

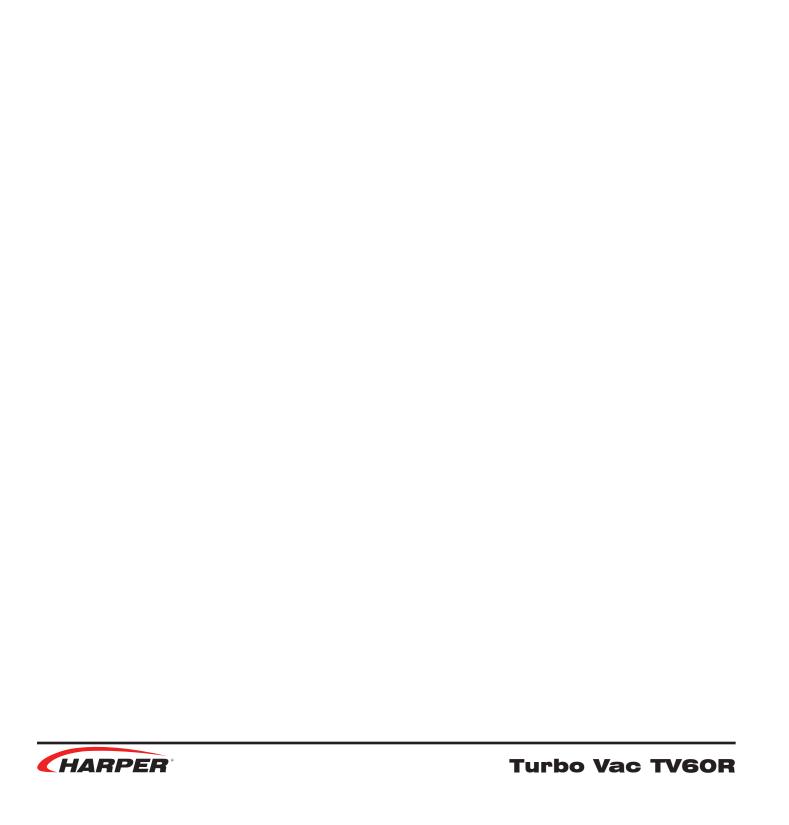
Operator's Manual



TV60RE



TV60R



Thank you for purchasing a Harper Turbo Vac.

TO THE OWNER OR OPERATOR:

As with all Harper products, the Harper Turbo Vac has been developed through tough design and testing procedures to produce a machine that can be relied on. This manual gives assembly, operating, and service information for models TV60RE and TV60RH. Please read and understand all instructional material included with the Turbo Vac and its components before assembling and operating the equipment.

A Turbo Vac can present hazards to an operator who follows unsafe procedures in either the operation or maintenance of the unit. Therefore, **SAFETY WARNINGS** are presented at certain locations in the text.

SYMBOL:



SAFETY WARNING!



MEANING: Failure to understand and obey this warning may result in injury to you or others. Whenever this symbol is used, please pay very close attention to the information presented, and make sure you fully understand. If you do not, contact your dealer or Harper Industries for clarification.



SAFETY WARNING!



All shields and guards must be in place for proper and safe operation of this equipment. Where they are shown removed in this manual, it is for purposes of illustration and instruction only. Do not operate this equipment unless all shields and guards are in place.

Harper Industries, Inc. is continually striving to improve the design and performance of its products. We reserve the right to make changes in specifications and design without thereby incurring any obligation relative to previously manufactured products.

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LIMITED WARRANTY

The Harper Turbo Vac is warranted against defects in workmanship and materials for a period of one (1) year from the original date of retail purchase to the original purchaser.

Harper Industries will repair or replace, at its own option, any part that evaluation shows to be defective. Warranty is limited to parts, labor and ground freight delivery of replacement parts. The user will pay freight charges for expedited orders of replacement parts and/or parts submitted for warranty evaluation. No product or part may be returned for warranty evaluation without prior approval.

This warranty does not apply to parts subjected to misuse, abuse, alteration, improper or inadequate maintenance, or normal wear (including belts and broom).

Gasoline engines are not covered under this warranty. Refer to manufacturer's warranty for specific warranty information. Harper Industries, its agents or representatives make or imply no other warranties.

Evaporative Emissions Control System Warranty

The evaporative emission control system is warranted for two (2) years. If any evaporative emission-related part on your equipment is defective in material or workmanship, the part will be repaired or replaced by Harper Industries Inc..

Your evaporative emission control system may include parts such as: fuel tanks, fuel lines, fuel line fittings, fuel caps, carbon canisters, canister mounting brackets, carburetor purge port connection, filters, vapor hoses, clamps, control valves, control solenoids, electronic controls, vacuum control diaphrams, purge valves, liquid/vapor separator and other associated components.

RECORDS

Date of Purchase///	Serial Number Machine
Dealer's Name	Serial Number Engine
Dealer's Phone	



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Specifications

Safety Features	 Locking safety latches on all cylinders for service functions 	
	TV60RE – Engine automatically returns to idle while dumping	
Power	TV60RE – 25 HP Kohler gasoline engine, adjustable throttle	
	TV60RH – Tractor PTO	
Hydraulic System	TV60RE – Belt-driven pump powers broom and cylinders	
	TV60RH – PTO-driven pump powers blower, broom and cylinders	
Hydraulic Reservoir	TV60RE – 5 gallons	
	TV60RH – 20 gallons	
	 Biodegradable hydraulic oil - Terrasolve EL 3068 is rated for a 2 	
	year shelf life after sealed container is opened	
Blower Drive	TV60RE – Dual Powerband belt drive (no gearbox)	
	TV60RH – Hydraulic motor – direct drive from PTO gear pump	
Blower Fan &	 25" diameter fan of abrasion-resistant steel 	
Housing Liner	 1½" shaft with self-aligned bearings supporting both ends 	
	 Easy access to housing liner* for inspection and replacement 	
	*UHMW poly-liner - Ultra High Molecular Weight Polyethylene	
Broom Drive	Hydraulic motor – direct drive	
Broom	 17" diameter X 60" wide pick-up broom with heavy-duty polyethyl- 	
	ene bristles and adjustable gauge wheels	
Bearings	Greasable sealed bearings	
Hopper	7 yard capacity	
Wheels/Tires	6-bolt steel wheels	
	Tires – 225 X 60R15 steel belted radials	
Optional Duals	 Optional dual wheels are available for soft terrain 	
Controls	Wireless RF (radio frequency) remote controls	
Discharge	Hydraulic dump with automatic latch mechanism	
Hitch	 Adjustable height tongue with ball hitch and adjustable jackstand. 	
Paint	Durable 2-part polyurethane	
Dimensions	• 164" long X 85" wide X 85" high	
Weight	TV60RE – 2300 lbs – 1046 kg	
	TV60RH - 2250 lbs - 1023 kg	

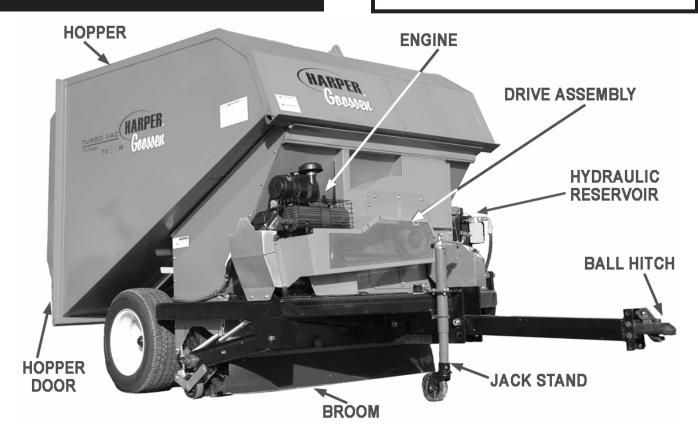
[•] Denotes common characteristics of both the TV60RE and TV60RH

NOTE: Following publication of this manual certain changes in standard equipment and/or options may have occurred that would not be included in these pages. Your Harper/Goossen dealer is the best source for up-to-date information.



Feature Identification

Model TV60RE



Hopper* – The hopper stores up to seven yards of collected material.

Hopper Door* – The hopper door opens when the door latches are opened.

Engine – A 25 HP Kohler engine powers the drive assembly.

Drive Assembly – The drive assembly powers the hydraulic pump and blower.

Hydraulic Reservoir – The hydraulic reservoir on a **TV60RE** has a 5 gallon capacity.

Broom* – The broom rotates to rake up the material from the turf.

Jack Stand* – The jack stand supports the front of the Turbo Vac when it is not attached to a tow vehicle. During operation, the jack stand must be up, with the wheel removed and in the stow location.

Ball Hitch* – The TV60R is towed with a ball hitch. Unit is not approved highway towing.

Remote Controls* – A wireless transmitter allows functions of the Turbo Vac to be controlled from the tow vehicle. The remote transmitter uses two AA batteries with a sleep function that prolongs battery life.

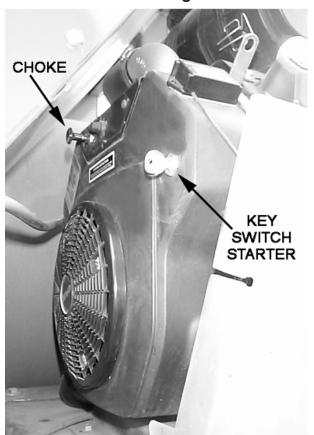


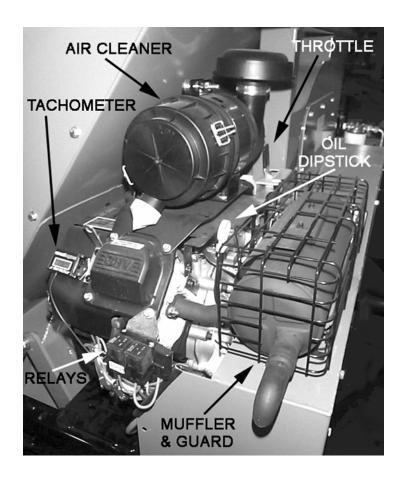
* Denotes common features of both the **TV60RE** and **TV60RH**.

See Adjustments section for information on the sleep function with the remote and transmitter.

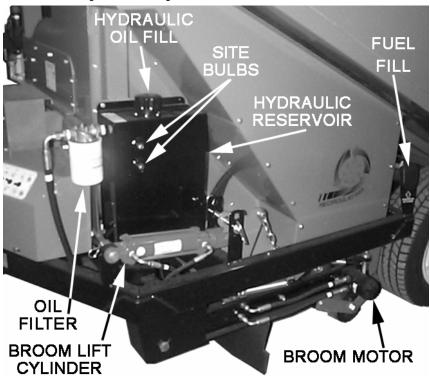


TV60RE - HP Kohler Engine

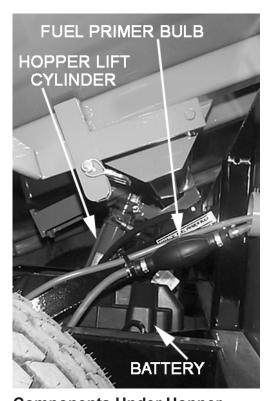




TV60RE - Hydraulic System &Fill Locations





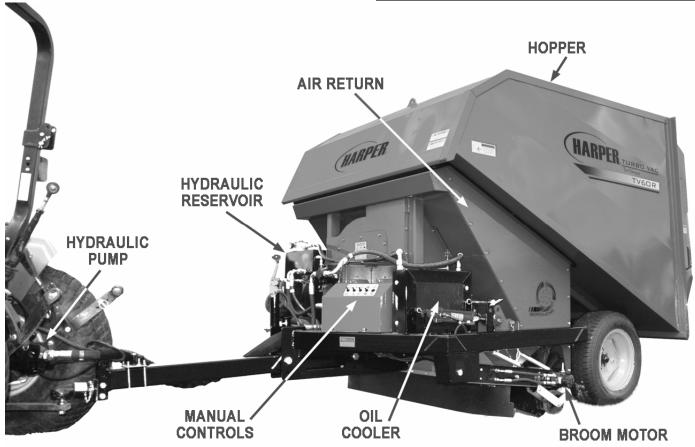


Components Under Hopper



Feature Identification

Model TV60RH



Hydraulic Pump – The hydraulic pump on the **TV60RH** is directly attached to the tractor PTO. Always connect torque chain to tractor.

Torque Chain – The torque chain keeps the hydraulic pump from moving when it is hooked up to the tractor PTO.

Broom Motor* – The broom motor turns the broom clock-wise, throwing material forward and upward into the air stream.

Oil Cooler – The oil cooler prevents the hydraulic oil from over-heating. Always keep the fins free of debris.

Hydraulic Reservoir – The hydraulic reservoir on a **TV60RH** has a 20 gallon capacity.

Air Return* – The air return allows air to be recirculated, significantly reducing dust.

Hopper* – The hopper stores up to seven yards of collected material.

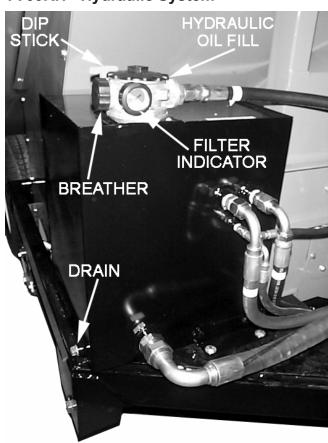
Manual Controls* – All of the functions on the Turbo Vac can be operated with the manual controls or the remote controls.



