and flashing.

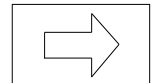


Figure 2-12 Right Turn Indicator Light

2.3.2 Tractor Control Switches

Left Rocker Switch Combination

The left rocker switch combination includes four parts as shown in Fig. 2-13.

1. Headlight Dimmer Switch.
2. Headlight/Taillight Switch.
3. Roof Light/Rear Light Switch.
4. Front Windshield Wiper Switch.

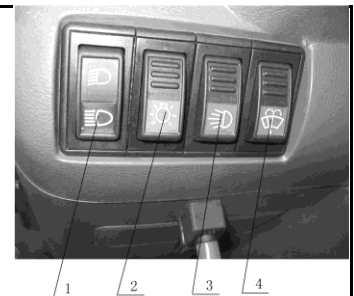


Figure 2-13 Left Rocker Switch Combination

Operation Description

Headlight Dimmer Switch

“1” Position: Headlights are on low beam.

“0” Position: Spare.

“2” Position: Headlights are on high beam when light switch is in “2” Position.

This switch works with the headlight/taillight switch. The headlights must be turned on before they can be set to high beam.

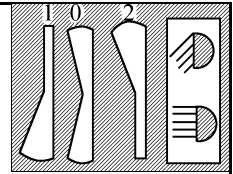


Figure 2-14 Headlight Dimmer Switch

Headlight/Taillight Switch

“2” Position: Turns on high beam headlights if dimmer switch is set to “2” Position.

“1” Position: Turns on low beam headlights, taillights, and dash panel lights.

“0” Position: Turns off headlights and taillights.

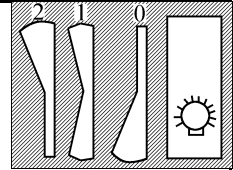


Figure 2- 15 Dimmer Switch

Upper and Lower Work Light Switch

“2” Position: All work lights are on.

“1” Position: Upper front and rear work lights on (if there is a cab).

“0” Position: All work lights are off.

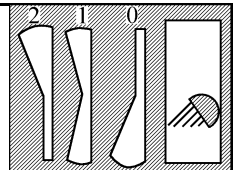


Figure 2-16 Roof/Rear Light Switch

Front Windshield Wiper Switch

“2” Position: High speed front wipers.

“1” Position: Low speed front wipers.

“0” Position: Front wipers off.

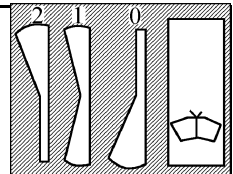


Figure 2-17 Wiper Switch

Right Rocker Switch Combination

The right rocker switch combination includes three switches, as shown in figure 2-18.

1. Warning Flashers Switch.
2. Turn Indicator Switch.
3. Rear Windshield Wiper Switch.

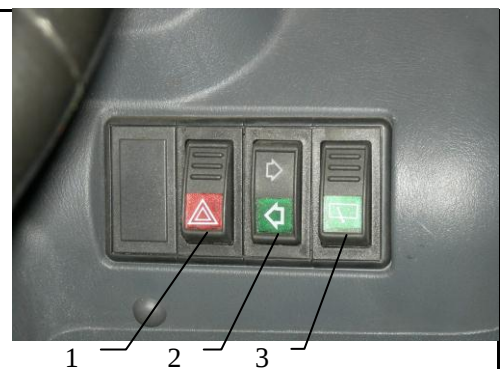


Figure 2-18 Right Rocker Switch Combination

Operation Description

Hazard Warning Switch

The hazard warning switch should be used in case of a tractor malfunction where the tractor is stopped in a potentially dangerous area.

“1” Position: Flashers on.

“0” Position: Flashers off.

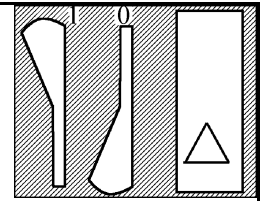


Figure 2-19 Warning Flashers Switch

Turn Signal Indicators Switch

“1” position: Turns on the left turn indicator.

“0” position: Turns off both turn indicators.

“2” position: Turns on the right turn indicator.

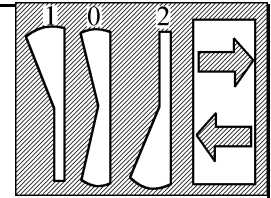


Figure 2-20 Steering Switch

Rear Windshield Wiper Switch (with optional cab)

“1” position: Turns on the rear wiper.

“0” position: Turns off the rear wiper.

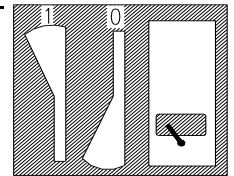


Figure 2-21 Rear Wiper Switch

Ignition Switch

Put the key into the ignition switch and turn it clockwise to the following positions:

- Turn the key to ACC (accessory) to enable the windshield wipers and other electrical accessories, depending on options installed on the tractor.
- Turn the key further to ON to turn on the tractor's electrical system.
- Turn the key to H to turn on the engine preheat plug.
- Turn the key to ST to start the engine. After the engine is started, release the key immediately. The key will return to the ON position automatically. Power supply for the entire tractor is on at this time.
- Turn key counter-clockwise to OFF. This will shut off all power to the entire tractor.

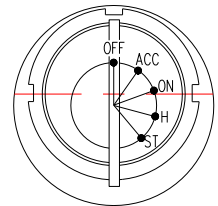


Figure 2-22 Ignition Switch

Horn

The horn is located on the steering wheel. It can be turned on by pressing down on the center cover plate of the steering wheel.

2.4 Starting the Engine

IMPORTANT ISSUES:

1. Before starting the tractor, inspect it for damage or loose parts that could cause an accident.
2. Check the radiator regularly and make sure that you have a clean water/antifreeze mix to avoid overheating of the engine.

2.4.1 Engine Starting Preparations

1. Before starting the engine, check to make sure that there are no loose parts, that each operating mechanism is functioning normally, that each hose or tube connection is tight and that there is no oil, fuel, or water leakage.
2. Check the engine oil pan, gearbox, rear axle and the hydraulic system to make sure that their lube oil levels are sufficient. The radiator should be full of cooling water and antifreeze and the fuel tank should have fuel.
3. Check the gearbox control lever and the power takeoff (PTO) shaft control handle. Make sure that the main shift lever, the high/low gear shift lever, the shuttle shift lever, and the front drive axle control handle are set in the neutral position. The 3-point lift lever should be set in the lowering position.
4. Before starting a new tractor or one that has been overhauled or not been in use for a long time, it is necessary to bleed the air from the fuel line to ensure that the diesel engine starts smoothly. The procedure is as follows: (1) Loosen the bleed screw on the fuel filter. (2) Bleed the air in the fuel line from fuel tank to the diesel fuel filter with a hand pump until there are no bubbles in the discharged fuel. (3) Tighten the bleed screw on the filter and loosen the bleed screw on the fuel pump to bleed out air until there are no air bubbles in the fuel. (4) Tighten the bleed screw on the fuel pump.
5. The Engine Throttle Handle should be in its center position and the accelerator pedal should be released.

IMPORTANT ISSUES:

1. Clean debris off the radiator regularly to avoid engine overheating.
2. If the tractor is equipped with a combine, heat buildup during operation will become a problem. To make sure that the engine performs properly, an auxiliary radiator needs to be installed on the tractor.

Operation Description

2.4.1.1 Check The Oil And Water Level And Related Components.

Check the engine oil pan, the gearbox, the rear axle and lube oil level for the hydraulic system.

There should be enough fuel in the fuel tank. Antifreeze should be added to the cooling system, if necessary.

IMPORTANT NOTE: When checking the oil level, the tractor should be parked on level ground.
You should check the lube oil on a regular basis to avoid damage to tractor parts.

Engine Oil Maintenance

Check the oil level in engine oil pan and top off as needed.

Oil level should be between the two graduations on the dipstick.



Figure 2-23 Engine Oil Level Maintenance

Gearbox/Rear Axle Oil Maintenance

The position of the oil filling port for the tractor gearbox and rear axle is shown in Figure 2-24. The oil level should fall between the two graduations on the dipstick.

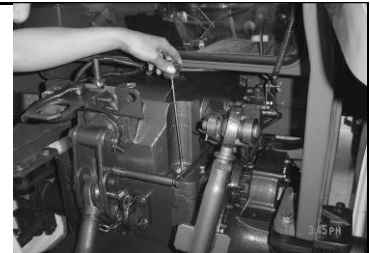


Figure 2-24 Gearbox/Rear Axle Oil Maintenance

Lifter Oil Maintenance

The position of the lifter oil filling port is shown in Figure 2-25.

Insert the oil gauge into the lifter cover. The oil level should be between the two graduations on the dipstick.

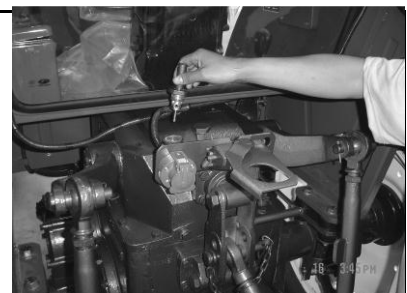


Figure 2-25 Lifter Oil Maintenance

Operation Description

Steering Oil Cylinder Maintenance

The steering oil cylinder is located under the cover on the front of the tractor. It should be filled when low.



Figure 2-26 Steering Oil Cylinder Maintenance

2.4.1.2 Fuel Tank Sediment Cup Switch

For proper sediment cup switch position, see diagram 2-27.



Figure 2-27 Sediment Cup Switch

2.4.1.3 Turn the hand throttle to set it to a semi-open status.

2.4.1.4 Check the operating handles of the gearbox and the power output shaft and put them in the neutral position, and hydraulic operating handle to the lowering position.

2.4.1.5 If the tractor is not in use for a long time or hard to start, the air discharge bolt on the high pressure oil pump should be loosened and the handle of the power output oil pump should be pressed down by hand until all the air in the oil pipe has been released.

After discharging the air, retighten the screw.

IMPORTANT NOTES:

1. Clean contaminant in the water tank screen regularly to avoid engine overheating.
2. If the tractor is equipped with a knapsack type cropper, when operating, heat radiation will become troublesome. To make sure that the engine performs at a high level, an auxiliary heat radiation device needs to be installed on the tractor.

Operation Description

Starting the Electromotor



NOTE: Before starting the engine, the main and auxiliary gear shift levers and front drive control handle need to be in the neutral position and the distributor control handle needs to be set in the lowering position to prevent the tractor from starting by accident and a loss of control.

2.5 Engine Start



WARNING: Before starting the engine, make sure that the main and high/low and shuttle gearshift levers and the front drive control lever are in the neutral position, and the 3-point lift control lever is in the lowering position. This will prevent the tractor from accidentally starting and causing an accident or injury.

IMPORTANT ISSUES:

1. Never turn the key for more than 5 seconds. If the engine does not start within 5 seconds, let the starter rest for 15 seconds and try again. You can do this three times. If the engine still doesn't start, you need to trouble shoot the problem to prevent damage to engine components.
2. Once the engine is started, ease up on the throttle immediately. Check the engine oil pressure at this time, the oil pressure gauge should read 275-345 kPa (40-50 psi).
3. Do not attempt to run at full-load immediately. It is necessary to run the engine at medium speed to warm it up. When coolant temperature is above 60°C (140°F), you can then increase the speed and operate the tractor with a full load.
4. The engine rpm and load should be varied between low and high speed, especially for a new engine. Do not attempt to run the tractor at high speed using the fuel throttle lever or the accelerator foot pedal.
5. When running the engine, the oil pressure and coolant temperature should be checked regularly. During the normal operations of the engine, the cooling temperature should be around 85°C (185°F) and the engine oil pressure should be 310 to 345kPa. (45-50 psi).

Starting the Engine in Ambient Temperatures (above 40°F):

When the temperature is above freezing, insert the key and turn it clockwise. Turn to ignition to the ON position to switch on the tractor electrical system. Step on the clutch pedal and then turn the key clockwise to ST to start the engine. After the engine is started, release the key immediately. It will automatically return to the ON position.

Operation Description

Starting the Engine in Low Temperatures (below 40°F):

When starting the tractor in low temperatures (below 40°F), use the engine preheater. Put the fuel throttle lever in the one-quarter throttle position, turn the key clockwise to H position and leave it on H for 15–20 seconds. Turn the key to the ST position to engage the starter. Release it immediately after starting and the key will automatically return to the ON position.

When working in a cold climate, consider having an engine coolant heater permanently installed in the engine to make cold weather starting easier.

Plug in the engine heater when the tractor is not in use.

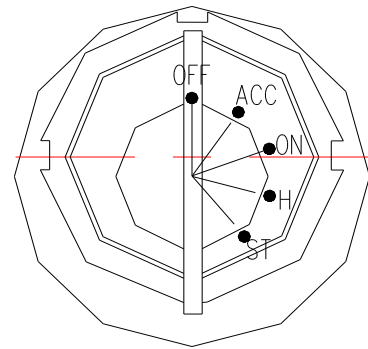


Figure 2-28 Ignition Switch

IMPORTANT ISSUES: In order to avoid damage to the engine, never let the oil pressure fall below 275 kPa (40 PSI). If the oil pressure is dangerously low, shut down the engine and troubleshoot the problem immediately.

2.6 Putting the Tractor in Motion

1. Set the shuttle gear shift to Forward or Reverse.
2. Set the range gear shift into the Low range.
3. With the engine running at low speed, step on the clutch pedal. Then, put the gear shift level in the desired speed. To prevent gear tooth breakage in the transmission or early clutch damage, do not start the engine in the High gear range.
4. Release the parking brake.
5. Gradually increase the engine speed and slowly release the clutch pedal until the clutch engages, then fully release the clutch to get the tractor running properly. Gradually accelerate to the required speed.
6. Always step on the clutch when changing gears to prevent damage to the transmission.
7. When driving the tractor on the road, make sure you use the turn signals to signal your direction and the horn to warn others. Lower your speed before making a turn and make the turn slow and early. If the turn is extremely sharp, slow your speed and take a wider angle.
8. When turning the tractor on a tight angle or on soft soil, steering becomes more difficult due to front wheel side slip. To make the turn easier, step on brake pedal on corresponding side while making the turn.



WARNING:

1. When running the tractor at high speed, never use the single-side brake for sharp turns. Use both brake pedals. If you hear an abnormal noise from the front wheel, the steering wheel needs to be adjusted so that you do not cause damage to the hydraulic steering system due to an overload.
2. When operating in the field, prior to turning or backing up, the parts and components of a towed implement need to be lifted clear of the soil to prevent equipment damage or injury.

2.7 Steering the Tractor

When driving the tractor on the road, press the turn signal switch on the control console to light the turn indicator, and then make the turn. If your speed is too high, slow down before making the turn and start the turn early. If you have to make a large turn, make the turn at a slow speed.

When turning the tractor tightly or on spongy-soft ground, you may experience some sideslip on the front wheel.

When this happens, step on the corresponding brake pedal and rotate the wheel to make the turn.

Operation Description

2.8 Shifting Gears With Optional 10+10 Shuttle Type Gear Shift (only used in tractors with shuttle gear shift 10+10)

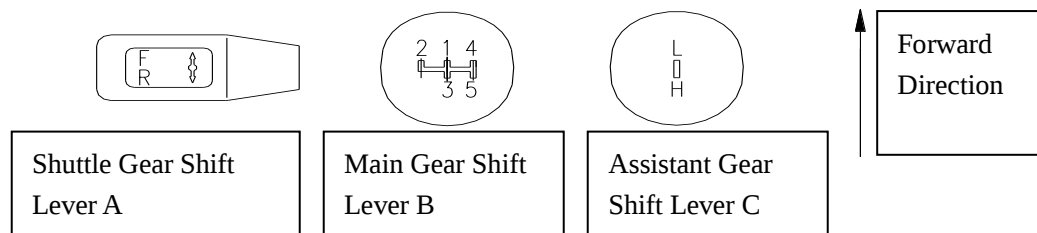


Figure 2-29 10+10 Gear Shift

Gear Lever Shift Description

The tractor transmission gears can be engaged with three control levers: the shuttle shift, the main gear shift, and the auxiliary gear shift to allow 10+10 shifts. Shuttle shift rod A can shift between forward and reverse. The main gear lever B can obtain 5 shifts, 1st through 5th, and the auxiliary gearlever C can run at two speeds, L-low speed, and H- high speed.

Gear Lever Instruction

1. Step on the clutch pedal and move the shuttle gear shift lever A away from the neutral position. Pull backward to shift into R (Reverse) or push forward to shift into F (Forward).
2. Step on the clutch pedal, push the main gear shift lever B to the left from neutral position and then push it forward for Gear 2. Pull back the shift lever to right middle neutral shift, and then push forward to Gear 1. Pull straight back for Gear 3. Go back to neutral and from the neutral position, push the shift lever to the right and then push forward for Gear 4, and pull straight back for Gear 5.
3. Step on the main clutch pedal, push forward assistant gear shift lever C from the neutral position to low speed range L. Pull the gear shift back for high speed range H.
4. Select the operating speed of the tractor based on getting optimum productivity, economy and longevity of service life from your tractor. When working, the tractor should not be overloaded. The engine should have a certain power reserve. When working in the field, you should have an 80% working load. When the tractor is doing light-duty operations at a low speed, high shift 1 can be used to save fuel oil by throttling down.

Operation Description

IMPORTANT ISSUES:

1. When the engine is in idle, step on the clutch pedal to disengage the clutch. This will help you to avoid damaging gears in the gearbox.
2. Always step on the clutch before shifting any of the gear shift levers.
3. Never shift into reverse until the tractor is at rest, to avoid damage to the gears.
4. When the tractor is running, never place your hand on the gear shift lever. Pressure on the gear shift fork is felt in the gear box and can result in premature wear of the gears.

2.9 Differential Lock Operation

If the tractor should become stuck or should one rear drive wheel slip, you can lock in the differential and connect the right and left drive shafts. Step on main clutch pedal, and shift the high/low shift lever into the low range.

1. Move the throttle control lever to the high speed position.
2. Step on the differential pedal.
3. Release the clutch pedal smoothly for stable operation.
4. After getting unstuck or stopping the skid, the differential lock will automatically release.



Figure 2-30 Differential Lock

IMPORTANT ISSUES: Never use the differential lock when driving the tractor normally as this can cause damage to components and accelerate tire wear.

2.10 Front Axle Drive Operation

The NorTrac 70XTC series of 4-wheel drive tractors can be used for normal operations in the field and on wet and soft soil. If only rear wheel drive is used, the traction may be insufficient. When this happens, connecting the front drive axle will increase the traction of the tractor and reduce slippage. In order to connect and disconnect the front axle drive, the following operation sequence should be followed:

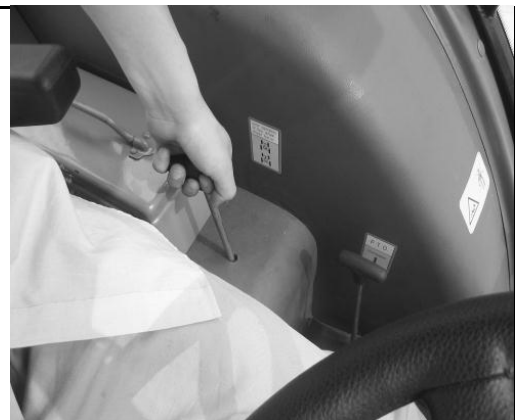


Figure 2-31 Front Drive Axle Control Handle

Connecting the Front Axle Drive

Step on the main clutch pedal. Put the tractor in a low forward gear.

Operation Description

Release the clutch pedal slowly. After the tractor moves a little, immediately pull the front drive axle control handle backward to change the two-wheel drive into four-wheel drive.

Disconnecting the Front Axle Drive

Step on the clutch pedal. Push the front drive axle control lever forward to disconnect the front drive axle.

