

OPERATION AND PARTS MANUAL



WHITEMAN SERIES **MODEL HHN-31V**

RIDE-ON POWER TROWEL (B & S VANGUARD GASOLINE ENGINE)

Revision # 5 (03/02/07)



THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

P/N 20382

PARTS FINDER

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WARNING



CALIFORNIA — Proposition 65 Warning

Engine exhaust and some of its constituents, and some dust created by power sanding, sawing, grinding, drilling and other construction activities contains chemicals known to the State of California to cause cancer, birth defects and other reproductive harm. Some examples of these chemicals are:

- Lead from lead-based paints.
- Crystalline silica from bricks.
- Cement and other masonry products.
- Arsenic and chromium from chemically treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: **ALWAYS** work in a well ventilated area, and work with approved safety equipment, such as dust masks that are specially designed to filter out microscopic particles.

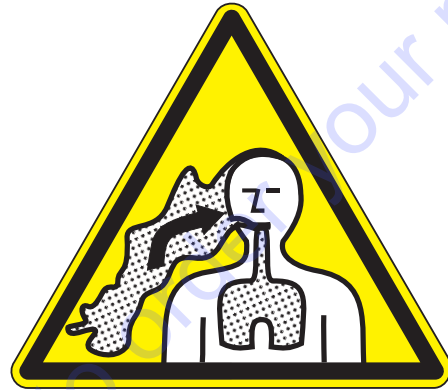
! WARNING



SILICOSIS WARNING

Grinding/cutting/drilling of masonry, concrete, metal and other materials with silica in their composition may give off dust or mists containing crystalline silica. Silica is a basic component of sand, quartz, brick clay, granite and numerous other minerals and rocks. Repeated and/or substantial inhalation of airborne crystalline silica can cause serious or fatal respiratory diseases, including silicosis. In addition, California and some other authorities have listed respirable crystalline silica as a substance known to cause cancer. When cutting such materials, always follow the respiratory precautions mentioned above.

! WARNING



RESPIRATORY HAZARDS

Grinding/cutting/drilling of masonry, concrete, metal and other materials can generate dust, mists and fumes containing chemicals known to cause serious or fatal injury or illness, such as respiratory disease, cancer, birth defects or other reproductive harm. If you are unfamiliar with the risks associated with the particular process and/or material being cut or the composition of the tool being used, review the material safety data sheet and/or consult your employer, the material manufacturer/supplier, governmental agencies such as OSHA and NIOSH and other sources on hazardous materials. California and some other authorities, for instance, have published lists of substances known to cause cancer, reproductive toxicity, or other harmful effects.

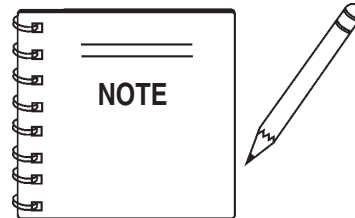
Control dust, mist and fumes at the source where possible. In this regard use good work practices and follow the recommendations of the manufacturers or suppliers, OSHA/NIOSH, and occupational and trade associations. Water should be used for dust suppression when wet cutting is feasible. When the hazards from inhalation of dust, mists and fumes cannot be eliminated, the operator and any bystanders should always wear a respirator approved by NIOSH/MSHA for the materials being used.

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Specifications and part numbers are subject to change without notice.

TRAINING CHECKLIST

TRAINING CHECKLIST

This checklist will lists some of the minimum requirements for machine maintenance and operation. Please feel free to detach it and make copies. Use this checklist whenever a new operator is to be trained or it can be used as a review for more experienced operator's.

TRAINING CHECKLIST			
NO.	DESCRIPTION	OK?	DATE
1	Read Operator s Manual completely.		
2	Machine layout, location of components, checking of engine and gearbox oil levels.		
3	Fuel system, refueling procedure.		
4	Operation of spray and lights (if equipped).		
	Operation of controls (machine not running).		
6	Safety controls, seat kill switch operation.		
7	Emergency stop procedures.		
8	Startup of machine.		
9	Maintaining a hover.		
10	Maneuvering		
11	Pitching		
12	Matching blade pitch between towers. Twin Pitch and Electric Pitch: disengaging the linkage.		
13	Concrete finishing techniques.		
14	Shutdown of machine.		
15	Lifting of machine (lift loops).		
16	Machine transport and storage.		

Operator _____ Trainee _____

COMMENTS:

DAILY PRE-OPERATION CHECKLIST

DAILY PRE-OPERATION CHECKLIST

DAILY PRE-OPERATION CHECKLIST	
1	Engine oil level.
2	Gearbox oil level.
3	Radiator coolant level.
4	Condition of blades.
5	Blade pitch operation.
6	Kill switch (seat) operation.
7	Steering control operation.
8	Condition of belts

COMMENTS:

Go to Discount-Equipment.com to order your parts

HHN-31V— RULES FOR SAFE OPERATION

CAUTION:



Failure to follow instructions in this manual may lead to serious injury or even death! This equipment is to be operated by trained and qualified personnel only! This equipment is for industrial use only.

The following safety guidelines should always be used when operating the trowel.

GENERAL SAFETY

- **DO NOT** operate or service this equipment before reading this entire manual.



- This equipment should not be operated by persons under 18 years of age.

- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, steel-toed boots and other protective devices required by the job.



- **NEVER** operate this equipment when not feeling well due to fatigue, illness or taking medicine.



- **NEVER** operate this equipment under the influence of drugs or alcohol.



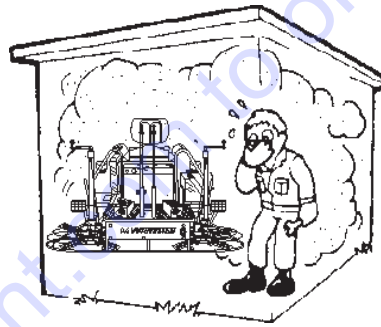
- **NEVER** use accessories or attachments, which are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.
- Manufacturer does not assume responsibility for any accident due to equipment modifications.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Always check the machine for loosened threads or bolts before starting.

- **NEVER** touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing engine or trowel.



- **High Temperatures** – Allow the engine to cool before adding fuel or performing service and maintenance functions. Contact with *hot* components can cause serious burns.

- The ride-on trowel engine requires an adequate free flow of cooling air. Never operate the ride-on trowel in any enclosed or narrow area where free flow of the air is restricted. If the air



flow is restricted it will cause serious damage to the trowel or engine and may cause injury to people. Remember the trowel's engine gives off **DEADLY** carbon monoxide gas.

- Always refuel in a well-ventilated area, away from sparks and open flames.



n Always use extreme caution when working with **flammable** liquids. When refueling, **stop the** engine and allow it to cool. **DO NOT** smoke around or near the trowel. Fire or explosion could result from fuel vapors, or if fuel is spilled on a hot engine.

- **NEVER** operate the trowel in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe *bodily harm or even death*.
- Topping-off to filler port is dangerous, as it tends to spill fuel.

HHN-31V— RULES FOR SAFE OPERATION

The following safety guidelines should always be used when operating the HHN Ride-on Power Trowel:

GENERAL SAFETY

- **DO NOT** operate this equipment unless all guards and safety devices are attached and in place.
- Always use proper heavy lifting techniques when moving equipment. This ride-on trowel is very heavy. It should be lifted only with a lifting device (i.e. crane, forklift, etc.) with a lifting capacity of at least one ton.
- Always check to make sure that the operating area is clear before starting the engine.
- Always test the safety kill switch before operating the equipment.
- **NEVER** place your feet inside the guard rings while starting or operating this equipment.
- Always keep clear of rotating or moving parts while operating this equipment.
- **NEVER** leave the machine **unattended** while running.
- Always refuel in a well-ventilated area, away from sparks and open flames.
- **Moving Parts** - Shut down the engine and disconnect battery before performing service or maintenance functions. Contact with moving parts can cause serious injury.

CAUTION:

Temperatures



- **High Temperatures** – Allow the machine and engine to cool before adding fuel or performing service and maintenance functions. Contact with *hot* components can cause serious burns.

CAUTION:

Emergencies



- Always know the location of the nearest **fire extinguisher** and **first aid kit**. Know the location of the nearest telephone. Also know the phone numbers of the nearest **ambulance, doctor** and **fire department**. This information will be invaluable in the case of an emergency.

MAINTENANCE SAFETY

- Disconnect the battery and spark plug wires before attempting any type of service.
- Securely support any machine components that must be raised.
- **NEVER** lubricate components or attempt service on a running machine.
- Always allow the machine a proper amount of time to cool before servicing.
- Keep the machinery in proper running condition.
- Make sure that there is no buildup of concrete, grease, oil or debris on the machine.
- Fix damage to the machine immediately and always replace broken parts.
- Dispose of hazardous waste properly. Examples of potentially hazardous waste are used motor oil, fuel and fuel filters.
- **DO NOT** use food or plastic containers to dispose of hazardous waste.
- **DO NOT** pour waste, oil or fuel directly onto the ground, down a drain or into any water source.

Moving the Ride-On Trowel

CAUTION:



This ride-on trowel is very **heavy** and awkward to move around. Use proper heavy lifting procedures and **DO NOT** attempt to lift the ride-on trowel by the guard rings.

The HHN series Ride-on Power Trowel is designed to be moved and handled several ways.

The easiest way to lift the ride-on trowel is to utilize the lift loops that are welded to the frame. These lift loops are located to the left and right sides of the operator's seat (Figure 3, Page 11).









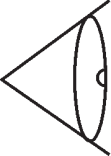
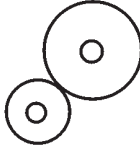




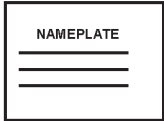



A strap or chain can be attached to these lift loops, allowing a forklift or crane to lift the ride-on trowel up onto a slab of concrete. The strap or chain should have a minimum 2,000 pounds (1000-kg) lifting capacity and the lifting gear must be capable of lifting at least this amount.

HHN-31V— OPERATION AND SAFETY DECALS

Machine Safety Decals

The HHN series Ride-on Power Trowel is equipped with a number of safety decals. These decals are provided for operator safety and maintenance information. Table 1 below illustrates these decals as they appear on the machine. Should any of these decals become unreadable, replacements can be obtained from your dealer.

Table 1. HHN-31V Safety & Operating Decals

	Symbol for CAUTION . When this symbol is displayed in the manual or on the machine be aware that there is a potential for personal injury or damage to the equipment. Always follow instructions for safe operation and use.		Lift point symbol. Symbol indicates where machine should be lifted.
	Symbol indicates that it is mandatory to wear safety glasses, safety helmet and ear protection. P/N 11247 (Part of decal kit 12620)		Lubrication symbol. Know that wherever you see this symbol on the machine, a lubrication point will be called out. P/N 11246 (Part of decal kit 12620)
	Symbol indicates that it is mandatory to wear gloves. P/N 11247 (Part of decal kit 12620)		Symbol indicates that it is mandatory to wear safety shoes, with extra protection (steel toed). P/N 11247 (Part of decal kit 12620)
	Radiating heat symbol. Symbol indicates equipment is hot. P/N 11246 (Part of decal kit 12620)		This is the symbol for belt drive. P/N 11246 (Part of decal kit 12620)
	Symbol for examining or checking of the machine. Mostly used for maintenance. P/N 11246 (Part of decal kit 12620)		This is the symbol for gear drive. P/N 11246 (Part of decal kit 12620)
	OIL, WATER AND CHARGE DECAL. P/N 12571		
			
			P/N 10818 (WHITE/PANEL)

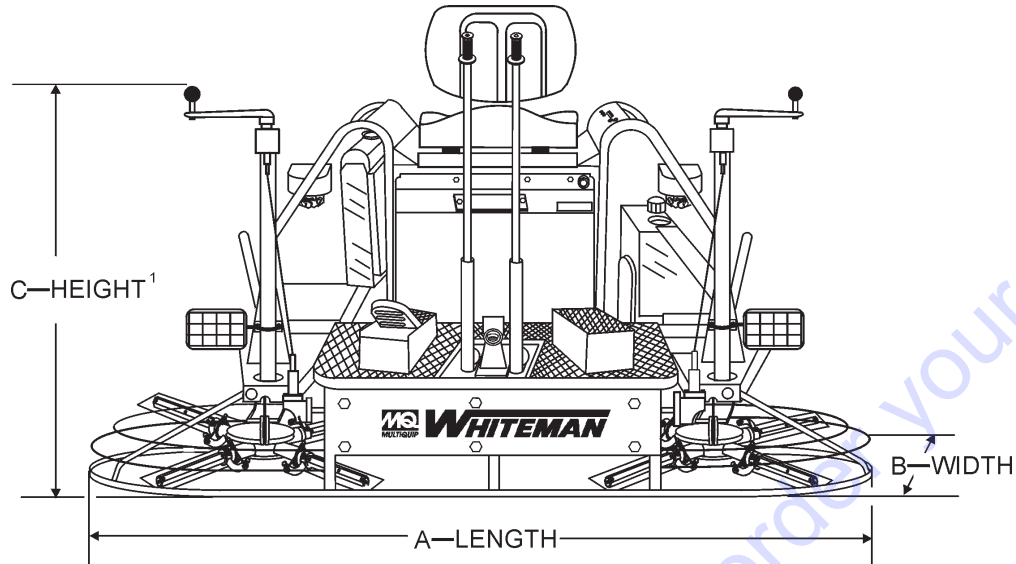


Figure 1. HNN Dimension Specifications

Table 2. HNN Specifications

SPECIFICATION PARAMETER	HNN-31V (VANGUARD)
A-Length – in. (cm)	97.0 (246.4)
B-Width – in. (cm)	50.0 (127)
C-Height – in. (cm) ¹	46.0 (117)
Weight – lbs. (kgs.) Operating	1,042 (477)
Weight – lbs. (kgs.) Shipping	1,224 (555)
Sound Pressure – dBA ²	95
Vibration – ft/s ² (m/ s ²) ³	<8.0 (2.5)
Engine – H.P.	31
Fuel Tank – gallons (liters)	5 (19)
Rotor – RPM	60 to 160
Path Width – in. (cm)	91 (231)
Lubrication Oil	ISO 220 GR 5EP
Gear Box Oil Capacity	144 OZ.
Fuel Consumption (Full Load)	0.54 LB/BHP-HR
Radiator Capacity	1.0 GAL.

NOTE:

- This value does not include seat height. To obtain total height (seat) add 4 inches (10.2 cm.).
- Sound pressure is "A" weighted . Measured at the operators ear position while the ride-on trowel is operating at full throttle on concrete in a manner most often experienced in "normal" circumstances. Sound pressure may vary depending upon the condition of the concrete. Hearing protection is always recommended.
- The vibration level indicated is the maximum RMS (Root Mean Square) value obtained at the handle grip while operating the ride-on trowel on curing concrete in a manner most often experienced in "normal" circumstances. Values were obtained from all three axes of motion. The values shown represent the maximum RMS value from these measurements.

HHN RIDE-ONTROWEL FAMILIARIZATION

The HHN series Ride-On Power Trowel is designed for the floating and finishing of concrete slabs.

Take a walk around the HHN Ride-On Power Trowel. Take notice of all the major components (see Figures 2 and 3, pages 13 and 14) like the engine, blades, air cleaner, fuel system, fuel shut-off valve, ignition switch etc. Check that there is always oil in the engine, and gear oil in the gear box assembly.

Read all the safety instructions carefully. Safety instructions will be found throughout this manual and on the machine. Keep all safety information in good, readable condition. Operators should be well trained on the operation and maintenance of the HHN Ride-On Power Trowels.

Look at the operator control levers. Grab the control levers and move them around a bit. Look to see how moving the control levers causes the gearboxes and frame to move.

Notice the foot pedal which controls the engine speed. Also take a look at the main driveline of the trowel. Take note and reference how the belts look, this is the way the belts should look when adjusted properly.

Before using your HHN Ride-On Power Trowel, test it on a flat watered down section of finished concrete. This trial test run will increase your confidence in using the trowel and at the same time it will familiarize you with the trowel's controls and indicators. In addition you will understand how the trowel will handle under actual conditions.

Engine

The HHN Ride-On Power Trowel is equipped with a liquid cooled 31 HP Vanguard gasoline engine. Refer to the engine owner's manual for specific instructions regarding engine operation. This manual is included with the ride-on trowel at the time of shipping from Whiteman. Please contact your nearest Multiquip Dealer for a replacement should the original manual disappear.

Blades

The blades of the ride-on power trowel finish the concrete as they are swirled around the surface. Blades are classified as combination (10 or 8 inches wide) and finish (6 inches wide). The HHN ride-on power trowels are equipped with five blades per rotor equally spaced in a radial pattern and attached to a vertical rotating shaft by means of a **spider assembly**.

Figures 2 and 3 show the location of the controls, indicators and general maintenance parts. Each control may perform more than one function. The functions of each control or indicator is on pages 13 and 14.

Gearboxes

The HHN Ride on Power Trowel consist of two separate gearbox assemblies that are enclosed in rugged cast aluminum gear cases.

The gearbox casing holds 50% more oil capacity than competitors, which allows more lubrication to be provided to critical points.

Steering Assist

Dual control levers located in front of the operator's seat are provided for steering the HHN Ride on Power Trowel. The control levers are linked to two spring loaded cylinders.

Push the left control lever forward and pull the right control lever backward and the trowel will rotate clockwise on approximately a center axis. Pull the left control lever backward and push the right control lever forward and the trowel will rotate counterclockwise. See Table 3 on page 15 for a complete description on the control levers directional positioning.

Constant Velocity Joints (CV-Joints)

Constant velocity joints insure the efficient transfer of power to the drive shaft and maintain the timing of the gearboxes without any chance of slippage.

Training

For training, please use the "TRAINING CHECKLIST" located in the front of this manual (Page 5). This checklist is not intended to be a substitute for proper training but will provide an outline for an experienced operator to provide training to a new operator.

HHN -31V — CONTROLS AND INDICATORS

- 1. Seat** – Place for operator to sit. Engine will not start unless operator is seated. Seat is adjustable, fore and aft for operator comfort.
- 2. Steering Control Lever (right side)** -Allows the unit to move in either a forward, reverse left or right direction.
- 3. Retardant Spray Control Buttons** – When pressed allows retardant spray to flow through the spray nozzle located at the front of the machine.
- 4. Twin Pitch Control** – Adjusts the blade pitch for right side of the trowel. Turn the crank as marked on its top surface to increase or decrease blade pitch.
- 5. Twin Pitch Control** – Adjusts the blade pitch for left side of the trowel. Turn the crank as marked on its top surface to increase or decrease blade pitch.
- 6. Steering Control Lever (left side)** -Allows the unit to move in either a forward, reverse left or right direction.
- 7. Light Switch** – When activated, turns on four halogen lights. Lights offer better visibility when working indoors.
- 8. Ignition Switch** – With key inserted turn clockwise to start engine.
- 9. Oil Indicator Light** - Lights red when oil pressure is low.
- 10. Water Indicator Light** - Lights red when water temperature is high.
- 11. Charge Indicator** - Lights red when electrical system is not charging properly.
- 12. Hour Meter** - Indicates number of hours the key switch is in the "ON" position.
- 13. Choke Control Lever.** - In cold weather pull this lever forward about half way to start engine. After engine warms push knob all the way in.
- 14. Fuel Gauge/Filler Cap** - Indicates the amount of fuel in the fuel tank. Remove this cap to add fuel.
- 15. Fuel Tank** - Holds 5 gallons of unleaded gasoline.
- 16. Spare Belt Carrier** - Contains a spare belt. Belt is used on the drive pulley.
- 17. Left Foot Riser** – Operator foot rest pedal.
- 18. Spray Nozzles** – Spray nozzle for retardant.
- 19. Right Foot Pedal** – Controls blade speed. Slow blade speed is accomplished by slightly depressing the foot pedal. Maximum blade speed is accomplished by fully depressing the foot pedal.
- 20. EZ-Mover Boss** – Front -side insertion point for EZ Mover. Used when the transporting of the trowel is required.

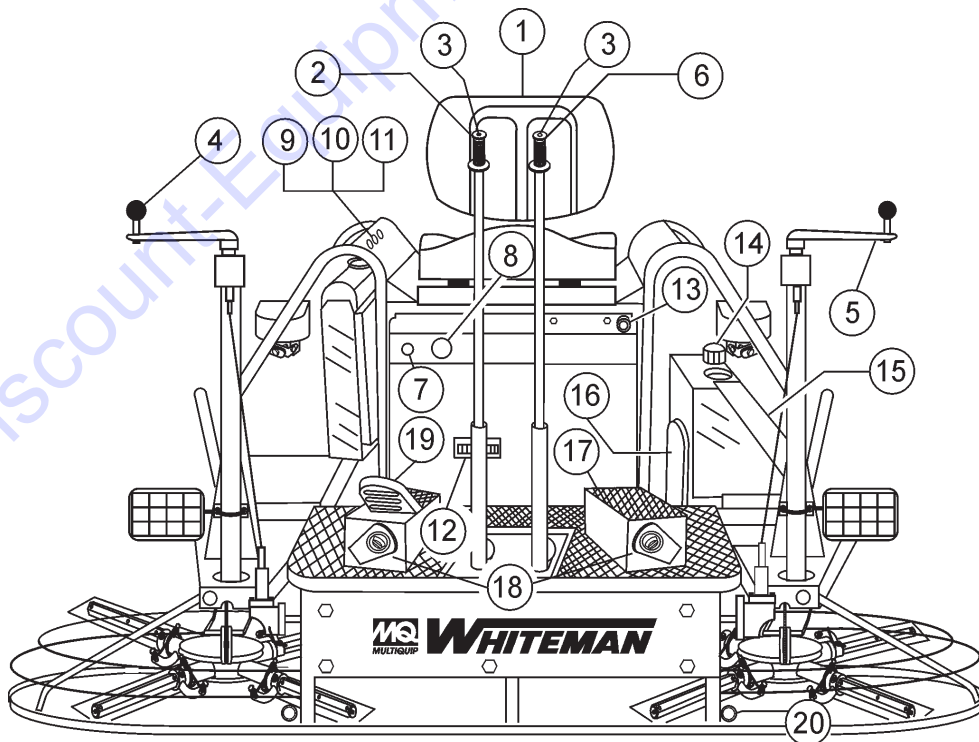


Figure 2. HHN Controls and Indicators (Front)

HHN -31V — CONTROLS AND INDICATORS

21. **Radiator/Filler Cap** – Holds coolant or water necessary to keep engine at a safe operating temperature. Remove this cap to add water or antifreeze. **DO NOT** remove this cap when the engine is warm.
22. **Lift Loops** – Located on both the left and right sides of the main frame. Used when the trowel must be lifted onto a concrete slab.
23. **Lights** – Four 12 volt halogen lights are provided with this unit.
24. **Right-Side Spider** – Consists (basic) of trowel arms, blades, wear plate, and thrust collar etc.
25. **Left-Side Spider** – Consists (basic) of trowel arms, blades, wear plate, and thrust collar etc.
26. **Safety Kill Switch** – Shuts down engine when operator is **not** sitting in seat.
27. **Engine Oil Filler Cap** - Remove this cap to add engine oil.
28. **Overflow Bottle** - Supplies coolant to the radiator when radiator coolant level is low. Fill to indicated level as shown on bottle.
29. **Engine Air Filter** – Prevents dirt and other debris from entering the fuel system. Lift locking latch on air filter canister to gain access to filter element.
30. **Engine Dip Stick** – Indicates engine oil level. Add oil as required.
31. **Oil Filter** – Provides oil filtering for the engine.
32. **Battery** – Provides +12V DC power to the electrical system
33. **Retardant Spray Motors** – Used in conjunction with the left and right spray control buttons.
34. **Retardant Spray Tank** – Holds 5 gallons of retardant.
35. **Belt Guard** – Encloses drive belt used in conjunction with clutch.
36. **EZ-Mover Boss** – Back-side insertion point for EZ Mover. Used when the transporting of the trowel is required.
37. **Oil Sight Glass** - Indicates the level of the hydraulic oil in the gear box.

NOTE

Read this entire instruction manual completely before attempting to operate trowel.

The following section is intended as a basic guide to the ride-on trowel operation, and is not to be considered a complete guide to concrete finishing. It is strongly suggested that all operators (experienced and novice) read "**Slabs on Grade**" published by the American Concrete Institute, Detroit Michigan.

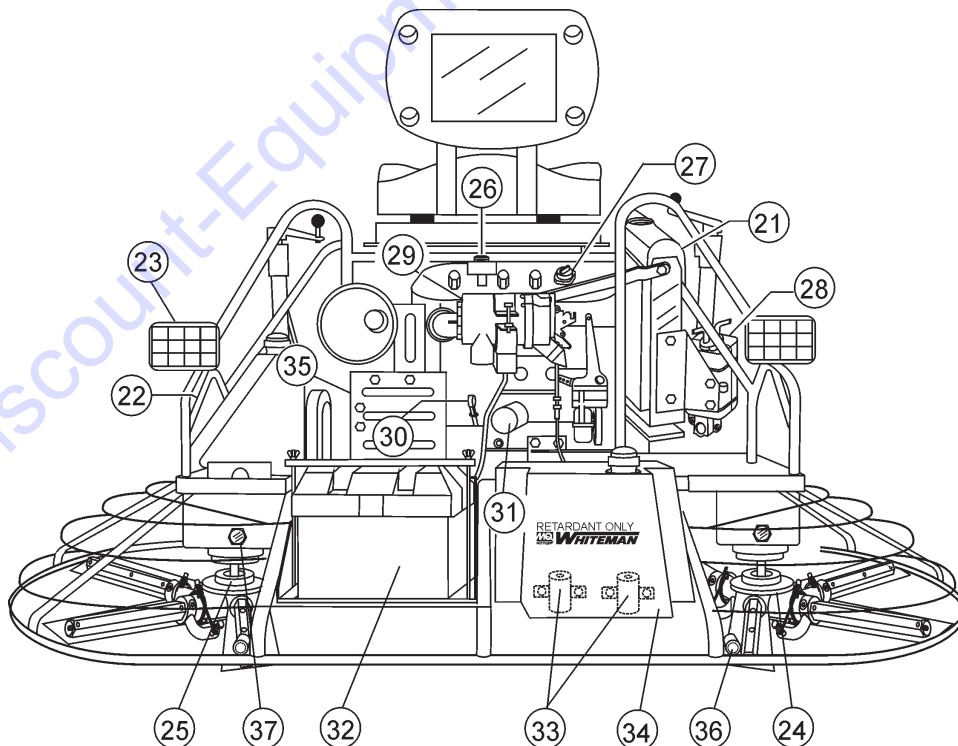


Figure 3. HHN Controls and Indicators (Rear)

HHN -31V — NEW MACHINE SETUP INSTRUCTIONS

Trowel Pre-Set-Up Instructions

The purpose of this section is to assist the user in setting up a **NEW** trowel. If your trowel is already assembled (seats, handles, knobs and battery), then this section can be skipped.

NOTE

The new ride-on trowel cannot be put into service until the pre-setup installation instructions are completed. These pre-setup instructions only need to be performed at the time of unpacking a **NEW** trowel.

Before packaging and shipping this Whiteman Ride-On Power Trowel was run and tested at the factory. If there are problems, please let us know.

Control Handle Assembly

The steering control handles are not attached to the trowel's two lower handles at the time of shipment. To attach the steering control handles to the two lower handle assemblies perform the following:

1. Remove the bolts from the plastic bag tied to the control towers.
2. Remove all protective wrapping and straps from the control handles.
3. Slip the top (loose) piece into the base of the corresponding handle, making sure to line up the holes.
4. Install the bolt through the lined up holes and tighten the acorn nut onto the threaded end.

NOTE

Some models are equipped with adjustable height handles. Adjust the height by placing the bolt through the set of holes that corresponds to the most comfortable height.

5. Pay close attention to any wires that may be inside the control handles. **DO NOT** pinch or cut any wires during installation.
6. Inside the plastic bag of parts are two knobs for the pitch control tower cranks. Install these two knobs onto the tower crank levers.

Seat Assembly

The seat is not installed on the trowel for shipping purposes. To attach the seat perform the following:

NOTE

There are two types of seats, depending on what type of trowel you have. J and B series trowels have slots on the seat mounting plate that allow **fore** and **aft** adjustment of the seat. H-series trowels have a seat that is mounted on tracks, similar to an automobile seat. This seat can be adjusted fore and aft via the control lever under the front of the seat.

