

BILLY GOAT FINISH MOWER Owner's Manual

FM3301EB

Patent Number: D494985

Accessories

Mulching Kit	Grass Catcher Kit	Transaxle Guard Kit
Reduces lawn clippings to fine nutrient-rich particles that filter down to the soil.	Easily convert your mower to bag grass and leaves.	To protect the transaxle from accidental contact from concrete curbs or other hazards.
P/N 520144	P/N 520142	P/N 520155



ABOUT THIS MANUAL

THANK YOU for purchasing a BILLY GOAT[®] *FM Mower*. Your new machine has been carefully designed and manufactured to provide years of reliable and productive service. This manual provides complete operating and maintenance instructions that will help to maintain your machine in top running order. Read this manual carefully before assembling, operating, or servicing your equipment.

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SERIAL PLATE DATA

Record the model number, serial number, date of purchase, and where purchased.

Purchase Date: _____

Purchased From: _____

		1803 S.W. Jefferson Lee's Summit, MO 64082 / USA Tel (816) 524-9696 Fax (816) 524-6983	
Model		Serial No.	
<input type="text"/>		<input type="text"/>	
Unit(Weight)		Engine Power	
<input type="text"/> lbs.	<input type="text"/> kg	<input type="text"/> kW	<input type="text"/> rpm

Specifications

FM3301EB

Engine: HP	13 (9.7 kW)
Engine: Model	21A9070147
Engine: Type	B & S INTEK OHV Elec.
Engine: Fuel Capacity	3.0 qt. (2.8 L)
Engine: Oil Capacity	1.5 qt. (1.4 L)
Total Unit Weight:	267# (121 Kg)
Max. operating slope	15°
Overall length	57" (1.44m)
Overall width	43" (1.09m)
Overall height	47" (1.19m)
In accordance with 2000/14/EEC	108dBa
Sound at operators position	88dBa
Vibration at operator position	2.65g

GENERAL SAFETY INSTRUCTIONS and SYMBOLS

The safety symbols shown below are used throughout this manual. You should become familiar with them before assembling, operating, or servicing this equipment.



WARNING: This symbol indicates important information that will prevent injury to yourself or others.



This symbol indicates ear protection is recommended when operating this equipment.



This symbol indicates eye protection is recommended when operating this equipment.



This symbol indicates gloves should be worn when servicing this equipment.



This symbol indicates that this manual and the engine manufacturer's manual should be read carefully before assembling, operation, or servicing this equipment.



CAUTION: This symbol indicates important information that will prevent damage to your BILLY GOAT[®] FM Mower.



This symbol indicates the engine oil level should be checked before operating this equipment.

Read and make sure you thoroughly understand the following safety precautions before assembling, operating or servicing this equipment:



READ this manual and the engine manufacturer's manual carefully before assembling, operating, or servicing this equipment.



EAR PROTECTION is recommended when operating this equipment.



EYE PROTECTION is recommended when operating this equipment.



BREATHING PROTECTION is recommended when operating this equipment.




WARNING: **EXHAUST** from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

DO NOT operate this equipment on any unimproved forested, brushy, or grass covered land unless a spark arrester is installed on the muffler as required by Section 4442 of the California Public Resources Code. The arrester must be maintained in good working order. Other states may have similar laws. Federal laws apply on federal lands.

DO NOT run engine in an enclosed area. Exhaust gases contain carbon monoxide, an odorless and possibly fatal poison.




 **WARNING: IMPORTANT! This cutting machine is capable of amputating hands and feet and throwing objects. Failure to observe the following safety instructions could result in serious injury or death.**

-  **WARNING:**
-  **DO NOT** run this equipment indoors or in any poorly ventilated area. Refueling outdoors is recommended.
 -  **DO NOT** refuel this equipment while the engine is running. Allow engine to cool for at least two minutes before refueling.
 -  **DO NOT** store gasoline near an open flame.
 -  **DO NOT** remove gas cap while engine is running.
 -  **DO NOT** start or operate engine if strong odor of gasoline is present.
 -  **DO NOT** start or operate engine if gasoline is spilled. Move equipment away from spill until gasoline has completely evaporated.
 -  **DO NOT** smoke while filling the fuel tank.
 -  **DO NOT** check for spark with spark plug or spark plug wire removed. Use an approved spark tester.
 -  **DO NOT** operate engine without a muffler. Inspect muffler periodically and replace if necessary. If equipped with muffler deflector, inspect deflector periodically and replace if necessary.
 -  **DO NOT** operate engine with grass, leaves or other combustible material near the muffler.
 -  **DO NOT** touch muffler, cylinder, or cooling fins when hot. Contact with hot surfaces may cause severe burns.
 -  **DO NOT** leave equipment unattended while in operation.
 -  **DO NOT** park equipment on a steep grade or slope.
 -  **DO NOT** operate equipment with bystanders in or near the work area.
 -  **DO NOT** allow children to operate this equipment.
 -  **DO NOT** operate equipment with guards removed.
 -  **DO NOT** operate equipment near hot or burning debris or any toxic or explosive materials.
 -  **DO NOT** operate equipment on slopes greater than specified in Specifications section of this manual.
 -  **DO NOT** operate barefoot or wearing open sandals. Always wear substantial footwear
 -  **DO NOT** place hands or feet underneath unit, or near any moving parts.
 -  **DO NOT** pull mower backwards unless absolutely necessary
 -  **DO NOT** operate the mower while under the influence of alcohol or drugs.
 -  **DO NOT** operate mower in wet grass. Always be sure of your footing; keep a firm hold on the handle and walk; never run.
 -  **DO NOT** mow on wet grass. Reduced footing could cause slipping.
 -  **DO NOT** mow near drop-offs, ditches, or embankments. The operator could lose footing or balance
 -  **DO NOT** mow excessively steep slopes.
 -  **DO NOT** change the engine governor setting or overspeed the engine.
- ALWAYS** Stop the blade(s) when crossing gravel drives, walks, or roads.
- ALWAYS** Shut the engine (motor) off and wait until the blade comes to complete stop before removing grass catcher.
- ALWAYS** Mow only in daylight or good artificial light.
- ALWAYS** Disengage the self-propelled mechanism or drive clutch on mowers so equipped before starting the engine.
- ALWAYS** wear safety goggles or safety glasses with side shields
- ALWAYS** remove spark plug wire when servicing equipment to prevent accidental starting.
- ALWAYS** check fuel lines and fittings frequently for cracks or leaks. Replace if necessary.
- ALWAYS** store fuel in approved safety containers.

 **WARNING: Important**

Remove all rocks, wire, string, etc. that can present a hazard during work prior to starting.

 **DO** identify and mark all fixed objects to be avoided during work such as sprinkler heads, water valves, limbs, or clothes line anchors, etc.



SOUND



L_{WA}

SOUND LEVEL 88 dB(a) at Operator Position

108 dB(a)

Sound tests were conducted in accordance with 2000/14/EEC, and were performed on 8-15-2003 under the conditions listed below.

⚠ Sound power level listed is the highest value for any model covered in this manual. Please refer to serial plate on the unit for the sound power level for your model.

General Conditions:	Sunny
Temperature:	86°F (30°C)
Wind Speed:	2.4 mph (3.9 kmh)
Wind Direction:	South
Humidity:	57%
Barometric Pressure:	30.2Hg (767 mm Hg)

VIBRATION DATA

VIBRATION LEVEL 2.65g (25.20m/s²)

Vibration levels at the operator's handles were measured in the vertical, lateral and longitudinal directions using calibrated vibration test equipment. Tests were performed on 5-26-2006 under the conditions listed below.

General Conditions:	Sunny
Temperature:	87.44°F (30.8°C)
Wind Speed:	3.1 mph (5.04kph)
Wind Direction:	South East
Humidity:	41.5%
Barometric Pressure:	29.89Hg (101.25kpa)

INTENDED USE

INTENDED USE: This unit is mainly designed for cutting grass. Some overgrown weeds, and taller grass may also be cut. Be sure to inspect work area and machine before operating. Make sure that all operators of this equipment are trained in general machine use and safety.



INSTRUCTION LABELS

The labels shown below were installed on your BILLY GOAT® FM Mower. If any labels are damaged or missing, replace them before operating this equipment. Item numbers from the Illustrated Parts List and part numbers are provided for convenience in ordering replacement labels. The correct position for each label may be determined by referring to the Figure and Item numbers shown.



