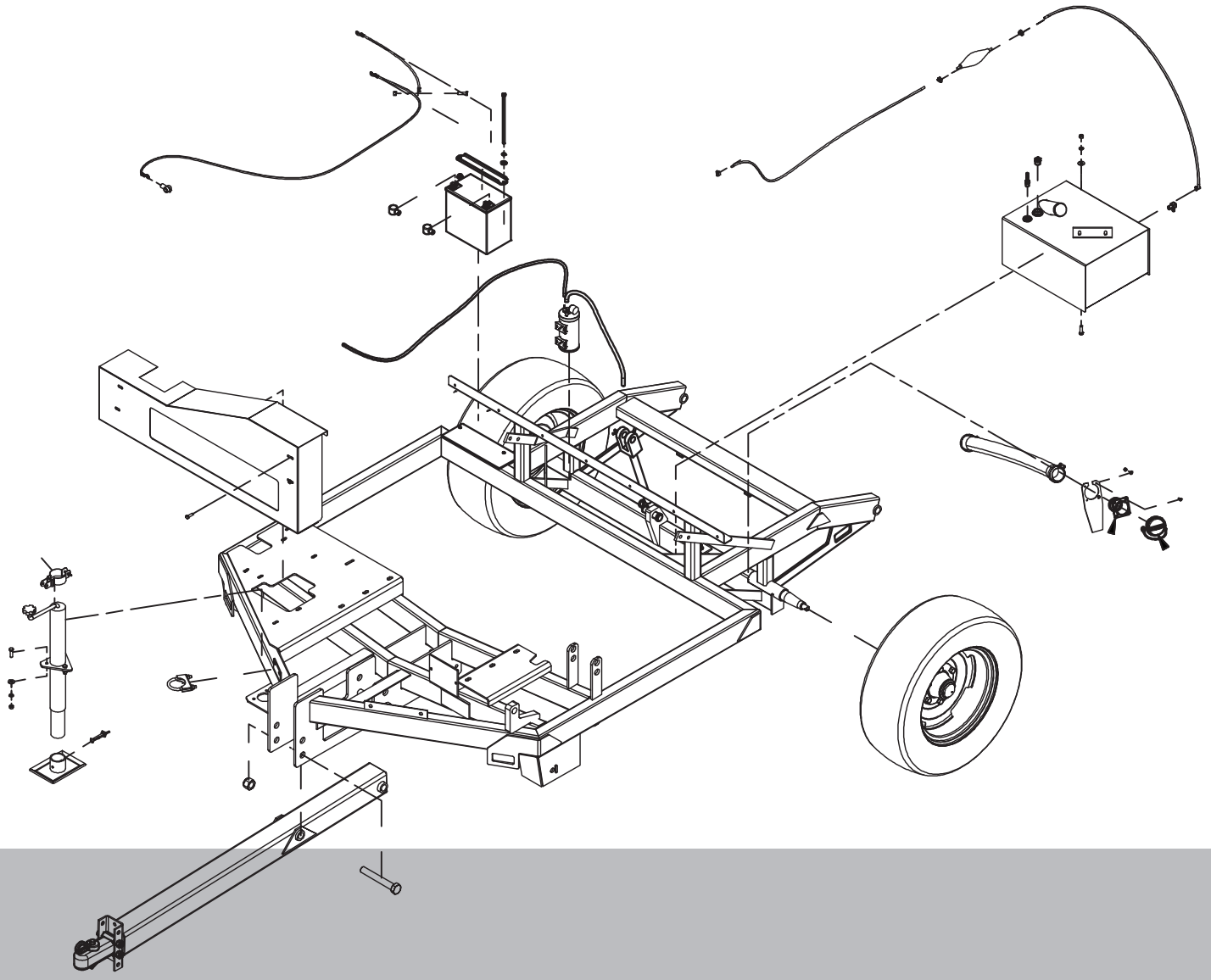
TURBO VAC 60RE



OPERATOR'S & PARTS MANUAL

4-2017

HARPER INDUSTRIES INC

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**. 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

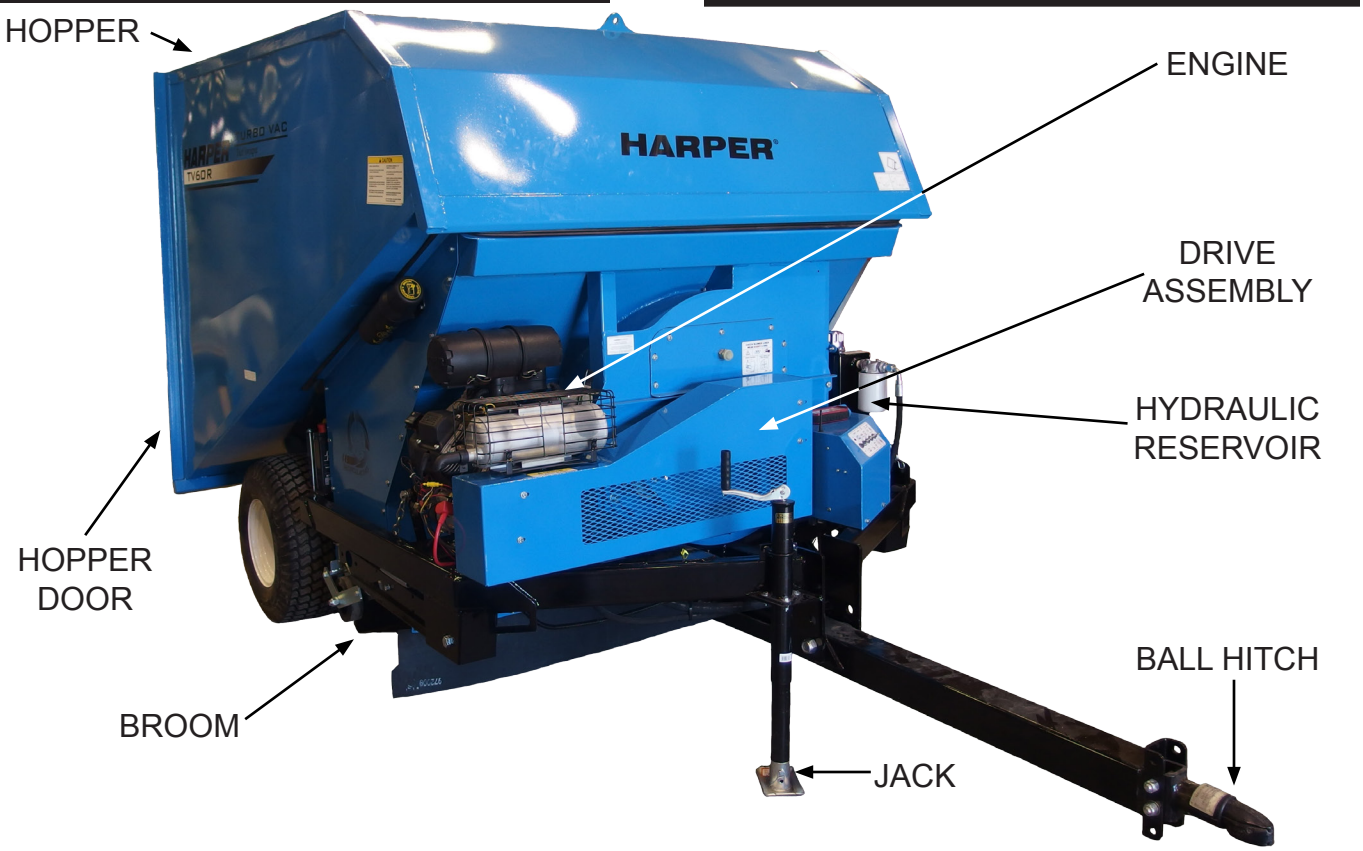
Safety Features	• Locking safety latches on all cylinders for service functions – Engine automatically returns to idle while dumping
Power	23.5 HP Kohler EFI gasoline engine
Hydraulic System	Belt-driven pump powers broom and cylinders
Hydraulic Reservoir	5 gallons, Crown AW46
Blower Drive	Dual Powerband belt drive w/ electric clutch
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 polyethylene bristles and adjustable gauge wheels
Bearings	Greasable bearings and sealed bearings
Hopper	7 yard capacity
Wheels/Tires	6-bolt steel wheels • Turf Tires – 26 x 12 (standard) • Radial Tires – 225 X 60R15 steel belted (available as an option)
Controls	Wireless RF (radio frequency) remote controls
Discharge	Hydraulic dump with automatic latch mechanism
Hitch	Adjustable height tongue with ball hitch
Paint	Durable 2-part polyurethane
Dimensions	164” long X 85” wide X 85” high
Weight	2300 lbs – 1046 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 informaion.*

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

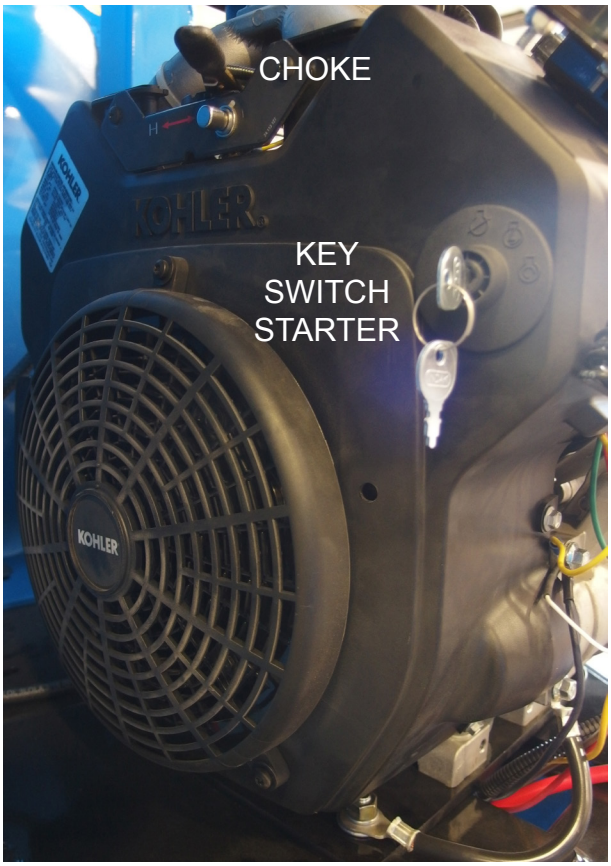
Ball Hitch* – The TV60R is towed with a ball hitch. Unit is not approved highway towing.

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.

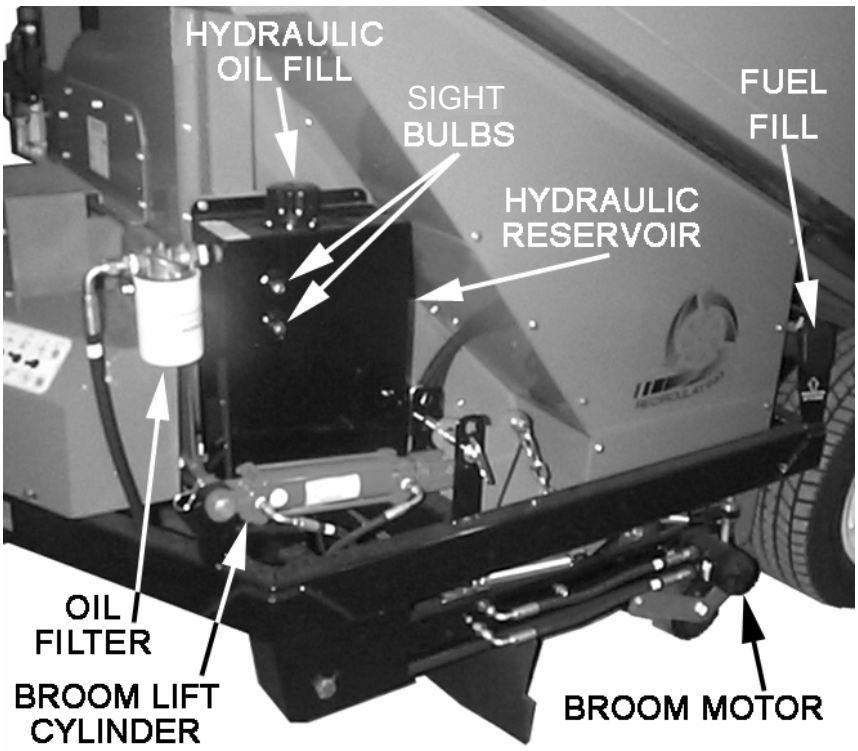
* Denotes common features of both the **TV60RE** and **TV60RH**.

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

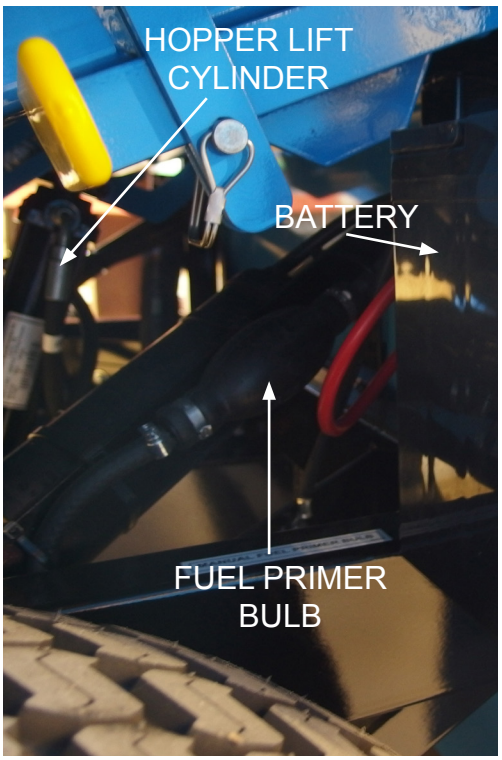
TV60RE - HP Kohler Engine



TV60RE - Hydraulic System &Fill Locations



Hydraulic Reservoir Assembly



Components Under Hopper

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.
- Ensure tires are inflated to air pressure listed on side of tire.
- 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! ⚠

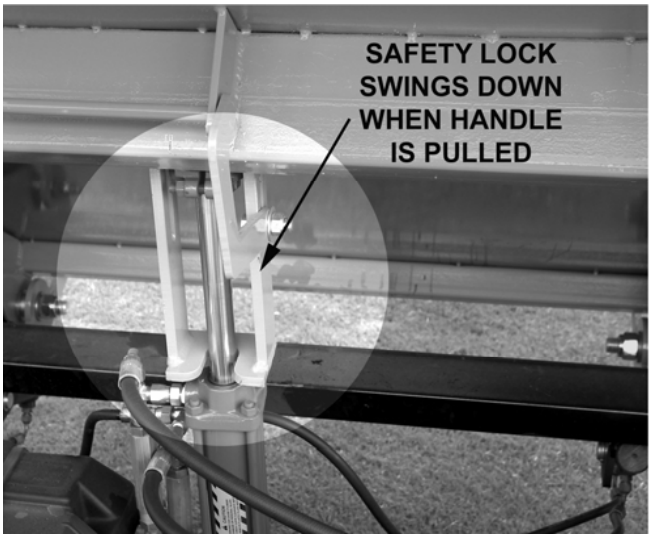
To prevent possible eye injury, always wear SAFETY GLASSES while operating or servicing the equipment.

During Service & Maintenance

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.

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 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.

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.)
4. 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 SECONDS.**
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.)

SAFETY WARNING!

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.

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.

1. Push the switches on the remote control or move the manual switches to activate the functions on the Turbo Vac.
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

1. 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.

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.

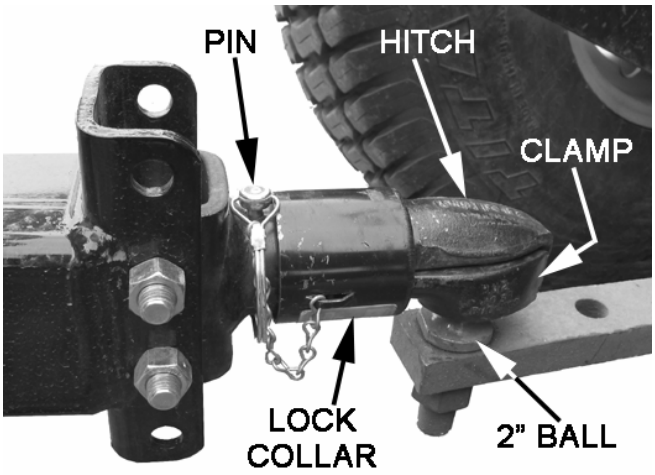
Check overhead clearance during use.
Clearance is: 7’ 6” for sweeping
8’ 6” for dumping

Towing

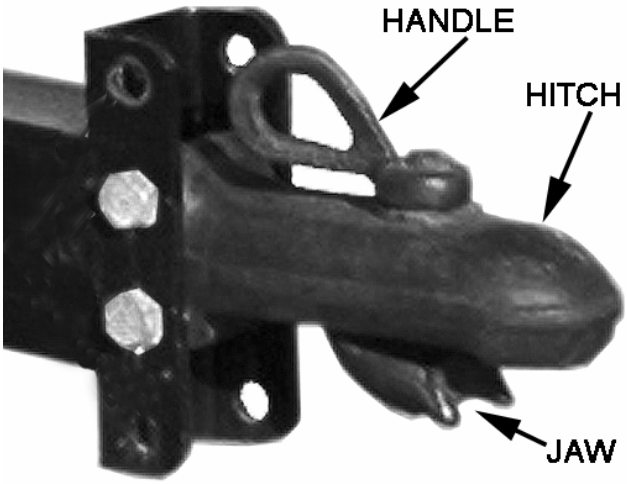
SAFETY WARNING!

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.

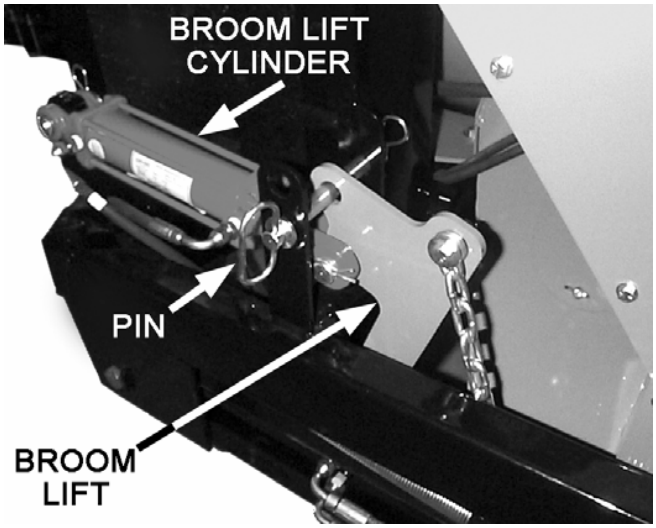


- For the jaw-type displayed in the following photograph, turn the handle until the jaw closes completely around the ball.



- The jack should be up whenever the Turbo Vac is connected to a tow vehicle.

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

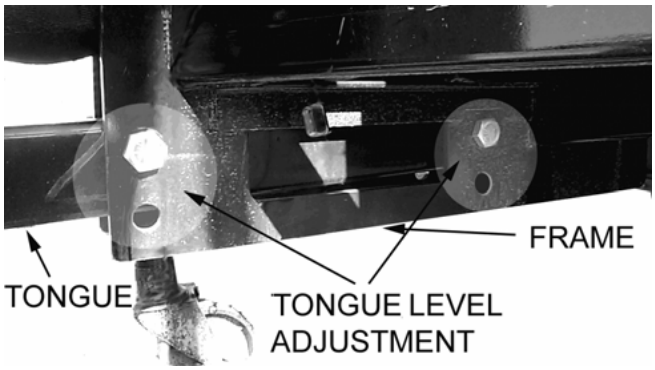


- Tires should be aired up to the proper tire pressure listed on the side of tire.
- Make sure the wheel lug nuts are tight.

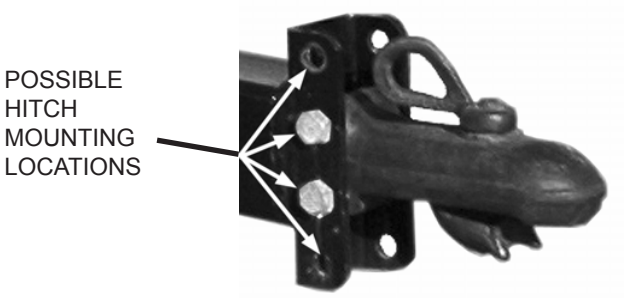
Adjustments

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.

