



## **Preface**

**Congratulations on your buying power tiller!**

**It will lead your family to a better life more quickly.**

**This machine is small, light, multi-functional, and with a high efficiency for cultivating. It can climb hills, run in water, walk over the field ridges and ditches, move freely and change the directions easily, and it is especially applicable to various working in hilly area, dry land, paddy field, orchard, vegetable garden and greenhouse, etc. Cultivating, ditching & ridging, and transport are the machine's basic functions. Moreover, after being equipped with relative devices and tools, it may be used to pump water, spray water and pesticide, reap the crops, generate electricity, fertilizer, implant seeds, threshing, cut tendrils, grind something, etc. The machine has a simple structure, can be easily repaired and its fuel consumption is small, it is your ideal micro agricultural machine.**

**The machine is a good helper for your family to be wealthy**

**Before you use the machine, please read the instruction manual carefully. it can guide you to solve the problems when you are installing, manipulating and repairing the machine.**

**With the continuous innovation and improvement of the products, the contents in the (of ) instruction manual may differ slightly from the actual situations, your understanding and pardon is highly appreciated. If you find some problems or have some good suggestions, please do not hesitate to contact us.**

**Let's seek a bright future hand in hand!**

**Thanks!**

## Precautions

- When starting the machine, set shifting bar to the neutral position.
- When the machine is working, pay attention to the safety!
- Be careful not to be hurt by the rotary blades!
- When grasp the reverse handle, the shifting bar must be set to the neutral position.
- Fuel and lubricant must be clean.
- Clutch must be broken off when changing the shift.
- Please read the contents of nameplate on the handle bar carefully before using the machine.
- Must install the safety protecting board on the machine before using machine or after maintenance.

START WARNING	PROTECTION WARNING
<ul style="list-style-type: none"><li>• SUFFICIENT ENGINE OIL</li><li>• START AT NEUTRAL</li><li>• PRESS CLUTCH WHEN GEAR SHIFTING</li><li>• LOAD AFTER IDLE 5 MINUTES</li><li>• COLD STARTING, CLOSE CHOKE</li><li>• HOT STARTING, HALF-OPEN THE CHOKE</li></ul>	<ul style="list-style-type: none"><li>• THE CHOKE FULL OPEN AFTER STARTING</li><li>• OFTEN RINSE AIR CLEANER</li><li>• FILL UP THE ENGINE OIL WHILE ADDING THE FUEL</li><li>• SHUT DOWN AFTER IDLE 5 MINUTES</li><li>• THE MACHINE CAN TINCLINE BACK WARD 20 DEGREES</li></ul>

# Content

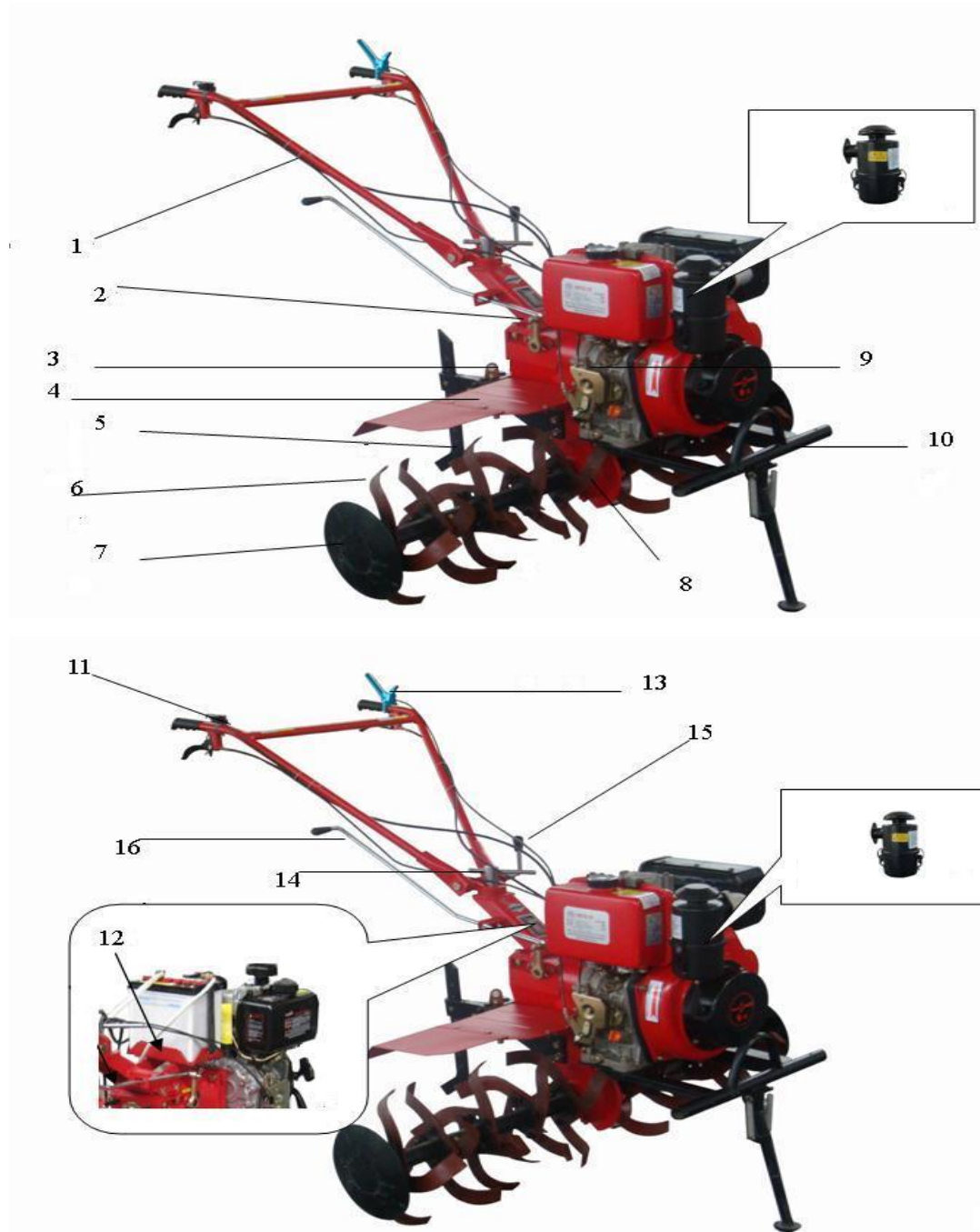
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# Chapter One A Survey on Power tiller