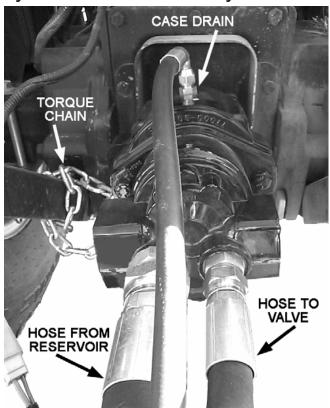
* Denotes common features of both the **TV60RE** and **TV60RH**



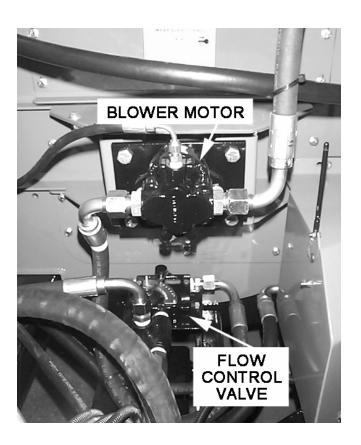
TV60RH - Hydraulic System



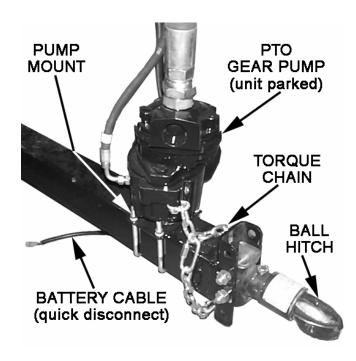
Hydraulic Reservoir Assembly



PTO Gear Pump on Tractor PTO



Blower Motor & Flow Control Valve



PTO Gear Pump (unit parked)

NOTE: The PTO gear pump should be stored as shown in the above photograph when the **TV60RH** is parked.



General Safety Guidelines

Equipment & Controls

- Before operating this equipment, read and understand the Owner's Manual.
- Altering the unit in any way that adversely affects its safe operation, performance or durability will void the warranty and may cause hazardous conditions.
- Know the location and function of all controls and how to stop the equipment quickly in an emergency before you operate the Turbo Vac.
- Keep all nuts, bolts and screws tight to ensure safe operation of equipment.

Guards & Shields

- Keep all safety devices in place and in good operating condition.
- Replace all worn, damaged, unusable, missing or lost safety shields and guard before operating unit.

Before Operation

- Do not allow children near this machine.
- Make sure bolts in tongue are secure and jack is in the transport position.
- Tire pressure should be 30-32 psi and equal in both tires.
- Engine governor settings are preset and should not be changed; any change can damage moving parts and void warranty.
- Before starting the machine, visually inspect all nuts, bolts and other fasteners to see that they are properly secured.
- Nuts, bolts and other fasteners should be checked after the first hour of operation and every 8 to 10 hours there after for proper alignment and tightness.
- Make sure that all belts are in good condition, and replace if necessary.

During Operation

- While operating the equipment, make sure that no foreign objects such as rocks, bottles or other hard materials are in the path of the Turbo Vac.
- If an object should strike the broom or blower mechanism causing an unusual noise or vibration, shut the engine off immediately and allow it to come to a complete stop. Disconnect the spark plug wire from the spark plug of the power unit, and do the following:
 - 1. Inspect for damage.
 - 2. Repair or replace damaged parts.
 - 3. Check for and tighten any loose bolts, nuts, fasteners or parts.
- Keep the engine area clean and free of debris and other accumulations.
- If the Turbo Vac should become clogged, shut off the engine and allow it to come to a complete stop. Disconnect the spark plug wire from the spark plug of the power unit before attempting to remove the clog.



SAFETY WARNING!



Always keep a fire extinguisher near the Turbo Vac during operation and service.



SAFETY WARNING!



To prevent possible eye injury, always wear SAFETY GLASSES while operating or servicing the equipment.



During Service & Maintenance

A

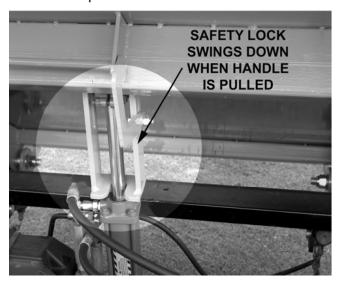
SAFETY WARNING!



When working under the hopper the cylinder safety lock should be engaged to prevent the hopper from falling.



 To engage the cylinder safety lock, take the pin out of the bracket on the hopper and pull the handle down.



- The cylinder safety lock prevents the hopper from being lowered so that maintenance can be performed safely.
- When finished working under the hopper, disengage the safety lock, put the handle back into the bracket on the hopper and replace the pin.

A

SAFETY WARNING!



Attempting to lower the hopper while the cylinder safety lock is engaged may cause damage to the cylinder and/or the safety lock mechanism.

SAFETY WARNING!



If it is necessary to get between the hopper and the hopper door, set the door prop to avoid being pinched.

 To set the door prop, pull the door open and insert prop into pre-cut hole in door.



Safety Decals

- If safety related or instructional decals become illegible or are removed, replace them immediately.
- If parts are replaced, make sure all safety related or instructional decals are present before the equipment is operated again.
- New decals may be obtained from your local Harper/Goossen Dealer.



Replacement Parts



SAFETY WARNING!



Use genuine factory parts or parts with equivalent characteristics including: type, strength and material. Failure to do so may result in voidance of warranty, product malfunction or possible injury to operator and others.

- Replace locknuts and locking screws if they can be tightened without considerable resistance for several turns before they are completely tight.
- If hardware is not secure, or if some of the fasteners are over-tightened, equipment failure may result, posing possible safety hazards.
- Use proper torque specifications for all fasteners when they are replaced.

Gasoline



SAFETY WARNING!



Gasoline is extremely flammable and can be highly explosive.

- Always use an approved container for gasoline.
- Do not allow open flames or sparks while performing maintenance or refueling.
- Never remove the fuel tank cap or add gasoline when the engine is running or while it is hot.
- Never fill the fuel tank indoors. Gasoline fumes are heavy and will sink to the lowest point, collecting and becoming increasingly hazardous. One part gasoline in 20 parts air will explode easily and violently.
- Wipe up spilled gasoline immediately.
- Do not store gasoline in a room with an appliance that has a gas pilot or electrical switch that may cause sparks.
- Always store gasoline outside in a safety can (a can that has a flame

- arrestor and pressure relief valve in pour spout).
- Never store the equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark.
- Allow the engine to cool before storing in any enclosure.
- Be certain to provide adequate ventilation if an engine must be run indoors exhaust fumes are dangerous.

Hydraulics



SAFETY WARNING!



HIGH-PRESSURE FLUID HAZARD!

Escaping fluid under pressure can penetrate skin and cause serious injury or death.

To prevent serious injury or death:

- Relieve pressure on system before repairing, adjusting or disconnecting.
- Wear proper hand and eye protection when searching for leaks.
- Use wood or cardboard instead of hands when looking for leaks.
- Keep all hoses, fittings and components in good repair.
- Do not use any type of heat or flame (welding, soldering, cutting torch, etc.) near pressurized hydraulic lines.



Specific Safety Guidelines

TV60RE

- Be sure to provide adequate ventilation if the engine must be run indoors
 – exhaust fumes are very dangerous.
- The Turbo Vac hydraulic system operates under high pressure. Be sure the hydraulic system is disabled prior to service.
- Periodically clean area around engine to lessen the possibility of fire.
- The engine governor should not be adjusted; any change can damage moving parts and void warranty.
- Keep clothing and all body parts away from rotating parts.



SAFETY WARNING!



Gasoline is extremely flammable and can be highly explosive.

- Always use an approved container for gasoline.
- Do not allow open flames or sparks while performing maintenance or refueling.
- Never remove the fuel tank cap or add gasoline while the engine is running or hot.
- Refer to the engine manual for additional information on gasoline.



SAFETY WARNING!



The battery on Turbo Vacs with electric start can produce explosive gasses.

- Ventilate when charging battery or using in an enclosed space.
- DO NOT produce sparks from cable clamps, tools, or other sources.
- DO NOT allow flames or smoking in the vicinity of the battery.
- Shield eyes when working near battery.

TV60RH

- Avoid wearing loose clothing to prevent it from getting caught in the PTO drive.
- Keep clothing and all body parts away from rotating parts.
- The pump stop bar must be properly positioned to keep the hydraulic pump from spinning with the PTO.
- The Turbo Vac hydraulic system operates under high pressure. Be sure the hydraulic system is disabled prior to service.



SAFETY WARNING!



Engage the tractor PTO at low engine RPM when operating the TV60RH to prevent premature failure of hydraulic system components.



SAFETY WARNING!



HIGH-PRESSURE FLUID HAZARD! Escaping fluid under pressure can penetrate skin and cause serious injury or death.



Set-Up and Operation

SAFETY WARNING!
Wear approved eye protection and safety gear during set-up and operation of the Turbo Vac.

TV60RE

- 1. Fill the tank with gasoline. (Refer to engine manual for gasoline specifics.)
- 2. Attach the unit to the tow vehicle. Be sure that the Turbo Vac is level with the ground. (Refer to the Adjustments section for information on leveling.)
- Pull choke and turn key to start position and release as soon as the engine starts. DO NOT TURN THE STARTER OVER FOR MORE THAN 10 SEC-ONDS.
- 5. Once the engine is running, gradually move the choke lever to the off position, and allow the engine to warm up. (When restarting a warm engine, it should not be necessary to use the choke lever.)

Never remove the fuel tank cap or add gasoline when the engine is running or while it is hot.

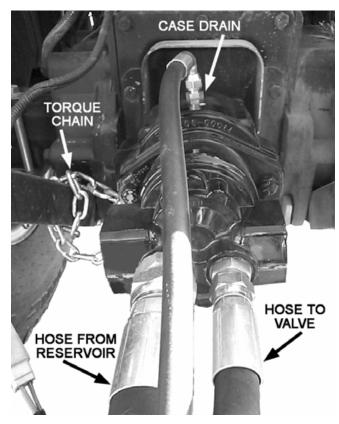
6. The engine will automatically throttle up to operating speed when the blower and broom are engaged.

SAFETY WARNING! Periodically clean material away from engine to lessen the possibility of fire.

TV60RH

 Before using the TV60RH for the first time, install the battery cable onto the tractor battery to supply power to the unit's valve and RF receiver. Connect the black wire of the cable to the

- negative terminal and the red wire (with fuse) to the positive terminal of the battery. When using more than one tractor, other power cords may be ordered (p/n 932031).
- 2. Attach the unit to a tractor with a PTO. Be sure that the Turbo Vac is level with the ground. (Refer to Adjustments section.)
- 3. Slide the hydraulic gear pump onto the PTO shaft of the tractor.



- 4. Fasten the torque bar or chain to the tractor to prevent the pump from rotating.
- 5. Make certain that the case drain hose is on top of the pump and in a vertical position when attached to the tractor.
- 6. Plug quick connector on battery cable to the quick connector located on the tongue of the **TV60RH**.
- 7. Engage tractor PTO and set to 540 RPM.



Starting Operation



SAFETY WARNING!



Before operating the Turbo Vac, perform the daily inspection as described in the Service & Maintenance section.

Before operating the Turbo Vac, the operator should be familiar with the area to be swept, and make sure it is clear of large debris.

- Push the switches on the remote control or move the manual switches to activate the functions on the Turbo Vac. The tractor PTO must be engaged for the blower to function on the TV60RH.
- 2. Engage the tow vehicle and advance slowly at first to test environmental conditions and machine performance.
- 3. Proceed with caution, steering clear of obstacles that could damage broom.



SAFETY WARNING!



Wear approved eye and ear protection while operating the Turbo Vac.

Keep all guards in place during operation. Never operate the Turbo Vac with safety shields removed.

Always keep a fire extinguisher near the Turbo Vac during operation.

Stopping Operation

TV60RE

- Push the BLOWER and BROOM switches on the remote control to turn off the **TV60RE** functions.
- 2. Shut off the engine and allow the ma chine to come to a complete stop.

TV60RH

 Push the BROOM switch only on the remote control to turn off the broom. **Note**: The BLOWER switch is not used on the **TV60RH** remote control.

- 2. Move the throttle on the tractor to the "SLOW" position and disengage the PTO lever to turn off the blower.
- 3. Shut off the tractor engine and allow the unit to come to a complete stop.



SAFETY WARNING!



Do not leave the Turbo Vac unattended, or attempt any service or inspection unless the machine has come to a complete stop, the engine has been shut off, and the spark plug has been disconnected.

Unloading Hopper

- 1. Check the overhead clearance. 8' 6" is required for dumping.
- 2. To unload, press the OPEN LATCH and LIFT HOPPER buttons on the remote.
- 3. When unload is complete, press the LOWER HOPPER button. Once the hopper has lowered completely, press the CLOSE LATCH button.



SAFETY WARNING!



Do not stand near the back of the Turbo Vac while unloading.

