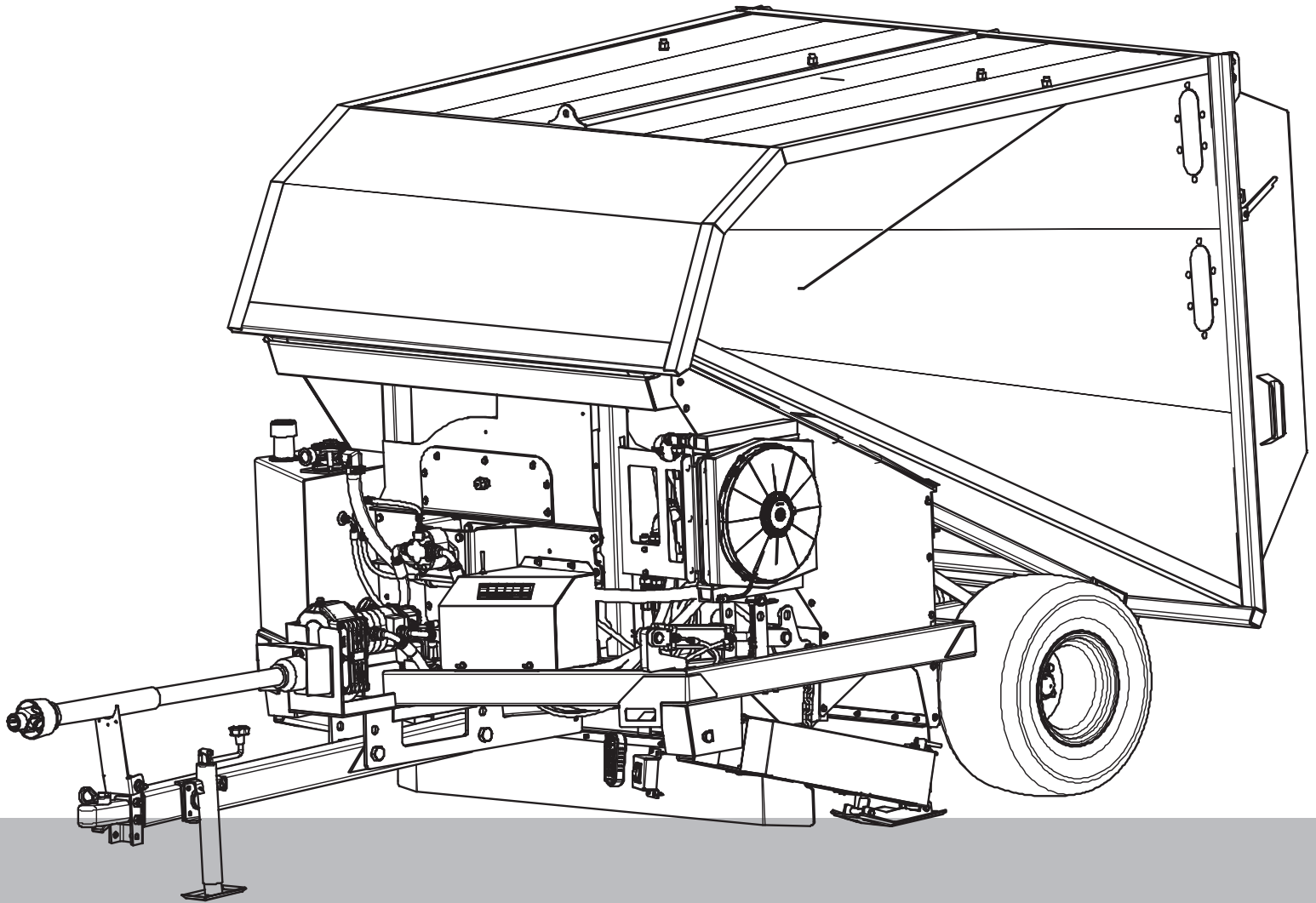


TURBO VAC 60RHD

Serial Number: 22A01+

Part # 301041



OPERATOR'S & PARTS MANUAL

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 **TV60RHD**. 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.

© 2025 Harper Industries, Inc.

The Harper and Goossen names are registered trademarks of Harper Industries, Inc. All other brand and product names are trademarks or registered trademarks of their respective companies.

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 _____

Supplier's declaration of conformity



This is the Australian Communications and Media Authority (ACMA) approved form for a declaration of conformity under the following legislative instruments:

- > Radiocommunications Equipment (General) Rules 2021
- > Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017.

This is a sample form for a declaration of conformity under the Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015.

Instructions for completion

Do not return this form to the ACMA. This completed form must be retained by the supplier as part of the documentation required for the compliance records. However, it must be made available for inspection by the ACMA when requested.

Supplier's details (manufacturer, importer or authorised agent)

Company name (or individual)

TORO Australia Pty. Ltd

Trading as

ACN/ARBN

N1625

or

New Zealand IRDN

47 001 310 443

Street address (Australia or New Zealand)

53 Howards Rd

Beverly, S.A

POSTCODE 5009

Phone:

Product details and date of manufacture

Product description – brand name, type, current model, lot, batch or serial number (if available), software/firmware version (if applicable)

Model No.	Product Description
900244	TV60 RHD Base Machine - PTO Powered

Compliance – applicable standards and other supporting documents

Evidence of compliance with applicable standards may be demonstrated by test reports, endorsed/accredited test reports, certification/competent body statements.

Having had regard to these documents, I am satisfied the above-mentioned product complies with the requirements of the relevant ACMA standards made under the *Radiocommunications Act 1992* and/or the *Telecommunications Act 1997*.

List these documents including details of the standard title, number and, if applicable, number of the test report/endorsed test report or certification/competent body statement.

AS/NZS CISPR 12:2007

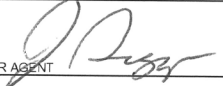
Declaration

I hereby declare that:

1. I am authorised to make this declaration on behalf of the Company mentioned above
2. the contents of this form are true and correct
3. the product mentioned above complies with the applicable above mentioned standards and all products supplied under this declaration will be identical to the product identified above
4. I understand that giving false or misleading information is a serious offence.

Note: It is an offence to knowingly provide false or misleading information to a Commonwealth entity or a person who is exercising powers, performing functions under, or in connection with, a law of the Commonwealth. It is an offence to knowingly provide false or misleading information or documents in compliance or purported compliance with a law of the Commonwealth. (See sections 137.1 and 137.2 of the *Criminal Code Act 1995*.)

Penalty: 12 months imprisonment

SIGNATURE OF SUPPLIER OR AGENT

PRINT NAME Joe Biggerstaff

POSITION IN ORGANISATION	VP of Engineering
DATE	22-Jul-24

The *Privacy Act 1988* (Cth) (the Privacy Act) imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the Australian Privacy Principles.

The ACMA may only collect personal information if it is reasonably necessary for, or directly related to, one or more of the ACMA's functions or activities.

The purpose of collecting the personal information in this form is to ensure the supplier is identified in the 'declaration of conformity'. If this declaration of conformity is not completed and the requested information is not provided, a compliance label cannot be applied.

Further information on the Privacy Act and the ACMA's privacy policy is available at www.acma.gov.au/privacypolicy. The privacy policy contains details about how you may access personal information about you that is held by the ACMA, and seek the correction of such information. It also explains how you may complain about a breach of the Privacy Act and how we will deal with such a complaint.

Should you have any questions in this regard, please contact the ACMA's privacy contact officer on telephone on 1800 226 667 or by email at privacy@acma.gov.au.

MANUFACTURER'S NOTICE OF COMPLIANCE**AUSTRALIA WORK AND SAFETY ACT AND REGULATIONS OF 2011**

The turf machine identified below was designed and manufactured by Harper Industries, Inc. headquartered in Harper Kansas, USA.

Hazard identification, Risk Assessment and Risk Reduction: Harper Industries has undertaken a hazard identification, risk assessment and risk reduction procedure on a sample of the product and model identified below. The procedure undertaken followed the principles identified in the Australian safety standard AS/NZS 4024.1201 – Safety of *machinery – General principles for design – Risk assessment and risk reduction*. The procedure followed meets the requirements specified in the Occupational Work and Safety Regulations 2011 as amended for the design and manufacture of plant. The machine has been designed and manufactured to comply with the relevant and applicable industry safety standards. Appropriate hazard elimination or control measures have been incorporated into the product design and specifications.

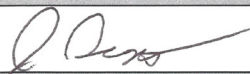
Health and Safety Information: An operator's manual, which includes instructions on the safe use of the machine, is provided with each machine. Product warning signs are affixed to the product where necessary.

Operator Noise Exposure: The sound level at the operator's station of ride-on equipment has been measured on a representative sample of a machine in accordance with ISO 5131, Annex B or equivalent standard. The sound level depends upon the machine operating conditions such as engine and travel speed, as well as the condition and maintenance of the machine.

Operator Station Sound Level: 83 d(B)A

Product Description	Pull Type Turbo Vac
Model Number(s)	TV60RHD - 900244
Manufacturing Unit	Harper Industries Inc., Harper, Kansas, USA

Authorized Representative Signature



Name Joe Biggerstaff, VP Engineering

Date 9-23-24

151 E. US Hwy 160
Harper, Kansas 67058, USA
www.harperindustries.com

☎ 620.896.7381
📠 620.896.7129
☎ 800.835.1042
✉ info@harperindustries.com

EC declaration of conformity
according to the EC Machinery Directive 2006/42 / EC, Annex II 1.A

Manufacturer:

Harper Industries Inc.
151 E US Highway 160
Harper, Kansas, USA, 67058
Phone: +1 (620) 896-7381

Person established in the Community, who is authorized to compile the technical file:

ProDoku
Hartmut Hartmann, Dipl.-Ing. (FH)
Wersener Holz 2a
D-49504 Lotte
Phone.: +49 (0) 5404 / 5637
Mobil: +49 (0) 176 / 10590693
Email: Hartmut.Hartmann@prodoku.com

Description and identification of the machinery:

Machine Type: Turf Vacuum Sweeper s

Model(s): TV60RHD

Serial number: NNNNNNNN

Measured Sound Pressure Level: 84 dB

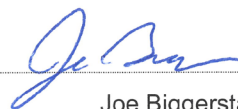
It is expressly declared, that the machinery fulfils with all the relevant provisions of the following EC directives:

Directive 2006/42/EG	Directive on machinery Published in the Official Journal of the European Union, L 157/41 of 9.6.2006
Directive 2000/14/EC	Directive on noise emission in the environment by equipment for use outdoors Published in the Official Journal of the European Union, L 162 of 3.7.2000
Directive 2005/88/EC	Amending Directive 2000/14/EC Published in the Official Journal of the European Union, L 344/44 of 27.12.2005

Place of the declaration: Harper, Kansas, USA

Date of the declaration: 5 December 2024

Signature:



Joe Biggerstaff

Title:

Vice President, Engineering

Table of Contents

OPERATOR SECTION

To the Owner or Operator.....	1
Warranty Statement.....	2
Declaration of Conformity AU.....	3-5
Declaration of Conformity EC.....	6
Table of Contents.....	7
Specifications.....	8
Feature Identification.....	9-10
General Safety Guidelines	
Equipment & Controls.....	11
Guards & Shields.....	11
Before Operation.....	11
During Operation.....	11
During Service & Maintenance.....	12
Safety Decals.....	13-15
Replacement Parts.....	16
Hydraulics.....	16
Specific Safety Guidelines.....	16
Set-up and Operation	
TV60RHD.....	17
Starting Operation.....	18
Stopping Operation.....	18
Unloading Hopper.....	18
Towing.....	19
Adjustments	
Level Hook-Up.....	20
Deck Height.....	20
Remote and Receiver.....	21-23
Service & Maintenance	
Break-in Service.....	24
Lubrication.....	24
Hydraulic Oil Reservoir & System.....	25
Hydraulic Oil Cooler.....	26
Blower Liner.....	26
Return Air Screens.....	27
TV60RHD Service Schedule.....	28
Troubleshooting.....	28

PARTS SECTION

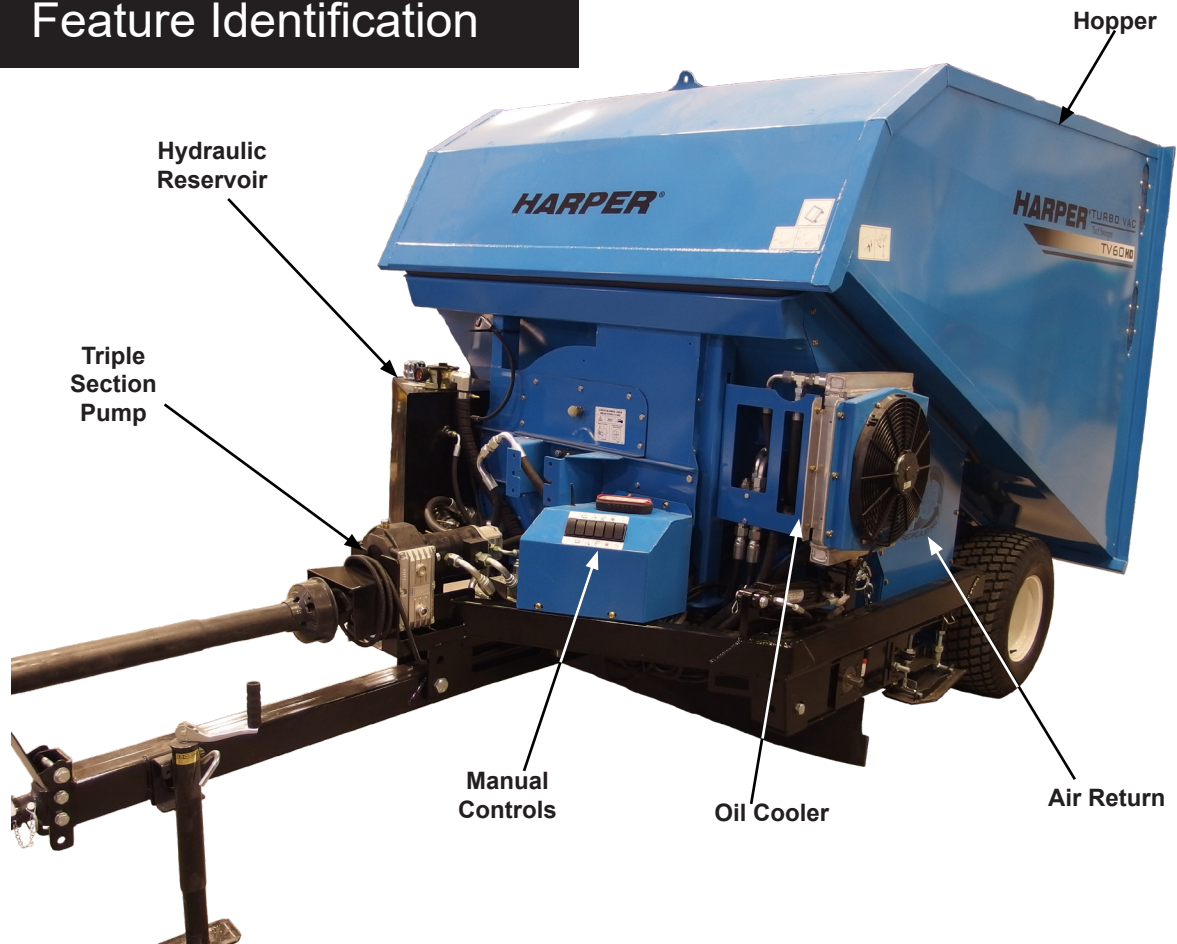
Structure	
Frame Assy.....	31-32
Wheel Assy.....	33
Deck Arms Assy.....	34
Attaching Deck Arms.....	35
Blower Housing Assy.....	36
Fan Assy.....	37
Fan Shaft Assy.....	38
Fan Housing Assy.....	39
Blower Housing Installation.....	40
Fan Housing Installation.....	41
Air Return.....	42
Seal & Trim Installation.....	43
Hopper Assembly.....	44
Site Window Installation.....	45
Screen Installation.....	46
Lift Lock Installation.....	48
Door Latch Installation.....	49
Door Installation.....	50
Door Assy.....	51
Hydraulics	
Hydraulic Installation.....	53
PTO Pump & Drive Assy.....	54
Hydraulic Reservoir.....	55
Oil Cooler Assy.....	56
Fan Drive Hydraulics.....	57
Deck Drive Hydraulics.....	58
Implement Drive Hydraulics.....	59
Implement Valve Assy.....	60
Fan & Deck Valve.....	61
Hydraulic Schematic.....	62
Electrical	
Control Panel Assy.....	64
Wiring Schematic w/Kar-Tech Remote.....	65
Final Installation	
Export Kit.....	66
Decal Installation Left.....	68
Decal Installation Right.....	69
Decal Installation General.....	70
Attachments	
Verticutter Kit.....	71
Verticutter Carbide Tip Kit.....	72
Finger Rotor Kit.....	73
Broom Kit (22A01+).....	74
Broom Kit (Older-21A99).....	75
Brush Assy.....	76
Obsolete Brush.....	77

Specifications

Noise Levels	• 83dBa
Safety Features	Locking safety latches on all cylinders for service functions
Power	Tractor PTO - 540 RPM - <i>40 HP Tractor required</i>
Hydraulic System	PTO driven triple-section pump powers fan, deck rotor, and cylinders
Hydraulic Reservoir	20 gallons - Crown AW46
Blower Drive	Hydraulic motor powered by gear pump
Blower Fan & Housing Liner	• 25" diameter fan of abrasion-resistant steel • 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
Deck Drive	Hydraulic motor - chain drive
Broom Option	12" diameter X 60" wide pick-up broom with heavy-duty polyethylene bristles
Rubber Finger Option	12" diameter X 60" wide rubber finger pick-up rake
Verticutter Option	12" diameter blades X 56" cutting width * 28 - 10 Gauge blades on 2" spacing * adjustable skids for height adjustment
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 hydraulic powered latches
Hitch	Adjustable height tongue with ball hitch
Paint	Durable 2-part polyurethane
Dimensions	164" long X 85" wide X 85" high
Weight	2250 lbs – 1023 kg
Hitch Weight	675 lbs – 306 kg

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/Goosen dealer is the best source for up-to-date information.

Feature Identification



Triple Section Pump – The triple section pump powers the deck, fan, and implement parts of the machine.

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

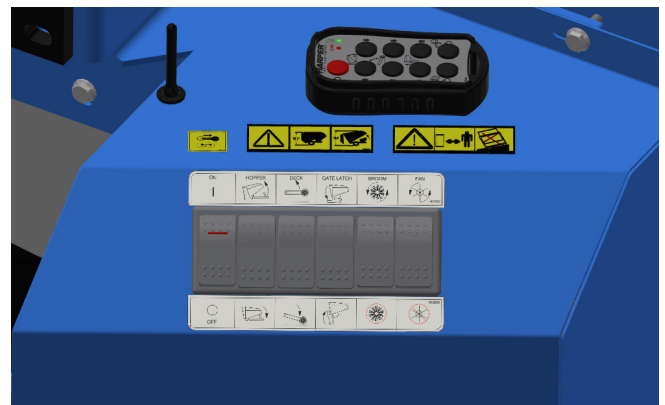
Oil Cooler – The oil cooler prevents the hydraulic oil from over-heating. Always keep the fins free of debris.

Hydraulic Reservoir – The hydraulic reservoir on a TV60RHD has a 20 gallon capacity.

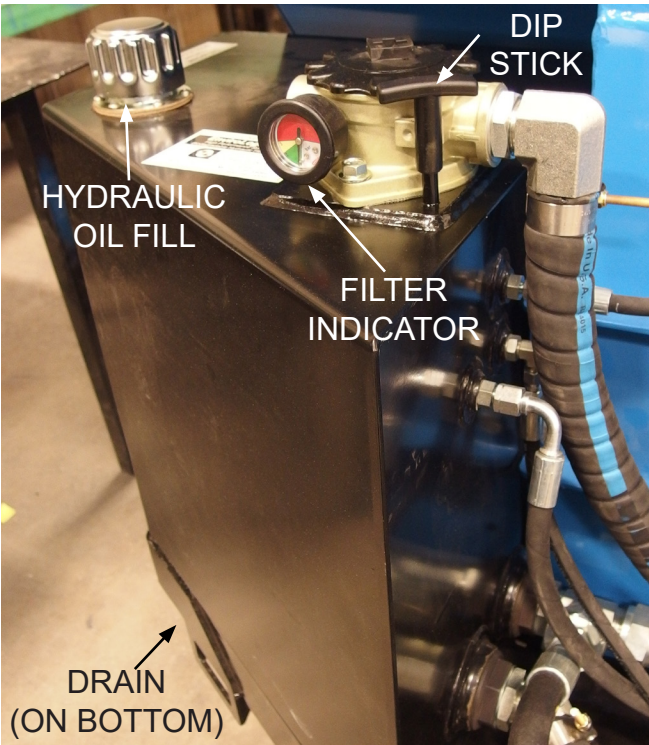
Air Return – The air return allows air to be recirculated, significantly reducing dust.

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

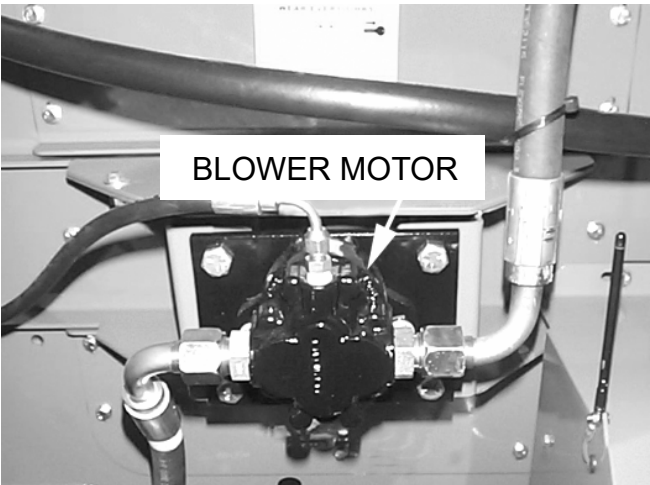
Manual Controls – All of the functions on the Turbo Vac can be operated with the manual controls or the remote controls.



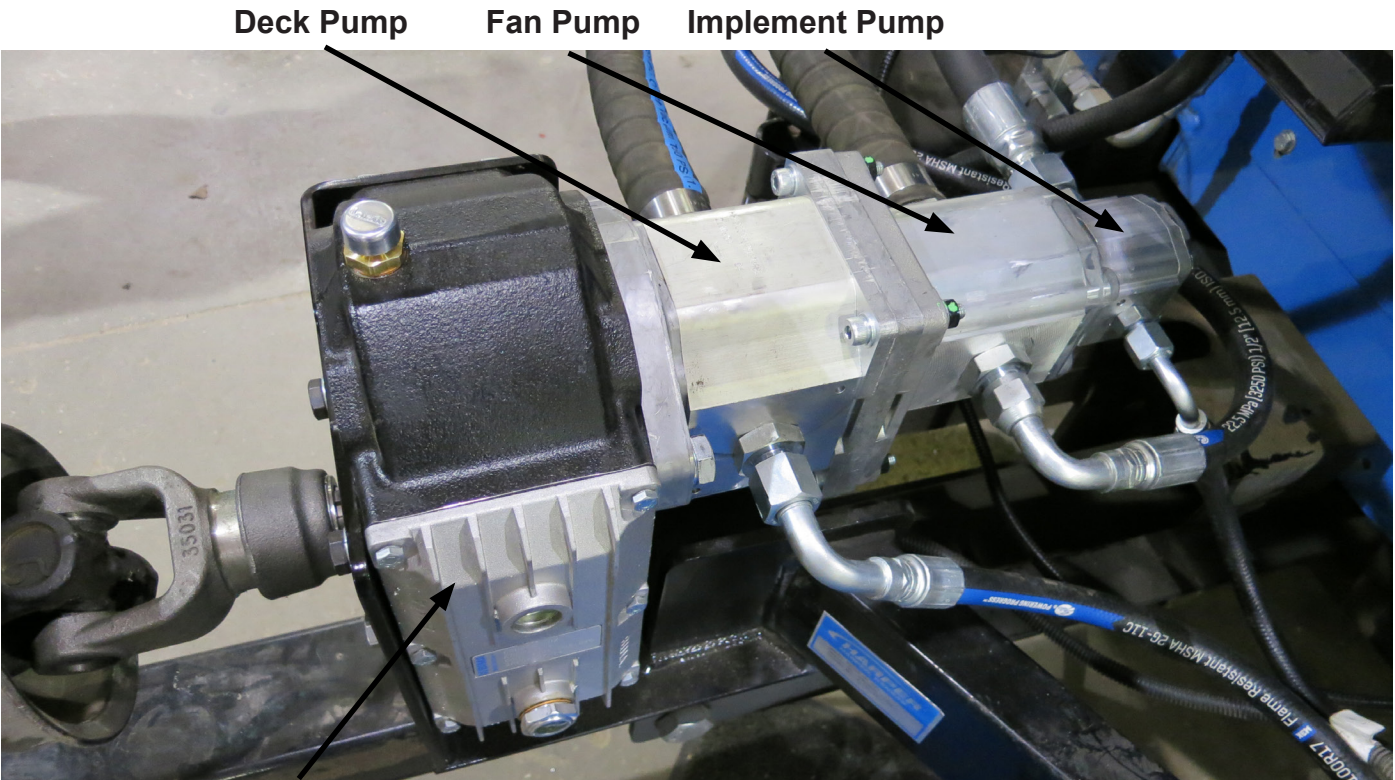
TV60RHD - Hydraulic System



Hydraulic Reservoir Assembly



Blower Motor



1:4 Ratio Gearbox

Triple Gear Pump

General Safety Guidelines

Equipment & Controls

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

Guards & Shields

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

Before Operation

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



SAFETY WARNING!

Not for use on public roadways.

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.
- After use, use provided wheel chocks for parking.



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.



SAFETY WARNING!

Noise levels are noted but depend upon machine towing unit. Use appropriate hearing protection.

During Service & Maintenance



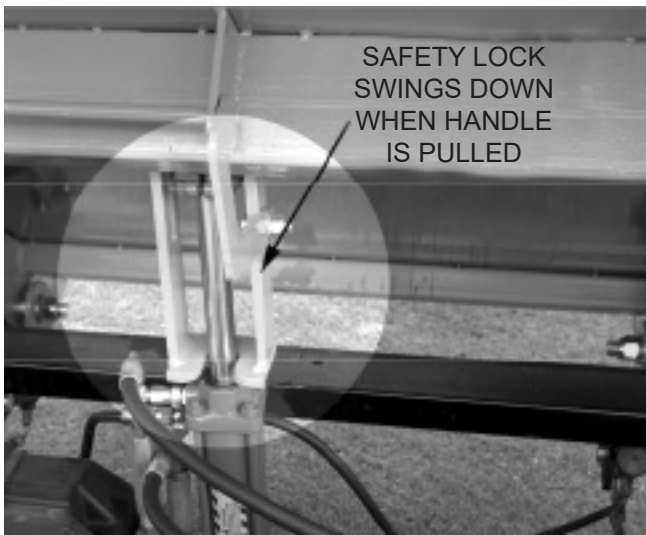
SAFETY WARNING!



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.



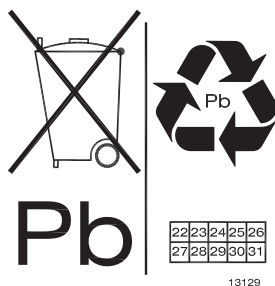
Safety Decals

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

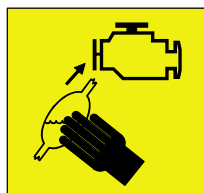
Safety Symbols

⚠ WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

1. P65 Warning



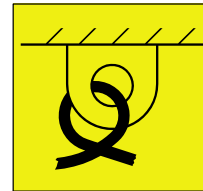
2. Recycle the battery



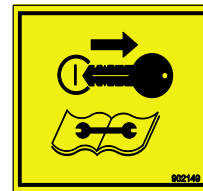
3. Engine prime bulb



4. Fuel Tank



5. Tie down point



6. Read manual before starting/ operation



7. Safety Alert



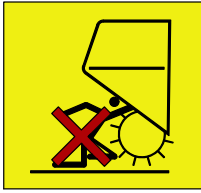
8. Hand can be entangled in moving parts



9. Contacting moving parts will cause serious injury



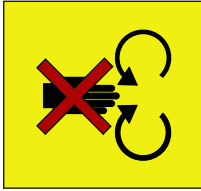
10. Shut off equipment before servicing



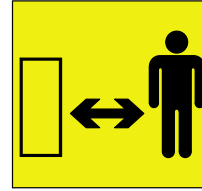
11. Don't enter machine while it's running



17. High pressure spray could erode flesh



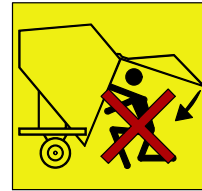
12. Don't remove safety shields while machine is running.



18. Stay safe distance from machine when in use



13. Hopper can come down on operator



19. Don't enter while door is loose



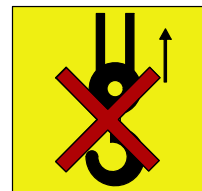
14. Hot surface could burn fingers or hands



20. Don't stand behind machine



15. Shut off engine before servicing



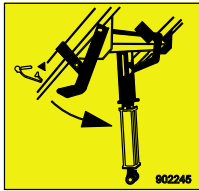
21. Don't use for lifting machine



16. High pressure fluid could be injected into the body



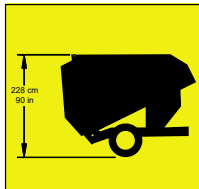
22. Never tip machine on soft ground or a slope



23. Install cylinder safety lock before servicing



24. Insert prop rod



25. Machine height



26. Machine height with raised hopper



27. Swinging door can crush person standing behind



28. Swinging door can pinch person entering hopper

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.

Hydraulics



SAFETY WARNING!

HIGH-PRESSURE FLUID HAZARD!

Fluid escaping under pressure can penetrate skin, causing 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

TV60RHD

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



SAFETY WARNING!

Engage the tractor PTO at low engine RPM when operating the TV60 RHD to prevent premature failure of hydraulic system components.



SAFETY WARNING!

HIGH-PRESSURE FLUID HAZARD!

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

Set-Up and Operation



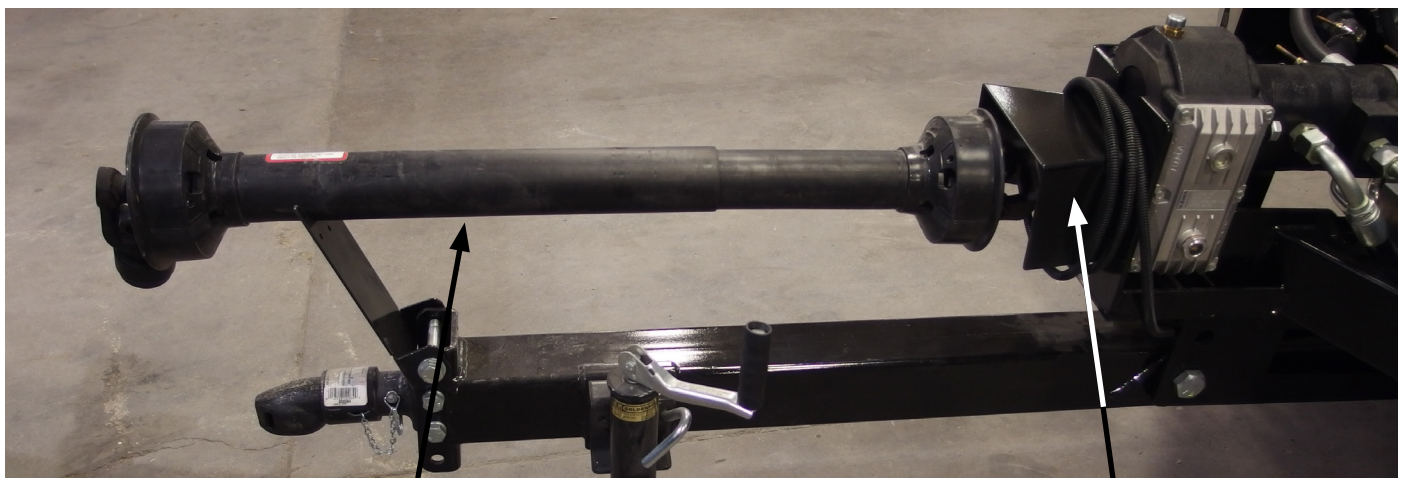
SAFETY WARNING!



