# OPERATION MANUAL

# Original Instruction

# （300E-354E）

# MADE IN CHINA

# Contents

# Preface

Thank you for your trust on our JINMA-35E and HHJM-35E series wheel tractors (hereinafter JINMA-300E, HHJM-300E, JINMA-304E, HHJM-304E, JINMA-350E, HHJM-350E and JINMA-354E, HHJM-354E). This series is reasonable in structure, excellent in materials and completed in performance. In order to help customres operate, adjust , repair and maintain the products in a better way, and for better performance of this series, we compile this operation manual. As for the operation & maintenance manue of engines, please refer to diesel engine manual.

With technical development and requirenments from our customers, descriptions in the manual may differ from the real structure of your tractors and the differences will be involved in the next version. If what you want to know is beyond this book, plesease contact the agent or the manufactuer.

## “  ” Precaution Symbol

In this manual, this precaution symbol means some important safety information. Seeing this symbol, you should read the contents below it carefully and inform other operators to protect from possible hurts.

"**Warning** " and "**Attention** ": These focus on correct steps or techniqus in operations. Driver or stander-bys will be hurt or even die due to ignore.

**"Important"** : These focus on correct steps or techniqus in operations. Your ignore can result in the damages to tractors or equipments.

# Chapter One Precautions for Safe Operations

1.1 Only after reading the manual carefully, can the driver who has got special training and driving licence with a full survey record operate the tractor. Tractor cannot be operated without licenses.

1.2 This machine only can be operated, maintained and repaired by the perssons who are familiar to its features and know the related safe operation rules.

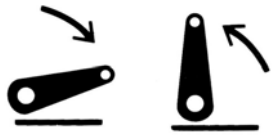
1.3 Driver should pay especial attention to the precaution symbol on the machine.

1.4 It is forbidden to drive tractors after being drunk, tired or taking some antipsychotic.

1.5 1.5 During operating the tractor, driver should strictly complies with the informed steps accroding to the presaution symbols to avoid accidents. When the symbols are lost, poluted or abrased, they should be replaced in time.( See Fig.1--1~Fig. 1-7 for precaution and operation symbols)

| REF. | MEANNING | | LOCATION | Q.TY |
|---|---|---|---|---|
| 1-1 |  | DANGER：ENGINE FAN | On the two sides of radiator wind scooper clearly. | 2 |
| 1-2 |  | DANGER：HOT PARTS | 1.On the two sides of radiator wind scooper clearly.<br>2、Near to muffler. | 2+1 |
| 1-3 |  | DANGER：COOLING SYSTEM UNDER PRESSURE | On the position of fore and lower part of radiator. | 1 |
| 1-4 |  | CONSULT THE USER MANUAL BEFORE OPERATING THE MACHINE | On the PTO guard at the back of the machine | 1 |
| 1-5 |  | DO NOT USE CHAINS OR ROPES JOINED TO ROPS FOR TOWING | On the right inside of ROP. | 1 |

| REF. | MEANNING | | LOCATION | Q.TY |
|---|---|---|---|---|
| 1-6 |  | DO NOT STAND BETWEEN TRACTOR AND EQUIPMENT WHILE OPERATIING HYDRAULIC LIFT | At the central site of the machine end. | 1 |
| 1-7 |  | ALWAYS LOCK ROPS IN UPRIGHT POSITION UNLESS IT HAS TO BE FOLDED DOWN TO ALLOW OPERATION UNDERNEATH TREES OR BUSHES | On the left og the inside of ROP | 1 |
| 1-8 |  | PROHIBITION:<br>DO NOT LUBRICATE MOVING PARTS | On the two sides of radiator wind scooper clearly. | 2 |
| 1-9 |  | CONSULT THE MANUAL（IF THE MANUAL IS MISSING OR DAMAGED，CONTACT THE VEHICLE'S MANUFACTURER） | On the right side og tractor instrument panel | 1 |
| 1-10 |  | DIESEL | On the front end of oil tank | 1 |
| 1-11 |  | HYDRAULIC OIL | On the oil tank | 1 |
| 1-12 |  | USE SAFETY BELTS | On the right of the inside of ROP | 1 |

| REF. | MEANNING | | LOCATION | Q.TY |
|---|---|---|---|---|
| 1-13 |  | STARTER CONTROL | Above starting switch | 1 |
| 1-14 |  | ENGINE SHUT-OFF CONTROL | Above choke line | 1 |
| 1-15 |  | DIFFERENTIAL LOCK CONTROL | above pedal of differential lock | 1 |
| 1-16 |  | ENGINE ROTARY VARIATIONS | On cover plate of hand throttle assembly | 1 |
| 1-17 |  | THREE-OINTLIFTING ECHANISM CONTROL | At the starting and ending positions of lifter control lever | 1 |
| 1-18 |  | PARKING BRAKE CONTROL | Near hand throttle assembly | 1 |
| 1-19 |  | DIPPED-BEAM HEADLAMPS CONTROL | On the surface of head lamps | 1 |

| REF. | MEANNING | | LOCATION | Q.TY |
|---|---|---|---|---|
| 1-13 |  | STARTER CONTROL | Above starting switch | 1 |
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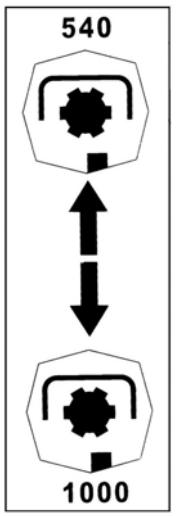
| 1-17 |  | THREE-OINTLIFTING ECHANISM CONTROL | At the starting and ending positions of lifter control lever | 1 |
| 1-18 |  | PARKING BRAKE CONTROL | Near hand throttle assembly | 1 |
| 1-19 |  | DIPPED-BEAM HEADLAMPS CONTROL | On the surface of head lamps | 1 |

1.6 Before operation, a new tractor should have a running-in following the related regulations. And then normal loaded work can be done.

1.7 Befor the tractor moves, on its path should be no any barrier, and no people between the tractor and the rear implement or trailer.

1.8 Don't leave driver's seat to start or control the tractor. Each gear shifter should be placed at the "neutral gear" before strating or getting off the tractor.

1.9 Don't get on or off the tractor during its running. Before repairing the tractor, the machine should be stopped and the key should be taken off. Repair or check under the tractor is forbidden when the engine runs.

1.10 To avoid turn-over, only low gears can be used, especially going on high slopes or muddy path. When going downslope, clutch engaging or neutral gear is not allowed. Let the running tactor not too near to any ditch, to avoid damage due to broken trenches.

1.11 In transportation, the left and the right brake pedals should be joined and locked together. Move PTO handle to the "Apart" position.

1.12 When the suspended implement of the tractor is transfered, hydraulic lifter should be at the position of "neutral".

1.13 No sharp turn is permitted while driving at a hig speed. Sharp turn with the help of one side brake is prohibited eitherto avoid turn-over or parts damaging .

1.14 You'd better check and fasten bolts of wheel radial plates and the bolts or nuts in other key positions.

1.15 When transfering to another field or operating with hung farm implements, high speed is forbidden to avoid the damage to parts of lifting system and suspending system. Before leaving the tractor, driver should drop down its farm implement first, stop the engine and take off the key to prevent others from starting the tractor.

1.16 Before starting the tractor, you'd better check oil duct, electric circuit and cooling water.In any case, it is not allowed to fill the fuel that has not been precipitated or filtrated into tank.After starting the machine, you'd better pay attention to all indicators and meters.

1.17 Before filling fuel into tank, you'd better stop the engine; Smoking is prohibited during fuel filling and check & repair for fuel system.

1.18 When deep treaded tires working or transfering in fields, high speed is not allowed; Deep treaded tires can't be used for transportation.

1.19 Tractor cannot be used with over load to avoid damage to organs. Load limit of the trailer is 3 tons.

1.20 Dirts should be eliminated from radiating water tank to guarantee its heat radiating performance. When the water tank is too hot, you can't water the engine or water tank with cold water to avoid breaking the tank. You should reduce its load and only after the water is not so hot can cooling water be filled with the engine running.

1.21 You should tell your next shift about any troubles of the tractor. During operation in night, fine lightings are necessary.

1.22 When it works below 0 ℃ in winter, exhaust all the water in the case of idling operation to avoid organs freezing caused by remained water.

1.23 Manufacturer is not responsible for any reduced raliability of the machine, personnel hurt or damaged machine due to any unauthorized reform on the tractor.

1.24 During running or working, if one of the tractor's driving wheel is found severe wheelspin, you can use the differential lock following its instruction. The differential lock is forbidden to use in any other case to avoid machine damaging or other accidents.

1.25 During harvesting or operating in field yard, a spark extinguisher should be installed on air exhaust .

1.26 Exhaust elbow and muffler are high temperature components. within a half hour after starting or stoping the engine, anyone is not allowed to get near to avoid burn.

1.27 Faulted tractor cannot be put into use, especially when oil pressure is zero or too low , water is too hot or abnormal sound or smell come. The machine should be stopped for check and the trouble should be shot in time.

1.28 Only after taking earth wire off from the battery can electric parts be repaired.

1.29 Don't stop the tractor on a big slop. If so, its park brakes should be used and a triangle should be stuck under the real wheels.

1.30 The protecting components for driver is not indispensable. However when installing safety frame on the tractor, a seat belt is necessary; when removing the fram fron the tractor, the seat belt should be removed too to avoid ues by mistake.

1.31 When working in fields or muddy area, you'd better remove the dirt from your shoes and keep the pedals clean.Catcj the armrest carefull when getting on or off the tractor.

1.32 When driving along the road, you'd better follow the local traffic rules

1.33 In any case kids or no-drivers should be kept far away from the machine to avoid hurts.

1.34 Before using PTO, a protecting cover need be installed.

1.35 Before operating the tractor, please read operation manual; Please be sure to sit on the seat and fasten the seat belt, then you can start and operate the tractor.

1.36 It is forbidden to put down the roll bar when you are starting and using the tractor normally!

1.37 You can use the differential lock only when the tractor skid on the muddy road; when the tractor skids, please press the handle of the differential lock, then the differential lock works, and it makes lef-right jaw of the drive shaft meshing to be one, and then makes the tractor driving out of the muddy road; At the same time release the handle back to the position!

# Chapter Two General Description

JINMA-35E、HHJM-35E series wheel tractors （JINMA-300E、HHJM-300E、JINMA-304E、HHJM-304E、JINMA-350E、HHJM-350E、JINMA-354E、HHJM-354E）are a new series developed by ourselves according to Europe farming machinery markets.

JINMA-35E、HHJM-35E series wheel tractors are newly developed with kinds of new technologies, new processes and new structures, together with years' production experiences . The new series has more reasonable structures and better improved performance. They are more powerful, economical in oil consumption, high efficiency , nice in appearance, easy in operation and maintenance, conenient for being supported, economical in use and perfect in integrated performance. This series has got EC certificate in Decemner 2007 (Certificate No. e11*2005/67*0005*00) while the certificated types exclude any optional parts.

JINMA-35E、HHJM-35E series wheel tractors are equipped with 30hp and 35hp vertical and oil-saving diesels respectively. Direct transmission is used between the engine and the transmission system and an 8-gear gear box is installed for the work of rototilling, ploughing, harvesting, transportation and so on. They have a hydraulic suspending system with perfect performance, low-pressure broad driving wheel tires with fine adhesion, and airbraking device with reliable performance. Besides, customers can select different types of tractors according to their own requirenments and economic situations. The series include single-acting clutch and dual-acting clutch, 2-wheel driving and 4-wheel driving, mechanical steering and entirely hydraulic steering.

## ⚠ Warning:

**1. Manufacturer is not responsible for any reduced reliability of the machine, personnel hurt or machine damaging due to any unauthorized reform on the tractor or any operation that doesn't follow related technical requirements.**

**2. You can only use the implements specially designed for this series. Customers should try to avoid possible damages to the machines caused by the farm implements that don't follow the configuring regulations.**

# Chapter Three Key Technical Specifications of the Tractors

## 3.1 Data of whole uni

| Parameter \ tractor type | | JINMA/HHJM 300E | JINMA/HHJM 350E | JINMA/HHJM 304E | JINMA/HHJM 354E |
|---|---|---|---|---|---|
| mode | | 4 × 2 (2WD) | | 4 × 4 (4WD) | |
| external size mm | L | 3363 | | 3353 | |
| | W | 1485 | | 1485 | |
| | H | 2420 | | 2420 | |
| wheelbase mm | | 1776.5 | | 1833.5 | |
| usual tread of front wheels mm | | 1050~1450(adjustable with steps) | | 1200 | |
| usual tread of back wheels mm | | 1200~1500(adjustable with steps) | | 1200~1500(adjustable with steps) | |
| Min. ground clearance mm | | 350 | | 292 | |
| radius of turning circle m | | 3.55 | | 4.15 | |
| Min. use weight kg | | 1735 | | 1935 | |
| fore axle kg | | 695 | | 845 | |
| rear axle kg | | 1040 | | 1090 | |
| added mass (option) kg | | 208 | | 208 | |
| fore axle kg | | 48 | | 48 | |
| rear axle kg | | 160 | | 160 | |
| allowed max. weight | | 2400 | | 2750 | |
| fore axle kg | | 850 | | 1050 | |
| rear axle kg | | 1550 | | 1700 | |
| pull mass kg | | 1200 | | 1500 | |
| tow truck without braking | | / | | / | |
| tow truck with independent braking | | / | | / | |
| tow truck with inertiabraking | | / | | / | |
| tow truck with hydraulic or pneumatic braking | | / | | / | |
| Noise by ear dB(A) | | 85.6 | | 85.9 | |
| Vibration of the seat m/sec∧2 | | 1.15 | | 1.20 | |

| theoretical velocity km/h | | |
|---|---|---|
| 1.Rated engine speed：2350r/min<br>2.Tyre code of rear driving wheels：11.2-24<br>3.Max. impetus radius of rear driving wheels：516mm | | |
| theoretical velocity / tractor model<br>gear | JINMA/HHJM-300E/304E/350E/354E | |
| | dual-acting clutch | single-acting clutch |
| L- Ⅰ | 2.248 | 2.082 |
| L- Ⅱ | 3.008 | 2.628 |
| L- Ⅲ | 4.127 | 4.279 |
| L- Ⅳ | 6.258 | 6.785 |
| H- Ⅰ | 10.37 | 8.867 |
| H- Ⅱ | 13.875 | 11.182 |
| H- Ⅲ | 19.451 | 18.204 |
| H- Ⅳ | 28.867 | 28.867 |
| R- Ⅰ | 2.861 | 1.942 |
| R- Ⅱ | 13.2 | 8.265 |

## 3.2 Engine Parameter

| Type / Engine Data | JINMA/HHJM-300E/304E | JINMA/HHJM-350E/354E |
|---|---|---|
| Model | 4L22T1 | 4L22T |
| Type | Four-cylinder,In-line Water-cooled,Four-stroke,Swirl chamber | |
| Bore of cylinder mm | 85 | |
| Stroke of piston | 95 | |
| Tated power/speed kW/rpm | 22.2/2350 | 25.8/2350 |
| Max. torpue/speed N·m/rpm | 103.28/1650 | 120.57/1650 |
| Maximum allowable intake depression kPa | 3.6 | |
| Maximum allowable back pressure kPa | 10.2 | |
| Compression ratio | 22：1 | |
| Displacement L | 2.156 | |

| Engine parameter \ Type | | JINMA/HHJM-300E/304E | JINMA/HHJM-350E/354E |
|---|---|---|---|
| Model | | 4L22T1 | 4L22T |
| Firing order | | 1-3-2-4 | |
| Oil pressure | At idle speed kPa | ⩾ 50 | |
| | At rated speed kPa | 300 ～ 450 | |
| Valve timing phase | Intake valve open(before T.D.C) | 13 CA | |
| | Intake valve close (after B.D.C) | 29 CA | |
| | Exhaust valve open(before B.D.C) | 56 CA | |
| | Exhaust valve close(after T.D.C) | 12 CA | |
| Valve clearance | Intake valve mm | 0.20 ～ 0.30 | |
| | Exhaust valve mm | 0.25 ～ 0.35 | |
| Temperature ℃ | Cooled water | 75 ～ 85 | |
| | Oil | 85 ～ 95 | |
| | Exhaust pipe | ⩽ 650 | |
| Starting method | | Electric starting | |
| Lubricating method | | Pressure & splash | |
| Cooling method | | Water cooling | |
| Overall dimension (L × W × H) mm | | 757 × 494 × 620 | |
| Net weight kg | | 200 | |
| | | | |

## 3.3 Transmission system

| part names \ Type | JINMA/HHJM-300E/350E | JINMA/HHJM-304E/354E |
|---|---|---|
| Clutch | single-acting, dry and constantly-engaged friction type<br>gual-acting, dry and constantly-engaged friction type | |
| Gearbox | two-axial, direct teeth （4+1） × 2 combination type | |
| Central Drive | spiral taper gear | |
| Differential | two planetary gear teeth, bevel gear type (with differential lock) | |
| Final Drive | external gearing direct teeth type | |
| Fore Drive Axle | —— | whole-sealed bevel gear type |
| Transfer Case | —— | spur gear |

