



Tiller/Cultivator with 4 Stroke Engine

OWNER'S MANUAL



Welcome to the World of Mantis® XP Gardening

Here's your new MANTIS XP Tiller... the lightweight wonder that is making gardening easier.

Unlike big tillers, your MANTIS XP Tiller weighs only 34 pounds and is like no other. So it lifts easily, handles smoothly, tills and weeds precisely. And, unlike other small tillers, it features dual 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.

If you have questions about any topic in this Manual, or for the name of your local dealer, call **1-800-366-6268** toll free, Monday – Saturday, 8:00am to 5:00pm, Eastern Time.



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Safety Rules & Warnings

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

I. Special Safety Information

 **WARNING • DANGER** 
*ATTENTION: THIS SYMBOL POINTS OUT
OUR IMPORTANT SAFETY INSTRUCTIONS.*

*WHEN YOU SEE THIS SYMBOL, 
HEED IT'S WARNING!! STAY ALERT!!*

 **WARNING • DANGER** 
*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 • DANGER** 
*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.

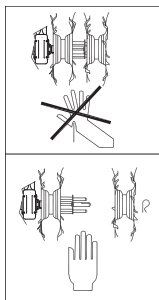
III. Safety Decal Information

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. The location and part numbers (P/N) of these decals are illustrated below.



P/N 400634

P/N 400631



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 FUEL, REFUEL, OR CHECK FUEL WHILE SMOKING, OR NEAR AN OPEN FLAME OR OTHER IGNITION SOURCE.



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 7.



INCORRECT ASSEMBLY.



WEAR EAR AND EYE PROTECTION.



DO NOT OPERATE TILLER INDOORS OR IN POORLY VENTILATED AREA

WARNING • DANGER

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 • DANGER

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 - Do's

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 ANSI Z 87.1. 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 and ensure that all handles, guards and fasteners are secure, operating, and in place.

18. Always maintain and examine your tiller with care. Follow maintenance instructions given in manual.

19. 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.

20. Always remove the outer set of tines before removing the inner set of tines.

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 overreach. Keep a good footing at all times.

Don't run with the machine, walk.

Don't let others operate tiller without proper training.

Do not stand in front of tiller

when tines are rotating.

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 incapable people to operate this tiller.

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 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 you fingers and/or hands in between the tine blades.

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

WARNING • DANGER

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 - Do's

Always use fresh gasoline. Stale gasoline can cause damage.

Always store fuel in containers specifically designed for this purpose.

Always pull starter cord slowly until resistance is felt. Then pull cord rapidly 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.

Allow the engine to cool before storing in any enclosure.

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

VII. Engine/Fuel Warnings - Don'ts

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 engine before putting the tiller down or while transporting from one place to another.

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.

Don't operate the unit if gasoline is spilled. Clean up spill

completely before starting engine.

Don't operate your tiller if there is an accumulation of debris around the muffler, and cooling fins.

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.

Assembly

⚠ WARNING • DANGER ⚠

**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**

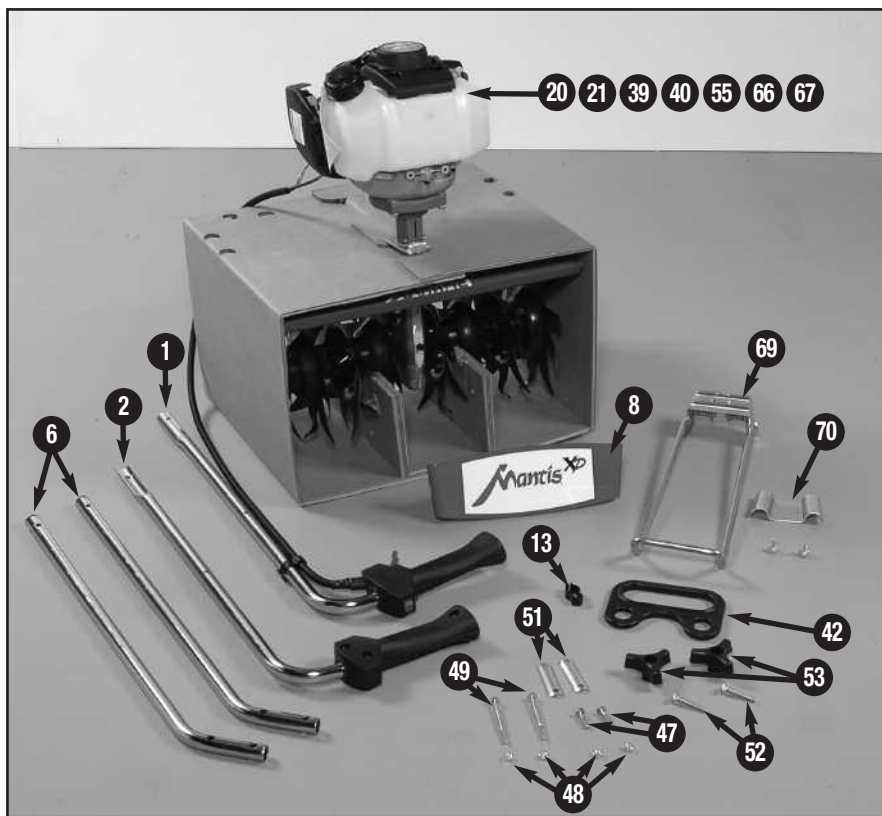
Your MANTIS® XP Tiller comes partially assembled. Full assembly will take just a few minutes if you follow the directions.

