

Mantis^{XP}

Tiller/Cultivator **Motobêche-bineuse**



MODEL 7990
MODÈLE 7990

**Operator's Manual and Safety Instructions for
Tiller/Cultivator**

**Manuel de l'utilisateur et consignes de
sécurité pour la motobêche-bineuse**

MAN 430091

Rev. B 10-02-15

OPERATOR'S/PARTS MANUAL
MANUEL DE L'UTILISATEUR / PIÈCES DÉTACHÉES

Welcome to the World of Mantis Gardening

Here's your new MANTIS® XP Tiller . . . the lightweight wonder that's Changing the Way Americans Garden.®

Unlike big tillers, your MANTIS XP Tiller weighs only 35 lbs. (Model 7990). So it lifts easily, handles smoothly, tills and weeds precisely. And, unlike other small tillers, it features serpentine tines that churn soil to ten inches deep. It creates a soft, smooth seed bed, even in problem soil.

It's bigger than a mini tiller and better than a bigger tiller!

Once you know how to use your tiller correctly, we guarantee you'll love it. So first, please read this manual. It shows, step by step, how to use your tiller safely.

ATTENTION MANTIS PRODUCT OWNERS!

Get maintenance tips for your Mantis product on our web site at www.mantis.com

IMPORTANT MESSAGE

Thank you for purchasing this Schiller Grounds Care, Inc. product. You have purchased a world class product, one of the best designed and built anywhere.

This machine comes with Operation and Safety instructions, Parts and Service instructions and Engine instructions. The useful life and good service you receive from this machine depends to a large extent on how well you read and understand these manuals. Treat your machine properly, lubricate and adjust it as instructed, and it will give you many years of reliable service.

Your safe use of this Schiller Grounds Care, Inc. product is one of our prime design objectives. Many safety features are built in, but we also rely on your good sense and care to achieve accident-free operation. For best protection, study the manuals thoroughly. Learn the proper operation of all controls. Observe all safety precautions. Follow all instructions and warnings completely. Do not remove or defeat any safety features. Make sure those who operate this machine are as well informed and careful in its use as you are.

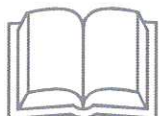
See a Schiller Grounds Care, Inc. dealer for any service or parts needed. Schiller Grounds Care, Inc. service ensures that you continue to receive the best results possible from Schiller Grounds Care, Inc. products. You can trust Schiller Grounds Care, Inc. replacement parts because they are manufactured with the same high precision and quality as the original parts.

Schiller Grounds Care, Inc. designs and builds its equipment to serve many years in a safe and productive manner. For longest life, use this machine only as directed in the manuals, keep it in good repair and follow safety warnings and instructions. You'll always be glad you did.

Schiller Grounds Care, Inc.
1028 Street Road
Southampton, PA 18966-4217
PHONE (800) 366-6268 • FAX (215) 956-3855

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This Operator's / Parts Manual is part of the machine. Suppliers of both new and second-hand machines must make sure that this manual is provided with the machine.

Safety Rules & Warnings

You will notice throughout this Operator's Manual Safety Rules and Important Notes. Make sure you understand and obey these warnings for your own protection.

I. SPECIAL SAFETY INFORMATION

WARNING

Attention: This symbol points out our important safety instructions. When you see this symbol,  heed it's warning!! Stay alert!!

WARNING

To reduce the potential for accidents, comply with the safety instructions in this manual. Failure to comply may result in serious personal injury, and/or equipment and property damage.

II. SAFETY & WARNINGS

WARNING

Improper use or care of this tiller or failure to wear proper protection can result in serious injury. Read and understand the rules for safe operation and all instructions in this manual. Wear hearing and eye protection.

WARNING

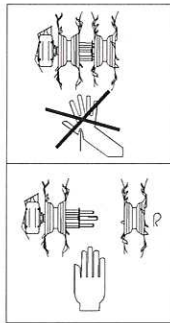
The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

III. SAFETY DECAL INFORMATION

An important part of the safety system incorporated in this tiller are the warning and information decals found on various parts of the tiller. These decals must be replaced in time due to abrasion, etc. It is your responsibility to replace these decals when they become hard to read.



P/N 430057



P/N 400635

Do not reach your fingers and/or hands in between the tine blades

Always remove the outer tines before removing the inner tines



Cutting hazard; keep feet and hands away from rotating tines.



Do not carry the tiller in this position.



Read owner's manual before using tiller, or performing any repair or maintenance. Keep owners manual in a safe place.



Don't operate indoors



Don't fuel, refuel, or check fuel while smoking, or near an open flame or other ignition source.



Incorrect assembly.



P/N 400631



Wear ear and eye Protection.



Caution: when assembling the handles, make sure fuel tank faces away from operator. This is the rear of the tiller, refer to assembly instruction on page 8-9.

⚠ WARNING

If the tiller is used improperly or safety precautions are not followed, the users risk serious injury to themselves and others.
Read and understand this manual before attempting to operate this tiller.

⚠ WARNING

Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrestor is installed. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

IV. WARNINGS - DOS

Read and understand the owner's manual. Pay particular attention to all sections regarding safety.

1. **Always** keep a firm grip on both handles while the tines are moving and/or the engine is running. BE AWARE!! The tines may coast after throttle trigger is released. Make sure tines have come to a complete stop and engine is off before letting go of the tiller.
2. **Always** maintain a firm footing and good balance. Do not overreach while operating the tiller. Before you start to use the tiller check the work area for obstacles that might cause you to lose your footing, balance or control of the machine.
3. **Thoroughly** inspect the area where equipment is to be used and remove all objects, which can be thrown by the machine.
4. **Always** keep area clear of children, pets, and bystanders.
5. **Always** stay alert. Watch what you are doing and use common sense. Do not operate unit when fatigued.
6. **Always** dress properly. Do not wear loose clothing or jewelry, they might get caught in moving parts. Use sturdy gloves. Gloves reduce the transmission of vibration to your hands. Prolonged exposure to vibration can cause numbness and other ailments.
7. **While working**, always wear substantial footwear and long trousers. Do not operate the equipment when barefoot or wearing open sandals.
8. **Always** wear ear and eye protection. Eye protection must meet applicable CE requirements. To avoid hearing damage, we recommend hearing protection be worn whenever using the equipment.
9. **To reduce fire hazard**, keep the engine, and petrol/gas storage area free of vegetative material and excessive grease.
10. **Start** the engine carefully, according to the manufacturer's instructions and with feet well away from tool(s).
11. **Keep** all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
12. **Use extreme caution** when reversing or pulling the machine towards you.
13. **Work only** in daylight or good artificial light.
14. **Always** be sure of your footing on slopes.
15. **Exercise** extreme caution when changing direction on slopes.
16. **Always** keep a safe distance between two or more people when working together.
17. **Always** inspect your unit before each use. Keep all knobs, nuts, bolts and screws tight to be sure the equipment is in safe working condition.
18. **Always** visually inspect to see that the tools are not worn or damaged. Before using your tiller, replace worn or damaged elements and bolts in sets to preserve balance.
19. **Always** maintain and examine your Tiller with care. Follow maintenance instructions given in manual.
20. **Always** store tiller in a sheltered area (a dry place), not accessible to children. The tiller as well as fuel should not be stored in a house.
21. **Always** keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.
22. **Always** remove the outer set of tines before removing the inner set of tines.



Safety Rules & Warnings

V. WARNINGS - DON'TS

Don't use tiller with one hand. Keep both hands on handles with fingers and thumbs encircling the handles, while tines are moving, and engine is running.

Don't run with the machine, walk.

Don't work on excessively steep slopes.

Don't attempt to clear tines while they are moving. Never try to remove jammed material before switching the engine off and making sure the tines have stopped completely.

Don't allow children or people unfamiliar with these instructions to use the machine. Local regulations can restrict the age of operator.

