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Chapter One

Safety Rules for Tractor Driving

A. General

1. Tractor drivers should drive the tractor carefully and concentrate their attention for driving, so as to avoid accident.

2. Before using the tractor, carefully read the tractor's operation and maintenance manual as well as the tractor engine's operation and maintenance manual. Carry out the running-in, operation and maintenance strictly in accordance with the requirements of the manuals.

3. A tractor driver should be specially trained and should have a driving and operation license which should be verified periodically.

4. Farm machinery and implements attached to the tractor should be carefully selected in accordance with the requirements of the operation and maintenance manual. Overload is not allowed. Curb idling time should not exceed 10 minutes.

5. Never operate the tractor when it has troubles. When there is no oil pressure, oil pressure is too low, water temperature is too high, or abnormal noise is heard, immediately stop the tractor, check and repair the troubles.

6. Do not adjust the opening pressure of the safety valve in the hydraulic system. If it needs to adjust the safety valve, it can only be carried out by a professional technician with special equipment. After adjustment, the opening pressure should conform to the requirement of the manual.

7. If the driver off his feed, never force himself to go on driving the tractor, so as to avoid accidents.

B. Starting the tractor

1. Before starting the diesel engine, put the gearlever and the power take-off shaft in the neutral position. Put the lift control handle to the lowering position.

2. Before starting the tractor, all the attached implements should be kept in the lowest position.

3. Before starting the tractor, make sure that all the shields and protective devices (e.g. the V belt cover, the engine cover, splash guard etc.) should be installed well in place.

4. Before starting the tractor, check and tighten all the outside screws and nuts, so as to avoid any accident during driving.

5. Before driving the tractor, make sure there that there is no people or other things around the tractor, so as to avoid any accident.

C. Driving the tractor

1. Smoothly connect the clutch so as to avoid the tractor from tilting which may cause accidents. This will be more important when the tractor goes up slope or in a towing state.

2. When the tractor goes down slope, never let it slide down by using the neutral gear or by pushing down the clutch pedal.

3. When diving the tractor on the road, the driver should not leave the driver's seat.

4. When emergency braking is needed, push down the clutch pedal and the brake pedal at the came time.

5. When driving the tractor with a high speed, never turn it sharply.

6. Drive the tractor at the safety speed according to the road condition. When driving on a up slope or a zigzag road, select a lower speed so as to avoid turning over.

7. Specially care should be taken when driving along the edge of a slope.

8. Only the driver is allowed to sit on the tractor.

9. In case the diesel engine is "galloping", shut off the fuel circuit or the air circuit immediately, so as to force the engine to shut down. When carrying out this operation, care should be taken to ensure the safety of the people

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and machine.

10. The tractor driver should strictly abide by the "Machinery maintenance safety rules" and the "Regulation of road traffic control".

D. Traction work

1. The towed vehicle should have a independent braking system, otherwise, it cannot be towed.

2. If the towed vehicle has a air brake unit, the working pressure of the air brake valve should be 630kPa.

3. When the tractor tows a implement or a heavy duty towed vehicle, please drive it in a low speed.

E. Using farm implements

1. The power of the tractor should match that of the farm implement it drives, do not overload the tractor.

2. During the tractor's power take-off shaft is revolving, do not turn the tractor sharply, and do not raise the farm implement too high.

3. When driving the backward to attach the implement, no one is allowed to stand between the tractor and the implement.

4. When attaching the power take-off shaft to drive the implement, no one is allowed to stand around the implement. During operation, no one should get close to the revolving parts of the tractor.

5.When driving the tractor with implements on the road, turn the lowering control handle to the position where the implements cannot be lowered further(but not deadlocked).When passing the field ridges or other implements, decrease the speed.

6. When the tractor is used for harvesting or threshing, install a spark killer device to the exhaust pipe.

F. Parking

1. When parking the tractor, the implements should not be put in a raised position.

2. When the driver leaves the tractor, at first put the gearlever to the neutral gear position, push the brake pedal to the end position and lock it with the fixing claw, then shut down the engine and connect the gear again. When parking on a slope, in order to ensure safety, block the wheels with chock blocks.

G. Maintaining the tractor

1. When draining off water or oil, or get close to the engine parts with high temperature, take care to avoid being burnt.

2. When there is still a high pressure in the hydraulic system, do not detach the pipeline.

3. Before checking, cleaning, washing, adjusting and repairing the tractor or implements, be sure to shut down the engine, put the gearlever to the neutral gear, and all the motion parts should be in a rest state.

4. When operating the tractor or during fueling, take care to avoid fire, make sure that no fire disaster would be caused.

5. When maintaining the battery, take care to ensure the safety of persons and the assets.

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Chapter Two

Technical Specifications of the Complete Tractors

A. Parameters for Complete Tractors

Parameters \ Tractor model		HS450	HS500	HS550	HS600	HS454	HS504	HS554	HS604
Type		4×2 2WD				4×4 4WD			
Exterior size mm	Length(with Front ballast)	3780		3900		3780		3900	
	Width	1550/1650/1750							
	Height(to the Exhaust vent)	2250	2280	2300		2250	2330	2330	
Axle base mm		1946		2025		1990		2040	
Front wheel base mm		1250~1450				1300			
Rear wheel base mm		1250~1450							
Min. ground clearance: mm		300				325			
Turning radius: m	One side braking	3.5				3.8			
	No side braking	4.0				4.3			
Minimum operational weight		1890		2060	2105	2250	2150	2280	2370
Rated traction force N		7640	7890	9500	9800	9500	9630	9980	11750
Gears		Theoretical speed: km/h							
Low I		2.57		2.47		2.57		2.47	
Low II		3.73		3.58		3.73		3.58	
LowIII		5.09		4.89		5.09		4.89	
LowIV		8.14		7.81		8.14		7.81	
High I		13.00		12.48		13.00		12.48	
High II		16.62		15.96		16.62		15.96	
HighIII		25.88		24.84		25.88		24.84	
HighIV		36.32		34.87		36.32		34.87	
Low reverse 1/High reverse 1		2.30/11.61		2.21/11.15		2.30/11.61		2.21/11.15	
Low reverse 2/High reverse 2		3.33/14.84		3.20/14.25		3.33/14.84		3.20/14.25	
Low reverse 3/High reverse 3		4.54/23.11		4.36/22.19		4.54/23.11		4.36/22.19	
Low reverse 4/High reverse 4		7.27/32.43		6.98/31.13		7.27/32.43		6.98/31.13	

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B. Engine

Tractor model / Engine parts and parameters	HS450	HS500	HS550	HS600	HS454	HS504	HS554	HS604
Engine model	QC495	JD4100BT3/ A498BT	YT4A2-23	YT4A2-23	QC495	JD100BT3/ A498BT	YT4A2-23	YT4A2-23
Engine type	Vertical in-line four stroke							
Rated speed r/min	2400	2400	2300	2300	2400	2400	2300	2300
Rated power kW	33.1	36.75/36.8	40.5	44.1	33.1	36.75/36.8	40.5	44.1
Fuel consumption under the rated condition: g/Kw.h	See to launch the machine usage the manual							
Engine oil consumption under the rated condition: g/Kw.h	See to launch the machine usage the manual							

C. Drive System

Tractor model / Parts name	HS450	HS500	HS550	HS600	HS454	HS504	HS554	HS604
Clutch	dry type、double action							
Gearbox	4×(2+2) gear group type							
Central transmission	Spiral bevel gear transmission							
Differential gear	Four planetary gear							
Differential lock	Pin type							
Final transmission	Planetary gear type							
Front axle drive	Whole sealing bevel gear type (Four-wheel drive model)							
Transfer case	Straight toothed cylindrical gear (Four-wheel drive model)							

D. Front axle, Steering and Braking

Tractor model / Parts and parameters	HS450	HS500	HS550	HS600	HS454	HS504	HS554	HS604
Frame type	No frame							
Front axle Type (front driving axle)	Inverted U pipe balancing type			Bevel gear reducer tri-section separable type axle housing				
Front wheel toe-in mm	4~8			4~11				
Front wheel tire size	6.00-16			8.3-20				
Rear wheel tire size	12.4 -28							
Front wheel tire pressure kpa	200~280			90~120				
Rear wheel tire pressure kpa	80~120							
Steering type	Hydrostatic steering							
Steering	Cycloid rotary valve type Hydrostatic power steering gear							
Hydraulic steering constant current overflow pump	CBT-E306FHL06							
Hydraulic steering safety valve open pressure	6.3							
Brake type	Mechanical brake							

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E. Work Devices

Tractor model / Parts and parameters		HS450	HS500	HS550	HS600	HS454	HS504	HS554	HS604
Lifter type		Half separating type							
Oil pump type		CBT-E310FR2(right)/CBT-E310FBL3(left)/CBN-E312/CBN-E314							
Distributor type		Built-in unloading control type							
Oil cylinder(diameter×stroke)mm		Single action φ80×110							
System and oil cylinder's safety valve type		Gapping damping delivery valve direct action type, and cone valve direct action type							
System safety valve adjusted pressure: MPa		18±0.5							
Tilling depth controlling method		Force and position controlled floating type							
Maximum lifting force at the place 610mm backed from the lower suspending point:kN		7.8	8.7	9.6	10.5	7.8	8.7	9.6	10.5
Lifter hydraulic output connector	Size	M22×1.5(External screw thread)							
	Output of the oil quantity (L/min)	22							
Multiway valve hydraulic output connector	Quantity	2 group							
	Rated pressure (Mpa)	16							
	Rated flow (L/min)	50							
Suspension type		Postpositional three points type 1 class							
Suspension joint triangle: mm		460×683±15							
Upper suspension point's joint hole diameter: mm		25.2+0.2							
Lower suspension point's joint hole diameter: mm		28.7+0.3							
Power take-off shaft type		Independent type of half							
Power of PTO		28.1	31.3	34.4	37.5	28.1	31.3	34.4	37.5
Speed r/min		540/1000 and 540/760							
Revolving direction		Clockwise							
Shaft extension type and size		I type (φ35×8teeth) [GB1592]							
Towing device	Joint pin diameter mm	40							
	Joint pin height from the ground: mm	577							

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F. Air Braking Unit

Tractor model / Parts and parameters	HS450	HS500	HS550	HS600	HS454	HS504	HS554	HS604
Air cylinder volume: L	15.8							
Air cylinder's rated pressure: kPa	700							
Air braking valve type	QFJ-10/0.63							
Air braking valve's working pressure: kPa	630							

G. Electric System

Tractor model / Parts and parameters	HS450	HS500	HS550	HS600	HS454	HS504	HS554	HS604
Electric system type	12V minus earth single wire system							
Battery	6-QW-100 maintenance free battery							
Starter relay	JD133D							
Head light	45/40W double filaments bulbs							
Rear light	35W							
Horn	Monotone horn							
Front turning light	21W							
Rear light assembly	Turn light 10W,brake light 10W and width indicating light 10W							
Combined meters	Tachometer, water thermometer, oil meter							
Fuse box	Chip fuse box							
Starter motor	QD1536	QDJ152TD	QDJ1408G	QDJ1408G	QD1536	QDJ152TD	QDJ1408G	QDJ1408G

H. Oil and Water Volume

Tractor model / Parts and parameters	HS450	HS500	HS550	HS600	HS454	HS504	HS554	HS604
Fuel tank volume L	38							
Engine's bottom shell volume L	12							
Gearbox, rear axle, transfer case and final drive's volume L	44							
Front driving axle's volume L				8				
Redirector volume L	0.8							
Raiser volume: L	10.5							
Cooling water volume L	9							
Note: Different manufacturers' same power engine colling water volume is different.								

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Theoretical velocity table (8+4 ordinary gears、engine speed 2400r/min、12.4-28 ordinary tire)

	Forward gear (km/h)			Reverse gear (km/h)
	Low gear	High gear		
1	2.67	13.00		3.96
2	3.87	16.62		5.74
3	5.28	25.88		7.84
4	8.14	34.97		12.08

Note: ① When the tire is 12.4-28 paddy field tire, the data in the table will be multiplied by 1.044.

② When the engine speed is 2300r/min, the data in the table will be multiplied by 0.958.

Theoretical velocity table (8F+8R ordinary shuttle type gear、engine speed 2400r/min、12.4-28 ordinary tire).

	Low gear area L (km/h)			High gear area H (km/h)	
	Forward gear F	Reverse gear R		Forward gear F	Reverse gear R
1	2.57	2.25		13.00	9.68
2	3.73	3.27		16.62	14.05
3	5.09	4.46		25.88	19.17
4	8.14	6.87		36.32	29.55

Note: ① When the tire is 12.4-28 paddy field tire, the data in the table will be multiplied by 1.044.

② When the engine speed is 2300r/min, the data in the table will be multiplied by 0.958.

Theoretical velocity table (12F+12R ordinary shuttle type gear、engine speed 2400r/min、12.4-28 ordinary tire).

	Low gear area L (km/h)		Middle gear (km/h)		High gear area H (km/h)	
	Forward gear F	Reverse gear R	Forward gear F	Reverse gear R	Forward gear F	Reverse gear R
1	2.82	2.47	7.09	6.22	12.19	10.69
2	4.17	3.58	10.29	9.02	17.68	15.50
3	5.57	4.89	14.04	12.31	24.14	21.16
4	8.66	7.59	21.81	19.12	37.20	32.87

Note: ① When the tire is 12.4-28 paddy field tire, the data in the table will be multiplied by 1.044.

② When the engine speed is 2300r/min, the data in the table will be multiplied by 0.958.

Theoretical velocity table (12F+12R strengthen shuttle type gear、engine speed 2300r/min、11-32 paddy field tire).

	Low gear area L (km/h)		Middle gear (km/h)		High gear area H (km/h)	
	Forward gear F	Reverse gear R	Forward gear F	Reverse gear R	Forward gear F	Reverse gear R
1	2.65	2.33	6.68	5.86	11.49	10.07
2	3.85	3.37	9.69	8.50	16.67	14.61
3	5.25	4.60	13.23	11.60	22.75	19.94
4	8.16	7.15	20.55	18.02	35.06	30.98

Note: ① When the tire is 11-32 ordinary tire, the data in the table will be multiplied by 0.932.

② When the tire is 12.4-28 paddy field tire, the data in the table will be multiplied by 0.883.

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Chapter Three

Tractor's Running-in

A. Preparing for running-in

1. Check and tighten all the outside fastening parts;
2. Add lubricant grease to each lubricating point;
3. Check the oil level in the diesel engine, gearbox, rear axle, transfer case, final drive, front driving axle(four wheel drive type vehicle), steering, liter, and fuel tank. If the oil is insufficient, replenish immediately;
4. Fill in fuel and cooling water;
5. Check the air pressure in the tires;
6. Check the electrolyte's density and its liquid level in the battery;
7. Put the control handle of the transfer case in the work position (four wheel drive type Vehicle).

B. Racing running-in for the engine

Run the diesel engine in low, mid and high speed in turn for 7 minutes,5 minutes, and 3 minutes respectively. During the running-in, carefully check the engine for leakage, abnormal noise and other abnormal phenomena, and to see if the engine oil pressure is stable and normal.

If any abnormality is found, stop the engine immediately, after removing the trouble, carry out running-in again.

C. Running-in the power take-off shaft

When the engine is running with a mid throttle, put the control handle of the power take-off shaft at the high and low positions for 5 minutes respectively, then put the control handle of the power take-off shaft at the neutral position.

D. Running-in the hydraulic system

After connecting the implements to the suspension device, operate the lifting handle up and down for 10 minutes with the engine running at the largest throttle. Repeat this up and down operation for at least 20 times. After grinding-in, put the distributor control handle at the lowering position.

E. Running-in the tractor with and without load(49.5h)

1.Running-in time for each phase

Unit: hour

Tractor gear	I	II	III	IV	V	VI	VII	VIII	R I	R II	R III	R IV
Noload running-in time	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Light load running-in time		2.5	3	3	2.5							
Mid load running-in time		3	5	5	5							
Heavy load running-in time		3	4.5	4.5	3							

2.Load value during running-in

Tractor model / Traction load During grinding-in	HS500/504	HS550/554	HS550/554
Light load (N)	3500	3600	3700
Mid load (N)	5500	5600	5700
Heavy load(N)	7700	7900	8100

The running-in should be carried out gradually from low peed gear to high-speed gear,and from light load

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to heavy load.

During no-load and light-load running-in, the engine throttle should be opened to its 3/4 opening with. During mid load and heavy load grinding-in, the engine throttle should be fully opened.

Pay attention to the following during running-in:

1. The working condition of the engine, drive system, ground drive steering system, and the readings on each related meter.
2. See if the clutch, gearbox, transfer box, front driving axle and brakes work normally.
3. If the differential lock can connect and disconnect.
4. Electric equipment's working condition.

During running-in, if there is any abnormality or trouble, please find out the reason, after removing the trouble, continue running-in.

F. Carry out the following after running-in

After the running-in is completed, please do the following before putting the tractor into normal use.

1. After shutting down, drain off the lubricating oil from the oil bottom shell while the oil is warm, and rinse clean the oil bottom shell, engine oil filtering screen, and the engine oil filter. The fill in new lubricating oil.
2. Drain off the lubricating oil from the gearbox, rear axle, transfer box, final drive, front axle, and the steering. Clean the oil draining screw plugs and magnets, and fill in an appropriate amount of diesel oil. Drive the tractor with II gear and areverse gear for 2~3 minutes respectively, then drain off the diesel engine, and fill in new lubricating oil.
3. Rinse clean the diesel oil filter (including the filtering screen in the fuel tank)and the air filter.
4. Drain off the cooling water, rinse clean the engine's cooling system with clean water.
5. Drain off the working oil from the hydraulic system while the oil is warm. After rinsing the system clean, fill in new working oil.
6. Check the free path of the front wheel toe-in, clutches, brakes, and the brake pedals, Adjust it whenever it is needed.
7. Check and tighten the nuts and bolts on all the main parts.
8. Check the spray nozzle and the valve clearance, and adjust when necessary.
9. Check the working condition of the electrical system.
10. Fill in lubricant oil to each oil cup.