If there is grass stuck in the hopper, do not go in between the hopper and the door without setting the safety lock.

Check overhead clearance during use.
Clearance is: 7' 6" for sweeping
8' 6" for dumping

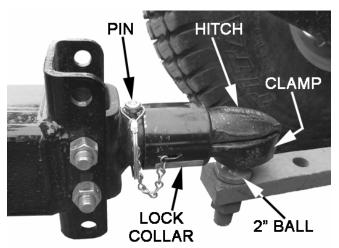


Towing

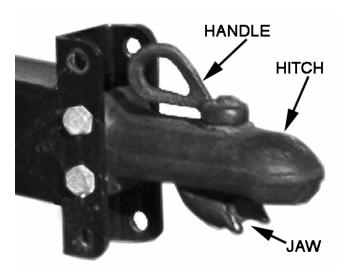
🛕 SAFETY WARNING! 🛕

The Turbo Vac does not meet highway safety codes. Tail lights, turn signals and safety chains must be attached before towing on public roadways.

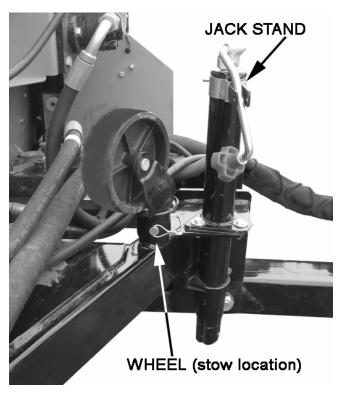
- Two types of ball hitches have been used on the Turbo Vacs: clamp and jaw.
- For the clamp-type displayed in the following photograph, close the clamp around the ball and secure with the lock collar. Insert the pin to keep the lock collar in place.



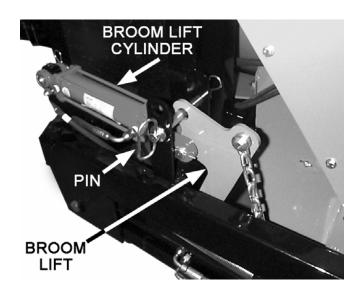
 For the jaw-type displayed in the following photograph, turn the handle until the jaw closes completely around the ball.



 The jack stand should be up, with the wheel in stow location whenever the Turbo Vac is connected to a tow vehicle.



 Always use the safety pin to lock the broom lift when towing the unit.



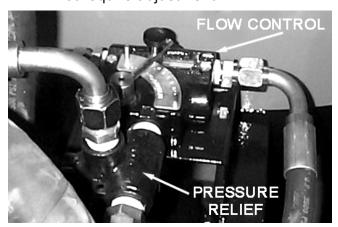
- Tire pressure should be 30-32 psi and equal in both tires.
- Make sure the wheel lug nuts are tight.



Adjustments

TV60RH Hydraulic Controls

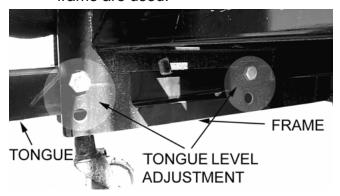
 The hydraulic flow control and pressure relief are set at the factory, and should not require adjustment.



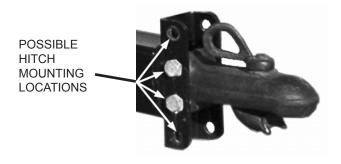
 If desired, oil flow can be redirected from the broom to the blower, or viseversa, by loosening the knob and moving the adjustment lever of the flow control. This action will speed up or slow down these components in an inverse fashion.

Level Hook-Up

- For the Turbo Vac to work properly, the frame needs to be level with the ground.
- The tongue can be moved up or down depending on which set of holes on the frame are used.

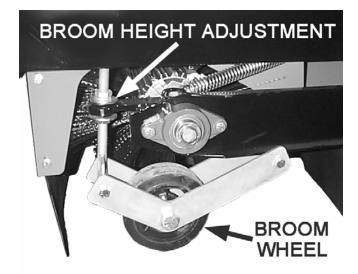


 The hitches on different tow vehicles vary in height, so there are adjust ments on the hitch and the tongue to keep the Turbo Vac level.



Broom Height

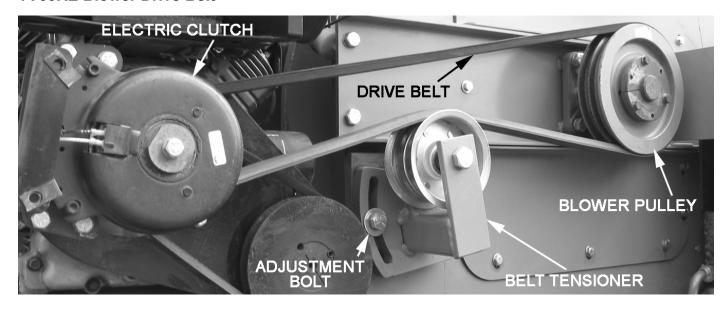
 The broom height should be adjusted so that the broom barely touches the grass.



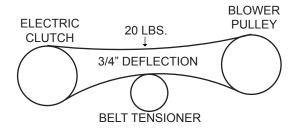
- Broom height is easily adjusted tightening or loosening the nuts on the broom height adjustment.
- Make sure that both broom wheels (one per side of unit) are adjusted the same so the broom stays level.
- Brooms are originally 17" in diameter.
- When the broom wears down to 15" the adjustment will not lower the broom enough for it to perform adequately and the broom needs to be replaced.



TV60RE Blower Drive Belt

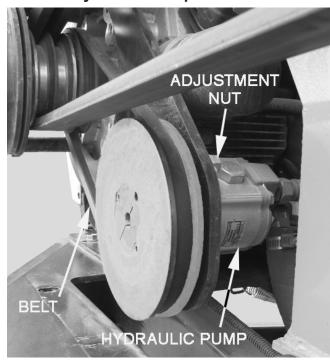


To adjust belt tension, loosen the adjustment bolt and the bolt where the tensioner pivots. Position the tensioner to allow for proper deflection. Re-tighten both bolts.



- Apply 20 lbs. of pressure to the midpoint between the electric clutch and blower pulley. The belt should deflect ³/₄ in.
- Too much tension (minimal deflection) can damage the belt and bearings. Too little tension (excessive deflection) will allow belt to slip and decrease blower performance.
- To replace the drive belt, loosen the belt tensioner and remove the old belt. Install the new belt, and follow the same procedure for adjusting tension as described previously.
- Inspect the belts frequently and maintain the correct tension and alignment.

TV60RE Hydraulic Pump Belt



- To adjust the belt tension on the hydraulic pump, loosen the adjustment nut and the nut where the pump pivots.
- Position the pump to allow ¼ in. deflection at the mid-point. Re-tighten both nuts.
- If a belt shows signs of wear, such as: fraying, cracking or missing pieces; replace it immediately.



Remote and Receiver

System Operation

Press and hold the power button the transmitter until both LEDs turn on, then release. The greed LED will flash rapidly when communication has been established. When the receiver is off, the red LED will flash slowly indicating this. With the receiver on, press the corresponding buttons on the transmitter keypad to turn on and off each of the outputs.

Cloning

- On transmitter A (the teacher), press the POWER button, LOWER HOP, and BROOM ON/OFF simultaneously. At this point, both LEDs will flash on the first transmitter.
- On transmitter B (the learner), press the POWER button to turn it on, the press LIFT HOP, LOWER BROOM, RAISE BROOM, and BROOM ON/OFF simultaneously. Both green and red LEDs will begin flashing.
- Release buttons and wait for 1 second or until the green and red LEDs stop flashing on both units. Both transmitters will have the same ID at this point.

Sleep Time

The transmitter is factory set to turn off (sleep) after 15 minutes. To change the time, the transmitter waits before going to sleep, use the following procedure:

- 1. On the transmitter, press and hold POWER and buttons 3,4, and 8.
- 2. Release the buttons. At this point, both lights will blink once per second.
- 3. On the transmitter, press one of the following buttons to adjust the sleep time:
 - a. 1=15 min.
 - b. 2=30 min.
 - c. 3=1 hr.
 - d. 4=2 hrs.
 - e. 8=sleep disabled

4. Sleep time programming complete.

Indicator Lights

The transmitter has two LED indicators, the red BATTERY/DIAGNOSTIC indicator and the green TRANSMIT indicator.

The green TRANSMITTER indicator flashes rapidly whenever there is communication between the transmitter and the receiver.

The red BATTERY/DIAGNOSTIC indicator starts blinking once every second when the battery voltage is low and requires replacement. It also blinks when there is a problem with the system in the form of an error code. Refer to the ERROR CODE CHART tables for more information.

Note: To check for low battery, turn the receiver off and leave the transmitter on. If the transmitter red LED continues to blink, the battery is low and requires replacement. If the red LED blinks only when the receiver is on, count the number of blinks and refer to ERROR CODE CHART tables for additional information.

Teach ID Code

To synchronize a new transmitter and receiver together, refer to Fig. 1 and use the following procedure:

- 1. Remove receiver cover
- 2. Apply power to receiver
- 3. Place a jumper across the TEACH ID jumper inside the receiver, green LED will go steady inside the receiver. Remove the jumper and store it on one pin.
- 4. To get the transmitter into TEACH ID mode, press and hold the POWER button, LOWER HOP and BROOM ON/OFF.
- Release the POWER button and wait for 1 second or until the green LED goes from steady to blinking in the receiver. Release the other buttons.
- 6. Teach complete



7. Replace the cover on the receiver.

Vibration: 3G to 200 Hz

Outputs: 5A maz each (20A system max)

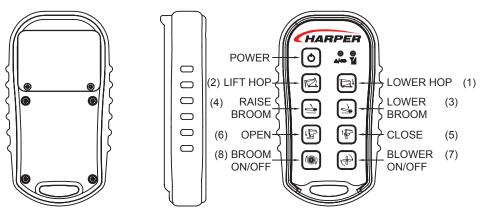
Specifiactions

RF Transmit power (EIRP): 10 mW

RF Frequency: 902-928 MHz

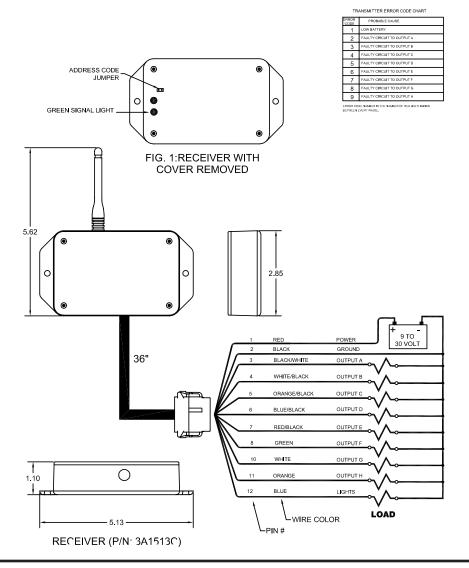
Operating temperature - Radio: -40C to +85C

Battery life (min): 30 hours continuous



TRANSMITTER (P/N: 3A1518C)

Uses 2 AA Alkaline batteries



Service & Maintenance



SAFETY WARNING!



Before servicing or inspecting the Turbo Vac, make sure the power source is shut off and all moving parts have stopped.



SAFETY WARNING!



Disconnect the spark plug wire or the negative battery cable to prevent the engine from being turned on.



SAFETY WARNING!



Always wear safety glasses and protective gloves when servicing the Turbo Vac.

Break-in Service

After the first hour of use:

- Check belts. Tighten if needed.
- Tighten set screws on bearings.
- Check nuts, bolts, and fasteners to see that they are secure. Tighten if needed.
- Check hydraulic hoses and fittings for leaks using the method described in the General Safety Guidelines. Tighten or replace if needed.

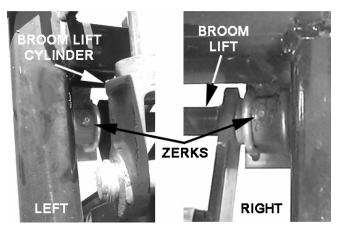
Lubrication

Nine grease zerks in the following locations should be greased daily to reduce wear:

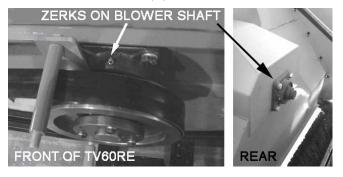
Hopper door latches (2)



Broom lift (2)

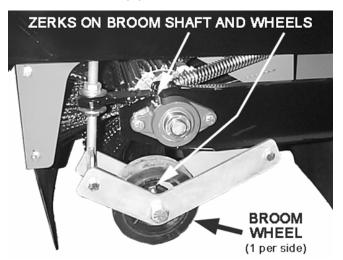


Blower shaft (2)



Note: The safety shield must be removed to access grease zerk on front blower shaft of the **TV60RE**.

- Broom shaft (1)
- Broom wheels (2)

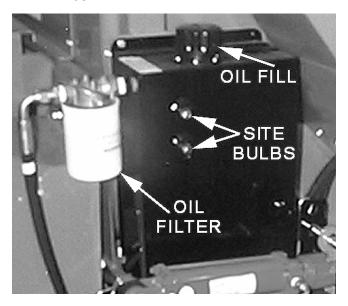


 Replace the safety shields before operating the Turbo Vac.