Don't let others operate tiller without proper training.

Don't operate while under the influence of alcohol or drugs.

Don't attempt to repair this tiller. Have repairs made by a qualified dealer or repairman. See that only original Mantis parts are used.

Don't overreach. Keep a good footing at all times.

Don't stand in front of tiller when tines are rotating.

Don't operate tiller with tines having the 3 rods extending from end without having second set of tines attached. Failure to have tines in place will damage tine assembly.

Do not reach your fingers and/or hands in between the tine blades.

Do not attempt to remove the inner tines before removing the outer tines.

WARNING

Handle fuel with care, it is highly flammable. Fueling a hot engine or near an ignition source can cause a fire and result in serious personal injury and/or property damage.

VI. ENGINE/FUEL WARNINGS - DOS

Always use fresh gasoline. Stale gasoline can cause damage.

Always store fuel in containers specifically designed for this purpose.

Always add fuel before starting the engine.

Always replace all fuel tank and container caps securely.

Always pull starter cord slowly until resistance is felt to avoid kickback and prevent arm or hand injury.

Always operate engine with spark arrestor installed and operating properly. The use of spark arrestor mufflers is required by law in the state of California (Section 4442 of the California Public Resources Code), as well as in other

states or municipalities. Federal laws apply on federal lands.

Stop the engine whenever you leave the machine and before refueling. Allow the engine to cool before storing in any enclosure. Replace worn or damaged parts for safety.

If the fuel tank needs to be drained, this should be done outdoors.

VII. ENGINE/FUEL WARNINGS - DON'TS

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

Don't fuel, refuel or check fuel while smoking, or near an open flame or other ignition source. Stop engine and be sure it is cool before refueling.

Don't leave the engine running while the tiller is unattended. Stop the engine when carrying out maintenance and cleaning operations, when changing tools and when being transported by means other than under its own power.

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

Don't refuel, start or run this tiller indoors or in an improperly ventilated area.

Don't run engine when electrical system

causes spark outside the cylinder. During periodical checks of the spark plug, keep plug a safe distance from cylinder to avoid burning of evaporated fuel from cylinder.

Don't check for spark with spark plug or plug wire removed. Use an approved tester.

Don't crank engine with spark plug removed unless spark plug wire is disconnected. Sparks can ignite fumes.

Don't run engine when the odor of gasoline is present or other explosive conditions exist.

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

Don't operate your tiller if there is an accumulation of debris around the muffler, and cooling fins. To reduce the fire hazard, keep the engine and fuel storage area free of vegetative material and excessive grease.

Don't touch hot mufflers, cylinders or cooling fins as contact may cause serious burns.

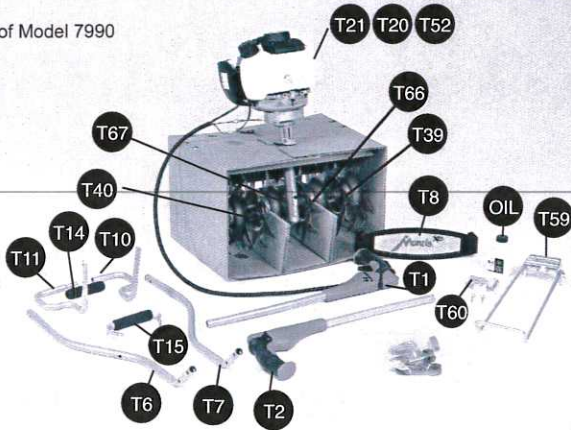
Don't change the engine governor setting or over speed the engine.

Don't attempt to remove spark plug while engine is hot. Removing a spark plug from a hot engine can cause irreparable damage to the engine and will void your warranty.

Don't use starter fluids as they will cause permanent engine damage.

Assembly

Picture of Model 7990



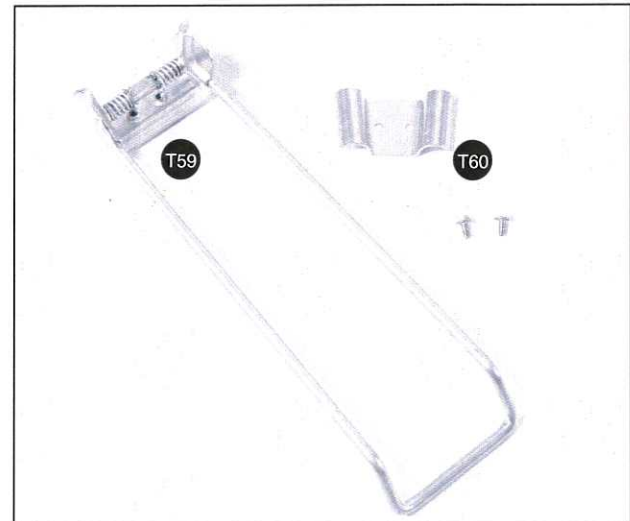
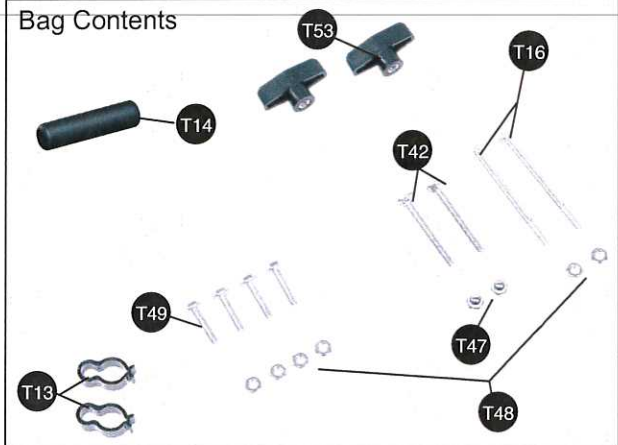
WHAT COMES IN THE BOX

Key	Qty.	Part No.	Description
T21, T20, T52	1		Engine Assembly (includes Fender Guard & Worm Gear Transmission)
T10	1		Loop Handle, Right Half
T11	1		Loop Handle, Left Half
T14	1		Foam Grip
T6	1		Lower Handle with Plug, Right
T7	1		Lower Handle with Plug, Left
T16	2		Bolt 1/4-20 X 3.25"
T48	6		1/4-20 Two-Way Lock Nut
T15	1		Carry Handle with Grip
T49	4		1/4-20 X 1.125" Hex Head Cap Screws
T1	1		Trigger Handle Assembly, 4-Cycle Engine, Right
T2	1		Handle Assembly, Left
T8	1		Handle Brace
T53	2		Knob, Two Prongs, Female
T42	2		Carriage Bolt, 1/4-20 X 2.25"
T47	2		Acorn Nut
T13	2		Throttle Clip
T39	1		Tine Assembly, Outer Right
T40	1		Tine Assembly, Outer Left
T66	1		Tine Assembly, Inner Right
T67	1		Tine Assembly, Inner Left
T41	4		Tine Retaining Pins (not shown)
T59	1		Kickstand, Stand Assembly
T60	1		Kickstand, Bracket and Hardware
Oil	1	400208	4-Cycle Oil 3.4oz

! WARNING

Improper assembly of this tiller can result in serious injury. Make sure to follow all instructions carefully. If you have any questions, contact our factory at 1-800-366-6268 or an authorized Mantis dealer.