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

TV60RHD

1. Before using the **TV60RHD** for the first time, install the battery cable onto the tractor battery to supply power to the unit's valve and RF receiver. Connect the black wire of the cable to the negative terminal and the red wire (with 30 amp fuse) to the positive terminal of the battery. When using more than one tractor, other power cords may be ordered (p/n 935017).
2. Attach the unit to a tractor with a PTO. Be sure that the Turbo Vac is level with the ground. (Refer to Adjustments section.)
3. Attach the PTO shaft to the tractor's PTO.
4. Make certain that the case drain hose is on top of the pump and in a vertical position when attached to the tractor.
5. Plug quick connector on battery cable to the quick connector located on the tongue of the **TV60RHD**.
6. Engage tractor PTO and set to 540 RPM.



540 RPM PTO Shaft

1:4 Ratio Gearbox

Starting Operation



SAFETY WARNING!

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

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. The tractor PTO must be engaged for the blower to function on the **TV60 RHD**.
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

TV60RHD

1. Push the BROOM switch only on the remote control to turn off the broom.

Note: The BLOWER switch is not used on the **TV60RHD** remote control.

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



SAFETY WARNING!

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

Unloading Hopper

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



SAFETY WARNING!

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

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

Check overhead clearance during use.

Clearance is: 7' 6" for sweeping
 8' 6" for dumping

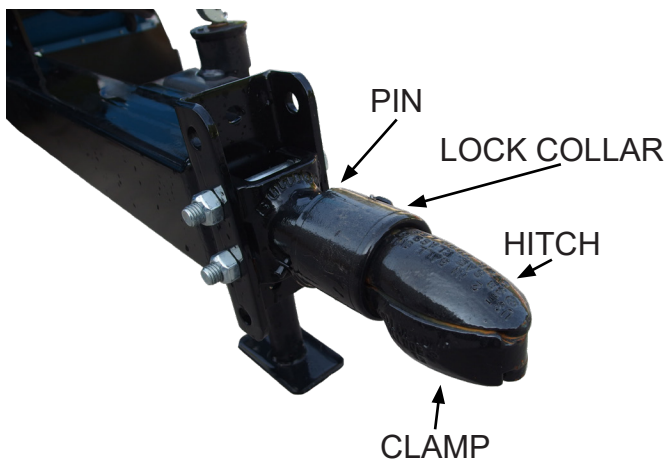
Towing



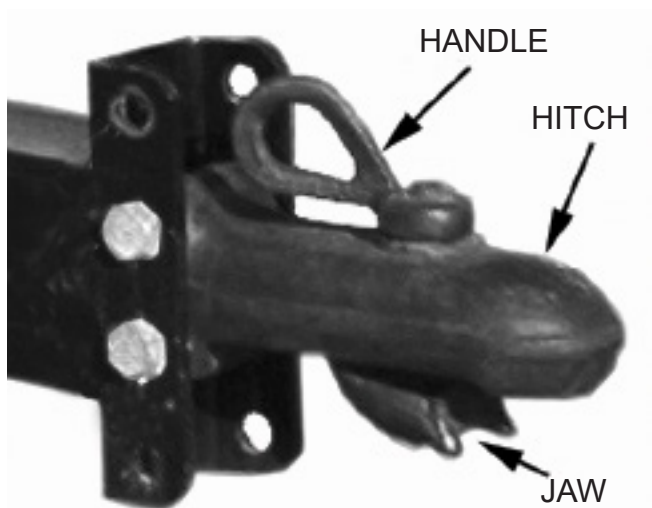
SAFETY WARNING!

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

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



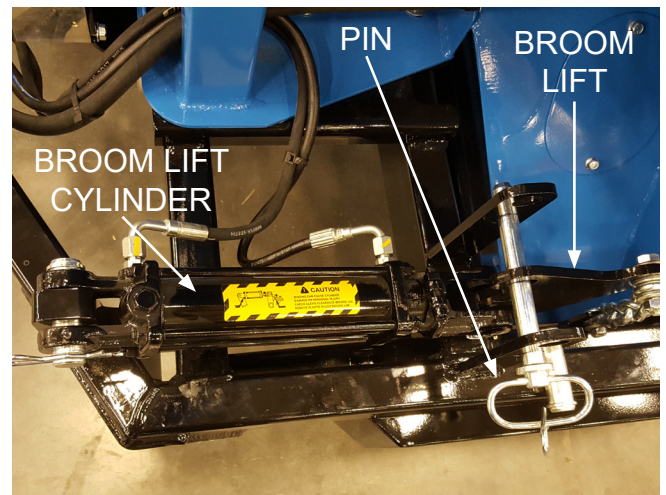
- For the jaw-type displayed in the following photograph, turn the handle until the jaw closes completely around the ball.



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



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

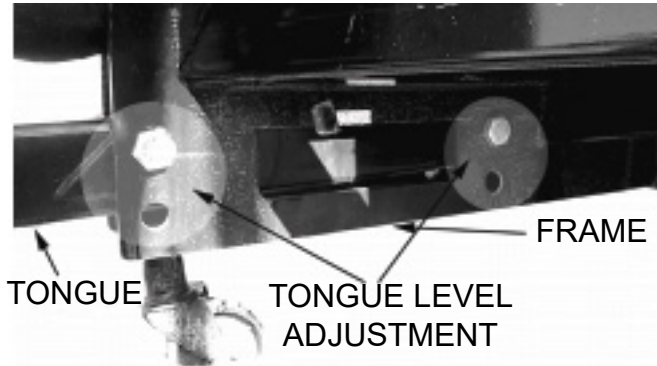


- Tire pressure should be 30-32 psi and equal in both tires.
- Make sure the wheel lug nuts are tight.

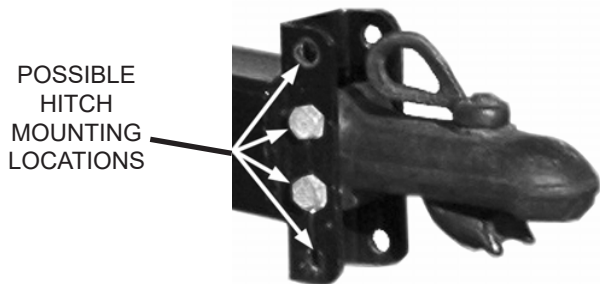
Adjustments

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.

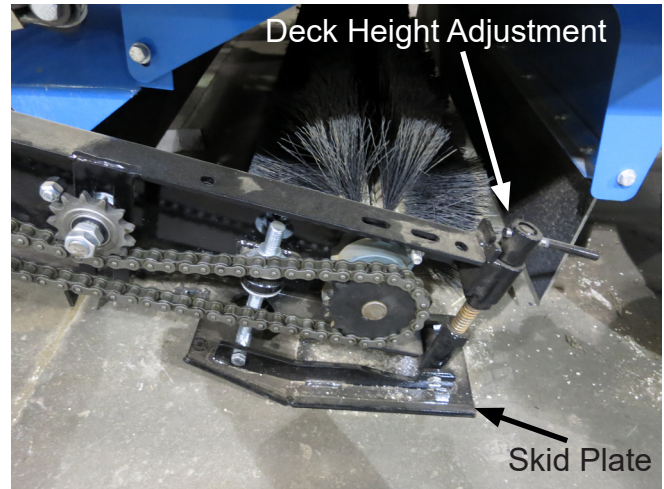


- The hitches on different tow vehicles vary in height, so there are adjustments on the hitch and the tongue to keep the Turbo Vac level.



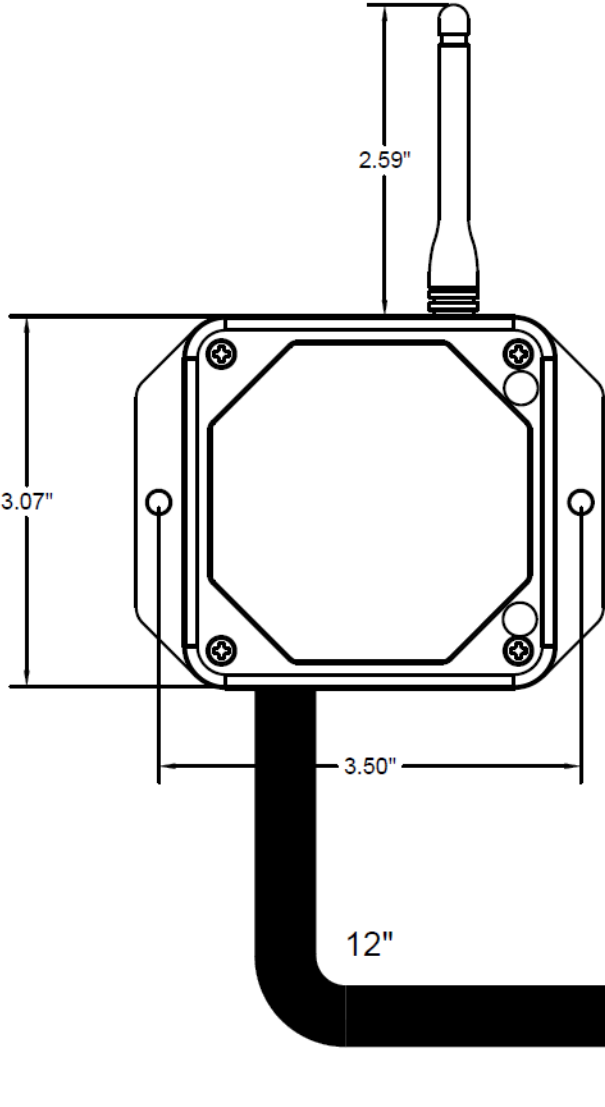
Deck Height

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



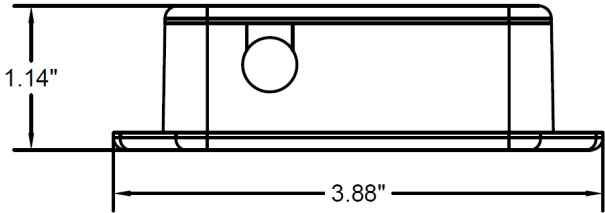
- Deck height is easily adjusted tightening or loosening the deck height adjustment tool that is attached.
- Make sure that both skid plates (one per side of unit) are adjusted the same so the deck stays level.

Remote and Receiver



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

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



CONN:055-157-1200 CABLE: 020-050-1218	
PIN	DESCRIPTION
1	POWER (9-30V)
2	GROUND
3	OUTPUT A
4	OUTPUT B
5	OUTPUT C
6	OUTPUT D
7	OUTPUT E
8	OUTPUT F
9	OUTPUT I
10	OUTPUT G
11	OUTPUT H
12	INPUT J

Operation

- Turn on the transmitter, press and hold the POWER button for at least 2 seconds and release.
- To turn the transmitter off, press and hold the POWER button until the LEDs stop blinking.
- The transmitter is designed with a power saving feature which turns the transmitter off after 15 minutes irrespective of receiver status.
- Transmitter and receiver have red and green LEDs. The green LED will double blink when no buttons are pressed, blink rapidly when a synched button is pressed, and will blink slowly if there is no communication (i.e. - no power to the receiver) when a button is pressed.
- The red LED on the receiver will blink if there is a shorted or open output.
- The transmitter's red LED blinks 1 time per second if the battery is low and needs charging.
- If transmitter is powered off or goes out of range outputs will turn off and be disabled until power on and in range.

Synchronizing Transmitter and Receiver

Each transmitter and receiver pair is synchronized together at the factory. If a new transmitter is needed, synchronizing is required. Use the following procedure:

1. Turn both transmitter and receiver off.
2. With the transmitter off, press and hold the POWER button for more than 10 seconds. LEDs start blinking.
3. Release buttons.
4. Apply power to receiver.
5. Wait for 5 seconds or until just the green LED on the transmitter blinks rapidly.
6. Teach complete.

Sleep Time

All transmitters have the ability to change the sleep time from the default to user's preference. The transmitter is factory set to turn off (sleep) after 15 minutes irrespective of receiver status. To change the time the transmitter waits before going to sleep, use the following procedure:

1. With the transmitter off, press and hold buttons RAISE BROOM, LOWER BROOM, BROOM ON/OFF, & POWER (~ 5 seconds)
2. At this point, both lights will blink once per second. Release the buttons.
3. On the transmitter, press one of the following buttons to adjust the sleep time:
 - LIFT HOP = 15 minutes
 - LOWER HOP = 30 minutes
 - RAISE BROOM = 60 minutes
 - LOWER BROOM = 120 minutes
 - BROOM ON/OFF = DISABLED
4. Sleep time programming complete.

Cloning Transmitters



SAFETY WARNING



Only one transmitter can be on at a time, they cannot be used simultaneously. Use caution.

Occasionally, it is desired to have more than one transmitter work with a single receiver. This is accomplished by a process called cloning. Cloning allows an additional transmitter (B) to have the same ID code as the original transmitter (A). If this feature is desired, use the following procedure:

1. Make sure both transmitters and the receiver are off.
2. On Transmitter A, press and hold the POWER button for 10 seconds until LEDs blink, then release. Green and red LEDs will blink together at this point.
3. On Transmitter B, press and hold buttons LIFT HOP, LOWER HOP, and POWER simultaneously until both LEDs blink.

4. Wait for a few seconds until the green LED starts to blink on both transmitter A and transmitter B.
5. Turn both the transmitters off.
6. Synchronize one of the transmitters to the receiver using SYNCHRONIZING TRANSMITTER AND RECEIVER instructions.

If the cloning feature has been invoked and is no longer desired, the ID code of one of the transmitters needs to be changed. This will unclone the transmitters. If this is desired, use the following procedure:

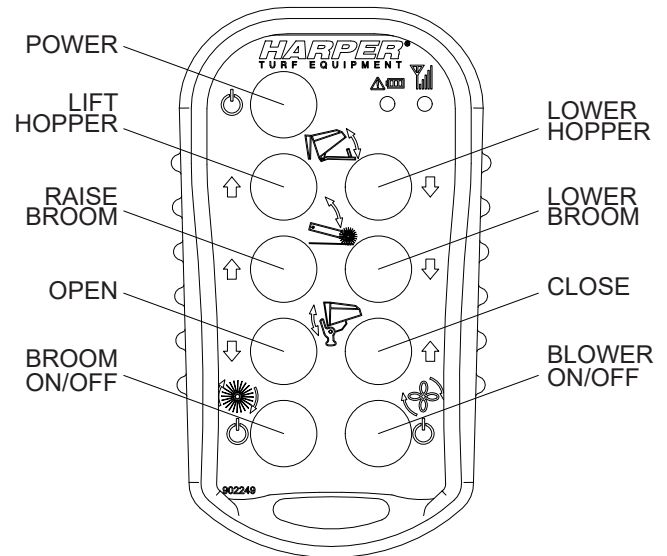
- Make sure the transmitter is off.
- Press and hold hold LOWER HOP, RAISE BROOM, BLOWER ON/OFF and POWER buttons for 5 seconds.
- Release all the buttons when GREEN and RED LEDs start toggling.
- Press any button and release. GREEN LED should start to double-blink.
- ID change Sequence complete.

SPECIFICATIONS

- RF: 2.4GHz FHSS 100mW
- Temperature:
 - o Receiver: -40 to +85°C
 - o Transmitter: -20 to 60°C
- Transmitter Power: 3.7V LiPo rechargeable battery, Battery life: 30-40 hours continuous
- Micro-USB Charger Port
- Receiver Power: 9-30V DC

SN: 25A49+ come standard with the 2.4GHz remote systems. Old remote systems and the 2.4 GHz components are NOT compatible.

BUTTON PRESS	ENGAGE OUTPUTS
LOWER HOPPER	A
LIFT HOPPER	B
LOWER BROOM	C
RAISE BROOM	D
CLOSE	E
OPEN	F
BLOWER ON/OFF	G (LATCHING)
BROOM ON/OFF	H (LATCHING)



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

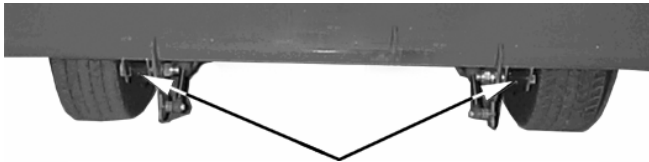
After the first hour of use:

- 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

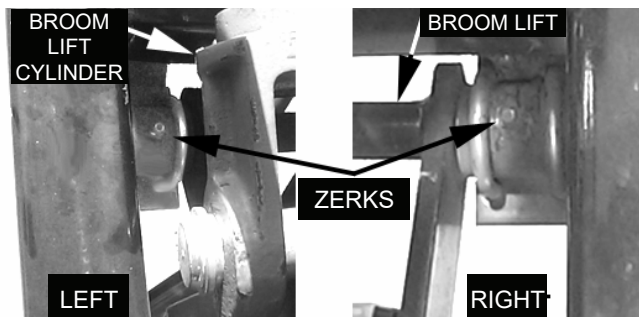
Ten grease zerks in the following locations should be greased daily to reduce wear:

- Hopper door latches (2)



HOPPER DOOR LATCH ZERKS

- Broom lift (2)



- Blower shaft (2)
ZERKS ON BLOWER SHAFT



- Rotor shaft (2) - one per side
- Deck Hinge Shaft (2) - one per side



Deck Hinge Shaft

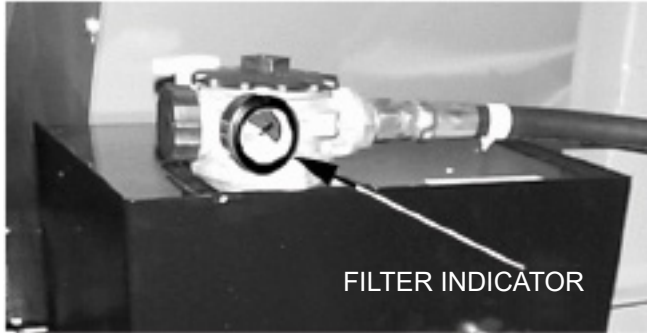
Rotor Shaft

* Located behind frame and must be turned until its visible.

- Replace the safety shields before operating the Turbo Vac.

TV60RHD Hydraulic Oil Reservoir

- The **TV60RHD** is equipped with a HYDAC hydraulic oil filter assembly that is designed for a long service life.
- Monitor the needle in the filter indicator daily. The element (Part no. 822002) does not need replaced until the needle is in the red portion of the gauge.

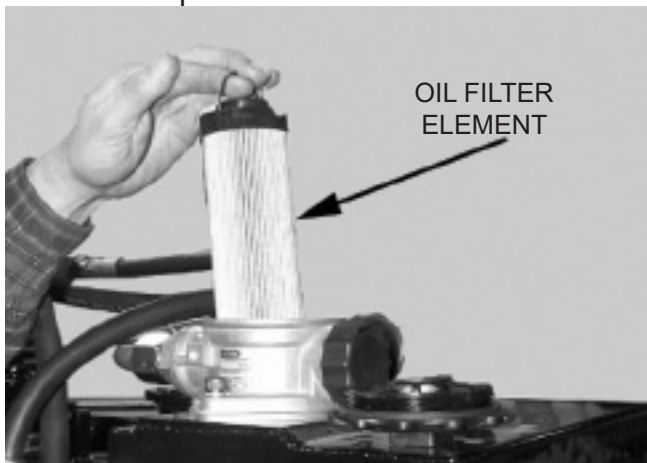


- To replace the element, unscrew the cover, remove the old element and insert the new one.
- Replace hydraulic oil every **500 hours**.

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

To add hydraulic oil to a **TV60RHD** reservoir:

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



SAFETY WARNING!



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

Hydraulic System

- The hydraulic system of the **TV60RHD** is filled at the factory with Crown AW46 hydraulic oil that has an ISO of 46.
- The **TV60RHD** 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.

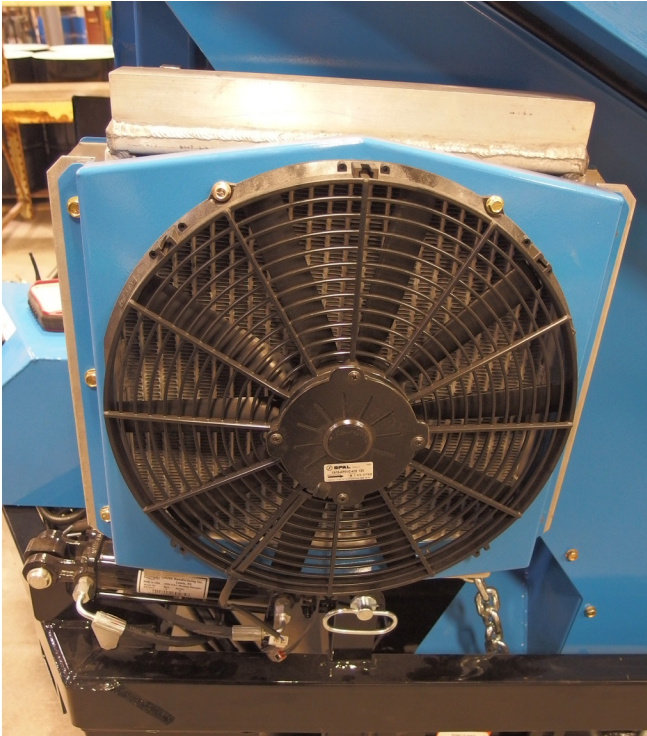
Appropriate replacements:

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 Univas N 46
- Pennzoil AWX MV 46
- Shell Tellus 52 M46
- Shell Tellus 52 V46
- Texaco Rando HDZ 46

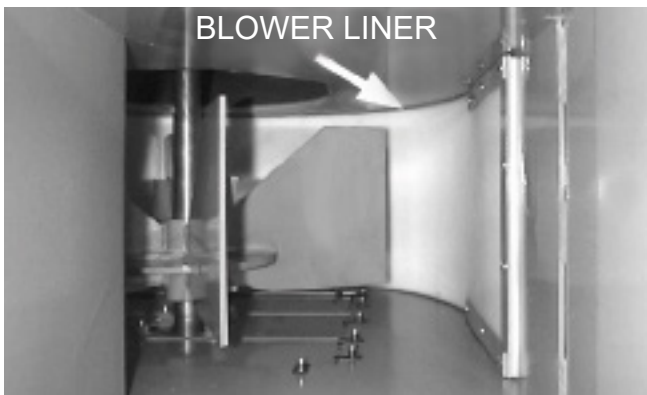
TV60RHD Hydraulic Oil Cooler

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



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.

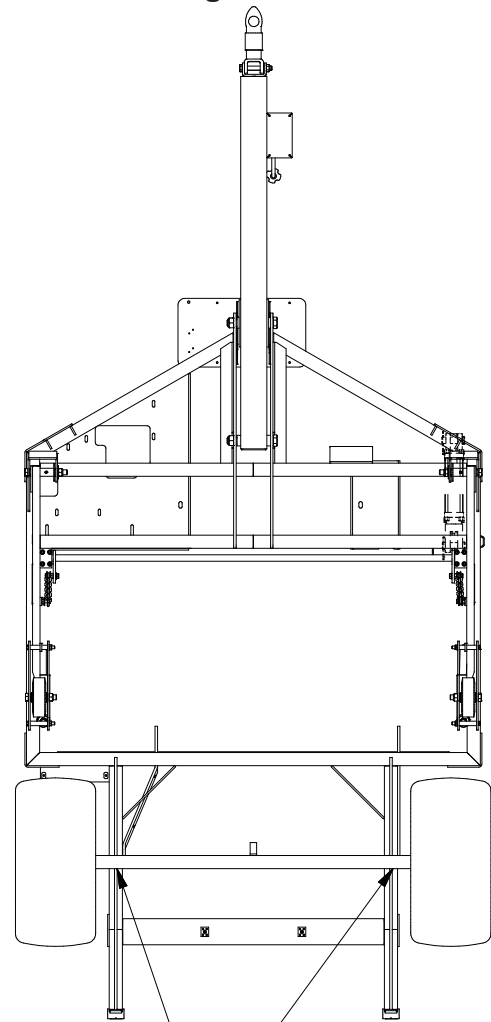
- Check the blower liner located around the inside of the blower housing.
- If the blower liner is damaged or worn through, replace it before damage is done to the blower housing.



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.

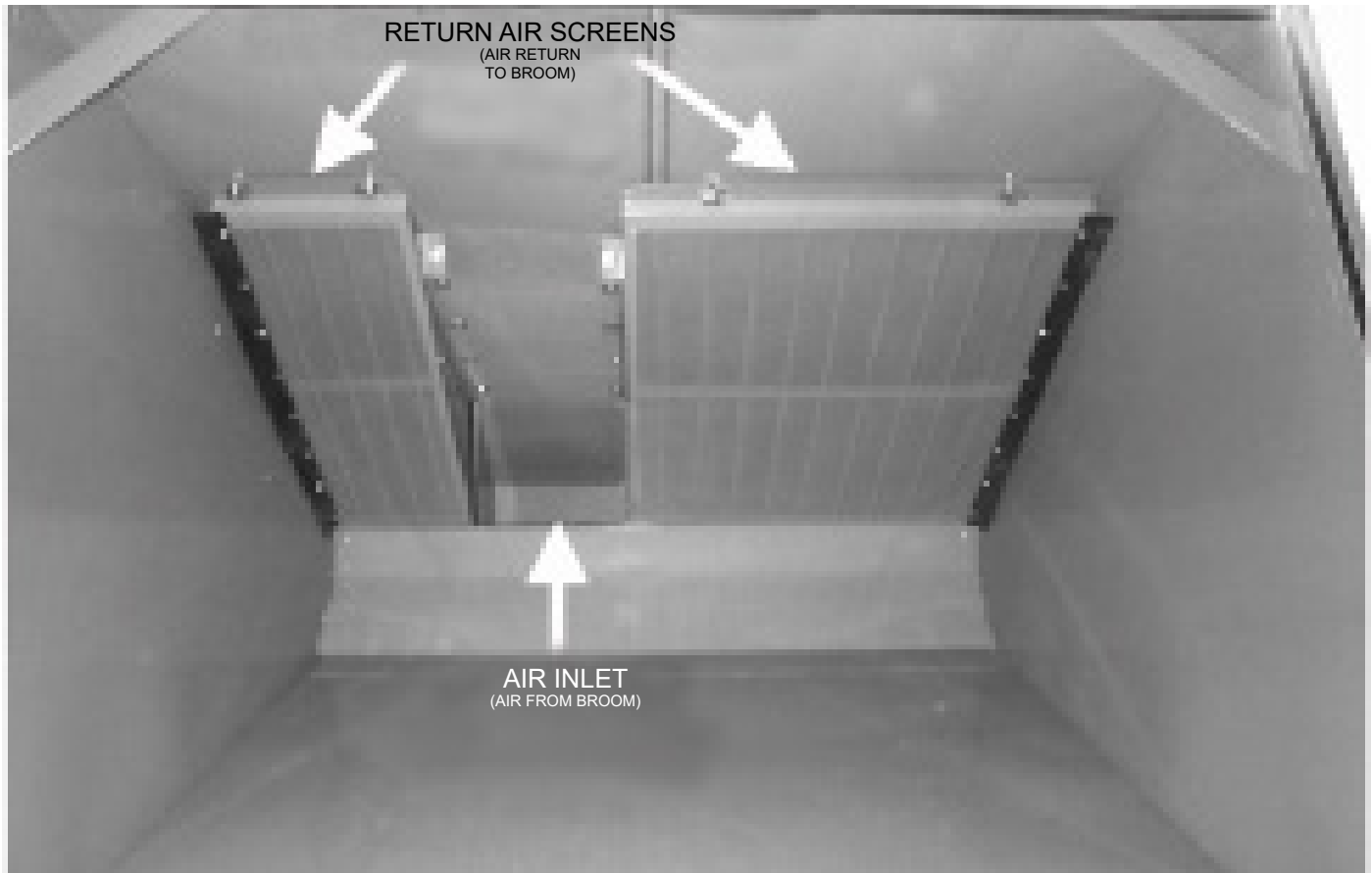
When working under the hopper the cylinder safety lock should be engaged to prevent the hopper from falling.

Lift Points for Servicing Wheels



**PLACE JACK UNDER
AXLE SUPPORT**

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.

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



SAFETY WARNING!

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

TV60RHD Service Schedule

Daily

Check hydraulic oil level.....	Crown AW46 or equivalent
Check hydraulic oil filter indicator.....	Change filter element when needle is in red portion of gauge.*
Check hydraulic oil cooler.....	Clean as necessary.
Visually inspect belts, bolts, fittings, and hoses	Tighten or replace if necessary.
Grease.....	See Service & Maintenance Section.
Check tire pressure.....	Inflate to 30-32 psi.

After first 50 hours

Change 1:4 ratio gear box oil.....	SAE90, 2.43 qts (2.3L)
------------------------------------	------------------------

Annually or 500 Hours

Change hydraulic oil.....	20 gallons
Change 1:4 ratio gear box oil.....	SAE90, 2.43 qts (2.3L)

• The TV60RHD is equipped with a Hydac, 10 micron, beta rated, hydraulic filter and is designed for a long service life. When the hydraulic oil is warm and the indicator needle is in the red portion of the gauge, the filter needs to be changed.

Standard Torque Chart

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



SAFETY WARNING!



