



# OPERATOR'S AND MAINTENANCE MANUAL WITH PARTS LISTING

Long Reach Mower Model: LR50148



FOR SERIAL #s STARTING WITH 13511 RELEASED 08/14/17

**B** DANGER

Read this manual and the manual for your tractor carefully to acquaint yourself with both machines before operating!

| MODEL NUMBER     |  |
|------------------|--|
| SERIAL NUMBER    |  |
| DATE OF PURCHASE |  |

| Customer Pre-Operation Check List   | Reference |
|---|-----------|
| Read, understand and follow the general safety rules listed in this manual.   | Page 2    |
| Check all shields and guards.   | Page 2    |
| Cut driveshaft to the proper length for your tractor.                         | Page 8    |
| Add ballast to the rear tractor tires and space them six feet or wider apart. | Page 8    |
| Add ballast and front weights to your tractor, if needed.                     | Page 8    |
| Check all fluid levels, tractor and mower.                                    | Page 11   |
| Turn gate valve under the oil tank "on".                                      | Page 12   |
| Check all grease fittings.  | Page 15   |

### **Service Notice**

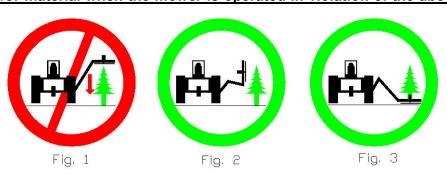
Please take extra care while servicing the hydraulic system by keeping all openings properly covered, thus preventing contamination of the hydraulic components. Contaminates in the oil <u>WILL</u> cause faulty operation or premature failure of components in the hydraulic control valve, pump, and motor.

#### Disclaimer

THIS MOWER IS NOT DESIGNED TO CUT TREES FROM TOP TO BOTTOM (VERTICALLY) WITH THE MOWER DECK IN THE HORIZONTAL POSITION (See Fig. 1). The mower is designed to trim branches with the mower deck in the <u>VERTICAL</u> position while moving the tractor forwards or backwards, repositioning the mower deck after each path (See Fig. 2).

The mower is also designed to cut tree trunks and branches up to 4" in diameter with the "Hinged Gate" in the unlocked, secured raised position and the mower deck in the HORIZONTAL position, perpendicular to the trunk and/or branch of the tree (See Fig. 3).

Any modes of operation other than the ones described above and shown below, while cutting trees and/or branches are not permitted and shall void the warranty. Moreover, HARDEE by EVH Manufacturing Company, LLC does not accept any liability to any person and/or material when the mower is operated in violation of the above information.



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### **To Our Customers**

We at Hardee by EVH Manufacturing Company thank you for buying your new Long Reach Mower.

We have tried hard to build a mower to do the work you have in mind. Many hours of engineering, field-testing and improvement have gone into the design and fabrication of your mower. We will strive to continue this quality of manufacturing in the future, always keeping the customer's needs clearly in mind.

The best performance of your mower will depend on you. Proper lubrication, maintenance, hookup, adjustments and operation are essential for it to give you long and dependable service. However, as with any type of equipment, your mower is designed to perform specific functions.

In this manual, you will find instructions on mower features, maintenance and operation. If customer service or repair parts are required, contact your local Hardee dealer. Please specify model and serial number when ordering parts.

### Owner's Responsibility

The manufacturer has no control over the ultimate use of the mower and therefore assumes no responsibility or liability for damage or injury resulting from the use of this machine.

The upkeep of the hydraulic mower is the responsibility of the user. This upkeep includes all shielding, guards, and safety decals (OSHA Regulation 1928.57). You can obtain replacement parts from any authorized Hardee dealer.

Read this Operator's Manual before operating the mower. Failure to do so could result in injury to the operator or to others. Remember that most accidents occur due to neglect or carelessness. The operator is responsible for inspecting and making repairs as may be necessary. Cleaning after each use and storage under a shelter will extend the life of the mower.

#### **Purpose of This Manual**

This manual provides information on safety, operation, adjustments, troubleshooting and maintenance of your new mower. Please read and follow all the recommendations to help ensure that you get many years of service from your new Hardee mower.

If you need additional copies of this manual, please contact your local Hardee dealer or download a copy from our website at www.hardeebyevh.com.

### **Safety-Alert Symbol**



This symbol is the safety alert symbol. It appears throughout this manual to call your attention to instructions involving your personal safety and the safety of others. Failure to follow these instructions can result in injury or death.

### Signal Words

Safety signal words are words that call attention to the safety sign and designate a degree or level of hazard seriousness. The signal words used throughout this manual are DANGER, WARNING and CAUTION. Please read and follow all safety messages that have these signal words shown for your protection.



### **DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



### MARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



### CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury

### **Customer Assistance**

The Hardee sales team would like you to be satisfied with your new Long Reach Mower. If for some reason you have any questions about the information in this manual or have a problem with your mower, please discuss the problem or question with the management of your local dealership. If further assistance is required, please contact:

Hardee By EVH Manufacturing Company, LLC Sales Department

4895 Red Bluff Road Loris, SC 29569 843-756-2555

### Safety Information

### **General Safety Rules**

This section of your manual will address the safe operation of your new mower. We at Hardee strive to produce a machine that is both a quality product and safe to operate. Please take the time to read, understand and follow the safety rules listed below and throughout this manual.

Your safety also depends on you becoming familiar with the basic operation of your new mower. You can find complete instructions for this mower in the Operation Instruction section of this manual. We believe that using your mower safely, in a safe environment will give you great results!



### A DANGER

This machine is designed for use on a closed cab tractor only! If your tractor has an open cab, then it MUST be equipped with operator protective equipment in the form of shielding from thrown objects and Roll Over Protective Structure (ROPS) to operate this equipment safely.



### DANGER

Rotary mowers have the inherent ability to throw debris considerable distances when the blades are allowed to strike foreign objects. The operator must use caution or serious injury may result. Be sure bystanders are at a safe distance at all times when the cutter is in use.



### **WARNING**

Always keep your tractor level as you reach over ditches, etc. Be careful to keep ample distance between the rear tire and the top of the ditch bank to avoid a cave-in of the bank.



### WARNING

Failure to keep the tractor level may result in loss of traction, tipping, rollover, property damage, personal injury or death.



### **WARNING**

Never stand, or allow others to stand, under the boom or mowerhead at any time. Never park the unit without placing the mowerhead squarely and firmly on the

ground. Serious injury or death by crushing may occur in case of hydraulic failure.



### A DANGER

Do not look under the mower deck or attempt to remove objects or branches from under the mower deck while the tractor is running. Serious injury, loss of limb or death may result.



### DANGER

Do not reach under the mower deck at any time. Cutting blades may cause serious injury, loss of limb or disfigurement.



### WARNING

Never use the mower for a crane or lifting device of any kind. It is not designed for this purpose. Serious damage to unit may occur. Serious bodily injury may be incurred from this misuse.



### **WARNING**

Never use the mower for a man-lift or personnel lift. It is not designed for this purpose. Serious damage to unit may occur. Serious bodily injury may be incurred from this misuse.



#### DANGER

Never operate the mower within 10 feet of overhead power lines or utility lines. Do not trim trees with power lines running through them. Serious injury or death by electrocution may occur.



#### WARNING

Never allow the mower to impact rock piles, piles of gravel, steel guardrails or concrete abutments. Contact with these objects could cause blade failure. Serious machine damage, property damage or bodily injury may occur. Check the area for these items before mowing.



### A DANGER

Never attempt to use the mower to remove brush or trees larger than 4 inches in diameter. Failure to use caution when cutting trees, may lead to the tree falling on the mower deck and tipping the tractor over.

### **Safety Decals**

Your Hardee mower ships with all safety decals in place. They are located in areas on the mower that are potentially hazardous. Please locate, read and follow the information you find on these decals.