First, take all items out of the carton. But do not remove the cardboard from around the Tiller's base.

The list at the right, shows the parts that come with your tiller. Check to make sure you have them.

The bag of hardware is in the plastic bag containing the Owner's Manual and Video.

To assemble your MANTIS Tiller, you'll need two 7/16" and one 3/8" wrenches or sockets. We suggest that you install all nuts and bolts only "finger tight" — that is, one-half to one full turn — until you've completed assembly. **The nuts are self locking, but you must use a wrench to tighten them completely.**



Quantity	Description	*Key #
1	Upper Handle Assembly	2
1	Upper Handle Throttle Assembly	1
2	Lower Handles	6
1	Engine Assembly (includes Fender Guard, Worm Gear Transmission & Tines)	20, 21, 39, 40, 55, 66, 67
1	Carrying Handle	42
1	Handle Brace	8
1	Bag of Hardware Containing:	
2	Bolts (1" long)	47
4	Lock Nuts	48
2	Bolts (3" long)	49
2	Handle Clamps	51
1	Throttle Cable Clip	13
2	Round Head, Square Neck Bolts	52
2	Handle Knobs	53
1	Kickstand Assembly	69
1	Kickstand Top Bracket with 3/8" Bolts**	70

*These numbers are the same numbers shown on the Parts Layout on page 18.

**If applicable.

HOW TO ASSEMBLE LOWER HANDLES

To identify part numbers, see pages 6 and 18.

1. Open the protective cardboard sleeve, but leave the engine assembly (#21) in this cradle to stabilize it during assembly. (Picture 1)

2. Lay the handle parts within easy reach. You'll need one of the handle clamps (#51) and one of the lower handles (#6). Note that the lower handles have a short leg on one end.

3. Fit the handle clamp along the outside of the short leg. Line up the holes on the clamp and the leg.

4. Choose one of the two 3-inch bolts (#49). Slide it through the first set of holes — near the elbow where the lower handle curves. (Picture 2)

5. Now slide the other lower handle onto the 3-inch bolt. Fit the

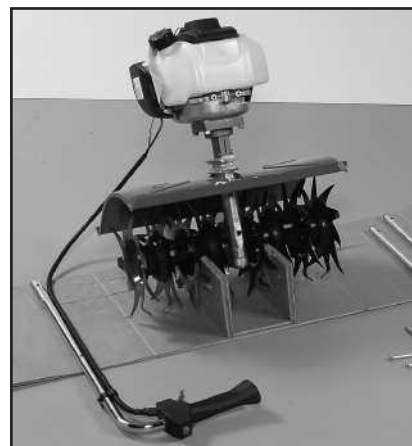
other handle clamp onto this other handle's short leg. Add a nut (#48) and tighten finger tight. (Picture 3)

6. Locate the worm gear housing. It starts just above — and extends down through — the tiller's red fender guard. You'll notice that there's a recessed channel on either side of the housing's top. (Picture 4.)

7. Take the lower handles that you've just put together. Slide them into the two recessed channels. (Picture 5.)

Make sure you insert them from the rear of the tiller (gasoline tank faces away from the operator)... so that the bolt fits along the back of the housing.

