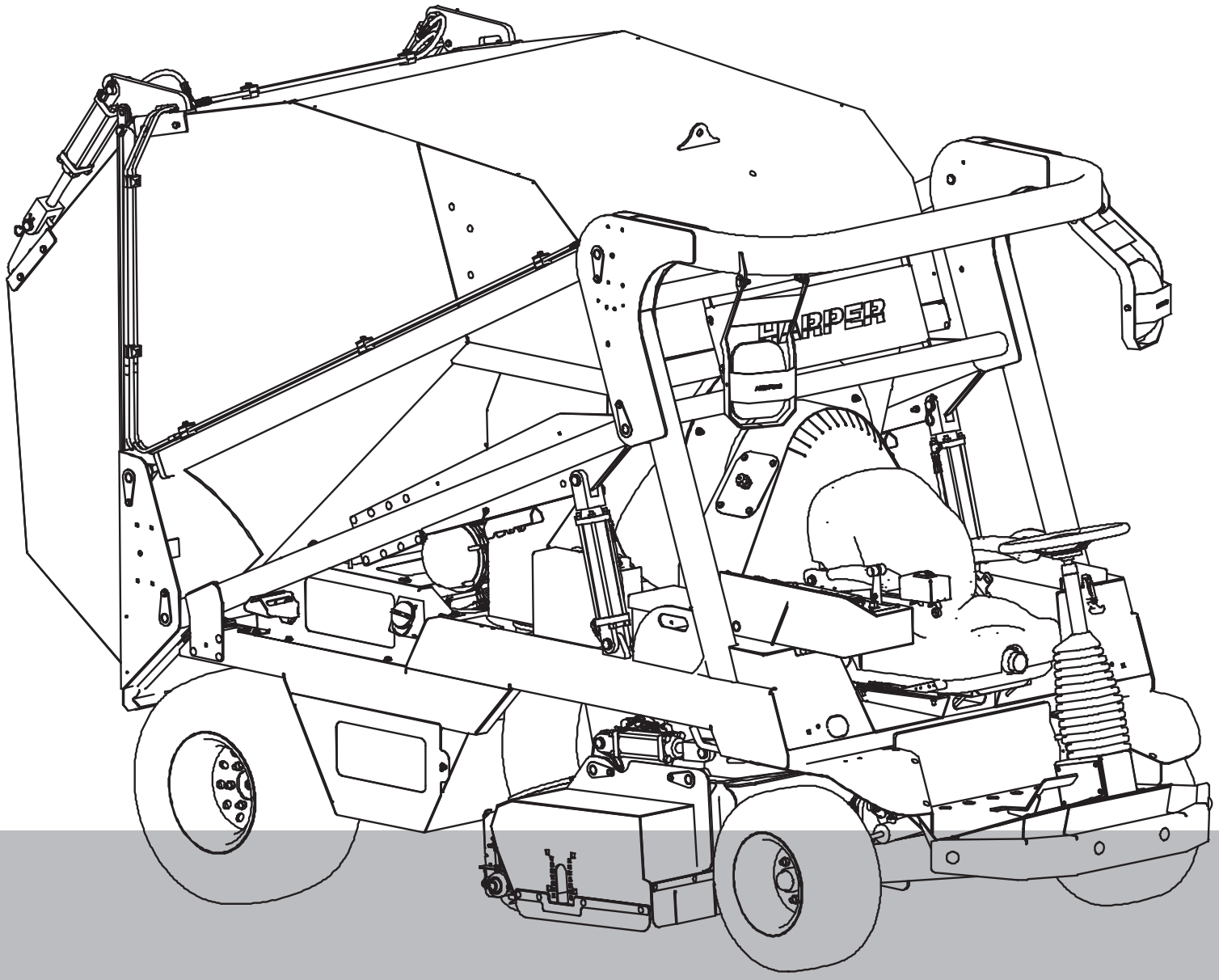
TURBO VAC 35D



OPERATOR'S MANUAL

10-2022

HARPER INDUSTRIES INC

Thank you for purchasing a Harper Turf Vac.

As with all Harper products, the Turf Vac has been developed through tough design and testing procedures to produce a top quality machine. This manual gives assembly, operating, and service information for the model TV35 Turf Vac. Please read and understand all instructional material included with the Turf Vac or its components before assembling and operating the equipment.

A Turf 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.

THIS 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, Inc. 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.

LIMITED WARRANTY

Harper Industries, Inc. (HII) warrants to each purchaser of a new Harper Turbo Vac from an authorized dealer or representative, that such equipment is free of manufacturer's defects in workmanship and materials which appear while in normal service for a period of ONE YEAR commencing with delivery to the original user.

The obligation of HII under this warranty is expressly limited, at our option, to replacement or repair at a service facility designated by Harper Industries or at the manufacturing plant in Harper, KS. A part will be replaced after inspection discloses it to have been defective. This warranty does not apply to defects caused by damage or unreasonable use (including failure to provide reasonable and necessary maintenance, or by performing functions without genuine Harper Turbo Vac accessories) while in the possession of the consumer.

Warranty is limited to parts, labor and ground freight delivery of replacement parts. HII shall not be liable for the consequential damages of any kind, including but not limited to consequential labor costs or transportation charges in connection with replacement or repair of defective parts.

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

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.

Harper Industries makes no warranty with respect to trade accessories. They are subject to the warranties of their respective manufacturers.

ANY IMPLIED OR STATUTORY WARRANTIES, INCLUDING ANY WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. HII makes no other express warranty, nor is anyone authorized to make any on behalf of HII.

For further information please contact your nearest Harper Turbo Vac dealer.

