Safe Operation Practices • Assembly • Operation • Service And Maintenance

Operator's Manual

Front Engine Lawn Tractor

English .....Page 1
Spanish (Español) .....Page 36
French (Français).....Page 74

Record Product Information

Before setting up and operating your new equipment, please locate the model plate on the equipment and record the information in the provided area to the right. You can locate the model plate by lifting up the seat and looking under the seat pan. This information will be necessary, should you seek technical support via our web site or with your local authorized service dealer.

Model Number

Serial Number

⚠ WARNING

Read and follow all safety rules and instructions in this manual before attempting to operate this machine.

Failure to comply with these instructions may result in personal injury - SAVE THESE INSTRUCTIONS.

⚠ WARNING

CALIFORNIA PROPOSITION 65

Engine Exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

NOTE: This Operator's Manual covers several models. Features may vary by model. Not all features in this manual are applicable to all models and the model depicted may differ from yours.

Form No. 769-25738B
(July 28, 2021)

SAFE OPERATION PRACTICES

⚠ WARNING



This symbol points out important safety instructions which, if not followed, could endanger the personal safety and/or property of yourself and others. Read and follow all instructions in this manual before attempting to operate this machine. Failure to comply with these instructions may result in personal injury. When you see this symbol, HEED ITS WARNING!

⚠ DANGER

This machine was built to be operated according to the safe operation practices in this manual. As with any type of power equipment, carelessness or error on the part of the operator can result in serious injury. This machine is capable of amputating fingers, hands, toes, and feet and throwing debris. Failure to observe the following safety instructions could result in serious injury or death.

GENERAL OPERATION

1. Read, understand, and follow all instructions on the tractor and in the manual(s) before attempting to assemble and operate. Keep this manual in a safe place for future and regular reference and for ordering replacement parts.
2. Be familiar with all controls and their proper operation. Know how to stop the tractor and disengage them quickly.
3. Never allow children under 14 years of age to operate this tractor. Children 14 and over should read and understand the instructions and safe operation practices in this manual and on the tractor and should be trained and supervised by an adult.
4. Never allow adults to operate this tractor without proper instruction.
5. If situations occur which are not covered in this manual, use care and good judgment. Contact your customer service representative for assistance.
6. According to the U.S. Consumer Products Safety Commission (CPSC) and the U.S. Environmental Protection Agency (EPA), this product has an estimated useful life of seven (7) years, under ordinary use conditions. At the end of its useful life, have the product inspected annually to ensure all mechanical and safety systems are operating properly, safely, and are not worn excessively. Failure to do so may result in accident, injury, or death.

PREPARATION BEFORE OPERATING

1. Thoroughly inspect the area where the tractor is to be used. Remove all stones, sticks, wire, bones, toys, and other foreign objects which could be picked up and thrown by the blade(s). Thrown objects can cause serious personal injury.
2. To help avoid blade contact or a thrown object injury, keep helpers at least 75 feet (23 meters) from the tractor while it is in operation. Keep bystanders, children, and pets inside during operation. Stop tractor if anyone enters the area.
3. Be aware of the tractor discharge direction and do not point it at anyone.
4. Always wear safety glasses or safety goggles during operation and while performing an adjustment or repair to protect your eyes. Thrown objects which ricochet can cause serious injury to the eyes.
5. Wear sturdy, rough-soled work shoes and close-fitting slacks and shirts. Loose fitting clothes, jewelry, and long hair can be caught in moving parts. Never operate this tractor in bare feet or sandals.
6. Never over fill fuel tank. Fill tank to no more than 1/2″ (13 mm) below bottom of filler neck to allow space for fuel expansion.
7. Replace gasoline cap and tighten securely.
8. Use only accessories and attachments approved for this tractor by the tractor manufacturer. Read, understand, and follow all instructions provided with the approved accessory or attachment.

OPERATING

1. Data indicates that operators, age 65 years and above, are involved in a large percentage of riding tractor-related injuries. These operators should evaluate their ability to operate the riding tractor safely enough to protect themselves and others from serious injury.
2. Disengage the blades and set the parking brake before attempting to start the tractor.
3. Do not put hands or feet near rotating parts or under the cutting deck. Contact with the blade(s) can amputate hands and feet.
4. Watch for holes, ruts, bumps, rocks, or other hidden objects. Uneven terrain could overturn the tractor. Tall grass can hide obstacles.
5. Plan your mowing pattern to avoid discharge of material toward roads, sidewalks, helpers, and the like. Avoid discharging material against a wall or obstruction which may cause discharged material to ricochet back toward the operator.
6. Check overhead clearances carefully before driving under low hanging tree branches, wires, door openings, etc., where the operator may be struck or pulled from the tractor, which could result in serious injury.

SAFE OPERATION PRACTICES

7. Never leave a running tractor unattended. Always turn off blade(s), set the parking brake, stop the engine, and remove the key before dismounting.
8. Disengage blade(s), set the parking brake, stop engine, and wait until the blade(s) come to a complete stop before removing grass catcher, emptying grass, unclogging chute, removing any grass or debris, or making any adjustments.
9. Your tractor is designed to cut normal residential grass of a height no more than 10" (25 cm). Do not attempt to mow through unusually tall, dry grass (e.g. pasture) or piles of dry leaves. Dry grass or leaves may contact the engine exhaust and/or build up on the tractor deck presenting a potential fire hazard.
10. Back up slowly. Always look down and behind before and while backing to avoid a back-over accident.
11. Never carry passengers.
12. Stay at least 10 feet (3 meters) from drop-offs, ditches, embankments, or the edge of water. The tractor could suddenly turn over if a wheel is over the edge of a cliff, ditch, or if an edge caves in.
13. A missing or damaged chute deflector can cause blade contact or thrown object injuries.
14. Do not operate the tractor without the chute deflector or entire grass catcher in its proper place.
15. Use extra care with grass catchers or other attachments. These can change the stability of the tractor. Always follow the attachment manufacturer's instructions.
16. Stop the blades when crossing gravel drives, walks, or roads and while not cutting grass.
17. Watch for traffic when operating near or crossing roadways. This tractor is not intended for use on any public roadway.
18. Mow only in daylight or good artificial light.
19. Do not operate the tractor while under the influence of alcohol or drugs.
20. Slow down before turning. Operate the tractor smoothly. Avoid erratic operation and excessive speed.
21. The muffler and engine become very hot and can cause serious burn injuries. Do not touch. Allow the tractor to cool for five minutes before attempting any service.
22. Never run an engine indoors or in a poorly ventilated area. Engine exhaust contains carbon monoxide, an odorless and deadly gas.

CHILDREN

1. Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the tractor and the mowing activity. They do not understand the dangers. Never assume that children will remain where you last saw them.
2. Keep bystanders, children, and pets inside during operation under the watchful care of a responsible adult other than the operator. Stop tractor if anyone enters the area.
3. Never carry children, even with the blades shut off. They may fall off and be seriously injured or interfere with safe tractor operation. Children who have been given rides in the past could suddenly appear in the mowing area for another ride and be run over or backed over by the tractor.
4. Be alert and turn tractor off if a child or bystander enters the area.
5. To avoid back-over accidents, always look behind and down for small children.
6. Use extreme care when approaching blind corners, doorways, shrubs, trees, or other objects that may block your vision of a child who may run into the path of the tractor.
7. Never allow children under 14 years of age to operate this tractor. Children 14 and over should read and understand the instructions and safe operation practices in this manual and on the tractor and should be trained and supervised by an adult.
8. Do not allow any child to joy ride on the tractor. The tractor is not a toy or a go-cart. Warn your children that the tractor can be dangerous and they must stay away from it at all times.
9. Keep children away from hot or running engines. They can suffer burns from a hot muffler.
10. Remove key when tractor is unattended to prevent unauthorized operation. Make certain the key is inaccessible to small children.

SLOPE OPERATION

1. Slopes are a major factor related to loss of control and tip-over accidents which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not mow it.
2. For your safety, measure any slope before using the tractor on the sloped area. Use a slope measuring device in addition to the slope gauge included as part of this manual to measure slopes before operating this tractor on a sloped or hilly area. Smart phone applications can also be utilized to measure slopes. If the slope is greater than 15° (25%) as shown on the slope gauge or a slope measuring device, do not operate this tractor on that area or serious injury could result.
3. Do not mow on slopes greater than 15° (25%).
4. Do not mow across slopes, only mow up and down slopes that are less than 15° (25%). Use low speeds and avoid sudden turns.
5. Do not mow on wet grass. Reduced traction could cause sliding or a loss of control.
6. Do not operate tractor under any conditions where traction, steering, or stability is in question. Tires could slide even if the wheels are stopped.
7. Avoid starting and stopping on slopes. Avoid making sudden changes in speed or direction. Make turns slowly and gradually.

8. Use extra care while operating tractor with grass catcher or other attachment(s). They can affect the stability of the tractor. Do not use grass catcher on slopes greater than 10° (17%).
9. Do not try to stabilize the tractor by putting your foot on the ground.
10. Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction. Rapid acceleration could cause the front of the tractor to lift and rapidly roll over backwards, which could cause serious injury or death.

SLOPE GAUGE (BACK COVER)

⚠ WARNING

Slopes are a major factor related to slip and fall accidents which can result in severe injury or death. All slopes require extra caution. If you feel uneasy on the slope, do not mow it. Do not mow on slopes greater than 15° (25%). Do not mow across slopes, only mow up and down slopes.

USE THE SLOPE GAUGE ON THE BACK COVER AS SHOWN TO DETERMINE IF A SLOPE IS TOO STEEP FOR SAFE OPERATION! To check the slope, proceed as follows:

1. Open manual to the back cover and fold along the dashed line.
2. Locate a vertical object on or behind the slope (e.g. a pole, building, fence, tree, etc.).
3. Align either side of the slope gauge with the object.
4. Adjust gauge up or down until the left corner touches the slope.
5. If there is a gap below the gauge, the slope is too steep for safe operation.

FIRE & FUEL

1. To avoid personal injury or property damage use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive. Serious personal injury can occur when gasoline is spilled on yourself or your clothes which can ignite. Wash your skin and change clothes immediately.
2. Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
3. Use only an approved gasoline container.
4. Never remove gas cap or add fuel while the engine is hot or running. Allow engine to cool at least five minutes before refueling.
5. Never fuel tractor indoors.
6. Never store the tractor or fuel container inside where there is an open flame, spark, or pilot light as on a water heater, space heater, furnace, clothes dryer, or other gas appliances.
7. If gasoline is spilled, wipe it off the engine and equipment. Clean up oil or fuel spillage and remove any fuel soaked debris. Move tractor to another area. Wait five minutes before starting the engine.
8. To reduce fire hazards, keep tractor free of grass, leaves, or other debris build-up. Follow the cleaning instructions in the Service and Maintenance section.
9. Your tractor is designed to cut normal residential grass of a height no more than 10″ (25 cm). Do not attempt to mow through unusually tall, dry grass (e.g., pasture) or piles of dry leaves. Dry grass or leaves may contact the engine exhaust and/or build up on the tractor deck presenting a potential fire hazard.
10. Never over fill fuel tank. Fill tank to no more than 1/2″ below bottom of filler neck to allow space for fuel expansion.
11. Replace gasoline cap and tighten securely. Do not operate without fuel cap in place.
12. Allow tractor to cool at least five minutes before fueling or storing.
13. Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.
14. When practical, remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.
15. Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.

HAULING

1. Use properly secured full width ramps for loading and unloading a tractor for transport.
2. Use extra care when loading or unloading the tractor into a trailer or truck. This tractor should not be driven up or down ramp(s), because the tractor could tip over, causing serious personal injury. The tractor must be pushed manually on ramp(s) to load or unload properly.
3. Raise the deck to the highest position for loading clearance.

TOWING WITH YOUR TRACTOR

1. Do not tow a load that exceeds 250 lbs (113 kg) rolling weight and never exceed 50 lbs (22 kg) tongue weight.
2. Do not attach towed equipment except at the hitch point of the tractor.
3. Never allow children or others in or on towed equipment.
4. Do not tow on slopes greater than 5° (9%). On slopes, the weight of the towed equipment may cause loss of traction and loss of control and/or the ability to stop.
5. Always use extra caution when towing with a tractor capable of making tight turns (e.g. tight-turn tractor). Make wide turns to avoid jack-knifing.
6. Travel slowly and allow extra distance to stop.

SAFE OPERATION PRACTICES

SERVICE

1. Keep machine in good working order. Do not use the tractor until worn or damaged parts are replaced.
2. To avoid serious injury or death, do not modify engine in any way. Tampering with the governor setting can lead to a runaway engine and cause it to operate at unsafe speeds. Never tamper with factory setting of engine governor. Do not change the engine governor settings or over-speed the engine. The governor controls the maximum safe operating speed of the engine.
3. Tractor blades are sharp. Wrap the blade or wear gloves, and use extra caution when servicing them.
4. Tractors with hydraulic pumps, hoses, or motors; and/or diesel injection systems have fluid systems under pressure. Fluid escaping under pressure may have sufficient force to penetrate skin and cause serious injury. If fluid is injected into the skin, seek immediate medical attention. Keep body and hands away from pin holes or nozzles that eject fluid under high pressure. If a leak occurs, have the tractor immediately serviced by an authorized dealer.
5. Before cleaning, repairing, or inspecting, make certain the blade(s) and all moving parts have stopped. Turn off the engine, remove the key, disconnect the spark plug wire(s), and ground against the engine to prevent unintended starting.
6. Check to make sure the blades come to a complete stop in not more than five seconds after disengaging the blade disengagement control per the schedule shown on the Maintenance Schedule chart in the Service and Maintenance section of this manual. Measure the stopping time with a stop watch. If the blades do not stop completely in less than five seconds, your tractor should be serviced professionally by an authorized dealer.
7. Check the safety interlock system for proper function per the schedule shown on the Maintenance Schedule chart in the Service and Maintenance section of this manual. If the safety interlock system does not function properly, have your tractor serviced professionally by an authorized dealer.
8. Never tamper with the safety interlock system or other safety devices. Check their proper operation regularly.
9. Check the blade(s) and engine mounting bolt torque in accordance with the Maintenance Schedule chart in this manual. Also, visually inspect blade(s) for damage (e.g., excessive wear, bent, cracked). Replace the blade(s) with the original equipment manufacturer's (O.E.M.) blade(s) only.
10. Use of service parts which do not meet the original equipment specifications may lead to improper performance and compromise safety.
11. Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition. Review the Maintenance Schedule chart in this manual for service interval information.
12. After striking a foreign object, stop the engine, disconnect the spark plug wire(s), and ground against the engine. Thoroughly inspect the tractor for any damage. Repair the damage before starting and operating.
13. Never attempt to make adjustments or repairs to the tractor while the engine is running.
14. Grass catcher components and the chute deflector are subject to wear and damage which could expose moving parts or allow objects to be thrown. Frequently check components and replace immediately with original equipment manufacturer's (O.E.M.) parts only.
15. Maintain or replace safety and instruction labels, as necessary.
16. Observe proper disposal laws and regulations for gas, oil, etc. to protect the environment.