## 3.4 Travel, steering and braking systems

<table>
<tr><td colspan="3">tractor type<br>parts and parameters</td><td colspan="4">JINMA/HHJM-300E/350E</td><td colspan="4">JINMA/HHJM-304E/354E</td></tr>
<tr><td colspan="3">Frame Type</td><td colspan="8">No Frame</td></tr>
<tr><td colspan="3">Type of Fore Shaft(Fore Drive Axle)</td><td colspan="4">Inverted-U Pipe Epuilibrium</td><td colspan="4">tri-sentor separable axisle shousing of conic reducer</td></tr>
<tr><td colspan="3">Fore Axle Tilt Angle</td><td colspan="4">± 13 °</td><td colspan="4">± 12 °</td></tr>
<tr><td colspan="3">Toe-in of Front Wheels mm</td><td colspan="4">4~11</td><td colspan="4">3~11</td></tr>
<tr><td colspan="3">Toe-out of Front Wheel</td><td colspan="4">2 °</td><td colspan="4">3 °</td></tr>
<tr><td colspan="3">Tumble Home of Main Shaft</td><td colspan="4">8 °</td><td colspan="4">8 °</td></tr>
<tr><td rowspan="11">agricultural tyre</td><td rowspan="3">fore wheels</td><td>tyre code</td><td colspan="2">5.00-15-8PR</td><td colspan="2">6.00-16-6PR</td><td colspan="4">7.50-16-6PR</td></tr>
<tr><td rowspan="3">air pressure / load Pa/kg</td><td colspan="2">200/310</td><td colspan="2">150/350</td><td colspan="4">120/415</td></tr>
<tr><td colspan="2">350/430</td><td colspan="2">250/470</td><td colspan="4">180/530</td></tr>
<tr><td colspan="2">460/510</td><td colspan="2">340/560</td><td colspan="4">210/585</td></tr>
<tr><td rowspan="7">back wheels</td><td rowspan="2">tyre code</td><td colspan="2">9.5-24</td><td colspan="2">11.2-24</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>6PR</td><td>8PR</td><td>6PR</td><td>8PR</td><td>6PR</td><td>8PR</td><td>6PR</td><td>8PR</td></tr>
<tr><td rowspan="5">air pressure/ load Pa/kg</td><td>120/600</td><td>120/600</td><td>120/745</td><td>120/745</td><td>120/600</td><td>120/600</td><td>120/745</td><td>120/745</td></tr>
<tr><td>180/765</td><td>200/810</td><td>160/880</td><td>200/1000</td><td>180/765</td><td>200/810</td><td>160/880</td><td>200/1000</td></tr>
<tr><td>210/845</td><td>280/1000</td><td>180/940</td><td>240/1110</td><td>210/845</td><td>280/1000</td><td>180/940</td><td>240/1110</td></tr>
<tr><td rowspan="6">lawn tyres</td><td rowspan="3">front wheels</td><td>tyre code</td><td colspan="8">31 × 9.5-16-4PR</td></tr>
<tr><td rowspan="3">air pressure / load Pa/kg</td><td colspan="8">120/640</td></tr>
<tr><td colspan="8">140/705</td></tr>
<tr><td colspan="8">160/765</td></tr>
<tr><td rowspan="3">back wheels</td><td>tyre code</td><td colspan="8">13-20-6PR</td></tr>
<tr><td rowspan="3">air pressure / load Pa/kg</td><td colspan="8">80/745</td></tr>
<tr><td colspan="8">100/850</td></tr>
<tr><td colspan="8">120/945</td></tr>
<tr><td colspan="3">model of hydraulic steering device</td><td colspan="8">101S-1-100-12-AH</td></tr>
<tr><td colspan="3">model of constant flow pump</td><td colspan="8">CBT-E306(coupling by levogyrate splines)</td></tr>
<tr><td colspan="3">brake</td><td colspan="8">disk brake</td></tr>
</table>

## 3.5 Working unit

| parts and parameters \ Tractor model | | | JINMA/HHJM-300E/304E/350E/354E |
|---|---|---|---|
| Lifter type | | | Semi-divided positioned Type |
| Model of Gear Pump | | | CBN-E314(coupling by dextrogyrate splines) |
| Model of Dispenser | | | Outlaid Unload Control |
| cylinder（diameter × stroke） mm | | | 85 × 100 |
| Safety Valve Type of System andOil Cylinder | | | Damping Valve Direct Action Type and Cone Valve Direct Action |
| System Pressure MPa | | | 16 |
| Opening Pressure of Safety Valve MPa | | | 18 |
| Plowing Depth Control | | | combination control |
| Max Lift Force in the Position of 610mm back from Lower Hook Station kN | | | 4900/4900/5800/5800 |
| Hydraulic-pressure Output Joint | Specification of Diameter | | M16 × 1.5 |
| | Quantity | | 1 |
| | Output Discharge l/min | | 12 |
| Type of Hanging Device | | | REar Three-point Suspending |
| Hanging Connection Triangle mm | | | W |
| Connecting Aperture of Upper Suspending Point mm | | | Φ19 |
| Connecting Aperture of Lower Suspending Point mm | | | Φ22 |
| Mode of PTO Shaft | | | combined type |
| speed r/min | | | 540/1000 |
| Circumrotation Direction | | | Clockwise(Facing the head-ward of Tractor) |
| Shaft Extension | | | I type/ square spline (6-35 × 28.91 × 8.69) |
| pull unit | Diameter of Joint Pin mm | | Φ30 |
| | 20Ground Clearance of Joint Pin (Midpoint) mm | Swing drawbar | 323.5 |
| | | | 418.5 |
| | | Clevis | 509 |

## 3.6 Electrical system

| parts \ model | JINMA/HHJM-300E/304E/350E/354E |
|---|---|
| electrical system | minus earthsingle-wire system12V |
| starting motor | QDZ157Y(12V,3.2kW) |
| generator | ZFW13C1(14V,350W) |
| battery | C603-6QA-90AH |
| gauges | C110-015(oil pressure gauge, fuel gauge, water thermometer,chronometer,speed indicator) |
| head lamp | C201-014 |
| rear working lamp | C203-005 |
| front signal lights | C202-007 |
| tail lamp | C203-002 |
| rear license light | C209-001 |
| horn | C502-50F |
| fuse box | C703-003 |
| combined switch | 254E.48.012 & 254E.48.013 |
| 7-hole socket | C604-001 |
| starting switch | C402-003 |
| speed sensor | C304-005 |
| oil mass sensor | C302-006 |
| oil pressure sensor | C303-002 |
| water-temperature sensor | C301-003 |
| starting interlock switch | C402-007 |
| braking interlock switch | C402-008 |
| cigarette lighter | C801-001 |

## 3.7 Liquid filling capacity

| parts and parameters \ tractor model | JINMA/HHJM-300E/350E | JINMA/HHJM-304E/354E |
|---|---|---|
| fuel tank L | 40 | 40 |
| gearbox, rear axle, final transmission of dispenser L | 18.5 | 20.2 |
| front driving axle L | —— | 6.6 |
| hydraulic steering L | 2.5 | 2.5 |
| lifter L | 8.8 | 10 |
| cooling liquid L | 7.2 | 7.2 |

# Chapter Four Operation of the Tractor

## 4.1 The fuel and lubricating oil of the tractor

See Fig. 4-1 for The fuel and lubricating oil of the tractor.

Fig. 4-1 The fuel and lubricating oil of the tractor

| Site | Season and Envirenmental Temperature | Oil Specification |
|---|---|---|
| Fuel Tank | Summer（Above 10℃） | 0#, -10 # solar oil（GB/T 252-2000） |
| | Winter（Below 10℃） | -10# solar oil （GB/T 252-2000） |
| Oil pan of engine, hydraulic-pressure steering gear of lifter, oil pan of air filter, and injection pump | Below 0℃ | 20# 40# diesel oil（GB/T 5323-1994） |
| | Between 0℃-25℃ | 30# diesel oil（GB/T 5323-1994） |
| | Above 25℃ | 40# diesel oil（GB/T 5323-1994） |
| Gear box, transfer case, front driving axle, mechanical steering device | Summer（Above 10℃） | 40# diesel oil（GB/T 5323-1994） |
| | Winter（Below 10℃） | 30# diesel oil （GB/T 5323-1994） |
| Each grease nipple | For all seasons | ZFG2# complex calcium lubricating grease(SH0370-1992) |
| engine, starter, bearing6203-E | For all seasons | ZFG2# complex calcium lubricating grease(SH0370-1992) |

### ⚠ Warning:

**1. Before filling fuel into tank, you'd better stop the engine; Smoking is not allowed during fuel filling and check & repair for fuel system.**

**2. In no case can gasoline or alcohol be filled in diesel oil. This mixture can lead to fire or explosion because it is more detonable than pure gasoline in fuel tank. Different grade oil can't be mixed for use.**

### ● Important:

1. Only very clear fuel can be used. Fuel should be precipitated for above 48 hours and then only the middle and top fuel can be filled into the tank with a filter. No full fuel for volatilization and screw down the tank cover after filling.

2. Fill fuel before the tank is empty. To fill fuel after the oil is used out in the supplying system, air must be exhausted from the supplying system firstly.

3. Do use a clean filling tool. Don’t wash or wipe with diesel oil. Wipe the overflowed diesel oil at once.

4. Wash fuel tank regularly, discharge precipitated oil, and wash diesel oil filter.

5. Don’t use open oil drum to transport fuel.

6. Put all cloth with oil into containers with covers. No dog-end can touch it.

7. You’d better check the engine oil on each lubricated site very often. Fill oil at the sites in time. Fill grease into grease nipples regularly.

## 4.2 Water

4.2.1 Only clear and soft water can be filled into water cooling tank to avoid inefficient

performance caused by scale incrustation.

4.2.2 Hard water(in well, spring and so on) should be softened and then be used. Follow the steps below to soften the hard water:

1. Boil up hard water, precipitate and filter it.

2. Use caustic soda to treat hard water at a rate of 1.5g/l

Working in cold areas, anti-icing fluid can be used for cooling water.

### ⚠ Attention:

**When the engine works or just after it is stopped, the water tank has a high temperature, so it is dangerous to open the tank cover at that time. Only after the tank is cooled down can it be opened. To open it , you can loose the cover first to release its inside air pressure.**

### ● Important:

1. Dirt should be eliminated from radiating water tank to guarantee its heat radiating performance. When the water tank is too hot, you can't water the engine or the tank to avoid breaking the tank. You should reduce its load and only after the water is not so hot can cooling water be filled with the engine running. Check cooling water in the tank that should be kept full. Cooling water can’ t be less than 2/3 of the tank volume.

2. When the water in tank is over 100℃, stop the engine immediately. Have a necessary check and repair on the water tank after it is cooled.

3. When operation in the cold area with a temperature under 0℃ is over, you should discharge all the water with tractor idling.

## 4.3 Running-in

To put into use, new tractors or heavily repaired tractors must run in first, because newly manufactured parts have more or less tool marks on the surfaces. If you use the tractor with a heavy load without running-in, abrasion on the parts will be more severe and the parts can even be stuck and damaged to shorten the tractor life.

4.3.1 Preparation before Running-in

1. Wash the housing of the engine.

2, Check and tighten the external bolts and nuts.

3. Check the oil level in each lubricating box, refill oil if not enough.

4. Fill grease to every oil site.

5. Fill fuel and cooling water.

6. Check the toe-in of front wheel (4-11mm); Check air pressure of the front and the rear tires and adjust the pressure to the rated value.

7. Check batteries and connections of the electric circuit in electric system.

8. Put shifter at neutral gear, hand throttle in idle-speed position and hydraulic hand in dropping position.

4.3.2 Running-in of the engine without load

After connecting farm implements to the suspending mechanism, control the lift& drop handle with the engine running at a rated rev to make the suspending unit lift and drop equably for 10 minutes and at least 20 times. Don’ t drop or lift the farm implements on hard ground to avoid damage. After running-in, its oil pump should be stopped from working.

better find out their causations. Only after all troubles are disposed, can the running-in go on.

4.3.3 Running-in of Hydraulic System

After connecting farm implements to the suspending mechanism, control the lift& drop handle with the engine running at a rated rev to make the suspending unit lift and drop equably for 10 minutes and at least 20 times. Don't drop or lift the farm implements on hard ground to avoid damage. After running-in, its oil pump should be stopped from working.

4.3.4 Travel running-in without load for 2 hours

Start and move the tractor according to stipulations and do running-in following the steps and rules below:

| | |
|---|---|
| III-gear | 20min. |
| IV-gear | 30min. |
| V-gear | 30min. |
| VI-gear | 30min. |
| Reverse I-gear | 10min. |

During the travel of free running-in, do steering operations and use the brake suitably. Pay attention to the following items:

1) Watch and listen carefully to the operations of its engine, transmission system and travel & steering.

2) Watch and see if clutch, brake and gear shifting work normally and smoothly.

3) See if indicators and electric units work well.

When abnormal things or troubles happen, you'd better find out their causations. Only after shooting the troubles can load running-in be done.

4.3.5 Running-in with load for 48 hours

The running-in of the tractor with load is to make the tractor operating with a certain load from a small load to heavy one and at speed from low gear to high gear.

See Fig. 4-2 for Loaded running-in and load

Fig. 4-2

| time (h) / gear / load | 3 | 4 | 5 | 6 | total | approximate traction value for reference |
|---|---|---|---|---|---|---|
| basic configuration 150kg (1/4 load) | 3 | 4 | 5 | 5 | 17 | pull 2-wheel trailer, transport on roads with loadof 2 tons |
| basic configuration 300kg (1/2 load) | 3 | 5 | 5 | 5 | 18 | tow a 2-plowshare plough with a ploughing width of 60cm and a depth of 12 cm. |
| basic configuration 450kg (3/4 load) | 3 | 5 | 5 | | 13 | tow a 3-plowshare plough with a ploughing width of 71cm and a depth of 15 cm. |

When abnormal things or troubles happen, you'd

4.3.6 After the running-in is finished, do the following maintenance and then the tractor can be put into use.

1. After the machine is stopped, discharge the lubricating oil from the oil pan of diesel engine. Wash oil pan, engine oil filter cloth and engine oil cleaner, and fill new lubricating oil to rated level.

2. Discharge the lubricating oil from gear box, hydraulic system and front driving axle when it is hot. Fill in some diesel oil, travel for 2-5minutes at II-gear and reverse I-gear, wash it, let out the

washing oil and fill in new lubricating oi.

3. Wash diesel oil cleaner (including the filter cloth in fuel box) and air filter.

4. Discharge cooling water, wash the cooling system of the engine with clean water.

5. Check and adjust the free travels of the clutch pedal and brake pedal, and the operating of the brake.

6. Check and tighten the bolts and nuts at every key connecting sites.

7. Check oil nozzle and valve clearance. Adjust them if necessary.

8. Check the work of electric system.

9. Check and adjust toe-in of the front wheels.

10. Fill lubricating grease to every grease nipple sites.

● **Important:**

**1. See if the operation of engine is right.**

**2. See if clutch adjustment normal and its separation is thorough.**

**3. See if gear shifting of gear box including front driving handle, crawling gear shifting are flexible and easy. Pay attention to possible spontaneous out-of-gear or failure interlock.**

**4. See if brake adjustment is proper and the performance is reliable.**

**5. See if steering control is flexible.**

**6. See if electric units and meters work normally and reliably.**

## 4.4 Steering Mechanism and meters

(1)Preheating starting control unit (Fig. 4-1, part 1)

Insert key into the switch, position "OFF" means the electric circuit not through; turn clockwise to the position "ON", all electric circuits except starting and warming-up electric circuits are energized (after starting, the key should be kept in this position); turn to position "H", heater plug is energized; turn to the position of "ST", starting circuit is alive. Turn anti-clockwise to the position "ST" and it can be started directly.


Fig. 4-1 control unit 1

1-preheating starting switch
2- flameout handle
3-clutch pedal 4- assistant gear-shifting lever
5-key gear-shifting lever 6-braking pedals
7-foot accel pedal

(2)Control Mechanism of Hand Throttle (Fig. 4-3 Parts 11)

Push ahead, and the oil supply will be increased; pull hack, it will be reduced.Hand throttle is forbidden for road traveling.。

(3) Control mechanism of foot throttle (Fig. 4-1, Parts 7)

Step it down to increase oil pully; release pedal to reduce oil supply.

(4)Shut-off control mechanism (Fig. 4-1, Parts2)

Pull the lever backward and the engine will be shut down. Then the lever will be rush into the original position for next starting.

(5)Clutch contro l mechanism (Fig. 4-1, Parts 3)

Step down the clutch pedal forward for releasing

clutch and the pedal to keep the clutch engaged.

（6） Key and assistant gear-shifting control mechanism (Fig. 4-1, Parts 4, 5)

Control key and assitant gearlevers for 8 forward gears and 2 reverse gears. Before the key and the assistant gearlevers, clutch pedal should be stepped down first.

（7） Control mechanism of foot brake (Fig. 4-1, parts 6)

Step down left-right braking pedal for braking. Before that, clutch pedal should be stepped down first. In emergent case, braking and clutch pedals can be stpped down at the same time.

（8） Control mechanism of hand brake (Fig. 4-2, Part 9)

Pull hand brake handle upward for emergent braking or park braking. Before starting the vehicle, check the hand brake to see if it is in the separated position.

(9) Control mechanism of differential lock(Fig. 4-3, Part 13)

Step differential lock pedal down and the differential gear will lose the differential function. After the operation is over, rerlease the pedal to its original position.

(10) Front driving control mechanism (Fig. 4-2, Parts 10)

As for 4-WD tractors, push the control lever forward for 4-wheel driving; pull the control lever backward, separate 4-WD. Before operation, the clutch pedal should be stepped down first.

(11)Control mechanism of hydraulic system (Fig. 4-2, Parts 12)

Control modes of hydraulic suspending system has three types of combination control, position control and floating control. These are operated through lifter control lever, force-control spring assembly, right press plate of lifting axle, middle rod weldment, link lever, feedback link and such other parts.


Fig. 4-2 control unit2

8-PTO handle 9-hand braking assembly
10-front-driving handle


Fig. 4-3 control unit3

11-hand throttle 12-lifter control
13-differential lock pedal


Fig.4-4 combined gauges and switches

14-triad switch 15-combined guages assembly
16-quad switches

(12) Control mechanism of PTO (Fig. 4-2, Part 8)

Pull PTO control handle upward to realize PTO of 540r/min; press PTO control handle down to realize PTO of 1000r/min. Middle position is in saperated situation, no PTO. Every time the speed is changed, the clutch pedal should be stepped down first..

(13)Combined gauges and switches (Fig. 4-4, Part 14, 15 and 16)

Combined gauges include oil-pressure gauge, oil volume indicator, water-temperature indicator, chronometer, rotation speed gauge, warming light and indicator light.

Combined switches include : dipped headlight switch of head lamp, switch of front turn lights, switch of rear turn lights, switches of the front signal light and the front license light, the rear signal light and license light, switches of rear working lights, horn button, switch of emergent light.

