



HHJM-164Y Wheel Tractors

OPERATION MANUAL

MAHINDRA YUEDA [YANCHENG] TRACTOR CO.,LTD.

Preface

Thank you for choosing HHJM -164Y wheel tractors. The model has a more rational structure, hi-quality material and improved performances. They are more powerful, lower in oil consumption, higher efficient, nice in appearance, easy in operation and maintenance, and applicable for a wide range of gardening or field work. This operation manual is prepared to help you know better about the use, adjustment, maintenance and repair of this model to get the best performance of the model. Please refer to diesel manual about the repair of the engine.

With technical development and requirements from our customers, descriptions in the manual may differ from the real tractor structure and the differences will be involved in the next version. If what you want to know is beyond this book, you can contact the agent or the manufacturer.



Precaution Symbols

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.

"Warning" and "Notice": These focus on correct operational steps or techniques. Driver or stander-bys will be hurt or even die due to neglect.

"Important": It focuses on correct operational steps or techniques. Your ignoring may result in damages to tractors or equipments.

Symbols and Marks of the Product

When you purchase this machine, please fill in the table below carefully. The information including code and each letter should be complete, right and clear. Refer to the name plate at the inside of tractor's fender and the code at the rear part of the chassis for the information contents. Complete and right information help user to apply for an immediate repair, or it is the evidence for a lost tractor. This operation manual is a fixed part of the machine, so it is recommended for the suppliers of new or second-hand machine to keep the related documents to approve that this book is offered together with the machine. User should keep the book well for a long term at a place separated from the tractor.

Product name	HHJM
Product model	
Machine number	
Chassis number	
Engine model	
Engine number	
User's name	
Purchase date	
Purchase place	
Dealer	
Dealer's phone	
Manufacturer	Mahindra Yueda (Yancheng) Tractor Co., Ltd.
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HHJM-164Y Wheel Tractor Operation Manual

by Mahindra Yueda (Yancheng) Tractor Co., Ltd.

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Chapter I Precautions for Safe Operation

1.1 Only after reading the manual carefully, can the driver who has got special training and driving license with a full survey record operate the tractor.

1.2 Tractor cannot be operated without licenses. When driving along the road, you'd better follow local traffic rules.

1.3 This machine only can be operated, maintained and repaired by the persons who are familiar to its features and know related safe operation rules. Drivers shall wear compact and safe clothing when riding or using the tractor. Operation with barefoot or slippers are prohibited.

1.4 In any case kids or non-drivers should be kept far away from the machine to avoid hurts.

1.5 It is forbidden to drive tractors after being drunk, tired or taking some medicines like antipsychotic. Overload or overrun driving and using tractor shall be prohibited.



1.6 Driver should pay special attention to the precaution symbols on the machine.

1.7 During operating the tractor, driver should strictly comply with instructions of precaution symbols to avoid accidents. When the tags are lost, polluted or abraded, they should be replaced in time.(See Fig.1--1~Fig. 1- 9 for safety tags)



Warning

For physical safety:

- When using a PTO shaft, a safety cover should be installed, on which people are strictly prohibited to sit. Bush of PTO shaft should be installed when PTO shaft is out of operation.
- Rotation speeds of farm implements should match with that of the tractor PTO.
- Engine should stop working when a farm implement is connected.
- The deviation angle of universal joint should not be too big when it is connected with PTO, or the gimbaled joint can be damaged.
- Only after the clutch is released thoroughly, can the gimbaled joint be connected.



Fig.1-1 Stuck to the back of the tractor
Precautions for PTO shaft usage

Fig.1-2 Stuck on the left-back
wheel-guard plate
Don't sit on the No-seat position

 Warning
<p>For physical safety:</p> <ul style="list-style-type: none"> ----Read and comprehend the operation manual before operating tractor; ----When starting the tractor, put into neutral gear and release the clutch. ----Skidding down aslope with neutral gear is strictly prohibited. ----Only when sitting on the driver's seat, can an operator start engine; ----Drunk driving or fatigue driving is strictly prohibited; ----Before maintaining and repairing tractor, operator should stop engine and take down the key. When engine works, don't open or disassemble the safety cover.

Fig. 1-3 Stuck to the front of the dashboard
Instruction for operating tractor

 Warning
<p>To avoid casualty caused by overturn or bump, the left and the right braking pedals should be jointly locked up. During parking, slide or rolling can cause casualty, so parking brake is needed then.</p>

Fig. 1-4 Stuck on the right-back wheel-guard plate
Instructions for using tractor brake

 Notice
<p>For physical safety:</p> <ul style="list-style-type: none"> ----Keep yourself far away from lifting area of the lift link when operating hydraulic lifter; ----three-point hitch gears are only applicable for the farm implements specially designed for three-point hitch suspending linkages.

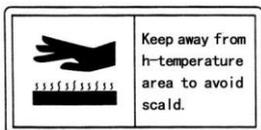
Fig. 1-5 Stuck to the back of the
Tractor Instruction for using hydraulic lifting and 3-point suspension

 Notice
<p>Easy to cause fire. Keep sparker away.</p>

Fig. 1--6 Stuck beside the oil filler of the fuel tank
Instruction for using fuel tank

 Notice
<p>Be careful against scald when opening water tank cover. Cool down the water tank and then open the cover.</p>

Fig. 1-7 Stuck near water tank
Instruction for using water tank



**Fig. 1-8 Stuck to muffler
Instruction for using
muffler**



**Left- right lower upper horn rear working
steering beam, beam lamp**

Fig.1-9 Stuck to instrument panel operational buttons

1.8 Before operation, a new tractor or an old tractor after heavy repair should follow the related running-in regulations. And then normal loaded work can be done.

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

1.10 Don't leave driver's seat to start or control the tractor. Each gear shifter should be placed at the "neutral gear" before starting the tractor. PTO lever and front driving handle shall be in disengaged status.

1.11 Don't get on or off the tractor during its running. Before checking, washing, adjusting, repairing, and maintaining the tractor, you'd stop the engine and the key should be taken off. Put gear shifter and PTO shaft control lever at neutral gear and lock up park brake to make all moving parts stay in idle status. Repair or check under the tractor is forbidden when the engine runs.

1.12 Only after taking earth wire off from the battery, can electric parts be repaired to avoid electric parts burnt.

1.13 When driver leaves tractor, drop the implement to the ground and shift all gearlevers to "neutral gear" position. Stop engine, and take down key to avoid others' starting the tractor.

1.14 To avoid turn-over, only low gears can be used, especially going on steep slopes or muddy paths. When going down slope, clutch engaging or neutral gear is not allowed. Let the running tractor not too near to any ditch to avoid any damage caused by broken trenches.

1.15 In transportation operation, the left and the right brake pedals should be joined and locked together. Move PTO handle to the "Disengage" position. During tractor running, driver' feet cannot step on the brake pedal or clutch pedal.

1.16 No sharp turn is permitted while driving at a high speed. Sharp turn with single-side brake is prohibited to avoid turn-over and parts damaging.

1.17 High-gear running is forbidden during field operation and transferring with high-tread tyre .

The tyre is strictly prohibited during transportation operation.

1.18 Tractor cannot be used with overload to avoid damages to parts. The ratio between trailer's max. total weight and tractor's use weight should be not bigger than 3. Specific power of tractor transportation unit should be less than 4.0kW/t. High-tread tyres are not allowed in tractor transportation unit. During towing trailer, you must use towing hook instead of three-point suspending lever. Trailer must have its own separated brake system.

1.19 Before starting the tractor, you'd better check oil duct, electric circuit and cooling water. After starting the machine, you'd better pay attention to digits on all indicators and meters.

1.20 Before filling fuel into tank, you'd better stop the engine; smoking and open flame are prohibited during fuel filling and fuel system maintaining.

1.21 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. When the engine is hot, don't screw the water tank cover to avoid scald caused by sprayed cooling fluid. Dirt should be removed from radiating water tank to

guarantee its heat radiating performance.

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

1.23 Exhaust elbow and muffler are high temperature components. Within a half hour after starting or stopping the engine, anyone is not allowed to get near to avoid scald.

1.24 You should tell your next shift about any trouble of the tractor. During operation in night, fine lighting is necessary.

1.25 When it finishes work below 0°C in winter, exhaust all the water when idling running to avoid parts' freezing caused by remained water (except antifreeze added).

1.26 Tractor's front driving axle is used only when tires slide during working in farm fields and on muddy road. It is forbidden to use it in other situations, or it can lead to early abrasion of tires and transmission system.

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

1.28 Before using PTO, a protecting cover need be installed. When tractor PTO shaft works with loads, tractor can not do sharp turn to avoid damaging gimbal.

1.29 Don't stop the tractor on a steep slope. If parking on a slope, its park brakes should be used and a triangle should be stuck under rear wheels.

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

1.31 Tractor of malfunction 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.

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

1.33 Manufacturer is not responsible for any weakened reliability of the machine, personnel hurt or machine damage due to any unauthorized reform on the tractor.

1.34 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 II General Description

HHJM 164Y wheel tractor is a new type developed according to the International demands of updated small wheel tractor. It is mainly applicative to various house gardening operations. The type has the characteristics of light weight, flexibility, multi-purpose and nice appearance.

This type utilizes Changchai (3M78) diesel as the power with direct transmission between engine and transmission system, single-acting clutch and 4 wheels driving. It is equipped with 6-gear transmission case for rotary cultivation, ploughing and transportation, hydraulic suspending system complete in performance, low-pressure & wide driving tyres with good adhesive force. Their advantages are not only proper power, large traction force, tight structure, efficient transmission, easy operation, simple maintenance, convenient matching, economical use and excellent joint application.



Warning:

- 1. Manufacturer is not responsible for any declined 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 III Key Technical Specifications of the Tractor

3.1 Parameters of the whole unit

Model		HHJM-164Y
Mode		4-wheel driving
Engine	Model	3M78
	Type	3 cylinder ,Vertical, water cooling, 4-stroke and swirling type
	Net weight	110kg
	Borex Stroke	78x78.4 mm
	Displacement	1.123 L
	Nominal power	11.76 kW
	Rated speed	2400 rpm
	Max. torque	54N.m
	Speed at the max. torque	1800r/min
	Fuel consumption rate	275g/kW.h
	Engine oil consumption rate	2.72g/kW.h
	Displacement	ECIII (non-road) and EPA Tier IV
PTO Power (kW)		10.47
Rated Traction (kN)		3.5
External size (mm)	Length (including front bob-weight, suspension)	2590
	Width(tread to outer side of back wheel before delivery)	1050
	Height (to steering wheel top)	1220
Wheelbase (mm)		1290
Tread (mm)	Front wheel (size at delivery)	750

	Rear wheel (size at delivery)	840	
Ground clearance (under front driving axle housing) (mm)		248	
Front bob-weight (kg)		24	
Min. service mass (with bob-weight stand without bob-weight) (kg)		803	
Mass distribution	Front wheels (kg)	316	
	Rear wheels (kg)	487	
Gear levels		(3+1) x2	
Theoretic speed (km/h)	Low gears	I	1.4
		II	2.10
		III	3.29
	Middle gears	I	6.40
		II	9.61
		III	15.03
	Reverse gears	I	1.76
		II	8.06

3.2 Transmission system

Clutch	single-action clutch
Gear box	Composition type 2x (3+1) , 6 forward gears and 2 reverse gears. Basic transmission is constantly-engaged spur gear; secondary transmission is constantly-engaged spur gear.
Central transmission	Spiral bevel gear pair
Differential	Closed and two straight bevel planet gear
Differential lock	Jaw and toothed type. Stepping down the differential lock pedal automatically means an engagement status.
Final transmission	Mono-stage planet gear type
Front driving axle	Middle-positioned integrated type
Front central transmission	Spiral cone gear pair
Front final transmission	Mono-step planet gear type

3.3 Traveling, steering and braking

Model		HHJM--164Y
Housing		No housing
Drive shaft of front axle		Middle-positioned driving shaft
Tyre Spec. (in)	Front wheels	5.00-12
	Back wheels	7.50-16
Tyre air pressure (kPa)	Front wheels	200-250
	Back wheels	200-250
Front wheel alignment	Toe-in of front wheel(mm)	4-8
	Camber of front wheel	3°
	Kingpin inclination angle	7°
Pivot angle of front axle		12° (Each side)
Turning radius	Unilateral brake (mm)	2440
	No braking(mm)	2750
Steering mode		Mechanical steering / hydraulic steering
Service brake		Shoe brake

3.4 Working device

Hydraulic suspension system	JM164Y
Mode	Semi-separated type
Plough depth control	Force & position control and floating control
Master cylinder diameter × stroke (mm)	60×79
Adjusting pressure of system safety valve (MPa)	16
Opening pressure of cylinder safety valve (MPa)	18
Min. system lifting force (kN) (at the point 610mm behind the suspending point)	2. 64
Suspending gear	Rear positioned, Category 0. Quick connecting device is an option

Set pressure of safety valve (MPa)	18
PTO shaft	Rear positioned and independent type
Speed (r/min)	540/1000
Diameter of axle (mm)	Spline Shaft Model I (6-35×28.91×8.69)
Ground clearance (mm) and turning direction of shaft head	487\ right-handed rotation
Mode of traction device	Swing draw bar,
Diameter of traction pin (mm)	Φ30

3.5 Perfusion capacity

Model		
Fuel	14.7	
Water tank, heat radiator	2	
Oil for engine	2.3	
Oil for steering gear	0.3	
Engine oil for front axle	Transmission case	1.1
	Side reduction	0.3
Engine oil for transmission case Engine oil for hydraulic system	10.3	

3.6 Electrics and instruments

Electric system	12V, Minus earth
Battery	Maintenance-free 450Ah
Starter	12V, 1.2kW
Headlamps	BL30-Q
Rear turn signals	SSD-2
Combined meters	164Y,48.042

Chapter IV Operation

4.1 Fuel and lubricating oil

Refer to Fig.4-1 for fuel and lubricating oil used for tractor

Table 4-1 Fuel and lubricating oil

Site	Season and environment temperature	Oil grade
Fuel tank	Summer (environment temperature over 10°C)	0, -10# light diesel oil (GB/T 252-2000)
	Winter (environment temperature below 10°C)	10# light diesel oil (GB/T 252-2000)
Engine oil pan, lifter	Environment temperature below 10°C	20# diesel engine oil (GB/T 5323-1994)
	Environment temperature 0°C~25°C	30# diesel engine oil (GB/T 5323-1994)
	Environment temperature over 25°C	40# diesel engine oil (GB/T 5323-1994)
Transmission case, transfer case, front driving axle and mechanical steering gear	Summer (environment temperature over 10°C)	40# diesel engine oil (GB/T 5323-1994)
	Winter (environment temperature below 10°C)	30# diesel engine oil (GB/T 5323-1994)
Grease nipples at all sites	For all seasons	ZFG2 # Complex calcium lubricating grease (SH0370-1992)
Engine, starter, bearing 6203-E	For all seasons	ZFG2 # Complex calcium lubricating grease (SH0370-1992)



Warning:

- (1) Before refueling or repairing fuel system, engine shall be stopped; Smoking is prohibited during the refueling or repairing.
- (2) It is strictly prohibited to add gasoline or alcohol into diesel oil, as these mixtures can cause fire or explosion. In fuel tank, the mixtures are more explosive than pure gasoline. Oil of different grades cannot be mixed to use.

