



600 Series  
Mowing  
Machine

**TORO®**

**Wheel Horse**  
Operator's Manual

Specifications  
Operating Instructions  
Maintenance Information

# FOR YOUR SAFETY

Two of the most potentially serious types of accidents involving power mowers are contact with the mower blade and overturning the rider/tractor. To minimize the possibility of having these types of accidents, read

and follow these instructions. Also refer to the Safe Operation Practice in this Operator's Manual for other important safety information.

## BLADE CONTACT

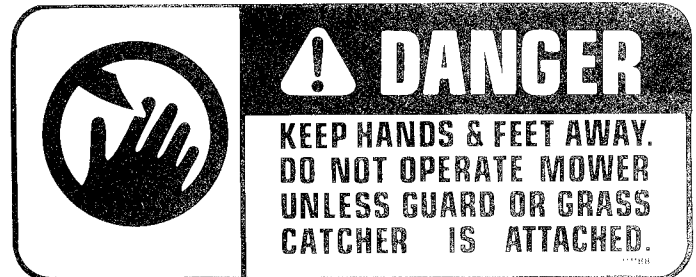
**! DANGER! Mower Blades are Designed to CUT: therefore,**

### **ALWAYS:**

- Shut off engine and set parking brake.
- Remove ignition key.
- Allow moving parts to stop before dismounting, servicing, or cleaning unit.

### **NEVER:**

- Perform ANY work on the mower with engine running.
- Mow with other people around, especially children.
- Leave mower unattended.



## RIDER/TRACTOR STABILITY

**Vehicle stability changes with conditions and is affected by:**

- Slope angle and length/bumps/holes, etc.
- Slippery conditions (lawn moisture and length)
- Operator size and position/how loaded/equipment used
- Speed/braking/steering changes
- Operator physical limitations/alertness

### **ALWAYS:**

- Use good judgement when operating the rider/tractor, especially on slopes.
- Maintain the vehicle in good operating condition.
- Be attentive to changing conditions affecting vehicle stability.

### **NEVER:**

- Operate vehicle on extreme slopes.
- Operate vehicle across slopes.
- Abruptly change speed or direction.



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## CAUTION



This symbol marks important instructions relating to your personal safety. To avoid the possibility of injury, read and follow such instructions carefully.

When the manual refers to the left or right side of the vehicle, it means your left and right when sitting in the driver's seat.

## SAFE OPERATION PRACTICES — RIDING VEHICLES

### GENERAL

1. This machine is capable of amputating hands and feet and can throw objects that can cause injury and damage. **KNOW** the controls and how to stop machine quickly. **READ THIS OPERATOR'S MANUAL** and instructions furnished with attachments. Read, understand, 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 attachment discharge area, underside of mower deck or any moving parts while engine is running.
3. The use of drugs or alcohol while operating any equipment will place your safety in peril. Do not attempt operation of 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 proper use of this equipment.
5. Do not allow children to operate machine.
6. Do not carry passengers.
7. The purpose of this machine is to perform work. This equipment is not intended for sport or recreation.
8. Do not mow when people or pets are around.

9. Clear work area of objects (wire, rocks, etc.) which might be picked up and thrown.
10. Take all possible precautions when leaving vehicle unattended, such as disengaging power-take-off, lowering attachments, shifting into neutral, setting parking brake, stopping engine and removing key.
11. Watch out for traffic when crossing or near roadways.
12. Machine and attachments should be stopped and inspected for damage after striking a foreign object. Damage should be repaired before restarting and operating equipment.
13. Do not change engine governor settings or over-speed engine.
14. Wear appropriate protective clothing when operating equipment. Long pants and substantial footwear, not barefoot or open sandals, are essential.
15. Do not operate equipment unless properly seated with feet on footrests or pedals.
16. Keep your eyes and mind on your machine, attachment and the working area. Do not let other interests distract you.
17. Safety switch(es) are intended to stop or prevent starting of engine to help prevent accidents. **OPERATOR SHOULD TAKE PRECAUTIONS AND NOT RELY ENTIRELY ON SAFETY SWITCH(ES).**
18. Care should be used not to touch equipment or attachment parts which may be hot from operation. Muffler and nearby areas may exceed 150° F. Allow cooling to occur before attempting to maintain, adjust or service.
19. Use of 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 approved gasoline container. Place container out of reach of children.
22. Use gasoline only as a fuel — never as a cleaner.
23. Never remove fuel cap or add gasoline to a running or hot engine, or an engine that has not been allowed to cool for several minutes after running.
24. Never fill fuel tank indoors. Wipe up spilled gasoline.
25. Open doors if engine is run in garage — exhaust fumes are dangerous. Do not run engine indoors.
26. Do not fill machine with gasoline while smoking or when near open flame or sparks.
27. Never store equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark.
28. Allow engine to cool before storing in any enclosure.
29. To reduce fire hazard, keep 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. It is recommended that first operation of equipment be done at a slow speed with attachment disengaged. Continue this practice until operator is thoroughly familiar with the controls and has developed operating skills.
33. Disengage all attachment clutches, set parking brake and shift into neutral before attempting to start engine.
34. Disengage power to attachment(s), set parking brake and stop engine before leaving operator position.
35. Disengage power to attachment(s) and stop engine before making any repairs or adjustments.
36. Disengage power to attachment(s) when transporting or not in use.
37. Disengage attachment clutch before attempting to remove the mower from a hole or other obstruction.
38. Disengage power to attachment(s) before backing. Do not mow in reverse unless absolutely necessary and then only after careful observation of the entire area behind the machine.
39. LOOK behind machine to make sure the area is clear before placing the transmission in reverse and continue looking behind while backing.
40. Always back up loading ramps and tilt bed trailers.
41. The parking brake is designed to hold tractor in place at rest, with engine off. Parking brake **will not** restrain tractor with engine running and transmission engaged.

#### **STABILITY/TIPOVER/TRACTION**

42. Know the terrain on which you are operating your equipment. There are areas on which your equipment can not be safely operated.
43. Avoid operating equipment on hillsides, slopes or rough terrain. **DO NOT** operate 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 a steep hill must be ascended, back up the hill, and drive forward down the hill, keeping tractor 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 insure complete control at all times. Avoid erratic operation and excessive speed.
47. Sharp turns on any terrain may cause loss of control. Reduce speed and use caution when making sharp turns.

48. Do not stop or start suddenly when going uphill or downhill. Avoid uphill starts. If machine is stopped 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 on which you are working. Find hidden obstacles by walking through and inspecting the area prior to operating your equipment in that area. Plainly mark obstacles, such as rocks, ruts or holes and **stay well clear of these obstacles** when operating.
50. While operating, stay alert for holes, rocks or roots, which may cause damage to equipment or upset. Keep at least 3 ft. 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 the object. 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 perform differently. Rain, snow, loose gravel, wet grass, etc., change the tractive conditions of the terrain requiring changes in your operating technique, which may include a decision not to operate on that terrain.
54. Use care when pulling loads or using heavy equipment.
  - A. Use only approved drawbar hitch points.
  - B. Limit loads to those you can safely control.
  - C. Do not turn sharply. Use care when backing.
  - D. Use counterweight(s) or wheel weights when suggested in operator's manual.

#### ATTACHMENT USE

55. When using attachments never direct discharge of material toward bystanders nor allow anyone near vehicle while in operation.
56. When using machine with mower:
  - A. Mow only in daylight or in good artificial light.
  - B. Never make a cutting height adjustment while engine is running if operator must dismount to do so.
  - C. Shut engine off when unclogging chute.
  - D. Check blade mounting bolts for proper tightness at frequent intervals.
57. Keep hands and feet away from rotating blade(s) underneath mower deck. Never place foot on ground when mower is engaged or when mower is in motion.
58. DO NOT operate mower attachment without the chute deflector or complete bagger in place.
59. Exercise care while maneuvering with grass catcher. Front to rear stability may change.
60. When using machine with snowthrower and auger becomes plugged or jammed:
  - A. Declutch snowthrower and stop tractor engine immediately.
  - B. Disconnect spark plug wire(s).
  - C. Clear snow from discharge chute if plugged.
  - D. If auger is jammed, remove foreign object and repair any damage to snowthrower before continuing.
  - E. Reconnect spark plug wire(s) and resume operation.
61. Never permit anyone to stand near snowthrower auger or discharge opening. Objects may be present in snow, which when thrown, could cause injury.
62. When using snow/dozer blades:
  - A. Avoid hitting solid objects. This can damage blade and injure operator.
  - B. Always travel at a safe, slow speed.
63. Keep all persons a safe distance away when operating tillers. Always disengage the PTO, lower the attachment and remove the ignition key before making any adjustments.
64. If tiller starts to push tractor, disengage PTO clutch immediately.
65. Use chains, counterweight(s) or wheel weights when suggested in the operator's manual.

#### MAINTENANCE

66. Keep all nuts, bolts, fasteners and screws tight to be sure equipment is in safe working condition and check them frequently. Repair or replace worn, damaged, distorted or broken parts as needed.
67. Keep vehicle and attachments in good operating condition and keep safety devices in place and working.
68. Under normal usage, grass catcher bag material is subject to deterioration and wear. It should be checked frequently to determine need for bag replacement.
69. Use only genuine Wheel Horse replacement parts to assure that original standards are maintained.
70. Shields, deflectors, switches, blade controls and other safety devices must be in their proper position and functional.
71. Do not operate without muffler or tamper with the exhaust system. Damaged mufflers or spark arresters can create a fire hazard. Periodically inspect and replace if necessary.
72. If equipment begins to vibrate abnormally, disengage power to attachments and stop engine at once. Repair any damage before starting or continuing operation.
73. Periodically inspect all shafts, levers, friction devices and other moving parts subject to wear. Make required adjustment or replace these parts if damaged, distorted or broken, or as soon as wear affects the normal operation of the vehicle or attachment. DO NOT operate equipment that is not functioning properly.