RECORDS

Date of Purchase _____ / _____ / _____

Dealer's Name _____

Dealer's Phone _____

Serial Number Machine _____

Serial Number Engine _____

Table of Contents

Specifications

Power	Diesel - Kubota 37 hp 4-Cylinder
Configuration	Self-contained, 4-wheel configuration with front steering, two rear drive wheels, and a rear mounted, high-lift, debris hopper with patented recirculating vacuum air technology
Sweeper	60” single sweeping head, follows all terrain with rear mounted roller on sweeper head (vertical float), rises to transport position, lowers to operating position by hydraulic cylinders; Brush, Rubber Finger, and Verticut Rotors available.
Fan	25” diameter with 6-blade radial fan, fan housing includes UHMW liner
Debris Hopper	Capacity – 3.5 cubic yards
Lift	Rises 6’4” above the ground to dump debris into vehicle or container
Lift Safety	5° Inclinometer Sensor with lift interlock that prevents hopper from lifting if the machine is on a slope greater than 5°
Drive	Hydrostatic pump directly coupled to engine drives two Poclain high-efficiency piston drive hydraulic motors on rear wheels with two speed operation,traction control and torque transfer capability; foot operated pedal for forward and reverse drive
Speed	Infinitely variable, 0-8 mph low (operation), 0-14 mph high (transport), 0-7 mph reverse; Dynamic braking through the hydrostatic drive system, mechanically applied and hydraulically released parking brake on rear wheels
Main Frame	¼” and 7 gauge steel frame
Tires/Wheels	Front (2) 20-10x10 4-ply premium turf tire, Rear (2) 26-12x12 6-ply premium turf tires
Compaction	11.2 psi in front, 7.8 psi in rear
Steering	Power steering with automotive type steering wheel, tilt steering
Controls	Hydraulic lift/lower of debris hopper Hydraulic open/close of debris hopper door Hydraulic raise/lower of sweeping mechanism head assembly Solid State max grade detection for dump circuit
Seat	Adjustable ride suspension, high back, and retractable seat belt
Electrical	12 volt, electronic key start
Dimensions	Length – 144 in., Height – 91 in., Width – 68 in., Wheel Base – 84 in.
Weight	5220 lbs.
Liquid Capacities	Fuel – 14.25 Gallon; Hydraulic Fluid – 32 Gal Tank
Safety & Hydraulic Oil	Includes Certified ROPS and seatbelt and a *Crown AW46*; ISO 46 Hydraulic Oil

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

Control Identification

ROPS – Roll-Over Protective Structure is certified and designed to protect operator in case of a roll-over. Always wear a safety belt.

Steering Wheel – steering is hydraulically controlled. Turning radius of the sweeper head is approximately 46 in. Steering wheel angle may be adjusted with tilt lever.

Control Panel – all functions of the turf vac may be controlled from the operator's seat.

Foot Pedal – hydrostatic pump is controlled by pushing foot pedal forward and backward.

Lift Mechanism – raises the bottom of the hopper to a height of 6'4" to dump into a vehicle or container. **Use extreme caution when raising the hopper as the top can reach approx. 13½ feet.**

Fan Housing – surrounds the impeller and is protected on the inside by a plastic liner.

Sweeper Deck – has a 60" rotating rotor and is designed to keep the vacuum concentrated on the ground.

Engine – Diesel – 37 HP Kubota

Hopper – stores up to 3½ cubic yards of material. Always empty hopper at end of operation.

Hopper Door – opens, closes and locks when the switch is activated by the operator.

Cleanout Lever – opens door under the fan housing to release any debris build up inside.

Radiator/Oil Cooler – remote located and equipped with reversible and removable screen.

Fan ON/OFF – turn fan on while engine is from low to mid-throttle.

Broom ON/OFF – turn broom on while engine is from low to mid-throttle.

Hopper UP/DOWN – raise hopper with extreme caution.

Door OPEN/CLOSE – hopper door is hydraulically opened and closed with switch.

Transport Speed HI/LO – ALWAYS SWEEP WITH TRANSMISSION IN LOW. Use high range when traveling between operations.

Park Brake ON/OFF – set park brake when unit is not in use or is parked on an incline. Make sure park brake is disengaged before operation.

Park Brake Indicator – light illuminates when key switch is on and park brake is set.

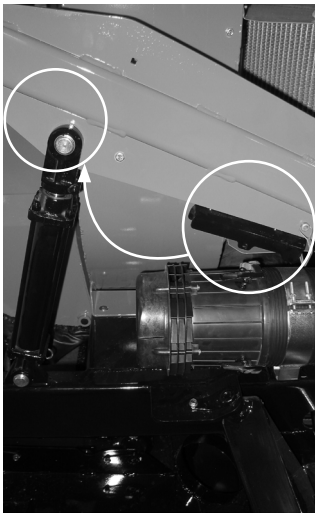
Deck Lift – sweeper deck height may be adjusted for conditions and performance.

Throttle – adjust engine speed with throttle. Start at low throttle, allow engine to warm up, then operate unit at full throttle.

Ignition – turn key to right to start unit. Remove key when unit is not in use. Never leave unit unattended with key in ignition.

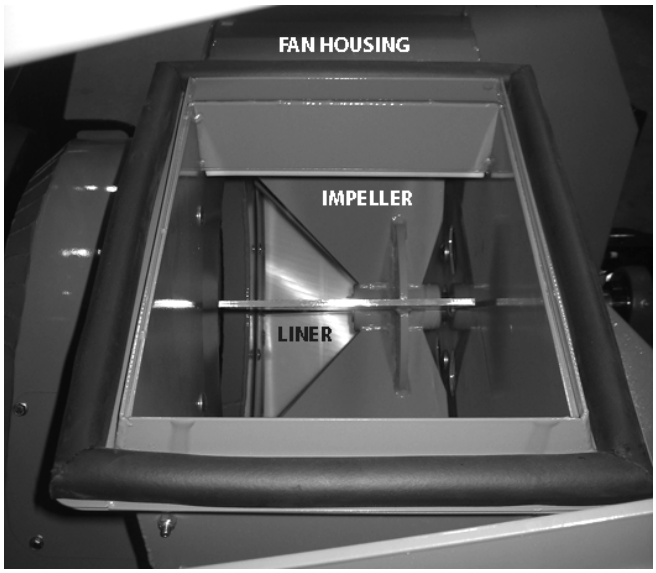
Engine Preheat – use the pre-heat position on the ignition switch when starting a cold engine. Hold the ignition key in that position until the glow lamp turns off. Preheating may not be needed if the engine is already warm.