NOTICE REGARDING EMISSIONS

Engines which are certified to comply with California and federal EPA emission regulations for SORE (Small Off Road Equipment) are certified to operate on regular unleaded gasoline and may include the following emission control systems: Engine Modification (EM) and Three Way Catalyst (TWC), if so equipped.

When required, models are equipped with low permeation fuel lines and fuel tanks for evaporative emission control. California models may also include a carbon canister. Please contact Customer Support for information regarding the evaporative emission control configuration for your model.

SPARK ARRESTOR

⚠ WARNING

This tractor is equipped with an internal combustion engine and should not be used on or near any unimproved forest-covered, brush-covered, or grass-covered land unless the engine's exhaust system is equipped with a spark arrestor meeting applicable local or state laws (if any).

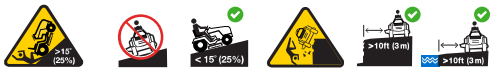
If a spark arrestor is used, it should be maintained in effective working order by the operator. In the State of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands.

A spark arrestor for the muffler is available through your nearest engine authorized service dealer or contact the service department, P.O. Box 361131, Cleveland, Ohio 44136-0019.

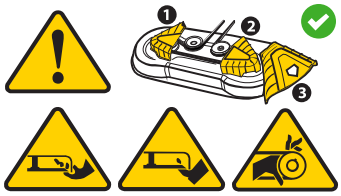
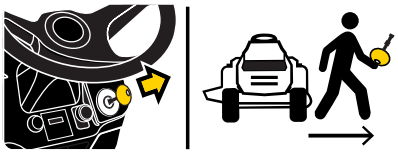
SAFE OPERATION PRACTICES

SAFETY SYMBOLS

This page depicts and describes safety symbols that MAY APPEAR on this product.

Symbol	Description
	**WARNING – READ OPERATOR'S MANUAL** Read, understand, and follow all the safety rules and instructions in the manual(s) and on the tractor before attempting to operate this tractor. Failure to comply with this information may result in personal injury or death. Keep this manual in a safe location for future and regular reference. Using a Smart Phone, scan the QR code symbol to learn more information concerning the warnings contained on this tractor. You can also go to www.OPESymbol.com for more information.
	**WARNING – AVOID THROWN OBJECTS INJURY** Keep helpers at least 75 feet (23 meters) from machine during operation. Remove all stones, sticks, wire, bones, toys, and other foreign objects which could be picked up and thrown by the blade(s). Do not operate the tractor without the discharge cover or entire grass catcher in its proper place.
	**WARNING – AVOID CHILD BACKOVER/RUNOVER/ BLADE INJURY** To avoid back-over accidents, always look behind and down for small children. Never carry children, even with the blade(s) shut off. Keep bystanders, children, and pets inside during operation under the watchful care of a responsible adult other than the operator. Stop tractor if anyone enters the area.
	**WARNING – AVOID TIP-OVER/ROLL-OVER INJURY** Do not operate machine on a slope greater than 15° (25%). Do not mow across slopes, only mow up and down slopes that are less than 15° (25%). Use low speeds and avoid sudden turns on slopes. Stay at least 10 feet (3 meters) from drop-offs, ditches, embankments, or the edge of water.

SAFE OPERATION PRACTICES

Symbol	Description
	**WARNING – AVOID FIRES** Your tractor is designed to cut normal residential grass of a height no more than 10" (25 cm). Do not attempt to mow through unusually tall, dry grass (e.g., pasture) or piles of dry leaves. Allow tractor to cool at least five minutes before fueling or storing inside an enclosed garage or storage shed.
	**WARNING – AVOID AMPUTATION INJURY** Do not put hands or feet near or under the cutting deck. Contact with the blade(s) can amputate hands and feet.
	**WARNING – AVOID AMPUTATION INJURY** Do not put hands or feet near rotating parts or under the cutting deck. Contact with the blade(s) can amputate hands and feet. Ensure that all safety devices (guards, shields, switches, etc.) are in place and working. Belt and/or blade spindle contact can crush or injure body parts.
	**WARNING – REMOVE KEY** Always turn off blade(s), set the parking brake, stop engine, and remove key before dismounting. If you are leaving the tractor unattended, always remove the key to prevent unauthorized use by children or others.
	**WARNING – AVOID TOWING RELATED INJURY** Do not tow a load that exceeds 250 lbs (113 kg) rolling weight and never exceed 50 lbs (22 kg) tongue weight. Never allow children or others in or on towed equipment. Do not tow on slopes greater than 5° (9%). On slopes, the weight of the towed equipment may cause loss of traction, loss of control, and/or loss of the ability to stop. Travel slowly and allow extra distance to stop.

⚠ WARNING

Your Responsibility—Restrict the use of this power machine to persons who read, understand, and follow the warnings and instructions in this manual and on the machine - **SAVE THESE INSTRUCTIONS!**

ASSEMBLY

NOTE: This Operator's Manual covers several models. Tractor features may vary by model. Not all features in this manual are applicable to all tractor models and the tractor depicted may differ from yours.

NOTE: All references in this manual to the left or right side and front or back of the tractor are from the operating position only. Exceptions, if any, will be specified.

Preparation

MANUALLY MOVING THE TRACTOR

1. Engage the transmission bypass rod to move the tractor manually without starting it. The transmission bypass rod is located on the rear of the tractor, on the frame. Engage the bypass rod by pulling out. See Figure 1.

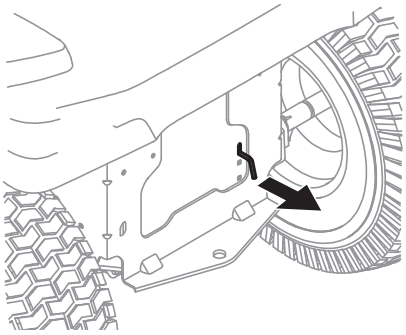


Figure 1

NOTE: If the tractor will not move or does not move freely when pushing check if the hydrostatic bypass rod is fully open or the brake is engaged.

NOTE: The transmission will NOT engage when the hydrostatic bypass rod is pulled out. Return the rod to its disengaged position prior to operating the tractor.

2. Disengage the transmission bypass rod by pushing the rod back in after moving the tractor. See Figure 1.

INSTALL OPERATOR'S SEAT (IF NECESSARY)

To install the seat proceed as follows:

NOTE: The seat is shipped with the seat switch and seat pan attached.

1. Cut any straps securing the seat assembly to the tractor. Remove any packing material.

NOTE: Be careful not to cut the wiring harness connecting the seat and the seat switch.

2. Remove the two shoulder bolts (a) and flange lock nuts (b) in the seat pan as shown in Figure 2.

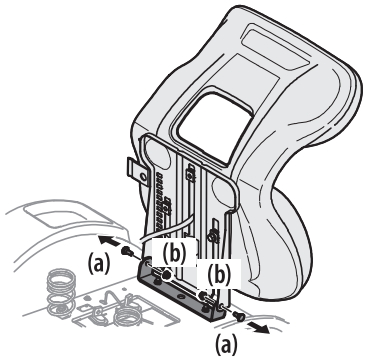


Figure 2

3. Rotate the seat into position and slide a Phillips screwdriver through one of the seat-securing holes and seat bracket for alignment.

4. With the previously removed shoulder bolts (a) and flange lock nuts (b) secure one side of the seat and seat bracket. While supporting the seat, remove the Phillips screwdriver and secure the other side of the seat. Be careful not to crimp or damage the wire harness while installing the seat. See Figure 3. Torque to 84-103 in-lbs (9.5-11.6 N-m).

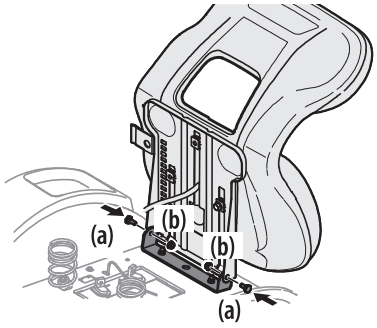


Figure 3

5. Using the harness clip attached to the harness, secure the excess wire to the fender by snapping the harness clip in place as shown in Figure 4.

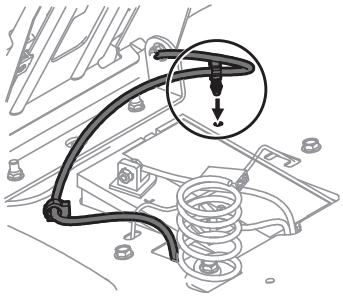


Figure 4

ASSEMBLY

INSTALLING THE HOOD COLLAR (IF NECESSARY)

There are three (3) alignment posts (a) on the hood collar (b) that line up with corresponding alignment holes (c) in the hood (d). See Figure 5.

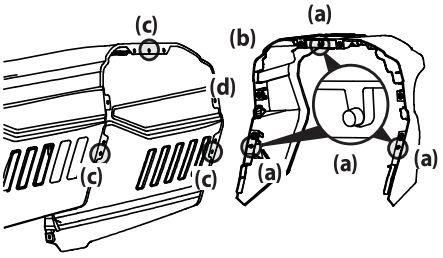


Figure 5

Use these alignment points to properly position the hood collar (a), then secure it in place with the six hex bolts (b) provided in the hardware bag. Tighten the hex bolts to 102-124 in-lbs (11.5-14 N-m). See Figure 6.

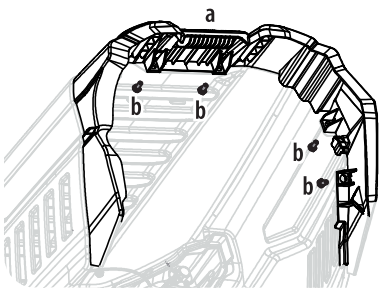


Figure 6

INSTALLING THE SNAP-ON HOOD TOPPER (IF NECESSARY)

1. To install the snap-on hood topper (a), line up the holes on the hood topper (a) with the tabs (b) in the hood frame as shown in Figure 7.

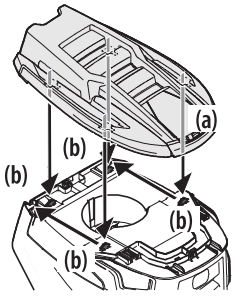
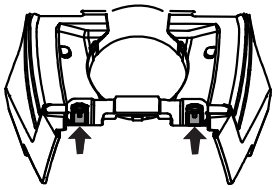


Figure 7

2. Insert the tabs into the hood topper and pull back to lock into place.
3. Once the hood topper is in place, the two locking tabs near the rear of the hood need to be pushed upward to lock the hood topper in place. See Figure 8.



Hood Topper Not Shown for Clarity

Figure 8

INSTALLING THE SCREW-ON HOOD TOPPER (IF NECESSARY)

NOTE: Be careful not to damage the headlight harness when installing the screw-on hood topper.

1. Set the hood topper up against the top of the hood with the hood open, and align the holes on the hood.
2. Secure the screw-on hood topper (a) from below, hand-tighten the screws (b) on the rear half of the hood and then snug them. See Figure 9.
3. With the rear screws in place, align the holes in the hood topper (a) with the holes in the hood (c) and secure in place with remaining two screws (d). See Figure 9.

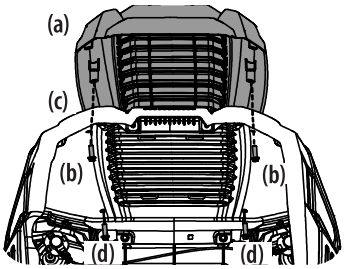


Figure 9

4. Tighten all four screws to 16-24 in-lbs (1.8-2.7 N-m).

INSTALLING THE PLENUM (IF NECESSARY)

NOTE: Be careful not to damage the headlight harness when installing the plenum.

To install the plenum (a) onto the hood (b):

1. Insert the rear tabs (c) as shown in Figure 10.

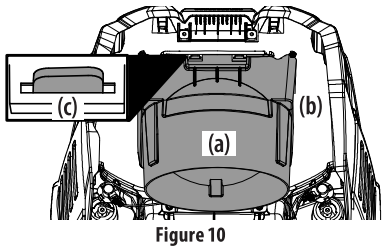


Figure 10

2. With the rear tabs installed, insert the front tabs (a) on the plenum (b) as shown in Figure 11.

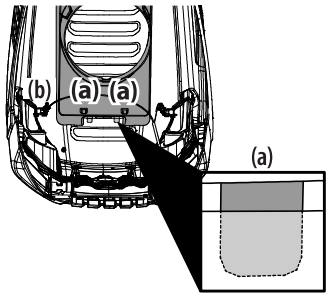


Figure 11

NOTE: The rear tabs fit into a recessed area on the top of the hood. They slide up from under the hood and into these recessed areas.

3. Push up on the bottom of the plenum to make sure that the plenum is securely in place.

4. Secure the headlight harness (a) into the two guides (b) on the front of the plenum. Figure 12.

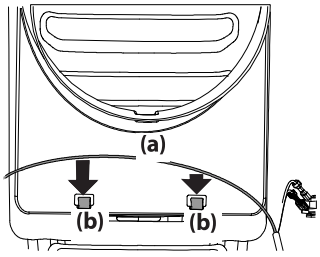


Figure 12

INSTALLING THE DASH CAP (IF NECESSARY)

To install the dash cap (a), line up the tabs (b) on the dash cap (a) with the holes in the upper dash as shown in Figure 13. Slide the tabs (b) into the holes in the upper dash and push forward on the dash cap to lock into place.

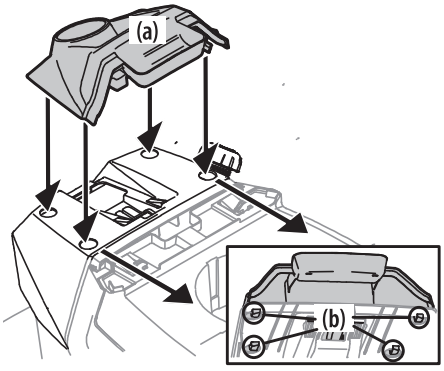


Figure 13

NOTE: Be sure to press on the lower part of the dash cap (a) facing the operator position to ensure the lower tabs on the dash cap are in place. See Figure 13.

INSTALLING THE STEERING WHEEL (IF NECESSARY)

The hardware for attaching the steering wheel has been packed within the steering wheel, beneath the steering wheel cap. Carefully remove the cover by inserting a small flat screwdriver into one of the three snap locations, while slowly prying up on the steering wheel cap to remove the hardware.

IMPORTANT! Do not use impact tools to install or remove the steering wheel. Doing so can over-torque and damage the fastener.