●Important:

(1) Use of unclear fuel shall be in strict control. Before adding into fuel tank, fuel shall be deposited for over 48hours and only middle and top layers of fuel can be used. Use filter net during refueling. Don't fill up the tank for volatilizing space. Screw up the tank cover after refueling.

(2) Refuel before the fuel tank becomes empty. If refueling after supply system is used up, air in oil supply system shall be exhausted completely.

(3) Refueling tools shall be kept clean and cannot be washed with diesel oil. Wipe out overflowing diesel oil.

(4) Do periodic cleaning for fuel tank and let out oil sediment. Wash diesel filter.

(5) Don't transport refuel with open oil drum.

(6) Put all cloth stuck with oil into covered container to avoid dropping butt.

(7) Do regular checks on the engine oil at every lubricating site. Add it in time if not sufficient. Fill in grease to grease nipples termly.

4.2 Cooling liquid

4.2.1 Fill in antifreeze solution into cooling water tank to avoid cooling effect declined by scale deposit of engine cooling system.

When engine works or just stops, water tank has a high temperature, so scalding may happen when opening water tank cover. Open it after water tank is cooling down. Before opening the water tank cover completely, screw it off slowly to release the pressure in the tank.

●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°C, stop the engine immediately. Have a necessary check and repair on the water tank after it is cooled.

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 (4-8mm); 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 starting the engine according to stipulated steps, you should listen to the engine carefully. Make sure there is no water leak, oil leak or gas leak. Read all indicators to see if all are OK. Do next running-in step after making sure that the engine works normally. Run the engine from low speed to middle speed and then high speed for 7 minutes, 5minutes and 3 minutes respectively, totally running-in of the engine without load costs 15 minutes.

4.3.3 Free and loaded running-in of tractor

Tractor running-in should be done at rated engine rev. Running-in steps and time should be consistent with the following rule:

Table 4-2 Tractor Running-in Rules

Running-in Mode	Load	Running-in time of each gear (H)								Total	General Total
		I	II	III	IV	V	VI	Reverse-I	Reverse-II		
Free-load running-in	No load	1	1	1	2	0.5	0.5	0.5	0.5	6	21
Load	Transporting on road with 0.5t-loaded trailer	1	2	4	4	2	2			15	

When abnormal things or troubles happen, you'd better find out their causations. Only after all troubles are disposed, can the running-in go on.

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 oil.

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

(4) Check and adjust the free travels of the clutch pedal and brake pedal, and the operating of the brake.

(5) Check and tighten the bolts and nuts at every key connecting sites.

(6) Check oil nozzle and valve clearance. Adjust them if necessary.

(7) Check the work of electric system.

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

(9) Fill lubricating grease to every grease nipple sites.

● **Important:**

(1) **See if the operation of engine is in normal condition.**

(2) **See if clutch adjustment is normal and if it can be disengaged completely.**

(3) **See if gear shifting of gear box including front driving handle is 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 meter

It is a necessary condition for right operating tractor to get familiar with all the functions and positions of every control unit and indicator (see fig. 4-1).

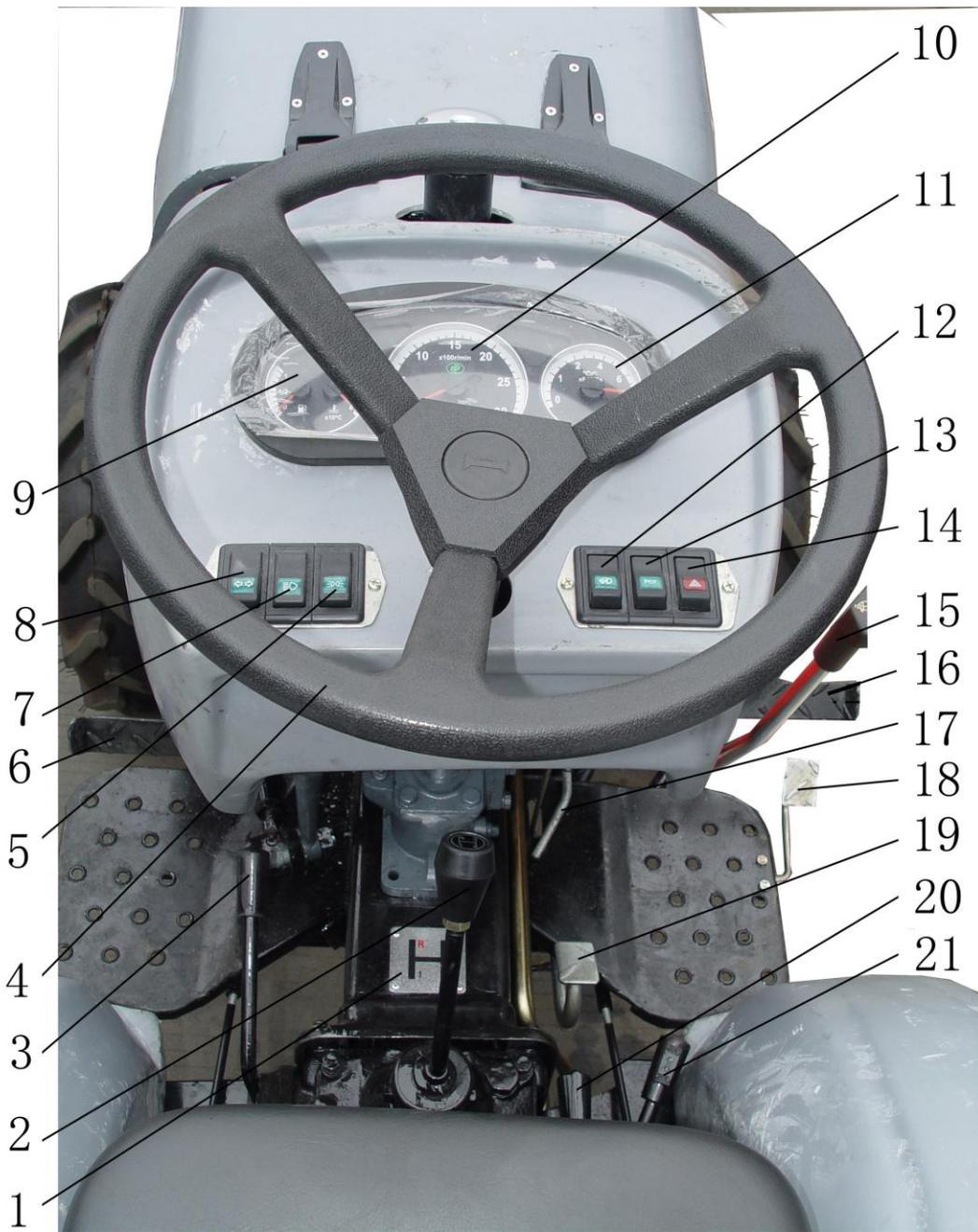


Fig. 4-1 Control unit and indicators

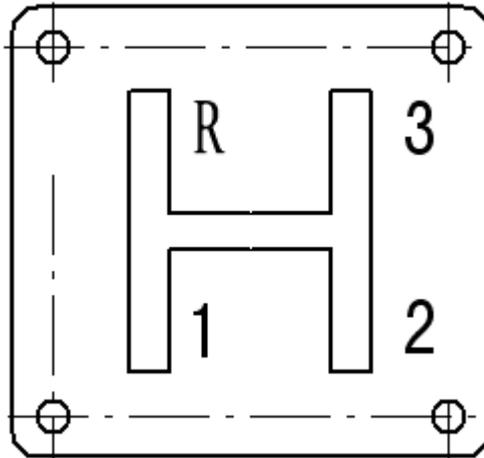
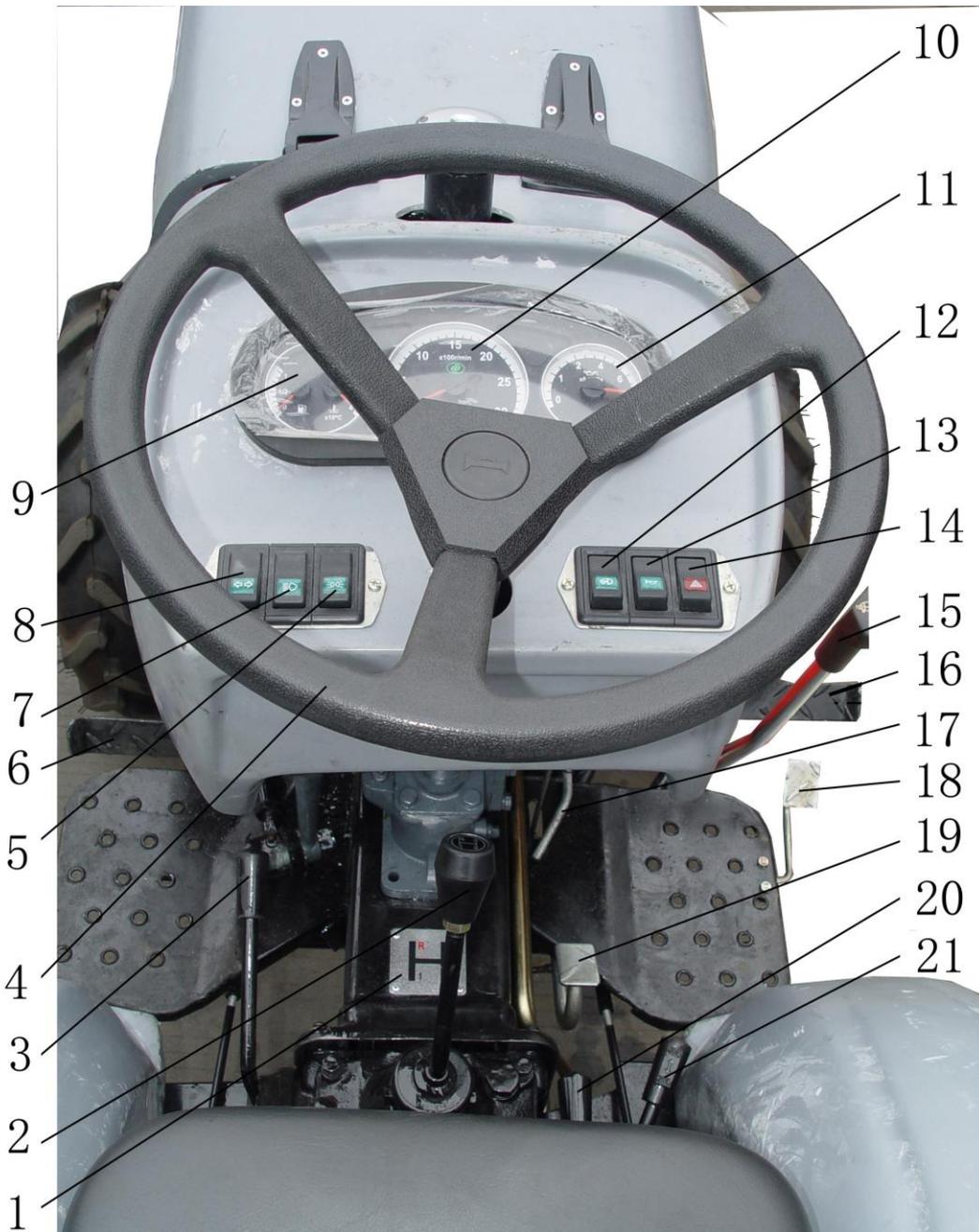


Fig. 4-2 Tractor gears indicator

- (1) Gear indicator: located on the bridge shell and indicating the location of gear lever (Fig. 4-2)
- (2) Master gear lever: to control master gears shifting (Fig. 4-2)
- (3) PTO lever: to release or shift several PTO speeds for output.
- (4) Steering wheel: to control the running direction of tractor.
- (5) Switch of profile lights: to use tractor profile lights during traveling and operating at night.
- (6) Clutch pedal: to get power disengaged through stepping down the pedal
- (7) Switch of head lamps: to switch on the head lamps for traveling and operation at night.
- (8) Switch of steering indicator: to switch on the indicators for turning.
- (9) Gauge for oil and water temperature: to indicate oil and cooling liquid temperature.
- (10) Speed and timing meters: to show the working speed of the engine and the accumulated service time of tractor.
- (11) Engine oil manometer: to indicate oil pressure of the engine oil. Normal working pressure is (0.4—0.6) Mpa
- (12) Switch of rear working lights: Switch on the rear working lights for implement's operation at night
- (13) Switch of horn: Press the button and the horn will sound.
- (14) Switch of caution lights: Switch on the light for short-time parking during traveling and operation at night.
- (15) Hand throttle control handle: to adjust oil supply. Pushing forward means high gear while pulling back means lower gear.
- (16) Left and right brake pedal: move the brake lock-link plate right to link the left and the right pedals and carry out braking. Separating link-lock plate can carry out left or right unilateral brake for a unilateral brake steering.
- (17) Brake self-lock handle: Step down brake plate (16), press the handle, and then the long-term braking is available.
- (18) Foot throttle pedal: Step down the pedal for higher gears while lifting foot means lower down.
- (19) Differential lock pedal: When tractor can't go forward caused by tyre skidding, step down the pedal to get non-differential driving wheels at both sides. Release the pedal and the tractor has normal working situations.



