

TORO[®]

MODEL NO. 73380—3900001 & UP
MODEL NO. 73440—3900001 & UP
MODEL NO. R112K804—2000001 & UP
MODEL NO. R1160804—2000001 & UP
MODEL NO. R112K803—1000001 & UP
MODEL NO. R1160803—1000001 & UP

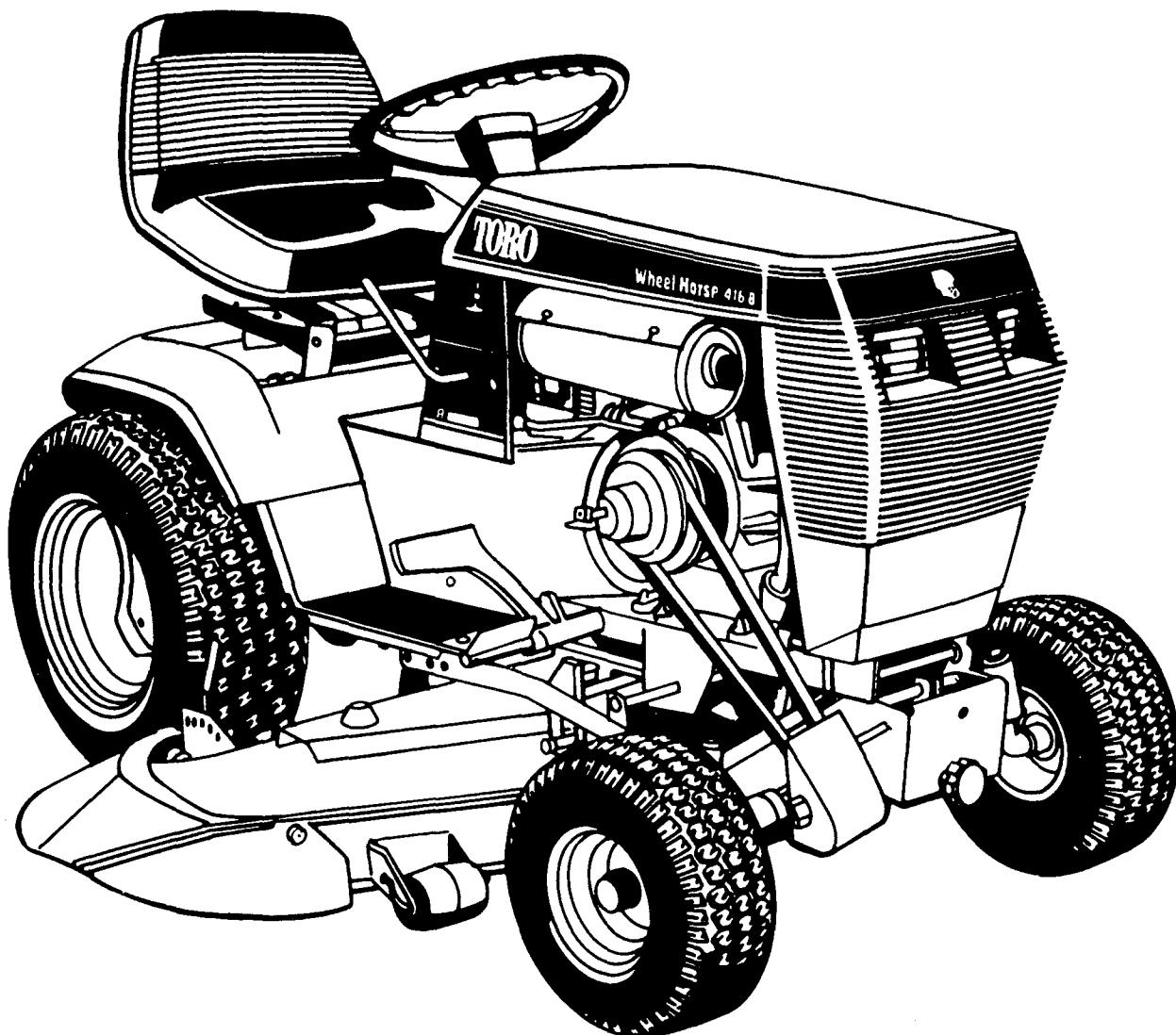
**OPERATOR'S
MANUAL****WHEEL HORSE®
312-8 AND 416-8 GARDEN TRACTORS**

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CAUTION

This symbol marks important instructions concerning your personal safety. To avoid injury, read and follow these instructions carefully.

When the manual refers to the left or right side of the vehicle, it means your left or right when sitting on the tractor seat.

SAFE OPERATION PRACTICES—RIDING VEHICLES

GENERAL

1. This machine can amputate hands and feet and throw objects that can cause injury and damage. KNOW the controls and how to stop the machine quickly. READ THIS OPERATOR'S MANUAL and obey all safety messages appearing on the machine and in the operator's manual. LEARN from your operator's manual and from careful EXPERIENCE how to operate your equipment correctly. Know your machine's limitations.
2. Keep hands, feet, hair and loose clothing away from the attachment discharge area, the underside of the mower deck or any moving parts while the engine is running.
3. For your personal safety: Do not operate this machine while taking drugs or medication or while drinking alcoholic beverages.
4. Only responsible persons with mature judgment and proper physical capabilities should be allowed to operate this machine, and only after instruction in the correct use of this equipment.
5. Do not allow children to operate the machine.
6. Do not carry passengers.
7. The purpose of this machine is work. Do not use it for sport or recreation.
8. Do not mow when people or pets are in the area.
9. Clear the work area of objects (wire, rocks, etc.) that might be picked up and thrown.
10. Take all possible precautions when leaving the machine unattended. Disengage the power-take-off, lower attachments, shift into NEUTRAL, set the parking brake, stop the engine and remove the key.
11. Watch out for traffic when crossing or near roadways.
12. Stop and inspect the machine and attachments for damage after striking a foreign object. Damage should be repaired before restarting and operating the equipment.
13. Do not change the engine's governor settings or overspeed the engine.

14. Wear appropriate protective clothing when operating equipment. Long pants and substantial footwear, not bare feet or open sandals, are essential.
15. Do not operate the machine unless properly seated with your feet on the footrests or pedals.
16. Keep your eyes and mind on your machine, its attachment and the working area. Do not let other interests distract you.
17. Safety switch(es) stop or prevent engine starting to help prevent accidents. TAKE PRECAUTIONS —DON'T RELY ENTIRELY ON SAFETY SWITCH(ES).
18. Take care not to touch the equipment or attachment parts that may be hot from operation. The muffler and nearby areas may exceed 150° F. Let the engine and other parts cool before attempting to maintain, adjust or service them.
19. Stereo headphones, ear protection or other sound altering/dampening devices may limit your ability to hear warning sounds (horns, shouts, etc.).

FUEL/FIRE PRECAUTIONS

20. Handle gasoline with care—it is highly flammable.
21. Use an approved gas container. Place it out of children's reach.
22. Use gasoline only as a fuel—never as a cleaner.
23. Never remove the fuel cap or add gasoline to a running or hot engine, or an engine that has not cooled for several minutes after running.
24. Never fill the fuel tank indoors. Wipe up spilled gasoline.
25. Open doors if you run the engine in a garage—exhaust fumes are dangerous. Do not run the engine indoors.
26. Do not fill the machine with gasoline while smoking or when near an open flame or sparks.
27. Never store equipment with gasoline in the fuel tank inside a building where fumes may reach an open flame or spark.

SAFE OPERATION PRACTICES—RIDING VEHICLES

28. Allow the engine to cool before storing it in any enclosure.
29. To reduce fire hazard, keep the engine and attachments free of grass, leaves or excessive grease.
30. Battery acid is a poison and can cause burns. Avoid contact with skin, eyes and clothes and protect your face, eyes and clothing when working around the battery.
31. Battery gases can explode. Keep cigarettes, sparks and flames away from battery.

EQUIPMENT USE AND OPERATION

32. We recommend that you first operate the equipment at a slow speed with any attachment disengaged until you are thoroughly familiar with the controls and have developed operating skills.
33. Disengage all attachment clutches, set the parking brake and shift into NEUTRAL before starting the engine.
34. Disengage power to the attachment(s), set the parking brake and stop the engine before leaving the operator position.
35. Disengage power to the attachment(s) and stop the engine before making any repairs or adjustments.
36. Disengage power to the attachment(s) when transporting the machine or when it is not in use.
37. Disengage the attachment clutch before removing the mower from a hole or other obstruction.
38. Disengage power to the attachment(s) before backing. Do not mow in reverse unless it is absolutely necessary and then only after careful observation of the entire area behind the machine.
39. LOOK behind the machine to make sure the area is clear before placing the transmission in reverse and continue looking behind while backing.
40. Always back the machine up loading ramps and tilt bed trailers.
41. The parking brake is designed to hold the vehicle in place at rest, with the engine off. *The parking brake will not restrain the vehicle with the engine running and the transmission engaged.*
42. Know the terrain on which you operate your equipment. There are areas on which you cannot safely operate your equipment.
43. Avoid operating the machine on hillsides, slopes or rough terrain. DO NOT operate the machine on hillsides or slopes exceeding 15° (27% grade). If safety is in doubt—STAY OFF THE SLOPE.
44. Reduce speed and exercise extreme caution on slopes above 10° (18% grade) to prevent tipping or loss of control. Never mow uphill on these slopes—mow downhill only. If you must climb a steep hill, back the machine up the hill, and drive the machine forward down the hill, keeping the vehicle in gear. If necessary to turn on hill, always turn downhill.
45. Mow up and down the face of slopes greater than 5° (9% grade), never across the face. Be especially cautious when changing directions on all slopes.
46. Operate your machine smoothly and at a ground speed slow enough to ensure complete control. Avoid erratic operation and excessive speed.
47. Sharp turns on any terrain may cause loss of control. Reduce speed and use caution on sharp turns.
48. Do not stop or start suddenly when going uphill or downhill. Avoid uphill starts. If machine stops when going up a slope, turn the attachment off and back slowly down the slope, keeping the machine in gear. Do not stop or change gears (speed) on slopes.
49. Know the terrain. Find hidden obstacles by walking through and inspecting the area before operating your equipment in that area. Plainly mark obstacles, such as rocks, roots or holes and **stay well clear of these obstacles** when operating.
50. While operating, stay alert for holes, rocks or roots, which may damage equipment or cause it to upset. Keep at least three (3) feet away from drop-offs, ditches, creeks, culverts, washouts and public highways.
51. Exercise care when mowing around a fixed object to prevent the equipment or attachment from striking it. When mowing, never deliberately run over any foreign object.
52. Areas wet with dew, rain or snow will be more slippery than when dry. Areas covered with loose gravel are more slippery than firm, dry ground. Greater stopping distances are required in these slippery areas.
53. Learn to expect changes in operating conditions. Adding or removing attachments or weight to your equipment will make your machine operate differently. Rain, snow, loose gravel, wet grass, etc., change the terrain's tractive conditions. Changing tractive conditions require you to change your operating technique—including deciding not to operate on that terrain sometimes.