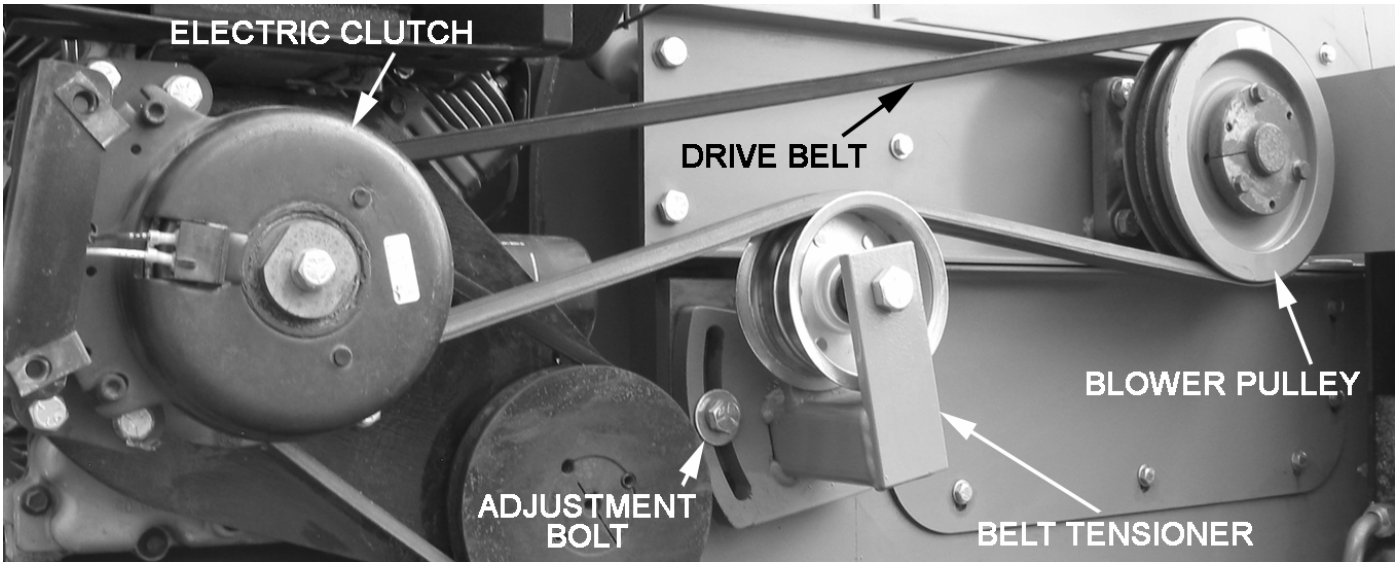


Broom Height

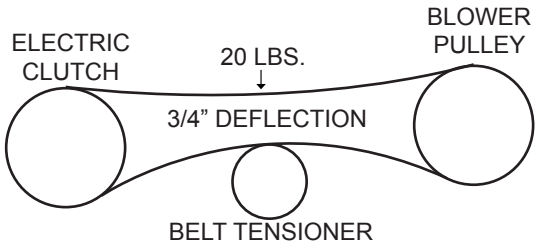
- The broom height should be adjusted so that the broom barely touches the grass.

- 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

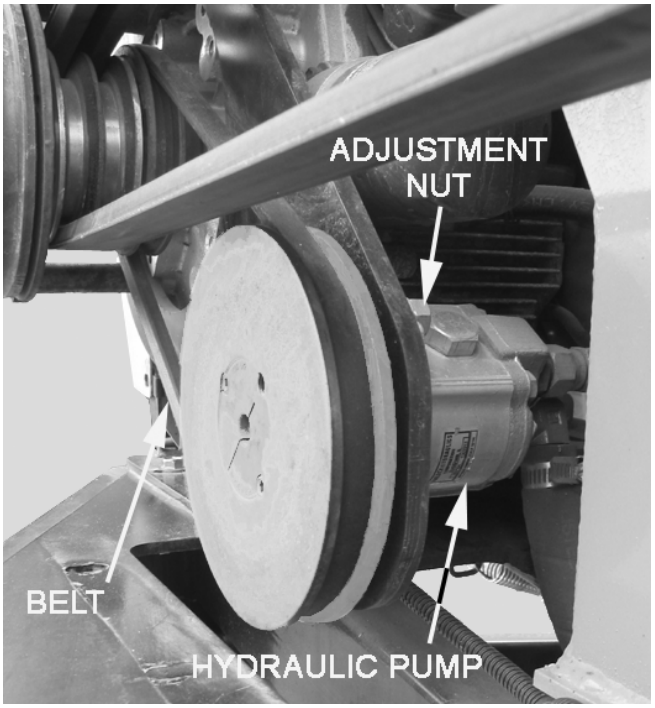


- To adjust belt tension, loosen the adjustment bolt and the bolt where the tensioner pivots. Position the tensioner to allow for proper deflection. Re-tighten both bolts.



- Apply 20 lbs. of pressure to the mid-point between the electric clutch and blower pulley. The belt should deflect ¾ 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
1. 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.
2. 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.
3. 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:

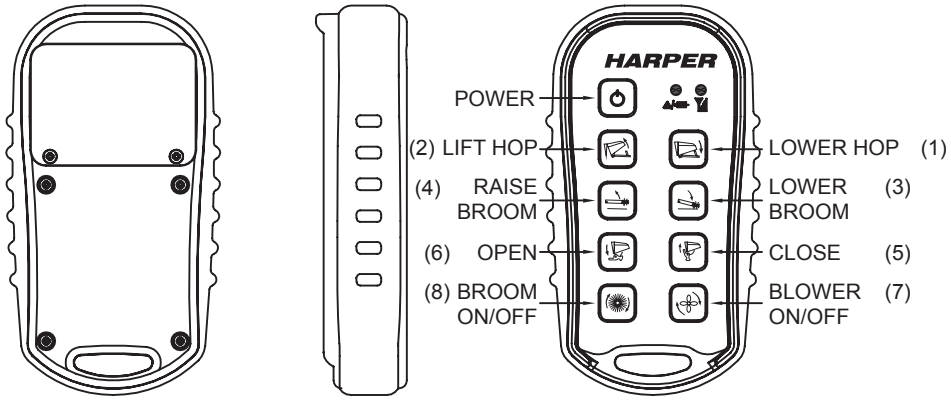
1. Remove receiver cover
2. Apply power to receiver
3. Place a jumper across the TEACH ID jumper inside the receiver, green LED will go steady inside the receiver. Remove the jumper and store it on one pin.
4. To get the transmitter into TEACH ID mode, press and hold the POWER button, LOWER HOP and BROOM ON/OFF.
5. 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.

Specifiactions

RF Transmit power (EIRP): 10 mW
RF Frequency: 902-928 MHz
Operating temperature - Radio: -40C to +85C
Battery life (min): 30 hours continuous

Vibration: 3G to 200 Hz
Outputs: 5A maz each (20A system max)



TRANSMITTER (P/N: 3A1518C) Uses 2 AA Alkaline batteries.

TRANSMITTER ERROR CODE CHART

ERROR CODE	PROBABLE CAUSE
1	LOW BATTERY
2	FAULTY CIRCUIT TO OUTPUT A
3	FAULTY CIRCUIT TO OUTPUT B
4	FAULTY CIRCUIT TO OUTPUT C
5	FAULTY CIRCUIT TO OUTPUT D
6	FAULTY CIRCUIT TO OUTPUT E
7	FAULTY CIRCUIT TO OUTPUT F
8	FAULTY CIRCUIT TO OUTPUT G
9	FAULTY CIRCUIT TO OUTPUT H

ERROR CODE NUMBER IS THE NUMBER OF RED LIGHT BLINKS BETWEEN EVERY PAUSE.

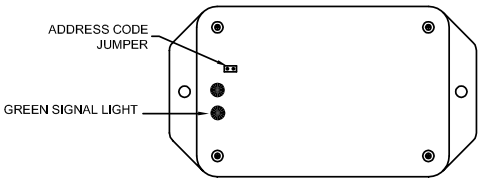
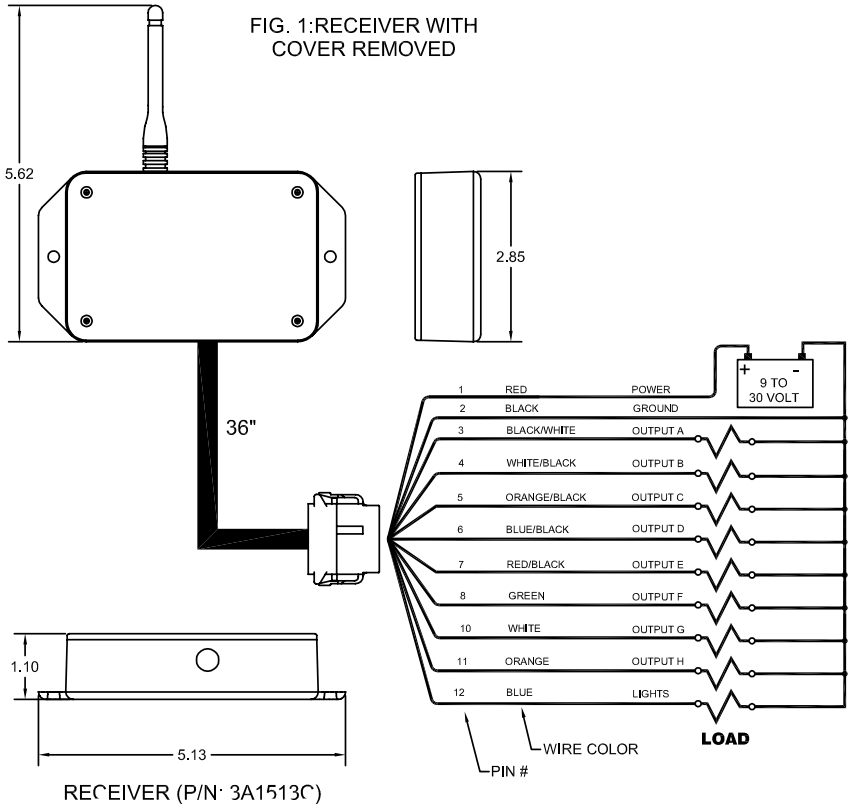


FIG. 1:RECEIVER WITH COVER REMOVED



RECEIVER (P/N: 3A1513C)

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

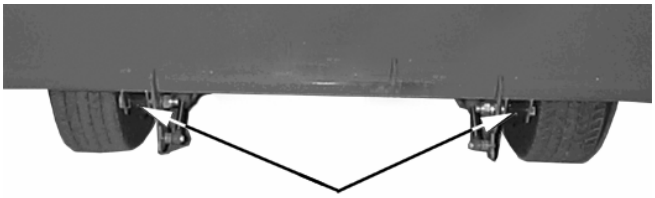
After the first hour of use:

- 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

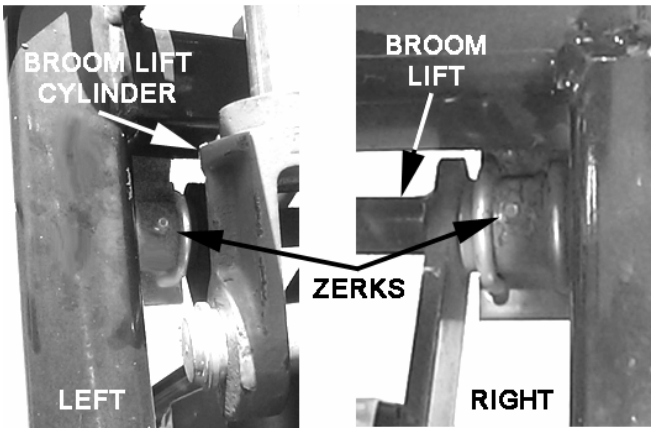
Nine grease zerks in the following locations should be greased daily to reduce wear:

- Hopper door latches (2)

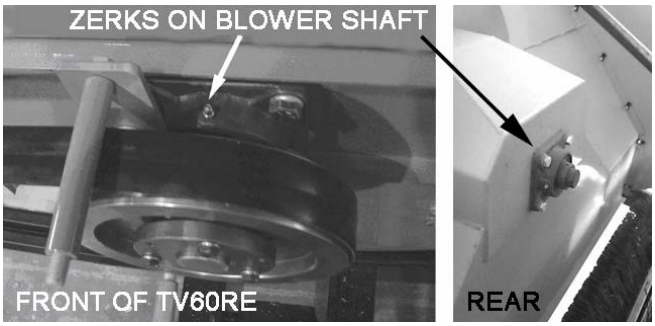


HOPPER DOOR LATCH ZERKS

- Broom lift (2)

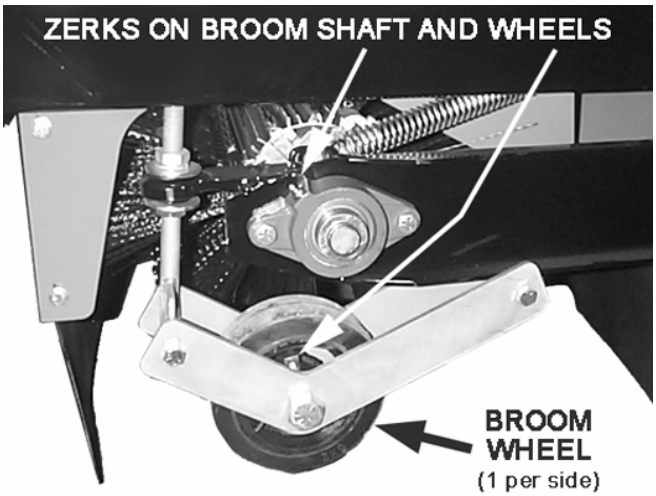


- Blower shaft (2)



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.

Hydraulic System

- The hydraulic system of the **TV60RE** is filled at the factory with Crown AW 46 hydraulic oil that has an ISO of 46.
- The **TV60RE** has a 10 micron, beta rated hydraulic oil filter designed for long life.

The following list of hydraulic fluids are compatible and can be mixed with Crown hydraulic fluid. MIXING OTHER OILS THAT ARE NOT INCLUDED ON THIS LIST COULD CAUSE GELLING AND DAMAGE TO THE HYDRAULIC COMPONENTS. If another type of oil is desired, then the system must be completely drained and flushed first.

Appropriate replacements:
ISO 46: Recommend for running in ambient air temperatures of 32°F-110°F, and it contains a kinematic viscosity rating around 46 cSt at 40°C. (1cSt = 1mm²/s)

- Mobil DTE 25
- Mobil DTE 15M
- Amoco Rykon Premium Oil ISO 46
- Chevron Rykon Premium Oil ISO 46
- Conoco Hydroclear AW MV 46
- Exxon Univis N 46
- Pennzoil AWX MV 46
- Shell Tellus T 46
- Texaco Rando HDZ 46

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.

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.

RECEIVER

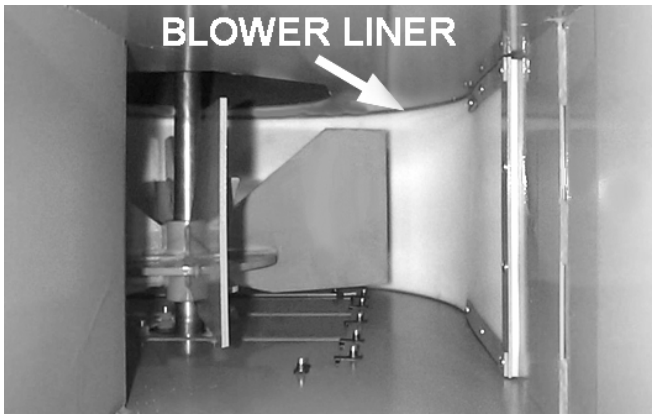
TRANSMITTER

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.



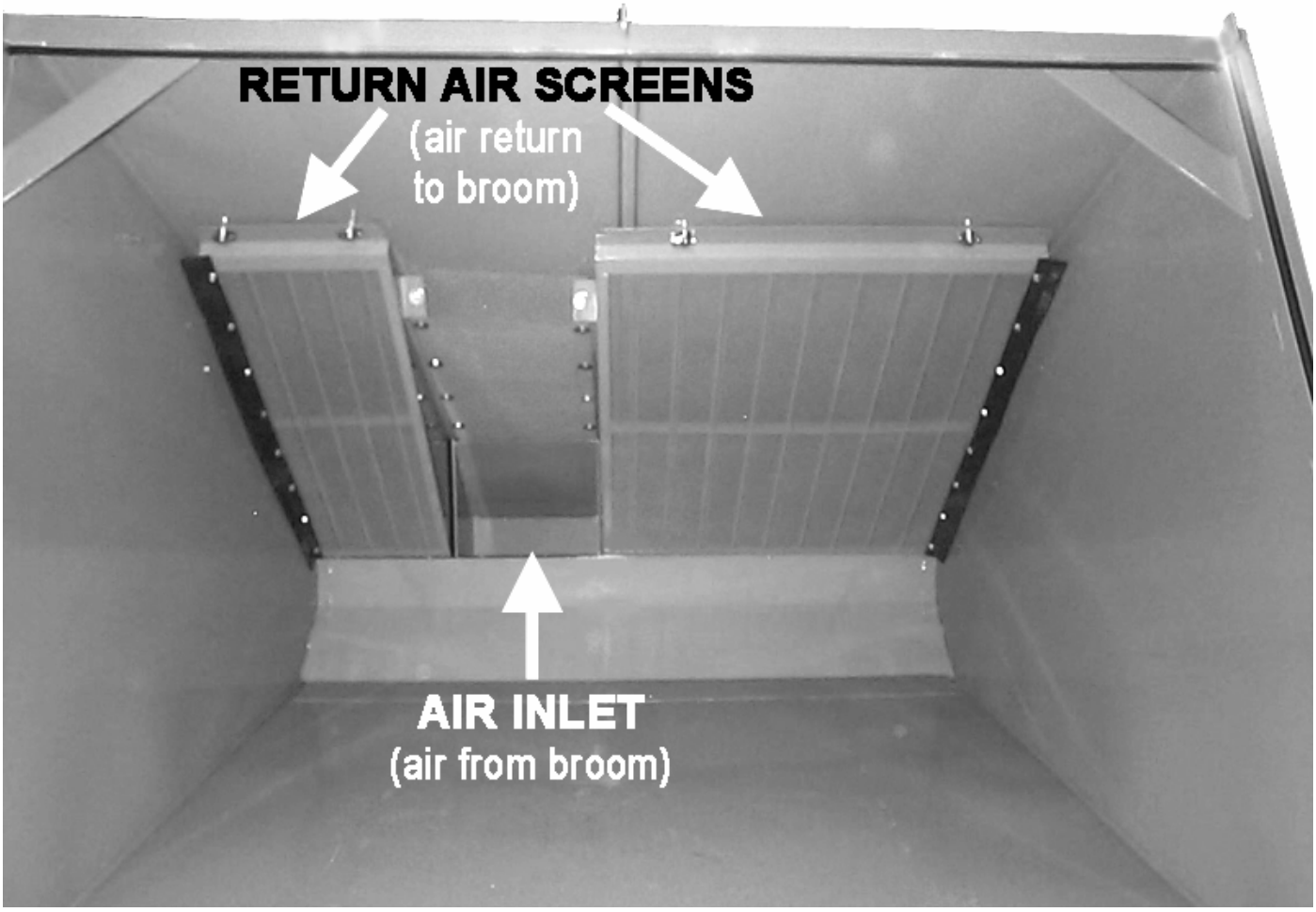
- If the blower liner is damaged or worn through, replace it before damage is done to the blower housing.

⚠ 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.

SAFETY WARNING!

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

- **Disclaimer – For the 23.5 HP engine, Kohler Engine Co. recommends the following:**

Daily or Before Starting Engine

Check engine oil level	SAE 10W-30
Check hydraulic oil level	Crown AW46 or equivalent
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.
Check tire pressure	Inflate to pressure listed on the side of the tire.