## I. Main Technical Parameter

Item	Parameter		Model	Unit	TM1050	TM1250	TM1350B
Engine	Model /Name				178F Diesel engine	186F Diesel engine	188F Diesel engine
	Rated Power			kW	6.0	7.1	8.0
	Power			HP	6	9	12
	Rotating speed	Rate rotating speed			3600		
		Rotate speed of power output shaft			3600		
	Displacement			ml	296	406	438
	Ignition mode				Compression ignition		
	Start mode				Recoil	Recoil starter	Recoil starter
	Fuel tank capacity			l	3.5	5.5	5.5
	Engine oil capacity			l	1.1	1.65	1.65
	Requirement of battery (lead-acid battery)	Voltage			12V	12V	12V
		20 hours power capacity			36A	36A	36A
Power Tiller	Machine's dimension(length×width×height)			mm	1030×560×870	1150×560×870	1150×560×870
	Machine's weight			kg	≤105	≤120	≤120
	Transmission mode				Full gear transmission		
	Connection mode				Direct connection		
	Speed	Running speed	Fast		10	10	10
			Slow		5	5	5
		Working Speed	Cultivating	km/h	0.5-1.3	0.5-1.3	0.5-1.3
			Plowing farming				
		Reversing speed			2	2	2
	Blades	Rotate speed		r/min	115	129.78	129.78
		Max. radius of gyration		mm	188	180	180
		Total blades quantity		pcs	38	38	38
		Total groups of blades		pcs	10	10	10
		Blades for each group		pcs	4×4+3×1	4×4+3×1	4×4+3×1
		Distance between 2 neighbouring faces are cut		mm	150	150	150
		Diameter of the farming blades		cm	36	36	36
	Rotary blade type				Bent blade for dry land		
	Clutch mode				Wet multiple disc clutch land manual control		
	Tilling Depth			cm	≥10	≥10	≥10
	Tilling Width			cm	105	135	145
	Working efficiency			h m <sup>2</sup> /h	0.053-0.099	0.066-0.133	0.066-0.133
	Consumption fuel			kg/h	≤1.20	≤1.50	≤1.50
	Gear-box's oil capacity			L	2.4	2.4	2.4
	Sound pressure level			dB(A)	≤86	≤86	≤86
	Sound power level			dB(A)	≤93	≤93	≤93

## II. General View



- |                                    |                                      |
|------------------------------------|--------------------------------------|
| 1. Handle Bar                      | 10. Bumper                           |
| 2. Gear-box Assy.                  | 11. Throttle Switch                  |
| 3. Adjustment Screw                | 12. Battery base                     |
| 4. Fender                          | 13. Safety Device ( Dead-man Handle) |
| 5. Deep Furrowing Resistance Stick | 14. Locked handle (up & low)         |
| 6. Rotary Blade                    | 15. Locked handle (left & right)     |
| 7. Side Disc                       | 16. Shifting Bar                     |
| 8. Stepped Box Assy.               |                                      |
| 9. Diesel Engine                   |                                      |

## Chapter Two Main Applications of Power tiller

### I. Cultivating

Fix the cultivating device onto the left and right side of the transmission shaft of the running part of the power tiller, then use two M8×55 screw bolts for axial positioning. After that, the machine can start cultivating finally. (See the following table 2 and 2,3)

Form of cultivating devices	Four groups		Five groups	
	3 blades	4 blades	3 blades	4 blades
No. of rotary blades	3×8	4×8	3×10	4×10
Width of cultivating (mm)	1050		1350/1450	
Applicable earth	Paddy filed without enough water and with Earth of high viscosity	Hard earth	Wet earth after rain	Dry land or it remains long stump for long-stem. Crop.

Figure 2. Cultivating device

Figure 3. Ditching device



### II Ditching & Ridging

Knock down the adjustment screw before the ditcher is fixed. Subject to the adjustment of the width and height for ditcher, then the ditching can be conducted. (see figure 3)

### III Short Distance Transport

when fixing the forearm of the wagon box on the trailer and wheels on the transmission shaft of the running part, the machine can do a transportation . The rated load is 250kg, under normal rotated speed of the diesel engine, speed of the fast shift is about 10km/h and that of the slow shift is about 5 km/h.

#### IV Multi-Functional Working

Dismount protection cover of the gear-box (No.2 in Figure 1), unscrew the bolts away from the rear part of the main shaft, take the cover for keys out of shaft, fasten the self-contained belt pulley or coupling onto the gear-box's main shaft's rear part with screws. Type A of common V belt is adopted for belt pulley's cross section. Rated rpm of the belt pulley is 3000 rpm. When the corresponding devices are equipped, pumping water, spraying, threshing, reaping, generating electricity, etc are realized. (Above additional implements are in exploration process. Please contact with the local distributor if you need above implements.)

### Chapter Three Operation & Use Method of Power tiller

#### I. Assembly After Unpacking (see Figure 4)

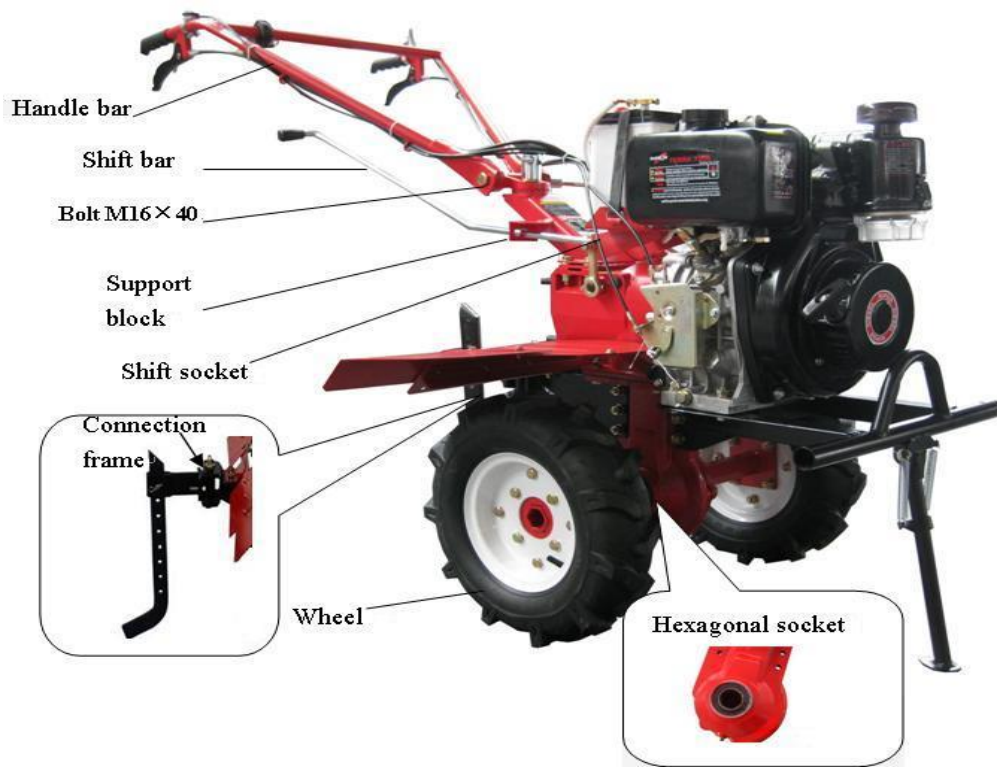
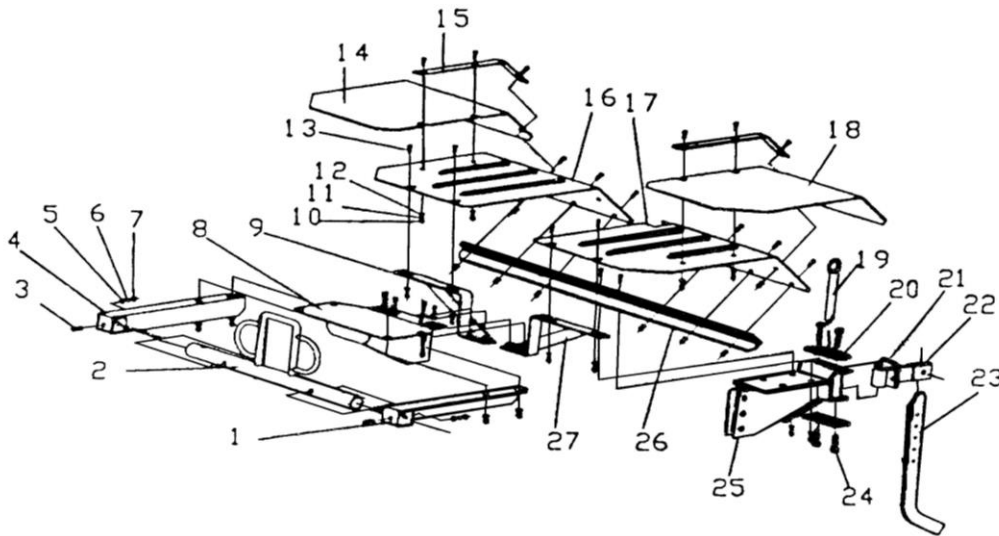


Figure 4

1. Fix the main machine, insert the hexagonal output shaft into stepped box's output casing's hexagonal hole.
2. Fix the hexagonal stop casing onto the hexagonal output shaft with M6 x 6 socket head screws, and make the hexagonal shaft not move axially.
3. Wheel fixing: fix the wheels at the two sides of the Hexagonal output shaft, and fix them with two

M8×55 bolts and M8 nuts.