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

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

Hydraulic System:	
Problem: Hydraulic function will not respond or hold its position	What to Check: • RF receiver or transmitter malfunctioning • Hydraulic cylinder seals worn, replace them

Parts

TV60RHD



TV60R

Table of Contents

PARTS SECTION

Structure

Frame Assy.....	31-32
Wheel Assy.....	33
Deck Arms Assy.....	34
Attaching Deck Arms.....	35
Blower Housing Assy.....	36
Fan Assy.....	37
Fan Shaft Assy.....	38
Fan Housing Assy.....	39
Blower Housing Installation.....	40
Fan Housing Installation.....	41
Air Return.....	42
Seal & Trim Installation.....	43
Hopper Assembly.....	44
Site Window Installation.....	45
Screen Installation.....	46
Lift Lock Installation.....	48
Door Latch Installation.....	49
Door Installation.....	50
Door Assy.....	51

Hydraulics

Hydraulic Installation.....	53
PTO Pump & Drive Assy.....	54
Hydraulic Reservoir.....	55
Oil Cooler Assy.....	56
Fan Drive Hydraulics.....	57
Deck Drive Hydraulics.....	58
Implement Drive Hydraulics.....	59
Implement Valve Assy.....	60
Fan & Deck Valve.....	61
Hydraulic Schematic.....	62

Electrical

Control Panel Assy.....	64
Wiring Schematic w/Kar-Tech Remote.....	65

Final Installation

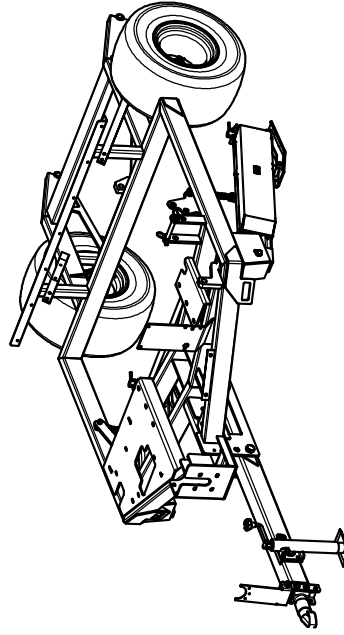
Export Kit.....	66
Decal Installation Left.....	68
Decal Installation Right.....	69
Decal Installation General.....	70

Attachments

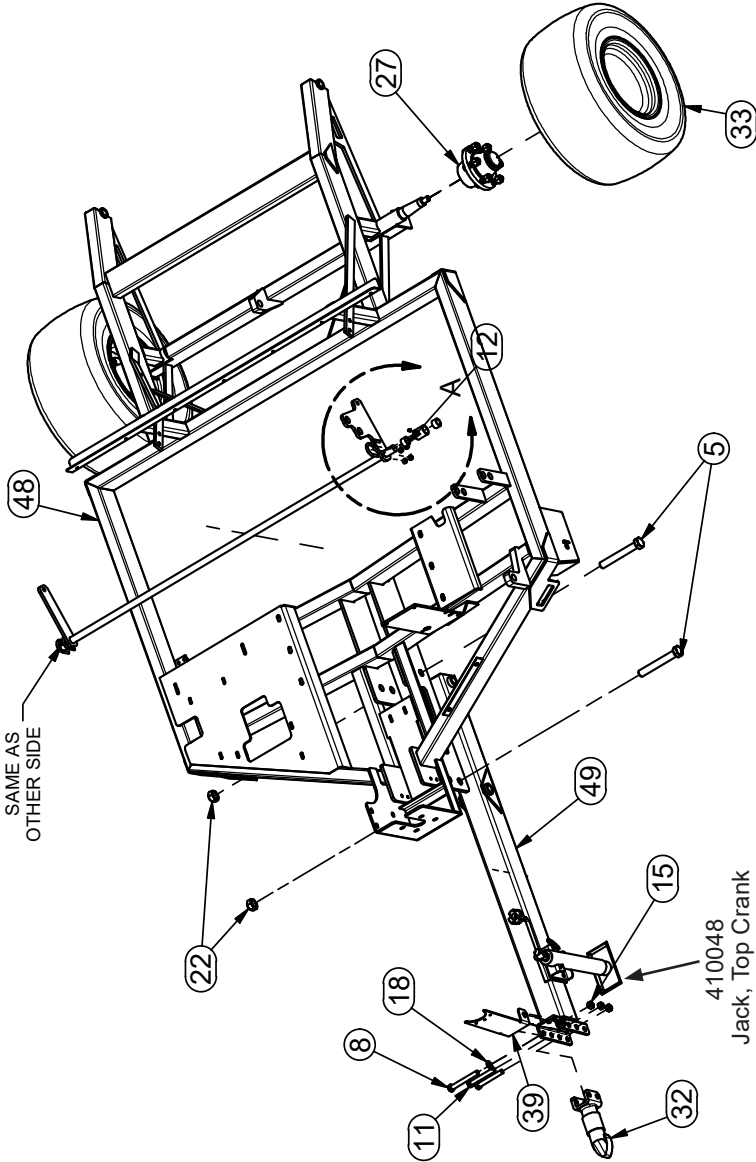
Verticutter Kit.....	71
Verticutter Carbide Tip Kit.....	72
Finger Rotor Kit.....	73
Broom Kit (22A01+).....	74
Broom Kit (Older-21A99).....	75
Brush Assy.....	76
Obsoleted Brush.....	77

Parts List				Parts List				Parts List				975431	REV: H
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION		
1	1	102015	HITCH PIN, 3/4 X 6 W/KEEPER	17	8	110662	WASHER, 1/2" FLAT SPECIAL 1.250d	33	2	943053	Tire & Wheel Assy, 26" Grassmaster		
2	6	110039	NUT, 5/8-11 JAM	18	2	110663	WASHER, 5/8" FLAT SAE	34	2	970370	BROOM LIFT BUSHING		
3	2	110320	NUT, 3/4-10 NYLOCK	19	2	110677	WASHER, 3/4" FLAT STANDARD	35	2	970841	CHAIN, DECK LIFT, 3/8 X 8 LINKS		
4	4	110362	U-BOLT, 5/16	20	4	110768	NUT, 7/16-14 LOCK 2-WAY	36	2	970855	BUSHING, ADJUSTABLE SKID		
5	2	110364	BOLT, 1-8 X 7.0	21	1	110895	Bolt, 5/8-11 X 3 in Carriage	37	2	970857	HANDLE, .375 X 4.25		
6	2	110379	BOLT, 1/2-13 X 2.0	22	2	111226	NUT, 1-8, UNITORQUE LOCK	38	1	970862	SPACER, IDLER SPROCKET		
7	2	110383	BOLT, 3/4-10 X 6.0	23	2	111230	WASHER, 3/4" FLAT STANDARD Gr	39	1	970863	BRKT, PTO SHAFT HOLDER		
8	1	110407	BOLT, 5/8-11 X 5.0				8	40	2	975015	WELDMENT, HEIGHT ADJUSTMENT		
9	5	110437	BOLT, 3/8-16 X 0.75, WIZ FLANGE	24	2	112070	Bolt, 1/2-13 X 1.25 in Carriage	41	1	975098	BROOM LIFT WELDMENT		
10	4	110527	BOLT, 7/16-14 X 4.0	25	4	112104	ROLL PIN, 1/8 X 0.5625	42	2	975144	WELDMENT, TV60 VERTICUT SKID		
11	2	110562	BOLT, 5/8-11 X 4.5	26	2	140016	PIN, LOCK, 1/4 X 2-1/4, SQ WIRE	43	2	975145	MOUNT, ADJUSTABLE SKID		
12	8	110606	NUT, 5/16-18 WIZ FLANGE	27	2	413001	HUB COMPLETE, 35-6LM	44	1	975146	WELDMENT, TV60HD RH ARM		
13	2	110613	NUT, 3/4-16, CASTLE	28	4	510174	GREASE ZERK, 1/4-28 ST	45	1	975147	WELDMENT, TV60HD LH ARM		
14	4	110615	NUT, 1/2-13, UNITORQUE LOCK	29	2	510175	COTTER PIN, 3/16 X 2	46	2	975148	WELDMENT, ADJUSTABLE SCREW		
15	3	110639	NUT, 5/8-11, UNITORQUE LOCK	30	4	800128	BUSHING, IGUS, FOOT PEDAL	47	1	975194	Assy, Chain Shield w/Decal		
16	4	110650	WASHER, 5/8" FLAT STANDARD	31	4	922006	BUSHING, 1.75 X 1 X .75	48	1	975435	FRAME WELDMENT, TV60R HD		
				32	1	942184	COUPLER, 2" FORGED 7000#	49	1	975436	WELDMENT, TV60R HD HITCH		

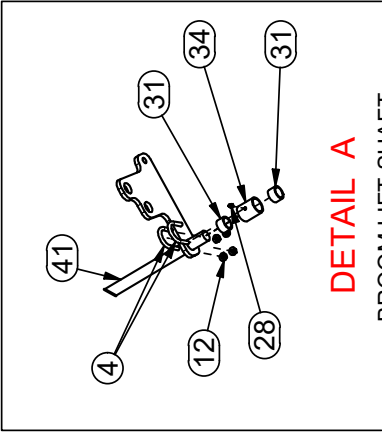
TV60RHD FRAME ASSEMBLY



FRAME ASSEMBLY



SEE WHEEL ASSY
FOR MORE DETAILS

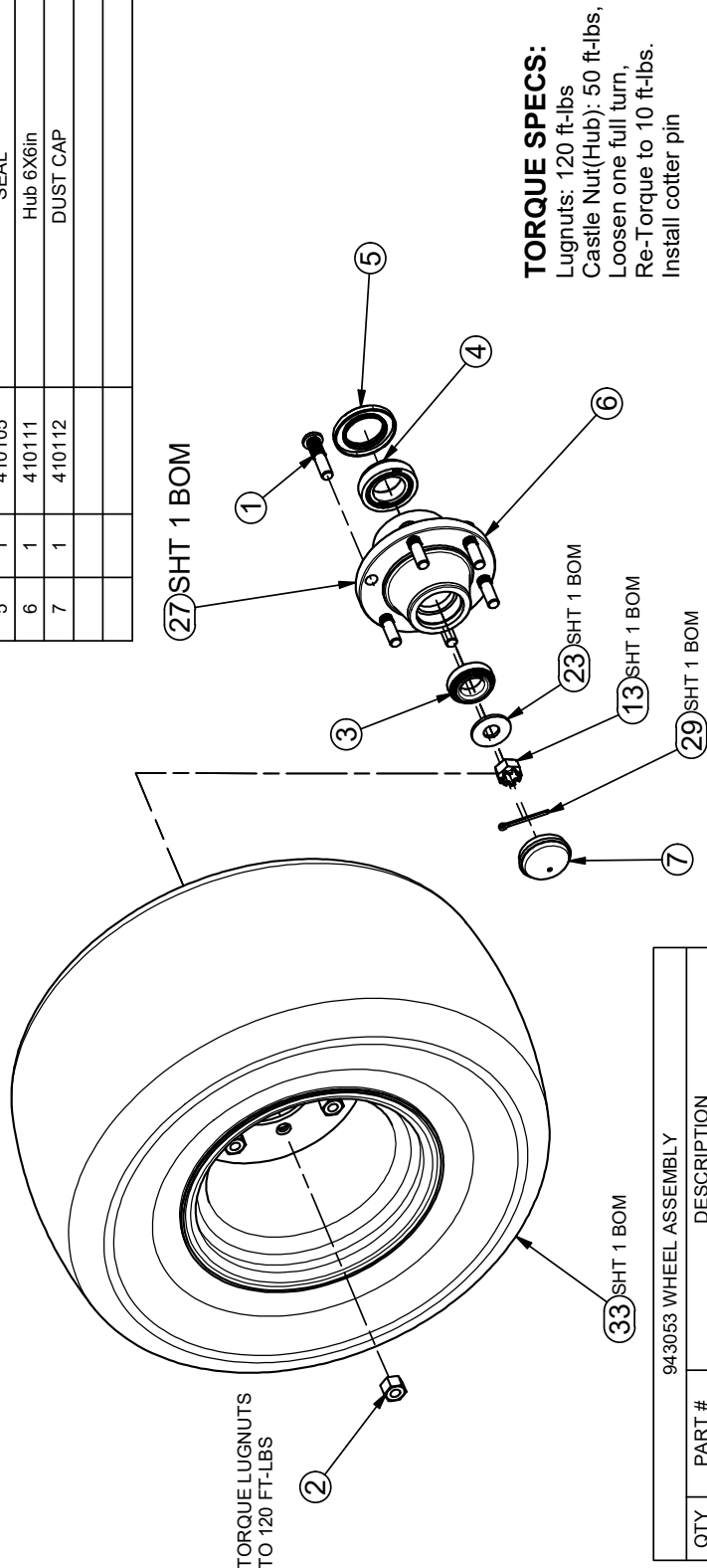


DETAIL A
BROOM LIFT SHAFT
ASSEMBLY VIEW

Parts List			
ITEM	QTY	PART #	DESCRIPTION
4	4	110362	U-BOLT, 5/16
5	2	110364	BOLT, 1-8 X 7.0
8	1	110407	BOLT, 5/8-11 X 5.0
11	2	110562	BOLT, 5/8-11 X 4.5
12	8	110606	NUT, 5/16-18 WIZ FLANGE
15	3	110639	NUT, 5/8-11, UNITORQUE LOCK
18	2	110663	WASHER, 5/8" FLAT SAE
22	2	111226	NUT, 1-8, UNITORQUE LOCK
27	2	413001	HUB COMPLETE, 35-6LM
28	4	510174	GREASE ZERK, 1/4-28 ST
31	4	922006	BUSHING, 1.75 X 1 X .75
32	1	942184	COUPLER, 2" FORGED 7000#
33	2	943053	Tire & Wheel Assy, 26" Grassmaster
34	2	970370	BROOM LIFT BUSHING
39	1	970863	BRKT, PTO SHAFT HOLDER
41	1	975098	BROOM LIFT WELDMENT
48	1	975435	FRAME WELDMENT, TV60R HD
49	1	975436	WELDMENT, TV60R HD HITCH

WHEEL ASSEMBLY

413001 HUB ASSEMBLY			
ITEM	QTY	PART #	DESCRIPTION
1	6	113006	Stud 9/16-18
2	6	113007	Nut 9/16-18
3	1	410115	Bearing 2.328 x .465
4	1	410114	Bearing 2.8910 x .58
5	1	410105	SEAL
6	1	410111	Hub 6X6in
7	1	410112	DUST CAP



TORQUE SPECS:
Lugnuts: 120 ft-lbs
Castle Nut(Hub): 50 ft-lbs,
Loosen one full turn,
Re-Torque to 10 ft-lbs.
Install cotter pin

943053 WHEEL ASSEMBLY		
QTY	PART #	DESCRIPTION
1	342020	TIRE, 26x12x12/6
1	942072	WHEEL, 12 X 10-1/2, 6 ON 6", White, w/ -2/0 Offset

RADIAL TIRE ASSEMBLY
OPTION AVAILABLE
ASSEMBLY: P/N 943013
WHEEL: P/N 410107
TIRE: P/N 942090

975431

REV: H

Parts List		Parts List	
ITEM	QTY	PART #	DESCRIPTION
2	6	110039	NUT, 5/8-11 JAM
10	4	110527	BOLT, 7/16-14 X 4.0
15	3	110639	NUT, 5/8-11, UNITORQUE LOCK
16	4	110650	WASHER, 5/8" FLAT STANDARD
20	4	110768	NUT, 7/16-14 LOCK 2-WAY
21	1	110895	Bolt, 5/8-11 X 3 in Carriage
25	4	112104	ROLL PIN, 1/8 X 0.5625
26	2	140016	PIN, LOCK, 1/4 X 2-1/4, SQ WIRE
28	4	510174	GREASE ZERK, 1/4-28 ST
30	4	800128	BUSHING, IGUS, FOOT PEDAL

DECK ARM ASSEMBLIES

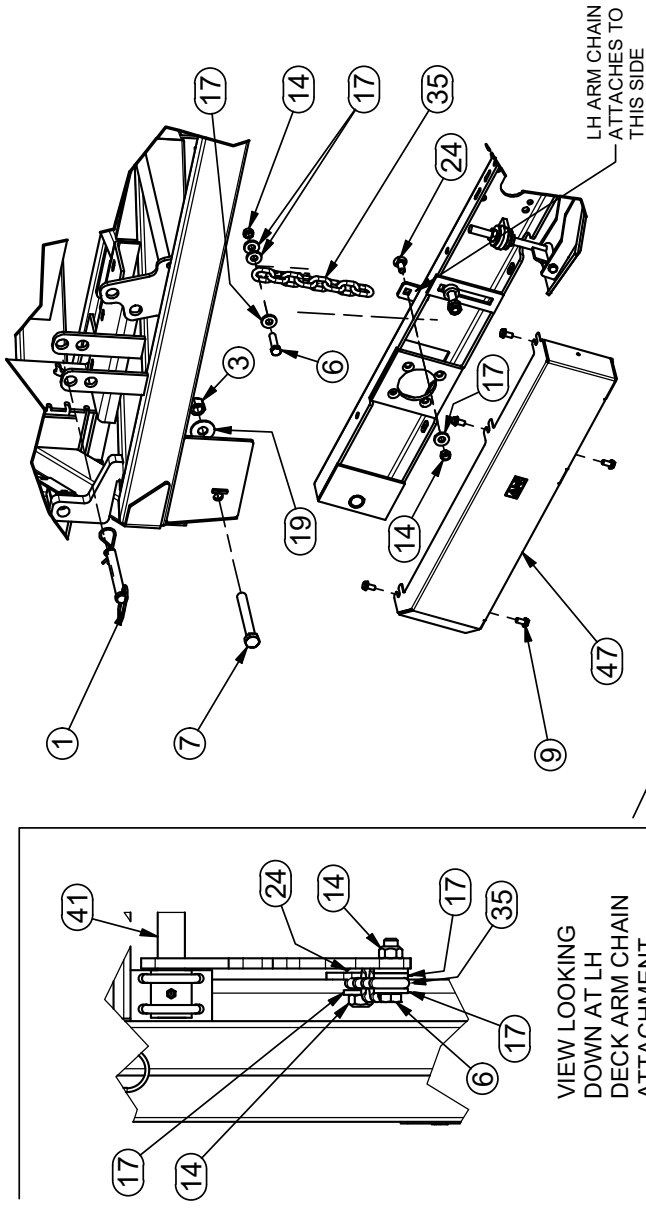
RH DECK ARM

LH DECK ARM
REPEAT ASSEMBLY OF RH ARM

NOTE: INSTALL GREASE ZERK INTO TUBE

VIEW SHOWING SKID
DEPTH SETTINGS

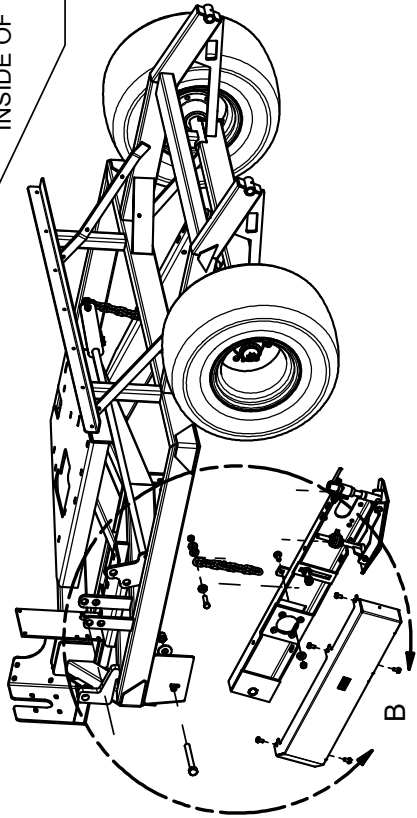
ATTACHING DECK ARMS



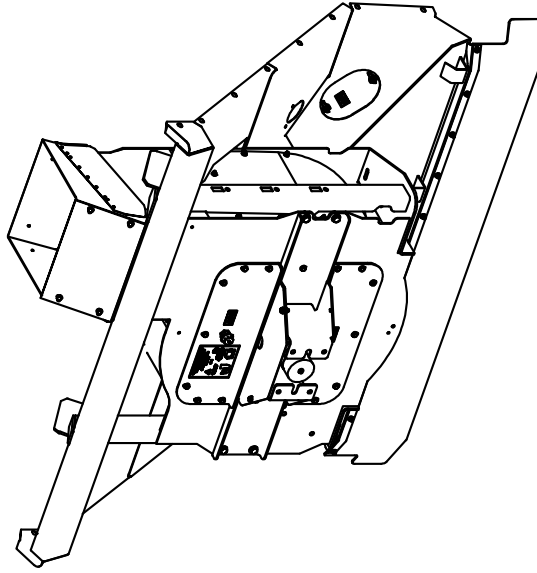
DETAIL B

NOTE: ATTACH RIGHT ARM THE SAME WAY -EXCEPT ATTACH THE CHAIN TO THE INSIDE OF THE TAB FOR CLEARANCE

Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	1	102015	HITCH PIN, 3/4 X 6 W/KEEPER
3	2	110320	NUT, 3/4-10 NYLOCK
6	2	110379	BOLT, 1/2-13 X 2.0
7	2	110383	BOLT, 3/4-10 X 6.0
9	5	110437	BOLT, 3/8-16 X 0.75, WIZ FLANGE
14	4	110615	NUT, 1/2-13, UNITORQUE LOCK
17	8	110662	WASHER, 1/2" FLAT SPECIAL 1.250d
19	2	110677	WASHER, 3/4" FLAT STANDARD
24	2	112070	Bolt, 1/2-13 X 1.25 in Carriage
35	2	970841	CHAIN, DECK LIFT, 3/8 X 8 LINKS
47	1	975194	Assy, Chain Shield w/Decal



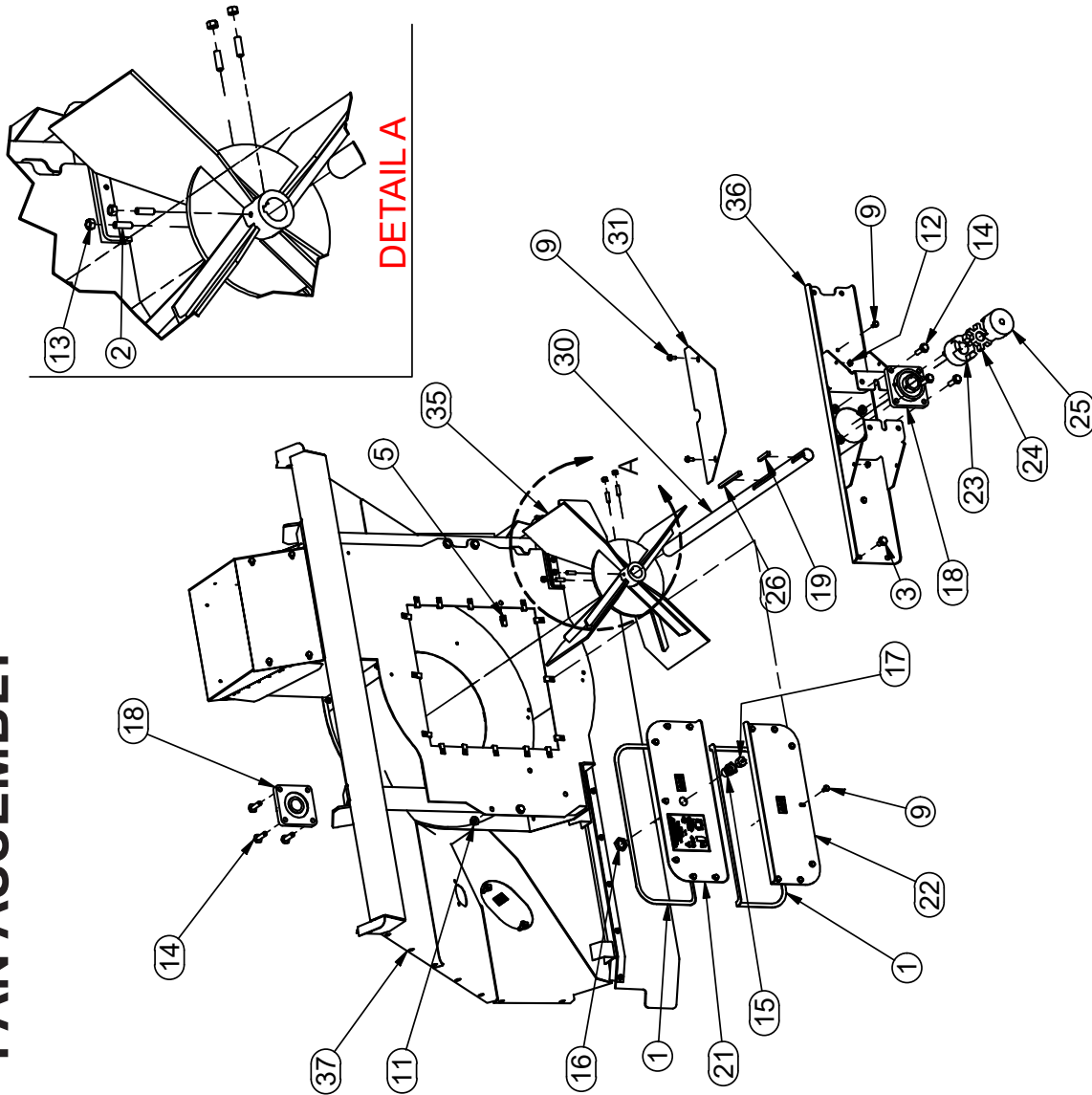
Parts List				Parts List				Parts List			
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	10ft	100613	Seal, .50 X .187	13	4	110826	Nut, 3/8-16 Gr 5	25	1	922098	Coupling, 5/8" Bore, 5/32 Kw
2	4	110093	Setscrew, 3/8-16 X 1.25	14	8	111222	Bolt, 1/2-13 X 1.75, Wiz Flange	26	1	940113	Key, 3/8 X 5
3	4	110220	Bolt, 1/2-13 X 1, Wiz Flange	15	1	302060	Swivel, Garden Hose-To-Pipe	27	1	970086	Clamp Bar
4	23	110290	Nut, 1/4-20 Wiz Flange	16	1	302061	Locknut, 3/4 Npt	28	2	970161	Blower Liner Retainer, Inner
5	24	110319	Nut, 5/16-18 U-Type .75l	17	1	302062	Plug, Garden Hose	29	2	970162	Blower Liner Retainer, Outer
6	12	110326	Bolt, 1/4-20 X 1 In Carriage	18	2	410851	Bearing, 4fng 1 1/2"	30	1	970287	Blower Shaft
7	4	110327	Nut, 5/16-18 Wing	19	1	411120	Key, 3/8 X 3/8 X 2.25	31	1	970508	Fan Motor Shield
8	4	110423	Bolt, 5/16-18 X 1.0	20	2	905122	Assembly, Nozzle Access Cover	32	1	970558	Blower Plate
9	22	110444	Bolt, 5/16-18 X 0.75, Wiz Flange	21	1	905194	Assy, Upper Fan Shield W/Decal	33	1	972008	Debris Flap
10	11	110464	Bolt, 1/4-20 X 1.0	22	1	905195	Assy, Lower Fan Shield W/Decal	34	1	972010	Blower Liner, .250 Uhmw
11	4	110588	Nut, 1/2-13 Wiz Flange	23	1	922068	Hub, Coupling 1-1/2" Bore	35	1	975195	Fan Assy Wldmnt
12	2	110606	Nut, 5/16-18 Wiz Flange	24	1	922069	Lovejoy Coupler Spider	36	1	975101	Bearing Channel
								37	1	975119	Blower Weldment, Tv60hr



BLOWER HOUSING ASSEMBLY

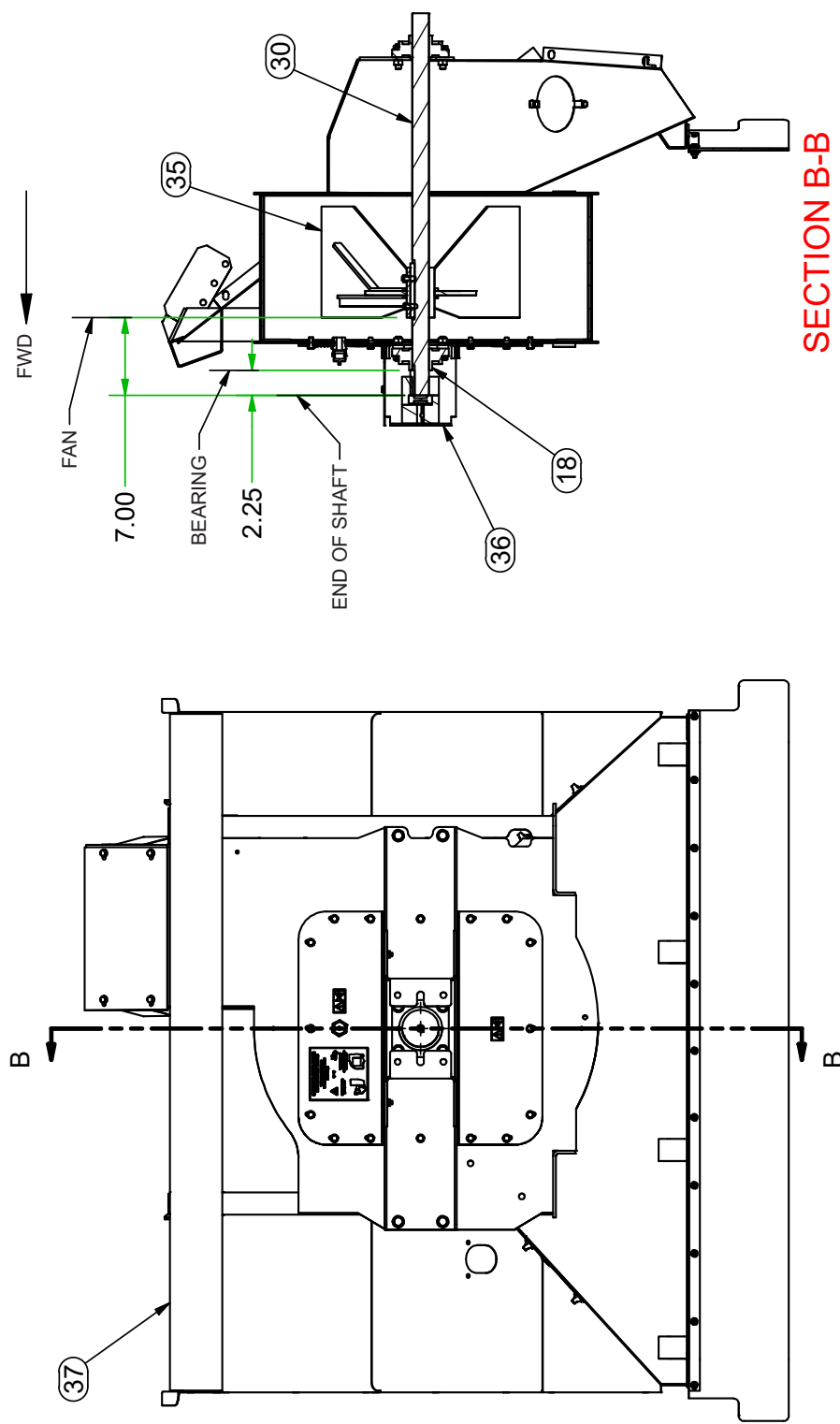
FAN ASSEMBLY

975434 REV: J



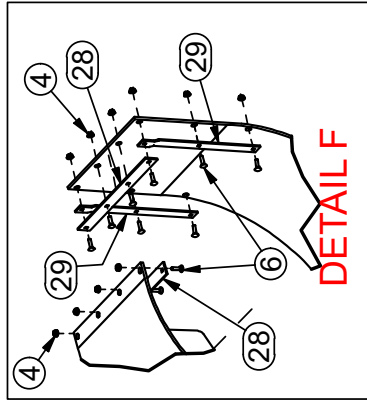
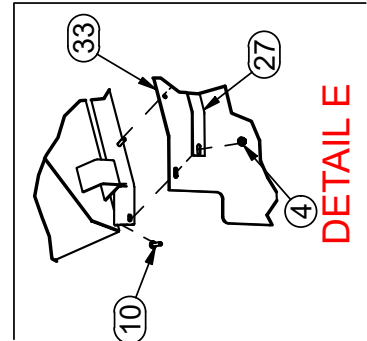
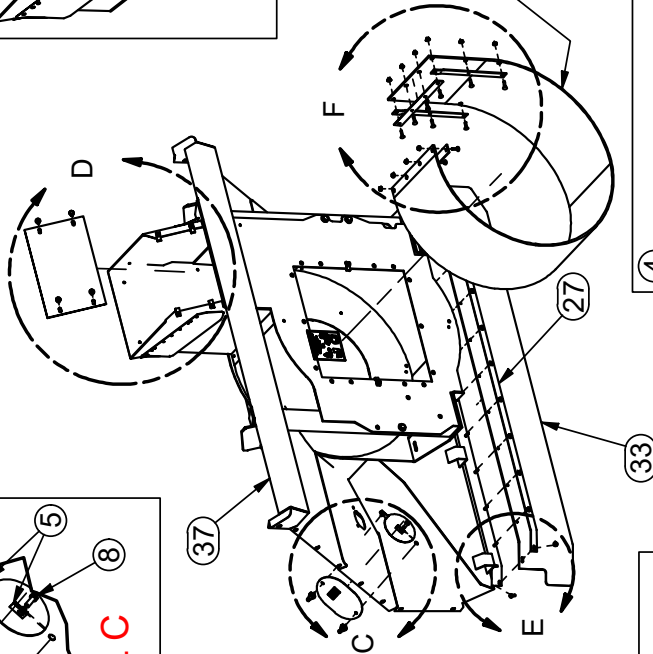
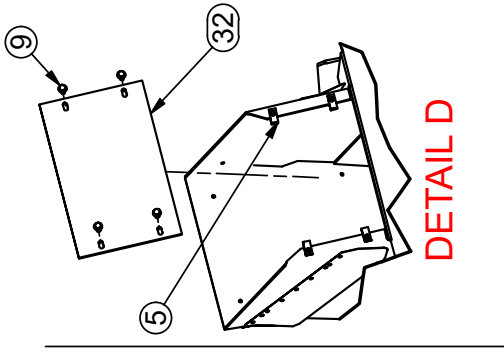
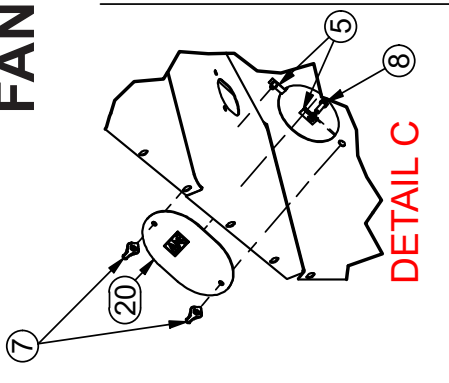
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	10ft	100613	Seal, .50 X .187
2	4	110093	Setscrew, 3/8-16 X 1.25
3	4	110220	Bolt, 1/2-13 X 1, Wiz Flange
5	24	110319	Nut, 5/16-18 U-Type .75l
7	4	110327	Nut, 5/16-18 Wing
8	4	110423	Bolt, 5/16-18 X 1.0
9	22	110444	Bolt, 5/16-18 X 0.75, Wiz Flange
11	4	110588	Nut, 1/2-13 Wiz Flange
12	2	110606	Nut, 5/16-18 Wiz Flange
13	4	110826	Nut, 3/8-16 Gr 5
14	8	111222	Bolt, 1/2-13 X 1.75, Wiz Flange
15	1	302060	Swivel, Garden Hose-To-Pipe
16	1	302061	Locknut, 3/4 Npt
17	1	302062	Plug, Garden Hose
18	2	410851	Bearing, 4fng 1 1/2"
19	1	411120	Key, 3/8 X 3/8 X 2.25
21	1	905194	Assy, Upper Fan Shield W/Decal
22	1	905195	Assy, Lower Fan Shield W/Decal
23	1	922068	Hub, Coupling 1-1/2" Bore
24	1	922069	Lovejoy Coupler Spider
25	1	922098	Coupling, 5/8" Bore, 5/32 Kw
26	1	940113	Key, 3/8 X 5
30	1	970287	Blower Shaft
31	1	970508	Fan Motor Shield
35	1	975195	Fan Assy Wildmnt
36	1	975101	Bearing Channel
37	1	975119	Blower Weldment, Tv60hr

FAN SHAFT ASSEMBLY

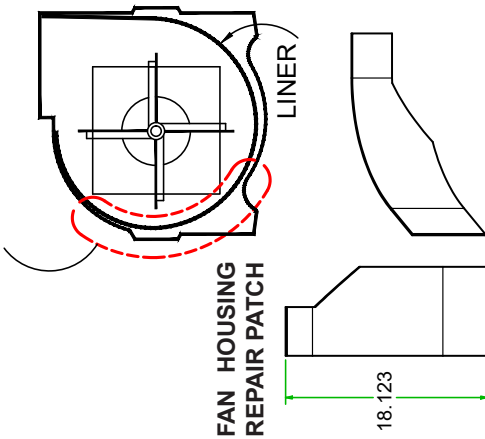


FAN HOUSING ASSEMBLY

(Liner & Debris Flap)



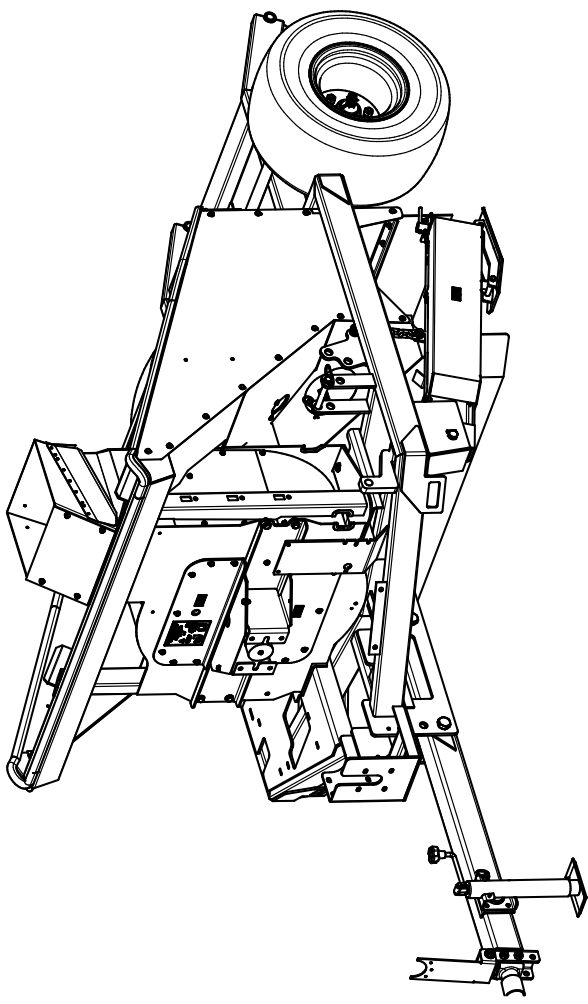
CHECK LINER IN THIS AREA FOR WEAR



IF LINER NOT REPLACED, THE HOUSING WILL WEAR. WELD METAL PATCH 911251 TO REPAIR.