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Chapter Four

How to Use the Tractor

A. Operating and driving the tractor

1. Starting the diesel engine

Before starting the engine, check fuel, lubricating oil, cooling water, and check each part of the engine to make sure that all parts are normal, oil line is smooth without air in it, the gearlever is at the neutral position, the shut off pulling cord has pulled to the starting position. The oil used in the hydraulic system is free standing; check that if the hydraulic oil is enough.

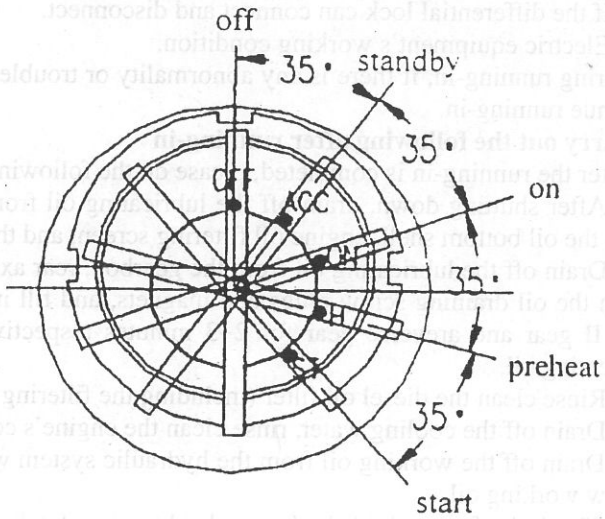


Diagram 4-1

(1)Starting under normal temperature (Diagram 4-1)

At first, push down the clutch pedal, let the hand throttle to the middle position, turn the starting switch clockwise till to the "starting" position of II gear (the I gear means electric power on),after the engine immediately. If the engine cannot be started within 10 minutes, wait for 20 minutes, and then start again. If the engine cannot be started in three times, stop the starting and check the reason.

(2)Starting under low temperature (Diagram 4-1: Diagram for switch positions)

When starting the tractor in a low temperature(below 5℃),you can use the preheater. To use the preheater, large open the hand throttle, turn the starting switch counterclockwise till to the "preheat" position, stop there for 15 to 20 seconds. After the engine is started, the starting switch should immediately return to I gear position, and the hand throttle should be adjusted to the small opened position.

(3)Starting in cold winter

If it is cannot be started with above methods, please use the following methods:

1)Drain off the engine oil from the sump, heat the oil to 80~90℃ and refill the heated oil back into the sump. During heating, stir the oil and heat it uniformly, so as to avoid deterioration caused by partial heating.

2)Fill hot water of 80~90℃ to the cooling system, until the temperature of the cooling water rise to 40℃, then start the engine with the method as described in "starting under low temperature".

Notice:

1)Never start the engine when there is no enough water in water tank and no enough oil in the sump.

2) After the engine is started, in case when the throttle is diminished, the engine speed is rapidly increased, this phenomenon is called "galloping". If this happens, take an emergency measure to force the engine to shutdown immediately. To do this, you can loosen the tightening nut on the high-pressure oil pipe between the fuel pump and the fuel-spraying nozzle, with a spanner. Then pull out the oil hose to cut off the oil supply circuit.

2. Starting the tractor

(1) Raising the suspended implements.

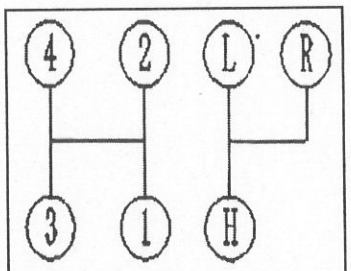
(2)Unlock the parking lockup device, push down the clutch pedal, put the main and assistant gear levers to the needed gear position.

(3)Gradually release the clutch pedal and gradually increase the throttle opening. The tractor will start to move smoothly.

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3. Tractor's shift gears and driving speed selection

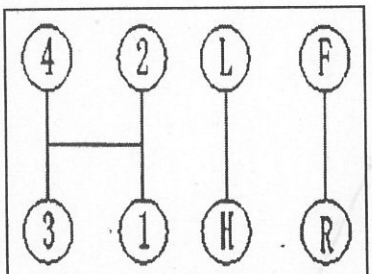
(1)Tractor's shift gears (see diagram 4-2)



Main transmission Auxiliary transmission

8+4 common gears

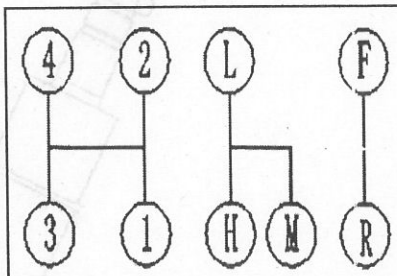
Diagram 4-2-1



Main transmission Auxiliary transmission Shuttle type

8+8 shuttle type gears

Diagram 4-2-2



Main transmission Auxiliary transmission Shuttle type

12+12 shuttle type gears

Diagram 4-2-3

Diagram 4-2

If you choose 8+4 common gear (Diagram 4-2-1), then combined main transmission rod with auxiliary transmission rod can get 8 forward gears and 4 reverse gears.

If you choose 8+8 shuttle type gears (Diagram 4-2-2), then combined main、auxiliary transmission rod with shuttle type rod can get 8 forward gears and 8 reverse gears.

If you choose 12+12 shuttle type gears (Diagram 4-2-3), then combined main、auxiliary transmission rod with shuttle type rod can get 12 forward gears and 12 reverse gears.

(2)Selecting driving speed

Correct driving speed will achieve an optimum productivity, get the best economic results, and prolong the tractor's service life. The tractor should not be often overloaded, the diesel engine should keep certain power reserves. The working speed in the field can be selected as following: the engine's working load should be kept at about 80 percent of the rated load.

Applicable working gears for field operation: Gears II,III and IV are used for ploughing; gears I and II for rototilling; gears Ⅴ,Ⅵand Ⅶ for transport on farm roads; and creeping gear I for ditching(when the sectional area is 0.4 ㎡)with disc type ditchdiggers.

When the engine sound is depressed, the speed is decreased and black smoke is found, please change to a lower speed so as to avoid overloading; When the load is light and the working speed should not be too high, please select a higher gear and smaller opened throttle so as to save fuel.

4. Turning the tractor

To turning the tractor, properly decrease the throttle, and then turn it with the steering wheel, when turning in a soft and slurry field, one sided braking can be used, which means while turning with the steering wheel, push down the brake pedal at the corresponding side.

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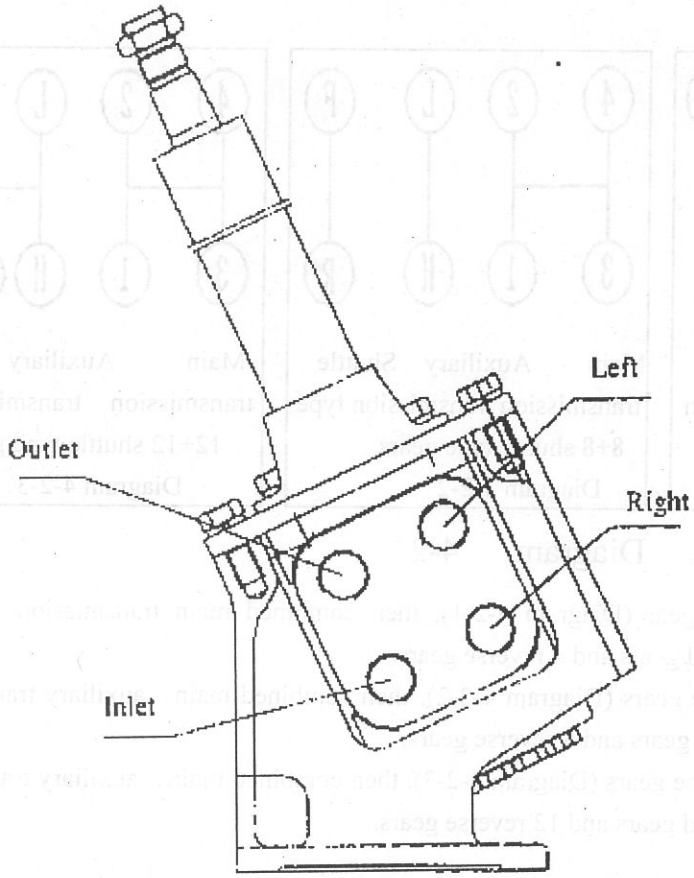


Diagram 4-3 Position plan for the hydraulic steering's pipe line joint

HS55 series wheel tractors are equipped with separate type full hydraulic steering system, which consists of a cycloid rotary spool valve full hydraulic redirector, steering cylinder, oil tank, cross tie, constant flow flooding pump, and oil pipes etc. The steering cylinder is installed at the right side of the front axle, the oil pipe joint is shown in diagram 4-4 Generally, it does not need adjustment in normal use. However, pay attention to the following for maintenance:

a. Check the oil level in the oil tank(when replenishing, the steering cylinder and the oil pipes should be filled with oil),if the oil is insufficient, replenish immediately.

b. In order to prevent leakage, all the pipe joints and all the oil connections of the constant flooding pump, oil tank and steering cylinder should be tightened. If there is any leakage, immediately check the washers or gaskets, if they are damaged, replace them in time.

c. Regularly check the steering cylinder and the piston rod, if any leakage is found, check the oil sealing, if the oil sealing is ineffective, replace it in time.

d. Check the ball and spigot of the steering knuckle tie and the bolts at both sides of the steering cylinder, if they are loose or damaged, replace them immediately.

5. How to use the differential lock

If you cannot drive the tractor forward because one side's rear wheel is sliding, you can use the differential lock to help with the following method.

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(1)Push down the clutch pedal, and connect a low speed gear.

(2)Open the hand throttle to the largest position.

(3)Push down the differential lock control pedal under the right side of the driver's seat. Then gradually release the clutch pedal and connect the clutch smoothly. At this time, the tractor's two drive wheels will rotate simultaneously. Now the tractor is able to leave the sliding place.

(4)After the tractor leaves the sliding place, release the differential lock control pedal immediately.

Note: When the differential lock is connected, never turn the tractor. Otherwise, machine parts may be damaged.

6. How to use the front driving axle

When the four-wheel drive tractor works in the wet and soft field with heavy load, in order to improve the tractor's adherence to the ground, you can use the four-wheel driven function by connecting the front driving axle. To do this, pull back the control handle under the left side of the driver's seat till to the connecting position, then the power will be transmitted to the front driving axle through the transfer case. In order to separate or connect the transfer case, the clutch must be disconnected completely.

Caution: When a four-wheel driven tractor is used for transport on the normal road, it is not allowed to use the front driving axle, otherwise, the front wheels will be worn quickly. The front driving axle should be used only on rain or snow caused slippery roads or on macroslopes where the two rear wheels may slip. Once the tractor get out of the difficult place, disconnect the front driving axle immediately.

7. Stopping the tractor and shutting down the engine

If the tractor stops temporarily, it does not need to shut down the engine. If the tractor stops for a long time, the engine should be shut down. Use the following procedure to shut down the engine:

(1)Minish the throttle to decrease the speed of the tractor.

(2)Push down the clutch pedal, put the gearlever to the neutral position, then release the clutch.

(3)After the tractor stops, let the engine continue to run several minutes in order to wait the water and lubricating oil temperature to cool down. Do not shut down the engine while the water and lubricating oil temperature is high.

(4)Put the shut down pulling rod to the shut down position.

(5)Adjust the starting switch to "OFF" position. Turn off all the electric power.

(6)To park the tractor in winter, drain off the cooling water, so as to prevent the engine's cylinder body and water tank from damage by freezing.

8. Precautions for driving the tractor

(1)When driving the tractor, regularly check the combined gauges and pay attention to all sorts of warning signals.

(2)The engine should not work for a long time when the water temperature reaches 70℃.When the water temperature reaches 90℃,stop the engine to check the reason.

(3)Carefully listen to the sounds of the engine and the tractor, watch the working condition of the outside mechanical parts. If any abnormality is found, stop the tractor to check the reason, and remove the troubles.

(4)When driving the tractor, the driver should not put his feet on the clutch and brake pedals.

(5)When braking, push down he clutch pedal before pushing down the brake pedal. In case of emergency braking, push down the clutch pedal and brake pedal simultaneously, instead of only pushing down the brake pedal.

(6) For transport, lock the hydraulic lift control handle to the mid position, pull the brake pedal's link plate to the connecting position, interlock the left and right brakes, so as to avoid upsets.

(7) Before driving up or down a slope, connect the gear beforehand, it is not allowed to change gears midway on a slope. Coasting is strictly prohibited.

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(8) When driving down a slope during transport, if the inertia of the trailer is larger than the inertia of the tractor and the trail pushes the tractor with a large inertia force, or the road surface is slippy, the only correct way to sole this problem is to properly increase the tractor's speed, at this time, never push brake pedals suddenly, otherwise, the trailer may upsets the tractor.

(9) When driving on potholed roads and passing through small ditches or other obstacles, be sure to minish the throttle or change to a lower speed. It is not allowed to control tractor speed with the clutch. Never rushing over the obstacle by sudden connection of the clutch.

(10) When the tractor turns, be sure to decrease the drive speed. Never drive the tractor at a high speed during transport, never turn the tractor sharply when the attached implement is still in the earth during work in the field.

(11) During work, if the tractor's head is titled up, push down the clutch pedal immediately and stop the tractor, then get rid of the exceeded load.

B. Using and operating the tractor's working devices

1.How to use the power take-off shaft

The power take-off shaft has two speeds as described in the following table(unit:r/min)

High speed	1000
Low speed	540

Note: the speed of the power take-off shaft described here is the speed when the engine runs at a speed 80~90% of the rated speed.

Operate the power take-off shaft using the following steps.(see diagram 4-5)

(1) Pull the power take-off shaft to the neutral position, detach the safety guard and the power take-off shaft cover, then connect the working machine to the power take-off shaft.

(2) Push the clutch pedal to the lowest position to disconnect the power take-off shaft clutch. Then pull the control handle to the needed speed position.

(3) Gradually release the clutch pedal, so that the working machine will begin to operate. At fires, use a small throttle to check the operation, then open large the throttle and begin the normal work.

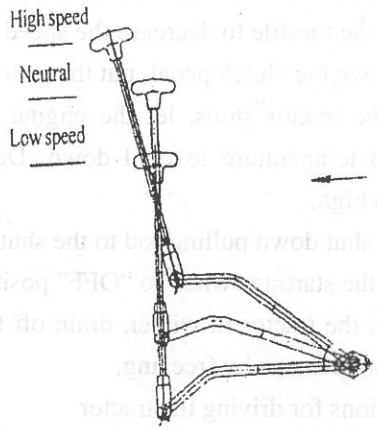


Diagram 4-4

Schematic diagram for power take-off shaft control handle

2. Operating and using the hydraulic suspension system

The hydraulic suspension system is operated though the control handle.

1) Connecting, lifting and displace the implements

Before connecting the implements, set the hydraulic system into the working state, set the adjusting handle to the lowering position, as shown in diagram 4-6.Drive the tractor backward to reach the implements, connect the left and right pulling rods at first, then connect the upper pulling rod, at last, tighten them with nuts.

Operate the adjusting handle to lift or lower the implement.

Note: When the tractor with attached implements works in the fields, it cannot lower the implements during around, it can does so only after finishing the turning and begin to drive straight forward. Before turning around, the implements must be lifted up.

When it needs to drive the tractor with attached implements to another working displace place through a long distance, the implements should be locked to the lifted position with the lock bolt.

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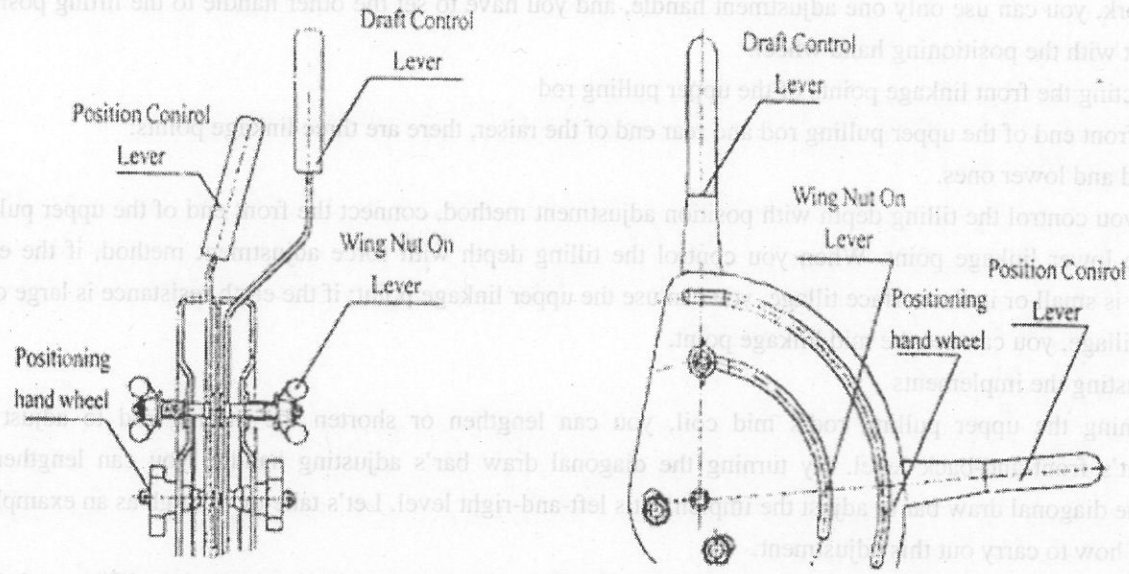


Diagram 4-5 Control mechanism for the hydraulic system

2) Adjusting the tilling depth of the implements

There are two methods to adjust the implements' tilling depth: force adjustment and depth adjustment.