Cooling Fan – switch to reverse the direction of the cooling fan to clean debris from screen located on the radiator/oil cooler.



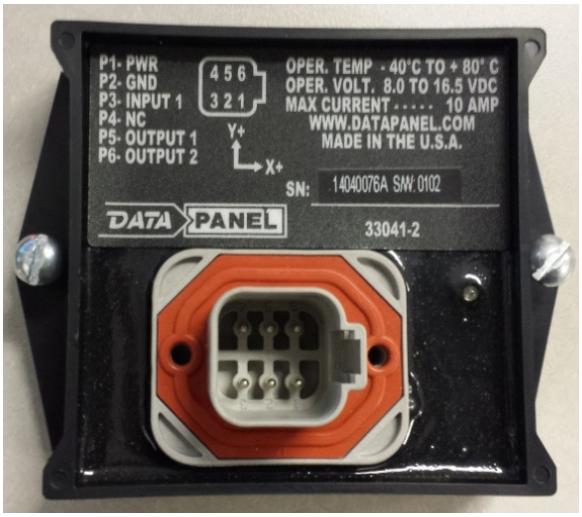
Hopper Lift Cylinder – hopper may be raised to empty debris into a vehicle or container.

Safety Lock – use safety lock whenever maintenance is performed. Make sure weight of raised hopper rests on safety lock by relieving pressure on cylinder with switch. Remove safety lock before lowering hopper.



Impeller – impeller is enclosed in fan housing. Make sure unit is turned off and key is removed from ignition before attempting any service.

Liner – inspect liner frequently for wear. Replace liner before it wears through to fan housing.



Inclinometer Switch – senses incline of machine and prevents the hopper from lifting if it senses an incline greater than 5°.

SAFETY WARNING!

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

Safety Guidelines

Equipment & Controls

- **Read and understand this manual.**
- Altering this equipment in any manner which adversely affects its operation, performance, durability, or use will void the warranty and may cause hazardous conditions.
- Know the location and function of all controls and how to stop this equipment quickly in an emergency before you operate the equipment.
- Keep all nuts, bolts and screws tight to help ensure safe operation of this equipment.
- Use genuine factory parts or parts with equivalent characteristics, including type, strength and material. Failure to do so may result in product malfunction and possible injury to the operator and/or others.
- If hardware is not secure, or if some of the hardware is over-tightened, equipment failure may result, posing possible safety hazards.
- To prevent possible eye injury, always wear SAFETY GLASSES while operating equipment.

Safety Decals

- If safety related or instructional decals become illegible or are removed, replace them immediately. New decals may be obtained from your local Harper Dealer.
- If you replace parts that have such decals attached to them, make sure the decals are replaced with current versions, and are on the replacement parts before the machine is operated again.

Diesel Fuel

- Always use an approved container for transporting diesel fuel.
- Do not allow open flames or sparks while performing maintenance or refueling.
- Never remove fuel tank cap or add fuel when engine is running or while it is hot.
- Only use ultra low sulfur diesel.
- Never fill fuel tank indoors. Fumes are heavy and will sink to the lowest point, collect and become hazardous.
- Wipe up spilled fuel immediately.
- Do not store fuel in a room with an appliance that has a gas pilot or electrical switch that may cause sparks.
- Always store diesel outside in a safety can (a can with flame arrestor and pressure relief valve in pour spout).
- Never store the equipment with fuel 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.

⚠ SAFETY WARNING! ⚠

Diesel fuel is extremely flammable and can be highly explosive.

Guards & Shields

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

Battery

SAFETY WARNING!

Batteries can produce explosive gas. Use extreme caution when working on the battery.

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

Hydraulics

SAFETY WARNING!

Escaping fluid under pressure can penetrate skin causing serious injury.
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 components in good repair.
- Do not use any type of heat (welding, soldering, cutting torch, etc) near pressurized lines.

Before Operation

- Before operating this equipment, read and understand the Owner's Manual.
- Do not allow children to operate this machine.
- Wear approved eye and ear protection and other appropriate safety equipment while operating the machine.
- Check tire pressure and fill to specifications.
- Engine settings are preset and should not be changed; any change can damage moving parts and void the 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 every 8 to 10 hours of operation for proper alignment and tightness.
- Replace damaged or missing safety decals.
- Use factory authorized parts or their equivalent.
- Make sure that all bearings or hinging parts are greased and or oiled properly.

During Operation

- Always keep a fire extinguisher near the Turf Vac during operation.
- Keep clothing and all body parts away from rotating parts.
- Keep the engine area clean from debris and other accumulations to lessen the possibility of fire.

Maintenance

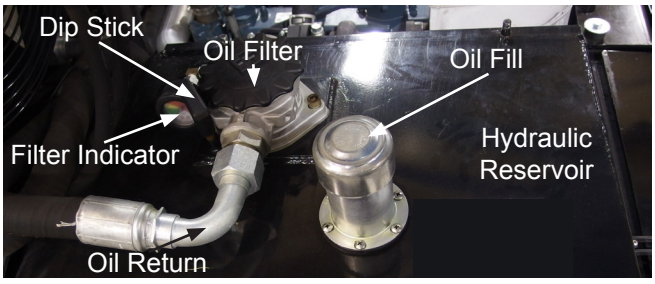
Hydraulic System

- The hydraulic system of the TV35D is filled at the factory with Crown AW 46 hydraulic oil that has an ISO of 46.
- The TV35D has a 10 micron, beta rated hydraulic oil filter designed for long life.