## 4.5 Control and Drive

### ⚠ Warning:

**1. Only after reading the manual carefully, can the driver who has got special training and driving license with a full survey record can operate the tractor. Tractor cannot be operated without licenses. Overload is forbidden.**

**2. drivers should pay especial attention to the safety & warning symbols and understand them correctly.**

**3. It is forbidden to drive tractors after being drunk, tired or taking some antipsychotic.**

**4. Don’ t leave driver’ s seat to start or control the tractor. Before starting the tractor, every gear shift lever should be placed in the position of “neutral gear”. To get off the tractor, every gear shift lever should be placed in the position of “neutral gear”.**

**5. Before the tractor moves, its path should be no any barrier, and no people between the tractor and the rear implement or trailer.**

**6. Don't getting on or off the tractor when it is running. No repair or check under the tractor is allowed when the engine runs. People are forbidden to sit on the fender apron. Casualty accident can happen when it parks, so parking brake is necessary.**

**7. To go on an abrupt slope, you’ d better select a proper gear. It is not allowed to shift gears on an abrupt slope. When going down the slope, it is forbidden to stop the engine or out-of-gear or turn sharply. For emergency stop, you should step down the clutch pedal and the brake pedal at the same time. Don’ t just step down the brake pedal , or some mechanical parts will be damaged.**

**8. For transportation operation, the right and the left brake pedals should be locked together. For high-speed driving or full-load operation, it is strictly forbidden to use unilateral brake to get a sharp turn.**

**9. High speed is not allowed when operating or transferring to other field with hung farm implements. Lift the working units of farm implements out of the earth to avoid damages to the parts of lifting system and suspending system. When leaving the tractor, driver should drop farm implements to the ground, stop the engine and take off the keys to avoid others’ starting tractor.**

**10. For emergency parking, you should step down the clutch pedal and brake pedal at the same time. Don’ t only step down the brake pedal , or the brake will be damaged.**

**11. Driving on road, you should follow the local traffic rules.**

## Attention:

**1. Carefully check and listen to the engine and all parts of the tractor when they are working to see if there are abnormal sound and noise, especially check the technical situations of clutch and brake, check and tighten the bolts and nuts at every key site of the tractor. Check air pressure of the tires, aerate the tires if necessary.**

**2. When the machine is turnup during operation, shift to a low gear, release the clutch and discharge the load to avoid lengthways turn-over.**

**3. When engine is over speed, unloading is not allowed. You' d better immediately pull shut-down lever, and turn the decompression rod to the decompression position or keep air away from entering engine or cut off the oil way.**

**4. Watch the color of the exhausted air. Too much black smoke is not allowed to avoid overload of the engine. If the clutch slides or cannot separate thoroughly or brake doesn' t work well, the machine should be stopped for check.**

**Operations during nights need complete lighting equipments.**

**6. When 4-wheel driving tractors travel without load or are engaged in transportation, the front driving lever should be placed in the neutral position.**

**7. To avoid turn-over, especially travel on steep slope and muddy roads. Only low gears are allowed. When going down the slope, it is forbidden to step down the clutch and slide with neutral gear.**

**8. To avoid the pollution caused by the exhaust gas don' t start the diesel in a room that is closed without fine ventilated conditions. When a diesel transfers, keep human and animals far away from the exhaust gas.**

4.5.1 Starting the Engine

Before a new shift begins to work and start the engine, they should do shift technical maintenance first (detailed description is below). Dispense its troubles and do the following work before starting the engine:

1. Release the switch of fuel tank.

2. Pump the oil with hands, fill fuel into fuel system, and exhaust the air in the system.(This step can be omitted generally. )

3. Check and see if every gear shift lever in the neutral position.

4. Hand throttle should be pulled into the position of "fully opened".

5. Insert the key into the switch of preheat starting.

6. Turn the decompression handle to the decompression position (decompression can be omitted in hot weather)

Finishing the above steps, you can start the engine as the following steps:

(1) Starting Preheated Machine

Turn the preheat starting switch anti-clockwise until you can hear the sound of ignition and then return to the position "ON" immediately. Put the hand throttle in the low-speed position. Attention: If the engine has been started while the starting switch is still kept in the starting position, the motor will be burned in several minutes.

(2) Starting Cold Machine:

Turn the crank shaft with engine crank handle for 5-10 rounds, turn the preheat starting switch clockwise to the position "H" and stay there for about 10 seconds, then turn to the position "ST" and stay there for 5 seconds. And then reset the compression handle. After ignition, the starting switch will be reset to the middle position "ON" and put the hand throttle to the poison of small oil supply. Starting the engine costs over 15 seconds and the engine isn't alive yet. The storage battery should rest for 10 seconds and then have another try to start.

3. When it is hard to start due to a temperature of below 5℃, usually you need a engine oil preheater that will be energized for 15 minutes, fill some 20~30℃ water , and the engine can be started. Or you can fill some 80~90℃ water, discharge switch should be on at the beginning to discharge some cold water until the water from the engine is 40~50℃ and the turn off the discharge switch. At the same time, the engine oil will be heated to 60~70℃ and be filled into the engine (slowly churning during heating). It is not allowed to brake the oil pan of the engine with fire, or the machine body will be damaged.

4.5.2 Start to Move

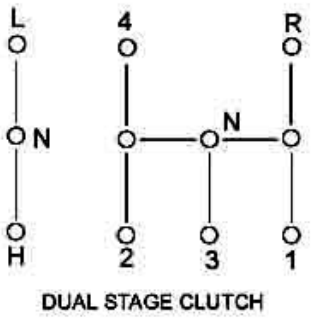
1. Step down the clutch pedal thoroughly, and shift the main and assistant gear shifting levers to needed gear steadily and slowly.

2. Release the clutch pedal slowly and at the same time gradually gear up to make the tractor start moving slowly and stably.

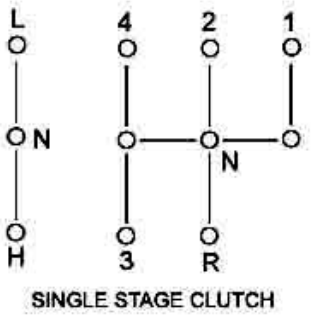
3. Gear selection: Select a proper gear to get a high production and

4.5.3 Driving Tractor

1. Turn the steering wheel to get a direction change. Sharp turn is allowed under low gear. single-side braking can be used to minus the turning radius during field operations (especially in paddy fields) to raise its flexibility and production; however when it operates with high speeds or transports on roads, single-side braking cannot be adapted for sharp turn to avoid turn-over. 2. When the tractor is engaged in transportation or travel on roads, the left and the right brake pedals should be interlocked. When the tractor is parked, especially when it is stopped on a slope, you must use a fixed jaw to lock the brakes to avoid automatical moving.



DUAL STAGE CLUTCH



SINGLE STAGE CLUTCH

Fig.4-5 gears distribution

3. Gear selection: Select a proper gear to get a high production and economic performance. See Fig.4-3 for the speeds and uses of every gear.

I-gear and II-gear cannot be used to plough and harrow, or be used as the pull force. Or the transmission system will have severe overload to avoid damage. During working the tractor should be kept from overload. Follow the steps below to distinguish:

1). V-gear is adapted for working. Put the throttle in the semi-open position to let the tractor work with loads, and then push the throttle to the fully-open position. If now the tractor speed is increase, it means no over load, while if it slows down, it means over load.

2). When V-gear is used for working and engine sounds heavy with black smoke, it means overload. Change to IV-gear. Every time you shift gears, clutch pedal should be stepped down fully first to avoid breaking gears.

4.5.4 Parking

1. Lower down the gear for a slower moving

2. Step down the clutch pedal and push the main gear shifting lever to the neutral position.

3. Release the clutch pedal to make the engine freely run with a low speed.

4. To reduce the water temperature and oil temperature slowly, engine should be kept running for a while at a slow speed. It is forbidden to stop the engine under a high temperature.

5. Push the hand throttle to the position of "closed"

6. Pull out the shut-down lever

7. Turn off the oil tank switch after stopping the tractor.

8. To prevent the cooling water from being frozen in winter that can cause frost crack, you should turn on the two discharge switches and open the water tank to discharge all the water.

Table 4-3

| gear grade | action | theoretical velocity (km/h) | gear | action | theoretical velocity (km/h) |
|---|---|---|---|---|---|
| F1 | rototilling,replanting | 2.248(2.082) | F5 | ploughing, harrowing, and seeding | 10.37(8.867) |
| F2 | rototilling,replanting | 3.008(2.628) | F6 | ploughing, harrowing, and seeding | 13.875(11.182) |
| F3 | harvesting | 4.127(4.279) | F7 | road transportation | 19.451(18.204) |
| F4 | ploughing, harrowing, and seeding | 6.258(6.785) | F8 | road transportation | 28.867(28.867) |
| Speeds in () match single-acting clutch | | | | | |

## ● Important:

**1. When working in fields or muddy area, you'd better remove the dirt from your shoes and keep the pedals clean. Catch the armrest careful when getting on or off the tractor.**

**2. Watch readings of every gauges. During normal operation, engine oil has a pressure range of 300~450kPa and a water temperature range of 70~90℃. When readings on gauges have malfunctions, repair or replace them. Don't use it any longer.**

**3. You should tell your next shift about the troubles and malfunctions you found.**

**4. Try to avoid barriers on roads when driving tractors.**

**5. Driving on roads, farm implements cannot be put into use.**

## 4.6 Operation and Use of the Working Units of Tractor

4.6.1 Operation and use of PTO shaft

Rev of PTO shaft is the combination of 540r/min. and 1000r/min:

1. Push the control handle of PTO shaft to the middle neutral position, take down the protecting cover of PTO shaft and connect the working mechanism and PTO shaft.

2. Step down the clutch pedal to the bottom, put the handle of the driving PTO shaft to the position "conjunction", and then put the handle of PTO shaft to needed gears according to the requirements of working mechanism

3. Release the clutch pedal slowly to run the working units. You’ d better run at a slow speed to check the operation of the working units.

**Warning:**

**1. When using PTO shaft, a safety protecting cover should be installed. People are not allowed to stand on the protecting cover. When the operation is over, an axial sleeve is needed to cover the PTO shaft.**

**2. When selecting implements, you make rotating speed of the farm implement match that of PTO shaft;**

**3. Stop the engine to couple farm implements.**

**4. Coupling with the PTO shaft, cardan joint can’ t have a too big deviation angle;**

**5. To couple with cardan joint, the clutch should be released thoroughly first.**

**6. When the machine travels for a long distance, the control handle should be at the neutral position. Cut off power to avoid breaking farm implements and personnel hurts.**

**7. When the PTO shaft is being coupled, only work staff can be near to the farm implements to guarantee personnel safety.**

**8. When the engine works, to engage or separate the PTO shaft, you should step down the clutch pedal.**

4.6.2 Control and Use of the Hydraulic Suspending System

Hydraulic suspending system has three control modes of force-position combination control, position control and floating control. It operates through force-control spring assembly, right pressing plate of lift shaft, middle-rod weldment, link rod, reactive lever and other parts.

（1） Operation of control handle of hydraulic suspending system

Use control handle to control hydraulic suspending system.

1） Combination control

During ploughing , combination control is used in case of changeable soil specific resistance. Different locations of the control handle can cause different ploughing depth. In the combination control range, lower the control handle moves, bigger depth forms; higher handle brings smaller depth. Adjust until right depth and tighten butterfly nut on handle stopper. Control handle should be sure to touch the stopper every time lifting or dropping farming implements to keep the same depth in the rough

2） Position control

During operations of rototilling, grass cutting and harvesting with farming implements, suspending lifting bar receives pull force and force-control spring can't work. Then the combination control is only position control. In the range of position control, lower the handle goes lower the implement drops.

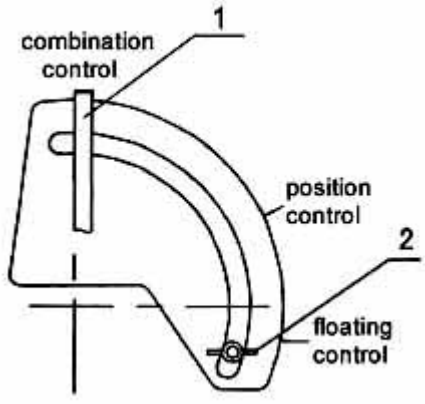



Fig.4-6 control of hydraulic lifting system

1-handle 2-stopper butterfly nut

3）Floating control

Floating control can be selected when a farming implement with land wheel is used. The control handle should be put in the range of floaing control. Now the farming implement will undulate following the land surface along with the land wheel traveling.

（2）Dropping speed control of farming implement

Adjusting dropping-speed control handwheel (2) can change the dropping speed of the farming implement (Fig. 4-7). Suitable dropping speed can avoid the farming implement impacting land due to over-fast dropping and then protect the farming implement.

Dropping-speed control handwheel (2) directly controls the dropping-speed control valve (3) on the control cylinder end (1). Screw in dropping-speed control handwheel (2) clockwise and the farming implement will drop more slowly; screw out withershins and it will drop faster.

Turn the dropping-speed control handwheel (2) until the farming implement can't drop any more when tractor travel a long distance together with farming implement (Don't lock up ) to play a role of hydraulic lock for a safe move of tractor unit.

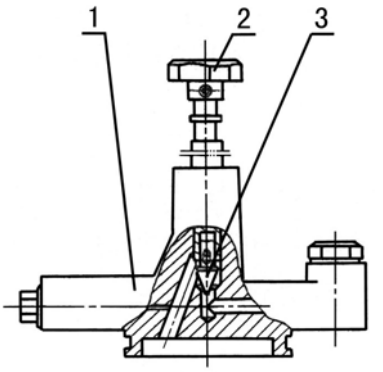



Fig. 4-7Use of dropping-speed control valve

1-cylinder head 2. hand wheel of dropping speed 3. control valve of dropping speed

（3）Simple hydraulic output

To get pressure oil output, move the casing cap from the hydraulic output port on the cylinder top , connect to high-pressure oil pipe, move away the oil-returning block at the same time and couple with oil-return pipe. During operation, the suspending levers should be put in the bottom positions and lock up the dropping-speed control handwheel. Put the control handle in the position of "lifting" and pressure oil can be input into right hydraulic units. Move control handle down, and source oil in hydraulic pump will flow back to oil tank. Return oil of hydraulic device will return back to oil tank through scavenge pipe.

(4) Hydraulic output with hydraulic output valve: This series tractors can be equipped with one set or two sets of hydraulic output valves. During hydraulic output, output oil pipe and return oil pipe can be connected to the quick change coupler on output valve. During hydraulic output, the riser can't work. Only when hydraulic output valve is put in the neutral position, can the riser begin to work.

(5)Coupling and adjusting of suspending gear and suspending plow

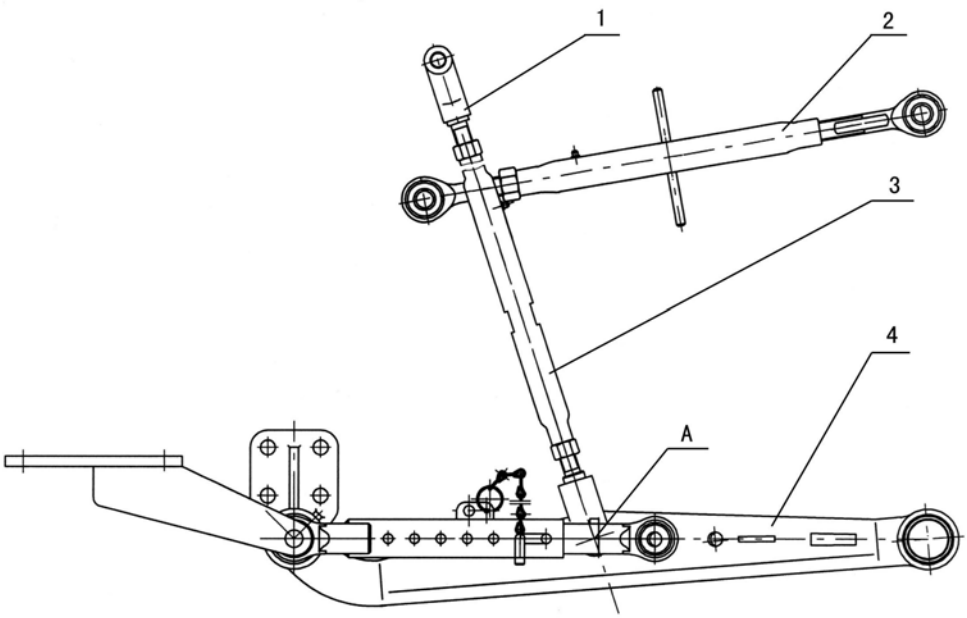
1） Preparation before hanging plough

Install the top lifting lever onto the middle hole of force-control spring rocker (Fig. 4-8), connect top end of left lifting lever with the front hole A of the left lower link , connect the lower end of right lifting lever and the front hole A of right draw link. Force-control spring rocker (or position-control support) has 4 coupling holes: during operating combination control, mi-high hole is used normally, and top hole is used for light load ; lower hole for 35hp load and the below.

As for 30hp, mid-lower hole is used normally while light load uses mi-higher hole. It can be selected according to deflection amount of force-adjusting during trial ploughing Too large deflection or seizing needs top link lever moving down to the lower holes. In the contrary case, couple with higher holes.

2）Hanging plough

Brace bar couples the lower suspending point and the linkage point of draw link through adjusting




1- right lifting lever 2-top link 3- left lifiting lever 4-lower link

Fig. 4-8 suspending gear

the helix of riser. By self-adjusting, top lifting lever 's link pin on top suspending point connects to the top suspending point of plough.

3) Adjustment of plough

a. Left-right leveling adjustment of plough frame: adjust the lengths of left and right brace bars to demanded ploughing depth and keep the plough frame horizontal at the same time to keep depth consistent;

b. Front-back horizontal adjustment: adjust the top lifting lever of the suspending gear: when front plowshare is deep or plowshare heel leaves furrow bottom, top lifting lever should be adjusted; when back plowshare is deep, top lifting lever should be shortened to keep plough frame horizontal.

c. Ploughing width adjusting: ploughing width is adjusted mainly though adjusting the ploughing width adjustor of the plough. Adjusting ploughing width adjustor can change the front-back relative positions of the left and right lower suspending points. Move the right lower suspending point forward to get a larger ploughing width. Adjusting the width adjustor can guarantee the plough frame in its correct position to avoid second ploughing or missed ploughing.

## Attention:

**1. Keep people far away from the lifting area of the lifter when operating hydraulic lifters**

**2. 3-point suspending unit is only for the farm tools especially designed for 3-point suspending devices.**

**3. High speed is not allowed when operating or transferring to other field with hung farm implements. Lift the working units of farm implements out of the earth to avoid damages to the parts of lifting system and suspending system.**

**4. With heavy farm tools connected, the lifting control handle should move up slowly to avoid turn-over.**

**5. Trailer should be connected to the drawing plate.**

4.6.3 Differential Lock

During the travel or operation of the tractor, if one of the driving wheels is found too severely sliding to stop the tractor from moving, you can control the differential lock as the following steps:

1. Step down the pedal of the differential lock, shift to a low gear.

2. Turn the hand throttle to the max. position.

3. Press the control lever of the differential lock at the low right position of the driver's seat. Release the clutch pedal slowly to engage the clutch. Now the two driving wheels of the tractor drives at the same time to let the tractor out of the sliding area.