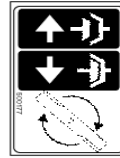
LABEL DANGER KEEP HANDS AND FEET AWAY
ITEM #5 P/N 400424



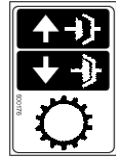
LABEL PATENT FM
ITEM#178 P/N520191



DANGER FLYING DEBRIS
ITEM #2 P/N 810736



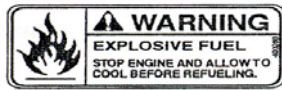
LABEL CLUTCH BLADE
ITEM #11 P/N 500177



LABEL CLUTCH DRIVE
ITEM #10 P/N 500176



LABEL WARNING GUARDS
ITEM #119 P/N 900327



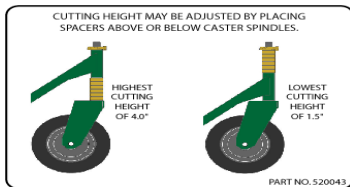
LABEL EXPLOSIVE FUEL
ITEM #4 P/N 400268



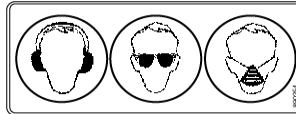
LABEL CUTTING HEIGHT
ITEM #95 P/N 520117



LABEL WARNING MOWER
ITEM #17 P/N 510206



LABEL HEIGHT ADJUST GUIDELINE
ITEM #7 P/N 520043



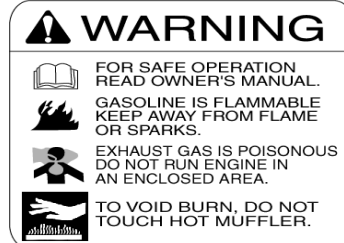
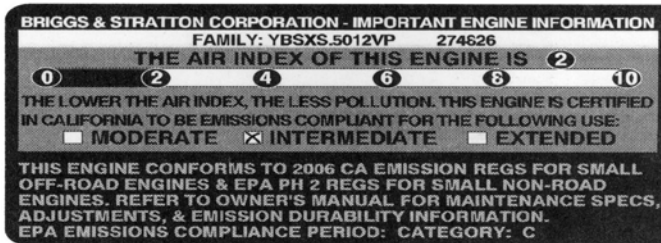
LABEL EAR EYE BREATHING
ITEM #114 P/N 890254



LABEL READ MANUAL
ITEM #52 P/N 890301

ENGINE LABELS

BRIGGS AND STRATTON



THROTTLE CONTROLS AND LABELS

Throttle Control

LABEL FM
CONSOLE ITEM #47
P/N 520079
ELECTRIC (520048)



SPEED CONTROL

5th gear (Transporting Speed): Lift up on the lever then push to engage in the 5th gear.
Rev: Lift up on the lever then pull back for reverse.

Electric Start Only

Pull up on the switch then push forward to start the engine.



PACKING CHECKLIST

Your Billy Goat Mower is shipped from the factory in one crate, completely assembled except for the handles and console assembly.



READ all safety instructions before assembling unit.
TAKE CAUTION when removing the unit from the box.



PUT OIL IN ENGINE BEFORE STARTING

PARTS BAG &
LITERATURE ASSY


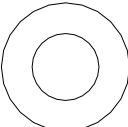


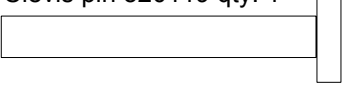



Warranty card P/N- 400972, Owner's Manual P/N-520187.

Boxing Parts Checklist

Briggs and Stratton 6HP

Literature Assy P/N-520137

Parts Bag

<p>Ty-wrap 900407 qty. 4</p> 	 <p>Washer 3/8 FC 8171004 qty. 4</p>
<p>8041051 qty. 4</p> 	 <p>Washer split lock 3/8" 8177012 qty. 4</p>
<p>Clevis pin 520119 qty. 1</p> 	 <p>Washer 5/16" FC 8171003 qty. 2</p>
<p>Roll pin 1/4"x1" long 520156 qty. 1</p> 	 <p>Pal Nut 3/8" 360218 qty. 1</p>

ASSEMBLY

NOTE: All item numbers called out in the assembly, operation, and maintenance sections of this manual can be found on Parts List (pages 15-18).

1. Cut and remove the nylon retaining straps (see figure 11-1).
2. With the console and handle assembly positioned as shown in Figure 11-3, insert the shift linkage rod (Item 31) into the shift linkage connector (Item 54).

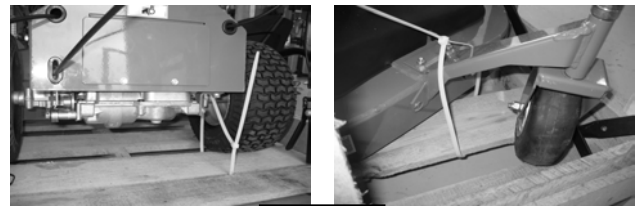


Fig. 11-1

3. To assemble the shift rod (item 31) to the shift linkage (item 54), use the roll pin in the parts/literature bag. If you'll notice on the shift linkage, the hole is larger on one side than the other.

It will be easier to start the roll pin from the larger side, forcing it through the shift rod and the hole on the other side of the shift linkage, using a hammer or large adjustable pliers.

4. Insert one of the handle mounting bolts (Item 102) with split lock washer (Item 6) on top of flat washer (Item 184) through the rear handle mounting hole of the right side handle, and screw it into the rear handle mounting hole on the right side of engine base chassis (Item 61). Repeat this procedure for the left side using the left handle.

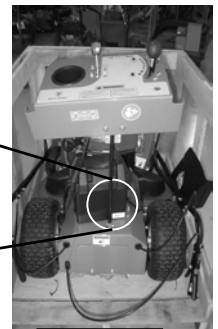
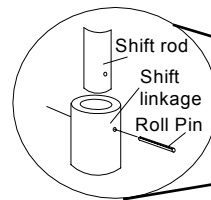


Fig. 11-3

5. On each side of the mower, insert one of the handle mounting bolts (Item 102) with split lock washer (Item 6) on top of flat washer (Item 184) through the hole in one end of the handle brace (Item 32), the front handle mounting hole of the handle and screw into the front handle mounting hole in the engine base chassis (Figure 11-5).

6. Attach the blade lever using the clevis pin, two washers and the pal nut from the parts bag. Align the lever to the hole on the handle and place a washer on the pin and slide it through. Then put a washer on the other side and gently tap the pal nut onto the end of the pin. (See fig. 11-7)

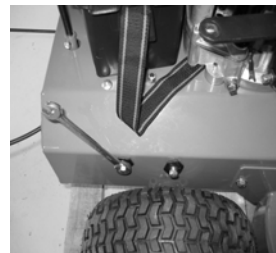


Fig. 11-4



Fig. 11-5

7. Position control cables and use 2 cable ties on each handle to secure the cables in position. The top cable tie should be 1" below the console and the lower tie should be 12" below the console (see figure 11-8 and 11-9).

8. Check the position of the shift rod guide (Item 69), and if necessary, snap it in place in the shift bracket (Item 78) as shown in Figure 11-10.

9. Put shift lever in NEUTRAL, depress the brake lever (release the brake) and carefully pull the machine back off the pallet.

10. Fill with oil and gas to the proper level and the unit is ready to mow. (A battery will also have to be installed.)

11. Read the operator's manual.



Fig. 11-7

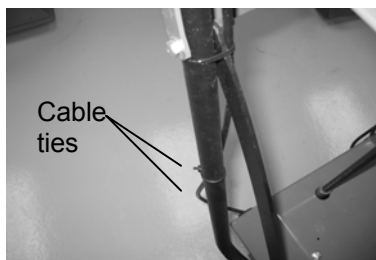


Fig. 11-8




Fig. 11-9



Fig. 11-10



OPERATION

 Like all mechanical tools, reasonable care must be used when operating machine. **Inspect machine work area and machine before operating. Make sure that all operators of this equipment are trained in general machine use and safety.**

 **PUT OIL IN ENGINE BEFORE STARTING**

STARTING

 **ENGINE:** See engine manufacturer's instructions for type and amount of oil and gasoline used. Engine must be level when checking and filling oil and gasoline.

ENGINE SPEED: Controlled by throttle lever on the control console plate.

FUEL VALVE: Move fuel valve to "ON" position (when provided on engine).

CHOKE: Operated with the throttle control by moving the throttle control to the full start position.


THROTTLE: Move remote throttle control to fast position. Pull starting rope to start engine.


ELECTRIC START: Choke the engine if necessary. Pull up then push forward on the toggle switch until engine starts, then release switch to run.

1. Select desired cutting height before starting engine.
2. Be sure drive lever or blade lever are not engaged.
3. Choke if necessary.
4. Pull back on starter rope slowly until resistance is felt. Then pull cord rapidly to start. Repeat if necessary.


Do not operate if excessive vibration occurs. If excessive vibration occurs, shut engine off immediately and check for damaged or worn blade, loose blade jam nut, loose engine or lodged foreign objects. Note: See maintenance section for proper blade jam nut torque specifications.

HANDLING & TRANSPORTING:


 Using two people to lift machine is recommended. Lift holding the handle and front of deck. Secure in place during transport.

 Never lift the machine while the engine is running. **ENGINE MUST BE OFF** while handling, lifting, or transporting the unit on or off the vehicle.

STORAGE

 Never store engine indoors or in enclosed poorly ventilated areas with fuel in tank, where fuel fumes may reach an open flame, spark or pilot light, as on a furnace, water heater, clothes dryer or other gas appliance.