By law, you must replace any safety decals that are damaged or missing. You can order replacement decals from any local Hardee dealer. Just ask for part number 15845.

To apply the replacement decals:

- Clean the surface to place the new decal.
- Peel the decal away from the paper backing.
- Press firmly onto the clean surface.
- Squeeze out any air pockets using a straight edge.



**Deck** 



Danger - Thrown Object



Danger - Rotating Driveline



**Weight Box** 



Operating Safety and General Instruction



Warning – Thrown Object (PN 11005)

### Safety Decals, continued



### **A WARNING**

# ROTATING COMPONENTS

Do not operate without covers in place.

Warning - Rotating Components



**Hitch Frame** 



- Do not stand between implement and moving tractor.
- Stop tractor engine and set park brake before installing pins.

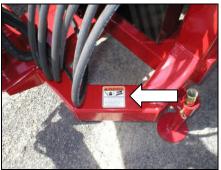
Danger - Crushing Hazard



**Hitch Frame** 



Warning – High Pressure Fluid Hazard



**Hitch Frame** 



Deck

### Safety Decals, continued







Deck Linkage

**Deck Linkage** 

1<sup>st</sup> Stage Boom





Warning – Pinch Point



Deck



**Blade Rotation** 



Hitch Frame



Danger - Crushing Hazard

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### Safety Information

### Safety Decals, continued







Danger - Keep Clear



**Hitch Frame** 







Danger - Electrocution, Falling and Crushing Hazard



Deck



Danger - Exposed Blades



Deck - Front/Rear

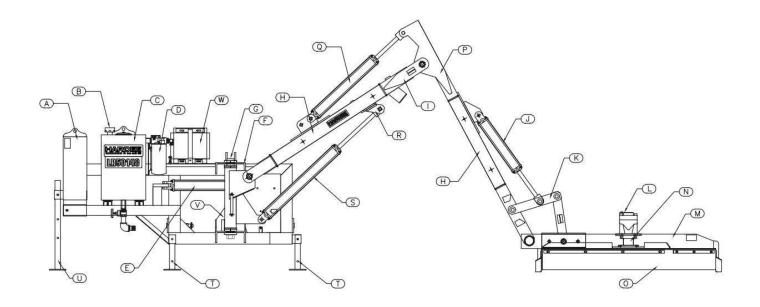


Weight Box - Front/Rear

15852 – Red Reflector, Rear (Not Shown)

15853 - Yellow Reflector, Front

### **Component Identification and Terminology**



| Α | Weight Box                        | M | Deck                               |
|---|-----------------------------------|---|------------------------------------|
| В | Flow Ezy Breather                 | N | Motor Drive Housing                |
| С | Oil Tank                          | 0 | Rubber Shielding                   |
| D | Return Filter                     | Р | 2 <sup>nd</sup> Stage (Reach) Boom |
| Е | Swing Cylinder                    | Q | 2 <sup>nd</sup> Stage Cylinder     |
| F | Hitch Frame                       | R | Lift Break-Away                    |
| G | Swing Post                        | S | 1 <sup>st</sup> Stage Cylinder     |
| Н | Hose Guard                        | T | Short Stand                        |
| 1 | 1 <sup>st</sup> Stage (Lift) Boom | U | Long Stand                         |
| J | Deck Cylinder                     | V | Hydraulic Pump                     |
| K | Deck Linkage                      | W | Oil Cooler                         |
| L | Hydraulic Motor                   |   |                                    |
|   |                                   |   |                                    |

### **Tractor Requirements**

The Long Reach Mower you have purchased is designed for use with 90 horsepower; 4-wheel drive or 100 horsepower; 2-wheel drive and above tractors. equipped with a 540 RPM or 1000 RPM rear power take-off (PTO).

Your tractor must also be equipped with a standard hitch. A category 2 or 3 quick hitch can also be used with this mower.



To insure stability of your tractor, the rear tires should be spaced at their widest setting. We recommend six feet or wider. You should also add ballast to maintain proper steering control and balance. In addition, unless your tractor is 4-wheel drive, you may also need to add front weights. Please refer to the operator's manual for your tractor to determine the correct setup.



### **A** DANGER

This machine is designed for use on a closed cab tractor only! If your tractor has an open cab, then it MUST be equipped with operator protective equipment in the form of shielding from thrown objects and Roll Over Protective Structure (ROPS) to operate this equipment safely.

### **Driveshaft Installation**

The make of your tractor will determine the length of driveshaft you require to connect from the end of the pump shaft to the PTO connection of your tractor. This step may require cutting the standard driveshaft included with the Hardee mower. We recommend contacting your local Hardee dealer for assistance.

### **Driveshaft Installation on Pump Shaft**

Refer to Figure 1 for reference

- Verify that driveshaft is the proper length.
- Grease both pump shaft and driveshaft.
- Attach equipment end of driveshaft to pump. Tractor end has a figure of a tractor stamped onto the guard.
- Rotate driveshaft to line up holes for securing with the bolt and nut provided.
- Fix shaft guard to the mower using anti-rotation chain.



Figure 1

### Tractor Hook-Up Procedures

Hook Tractor 3-point hitch to mower hitch frame. The LR50148 is designed to work with a standard, category 2 or 3 quick hitch.



### WARNING

Before leaving the tractor seat, always engage the tractor brake and/or set the transmission of the tractor in parking gear. Stop engine and remove key. Always make sure that no one is between the tractor and the mower when tractor is in motion.

- Attach driveline to tractor (PTO shaft). (See below for instructions)
  - Verify that the shaft is sufficiently lubed before attachment.
  - Verify that drive shaft is the proper length.
- ✓ Connect joystick to bulkhead connector on the wire cover panel of the controller.
- Connect joystick to 12-volt system. (Cigarette lighter plug provided with Joystick. Hardee dealer can supply receptacle).
- Raise all jack stands before moving mower.

### **Driveshaft Installation on PTO**



### WARNING

Never attempt any checks, repairs or adjustments with the tractor engine running or the PTO engaged. Adjustment of rotating parts with tractor engine running may result in severe personal injury or death if the PTO accidentally engages.

- Lift tractor PTO guard.
- Pull U-joint guard back along driveshaft.
- Press driveshaft yoke plunger in and slip driveshaft U-joint voke onto splined PTO shaft. Ensure that yoke plunger returns to locked position.
- Position U-joint guard over driveshaft U-joint.
- Lower tractor PTO guard.
- Fix shaft guard to tractor with anti-rotation chain.

### **Hydraulic System Setup**



### MPORTANT

The hydraulic system setup information contained in the following sections should be used only as a guide. Consult your local Hardee dealer or mower manufacturer for more detailed information.

### Working Safely with Hydraulic Lines

Purge all air from hydraulic system before attempting to raise or lower the mower boom and deck.



### **DANGER**

Stand clear if lowering or raising deck, hydraulic deck can fall suddenly from system failure.



### A DANGER

Do not use your hand or skin to check for hydraulic leaks, use cardboard or wood. High-pressure oil leaks can penetrate skin causing injury and gangrene. Consult a doctor immediately. Always wear safety goggles when working around high-pressure lines.

### **Description of Operation**

The LR50148 is set-up at the factory as a selfcontained hydraulic system. This means that the mower pump powers **ALL** hydraulic functions.

A Programmable Processor (Refer to Page 25) controls four cylinder functions (swing, first stage boom lift, second stage boom lift, and mower deck tilt) and one motor function which drives the mower head. A single tethered handheld grip serves as the operator input. The grip includes a dead-man bar, a left twoaxis thumb controlled proportional joystick, a right twoaxis thumb controlled proportional joystick and a momentary switch controlling a latching circuit turning the mower head motor on and off. A proximity switch is used to decelerate the swing velocity near both stroke ends.