1. With the wheels of the tractor pointing straight forward, align the steering wheel (a) by using the center-line (b) on the front of the steering wheel (a) pointing straight ahead and the flat section (c) of the steering wheel (a) facing toward the seat, place the steering wheel (a) over the steering shaft (d). See Figure 14.

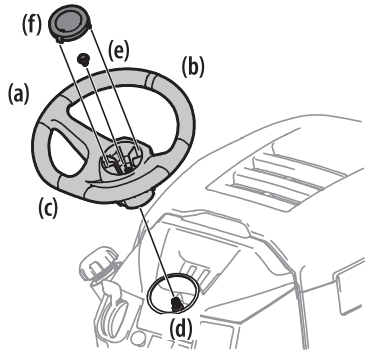


Figure 14

2. Secure the steering wheel (a) with the hex bolt (e) from under the steering wheel cap (f) and torque to 18-22 ft-lbs (24.4-29.8 N-m). See Figure 14.

3. Place the steering wheel cap (f) over the center of the steering wheel (a) and push downward until it "clicks" into place.

NOTE: The hex bolt (e) securing the steering wheel (a) has thread locker applied to it, so if it is removed, it is recommended that the hex bolt (e) be replaced or thread lock re-applied. See Figure 14.

INSTALLING THE FRONT BUMPER (IF EQUIPPED)

⚠ WARNING

Disengage the PTO, engage the brake lock, and stop the tractor engine before performing any preparation procedures. Place the tractor on a firm and level surface before beginning installation or removal procedures.

The exhaust system and surrounding areas are HOT. To avoid personal injury, allow the tractor to cool before beginning any installation or removal procedures.

ASSEMBLY

The hardware for attaching the front bumper is shipped installed into the bumper.

1. Remove the four hex screws (a) from the bumper (b). See Figure 15.
2. Position the bumper brackets to the inside of the tractor's frame and secure it in place with the four hex screws (a). See Figure 15.

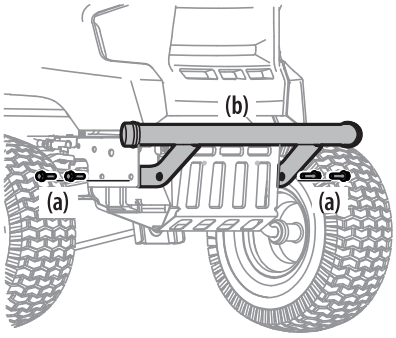


Figure 15

INSTALLING THE FASTATTACH™ BRUSH GUARD (IF EQUIPPED)

1. Align the brush guard assembly with the FastAttach™ brackets and push assembly together. See Figure 16.

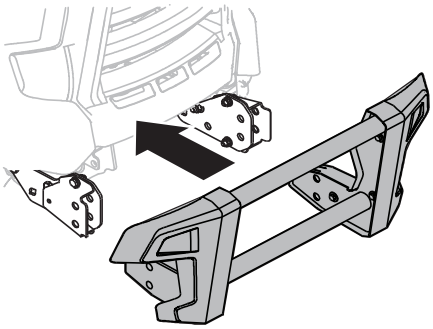


Figure 16

2. Install the pins on the right and left side of brush guard and then secure with two cotter pins found in the hardware pack. See Figure 17.

NOTE: Pulling up lightly on the brush guard may make installation of the pins easier.

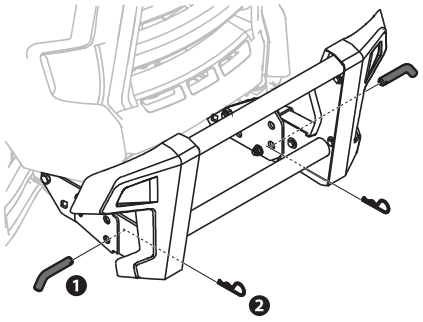


Figure 17

LOWER DECK DISCHARGE CHUTE DEFLECTOR

⚠ WARNING

Never operate the mower deck without the chute deflector installed and in the down position.

For 46″ deck models:

1. Remove the keys attached with a zip tie to the chute bracket.
2. Remove the flange lock nut and hex screw from the deck.
3. Place the chute deflector on the deck, be sure to insert the tabs on the chute deflector into the holes on the deck. See Figure 18.
4. Slide the chute deflector toward the rear of the tractor until the bolt hole in the chute deflector aligns with the hole in the deck. See Figure 18.

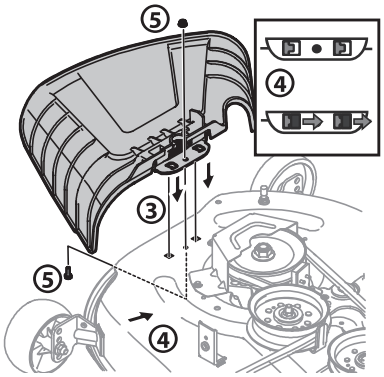


Figure 18

5. Secure the chute deflector in place with the flange lock nut and hex screw removed in Step 2. Tighten to 102-124 in-lbs (11.5-14 N-m). See Figure 18. Skip ahead to Setting the Deck Wheels.

ASSEMBLY

For 42"/50"/54" deck models:

1. Check the tractor deck for a shipping brace that may be holding the chute deflector upward for shipment. If the brace is present, it must be removed before operating the tractor. Holding the chute deflector fully upward, remove the shipping brace. Lower the chute deflector and discard the shipping brace. See Figure 19.

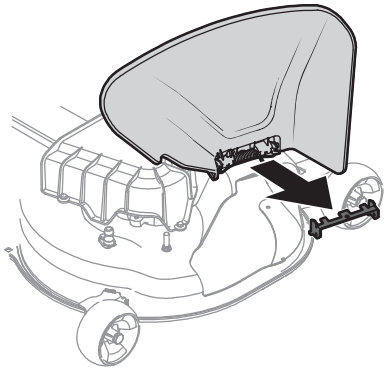


Figure 19

SETTING THE DECK WHEELS

NOTE: The deck wheels are an anti-scalp feature of the deck and are not designed to support the weight of the cutting deck.

1. Move the tractor to a level surface, preferably pavement.
2. Check the tire pressure, adjust, if necessary. See tire sidewall for proper tire pressure.
3. Make sure the deck is level side-to-side and properly pitched. See the Service and Maintenance section for deck leveling information and instructions.
4. Place deck lift lever in the desired mowing height position.
5. Check the wheels for contact or excessive clearance with the surface below.

NOTE: The deck wheels should have between 1/4"-1/2" (6.35-12.7 mm) clearance above the ground. Proceed as follows to adjust the wheels:

a. Raise the deck lift handle to its highest setting.

b. Remove the front (a) and rear (b) deck wheels by removing the flange lock nuts (c) and shoulder bolts (d) that secure them to the deck. See Figure 20.

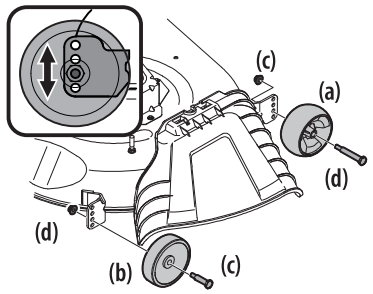


Figure 20

c. Place the deck lift lever in the desired mowing height setting.

d. Reinsert the shoulder bolt (with each deck wheel) into the index hole that leaves approximately 1/2" (12.7 mm) between the bottom of the wheel and the pavement. Tighten the flange lock nut and shoulder bolt to between 25-30 ft-lbs (33.9-40.7 N-m) using a torque wrench.

Battery Information

⚠ WARNING

California Proposition 65 Warning: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

⚠ WARNING

Should battery acid accidentally splatter into the eyes or onto the skin, rinse the affected area immediately with clean cold water. Seek prompt medical attention.

If acid spills on clothing, first dilute it with clean water, then neutralize with a solution of ammonia/water or baking soda/water.

NEVER connect (or disconnect) battery charger clips to the battery while the charger is turned on, as it can cause sparks.

Keep all sources of ignition (cigarettes, matches, lighters) away from the battery. The gas generated during charging can be combustible.

As a further precaution, only charge the battery in a well ventilated area.

Always shield eyes and protect skin and clothing when working near batteries.

Batteries contain sulfuric acid and may emit explosive gases. Use extreme caution when handling batteries. Keep batteries out of the reach of children.

The battery may present a risk of fire or chemical burn if misused. Do NOT open, disassemble, overheat, or incinerate the battery.

ASSEMBLY

⚠ CAUTION

When attaching battery cables, always connect the POSITIVE (Red) wire to terminal first, followed by the NEGATIVE (Black) wire.

NOTE: The positive battery terminal is marked Pos. (+). The negative battery terminal is marked Neg. (–).

CONNECTING THE BATTERY CABLES

⚠ WARNING

Always connect the positive lead to the battery before connecting the negative lead. This will prevent sparking or possible injury from an electrical short caused by contacting the tractor body with tools being used to connect cables.

For shipping reasons the factory may leave both battery cables disconnected from the terminals. To connect the battery cables, proceed as follows:

NOTE: Wiring harness should lay on top of battery hold down rod, otherwise damage to the wiring harness may result. See Figure 22 on page 14.

1. Remove the factory installed hex screws (a) and square nuts (b) located either on the end of the wiring harness or in the bag with this manual. Retain the hardware for later instructions. See Figure 21.
2. Remove the plastic cover (c), if present, from the positive battery terminal (d) and attach the red cable (e) to the positive battery terminal (d) with one of the hex screws (a) and square nuts (b), from Step 1. Use a Philips screw driver. See Figure 21.
3. Remove the plastic cover (c), if present, from the negative battery terminal (f) and attach the black cable (g) to the negative battery terminal (f) with the remaining hex screw (a) and square nut (b). See Figure 21.
4. Position the red rubber boot over the positive battery terminal to help protect it from corrosion. See inset in Figure 21.

NOTE: If the battery is put into service after the date shown on top/side of battery, charge the battery as instructed in the Charging the Battery section prior to operating the tractor.

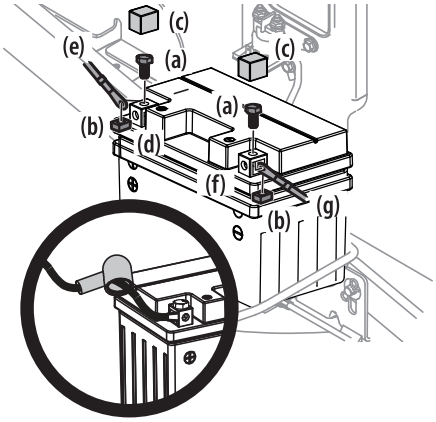


Figure 21

BATTERY MAINTENANCE

- Some batteries are filled with battery acid and then sealed at the factory. However, even a "maintenance free" battery requires some maintenance to ensure its proper life cycle.
- Spray the terminals and exposed wire with a battery terminal sealer, or coat the terminals with a thin coat of grease or petroleum jelly, to protect against corrosion.
- Always keep the battery cables and terminals clean and free of corrosion.
- Some models are equipped with a battery containing a liquid electrolyte. Handle the battery with care and avoid tipping to prevent leakage.

BATTERY STORAGE

- When storing the tractor for extended periods, disconnect the negative battery cable. It is not necessary to remove the battery.
- All batteries discharge during storage. Keep the exterior of the battery clean, especially the top. A dirty battery will discharge more rapidly.
- The battery must be stored with a full charge. A discharged battery can freeze sooner than a charged battery. A fully charged battery will store longer in cold temperatures than hot.
- Recharge the battery before returning to service. Although the tractor may start, the engine charging system may not fully recharge the battery.

BATTERY REMOVAL

⚠ WARNING

Battery posts, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.

The battery is located beneath the seat frame. To remove the battery:

1. Remove the hex screw and square nut securing the black negative battery lead to the negative battery post (marked NEG (-)). Move the cable away from the negative battery post.
2. Remove the hex screw and square nut securing the red positive battery lead to the positive battery post (marked POS (+)).
3. Remove the battery hold down rod by pushing the hooked end out of the tab on the fender to the right side of the battery. Then flip the battery hold down rod up to free the battery. See Figure 22.

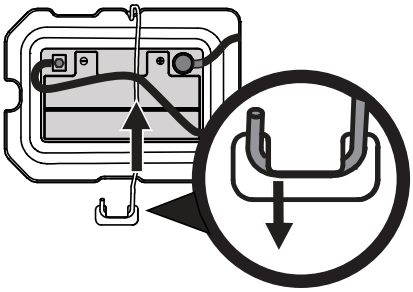


Figure 22

4. Carefully lift the battery out of the tractor.
5. Install the battery by repeating the above steps in the reverse order.

CHARGING THE BATTERY

Test and, if necessary, recharge the battery after the tractor has been stored for a period of time.

Models with Lead-Acid Battery

- A voltmeter or load tester reading of 12.4 volts (DC) or lower across the battery terminals indicates that the battery needs to be charged.
- A lead-acid battery charger should be used. Recommended charge rate is 4A/14.7V.
- If your battery charger is automatic, charge the battery until the charger indicates that charging is complete. If the charger is not automatic, charge for no fewer than eight (8) hours.

Models with AGM Battery

- An AGM battery charger should be used. Recommended charge rate is 1.1A/14.8V.

IMPORTANT! Do NOT use an automotive charger.

- If your battery charger is automatic, charge the battery until the charger indicates that charging is complete. If the charger is not automatic, charge for no fewer than eight (8) hours.

Adjusting the Seat

To adjust the position of the seat, lift the seat adjustment lever up. Slide the seat forward or rearward to the desired position; then release the adjustment lever. Make sure seat is locked into position before operating the tractor. See Figure 23.

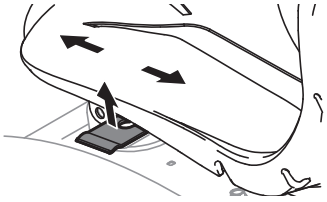


Figure 23

Oil

NOTE: Your tractor is shipped with oil in the engine. However, you MUST check the oil level before operating. See the Engine Operator's Manual for instructions on checking, adding and changing oil.

⚠ CAUTION

Always check the engine oil level before each use as instructed in the Engine Operator's Manual. Add oil as necessary. Failure to do so may result in serious damage to your engine.