100 Hour Service – Perform these and all previous items:

Check outer air cleaner element (change if element appears dusty due to severe conditions)	Kohler part # 25 083 01-S
Change engine oil	2.0 quarts SAE 10W30
Remove cooling shrouds	Clean cooling areas.
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

Change outer air cleaner element	Kohler part # 25 083 01-S
Check inner air cleaner element (change if element appears dusty due to severe conditions)	Kohler part # 25 083 04-S

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

Have Bendix starter drive serviced.*

Have solenoid shift starter disassembled and cleaned.*

Change hydraulic oil	5 gallons Crown AW46 or equivalent
Change inner air cleaner element	Kohler part # 25 083 04-S

- **Should be serviced by an authorized Kohler Dealer.**

- **Refer to Kohler engine manual for more information on engine servicing.**

- **The identification number of the 23.5 HP Kohler EFI engine is: PA-CH730-0142.**

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
¼ 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.

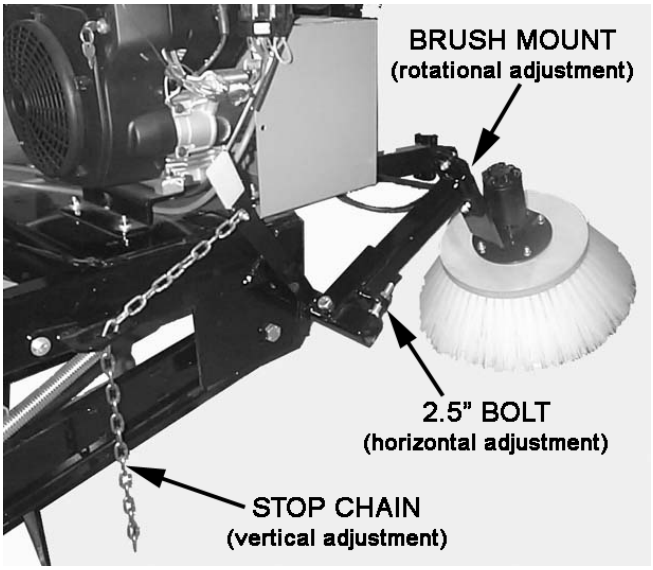
Hydraulic System:

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.

Parts

TV60RE

TV60R

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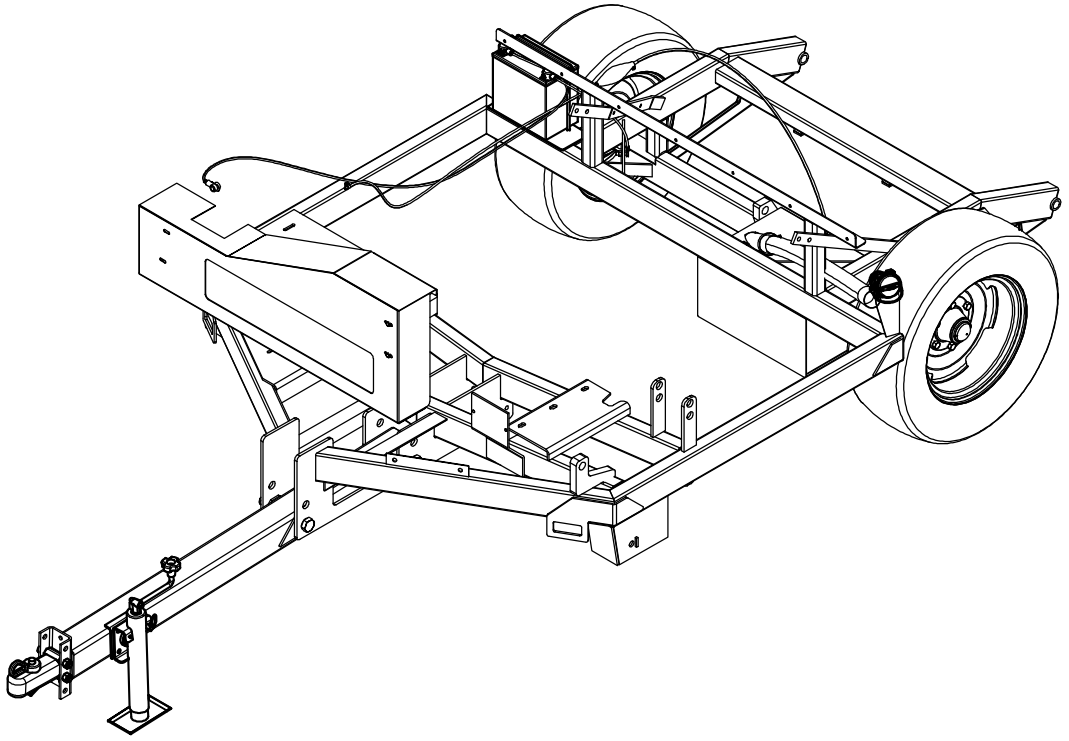
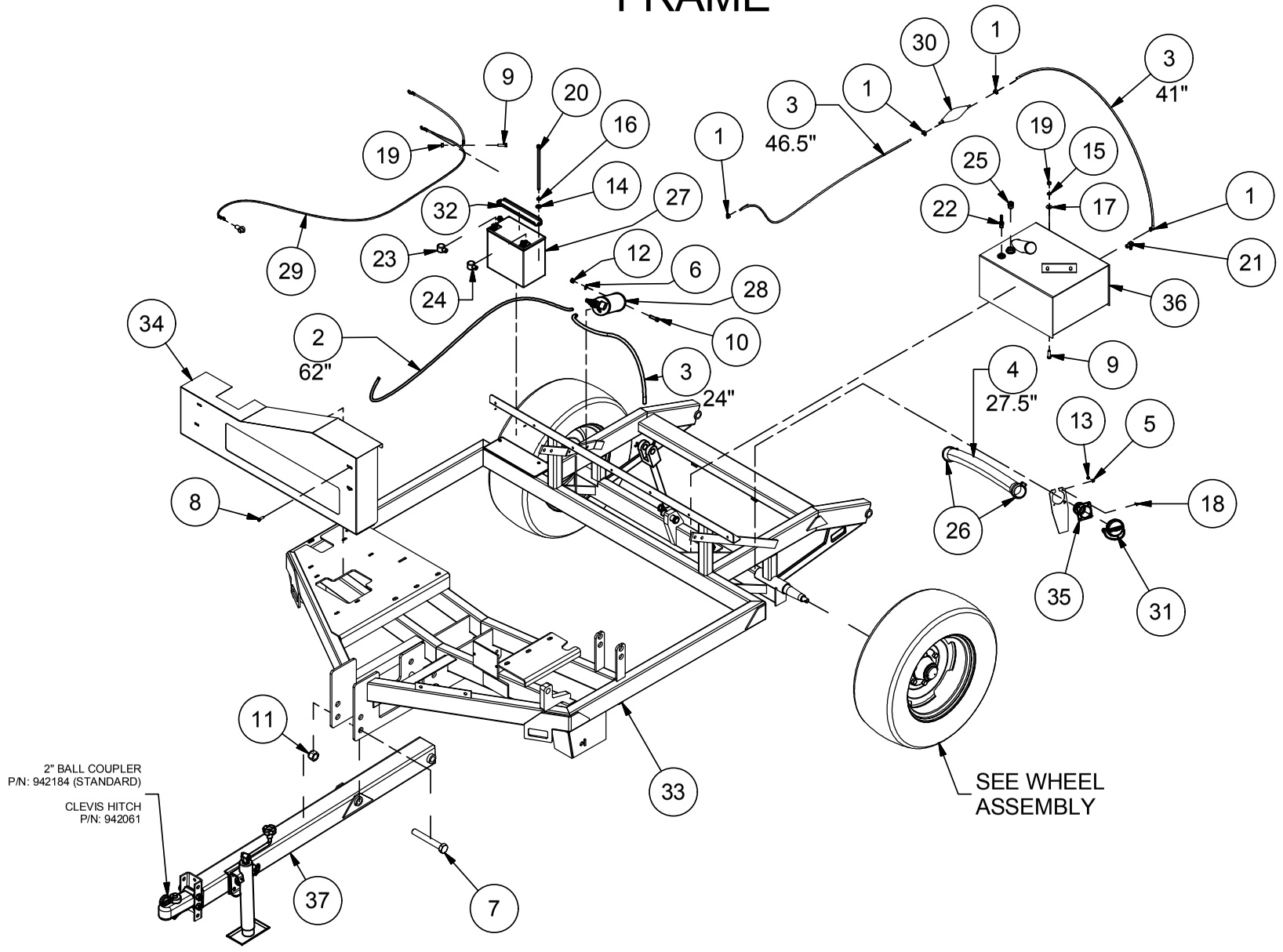
FRAME



Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	4	100361	CLAMP, HOSE #4 .25 MINI
2	1	100363	HOSE, 3/16" LOW PRESS
3	3	100644	HOSE, 1/4" LOW PERM
4	1	100715	27", 1-1/2" FUEL FILL HOSE
5	2	110090	WASHER, #10 FLAT STANDARD
6	6	110155	WASHER, 3/8" FLAT SAE
7	2	110364	BOLT, 1-8 X 7.0
8	4	110423	BOLT, 5/16-18 X 1.0
9	9	110425	BOLT, 3/8-16 X 1.25
10	2	110465	BOLT, 3/8-16 X 1.25 SHCS
11	2	110602	NUT, 1-8 LOCK NYLON INSERT
12	2	110618	NUT, 3/8-16 LOCK NYLON INSERT
13	4	110631	NUT, 10-24 LOCK NYLON INSERT
14	12	110665	WASHER, 5/16" FLAT STANDARD
15	9	110672	WASHER, 3/8" LOCK
16	10	110674	WASHER, 5/16" LOCK
17	9	110676	WASHER, 3/8" FLAT STANDARD
18	4	110709	SCREW, 10-24 X 0.75, RHMS
19	9	110826	NUT, 3/8-16 GR 5
20	2	111016	BOLT, 5/16-18 X 9.0
21	1	120205	ADAPTER, 4BH-4MP90
22	1	120237	ADAPTER, 4BH-4MP
23	1	132069	BATTERY TERMINAL COVER, POSITIVE
24	1	132070	BATTERY TERMINAL COVER, NEGATIVE
25	2	500175	PIPE PLUG, 1/2" SQ HEAD
26	2	511003	CLAMP, HOSE #36 2.25"
27	1	832011	BATTERY
28	1	902190	CANISTER, 550 CC CARBON
29	1	932062	CABLE, BATTERY, 4GA 96" W/RING TERMINALS
30	1	952009	PRIMER BULB
31	1	970788	FUEL CAP, 2"
32	1	970876	BRKT, BATTERY HOLD DOWN
33	1	975095	FRAME WLDMNT, TV60ER
34	1	975118	BELT GUARD
35	1	975139	NECK END WITH PLATE
36	1	975140	GAS TANK
37	1	975436	WELDMENT, TV60R HD HITCH

12/7/2015

FRAME



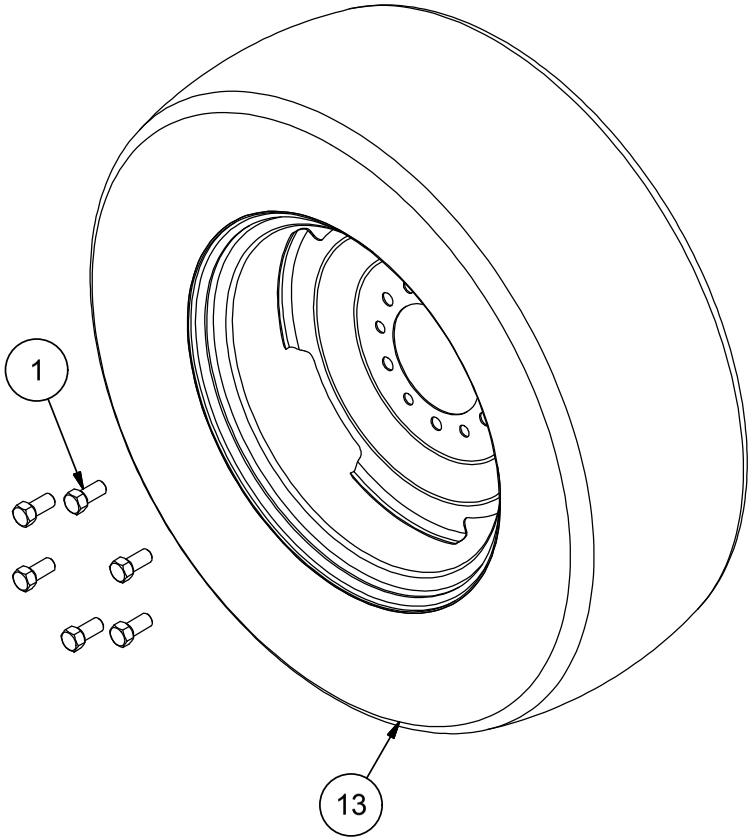
NOTE: NUMBERS UNDERNEATH BALLOONS DENOTE LENGTH.

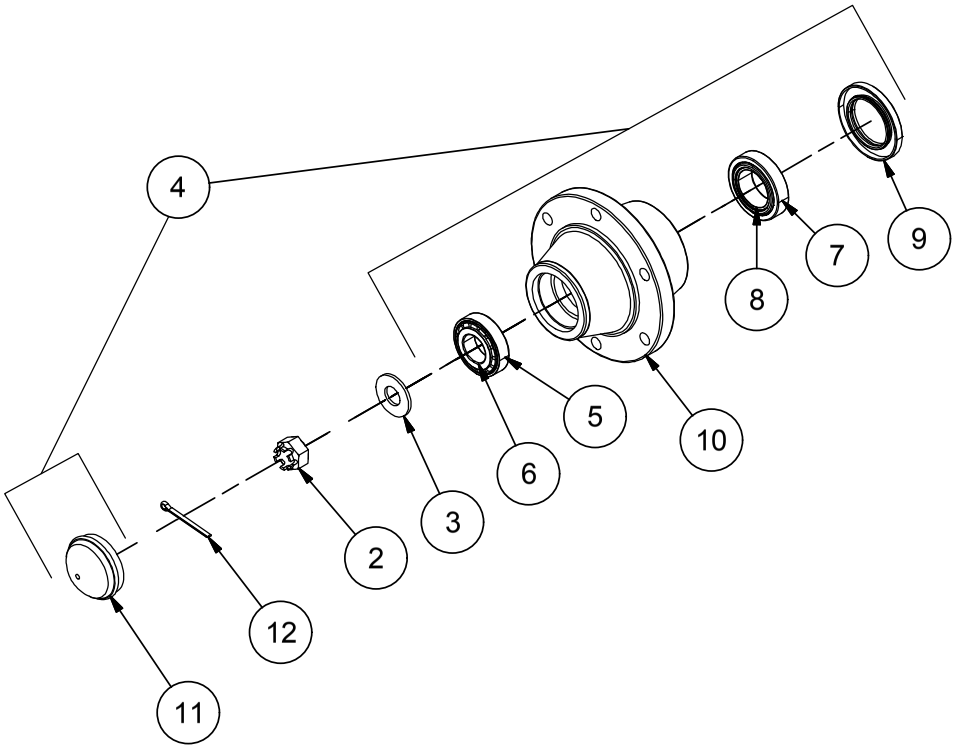
12/7/2015

HARPER TURF EQUIPMENT

WHEEL ASSEMBLY

Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	6	110394	BOLT, LUG 9/16-18 X 1-1/8
2	1	110613	NUT, 3/4-16, CASTLE
3	1	110654	SPINDLE WASHER
4	1	410511	HUB ASSY
5	1	410103	OUTER RACE
6	1	410115	OUTER BEARING
7	1	410104	INNER RACE
8	1	410114	INNER BEARING
9	1	410105	SEAL
10	1	410111	HUB
11	1	410112	DUST CAP
12	1	510175	COTTER PIN, 3/16 X 2
13	1	943053	TURF WHEEL AND TIRE ASSEMBLY
		942072	Wheel, 12 X 10.5; 6 On 6, White w/-2.0
		342020	Tire, 26 X 12 X 12/6 Titan





RADIAL TIRE ASSEMBLY
OPTION AVAILABLE

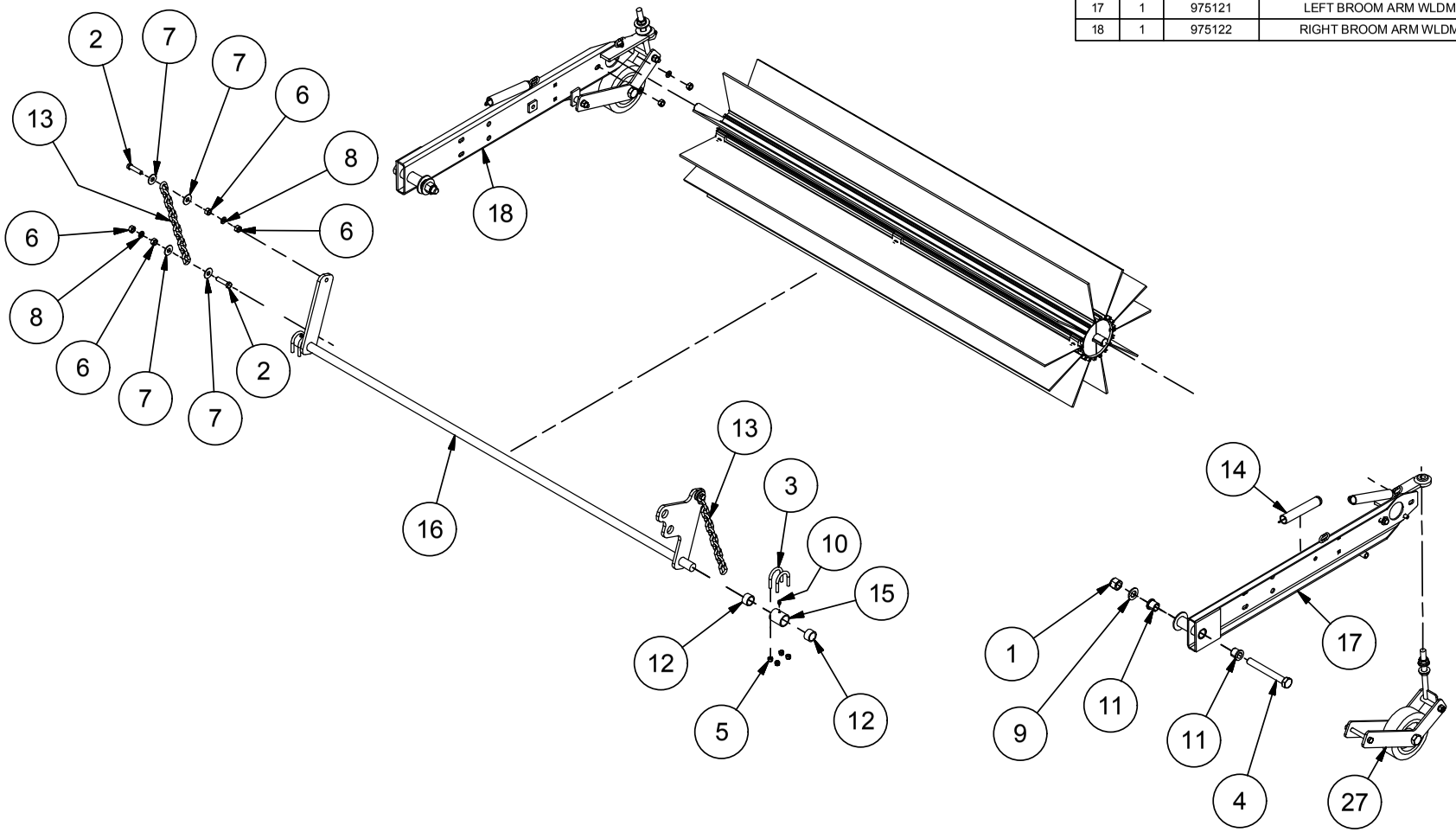
ASSEMBLY: P/N 943013
WHEEL: P/N 410107
TIRE: P/N 942090

7/31/2014

DECK LIFT

Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	2	110320	NUT, 3/4-10 NYLOCK
2	6	110321	BOLT, 7/16-14 X 1.75 GR 5 HEX HEAD
3	4	110362	U-BOLT, 5/16
4	2	110383	BOLT, 3/4-10 X 6.0
5	16	110603	NUT, 5/16-18 LOCK (NYLON)
6	11	110641	NUT, 7/16-14
7	10	110670	WASHER, 7/16" FLAT STANDARD

