

# OPERATOR'S MANUAL



## **200 Series**

Lawn Tractors

3 Speed, 5 Speed, & 6 Speed

## **300 Series**

Lawn & Garden Tractors

8 Speed & Automatic

## **400 Series**

Garden Tractors

8 Speed & Automatic

- Specifications
- Operating Instructions
- Maintenance Information



# **Wheel Horse**

PART NO. 810399R1

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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.

# TRACTOR SPECIFICATIONS:

## ENGINE:

TRACTOR MODEL	ENGINE MODEL*	RATED H. P.**	DISPLACEMENT cu. in./cc	BORE in./mm	STROKE in./mm	IGNITION
208-3	B-191707	8	19.44/318.56	3/76.2	2.75/69.9	Electronic
211-3	B-252707	11	24.36/400	3.44/87.3	2.62/66.7	Electronic
211-5, 211-6	B-253707	11	24.36/400	3.44/87.3	2.62/66.7	Electronic
308	K181S	8	18.64/305	2.94/74.7	2.75/69.8	Electronic
310	K241S	10	23.9/391.6	3.25/82.6	2.88/72.9	Battery
312	K301S	12	29.07/476.4	3.38/85.7	3.25/82.6	Battery
414	K321S	14	31.27/512.4	3.5/88.9	3.25/82.6	Battery
416	K341S	16	35.89/588.1	3.75/95.3	3.25/82.6	Battery
417	KT17QS	17	42.18/691.4	3.125/79.4	2.75/69.8	Battery

\*Letter Prefix: B = Briggs & Stratton, K = Kohler. Basic engine model number shown; specification and serial numbers from engine I. D. plate are required to completely identify engine.

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

## TRANSMISSION:

### 200-Series 3, 5 & 6 Speed Models

Type: Mechanical  
All Gear

Approximate Ground Speeds (at full throttle):

3-Speed		5-Speed (Peerless 801-028)	
1st	1.2 mph (1.9 kmh)	1st	1.0 mph (1.6 kmh)
2nd	2.8 mph (4.5 kmh)	2nd	1.9 mph (3.0 kmh)
3rd	4.2 mph (6.8 kmh)	3rd	2.9 mph (4.6 kmh)
Rev.	2.0 mph (3.2 kmh)	4th	3.7 mph (5.9 kmh)
		5th	4.3 mph (6.9 kmh)
		Rev.	2.0 mph (3.2 kmh)

### 6-Speed (Peerless 801-037)

1st	0.7 mph (1.1 kmh)
2nd	1.1 mph (1.8 kmh)
3rd	2.2 mph (3.5 kmh)
4th	3.3 mph (5.3 kmh)
5th	4.2 mph (6.7 kmh)
6th	4.9 mph (7.8 kmh)
Rev	2.3 mph (3.7 kmh)

### 300-Series 8-Speed Models

Type: Mechanical  
All Gear

Approximate Ground Speeds (at full throttle):

Gear	Low Range	High Range
1st	.5 mph (.8 kmh)	2 mph (3.2 kmh)
2nd	.8 mph (1.3 kmh)	3.1 mph (5.0 kmh)
3rd	1.3 mph (2.1 kmh)	5.3 mph (8.5 kmh)
Rev.	.6 mph (1.0 kmh)	2.5 mph (4.0 kmh)

### 400-Series 8-Speed

Type: Mechanical  
All Gear

Approximate Ground Speeds (at full throttle):

Gear	Low Range	High Range
1st	.5 mph (.8 kmh)	2 mph (3.2 kmh)
2nd	.8 mph (1.3 kmh)	3.2 mph (5.2 kmh)
3rd	1.4 mph (2.2 kmh)	5.5 mph (8.8 kmh)
Rev.	.7 mph (1.1 kmh)	2.6 mph (4.2 kmh)

### Automatic

Type: Hydrostatic

Approximate Ground Speeds (at full throttle):

300-Series	400-Series
Variable 0-5.6 mph (9.0 kmh) Forward	Variable 0-7 mph (11.5 kmh) Forward
Variable 0-3.4 mph (5.4 kmh) Reverse	Variable 0-4.5 mph (7.2 kmh) Reverse

## ELECTRICAL SYSTEM:

Type:	12 Volt D.C., Negative Ground
Battery:	200-Series; 308, 310, 312, 414 Models — 12 Volt, 24 Amp. Hr. 416 & 417 Models — 12 Volt, 32 Amp. Hr.
Alternator:	308 Model — 1.25 Amp — Unregulated (dual circuit) 200, 310, 312, 414 Model — 3 Amp — Unregulated (dual circuit) 416, 417 — 15 Amp — regulated circuit

## TIRES:

Sizes:	Front	Rear
208-3	13 x 5.00-6	18 x 6.50-8
211-3	13 x 5.00-6	18 x 8.50-8
211-5	13 x 6.50-6	18 x 9.50-8
211-6	13 x 6.50-6	20 x 10.00-10
308, 310	15 x 6.00-6	22 x 7.50-12
312	15 x 6.00-6	22 x 9.00-12
414	16 x 6.50-8	23 x 8.50-12
416, 417	16 x 6.50-8	23 x 9.50-12
Pressure:		
PSI	12	12
kg/cm <sup>2</sup>	.85	.85

# TRACTOR SPECIFICATIONS (continued):

## PHYSICAL DATA:

TRACTOR MODEL	HEIGHT in./cm	LENGTH in./cm	WIDTH in./cm	WHEEL BASE in./cm	INSIDE TURNING RADIUS in./cm	NET WEIGHT (APPROXIMATE) lbs./kg
208-3	36.5/93	64.5/164	33/84	45.5/116	32/81	318/145
211-3	38.2/97	64.5/164	35.1/89	45.5/116	32/81	343/156
211-5	39/99	64.2/163	35.7/91	45.5/116	32/81	355/162
211-6	39/99	64.5/164	35.8/91	45.5/116	32/81	406/185
308-8	40.1/102	64.8/165	34.1/87	45.5/116	36/91	466/212
310-8	40.1/102	64.8/165	34.1/87	45.5/116	36/91	529/241
312-8	40.4/102	64.8/165	36/91	45.5/116	36/91	547/249
312-A	41.2/105	64.8/165	36/91	45.5/116	36/91	584/266
414-8	40.5/103	65/165	36.4/92	45.5/116	36/91	553/252
416-8	41.6/106	65/165	37.1/94	45.5/116	36/91	553/252
417-8	41.6/106	65/165	37.1/94	45.5/116	36/91	585/266
417-A	41.6/106	65/165	38/96.5	45.5/116	36/91	634/289

## TUNE-UP/GENERAL MAINTENANCE SPECIFICATIONS:

### ENGINE:

TRACTOR MODEL	POINT GAP in./mm	TIMING MARK LOCATION	IGNITION TIMING (BTDC)	SPARK PLUG TYPE*	SPARK PLUG GAP in./mm	DIRECTION OF ROTATION (Facing PTO)	IDLE RPM (No Load)	GOVERNED MAX. RPM (No Load)
208	N/A	N/A	Fixed	J-8	.030/.76	Counterclockwise	1750	3400
211	N/A	N/A	Fixed	CJ-8	.030/.76	Counterclockwise	1750	3400
308-8	N/A	N/A	Fixed	RCJ-8	.025/.64	Counterclockwise	1000	3500
310, 312, 414, 416	.020/.5	N/A	Fixed	RH-10	.035/.9	Counterclockwise	1000	3400
417	.020/.5	N/A	Fixed	RBL-15Y	.025/.64	Counterclockwise	1200	3400

\*Or equivalent (Champion number shown).

### LIQUID CAPACITIES:

<b>Crankcase:</b>	208 — 1½ qt. (1.0 l) 211 — 1½ qt. (1.4 l) 308 — 1¼ qt. (1.2 l) 310, 312, 414, 416 — 2 qt. (1.9 l) 417 — 1½ qt. (1.4 l)
<b>Transmission:</b>	200-Series 3, 5 & 6 Speed — N/A 300-Series Automatic Hydrostatic Unit — ¾ qt. (.7 l) Transaxle — 3 qt. (2.8 l) 300, 400-Series 8-Speed — 2 qt. (1.9 l) 400-Series Automatic — 5 qt. (.47 l)
<b>Fuel Tank:</b>	200-Series — 1½ gal. (5.7 l) 308 Model — 1¼ gal. (4.8 l) 310, 312 Models, 400-Series — 3 gal. (11.4 l)

### CHASSIS:

<b>Zerk Fittings</b>	All Models — 6
<b>PTO Brake Adjustment (PTO engaged):</b>	200-Series — .010 (.25 mm) Gap between brake pad and pulley 300, 400-Series — .012 (.3 mm) Gap between brake pad and pulley
<b>Front Wheel End Play:</b>	0-.015 in. (.4 mm) All Models

# GENERAL SAFETY SUGGESTIONS

Recommended by Outdoor Power Equipment Institute

## SAFE OPERATION PRACTICES — RIDING VEHICLES

1. Know the controls and how to stop quickly — **READ THIS OWNER'S MANUAL** and instructions furnished with attachments.
2. Do not allow children to operate machine. Do not allow adults to operate it without proper instruction.
3. Do not carry passengers. **Do not mow when children and others are around.**
4. Clear work area of objects (wire, rocks, etc.) which might be picked up and thrown.
5. Disengage all attachment clutches and shift into neutral before attempting to start engine (motor).
6. Disengage power to attachments and stop engine (motor) before leaving operator position.
7. Disengage power to attachment(s) and stop engine (motor) before making any repairs or adjustments.
8. Disengage power to attachments when transporting or not in use.
9. 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.
10. Do not stop or start suddenly when going uphill or downhill. Mow up and down the face of steep slopes; never across the face. If a steep hill must be ascended, **back** up the hill; drive forward when descending.
11. Reduce speed and exercise extreme caution on slopes and in sharp turns to prevent tipping or loss of control. Be especially cautious when changing directions on slopes.
12. Stay alert for holes, rocks and roots in the terrain which may cause the vehicle to upset. Keep away from drop-offs.
13. 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 owner's manual.
14. Watch out for traffic when crossing or near roadways.
15. When using any attachments never direct discharge of material toward bystanders nor allow anyone near vehicle while in operation.
16. Handle gasoline with care — it is highly flammable.
  - A. Use approved gasoline container. Place container out of the reach of children.
  - B. Use gasoline only as a fuel — never as a cleaner. Never remove 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. Never fill fuel tank indoors. Wipe up spilled gasoline. And positively **NO SMOKING.**
  - C. Open doors if engine is run in garage — exhaust fumes are dangerous. Do not run engine (motor) indoors.
17. Keep vehicle and attachments in good operating condition and keep safety devices in place and working.
18. Keep all nuts, bolts, and screws tight to be sure equipment is in safe working condition.
19. Never store equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark.
20. Allow engine to cool before storing in any enclosure.
21. To reduce fire hazard keep engine free of grass, leaves or excessive grease.
22. Vehicle and attachments should be stopped and inspected for damage after striking a foreign object and the damage should be repaired before restarting and operating the equipment.
23. Do not change engine governor settings or over-speed engine.
24. When using vehicle with mower:
  - (1) Mow only in daylight or in good artificial light.
  - (2) Never make a cutting height adjustment while engine (motor) is running if operator must dismount to do so.
  - (3) Shut engine (motor) off when unclogging chute.
  - (4) Check blade mounting bolts for proper tightness at frequent intervals.
25. Under normal usage, grass catcher bag material is subject to deterioration and wear. It should be checked frequently for bag replacement. Replacement bags should be checked to ensure compliance with original manufacturers recommendations or specifications.
26. Disengage power to mower before backing up. Do not mow in reverse unless absolutely necessary and then only after careful observation of the entire area behind the mower.



## VEHICLE IDENTIFICATION NUMBER (VIN) LOCATIONS

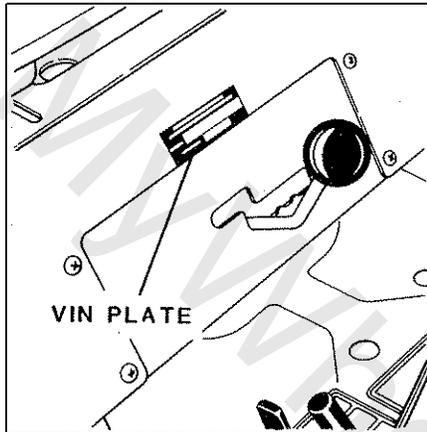
Vehicle identification numbers are used to identify your new tractor and major attachments. These numbers should always be referred to when consulting dealer or factory concerning service, parts, or other information you may require. If these plates are removed during repair operations, they should always be replaced.

Tractor vehicle identification number plate is located just below seat on rear fender.

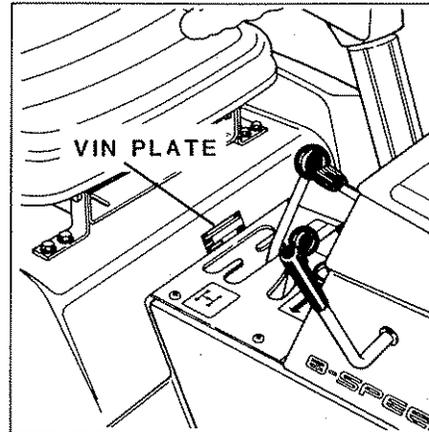
Engine identification numbers are located on engine shrouding and indicate model, specification or type number and serial number of tractor's engine.

Major attachments also have a vehicle identification number plate attached to them.

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



200-Series VIN Location



300, 400-Series VIN Location

### Tractor Identification Number



### Engine Identification Number

Model \_\_\_\_\_

Type or Spec No. \_\_\_\_\_

Serial No. \_\_\_\_\_

## OWNER REGISTRATION AND WARRANTY

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

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

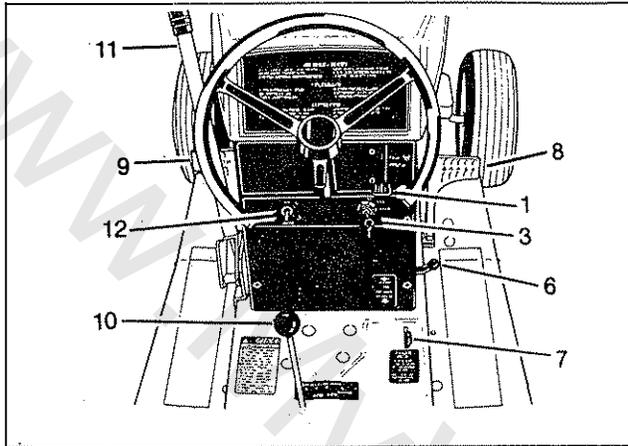
## PARTS MANUAL

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

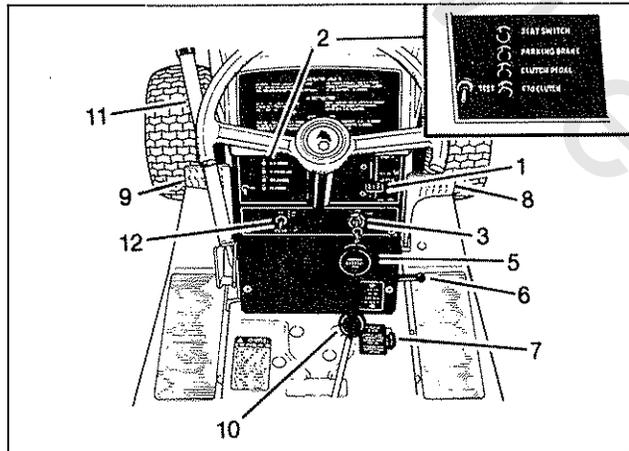
**BE SURE TO INCLUDE THE VEHICLE IDENTIFICATION NUMBER OF THE EQUIPMENT.**

# INSTRUMENTS AND CONTROLS

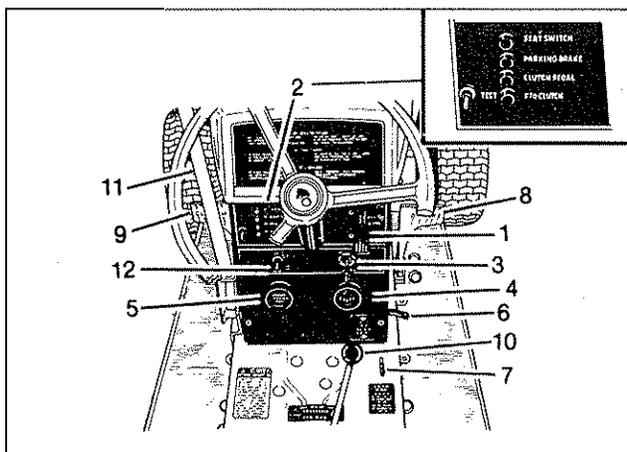
## 200-SERIES TRACTORS



3-SPEED MODELS



5-SPEED MODELS



6-SPEED MODELS

### 1. COMBINED THROTTLE/CHOKE CONTROL

Combined throttle/choke control is located on upper right side of dash panel. To start engine raise lever all the way up past detent to Choke position. To operate tractor raise lever to detent position near top of slot. Lower lever before shutting engine off. If engine is warm or has been running, raising lever to Choke position may not be necessary to restart it.

