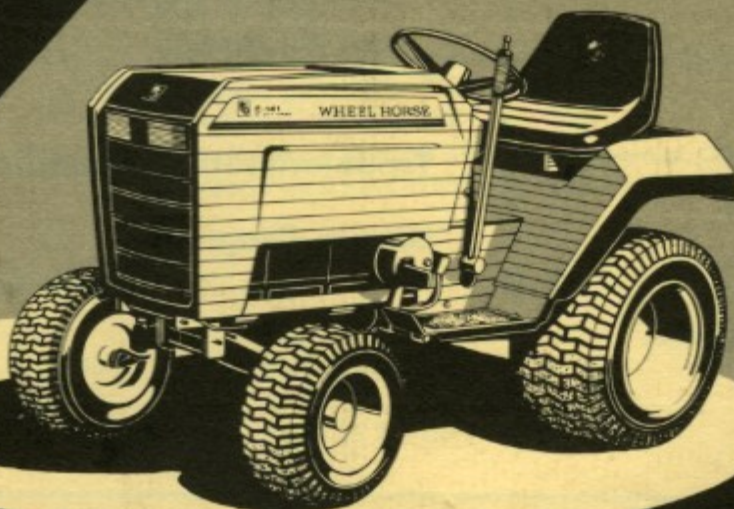


E-141



**Owners
Manual**



WHEEL HORSE
lawn & garden tractors

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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.

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

TRACTOR SPECIFICATIONS:

MOTOR: 36 Volt DC Permanent Magnet Motor with Built-in-Thermal Overload Circuit Breaker

BATTERIES: 12 Volt Deep Discharge (Golf Cart Type)

Rated at: 90 Amp Hour — 20 Hour Rate; or 155 Minutes at 25 Amps.

TRANSMISSION:

Type:	Mechanical, All Gear		
Number of Forward Speeds:	6		
Number of Reverse Speeds:	2		
Approximate Ground Speeds:	Gear	Low Range	High Range
	1st	.5 mph (.7 kph)	1.8 mph (2.9 kph)
	2nd	.7 mph (1.1 kph)	2.9 mph (4.7 kph)
	3rd	1.3 mph (2.0 kph)	5.0 mph (8.1 kph)
	Rev.	.5 mph (.9 kph)	2.4 mph (3.8 kph)

ELECTRICAL SYSTEM:

Circuit Voltage:	Main — 36 Volt DC, Isolated Ground Lights — 12 Volt DC, Isolated Ground
Power Pack:	Six 12 volt batteries series connected as two sets of three, with the sets wired in parallel
Power Control:	Brain in a Box
Protection Devices:	Main Fuse (2) — 125 amp Open Link (Buss Type WEA) Secondary Fuse (2) — 3 amp AGC Light Fuse — 20 amp SFE Drive Motor — Internal Auto. Reset Thermal Circuit Breaker Charger/Accessory Circuit — 50 amp Manual Reset Circuit Breaker

TIRES:

	Front	Rear
Size:	16 x 6.50-8	23 x 8.50-12
Pressure*:	12-24 PSI (.85-1.69 kg/cm ²)	12-15 PSI (.85-1.05 kg/cm ²)

PHYSICAL DATA:

HEIGHT	LENGTH	WIDTH	WHEEL BASE	OUTSIDE TURNING RADIUS	OPERATIONAL WEIGHT
41.5 in. (105 cm)	69 in. (175 cm)	36 in. (92 cm)	45.5 in. (116 cm)	87 in. (221 cm)	805 lbs. (364 kg)

LIQUID CAPACITIES:

Transmission:	2 qt. (1.9 l)
Batteries:	6 qt. (5.7 l) per Battery

CHASSIS:

Zerk Fittings:	6
Front Wheel End Play:	0-.015 in. (.4 mm)

*Tire pressures may be increased or decreased within the given range to maximize operator control and comfort.

GENERAL SAFETY SUGGESTIONS

Recommended by Outdoor Power Equipment Institute

SAFE OPERATION PRACTICES — RIDING VEHICLES

1. Know the controls and how to stop quickly — **READ THE OWNER'S MANUAL.**
2. Do not allow children to operate vehicle. Do not allow adults to operate it without proper instruction.
3. Do not carry passengers. **Keep children and pets a safe distance away.**
4. Clear work area of objects 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.
11. Reduce speed on slopes and in sharp turns to prevent tipping or loss of control. Exercise extreme caution when changing direction on slopes.
12. Stay alert for holes in terrain and other hidden hazards.
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 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.
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. Check grass catcher bags frequently for wear or deterioration. Replace with new bags for safety protection.



CAUTION



1. KEEP ALL SHIELDS IN PLACE.
2. BEFORE LEAVING OPERATOR'S POSITION:
 - A. SHIFT TRANSMISSION TO NEUTRAL
 - B. DISENGAGE AND LOWER ATTACHMENTS
 - C. SET PARKING BRAKE
 - D. SHUT OFF ENGINE (MOTORS)
 - E. REMOVE IGNITION KEY
3. KEEP PEOPLE AND PETS A SAFE DISTANCE AWAY FROM MACHINE.
4. WAIT FOR ALL MOVEMENT TO STOP BEFORE SERVICING MACHINE.

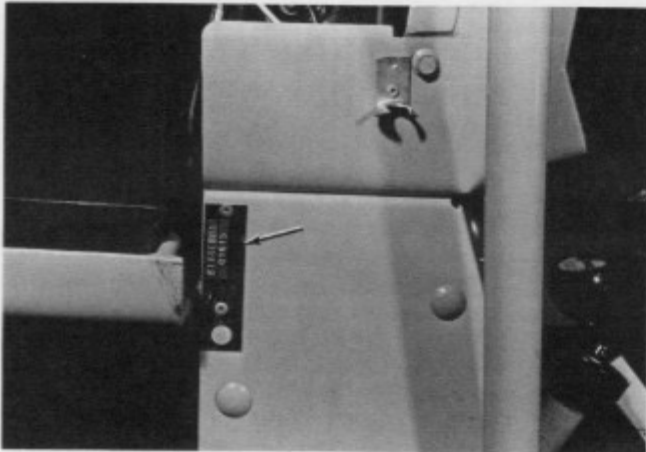
VEHICLE IDENTIFICATION NUMBER (VIN) LOCATIONS

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

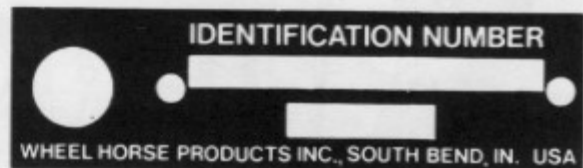
The tractor vehicle identification number plate is located on the left side of the hoodstand, just to the rear of the upper battery tray.

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

For your convenience and ready reference, enter the tractor identification number below.