OPERATION

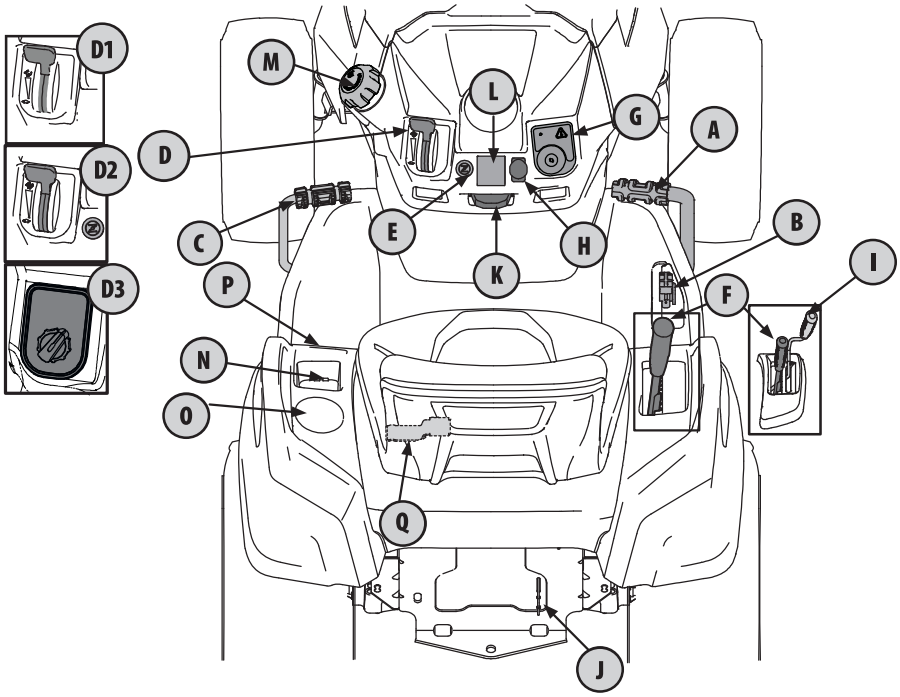


Figure 24

NOTE: This Operator's Manual covers several models. Tractor features may vary by model. Not all features in this manual are applicable to all tractor models and the tractor depicted may differ from yours.

NOTE: All references in this manual to the left or right side and front or back of the tractor are from the operating position only. Exceptions, if any, will be specified.

A. FORWARD DRIVE PEDAL

Depress the forward drive pedal forward to allow the tractor to travel forward. The further forward the pedal is depressed, the faster the tractor will travel. The pedal will return to its original/neutral position when it is not depressed.

B. REVERSE DRIVE PEDAL

Depress the reverse drive pedal downward to allow the tractor to travel backward. The further downward the pedal is depressed, the faster the tractor will travel. The pedal will return to its original/neutral position when it is not depressed.

C. BRAKE PEDAL

Depress the brake pedal while the tractor is in use to stop the tractor and for setting the park brake.

NOTE: The brake pedal must be fully depressed to start the tractor. Refer to Safety Interlock System for more information.

D. THROTTLE/CHOKE CONTROL LEVER, THROTTLE CONTROL, OR ELECTRONIC GOVERNOR CONTROL

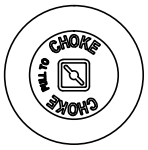
1. **Throttle/Choke Control Lever (If equipped) -** Push the throttle/choke control lever forward to increase the engine speed. The tractor is designed to operate with the throttle/choke control lever at full throttle (FAST) when the tractor is being driven and the mower deck is engaged. Pull the throttle/choke control lever rearward to decrease the engine speed. When starting the engine, push the control lever fully forward into the CHOKE position. After starting and warming the engine, move the control lever rearward until you feel it move past the choke detent. Throttle is not meant to control unit speed, throttle should remain in high speed while operating blades.
2. **Throttle Control (If equipped) -** Push the throttle control lever forward to increase the engine speed. The tractor is designed to operate with the throttle control lever at full throttle (FAST) when the tractor is being driven and the tractor deck is engaged. Pull the throttle control lever rearward to decrease the engine speed.

3. **Electronic Governor Control (If equipped) -** When set in a given position, a uniform engine speed will be maintained. The electronic governor control has various inputs for maintaining engine speed. Use CUT setting for optimal cutting performance in normal cutting conditions. Use POWER CUT setting for optimal cutting performance in heavy cutting conditions.

NOTE: If the tractor is equipped with an Electronic Governor Control, the tractor can be started at any speed setting along the dial and will automatically adjust to the desired engine speed setting.

NOTE: It may take a few seconds after starting for the engine to adjust to the proper engine speed. This is normal.

E. CHOKE CONTROL (IF EQUIPPED)



The choke control determines the position of the engine choke. Pull the knob out to choke the engine; push the knob in to open the choke. If equipped, Choke Control will be paired with a Throttle Control (D2). When pulled outward the Choke Control closes the choke for cold starting. Once started always run the engine with the Choke Control pushed all the way inward.

F. DECK LIFT LEVER

The deck lift lever is used to raise and lower the deck. Pull the lever to the left out of the index notch and push downward to lower the deck, or pull upward to raise the deck. When the desired height is attained, move the lift lever to the right until fully engaged in the index notch.

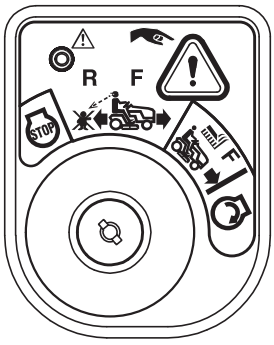
G. IGNITION SWITCH

TURN-KEY START (IF EQUIPPED)

⚠ WARNING

Never leave a running tractor unattended. Always disengage PTO, set park brake, stop engine, and remove key to prevent unintended starting.

Refer to Starting the Engine for information on how to start the engine. Refer to Stopping the Engine for instructions on how to stop the engine.



⚠ WARNING

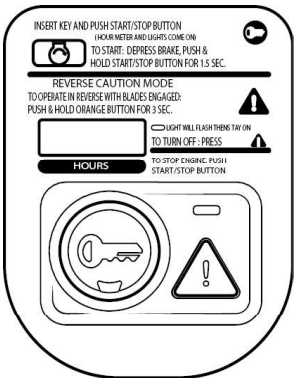
Prior to operating the tractor, refer to both Safety Interlock System and Starting the Engine in the Operation section of this manual for detailed instructions regarding the Ignition Switch Module and operating the tractor in REVERSE CAUTION MODE.

PBS (PUSH BUTTON START)/SERVICE MINDER & HOUR METER (IF EQUIPPED)

⚠ WARNING

Never leave a running tractor unattended. Always disengage PTO, set park brake, stop engine, and remove the key.

NOTE: If the REVERSE CAUTION MODE button is depressed during starting, the starting sequence is aborted and needs to be restarted.



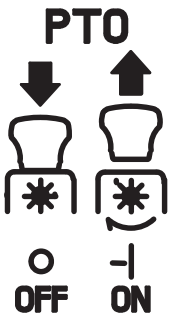
To stop the engine, press or remove the ignition key.

When the ignition key is inserted and pressed for less than 0.5 seconds, the LCD Service Minder & Hour Meter will briefly display the battery voltage, followed by the tractor's accumulated hours.

NOTE: Hours of tractor operation are recorded only when the engine is running.

The LCD Service Minder will remind the operator of maintenance intervals for changing the engine oil, air filter service, low engine oil and low or high battery warnings.

H. POWER TAKE-OFF (PTO)(BLADE ENGAGE) SWITCH (ELECTRIC PTO) (IF EQUIPPED)



The PTO (Blade Engage) switch operates the electric PTO clutch mounted on the bottom of the engine crankshaft. Pull the switch knob outward to engage the PTO clutch, or push the knob inward to disengage the clutch.

The PTO (Blade Engage) switch must be in the OFF position when starting the engine. See Engaging the PTO (Blade Engage) (Electric PTO tractors) section for information and instructions on using the PTO.

I. PTO (BLADE ENGAGE) LEVER (MANUAL PTO)

Activating the PTO (Blade Engage) Lever engages power to the cutting deck or other (separately available) attachments. See Engaging the PTO (Blade Engage) (Manual PTO tractors) section for information and instructions on using the PTO.

J. TRANSMISSION BYPASS ROD

When engaged, the rod opens a bypass within the hydrostatic transmission, which allows the tractor to be pushed short distances by hand. Refer to the Assembly section for instructions on using the bypass feature.

⚠ CAUTION

Never tow your tractor. Towing the tractor with the rear wheels on the ground may cause severe damage to the transmissions.

K. PARK BRAKE/CRUISE CONTROL LEVER



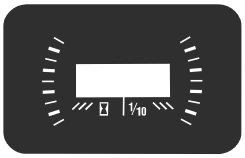
The park brake/ cruise control lever is used to engage the park brake and the cruise control. Refer to the Driving the Tractor section of this manual for detailed instructions regarding the park brake.

NOTE: The park brake must be set if the operator leaves the seat with the engine running or the engine will automatically shut off.

NOTE: Cruise control CANNOT be engaged at the tractor's fastest ground speed.

L. HOUR METER

LCD SERVICE MINDER & HOUR METER (IF EQUIPPED)



The LCD service minder will remind the operator of maintenance intervals for changing the engine oil, air filter service, low engine and low battery warnings. When the key is rotated out of the STOP position but is not in the START position, the LCD Service Minder & Hour Meter will briefly display the battery voltage, followed by the tractor's accumulated hours.

NOTE: When the ignition key is out of the STOP position the hourglass symbol is illuminated/blinks to indicate it is recording the hours of tractor operation, regardless of whether the engine has been started.

CHANGE OIL

The LCD screen will alternate the letters "CHG", followed by "OIL", followed by "SOON", followed by the meter's accumulated time. "CHG/OIL/SOON/TIME" will alternate on the display for 7 minutes after the meter reaches 50 hours. This oil service minder interval will occur every 50 hours. Before the interval expires, change the engine oil as instructed in the Engine Operator's Manual.

LOW OIL

NOTE: The low oil pressure function only works if the engine is equipped with an oil pressure switch.

The LCD screen will alternate the letters "LO" followed by "OIL", followed by the meter's accumulated time, which indicates the engine has low oil pressure. This is common when starting an engine. The indicator will remain active until the engine sufficiently builds pressure after starting. If it remains on with the engine at full speed and after a few minutes of operation, stop the tractor immediately, check the engine oil level and add as instructed in the Engine Operator's Manual. If the oil level is correct and the indicator persists, contact an authorized service dealer.

LOW BATTERY

At startup, the battery voltage will briefly display, then changes to accumulated hours. The letters "LO" followed by the letters "BATT" will display, followed by the meter's accumulated time. "LO/BATT/TIME" is displayed on the LCD when the voltage drops below 11.5 volts. When this occurs, the battery is in need of a charge or the engine's charging system is not generating sufficient amperage. Charge the battery as instructed in the Charging the Battery section of this manual or have the charging system checked by your local service dealer.

AIR FILTER SERVICE

The LCD screen will display the letters "CLN" followed by the letters "AIR", followed by "FILT", followed by the meter's accumulated time. "CLN/AIR/FILT/TIME" will alternate on the display for 7 minutes after the meter reaches 25 hours. This air filter service minder time interval will be every 25 hours. On intervals that are common with oil service, the oil message will be displayed first followed by the air filter message.

M. FUEL TANK CAP

Turn the fuel cap at least two clicks counter-clockwise and pull upward to remove. The fuel cap is tethered to the fuel tank to prevent its loss. Do not attempt to remove the cap from the fuel tank. Fill tank to 1/2" (12.7 mm) below the bottom of the filler neck, allowing some space in the tank for fuel expansion. Do not overfill the tank. The fuel tank holds approximately 3 gallons (11.35 L) of gasoline.

Push the cap downward on the fuel tank filler neck and turn at least two clicks clockwise to tighten. Always re-install the fuel cap tightly onto the fuel tank after removing.

⚠ WARNING

Never fill the fuel tank when the engine is running. If the engine is hot from recently running, allow to cool for at least five minutes before refueling. Highly flammable gasoline could splash onto the engine and cause a fire.

N. STORAGE TRAY

The storage tray is located to the left of the operator's seat.

O. CUP HOLDER

The cup holder is located to the left of the operator's seat.

P. DIFFERENTIAL LOCK PEDAL (IF EQUIPPED)

Activating the differential lock increases traction by maintaining equal wheel speed on the rear tires. See Using the Differential Lock section for more information on using the differential lock.

Q. SEAT ADJUSTMENT LEVER

The seat adjustment lever allows for adjustment forward or backward of the operator's seat. Refer to the Assembly section for instructions on adjusting the seat position.

HEADLIGHTS (NOT SHOWN)

On turn-key tractors the lights are ON whenever the ignition key is rotated out of the STOP position. The lights turn OFF when the ignition key is moved to the STOP position.

On PBS tractors the lights are ON whenever the PBS module is on. Headlights can be activated for 15 seconds without being on the seat by pressing the ignition key once. To keep the headlights active you can sit in the seat or start/run the engine.

Operation

BEFORE OPERATING YOUR TRACTOR

- Before operation, refer to the Maintenance Schedule chart located in this manual for regularly scheduled service items.
- This engine is certified to operate only on clean, fresh, unleaded gasoline. Fill only with clean, fresh, unleaded gasoline with a pump sticker octane rating of 87 or higher.
- Do not use gasoline left over from the previous season, to minimize gum deposits in the fuel system.
- Gasohol (up to 10% ethyl alcohol, 90% unleaded gasoline by volume) is an approved fuel. Other gasoline/alcohol blends are not approved.
- Methyl Tertiary Butyl Ether (MTBE) and unleaded gasoline blends (up to a maximum of 15% MTBE by volume) are approved fuels. Other gasoline/ether blends are not approved.

SAFETY INTERLOCK SYSTEM

⚠ WARNING

Do not operate the tractor if the safety interlock system is malfunctioning. This system was designed for your safety and protection.

This tractor is equipped with a safety interlock system for the protection of the operator. If the safety interlock system should ever malfunction, do not operate the tractor. Contact an authorized service dealer.

- The safety interlock system prevents the engine from cranking or starting unless the park brake is engaged or the operator is in the seat and the brake pedal is fully depressed, with the PTO (Blade Engage) Switch or PTO (Blade Engage) Lever in the disengaged (OFF) position.
- The engine will automatically shut off if the operator leaves the seat before engaging the park brake.
- The engine will automatically shut off if the operator leaves the tractor's seat with the PTO (Blade Engage) Switch or PTO (Blade Engage) Lever in the ENGAGED (ON) position, regardless of whether the park brake is engaged.
- With the ignition key in the NORMAL MOWING position, the electric PTO (Blade Engage) Clutch will automatically shut off if the PTO (Blade Engage) Switch or PTO (Blade Engage) Lever is moved into the engaged (ON) position with the drive pedal in position for reverse travel.

CHECKING THE SAFETY INTERLOCK CIRCUITS

Periodically check the safety interlock circuits to ensure they are working properly. If a safety circuit is not working as designed, contact your authorized service dealer to have the tractor inspected. Do NOT operate the tractor if any safety circuit is not functioning properly. To check the safety circuits, proceed as follows:

1. With the engine off and sitting in the seat, place the PTO control (PTO (Blade Engage) Switch or PTO (Blade Engage) Lever) to the ENGAGED (ON) position. Momentarily turn the ignition switch to the START position; the engine should not crank.
2. With the tractor running, and the park brake not engaged; lift upward from the operator's seat. The engine should stop.
3. With the park brake engaged, engage the PTO. Lift upward from the operator's seat; the engine should stop.