### 2. INDICATOR LIGHTS (211-5, 211-6 Models)

Indicator lights are located on upper left side of dash panel. Test switch is used to check light bulbs and electrical circuits. Actuate test switch to turn lights "On" or "Flashing"; if one or more lights are out, check wiring and replace bulb if necessary as outlined in "Maintenance" section of this manual. If PTO Clutch or Clutch Pedal light is on when attempting to start engine, check that control is in proper position for starting. All lights must be OFF during operation; if light(s) is on, a malfunction is indicated in that operation(s) and must be corrected.

### 3. IGNITION SWITCH

Ignition switch is located on lower right side of dash panel near steering column. Ignition switch has three positions from left to right: (1) Off, (2) Run, (3) Start. To start engine turn key all the way right to Start position. Release key when engine starts and it will automatically return to Run position. When switch is turned to Off position, engine stops and all electrical accessories are turned off.

### 4. VOLTMETER (211-6 Model)

Voltmeter is located on dash panel to left side of steering column. Voltmeter is a gage indicating electrical system battery voltage.

With ignition key in Off position, gage is not actuated. When ignition key is turned to On position, gage should read 12 Volts or slightly above. When starter is engaged, gage reading should not drop below 8 Volts.

After engine is started and running, gage should read between 12 and 16 Volts. If gage reads less than 12 Volts battery is discharging. If gage reads 16 Volts or higher for long periods of time, check battery water more frequently.

## **5. HOUR METER (211-5, 211-6 Models)**

Hour meter is located on dash panel below steering column. Hour meter is a gage indicating operating hours of tractor.

## **6. PTO (POWER TAKE-OFF) CLUTCH LEVER**

PTO clutch lever is located on right side of tractor. Power driven attachments are engaged and disengaged with PTO lever. Push lever forward to engage attachment. Pull lever back to disengage attachment. PTO clutch lever actuates a safety interlock switch in starter circuit; therefore indicator light comes on, if so equipped, and tractor will not start unless lever is in disengaged position. If operator's seat is vacated while PTO is engaged, seat switch indicator light comes on (if so equipped) and seat switch will automatically shut engine off.

## **7. PARKING BRAKE LOCK LEVER**

Parking brake lock lever is located in front of seat on right side of frame. To engage parking brake, first apply foot brake pedal solidly and then move parking brake lock lever forward to lock brake. To release parking brake push down on brake pedal. Parking brake lock lever is spring loaded and will return to disengaged position when foot brake is applied. Indicator light is on, if so equipped, when parking brake is locked with engine running.

## **8. BRAKE PEDAL**

Brake pedal is located on right side of tractor. Pushing down on pedal applies brake. Note: When coming to a stop always depress clutch pedal as well as brake pedal so that transmission will be disconnected from engine.

## **9. CLUTCH PEDAL**

Clutch pedal is located on left side of tractor. Pushing down on clutch pedal does two things: (1) De-clutches transmission drive belt from engine; (2) Actuates a safety interlock switch so starter will operate. Engaging clutch is done by releasing pedal which tightens transmission drive belt. Always release pedal slowly when engaging clutch. Always depress pedal when shifting transmission into or out of gear and when starting engine. Indicator light comes on, if so equipped, with pedal released and ignition key in start position.

## **10. GEAR SHIFT LEVER**

Gear shift lever is located in front of seat. Select any forward or reverse speed by moving lever to position as indicated on shift pattern decal.

## **11. LIFT LEVER**

Manual attachment lift lever is located to left side of steering wheel. Depress release button and move lever forward or backward to lower or raise attachments used with tractor. Always lower attachments before leaving tractor unattended.

## **12. LIGHT SWITCH**

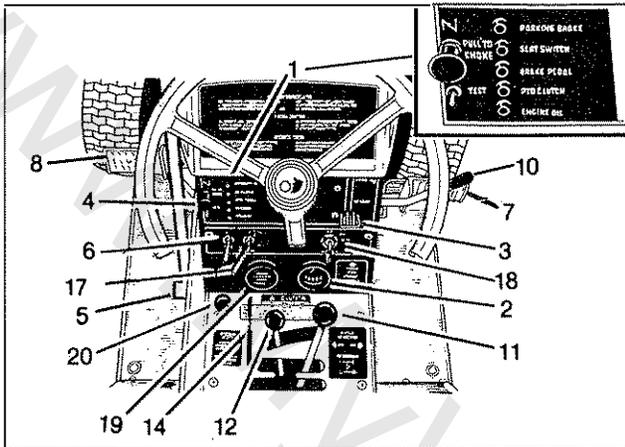
Light switch is located on lower left side of dash panel. Raise toggle to turn lights on. Lower toggle to turn lights off. Lights will work only while engine is running.

## **13. FUEL SHUT-OFF VALVE (Not Shown)**

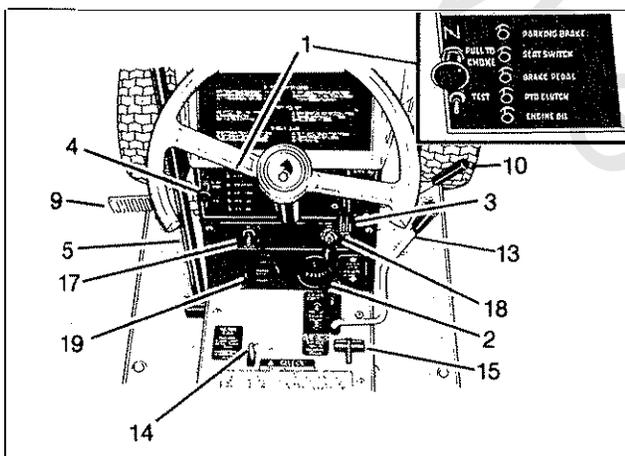
Fuel shut-off valve is located on bottom of fuel tank. Fuel shut-off valve is normally left open, except when service on fuel system becomes necessary.

# INSTRUMENTS AND CONTROLS

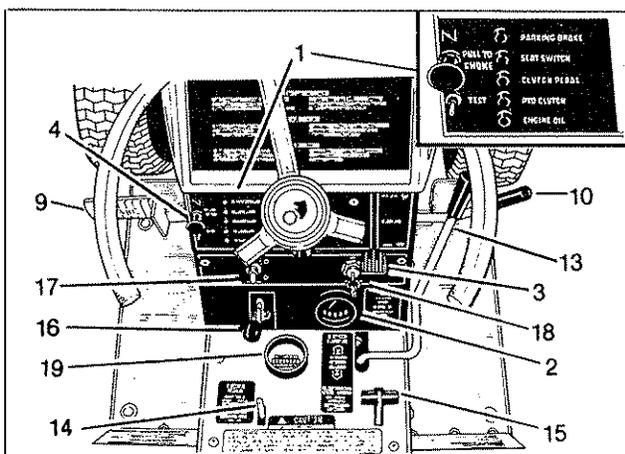
## 300, 400-SERIES TRACTORS



300, 400-SERIES 8-SPEED MODELS



300-SERIES AUTOMATIC MODELS



400-SERIES AUTOMATIC MODELS

### 1. INTERLOCK INDICATOR LIGHTS (312, 414, 416, 417) ENGINE OIL LIGHT (310, 312, 414, 416, 417)

Indicator light test switch is used to check light bulbs and electrical circuits. Actuate test switch to turn lights "On" or "Flashing"; if one or more lights are out check wiring and replace bulb if necessary as outlined in "Maintenance" section of this manual. If PTO clutch or clutch pedal light is on when attempting to start engine, check that control is in proper position for starting. All lights must be OFF during operation; if light(s) is on, a malfunction is indicated in that operation(s) and must be corrected.

### 2. VOLTMETER (310-8, 312-8, 312-A, 414-8, 416-8, 417-8, 417-A Models)

Voltmeter is a gage indicating electrical system battery voltage. With ignition key in Off position, gage is not actuated. When ignition key is turned to On position, gage should read 12 Volts or slightly above. When starter is engaged, gage reading should not drop below 8 Volts. After engine is started and running, gage should read between 12 and 16 Volts. If gage reads less than 12 Volts battery is discharging. If gage reads 16 Volts or higher for long periods of time, check battery water more frequently.

### 3. THROTTLE CONTROL

Throttle control lever controls engine speed. Raise lever to operate tractor; lower lever before shutting engine off.

### 4. CHOKE CONTROL

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 it.

### 5. MANUAL LIFT (308-8, 310-8, 312-8, 312-A, 414-8, 416-8)

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

### 6. ELECTRIC LIFT (417-8 Model)

Raise toggle to lift attachment; lower toggle to lower attachment.

### 7. BRAKE PEDAL (8-Speed Models)

Pushing down on brake pedal applies brake. Note: When coming to a stop always depress clutch pedal as well as brake pedal so that transmission will be disconnected from engine.

## **8. CLUTCH PEDAL (8-Speed Models)**

Pushing down on clutch pedal does two things:

- (1) De-clutches transmission drive belt from engine;
- (2) Actuates a safety interlock switch so starter will operate. Engaging clutch is done by releasing pedal which tightens transmission drive belt. Always release pedal slowly when engaging clutch. Always depress pedal when shifting transmission into or out of gear and when starting engine. Indicator light comes on, if so equipped, with pedal released and ignition key in start position.

## **9. BRAKE/RETURN TO NEUTRAL PEDAL (Automatic Models)**

Brake/Return to neutral pedal provides dynamic braking to both rear wheels through automatic transmission. As pedal is depressed, transmission is shifted to neutral. When pedal is fully depressed a mechanical brake is also applied for additional braking action. Pedal must be depressed when starting engine, as pedal linkage actuates a safety interlock switch, allowing starter to operate. Indicator light comes on, if so equipped, with pedal released and ignition key in start position.

## **10. PTO (POWER TAKE-OFF) CLUTCH LEVER**

Power driven attachments are engaged and disengaged with PTO lever. Push lever forward to engage attachment. Pull lever back to disengage attachment. PTO clutch lever actuates a safety interlock switch in starter circuit; therefore, indicator light comes on, if so equipped, and tractor will not start unless lever is in disengaged position. If operator's seat is vacated while PTO is engaged, seat switch indicator light comes on (if so equipped) and seat switch will automatically shut engine off.

## **11. GEAR SHIFT LEVER (8-Speed Models)**

Select any forward or reverse speed by moving lever to position as indicated on shift pattern decal.

## **12. RANGE SELECTOR (8-Speed Models)**

Select either high or low range by moving range selector lever right or left to position as indicated on 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 a mid-point position for neutral. Neutral must be selected with gear shift lever.

## **13. MOTION CONTROL LEVER (Automatic Models)**

Push motion control lever ahead to move tractor forward. Pull lever back to move tractor in reverse. Move lever to neutral (center) position to stop. Brake pedal returns lever to neutral position for dynamic braking. Control lever varies ground speed and pulling power of tractor independent of engine speed. To increase ground speed, move lever away from neutral. Increase pulling power by moving lever toward neutral. Neutral position is provided with a detent type stop to give a 'perceptible feel' as control lever passes through neutral.

## **14. PARKING BRAKE LOCK LEVER**

To engage parking brake, first apply foot brake pedal solidly and then move parking brake lock lever back to lock brake. To release parking brake push down on foot brake pedal. Parking brake lock lever is spring loaded and will return to disengaged position when foot brake pedal is applied. Indicator light is on, if so equipped, when parking brake is locked with engine running.

## **15. TRANSMISSION CLUTCH LEVER (Automatic Models)**

Transmission clutch lever disconnects engine from transmission. Pull lever up and rearward to disconnect transmission. Push lever forward and down to engage transmission. Always disengage transmission when starting engine in cold weather.

## **16. HYDRAULIC LIFT (417-A Model)**

Pull hydraulic attachment lift lever back to lift attachment. Release lever to hold attachment in position. Push lever forward to lower attachment. Neutral position will hold attachment at any up or down position. Always lower attachments before leaving tractor unattended.

## **17. LIGHT SWITCH**

Raise toggle to turn lights on. Lower toggle to turn lights off. On 308, 310, 312, and 414 models, lights will work only when engine is running. On 416 and 417 models, lights work only when ignition switch is in Run position.

## **18. IGNITION SWITCH**

Ignition switch has three positions from left to right: (1) Off, (2) Run, (3) Start. To start engine turn key all the way right to Start position. Release key when engine starts and it will automatically return to Run position. When switch is turned to Off position, engine stops and all electrical accessories are turned off.

## **19. HOUR METER (312, 416, & 417 Models)**

Hour meter is a gage indicating operated hours of tractor.

## **20. DIAL-A-HITE (414-8, 416-8 Models)**

Dial-A-Hite control is used to hold an attachment (other than a mower) at a desired height above ground. Turn knob left or right to limit forward travel of lift lever.

## **21. FUEL SHUT-OFF VALVE (Not Shown)**

Fuel shut-off valve is located on bottom of fuel tank. Fuel shut-off valve is normally left open, except when service on fuel system becomes necessary.

# OPERATING YOUR TRACTOR

## SAFETY INTERLOCK SYSTEM

Safety interlock system incorporates two switches, for safe starting.

Two starting switches are actuated by left foot pedal and PTO clutch control. If tractor will not start, check that PTO clutch is disengaged and left foot pedal is depressed. Indicator lights will be on, if so equipped, and engine will not start unless both switches are properly actuated. Tractor is also equipped with a seat switch. This switch shuts off engine if indicator light is on, if so equipped, and driver rises off seat while PTO is engaged.

## 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. Always check transmission oil level (automatic transmission models) before starting.

### ⚠ WARNING ⚠

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 tractor will not start until clutch pedal is depressed and PTO is disengaged. Indicator light(s) will be on, if so equipped, when controls are not in correct position for starting.

On 310, 312, 414 and 416 models, engine is equipped with a low oil safety switch and will not allow engine to start when oil is low or out. Oil indicator light will be on when oil is low or out of oil and key switch is in start position.

On 417 models, engine is equipped with a low oil pressure switch. Engine will start and run when light flashes and oil pressure is low.

To start engine depress left foot pedal and disengage PTO.

**Separate Throttle/Choke Controls:** Move throttle control lever about half way to Operate position. Pull choke control all the way to Cold position.

**Combined Throttle/Choke Controls:** Move throttle/choke control lever to Choke position.

### ⚠ CAUTION ⚠

**Mechanical Transmission:** Always place transmission gear shift lever in neutral position before attempting to start engine.

Turn ignition key clockwise until starter engages. 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.

**Separate Throttle/Choke Controls:** Once engine has started, slowly return choke control to its normal position. If engine stalls at low speeds, or hesitates during acceleration, choke should be applied as necessary until engine reaches normal operating temperature.