## SPECIFICATIONS:

### ENGINE:

MACHINE MODEL	ENGINE MODEL*	RATED H.P.**	DISPLACEMENT cu. in./cc	BORE in./mm	STROKE in./mm	IGNITION
612-Z	E125V-N/10964B	12.5	23.7/389	3.31/84.1	2.76/70.0	Electronic
616-Z	P-216V-I/10959A	16	43.3/710	3.25/82.6	2.62/66.6	Electronic

\*Basic engine model number shown; type and serial numbers from engine I.D. plate are required to completely identify engine.

\*\*Engine manufacturer's rating at 3600 RPM

### TRANSMISSION:

#### TYPE: HYDROSTATIC

#### APPROXIMATE GROUND SPEEDS (at Full Throttle)

FORWARD - Variable 0-7.2 mph (11.6 kph)

REVERSE - Variable 0-7.2 mph (11.6 kph)

### ELECTRICAL SYSTEM:

	612-Z MODELS	616-Z MODELS
Type	12 Volt D.C. Negative Ground	12 Volt D.C., Negative Ground
Alternator:	12 Volt, 15 amp. Regulated	12 Volt, 20 amp. Regulated
Battery:	12 Volt 200 CCA	12 Volt, 280 CCA

### TIRES:

	SIZES - FRONT	SIZES - REAR	PRESSURE - FRONT	PRESSURE - REAR
612-Z, 616-Z	11x 4.00-5	18 x 9.50-8	8 psi (.57 kg/cm <sup>2</sup> )	8 psi (.57 kg/cm <sup>2</sup> )

### PHYSICAL DATA:

MODEL	HEIGHT	LENGTH	OVERALL WIDTH	WHEEL BASE	INSIDE TURNING RADIUS	NET WEIGHT (Approximate)
612-Z, 616-Z	41.2 in. (104.9 cm)	71.7 in. (182.1 cm)	40 in. (101.6cm)	42 in. (106.7 cm)	0 in. (0 cm)	590 lbs. (268 kg)

## TUNE-UP/GENERAL MAINTENANCE SPECIFICATIONS:

### ENGINE:

MACHINE MODEL	POINT GAP in./mm	TIMING MARK LOCATION	IGNITION TIMING (BTDC)	SPARK PLUG TYPE	SPARK PLUG GAP in./mm	DIRECTION OF ROTATION	IDLE RPM (No Load)	GOVERNED MAX. RPM (No Load)
612-Z	N/A	N/A	Fixed	BPR4HS-10**	.035/.88	Counterclockwise	1500	3600
616-Z	N/A	N/A	Fixed	RS14YC*	.025/.64	Counterclockwise	1400	3600

\* Or equivalent (Champion number shown)

\*\* Or equivalent (NGK number shown)

### LUBRICANT/FUEL CAPACITIES:

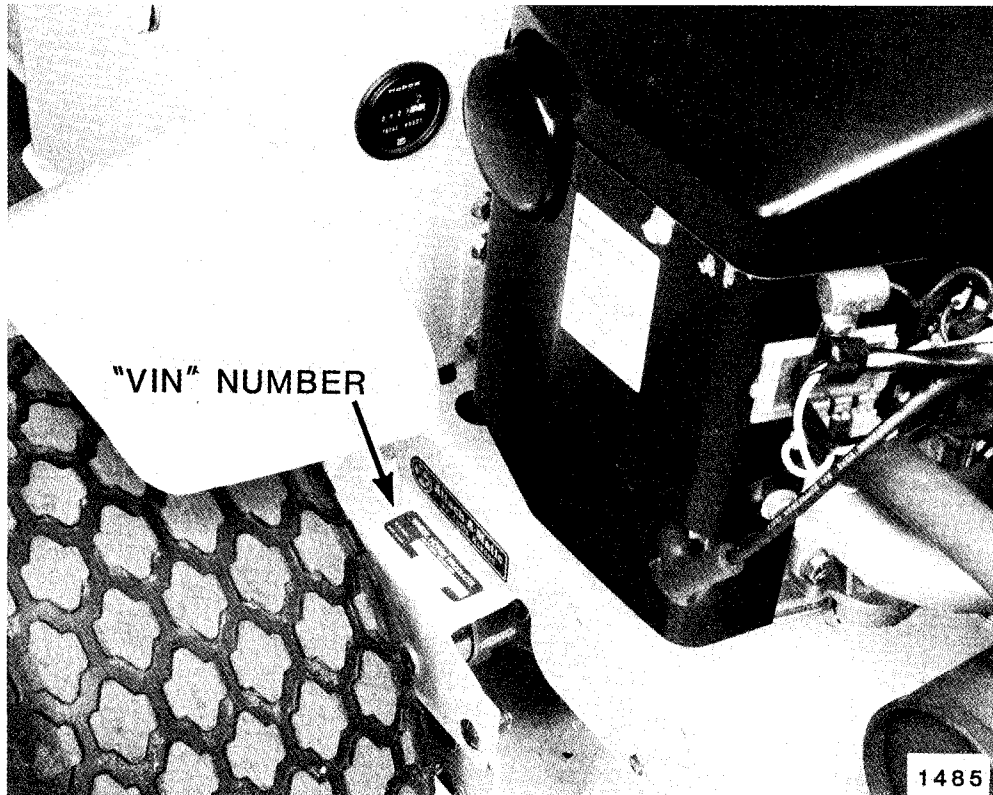
	CRANKCASE:	FUEL TANK:	CHASSIS:
612-Z	1 1/2 qts. (1.4l) w/o Filter 1.65 qts. (1.55l) w Filter	3 Gallons (11.2l)	Grease Fittings: 6
616-Z	1.7 qts. (1.6 l) w/o Filter 2.0 qts. (1.9l) w/ Filter	3 Gallons (11.2 l)	Grease Fittings : 6

## VEHICLE IDENTIFICATION NUMBER (VIN) LOCATIONS

Vehicle identification numbers are used to identify your new machine and attachments. These numbers should always be referred to when consulting your dealer or factory concerning service, parts, or other information you may require. If this plate is removed during repair operations, it should always be replaced.

The machine vehicle identification number plate is located on left side of frame next to engine. Engine identification number is located on engine shrouding, and indicates model, type number and serial number of your machines engine.

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



Machine Identification Number

Engine Identification Number

**TORO Wheel Horse**  
P.O. BOX 2649 SOUTH BEND, INDIANA 46680

I.D. NUMBER

MADE IN U.S.A.

Model

Type No.

Code No.

## OWNER REGISTRATION AND WARRANTY

Service and warranty assurance is as important to Toro Wheel Horse as it is to you, the owner. To facilitate warranty service at an Authorized Toro Wheel Horse Dealer, Toro Wheel Horse requires factory registration. A registration card is supplied with each new tractor and attachment. **Either you or your dealer must fill in required information and mail card to Toro Wheel Horse.**

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

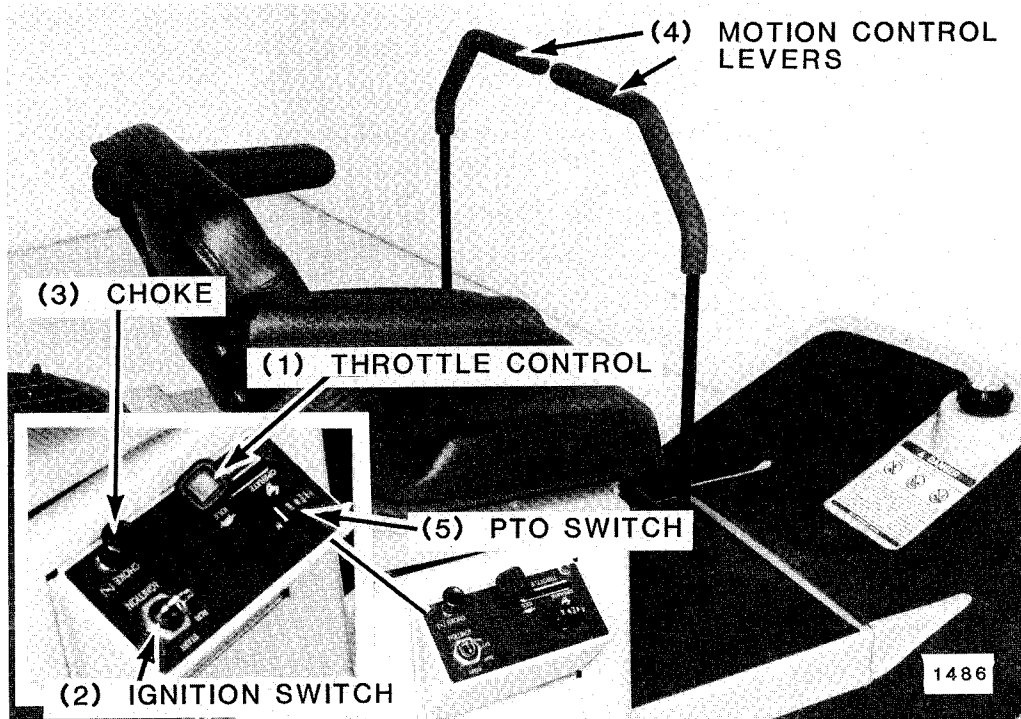
## PARTS MANUAL

A separate parts manual is available for your Toro Wheel Horse equipment. To obtain a parts manual, see ordering information at end of this publication.

**BE SURE TO INCLUDE VEHICLE IDENTIFICATION NUMBER OF EQUIPMENT.**



# MACHINE CONTROLS



## 1. THROTTLE CONTROL

Throttle is located on top of right panel below seat. Move throttle forward all the way to operate position to operate machine. Move throttle all the way to rear position before shutting engine off.

## 2. IGNITION SWITCH

Ignition switch is located on right panel below seat. Ignition switch has three positions: (1) Off, (2) Run, (3) Start. To start engine turn key all the way to Start. Release key when engine starts and it will automatically return to Run position. Turn switch to Off position to stop engine.

## 3. CHOKE CONTROL

Choke control is located on right panel next to ignition switch. Pull choke knob out when starting engine. Slowly push knob in after engine starts. If engine is warm and has been running, choking may not be necessary to restart engine.