IMPORTANT ISSUES: When driving the tractor on a hard-surface road, never connect the front drive axle. Engaging the front drive axle will cause front wheel wear and tear and increase fuel consumption. The front drive axle should only be connected on roads when the road surface is slippery or when climbing a steep slope on rainy and snowy days. Once the tractor is back on a stable surface or past the obstacles, disengage the front drive axle.

NOTE: When driving on a hard road, the front wheel tires will wear rapidly and the left and right sides of tire tread patterns will be worn unevenly. For this reason, it is a good practice to switch the left and right tires on occasion.

2.11 Tractor Braking

2.11.1 Tractor Braking

When braking, use this approach:

- Decrease the throttle, step on the clutch pedal and then step on the brake pedal gradually to stop the tractor.
- In an emergency, step on the clutch and brake pedal simultaneously. Never step on brake pedal without disengaging the clutch to prevent excessive clutch wear and prevent the engine from stalling.
- When driving the tractor on the road, lock the left and right brake pedals together with the lock plate.



Figure 2-32 Tractor Braking

2.11.2 Left/Right Brake Pedal Interlock



WARNING:

1. Check for proper brake function before operating the tractor. Brake failures can result in accidents, damage and seriously bodily injury.
2. Prior to operating the tractor, check the oil level in the brake oil cylinder and the brake pipe for leakage, and troubleshoot if necessary. This will help prevent a potential brake failure.
3. When driving the tractor on the road, the left and right brake pedals must be interlocked to prevent tractor from pulling to one side when braking, and prevent a possible rollover accident.

2.12 Stopping the Tractor and Engine Shutdown Procedure

1. Throttle down to decrease the tractor's running speed.
2. Step on the clutch pedal and then the brake pedal. When the tractor stops, set the shift lever in to the neutral position. The auxiliary shift lever (high/low gear range selector) and the shuttle shift lever (forward and reverse) can be left where they are.
3. Release the clutch and brake pedal, and reduce the throttle so that the engine runs at idle.
4. Pull the fuel shut-off cable knob, which stops the fuel pump from supplying fuel to the engine. The engine will stop.
5. Turn the starting switch key to the OFF position and shut down all power to the tractor.



WARNING:

1. Never leave the tractor unattended when the engine is running. The tractor could reengage and start moving.
2. When parking the tractor on a slope, the gear shift should be engaged (Shift Forward on uphill and Shift Backward on downhill) to prevent the tractor from rolling.

2.13 Tire Assembly and Disassembly

2.13.1 Tire Use

- The tires are important parts of the tractor. Attention should be paid to their use and maintenance in order to prolong tire service life.
- All of the tires have specified load values. An overload will deform the tire. The sidewall will bend excessively, and possibly rupture. The fabric of the tire body, as well as the cushion layer, also deforms easily. The fabric layer will become loose until the tire ruptures. This is especially true when the road surface is uneven or impacted by obstacles.
- The inflation pressure of the tires must conform to the specifications. Service life is affected when the tire pressure is too high or too low. If the pressure is too low, the tire will have excessive wear, and service life will be limited. Both inner and outer tires will wear more rapidly when pressure is low. When pressure is low, steering will be adversely affected. If the air pressure on the front tires is too low, steering will be difficult. If tire pressure is too high, the tire body fabric will be stretched excessively and more apt to rupture. The wear on the tire surface will be accelerated. The tractor vibration will be increased.

Operation Description

During field operations, the air pressure of the tire should be appropriately lower than when running on the road. Tire pressure is best checked under normal temperatures. Checking a tire when it is hot can result in an incorrect measurement. When driving the tractor, avoid jumping over obstacles at high speed, sudden braking or quick turning. When driving on gravel, spinning the tires should be avoided, when possible.

- During use, the tires should be kept clean of any oil, acid, alkaline chemicals or corrosives. Keep the tires out of bright sunshine and excessive heat as much as possible to prevent the rubber from degrading.
- The front wheel alignment and toe-in should be checked regularly. Failure to do so can result in excessive tire wear. When tire wear is non-uniform, the left and right tires can be switched.

IMPORTANT ISSUES: The inflation pressure for the front and rear tires on a 4-wheel drive tractor should be the same in order to prevent the tires from being worn unevenly.

2.13.2 Tire Removal and Refit

Tire Removal

Special tools are needed to assemble and disassemble a tire. Contact a qualified tire service center to replace tires.



WARNING:

1. When inflating the tire, never remove the lug nuts from the hub. This could cause the tire to fall off and may result in damage to the tractor and serious personal injury.
2. Never disassemble the bolts connecting the tire, the hub and rim in the inflated state. The bolts may become dislodged and cause an accident

2.14 Counterweight Use

2.14.1 Rear Counterweight Use

When using the tractor for field operations, you can use counterweights to improve the tractors traction and performance.

The weight of the casting iron counterweights for the rear of the tractor are 100 pounds a piece. The tractor can hold a maximum of 8 counterweights per wheel, for a total of 800 pounds of rear counterweights.



Figure 2-33 Rear Counterweight



WARNING: Before removing the rear wheel, with rear counterweights, from the tractor, first remove the counterweight from the tire to avoid an accident or injury.

2.14.2 Front Counterweight Use

In order to adjust the relation between front and rear axle loads of the tractor, it is necessary to install front counterweights.

The mass of the standard front counterweight frame is 45 kg (90) pounds.

You can select a maximum of 11 cast-iron front counterweight pieces, each one weighing 22kg. (48.5 lb.), for a maximum front counterweight load of 242kg. (534 lb.).



Figure 2-34 Front Counterweight

2.15 Driver's Seat Adjustment

The forward and backward position and firmness of the driver's seat are adjustable. For safety, the seat should not be adjusted to the point where it is too soft, or when the tractor is moving.

2.15.1 Forward and Backward Driver's Seat Adjustment

To adjust the seat, pivot the adjustment handle (1) beneath the outside right side of the driver's seat (see diagram). At the same time, move the seat forward or backward. Release the handle once the required position is reached



Figure 2-35 Forward/Backward Driver's Seat Adjustment

1. Handle

2.15.2 Driver's Seat Firmness Adjustment

Use the knob (1) behind the driver's seat back rest to adjust the firmness of the seat for the height and weight of the driver.



Figure 2-36 Driver's Seat Firmness Adjustment

1. Drivers Seat Knob

Operation Description



NOTE:

1. For safety, the seat should not be adjusted when the tractor is in motion.
2. Making the seat too soft can make running the tractor on uneven surfaces particularly challenging and cause a loss of sight lines.

2.15 Hydraulic Suspension, PTO, and Electrical System Operation

The Series 70XTC tractor uses a semi-separate hydraulic lifting system with two types of adjustment modes: position adjustment and height adjustment. The control handle of the control distributor valve is used to raise and lower farm implements. Push the handle forward to lower an implement; and pull it back to raise an implement. See “Hydraulic Lifting System Adjustment” for the adjustments to reach the maximum raising position and the minimum lowering position.

2.16.1 Implement Position/Height Adjustment

When the tractor is pulling a cultivator or a plow, a 3-point lift is used to adjust the tilling depth. The tilling depth is determined by the position of the lowering stopper in the reset push rod, which adjusts the height from the ground level to the plow bottom. When adjusting the stop on the 3-point lift, set the stop to the lower limit, and put the 3-point lift control handle in the low position. When the farm implement is lowered to the required depth (the adjustment method is shown in the **Adjustment on the Hydraulic Lift System** section), it will operate at the tilling depth.

NOTE: Adjust tilling depth (draft) control according to implement specifications.

2.16.2 Farm Implement Lowering Speed Adjustment

Select a suitable lowering speed for the farm implement to keep it from being damaged by heavy impact when it contacts the ground. Before delivery of the tractor, the descending speed regulating valve was adjusted.

The owner/operator can readjust the valve according to the weight of farm implement and ground hardness.

- To decrease the lowering speed of the farm implement, turn the adjustment valve (A) clockwise.
- To increase the lowering speed of the farm implement turn the adjustment valve (A) counterclockwise.

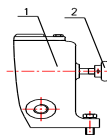


Figure 2-37 Farm Machinery Lowering Speed Adjustment 1. Lift Cover 2. Lower Speed Adjustment Handle

Operation Description

2.16.3 Application of the Hydraulic Output and Lock

- Turn the adjustment valve (B) in a counterclockwise direction until the valve is closed. This will also close the adjustment valve on the inlet and outlet of the oil cylinder. The male connector on the quick change coupler is connected with the oil inlet of the farm implement. The hydraulic output female connector (A) is connected with the male connector on the farm implement. Push the distributor control handle to the lifting position to reach the appropriate hydraulic output. Simple hydraulic output can only control a single-action oil cylinder.
- When using the hydraulic output, the farm implement should be in the lift position, if the lower speed adjustment valve (B) is closed and the oil in the tank can not return. The farm implement should be locked in the transport position and the adjustment valve can act as the hydraulic lock.



WARNING: When transporting implements in the raised position over long distances, the hydraulic lock should be used to lock the implements in place. This will prevent an accidental move of the distributor control handle from making the farm implements drop suddenly and cause damage.

2.16.4 Hydraulic Control Levers

There are three levers that control the hydraulic system for farm implements towed by the tractor.

- Control lever C controls the first hydraulic control loop (quick disconnects A1 and B1).
- Control lever D controls the second hydraulic control loop (quick disconnects A2 and B2).
- Control Lever E is the 3-point control lever.



C — D — E —

Figure 2-38 Hydraulic Control Levers

2.16.5 Use of Multiway Valve

- Shut off the engine.
- Put the lifter in the lowering position.
- Move the hydraulic output valve operation handle forward and backward, in order to eliminate the pressure in the hydraulic quick disconnect.
- Remove the seal cover of the quick disconnects to be used and clean the connectors.
- Connect a hose with a male connector into the female end of each quick disconnect on the valve. Connect the other ends of these hoses to the oil inlet and outlet of the double-acting oil cylinders on the farm implement. The multi-way valve has four female connectors (A1, B1, A2, and B2). A1 and B1 form the first group of the hydraulic output loop and are controlled by control lever C. A2 and B2 form the second group of the hydraulic output loop and are controlled by control lever D.

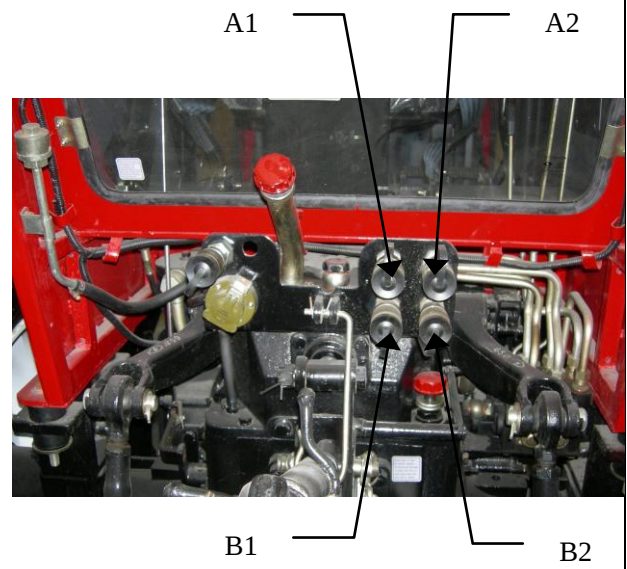


Figure 2-39 Multiway Valve

IMPORTANT ISSUES:

1. When a quick disconnect is not used, the connector seat should be covered with a seal cover to avoid dust.
2. After the hydraulic output device is used, the operating handle should be set to the neutral position, otherwise the hydraulic system may overheat.

Operation Description

2.16.6 Adjustment of the Hydraulic Lift System

When plowing, in order to keep the tilling depth of all the plowshares consistent from beginning to end, the longitudinal and horizontal level adjustments need to be used.

- Longitudinal level adjustment: Adjust the length of the upper tie rod (A) to keep the plow frame level in the longitudinal direction, so as to make the tilling depth of all the plowshares the same. When the front plowshare is deep and the rear plowshare is shallow or the heel leaves the trench bottom, the upper tie rod should be lengthened. When the front plowshare is shallow and the rear plowshare is deep or the heel compacts the trench bottom, the upper tie rod should be shortened.
- Horizontal level adjustment: Adjust the length of the left and right lifting rods to keep the plow stock level in the horizontal direction. If the right lifting rod (B) is lengthened, the tilling depth of the first plowshare will be deeper. If the right lifting rod is shortened, the tilling depth of the first plowshare will be shallower. In general, the left lifting rod (C) should not be adjusted. The left lifting rod is adjusted only when the adjustment of the right lifting rod is not enough, so as to make the tilling depth of all plowshares the same.
- Plowing Width Adjustment: Tilling width is adjusted mainly through the tilling width regulator. Front and rear relative position for the left and right suspension points can be changed by lowering the plow width regulator. The working width will then be increased when the right suspension point moves forward; otherwise the tilling width will be decreased. You can adjust the device for the furrow width to ensure the plow frame is aligned, which will help to avoid repeating or missed furrowing.

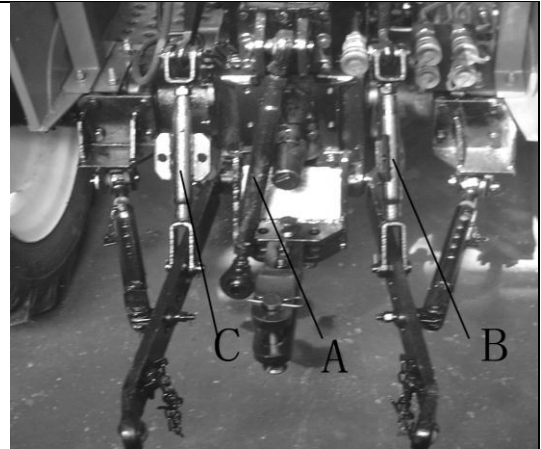


Figure 2-40 Suspension Mechanism

IMPORTANT ISSUES:

1. When plowing, never adjust the traction of the farm machinery by adjusting the limit rod. Instead, reduce the number of bottoms (plowshares) to match the tractor's pulling capacity. This will help you avoid damaging the suspension mechanism.
2. In order to avoid damage to the implement suspension mechanism when plowing, the tractor should never be turned without lifting the farm implement it is towing.

2.16.7 Sway Bar Adjustment

The sway bars are mainly used to prevent impact on the rear wheels of the tractor caused by an overlarge swing of the lower tie rod when the tractor turns around at the end of a field with a lifted farm implement in tow. When the farm implements are in the plowing position, the sway bars are in a loose state. Therefore, a certain amount of swing between the tractor and the farm implement is allowed.



NOTE:

1. When moving the tractor and an attached implement over long distances, the height of the implement should be adjusted to its lowest level by using the adjustable 3-point arm. The adjustable limit rod should also be used to keep the machinery from swinging to the right or left during transport.
2. The nuts for the adjustable 3-point arm and the limit rod should also be tightened to prevent wide swings of the implement during transport.

IMPORTANT ISSUES:

1. When a fast change coupler is not used, the seat hole should be protected with the spare dust cover.
2. The lifter and the hydraulic output valve cannot be operated at the same time.
3. After setting up the auxiliary hydraulic output connection, the operating handle should be set in the neutral position; otherwise, the hydraulic system could overheat.
4. The draft position control lever can control the 3-point hitch.
5. During the course of operation, only one lift handle should be used, and the other one set in the lifting position.



WARNING:

Do not overload the tractor during traction operation or with a trailer. This can result in a loss of performance and may shorten the service life of the tractor.

When braking, the trailer brake will apply slightly earlier than the tractor brake to prevent the load from overturning.

2.16.8 Power Take Off (PTO) Shaft Use

To connect and disconnect power to the power take off (PTO) shaft the double-acting clutch, the PTO gear shift handle, and the PTO disconnect control handle are used. When the clutch pedal is pushed down part way it disconnects the engine clutch, and when it is pushed down all the way down it disconnects the PTO clutch. When the PTO gear shift handle is pushed forwards, it will be in high gear. When the PTO handle is pulled backwards, it will be in low gear. Use the following method:

- Remove the rear hitch (only when using the 3-point configuration) and the protective cover on the power take off (PTO) shaft and connect the farm implement drive to the PTO shaft on the tractor.
- Depress the clutch pedal to the floor to disconnect the PTO clutch and put the PTO gear shift handle in the required position (high or low).
- Depress the clutch pedal to the floor again and turn the PTO disconnect control handle to the “connected” position.
- Release the clutch pedal slowly. First operate with the throttle at low speed to check whether the PTO is working properly, and then start working.
- When repeated work in the same place within a short time frame is required, step on the clutch pedal gently to disconnect the main clutch. This cuts off the power to the tractor transmission, and the tractor stays in one place while the farm implement behind it can still work normally.
- To disconnect the PTO depress the clutch pedal to the floor and turn the PTO disconnect control handle to the “disconnected” position. The PTO gear shift handle does not need to be moved. The PTO shaft will stop turning.
- After disconnecting the farm implement from the PTO shaft, reinstall the protective cover over the PTO shaft. Replace the rear hitch if it had been removed.

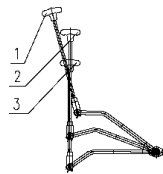


Figure 2-41 Power Output Device Operation

1. High Gear 2. Neutral gear 3. Low Gear



WARNING: Do not attach or detach anything from the PTO shaft while it is turning. Attempting to do so can cause damage to the equipment and serious injury.

2.16.9 Electrical Equipment Use

The electrical system of the 70XTC Series Tractor uses a 12V double wire system with a negative ground.

2.16.9.1 Battery

The battery is used to store the electrical energy produced by the alternator. The battery can then supply electrical power to the electrical equipment on the tractor when the alternator is not turning or is running at low speed. It can also help with the power supply when the alternator is overloaded for a brief period.

- Frequently remove the dust and mud on the battery shell to avoid electric leakage. Check whether there are any cracks in the battery case and/or leakage of electrolytes. Ensure good contact between the terminals and the battery cables. The air vent on the plastic cover should not be blocked in order to avoid an explosion.
- Frequently check the battery voltage. Charge it when the voltage is low.
- The starter cranking time should not exceed 5 seconds each time to avoid excessive discharging.
- If the tractor is not used for a long time, the battery should be removed for charging and maintenance.

2.16.9.2 Alternator

- The alternator must be used with a matching regulator.
- The silicon rectification alternator is minus “—” grounded. The connection of the positive and negative poles of the alternator, the regulator and the battery must be correct to avoid burnout of the alternator and the regulator.
- Do not strike sparks to determine whether the alternator is generating electricity.
- Remove the key from the ignition switch when the tractor is stopped to cut off the connection between the motor and the battery and prevent the battery from discharging over an extended period of time.

2.16.9.3 Starter

- The starter should not run for an extended period. The starting time should not exceed 5 seconds each time to avoid damage to the starter.
- If a grinding sound (teeth colliding) between the small gear on the starter and the flywheel ring gear is heard when starting, turn the key back to its original position immediately and try again.
- If the starter continues running after the key is back to its original position, shut down the engine immediately and start again after the fault is remedied.

Operation Description

2.16.9.4 Auxiliary Electrical Equipment

- The fuse box: has 15 fuses, total, 7 for normal use, and the others for spares. Fuses are used to protect electrical equipment. Replace burned out fuses immediately. Each fuse's rating should coincide with the requirements on the electrical schematic. When a fuse burns out, it is necessary to troubleshoot the cause immediately. Do not substitute a fuse with a higher or lower rating, as this can result in damage to the electrical system.
- The ignition switch is used to turn on the electrical system and preheat and start the diesel engine. Put the key into the ignition switch, turn the key clockwise to the ON position and switch on the electrical system. Turn the key further clockwise to H and switch on the engine preheater. Turn the key still further clockwise to ST engage the starter. After the diesel engine is started, release the key and it will return to the ON position automatically. During normal operations the key is always in the ON position. When the tractor will not be used for a long time the key should be removed from the ignition switch.
- Rear Trailer Socket: For powering the trailer taillights when the tractor is equipped with a trailer, the tractor is equipped with a rear trailer electrical socket. For the socket wiring layout, please see the system electrical schematic.