**Combined Throttle/Choke Controls:** Once engine has started, slowly return throttle/choke control to Operate position. If engine stalls or hesitates during operation, choke should be applied as necessary until engine reaches normal operating temperature.

**Automatic Transmission:** When starting engine during cold weather, be sure to follow special procedures for warming up engine and transmission as described under "Correct Automatic Transmission Operation", before placing tractor into operation.

## STOPPING ENGINE

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

Engine in your new Wheel Horse has been designed with a special governor that limits maximum RPM. Governor allows engine to operate most efficiently at a set speed, and protects it from damage caused by excessive RPM. Always operate tractor with throttle control set at  $\frac{3}{4}$  to full speed.

Engine MUST be operating at a minimum of  $\frac{3}{4}$  throttle whenever tractor is in use. Using tractor while engine is operating at less than  $\frac{3}{4}$  throttle may result in extensive transmission damage on automatic models, as well as poor overall tractor performance on all models.

## 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 started cold. Warmer engines may not need choking.

### WINTER OPERATION, 417 MODELS

A special air intake system is used. A decal on engine gives instructions on how to set up air intake for winter use.

Purpose of this system is to help prevent a chance of carburetor icing when tractor is operated in near-freezing, high humidity weather.

In Summer position outside air is drawn directly into air cleaner. In Winter position heated outside air is drawn in from around muffler.

Place air intake in Winter position at beginning of snow season. Return it to Summer position in Spring.

## FUEL SPECIFICATION

### ⚠ CAUTION ⚠

Handle fuel with care — it is highly flammable. Use only approved fuel container. Never add fuel while 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.

For convenience and to minimize chance of fuel spills, it is recommended that a large funnel be used when refueling tractors with underseat fuel tanks.

When tractor requires refueling, fill tank with a good grade (85 octane minimum) of regular gasoline. Leaded or unleaded regular may be used. Do **not** intermix regular and unleaded gasolines. Do **not** mix oil with gasoline. Use of gasohol fuel is not recommended by either of these engine manufacturers.

In general, use of unleaded fuel will reduce build-up of combustion deposits in engine and contributes to long valve life. It is suggested that leaded regular gasoline be used for first 25 hours of operation, while piston rings are seating, and unleaded fuel thereafter.

## OIL SPECIFICATION

To protect your tractor's engine, check oil level before each use. On 310, 312, 414 and 416 models, engine is equipped with a low oil safety switch and will not allow engine to start when oil is low or out. Oil indicator light will be on when oil is low or out of oil and key switch is in start position.

On 417 models, engine is equipped with a low oil pressure switch. Engine will start and run when light flashes and oil pressure is low.

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

## CORRECT AUTOMATIC TRANSMISSION OPERATION

During cold weather, start engine with parking brake engaged and transmission clutch lever disengaged. Run engine for at least two minutes to allow engine to warmup; engage transmission clutch with engine at full throttle. For temperatures between 0° and 30°F (18° and -2°C) allow transmission to run in neutral for 5 minutes before attempting to set unit into motion. For temperatures below 0°F (-18°C) allow transmission to run in neutral for 10 minutes before attempting to set unit in motion. Failure to do so may result in extensive internal transmission damage.

## TO GO FORWARD

### ⚠ CAUTION ⚠

Before tractor will move either forward or backward, parking brake must be disengaged. **ALWAYS** depress brake/return to neutral pedal when disengaging parking brake.

Motion of your tractor is controlled by a single "Motion Control Lever". To go forward, simply push lever forward. Farther forward lever is pushed, faster tractor will go.

### ⚠ CAUTION ⚠

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

By adjusting motion control lever, forward speed of tractor can be regulated **without** adjusting engine throttle control. For heavy pulling, moving control lever toward neutral reduces tractor ground speed and increases pulling power as shifting to a lower gear with a mechanical transmission.

## TO GO BACKWARD

To reverse motion of tractor, return motion control lever to neutral position, and pull lever back. Farther back lever is pulled, faster tractor will go in reverse.

### ⚠ CAUTION ⚠

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

By adjusting motion control lever, reverse speed of tractor can be regulated **without** adjusting engine throttle control.

## TO STOP

Stopping tractor from either forward or reverse direction can be achieved by one of two methods:

1. Return motion control lever to its neutral position.
2. Depress brake pedal.

Activating brake pedal automatically returns motion control lever to its neutral position and applies a mechanical brake. Brake pedal will hold motion control lever in neutral position. Pedal must be released before motion control lever can be moved either forward or back.

Tractor is stopped by a "dynamic braking" action inside hydrostatic transmission and a mechanical brake. 417-A model tractor is **free to roll** (at a very slow speed) when transmission is in neutral. Therefore, always depress brake pedal when tractor is stopped on unlevel terrain. Although 312-A models will tend to remain stationary in neutral even when brake is released, use of brake is recommended to avoid accidental movement when stopped on unlevel terrain.

## HAND PUSHING TRACTOR

**Hand push tractor only. Do not tow. Towing can cause severe damage to hydrostatic transmission.**

Automatic transmission tractors can be pushed at a slow speed. To do this, disengage transmission clutch lever and move motion control lever fully forward; tractor will then move when pushed.

## CORRECT MECHANICAL TRANSMISSION OPERATION

### TO GO FORWARD OR REVERSE

With engine running, depress both clutch and brake pedals. Move range selector (8-Speed Only) to either High or Low position. Move gear shift lever to desired speed forward, or to reverse. Gear shift decal identifies various speeds. Release brake pedal. Slowly release clutch pedal. As clutch pedal is released, tractor will begin to move.

### CAUTION

**Always release clutch pedal slowly when starting tractor in motion. Sudden starts can be damaging to equipment and could cause loss of operator control.**

## TO CHANGE SPEEDS OR DIRECTION

When a change in ground speed or direction is required, always bring tractor to a complete halt by depressing both clutch and brake pedals.

**Never attempt to shift gears with unit in motion. Severe internal transmission damage may result.**

Change gear shift lever or range selector (8-Speed only) as desired. Approximate ground speed for each gear is shown in Specifications Section in front of this manual.

It is not necessary or recommended to shift "up" or "down" through gears with tractor in motion. Tractor has sufficient power to move out in a selected gear with a heavy load attached, a lower gear should be used.

## TO STOP

To stop tractor, depress clutch pedal then brake pedal. Clutch pedal must be depressed fully before brake pedal is depressed.

### CAUTION

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

# CORRECT TRACTOR USAGE

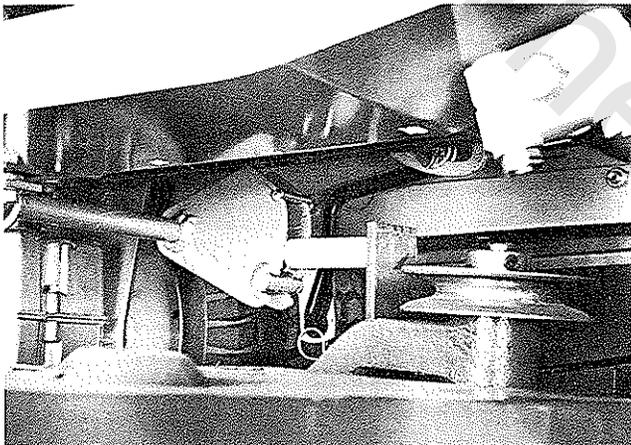
## ⚠ CAUTION ⚠

Read the manuals provided with the attachments before operating. The manuals give a more detailed description of operation and point out other areas of caution.

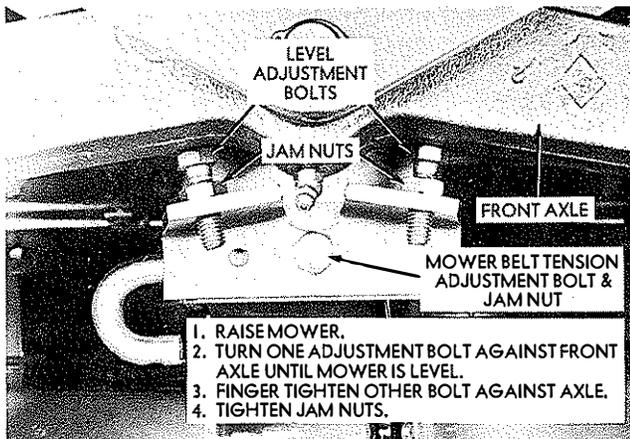
Familiarize yourself thoroughly with the equipment before attempting to use it.

## 200-SERIES ATTACHMENT MOUNTING

200-Series attachments are designed for easy installation and removal. Rear guide pin on mower is connected to tractor and is leveled in transport position as shown in photos below. (Owner's Manual supplied with mower may show an earlier mounting method, which should be disregarded.) Refer to manual supplied with each attachment for complete mounting and adjustment instructions.



Mower Guide Pin Installation (200-Series)



Mower Transport Level Adjustment (200-Series)

## 300, 400-SERIES ATTACHMENT MOUNTING

### HITCHES

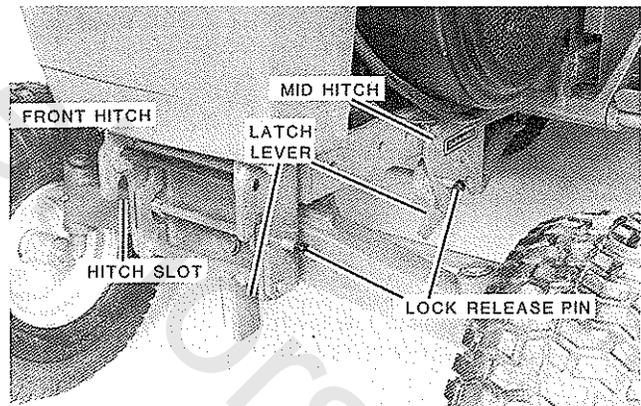
Tach-a-matic front and mid hitches are provided for easy installation and removal of attachments without tools.

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

To install attachments make sure hitch latch is in released position — to do this, push in on lock release pin; move latch lever so latch is open and release lock pin to hold latch in open position. Insert and center attachment shaft in hitch slots and move latch toward closed position until release pin snaps outward.

Removal of attachment is done by pushing in on lock release pin, which allows latch to be moved to open position.

**Note:** For specific installation and removal instructions refer to attachment instructions.



Front and Mid Attachment Hitches (300, 400-Series)

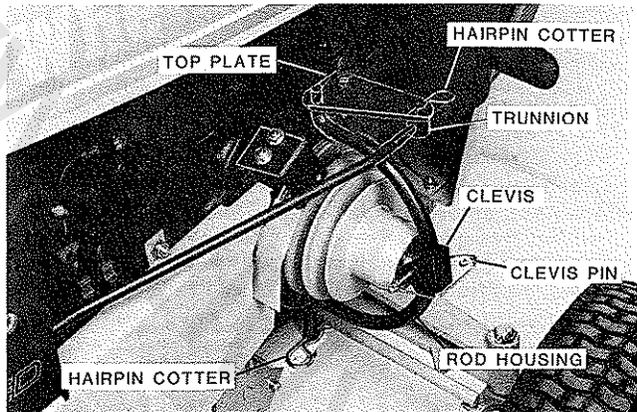
## ATTACHMENT BELTS

### Front & Mid Mount Attachments

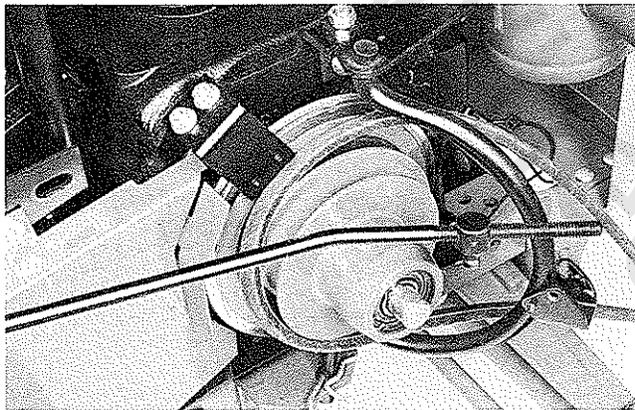
1. Remove hairpin cotter from trunnion and remove trunnion out of top plate; this step is usually necessary only when tractor is new.
2. Remove clevis pin from clutch shaft and clevis.
3. Move top plate forward to move rod housing away from engine, enabling clevis to clear clutch shaft; swing clutch rod housing (yoke) to front or rear.
4. Install attachment belt.
5. Line clutch rod housing (yoke) up with clutch shaft. Move top plate rearward. Line up clevis with hole in clutch shaft and install clevis pin.
6. Insert trunnion in top plate and secure with hairpin cotter.

## Rear Mount Attachments

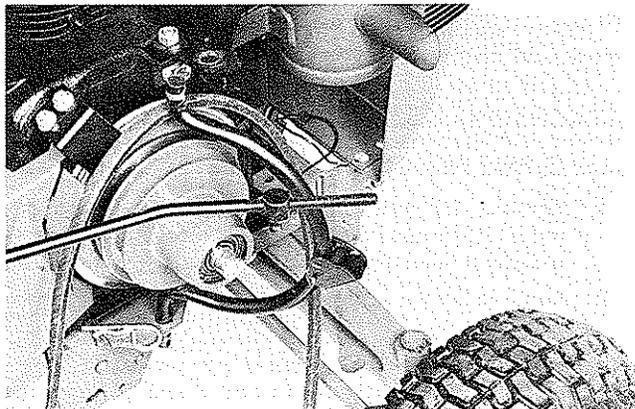
Rear mounted power driven attachments may require that one strand of drive belt run **OUTSIDE** rod housing. To install this belt on PTO, follow preceding steps 1-3. Next, remove large hairpin cotter at bottom of rod housing which will permit it to slide down and out of top plate. Attachment belt can then be installed over top end of housing. Reassemble PTO.



300, 400-Series Power Take-Off (PTO)



300, 400-Series  
Front/Mid Attachment Belt Installation



300, 400-Series Rear Attachment Belt Installation

## OPERATION OF THE TRACTOR:

Because of sufficient tractor engine power no problems should be encountered using attachments under normal conditions. On rough, hilly, or wet terrain, ad-

dition of wheel weights and tire chains will minimize rear tire slippage. A rear weight box is available for use on 200-Series tractors only. All front tires may be fluid filled. Rear tires may be fluid filled on 400-Series tractors only.

## WITH A MOWER (All Models)

### ⚠ WARNING ⚠

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

For best operation on average lawns, operate engine at full throttle while controlling ground speed with transmission. Tractor should be operated at 2 to 3.5 MPH (3.2 to 5.6 KM/H)\* while mowing grass. Uneven cutting is often a result of excessive ground speed. To correct, reduce ground speed with transmission. Average lawns are usually cut at a height between 2 and 3 in. (5-7.6 cm). Tall grass and weeds should be cut with mower in its highest position, making a second pass cutting at height desired.

Always keep mower blades sharp.

### ⚠ CAUTION ⚠

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

## WITH A SNOWTHROWER (All Models)

### ⚠ CAUTION ⚠

Thoroughly inspect area where snowthrower is to be used. Remove all door mats, sleds, boards and other foreign objects. Never make any adjustments while engine is running. Never try to clear chute while engine is running.

Snow removal will vary greatly with condition of each snowfall. Light fluffy snow will be cleared with ease. Heavy wet snow will be more difficult. It is advisable to coat auger and chute with a light coat of wax or paraffin to keep snow from sticking. Best results are usually attained when tractor ground speed is set at 1 to 2 MPH (1.6 to 3.2 KM/H)\*.

Experience will teach you not to throw snow into wind.

Care should be exercised whenever snow thrower is engaged. Auger is capable of picking up sticks, stones and other foreign objects and expelling them with great velocity. Always aim discharge chute away from persons or objects subject to harm.

Tire chains and wheel weights, plus rear weight box on 200-Series tractors, are recommended when using a snowthrower.