(1) Force adjustment

Force adjustment means traction force adjustment. It controls the tilling depth by changing the implements' resistance (i.e. the traction force).In plowing operation, force adjustment is generally used.

Set the position adjustment handle to the highest lifting position, move the force adjustment handle forward, when the implement is lowered to a certain tilling depth, it will stop lowering further under the action of the adjustment mechanism. The tilling depth can be selected during the time you drive the tractor forward. The more you move forward the handle, the more the implement will be lowered, and the tilling depth will be increased. Vice versa, the tilling depth will be decreased. After selecting the tilling depth, block the force adjustment handle with the force adjustment positioning hand wheel so that the force adjustment handle will be pushed to this position each time, this will ensure the same tilling depth during operation. In case the field is out of level or the resistance of the earth changes greatly, the tilling depth of implement can be automatically adjusted. When the plowing resistance increased, the implement will rise a little, and the tilling depth will be decreased. When the plowing resistance decreased, the tilling depth will be increased. After passing over this area, the implement will restore the normal position.

(2)Position adjustment

Position adjustment means adjusting the implement's position relative to the tractor. This kind of adjustment is generally use for rotary plowing, harvesting, sowing, and bulldozing etc. It can also be used for plowing in plowing in plane fields.

To use the position adjustment, set the force adjustment handle to the highest lifting position, move the position adjustment handle forward, lower the implement down. In position adjustment, each adjustment position is related to an implement position relative to the tractor. The more you move forward the handle, the more the implement will be lowered, the tilling depth can be selected at the time you drive the tractor forward during work. After selecting the implement's tilling depth, block the position adjustment handle will be pushed to this position each time, this will ensure that each time the implement will be lowered to the same operation.

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Note: Both force and position adjustment handle are used to control the up-down position of the implements, during work, you can use only one adjustment handle, and you have to set the other handle to the lifting position and lock it with the positioning hand wheel.

1) Selecting the front linkage points of the upper pulling rod

At the front end of the upper pulling rod and rear end of the raiser, there are three linkage points: upper, mid and lower ones.

When you control the tilling depth with position adjustment method, connect the front end of the upper pulling rod to the lower linkage point. When you control the tilling depth with force adjustment method, if the earth resistance is small or in the surface tillage, you can use the upper linkage point; if the earth resistance is large or in the deep tillage, you can use the mid linkage point.

2) Adjusting the implements

By turning the upper pulling rod's mid coil, you can lengthen or shorten the pulling rod to adjust the implement's front-and-back level. By turning the diagonal draw bar's adjusting handle, you can lengthen or shorten the diagonal draw bar to adjust the implement's left-and-right level. Let's take the plough as an example to show you how to carry out this adjustment.

(1)The plough stock's left-right level is usually adjusted by change the length of the right lifting rod. This adjustment will ensure that the plough stock: is in a plane level, so that the tilling rod, so that the plough's first plowshare will till deeper, vice versa, its tilling depth will decrease. Usually the left lighting rod does not need adjustment, it will only be adjusted when the adjustment of the right lifting rod is not enough to meet the requirement.

(2)Fore and aft level adjustment: This will be realized by adjusting the suspension mechanism's upper pulling rod. If the front plowshare goes deeper or the rear plow heel leaves the furrow bottom, the length of the rod should be increased. If the rear plowshare goes deeper, the length of the rod should be decreased.

(3) Adjusting the tilling width: this will be realized by adjusting the plough's tilling width adjustor. The tilling width adjustor can control relative positions of the implement's left and right lower suspending points. When the right lower suspending point moves forward, the tilling width will be wider, vice versa, moves backward, the tilling width will be decreased. By adjusting the tilling width adjustor, the plough stock can keep can keep normal position and level, so as to avoid repeated tilling and missed tilling.

1) Adjusting the lowering speed of the implements

The implement's lowering speed should be selected according to the type and weight of the implement as well as the softness and hardness of the field condition, so as to prevent the implement from damage. Turn the adjusting valve clockwise, the implement's lowering speed will be decreased; turn the adjusting valve counterclockwise, the implement's lowering speed will be increased.

2) Adjusting the positioning chain

The positioning chain is used to limit the left and right swing amplitude of the implement and the lower pulling rod during their moving up and down. The positioning chain should be adjusted to a proper length, it should prevent the implement and the lower pulling rod from colliding with the rear wheels on the one hand, it should not affect the implement's up and sown limits on the other. The positioning chain should not be adjusted too tight so as to avoid damage to the machine parts.

3) Hydraulic output

When the implement and the trailer need hydraulic oil, it should be supplied with the following steps:(1)At first stop the oil pump(i.e. cut off the oil pump's input power);(2)Pull the position adjusting handle to the lowering position, push the outer lifting arm down to the lowest position, drain off the oil in the cylinder;(3)Turn the block valve clockwise until the cylinder's oil intake line is completely blocked;(4)Connect the implement's or the trailer's oil pipe to the oil pressure output joint and tighten the of the joint;(5)Pull the force adjusting handle to the

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lifting position and lock it;(6)Resume the hydraulic pump's normal work, use the position adjusting handle to control the implement's lifting and the trailer's self dumping.

3. Operating and using the hydraulic output device

The tractor can be equipped with a single pieced or double pieced slide valve type hydraulic output selector valve(installed in left side the rear axle shell),which is controlled by two control handles "C" and "D" respectively. It is used to control implement's single action or double action hydraulic cylinder. The selector valve assembly has four M10bolts, which connect the rear axle shell through the selector valve fixing plate. The oil intake and outlet are connected to the gear pump and the lifter's oil outlet respectively, the oil returning port is connected to the connected to the gear pump and the lifter's oil outlet respectively, the oil returning port is connected to the lifter shell's oil returning port(as shown in diagram 4-7).Each control valve has two M22×1.5 sized 8JB/ZQ4434-1986 quick joint adaptor sockets A1,B1,A2 and B2(as shown in diagram 4-8),if it is not used, cover it with the sealed cap. To use it, connect the spare male joint(in the spare parts box)to the quick change female joint, then connect to the oil intake and outlet A1 and B1;the control handle "D" will control the second line hydraulic output A2 and B2.When connecting to a single action cylinder, you should connect the cylinder's oil pipe to the first line hydraulic output A1 or the second line hydraulic output A2.Operate the control handles"C"and"D"in up and down direction, the single action or double action cylinder will carry out the corresponding actions.

When connecting with the hydraulic quick coupler, it needs first to carry out the following work before inserting the male joint on the implement into the joint seat.

(1)Shut down the engine.

(2)Lower the implement.

(3)Move the hydraulic output control handle back and froth to remove the pressure in the hydraulic quick-coupler seat.

(4)Take off the sealing cap from the quick-couple seat and clean the quick-change joint.

Note:

（1）When the quick-coupler is not used, the seat hole must be covered with the spare dust cap.

（2）The lifter and the hydraulic output valve cannot be used at the same time.

（3）After finishing the operation of the hydraulic output valve, the control handle must be returned to the neutral position, otherwise, the hydraulic system may be overheated.

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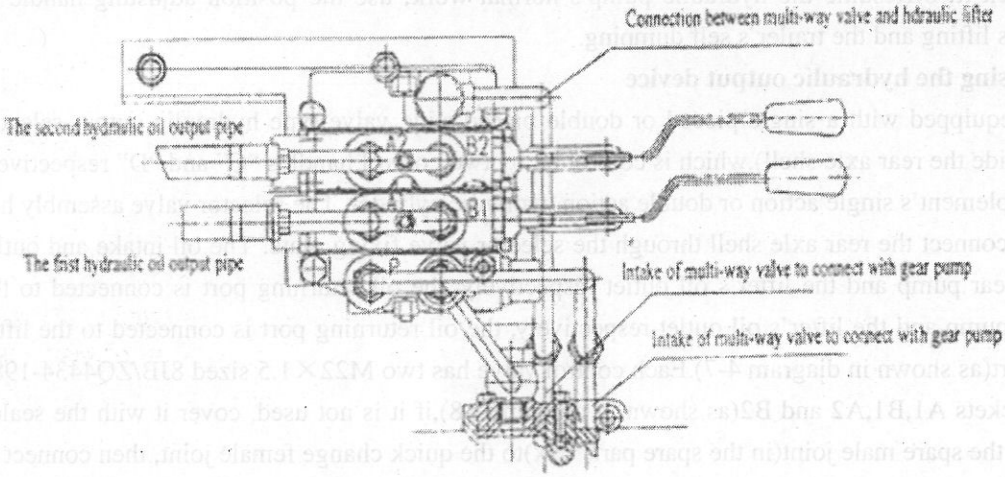
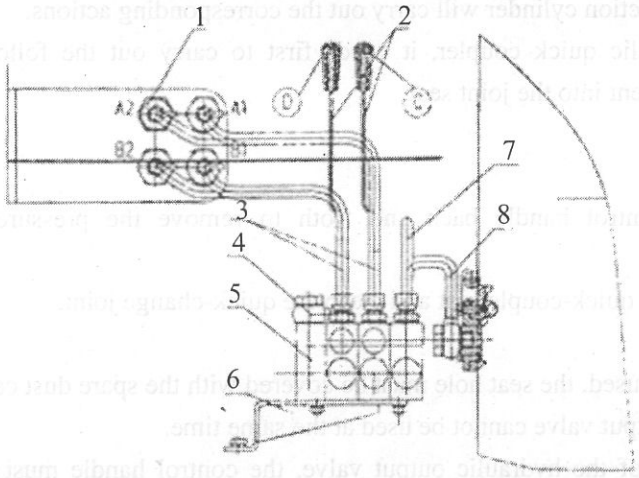


Diagram 4-6 Connecting the selector valve and the pipeline



1. Quick-coupler 2. Control handle 3. Oil outlet pipe for the selector valve
4. Oil outlet pipe assembly for the selector valve 5. Selector valve assembly
6. Fixing plate for the selector valve 7. Oil intake pipe assembly for the selector valve
8. Oil returning pipe assembly for the selector valve

Diagram 4-7 Hydraulic output device

C. Using and maintaining the electric system

The electric system used in this tractor is a single-wire system with the anode take iron, the system voltage is 12V, and the complete vehicle circuit is shown in diagram 4-10.

1. The composition of the electric devices

The electric devices in the tractor are mainly used to assure the tractor's starting, supervise the engine's working condition, and provide illumination and signals during the tractor's operation. The tractor's monitoring meters and control switches are all located on the meter panel in front of the driver. The position of each electric device is shown in diagram 4-9.

The electric devices can be divided in the following parts according to their functions:

(1) Power source part: Consists of the silicon rectifying alternator, voltage regulator, and the battery.

(2) Starting part: Consists of the starter motor, glow plug etc.

(3) Meters and gauges: Consists of the speedometer, engine oil pressure gauge, oil meter, and chronomete.

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(4) Illuminating and signal devices: Consists of the headlights, rear working lights, front signal lamps, rear group signal lamps, flasher, horn and indicating lamps etc.

(5) Auxiliary electric devices: Mainly consists of the central electric box, electrical outlet for trailers, preheating starting switch, combined switch switches, and braking lamp switch etc.

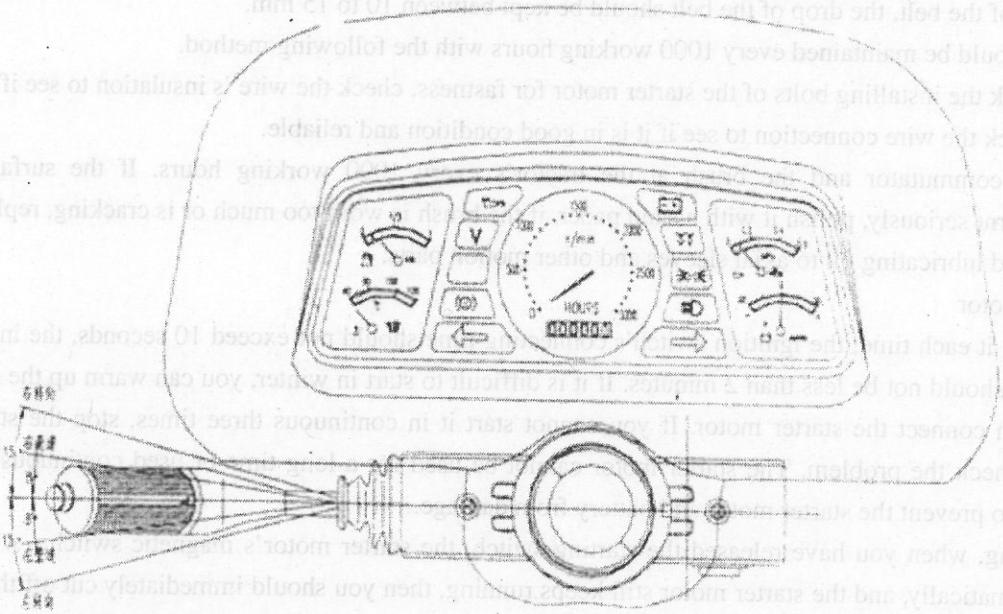


Diagram 4-8 The combined meters and combined switches

1. Using and maintaining the electric devices

In order to ensure that the tractor's electric system works normally, always use the electric system correctly and a good maintenance must be carried out regularly. Often check each electric part, see if each part works normally, if any electric joint becomes loose, if any insulating cover of the electric wire is damaged. If there is any trouble, remove it in time. During the use of the tractor, the following important part must be maintained regularly.

(1) Battery: dry load and plastic shell,volume:120Ah(135Ah).Before filling electrolyte to the new battery, screw off the liquid filling spout plug, eliminate the sealing from the spout plug so as to ensure ventilation of the air hole. Fill each cell with the electrolyte of 1.26 density(above 35℃)or 1.28 density(below 25℃),the electrolyte level should be 10~15mm than the protective plate. Normally we can observe the electrolyte level in the battery after adding the acid. The electrolyte level in the battery should be kept between the upper and lower liquid level on the battery shell.

After filing electrolyte, carry out initial charging to the battery (the charging time and current is indicated in the battery's manual).This will be more favorable to the battery.

In daily use, often check the liquid level and density of the electrolyte carry out maintenance according to the using and temperature conditions, and ensure that the liquid level of the electrolyte is kept between the two level lines. If it needs replenishing, add distilled water into the battery. Never add sulfuric acid or other liquid. The battery should be kept in a fully charged state. Charge it whenever necessary. If the tractor is not used for a long time, take off the battery from the tractor, and charge it every month for protection, and keep the electrolyte's density and level in the battery. Keep the exterior of the battery clean, especially the top of the battery. The battery's terminals and joints should keep on good contact and keep clean, clean off any oxide, apply Vaseline to the battery's terminals and the edge joint block so as to avoid rusting.

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(2)Generator

Regularly clean off dusts and oil stains on the exterior of the generator, especially the dusts and oil stains on the wiring terminals, keep a good connection. The generator's V belt should keep a proper tension, if it is over-loose; it will slip on the pulley and the generation of electricity will be insufficient; if it is too tight, the bearing will be worn quickly. Normally, the V belt tension can be tested with the following method: when you forcibly press down the mid part of the belt, the drop of the belt should be kept between 10 to 15 mm.

The generator should be maintained every 1000 working hours with the following method.

1)Regularly check the installing bolts of the starter motor for fastness, check the wire 's insulation to see if there is any damage, check the wire connection to see if it is in good condition and reliable.

2) Replace the commutator and the brush at the tractor's every 1000 working hours. If the surface of commutator has burnt seriously, polish it with a sand paper, if the brush is worn too much or is cracking, replace it with a new one. Add lubricating oil to axial sleeves and other motion parts.

(3)Starting the motor

1) When starting it each time, the ignition switch's connecting time should not exceed 10 seconds, the interval between two starts should not be less than 2 minutes. If it is difficult to start in winter, you can warm up the diesel oil at first and then connect the starter motor. If you cannot start it in continuous three times, stop the starting immediately and check the problem. The starter motor cannot be used for a long time or used continuously too many times, so as to prevent the starter motor and battery from damage.

2) During starting, when you have released the starting switch, the starter motor's magnetic switch will not cut off power automatically, and the starter motor still keeps running, then you should immediately cut off the line between the starter motor and the battery, and check the reasons, after removing the troubles, try to start again.

(4)Meters

The tachometer and the water thermometer are used to monitoring the engine's working state. The oil meter is used to monitor the level of the remained diesel oil. The chronometer is used to record the tractor's working time. The charging indicating lamp and the oil pressure indicating lamp are used to indicate the working state of the electric system and the engine's lubricating system, with them, we can observe if these system work normally. Therefore, you should often observe the working sate of these meters, if there is any abnormality, stop the engine immediately to check the problem and remove any trouble you have found.

(5)Illuminating and signal devices

Illuminating and signal devices are mainly used when the tractor works or transports at night, they are very important for the tractor to work safely at night. Therefore, if they have any trouble, stop the tractor and check the problem. If there is any damaged part, replace it with a new one of the same model in accordance of the requirement, do not use other parts as substitutes.