4. Trailer fixing: Fix the link group onto the trailer, use the link shaft assembly for connection, insert the split pin  $\varnothing 3 \times 26$  and insert the velocity adjustment screw into square groove of the link group, and fix it with M8×55 bolts and nuts.
5. Handle bar fixing: Two gear discs of the handle bar support aim at the discs of the handle bar support base, and adjust the positions. Fix them with M16×140 bolts, flat gasket 16 and spring gasket 16.
6. Shifting bar assembly: Get the shifting bar through the groove of shift support in the handle bar support base, and insert it into the hole of the shift casing, then fix it with split pin  $\varnothing 3.2 \times 16$ . set the shifting bar in neutral position.
7. Assembly drawing of safety protection guard install.



- |   |                                      |
|---|--------------------------------------|
| 1. BRACKET OF COLLISION BUMPER(LEFT)        | 15. FIFTY OF SAFETY PROTECTION GUARD |
| 2. BRACKET OF COLLISTION BUMPER(FRONT)      | 16. SAFETY PROTECTION GUARD(RIGHT)   |
| 3. BOLT M8 (BG5781-86)                      | 17. SAFETY PROTECTION GUARD(LEFT)    |
| 4. BRACKER OF COLLISION BUMPER(RIGHT)       | 18. FENDER FOR PADDY FIELD(LEFT)     |
| 5. NUT M8(GB41-86)                          | 19. DOWEL                            |
| 6. SPRING WASHER $\varnothing 8$ (GB93-87)  | 20. CONNECTING PLATE                 |
| 7. WASHER $\varnothing 8$ (GB95-85)         | 21. BOLT M8×50(GB5781-86)            |
| 8. STAND (DIESEL)                           | 22. CONNECTOR JOINTING ASSEMBLY      |
| 9. BRACKET(RIGHT)                           | 23. DEEP FURROWING RESISTANCE STICK  |
| 10. NUT M6(GB41-86)                         | 24. BOLT M8×25(GB5781-86)            |
| 11. SPRING WASHER $\varnothing 6$ (GB93-87) | 25. BULLING SET (TROUGH COMP 16mm)   |
| 12. WASHER $\varnothing 6$ (GB95-85)        | 26. BRCRET OF FENDER COMP            |
| 13. BOLT M6×10(GB5781-86)                   | 27. BRACKET (LEFT)                   |
| 14. FENDER FOR PADDY FIELD (RIGHT)          |                                      |

**ATTENTION:** After maintenance the safety protection guard installment must fix it on the power tiller wholly

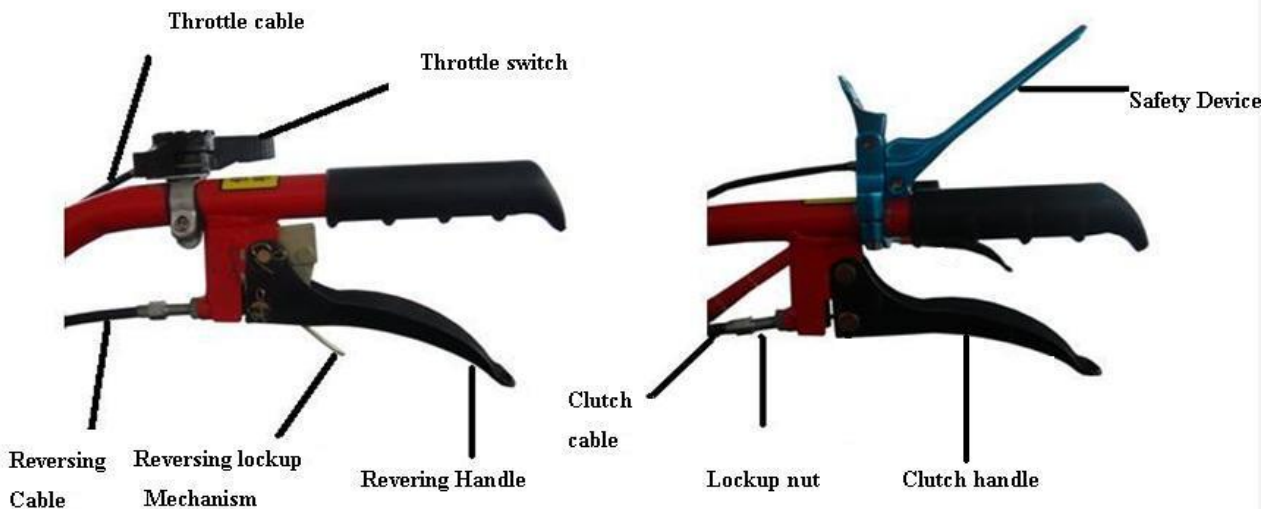


## II. Installation and Adjustment for cable

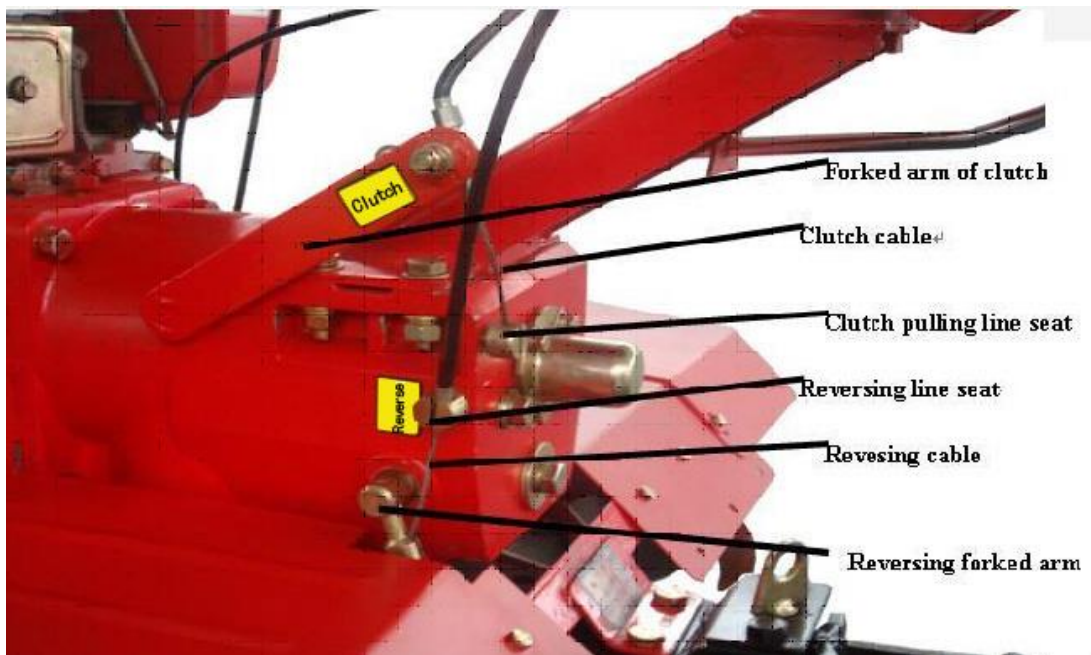
1. Adjustment of the clutch cable. (See Figure 5 and 6)

- ① Unscrew the locknut of the tie rod
- ② Spin the tie rod clockwise until the exposed handle support is the shortest.
- ③ Get the joint of cable into the clutch wire socket of rear part of the gear-box assembly, and ensure the joint of cable goes into the hole of the socket.