Bag Contents



WHAT YOU WILL NEED TO ASSEMBLE THE TILLER

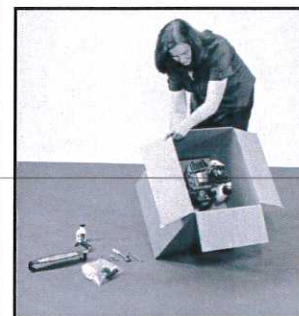
Prior to removing the contents and assembling, it is important to:

- Have a clean work area
- Make sure all necessary tools are handy
- You will need a 7/16" crescent wrench
- A ratchet wrench with an extension
- A 7/16" socket
- A 3/8" socket or crescent wrench

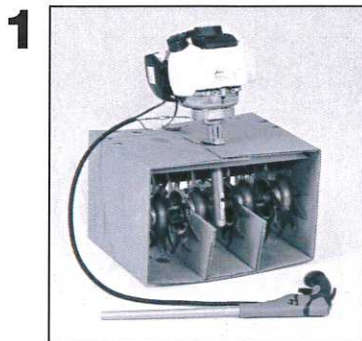
Assembly

LET'S BEGIN

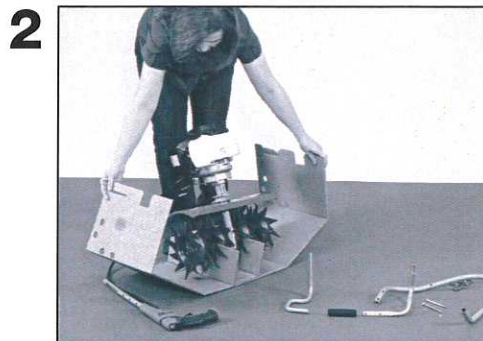
- With the box upright, open the box and remove insert.
- Remove second cardboard insert and all loose parts that are at the top of the tillers cradle.
- Lay the box on the side and open the bottom flaps.
- Return the box to an upright position and pull the box straight up.
- Right throttle handle attached to tiller assembly with installed tines will be in the box cradle.
- Lay everything out so you can easily identify the parts (see parts image and list on page 6).



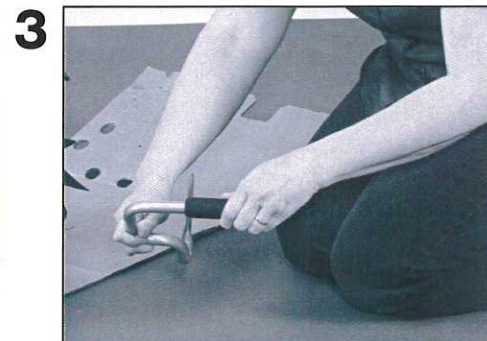
LOWER HANDLE ASSEMBLY



- For ease of assembly and stability it is important that you keep the engine assembly in its cardboard cradle.



- Open cradle by pulling sides apart.



- Slide the foam grip onto the right loop handle.



- Line up the holes of the right loop handle with the holes of the lower right handle.
- Slide the two 3.25" bolts through the hole.



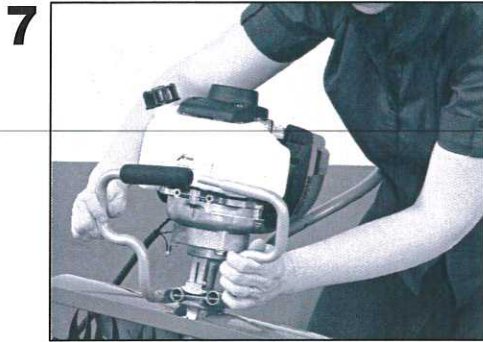
- Position this assembly onto the recessed channels below the engine.



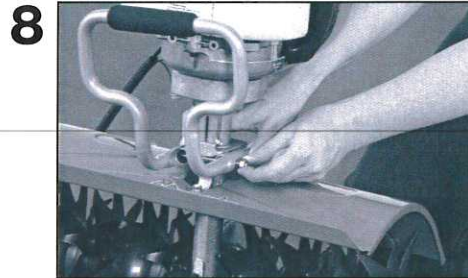
- Slide the lower left handle onto the bolts.

Assembly (Continued)

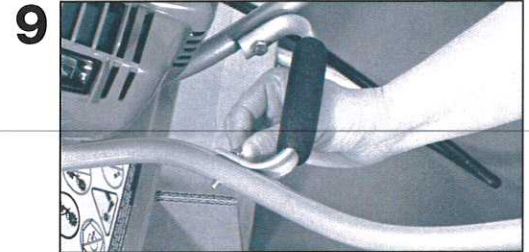
LOWER HANDLE ASSEMBLY (CONTINUED)



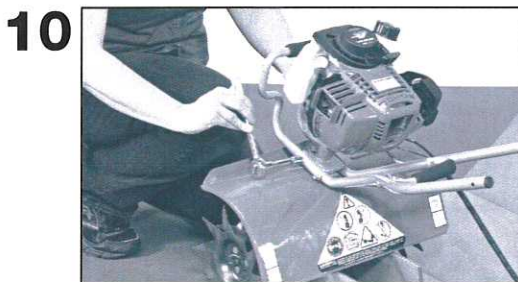
- Slide the left loop handle into the foam grip and right loop handle.



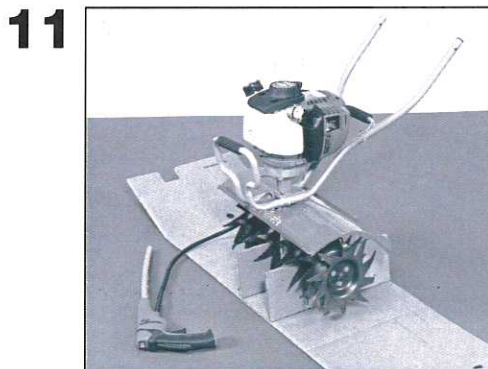
- Slide loop handle through bolts and over top lower left handle, then take two lock nuts and fasten them finger tight.



- Place the carry handle between the lower handles and line up the holes
- Place two of the 1.125" bolts through holes with hex head on inside of carry handle and with two lock nuts fasten them tight with wrench and socket.

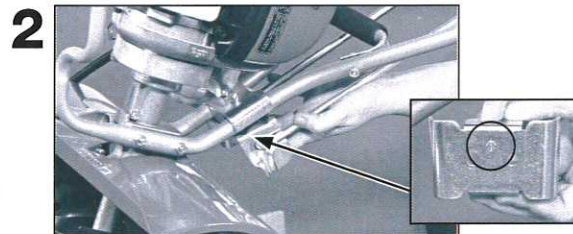
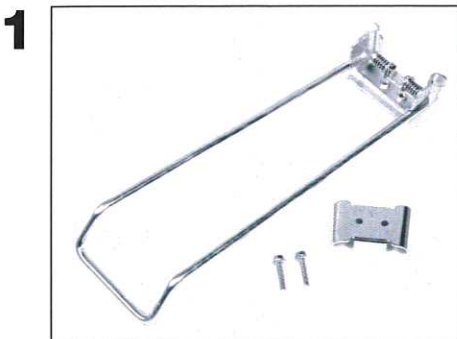


- Use the 7/16" wrenches and socket to tighten the rest of the handle bolts.

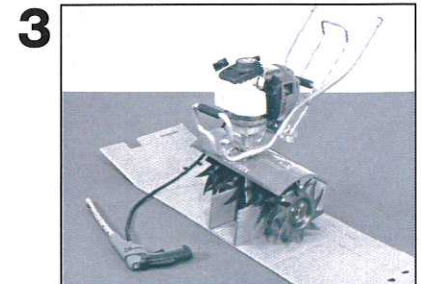


- At this point, your Mantis[®] XP Tiller should look like this when lower handle assembly is complete.

KICKSTAND ASSEMBLY



- Position the kickstand bracket just above the bend of the lower handles. The stamped arrow should be pointing up.
- Position the kickstand under the lower handles, line up the holes and thread the kickstand bracket bolts into the kickstand.
- Tighten with the 3/8" crescent wrench.



- Your Mantis[®] XP Tiller will look like this when lower handle assembly and kickstand is complete.