1. Remove the seat from the protective wrapping.
2. Remove the bolts on the bottom of the seat, and place seat on the seat mounting plate, then insert the bolts through the holes or slots on the seat mounting plate and tighten.

Battery Setup

This trowel was shipped with a wet charged battery. This battery may need to be charged for a brief period of time as per the manufacturer instructions.

CAUTION:



Use all safety precautions specified by the battery manufacturer when working with the battery.

To install the battery on the trowel, make sure that the battery is well seated in the battery box and the terminals are properly connected. Close the plastic battery box cover and secure the battery box.

HHN -31V — INITIAL START-UP

This section is intended to assist the operator with the initial start-up of the HHN series Ride-On Power trowel. It is extremely important that this section be read carefully before attempting to use the trowel in the field.

DO NOT use your ride-on power trowel until this section is thoroughly understood.

CAUTION:



Failure to understand the operation of the HHN Ride-ON Power Trowel could result in severe damage to the trowels or personal injury.

See Figures 2 and 3 (Pages 13 and 14) for the location of any control or indicator referenced in this manual.

Engine Oil Level



1. Pull the engine oil dipstick from its holder.
2. Determine if engine oil is low (Figure 4), add correct amount of engine oil to bring oil level to a normal safe level.

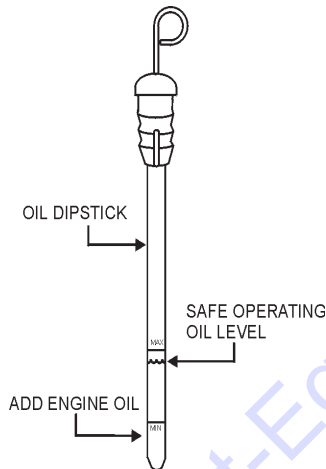


Figure 4. Engine Oil Dipstick

Gearbox Oil Level



1. Check the gearbox oil level in both gearboxes by viewing the sight glass at the rear of the gearbox. See Figure 5.

2. The oil level of the gear box should be at the half-way point of the sight glass (Figure 5). The gear box oil capacity is 144 oz. If additional oil is required, unscrew the oil fill plug located on top of the gearbox, and refill with ISO 220 A GMA GR 5 EP oil.

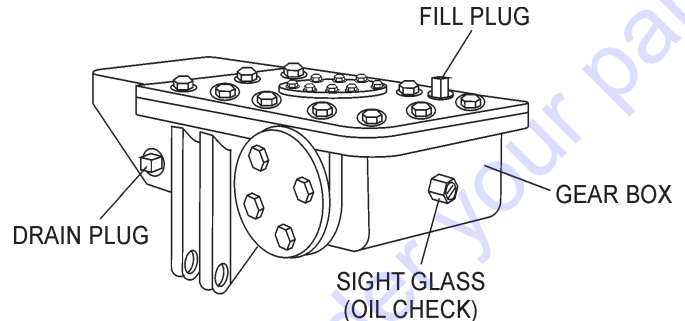


Figure 5. Gearbox Oil Plugs/Sight Glass

Fuel

1. Determine if the engine fuel is low (Figure 6). If fuel level is low, remove the fuel filler cap and fill with unleaded gasoline.

CAUTION:



Handle fuel safely. Motor fuels are highly flammable and can be dangerous if mishandled. **DO NOT** smoke while refueling. **DO NOT** attempt to refuel the ride-on trowel if the engine is hot or running.

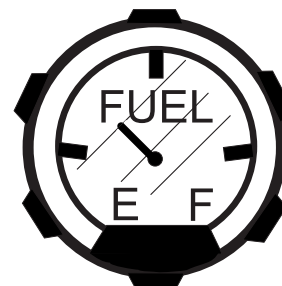


Figure 6. Fuel Gauge

CAUTION:



Never store the ride-on trowel with fuel in the tank for any extended period of time. Always clean up spilled fuel immediately.

Starting the Engine

1. With one foot on the ground and the other foot placed on the trowel's platform, grab hold of any part of the frame and lift yourself onto the trowel. Then sit down in the operator's seat.
2. The Whiteman Ride-On Power trowel is equipped with a safety **kill switch**. This switch is located beneath the seat assembly. Remember the engine will not start unless an operator is sitting in the operator's seat. The weight of an operator depresses an electrical switch, which will allow the engine to start.

CAUTION:



NEVER disable or disconnect the kill switch. It is provided for the **operator's safety** and injury may result if it is disabled, disconnected or improperly maintained.

3. It is recommended that the kill switch be used to stop the engine after every use. Doing this will verify that the switch is working properly and presents no danger to the operator. Remember to turn the key to the "OFF" position after stopping the machine. Not doing so may drain your units' battery.
4. The right foot pedal (Figure 7) controls blade and engine speed. The position of the foot pedal determines the blade speed. Slow blade speed is obtained by slightly depressing the pedal. Maximum blade speed is obtained by fully depressing the pedal.

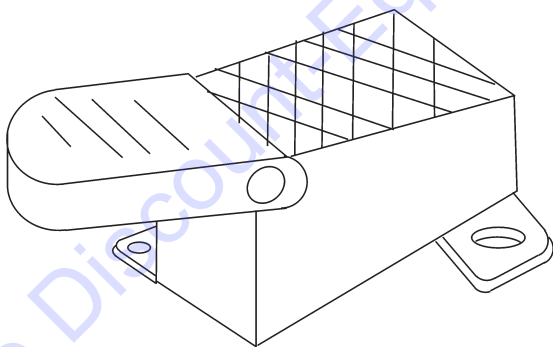
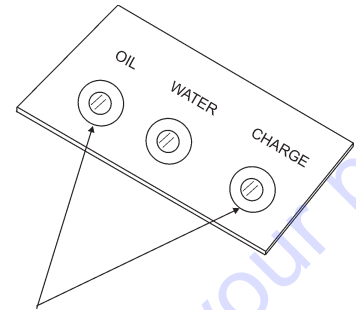


Figure 7. Blade Speed Control Foot Pedal

5. Keep your foot **OFF** the gas pedal (right foot pedal). If the engine is cold, adjust the choke but in all circumstances, start the engine at idle (without touching the gas pedal).
6. Insert the **ignition key** into the ignition switch .

7. Turn the ignition key clockwise to the (start) position. The **oil** and **charge** indicator lights (Figure 8) should be on.



OIL AND CHARGE INDICATOR LIGHTS COME ON WHEN IGNITION SWITCH IS IN THE ON POSITION, AND ENGINE IS NOT RUNNING.

Figure 8. Oil and Charge Indicator Lights

8. Turn ignition key fully clockwise and listen for engine to start. Once engine has started release ignition key.
9. If the engine fails to start in this manner, consult the engine owner's manual supplied with the trowel.
10. Test the safety kill switch by standing up briefly. The switch under the seat should cause the engine to stop. If the kill switch fails to shut down the engine. Turn off the engine with the key switch and fix the safety kill switch. See Table 4 (Troubleshooting) for possible problems.
11. Repeat this section a few times to get fully acquainted with the engine starting procedure.

Steering

Two control levers located in front of the operator's seat provide directional control for the HHN Ride-On Power Trowel. Table 3 (Page 18) illustrates the various directional positions of the joysticks and their effect on the ride-on trowel.

NOTE

All directional references with respect to the steering control levers are from the **operator's** seat position.

2. Push both the left and right control levers forward. See Figure 9.
3. With your right foot quickly depress the right foot pedal halfway. Notice that the ride-on power trowel begins to move in a forward direction. Return both joystick controls to their neutral position to stop forward movement, then remove your right foot from the right foot pedal.

4. Practice holding the machine in one place as you increase blade speed. When about 75% of maximum blade speed has been reached, the blade will be moving at proper finishing speed. The machine may be difficult to keep in one place. Trying to keep the ride-on trowel stationary is a good practice for operation.
5. Practice maneuvering the ride-on trowel using the information listed in Table 3. Try to practice controlled motions as if you were finishing a slab of concrete. Practice edging and covering a large area.
6. Try adjusting the pitch of the blades. This can be done with the ride-on trowel stopped or while the trowel is moving, whatever feels comfortable. Test the operation of optional equipment like retardant spray and lights if equipped.
7. Push both the left and right joysticks backward and repeat steps 3 through 6 while substituting the word reverse for forward.

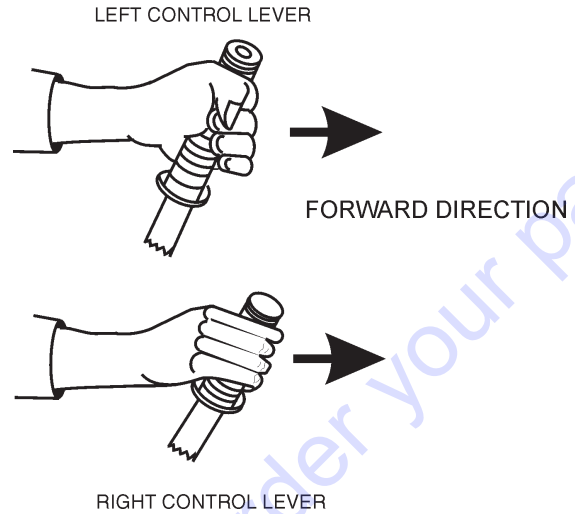


Figure 9. Left and Right Control Levers

Table 3. Control Lever Directional Positioning		
CONTROL LEVER	DIRECTION	RESULTS
Left	Move Control Lever Forward	Causes the ride-on trowel to move forward and to the right.
Left	Move Control Lever Backward	Causes the ride-on trowel to move backward and to the left.
Right	Move Control Lever Forward	Causes the ride-on trowel to move forward and to the left.
Right	Move Control Lever Backward	Causes the ride-on trowel to move backward and to the right.
Left and Right	Move Both Control Levers Forward	Causes the ride-on trowel to move forward in a straight line.
Left and Right	Move Both Control Levers Backward	Causes the ride-on trowel to move backward in a straight line.
Left and Right	Move Both Control Levers to the Right	Causes the ride-on trowel to move to the right.
Left and Right	Move Both Control Levers to the Left	Causes the ride-on trowel to move to the left.

NOTE

See the engine manual supplied with your machine for appropriate engine maintenance schedule and troubleshooting guide for problems.

At the front of the book (Page B) there is a “Daily Pre-Operation Checklist”. Make copies of this checklist and use it on a daily basis.

Disconnect spark plug wires and battery cables before attempting any service or maintenance on the ride-on trowel.

MAINTENANCE SCHEDULE

Daily (8-10 Hours)

1. Check the fluid levels in the engine and gearboxes, fill as necessary.

Weekly (30-40 Hours)

1. Relube arms, thrust collar and steering links.
2. Replace blades if necessary.
3. Check and clean or replace the engine air filter as necessary.
4. Replace engine oil and filter as necessary, see engine manual.

Monthly (100-125 Hours)

1. Remove, clean, reinstall and relube the arms and thrust collar. Adjust the blade arms.
2. Replace gearbox lubricant after the first 100 hours of operation. Then replace every 500-600 hours.
3. Check drive belt for excessive wear.

Yearly (500-600 Hours)

1. Check and replace if necessary the arm bushings, and thrust collar bushings, shaft seals and belts.
2. Check pitch control cables for wear.
3. Replace gearbox lubricant.

MAINTENANCE PROCEDURES

Checking The Drive Belt

The drive belt needs to be changed as soon as it begins to show signs of wear. **DO NOT** reuse a belt under any circumstances. Indications of excessive belt wear are fraying, squealing when in use, belts that emit smoke or a burning rubber smell when in use.

Under normal operating conditions, a drive belt may last approximately 150 hours. If your trowel is not reaching this kind of life span for drive belt wear, check the drive belt for proper pulley alignment and spacing.

To gain access to the drive belt, remove the drive belt guard cover, then visually inspect the drive belt for signs of damage or excessive wear. If the drive belt is worn or damaged, replace the drive belt.

WARNING:



DO NOT attempt to insert hands or tools into the belt area while the engine is running and the safety guard has been removed. Keep fingers, hands, hair and clothing away from all moving parts to prevent bodily injury.

WARNING:



DO NOT remove the V-belt guard cover until the muffler has cooled. Allow the entire trowel to cool down before performing this procedure.

NOTE

- Leave the existing drive belt intact until instructed to cut it.
- Leave the engine in place for this procedure. It is not necessary to slide the engine to replace the drive belt.
- Have a 3/4 X 1 X 3.25 inch wooden block available.

Removing the V-belt

1. Remove the seven HHC screws that secure the V-belt guard cover as shown in Figure 10. Please note that the screw under the muffler is somewhat difficult to remove.
2. Remove the drive belt guard cover from the trowel and set aside.

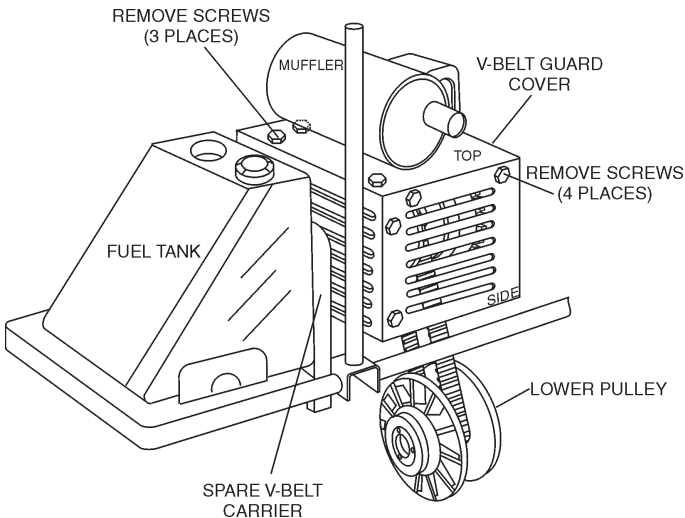


Figure 10. Drive Belt Guard Cover

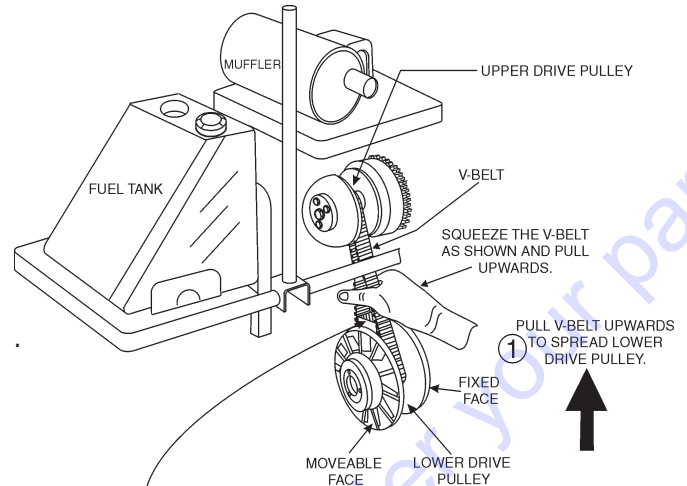
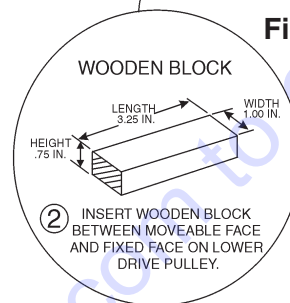


Figure 11. Lower Drive Pulley



3. Once the drive belt "Guard Cover" has been removed, squeeze the drive belt as shown in Figure 11, and pull the V-belt upwards. This will spread open the faces of the **lower** drive pulley.
4. **Insert** the 3/4" X 1" X 3.25" block between the moveable face and the fixed face of the lower drive pulley. This block will help keep the lower drive pulley faces open while installing the new V-belt.
5. Work the drive belt over the lower drive pulley as shown in Figure 12, position it over the CV-joint boot, then pull the belt over the upper drive pulley also shown in Figure 12.
6. Once drive belt is free from both the upper and lower pulley's **CUT** the drive belt.

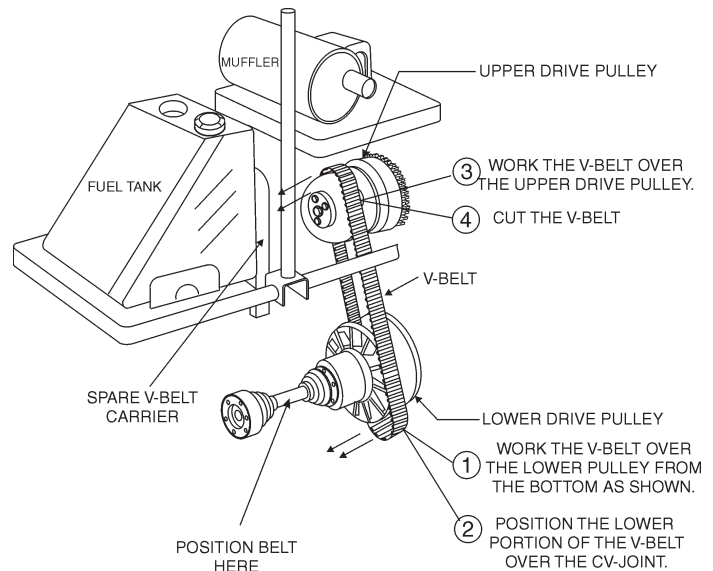


Figure 12. Drive Belt Removal

Installing the Replacement Drive Belt

The HHN trowel is equipped with a replacement drive belt (spare) carrier (Figure 13), which is mounted on the back-side of the fuel tank opposite the clutch. Make sure that there is **ALWAYS** a spare drive belt in the drive belt carrier before the trowel is placed on a slab to finish concrete.

1. To add a replacement drive belt for use on the upper and lower drive pulleys, remove the 2 screws that secure the spare drive belt carrier.
2. Remove the spare drive belt carrier from the trowel, and free the replacement drive belt.
3. Slide the replacement drive belt over the upper and lower pulleys reversing steps 1 thru 5 on page 20.

NOTE

It **will** be necessary to disconnect the CV-Joint from the left-side gear box coupler. This means the removal of the three screws that secure the CV-Joint to the gear box.

Spare Drive Belt Replacement

To replace a spare drive belt, be prepared to disconnect the CV-joint from the left-side gear box.

1. Place the HHN trowel on jack stands, and observe all safety precautions.
2. Remove the three screws that secure the CV-joint to the left-side gear box coupler.
3. Once the CV-joint has been separated from the left-side gearbox, push the CV-joint inward so that a gap exist between the gearbox and the CV-joint (Figure 13). Slide the spare V-belt between the gear box coupler and the CV-joint. If any grease or oil is present on the replacement drive belt, remove it.
4. Place the spare drive belt inside the drive belt carrier, and secure the spare belt carrier to the back-side of fuel tank.
5. Install the three screws that secure the CV-joint to the left-side gear box coupler.

NOTE

It **may** be necessary to disconnect the CV-Joint from the lower pulley coupler. This means the removal of the three screws that secure the CV-Joint to the pulley.

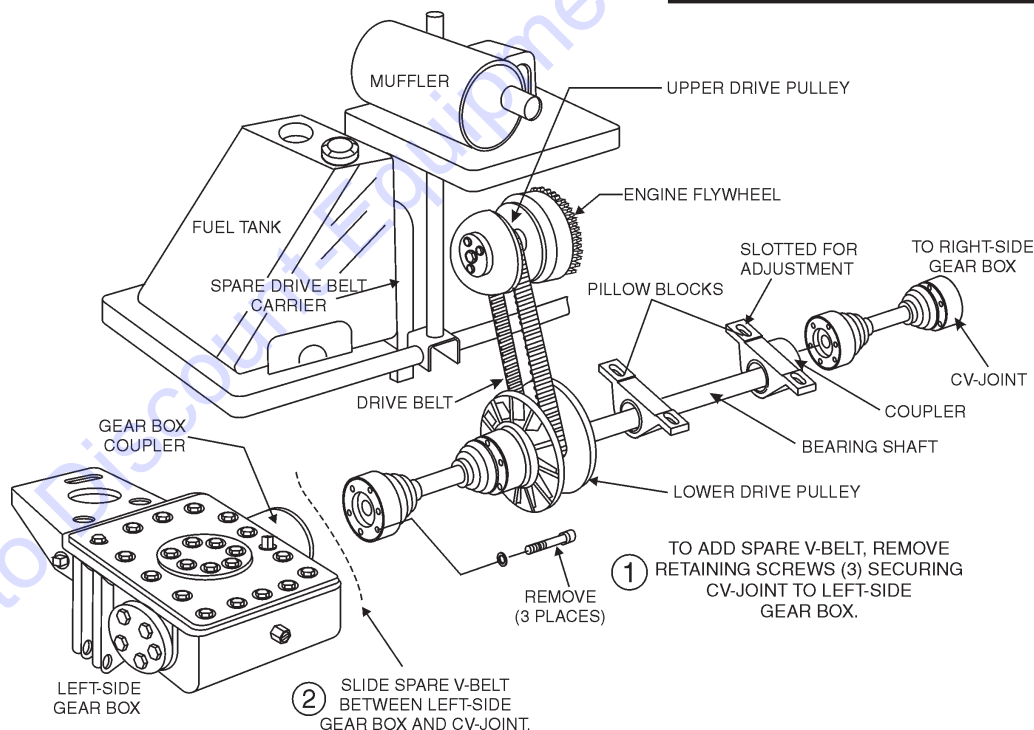


Figure 13. Spare V-Belt Replacement

The HHN trowel is equipped with a "Torque Converter" which supplies torque to both the left and right gear boxes.

The function of the a torque converter is to automatically deliver the correct amount of torque required by the trowel under all load conditions. This enables the trowel to deliver the necessary torque for float pan applications and the high rotor speeds required for burnishing concrete.

The torque converter used in the HHN series trowels is of the variable pitch pulley type (Figure 14) connected by a drive belt.

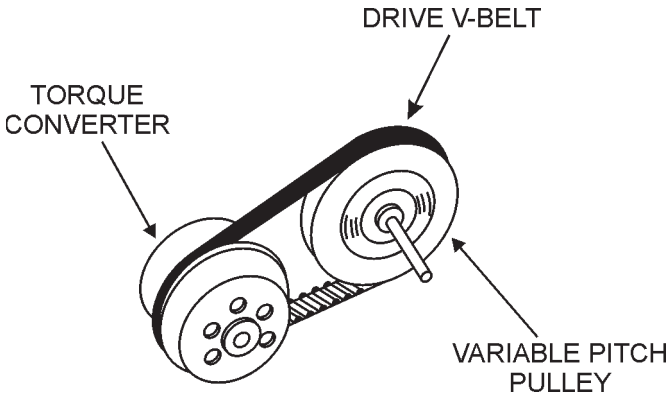


Fig. 14. Torque Converter/Variable Pitch Pulley

Drive Pulley

The "Drive Pulley" uses centrifugal force (Figures 15 and 16) to create a belt squeeze force transmitted at the pulley faces. This condition functions as an automatic clutch.

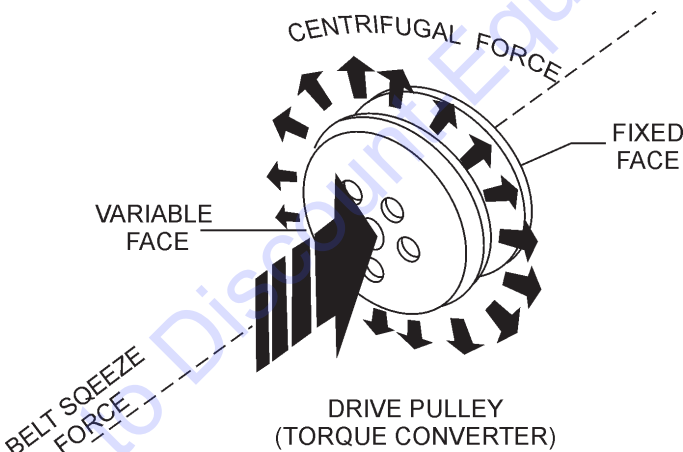


Figure 15. Torque Converter (Centrifugal Force)

As shown in Figure 16, centrifugal force pushes the roller arms (see Figure 17 below) against the ramp plate, forcing moveable face toward fixed face squeezing belt.

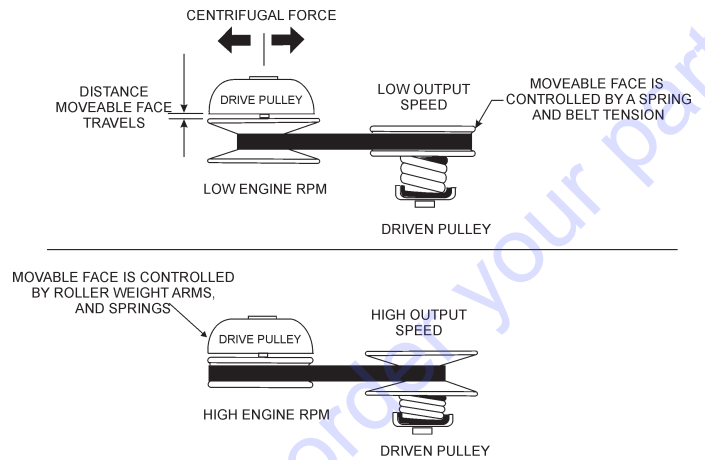


Fig. 16. Pulley Interaction

The "Variable Pitch Pulleys" have one *fixed face*, and one *moveable face*. The *drive pulley* (torque converter, Figure 17) moveable face is controlled by roller weight arms and springs, which change position according to engine speed. The *driven pulley moveable face* is controlled by a spring and belt tension.

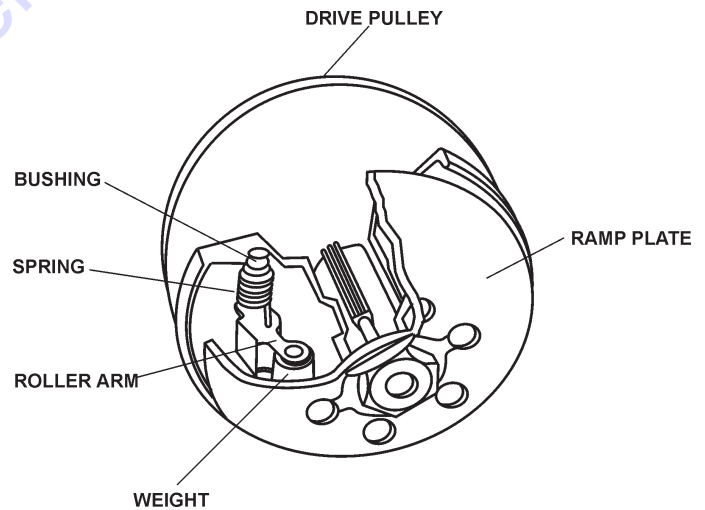


Fig. 17. Variable Pitch Pulley

How It Works (Figure 17)

- Condition A:**
- Engine Idling
 - Drive Pulley: Small
 - Driven Pulley: Large
 - Belt: Loose and Stationary
- Condition B:**
- Engine Accelerating
 - Drive Pulley: Small But Increasing
 - Driven Pulley: Large But Decreasing
 - Belt: Approaching Tightness
- Condition C:**
- Engine At High Speed
 - Drive Pulley: Large
 - Driven Pulley: Small
 - Belt: Tight

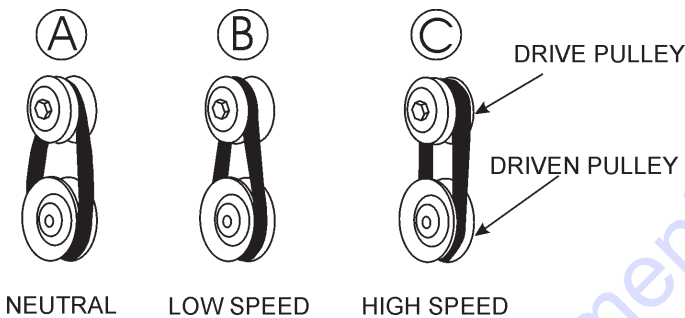


Figure 17. Pulley Conditions

Clutch

This clutch system provides a high pulley ratio (a low gear- so to speak) to start out and a low pulley ratio (a high gear- so to speak) for a high speed operation, with infinite variation between the two.

This means that it will not be necessary to give **full throttle** in order to "break the blades/pans loose". The machine can slowly be brought up to speed.

The torque sensitive pulley (Figure 18) utilizes a spring and cam bracket. Peak performance results from proper interaction between the driven pulley spring and the ramp angle of the cam bracket.