2.17 Tractor Upper Chassis

The tractor upper chassis includes the following: the hood, the cab (optional), the fenders, the instrument console, the driver's seat, the floor mats, and various attachments.

2.17.1 Tractor Hood

The engine hood for the tractor has an ergonomic streamlined shape. It protects the engine and radiator.

2.17.1.1 Unlocking the Tractor Hood

Pull the handle on the lower left corner of the tractor hood and the tractor hood will unlock and slowly lift upwards through the use of air springs.



Figure 2-42 Opening the Tractor Hood

Operation Description

2.17.1.2 Locking the Tractor Hood

Pull the hood down, either directly or with the strap that keeps it from opening too far. When the hood lowers into the right position it will automatically lock in place.

Figure 2-43 Locking the Tractor Hood



2.17.2 Instrument Console

The electrical control switches and the tractor instrument panel are mounted on the instrument console

Figure 2-44 Instrument Console



2.17.3 Cab (optional)

The cab frame has a welded steel tubing frame. It has large windows on all sides, including in both doors and in the lower parts of the front and rear panels. It offers the driver protection against the weather and greater comfort while operating the tractor. It has an HVAC system (heating, ventilating, and air conditioning), an interior light, front and rear windshield wipers, and a top hatch for ventilation and emergency exiting.

2.17.3.1 Cab Interior

The cab interior includes the inside portions of the fenders, the seat, the windows, the floor mats, the instrument panel and control levers, and the inside roof lining. The space is designed for the driver's comfort and efficiency, and for unobstructed views in all directions.



Figure 2-45 Cab Interior

2.17.4 Cab Doors

The door has a contoured frame of steel tubing that holds a large glass window.

When opening the door, turn the key (1) clockwise.

Remove the key, grasp the door handle (3), and press down with your thumb on the button (2).

Turn and pull the outside handle (6) and the door will open.

When closing the door, latch and lock the door in the reverse order.

When opening the door from inside the tractor, lift up the handle (5), and at the same time, push the door outward.

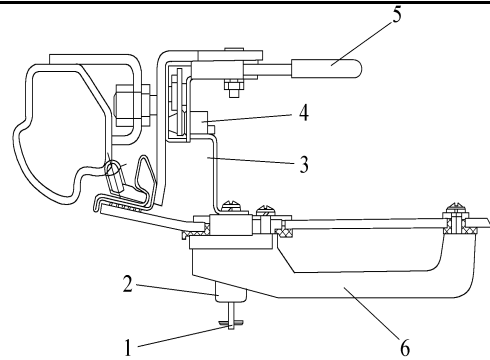


Figure 2-46 Door Diagram

1. Door Key 2. Door Lock 3. Bracket

4. Fastening Screw 5. Start handle 6. Door Handle

2.17.5 Cab Windows

The windows feature a full steel frame. When opening, first lift the lock handle. At the same time, push out the window and slightly pull the lock handle upward.

The side windows can be opened within a limited range.

The maximum distance of side window is the lock limit handle's efficient length.

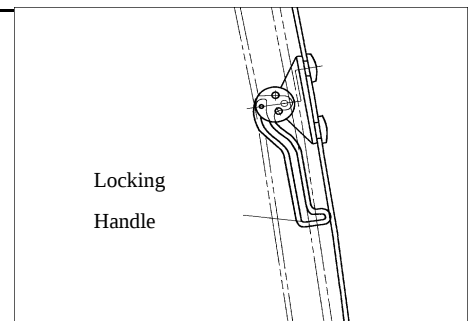


Figure 2-47 Right/Left Window

2.17.6 Cab Top Hatch

The cab top hatch is made of fiberglass. When opening, hold the handle and press it with your thumb.

Press the top hatch lock button and it will unlock automatically.

Lightly push the cab top hatch up, on the right and left sides.

The hatch has a spring action, and opens automatically.

When closing, operate in reverse order.



Figure 2-48 Cab Top Hatch

2.17.7 Cab Rear Window

The tractor cab rear window is a semi-automatic upward

Opening type. There are two opening positions;

normal and maximum.

● **Normal Position:** Rotate the handle (1). When the front part of the handle protrudes, push the handle until the bulge on the rear of the handle reaches the slot. Rotate the handle (1) allowing the bulge to slide into the slot. When this is done, the rear window can be opened and kept at a certain angle.

When closing, operate in the reverse order.

Maximum Position: Place the handle (1) so that the front of the handle slides out. Once the handle is in position, push the handle outside until the pulling force of the air spring (2) is overcome.

The gas spring (2) immediately changes to pushing from pulling.

The rear window can be opened automatically to the maximum position. When closing, the handle should be pulled inwards, resisting the pushing force of the air spring (2). The air spring (2) will change to pushing from pulling.

The rear window automatically closes when you turn the handle. Once closed, slide the bulge in to the slot and in to the locked position.



Figure 2-49 Rear Window Diagram

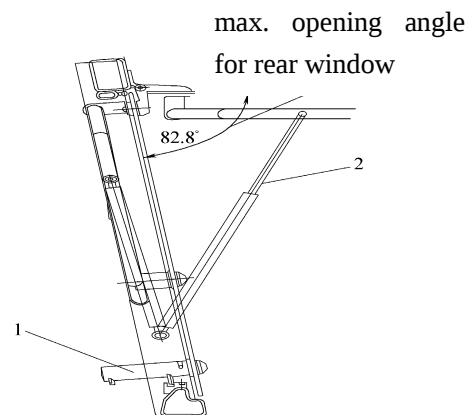


Figure 2-50 Rear Window

1. Handle 2. Air Spring

2.17.8 Driver's Cab HVAC

There are two air outlets installed in cabs with HVAC (heating, ventilation, air conditioning).

The cover plate at the air outlet can be used to adjust the airflow and direction of the air. These controls are located on the left side of the air conditioner.

The air conditioner control panel has the following controls:

Operation Description

Individual Ventilation Control

- Close the water inlet/outlet switch of the engine heater.
- Close the compressor switch on the left side of the control plate.
- Adjust the airspeed by using the switch in the middle of the operator panel for outside vented air.



Figure 2-51 Air Conditioner Vents

Air Conditioner Controls

- Close the water inlet/outlet switch of the engine heater.
(see air conditioning operational instructions for location)
- Open the compressor switch on the left side of the control plate to get full cooling.
- The compressor will work to blow cool air into the drivers cab.
- Turn the temperature control switch on the right of the control plate to adjust the temperature.
- Adjust the fan speed with the switch in the middle of the control panel.



Figure 2-52 Air Conditioner Control Panel

Heater Controls

- Close the compressor switch on the left side of the control plate.
- Open the water inlet/outlet engine heater switch to start circulating hot water to the heater. This will increase the cab temperature.
- Adjust the fan speed with the switch in the middle of the control panel.

2.18 Tractor Break-In

Before using the tractor, it should be run for a certain period under the condition of a specified lubrication, rpm and load. The tractor should be checked, adjusted and maintained. This procedure is called break-in.



WARNING: Learn how to operate and control the tractor, before starting the running in process.

IMPORTANT ISSUES: Breaking-in needs to be done before any new or overhauled tractor can be put into use. Operating a tractor without first performing the running in procedure can shorten the service life of the machine.

2.18.1 Break-In Preparations

- Check the exterior bolts and nuts of the tractor, and tighten them if necessary.
- Fill each lubrication point with grease according to the Lubrication Chart.
- Check the oil level in the engine oil pan, transmission,-rear axle, lifter, front axle and the steering oil cylinder according to the lubrication chart.
- Fill the fuel tank with diesel fuel.
- Check the radiator for coolant and check the water/antifreeze mixture is 50/50, using a hydrometer.
- Open the fuel shutoff lever.
- Check tire air pressure in all four tires.
- Check the electrical circuits for a good connection.
- Each operating handle should be in the neutral position and the hydraulic handle should be in the lowering position.

2.18.2 Engine Idle Break-In

- Start the engine in the sequence specified in this Operation Manual. After starting, run the engine at idle for 5 minutes to make sure that it is in good working condition, and then gradually increase rpms.
- During engine break in with no load, check the tractor to make sure that there are no abnormal noises or water, oil or air leaks. Check the readings for the various instruments. If anything appears abnormal, stop and troubleshoot the problem immediately.
- Run the engine at idle for 30 minutes.

2.18.3 Power Output Shaft Break-In

- The engine throttle control handle should be set in the medium position and the engine should be run at medium speed. Turn the power output shaft on so that it runs at low speed and high speed respectively for 5 minutes each. Check for normal operation.
- The power output shaft should be put in neutral position after break-in.

2.18.4 Hydraulic Suspension System Break-In

Start the engine and operate the lifter handle to lift the suspension mechanism up and down several times to make sure that the hydraulic system is operational. Put some weight on the suspension system (500 kg. or less) and raise and lower the mechanism 25 times or more.

Operation Description

2.18.5 Break-in – No Load

- After breaking-in with the power output shaft and the hydraulic suspension, the entire tractor should be run in. During idle break-in, make turns at low speed using the single-side brake and also test the emergency brake at high speed. The break-in sequence and time required should be done in accordance with the specifications defined in table 2-2.
- While performing break-in operations, the rotary speed of the engine should be 1500 rpm. During break-in, pay attention to the following:
- Check to see if the electrical equipment and the readings for various instruments are normal.
- Make sure that the engine is running normally.
- Check to see that the clutch engages smoothly, and disengages completely.
- Make sure that the shifting is easy and flexible and that it stays in gear.
- Check the brakes for proper function.
- Check the Differential Lock engagement and disengagement.
- That the engagement/release of the front axle is reliable.
- If any faults are found, troubleshoot immediately before continuing the running in process.

Table 2-2 . 10+10 shift tractor shift and idle break-in time comparison table

Shift Number	Forward Low I	Forward Low II	Forward Low III	Forward Low IV	Forward Low V	Forward High I	Forward High II	Forward High III	Forward High IV	Forward High V
Break-In Time [min]	30	30	30	30	30			30	30	
Shift Number	Low Reverse I	Low Reverse II	Low Reverse III	Low Reverse IV	Low Reverse V	High Reverse I	High Reverse II	High Reverse III	High Reverse IV	High Reverse V
Break-In Time [min]	30	30	30	30	30		30	30		

2.18.6 Break-In – With a Load

Load break-in should be performed only after the mechanical condition of the tractor has been thoroughly checked during idle break-in. The load should be from low to high with the speed going from low to high.

The running in sequence and the time should be done in accordance with the break-in specifications defined in tables 2-3.

Operation Description

During break-in, pay attention to the following:

- Check to make sure that the electrical equipment and the readings for various instruments are normal.
- Make sure that the engine is running normally.
- Check to see that the clutch engages smoothly, and disengages completely.
- Make sure that the shifting is easy and flexible and that the transmission stays in gear.
- Check the brakes for proper operation.
- Make sure that the differential lock engages and disengages.
- Make sure that the engagement/release of the front axle is reliable.
- If any faults are found, stop the running in process until the trouble can be fixed.

Table 2-3. 10+10 Shuttle Shifting Tractor Load, Throttle Opening, Shift Number and Load Break-In Time Comparison Table

Loading	Throttle Opening Degree	Running In Time for Each Shift						Total hr
		Forward Low V	Forward High I	Forward High II	Forward High III	Forward High IV	Forward High V	
Trailer Capacity 3t	3/4	3	3	4	4	2	2	18
Trailer Capacity 6t	Full open	4	4	4	4			16
Plow [Tilling Depth (16–20cm.)]	Full open	7	6	6				19

2.18.7 Technical Maintenance after Break-In

After break-in is completed, there may be some metal dust and contaminants mixed in with the lube oil of the drive system, lubrication system and hydraulic system of the tractor. The systems should be cleaned and refilled with fresh oil. The tractor should not be put in to normal operation until all of the technical maintenance is completed.

Perform technical maintenance as follows:

1. Drain lubrication oil in the engine oil pan shortly after shutting down the tractor, while the oil is still warm.
Replace the oil filter and refill the engine with new oil. Replace the diesel fuel filter and clean the air filter.
2. Maintain or adjust the diesel engine according to Diesel Engine Instruction.
3. Drain any lubricating oil in the gearbox-rear axle housing while it is warm and refill with new lube oil.
4. Drain the hydraulic oil in the hydraulic lifter and the steering oil cylinder while it is warm. Fill both places with new hydraulic oil.
5. Replace the 50/50 water/ antifreeze in the cooling system.
6. Fill each lubrication point with grease according to the Lubrication Chart.

Operation Description

7. Check the front wheel toe-in and the free stroke of the clutch/brake pedal, and adjust if necessary.
8. Check and tighten all of the exterior screws, bolts and nuts.

IMPORTANT NOTE: The length of clutch release pull rod should be checked and adjusted frequently to ensure that clutch pedal has 40–4 mm. free stroke, and a 2.5 mm. clearance exists between the clutch release bearing and the three release lever fingers. Otherwise, the clutch release bearing and friction disk will heat excessively.

Operation Description

2.19 Tractor Common Faults and Troubleshooting

2.19.1 Clutch Faults and Troubleshooting

Table 2-4 Clutch Faults and Troubleshooting

Fault	Causes	Solutions
The clutch slips	(1) The clutch plate and pressure plate are dirty or greasy (2) The clutch plate is excessively worn or burnt (3) The Belleville spring pressure is too low (4) The free play of the pedal is too small or there is no free play (5) The clutch fingers are badly deformed	(1) Clean with solvent. Find the cause and eliminate the fault (2) Replace the clutch plate (3) Replace the spring (4) Re-adjust the free play of the pedal according to the specifications (5) Replace the clutch fingers
The clutch does not disengage completely, and noise is heard when it is engaged	(1) The free play of the pedal is too large and the working play is too small (2) The clutch fingers are excessively warped (3) The heads of the three clutch fingers are not in the same plane	(1) Adjust the free play of the pedal according to the specifications (2) Replace the clutch fingers (3) Adjust according to requirements
The tractor shakes when starting	(1) The heads of the three clutch fingers are not in the same plane (2) The clutch plate and the clutch fingers have grease on them (3) The clutch fingers are warped (4) The fastening screw for the flywheel and the clutch has come loose	(1) Make adjustments according to requirements (2) Clean the friction plate and the clutch fingers with solvent (3) Replace the clutch fingers (4) Stop the tractor immediately and repair the fault
When the main clutch is disengaged, the power output (PTO) shaft stops rotating	(1) Not enough clearance between the upper adjustment bolt head of the main pressure plate and the projecting lug on the auxiliary pressure plate	(1) Adjust according to requirements
The power output (PTO) shaft does not stop rotating when the clutch is depressed	(1) Too much clearance between the upper adjustment bolt head on the main pressure plate and the projecting lug on the auxiliary pressure plate (2) The three grooves for locating the auxiliary pressure plate lug into the clutch cover are too shallow	(1) Adjust according to requirements (2) Add shims to bring into adjustment

Operation Description

2.19.2 Gearbox Fault and Troubleshooting

Table 2-5 Gearbox Faults and Troubleshooting

Fault	Causes	Solutions
Putting the tractor into gear is difficult or impossible	(1) Clutch has not disengaged completely (2) Gearshift interlocking rod is too long (3) The shift lever fork is severely worn (4) The end face of the engagement sleeve or the end face of the gear is worn or broken	(1) Troubleshoot according to the clutch type (2) Shorten the gearshift interlocking pull rod (3) Replace the shift lever (4) Replace or repair
Gearshift disengages automatically	(1) The gearshift interlocking rod is too short (2) The locating slot of the shifting fork shaft is severely worn (3) The spring pressure of the interlocking latch is insufficient (4) The bearing on the gear shaft is worn, making the shaft tilt (5) The spline of the tooth holder is worn	(1) Lengthen the gearshift interlocking pull rod (2) Replace the shift fork (3) Adjust or replace the interlocking pin spring (4) Replace the bearing (5) Replace the tooth holder
Random gear shifting	(1) The shift lever fork is worn (2) The gear guide plate is severely worn (3) The fork slot of the shifting fork and the meshing bush are worn (4) Locating pin of interlocking pin and shift fork is severely worn	(1) Repair or replace the shift lever (2) Replace the gearbox guide plate (3) Replace the shifting fork and the meshing bushing (4) Replace the interlocking pin and the shift fork shaft
Noise or impact sound from the gear box	(1) The gear is excessively worn and/or the tooth surface has chipped off (2) The bearing is badly worn or damaged (3) The lubricating oil is insufficient or oil quality does not conform to the specifications	(1) Replace the gear (2) Replace the bearing (3) Fill or replace lube oil
Oil goes into gearbox body or clutch housing	(1) Failure of the rear oil seal of the engine crank shaft (2) No. 1 bearing oil seal seat or No. 1 transmission shaft failure	(1) Replace (2) Replace
Oil coming from gear shift lever	(1) Plugged air filter element for the rear axle or for the gearbox cover	(1) Clean or replace filter

Operation Description

2.19.3 Rear Axle Faults Troubleshooting

Table 2-6 Rear Axle Faults and Troubleshooting

Fault	Causes	Solutions
Increased noise in the central drive	(1) The bearing play of the small conical gear is too large (2) Gear engagement is abnormal (3) The bearing of the conical gear pair or the gear pair is damaged (4) The differential shaft is worn or locked (5) The planetary gear or gasket is worn (6) The differential bearing is worn or damaged	(1) Adjust according to requirements (2) Readjust according to requirements (3) Replace the bearing or the gear (4) Replace the differential gear shaft (5) Replace the planetary gear or gasket (6) Replace the differential bearing
Small conical gear and the differential bearing overheat	(1) The pre-load force is too high (2) Oil level is low - poor lubrication (3) Backlash at gear pair side of conical gear is too small	(1) Readjust the pre-load force of the bearing (2) Check the lubricating oil level and add if necessary (3) Readjust the gear backlash
Abnormal noises from the final drive	(1) The bearing, gear or shaft is damaged	(1) Replace the bearing, gear or shaft
Differential lock handle does not return	(1) Failure of the differential lock return spring (2) Differential lock push rod stuck	(1) Replace (2) Dismantle, clean or de-burr

2.19.4 Brake Faults Troubleshooting

Table 2-7 Brake Faults and Troubleshooting

Fault	Causes	Solutions
No brakes	(1) The free play of the brake pedal is too large (2) The brake shoes are severely worn or warped (3) The engagement of the brake pedal is misadjusted (4) Oil on the brake shoes (5) Brake shoes are worn	(1) Readjust the free play of the brake pedal (2) Replace the brake shoes (3) Adjust the engagement of the brake pedal according to the specifications (4) Check or replace brake cylinder oil seal (5) Replace brake shoes
Brakes get hot	(1) The brake shoes do not return (2) The brake shoes do not completely disengage from the brake drums	(1) Replace the return spring (2) Make adjustments according to requirements
The tractor pulls in one direction when braking	(1) The free play of the left and right brake pedals are not the same (2) The brake shoes on one side are damaged	(1) Adjust (2) Replace the brake shoes (3) Check and inflate the tires

Operation Description

	or worn unevenly (3) The air pressure of the two rear tires is not the same	according to the specifications
Brakes do not completely disengage	(1) Brake pedal free play is too small (2) Brake return spring failure (3) Inadequate clearance between brake shoes (4) Brake pedal not returning	(1) Adjust (2) Replace (3) Adjust (4) Check the return spring