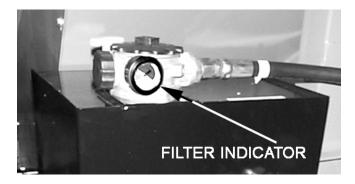
TV60RE Hydraulic Oil Reservoir

- Maintain the oil level in the reservoir of the TV60RE between the upper and lower site bulbs at all times.
- Replace the spin-on oil filter (Part no. 720043) after every 250 hours of service.



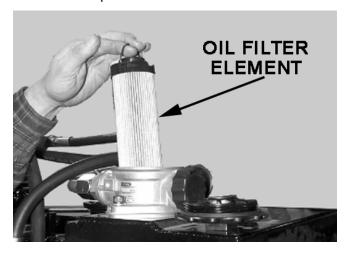
TV60RH Hydraulic Oil Reservoir

- The TV60RH is equipped with a HY-DAC hydraulic oil filter assembly that is designed for a long service life.
- Monitor the needle in the filter indicator daily. The element (Part no. 822002) does not need replaced until the needle is in the red portion of the gauge.



 To replace the element, unscrew the cover, remove the old element and insert the new one. To add hydraulic oil to a **TV60RH** reservoir:

- For small quantities, simply remove cover and add oil. The oil will seep past the filter element slowly.
- For larger quantities, remove the cover and the filter element. Take extra care that no impurities enter the reservoir.
- Maintain the oil level in the reservoir between the FILL and ADD marks on the dipstick at all times.



Replace the breather (Part no.822018) whenever the element is replaced.



Note: The Turbo Vac is filled at the factory with biodegradable hydraulic oil. Mixing with regular oil will reduce biodegradability.



SAFETY WARNING!



Escaping hydraulic fluid under pressure can penetrate skin and cause serious injury or death.



TV60RH Hydraulic Oil Cooler

 Make sure that the oil cooler assembly is kept free of debris. Clean as necessary.



Remote Control

 If the remote control transmitter or receiver should ever be replaced, the dip switches must be set so that the two components match.

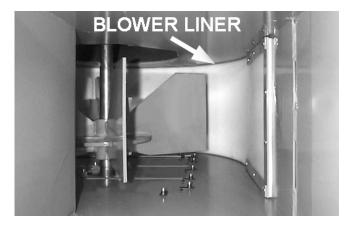


Blower Liner

- Regularly inspect the blower liner in the blower housing for wear.
- If the blower liner wears excessively, damage may result to the blower housing.
- The blower liner is a wear item and is not covered under warranty.
- Sandy conditions will shorten the life of the blower liner.

To check the blower liner:

- Raise hopper and set the safety lock as shown in the General Safety Guide lines.
- Check the blower liner located around the inside of the blower housing.



 If the blower liner is damaged or worn through, replace it before damage is done to the blower housing.



SAFETY WARNING!

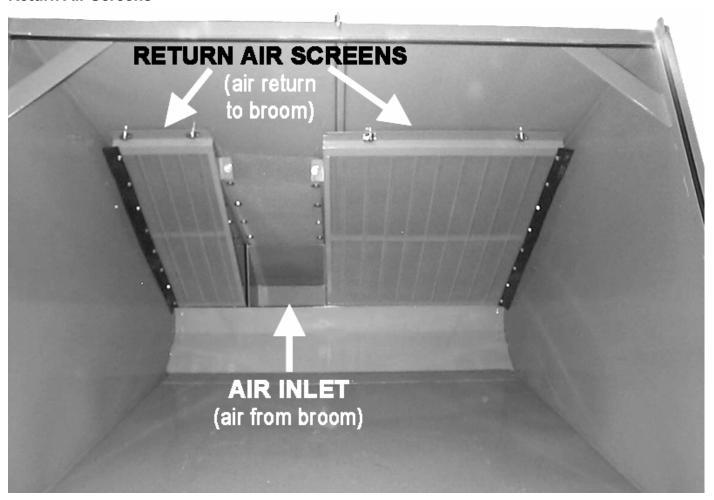


Before attempting to inspect the liner, make sure the power unit is turned off, the unit has come to a complete stop, and the spark plug wire has been removed.

When working under the hopper the cylinder safety lock should be engaged to prevent the hopper from falling.



Return Air Screens



- The return air screens do not require cleaning on a regular basis.
- Material that sticks to the screens during operation will fall off when the blower is stopped. However, if debris is extremely wet or muddy, plugging may occur.
- If there is a noticeable decline in ability to pick up debris, visually inspect screens for clogging and clean, if necessary.
- The return air screens may be cleaned with a broom or water hose, and may be removed, if necessary.

When it is necessary to get between the hopper and the hopper door, set the door prop to avoid being pinched.

• To set door prop, pull the door open and insert prop into the pre-cut hole in door.





TV60RE Service Schedule

Daily or Before Starting Engine

Disclaimer – For the 25 HP engine, Kohler Engine Co. recommends the following:

,	
Check engine oil level	. SAE 10W-30
Check hydraulic oil level	Terrasolve EL 3068 or equivalent
	Use only biodegradable oil.
Fill fuel tank	. Clean, unleaded, 87 octane or higher
Check air intake and cooling areas	. Clean as necessary.
Visually inspect belts, bolts, fittings and hoses	Tighten or replace if necessary.
Grease	See Service & Maintenance section.

100 Hour Service – Perform these and all previous items:

Check battery...... Clean terminals if necessary.

Change hydraulic filter...... DewEze part # 720043

Wix part # 51551

200 Hour Service – Perform these and all previous items:

Check spark plug...... Set gap to 0.76 mm (.030 in.)

Kohler part # 12 132 02-S Champion part # RC12YC

Change oil filter...... Kohler part # 12 050 01-S

250 Hour Service

Annual or 500 Hour Service – Perform these and all previous items:

Have Bendix starter drive serviced.*

Have solenoid shift starter disassembled and cleaned.*

Terrasolve EL 3068 or equivalent

- Should be serviced by an authorized Kohler Dealer.
- Refer to Kohler engine manual for more information on engine servicing.
- The identification number of the 25 HP Kohler engine is: PA-CH730-0142.



TV60RH Service Schedule

Daily

Check hydraulic oil level	. Terrasolve EL 3068 or equivalent
·	Use only biodegradable oil; mixing oils will result in a loss of bio-degradability.
Check hydraulic oil filter indicator	. Change filter element when needle is in red portion of gauge.*
Check hydraulic oil cooler	Clean as necessary.
Visually inspect belts, bolts, fittings, and hoses	Tighten or replace if necessary.
Grease	. See Service & Maintenance Section.
Check tire pressure	. Inflate to 30-32 psi.
Annually or 500 Hours	

• The TV60RH is equipped with a Hydac, 10 micron, beta rated, hydraulic filter and is designed for a long service life. When the hydraulic oil is warm and the indicator needle is in the red portion of the gauge, the filter needs to be changed.

Standard Torque Chart



SAFETY WARNING!



Refer to the Standard Torque Chart whenever bolts, nuts or screws are tightened.

Size	In-Lbs	Ft-Lbs	N-m
No. 10-24	25-35	5-7	2.8-4.0
1⁄4 in.	60-80	18-20	7-9
5/16 in.	120-140	28-30	14-16
3/8 in.	340-360	64-74	24-27
½ in.		126-150	90-100

Note: When tightening two or more fasteners on the same part, DO NOT tighten the fasteners completely one at a time. To avoid distortion, first tighten all fasteners in sequence to one-third of torque value, then tighten to two-thirds of torque value, then tighten to full value.



Troubleshooting

TV60RE Engine:

Problem:	What to Check:
Engine will not start.	 Improper control settings. Engine may be low on fuel. Engine may be low or too full of oil. Battery charge may be too low. Possible internal problems. Manual fast idle switch may be engaged, switch must be shut off for engine to start.
Problem:	What to Check:
Engine shuts off during operation.	Engine may be low on fuel.Engine may be low on oil.Air breather may be clogged.

Belts:

Problem:	What to Check:
Belts Slip	 Tension adjustment. Load may be excessive. Foreign material may be lodged. Bearings may have seized.
Problem:	What to Check:
Belts wear rapidly; Belts jump catch or twist.	Pulleys may not be properly aligned.Check with straightedge across faces of pulleys.

Hydraulic System:

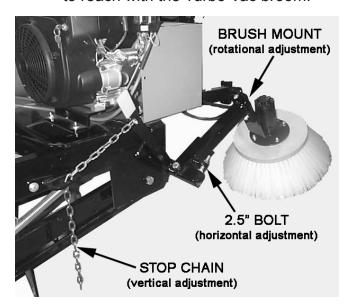
Problem:	What to Check:
Hydraulic function will not respond or hold its position.	 The RF receiver or transmitter may be malfunctioning. Hydraulic cylinder seals may be worn and in need of replacement.



Optional Equipment

Edge Brush

 A fence brush kit (Part no. 900218) is available for cleaning areas along fences and curbs, etc., that are difficult to reach with the Turbo Vac broom.



- The fence brush can be adjusted vertically and horizontally, as well as rotated at an angle, so that debris is thrown into the Turbo Vac broom. For best results, angle the front edge of the brush downward.
- The stop chain is used to adjust the height of the fence brush during operation and to hold it up during transport.
- Never allow the brush to rest completely on the ground during operation.



SAFETY WARNING!



The Turbo Vac should never be transported with the fence brush in operating position. Always use the stop chain to suspend the brush during transport.

Dual Spacer Kit

- For soft terrain, a dual spacer kit is available for the Turbo Vac.
- The kit includes the spacers shown in the photograph below, two turf tires and all the fasteners for installation (Part no. 905080).



 Use torque values from the Standard Torque Chart (see page 22) when tightening nuts and bolts.



SAFETY WARNING!

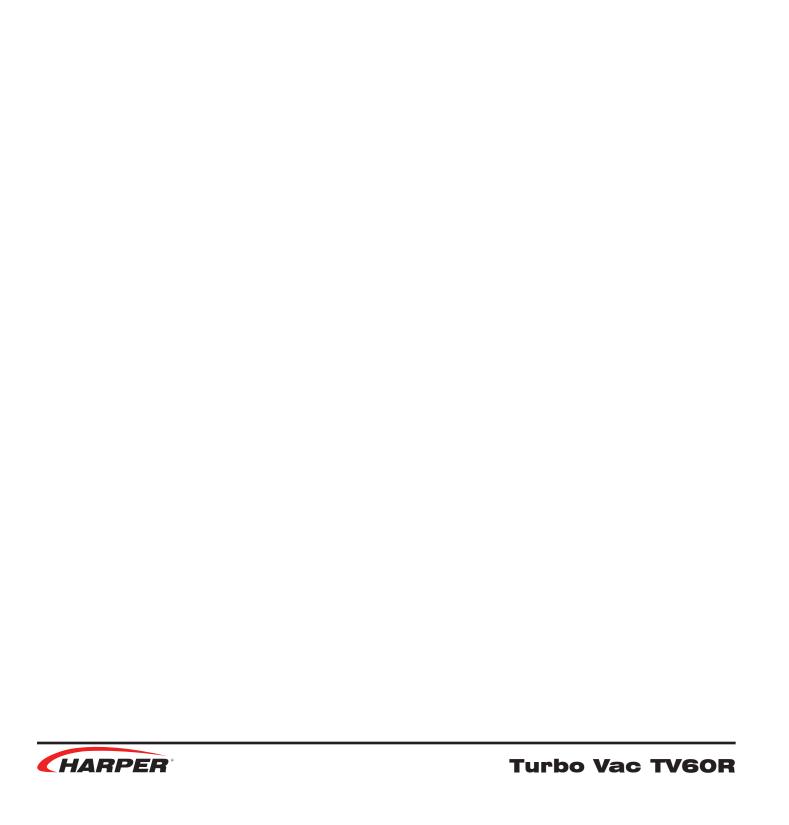


The Turbo Vac should not be towed at highway speeds when the dual wheels are attached.

The Turbo Vac does not meet highway safety codes.