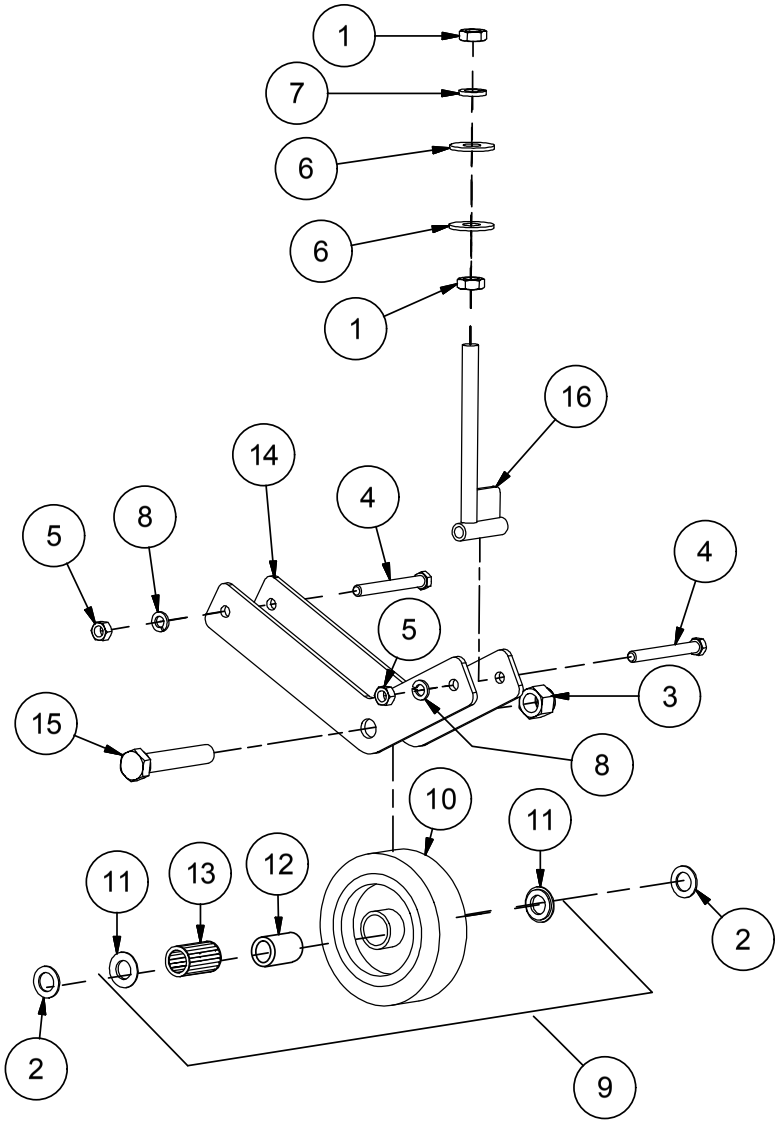
Parts List			
ITEM	QTY	PART #	DESCRIPTION
8	13	110671	WASHER, 7/16" LOCK
9	1	110678	WASHER, 3/4" FLAT SAE
10	2	510174	GREASE ZERK, 1/4-28 ST
11	4	800128	BUSHING, IGUS, FOOT PEDAL
12	4	922006	BUSHING, 1.75 X 1 X .75
13	2	940126	BROOM LIFT CHAIN
14	4	942054	SPRING
15	2	970370	BROOM LIFT BUSHING
16	1	975098	BROOM LIFT WELDMENT
17	1	975121	LEFT BROOM ARM WLDMNT
18	1	975122	RIGHT BROOM ARM WLDMNT



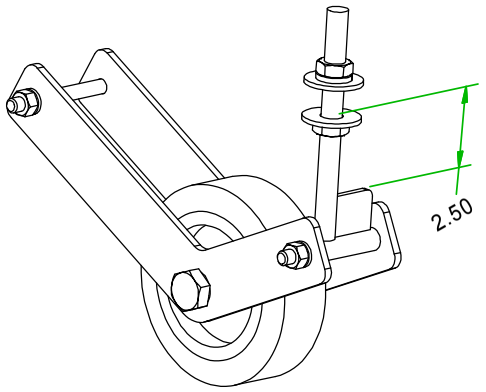
10/21/2015

HARPER TURF EQUIPMENT

BROOM WHEEL

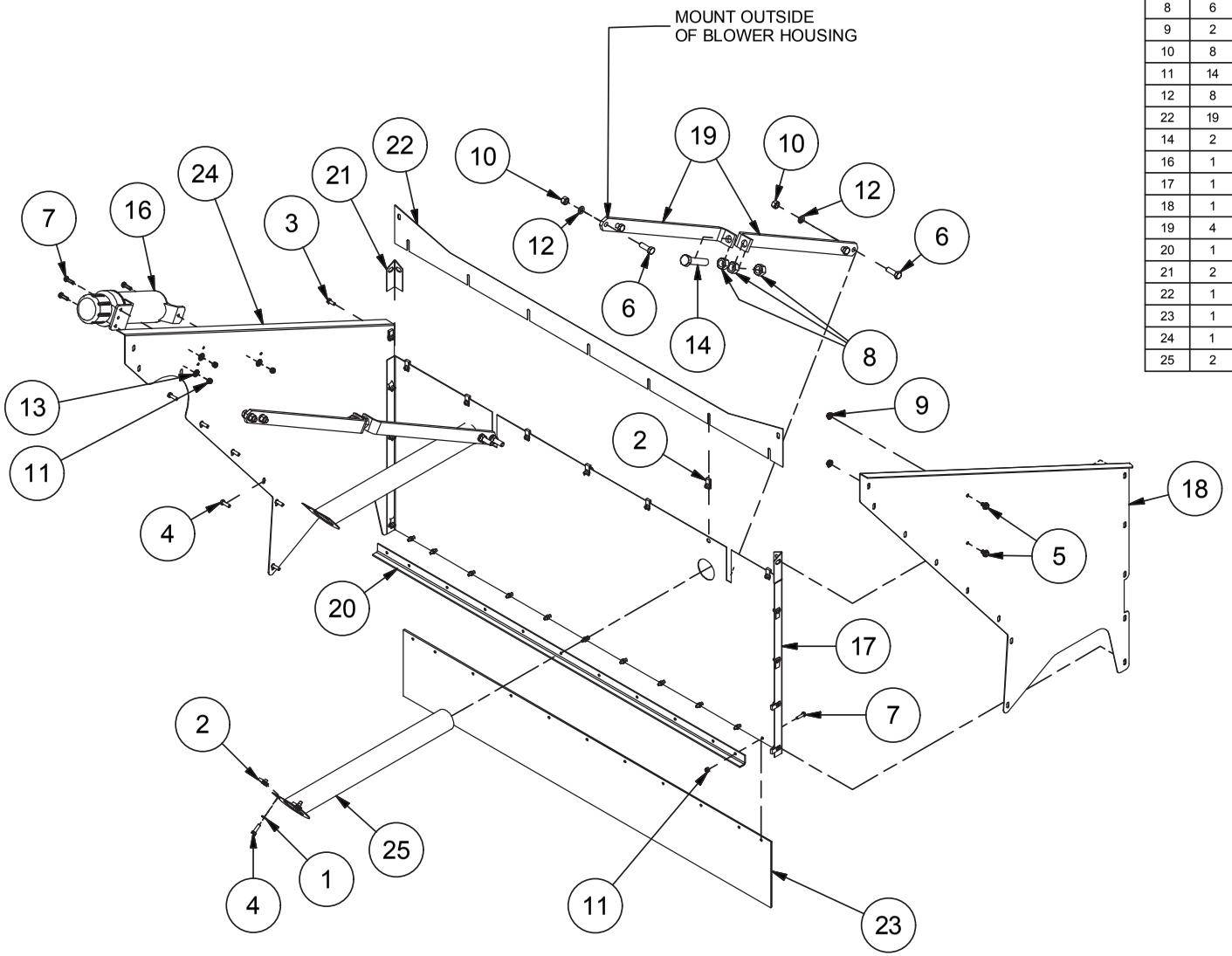


Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	2	110039	NUT, 5/8-11 JAM
2	2	110068	WASHER, 1.25 OD X .75 ID X .075
3	1	110320	NUT, 3/4-10 NYLOCK
4	2	110527	BOLT, 7/16-14 X 4.0
5	2	110641	NUT, 7/16-14
6	2	110650	WASHER, 5/8" FLAT STANDARD
7	1	110655	WASHER, 5/8" LOCK
8	2	110671	WASHER, 7/16" LOCK
9	1	940043	CASTER WHEEL ASSY
10	1	942071	CASTER WHEEL
11	2	942115	RETAINING SEAL
12	1	942164	BUSHING SPANNER
13	1	942220	ROLLER BERRING
14	2	970067	BROOM WHEEL BRACKET
15	1	970254	CASTER WHEEL BOLT
16	1	975015	WHEEL HEIGHT ADJ. WLDMNT

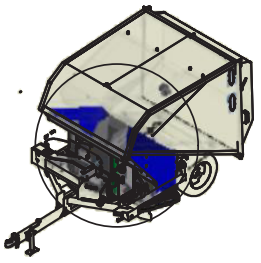


12/7/2015

AIR RETURN



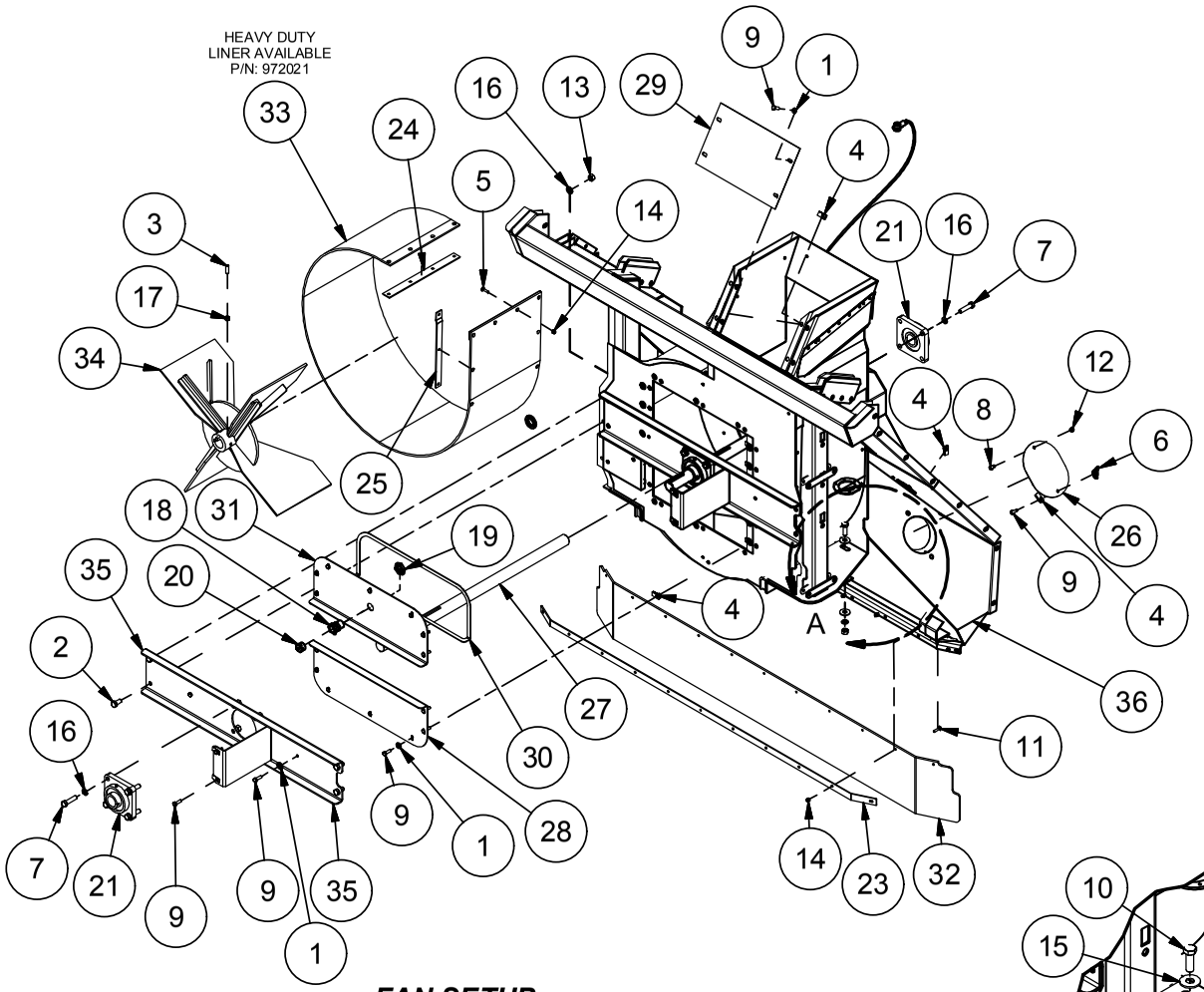
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	4	110069	WASHER, 5/16" FLAT SAE
2	21	110319	NUT, 5/16-18 U-TYPE .75L
3	4	110422	BOLT, 5/16-18 X .75
4	16	110423	BOLT, 5/16-18 X 1.0
5	2	110426	BOLT, 5/16-18 X 0.5, WIZ FLANGE
6	8	110429	BOLT, 1/2-13 X 1.5
7	14	110464	BOLT, 1/4-20 X 1.0
8	6	110596	NUT, 3/4-10
9	2	110606	NUT, 5/16-18 WIZ FLANGE
10	8	110610	NUT, 1/2-13
11	14	110630	NUT, 1/4-20 LOCK (NYLON INSERT)
12	8	110666	WASHER, 1/2" LOCK
22	19	110673	WASHER, 1/4" FLAT STANDARD
14	2	110713	BOLT, 3/4-10 X 3.5 TAP
16	1	152005	HOLDER, MANUAL
17	1	970390	BACK AIR RETURN
18	1	970391	LEFT AIR RETURN
19	4	970393	TRUSS BAR
20	1	970394	FLAP RETAINER
21	2	970542	ANGLE, AIR RETURN
22	1	970545	REAR SEAL
23	1	970685	DEBRIS FLAP MAIN
24	1	970882	Right Air Retum Shield
25	2	975111	HOSE TUBE



10/7/2016

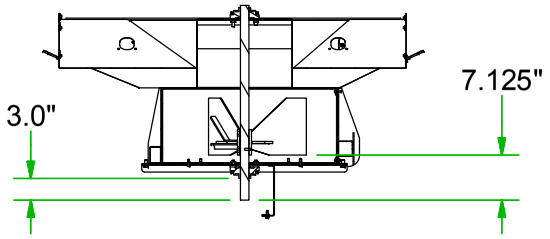
HARPER TURF EQUIPMENT

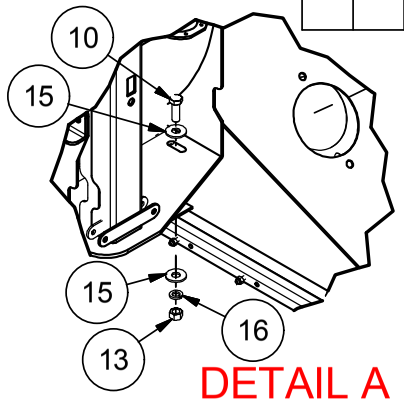
FAN HOUSING



Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	20	110069	WASHER, 5/16" FLAT SAE
2	4	110086	BOLT, 1/2-13 X 1.0
3	4	110093	SetScrew, 3/8-16 X 1.25
4	38	110319	NUT, 5/16-18 U-TYPE .75L
5	12	110326	Bolt, 1/4-20 X 1 in Carriage
6	2	110327	NUT, 5/16-18 WING
7	8	110379	BOLT, 1/2-13 X 2.0
8	2	110422	BOLT, 5/16-18 X .75
9	20	110423	BOLT, 5/16-18 X 1.0
10	6	110429	BOLT, 1/2-13 X 1.5
11	11	110464	BOLT, 1/4-20 X 1.0
12	2	110603	NUT, 5/16-18 LOCK (NYLON)
13	10	110610	NUT, 1/2-13
14	23	110630	NUT, 1/4-20 LOCK (NYLON INSERT)
15	12	110658	WASHER, 1/2" FLAT STANDARD
16	14	110666	WASHER, 1/2" LOCK
17	4	110826	NUT, 3/8-16 GR 5
18	1	302060	SWIVEL, GARDEN HOSE-TO-PIPE
19	1	302061	LOCKNUT, 3/4 NPT
20	1	302062	PLUG, GARDEN HOSE
21	3	410851	BEARING, 4FNG 1 1/2"
22	1	940113	KEY, 3/8 X 5
23	1	970086	CLAMP BAR
24	2	970161	BLOWER LINER RETAINER
25	2	970162	BLOWER LINER RETAINER
26	2	970205	NOZZLE ACCESS COVER
27	1	970287	BLOWER SHAFT
28	1	970506	COVER PANEL
29	1	970558	BLOWER PLATE
30	1	970561	100613 - 10 FT. SEAL, BULK
31	1	970833	PANEL, FAN ACCESS
32	1	972008	DEBRIS FLAP
33	1	972010	BLOWER LINER. .250 HD UHMW
34	1	975001	FAN ASSY WLDMNT
35	1	975102	BEARING CHANNEL
36	1	975150	WELDMENT, BLOWER HOUSING, TV60E, EFI