4. After driving from the sliding area, the tractor cannot turn, or it is possible to damage the mechanical parts.

## Attention:

**1. During normal driving and direct changing of the tractor, the differential lock should be forbidden to use, or the differential lock will stop the tractor from turning and this will lead to breaking parts and enhancing the abrasions of the tires.**

**2. If one of the rear wheel has wheelspin, speed down the engine before stepping down the differential lock to avoid impact on the transmission box.**

**3. When the differential lock is engaged, release the control lever of the differential lever immediately to let it reset.**

# Chapter Five Technical Maintenance of the Tractor

For continuous normal work and a longer life of the tractor, technical maintenance rules should be strictly followed and technical maintenance should be often done to see the technical situation of the tractor.

Technical maintenance is done regularly and is classified into the following grades according to their regular time :

1. Shift technical maintenance: Just after a new shift' work begins or after a new shift's 10~12 working hours
2. I-grade technical maintenance: once every 250 working hours
3. II-grade technical maintenance: once every 500 working hours
4. III-grade technical maintenance: once every 1000 working hours

## 5.1 Shift Technical Maintenance

Following the steps below just after a new shift' work begins or 10~12 hours after work beginning

1. Check the oil level s of oil pan of the engine, transmission box and the lifter. Fill new engine oil if necessary.
2. Check and see if the water in the radiator is full, wash the dirt between the cooling plates away to avoid inefficient heat dissipation.
3. Check and see if fuel tank has enough fuel.
4. Check and see if the fuel sediment bowl contains water or dirt. Eliminate them and discharge the air from the oilway.
5. Check every connecting sites and the engine. Eliminate fuel leakage, engine oil leakage and cooling water leakage if there are.
6. Check the battery for its charging .
7. Check the air pressure of the tires following the Item 3.4 in the Chapter Three "Main Technical Specification". If you have no pressure tester at hand, you can watch the tire tread of the real tires. It is OK with 2-3 teeth touching the ground.
8. Check and see if every assembly of tractor and engine is fastened and reliable.
9. Fill grease to the lubricated points below with a grease gun.
   a. Every points of 2WD axle and 4WD axle
   b. Various sleeves of brakes, clutch pedal shafts.
   c. suspending gear
   d. driving axle
   e. Other relatively-rotating parts .
10. Check and see if the tools along with the tractor is complete.
11. Start the engine and watch is the pressure of engine oil and cooling water is normal.
12. When the tractor travels toward a working site or gets near to farm tools, you should have try to push the control handle of the suspending lifter or the handle of PTO shaft, watching their performances and listen to the working gears.

## 5.2 I-grade Technical Maintenance

Do the following maintenance every 250 working hours:

1. Do all the shift maintenance work .

2. Replace the engine oil in oil pan of engine, wash the engine-oil filter, and replace filter elements.

3. Turn out the discharge plug screw to discharge fuel and wash the fuel tank.

4. Wash the fuel filter, then install it and exhaust the inside air.

5. Clean drabbish and dusts away from air filter.

6. Clean battery with cloth, check battery for its charging, wipe corrosive from connectors, oil the connectors with grease against corrosion.

7. Wash the oil-taking filter of the lifter.

8. Check and regular brakes.

9. Check and regular the travels of clutch.

10. Check the bearing clearance of the front wheels. Adjust it if it is too loose.

## 5.3 II-grade Technical Maintenance

Do the following maintenance every 500 working hours:

1. Do all the work of I-grade technical maintenance.

2. Wash the filter cloth of suction filter of the oil pan.

3. Check the injection pressure and injection quality. Wash the fuel injector and adjust it if necessary.

4. Check valve spring and adjust valve clearance (cold-state intake valve 0.20~0.30mm, exhaust valve 0.25~0.35mm ).

5. Check the nuts on cylinder cover, bolts on links and bolts on flywheels to make sure that they are fastened and reliable.

6. Check the tautness of its fan belt (press the belt with your hand, a 15mm-dent is OK)

7. Check the sealing between the valve and its base. Turn crankshaft, listen carefully and make sure there is no air leakage. Do grinding if necessary and eliminate carbon deposit from its air flue.

8. Check the clearance of free turning angle of the steering wheel, do adjustment if necessary.

9. Replace the engine oil of the transmission box.

10. Check the toe-in.

11. Check the king pin of steering knuckle and its bush. Wash it.

12. Wash the inside of the lifter and replace engine oil.

## 5.4 III-grade Technical Maintenance

Do the following maintenance every 1000 working hours:

1. Do all the work of II-grade technical maintenance.

(2. Eliminate carbon deposit from its air flue, check the sealing of air valve (grinding if necessary). Eliminate the carbon deposit from piston and check the carbon deposit on piston ring. Check piston ring working gap and the abrasion of cylinder liner, link bearing, and crank bearing. Replace them if necessary.

3. Check the abrasion of cam, tappet and rocking arm.

4. Check the oil supply of injection pump for its equality. Do adjustments if necessary.

5. Check the advance angle of fuel supply, do adjustment if necessary.

6. Check the flexibility of the shaft of the cooling water pump and its sealing ring. Replace it if it

works not so well.

7. Wash the water scale away from the cooling system. Top up the cooling system with the mixture of 10L water, 750g caustic soda (caustic soda]) and 200g kerosene, run for 5-10 minutes at a middle speed, remain the mixture for 10-12 hours (in severely cold winter, make it work continuously or do something to keep temperature ) and then restart the diesel, make it run 5-10 minutes at a middle speed, discharge the washing liquid, and wash it with clear water.

8. Replace air filter or the filter element of the filter.

9. Dissemble and check the engine. Have a test on stator insulation and electrical brush, wash its ball bearing and oil with lubricating grease. Replace the oil seal if necessary (Oil new oil seal with engine oil.)

10. Replace the lubricating grease of the front wheel hub bearing.

11. Check the bush of every gear, seal ring and reinforced seal. Replace them if necessary.

12. Check the oil level of steering gear. Top up if it is not enough.

13. After finishing the whole assembling, have a short-time operation to test the performances of every gear.

14. Knock the body of the muffler to eliminate dusts from it.

15. When tractor operation is over, store it in a dry and ventilated place.

16. For maintenance, only the parts that meet product standard can be used to replace malfunctioned parts.

## 5.5 Technical Maintenance in Winter

When operating tractors under a temperature below 5℃, special technical maintenance is necessary. Now besides shift technical maintenance, you should follow the rules below:

1. Engine can’t be started without water in cooling system. You can fill 60~80℃ water into the water tank.

2. After being cold started, the engine should be preheated for a while until the water is above 60 ℃.

3. When the tractor operation is over and it rests for a long time, all the water in cooling system will be discharged (without anti-icing fluid), and discharged water has the temperature of 50~55℃.

4. Fuel and lubricating oil selections depend on air temperatures or seasons.

5. In severely cold seasons, for easily starting the engine, you’d better store the tractor in a warm garage

## 5.6 Technical Maintenance for long-time storage

The tractor that is to be stored for a long time should get a thorough check and test for its technical situation before its storage.

1. You’d better store the tractor in a dry garage, and support it’s front and real wheels with wood blocks to leave ground. If you have to park in an open area, a tarp is necessary to cover the tractor with drainage lead around it. The storing area should be far from fire resources such as oil store and kitchen.

2. Wash and clean the tractor body before its storage. Oil the sites that need lubricating following Fig. 4-1 <<Fuel and Lubricating Oil of Tractor>>.

3. After parking, the cooling water should be discharged from the diesel; dissemble the batteries for another storage; cover air exhaust mouths.

4. Start the engine once every three months, and let it running for 20 minutes at various rev. Watch abnormal performances.

## Attention:

**1. Only the persons who are familiar to the features of the machine and have related safe-operation skills can maintain and repair the machine.**

**2. Read the parts book relative to this manual and the manual for diesel before maintenance.**

# Chapter Six Structure and Maintenance for Tractors

## 6.1 Transmission system

### 6.1.1Clutch

1 . Control unit of clutch. See Fig.6-1 for its structure.

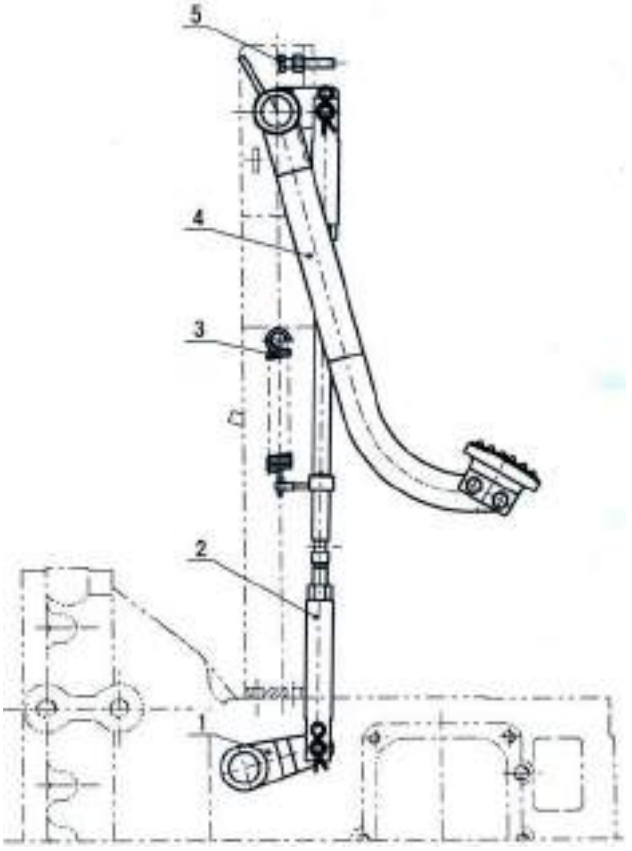



Fig. 6-1 single-action clutch assembly
1- external rocker
2- clutch push rod assembly
3-retracting spring of clutch pedal
4-clutch pedal assembly
5-fixing bolt

2. Single-action clutch

nd the pressure disc doesn't press tightly to the friction disc, the friction force disappears and the driven part doesn't run along with the driving part any longer. Clutch control system mainly includes releasing lever 5, releasing lever iron block(17), releasing spring (6), adjusting bolt of releasing lever (16), adjusting nut of releasing lever (15), releasing bearing (13), return spring of releasing bearing seat (11) and so on.(1) Structure and working principal: Single-disk dry constantly-engaged friction clutch. See Fig. 6-2 for structure

Main clutch parts include engine flywheel 1, clutch case 2, clutch pressure spring 8, and clutch pressure plate 3. Clutch case is fastened with 6 screws 10, pressure plate is installed in clutch case, three claws of the pressure plate are put in the holes on clutch case, and between the pressure plate and the clutch case 6 pressure springs are installed to press the plate towards flywheel end. Its driven part is a driven plate assembly. The whole driven assembly is installed between flywheel and clutch pressure plate and pressed by the pressure plate. Friction force on the contact surface makes the driven part turn along with driving part.The clutch shaft 7 extends into the wheel hub of the driven plate

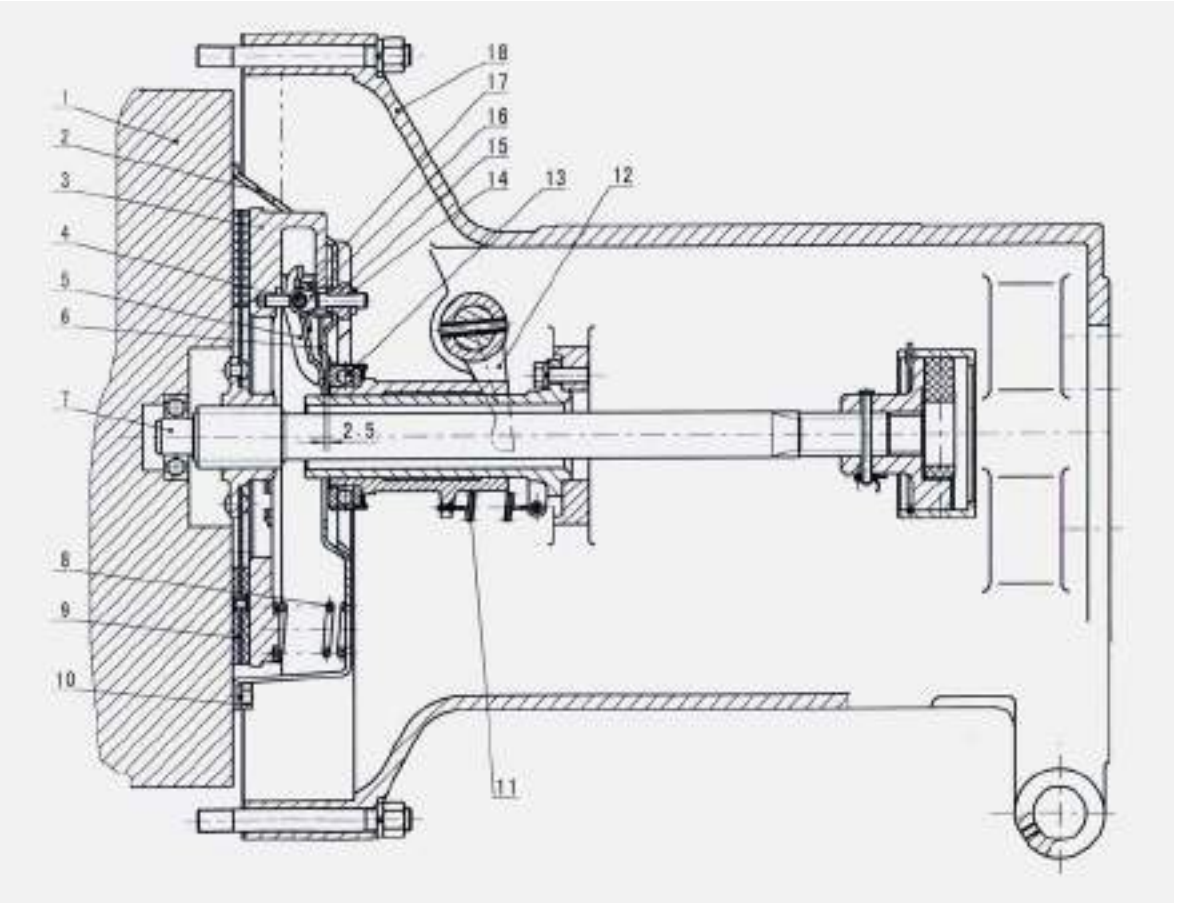



Fig. 6-2 single-stage clutch assembly

1-flywheel 2-clutch cover 3-clutch press disk 4-pin 5-releasing lever 6-releasing lever spring 7-clutch shaft 8-clutch press spring 9-driven-disk assembly 10- bolt 11-return spring of releasing bearing seat 12-clutch release fork 13-releasing bearing986911 14-tightening nut 15-adjusting nut of release lever 16-adjustingbolt of release lever 17- iron block of release lever 18- bridge piece case

assembly and be connected by splines.The power is transfered to the transmission system through the clutch shaft.When the pressure of the clutch pressure spring is overcome a

Saperation of clutch is controled through releasing bearing (13) assembly and clutch pedal assembly (4/Fig. 6-1). When clutch pedal is stepped down, releasing lever is driven through clutch pushrod assembly (2/Fig. 6-1), external releasing rocker(1/Fig.6-1), pin (4) and releasing bearing (13). When the releasing lever 5 is pushed ahead, the releasing lever 5 will be rotated with the pin 4 in the adjusting bolt 16of the releasing lever as a pivot . The end with releasing lever iron blockis pressed on convex jaw of press plate (3) bu its iron block (17).

When the clutch pedal is released, the releasing rocker (1/Fig. 6-1)and the releasing fork (12)will be reset due to the action of the pullback spring(3/Fig. 6-1). Here the clutch releasing bearing (13) will be reset due to the action of the pullback spring(11) of the releasing bearing base, besides, the releasing lever (5) will also be reset without the action of releasing bearing(13). The pressure plate (3) will press the driven plate (9)again due to the action of the pressure spring(8). Here the clutch is engaged.

（2） Adjustment of clutch：

For a reliable power transfer, the driving sector must press the driven sector very tightly to avoid clutch trackslip. There should be 2-2.5mm gap betwenen the releasing bearing 13 and the interfaces of three releasing levers 5. During the clutch being released, only a slight force on the clutch pedal (4/ FIg. 6-1)can eliminate the gap.This travel of the pedal is called as "free travel", converted to releasing rocker's 4-7mm. From this time on, you continue to press the clutch pedal to make the releasing rocker (1/Fig. 6-1) swing ahead until the clutch pedal (4/ fig. 6-1) touches the limit screw (5/fig. 6-1). Its straight distancesliding gear of is called as "working travel", converted to the swinging of releasing rocker, about 26-36mm. During operation, the free travle will be reduced gradually in respose to the abration of the driven plate 9 and the forwarding movement of the pressure disc 3, which will reduce the original " free travel", so regular check and adjustment are necessary and the following are the steps:

1) Turning the adjusting fork 16 to shorten or prolong the push rod (2/fig.6-1)can change the free travel; screwing in or out the limit screw (5/fig.6-1)can change the working travel.

2)clutch can't be released thoroughly:

First, adjust the working travel to its max. value. If it doesn't work, open the check winder on the right of the body of the cover of bridge piece(29), releasing the fastening nut 14 and tighten the three adjusting nuts 15 at the same time. The revolution angles must be the same and use the control test of the releasing clutch to test its reliability. After finishing the adjustment, tighten the nuts14.

3)When the clutch skids:

One possible situation is that the free travel disappears, or the three releasing levers are even compressed, you just need to adjust the free travel to the rated value; the other case is that the free travel is ok, then you must adjust the three adjusting nuts 15, screwing out a same revolution angle. Control the releasing clutch to check the reliability of your adjustment.

The above adjustments on the tractor are just emergency methods. A more reliable method is to dissemble the clutch assembly for adjustments. Refer to "Installation of Clutch".

（3） Use of Clutch

1) Clutch should be released quickly and thoroughly, but no impulse force.

2) Clutch should be engaged equally and stably.

3) Driver should not put feet on clutch pedal during driving to avoid semi-engagement or unreliable engagement that can lead to severe abrasion of clutch and releasing bearing.

4) It is not permitted to control the speed through clutch.

3、Dual stage clutch

Adjustment of dual stage clutch：

Fig. 6-3 shows a coordinated control duable stage clutch that consists of three main sectors: driving sector, driven sector, and control sector (Fig. 6-1). The driving sector runs together with the engine fly wheel, while only when the clutch is engaged, will the driven sector run along with the engine.