(6)Auxiliary electric devices

1)Fuse box: There are 15 fusing degrees in the fuse box, 7 of which are active; others are spare degrees. There are spare fuse links for each specification. The fuse is mainly used for protecting the electric devices, their specifications should conform to the requirement of the drawing. If the fuse is burnt too frequently, check the reason of the trouble and remove the trouble in time. Never arbitrarily change the specification of each fuse, otherwise, electric devices may be damaged.

2) Preheating starting switch: Preheating starting switch is used to connect the complete tractor's electric circuit, start and preheat the engine. Put the key into the starting switch, turn it clockwise one step, it will connect the preheating device, turn it clockwise till to position II ,it will connect the start motor. After the engine is started, the key will return automatically to the position I. During the tractor's working time, the key will keep at position I. If the tractor works for a long time, you should pull out the key so as to cut off the complete tractor's electric circuit.

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Chapter Five

The Tractor's Technical Maintenance, Fuel, Lubricating oil and Water

A. The tractor's technical maintenance

The tractor's technical maintenance can be divided into several degrees as following according to the different maintenance periods calculated in accumulated working hours:

(1) Technical maintenance in each shift: Carry out before and after each shift.

(2) First-degree technical maintenance: Carry out every 50 working hours.

(3) Second degree technical maintenance: Carry out every 25 working hours.

(4) Third degree technical maintenance: Carry out every 500 working hours.

(5) Fourth degree technical maintenance: Carry out every 1000 working hours.

1. Technical maintenance in each shift:

(1)Remove the dust and foul mud on the tractor and the implement. If the tractor works in the environment full of dust and sand, clean the air strainer.

(2)Check each main nut and bolt on the exterior side of the tractor, especially the nuts and bolts on the front and rear wheels, see if they are loose, tighten them if necessary.

(3)Check the liquid level in the engine bottom shell, water tank, oil tank. and the hydraulic lifter shell. Replenish them if necessary. When checking the oil level in the bottom shell, you have to wait for 15 minutes after the engine is shut down.

(4)Check that if there is any air leakage, oil leakage, water leakage, if there is any leakage, repair it immediately.

(5)Check the tires' air pressure, recharge them if necessary.

(6) When working in the paddy field, add lubricant grease to the following lubricating points.(When working in the dry field, add lubricant grease every another shifts.)

1)At the front axle, pivot center's front and rear seats, the steering buttonhead of the driving wheel and axle.12 lubricating points (four wheel drive tractors).

2) At the pivot center, left and right king bolts: 3 lubricating points (two wheel drive tractors).

3) Clutch pedal axial, one lubricating point.

4) Braking pedal axial, one lubricating point.

5) Right lifting lever, one lubricating point.

2. The first-degree technical maintenance

(1)Fulfill the technical maintenance task for each shift.

(2)Check the fan's V belt, and adjust it if necessary.

(3)Add lubricant grease to fan and pump bearings.

(4)Check the oil level in the gearbox, rear axle, transfer case, front driving axle (for four wheel drive tractors), steerer and hydraulic oil tank, replenish if necessary.

(5)Check the free path of the clutch pedal and the left and right brake pedals, and adjust them if necessary.

(6)Check the electrolyte in the battery. The electrolyte level should be 10 to 15mm higher than the pole plate. Add distilled water if the electrolyte is insufficient. If the density of the electrolyte does not conform to the requirement, add new electrolyte with a density of 1.28 to the regulated level.

(7)Maintain the engine oil filter, and rinse the filtering element with diesel oil.

(8)Open the fuel filter's air releasing plug and oil releasing plug, drain of deposited water and impurities.

(9)Wash the oil-sucking filter in the hydraulic system.

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3. The second-degree technical maintenance

(1)Carry out all the technical maintenance tasks in the first degree technical maintenance

(2)Replace the engine oil in the engine bottom shell, and wash clean the bottom shell and the filtering screen.

(3)Replace the engine oil-filtering screen, after assembling, release the air in the oil circuit.

(4)Wash the air strainer's filtering element, and replace engine oil.

4. The third-degree technical maintenance

(1)Carry out all the technical maintenance tasks in the second-degree technical maintenance.

(2)Check and adjust the valve clearance, the spray nozzle pressure, and the atomization, adjust them if necessary.

(3)Replace the fuel filter element.

(4)Replace the air strainer's filtering element.(it can be carries out earlier or later according to the dust condition in the working area).

(5)Replace the engine oil in the oil spraying pump shell.

(6)Replace the engine oil in the gearbox, rear axle, transfer case, front driving axle(for four wheel drive tractors),hydraulic lifter and steerer.

(7)Check and adjust the front wheel toe-in.

(8)Adjust the free path of the steering wheel.

(9)Rinse and clean the battery with boiled water. Check the electrolyte in the battery, the electrolyte's density should not less than 1.24.If the battery's charging or discharging is abnormal, check the reason and repair it, and charge it from outside.

5. The fourth-degree technical maintenance

(1)Carry out all the technical maintenance tasks of the second degree technical maintenance

(2)Cleanout the dust between water tank radiator pipes. And thoroughly rinse the engine's cooling system.

(3)According to the working frequency and conditions in the prior period, decide if it needs to detach the cylinder cap to check and maintain the cylinder, and decide if it needs to carry out other maintenance items.

(4)According to the rated torque, tighten the cylinder cap bolts in turn.

(5)Clean the fuel tank.

(6)According to the hydraulic system's present conditions, decide if it is necessary to adjust it and carry out maintenance.

(7)Detach the generator to repair.

(8)According to the starter motor's present conditions, decide if it is necessary to detach it for check and repair.

(9)After maintenance, assemble the complete tractor, carry out a short time test run, then check and adjust each mechanism.

6. Maintain the tractor in long time storage

(1)When the tractor is stored for a long time, it is better to store it in a dry garage, lift the tractor up, let the front and rear wheels leave the ground.

(2)When parking the tractor, clean its exterior surface, add lubricating oil to each lubricating point.

(3)Drain off the cooling water from the engine, and cover the outlet the exhaust pipe.

(4)During storage, start the engine every three months, and let the engine run for 20 minutes at each speed. Check that if there is any abnormality.

B. The tractor's fuel, lubricating oil and water

1. Fuel

Summer: No. 0or No 10 light diesel oil

Winter:-No.10 or -20 light diesel oil

2. Oil used in wheel box, steerer, hydraulic lifter, and front driving axle.

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Summer: N100D tractor transmission and hydraulic oil(dual purpose)

Winter:N68 tractor transmission and hydraulic oil(dual purpose)

3. Lubricating oil for diesel engine

Mobile oil for low blower: CC degree and No.14

4. Lubricant grease

No.2 calcium-base grease (GB491-87)

5. Cooling water

Select soft and clean water as the engine's cooling water, if your tap water is from the well or from other underground water source, the water should be boiled up and softened before using it as cooling water.

6. Water used in the battery should be distilled water, in case there is an emergency condition and the distilled water is no available, you can use a small quantity of drinkable cold water or rain water. However, the use of salt water, tap water containing chloride, chemically softened water, and river water etc. are prohibited.

Chapter Six

Adjusting the Tractor

A. Clutch structure and its adjustment

1. HS500/504/550/554/600/604 tractor' single action clutch.

The structure of the clutch is shown in diagram 6-1:

(1)Adjusting the clutch

After repeated use, the clutch discs have been worn, so the clearance between the separating lever head and the separating bearing's end face become smaller, some time even the separating lever head touches directly with the separating bearing, If this working condition last for a long time, the separating bearing may be burnt, and the clutch cannot work normally. Therefore, during use, regularly check and adjust it.

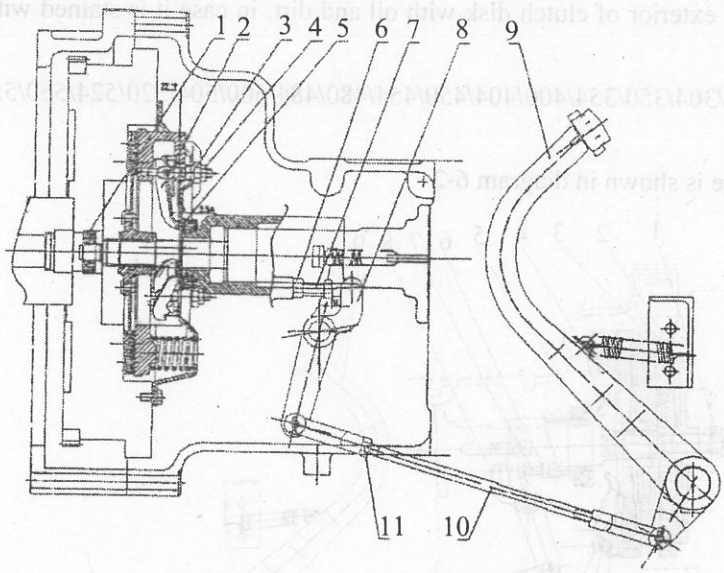


Diagram 6-1 tractor's single action clutch

1—Bearing 2—Separating lever 3—Adjusting nut 4—Lock nut 5—Separating bearing 6—Lock nut
7—Bolt 8—Separating fork rocker 9—Clutch pedal assembly 10—Pulling rod 11—Lock nut

1)There clearance between clutch separating lever(2) and separating bearing (5) end face is $2.5^{0}_{-0.5}$ mm, the

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adjusting height from the clutch platen to the disengaging pawl's plane face is 39(or 42.5)mm, the height differences of the three separating level heads should not exceed 0.2mm.

Adjusting method: Loosen locknut(4),turn adjusting nut(3),adjust the clearance between the three separating levers(2)and the end face of the separating bearing to $2.5^{0}_{-0.5}$mm,the height difference between the heads of the three separating levers should not exceed 0.2mm,then tighten locknut(4)and adjusting nut the heads of the three separating levers should not exceed 0.2mm,then tighten locknut(4)and adjusting nut (3).

2) The free path of the clutch pedal (9) is 15~20mm.

Adjusting method: Loosen locknut (11) on clutch pull rod(10),turn the pull rod to change its length, so as to adjust clutch pedal (9)'s free path to a distance between 15 and 20 mm, after adjustment, tighten locknut(11)on clutch pull rod.

3) Distance limit H=7~8mm.

Adjusting Method: Loosen locknut (6),adjust bolt(7),the distance between the bolt's hexagonal head and the clutch fork rocker(8)should be H=7~8mm,after adjustment, tighten locknut(6).

(2)Lubricating the clutch bearing

During assembling, the clutch's front bearing(1)should be filled with enough grease, normally, it does not need to add lubricant grease to separating bearing(5),after the tractor's 1000 working hours, or if there is any abnormal noise from the bearing, detach the bearing and wash it clean, then put it in the melted hot lithium grease, until the inside of the bearing is filled with grease, and take it out after it cools down, then clean its surface and reinstall it back to place.

(3)Precautions in using the clutch

1) When using the clutch, care must be taken: Separation must be carried out completely, and connection should be carried out smoothly.

2) When driving on the road, do not put your foot on the clutch pedal, never half connect the clutch in order to reduce the tractor's driving speed, and never suddenly connect the clutch in order to climb a slope or pass over a blockage.

3) Do not stain the exterior of clutch disk with oil and dirt, in case it is stained with oil, clean it with gasoline, and dry it before use.

2. Model HS300/304/350/354/400/404/450/454/480/484/500/504/520/524/550/554 tractors' double action clutch

The clutch structure is shown in diagram 6-2

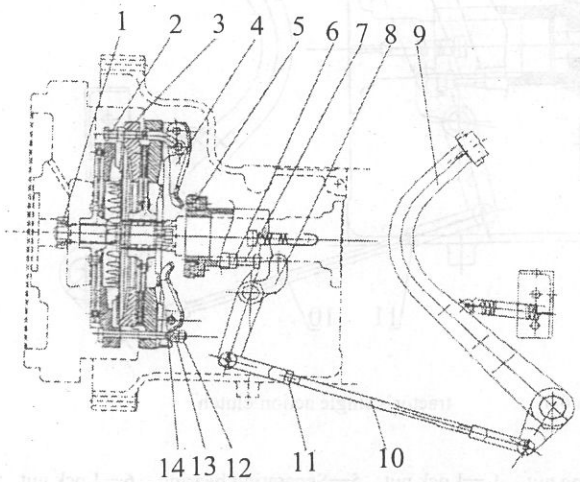


Diagram 6-2 tractors' double action clutch

1—Bearing 2—Main clutch adjusting screw 3—Locknut 4—Main clutch separating lever
5—Separating bearing 6—Locknut 7—Adjusting screw 8—Separating fork rocker

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9—Clutch pedal assembly 10—Pull rod 11—Locknut 12—Locknut 13—Ball head screw

14—Assistant clutch separating lever

(1)Adjusting the clutch

For the double action clutch, the adjustment work includes adjusting the main clutch and adjusting PTO clutch.

1) Adjusting the main clutch

a. The clearance between the main clutch's separating lever(4) and the end face of separating bearing(5) should be $2.5^{0}_{-0.5}$mm,the height difference of the three separating lever heads should not exceed 0.2mm.

Adjusting method: Loosen locknut(3),adjust the main clutch's adjusting screw(2),the clearance between the main clutch's separating lever(4) and the end face of separating bearing (5) should be adjusted to $2.5^{0}_{-0.5}$mm,and the height difference of the three separating lever heads should not exceed 0.2mm.

B. The clutch pedal's free path should be 15~20mm.

Adjusting method: Loosen locknut (11) on clutch pull rod (10), turn the pull rod to change its length, so as to adjust clutch pedal (9)'s free path to a distance between 15 and 20mm,after adjustment, tighten locknut(11) on clutch pull rod.

C. Distance limit H=9.5~11mm.

Adjusting Method: Loosen locknut (6), adjust bolt (7), the distance between the bolt's hexagonal head and the clutch fork rocker (8) should be H=9.5~11mm, after adjustment, tighten locknut (6).

2) Adjusting the assistant clutch

The distance between Model HS300/304/350/354 Main and PTO clutches' separating heads should be kept at 8.5mm,and the height difference between the PTO clutch's separating lever heads should not exceed 0.2mm,after adjustment, tighten the locknut.

The distance between Model HS400/404/450/454/480/484/500/504/520/524/550/554 main and PTO clutches' separating heads should be kept at 8mm,and the height difference between the PTO clutch's separating lever heads should not exceed 0.2mm,after adjustment, tighten the locknut.

Adjusting method: Loosen locknut(12),adjust ball head nut(13),the distance between the main and assistant clutches' separating heads should be kept at 8.5(for model HS300/304/350/354)or at 8mm(for model HS400/404/450/454/480/484/500/504/520/524/550/554),and the height difference between the PTO clutch's separating lever(14)heads should not exceed 0.2 mm, after adjustment, tighten the locknut(12).

(2)The lubricating method for tractors' double action clutch is the same as tractors' single action clutch.

(3) Note: For tractors' double action clutch is the same as that of tractors' single action clutch.

B. Adjustment the brake

The brake pedal's free path should be between 120mm and 130mm.

After the brake strip is worn, the brake pedal's free path will be increased, and result in insufficient braking. So it should be adjusted.

As shown in diagram 6-4:Loosen locknut(2),adjust pull rod (3),adjust the free path of brake pedal (1) to a distance between 120 and 130mm,the left and right brake pedals' free paths should be about the same, after adjustment, tighten the locknut(2).

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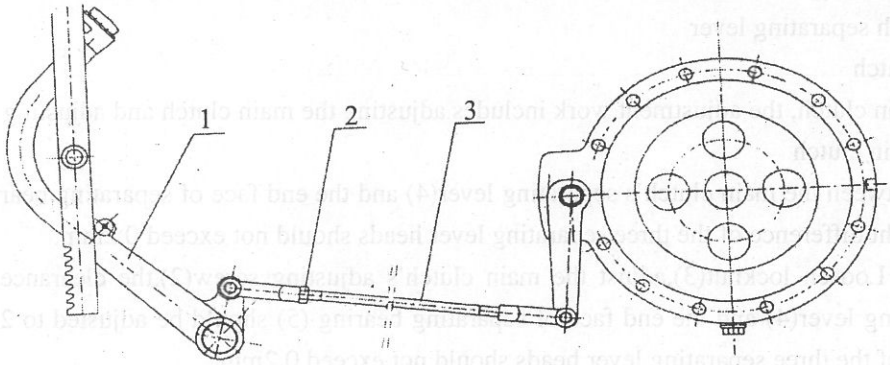


Diagram 6-4 1---Link piece of the brake pedal 2---Nut 3---Pull rod

C. Rear axle's structure and its adjustment

The rear axle consists of the central drive, differential, differential lock and power take-off shaft etc.

1. Rear axle structure

The central drive consists of a pair of helical bevel gears(diagram 6-5).The rear end of the minor bevel pinion shaft(7)is supported by taper roller bearing(6).The front end is supported by cylindrical roller bearing(8).Its shaft end spline is connected with the gearbox spline.