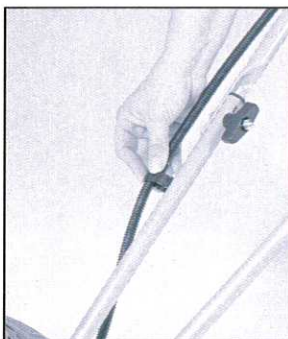
Assembly (Continued)

1



- Lift the upper handle until it lines up with the lower handle.
- Insert carriage bolt (T42) from outside in.
- Screw on knob (T12) and fully tighten the knob at the pivot point.

3



- Follow the same steps to install the other upper handle onto the other lower handle.
- Use the clip (T9) to secure the throttle cable and wire in place on the lower handle.

2



- Cap the exposed bolt with an acorn nut (T13) and tighten with your 7/16" wrench until snug. Do not over tighten.

4



- Now install the handle brace. Line it up with the holes on the upper handles. Then insert a cap screw (T15) and a lock nut (T14) on either side.
- Use a wrench to tighten cap screws and lock nuts.
- Now use wrench to tighten all nuts and bolts firmly and securely.



7990

WARNING

Improper Throttle installation can cause tines to rotate unexpectedly.

IMPORTANT NOTE:

Make sure you have installed the handles properly. When you stand behind your tiller, holding the handles, the fender warning label should face you.

IMPORTANT NOTE:

Before you use your MANTIS Tiller, read the Safety Rules & Warnings on pages 3-5

IMPORTANT NOTE:

Be sure you have proper throttle movements and that the throttle cable is not wrapped or twisted around the handle bar. Hold down the lockout lever, fully squeeze the throttle trigger and let go. The throttle triangle must click in both directions. If there is any doubt, remove air filter and visually check that the throttle triangle hits both the idle screw and the full open stop. **THIS MUST BE DONE BEFORE STARTING THE ENGINE.**

Mantis® XP Tiller Fueling & Starting

MANTIS® XP TILLER FUELING AND OIL ONLY

IMPORTANT!

It is normal for your 4 stroke engine to smoke for the first minute or two of operation, however it is not necessary for this to occur every time. This is a result of the oil being pulled through the engine for lubrication.

- Rock the tiller forward so that it rests on its front loop handle.
- It is important to position the Mantis® XP Tiller as shown in **Figure 1** so the oil will properly fill the crankcase. Failure to do so will cause engine damage.
- Remove the oil plug.
- Pour in the bottle of pre-measured (3.4 oz) Mantis approved, 4-cycle engine oil.
- Always check the oil level before each use. The oil level should reach the inner first thread of the reservoir. Do not overfill.
- Replace the oil plug.
- Then return the unit to the upright position and put the kickstand down.

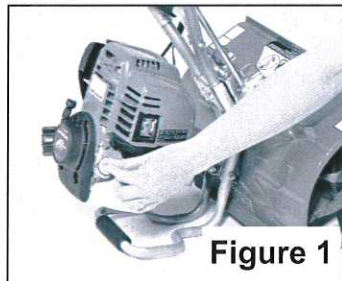


Figure 1

Fueling your Mantis® XP Tiller/Cultivator is easy. Unscrew the gas cap and fill the tank about four-fifths of the way up with 89 octane unleaded gasoline. And remember, always drain the gas when transporting the unit from one location to another.

MANTIS® XP TILLER STARTING ONLY

Starting the engine for the first time, or "cold starting", is easy.

- First, make sure the start/stop switch, located on the throttle handle, is in the start position, which is indicated by the "I" symbol.
- Close the choke by moving the choke lever to the up position.
- Press the primer bulb approximately 6 times until the bulb is filled with gas. Once it is filled, press it two more times.
- Pull the starter cord lightly until you feel resistance and then give it a short, brisk pull. Your tiller should start immediately. Do not pull the cord all the way out and do not let it snap back into the starter housing.
- Once it is running, open the choke. Ensure the lever is fully down.
- To stop the engine, simply push the start/stop switch to the stop position "O."
- To start a warm engine, follow the same procedure. Except now you can leave the choke lever in the down position and there is no need to pump the primer bulb.
- Before using the tiller, let the engine run for a minute to warm up. And before shutting it down, let the engine run briefly to cool down.



Switch

IMPORTANT NOTE:

Check the oil level in the engine before each use. If oil is low see your 4 Stroke Tiller Engine Manual and information above for details.

Never use starting fluids as they will cause permanent engine damage. Using them will void the warranty. Before you use the tiller, read the Safety & Warning rules on pages 3-5.

⚠ WARNING • DANGER ⚠

ALTERNATIVE FUELS, SUCH AS E-15 (20% ETHANOL), E-85 (85% ETHANOL) OR ANY FUELS NOT MEETING HONDA REQUIREMENTS ARE NOT APPROVED FOR USE IN GASOLINE ENGINES. USE OF ALTERNATIVE FUELS MAY CAUSE PERFORMANCE PROBLEMS, LOSS OF POWER, OVERHEATING, FUEL VAPOR LOCK AND UNINTENDED MACHINE OPERATION, INCLUDING, BUT NOT LIMITED TO, IMPROPER CLUTCH ENGAGEMENT. ALTERNATIVE FUELS MAY ALSO CAUSE PREMATURE DETERIORATION OF FUEL LINES, GASKETS, CARBURETORS AND OTHER ENGINE COMPONENTS.

⚠ WARNING

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

⚠ WARNING

Fuel is extremely flammable. Handle it with care. Keep away from ignition sources. Do not smoke while fueling your equipment

⚠ WARNING

Avoid accidental blade engagement. Do not squeeze the throttle trigger when starting. Maintain proper idle speed adjustment (2500-3100 rpm)

Mantis® XP Tiller Fueling & Starting

CORRECTIVE ACTION

If you suspect the engine is overfilled the following procedure should remove the excess oil from the crankcase and valve cover.

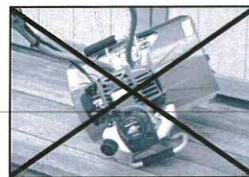
If the engine is overfilled, oil will enter the crankcase and it does not simply pour out of the oil fill opening. The excessive oil has to be pumped out as the engine runs. Checking the oil level and draining any excess between multiple 30 second running intervals will bring the oil back to the proper level.

1. Place the engine on a level surface resting flat on the front

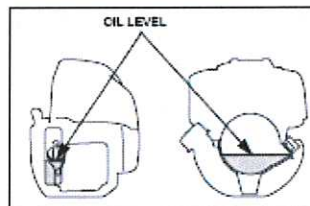
loop handle and remove the oil fill cap/dipstick. Use a catch basin for any oil that overflows from the oil fill opening.

2. Replace the oil fill cap/dipstick and run the engine for approximately 30 seconds then repeat step one. Continue steps 1 & 2 until oil no longer overflows when the oil fill cap/dipstick is removed.
3. Once the oil level is corrected the engine may continue to smoke while running for several minutes while the residual oil burns off.

MANTIS® XP TILLER PROPER OIL FILL/ LEVEL CHECK POSITION



This position does not allow for a proper oil level reading and may cause overfilling.



Engine must be resting on a flat surface on the fuel tank

Mantis® XP Tiller Operation

A SPECIAL FEATURE

(With the idle set properly and the engine running)

Even when the engine is running, the tines won't turn unless you squeeze the throttle trigger on the handlebars. When you release the throttle trigger, the tines will stop.

A TIP FOR EXTENDING YOUR ENGINE'S LIFE

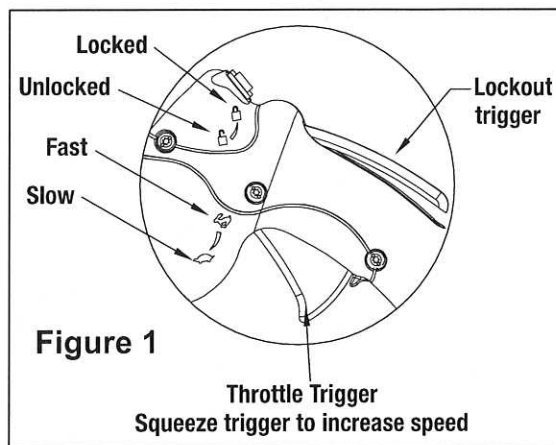
After you start the engine, let your tiller

warm up for two to three minutes before you use it. Then, before you put your tiller away, let it idle for a minute to give the engine a chance to cool down.