If engine is to be unused for 30 days or more, prepare as follows:

 Be sure engine is cool. Do not smoke. Remove all gasoline from carburetor and fuel tank to prevent gum deposits from forming on these parts and causing possible malfunction of engine. Drain fuel outdoors, into an approved container, away from open flame. Run engine until fuel tank is empty and engine runs out of gasoline.


NOTE: Fuel stabilizer (such as Sta-Bil) is an acceptable alternative in minimizing the formation of fuel gum deposits during storage. Add stabilizer to gasoline in fuel tank or storage container. Always follow mix ratio found on stabilizer container. Run engine at least 10 min. after adding stabilizer to allow it to reach the carburetor.

CAUTION: Wheels must be chocked or blocked when unit is parked on a slope.

CUTTING OPERATION

CAUTION: Shut off the blades when crossing gravel drives, walks or roads and under all conditions where thrown objects might be a hazard.

CAUTION CLEARING A CLOGGED CUTTING DECK: Turn engine off and wait for blade to stop completely. Disconnect spark plug wire.

 Wearing durable gloves, remove clog. **Danger**, the clog may contain sharp materials. Reconnect spark plug wire.

CAUTION: Use extreme care when operating the blades. Inspect the work area for foreign objects that could cause damage to the unit or injure the operator if struck by the blade. Never operate the blades with bystanders in the work area.

GENERAL OPERATION: To engage the blades, depress the operator's left hand control lever against operator's handle. The blade is disengaged by releasing this lever. (See Fig. 1.1) To engage the wheel drive press down on the brake lever, lift the operator's right hand control lever against operator's handle. The drive is disengaged by releasing this lever. (See Fig. 1.2) Ground speed can be varied by shifting gears as described on page 12. To begin cutting, engage the blade lever, allow the blade to spin up to speed, and engage the wheel drive to begin moving forward into the material to be cut.

NOTE: Do not engage blades during transport between work sites. The blade should remain disengaged at all times when work is not being performed. The best performance is achieved when cutting in dry conditions. If the deck becomes choked with grass or debris during operation, back unit off of debris allowing machine to clear itself and continue cutting, or shut the unit off and clear the clog by hand (See above). A drop in engine RPM or a noticeable change in engine sound is usually a good indicator of a clogged discharge or other interference.

Under most conditions cutting should be done in second or third gear. Fourth gear should be reserved for conditions where grass is thinned out or not as tall. The quality of the cut produced is directly related to the unit's ground speed during cutting. If the quality of the cut is not satisfactory (i.e. material left standing) you should shift into a lower gear during cutting. For improved control in confined areas, this machine can be pushed forward or backward by releasing the drive lever and shifting to neutral located at the bottom of the operator's right-hand handle while depressing the brake release lever.

CUTTING HEIGHT ADJUSTMENT

CAUTION: DO NOT make cutting height adjustment when engine is running. Cutting height can be adjusted from 1.5" to 4" by placing spacers above or below caster spindles. For easiest adjustment change the height on one side at a time. To change cutting height, tilt the unit back, remove lynch pin, remove all spacers then set it off to the side, remove caster rig, add or subtract spacers, reinstall caster rig, place remainder of spacers if any, then reinsert lynch pin (see figure 16-1 through 16-4). Repeat this step on other side.

NOTE: Be sure that the spacers are even on both casters. Running the deck out of level will result in poor cut quality and increased belt wear.

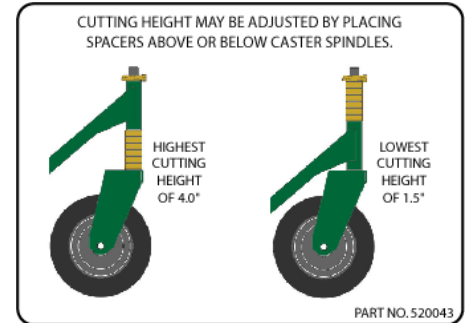


Fig. 16-1



Fig. 16-2



Fig. 16-3



Fig. 16-4



BLADE CLUTCH

The FM mower blade clutch is controlled by an operator presence control. To engage the blade, depress the operator's left hand control lever against operator's handle. The blades are disengaged by releasing this lever. (See figure 16-5)

NOTE: The blade clutch must be either fully engaged for cutting or fully disengaged to bring the blades to a stop. Do not operate the unit with the blade clutch partially engaged. Premature belt wear and clutch failure will result from improper operation of the clutch.

CAUTION: Use extreme care when operating the blades. Inspect the work area for foreign objects that could cause damage to the unit or injure the operator if struck by the blade. Never operate the blades with bystanders in the work area. Lever operates the blade without either the discharge deflector chute or the grass catcher in place.

PROPULSION

This unit is self-propelled, and is controlled by an operator presence control. To engage the wheel drive, first push down on the BRAKE RELEASE lever on the right side, and then lift the operator's DRIVE lever on the right side against operator's handle. The drive is disengaged by releasing the lower lever. (See figure 16-6). Shift to neutral, push and hold the Brake lever to free wheel.

GROUND SPEED can be varied by selecting a higher or lower gear using the gearshift lever on top of the console (see figure 16-7). **Note:** Only change gear selection when unit is stopped. Under most conditions cutting should be done in second or third gear. Fourth gear should be reserved for conditions where grass is thinned out or not as tall. The quality of the cut produced is directly related to the unit's ground speed during cutting. If the quality of the cut is not satisfactory (i.e. material left standing), you should shift into a lower gear during cutting. For improved control in confined areas, this machine can be pushed forward or backward by releasing the drive lever located at the bottom of the operator's right-hand handle, and shifting to neutral while depressing the brake release lever.

HILLSIDE MOWING

WARNING! Never mow on any slope greater than 15 degrees. Always mow across the face of slopes; never up and down or diagonally (see figure 16-8). DO NOT attempt sudden starts or stop when mowing on a slope. Avoid sudden turns and use extreme caution when changing direction on a slope.

Blade Clutch Lever



Operator's handle Fig. 16-5

Brake release lever -down to release Operator's handle



Fig. 16-6 Drive lever -up to drive



Fig. 16-7

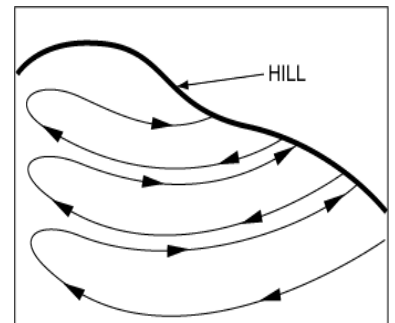


Fig. 16-8

MAINTENANCE

PERIODIC MAINTENANCE

Periodic maintenance should be performed at the following intervals:

Maintenance Operation	Every Use (daily)	Every 5 hrs or (daily)	Every 25 Hrs	Every 50 Hrs	Every 200 Hrs
Inspect for loose, worn or damaged parts.	•				
Check for excessive vibration		•			
Inspect belt for wear			•		
Engine (See Engine Manual)					
Grease caster pivot points and lubricate height adjustment spacers			•		
Sharpen Blade			•		
Lubricate pivot points of all three control levers			•		
Check tire pressure Note: inflate to mfr.'s specs. as shown on tire side wall			•		
Check brake puck				•	
Check parking brake				•	
Replace blade and traction belts					•

Note: Blade, blade brake puck, transaxle brake, and drive belts are normal wear items. These should be inspected on a regular basis and replaced if worn.

BLADE Removal / Sharpening

⚠ NOTE: When sharpening the blade it is a good idea to check the balance of the blade. A properly balanced blade will increase life of the bearings and other components.

Tools required: ratchet, 3/4" inch socket, torque wrench, adequate support, block to inhibit blade rotation.

1. Disconnect spark plug wire.
 2. Support front of unit to allow access to the blades.
- Note: Unit is heavy. Be sure support is adequate to prevent personal injury.
3. Block the blade to prevent it from rotating during removal (see figure 17-4).

For Each Spindle:

4. Remove the blade bolt (Item 35), lock washer (33), and large friction washer (103).
 5. Remove the blade (18) and replace or sharpen the blade.
- NOTE: Use only B.G.I. Part no. 520001(Standard blade) or B.G.I. Part no. 520002 (Mulch blade).
6. Reinstall the blade using all fasteners in the exact order they were removed (see figure 17-4).
 7. Torque blade screw to 60 ft-lbs.
- NOTE: Before installing the fasteners inspect them for wear and replace as necessary.
8. Reconnect spark plug wire.