2.19.5 Four-Wheel Drive System Faults and Troubleshooting

Table 2-8 Front Drive Axle Faults and Troubleshooting

Fault	Causes	Solutions
The front tire has excessive wear	(1) The rim or the radial plate of the front wheel is deformed (2) The toe-in has been improperly adjusted (3) The bearing pins of the steering knuckle and the oil cylinder are severely worn (4) The tire pressure is too low (5) The front drive axle does not disengage during operation (6) The drive tread of the front tire is mounted backwards	(1) Align the front wheel rim or the radial plate (2) Adjust the toe-in (3) Replace the bearing pin(s) (4) Inflate the tires according to the specifications (5) Disengage the front drive axle or repair it (6) Reinstall the tire according to requirements
The front wheel shakes	(1) The fastening nuts and bolts for the ball pins, oil cylinder and the steering arm are loose (2) The toe-in has been improperly adjusted (3) The clearance of the bearing is too great, or the bearing is severely worn (4) The rim of the front wheel is severely deformed	(1) Check and tighten (2) Adjust the toe-in (3) Adjust or replace the bearing (4) Align or replace the front wheel rim
Loud noise (four wheel drive tractors)	(1) Engagement trace of the front central drive gear is bad (2) The clearance of the central drive bearing is too great or the bearing is damaged (3) The differential axle is worn or damaged (4) The planetary gear or gasket is worn (5) The meshing of the final planetary gear pair is bad	(1) Readjust the gear meshing backlash (2) Adjust or replace (3) Replace the differential axle (4) Replace the planetary gear or the gasket (5) Replace the planetary drive gear
The drive shaft and sleeve overheat	(1) The transmission shaft is severely bent or deformed, creating friction	(1) Replace the transmission shaft
Loud noise in the transfer case	(1) Using too high a gear (2) The bearing or the gear is badly worn	(1) Put into low gear (2) Replace

Operation Description

2.19.6 Hydraulic Steering System Faults and Troubleshooting

Table 2-9 Steering System and Running System Faults and Troubleshooting

Fault	Causes	Solutions
Free stroke of steering system is too large	(1) Steering gear thrust bearing worn (2) Steering gear screw, nut and ball worn (3) Gear sector and rack worn	(1) Replace bearings or adjust (2) Replace wearing parts (3) Adjust
Mechanical and hydraulic steering is too heavy	(1) Upper ball seat screw of the steering thrust bearing is too tight (2) The air pressure of front wheel tire is low (3) Oil delivery of gear oil pump is not enough. Gear oil pump leaks inside or oil screen inside the steering oil tank is blocked, light at slow speed and heavy at rapid speed (4) Air exists in steering system, when rotating steering wheel, oil cylinder sometimes moves and sometimes does not move (5) Oil level in steering oil cylinder is insufficient (6) Spring elasticity in relief valve is weak or the steel ball is not sealed; a light load is steering lightly, and steering becomes heavier if load is increased (7) Oil viscosity too high (8) Steel ball check valve in the valve body fails, steering wheel is heavy when turning it slowly or quickly, and steering is weak (9) Oil leakage from steering system, including inside and outside	(1) Properly tighten upper ball seat screw (2) Fill with air according to the requirements (3) Check if gear oil pump is normal. Clean the filter screen (4) Discharge the system and check if any air is in the oil inlet line (5) Fill oil to the specified level (6) Wash safety valve and adjust safety valve spring pressure (7) Apply the specified oil (8) Clean, do maintenance and change (9) Check and find the leaking points
Front wheel swings	(1) Clearance between tapered roller bearing and housing of front bearing is too large (2) Steering ball joint is seriously worn (3) Gasket between the swing shaft and bracket is worn (4) Toe-in of front wheel is abnormal (5) Front wheel ring is seriously worn (6) Air in steering hydraulic cylinder	(1) Adjust the clearance to the specified requirements (2) Replace (3) Replace (4) Adjust (5) Correct (6) Bleed air from cylinder
Earlier than normal tire wear on front tire	(1) Toe-in of front wheel is abnormal (2) Pressure in the tire is incorrect (3) Drive tire thread mounted in reverse	(1) Adjust (2) Add air according to specs (3) Reassemble
Oil leak	(1) Rubber O-rings at various pipe joints are damaged or loose (2) O-rings in hydraulic steering gear valve body, stator and rear cover are damaged (3) The O-ring at the axle journal is damaged (4) The bolts at the joint of the steering rack or the hub subassembly have loosened	(1) Replace the O-ring or tighten the fitting (2) Clean or replace the O-ring (3) Replace the O-ring (4) Tighten the bolts

Operation Description

Heavy steering	(1) The oil supply to the gear oil pump is insufficient, or the gear oil pump leaks inside or the filter screen in the steering oil tank is blocked. The steering is light at low speed and heavy high at high speed (2) Erratic steering cylinder movement when the steering wheel is turned (3) The oil level in the steering oil cylinder is too low (4) The spring tension in the relief valve has weakened, or the steel ball is not seated correctly. With a light load the steering is light but the steering becomes heavier as the load increases (5) Oil viscosity is too thick (6) Steel ball check valve in the valve body has failed. The steering is heavy when turning slowly or weak when turning sharply (7) Oil leakage from the steering system, both inside and outside (8) Air in the steering system	(1) Check the gear oil pump. Clean the filter screen (2) Bleed the air from the system and check whether there is air or an air leak in the oil suction pipe (3) Fill oil to specified height, clean the relief valve and adjust the spring pressure in the relief valve (4) Replace defective relief valve components (5) Drain oil and replace with the specified oil (6) Replace valve (7) Troubleshoot to find the location of the oil leak and repair or replace leaking components (8) Bleed air from steering system
Steering fails	(1) The king pin is broken or deformed (2) Rotor and linkage shafts are improperly mounted or misaligned (3) Steering cylinder or piston seal ring is damaged	(1) Replace the king pin (2) Refit and realign (3) Replace the piston or the seal ring
Power steering fails	(1) The clearance between the rotor and the stator on the pump is too large (2) During power steering, the driver cannot feel the endpoints of the extreme steering positions. During manual steering, the steering wheel turns but the steering cylinder does not move	(1) Replace the pump (2) Replace the seal ring on the piston
Steering is slow to respond or hard to turn	(1) The clearance between the valve core and the valve housing is too large (2) The clearance between the interlocking shaft and the fork pin is too large (3) The clearance between the interlocking shaft and the rotor is too large (4) The return spring is broken or too soft	(1) Replace (2) Replace (3) Replace (4) Replace

Operation Description

Steering wheel does not return to neutral position when steering	(1) Steering cylinder leaks oil (2) In the neutral position, when the oil pressure is too high or the steering wheel stops turning, the steering cylinder will not return center (neutral) (3) Steering shaft and hydraulic control valve core are not aligned	(1) Find and fix oil leak (2) Repair or replace steering cylinder (3) Reassemble and adjust
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2.19.7 Hydraulic Hitch System Faults and Troubleshooting

Table 2-10 Hydraulic Hitch System Faults and Troubleshooting

Fault	Causes	Solutions
Unable to lift either a light or heavy load	(1) Oil level within the 3-point lift is too low (2) Strainer in the oil filter is blocked (3) Air is getting into the oil suction line (4) Gear oil pump failure (5) Spring pin on the outside/inside end of the operation handle has fallen out (6) The swing rod inside the hydraulic distributor dropped (7) The main control valve seized at the middle or lowering position, or the oil return valve seized in the open position (8) Main control valve seized (9) Lowering valve seized (10) Pin shortened, or lowering valve assembly comes loose making it unable to open the lowering valve (11) The oil passage from the cylinder end to oil cylinder is closed	(1) Add oil to the specified oil level (2) Clean or replace the strainer on the oil filter (3) Check for air leaks (4) Replace the geared oil pump (5) Reinstall the spring pin (6) Open the distributor, and install the swing rod (7) Take apart the distributor, and clean each valve (8) Clean main control valve (9) Clean lowering valve (10) Remove plug for lowering valve, readjust the clearance of the lowering valve push pin or tighten the lowering valve assembly (11) Open the oil passage
Light load can be lifted, but heavy load cannot be lifted or lifts slowly	(1) Air is entering the oil suction line (2) Adjustment pressure of the system safety valve is too low (3) Adjustment pressure of the oil cylinder safety valve is too low (4) Gear oil pump is worn or pressure is inadequate (5) Oil cylinder seal ring is leaking	(1) Check the oil suction pipe and oil filter (2) Replace the system safety valve (3) Replace the oil cylinder safety valve (4) Replace the geared oil pump (5) Replace the seal ring on the oil cylinder
Farm implements shake during lifting and/or lift slowly	(1) Oil filter is blocked (2) Air getting into the oil suction pipe (3) Gear oil pump failure (4) Hydraulic oil level is too low	(1) Replace the filter element (2) Replace the O-ring seal (3) Replace the gear oil pump (4) Add lubricating oil according to the requirements

Operation Description

Farm implements slowly drop after being lifted, and the descent becomes faster after turning off the engine	(1) The tightness of the check valve in the hydraulic flow distributor is poor (2) The lowering valve is not sealed tightly (3) The oil cylinder safety valve leaks oil or is not adjusted properly (4) The O-ring for the oil cylinder is damaged or leaking (5) The seal ring between the distributor or the cylinder head and the oil inlet hole on the 3-point lifter shell is improperly installed or damaged	(1) Clean the check valve, and lap it-in if necessary (2) Clean or lap in the lowering valve (3) Repair or readjust the safety valve on the oil cylinder (4) Replace the O-ring (5) Check and replace the seal ring
With the 3-point lift lever at lifting position, the hydraulic distributor makes a loud noise	(1) Because of improper adjustment, the inner lifting arm props against the lifter case to open the safety valve	(1) First measure the lifting height of the farm implement. Then readjust and shorten the force/position adjusting rod to make the highest lifting position lower than the original position
The 3-point hitch has no hydraulic pressure or weak output	(1) The oil cylinder inlet line has been disconnected (2) The front cone and conical hole of the speed lowering control valve have not been sealed tightly (3) Lifter is in the neutral lifting position	(1) Tighten the lowering speed adjustment knob clockwise to reduce the lowering speed (2) Replace the valve (3) Push the lifter control handle to the lowering position to lower the outer lifting arm to the lowest position. Shut off the inlet oil line to the oil tank, and then put the operating lever in the lift position
Hydraulic cylinder lifts slowly or not at all	(1) Inner leakage from relief valve (2) Low oil pump output	(1) Clean and readjust or replace relief valve (2) Replace the hydraulic pump
No oil pressure in the 3-point lift	(1) Pressure in relief valve is too low (2) Oil leakage in the system (3) Oil pump malfunction	(1) Replace the relief valve or the hydraulic oil (2) Find and repair leaks (3) Repair or replace hydraulic pump
Oil leaks around front differential housing or rear differential housing	(1) Seal ring damage	(1) Replace the leaking seal ring

Operation Description

2.19.8 Starter Faults and Troubleshooting

Table 2-11 Starter System Faults and Troubleshooting

Fault	Causes	Solutions
Starter does not turn over	(1) Battery capacity is insufficient (2) Battery terminal is dirty (3) Cable connection is loose (4) The wires in control circuits such as the start switch are broken (5) Poor contact between carbon brushes and commutator in starter (6) Broken circuit or short circuit within the starter	(1) Charge the battery according to the specifications (2) Remove dirt and corrosion (3) Tighten cable connector (4) Check circuits for breaks and shorts (5) Replace starter (6) Replace starter
Starter is weak	(1) Battery capacity is insufficient (2) Poor battery cable connection (3) The commutator surface is burnt and/or has oil stains (4) The carbon brushes are abraded too much or the spring pressure is insufficient, which causes poor contact between the carbon bush and the commutator (5) Bad contact in rectifier (6) The main contacts of the solenoid switch are burned, resulting in a poor connection (7) The bearing is abraded severely, and the armature grates against the case	(1) Charge the battery according to specifications (2) Tighten the cable connections (3) Polish the commutator surface or remove the oil stains (4) Replace starter (5) Replace starter (6) Replace starter (7) Replace starter
After the engine has been started, the starter continues to run but makes a sharp noise	(1) Lever return spring is broken or loose (2) Tooth surface on starter pinion gear snapped or locked (3) Stuck contact(s) on starting relay (4) The ignition switch does not return automatically after starting	(1) Replace starter (2) Replace starter (3) Replace the starting relay (4) Replace the ignition switch

Operation Description

2.19.9 Alternator Faults and Troubleshooting

Table 2-12 Alternator Faults and Troubleshooting

Fault	Causes	Solutions
The alternator does not generate electricity	(1) Wiring is wrong, broken, and/or making poor contact (2) Rotor circuit broken (3) Rectifier diode damaged (4) Carbon bushes are not making proper contact (5) Regulator is damaged	(1) Check and repair the circuits (2) Replace alternator (3) Replace alternator (4) Replace alternator (5) Replace alternator
The alternator is not charging properly	(1) The drive V-belt is loose (2) Bad contact with the carbon brush and the commutator (3) The regulator is damaged (4) Not enough electrolytes in the battery or battery is sulfurized or too old	(1) Adjust the tension of the drive V-belt (2) Replace alternator (3) Replace alternator (4) Replace battery
The alternator is overcharging	(1) Regulating voltage for the regulator is too high	(1) Replace the voltage regulator

2.19.10 Battery Faults and Troubleshooting

Table 2-13 Battery Faults and Troubleshooting

Fault	Causes	Solutions
The battery capacity is low and the engine is hard to start	(1) Short circuit between electrode plates in the battery (2) Sulphurization of the electrode plates in the battery (3) Poor circuit connector contact, or too much oxidation	(1) Replace battery (2) Replace battery (3) Clean battery terminal, securely fasten cable connector, and coat with a layer of petroleum jelly
Excessive battery discharging	(1) Impurities in the electrolytes (2) Short circuits exist in the electrical system (3) Short circuit caused by placement of a metal tool or bar between positive/negative posts. (4) Corrosion on battery terminals or cables	(1) Replace battery (2) Troubleshoot and repair (3) Remove metal object, replace battery if necessary (4) Clean and replace if necessary

Operation Description

2.19.11 Instrument Faults and Troubleshooting

Table 2-14 Instruments Faults and Troubleshooting

Fault	Causes	Solutions
The water temperature gauge always indicates a low temperature	(1) Break in the circuit or the plug is making poor contact (2) The water temperature sensor is damaged (3) The water temperature gauge is broken	(1) Overhaul the circuit, or remove the dirt at the plug (2) Replace the water temperature sensor (3) Replace the gauge
The water temperature gauge always indicates a high temperature	(1) The water temperature sensor is damaged (2) There is a broken circuit or a short circuit (3) The water temperature gauge is broken	(1) Replace the water temperature sensor (2) Replace instrument cluster (3) Replace the gauge
The oil pressure gauge is abnormal	(1) The oil pressure sensor is damaged (2) There is broken circuit or a short circuit (3) The oil pressure gauge is bad	(1) Replace the oil pressure sensor (2) Replace instrument cluster (3) Replace the gauge

2.19.12 Headlight/Taillight/Work Light Faults and Troubleshooting

Table 2-15 Headlight/Taillight/Work Lights Faults and Troubleshooting

Fault	Causes	Solutions
The headlights have no high beam or low beam	(1) Circuit broken, short circuit, or a blown fuse (2) Bad contact or damage to the headlight switch (3) Burned-out filament in bulb	(1) Check and repair, then reconnect (2) Check and replace if necessary (3) Replace bulb
The taillights do not work	(1) Circuit broken, short circuit, or a blown fuse (2) Bad contact or damage to the taillight/instrument light/work light switch (3) Burned-out filament in bulb	(1) Check and repair, then reconnect (2) Check and replace if necessary (3) Replace bulb
The rear work lights or instrument lights do not work	(1) Circuit broken, short circuit, or a blown fuse (2) Bad contact or damage to the taillight/instrument light/work lights switch (3) Burned-out filament in bulb	(1) Check and repair, then reconnect (2) Check and replace if necessary (3) Replace bulb

3. Accessories and Consumables

3.1 Accessories

Tractor accessories include the heater, interior decoration, floor mats, swing traction rod, etc.

3.1.1 Heater

The tractor cab heater is in the top front of the cab. There is a heater switch on the heater that turns the heater fan on and off, in order to ensure a comfortable working temperature in the cab.

The engine coolant supply valve must be turned on to use the heater.

When ventilation is needed in the cab, especially in the summer,

unheated air can be supplied by turning off the engine coolant supply valve and turning on the fan.

The heater and the air conditioner both use four circular vents just inside the front window of the cab, and two vents above the driver's head. All the vents are located in the cab headliner.



Figure 3-1 Heater

3.1.2 Floor Mats

The floor mats consists of four pieces made of 10 mm. soft rubber. The mats are fixed on the floor with plastic buckles. When removing, the floor mat can be taken up only after the buckles are pried up slightly with a screwdriver. To put them back, place them in the original position and reapply the buckles.

3.1.3 Fender Gaskets

With applied PVC foam surface adsorption material and molding, the whole fender gaskets are fixed on to the right and left fender by plastic buckles.

3.1.4 Swing Traction Rod

The swing traction rod is used for traction type farm implements.

The traction rod is connected to the farm implement with a traction pin.

The traction rod can swing both ways, which makes mounting farm implements more convenient. However, when the tractor is towing a farm implement backward, the positioning pin (1) must be inserted into the hole of the traction plate, in order to stabilize the traction rod (2).

The traction point can be adjusted to the right height by turning the traction rod, in order to connect the farm implement.

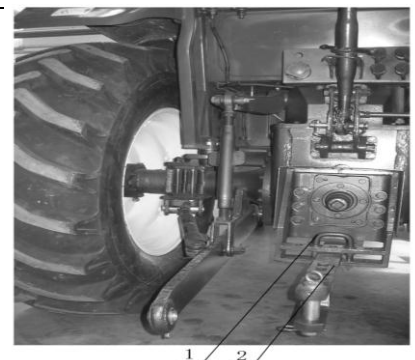


Figure 3-2 Swing Traction Rod
1. Positioning Pin 2. Traction Rod

Accessories and Consumables

3.1.5 Air Conditioner

The air conditioner is located between the headliner of the cab roof cab roof panel. Air conditioner controls are located on the left side of the headliner, above the driver. Air supply vents for the AC unit are also in the headliner. The AC unit runs on tractor electrical power. The engine coolant supply valve must be turned off before starting the air conditioner.

3.1.6 Cab Interior Light and Sun Shade

The cab includes an interior light above the front window. It is controlled by a switch on the light and by the headlights switch. The sun shade is inside the front window, at the top.

IMPORTANT NOTE: When the tractor is equipped with a heater or air conditioner, the engine cooling system must have antifreeze at all times, in order to prevent the engine and cooling system from freezing or overheating. Use a 50/50 water/antifreeze blend.

3.2 Consumable Parts (not included with tractor purchase)

Consumables for the NorTrac 70XTC Series Tractor includes: all bearings listed in appendix 10.3, all oil seals and sealing rings listed in appendix 10.4, all fuses, bulbs, various rubber boots, various glass products and belts used for the tractor listed in table 3-2.