VIN Plate Location



OWNER REGISTRATION AND IDENTIFICATION CARD

Service and warranty assurance is as important to Wheel Horse as it is to you, the owner. TO ASSURE warranty service at ANY Authorized Wheel Horse Dealer, Wheel Horse provides an "OWNER IDENTIFICATION CARD" for each new tractor, or major attachment, registered with the factory.

To receive your "OWNER IDENTIFICATION CARD" either you or your dealer must fill in the required information on the "NEW OWNER FACTORY REGISTRATION CARD" and mail immediately. Your "OWNER IDENTIFICATION CARD" will be returned by mail.



WHEEL HORSE
lawn & garden tractors

OWNER IDENTIFICATION CARD

PRODUCT ID NUMBER

SELLING DEALER

WARRANTY EXPIRES

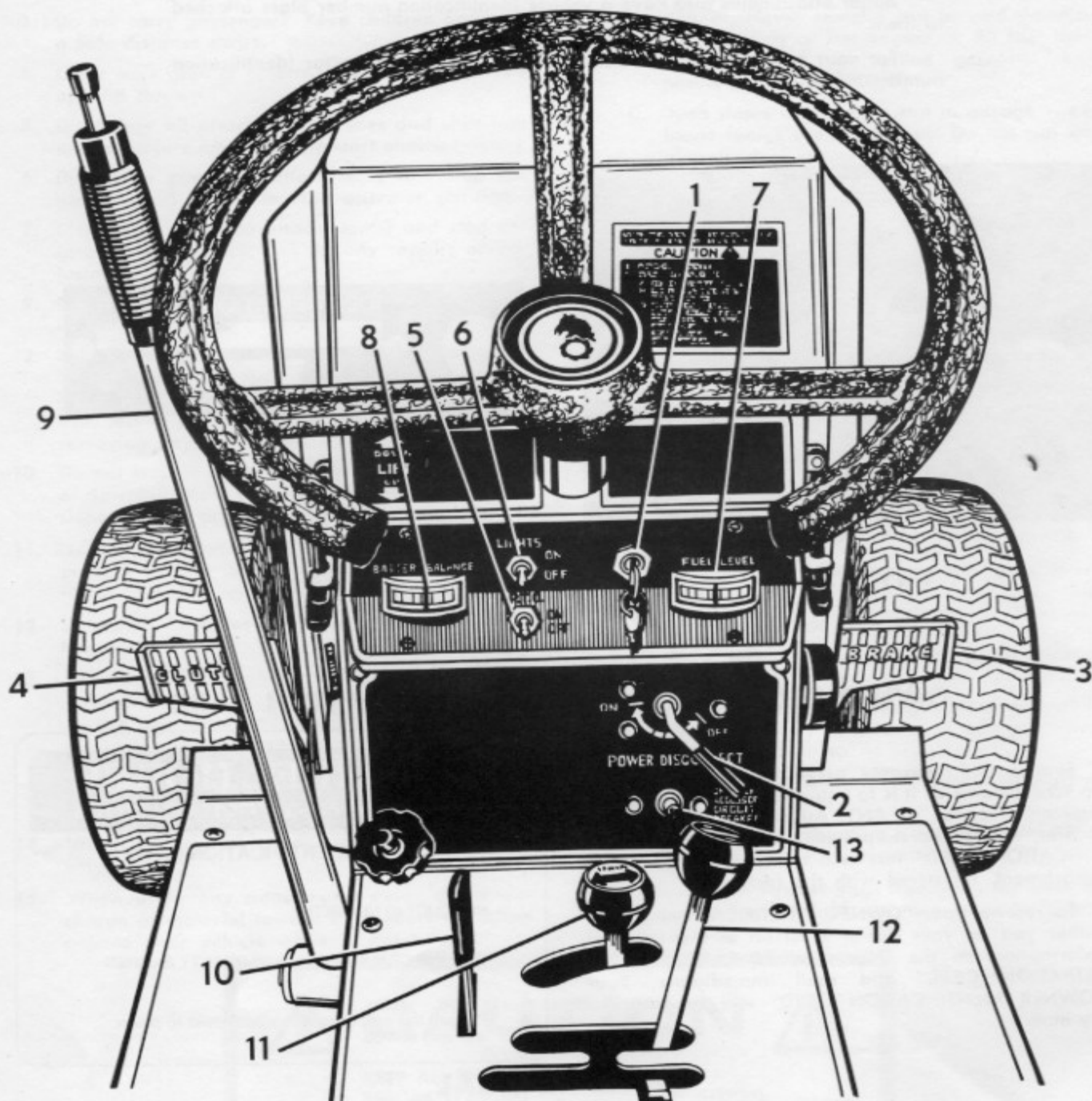
Present this card to an authorized dealer to obtain warranty service.

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



1. IGNITION SWITCH

The ignition switch is located on the upper portion of the dash panel, just right of center. The ignition switch has three positions from left to right: (1) Off, (2) Run, (3) Start. To start the drive motor, turn the key all the way to the right. Release the key when the drive motor starts and it will automatically return to the Run position.

2. POWER DISCONNECT SWITCH

The power disconnect switch is located just below the right side of the dash panel. This switch, much like the fuel shut-off valve on a gasoline powered tractor, is turned Off when the tractor requires service. Rotate the switch clockwise to turn the switch On. Rotate the switch counterclockwise to turn the switch Off. **Always turn the power disconnect switch Off when charging the power pack and when performing any adjustments or service on the tractor or installed attachments.**

3. BRAKE PEDAL

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

4. CLUTCH PEDAL

The clutch pedal is located at the left side of the tractor. Pushing down on the clutch pedal does two things: (1) Disengages the tractor drive belt, disconnecting the drive motor from the transmission; (2) Actuates a safety interlock switch, so the drive motor will start. Engaging the clutch is done by releasing the pedal which tightens the drive belt. **Always release the pedal slowly when engaging the clutch. Always depress the pedal when shifting the transmission into or out of gear and when starting the drive motor.**

5. PTO (POWER TAKE-OFF) SWITCH

The PTO switch is located on the lower portion of the dash panel, just left of center. Power driven attachments are engaged and disengaged with the PTO switch. The PTO switch has three positions: (1) Off, (2) Run, (3) Start. To engage the PTO lift the switch to the Start position and release. The switch is spring loaded and will automatically return to the Run position. The PTO is disengaged by lowering the switch to the Off position. The PTO will not operate unless the drive motor is running.

6. LIGHT SWITCH

The light switch is located on the upper portion of the dash panel, just left of center. Raise toggle to turn on lights. Lower toggle to turn lights off. Lights will work anytime the power disconnect switch is in the On position.

7. FUEL LEVEL METER

The fuel level meter is located on the right side of the dash panel. The fuel level meter is a gauge indicating the level of charge remaining in the batteries. The meter needle will indicate in the green scale during charging operations and while the power pack

contains the useable portion of its charge. Stop power driven attachments (such as the mower) and return the tractor to the charger for recharging when the meter needle enters the yellow scale. Operation of the tractor when the meter registers in the red scale should be strictly avoided, to prevent damage to the batteries.