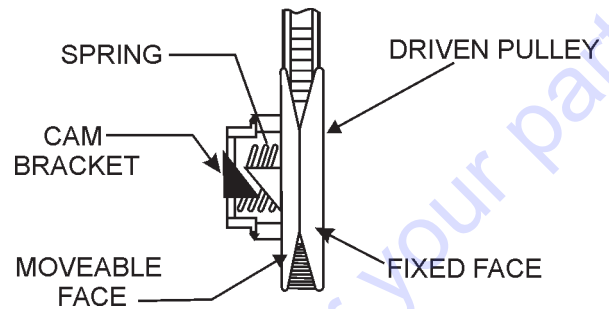


Figure 18. Pulley Spring and Cam Bracket

Blade Pitch

Matching Blade Pitch for Both Sets of Blades

Sometimes it may be necessary to match blade pitch between the two sets of blades. There are some signs that this may be necessary. For example, the differences in pitch could cause a noticeable difference in finish quality between the two sets of blades. Or, the difference in blade pitch could make the machine difficult to control. This is due to the surface area in contact with the concrete (the blade set with the greater contact area tends to stick to the concrete more).

Single Pitch™

On a Single Pitch™ trowel each spider assembly can be pitched individually, forcing the operator to constantly make adjustments on each pitch tower.

Blade Pitch Adjustment Procedure

The maintenance adjustment of blade pitch is an adjustment that is made by a bolt (Figure 19) on the arm of the trowel blade finger. This bolt is the contact point of the trowel arm to the lower wear plate on the thrust collar. The goal of adjustment is to promote consistent blade pitch and finishing quality.

There are some things to look for when checking to see if adjustment is necessary. Is the machine wearing out blades unevenly (i.e. one blade is completely worn out while the others look new)? Does the machine have a perceptible rolling or bouncing motion when in use? Look at the machine while it is running, do the guard rings “rock up and down” relative to the ground? Do the pitch control towers rock back and forth? These are some of the indications that the blade pitch may need to be adjusted using the adjustment bolts on the trowel blade finger.

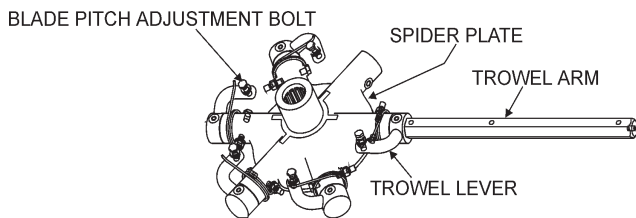


Figure 19. Blade Pitch Adjustment Bolt

The easiest and most consistent way to make this adjustment is to use the Trowel Arm Adjustment Fixture (P.N. 9177). This fixture will allow consistent adjustment of the trowel arm fingers. It comes with all the hardware necessary to properly accomplish this maintenance and instructions on how to properly utilize this tool. Adjusting the trowel arm fingers without a fixture requires a special talent.

If a trowel arm adjustment fixture is not available and immediate adjustment is necessary; we suggest the following procedure. If you can see or feel which blade is pulling harder, adjust the bolt that corresponds to that blade.

Another way to determine which blades need adjustment is to place the machine on a flat surface and pitch the blades as flat as possible. Now, look at the adjustment bolts. They should all barely make contact with the lower wear plate on the spider. If you can see that one of them is not making contact; some adjustment will be necessary.

It will be possible to adjust the “high” bolts down to the level of the one that is not touching, or adjust the “low” bolt up to the level of the higher ones. If possible, adjust the low bolt up to the level of the rest of the bolts. This is the fastest way, but may not always work. Verify that after adjustment, the blades pitch correctly.

Often times, if the blades are incorrectly adjusted, they will not be able to pitch flat. This occurs when the adjusting bolts have been raised too high. Conversely, sometimes the adjusting bolts are too low and the blades cannot be pitched high enough for finishing operations.

Changing A Blade

Whiteman recommends that all the blades on the entire machine be changed at the same time. If only one or some of the blades are changed at one time, the machine will not finish concrete consistently and the machine may wobble or bounce.

1. Place the machine on a flat, level surface. Adjust the blade pitch control to make the blades as flat as possible. Note the blade orientation on the trowel arm. This is important for ride-on trowels as the two sets of blades counter-rotate. Lift the machine up, placing blocks under the main guard ring to support it.
2. Remove the bolts and lock washers on the trowel arm, and then remove the blade.
3. Scrape all concrete and debris from the trowel arm. This is important to properly seat the new blade.
4. Install the new blade, maintaining the proper orientation for direction of rotation.
5. Affix the bolts and lock washers.
6. Repeat steps 2-5 for all remaining blades.

Steering Adjustment

The steering assist adjustment is to be performed only by qualified service technicians. For HHN steering adjustment instructions, reference MQ Whiteman service bulletin 200925

Clean-Up

Never allow concrete to harden on the power trowel. Immediately after use wash any concrete off the trowel with water, be careful not to spray a hot engine or muffler. An old paint brush or broom may help loosen any concrete that has started to harden.

HHN -31V — TROUBLESHOOTING

TABLE 4. TROUBLESHOOTING

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
Engine running rough or not at all.	Kill switch malfunction?	Make sure that the kill switch is functioning when the operator is seated; replace switch if necessary.
	Fuel?	Look at the fuel system. Make sure there is fuel being supplied to the engine. Check to ensure that the fuel filter is not clogged.
	Ignition?	Check to ensure that the ignition switch has power and is functioning correctly.
Safety kill switch not functioning.	Other problems?	Consult engine manufacturer's manual.
	Loose wire connections?	Check wiring. Replace as necessary.
	Bad contacts?	Replace switch.
If trowel "bounces, rolls concrete, or makes uneven swirls in concrete".	Blades?	Make certain blades are in good condition, not excessively worn. Finish blades should measure no less than 2" (50mm) from the blade bar to the trailing edge, combo blades should measure no less than 3.5" (89mm). Trailing edge of blade should be straight and parallel to the blade bar.
	Spider?	Check that all blades are set at the same pitch angle as measured at the spider. A field adjustment tool is available for height adjustment of the trowel arms (see Optional Equipment).
	Bent trowel arms?	Check the spider assembly for bent trowel arms. If one of the arms is even slightly bent, replace it immediately.
	Trowel arm bushings?	Check the trowel arm bushings for tightness. This can be done by moving the trowel arms up and down. If there is more than 1/8" (3.2 mm) of travel at the tip of the arm, the bushings should be replaced. All bushings should be replaced at the same time.
	Thrust collar?	Check the flatness of the thrust collar by rotating it on the spider. If it varies by more than 0.02" (0.5 mm) replace the thrust collar.
	Thrust collar bushing?	Check the thrust collar by rocking it on the spider. If it can tilt more than 3/32" (2.4 mm) [as measured at the thrust collar O.D.], replace the bushing in the thrust collar.
	Thrust bearing worn?	Check the thrust bearing to see that it is spinning free. Replace if necessary.
	Blade pitch?	Check blades for consistent pitch. Adjust per Maintenance section instructions if necessary.
Machine has a perceptible rolling motion while running.	Main shaft?	The main output shaft of the gearbox assembly should be checked for straightness. The main shaft must run straight and cannot be more than 0.003" (0.08 mm) out of round at the spider attachment point.
	Yoke?	Check to make sure that both fingers of the yoke press evenly on the thrust bearing. Replace yoke as necessary.
	Blades?	Check to ensure that each blade is adjusted to have the same pitch as all other blades.

TABLE 4. TROUBLESHOOTING (CONTINUED)

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
Lights (optional) not working.	Wiring?	Check all electrical connections, including the master on/off switch and check to see if wiring is in good condition with no shorts. Replace as necessary.
	Lights?	Check to see if light bulbs are still good. Replace if broken.
Retardant spray (optional) not working.	Retardant?	Check the tank to make sure retardant is present. Fill tank as necessary.
	Wiring?	Check all electrical connections, including master on/off switch connections. Replace components and wiring as necessary.
	Bad switch?	Check the continuity of master on/off switch. Replace if broken.
	Bad spray pump?	If pump has a voltage present when the switch is turned on, but does not operate and electrical connections to the pump are good, replace the pump.
Steering effort is too high or unresponsive.	Steering linkages out of adjustment?	Adjust the connecting linkage found at the base of the handle. See "Steering Adjustment Instructions", Service Bulletin 200925.
	Worn components?	Replace all parts that are bent or worn.
	Gearbox pivots?	Check to ensure free movement of gearboxes.
Operating position is uncomfortable.	Seat adjust for operator?	Adjust seat with lever located on the front of the seat.
Control handles are too close together or too far apart.	Steering linkages out of adjustment?	See section on steering adjustment.
	Bent control handles?	Replace all parts that are bent.
Clutch slipping or sluggish response when responding to engine speed.	Belt tension?	Adjust the belt center distance as noted in the drive belt adjustment section.
	Worn belts?	Replace.
	Dirty Clutch?	Disassemble and clean the clutch.
	Worn out Clutch?	Replace shoes on friction clutch. Posi-Grip, replace entire clutch.
	Worn Bearings in gearbox?	Rotate gearbox input shaft by hand. If shaft rotates with difficulty, check the input and output shaft bearings. Replace if necessary.
	Worn or broken gears in gearbox?	Check in particular to verify that the gearbox output shaft rotates when the input shaft is rotated. Replace both the worm gear and worm as a set.
	Worn drive shaft bearings	Inspect driveline bearings, replace if necessary.
Linkage on Twin Pitch (optional) not working.	Crank handles?	Make sure that both crank handles are pushed down as far as possible. Doing this ensures that the linkage is engaged.
	Damaged part?	Replace all damaged parts immediately.
Belts wearing out too fast.	Drive pulley alignment?	Check to see if lower drive pulley is correctly aligned with the clutch.
	Tension?	Check to ensure that the crankshaft to drive line center distance is correct.

EXPLANATION OF CODE IN REMARKS COLUMN

The following section explains the different symbols and remarks used in the Parts section of this manual. Use the help numbers found on the back page of the manual if there are any questions.

The contents and part numbers listed in the parts section are subject to change **without notice**. Multiquip does not guarantee the availability of the parts listed.

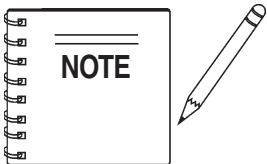
Sample Parts List:

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	12345	BOLT	1	INCLUDES ITEMS W/*
2*		WASHER, 1/4 IN.		NOT SOLD SEPARATELY
2*	12347	WASHER, 3/8 IN.	1	MQ-45T ONLY
3	12348	HOSE	A/R ..	MAKE LOCALLY
4	12349	BEARING	1	S/N 2345B AND ABOVE

NO. Column

Unique Symbols - All items with same unique symbol (*, #, +, %, or >) in the number column belong to the same assembly or kit, which is indicated by a note in the "Remarks" column.

Duplicate Item Numbers - Duplicate numbers indicate multiple part numbers are in effect for the same general item, such as different size saw blade guards in use or a part that has been updated on newer versions of the same machine.



When ordering a part that has more than one item number listed, check the remarks column for help in determining the proper part to order.

PART NO. Column

Numbers Used - Part numbers can be indicated by a number, a blank entry, or TBD.

TBD (To Be Determined) is generally used to show a part that has not been assigned a formal part number at time of publication.

A blank entry generally indicates that the item is not sold separately or is not sold by Multiquip. Other entries will be clarified in the "Remarks" Column.

QTY. Column

Numbers Used - Item quantity can be indicated by a number, a blank entry, or A/R.

A/R (As Required) is generally used for hoses or other parts that are sold in bulk and cut to length.

A blank entry generally indicates that the item is not sold separately. Other entries will be clarified in the "Remarks" Column.

REMARKS Column

Some of the most common notes found in the "Remarks" Column are listed below. Other additional notes needed to describe the item can also be shown.

Assembly/Kit - All items on the parts list with the same unique symbol will be included when this item is purchased.

Indicated by:

"INCLUDES ITEMS W/(unique symbol)"

Serial Number Break - Used to list an effective serial number range where a particular part is used.

Indicated by:

"S/N XXXXX AND BELOW"

"S/N XXXX AND ABOVE"

"S/N XXXX TO S/N XXX"

Specific Model Number Use - Indicates that the part is used only with the specific model number or model number variant listed. It can also be used to show a part is NOT used on a specific model or model number variant.

Indicated by:

"XXXXX ONLY"

"NOT USED ON XXXX"

"Make/Obtain Locally" - Indicates that the part can be purchased at any hardware shop or made out of available items. Examples include battery cables, shims, and certain washers and nuts.

"Not Sold Separately" - Indicates that an item cannot be purchased as a separate item and is either part of an assembly/kit that can be purchased, or is not available for sale through Multiquip.

HHN -31V — SUGGESTED SPARE PARTS

31 VANGUARD ENGINE

1 to 3 Units

Qty.	P/N	Description
4	0189	HANDLE GRIP
4	2267	HANDLE GRIP (RIGHT SIDE)
1	11430	SWITCH
2	12460	CABLE, PITCH
1	1617	LEVER ASSY. TROWEL ADJUSTMENT
2	2737	KNOB ASSY.
1	10208	MUFFLER W/CLAMP
1	10434	CLAMP
1	10463	CLAMP
4	10937	BELT (B-37)
1	11771	BRACKET ENGINE THROTTLE CABLE
1	12168	HEADER PIPE
1	2124	THROTTLE CABLE
5	2829	ARMS
2	9005	LEVER TROWEL ARM (L.S.)
20	0166A	WASHER
20	1876	JAM NUT
20	0164B	SCREW
5	11039	BUSHING
2	9111	SPRING (L.S.)
20	1875	WASHER
20	1322	SCREW ASSY., ARM RETAINING
2	12611	SPIDER PLATE
20	1162A	CAP GREASE FITTING
20	16602	SCREW (HHC 3/8 -16 X 3/8)
20	1456	NUT (3/8 -16)
20	12097	SCREW (SQH 3/8-16 X 1 3/4 CONE)
2	2143	SPRING (R.S.)
2	1986	LEVER TROWEL ARM (R.S.)
2	12005	SAFETY KILL SWITCH
20	0181B	WASHER 1/4 IN
2	11418	FUEL CAP/GUAGE
20	4514	SCREW (HHC 1/4-20 X 5/8)

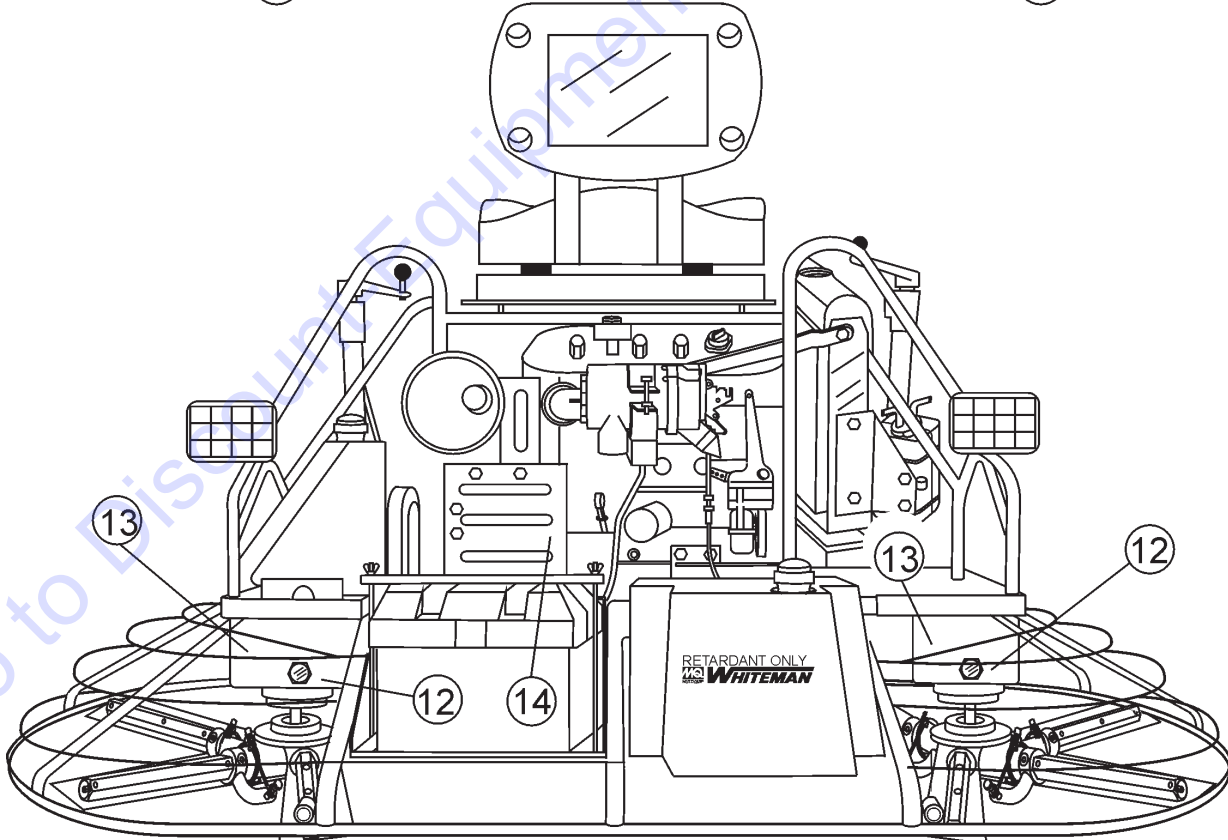
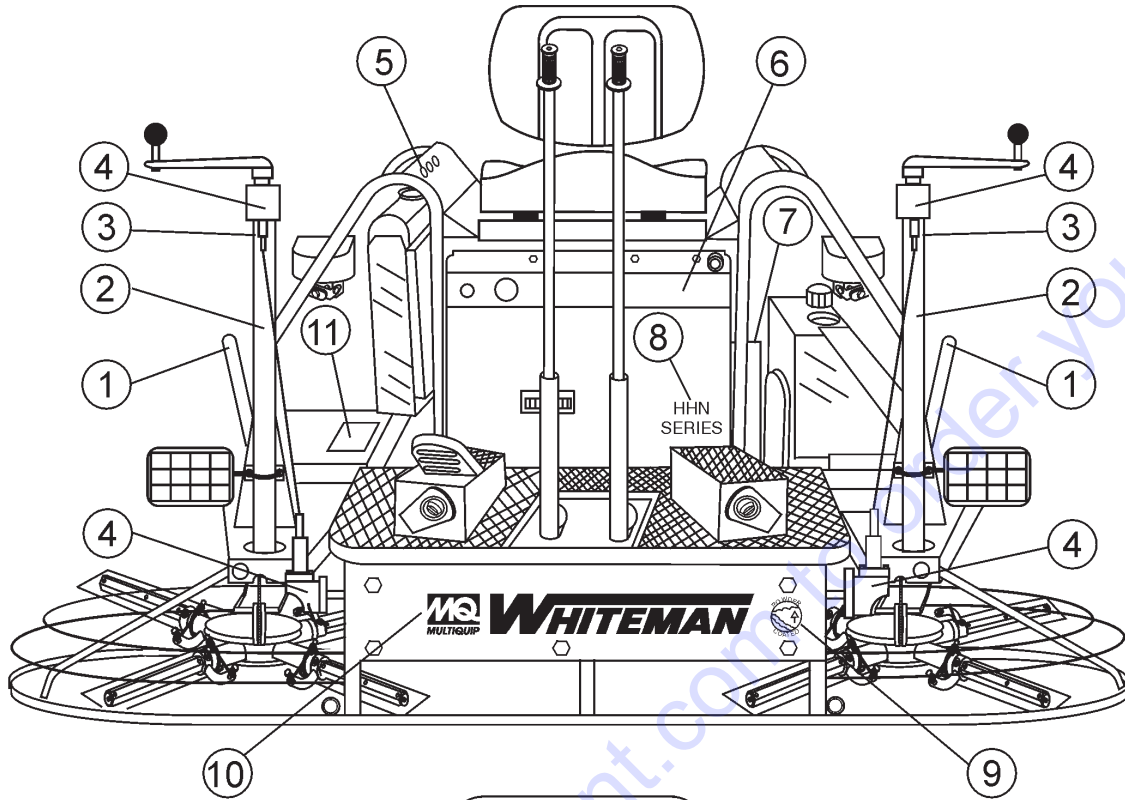
Qty.	P/N	Description
2	2124	CABLE THROTTLE (RT)
10	10031	WASHER 1/4 IN.
2	11692	BRACKET BATTERY
2	11693	BOLT BATTERY
6	2509	WING NUT
2	12548	SPRAY PUMP
2	2108	CAP SPRAY TANK
2	10958	SWITCH, IGNITION
1	19301	TERMINAL STRIP (10-POLE)
1	2580	CHOKE CABLE
1	2673	CIRCUIT BREAKER 30 AMP, 12V
2	4682	TOGGLE SWITCH
2	8381	BOOT, TOGGLE SWITCH
1	11792	ACCESSORY SOLENOID
4	11078	KEYS, IGNITION (SWITCH)
2	2655	HOUR METER

NOTE

Part numbers on this Suggested Spare Parts List may supercede/replace the P/N shown in the text pages of this book.

HHN -31V — NAME PLATE AND DECALS

NAME PLATE AND DECALS



HHN -31V — NAME PLATE AND DECALS

NAME PLATE AND DECALS

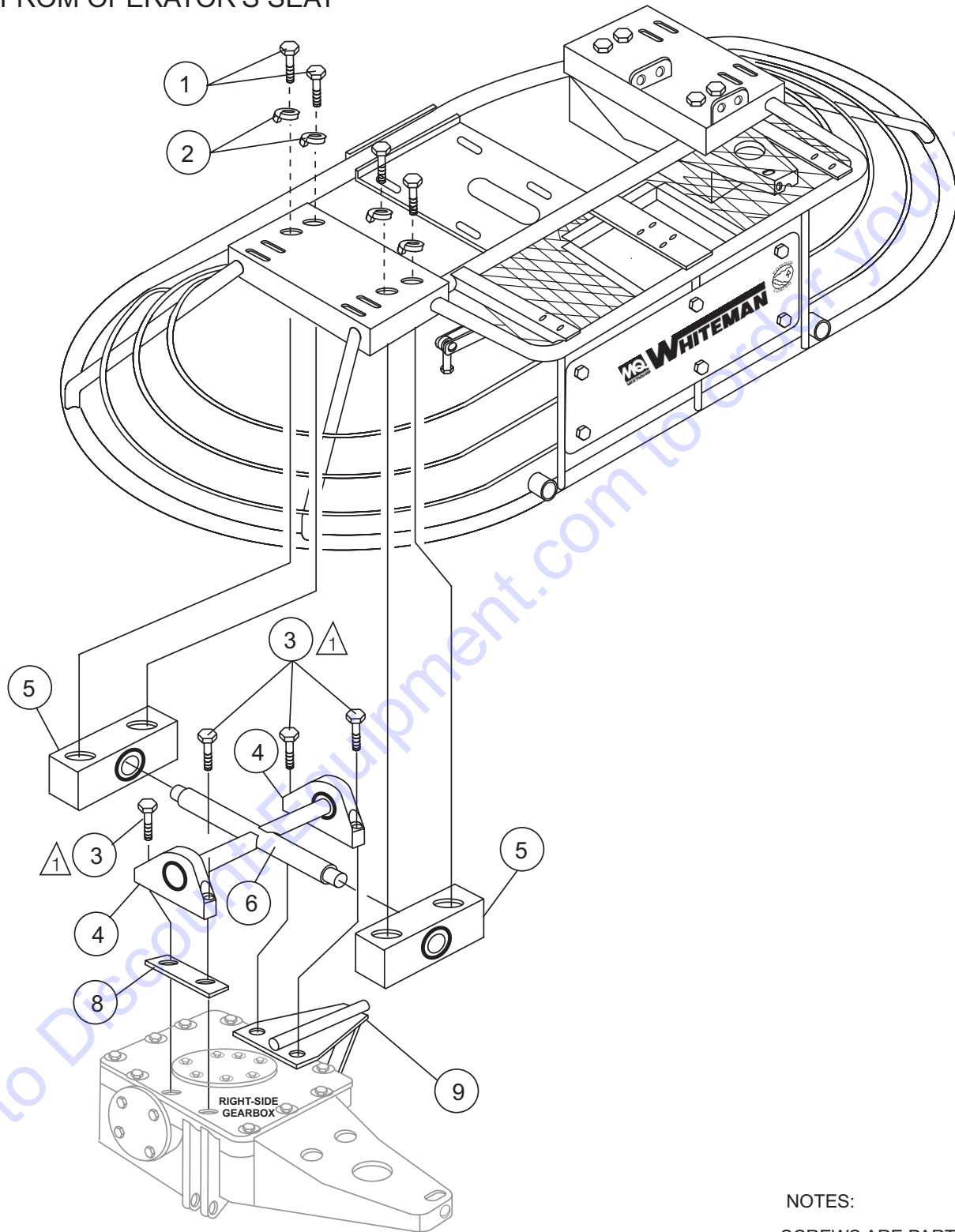
<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	11246	DECAL: LIFT	2	PART OF DECAL KIT12620
2	1499	DECAL: MQ WHITEMAN (RED/TOWER)	2	
3	2634	DECAL: DANGER (COMPRESSION)	2	
4	11246	DECAL: LUBRICATION	4	PART OF DECAL KIT12620
5	12571	DECAL: OPERATING LIGHTS	1	
6	11247	DECAL: HELMET, HAND AND FOOT	1	PART OF DECAL KIT12620
7	11246	DECAL: RADIATING HEAT	1	PART OF DECAL KIT12620
8	20198	DECAL: HHN SERIES	1	
9	13118	DECAL: POWDER COATED	1	
10	10818	DECAL: MQ WHITEMAN (WHITE/PANEL)	1	
11		DECAL: NAME PLATE	1	CONTACT DISCOUNT-EQUIPMENT
12	11246	DECAL: CHECK HYDRAULIC OIL	2	PART OF DECAL KIT12620
13	11246	DECAL: GEAR DRIVE	2	PART OF DECAL KIT12620
14	11246	DECAL: BELT DRIVE	1	PART OF DECAL KIT12620

SEE DECAL ILLUSTRATIONS ON PAGE 10.

Go to Discount-Equipment.com to order your parts

HHN -31V — PIVOT/GEAR BOX-RIGHT SIDE ASSY.

PIVOT/GEAR BOX- RIGHT SIDE ASSY.
VIEW FROM OPERATOR'S SEAT



NOTES:

SCREWS ARE PART OF
RIGHT-SIDE GEAR BOX
ASSEMBLY. TO ORDER
SCREWS USE P/N 9154



HHN -31V — PIVOT/GEAR BOX-RIGHT SIDE ASSY.

PIVOT/GEAR BOX- RIGHT SIDE ASSY.