STABILITY/TIP OVER/TRACTION

42. Know the terrain on which you operate your equipment. There are areas on which you cannot safely operate your equipment.
43. Avoid operating the machine on hillsides, slopes or rough terrain. DO NOT operate the machine on

SAFE OPERATION PRACTICES—RIDING VEHICLES

54. Use care when pulling loads or using heavy equipment.

- Use only approved drawbar hitch points.
- Limit loads to those you can safely control.
- Do not turn sharply. Use care when backing.
- Use counterweight(s) or wheel weights when suggested in the operator's manual.

ATTACHMENT USE

55. When using attachments, never direct the discharge of material toward bystanders, nor allow anyone near the vehicle while it operates.

56. When using the machine with a mower:

- Mow only in daylight or in good artificial light.
- Never adjust cutting-height while the engine is running if you must dismount to do so.
- Shut off the engine when unclogging the chute.
- Check the blade mounting bolts for proper tightness at frequent intervals.

57. Keep hands and feet away from rotating blade(s) underneath the mower deck. Never place your foot on the ground when the mower is engaged or in motion.

58. DO NOT operate the mower attachment without the chute deflector or complete bagger in place.

59. Exercise care while maneuvering with the grass catcher. Front-to-rear stability may change.

60. If you use the machine with a snowblower and the auger becomes plugged or jammed:

- Declutch the snowblower and stop the vehicle engine immediately.
- Disconnect the spark plug wire(s).
- Clear snow from the discharge chute if it is plugged.
- If the auger is jammed, remove the foreign object and repair any damage to snowblower before you continue.
- Reconnect the spark plug wire(s) and resume operation.

61. Never permit anyone to stand near the snowblower auger or discharge opening. Objects

may be present in snow, which when thrown, could cause injury.

62. When using snow/dozer blades:

- Do not hit solid objects. This can damage blades and injure the operator.
- Always travel at a safe, slow speed.

63. Keep all persons at safe distance away when operating tillers. Always disengage the PTO, lower the attachment and remove the ignition key before making any adjustments.

64. If the tiller starts to push the vehicle, disengage the PTO clutch immediately.

65. Use chains, counterweight(s) or wheel weights when necessary.

MAINTENANCE

66. Keep all nuts, bolts, fasteners and screws tight to ensure the equipment is in safe working condition and check them frequently. Repair or replace worn, damaged, distorted or broken parts as needed.

67. Keep the vehicle and its attachments in good operating condition and keep safety devices in place and working.

68. Under normal usage, the grass catcher bag's material will wear and deteriorate. Check often to see if the bag needs to be replaced.

69. Use only genuine TORO Wheel Horse replacement parts to maintain original standards.

70. Shields, deflectors, switches, blade controls and other safety devices must be in their proper position and functional.

71. Do not operate without a muffler or damper on the exhaust system. Damaged mufflers or spark arresters can create a fire hazard. Periodically inspect and replace whenever necessary.

72. If the equipment begins to vibrate abnormally, disengage power to the attachments and stop the engine immediately. Repair any damage before starting or continuing operation.

73. Periodically inspect all shafts, levers, friction devices and other moving parts that are subject to wear. Adjust or replace these parts if they are damaged, distorted or broken, or when wear affects the normal operation of the vehicle or attachment. DO NOT use equipment that is not operating properly.

SPECIFICATIONS

ENGINE:

TRACTOR MODEL	ENGINE MODEL*	RATED H.P.**	DISPLACEMENT cu.in./cc	BORE in./mm	STROKE in./mm	IGNITION
312-8	MS12S	12	29.07/476.4	3.38/85.7	3.25/82.6	Electronic
416-8	P216	16	43.3/710	3.25/82.6	2.62/66	Electronic

* M = Kohler and P = TORO POWER PLUS. Basic engine model number shown; specification and serial numbers from engine I.D. plate are required to identify the engine.

** Engine manufacturer's rating at 3600 RPM.

8-SPEED TRANSMISSION: GROUND SPEED (AT FULL THROTTLE):

Gear	Low Range	High Range
1st	0.4 mph (0.6 kmh)	1.6 mph (2.6 kmh)
2nd	0.6 mph (1.0 kmh)	2.5 mph (4.0 kmh)
3rd	1.1 mph (1.8 kmh)	4.3 mph (6.9 kmh)
Rev.	0.5 mph (0.8 kmh)	2.1 mph (3.4 kmh)

ELECTRICAL SYSTEM:

	312-8	416-8
Type:	12 Volt, D.C., Negative Ground	12 Volt, D.C., Negative Ground
Battery:	12 Volt, 15-amp Regulated	12 Volt, 20-amp Regulated
Alternator:	12 Volt, 24 amp hr., 160 CCA	12 Volt, 24 amp hr., 200 CCA

TIRES:

TRACTOR MODEL	SIZE - FRONT	SIZE - REAR	PRESSURE
312-8	15 x 6.00-6	23 x 9.50-12	12 psi (0.85 kg/cm ²)
416-8	16 x 6.50-8	23 x 9.50-12	12 psi (0.85 kg/cm ²)

PHYSICAL DATA:

MODEL	HEIGHT in./cm	LENGTH in./cm	WIDTH in./cm	WHEEL BASE in./cm	INSIDE TURNING RADIUS in./cm	NET WEIGHT (APPROXIMATE) lbs/kg
312-8	42.5/108	65.0/165	36.5/93	45.5/116	36/91	553/252
416-8	43.5/111	65.0/165	36.5/93	45.5/116	36/91	566 /258

TUNE-UP AND MAINTENANCE SPECIFICATIONS:

MODEL	POINT GAP in./mm	TIMING MARK LOCATION	IGNITION TIMING (BTDC)	SPARK PLUG TYPE*	SPARK PLUG GAP in./mm	DIRECTION OF ROTATION (Fac, DR.P.)	IDLE RPM (No Load)	GOVERNED MAX. RPM (No Load)
312-8	N/A	N/A	Fixed	RH10	.025/0.64	Counterclockwise	1000	2800
416-8	N/A	N/A	Fixed	RS14YC	.025/0.64	Counterclockwise	1400	2800

* Or equivalent (Champion number shown)

LUBRICATION/FUEL CAPACITIES:

MODEL	CRANKCASE	FUEL TANK	CHASSIS
312-8	2.5 qts (2.3 l)	9 qts (8.6 l)	Grease Fittings: 8
416-8	1.5 qts (1.4 l) without filter 1.8 qts (1.7 l) with filter		

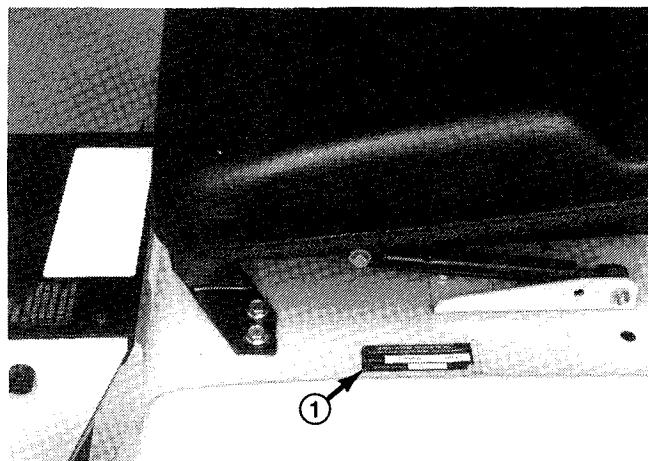
MODEL AND SERIAL NUMBER LOCATIONS

Model and serial numbers identify your new tractor and major attachments. Always refer to these numbers when consulting your dealer or factory about service, parts, or other information. If the plates showing the model and serial numbers are removed during repair operations, they should always be replaced.

The **tractor** vehicle identification number plate is just below the seat on the rear fender. The **engine**

identification numbers are on the engine shrouding and show your tractor's model, specification or type number and the serial number of your tractor's engine. Major attachments also have a model and serial number plate attached to them.

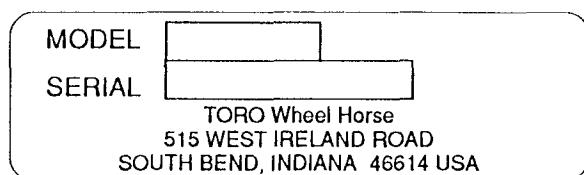
For your convenience and ready reference, enter the tractor and engine numbers below.



Model and Serial Number Plate Location

1. *Model and serial number plate*

Tractor Model and Serial Number



Engine Identification Number

Model _____

Type or Spec. No. _____

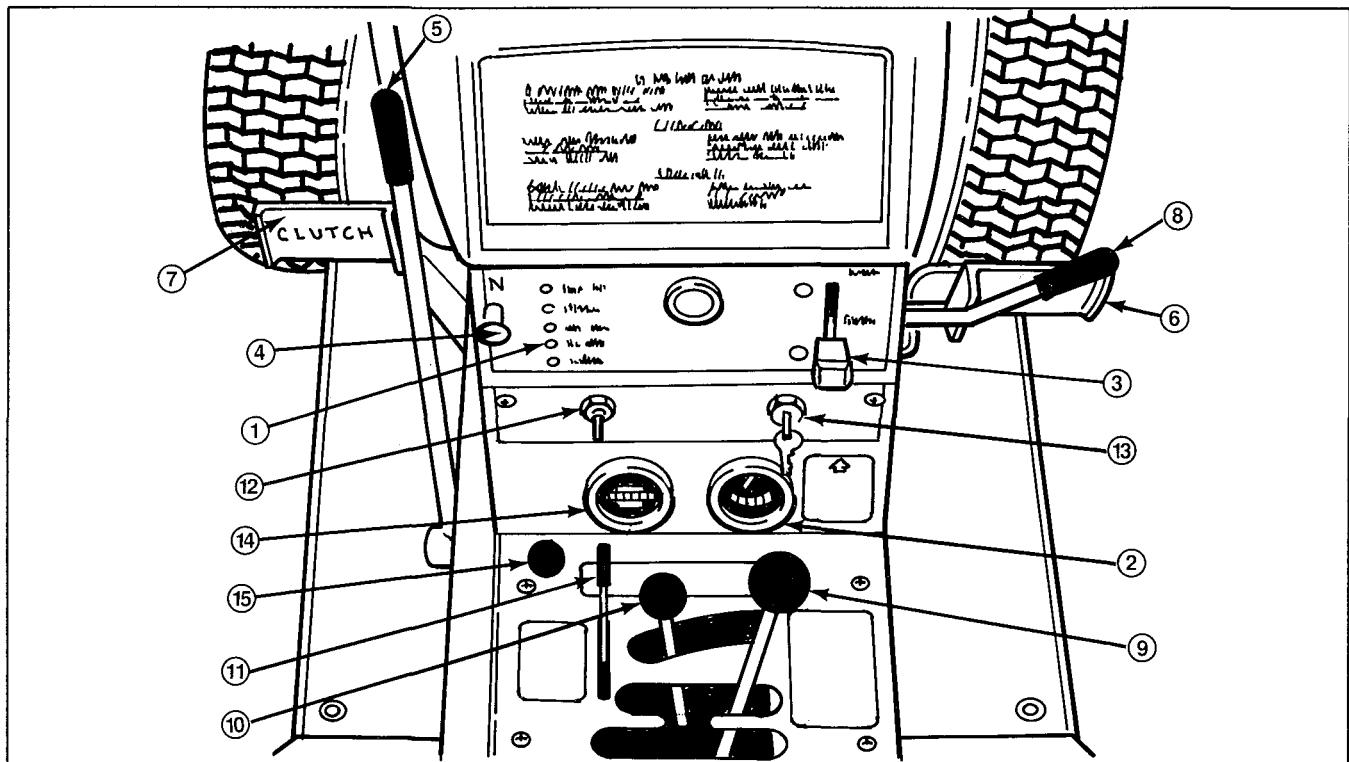
Serial No. _____

OWNER REGISTRATION AND WARRANTY

Service and warranty assurance are as important to TORO Wheel Horse as it is to you. To simplify warranty service at an Authorized TORO Wheel Horse Dealer, TORO Wheel Horse requires factory registration. We supply a registration card with each new tractor and attachment. **Either you or your dealer must supply the required information and mail the card to TORO Wheel Horse.**

The TORO Wheel Horse Limited Warranty Statement is on a "hang tag" attached to each product. This statement describes the items covered by the TORO Wheel Horse Limited Warranty, your rights and obligations, and the procedure for obtaining warranty service. Please familiarize yourself with the warranty statement. **We want you to be satisfied with your TORO Wheel Horse tractor; please don't hesitate to contact us for assistance.**

INSTRUMENTS AND CONTROLS



1. INDICATOR LIGHTS

The indicator light test switch checks the light bulbs and electrical circuits. Push on the test switch to turn lights "On" or "Flashing." If a light is out, check the wiring and replace circuit board (or the bulb assembly on the Model 310) as outlined in the *Maintenance* section of this manual.