## 4. RIGHT AND LEFT MOTION CONTROL LEVERS

Motion control levers move right, left, forward and rearward. To enter seat, move levers all the way left and right. Enter seat and move levers in toward center of machine. Left lever controls left rear wheel and right lever controls right rear wheel. To go forward, push both levers forward evenly; further levers are pushed forward, faster machine will travel. To go in reverse, pull both levers to rear evenly; further levers are pulled, faster machine will travel. To turn, slow machine down and pull

one lever back far enough to cause it to rotate backwards at the same speed the opposite wheel is turning forward.

## 5. PTO (POWER TAKE-OFF) ELECTRIC CLUTCH/BRAKE SWITCH

PTO switch is located on right panel below seat. Mower is engaged and disengaged with PTO switch.

To engage PTO raise switch cover and move switch to "ON" position. To disengage PTO, lower switch cover. This will move switch to "OFF" position. Switch must be in Off position to start engine.

## 6. PARKING BRAKE LEVER

Parking brake lever is located on left side below seat. To engage parking brake, place motion control levers in neutral position and move brake lever back. To disengage parking brake move lever forward.

Parking brake must be in engaged position to start engine.

## 7. HOUR METER

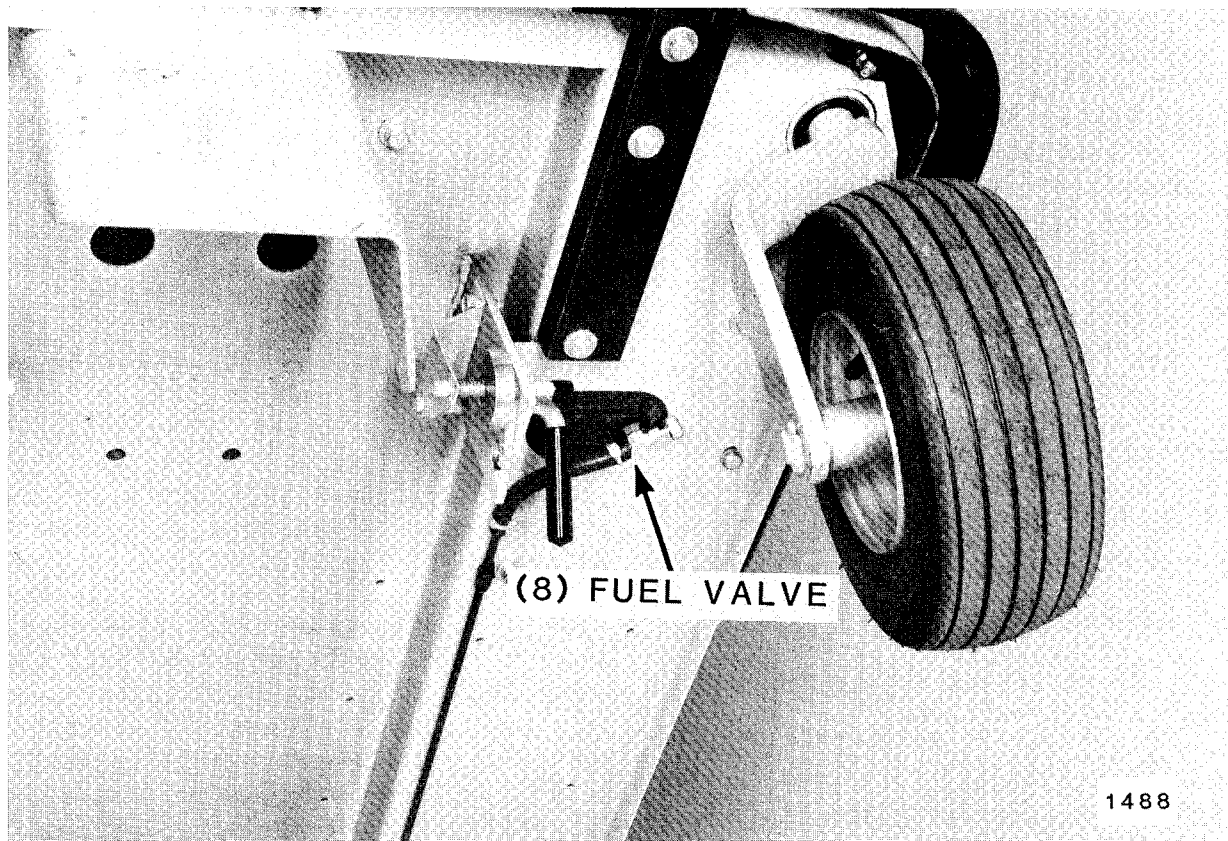
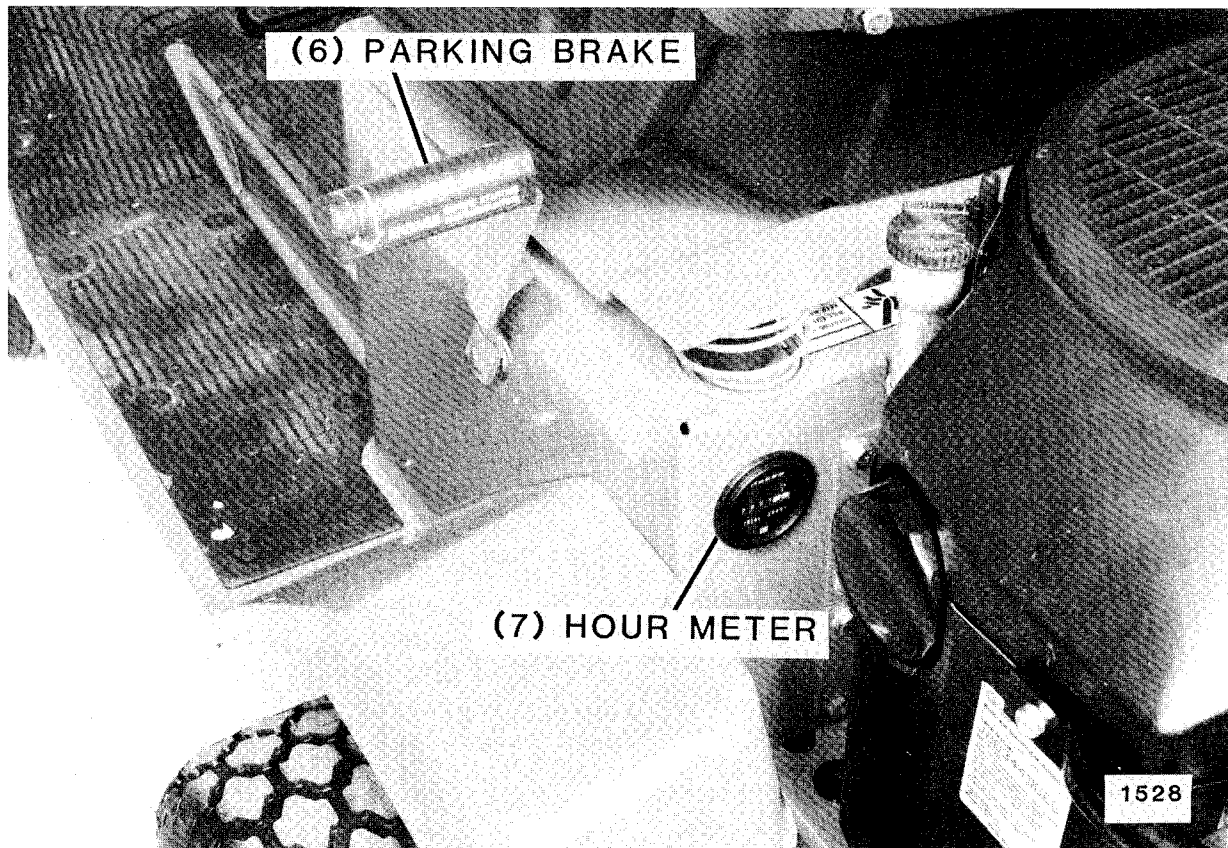
Hour meter is located on back of seat support in front of engine. Hour meter is a gauge indicating operating hours of tractor.

## 8. FUEL TANK VALVE

Fuel tank valve is located at bottom of tank. Fuel valve is normally left open except when service on fuel system becomes necessary.

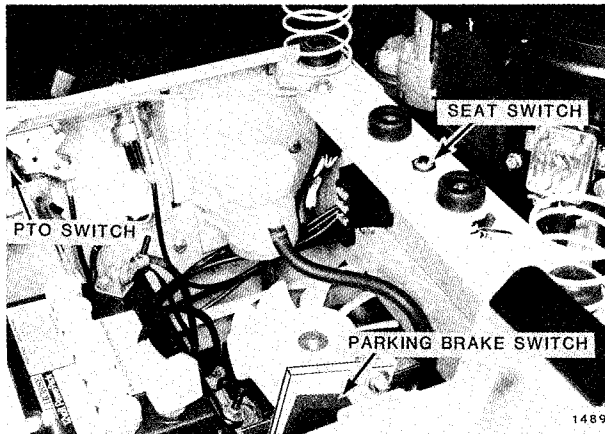


# MACHINE CONTROLS



# OPERATING YOUR MACHINE

## SAFETY INTERLOCK SYSTEM



**SAFETY INTERLOCK SWITCHES**

Each machine has two interlock switches for safe starting and a seat switch that shuts engine off when driver raises off seat. PTO switch must be "OFF" and parking brake engaged before engine will start. Seat switch will stop engine when seat is vacated with PTO switch in "ON" position.

If machine will not start, check that parking brake is engaged and PTO switch is in "OFF" position.

Safety interlock system must be tested periodically. To test operation, following functions must be observed. If not, immediate repairs must be performed by an Authorized Wheel Horse Dealer for your protection.