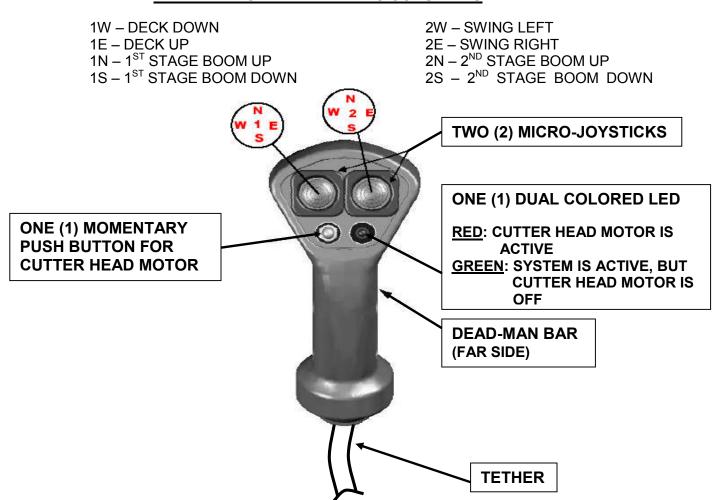
### **Joystick Functions**

- Left X-axis (horizontal) controls Deck Down (W) and Deck Up (E).
- Left Y-axis (vertical) controls First Stage Boom Up (N) and Boom Down (S).
- Right X-axis (horizontal) controls Swing Left (W) and Swing Right (E). Proximity switch decreases output to Swing by 50% when actuated.
- Right Y-axis (vertical) controls Second Stage Boom Up (N) and Boom Down (S).
- LED should be Red when mower head motor is active and Green when the system is active but the mower head is off. LED remains active if dead-man is released until system hibernates.
- Push Button controls mower head motor. Motor switches on when dead-man bar is depressed and push button is held for two seconds. Motor switches OFF when push button is instantly depressed or fifteen seconds after the dead-man bar is released.
- System becomes active when Dead-Man Bar is depressed for two seconds. Bar must remain depressed for all control functions to be active except for the fifteen second motor off delay mentioned above. System Hibernates after ten minutes of inactivity on the Dead-Man Bar.

Refer to Figure 2 for joystick functions on Page 10.

Section 3 Hardee by EVH

### **TETHERED GRIP WITH MICRO-JOYSTICKS**



### JOYSTICK RECALIBRATION

### **CLEAR CURRENT CALIBRATION**

- 1.0 POWER UP THE CONTROLLER BOX WITH JOYSTICK CONNECTOR (ENGINE SHOULD BE SHUT OFF).
- 2.0 PULL "DEAD-MAN BAR" UNTIL GREEN LED COMES ON, THEN RELEASE "DEAD-MAN BAR".
- 3.0 HOLD DOWN THE CUTTER HEAD SWITCH (<u>ENGINE SHOULD BE SHUT OFF</u>) WHILE PUSHING THE LEFT JOYSTICK (1) UP AND THE RIGHT JOYSTICK (2) DOWN FOR 5-SECONDS. THE GREEN **LED** WILL BEGIN TO FLASH, INDICATING THE CALIBATION HAS BEEN RESET.

### CALIBRATE JOYSTICK

- 4.0 -WITH JOYSTICK (1): PUSH AND HOLD IN EACH DIRECTION FOR 5 SECONDS EACH. N, S, W AND E
- 5.0 -WITH JOYSTICK (2): PUSH AND HOLD IN EACH DIRECTION FOR 5 SECONDS EACH. N, S, W AND E
- 6.0 -AFTER THE CALIBRATION HAS BEEN COMPLETED THE GREEN LED WILL STOP FLASHING.
- 7.0 -POWER DOWN THE CONTROLLER FOR 10 SECONDS AND THEN POWER UP THE SYSTEM AGAIN. PULL THE DEAD-MAN BAR FOR 2 SECONDS TO VERIFY THAT CALIBRATION WAS ACCEPTED (THE **LED** WILL BE A STEADY GREEN).
- NOTE: THE BOOM AND SWING FUCTIONS WILL NOT WORK UNTIL ALL POSITIONS OF THE JOYSTICKS ARE CALIBRATED.

### **Operation Instructions**

### **During Operation**



### WARNING

Ensure that all bystanders are clear of the mower before starting tractor engine. Objects thrown by the mower blades can cause severe personal injury or death

Before any operation of the mower, be familiar with the locations and functions of the unit's controls. Being familiar with the mower and its controls will increase efficiency and reduce the possibility of serious injury or damage to the unit.

The operator should work slowly and carefully until he feels comfortable with the mower. Speed and skill will be attained much more easily if the necessary time is spent to familiarize yourself with the mower and its operation.

Get into the habit of completing a walkaround inspection before use. This procedure is a simple method of inspecting your unit's condition by walking around and looking at each component of the unit, including the tractor. This procedure has been used by airline pilots for many years as a final inspection before flight and is also used by long distance ground transportation drivers on buses and trucks. During the walkaround, you will visually search your units tire condition, look for hydraulic leaks, fuel leaks, inspect hose condition and condition of hydraulic cylinders. Look for loose or worn components, see that all guards are in place, check blade condition, look for broken or inoperative lights and determine that it is or is not operable before use. We recommend that you follow this procedure before start up.

| Daily Start-Up Checklist |  |         |  |  |
|--------------------------|--|---------|--|--|
|                          | Check  | Section |  |  |
|                          | Check All Fluid Levels,<br>Tractor & Mower, For best<br>results, use Hardee hydraulic<br>oil – part number 23333 | -       |  |  |
|                          | Grease Points  | Page 15 |  |  |
|                          | PTO Shaft, Check Grease  | Page 15 |  |  |
|                          | Blade Tightness  | Page 16 |  |  |

### **Operating Environment**

### **Application Do's and Don'ts**

There are obvious and hidden potential hazards in operating this mower. REMEMBER! This machine is often operated in rough terrain conditions that include gullies, holes, slopes and hidden obstructions. Serious injury or even death may occur unless care is taken to assure the safety of the operator and bystanders in the area.

Included here is a list of safety messages, which should be followed. Observing these messages and using common sense learned from experience help eliminate the hazards of operating this and other machinery.



### **DANGER**

Read this manual and the manual for the tractor carefully to acquaint yourself with both machines before operating. REMEMBER, power-driven equipment should be operated only by those trained and familiar with the operation and instructed to do so. Working with unfamiliar equipment or in unfamiliar conditions can lead to accidents.



### **WARNING**

Before leaving the tractor seat, always engage the tractor brake and/or set the transmission of the tractor in parking gear. Stop engine and remove key.



### **DANGER**

Never allow riders on tractor or equipment. Falling off can cause serious injury or death.



### **WARNING**

Worn or dull mower blades can cause excessive mower vibration resulting in damage to the gearbox and structural damage to the mower. You should replace or sharpen blades in pairs. Excessive vibration can cause rotating parts to break and fly off the mower, causing serious injury or death to the operator or bystanders.



### **DANGER**

Do not modify or alter this machine or any of its components or any equipment function without consulting HARDEE BY EVH Manufacturing Company.

### **Using Your Mower**

### **Getting Started**

You will need to spend some time getting the "feel" of your new mower. Spend time reviewing the following steps before using your mower for the first time. The time that you take will greatly enhance your ability to get the desired results when you begin mowing.

- Locate the tethered grip mounted on the right side of the tractor and move the two joysticks through the positions shown on the instruction decal.
- ✓ The next step is to attach the mower to the tractor, see the hook-up procedures on page 8 for complete instructions. After you have the mower attached, double check to ensure that no part of the tractor is in contact with the mower.
- Next, follow the instructions for installing the driveshaft. Check to see that all PTO guards are in place correctly.
- Connect joystick cable to the bulkhead connector on the wire cover box. Make sure that all hoses and the joystick connection cable will not contact the PTO shaft. Use velcro straps to tie pendant cable to top link.
- ✓ Check the blades for sharpness. Check the blade carrier castle nut and both blade bolts for tightness. Verify that the gate valve under the oil tank is "on". The mower is shipped with the gate valve in the "off" position.