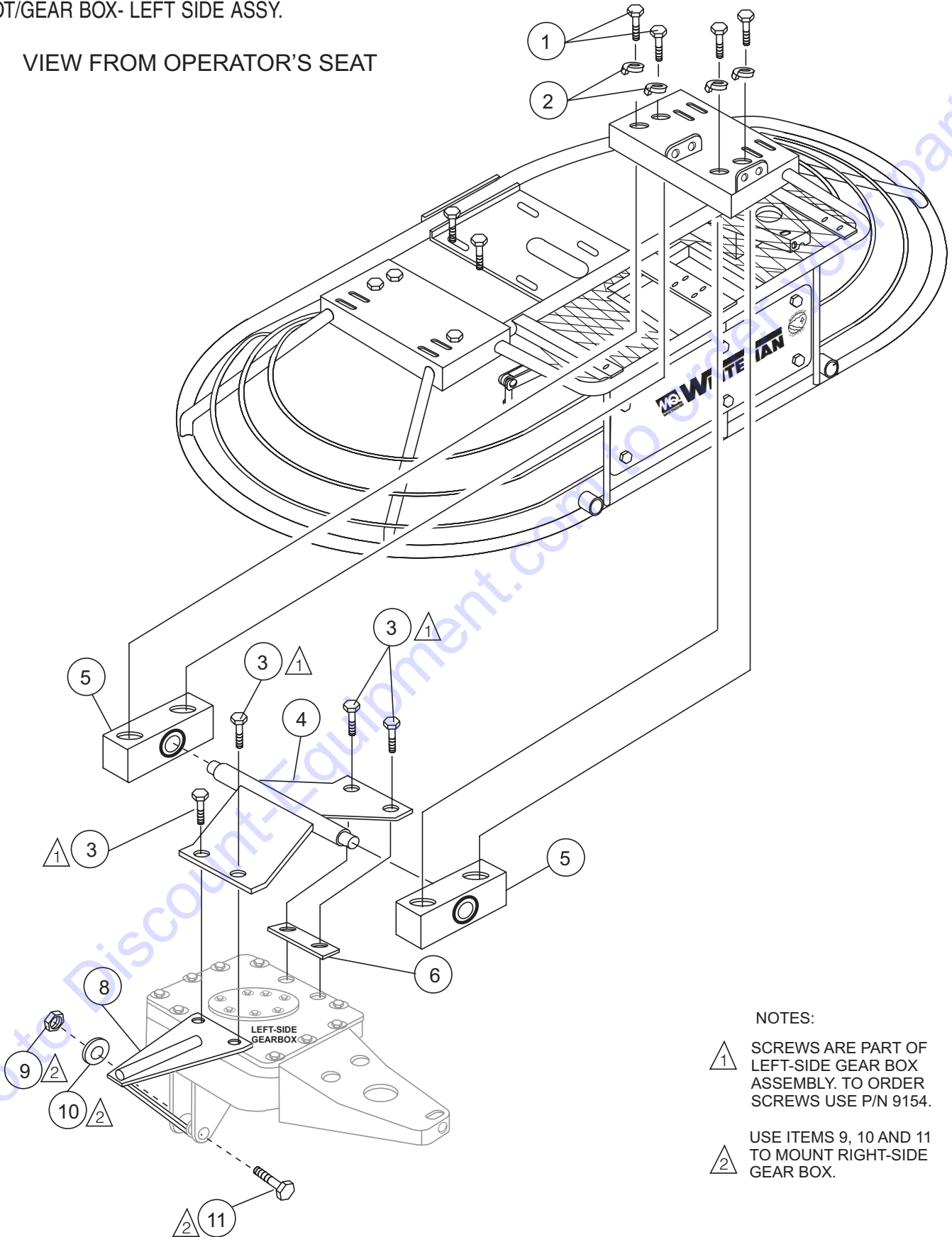
<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	1023	SCREW, HHC 3/8 -16 X 1-1/4	8	
2	0166A	WASHER, LOCK 3/8 MED	8	
3	9154	SCREW	4	PART OF GEAR BOX
4	12713	ROCKER BLOCK	2	
5	12725	BLOCK, ROCKER	2	
6	12716	TRUNNION W/A	1	
7	12704	GEARBOX, COMPLETE	1	
8	12859	PLATE G.B. SPACER	1	
9	12856	BRACKET, DIRECTION CONTROL	1	

Go to Discount-Equipment.com to order your parts

HHN -31V — PIVOT-LEFT SIDE ASSY.

PIVOT/GEAR BOX- LEFT SIDE ASSY.

VIEW FROM OPERATOR'S SEAT



NOTES:

▲ SCREWS ARE PART OF LEFT-SIDE GEAR BOX ASSEMBLY. TO ORDER SCREWS USE P/N 9154.

▲ USE ITEMS 9, 10 AND 11 TO MOUNT RIGHT-SIDE GEAR BOX.

HHN -31V — PIVOT-LEFT SIDE ASSY.

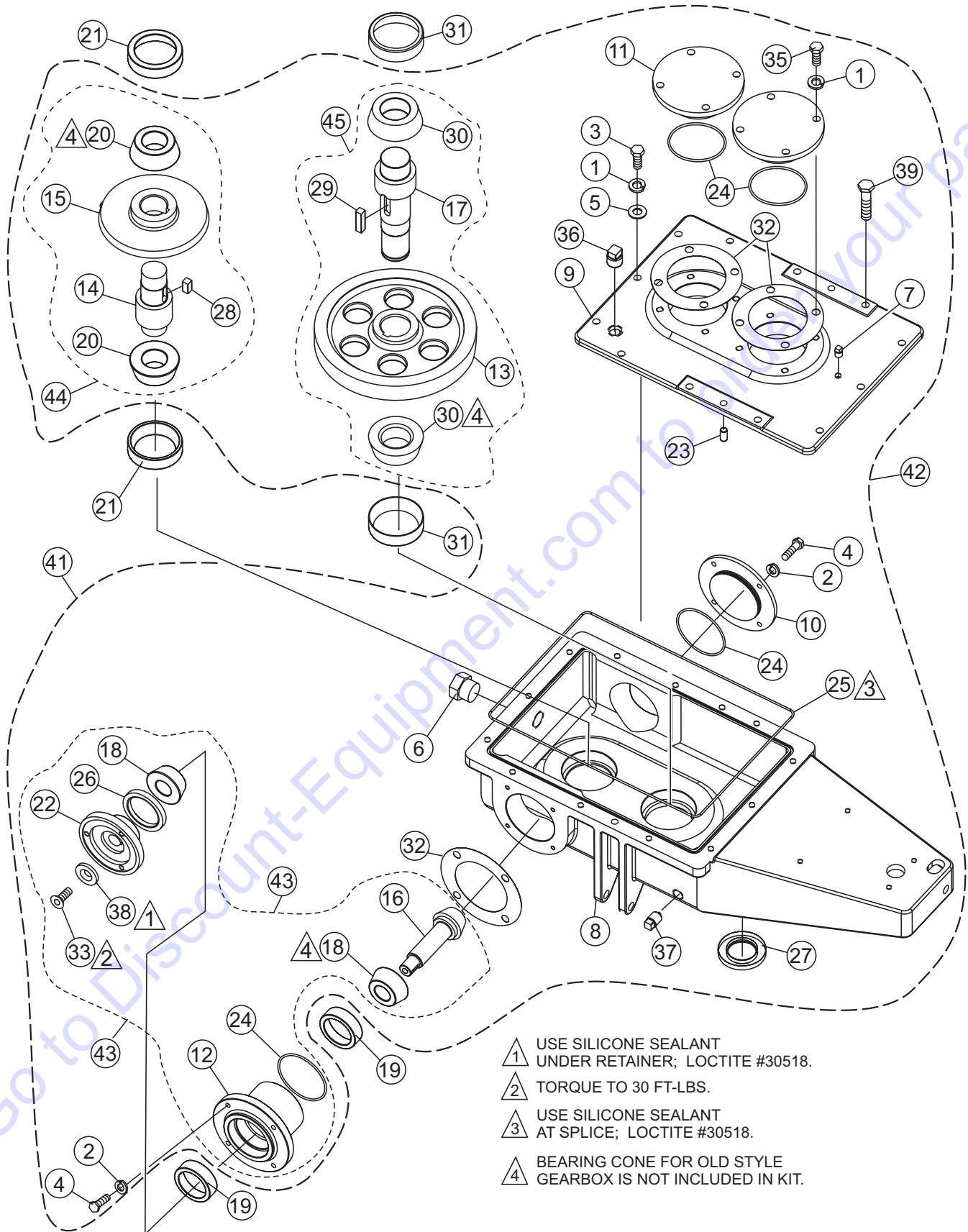
PIVOT/GEAR BOX- LEFT SIDE ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	1023	SCREW, HHC 3/8 -16 X 1-1/4	8	
2	0166A	WASHER, LOCK 3/8 MED	8	
3	9154	SCREW	4	PART OF GEAR BOX
4	12719	PIVOT, GEAR BOX W/A	1	
5	12725	BLOCK, ROCKER	2	
6	12859	PLATE G.B. SPACER	1	
7	12703	GEARBOX, COMPLETE	1	
8	12856	BRACKET, DIRECTION CONTROL	1	
9	0176	NUT, NYLOC 1/2-13	2	USE ON RS GEAR BOX
10	0447	WASHER, FLAT 1/2 SAE	2	USE ON RS GEAR BOX
11	2549	SCREW, HHC 1/2-13 X3	2	USE ON RS GEAR BOX

Go to Discount-Equipment.com to order your parts

HHN -31V — GEAR BOX ASSY.

GEARBOX ASSY.



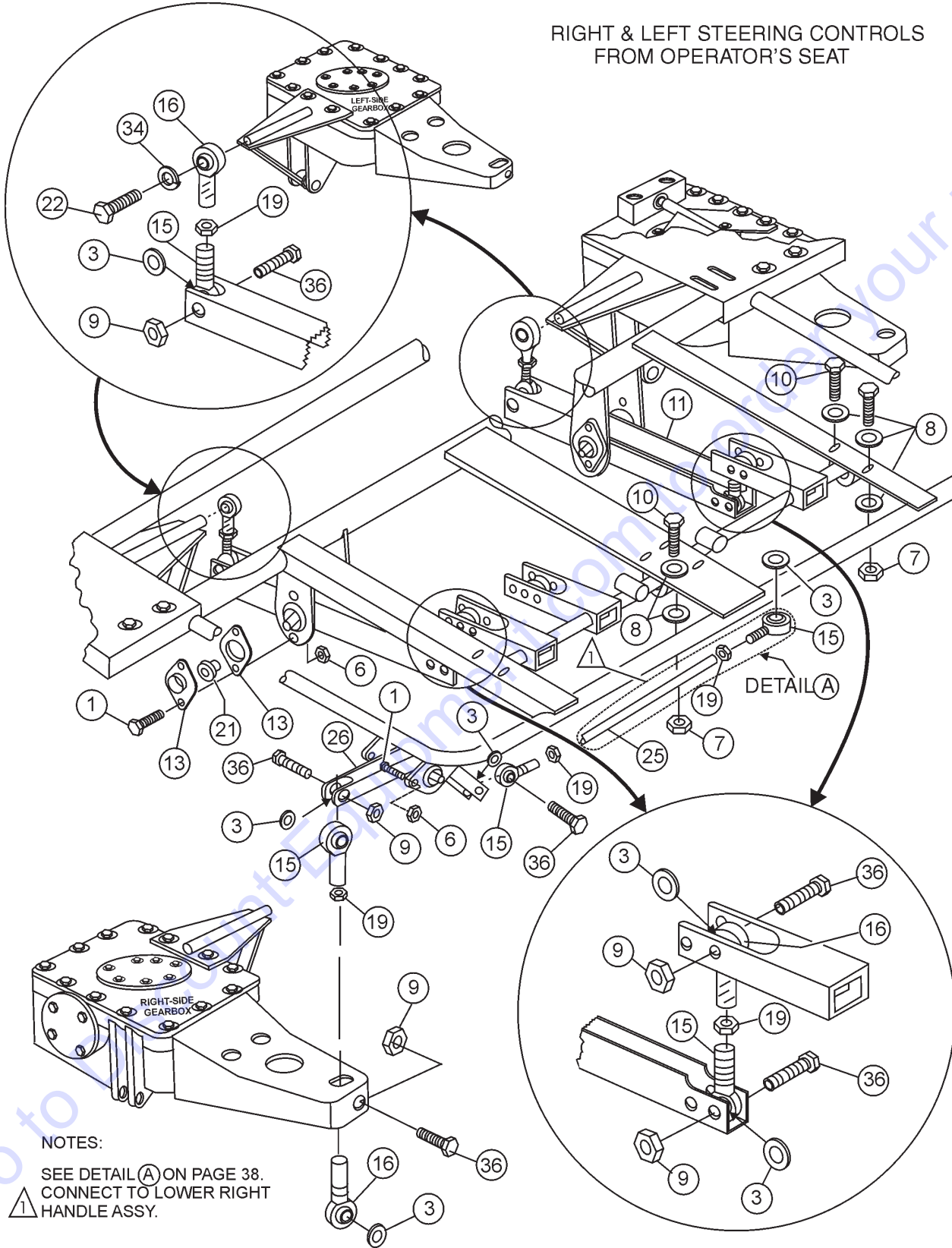
HHN -31V — GEAR BOX ASSY.

GEARBOX ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1\$	0166 A	WASHER, LOCK 3/8 MED	16	
2\$	0181 B	WASHER, LOCK 1/4 MED	8	
3\$	0205	SCREW, HHC 3/8-16 X 1	8	
4\$	0730	SCREW, HHC 1/4-20 X 1	8	
5\$	10136	WASHER, FLAT, 3/8 SAE	8	
6\$	11584	SIGHT GLASS, 3/4 MALE PIPE	1	
7\$	11682	FITTING, PLUG, 1/8 MP SQ HEAD	1	
8\$	12599	CASE, GEAR MACHINED	1	
9\$	12600	COVER, GEAR BOX	1	
10\$	12601	CAP, GEARBOX INPUT	1	
11\$	12602	CAP, GEARBOX IDLER	2	
12\$%		HUB, INPUT SHAFT	1	NOT AVAILABLE SEPARATELY
13\$+		GEAR, 85T HELICAL	1	NOT AVAILABLE SEPARATELY
14\$*		PINION, 17T HELICAL	1	NOT AVAILABLE SEPARATELY
15\$*		GEAR, 60T HELICAL	1	NOT AVAILABLE SEPARATELY
16\$%		PINION, 15T BEVEL	1	NOT AVAILABLE SEPARATELY
17\$+		SHAFT, OUTPUT	1	NOT AVAILABLE SEPARATELY
18	12691	BEARING, CONE TIMKEN #M84249	2	OLD STYLE GEARBOX
18\$%	21803	BEARING, CONE SKF 32305 J2	2	NEW STYLE GEARBOX
19	12692	BEARING, CUP TIMKEN #M84210	2	OLD STYLE GEARBOX
20	12693	BEARING, CONE TIMKEN #2793	2	OLD STYLE GEARBOX
20\$*	21802	BEARING, CONE SKF 32307 J2	2	NEW STYLE GEARBOX
21	12694	BEARING, CUP TIMKEN #2729	2	OLD STYLE GEARBOX
22\$%	12696	COUPLER, GEARBOX	1	
23\$	12697	PIN, DOWEL 0.375/.3752 X 3/4	2	
24\$%#	12698	O RING, SIZE - 151 BUNA N	4	
25\$#	12700	SEAL, CASE O-RING HHN 0.103 X 46. 38	1	
26\$%#	12701	SEAL, NATIONAL #471424	1	
27\$#	12702	SEAL, NATIONAL #470682	1	
28\$*	12735	KEY, 3/8 X 3/4	1	
29\$+	12736	KEY, HARDENED 3/8 X 1-1/2	1	
30	12796	BEARING, CONE TIMKEN #26882	2	OLD STYLE GEARBOX
30\$+	21801	BEARING, CONE SKF 33109 Q	2	NEW STYLE GEARBOX
31	12797	BEARING, CUP TIMKEN #26823	2	OLD STYLE GEARBOX
32\$	20932	SHIM, INPUT. 0.002 THICK	3	
33\$%	1313	SCREW, FHSC 3/8 - 24 X 3/4 PLAIN	1	
34\$%	26034	KEY, 3/16 X 17/32	1	
35\$	4196	SCREW, HHC 3/8 - 16 X 3/4	8	
36\$	911064	FITTING, PLUG 1/2 MP SQ HEAD	1	
37\$	911329	FITTING, PLUG 3/8 MP MAGNETIC	2	
38\$%	9120	RETAINER, DRIVEN PULLEY	1	
39\$	9154	SCREW, HHC 3/8 - 16 X 1-3/4	4	
40	20933	KIT, BEARING/SEAL HHN HELICAL	1	INCLUDES ITEMS W/ #
41	21854	GEARBOX ASSY., RIGHT	1	INCLUDES ITEMS W/ \$
42	21853	GEARBOX ASSY., LEFT	1	INCLUDES ITEMS W/ \$
43	21853854INPUT	KIT, INPUT PINION/HUB/COUPLER	1	INCLUDES ITEMS W/ %
44	21853854INTER	KIT, INTER PINION/GEAR	1	INCLUDES ITEMS W/ *
45	21853854OUTER	KIT, OUTPUT SHAFT/GEAR	1	INCLUDES ITEMS W/ +

HHN -31V — CONTROL STEERING (ASSIST)

RIGHT & LEFT STEERING CONTROLS
FROM OPERATOR'S SEAT



NOTES:

SEE DETAIL (A) ON PAGE 38.
CONNECT TO LOWER RIGHT
HANDLE ASSY.



HHN -31V — CONTROL STEERING (ASSIST)

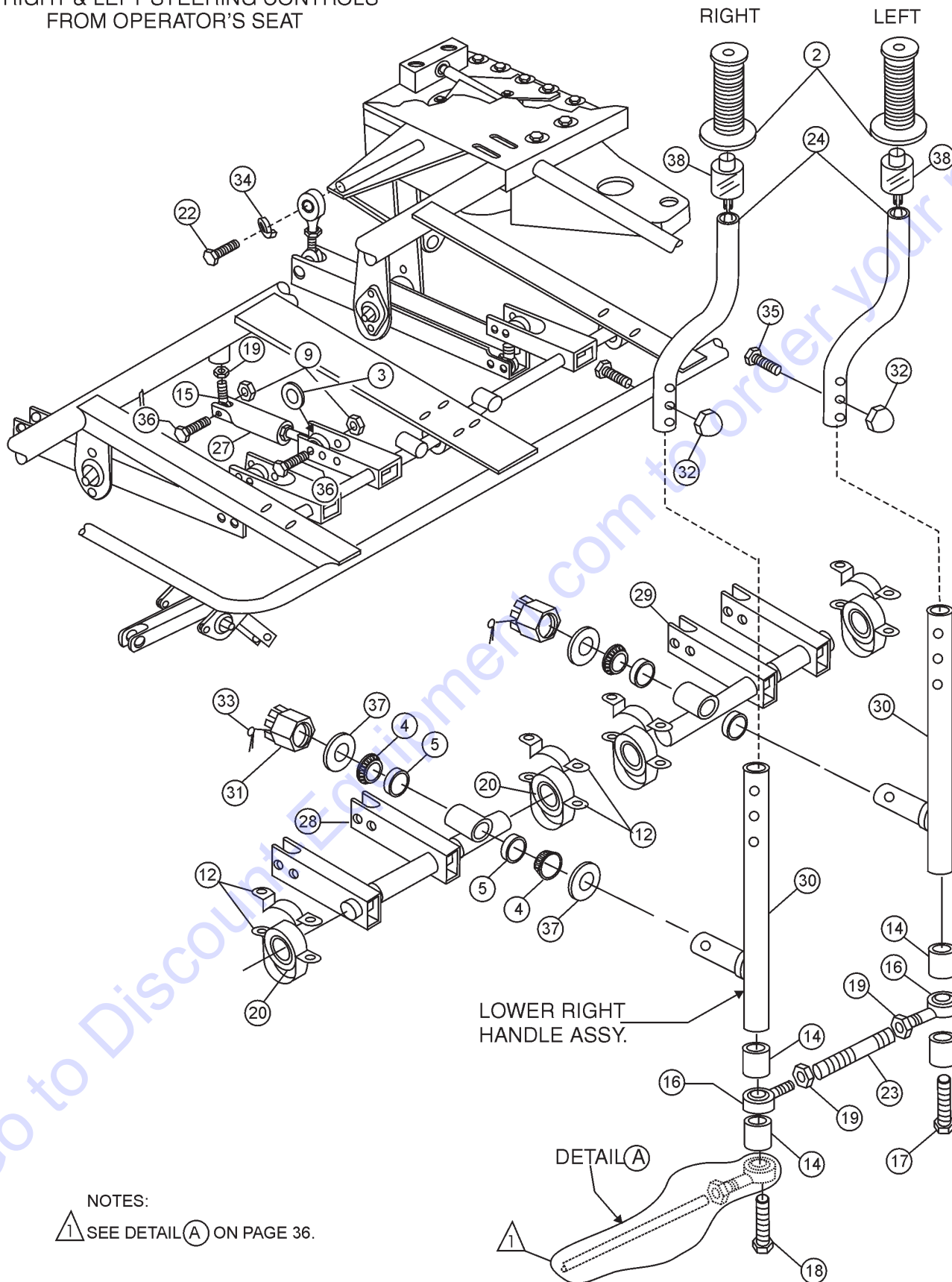
CONTROL STEERING (ASSIST)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0131 A	SCREW, HHC 1/4-20 X 3/4	12	
3	0447	WASHER, FLAT, 1/2 SAE	12	
6	10024	NUT, NYLOC 1/4-20	16	
7	10133	NUT, NYLOC 3/8-16	8	
8	10136	WASHER, FLAT, 3/8 SAE	16	
9	10176	NUT, NYLOC 1/2-13	13	
10	1023	SCREW, HHC 3/8-16 X 1 1/4	8	
11	11127	LEVER, STEERING CONTROL W/A	2	
13	11139	BEARING, FLANGE HOUSING 40M-2	6	
14	11141	SPACER, ROD END	5	
15	11142	ROD END, 1/2-20 MALE RH	9	
16	11143	ROD END, 1/2-20 FEMALE RH	7	
19	11146	NUT, HEX JAM 1/2-20	11	
21	11150	BEARING, SB-201-8	6	
22	11170	SCREW, HHC 1/2-20 X 1.1/2"	2	
25	11205	ROD, L/R MOTION	1	
26	12193	LEVER, L/R CONTROL W/A	1	
34	5054 A	WASHER, LOCK, 1/2 MED.	2	
36	6159 A	SCREW, HHC 1/2-13 X 2	13	

Go to Discount-Equipment.com to order your parts

HHN -31V — CONTROL STEERING (ASSIST)

RIGHT & LEFT STEERING CONTROLS
FROM OPERATOR'S SEAT



NOTES:

1 SEE DETAIL (A) ON PAGE 36.

PARTS FINDER

**Search Website
by Part Number**



**Search Manual
Library For Parts
Manual & Lookup Part
Numbers – Purchase
or Request Quote**

Search Manuals

Enter your information to help us find the right parts manual for your machine.

* Brand:

* Model:

* Serial:

* Part Number:

SEARCH

**Can't Find Part or
Manual? Request Help
by Manufacturer,
Model & Description**

Parts Order Form

Please fill in the following information to help us find the right part for your machine.

Manufacturer:	<input type="text"/>
Model:	<input type="text"/>
Description:	<input type="text"/>
Part Number:	<input type="text"/>
Quantity:	<input type="text"/>
Notes:	<input type="text"/>

Submit

Discount-Equipment.com is your online resource for quality parts & equipment.

Florida: **561-964-4949** Outside Florida TOLL FREE: **877-690-3101**

Need parts?

Click on this link: <http://www.discount-equipment.com/category/5443-parts/> and choose one of the options to help get the right parts and equipment you are looking for. Please have the machine model and serial number available in order to help us get you the correct parts. If you don't find the part on the website or on one of the online manuals, please fill out the request form and one of our experienced staff members will get back to you with a quote for the right part that your machine needs.

We sell worldwide for the brands: Genie, Terex, JLG, MultiQuip, Mikasa, Essick, Whiteman, Mayco, Toro Stone, Diamond Products, Generac Magnum, Airman, Haulotte, Barreto, Power Blanket, Nifty Lift, Atlas Copco, Chicago Pneumatic, Allmand, Miller Curber, Skyjack, Lull, Skytrak, Tsurumi, Husquvarna Target, Stow, Wacker, Sakai, Mi-T-M, Sullair, Basic, Dynapac, MBW, Weber, Bartell, Bennar Newman, Haulotte, Ditch Runner, Menegotti, Morrison, Contec, Buddy, Crown, Edco, Wyco, Bomag, Laymor, EZ Trench, Bil-Jax, F.S. Curtis, Gehl Pavers, Heli, Honda, ICS/PowerGrit, IHI, Partner, Imer, Clipper, MMD, Koshin, Rice, CH&E, General Equipment, Amida, Coleman, NAC, Gradall, Square Shooter, Kent, Stanley, Tamco, Toku, Hatz, Kohler, Robin, Wisconsin, Northrock, Oztec, Toker TK, Rol-Air, APT, Wylie, Ingersoll Rand / Doosan, Innovatech, Con X, Ammann, Mecalac, Makinex, Smith Surface Prep, Small Line, Wanco, Yanmar

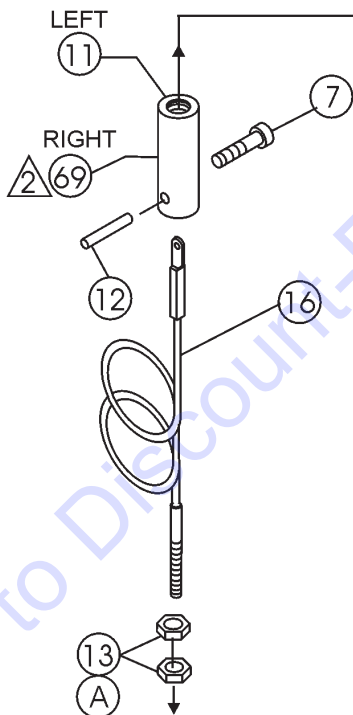
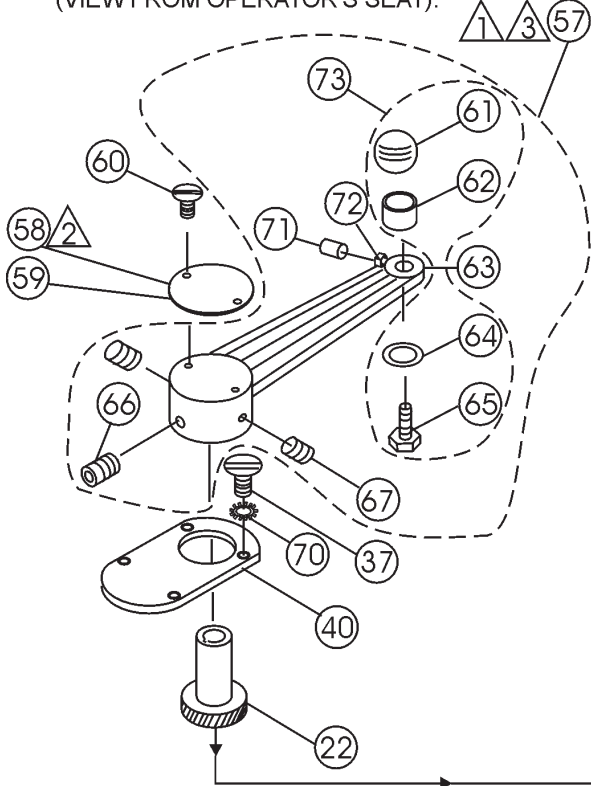
HHN -31V — CONTROL STEERING (ASSIST)

CONTROL STEERING (ASSIST)

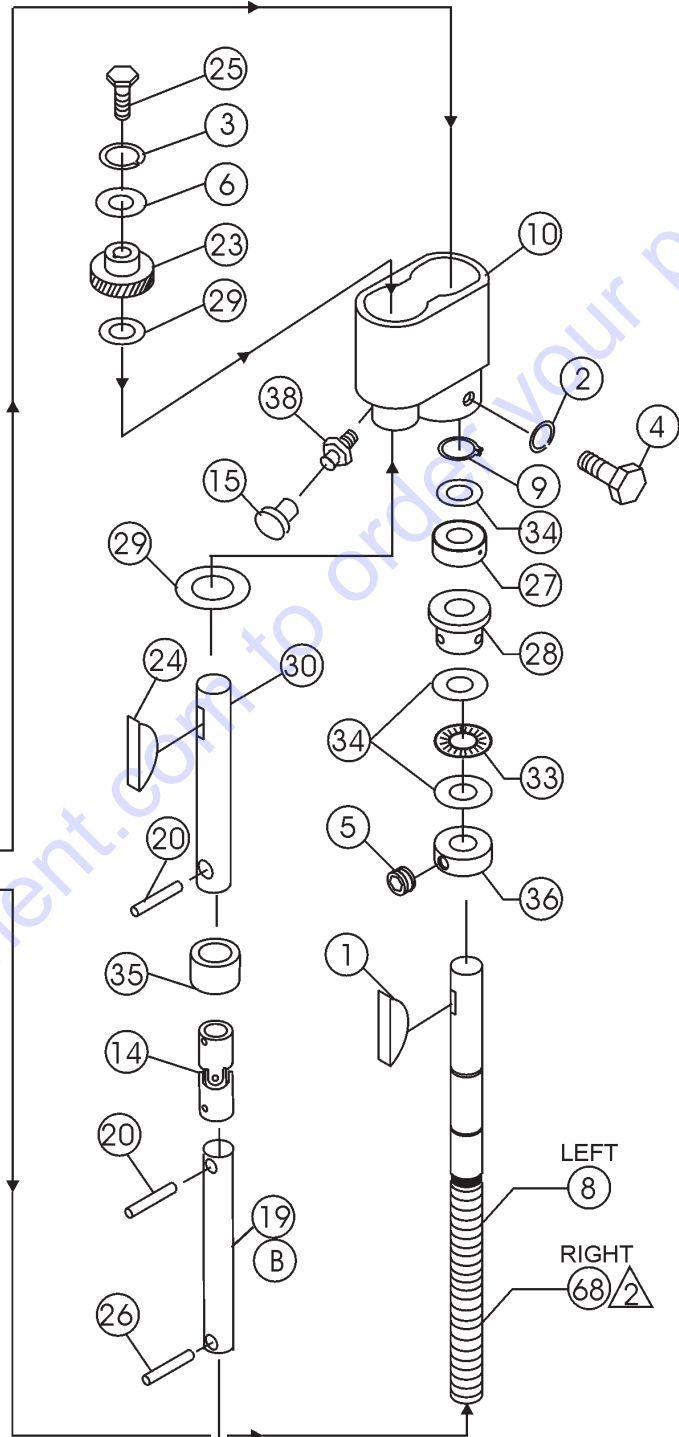
<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
2	2267	GRIP HANDLE, LEFT-RIGHT	2	
3	0447	WASHER, FLAT, 1/2 SAE	12	
4	0735	BEARING, CONE, TIMKEN #A6075	4	
5	0735 A	BEARING, CUP, TIMKEN #A6157	4	
8	10136	WASHER, FLAT, 3/8 SAE	16	
9	10176	NUT, NYLOC 1/2-13	13	
12	11138	BEARING, P-BLOCK HOUSING 47MPB	4	
14	11141	SPACER, ROD END	5	
15	11142	ROD END, 1/2-20 MALE RH	9	
16	11143	ROD END, 1/2-20 FEMALE RH	7	
17	11144	SCREW, SHC 1/2-20 X 2 PLTD	1	
18	11145	SCREW, SHC 1/2-20 X 3 PLTD	1	
19	11146	NUT, HEX JAM 1/2-20	11	
20	11149	BEARING, SB-204-12	4	
22	11170	SCREW, HHC 1/2-20 X 1.1/2"	2	
23	11173	THREADPIECE, 1/2-20 X 2 PLTD	1	
24	11177	HANDLE TUBE, UPPER	2	
27	12200	ASSIST ASM, STEERING SPRING	2	
28	12904	STEERING CONTROL W/A RS ASSIST	1	
29	12903	STEERING CONTROL W/A LS ASSIST	1	
30	12425	HANDLE, LOWER W/A	2	
31	12426	NUT, SLOTTED 3/4-16 PLATED	2	
32	2197	NUT, ACORN 1/4-20	2	
33	2219	PIN, COTTER 1/8 X 1 1/2	2	
34	5054 A	WASHER, LOCK, 1/2 MED.	2	
35	5277	SCREW, HHC 1/4-20 X 1 1/2	2	
36	6159 A	SCREW, HHC 1/2-13 X 2	13	
37	8151	WASHER, FLAT, 3/4 SAE	4	
38	11430	SWITCH, PUSHBUTTON	1	

HHN -31V — TWIN PITCH ASSY. (LEFT/RIGHT)

LEFT SIDE TWIN PITCH TOWER
ASSEMBLY P/N 12386 ITEM 55
(VIEW FROM OPERATOR'S SEAT).