The dual clutch should be adjusted on a clamp. Adjusting steps are: adjust the length of adjusting screw 17to get a 99.6mm distance from the three relaesing levers 12 to the end face of the assistant clutch pressure plate 4 with a diffirence value of smaller than 0.1 mm allowe . After adjustments, lock it up with M10×1 nut 16.

Adjust the free travel of clutch pedal (4/fig.6-1). First length of of the clutch push rod assembly (2/ fig. 6-1) is adjusted to guarantee a gap of $2.5 \pm 0.5$mm between the end face of the three releasing

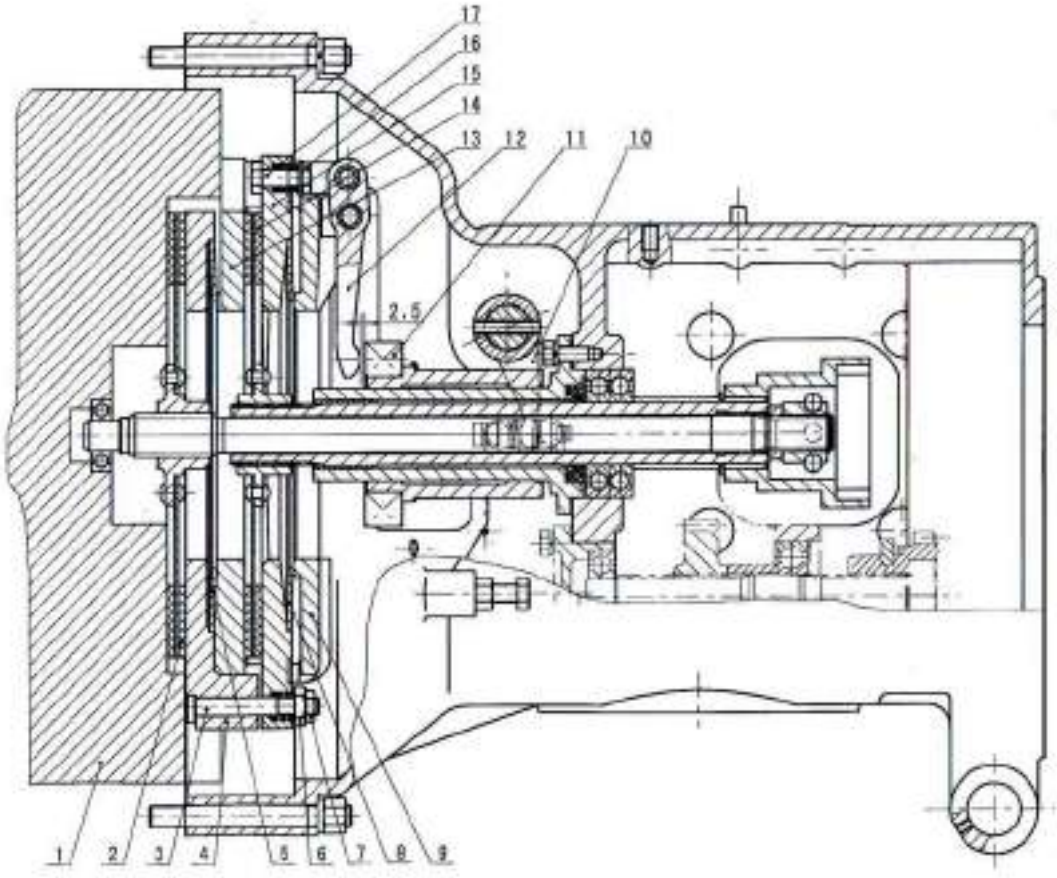



Fig.6-3 dual-acting clutch

1-Fly wheel 2-power output clutch driven disk assembly 3- drawbar 4- Assist clutch press disk 5- batterfly spring 6- adjusting nut 7-nutM10×1 8-batterfly spring 9-clutch cover 10-clutch fork 11-rolling bearing996713 12-releasing lever 13fixed press plate 14-key clutch driven disk assembly 15-key clutch press disk 16-nutM10×1 17-adjusting bolt

levers 12 of the key clutch and releasing bearing 11 . After adjusting the push rod length, lock up the nut .

Adjustment of the working travel of the clutch pedal(4/fig. 6-1) is done through screwing in or out limit screw (5/fig. 6-1).

Other items about dual-stage clutch can follow the related contents of single stage clutch.

## ⚠ Attention:

**1) With safety considered, the engine cannot be started without released clutch.**

**2) When you released the clutch pedal, your action should be quick and when you engage it, action should be slow. Before speed changing, the clutch pedal should be stepped down completely.**

**3) During operation, don't put your feet on the clutch pedal, or the abrasion of the clutch is increased.**

6.1.2 Structure and working principal of shaft coupling:

Shaft coupling is set for three purposes: one is to assort with the axial error between the clutch shaft and the shafts of transmission box; another one is to absorb some of the impact force from the

engine to protect the transmission system; the third one is to prolong the life of the driven disc of the clutch. Now nylon embed-type coupler is adpated for single actions of JINMA35E series tractors, while friction ball for their double actions.

6.1.3 Gear box assembly

（1）Constructure of the gear box (see fig. 6-4 and fig. 6-5)（4+1）×2 gear shifting of the gear box is done through controling the key and assistant gear shifters. The key gear shifter can get four forwarding gears and a reverse gear, while the assistant gear shifter can get a high-speed gear and a low-speed gear. Gear distributions are some diffirent between the single-acting gear box and the bi-acting gear box, so you should first see clearly the gear distributions on the key or the assistant gear shifters.

Step down the clutch pedal, select your needed gear, look around, release the clutch pedal slowly,

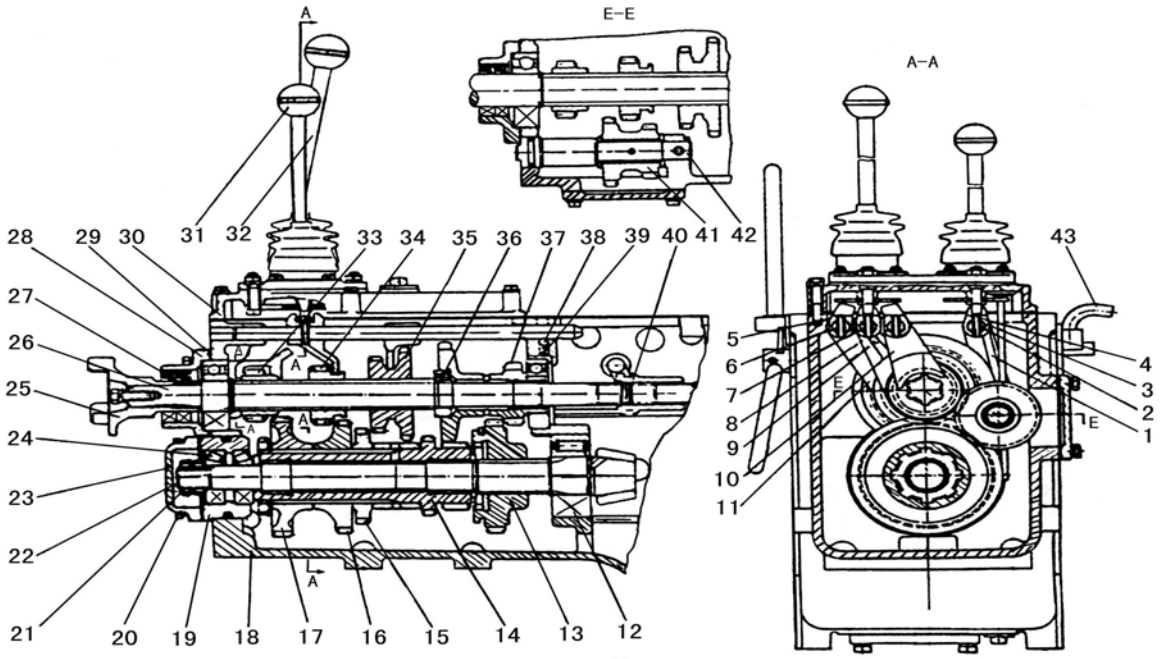



Fig.6-4 single stage gearbox assembly

1-high-low gear shifter 2-high-low gear shift shaft 3-high-low shifting block 4-spring-type straight pin 5-shifting blocks of Ⅲ-Ⅳ gears 6-shifter shaft of Ⅲ-Ⅳ gears 7-shifter shaft of Ⅱ-reverse gears 8-forks of Ⅱ-reverse gears 9-fork shaft of gear Ⅰ 10-shift fork of gear Ⅰ 11-shift forks of Ⅲ-Ⅳ gears 12 - bearing NUP2308 13-high-low gear sliding gear 14-II-shaft spline sleeve 15-driven gear of gear Ⅲ 16-driven gear of gear Ⅱ 17-driven gear of gear Ⅰ 18-cover of transmission case 19-front bearing shell of II-shaft 20-washer 21-round nut 22-II-shaft 23-front bearing cover of II-shaft 24-bearing 31305 25-shafting coupling 26-I-shaft 27-oil seal 28-front bearing cover of I-shaft 29-paper spacer of I-shaft 30-gearbox cover assembly 31-assisy gear-shifting lever 32-key gear-shifting lever 33-sliding gear of I-gear 34-sliding gear of Ⅱ-reverse gear 35-sliding gear of Ⅲ-Ⅳ gears 36bearing 6006 37-high-low gear dual gear 38-steel ball 39-locking spring of fork shaft 40-spline spline coupling sleeve 41-reverse gear 42-reverse-gear shaft 43-aeration pipe

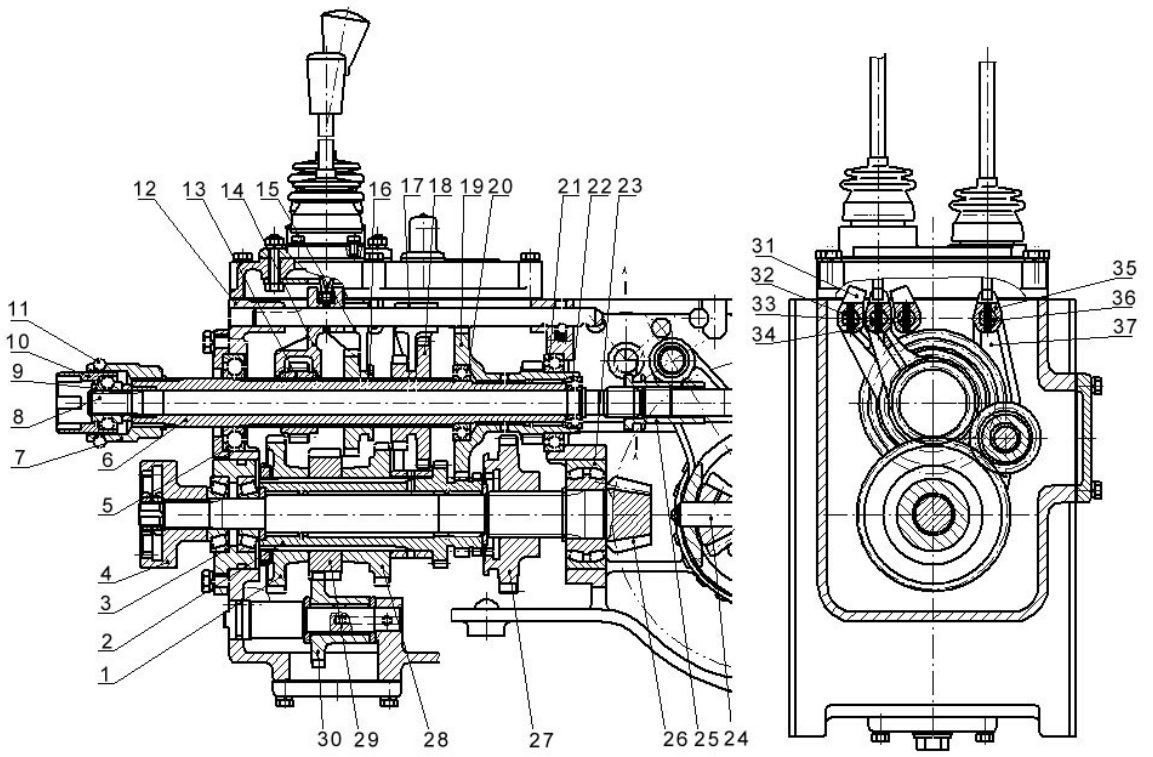



Fig. 6-5 dual stage gearbox assembly

1-driven gear of Gear Ⅰ 2-spline sleeve of II-shaft 3-rolling bearing 31305 4-link gear 5-rolling bearing 6208 6-I-shaft7-coupler driven sleeve of key clutch 8-PTO driving shaft 9-coupler driven sleeve of assistant clutch 10-coupler link sleeve of assistant clutch 11-steel ball 10.3188 G400 b 12-transmission case assembly 13-sliding gear of Ⅰ-reverse gears 14-shifting fork of I-reverse gears 15-shifting fork of Gear Ⅲ 16-sliding gear of Gear Ⅲ 17-shifting fork of Gear Ⅱ-Ⅳ 18-sliding gear of Ⅱ-Ⅳ gears 19-high-low gear dual gear 20-rolling bearing 6007 21-rolling bearing 6010 22-rolling bearing 6004 23-self-aligning roller bearing 22308C 24-diffirential assembly 25-spline coupler 26-II-shaft 27-high-low gear sliding gear 28-driven gear of Gear Ⅱ 29-driven gear of GearⅢ 30-reverse gear 31-shifting fork of GearⅢ-Ⅳ 32-shifitng fork shaft of Gear Ⅱ-Ⅳ 33-shifting fork of GearⅢ 34- shifting shaft of Ⅰ-reverse gears 35-shifting block of high-low gears 36-high-low gear fork 37-high-low gear fork

and then the tractor can travel and take power out. A proper working speed of the tractor cannot only get the best productivity and economical efficiency but also prolong its life. Overload is not proper during tractor working. It is better for the engine to have a certain power margin. Speed selection for tractor's working in fields should let the engine have about 80% load. If it is light loaded and slow operation, higher gear together with small fuel supply can save your fuel.

6.1.4 Differential gear and differential lock

Structure of the differential gear (see fig. 6-6):

Differential gear is taper gear type consisting two planet gears. The big taper gear 5 is fixed on the cover of differential gear 14 by the six bolts 4. Two half-axle gears 15 that can turn inside the

differentialcover are installed inside the differential housing and are connected to the final driving small gears by splines; there are two planet gears 16 engaged to half-axle gear that is installed on the planet gear shaft 17 on the differential cover.

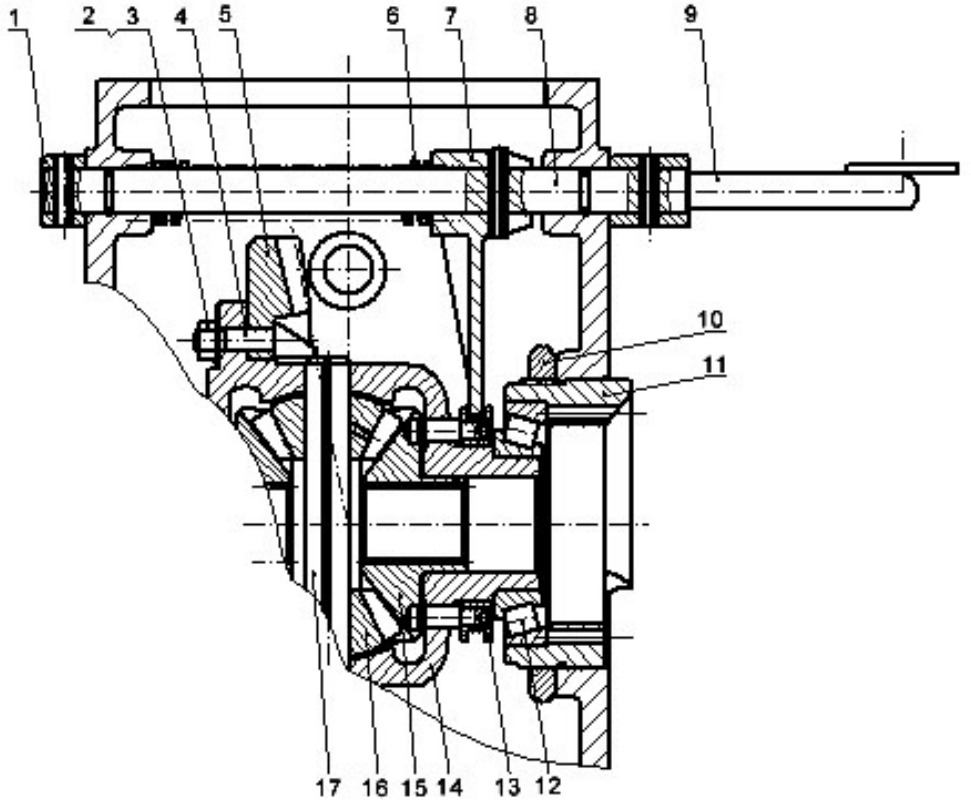



Fig.6-6 diffirencial gear and diffirencial lock assembly

1-axle sleeve 2-washer 10 3-nut M10 4-retainer bolt 5-big tapper gear 6-return spring of diffirencial lock 7-fork of diffirencial lock 8-fork shaft of diffirencial lock 9-pedal of diffirencial lock weldment 10-adjusting nut of diffirencial lock 11-bearing seat of diffirencial gear 12-bearing 30212 13-diffirencial lock assembly 14-cover of diffirencial gear 15-gear of right half axle 16-epicyclic gear 17-planet gear shaft

(2) Adjustment for the differential assembly:

Put the differential assembly into the middle of the transmission box (the big taper gears should be out its left side), then put the inner ring of bearing 30212 and adjusting nuts of differential into its two bearing journals' end. After that, put the differential bearing with the outer ring of bearing 30212 into two bigger holes on the wheel box's two sides and screw the differential adjustment nuts. Take care of the joggle of the big taper gear (the big spiral umbrella) and No.2 axes(the small umbrella) and adjust it if necessary. After adjusting, fix the adjusting nut orientation slice, two M8×14 bolts and the orientation lock slice above the differential adjusting nut (on the wheel box),

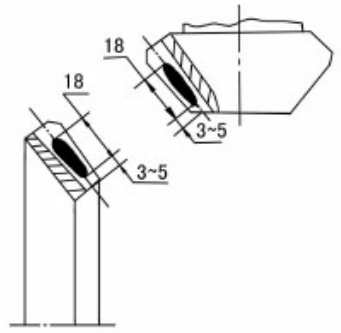



Fig. 6-7 Ideal touch of spiral taper gear

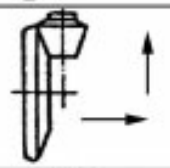
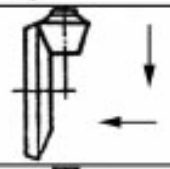
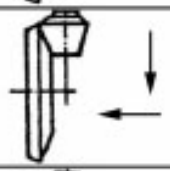
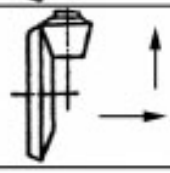
| tooth contacting of big gear | adjusting girections | moving directions of gears |
|---|---|---|
|  | normal print |  |
|  | adjust big gears towards mnall gears. move small gears outward if the clearance is too small |  |
|  | adjust big gears apart from small gears. move small gears inside if the clearance is too big |  |
|  | adjust small gears towards big gears. move big gears outward if the clearance is too small |  |
|  | adjust small gears leaving from big gears. move small gears inside if the clearance is too big |  |

Fig. 6-8 Print adjusting of helical beval gear

then fasten the bolt's six conners by curving the lock slice.