\*Average walking speed is 2.5 MPH (4 KM/H).

## WITH A SNOW BLADE (200-Series)

Front end snow blade is used for snow removal. Care should be taken and a slow ground speed should be maintained whenever blade is used. Impact with a solid object may result in injury to operator and/or damage to blade.

Tire chains, wheel weights and rear weight box may be added to improve rear tire traction.

## WITH A DOZER OR GRADER BLADE (300, 400-Series)

Although front end dozer blade is generally used for snow removal, it can also be used for moving dirt, sand or gravel. Care should be taken and a slow ground speed should be maintained whenever blade is used. Impact with a solid object may result in injury to operator and/or damage to blade.

Grader blades are generally preferred for leveling sand, dirt or gravel. Operation of these blades is similar to that of a dozer blade. Rear mount grader blades may require special hitches; consult your dealer for proper hitch(es) required for your tractor.

On 400-Series tractors only, front wheel weights may be used to increase front wheel traction. Rear wheel weights and tire chains may also be used to increase rear wheel traction on both 300 and 400-Series tractors.

## WITH A TILLER (All Models)

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

Caution should be exercised when tilling virgin ground or clay as tiller may have a tendency to push tractor. This can be corrected by raising tiller with attachment lift so tiller penetrates only very top of soil. Tiller can be lowered to its full depth on following passes.

### **⚠ CAUTION ⚠**

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

Rear wheel weights and cleat tires (300, 400-Series) or tire chains will reduce pushing effect of tiller. Front weights may be used on 400-Series tractors to help improve steering control.

Slowing tractor's ground speed will improve aggressive action of tiller. Best results are usually attained when tractor ground speed is set at less than 1.0 MPH (1.6 KMH).\*

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

## WITH A PLOW, DISC, CULTIVATOR, OR HARROW (400-Series)

Plows and disc require maximum tractor efficiency. Cleat tires, or tire chains, as well as wheel weights increase rear tire traction. Front wheel weights add to steering control of tractor.

Some of these 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 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 soil.

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

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

After discing, generally, a spike tooth harrow is dragged over soil. Spike tooth harrow helps pulverize soil and levels seed bed. Soil should now be ready for planting.

Cultivator is used during growing season to help remove unwanted weeds, and to help aerate plant roots. Generally, width of cultivator is taken into consideration before planting seed bed to insure cultivator fitting between rows without damaging crop roots.

## WITH OTHER ATTACHMENTS (All Models)

There are numerous other special-purpose attachments available, which greatly increase tractor's versatility. Attachment can be a completely self-contained system (front bucket loader), one that is used along with another attachment (lawn vacuum), or one intended for operator comfort (snow cab). These attachments are custom designed for a particular tractor model, but many others simply use tractor as a towing vehicle. They are attached or removed from tractor 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 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 vehicle when in operation. Never allow any unauthorized personnel to operate equipment.

Your authorized Wheel Horse dealer can assist you with selecting attachments for use with your tractor.

### **DUMP CART LOAD LIMITS**

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

**200-Series — 150 lbs. (69kg)  
300, 400-Series — 275 lbs. (127kg)**

\*Average walking speed is 2.5 MPH (4 KMH).

# MAINTAINING YOUR TRACTOR

## ⚠ CAUTION ⚠

To minimize chance of injury, perform all maintenance and adjustments on your tractor 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: Service intervals shown are considered **MAXIMUM** under normal operating 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 100 Hours/One Year(2)
Check:						
Engine Oil Level	X					
Battery Water Level	X					
Auto. Trans. Oil Level	X					
General Condition of Tractor	X					
8-Speed Trans. Oil Level			X			
Transaxle Oil Level <sup>(4)</sup>			X			
Tire Pressures			X			
All Fasteners in Place & Tight			X			
Clean:						
Engine Cooling Fins		X				
Air Filter			X			
Lubricate Chassis			X			
Charge Engine Oil <sup>(1)</sup>			X			
Inspect Spark Plug(s)					X	
Replace Air Filter						X
Change Auto. Trans. Oil <sup>(5)</sup>						X
Replace Auto. Trans. Oil Filter <sup>(5)</sup>						X
Replace Fuel Filter <sup>(3)</sup>						X

## SERVICE OPERATION

Inspect/Replace Breaker Points						
200-Series & 308-8 Model — Not Applicable						
310, 312, 414, 416, 417-Models						Every 500 Hours
Refer to Engine Owner's Manual for Applicable Information Concerning:						
Adjustments						
Special Cleaning Instructions						
Recommended Dealer Maintenance						

Inspect/Replace Breaker Points  
200-Series & 308-8 Model — Not Applicable  
310, 312, 414, 416, 417-Models ..... Every 500 Hours

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) Whichever occurs first.
- (3) As applicable.
- (4) 312-A Models (Automatic Only).
- (5) 417-A Model Only.

## ENGINE

### Oil Quality

For maximum engine protection under all operating conditions use API Service Classification SC, SD, SE, or SF oil in tractors equipped with Briggs & Stratton or Kohler engines. These letters may appear on oil can singularly or in combination with other letters.

### Oil Level

Form a habit of checking oil level regularly.

**Check oil level of engine every time tractor is used. An improper oil level can cause extensive internal damage to engine.**

Oil filler plug/dipstick and oil drain locations for all engines are illustrated in following photos and drawings.

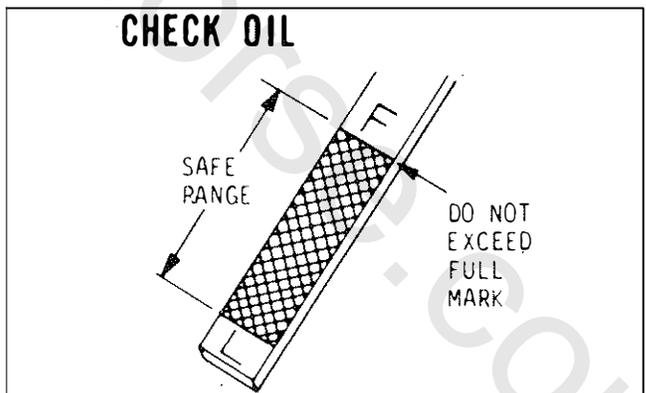
To check engine oil level, stop tractor where engine is level. Shut off engine, set parking brake, and remove ignition key.

### ENGINES WITH OIL CHECK AND FILL PLUGS

Remove oil check and fill plug from right side of engine block by turning it counterclockwise. Add oil to bring oil level to top of fill tube, if necessary.

### ENGINES WITH OIL DIPSTICKS

Remove oil dipstick from engine.



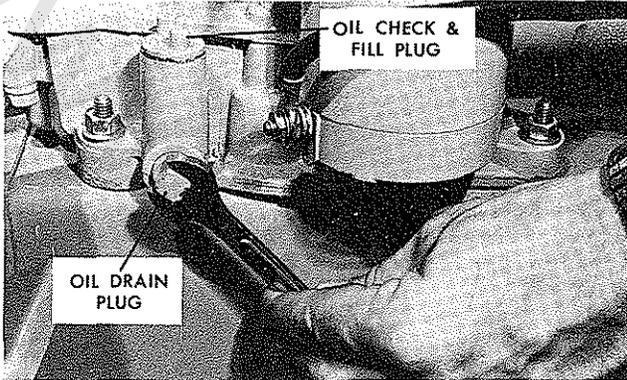
Correct Oil Level — Engines with Dipsticks

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

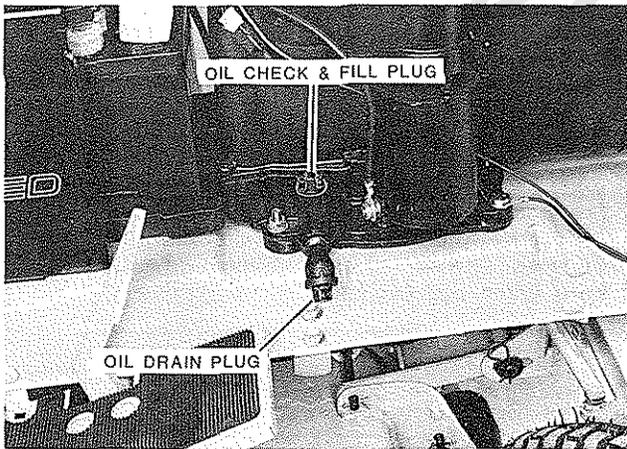
Add oil through dipstick opening (except 417 models), if necessary. A separate oil fill tube is used on 417 model engines, located just forward from oil dipstick tube. Turn cap counterclockwise to remove it.

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

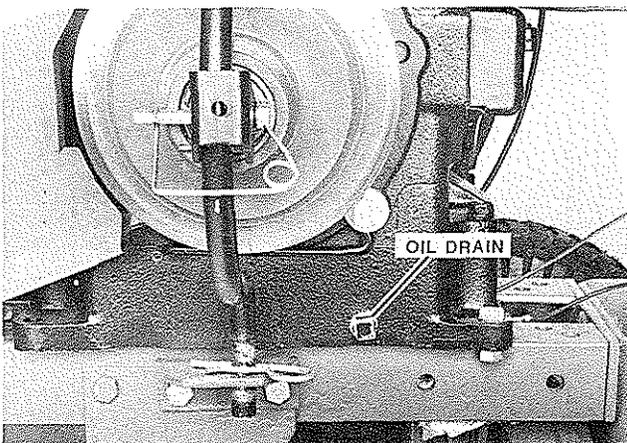
Be sure to add same viscosity oil as is presently in engine. New tractors are shipped with SAE 30 oil in crankcase. It may be necessary to change original oil before using tractor in cold weather.



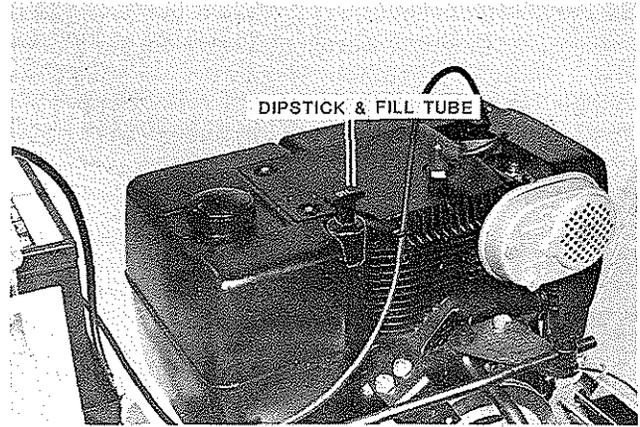
**208-Series Oil Fill and Drain Plugs**



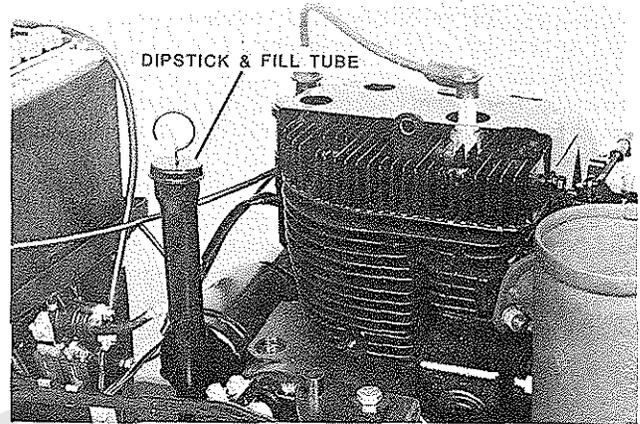
**211-Series Oil Fill and Drain**



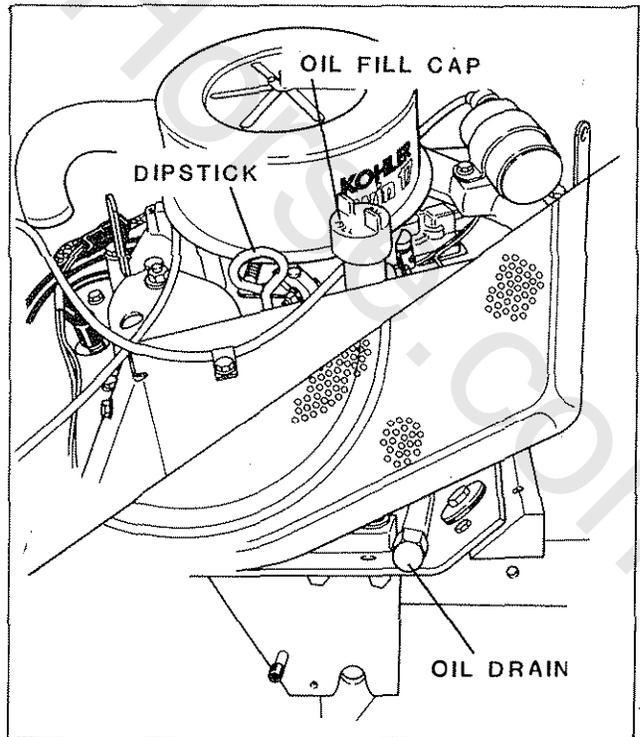
**Single Cylinder 300, 400-Series Oil Drain**



**Single Cylinder 308-Series Oil Check and Fill**



**Single Cylinder 310, 312, 414, 416-Model Oil Check and Fill**



**417-Series Dipstick, Filler Plug and Oil Drain**

## Oil Changes

Engine oil in a new tractor should be changed after first 2 hours of operation. Thereafter, oil should be changed at 25 operating hour intervals. 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 and oil filter changes if tractor is operated under extremely dusty conditions.**

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

Open oil drain. Locations of oil drain plugs are shown in "Oil Level" section of this manual. After oil has drained completely reinstall drain plug or cap as applicable.

Remove oil filler plug or dipstick 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 25 hours of operation.

### ENGINE OIL CHANGE

Tractor Model	Crankcase Oil Capacity
208 .....	1½ quarts (1.0 liters)
308 .....	1¼ quarts (1.2 liters)
310, 312, 414, 416 .....	2 quarts (1.9 liters)
211, 417 .....	1½ quarts (1.4 liters)

### ENGINE OIL TEMPERATURE — VISCOSITY CHART

#### Briggs & Stratton Engine

Air Temperature	Oil Viscosity
Above 40°F (4°C)	SAE 30
0° to 100°F (-18° to 38°C)	SAE 10W-30, 10W-40
Below 20°F (-6°C)	SAE 5W-20, 5W-30*

#### Kohler Engine

Above 32°F (0°C)	SAE 30
Below 32°F (0°C)	SAE 5W-20, 5W-30

\*If not available, a synthetic oil with a viscosity of 5W-20, 5W-30 or 5W-40 may be used.

### ENGINE OIL TYPE

Engine	Oil Type
Kohler Briggs & Stratton	} API Service SC, SD, SE, or SF

After adding 80% of prescribed amount of oil, check oil level. Add oil as necessary to bring oil to "Full" level in single cylinder 200-Series engines or into "Safe" range on dipstick.

**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 forming harmful sludge deposits.

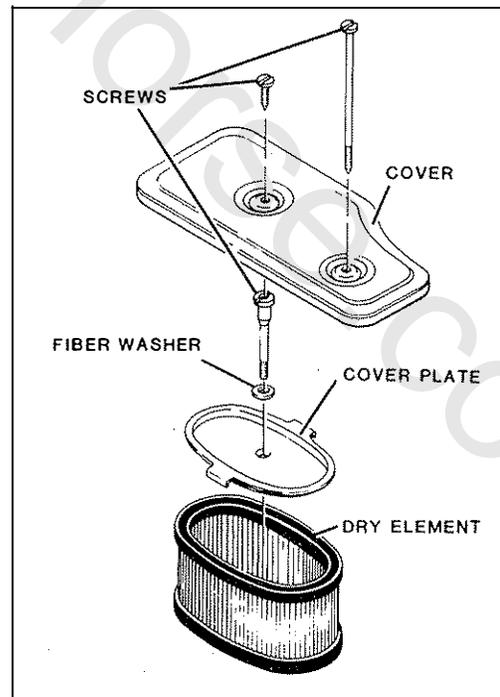
Clean engine air filter after every 25 hours of operation (more often if tractor is operated under extremely dusty conditions).