### 🕰 Danger

Before proceeding, make sure that no other persons are in close proximity to the mower!

- ✓ With all controls in neutral, the tractor in park, the throttle in idle position and the joystick power switch off... Start the tractor engine.
- ✓ Slowly engage the PTO shaft.
- Now with the mower under power, practice using the joystick to control the movement of the mowerhead and boom arms.

### **Joystick Control**

 Turn "Power On" switch located to the right of the joystick control handle, "on". After you feel comfortable with the basic mower control, the next step is to start the blades.

✓ Hold lower left-hand button for (2) two seconds or unit LED turns red.



### Danger

Do not change the blade rotation direction! Blades must rotate in the clockwise direction indicated by the rotation decal on the mower deck.

- ✓ After the mower is running smoothly, increase the tractor to 800 PTO RPM (Max.1000 RPM) and lift the mowerhead off the ground. Swing the mowerhead to the mowing position, which is three 'o clock on the right side of your tractor. (If moving in reverse, swing deck back 15°).
- Release the tractor from park and put the transmission in low range. You are now in mowing mode and are underway.

### **Operation Instruction**

The terrain and the kind of material being cut will determine your ground speed. Remember that you will need to raise and lower the mowerhead to follow the ground contour you are cutting.

### **Boom Breakaway**

The LR50148 is designed with an automatic breakaway system to protect the mower booms. This works when the mowerhead contacts a solid obstruction or the mowerhead is "grounded" while the tractor is in motion. The breakaway is activated through the hydraulic valve and will function mowing both forward and backward.

When the mowerhead strikes a solid object the booms will begin to break back, IMMEDIATELY stop your tractor and adjust the position of the booms to clear the object.

If you "ground" the mowerhead and the booms begin to break back, simply lift the boom slightly to free the mowerhead, then swing the boom back into normal mowing position. See figure 2

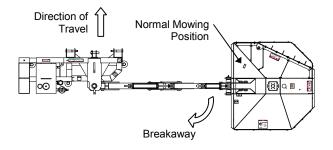


Figure 2

### Mowing in Reverse

Your Hardee unit can cut as easily when the tractor is moving in reverse as forward. The breakaway protection works in the same way. The only difference being you must swing the booms to the rear 10 - 15 degrees. This will allow for more boom breakaway travel. This space is critical so as not to bottom-out the boom arm. See figure 3



### Caution

You will do severe damage to your mower if you allow the boom arm to reach the bottoming-out point!

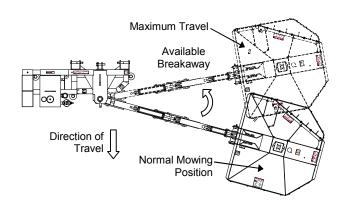


Figure 3



### Caution

You must allow for the extra boom travel when mowing in reverse. See figure 3. If you have any questions about these instructions, please ask your local Hardee dealer immediately! Warranty claims for equipment used improperly will not be accepted.

### **Side Dressing Trees**

The design of your heavy-duty brush mower will allow you to "side dress" trees if needed. To do this, raise the booms to the desired height and tilt the mowerhead to the vertical position. With the blades "on" move forward slowly, removing only approximately 12 inches of material per pass.



### **DANGER**

Never operate the mower within 10 feet of overhead power lines or utility lines. Do not trim trees with power lines running through them. Serious injury or death by electrocution may occur.

#### **Cutting Larger Brush and Trees**

A unique feature on the LR50148 is the mowerhead "HINGED GATE". The "HINGED GATE" is used when you need to remove trees as large as 4 inches in diameter. This is accomplished in the following manner:

- Be sure that the mower blades and tractor are turned "OFF".
- Unlock the "HINGED GATE" by removing the two bolts. Refer to Figure 5 & 6 on Page 14.
- Replace one bolt on the main deck for storage and use the second bolt to lock the gate in its raised up position.



Figure 5

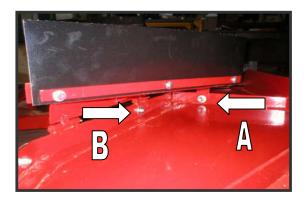


Figure 6

Figure 6 shows the two sets of bolts, nuts and washers that go on the "HINGED GATE". Bolt A is used to lockdown the hinged gates to the LR50148 DECK when cutting trees and bolt B is tightened onto the deck for storage during the tree-cutting process.



Never attempt to use the cutter to remove brush or trees larger than 4 inches in diameter. Failure to use caution when cutting trees, may lead to the tree falling on the cutter deck and tipping the tractor over. We recommend removing small sections at a time, no more than two or three feet in length per pass. See fig. 5.

### **Unhook and Post Use Care**

Before unhooking the tractor from your mower, always clean the unit thoroughly to remove any grass, mud or debris. This mower should always be stored on a hard level surface.

### **Unhooking the LR50148**

- To unhook from your unit, first lower all jack stands to the storage position.
- ✓ Lower the tractor lift arms so that the mower will rest firmly and evenly on all jack stands.
- ✓ Lower the boom arms and mower deck so that they too rest firmly on the ground.
- ✓ Be sure to relieve all hydraulic pressure on the boom arms and deck before unhooking.
- ✓ Disconnect driveshaft from tractor.
- Disconnect joystick cable at the bulkhead connector on the wire cover box.
- ✓ Unhook tractor hitch from 3-point frame on mower

#### **POST USE CARE**

• Never leave the driveshaft hanging down and touching the ground.

### **Maintenance and Service Schedule**

This section is dedicated to the maintenance of the LR50148. As with any piece of equipment, the performance and life span depends on the proper operation and maintenance.

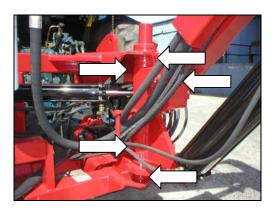


### DANGER

Never attempt any checks, repairs or adjustments with tractor engine running or the power take-off engaged. Adjustment of rotating parts while the tractor engine is running can result in serious personal injury or death if the PTO accidentally engages.

### First Stage Boom

Inject with heavy multi-purpose grease. There are five grease fittings on the swing post.

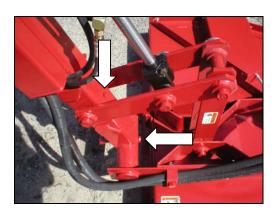


# First Stage Boom to Second Stage Boom Inject with heavy multi-purpose grease. There is a grease fitting at every hinge point.



#### **Deck and Second Stage Boom**

Inject with heavy multi-purpose grease.



### **Hydraulic Motor Housing Assembly**

Locate fitting on motor housing. Inject with 90W gear oil.



#### **Greasing PTO Driveshaft to Pump**

Remove PTO shaft from mower before greasing. Use heavy multi-purpose grease at all grease fitting and on shaft. Remember to grease the shield grease fittings as well as the u-joints.



### **Inspection and Replacement of Blades**

The mowing blades on the Hardee mower are designed and made to exact specifications and should be replaced with only original Hardee parts. Always replace blades in pairs to retain balance on the blade holder. Never weld the blades, as this will change the temper of the steel. Never modify the blades. Check for cross sectional thickness (5/8") and deterioration of blades. Replace as necessary.

When the replacement of mower blade is required, a few rules should be followed:

- Replace blades in pairs.
- Inspect bolt holes.
- If bolt holes are elongated, replace blade holder.
   See instructions below.
- Cutting heavy brush causes excess stress on the blade bolts, because of this they will require inspection that is more frequent.
- When replacing blades always replace bolts and nuts. Never reuse blade bolts and nuts.