1. Engine should **NOT** start if:
  - a. Parking brake is disengaged.
  - b. PTO switch is "ON".

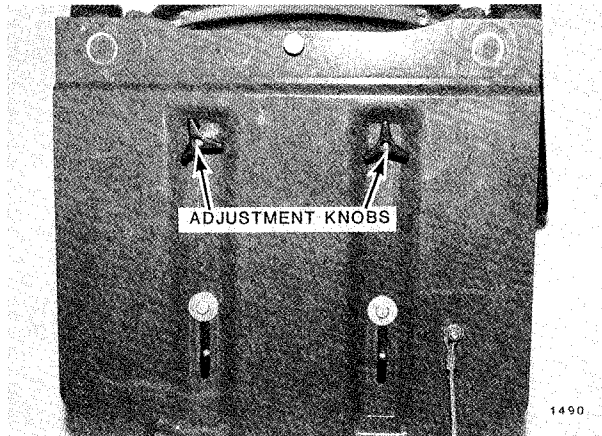
**Test each of the above one at a time.**

2. With engine running and PTO switch in "ON" position, test operate seat switch by rising off seat. Engine should shut off.

## SEAT ADJUSTMENT

Seat can be adjusted for optimum operator comfort.

1. Loosen two knobs.
2. Slide seat to desired position.
3. Tighten knobs.



**Seat Adjustment**

## CORRECT ENGINE OPERATION

### ⚠ CAUTION ⚠

Before starting engine, become familiar with all controls. Read this Operator's Manual thoroughly. Always check engine oil level before starting engine.

### ⚠ DANGER ⚠

Care should be taken to avoid inhaling exhaust gases as they contain carbon monoxide gas which is colorless and odorless. Carbon monoxide is a dangerous gas that can cause unconsciousness and is potentially lethal. Do not run engine in confined areas such as a closed garage.

## Starting Engine

Because of a built-in safety interlock system, your machine will not start unless parking brake is engaged and PTO switch is "OFF".

To start engine, engage parking brake. Move throttle control lever to low idle position. Pull choke control all the way out to Cold position. Turn ignition key to Start position to engage starter. When engine starts, release key. Switch is spring loaded and will return to Run position automatically.

**If engine fails to start after 10 seconds of continuous cranking, turn key to OFF position and allow starter motor to cool. Check for cause of hard starting; consult Troubleshooting Checklist.**

Once engine has started, raise throttle to half position and lower choke. If engine stalls at low speeds, or hesitates during acceleration, choke should be applied as necessary until engine reaches normal operating temperature.

### Stopping Engine

To stop engine; move throttle lever to Idle position and turn ignition key to "Off" position. If engine has been working hard or engine is hot, allow engine to idle a short time before turning key off. This practice will help cool engine before stopping.

**Note:** In case of emergency engine may be stopped by turning ignition key to "Off" position.

#### **CAUTION**

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

### Throttle Control

Throttle control regulates speed of engine as measured in RPM (Revolutions Per Minute). This control **Should not** be used to regulate ground speed.

Engine has been designed with a special governor that limits engine RPM. Unlike an automobile, this governor allows engine to operate most efficiently at a set speed and protects it from damage caused by excessive RPM. Always operate machine with throttle control set at full speed.

### Choke Control

Choke control activates a "butterfly" valve in

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

### Fuel Recommendations

#### **DANGER**

**Ignition of fuel can cause serious personal injury or death by fire or explosion. Do Not permit any flame, cigarette, or other igniter near fuel system. Handle fuel with care - It is highly flammable.**

Use clean, fresh, unleaded gasoline. Regular leaded gasoline may also be used, but is not a preferred fuel. Do not use highly leaded premium gasoline. Use of unleaded gasoline results in less maintenance.

#### **CAUTION**

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

If regular leaded gasoline is used continually, carbon and lead deposits should be removed from cylinder heads as required because of engine power loss. Unleaded gasoline may be used safely after lead deposits have been removed.

#### **DANGER**

**Spilled fuel can ignite and cause serious personal injury or death. Never fill fuel tank when engine is running. Fill fuel tank outdoors with extreme care. Never fill fuel tank indoors. Replace gasoline cap securely and wipe up all spilled fuel.**

### Oil Specification

To protect your machine's engine check engine oil level before each use. Complete information concerning recommended oils and how to check oil level is given in "Maintenance" section of this manual.

## CORRECT TRANSMISSION OPERATION

### To Go Forward Or Reverse

Machine is equipped with a separate transmission for each rear wheel. Transmissions are controlled with Motion Control Levers, one for each wheel.

#### **⚠ CAUTION ⚠**

**Always move motion control levers slowly when placing machine into motion. Sudden starts can be damaging to equipment and could cause loss of operator control.**

For safe operation, never move motion control levers too rapidly, especially on grades.

To place machine into motion, release parking brake; move motion control levers inward from their Park position to place them in front of you. To go forward push both levers forward evenly. To go in reverse pull back on both levers evenly.

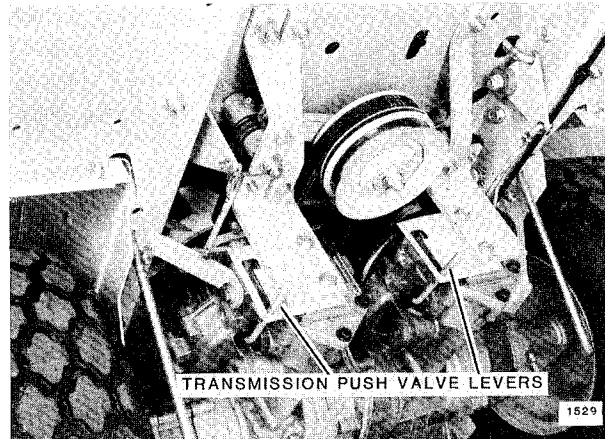
### To Change Speed Or Direction

To change direction of machine, slowly move levers to neutral and move levers in direction you want to go.

Farther levers are moved away from neutral positions, faster machine will travel. To turn machine left or right, pull one lever back far enough to cause it to rotate backwards at same speed the opposite wheel is turning forward. Practice turning in a low visibility hard surface area before trying to turn on lawn surface.

### To Stop

To stop machine, return both levers evenly to neutral position. Always engage parking brake, shut off engine and remove ignition key before leaving machine.



**Transmission Push Valve Levers**

## HAND PUSHING MACHINE AND MACHINE LUBRICATION

**Hand push machine only. Do not tow. Towing can cause severe damage to transmissions.**

Machine can be pushed at a slow speed. Transmission push valves are located under main frame in front of rear wheels. To release pressure in each transmission, lift levers up and to the right into lock positions. To resume operation of machine, release levers so that levers are in lowered position.

# CORRECT MACHINE USAGE

## ⚠ CAUTION ⚠

Read manuals provided with attachments before operating. These manuals give a detailed description of operation and point out other areas of caution. Familiarize yourself thoroughly with equipment before attempting to use it.

### OPERATION OF MACHINE:

#### WITH MOWER

## IMPORTANT

Keep all shields and mower discharge chute in place. Never attempt to clear discharge areas or mower blades without disengaging mower and removing ignition key.

## IMPORTANT

Each time mower is installed, check for proper operation of PTO clutch and brake.

For best operation on average lawns, operate engine at full throttle; control ground speed with transmission. Uneven cutting is often a result of excessive ground speed. To correct, reduce ground speed.

#### Mowing Speed

Mower is designed to operate most efficiently at maximum blade speeds. Speed of machine should allow mower blades to maintain this maximum speed while mowing across turf. Slow machine for cutting tall grass, grass which is heavy with moisture, or when moving uphill. If ground speed is too fast, or blade speed is too slow, mowing will be uneven because mower blades will not be able to lift grass into cutting position as mower passes over ground.

#### Mowing Height

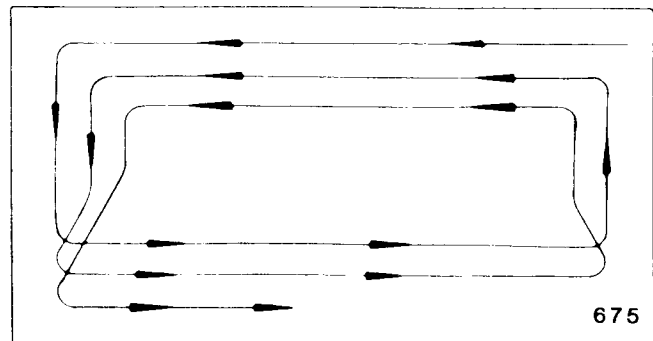
Best cutting height for your lawn has probably been established from previous experience. First time you mow, set mower to cut a little higher than

you have in the past. This will help you determine best approach to uneven areas, to be sure wider cut does not result in scalping high spots. In general, recommended cutting height is 2 to 3 in. (5-7.6 cm).

When cutting very tall or damp grass, set mower in its highest cutting position and enter area slowly. If necessary, take a cut on half width of mower, overlapping previously cut area on each pass. Then, with mower set to desired height, make a finish cut over entire area.

#### Mowing Pattern

Machine will cut an area quickly and efficiently if mowing pattern is planned to take full advantage of machine's capabilities. Use a pattern that will permit as much continuous forward motion and long straight runs as possible. Avoid necessity of repeated tight turns whenever you can by swinging wide over previously cut areas at ends of each pass. Progressive system illustrated below can be used on most lawns and eliminates tight turns and constant direction changes. Leave tight corners and close trimming until last.



#### Efficient Mowing Pattern

#### WITH DRAWBAR TYPE ATTACHMENTS

Many attachments simply use machine as a towing vehicle. They are attached or removed from machine by installation or removal of a single drawbar hitch pin.

Some of these attachments are powered by a separate gasoline engine, some are "ground driven" and some are simply towed, such as a lawn sweeper or dump cart.

In any case, all these attachments should be approached with same amount of caution given any mechanical device. Always read each "Operating Instruction Manual" carefully before attempting to use attachment. Keep children and pets away from machine when in operation. Never allow any unauthorized personnel to operate equipment.

#### **WITH A REAR VACUUM**

Optional rear mount vacuum can effect the way machine is operated. Because of added weight of vacuum, it may be necessary to operate machine at a slower ground speed.