OPERATION

With engine running, and both hands on the handles, hold down the throttle lockout trigger (Figure 1), then squeeze the throttle trigger gradually to increase the engine speed and engage the tines.

NOTE: This step must be repeated each time your tiller trigger is released.



! WARNING

If engine does not stop when switch is put in the stop position, release the throttle, allow engine to idle. Put the tiller down, and slide the choke lever to the cold start (closed) position. Have product serviced before using.

Mantis® XP Tiller Operation (Continued)

WARNING

Read the instructions carefully. Be familiar with the controls and the proper use of the equipment.

NOW YOU'RE READY TO USE YOUR MANTIS TILLER.

If you've seen other tillers, your MANTIS XP Tiller may surprise you. It tills best when you pull it backward! You see, when you pull your MANTIS XP Tiller backward, you give extra resistance to the tines, so they dig deeper. (Figure 1)

In addition, when you go backward, you erase your footprints. So your soil stays light and fluffy. With other tillers, by contrast, you walk right over the soil you've just tilled, packing it down, so it's less plantable.

RUN YOUR MANTIS TILLER LIKE A VACUUM CLEANER

Place your Tiller at the head of the row or area you want to till. Start it up. Then use an easy rocking motion. First, pull your Tiller backward. Then use an easy rocking motion. Again, pull your Tiller backward. Then, let

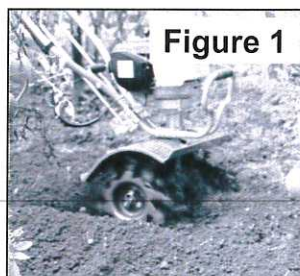


Figure 1

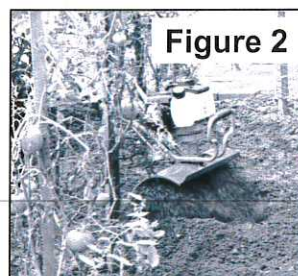


Figure 2

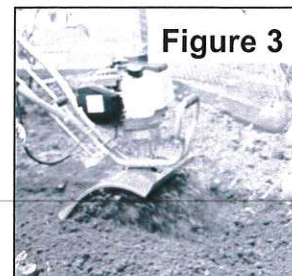


Figure 3

it move forward just a little bit. Then pull it backward again. This will help you till deeper.

Keep repeating these steps until you've tilled an entire row. Start again on the next row. It's much like running a vacuum cleaner! (Figure 2)

You Can Even Control Depth.

For Deeper Tilling:

Move your Tiller slowly back and forth, as you would a vacuum cleaner. Work the same area over and over until you've dug to your desired depth. (Figure 3)

For Shallow Tilling:

Switch the tines to the cultivating position. (See page 13 to learn how.) Then move your Tiller quickly over your soil surface.

For Big Weeds or Tough Roots:

Let your Tiller rock back and forth over the tough spot, until the tines slice through the weed or root.

Your MANTIS XP Tiller Handles Special Tilling Projects:

Want to turn part of your lawn into a colorful flower border? Your MANTIS XP Tiller makes it easy! Just run your Tiller back and forth until the sod begins to break up. Then continue tilling. Your Tiller will chop the clumps of sod until they're fine. Then, it will work them into the soil. Pretty soon, you'll have a soft, fresh planting bed.

WARNING

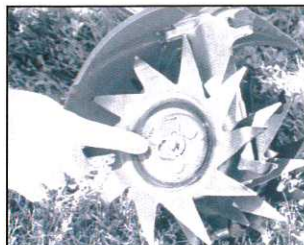
ALWAYS MAKE SURE THE HANDLE KNOBS ARE SECURE BEFORE STARTING YOUR MANTIS TILLER.

WARNING

If your tines get jammed or entangled, shut off the engine at once. Remove the obstruction while the engine is off. Never try to remove an obstruction while the engine is running. Serious injury can result.

WARNING

The operator of this tiller is responsible for accidents or hazards occurring to himself, other people or their property.



YOUR MANTIS XP TILLER MAKES WEEDING A PLEASURE!

As a tiller, your MANTIS XP Tiller works the soil down to 10" (25.4 cm) deep. But, as a cultivator, it gently cultivates the surface, only 2" to 3" (5.08 cm to 7.62 cm) deep.

First, you must switch the tines to the weeding, cultivating position. This takes less than a minute.

Then, your MANTIS XP Tiller's sharp "tine teeth" will slice up those pesky weeds, burying them as you go along. And, since the tines in this position won't dig too deep, they won't hurt your plants' precious root systems.

The result? Your Tiller will cut your weeding time in half, and turn a tiresome chore into a pleasure.

Mantis[®] XP Tiller Operation (Continued)

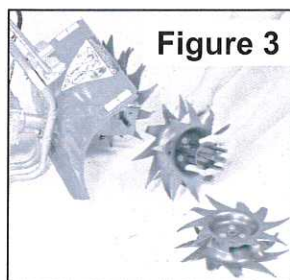
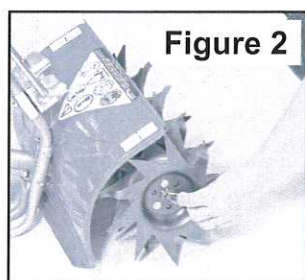
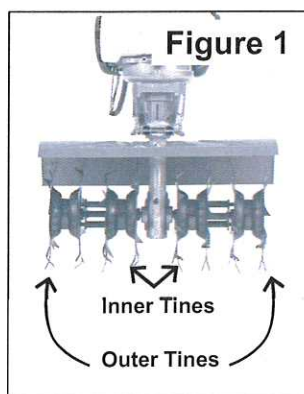
HOW TO SWITCH FROM TILLING TO CULTIVATING POSITION

1. First, you will need to understand that your Mantis[®] XP Tiller has an inner and an outer set of tines on each side of the tiller as shown in **Figure 1**.
 2. Make sure the tiller is turned off.
 3. Remove the retaining pins from the outer set of tines (**Figure 2**) and remove the outer tines.
 4. Only after you have removed the outer set of tines, then remove the retaining pins from the inner tines and remove the inner tines from the transmission axle (**Figure 3**)
 5. Place the right-side set of inner tines onto the left-side. The "D" shaped hole should be to the outside. Make sure the tine retaining pin is installed. Repeat for the other side.
 6. Place the right side set of outer tines onto the left-side axle. The "D" shaped hole should be to the outside and insert the tine retaining pin. Repeat for the other side.
- Your Mantis[®] XP Tiller also has the ability to till or cultivate at either a 9" or 16" width. The tiller is sent to you set up for 16". To run the tiller at a 9" width,

simply remove the inner and outer tines as noted above. Then just put the outer tines back onto the transmission axle and secure with a retaining pin on each side.

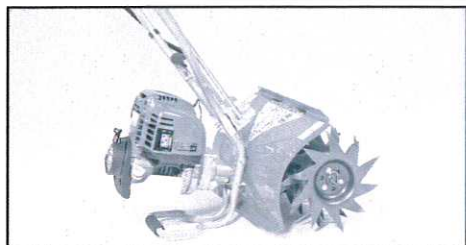
WARNING

DO NOT reach your fingers and/or hand between the tine blades.
DO NOT attempt to remove the inner set of tines until you have first removed the outer set of tines.