8. Slide the second 3-inch bolt through the second set of holes in the short legs. Add a nut and tighten finger tight.



Picture 1

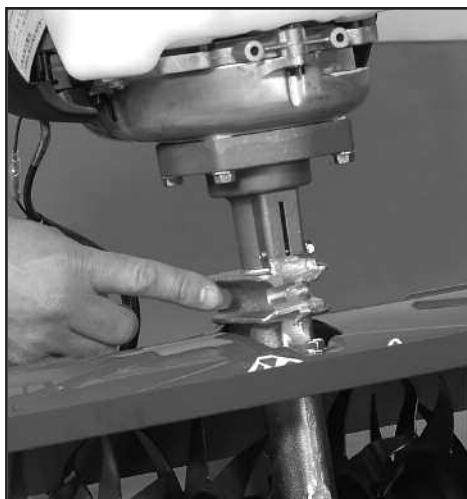


Picture 2

NOTE: THE LOCK NUTS ARE STAMPED. FINGER TIGHT IS APPROXIMATELY 1/2 TO 1-1/2 TURNS.



Picture 3



Picture 4



Picture 5

Assembly *(continued)*

How to Assemble Kickstand, Upper Handles and Carrying Handle

NOTE: If your Mantis® XP was supplied with a kickstand, please start at line 1. If not, please start with the assembly of the carry handle in line 3 below.

1. Locate the kickstand top bracket (#70). Note that the distance between the channels is narrower on one end of the bracket than the other. Place the kickstand top bracket onto the kickstand assembly (#69) so the end where the channels are closer together points away from the foot of the kickstand (Picture 1). Align the bolt holes and insert two 3/8" bolts through the holes in the top bracket and screw them into the bottom bracket by hand.

2. Lightly squeeze the lower handles (#6) toward one another so they line up with the channels in the top bracket of the kickstand and slide the assembly down the lower handles until the foot of the kickstand is about 2" from the ends of the lower handles (Picture 2).

3. Again, lightly squeeze the lower handles (#6) toward one another so they line up with the 2 holes in the carry handle (#42). Then slide the

carry handle and the kickstand assembly down at the same time until the kickstand comes to a stop (Picture 3).

4. Gently pull the lower handles out to their original position.

5. Attach the upper handle throttle side assembly (#1) – the handle with the throttle cable and ground wire – onto the right lower handle with a shoulder bolt (#52), and secure with the handle knob (#53). (Picture 4) **Be sure you have proper throttle movements and that the throttle cable is not wrapped or twisted around the handle bar.** Locate the red lockout button located on the throttle handle (Picture 5). Press the red lockout button and squeeze the throttle lever and let go.

THIS MUST BE DONE BEFORE STARTING THE ENGINE.

6. Follow the same steps to install the other upper handle onto the other lower handle. Does not show other handle installation.

7. Use the clip (#13) to secure the throttle cable and wire in place on the lower handle. (Picture 6)

8. Now install the Handle Brace (#8). Line it up with the holes on the upper handles.



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5



Picture 6

⚠ WARNING • DANGER ⚠
REMOVE TINES BEFORE STARTING ENGINE AND MAKING ADJUSTMENTS.

WARNING: Improper throttle installation can cause tines to rotate unexpectedly.



Assembly *(continued)*

Then insert a Cap Screw (#47) and a Lock Nut (#48) on either side (Picture 7)

9. Use a wrench to tighten Cap Screws and Lock Nuts.

10. Now use wrench to tighten all nuts and bolts firmly and securely.

IMPORTANT NOTE:

Make sure you have installed the handles properly. When you stand behind your tiller, holding the handles, the gas tank is facing away from you, on the front side of the engine.



Picture 7

IMPORTANT NOTE:

Before starting your 4 Stroke/Mantis® Tiller, add the premeasured bottle of 4 stroke engine oil supplied with your tiller. See 4 Stroke Tiller Engine Manual and information below for details.

IMPORTANT NOTE:

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

Checking the Oil Level in the Engine's Oil Sump

IMPORTANT NOTE: Before using your new Mantis 4-Stroke Tiller for the first time, it is important to check the oil level in the engines oil sump. The bottle of oil supplied with this machine holds the correct grade of engine oil.

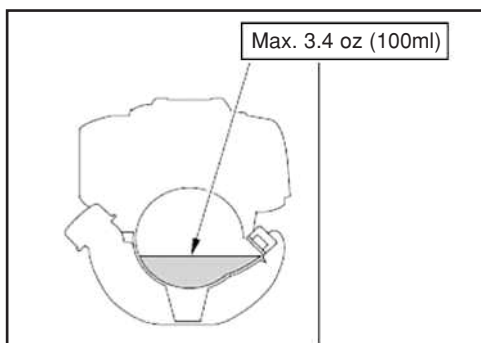
Please follow the notes below for full instructions how to check the oil level in the engine.