Table 3-2 List of Tractor Consumables

Sequence No.	Code	Description	Quantity/Set	Remark
1	FT65.45.611	Front wind shield glass	1	
2	FT65.45.612	Front- left window glass	1	
3	FT65.45.613	Front-right window glass	1	
4	FT65.45.811	Rear window glass	1	
5	FT65.45.711	Left-side window glass	1	
6	FT65.45.712	Right-side window glass	1	
7	FT65.45.401	Left door glass	1	
8	FT65.45.501	Right door glass	1	
9	FT65T.45.811	Rear window glass	1	
10	FT65T.45.711	Left-side window glass	1	
11	FT65T.45.712	Right-side window glass	1	
12	FT65T.45.841	Left side of rear lower window	1	

Accessories and Consumables

Sequence No.	Code	Description	Quantity/Set	Remark
13	FT65T.45.842	Right side of rear lower window	1	
14	TA700.451-01	Front- left window glass	1	
15	TA700.451-02	Front-right window glass	1	
16	TA700.451.2-01	Left door glass	1	
17	TA700.451.3-01	Right door glass	1	
18	FT65.45.328a	Dust cover for the floor	1	
19	TFT65.45.303	Dust cover for differential lock	1	
20	FT65.45.393	Sealing boot for accelerator pedal	1	
21	TA700.373A-02	Seal for gear shift lever	1	
22	GE20H4.34.13-01	Fuse 30A (Ampere)	2	
23	DE2383.51.6-05	Fuse 10A (Ampere)	8	
24	DE2383.51.6-04	Fuse 15A (Ampere)	2	
25	DE2383.51.6-06	Fuse 5A (Ampere)	3	
26	12V-H4-55/60W	Double-filament bulb for high beam and dipped headlight	2	
27	12V-1141-21W	Steering lamp bulb	6	
28	12V-89-5W	Positioning lamp bulb	6	
29	12V-H3-35W	Rear work lamp bulb	2	
30	12V-H3-55W	Bulb for top work lamp	4	
31	12V-1141-21W	Braking lamp bulb	2	
32		Engine fan belt	1	Type of LOVOL power engine
33		Belt of air conditioner compressor	1	Type of LOVOL power engine

IMPORTANT NOTES:

1. All the above-mentioned consumables are special parts for the tractor. Please keep them in an upright position and avoid losing part needed for future use, maintenance and repair. If parts are lost, the machine's performance may be affected or degraded.
2. When maintaining and repairing the tractor, the spare parts specified by the supplier should be used. Otherwise, the machine's operation, performance and work life may be affected.

4. Maintenance Instructions

4.1 Technical Maintenance Procedures

Technical maintenance includes a series of procedures, such as regularly cleaning, checking, lubricating, tightening, and adjusting every part of the tractor and replacing parts when necessary. Regular maintenance can reduce wear on the tractor components, prevent breakdowns, extend the tractor's work life and keep the tractor in good working order.

The technical maintenance schedule for the NorTrac 70XTC Series tractor is based on the accumulated work hours, which includes maintenance for every shift (every 10 work hours), every 50 work hours, every 250 work hours, every 500 work hours, every 1000 work hours, every 1600 work hours, and maintenance in winter and for long-term storage.

IMPORTANT ISSUES:

1. All maintenance should be carried out by the owner/operator or a trained service professional that is familiar with the tractor.
2. In order to make the tractor work properly and to prolong its service life, technical maintenance procedures must be strictly observed during break-in period and normal operation.
3. The tractor warranty can be voided at any time should damage happen as the result of any operator who is unfamiliar with the tractor or when specified maintenance procedures are not performed according to manufacturer specified timelines.

Opening the engine and hydraulic system safety valve, the relief valve, and the voltage regulator are prohibited, without prior manufacturer authorization. Making adjustments to these sensitive areas may cause damage to the tractor, and invalidate the warranty.

Maintenance Instructions

4.1.1 Technical Maintenance for Every Shift (every 10 work hours)

1. Remove the dust, oil and dirt from the tractor, and clean the air filter if working in dusty conditions.
2. Check and tighten (if necessary) each fastener outside the tractor, especially the fastening nut for the front and rear wheels.
3. Check the level of the engine oil pan, radiator, fuel tank, hydraulic steering oil tank and hydraulic lifter and battery. Refill if necessary. Before checking the oil level of engine oil pan, the tractor should be parked on a flat surface and the engine cool.
4. Fill lubricating grease according to Maintenance Table 4-1.
5. Check the tire pressure and refill as needed.
6. Check if the tractor has any air, oil or water leakage. If any leakage is found, have it repaired immediately.
7. Maintain the diesel engine according to the daily-shift technical maintenance guidelines specified in the diesel engine operation and maintenance manual.

4.1.2 Technical Maintenance for Every 50 Work Hours

1. Perform all the requirements of the technical maintenance per shift.
2. Check the air filter and remove the dust.
3. Check the tightness of the fan belt. When pressing the belt, it should deflect 15–20 mm.
(0.6-0.8 in.). Adjust if necessary.
4. The terminals on the battery should be coated with grease to prevent corrosion.
5. Check and adjust the free play of main clutch and brake pedals.
6. Open the fuel/air separator drain screw and the air vent screw and release any deposited water and impurities.
7. Maintain the engine according to the level 1 maintenance requirements specified in the engine manual.

Maintenance Instructions

4.1.3 Technical Maintenance for Every 250 Work Hours

1. Perform all technical maintenance required after 50 work hours.
2. Lubricate all grease fittings according to Table 4-1.
3. Change the engine oil and the oil filter.
4. Clean the air filter and replace the air filter element.
5. Clean the oil filter of the lifter, and replace the filter element, if necessary.
6. Maintain the diesel engine according to the requirement of level 2 technical maintenance described in the diesel engine operation and maintenance manual.

4.1.4 Technical Maintenance for Every 500 Work Hours

1. Perform all technical maintenance required after every 250 work hours.
2. Change the filter core for the fuel air separator in the fuel injection pump.
3. Check the tightness of the toe-in of the front wheel and the front wheel bearing, and adjust the tightness if necessary. Replace the lubricating oil inside the front wheel hubs.
4. Check the angle of the steering wheel during idle running, adjust the angle if necessary.
5. Change the engine oil filter.
6. Clean and maintain the hydraulic system filter.
7. Change the lube oil in the fuel injection pump casing.
8. Change the oil in the engine, the transmission, the rear axle, the transfer case, the front drive axle, the hydraulic lifter, and the steering gear.
9. Check and adjust the toe-in of the front wheels.
10. Adjust the steering wheel free play.
11. Drain, flush, and refill the cooling system with a 50/50 water/antifreeze mix.
12. Maintain the diesel engine according to the requirement of level 3 technical maintenance described in diesel engine operation and maintenance manual.

Maintenance Instructions

4.1.5 Technical Maintenance for Every 1000 Work Hours

1. Perform all technical maintenance required for every 500 work hours.
2. Change the hydraulic system oil.
3. Flush cooling system and radiator. Refill with a 50/50 water/anti-freeze mixture.
4. Clean the transmission case and change the oil in the transmission when the tractor is warm.
5. Clean the oil filter in the hydraulic system, and check the cleanliness of the hydraulic oil. When necessary, drain the sump of the lifter case, clean it with solvent, and change the oil.
6. Drain and flush the fuel tank and clean the filter in the fuel tank.
7. Inspect the hydraulic suspension mechanism and do maintenance if necessary, according to the work situation.
8. Carry out maintenance of the engine according to the level 4 maintenance requirements in the engine manual.

4.1.6 Technical Maintenance for Every 1600 Work Hours

1. Perform all technical maintenance required for every 1000 work hours.
2. Check engine to manufacturer's specifications.
3. Change the lube oil in the front drive axle central drive the final drive.
4. Check for bearing noise in the clutch and front end.
5. Check whether the clearance and contact points of the central transmission gears are normal. Check the clearance and pre-loading condition of bearings, and adjust if necessary.
6. After completing the maintenance, assemble the whole machine and carry out a short-term trial run. Check and adjust each mechanism as necessary.
7. Maintain the diesel engine according to the requirement of level 3 technical maintenance described in diesel engine operation and maintenance manual.

4.1.7 Special Technical Maintenance (Winter)

When the temperature is below freezing, along with the "Technical Maintenance per Shift", the following provisions should be strictly observed:

1. Select winter grade fuel and lubricating oil.
2. Check the strength of the coolant with a hygrometer. If necessary add anti-freeze to the cooling system as required to protect against coolant freezing.

Maintenance Instructions

3. At the start of every shift start the engine in accordance with winter starting procedures.
4. In order to protect the tractor and ensure that the engine is easy to start, it is recommended that the tractor be parked in an insulated machine shed or garage during cold periods.

4.1.8 Technical Maintenance for Long-Term Storage

If the tractor is going to be kept in storage less than 1 month, and the time since the last oil change does not exceed 100 hours of running time, special technical maintenance is not required. If the tractor is going to be kept in storage longer than 1 month, special technical maintenance should be performed according to Section 5 – Storage as specified in this manual.



NOTE : After performing tractor maintenance and all cleaning and repair is completed, all the guard covers and plates should be reassembled. Otherwise, it can cause a potential safety hazard. All waste oil should be collected in a suitable container and disposed of properly.

Table.4-1 NorTrac 70XTC Tractor Maintenance Table

Item	Maintenance/Repair Position	Operation Content	No. of Points	Maintenance Time (hour)	Remark
1	Engine water pump shaft	Fill lube grease	1		
2	Engine oil pan	Check oil level	1		
3	Engine air filter	Check and clean	1	Every shift	
4	Clutch/brake pedal axle	Check	2	Every shift	Fill if necessary
5	Steering wheel thrust bearing	Check	2	Every shift	
6	Rear wheel hub	Check oil level	2	Every shift	
7	Right/left lifter rod	Check	2	Every shift	
8	Steering track rod ball pin	Check	2	Every shift	
9	Front axle swing for four -wheel drive	Check	2	Every shift	
10	Steering oil cylinder	Check oil level	2	Every shift	
11	Battery	Check	1	Every shift	
12	Hydraulic steering oil tank	Check oil level	1	Every shift	Fill if necessary
13	Radiator	Check coolant level	1	Every shift	Add if necessary
14	Lifter	Check oil level	1	Every shift	Fill if necessary
15	Gear box-rear axle	Check oil level	1	Every shift	Fill if necessary
16	Fan V-belt	Check tension	1	50	
17	Engine oil pan	Change lube oil	1	200	
18	Engine oil filter	Change oil filter	1	200	
19	Engine air filter	Change air filter	1	200	
20	Air separator for diesel fuel injection pump	Change filter core	1	200	Bleed
21	Hydraulic system oil filter	Wash or change	1	200	

Maintenance Instructions

		filter core			
22	Front- drive axle end-transmission	Check oil level	2	400	Fill if necessary
23	Grease cup for four-wheel drive main pin	Fill lube grease	2	400	
24	Front -drive axle differential	Check oil level	2	400	Fill if necessary
25	Hydraulic steering oil pan	Change hydraulic oil	1	400	
26	Lifter	Change hydraulic oil	1	400	
27	Rear axle differential	Change lube oil	1	400	
28	Fuel tank	Maintain and clean	1	800	
29	Front- drive axle hubs	Change lube oil	2	800	
30	Front -drive axle differential	Change lube oil	1	800	
31	Radiator	Maintain and clean	1	800	Drain, flush and fill

4.2 Clutch Adjustment and Maintenance

4.2.1 Clutch and Operation System Adjustment

During clutch operation, in reference to the wear of clutch friction discs and clutch plates, the clearance between the clutch plate and the clutch fingers will gradually decrease. (Normal clearance is 2–2.5 mm.). Sometimes the clutch fingers may contact the throwout bearing, eliminating clutch pedal free play, and the clutch will slip and the throwout bearing will stick. In this situation the clutch should be checked and adjusted.

4.2.1.1 Clutch Pedal Free Play Adjustment

Unfasten the lock nut (1) counterclockwise and rotate the clutch. The clutch pedal free travel is adjusted by the vertical rod assembly (2) and should be 35–40 mm. Make the clearance between the clutch fingers and the throwout bearing 2–2.5 mm., then lock the nut (1) tight.

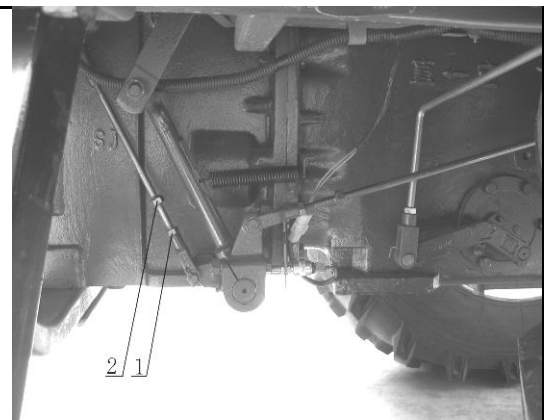


Figure 4-1 Adjustment on clutch pedal free path
1. Lock nut 2. Steering rod assembly

4.2.1.2 Clutch Fingers Adjustment

When the previous adjusement does not meet the requirements of 35–40 mm. of clutch pedal free travel, it means that the throwout bearing has moved backward and is sitting tight on the carrier. The following adjustment inside the clutch should be carried out:

1. Remove the inspection plate for the clutch on the transmission.
2. Loosen the nut and adjust the screw for the clutch fingers with a wrench.
3. Loosen the nut and adjust the screw for the clutch fingers with a wrench.
4. Make the clearance between the three clutch fingers on top of the clutch cover and the throwout bearing 2–2.5 mm. The three clutch fingers of the clutch cover should be on the same plane. Their position tolerance should be less than 0.2 mm.
5. Tighten the lock nut after adjustment.
6. Check the clultch pedal free play to ensure that the stroke is within the range of 35–40 mm.
7. Reinstall the inspection plate on the transmission.

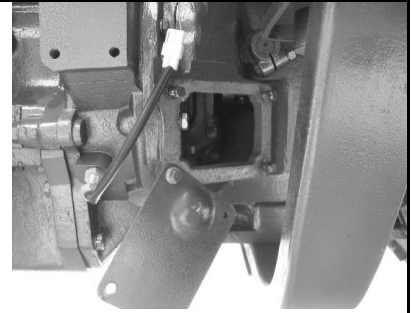


Figure 4-2

Inspection Plate Removal



Figure 4-3

Release Rod Adjustment

4.2.1.3 Main Clutch Release Travel Adjustment

1. There should be suitable pedal travel from the main clutch release to the auxiliary clutch release, to avoid the auxiliary clutch releasing too early.
2. To obtain a suitable path, the clearance between the three adjusting screws (2) on the main pressure plate of the clutch and the three fingers (1) of the auxiliary friction discs pressure plate should be 1.7 mm. Turn the adjusting screw and insert a feeler gauge to adjust the clearance between the bolt head and the finger of the auxiliary friction pressure plate so that it is 1.7 mm.
3. The lock nut should be tightened after adjustment.



Figure 4-4 Main Clutch
Release Travel Adjustment

1. Lug 2. Set Screw 3. Lock nut

4.2.1.4 Tractor Overhaul Clutch Adjustment and Assembly

- There is a group of crescent shaped spacers between the clutch plate and clutch cover, as well as between the engine flywheel and auxiliary (PTO) clutch. During tractor overhaul, if the main/auxiliary friction discs are seriously worn, you can take out some of the adjustment gaskets to provide the disc spring enough pressure.
- When assembling the clutch, it can be sub-assembled on the mandrel, then inserted into the flywheel bearing hole, to make main/auxiliary clutch friction discs concentric to the spline hole, when mounting the transmission to the engine.

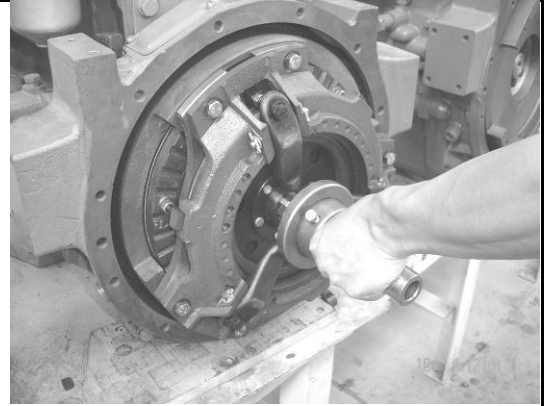


Figure 4-5

Tractor Overhaul
Clutch Adjustment and Assembly

4.2.2 Clutch Maintenance

Check the clutch regularly to make sure that there is no oil leak in the split pin on the bottom of the transmission. If any leaks are found, check the rear oil seal of the engine crankshaft, the seal on the first shaft of the transmission, or the seal on the main power output shaft.

IMPORTANT ISSUES:

1. When using the clutch the clutch release should be rapid and complete, and the engagement should be soft and smooth, in order to avoid damage to the clutch.
2. To avoid clutch damage when the tractor is running, never rest your foot on the clutch pedal, or ride the clutch to reduce the tractor's running speed. Never engage the clutch suddenly to accelerate over a barrier or up a slope.
3. Make sure there is no oil on the surface of clutch friction discs. If oil is found, remove it with solvent and allow the discs to air dry, in order to avoid damage to the clutch.

4.3 Transmission Adjustment and Maintenance

The transmission usually needs no adjustment during operation. The following information should be noted during the operation and maintenance of the tractor.

Maintenance Instructions

4.3.1 Checking Transmission and Rear Axle Differential Oil Level

The transmission and the rear axle differential share the same oil sump. The sump uses a transhydraulic oil. The position of the oil filling port on the lifter case is shown in Figure 4-6.

When checking the oil level, the tractor should be parked on a level surface.

After shutting down the engine, remove the oil level dipstick on the rear end of the rear axle, wipe it clean, then reinsert the dipstick.

If the oil level is lower than the low oil level line, lube oil should be added until the oil level is between the high and low level marks. Check the oil level 5 minutes after the engine has been shut down.

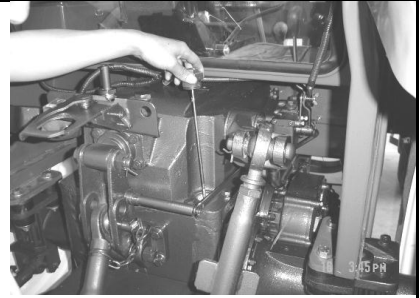


Figure 4-6
Transmission Oil Level

4.3.2 Changing Oil in the Transmission and Rear Axle Differential

When changing the lube oil in the transmission and rear axle differential the drain plug (1) in the transmission should be removed to completely drain the used oil. Replace the oil drain plug, and fill with fresh lube oil.

The position of oil drain port for the transmission is shown in Figure 4-7.

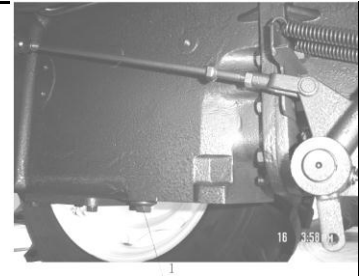


Figure 4-7
Transmission Oil Drain Port
1. Oil Drain Plug

4.3.3 Changing Transfer Case Lube Oil

When draining the oil, remove the drain plug (1) on the bottom of the transfer case and wipe off any metal chips adhered to the plug.

The location of the transfer case oil drain port is shown in Figure 4-8.

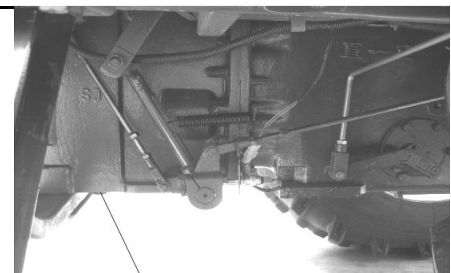


Figure 4-8 Transfer Case Lube Oil Drain
1. Oil Drain Plug

4.4 Rear Axle Adjustment and Maintenance

The rear axle consists of the central drive, the differential, the differential lock, the final drive, the right/left axle, the power output (PTO) shaft and the operation mechanism.

Maintenance Instructions

4.4.1 Rear Axle Maintenance

The main drive/driven spiral bevel gear pair for the center drive should be replaced as a matching set.

When applying the differential lock, the tractor should be driven in a straight line and steering wheel cannot be operated, otherwise, it will cause mechanical damage.



NOTE: When operating the tractor in reverse, the operation handle for the power output shaft (PTO) should be put into neutral to avoid damage to the farm implement.

4.5 Brake Adjustment and Maintenance

There are two disc brake assemblies, which are symmetrically mounted on the right and left shafts of the rear axle, and connected with the brake operation mechanism.

4.5.1 Brake Pedal Free Play Adjustment

When the brake pad assembly and the brake drum are working correctly, the clearance between them is 1–1.4 mm., and the corresponding brake pedal free play is 90–120 mm.

When the brake pads are worn, the brake pedal free play will increase, resulting in poor braking.

When this is the case, the brake pedal free play must be adjusted.

Adjustment Method:

Loosen the lock nut (1) on the adjustment rod (2) and turn the rod.