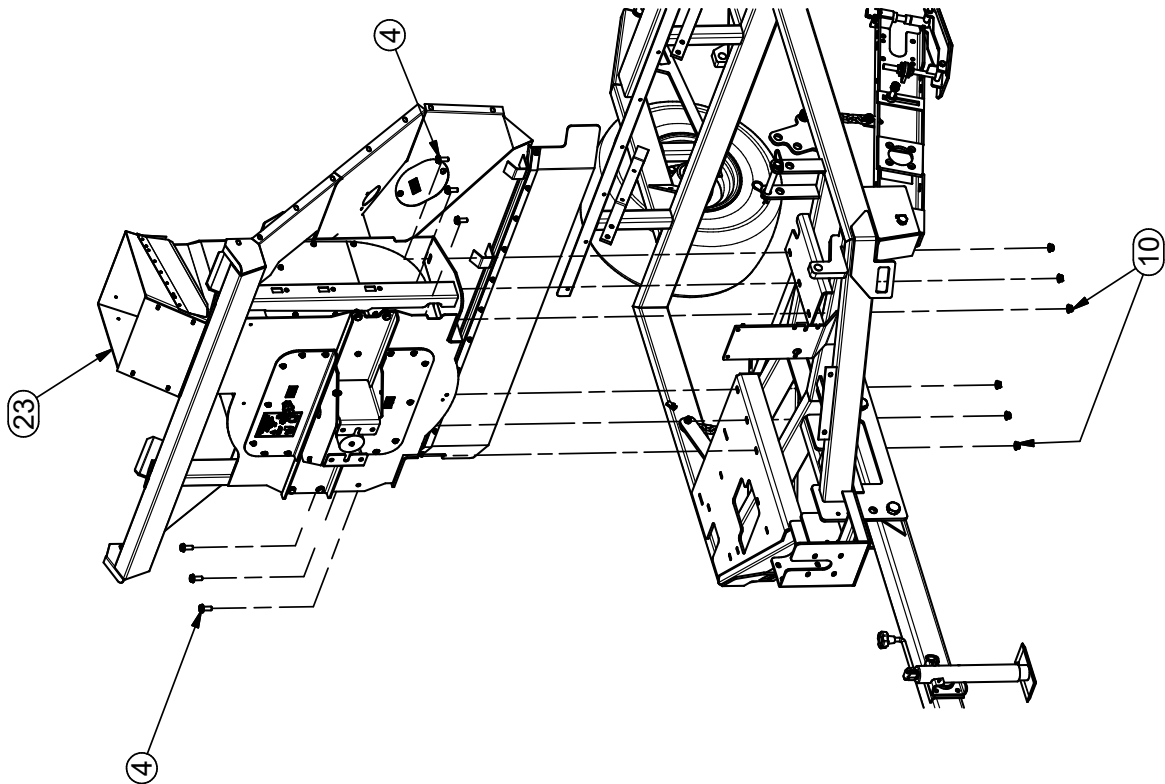
Parts List		
ITEM	QTY	PART # DESCRIPTION
4	23	110290 Nut, 1/4-20 Wiz Flange
5	24	110319 Nut, 5/16-18 U-Type .75l
6	12	110326 Bolt, 1/4-20 X 1 In Carriage
7	4	110327 Nut, 5/16-18 Wing
8	4	110423 Bolt, 5/16-18 X 1.0
9	22	110444 Bolt, 5/16-18 X 0.75, Wiz Flange
10	11	110464 Bolt, 1/4-20 X 1.0
20	2	905122 Assembly, Nozzle Access Cover
27	1	970086 Clamp Bar
28	2	970161 Blower Liner Retainer, Inner
29	2	970162 Blower Liner Retainer, Outer
32	1	970558 Blower Plate
33	1	972008 Debris Flap
34	1	972010 Blower Liner .250 Uhmw
37	1	975119 Blower Weldment, Tv60hr

TV60RHD BLOWER HOUSING INSTALLATION



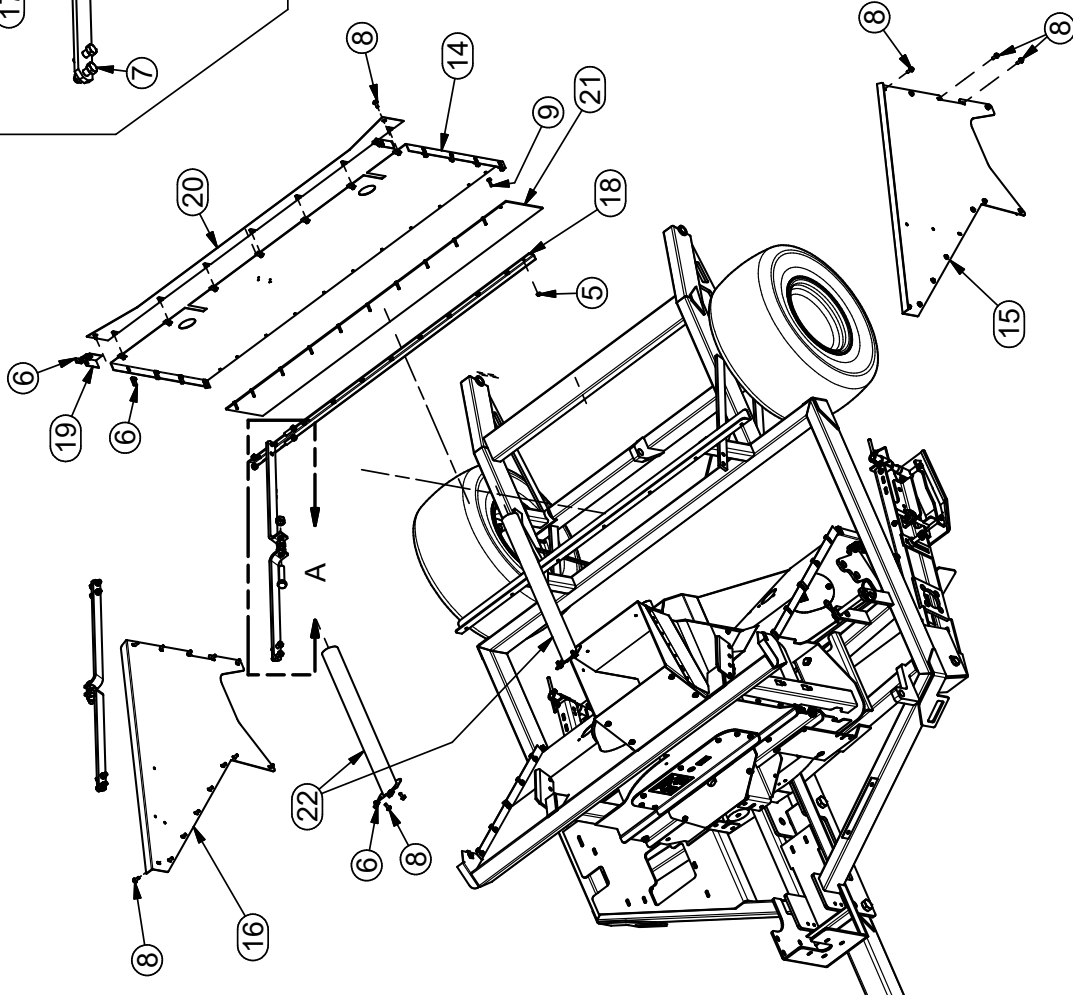
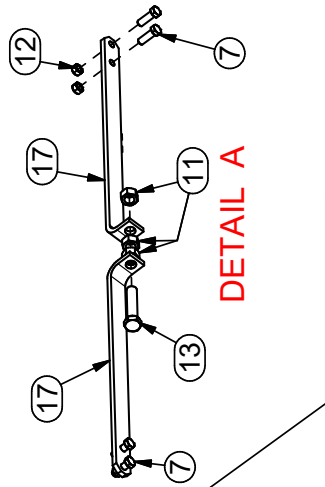
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	6 ft	100360	MOULDING, EDGE, AIR INLET
2	30 in	100365	TRIM, EDGE, .085 TO .210 THICKNESS
3	15 ft	102004	D SEAL, 1.00 X 1.00
4	6	110001	BOLT, 1/2-13 X 1.25, WIZ FLANGE
5	11	110290	NUT, 1/4-20 WIZ FLANGE
6	39	110319	NUT, 5/16-18 U-TYPE .75L
7	8	110429	BOLT, 1/2-13 X 1.5
8	39	110444	BOLT, 5/16-18 X 0.75, WIZ FLANGE
9	11	110464	BOLT, 1/4-20 X 1.0
10	6	110588	NUT, 1/2-13 WIZ FLANGE
11	6	110596	NUT, 3/4-10
12	8	110615	NUT, 1/2-13, UNITORQUE LOCK
13	2	110713	BOLT, 3/4-10 X 3.5 TAP
14	1	970390	BACK AIR RETURN
15	1	970391	LEFT AIR RETURN
16	1	970392	RIGHT AIR RETURN
17	4	970393	TRUSS BAR
18	1	970394	FLAP RETAINER
19	2	970542	ANGLE, AIR RETURN
20	1	970545	REAR SEAL
21	1	970685	DEBRIS FLAP MAIN
22	2	975111	HOSE TUBE
23	1	975434	ASSEMBLY, TV60HD BLOWER HOUSING

FAN HOUSING INSTALLATION



Parts List			
ITEM	QTY	PART #	DESCRIPTION
4	6	110001	BOLT, 1/2-13 X 1.25, WIZ FLANGE
10	6	110588	NUT, 1/2-13 WIZ FLANGE
23	1	975434	ASSEMBLY, TV60HD BLOWER HOUSING

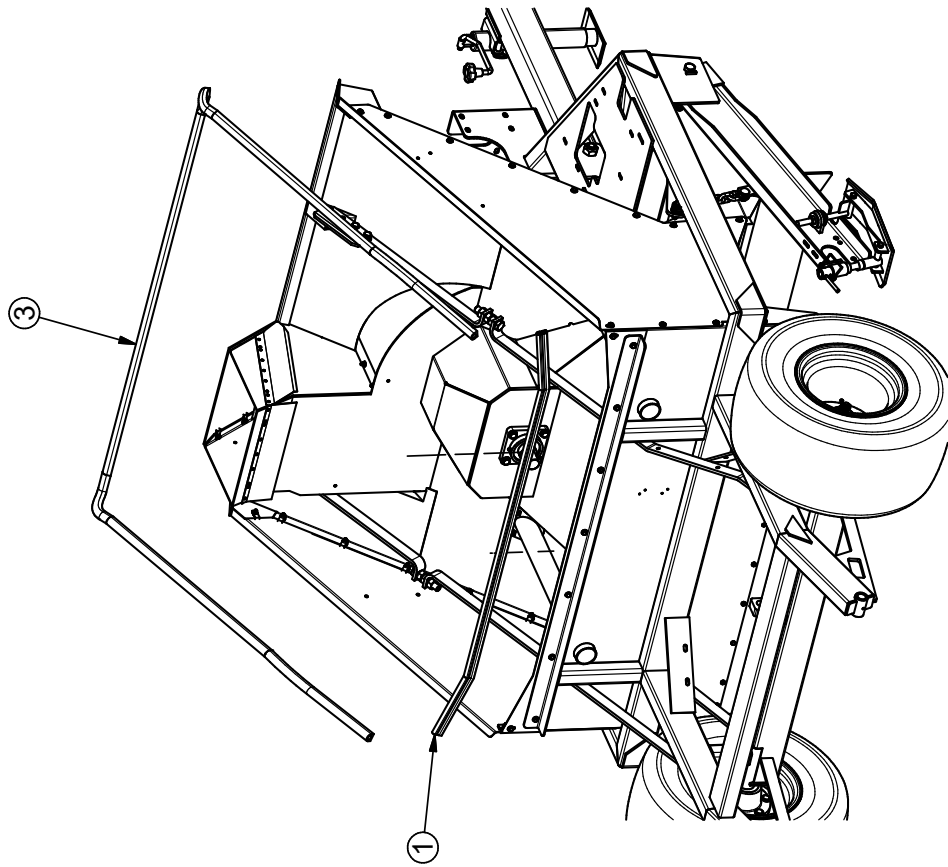
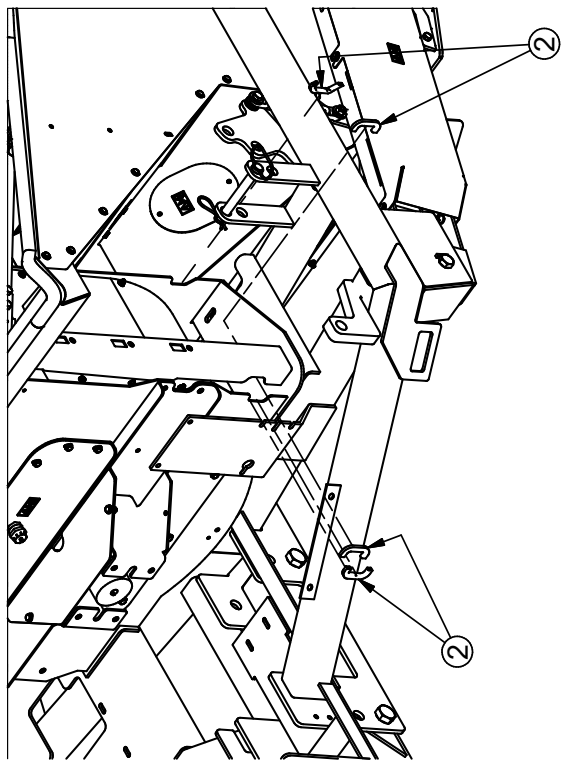
AIR RETURN



Parts List

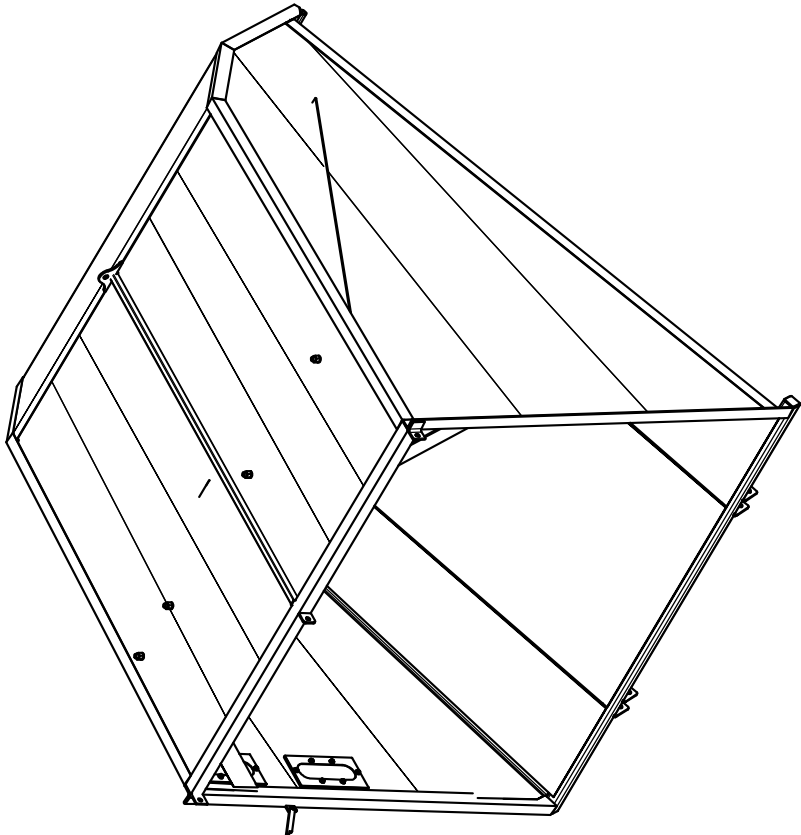
ITEM	QTY	PART #	DESCRIPTION
5	11	110290	NUT, 1/4-20 WIZ FLANGE
6	39	110319	NUT, 5/16-18 U-TYPE .75L
7	8	110429	BOLT, 1/2-13 X 1.5
8	39	110444	BOLT, 5/16-18 X 0.75, WIZ FLANGE
9	11	110464	BOLT, 1/4-20 X 1.0
10	6	110596	NUT, 3/4-10
11	8	110615	NUT, 1/2-13, UNITORQUE LOCK
12	2	110713	BOLT, 3/4-10 X 3.5 TAP
13	1	970390	BACK AIR RETURN
14	1	970391	LEFT AIR RETURN
15	1	970392	RIGHT AIR RETURN
16	4	970393	TRUSS BAR
17	1	970394	FLAP RETAINER
18	2	970542	ANGLE, AIR RETURN
19	1	970545	REAR SEAL
20	1	970685	DEBRIS FLAP MAIN
21	2	975111	HOSE TUBE

SEAL & TRIM INSTALLATION



Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	6 ft	100360	MOULDING, EDGE, AIR INLET
2	30 in	100365	TRIM, EDGE, .085 TO .210 THICKNESS
3	15 ft	102004	D SEAL, 1.00 X 1.00

TV60RHD HOPPER ASSEMBLY

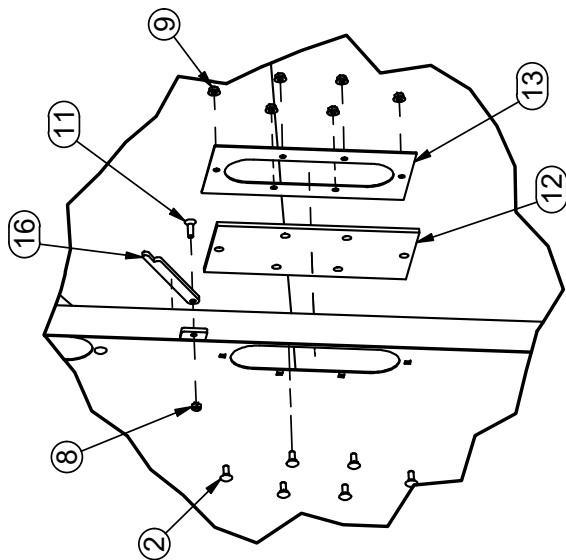


Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	6 ft	102004	SEAL, RUBBER, D 1' X 1'
2	12	110020	Bolt, 5/16-18 X 0.75 in Carriage
3	4	110038	WASHER, 1" FLAT STANDARD
4	10	110049	WASHER, 5/16" X 1 1/2 FENDER
5	4	110305	Pin, Lynch 7/16 x 1 3/4
6	10	110319	NUT, 5/16-18 U-TYPE .75L
7	10	110423	BOLT, 5/16-18 X 1.0
8	1	110600	NUT, 5/16-18, UNITORQUE LOCK
9	17	110606	NUT, 5/16-18 WIZ FLANGE
10	16	110673	WASHER, 1/4" FLAT STANDARD
11	1	110986	SCREW, 5/16-18 UNCX1 FH
12	2	311691	SIGHT GLASS, HOPPER
13	2	311692	Backing Plate, Sight Glass
14	16	710586	SCREW, 1/4 X 1 TEK SELF-TAP
15	4	942161	PIN, STABILIZER
16	1	970211	BAR, PROP
17	1	970366	MIDDLE SCREEN
18	2	970729	DEBRIS FLAP-RETURN SCREEN
19	1	975091	HOPPER WELDMENT
20	1	975099	LEFT RETURN SCREEN
21	1	975100	RIGHT RETURN SCREEN

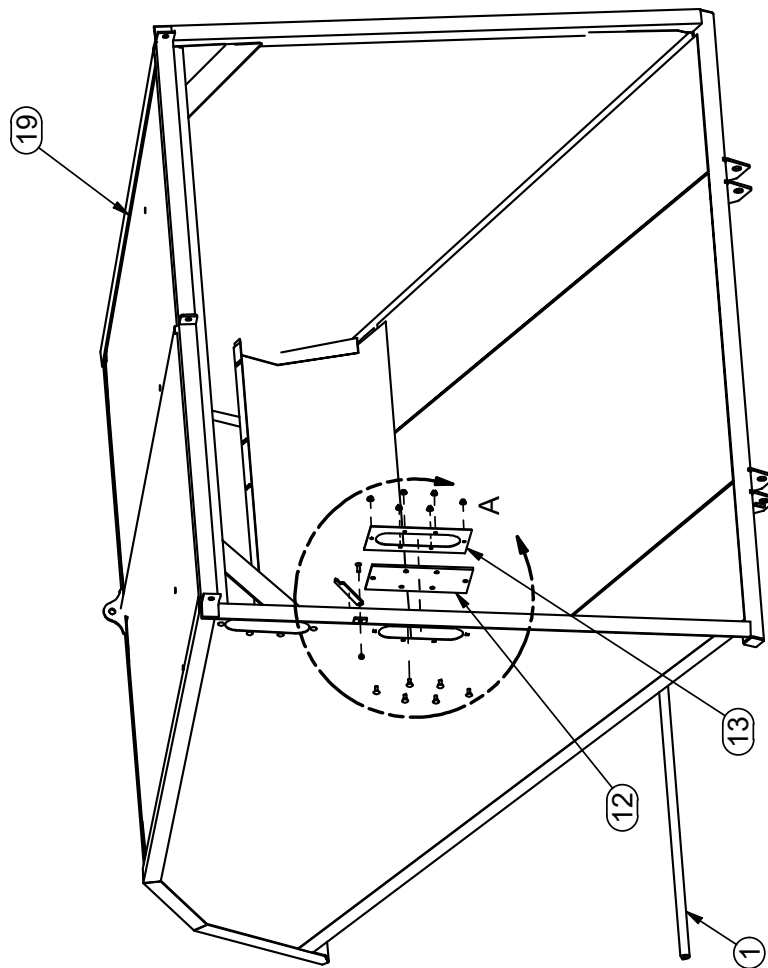
SIGHT WINDOW INSTALLATION

975440

REV: A



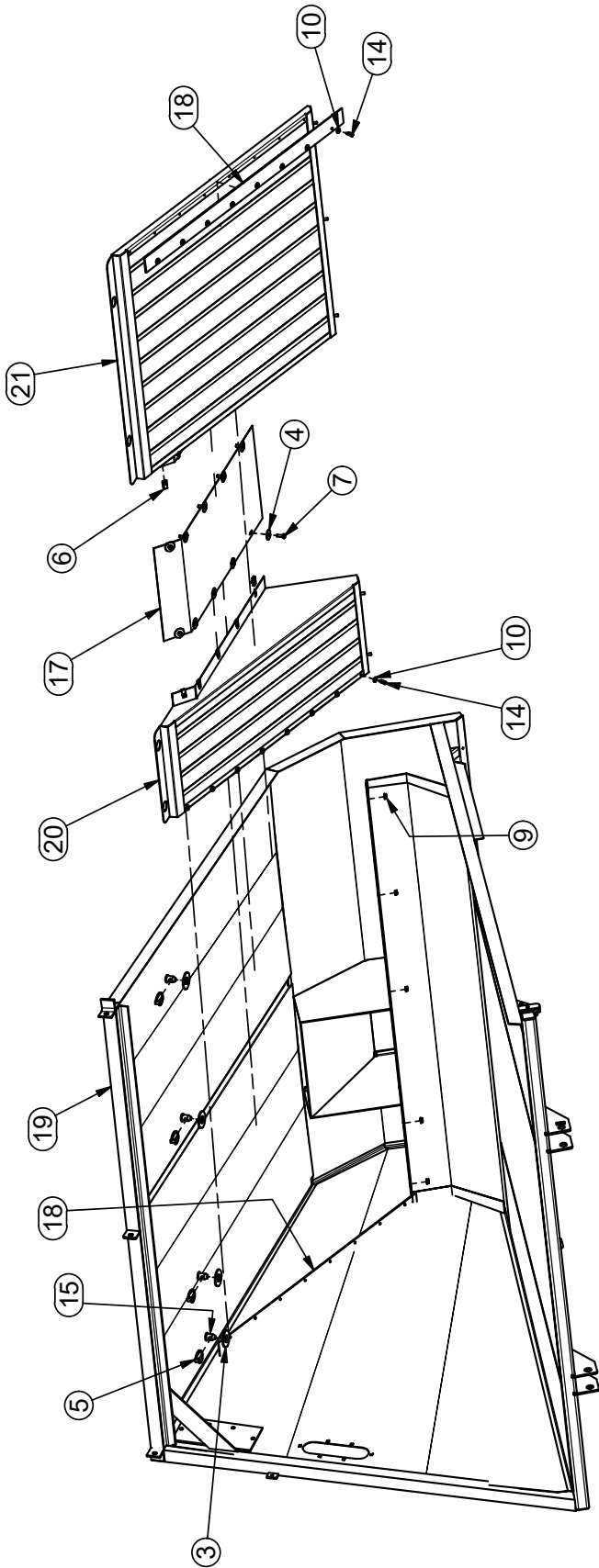
DETAIL A



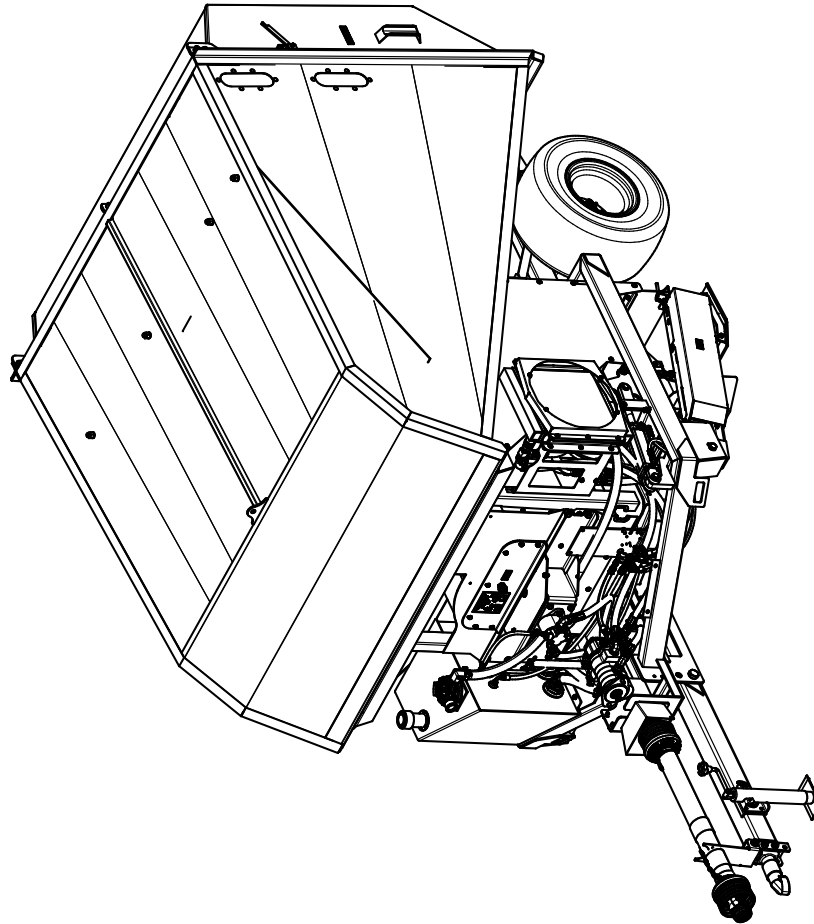
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	6 ft	102004	SEAL, RUBBER, D 1" X 1"
2	12	110020	Bolt, 5/16-18 X 0.75 in Carriage
8	1	110600	NUT, 5/16-18, UNITORQUE LOCK
9	17	110606	NUT, 5/16-18 WIZ FLANGE
12	2	311691	SIGHT GLASS, HOPPER
13	2	311692	Backing Plate, Sight Glass
16	1	970211	BAR, PROP
19	1	975091	HOPPER WELDMENT
11	1	110986	SCREW, 5/16-18 UNC X 1 FH

Parts List				Parts List				Parts List			
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
3	4	110038	WASHER, 1" FLAT STANDARD	9	17	110606	NUT, 5/16-18 WIZ FLANGE	18	2	970729	DEBRIS FLAP-RETURN SCREEN
4	10	110049	WASHER, 5/16" X 1 1/2 FENDER	10	16	110673	WASHER, 1/4" FLAT STANDARD	19	1	975091	HOPPER WELDMENT
5	4	110305	Pin, Lynch 7/16 x 1 3/4	14	16	710586	SCREW, 1/4 X 1 TEK SELF-TAP	20	1	975099	LEFT RETURN SCREEN
6	10	110319	NUT, 5/16-18 U-TYPE .75L	15	4	942161	PIN, STABILIZER	21	1	975100	RIGHT RETURN SCREEN
7	10	110423	BOLT, 5/16-18 X 1.0	17	1	970366	MIDDLE SCREEN				