If the PTO clutch or the clutch pedal light is on when you try to start the engine, check to see if the control is in the correct position for starting. All indicator lights must be OFF during operation; if a light is on, a malfunction is suggested that must be corrected.

2. VOLTMETER

This gauge shows the electrical system's battery voltage. When you turn the ignition key to ON, the gauge should read 12 volts or slightly higher.

When you engage the starter, the gauge reading should not drop below 8 volts. After the engine starts, the gauge should read between 12 and 16 volts. If the gauge reads less than 12 Volts the battery is discharging. If the gauge reads 16 volts or higher for long time periods, check the battery water more often.

3. THROTTLE CONTROL

The throttle lever controls the engine speed. Raise the lever to operate the tractor. Lower the lever before shutting off the engine.

4. THE CHOKE CONTROL

Pull the choke knob out when starting the engine. Slowly push the knob in after the engine starts. If the engine is warm and has been running, choking may not be necessary to restart it.

5. MANUAL LIFT

Depress the lift lever release button and move the lever forward or rearward to raise or lower attachments. Always lower attachments before leaving the tractor unattended.

6. THE BRAKE PEDAL

Pushing down on the brake pedal applies the brake.

Note: When coming to a stop, always depress the clutch pedal and the brake pedal so that the transmission will be disconnected from the engine.

INSTRUMENTS AND CONTROLS

7. THE CLUTCH PEDAL

Pushing down on the clutch pedal does two things: (1) It de-clutches the transmission drive belt from the engine; (2) It actuates a safety interlock switch so the starter will operate.

Engage the clutch by releasing the pedal. Always release the pedal slowly when engaging the clutch. Always depress the pedal when shifting the transmission into or out of gear and when starting the engine. The indicator light comes on with the pedal released and the ignition key in the START position.

8. PTO (POWER TAKE-OFF) CLUTCH LEVER

Power-driven attachments are engaged and disengaged with the PTO lever. Push the lever forward to engage attachments. Pull the lever back to disengage attachments. The PTO clutch lever actuates a safety interlock switch in the starter circuit; an indicator light comes on (if so equipped) and the tractor will not start unless the lever is released while the PTO is engaged. Also, if you leave the seat while the PTO is engaged, the seat switch indicator light will come on (if so equipped) and the seat switch will shut off the engine.

9. GEAR SHIFT LEVER

Select any forward or reverse speed by moving the lever to a position shown on the shift pattern decal.

10. THE RANGE SELECTOR

Select either high or low range by moving the range selector lever right or left to the position shown on the range selector decal. Low range provides a 4-to-1 speed reduction and greater pulling power for moving heavy loads in any forward or reverse speed. Do not use the mid-point position for NEUTRAL. You must select NEUTRAL with the gear-shift lever.

11. THE PARKING BRAKE LOCK LEVER

The parking brake lever is in front of the seat on the left side of the frame. To engage the parking brake, first press the foot brake pedal solidly and then move the parking brake lock lever back to lock the brake.

To release the parking brake, push down on the foot brake pedal. The parking brake lock lever is spring-loaded and will return to the disengaged position when you push the foot brake pedal. The indicator light (if so equipped) will go on if you lock the parking brake with the engine running.

12. LIGHT SWITCH

Raise the toggle to turn the lights on. Lower the toggle to turn the lights off. The lights only work when the ignition switch is in the RUN position.

13. IGNITION SWITCH

The ignition switch has three positions from left to right: (1) OFF, (2) RUN, (3) START. To start the engine, turn the key all the way right to the START position. Release the key when the engine starts and it will automatically return to RUN. When you turn the switch to OFF, the engine stops and all electrical accessories are turned off.

14. HOUR METER

The hour meter shows the number of hours the tractor has operated.

15. DIAL-A-HEIGHT

The Dial-A-Height control lets you hold an attachment (other than a mower) at a desired height above the ground. Turn the knob left or right to limit forward travel of the lift lever. Turn the knob all the way left for mower operation.

16. FUEL SHUT-OFF VALVE (NOT SHOWN)

The fuel shut-off valve is on the bottom of the fuel tank. The fuel shut-off valve is left open usually, unless service on the fuel system is necessary.

BEFORE OPERATION



CHECK THE FUEL

THE TORO COMPANY STRONGLY RECOMMENDS USING ONLY FRESH, CLEAN UNLEADED REGULAR GRADE GASOLINE. UNLEADED GASOLINE BURNS CLEANER, EXTENDS ENGINE LIFE AND PROMOTES GOOD STARTING BY REDUCING BUILD-UPS OF COMBUSTION CHAMBER DEPOSITS. IF UNLEADED GASOLINE IS NOT AVAILABLE, YOU CAN USE LEADED GAS. NEVER USE METHANOL, GASOLINE CONTAINING METHANOL OR MORE THAN 10% ETHANOL, GASOLINE ADDITIVES, PREMIUM GASOLINE OR WHITE GAS BECAUSE THE ENGINE FUEL SYSTEM MAY BE DAMAGED. ALSO, DO NOT USE GASOLINE DE-ICERS. THEY CAN CAUSE INTERNAL DAMAGE TO CARBURETOR AND FUEL PUMP PARTS.

IMPORTANT: Do not use gasoline de-icers. Gasoline de-icers can cause internal damage to carburetor and fuel pump parts. Do not use fuels containing alcohol concentrations greater than 10 percent. Fuel containing alcohol may cause poor engine performance and internal engine damage.

If you use regular leaded gasoline continually, you should remove carbon and lead deposits from the cylinder heads as required because of engine power loss. You can safely use unleaded gasoline after the lead deposits have been removed.

DANGER

- Gasoline is highly flammable, use caution when storing or handling it.
- Do not fill the fuel tank while the engine is running, hot, or when the machine is in an enclosed area. Vapors may build up and be ignited by a spark or flame source many meters (feet) away.
- DO NOT SMOKE while filling the tank.
- Always fill the fuel tank outside and wipe up any spilled fuel before starting the engine.
- To prevent spilling fuel, use a funnel or spout and fill the tank to about 25 mm (1 in.) below the filler hole. DO NOT OVERFILL.
- Use gasoline for the engine only, not for any other purpose.
- Store gasoline in a clean, safety approved container and keep the container capped.
- Keep gasoline in a cool, well-ventilated place. Never store gasoline in an enclosed area such as a hot storage shed.
- Never buy more than 30 days' supply to assure volatility.
- Because many children like the smell of gasoline, keep it out of their reach because the fumes are explosive and dangerous to inhale.

BEFORE OPERATION

CHECK THE OIL

To protect your tractor's engine, check the oil level before each use. The 312-8 models have a low-oil safety switch that will not allow the engine to start when the oil is low and the ignition switch is in the ON position.

Complete information on recommended oils and how to check the oil level is in the "Maintaining Your Tractor" section of this manual.

CHECK THE SAFETY INTERLOCK SYSTEM

The safety interlock system incorporates two switches for safe starting, and a seat switch that shuts off the engine when you raise off the seat with the PTO engaged.

The starting switches are actuated by the left foot pedal and PTO clutch control. If the tractor won't start, check whether the PTO clutch is disengaged and the left foot pedal is depressed. The indicator lights will be on (if so equipped) and the engine will not start unless both switches are actuated correctly.

Test the safety interlock system periodically. To test it, observe the following functions. For your protection, if you do not get the results described, have repairs done immediately by an authorized TORO Wheel Horse Dealer.

1. The engine should NOT start if:

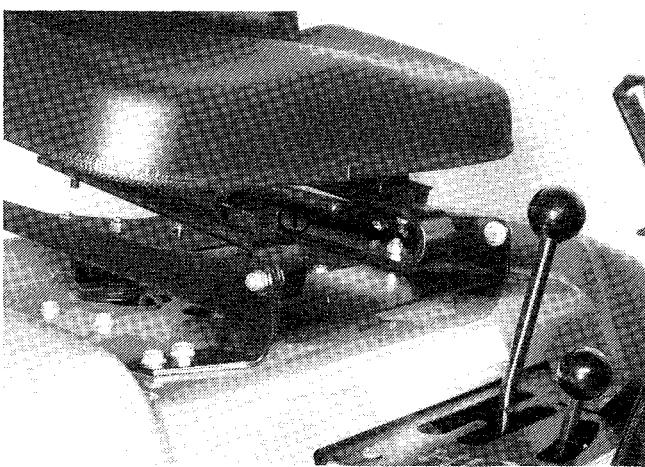
- A. The left foot pedal is released
- B. The PTO is disengaged.

Test each, one at a time.

2. With the engine running, test the operator seat switch by engaging the PTO and rising off the seat. The engine should shut off.

ADJUSTING THE SEAT

For adjustment, loosen the bolts under the seat, slide the seat to the desired position and re-tighten the bolts. To move the Model 416-8's seat, push on the lever and slide the seat to the desired position.



Seat Adjustment (Model 416-8)

1. *Seat adjustment*

OPERATING



CAUTION

Before starting the engine, become familiar with all controls. Read this manual thoroughly. Also, always check the engine's oil level before starting.



DANGER

Take care to avoid inhaling exhaust gases because they contain carbon monoxide gas, which is colorless and odorless. Carbon monoxide is a dangerous gas that can cause unconsciousness and death. Do NOT run the engine in confined areas such as a closed garage.

STARTING THE ENGINE

Because of the safety interlock system, your tractor will not start until you depress the clutch pedal and engage the PTO. The indicator light (if so equipped) will glow if the controls are not in the correct position for starting.

On 312-8 models, the engine has a low-oil safety switch that will not let it start when the oil is low. The oil indicator light will be on when the oil is low and the key switch is in the START position.

Move the throttle control lever halfway to the OPERATE position. Pull the choke control all the way to the COLD position.

On 416-8 models, Move the throttle control to the LOW idle position and the choke control all the way to the COLD position.



CAUTION

Mechanical Transmission: Always place the transmission gear shift lever in NEUTRAL before you start the engine.