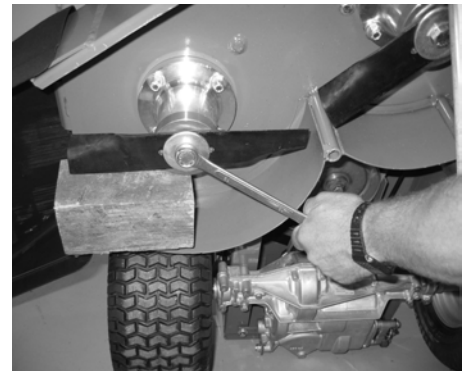


Fig. 17-4



Fig. 17-5



BELT REPLACEMENT

When replacing one belt the other should be inspected for wear and replaced if worn. It is good practice to change both belts when either is worn beyond use. Use only original equipment belts for replacement. Billy Goat uses only premium quality, Kevlar corded and coated belts in your unit. Substitute belts do not meet the design and performance requirements for your unit, and will greatly reduce machine performance and belt life.

Blade Drive Belt

Tools required: ratchet, 3/4 inch socket, 10" extension bar for socket, two 1/2" wrenches and adequate support for machine.

1. Disconnect spark plug wire.
 2. Remove the deck belt cover.
 3. Support front of unit to allow access to underside of the machine near the engine.
- Note: Unit is heavy. Be sure support is adequate to prevent personal injury.
4. Observe the orientation of the belt fingers (Item 90) under the engine.
 5. Remove the 4 engine mount bolts (Item 48) being careful not to let engine slide out of place.
 6. Remove the left and right belt fingers (These fingers are interchangeable).
 7. Observe the orientation of the belt finger (Item 91) on idler (Item 50).
 8. Loosen but do not remove idler/belt finger retaining nut (Item 144).
 9. Observe belt routing and remove the belt from front spindle pulley (Item 46).
 10. Remove the belt from the idler pulley and from the engine pulley.
 11. Install new belt on engine pulley, idler and front spindle pulley following the original belt routing.
 12. Position the idler belt finger centered on idler bracket and tighten the retaining nut (Item 144).
 13. Reinstall the left and right belt guide fingers under the engine base using all fasteners in the exact order they were removed.
- NOTE: Before installing the fasteners inspect them for wear and replace as necessary.
14. Torque the four engine bolts to 40 ft-lbs.
- Note: With clutch levers engaged, be sure belt guides do not touch belts after installation, there should be 1/8" clearance between the belt and the guides.
15. Observe the idler pulley when the blade drive lever is lowered and released (see figure 17-7).
- NOTE: Idler should tighten the belt when blade drive lever is pressed and the belt should be slack when the lever is released. With the lever depressed, the edge of the belt guide should not rub on the belt.
16. Replace the cover
 17. Reconnect spark plug wire.
 18. Start engine and check for proper operation of blade drive system.

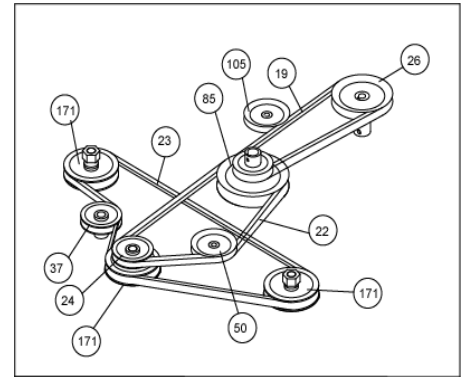


Fig. 17-6

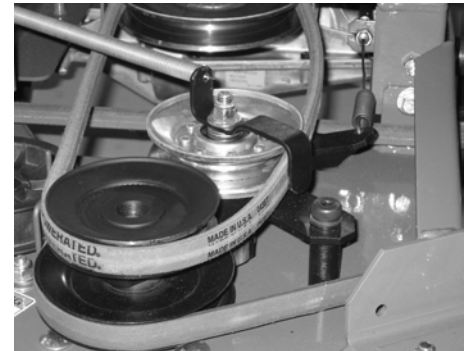


Fig. 17-7

Spindle Drive Belt

Tools required: 3/8 inch socket, 1/2 inch socket.

1. Disconnect spark plug wire.
 2. Follow steps to remove the Blade Drive Belt (on the spindle pulley side only) from the previous section.
 3. Loosen the two idler plate nuts (Item 143).
 4. Slide the belt idler to release the belt tension.
 5. Observe the belt routing, then remove the old belt and install the new belt using the original routing.
 6. Tension the belt using a long screwdriver or other pry bar to push the idler pulley against the belt.
- Note: Take care not to damage the idler pulley.
7. Tighten the two idler plate nuts just enough to avoid slippage while checking the belt tension.
 8. Check belt deflection. Finger pressure should give 0.5" to 0.75" (see figure 17-8).
 9. Increase/decrease belt tension for proper deflection.
 10. Finish tightening the two idler plate nuts.
 11. Follow steps to reinstall Blade Drive Belt from the previous section.
 12. Replace cover.
 13. Reconnect spark plug wire.



Fig. 17-8

BELT REPLACEMENT continued

Tools required: 1/2 Wrench or ratchet and 1/2 inch socket, adequate support for machine.

1. Remove the Blade Drive Belt (Steps 1-10: Blade Drive Belt Replacement Procedure).
2. Assure that spark plug wire is disconnected.
3. Support rear of unit to allow access to underside of the machine near the rear.

Note: Unit is heavy. Be sure support is adequate to prevent personal injury.

4. Observe the belt fingers (Item 63), position of idler and belt routing.
5. Remove the belt finger retaining nuts and bolts (Items 125 and 143).
6. Remove the belt finger and remove the belt from the transaxle pulley (Item 48).
7. Remove the belt from the drive idler (Item 105).
8. Remove the belt from the engine drive pulley (Item 85).
9. Install new belt on the top (small) engine pulley, drive idler and transaxle pulley using the original belt position and routing.

10. Reposition and secure the belt finger (Item 63) using the original bolts, washers and nuts.

NOTE: Before installing the fasteners inspect them for wear and replace as necessary.

11. Reinstall the Blade Drive Belt (Steps 11-16: Blade Drive Belt Replacement Procedure).
Note: With clutch levers engaged, be sure belt guides do not touch belts after installation.
12. Replace the cover
13. Reconnect spark plug wire.
14. Start engine and check both belts for proper operation of blade drive system and mower drive system.

⚠ WARNING: If the drive belt begins to squeal or slip, do not continue to operate your unit until adequate adjustment or repair has been performed. Improper adjustment can cause drive belt to slip and overheat, greatly reducing machine performance and transmission life.

CABLE ADJUSTMENTS

Brake Adjustment

The brake control cable is spring-loaded and requires no adjustment; however, the transaxle brake is adjustable. When the mower is in neutral and can be pushed by hand without depressing the brake lever, the transaxle brake needs adjustment.

Using a 1/2 inch wrench turn the adjusting nut 1/4 turn clockwise (see figure 17-1).

With the machine in neutral and:

1. The brake lever not depressed, the brake should be on and inhibit the machine from being rolled by pushing.
2. The brake lever depressed the brake should be off and the machine should roll uninhibited by the brake.

Transaxle Drive Control Cable Adjustment

When the transaxle drive belt slips, the drive control cable needs to be adjusted or the belt needs to be replaced with a new belt.

Cable Adjustment:

1. Using a 3/8" wrench, remove the rear access door (Item 51).
2. Using a 1/2 " open end wrench, turn the inside adjusting nut counter-clockwise and back it off 1/8", then tighten the outboard adjusting nut against the support bracket (see figure 17-2).
3. Check for proper operation. If the operation is not correct, repeat step 2.
4. Replace the access door.

The drive control cable adjustment should be the minimum amount required so the belt does not slip when the drive is engaged.

Blade Drive Control Cable Adjustment

When the blade drive control lever is depressed, the blades should turn and the blade drive belt should not slip. When the cable is properly adjusted the tension spring on the end of the control cable will open slightly (only enough for a piece of paper to slip between the coils). See figure 17-3.

Cable Adjustment:

1. Remove the deck belt cover (Item 81).
2. Observe the tension spring on the end of the cable when the blade drive lever is depressed. The spring should just break open.
3. If adjustment is required, using a 1/2" open end wrench, turn the inboard adjustment nut counter-clockwise and back it off 1/8" (Figure 4). Then tighten the outboard adjustment nut against the cable support bracket (Item 49).
4. Check the spring tension with the blade drive lever depressed.
5. Readjust the control cable as needed for proper tension.
6. Replace the deck belt cover.

Note: Too much tension will shorten belt and bearing life and too little tension will allow the belt to slip.

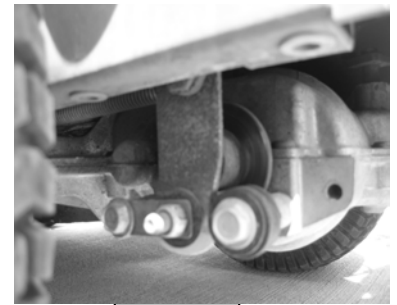


Fig. 17-1



Fig. 17-2

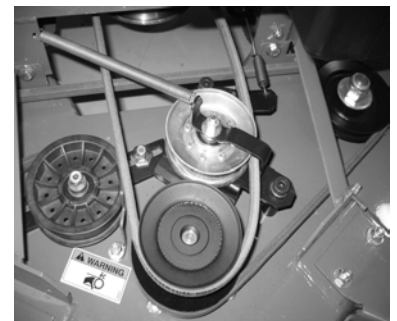


Fig. 17-3





BRAKE PUCK REPLACEMENT

Tools Required: 5/32" Allen wrench; 3/8" wrench.