SCREEN INSTALLATION



TV60RHD HOPPER INSTALLATION

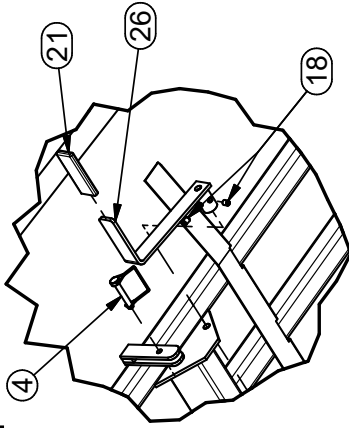


Parts List		
ITEM	QTY	PART # DESCRIPTION
1	3	110026 BOLT, 5/8-11 X 1.25
2	2	110179 BOLT, 7/16-14 X 2.75
3	1	110208 BOLT, 1-8 X 5.0
4	1	110304 PIN, LOCK 3/8 X 2.5 SQ
5	2	110334 BOLT, 1-8 X 6.0
6	2	110336 WASHER, 1-1/4 FLAT MACHINE 10GA
7	2	110337 NUT, 7/16-14 WIZ FLANGE
8	1	110379 BOLT, 1/2-13 X 2.0
9	1	110610 NUT, 1/2-13
10	1	110615 NUT, 1/2-13, UNITORQUE LOCK
11	3	110639 NUT, 5/8-11, UNITORQUE LOCK
12	2	110658 WASHER, 1/2" FLAT STANDARD
13	2	110670 WASHER, 7/16" FLAT STANDARD
14	3	111226 NUT, 1-8, UNITORQUE LOCK
15	2	210326 CLIP, HAIRPIN
16	2	220480 PIN
17	3	315257 PIN WELDMENT, HOPPER DOOR
18	2	510161 SetScrew, 3/8-16 X 0.5
19	2	510174 GREASE ZERK, 1/4-28 ST
20	1	905136 ASSEMBLY, TV60 DOOR
21	1	910044 COVER, VINYL .25 X 1.5 X 4 GRIP
22	2	970148 HOPPER DOOR LATCH
23	2	970149 LATCH PIVOT BUSHING
24	2	970150 LATCH SPACER
25	2	970151 LATCH PIVOT SPACER
26	1	975055 HANDLE WELDMENT, DUMP CYL LOCK
27	1	975056 SHAFT WELDMENT, DUMP CYL LOCK
28	1	975057 STOP WLDMNT, CYLINDER LOCK
29	1	975440 ASSEMBLY, TV60HD HOPPER

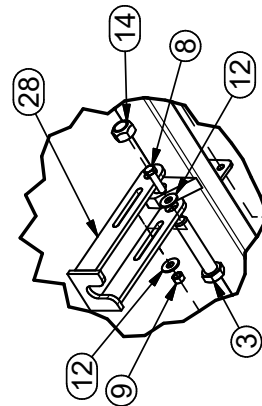
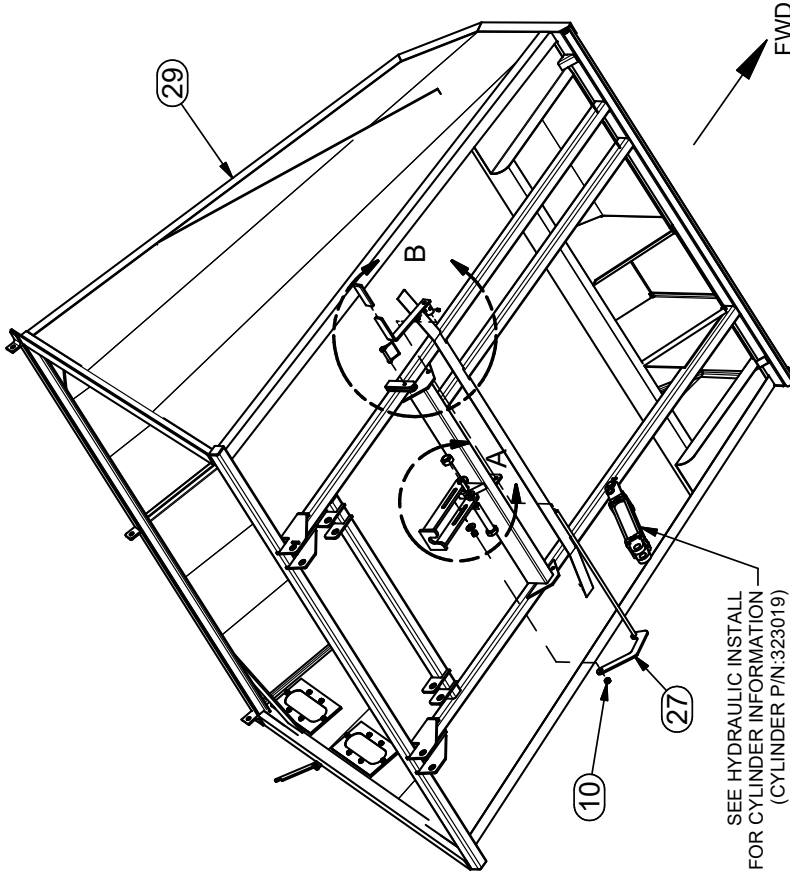
975433

REV: C

LIFT LOCK INSTALLATION



DETAIL B

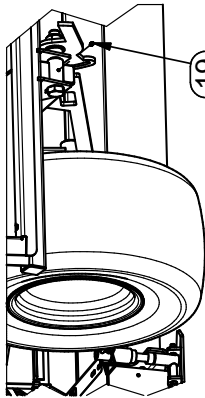
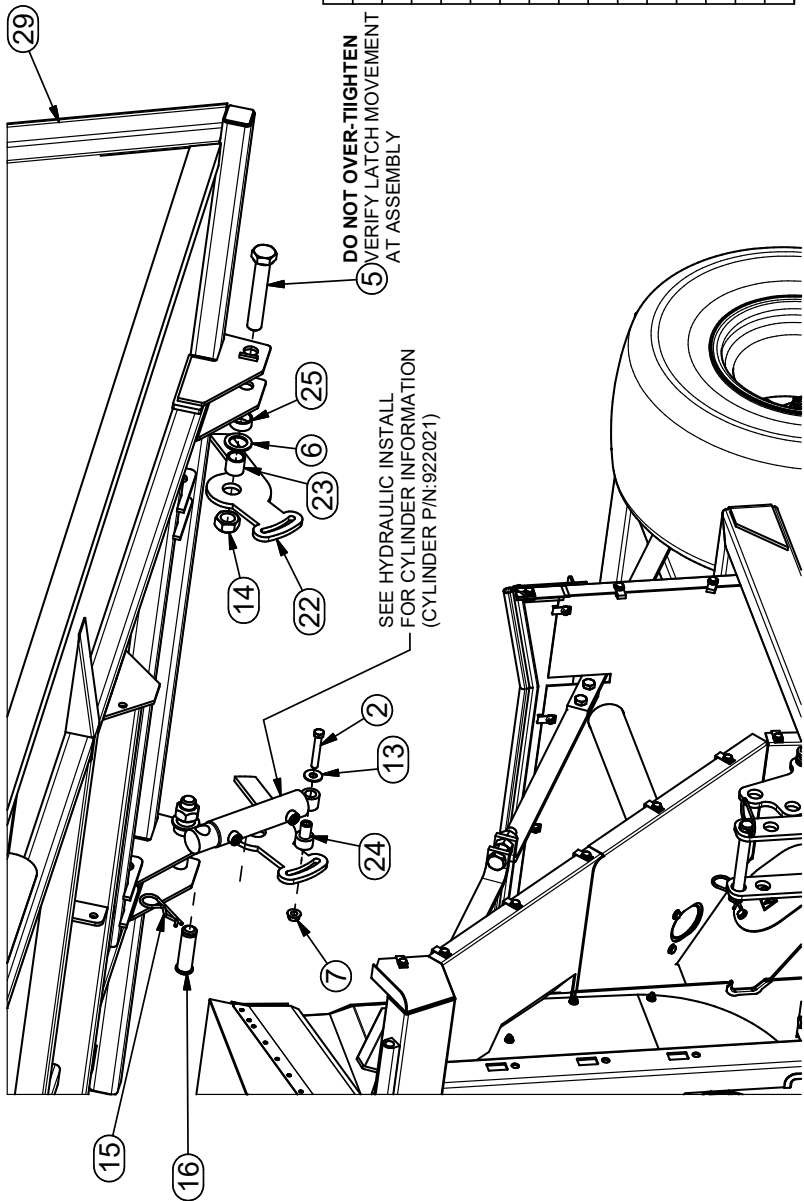


DETAIL A

Parts List		
ITEM	QTY	PART #
3	1	110208
4	1	110304
8	1	110379
9	1	110610
10	1	110615
12	2	110658
14	3	111226
18	2	510161
21	1	910044
26	1	975055
27	1	975056
28	1	975057
29	1	975440

Description		
BOLT, 1-8 X 5.0		
PIN, LOCK 3/8 X 2.5 SQ		
BOLT, 1/2-13 X 2.0		
NUT, 1/2-13		
NUT, 1/2-13, UNITORQUE LOCK		
WASHER, 1/2" FLAT STANDARD		
NUT, 1-8, UNITORQUE LOCK		
SetScrew, 3/8-16 X 0.5		
COVER, VINYL .25 X 1.5 X 4 GRIP		
HANDLE WELDMENT, DUMP CYL LOCK		
SHAFT WELDMENT, DUMP CYL LOCK		
STOP WLDMNT, CYLINDER LOCK		
ASSEMBLY, TV60HD HOPPER		

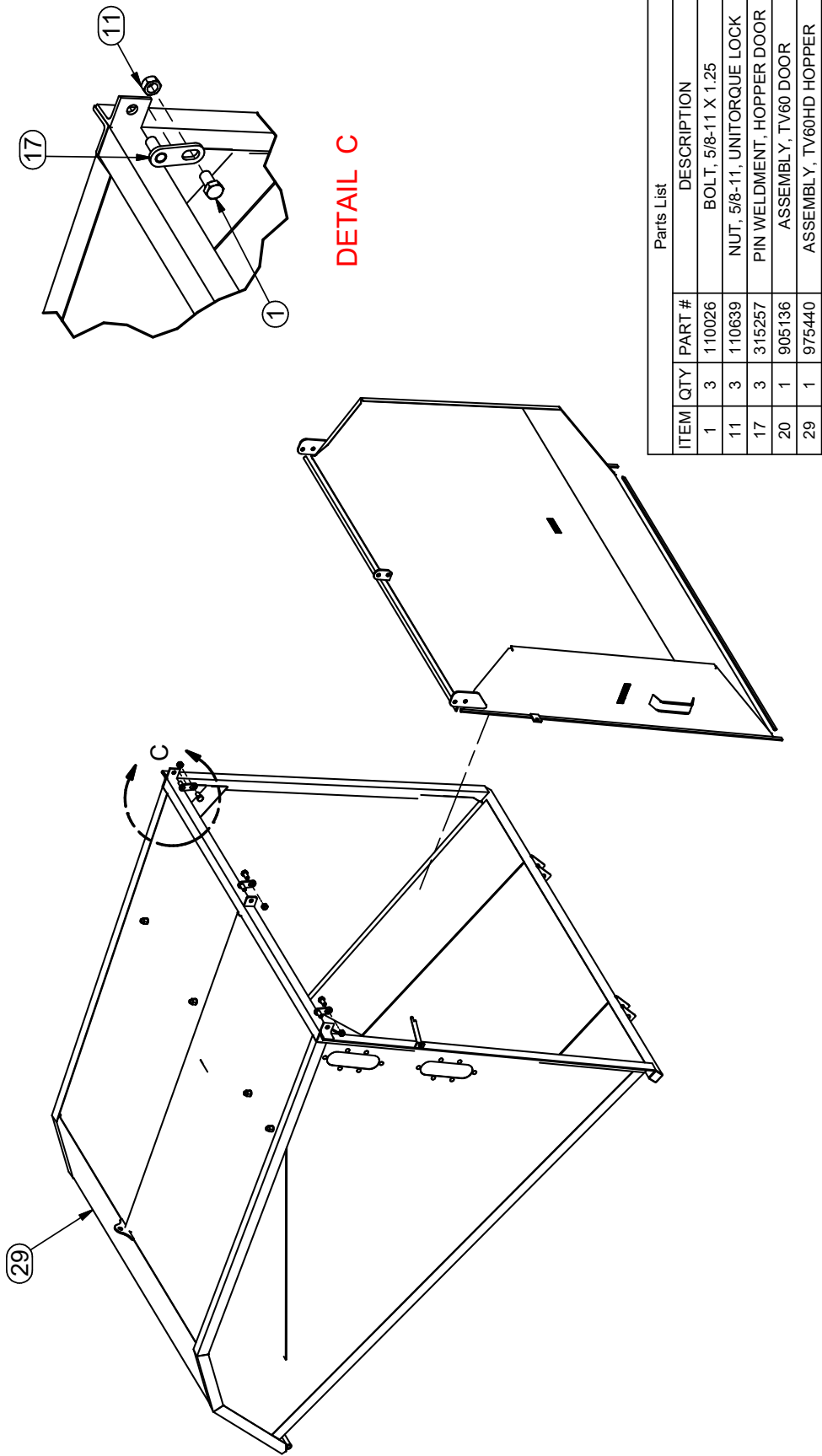
DOOR LATCH INSTALLATION



HOPPER HINGE
GREASE ZERK
INSTALLATION

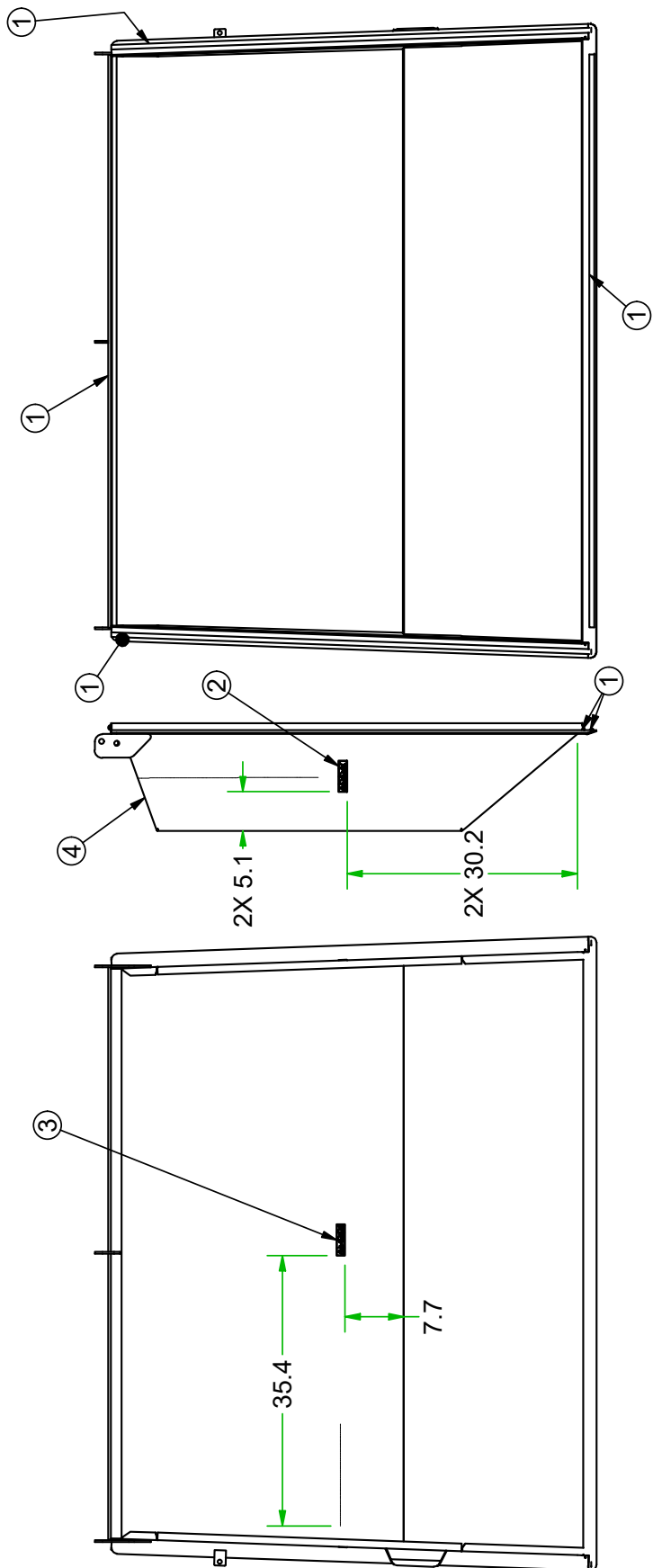
Parts List			
ITEM	QTY	PART #	DESCRIPTION
2	2	110179	BOLT, 7/16-14 X 2.75
5	2	110334	BOLT, 1-8 X 6.0
6	2	110336	WASHER, 1-1/4 FLAT MACHINE 10GA
7	2	110337	NUT, 7/16-14 WIZ FLANGE
13	2	110670	WASHER, 7/16" FLAT STANDARD
14	3	111226	NUT, 1-8, UNITORQUE LOCK
19	2	510174	GREASE ZERK, 1/4-28 ST
22	2	970148	HOPPER DOOR LATCH
23	2	970149	LATCH PIVOT BUSHING
24	2	970150	LATCH SPACER
25	2	970151	LATCH PIVOT SPACER
29	1	975440	ASSEMBLY, TV60HD HOPPER
16	2	220480	PIN
15	2	210326	CLIP, HAIRPIN

DOOR INSTALLATION



905136			REV: B
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	24 ft	100623	D SEAL, .375 X .625
2	2	902226	Decal, Hopper Crushing
3	1	902233	Decal, Hopper Crushing
4	1	975196	DOOR WILDMNT

TV60 HOPPER DOOR ASSEMBLY



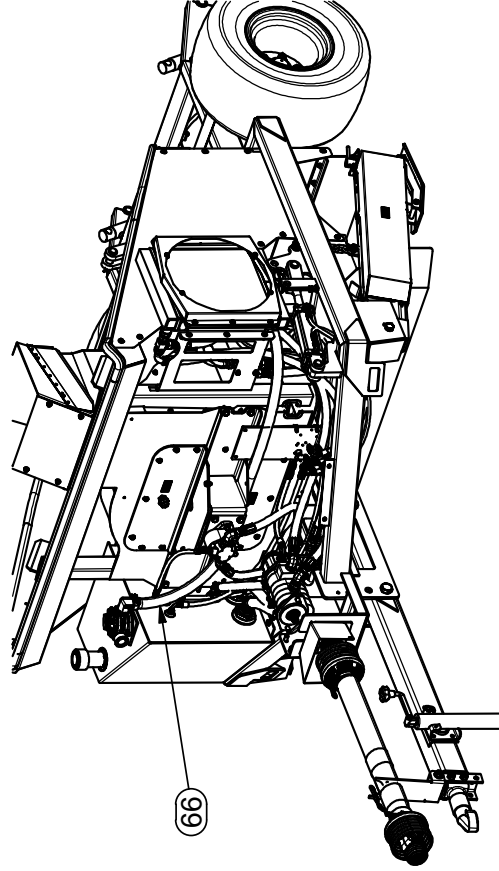
975432			REV: G								
Parts List				Parts List				Parts List			
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	4	110001	BOLT, 1/2-13 X 1.25, WIZ FLANGE	26	1	120031	ADAPTER, 12MJ-12MB45	51	1	322028	COOLER - HYDRAULIC, TV30
2	2	110161	BOLT, 3/8-16 X 1.25, WIZ FLANGE	27	10	120143	ADAPTER, 12MJ-10MB	52	1	322073	FILL NECK ASSY
3	4	110290	NUT, 1/4-20 WIZ FLANGE	28	1	120144	ADAPTER, 6MJ-10MB	53	1	323019	CYLINDER - 2 X 8, SAE-6
4	3	110319	NUT, 5/16-18 U-TYPE .75L	29	2	120189	ADAPTER, 20BH-20MB 45°	54	1	335001	SWITCH ASSY, 140 F TEMP, NC RISING
5	3	110437	BOLT, 3/8-16 X 0.75, WIZ FLANGE	30	1	120220	ADAPTER, 4MJ-6MB90	55	2	522104	DOUBLE HOSE CLAMP
6	4	110440	BOLT, 3/8-16 X 1, WIZ FLANGE	31	3	120222	ADAPTER, 6MJ-6MB90	56	2	522105	DOUBLE COVERPLATE
7	18	110444	BOLT, 5/16-18 X 0.75, WIZ FLANGE	32	3	120233	ADAPTER, 4MJ-4MB	57	2	722076	Seal, Buna Rubber, Pressurized Fill
8	4	110468	BOLT, 1/4-20 X 0.75, WIZ FLANGE	33	2	120235	ADAPTER, 4MJ-4MB90	58	1	723014	FILTER ASSY
9	2	110474	BOLT, 1/4-20 X 1-1/2	34	2	120241	ADAPTER, 4MJ-4MJ-4MJ	59	2	922021	HYDRAULIC CYLINDER
10	4	110529	BOLT, 5/16-18 X 4.5	35	2	120249	ADAPTER, 4MJ-6MB	60	1	923004	MOTOR, 1.76 Ci, FAN DRIVE
11	2	110539	BOLT, 7/16-14 X 1.25	36	1	120254	ADAPTER, 12MJ-12MB	61	1	923011	Cylinder, 2 X 6, -6 SAE Cross
12	4	110588	NUT, 1/2-13 WIZ FLANGE	37	1	120256	ADAPTER, 12MJ-16MB	62	1	923014	MOTOR, 4.9 CID
13	18	110606	NUT, 5/16-18 WIZ FLANGE	38	2	120257	ADAPTER, 12MJ-12MB90	63	1	923015	MANIFOLD, TV60R HD CYLINDER
14	4	110610	NUT, 1/2-13	39	1	120267	ADAPTER, 12MJ-12FJX90	64	1	923016	Pump, Triple Section Gear (1.55, 1.55, & .24 cu in)
15	4	110645	NUT, 3/8-16 WIZ FLANGE	40	1	120268	ADAPTER, 12MJ-12FJX-12MJ				
16	4	110666	WASHER, 1/2" LOCK	41	9	120319	ADAPTER, 6MJ-6MB	65	2	923017	VALVE, TV60HD CONTROL
17	2	110667	WASHER, 1/4" LOCK	42	1	120372	PLUG, O-RING -8, EXTERNAL HEX	66	1	925011	HOSE KIT, TV60R HD
18	2	110671	WASHER, 7/16" LOCK	43	2	120545	ADAPTER, 12BH-12MB 45°	67	1	932072	FAN - 16", 12V, 12A, HYDRAULIC COOLER
19	4	111045	Bolt, 1/2-13 x 1.75 FHCS	44	2	120546	ADAPTER, 20BH-16MB90	68	1	942272	Gearbox, M7 Bima 1:4
20	4	111223	Bolt, M12-1.75 x 35, Wiz Flange, 8.8	45	1	120551	ADAPTER, 6MJ-6MB90 R.062	69	1	943060	PTO ASSY, TV60HD CE MARK
21	4	111224	Bolt, M12-1.75 x 25, Wiz Flange, 10.9	46	2	120677	ADAPTER, 20BH-16MB45	70	1	970291	ADAPTER PLATE
22	2	111225	Bolt, M14-2.0 x 35, Wiz Flange, 8.8	47	1	311493	SHROUD - COOLER FAN	71	1	970839	SUPPORT, REAR COOLER MOUNT
23	6	112007	CLAMP, 1.75", T-BOLT	48	2	312025	MAGNET, 2"x2"x1" RECT 15LB	72	1	970840	SUPPORT, FRONT COOLER MOUNT
24	2	112008	CLAMP, 1.25", T-BOLT	49	2	322012	STRAINER, SUCTION, SAE-32/-20, 25 GPM	73	1	970860	SUPPORT, TV60 GEARBOX
25	6	112053	SCREW, 10-32 X 1/2 MACH SEAL	50	1	322025	DIP STICK - TV30, HYDRAULIC TANK	74	1	970864	SHIELD, PTO
								75	1	975437	TANK WELDMENT, TV60R HD HYD

TV60RHD HYDRAULIC

INSTALLATION

TV60RHD HYDRAULIC INSTALLATION

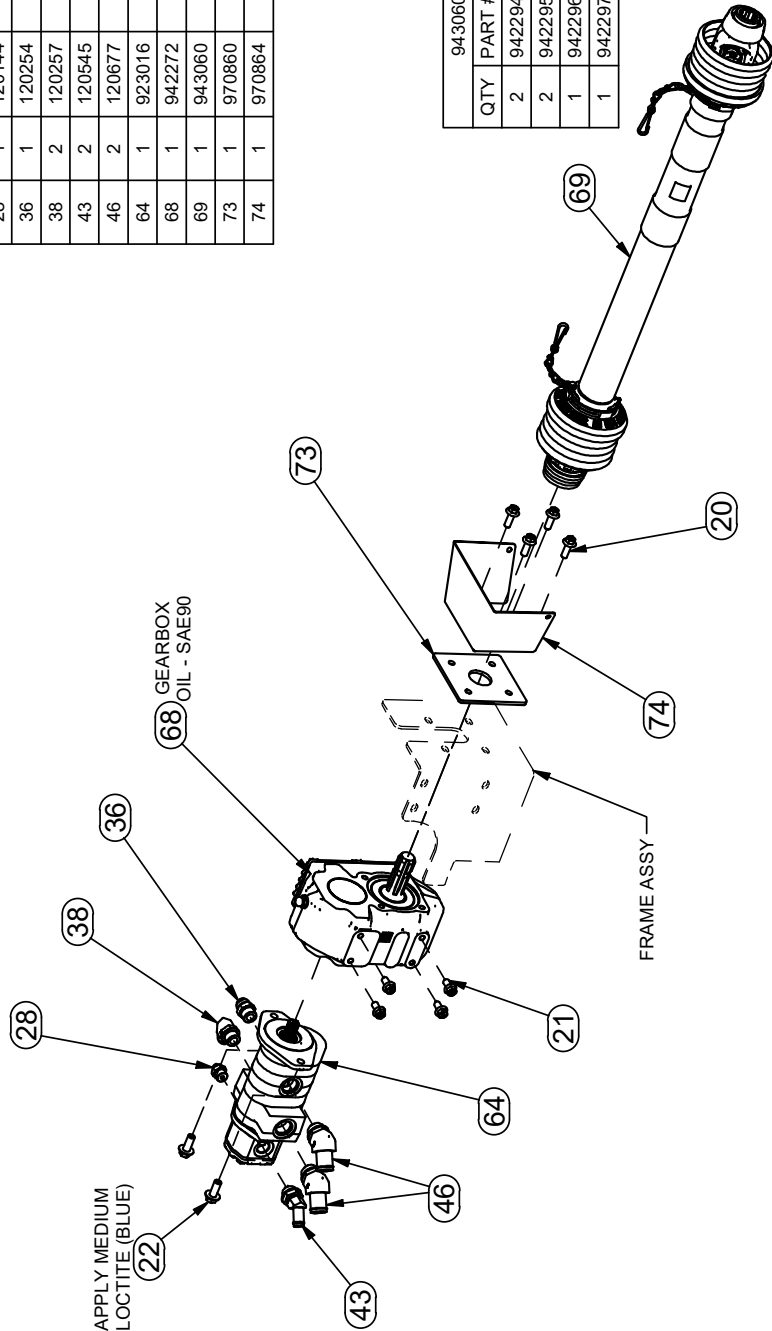
TV60RHD HYDRAULIC INSTALLATION



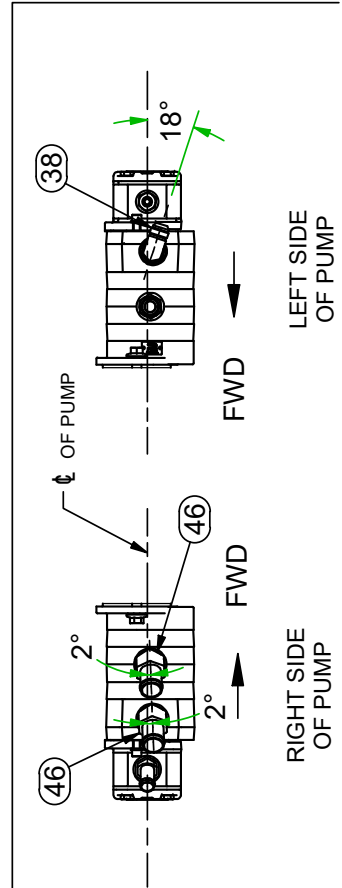
925011 HOSE KIT PARTS LIST		
QTY	PART #	DESCRIPTION
1	920016	HOSE ASSY, DECK VALVE TO COOLER
2	920019	HOSE, FAN/DECK SUCTION
1	920023	HOSE ASSY, FAN VALVE RETURN
1	920024	HOSE ASSY, FAN MTR CD
1	920026	HOSE ASSY, DECK MTR RET
1	920027	HOSE ASSY, DECK MTR CD
1	920028	HOSE, COOLER RETURN
1	920029	HOSE ASSY, CYL MANIFOLD PRESS
1	920030	HOSE ASSY, CYL MANIFOLD RETURN
1	920031	HOSE ASSY, DECK MTR PRESS
1	920032	HOSE, IMPLEMENT SUCTION
2	922038	HOSE ASSY, HOPPER LIFT
4	922052	HOSE ASSY, DOOR LATCH
2	922133	Hose Assy, Deck Lift
2	922136	Hose Assy, Door Latch
1	922138	HOSE ASSY, FAN VALVE PRESSURE
1	922139	HOSE ASSY, FAN MTR PRESSURE
1	922140	HOSE ASSY, FAN MTR RETURN
1	922141	HOSE ASSY, DECK VALVE PRESS

PTO DRIVE & PUMP ASSEMBLY

975432		REV: G	
Parts List			
ITEM	QTY	PART #	DESCRIPTION
20	4	111223	Bolt, M12-1.75 x 35, W/iz Flange, 8.8
21	4	111224	Bolt, M12-1.75 x 25, W/iz Flange, 10.9
22	2	111225	Bolt, M14-2.0 x 35, W/iz Flange, 8.8
28	1	120144	ADAPTER, 6MJ-10MB
36	1	120254	ADAPTER, 12MJ-12MB
38	2	120257	ADAPTER, 12MJ-12MB90
43	2	120545	ADAPTER, 12BH-12MB 45°
46	2	120677	ADAPTER, 20BH-16MB45
64	1	923016	Pump, Triple Section Gear (1.55, 1.55, & 24 cu in)
68	1	942272	Gearbox, M7 Bima 1:4
69	1	943060	PTO ASSY, TV60HD CE MARK
73	1	970860	SUPPORT, TV60 GEARBOX
74	1	970864	SHIELD, PTO

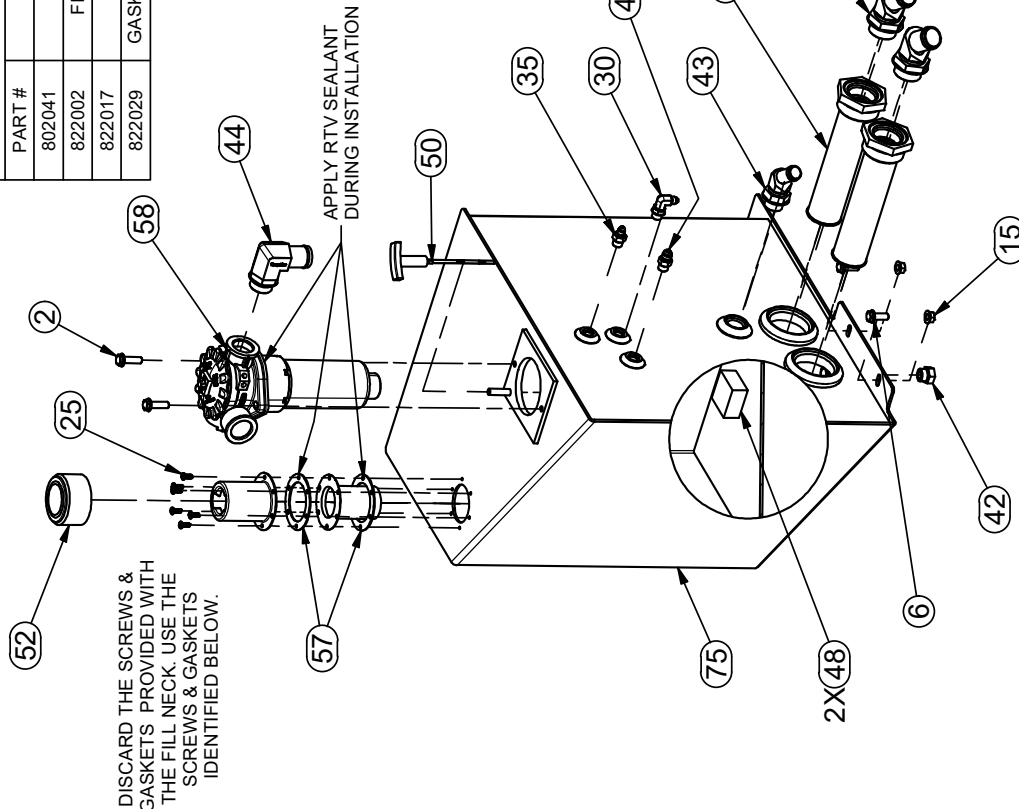


(SERVICE NOTE: PTO ASSY 945007
USED ON S/N 19A14 & BELOW)