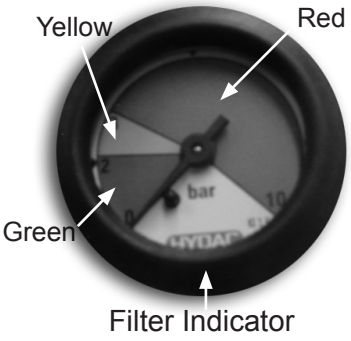
The following list of hydraulic fluids are compatible and can be mixed with Crown hydraulic fluid. MIXING OTHER OILS THAT ARE NOT INCLUDED ON THIS LIST COULD CAUSE GELLING AND DAMAGE TO THE HYDRAULIC COMPONENTS. If another type of oil is desired, then the system must be completely drained and flushed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

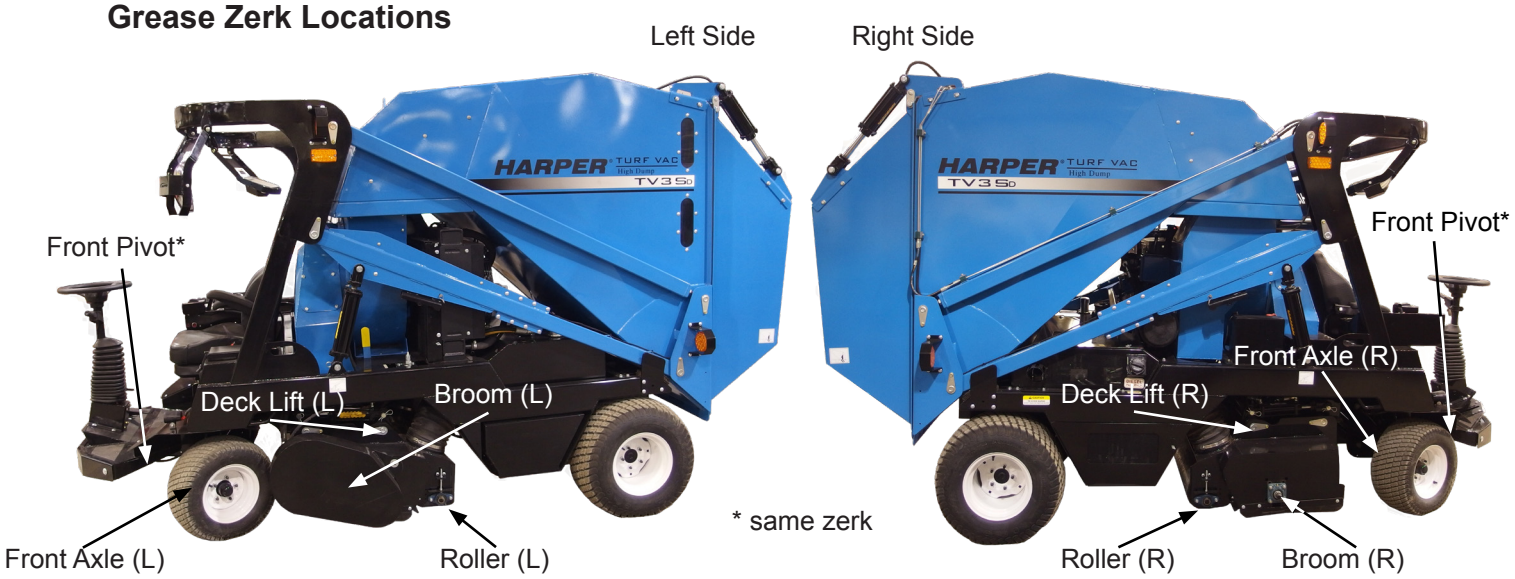


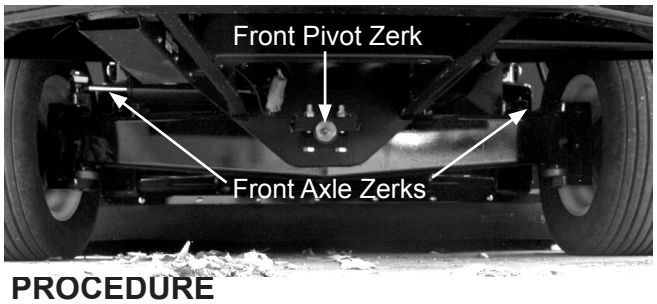
- On a daily basis, monitor the needle in the filter indicator when the oil is at normal operating temperature.



- The element (part no. 822002) does not need replaced until the needle is in the red portion of the gauge.
- To replace element, remove cap and twist element counter-clockwise. Insert new element, turn clockwise and replace cover.
- The hydraulic oil level should be monitored daily with the oil dip stick located on the top of the hydraulic oil reservoir next to the filter indicator.
- Keep the hydraulic oil near the full mark at all times. Do not over fill.
- Fill reservoir through the fill location on top of the reservoir.