#### Inspection and Replacement of Blade Holder

#### Inspection

- ✓ First, completely extend boom. Rotate mower deck all the way up; drop boom until deck rests on ground. Switch off tractor, secure parking brake and remove key.
- When inspecting, pay particular attention to any small hairline cracks between spindle bolt hole and blade bolt holes. This indicates metal fatigue from severe abuse and holder must be replaced.
- Blade and spindle bolts and nuts should be checked daily.

#### Replacement

- ✓ Remove cotter pin and castle nut.
- With an assistant, carefully remove the blade holder.
- ✓ Then position the new blade holder in place.
- ✓ Replace the castle nut and cotter pin. See parts breakdown drawing on page 37 for reference.

### Checking the Mower Head Relief Valve

The LR50148 is equipped with a mowerhead relief valve that comes pre-set from the factory. This valve is installed in the side of the manifold and identified with the number "3". Before checking the pressure on the valve, make certain that a clean filter is installed and that the reservoir contains the correct amount of hydraulic oil.

The procedure to check the pressure on the mower head relief is as follows:

- ✓ Start the tractor and with the tractor in park, place the mowerhead on the ground. Engage the tractor PTO to power the mower head and increase engine speed until 800 (Max. 1000) PTO RPM is reached. Allow the mower to run at this speed for 3 to 5 minutes.
- ✓ Disengage the PTO and stop tractor engine.
- ✓ Remove the motor pressure line ("MP") and plug it. Install a 5000 psi pressure gauge into the 4-M-SAE outlet ("GP") adjacent to the relief valve. Place the loose pressure line in a clean container to catch any spillage.



### **Caution**

Be sure all fittings are tight before proceeding!

- ✓ Start the tractor engine and increase engine speed to 1200 **ENGINE** RPM. Engage tractor PTO and immediately observe the pressure reading and disengage tractor PTO. (If pressure reads 2700 psi (+/- 150 psi), you may proceed.)
- ✓ Increase tractor engine speed to 800 (Max.1000) PTO RPM. Engage tractor PTO and immediately observe the pressure reading and disengage tractor PTO.

The correct pressure setting is 2700 psi. If the reading is less than 2550 or more the 2850, contact your local Hardee dealer for assistance.



### **L** Caution

Never let the unit operate in the capped position for over 5 seconds. A reading can be obtained accurately in this amount of time.

Now you can remove the cap and gauge, and reinstall the pressure line.



### **A** CAUTION

Never vary from the 2700-psi mowerhead pressure. Failure to comply with this specification will cause severe hydraulic heat, loss of power and damage to components.



### **L** DANGER

Exceeding 2700 psi will cause premature hose failure (rupture), and possible bodily injury or property damage.

### Cylinder Speeds

The LR50148 is equipped with a "Proportional Control" feature in the main control valve that allows the operator to control the piston speed of individual cylinders with the amount of movement on the thumb actuated joysticks.

### Adjusting the Cylinder Control Valve

The LR50148 comes from the factory with the cylinder control valve pre-set at the proper pressures. There is a main relief (Item P), and seven individual cylinder counterbalance valves (Items 5D2; 5D1; 5C2; 5C1; 5B2; 5B1; 8A2; 8A1). The chart on page 18 lists the proper settings for these valves.

The procedure for checking the pressures on the cylinder control valve is as follows:

### Cylinder Relief Valve (ITEM P)

- Rest the deck of the LR50148 on the ground to relieve all pressures on the hydraulic lines.
- With the tractor engine off and parking brake set, remove the hydraulic test port plug (see page 19 for gauge port locations). Install a 5000 psi pressure gauge with a SAE 4-M-ORB fitting into the hydraulic test port and place the gauge where you can easily see it from a safe distance.
- Start the tractor and bring the engine up to operating speed 800 (Max.1000) PTO RPM. Activate the joystick, raise the mower deck off the ground, and swing the boom so that it is straight behind the tractor.
- Activate the joystick in the "HEAD UP" position until the deck cylinder fully retracts. Continue to hold the joystick in this position for not more than 5 seconds at a time, and have someone read the pressure on the gauge.



### **MARNING**

While reading the gauge, be careful not to stand in an area where inadvertent movement of the booms could trap or crush you. If you fail to heed this warning, SERIOUS INJURY OR DEATH COULD OCCUR.

The correct pressure setting for the cylinder relief is 2500 psi.

To increase or decrease pressure, insert a 1/4" allenwrench into the adjusting stem at the top of the valve. Loosen the 3/4" lock nut at the base of the stem slightly, and then turn the adjusting stem to make your pressure change. Re-tighten the stem lock nut

Note: The allen-head adjusting stem increases pressure when turned clockwise and decreases pressure when turned counterclockwise. Pressure increases or decreases rapidly with only a slight movement. Move adjusting stem in increments of 1/4 turn or less.



### **A** CAUTION

NEVER attempt to adjust the valve when in the "on" (loaded) position. Always make adjustments in the "off" (neutral) position with the tractor engine turned

When 2500 psi is obtained, retighten the jam nut. Then re-test the pressure to be sure 2500 psi is retained.

When the adjustment is complete, rest the cutter deck back on the ground to relieve pressure in the hydraulic lines. Remove the pressure gauge and re-install the hydraulic test port plug.

### Individual Cylinder Counterbalance Valves (5D2; 5D1; 5C2; 5C1; 5B2; 5B1; 8A2; 8A1;)

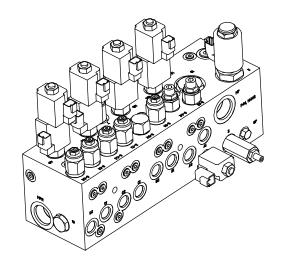
Each cylinder has counterbalance valves that provide both work port relief and load control. These valves are 100% inspected and pre-set from the factory to ensure the proper settings. Do not alter the settings on these valves.

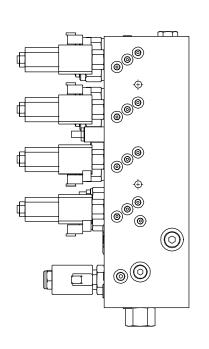
If you need assistance, contact your local Hardee dealer.