8. BATTERY BALANCE METER

The battery balance meter is located on the left side of the dash panel. The battery balance meter is a gauge that indicates how evenly the batteries are being discharged. The meter needle will normally deflect to the left and right within the green scale during operation. At low power levels (fuel level meter indicating in yellow scale), the battery balance meter may indicate in the red scale on the left or right side of the gauge. This is a normal condition.

9. LIFT LEVER

The manual lift lever is located just left of the steering wheel. Depress the release button and move the lever forward or backward to lower or raise attachments used with the tractor. When it is desired to hold an attachment at a certain height above the ground, the forward (down) travel of the lever can be limited by the Dial-A-Hite selector. Turn the hand knob right or left until the lift lever is held in the desired position. Always lower attachments before leaving the tractor unattended.

10. PARKING BRAKE LEVER

The parking brake lever is located in front of the seat to the left.

To engage the parking brake, first apply the foot brake solidly and then move the parking brake lever back to lock the brake On.

To release the parking brake, push down on the foot brake. The parking lever is spring loaded and will return to the disengaged position when the foot brake is applied.

11. RANGE SELECTOR

The range selector is located in front of the seat, just forward of the gear shift lever. Select either high or low range by moving the lever right or left to the position indicated on the decal on the shift knob. Low range provides a 4 to 1 speed reduction and greater pulling power for moving heavy loads in each of the three forward speeds and reverse. **Do not use a mid-point position for neutral; neutral must be selected with the gear shift lever.**

12. GEAR SHIFT LEVER

The gear shift lever is located just in front of the seat. Select any of three forward speeds or reverse by moving the lever to the position indicated on the shift pattern decal on the gear shift knob.

13. CHARGER/ACCESSORY CIRCUIT BREAKER

The charger/accessory circuit breaker is located in front of the operator, just below the power disconnect switch. This circuit breaker protects electrical circuits from damage by excessive current when the tractor is being charged, or when an accessory, such as the rotary inverter, is being operated from the charger/accessory receptacle.

OPERATING YOUR TRACTOR

POWER PACK BREAK-IN

Unlike gasoline engines that are run-in at the factory, the power pack in your new tractor is put into service by your dealer. For maximum battery life, it is important that proper break-in procedure is followed the first 5 times the tractor is used:

1. Operate the tractor only as long as the fuel level remains within the green scale on the fuel level meter.
2. Recharge the batteries fully after each use.
3. Check the water level in all the batteries after recharging.

After the break-in period, the power pack should be recharged as described in the instructions provided with the charger.

SAFETY INTERLOCK SYSTEM

The safety interlock system incorporates two switches for safe starting.

The two starting switches are actuated by the clutch pedal and the seat. If the tractor will not start, check that the clutch pedal is depressed and that the operator is properly seated.

The seat switch will also shut the tractor off if the operator rises off the seat with the ignition switch in the Run position.

CORRECT DRIVE MOTOR OPERATION

CAUTION
Before starting the drive motor, become familiar with all controls. Read this owner's manual thoroughly.

STARTING THE MOTOR

Because of a built-in safety interlock system, your new Wheel Horse will not start unless the operator is in the seat and the clutch pedal is depressed.

To start the motor depress the clutch pedal.

CAUTION
Always place the transmission gear shift lever in the neutral position before attempting to start the motor.

Turn the ignition key clockwise until the motor starts. When the motor starts, release the key. The switch is spring loaded and will return to the Run position automatically.

STOPPING THE MOTOR

The motor is stopped by turning the ignition key to the Off position.

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

MOTOR PROTECTION

To help protect the drive motor from damage due to excessive loads, the tractor is equipped with an "audio alert" system that sounds an audible warning to the operator that the drive motor is operating under an overloaded condition. If a high pitched horn sound is heard, reduce the load by shifting the transmission into a lower gear. The "audio alert" system is also part of the charging circuit (see "Recharging the Batteries").

CORRECT TRANSMISSION OPERATION

TO GO FORWARD OR REVERSE

With the drive motor running, depress both the clutch and the brake pedals. Move the range selector to either the High or the Low position. Move the gear shift lever to the desired speed forward, or to reverse. The gear shift knob identifies the various speeds. Release the brake pedal. Slowly release the clutch pedal. As the clutch pedal is released, the tractor will begin to move.

CAUTION
Always release the clutch pedal slowly when starting the tractor in motion. Sudden starts can be damaging to the 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 the tractor to a complete halt by depressing both the clutch and the brake pedals.

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

Change either the gear shift lever or range selector as desired. The approximate ground speed for each gear is shown in the specifications in the front of this manual.

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

TO STOP

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

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

UNDERSTANDING THE GAUGES

FUEL LEVEL METER

The fuel level meter is a direct reading gauge that reflects the amount of power stored in the batteries. When the power pack is being charged the fuel level meter will read toward the right side of the green scale. After the charging cycle has been completed, the meter needle will move toward the center of the green scale, indicating fully charged batteries.

As the tractor is operated, the meter needle will gradually move toward the left and enter the yellow scale. When the needle moves into the yellow scale, shut off power driven attachments and return the tractor to the charger for recharging. The red scale on the meter indicates severely discharged batteries. Operation of the tractor with the fuel level meter reading in the red scale can result in damage to the batteries.

BATTERY BALANCE METER

The battery balance meter indicates how evenly the batteries are being discharged. The meter needle will normally remain within the green scale, indicating an even discharge rate. Fluctuation of the needle within the green band is normal. When the power pack is at a low power level (fuel level meter indicating in yellow scale) the balance meter may indicate in the red scales to the left and right of center. This is also a normal condition.

Keep in mind that the battery balance meter is read when the batteries are being discharged. Under normal conditions, meter indications while the power pack is being recharged are unimportant and should be disregarded.

When the fuel level is in the green scale on the fuel level meter and the battery balance meter indicates in one of the red scales, it is an indication of trouble. Possible faults causing incorrect battery balance meter readings are covered in the Maintenance Section of this manual.

RECHARGING THE BATTERIES

Your new Wheel Horse is powered by 12 volt heavy duty DEEP DISCHARGE (GOLF CART TYPE) BATTERIES. Power stored in these batteries is restored using the off-board charger unit. Detailed instructions for recharging the batteries are supplied with the charger.

⚠ CAUTION ⚠

Batteries produce flammable hydrogen gas. Avoid creating sparks and open flames and do not smoke when working near batteries. Do not remove battery vent covers when the power pack is being recharged.