(20) Handle for high and low gears: shifting between high gears and low gears.

(21) Front driving disengaging lever: to engage or shut the power of the front driving to get 4 wheels driving or 2 wheels driving.

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.

Notice:

(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 tractor head rises 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.

(5) 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 starting, the fuel, lubricating oil, and cooling liquid should be checked. Make sure all parts and electric circuits work normally, and oil circuits are through without air. Gear lever should be put in the neutral gear and PTO release lever should be released. With hydraulic system installed, lifter must have full hydraulic oil.

When the preparation is done, tractor can be started.

(1) When using electric starting, turn the starting switch clockwise and the electric starter drives the engine. Starting time of electric starter does not exceed 5—10 seconds each time and the interval between starting should not be less than 2 seconds.

(2) For electric starting, once the engine begins working, the key to starting switch should be turned withershins immediately to the battery charging position.

(3) When using electric starting in Summer, decompress is not necessary; starting in winter is difficult, so hot water or heating can help you with the starting, or preheating unit can be helpful.

4.5.2 Start to move

After starting the engine, make it running for 5—10minutes to preheat the engine. When the water temperature rises to 70°C and the above, follow the steps below to start:

(1) Raise the suspending implements.

(2) Step down the clutch pedal, put gear lever on the low gear needed, and release self-lock handle of brake pedal.

(3) Watch around and pay attention to any barrier. Sound the horn to catch people's attention.

(4) Release clutch pedal slowly. Gear up gradually and the tractor starts moving.

4.5.3 Driving tractor

(1) During tractor's operation, watch the meters to make sure the readings are ok.

(2) During driving tractor, driver is not allowed to put foot on the clutch pedal to avoid clutch burned caused by long-term semi-engagement.

(3) During transporting or traveling on road, use link-lock to lock up the left and the right brake pedals.

(4) Working in fields, single-side braking can be done to minus turning radius. However, it is forbidden to operate single-side braking to get sharp turn in high-speed operation or transporting on road to avoid turn-over and damaging parts..

(5) Select proper gear levels for tractor operation for higher production and economical efficiency.

4.5.4 Parking

(1) Reduce oil supply to slow down the tractor speed.

(2) Step down the clutch pedal immediately and push the master gear lever to the neutral gear.

(3) Release clutch pedal to make engine run at a low speed without load.

(4) Step down the brake pedal, wait until tractor stop stably, and pull brake self-lock handle.

(5) For long-time parking, the engine should be stopped. For engine unloading, make it run for a while at a low speed. When the cooling water temperature drops to below 70°C, stop the engine for parking.

(6) Position the starting switch at the "0" site. Take down the key. For long-time parking, fuel tank switch should be turned off.

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

3. Try to avoid barriers on roads when driving tractors.

4. 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

Power of PTO shaft is shifted and cut off through controlling the PTO shaft handle at the left side of transmission case.

Speeds of PTO shaft are 540r/min., 720r/min., 1000r/min..

Use PTO shaft as the steps below:

- (1) Disassemble the cover of PTO Shaft and mount implement.
- (2) Put main gear lever in the neutral position.
- (3) Step down the clutch pedal to disengage the clutch. Pull PTO shaft to the needed speeds.
- (4) Release clutch pedal slowly. Running at a low-speed can check if the operation is normal and then do the working.

4.6.2 Control and use of tractor PTO shaft

Shifting and cutting off the power of PTO is done through controlling the PTO shaft at the back of the transmission case. Release handle has three positions of high, middle and low levels. When the control handle is at the "N" position, PTO Shaft is cut off.



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.

4.6.3 Control and utilization of the hydraulic suspension system

(1) Position adjusting:

When using position adjusting, implement positing lifting is done through pulling control handle of distributor to adjust the stopper's location on the return bar. When needed position is got, lock the stopper on the bar with bolt.

Ploughing depth can be adjusted during ploughing. When using position adjustment, farm implement needs no land wheels.

(2) Height adjusting:

Ploughing in dry fields, height adjustment is available. During using height adjustment, farming implement needs land wheel. For ploughing, distributor handle should be at the dropping position (that is to control distributor handle to drop return stopper. Control handle should not return to the neutral position). Now, oil circuit of hydraulic system should be at the “floating” state.

To use height adjusting, ploughing depth is controlled through adjusting the distance from land wheel to land. Thus uniform ploughing depth can be got in dry fields with soil specific resistance.

(3) Dropping speed adjusting

Dropping speed is controlled for quick or slow dropping of farming implements. Select proper dropping speed of the farming implement to avoid implements damaged caused by severe impact. Select a proper one according to the weight of farming implements and soft degree of the land.

Turn the valve clockwise and implement will drop slower while turn it counter-clockwise, it drops faster.

(4) Use of suspending gear:

Before coupling with tractor suspending device, farming implement should be adjusted according to manual.

During ploughing, to get uniform depth of the front and rear ploughshares, ploughshares should be adjusted fore-and-aft horizontally and laterally horizontally.

①Fore-and-aft horizontal adjustments:

Adjust the length of the top lever of the suspending device to get the plough fore-and-aft horizontal and get uniform depth of all ploughshares. Extend top lever when the front ploughshares plough deeper and rear ploughshare or plow heel leaves furrow sole; shorten the top lever when the front ploughshare plough shallow and ploughshare's heel presses the land too tightly.

②Horizontal adjustments

Adjust the right length of lifting lever to keep the plough frame horizontal. Extend the right lifting rod, the ploughing depth of the first ploughshare is increased; Shorten the right lifting

lever, the ploughing depth of the first ploughshare is decreased. Usually, don't make adjustments on the left lifting lever. Only when the adjustments of the right lifting rod, can the left lifting rod be adjusted to keep uniform depth of all ploughshares.

During real operations, to get better ploughing quality, ploughing width should get adjusted according to the manual to avoid repeated or missed ploughing. As the above adjustments are interconnected, adjustments should be based on the real situation to get nice performance.

Check chain can make the unit be controlled easily during operation in fields and can avoid impaction on the rear wheels caused by too large swing when the implement rises for turning. When implement do ploughing, the chain is loosed to allow some swing between tractor and farm implement. In ploughing, it is forbidden to tighten the chain to adjust implement's traction.

③When driving type implements are used, length of cardan driving shaft should be proper. After coupling, there should be an axle clearance of about 10mm between the front and the rear driving axles.

Notice:

- (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 implement especially designed for 3-point suspending devices.
- (3) High speed is not allowed when operating or transferring to other field with suspending 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.

4.6.4 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 drive 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

 **Notice:**

(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 wheels is in 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.

4.7 Operation of electrical equipments

The electric equipments of tractor are used to start tractor and meet the requirements of sending out signal from tractor and lighting at night etc. The electric system of this tractor is negative-grounded 12V single wire schedule.

4.7.1 Accumulator

When the type of accumulator 6-QW-45 has a rated voltage of 12V and a rated capacity of 45 ampere hour, the accumulator is used to store redundant power from generator. When the generator is not working or running at low speed, it can supply its power to start the tractor and other power consumers. When the engine is over-loaded at short time, it also assists to supply power.

Check and maintain the tractor regularly according to the Technical Maintenance of tractor during daily use.

(1) For a new accumulator, charge it for 1—2 hours before using it, which can prolong the service life of the accumulator.

(2) Clean the dust and dirty on the accumulator case regularly in order to avoid the leakage. Check whether there is crack or electrolyte leakage and maintain the pole and wire contactor in good contacting condition. The blowhole of plastic cover shall be kept unblocked in order to avoid explosion.

(3) Each starting time shall not be over 10 seconds and interval between starting should not be less than 2 minutes in order to avoid over discharging. Accumulator shall be charged timely. The single battery voltage shall be 12.6V after being charged.

(4) Before the tractor is to be stored for a long term, cathode cable should be dismantled to avoid self-discharging of the battery. When the battery is in long-term use, charge it before next use. It is forbidden to start the tractor in the deficient power state of battery.

 **Warning:**

(1) **When engine is running, it is absolutely forbidden to disassemble accumulator cover. Don't let eye, hand or clothe being touched by electrolyte. In case being touched , wash with clean water completely.**

(2) **Maintenance of electric equipments can only be carried out after disconnecting the ground cable and accumulator.**

(3) **Gas emitted from accumulator is explosive. Keep the accumulator far away from electric spark in order to avoid damaging the accumulator.**

(4) **Don't discharge in enclosure environment. Appropriate ventilation can protect the build-up gas from explosion.**

● **Important:**

(1) **Improper use of accumulator can decrease its service life and increase its maintenance cost. It shall be used properly and exert its full performances.**

(2) **The positive and negative poles of accumulator shall not be connected reversedly. Reversed connection of positive and negative will cause failure of accumulator and electrocircuit.**

(3) **Disconnecting the wire of accumulator from negative pole and connecting it from positive pole.**

4.7.2 Operation of generator and regulator

(1) Use of generator must mach with regulator.

(2) It is forbidden to check whether generator generating power with the method of ground ignition. It is not allowed to check insulation of generator with tramegger or AC power over 100V. It can only be checked with multimeter with high inner-resistance, otherwise the diode will be destroyed.

(3) When parking, it should remove the key in order to disconnect the motor field winding and accumulator, and ensure the accumulator will not discharging in long term.

4.7.3 Use of start motor

(1) During using, keep regularly the start-motor clean, all contacting points of wire being tightened tightly and in good contacting condition.

(2) Each starting time shall not be over 10 seconds, the time between two starting shall be less than 2 minutes. Find the reason and eliminate them in case fail to start several times.

(3) Pre-heating the engine and then use the start-motor when starting in cold weather.

Chapter V 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.

Table 5-1 Technical Maintenance Schedule

Maintenance Class	Working hours of tractor (h)
Shift technical maintenance	After every shift or 10-12 working hours
First class technical maintenance	50
Second class technical maintenance	250
Third class technical maintenance	500
Forth class technical maintenance	1000

It can add and improve the contents and method of maintenance depending on the actual situation during utilization.

5.1 Technical service of every shift

Make the following maintenances after each shift's work or every 10-12 hours of work.

(1) Clean the dust and mud form tractor and farming implement. The air filter should be cleaned in case working in the environment with heavy dust and sand.

(2) Check the tightening bolts and nuts of every main part of tractor exterior, especially whether the connecting bolts and nuts of front and rear wheels are loosen or not, tighten it when necessary.

(3) Inspect the liquid level of oil pan of diesel, water box, oil tank and lifter. Refill it when necessary. Inspection of oil pan level should be carried out after 15 minutes when engine stops.

(4) Inspect whether there are air leakage, oil leakage and water leakage etc. Eliminate it in case anyone of them happened.

(5) Inspect whether water in radiator is full, wash and clean the sundries between radiating fins in order to avoid decreasing the radiating effect.

(6) Inspect whether there are dirt and water in the fuel oil depositing cup. Eliminate them and get rid of the air in the oil circuit when necessary.

(7) Check the pressure of front and rear tires.

(8) Fill grease according to the stipulations in table 4-1 <Fuel oil and lubrication oil of tractor>. All the muddy water inside lubricating position should be squeezed out until the grease comes out when filling grease.

(9) Check whether the means along with the tractor is complete or not.

5.2 Class-I technical maintenance

Make the following maintenances after every 50 hours of working

(1) Complete the shift maintenance items.

(2) Wash the air filter; replace the machine oil inside the oil pan.

(3) Check the tightness of the fan belt. Push the middle of belt at the longest side with hand. It is appropriate that the belt will be sagged 15~25mm at the pressure of around 10N. Adjust it when necessary.

(4) Check and adjust free stroke of the clutch pedal and brake pedal.

(5) Check the oil level of transmission box and front driving-axle. Refill it in case insufficient.

5.3 Class-II technical maintenance

Make the following maintenances after every 250 working hours:

(1) Complete the first class technical maintenance items.

(2) Replace machine oil inside the diesel oil pan, wash oil pan and absorbing pan and oil filter.

5.4 Class-III technical maintenance

Make the following maintenance after every 500 hours of working.

(1) Complete the secondary technical maintenance items.

(2) Check and adjust the throttle gap, nozzle pressure and atomization condition according to the operation Manual.