STARTING THE ENGINE

⚠ CAUTION

The operator should be sitting in the tractor seat when starting the engine.

Continue for turn-key ignitions, skip ahead to the PBS Ignition section for Push-Button Start ignitions.

Turn-Key Ignition with Separate Throttle and Choke Control

1. Insert the ignition key into the ignition switch.
2. Place the PTO (Blade Engage) Switch or PTO (Blade Engage) Lever in the OFF position.
3. Engage the tractor's park brake.
4. Engage the choke control (if equipped).

NOTE: If the engine is warmed up, it may not be necessary to choke the engine.

5. Move the throttle control lever to midway between the FAST and SLOW positions.

NOTE: When operating the tractor be certain that the throttle lever is always in the FAST position.

6. Turn the ignition key clockwise to the START position. After the engine starts, release the key. It will return to the NORMAL MOWING position.

OPERATION

⚠ CAUTION

Do not hold the key in the START position for longer than ten seconds at a time. Doing so may cause damage to your engine's electric starter.

7. As the engine warms up, disengage the choke control. Do not use the choke control to enrich the fuel mixture, except as necessary to start the engine.
8. Allow the engine to run for a few minutes at mid-throttle before putting the engine under load.

NOTE: When operating the tractor be certain that the throttle control lever is always in the FAST position.

9. Observe the hour meter/indicator panel. If the battery indicator light or oil pressure light comes on, immediately stop the engine. Have the tractor inspected by your authorized service dealer.

NOTE: There will be no oil pressure when the engine is not running and this may be indicated by oil pressure light.

Turn-Key Ignition with Throttle/Choke Control

1. Insert the ignition key into the ignition switch.
2. Place the PTO (Blade Engage) Switch or PTO (Blade Engage) Lever in the OFF position.
3. Engage the tractor's park brake.
4. Push the throttle control lever upward, past the detent, to engage the choke.

NOTE: If the engine is warmed up, it may not be necessary to choke the engine.

5. Turn the ignition key clockwise to the START position. After the engine starts, release the key. It will return to the NORMAL MOWING position.

⚠ CAUTION

Do not hold the key in the START position for longer than ten seconds at a time. Doing so may cause damage to your engine's electric starter.

6. As the engine warms up, gradually pull the throttle/choke control lever rearward past the choke detent position. Do not use the choke position to enrich the fuel mixture, except as necessary to start the engine.
7. Allow the engine to run for a few minutes at mid-throttle before putting the engine under load.

NOTE: When operating the tractor be certain that the throttle lever is always in the FAST position.

8. Observe the hour meter/indicator panel. If the battery indicator light or oil pressure light comes on, immediately stop the engine. Have the tractor inspected by your authorized service dealer.

NOTE: There will be no oil pressure when the engine is not running and this may be indicated by oil pressure light.

Turn-Key Ignition with Electronic Governor Control

1. Insert the ignition key into the ignition switch.
2. Place the PTO (Blade Engage) Switch or PTO (Blade Engage) Lever in the OFF position.
3. Engage the tractor park brake.
4. Set the Electronic Governor Control dial to the desired engine speed setting.

NOTE: If the tractor is equipped with an Electronic Governor Control, the tractor can be started at any speed setting along the dial and will automatically adjust to the desired engine speed setting.

5. Turn the ignition key clockwise to the START position. After the engine starts, release the key. It will return to the NORMAL MOWING position.

NOTE: It may take a few seconds after starting for the engine to adjust to the proper engine speed. This is normal.

PBS Ignition

1. Place the PTO (Blade Engage) Switch or PTO (Blade Engage) Lever in the OFF position and sit in the seat. You must be in the seat for the PBS ignition to work.
2. Insert the ignition key.
3. Engage tractor park brake.
4. Move the throttle into the FAST position.
5. Press and hold the ignition key. After the engine starts, release the key. It will return to an extended position.

NOTE: When operating the tractor be certain that the throttle control lever is always in the FAST position. Operating with the throttle at less than full throttle may lead to shortened battery life.

COLD WEATHER STARTING

When starting the engine at temperatures near or below freezing, ensure the correct viscosity motor oil is used in the engine and the battery is fully charged. Start the engine as follows:

1. Be sure the battery is in good condition. A warm battery has much more starting capacity than a cold battery.
2. Use fresh winter grade fuel. Winter grade gasoline has higher volatility to improve starting. Do not use gasoline left over from summer.
3. Follow the previous instruction for Starting the Engine.

USING JUMPER CABLES TO START ENGINE

⚠ WARNING

Batteries contain sulfuric acid and produce explosive gases. Make certain the area is well ventilated, wear gloves and eye protection, and avoid sparks or flames near the battery.

If the battery charge is not sufficient to crank the engine, recharge the battery. If a battery charger is unavailable and the tractor must be started, the aid of a booster battery will be necessary. Connect the booster battery as follows:

1. Connect the end of one cable to the disabled tractor battery's positive terminal; then connect the other end of that cable to the booster battery's positive terminal.
2. Connect one end of the other cable to the booster battery's negative terminal; then connect the other end of that cable to the frame of the disabled tractor, as far from the battery as possible.
3. Start the disabled tractor following the normal starting instructions previously provided; then disconnect the jumper cables in the exact reverse order of their connection.
4. Have the tractor's electrical system checked and repaired as soon as possible to eliminate the need for jump starting.

STOPPING THE ENGINE

1. If the blades are engaged, place the PTO (Blade Engage) Switch or PTO (Blade Engage) Lever in the OFF position.
2. Engage the tractor park brake.
3. Place the throttle control to midway between the FAST and SLOW positions.
4. Turn the ignition key counter-clockwise to the STOP position, or on PBS units press or remove the ignition key.

Driving the Tractor

⚠ WARNING

Keep all movement of the Forward and Reverse drive pedals and brake pedal slow and smooth. Abrupt movement of the drive pedals or brake pedal can affect the stability of the tractor and could cause the tractor to flip over, which may result in serious injury or death to the operator.

1. Depress the brake pedal to release the park brake. Move the throttle into the FAST position.
2. To travel FORWARD, slowly depress the forward drive pedal (a) forward until the desired speed is achieved. See Figure 25.
3. To travel in REVERSE, check that the area behind is clear then slowly depress the reverse drive pedal (b) until the desired speed is achieved. See Figure 25.

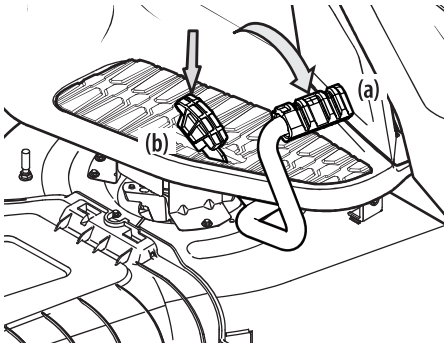


Figure 25

⚠ WARNING

- **Sharp turns can affect control of the tractor. ALWAYS slow the tractor before making sharp turns.**
- **Do not leave the seat of the tractor without first placing the PTO (Blade Engage) Switch or Lever in the DISENGAGED (OFF) position and engaging the park brake. If leaving the tractor unattended, also turn the engine off and remove the ignition key.**

Engaging the Park Brake

NOTE: The park brake must be set if the operator leaves the seat with the engine running or the engine will automatically shut off.

To set the park brake:

1. Depress the brake pedal completely down with your left foot and hold it in that position.
2. Depress the park brake/cruise control lever and hold it in that position.
3. Remove your foot from the brake pedal.
4. Release pressure from the park brake/cruise control lever.

After completing Step 3, the brake pedal should remain in the down position. If it doesn't, the park brake is not engaged. Repeat Steps 1-4 to engage the park brake.

To disengage the park brake, depress the brake pedal.

Setting the Cruise Control

⚠ WARNING

Do not attempt to engage the cruise control lever while traveling in reverse. The cruise control will not engage while traveling in reverse.

To set the cruise control:

1. Depress the forward drive pedal with your right foot until the desired speed is achieved.

2. Press down on the park brake/cruise control lever and hold it in that position.
3. Remove your foot from the forward drive pedal.
4. Release pressure from the park brake/cruise control lever.

The forward drive pedal should remain in the down position and the tractor will maintain the same forward drive speed. If it doesn't, the cruise control is not engaged. Repeat Steps 1-4 again to engage the cruise control.

To disengage the cruise control, lightly depress the forward drive pedal or the brake pedal.

Reverse Caution Mode

REVERSE CAUTION MODE (TURN-KEY IGNITION)
The REVERSE CAUTION MODE position of the ignition switch allows the tractor to be operated in reverse with the PTO (Blade Engage) Lever in the engaged (ON) position.

NOTE: Mowing in reverse is not recommended.

⚠ WARNING

Use extreme caution while operating the tractor in the REVERSE CAUTION MODE. Always look down and behind before and while backing. Do NOT operate the tractor when children or others are around. Stop the tractor immediately if someone enters the area.

To use the REVERSE CAUTION MODE:

NOTE: The operator MUST be seated in the tractor seat.

1. Start the engine as previously instructed.
2. Turn the ignition key from the NORMAL MOWING (a) position to the REVERSE CAUTION MODE (b) position of the ignition switch. See Figure 26.

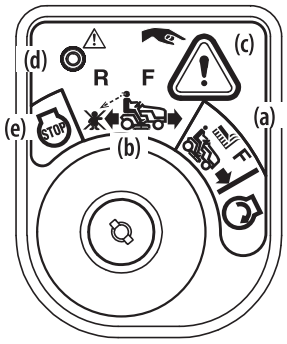


Figure 26

3. Press and hold the REVERSE CAUTION MODE BUTTON (c) at the top, right corner of the ignition module for 3 seconds. The red indicator light (d) at the top, left corner of the ignition module will be ON while activated. See Figure 26.
4. Once activated (indicator light ON), the tractor can be driven in reverse with the PTO (Blade Engage) Lever in the engaged (ON) position.
5. Always look down and behind before and while backing up slowly to make sure no children are around. After resuming forward motion, return key to the NORMAL MOWING (a) position to return to normal mowing operation. See Figure 26.

The REVERSE CAUTION MODE (b) will remain activated until:

- The key is placed in either the NORMAL MOWING (a) position or STOP (e) position. See Figure 26.
- The operator leaves the seat (electric PTO)/the park brake is set (manual PTO).

REVERSE CAUTION MODE (PBS IGNITION)
The REVERSE CAUTION MODE allows the tractor to be operated in reverse with the PTO (Blade Engage) Lever in the engaged (ON) position.

NOTE: Mowing in reverse is not recommended.

⚠ WARNING

Use extreme caution while operating the tractor in the REVERSE CAUTION MODE. Always look down and behind before and while backing. Do NOT operate the tractor when children or others are around. Stop the tractor immediately if someone enters the area.

To use the REVERSE CAUTION MODE:

NOTE: The operator MUST be seated in the tractor seat.

1. Start the engine as instructed above.
2. Press the REVERSE CAUTION MODE button and hold for 3 seconds. The indicator light will flash for 3 seconds and will stay on when the REVERSE CAUTION MODE is activated. See Figure 27.
3. The indicator light above the REVERSE CAUTION MODE button will be ON while activated. See Figure 27.

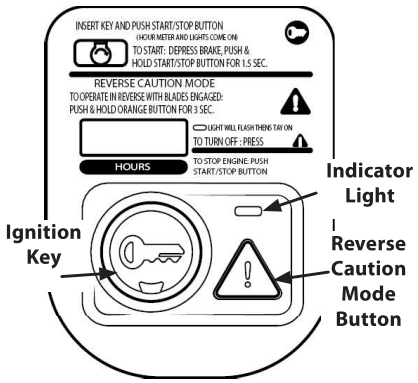


Figure 27

4. Once activated (indicator light ON), the tractor can be driven in reverse with the cutting PTO (Blade Engage) Lever in the engaged (ON) position.
5. Always look down and behind before and while backing to make sure no children are around. After resuming forward motion, press the REVERSE CAUTION MODE button to return to NORMAL MOWING.
6. The REVERSE CAUTION MODE will remain activated until:

- The REVERSE CAUTION MODE button is pressed again.
- The ignition key is pressed or removed.
- The operator leaves the seat.

Engaging the PTO (Blade Engage)(Electric PTO tractors)

Engaging the PTO (Blade Engage) transfers power to the cutting deck or other (separately available) attachments. To engage the PTO:

1. Move the throttle to the FAST position.
2. Pull the PTO (Blade Engage) Switch outward into the engaged (ON) position. See H in Figure 24 on page 15.

NOTE: When operating the tractor be certain that the throttle is always in the FAST position. Operating with the throttle at less than full throttle may lead to premature battery wear and a poor quality cut.

3. To disengage the PTO (Blade Engage), push the PTO (Blade Engage) Switch inward to the disengaged (OFF) position.

Engaging the PTO (Blade Engage)(Manual PTO tractors)

Engaging the PTO (Blade Engage) transfers power to the cutting deck. To engage the PTO:

1. Move the throttle to the FAST position.
2. Push the PTO (Blade Engage) Lever forward into the engaged (ON) position. See Figure 28.

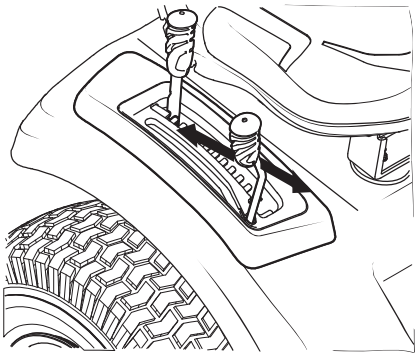


Figure 28

NOTE: When operating the tractor be certain that the throttle is always in the FAST position. Operating with the throttle at less than full throttle may lead to premature battery wear and a poor quality cut.

3. To disengage the PTO (Blade Engage), push the PTO (Blade Engage) Lever forward and to the right, out of the locked position, then release the lever into the disengaged (OFF) position.

Mowing

⚠ WARNING

To help avoid blade contact or a thrown object injury, keep bystanders, helpers, children, and pets at least 75 feet (23 meters) from the machine while it is in operation. Stop machine if anyone enters the area.

⚠ WARNING

Make certain the area to be mowed is free of debris, sticks, stones, wire, or other objects that can be thrown by the rotating blades.

NOTE: Do not engage the mower deck when lowered in grass. Premature wear and possible failure of the "V" belt and PTO clutch will result. Fully raise the deck or move to a non-grassy area before engaging the mower deck.