Contact your Harper Dealer for more information about optional equipment, or see the Harper Industries website at: www.harperindustries.com







Parts

TV60RE

TV60R

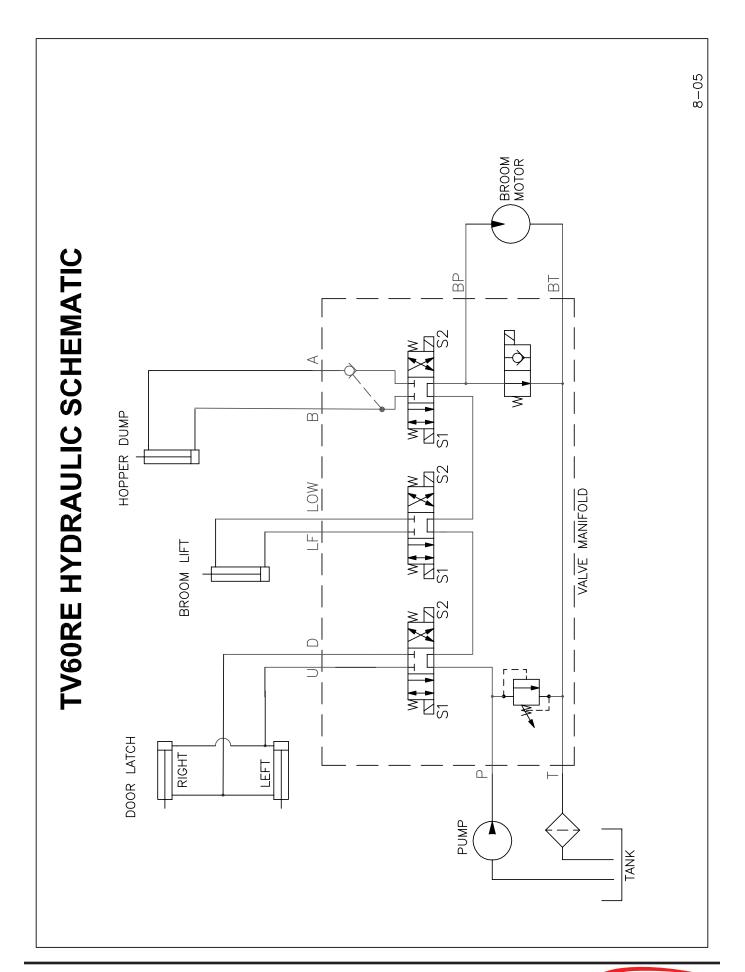


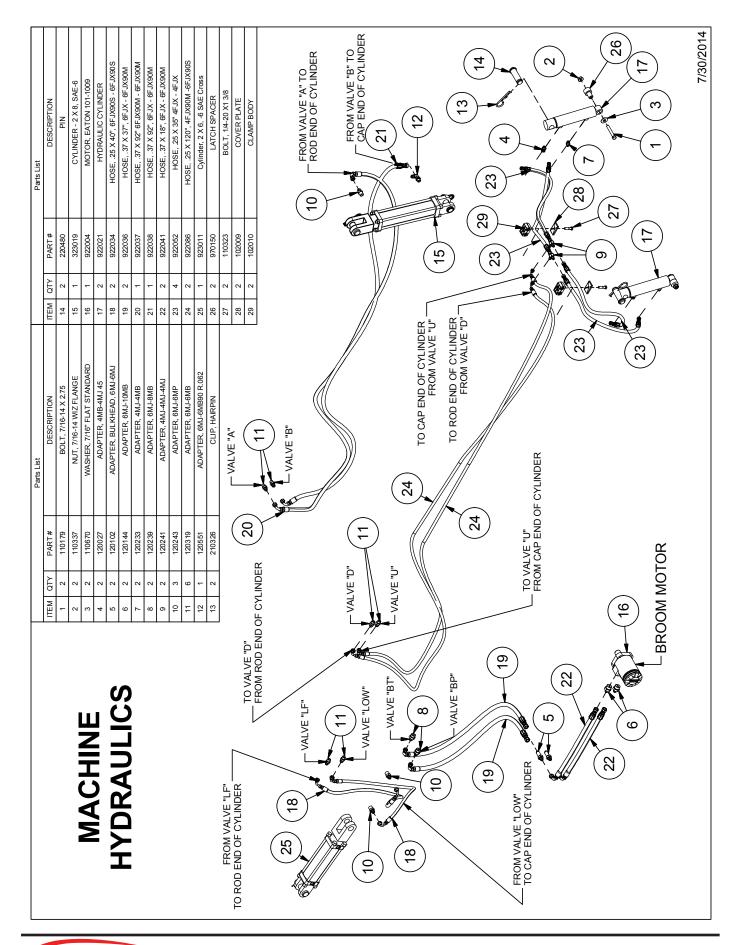
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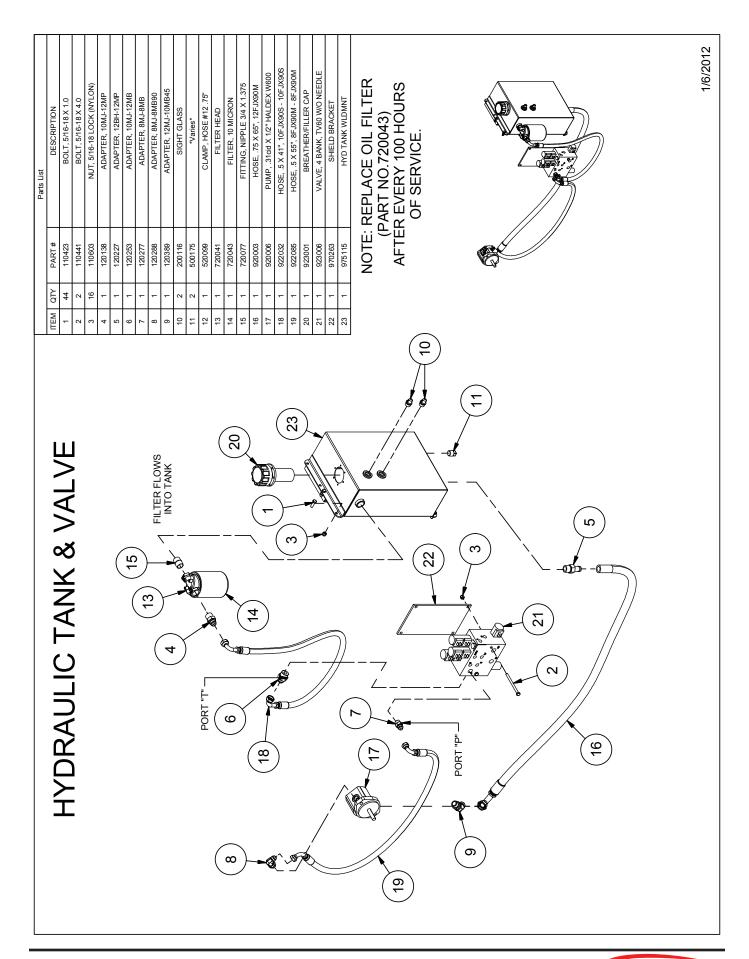
PARTS SECTION

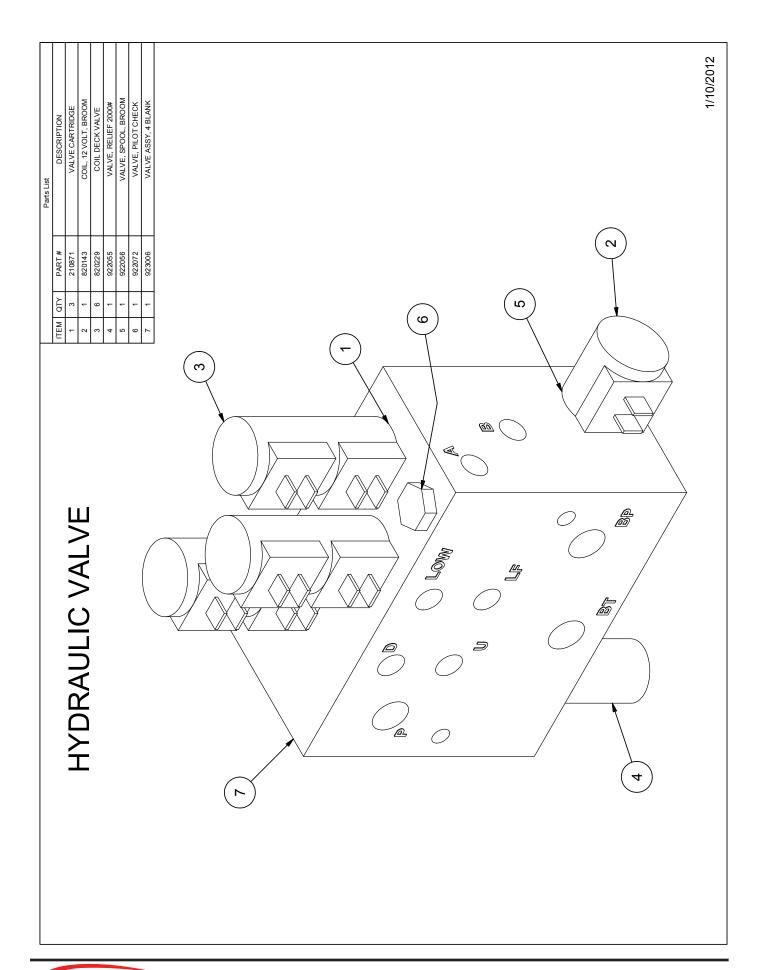
Hydrau	ılics	
•	TV60RE Hydraulic Schematic	1.1
	Machine Hydraulics	
	Hydraulic Tank and Valve	
	Hydraulic Valve	
Remot		
	Wiring Schematic TV60RE	2.1
	Remote and Receiver	
Broom		
	Broom Wheel	3.1
	Broom Lift	
	Broom	3.3
	Finger Rotor Kit	3.4
	Finger Rotor Assembly	3.5
	Air Return	
	Air Return Screens	3.7
	Fan Housing	3.8
	Drive Components	
Structu	•	
	Hopper and Door	4.1
	Frame	
	Wheel Assembly	
	Decal Layout	
	Dual Spacer Kit-Optional	4.5
	Edge Brush Kit-Optional	