How to fill the engines oil sump before using your new Mantis Tiller:

1. Rock the tiller forward so that it rests on its fuel tank.
2. Remove the grey sump plug and top up the oil using the correct type of oil so that it is level with the inner first thread of the sump plug. (Picture 1)



Picture 1



IMPORTANT NOTE:

Check the oil level in the engine before each use. If oil is low, top it off with 10W-30 before using. 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 3-6.

⚠ WARNING • DANGER ⚠

FUEL IS EXTREMELY FLAMMABLE. HANDLE IT WITH CARE. KEEP AWAY FROM IGNITION SOURCES. DO NOT SMOKE WHILE FUELING YOUR EQUIPMENT.

WARNING: CHECK OIL LEVEL



Running the engine with a low oil level can cause engine damage. Overfilling the engine with oil can lead to oil leaking and smoking/oil from the muffler

Starting

TO START YOUR TILLER FOR THE FIRST TIME:

First, fill the fuel tank with the proper amount of gasoline (Use branded 89 octane (R+M+2) unleaded gasoline or gasohol—maximum 10% ethyl alcohol, or 15% MTBE, no methyl alcohol.)

Mantis® XP Tiller Starting Instructions (4 Stroke 35cc engine)

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.

Cold Engine

1. Place the **o/I** switch into the **I** “start/on” position. (Picture 1)
2. Choke the engine (or close the choke. Move choke to the closed position.) (Picture 2)
3. Push primer bulb 6 times. (Picture 3)
4. Pull grip slowly until you feel resistance then pull briskly. (Picture 4)
5. Once the engine is running, slowly push the choke lever down to the run position—the engine will continue to run. (Picture 5)

Follow these steps whenever you are starting the engine “cold”, or when the engine has run dry and you have just added fuel. Remember, always use short, brisk pulls. Don’t give the cord a long, forceful yank. And, do not let the cord snap back into the starter housing.

⚠ WARNING ⚠

DO NOT OPERATE IN A CLOSED OR CONFINED AREA

Warm Engine

1. Push ignition switch to **I** “start/on” position.

Push to Stop/Off Push to Start/On



2. Pull grip slowly until you feel resistance then pull briskly. Make sure the choke is in the open, or run, position.

NOTE: When the choke is closed, never pull the cord more than four or five times. Over-pulling may cause flooding.

⚠ WARNING ⚠

AVOID ACCIDENTAL BLADE ENGAGEMENT

DO NOT SQUEEZE THE THROTTLE TRIGGER WHEN STARTING.

MAINTAIN PROPER IDLE SPEED ADJUSTMENT (2500-3100 RPM)

How to Stop the Engine

Simply push the **o/I** “stop/ start” switch to “**O**” (Picture 6). This will stop the engine instantly. If it should ever fail to do so, just pull the choke up to the closed position. The engine will stop at once.

About the Choke

The choke controls the amount of air drawn into the engine. Your tiller will run only if the choke is open.



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5



Picture 6

⚠ WARNING • DANGER ⚠

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 FORWARD TO THE COLD START (CLOSED) POSITION. CHECK AND RETURN IGNITION SWITCH TO ON POSITION BEFORE STARTING ENGINE AGAIN.

Additional Information

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 lever on the handlebars. And, when you release the throttle lever, 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, press the

throttle lock out button (Picture 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.

How to get your tiller to your garden

NOTE: Once the throttle trigger is squeezed, you can release the lockout button (Picture 2).

Walk it.

Once your tiller is running, you can "walk" it to your garden. Just squeeze the throttle lever gently and let the tiller "tip-toe" across your yard on its tines. It won't hurt your lawn or driveway. (Picture 3)

Carry It.

Make sure the engine is off.

Then use one hand to grasp the convenient carrying handle. Use the other hand to hold the handlebars. (Picture 4) Then lift your tiller and carry it to your garden. Since it weighs only 30 pounds, it won't strain your muscles or tire you out!

Take It for a Ride.

You can easily transport your MANTIS® XP Tiller to a friend's or relative's house. Just empty the fuel tank. (**This is crucial.**) Then stow your Tiller in the trunk of your car or truck. It fits easily. And you can put it in and take it out without straining your back.



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5

Tilling



Picture 1

Now You're Ready to Use Your MANTIS® XP Tiller.

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

What's more 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 XP 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 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! (Picture 2)



Picture 2



Picture 3

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. (Picture 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 • DANGER ⚠

THE OPERATOR OF THIS TILLER IS RESPONSIBLE FOR ACCIDENTS OR HAZARDS OCCURRING TO HIMSELF, OTHER PEOPLE OR THEIR PROPERTY.

⚠ WARNING • DANGER ⚠

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.

Tilling

How about a family-size vegetable garden?