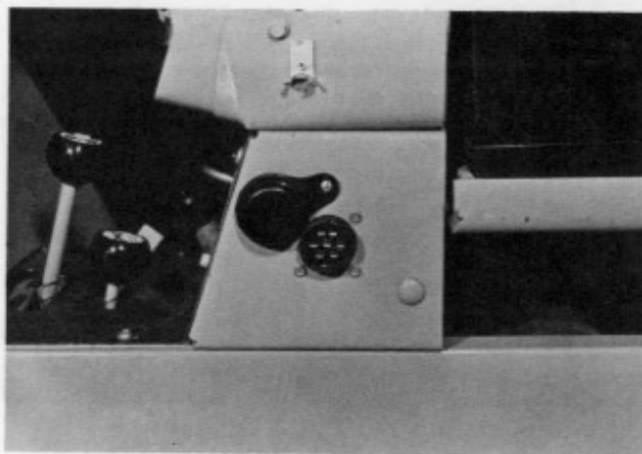
Battery electrolyte solution is poisonous and can be injurious to eyes, skin and clothing. In the event of an accident, flush affected area immediately with a solution of one part baking soda to four parts water. Notify physician immediately. If baking soda is not immediately available, flush affected area with water. Notify physician immediately.

The charger is connected to the receptacle located on the right side of the tractor, just above the footrest.

The power disconnect switch must be in the Off position for charging or the power pack will not recharge. The "audio alert" system has been incorporated into the charging circuit. If the charger is connected to the tractor with the power disconnect switch On, a high pitched horn sound will be heard. Turn the power disconnect switch to the Off position.

When the power pack requires recharging, return the tractor to the charger location. If the power pack should accidentally become fully discharged during operation, shut off all power and allow the tractor to set for 10-15 minutes. Start the drive motor and return the tractor to the charger location for recharging.

The charger delivers a high rate of output during the early part of the charging cycle, when the batteries store the major portion of their power. This is especially useful when longer operation between complete charge cycles is desired. During any pause in operation of 10 minutes or more, simply place the tractor on charge to quickly restore some of the power to the batteries.



Charger/Accessory Receptacle

CORRECT ACCESSORY OPERATION

The charger receptacle on the tractor is also used to power certain accessories, such as the rotary inverter. These accessories are connected in the same manner as the charger. The accessory will operate with the power disconnect switch in either the On or Off position.

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.

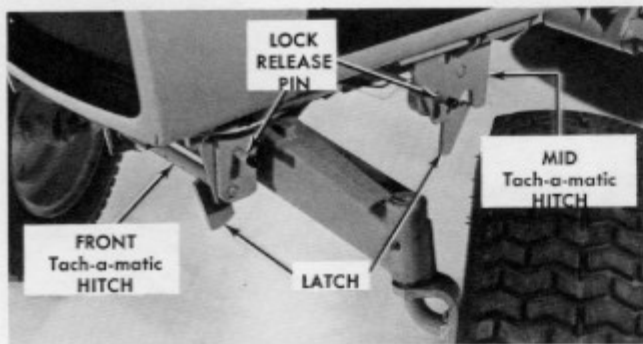
FRONT AND MID ATTACHMENT HITCHES

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

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

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

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



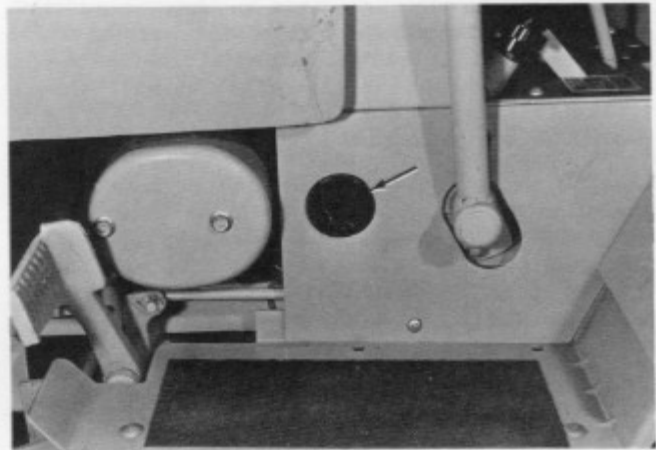
Front and Mid Attachment Hitches

PTO OUTLET

Power driven attachments are plugged into a convenient PTO outlet located on the left side of the tractor just above the footrest.

⚠ CAUTION ⚠

Always remove the ignition key and turn the power disconnect switch to the Off position before installing or removing any power driven attachments or making any adjustment or repair.



PTO Outlet

OPERATION OF THE TRACTOR:

Because of the power of the tractor, no problem should be encountered using these attachments under normal conditions. On rough, hilly, or wet terrain, the addition of wheel weights and tire chains will minimize rear tire slippage.

WHEEL HORSE DOES NOT RECOMMEND ADDING ANY OTHER WEIGHT, SUCH AS WATER OR CALCIUM CHLORIDE, TO THE REAR TIRES. THIS ADDITIONAL EXTRA WEIGHT CAN CAUSE EXTENSIVE TRANSMISSION DAMAGE.

WITH A MOWER

⚠ WARNING ⚠

Keep all shields and mower discharge chute in place. Never attempt to clear discharge areas or mower blades without disengaging the PTO, removing the ignition key and turning the power disconnect Off.

For best operation on average lawns the tractor should be operated at 2 to 3.5 MPH (3.2 to 5.6 KPH). Uneven cutting is often the result of excessive ground speed. To correct, reduce the ground speed with the 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 the mower in it's highest position, making a second pass cutting to the height desired.

Always keep the mower blades sharp.

WITH A DOZER OR GRADER BLADE

Although the 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 the blade is used. Impact with a solid object may result in injury to the operator and/or damage to the blade.

Grader blades are generally preferred for leveling sand, dirt or gravel. The operation of these blades is similar to that of a dozer blade.

When using these attachments with the tractor, front wheel weights should be used to increase front wheel traction. Rear wheel weights and tire chains may also be used to increase rear wheel traction.

WITH DRAWBAR TYPE ATTACHMENTS

Many attachments simply use the tractor as a towing vehicle. They are attached or removed from the tractor by the 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 the dump cart.

In any case, all these attachments should be ap-

proached with the same amount of caution given any mechanical device. Always read each Operating Instruction Manual carefully before attempting to use the attachment. Keep children and pets away from the vehicle when in operation. Never allow any unauthorized personnel to operate the equipment.

WITH TRACTOR POWERED ACCESSORIES

Power driven accessories, such as the rotary inverter for operating 115V AC equipment from the tractor's power pack, are connected to the tractor's charger/accessory receptacle. When operating this type of equipment, check the fuel level gauge periodically to insure that the power pack is not overly discharged. Refer to the Owner's Manual supplied with each accessory for detailed operating instructions.

CAUTION

Power is always present at the charger/accessory receptacle. When making an adjustment or repair to power driven accessories, always turn the accessory off and disconnect the power cable from the charger/accessory receptacle.

MAINTAINING YOUR TRACTOR

⚠ CAUTION ⚠

To minimize the chance of injury, perform all maintenance and adjustments on your tractor with the motor off and ignition key removed, unless instructed otherwise in this section. Use extreme care when working near operating machinery. Remove watch and jewelry before beginning work and observe common safety practices when using tools.