- Mow up and down slopes, not across. If mowing a slope, start at bottom and work upward to ensure turns are made uphill.
- Do not mow at high ground speed, especially if a mulch kit or grass collector is installed.
- Do not cut the grass too short. Short grass is prone to weed growth and yellows quickly in dry weather.
- Always operate the tractor with the throttle in the FAST position while mowing.
- On the first pass, pick a point on the opposite side of the area to be mowed. Follow the point to maintain a straight line.
- Engage the PTO and move the throttle control or throttle/choke control to the FAST position.
- Lower the mower deck to the desired height setting.
- For best results it is recommended that the first two laps be cut with the discharge thrown towards the center. After the first two laps, reverse the direction to throw the discharge to the outside for the balance of cutting. This will give a better appearance to the lawn.

NOTE: The speed of the tractor will affect the quality of the tractor cut. Mowing at full speed will adversely affect the cut quality.

- Your tractor is designed to cut normal residential grass of a height no more than 10" (25 cm). Do not attempt to mow through unusually tall, dry grass (e.g., pasture) or piles of dry leaves. Dry grass or leaves may contact the engine exhaust and/or build up on the tractor.

- Do NOT attempt to mow heavy brush and weeds or extremely tall grass. Your tractor is designed to mow lawns, NOT clear brush.
- Keep the blades sharp and replace the blades when worn.
- When approaching the other end of the strip, slow down or stop before turning. A three point turn is recommended.
- Align the tractor with an edge of the mowed strip and overlap approximately 3" (7.6 cm).
- Direct the tractor on each subsequent strip to align with a previously cut strip.
- To prevent rutting or grooving of the turf, if possible, change the direction that the strips are mowed by approximately 45° for the next and each subsequent mowing.

When stopping the tractor for any reason while on a grass surface, always:

- Engage the park brake.
- Shut engine off and remove the ignition key.
- Doing so will minimize the possibility of having your lawn "browned" by hot exhaust from your tractor's running engine.

Using the Differential Lock (If equipped)

⚠ WARNING

- **When the differential lock is on, be sure to allow for a larger turning radius and greater steering effort.**
- **Engage the differential lock only when the vehicle is stationary. Do not use the differential lock when traveling downhill.**
- **With or without the differential lock engaged, all Safe Operation Practices described in this manual must be followed.**

NOTE: The system should only be used when poor traction is encountered. It should be disengaged when traveling on solid surfaces.

In some instances, the tractor may be driven in slippery or low-traction situations and it may be necessary to activate the differential lock. To use the differential lock proceed as follows:

1. Stop the motion of the tractor.
2. Depress the differential lock pedal to engage the differential lock.

NOTE: The differential lock only works while the pedal is depressed.

NOTE: Engagement may be delayed. The differential lock will engage when different wheel speeds are detected.

NOTE: Disengagement may be delayed. The differential lock will disengage when the rear wheel speeds allow it to release.

3. To disengage the differential lock, release the pedal.

SERVICE AND MAINTENANCE

⚠ WARNING

Before performing any type of maintenance/service, disengage all controls and stop the engine. Wait until all moving parts have come to a complete stop. Allow the engine to cool. Disconnect spark plug wire and ground it against the engine to prevent unintended starting. Always wear safety glasses during operation or while performing any adjustments or repairs.

Follow the Maintenance Schedule given below. This chart describes service guidelines only.

Refer to the Engine Operator's Manual for engine maintenance items listed in the table below.

	Before Each Use	After First 5 Hours	Every 10 Hours	Every 25 Hours	Every 50 Hours	Every 100 Hours	Every 200 Hours	Prior to Storing	See Engine Operator's Manual
Check/Clean Engine Intake Screens & Cooling Fans #	✓							✓	
Check/Clean Exhaust Manifold, Muffler Pipe & Muffler Shields #	✓							✓	
Check/Clean Top & Underside of Deck, Under & Around Spindle Covers & Belt Area #	✓							✓	
Check/Clean Around Fuses, Wiring & Wiring Harnesses #	✓							✓	
Check/Clean Around Transmission, Axle & Fans #	✓							✓	
Check Air Filter for Dirty, Loose or Damaged Parts	✓								
Check Engine Oil Level	✓								
Clean Battery Terminals			✓					✓	
Grease All Lubrication Points			✓					✓	
Check Engine Intake Screen/Clean as Needed			✓					✓	
Check Blades/Sharpen or Replace as Needed			✓					✓	
Check Tire Pressure			✓					✓	
Check/Clean Underside of Deck	✓		✓						
Check Safety Interlock System			✓					✓	
Check Mower Blade Stop Time			✓					✓	
Inspect & Lube Deck Wheels				✓				✓	
Check Deck Level/Pitch				✓				✓	
Check Belts & Pulleys for Damage/Wear					✓				
Check That All Hardware is in Place & Secure						✓			
Check Engine Mounting Bolt Torque (Tighten to 325-450 in-lbs (36.7-50.8 N-m))		✓			✓			✓	✓
Check Blade Mount Nut Torque (Tighten to 70-90 ft-lbs (94.9-122 N-m))		✓			✓			✓	
Check Spark Plug Condition & Gap						✓		✓	✓
Engine Break-in Oil Change		✓							✓
Change Engine Oil					✓			✓	✓

SERVICE AND MAINTENANCE

	Before Each Use	After First 5 Hours	Every 10 Hours	Every 25 Hours	Every 50 Hours	Every 100 Hours	Every 200 Hours	Prior to Storing	See Engine Operator's Manual
Check Fuel System (Lines, Tank, Cap, Fittings)		✓			✓			✓	✓
Check Spark Arrestor		✓			✓			✓	✓
Replace Oil Filter					✓			✓	✓
Clean or Change Air Filter					✓				✓
Replace Fuel Filter					✓				✓
Have Valve Lash Checked & Adjusted *									✓

* -- Have this item performed by an authorized service dealer.

-- Perform more often in dry conditions and when mulching.

NOTE: This Operator's Manual covers several models. Tractor features may vary by model. Not all features in this manual are applicable to all tractor models and the tractor depicted may differ from yours.

Post-Operation Tractor Care

After each operation of the tractor, the following procedures should be implemented to extend the life of your tractor and ensure safe operating conditions.

⚠ WARNING

Failure to follow these recommendations may result in serious injury to yourself or others and may cause damage to the tractor.

Cleaning the Underside of the Deck

DECK WASH SYSTEM (IF EQUIPPED)

Your tractor's deck may be equipped with a water port on its surface as part of its deck wash system.

Use the deck wash system to rinse grass clippings from the deck's underside and prevent the buildup of corrosive chemicals. Complete the following steps AFTER EACH MOWING:

1. Attach the nozzle adapter to a standard garden hose connected to a water supply.
2. Move the tractor to an area within reach of the hose where the dispersal of wet grass clippings is acceptable. Disengage the PTO, engage the park brake and stop the engine.
3. Pull back the lock collar (a) of the nozzle adapter (b) and push the nozzle adapter onto the deck wash nozzle (c). Release the lock collar to lock the nozzle adapter on the deck wash nozzle. See Figure 29.

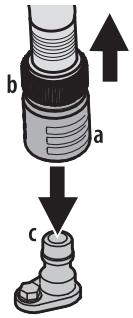


Figure 29

4. Turn on the water supply.
5. From the tractor operator's seat, start the engine and engage the PTO. Allow to run as needed. Disengage the PTO and stop the engine.
6. Turn off the water supply.
7. Pull back the lock collar of the nozzle adapter to disconnect the nozzle adapter from the deck wash nozzle.

Cleaning the Tractor

⚠ WARNING

If the tractor has been recently run, the engine, muffler, and surrounding metal surfaces will be hot and can cause burns to the skin. Let the engine cool for at least five minutes. Exercise caution to avoid burns.

Your tractor should be cleaned after each use and under certain conditions, i.e. dry conditions and/or mulching situations, additional cleaning may be necessary.

One of the best ways to keep your tractor running efficiently and to reduce fire risk is to regularly remove debris buildup from the tractor. Follow the recommendations below and contact your authorized dealer with any questions.

- Allow the tractor to cool at least five minutes in an open area before cleaning.

SERVICE AND MAINTENANCE

NOTE: Using a pressure washer or garden hose is not recommended for cleaning your tractor other than to clean the underside of the deck. It may cause damage to electrical components, spindles, pulleys, bearings or the engine. The use of water will result in shortened life and reduce serviceability.

- Clean under the hood, including exhaust manifold, around fuses, all wiring and harnesses, muffler pipe, muffler shield, engine intake screens and cooling fins, etc. See Figure 30.

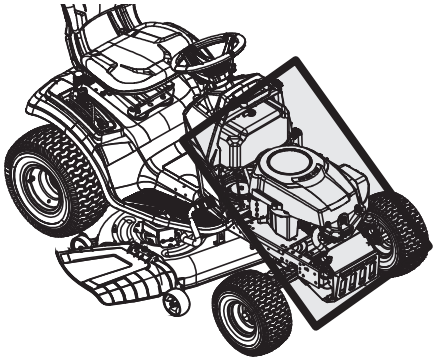


Figure 30

- Clean the top of the tractor deck, under the spindle covers and belt area. See Figure 31.

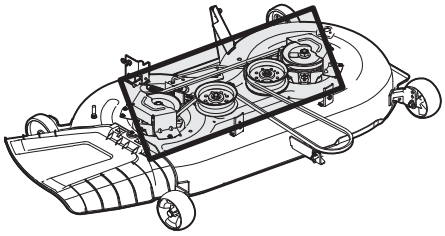


Figure 31

- Clean around and near the transmission, axle and the fan area. See Figure 32.

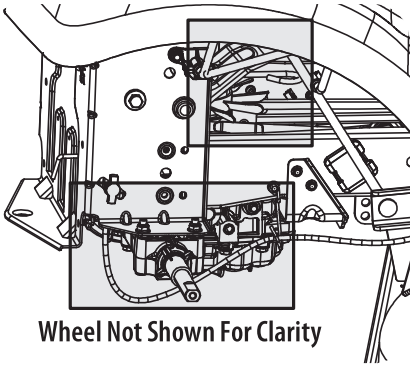


Figure 32

- Debris can accumulate anywhere on the tractor, especially on horizontal surfaces. Additional cleaning may be necessary when mowing in dry conditions or when mulching.
- Fuel leaks/spills, oil leaks/spills and excess lubrication can also become collection sites for debris. Immediate repair and cleaning up oil or fuel spills can help reduce fire hazards.
- In addition to cleaning the tractor before operating and storing, do not attempt to mow unusually tall grass, 10″ (25 cm) or higher, dry grass (e.g., pasture) or piles of dry leaves. Dry grass or leaves may contact the engine exhaust and/or build up on the tractor deck presenting a potential fire hazard.

Storing the Tractor

- Allow the tractor to cool at least five minutes in an open area before storing.
- Do not park the tractor near any flammable materials (wood, cloth or chemicals) or any open flames or other potential source of ignition (furnace, water heater or any other type of heater).
- Remove all combustible materials from the tractor before storing. Empty cargo boxes, grass catchers or containers.
- Always shut off fuel flow when storing or transporting if tractor is equipped with a fuel shutoff.
- Check the fuel system (lines, tank, cap and fittings) frequently for cracks or leaks. Repair and clean as necessary.

NOTE: If the tractor is temporarily left outside, tip the seat forward and cover it with a suitable plastic bag to prevent rain damage.

Maintenance

ENGINE

⚠ WARNING

Allow machine to cool in an open area for at least five minutes before storing or refueling.

Refer to the Engine Operator's Manual for all engine issues and questions.

NOTE: Maintenance, repair or replacement of the emission control devices and systems which are being done at owner's expense may be performed by any engine repair establishment or individual. Warranty repairs must be performed by an authorized dealer.

CHANGING THE ENGINE OIL

⚠ WARNING

If the tractor has been recently run, the engine, muffler and surrounding metal surfaces will be hot and can cause burns to the skin. Let the engine cool for at least five minutes. Exercise caution to avoid burns.

NOTE: The oil filter should be changed at every oil change interval.

To complete an oil change, proceed as follows:

1. Run the engine for a short time to warm the engine oil. The oil will flow more freely and carry away more impurities. Use care to avoid burns from hot oil.
2. Open the tractor's hood and locate the oil drain port on the side of the engine.
3. Place an appropriate oil collection container with at least a 2.5 quart (2.36 L) capacity below the opening of the oil drain tube, to collect the used oil. Remove the oil fill cap/dipstick from the oil fill tube.
4. Open the protective cap on the end of the oil drain valve to expose the drain port. See Figure 33.

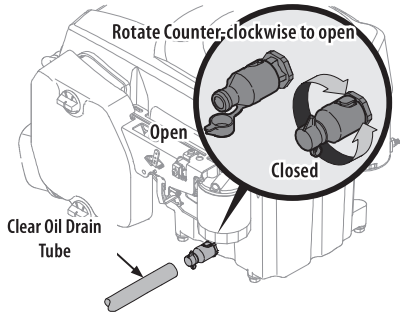


Figure 33

5. Push the oil drain tube (packed with this manual) onto the oil drain port. Route the opposite end of the tube into an appropriate oil collection container with at least a 2.5 quart (2.36 L) capacity to collect the used oil.
6. The engine is equipped with a twist-and-pull drain port. Turn the oil drain valve 1/4-turn counter-clockwise, then pull outward to begin draining oil. After the oil has finished draining, push the end of the oil drain valve back in and turn 1/4-turn clockwise to close the oil drain. Re-cap the end of the oil drain valve to keep debris from entering the drain port.
7. Replace the oil filter, and refill the engine with new oil as instructed in the Engine Operator's Manual.
8. Reinstall the oil fill cap/dipstick.

NOTE: Place an absorbent towel beneath the oil filter to keep oil off the engine pulley.

NOTE: Observe proper disposal laws and regulations for gas, oil, etc. to protect the environment.

NOTE: Maintenance, repair or replacement of the emission control devices and systems which are being done at the owner's expense may be performed by any engine repair establishment or individual. Warranty repairs must be performed by an authorized dealer.

Lubrication

⚠ WARNING

Before lubricating, repairing, or inspecting, always disengage PTO, set park brake, stop engine, and remove key to prevent unintended starting.

Using a quality lubricating oil, lubricate all lubrication points. Refer to Maintenance Schedule chart located in this manual for proper service intervals.

LUBRICATING FRONT WHEELS

Each of the front wheel axles is equipped with a grease fitting. See Figure 34. Some models have rims equipped with grease fittings (excludes Turf Master and Multi-Trac wheels). See Figure 35. Lubricate with a No. 2 multi-purpose grease applied with a grease gun per the Maintenance Schedule.

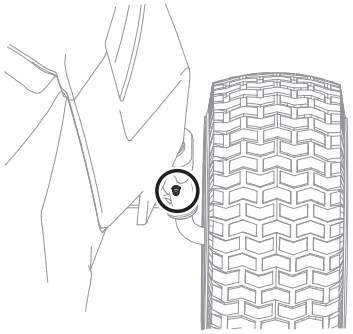


Figure 34

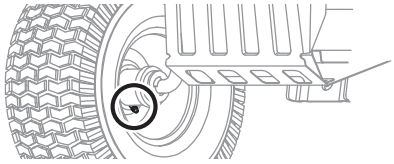


Figure 35

LUBRICATING PIVOT POINTS & LINKAGE

Lubricate all the pivot points on the drive system, park brake and lift linkage per the Maintenance Schedule.