(3) Wash the fuel oil tank and filter.

(4) Wash the transmission box and replace lubrication oil.

(5) Wash the filter of hydraulic lifter, check the cleanness of oil. Wash the internal bore of lifter case and replace with new oil when necessary.

(6) Check and adjust the front wheel toe-in (required toe-in 4-10mm). Check the tightness of front wheel bearing and adjust it when necessary. Replace the grease in the front wheel hub.

(7) Check the idle-running angle of steering wheel (required idle angle less than 15°), adjust it when necessary.

(8) Check the oil level inside the steering gear, refill it when insufficient.

5.5 Class-IV technical service

Make the following maintenances after every 1000 working hours.

(1) Complete the class III technical maintenance items.

(2) Carry out the relative maintenance items according to the Instruction Manual of diesel.

(3) Wash the oil tank completely with 25% hydrochloric acid, and then wash with clean water.

(4) Disassemble the generator and start-motor, wash off the grease inside bearing and replace with new grease. In the mean time check the drive gear of start-motor.

(5) Clean off the carbon deposit in exhaust pipe and silencer.

(6) Soak the bearings dissembled from clutch into the molten high-temperature grease, and refill the lubrication grease.

(7) Check and adjust the engaging clearance and meshing impression of central driving bevel gear, and clearance and pre-tension of the bevel gear

(8) Wash the filter of hydraulic lifting system, replace oil of the system.

(9) Wash steering gear, replace the lubrication grease inside the case.

(10) Carry out test running in short-term, check whether all parts works in good condition.

5.6 Technical maintenance in winter

When operating tractors under a temperature below 5°C, special technical

maintenance is necessary. Now besides shift technical maintenance, you should follow the rules below:

(1). Engine can't be started without cooling liquid in cooling system. Preheating machine helps starting engine.

(2) After cold start, the engine should be preheated for a while until the water is above 60°C.

(3) Fuel and lubricating oil selections depend on air temperatures or seasons.

(4) In severely cold seasons, for easily starting the engine, you'd better store the tractor in a warm garage.

5.7 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 rear 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; disassemble 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.

Notice:

(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 VI Main Adjustments on Tractor

6.1 Adjustment on clutch

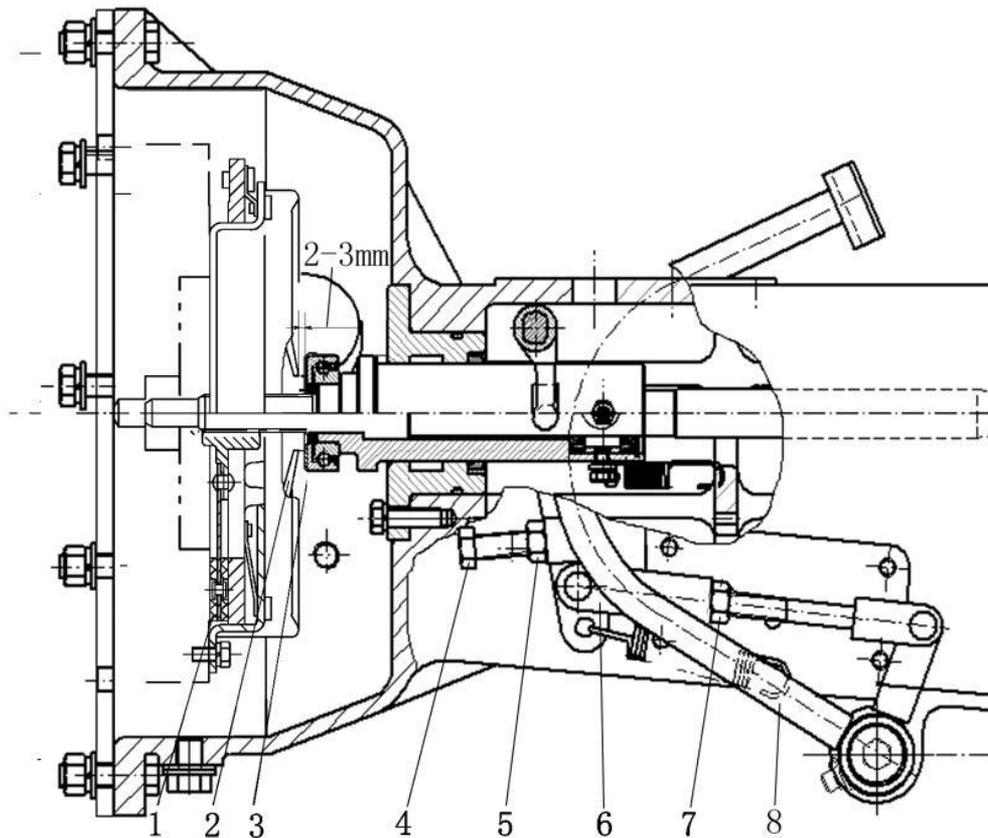


Fig. 6-1 Single-action clutch

1. Friction disk
2. Disengaging pawl of clutch
3. Releasing bearing
4. Limit screw
5. Nut
6. Adjusting fork
7. Nut
8. Clutch pedal

6.1.1 Adjustment on free stroke

Turn the adjusting fork (6), then fasten nut (7) when the clearance between front end of the separating bearing (3) and the clutch separating claw (2) is about 2-3mm.

6.2.2 Adjusting work stroke of clutch

Turn limit screw (4), then step down the clutch pedal (8), then fasten nut (7) when the clutch is disengaged fully.

Notice:

- (1) Before the clutch is not disengaged, don't start the engine for safety.**
- (2) The clutch should be disengaged quickly and its engagement should be slow. Before changing speed, floor the clutch pedal .**
- (3) During operation, you should not put your feet on the clutch pedal lto avoid clutch worn away**

6.2 Adjustments on central transmission

Adjusting backlash of conic gear pair

- (1) The backlash standard

The backlash of spiral gearwheel should be 0.10~0.15mm.

- (2) Checks for backlash and the touch impression

- ① Checking the backlash

There are two checking ways, one is dial gauge measurement: put its feeler on the teeth surface of big end of big conic gearwheel, fix small conic gearwheel, sway big conic gearwheel toward rotational direction, if the reading of the dial gauge is 0.14~0.3mm (circumferential clearance), the backlash is proper. The other way is to choose a 15~20mm long, 0.5mm thick lead sheet or a fuse bent to “∞” shape, and put it into the clearance between un-meshing teeth faces of the two gearwheels (that is, between convex surface of the small gearwheel and concave surface of the big gearwheel), turn gearwheel, then the pressed thickness of the lead sheet near the big end is here normal teeth side clearance, the clearance should be in 0.1~0.25mm (normal clearance). The checking spots should be 3 or more than 3 and distributed evenly along the circumference of the gearwheels.

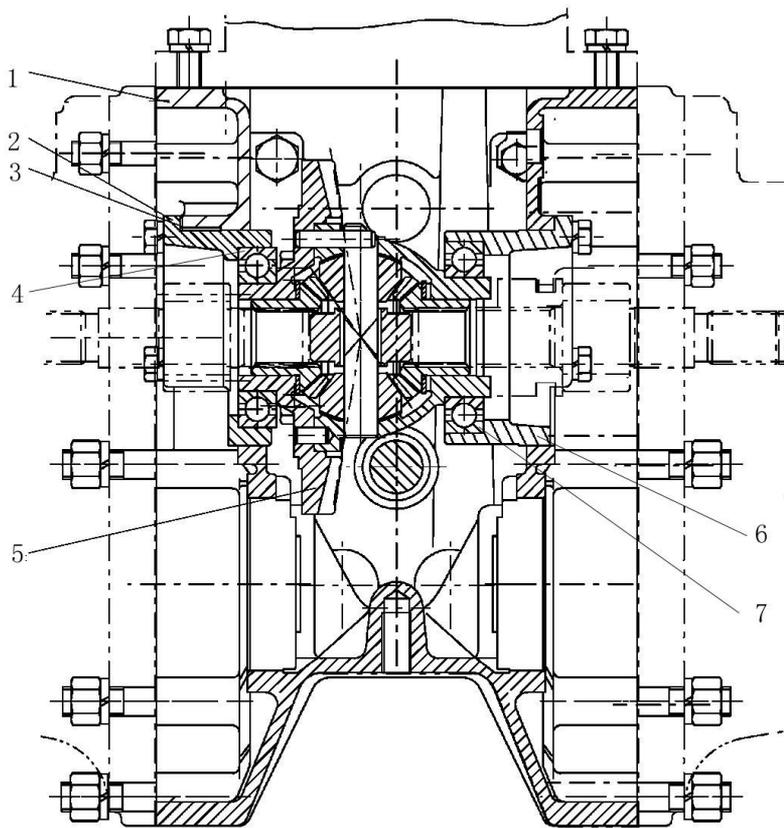


Fig. 6-2 Rear-axle assembly

1. Rear axle housing 2. Adjusting Washer 3. Left bearing seat of differential device 4. Bearing 6009 5. Driven gearwheel 6. Right bearing seat of differential device 7. Bearing 6009

② Adjusting backlash

Before adjusting, add washers between left bearing seat (3) of differential device and bearing 6009(4), right bearing seat (6) of the differential device and bearing 6009 (7) to ensure the backlash between the driven gearwheel(5) and small spiral gearwheel is about 0.1~0.15mm.

When the tractor is operated normally, the backlash and contact impression will both change, but as long as touching (meshing) between tooth surface is normal and only the backlash increases, backlash needs not be adjusted, but you should adjust the backlash and impressions carefully and guarantee the backlash and tooth surface impressions after heavy repair or replacing a pair of new central gearwheels or conic bearings.

● Important:

The big and small curved-tooth gears of central transmission are of mating gears. They can't be mounted wrongly. They had better be replaced together with bearings to guarantee their service life.

6.3 Adjustments on brakes

After the brake is used for a certain time, the clearance between friction pieces and brake drum or, friction pieces and the brake housing or brake cover will increase due to abrasion of friction pieces. Then it influences brake function. The too long free travel will lead to failure of braking so the brake should be often adjusted for safe running.

No matter what the tractor is (new or old), its brake should be adjusted when the following phenomena happens to the brake.

- ①The free travel of the brake pedal is too long and causes brake failure.
- ②The free travel of the brake pedal is too short, making the brake be “half-braking” state, the brake housing becomes hot.
- ③As braking force of the left pedal doesn't conform to right pedal, the tractor deviates from the right path.

6.3.1 Adjusting shoe brake:

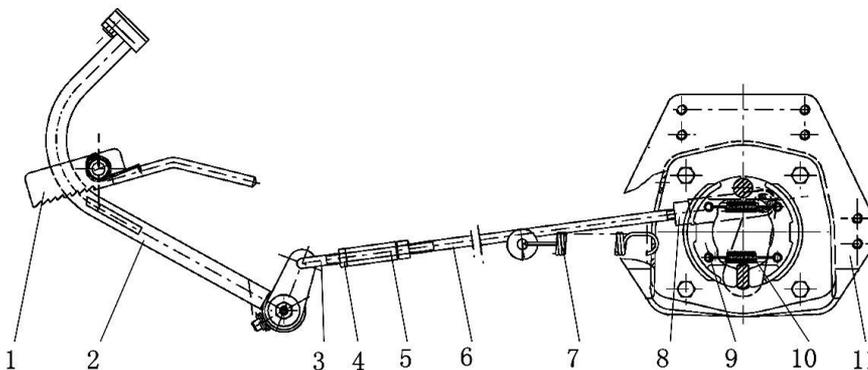


Fig .6-3 shoe brake

1. Brake self-locking handle 2. Brake pedal 3. Short pull-rod 4. Nut 5. Adjusting bolt
6. Brake long pull-rod 7. Returning spring 8. Adjusting pull rod fork 9. Shoe brake
10. Returning spring of the shoe brake 11.Brake housing

(1) Adjusting free travel of the brake pedal

The free travel of the pedal implies the displacement measured from brake pedal's highest position to a position you feel obvious resistance when pressing the pedal. The free travel should be within 55-65mm (Fig. 6-3).

When adjusting, firstly loose the lock nut (4) of the short pull-rod (3), turn the adjusting bolt (5) to change the length to get a displacement within 55-56mm measured after the clearance between the top brake drum (11) and the shoe brake (9) is eliminated through pressing the brake pedal. Make the adjustment of left pull-rod conform to the right pull-rod, then fasten lock nut (4) (Fig .6-3).

(2) Adjusting deviation of the tractor

When the adjustment of the left brake does not conform with that of the right brake, and if tractor brakes hard during running at a high speed, the brake impressions of left and right tyres are different and “deviation” will also happen. If so, you should prolong the brake rod at the side of longer impression, or shorten brake rod at the side of the shorter impression until the tyre impressions of left and right tyres are almost in the same length and reliability of

braking is guaranteed. Then fasten nut (4), and check its operation at gear III, check again at Gear IV after adjustment.



Warning:

Before starting, lock the left braking pedal with right braking pedal, the tractor may turn over by unilateral braking.

• **Important:**

Free travel of left braking pedals of tractor must be adjusted to conform to that of the right braking pedal, or the tractor will deviate from path and danger may take place.