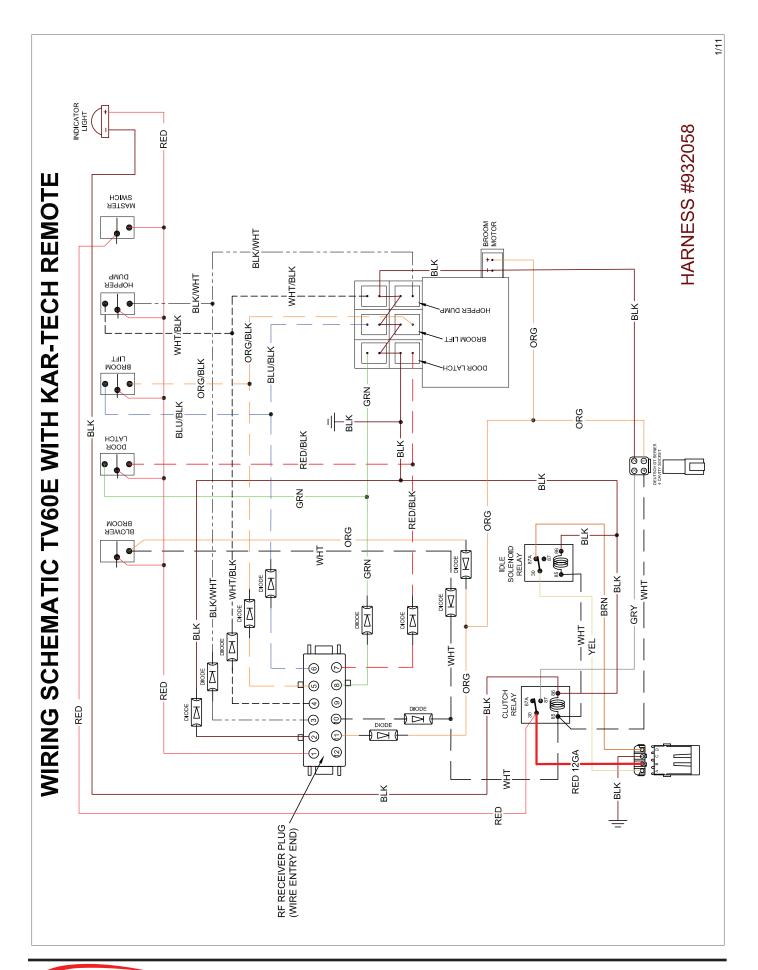




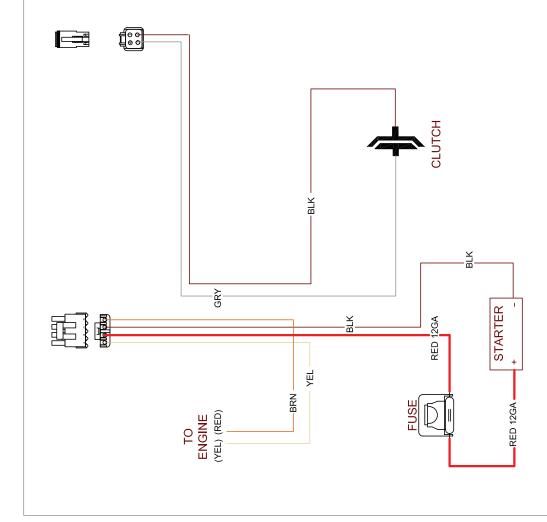


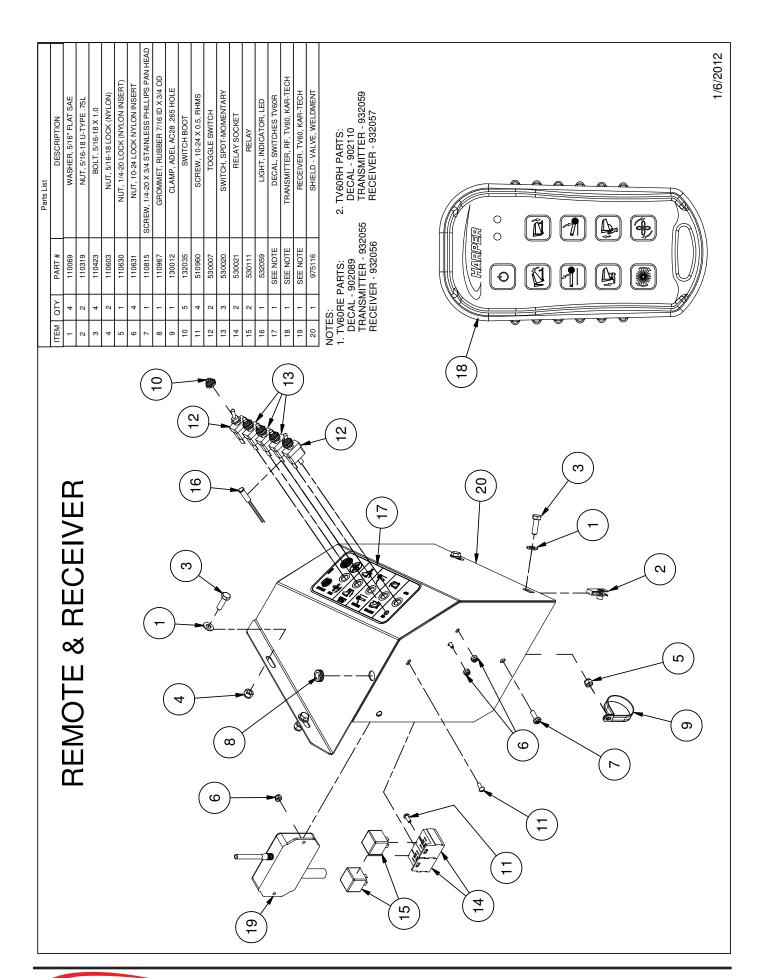


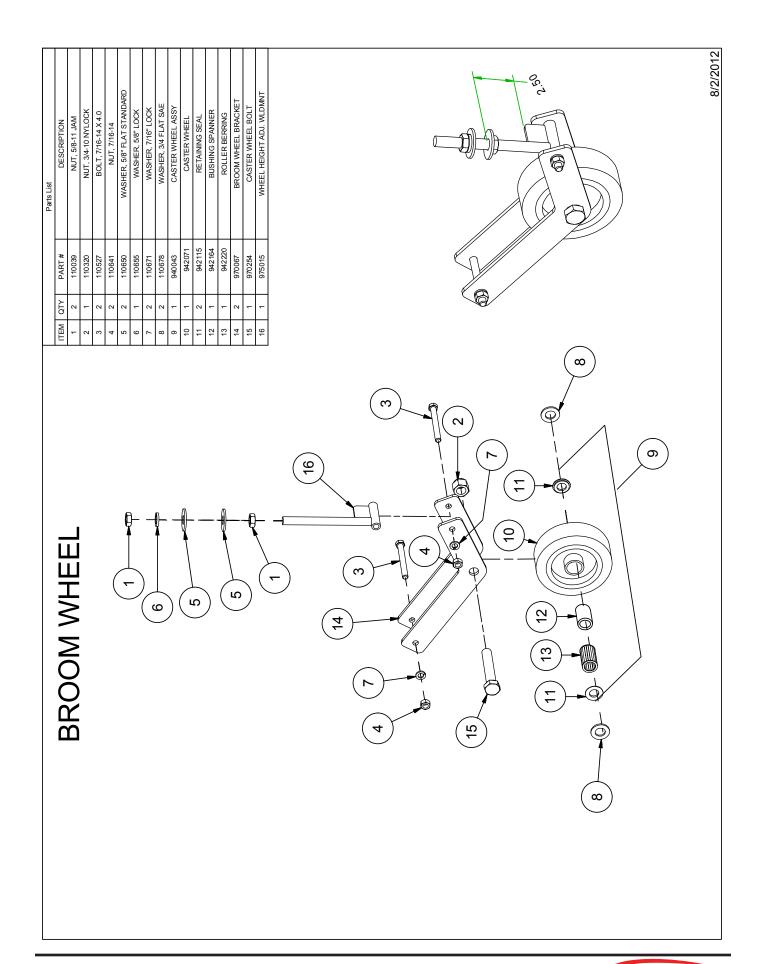


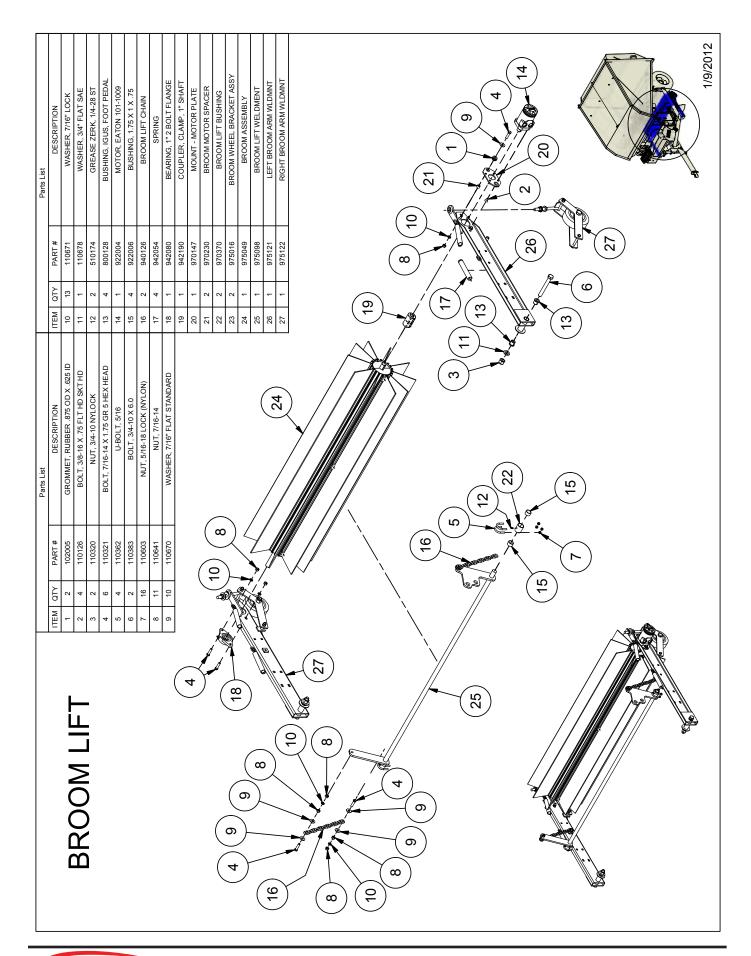


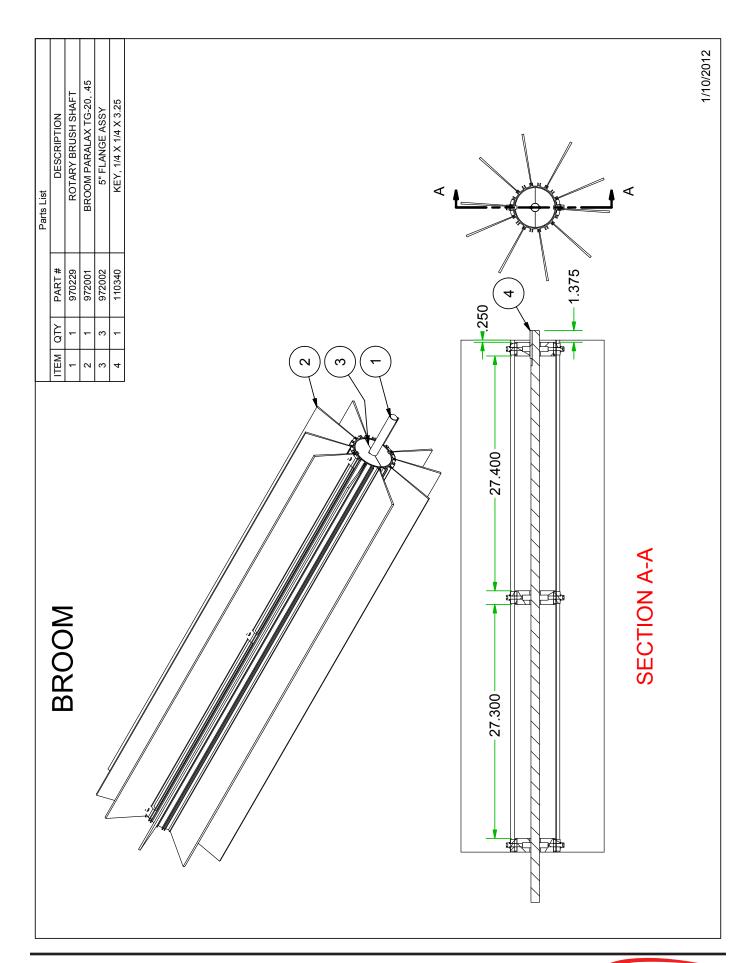
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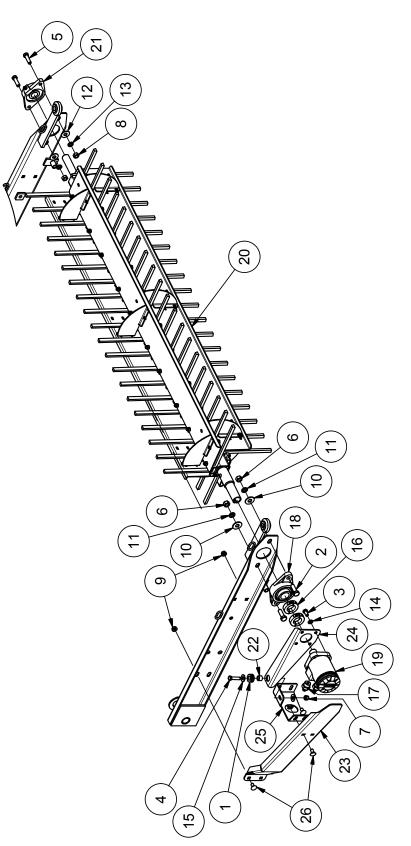