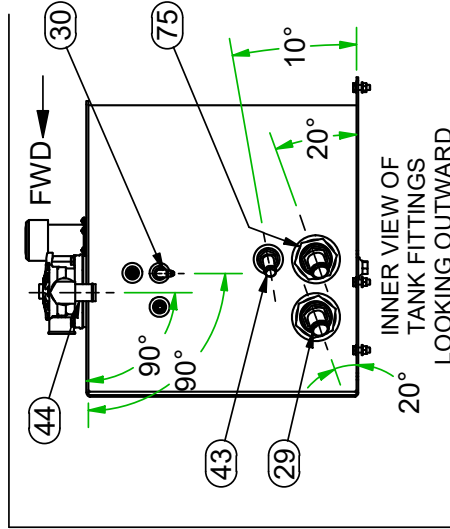
HYDRAULIC RESERVOIR

723014 SERVICE PARTS	
PART #	DESCRIPTION
802041	O-RING, CAP
822002	FILTER REPLACEMENT
822017	GUAGE, OIL FILTER
822029	GASKET, RETURN OIL FILTER



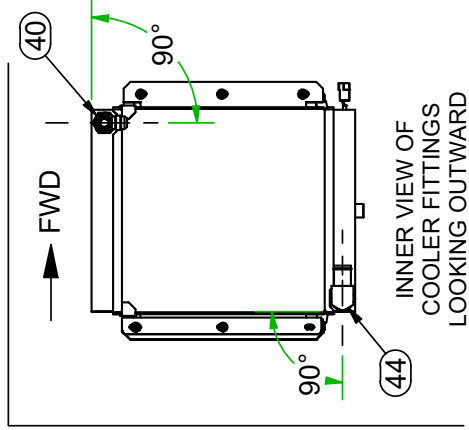
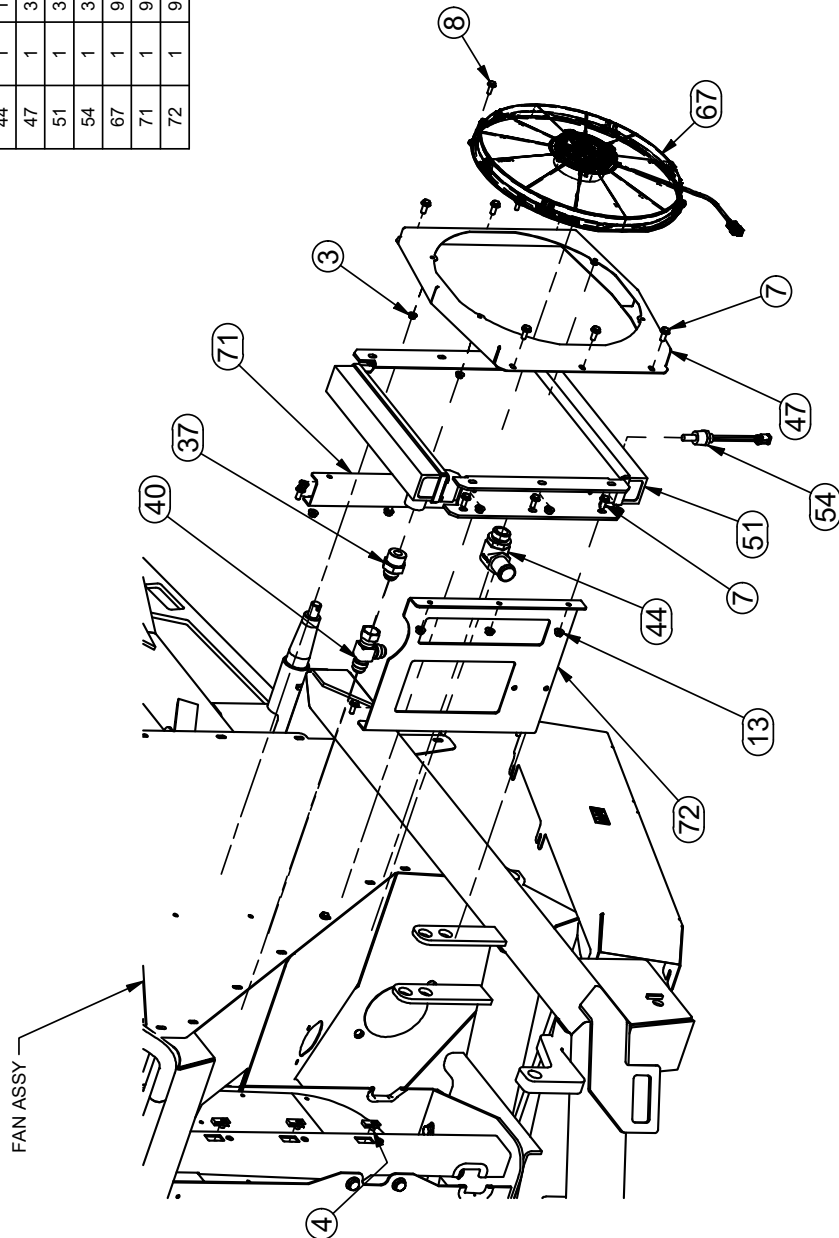
Parts List

ITEM	QTY	PART #	DESCRIPTION
2	2	110161	BOLT, 3/8-16 X 1.25, WIZ FLANGE
6	4	110440	BOLT, 3/8-16 X 1, WIZ FLANGE
15	4	110645	NUT, 3/8-16 WIZ FLANGE
25	6	112053	SCREW, 10-32 X 1/2 MACH SEAL
29	2	120189	ADAPTER, 20BH-20MB 45°
30	1	120220	ADAPTER, 4MJ-6MB90
35	2	120249	ADAPTER, 4MJ-6MB
41	9	120319	ADAPTER, 6MJ-6MB
42	1	120372	PLUG, O-RING-8, EXTERNAL HEX
43	2	120545	ADAPTER, 12BH-12MB 45°
44	2	120546	ADAPTER, 20BH-16MB90
48	2	312025	MAGNET, 2"x2"x1" RECT 15LB
49	2	322012	STRAINER, SUCTION, SAE-32/-20, 25 GPM
50	1	322025	DIP STICK - TV30, HYDRAULIC TANK
52	1	322073	FILL NECK ASSY
57	2	722076	Seal, Buna Rubber, Pressurized Fill
58	1	723014	FILTER ASSY
75	1	975437	TANK WELDMENT, TV60R HD HYD

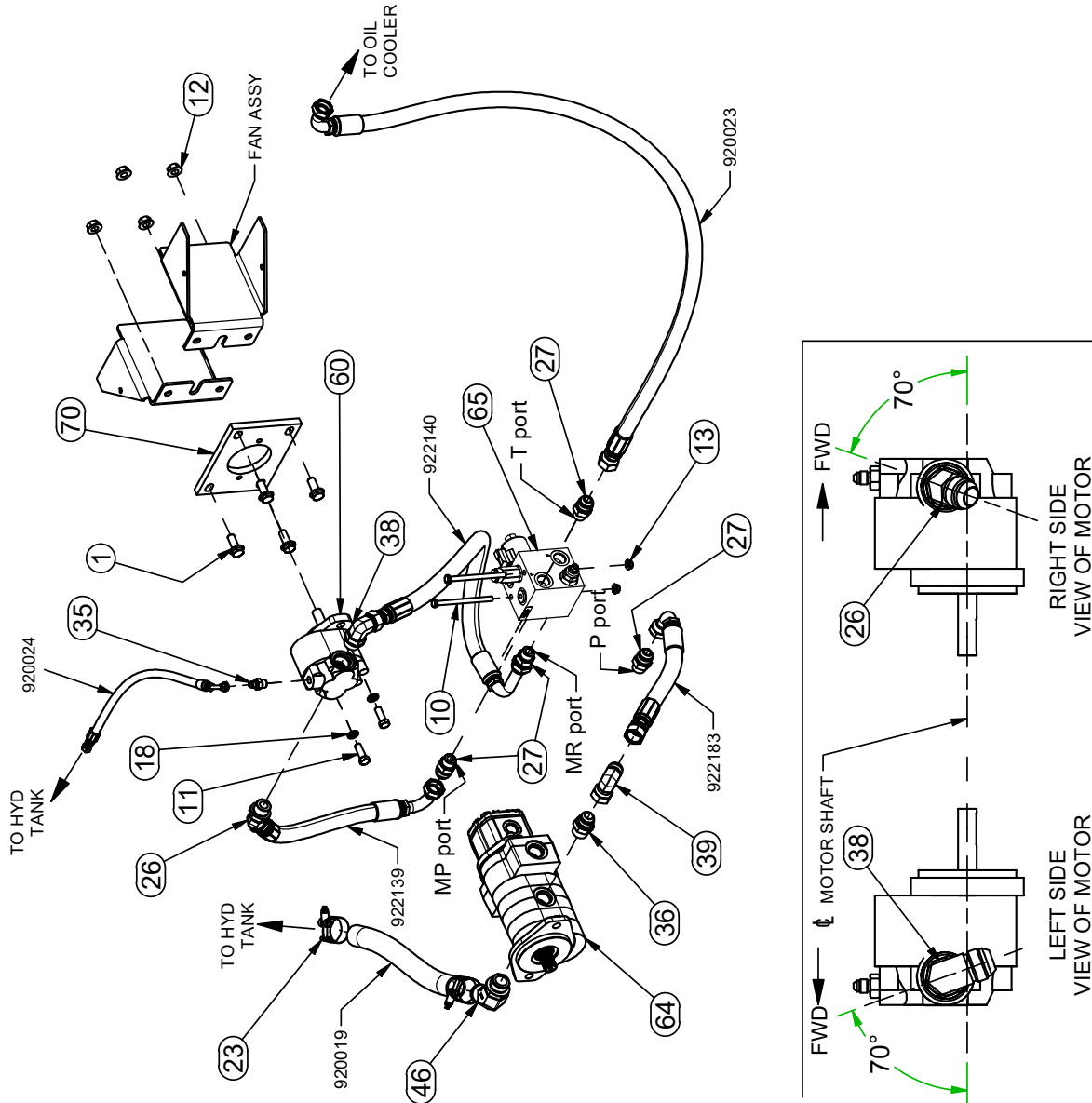


OIL COOLER ASSEMBLY

975432		REV. G	
Parts List			
ITEM	QTY	PART #	DESCRIPTION
3	4	110290	NUT, 1/4-20 WIZ FLANGE
4	3	110319	NUT, 5/16-18 U-TYPE .75L
7	18	110444	BOLT, 5/16-18 X 0.75, WIZ FLANGE
8	4	110468	BOLT, 1/4-20 X 0.75, WIZ FLANGE
13	14	110606	NUT, 5/16-18 WIZ FLANGE
37	1	120256	ADAPTER, 12MJ-16MB
40	1	120268	ADAPTER, 12MJ-12FJX-12MJ
44	1	120546	ADAPTER, 20BH-16MB90
47	1	311493	SHROUD - COOLER FAN
51	1	322028	COOLER - HYDRAULIC, TV/30
54	1	335001	SWITCH ASSY, 140 F TEMP, NC RISING
67	1	932072	FAN - 16", 12V, 12A, HYDRAULIC COOLER
71	1	970839	SUPPORT, REAR COOLER MOUNT
72	1	970840	SUPPORT, FRONT COOLER MOUNT

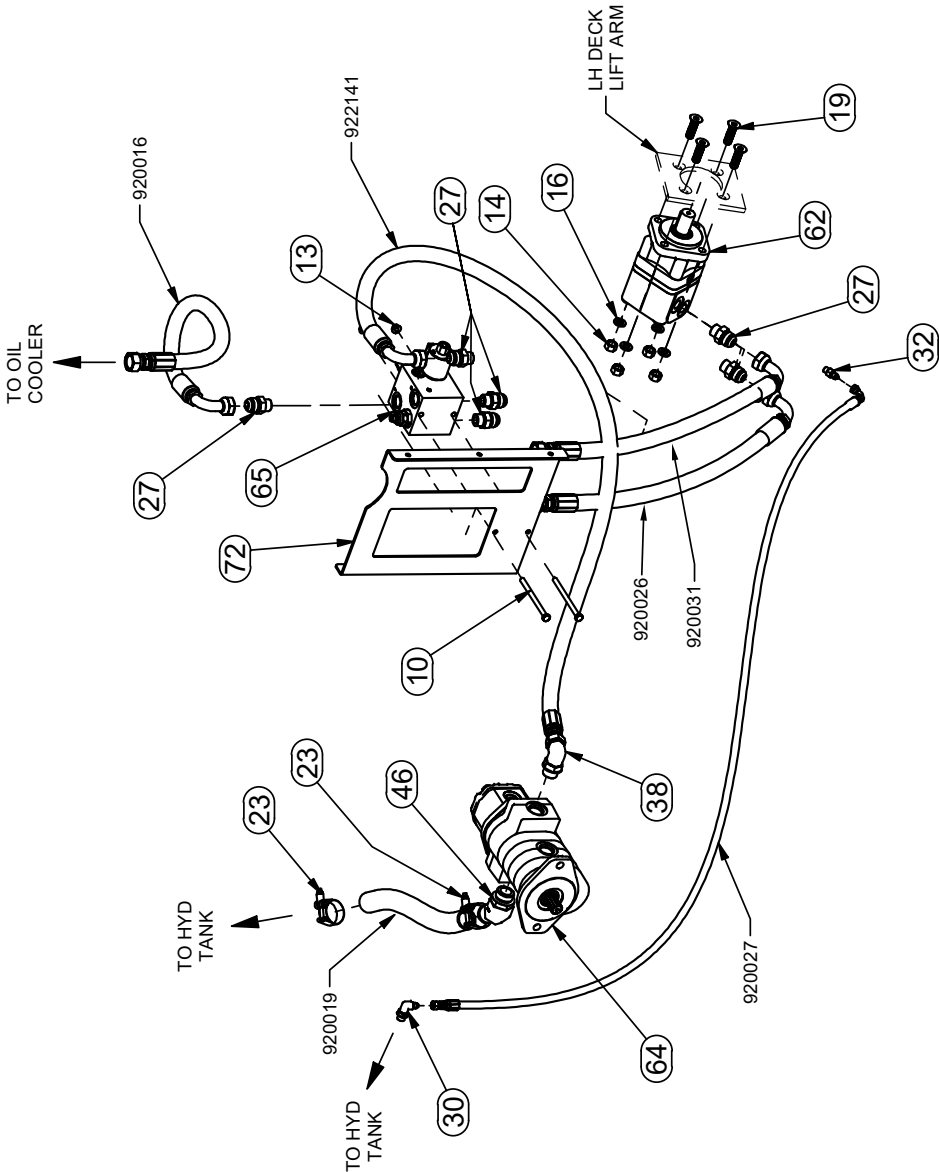


FAN DRIVE HYDRAULICS



Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	4	110001	BOLT, 1/2-13 X 1.25, WIZ FLANGE
10	4	110529	BOLT, 5/16-18 X 4.5
11	2	110539	BOLT, 7/16-14 X 1.25
12	4	110588	NUT, 1/2-13 WIZ FLANGE
13	18	110606	NUT, 5/16-18 WIZ FLANGE
18	2	110671	WASHER, 7/16" LOCK
23	6	112007	CLAMP, 1.75", T-BOLT
26	1	120031	ADAPTER, 12MJ-12MB45
27	10	120143	ADAPTER, 12MJ-10MB
35	2	120249	ADAPTER, 4MJ-6MB
36	1	120254	ADAPTER, 12MJ-12MB
38	2	120257	ADAPTER, 12MJ-12MB90
39	1	120267	ADAPTER, 12MJ-12FX90
46	2	120677	ADAPTER, 20BH-16MB45
60	1	923004	MOTOR, 1.76 Ci, FAN DRIVE
64	1	923016	Pump, Triple Section Gear (1.55, 1.55, & 24 cu in)
65	2	923017	VALVE, TV60HD CONTROL
70	1	970291	ADAPTER PLATE

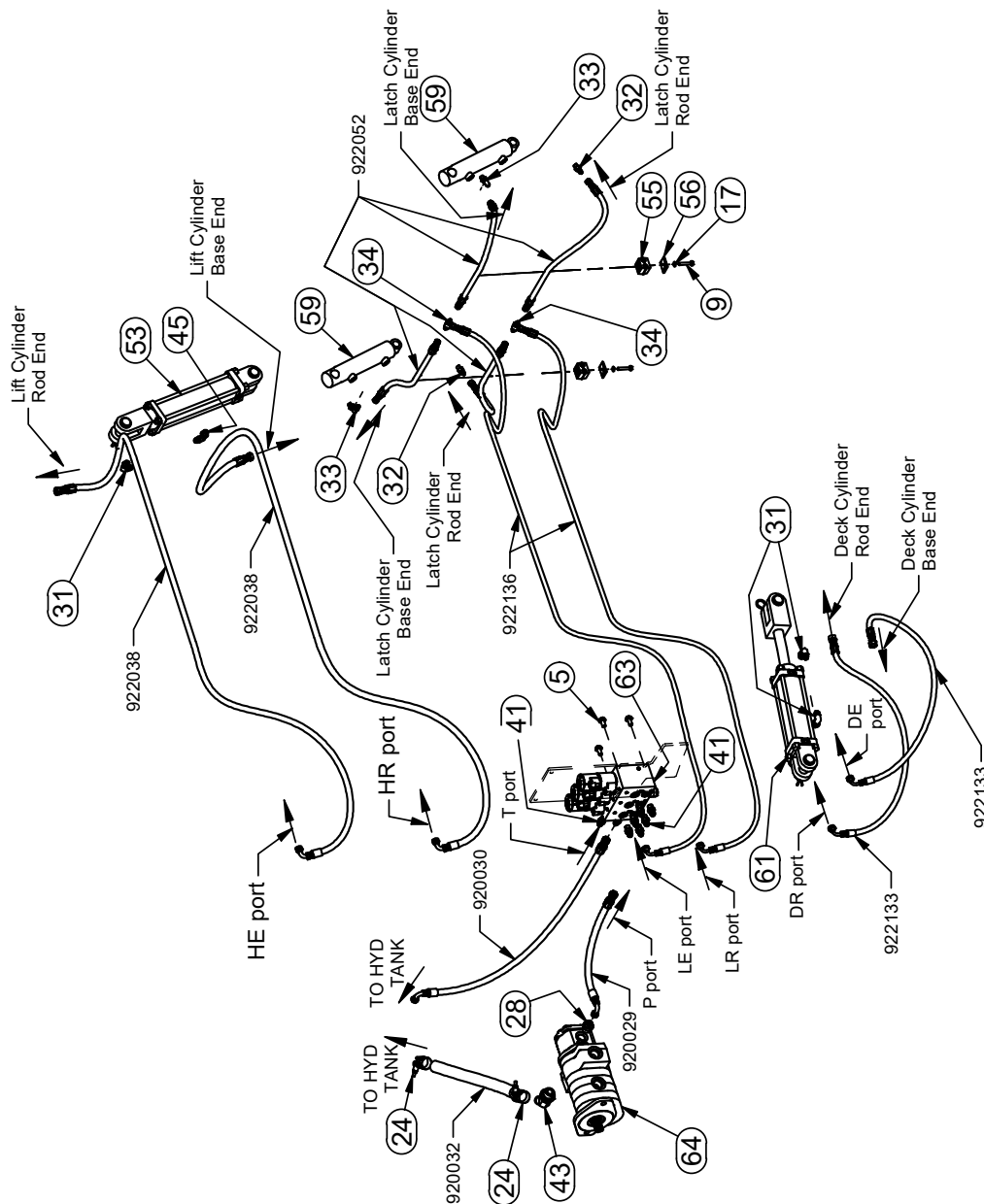
DECK DRIVE HYDRAULICS



Parts List			
ITEM	QTY	PART #	DESCRIPTION
10	4	110529	BOLT, 5/16-18 X 4.5
13	18	110606	NUT, 5/16-18 WIZ FLANGE
14	4	110610	NUT, 1/2-13
16	4	110666	WASHER, 1/2" LOCK
19	4	111045	Bolt, 1/2-13 x 1.75 FHCS
23	6	112007	CLAMP, 1.75", T-BOLT
27	10	120143	ADAPTER, 12MJ-10MB
30	1	120220	ADAPTER, 4MJ-6MB90
32	3	120233	ADAPTER, 4MJ-4MB
38	2	120257	ADAPTER, 12MJ-12MB90
46	2	120677	ADAPTER, 20BH-16MB45
62	1	923014	MOTOR, 4.9 CID
64	1	923016	Pump, Triple Section Gear (1.55, 1.55 & .24 cu in)
65	2	923017	VALVE, TV60HD CONTROL

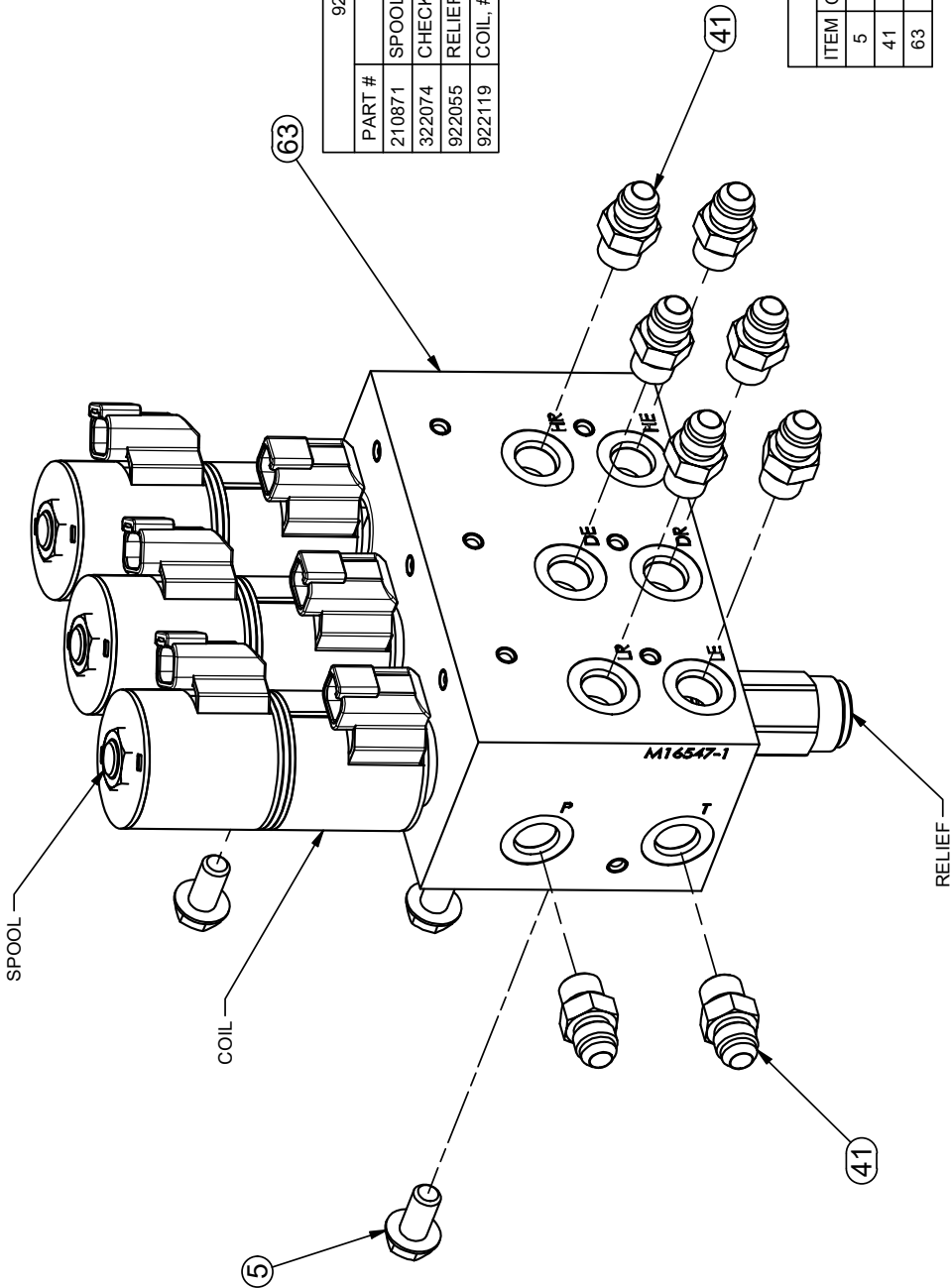
IMPLEMENT DRIVE HYDRAULICS

975432 REV: G



Parts List			
ITEM	QTY	PART #	DESCRIPTION
	3	110457	BOLT, 3/8-16 X 0.75, W/IZ FLANGE
	2	110474	BOLT, 1/4-20 X 1-1/2
17	2	110667	WASHER, 1/4" LOCK
24	2	112008	CLAMP, 1.25", T-BOLT
28	1	120144	ADAPTER, 6MJ-10MB
31	3	120222	ADAPTER, 6MJ-6MB90
32	3	120233	ADAPTER, 4MJ-4MB
33	2	120235	ADAPTER, 4MJ-4MB90
34	2	120241	ADAPTER, 4MJ-4MJ
41	9	120319	ADAPTER, 6MJ-6MB
43	2	120545	ADAPTER, 12BH-12MB 45°
45	1	120551	ADAPTER, 6MJ-6MB90 R.062
53	1	323019	CYLINDER - 2 X 8, SAE-6
55	2	522104	DOUBLE HOSE CLAMP
56	2	522105	DOUBLE COVERPLATE
59	2	922021	HYDRAULIC CYLINDER
61	1	923011	Cylinder, 2 X 6, -6 SAE Cross
63	1	923015	MANIFOLD, TV60R HD CYLINDER
64	1	923016	Pump, Triple Section Gear (1.55, 1.55&.24 cu in)

IMPLEMENT VALVE ASSEMBLY

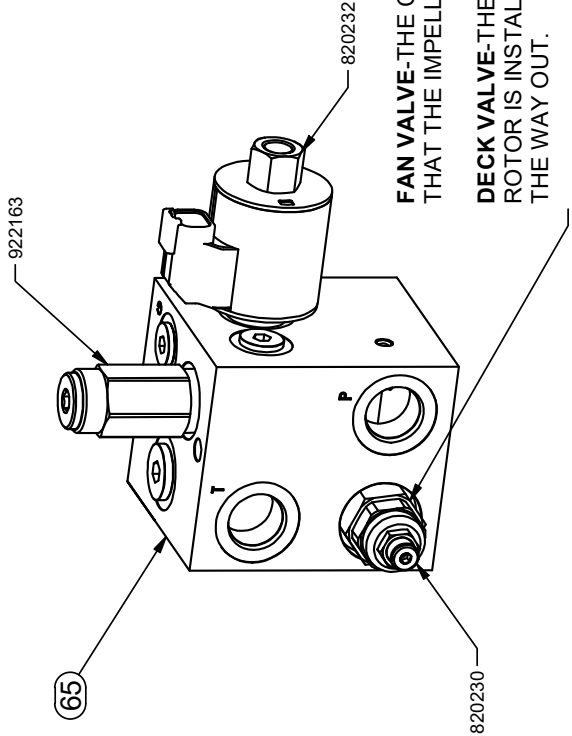


923015 Valve - Service Parts	
PART #	DESCRIPTION
210871	SPOOL, #10, 4W3P TANDEM CENTER
322074	CHECK, #8, PILOT TO OPEN, 25 psi
922055	RELIEF, #8, DIRECT ACTING POPPET, 2000 psi
922119	COIL, #10, DEUTSCH DT04-2P

Parts List		
ITEM	QTY	PART # DESCRIPTION
5	3	110437 BOLT, 3/8-16 X 0.75, WIZ FLANGE
41	9	120319 ADAPTER, 6MJ-6MB
63	1	923015 MANIFOLD, TV60R HD CYLINDER

FAN & DECK VALVE

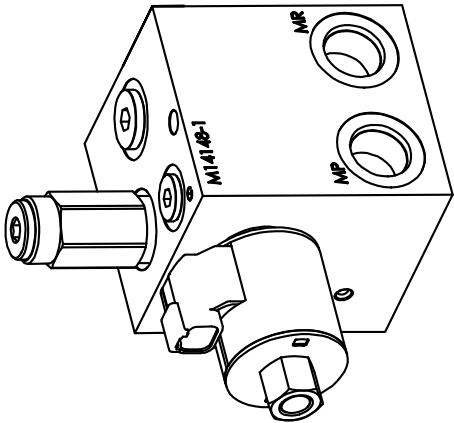
923017 Valve - Service Parts	
PART #	DESCRIPTION
522163	COIL, #10, HYDRAFORCE
820230	VALVE, COUNTER BALANCE
820232	VALVE, SPOOL
922130	VALVE, RELIEF DIRECT ACTING 2900 psi



FAN VALVE-THE COUNTER BALANCE VALVE WILL INITIALLY BE SET SO THAT THE IMPELLER FAN HAS APPROXIMATELY A 3-5 SECOND SPINDOWN.

DECK VALVE-THE DECK VALVE WILL NEED TO BE ADJUSTED AFTER THE ROTOR IS INSTALLED. INITIALLY, THE COUNTER BALANCE IS ADJUSTED ALL THE WAY OUT.

ADJUSTING THE COUNTER BALANCE VALVE-THE SPINDOWN FOR THE IMPELLER FAN AND THE DECK ROTOR SHOULD BOTH BE BETWEEN 3-5 SECONDS. FOR ADJUSTMENT, LOOSEN THE JAM NUT AND THEN TURN THE SET SCREW ABOUT A 1/4 TURN. FOR A SLOWER SPINDOWN, LOOSEN THE SET SCREW. FOR A QUICKER SPINDOWN, TIGHTEN THE SET SCREW. REPEAT UNTIL THE SPINDOWN IS BETWEEN 3-5 SECONDS, THEN TIGHTEN JAM NUT.