Grease Zerk Locations

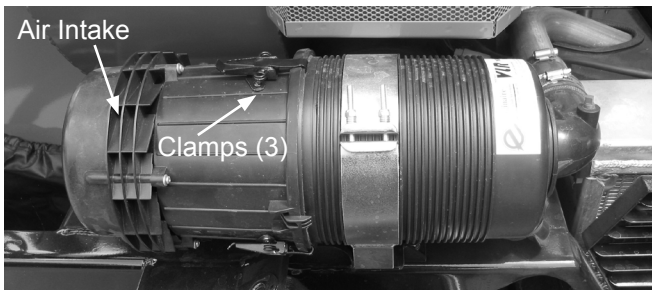


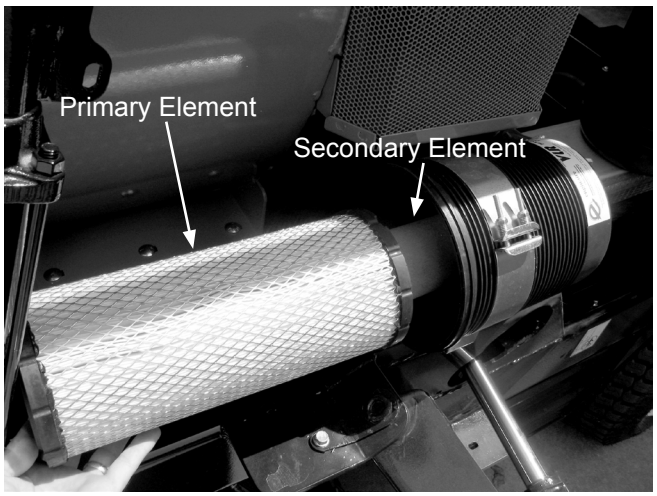


PROCEDURE

1) Park on level ground and set park brake.
2) Lower broom to the ground.
3) Turn off Turbo Vac.
4) Give 2 to 3 shots of grease after every 10 hours of use.

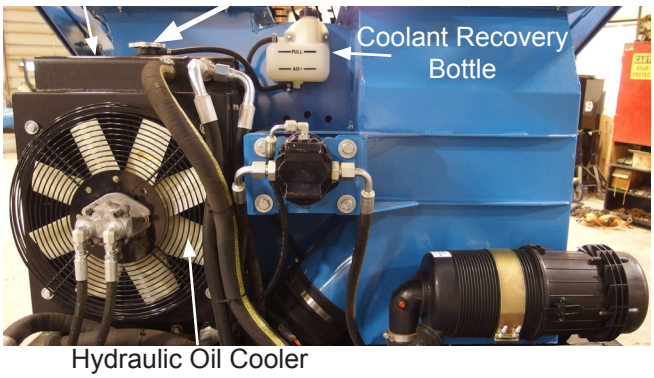
Air Cleaner



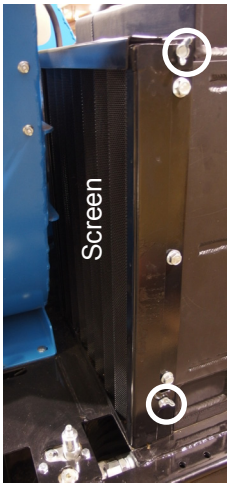


- Make sure intake is always free of debris.
- When engine is turned off, loosen clamps on air cleaner to access primary and secondary elements.
- Replace both elements according to the Maintenance Schedule.

Cooling System



- Clear hydraulic oil cooler and radiator of debris with pressurized air daily or as needed.
- Remove screen on side of oil cooler to clean properly. It is released by wing bolts located on the side of the screen.



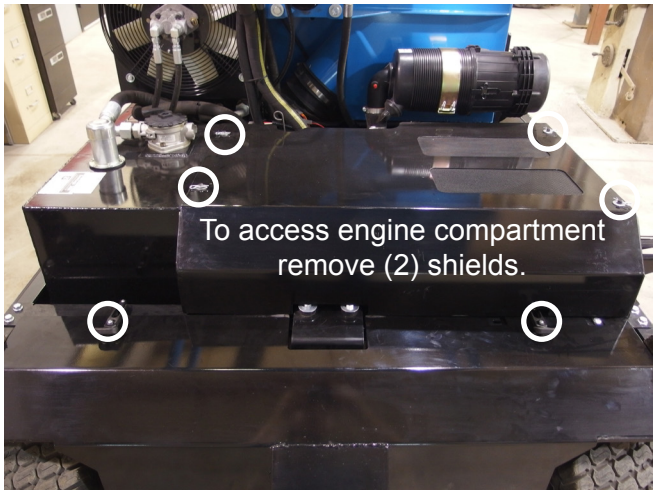
- Check radiator level daily and only when engine is cool and not running.
- Remove cap (radiator fill) slowly to relieve any pressure that may be built up.
- Fill up radiator with coolant (50% water/ 50% antifreeze) until coolant is visible in neck of radiator.
- Make sure that the coolant recovery bottle has at least 1" of coolant in bottom. The presence of coolant in the recovery bottle does not mean radiator is full.
- Do **NOT** operate the machine if the engine temperature exceeds 220°F. Severe engine damage may occur if the machine is continuously operated above 215°F. If overheating does occur, diagnose the cooling system and ensuring proper coolant levels and proper air flow across the radiator.

⚠ SAFETY WARNING ⚠

Hot Coolant and steam from the radiator can cause severe burns. Never open the radiator cap of a hot engine.

Engine Oil

- The dipstick and engine oil fill are located on the back left side of the engine.
- The engine oil filter is located on the right side of the engine and it is accessible from there also.
- To get to the engine oil fill or dipstick, the cover must first be taken off by removing the four R pins on the top of the cover.



PROCEDURE

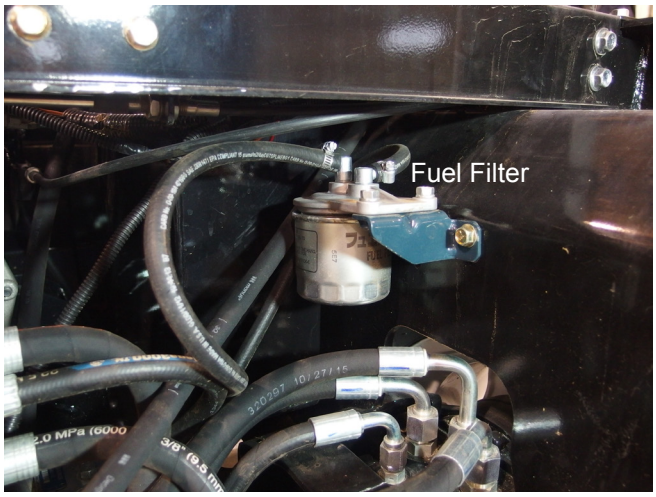
- Check engine oil level only when engine is turned off.
- Keep engine oil level between the FULL and ADD marks on dipstick at all times. DO NOT OVER-FILL.