Nowadays many gardeners prefer small gardens — especially in the suburbs, where space is at a premium. But, if you're fortunate enough to own a large lot, you can create a bigger garden — a half acre or more.

⚠ IMPORTANT ⚠

To change the tines on your 4 Stroke Mantis® XP Tiller, rotate the handles forward and allow tiller to rest on the engine.



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" (5.09 cm to 7.62 cm) deep.

First, you must switch the tines to the weeding position. This

takes less than a few minutes.

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.

How to Switch From Tilling to Cultivating Position

To switch between tilling and cultivating, you will simply move the tines from one side of the tiller to the other.

When the tines are in the tilling position, they will appear as shown in Picture 1. When running, the tines rotate to the front of the tiller and the points of the tines will contact the ground first, allowing it to aggressively cut and break the soil for tilling.

When the tines are in the cultivating position, they will appear as shown in Picture 2. In this position, when the tines rotate, the long flat part of the teeth will contact the ground first for a less aggressive cultivating action.

1. First, you will need to understand that your Mantis XP has an inner and an outer set of tines on each side of the tiller as shown in Picture 3

2. Make sure the tiller is turned off.

3. Remove the retaining pins from the outer set of tines (Picture 4) 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 (Picture 5)

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 axel and secure with a retaining pin on each side.

⚠ WARNING • DANGER ⚠

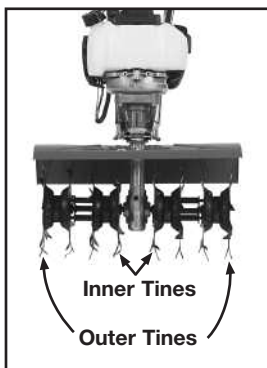
DO NOT REACH YOUR FINGERS AND/OR HAND BETWEEN THE TINE BLADES.
DO NOT ATTEMPT TO REMOVE THE INNER SET OF TINES UNTIL YOU HAVE FIRST REMOVED THE OUTER SET OF TINES.



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5

Cultivating

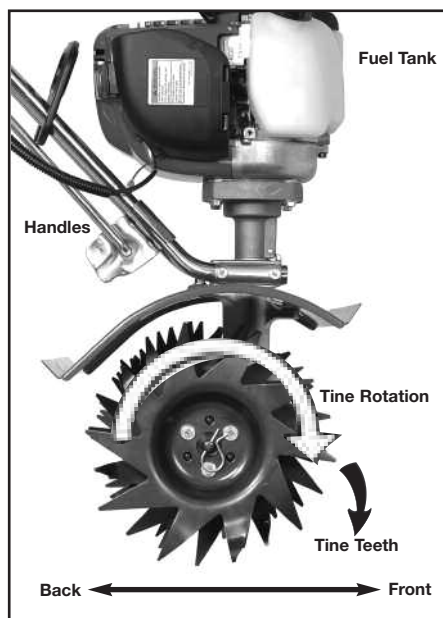
Now You're Ready to Cultivate or Weed.

Guide your tiller where you want to weed and start it up. Pull your Tiller backward slowly, then let it move forward a bit, in a gentle rocking motion. Watch it slice, shred, and bury those weeds!

Got tough weeds? Lighten your pressure on the throttle to slow your Tiller down. Then work back and forth until your Tiller chops up the weeds. It's easy and effective!

Your Mantis® XP Tiller Can Weed Between Narrow Rows!

Your Mantis XP Tiller is a precision weeder that can easily fit in tight places. So don't be afraid to weed anywhere: between plants and shrubs, in corners, against fences, on raised beds, in wide rows, even in very narrow rows. Your Mantis XP Tiller weeds six* to nine inches wide. So you can run it in a tightly planted garden without damaging your delicate plants. That's good news for

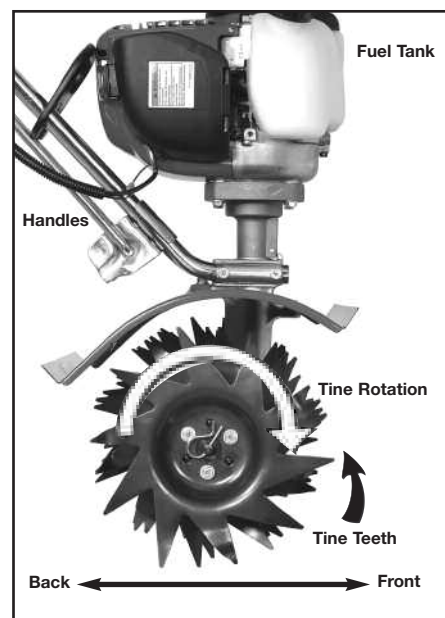


Tilling Position

Tine teeth point in the same direction as the rotation of the tine; or toward the front of the Tiller, away from the operator.

suburban gardeners, who often have to plant rows close together!