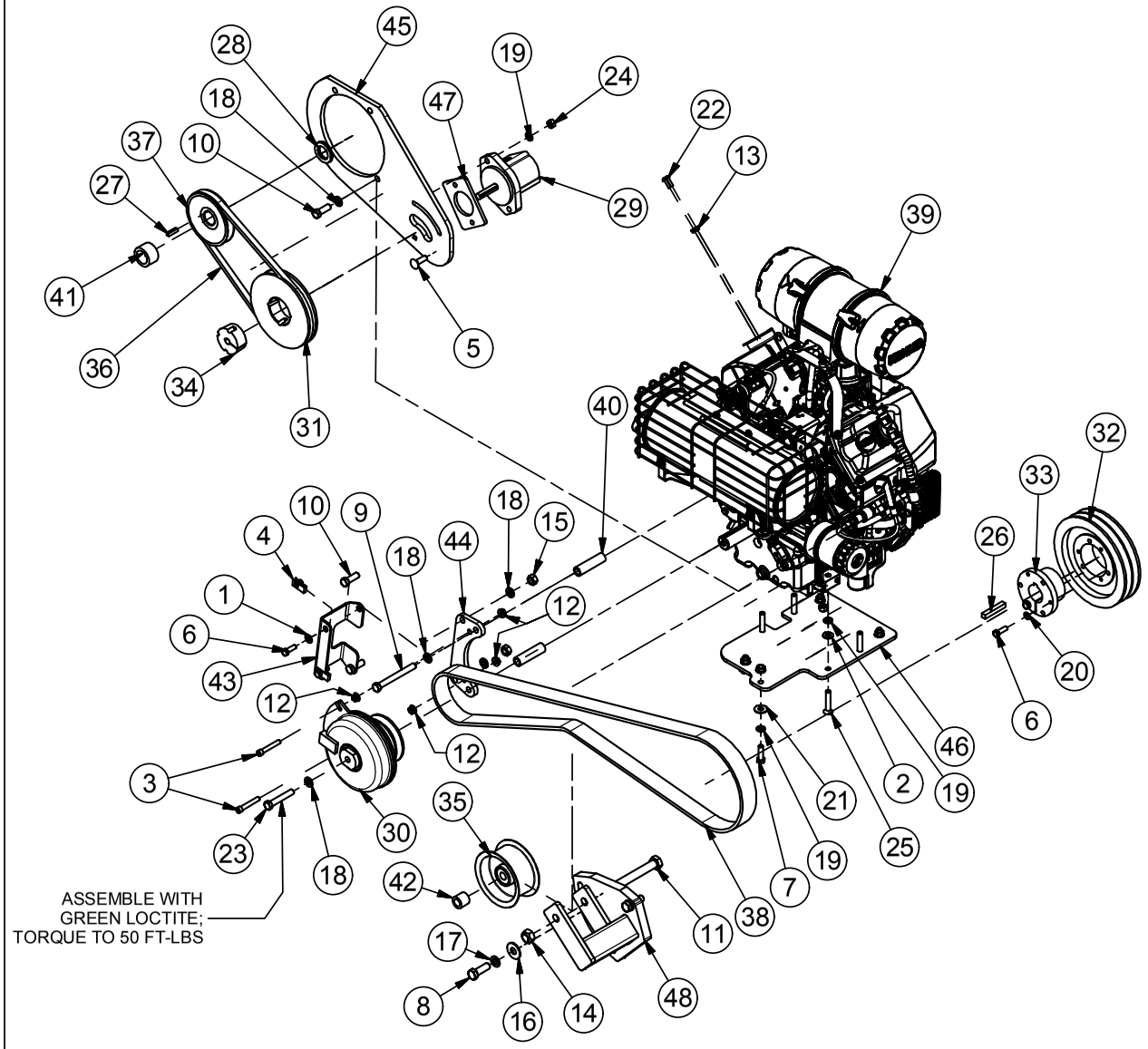
FAN SETUP





4/11/2017

DRIVE COMPONENTS

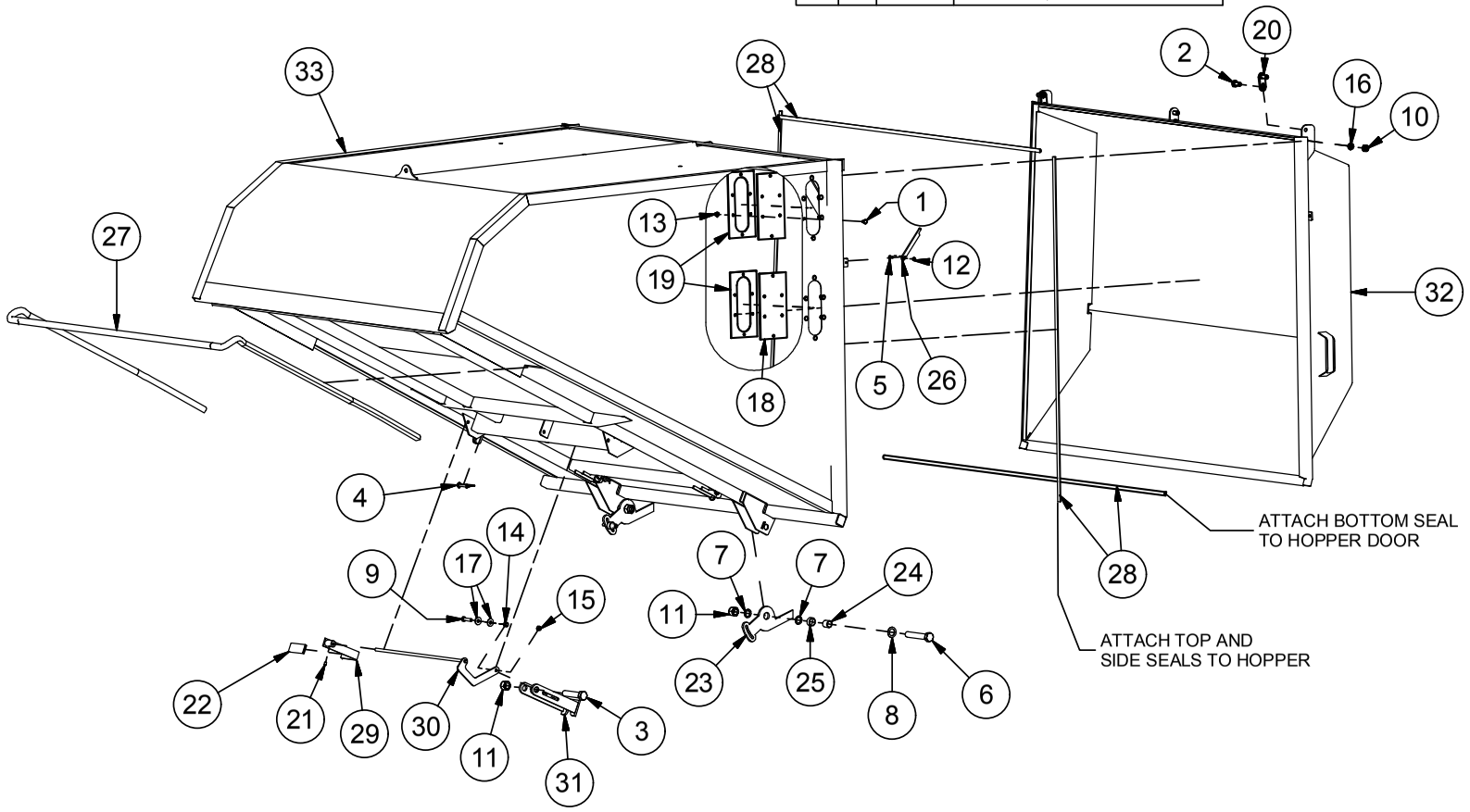


Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	2	110069	WASHER, 5/16" FLAT SAE
2	6	110155	WASHER, 3/8" FLAT SAE
3	2	110168	BOLT, 5/16-18 X 2.0 SHCS
4	2	110319	NUT, 5/16-18 U-TYPE .75L
5	2	110402	Bolt, 3/8-16 X 1.25 in Carriage
6	5	110423	BOLT, 5/16-18 X 1.0
7	4	110425	BOLT, 3/8-16 X 1.25
8	2	110429	BOLT, 1/2-13 X 1.5
9	2	110527	BOLT, 7/16-14 X 4.0
10	4	110539	BOLT, 7/16-14 X 1.25
11	3	110562	BOLT, 5/8-11 X 4.5
12	18	110606	NUT, 5/16-18, WIZ FLANGE
13	8	110631	NUT, 10-24 LOCK NYLON INSERT
14	1	110639	NUT, 5/8-11, UNITORQUE LOCK
15	2	110641	NUT, 7/16-14
16	2	110658	WASHER, 1/2" FLAT STANDARD
17	2	110666	WASHER, 1/2" LOCK
18	9	110671	WASHER, 7/16" LOCK
19	8	110672	WASHER, 3/8" LOCK
20	10	110674	WASHER, 5/16" LOCK
21	8	110676	WASHER, 3/8" FLAT STANDARD
22	4	110709	SCREW, 10-24 X 0.75, RHMS
23	1	110715	BOLT, 7/16-20 X 2.5
24	10	110826	NUT, 3/8-16 GR 5
25	4	111067	BOLT, 3/8-16 X 2.0 FHCS 82°
26	1	411120	KEY, 3/8 X 3/8 X 2.25
27	1	510228	KEY, 1/4 X 1/4 X 1.0 UNDER
28	3	510925	Machine Bushing
29	1	920006	PUMP, .31cid X 1/2" HALDEX W600
30	1	932018	CLUTCH, ELECTRIC
31	1	942027	SHEAVE, 1A5.6/B6.0 -1610 TL
32	2	942063	PULLEY, 2 GROOVE QD BUSHING
33	2	942067	BUSHING, SK 1 1/2
34	1	942101	BUSHING, TAPERLOCK 1610 -1/2
35	1	942167	IDLER PULLEY ASSY
36	1	942187	BELT, GATES A33
37	1	942188	SHEAVE, 1A4.5 X 1 1/8KSS
38	1	942283	BELT, TIER 4, POWERBAND 2/B75
39	1	943054	ENGINE, 23.5 HP KOHLER, EFI
40	2	970284	SPACER, .75 X .50 X 2.75
41	1	970509	SPACER, 1.625 X 1.13 X 1.00
42	2	970529	SPACER
43	1	970548	BELT GUARD, BRACKET R
44	1	970680	CLUTCH BRACKET
45	1	970785	Plate, Pump Mount AA
46	1	970873	Mount, Engine 23.5 Tier 4
47	1	970879	Pump Mount Spacer
48	1	975117	TENSIONER WELDMENT

4/11/2017

HOPPER & DOOR

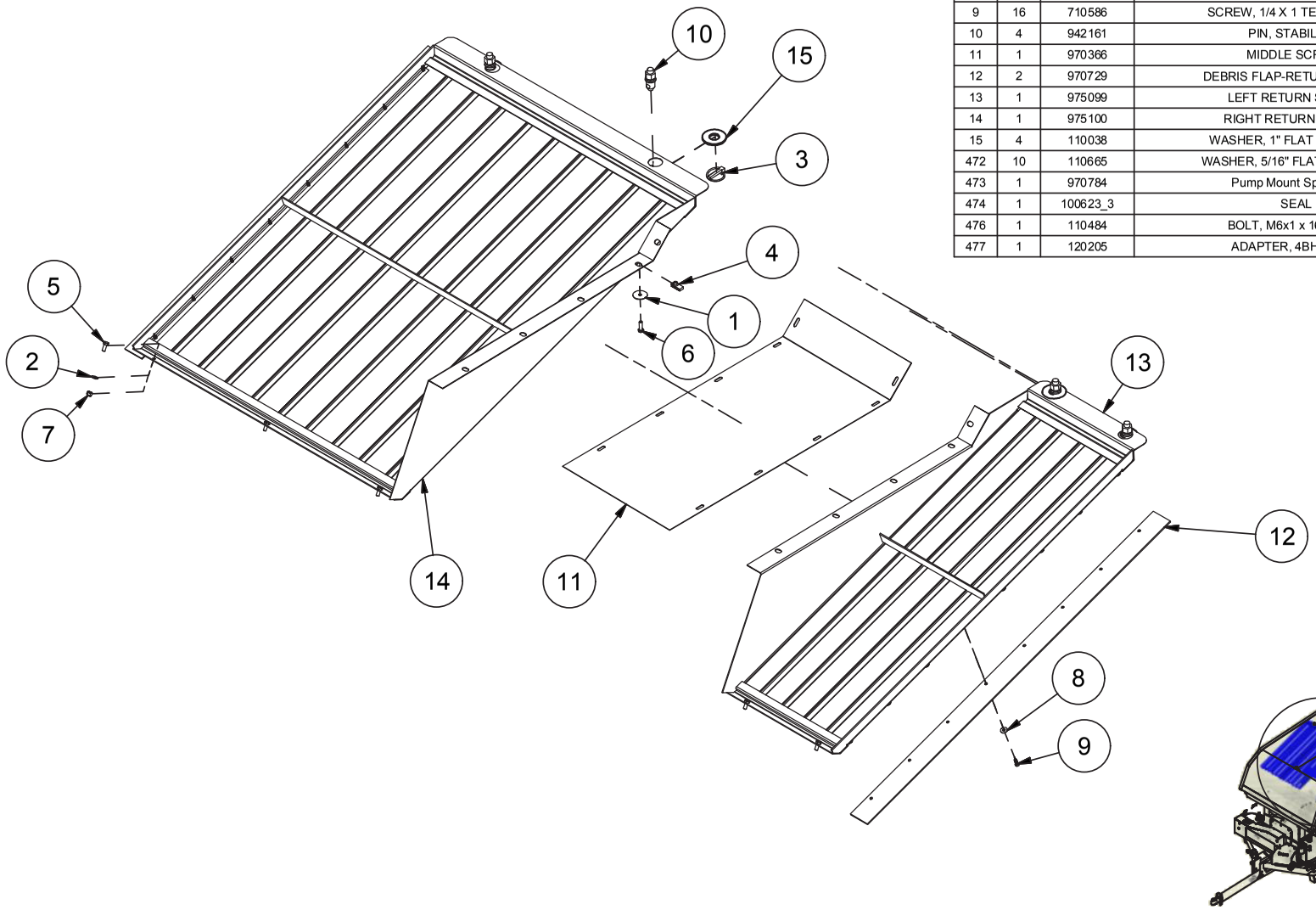
Parts List				Parts List			
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	12	110020	Bolt, 5/16-18 X 0.75 in Carriage	18	2	311691	SIGHT GLASS, HOPPER
2	3	110026	BOLT, 5/8-11 X 1.25	19	2	311692	Backing Plate, Sight Glass
3	1	110208	BOLT, 1-8 X 5.0	20	3	315257	PIN WELDMENT, HOPPER DOOR
4	1	110304	PIN, LOCK 3/8 X 2.5 SQ	21	2	510161	SetScrew, 3/8-16 X 0.5
5	1	110328	BOLT, 5/16-18 X 1 FHCS	22	1	910044	COVER, VINYL .25 X 1.5 X 4 GRIP
6	2	110334	BOLT, 1-8 X 6.0	23	2	970148	HOPPER DOOR LATCH
7	4	110335	WASHER, 1" FLAT MACHINE	24	2	970149	LATCH PIVOT BUSHING
8	2	110336	WASHER, 1-1/4 FLAT MACHINE 10GA	25	2	970151	LATCH PIVOT SPACER
9	1	110379	BOLT, 1/2-13 X 2.0	26	1	970211	DOOR PROP
10	3	110597	NUT, 5/8-11 HEX	27	1	970563	102004 - 15FT. SEAL, BULK
11	1	110602	NUT, 1-8 LOCK NYLON INSERT	28	1	970566	100623 - 23.5FT. SEAL, BULK
12	1	110603	NUT, 5/16-18 LOCK (NYLON)	29	1	975055	HANDLE WELDMENT, DUMP CYL LOCK
13	15	110606	NUT, 5/16-18, WIZ FLANGE	30	1	975056	SHAFT WLDMNT, CLYNDER LOCK
14	1	110610	NUT, 1/2-13	31	1	975057	STOP WLDMNT, CYLINDER LOCK
15	1	110615	NUT, 1/2-13, UNITORQUE LOCK	32	1	975090	DOOR WLDMNT
16	3	110655	WASHER, 5/8" LOCK	33	1	975091	HOPPER WELDMENT
17	2	110658	WASHER, 1/2" FLAT STANDARD				

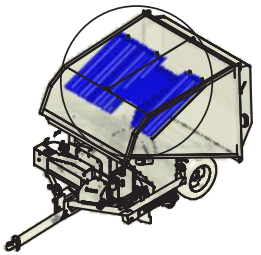


12/7/2015

AIR RETURN SCREENS

Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	10	110049	WASHER, 5/16 X 1.50 FENDER
2	5	110069	WASHER, 5/16" FLAT SAE
3	4	110305	PIN, LYNCH 7/16 X 1 3/4
4	10	110319	NUT, 5/16-18 U-TYPE .75L
5	5	110422	BOLT, 5/16-18 X .75
6	10	110423	BOLT, 5/16-18 X 1.0
7	5	110603	NUT, 5/16-18 LOCK (NYLON)
8	19	110673	WASHER, 1/4" FLAT STANDARD
9	16	710586	SCREW, 1/4 X 1 TEK SELF-TAP
10	4	942161	PIN, STABILIZER
11	1	970366	MIDDLE SCREEN
12	2	970729	DEBRIS FLAP-RETURN SCREEN
13	1	975099	LEFT RETURN SCREEN
14	1	975100	RIGHT RETURN SCREEN
15	4	110038	WASHER, 1" FLAT STANDARD
472	10	110665	WASHER, 5/16" FLAT STANDARD
473	1	970784	Pump Mount Spacer AA
474	1	100623_3	SEAL
476	1	110484	BOLT, M6x1 x 16 Gr 10.9
477	1	120205	ADAPTER, 4BH-4MP90





8/2/2012

HARPER TURF EQUIPMENT

TV60R DECAL LAYOUT

902195 HARPER® TURBO VAC Turf Sweeper 902084

TV60R

902102

902151 - BOTH SIDES

902075

CAUTION

KEEP CLEAR OF DOOR AND REAR OF MACHINE.

UNIT MAY BACK UP WITHOUT WARNING.

IMPORTANT EMISSIONS CONTROL INFORMATION

HARPER INDUSTRIES,INC

HARPER INDUSTRIES, INC.
DATE OF EQUIPMENT MANUFACTURE:

THIS EQUIPMENT MEETS U.S. EPA AND CALIFORNIA (13 CCR SECTION 2766(B)) EVP EMISSION REGULATIONS FOR SMALL OFF-ROAD ENGINES FOR 2015 MODEL YEAR

CARB EVAP FAMILY: CMTV60 EMISSION CONTROL SYSTEM: CM
EPA EQUIPMENT FAMILY NAME: FNHRPPNHEQ50G

902192

902154

902153

902195 HARPER®

RECIRCULATING

902104 - BOTH SIDES

MANUAL FUEL PRIMER BULB
LOCATED ABOVE TIRE, AFFIXED TO CHASSIS TRUSS RAIL. USE ONLY IF ENGINE IS OUT OF FUEL.

902070

MANUAL FUEL PRIMER BULB

902071

THIS MACHINE CONTAINS ISO 46 HYDRAULIC OIL

902204

400014

WARNING

SHIELD HAS BEEN REMOVED! REPLACE PRIOR TO MACHINE OPERATION

APPLIED TO ENGINE MOUNT - VISIBLE WHEN SHIELD REMOVED

902092

PUSH BUTTON UP TO OPEN

CAUTION

TO AVOID BURNS
DO NOT TOUCH HOT MUFFLER OR PIPE

500257

902152 - BOTH SIDES

Pb

800195 - APPLIED TO FRAME NEAR BATTERY

902072

902095

CHECK BLOWER LINER WEAR EVERY 8 HRS

REMOVE THIS PANEL

CHECK LINER IN THIS AREA FOR WEAR

LINER

902069

CAUTION

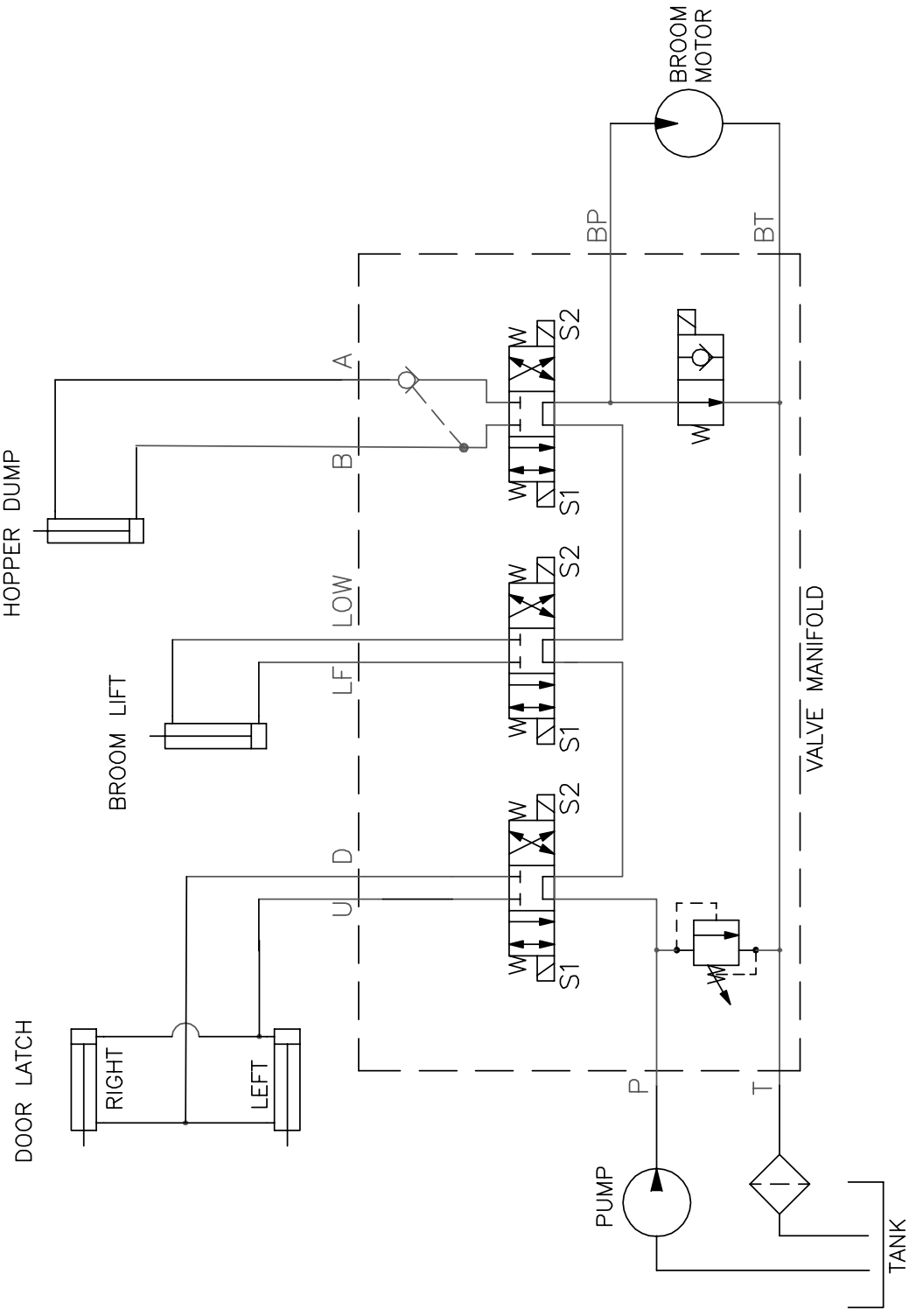
- KEEP ALL SHIELDS IN PLACE.
- KEEP HANDS, FEET AND LOOSE CLOTHING CLEAR OF ROTATING PARTS.
- BE AWARE OF ALL WARNING/CAUTION LOCATIONS.
- BEFORE OPERATING, MAKE SURE EVERYONE, INCLUDING CHILDREN, IS CLEAR OF MACHINE AND IMMEDIATE AREA.
- USE SEATBELT. CAUTION ON SLOPES! AIRBAG. THE POSSIBILITY OF ROLLOVER MAY EXIST.
- LUBRICATE MACHINE BEFORE EACH USE.
- UNIT OVERHEAD CLEARANCE IS 7 1/2' SWEEPING, 8 1/2' DUMP NO.
- AFTER DUMPING, BE SURE HOPPER AND DOOR LATCHES ARE SECURE.
- BEFORE CLEARING, ADJUSTING OR SERVICING, DISENGAGE FAN AND WAIT FOR ALL MOVEMENT TO STOP. RAISE HOPPER AND SECURE BOTH DOOR AND HOPPER WITH SAFETY LOCKS. RAISE BROOM AND SECURE WITH SAFETY LOCK. STOP ENGINE.
- RAISE BROOM, DISENGAGE BOTH FAN AND BROOM WHEN TRANSPORTING.
- NOT FOR HIGHWAY USE UNLESS CONFORMS TO LOCAL VEHICLE CODES.