The brake pedal free path will be decreased or increased depending on the direction you turn the rod.

The right and left pedal free path should be adjusted to be the same. The lock nut (1) should be tightened after adjustment.

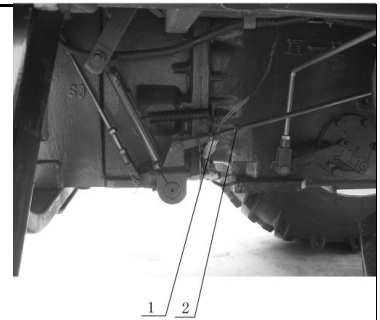


Figure 4-9 Brake Pedal Adjustment
1. Lock Nut 2. Adjustment Rod

Maintenance Instructions

4.5.1.2 Right/Left Brake Friction Discs Total Clearance Adjustment

If the total clearance between the right and left brake friction discs are different, and the difference is more than normal, the above-mentioned adjustment method may not be enough.

At that time, the brake cover of adjusting gasket (1) can be reduced or increased, to achieve the above-mentioned adjustment after the total clearance is adjusted.

Refer to figure 4-15.

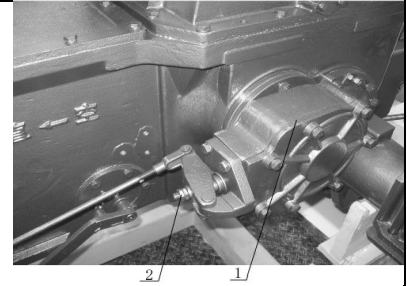


Figure 4-15 Right/Left Brake Friction Discs

Total Clearance Adjustment

1. Adjustment Gasket 2. Adjustment Nut

4.5.2 Right/Left Braking Force Adjustment

The braking force of the right and left brakes should be consistent. Usually when emergency braking on a paved surface, the tire trace of the right and left drive wheels should be the same.

Adjustment Method: Loosen the two lock nuts on the brake rod, adjust, and retighten the two nuts.

4.5.3 Brake Use and Maintenance

If there is oil or dirt on the surface of the brake pads, it should be cleaned with solvent and re-assembled after it has dried. Regularly check the wear of the oil seals on the brake casing and cap. Change them, if necessary.



WARNING:

The right and left brake pedal free play should be adjusted to be equal. Otherwise, when emergency braking, the tractor could sway and cause a rollover or accident.

To be safe, test the brakes after any brake mechanism adjustment. The procedures is as follows:

1. Interlock the right and left brake pedals.
2. Drive the tractor on a dry, flat road.
3. Run the tractor in a straight line and use the emergency brake after releasing the main clutch.
4. Check the tire skid marks on the road surface.
5. If the skid marks of the right and left drive wheels on the road are consistent (in a straight line and parallel) then the brake adjustment is good.
6. Otherwise, readjust if necessary. If it is still not good even after repeated adjustment, the brakes should be thoroughly checked.

4.6 Steering Mechanism Adjustment and Maintenance

The tractor uses a separate hydraulic steering system consisting of a cycloid rotary valve, a full hydraulic steering gear, a steering oil cylinder, an oil tank, a track rod, a constant and overflow pump, and oil lines.

Never adjust the steering during use. During maintenance,

should be noted that the constant and overflow pump

oil cylinder and oil inlet/outlet of the steering gear,

as well as the oil line joints should be checked and tightened, in order to avoid oil leaks.

If you encounter an oil leak, check the gaskets and make sure that none of the seal rings are damaged.

Replace if necessary.

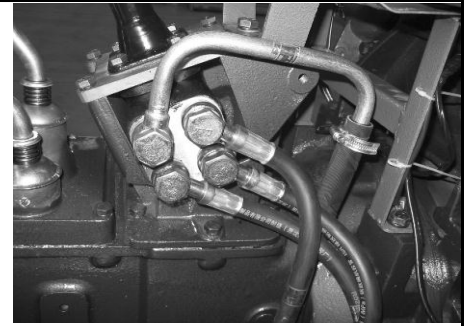


Figure 4-10 Steering Mechanism

IMPORTANT ISSUES: The safety overflow pressure for the overflow valve on the constant current overflow pump has been set before delivery. It should not be removed and adjusted without Nortrac approval.

After repair, loosen the two fittings on the oil cylinder and run the oil pump at a low speed to bleed any air from the oil, then tighten the fittings.

4.7 Four-Wheel Drive Front Axle Adjustment and Maintenance

The tractor front axle can be divided into three chambers: the central oil chamber, the left end drive oil chamber and the right end drive oil chamber.

4.7.3 Four-Wheel Drive Front Axle Central Oil Chamber Drain and Fill

The central oil chamber is in the middle of the front end of the tractor.

The oil level should be checked regularly from the sight glass. When the oil level is low, oil should be added until the oil reaches the top line on the sight glass. When changing the engine oil, unscrew the oil drain plug from under the front axle and completely drain the used oil. Then, replace and tighten the oil drain plug. Put fresh lube oil into the oil filling port (1) and reinstall and tighten the fill plug.

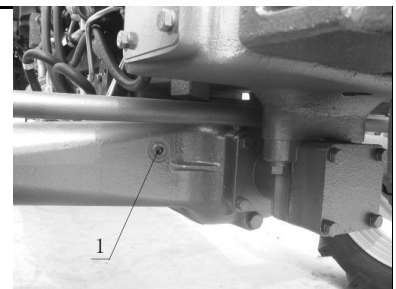


Figure 4-11 Front Axle Central Oil Chamber Adjustment and Maintenance
1. Oil Drain Plug

Maintenance Instructions

4.7.4 Four-Wheel Drive Front Axle Right/Left Hub Oil Sump Drain and Fill

When checking the oil level on the two front axle hubs, the tires should be turned to allow access to the oil drain and fill plugs on the hubs.

The oil level should be near the top of the plug when the plug is at the horizontal centerline of the wheel. If not add oil to the top of the sump.

When changing the oil, the front wheel should be turned to put the drain plug in the lowest position. Unscrew the plug, and drain the used oil.

Unscrew the plug, and drain the used oil. Then, roll the tire to align the plug and the front wheel horizontal center line. Fill with fresh oil and reinstall the fill plug.

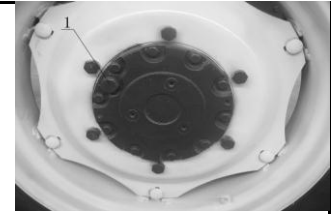


Figure 4-22 Right/Left

Front Hub Oil Drain and Fill

4.8 Transfer Case Adjustment and Maintenance

The oil drain plug for the transfer case is on the side of transfer case. The used oil from the transfer case can be completely drained through this plug.

4.9 Tire Adjustment and Maintenance

Tires are one of the main consumables of the tractor, and should be carefully used and maintained in order to extend their working life as long as possible.

Improper operation will cause the tires to wear out too soon or be damaged during normal operations.

During operation, avoid going over obstacles at high speeds and emergency stopping or turning. When driving on a rough road, avoid tire slippage if at all possible.

During use, the tires should be kept clean of oil, acid, alkaline, chemical corrosives and out of direct sunlight as much as possible, in order to keep the rubber from aging and degrading. The front wheel alignment and front track also need regular checking, in order to avoid uneven tire wear. You can switch the right and left tires when wear is uneven.

Maintenance Instructions

4.9.1 Tire Inflation

Tire air pressure should be kept according to the regulations.

Four-Wheel Drive Type: Both the front and rear tires are inflated to 0.11–0.14Mpa (16-20 PSI).

When the drive wheel slips you need to shut down the tractor and troubleshoot immediately.

Do not run at high speed on uneven or rough roads. Operate the emergency brake as little as possible.

The tires should be kept clean of fuel, lube oil or other dirt. When dirty, wash or brush them with water.

When the tractor is not going to be run for a long period, it should be jacked up to take pressure off the front tires.



NOTE: Excessively low or high tire pressure will shorten the service life of the tires. It will affect steering and control of the tractor, and could lead to hazardous situations.

4.10 Electrical System Adjustment and Maintenance

The tractor electrical system uses a 12V, single-wire, negative ground system. The system consists of the engine starting equipment, lights, instruments, and signal devices.

The engine starting equipment includes the starter, alternator, battery, voltage regulator, ignition switch, and clutch switch. For the operation and maintenance of this equipment, refer to the diesel engine instruction manual. The lighting and signal devices include the headlights, rear lights (with top rear lamp for cab), turn signals, and taillight set (turn signals, position and brake lights), combined instruments, speakers and fuses, etc. The fans and controls for the cab HVAC system and the air conditioner compressor are also electrical.

4.10.1 Battery

The battery is in the front of the tractor, as shown in Figure 4-23.

Figure 4-23 Battery Position



4.10.2 Battery Maintenance

Normally the maintenance-free battery does not require any special maintenance. Water does not have to be added to maintain the level of electrolyte since the battery is sealed. You can observe the power levels from the view hole in the battery: Green = full power; Grey = lack of power; Dark = no power.

As part of the tractor's electrical system the battery requires some system level maintenance.

1. Check the status of the battery. Make sure the case is not cracked or leaking, and the battery is secured in place.
2. The battery should be charged under the following conditions:
 - The engine is slow to start and/or the lights are faint.
 - The inspection hole becomes grey. It should be replaced when the inspection hole becomes dark.
 - The battery is under voltage. Measure the terminal voltage when discharging. There is a problem with a 12V battery if the output voltage is lower than 10.5V.
3. When being stored, the battery should be charged monthly. 2 amp trickle charge battery to maintain voltage.
4. When removed from the tractor for any reason the battery should be stored in a clean, dry and well-ventilated area with a temperature that is 32–104°F. The battery should be handled with care and stored right side up.
5. The power supply should be tightly connected to the battery terminals, in order to prevent the terminal from melting when the tractor is started. In order to avoid terminal oxidation or corrosive, the exterior of terminal should be coated with petroleum jelly or corrosion preventative spray.
6. Keep the exterior terminals of the battery clean.
7. Check the voltage regularly to make sure that the regulator is working properly. The voltage for the regulator is $14.2.1 \pm 0.2V$. Check the generator output voltage regularly. The voltage should be $(14.2 \pm 0.25)V$.



NOTE:

1. When charging the battery, keep it in a ventilated area and far from open flames.
2. When charging is over, shut off the power in order to avoid a fire or explosion.

4.10.3 Front Headlights

The position of combined headlights is shown in Figure 4-24.



Figure 4-24 Combined Front Head Lamp Position

4.10.4 Taillight Assembly

The position of the rear lamp and tail lamp assembly (steering, position and braking) is shown in Figure 4-25.



Figure 4-25 Taillight Assembly and Position

4.10.5 Headlight Illumination Intensity Distribution

As Figure 4-26 shows, the curve of the illumination intensity distribution is applicable to right-side traveling. If necessary, check and adjust the illumination intensity distribution for the headlights.

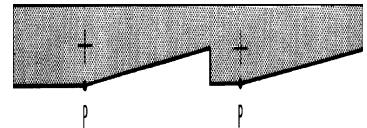


Figure 4-26

Head Lamp

Illumination Intensity Distribution

The procedure is as follows:

1. Check the tire pressure and make sure that it meet the requirements.
2. Place the (empty-load) tractor on a level plane, facing a smooth wall.
3. Place two “+” signs on the wall corresponding to head lamp central line:
 - Turn on the low beam light switch when the tractor is at distance of 5m from the wall.
 - The reference point (P-P) is located at 5cm under the “Cross” mark on the wall.
 - Turn the adjusting nut of the headlight to regulate its distribution curve.

4.10.6 Top Lights

There are four top lights on the cab, which are located on the front upper and rear upper parts of the cab.

The cab front top lights are shown in Figure 4-27; the cab rear top lights are shown as Figure 4-28.



Figure 4-27 Front Top Lights



Figure 4-28 Rear Top Lights

It is possible to turn on the left and right top lights according to the requirement of work.

4.10.7 Fuse Box

There are strip fuses in the fuse box.

The working current for each circuit and its protected electric devices are shown in Table 4-2. When there are electric problems, First check the fuse box.

If the fuse is broken, take a standby current fuse from the circuit board (brass wire replacement not allowed) and replace it, in order to ensure the safety of the electric element.



Table 4-2 The Working Current in Each Circuit and Its Protecting Electric Appliance

Position	I	II	III	IV	V	VI	VII	VIII	IX	X
Fuse Rating (A)	10	10	30	10	10	15	10	20	30	15
Electric Components Being Protected	Brake light and horn	Direction light	Warm air blower and A/C	Head light on low beam	Head light on full beam	Working light, buzzer, Start relay, Master power relay	Position light	Top light	Pre-heating device	Tail light

4.11 Hydraulic Suspension System Maintenance

The tractor's lifter has been properly adjusted at the factory and there is no need for the user to do it again.

But during use, the adjusted state can change, which will impact the normal operation of the tractor because of wear and loosening of the bar driver pair.

When the force-adjusted spring assembly is mounted, the regulating washer may be used for adjustment, which doesn't allow clearance on the spring after mounting.

4.11.1 Control Handle and Feedback Lever Adjustment

- Install the lifter on the tractor, connect the hoses and fill the hydraulic oil reservoir.
- Mount the suspension bar and hang a load of approximately 200~300kg at the lower suspension point. Place the control handle in the lowest position.
- Start the engine and set the accelerograph in the neutral position.
- Slowly move the control handle up and the lift arm and load will rise. When the handle reaches its peak, the angle should be 53° between the lift arm; the level is normal. If the angle between the lift arm and the level is less than 53° , it should be adjusted.
- When the angle between the lift arm and the level is less than 53° , the bolt (1) on the feedback lever can be used to increase the length of the feedback lever until it conforms to the requirements.
- Tighten the nut (2) after adjustment.



Fig.4-30 Hydraulic Suspension System

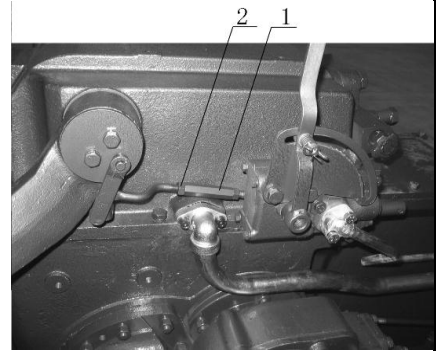


Fig 4-31 Feedback Lever Adjustment

1. Adjust the Bolt 2. Screw Down the Nut

4.11.2 Hydraulic System Use (only for a double acting oil cylinder type system)

When the control handle is pushed from the N position to the front position, the suspension system will start to rise. When reaching the deadline position, the control handle will move back automatically (i.e. back to the N position).

When the control handle is pushed from the N position to the reverse direction (at such time, the control lever is not in the rear position, the suspension system will descend. Once you release the control handle, it will go back to the N position, the descent will stop.

When the control handle is pushed from the N position to the lowest position, the suspension system stays in the “floating” state after dropping down to the final position.

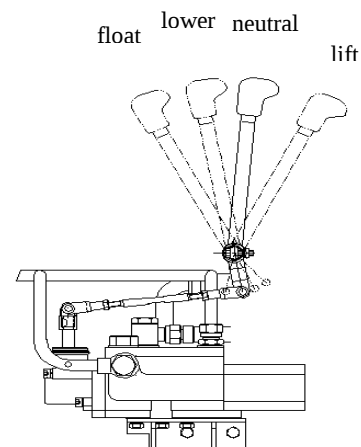


Figure 4-32 Hydraulic System Use

4.11.3 Lifter Height Limiter Procedure (for a double-acting oil cylinder system)

4.11.3.1 Lifter Height Limiter Function and Structure Diagram

You can control the lift height of farm implements by adjusting the position of the limiter (see adjustment procedure). Refer to the Figure 4-33 and make any adjustments as per the procedures described, to prevent breakage of the PTO shaft caused by the farm implement being lifted too high.

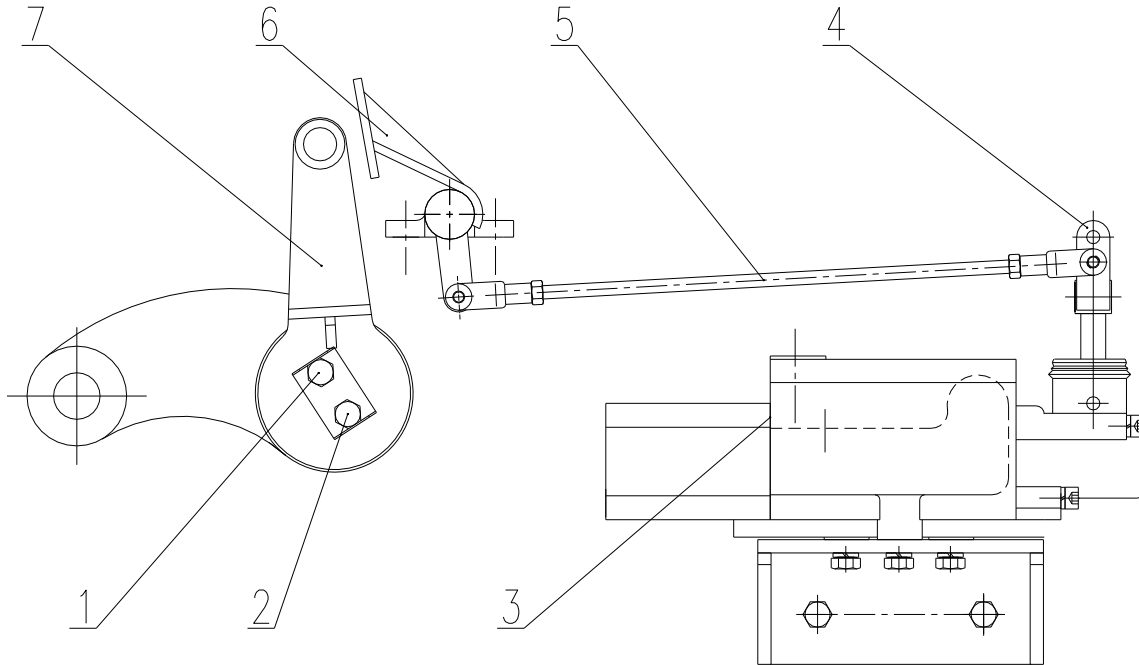


Fig 4-33 Lifter Height Limiter

1. Nuts (1) 2. Nuts (2) 3. Distributor 4. Control System
5. Feedback Lever 6. Height Limiter Feedback Lever Parts 7. Push Board

4.11.3.2 Height Limiter Adjustment Method and Requirements

- Shown above, you can control the height adjustment by adjusting the limit push board on the right side of lift shaft. Remove the nuts (1 and 2). The more the limit push board is adjusted counter-clockwise the higher the adjustment. Adjusting clockwise will lower it.
- Farm implements must be raised up when turning while doing field operations. It is required that the farm implement has a ground clearance of 150–250 mm. after lifting. This can be achieved through setting the length of the limit push board.
- When making adjustments for long distance operations or road transportation: adjust the position of the limit push board; the farm implement's lift height must have over 250 mm. of ground clearance.
- Tighten the fixture parts after adjustment.

Maintenance Instructions

4.11.3.3 Hydraulic Suspension System Oil Use and Maintenance

- The lifter cover is on the oil tank of the hydraulic suspension system. International standard hydraulic oil should be used according to the environment.
 - Check every 50 hours to see if the oil level in the lifter cover is within the oil level stick range.
 - Clean up the breather regularly. To do this, open it, take out the filter, clean it with solvent and blow it clean with compressed air. Replace it with a new filter elements when it become difficult to clean or it is broken.
- Maintenance



Fig. 4-35. Hydraulic Suspension System Oil Use and

4.11.3.4 Oil Filter Maintenance

After every 100 hrs. of tractor operation, check the hydraulic suspension system filter (1) and clean the filter element.

The maintenance method is to turn the cover at the back end of the oil filter, take out the filter element, clean it with solvent and blow it dry with compressed air.