CONTINUED ON PAGE 42
SEE (A), ITEM 32.



CONTINUED ON PAGE 42
SEE (B), ITEM 31.

NOTES:

① LEVER ASSEMBLY, ITEM 57
INCLUDES ITEMS WITHIN OUTLINE.

② RIGHT SIDE TWIN PITCH
ASSEMBLY P/N 12385 ITEM 54
IS IDENTICAL TO LEFT SIDE
TWIN PITCH ASSEMBLY UNLESS
OTHERWISE NOTED.

③ KNOB KIT P/N 2737 (ITEM 73)
INCLUDES ITEMS 61, 62, 64 AND 65.

HHN -31V — TWIN PITCH ASSY. (LEFT/RIGHT)

TWIN PITCH ASSY. (LEFT/RIGHT)

NO	PART NO	PART NAME	QTY.	REMARKS
1+%	0126 B	KEY, WOODRUFF #9	1	
2+%	0161C	WASHER, LOCK 5/16 MED	1	
3*+%	0181 B	WASHER, LOCK, 1/4 MED	4	
4+%	0655	SCREW, HHC 5/16 – 18 X 3/4	1	
5+%	0685	SCREW, SHS 5/16 – 18 X 5/16	1	
6+%	0948	WASHER, FLAT, 1/4 SAE	1	
7+%	10382	BOLT, SHOULDER, 3/8 X 3/8 LONG	1	
8+	10511	SHAFT, PITCH CONTROL, LH TPC	1	LEFT SIDE ONLY
9+%	10512	RING, SNAP, TRUARC 5160 – 75	1	
10+%	10546	HOUSING, PITCH CONTROL, 1-3/4	1	
11+	10722	SLIDE BLOCK, LH PITCH CON	1	LEFT SIDE ONLY
12+%	10723	PIN, SPIROL 3/16 X 1 3/8 HD	1	
13+%	1116	NUT, BRASS JAM 5/16 – 18	2	
14*+%	11583	U-JOINT, PITCH CONTROL	2	
15*+%	1162 A	CAP, GREASE ZERK	2	
16+%	12460	CABLE, PITCH ASM	1	
19+%	20005	SHAFT, TWIN PITCH	1	
20*+%	11654	PIN, ROLL 1/8 X 1 PLATED	5	QTY. INCLUDES USAGE ON BOTH TWIN PITCH ASSEMBLIES, AND MITER BOX SHAFTS
22+%	1529	GEAR, MASTER, TPC	1	
23+%	1530	GEAR, SLAVE, TPC	1	
24*+%	1578	KEY, WOODRUFF, #3	9	QTY. INCLUDES USAGE ON BOTH TWIN PITCH ASSEMBLIES, AND MITER BOX SHAFTS
25+%	1579	SCREW, HHC 1/4 – 20 X 1/2	1	
26+%	1586	PIN, ROLL 1/8 X 3/4	1	
27+%	1604	BEARING, BALL	1	
28+%	1612	BEARING, ALUM – PITCH CONTR	1	
29*+%	1733	WASHER, 1/32 X 1/2 HARDENED	8	
30+%	2007	SHAFT	1	
33+%	2169	BEARING, THRUST, TORR #NTA 1220	1	
34+%	2170	BEARING, RACE, TORR #TRA 1220	3	
35+%	2311	SPACER, 3/4 X 1/2 X 0.8L	1	
36+%	2367	SET COLLAR	1	INCLUDES ITEM 5
37+%	2620	SCREW, BHC 10 – 24 X 5/8	4	
38*+%	2621	ZERK, GREASE STR 1/4 – 28	2	
40+%	2649	COVER, PITCH CONT HOUSING	1	
57	1617	LEVER ASSY, TROWEL ADJUSTMENT	1	INCLUDES ITEMS W/#
58	2300	DECAL, AL PITCH, RH	1	
59	2332	DECAL, AL PITCH, LH	1	
60#	4014	SCREW, 2-3/16 P-K TYPE U DRIVE	2	
61#\$	4403	CRANK KNOB	1	
62#\$	3231	SPACER	1	
63#	1615	CRANK LEVER	1	
64#\$	1733	HARDENED WASHER	1	
65#\$	1616	SHOULDER BOLT	1	
66#	0185	SCREW, SHSS 3/8 – 16 X 3/8"	1	
67#	1528	SCREW, SHSS 1/4 – 20 X 5/16"	1	
68%	10510	SHAFT, PITCH CONTROL, RH TPC	1	RIGHT SIDE ONLY
69%	10721	SLIDE BLOCK, RH PITCH CONTROL	1	RIGHT SIDE ONLY
70	10114	WASHER, EXT. SHKP, #8	4	
71	1162A	CAP, GREASE ZERK/2	1	
72	2621	FITTING GREASE	1	
73	2737	KNOB, KIT	1	INCLUDES ITEMS W/\$

NOTE:

Indicated quantities are for one pitch tower. If ordering for two pitch towers double the quantity.

HHN -31V — TWIN PITCH ASSY. (LEFT/RIGHT)

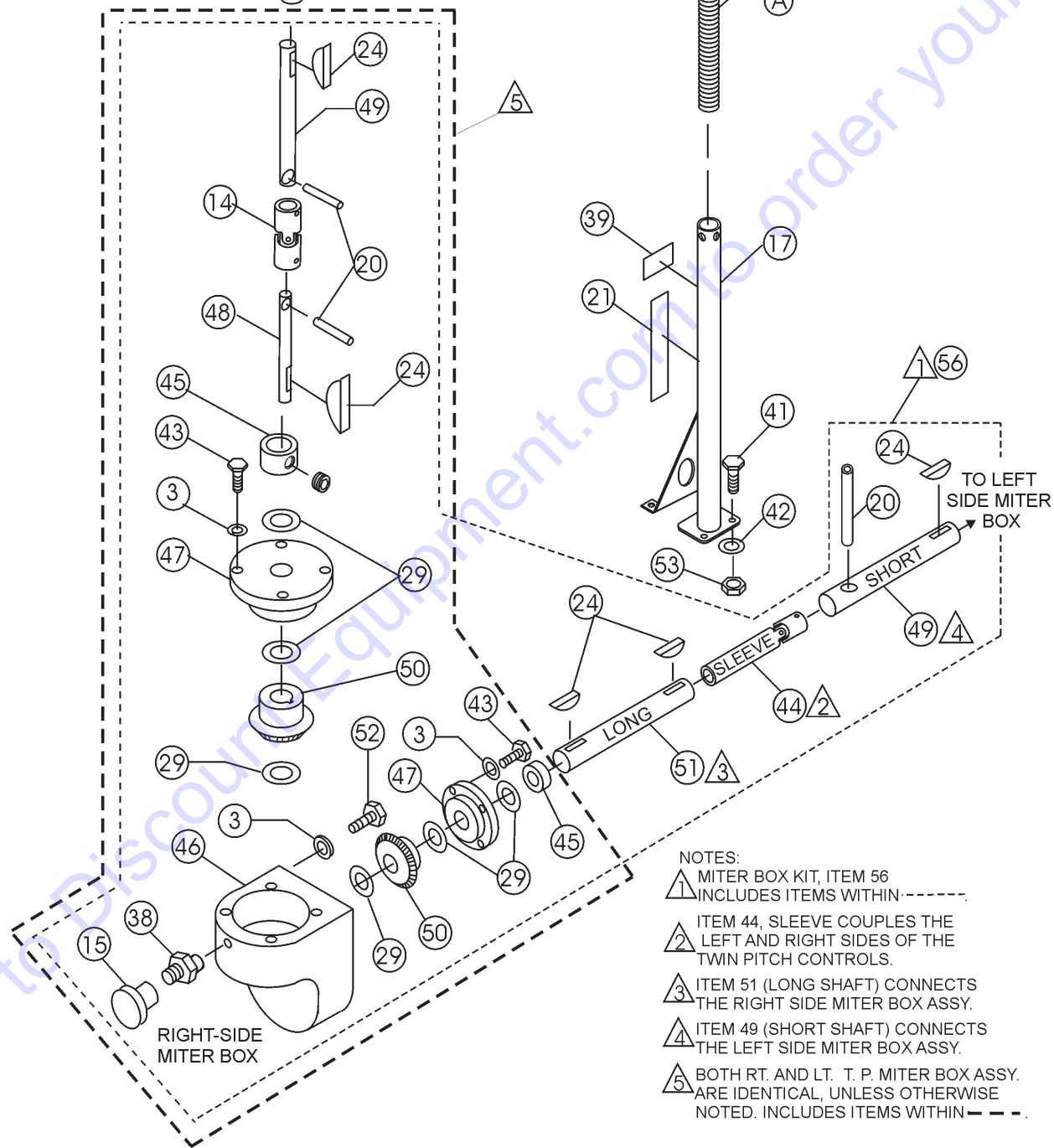
VIEW FROM
OPERATOR'S SEAT

CONTINUED FROM (B), ITEM 19
SEE PAGE 40

CONTINUED FROM (A), ITEM 13
SEE PAGE 40

TYPICAL BOTH LEFT
AND RIGHT SIDES
COMPLETE MITER
BOX KIT

PART OF LEFT SIDE TWIN
PITCH TOWER ASSEMBLY



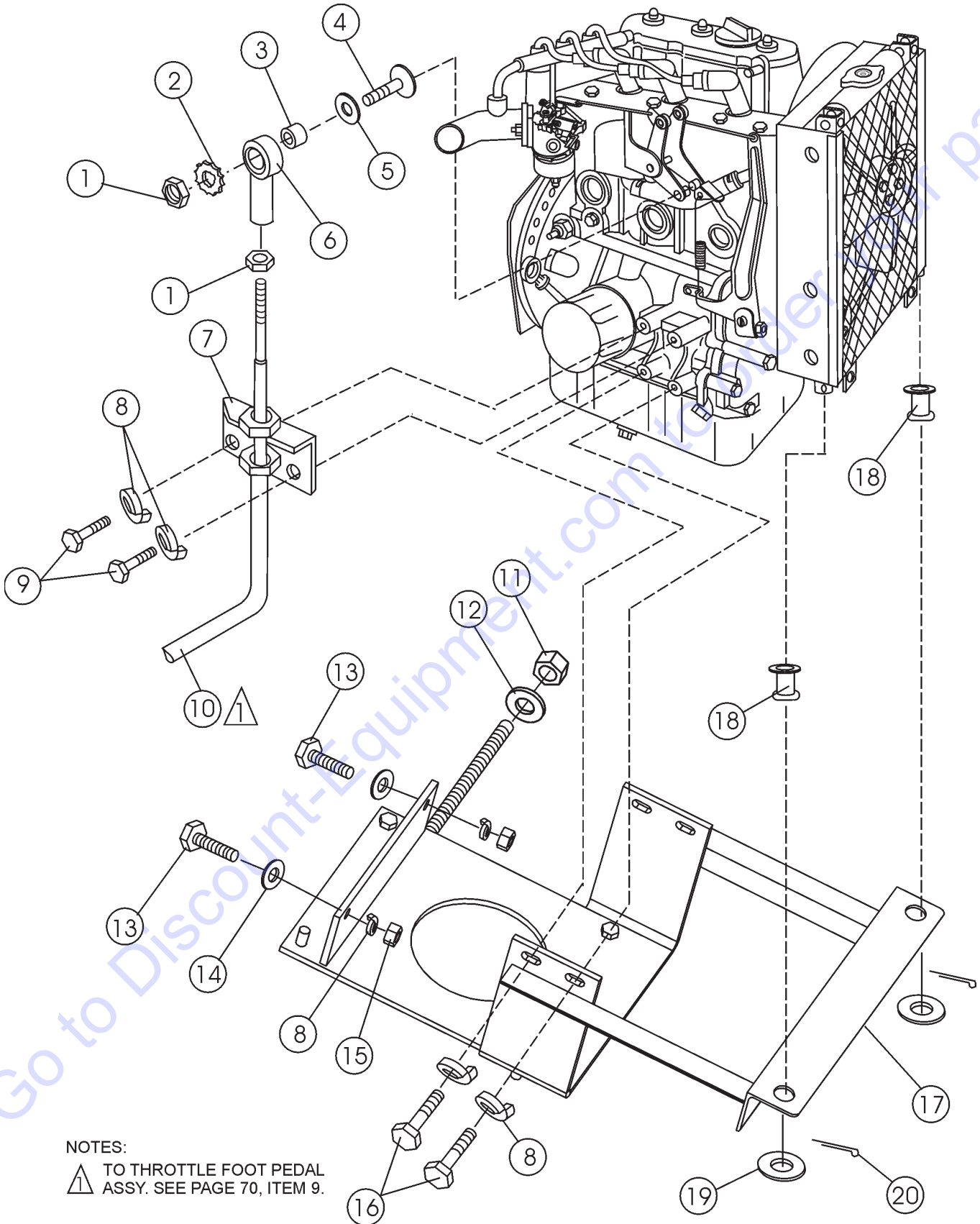
HHN -31V — TWIN PITCH ASSY. (LEFT/RIGHT)

TWIN PITCH ASSY. (LEFT/RIGHT)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
3*+%	0181 B	WASHER, LOCK, 1/4 MED	4	
14*+%	11583	U-JOINT, PITCH CONTROL	2	
15*+%	1162 A	CAP, GREASE ZERK	2	
16+%	12460	CABLE, PITCH ASM	1	
17	10548	TUBE, PITCH CONTROL W/A	1	
20*+%	11654	PIN, ROLL 1/8 X 1 PLATED	5 QTY. INCLUDES USAGE ON BOTH TWIN PITCH ASSEMBLIES, AND MITER BOX SHAFTS
21	1499	DECAL, WHITEMAN	1	
22+%	1529	GEAR, MASTER, TPC	1	
23+%	1530	GEAR, SLAVE, TPC	1	
24*+%	1578	KEY, WOODRUFF, #3	9 QTY. INCLUDES USAGE ON BOTH TWIN PITCH ASSEMBLIES, AND MITER BOX SHAFTS
29*+%	1733	WASHER, 1/32 X 1/2 HARDENED	8	
31	2012	SLEEVE, ADJ - LONG, RIDER	1	
32	2156	SPRING, COIL	1	
38*+%	2621	ZERK, GREASE STR 1/4 - 28	2	
39	2634	DECAL, PITCH TOWER	1	
41	0202	SCREW, HHC 5/16 - 18 X 1	4	
42	0300 B	WASHER, FLAT, 5/16 SAE	4	
43*	0730	SCREW, HHC 1/4 - 20 X 1	8	
44*	11653	SLEEVE W/U JOINT	1	
45*	1577	SET COLLAR, 1/2	2	
46*	1987	MITER BOX, PITCH CONTROL	1	
47*	1988	MITER BOX, BEARING CAP RIDERS	2	
48*	2021	SHAFT, MITER VERT	1	
49*	2022	SHAFT, MITER VERTICAL	3 QTY. INCLUDES USAGE ON BOTH TWIN PITCH ASSEMBLIES, AND MITER BOX SHAFTS
51*	2845	SHAFT, MITER BOX HORIZ (HNN)	1	
52*	4514	SCREW, HHC 1/4 - 20 X 5/8	4	
53	5283	NUT, NYLOC 5/16 - 18	4	
56	11655	MITER BOX ASSY (HNN)	1 INCLUDES ITEMS W/*

HHN 31V-31V-TC — ENGINE (VANGUARD)

ENGINE (VANGUARD)



NOTES:

▲ TO THROTTLE FOOT PEDAL ASSY. SEE PAGE 70, ITEM 9.

HHN 31V-31V-TC — ENGINE (VANGUARD)

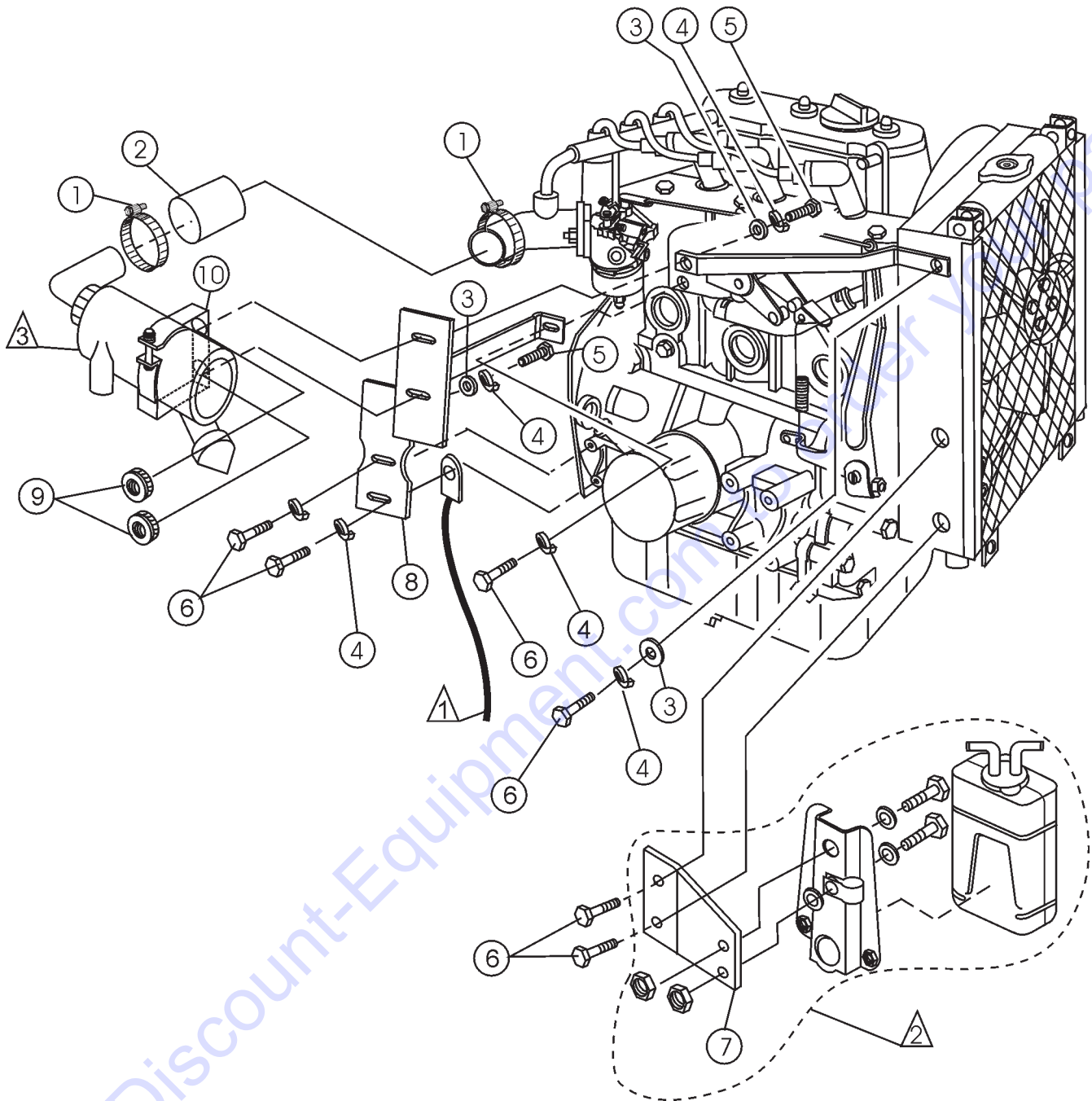
ENGINE (VANGUARD)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0937	NUT, HEX 10-32	2	
2	10237	WASHER, EXT. SHKP. #10	1	
3	11710	SPACER, ENG THROTTLE	1	
4	8133	SCREW, RHM 10-32 X 3/4	1	
5	2203	WASHER, FLAT #10	1	
6	2153	ROD END, 10-32 FEMALE RH	1	
7	11771	BRACKET, ENGINE THROTTLE CABLE	1	
8	0161 C	WASHER, LOCK, 5/16 MED.	8	
9	2299	SCREW, HHC M8-1.25 X 16mm	3	
10	2124	CABLE, THROTTLE (RT)	1	
11	10087	NUT, NYLOC 1/2-20 THIN	1	
12	0447	WASHER, FLAT 1/2 SAE	1	
13	0202	SCREW, HHC 5/16-18 X 1	3	
14	0300 B	WASHER, FLAT, 5/16 SAE	2	
15	5283	NUT, NYLOC 5/16-18	3	
16	2866	SCREW, HHC M8-1.25 X 20mm	4	
17	12844	MOUNT, 31V ENGINE W/A	1	
18	19468	GROMMET, MINOR PN Z-4004	2	
19	12199	WASHER, FLAT	2	
20	0183	COTTER OIN	2	

Go to Discount-Equipment.com to order your parts

HHN -31V — ENGINE (VANGUARD)

ENGINE (VANGUARD)



NOTES:

▲ PART OF NEGATIVE BATTERY CABLE. SEE PAGE 72, ITEM 6.

▲ ITEMS WITHIN DASHED LINE (EXCEPT ITEM 7) ARE INCLUDED WITH ENGINE. REFER TO ENGINE PARTS MANUAL.

▲ INCLUDED WITH MUFFLER CLAMP.