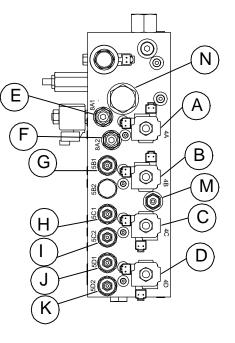
|              | LR             | 5014         | 8 CONTROL VALVE                                   | POF  | RT LIS   | STING       |             |
|--------------|----------------|--------------|---|------|----------|-------------|-------------|
| Item         | EVH P/N        |              | Description                                       | Code | Setting  | Torque      | Coil Nut    |
| A            | 16262<br>16263 | Stem<br>Coil | Solenoid Valve (Deck Cyl. Control)                | 4A   |          | 25 ft lbs.  | 2.5 ft lbs. |
| В            | 16262<br>16263 | Stem<br>Coil | Solenoid Valve (II stg Boom Control)              | 4B   |          | 25 ft lbs.  | 2.5 ft lbs. |
| С            | 16262<br>16263 | Stem<br>Coil | Solenoid Valve (I stg Boom Control)               | 4C   |          | 25 ft lbs.  | 2.5 ft lbs. |
| D            | 16262<br>16263 | Stem<br>Coil | Solenoid Valve (Swing Control)                    | 4D   |          | 25 ft lbs.  | 2.5 ft lbs. |
| E            | 1625           | 58           | Counterbalance Valve (Swing Right)                | 8A1  | 1300 PSI | 35 ft lbs.  |             |
| F            | 1625           | 58           | Counterbalance Valve (Swing Left)                 | 8A2  | 1300 PSI | 35 ft lbs.  |             |
| G            | 1625           | 56           | Counterbalance Valve (1st Stage Up)               | 5B1  | 2500 PSI | 35 ft lbs.  |             |
| Н            | 1625           | 56           | Counterbalance Valve (2nd Stage Down)             | 5C1  | 1800 PSI | 35 ft lbs.  |             |
| I            | 1625           | 56           | Counterbalance Valve (2nd Stage Up)               | 5C2  | 3300 PSI | 35 ft lbs.  |             |
| J            | 1625           | 56           | Counterbalance Valve (Deck Down)                  | 5D1  | 1800 PSI | 35 ft lbs.  |             |
| K            | 162            | 57           | Counterbalance Valve (Deck UP)                    | 5D2  | 3300 PSI | 35 ft lbs.  |             |
| L            | 16523<br>16524 | Stem<br>Coil | Proportional Flow Control                         | 2    |          | 50 ft lbs.  | 2.5 ft lbs. |
| М            | 1625           |              | Cylinder Relief Valve                             | 7    | 2500 PSI | 25 ft lbs.  |             |
| N            | N/A            |              | Check Valve                                       | 13   |          | 130 ft lbs. |             |
| 0            | 16260<br>16261 | Stem<br>Coil | Solenoid Valve (Deck Motor Control)               | 9    |          | 22 ft lbs.  |             |
| Р            | 1625           |              | Main Relief                                       | 3    | 2700 PSI | 37 ft lbs.  |             |
| Q            | N/A            | 4            | Pilot Opp. Dir. Valve                             | 6    |          | 80 ft lbs.  | 2.5 ft lbs. |
| R            | N/A            | Α            | Return Port                                       | Т    |          |             |             |
| S            | N/A            | 4            | Pump Port   | Р    |          |             |             |
| Т            | N/A            | 4            | Deck Motor Pressure Port                          | MP   |          |             |             |
| U            | N/A            | 4            | Deck Motor Return Port                            | MPR  |          |             |             |
| NOT<br>SHOWN | 1649           | 96           | MAIN CONTROLLER                                   |      |          |             |             |
| NOT<br>SHOWN | 1627           | 78           | JOYSTICK WITH WIRE HARNESS                        |      |          |             |             |
| NOT<br>SHOWN | 1624           | 49           | PROX SENSOR FOR SWING                             |      |          |             |             |
| NOT<br>SHOWN | 1640           | 97           | HITCH FRAME WIRING HARNESS<br>FOR MAIN CONTROLLER |      |          |             |             |
| NOT<br>SHOWN | 1661           | 37           | Single Micro Joysticks for<br>16278 Joystick      |      |          |             |             |
| NOT<br>SHOWN | 1619           | 31           | Wire Harness for HR2360/LR50160<br>16278 Joystick |      |          |             |             |

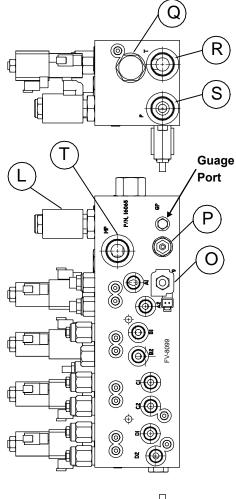


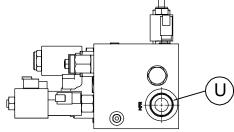
## CONTROL VALVE PORT SCHEMATIC



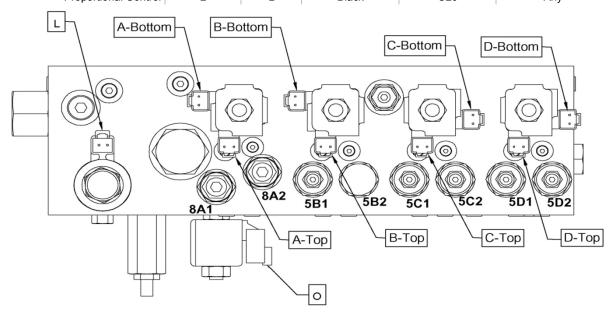








| LR50148 Valve / Joystick Wiring Schematic |            |            |                |               |                        |
|---|------------|------------|----------------|---------------|------------------------|
| Function                                  | Valve Port | Coil       | Wire Color (+) | Connector No. | <b>Handle Position</b> |
| Swing (Boom) Right                        | 8A1        | A - Top    | White          | C10           | Right (E)              |
| Swing (Boom) Left                         | 8A2        | A - Bottom | White          | C9            | Left (W)               |
| 1st Stage Up                              | 5B1        | В - Тор    | White          | C17           | Up (N)                 |
| 1st Stage Down                            | 5B2        | B - Bottom | White          | C16           | Down (S)               |
| 2nd Stage Down                            | 5C1        | C - Top    | White          | C12           | Down (S)               |
| 2nd Stage Up                              | 5C2        | C - Bottom | White          | C11           | Up (N)                 |
| Deck Down                                 | 5D1        | D - Top    | White          | C15           | Left (W)               |
| Deck Up                                   | 5D2        | D - Bottom | White          | C14           | Right (E)              |
| Deck Motor                                | 9          | 0          | Black          | C19           | Any                    |
| Proportional Control                      | 2          | L          | Black          | C20           | Any                    |



### **Routine Maintenance Checklist**

| Interval                 | Item                                 | Check | Page | Change | Comments  |
|--------------------------|--------------------------------------|-------|------|--------|---|
|                          | Pump Drive Shaft                     |       | •    |        |   |
|                          | Pivot Points                         |       | •    |        |   |
|                          | Grease Fittings                      |       | •    |        |   |
|                          | Hydraulic Fluid Level                | •     |      |        |   |
| Daily Or 10              | Blades                               | •     |      |        | Change If Damaged                               |
| Hours                    | Blade Bolts (Blade To Blade Holder)  | •     |      |        | Torque to Spec. on Blade Holder Breakdown       |
|                          | Blade Holder Nut                     | •     |      |        | Torque to Spec. on LR50148 - Parts Breakdown    |
|                          | Spindle Bolts (Spindle To Deck)      | •     |      |        |   |
|                          | Main Frame And Deck Bolts            | •     |      |        |   |
|                          | Rubber Shielding                     | •     |      |        | Change If Damaged                               |
| Weekly Or 50             | Hydraulic Return Filter              |       |      | •      | Change After 1st 50 Hours, Then Every 500 Hours |
| Hours                    | Hydraulic Fittings                   | •     |      |        |   |
| Monthly Or 150           | Tank Breather                        | •     |      |        |   |
| Hours                    | Hydraulic Fluid Level                | •     |      |        |   |
| Seasonal Or 500<br>Hours | In Tank And Return Hydraulic Filters |       |      | •      |   |