MAINTENANCE CHECKLIST

	After each Use	Every 10 Hours	Every 25 Hours
SERVICE OPERATION			
Check:			
Tire Pressures		X	
Transmission Oil Level			X
Tightness of all Attaching Hardware			X
Clean Drive Motor	X		
Lubricate Chassis			X
Check Battery Water Level*	After every 10th recharging		
Clean Power Pack	At least twice a month while tractor is in service		

*Refer to "Power Pack Break-In" for check interval on new tractors.

NOTE: These service intervals are considered **MAXIMUM** under normal operating conditions. Increase frequency under extremely dirty or dusty conditions.

DRIVE MOTOR

The tractor's drive motor should be kept clean and free of debris. After each use, wipe off the accessible portions of the drive motor case and surrounding sheet metal. Keeping this area clean will keep the motor's cooling system working at peak efficiency.

CHARGING SYSTEM

The charging system on the E-141 tractor consists of the off-board charger unit, control circuitry inside the "Brain in a Box" and interconnecting wiring between the charger connector, the Brain in a Box and the batteries. The charging system normally requires no maintenance other than periodically checking that all exposed wiring and electrical connections on the tractor are clean, tight and in good condition.

The charger and Brain in a Box work together to recharge the power pack. Special circuits inside the Brain in a Box control the distribution of charging current to the batteries and signal the charger unit to supply various rates of charge current.

Charging current passes through the charger/accessory circuit breaker and the two main fuses in the vehicle (see "Circuit Breakers" and "Fuses", following). A fuse inside the charger unit helps protect it against serious damage in the event of an internal failure in the charger. Refer to the charger Owner's Manual for information about this fuse.

ELECTRICAL SYSTEM

All of the tractor's circuits, except for the lights, are powered by 36 volts D.C. The 12 volt batteries are series connected in groups of three to obtain this voltage, then the groups of three are connected in parallel to give the tractor its operating range. The light circuit is 12 volt D.C. operated, power being supplied by connecting this circuit to the battery in the upper battery tray.

Almost all electrical functions of the tractor are controlled by the Wheel Horse "Brain in a Box", which is the key to the simple operation and low maintenance requirements of the E-141 tractor. The use of modern electronic circuits eliminate most electro-mechanical devices, providing a high degree of reliability and permitting special features, such as the "audio alert" system, to be easily incorporated into the design. The electronic circuits within the box are sealed to protect them from moisture, dirt and vibration. No routine maintenance of the Brain in a Box is required.

The various electrical circuits in the tractor are protected by a number of fuses and circuit breakers, to guard against damage caused by excessive current. Excessive current in a circuit can be due to; a defect in a circuit (open, short, or ground); overload during operation (cutting tall, wet grass with the mower at low cutting height, moving a heavy load in too high a gear); low battery voltage (operating tractor too long between charges, corroded battery connections).

Excessive current causes heat, which in turn causes these protective devices to open and stop current flow before serious damage occurs.

Proper care of the electrical system consists of periodically checking that all exposed wiring and electrical connections on the tractor are clean, tight and in good condition, and operating the tractor in a manner that avoids continuous overloads. When a circuit breaker or fuse opens, it is **important to always check for a possible electrical fault before restoring power and resuming operation. Continued blowing of fuses or tripping of circuit breakers should be investigated immediately to determine the cause.**

Unlike many other electrical systems, the E-141 tractor uses an isolated ground, meaning that the negative side of the battery pack is not connected to, and is insulated from, the frame. Therefore, when checking for a possible electrical fault, it is important to insure that both the positive and negative sides of the batteries and all electrical components are insulated from all metal parts of the tractor.

⚠ CAUTION ⚠

Under no circumstances should automotive electrical equipment such as lights, horns, or any grounded frame device be attached to the tractor. The tractor frame is not grounded and such devices could cause damage to the control system and a potential safety hazard if used.

⚠ CAUTION ⚠

Avoid the possibility of electrical shorts. When servicing any part of the tractor's electrical system, always isolate the power pack. Turn the power disconnect switch Off, and disconnect battery cables as follows:

1. Disconnect the cable attached to the negative post of the battery in the upper battery tray (this isolates the two batteries under the seat also).
2. Disconnect a cable attached to a negative post on any one of the three batteries in the lower battery tray.

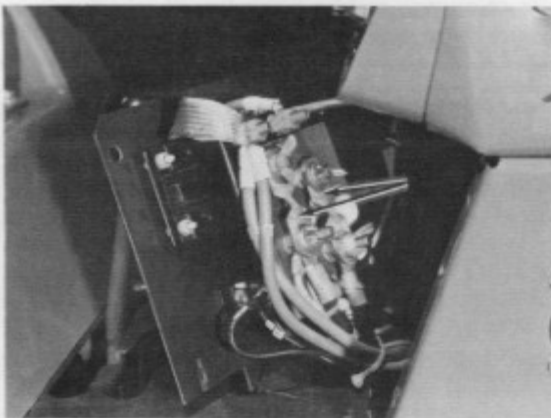
Keep in mind that even though the power supply has been disconnected, the batteries still contain electricity. Keep tools and other conductors away from battery terminals. Tape removed battery cables away from battery posts and insulate cable clamps.

Fuses

The E-141 tractor has two main fuses (125 amp open link, Buss Type WEA) for protection of the wiring and the power pack. If either fuse should open, the needle on the battery balance meter will move all the way to the left or right to indicate the fault.

Both fuses are located on the rear side of the power disconnect switch. To replace a fuse, isolate the power pack and then remove the two screws holding the lower dash panel in place. Pull the panel out toward the left rear to expose the fuses. The fuse toward the outside of the vehicle is connected in series with the rear battery in the upper battery tray and the two batteries under the seat. The other fuse is in series with the three batteries in the lower battery tray.

The fuses are held in place by wing nuts for easy replacement. When installing a new fuse, replace all parts exactly as they were before removal. If the brass washers on the fuse mounting studs show signs of corrosion, remove it with steel wool.



Main Fuses

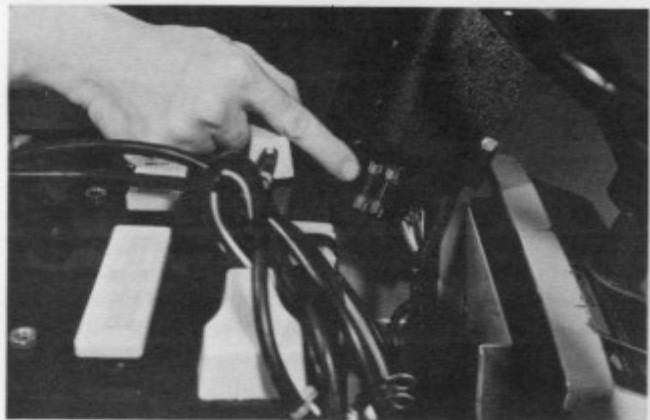
Two 3 amp AGC fuses are contained in external fuse holders at the bottom of the "Brain in a Box". These fuses protect low current portions of the trac-

tor's wiring and the Brain Box circuits. Check these fuses if one of the following indications is evident:

1. The fuel level meter does not indicate and the drive motor does not run when the ignition key is turned to the Start position (power pack charged).
2. The drive motor runs when the ignition key is turned to the Start position, but immediately stops when the key returns to the Run position (drive motor not overheated).