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. As with cleaning filter, replacement intervals must be shortened when operating under extremely dusty conditions. To protect engine, use only manufacturer's replacement filter, or replacement filters with equivalent specifications.

Check following when installing a new or serviced element:

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

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



211-5, 211-6 Air Cleaner

**211-5, 211-6 Models:** On 11 HP engine, air is drawn from inside to outside of filter element. When checking filter, be sure to inspect inside of element to determine if it needs replacement.

Wipe off air cleaner cover(s) and backing plate, taking care to prevent any dirt from entering carburetor.

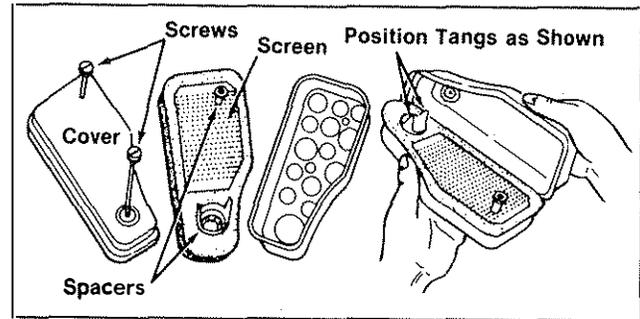
**300, 400 Series:** Dry type air filter element is cleaned by tapping it lightly on a flat surface to remove loose dirt particles. Replace element if dirt does not drop off easily. DO NOT wash elements in liquid. Do not attempt to blow dirt off with compressed air as this can puncture filter element.

Foam precleaners are used over filter elements on some engines. Clean precleaner at 25 hour intervals, when air cleaner is serviced. Wash precleaner in a solution of liquid dishwashing detergent and water. Squeeze out excess water and allow it to dry. Saturate precleaner in engine oil, then squeeze out excess oil and install precleaner on element.

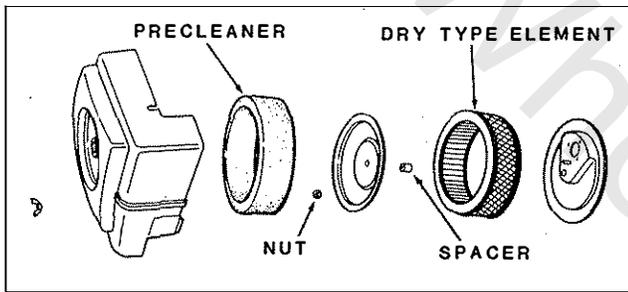
**208-3, 211-3 Models:** To service foam air filter, remove two screws and lift off complete air cleaner assembly. Remove screen and spacers from foam element and remove element from body of air cleaner.

Wash foam element in a solution of liquid detergent and water. Wrap foam in a clean cloth and squeeze dry. Saturate element in clean engine oil and squeeze to remove excess oil.

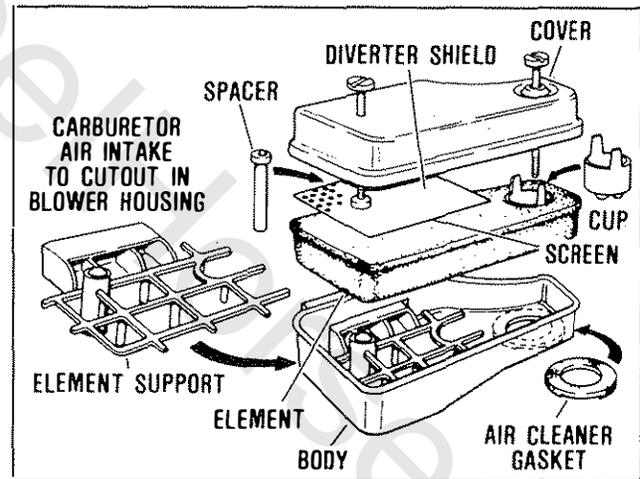
Reassemble air cleaner and reinstall on carburetor. Be sure gaskets are in good condition and in place. When assembling, make certain lip of foam element extends over edge of air cleaner body. Foam element will form a protective seal.



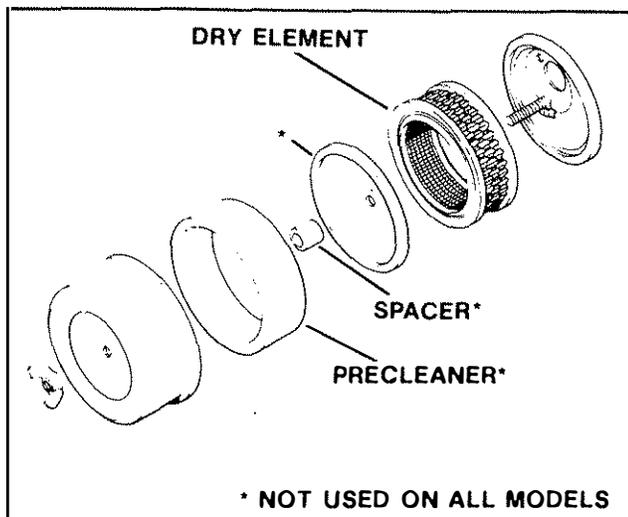
208-3 Air Cleaner



308-Series Air Cleaner



211-3 Air Cleaner



310, 312, 414, 416, 417-Series Air Cleaner (Typical)

## Spark Plug(s)

Engine misfire, or generally poor operation, is often caused by spark plug(s) in poor condition or with incorrect spark gap setting. Spark plug(s) should be checked after each 100 hours of operation. Replace a spark plug if inspection reveals fouling or excessive deterioration.

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

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 reinstall spark plugs in poor condition. Best results are obtained with new plugs.**

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

Tractor Model	Plug Gap
200-Series .....	.030 in. (.8 mm)
417-Series .....	.025 in. (.6 mm)
308 Model .....	.025 in. (.6 mm)
310, 312, 414, 416 Models .....	.035 in. (.9 mm)

Tighten spark plug(s) to:  
 200-Series, 417 Model — 15 ft. lbs. (20 Nm)  
 308, 310, 312, 414, 416 Models — 22 ft. lbs. (30 Nm)

## Breaker Points and Condenser

Following information does not apply to 200-Series and 308 Model tractors, which have an engine with breakerless electronic ignition. This system requires no maintenance.

Condition and adjustment of breaker points greatly affects engine operation. If point surfaces are burned or badly oxidized, little or no current will pass; as a result, engine may not operate at all, or if it does run, it is likely to "miss", particularly at full throttle. An improper engine breaker point gap can also result in erratic engine operation, since an incorrect gap changes ignition timing.

Engine breaker points should be inspected, cleaned, and gap reset at intervals shown in Maintenance Checklist. Points that are in poor condition due to excessive pitting or burning should be replaced.

Primary function of condenser is to minimize arcing across breaker points. Under normal operating conditions, a small amount of metal transfer (pitting) will occur between point surfaces. If condenser fails, excessive pitting or burning of points will occur over a short period of time. A shorted condenser grounds ignition system and results in no output voltage to fire spark plug(s). Condenser is usually replaced each time breaker points are changed.

Access to breaker points requires a significant amount of disassembly on some engines and, in some

cases, special tools. In addition, other adjustments affecting engine timing may be necessary after replacing or adjusting breaker points. For these reasons, it is suggested that ignition system service be performed by an authorized dealer.

## Carburetor Adjustment

Carburetors are adjusted at factory and should not have to be reset. If a condition is noted as outlined in following "Carburetor Adjustment Chart", carburetor should be readjusted immediately. Continued operation with incorrect carburetor settings can lead to fouled spark plugs, overheating, excessive valve wear or other problems. If black exhaust smoke is noted, check air cleaner first — an "overrich" mixture is usually caused by a poorly serviced, clogged air cleaner element, not an improperly adjusted carburetor.

Correct carburetor adjustment requires a significant amount of knowledge as well as special equipment, such as a good tachometer. 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 dealer.

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 fuel needle if needed.

### Carburetor Adjustment Chart

## Fuel Filter

On 310, 312, 414, 416, 417 Models, a fine-mesh screen type strainer is incorporated into fitting at bottom of fuel tank, which filters foreign matter from gasoline before it reaches carburetor. This strainer normally requires service only if fuel supply becomes severely contaminated.

On 200-Series and 308 Model, engines have an in-line fuel filter, located near carburetor. This filter should be replaced after each 100 hours of operation or at 1 year intervals, whichever occurs first.

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

Fuel filter gives only limited protection against moisture in fuel system. Keep fuel tank full during winter operation, when cold and damp weather conditions can cause moisture to condense in tank.

# CHARGING AND ELECTRICAL SYSTEMS

## Alternator

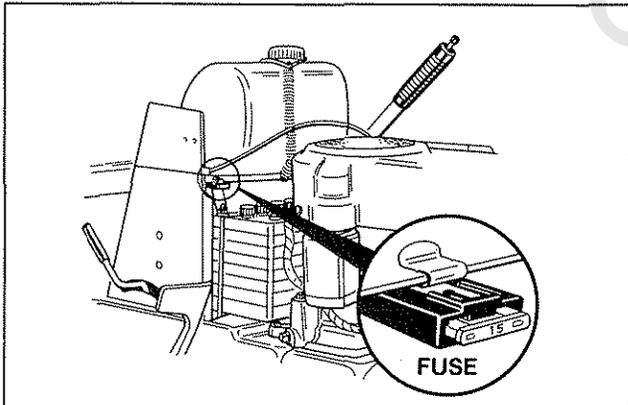
An alternator is used to charge battery. Alternator charging system normally requires no service other than periodically checking all exposed wiring and electrical connections on tractor are clean, tight and in good condition.

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

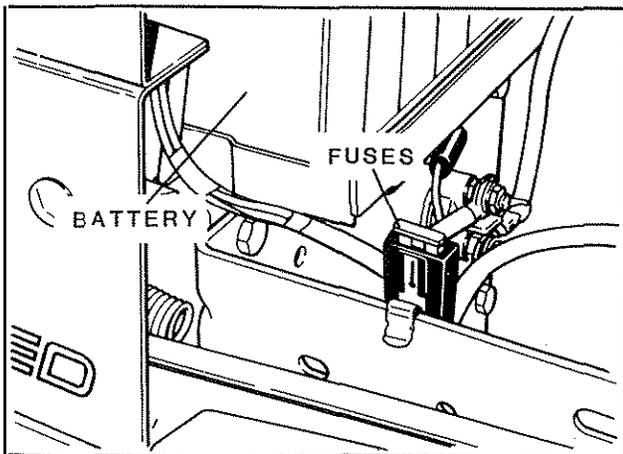
Never run engine if battery is removed, or if battery is not connected to charging system. Serious damage to charging system components may result.

## Main Fuse

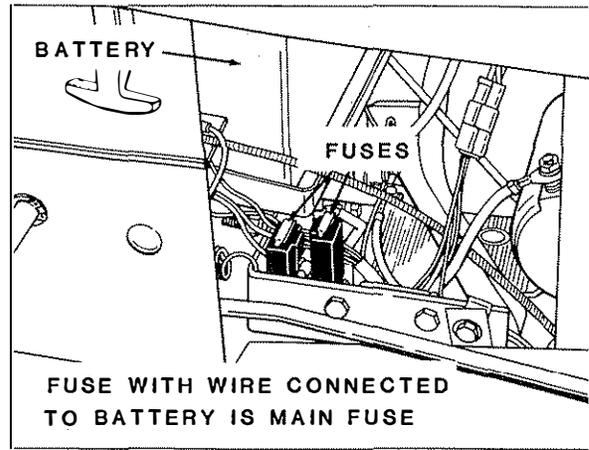
A 25 amp (416, 417-Models) or a 15 amp (200-Series & 308, 310, 312, 414-Models) automotive type ATO or ACT fuse is used to protect main circuit of electrical system. Fuse locations are shown below.



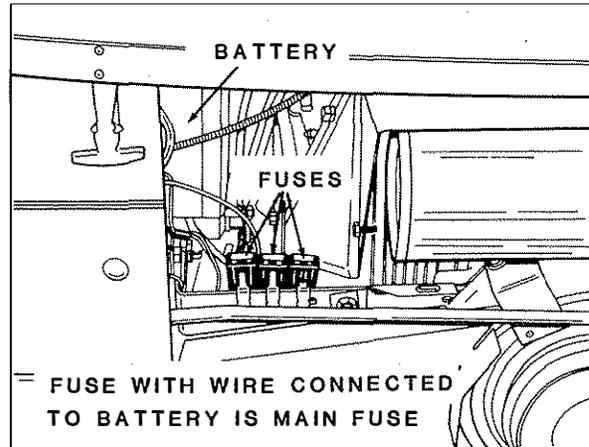
200-Series Fuse Location



308 Model Fuse Location



310, 312, 414, 416 Model Fuse Locations



417 Model Fuse Locations

## Light Circuit and Fuse

**200-Series; 308, 310, 312, 414 Models:** Electrical system has a separate circuit for operating lights. Alternator output for this circuit is ALTERNATING CURRENT (A.C.). For this reason lights will not operate without engine running. A fuse is not used in this light circuit. Never interconnect A.C. light circuit and D.C. battery circuit as this may result in serious damage to charging system.

**416, 417-Models:** Light circuit is powered by battery. Lights will operate when ignition switch is in Run position. A 15 amp automotive type ATO or ATC fuse is part of light circuit. Fuse holder is next to main fuse holder (See preceding "Main fuse").

## Voltmeter and Hour Meter Fuse

**200-Series:** Meter circuits are protected by main fuse (See preceding "Main Fuse").

**310, 312, 414-Models:** Meter circuits are protected by a 5 amp automotive type ATO or ATC fuse located next to main fuse (See preceding "Main Fuse").

**416, 417-Models:** Meter circuits are protected by light circuit 15 amp automotive type ATO or ATC fuse located next to main fuse (See preceding "Main Fuse").

## Electric Lift Fuse

**417-8 Model:** Lift circuit is protected by a 20 amp automotive type ATO or ATC fuse located next to light circuit fuse. (See preceding "Main Fuse").

## 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.

This paragraph does not pertain to a "Maintenance Free Battery." Maintain electrolyte level above plates in each cell by adding distilled water as necessary. Best time to add water is just prior to operating tractor 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 tractor for servicing, take care to connect cables to battery exactly as they were before removal.

Electrolyte level on 200-Series tractors can be inspected if a mirror and light are used. To add water, disconnect battery ground cable and remove battery hold down. Battery can then be slid out enough to permit adding water.

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.

## Light Bulb Replacement

Headlight and tail light bulbs (on models so equipped) are replaced as described below. Care should be taken when handling bulbs, particularly if they are broken.

Either sealed beam headlamp unit is replaced by first disconnecting both terminal wires. Note way headlamp is installed, then carefully remove bolt and retainer to release headlamp.

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

To replace indicator light bulb, remove circuit board from dash panel and pull bulb off circuit board. Push new bulb on circuit board and reinstall circuit board on dash panel.

## AUTOMATIC TRANSMISSION

### Oil Quality

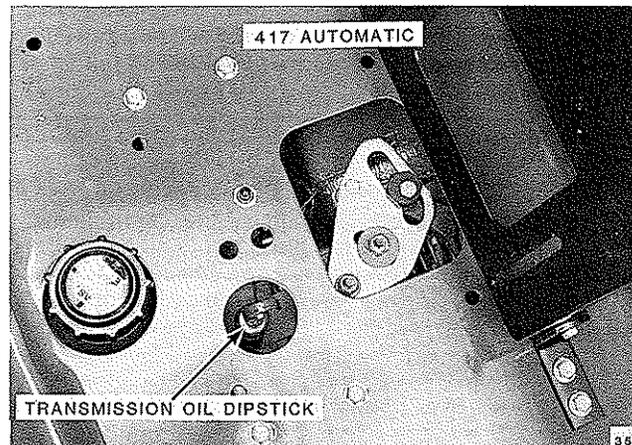
#### 417-A MODEL:

Hydrostatic transmission requires 10W-30 or 10W-40 premium quality motor oil.