### **Troubleshooting Guide**

### Hydraulic System, Blade System, Pump, Motor, Fluid Lines

| Problem                               | Possible Cause                                | Solution / Correction  |
|---------------------------------------|---|--|
| Cylinder Will Not Operate             | No Power To Joystick                          | Repair / Replace Connections   |
|                                       | Fuse Blown Inside Lighter Plug                | Replace Fuse   |
|                                       | Joystick Not Connected To A 12-Volt<br>System | Connect To 12-Volt Power Supply  |
|                                       | Joystick Not Connected To Valve               | Examine Bulkhead Connection To Mower   |
|                                       | Proportional Valve Not Functioning            | Repair Electrical Connections To Solenoid Or Replace Solenoid                    |
| Head Drifts Back When In<br>Operation | Improper Counter Balance Valve Setting        | Adjust Counter Balance Valves To<br>Specifications (Refer To Pages 18 - 19)      |
|                                       | Cylinder Leakage                              | Repair / Replace Cylinders   |
| Boom Drifts Down                      | Improper Counter Balance Valve Setting        | Adjust Counter Balance Valves To<br>Specifications (Refer To Pages 18 - 19)      |
|                                       | Cylinder Leakage                              | Repair / Replace Cylinders   |
| Leaking Motor                         | Motor Seal Blown                              | Repair / Replace Seal And Check Filter<br>For Blockage (Repair / Replace Filter) |
| Blades Loose Speed In Mowing          | Improper Relief Valve Setting                 | Check Relief Valve Setting (Refer To Pages 18-19)                                |
|                                       |   | Repair / Replace Relief Valve  |
|                                       | Proportional Valve                            | Check for trash or Replace   |
|                                       | Poppet Valve in Motor                         | Check/Replace Poppet valves in motor   |
| Pump Whines                           | Worn Or Damaged Pump                          | Repair / Replace Pump (Make sure gate valve is open)                             |
|                                       | Improper Oil In System                        | Replace Oil  |
|                                       |   | Requires Hardee Oil Part NO 23333 Or<br>Comparable Oil With Proper Viscosity     |
|                                       | Pressure Setting On Relief Valve Too<br>Low   | Check Relief Valve Setting (Refer To Pages 18-19)                                |
| Motor Whines                          | Worn Or Damaged Motor                         | Repair / Replace Motor   |
|                                       | Improper Oil In System                        | Replace Oil  |
|                                       |   | Requires Hardee Oil Part NO 23333 Or<br>Comparable Oil With Proper Viscosity     |
|                                       | Pressure Setting On Relief Valve Too<br>Low   | Check Relief Valve Setting (Refer To Page 18)                                    |
| Motor Seal Continually Blows Out      | Internal Poppet Valve Damaged                 | Replace Poppet Valves  |
| Unit Vibrates Severely                | Broken Blade                                  | Replace Blades, Blade Bolts And Nuts (Refer To Page 16)                          |
|                                       | Mismatched/Unbalanced Blades                  | Refer to Page 16   |
|                                       | Blade Holder Loose                            | Repair / Replace Blade Holder (Refer To Page 16)                                 |
|                                       | Loose Output Shaft                            | Repair / Replace Shaft's Bearings In<br>Mower Head Housing                       |
| Mower Head Grinds And Roars           | Worn Bearings Or Improper Lubrication In      | Repair / Replace Components (Bearing,  |
| When Operating                        | Mower Hydraulic Motor Housing                 | Seals And Housing) As Required   |

### Troubleshooting Guide, continued

### Hydraulic System, Blade System, Pump, Motor, Fluid Lines

| Problem  | Possible Cause   | Solution / Correction                                      |
|--|--|--|
| Individual Cylinders Leak Down                 | Blown Or Worn Cylinder Packing                                       | Repair / Replace Cylinder                                  |
| Relief Valve Will Not Adjust To Specifications | Defective Or Worn Valve Seat   | Repair / Replace Relief Valve And Adjust To Specifications |
|  | Worn Pump  | Replace Pump   |
|  | Gate Valve Closed  | Open Gate Valve  |
|  | Hydraulic Valve Cracked Internally                                   | Repair / Replace Valve                                     |
|  | Improper Oil   | Repair / Replace Oil (Use Hardee Oil Part No. 23333)       |
| No Power To Control Box                        | No Power To Joystick / Joystick Not<br>Connected To A 12-Volt System | Connect To 12-Volt Power Supply                            |
|  | Improper Connection To Joystick                                      | Repair / Replace Connections                               |
|  | Fuse Blown Inside Cigarette Lighter Plug                             | Replace Fuse   |
| Filter Gauge Is In The Red At All Times        | Filter Restricted  | Repair / Replace Filter                                    |
|  | Bad Gauge  | Repair / Replace Gauge                                     |
|  | Hydraulic Oil Too Heavy For Region Or Climate                        | Replace Oil  |
| PTO Shaft Won't Telescope                      | PTO Shaft Not Lubed Properly   | Lube Driveshaft (Per Daily Routine Check Sheet On Page 15) |
|  | Bent Shaft   | Replace PTO Shaft  |
| Excessive Slack In Boom Hinges                 | Pins Worn  | Repair / Replace Pins                                      |
| Beams Squeak When Operating                    | No Lubrication Or Improper Lubrication                               | Lube Hinge Points (Per Instructions On Page 15)            |
|  | Defective Lube Fittings  | Repair / Replace Fittings                                  |
| Boom Operates Erratically                      | Speed Is Too Fast  | Call HARDEE Dealer   |
|  | Defective Controller   | Check Blink Codes on Page 24                               |
|  | Air In Lines   | Purge Hydraulic Lines                                      |
|  | Proportional Valve   | Trash in Valve   |
| Blades Won't Start-Up                          | Oil Flow Restricted  | Open Gate Valve  |
|  |  | Repair / Replace Hydraulic Lines                           |
|  |  | Replace In-Tank Filter                                     |
|  | Blade Off/On Switch or Electric Circuit                              | Check for 12-volts at Coil                                 |
|  | Proportional Valve   | Trash in Valve   |
|  |  | Check Coil   |

### **Fault Codes for Status LED**

| Blink Code | Reason for Fault   | Corrective Action          |
|------------|--|----------------------------|
| 21         | Left Joystick X axis Voltage out of range                    | Check Joystick and wires   |
| 22         | Left Joystick Y axis Voltage out of range                    | Check Joystick and wires   |
| 23         | Right Joystick X axis Voltage out of range                   | Check Joystick and wires   |
| 24         | Right Joystick Y axis Voltage out of range                   | Check Joystick and wires   |
| 25         | Left X axis No cal   | Recalibrate the Joysticks  |
| 26         | Left Y axis No cal   | Recalibrate the Joysticks  |
| 27         | Right X axis No cal  | Recalibrate the Joysticks  |
| 28         | Right Y axis No cal  | Recalibrate the Joysticks  |
| 31         | Stage 1 Down/Stage 2<br>Down Output Open or<br>Short Circuit | Check valve coil and wires |
| 32         | Proportional Unloader<br>Output Open or Short<br>Circuit     | Check valve coil and wires |
| 33         | Head Down/Swing Right Output Open or Short Circuit           | Check valve coil and wires |
| 34         | Head Up/Swing Left Valve Output Open or Short Circuit        | Check valve coil and wires |
| 35         | Cutter Head Motor Valve<br>Output Open or Short<br>Circuit   | Check valve coil and wires |
| 36         | LED Output Open or<br>Short Circuit                          | Check valve coil and wires |
| 37         | Stage 1 Up/Stage 2 Up<br>Output Open or Short<br>Circuit     | Check valve coil and wires |
| 38         | Relay Driver Output<br>Open or Short Circuit                 | Check relay and wires      |

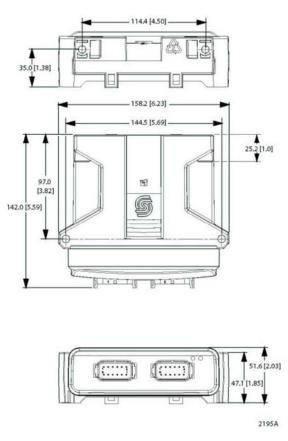
### **How to interpret the "BLINK CODE":**

On the bottom of the Controller Box, locate two (2) LED's; one Red; one Green. Whenever the red LED lights up you may see the following "BLINKS":

- (2) Red "BLINKS" pause (1) Red "BLINK" = "BLINK CODE" 21
- (3) Red "BLINKS" pause (6) Red "BLINKS" = "BLINK CODE" 36 ETC.
- Now check "Reason for Fault" and "Corrective Action" opposite the corresponding "BLINK CODE".