6.4 Adjustments on front shaft

6.4.1 Adjusting toe-in of front wheels.

While the tractor is operated, front toe-in of front wheels changes as steering mechanism, front axle parts deform and wear away. If an adjustment is not made, front wheel tyres will wearing away quickly. The adjustment procedure of the toe-in (see Fig-6-4) is as follows:

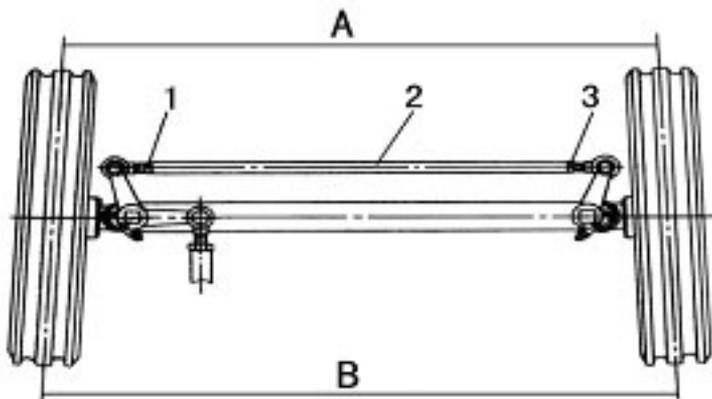


Fig .6-4 Adjusting toe-in

1. Right-handed nut 2. Tie rod 3. Left-handed nut

(1) Put the tractor on level ground, and set the front wheels to straight – running position.

(2) At a horizontal level that is the same as the center of front wheels, measure the distance A between the front ends of the wheels and B of the rear ends between two wheels.

(3) Loose locking nut 1 and nut 3 on the two ends of the tie rod, turn the rod to make $B-A=4\sim 8\text{mm}$, then fasten rod 2 by nut 1 and nut 3.

6.5 Adjustments on front driving axle

Adjusting central transmission mechanism(Fig.6-5)

During assembling, put some washers (2) and (5) between the right half axle sleeve (1) and bearing 6008 (3), and between bearing 6008 (4) and fixing ring (6) to keep the backlash of the central transmission gear pair (driving conic gearwheel 9 and driven gearwheel 10) within 0.15~0.20mm, and ensure axial movement of the differential device does not happen to the differential device bearings, and differential device assembly works smoothly. Turn nut (8) to ensure its axial movement does not happen to the driving conic gearwheel and works smoothly, and then fasten the lock plate (7).

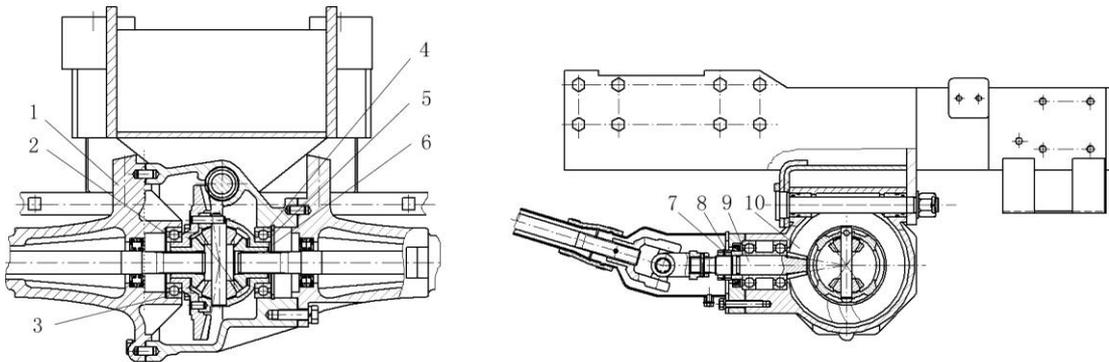
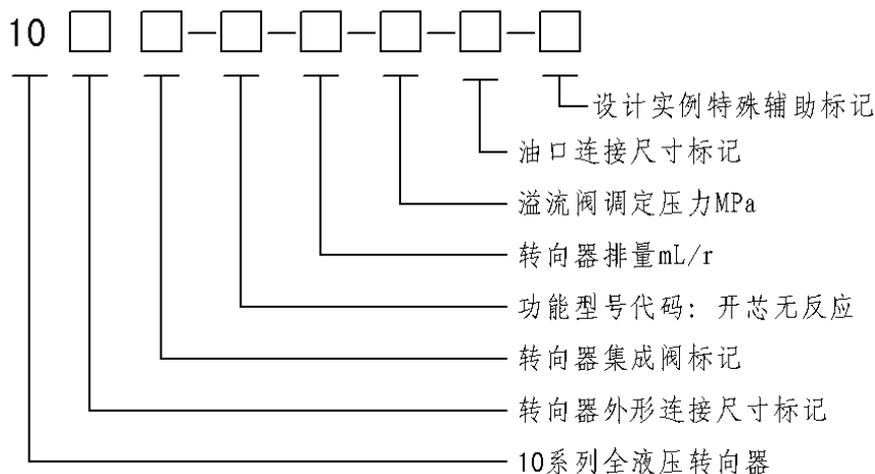


Fig. 6-5 Front-driving system adjusting

1. Right half axle sleeve 2. Adjusting washer 3. Bearing 6008 4. Bearing 6008
5. Adjusting washer 6. Fixing ring 7. Locking plate 8. Locking nut 9. Driving conic gearwheel
10. Driven gearwheel

6.6 Adjustments on steering gears

6.6.1 Models of steering gears: 101S-1-100-12-AH (Fig. 6-6)



Special Design Auxiliary Mark

port Connection Size

Setting Pressure of Overflow Valve MPa

Displacement of Steering Gear mL/r

Functional Model Code: Open-core non-response

Mark of Steering Gear pile-up Valve

Overall Connection Size of Steering Gear

10 Series Full-hydraulic Steering Gear

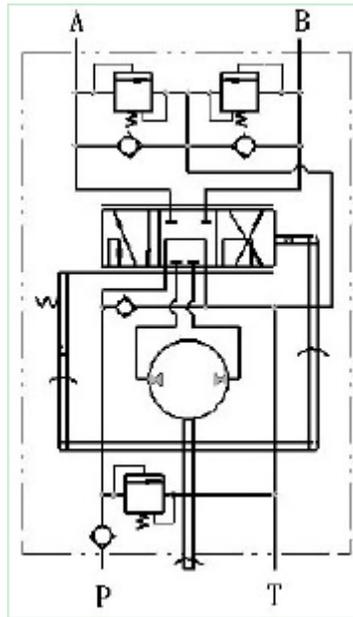
Fig. 6-6 Model Coding

101S-1 series steering gear is a model, modified on model 101-1, newly combining overflow valve, bi-directional cushion valve, bi-directional oil-make-up valve and inlet check valve. The features of 101-1 are remained, while working pressure of steering system can be controlled. Oil cylinder gets pressure buffered and protected by oil make-up to prevent from reverse oil flow of the system.

6.6.2 Precautions of mounting:

(1) Precautions of mounting

- ① For mounting steering gear, steering gear and steering column should be kept in the same concentricity. Meanwhile, in axial direction there must be a gap of 1mm between them.
- ② Fasten the bolt of steering column. Scw it into steering and coupling threaded hole has a depth $\leq 15\text{mm}$.
- ③ After steering gear mounted, return of steering wheel must get checked to guarantee flexibility of return.



④Connecting piping: P: port to oil supply pump; T: port to oil return tank; A and B ports to left and right oil chambers of steering gear respectively.

(2) Precautions of flow speed:

For the oil supply circuit connecting to port P, the inside oil flow speed is recommended as $\leq 1.5\text{m/s}$.

Cylinder pressure circuit connecting to Port A and B, the inside oil flow speed is recommended as $\leq 4\sim 5\text{m/s}$.

(3)Other precautions:

① Diameter of steering wheel should not be over 500mm.

② A filter of precision of $30\mu\text{m}$ should be mounted in oil return circuit of steering gear. Tank should be higher than steering system and oil return pipe should be under oil level. Therefore, only when manual steering is carried out, oil make-up can be done. Meanwhile, air can be kept away from oil circuit.

③ Viscosity of oil in steering gear should be 17 cst~33 cst. Low-condensation hydraulic oil is recommended. Normal working temperature of steering gear can be $20\sim 80^{\circ}\text{C}$ while extreme working temperature has a range of $-30^{\circ}\text{C}\sim 100^{\circ}\text{C}$. Notice: In abnormal oil temperature environment, steering capacity will be reduced.

④ After being assembled, steering system should get trial operation: wash oil tank before operating. Fill in hydraulic oil to the top oil level. Release threaded connectors of steering

cylinder to make oil pump run in low speed for air bleeding until oil doesn't contain foam. Disassemble the connection between steering cylinder piston rod and steering wheel to turn steering wheel to make the direction the most left or right (Don't stay at the two extreme positions.). Fill oil into tank to stated oil level. All threaded connectors should be fastened (Don't screw up in case of pressure). Piston rod should connected and check for normal working of steering system in various working conditions.

⑤ Keep oil clean to avoid dirt seizing inner parts of steering gears that can cause abnormal steering performance. Filter core and oil should be checked usually. It should be replaced when necessary (Make hydraulic oil drop to blotting paper. In case of oil stain has a black core, the oil should be replaced at once).

⑥ In case steering gear is found heavy or abnormal steering, you should find out the cause firstly and don't pull steering wheel hard to avoid parts damaged. It's forbidden to let two persons turn steering wheel at the same time.

4. Disassembling and assembling of steering gear

(1) Disassembling

① Steps:

Rear cover-limit column-stator-rotor-universal driving shaft-separation disc-split pin+steel ball-valve core and valve bush-washer-pin-spring piece-collar-valve body

Safety valve block-bolt-spring base-spring-overflow valve core-overflow valve base

Cushion valve block-damping pressure-regulating bolt-bi-cushion valve spring- steel ball base-steel base-cushion valve base

② Precautions of disassembling:

During disassembling, don't scratch working surface or end face of each part. Rubber ring disassembled can't be dipped in gasoline to avoid action with it that can cause transformation or deterioration. Please notice the correct assembling position of the steel balls disassembled.

③ Steering gear is a part of high precise. Usually, users have no test method, so it is recommended not to disassemble it.

(2) Assembling

① Steps:

Valve core-valve bush-leaf spring-pin-washer-big stopper-bearing-small stopper-valve body-steel ball + split pin-separation disc-universal driving shaft-rotor-stator-limit column-rear cover

Overflow valve base-overflow valve core-spring-spring base-bolt-safety valve block

cushion valve base-steel ball-steel ball base-bi-cushion valve spring-cushion adjusting-pressure bol-cushion valve block

② Precautions:

- I. Use gasoline or paraffin to wash all parts except rubber ring before assembling. If coupling face has paint, it should be cleaned with acetone. It's forbidden to use cotton yarn or cloth to wash parts. Bristle brush or silk cloth is recommended. It's the best to use compressed air. After steering gear is mounted, 50~100ml hydraulic oil should be added into oil port. Turn valve core left and right. Only if no abnormal case happens, assembling and running-in can be done.
- II. Joint surfaces of valve body, separation disc, stator and rear cover should be highly clear. Impact or scratch is forbidden.
- III. End surface of universal driving shaft has compact point mark that should gear into inner spline tooth space corresponding to rotor tooth base. (It must get attention during assembling);
- IV. Only qualified washer set can be used for rear cover bolts;
- V. You need to follow certain steps to fasten the 7 bolts of the rear cover, each after another two, to fasten them gradually. The screw force is about 40-50N.m.
- VI. During assembling, proper quantity of Lithium Complex Grease can be added to avoid scratch on sealing rings.
- VII. After assembling finished, turn valve core of steering gear. Only if it is sure that assembling is all correct, can the running-in be carried out.

6.7 Lifter adjusting

- (1) Work principle of distributor (simple reversing valve)

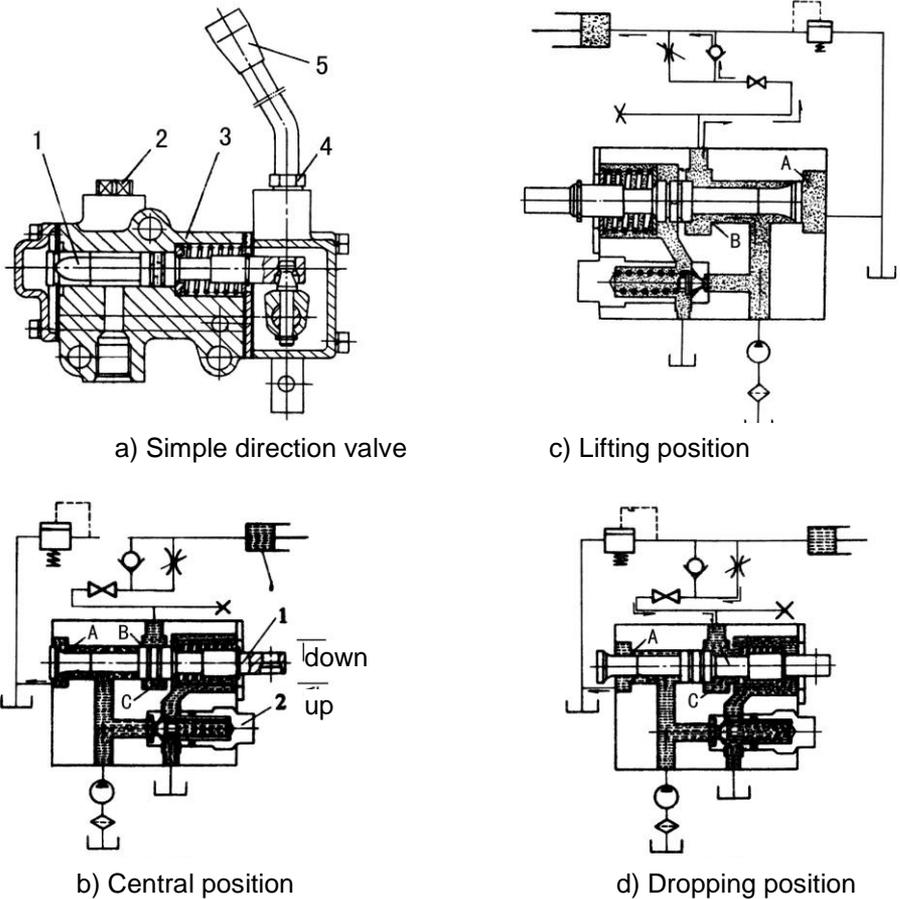


Fig.6-7 Simple direction valve and its work principle

Simple reversing valve structure and operating principal are presented in Fig.6-7. Pull control handle 5, and then master control valve 1 can be set in the three different working positions of lifting, neutral position and dropping. When the master control valve 1 stands at the middle position (Fig. 6-7b), the oil flowing into reversing valve through oil pump returns to oil tank through return port A following the direction shown on the figure. Then Inlet port B and Return port C of cylinder are closed up by master control valve 1. Cylinder is closed and implement mounted is kept at a certain position.