- Add engine oil (S.A.E. 10W30) through the engine oil fill location.
- Replace the engine oil according to the Maintenance Schedule.
- Replace the engine oil filter according to the Maintenance Schedule.

SAFETY WARNING

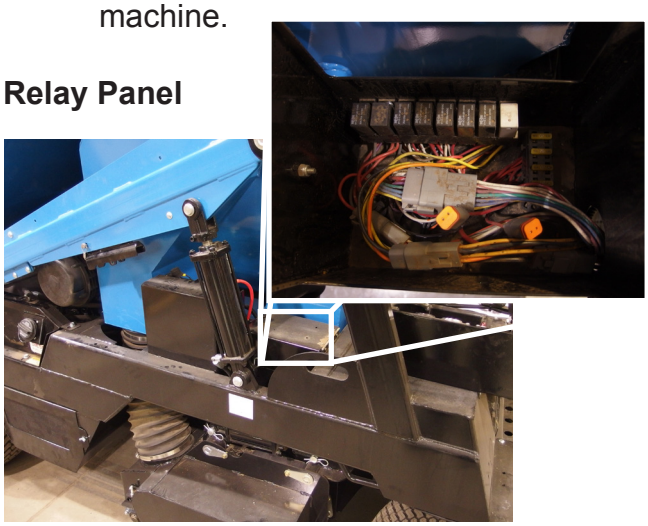
Keep dipstick and oil fill cap secured tightly. Engine oil may escape through these orifices when engine is running causing severe burns.

Fuel Filter



- Fuel filter is located under the rear most shield on the back of the machine.
- The Fuel Shut-off valve is located directly under the fuel tank itself. It can be accessed from below the machine.

Relay Panel



- Located behind operator's console under the access door.
- Refer to the parts section for relay and corresponding functions.
- All fuses are 20 amp.

Tow Procedure

- In order to move the machine with out the engine running, the park brake must be released and the bypass valve must be opened.

Park Brake Release

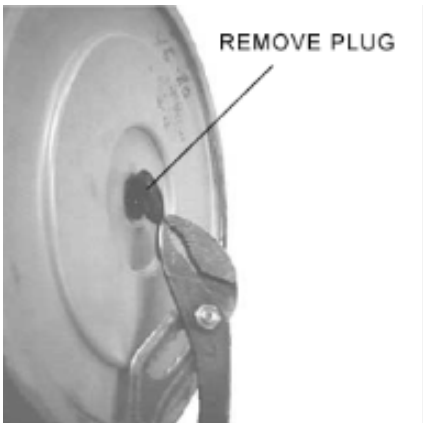
- The two rear wheel motors each contain a park brake that is applied whenever the engine is off (zero system pressure).
- Always release the park brake (inside left and right rear wheel motors) when towing or pushing the unit.

PRECAUTION

Towing or pushing the unit with the park brakes applied may cause serious damage to internal brake parts.

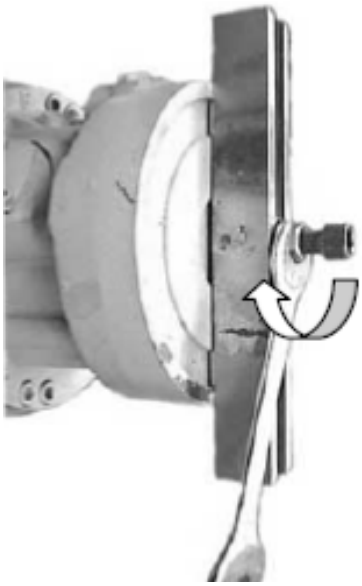
PROCEDURE

- Remove plastic plug from the center of the park brake housing.



- Install brake release tool (P/N 575064) by placing on brake housing and tightening the screw into the piston. These tools can be found inside the toolbox.

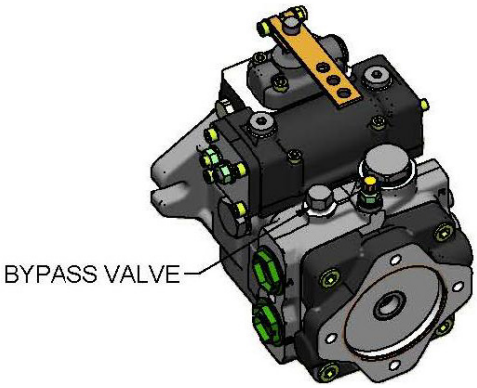
- Tighten the nut until the motor shaft turns freely.



- After towing the unit, follow procedure in opposite order to remove brake release tool and install new plastic plug.

Opening the Bypass Valve

- The bypass valve is located on the top side of the propulsion pump. The valve can be accessed easiest with the hopper up and the engine shields removed. If the hopper is down, access it by removing the shields on the right side of the machine.
- Open the bypass valve when moving the machine for short distances.
- The bypass valve is not a tow valve.



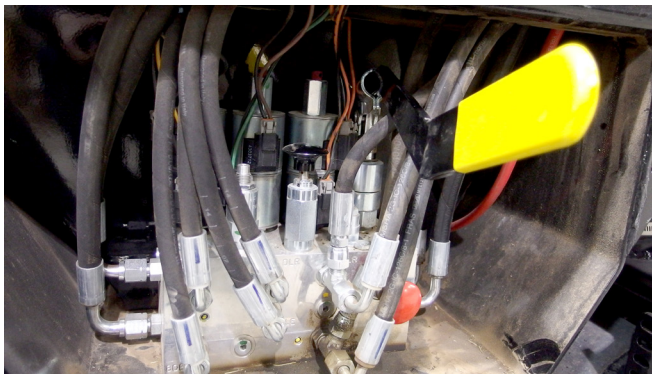
PRECAUTIONS

- **The bypass valve is intended only for moving a vehicle a very short distance and is not intended for towing a vehicle behind a truck or tractor. Note: Serious damage to the hydrostatic drive will result if the vehicle is towed.**
- **Close the bypass valve tightly when finished moving unit. Failure to close valve tightly will result in full or partial loss of power.**

PROCEDURE

- Loosen the bypass valve completely from the pump housing.
- After the machine has been moved, reinstall the bypass valve and torque to 22 ft-lb.