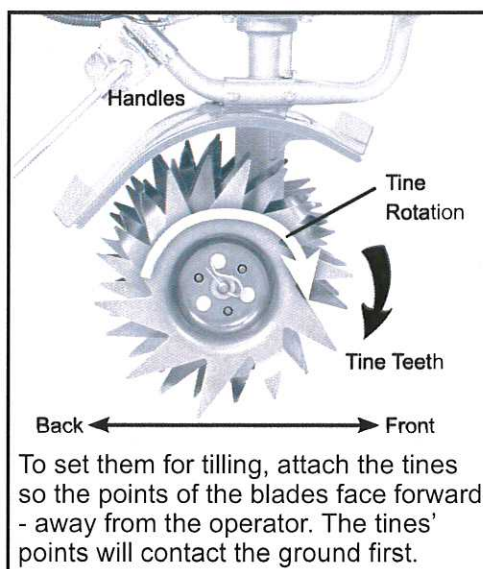


IMPORTANT:

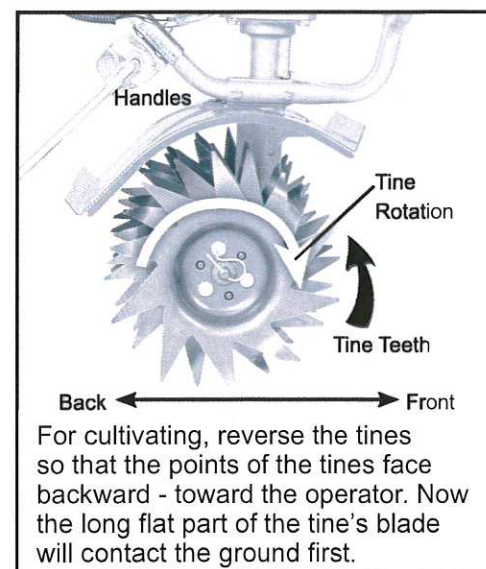
To change the tines on your Mantis[®] XP Tiller, push the tiller forward and allow it to rest on the loop handle.



Tilling



Cultivating



Mantis® XP Tiller Maintenance

CLEANING THE TINES

If you have a “backyard jungle,” first use a knife, pruner, or brush cutter to chop up the overgrowth. If the tines become tangled anyway, turn the engine off completely before trying to clear them.

From time to time, you may want to remove the tines to get them completely

clean. To do this, please follow steps 1-4 as noted under “How to Switch From Tilling to Cultivating Position” on page 13. Then, you can remove any weeds, stones, or mud from the tines. As always, please be sure to remove the outer tines before removing the inner tines. Also, do not reach your fingers and/or hand in

between the tine blades. When finished, simply return the tines to their starting positions.

The optional Tine Detangler (Item #1322) will clear tines in a jiffy. Contact your local authorized Mantis® dealer or call 1-800-366-6268 to order.

MANTIS® XP TILLER TRANSPORTATION



Figure 1



Figure 2

MANTIS® XP TILLER TRANSPORTATION

Transporting your tiller is easy. It's light enough and easy to carry using the carrying handle as seen in **Figure 1**.

Or, with it running, you can walk it by gently squeezing the throttle until it moves at a comfortable

pace seen in **Figure 2**.

Your tiller is easily transported in the back of a car or truck. Be sure to empty the fuel tank (This is crucial)! Then stow your tiller in the trunk of your car or truck.

WARNING

Never store the equipment with Fuel in the tank or inside a building where fumes can accumulate and breach an open flame or spark

MANTIS® XP TILLER STORAGE

WARNING

Never store the equipment with fuel in the tank or in an area where fumes may accumulate and breach an open flame or spark

Each fall, or before you store your Mantis Tiller for any long period, be sure to take these measures:

1. Do not store your Tiller with fuel still in it. Even under ideal conditions, stored fuel containing ethanol or MTBE can start to go stale in 30 days. And, since stale fuel has a high gum content, it can clog the carburetor, this, in turn, will restrict fuel flow. Therefore, **when you're ready to store your Tiller, or will not be using it for more than 2 weeks, drain the fuel tank completely.**
2. Next, restart the engine to make sure no fuel is left in the carburetor. Then, run the engine

until it stops. This will prevent gum deposits, forming inside of the carburetor and possible engine damage.

3. Disconnect spark plug wire and remove the spark plug. Slowly pull the starter cord once.
4. Inspect the spark plug, and if necessary, clean it. If you need to replace it, buy a NGK-CMR5H.
5. Install the spark plug, but leave the spark plug wire disconnected.
6. Wipe the tines with oil or spray them with WD-40, to prevent rusting.
7. Oil the throttle cable and all visible moving parts. (Do not remove the engine cover.)
8. Clean or replace the air filter.
9. Check or replace fuel filter.
10. Check the grease level in the worm gear housing. Add grease if needed.

Mantis[®] XP Tiller Maintenance (Continued)

11. Store your Tiller in an upright position in a clean, dry place. You can store with the handles in an extended position or folded down.

To fold the handles down, simply loosen the lower 2-pronged knobs until you can pivot the upper handles down. **(Figure 2)**

Or it can be hung using the handle brace.

12. Do you have fuel left over from last season? Dispose of it properly. Buy fresh oil and gasoline next season.
13. Remove Tilling Tines or attachments and lightly oil tine shaft at least once a year.

IMPORTANT:

It is important to store your 4-Cycle Mantis XP Tiller in an upright position. Laying the Tiller on its side will cause the oil to leak out of the engine through the air cleaner case.

IMPORTANT:

Avoid any orientation that places the top cover (engine head) down -this may allow oil from the crankcase to enter the combustion chamber and cause hard starting or a locked piston.

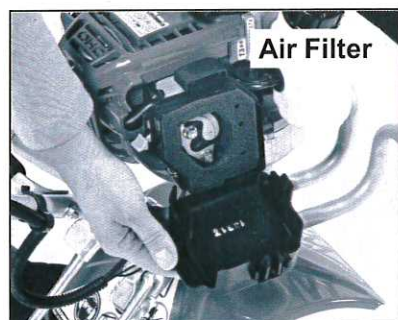
Your MANTIS XP Tiller will require some basic maintenance to keep it performing year after year.

If you are storing your tiller for the season or longer than 30 days it is very important to empty the fuel tank to prevent engine damage.

Undoubtedly, you will be putting your tiller through rigorous use.

Check engine oil level, air filter and fuel filter.

Refer to your Honda[®] engine manual for more details.



Mantis® XP Tiller Maintenance (Continued)

AIR FILTER MAINTENANCE

A wet or dirty air filter can affect the way your engine starts, performs, and wears. So, it's a good idea to check your air filter once a month.

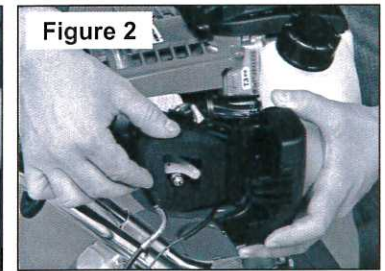
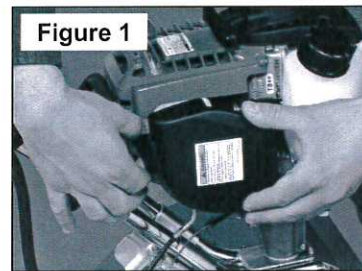
If you work in dusty soil, or if you want to be on the safe side – check your filter more often (for instance, before each use). But be sure to replace it at least once a year, in the spring or fall.

How to Check, Clean and Change the Air Filter

1. The air filter is held in the air cleaner in a black housing on the side of the tiller, behind the gas tank cap.
2. Squeeze the two locking tabs at the rear of the air cleaner cover (**Figure 1**) and swing the cover towards the front of the engine to open it
3. The air filter is the dark sponge like material on the inside of the air cleaner. Check whether it is soiled or moist.
4. If the air filter needs to be cleaned or no longer fits properly, simply remove it by carefully peeling it out of the air cleaner. (**Figure 2**)
5. To clean the air filter

- a. Clean the filter element in warm soapy water, rinse and allow to dry thoroughly. Or, clean in a non-flammable solvent and allow to dry.
- b. Dip the filter element in clean engine oil, then squeeze out all excess oil. The engine will smoke when started if too much oil is left in the element.
- c. Wipe dirt from the air cleaner body and cover, using a moist rag. Be careful to prevent dirt from entering the carburetor.