When Master control valve 1 is pulled down to dropping position from the neutral position (Fig. 6-7d), Cylinder return port C is opened, oil in the cylinder is pressed to oil tank by the implement's own weight following the flow direction of the arrow shown in Fig. 6-7. Then implement begins to drop. Now the oil to reversing valve through oil pump still returns to oil tank through return port A.

When master control valve is pushed to lifting position from the neutral position as Fig. 6-7c,

return port A of oil pump is shut up while inlet port B of cylinder is opened. Then the oil input to reversing valve through oil pump goes into cylinder through port B following the direction of arrow shown in the figure. Oil drives the piston and the implement is raised.

There is a safety system in the reversing valve to prevent from hydraulic elements damaged caused by overload during the implement is lifted.

(2) Work principle of the lifter

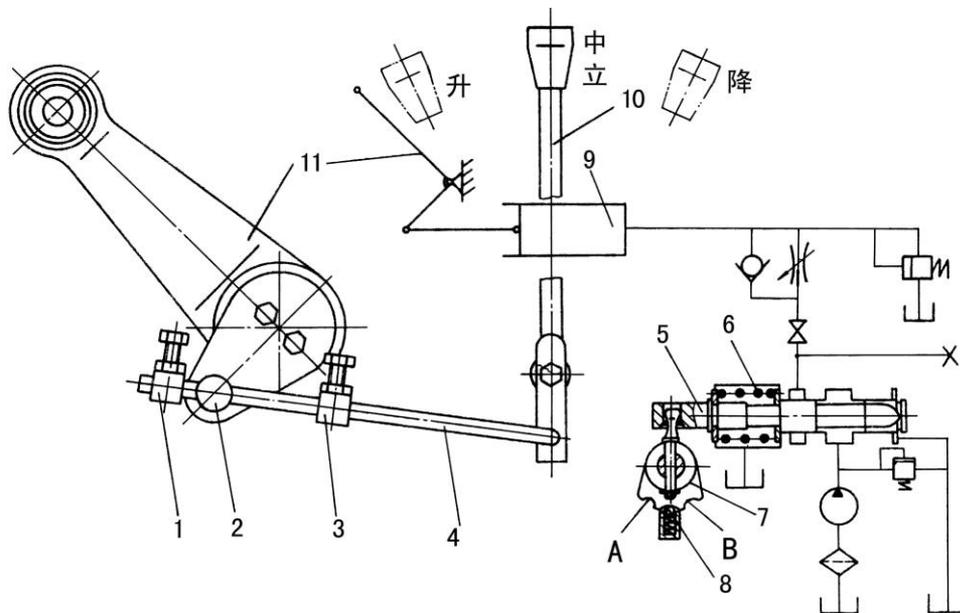


Fig. 6-8 Work principle of lifter

- 1. Lifting return gearshift block
- 2. Return pin
- 3. Dropping limit stop
- 4. Handle return push-rod
- 5. Principal control valve
- 6. Return spring of slide valve
- 7. Locating block
- 8. Locking ball
- 9. cylinder
- 10. Control handle
- 11. Outer lifting arm

Figure 6-8 is simple position-adjusting operational principle of the simple reversing valve equipped with a height-adjustable lifter. In the figure the master control valve 6 is at neutral position.

When the handle 10 pulled to the dropping position, locking ball 8 drops into the dropping locating slot B of the locating block, meanwhile the principal valve 5 moves right to the dropping position. Oil in the cylinder flows back to the tank through the principal valve 5, and the implement starts dropping. With the implement dropping slowly, the return pin 2 fixed at lift axle guard spins around lift axle counter clock wise together with the lifting shaft, and slides along the return push-rod 4. After it slides to touch dropping limit stop 3, it drives the return push-rod 4 to move toward right, turn the operating handle until the locking ball 8 is pushed out of the

locating slot B. At the same time the operating handle 10 and the principal control valve 5 return to the neutral position under tension of return spring 6 of the principal control valve. Oil returning is stopped and the implement stops dropping. Therefore, the dropping position of the implement depends upon the position of the dropping limit stop 3 fixed on the return push-rod 4. That is to say the shorter distance between the dropping return baffle and the operating handle is, the lower the implement will drop. Loose the screws of the dropping return baffle, the return push-rod will lose the ability to drive the operating handle to the neutral position. The principal control valve is always retained at the dropping position, the oil cylinder will work at “floating state”.

When lifting the implement, push the operating handle 10 to the lifting position, then the locating ball drops to the locating slot A (Fig 6-8), the principal control valve 5 moves to the lifting position toward left, the implement starts rising. When the implement rises, the return limit pin 2 rotates around the lifting axle clockwise, the pin slides to touch the lifting safe block 1 , drives the return rod 4 left, and turns the control handle 10 until the locating ball 8 is pulled out of Locating slot A. Then both the operating handle 10 and the principal control valve 5 return to the neutral position under tension of the return spring 6. The oil pump stops providing oil to oil cylinder, the implement also stops rising. The implement’s height depends on the fixing position of the lifting return baffle 1 at the return push-rod 4. The closer the return stop-block 1 is from the return push-rod, the higher the implement rises.

● **Important:**

If adjustment is not proper, the operating handle can not be reset in time. This will cause hydraulic system overload and machine damaging.

(3) Adjusting hydraulic lift

① Adjusting the highest lifting position

Put the operating handle 1 to neutral position as Fig 6-21 shows, drive the lifting arm assembly 2 to move upwards to end of the internal lifting arm 3 to the position where is not more than 5 mm from the position limiting bolt 4, the distance L between the stop-board 6 and the stop-bolt should be adjusted within 9~10mm, then fix the safety guard to the return push-rod 8 with bolts and nuts.

② Adjusting dropping position

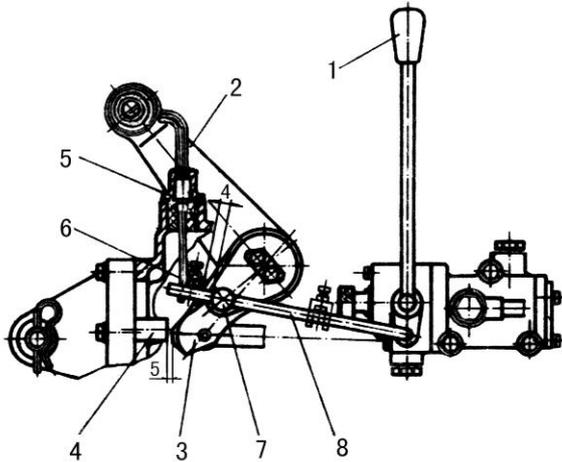


Fig. 6-9 Adjusting dropping position

1. Operating handle 2. Lift assembly 3. Position –limiting block
4. Safety-bolt 5. Return push-rod

When the operating handle 1 is at the neutral position, turn the lift arm assembly 2 towards the dropping direction, the distance L between the position-limiting boards 3 and the safety-bolt 4 should be adjusted to 9-10mm, the positional adjustment should be made for the machine set. After the tools drop into soil, fix the safety-board 3 at the return push-rod 5 with bolt and nut (see Fig 6-9), then lift the implement for repeating the experience to check if the adjustment is right.

If you use an implement with ground wheels that needs height adjustment, and the dropping limit block 3 should be adjusted to ensure the operating handle 1 of the distributor does not return to the neutral position.

③ Adjusting the dropping speed.

During adjustment, adjust the implement dropping speed by turning adjustment valve bolt 5 (Fig. 6-10). With a proper dropping speed, fix the action scope of adjusting valve bolts with the limit screw 4.

④ Adjusting safety valve

The safety valve has been adjusted before delivery. In normal operation, it can't be dismantled at will. When adjustment is necessary, it should be made on a special pressure adjustment table. Experiment oil should be HC-8 (SY1152-77), oil temperature should be controlled at $65^{\circ}\text{C} \pm 5^{\circ}\text{C}$, when fixing bolt of the safety valve turns clockwise, open pressure increases, on the contrary, opening pressure reduces (see Fig. 6-10).

As most elements in the hydraulic system is of very high in precision, and subassemblies have been checked carefully at experimental table, user should keep hydraulic oil, washing oil and

environment clean during operation, maintenance and trouble shooting. In general, user should not dismantle it at will.

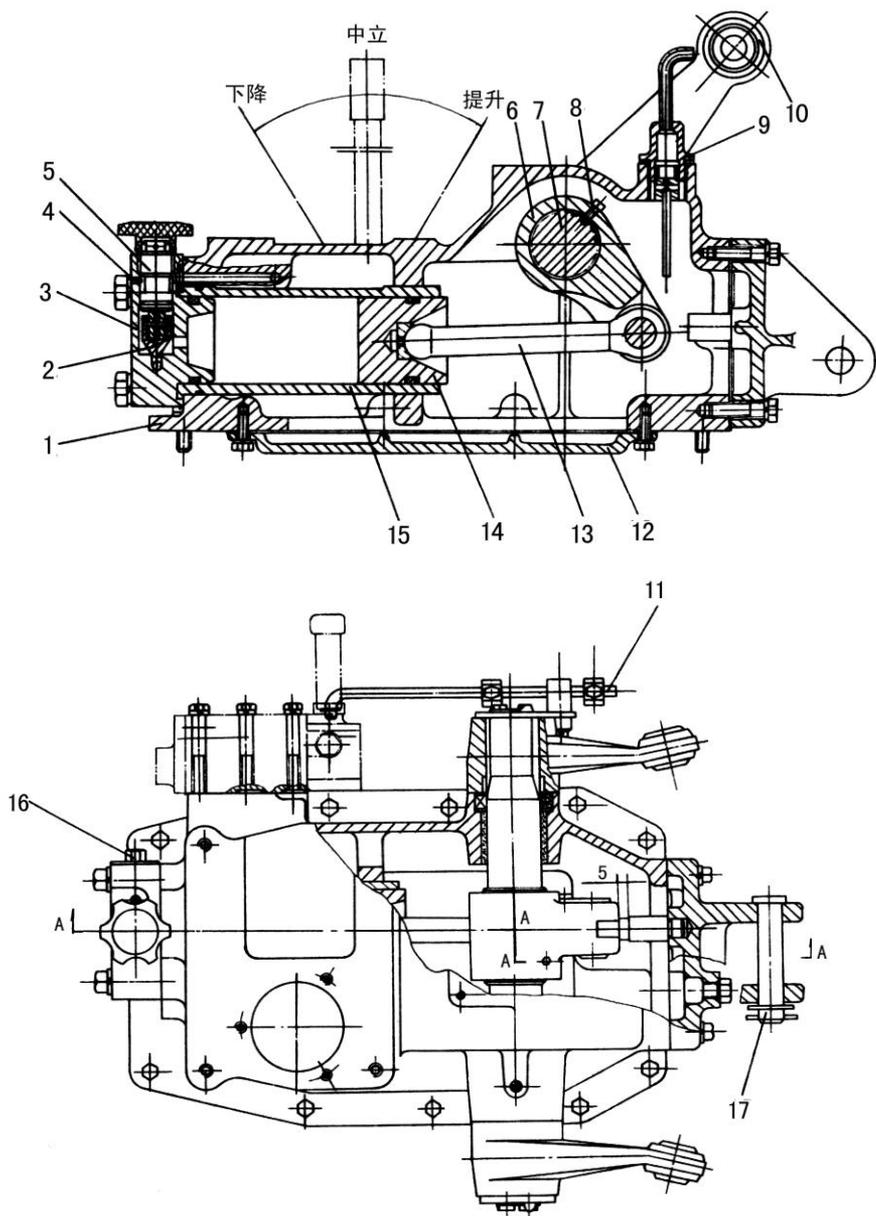


Fig. 6-10 Lifter

- 1. Lift housing 2. Adjusting valve 3. Cylinder head 4. limit screw 5. Adjusting valve bolt
- 6. Internal lifting arm 7. Lifting axle 8. Internal arm positioning bolt 9. Ventilation plug and oil ruler
- 10. External lifting arm 11. Handle return push-rod 12. Oil tank housing 13. Internal arm positioning screw
- 14. Piston 15. Cylinder 16. Hydraulic output screw plug 17. Front connecting bolt of upper pull-rod.

Notice

(1) Before checking hydraulic system, user should stop engine, and push the hydraulic handle to reduce pressure of the system.

(2) High-pressure oil can permeate skin and harm you, so pay special attention to hi-pressure oil, especially to avoid it's hurting your eyes.

(3) User should fill the hydraulic lift housing with hydraulic oil according to the regulations first and then the engine can be started to avoid burning hydraulic gear pump.