Replace it with a new filter element when it is difficult to clean or it is broken.

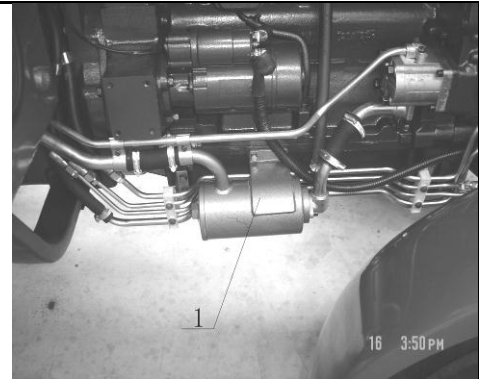


Fig.4-36 Hydraulic Oil Filter
1. Oil Filter

4.12 Air Filter Use and Maintenance

The interval for air filter maintenance should be based on the dust conditions in which the tractor operates. When the dust is heavy, service is recommended every 8hrs.

When the air filter is blocked, a visual alarm on the filter housing turns red, and the air filter must be serviced.

Every day, or when refueling, check the air filter to ensure that all of the joints between the air filter and engine are well

sealed, including all of the hose joints and the air filter housing.

When replacing the filter element, remove the wing nut and washer and carefully remove the element from the housing. Take care to prevent dust from falling into the filter housing. Use a clean, moist cloth to wipe the

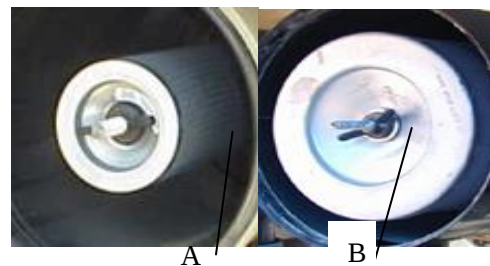


Fig. 4-37 Air Filter

A. Air Filter Element

B. Filter End Cover with Wing Nut

Maintenance Instructions

inside of the filter housing and the used safety filter element surface prior to reinstalling the filter element. Do not use compressed air to clean up the filter housing. Repair any holes immediately and log the repair into the machine service and maintenance record. Throw away any damaged filters and replace with a new filter. Use the cover, washer and wing nut to tighten it down. Ensure that the filter rubber washer is mounted between the wing nut and filter element, and that the intake resistor is installed.. Ensure that the end cover position and seat are aligned prior to putting on the end cover and fastening the clamp ring or wing nut.

IMPORANT ISSUES:

1. The proper use and maintenance of the air filter is vital to the service life of the engine. It must be kept clean.
2. Never rinse the filter element with water or solvent as this can damage the filter element.

Electrical Schematic

Instruction On Maintenance

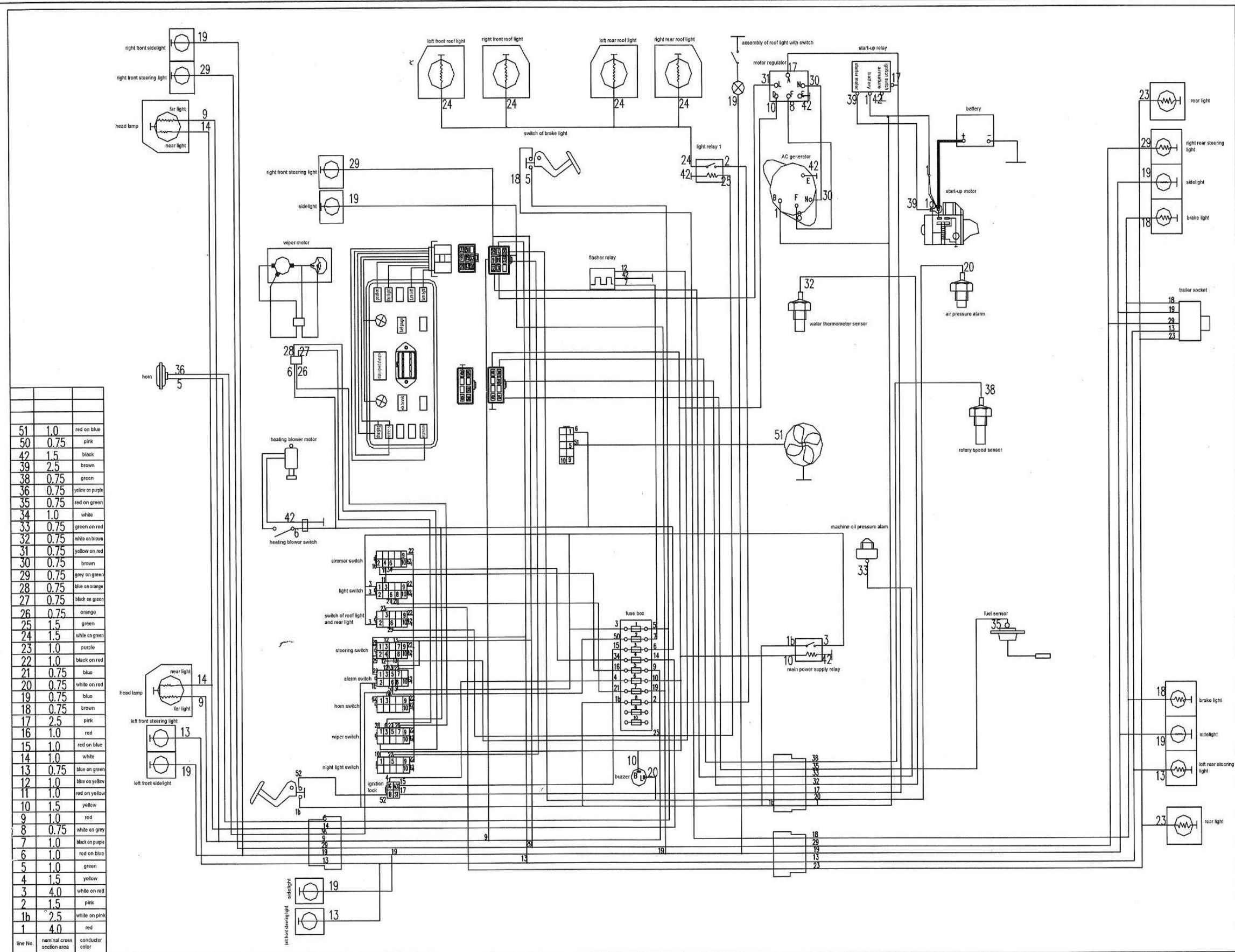


Figure 4-38 Schematic Circuit Diagram

5. Storage

When the tractor is going to be out of use for an extended period of time (more than one month) it should be kept in a proper storage building. The storage facility should provide protection from the elements so as to keep the tractor clean and prevent rust and corrosion.

Before storing the tractor it must undergo a thorough cleaning and adjustment and tightening of various parts, subject to the technical maintenance requirements based on the duty hours, so that the tractor remains in good technical condition.

IMPORTANT ISSUES:

During long periods of non-use it is very important to preserve and maintain the tractor. If special steps are not taken, the life of the tractor could be shortened and parts could deteriorate.

5.1 Tractor Storage - Causes of Damage

- **Rust:** During the storage period, dust and moisture in the air get into the tractor. This can cause contamination and rusting of the components. When pistons, valves, bearings and gears stay in one place for an extended period of time, they lose lubricant film protection, which produces rust and causes parts to stick and seize up.
- **Aging:** Some components are made of with rubber and plastic parts, which will age and deteriorate, getting brittle and rotting, under the ultraviolet rays in sunlight.
- **Deformation:** Components such as drive belts and tires may become distorted in shape if left in the same place for too long.
- **Others:** Electrical parts are affected by damp conditions, and the battery can discharge over time.

5.2 Tractor Storage

- Prior to storage inspect the tractor and its surroundings to ensure that the tractor can be stored safely. The external surface of the tractor should be cleaned.
- Remove the battery, coat the terminals posts with petroleum jelly, or corrosion prevention spray. Keep it in dark, well-ventilated room with a consistent moderate temperature.
- Drain the engine oil while it is warm and fill with fresh engine oil. Run the engine for 10 minutes at idle to allow the new engine oil to adhere to the surfaces of all the moving parts evenly.
- Add lubricant to all the various lubrication points.
- Coat the electrical contacts, connectors and all unpainted metal part surfaces with anti-corrosion spray.

Storage

- Loosen the fan belt on the engine and remove it if necessary. Wrap the belt(s) securely and spray the pulley groove with a rust-proof agent. If possible, paint over all chips in the paint and cover non-painted metal parts with a preservative.
- Drain diesel fuel from the fuel tank or add diesel fuel conditioner to the fuel tank.
- Seal any engine opening such as intakes/outlets with protective material to prevent foreign matter, dust, and moisture from getting in.
- Place all control handles in the neutral position (including electrical system switches and the parking brake).
- If possible, prop the tractor on blocks so that the tires are free of weight. Check the tire pressure on a regular basis.
- The tractor should be parked in a dry, well ventilated area. If such an area is unavailable, cover the tractor with a waterproof covering. Never store the tractor around flammables or corrosive materials.
- Any parts removed from the tractor should be cleaned, packed and stored in a dry place.

5.3 Tractor Storage Maintenance

- Check on the tractor and its parts at least once a month to see whether there is any rust, corrosion, aging, or distortion happening. Immediately make any necessary repairs.
- Start the tractor twice a month and allow the engine to run. This will prevent interior rust.
- If possible, drive the tractor once every three months at low speed for 20-30 minutes. This is a great way to see how the tractor is doing in storage.
- Clean the dust off the top of the battery with a dry cloth, and check the charge level. The battery can go dead even when not in use. Recharge the battery once a month.
- When transporting the tractor long distances by train, truck, or trailer the gears should not be engaged. Transporting the tractor with the gears engaged, will move parts such as the gears, bearings, crankshaft and pistons, which can rub without lubricant and cause damage.

IMPORTANT ISSUES: If you cannot carry out the anti-rust treatment and the tractor needs to be out of use for several months or longer, at a minimum, replace the machine oil and oil filter. Start the tractor once every month and run the tractor at low speed for 20–23 minutes at a minimum. Check to make sure everything is operating properly and keep the tractor clean to limit the amount of corrosion that could result from dust and wet conditions.

5.4 Removing Tractor from Storage

- Remove the grease used for anti-rusting.
- Reopen the various sealed up nozzles and clean the tractor.
- Check coolant, machine oil, and diesel fuel and lubricate all of the lubrication points according to the provisions.
- Remove any anti-rust agent in the belt grooves and reinstalls and/or adjust the belts.
(See: Engine Instruction for Use and Maintenance)
- Reinstall the battery and check the terminals.
- Check that all of the circuits, hoses and lines are properly connected.
- Check air pressure in tires.

NOTE: Please refer to the “Engine Instruction for Use and Maintenance” for details on engine storage and removing tractor from storage.

6. Transportation

If the tractor is to be driven by the owner, local traffic regulations should be strictly observed with at least 180 feet of distance maintained between vehicles. If the tractor is being transported, the following procedures should be followed:

1. A smooth, level spot should be selected for loading and unloading the tractor. A special unloading platform should be used if one is available.
2. Have one helper available for guiding and make sure the area is clear of everyone else.
3. After loading, the lift should be placed at the lowest position, the hand brake set, the reverse gear engaged, the key taken out, and the ignition switch turned off.
4. The front and rear tires should be fixed in place with straps in a figure 8 pattern. Both front and rear tires should be blocked and the rear axle secured with straps.
5. The tractor should be pulled inside an enclosed trailer or moved to the center of a flatbed trailer as far as possible and the rear view mirror may be taken down when necessary.
6. When tunnels and bridges are encountered, full attention must be paid to the load height, and speed should be adjusted for road safety.
7. While unloading, the hand brake should be released first. The drive gear should then be engaged and the tractor should be unloaded slowly and carefully at the lowest tractor speed.

Technical Specifications

7. Technical Specifications

7.1 Four Wheel Drive Tractor Technical Specifications

Table 7-1 4WD Tractor Technical Specifications

Item		Unit	NorTrac
			70XTC
Type		--	Wheeled 4x4
Nominal Traction Power		kN	15
Maximum Power of the PTO Shaft		kW	46.4
Outside Size	Length (includes front counterweight and rear suspension)	mm	4200
	Width (outside tire in case of the common tread)		1910
	Height (up to the top of muffler)		2625
Wheelbase		mm	2236
Tread	Front Wheel	mm	1450
	Rear Wheel	mm	1530
Ground Clearance	Min. Clearance	mm	335(transfer case)
Min.Steering Radius	When the single sided brake is not used	m	4.8
	When the single sided brake is used	m	4.3
Structural Mass	Without the cab	kg	2960
	With the cab	kg	3190
Min. Used Mass (incl. front counterweight frame)	Without the cab	kg	3190
	With the cab	kg	3405
Displacement	Front Without	kg	1470

Technical Specifications

Item			Unit	NorTrac
				70XTC
	Wheel	the cab		
		With the cab	kg	1535
	Rear Wheel	Without the cab	kg	1720
		With the cab	kg	1870
Counterweight		Front counterweight	kg	240
		Rear counterweight	kg	540
Engine	Model of Engine		--	Forced water cooled, vertical aligned four stroke engine
	Number of Cylinders		--	4
	Diameter of Cylinder		mm	100 (Lovol power)
	Travel		mm	127 (Lovol power)
	Nominal Power		kW	51.5
	Nominal Rotation Speed		r/min	2200
	Max. Torque/Rotation Speed		N • m/ (r/min	320/（1400~1600）
	Nominal Fuel Consumption Rate on the Operating Condition		g/kW • h	≤260
	Nominal Oil Consumption Rate on the Operating Condition		g/kW • h	≤1.6
	Lubrication Mode		--	Press mode
Startup Mode		--	Electric startup or with the preheating assistant device	
Transmission System	Clutch		--	Dry type, single plate, double action type
	Gearbox		--	Planet reducing assembly, Type Iz
	Rear Axle	Central Transmission	--	Spiral bevel gear pair
		Differential	--	Close, 4 planet bevel gears(with differential lock)
		Differential Lock	--	Pole coupling
		Final Transmission	--	Outer meshing, built-in
	Front Drive Axle	Transmission Shaft	--	Central transmission shaft
Central Transmission		--	Spiral bevel gear	

Technical Specifications

	Item		Unit	NorTrac
				70XTC
		Differential	--	Close 2 bevel planet gear
		Final Transmission	--	Mono-planet gearing
Running Gears and Undercarriages	Frame Assembly		--	Frameless
	Front Suspension		--	Rigid suspension
	Front Shaft/Front Axle		--	Double universal coupling, mono-planet reducing transmission
	Tire Air Pressure	Front Wheel	kPa	118 - 137
		Rear Wheel		118 - 137
	Tire Specification	Standard: Front/Rear Wheels	--	8.3-24/14.9-30
		Options: Front/Rear Wheels	--	8.3-20/12.4-32; 8.3-24/16.9-28; 8.3-24 (paddy field) /11-32 (paddy field) 9.5-24 (paddy field) /11-32 (paddy field)
Steering System	Front Wheel Toe-In		--	0~3
	Camber of Front Wheel		--	1°
	King Pin Inclination		--	7.5°
	King Pin Caste Angle		--	3°
	Front Axle Swing Angle		--	12°
	Mode of steering system		--	Front wheel steering
	Steering Gear		--	Static hydraulic steering
Brake System	Running Brake System		--	Dry type, disc mechanically operating
	Parking Brake		--	Non-independent hand brake
	Trailer Brake Control		--	Air-cut brake
Working Device	Mode of Hydraulic System		--	Semi-partition, single acting cylinder, position controlled, force mixed control and floating control Separate, double action cylinder with height and floating control
	Type of Hydraulic Oil Pump		--	CBJ30-F14L or CBJ30-F16L or CBJ30-F20L
	Hydraulic Oil Pump Output		ml/r/	16/20
	Distributor		--	Lubricate
Suspension System	Oil Cylinder	Diameter	mm	φ110
		Travel	mm	130,or 200
		Type	--	Single action(semi-partition) or double action(separate)
Suspension System	Form		--	Suspension on rear-fixed three points
	Joint		mm	φ25.7

Technical Specifications

	Item		Unit	NorTrac
				70XTC
Electric Appliance Instrument Device	Bottom Suspension Point	Hole		
		Width	mm	51
		Joint Hole	mm	φ28.7
		Width	mm	45
	Plow Depth Adjusting Modes		--	Common hoister: press adjustable, gear position regulated, force position mixed adjustable and floating controlled Or force hoister: height adjustable, floating controlled
	Max. Hoist Power [610mm behind the Suspension Point]		(KN)	Common hoister: ≥15 Or force hoister: ≥20
	Opening Pressure of the System Safety Valve		MPa	17.5~18.0
	Hydraulic Power Take-Off	Type	--	Rear sited, optional
		Amount	--	Two pairs or two pairs with one line (Common hoister)
		Spec-ification	mm	M22X1.5
		Flux	L/min	30
	Power Take-Off Shaft	Type	--	Rear sited semi-independent or rear-sited independent
		Spec-ification	--	φ35:6 teethed rectangle spline or φ38: 8 teethed rectangle spline
		Rotation Speed	r/min	Standard: Options: 540; or 540/1000; or 540/760; or 760
	Traction Device	Form	--	Swing rod
		Ground Height	mm	315
	Towing Device		--	U-pothook
	Cab		--	Cab with fan or warm air blower or A/C
	Safety Stand		--	Double columns(mode without cab for option)
	Pilot Seat		--	Mechanically floating, PVC coating, height, front/rear and backrest adjustable
	Electrical System Mode			12 volts, negative earth, twin-wire
	Generator	Voltage	V(voltage)	14
		Power	W	1000
	Regulator	Regulated Voltage	V(voltage)	14
	Generator	Voltage	V(voltage)	12

Technical Specifications

Item			Unit	NorTrac
				70XTC
	Start-Up	Power	kW	3.7
	Battery	Type		6-Q-165
		Capacity	A • h	165
		Voltage	V(voltage)	12
		Amount	--	1
Electric Appliance Instrument Device	Lighting and Signal Device	Headlight	--	Double-filament bulb 45/40W(watt) (one piece, each for L/R)
		Taillight	--	55 W(one piece, each for L/R)
		Horn	--	Single Horn
		Front Turn Signal	--	21 W(one piece, each for L/R)
		Tail Light Assembly	--	Turn indicator : 21 W; brake light 21 W; ambient light: 10 W (one piece, each for L/R)
		Direction Ambient Indicator	--	Turn indicator : 21 W; ambient light: 5 W(one piece, each for L/R)
	Watch and Warning Device	Combination Instrument	--	Water temperature gauge, fuel meter, tachometer
		Warning Device	--	On instrument panel: charge indicator, beam indicator light, L/R direction indicator, parking light indicator, oil pressure indicator, alarm light, Safety warning symbols; reflector.
	Fuse Box		--	10 routed fuse plate or fuse wire.
Air-Brake System	Air-Brake Device Mode		--	Air-cut brake
	Gas Tank Dimension		L	23
	Exhaust Opening Clearance of Brake Valve		mm	1.0~1.5
	Working Pressure of Brake Valve		MPa	0.60~0.64
	Opening Pressure of Safety Valve		MPa	0.8±0.05
Perfusion Cap. Value	Fuel Tank		L	78
	Engine Oil Pan		L	16
	Gearbox-Rear Axle		L	40
	Lifter		L	21
	Steering Oil Tank		L	2.5
	Water Radiator		L	15
	Radiator		L	5

Technical Specifications

Item	Unit	NorTrac
		70XTC
Front Drive Axle	L	11.5

8. Disassembly and Disposal

After the machine reaches the end of its service life, for your personal safety and the protection of the environment, please deliver it to the licensed company specialized in the disassembly and recycling of such products.

The tractor should be disassembled in a sequence, from top to bottom, outside to inside. In the case of large or heavy parts a hoist should be used. Please take the battery to a battery recycling company and collect all waste oil for proper treatment.