The adjustment of the screw wimble gear should be done after the wheel box has run for 1~2 minutes without oil. The side gap of the taper gear should be between 0.15~0.25mm and the ideal touching trace are shown as Picture 6-7. The interface of the small gear should be higher than the the bigger one. Under the lesser burthen, the touching trace's length should be half of the gear's length. Because the interface will move to the bigger end under full burthen, so you should make sure that the interface is closer to the smaller end when fixing and testing. The screw wimble gear and its adjustment are shown as Fig. 6-8.

The adjustment of the screw wimble gear's trace can be realised by adding or reducing the two axeses' underlay and screw the adjusting nuts on the differential's two sides. At the same time, the adjusting nut can also be used to fasten the differential braring and the total friction torque should be between 0.98~1.47 NM(0.1~0.15 KgN/M).

The differential lock's control is on the tractor's left side(Fig. 6-6), which consists of differencial lock assembly(13), diffiencial lock's joy stick(9), differential dial forked shaft(8), diffierencial lock dial fork(7) and differential lock spring(6). While working, if getting stuck or sliding, the differential lock can be joined as follows to make the tractor move out the lubricious area:

1.Step the clutch pedal, and switch the main and assistant gearlever to low gear.

2.Put the the accelerograph control to the maximum.

3.Use your right foot to step the differential lock footplate.

4.Loosen the clutch pedal slowly to make the tractor move out of the lubricious area slowly.

5.Loosen the differential lock footplate and it will come away automatically.

● **Important:**

The central transmission big and small gears are a pair of matched gears. Make sure that they are fixed correctly. It's better that they are replaced together with the bearing, otherwise the service life will be shortened.

6.1.5 Final transmission (Fig. 6-9)

JINMA-35 series of tractors are equipped with 2 sets of straight teeth cylinder gears (external mesh) final transmission systems, distributed at both sides of the transmission case. Engine transmits its power through clutch and transmission case, and the power is divided by differential mechanism into two parts and transmitted to the right and the left final small transmission gears and then to two driving shafts. Its structure is as Fig. 6-9.

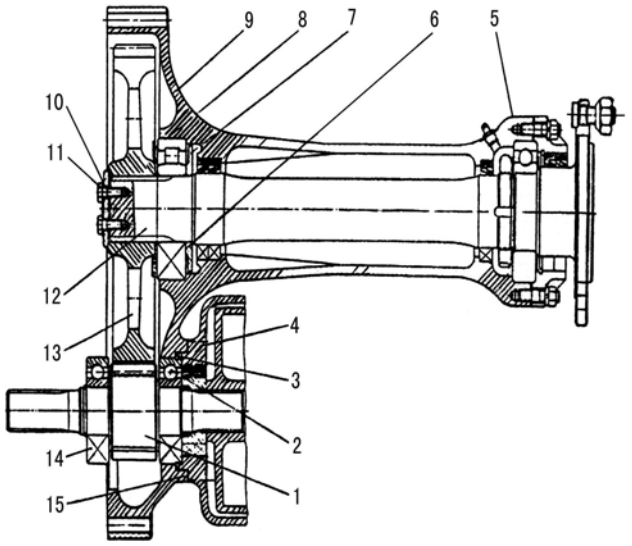



Fig.6-9 Final transmission assembly

1-final-transmission small gears 2-ball bearing6308N 3-limit ring 4-brake housing 5-bearing213 6-bearingNU311 7-base plate 8-baffle 9-final-transimmion housing 10-safety washer 11-screw12-driving shaft 13-final-transmission big gears 14-bearing6308 15-spacer of brake housing

One end of the small final transmission gear (1) is supported in the differential bearing seat with rolling ball bearings 308(14), a spline is inserted into spline hole of differential mechanism half shaft gear and connected with haft shaft gear, another end is set in final transmission housing (9) with ball bearings (2), and its axial position is fixed with limit ring (3) and brake housing (4). Driving shaft (12) is set in the final transmission case with two bearings(5) and (6), big final transmission gear(13) is fixed on the spline of the driving shaft, and engaged with small final transmission gear. The position of the big final transmission gear on the driving shaft is fixed with two M8×20 screws (11) and a safety washer (10). The final transmission case is fixed on the external side of transmission case with twelve bolts.

Lubricating oil in final transmission case: As transmission case is through to the final transmission case, no additional lubricating oil need be filled into the final transmission case, but if lubricating oil in the final transmission case need be drained off, lubricating oil in the transmission case shall be drained off at the same time. Base plate (7) is used for stopping oil and as dismantling tool when connection between bearings NU311 external ring and case is too tight. The block bearing on the small-end driving shaft of the end transmission case shall be often oiled with lime grease.

## 6.2 Travel& Steering System

### 6.2.1 Hydraulic Steering Control Unit (SCU)

Model：101S-1-100-12-AH

Hydraulic Steering Control Unit (SCU) series 101S-1 is integrate hydraulic orbital steering control unit，CU series 101S-1, based upon series 101-1, incorporates relief valve, shock valve, suction valve and check valve inside the steering unit. They inherit the same feature as series 101-1, meanwhile they can also control the steering pressure , and provide the oil cylinder with shockproof and oil suction protection, to avoid the oil flowing backward。

1、Model Code (fig 6-10)

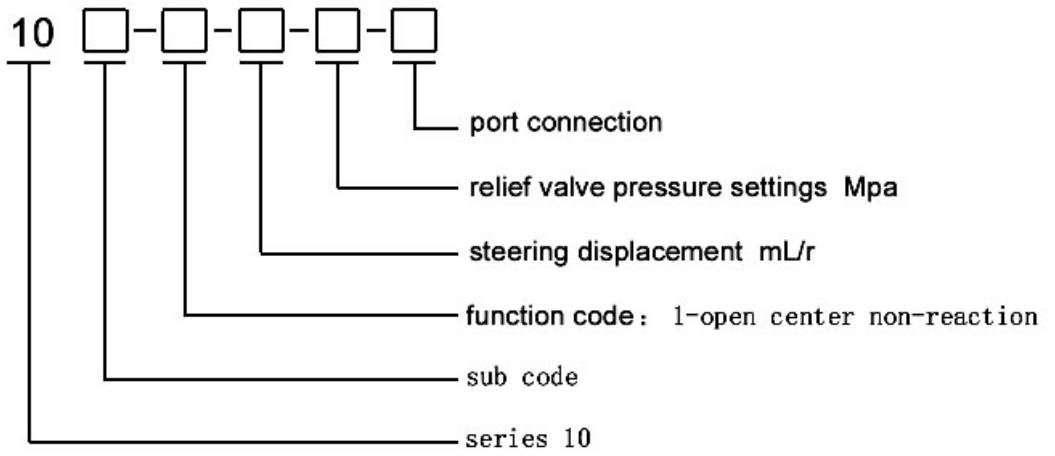



FIG 6-10 Model code

2、Drawing (fig 6-11)

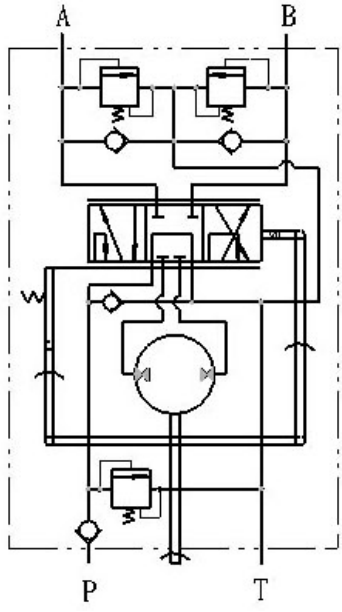



FIG 6-11 Drawing

3、Issues needing attention

(1) For mounting

①the mounting data of SCU should conform with the coaxal requirement between the steering control unit and the steering column, meanwhile there should be about 1 mm clearance in the axial direction between the steering column and the steering control unit.

②The depth of the bolt that fastens the steering column, screwing inside the steering thread hole, should be≤17mm, the fastening torque should be≥30N.m.

③After mounting, the steering control unit should be checked whether the steering wheel can return to the neutral

position smoothly, to ensure the flexibility

④ Pipe connecting: Port P should be connected with supply pipe of the pump, Port T should be connected with pipe to oil tank. Port A and B should be connected separately with the left and the right pipe.

⑵ For oil flow speed

①For the oil supply pipe to be connected with the Port P, it's recommended that the oil flow speed inside the pipe be ≤1.5m/s。

② For the cylinder pressure pipe to be connected with Port A and Port B, it's recommended that the oil flow speed inside the pipe be ≤4～5m/s。

⑶ For others

①The diameter of the steering wheel should not exceed 500mm。

② A filter , the filtering precision of which is 30μm , should be installed on the way to Port T. The tank position should be mounted generally higher than the SCU mounting position, and the backward flowing pipe should be put under the oil, then during the manual steering, the suction can be supplied, meanwhile the air can be prevented to go inside the oil pipe

③The viscosity of the oil for the steering is 17 cst～33 cst. It is recommended to use low condensate hydraulic oil. The scope of oil operational temperature is -30 ℃～100 ℃ and the normal oil temperature should be 20～80℃

④ The steering should be executed under test operation after mounting: Before running, clean the tank and fill the oil to the maximum level. Loosen the cylinder thread screw, to make the pump run at low speed to deflate, until the oil flowing outward doesn't produce any foam. Disassembling the link of the piston rod and the steering wheel, and turning steering wheel to make the piston to the extreme left or right (don't stop between the extreme ends), then filling oil up to the stipulated level. Fastening all the thread joints(don't fasten on the condition of pressure), link the piston rod, and then check whether steering unit operates normally or not under different conditions.

⑤ It's necessary to keep oil clean, to prevent the internal part of the steering unit from being locked by any dirty fragment , resulting in malfunction of steering. Therefore, the filter and the oil should be frequently inspected(the oil should be changed under the condition that there appears the black center on the blotter , if one drop of oil is put on the paper.

⑥ If the operator feels the steering unit heavy or malfunction during the operation, the operator should check carefully and check the reason, it's forbidden to turn the steering wheel rudely , or disassembly the steering unit to prevent parts being damaged. It's

forbidden that two operators turn steering wheel at the same time

4、Disassembly and Assembly

(1) Disassembly

① Disassembly Order:

End Cap—Spacer—Stator—Rotor—Drive shaft—Spacer Plate— Pin + Steel Ball—valve Spool &Sleeve—Pin—Spring—backup ring—Bearing—backup ring—Housing

Plug of Relief Valve—Lock Bolt—Spring base—Spring—Spool of Relief Valve —Base of Relief Valve

Plug of Shock Valve—Shockproof and Pressure adjustment Bolt—Spring of ShockValve —Base of Steel Ball—Steel Ball—Base of Shock Valve

② Attentions

Don’t damage or scrape the surface and end of parts.

Don’ t dip or soak in petrol the rubber ring which is disassembled from SCU. Otherwise it will cause distortion and deterioration.Pay attention to the right position of the steel ball, after it’s disassembled.

③ SCU is a kind of high precision product. The user doesn't have the test tool, thus So we don’t suggest that the user disassemble it himself.

(2) Assembling

① Assembling Order

Valve Spool—valve Sleeve—Pin—Spring—Big backup ring—Bearing—small backup ring—Housing—Steel Ball+ Pin—Spacer Plate—Drive shaft—Rotor—Stator—Spacer—End Cap

Base of Relief Valve—Spool of Relief Valve—Spring—Spring Base—Locked Bolt —Plug of Relief Valve

Base of Shock Valve—Steel Ball—Base of Steel Ball—Spring of Shock Valve—Shockproof and pressure Adjustment Bolt—Plug of Shock Valve

② Attentions

Ⅰ. Please clean all the parts (except the rubber ring) with petrol or coal oil before assembly. If there is paint with the connection surface, it should be cleaned by acetone. Please clean with soft brush or silk ,it’s forbidden to clean with any cotton or clout. And the best cleaning method is to blow by compressed air.

After finishing assembly, the operator should put 50-100 mL hydraulic pressure oil into the input port , and turn the valve spool left or right . If there is no problem , it can be installed in the vehicle.

Ⅱ. Keep clean the connection surface of Housing ,Spacer Plate, Stator and End Cap. Do not be scraped or broken.

Ⅲ. There is a mark both on the end surface of the rotor and on the drive shaft, the mark of the drive shaft should be meshed against the tooth vale of inner spline. Pay attention to the right position while assembling.

Ⅳ. For the bolt of the end cap, the qualified complex washer has to be used

Ⅴ. While fastening seven blots in the end cap, one bolt should be fastened every two bolts in sequence, fasten gradually, and the fastening torque is around 40-50N.m;

Ⅵ. To avoid scraping during assembly, bit Lithium-based lube grease can be used.

6.2.2 Brake

(1) Structure and work principle of brake:

The tractor is equipped with sealing disc brakes, they are set on the left side and the right side of the final transmission (small) gear shaft respectively, the right brake or the left brake may be applied in single side, its structure is as Fig. 6-12 with pressing plates (14) and frictional slice assembly (15) .

Two pressing plates (14) are pulled by each other with 3 springs (16)with 3 steel balls (17) between 2 pressing plates. The pressing plates may rotate around the steel balls, and two pressing plates are connected with a pull plate (3) and a fork pull plate (4), another end of pull plates is connected to adjustment rod (5), and put an adjustment rod in the swing arm (6). The other end of the swing arm is connected to adjustment fork (9) of brake pull rod, brake pull rod (11), left brake pedal (13) and the right welded brake pedal unit (12). When treadling brake pedal, two pressing plates are pulled by the pull plate through brake pull rod, adjustment fork, swing arm, adjustment rod to make the pressing plates rotate around steel balls. As there is a spade concave in the pressing plate, clearance between two pressing plates gets wider, so the frictional slices are pressed. As frictional force functions, the frictional slices stop rotating, so the final transmission (small) gear connected to the frictional slices also stop rotating, driving wheel stops work.

When releasing pedal, the pressing plate returns to the original position by the spring (16), and the frictional slices also return to original position and separate from the pressing plate.

If single side brake is applied, turnning radius may be reduced. When two pedals are locked together, treading on any pedal can operate two driving wheels. Pull the manual brake assembly (1) upword to keep tractor inlong-term braked statue .

(2) Adjustment of brake

After brake is used for some time, frictional slices may wear out; so clearance between frictional slices and pressing plate gets wider, which will reduce brake function. So brake shall be often adjusted for safe operation. Adjustment method is to loose nut (9) , tighten nut inside forward (8), and move adjusting fork korward (5), to eliminate clearance caused by abrasion. After adjustment, lock it up with nut(9) to adjust clearance.

If free state and braking state of brake can not be adjusted well by the above method, it can be adjusted by adding or reducing brake cover paper spacers (18)between brake cover (19) and brake case (20). Add paper spacers if brake travel is too short, otherwise reduce paper spacers. It can also be adjusted through changing the lengthof braking soft shaft (11).

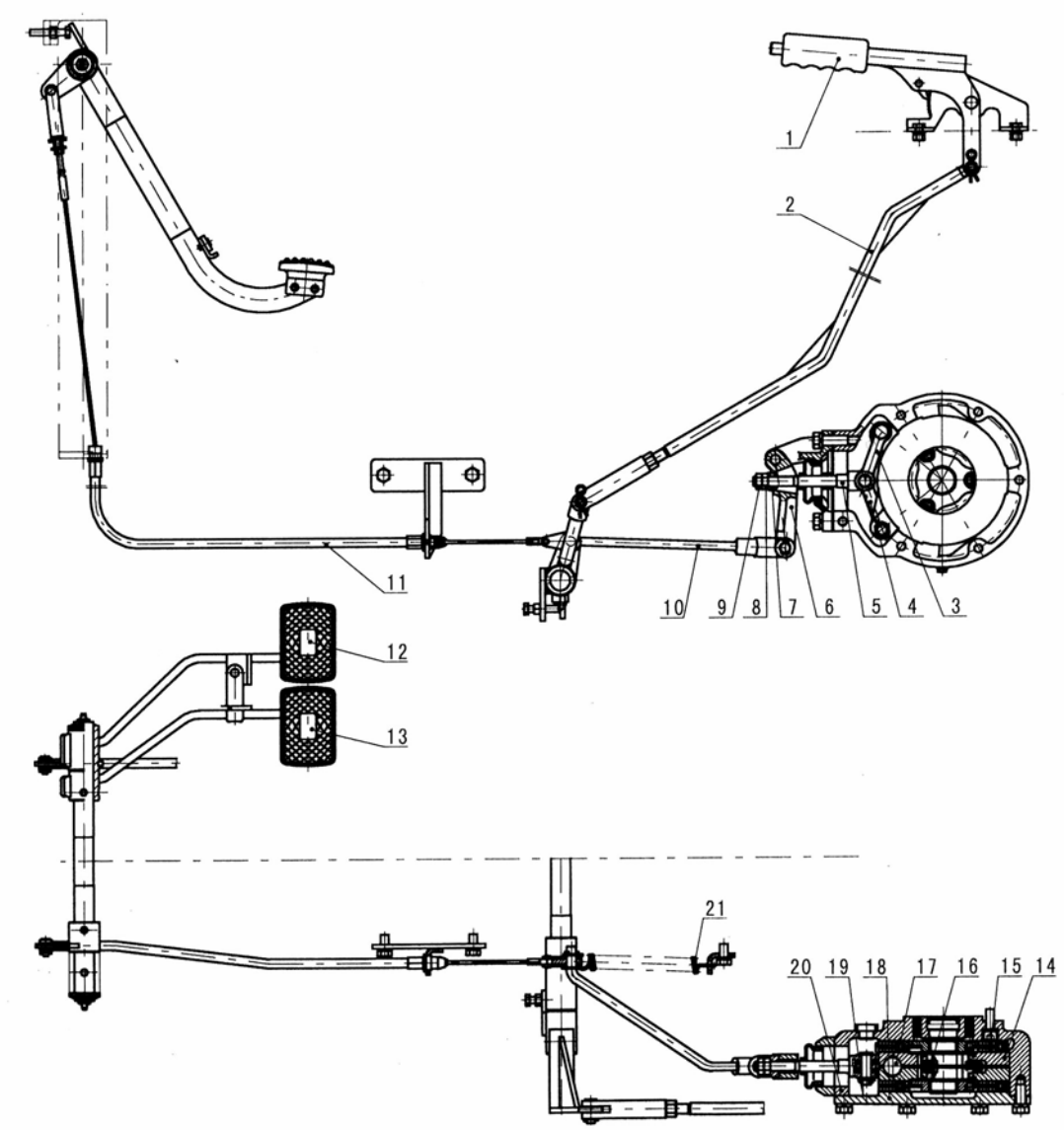



Fig. 6-12 Brake Assembly

1-hand throttle assembly 2-hand brake push rod 3-lever 4-fork pull plate 5-adjusting lever 6-swing arm7-block 8-nut 9-locking nut 10-braking lever coupling fork 11-braking soft shaft 12-right braking pedal weldment 13-left brake pedal weldment 14-pressing plates 15-frictional slice assembly16-return springof pressing plate 17-steel ball 18-brake cover 19-paper spacer of brake cover 20-brake case 21-pedal spring

If adjustment of the left brake is not identical with that of the right brake and emergency brake is applied during a high speed, tractor will have different braking marks and deviate from its course, people can prolong the brake pull rod at the side where braking track is longer or shorten the one at the side where braking track is shorter until the left braking track is as long as the right one and the brake works reliably, and then tighten nut (9), firstly test with III-gear, then IV-gear after adjustment.