MOTOR SIDE
PORT VIEW

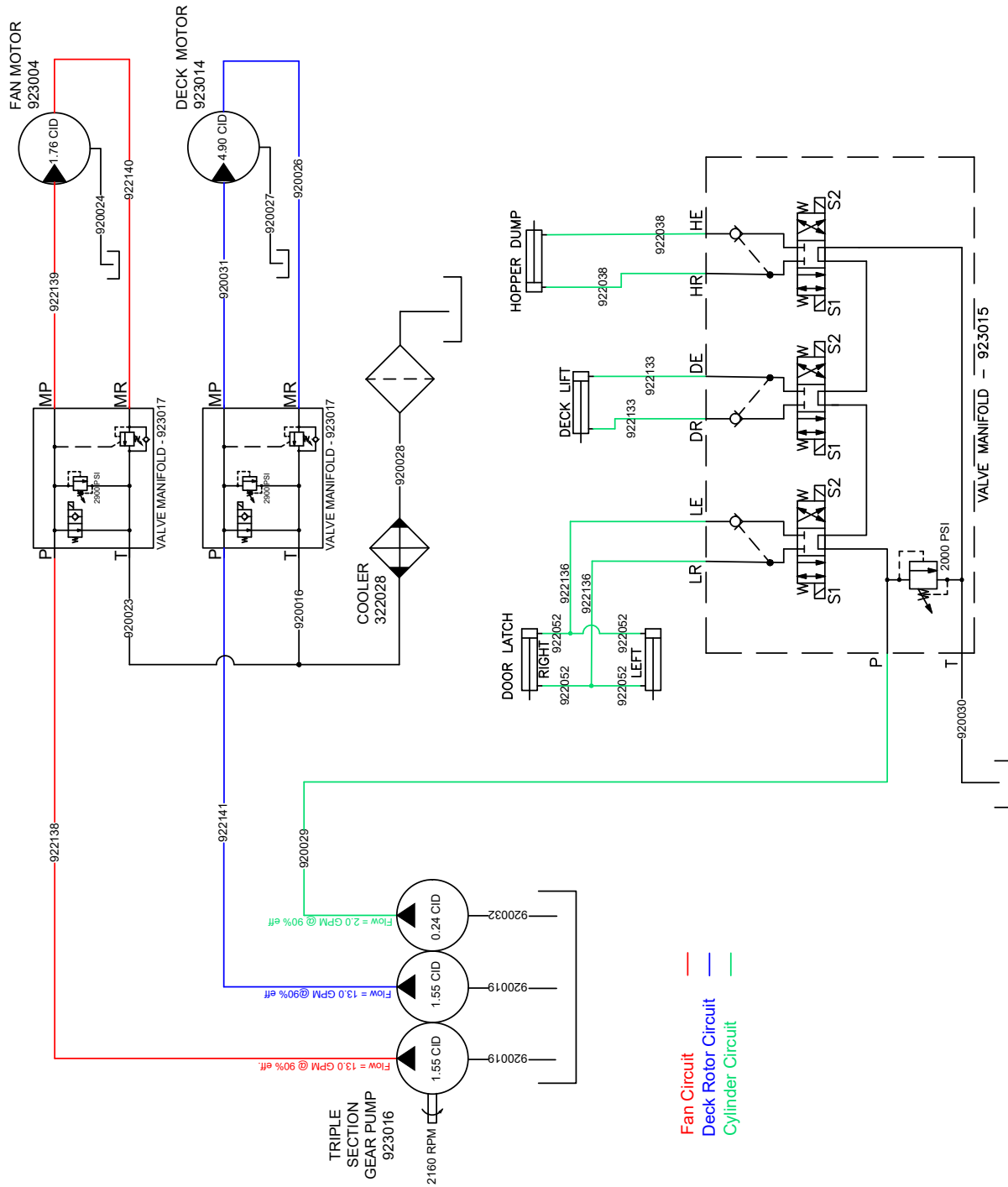
Parts List		
ITEM	QTY	DESCRIPTION
65	2	923017 VALVE, TV60HD CONTROL

975432

REV: G

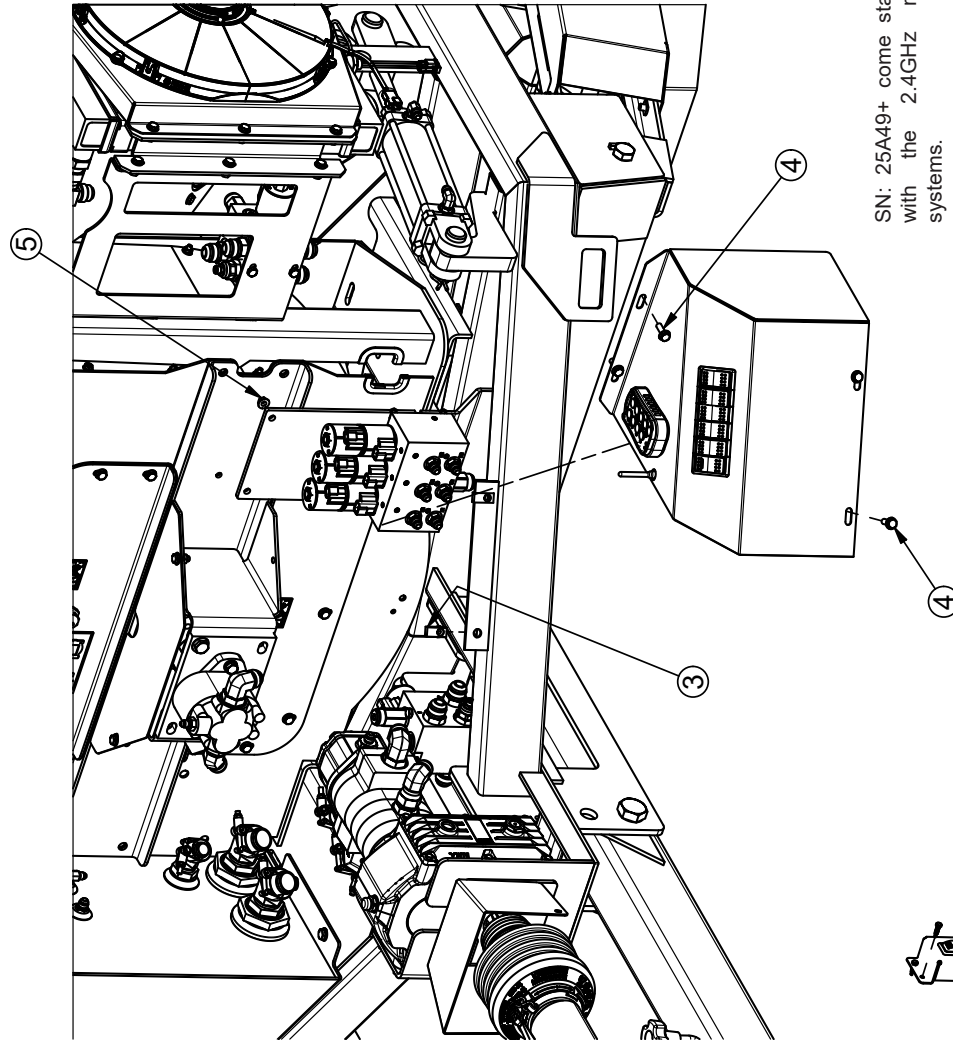
TV60HD HYDRAULIC SCHEMATIC

S/N: 22A11 & ABOVE



05/28/25

ELECTRONICS INSTALLATION



SN: 25A49+ come standard with the 2.4GHz remote systems.

NOTE: New style remote items are NOT compatible with Old style remote components.

18 Install on pull vehicle

975192 REV: B

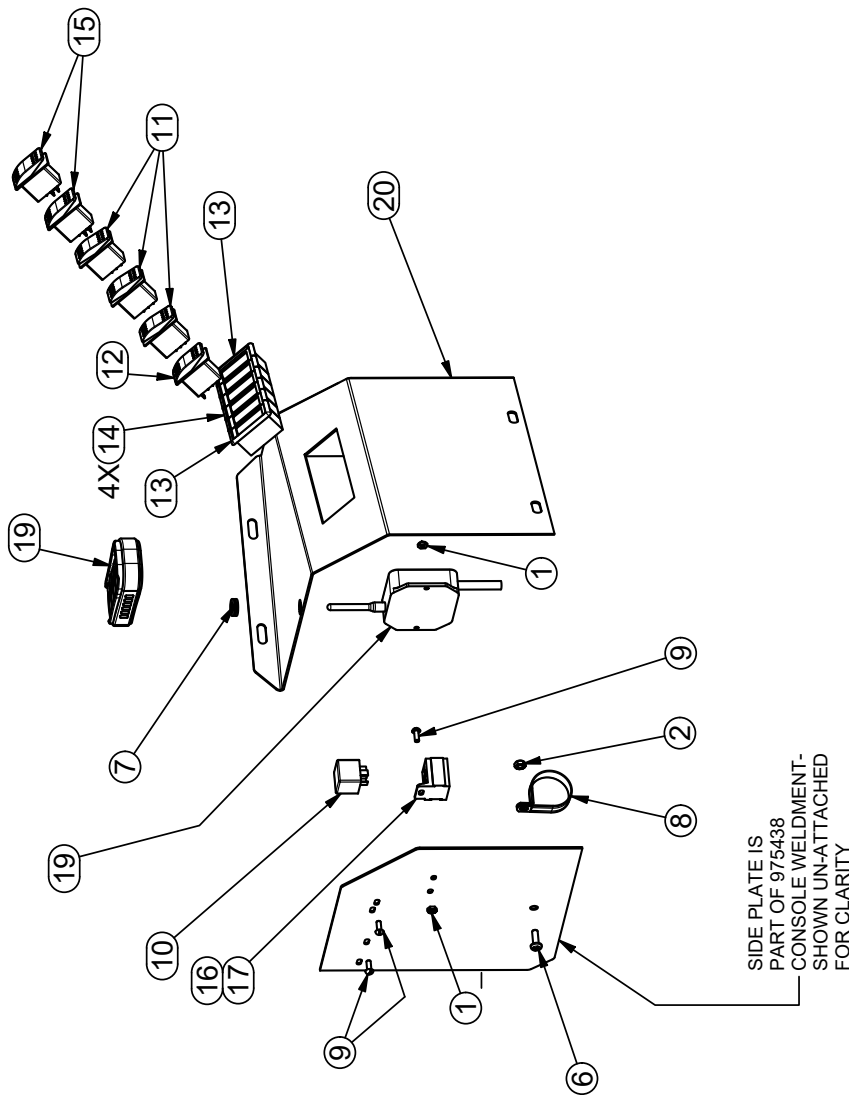
Parts List		
ITEM	QTY	PART # DESCRIPTION
1	3	110119 Nut, 10-24 Lock
2	1	110174 Nut, 1/4-20, Unitorque Lock
3	2	110319 Nut, 5/16-18 U-Type .75l
4	4	110459 Bolt, 5/16-18 X 1, Wiz Flange
5	2	110606 Nut, 5/16-18 Wiz Flange
6	1	110815 Screw, 1/4-20 X 3/4 SS Phillips Head
7	1	110967 Grommet, Rubber 7/16 Id X 3/4 Od
8	1	130012 Clamp, Adel Ac28 .265 Hole
9	3	510960 Screw, 10-24 X 0.5, Rhms
10	1	530111 Relay
11	3	832004 Switch, Paddle, Carling (29261)
12	1	832005 Switch, Paddle, Carling (29253)
13	2	832007 Switch Mount, End
14	4	832008 Switch Mount, Middle
15	2	832018 Switch, Spdt, On-On
16	1	932060 Harness, Vehicle/Remote Tv60h
17	1	932078 Harness, Tv60hdi Receiver
18	1	935017 Kit, Tv40/60h Tractor Harness
19	1	935025 Transmitter/Receiver, 2.4 Ghz, Tv60
20	1	975438 Weldment, Operators Console

935016 Kar-Tech Upgrade Kit (Field Install)		
QTY	PART #	DESCRIPTION
7	132110	Flyback Diode Assembly
1	333006	Transmitter/Receiver, 2.4 Ghz
1	902110	Decal, Switches
1	905075	Bolt Kit, Elect Assy
1	932078	Harness, Receiver
1	932060	Harness, Vehicle/Remote
1	932063	Harness, Tractor
1	932064	Harness, Kar-Tech Update

NEW 2.4 GHz 935025 Kar-Tech Transmitter / Receiver		
QTY	PART #	DESCRIPTION
1	332075	Receiver, 2.4 GHz
1	935029	Transmitter, 2.4 GHz
1	902249	Decal, 2.4 GHz

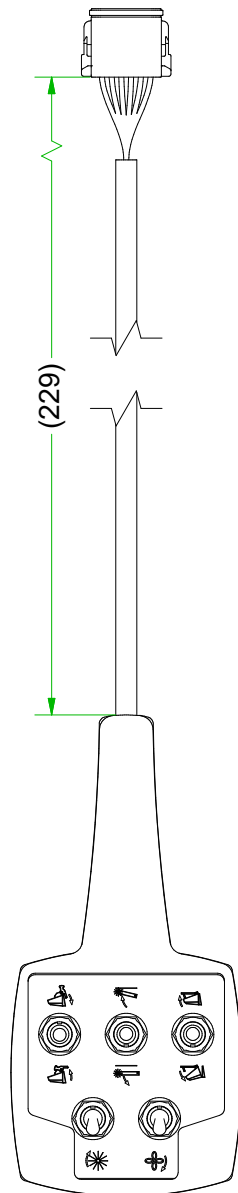
OLD STYLE 933003 Kar-Tech Transmitter / Receiver		
QTY	PART #	DESCRIPTION
1	932056	Receiver
1	233004	Transmitter
1	902158	Decal

CONTROL PANEL ASSEMBLY



SIDE PLATE IS
PART OF 975438
CONSOLE WELDMENT-
SHOWN UN-ATTACHED
FOR CLARITY

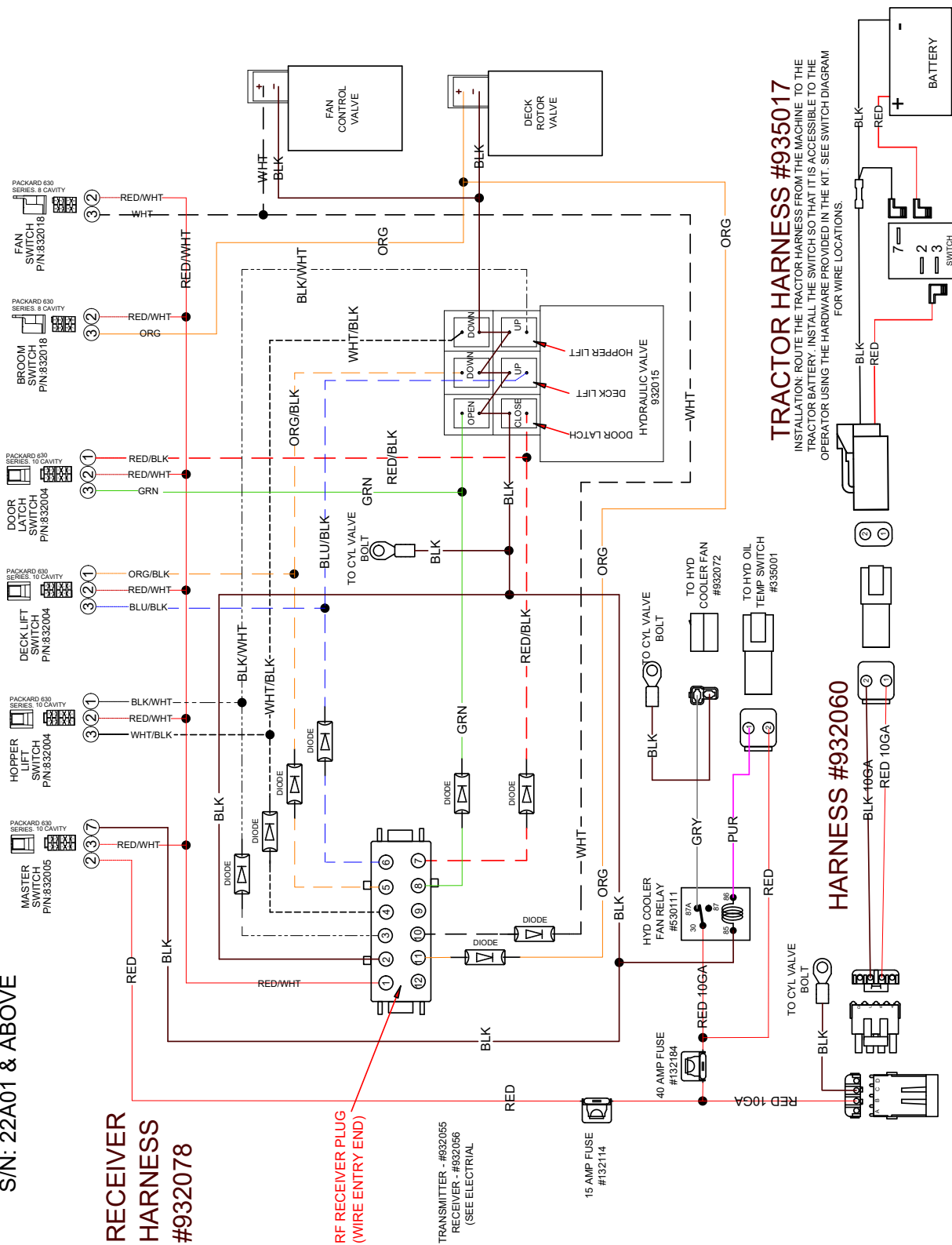
Parts List		
ITEM	QTY	PART # DESCRIPTION
1	3	110119 Nut, 10-24 Lock
2	1	110174 Nut, 1/4-20, Unitorque Lock
3	2	110319 Nut, 5/16-18 U-Type .75l
4	4	110459 Bolt, 5/16-18 X 1, Wiz Flange
5	2	110606 Nut, 5/16-18 Wiz Flange
6	1	110815 Screw, 1/4-20 X 3/4 SS Phillips Head
7	1	110967 Grommet, Rubber 7/16 Id X 3/4 Od
8	1	130012 Clamp, Adel Ac28 .265 Hole
9	3	510960 Screw, 10-24 X 0.5, Rhms
10	1	530111 Relay
11	3	832004 Switch, Paddle, Carling (29261)
12	1	832005 Switch, Paddle, Carling (29253)
13	2	832007 Switch Mount, End
14	4	832008 Switch Mount, Middle
15	2	832018 Switch, Spdt, On-On
16	1	932060 Harness, Vehicle/Remote Tv60h
17	1	932078 Harness, Tv60hd Receiver
18	1	935017 Kit, Tv40/60h Tractor Harness
19	1	935025 Transmitter/Receiver, 2.4 Ghz, Tv60
20	1	975438 Weldment, Operators Console



Optional Corded Remote		
QTY	PART #	DESCRIPTION
1	930011	Corded Remote Assembly

TV60RHD WIRING SCHEMATIC WITH KAR-TECH REMOTE

S/N: 22A01 & ABOVE



TRACTOR HARNESS #935017

INSTALLATION: ROUTE THE TRACTOR HARNESS FROM THE MACHINE TO THE TRACTOR BATTERY. INSTALL THE SWITCH SO THAT IT IS ACCESSIBLE TO THE OPERATOR USING THE HARDWARE PROVIDED IN THE KIT. SEE SWITCH DIAGRAM FOR WIRE LOCATIONS.

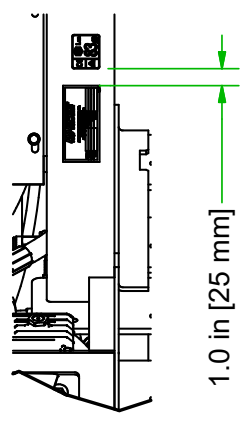
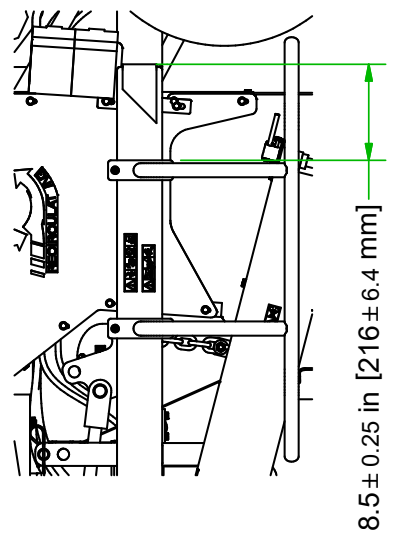
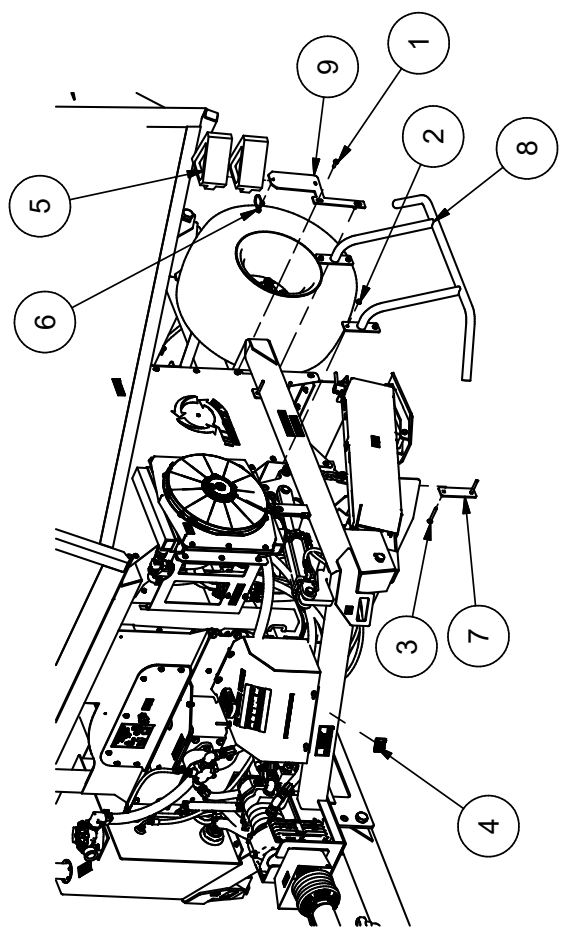
HARNES #932060

SHT 3 of 3

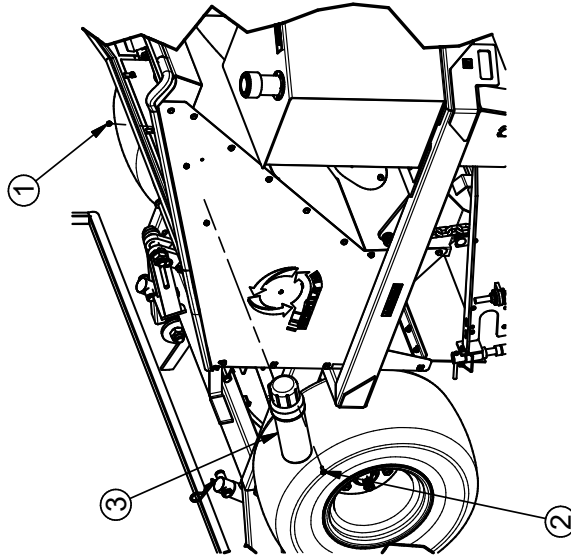
EXPORT KIT

905207 REV: NC

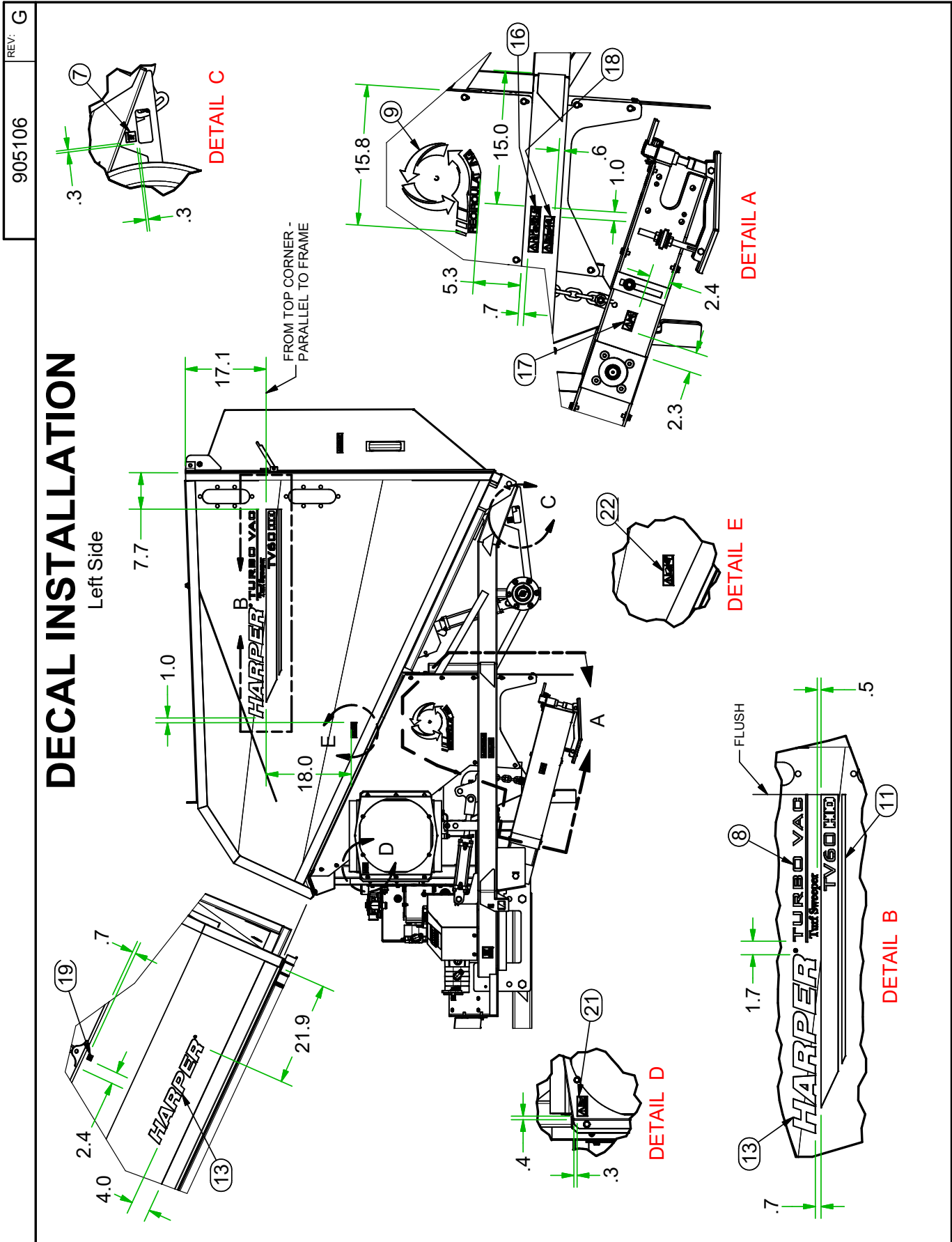
Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	2	110459	BOLT, 5/16-18 X 1, WIZ FLANGE
2	8	110606	NUT, 5/16-18 WIZ FLANGE
3	8	112090	Bolt, 5/16-18 X 2.75 in Carriage
4	1	302206	DECAL, SOUND LEVEL TV60RE
5	2	302207	WHEEL CHOCK, SOLID RUBBER
6	1	510962	PIN, WIRE LOCK
7	4	911272	SIDE GUARD BOLT PLATE
8	2	915856	SIDE GUARD W/A
9	1	970937	CHOCK HANGER



TV60RHD FINAL INSTALLATION

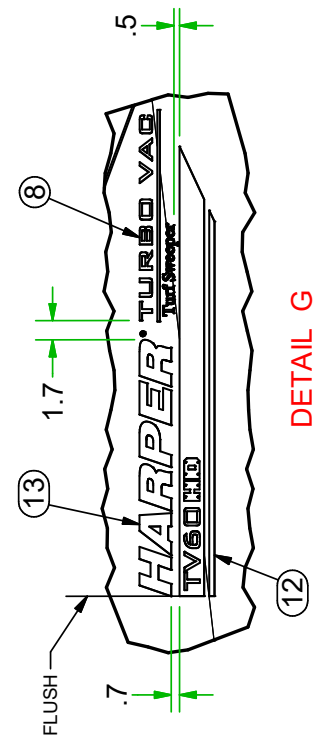
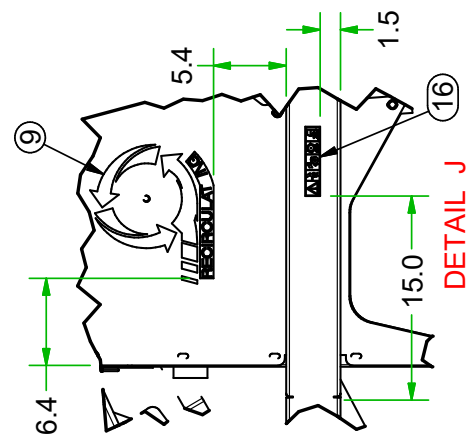
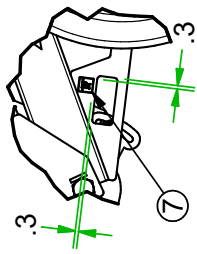
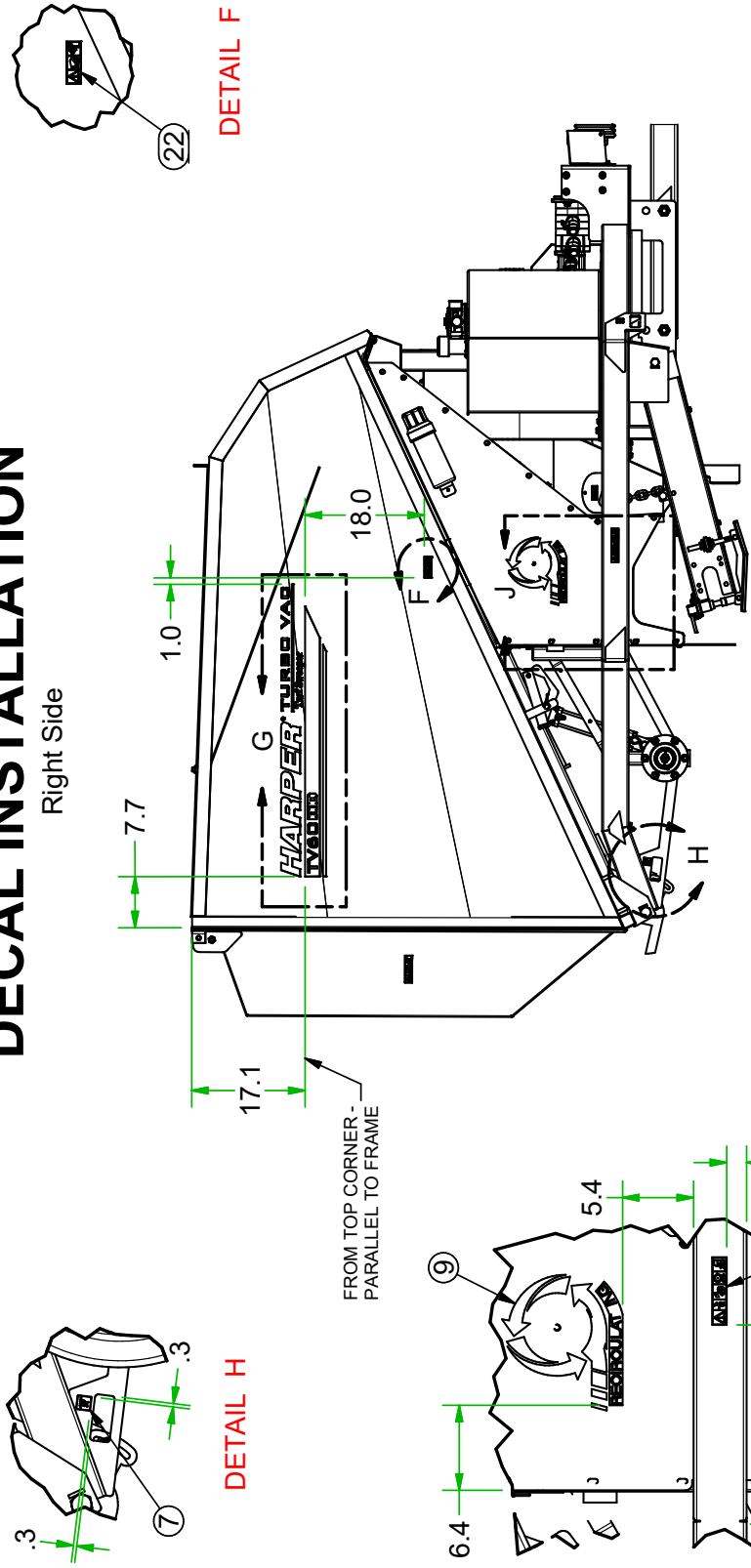


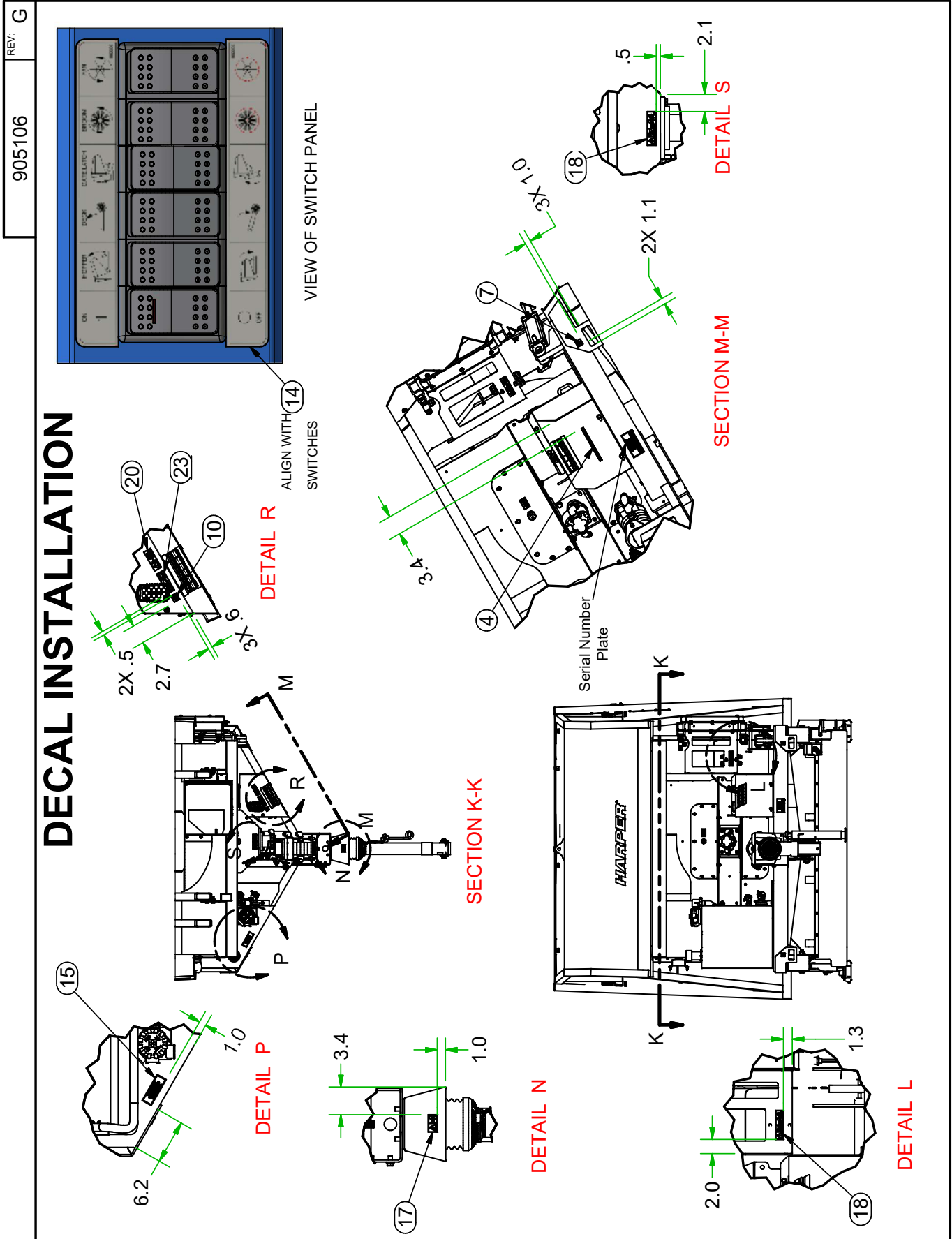
Parts List		
ITEM	QTY	PART # DESCRIPTION
1	3	110290 NUT, 1/4-20 WIZ FLANGE
2	3	110468 BOLT, 1/4-20 X 0.75, WIZ FLANGE
3	1	152005 HOLDER, MANUAL
4	1	202134 DECAL, PROP 65, SHORT FORM
7	4	802067 Decal, Tie Down Point
8	2	902084 Decal, Turbo Vac, Turf Sweeper
9	2	902104 DECAL, RECIRCULATING
10	1	902149 DECAL, READ OPERATORS MANUAL
11	1	902193 DECAL, STRIPE LEFT TV60R HD
12	1	902194 DECAL, STRIPE RIGHT, TV60R HD
13	3	902195 DECAL, HARPER 2.87 X 24.00, BLACK GLOSS
14	1	902202 DECAL, SWITCHES, TV60R HD
15	1	902204 DECAL, ISO 46 HYDRAULIC OIL
16	2	902227 Decal, Entanglement
17	2	902228 Decal, Do Not Remove Shield
18	3	902232 Decal, High Pressure Injection
19	1	902234 Decal, No Lift
20	1	902235 Decal, Safe Distance, No Slope
21	1	902239 Decal, Hot Surface
22	2	902245 Decal, Hopper Safety Lock
23	1	902247 Decal, Overhead Clearance