Turn the ignition key clockwise until the starter engages. When the engine starts, release the key. The switch is spring loaded and will return automatically to the RUN position.

IMPORTANT: If the engine fails to start after 10 seconds of continuous cranking, turn the key to OFF and let the starter motor cool. Check for the cause of hard starting; consult the Troubleshooting Check List.

On 312-8 models, after the engine starts, slowly return the choke control to the OPERATE position.

On 416-8 models, after the engine has started, raise the throttle to the halfway position and then move the choke to the OPERATE position.

If the engine stalls at low speeds or hesitates during acceleration, use the choke until the engine reaches its normal operating temperature.

USING THE THROTTLE CONTROL

The throttle control regulates the **engine** speed as measured in RPM (Revolutions Per Minute). This control **should not** be used to regulate the tractor's ground speed.

The engine in your new TORO Wheel Horse tractor has a special governor that limits its RPM. This allows the engine to operate most efficiently at a set speed and protects it from damage caused by excessive RPM. Always operate your tractor with the throttle control set at full speed.

IMPORTANT: The engine **MUST** operate at full throttle whenever you use the tractor. Operating at less than full throttle may result in poor tractor performance.

USING THE CHOKE CONTROL

The choke controls a "butterfly" valve in the carburetor. When the choke is partially or completely closed, less air is admitted to the engine. This results in a higher fuel-to-air (richer) mixture that is easier to ignite when the engine is cold. Warm engines may not need choking.

TO GO FORWARD OR BACKWARD

With the engine running, depress both the clutch and brake pedals. Move the range selector to either the HIGH or LOW position. Move the gear shift lever to the desired speed forward, or to reverse. (The gear shift decal identifies various speeds.) Release the brake pedal. Slowly release the clutch pedal. As the clutch pedal is released, the tractor will begin to move.



CAUTION

Always release the brake pedal slowly when starting the tractor in motion. Sudden starts can damage equipment and cause loss of control.

OPERATING

TO CHANGE SPEEDS OR DIRECTION

Before changing ground speed or direction, always bring the tractor to a complete halt by depressing both the clutch and brake pedals.

IMPORTANT: Never try to shift gears when the unit is moving. Severe internal transmission damage may result.

Change the gear shift selector as you desire. Ground speed for each gear is shown in the Specifications section in this manual.

It is not necessary or recommended to shift "up" or "down" through the gears when the tractor is moving. The tractor has enough power to move out in whatever gear you select. However, use a lower gear when you have a heavy load attached.

STOPPING

To stop the tractor, depress the clutch pedal, then the brake pedal. You must depress the clutch pedal fully before depressing the brake pedal.

CAUTION

When stopping the tractor, always press the clutch pedal first, then the brake pedal. Depressing the brake without the clutch may cause excessive brake lining wear or extensive internal transmission damage. Depressing the clutch pedal without depressing the brake pedal WILL NOT STOP THE TRACTOR.

SHUTTING OFF THE ENGINE

To stop the engine, return the throttle lever to the idle position and turn the ignition key to OFF. If the engine has been working hard or is hot, allow it to idle a short time before turning off the key. This will help cool the engine before stopping.

Note: In an emergency, the engine may be stopped by turning the ignition key to the OFF position.

CAUTION

Always remove the key and set the parking brake when leaving the tractor unattended, even if just for a few minutes. Prevent accidents; don't give children or unauthorized persons an opportunity to operate this machine.

USING ATTACHMENTS



CAUTION

Read the manuals provided with attachments before using them. These manuals give a more detailed description of operation and stress other areas of caution. Familiarize yourself thoroughly with equipment before using it.

ATTACHMENT MOUNTING HITCHES

Tach-a-matic front and mid hitches provide easy attachment installation and removal without tools.

Rear-mounted attachments are secured to the tractor's rear drawbar hitch, or to a special hitch supplied with the attachment or available as optional equipment.

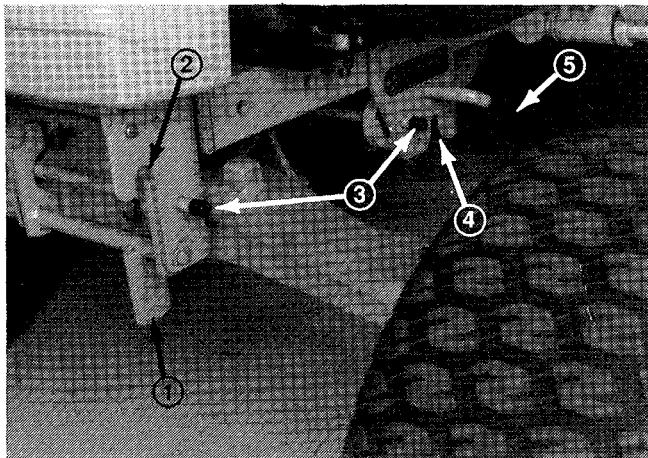
To install attachments, make sure the hitch latch is in the released position:

- Push in the lock release pin
- Move the latch lever so the latch is open
- Release the lock pin to hold the latch in the open position

Insert and center the attachment shaft in the hitch slots and move the latch toward the closed position until the release pin snaps outward.

Remove attachments by pushing in the lock release pin, which allows the latch to be moved to the OPEN position.

Note: For specific installation and removal instructions, refer to your attachment's instructions.



Front- and Mid-Attachment Hitches

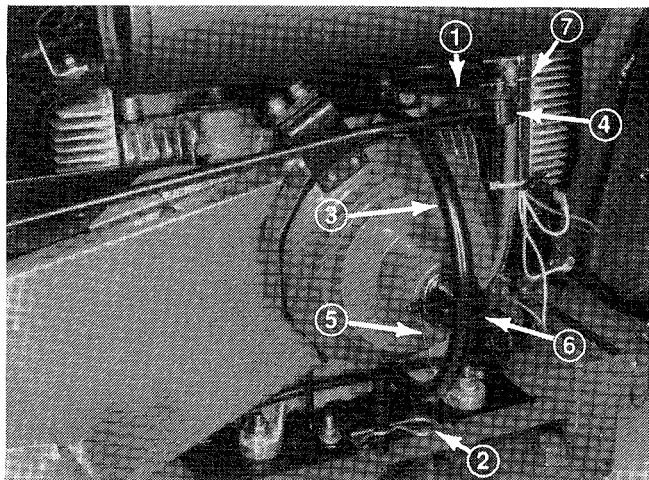
1. Front latch lever	4. Mid hitch slot
2. Front hitch slot	5. Latch handle
3. Lock release	

ATTACHMENT BELTS

1. Remove the hairpin cotter from the trunnion and remove the trunnion from the top plate.
2. Remove the clevis pin from the clutch shaft and clevis.
3. Move the top plate forward and remove the large hairpin cotter at the bottom of the rod housing. Slide the rod housing down and out of the top plate. Swing the rod housing to the front or rear.
4. Install the belt in the inner groove of the PTO pulley for the mower and tiller. Install the belt in the outer groove for the Snowblower, Lawn Vac, Generator and Loader.
5. Move the top plate forward, insert the top end of the rod housing in the hole in the top plate and install the large hairpin cotter in the bottom of the rod housing.

Move the top plate rearward. Line up the clevis with the hole in the clutch shaft and install the clevis pin.

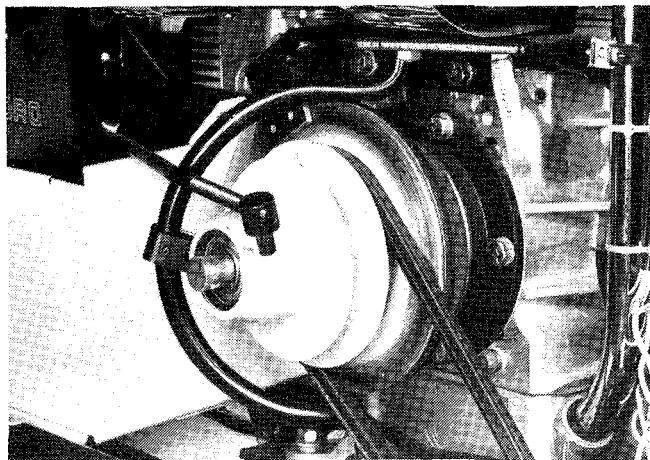
6. Insert the trunnion in the top plate and secure it with a hairpin cotter.



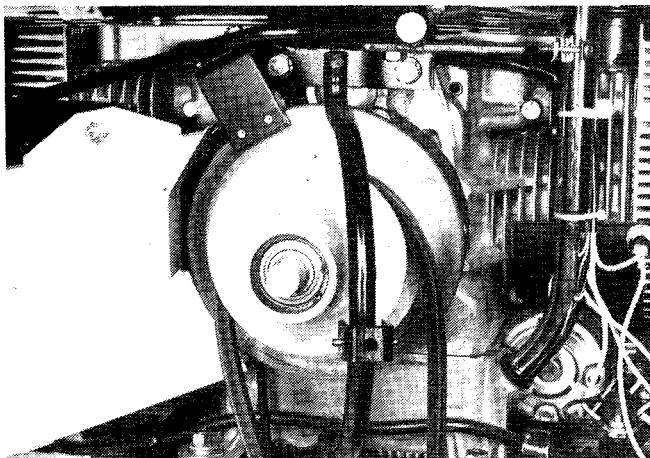
Power Take-Off (PTO)

1. Top plate	5. Clevis pin
2. Hairpin cotter	6. Clevis
3. Rod housing	7. Hairpin cotter
4. Trunnion	

USING ATTACHMENTS



Belt Routing – Both belt strands are outside the rod housing



Belt Routing – One belt strand is OUTSIDE, and one strand is inside the rod housing

Because of your tractor's engine power, you should not have any problems using attachments under normal conditions. On rough, hilly or wet terrain, wheel weights and tire chains will reduce rear tire slippage. All tires may be fluid filled.

USING A MOWER



WARNING

Keep all shields and the mower discharge chute in place. Never put your hands or feet under the mower deck. Never try to clear discharge areas or mower blades without disengaging the PTO clutch and removing the ignition key.

For best operation on average lawns, operate the engine at full throttle while controlling your ground speed with the transmission. Operate the tractor at 2 to 3.5 mph (3.2 to 5.6 kmh).

Note: Average walking speed is 3.5 mph (4 kmh) while mowing grass.

Excessive ground speed often causes uneven cutting. To get a more even cut, use the transmission to reduce your ground speed.

Lawns are usually cut to heights between 2 and 3 in. (5-7.6 cm). Tall grass and weeds should be cut with the mower at its highest position, making a second-pass cutting at the desired height.

Always keep the mower blades sharp.



CAUTION

Sharp edges or mower blades can cut you during blade maintenance or adjustment. Use a suitable covering over the blades' cutting edges to prevent bodily harm.

USING A SNOWTHROWER



CAUTION

Thoroughly inspect the area where you will use the snowblower. Remove all door mats, sleds, boards and other foreign objects. Never make any adjustments while the engine is running. Never try to clear the chute while the engine is running.

Snow removal will vary greatly with the condition of each snowfall. Light fluffy snow can be cleared with ease. Clearing heavy wet snow may be more difficult. Coating the auger and chute with a light coat of wax or paraffin will help keep snow from sticking. The best results usually occur when you set the tractor ground speed at 1 to 2 mph (1.6 to 3.2 kmh.).