1. Remove the spark plug wire.
2. Remove the belt deck cover.
3. Remove the brake spring (A) and control cable spring (B) (see figure 17-10).
4. Remove the blade drive belt (C) from the drive pulley (D).
5. Using a 3/8" wrench and 5/32" allen wrench, remove the nuts from the #10 puck retaining bolts (see figure 17-11).
6. Remove the bolts from the puck.
7. Remove the brake puck.

Note: The puck ends are symmetrical and can be interchanged to use a new braking surface unless both ends are already worn (Figure 4). When both ends have been used replace the puck with a new one.

8. Inspect the nylon brake arm spacer (Item 44) by removing the belt finger (Item 91) and idler pulley (Item 50).
9. Replace the spacer if it shows signs of wear.
10. Reassemble all parts in the same orientation as when removed.

Note: Be sure that the brake puck is centered and contacts both sides of the pulley groove after tightening.

Note: Before installing fasteners, inspect them for wear and replace as necessary. Be sure that when reinstalling control cable spring (B), the open side of the spring hook faces up.

11. Check the operation of the clutch and brake mechanism.
The drive belt should be slack and the brake engaged (center pulley will not turn easily by hand) when no pressure is exerted on blade drive lever.

Note: When the blade drive lever is depressed, the brake puck should not rub on the center pulley, the belt should be under tension, and not rub on the belt finger (see figure 17-10).

13. Replace the belt cover and connect the spark plug wire.
Start the engine and check the clutch/brake operation under power.

Note: When the blade clutch control lever is pressed down, the blades should spin up to speed without belt slippage indicated by a pronounced belt squealing sound. When the clutch control lever is released, the blades should stop spinning in 5 seconds or less.

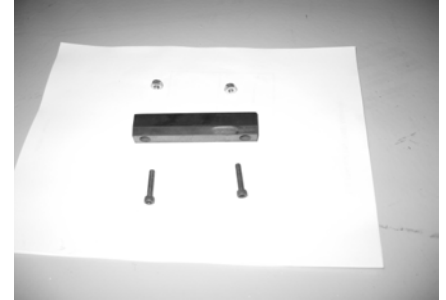


Fig. 17-9

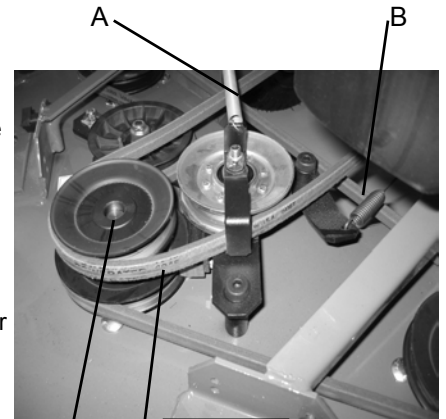


Fig. 17-10

Belt finger should not rub on belt when drive is engaged.

STARTER SWITCH WIRING

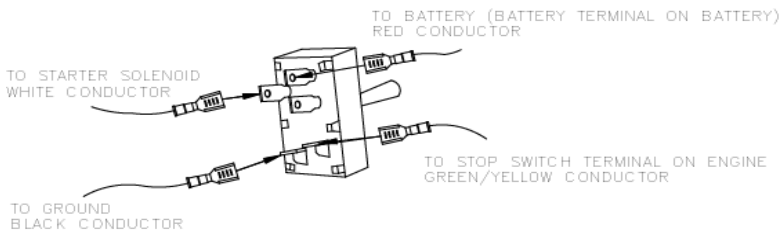


Fig. 17-11



Troubleshooting

Problem	Possible Cause	Solution
Engine will not start.	Choke not on. Out of gasoline, bad or old gas. Spark plug wire disconnected. Dirty air cleaner. Blade clutch is engaged	Move throttle to start position. Check Gasoline. Check for spark with an approved tester. Clean or replace air cleaner. Disengage the Blade clutch lever.
Engine will not stop	Damaged control cable. Harness Wire is disconnected or damaged. Damaged ignition switch.	Replace control cable. Reconnect harness wire or replace if damaged. Replace switch.
Engine runs poorly	Spark plug wire loose. Engine RPM set too low. Carburetor out of adjustment. Water or dirt in fuel system. Spark plug fouled, faulty or wrong gap	Sharpen or replace blade (pg 13). Check engine RPM (refer to engine manual). Adjust carburetor (refer to engine manual). Reset gap or replace spark plug (refer to engine manual).
Abnormal vibration.	Loose or out of balance blade. Bent blade. Loose engine bolts	Stop work immediately. Check blade mount and balance. Replace damaged or bent blade if required (pg 13). Check engine mount.
Uneven cut	Height adjust is not set correctly. Dull or bent blade. Tire pressure low on one side.	Be sure height adjust is set the same on both sides (pg 11). Sharpen or replace blade (pg 13). Adjust pressure.
Will not cut or has poor cutting performance	Dull or bent Blade. Clogged deck. Engine running at too low RPM. Wet Grass. Excessively high grass.	Sharpen or replace blade (pg 13). Unclog deck (pg 11). Check engine RPM (refer to engine manual). Do not mow when grass is wet. Mow once at a high cutting setting then mow again at desired setting or make a narrower cutting path.
Belt slips or smokes	Belt tension too low. Belt worn or stretched. Pulleys worn or damaged. Control cable out of adjustment.	Increase tension at idler (pg 14). Replace belt. Replace Pulleys. Adjust control cable
No self propelling	Not set to gear. Out of adjustment clutch cable. Broken clutch cable. Worn or broken belt.	Shift lever to desired gear. Adjust clutch cable (pg 15). Replace with new cable. Replace belt (pg 14).
Self propelled drive will not release.	Clutch cable out of adjustment. Damaged drive clutch lever.	Adjust clutch cable (pg 15). Replace drive clutch lever.
Engine is locked, will not pull over.	Debris locked against blade. Damaged engine. Broken control cable.	Remove debris (pg 11). Refer to engine owner's manual. Replace control cable.

When servicing engine refer to specific manufacturers engine owner's manual. All engine warranty is covered by the specific engine manufacturer. If your engine requires warranty or other repair work contact your local servicing engine dealer. When contacting a dealer for service it is a good idea to have your engine model number available for reference(See table page 11). If you cannot locate a servicing dealer in your area you can contact the manufacturers national service organization.