*With optional Planter Furrower attachment. (Item #6222)



Cultivating Position

Tine teeth point in the opposite direction as the rotation of the tine. Tines point toward the back of the tiller, or toward the operator.

To do this you must take off the tine assemblies (both sides) and replace with only the outer set of tines. Do not operate with only the inner set of tines. Damage will occur using this set of tines.

Cleaning the Tines

The installed weed reducer will help, but remember, any tiller will tangle in tall grass, stringy vines, or super-big weeds. So, 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.

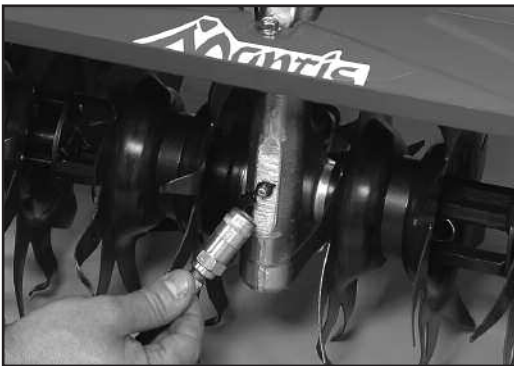
Maintenance

How to Check the Grease Level Inside the Worm Gear Housing

When we built your Mantis® XP tiller, we added 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 (Picture 1). **You should add grease through this fitting after the first 10 hours of operation and then every 50 hours of use.** To add grease through the grease fitting:

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 (Picture 2).



Picture 1



Picture 2



Picture 3

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

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 (Picture 3).

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

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 item number 9985.



WARNING



PREMATURE TRANSMISSION FAILURE CAN OCCUR IF PROPER GREASE LEVEL IS NOT BE MAINTAINED

Maintenance

Check the Air Filter Often

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 — then 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 (Picture 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

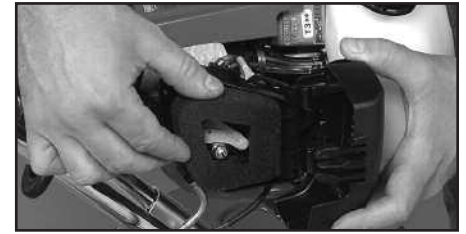


Picture 1

(Picture 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! 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



Picture 2

over the air cleaner and snap the two locking tabs.

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 then specified in the Maintenance section.

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.

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.

What to do Just in Case...

At some point, you may find that the tines won't turn when you squeeze 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. The flange bolt (Key #12, Page 18) may have come loose and lifted the engine up.

If this happened you'll notice a gap between the bottom of the engine flange (Key #43, Page 18) and the top of the worm gear housing. (Picture 3)

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 (Key #22, Page 18). Inside the flange housing, you'll find the clutch drum (Key #57, Page 18). Make sure the hex head lines up with the clutch drum inside the flange housing.

Then put the engine back on the



Picture 3. Note how the engine doesn't sit all the way down on the transmission.

worm gear housing. Make sure the plastic carrying handle is not under the engine.

If you've followed these steps properly, there will be no gap between the engine flange and the worm gear housing. (Picture 4) Make sure you tighten the flange bolt!



Picture 4. Note how the engine sits all the way down on the transmission.

Storage

Each fall, or before you store your Mantis® XP 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 the 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.

⚠ WARNING • DANGER ⚠

DO NOT STORE IN AN AREA WHERE FUEL FUMES MAY ACCUMULATE AND REACH A FLAME OR SPARK.

5 Install the spark plug, but leave the spark plug wire disconnected.

6. Clean the air filter as described in your 4 Stroke Tiller Engine Manual.

7. Clean dirt, grass and other materials from the entire machine.

8. Wipe the tines with oil or spray them with WD-40, to prevent rusting.

9. Oil the throttle cable and all visible moving parts. (Do not remove the engine cover.)

10. Check the grease level in the worm gear housing as described on page 15.

11. Order new parts to replace any that are badly worn or broken. Just call 1-800-366-6268 and ask for a local authorized Mantis or 4 Stroke Tiller dealer.

12. 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.

13. To fold the handles, follow these easy steps: Loosen the handle knobs (#53) then fold the handles forward. Tighten knob securely. Your handles are now folded and ready to store in a smaller area.