The "Brain in a Box" must be removed to replace these fuses. To do this, first isolate the power pack. Next, disconnect the two heavy cables connected to each side of the Brain in a Box, making a note of the connection points. Loosen the screw on each side of the box, nearest the top, until the Brain in a Box can be slid up and off its mounting bracket. The fuses are on the bottom of the box.

Use a fuse puller to safely remove and install the fuses. After replacement, check that the connector next to the fuses is securely attached and reinstall the Brain in a Box. Reconnect the four cables. On the right side of the box, connect cable 25 (red) to the upper PTO solenoid post and cable 32 (black) to the lower post. On the left side, connect cable 15-08 (black) to the upper drive motor solenoid post and cable 31 (red) to the lower post.



Low Current Fuses

The light circuit is protected by a 20 amp SFE fuse located in a fuse capsule connected to the light switch.



Light Fuse Capsule

ELECTRICAL SYSTEM (continued)

Circuit Breakers

The 50 amp charger/accessory circuit breaker is a manual reset type. Should excessive current be drawn from the charger, or if an accessory connected to the tractor draws excessive current, this circuit breaker will trip. If this occurs, disconnect the charger or shut off the accessory and push the button on the lower dash panel to reset it.

When actuated, the circuit breaker reset button will move outward slightly as a visual indication. Also, if the circuit breaker trips while the power pack is being recharged, the charger's fault indicator will light up to indicate an interrupted charge cycle. Depending upon when the circuit breaker operates, it can be up to 10 hours before the charger's fault indicator light will illuminate.

The tractor's drive motor and motors of power driven attachments and accessories are protected by internal circuit breakers (thermal). If a motor becomes too hot the circuit breaker will open and the motor will stop. If an attachment or accessory motor circuit breaker trips, the attachment or accessory will stop operating. If the drive motor circuit breaker trips, both the tractor and the attachment will stop operating.

Motor circuit breakers automatically reset after the motor cools. If an attachment or accessory suddenly stops when operating it under high load conditions, stop the tractor, allow the motor to cool off a few minutes and then resume operation. In the case of an overheated drive motor, the cooling process can be accelerated by the following method:

1. Place transmission in neutral.
2. Depress clutch pedal.
3. Hold ignition key in the Start position to operate the drive motor and circulate cooling air.
4. Periodically let the ignition switch return to the Run position. When the circuit breaker has reset, the drive motor will continue to operate in the Run position and normal operation can be resumed.

Batteries

⚠ CAUTION ⚠

Batteries produce flammable hydrogen gas. Avoid creating sparks and open flames and do not smoke when working near batteries. Do not remove battery vent covers when the power pack is being charged.

Battery electrolyte solution is poisonous and can be injurious to eyes, skin and clothing. In the event of an accident, flush affected area immediately with a solution of one part baking soda to four parts water. Notify physician immediately. If baking soda is not immediately available, flush affected area with water. Notify physician immediately.

⚠ CAUTION ⚠

When servicing, removing, or installing batteries, always isolate the power pack as outlined in the Caution at the beginning of this section, then disconnect remaining battery cables as required. Insulate cable clamps and secure away from battery posts to avoid the possibility of electrical shorts.

The tractor comes equipped with a convenient filler bottle for maintaining the battery electrolyte level. To use the bottle, fill it with distilled water and then simply insert the filler spout into each cell of the battery as far as it will go. The battery will automatically be filled to the correct level. Wash off the end of the filler spout after use.

On new tractors, adjust the electrolyte level after each of the first five recharging cycles (see "Power Pack Break-In" for additional information). Thereafter, check and adjust the electrolyte level after every 10 recharging cycles. The best time to add water is just before use, so the water will mix with the electrolyte. Unless the electrolyte is below the top of the plates inside the battery, do not fill the batteries before recharging, since the corrosive electrolyte is likely to overflow and cause damage to surrounding surfaces. If the water level is below the top of the plates in a battery, add only enough water to cover the plates, charge the battery pack, and then top off the batteries before use.

For longest service life use only low mineral content (distilled) water and keep the batteries clean by wiping them off with a paper towel. At least twice a month while the vehicle is in service, the batteries should be washed off to clean the sides of the batteries and flush out the battery trays. Use a garden hose (without a nozzle) and moderate water flow. Allow the tractor to dry off before using or charging.

Access to the batteries in the lower battery tray is gained by removing the clevis pin and hairpin cotter that secures the tray on both sides of the tractor. The lower battery tray can then be pushed out halfway toward either side of the vehicle to facilitate service.

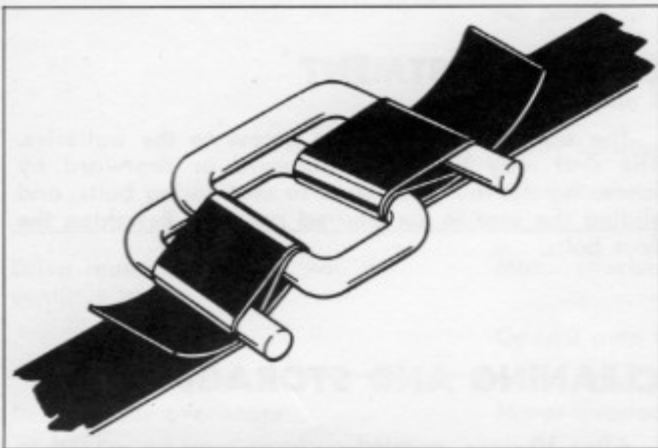
⚠ CAUTION ⚠

Never operate the tractor without the lower battery tray secured in position.



Battery Tray Clevis Pin Location

Plastic banding material is used to secure the batteries in position. If a battery or batteries must be removed for some reason, new banding material can be obtained from most distributors of packaging products. Use a **non-nylon** strapping tape, $\frac{3}{8}$ in. (1.1 cm) wide, with a rated strength of 500 lbs. (227 kg), such as Signode polypropylene plastic Contrax banding, Class 716. The following illustration shows how to route the banding material through the metal securing clips.



Securing Battery Banding Material

Corrosion around battery terminals can cause serious damage and reduced tractor performance if it is not taken care of promptly. Remove corrosion from battery terminals and cable clamps by applying a solution of one part baking soda to four parts water. Apply a light coating of grease or petroleum jelly to all exposed terminal surfaces and keep battery cables securely fastened to prevent corrosion.