**Figure 5**



**Figure 6**



- ④ Get the wire into the M8 hole on base of the clutch fork arm, properly press the fork arm of the clutch, and put the joint of cable into the wire socket.

- ⑤ Unscrew the tie rod, grasp and loosen the clutch handle until the spring force in the clutch can reset the handle, then screw the locknut.

## **2. Adjustment of the reversing gear cable(See Figure 5 and 6)**

- ① Unscrew the locknut of the tie rod.
- ② Spin the tie rod clockwise until the bare handle support is the shortest.
- ③ Get the cable into the reversing fork shaft besides the gear-box, and ensure the joint of cable goes into the hole of the fork shaft.
- ④ Properly pull the reversing fork shaft counterclockwise, get the cable into the narrow gap of the reversing wire socket besides the gear-box, and ensure the pipe head goes into the hole of the wire socket.
- ⑤ Unscrew the tie rod, grasp and loosen the clutch handle until the spring force in the clutch can reset the handle, then screw the locknut.

## **3. Adjustment of the throttle cable (See Figure 7)**



- ① shift the throttle switch clockwise to minimum positioning.
  - ② Get wire of the throttle cable into the threading base and firm base on top of the throttle adjustment board of the diesel engine.
  - ③ Tighten the wire, screw the binding bolts on the firm base.
  - ④ Adjust the throttle switch repeatedly until the throttle handle on the oil valve adjustment board can reach the maximum and minimum position.
4. Detailed information for the installation and adjustment of cable, refer to the disk attached.

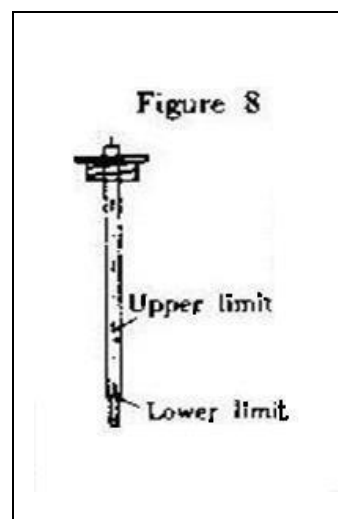
### III Check and Refueling

1. Check whether all the connection bolts are loose or not, and fix the connection bolts according to the moment of force listed in table 3. (Refer to the instruction manual for diesel engine for the screwing moment of force bolt and nut respectively)

Name of parts	Moment of force (N.M)
Flange and the diesel engine	20-25
Flange and the gear-box	35-40
Binding bolts of end of driving shaft of gear-box	10-12
Binding bolts of reversing gear shaft of gear-box	26-40
Binding bolts between engine support and traveling mechanism	35-40
Binding bolts of cover of the traveling mechanism	10.6-15
Binding bolts of trailer of the traveling mechanism	50-60
Connection bolts between traveling mechanism and gear-box	35-40
Trailer unit	45-60
Set bolts of the diesel engine base	35-40
Set bolts of the handle support base	35-40

2. Check each handle of the manipulation system (throttle switch, clutch, shifting bar and reversing bar) to see whether they can move freely or not. If they are out of the right positions, make them at the right positions.
3. Pull shift bar of the gear-box to the neutral position.
4. Refilling the engine oil

- ① Refill the SAE10W-40 lubricant into the crankcase of the diesel engine. See Figure 9 for details.
- ② Make the whole machine stable and horizontal, and refilling 20 # lubricant engine oil into the gear-box from oil hole at the top of the gear-box .when check the oil level, put the oil dipstick into the oil .(Note: not to turn the dipstick around), the oil level should be between the two limits of the oil dipstick. (refer to figure 8)



- ① Knock down the lower cover of the air cleaner, refill about 0.1 litre 20# engine oil into the air cleaner.
  - ② Select the appropriate lubricant for the diesel engine according to the environmental temperature. (See figure 9)
4. Refill 0# or -10# or -20# light diesel into the diesel engine.(See the instruction manual of the diesel engine for details)

**Note: do not exceed the mark when refilling.**

5. Make pre-starting preparations according to the instruction manual.

#### IV. Starting

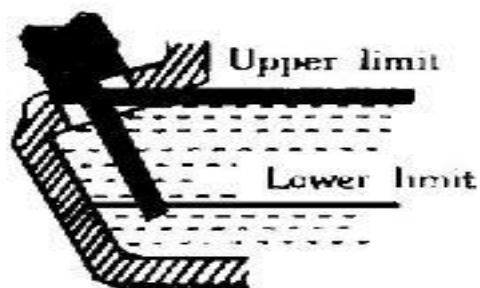
(Note: the shift bar must be on the neutral position)

1. Start the diesel engine according to the procedures stipulated in the instruction manual for the diesel engine.
2. The diesel engine should run at a low speed (1500-2000 rpm) under no load for 2-3 minutes.
3. Check whether the diesel engine runs normally or not. If it is abnormal, stop the engine and have a check.

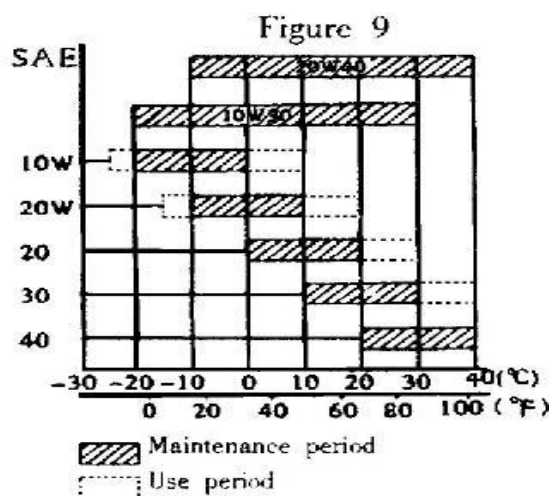
**V. Operation** (Note: breaking-in must be performed before the use of power tiller, see the breaking-in method in chapter Four)

##### Entrance of lubricant:

Fill in machine oil from oil month when diesel engine is placed level, and checking the oil level only needs a poke by dipstick rather than a rotation of dipstick



Model	178F	186F	188F
Litre(British gallon)	1.1(0.24)	1.65(0.36)	1.65(0.36)



Classification of maintenance for

P.I. diesel engine

Lubricant shall be grade CC or CD

1. Using a slow shift
  - ① The left hand grasps the clutch handle tightly and makes the clutch separated.
  - ② The right hand pulls the shift bar backwards, make sure the shift casing locates in the slow shift position, and observe whether it reaches the right position or not. Then the right hand grasps the right handle.(Note: do not grasp the reversing bar)
  - ③ Loosen the clutch handle gradually, the clutch will combine, and the power tiller can run at a slow speed.
  - ④ The right hand increase the throttle properly, the motor can run at a speed of 5 km/h
2. Using a fast shift
  - ① The left hand grasps the clutch handle tightly and makes the clutch separated.
  - ② The right hand pushes the shift bar forwards, make sure the shift casing locates in the fast shift position, and observe whether it reaches the right position or not. Then the right hand grasps the right handle. (Note: do not grasp the reversing bar)

③ Loosen the clutch handle gradually, the clutch will combine, and the power tiller can run at a fast speed.