(4) When the tractor goes with implement, the hydraulic lifting handle should be at neutral position, when the tractor transfers or goes with tools, it is not prohibited to march at high speed, lest damage the lift system and the hanger system. If user leaves the tractor, user should drop the implement to ground.

Chapter VII Main Troubles and Solutions

7.1 Diesel

7.1.1 Difficult diesel starting

Causes	Solutions
1. Too low temperature	Add hot water into radiator or add preheated engine oil into crank case
2. Diesel oil cannot flow smoothly.	Check and wash fuel pipes and filter core
3. Air enters fuel pipes	Exhaust air from fuel pipes and tighten every joint.
4. Such couple units as fuel injection nozzle and injection pump are blocked or abraded.	Wash, repair or replace couple units.
5. Intake and exhaust ports have leakage, washer of air cylinder cover is damaged, piston rubber ring is abraded, or the air port has no clearance. These cause inefficient pressure.	Grind intake and exhaust port, adjust air port clearance, replace air cylinder cover washer and piston ring.
6. Insufficient battery voltage	Charge battery or replace with a new one.

7.1.2 Insufficient power

Causes	Solutions
1. Air filter or diesel oil filter is jammed.	Wash filter core with diesel oil or coal oil.
2. Wrong advance angle of fuel supply	Regulate it to the stated value.
3. Diesel contains moisture.	Eliminate moisture or replace diesel oil.
4. Oil injector needle valve is seized or jet orifice is jammed.	Check, repair or replace couple pieces of oil injecting port
5. Intake & exhaust air port has leakage or air port has wrong clearance.	Grinding air port; adjust air port clearance. Check, repair or replace it.
6. Main bearing or connecting rod bearing shell is over abraded or burnt out.	Check and adjust two cylinders of oil injecting pump for oil supply and injecting pressure to improve the equality.
7. Two diesel cylinders cannot equally work	

7.1.3 Sudden self-park of Engine

(1) Crank is seized with bearing

Repair or replace crank and bearing

Causes	Solutions
1. Insufficient or halt engine oil 2. Machine oil is too watery or goes bad after long-term use. 3. Oil pump loses effects suddenly or oil filter is jammed; safety and by-pass valve don't work well.	Check the oil level in oil pan. If the level is too low, supplement machine oil in time. Replace with new machine oil. Check oil injecting pump post pair to see if too much diesel oil leakage dilutes machine oil. if so, do repair. Check, repair or replace machine oil pump and filter.

(2) Piston is seized with air cylinder

Repair or replace such parts as air cylinders and pistons

Causes	Solutions
1. Diesel lacks water and is so hot that seizes cylinder 2. Too much water scale in cylinder water jacket makes cylinder over hot. 3. Engine works with over loads 4. Fan belt is too loose.	Supplement cooling water Clear water scale away. Strictly comply with operation rules Adjust belt tautness or replace belt.

(3) If flywheel can still run, the following are the possible reasons

Causes	Solutions
1. Diesel oil in fuel tank is used out or fuel pipe breaks. 2. Air is induced in fuel pipes 3. Diesel oil filter or pipes are jammed. 4. Injection pump plunger spring is broken.	Fill in diesel oil or replace fuel pipes Eliminate air from fuel pipes. Wash diesel filter core or fuel pipes. Replace with new plunger spring.

7.1.4 Abnormal smoke exhaust

Causes	Solutions
1. Diesel works with over loads. 2. Much smoke comes with exhaust, which is caused by the secondary air ring is wrongly mounted or oil ring is severely abraded. 3. White smoke in exhaust is caused by water in fuel, or bad atomization of oil injector, or too low oil injecting pressure.	Minus loads. Adjust until requirements are met. Re-mount air ring. Make the surface with symbol "上" face piston top or replace oil ring. Wash oil tank, diesel filter, replace diesel, repair oil injecting pairs and adjust oil injecting pressure.

7.1.5 Over-hot diesel

Causes	Soluitons
1. Fan belt is too loose 2.diesel works with overload for a long term. 3.Oil supply is too late or oil injector drops oil to make exhaust test too high.	Adjust belt tautness or replace with belt. Reduce diesel loads Check and repair.

7.2 Transmission system

7.2.1 Clutch slides

Causes	Soluitons
1.Friction plate surface is oil stained 2.Pressure spring has no full force or is broken. 3.Free travel is small or zero. releasing levers are not in a plane. 4.Friction plates are severely abraded.	Wash with diesel oil. Eliminate oil leakage. Replace spring Re-adjust according to rules. Replace friction plates.

7.2.2Clutch cannot be released completely. Gear lever has difficult for gear shifting

Causes	Soluitons
1. Too large free travel or too small working travel 2.Clearance between three releasing levers and releasing bearing.	Re-adjust according to requirements. Re-adjust according to requirements.

7.2.3Transmission case sounds abnormally.

Causes	Soluitons
1.Tooth flank of gear is severely abraded or peeled off. 2.Gear tooth is broken. 3.Bearing is severely abraded or damaged. 4.Engage clearance of central drive gear is broken.	Replace gear. Replace gear Replace bearing Re-adjust to stated value.

7.2.4Transmission case is too hot

Causes	Soluitons
1. Bearing clearance or bevel gear's engaging clearance is too small. 2.Insufficient oil volume 3.Bad oil quality	Re-adjust to stated value. Add lubrication oil to stated oil level. Wash with diesel and then fill in proper lubricating oil.

7.3 Brakes

7.3.1 Brakes don't work well

Causes	Solutions
1.Brake shoe bears too much abrasion on friction belt. 2.Friction belt on brake shoe contains oil. 3.Improper adjustment.	Replace with new brake shoe. Wash it with gasoline and shoot the trouble of leakage. Re-adjust according to requirements.

7.3.2 Crooked running during braking

Causes	Solutions
1.The left and the right brake pedals have inconsistent travel. 2. Friction belt on single -side brake shoe is stained with oil. 3.Abrasion of friction belt on the left and the right braking shoes are not consistent.	Re-adjust until consistency. Wash with gasoline and shoot the trouble of leakage. Re-adjust or replace with new braking shoe.

7.3.3 Incomplete disengagement ; high temperature

Causes	Solutions
1.Brake shoe return spring has no full force. 2.Clearance between the friction belt and drum on brake shoe is too small.	Replace spring Adjust free travel of pedals.

7.4 Steering unit and traveling system

7.4.1 Hard steering

Causes	Solutions
1. Clearances or abrasion between pin and worm, or between bolt & nut assembly and rocker tooth, or between hindley screw and rolling wheel are severe. 2. Too low air pressure of front tires; 3. Insufficient oil supply of oil pump; 4. Steering system contains air. 5. Oil tank is not full.	Adjust clearance or replace worn parts. Inflate as instructions. Select proper oil pump or check oil pump for its normal performance. Eliminate air from exhaust system and check oil inlet pipes. Fill oil to stated level.

7.4.2 Tractor automatically goes to one side.

Causes	Solutions
1. Air pressure of the left and the right tires are not consistent. 2.Wheel treads of the left and the right tires don't match.	Adjust for consistence. Replace tires

7.4.3 Front wheels swing

Causes	Soluitons
1.Bearing clearance of front wheel shaft is too large or severely abraded. 2.Round-head pin or round-head base is severely abraded. 3.Sleeve of swing shaft is abraded. 4.Steering knuckle sleeve is abraded.	Adjust clearance or replace bearing. Replace round-head pin or round-head base. Replace axle sleeve. Replace axle sleeve.

7.4.4 Initial abrasion of tires

Causes	Soluitons
1.Improper adjustments on toe-in of front wheels. 2. Low tire pressure 3.Driving wheels are installed wrongly.	Re-adjust to stated value. Inflate according to rules. Re-install it.

7.5 Hydraulic suspension system

7.5.1 Farming Implements can't rise or drop

Causes	Soluitons
1.Adjusting valve is locked up. 2.Master valve is seized	Release adjusting valve. Wash the valve

7.5.2 Implement has too quick static dropping

Causes	Soluitons
1.Oil cylinder and piston are severely abraded. 2.Oil seal on piston is damaged. 3.Slide valve of distributor is damaged.	Repair or replace oil cylinder piston assembly Replace oil seal. Replace distributor.

7.6 Electrical system

7.6.1 Starter

Causes	Solutions
<p>1. Starter doesn't work.</p> <p>① Connecting wire is broken or cannot contact well.</p> <p>② Battery has insufficient charging.</p> <p>③ E-brush cannot contact commutators well.</p> <p>④ Starter has inside short or open circuit.</p> <p>2. Starter in idling without starting power.</p> <p>① E-Brush cannot contact commutators well.</p> <p>② Commutator surfaces burnt or has oil stain.</p> <p>③ Connector cannot work well.</p> <p>④ Electromagnet switch doesn't work well.</p> <p>⑤ Insufficient battery charging</p> <p>3. Starting small gears are not engaged and the starter turns, so gears impact against each other. Electromagnet switch armature has too small travel.</p>	<p>Weld or screw connecting points tightly. Supplement electric charging or replace batteries.</p> <p>Clean commutators surface or replace brush.</p> <p>Check and repair.</p> <p>Clean commutators' intersurfaces. Restore commutator with sand cloth or clean oil stain.</p> <p>Clean and screw up contact points.</p> <p>Check and repair switches.</p> <p>Check and charge</p> <p>Turn electromagnet switch armature connecting screws in for 2-3 teeth.</p>

7.6.2 Battery

Causes	Solutions
<p>1. Battery often has no sufficient electric storage.</p> <p>① Generator or adjustor has malfunction and produce no charging current.</p> <p>② Connecting wire of charging circuit is loose or rusted, which cause increased resistance.</p> <p>③ Pole plate has short circuits.</p> <p>2. Battery has self-discharging; Material of polar plate has too much impurities or the electrolyte is not pure.</p> <p>3. Battery capacity is obviously reduced (low discharging voltage, high charging voltage, electrolyte density is low) and pole plate is vulcanized.</p> <p>① Charging is always no sufficient.</p> <p>② Discharging with low current for a long term doesn't get charging in time.</p>	<p>Repair generator or adjustor.</p> <p>Check post clamping chuck and connecting bolts. If they are loose, screw it up or eliminate rusts.</p> <p>Repair it.</p> <p>Discharge batteries completely or do over-discharging to make pole plate impurity enter electrolyte and then discharge electrolyte, wash it with distilled water. Pour new electrolyte to charge again.</p> <p>Charging with low current for long time, or do fully-charging & fully-discharging circulations to react the active elements.</p>