The battery balance meter is very useful as an indicator of battery condition. If the meter indicates battery imbalance while the fuel level meter shows an adequate fuel supply, check all battery connections for tightness and inspect the cables and battery terminals for signs of corrosion. Another possibility is a faulty battery or one that is nearing the end of its useful life. Your Authorized Wheel Horse Dealer can perform tests to determine if this is the case.

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

Light Bulb Replacement

Headlight and tail light bulbs are easily replaced. Care should be taken when handling the bulbs, particularly if they are broken.

To replace the headlight bulbs, first remove the screws securing the headlight lens. Push the bulb down in its socket and turn counterclockwise to remove it.

To replace a tail light bulb, pry the lens off with a screwdriver. A slot is located at each end of the lens for this purpose. Push the bulb down in its socket and turn counterclockwise to remove it.

The bulbs are standard 12 volt automotive types:

Headlight Bulb — #1156

Tail Light Bulb — #1895

TRANSMISSION

Oil Quality

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

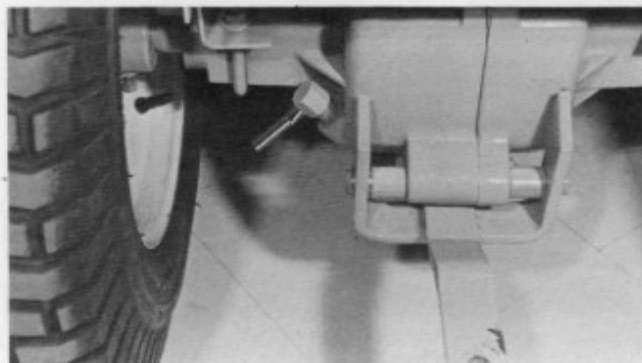
Oil
SAE 140
API Service
GL-5

Capacity
2 qt. (1.9 l)

Oil Level

The lubricant level should be checked after every 25 hours of operation. Changing the lubricant is not required except for major service. To check lubricant level remove the filler cap from the pipe nipple at the left rear of the transmission. Maintain oil level at the top of the pipe nipple.

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

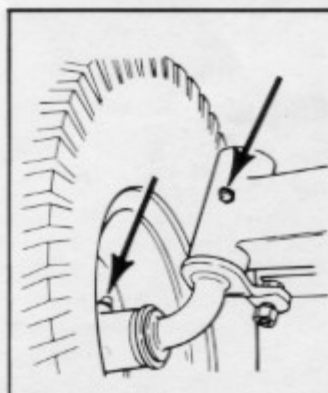


Transmission Oil Fill Cap

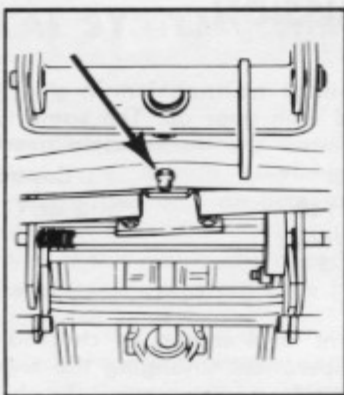
CHASSIS LUBRICATION

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

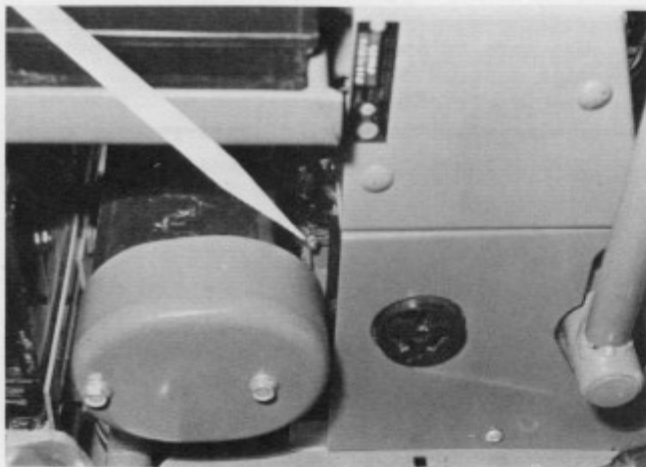
Lubricate the chassis after each 25 hours of operation. All other pivoting arms and levers should be lubricated at the same intervals with either general purpose grease or machine oil, applied directly to wear surfaces.



Front Wheel and Spindle Lube Fittings



Front Axle Lube Fitting

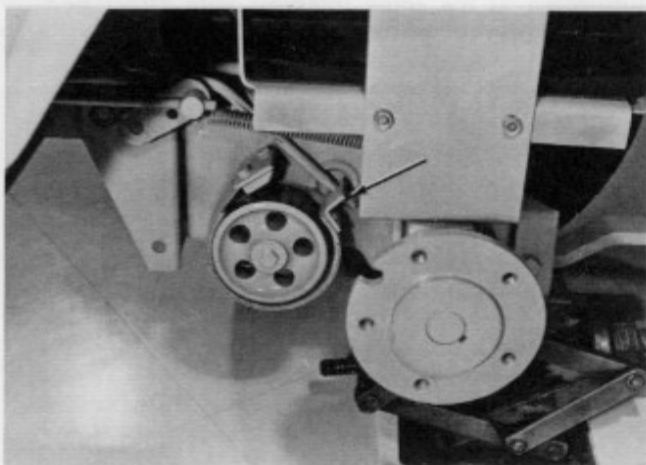


Steering Gear Lube Fitting

FOOT BRAKE ADJUSTMENT

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

To adjust the brake, tighten the adjustment nut in $\frac{1}{2}$ turn increments until proper braking action is restored. After adjustment, the brake band must not drag on the brake drum and the parking brake lever should not travel to the rear end of the lever's slot when the parking brake is engaged.



Brake Adjustment

PTO CLUTCH AND BRAKE ADJUSTMENT

Engagement and braking of power driven attachments is controlled by the tractor's PTO switch and related circuitry. No routine maintenance or adjustment of this system is necessary.

SEAT ADJUSTMENT

The seat tilts forward for access to the batteries. The seat may be moved forward or rearward by loosening the four seat plate to seat spring bolts, and sliding the seat to the desired position. Retighten the four bolts.

CLEANING AND STORAGE

After 30 days, painted surfaces may be waxed to protect the lustre of the original finish. The tractor should be washed regularly with a mild automotive type detergent and water. Exposed bare metal surfaces should be coated with oil or a light coating of grease to prevent rust until permanent repairs can be made. Aerosol cans of "Wheel Horse Red" and "Linen Beige" are available through your Authorized Wheel Horse Dealer.