#### **DUMP CART LOAD LIMITS**

**Wheel Horse recommends following load limits be observed when using machine with a dump cart. Load limits have been set to provide for safe braking on slopes.**

**275 lbs. (127 kg)**

# MAINTENANCE

## ⚠ CAUTION ⚠

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

## MAINTENANCE CHECKLIST

NOTE: These service intervals are considered MAXIMUM under normal conditions. Increase frequency under extremely dirty or dusty conditions.	Before Each Use	After Each Use	Every 25 Hours	Every 50 Hours	Every 100 Hours	Every 200 Hours/1 Year(2)	Every 1000 Hours
<b>SERVICE OPERATION</b>							
<b>CHECK:</b>							
Safety Interlock System	X						
Engine Oil Level	X						
Battery Water Level (3)				X			
Auto. Trans. Oil Level	X						
General Unit Condition	X	X					
Parking Brake Adj.					X		
Tire Pressure(3)			X				
Fasteners Placed & Tight			X				
PTO Electric Clutch & Brake Adjustment					X		
<b>CLEAN:</b>							
Air Filter/Precleaner			X				
Engine Chaff Screen	X						
Engine Exterior & Fins				X			
Breather Valve & Baffle							X
Cylinder Head Deposits							X
<b>REPLACE:</b>							
Engine Oil Filter					X		
Spark Plugs					X		
Air Filter						X	
In-Line Fuel Filter					X		
<b>LUBRICATE:</b>							
Chassis			X				
<b>CHANGE:</b>							
Engine Oil (1)				X			

Refer to Engine Owner's Manual for Applicable Information Concerning:

- Adjustments
- Special Cleaning Instructions
- Recommended Dealer Maintenance

- (1) Refer to text for initial service interval for new tractors.
- (2) Which ever occurs first.
- (3) Or monthly

## ENGINE

### Cooling

Check chaff screen on engine every time machine is used. Restricted air flow through engine can cause overheating and engine damage.

### Oil Quality

For maximum engine protection under all operating conditions use API Service Classification SF oil. This letter will appear on oil can.

### Oil Level

Form a habit of checking oil level regularly.

**Check oil level of engine every 8 hours or before each use. An improper oil level can cause extensive internal damage to engine.**

Oil filler dipstick and oil drain location for engine is illustrated in following illustrations.

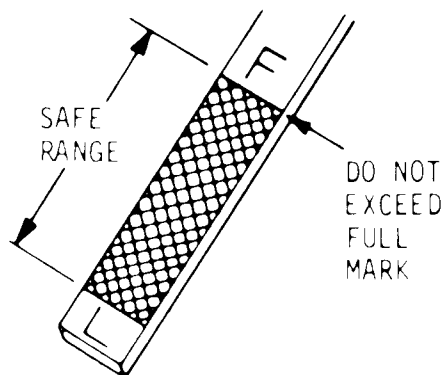
To check engine oil level, stop machine where engine is level. Shut off engine, set parking brake, and remove ignition key.

## ⚠ DANGER ⚠

**Crankcase pressure can blow out hot oil and cause serious burns. Do NOT check oil while engine is operating.**

Remove oil dipstick from engine.

## CHECK OIL



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### Correct Oil Level

Wipe dipstick with a clean lint free rag; insert it



into engine block as far as it will go. Remove dipstick again and read scale on lower portion of stick.

Add oil through oil dipstick tube.

**⚠ CAUTION ⚠**

**Do not overfill crankcase. Excess oil causes high oil consumption and oil accumulation in air cleaner housing.**

### Oil Changes

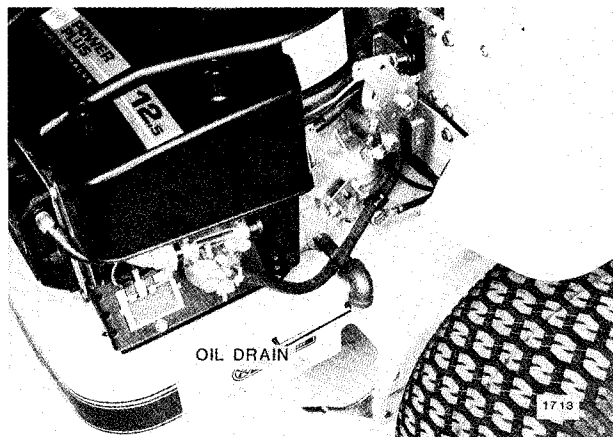
Engine oil in your machine should be changed after first 25 hours of operation. Thereafter, oil should be changed at 50 operating hour intervals. Oil filter should be changed every 100 hours. If operating conditions are extremely dusty or dirty frequency of oil changes should be increased.

Failure to change engine oil at recommended intervals can lead to serious damage to engine. This is especially true when using detergent oils which are designed to hold impurities in suspension; when saturation point is reached, oil may suddenly break down to form a gelatin-like substance which seriously impairs and can even stop flow of oil. Increase frequency of oil changes if machine is operated under extremely dusty conditions.

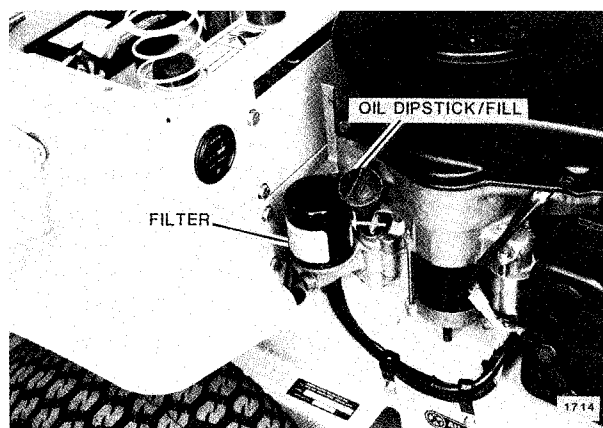
Before changing oil, start engine and allow it to warm up. This will allow oil to flow easier. Shut off engine and remove key.

#### To drain oil:

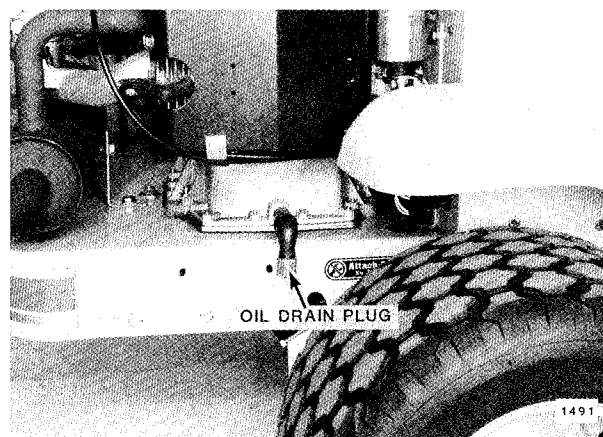
Remove drain plug. After oil has drained completely, reinstall drain plug.



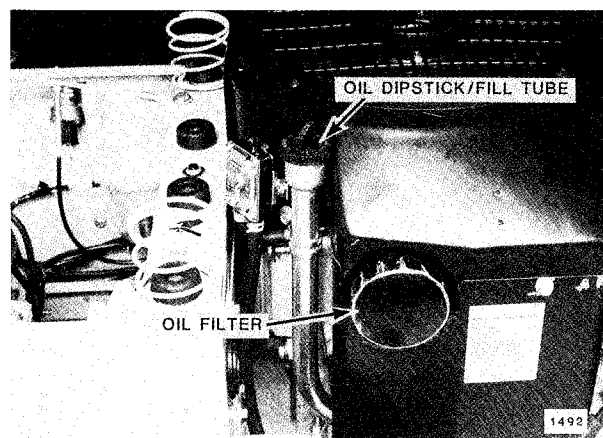
**612-Z Engine Oil Drain**



**612-Z Engine Oil Dipstick/Fill Tube and Filter**



**616-Z Engine Oil Drain**



**616-Z Engine Oil Dipstick/Fill Tube and Filter**

If oil filter is to be replaced, unscrew used filter and install new filter on engine.

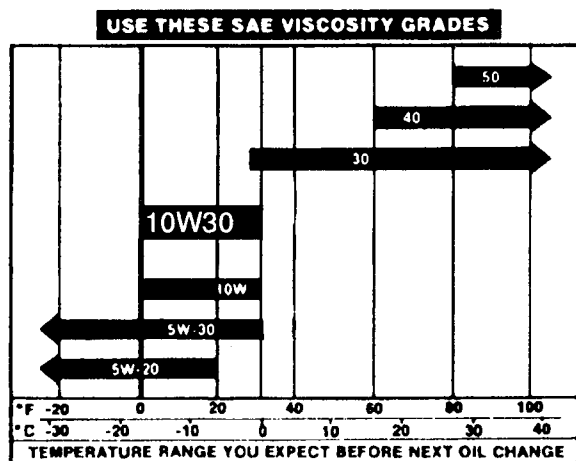
Remove dipstick/oil fill cap and add about 80%

of amount of oil specified in following chart. Also shown are charts for selecting correct oil type and oil viscosity. When using temperature - viscosity chart, select air temperature most likely to be encountered within next 50 hours of operation.

### ENGINE OIL CHANGE

Engine	Crankcase Oil Capacity
612-Z	1.5 qts. (1.4 l) w/o Filter 1.65 qts. (1.55 l) w/Filter
616-Z	1.75 qts. (1.6l) w/o Filter 2 qts. (1.9l) w/Filter

### ENGINE OIL TEMPERATURE - VISCOSITY CHART



### ENGINE OIL TYPE API Service SF or SF/CC

After adding 80% of prescribed amount of oil, check oil level. Add oil as necessary to bring oil to "Full" level.

**Never overfill engine crankcase with oil. Oil level must not exceed "F" level on dipstick.**

### Air Filter

Dirt induced through improperly installed, poorly serviced, or inadequate air filter elements, is more often cause of a worn out engine than long hours of operation. A small amount of dirt will destroy a set of piston rings in a matter of hours. A clogged element causes a richer fuel mixture which wastes gasoline, and may lead to formation of harmful

sludge deposits.

Clean engine air filter after every 25 hours of operation (more often if machine is operated under extremely dusty conditions).