902195 HARPER® TURBO VAC Turf Sweeper 902084

TV60R

902103

TV60RE HYDRAULIC SCHEMATIC

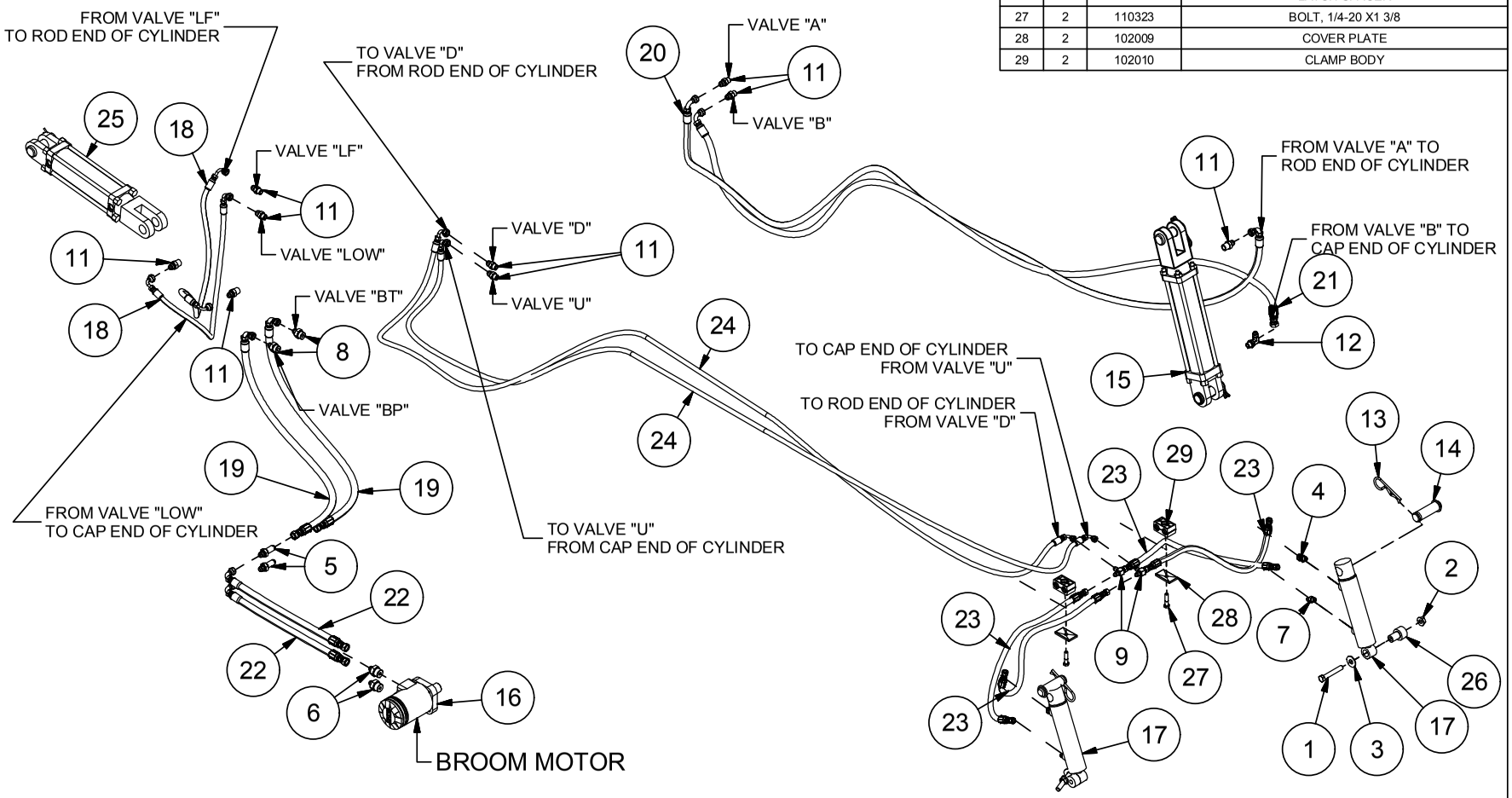


8–05

MACHINE HYDRAULICS

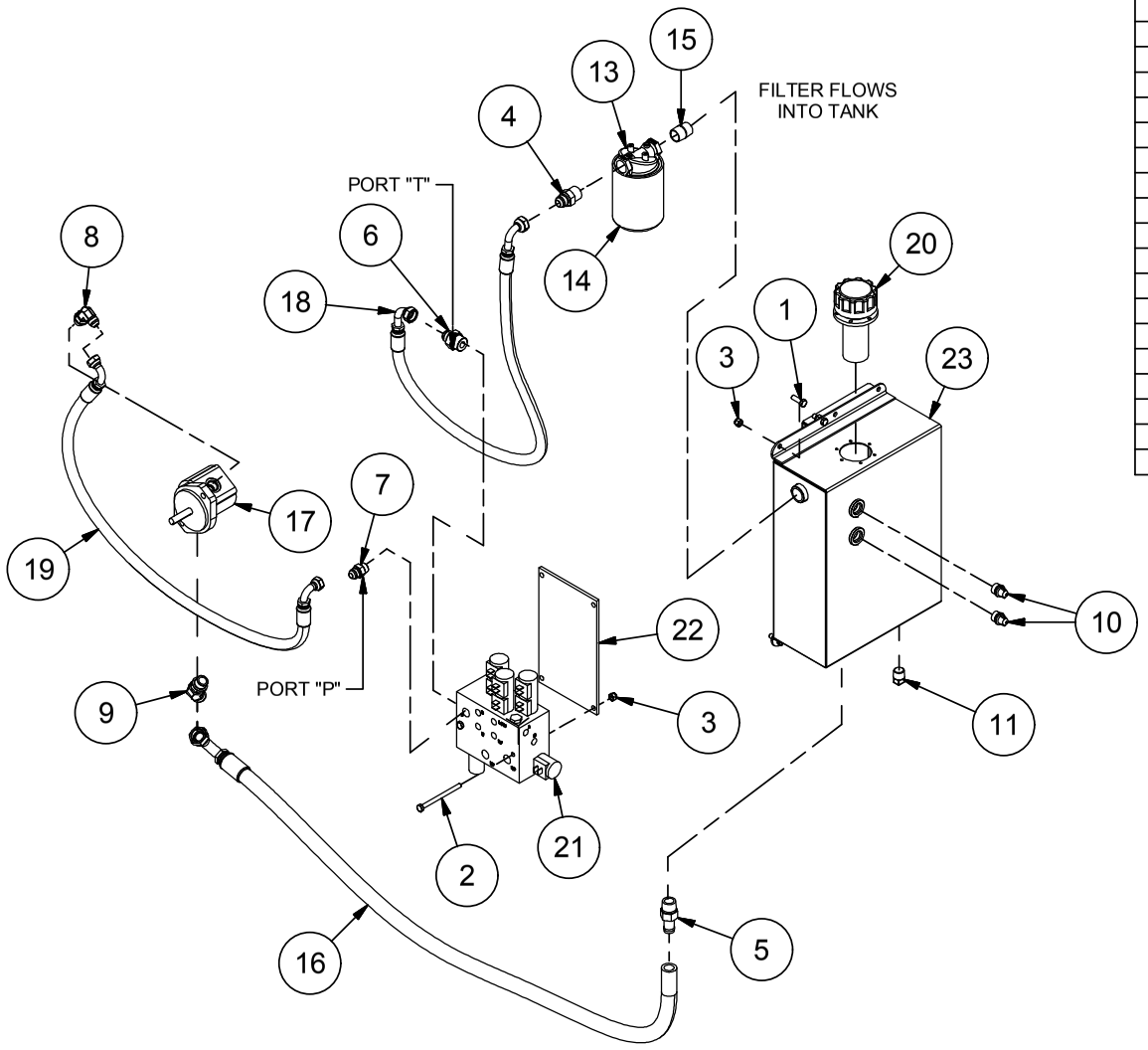
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	2	110179	BOLT, 7/16-14 X 2.75
2	2	110337	NUT, 7/16-14 WIZ FLANGE
3	2	110670	WASHER, 7/16" FLAT STANDARD
4	2	120027	ADAPTER, 4MB-4MJ 45
5	2	120102	ADAPTER, BULKHEAD, 6MJ-6MJ
6	4	120144	ADAPTER, 6MJ-10MB
7	2	120233	ADAPTER, 4MJ-4MB
8	2	120239	ADAPTER, 6MJ-8MB
9	2	120241	ADAPTER, 4MJ-4MJ-4MJ
11	9	120319	ADAPTER, 6MJ-6MB
12	1	120551	ADAPTER, 6MJ-6MB90 R.062
13	2	210326	CLIP, HAIRPIN

Parts List			
ITEM	QTY	PART #	DESCRIPTION
14	2	220480	PIN
15	1	323019	CYLINDER - 2 X 6, SAE-6
16	1	922004	MOTOR, EATON 101-1009
17	2	922021	HYDRAULIC CYLINDER
18	2	922034	HOSE, .25 X 40", 6FJX90S - 6FJX90S
19	2	922036	HOSE, .37 X 37", 6FJX - 6FJX90M
20	1	922037	HOSE, .37 X 92" 6FJX90M - 6FJX90M
21	1	922038	HOSE, .37 X 92", 6FJX - 6FJX90M
22	2	922041	HOSE, .37 X 18", 6FJX - 6FJX90M
23	4	922052	HOSE, .25 X 35" 4FJX - 4FJX
24	2	922086	HOSE, .25 X 120", 4FJX90M -6FJX90S
25	1	923011	Cylinder, 2 X 6, -6 SAE Cross
26	2	970150	LATCH SPACER
27	2	110323	BOLT, 1/4-20 X1 3/8
28	2	102009	COVER PLATE
29	2	102010	CLAMP BODY



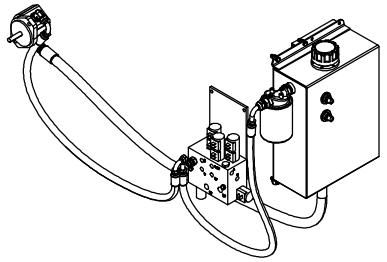
10/21/2015

HYDRAULIC TANK & VALVE



Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	44	110423	BOLT, 5/16-18 X 1.0
2	2	110441	BOLT, 5/16-18 X 4.0
3	16	110603	NUT, 5/16-18 LOCK (NYLON)
4	1	120138	ADAPTER, 10MJ-12MP
5	1	120227	ADAPTER, 12BH-12MP
6	1	120253	ADAPTER, 10MJ-12MB
7	1	120277	ADAPTER, 8MJ-8MB
8	1	120288	ADAPTER, 8MJ-8MB90
9	1	120389	ADAPTER, 12MJ-10MB45
10	2	200116	SIGHT GLASS
11	2	500175	*Varies*
12	1	520099	CLAMP, HOSE #12 .75"
13	1	720041	FILTER HEAD
14	1	720043	FILTER, 10 MICRON
15	1	720077	FITTING, NIPPLE 3/4 X 1.375
16	1	920003	HOSE, .75 X 65", 12FJX90M
17	1	920006	PUMP, .31cid X 1/2" HALDEX W600
18	1	922032	HOSE, .5 X 41", 10FJX90S - 10FJX90S
19	1	922085	HOSE, .5 X 55", 8FJX90M - 8FJX90M
20	1	923001	BREATHER/FILLER CAP
21	1	923006	VALVE, 4 BANK, TV60 W/O NEEDLE
22	1	970263	SHIELD BRACKET
23	1	975115	HYD TANK WLDMNT

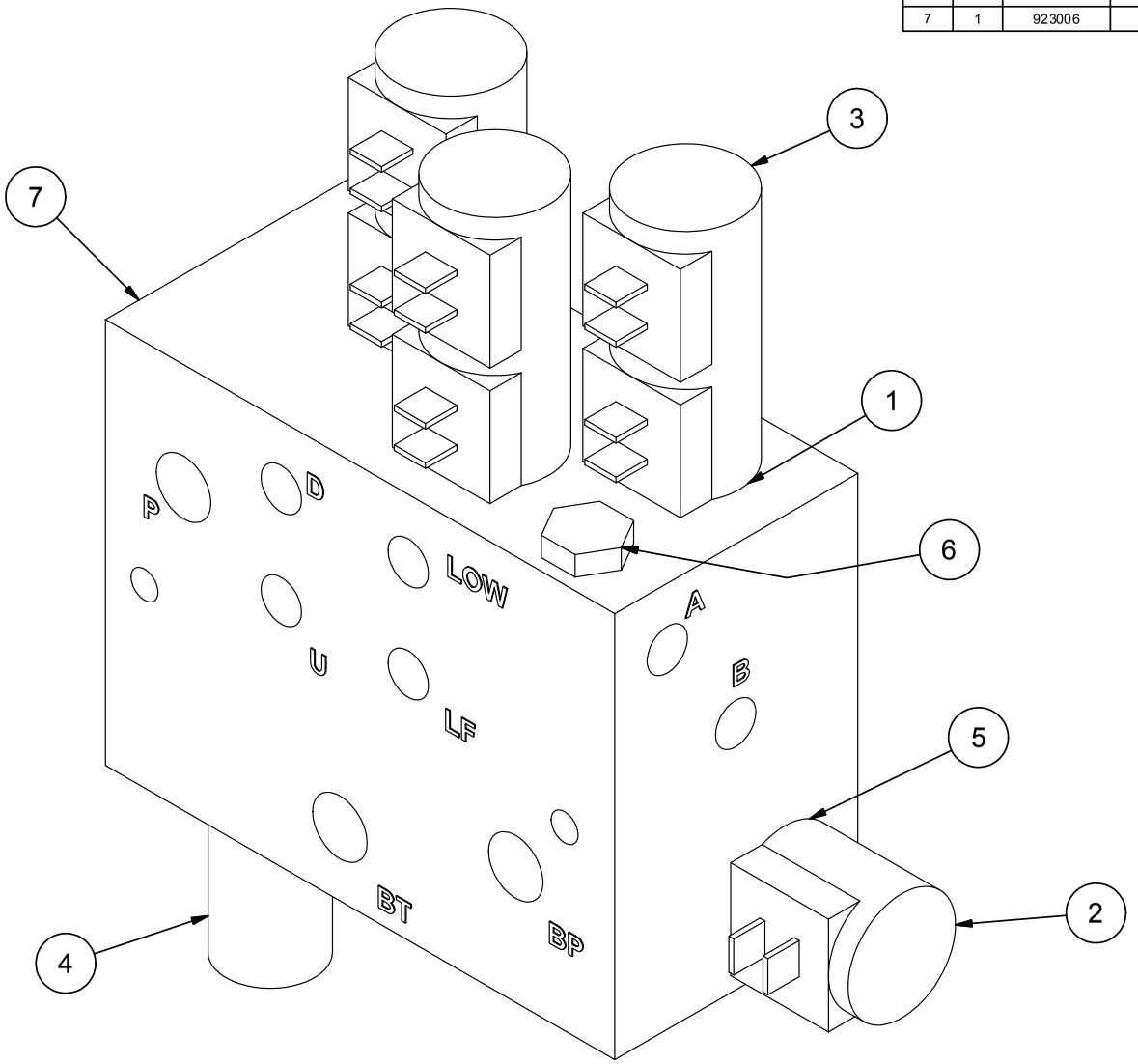
NOTE: REPLACE OIL FILTER (PART NO.720043) AFTER EVERY 100 HOURS OF SERVICE.