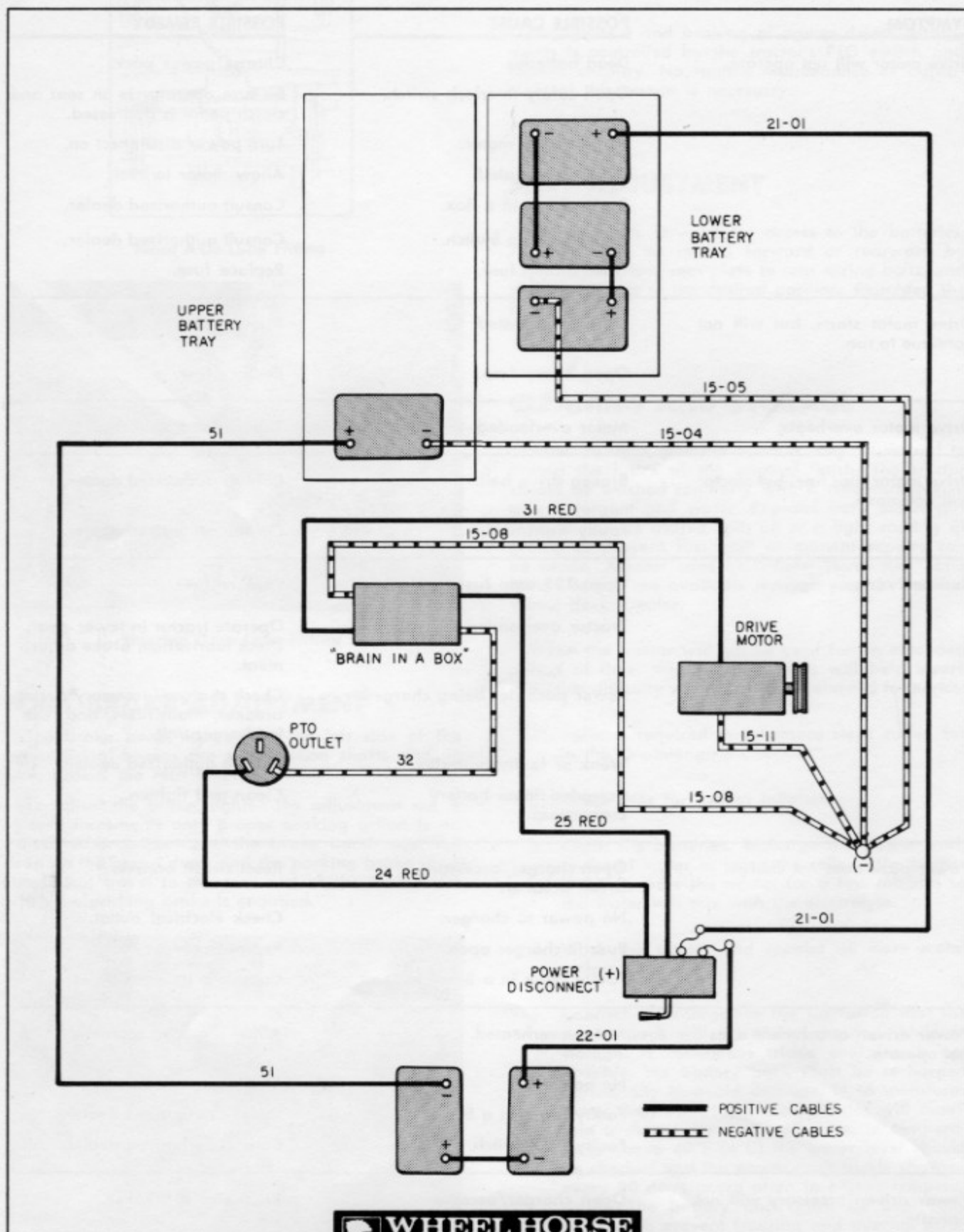
When the tractor will not be used for an extended period of time, the following steps will help insure minimum difficulty when the unit is returned to service:

1. Perform required maintenance steps called for in the "Maintenance Checklist".
2. Check tires for proper inflation.
3. Clean the batteries. Recharge the power pack and add water to bring the cells to the proper level. Operate the tractor for a few minutes so the water will mix with the electrolyte.
4. Wash the tractor and repaint all bare metal surfaces.
5. Connect the charger to the tractor so that the power pack will be trickle charged while in storage. If continuous trickle charging is not possible, the battery pack must be recharged periodically to avoid damage. In temperatures lower than 40°F (4°C) the batteries will maintain a charge for about 60 days. In temperatures above 40°F (4°C) the water level should be checked and the power pack trickle charged every 30 days (more often in higher temperatures). The battery pack must be kept fully charged to prevent freezing and internal damage in weather below 32°F (0°C).
6. Remove the key from the tractor.

TROUBLESHOOTING CHECKLIST

SYMPTOM	POSSIBLE CAUSE	POSSIBLE REMEDY
Drive motor will not operate.	Dead batteries. Open safety interlock switch. No power to motor. Motor overheated. Faulty Brain in a Box. Faulty Ignition Switch. Open 3 amp fuse.	Charge power pack. Be sure operator is on seat and clutch pedal is depressed. Turn power disconnect on. Allow motor to cool. Consult authorized dealer. Consult authorized dealer. Replace fuse.
Drive motor starts, but will not continue to run.	Motor overheated. Open 3 amp fuse.	Allow motor to cool. Replace fuse.
Drive motor overheats.	Motor overloaded.	Reduce load on tractor.
Drive motor runs fine, but tractor will not move.	Broken drive belt. Faulty transmission.	Consult authorized dealer. Consult authorized dealer.
Reduced range.	Open 125 amp fuse. Tractor overloaded. Power pack not being charged. Weak or faulty batteries. Corroded/loose battery connections.	Replace fuse. Operate tractor in lower gear, check lubrication, brake adjustment. Check charger/accessory circuit breaker, main fuses, and fuse in charger unit. Consult authorized dealer. Clean and tighten.
Power pack does not charge.	Open charger/accessory circuit breaker. No power to charger. Fuse in charger open. Faulty Brain in a Box.	Reset circuit breaker. Check electrical outlet. Replace charger fuse. Consult authorized dealer.
Power driven attachment does not operate.	Motor overheated. No power. Faulty Brain in a Box. Faulty PTO switch.	Allow motor to cool. Check power cord connection. Consult authorized dealer. Consult authorized dealer.
Power driven accessory will not operate.	Open charger/accessory circuit breaker. No power. Motor overheated.	Reset circuit breaker. Check power cord connection. Allow motor to cool.

WIRING DIAGRAM – POWER CIRCUITS



A separate Parts Manual for your Wheel Horse tractor can be obtained by completing the form below and sending it, along with a check or money order, to:

**PARTS DEPARTMENT
WHEEL HORSE PRODUCTS, INC.
515 W. Ireland Road
South Bend, Indiana 46614**

**TRACTOR
PARTS MANUAL ORDER FORM**

Enter number shown on your tractor:



I have enclosed a check or money order for \$5.00 for each manual requested.

MAILING LABEL — PLEASE PRINT CLEARLY

To:

Name

Address

City

State

Zip