(3) Application and maintenance of brake

① Do not put your foot on pedal when brake is not applied to avoid quickened wearing of frictional slices.

②Braking shall be engaged entirely, do not stop at its middle position.

③For braking, firstly treadle the clutch pedal, then treadle brake pedal. Treadle two pedals at the same time under emergency.

④During transportation, the left and the right brake pedals shall be locked together. In particular, when tractor is going at a high speed, don't apply single side brake.

⑤Brake frictional slices shall not be stained with oil.

**⚠ Warning:**

**Before starting, interlock left and right brake pedal. Single-side braking can cause sharp turn and leads to turn over**

**● Important:**

Free travel of the left brake pedal of tractor must be identical with that of the right one; otherwise tractor will deviate from its course and lead to accident in case of emergency brake.

6.2.3 Two-wheel Front Driving Axle

(1) Structure (See Fig. 6-13):

Front axle of 2WD tractor is pipe axle with an adjustable wheel base, setting in front of engine, stand (3) is connected to engine with 6 bolts, swing shaft (2) bears against front end and back end of stand and is put in welded sleeve assembly (25), there are 3 bolts (24) in both sides respectively used for fixing left and right assistant casing pipe assembly (7).

Left and right steering joint assembly (8) is equipped with front wheel rim (17), bearing against two conical rolling bearing 30305 (18) and 32206(19), in the inside of wheel rim there are 2 frame rubber oil seals (11) with spring ends towards the outside to avoid water and soil coming to bearings. There are paper spacers (12) of bearing cover (16) on the outside to avoid oil leakage. There is plentiful calcic grease in the front wheel rim. Washer (15) is used for avoiding accident when front wheel breaks away from tractor as soon as roller ring of bearing breaks. Left and right steering joint assembly and front wheel rim assembly and single thrust ball bearing 51207 (10) on steering joint bolt shall be put in left and right sleeve pair assembly, connected with left (right) steering arm (21) and clipped together with bolt (20), left and right steering arms are connected together with steering rod assembly (23), main bolt of steering joint is equipped with an oil cup (4) to lubricate main bolt and liner bush(6) and (9) at its top, rubber sealing ring (5) on the main bolt shall be used lest dust come in and butter leak.

The steering connector is shown as Fig. 6-14 with ball-head pin (1) and ball-head pin seat (2). They can relatively rotate in all directions in space, the ball-head pin seat is pressed at pull rod connector (8). Ball-head pin seat end is covered with a cap (3) and pressing spring (4). They are pressed with a spiral cover(5), a lock bolt (6) passes the screw cover (5) to avoid it is loose. Its lower end is put in oil seal sleeve of connector (9), and lubricating oil is filled into pull rod connector hollow by grease nipple(7).

(2) Adjustment and maintenance

New tractor's front wheel has a toe-in of 3 to 11 mm before ex-factory. Adjustment procedure is as Fig. 6-21: loose nuts (22) at both sides, turn transverse pull rod assembly (23) to adjust the distance between the front end and the back end of front wheels, and make the distance 3 ~ 11mm less than that

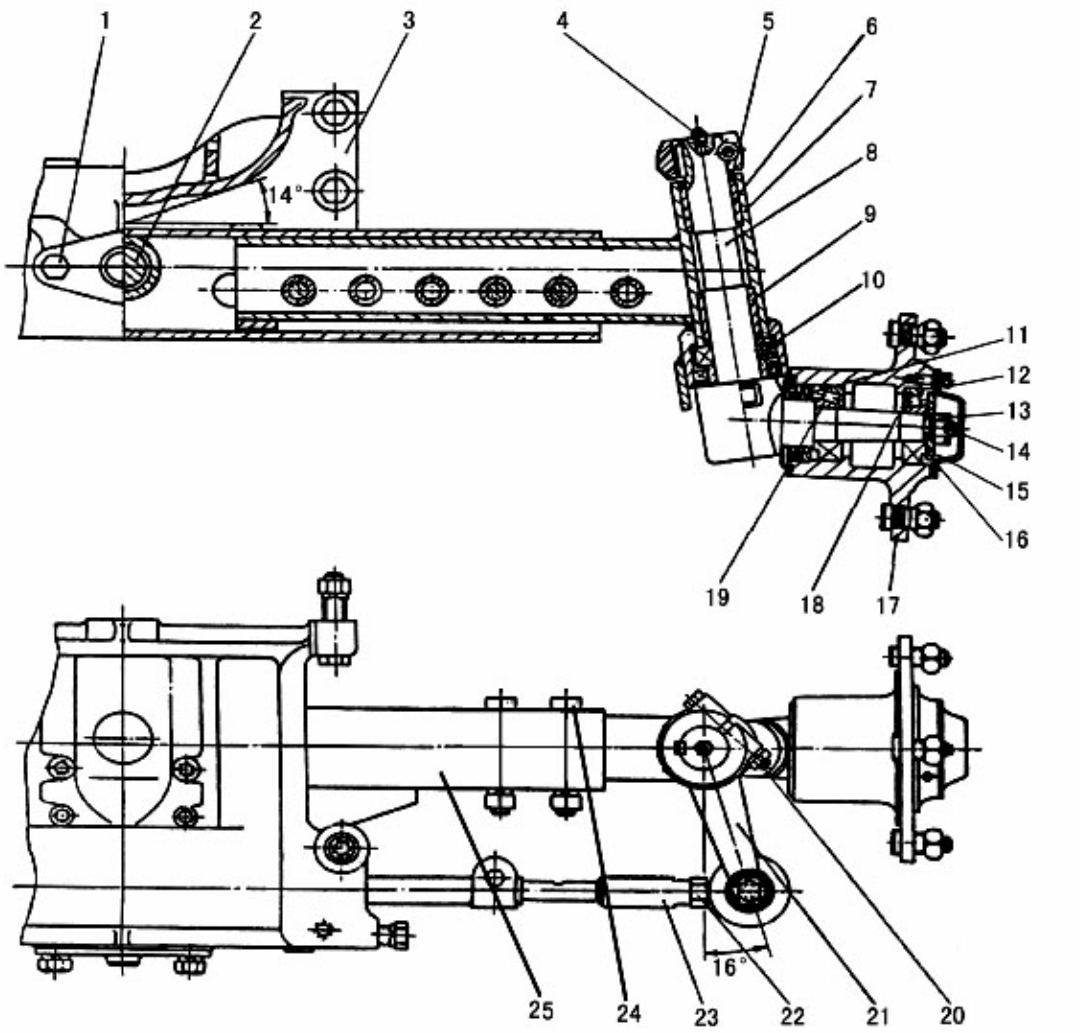



Fig.6-13 2WD fore axle assembly

1-screw 2-swing shaft 3-stand 4-oil cup 5-seal ring 6-bush 7- assistant casing pipe assembly 8- steering joint assembly 9-bush 10-bearing 51207 11-oil seal 12-paper spacer 13-nut 14-split pin 15-washer 16-bearing cover 17-front rim 18-bearing 30305 19-bearing 32206 20-bolt 21-left steering arm 22-nut 23-steering rod assembly 24bolt 25- sleeve assembly

of the back end (when measuring the distance, steering wheel shall be at the middle position). After adjustment, lock transverse pull rod assembly with nuts.

Sum of axial clearances of two conical roller bearings in front wheel rim shall be within 0.05 ~ 0. 2mm. During adjustment, bearings shall be free of load. Adjustment procedure is to twist channel nut (13), then reverse 12° to 60, and lock nuts with bolt (14).

(3) Dismantlement and installation

①Remove machine cover, air filter stand, battery seat and water tank assembly respectively.

②Lift the front end of engine with a jack.

③Disassemble tie-rods and their joints.

④ Remove the auxiliary sleeveassembly with front wheel rim.

⑤Remove 6 screws connecting stand with engine.

⑥ Remove 2 screw (1) of swing shaft assembly respectively, take out swing shaft (2), and separate sleeve assembly (26) from stand (3). Installing order is the opposite procedure.

Dismantlement and installation of the auxiliary sleeve assembly with front wheel rim:

① Remove bolt (20), then remove left and right steering swing arms (21).

②Take out seal ring (5) and auxiliary sleeve assembly (7).

③Remove bearing cover (16), paper spacer (12), split pin (14) and channel nut (13).

④ Remove washer (15), bearing 30305 and front wheel rim assembly(17) respectively.

⑤Remove the inner ring of bearing 32206 and oil seal (11).

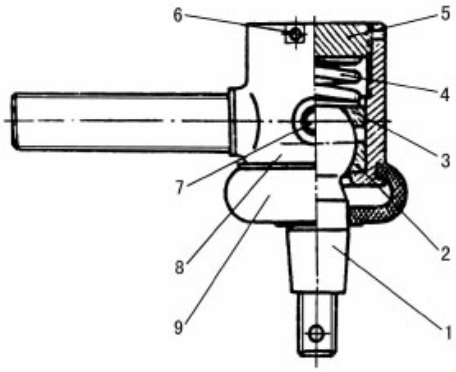



Fig. 6-14 2WD fore acle assembly

1-ball-head pin 2-ball-head pin seat 3-pin cap4-pressing spring 5screw cover 6-lock bolt 7-grease nipple 8-pull rod connector 9-oil seal of connector

Installing order is the opposite procedure, but clean and maintain parts according to the related regulations.

6.2.4 Front driving axle.

(1)Application of front driving axle

Front driving system of 4-wheel tractor is driven with a control handle (10/Fig.4-2). Push the control handle ahead, power is driven to the front driving system; pull the control handle backward, front driving system power is cut off . But before the above operation, you shall treadle clutch pedal (3/ Fig.4-1) to release the clutch entirely.

When 4-wheel tractor goes along highway, power of front driving system shall be cut off to have the front wheels driven for reducing tires wearing. If the tractor is used for transportation for a long term instead of fields work, half shaft (7) shall be removed (see Fig. 6-16) to reduce resistance from front driving system for convenient transport. When the tractor goes along a sticky, wet and sandy path, or works in half- dry water fields, its back wheels skid easily, the front driving system shall be given power to raise its traction force.

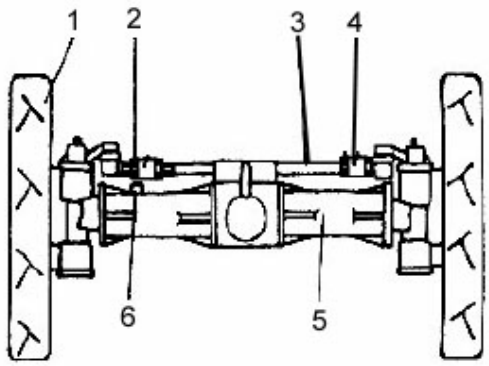



Fig. 6-15 adjustment of toe-in

1-driving wheels 2-locking nut 3-transverse pull rod assembly 4-locking nut 5-front driving asle 6-screw plug

(2) Structure and adjustment of front driving system.

①Adjustment of toe-in (See Fig. 6-15)

Front driving wheels (1) are at straight driving position, toe-in shall be kept within 3 to 11mm,

otherwise adjust it: loose 2 locking nut (2) and (4) at both ends of transverse pull rod, turn transverse pull rod assembly (3), adjust distances between front ends and back ends of front driving wheels(1) to make the front-ends 3 to 11 mm less than that of the back ends. After adjustment, lock the steering rod assembly (3) with nuts (2) and (4)

②Structure and adustment of the front driving axle assembly:

The front driving power turns the front wheels through the following mechanisms, that is, the power goes through the transfer case under the bridge piece housing to the rolling ball coupling joint assembly (Fig. 6-17) to transmit to the central transmission system (Fig. 6-16) to divide into two parts and passes side half shafts to front final transmission.

After bearing (13) and (15) of driving gear (16) in the front central transmission is used for some time, axial movement will get larger. It is necessary to twist its round nut (12) to reduce axial movement, so clearance between driving gear (16) and driven gear (18) of central transmission system will get wider, people may remove some adjustment spacers (10), or adjust nuts (17) at both ends of differential mechanism to get a proper clearance if necessary.

If tractor works in fields, in particular, in paddy fields, it is easy for mud to get into the end surfaces of front and back swing liners (14). To abrase the end surfaces easily, then the axial movement will get wider, plus that removing spacers (10), as the above-mentioned, will let axial movement get wider, so it is necessary to put a thrust washer (11) on every end surface between front axle assembly and swing seat (9) respectively for repairing or replacing to keep a normal axial movement.

Front final transmission small gear (3) and bearing (2) at main bolt (31) and conical gear (1) (21) and bearing (20) at half shaft (7) will wear out after a long time operation, which leads to the meshing clearance between auxiliary conical gears getting wider, so it needs adjusting. Adjustment procedures are as the following: loose oil discharge screw (4) at lower end of terminal transmission case (28) to exhaust lubricating oil.

(1) Upper end of main pin : remove swing arm (23) and main pin shaft seat (24). According to meshing clearance of gears, people may abrade the support sleeve (25) at the lower end of bevel gears (2), (27), and at the same time, take out washer (26) to make meshing clearance get less. Just draw out adjustment washer (26) if it is caused by bearing (22) abrasion, then reassemble the dismantled parts.

(2) Lower end of main pin: support half shaft case (19) of front axle with jack to make front wheel rise away from ground, remove front wheels and end cover (32). According to meshing clearance of gears, add adjusting washer(1) or draw out the adjusting washer (30) on the front driving end cover (29) to reduce backlash of gears, and then reassemble dismantled parts.

(3) Half shaft end: remove the whole front final transmission assembly and check ring 85(6). According meshing clearance of gears, add adjusting washer (5) to reduce backlash, then reassemble the dismantled parts and the front axle assembly.

After the above procedures, you must turn front wheel by hand to see if they can rotate freely without abnormal noise, then fill in lubricating oil to the rated level, and tighten the inlet bolt.

(4) Transfer case assembly (Fig. 6-17)

Transfer case of 304E/354Etype tractor is fixed under the left side of bridge piece case; its structure is as Fig. 6-17. Raise control handle (10) in Fig. 4-2, and the internal gear coupler (14) in Fig. 6-17 is engaged with gear coupler(15) to transmit power from two shafts in transmission case to the power input gear (16) of transfer case, then to PTO gear (12) and PTO shaft (10) of transfer case through middle gear of transfer case, and then transmit the power to the front driving axle finally

through coupling shaft and other parts to turn the front driving wheels.