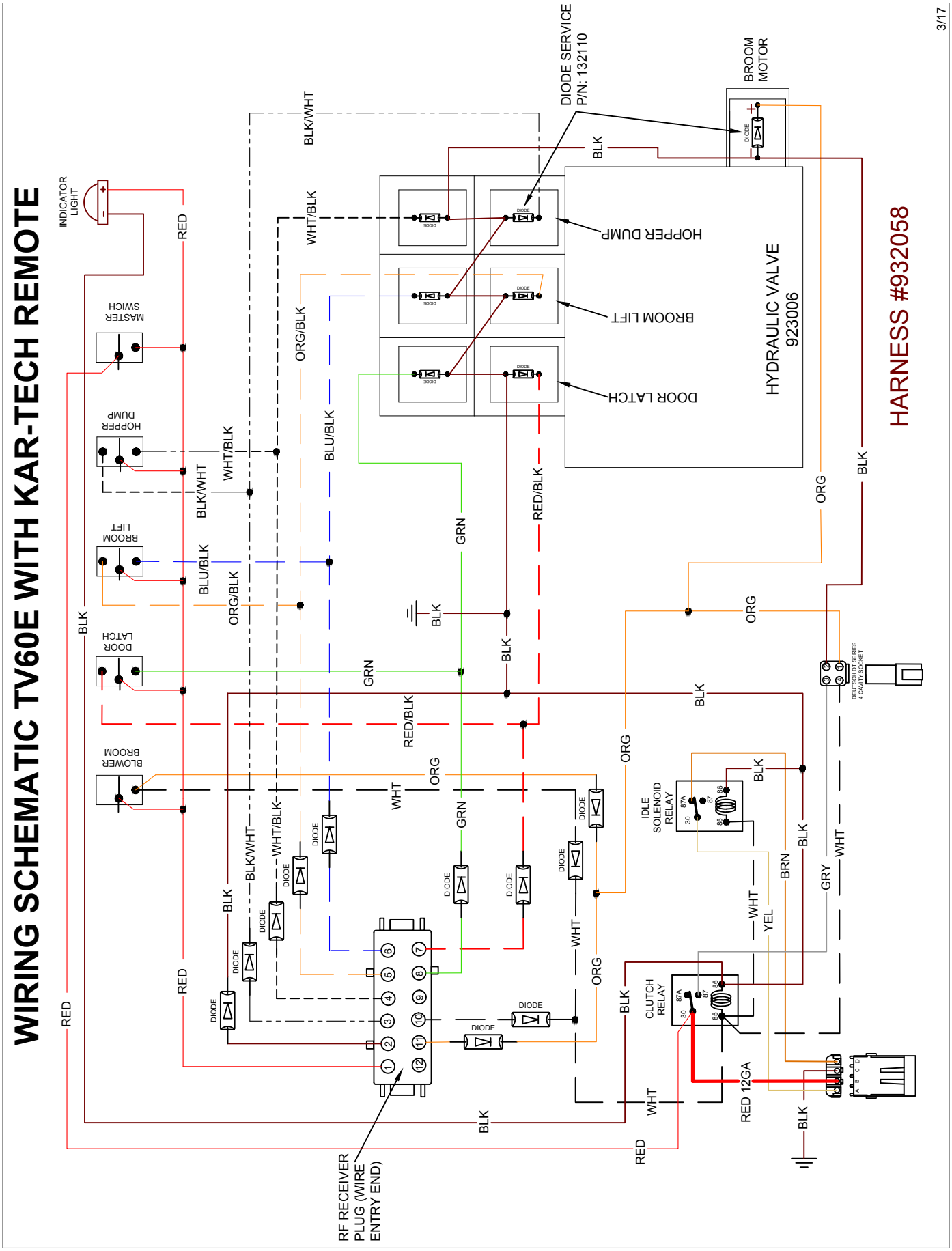
1/6/2012

HYDRAULIC VALVE

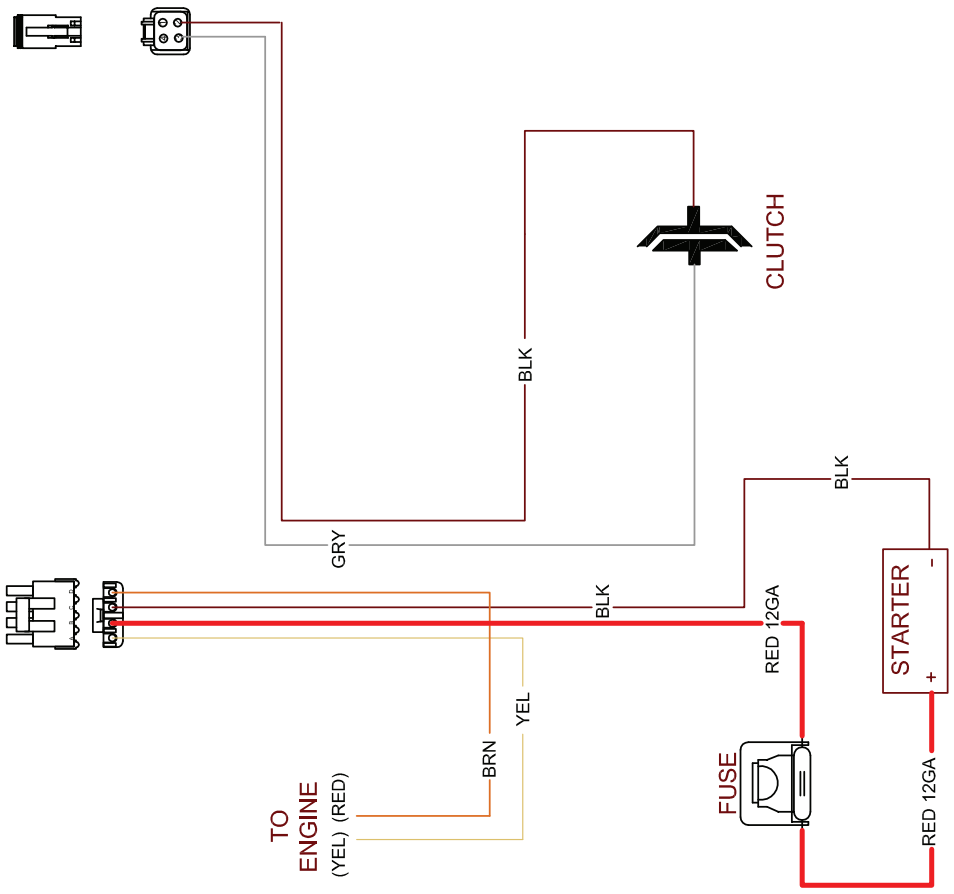
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	3	210871	VALVE CARTRIDGE
2	1	820143	COIL, 12 VOLT, BROOM
3	6	820229	COIL DECK VALVE
4	1	922055	VALVE, RELIEF 2000#
5	1	922056	VALVE, SPOOL, BROOM
6	1	922072	VALVE, PILOT CHECK
7	1	923006	VALVE ASSY, 4 BLANK



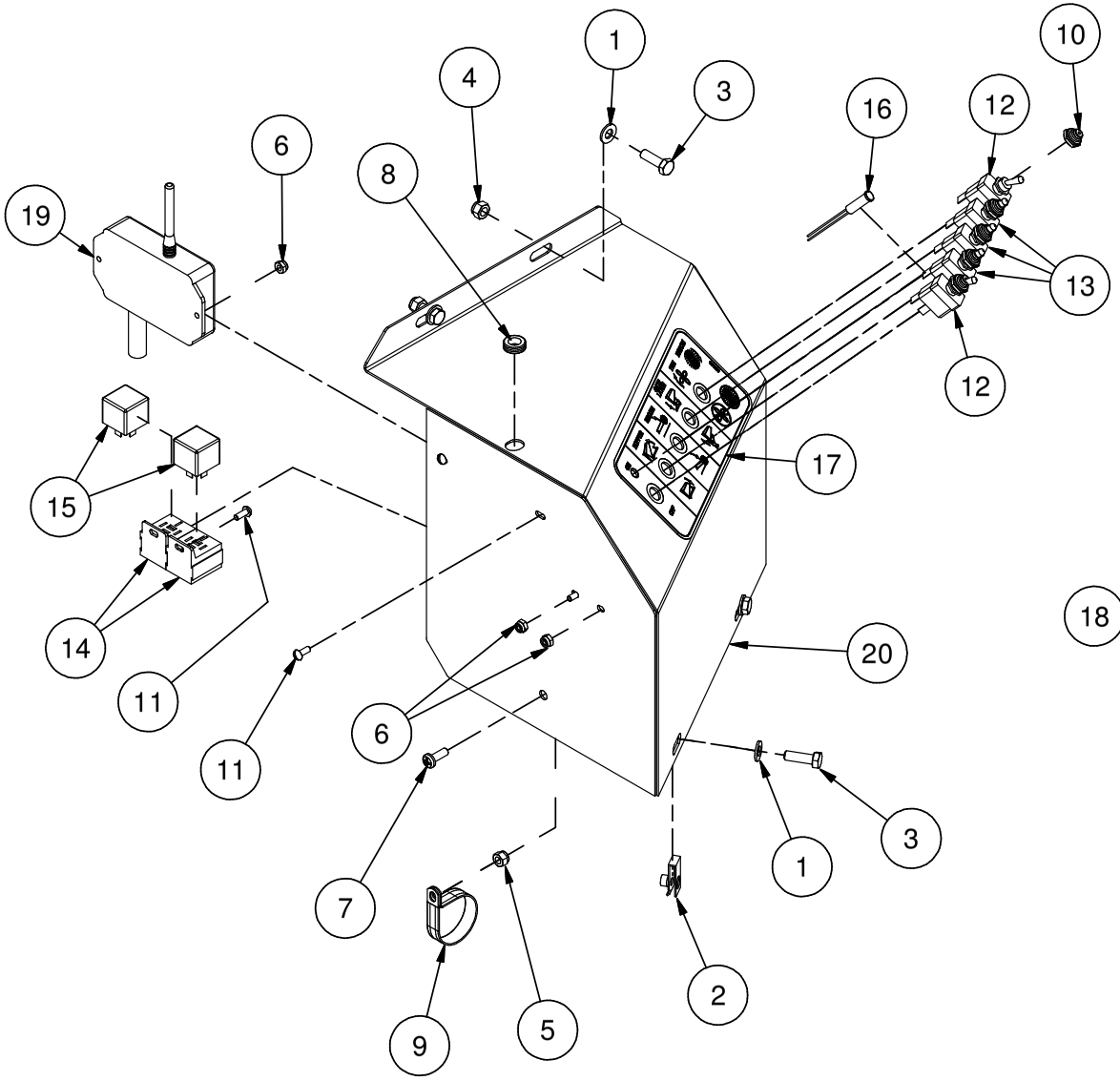
1/10/2012


WIRING SCHEMATIC TV60E WITH KAR-TECH REMOTE
HARNESS #932058
3/17
INDICATOR LIGHT
MASTER SWICH
HOPPER DUMP
BROOM LIFT
DOOR LATCH
BLOWER BROOM
HYDRAULIC VALVE 923006
HOPPER DUMP
BROOM LIFT
DOOR LATCH
DIODE SERVICE P/N: 132110
BROOM MOTOR
IDLE SOLENOID RELAY
CLUTCH RELAY
DEUTSCH DT SERIES 4 CAVITY SOCKET
RF RECEIVER PLUG (WIRE ENTRY END)
RED
BLK
BLK/WHT
WHT/BLK
ORG/BLK
BLU/BLK
GRN
RED/BLK
ORG
WHT
BRN
GRY
YEL
RED 12GA
DIODE

TV60E HARNESS #932061



REMOTE & RECEIVER

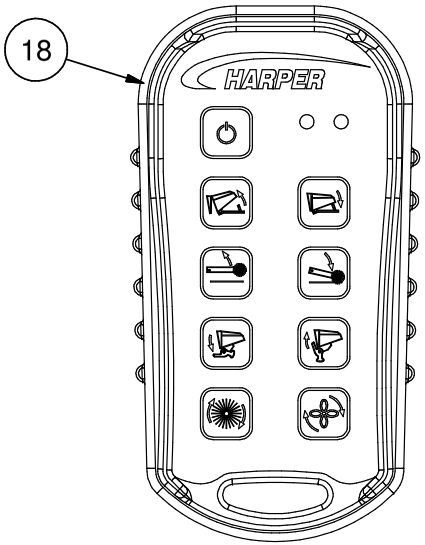


Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	4	110069	WASHER, 5/16" FLAT SAE
2	2	110319	NUT, 5/16-18 U-TYPE .75L
3	4	110423	BOLT, 5/16-18 X 1.0
4	2	110603	NUT, 5/16-18 LOCK (NYLON)
5	1	110630	NUT, 1/4-20 LOCK (NYLON INSERT)
6	4	110631	NUT, 10-24 LOCK NYLON INSERT
7	1	110815	SCREW, 1/4-20 X 3/4 STAINLESS PHILLIPS PAN HEAD
8	1	110967	GROMMET, RUBBER 7/16 ID X 3/4 OD
9	1	130012	CLAMP, ADEL AC28 .265 HOLE
10	5	132035	SWITCH BOOT
11	4	510960	SCREW, 10-24 X 0.5, RHMS
12	2	530007	TOGGLE SWITCH
13	3	530020	SWITCH, SPDT-MOMENTARY
14	2	530021	RELAY SOCKET
15	2	530111	RELAY
16	1	532059	LIGHT, INDICATOR, LED
17	1	SEE NOTE	DECAL, SWITCHES TV60R
18	1	SEE NOTE	TRANSMITTER, RF, TV60, KAR-TECH
19	1	SEE NOTE	RECEIVER, TV60, KAR-TECH
20	1	975116	SHIELD - VALVE, WELDMENT

NOTES:

1. TV60RE PARTS:
   DECAL - 902089
   TRANSMITTER - 932055
   RECEIVER - 932056

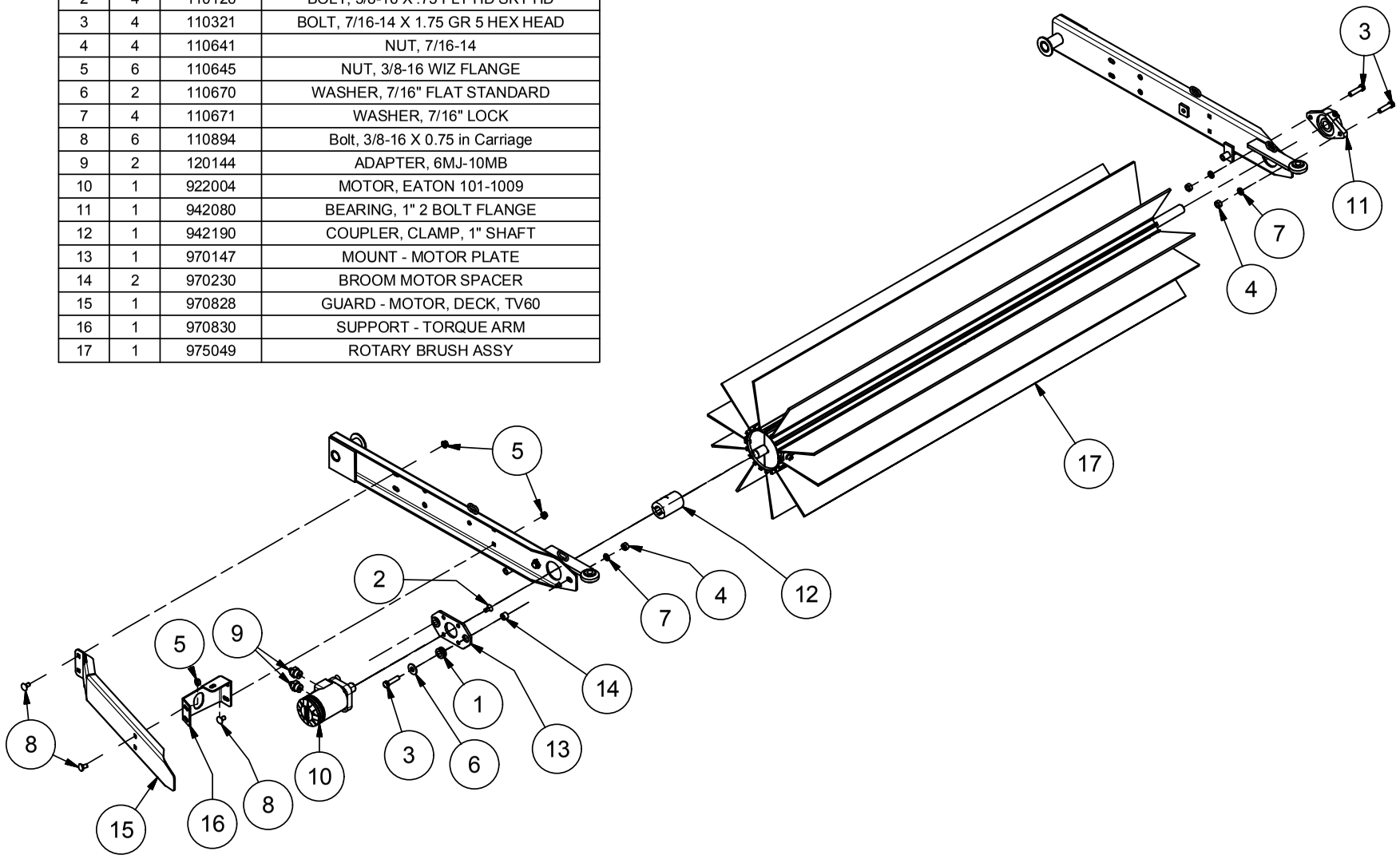
2. TV60RH PARTS:
   DECAL - 902110
   TRANSMITTER - 932059
   RECEIVER - 932057



1/6/2012

TV60 BROOM KIT - 900231

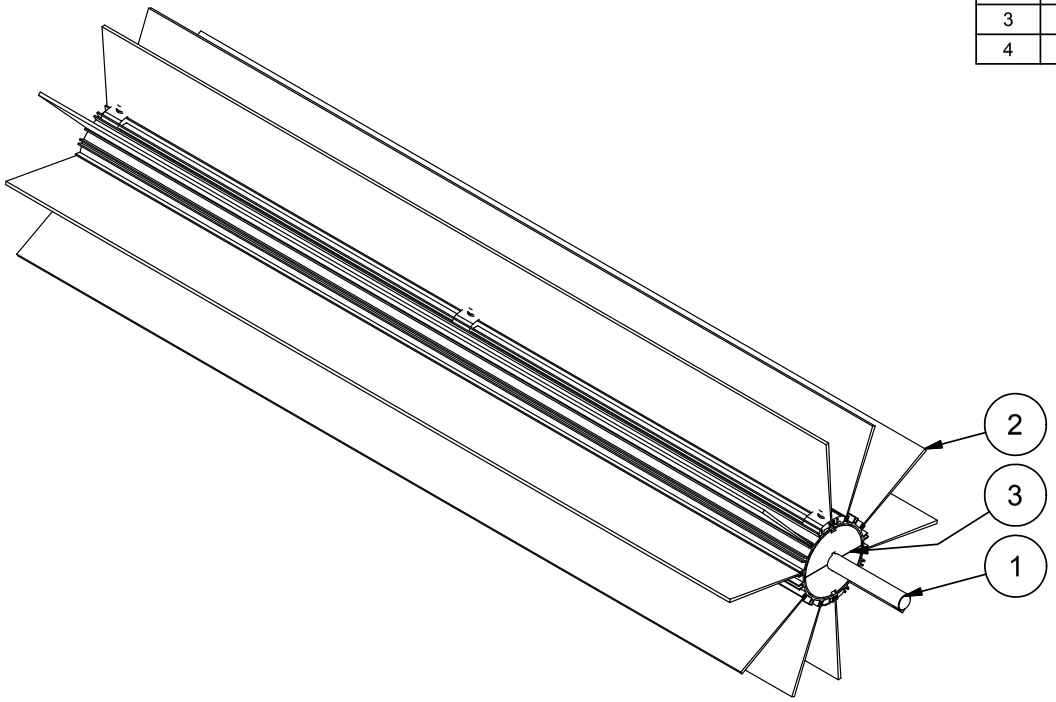
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	2	102005	GROMMET, RUBBER .875 OD X .625 ID
2	4	110126	BOLT, 3/8-16 X .75 FLT HD SKT HD
3	4	110321	BOLT, 7/16-14 X 1.75 GR 5 HEX HEAD
4	4	110641	NUT, 7/16-14
5	6	110645	NUT, 3/8-16 WIZ FLANGE
6	2	110670	WASHER, 7/16" FLAT STANDARD
7	4	110671	WASHER, 7/16" LOCK
8	6	110894	Bolt, 3/8-16 X 0.75 in Carriage
9	2	120144	ADAPTER, 6MJ-10MB
10	1	922004	MOTOR, EATON 101-1009
11	1	942080	BEARING, 1" 2 BOLT FLANGE
12	1	942190	COUPLER, CLAMP, 1" SHAFT
13	1	970147	MOUNT - MOTOR PLATE
14	2	970230	BROOM MOTOR SPACER
15	1	970828	GUARD - MOTOR, DECK, TV60
16	1	970830	SUPPORT - TORQUE ARM
17	1	975049	ROTARY BRUSH ASSY

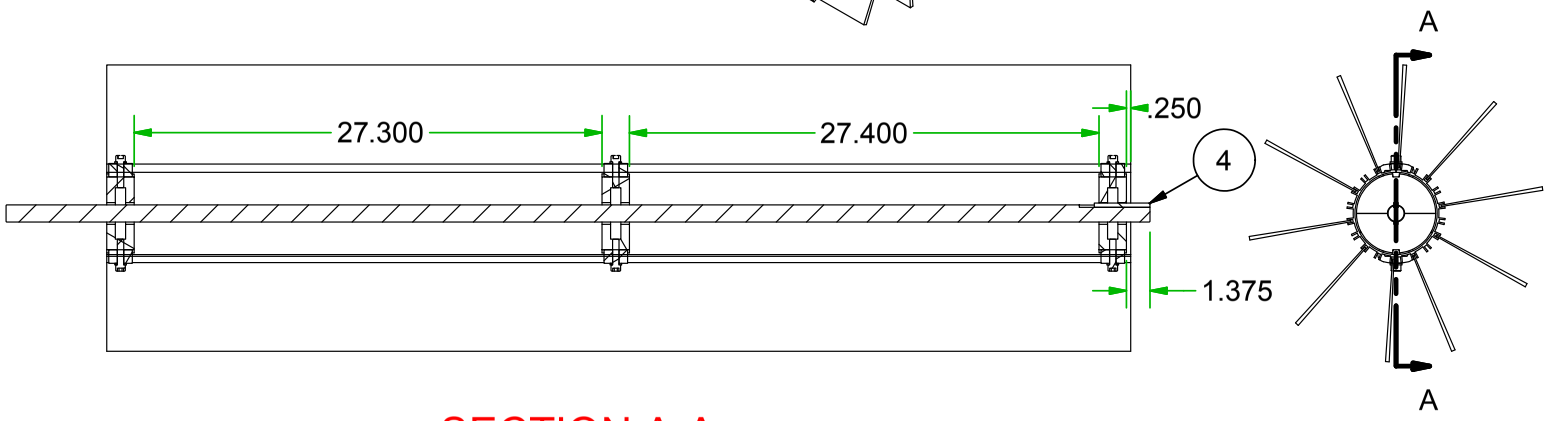


12/4/2015

BROOM

Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	1	970229	ROTARY BRUSH SHAFT
2	1	972001	BROOM PARALAX TG-20, .45
3	3	972002	5" FLANGE ASSY
4	1	110340	KEY, 1/4 X 1/4 X 3.25