HHN -31V— ENGINE (VANGUARD)

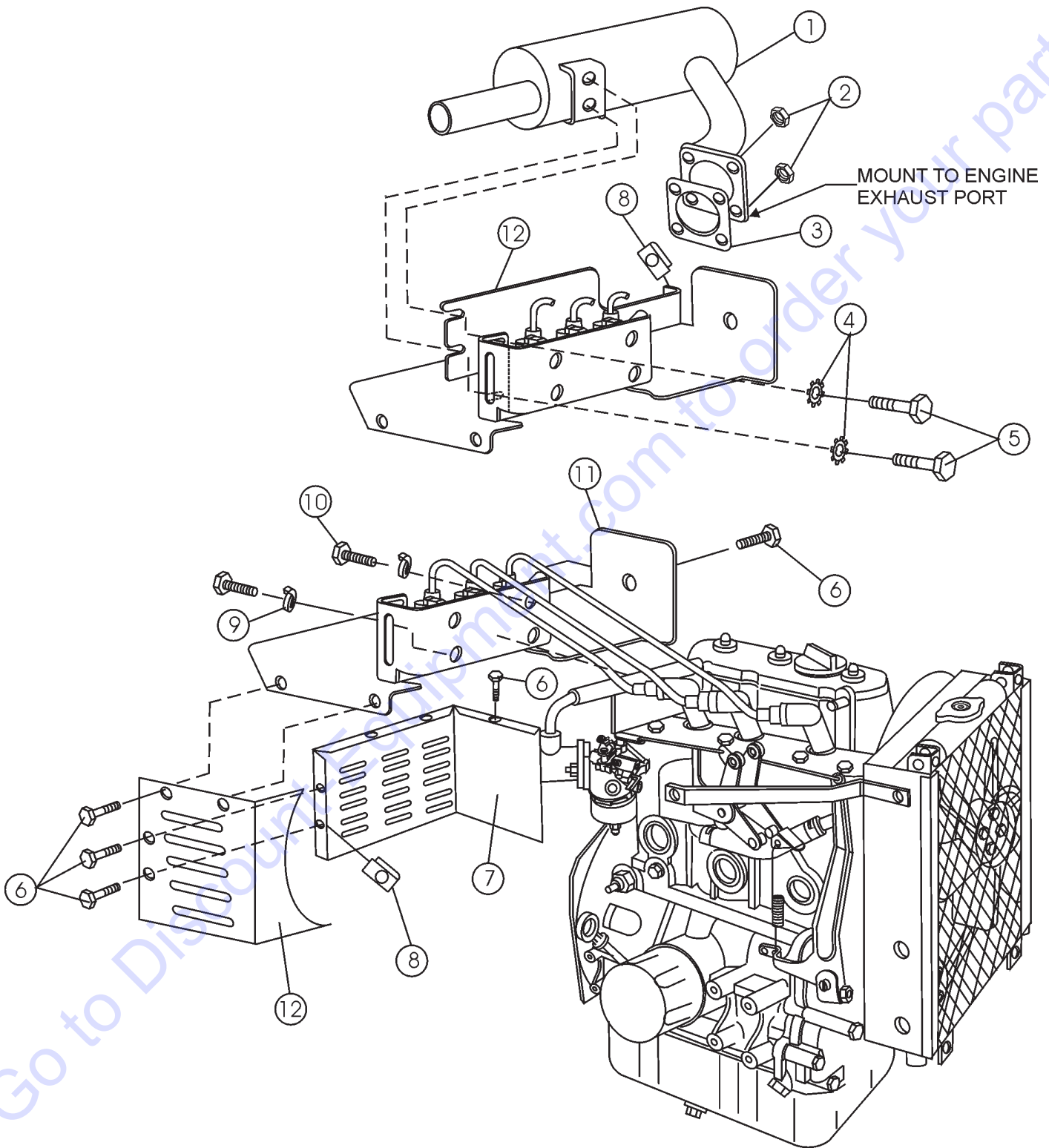
ENGINE (VANGUARD)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	10434	CLAMP, 2" HOSE	2	
2	12225	HOSE , AIR CLEANER MT	1	
3	0948	WASHER, FLAT, 1/4 SAE	8	
4	0161 C	WASHER, LOCK, 5/16 MED.	6	
5	0730	SCREW, HHC 1/4-20 X 1	2	
6	12464	SCREW, HHC M6-1.0 X 16mm	3	
7	11900	MOUNT, RADIATOR OVERFLOW	1	
8	12102	MOUNT, AIR CLEANER W/A	1	
9	19266	BLIND NUT	2	
10	12103	CLAMP, 31V AIR CLEANER ASM	1	

Go to Discount-Equipment.com to order your parts

HHN -31V — ENGINE (VANGUARD)

ENGINE (VANGUARD)



HHN -31V — ENGINE (VANGUARD)

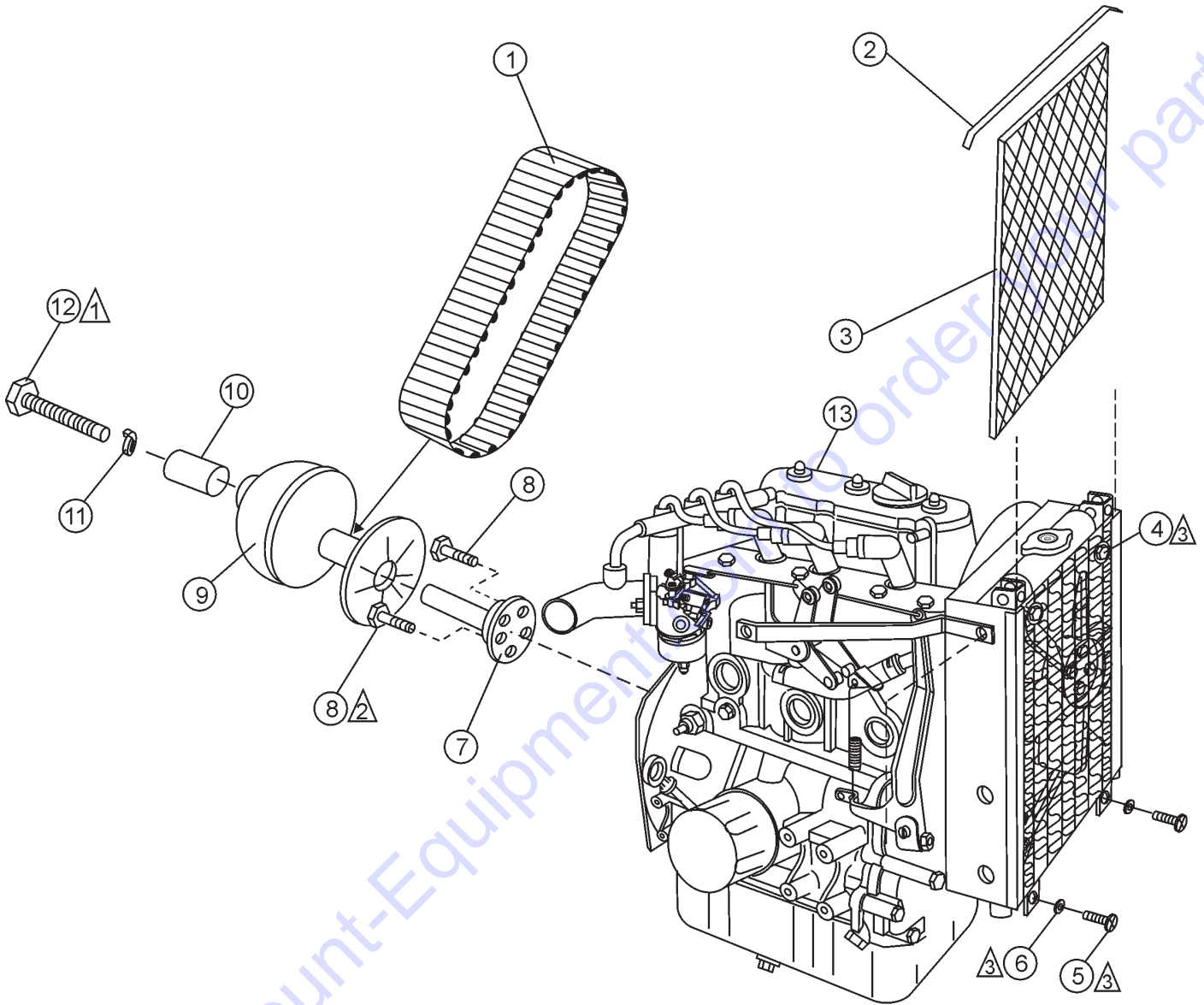
ENGINE (VANGUARD)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	20089	MUFFLER, 31V	1	
2	12848	EXHAUST FLANGE NUT	4	
3	12847	EXHAUST GASKET	1	
4	10114	WASHER, EXT. SHKP, #8	2	
5	0655	SCREW, HHC 5/16-18 X 3/4	2	
6	11819	SCREW, HHC 1/4-20 X 3/4 W/WASH	7	
7	12545	PLATE, BELT GUARD SIDE	1	
8	11534	NUT, "U" TYPE, 1/4-20	8	
9	0161 C	WASHER, LOCK, 5/16 MED.	4	
10	1605	SCREW, HHC M8-1.25 X 25mm	4	
11	20082	BELT GUARD/MUFFLER SUPPORT W/COMET	1	
12	20098	PLATE, BELT GUARD REAR	1	

Go to Discount-Equipment.com to order your parts

HHN -31V — ENGINE (VANGUARD)

ENGINE (VANGUARD)



NOTES:

▲ TORQUE TO 150 FT. LBS

▲ TORQUE TO 15 FT. LBS.
▲ BOLT IS INCLUDED WITH
ENGINE.

▲ INCLUDED WITH RADIATOR

HHN -31V — ENGINE (VANGUARD)

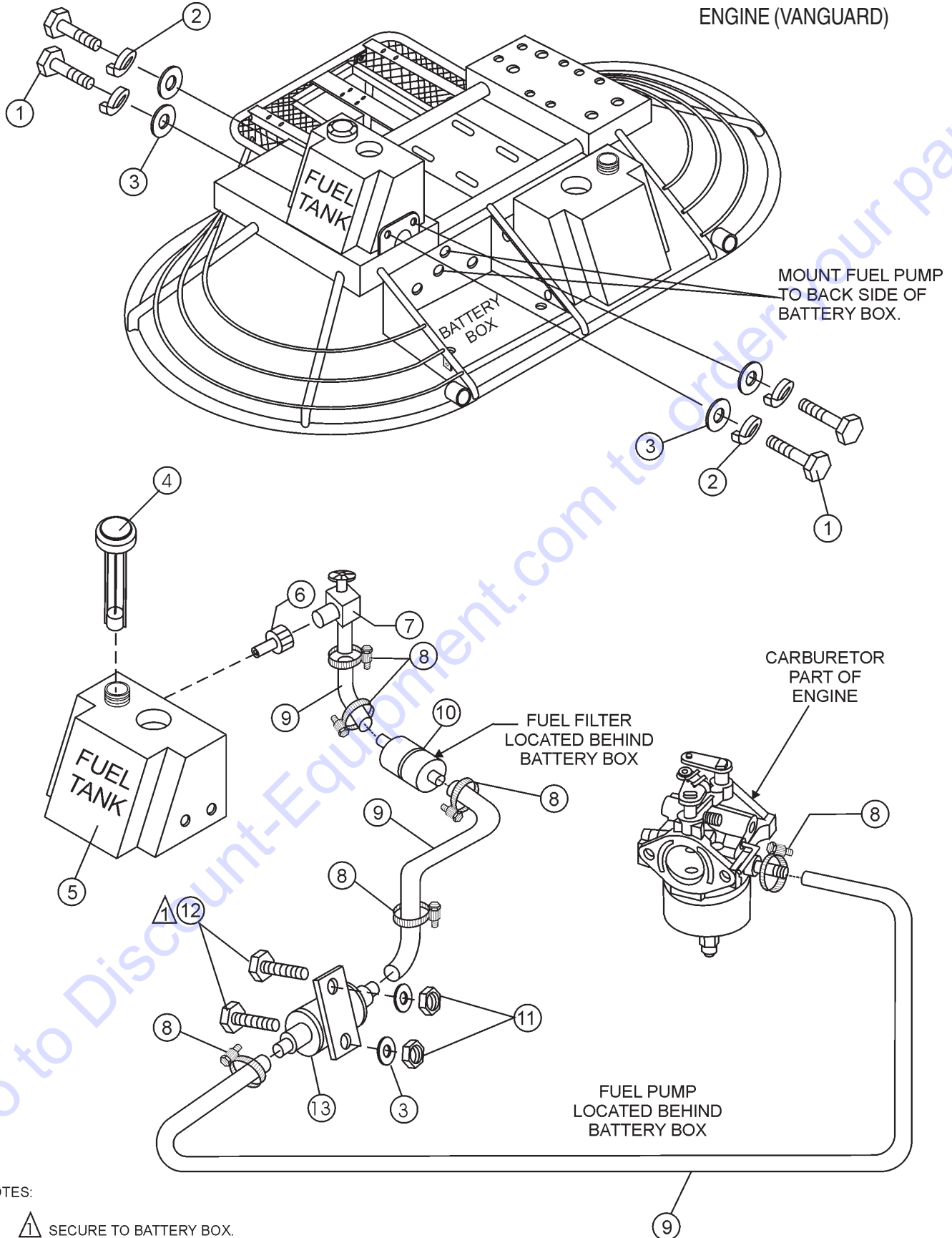
ENGINE (VANGUARD)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	20138	BELT, CVT-VANGUARD COMET	2	ORDER 2 BELTS FOR SPARES
2	60049	TRIM EDGE, 1/32 (62B3-1/32)	1.50 FT.	
3	12450	GUARD, RADIATOR (31 VAN)	1	
4		SCREW	2	INCLUDED W/RADIATOR
5		SCREW	2	INCLUDED W/RADIATOR
6		WASHER	2	INCLUDED W/RADIATOR
7	3911758	ADAPTOR, CLUTCH 31 HP VANGUARD	1	
8	20046	SCREW, HHC M8 125 X 25 MM GRADE 10.9	5	
9	12878	CLUTCH, CVT 1-7/16 COMET	1	
10	20215	.415 OD X 21/32 ID X 2-1/16L	1	
11	4703	WASHER, LOCK, 5/8 MED	1	
12	20057	SCREW, HHC 5/8-18 X4	1	
13	11292	ENGINE, BRIGGS 31 HP,DM950G	1	

Go to Discount-Equipment.com to order your parts

HHN -31V — ENGINE (VANGUARD)

ENGINE (VANGUARD)



HHN -31V — ENGINE (VANGUARD)

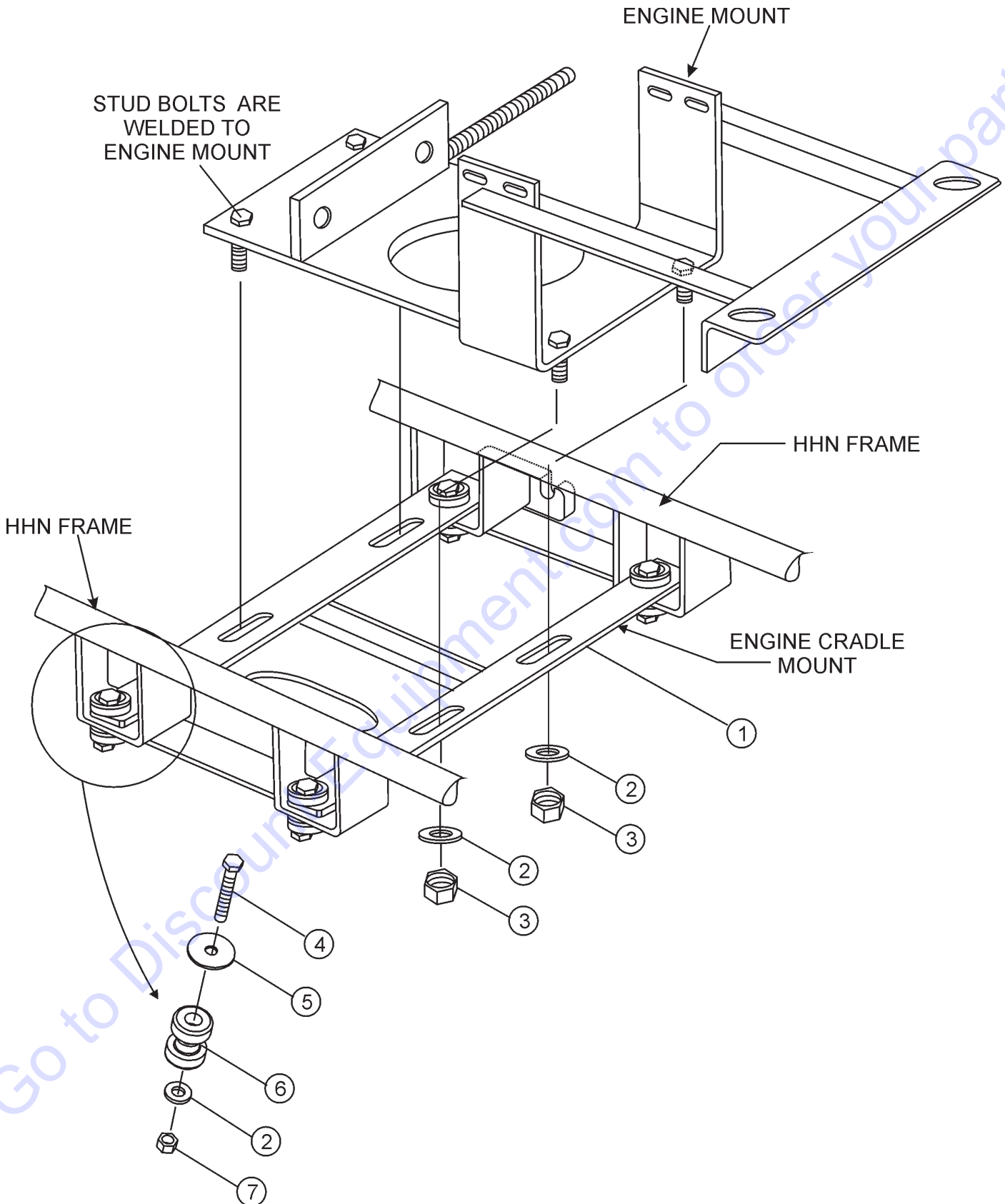
ENGINE (VANGUARD)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	4514	SCREW, HHC 1/4-20 X 5/8	4	
2	0161 C	WASHER, LOCK, 5/16 MED.	4	
3	0948	WASHER, FLAT, 1/4 SAE	8	
4	11418	FUEL CAP/GAUGE (10.5")	1	
5	12404	TANK, HNN 5GAL	1	
6	19633	BUSHING, RUBBER FUEL DAPCO10672	1	
7	19661	VALVE , FUEL DRAIN DAPCO 11478	1	
8	19473	CLAMP, WORM HOSE, #4 (1/4-5/8)	6	
9	60013	HOSE, .25id RUBBER FUEL LINE	3	
10	11984	IN-LINE FUEL FILTER 5/16	1	
11	10024	NUT, NYLOC 1/4-20	2	
12	0131 A	SCREW, HHC 1/4-20 X 3/4	2	
13	12497	FUEL PUMP	1	

Go to Discount-Equipment.com to order your parts

HHN -31V — ENGINE (VANGUARD)

ENGINE (VANGUARD)



HHN -31V — ENGINE (VANGUARD)

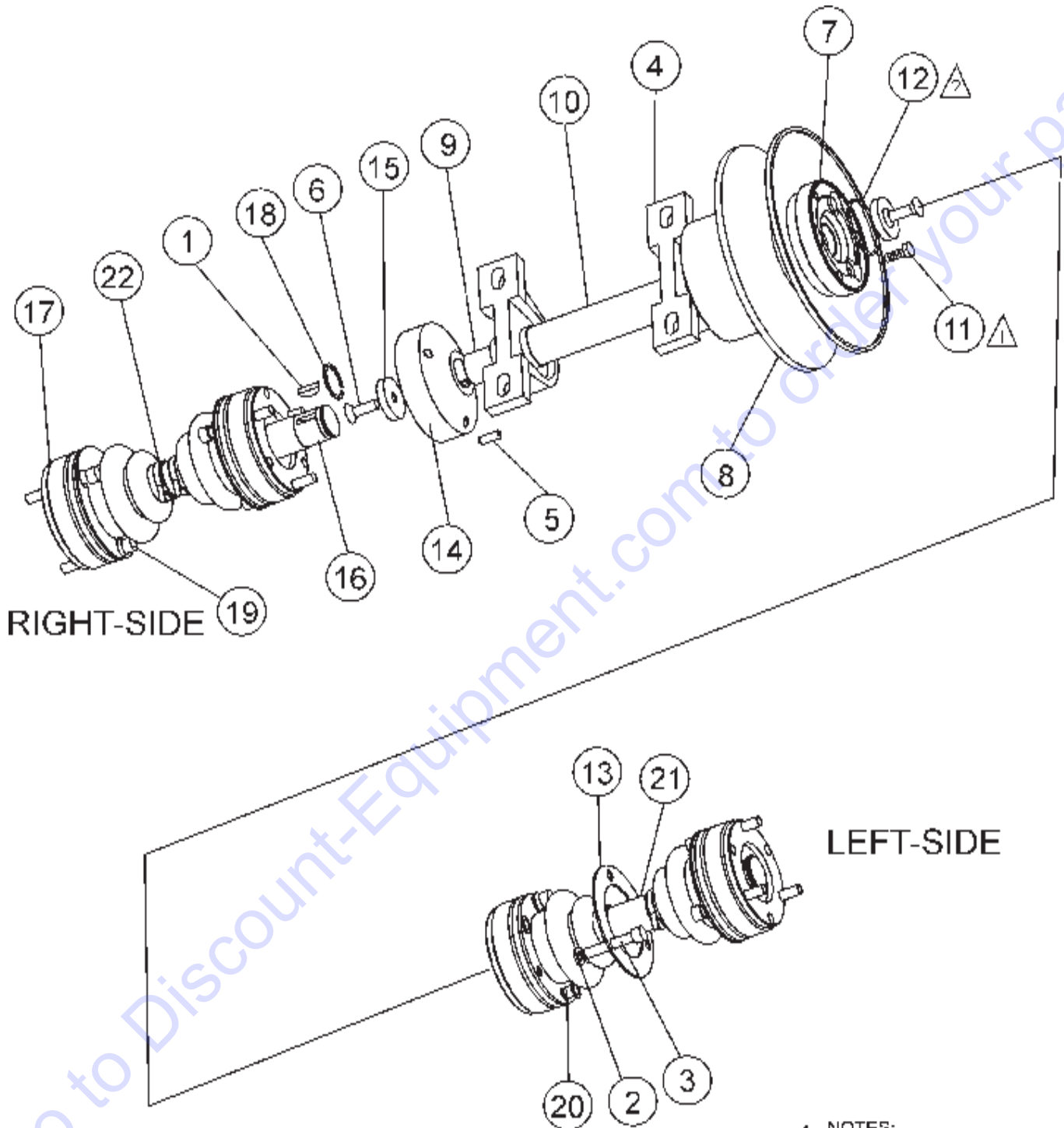
ENGINE (VANGUARD)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	20051	CRADLE, ENGINE W/A	1	
2	10136	WASHER, FLAT, 3/8 SAE	8	
3	1063	NUT NYLOC 3/8-24	4	
4	8156	SCREW, HHC 3/8-16 X 2-1/2	4	
5	12832	WASHER, VIBRATION SNUB	4	
6	12831	MOUNT, ENGINE VIBRATION	4	
7	10133	NUT, NYLOC 3/8-18	4	

Go to Discount-Equipment.com to order your parts

HHN -31V — DRIVE ASSY.

DRIVE ASSY.



- NOTES:
- ① TORQUE TO 12 FT-LBS
 - ② O RING SEAL IS SEATED BETWEEN ITEMS 7 AND 8

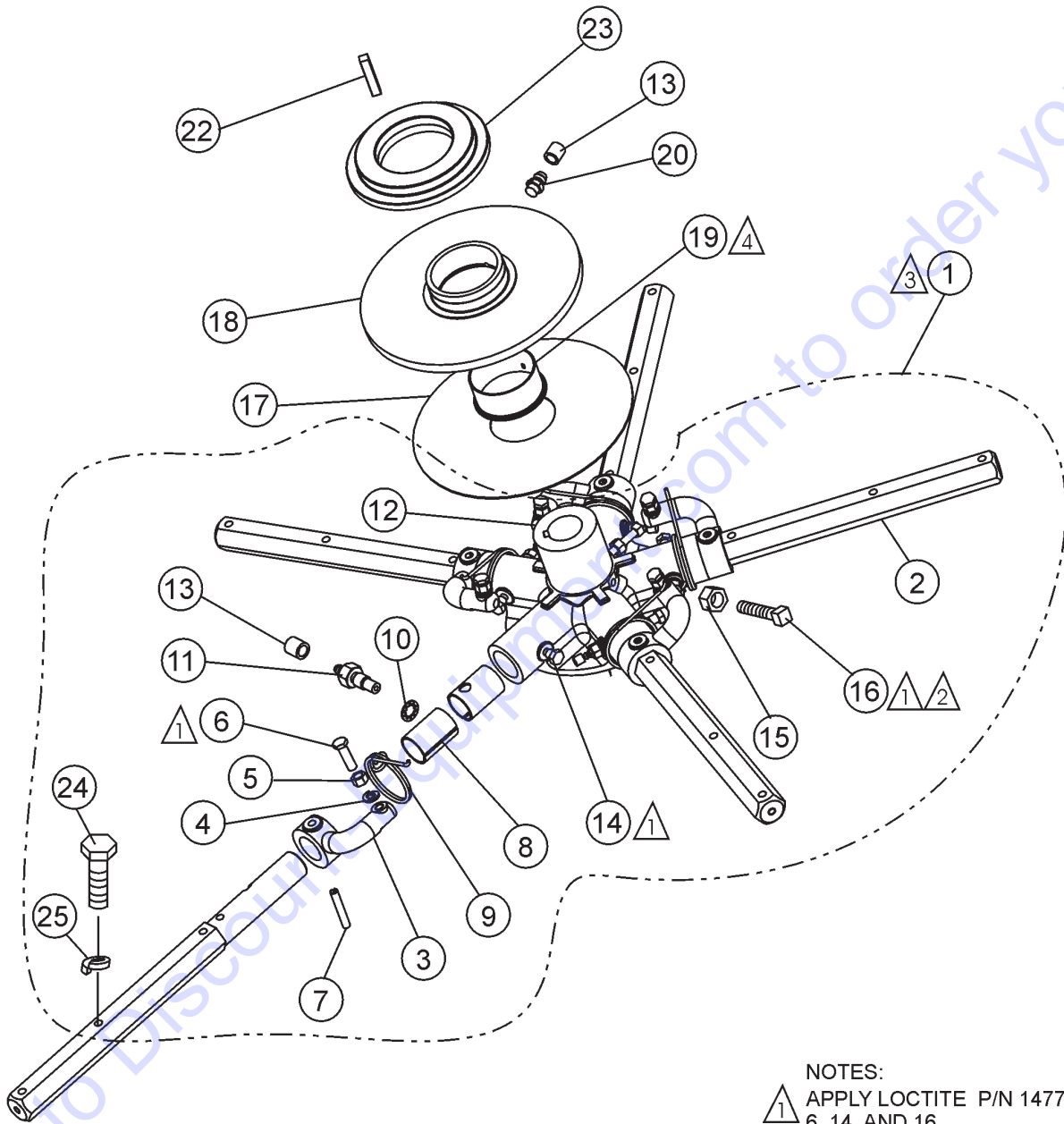
DRIVE ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0126	KEY, WOODRUFF	4	
2	0161C	WASHER, LOCK 5/16 MED	12	
3	0243	SCREW, SHC 5/16 -18 X 1/3/4	3	
4	10337	BEARING PILLOW BLOCK FAFYAK-1	2	
5	10909	KEY, 3/16 X 11/16	1	
6	1146	SCREW, FHSC 5/16-18 X 1 NYLOC	2	
7	12590	COUPLER, CV-JOINT COMET	1	
8	20350	PULLEY, CVT LOWER, COMET 302479C	1	
9	20043	SHAFT, DRIVE BEARING	1	
10	20044	SPACER, BEARING SHAFT	1	
11	20056	SCREW, HHC 1/4-28 X 3/4 GRADE 8	3	
12	20116	O-RING, SIZE 031 BUNA N	1	
13	20117	RETAINER, CAP PLUG	4	
14	2029	COUPLER 1 ID RIDER	1	
15	2037	WASHER, RETAINING	2	
16	2043	SHAFT, CV-JOINT BRT, 9.63LG	1	
17	2052	JOINT, CV W/BOOT	4	
18	2090	RING, SNAP TRUARC 5100-106	4	
19	2186	SCREW, SHC 5/16-18 X 2-1/4 PLTD	9	
20	2218	CAP PLUG, 1/8 RIDER	12	
21	20184	SHAFT, CV-JOINT JRN, 7.81LG	1	
22	60103	TIE WRAP, .312 X 8L X .082 THICK	4	

Go to Discount-Equipment.com to order your parts

HHN -31V — 5-BLADE SPIDER ASSY. (LEFT)

LEFT-SIDE SPIDER ASSEMBLY (5-BLADE).
VIEW FROM OPERATORS SEAT.



NOTES:

① APPLY LOCTITE P/N 1477 TO ITEMS 6, 14, AND 16.

② TORQUE TO 90 FT. LBS.

③ LEFT-SIDE SPIDER ASSEMBLY P/N 12932 INCLUDES ALL ITEMS WITHIN OUTLINE.

④ PART OF ITEM 18 (P/N11431).