To reach: Briggs & Stratton: 800-233-3723

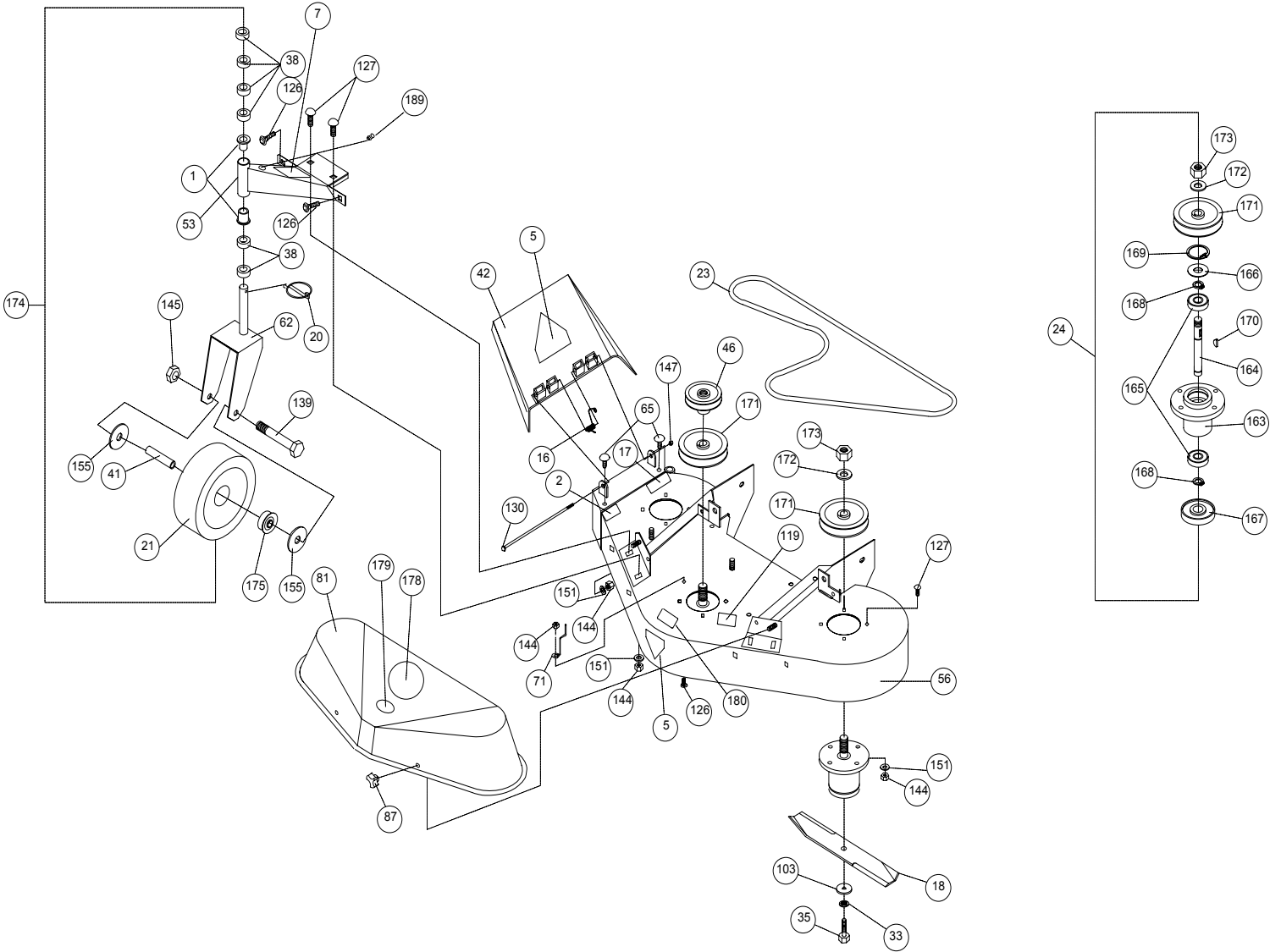
WARRANTY CLAIM PROCEDURE

Should a BILLY GOAT[®] machine fail due to a defect in material and/or workmanship, the owner should make a warranty claim as follows:

- The machine must be taken to the dealer from whom it was purchased or to an authorized Servicing BILLY GOAT Dealer.
- The owner must present the remaining half of the Warranty Registration Card, or, if this is not available, the invoice or receipt.
- The Warranty Claim will be completed by the authorized BILLY GOAT Dealer and submitted to their respective BILLY GOAT Distributor for their territory Attention: Service Manager. Any parts replaced under warranty must be tagged and retained for 90 days. The model number and serial number of the unit must be stated in the Warranty Claim.
- The distributor service manager will sign off on the claim and submit it to BILLY GOAT for consideration.
- The Technical Service Department at BILLY GOAT will study the claim and may request parts to be returned for examination. BILLY GOAT will notify their conclusions to the distributor service manager from whom the claim was received.
- The decision by the Technical Service Department at BILLY GOAT to approve or reject a Warranty Claim is final and binding.

For online product registration go to www.billygoat.com

PARTS DRAWING FM





PARTS LIST

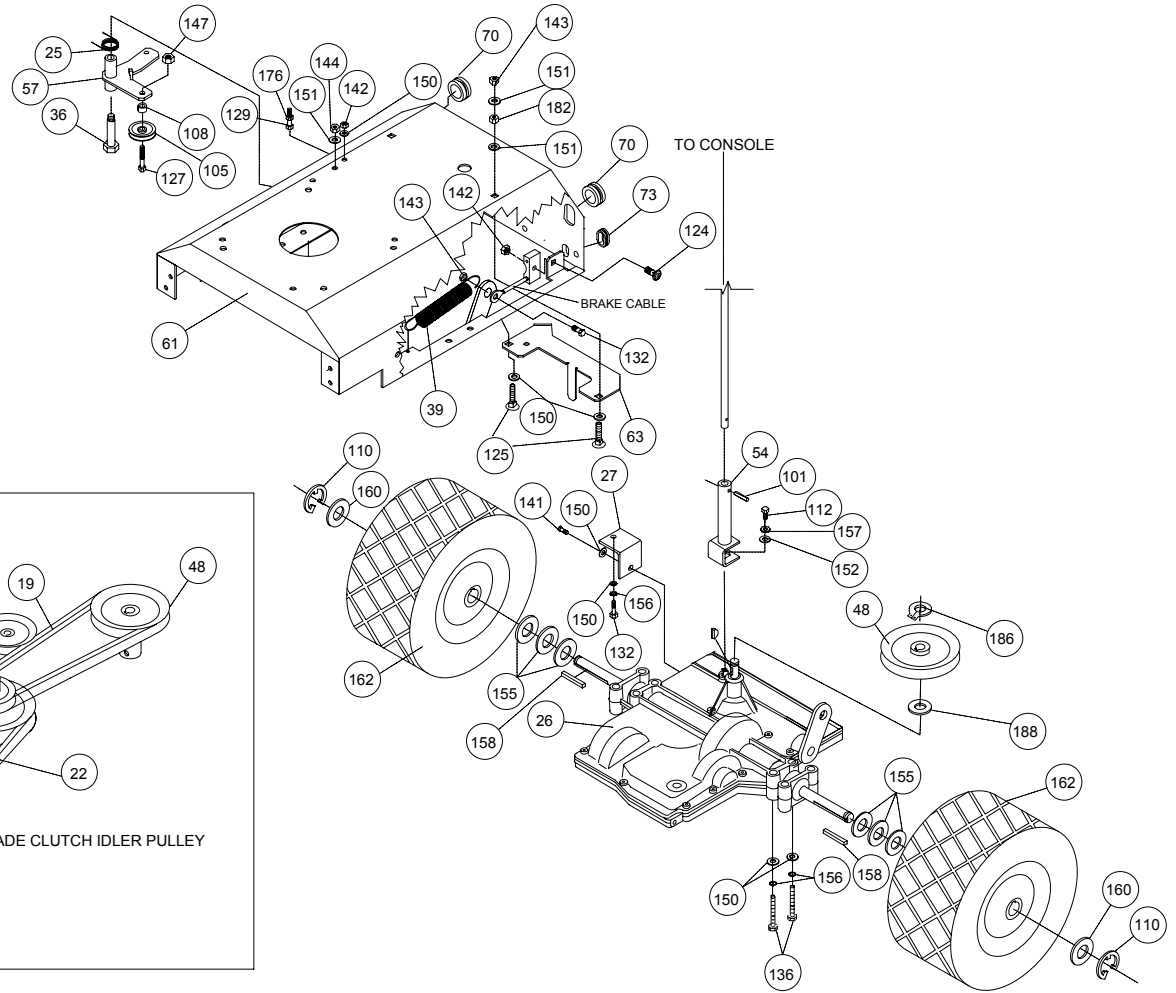
ITEM NO.	DESCRIPTION	FM3301EB Part NO.	QTY
1	BUSHING BRONZE	520184	4
2	LABEL DANGER FLY	810736	1
5	LABEL WARNING	400424	2
7	LABEL HGT. GUIDELINE	520043	1
16	SPRING EXHAUST CHUTE	510205	1
17	LABEL WARNING MOWER	510206	1
18	BLADE 11.88"	520001	3
20	LYNCH PIN 3/16" X 1 9/16	520004	2
21	WHEEL AND TIRE 8" ASSY.	520005	2
23	BELT SPINDLE DRIVE	520007	1
24	SPINDLE ASSY FM	520008	3
33	WASHER 1/2 INNER TOOTH	520025	3
35	SCREW CAP 1/2-20X1.25	520028	3
38	BUSHING CASTER SPACERS	520034	12
41	SPACER FRONT CASTER	520041	2
42	EXHAUST CHUTE DEFLECT.	520042	1
46	PULLEY DECK FRONT DRIVE	520047	1
53	CASTER ARM FM WA	520067-S	2
56	DECK WA W/ LABELS	520071-S	1
62	BRACKET CASTER FM WA	520077	2
65	PLUG 3/8" BUTTON HEAD	520081	2
71	WIRE BELT FINGER	520088	1
81	GUARD BELT W/ LABELS FM	520100-S	1
87	KNOB 3 PRONG 1/4"	520109	4
103	WASHER 1/2" X 2	610308-P	3
119	LABEL DANGER	900327	1
126	BOLT CARRIAGE 3/8-16X1" ZP	8024058	5
127	BOLT CARRIAGE 3/8-X 1 1/4	8024059	16
130	SCREW CAP 1/4 - 20 X 7"	8041023	1
139	SCREW CAP 1/2-13 X 4 1/2	8041107	2
144	NUT 3/8-16 LOCK NYLON	8160003	21
145	NUT 1/2-13 LOCK NYLON	8160005	2
147	NUT 1/4-20 LOCK NYLON	8160001	1
151	WASHER 5/16" FC	8171003	20
155	WASHER 3/4 FC	8172015	4
163	HOUSING SPINDLE	520008-01	3
164	SHAFT SPINDLE 1215 C. D. S.	520008-02	3
165	BEARING BALL 6305-25	520008-03	6
166	WASHER	520008-04	3
167	SHIELD	520008-05	3
168	RETAINING RING	520008-06	6
169	RETAINING RING	520008-07	3
170	WOODRUFF KEY # 605	520008-08	3
171	PULLEY 4.75" DIA. 3/4" BORE	520008-09	3
172	MACHINERY BUSHING 3/4"	520008-10	3
173	NUT 3/4-16 NYLON HEX	520008-11	3
174	FRONT CASTER ASSY.	520140	1
175	BEARING CASTER WHEEL	520124	4
178	LABEL BGI BIG CIRCLE	430303	1
179	LABEL 33" CUT FM	520115	1
180	LABEL MADE IN USA	520116	1
189	FITTING GREASE	610363	2