14. Do you have fuel left over from last season? Dispose of it properly. Buy fresh oil and gasoline next season.

15. Remove Tilling Tines or attachments and lightly oil tine shaft at least once a year.

You may store your Mantis Tiller with the handles upright as in Picture 1 or with the handles folded down, as in Picture 2.



Picture 1

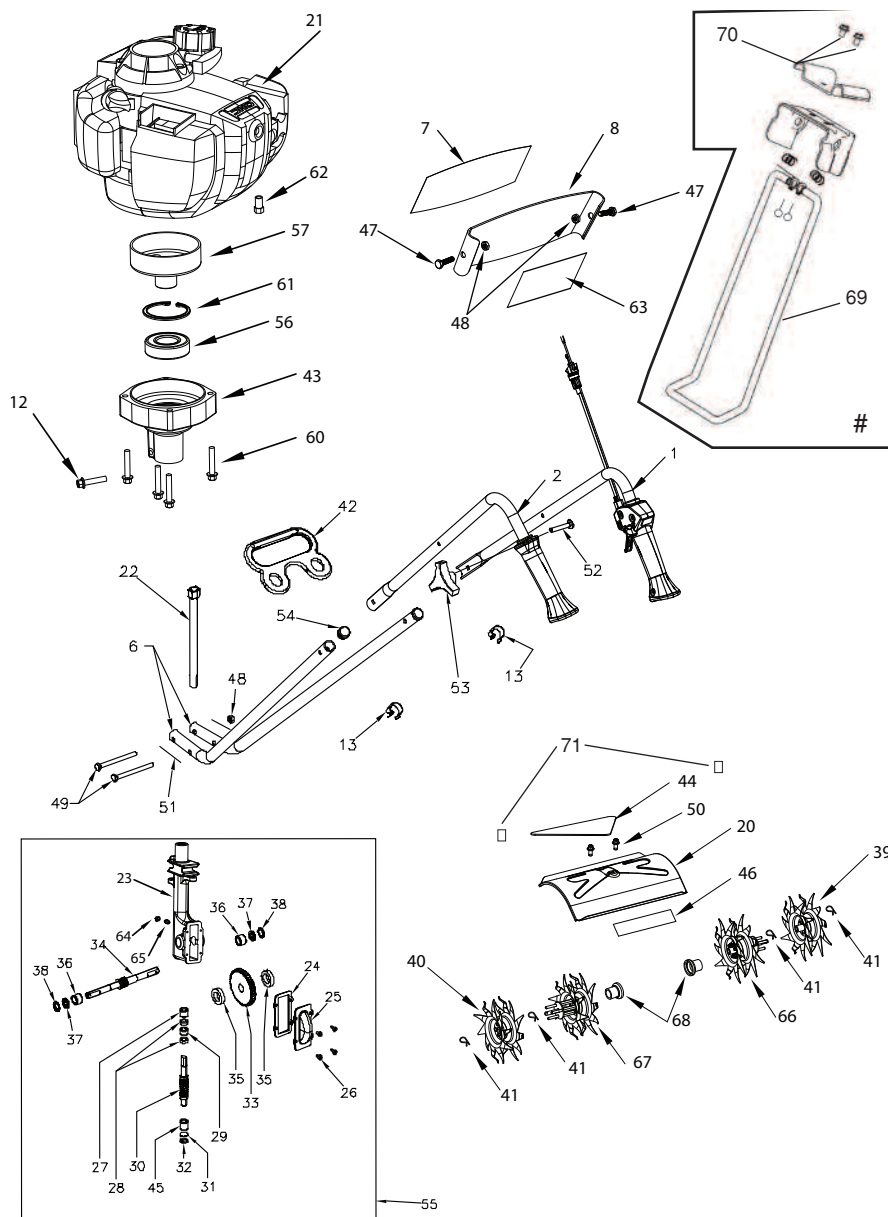


Picture 2

Do not store the tiller lying flat on its front, back, or side.

⚠ IMPORTANT ⚠
It is important to store your 4 Stroke Mantis 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.