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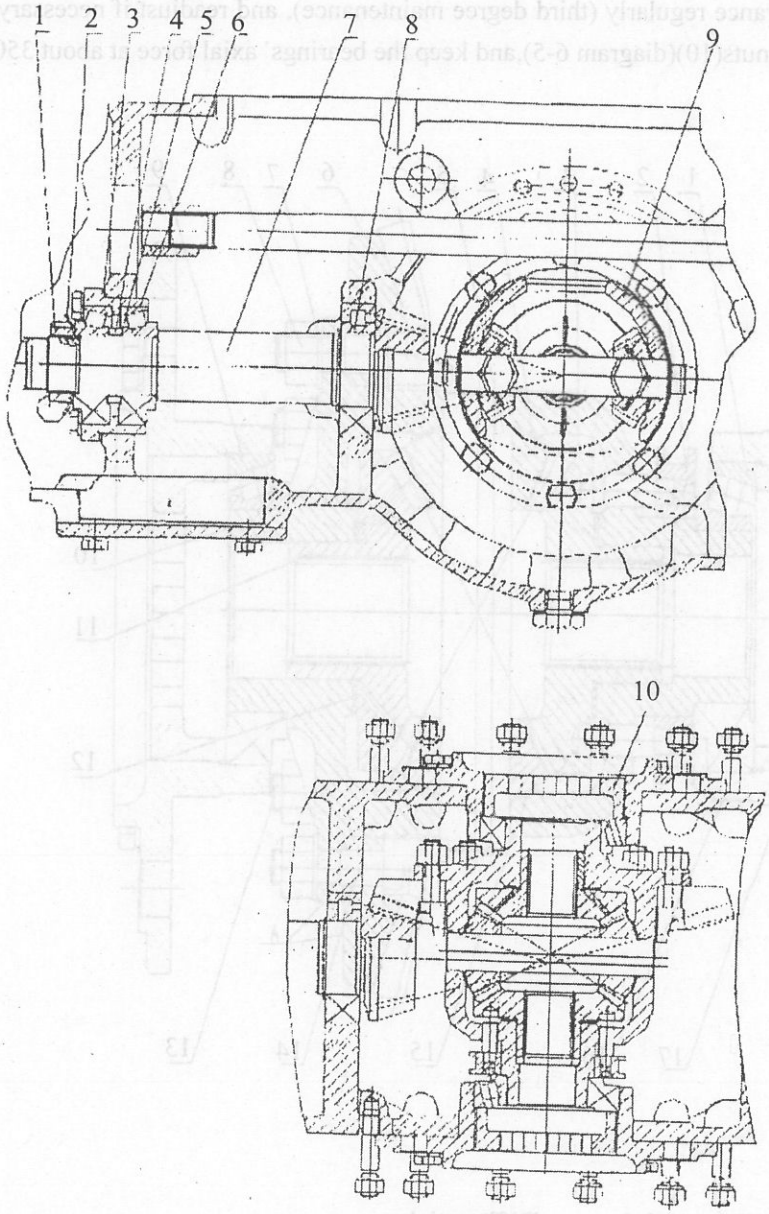


Diagram 6-5 Central drive

1-Round nut 2-Lockwasher 3-Adjusting washer 4-Spacer 5-Adjusting washer
6-Taper roll bearing 7-Minor bevel pinion shaft 8-Taper roller bearing 9-Differential
10-Adjusting nut

2. The rear axle's main adjustment

(1)Adjusting the minor bevel pinion shaft (diagram 6-5)

The two taper roller bearings (6) on the minor bevel pinion shaft (7) are pre-tightened. During use, the minor bevel pinion may have axial clearance caused by abrasion of the bearing. Thus the pre-tightening force will be reduced, therefore, check the clearance regularly(third degree maintenance),and readjust it when necessary. To adjust, at first measure distance "A" between the two bearings, next, put in a axial force of 350 N, then, measure the distance "B" between the two bearings after bending, select the adusting washers' thickness(thickness δ=A-B),and put them into the original place. After adjustment, tighten nut(1) and lock it with washer(2).

(2)Adjusting the differential bearings (diagram 6-6)

The differential's left and right bearings (1) and (9) are also pre-tightened. During use, because of the bearing's abrasion, the large bevel gear may produce an produce an axial clearance. Thus the pre-tightening force will be

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reduced, therefore, check the clearance regularly (third degree maintenance), and readjust if necessary. To adjust, tighten the left and right adjusting nuts(10)(diagram 6-5),and keep the bearings' axial force at about 350N.

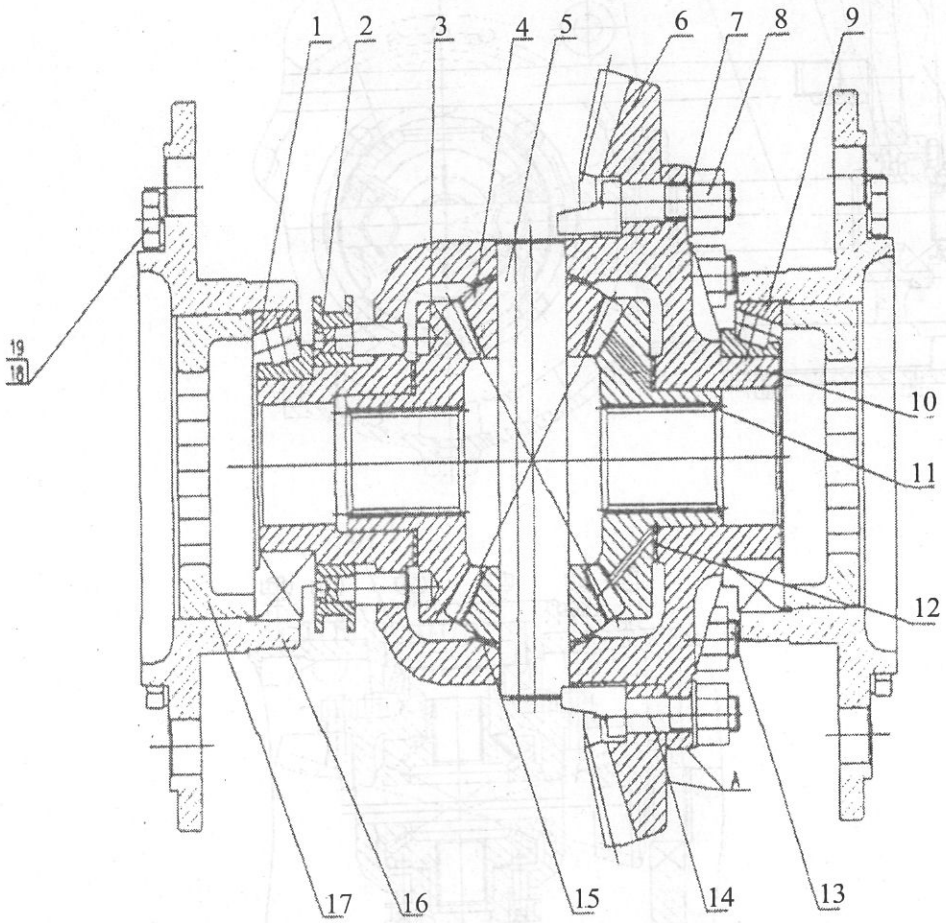


Diagram 6-6 Differential

1-Bearing 7211E 2-Differential lock assembly 3-Left face gear 4-Planet gear 5-Plant gear shaft 6-Large bevel gear 7-Lock washer 8-Nut 9-Bearing 2007113 10-Differential shell 11-Right face gear 12-Face gear washer 13-Large bevel gear's fixing bolt 14-Planet gear shaft fixing bolt 15-Planet gear washer 16-Differential bearing seat 17-Adjusting nut 18-Bolt M10X25 19-Washer 10

(3)Adjusting the central drive bevel gear's engagement (diagram 6-5)

During use, the tooth flank clearances will increase due to abrasion, which generally will not affect the gear's normal operation. The bearings' abrasion may cause the bevel gear pair to leave its original engaging position, which, in most cases, needs not to be readjusted so long as the gear can work normally. But engagement in above places must be adjusted during major overhaul, when the gear cannot work normally, or when it needs to change bearings (the differential bearing and the bevel pinion bearing) and the bevel gear shaft pair. Engagement should be adjusted after bearing's pre-tightening is adjusted.

1) Checking the tooth flank clearance. Put a lead sheet into the intertooth space in the nonworking face, turn the gear and let it squeeze the lead sheet, then take out the squeezed lead sheet and measure the thickness of the sheet at the part pressed against the large end of the tooth, this is the tooth flank clearance, which should be within 0.15 mm to 0.3mm.There measuring points should be selected evenly around the gear. The variation of the tooth flank

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clearance should not exceed 0.1mm.If the backlash cannot meet the requirement, it can be adjusted by turning adjusting nut(10)clockwise or counterclockwise, the adjusting amount in each direction should be summed as zero.

2) Checking the engaging mark. Apply a thin and even layer of red lead on the tooth face of the large bevel gear, when moving forward, the concave of the level pinion will be stressed, and it will spread the red lead to the tooth face of the large bevel gear. Then by turning the gear, you can get engaging marks on the and at least 3 to 4mm from the edge. Its length should not be less than 60% of the tooth length and its height should not be less than 50% of the tooth height. To adjust, change the thickness of the adusting washer (3), move the bevel pinion axially, and turn the adjusting nut(10),so that the large bevel gear will move axially, by this way, the correct engaging mark can be achieved. In order to keep the differential's pretension, the adjusting amount of the differential's left and right adjusting nuts should be summed as zero(diagram 6-5).

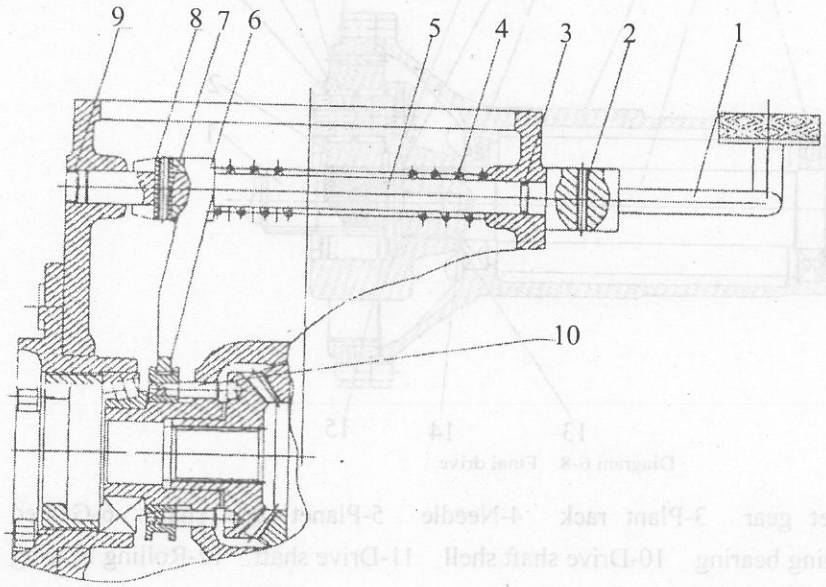


Diagram 6-7 The differential lock's operating position

1-Lock pedal weld assembly 2-Captive key 3-O ring 4-Differential lock retracting spring
5-Differential lock declutch shift shaft 6-Differential lock shifting fork 7-Captive key
8-Captive key 9-Calathiform block piece 10-Differential lock assembly

During adjustment, if there is a contradiction between the backlash and the engaging mark (e.g. when the engaging mark is proper, the backlash will not be proper), engaging mark will have the preferential. But the backlash should not be less than 0.15mm.

The large bevel gear (6)(diagram 6-6)is fixed to differential shell (10)by six bolts(13) and two planet gear shaft fixing bolts(14);on the two ends of the differential shell, there installed taper roller bearings(1) and (9),the differential shell is fixed to the rear axle shell by six screws(18) through the differential bearing seat(16).In the differential shell, there are two planet gears (4) and two are installed, there are two face gears(3)and (11),between the planet gears/face gears and the differential shell, there are spacers(12)and (15),the planet gear sleeve is installed on the planet gear shaft (5).There is a notch at one end of the planet gear shaft, which is hold down by fixing bolts(14) on both ends, so as to prevent it from turning and playing.

The differential lock's operating device is at the right side of the tractor(diagram 6-7),it consists of differential lock pedal (1),declutch shift shaft(5),shifting fork(6),retracting spring (4),differential lock(10)etc.

D. Final drive's structure and adjustment

1. The final drive's structure

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A planet gear drive mechanism in the final drive system (diagram 6-8).The planet gear drive mechanism consists of the driving sun gear (1),fixed geared ring (6),driven planet rack(3) and planet gear (2).The sun gear and the semi axis are fixed together, the front spline is connected to the semi-axis, and the geared ring (6) is fixed between the drive shaft shell (10) and the brake shell. The three planet gears(2)engaged with the sun gear and the geared ring are installed on the planet rack (3)through the needle bearing (4)and the planet shaft (5).The drive shaft(11) is supported by two annular ball bearings (9) and (12) in the drive shell(10).The drive shaft and the planet rack(3) are connected with a spline, and fastened with the drive shaft lock screw (7).In order to provide a suitable engaging condition for the sun gear and the planet gear and to get a evenly distributed load during engagement, the sun gear is designed to work in a floating state without fixed supporting. Between the planet rack (3) and the spacer ring (13), there is a floating clearance (the floating clearance G=0.2~0.3mm)

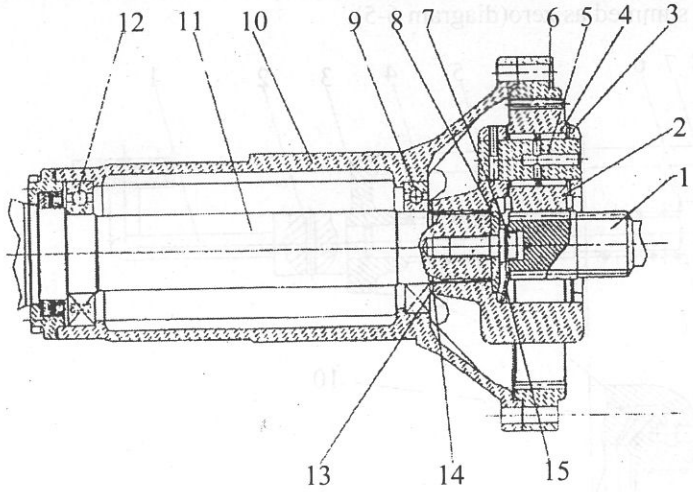


Diagram 6-8 Final drive

1-Sun gear 2-Planet gear 3-Plant rack 4-Needle 5-Planet gear shaft 6-Geared ring 7-Screw 8-Spacer ring 9-Rolling bearing 10-Drive shaft shell 11-Drive shaft 12-Rolling bearing 13-Spacer ring 14-Adjusting washer 15-Lock piece

2. Adjusting the final drive

The clearance between the planet rack(3)and the spacer ring (13)is factory adjusted(the pre-adjusted clearance G=0.2~0.3mm),and it does not need adjustment during use. But it need adjustment during overhaul and when replacing the planet gear mechanism. To adjust, measure out distance A between the drive shaft(3)and the bearing(9), spline hole depth B and the spacer(13)'s thickness C, then select the adjusting washer(14)'s thickness(washer thickness δ =A-(B+C+0.2~0.3mm)).Put the washer of this thickness to the position shown in the diagram, tighten the drive shaft's lock screw(7),and then lock it with the drive shaft's lock piece(15).

E. Front axle's structure and adjustment

1. Structure (see diagram 6-9)

The tractor's front axle is a tubular type axle with the wheelspan adjustable. It is installed in front of the engine, its bracket is connected to the engine by six bolts, the pendulum shaft is supported by the front and rear ends of the bracket, on the pendulum shaft there is the bushing weld assembly(8),on each side of the bushing, the assistant bushing assembly(7)is fixed by three bolts(1).

2. Adjustment

(1) Adjusting the front wheel bearing's axial clearance as shown in diagram 6-9.

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The normal front wheel bearing's axial clearance is 0.05 to 0.15mm; after using for a period of time, when the clearance exceeds 0.4 mm, it should be adjusted. To adjust, lift the front wheels up from the ground, take off bearing cap(4),pull out split pin(3),turn castle nut (2),after the clearance is eliminated, turn it back for 1/30 to 1/10 revolution. Then put back split pin (3) and lock it. At last reinstall the bearing's cap (4).

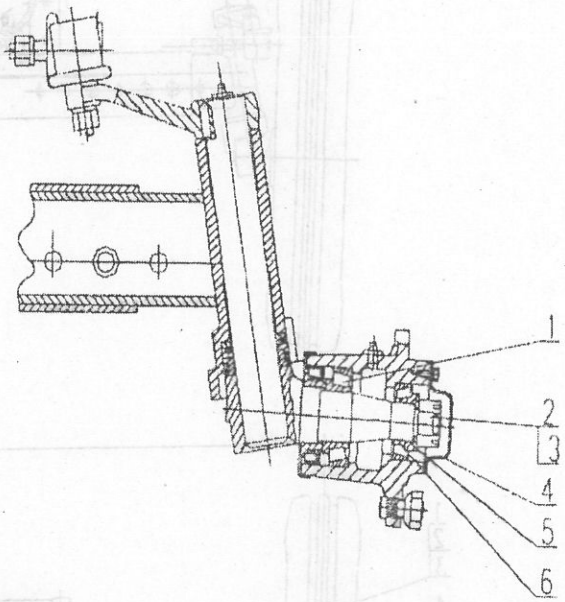


Diagram 6-9 Adjusting the front wheel bearing's axial clearance

1-Lage taper bearing 2-Castle nut 3-Split pin 4-Bearing cap 5-Check ring 6-Minor taper bearing

(2) Adjusting the front wheel toe-in (diagram 6-10): Check the front wheel toe-in after the tractor's 500 working hours, or the front wheels shake obviously, or the front wheel tire abrasion is too quick. The proper front wheel toe-in should be 4 to 8mm, if it exceeds this range, it should be adjusted.