NOTE: It is not necessary to grease the steering pinion/sector gear interface. Doing so will allow dirt to accumulate and can affect steering performance.

Hydrostatic Transmission

The hydrostatic transmission is sealed at the factory and is maintenance-free. The fluid level cannot be checked and the fluid cannot be changed.

Spark Arrestor Maintenance (If equipped)

Spark arrestor assemblies must be inspected and cleaned periodically (see the Maintenance Schedule chart in this manual). Visually inspect the screen for tears, broken wires or loose welds. Replace the spark arrestor assembly if any of these conditions exist. If the screen is in good condition, clean the screen by brushing away loose dirt or carbon particles.

Tires

Keep the tires inflated to the recommended pressures. Improper inflation will shorten the tire service life. See the tire side wall for proper inflation pressures. Refer to the Maintenance Schedule chart located in this manual for proper service intervals.

Observe the following guidelines:

- Do not inflate a tire above the maximum pressure shown on the sidewall of the tire.
- Do not reinflate a tire that has been run flat or seriously under-inflated. Have it inspected and serviced by a qualified tire mechanic.

Off-Season Storage

If your tractor is not going to be operated for an extended period of time (30 days to approximately six months), the tractor should be prepared for storage. Store the tractor in a dry and protected location. If stored outside, cover the tractor (including the tires) to protect it from the elements. The procedures outlined below should be performed whenever the tractor is placed in storage.

1. Change the engine oil and filter following the instructions provided in this manual as well as the Engine Operator's Manual provided with this tractor.

⚠ WARNING

Never store the tractor with fuel in the tank indoors or in poorly ventilated enclosures, where fuel fumes may reach an open flame, spark, or pilot light as on a furnace, water heater, clothes dryer, etc.

2. If storing the tractor for 30 days or more:
   a. To prevent gum deposits from forming inside the engine's carburetor and causing possible malfunction of the engine, the fuel system must be either completely emptied, or the gasoline must be treated with a stabilizer to prevent deterioration.
   b. Using a fuel stabilizer for storage between 30 and 90 days:
      - Read the product manufacturer's instructions and recommendations.
      - Add to clean, fresh gasoline the correct amount of stabilizer for the capacity (approximately 3 gallons) of the fuel system.
      - Fill the fuel tank with treated fuel and run the engine for 2-3 minutes to get stabilized fuel into the carburetor.
      - Fuel left in the fuel tank deteriorates and will cause serious starting problems.
   c. Emptying the fuel system for storage of more than 90 days:
      - Prior to putting the tractor in storage, monitor fuel consumption with the goal of running the fuel tank empty.
      - Run the engine until it begins to stall. Use the choke to keep the engine running until all fuel in the carburetor has been exhausted.
      - Referring to the Engine Operator's Manual, drain the fuel from the carburetor bowl.
3. Clean the engine and the entire tractor thoroughly.

NOTE: Using a pressure washer or garden hose is not recommended for cleaning your tractor other than to clean the underside of the deck. It may cause damage to electrical components, spindles, pulleys, bearings or the engine. The use of water will result in shortened life and reduce serviceability.

4. Fully charge the battery, then disconnect the negative cable at the battery to prevent possible discharge. Recharge the battery periodically when in storage.

NOTE: Remove the battery if exposed to prolonged periods of sub-freezing temperatures. Store in a cool, dry location where temperatures are above freezing.

5. Lubricate all lubrication points.

Removing the Tractor from Storage

1. Check the engine oil.
2. Fully charge the battery and inflate the tires to the recommended pressure. See tire side wall for proper tire inflation pressure.
3. Fill the fuel tank with clean, fresh gasoline.
4. Start the engine and allow to idle for a few minutes to ensure engine is operating properly.
5. Drive the tractor without a load to make certain all the tractor systems are functioning properly.

Adjustments

DECK LEVELING

If the cutting deck appears to be mowing unevenly, leveling adjustments can be performed.

⚠ WARNING

If the tractor has been recently run, the engine, muffler, and surrounding metal surfaces will be very hot and can cause burns to the skin. Let the engine cool for at least five minutes. Exercise caution to avoid burns.

NOTE: Check the tractor's tire pressure before performing any deck leveling adjustments. Refer to Tires in this section for information regarding tire pressure.

LEVELING THE DECK (SIDE-TO-SIDE)

1. With the tractor parked on a firm, level surface, place the deck lift lever in the middle position and rotate both blades so that they are perpendicular with the tractor.
2. Measure the distance from the outside of the left blade tip to the ground and the distance from the outside of the right blade tip to the ground. Both measurements taken should be equal. If they are not, proceed to the next step.
3. Under the rear fenders inside the wheels there is a lift adjustment rod for each side of the deck. See Figure 36.

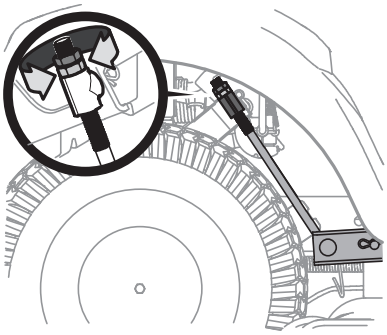


Figure 36

4. Minor side-to-side adjustments should be made using primarily the left adjustment rod.
5. To raise the left side of the deck, loosen the upper nut on the end of the lift rod, then turn the lower nut clockwise. When the proper adjustment is achieved, tighten the upper nut to secure in place. To lower the left side of the deck, loosen the upper nut on the end of the lift rod, then turn the lower nut counter-clockwise. When the proper adjustment is achieved, tighten the upper nut to 25-30 ft-lbs (33.9-40.7 N-m) to secure in place.
6. The deck is properly leveled when both blade tip measurements taken earlier are equal.

LEVELING THE DECK (PITCH/FRONT-TO-REAR)

The front of the deck is supported by a stabilizer bar that can be adjusted to level the deck from front to rear. The front of the deck should be 1/4"-3/8" (6.35 mm-9.5 mm) lower than the rear of the deck. Adjust if necessary as follows:

1. Park the tractor on a firm, level surface, place the deck lift lever in the middle position and rotate the blade nearest the discharge chute so that it is parallel with the tractor.
2. Measure the distance from the front of the blade tip to the ground and the rear of the blade tip to the ground. The front of the deck should be between 1/4"-3/8"(6.35 mm-9.5 mm) less than the rear of deck.
3. Determine the approximate distance necessary for proper adjustment and proceed, if necessary.
4. To **raise** the front of the deck, loosen the outer nut then tighten (thread inward) the inner nut against the front hanger bracket. See Figure 37. When proper adjustment is achieved, re-tighten the outer nut to 25-30 ft-lbs (34 mm-40.7 N-m).

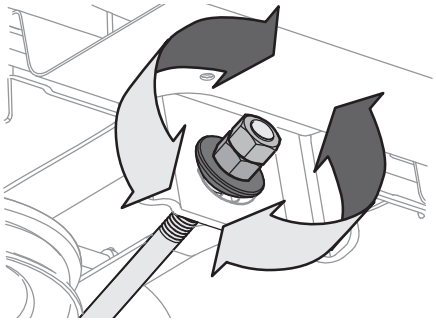


Figure 37

5. To **lower** the front of the deck, loosen the outer nut then loosen (thread outward) the inner nut, away from the front hanger bracket. See Figure 37. When proper adjustment is achieved, re-tighten the outer nut.

Adjusting the Deck Wheels

⚠ WARNING

Keep hands and feet away from the discharge opening of the cutting deck.

NOTE: The deck wheels are an anti-scalp feature of the deck and are not designed to support the weight of the deck.

The deck wheels should be approximately 1/4"-1/2" (6.35 mm-12.7 mm) above the ground when the deck is set in the desired height setting. To adjust the deck wheels see the Assembly section for instructions.

Service

ELECTRICAL SYSTEM

A fuse is installed to protect the tractor's electrical system from damage caused by excessive amperage. Always use the same capacity fuse for replacement. If the electrical system does not function, check for a blown fuse.

If you have a recurring problem with blown fuses, have the tractor's electrical system checked by your authorized service dealer.

RELAYS AND SWITCHES

There are several safety switches in the electrical system. If a function of the safety interlock system described earlier is not functioning properly, have the electrical system checked by your authorized service dealer.

PARK BRAKE ADJUSTMENT

If the tractor does not come to a complete stop when the brake pedal is completely depressed, or if the tractor's rear wheels can roll with the park brake applied (and the hydrostatic relief valve open), the brake is in need of adjustment. See your authorized service dealer to have the brake adjusted.

HYDROSTATIC NEUTRAL ADJUSTMENT

If the tractor creeps forward or rearward when neither the forward nor reverse pedal is depressed, contact your local authorized dealer to have the neutral setting properly adjusted.

WHEEL ALIGNMENT

If your tractor pulls to one side or is out of alignment, a wheel alignment might be necessary. Contact an authorized service dealer to have the wheels properly aligned.

Deck Removal

⚠ WARNING

Use caution to avoid pinching your fingers when rolling the belt off the PTO pulley.

To remove the deck, proceed as follows:

1. Move the tractor to a level surface, disengage the PTO, stop the engine, ENGAGE the park brake.
2. Lower the deck by moving the deck lift lever into the bottom notch on the right fender.
3. For tractors with a manual PTO continue with Step 4, for electric PTO models skip ahead to Step 8.
4. Loosen, but do not remove the flange lock nut on the right idler pulley and the hex screw on the left idler pulley.
5. Remove the hex screw securing the engine pulley keeper rod to the frame. See Figure 38.

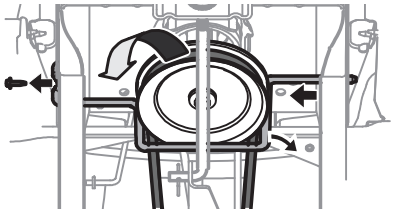


Figure 38

6. Slide the rod to the right to remove it.

NOTE: Be careful not to damage the wire harness when removing the rod.

7. Remove the bow tie clip that secures the PTO cable to the bracket on the deck, slide the PTO cable out of the bracket and unhook the spring from the idler bracket. See Figure 39.

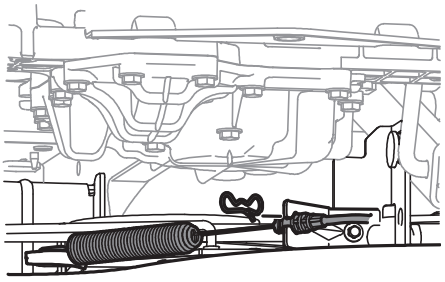


Figure 39

8. Working on the right side of the tractor, insert a 3/8" drive ratchet wrench, set to **tighten**, into square hole found on the idler bracket. See Figure 40.
9. Pivot the wrench forward to move the deck drive pulley forward. See Figure 40.

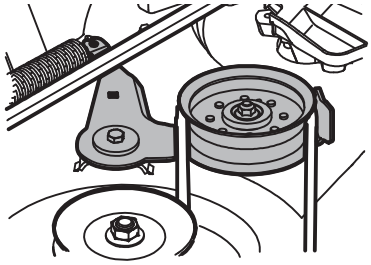


Figure 40

10. Carefully remove the belt from around the PTO pulley.
11. Looking at the deck from the left side of the tractor, locate the bow-tie pin on the rear left side of the deck. See Figure 41.
12. Remove the pin and slide the deck pin out of the deck lift arm. See Figure 41.

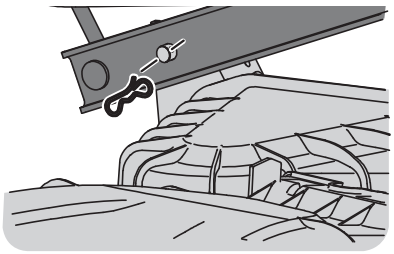


Figure 41

13. Repeat Steps 11-12 on the tractor's right side.
14. Pull the bow-tie pin out of the front deck lift rod securing it to the deck. See Figure 42. Slide the deck lift rod out of the front hanger bracket.

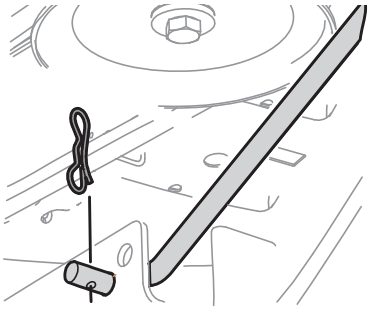


Figure 42

15. Move the deck lift lever into the top notch to raise the deck lift up and out of the way.
16. Gently slide the deck out from underneath the tractor.

Removing the Blades

⚠ WARNING

Shut the engine off and remove ignition key before removing the cutting blade(s) for sharpening or replacement. Protect your hands by using heavy gloves when grasping the blade.

Periodically inspect the blade and/or spindle for cracks or damage, especially after you've struck a foreign object. Do not operate the tractor until damaged components are replaced.

If the cutting edge of the blade has previously been sharpened, or if any metal separation is present, replace the blades with new ones.

FASTATTACH™ BLADE SYSTEM (IF EQUIPPED)

1. Set the tractor deck height to its highest position.
2. Carefully feel for the finger grooves on the blade collar at the sides of the blade.
3. Push upward on the blade collar and hold it. See Figure 43.

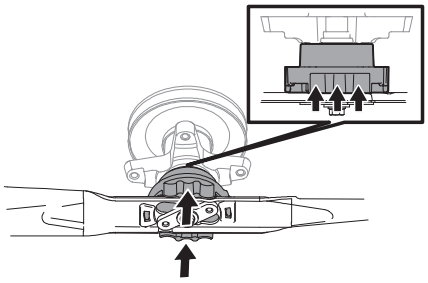


Figure 43

4. While holding the collar in the upward position, rotate the blade counter-clockwise to free it from the collar. See Figure 44.

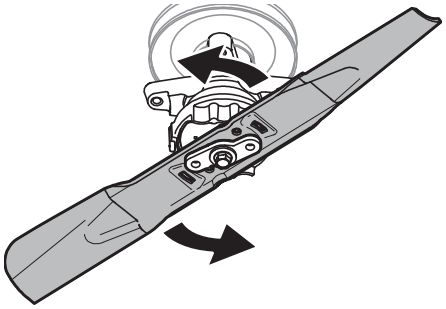


Figure 44

5. When the hole in the center of the blade aligns with the tractor blade retainer, carefully lower the blade. See Figure 45.