Mantis® XP Tiller Assembly



ITEM	QTY.	PART #	DESCRIPTION / REMARKS
1	1	400257	TRIGGER HANDLE ASSM. RH
2	1	400255	HANDLE ASSM. LH
6	2	400224	LOWER HANDLE - FOLD DOWN
7	1	400633	LABEL, BRACE FRONT
8	1	400306	HANDLE BRACE
12	1	910502	10-32 X 3/4 - FLANGED BOLT
13	2	478	THROTTLE CLIP
20	1	400312	FENDER GUARD
21	1	400916	ENGINE ASSY - 35CC 4 STROKE
22*	1	468	DRIVE SHAFT
23	1	400301	WORM GEAR HOUSING
24	1	436	GASKET
25	1	437A	HOUSING COVER
26	4	651	RD. HD. SELF TAPPING SCREW
27	1	423	ROLLER BEARING
28	2	425	WORM BEARING RACE
29	1	424	WORM THRUST BEARING
30	1	422	WORM SHAFT
31	1	426	WORM DISK

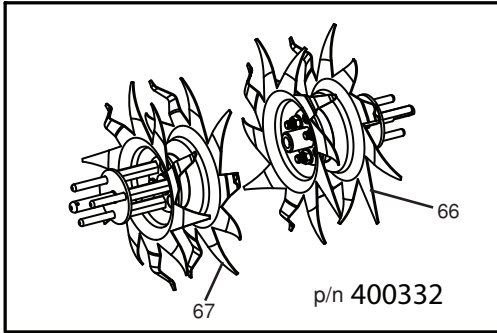
ITEM	QTY.	PART #	DESCRIPTION / REMARKS
32	1	428	RETAINING RING
33	1	429	WORM GEAR
34	1	431	TINE SHAFT
35	2	430	WORM GEAR THRUST WASHER
36	2	432	WORM GEAR BEARING
37	2	434	BEARING SEAL
38	2	435	BEARING SEAL RETAINER
39	1	400328	TINE ASSY - OUTER RIGHT
40	1	400327	TINE ASSY - OUTER LEFT
41	4	418-1	TINE RETAINING HAIR PIN
42	1	400315	CARRYING HANDLE
43	1	400307	ENGINE ADAPTER
44	1	400631	TINE LABEL
45	1	458	ROLLER BEARING
46	1	4058	MANTIS LABEL
47	2	410	CAP SCREW 1/4-20 X 1" LG.
48	4	972	LOCK NUT 1/4 - 20
49	2	470	1/4-20 X 3" BOLT
50	2	M9452	BOLT 1/4 - 20 X 1/2" LG.

ITEM	QTY.	PART #	DESCRIPTION / REMARKS
51	2	377	HANDLE CLAMP
52	2	400509	BOLT
53	2	400510	KNOB
54	2	400230	PLUG
55	1	400302	TRANSMISSION ASSEMBLY
56	1	400132	BEARING
57	1	400308	CLUTCH DRUM
60	4	400529	M6 X 33MM - FLANGED BOLT
61	1	400524	RETAINING RING
62	1	400310	THROTTLE STOP HONDA 35CC
63	1	400634	LABEL WARNING
64	1	400313	DUST CAP FOR GREASE FITTING
65	1	400300	GREASE FITTING
66	1	400330	TINE ASSY. INNER RIGHT
67	1	400329	TINE ASSY. INNER LEFT
68	2	4092	WEED RECYCLER
69#	1	410158	KICKSTAND LEG ASSY.
70#	1	410113	HARDWARE FOR KICKSTAND
71	2	400635	LABEL, XP TINE WARNING

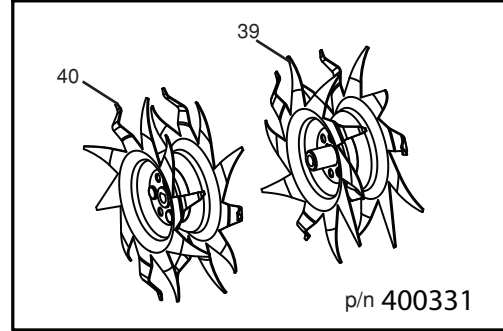
* ALSO IN KEY #55 - 400302
IF APPLICABLE

Spare Parts

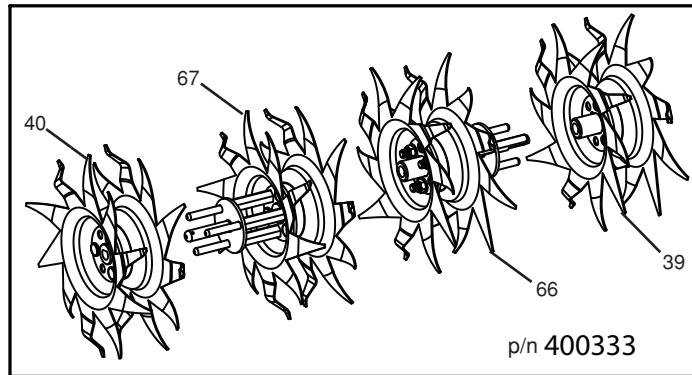
1. Set of two inner tines



2. Set of two outer tines



3. Set of four tines (inner and outer)



NOTES: _____

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