Be careful whenever you use the snow thrower. The auger can pick up sticks, stones and other foreign objects and throw them with great velocity. Always aim the discharge chute away from persons who might be harmed, or objects that might be damaged.

Tire chains and wheel weights are recommended when using a snowblower.

USING ATTACHMENTS

USING A SNOW, DOZER OR GRADER BLADE

Although the front-end dozer blade is usually used for snow removal, you can also use it to move dirt, sand or gravel. Be careful and maintain a slow ground speed whenever you use the blade. Striking a solid object could injure you and damage the blade.

Grader blades are usually preferred for leveling sand, dirt or gravel. Using these blades is similar to using a dozer blade. Rear-mount grader blades may require special hitches; consult your dealer for the correct hitch(es) for your tractor.

USING A TILLER (ALL MODELS)

The TORO Wheel Horse tiller does an excellent job of preparing gardens for planting.

Exercise caution when tilling virgin ground or clay because the tiller may have a tendency to push the tractor. You can correct this by raising the tiller with the attachment lift so the tiller penetrates only the very top of the soil. You can then lower the tiller to its full depth on later passes.



If the tiller starts to push the tractor, shut the tiller off immediately by disengaging the PTO clutch.

Rear wheel weights and cleat tires or tire chains will reduce the tiller's pushing effect. Front weights will improve steering control.

Slowing the tractor's ground speed will improve the tiller's aggressive action. Best results usually occur with a tractor ground speed of less than 1.0 mph (1.6 kmh).

Note: Average walking speed is 2.5 mph (4 kmh).

Do not over-till soil. Soil tilled excessively will not hold water and will compact easily.

USING A PLOW, DISC, CULTIVATOR OR HARROW

Plows and discs require maximum tractor efficiency. Cleat tires, or tire chains and wheel weights increase rear tire traction. Front-wheel weights increase steering control.

Some attachments require special rear hitches. Consult your dealer for proper hitch(es) required for your tractor.

There are two methods of preparing a seed bed for planting.

1. Use a tiller, which will prepare the soil in one operation.
2. Use a plow to turn ground, a disc to break up large clumps, and a harrow to pulverize and smooth the soil.

Plows are classified by the width of the furrow they turn. Generally, plows are set to cut 4 to 6 in. (10-15.2 cm) deep.

A disc is used immediately after plowing. The disc will break up large clumps of soil.

After discing, a spike-tooth harrow is usually dragged over soil. The harrow helps pulverize the soil and levels the seed bed. The soil should now be ready for planting.

A cultivator is used during growing season to remove unwanted weeds and aerate plant roots. Consider the cultivator's width before planting the seed bed to ensure the cultivator will fit between rows without damaging crop roots.

USING ATTACHMENTS

USING A REAR BAGGER

An optional rear-mount grass catcher can affect how the tractor operates. Because of the added weight of the bagger and the extra power required, operate the tractor in a lower transmission gear.



CAUTION

If the tiller starts to push the tractor, shut the tiller off immediately by disengaging the PTO clutch.

Under normal usage, grass catcher bag material will deteriorate and wear. Check it often to see if it needs to be replaced.

USING OTHER ATTACHMENTS

There are many other special-purpose attachments that greatly increase your tractor's versatility. An attachment can be a self-contained system (the front-bucket loader), one that is used with another attachment (the lawn vacuum), or one intended for your comfort (the snow cab).

Some attachments are powered by a separate gasoline engine, some are ground-driven and some are simply towed, such as a dump cart.

All attachments should be approached with the same caution given any mechanical device. Always read each Operating Instruction Manual carefully before using the attachment. Keep children and pets away from the vehicle when it is operating. Never allow any unauthorized personnel to operate the equipment.

Your authorized TORO Wheel Horse dealer can help you select attachments.

DUMP CART LOAD LIMITS

Observe the following load limits when using the tractor with a dump cart. These load limits provide for safe braking on slopes.

275 lbs (127 kg)

MAINTENANCE



CAUTION

To minimize chance of injury, do all maintenance and adjustments on your tractor with the engine off and the ignition key removed, unless instructed otherwise. Use extreme care when working near operating machinery. Do not wear loose fitting clothing. Remove your watch and any jewelry before beginning work and observe common safety practices when using tools.

MAINTENANCE CHECK LIST

Note: These service intervals are considered MAXIMUM under normal conditions. Reduce the intervals under extremely dirty or dusty conditions.

SERVICE OPERATION	Before Each Use	After Each Use	Every 25 Hours	Every 50 Hours	Every 100 Hours	Every 200 Hours/1 year (2)	Every 1000 Hours
CHECK: Safety Interlock System Engine Oil Level Battery Water Level Transmission Oil Level General Unit Condition Parking Brake Adj. Tire Pressure (3) Fasteners Placed 7 Tight PTO Electric Clutch & Brake Adjustment	X X X X X X X X X X		X X X	X	X X X		
CLEAN: Air Filter/Precleaner Engine Chaff Screen Engine Exterior & Fins Breather Valve (3) Cylinder Head Deposits	X		X	X		X X	X
REPLACE: Engine Oil Filter (3) Spark Plugs Air Filter (3) Air Filter (4)					X X X	X	
LUBRICATE: Fuel Filter (3) Chassis			X		X		
CHANGE: Engine Oil (1) (3) Engine Oil (1) (4) Engine Oil Filter (3)			X	X	X		

Refer To The Engine Owner's Manual for Applicable Information Concerning Adjustments and Special Cleaning Instructions.

- (1) Refer to the text for the initial service interval for new tractors.
- (2) Whichever occurs first.
- (3) Model 416-8
- (4) Model 312-8

MAINTENANCE

ENGINE

COOLING

Check the chaff screen and the rotating screen behind the chaff screen on the engine each time you use the tractor. Restricted air flow through the engine can cause overheating and engine damage.

OIL

For maximum engine protection in all operating conditions, use API Service Classification SF oil. This designation will appear on the oil can.

IMPORTANT: Check the engine's oil level every 8 hours or before each use. An improper oil level can cause extensive internal damage to the engine.

The oil filter dipstick and oil drain location are shown in the following illustrations.

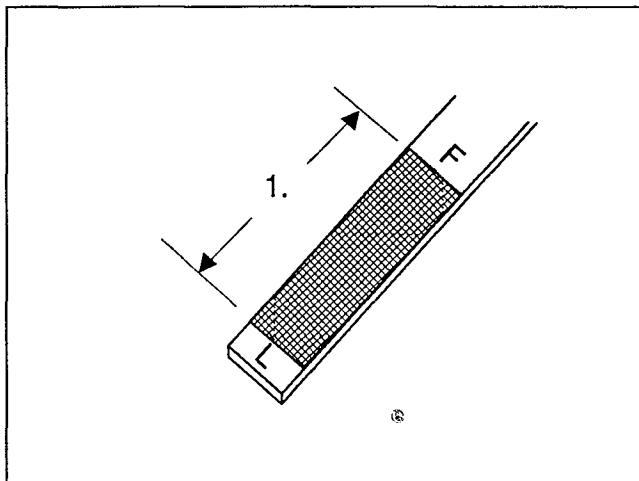
To check the engine oil level, stop the tractor where the engine is level. Shut off the engine, set the parking brake, and remove the ignition key.



DANGER

The 416-8 Model crankcase pressure can blow out hot oil and cause serious burns. Do NOT check its oil while the engine is operating

Remove the oil dipstick from the engine.



1. Correct oil level

Wipe the dipstick with a clean lint-free cloth; insert it into the engine block as far as it will go. Remove it again and read the scale on the lower portion of the stick.

Add oil through the oil dipstick tube.

IMPORTANT: Never overfill the engine crankcase with oil. Excess oil causes high oil consumption and oil accumulation in the air cleaner housing.

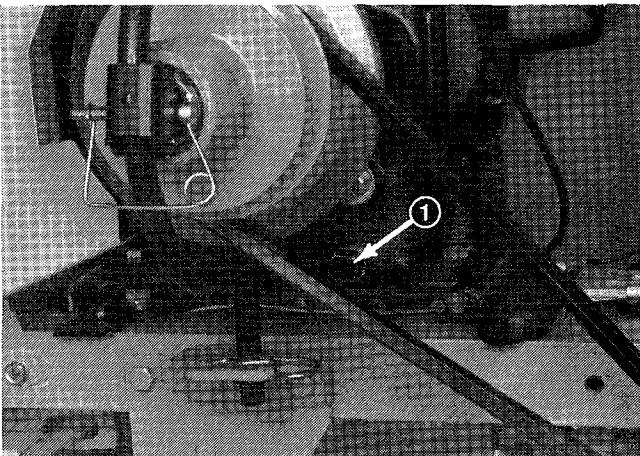
Be sure to add same viscosity oil as is presently in the engine. Your new tractor was shipped with 10W-30 oil in its crankcase. It may be necessary to change the original oil before using the tractor in cold weather.

Oil Changes

IMPORTANT: Failure to change the engine oil at recommended intervals can seriously damage the engine. This is especially true when using detergent oils designed to hold impurities in suspension; when they reach their saturation point, they may suddenly break down to form a gelatin-like substance that seriously impairs and can even stop flowing. Change the oil more often if you operate the machine in extremely dusty conditions.

On 312-8 Model engines, change the engine oil in your machine after the first 2 hours of operation. After that, change the oil at 25 operating-hour intervals. If operating conditions are extremely dusty or dirty, change the oil more often.

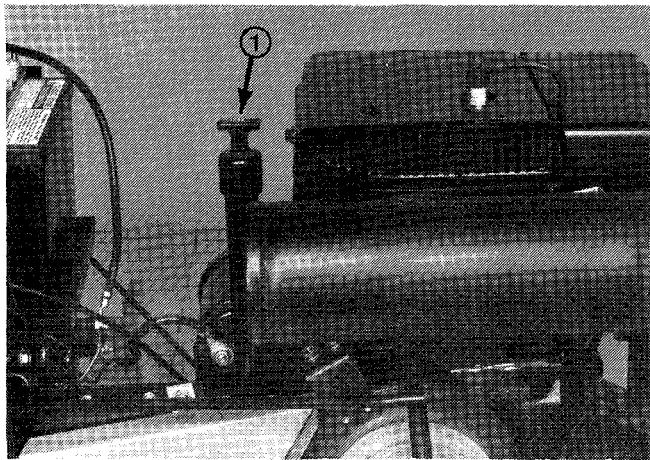
The oil sensor switch should be tested at 500 hour intervals. To test the switch, drain the oil and disconnect the spark plug. The engine should not crank and the indicator light should be ON with the key in the START position. If the engine cranks, consult your dealer for service.