Adjusting method: Park the tractor on a plane ground, turn the steering wheel to the middle position, put the two front wheels just like driving straight forward. The loosen the cross rod's left and right locknuts (6) and (13),turn the cross rods(9)and (12),measure the distance between two front ends and two the rear ends from the middle of the tire width at the same height of the front wheel's axial line, the difference should be : B-A=4~8mm.After adjustment, retighten the left and right locknuts.

(3)Adjusting the front wheelspan

Inner outer bushings are used. The wheelspan can be adjusted with a telescopic tube. Adjustment arrange:1150 to 1450 mm. Each adjustable step is 100 mm. To adjust, loosen the front bar inner arm's fixing nut(2),pull out fixing bolt(1) and bush (4),take out the cross tie's fixing nut(11) and fixing bolt (10),move the assistant bushing(7) and the assistant tie(12) to a proper position. After adjustment, retighten with bolts and nuts.

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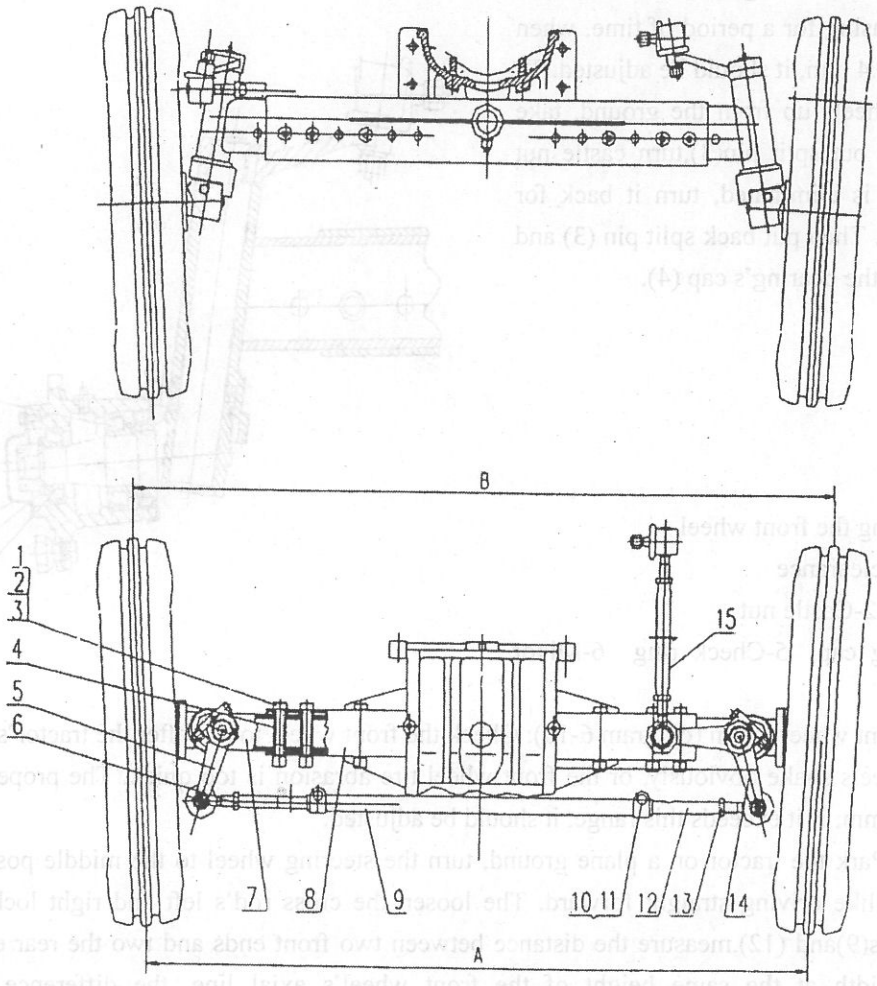


Diagram 6-10 Front axle

1-Bolt 2-Nut 3-Washer 4-Washer sleeve 5-Left drop arm 6-Nut 7-Asistant bushing 8-Bushing 9-Cross tie 10-Bolt 11-Nut 12-Left cross tie 13-Left-hand threaded nut 14-Left drop arm 15-Longitudinal tie

F. Steerer's structure and the adjustment

1. Spherical worm truckle type steerer

(1)Structure

This is a coneworm roller type steerer. It is fixed to the gearbox shell by 4 bolts. The steering shaft has a 65° angle to the tractor's longitudinal axial line. Its structure is shown in diagram 6-11.

The steering shaft and worm assembly(5) is installed in the director shell and supported by bearing 977907(9)which is also installed in the shell. The steering rocker shaft (8) is installed on the director shell, attached to it is the bush assembly (10), its left end is supported on the bush(2),and its right end is supported by the 205 bearing on the steerer shell's side cover(7).Thus, the roller(bearing 776701)installed on the steering rocker shaft will be engaged with the worm.

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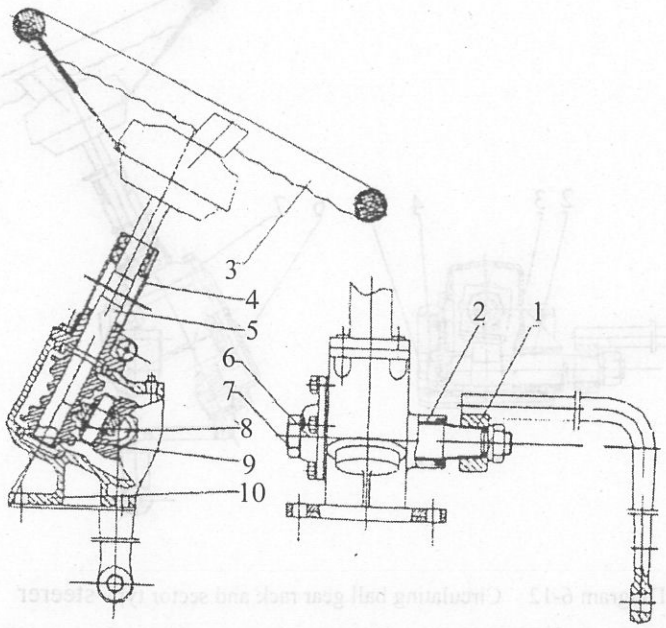


Diagram 6-11 Steerer assembly

1-Drop arm 2-Bush 3-Sreering wheel assembly 4-Steering bushing 5-Steering shaft and worm assembly 6-Steerer side cover 7-Nut 8-Steering rocker shaft 9-Bearing 977907 10-Steerer shell

(2)Adjustment

When installing the steerer, the worm must be pretemsioned. It is pretensioned by increasing or decreasing the number of adjusting washers between the steerer shell and its lower cover. When tightening the 4 bolts on the redirector's lower cover, the lower cover will press tight the bearing. The worm bearing should be pretensioned so that when the rocker shaft and the roller are not installed, the steering wheel can be turned with a force of 2.5N applied at the place of the steering wheel's 210mm radius.

The distance between the roller's central line and the worm's central line is 6mm, the distance is used to adjust the backlash between the roller and the worm. To adjust, screw off the adjusting screw(8) at the right side, turn the steering rocker's adjusting screw with a special spanner. This can move the steering rocker left and right axially. At the place of the steering wheel's 210mm radius, apply a force of 8N to 13N in tangent direction, turn the steering wheel left and right for 200° in each direction to check the backlash. When the rocker roller is at the two ends, the steerer's backlash should allow the steering wheel to turn idly in a range of 30° ; When the rocker roller is at the middle place, the steerer's backlash should allow the steering wheel to turn idly in a range of 45° ;the steerer assembly should have no backlash.

2. Circulating ball gear rack and sector type steerer

(1)Structure

This is a circular ball-rack and geared sector type steerer. It consists of the steering shaft, steering screw, steering nut, plumbing arm shaft and the steerer shell etc.(diagram 6-12).

The steering screw (6) is installed on the shell (2) by two 32206 taper bearing. Turing the steering wheel will drive the screw (6) to run, through two steel balls, it will move the steering nut up and down, the rack on the steering nut will push the geared sector to turn, then the plumbing arm will be driven to sway back and forth, the plumbing arm shaft (3) is supported in the steerer shell(2),and its axial position is fixed by the adjusting nut(4).

On the steerer, there is a oil filler, note to fill them up with transmission and hydraulic oil, so as to keep good lubrication.

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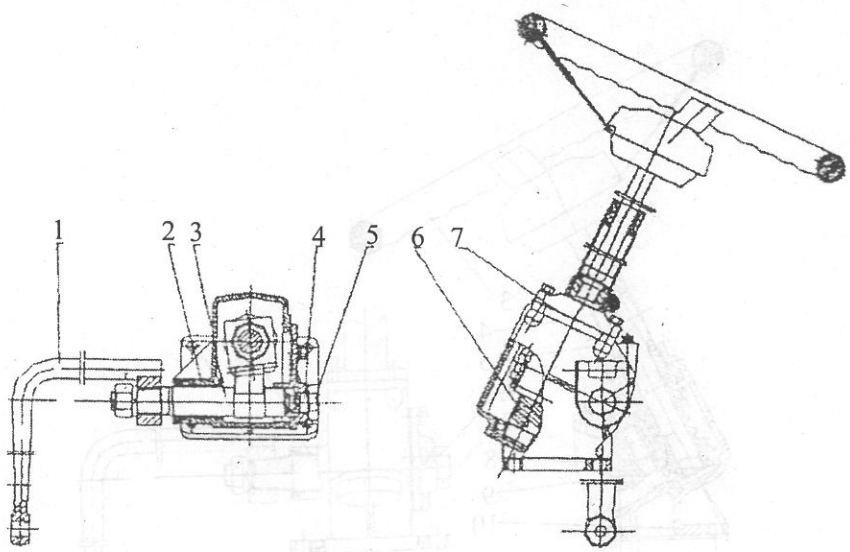


Diagram 6-12 Circulating ball gear rack and sector type steerer

1- Steerer plumbing arm 2- Steerer shell 3-Steering plumbing arm shaft 4-Adjusting screw
5- Adjusting nut 6-Sreering screw 7-Adjusting washer

(2)Adjustment

a) Adjusting the bearing clearance

In order to keep the steerer work normally, the 32206 taper bearings at both ends of the steering screw must be pretensioned. When there is a clearance in the bearing due to abrasion, it should be eliminated by increasing or decreasing the number of adjusting washers(7).The pretension should be adjusted so that the turning of the screw shaft(6) will apply a force of 3N to 5N at the steering wheel when the plumbing arm is not installed.

b) Adjusting the backlash between the rack and the geared sector

During use, the backlash between the rack and the geared sector will be increased due to abrasion, this will cause the idle motion of the steering wheel to increase. When the idle motion exceeds 20°,it should be adjusted.

To adjust, loosen the nut (5) on the right side of the steerer shell, turn the adjusting screw(4) clockwise to decrease the backlash, it should be adjusted so that when steering plumbing arm is the middle position, the steering wheel will move left and right in a 45°range. There should be no backlash between the rack and the geared sector. After adjustment, tighten the nut to prevent oil leakage.

G. Adjusting the rear wheelspan

The rear wheelspan is adjusted by installing the web and felloe in different place. The adjustment range is 1200 mm to 1500mm, divided in to four steps, they are: 1200mm, 1300mm, 1400mm,and 1500mm.(see diagram 6-13)

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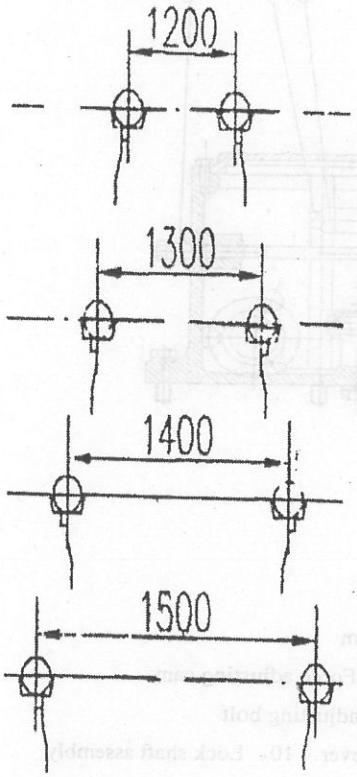


Diagram 6-13

Diagram for adjusting the rear wheelspan

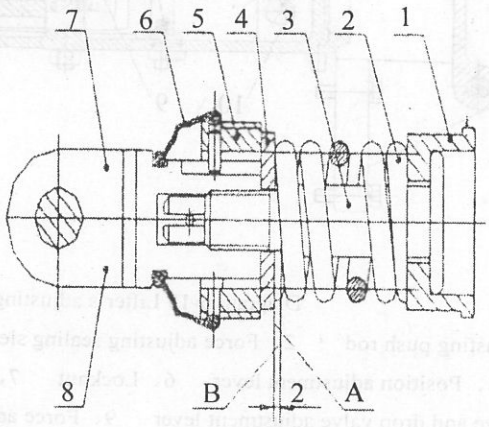


Diagram 6-14 Adjusting spring

1-Spring seat 2-Force adjusting spring 3-Spring lever 4-Spring clamp 5- Nut 6-Dust cover 7-Control link joint 8-Pin

H. Adjusting the hydraulic suspension system

Adjusting the lifter

1. Adjusting the adjusting spring (diagram 6-14)

The force adjusting assembly should be adjusted as following before installed into the lifter shell. Turn the control link (7) and the spring lever (3) oppositely so as to eliminate the clearances between the parts. The clearance between face A of spring clamp (4) and face B of the spring lever should be kept at 2 mm. Then put in pin(8),install the force adjusting spring assembly into the lifter's shell, turn screw(5) so that the front end of the force adjusting spring assembly contact face E of the raiser shell(se diagram 6-14),then through the hole of nut(5),put in the pin(21)(se diagram 6-14).

2. Adjusting the lifter's adjustment lever and the position adjusting cam (se diagram 6-15)

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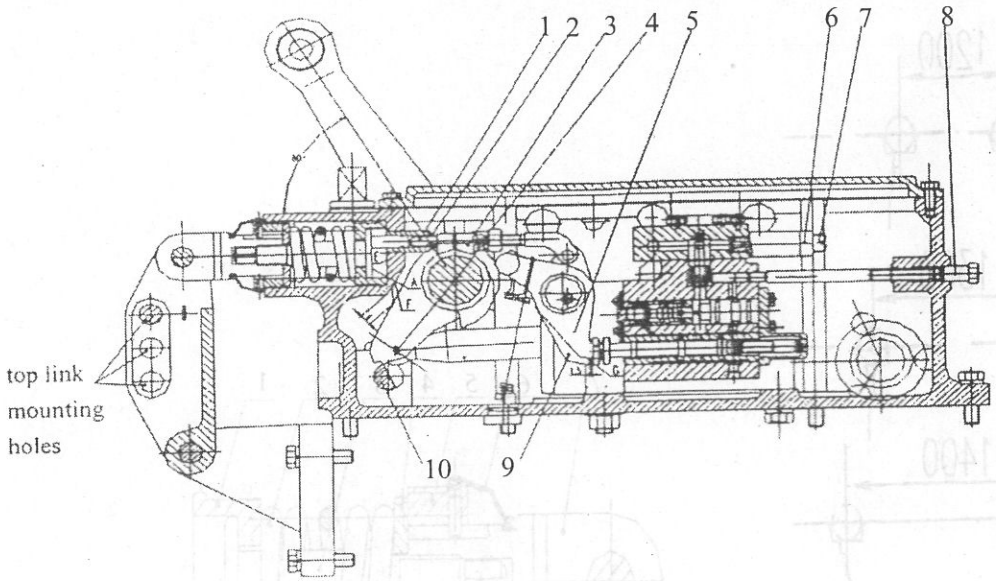


Diagram 6-15 Lifter's adjusting mechanism

1、Force adjusting push rod 2、Force adjusting sealing sleeve 3、Force adjusting cam
4、Bolt 5、Position adjustment lever 6、Locknut 7、Pressure adjusting bolt
8、Block valve and drop valve adjustment lever 9、Force adjustment lever 10、Lock shaft assembly

Put the force and position adjusting handle to the position where it contact with fan plate's top stop rabbet(perpendicular to the bottom plane of the lifter shell),leave a 4mm clearance between the inner lifter arm and the rear inner surface of the lifter shell. At this time, there is angle of 60° between the outer lifter ram and the bottom plane of the lifter shell, then adjust the force adjustment lever and the position adjusting cam.

(1)Adjusting the force adjustment lever

Adjust the force adjustment lever (1) so that the force adjustment sealing sleeve (2) head will contact with face A, then adjust the length of the force adjustment push rod, so that the clearance between the adjustment lever (7)'s end G and the main control valve's end face will be 1.5mm (at this time, the main control valve is at the outmost place).After adjustment, retighten with nuts.

(2)Adjusting the position cam

Let the control end of adjustment level(5)contact with the outmost end of the main control valve, turn the position adjustment cam(3),until it touches the roller of the position adjustment lever assembly(5).While the position adjustment level's roller is contacting with the cam, turn position adjustment cam(3)clockwise, until the adjustment lever's control end push the main control valve to the center valve position (where the main control valve moves 5mm inward from the outmost position).At this time, the control end of force adjustment lever(9)should be 6.5mm away from the end face of the control valve. Then fix the position adjustment cam to the lift shaft with bolt (4).

(3)Adjusting the hydraulic system pressure

A system safety valve is installed at the oil inlet side of the distributor. The safety valve's opening pressure is 16 to 16.5 megapascal (mpa), it is factory adjusted. Screw in the pressure adjustment screw (7), the pressure will increase; screw it out, the pressure will decrease.

I. Model 504/554/604 tractors' front driving axle structure and the adjustment

1. Adjusting the front toe-in

The adjustment method is the same as that of the two-wheel tractor's front axle assembly.