#### 312-A MODEL:

Hydrostatic transmission requires a straight SAE 20 weight premium quality motor oil API Service Classification SC, SD, SE or SF. Transaxle requires 10W-30 or 10W-40 premium quality motor oil.

### Oil Level

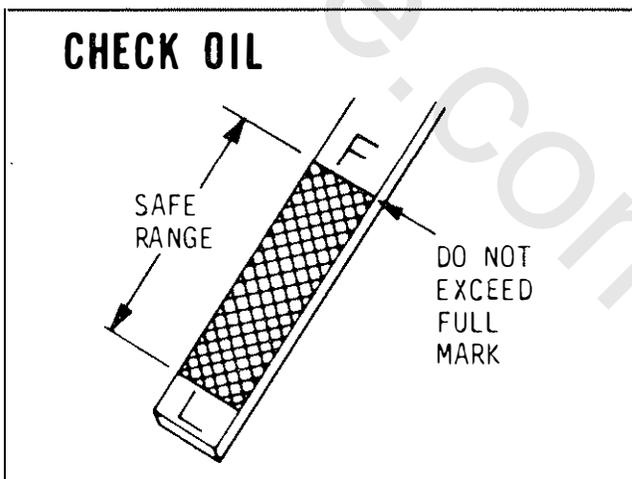


#### 417-A Model Automatic Transmission Dipstick

#### 417-A MODEL:

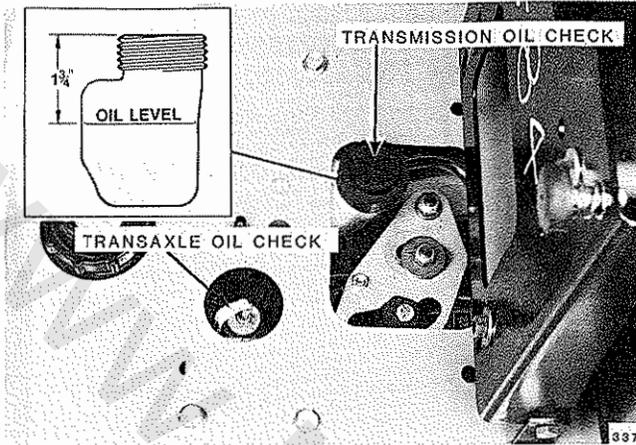
Lubricant level should be checked before each use. Dipstick is located in a filler tube coming up from transmission. Dipstick is marked for COLD oil. Remove dipstick and wipe clean with a clean lint free rag. Replace dipstick and remove again. Oil level should be maintained between "F" and "L" levels on dipstick. Never operate tractor with oil BELOW or ABOVE marks on dipstick. Add oil as necessary. Replace dipstick making sure it is fully seated in filler tube.

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



#### 417-A Model — Correct Transmission Oil Level

### 312-A MODEL:



#### 312-A Model Transmission/Transaxle Oil Level

Lubricant levels should be checked before each use. Check oil levels when oil is COLD. Transmission oil level should be 1 3/4 inches down from top of filler neck. Transaxle oil level should be maintained between "F" and "L" marking on dipstick.

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

### Oil Changes

#### 417-A MODEL:

Drain and refill transmission oil once per year or 100 hours of operation, whichever occurs first.

Oil is drained by removing pipe plug at bottom of transaxle. Plug is located near left rear of transaxle. Approximate refill capacity is 5 quarts (4.7 liters). After adding 4 quarts of oil, check oil level; Add oil as necessary to bring oil level between "F" and "L" marking on dipstick.

#### 312-A MODEL:

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

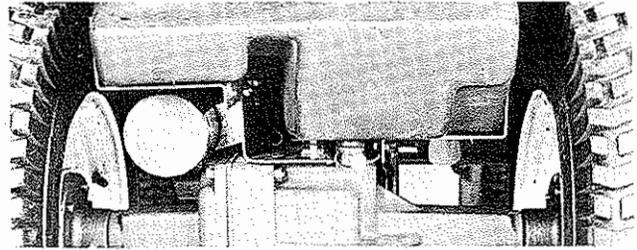
For information purposes, oil capacity is:  
Hydrostatic Transmission — 3/4 qt. (.7 Liters) SAE 20

Drain and refill transaxle oil once per year or 100 hours of operation, whichever occurs first.

Oil is drained by removing pipe plug at bottom of transaxle. Plug is located near left rear of transaxle. Approximate refill capacity is 3 quarts (2.8 liters). After adding 2 quarts of oil, check oil level; Add oil as necessary to bring oil lever between "F" and "L" marking on dipstick.

### Oil Filter (417-A Only)

Replace the oil filter after the first 10 hours of operation. Thereafter, replace the filter with each transmission oil change (100 hours or one year, whichever occurs first).



417-A Transmission Oil Filter

### Cooling Fan

A cooling fan is bolted to transmission input shaft (located just behind right footrest). 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 transmission 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 system.

## 8-SPEED TRANSMISSION

### Oil Quality

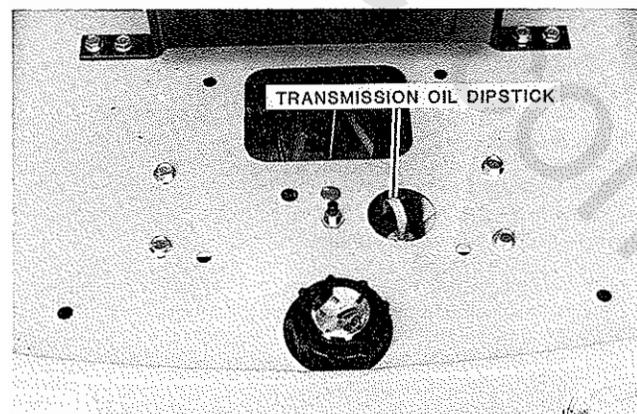
Mechanical transmission in your new Wheel Horse Tractor is filled with gear oil. Same type oil must be used whenever transmission needs filling.

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

### Oil Level

Lubricant level should be checked after every 25 hours of operation. Changing lubricant is not required except for major service. To check lubricant level remove dipstick from transmission case. Maintain oil at "full" level on dipstick.

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



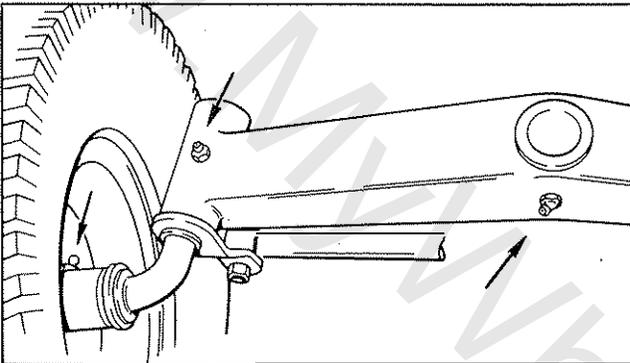
8-Speed Transmission Dipstick

## 3, 5 & 6-SPEED TRANSMISSION

Transmission is packed with grease at factory; checking transmission lubricant is not required.

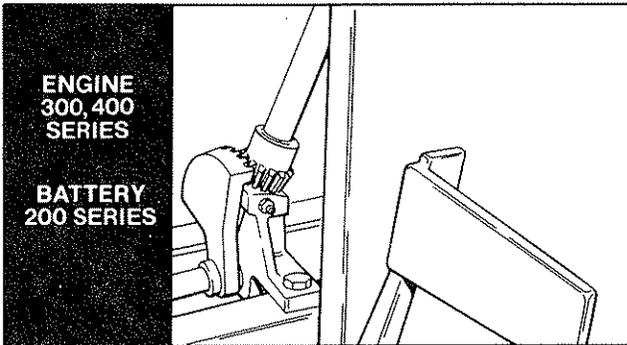
## CHASSIS LUBRICATION

Steering gear, spindles, front wheel bearings and front axle pivot are equipped with fittings to facilitate lubrication with a pressure grease gun. Before applying grease gun, clean zerks fittings carefully to prevent dirt from being forced into fitting. After inserting grease, wipe off any excess grease. A general purpose grease (lithium base) is used to lubricate tractor.



Front Wheel, Spindle and Front Axle Lube Fittings

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



Steering Gear Lube Fitting

## FOOT BRAKE ADJUSTMENT

### 3, 5 & 6-Speed Models

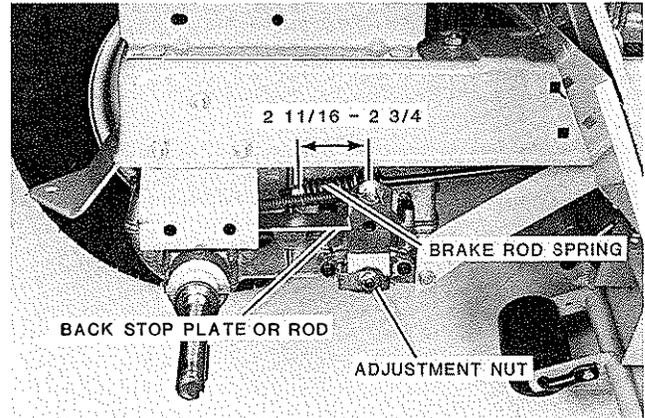
Brake adjustment is made at brake caliper. Block wheels to prevent tractor from rolling and place transmission shift lever in Neutral for brake adjustment.

1. Check that transmission brake lever is contacting back stop plate (or rod) when brake pedal is released. If it does not, brake pads will drag on disc while tractor is being operated, causing premature brake wear.
2. With brake pedal released, loosen or tighten adjustment nut until brake disc is no longer free

to turn. Next, back off adjustment nut just enough to permit disc to turn freely.

Brake rod spring adjustment should be checked after adjusting brake. This determines amount of force applied to brake lever.

1. Distance between inside of nut and washer on brake rod should be  $2\frac{11}{16}$  -  $2\frac{3}{4}$  in. (6.8 - 7 cm). Turn adjustment nut as required to obtain this dimension.

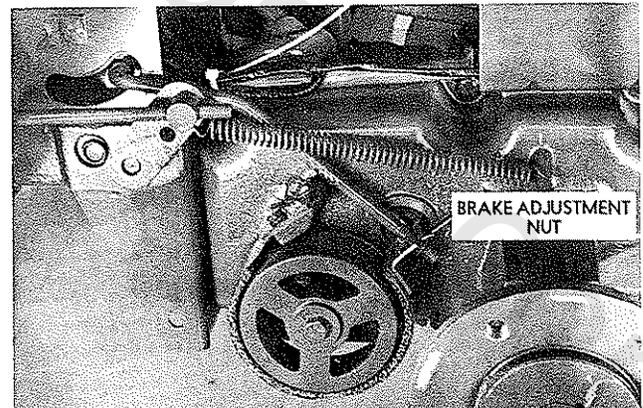


3, 5, & 6-Speed Brake Adjustment

### 8-Speed Models

Brake band, located on left side of transmission, brakes transmission shafts and, in turn, brakes rear wheels.

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



8-Speed Brake Adjustment

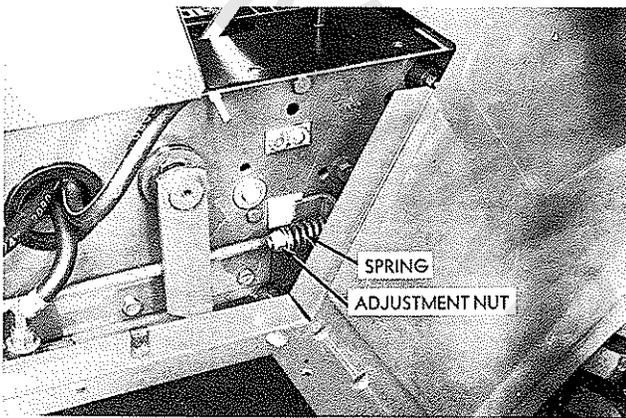
### 300, 400-Series Automatic Models

Brake band, located on left side of transmission, brakes transmission shafts and, in turn, brakes rear wheels. As brake pedal is depressed, linkage returns transmission to neutral, dynamically braking tractor. Brake band is actuated after transmission reaches

neutral, providing additional braking action. Brake band also serves as parking brake.

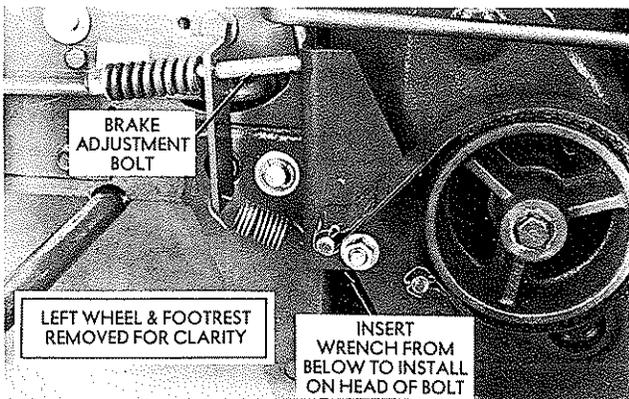
To adjust brake, remove left hand side cover, which is secured by two screws at top, one screw at bottom and a bolt at front.

1. Set parking brake so that lever is latched in first notch in control cam. This is done by pulling back on parking brake lever as brake pedal is slowly depressed. You will feel lever move back slightly as it drops into first notch of control cam.
2. Tighten nut on brake linkage bolt until coils of heavy spring are fully compressed, then back off nut 1/2 turn.
3. Release parking brake and check that brake band is not dragging on brake drum.



### 300, 400-Series Automatic – Brake Adjustment

If tractor creeps after brake pedal is depressed and then released, linkage that returns tractor to neutral requires adjustment. Your authorized dealer should make this adjustment.



### 300, 400-Series Automatic Brake Band & Drum

## PTO CLUTCH AND BRAKE ADJUSTMENT

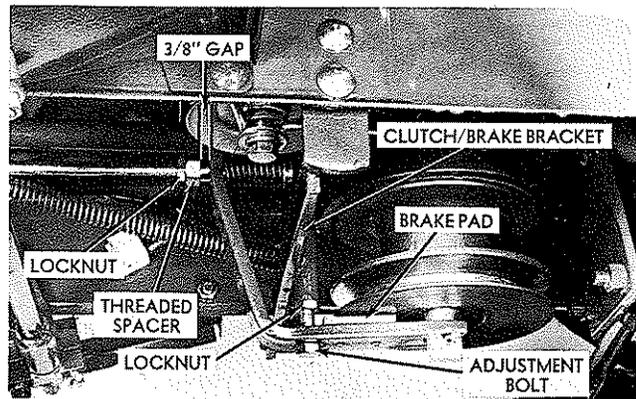
PTO clutch and brake may require periodic adjustment due to normal wear of friction surfaces. Adjustments are made as follows:

## 200-Series

To adjust PTO clutch and brake:

1. Engage PTO clutch.
2. Loosen locknut on PTO brake adjustment bolt.
3. Turn adjustment bolt so there is a .010 in. (.25 mm) gap between brake pad and clutch pulley face, then tighten locknut.
4. Check gap between hex head of threaded spacer, on PTO rod, and clutch/brake bracket, which should be 3/8 in. (9.5 mm). If adjustment becomes necessary, proceed as follows:

Loosen locknut behind threaded spacer on PTO rod; turn hex end of threaded spacer clockwise or counterclockwise, as required, to attain proper gap. Retighten locknut and recheck gap between brake pad and clutch pulley face.