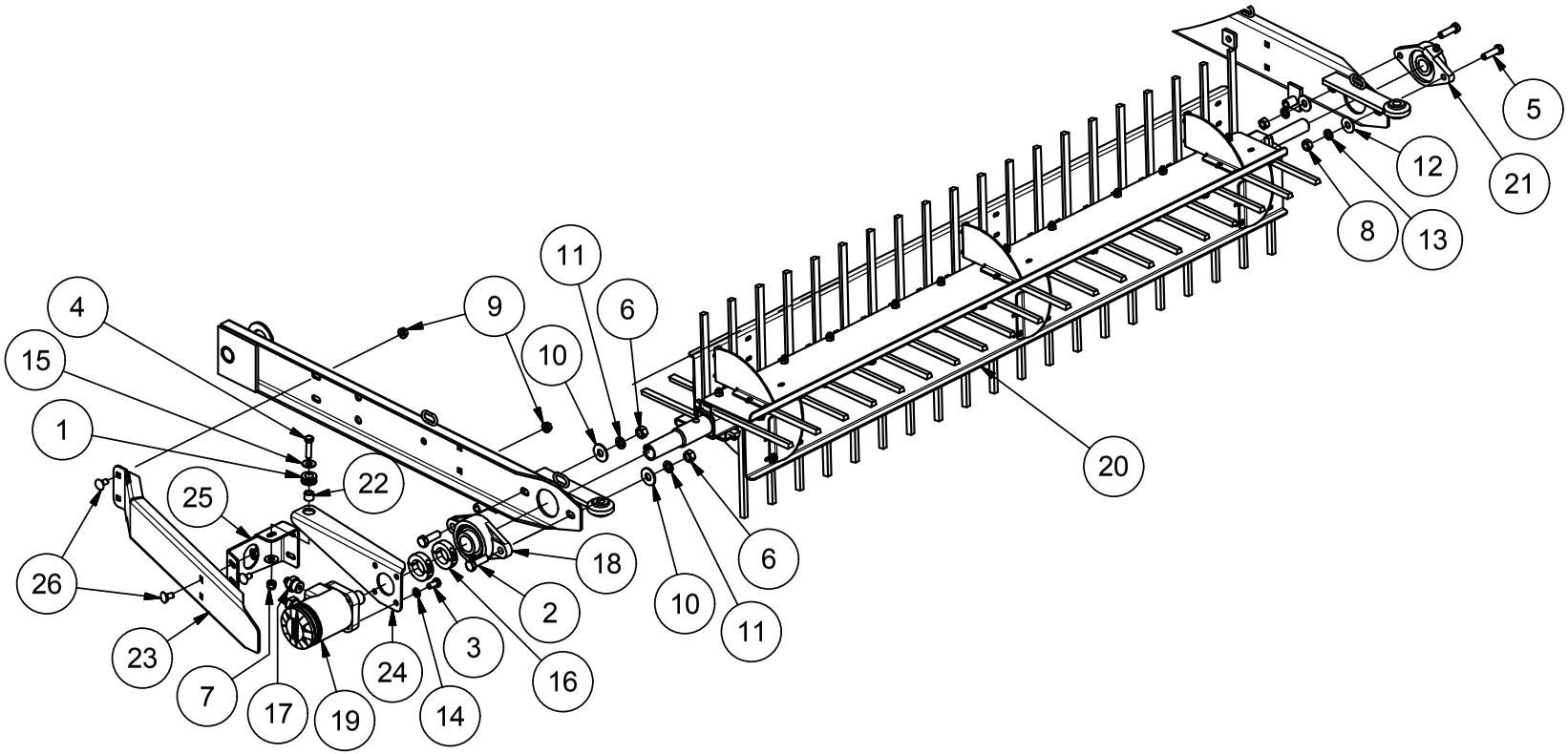
SECTION A-A

1/10/2012

HARPER TURF EQUIPMENT

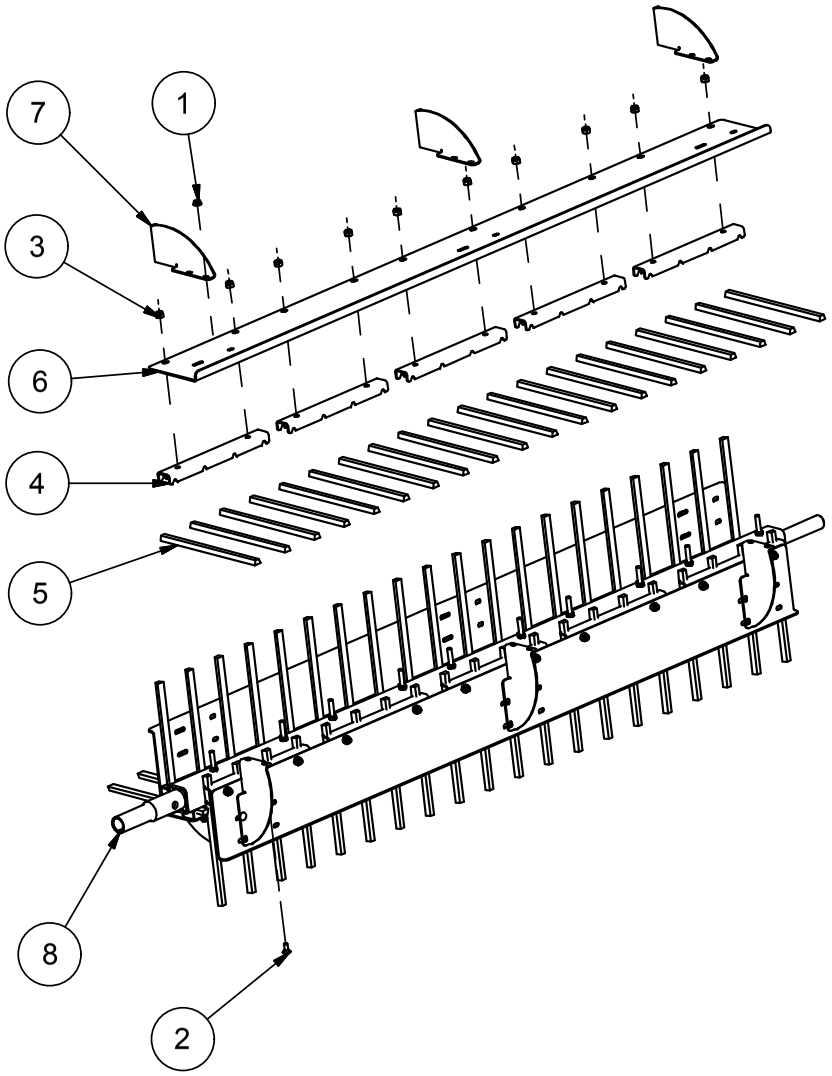
TV60 FINGER ROTOR KIT - 900227

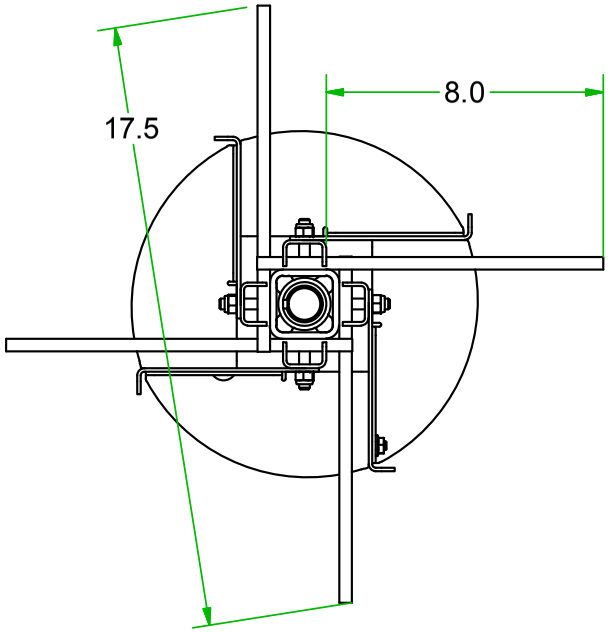
TV60 FINGER ROTOR PARTS LIST				TV60 FINGER ROTOR PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	1	102005	GROMMET, RUBBER .875 OD X .625 ID	14	4	110672	WASHER, 3/8" LOCK
2	2	110429	BOLT, 1/2-13 X 1.5	15	2	110676	WASHER, 3/8" FLAT STANDARD
3	4	110433	BOLT, 3/8-16 X .75	16	2	110956	COLLAR - 1-1/4" SPLIT
4	1	110435	BOLT, 3/8-16 X 1.5	17	2	120144	ADAPTER, 6MJ-10MB
5	2	110535	BOLT, 7/16-14 X 1.5	18	1	410928	BEARING - 1.25, 2 BLT FLG
6	2	110610	NUT, 1/2-13	19	1	420127	MOTOR, EATON 101-1009, 2.8 CID
7	1	110618	NUT, 3/8-16 LOCK NYLON INSERT	20	1	914014	ROTOR - TV60 FINGER, ASSEMBLY
8	2	110641	NUT, 7/16-14	21	1	942080	BEARING, 1" 2 BOLT FLANGE
9	6	110645	NUT, 3/8-16 WIZ FLANGE	22	1	970230	BROOM MOTOR SPACER
10	2	110658	WASHER, 1/2" FLAT STANDARD	23	1	970828	GUARD - MOTOR, DECK, TV60
11	2	110666	WASHER, 1/2" LOCK	24	1	970829	ARM - TORQUE, TV60
12	2	110670	WASHER, 7/16" FLAT STANDARD	25	1	970830	SUPPORT - TORQUE ARM
13	2	110671	WASHER, 7/16" LOCK	26	6	110894	Bolt, 3/8-16 X 0.75 in Carriage



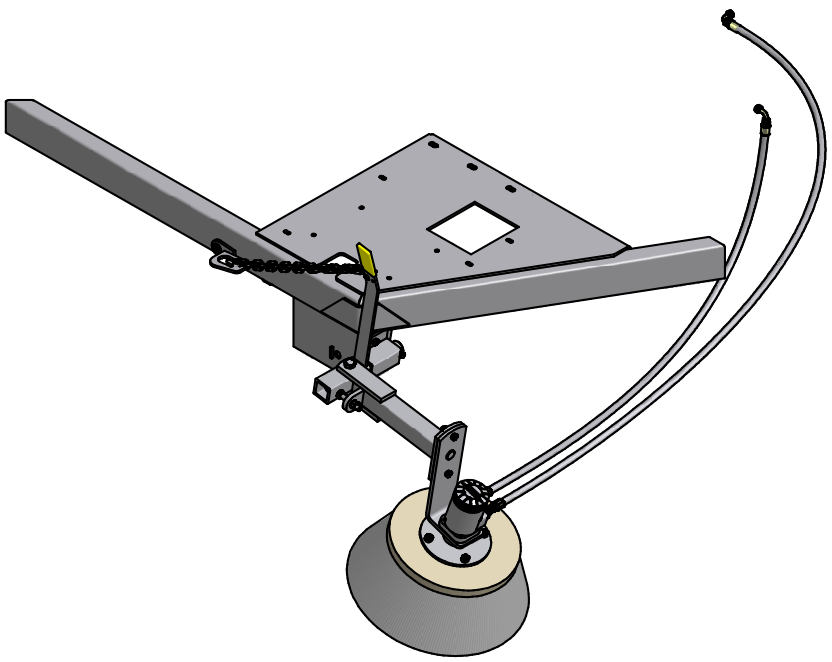
FINGER ROTOR

Parts List			
ITEM	PART #	QTY	DESCRIPTION
1	110290	24	NUT, 1/4-20 WIZ FLANGE
2	110358	24	Bolt, 1/4-20 X 0.625 in Carriage
3	110603	40	NUT, 5/16-18 LOCK (NYLON)
4	311403	20	CLAMP - RUBBER FINGER
5	902160	80	FINGER - RUBBER, TV60
6	970824	4	SUPPORT - FINGER
7	970827	12	GUSSET - FINGER ROTOR SUPPORT
8	975802	1	SHAFT - FINGER ROTOR, WELDMENT





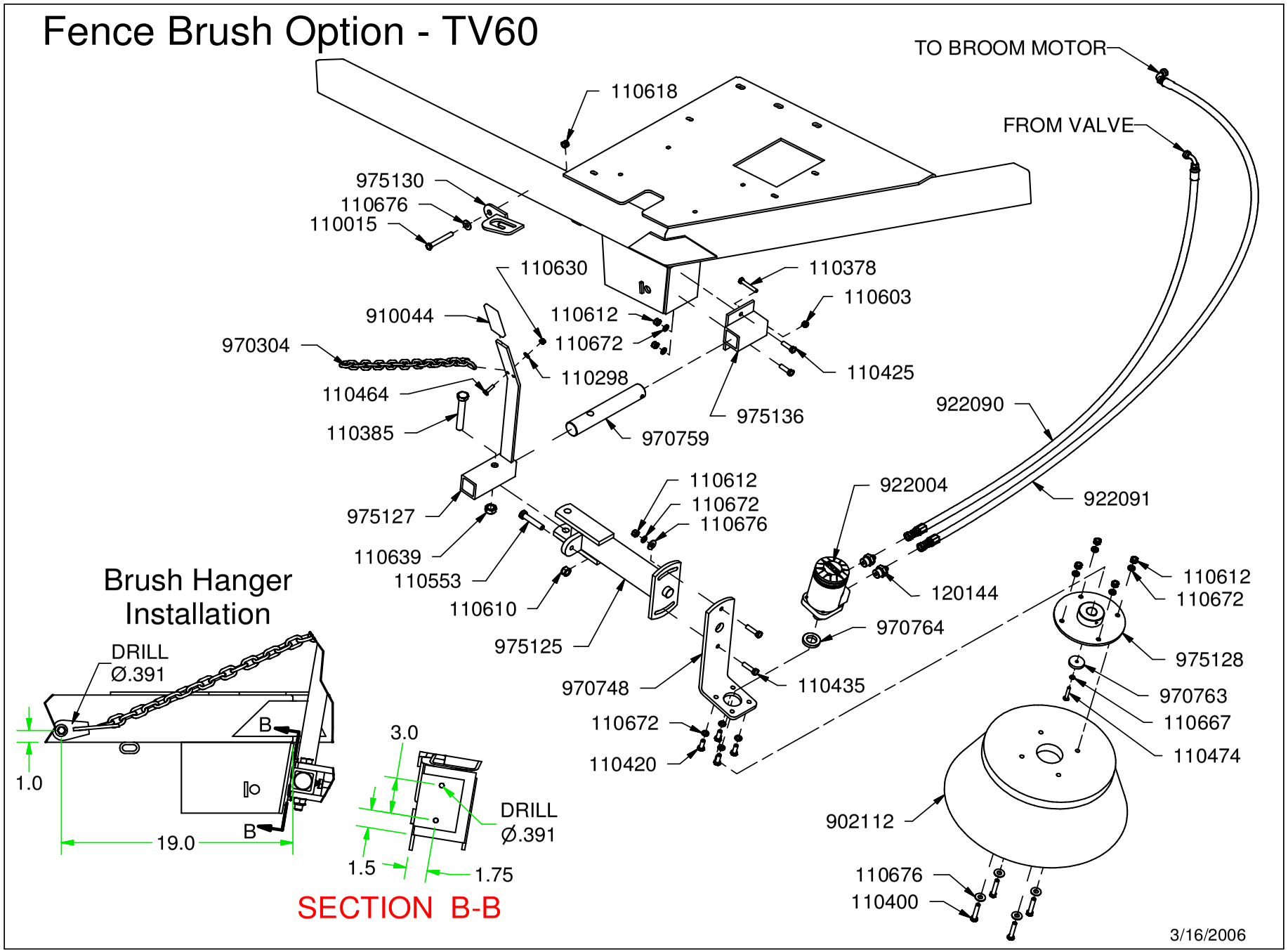
Fence Brush Option - TV60



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
110385	1	BOLT, 5/8-11 X 4.0
110400	4	BOLT, 3/8-16 X 2.0
110420	4	BOLT, 3/8-16 X 1.0
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)
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)
110639	1	NUT, 5/8-11, UNITORQUE LOCK
110667	1	WASHER, 1/4" LOCK
110672	12	WASHER, 3/8" LOCK
110676	6	WASHER, 3/8" FLAT STANDARD
120144	2	ADAPTER, 6MJ-10MB
902112	1	BRUSH, 18" x 6" x 40 DEG
910044	1	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	1	ARM, BRUSH MOTOR MOUNT
970759	1	SHAFT, LIFT PIVOT
970763	1	WASHER, 1.50 X .320
970764	1	SPACER, 1.700 X 1.005 X .320
975125	1	LIFT TUBE WELDMENT
975127	1	LIFT LEVER WELDMENT
975128	1	BRUSH ADAPTOR WELDMENT
975130	1	LIFT LATCH WELDMENT
975136	1	EDGE BRUSH HANGER WELDMENT

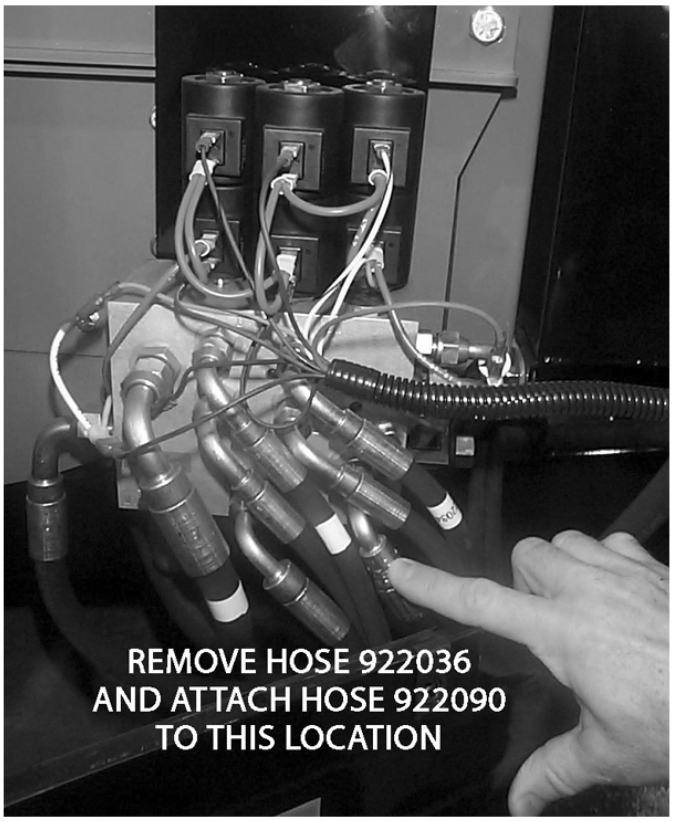
3/16/2006

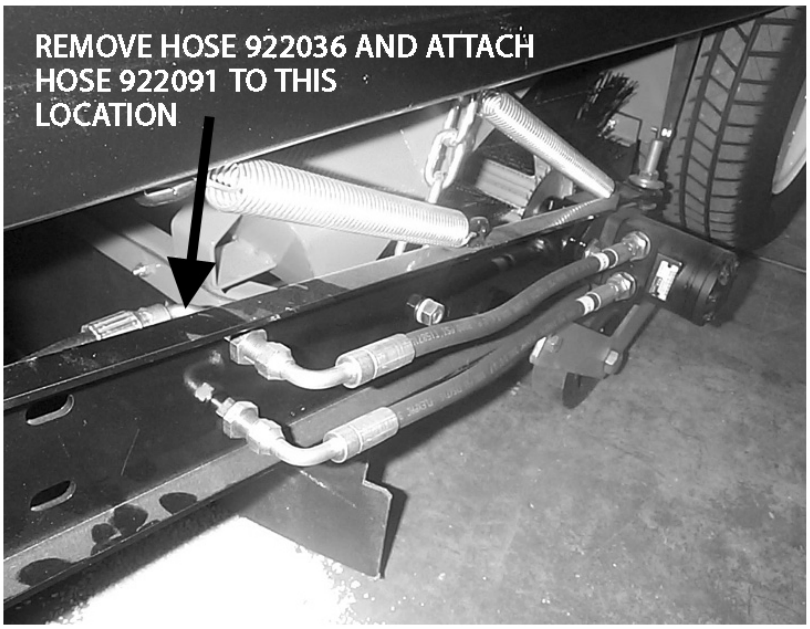
Fence Brush Option - TV60



HARPER TURF EQUIPMENT

TV60RE & RH - INSTRUCTIONS FOR INSTALLING EDGE BRUSH HYDRAULIC HOSES





NOTES

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