Manual Hopper Lift Instructions



To raise the hopper:

- Pull on the black knob and lock into upper position.
- Using the handle located in the toolbox, pump the hand pump.
- Return black knob to starting position.

To lower the hopper:

- Make sure area is clear.
- Slowly pull on the red knob.

Standard Torque Chart

SAFETY WARNING!

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

PRECAUTIONS

- 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.
- All lugnuts should be torqued to 140 ft-lbs (190 N-m).

U.S. BOLT TORQUE SPECIFICATIONS

Torque in foot-pounds

Diameter	Thread per inch	SAE 2	SAE 5	SAE 8	SHCS
1/4	20	4	8	12	14
1/4	28	6	10	14	16
5/16	18	9	17	25	29
5/16	24	12	19	29	33
3/8	16	16	30	45	49
3/8	24	22	35	50	54
7/16	14	24	50	70	76
7/16	20	34	55	80	85
1/2	13	38	75	110	113
1/2	20	52	90	120	126
9/16	12	52	110	150	163
9/16	18	71	120	170	181
5/8	11	98	150	220	230
5/8	18	115	180	240	255
3/4	10	157	260	380	400
3/4	16	180	300	420	440
7/8	9	210	430	600	640
7/8	14	230	470	660	700
1	8	320	640	900	980
1	12	350	710	990	1060

Baseline torque is calculated for a non-lubricated, un-plated bolt.

BOLT TORQUE FACTORS

LUBRICANT OR PLATING	TORQUE CHANGES
Oil	Reduce torque 15% to 25%
Chrome plating	No change
Cadmium plating	Reduce torque 25%
Zinc plating	Reduce torque 15%

Maintenance Schedule

- **See the Kubota Operation and Maintenance Manual provided with the TV35D for a detailed description of all maintenance and service procedures for the engine.**
- **For the TV35D, Harper Industries recommends the following:**

Service Parts

Filters	Part #
Engine Air (Inner) Filter	342064
Engine Air (Outer) Filter	342063
Engine Oil Filter	342062
Engine Fuel Filter	342057
Hydraulic Return Filter	822002
Belts	
Engine Drive Belt	342048
Tires and Wheels	
Front Wheel & Tire Assembly	302091
Front Wheel Only	342019
Front Turf Tire Only	342051
Rear Wheel & Tire Assembly	302008
Rear Wheel Only	342021
Rear Tire Only	342020
Other	
Fan Housing Liner	302082

Daily or Before Starting Engine

- □ Check for leaks, smell of fuel, loose or damaged parts.....Repair as needed.
- □ Check radiator and oil cooler.....Blow off debris as needed.
- □ Check air cleaner intake.....Clear debris as needed.
- □ Check engine coolant level.....50% antifreeze, 50% distilled water
- □ Check engine oil level.....SAE10W30
- □ Check hydraulic oil level.....Crown AW 46
- □ Fill fuel tank.....Clean #2 diesel fuel
- □ Visually inspecting fittings and hoses.....Tighten or replace as needed
- □ Grease.....See Grease Locations.
- □ Check tire pressure.....Inflate to Proper Pressure
- □ Check lights.....Replace as needed.
- □ Check hydraulic filter indicator (engine and fan running).....Replace filter (822002) when needle is in the red.
- □ Inspect blower liner (302082).....Replace liner before it wears through to fan housing.
- □ Check all engine screens to ensure proper air flow.....Clean debris as needed.

Every 50 hours

- □ Check of fuel pipes and clamp bands.....See Kubota Manual
- □ Draining water separator.....See Kubota Manual
- □ Check lugnuts.....Torque to 140 ft-lbs

100 Hour Maintenance – Perform these and all previous items:

- □ Check outer air cleaner element.....Harper part no. 342063
  - (Change if element appears dusty due to severe conditions.)
- □ Change engine oil.....SAE10W30
  - (Refer to Kubota manual for oil type and procedure.)
- □ Check battery.....Clean terminals if necessary.

250 Hour Maintenance

- □ Change outer air cleaner element.....Harper part no. 342063
- □ Check inner air cleaner element.....Harper part no. 342064
  - (Change if element appears dusty due to severe conditions.)
- □ Check battery electrolyte level
- □ Check fan belt tightness.....Tighten as needed.
- □ Check radiator hoses and clamp bands.....Tighten or replace as needed.
- □ Check intake air lines.....Clear debris as needed.

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

- □ Change engine oil filter.....Harper part no. 342062
  - (Refer to Kubota manual for filter type and procedure.)
- □ Change fuel filter.....Harper part no. 342057
  - (Refer to Kubota manual for filter type and procedure.)
- □ Check hydraulic oil condition.....32 gal. Crown AW 46
- □ Change inner air cleaner element.....Harper part no. 342064

- □ Removal of sediment in fuel tank
- □ Cleaning of water jacket (radiator interior)
- □ Replacement of fan belt.....Harper part no. 302048
- □ Cleaning of water separator

1000 Hour Maintenance – Perform these and all previous items:

- □ Change hydraulic oil.....32 gal. Crown AW 46
- □ Check valve clearance

Every One or Two Months – Perform these and all previous items:

- □ Recharge battery

1500 Hour Maintenance– Perform these and all previous items:

- □ Check of fuel injection nozzle injection pressure

3000 Hour Maintenance – Perform these and all previous items:

- □ Check turbo charger
- □ Check injection pump
- □ Check fuel injection timer

Every Two Years Maintenance – Perform these and all previous items:

- □ Change radiator coolant (L.L.C.)
- □ Replacement of battery
- □ Replacement of radiator hoses and clamp bands
- □ Replacement of fuel pipes and clamp bands
- □ Replacement of fan belt (or every 500 hours)

Date of Maintenance:_____ Hours:_____ Performed by:_____

- *For warranty replacement or repair of diesel engine, contact Kubota Engine America Corporation directly. Refer to www.kubotaengine.com for a service location.*

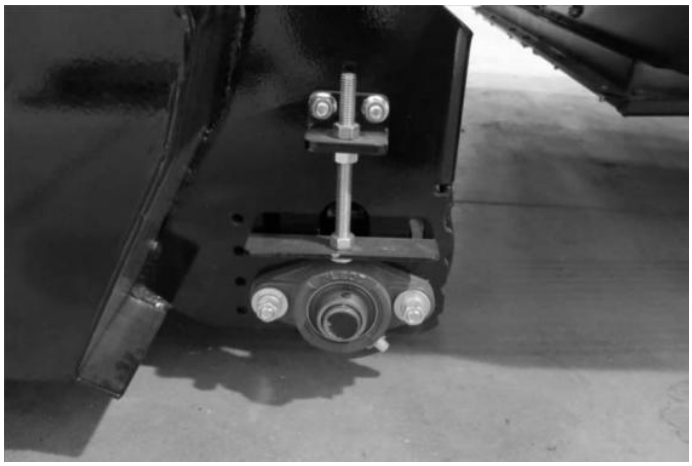
BEFORE OPERATION

- Safety Checklist
  - o Read and understand the Operator's Manual (located in the manual holder to the left of the seat).
  - o Ensure that the machine is equipped with safety stops for the hopper lift cylinders and that all shields and guards are in place.
  - o Check the seat belt to make sure it functions properly.
  - o Know the location and function of all controls and how to stop quickly in an emergency.

- Perform the daily maintenance checklist (For details, see the maintenance section of the Operator's Manual).
  - o Check for fluid leaks
  - o Make sure radiator and oil cooler is clear of debris
  - o Check air cleaner intake
  - o Check all fluid levels
  - o Check tire pressure
  - o Grease all zerks (see operator's manual for locations)
  - o Check hydraulic filter indicator
  - o Inspect blower liner
  - o Check all engine screens to ensure proper air flow

- Adjust the rotor to the desired height. The height can be adjusted using the different mounting holes for the rotor bearings and by the roller located on the rear of the deck. The height can also be set by installing stops to the deck lift cylinders.

NOTE: When sweeping hard surfaces, the cylinder stops must be installed to prevent damage to the rear rollers of the deck. The rear rollers are designed for turf use only.



STARTING

- In order for the machine to start, the foot pedal must be in the neutral position, the operator must be in the seat, and the fan switch must be in the OFF position.
- Turn the key to the pre-heat position so that the light on the control arm becomes lit. Hold the key in that position until the light goes out. Then start the engine.
- The engine will shut down if the operator leaves the seat while the broom function is engaged.

DURING OPERATION

- FASTEN SEAT BELT
- To prevent possible eye injury, always wear SAFETY GLASSES while operating machine.
- Park Brake – Make sure the park brake is disengaged before operation. Set the park brake when unit is not in use or is parked on an incline. The indicator light illuminates when the park brake is set.
- HI/LO Speed – Always sweep/vacuum with transmission in low speed. Use high range when traveling between operations. The machine is equipped with an interlock that prevents the machine from reversing in high speed.
- Fan & Broom – Turn the fan and broom switches ON while the engine speed is at low to mid-throttle. Then operate at full throttle.
- Hopper Lift – The machine is equipped with an interlock that prevents the hopper from lifting if the machine is on a slope greater than 5°.
- Hopper Door – Hydraulically opened and closed with switch.
- Deck Lift – Hydraulically raised and lowered using the switch.
- Throttle – Start at low throttle. After allowing engine to warm up, operate machine at full throttle.

TV35 Optional Attachments

- **Brush Rotor**
  - o PART NO: 300064 (CUSTOMER INSTALLED)
  - o PART NO: 300065 (FACTORY INSTALLED)

- **Rubber Finger Rotor**
  - o PART NO: 300066 (CUSTOMER INSTALLED)
  - o PART NO: 300067 (FACTORY INSTALLED)

- **Verticutter with Fingers Rotor**
  - o PART NO: 300068 (CUSTOMER INSTALLED)
  - o PART NO: 300069 (FACTORY INSTALLED)

- **Remote Hose Kit**
  - o PART NO: 300049 (CUSTOMER INSTALLED)
  - o PART NO: 300048 (FACTORY INSTALLED)

- **Light Kit**
  - o PART NO: 300072 (CUSTOMER INSTALLED)
  - o PART NO: 300073 (FACTORY INSTALLED)

- **Curb Brush Option**
  - o PART NO: 300070 (CUSTOMER INSTALLED)
  - o PART NO: 300071 (FACTORY INSTALLED)

- **Canopy Option**
  - o PART NO: 300057 (CUSTOMER INSTALLED)
  - o PART NO: 300056 (FACTORY INSTALLED)

- **Hopper Dump Extension**
  - o PART NO: 300054 (CUSTOMER INSTALLED)
  - o PART NO: 300053 (FACTORY INSTALLED)

- **Backup Camera Option**
  - o PART NO: 300074 (CUSTOMER INSTALLED)
  - o PART NO: 300075 (FACTORY INSTALLED)

NOTES

Harper Industries, Inc.
151 E. Highway 160
Harper, KS 67058

Telephone: 620-896-7381
Toll-Free: 800-835-1042
Fax: 620-896-7129

Website: www.harperindustries.com

E-mail: info@harperindustries.com