HHN -31V — 5-BLADE SPIDER ASSY. (LEFT)

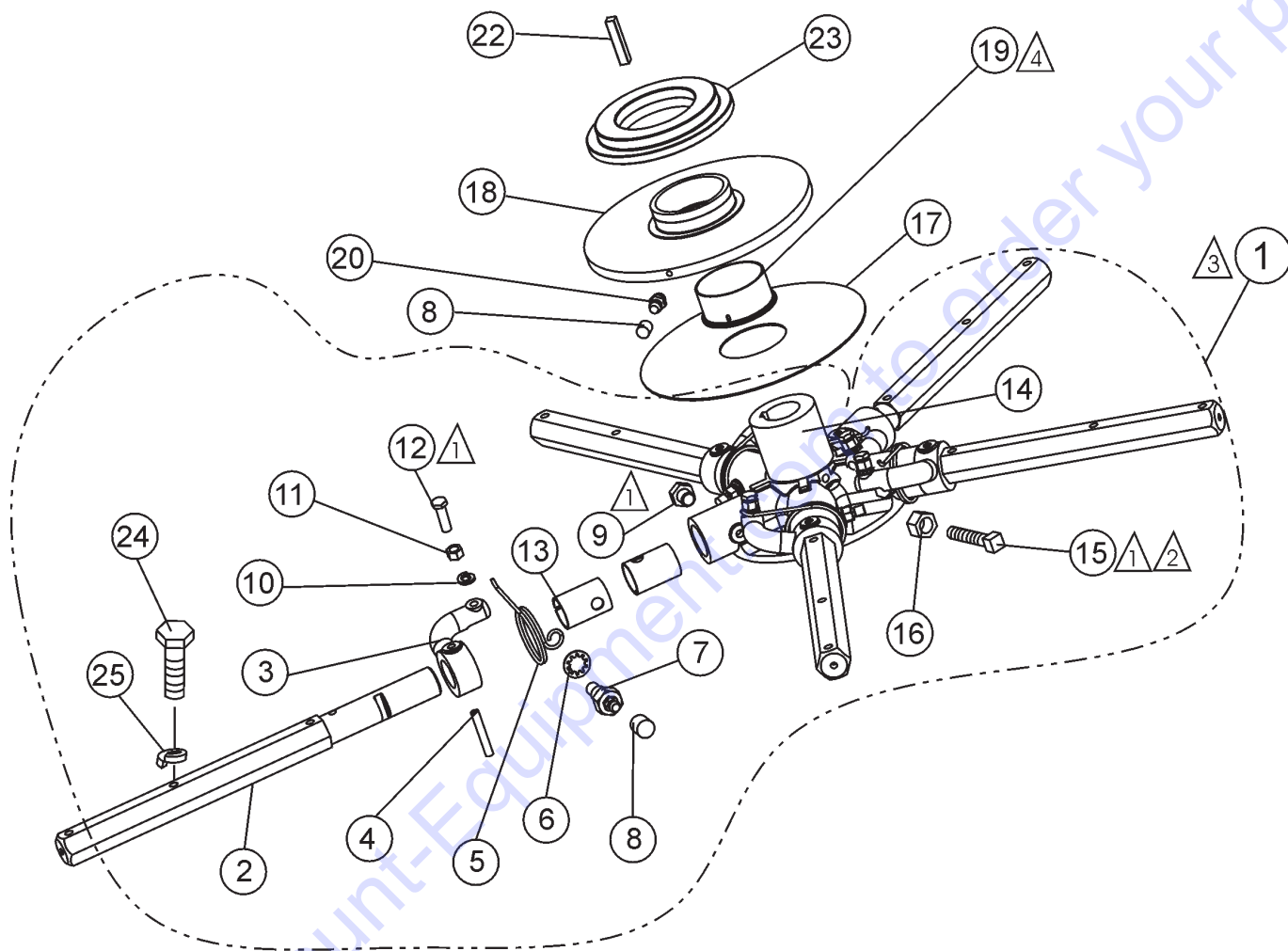
5-BLADE SPIDER ASSY. (LEFT)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	12932	SPIDER ASM, LEFT SIDE (1-1/2)	1	
2	2829	ARM, TROWEL EXTENDED	5	
3	11903	LEVER, TROWEL ARM LEFT SIDE	5	
4	0166 A	WASHER, LOCK, 3/8 MED	5	
5	1876	NUT, HEX JAM 3/8	5	
6	0164 B	SCREW, HHC	5	
7	9006	PIN, ROLL 5/16 X 2	5	
8	11039	BUSHING, ARM 2 PIECE	10	
9	9111	SPRING, LEFT TROWEL	5	
10	1875	WASHER, INT SHKP 3/8	5	
11	1322	SCREW ASSY, ARM RETAINING	5	
12	21208	PLATE, SPIDER 5 BLADE (1-1/2 SHAFT)	1	
13	1162 A	CAP, GREASE ZERK #2	5	
14	11602	SCREW, HHC 3/8-16 X 3/8	5	
15	1456	NUT, HEX FINISH 3/8 -16	2	
16	12097	SCREW, SQHS 3/8-16 X 1-3/4 CONE 8	2	
17	11419	PLATE, WEAR	1	
18	11431	THRUST COLLAR	1	INCLUDES ITEM W/+
19+	20426	BUSHING, THRUST COLLAR	1	
20	2621	FITTING, GREASE	1	
22	12687	KEY, 3/8 X 2	1	
23	12779	BEARING, THRUST 6017 2RS W/FLANGE	1	
24	0105	SCREW, HHCS 5/16-18 X 11/2"	15	
25	0161C	LOCK WASHER 5/16"	15	

Go to Discount-Equipment.com to order your parts

HHN -31V — 5-BLADE SPIDER ASSY. (RIGHT)

RIGHT-SIDE SPIDER ASSEMBLY (5-BLADE).
VIEW FROM OPERATORS SEAT.



NOTES:

△1 APPLY LOCTITE P/N 1477 TO ITEMS 9, 12, AND 15.

△2 TORQUE TO 90 FT. LBS.

△3 RIGHT-SIDE SPIDER ASSEMBLY P/N 12933 INCLUDES ALL ITEMS WITHIN OUTLINE.

△4 PART OF ITEM 18 (P/N11431).

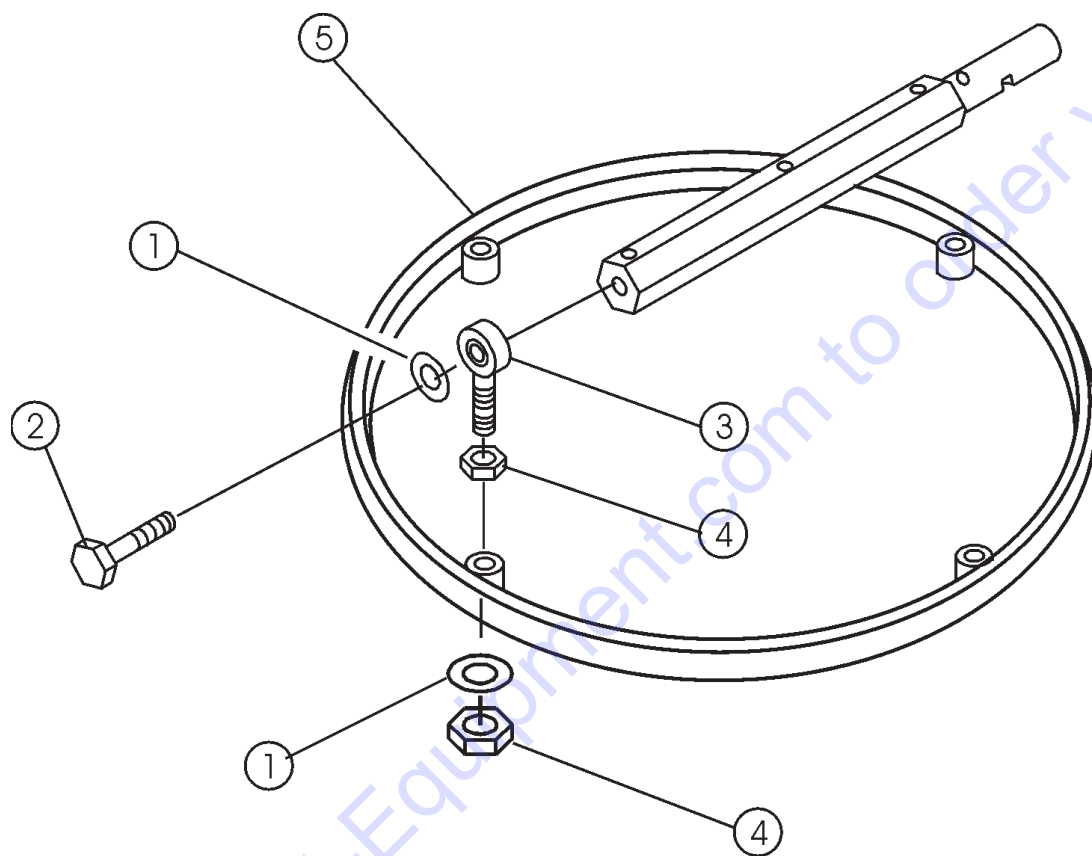
HHN -31V — 5-BLADE SPIDER ASSY. (RIGHT)

5-BLADE SPIDER ASSY. (RIGHT)

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	12933	SPIDER ASM, RIGHT SIDE (1-1/2)	1	
2	2829	ARM, TROWEL EXTENDED	5	
3	11904	LEVER, TROWEL ARM RIGHT SIDE	5	
4	9006	PIN, ROLL 5/16 X 2	5	
5	2143	SPRING, RIGHT TROWEL	5	
6	1875	WASHER, INT SHKP 3/8	5	
7	1322	SCREW ASSY, ARM RETAINING	5	
8	1162 A	CAP, GREASE ZERK #2	5	
9	11602	SCREW, HHC 3/8-16 X 3/8	5	
10	0166 A	WASHER, LOCK, 3/8 MED	5	
11	1876	NUT, HEX JAM 3/8	5	
12	0164 B	SCREW, HHC	5	
13	11039	BUSHING, ARM 2 PIECE	10	
14	21208	PLATE, SPIDER 5 BLADE (1-1/2 SHAFT)	1	
15	12097	SCREW, SQHS 3/8-16 X 1-3/4 CONE 8	2	
16	1456	NUT, HEX FINISH 3/8 -16	2	
17	11419	PLATE, WEAR	1	
18	11431	THRUST COLLAR	1	INCLUDES ITEM W/+
19+	20426	BUSHING, THRUST COLLAR	1	
20	2621	FITTING, GREASE	1	
22	12687	KEY, 3/8 X 2	1	
23	12779	BEARING, THRUST 6017 2RS W/FLANGE	1	
24	0105	SCREW, HHCS 5/16-18 X 11/2"	15	
25	0161C	LOCK WASHER 5/16"	15	

Go to Discount-Equipment.com to order your parts

HHN -31V — STABILIZER RING ASSY.



HHN -31V — STABILIZER RING ASSY.

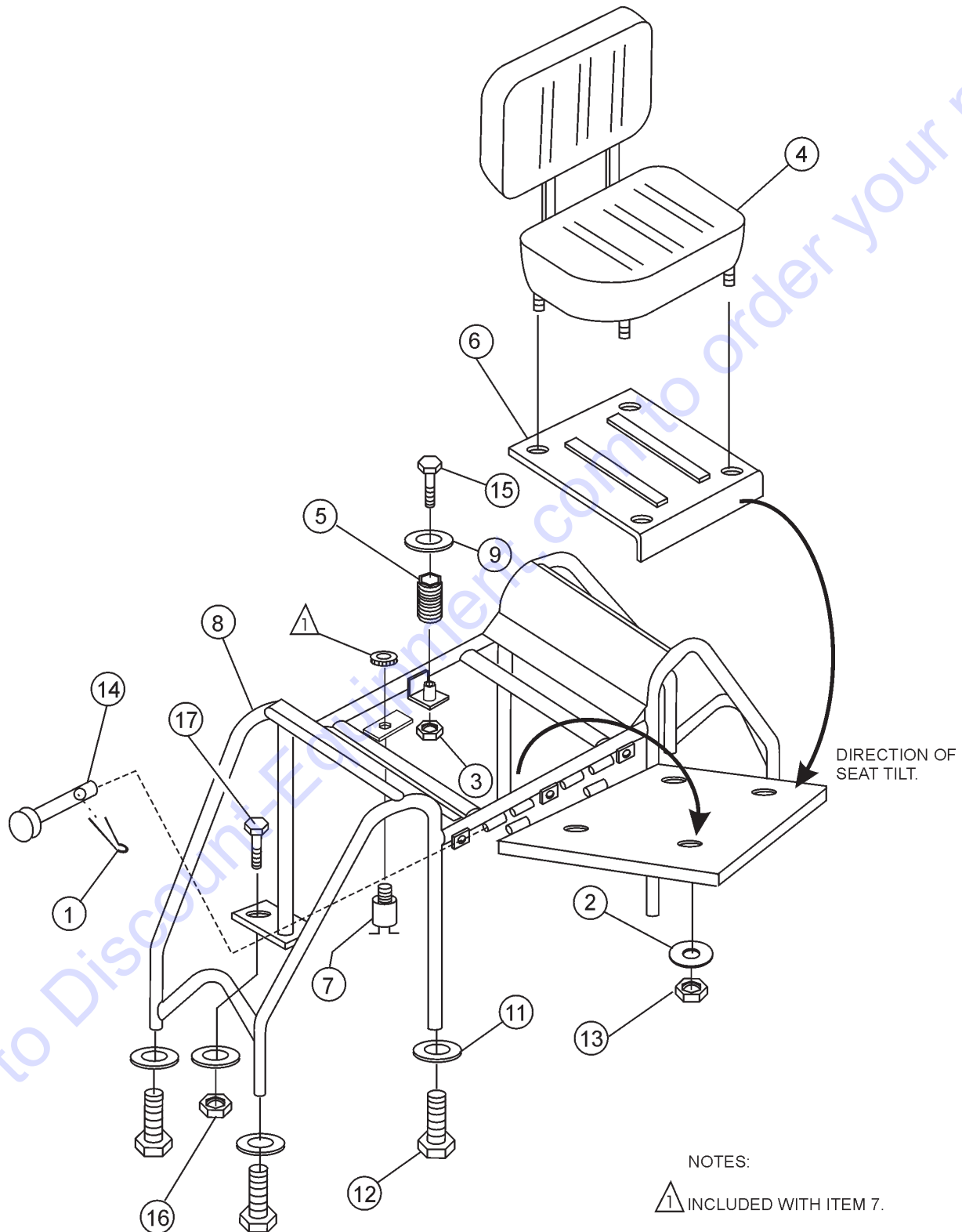
STABILIZER ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0161C	LOCK WASHER 5/16"	5	
2	1237	SCREW, SCH 5/16-18 X 7/8	5	
3	1723	ROD END, 5/16-24 MALE	4	
4	6014C	NUT, HEX FINISH 5/16-24	8	
5	12095	RING, STABILIZER, EXT ARM, HD	1	

Go to Discount-Equipment.com to order your parts

HHN -31V — SEAT AND FRAME ASSY.

SEAT AND FRAME ASSY.
(VIEW FROM OPERATOR'S SEAT)



HHN -31V — SEAT AND FRAME ASSY.

SEAT AND FRAME ASSY.

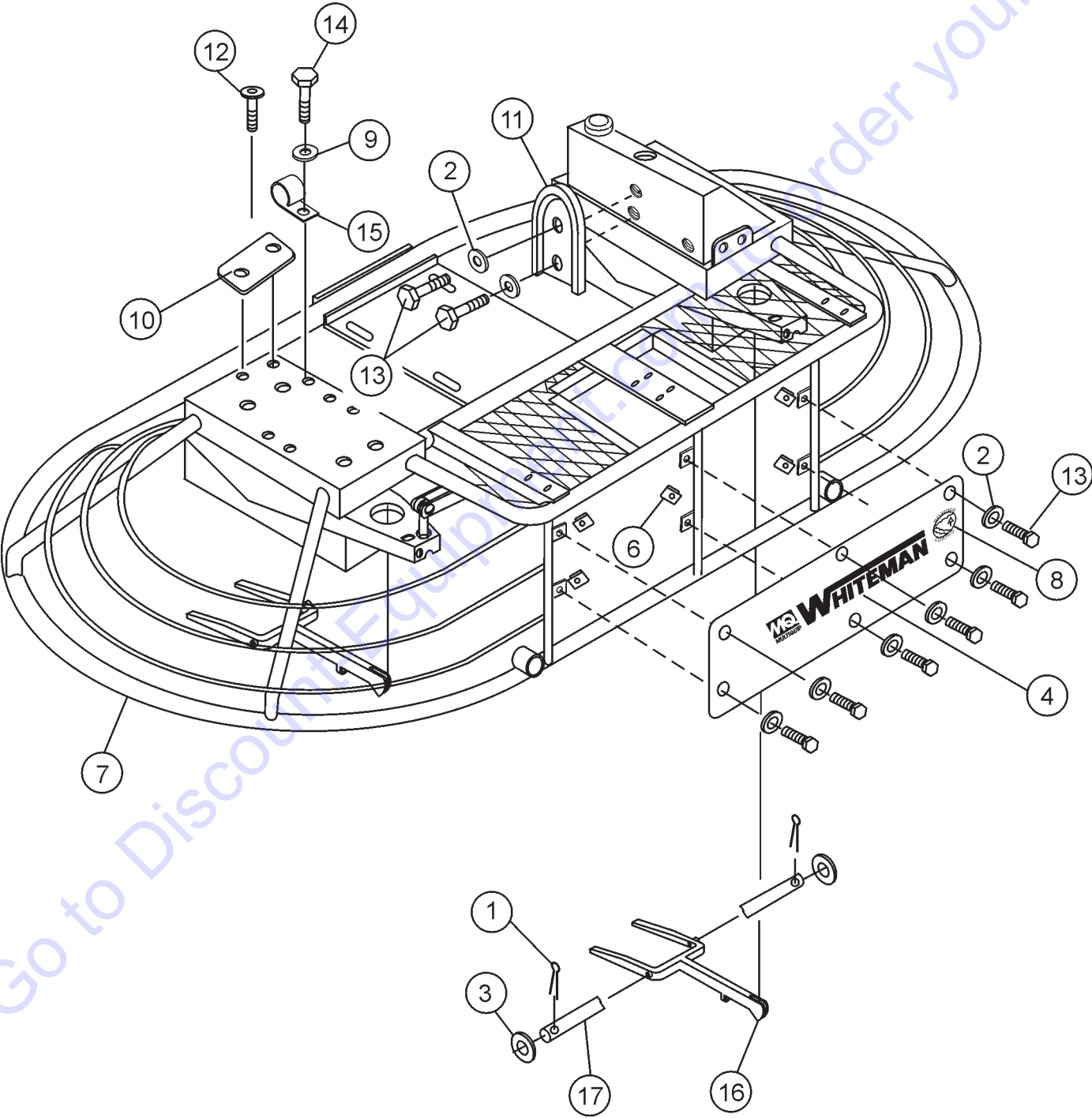
<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0183	PIN, COTTER 1/8X1 1/4	2	
2	0300	WASHER, FLAT, 5/16 SAE	4	
3	10133	NUT, NYLOC 3/8-16	1	
4	11286	SEAT, ADJUSTABLE	1	
5	11593	SPRING, SEAT	1	
6	11660	PLATE, SEAT W/A HHN	1	
7	12005	SWITCH, KILL	1	
8	12987	FRAME, HHN SEAT W/A VAN	1	
9	4001	WASHER, FLAT, 3/8 USS PLD	1	
11	5054A	WASHER, LOCK, 1/2 MED.	6	
12	5218	SCREW, HHC 1/2-13X1 1/2	6	
13	5283	NUT, NYLOC 5/16-18	4	
14	8081	PIN, CLEVIS 1/2X2 3/4	2	
15	8156	SCREW, HHC 3/8-16X2 1/2	1	
16	10176	NUT, NYLOC 1/2-13	2	
17	3214	SCREW	2	

Go to Discount-Equipment.com to order your parts

HHN -31V — FRAME AND COMPONENTS

FRAME AND COMPONENTS

VIEW FROM OPERATOR'S SEAT



HHN -31V — FRAME AND COMPONENTS

FRAME AND COMPONENTS

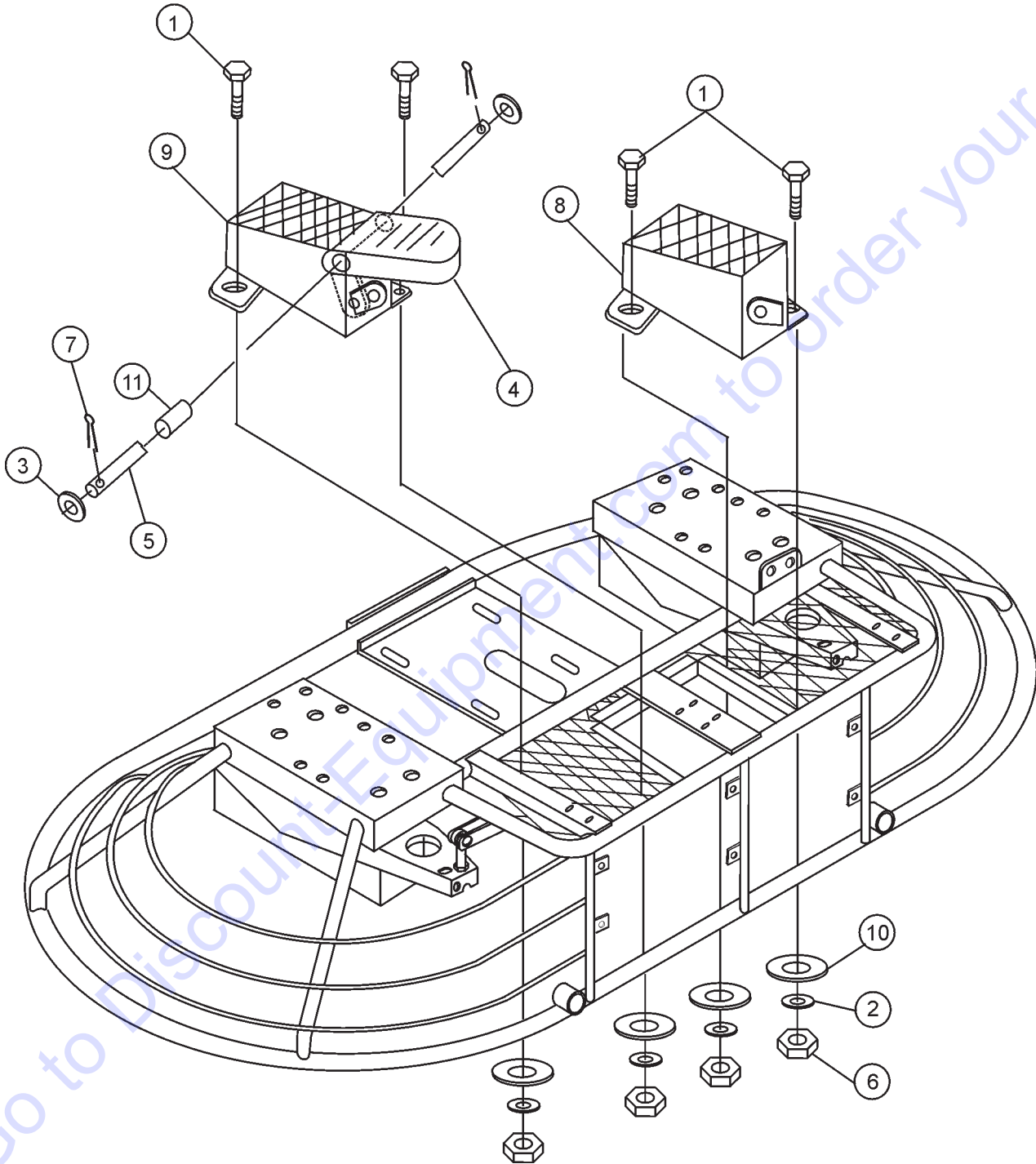
<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0183	PIN COTTER 3/32X3/4	4	
2	0948	WASHER, FLAT, 1/4 SAE	8	
3	0448	WASHER, FLAT, 3/8 SAE	4	
4	10818	DECAL, MQ WHITEMAN, 23-1/2"	1	
5	11223	PANEL, FRONT (HHN)	1	
6	11534	NUT "U" TYPE, 1/4-20	6	
7	12896	FRAME (HNN-V)	1	
8	13118	DECAL, "POWDER COATED"	1	
9	2203	WASHER, FLAT, #10	3	
10	2411	PLATE, SERIAL, RIDER	1	
11	2429	HOLDER, SPARE BELT ALL	1	
12	4014	SCREW, 2-3/16 P-K TYPE U DRIVE	2	
13	4514	SCREW, HHC 1/4-20X5/8	8	
14	5065B	SCREW, RHM 10-32X1/2	1	
15	8126	CLAMP, HOSE SUPPORT 1/2" SMALL	2	
16	11499	YOKE, HTO/HTN-V	2	
17	11648	PIN, YOKE	2	

Go to Discount-Equipment.com to order your parts

HHN -31V — FOOT PEDALS ASSY.

FOOT PEDALS ASSY.

VIEW FROM OPERATOR'S SEAT



HHN -31V — FOOT PEDALS ASSY.

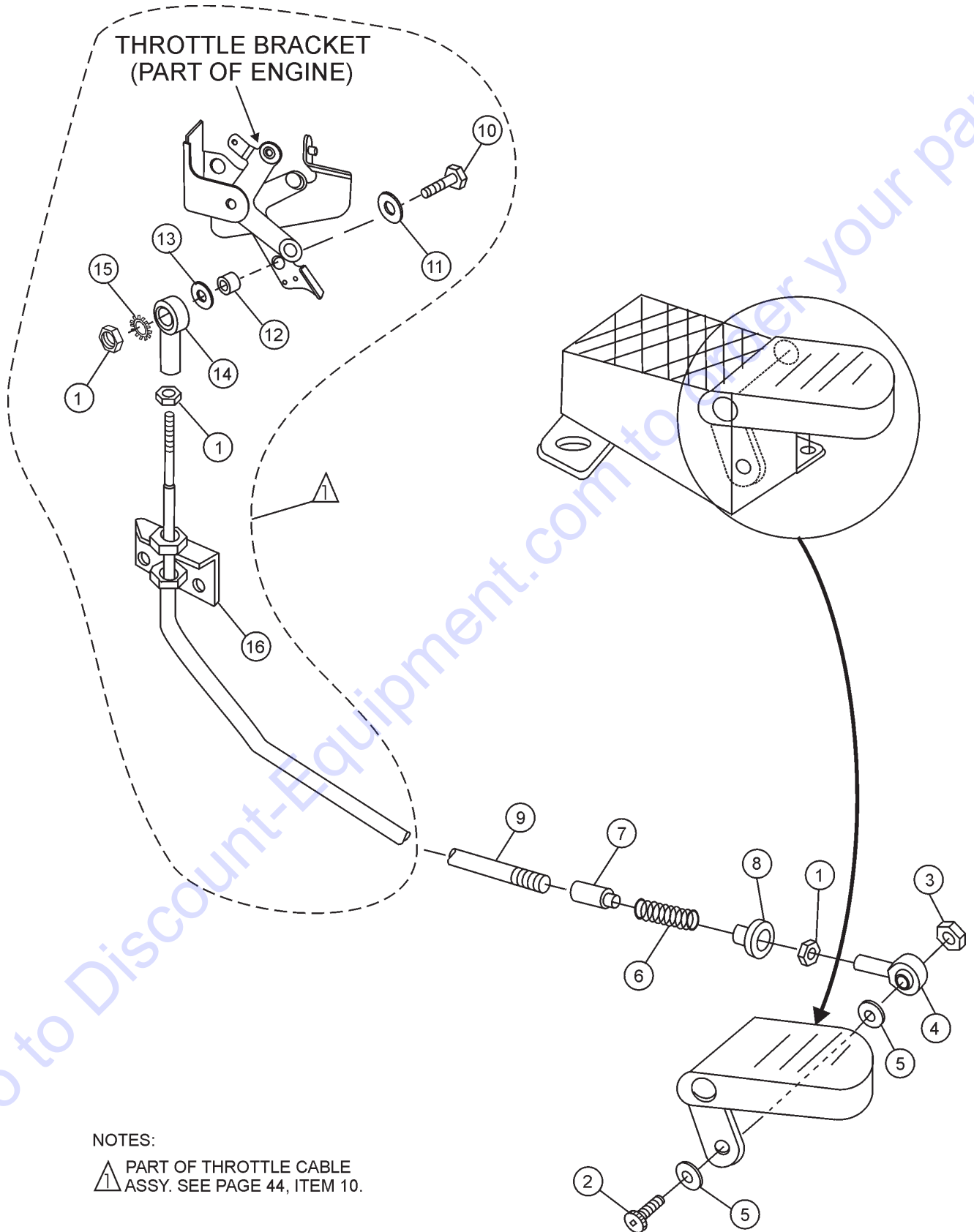
FOOT PEDALS ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0202	SCREW, HHC 5/16-18X1	4	
2	0300B	WASHER, FLAT, 5/16 SAE	4	
3	10136	WASHER, FLAT, 3/8 SAE	2	
4	2086	PEDAL, ACCELERATOR	1	
5	2772	PIN, ACC MOUNT	1	
6	5283	NUT, NYLOC 5/16-18	4	
7	6014B	PIN, COTTER 3/32X1	2	
8	12985	LEFT SIDE FOOT REST	1	
9	12986	RIGHT SIDE FOOT REST	1	
10	3233	WASHER, FENDER, 1.5odX3/8id	4	
11	3083	SPACER	1	

Go to Discount-Equipment.com to order your parts

HHN -31V — THROTTLE FOOT PEDAL ASSY.

THROTTLE FOOT PEDAL ASSY.



NOTES:

⚠ PART OF THROTTLE CABLE
ASSY. SEE PAGE 44, ITEM 10.

HHN -31V — THROTTLE FOOT PEDAL ASSY.