312-8 Model Oil Drain

1. Oil drain

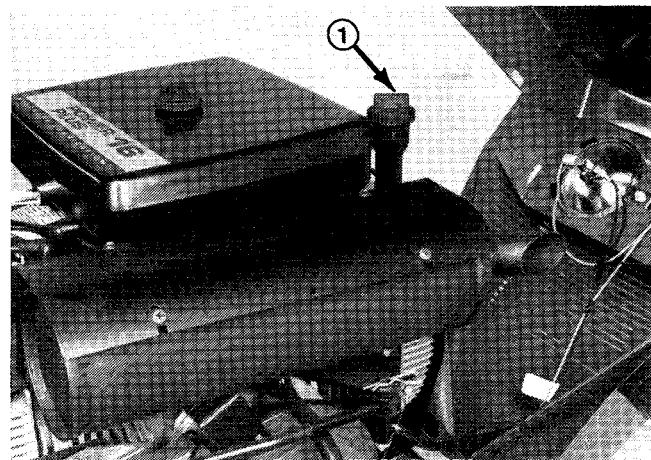
MAINTENANCE



312-8 Oil Check And Fill

1. Dipstick and fill tube

On **416-8 Model engines**, change the engine oil in your machine after the first 25 hours of operation. After that, change the oil at 50-operating hour intervals. The oil filter should be changed every 100 hours. If operating conditions are extremely dusty or dirty, change the oil more often.



416-8 Model Engine Oil Dipstick/Fill Tube

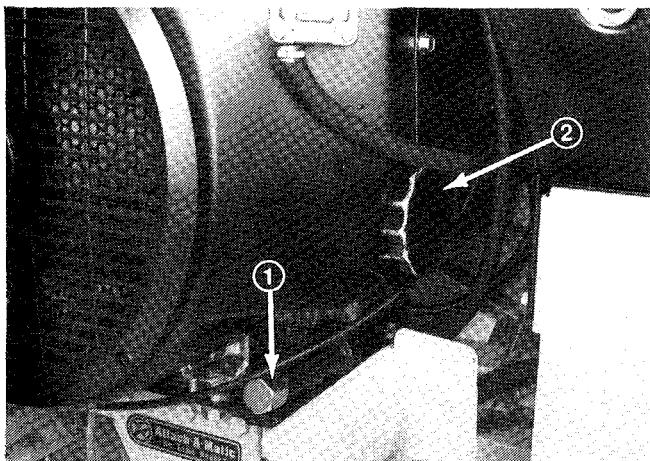
1. Dipstick/oil fill tube

Before changing oil, start the engine and let it to warm up. This will help the oil flow more freely. Shut off the engine and remove the key.

Open the oil drain. After the oil has drained completely, reinstall the drain plug or cap.

Remove the oil dipstick and add about 80 percent of amount of the oil specified in following charts. Charts for selecting the correct oil type and viscosity are also shown.

When using the temperature-viscosity chart, select the air temperature you will most likely encounter within the period before the next oil change.



416-8 Model Oil Filter And Drain Cap

1. Oil drain cap

2. Oil filter

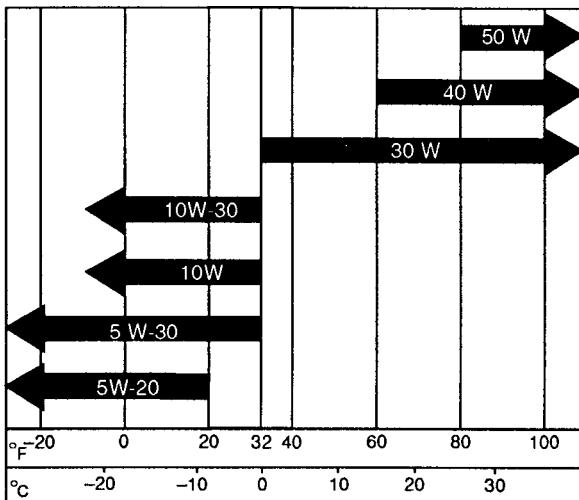
ENGINE OIL CHANGE	
Tractor Model	Crankcase Oil Capacity
312	2-1/2 qts (2.3 l)
416	1.5 qts (1.4 l) without the filter 1.7 qts (1.6 l) with the filter

ENGINE OIL TYPE	
Engine	Oil Type
Kohler	API Service SF
TORO POWER PLUS	API Service SF or SF/CC

ENGINE OIL TEMPERATURE-VISCOSITY CHART	
Kohler Engine	
Air Temperature	Oil Viscosity
Above 32° F (0° C)	SAE 30
Below 32° F (0° C)	SAE 5W-20, 5W-30

MAINTENANCE

TEMPERATURE RANGE ANTICIPATED BEFORE NEXT OIL CHANGE



After adding 80 percent of the prescribed amount of oil, check the oil level. Add oil as necessary to bring it to the "Full" level or into the "Safe" range on the engine oil dipstick.

IMPORTANT: Never overfill the engine crankcase with oil. The oil level must not exceed the "F" level on the dipstick.

AIR FILTER

Dirt coming through improperly installed, poorly serviced, or inadequate air filter elements is very harmful to the engine. Also, a clogged element causes a richer fuel mixture, which wastes gasoline and may lead to the formation of harmful sludge deposits.

(312-8 Models)

Clean the engine air filter and precleaner after every 25 hours of operation (more often if you operate the machine in extremely dusty conditions).

Replace dry-type filter elements at 100-hour intervals, or once a year, whichever comes first. Foam-type elements may be serviceable for more than 100 hours or one year of operation, provided element shows no sign of deterioration and can still be cleaned satisfactorily. Replacement intervals must be shortened when operating under extremely dusty conditions. To protect the engine, use only the manufacturer's filter, or replacement filters with equivalent specifications.

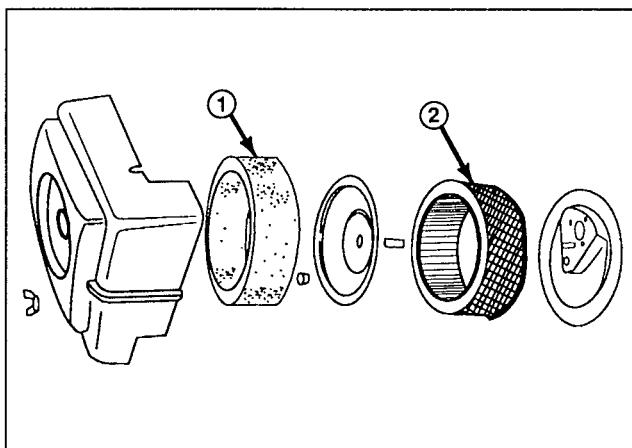
Check the following when installing a new or serviced element:

1. The back plate must be securely tightened to the carburetor. Replace the back plate if it is bent or cracked.
2. Gasket surfaces of the element must be flat against the back plate and cover to seal effectively.
3. Wing nut(s) must be finger-tight – don't overtighten. Tighten the screws securely.
4. Be sure cover seals and gaskets are in good condition and will seal properly. Bad gaskets and seals can let unfiltered air into the carburetor.

IMPORTANT: To prevent any dirt or other contaminants from entering the engine, always cover the carburetor air horn you remove the air cleaner.

Clean the dry-type air filter element by tapping it lightly on a flat surface to remove loose dirt particles. Replace the element if dirt does not drop off easily. DO NOT wash elements in liquid. Do not attempt to blow dirt off with compressed air because this can puncture the filter element.

Foam pre-cleaners cover the filter elements on some engines. Clean the precleaner at 25-hour intervals, when servicing the air cleaner. Wash the pre-cleaner in a solution of liquid dishwashing detergent and water. Squeeze out excess water and install the precleaner on the element.



312-8 Model Air Cleaner

1. *Precleaner*

2. *Element*

MAINTENANCE

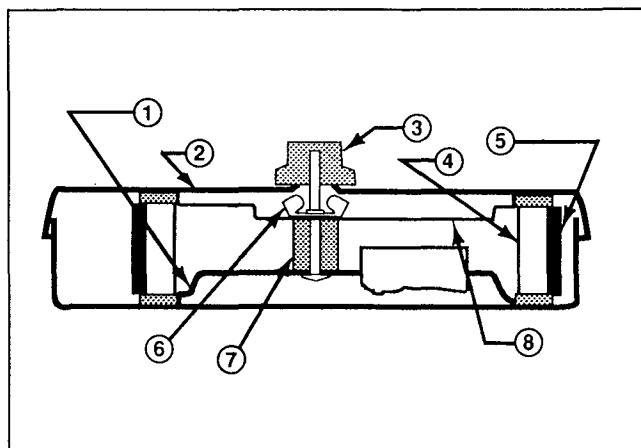
(416-8 Models)

Replace filter elements at 200-hour intervals. Replace more often in dusty operating conditions. To protect the engine, use only the manufacturer's filter, or replacement filters with equivalent specifications.

Check the following when installing a new or serviced element:

1. The base must be securely tightened to the carburetor. Replace the base if it is bent or cracked.
2. Gasket surfaces of the element must be flat against the base and cover to seal effectively.
3. Tighten screws securely.
4. Be sure cover seals and gaskets are in good condition and will seal properly. Bad gaskets and seals can let unfiltered air into the carburetor.

IMPORTANT: To prevent any dirt or other contaminants from entering the engine, always cover the carburetor air horn you remove the air cleaner.



416-8 Model Air Cleaner Assembly

1. Lower housing	5. Pre-cleaner
2. Cover	6. Wing nut
3. Knob	7. Spacer
4. Element	8. Deflector plate

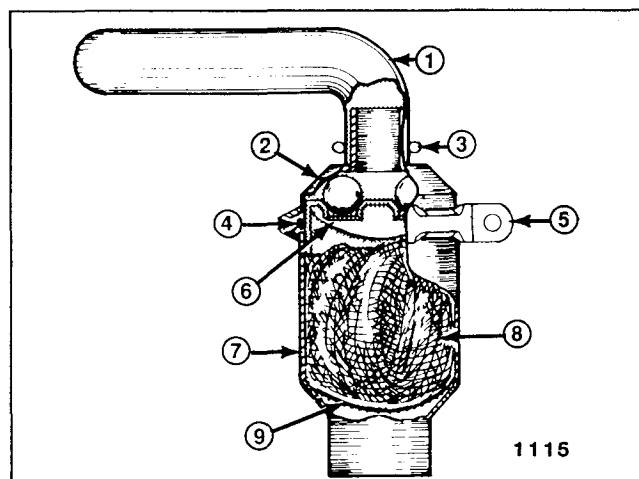
Clean the dry-type air filter element by tapping it lightly on a flat surface to remove loose dirt particles. Replace the element if dirt does not drop off easily. DO NOT wash elements in liquid. Do not attempt to blow dirt off with compressed air because this can puncture the filter element.

Foam pre-cleaners cover the filter elements on the engine. Clean the pre-cleaner at 50-hour intervals, when servicing the air cleaner. Wash the pre-cleaner in a solution of liquid dishwashing detergent and water. Squeeze out excess water and let the pre-cleaner dry.

Coat the pre-cleaner evenly with two tablespoons of SAE 30 engine oil. Knead it into the pre-cleaner, then wring out excess oil. Install the pre-cleaner over the air cleaner element.

CRANKCASE BREATHER (MODEL 416-8)

The engine uses a crankcase breather valve for maintaining crankcase vacuum. If the crankcase becomes pressurized as evidenced by oil leaks at the seals, clean the baffle pack and valve in a solvent. Check and clean the valve and baffle after every 200 hours of operation.



416-8 Model Crankcase Breather

1. Breather hose	6. Screen
2. Can and valve	7. Breather tube
3. Hose clamp	8. Baffle
4. "O" ring	9. Screen
5. Clamp	

SPARK PLUG(S)

A spark plug in poor condition or with an incorrect gap setting often causes engine misfires or generally poor operation. Spark plug(s) should be checked after each 100 hours of operation. Replace a spark plug if you see fouling or excessive deterioration.