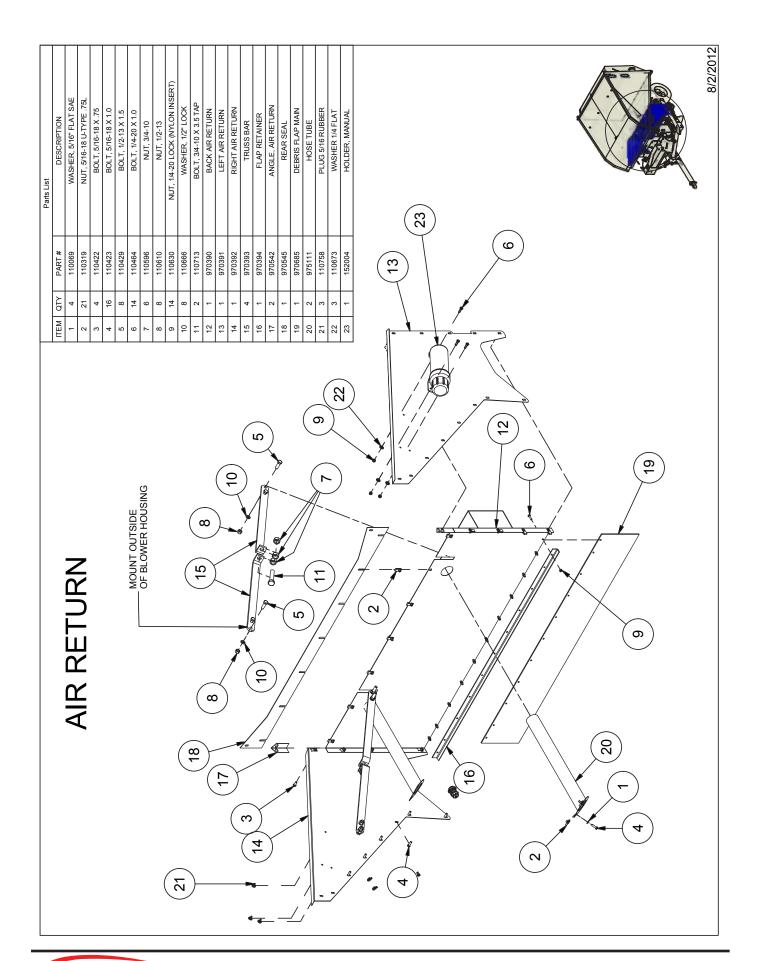
TV60 FINGER ROTOR KIT - 900227

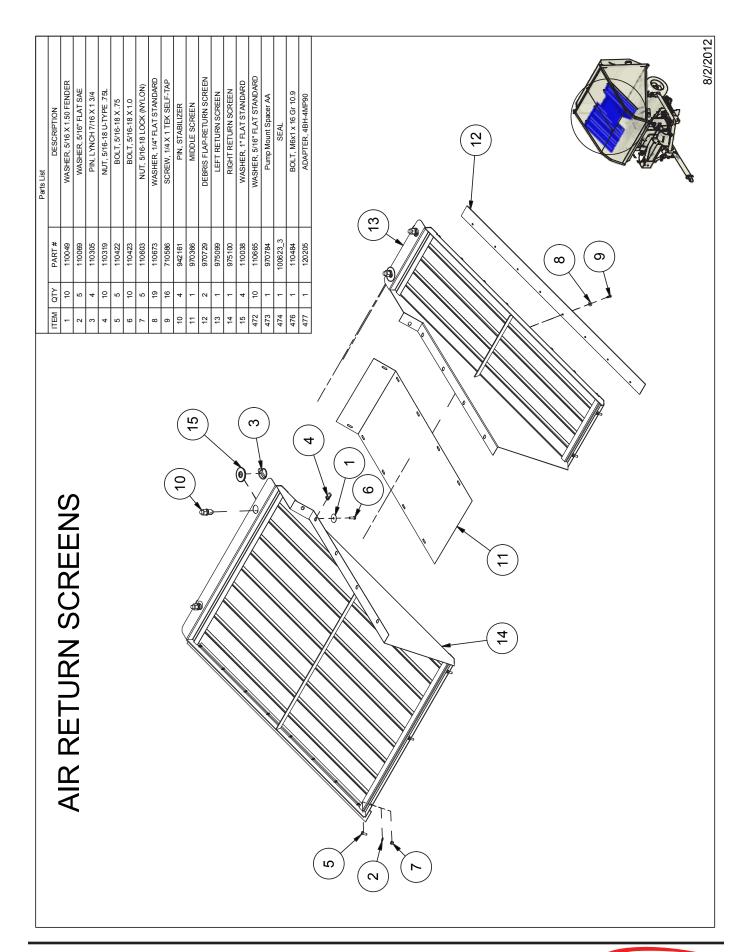
TV60 FINGER ROTOR PARTS LIST	DESCRIPTION	WASHER, 3/8" LOCK	WASHER, 3/8" FLAT STANDARD	COLLAR - 1-1/4" SPLIT	ADAPTER, 6MJ-10MB	BEARING - 1.25, 2 BLT FLG	MOTOR, EATON 101-1009, 2.8 CID	ROTOR - TV60 FINGER, ASSEMBLY	BEARING, 1" 2 BOLT FLANGE	BROOM MOTOR SPACER	GUARD - MOTOR, DECK, TV60	ARM - TORQUE, TV60	SUPPORT - TORQUE ARM	Bolt, 3/8-16 X 0.75 in Carriage
TV60 FIN	PART #	110672	110676	110956	120144	410928	420127	914014	942080	970230	970828	970829	970830	110894
	QTY	4	2	2	2	1	1	1	-	1	-	-	1	9
	ITEM	14	15	16	17	18	19	20	21	22	23	24	25	26
FINGER ROTOR PARTS LIST	DESCRIPTION	GROMMET, RUBBER .875 OD X .625 ID	BOLT, 1/2-13 X 1.5	BOLT, 3/8-16 X .75	BOLT, 3/8-16 X 1.5	BOLT, 7/16-14 X 1.5	NUT, 1/2-13	NUT, 3/8-16 LOCK NYLON INSERT	NUT, 7/16-14	NUT, 3/8-16 WIZ FLANGE	WASHER, 1/2" FLAT STANDARD	WASHER, 1/2" LOCK	WASHER, 7/16" FLAT STANDARD	WASHER, 7/16" LOCK
TV60 FIN	PART#	102005	110429	110433	110435	110535	110610	110618	110641	110645	110658	110666	110670	110671
	QTY	-	2	4	-	2	2	-	2	9	2	2	2	2
	ITEM	1	2	3	4	2	9	7	8	6	10	11	12	13

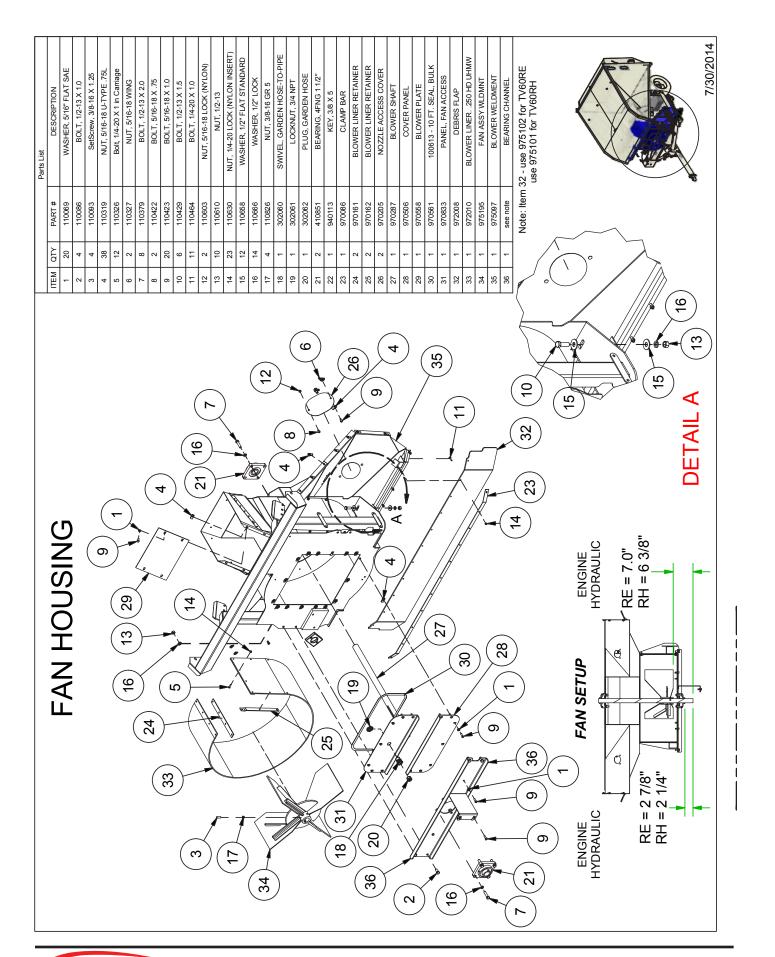




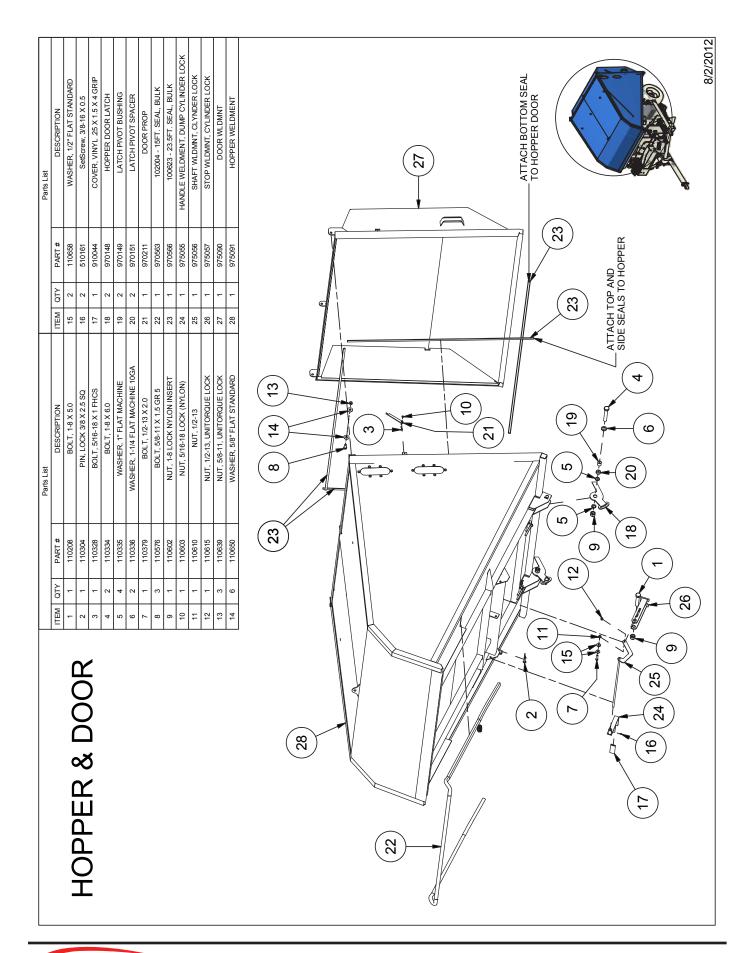
SHAFT - FINGER ROTOR, WELDMENT GUSSET - FINGER ROTOR SUPPORT Bolt, 1/4-20 X 0.625 in Carriage NUT, 5/16-18 LOCK (NYLON) CLAMP - RUBBER FINGER NUT, 1/4-20 WIZ FLANGE FINGER - RUBBER, TV60 SUPPORT - FINGER DESCRIPTION 8.0 Parts List Q Z 8 8 24 4 4 12 902160 PART# 110358 110603 110290 311403 970824 970827 975802 17.5 ITEM 2 9 **FINGER ROTOR** 7 2 9