Chapter VIII Appendix

8.1 Wiring diagram of electric system

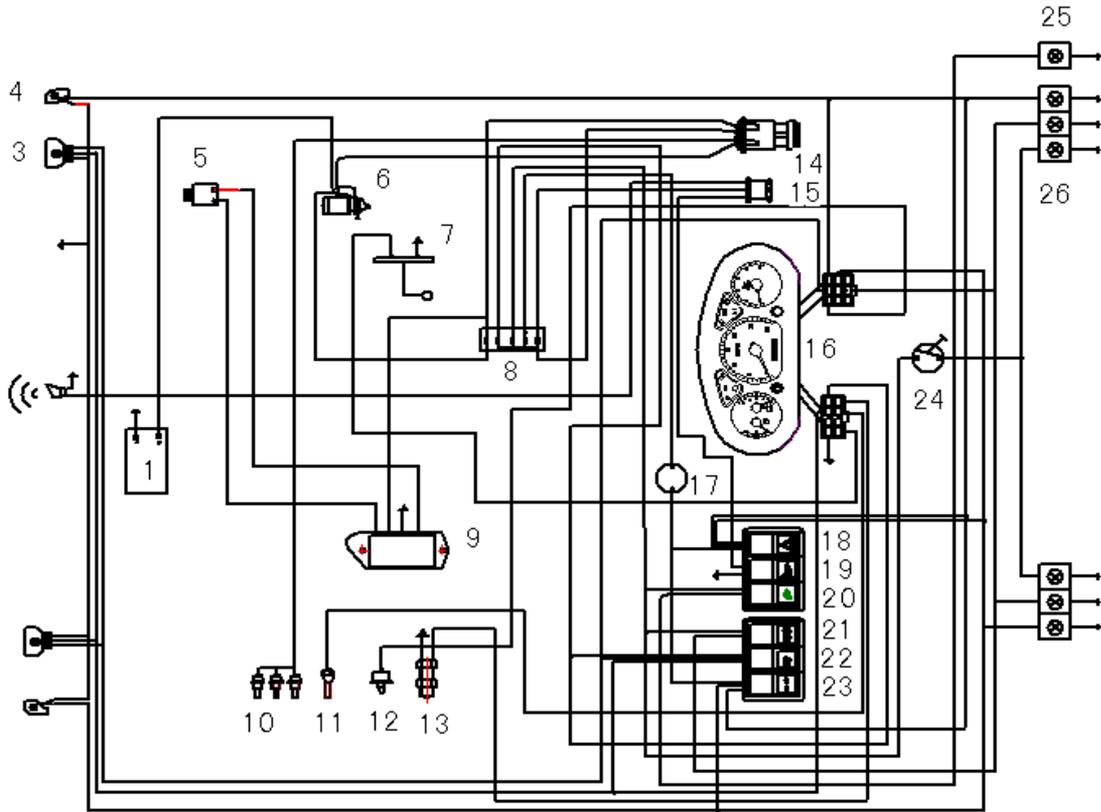
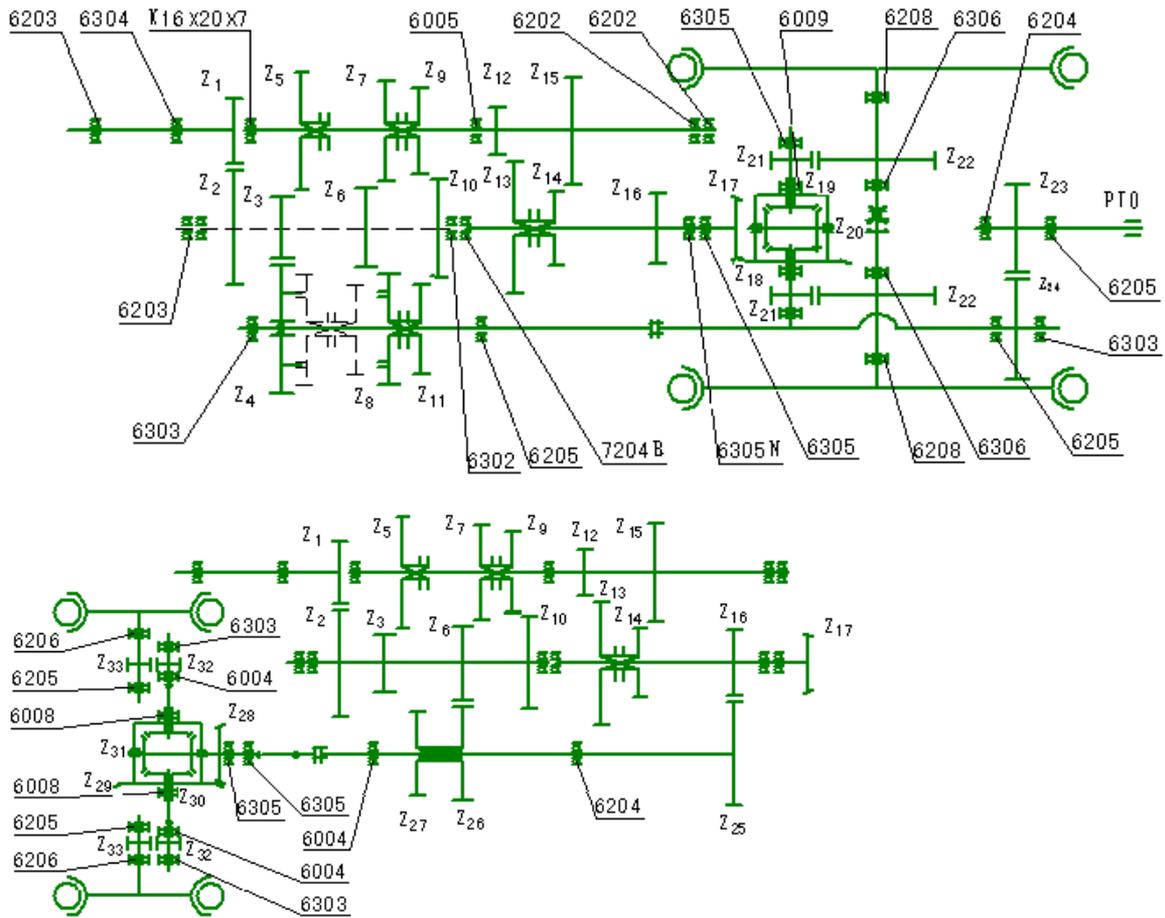


Fig. 8-1 Wiring diagram of electric system

1. Battery C603-6QA45 2. Electric horn C502-L129 3. Front lights 4. Turning indicators
 5. Generator 6. Starting motor 7. Oil volume sensor 8. Fuse box BX410
 9. Adjustor 10. Heater plug 11. Water-temperature sensor 12. Oil-pressure sensor
 13. Speed sensor 14. Switch of preheating 15. relay 16. Combined instruments
 17. Flasher 18. Warning switch 19. horn switch 20. Aft-working switch
 21. Width indicator 22. Switch of front working lights 23. Switch of turning indicators
 24. Brake switch 25. Aft-working lights 26. Rear lamps

8.2 Distribution of tractor transmission system and rolling bears

Tractor transmission



- I : Z1-Z2-Z3-Z5-Z12-Z13-Z17-Z18-Z20-Z19-Z21-Z22
 II : Z1-Z2-Z6-Z7-Z12-Z13-Z17-Z18-Z20-Z19-Z21-Z22
 III : Z1-Z2-Z10-Z9-Z12-Z13-Z17-Z18-Z20-Z19-Z21-Z22
 IV : Z1-Z2-Z3-Z5-Z15-Z14-Z17-Z18-Z20-Z19-Z21-Z22
 V : Z1-Z2-Z6-Z7-Z15-Z14-Z17-Z18-Z20-Z19-Z21-Z22
 VI : Z1-Z2-Z10-Z9-Z15-Z14-Z17-Z18-Z20-Z19-Z21-Z22
 R (I) : Z1-Z2-Z6-Z26-Z27-Z5-Z12-Z13-Z17-Z18-Z20-Z19-Z21-Z22
 R (II) : Z1-Z2-Z6-Z26-Z27-Z5-Z15-Z14-Z17-Z18-Z20-Z19-Z21-Z22

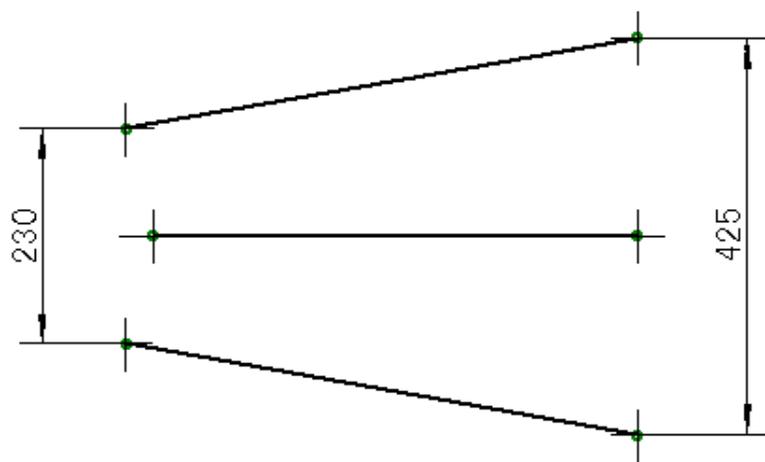
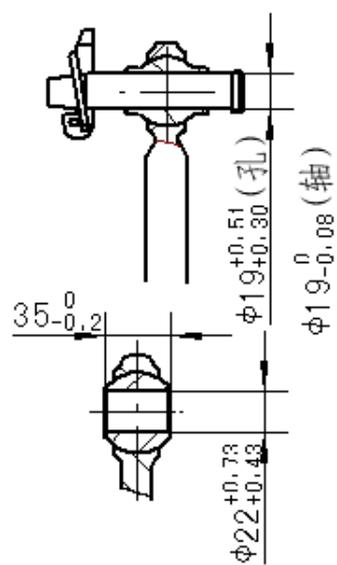
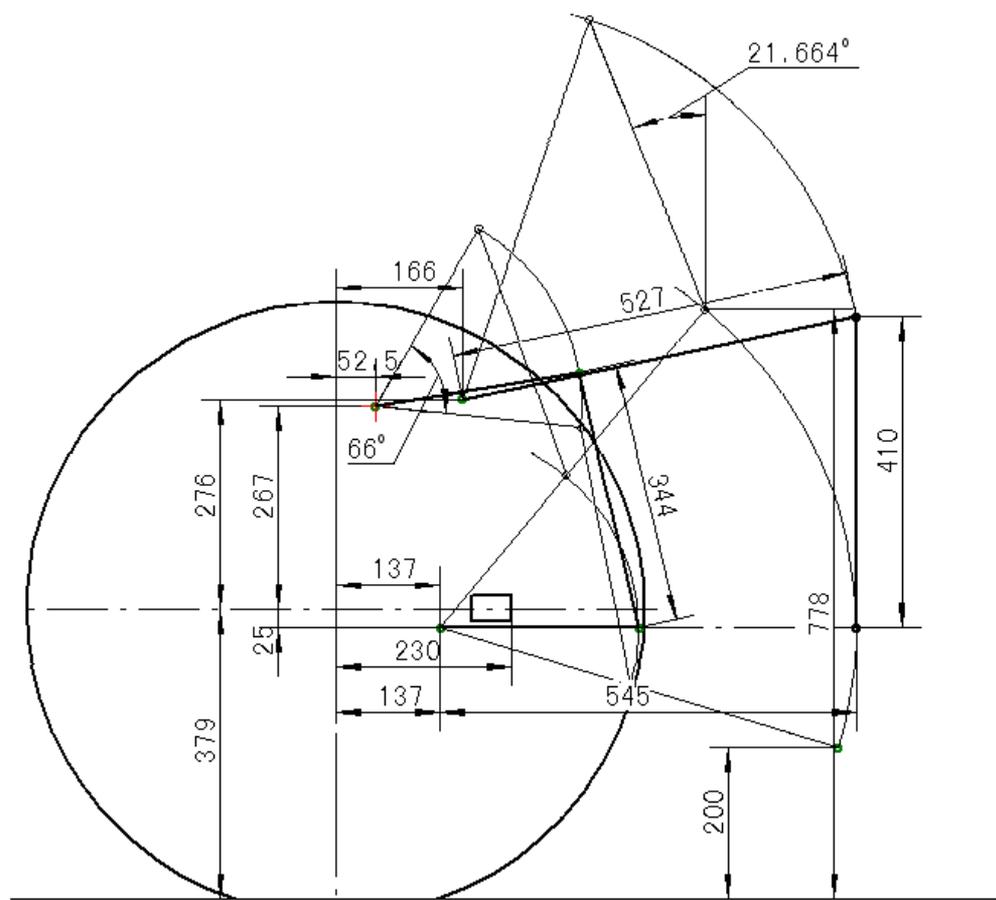
Z1 =17, Z2 =26, Z3 =14, Z4 =29, Z5 =29
 Z6 =15, Z7 =21, Z8 =21, Z9 =17, Z10=19
 Z11=17, Z12=11, Z13=32, Z14=14, Z15=22
 Z16=16, Z17=19, Z18=37, Z19=6, Z20=12
 Z21=55, Z22=20, Z23=16, Z24=25, Z26=11
 Z27=6, Z28=37, Z29=12, Z30=12, Z31=25

8.3 Chassis oil spec. and sites

Component	Spec.		Installing site	Quantity.
Gear box	GB/T9877.1 Lip type packing of rotating shaft	FB20×35×7	At spindle nose of reverse gear	1
	JB/T2600 Reinforced seal	SG17×30×8	Front end cap of Axle I	1
	GB 3452.1 O-ring	9.5×2.65 9×1.8	PTO declutch shift shaft declutch shift shaft of II-III, I- reverse gears Screws on cover plate of transmission case	1 1 1
Clutch	GB/T9877.1 Lip type packing of rotating shaft	FB20×35×7	Inside release bearing base	2
Rear transmission case	GB/T9877.1 lip type packing of rotating shaft	FB35×50×8	At PTO shaft	1
Final transmission	GB/T9877.1 lip type packing of rotating shaft	FB58×80×10	At the smaller end of final transmission shell	4

Front driving axle	GB 3452.1 O-ring	10.6×1.8	declutch shift shaft	1
	JB/T2600 Reinforced seal	W35×50×7	side reduction	2
	GB/T9877.1 lip type packing of rotating	FB20×35×7	inside dustproof pipes	1
		FB22×47×7	inside bush of half axle	2
		FB25×40×8	side reduction	2
		FB35×50×8	side reduction	2
		FB35×55×8	bearing cover	1
	GB 3452.1 O-ring	20×2.65	swing shaft	1
		25×2.65		1

8.4 Sizes of suspending system



8.5 Accessories

No.	Code	Name	Qty.
1	GB/T3390.3 Sleeve Spanner	sleeve 10*12.5	1
2		sleeve 13*12.5	1
3		sleeve 16*12.5	1
4		sleeve 18*12.5	1
5		sleeve 21*12.5	1
6		sleeve 24*12.5	1
7		sleeve 27*12.5	1
8		sleeve 10*12.5	1
9		splicing pole, boosting lever, sliding coupler	1 pc each
10	Double wrench GB/T4388	spanner 8*10	1
11		spanner 13*16	1
12		spanner 12*14	1
13		spanner 17*19	1
14		spanner 18*21	1
15		spanner 22*24	1
16	spanner 27*30	1	
17	GB/T5356	allen wrench S6(lengthened)	1
18	Allen wrench	outside calipers	1
19		inside calipers	1
20		cruciform screwdriver 150*5	1
21		dash line screwdriver 250*9	1
22		diesel accessories and the tool box	1set
23		Parts catalogue of HHJM-164Y series tractors	1
24		Manual of HHJM-164Y series tractors	1

8.6 Wearing parts

No.	Code	Name	Qty.	Note
1	JB/T2600-1979	reinforced seal W35*50*7	1	
2		reinforced seal SG17*30*8	1	
3	GB/T9877.1-1988	oil seal FB20*35*7	1	
4		oil seal FB22*47*7	1	
5		oil seal FB25*40*8	1	
6		oil seal FB35*50*8	1	
7		oil seal FB35*55*8	1	
8	GB3452.1-1992	O-ring 9.5*2.65	2	
9		O-ring 10.6*1.8	2	
10		O-ring 14*2.65	2	
11		O-ring 16*2.65	2	
12		O-ring 17*1.8	2	
13		O-ring 20*2.65	2	
14		O-ring 25*2.65	2	
15		O-ring 28*2.65	2	
16	O-ring 42.5*2.65	2		

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