Always clean the area around spark plug(s) before removing them to prevent dirt from entering the engine. Use a spark plug wrench to remove and install plugs.

Check the plug's condition. Good operating conditions cause a light coating of gray or tan deposit. A dead-white, blistered coating could suggest engine overheating. A black coating could suggest an "over-rich" fuel mixture caused by a clogged air cleaner, or incorrect carburetor adjustment.

MAINTENANCE

Replace a spark plug that is not in good condition. **Never sandblast, wire brush, scrape or otherwise service a spark plug in poor condition. A new plug gives the best results.**

Always check the spark plug gap before installing new plug(s) or reinstalling original plug(s). Use a spark plug gap gauge to adjust the electrode's air gap to the engine's specification.

TRACTOR MODEL	PLUG GAP
All Models	025 in. (0,6 mm)
Tighten the spark plugs to: 22 ft lbs (30 Nm)	

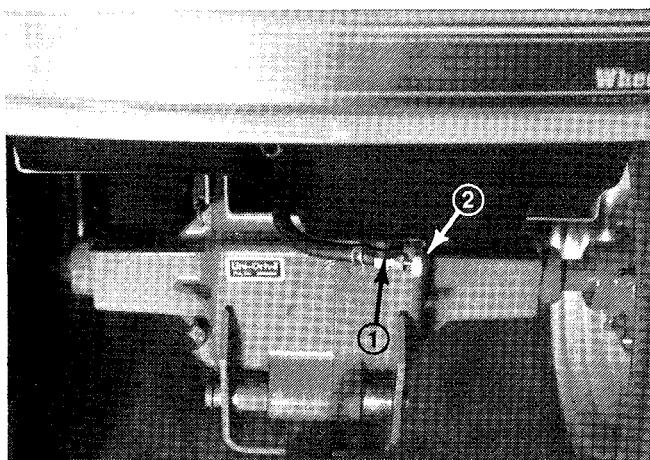
THE FUEL SYSTEM

On 312-8 models, a fine-mesh, screen-type strainer in the fitting at the bottom of the fuel tank filters foreign matter from gasoline before it reaches the carburetor. This strainer requires service only if the fuel supply becomes contaminated.

On 416-8 models, the engine has an in-line fuel filter near the carburetor. Replace this filter after each 100 hours of operation or at 1-year intervals, whichever occurs first.

Always clean the area around the fuel cap before you remove it to prevent dirt from entering the fuel system. Also make sure your fuel storage container is clean and in good condition.

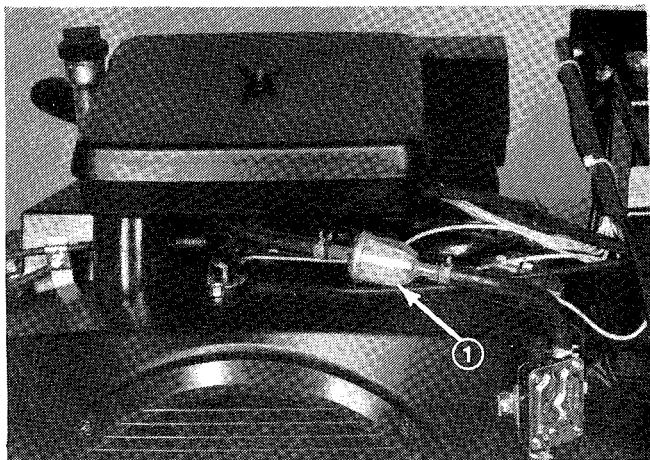
The fuel filter gives only limited protection from moisture in the fuel system. Keep the fuel tank full during winter. Cold, damp weather can cause moisture to condense in the tank.



Fuel Strainer

1. Fuel strainer

2. Shut-off valve



416-8 Model Fuel Filter

1. In-line fuel filter

CARBURETOR ADJUSTMENT

Your tractor's carburetor was adjusted at the factory and should not have to be readjusted. However, if you notice one of the conditions listed below, have the carburetor readjusted immediately. Continued operation with an incorrect carburetor setting causes fouled spark plugs, overheating, excessive valve wear or other problems.

Note: If you notice black exhaust smoke, check the air cleaner first—an "over-rich" mixture is usually caused by a poorly serviced, clogged air cleaner element, not an incorrectly adjusted carburetor.

CONDITION
A. Black, sooty exhaust smoke, engine sluggish.
B. Engine misses and backfires at high speed.
C. Engine starts, sputters and dies under cold weather starting.
D. Engine runs rough or stalls at idle speed.
POSSIBLE CAUSE/PROBABLE REMEDY
A. Mixture too rich—readjust main fuel needle.
B. Mixture too lean—readjust main fuel needle.
C. Mixture too lean—readjust main fuel needle.
D. Idle speed too low or improper idle adjustment—readjust speed then idle adjustment screw, if needed.

Carburetor Adjustment Chart

MAINTENANCE

Correct carburetor adjustment requires a significant amount of knowledge and special equipment. Also, other adjustments such as governor settings may be necessary after adjusting carburetor. For these reasons, we recommend an authorized dealer do carburetor adjustments.



ELECTRICAL SYSTEMS

The Alternator

An alternator charges the battery. This charging system normally needs no service—other than periodic checks that all exposed wiring and electrical connections are clean, tight and in good condition.

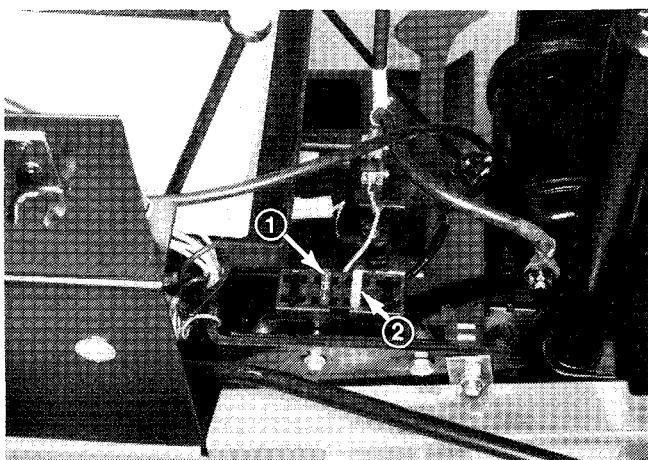
On the 416-8 model only, a 30-amp automotive type ATO or ATC fuse protects the charging circuit.

IMPORTANT: Correct polarity is critical with an alternator-type charging system. Always disconnect the battery ground cable (negative) before working on any part of the electrical system. Make sure you connect all components correctly before reconnecting the ground cable (negative). Otherwise, you may damage the alternator system.

IMPORTANT: Never run the engine if you have removed the battery, or if the battery is not connected to the charging system. Serious damage to charging system components may result.

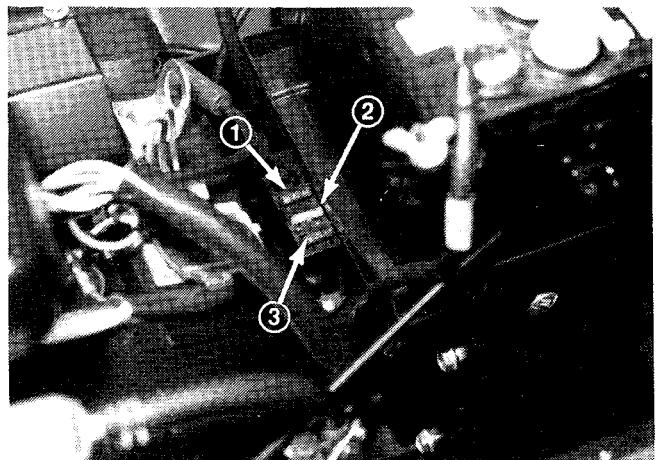
Main Fuse

A 25-amp (312 Models) automotive-type ATO or ATC fuse protects the electrical system's main circuit.



312-8 Model Fuse Location

1. 15-amp light/gauge fuse
2. 25-amp main fuse



416-8 Model Fuse Locations

1. 15-amp light/gauge fuse
2. 25-amp main fuse
3. 30-amp charge circuit fuse

Light Circuit Fuse

The light circuit is powered by the battery. The lights will operate when the ignition switch is in the RUN position. A 15-amp automotive-type ATO and ATC fuse is part of the light circuit. The gauge circuits are also protected by the light circuit's fuse.

Battery

IMPORTANT: When servicing the battery or any other part of the electrical system, or if you must remove the battery for any reason, always disconnect the negative (ground) cable FIRST and reconnect it LAST to avoid electrical shorts.

This paragraph does not pertain to a "Maintenance-Free Battery." Keep the electrolyte level above the plates in each cell by adding distilled water when necessary. The best time to add water is just before operating the tractor so the water will mix with the solution. Do not overfill the battery. Electrolyte solution is corrosive and overfilling can cause damage to surrounding metal parts. The battery should be maintained at a 1.265 specific gravity charge. When the battery has been out of the tractor for servicing, take care to connect cables to the battery exactly as they were before removal.

For longest service life, keep the battery clean by wiping it off with a paper towel. Any corrosion around the battery terminals should be removed by applying a solution of one-part baking soda to four-parts water. A light coating of grease or petroleum jelly may be applied to all exposed terminal surfaces to prevent corrosion.

IMPORTANT: At temperatures below 32° F (0° C), a full charge state must be maintained to prevent cell electrolyte from freezing and causing permanent battery damage.

MAINTENANCE

Light Bulb Replacement

Replace head-light and tail-light bulbs as described below. Be careful when handling bulbs, especially if they are broken.

Replace either sealed-beam head-lamp unit by first disconnecting both terminal wires. Notice how the head-lamp is installed, then carefully remove the bolt and retainer to release the head lamp.

To replace a tail light bulb, pry the lens off with a screwdriver. A slot is at each end of lens for this purpose. If the bulb has a metal socket, push the bulb down and turn it counterclockwise to remove it. If the bulb has a plastic socket, simply pull the bulb straight out. Tail-light bulbs are automotive number #1895 (metal base) or number #194 (all glass).

To replace an indicator light bulb, consult your authorized TORO Wheel Horse dealer.

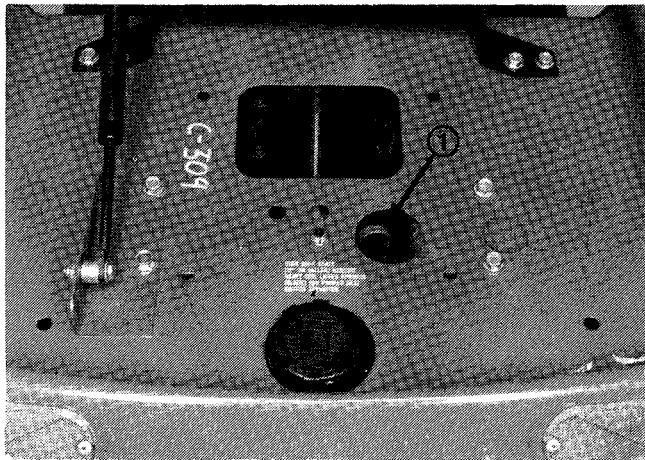
8-SPEED TRANSMISSION

The mechanical transmission in your new TORO Wheel Horse tractor is filled with gear oil. The same type of oil must be used whenever the transmission needs filling.