④ The right hand increase the throttle properly, the motor can run at a speed of 10 km/h.

### 3. Using a receiving shift

① The left hand pulls grasps the clutch handle tightly and makes the clutch separated.

② The right hand pulls or pushes the shift bar to the neutral shift and observe whether it reaches the right position or not. The forefinger of right hand grasps the trigger of the reversing shift first, then the right hand grasp the reversing handle.

③ Loosen the clutch handle gradually, the clutch will combine, and the power tiller can run backwards.(Note: do not loosen the reversing handle)

④ When the backward running of the machine is not needed, the left hand holds the clutch handle gradually, and the right hand loosens the reversing handle.

4. Shift when the machine is running, reduce the oil valve of the diesel engine (but subject to the diesel engine's not quenching), then makes the clutch separated. When the machine stops running, then shift.

5. Change directions: pull the handle to left or right to make the machine turn left or right. (Note: pulling the wrong handle may lead to damage to the gears)

### 6. The operation method of recoil/electric starter and safety device

① Left hand close upon the red emergency stop handle with the handle bar; draw back the clutch handle with your middle finger and ring finger at the same time. The above two locks mutual locking cause the engine at the condition which may start. And now, the operator can recoil –start the engine by hand according to the indication of instruction manual.

② If the engine is electric-starting model, carry out following two steps.(step2,3 are not suitable for recoil start engine) connecting well the power supply and control switch as the electric start hookup(or connect it beforehand). If the power tiller without power supply, you should prepare a lead-acid battery accord with direct current 12V, 36AH.

③ Clockwise turn the starting-key to the start position after inspects unmistakably, and then release the key after the engine started, it will return to the primary position automatically.

④ Adjust the throttling cock to the right position after the engine started.

⑤ Fasten upon the handle bar(Grasp the emergency stop handle and the handle bar with your left hand), and buckle the trigger of emergency stop lock come out from the clutch handle gently by your middle finger, the clutch handle restoration adown, then the clutch switch on, and the machine start to work. You should grasp the emergency stop handle and handle bar all the while in whole working course.

⑥ Meet emergency, release the emergency stop handle and handle bar, the engine will flameout and the machine will stop working immediately.

## 7. Stop the machine

- ① Grasp the clutch handle, and make the clutch separated.
- ② Pull the shift bar to the neutral position, loosen the clutch handle, switch the oil switch clockwise to the minimum position, the machine will stop.
- ③ When stopping the diesel engine is needed, the stopping should be conducted according to relative contents in the instruction manual. (Note: stopping the machine is generally conducted on the flat ground)

## VI. Connection use of Auxiliary Devices & Tools

1. When cultivating is needed, knock down the wheels, fix the hexagonal union of the cultivating device onto two ends of the hexagonal shaft of the running part, and axially fix them with M8×55 bolt. Note: cultivating blades are divided into two groups, namely, the left and the right. Fixing the blades should guarantee that when the machine is running, the blade edge should work first. After fixing the blades, also fix the left and right protection board for safety purpose. Depth of the cultivating can be realized by adjusting height of the velocity adjustment screw and angles between the lever and the ground ( refer to table 4).
2. Cultivating for paddy field: when the submerged depth of human's feet in the paddy field is less than 25cm, bent blades for wet land can be directly used for the cultivating of paddy field.



Deep Furrowing Resistance Stick

3. When ditching is needed, unlade the Deep Furrowing Resistance Stick, fix the ditcher, adjust width & height of the ditcher, then ditching can be conducted.( See Figure 3)

Width scope of ditching : 14cm-40cm

Depth scope of ditching: 11cm-25cm

4. Short distance transport

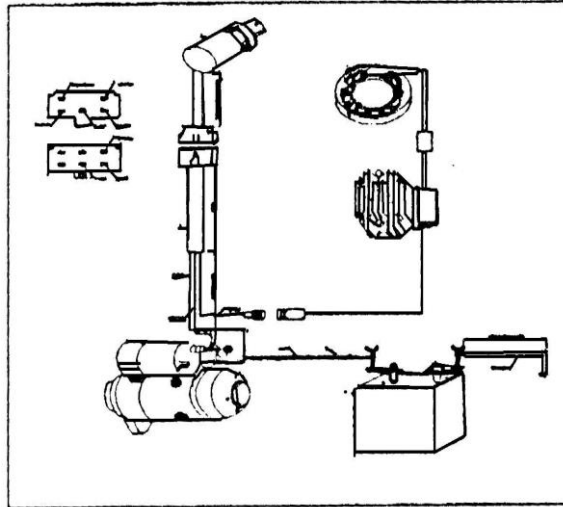
Fix forearm of the wagon box on the trailer and wheels on the transmission shaft of the running part, the machine can do a transportation job. The rated load is 250kg, under normal rotated speed of the diesel engine, speed of the fast shift is about 10 km/h and that of the slow shift is about 5km/h.

5. Multi-functional working

Knock down protection over of the gear-box (No.2 in Figure 1), unscrew the bolts away from the rear part of the main shaft, take the cover for keys out of the shaft, fasten the self-contained belt pulley or

coupling onto the gear-box's main shaft's rear part with screws. Type A of common V belt is adopted for belt pulley's cross section. Rated rpm of the belt pulley is 3000 rpm. When the corresponding devices are equipped, pumping water, spraying, threshing, reaping, generating electricity, etc are realized.

#### 6. Hookup, Electric Starter



### VII. Training

1. Read the instructions carefully. Be familiar with the controls and the proper use of the equipment.
2. Never allow children or people unfamiliar with these instructions to use the machine. Local regulations can restrict the age of the operator.
3. Never work while people, especially children, or pets are nearby.
4. Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.

### VIII. Preparation

1. The safety protection guard must be attached to the machine before using.
2. Check that the blade and fender are correctly assend and securely fastened.
3. While working, always wear substantial footwear and long trousers. Do not operate the equipment when barefoot or wearing open sandals.
4. Thoroughly inspect the area where the equipment is to be used and remove all objects which can be thrown up by the machine.
5. WARNING-Diesel is highly flammable:
  - store fuel in containers specifically designed for this purpose
  - refuel outdoor only and do not smoke while refueling.

---- add fuel before starting the engine. Never remove the cap of the fuel tank or add diesel while the engine is running or when the engine is hot.

----if diesel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until diesel vapours have dissipated.

----Replace all fuel tank and container caps securely

6. Replace faulty silencers

7. Before using, always visually inspect to see that tools are not worn or damaged. Replace worn or damaged elements and bolts in sets to preserve balance.

## **IX. Operation**

1. Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.