DECAL INSTALLATION

Right Side

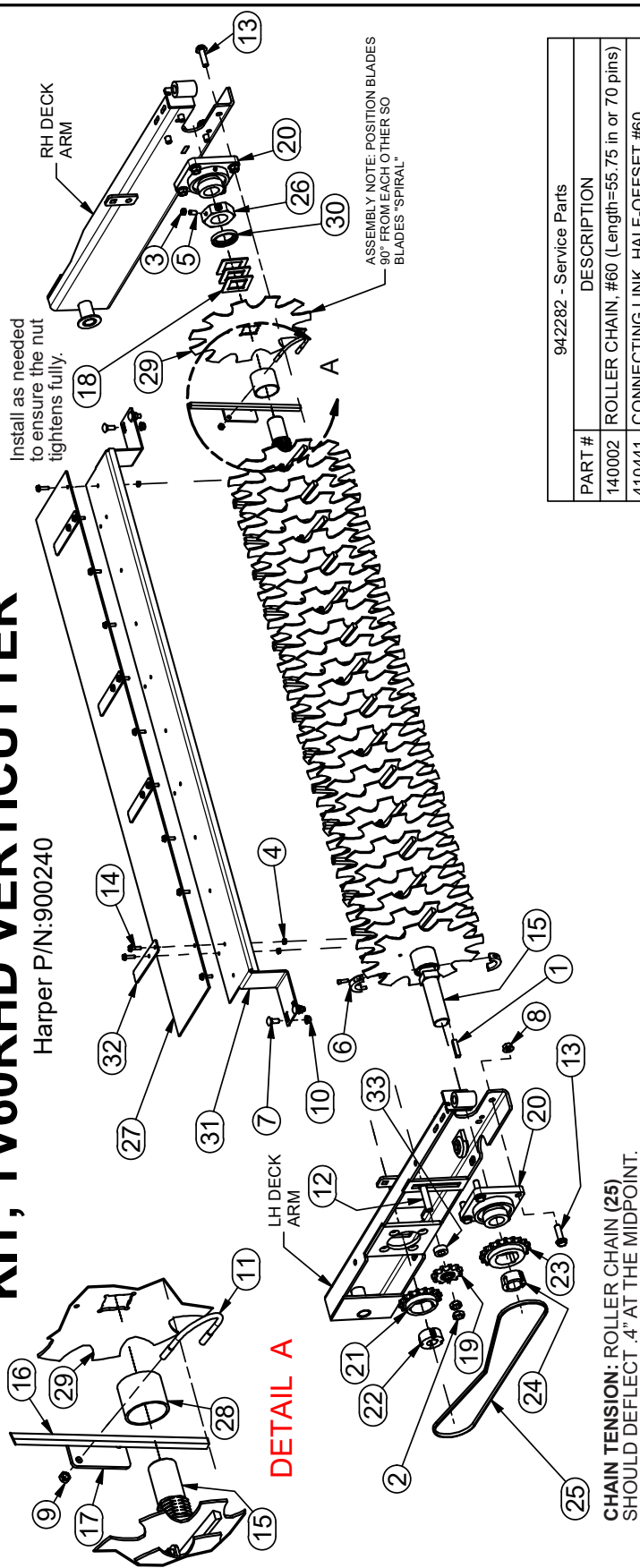




Parts List			Parts List			Parts List			900240	REV: B	
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	1	100567	KEY, 3/8 X 3/8 X 1.75 in	12	1	110895	Bolt, 5/8-11 X 3 in Carriage	23	1	942277	Sprocket, Roller Chain 60BTB19H-1610
2	2	110039	NUT, 5/8-11 JAM	13	8	111222	BOLT, 1/2-13 X 1.75, WIZ FLANGE	24	1	942278	Bushing, Taper 1610 1.5" Bore
3	2	110107	NUT, 3/8-16 HEX JAM GR 2	14	15	111227	BOLT, 1/4-20 X 1, WIZ FLANGE	25	1	942282	CHAIN, TV60HD Verticut #60 ROLLER
4	15	110174	NUT, 1/4-20, UNITORQUE LOCK	15	1	311400	SHAFT - VERTICUTTER, TV30	26	1	970475	NUT - HEX, JAM, 1-3/4 - 5 UNC
5	2	110325	SetScrew, 3/8-16 X 0.75	16	28	311608	FINGER, 12" RUBBER	27	1	970685	DEBRIS FLAP MAIN
6	1	110332	COLLAR - 1-1/2" SPLIT	17	28	311609	HOLDER, FINGER	28	29	970803	SPACER - VERTI CUTTER, 2 IN
7	4	110556	Bolt, 3/8-16 X 1 in Carriage	18	3	911276	SPACER, VERTICUTTER ASSY	29	29	970804	Blade, Dethatch, 10ga, 11 Point
8	8	110588	NUT, 1/2-13 WIZ FLANGE	19	1	942102	SPROCKET - IDLER, 6011 - 5/8 HARDEN	30	1	970805	WASHER - CUP, ROTOR
9	56	110600	NUT, 5/16-18, UNITORQUE LOCK	20	2	942273	BEARING, 4FNG VCJ 1 1/2"	31	1	970851	SHIELD, ROTOR DEBRIS
10	4	110645	NUT, 3/8-16 WIZ FLANGE	21	1	942274	Sprocket, Roller Chain 60BTB16H - 1610	32	4	970853	SUPPORT, DEBRIS FLAP
11	28	110824	BOLT, U-, 5/16-18 X 2-1/2 X 3-3/16	22	1	942275	Bushing, Taper 1610 1.0" Bore	33	1	970862	SPACER, IDLER SPROCKET

KIT, TV60RHD VERTICUTTER

Harper P/N:900240

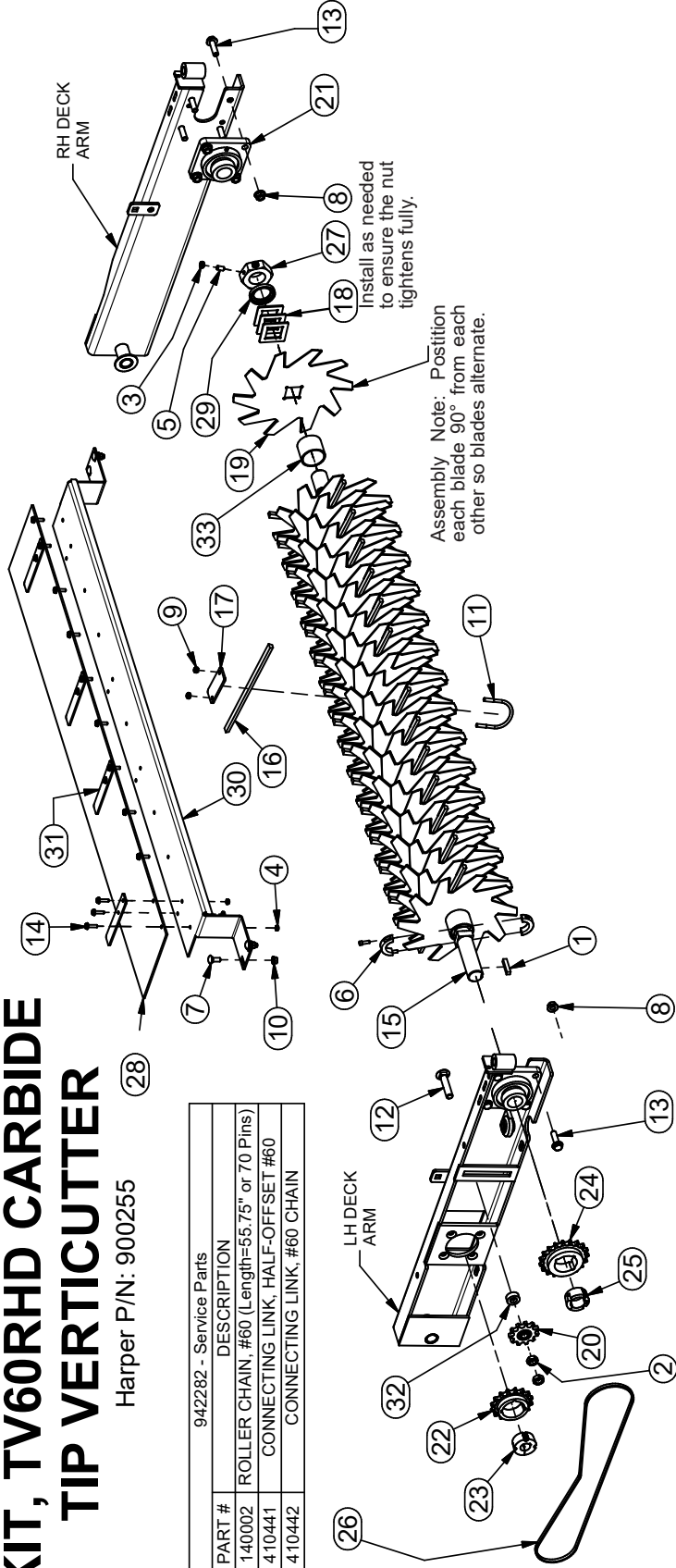


942282 - Service Parts	
PART #	DESCRIPTION
140002	ROLLER CHAIN, #60 (Length=55.75 in or 70 pins)
410441	CONNECTING LINK, HALF-OFFSET #60
410442	CONNECTING LINK, #60 CHAIN

Parts List				Parts List				Parts List			
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	1	100567	KEY, 3/8 X 3/8 X 1.75 in	11	28	110824	BOLT, U-, 5/16-18 X 2-1/2 X 3-3/16	22	1	942274	Sprocket, Roller Chain 60BTB16H - 1610
2	2	110039	NUT, 5/8-11 JAM	12	1	110895	Bolt, 5/8-11 X 3 in Carriage	23	1	942275	Bushing, Taper 1610 1.0" Bore
3	2	110107	NUT, 3/8-16 HEX JAM GR 2	13	8	111222	BOLT, 1/2-13 X 1.75, WIZ FLANGE	24	1	942277	Sprocket, Roller Chain 60BTB19H-1610
4	15	110174	NUT, 1/4-20, UNITORQUE LOCK	14	15	111227	BOLT, 1/4-20 X 1, WIZ FLANGE	25	1	942278	Bushing, Taper 1610 1.5" Bore
5	2	110325	SetScrew, 3/8-16 X 0.75	15	1	311400	SHAFT - VERTICUTTER, TV30	26	1	942282	CHAIN, TV60HD Verticut #60 ROLLER
6	1	110332	COLLAR - 1-1/2" SPLIT	16	28	311608	FINGER, 12" RUBBER	27	1	970475	NUT - HEX, JAM, 1-3/4 - 5 UNC
7	4	110556	Bolt, 3/8-16 X 1 in Carriage	17	28	311609	HOLDER, FINGER	28	1	970685	DEBRIS FLAP MAIN
8	8	110588	NUT, 1/2-13 WIZ FLANGE	18	3	911276	SPACER, VERTICUTTER ASSY	29	1	970805	WASHER - CUP, ROTOR
9	56	110600	NUT, 5/16-18, UNITORQUE LOCK	19	29	912013	BLADE, CARBIDE TIP 12 GA VERTI-CUTTER	30	1	970851	SHIELD, ROTOR DEBRIS
10	4	110645	NUT, 3/8-16 WIZ FLANGE	20	1	942102	SPROCKET - IDLER, 6011 - 5/8 HARDEN	31	4	970853	SUPPORT, DEBRIS FLAP
				21	2	942273	BEARING, 4FNG VCJ 1 1/2"	32	1	970862	SPACER, IDLER SPROCKET
								33	29	970874	SPACER, VERTI-CUTTER, 2 IN 12Ga BLADE

KIT, TV60RHD CARBIDE TIP VERTICUTTER

Harper P/N: 900255

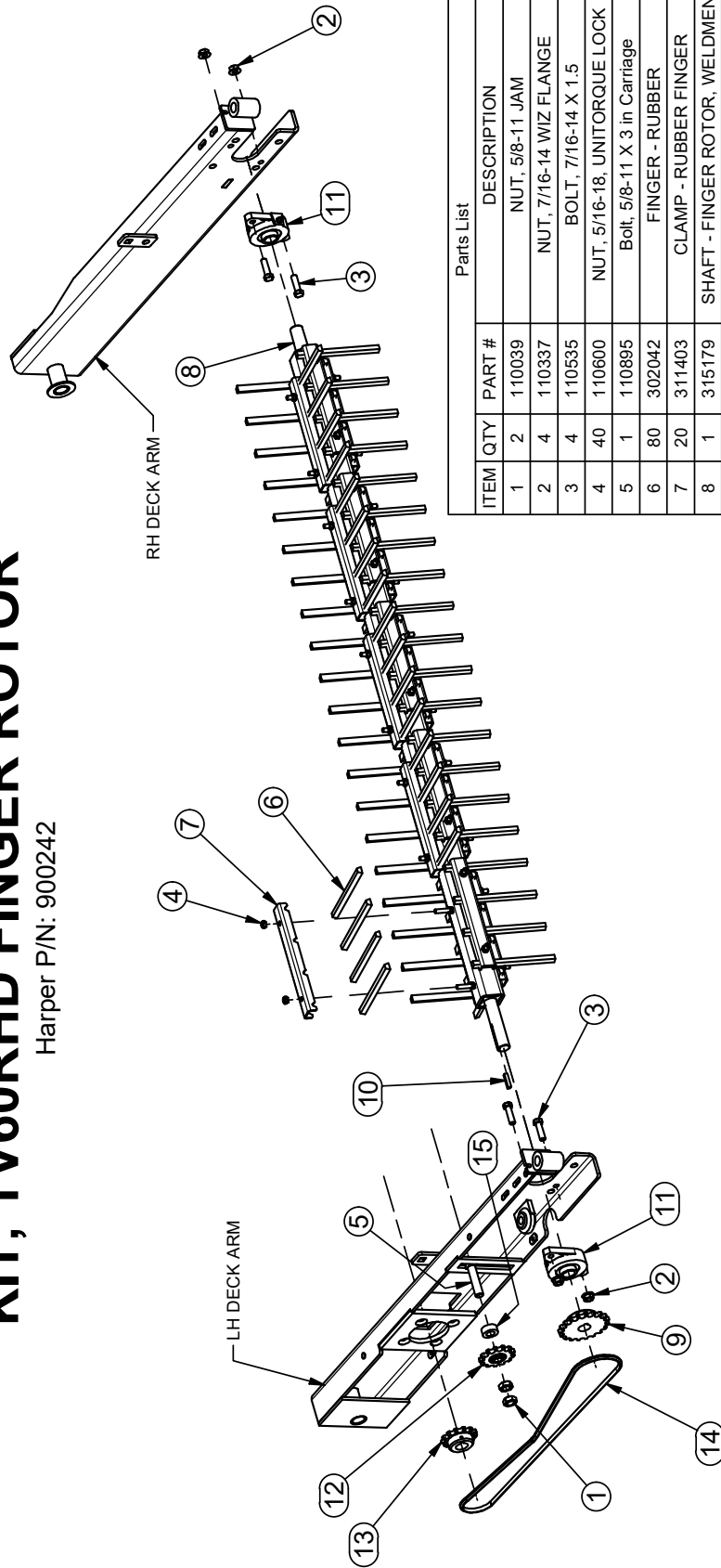


942282 - Service Parts	
PART #	DESCRIPTION
140002	ROLLER CHAIN, #60 (Length=55.75" or 70 Pins)
410441	CONNECTING LINK, HALF-OFFSET #60
410442	CONNECTING LINK, #60 CHAIN

CHAIN TENSION: ROLLER CHAIN (26)
SHOULD DEFLECT .4" AT THE MIDPOINT.

KIT, TV60RHD FINGER ROTOR

Harper P/N: 900242



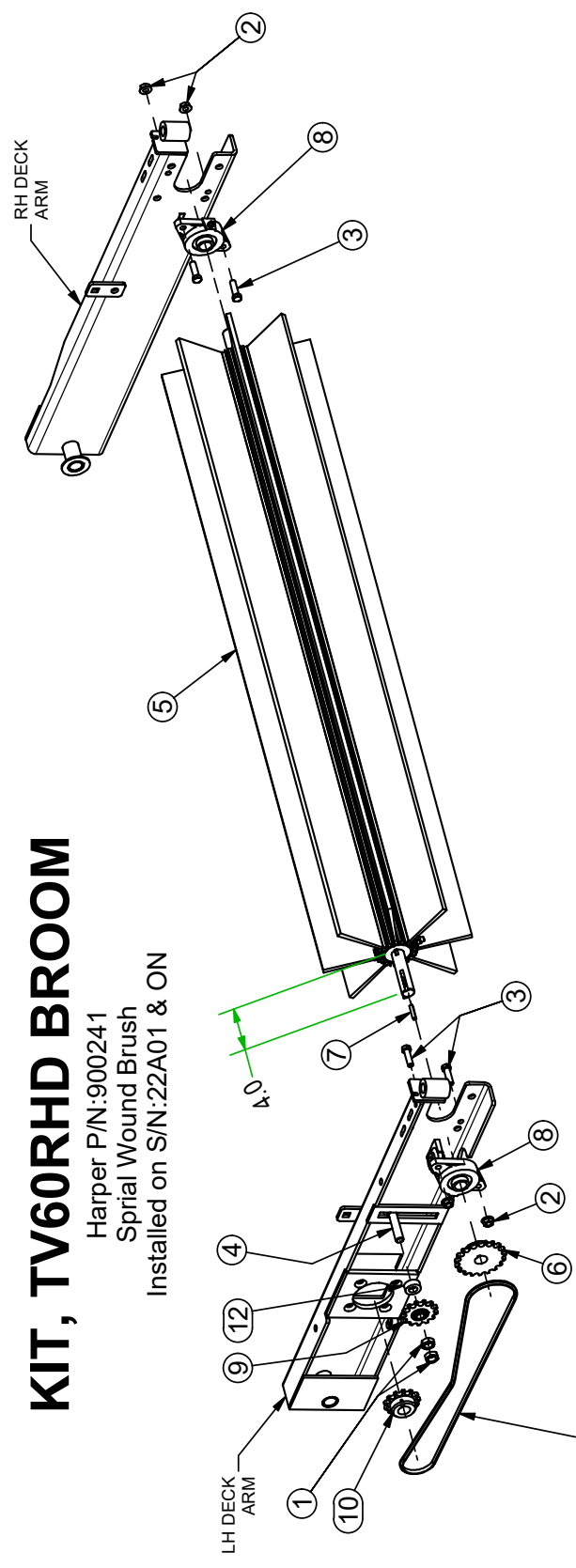
Parts List		
ITEM	QTY	PART # DESCRIPTION
1	2	110039 NUT, 5/8-11 JAM
2	4	110337 NUT, 7/16-14 WIZ FLANGE
3	4	110535 BOLT, 7/16-14 X 1.5
4	40	110600 NUT, 5/16-18, UNITORQUE LOCK
5	1	110895 Bolt, 5/8-11 X 3 in Carriage
6	80	302042 FINGER - RUBBER
7	20	311403 CLAMP - RUBBER FINGER
8	1	315179 SHAFT - FINGER ROTOR, WELDMENT
9	1	342016 SPROCKET - 50B19 X 1
10	1	510089 Key, 1/4 X 1/4 X 1.25, Under
11	2	942080 BEARING, 1" 2 BOLT FLANGE
12	1	942279 SPROCKET, IDLER #50 x 13T x 5/8ID
13	1	942280 SPROCKET, ROLLER CHAIN 50BS13 X 1"
14	1	942281 CHAIN, ROLLER #50 TV60HD
15	1	970862 SPACER, IDLER SPROCKET

942281 - Service Parts	
PART #	DESCRIPTION
142006	ROLLER CHAIN, #50 (Length=51.219 in)
140011	CONNECTING LINK, #50 CHAIN

CHAIN TENSION: ROLLER CHAIN (14) SHOULD DEFLECT .4" AT THE MIDPOINT.

KIT, TV60RHD BROOM

Harper P/N:900241
Spiral Wound Brush
Installed on S/N:22A01 & ON



942281 - Service Parts	
PART #	DESCRIPTION
142006	ROLLER CHAIN, #50 - (51.219")
140011	CONNECTING LINK, #50 CHAIN

CHAIN TENSION: ROLLER CHAIN (11)
SHOULD DEFLECT .4" AT THE MIDPOINT.

Service Note

- Due to part availability, starting at S/N: 22A01, the machine may have been equipped with a Full Brush Rotor (P/N: 305135) or a Strip Brush Rotor (P/N: 305157). See the brush assembly pages for service part details.

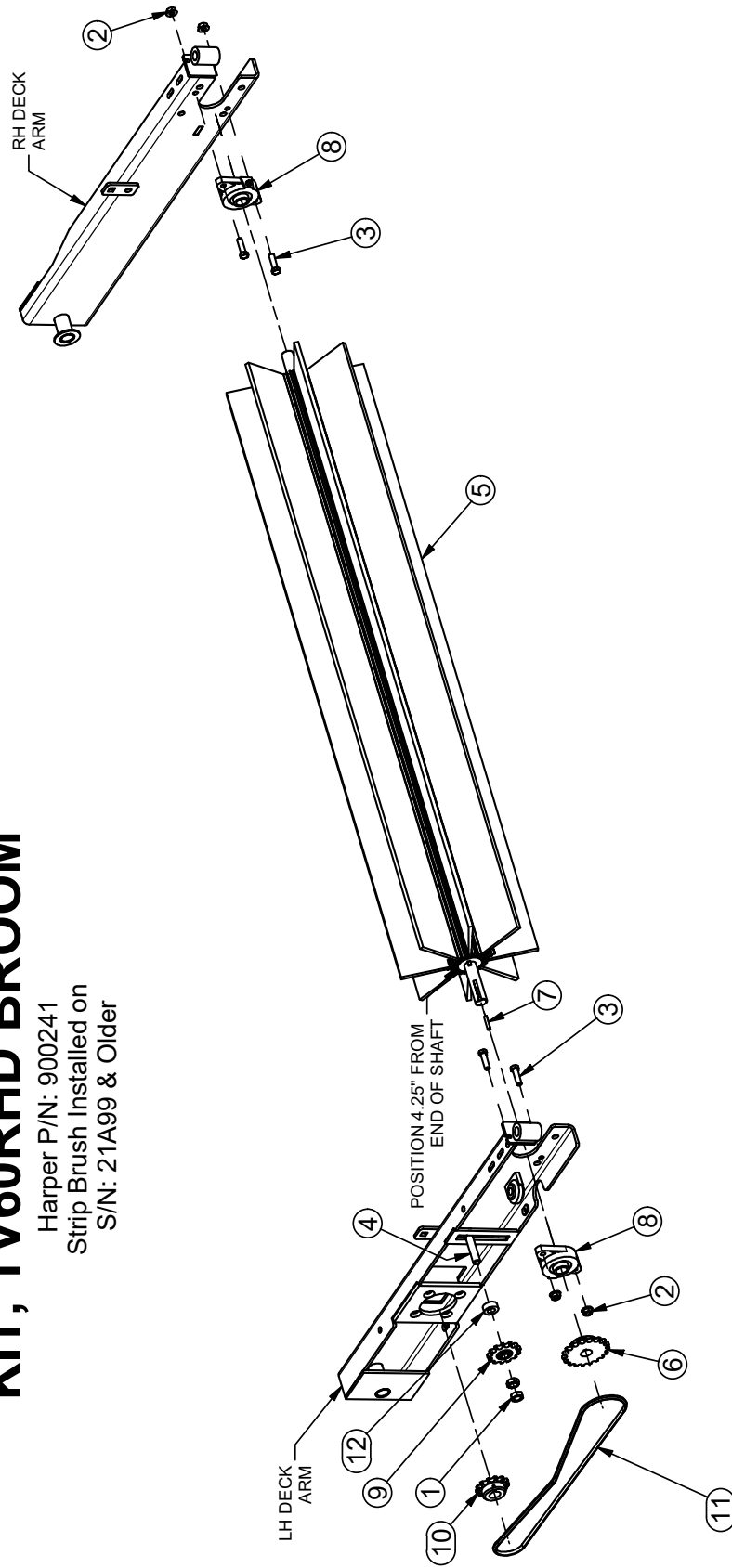
Parts List		
ITEM	QTY	DESCRIPTION
1	2	NUT, 5/8-11 JAM
2	4	NUT, 7/16-14 WIZ FLANGE
3	4	BOLT, 7/16-14 X 1.5
4	1	Bolt, 5/8-11 X 3 in Carriage
5	2	ASSY, TV35/TV60HD STRIP BRUSH
6	1	SPROCKET - 50B19 X 1
7	1	KEY, 1/4 X 1/4 X 1.25 in
8	2	BEARING, 1" 2 BOLT FLANGE
9	1	SPROCKET, IDLER #50 x 13T x 5/8ID
10	1	SPROCKET, ROLLER CHAIN 50BS13 X 1"
11	1	CHAIN, ROLLER #50 TV60HD
12	1	SPACER, IDLER SPROCKET

900241 REV: C

Parts List		Parts List	
ITEM	QTY	PART #	DESCRIPTION
1	2	110039	NUT, 5/8-11 JAM
2	4	110337	NUT, 7/16-14 WIZ FLANGE
3	4	110535	BOLT, 7/16-14 X 1.5
4	1	110895	Bolt, 5/8-11 X 3 in Carriage
5	2	305157	ASSY, TV35/TV60HD STRIP BRUSH
6	1	342016	SPROCKET - 50B19 X 1
7	1	510089	KEY, 1/4 X 1/4 X 1.25 in
8	2	942080	BEARING, 1" 2 BOLT FLANGE
9	1	942279	SPROCKET, IDLER #50 x 13T x 5/8ID
10	1	942280	SPROCKET, ROLLER CHAIN 50BS13 X 1"
11	1	942281	CHAIN, ROLLER #50 TV60HD
12	1	970862	SPACER, IDLER SPROCKET

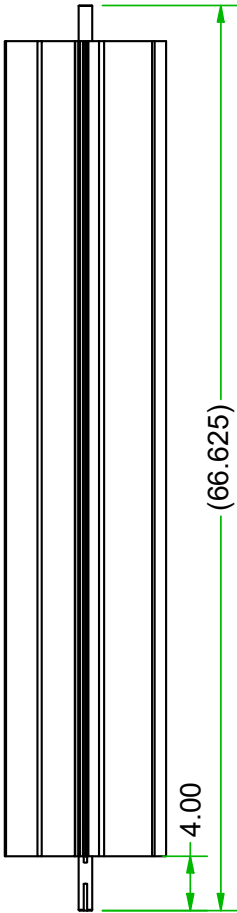
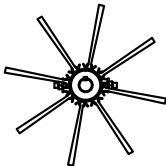
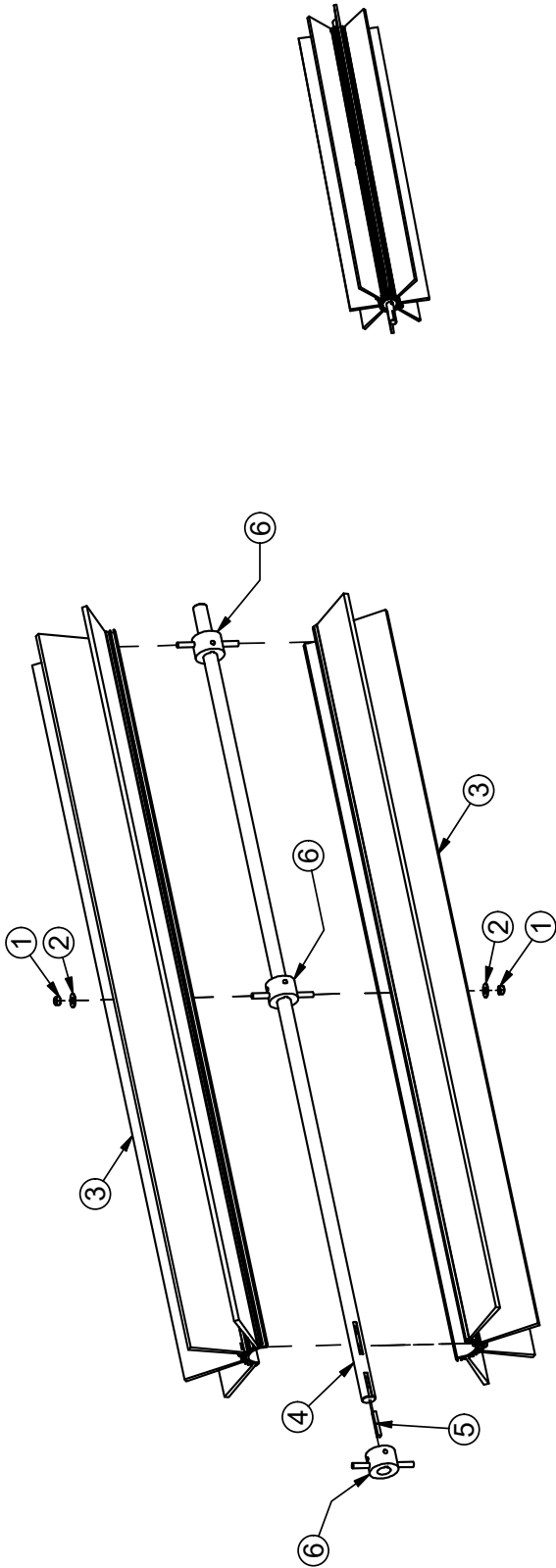
KIT, TV60RHD BROOM

Harper P/N: 900241
 Strip Brush Installed on
 S/N: 21A99 & Older



942282 - Service Parts	
PART #	DESCRIPTION
140006	ROLLER CHAIN, #50 (Length=51.219 in)
140011	CONNECTING LINK, #50 CHAIN

BRUSH ASSEMBLY



Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	6	110621	NUT, 3/8-16, UNITORQUE LOCK
2	6	110676	WASHER, 3/8" FLAT STANDARD
3	1	302003	Brush, Strip Assembly, 60 x 12.0, .030 Poly
4	1	311369	SHAFT - BROOM, DECK
5	1	411481	KEY, 1/4 x 1/4 x 2.0
6	3	973002	FLANGE, 2 1/8 X 1, T-J-16

BRUSH ASSEMBLY

Parts List			
ITEM	QTY	PART #	DESCRIPTION
1	1	302170	Brush, Spiral Wound, 60 x 11.50 OD, .030 Poly
2	1	311369	SHAFT - BROOM, DECK
3	1	411481	KEY, 1/4 x 1/4 x 2.0

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