PARTS LIST

ITEM NO.	DESCRIPTION	FM3301EB Part NO.	QTY
4	LABEL HOT ENGINE	400268	1
6	WASHER SPLIT LOCK 3/8"	8177012	4
9	WASHER 5/16" TWISTED LK.	430298	2
13	BATTERY BRACKET	520199	1
29	SCREW SOCKET #10 X 1"	520018	2
36	BOLT SHOULDER 1/2" X 2"	520031	2
37	IDLER PLASTIC 4" X 0.375	520032	1
40	ENGINE 13 HP B&S	520039	1
44	SPACER NYLON BRAKE	520045	1
49	BRKT CLUTCH CABLE FM	520052	1
50	PULLEY IDLER BLADE DRIVE	520061	1
51	PLATE ACCESS DOOR FM	520062	1
55	BRKT IDLER DECK BLADE WA	520070	1
58	PLATE BLADE CLUTCH IDL.	520073	1
59	PLATE BLADE CLUTCH BK	520074	1
83	SPRING TENSION WIRE	520103	1
85	PULLEY DOUBLE 6 / 3.5 FM	520105	1
86	BRAKE PUCK FM	520106	1
89	CABLE BATTERY POS 10"	520111	1
90	BRACKET BELT FINGER	520197	2
91	BRACKET BELT FINGER BK.	520113	1
92	SPACER HUB 1" BORE 1.5"	520114	1
93	SCREWCAP 5/16" -18 x 2"	8041032	1
96	WIRE HARNESS	520118	1
102	SCREWCAP 3/8" - 1.25"	8041051	4
104	CABLE BATTERY BLACK 10"	790133	1
106	SCREWCAP 7/16 X 2 1/4 GR 8	830114	1
109	WASHER LOCK 7/16 TWIST	850132	1
111	WASHER ENGINE PULLEY	850443	1
116	SCREW 1/4" - 20 X 5/8"	890359	2
118	SCREWCAP 3/8" 1 1/2" TAP	890408	3
120	LABEL GUARDS	900327	1
123	BOLT CARRIAGE 1/4" X 3/4"	8024039	2
125	BOLT CARRIAGE 5/16" X 1"	8024040	1
137	SCREW CAP 3/8"-16 X 1 HEX	8041050	4
138	SCREW CAP 3/8"-16 X 2 HEX	8041054	1
140	NUT LOCK 1/4"-20 NYLON	8160001	2
143	NUT LOCK 5/16"-18 NYLON	8160002	3
144	NUT LOCK 3/8"-16 NYLON	8160003	6
147	NUTLOCK 3/8"-16 LW TH ZP	8161042	1
148	NUT LOCK #10	8155007	2
150	WASHER 1/4" FC	8171002	1
151	WASHER 5/16" FC	8171003	8
159	KEY 1/4" SQ. X 2.25" LONG	9201123	1
178	LABEL DESIGN PATENT FM	520191	1
181	WASHER SPLIT LOCK 5/16"	8177011	1
182	NUT JAM 5/16"	8142002	1
183	POSITIVE CABLE 10"	520123	1
184	WASHER 3/8" FLATCUT	8171004	4
187	WASHER #10 FLATCUT	8171001	2
190	VALVE OIL DRAIN	520182	1
192	BATTERY 12v W/LABEL	520200	1