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

Check following when installing a new or serviced element:

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

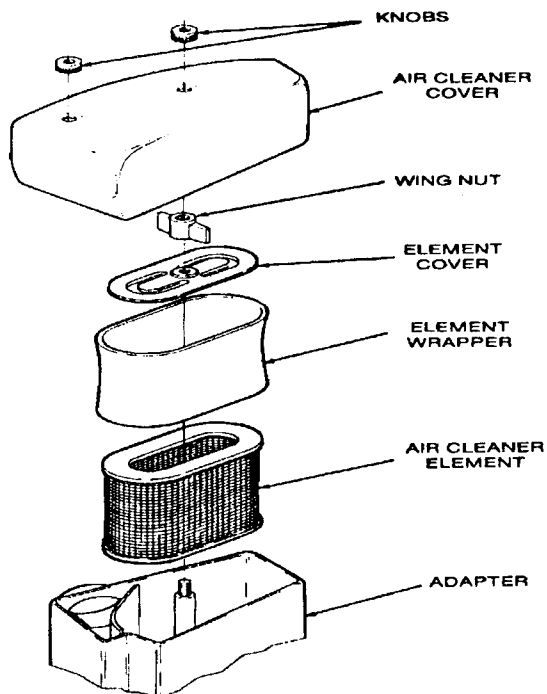
**To prevent any dirt or other contaminants from entering engine, always cover carburetor air horn when air cleaner is removed.**

Dry type air filter element is cleaned by tapping it lightly on a flat surface to remove loose dirt particles. Replace element if dirt does not drop off easily. **DO NOT** wash elements in liquid. **DO NOT** attempt to blow dirt off with compressed air as this can puncture filter element.

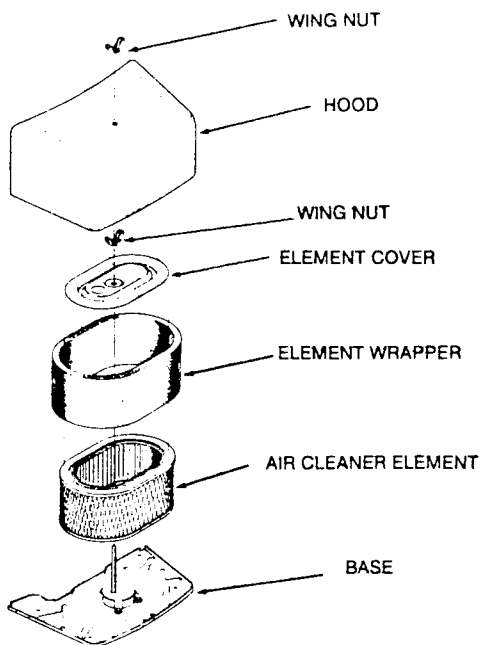
Foam precleaners are used over filter elements. Clean precleaner at 25 hrs. Wash precleaner in a solution of liquid detergent and water. Squeeze out excess water and allow it to dry. Coat precleaner evenly with SAE30 oil. Knead into and wring out excess oil from precleaner.



**Precleaner service - wash, squeeze dry, coat with oil & wring out**



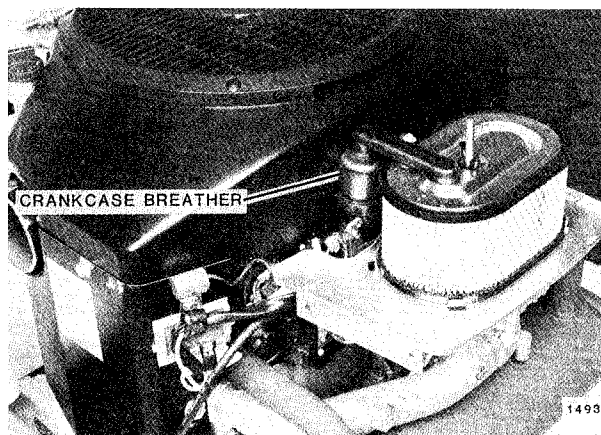
**612-Z Air Cleaner Assembly**



**616-Z Air Cleaner Assembly**

## **CRANKCASE BREATHER (616-Z)**

Engine uses a crankcase breather valve and "Pack" for maintaining crankcase vacuum. If crankcase becomes pressurized as evidenced by oil leaks at seals, clean pack and valve screens in a suitable solvent. Check and clean valve and baffle every 1000 hours of operation.



**616-Z Crankcase Breather**

## **Spark Plug**

Engine misfires, or generally poor operation, is often caused by spark plugs in poor condition or incorrect spark plug gap setting. Replace spark plugs at 100 operating hour intervals. Also replace spark plugs if inspection reveals fouling or excessive deterioration.

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

Check condition of plug(s). Good operating conditions are indicated by a light coating of gray or tan deposit. A dead white, blistered coating could indicate engine overheating. A black coating could indicate an "overrich" fuel mixture caused by a clogged air cleaner, or improper carburetor adjustment.

Replace spark plugs that are not in good condition. **Never sandblast, wire brush, scrape or otherwise service a spark plug in poor condition. Best results are obtained with a new plug.**

Always check spark plug gaps before installing

a new plug or reinstalling original plug. Use a spark plug gap gauge to adjust electrode air gap. Refer to Specifications section for settings.

## Carburetor Adjustment

Carburetors are adjusted at factory and should not have to be reset. If however, one of following conditions is noted, carburetor should be readjusted immediately as continued operation with incorrect setting can lead to fouled spark plugs, overheating, excessive valve wear or other problems. If black exhaust smoke is noted, check air cleaner first - and "overrich" mixture is usually caused by a poorly serviced, clogged air cleaner element, not an improperly adjusted carburetor.

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

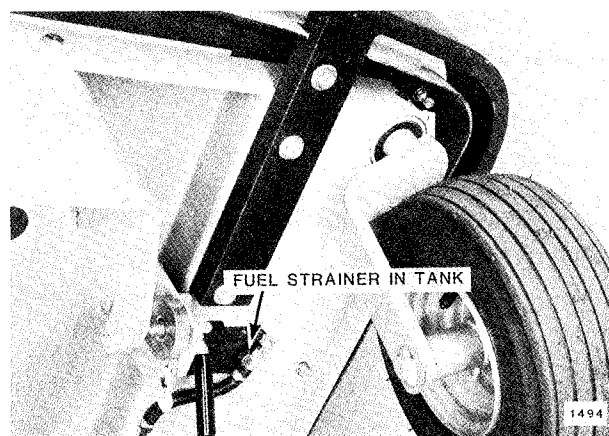
## Carburetor Adjustment Chart

Correct carburetor adjustment requires a significant amount of knowledge as well as special equipment. In addition, other adjustments, such as governor settings, may also be necessary after adjusting carburetor. For these reasons, it is suggested that carburetor adjustments be performed by an authorized Wheel Horse dealer.

## Fuel System

A fine-mesh screen type strainer, incorporated

into fitting at bottom of fuel tank filters foreign matter from gasoline before it reaches carburetor. This strainer requires service only if fuel supply becomes severely contaminated.

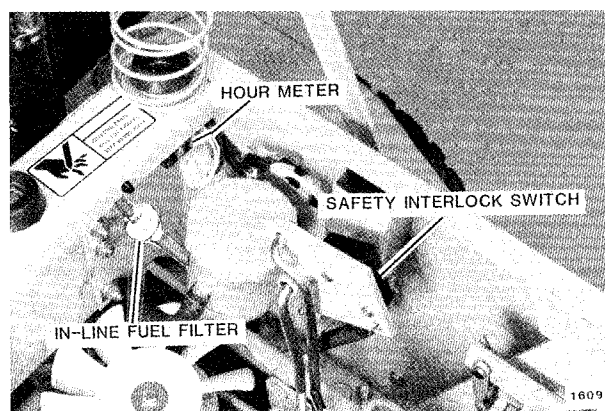


**Fuel Strainer**

On 616-Z only, an in-line fuel filter is located under seat. This filter strains foreign particles from gasoline before they reach the carburetor. This filter should be replaced after 100 hours of operation or once a year. Use only manufacturer's filter.

To replace filter:

1. Allow exhaust system to cool.
2. Close fuel shut-off valve.
3. Place a towel or rag on frame below filter to catch any spilled fuel.
4. Replace filter.
5. Open fuel shut-off and check for leaks.



**616-Z In-Line Fuel Filter**

Always clean area around fuel cap before removing it to prevent dirt from entering fuel system. Also insure that fuel storage container you are using is clean and in good condition.

Keep fuel tank full during winter operation, cold and damp weather conditions can cause moisture to condense in tank.

## Exhaust System

Make regular visible and audible inspections of exhaust system throughout life of machine. Locate leaks in muffler and piping while engine is operating. Repair all leaks immediately after they are detected for personnel safety.

### **⚠ DANGER ⚠**

Inhalation of exhaust gases can result in serious personal injury or death. Inspect exhaust system audibly and visually for leaks immediately.

## CHARGING AND ELECTRICAL SYSTEMS

### Alternator

An alternator is used to charge battery. Alternator charging system normally requires no service other than periodically checking that all exposed wiring and electrical connections on machine are clean, tight and in good condition.

### **⚠ CAUTION ⚠**

Proper polarity is critical with an alternator equipped charging system. Always disconnect battery ground cable (negative) before working on any part of electrical system. Verify all components are connected correctly before reconnecting ground cable (negative) or damage to alternator system components will result.

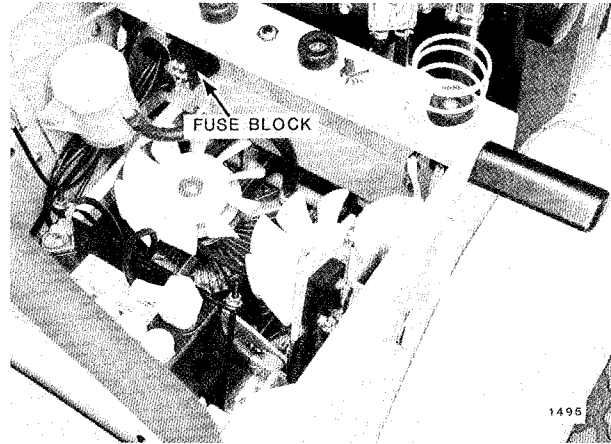
### **⚠ CAUTION ⚠**

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

## ELECTRICAL SYSTEM

### Fuses

Three fuses protect machine's electrical system and components from excessive current and short circuits.