2. Work only in daylight or in good artificial light.

3. Always be sure of your footing on slopes

4. Walk, never run with the machine.

5. Exercise extreme caution when changing direction on slopes

6. Do not work on excessively steep slopes

7. Use extreme caution when reversing or pulling the machine towards you

8. Do not change the engine governor setting or over speed the engine.

9. Start the engine carefully according to manufacturer instructions and with feet well away from the tool(s).

10. Do not put hands or feet near or under rotating parts.

11. Never pick up or carry a machine while the engine is running

12. Stop the engine

----whenever you leave the machine

----before refueling

13. Reduce the throttle setting during engine shut down and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of working

## **X. Matters Need Attention During The Use of power tiller**

1. Pay attention to working situations and sound of each part during the work, check whether the connection between different parts is ok or not, loose situations are not allowed. If abnormalities are found, stop the machine and solve the problems.

2. A cold machine is forbidden to do heavy load work immediately after the machine is just started,



especially for the new machines or the ones after overhaul.

3. Pay attention to checking the oil levels of the diesel engine and gear-box. Refill the engine oil when it is not enough
4. It is not allowed to cool the diesel engine by watering.
5. Be cautious about the machine's tilting when farming.
6. The machine fixed with cultivating blades is forbidden to run on sandy or stony place.
7. After using the machine for farming, pay attention to cleaning dirt, weeds and smear on the surface of the machine and keep the machine clean.
8. Clean the sponge or the wire mesh in the air cleaner frequently, and change the engine oil. (Keep an eye on the marking on the empty air cleaner)

## **XI. Safety Considerations**

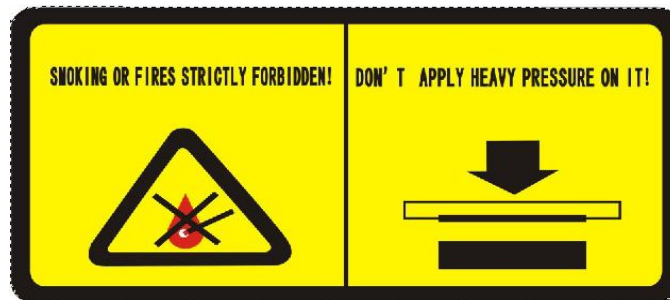
1. Muffler is a high temperature spare part, do not touch the power tiller in work or out of work freshly.



2. When the power tiller is working, keep an eye on the rotary parts, do not be too close to the machine to avoid being hurt by the rotary blades.



3. Keep the components of oil box away from fire and smoke.



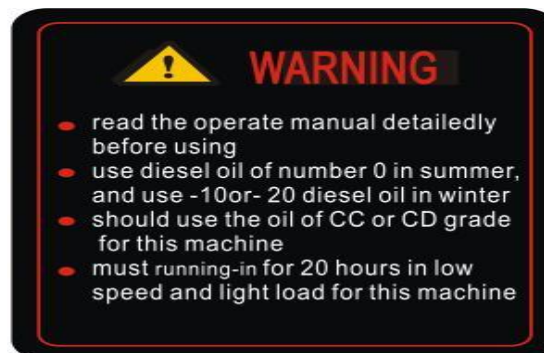
4 . Keep this machine stabilization before use and read the instruction carefully



5. Please refuel in time



6. Please pay attention to warning signs



## **Chapter Four Maintenance & Service Method of power tiller**

During the working period of the power tiller, due to the change of running, abrasion and loading, phenomena of bolts loosening and parts wearing are inevitable, these phenomena lead to the malfunction of the system, abnormalities of clearances, declination of engine power, more oil consumption, malfunction of each part, more failures of the machine, and the problems affect the normal use of the power tiller. To reduce chances of troubles, it is better to do a strict and regular maintenance job which emphasizes precaution to keep a good performance and extend its working life.

### **I . Breaking-in**

1. Refer to the instruction manual for the breaking-in of the diesel engine
2. As for a new or overhauled power tiller, it should be working for 1 hour under no load or 5 hours under light load, then drain all the lubricant from the gear-box and crankcase of the diesel engine, refill appropriate fix of clean diesel, and clean them at a slow speed for 3-5 minutes, then drain the diesel off. Refill engine oil into them according to 4/Clause Three / Chapter III to enter four hours breaking-in, then the machine can work.

### **II Maintenance and storage.**

1. Keep all nuts, bolts and screw tight to ensure the equipment is in safe working condition.
2. Never store the equipment with diesel in the tank inside a building where fumes can reach an open flame or spark.
3. Allow the engine to cool before storing in any enclosed place.
4. To reduce the fire hazard, keep the engine, muffler, battery compartment and diesel storage area free of vegetative material and excessive grease.
5. Replace worn or damaged parts for safety.
6. If the fuel tank has to be drained, this shall be done outdoors
7. After adjustment or maintenance, the safety protection guard must be attached to the machine.

### **III Technical Service of Power Tiller**

Clause One Maintenance by each work shift (conducted before and after each shift)

1. Listen and observe if there are any abnormalities of each part (such as abnormal sound, overheating and bolt loosening)
2. Check if there is oil leakage in diesel engine, gear-box and Traveling box.
3. Check if the oil levels of the diesel engine and gear-box are between the two extremes of the oil dipstick.
4. Timely clean the mud, weeds and smear on the machine and its parts.
5. Keep a good farming record.

Clause Two the first-rate service (every 150 working hours)

1. Do all the things listed for each work shift maintenance.
2. Clean the gear-box and Traveling box, and change the engine oil.
3. Check and adjust the clutch, shift system and reversing gear system.

**Clause Three The second-rate maintenance (every 800 working hours)**

1. Do all the things listed every 150 hours for service.

2. Check all the gears and bearing, replace with new ones if serious abrasion is found.
3. Other parts of the power tiller, like cultivating blade or connection bolts .if damaged, replace with new ones.

#### **Clause Four Technical overhaul (every 1500-2000 working hours)**

1. Take the machine apart in the local special service center, clean and check the machine, then replace or repair the seriously- attrited part.
2. Specialized service men are invited to check the friction piece and clutch.

**Clause Five About the maintenance of the diesel engine, refer to the instruction manual of the diesel engine.**

#### **IV Technical Service List of Power tiller**

(The mark O means the required service)

Work Interval Items to service	Every day	8 hours under half load	The 1 <sup>st</sup> month or after 20 hours	The 3 <sup>rd</sup> month or after 150 hours	Every year or after 1000 hours	Every two years or after 2000 hours
Check and screw bolts and nuts	O					
Check and refill engine oil	O					
Clean and change the diesel		O (the 1 <sup>st</sup> time)	O (the 2 <sup>nd</sup> time)	O (the 3 <sup>rd</sup> time)		
Check oil leakage	O					
Clean dirt, weeds and smear to keep clean	O					
Troubleshooting	O					
Adjust the control parts	O					
Friction piece of the clutch						O
Gears and bearings					O	
Clean Air Filter Oil	O					

#### **V Long-Term Storage of Power tiller**

When the power tiller needs a long-term storage, the following measures should be adopted to avoid rust.

1. The instruction manual of diesel engine requires to seal the diesel engine up for keeping purpose.
2. Clean dust and dirt away from the surface of the machine.
3. Drain the lubricant from the gear-box and add new lubricant into it.
4. Paint anti-rust oil on the non-painted area of the non-aluminum surface
5. The machine should be kept in a ventilated, dry and soft place.
6. Keep well the self-contained tools, conformity certificate of product and instruction manual.

## Chapter Five Debugging Method of Power tiller

### I . Debugging Method of Mesh of Bevel Gear

When the abnormal transmission of mesh of bevel gear of sound is confirmed, stop the machine and check as stipulated below:

1. Clearance adjustment of mesh of angel gear in gear-box ( See Figure 10)

① When lateral clearance of mesh of the gear  $\Delta < 0.05\text{mm}$ , we should put some vulcanized paper to enlarge the clearance between the gear-box and the traveling box.