Transmission	Oil	Capacity
8-Speed	SAE 90 API Service QL-5	2 qt (1.9 l)

Check the transmission lubricant level after each 25 hours of operation. Changing the lubricant is not required, except for major service. To check the lubricant level, remove the dipstick from the transmission case. Maintain the oil at the "full" level on the dipstick.

IMPORTANT: Use care to prevent dirt, clippings or other foreign material from entering the transmission during transmission oil level checks, oil fillings, or oil changes.

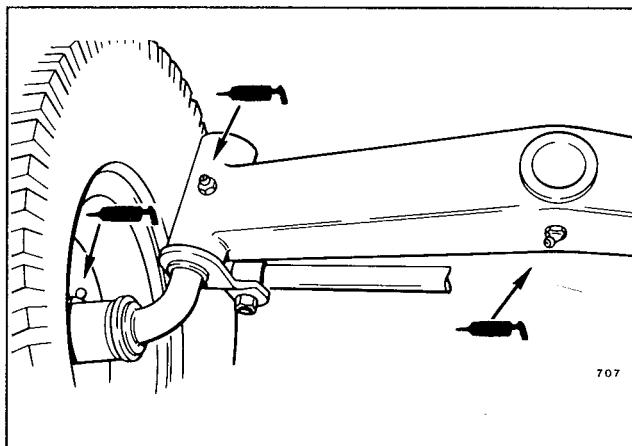


8-Speed Transmission Dipstick

1. *8-Speed transmission dipstick*

CHASSIS LUBRICATION

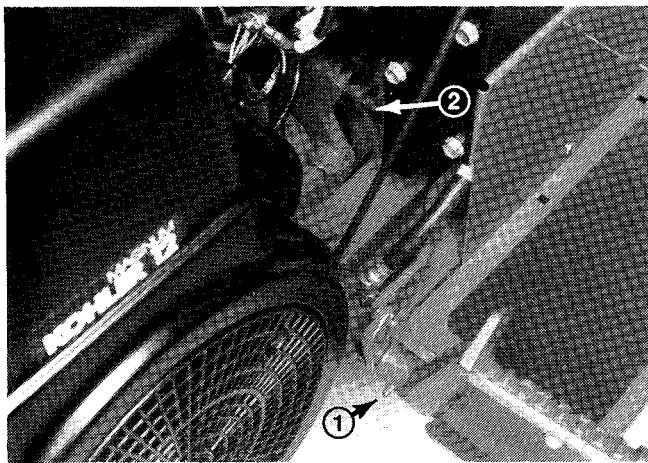
The steering gear, foot pedal, spindles, front wheel bearings, and front axle pivot have fittings to simplify lubrication with a pressure grease gun. Before using a grease gun, clean the zerk fittings carefully to prevent dirt from being forced into them. After greasing, wipe off any excess grease. Use a general purpose grease (lithium base) to lubricate the tractor.



Front Wheel, Spindle, and Front Axle Lube Fittings

MAINTENANCE

Lubricate the chassis after each 25 hours of operation. All other pivoting arms and levers should be lubricated at the same intervals with either general purpose grease or machine oil applied directly to wear surfaces.



Steering Gear And Foot Pedal Lube Fittings

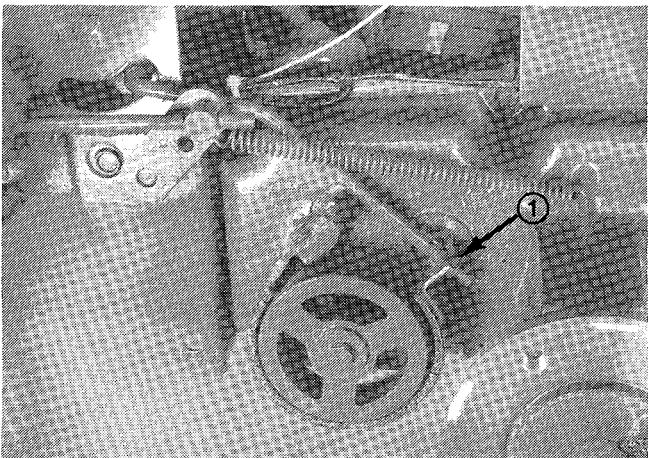
1. Foot pedal fitting

2. Steering gear fittings

FOOT BRAKE ADJUSTMENT

The brake band, located on the left side of the transmission, brakes the transmission shafts, which then brake the rear wheels.

To adjust the brake, push down on the brake pedal and pull back on the parking brake lever. With the parking brake engaged, adjust the nut on the end of the rod until the brake band is tight enough to skid both rear wheels when you push tractor. Then tighten the nut another 1/2 turn. After adjustment, the parking brake lever should not travel to the end of the lever's slot when the parking is engaged. With the brake released, the brake band should not "drag" on the brake drum.



8-Speed Transmission Brake Adjustment

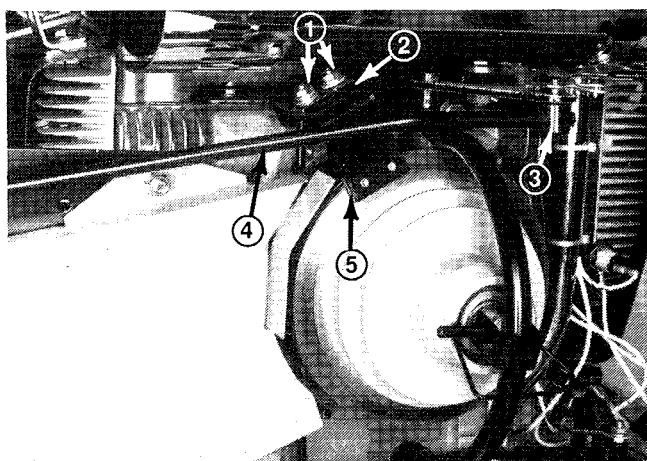
1. Brake adjustment nut

PTO CLUTCH AND BRAKE ADJUSTMENT

The PTO clutch and brake may require periodic adjustment due to normal wear of the friction surfaces. If clutch slippage is apparent, turn the trunnion farther onto the clutch rod in one-turn intervals until you eliminate the slippage.

To adjust the PTO brake:

1. Engage the PTO clutch.
2. Loosen the two bolts that hold the brake pad bracket to the support bracket.
3. Place a .012 in. (0.3 mm) feeler gauge between the brake pad and the clutch pulley.
4. While holding the brake pad against the feeler gauge and pulley, tighten the two brake bracket bolts.



PTO Adjustments

1. Adjusting bolts	4. Clutch rod
2. Brake pad bracket	5. .012 in. (3 mm)
3. Trunnion	PTO engaged

THE EXHAUST SYSTEM

Make regular visible and audible inspections of the exhaust system throughout the machine's life. Look for leaks in the muffler and piping while the engine is running. Repair all leaks immediately after you find them for personnel safety.



Inhaling exhaust gases can result in serious personal injury or death. Inspect the exhaust system audibly and visually for leaks daily and repair any leaks immediately.

MAINTENANCE

CLEANING AND STORAGE

Wash the tractor regularly with a mild automotive detergent and water. After 30 days, painted surfaces may be waxed to protect the original finish.

You can remove minor paint scratches or abrasions with an automotive cleaning and polishing compound. Rubbing compound is not recommended under normal circumstances because it is abrasive. Exposed bare metal surfaces should be given a light coating of oil or grease to prevent rust until permanent repairs can be made. Aerosol cans of TORO Wheel Horse paint are available through your authorized TORO Wheel Horse Dealer.

When the tractor will not be in used for an extended period, take the following steps to ensure minimum difficulty when the unit returns to service:

1. Do the required maintenance steps described in the "Maintenance Check List."

2. Check the tires for correct inflation.
3. Drain all fuel from the fuel tank. Start the tractor and let the engine run out of gas. (As gasoline grows old, it becomes less volatile and forms harmful gums and varnish deposits in the carburetor and fuel pump.) **DO NOT STORE GASOLINE FOR MORE THAN 2 MONTHS.**
4. Wash the tractor and repaint all bare metal surfaces.
5. Charge the battery. In temperatures lower than 40° F (4° C), a battery will keep a charge for about 50 days. In temperatures above 40° F (4° C), the water level should be checked and the battery "trickle charged" every 30 days (more often in higher temperatures). The battery must be fully charged to prevent freezing and internal damage in weather below 32° F (0° C).
6. Remove the key from the tractor.

TROUBLESHOOTING CHECK LIST

Symptom	Possible Cause	Possible Remedy
The engine will not turn over.	Dead battery Open the safety interlock switch. Starter Solenoid Ignition switch	Charge or replace the battery. Be sure the PTO is disengaged and the brake pedal is depressed. Consult an authorized dealer. Consult an authorized dealer. Consult an authorized dealer.
The engine turns over but will not start.	Spark plug not firing. Ignition system No fuel in the tank Fuel valve closed Incorrect carburetor adjustment Ignition switch	Check the spark plug condition and reset the gap. Consult an authorized dealer. Refuel the tractor. Open the fuel valve. Reset the carburetor adjustment. Consult an authorized dealer.
The engine is hard to start.	Spark plug wire(s) grounded or loose Ignition system Spark plug(s) faulty or improperly gapped The fuel line is clogged. A faulty fuel pump Carburetor dirty or improperly adjusted	Check spark plug wires. Consult an authorized dealer. Check spark plug condition and reset the gap. Clean the fuel line and, if applicable, check the fuel filter. Consult an authorized dealer Readjust the carburetor. Consult a dealer for authorized carburetor service.
The engine starts, but operates erratically.	A clogged fuel line Water in the fuel Vent in fuel cap plugged Ignition system Incorrect carburetor adjustment	Clean the fuel line; replace the filter. Drain old fuel and replace it with fresh supply. Check the vent. Consult an authorized dealer. Readjust the carburetor.
The engine knocks.	Fuel's octane is too low. Faulty ignition system Engine overheated	Drain fuel and replace it with a higher octane supply. Consult an authorized dealer. Shut off the engine and let it cool.
The engine occasionally "skips" at high speed.	The spark plug is fouled, faulty or its gap is too wide. Faulty ignition system Incorrect carburetor adjustment	Check plug condition and gap. Consult an authorized dealer. Readjust carburetor.
Engine overheating.	Air intake screen or fins clogged The oil level is too high or too low. The fuel mixture is too lean. Faulty ignition system The engine is overloaded.	Clean intake screen and fins. Adjust the oil level as necessary. Readjust the carburetor. Consult an authorized dealer. Reduce the load on the tractor.

TROUBLESHOOTING CHECK LIST

Symptom	Possible Cause	Possible Remedy
The engine idles poorly.	Incorrect carburetor adjustment Incorrect spark plug gap	Readjust the carburetor. Check the condition and gap of the spark plug.
The engine backfires.	Incorrect carburetor adjustment Ignition system.	Readjust the carburetor. Consult an authorized dealer.
The engine runs fine, but the tractor will not move.	The transmission is not in gear. Faulty transmission	Select a gear. Consult an authorized dealer.
The engine stalls whenever the PTO is engaged.	Excessive load on the PTO Faulty interlock system	Check for jammed attachments. Lessen the load on the attachment. The seat must be occupied to close the interlock system. Consult an authorized dealer.