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2. Front axle assembly's structure and adjustment (diagram 6-16)

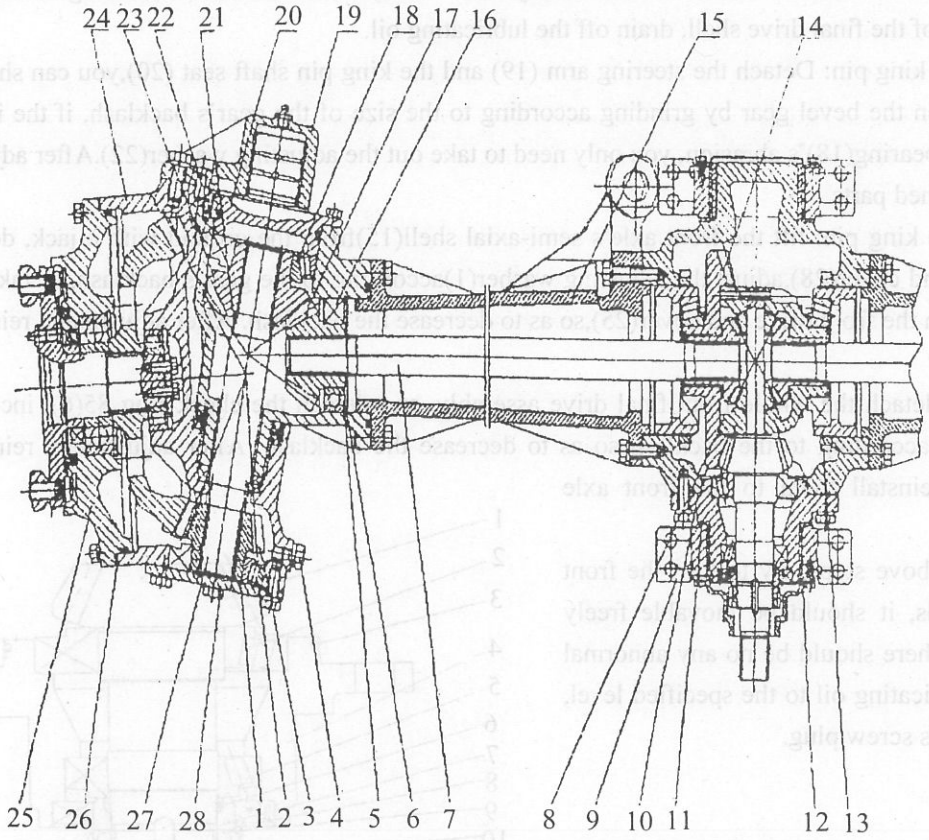


Diagram 6-16 Front driving axle

1-Adjusting washer 0.2、05、1.0 2-Bearing 36210 3-Front final drive pinion 4-Oil drajning screw plug
5-Adjusting washer 0.2、05、1.0 6-Check ring 85 7-Semi axial 8-Differential assembly
9- Pendulum seat 10-Adjusting washer 11-Thrust plate 12- Pendulum bushing 13-Ajusting nut
14-Diven gear 15-Semi axial shell 16-Bearing 209 17-Bevel gear（1） 18-Bearing 36208 19-Steering arm
20-Main pintle seat 21-Supporting sleeve 22- Adjusting washer 0.2、05、1.0
23- Bevel gear（2） 24-Final drive shell 25-Fornt drive end cover 26- Adjusting washer 0.2、05、1.0
27-King pin 28-Lower end cover

The front drive power is transmitted by the drive shaft thorough the transfer case, the drive shaft send the power to the central drive, which distribute the power to the two semi-axles, then the power is further transmitted to the final drive, which make the front drive wheel to turn.

The two bearings on the drive gear of the central drive will produce clearance after using for a period of time, the axial play will increase, at this time, it needs to tighten the small round nut to decrease the bearing's axial play. But this will increase the backlash between the front central drive's drive gear and driven gear (14).At this time, take out proper amount of adjusting washers (10) to decrease the thickness. If it is necessary, adjust the adjusting screw (13) at both sides of the front differential so as to make the clearance to become normal.

During work in the field, especially work in a paddy field with severe working condition, turbid water may enter into the end faces of the front and rear pendulum bushings (12) and cause abrasion to the end face, and increase the axial play. Under these circumstances, often adjust the thickness of the thrust plate (11) so as to keep a normal play.

After a long period of use, abrasion to the front final drive pinion and its bearing (installed on the king pin) and the bevel gear and its bearing (installed on the semi-axial) will be increased, which will cause the bevel gear pair's

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backlash to increase, at this time, the clearance must be adjusted. To adjust, loosen the oil draining screw plug (4) at the lower right side of the final drive shell, drain off the lubricating oil.

(3)Upper end of the king pin: Detach the steering arm (19) and the king pin shaft seat (20),you can shorten the supporting sleeve(21)on the bevel gear by grinding according to the size of the gear's backlash, if the increased backlash is caused by bearing(18)'s abrasion, you only need to take out the adjusting washer(22).After adjustment, then reinstall the detached parts.

(4)Lower end of the king pin: lift the front axle's semi-axial shell(15)from the ground with a jack, detach the front wheels and the end cover(28),adjust the adjusting washer(1)according to the gear's backlash, or take out the adjusting washer(26)on the front drive end cover(25),so as to decrease the backlash. After adjustment, reinstall the detached parts.

(5)Semi-axial end: detach the whole front final drive assembly, and detach the check ring 85(6), increase the adjusting washers (5) according to the backlash so as to decrease the backlash. After adjustment, reinstall the detached parts, and reinstall them to the front axle assembly.

After finishing all above steps, try to turn the front wheel with your hands, it should be movable freely with your hands, and there should be no any abnormal noise. Then fill in lubricating oil to the specified level, and retighten the filler's screw plug.

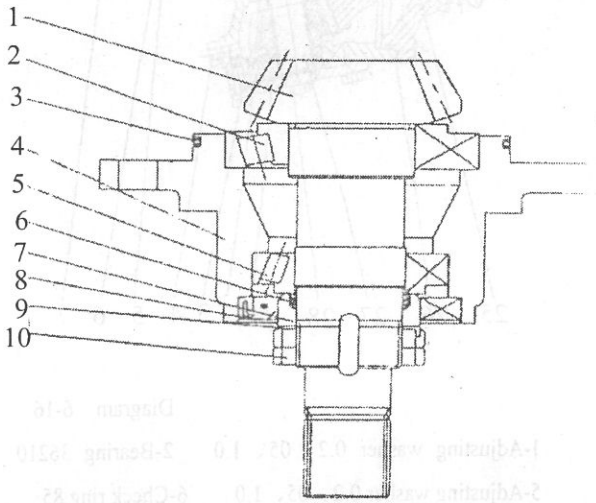


Diagram 6-17 Pretensioning the bearing of the drive bevel gear in the front central drive

1-Front drive bevel gear 2-Bearing 30208 3-Oring 4-Shaft seat 5-bearing 32007 6-O ring 7-Supporting sleeve 8-Reinforced seal 9-Washer 10-Minor round nut

Pretensioning the supporting bearing of the drive bevel gear in the front central drive: (see diagram 6-17)

The backlash of the bearing 208(2) and 2007107(5) should be adjusted so that the two bearing's backlashes added together should be 0.06mm to 0.10mm,during adjustment, the bearing should be free of load. Tighten the minor round nut(10),and then turn it back for 1/30 to 1/50 revolution, lock the winged washer(9),turn the gear(1)with your hands, it should move freely.

As the adjustment about the backlash of the bevel gear in the front central drive and the adjustment of engaging mark, please refer to in section 3,in which the rear axle's structure and adjustment is described: "Adjusting the central drive bevel gear's clearance" (as shown in diagram 6-5).

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Chapter Seven

Main Possible Problems and the Trouble Shooting Methods

A Clutch

Trouble	Possible Causes	Remedy
1.The clutch slips	1. The clutch disk or clutch plate is stained with oil. 2. Abrasion to clutch disk is uneven or the abrasion is serious and the rivet is bared. 3. The disk spring's pressure becomes weak. 4. The free path is not enough, the separating lever is not at the same plane, or it touches the separating bearing. 5. The driven disk is deformed.	1. Wash them clean with gasoline, and eliminate the oil leakage. 2. Replace the clutch disk. 3.Replace 4.Readjust in accordance with the requirement 5.Replace the driven disk
2.Clutch cannot be separated completely	1. The pedal's idle path is too large, and the working path is too small. 2.The driven disk warps too much 3.The three separating lever heads are not in the same plane	1.Readjust in accordance with the requirement 2.Replace 3.Adjust
3.The tractor is shivering at starting	1.The main friction disk and the driven disk are stained with oil 2.The friction disk is broken 3.The driven disk warps 4.The separating levers are not in the same plane	1. Wash them clean with gasoline. 2.Replace 3.Repair it 4.Ajust
4.When separating the main clutch, the power take-off shaft also stops running(for double action clutch)	1.The position of the pedal limit bolt is not proper	1.Adjust
5. Even the clutch pedal is pushed down to the bottom, the power take-off shaft still keeps running.	1. The position of the pedal limit bolt is not proper. 2. The power take-off shaft and the clutch plate are not separated completely.	1.Adjust 2. Readjust in accordance with the requirement.

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B. Gearbox

Troubles	Possible Causes	Remedy
1. There are hum or slap noises in the gearbox	1. The gear's tooth face is abraded too much, or the tooth face peels off, or there are cracks, or the gear teeth are broken. 2. The bearing is abraded heavily or is damaged. 3. Lubricating oil is not enough or oil quality does not conform to the requirement.	1. Replace with a new gear 2. Replace bearing 3.Fill in enough oil, or replace lubricating oil
2. It difficult to change gears, or it is unable to connect gears	1. The clutch does not separated completely. 2. Engaging sleeve and teeth end of the spline shaft are abraded heavily, or there are worn edge notches	1. Adjust the clutch 2. Repair or replace
3.The gear disconnects itself	1. Declutch shift shaft locating slot is worn 2. Declutch shift shaft lock spring is weaken broken 3. Engaging sleeve and spline are worn	1. Repair or replace 2. Repair the lock spring 3. Replace a sliding fear with a engaging sleeve

C. Rear axle

Trouble	Possible Causes	Remedy
1. There is great noise in the central drive	1. There is a play in the bearing of the drive helical bevel gear 2. Gear engagement is abnormal 3. The differential shaft is worn and seized. 4. The planet gear or washer is worn 5. The differential bearing is worn or damaged	1. Adjust the clearance 2. Readjust the engaging mark and the clearance, the flank clearance should be adjusted in accordance with the requirement in the user's manual 3. Replace 4. Replace 5. Replace
2. The drive helical bevel gear bearing and the differential bearing are over heated.	1. Too much bearing pretension. 2. Poor lubrication	1. Readjust 2. Check oil level, replenish if necessary

D. Brake

Troubles	Possible Causes	Remedy
1. Brake fails	1. The brake disk is worn seriously, or worn eccentrically. 2. The free path of the brake pedal is too large.	1. Replace. 2. Adjust.
2. During braking, the tractor will steer wander	1.The left and right brake pedals' free paths are different 2. The brake disk in one side is damaged 3. Air pressures in the two rear tires are different.	1.Adjust 2. Replace 3. Inflate the tires as specified
3. The tractor is shivering at starting	1. The free path of the brake pedal is too small. 2. The pedal retracting spring is too weak in force	1. Adjust 2. Replace
4. The brake cannot disconnect completely and become heated.	1. The free path of the brake pedal is too small 2. The free path of the brake pedal is too small.	1. Replace the parking brake. 2. Adjust

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E. Front driving axle (four wheel drive tractors)

Troubles	Possible Causes	Remedy
1. The front tires are worn seriously	1. The front wheel's steel ring and web deform seriously. 2. The front wheel toe-in is not proper 3. The steering knuckle's connecting pin is worn seriously. 4. During long transport work, the air pressure in the front tires is insufficient, or the front and rear axles' connecting handle is not disconnected.	1. Repair 2. Adjust 3. Replace 4. Inflate the tires as specified and disconnect the front axle
2. The front wheels are swaying	1. The front axle bearing is worn seriously. 2. The knuckle arm supporting bush bearing is worn seriously. 3. The clearance between the front and rear bearers is too large. 4. The front wheel rim deforms heavily. 5. The toe-in is not properly adjusted 6. The steering ball joint is worn seriously	1. Replace 2. Replace 3. Adjust 4. Repair 5. Adjust 6. Replace
3. The drive shaft and its jacket is heated	The drive shaft jacket is bent and deforms seriously	Repair
4. There is big noise	1. The central drive gear's engaging mark is not proper. 2. The central drive bearing clearance is too large or damaged 3. The differential shaft is worn or seized 4. The planet gear or its washer is worn 5. The final drive gear pair does not engaged properly	1. Readjust. 2. Readjust or replace 3. Replace 4. Replace 5. Replace

F. Redirector and the driving system

Trouble	Possible Causes	Remedy
1. The driving system's free path is too large	1. The redirector thrust bearing is worn 2. The redirector's screw, nut and ball bearing are worn 3. Geared sector's rack is worn	1. Replace the bearing or adjust it 2. Replace the worn parts 3. Adjust
2. The steering is too heavy	1. The redirector thrust bearing's upper ball bearing seat is over-tightened 2. The air pressure in the front tires is too low	1. Properly tighten the upper ball bearing seat 2. Inflate the tires as required
3. The front wheel sway	1. The front wheel bearing's bevel bearing clearance is too large 2. The steering ball head is worn seriously. 3. The washer between the oscillating shaft and the rack is worn. 4. The toe-in is not properly adjusted. 5. The front wheel rim deforms badly.	1. Adjust the clearance as required. 2. Replace. 3. Replace.
4. Tires are worn quickly	1. The toe-in is not properly adjusted 2. The tires' air pressure is not proper. 3. The drive wheel tread is installed in the reverse direction	1. Adjust 2. Inflate the tires as required 3. Reinstall

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G. Hydraulic system

Trouble	Possible Causes	Remedy
1. Raising is difficult or it is unable to raise.	1. The oil level is too low or the oil type is not proper. 2. The oil suction screen is blocked. 3. Air enters the hydraulic system 4. The oil pump is worm, inside oil leakage is seriously 5. The main control valve or the spill valve is seized 6. The main control valve or the spill valve is worn seriously 7. The safety valve fails 8. The cylinder leaks much oil 9. The gaskets in the distributor leak oil.	1. Fill in qualified oil as specified. 2. Wash the filtering screen clean 3. Release the air and tighten the joint, or replace the sealing gasket. 4. Replace the oil pump's sealing gasket. 5. Operate the lifter control handle up and down several times, use a screw driver to move the main control valve. If it is seized repeatedly, detach and clean it. 6. Replace the worn parts 7. Readjust or repair 8. Replace the gasket, replace the worn parts if it is necessary 9. Replace the gaskets.
2. Cannot lower down the implement	1. The main control vale or the spill valve is seized. 2. The lowering speed control valve or the block valve closes	1. Same as 1 (5). 2. Open the closed valve
3. It is shivering when lifting the implement	1. The on way valve is worn and cannot close tightly. 2. The gaskets in the distributor and cylinder leak oil.	1. Repair or replace the on way valve. 2. Find out leaking position, replace the gaskets.

H. Electric system

Troubles	Possible Causes	Remedy
1. The starter motor does not work	1. Wire is disconnected or in poor contact 2. The battery is uncharged or in low voltage. 3. The carbon brush touches the collector and the collector is dirty 4. The circuit in the staring motor is broken, short circuited or bonding.	1. Weld it or replace with new wire. 2. Charge the battery 3. Adjust the brush spring's pressure, clean the collector. 4. Check and repair the short circuit and broken circuit.
2. The starter motor stats weakly, and it cannot start the engine	1. The beating is worn badly, the armature shell is scraped. 2. The contact between the carbon brush and the collector is poor. 3. The exterior of the collector is burnt or stained with oil.	1. Replace with a new bearing. 2. Adjust. 3. Clean off the oil, polish it with "0" class nonmetal sandpaper.