② When lateral clearance of mesh of the gear  $\Delta > 0.3\text{mm}$ , we should reduce the clearance to 0.05-0.10 mm between the bearings and gear II shaft

2. Clearance adjustment of mesh of the gear in the running case.(See Figure 11)

① When lateral clearance of mesh of the gear  $\Delta < 0.05\text{mm}$ , we should increase adjustment pad I by 0.2-0.3mm to enlarge the clearance, and change vulcanized paper board II and adjustment pad. III. To ensure the axial clearance of the gear II is 0.05-0.15mm.

② When lateral clearance of mesh of the gear  $\Delta > 0.3\text{mm}$ , we should reduce adjustment pad I, meanwhile the axial clearance of gear II is 0.05-0.15mm, or increase the adjustment pad II, meanwhile ensure the axial clearance of gear I is 0.05-0.15mm.

### II . Debugging Method of Reversing Gears and Cables

When the power tiller's running backwards is not normal, it is necessary to adjust the reversing gears and Cables, see Chapter Three for the methods.

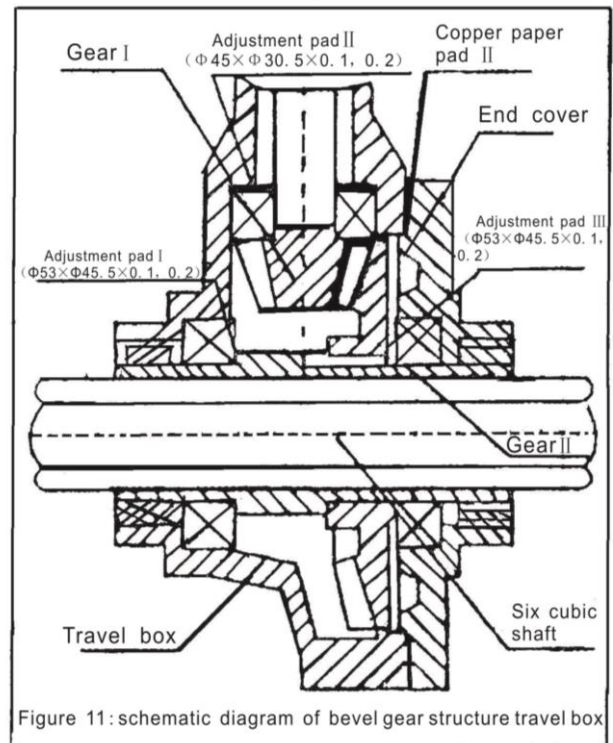
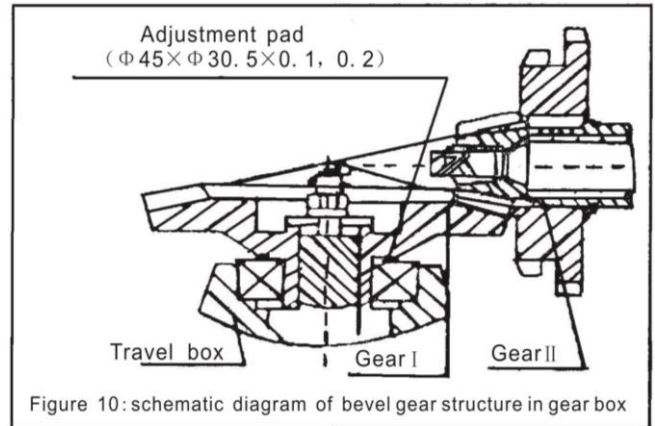
Note: 1. Grasp and loosen the reversing handle for 2-3 minutes to confirm the putting into gear. If it is abnormal, adjust it until it is qualified.

2. When the power tiller is running, loosen the reversing handle, the reversing gears should return to its original position and no abnormal sound by gears colliding in the gear-box, otherwise, it may cause damage to the gear.

### III Debugging Method of Clutch Cables

After some time use, the clutch does not perform well any more due to the weariness of friction piece and fork of clutch. As for how to adjust cable of the clutch, refer to Chapter Three for know-how.

Note: 1. Grasp and loosen the clutch handle for 2-3 times to confirm the clutch status. If abnormal, readjust it.



2. If repeated adjustment can not solve the problem, excess abrasion of fork or friction piece of the clutch can be confirmed. The machine should be sent to special service centre for replacing with a new fork or friction piece of the clutch.

3. Dismount the clutch by unspecialized person, which may cause damage to the clutch and the machine is forbidden.

#### **IV. Debugging Method of Accelerator Cables**

When spinning the throttle switch, acceleration or deceleration performance if the diesel engine is not good, adjust the throttle switch. Refer to Chapter Three for measures.

Note: 1. Repeatedly spin the throttle switch for 2-3 times and confirm whether the acceleration or deceleration performance of the diesel engine is ok.

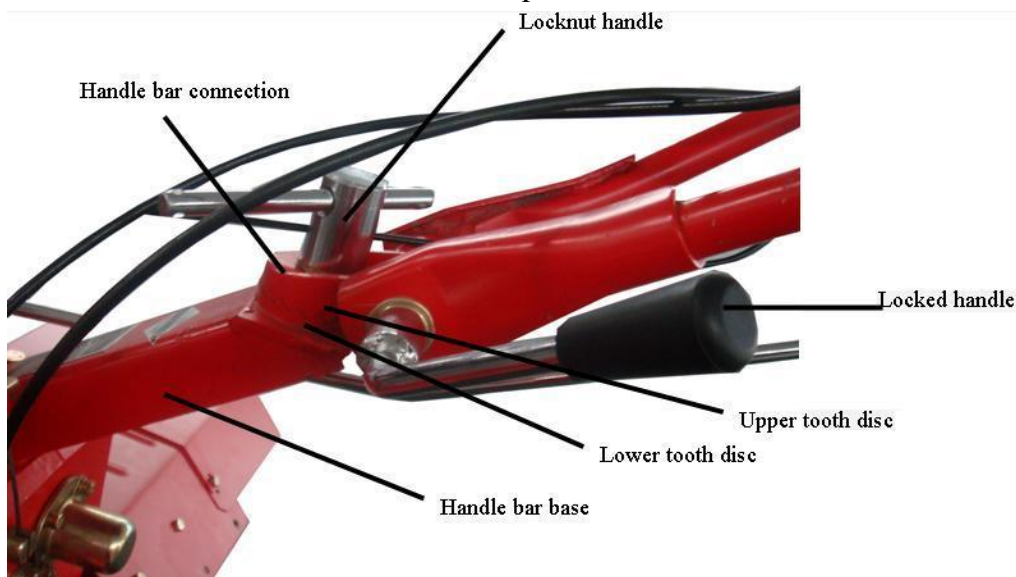
2. Joint of the cable must be firmly connected to the throttle cable.

#### **V. Use & Debugging Method of Handle bar Frame**

According to your height, farming and other special requirements ,the handle bar connection can be adjusted up and down, left and right appropriately, measure are interpreted as following: (see figure 12)

1. The up and down debugging for the handle bar connection

① Unscrew the Locked handle of the handle bar connection, and make the terminal tooth between the handle bar connection and the handle bar base separated.



② Select the best position for the handle bar connection according to your height and likes.

③ Then spin the handle to make the terminal teeth between the handle bar connection and handle bar base engage well with each other.

2. The left and right debugging for the handle bar connection.

① Unscrew the locknut handle of the handle bar base and the upper and lower terminal teeth.