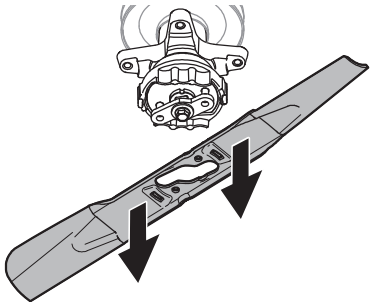


Figure 45

STANDARD BLADE SYSTEM (IF EQUIPPED)

1. Remove the deck from beneath the tractor, (refer to Deck Removal earlier in this section) then gently flip the deck over to expose its underside.
2. Place a block of wood between the deck housing baffle and the cutting blade to act as a stabilizer. See Figure 46.

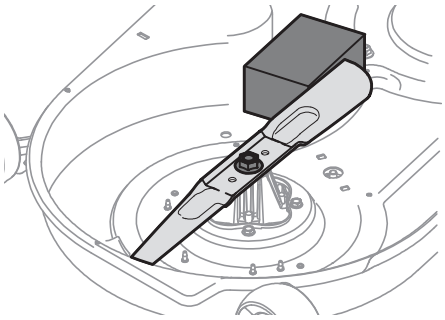


Figure 46

3. Remove the hex flange nut that secures the blade to the spindle assembly.

STANDARD BLADE SYSTEM WITH S-BLADES (IF EQUIPPED)

1. Remove the deck from beneath the tractor, (refer to Deck Removal) then gently flip the deck over to expose its underside.
2. Use a 15/16" wrench to hold the hex nut on top of the spindle assembly when loosening the hex nut (a) and washer (d)* securing the blade (b). A block of wood (c) may be placed between the deck housing and the cutting edge of the blade (b) to help in breaking loose the hex nut (a) and washer (d)* securing the blade. See Figure 47.

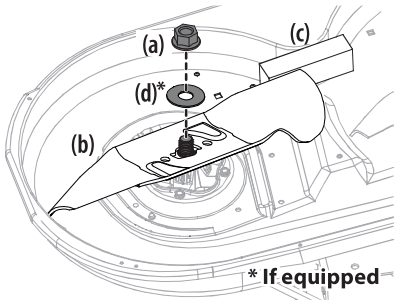


Figure 47

Installing the Blade

FASTATTACH™ BLADE SYSTEM (IF EQUIPPED)

1. Set the tractor deck height to its highest position.
2. Properly orient the blade. The bottom of the blade is labelled "Grass Side".
3. Position the blade under the spindle assembly and carefully align the large opening in the center of the blade over the tractor blade retainer. See Figure 48.

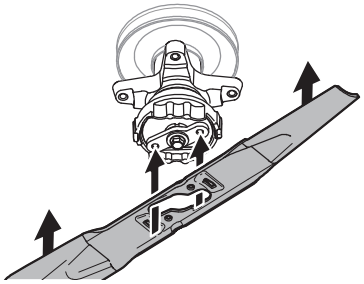


Figure 48

4. Push the blade upward against the blade adapter until the collar above rises. See Figure 43.
5. Rotate the blade clockwise to align with the blade adapter. See Figure 49.

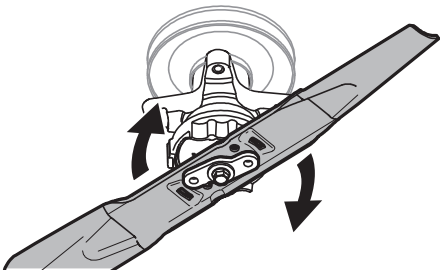


Figure 49

NOTE: If too much resistance is felt while turning the blade then the spindle is rotating, the blade is not properly aligned on the blade adapter, and installation will not be successful.

6. There will be an audible click when the blade is properly locked in place. See Figure 50.

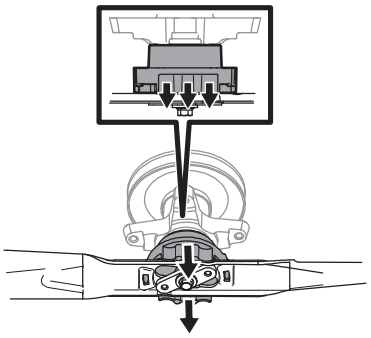


Figure 50

STANDARD BLADE SYSTEM (IF EQUIPPED)

1. With the deck removed gently flip the deck over to expose its underside.
2. Line up the hole in the center of the blade with the star-shaped retainer at the bottom of the spindle assembly and slide the blade into place.
3. Place a block of wood between the deck housing baffle and the cutting blade to act as a stabilizer. See Figure 46 on page 31.
4. Thread on the hex flange nut to secure the blade to the spindle assembly.
5. Use a torque wrench to tighten the blade spindle hex flange nut to 70-90 ft-lbs (94.9-122 N-m).
6. Re-install the deck (refer to Changing the Deck Belt & Reinstalling the Deck in this section).

NOTE: When replacing or reinstalling the blade, be sure to install the blade with the side of the blade marked "Bottom" (or with a part number stamped in it) facing the ground.

STANDARD BLADE SYSTEM WITH S-BLADES (IF EQUIPPED)

1. With the deck removed gently flip the deck over to expose its underside.

2. When re-installing blades, be sure of the following (see Figure 47 on page 32):
   a. Blades (b) are installed so that wings are pointing upward toward the top of the deck.
   b. Washer (d)* is placed between bottom of blade (b) and hex nut (a).

IMPORTANT! Align "S" shaped cutout with matching "S" shape on spindle for secure fit.

3. Tighten hex nuts (a) to 70-90 ft-lbs (95-122 N-m).
4. Re-install the deck (refer to Deck Installation in this section).

Sharpening the Blade

1. To properly sharpen the cutting blades, remove equal amounts of metal from both ends of the blades along the cutting edges, parallel to the trailing edge, at a 25° to 30° angle. Always grind each cutting blade edge equally to maintain proper blade balance. See Figure 51.

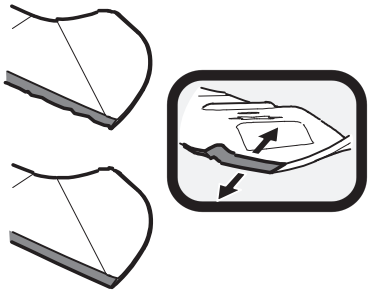


Figure 51

2. Test the blade's balance using a blade balancer. Grind metal from the heavy side until it balances evenly.

⚠ WARNING

A poorly balanced blade will cause excessive vibration, may damage the tractor, and/or result in personal injury.

Changing the Deck Belt & Reinstalling the Deck

⚠ CAUTION

The V-belts found on your tractor are specially designed to engage and disengage safely. A substitute (non-OEM) V-belt can be dangerous by not disengaging completely. For a properly working tractor, use factory approved belts.

All belts on your tractor are subject to wear and should be replaced if any signs of wear are present. To change or replace the deck belt on your tractor, proceed as follows:

1. Remove the deck as instructed earlier in this section under Deck Removal.
2. Loosen, but do not remove the hardware on the right and left idler pulley.

NOTE: On some decks it may be necessary to remove the spindle covers to remove and/or install the new belt. To remove the spindle covers, remove the screws securing them to the deck.

3. Carefully remove the belt from around the idler pulleys and the spindle pulleys.
4. Route the new belt as shown in the applicable figure below. See Figure 52 for 42" decks, Figure 53 for 46" decks and Figure 54 for 50" & 54" decks.

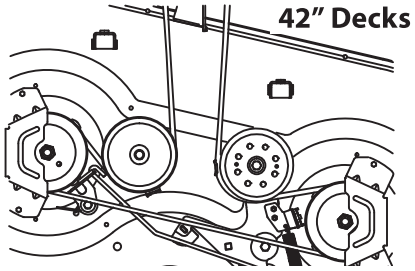


Figure 52

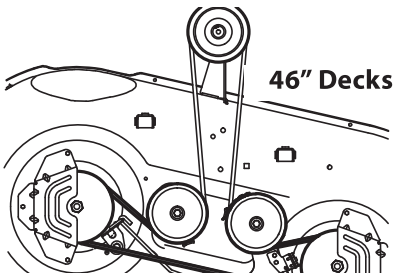


Figure 53

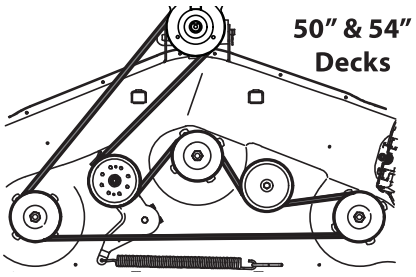


Figure 54

NOTE: Use a 3/8" drive ratchet wrench as instructed in earlier steps when routing the new belt to pivot the drive pulley.

5. Ensure that the belt is routed properly along the idler pulleys and inside the belt keepers and retighten idler pulleys, if loosened earlier. Torque to 256-313 in-lbs (28.9-35.4 N-m).
6. Remount the spindle covers if removed earlier.

7. Re-install the deck making sure the belt remains routed around the pulleys as instructed.
8. On manual PTO units, re-install the engine pulley keeper rod and the PTO cable.
9. Pull the right side of the belt and place the narrow "V" side of the belt into the PTO pulley. See Figure 55.

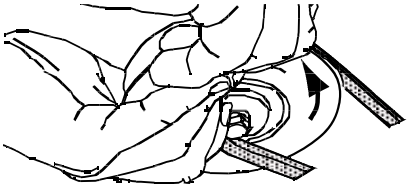


Figure 55

10. While holding the belt and pulley together, rotate the pulley to the left. Continue holding and rotating the pulley and belt until the belt is fully rolled into the PTO pulley.

Removing the Front Bumper (If equipped)

⚠ WARNING

Disengage the PTO, engage the brake lock, and stop the tractor engine before performing any maintenance procedures. Place the tractor on a firm and level surface before beginning installation or removal procedures.

The exhaust system and surrounding areas are HOT. To avoid personal injury, allow the tractor to cool before beginning any brush guard installation or removal procedures.

1. Remove the four hex screws (a) securing the front bumper in place. See Figure 56.
2. The front bumper (b) may now be removed.

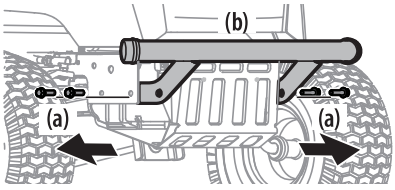


Figure 56

Removing the Brush Guard (If equipped)

⚠ WARNING

The exhaust system and surrounding areas are HOT. To avoid personal injury, allow the tractor to cool before beginning any brush guard installation or removal procedures.

1. Remove two cotter pins, and then pull the pins. See Figure 57.

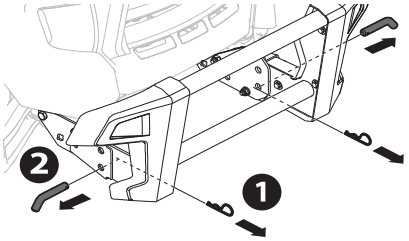


Figure 57

2. The brush guard assembly may now be removed. See Figure 58.

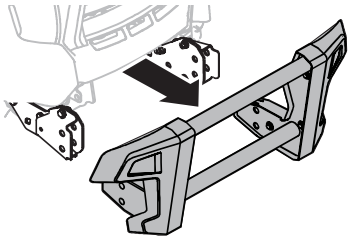


Figure 58

NOTE: The FastAttach™ brackets may be left in place for use with other FastAttach™ attachments. Contact your authorized service dealer for a complete list of products and availability.

Changing the Transmission Drive Belt

Several components must be removed and special tools used in order to change the tractor's transmission drive belt. Contact your authorized service dealer to have the transmission drive belt replaced.

SERVICE AND MAINTENANCE

Troubleshooting

⚠ WARNING

Before performing any type of maintenance/service, disengage all controls and stop the engine. Wait until all moving parts have come to a complete stop. Disconnect spark plug wire and ground it against the engine to prevent unintended starting. Always wear safety glasses during operation or while performing any adjustments or repairs.

THIS SECTION ADDRESSES MINOR SERVICE ISSUES. TO LOCATE THE NEAREST AUTHORIZED SERVICE CENTER CONSULT THE SEPARATE SUPPLEMENT SHEET FOR CONTACT INFORMATION.

PROBLEM	CAUSE	REMEDY
Engine fails to start	1. PTO/Blade Engage knob engaged. 2. Park brake not engaged. 3. Spark plug wire disconnected. 4. Throttle control lever not in correct starting position. 5. Fuel tank empty, or stale fuel. 6. Blocked fuel line. 7. Faulty spark plug. 8. Engine flooded. 9. Fuse(s) blown.	1. Place knob in disengaged (OFF) position. 2. Engage park brake. 3. Connect wire to spark plug. 4. Place Throttle lever to FAST position. 5. Fill tank with clean, fresh (less than 30 days old) gasoline. 6. Replace fuel line. See a qualified service dealer. Replace fuel filter. See the Service and Maintenance section. 7. Clean, adjust gap or replace plug. 8. Crank engine with throttle in FAST position. 9. Replace fuse.
Engine runs erratically	1. Tractor running with choke activated. 2. Spark plug wires loose. 3. Blocked fuel line or stale fuel. 4. Vent in gas cap plugged. 5. Water or dirt in fuel system. 6. Dirty air cleaner.	1. Check that the electric choke is working. See a qualified service dealer. 2. Connect and tighten spark plug wires. 3. Replace fuel line. See a qualified service dealer. Fill tank with clean, fresh gasoline and replace fuel filter. See the Service and Maintenance section. 4. Clear vent or replace cap if damaged. 5. Drain fuel tank. Refill with clean, fresh gasoline. See the Service and Maintenance section. 6. Clean or replace air cleaner paper element or clean foam pre-cleaner.
Engine overheats	1. Engine oil level low. 2. Air flow restricted.	1. Fill engine with proper amount and type of oil. 2. Clean grass clippings and debris from around the engine's cooling fins and housing.
Engine hesitates at high RPMs	1. Spark plug gap set too close.	1. Remove spark plug and adjust gap.
Engine idles poorly	1. Fouled spark plug. 2. Dirty air cleaner.	1. Replace spark plug and adjust gap. 2. Clean or replace air cleaner element and/or clean pre-cleaner.
Excessive vibration	1. Cutting blades loose or unbalanced. 2. Damaged, dull or bent cutting blade.	1. Tighten blade and spindle. Balance blade. 2. Replace blade.
Tractor will not mulch grass	1. Engine speed too low. 2. Wet grass. 3. Excessively high grass. 4. Dull blade.	1. Place Throttle control in FAST position. 2. Do not mulch when grass is wet. 3. Mow once at a high cutting height, then mow again at desired height or make a narrower cutting swath. 4. Sharpen or replace blade.
Uneven cut	1. Deck not leveled properly. 2. Dull blade. 3. Uneven tire pressure.	1. Perform side-to-side deck adjustment. 2. Sharpen or replace blade. 3. Check tire pressure in all four tires.