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Trouble	Possible Causes	Remedy
	4. The lead wire's contact is poor 5. The electromagnetic switch id burnt out, and the contact is poor. 6. The battery is not sufficiently charged, or the voltage is too low.	4. Tighten the nut. 5. Clean of the oil, polish it with "0" class nonmetal sandpaper. 6. Charge the battery.
3. The generator does not generate electricity	1. The armature is broken	1. Check and repair
4. The generator cannot charge sufficiently or the voltage is unstable	1. The V belt of the fan slips, the engine speed is low. 2. The wire joint is loose. 3. The armature is in trouble 4. The regulator is in trouble	1. Adjust the V belt tension 2. Tighten the screw 3. Check and repair 4. Check and repair
5. The battery's electricity is often insufficient.	1. The generator or the regulator has troubles, the battery is not fully charged. 2. Wiring connection is loose in the charging circuit 3. The plate electrode is short circuited.	1. Check and repair the generator or the regulator, if you find any loose contact in the at he contact point in the regulator, polish it with "0" class nonmetal sandpaper. 2. Check the armature joint and the wire connecting screw, if they are loose, tighten them. 3. Check and repair
6. The battery is overcharged (the distilled water is over-consumed, electrolyte seeps from vent holes)	1. The regulator cannot maintain the normal voltage of the generator.	1. Adjust

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Chapter Eight Appendix

A. Lubrication table for the tractors

Serial No.	Positions for maintenance and lubrication	Actions	Position number	Maintenance Cycle (h)	Remarks
1	Front wheel hub	Add lubricating grease	2	Each shift	
2	Oscillating shaft (front and rear bushes)	Add lubricating grease	2	Each shift	
3	Engine's water pump shaft	Add lubricating grease	1	Each shift	
4	Engine oil bottom shell	Check oil level	1	Each shift	
5	Oil bath type air strainer	Check oil level	1	Each shift	If necessary
6	Clutch and brake pedal shafts	Add lubricating grease	2	Each shift	If necessary
7	Steering wheel's thrust bearing	Add lubricating grease	2	Each shift	
8	Rear wheel hub	Add lubricating grease	2	Each shift	
9	Left and right lifting arms	Add lubricating grease	2	Each shift	
10	Battery	Check liquid level	1	Each shift	
11	Front axle king pin's upper and lower bushes	Add lubricating grease	4	Each shift	
12	Steering longitudinal tie ball and spigot	Add lubricating grease	2	Each shift	
13	Steering cross tie ball and spigot	Add lubricating grease	2	Each shift	
14	Radiator	Check liquid level	1	Each shift	
15	Lifter	Check liquid level	1	Each shift	Replenish if necessary
16	Gearbox-rear axle	Check liquid level	1	Each shift	Replenish if necessary
17	Hydraulic steering oil tank	Check liquid level	1	Each shift	If necessary
18	Steering cylinder	Add lubricating grease	2	Each shift	

(To be continued)

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Lubrication table for the tractors (continued)

Serial No.	Positions for maintenance and lubrication	Actions	Position number	Maintenance Cycle (h)	Remarks
1	Fan V belt	Check belt tension	1	Every 125 Working hours	
2	Rotary engine oil filter	Replace strainer	1	Every 125 working hours	
3	Diesel oil filter	Replace filtering element	1	Every 125 working hours	
4	Raiser oil filter	Wash it clean or replace filtering element	1	Every 125 working hours	
5	Engine oil bottom shell	Replace lubricating oil	1	Every 125 working hours	
6	Oil bath air strainer	Maintain and wash	1	Every 125 working hours	
1	Front wheel hub	Replace lubricating grease	2	Every 500 working hours	
2	Hydraulic steering oil tank	Replace hydraulic oil	1	Every 500 working hours	
3	Lifter	Replace hydraulic oil	1	Every 500 working hours	
4	Gearbox-rear axle	Replace hydraulic oil	1	Every 500 working hours	
1	Radiator	Maintain and wash	1	Every 1000 working hours	
2	Fuel tank	Maintain and wash	1	Every 1000 working hours	

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B. The tightening torques for the bolts and nuts in the main parts of the tractor

Connecting positions	Connecting parts	Specification	Tightening torque
Transmission system	Bolts connecting the engine and the clutch shell	M12	77.7
	Bolts connecting the gearbox and the rear axle shell	M12	77.7
	Fixing bolt for the differential bearing	M12	77.7
	Large bevel gear fixing bolt	M10	44.5
	Bolts connecting the drive shaft shell and the rear axle shell	M12	77.7
Driving and steering system	Bolts connecting the drive wheel hub and web	M14	123.6
	Bolts connecting the front drive wheel and the front wheel's hub and web	M14	123.6
	Bolts connecting the redirector and the gearbox shell	M12	77.7
	Steering ball head fixing bolts	M12	77.7
Front axle assembly	Bolts connecting the frame and the engine	M16	192.9
Hydraulic suspension system	Bolts connecting the lifter shell and the rear axle shell	M12	109.3
	Bolts connecting the cylinder head and the lifter shell	M14	173.9
	Bolts connecting the top link rocker bearer and the rear axle shell	M12	77.7
Front axle drive	Bolts connecting the driven bevel gear in the front differential assembly and the differential	M10	44.5
	Connecting bolts for left and right semi-axles' shells	M10	44.5
	Bolts connecting the tee joint shell and the tee joint top cover	M8	31.6
	Bolts connecting the final drive shell and the final drive shell's lower cover	M10	62.6
	Bolts connecting the final drive shell and the final drive shell cover	M10	44.5
	Bolts connecting the steering arm with bush and the final drive shell	M12	77.7
	Bolts connecting the bracket and the engine	M16	192.9
	Bolts connecting the oscillating seat assembly and the bracket	M12	77.7

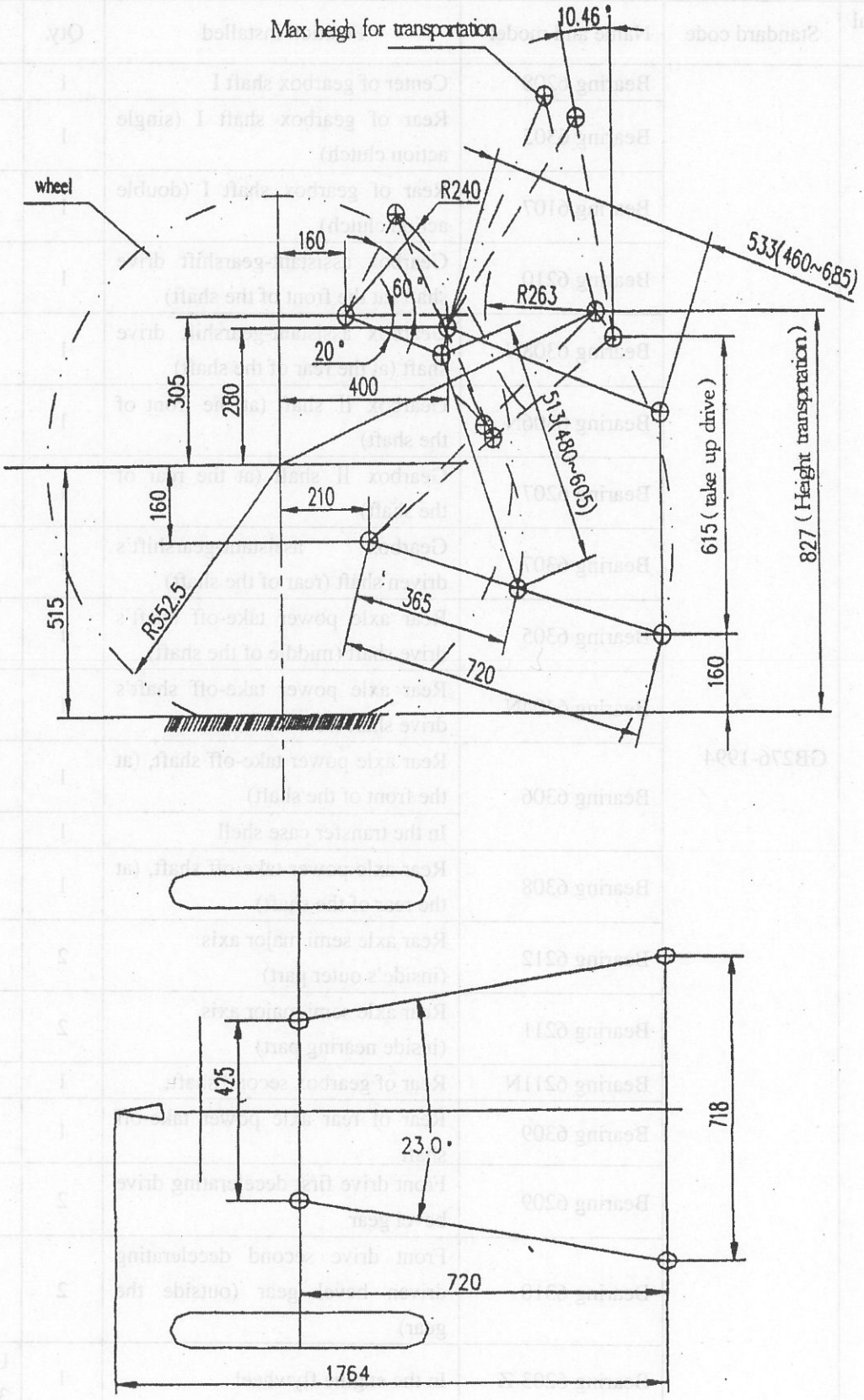
Note: The tolerance for the torque value listed in the table is : ±10%.

C. Implements applied with the tractor

Serial No.	Name of implement	Model	Tilling depthcm	Manufacturer	Tractors suitable
1	Share type plow	1L-420/327	18-20/20-22	Dezhou Baofeng Farm Machinery Works	HS500/504/550/554 /600/604
2	Share type plow	1L-420/325	18/20-22		HS400/454
3	Rototiller	1GQN-160	15	Xi'an Rotary sower Works	HS400

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D. Motion diagram for HS55Series tractors' suspension mechanism



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E. Specifications for the tractor's rolling bearing, needle bearings, and steel balls

Serial No.	Standard code	Name and model	Position installed	Qty.	Remarks
1	GB276-1994	Bearing 6208	Center of gearbox shaft I	1	
		Bearing 6305	Rear of gearbox shaft I (single action clutch)	1	
		Bearing 6107	Rear of gearbox shaft I (double action clutch)	1	
		Bearing 6210	Gearbox assistant-gearshift drive shaft (at the front of the shaft)	1	
		Bearing 6308N	Gearbox assistant-gearshift drive shaft (at the rear of the shaft)	1	
		Bearing 6306N	Gearbox II shaft (at the front of the shaft)	1	
		Bearing 6207	Gearbox II shaft (at the rear of the shaft)	1	
		Bearing 6307	Gearbox assistant-gearshift's driven shaft (rear of the shaft)	1	
		Bearing 6305	Rear axle power take-off shaft's drive shaft (middle of the shaft)	1	
		Bearing 6404N	Rear axle power take-off shaft's drive shaft (rear of the shaft)	1	
		Bearing 6306	Rear axle power take-off shaft, (at the front of the shaft)	1	
			In the transfer case shell	1	
		Bearing 6308	Rear axle power take-off shaft, (at the rear of the shaft)	1	
		Bearing 6212	Rear axle semi major axis (inside's outer part)	2	
		Bearing 6211	Rear axle semi major axis (inside nearing part)	2	
		Bearing 6211N	Rear of gearbox second shaft,	1	
		Bearing 6309	Rear of rear axle power take-off shaft	1	
		Bearing 6209	Front drive first decelerating drive bevel gear	2	
		Bearing 6310	Front drive second decelerating driven bevel gear (outside the gear)	2	
		Bearing 6203-Z	In the engine flywheel	1	Used for 30、35
		Bearing 6204-Z	In the engine flywheel	1	Used for 40

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Serial No.	Standard code	Name and model	Position installed	Qty.	Remarks
2	GB283-1994	Bearing NUP2210	Rear central drive bevel pinion (at the rear of the bevel pinion).	1	
		Bearing N208	Front drive second decelerating driven bevel gear (inside)	2	
3	GB/T301-1995	Bearing 51108	At the joint of steering knuckle and vertical bushing	2	
4	GB/T297-1994	Bearing 32208	Rear axle drive helical bevel gear (at the front of the gear).	2	
		Bearing 2007113	Rear axle differential	1	
		Bearing 30211	Rear axle differential	1	
		Bearing 30208	Front drive first decelerating drive bevel gear	2	
		Bearing 30210	Front drive second decelerating drive bevel gear	2	
		Bearing 30210	Front drive second decelerating drive bevel gear	2	
		Bearing 7211	Front central differential	2	
		Bearing 2007107	Front central drive bevel gear (at the rear of the gear)	1	
		Bearing 7208	Front central drive bevel gear (at the front of the gear)	1	
		Bearing 32206	At the joint of steering knuckle and the wheel hub	2	
			At the joint of steering rocker shaft and the shell	2	
			At the joint of steering knuckle and the wheel hub	2	
		Bearing 32208	At the joint of steering knuckle and the wheel hub	2	
			At the joint of the steering knuckle and the wheel hub	2	
		Bearing 6205	At the joint of the steering cylindrical shaft and the shell	1	
5	Clutch separating bearing	688908	Clutch thrust bearing seat	1	Single action
		9688213	Clutch thrust bearing seat	1	Double action
6	Nonstandard	977907	At the joint of the steering cylindrical shaft and the shell	1	
	Nonstandard	776701	At the joint of the steering cylindrical shaft and the shell	1	

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Serial No.	Standard code	Name and model	Position installed	Qty.	Remarks
7	GB/T 308-1999	Steel ball 8.0000G100b	Gearbox shifting axial	4	
		Steel ball 9.5V	Rear axle power take-off shaft's shifting axial	1	
		Steel ball 8.7312G400b	Front drive steering arm	2	
			Lifter lock shaft	1	
		Steel ball 18.0000G100b	Brake plate and differential shaft seat	12	
8	GB 309-84	Needle bearing ϕ 5×23.8	Final drive planetary gear shaft	264	
9	GB/T 5846	Bearing K20×26×20	Between the assistant shifting driven shaft and II shaft	1	

F. Specifications for the tractor's oil sealing and gaskets

Serial No.	Standard code	Description	Position	Qty.
1	GB/T 9877.1-1988	Oil sealing FB 50×72×8D	Rear axle power take-off shaft (at the rear of the bearer).	2
		Oil sealing B55×80×8	At the joint of steering knuckle and the wheel hub	2
		Oil sealing 30×52×7	Transfer case sealing	1
		Oil sealing SG70×95×10	Rear axle semi major axis inside outer position	2
2	JB2600-80	Oil sealing PG40×62×10	Gearbox I shaft, middle	1
		Oil sealing SD65×90×12	Front drive second decelerating drive gear	2
		Oil sealing SD45×70×10	Front drive's drive bevel gear bearer (at the rear of the bearer).	1
3	GB 13871-1992	Oil sealing B32×45×8	Joint of the steering rocker shaft and the shell	1
4	GB/T 3452.1	O ring 23.6×1.8	At the rear of gearbox auxiliary clutch shaft	2
		O ring 15×2.65	Differential lock control shaft	1
			The jointing place for the pressure oil pipe and the gear pump	1
		O ring 11.2×2.65	Power take-off shaft control lever	1
		O ring 115×3.55	Rear axle semi major shaft inside outer end	2
		O ring 61.5×5.3	Front drive second decelerating drive bevel gear	2
		O ring 19×2.65G	Oil suction pipe and gear pump's joining area	1

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Serial No.	Standard code	Description	Position	Qty.
			Pressure oil pump and lifter's joining area	1
		O ring 17×2.65G	At the joint of the oil inlet pipe's connecting plate and the lifter shell	1
		O ring 20×2.65G	At the lifter lock shaft	3
			Brake's crank axial sealing	2
		O ring 132×3.55G	At the sealing of the transfer case and the rear axle shell	1
		O ring 25×2.65G	Transfer case declutch shift shaft sealing	2
		O ring 43.7×2.65G	Between the transfer case drive shaft and the jacket	4
		O ring 18×2.65G	Brake's crank axial sealing	2
5	GB 1235-76	O ring 50×3.5	Front drive steering arm	2
		O ring 90×5.7	Front drive first decelerating drive bevel gear	2
		O ring 110×5.7	Front drive first decelerating drive bevel gear	2
		O ring 95×3.1	Front drive second decelerating drive bevel gear	2
		O ring 54×3.5	Front drive second decelerating drive bevel gear	2
		O ring 270×5.7	Front drive second decelerating drive bevel gear	2
		O ring 16×2.4	Front drive second decelerating drive bevel gear	2
			Front drive oil draining plug	1
		O ring 30×3.1	Front drive oil dipstick	1
		O ring 100×3.1	Front drive's drive bevel gear bearer (at the front of the bearer)	1
		O ring 32.5×3.1	Front drive's drive bevel gear bearer (at the rear of the bearer)	2
			Front drive's drive bevel gear bearer (at the front of the bearer)	2
		O ring 85×3.1	Front drive's drive bevel gear bearer (at the rear of the bearer)	2
		O ring 83.6×3.5	Front drive's drive bevel gear bearer (at the rear of the bearer)	2
		O ring 19×2	At the force adjustment seal housing position	1
		O ring 11×1.9	At the pusher rod sleeve	1
		O ring 13×1.9	At the block valve and the lowering valve adjusting lever position	4
		O ring 22×2.4	At the oil pressure outlet joint position	1
		O ring 16×2.4	At the hydraulic pressure output oil pipe position	4
		O ring 24×2.4	At the spring hanger position	1
		O ring 52×5.7	At the raising axial position	2

Note: Nonstandard oil sealing and O rings are not included in this table.

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Chapter Nine Spare parts and tools

A. Attached tools

Serial No.	Name	Specification	Quantity	Remarks
1	Socket wrench		1	Packed in boxes
	Socket head	10、13、16、18、21、24、27、30	1 Each	
	Crank		1	
2	Double end spanner	8-10	1	
3	Double end spanner	13-16	1	
4	Double end spanner	18-21	1	
5	Double end spanner	24-27	1	
6	Double end spanner	30-34	1	
7	Double end spanner	36-41	1	
8	Slip joint pliers	165mm	1	
9	Cross slot screw driver	4″	1	
10	Minus slot screw driver	8″	1	
11	Grease gun	200g or 400g	1	
12	Allen wrench	M8	1	

Note: Check the engine attached tools in accordance with the engine's checklist.

B. Attached spare parts

Serial No.	Code	Name and specification	Unit	Quantity	Remarks
1		Meter light 2W	Only	5	
2		Fuse 10A	Only	1	
3		Fuse 15A	Only	1	
4		Fuse 20A	Only	1	

Note: Check the engine attached spare parts in accordance with the engine's checklist.

C. Attached documents

Serial No.	Document name	Quantity	Remarks
1	The tractor's "operating instruction manual"	1	
2	The engine's attached technical document.	1	
3	Product quality certificate	1	
4	Guaranty service card		
5	Attached articles packing list	1	

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