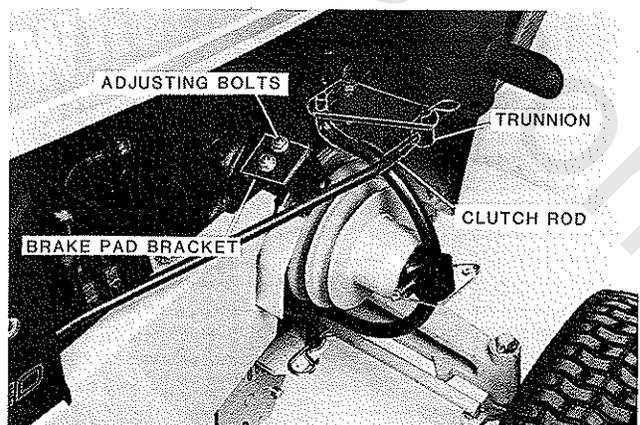
### 200-Series PTO Adjustments

## 300, 400-Series

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

To adjust PTO brake:

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



### 300, 400-Series PTO Adjustments

## CLEANING AND STORAGE

Tractor should be washed regularly with a mild automotive detergent and water. After 30 days, painted surfaces may be waxed to protect original finish.

Minor paint scratches or abrasions can be removed with an automotive cleaning and polishing compound. Rubbing compound is not recommended under normal circumstances, as it is highly 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 Wheel Horse paint are available through your Authorized Wheel Horse Dealer.

When tractor 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. Drain all fuel from fuel tank. Start tractor and 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 pump. DO NOT STORE GASOLINE FOR MORE THAN 2 MONTHS.
4. Wash tractor and repaint all bare metal surfaces.
5. 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 (4°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 tractor.

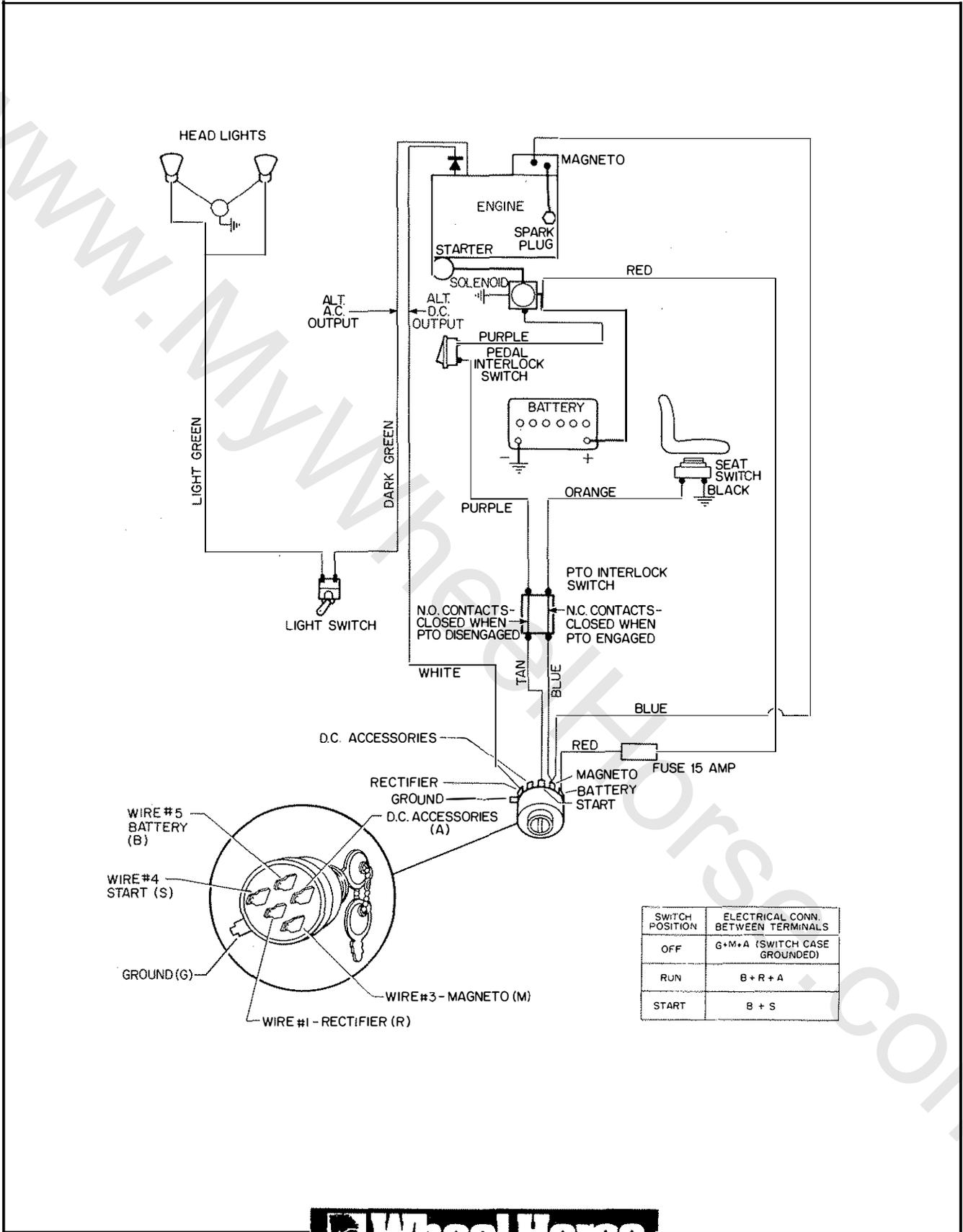
# TROUBLESHOOTING CHECKLIST

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE REMEDY</u>
Engine will not turn over.	Dead battery. Open safety interlock switch.  Starter. Solenoid. Ignition switch.	Charge or replace battery. Be sure PTO is disengaged and depress left pedal. Consult authorized dealer. Consult authorized dealer. Consult authorized dealer.
Engine turns over but will not start.	Spark plug(s) not firing.  Breaker points faulty. (N/A, 200-Series and 308-Model) No fuel in tank. Fuel valve closed. Improper carburetor adjustment. Ignition switch.	Check spark plug condition and reset gap. Check breaker points condition. Consult authorized dealer. Refuel tractor. Open fuel valve. Reset carburetor adjustment. Consult authorized dealer.
Engine hard to start.	Spark plug wire(s) grounded or loose. Breaker points faulty or improperly gapped. (N/A, 200-Series and 308-Model) Spark plug(s) faulty or improperly gapped. Fuel line clogged.  Faulty fuel pump (308, 310, 312, 414, 416, 417 Models). Carburetor dirty or improperly adjusted.	Check spark plug wires.  Consult authorized dealer.  Check spark plug condition and reset gap. Clean fuel line; check strainer in fuel tank. Consult authorized dealer.  Readjust carburetor. Consult dealer for authorized carburetor service.
Engine starts, but operates erratically.	Clogged fuel line.  Water in fuel.  Vent in fuel cap plugged. Faulty fuel pump (308, 310, 312, 414, 416, 417 Models). Improper carburetor adjustment.	Clean fuel line; check strainer in fuel tank. Drain old fuel and replace with fresh supply. Check vent. Consult authorized dealer. Readjust carburetor.

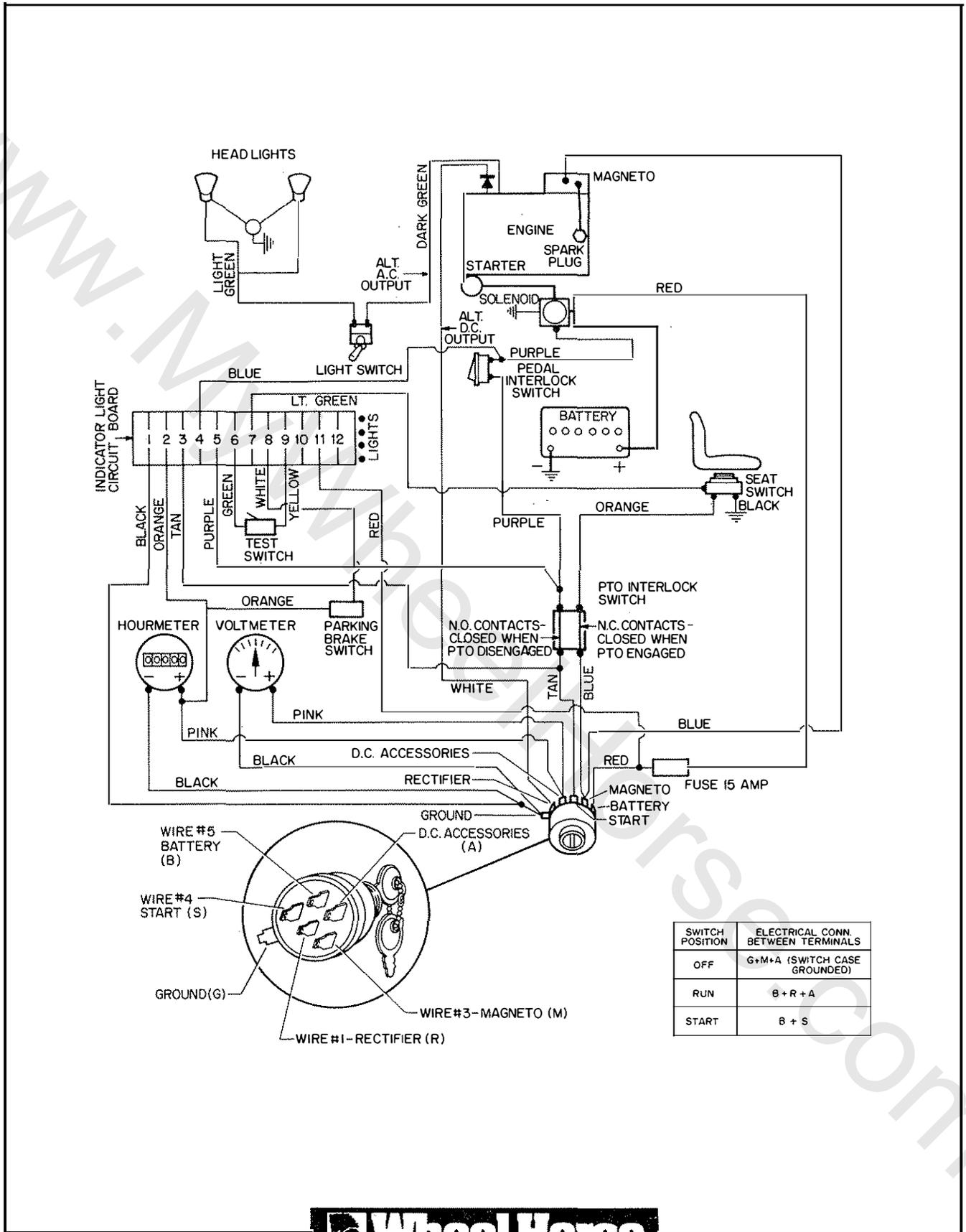
# TROUBLESHOOTING CHECKLIST (Continued)

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE REMEDY</u>
Engine knocks.	Fuel octane too low. Faulty Ignition System. Engine overheated.	Drain fuel and replace with higher octane supply. Consult authorized dealer. Shut off engine and allow to cool.
Engine occasionally "skips" at high speed.	Spark plug(s) fouled, faulty or gap too wide. Faulty 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. Faulty Ignition System. Engine overloaded.	Clean intake screen and fins. Adjust oil level as necessary. Readjust carburetor. Consult authorized dealer. Reduce load on tractor.
Engine idles poorly.	Improper carburetor adjustment. Improper spark plug gap.	Readjust carburetor. Check the condition and gap of spark plug(s).
Engine backfires.	Improper carburetor adjustment. Breaker points faulty. (N/A, 200-Series and 308-Model)	Readjust carburetor. Consult authorized dealer.
Engine runs fine, but tractor will not move.	Transmission clutch disengaged. Faulty Transmission.	Engage clutch. Consult authorized dealer.
Tractor loses power or transmission overheats. (Automatic models)	Transmission oil level too high or too low. Transmission damage has resulted from operating engine at low RPM or contamination of oil.	Adjust oil level as necessary. Consult dealer for authorized service.
Engine stalls whenever PTO is engaged.	Excessive load on PTO. Faulty interlock system.	Check for jammed attachments. Lessen load on attachment. Seat must be occupied to close interlock system. Consult authorized dealer.