6. Insert your clean filter inside the air cleaner.



IMPORTANT NOTE:

Please check the lip on the Air Cleaner Cover. If the lip is chipped or cracked, it should be replaced. This will prevent dirt from being ingested through the carburetor into the inside of the engine.

IMPORTANT NOTE:

Operating the engine without an air filter element, or with a damaged air filter element, will allow dirt to enter the engine, causing rapid engine wear. This type of damage is not covered by the Limited Warranty

IMPORTANT NOTE:

A dirty air cleaner will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dusty areas, clean the air filter element more often than specified in the Maintenance section.

IMPORTANT:

Make sure the filter is "seated" properly in the cover. The filter must fit snugly inside the opening that holds the filter in place. Installing the filter incorrectly will cause engine damage and void the warranty. Fit the cover back over the air cleaner and snap the two locking tabs

HOW TO RESEAT THE FLANGE

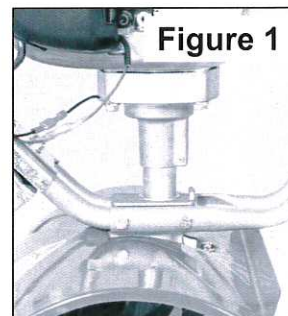
At some point, you may find that the tines won't turn when you press the throttle. This may mean the engine isn't sitting all the way down on the worm gear housing.

Perhaps you've been using your Tiller for several years. Or perhaps you've removed the engine for use with our hedge trimmer attachment, then replaced it. In either case, the flange bolt may have come loose and lifted the engine up.

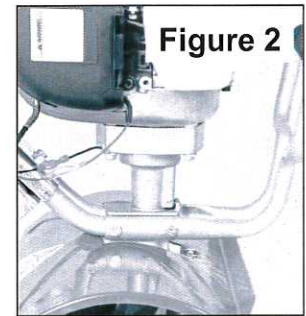
If this happened you'll notice a gap between the bottom of the engine clutch case and the top of the worm gear housing. (**Figure 1**)

To fix this, loosen the flange bolt. Take the engine off the worm gear housing. Notice the hex head on top of the drive shaft. Inside the clutch case, you'll find the clutch drum. Make sure the hex head lines up with the clutch drum inside the clutch case.

Then put the engine back on the worm gear housing. Make sure the plastic carrying handle is not under the fuel tank.



Note how the engine doesn't sit all the way down on the transmission.



Note how the engine sits all the way down on the transmission.

If you've followed these steps properly, there will be no gap between the clutch case and the worm gear housing. (**Figure 2**) Make sure you tighten the flange bolt!

All other engine maintenance issues can be found in the Honda® Engine Manual included in your tiller package.

Mantis[®] XP Tiller Maintenance (Continued)

TRANSMISSION CARE

How to Check the Grease Level Inside the Worm Gear Housing

When we built your Mantis[®] XP Tiller, we added Lithium EP #0 grease to properly lubricate the transmission for the first 10 hours of operation. As part of the regular maintenance of your tiller, it is imperative that you inspect the grease level and add grease if necessary. This will help your tiller give you years of excellent usage.

You will need to add grease with a grease gun using the fitting at the front of the transmission (**Figure 1**). You should add grease through this fitting after the first 10 hours of operation and then every 50 hours of use.

You can use Lithium EP#0 EP#1

! WARNING

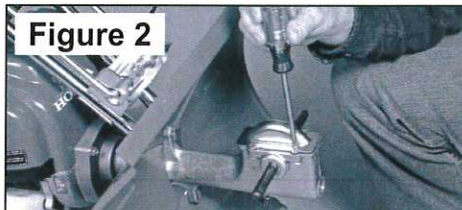
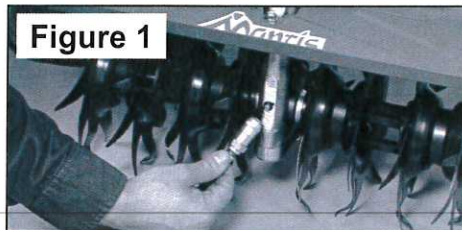
Premature transmission failure can occur if proper grease level is not maintained

grease or #2 grease in combination with specially formulated Mantis[®] grease (p/n 9985).

The following are different service steps for different type of grease.

IF YOU USE Lithium EP #1 or #0 grease:

1. Make sure the tiller is turned off and remove the tines.
2. Place the tiller front side down on an elevated surface and remove the 4 screws holding the transmission cover (**Figure 2**).
3. Remove the transmission cover and gasket. Inspect the grease level. If it is below the edge of the gear housing, you will need to add grease. If it is already flush with this edge, you do not need to add grease.
4. If grease is needed, remove the protective cap from the grease fitting, attach the grease gun, and slowly add



grease until the level is flush with the edge of the transmission (**Figure 3**).

5. Return the grease fitting protective cover, gasket and attach transmission cover with the 4 original screws.

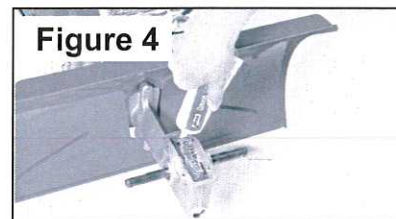
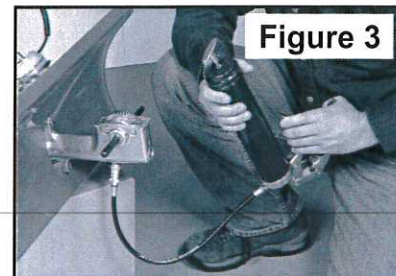
IF YOU USE Lithium EP #2 grease in combination with Mantis[®] grease (p/n 9985):

Follow steps 1 through 3 and then follow instructions below.

4. If grease is needed, remove protective cap from the grease fitting on the front of the transmission and attach the grease gun. Please pay attention to the size of the grease gun. Different guns distribute different amount of grease per pump.
 - a. If you are using Mini grease gun with **3 ounce cartridge** add **5 full pumps** of grease. One pump from Mini grease gun is equal to approximately 0.012 oz. or 0.3 grams.
 - b. If you are using standard automotive grease gun with 14 ounce cartridge, add 2 full pumps of grease. One pump from a standard automotive grease gun is equal to 0.03 oz. or 0.9 grams.

CAUTION: DO NOT ADD MORE GREASE THAN SPECIFIED ABOVE

5. Remove the grease gun from the grease fitting and replace the protective cap.



6. Inspect the grease level. If it is below the edge of the gear housing, you will need to add grease. If it is flush with the gear housing do not add grease.
7. If you need to add more grease, utilize the specially formulated Mantis grease (p/n 9985). This grease is compatible with the grease that was in the transmission from the factory. **DO NOT USE Lithium EP #2 IN THIS STEP. (Figure 4)**
8. Return the gasket and the transmission cover. Secure cover with the 4 original screws.

Always inspect the gasket prior to re-installation. If the gasket is damaged, replace it with a new gasket (p/n 436)

! WARNING

DO NOT OVERFILL.
Too much grease can create pressure which can cause seals to fail or the clutch to slip.

In between adding grease with the grease gun, you should inspect the grease level after approximately 10 hours of operation. If grease is needed, you can add grease directly to the opening in the transmission using Mantis[®] p/n 9985.