PARTS DRAWING FM

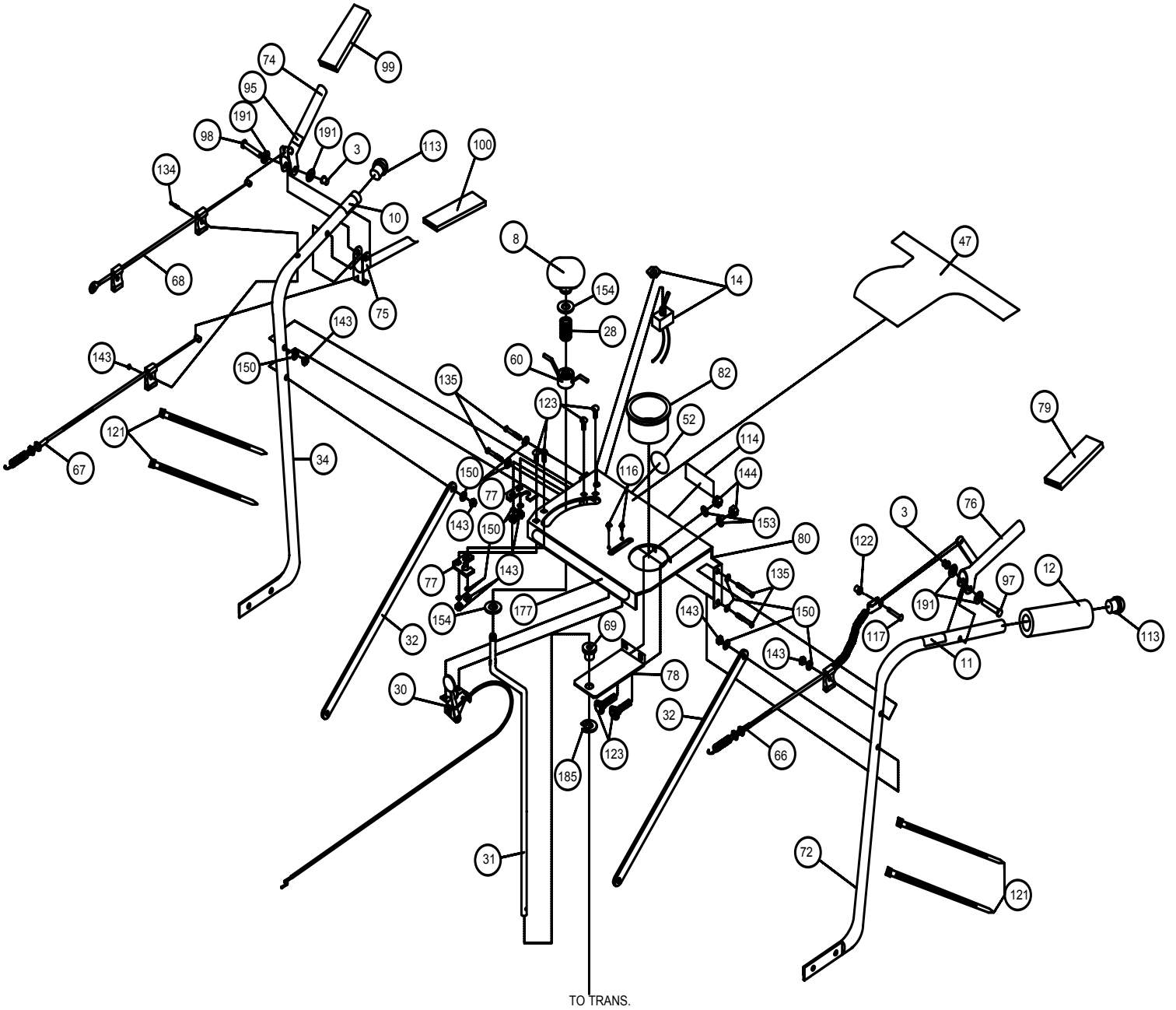




PARTS LIST

ITEM NO.	DESCRIPTION	FM3301EB Part NO.	QTY
19	BELT TRANS DRIVE FM	520201	1
22	BELT BLADE DRIVE FM	520006	1
25	SPRING TORSION WIRE	520009	1
26	TRANSAXLE 5SPD FM	520010	1
27	BRACKET T-AXLE SUPPORT	520016	1
36	BOLT SHOULDER 1/2" X 2"	520031	1
39	SPRING BRAKE	520037	1
48	PULLEY 6.875 OD 4LV GROOVE 0.625 BORE	520198	1
54	SHIFT LINKGAGE WA FM	520068	1
57	BRKT IDLER GRND DRIVE	520203	1
61	BASE ENGINE W/INSERTS	520177	1
63	BRACKET BELT GUIDE DRV	520196	1
70	GROMMET RUBBER 1"	520087	2
73	GROMMET RUBBER 1.25"	520092	1
101	ROLL PIN 1/4" X 1.0 IN LONG	520156	1
105	PULLEY IDLER TENSION	800260	1
108	TUBE PIVOT IDLER VQ	830526	1
110	RING SNAP 0.75	850230	2
112	SCREW CAP 1/4-28X1/2" GR 5	850408	1
124	BOLT CARR. 1/4-20X1.25"	8024023	1
125	BOLT CARR. 5/16-18X1 1/2"	8024042	2
127	SCREWCAP 3/8-16 X 1 3/4	8041053	1
129	SCREWCAP 1/4"-20 X 2.75"	8041013	1
132	SCREWCAP 5/16-18 X 1.25"	8041029	1
136	SCREW CAP 5/16 - 18 x 2.75	8041035	4
141	SCREW SELF TAP 5/16	8123128	1
142	NUT LOCK 1/4-20 NYLON	8160001	2
143	NUT LOCK 5/16-18 NYLON	8160002	4
144	NUT LOCK 3/8-16 NYLON	8160003	1
147	NUTLOCK 3/8"-16 LW TH ZP	8161042	1
150	WASHER 1/4" FC	8171002	5
151	WASHER 5/16" FC	8171003	3
152	WASHER 1/4 SAE	8172007	1
155	WASHER 3/4 FC	8172015	6
156	WASHER LOCK 5/16 SPLIT	8177011	5
157	WASHER LOCK 1/4" EXT.	8181007	1
158	KEY 3/16 x 2 1/8	9201087	2
160	WASHER 3/4 THIN	850238	2
162	WHEEL AND TIRE 13"	830177	2
176	NUT JAM 1/4-20	8143001	2
182	NUT JAM 5/16	8142002	2
186	RING SNAP 5/8 T.A.	850233	1
188	WASHER .765 ID X 1.25 OD X .06	850238	1

PARTS DRAWING FM





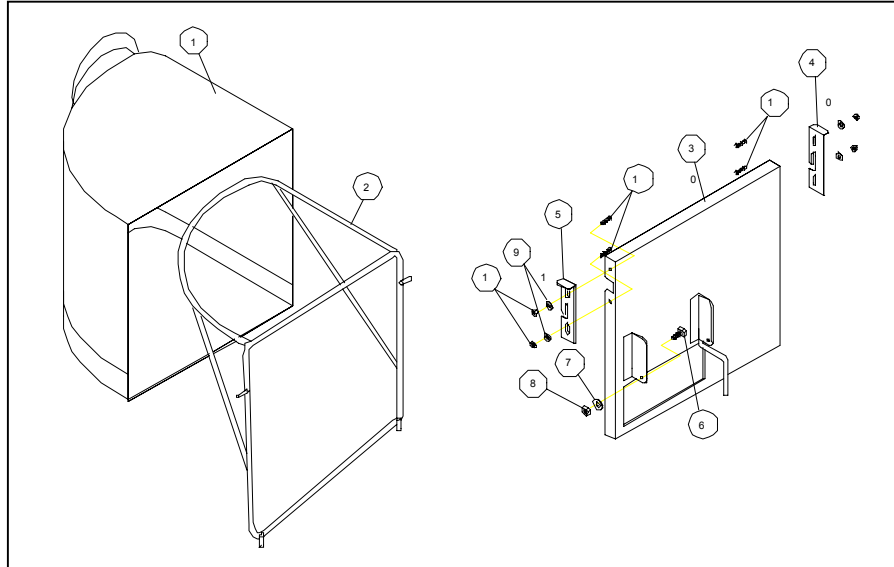
PARTS LIST

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3	PALNUTS 3/8"	360218	2
8	KNOB 1/2" THREAD	430128	1
10	LABEL CLUTCH DRIVE	500176	1
11	LABEL BLADE DRIVE	500177	1
12	GRIP HANDLE 1" x 7"	500267	1
14	SWITCH ELECTRIC W/ NUT	500307	1
28	SPRING COMPRESSOR 1/2"	520017	1
30	CONTROL THROTTLE POS	520019	1
31	ROD SHIFT LINKGAGE	520179	1
32	BAR HANDLE BRACE FM	520024	2
34	HANDLE RH FM	520026-S	1
47	LABEL CONSOLE	520048	1
52	LABEL READ MANUAL	890301	1
60	SHIFT LOCK HANDLE FM WA	520075	1
66	CABLE CLUTCH BLADE FM	520083	1
67	CABLE CLUTCH DRIVE FM	520204	1
68	CABLE CLUTCH BRAKE FM	520085	1
69	BUSHING NYLON	500130	1
82	HANDLE LH FM	520091-S	1
74	LEVER CONTROL BRAKE FM	520093-S	1
75	LEVER CONTROL DRIVE FM	520094	1
76	LEVER CONTROL BLADE FM	520095	1
77	PLATE REV LOCK OUT	520096	2
78	BRACKET SHIFT PIVOT FM	520097	1
79	GRIP LEVER ORANGE	520098	1
80	CONSOLE FM W/ LABELS	520146	1
82	CUP HOLDER	520102	1
95	LABEL PUSH TO RELEASE	520117	1
97	CLEVIS PINS 3/8 - 1.625	520119	1
98	CLEVIS PINS 3/8 - 2.125	520120	1
99	GRIP LEVER 0.125-1.00-3.75	520121	1
100	GRIP LEVER 0.125-0.75X3.75	520121	1
113	PLUG TUBE INSERT 1"	520122	2
114	LABEL EAR-EYE-BREATHE	890132	1
116	SCREW 1/4" - 20 X 5/8	890254	2
117	PIN CLEVIS 5/16-24	890359	1
121	TY-WRAP	830513	4
122	PAL NUTS 5/16"	900407	1
123	BOLT CARRIAGE 5/16-18 X 3/4	360203	6
134	SCREW CAP 5/16-18 X 2	8041032	1
135	SCREWCAP 5/16-18 x 2 1/4	8041033	4
143	NUT LOCK 5/16-18 NYLON	8160002	9
144	NUT LOCK 3/8-16 NYLON	8160003	2
150	WASHER 1/4" FC	8171002	12
153	WASHER 5/16 SAE	8172008	2
154	WASHER 1/2" SAE ZP	8172011	2
177	LABEL BGI OVAL FM	520110	1
185	RETAINING RING EXTERNAL	520176	1
191	WASHER 5/16" FC	8171003	4

ACCESSORIES

GRASS CATCHER KIT P/N 520142

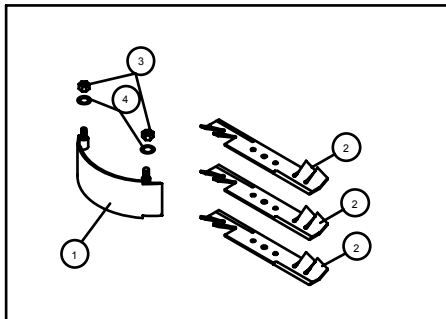
Purpose: Easily convert your mower to bag grass and leaves.



ITEM NO.	DESCRIPTION	Part NO.	QTY
1	GRASS CATCHER BAG	520012	1
2	WIRE FRAME GRASS CATCHER FM	520038	1
3	GRASS CATCHER MOUNT WA FM	520069	1
4	BRACKET GRASS CATHCER LATCH L FM	520059	1
5	BRACKET GRASS CATHCER LATCH R FM	520060	1
6	SCREW CAP 1/4" - 20 X 1" ZP	8041006	1
7	WASHER 1/4" FC ZP	8171002	1
8	NUTLOCK 1/4" - 20	8160001	1
9	WASHER #8 SAE	520126	4
10	SCREW ROUND HEAD #8-32 X 3/4" CLEAR ZINC	520128	4
11	NUTLOCK #8 - 32	520129	4
12	LIT GRASS CATCHER KIT FM	520147	1

MULCHING KIT P/N 520144

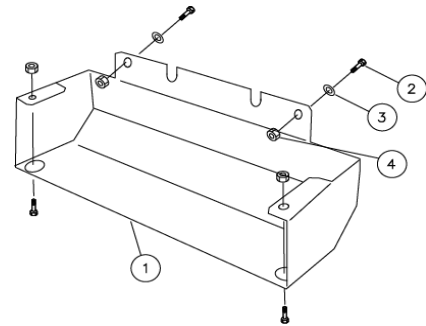
Purpose: Reduces lawn clippings to fine nutrient-rich particles that filter down to the soil.



ITEM NO.	DESCRIPTION	Part NO.	QTY
1	MULCHING PLATE WA FM	520014	1
2	BLADE 11.88" MULCHING	520002	3
3	NUTLOCK 3/8"-16 THIN HGT	8161042	2
4	WASHER 5/16 FC	8171003	2
5	LIT MULCHING KIT FM	520148	1

TRANSAXLE GUARD KIT P/N 520155

Purpose: To protect the transaxle from accidental contact from concrete curbs or other hazards.



ITEM NO.	DESCRIPTION	Part NO.	QTY
1	BRACKET GUARD TRANSAXLE FM	520151	1
2	SCREWCAP 5/16-18X1"	8041028	4
3	WASHER 1/4 FC	8171002	2
4	NUTLOCK 5/16 - 18	8160002	4