### Fuse Locations

Fuses are contained in a fuse holder clipped to machine's frame under seat:

10 amp fuse protects clutch & hour meter.

20 amp fuse protects switch circuit.

30 amp fuse protects charging circuit.

A "blown" fuse is an indication of short circuits or current overloads. Refer to wiring diagram in back of this manual and become familiar with machine's electrical system before attempting to troubleshoot.

### Battery

### **⚠ CAUTION ⚠**

When servicing battery or any other part of electrical system, or if battery must be removed for any reason, always disconnect negative (ground) cable **FIRST** and reconnect it **LAST** to avoid possibility of electrical shorts.

Maintain electrolyte level above plates in each cell by adding distilled water as necessary. Best time to add water is just prior to operating machine so water will mix with solution. Do not overfill battery. Electrolyte solution is corrosive and overfilling can cause damage to surrounding metal parts. Battery should be maintained at 1.265 specific gravity charge. When battery has been out of machine for servicing, take care to connect cables to battery exactly as they were before removal.

For longest service life, battery should be kept

clean by wiping it off with a paper towel. Any corrosion around battery terminals should be removed by applying a solution of one part baking soda to four parts water. A light coating of grease may be applied to all exposed terminal surfaces to prevent corrosion.

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

## HYDROSTATIC TRANSMISSION

Each rear wheel is controlled by a separate transmission. Lubricant level in both reservoirs should be checked before each use. Check oil levels when oil is **COLD**. Transmission oil level should be at line on reservoirs.

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

Changing oil in transmissions is not recommended except for major service. If oil must be frequently added, a leak is indicated and should be corrected immediately.

For information purposes, oil capacity for each transmission is 1.5 qt. (1.4 l)

**Oil specifications are:**

**SAE 20 A.P.I. Service SC,SD,SE,SF**



**Transmission Oil Level**

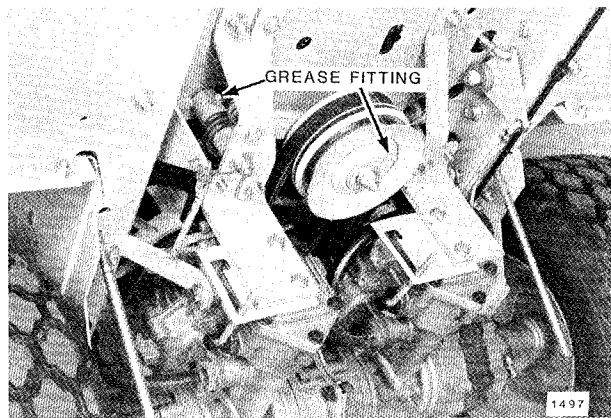
## Cooling Fans

A cooling fan is bolted to each transmission

input shaft. Fan forces air over transmission cooling fins to cool transmission oil. Replace cooling fan if it becomes cracked or broken., Be sure to install it so that maximum airflow is directed across transmission.

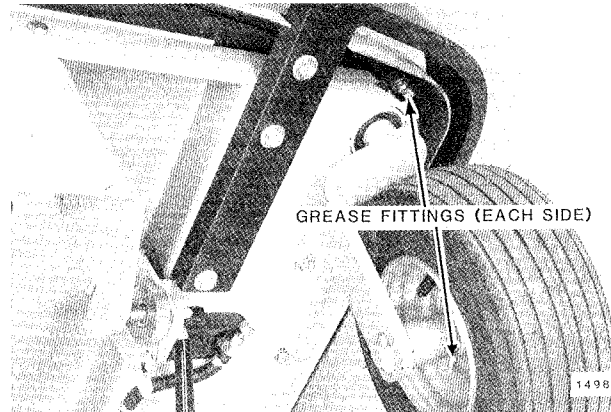
Cooling fins on transmissions should also be kept clean for best cooling efficiency. Periodically inspect for dirt buildup, and brush or wash out any accumulated dirt or clippings. If pressure washing equipment is used, avoid directing spray at joints and seal areas, to prevent forcing water into reservoir system.

## LUBRICATION



**Grease Fittings**

Lubricate all grease fittings after each 25 hours of operation with #2 multi-purpose lithium base grease using a pressure grease gun. Other pivoting arms and levers should be lubricated at same intervals with light machine oil applied directly to wear surfaces. Before applying grease gun, clean zerk fittings carefully to prevent dirt from being forced into fitting. After inserting grease, wipe off any excess grease.



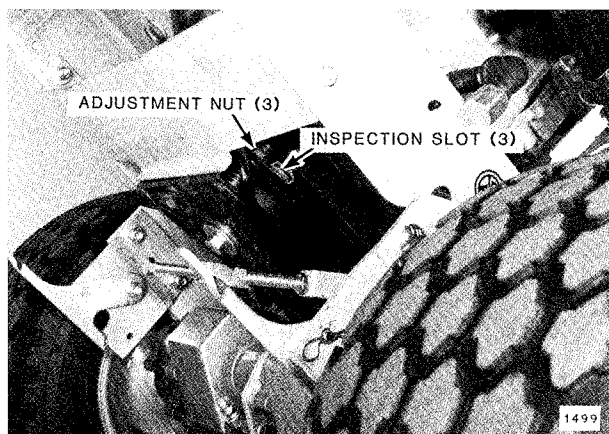
**Front Grease Fittings**

## PTO ELECTRIC CLUTCH/BRAKE

PTO electric clutch/brake may require periodic adjustment due to normal wear of friction surfaces. Check PTO electric clutch/brake adjustment every 100 hours.

### To adjust PTO Electric Clutch/Brake:

1. Stop engine, set parking brake and remove ignition key.
2. Clutch has three springs and adjustment nuts. All three must be adjusted equally.
3. Insert a .010" feeler gauge into the three air gap inspection slots, one at a time, and turn adjustment nuts until a small amount of resistance is felt on feeler gauge.



**PTO Electric Clutch/Brake Adjustment**

## PARKING BRAKE ADJUSTMENT

Each rear wheel has a separate parking brake. Adjust both sides at same interval.

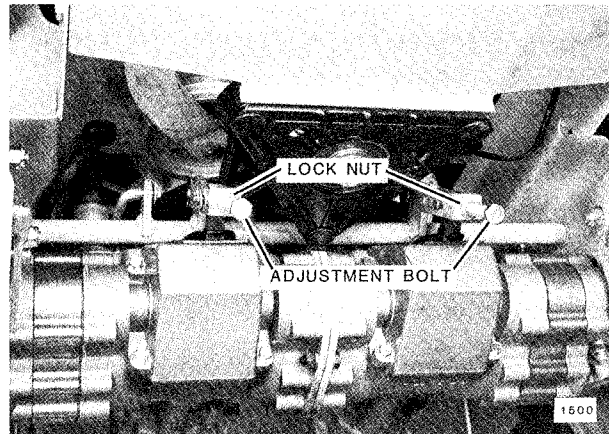
### To adjust parking brake:

1. Block both rear wheels with suitable blocks. Loosen lock nuts and adjustment bolts.
2. Engage parking brake.
3. Tighten adjustment bolts to 10-20 in. lbs. (approximately 1-1/2 turns after resistance is felt on bolts).
4. Hold adjustment bolts and tighten lock nuts.
5. Remove blocks. Both rear wheels should slide when machine is pushed.
6. With parking brake released, machine should move freely. Engage transmission push valves.

## CLEANING AND STORAGE

After 30 days, painted surfaces may be waxed

to protect lustre of original finish. Machine should



**Parking Brake Adjustment**

be washed regularly with a mild automotive type detergent and water. Exposed bare metal surfaces should be coated with oil for a light coating of grease to prevent rust until permanent repairs can be made. Aerosol cans of touch up paint are available through your Authorized Toro Wheel Horse Dealer.

When machine will not be used for an extended period of time, following steps will help insure minimum difficulty when unit is returned to service:

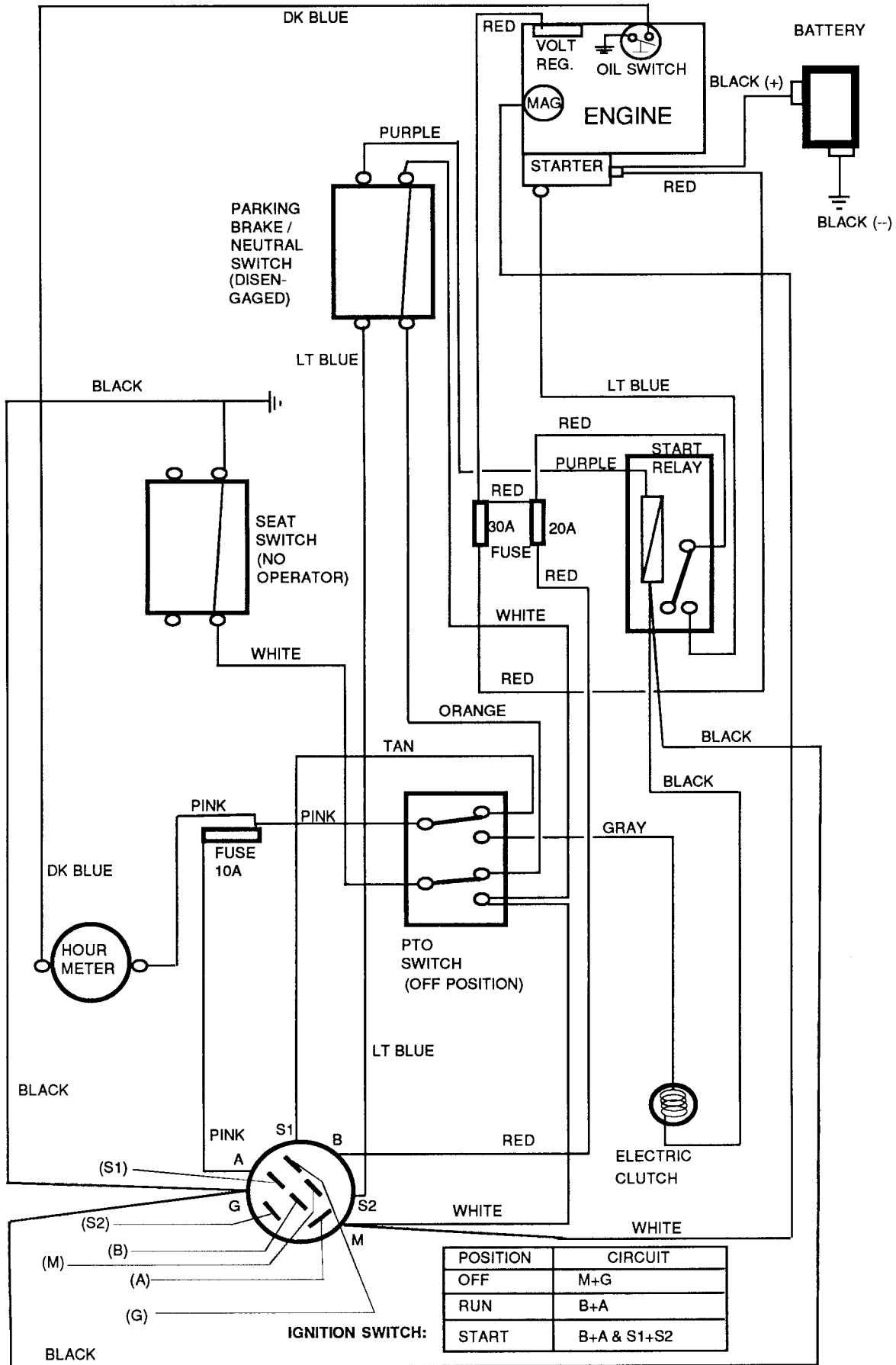
1. Perform required maintenance steps called for in "Maintenance Checklist".
2. Check tires for proper inflation.
3. Wash machine and repaint all bare metal surfaces.
4. Start machine and engage mower for approximately 1 minute to remove excess water from belts and pulleys. Let engine run out of gas. As gasoline grows old, it becomes less volatile and forms harmful gum and varnish deposits in carburetor and fuel system. **DO NOT STORE GASOLINE FOR MORE THAN 2 MONTHS.**
5. If applicable, charge battery. In temperatures lower than 40°F (4°C) a battery will maintain a charge for about 60 days. In temperatures above 40°F (40°C) water level should be checked and battery "trickle charged" every 30 days (more often in higher temperatures). Battery must be fully charged to prevent freezing and internal damage in weather below 32°F (0°C).
6. Remove key from machine.



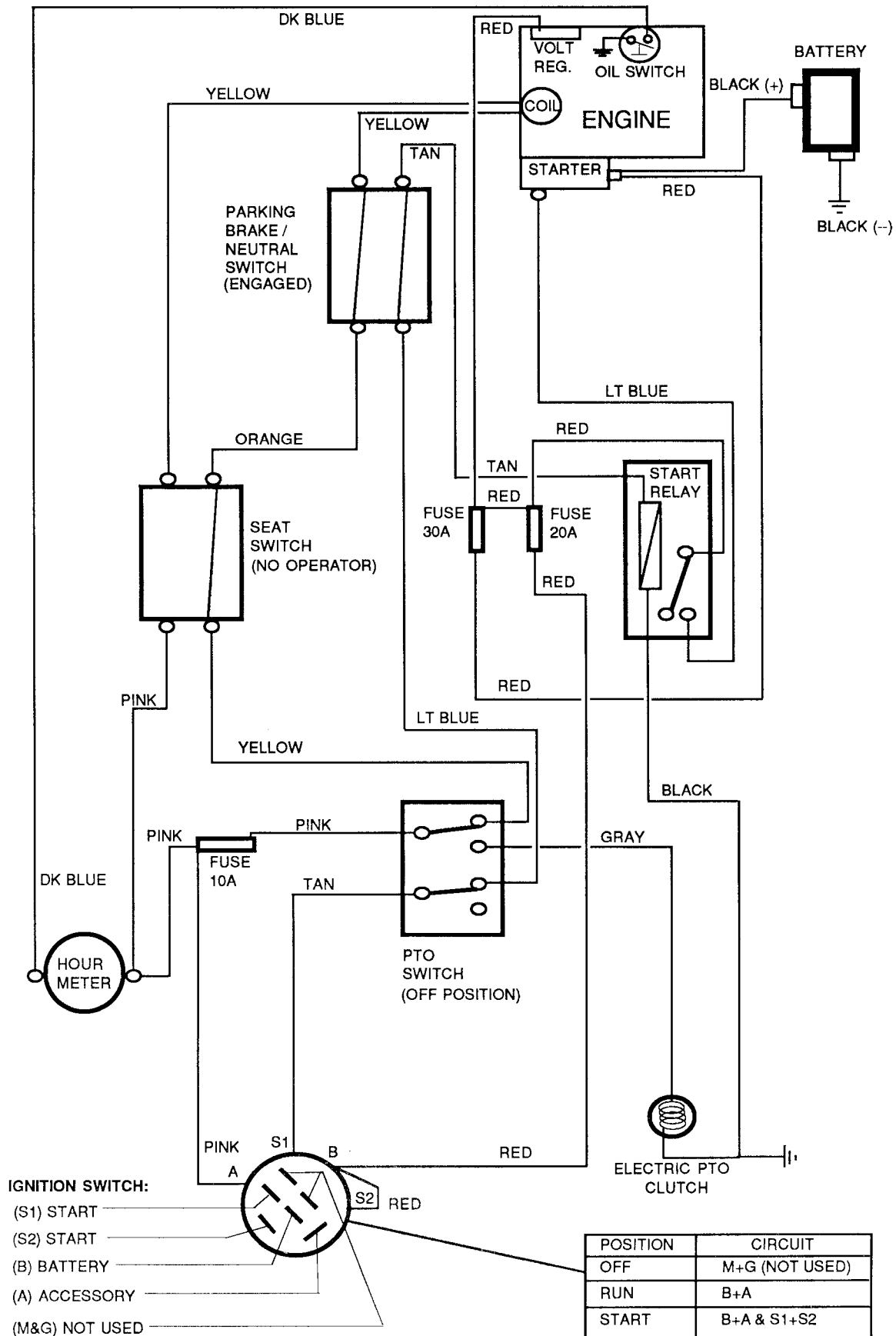
# TROUBLESHOOTING CHECKLIST

SYMPTOM	POSSIBLE CAUSE	POSSIBLE REMEDY
Engine will not turn over/Engine turns over but will not start.	Dead battery. .... Safety interlock switch. ....  Fuse. .... Starter or Solenoid. .... Ignition switch. .... Spark plug not firing. ....  Ignition system. .... No fuel in tank. .... Improper carburetor adjustment. ....	Charge or replace battery. Be sure mower is disengaged and parking brake is engaged. Replace fuse. Consult authorized dealer. Consult authorized dealer. Check spark plug condition and reset gap. Consult authorized dealer. Fill fuel tank. Reset carburetor adjustment.
Engine hard to start.	Spark plug wire grounded or loose. .. Ignition system. .... Spark plug faulty or improperly gapped.  Fuel line clogged. .... Carburetor dirty or improperly adjusted.	Check spark plug wires. Consult authorized dealer. Check spark plug condition and reset gap. Clean fuel line. Readjust carburetor. Consult authorized dealer for carburetor service.
Engine starts, but operates erratically.	Clogged fuel line. .... Water in fuel .....  Vent in fuel cap closed or plugged. .. Improper carburetor adjustment. ....	Clean fuel line. Drain old fuel and replace with fresh fuel. Check cap vent. Readjust carburetor.
Engine knocks.	Fuel octane too low. ....  Ignition system. .... Engine overheated. ....	Drain fuel and replace with higher octane fuel. Consult authorized dealer. Shut off engine and allow to cool. Clean engine air intake screen and fins.
Engine occasionally "skips" at high speed.	Spark plug fouled, faulty or gap too wide. .... Ignition system. .... Incorrect carburetor adjustment. ....	Check spark plug condition and gap. Consult authorized dealer. Readjust carburetor.
Engine overheating.	Air intake screen or fins clogged. .... Oil level too high or too low. .... Fuel mixture too lean. .... Ignition system. .... Engine overloaded. ....	Clean air intake screen and fins. Adjust oil level as necessary. Readjust carburetor Consult authorized dealer. Reduce load.
Engine idles poorly.	Improper carburetor adjustment. .... Improper spark plug gap. ....	Readjust carburetor Check condition and gap of spark plug.
Engine backfires.	Improper carburetor adjustment. .... Ignition system. ....	Readjust carburetor. Consult authorized dealer.
Engine runs fine, but machine will not move.	Faulty transmission. .... Transmission push valve engaged. ..	Consult authorized dealer. Release push valve.

# WIRING DIAGRAM 612-Z



# WIRING DIAGRAM 616-Z





A separate parts manual for your Toro Wheel Horse product can be obtained by completing the attached form below. You will receive an invoice with manual.

**PUBLICATIONS  
TORO WHEEL HORSE  
P.O. Box 2649  
South Bend, Indiana 46680**

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**PARTS MANUAL ORDER FORM**

Enter number shown on your attachment:

<b>TORO Wheel Horse</b>	
<b>P.O. BOX 2649 SOUTH BEND, INDIANA 46680</b>	
<b>I.D. NUMBER</b>	<input type="text"/>
<b>MADE IN U.S.A.</b>	<input type="text"/>

MAIL LABEL -- PLEASE PRINT CLEARLY

**TO:**

**Name** \_\_\_\_\_

**Address** \_\_\_\_\_

\_\_\_\_\_  
**City** **State** **Zip**

Your TORO Wheel Horse  
does more at home when it's equipped  
with TORO Wheel Horse attachments.

Product information and specifications are shown herein as of the time of printing. Wheel Horse Products, Inc. reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligation.

Right at home.



**Wheel Horse**  
Tractors & Riding Mowers