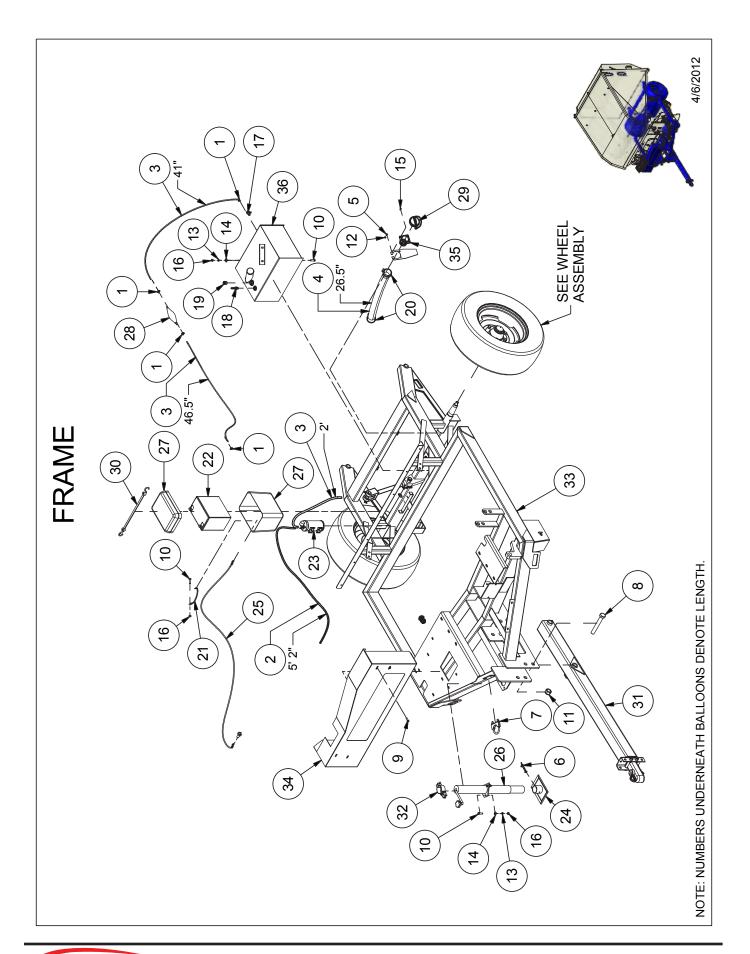




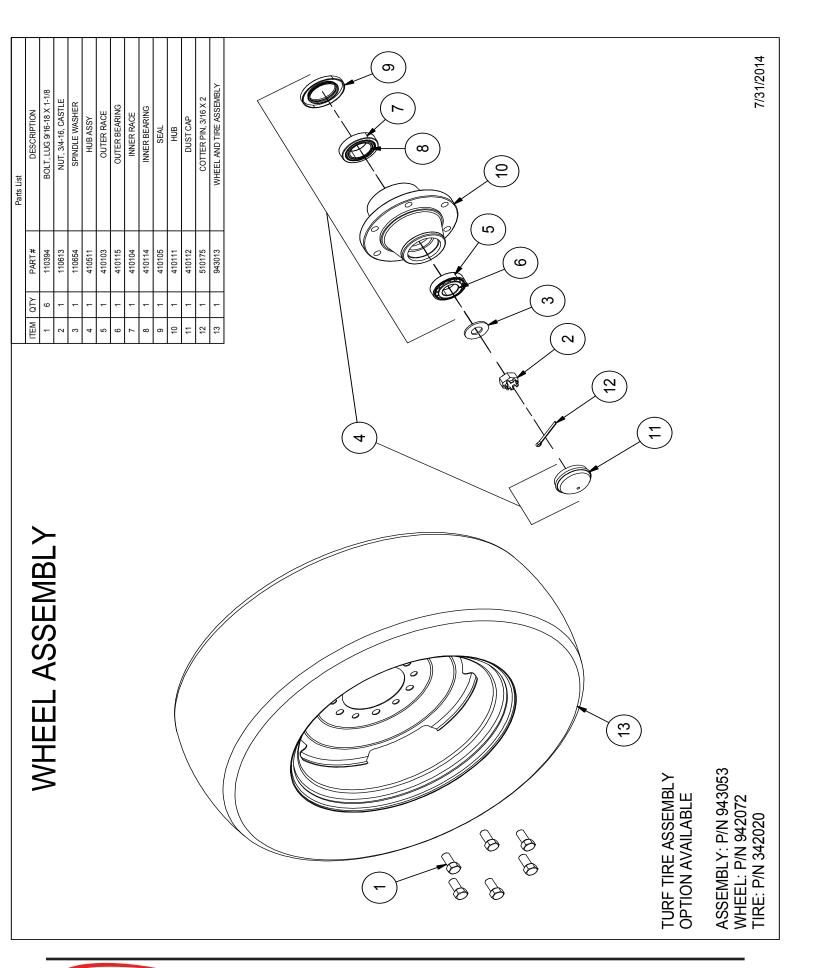




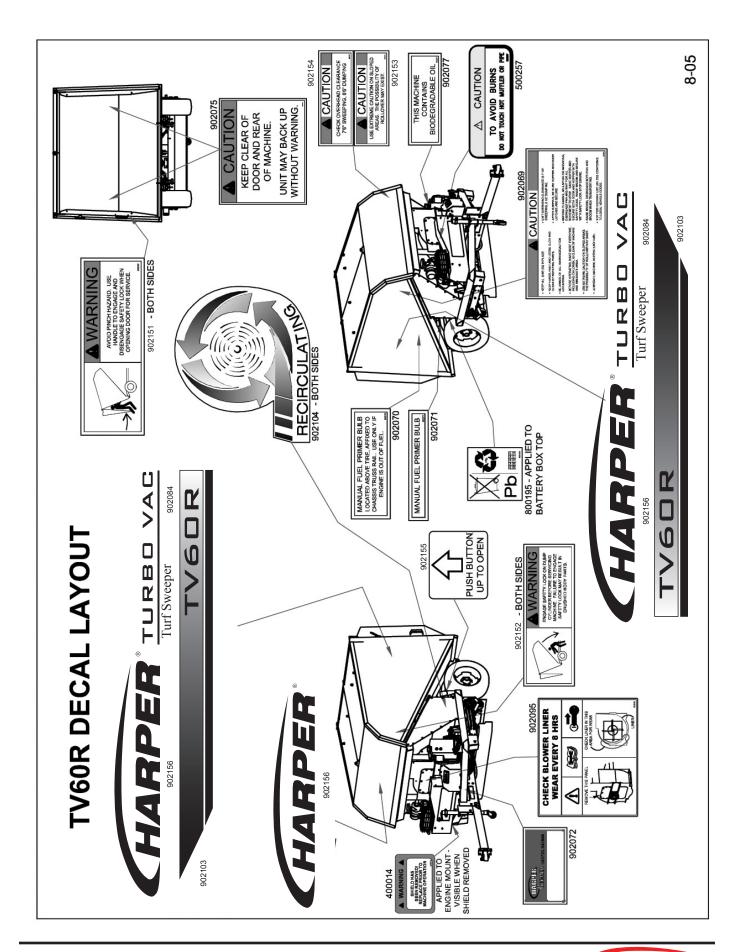


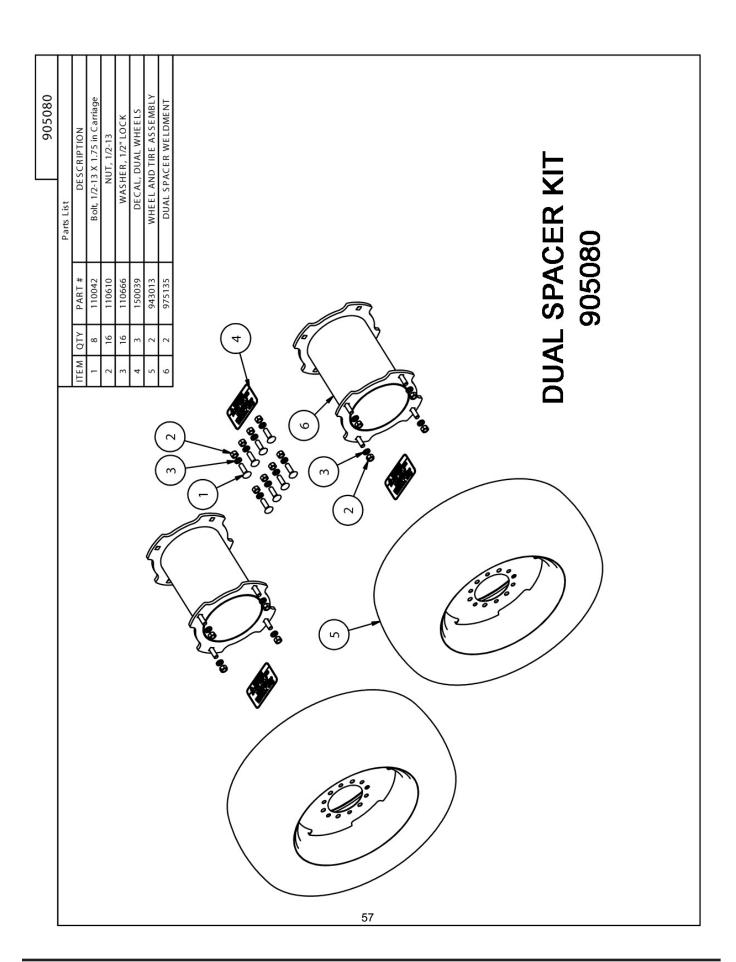


Ļ	ITEM	ΔT	PART#	DESCRIPTION
	-	4	100361	CLAMP, HOSE #4 .25 MINI
	2	-	100363	HOSE, 3/16" LOW PRESS
	Э	3	100644	HOSE, 1/4" LOW PERM
	4	-	100715	27", 1-1/2" FUEL FILL HOSE
	2	2	110090	WASHER, #10 FLAT STANDARD
	9	2	110304	PIN, LOCK 3/8 X 2.5 SQ
	7	-	110349	CLAMP, 2 1/4" EXHAUST
	∞	2	110364	BOLT, 1-8 X 7.0
	6	4	110423	BOLT, 5/16-18 X 1.0
	5	6	110425	BOLT, 3/8-16 X 1.25
	1	2	110602	NUT, 1-8 LOCK NYLON INSERT
	12	4	110631	NUT, 10-24 LOCK NYLON INSERT
	13	6	110672	WASHER, 3/8" LOCK
	4	6	110676	WASHER, 3/8" FLAT STANDARD
	15	4	110709	SCREW, 10-24 X 0.75, RHMS
	16	6	110826	NUT, 3/8-16 GR 5
	17	1	120205	ADAPTER, 4BH-4MP90
	18	-	120237	ADAPTER, 4BH-4MP
	19	2	500175	PIPE PLUG, 1/2" SQ HEAD
	8	2	511003	CLAMP, HOSE #36 2.25"
	21	-	530051	CABLE, BATTERY TO GROUND
	22	-	832011	ВАТТЕКУ
	23	-	902164	CARBON CANISTER
	72 12	- ,	912012	FOOT, JACK
	28 29	- -	932062	CABLE, BATTERY, 4GA 90 WIKING TERMINALS JACK
	27	-	952008	BATTERY BOX
	82	-	952009	PRIMER BULB
	59	-	970788	FUEL CAP, 2"
	99	-	972005	HOLD DOWN STRAP 15"
	31	-	975019	HITCH BAR WELDMENT
	32	-	975074	JACK HANDLE STOP ASSY
	33	-	975095	FRAME WLDMNT, TV60ER
	8	-	975118	BELT GUARD
	35	-	975139	NECK END WITH PLATE
	36	-	975140	GAS TANK
				4/6/2012
				4/6



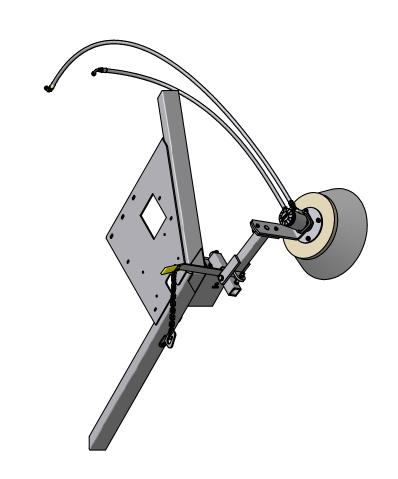




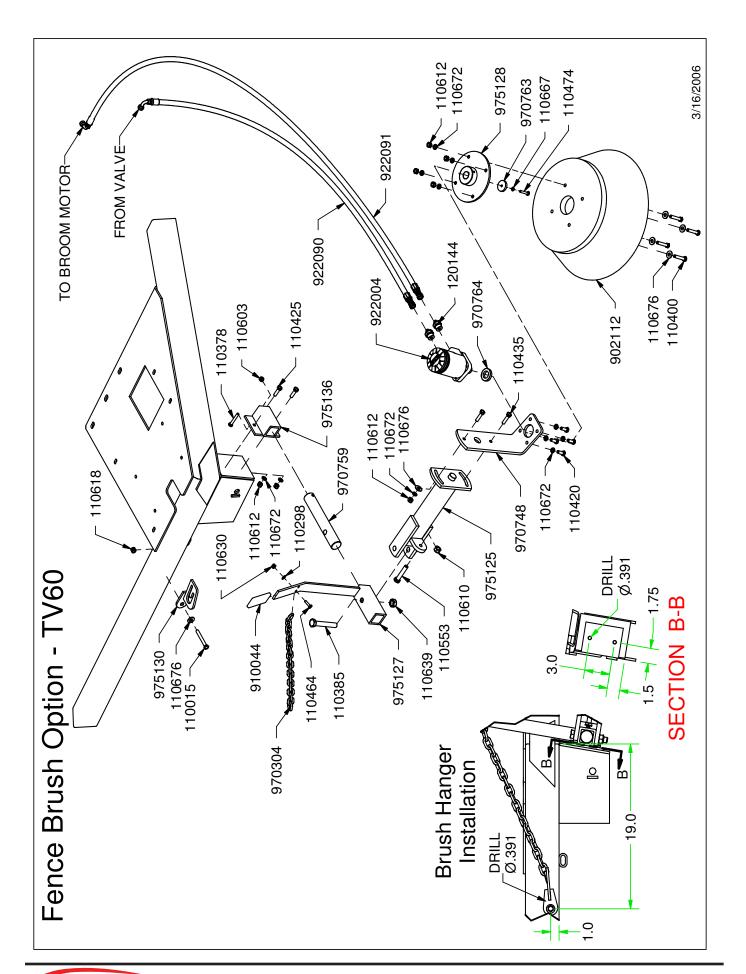


Fence Brush Option - TV60

OUANTITY 1			Parts List
	PART#	QUANTITY	DESCRIPTION
	110015	1	BOLT, 3/8-16 X 3.0
	110298	1	WASHER, 1/4" FLAT SAE
	110378	1	BOLT, 5/16-18 X 2.0
4 4 2 2 1 8 5 6 2	110385	1	BOLT, 5/8-11 X 4.0
4 2 2 8 5 0 2	110400	4	BOLT, 3/8-16 X 2.0
	110420	4	BOLT, 3/8-16 X 1.0
2	110425	2	BOLT, 3/8-16 X 1.25
	110435	2	BOLT, 3/8-16 X 1.5
	110464	1	BOLT, 1/4-20 X 1.0
	110474	1	BOLT, 1/4-20 X 1-1/2
	110553	1	BOLT, 1/2-13 X 2.5 TAP
	110603	1	NUT, 5/16-18 LOCK (NYLON)
ω	110610	1	NUT, 1/2-13
	110612	8	NUT, 3/8-16 GR 2
	110618	1	NUT, 3/8-16 LOCK NYLON INSERT
	110630	1	NUT, 1/4-20 LOCK (NYLON INSERT)
- 2 0 2	110639	1	NUT, 5/8-11, UNITORQUE LOCK
22 00 07	110667	1	WASHER, 1/4" LOCK
(O (N	110672	12	WASHER, 3/8" LOCK
N	110676	9	WASHER, 3/8" FLAT STANDARD
	120144	2	ADAPTER, 6MJ-10MB
	902112	1	BRUSH, 18" x 6" x 40 DEG
	910044	-	COVER, VINYL .25 X 1.5 X 4 GRIP
	922004	1	MOTOR, EATON 101-1009
	922090	1	HOSE, VALVE TO FENCE BRUSH MOTOR TV60
	922091	1	HOSE, FENCE BRUSH MOTOR TO BROOM MOTOR
	970304	1	PUMP STOP CHAIN
	970748	-	ARM, BRUSH MOTOR MOUNT
	970759	1	SHAFT, LIFT PIVOT
	970763	-	WASHER, 1.50 X .320
	970764	-	SPACER, 1.700 X 1.005 X .320
	975125	-	LIFT TUBE WELDMENT
	975127	-	LIFT LEVER WELDMENT
	975128	-	BRUSH ADAPTOR WELDMENT
-	975130	-	LIFT LATCH WELDMENT
	975136	1	EDGE BRUSH HANGER WELDMENT

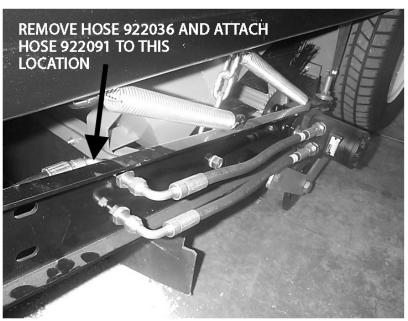






TV60RE & RH - INSTRUCTIONS FOR INSTALLING EDGE BRUSH HYDRAULIC HOSES





NOTES



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