Troubleshooting

Problem	Cause	Remedy
1. Tines don't turn when throttle is depressed.	<ul style="list-style-type: none"> Engine is not seated properly on the gear housing. 	<ul style="list-style-type: none"> Re-install engine following the instructions on page 16 (How to reseal the flange).
2. Engine fails to start.	<ul style="list-style-type: none"> O/I switch is in "O" position. No fuel in tank. Fuel strainer clogged. Fuel line clogged. Spark plug shorted or fouled. Spark plug is broken (cracked porcelain or electrodes broken). Ignition lead wire shorted, broken or disconnected from spark plug. Ignition inoperative. 	<ul style="list-style-type: none"> Move switch to "I." Fill Tank. Replace Strainer. Clean fuel line. Install new spark plug. Replace spark plug. Replace lead wire or attach to spark plug. Contact your local authorized dealer.
3. Engine hard to start.	<ul style="list-style-type: none"> Water in gasoline or stale fuel mixture. Engine under or over choked. Gasket leaks (carburetor or cylinder base gasket). Weak spark at spark plug. 	<ul style="list-style-type: none"> Drain entire system and refill with fresh fuel. Drain and refill with correct mixture. If flooded by over choking, proceed according to instructions in operation section. If under choked, move choke lever to closed position and crank two or three times. Replace gaskets. Contact your local authorized dealer.
4. There is black smoke coming from exhaust.	<ul style="list-style-type: none"> The muffler screen may be clogged. The exhaust port may be restricted. 	<ul style="list-style-type: none"> Clean carbon from muffler screen. Clean exhaust port.
5. Engine misses.	<ul style="list-style-type: none"> Dirt in fuel line or carburetor. Carburetor improperly adjusted. Spark plug fouled, broken or incorrect gap setting. Weak or intermittent spark at spark plug. 	<ul style="list-style-type: none"> Remove and clean. Clean or replace spark plug - set gap to .024-.028 in. (0.6-0.7 mm). Contact your local authorized dealer.
6. Engine lacks power.	<ul style="list-style-type: none"> Air filter clogged. Carburetor out of adjustment. Muffler clogged. Clogged exhaust ports. Spark Arrestor Clogged. Poor compression. 	<ul style="list-style-type: none"> Clean or replace air filter. Clean carbon from muffler. Clean Spark Arrestor. Contact your local authorized dealer.
7. Engine overheats.	<ul style="list-style-type: none"> Air flow obstructed. 	<ul style="list-style-type: none"> Clean flywheel cylinder fins and screen.
8. Engine noisy or knocking.	<ul style="list-style-type: none"> Spark plug in incorrect heat range. Bearings, piston ring or cylinder walls are worn. 	<ul style="list-style-type: none"> Replace with plugs specified for engine. Contact your local authorized dealer.
9. Engine stalls under load.	<ul style="list-style-type: none"> Engine overheats. Carburetor adjustment too "lean." 	<ul style="list-style-type: none"> Remove dust and dirt from between fins. Contact your local authorized dealer.

Parts List

Key	Qty.	Part No.	Description
T37	2	434	BEARING
T38	2	435	BEARING SEAL RETAINER
T39	1	400328	TINE ASSEMBLY, OUTER RIGHT
T40	1	400327	TINE ASSEMBLY, OUTER LEFT
T41	4	418-1	TINE RETAINING PIN
T42	2	430039	CARRIAGE BOLT 1/4-20 x 2.25"
T43	1	400307	ENGINE FLANGE
T44	1	400631	TRIANGLE WARNING LABEL (4 CYCLY ENGINE)
T45	1	458	ROLLER BEARING
T46	1	430058	MANTIS LOGO LABEL
T47	2	395	ACORN NUT
T48	6	972	1/4-20 TWO-WAY LOCK NUT
T49	4	144-2	1/4-20 x 1.125 HEX HEAD CAP SCREW
T50	2	M9452	BOLT 1/4-20 x 1/2" LONG
T51			
T52	1	400302	TRANSMISSION ASSEMBLY
T53	2	400523	KNOB, TWO PRONGS, FEMALE
T54	1	430043	GROUND WIRE JUMPER, 4 CYCLE ENGINE
T55	1	4079	M6 INTERNAL LOCK WASHER
T56	1	400132	BEARING
T57	1	400308	CLUTCH DRUM
T58	4	400529	M6 x 33 MM FLANGE BOLT
T59	1	410158	KICKSTAND, STAND ASSEMBLY
T60	1	430037	KICKSTAND, BRACKET AND HARDWARE
T61	1	400524	RETAINING RING
T62	1	400310	THROTTLE STOP, HONDA GX35
T64	1	400313	DUST CAP FOR GREASE FITTING
T65	1	400300	GREASE FITTING
T66	1	400330	TINE ASSEMBLY, INNER RIGHT
T67	1	400329	TINE ASSEMBLY, INNER LEFT

Key	Qty.	Part No.	Description
T6	1	430051	LOWER HANDLE W/PLUG, RIGHT
T1	1	430070	TRIGGER HANDLE ASSEMBLY, 4 CYCLE ENGINE, RIGHT
T2	1	430071	HANDLE ASSEMBLY, LEFT
T7	1	430050	LOWER HANDLE W/PLUG, LEFT
T8	1	430085	HANDLE BRACE ASSEMBLY
T10	1	430023	LOOP HANDLE RIGHT HALF
T11	1	430022	LOOP HANDLE LEFT HALF
T12	1	910502	10-32 x 3/4" FLANGE BOLT
T13	2	478	THROTTLE CLIP
T14	2	430025	FOAM GRIP
T15	1	430049	CARRY HANDLE W/GRIP
T16	2	4049	BOLT 1/4-20 x 3.25"
T18	1	4078	M6 JAM NUT
T19	2	400635	LABEL XP TINE WARNING
T20	1	400312	FENDER GUARD
T21	1	400916	ENGINE ASSEMBLY-35CC HONDA
T22*	1	468	DRIVE SHAFT
T23	1	400301	WORM GEAR HOUSING
T24	1	436	GASKET
T25	1	437A	GEAR HOUSING COVER
T26	4	651	#8 SELF TAPPING SCREW
T27	1	423	ROLLER BEARING
T28	2	425	WORM BEARING RACE
T29	1	424	WORM THRUST BEARING
T30	1	422	WORM SHAFT
T31	1	426	WORM DISK
T32	1	428	RETAINING RING
T33	1	429	WORM GEAR
T34	1	431	TINE SHAFT
T35	2	430	WORM GEAR THRUST WASHER
T36	2	432	WORM GEAR BEARING

*Also in key T52



LIMITED WARRANTY

MANTIS extends this limited warranty against defects in material and workmanship for a period of five (5) years under normal usage for residential purposes and two (2) years under normal usage for commercial purposes, from the date of purchase by the original purchaser.

MANTIS will repair or replace, at its option, any part or parts of the product found to be defective in material or workmanship during the warranty period. Warranty repairs and replacements will be made without charge for parts or labor. All parts replaced under warranty will be considered as part of the original product, and any warranty on the replaced parts will expire coincident with the original product warranty. If you think your MANTIS TILLER is defective in material or workmanship, please contact customer service at 800-366-6268 for the location of an authorized servicing dealer or send it, along with your proof of purchase (sales receipt) to:

Mantis

1028 Street Road
Southampton, PA 18966

You are responsible for pickup and delivery charges; if shipping to factory the product must be returned to us postage paid. Engines are warranted separately by the engine manufacturer

MANTIS assumes no responsibility in the event that the product was not assembled or used in compliance with any assembly, care, safety, or operating instructions contained in the Operators Manual or accompanying the product. This limited warranty does not cover damages or defects due to normal wear and tear, lack of reasonable and proper maintenance, failure to follow operating instructions or operators manual, misuse, lack of proper storage or accidents. This limited warranty shall not be effective if your Mantis tiller has been subjected to negligence or has been repaired or altered by anyone other than an authorized dealer or authorized service center.

You must maintain your MANTIS TILLER by following the maintenance procedures described in the operators manual. Such routine maintenance, whether performed by you or a dealer, is at your expense.

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