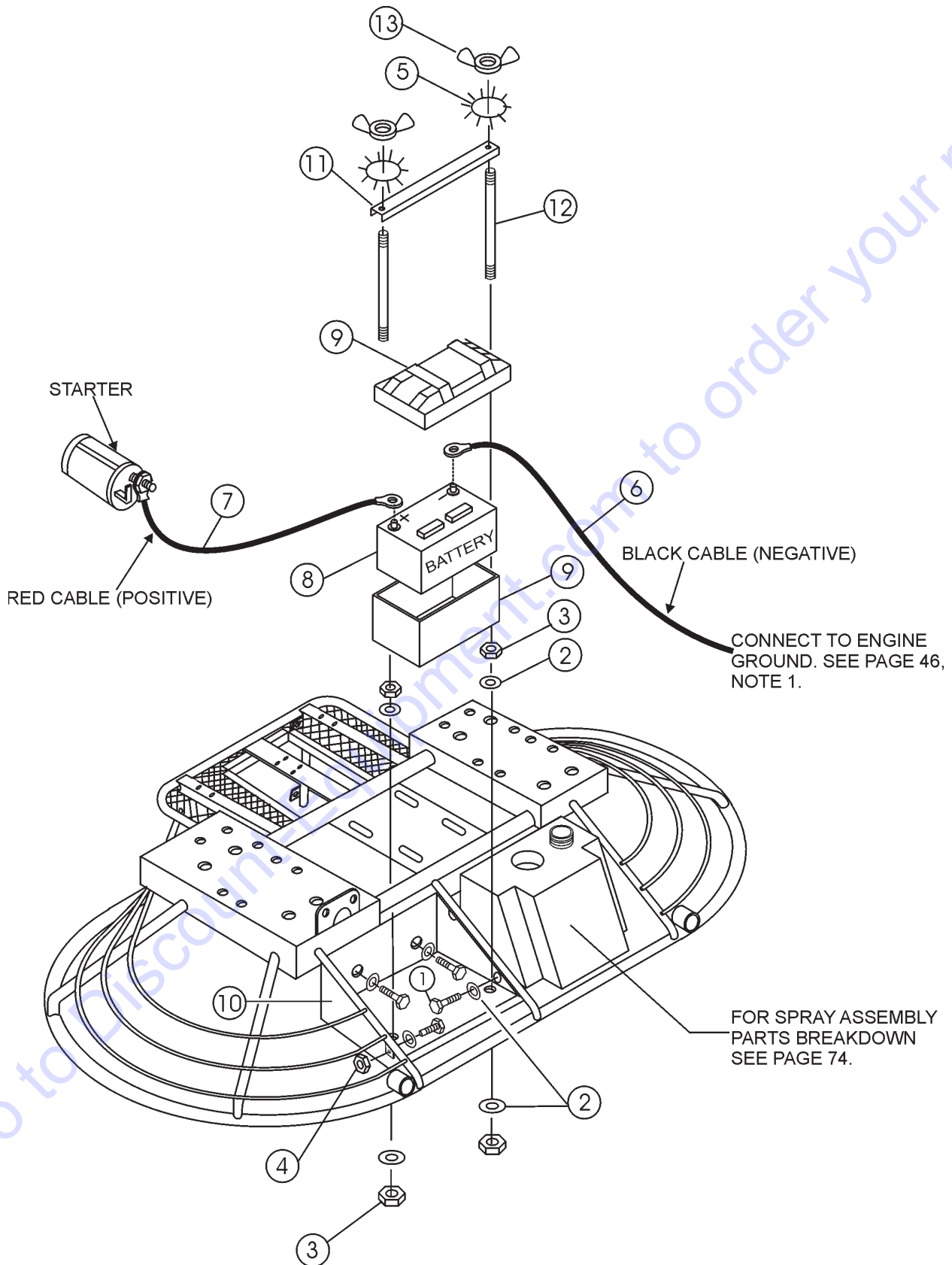
THROTTLE FOOT PEDAL ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0937	NUT, HEX 10-32	3	
2	10018	SCREW, SHC 10-32X1 NO PLATE	1	
3	10019	NUT, NYLOC 10-32	1	
4	2153	ROD END, 10-32 FEMALE RH	1	
5	2203	WASHER, FLAT, #10	2	
6	2753	SPRING, THROTTLE RETURN, LOWER	1	
7	2754	ADAPTOR, THROTTLE RET. SPRING LG.	1	
8	2755	ADAPTOR, THROTTLE RET. SPRING SHOR	1	
9	2124	CABLE, THROTTLE (RT)	1	
10	8133	SCREW, RHM 10-32 X 3/4	1	
11	2203	WASHER, FLAT #10	1	
12	11710	SPACER, ENGINE THROTTLE	1	
13	0300 B	WASHER, FLAT, 5/16 SAE	1	
14	2153	ROD END, 10-32 FEMALE RH	1	
15	10237	WASHER, EXT. SHKP, 5/16?	4	
16	11771	BRACKET, ENGINE THROTTLE CABLE	1	

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HHN -31V — BATTERY ASSY.

BATTERY ASSY.



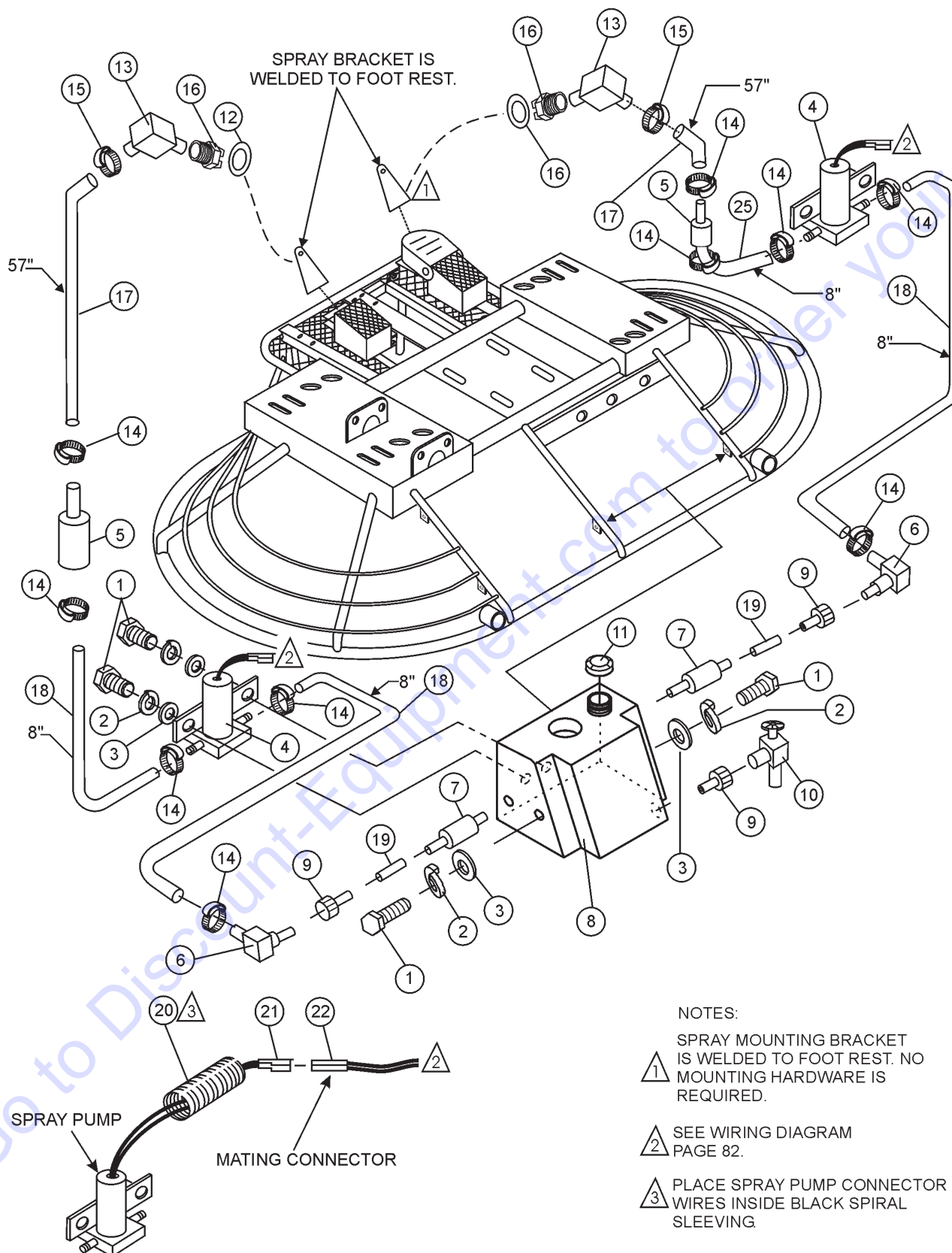
BATTERY ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0730	SCREW, HHC 1/4-20X1	4	
2	0948	WASHER, FLAT, 1/4SAE	8	
3	0949	NUT, HEX FINISH 1/4-20	4	
4	10024	NUT, NYLOC 1/4-20	4	
5	10031	WASHER, EXT SHKP, 1/4	2	
6	10313	CABLE, NEG BATTERY BLACK 20"	1	
7	19303	CABLE, POS BATTERY RED 48"	1	
8	10315	BATTERY, 12V WET GROUP 22	1	
9	10318	BATTERY BOX, GROUP 24, W/LID	1	
10	11362	BATTERY FRAME BOX	1	
11	11692	BRACKET, BATTERY BOX HOLD DOWN	1	
12	11693	BOLT, BATTERY BRKT	2	
13	2509	NUT, WING 1/4-20 PLATED	2	

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HHN -31V — SPRAY ASSY.

SPRAY ASSY.



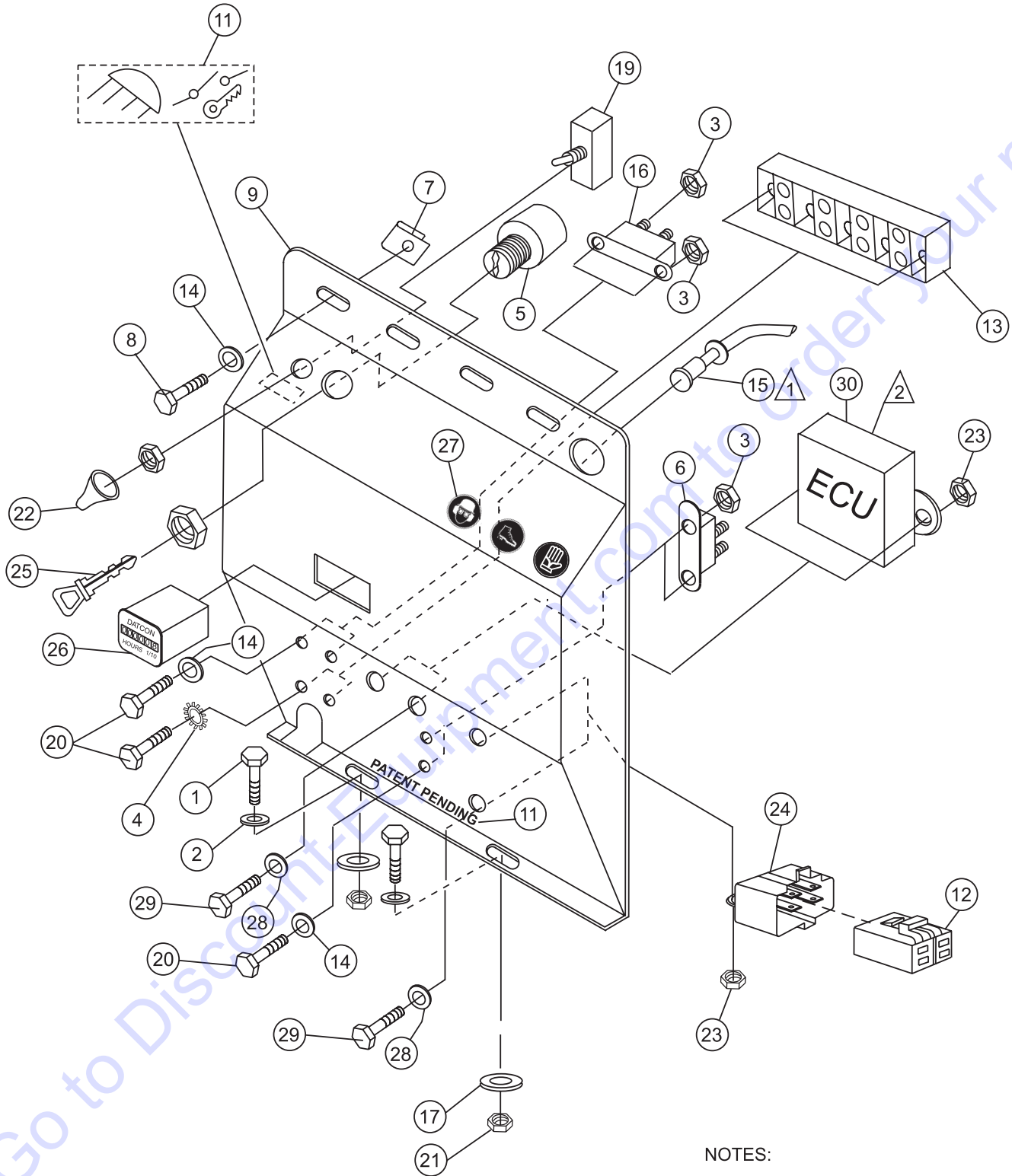
SPRAY ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0131 A	SCREW, HHC 1/4-20 X 3/4	6	
2	0181 B	WASHER, LOCK, 1/4 MED	6	
3	0948	WASHER, FLAT, 1/4 SAE	6	
4	12548	PUMP, SPRAY	2	
5	10022	FITTING, PLASTIC 6 BARB – 4 BARB	2	
6	12008	FITTING, 90 6 BARB – 4 BARB FUEL	2	
7	12009	SCREEN, FILTER	2	
8	12403	TANK, RETARDANT 5 GALLON	1	
9	19633	BUSHING, RUBBER FUEL	3	
10	19661	VALVE, FUEL DRAIN	1	
11	2108	CAP, SPRAY TANK	1	
12	2898	WASHER, BONDED NEOPRENE 1 X 1/2	2	
13	2912	FITTING, 90 4 BARB –1/4 FP	2	
14	2918	CLAMP, HOSE, 475 - 536 ID	8	
15	2930	CLAMP, HOSE, 360 - 410 ID	4	
16	392292	NOZZLE, SPRAY	1	
17	60001	HOSE, 25 ID X 375 OD	10 FT.	
18	60002	HOSE, 375 ID X 5 OD	32"	
19	60058	HOSE, 1/4 X 3/8 PVC FUEL YELLOW	4"	
20	60221	CABLE, SLEEVING BLACK SPRIAL	1 FT.	
21	2687	?		
22	2680	?		

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HHN -31V — FRONT PANEL ASSY.

FRONT PANEL ASSY.



NOTES:

① CHOKE CABLE ASSY, CONNECT TO CARBURETOR LINKAGE

② ELECTRONIC CONTROL UNIT (ECU) IS INCLUDED WITH ENGINE, SEE VANGUARD ENGINE OWNER'S MANUAL.

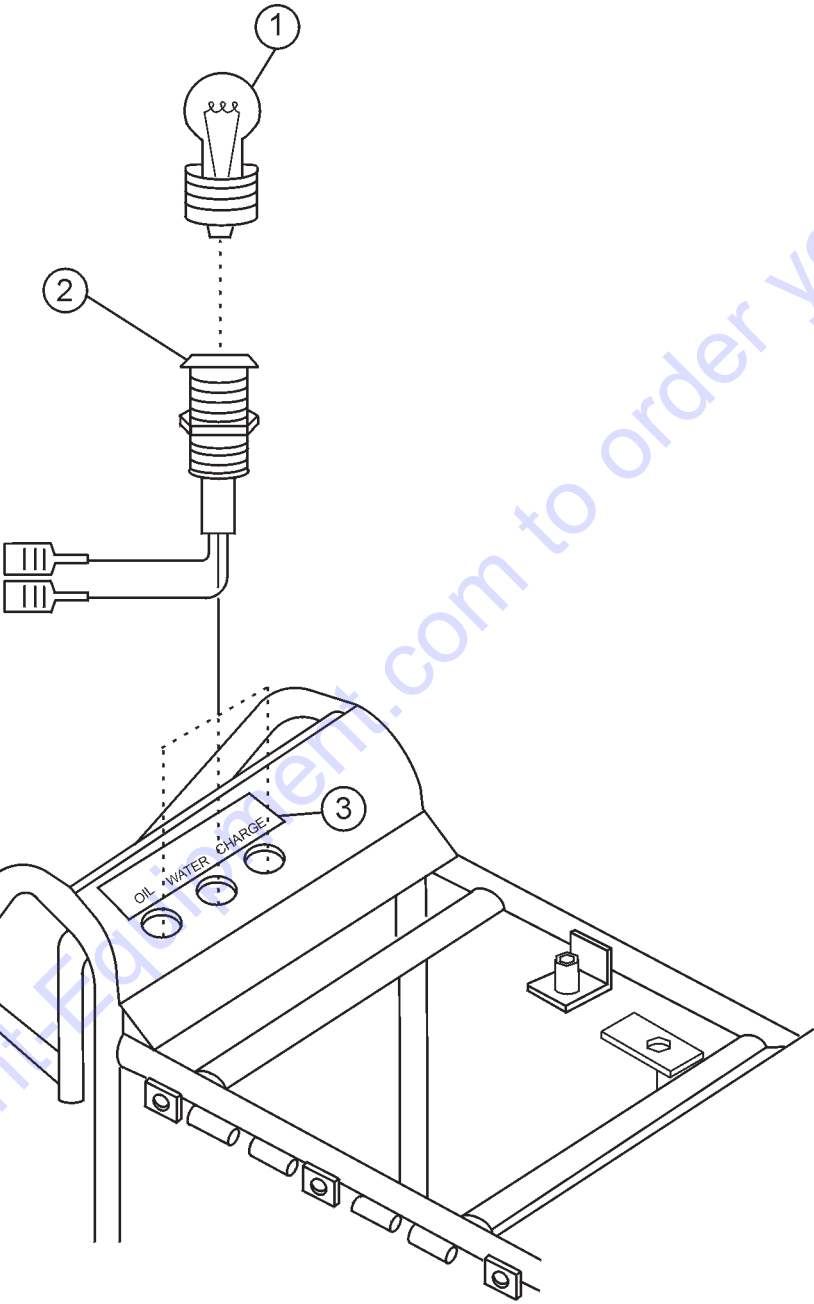
HHN -31V — FRONT PANEL ASSY.

FRONT PANEL ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0202	SCREW, HHC 5/16-18 X 1	2	
2	0300B	WASHER, FLAT, 5/16 SAE	2	
3	10019	NUT, NYLOC 10-32	8	
4	10114	WASHER, EXT. SHKP, #8	2	
5	10958	SWITCH, IGNITION VAN W/KEYS	1	
6	11098	CIRCUIT BREAKER, 40A, 12V	1	
7	11534	NUT, "U" TYPE, -20	4	
8	11819	SCREW, HHC -20 X 3/4 W/WASH	4	
9	11861	PANEL, HTO/N VANGUARD CONTROL	1	
10	11912	DECAL, "PATENT PENDING"	1	
11	12571	DECAL, INSTRUMENT LITES (31V)	1	
12	12018	CONNECTOR, RELAY	1	
13	19301	TERMINAL STRIP	.5	
14	2203	WASHER, FLAT, #10	4	
15	2580	CABLE, CHOKE	1	
16	2673	CIRCUIT BREAKER, 30A, 12V	1	
17	3233	WASHER, FENDER, 1.5od X 3/8id	2	
19	4682	SWITCH, TOGGLE	1	
20	5065B	SCREW, RHM 10-32 X 1/2	4	
21	5283	NUT, NYLOC 5/16-18	2	
22	8381	BOOT, TOGGLE SWITCH	1	
23	10024	NUT, NYLOC 1/4 20	4	
24	12017	ACCESSORY RELAY	1	S/N 61131 AND ABOVE
24	11792	SOLENOID	1	S/N 61130 AND BELOW
25	11078	KEY, IGNITION SWITCH	1	
26	11694	HOUR METER, DATCON	1	
27	11247	DECAL (HELMET, FOOT, HAND)	1	
28	0948	FLAT WASHER 1/4 "	4	
29	12287	SCREW, THP 1/4-20 X 3/4-SS	4	
30	825572	ECU IGNITION MODULE	1	

HHN -31V — TOP RIGHT PANEL ASSY.

TOP RIGHT PANEL ASSY.
(VIEW FROM OPERATOR'S SEAT)



HHN -31V — TOP RIGHT PANEL ASSY.

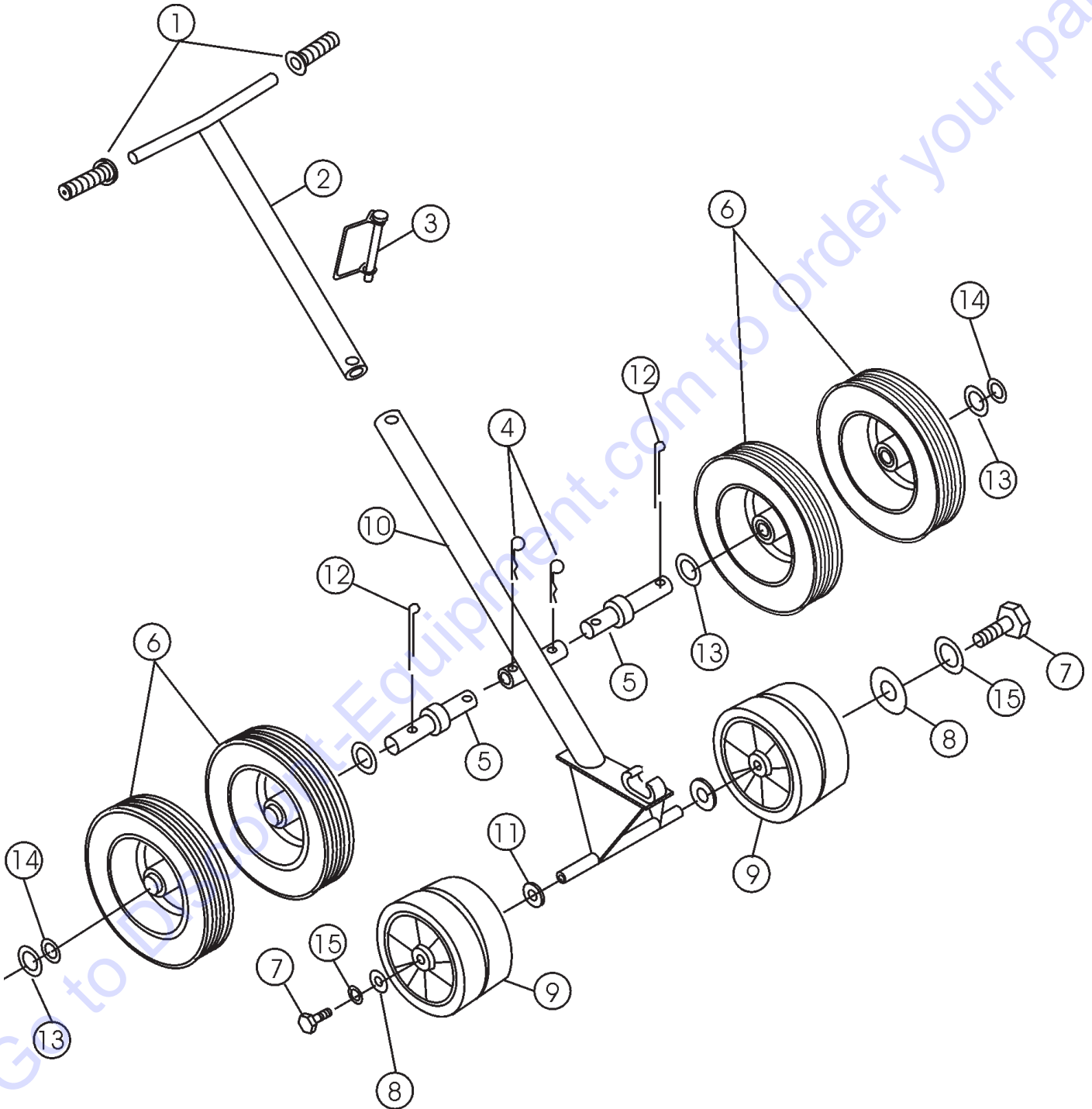
TOP RIGHT PANEL ASSY.

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	12307	BULB, INDICATOR LIGHT	3	
2	12305	PLUG INDICATOR LIGHT	3	
3	12571	DECAL, OPERATING LIGHTS	1	

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HHN -31V — E-Z MOVER AND LIFT HANDLE

E-Z MOVER (EMR2) AND LIFT HANDLE



HHN -31V — E-Z MOVER AND LIFT HANDLE

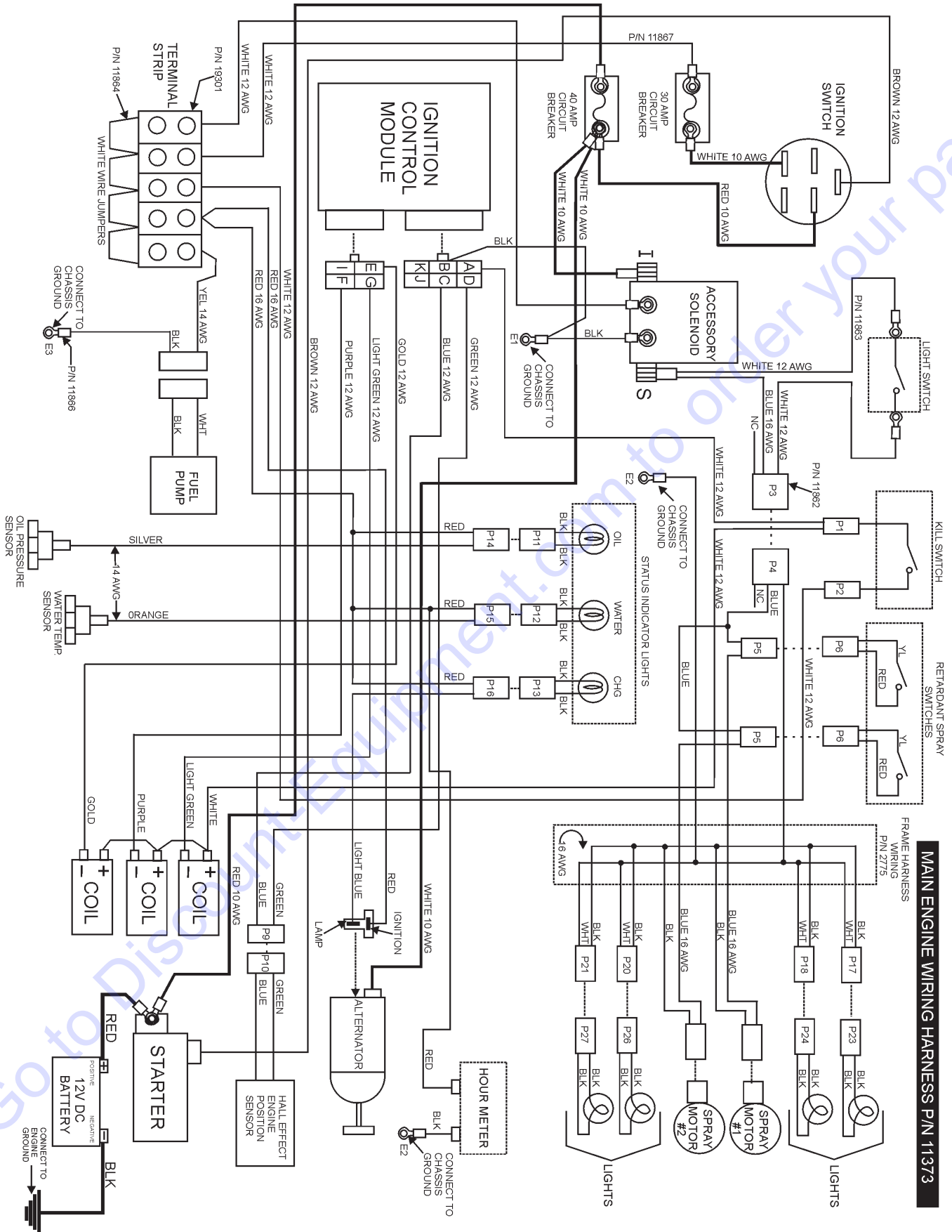
E-Z MOVER (EMR2) AND LIFT HANDLE

<u>NO</u>	<u>PART NO</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0189	HAND GRIP	2	
2	2336	UPPER HANDLE	1	
3	1869	SNAP PIN	1	
4	7170	CLIP	4	
5	11684	DOLLY AXLE	4	
6	10440	WHEEL & TIRE	4	
7	0655	SCREW, HHCS 5/16-18 x 3/4"	2	
8	0300B	FLAT WASHER 5/16"	2	
9	2364	WHEEL	2	
10	10445	FRAME	1	
11	4684	FLAT WASHER 5/8"	2	
12	0183	COTTER PIN	4	
13	10446	FLAT WASHER 3/4"	8	
14	8151	FLAT WASHER 3/4" SAE	8	
15	0161C	LOCK WASHER 5/16"	2	

EMR-2 E-Z MOVER ASSY — PURCHASE THROUGH DISCOUNT-EQUIPMENT

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HHN -31V — WIRING DIAGRAM



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