② Spin the handle bar left or right to the desired position.

③ Then screw the locknut handle to make the higher and lower terminal teeth of the handle bar base engage well with each other.

# Chapter Six Troubleshooting of Power Tiller

## I . Troubleshooting of Diesel Engine.

Refer to the instruction manual of diesel engine.

## II . Troubleshooting of Clutch

(Note: do not dismount the clutch assembly by yourself. Contact our company or our dealers to shoot the troubles marked with ※

Symptom	Cause	Terms of settlement
The clutch fails to clutch	Failure of the clutch handle	Repair or replace
	Damage of the clutch Cables	Replace
	Fork not in the right position	Re-adjust the cable or replace the fork
	Welding points between fork shaft and arm base break off	Repair or replace
	Fork pin is bent or broken	Replace the fork pin
	※Malfunction of the friction piece	Replace
	※Malfunction of spring	Replace
	The friction piece fails to touch the bearing face of the clutch cover	Add some adjustment pads to the back of the bearing
	Bearing is burnt in the clutch	Replace Pay attention to refilling engine oil into the gear-box
Skid around (after loosening the clutch, the diesel engine runs normally, but the main shaft of the transmission shaft stops running or runs slowly)	※The spring does not function due to tiredness	Replace
	Fork shaft's failure to turn around freely makes the fork fail to reset completely	Clean the combined face between positioning shaft and pushing plate to make the fork move freely.
	Cable adjustment is not right	Re-adjust the clutch Cables.

## III. Troubleshooting of Gear-box

Symptom	Cause	Terms of settlement
Failure of fast, slow and neutral shift	Bolts and nuts for the main shaft are loose	Dismount the bolts, keys cover at the back of the main shaft, screw the round nuts tight, then fix back the bolts and keys cover and screw them tight
Failure to shift to the right	Excess abrasion of puller	Replace the puller

position	Driving angle gear is loose	Tighten the round nuts
	Excess abrasion of the upper hole in the connection piece of support arm	Replace the support arm assembly
	Positioning spring inside the main shaft does not function	Replace
	Main shaft is moving ,the bolts for tightening the cover for the rear of the gear-box body are loose	Screw the bolts tight
	Deformation of shift bar brings about interference when you shift	Adjust the shift bar or Replace it
Failure to shift the reversing shift to the right position	Abrasion of reversing fork	Re-adjust the cable of reversing shift Replace the reversing fork
	Malfunction of reversing cable	Re-adjust the cable Replace the cable
	the reversing shaft is loose	Screw the bolts tight at the back of the reversing shaft
	The reversing fork is blocked to a standstill	Clean the combined face between reversing fork and reversing pushing plate to make the fork move freely
The reversing gears do not reset	The loosening of reversing shaft makes the gear be blocked to a standstill	Screw the bolts tight at the back of the reversing shaft.
	Malfunction of spring of the reversing shaft	Replace the spring
	The reversing shaft is bent and deformed	Replace the reversing shaft
The reversing shaft is loose	Rear bolts of reversing shaft are loose	Screw the reversing shaft
	The matching between reversing shaft and gear-box body is too loose	Replace
Too much noise from the gears	Deformation and bend of the angle gear and reversing shaft	Replace
	Too much lateral clearance due to excess abrasion of gears	Replace the gears
	The matching between bevel gear and reversing shaft and gear-box body is too loose	Replace
Oil leakage of the main shaft's rear cover	Malfunction of O-shaped ring for the main shaft	Replace with O-shaped ring $\phi 17 \times 1.8$
	Malfunction of lip-shaped oil seal in the main shaft	Replace with lip-shaped oil seal B25407
	Malfunction of O-shaped ring for the cover	Replace with O-shaped ring $\phi 46 \times 1.8$
Oil leakage of the reversing shaft	Loosening of bolts at the back of reversing shaft	Screw the bolts tight
	Malfunction of O-shaped ring of the reversing shaft	Replace with O-shaped ring $\phi 18 \times 1.8$
Oil leakage of the fork shaft	Malfunction of O-shaped ring	Replace with O-shaped ring $\phi 1.2 \times$



of the reversing shaft		1. 8
Oil leakage of the fork shaft of the clutch	Malfunction of O-shaped ring	Replace with O-shaped ring $\phi 1.2 \times 1.8$
Oil leakage of the shift shaft	Malfunction of O-shaped ring	Replace with O-shaped ring $\phi 1.2 \times 1.8$
Oil leakage of the flange connection	The bolts are loose there	Screw the bolts tight
	The vulcanized paper board is damaged there	Replace
Leakage of the gear-box body	The gear-box body has tiny hidden holes	Re-welding or brush base paint to stop the leaking
Oil leakage of the fork shaft of the clutch	Malfunction of O-shaped ring	Replace with O-shaped ring $\phi 1.2 \times 1.8$
Oil leakage of the shift shaft	Malfunction of O-shaped ring	Replace with O-shaped ring $\phi 1.2 \times 1.8$
Oil leakage of the flange connection	The bolts are loose there	Screw the bolts tight
	The vulcanized paper board is damaged there	Replace
Leakage of the gear-box body	The gear-box body has tiny hidden holes	Re-welding or brush base paint to stop the leaking

#### IV. Troubleshooting of Traveling Mechanism

Table 8

Symptom	Cause	Terms of settlement
Too much noise from the gear	Excess abrasion or error repairing of the gear	Re-fix and re-adjust or replace the gear
Gears are blocked to standstill when running	Error fixing	Re-fix
Overheating	No enough lubricant in the box	Re-fill oil according to the request
	The lateral clearance of gear is too small	Re-fix
	The axial clearance is too small	Re-adjust
Oil leakage of the gear-box connection	The connection bolt there is loose	Screw the bolt tight
	The seal gasket there is damaged	Replace with lip-shaped oil seal B45628
The oil leakage of the output shaft casing	The lip-shaped oil seal there is damaged	Replace with lip-shaped oil seal B45628
Serious oil leakage of the hexagonal hole in the output shaft casing	The shaft casing there is broken	Replace

Oil leakage of oil hole	The O-shaped ring there is damaged	Replace with O-shaped ring $\phi 10 \times 1.8$
	The bolts are loose	Screw the bolts tight
Leakage of the Traveling box body	The Traveling box body has tiny hidden holes	Re-welding or brush base paint to stop the leaking

## V Other Troubleshooting

Symptom	Cause	Terms of settlement
The cultivating blade is broken	Collide with the hard things like stones when working	Replace it. Avoid colliding with hard things like stones in the earth when working
The manipulation cable is broken	Long-time abrasion in work	Replace

## Closing

The micro agricultural machine is a labour tool needed in the vast countryside, today, the science and technology is progressing fast and the market economy is developing daily, our company has researched and manufactured this multi-function micro agricultural machine which can replace cows for farming. The practice has proved that, the machine is really an efficient tool for freeing the labour, also a reform of the thousands year long traditional cow ploughing. The phenomenon” start working when the sun is rising, stop working when the sun is going down” will disappear because of the appearing of the machine.

Thank you for buying our power tiller, as long as you use and manipulate the machine carefully according to our instruction manual, you will enjoy obvious economic gains.

Moreover, our company has relative water pumping machines, rice machines, sprinkling machines and generators, etc. If you need any of them, please kindly contact our dealers or our company.

In the future, our company will strive continuously and be go-getting to develop more and better agricultural machining products to change the undeveloped face of agriculture in our country, to make our contributions for shortening the distances between our country and agriculturally developed country, and for our country’s early realization of agricultural mechanization.