# WIRING DIAGRAM – 208-3, 211-3 MODELS



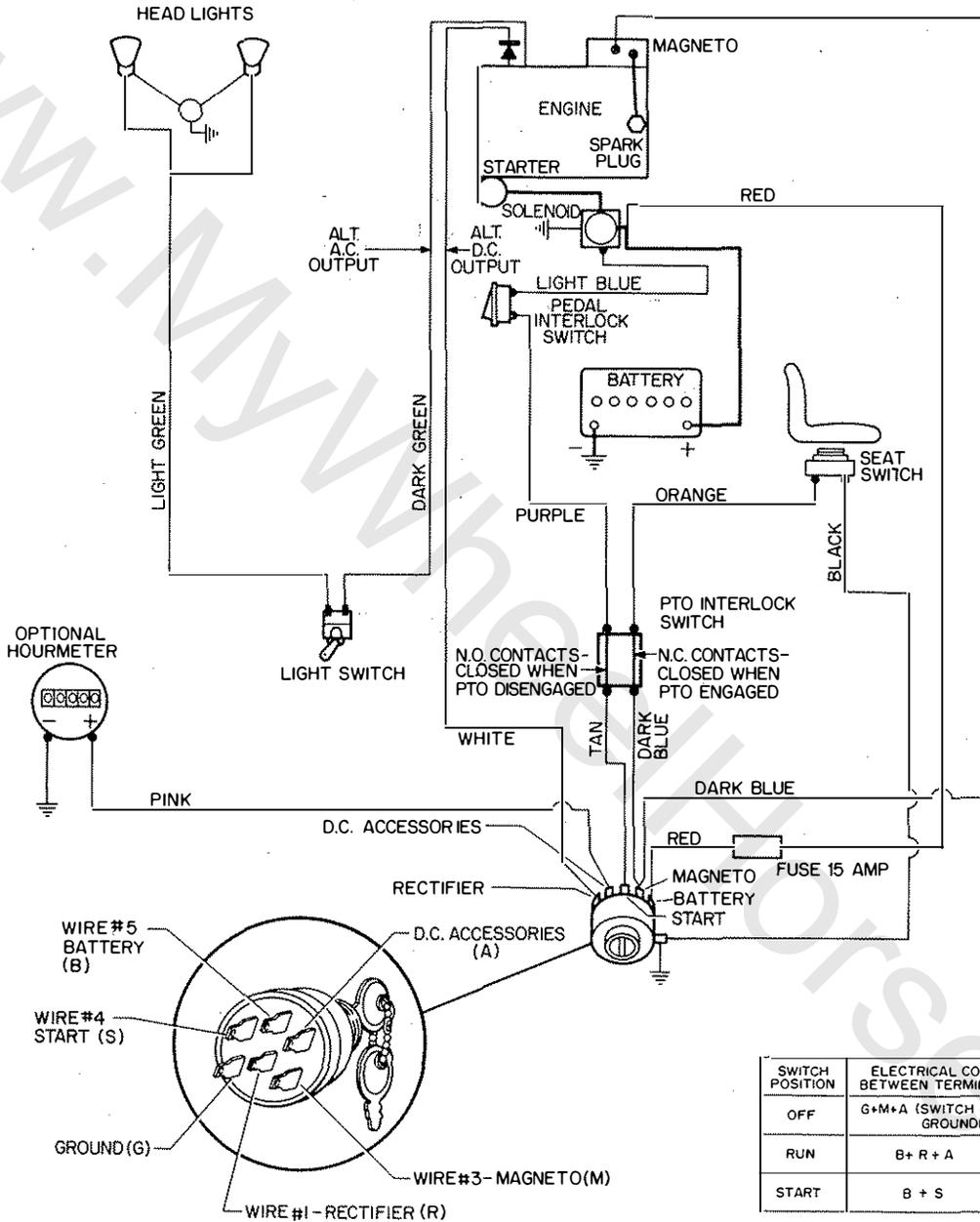
# WIRING DIAGRAM – 211-5, 211-6 MODELS



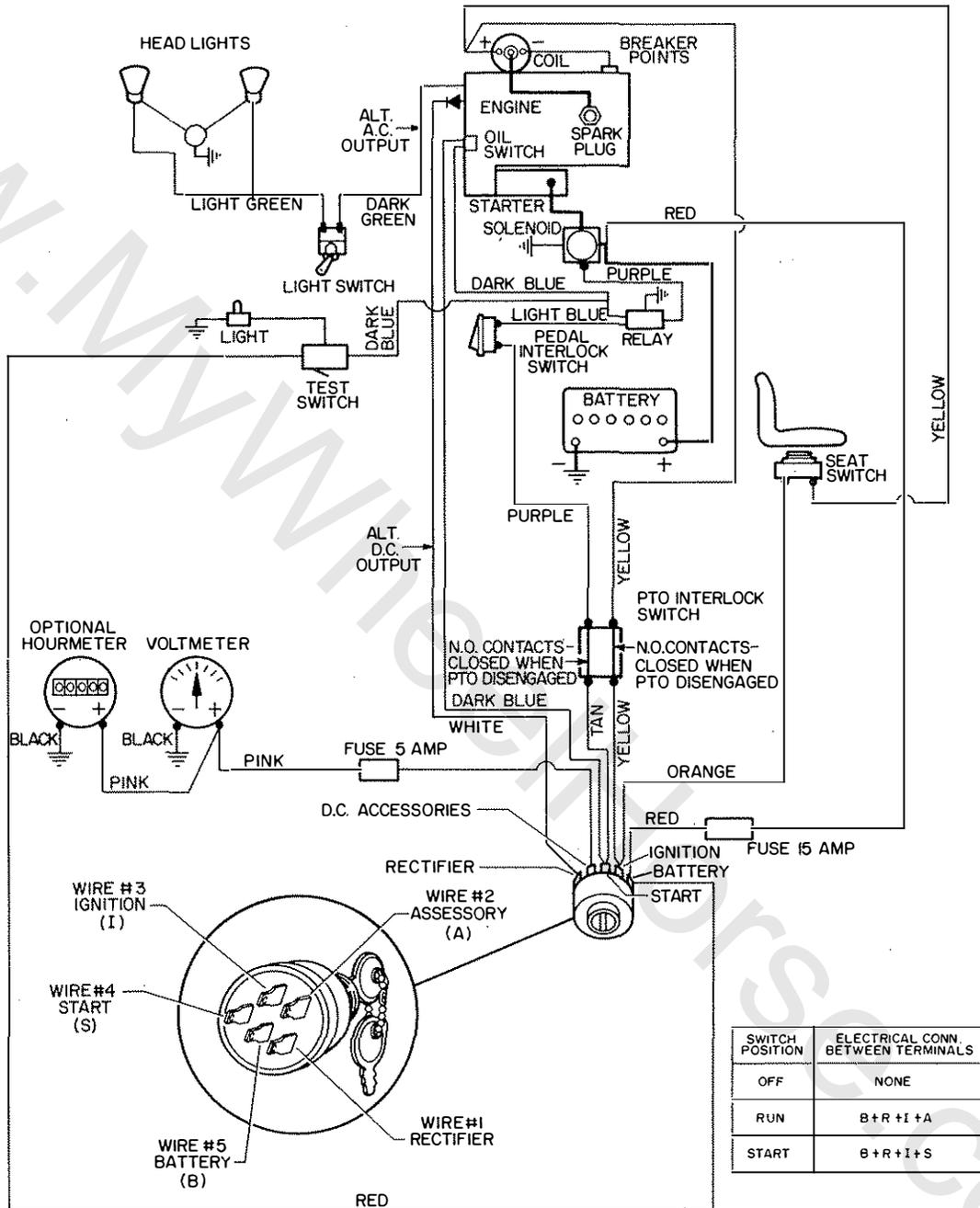
SWITCH POSITION	ELECTRICAL CONN BETWEEN TERMINALS
OFF	G+M+A (SWITCH CASE GROUNDED)
RUN	B + R + A
START	B + S



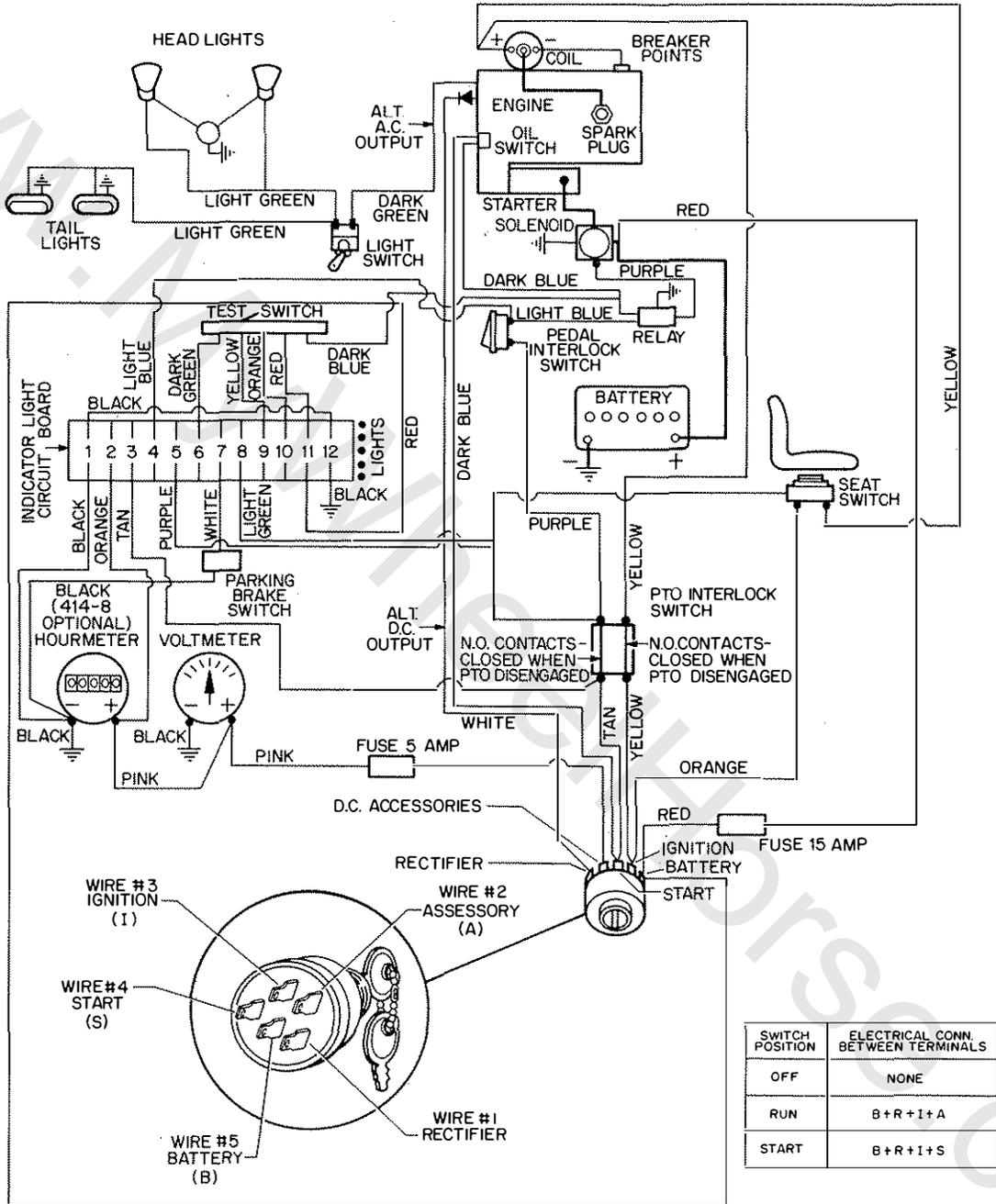
# WIRING DIAGRAM – 308 MODEL



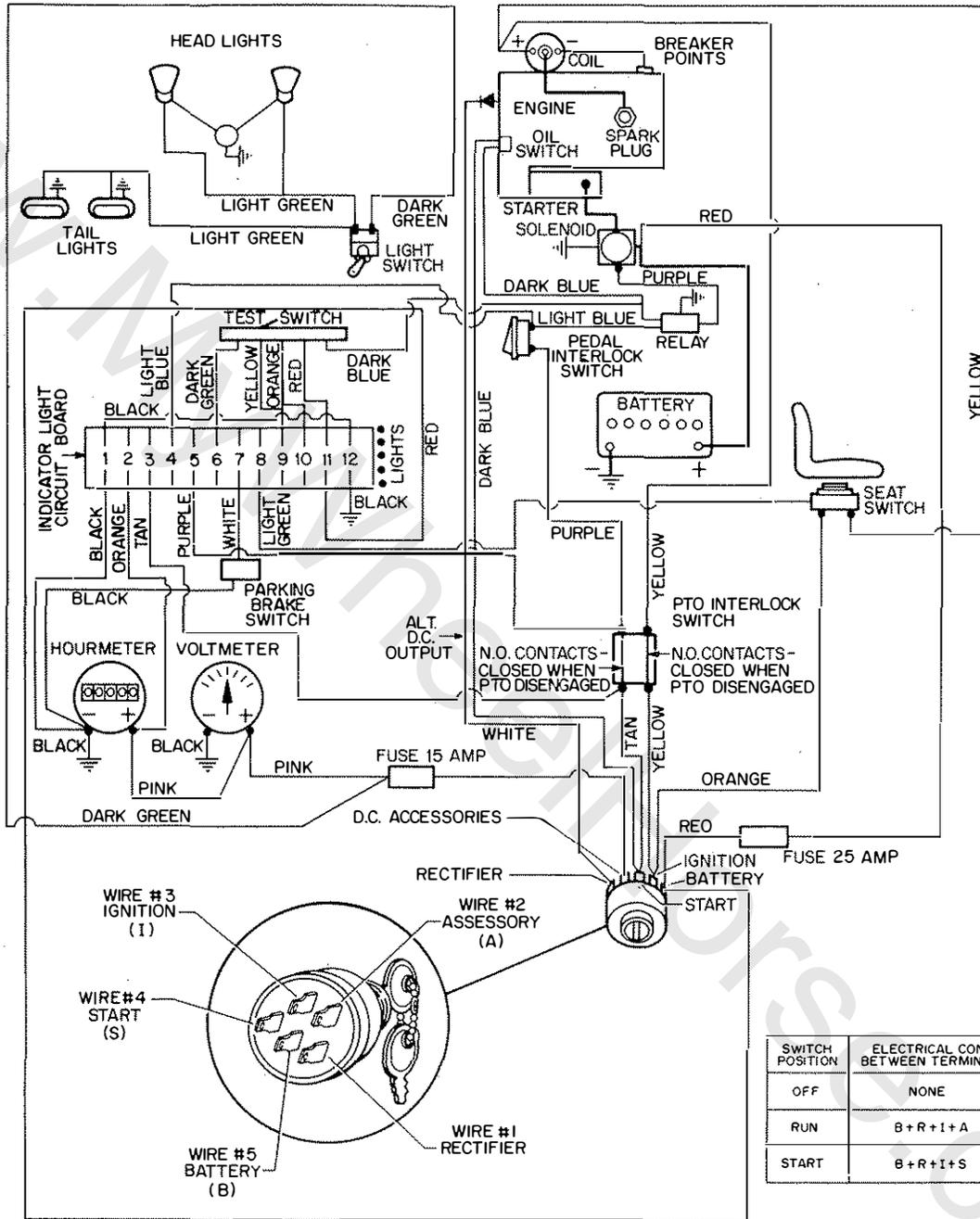
# WIRING DIAGRAM – 310 MODEL



# WIRING DIAGRAM – 312, 414 MODELS



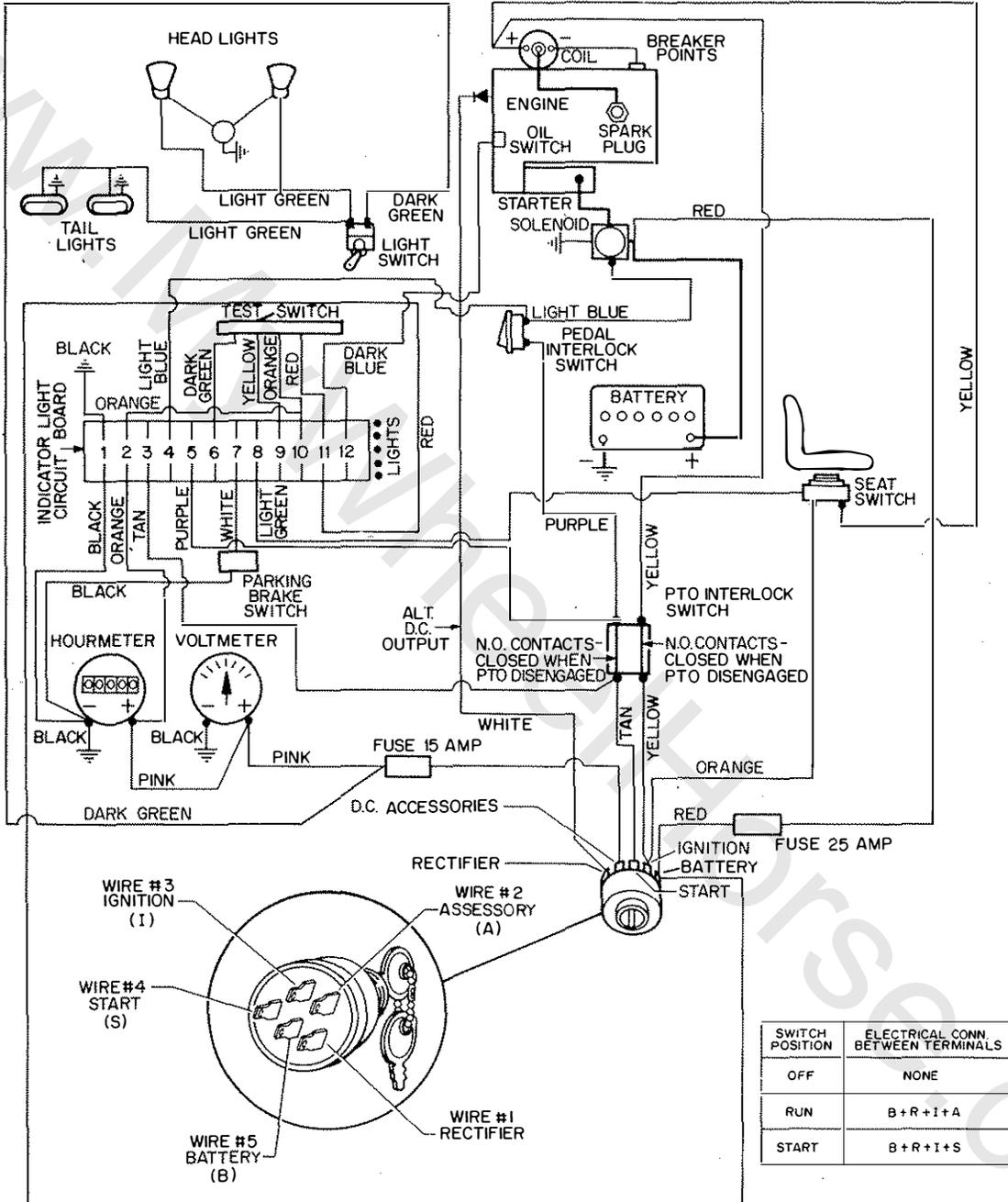
# WIRING DIAGRAM – 416 MODEL



SWITCH POSITION	ELECTRICAL CONN. BETWEEN TERMINALS
OFF	NONE
RUN	B+R+I+A
START	B+R+I+S



# WIRING DIAGRAM — 417 MODEL



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