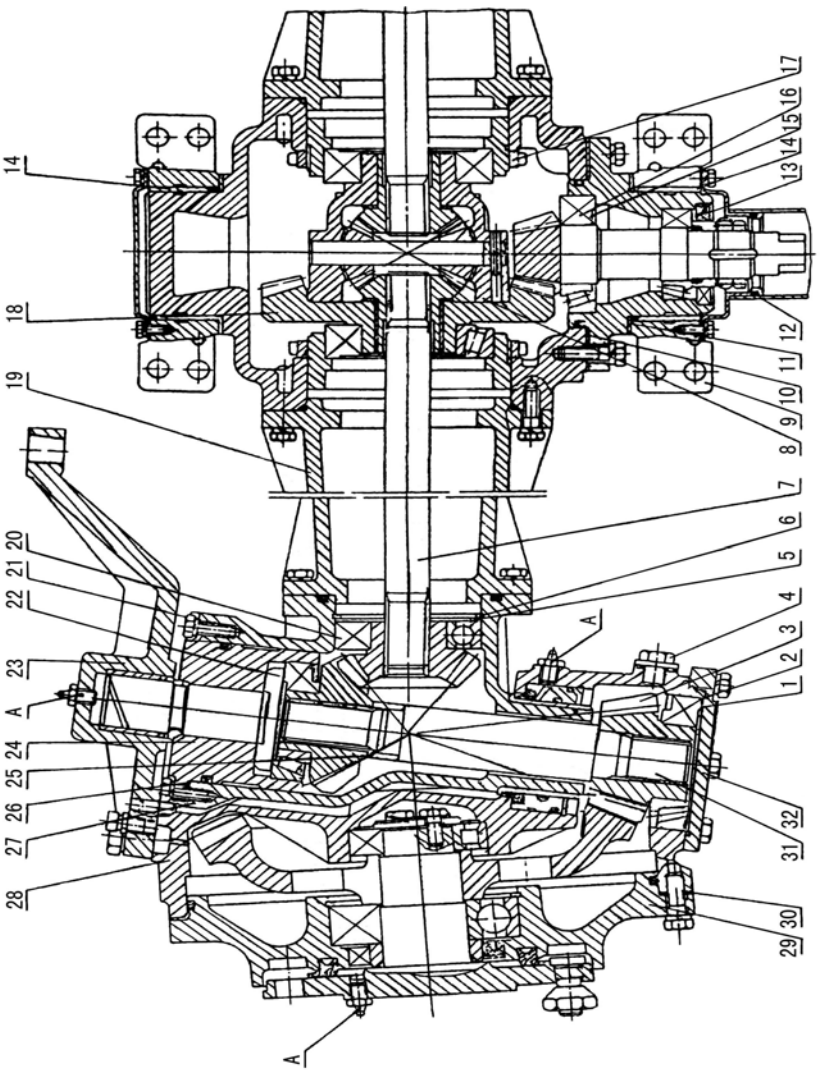



Fig.6-16 Fore central transtmission and terminal transmission

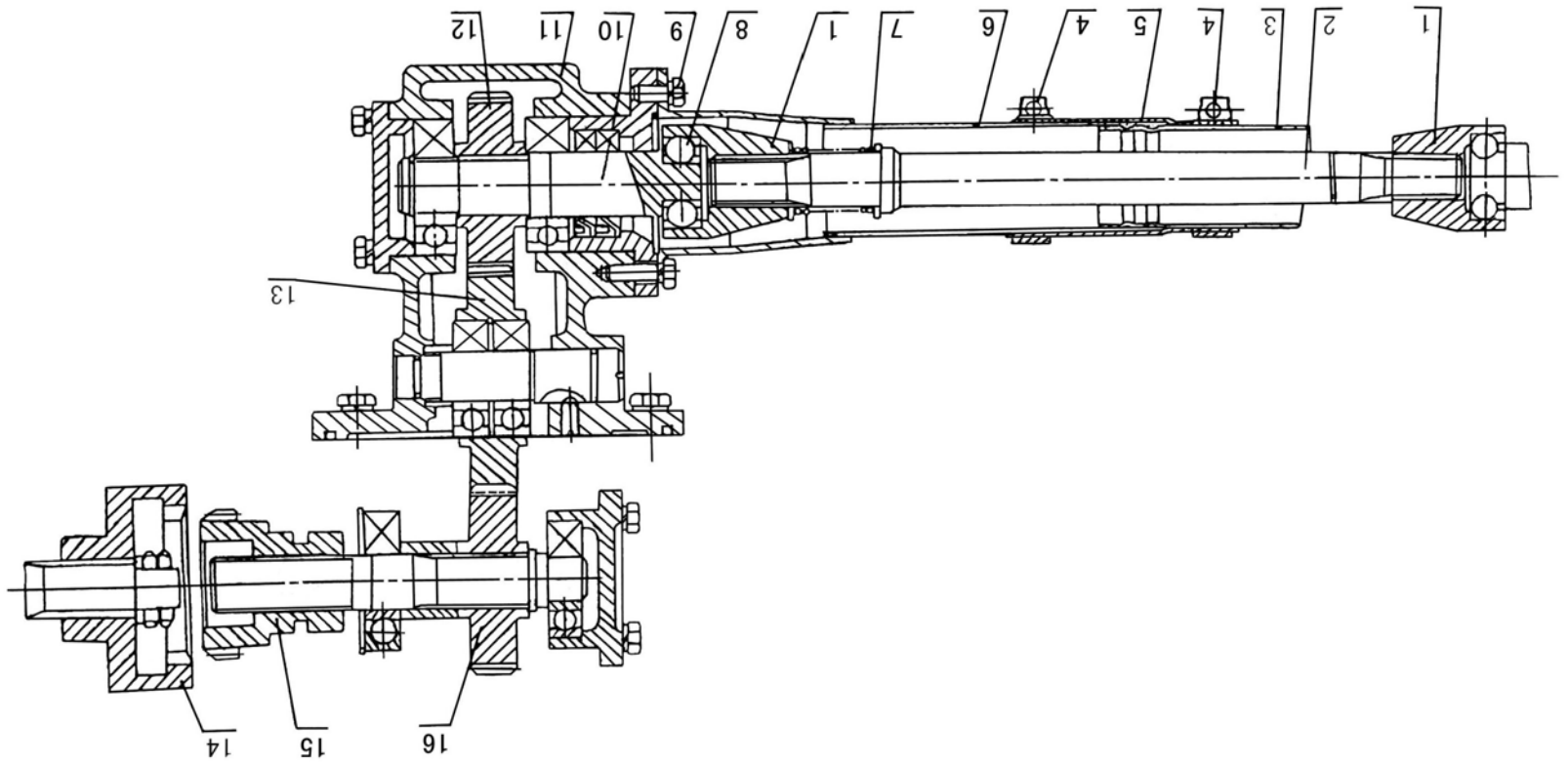
1.adjusting washer 2.bearing 36210 3.front terminal transmiooion small gear 4. discharging plu0g screw 5. adjusting washer 6.check ring 7. half axle 8.diffirencial gear assembly 9. swing seat 10.adjusting washer 11. thrust washer 12.round nut 13. bearing 32007 14. swing liner 15. bearing 30208 16. driving gear 17. adjust nut 18.driven gear 19. half-shaft cover 20. bearing 629 21 conical gear 22. bearing 23. swing arm 24. main pin shaft seat 26. washer 27. bevel gear 28. terminal transmission case. 29. front dring end cover 30. adjusting washer 31. key pin 32. lower cover.

Fig.6-17 transfer case and coupler assembly

1rolling ball couping 2coupler shaft 3dust pipe 4 hoop 5external dust ring 6 coupler cover weldment

7pressing spring 8 steel ball 9bolt 10 transfer case PTO shaft 11 transfer case body 12transfer case PTO gear

13 gear of transfer case 14 internal gear coupler 15gear coupler 16 transfer case PIO gear



Dismantlement and installation of rolling ball coupler

Remove hoop (4), get rid of external dust rubber ring (5), then remove 3 M8×20 bolts (9) at front end of transfer case, push dust pipe (2) toward back end, take out rolling ball coupling (1), remove pressing spring (7), then push coupler cover weldment (6) forward, and then the coupler shaft (2), and dust pipe(3), androlling ball coupling etc can be removed. Install according to the reversed procedure and pay attention to the procedure lest balls lost or omitted.

(5) Differential assembly (Fig. 6-18).

After put differential mechanism into front axle assembly (Fig. 6-16), put its two shaft necks into internal ring of bearing (6) and adjustment nut (17) respectively, inspect meshing of driven wheel (18) and driving wheel (16), and adjust it if necessary then twist bolt(4) and single ear washer (3) in driven wheel (18) and differential mechanism cover (2), and lock hexagon head of bolt (5) by bending single-ear washer(3).

See Fig. 6-16, you shall adjust driving gear after front driving axle has no oil, and turn for 1 to 2 m clockwise and anti - clockwise, gear clearance shall be within 0.15 to 0.25mm, ideal contact mark refers to Fig. 6-7 and Fig. 6-8.

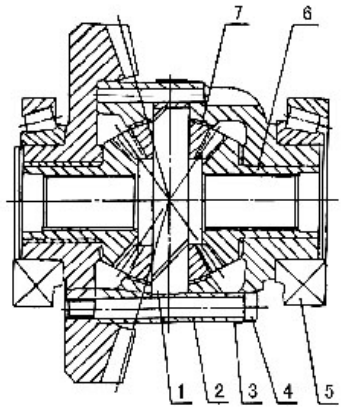



Fig. 6-18 diffirencial gear assembly

1. satellite gear shaft 2. diffirencial gear cover 3. washer 4. bolt 5. bearing 30212 6. half-axle gear 7. satellite gear

6.2.5 Wheels

(1) Structure and function

Front wheels and back wheels of HHJM-30-40 series of tractors consist of external tire (1) and tire tube (2), wheel rim assembly (3) and air tap (4) and radial plate (5), see Fig. 6-19, different kinds of tractors are equipped with different tires, refer to Section 3.4 of Chapter 3.

There are patterns “Y” in agricultural driving tires to raise adhesion. There are stripe patterns in the guide wheels to reduce deviation of tractors. There are convex patterns “Y” on the tires to raise adhesion for paddy fields work.

(2)Adjustment of wheel base

Front wheel base and back wheel base shall be adjusted for different kinds of fields operations. Wheel base of 2-wheel tractor is adjusted by extension sleeve pipe and auxiliary sleeve pipes, adjustment limit is 1200 to 1500mm, every 100 mm for 1 stage, back wheel base is adjusted by motive radial plate and wheel rim, every 100mm for 1 stage, see Fig. 6-20.

（3） Use and maintenance of tiers：

Correct use and maintenance tires can prolong tires' lives. Do the maintenance following the rules below:

①The air pressure of tires should comply with rules. See Item3.4 of Chapter three for details. Check it regularly.

②High speed is only used on flat and smooth roads without stones or carbon residue. Try not to use emergency brake.

③Don't stain the tires with fuel or lubricating oil.Wash or sweep the stains away if there are.

Keep tires clean.

⑤If the arasion of tires is not symmetrical, changes the posiitions of the tires.

⑥If the tractor is stored for a long time, it will be jacked up. No pressure on the tires, and no exhaust from the tires.

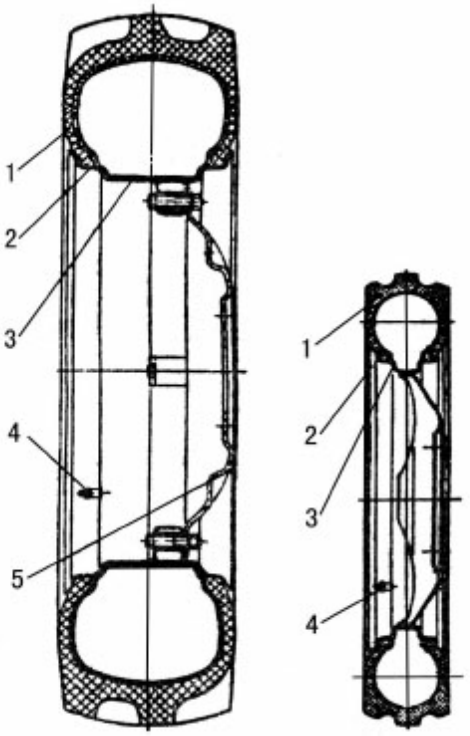



Fig.6-19 driving tire directive wheel
1 outer cover 2 inner tube 3 rim assembly
4 air nozzle 5radial plate

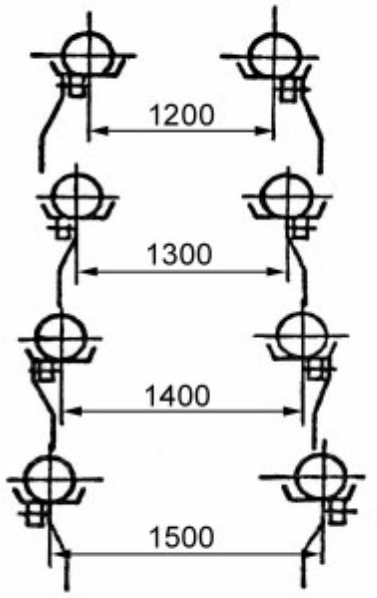



Fig.6-20 tread adjusting for driving wheels

(4) Dismantle and reassemble the tires:

Dismantle the tires:

①Exhaust air from the inner tubes.

②From the opposite side to the air nipple, hit the outer tubes into the wheel rims of grooves.

③Prize the tire sides near the air nipple out from the wheel rims with a tommy bar, and then prize the whole outer tubes from the wheel rims.

④Take the air nipple of inner tube from the hole of the wheel rim, and then take out the inner tubes from between the wheel rims and the outer tubes.

⑤Hit a side of outer tubes into the grooves of wheel rims. Take out the outer tubes from the other side with a tommy bar.

Assembling of the tires:

① Clean all the parts for installation, prize the outer tubes into the wheel rims with a tommy bar.

②Talc the inside and the outside of the outer tubes, and then place the inner tubes into the outer tubes (place the air nipple into the hole of the wheel rim firstly. )

③Prize the outer tubes into the wheel rims with a tommy bar.

④Aerify the tires till normal air pressure and check to see if there is leakage.

## Warning:

**1. The size of your tires cannot be larger than what is stiplulated in the manual.**

**2.Only skilled workers with proper tolls can do the dissembling and replacing the tires or adjusting the wheel bases. During working, try to avoid overturn of tractor or tires due to gravity action.**

**3. Screw the adjusting bolts of tires and septal lamella to get a needed torque moment . Do regular checks.**

## ● Important:

（1）Don't break the inner tubes with your tommy bar.

（2）Distinguish the left and the right tires.

（3）To increase the adhesive force of the rear wheels, install the four bob weights of the tractor.

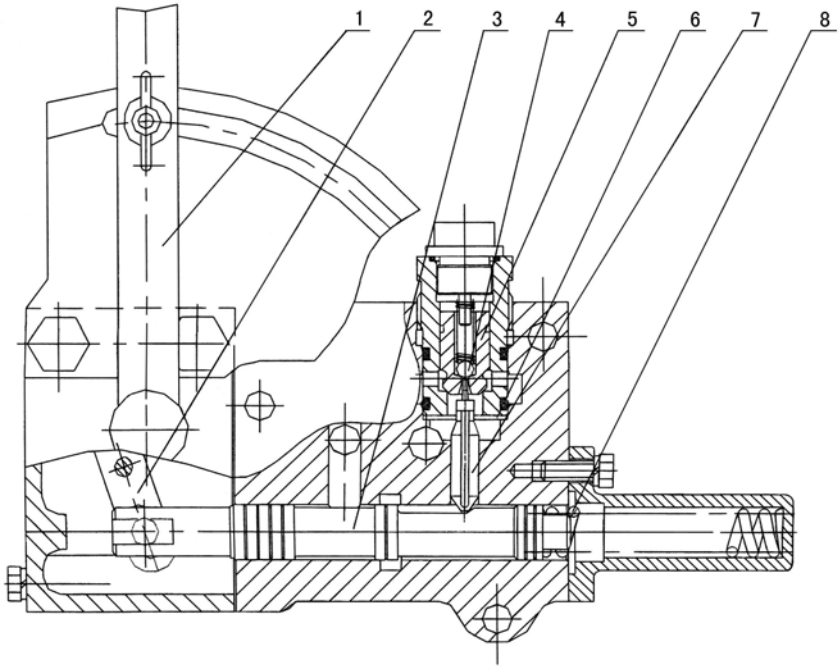
（4）35E series tractors can also be equppied with lawn tire for gardeing purpose against pressing land too compaction. The tire can't be used for agricultural and transportation operations.

### 6.3 Working unit

#### 6.3.1 Suspending system

After some working time, when the parts of suspending system are abraded or reassembled, every sector of the system should get an adjustment.

I . Adjustment of the distributor (Fig. 6-21)




1-control handle 2-swing lever 3-key control valve 4-steel ball 5-dropping valve 6-adjusing washers 7-push pin 8-key valve spring

Fig. 6-21 Adjustment of the distributor

1.Check the travel of the dropping valve

1)Screw up the plug of the dropping valve.

2) Put the handle in the top lifting position (The key control valve is placed in the lifting location.).

Measure the distance $h_1$ between the steel ball 4 and the upper end of the dropping valve bush.

3) Set the handle in the dropping position (Key control valve lies in the dropping position.). Measure the distance $h_2$ between the steel ball 4 and the upper end of the dropping valve bush.

4) If $h_1 - h_2 = 2^{+0.2}$, it means the adjustment is proper, or adjust the size through adding or reducing the adjusing washers 6.

5) Screw up the plug of the dropping valve.

2. Installed the wholelly adjusted distributor assembly onto the lifter.

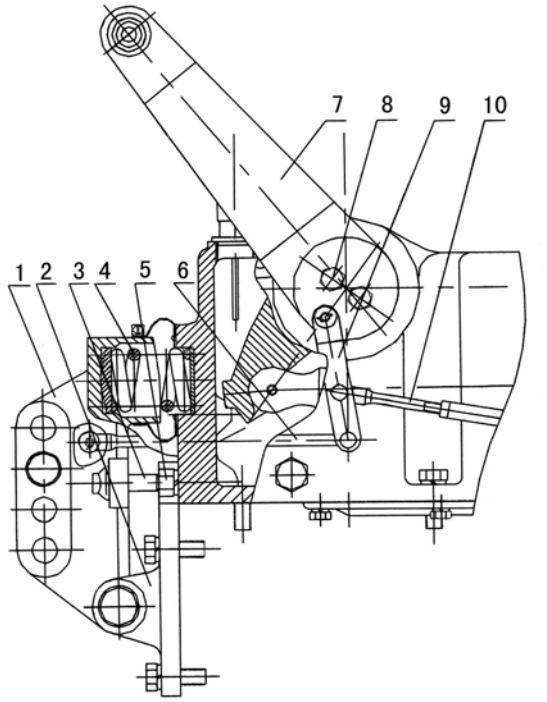
Ⅱ Adjustment of the hydraulic lifter

1. Adjustment of force-postion integraded control (Fig. 6-22)

1). Install rocker (1), stand (2) and force-control spring (4). Adjus the adjusting bolt (3) to make the force-control spring contact the rocker rightly. And then, screw up the locking nut (5).

2） Install the welded right pressing plate (8) onto the lifter and couple the middle arm (9) to the right pressing plate, and then couple with link (6) and response lever (10).

3）. Set the control handle in the dropping position, start the machine , and then move the control handle slowly to the lifting position. If the lifting height is not enough, extend the response lever (10); shorten it if it is over height. When the control handle is located in the top lifting position, the distance between the mark on the outer lifting arm and the one on the housing is not over 3mm (Here the inner lifting arm and the lifting housing have a gap of about 5mm). Lift repeadedly three time and lock up the locknut of the response lever.




1-rocker 2-stand 3-adjusting bolt 4-force-control spring 5-locking nut 6-link 7-external lifting arm 8- right pressing plate weldment 9-middle arm 10-response lever

Fig. 6-22 Adjustment of force-position combination control

III Structure, installation, and adjustment of cylinder piston （6-23）

During installation, oil the inner hole of cylinder case (1) with engine oil. Set O-ring (5) and check ring (4) into piston (2), and then install the unit into the hole of the cylinder case. Check ring (4)protects the seal ring (5).

After the cylinder piston is installed, do a pressure test on it.

IV Structure, installation and adjustment of force-adjusting spring assembly （6-24）

During the installation, orderly set spring seat (1), force-adjusting spring (2), spring pressing board (4) onto spring lever (8) Set dust guard (6) and nut (5) onto the connector of the top link. And then screw the spring lever into the hole of the connector of the rocker Adjust it till the spring is out of