WARNING: The battery electrolyte is corrosive. Take precautions to ensure that it does not get in your eyes or on your skin or clothes. If this happens, clean the affected area immediately with water and seek immediate medical treatment.



IMPORTANT ISSUES: Battery acid and machine oil are hazardous wastes. They should be disposed of properly following local laws so as not to cause any damage to the environment.

Breaking down a scrapped tractor requires special tools and practical experience. A lack of either of these can cause serious injury and damage to the environment.



WARNING: When disassembling large or heavy objects (i.e., a tractor) a hoist must be used and care should be taken to ensure safety at all times.

9. Warranty Terms



LIMITED WARRANTY



4WD Diesel Tractor

NorTrac™ equipment is sold by NorTrac; a division of Northern Tool & Equipment Company, Inc. NorTrac will repair or replace, at its option, any part(s) thereof of the NorTrac™ 4WD diesel tractor or compact crawler / bulldozer that are shown to be defective in material and/or workmanship, under normal use during the applicable warranty period. There is a \$100.00 deductible on the labor per warranty repair. After the labor deductible, all warranty repairs and replacements will be made without charge for parts or labor at a pre-authorized service center. All parts replaced as a result of this limited warranty become the property of NorTrac and must be returned upon request. All parts replaced will become a portion of the whole and will be warranted for the duration of the original equipment warranty.

Length of Warranty

The limited warranty begins on the original date of purchase and extends to 24 months for consumer household use. For the commercial end user, the limited warranty continues for thirty (30) days (Commercial use is defined as all applications in which the equipment is used for income production purposes, business purposes, or used by any governmental agency).

To qualify for the limited warranty you must:

- Be the original purchaser of the equipment. The limited warranty is non-transferable.
- Provide proof of purchase.
- Have purchased the equipment in the United States from authorized representatives of NorTrac and/or Northern Tool & Equipment Company, Inc.

To obtain service you must:

Contact NorTrac's Warranty Administrator by calling 1-800-222-5381 to relay your concerns about the equipment and to receive authorization from the Warranty Administrator. Or mail a letter with detailed failure and contact information to the address listed at the bottom of this page.

After receiving authorization from NorTrac's Warranty Administrator and the address of the Preauthorized Service center, take the equipment to the service center during their regular business hours. Transportation costs are the responsibility of the equipment owner.

If you are not able to secure warranty service from the authorized service center or are not happy with the service, please contact NorTrac's Warranty Administrator by calling 1-800-222-5381.

Exclusions and Warranty Disclaimers:

This limited warranty applies to equipment used in its original form. Any unauthorized modifications or any incorporation or use of unsuitable attachments or parts will automatically void this limited warranty.

This limited warranty does not include parts affected or damaged by accident and/or collision, normal wear & tear (battery, belts, tires, clutch, etc.), fuel contamination, or from failure to follow the instructions contained in the User Manual for the equipment. The cost of normal maintenance of the equipment is the responsibility of the owner.

This limited warranty does not extend to use in applications for which the equipment was not designed or to

Warranty Term

damages resulting from misuse, abuse, or neglect.

Disclaimer of Consequential Damage:

Any implied warranty of merchantability or fitness for a particular purpose, to the extent that either may apply to any NorTrac™ tractor or compact crawler / bulldozer, shall be limited in duration to the periods of the express warranties shown above, and to the extent permitted by law any and all implied warranties are excluded. In no event will NorTrac or Northern Tool & Equipment Company, Inc. be liable for any loss of income, loss of time or use of the product, transportation, hiring of alternative services, commercial loss or any other incidental, consequential, or special damages and / or expenses. Some states do not allow limitations on how long an implied warranty lasts and / or do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusions and limitations may not apply to you. This limited warranty gives you specific legal rights which may vary from state to state.

NorTrac

Warranty Administrator - Warranty Information

2800 Southcross Drive West — PO Box 1219

Burnsville, MN 55337

10. Appendices

10.1 Tractor Fuel, Oils and Solutions

The fuels, lubricants and solutions used on the tractor should conform to the regulations set forth in the table below.

Table 10-1 Tractor Fuel, Oils and Solutions

Application Locations of Oils and Solutions	Fuel, Oils and Solutions	
Fuel Tank	International standard	Adopt ASTM D-975 fuel. Under general air temperatures, use 2-D grade fuel; when ambient temperatures are below 32 F, use 1-D grade fuel
Engine Oil Sump	International standard	Engine sump, injection pump, and governor use viscosity grades compliant with SAE viscosity classifications. Use all-season SAE 15W/40 multi-grade oil. Quality class should comply with API CD grade standard
Water radiator	Use a 50/50 blend of antifreeze and water	
Gearbox-rear axle, hydraulic lifter, and front drive axle	International standard	Drive system and lifter, hydraulic steering, and central and final drives of front drive axle can use MF1135 (Massey Ferguson), M2C 86A (Ford), or J20A (John Deere) general-purpose oil
Steering fluid	International standard	Same as above
Oil Fittings/ grease zerks	International standard	Use a multipurpose grease
Battery		Maintenance free
IMPORTANT ISSUES: Mixing oils of different brands and manufacturers can affect the service performance of the machine. Use of mixed oils for engine or drive lubrication or the hydraulic system is not recommended.		



WARNINGS:

1. To avoid danger, do not refill the fuel tank while operating the diesel engine.

2. If the tractor is working under a blazing sun, the fuel tank should not be completely filled, as this will cause an overflow due to fuel expansion. If fuel overflows, it should be wiped up immediately.

IMPORTANT ISSUES: The cooling system should use a 50/50 water/antifreeze mix in all seasons.

10.2 Major Bolts and Nuts Tightening Torque Table

Table 10-2 Major Bolts and Nuts Tightening Torque Table

Assembly Location	Thread Specification	Tightening Torque (N·m)	Tightening Torque (ft.-lbs.)
Bolt connecting gearbox with rear axle	M14	122~149	90~110
Bolt connecting engine with gearbox	M12	73~89	54~66
Bolt connecting half-shaft casing with rear axle	M12X1.25	78~96	58~71
Bolt connecting tie rod with steering knuckle arm	M16X1.5	199~243	147~179
Bolt connecting differential support with driving bevel gear bearing seat	M12	73~89	54~66
Bolt connecting inner and outer casings of front shaft	M16X1.5	199~243	147~179
Bolt connecting lifter housing with rear axle	M12	73~89	54~66
Bolt connecting front shaft (axle) support with engine	M16	182~222	134~164
Joint bolt of drawbar	M16	182~222	134~164
Bolt connecting front wheel hub with front wheel spoke plate	M14X1.5	126~154	93~114
Bolt connecting rear axle spoke plate with wheel rim	M16	182~222	134~164
Bolt connecting rear axle differential carrier with driven bevel gear	M14X1.5	126~154	93~114
Bolt connecting long half shaft with spoke plate	M16X1.5	199~243	147~179
Bolt connecting lift arm with rocker arm shaft pressure plate	M10	41~51	30~38
Retaining bolt of lift cylinder	M18X1.5	287~336	212~248



Warning: When tightening the major bolts and nuts on the tractor, torque wrenches must be used to avoid such hazards as a complete machine performance reduction and/or personal injury caused by a failure to meet the requirements of the tightening torques.

10.3 Tractor Roller Bearings, Needle Bearings and Steel Ball Specifications\

Table 10-3 Tractor Rolling Bearings, Needle Bearings and Steel Ball Specification

SN	Standard Code	Name and Model	Installation Position	Quantity
1	GB/T 276	Bearing 6211	Front and rear ends of gearbox countershaft	3
		Bearing 6211-Z	Front end of gearbox driving power shaft gear	1
		Bearing 6314	On long half shaft of rear axle, close to rear wheel	2
		Bearing 6213	Outer end at inside of long half shaft of rear axle	2
		Bearing 6312	Inner end at inside of long half shaft of rear axle	2
		Bearing 6211N	Rear end of gearbox output shaft	1
		Bearing 6309	Rear end of rear axle PTO shaft	1
2	GB/T 276	Bearing 6203-2Z	In engine flywheel hole	1
			Water pump shaft	2
3	GB/T 283	Bearing NJ311E	Both ends of left and right short half shafts	4
		Bearing NJ211E	Gearbox input shaft	1
4	GB/T 5801	Bearing NKI25/20	Jack shaft	1
5	GB/T 12764	Bearing HK3524	Gearbox driving power shaft and PTO shaft	6
			Rear axle PTO shaft	1
6	GB/T 297	Bearing 30215	Rear axle differential	2
		Bearing 30309	Rear axle driving spiral bevel gear	1
		Bearing 7509E	Front wheel hull	2
		Bearing 7606E	Front wheel hull	2
		Bearing 32310	Rear axle driving spiral bevel gear	1
		Bearing 2007106E	Front drive axle knuckle pin	4
		Bearing 2007112E	Front wheel hub on front drive axle	2
		Bearing 2007113E	Front wheel hub on front drive axle	2
		Bearing 30209	Front drive axle differential	2
		Bearing 32207	Front drive axle bevel pinion shaft	1
		Bearing 30308	Front drive axle bevel pinion shaft	1
		Bearing 6006	Front drive axle universal drive shaft	2
7	GB /T 301	Bearing 8109	Front shaft guide wheel bracket	2
8	GB/T 305	Needle $\phi 5 \times 25.8$	Front drive axle planetary shaft	102

SN	Standard Code	Name and Model	Installation Position	Quantity
9	GB/T 308	Steel ball 11.906 (15/32")	Gearbox shift shaft	6
			In oil filter base hole	1
		Steel ball 12	Control lever of rear axle PTO shaft	1
		Steel ball 15	In oil filter base hole	1
		Steel ball 5	Front axle rear pendulum shaft bearing seat	1
		Steel ball 7/8"	Brake pressure plate	10
10	GB/T309	Needle $\phi 3.5 \times 28.8$	Shift planetary gear	60
11	JB/T7918	Bearing K25 $\times$ 31 $\times$ 20	Gearbox reverse gear	2
12	Custom	Thrust bearing 996713	Clutch thrust bearing seat	1

10.4 Tractor Oil Seals and Seal Rings Specifications

Table 10-4 Tractor Oil Seals and Seal Rings Specifications

SN	Standard Code	Name and Model	Installation Position	Quantity
1	GB/T 9877.1	Oil seal FB30 $\times$ 40 $\times$ 7D	Gearbox driving shaft	1
		Oil seal FB40 $\times$ 62 $\times$ 8D	Right brake cover	1
		Oil seal FB45 $\times$ 62 $\times$ 8D	Gearbox No.1 bearing	1
		Oil seal FB50 $\times$ 72 $\times$ 8D	PTO shaft (760r/min.	2
		Oil seal B65 $\times$ 90 $\times$ 12D	Long half shaft of left half shaft assembly	2
		Oil seal B65 $\times$ 90 $\times$ 12D	Long half shaft of right half shaft assembly	2
		Oil seal FB80 $\times$ 105 $\times$ 10D	Long half shaft of left half shaft assembly	2
		Oil seal FB80 $\times$ 105 $\times$ 10D	Long half shaft of right half shaft assembly	2
		Oil seal B60 $\times$ 85 $\times$ 14D	In front wheel hub and main shaft outer casing	4
2	GB/T3452.1	O-ring 20 $\times$ 1.8G	Front planetary shaft	6
		O-ring 19 $\times$ 2.65G	At joint of full hydraulic steering oil outlet pipe	1
		O-ring 13.2 $\times$ 2.65G	PTO shift fork shaft	2
		O-ring 20 $\times$ 3.55G	Differential lock operating shaft	1
2	GB/T3452.1	O-ring 25 $\times$ 2.65G	Differential lock push rod	2
		O-ring 92 $\times$ 5.3G	PTO shaft bearing seat	1
		O-ring 15 $\times$ 2.65G	Joint of pressure oil pipe and pump	1
		O-ring 19 $\times$ 2.65G	Joint of oil suction hose and pump	1
			Safety valve seat on lifter cylinder cover	1
		O-ring 31.5 $\times$ 2.65G	Joint of oil filter and oil suction short pipe	1
		O-ring 21.2 $\times$ 2.65G	Joint of oil suction long pipe and lifter	1
		O-ring 11.8 $\times$ 2.65G	Joint of pressure oil long pipe and lifter	1

SN	Standard Code	Name and Model	Installation Position	Quantity
			Spigot joint of multi-way valve oil return pipe	1
		O-ring 103×3.35G	Lifter cylinder cover	1
		O-ring 11.8×3.55G	Lifter cylinder	1
		O-ring 55×5.3G	Lift arm shaft of lifter	2
		O-ring 100×5.3G	Lifter cylinder piston	1
		O-ring 12.5×2.65G	Oil inlet and outlet on lifter cylinder cover	2
		O-ring 16×2.65G	Lowering speed regulating valve on lifter cylinder cover	1
			Connection of multi-way valve oil outlet and hollow bolt	1
		O-ring 23.6×2.65G	Safety valve on lifter cylinder cover	1

NOTE: This table does not include nonstandard oil seals and O-rings.

IMPORTANT ISSUES:

1. Before choosing the farm implements, you should refer to this detailed list and base your decision on the working conditions (requirements of soil resistance, agronomy and so on) of the area. Choose the categories of supporting implements and then consult the distributors.
2. According to the purchased model of the tractor (power capacity) in combination with the working conditions (requirements of soil resistance, agronomy and so on) of the working area, you should refer to the results of the consultations to determine the models of farm implements you need for suitable support. If the supporting equipment is not suitable, it will have an adverse impact.
3. Different working conditions (requirements of soil resistance, agronomy and so on) with the same working efficiency of the implement can give different results. Please calculate the working speed, working width etc. according to local working conditions.



NOTICE: Before using a supporting farm implement, read the implements “operation and maintenance manual” carefully and familiarize yourself with its construction, performance and method of operation to avoid machine damage and personal injury.



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Burnsville, MN 55306-6936

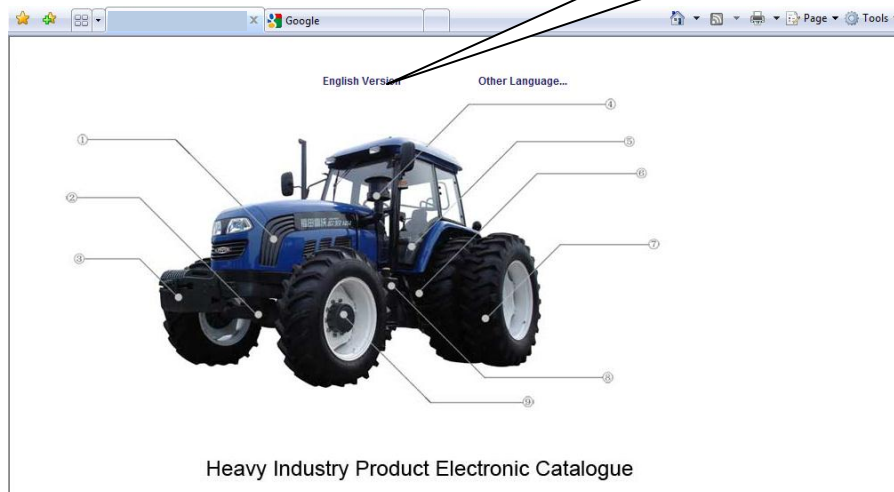
Made in China

70 HP On Line Spare Parts System

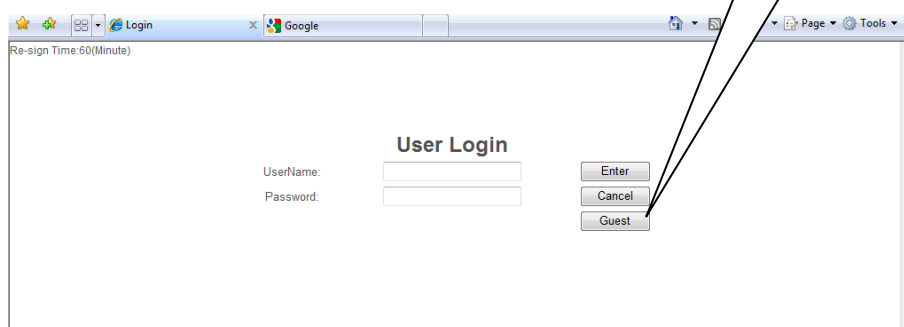
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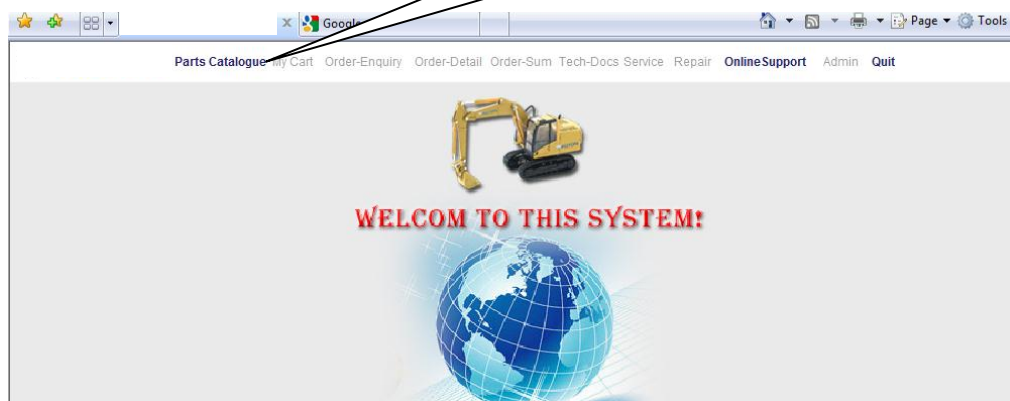
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Then search here

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Product: ProductLine: Series: Product Model:

Part: Model Code: Part Number: Part Name: Searching Sequence:

Then you can find the parts catalog and diagram of the tractor:

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Product: ProductLine: Series: Product Model:

Part: Model Code: Part Number: Part Name: Searching Sequence:

TB40 Series tractor

- TB454-X151Y1K tractor
 - 10Xin Chai Engine
 - Cooling water pump and fan assembly
 - Crankshaft flywheel assembly
 - Cylinder head and gas exchanging syst
 - Cylinder head cover assembly
 - Engine Body assembly and accessory
 - Fuel supply system assembly
 - Oil filter, Starting motor and charging
 - Oil pump and oil pipe assembly
 - Oil sump assembly
 - Piston connecting rod assembly
 - Timing gear train assembly



FEATURES Cabin with heater at option
Grammer seat at option
original Perkins engine at option as well.

☐ Select All

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Product: ProductLine: **Tractor Serie** Series: **TA60** Serials: **TA704-2F461H2K** Product Model:

Part: Model Code: Part Number: Part Name: Searching Sequence: **A->Z** Search

42Transfer case driven assembly

42Transfer case housing assembly

43Braker assembly

43Braker assembly-1

43Braker assembly-2

43Braker assembly-3

44Seat mounting assembly

45Floor mounting

45Floor mounting-1

45Floor mounting-2

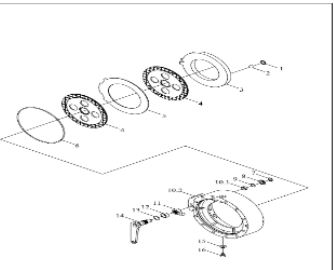
46Safety frame assembly

47Engine hood locking device assembly

47Front wall fender assembly

47Hood lower tail plate mounting assembly

FT300.43.001Brake assembly-1



FEATURESCabin with heater at option
Grammer seat at option
original Perkins engine at option as well.

Put In Cart Select All

Select	QTY	IndexID	DrawID	Name	Remark
☐	1	9	GB/T3452.1	O-Ring18.0×2.65	
☐	1	10	FT300.43.012	Left brake housing assembly	
☐	1	10.1	FT300.43.114	Crank shaft bush	

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FT300.43.001Brake assembly-1