### MC024-020-00000 PLUS+1 CONTROLLER

### **Dimensions and Pin Assignment**



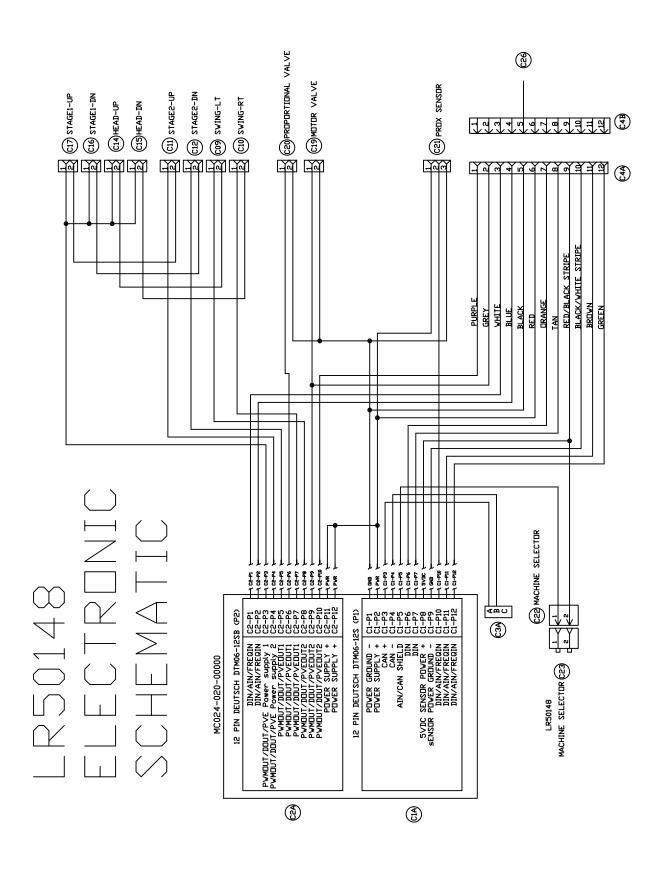
| DIN/AIN/FreqIN                   | C2-P1  |    |                |
|----------------------------------|--------|----|----------------|
| DIN/AIN/FreqIN                   | C2-P2  |    |                |
| PWMOUT/DOUT/PVG Power supply 1   | C2-P3  | (= |                |
| PWMOUT/DOUT/PVG Power supply 2   | C2-P4  |    |                |
| PWMOUT/DOUT/PVGOUT 1             | C2-P5  |    | Connector :    |
| PWMOUT/DOUT/PVGOUT 1             | C2-P6  |    | D Key (blace   |
| PWMOUT/DOUT/PVGOUT 1             | C2-P7  |    | 120 10         |
| PWMOUT/DOUT/PVGOUT 2             | C2-P8  |    | 110 20         |
| PWMOUT/DOUT/PVGOUT 2             | C2-P9  |    | 90 40          |
| PWMOUT/DOUT/PVGOUT 2             | C2-P10 |    | 70 60          |
| Power Supply +                   | C2-P11 |    |                |
| Power Supply +                   | C2-P12 |    | Connector      |
| Power ground -                   | C1-P1  |    | 'A' key (gray  |
| Power supply +                   | C1-P2  |    | 120 10         |
| CAN+                             | C1-P3  |    | 110 20         |
| CAN -                            | C1-P4  |    | 90 40<br>80 50 |
| AIN/CAN shield                   | C1-P5  |    | 70 60          |
| DIN                              | C1-P6  |    |                |
| DIN                              | C1-P7  |    |                |
| 5 V DC sensor power +            | C1-P8  |    |                |
| Sensor power ground -            | C1-P9  | (  |                |
|                                  | C1 D10 |    |                |
| DIN/AIN/FreqIN                   | C1-P10 |    |                |
| DIN/AIN/FreqIN<br>DIN/AIN/FreqIN | C1-P10 |    |                |

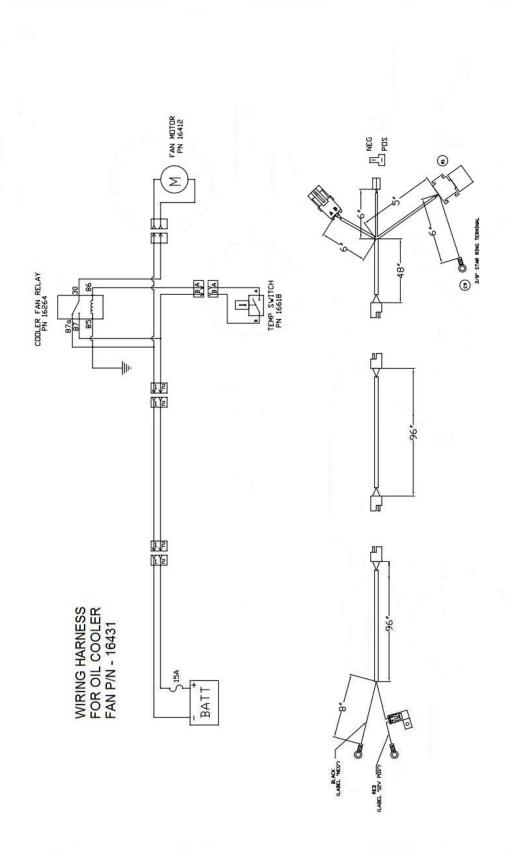
MC024-020-00000 mounting dimensions

MC024-020-00000 24 pin connector

### **Specifications**

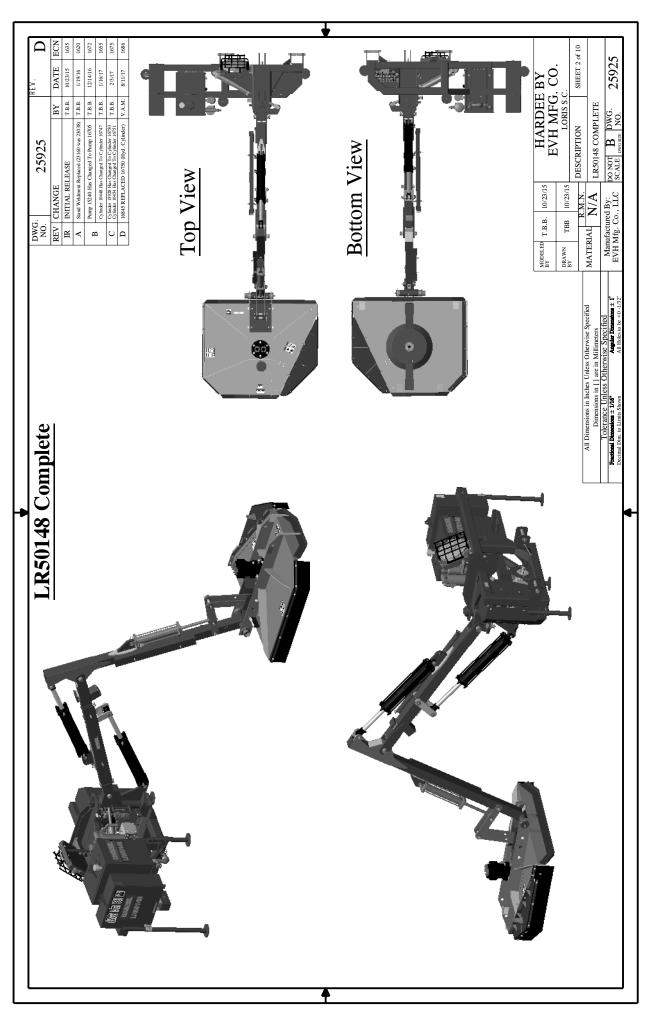
| Product Parameters               |                        |
|----------------------------------|------------------------|
| Supply voltage:                  | 9 to 36 V              |
| Operating temperature (ambient): | -40 to 70° C           |
| Storage temperature:             | -40 to 85° C           |
| IP rating:                       | IP 67                  |
| EMI/RFI rating:                  | 100 V/M                |
| Weight:                          | 0.40 kg (0.88 lb)      |
| Vibration:                       | IEC 60068-2-64         |
| Shock:                           | IEC 60068-2-27 test Ea |
| Maximum current, sourcing:       | 24 A                   |
| Maximum current, sinking:        | 8 A                    |



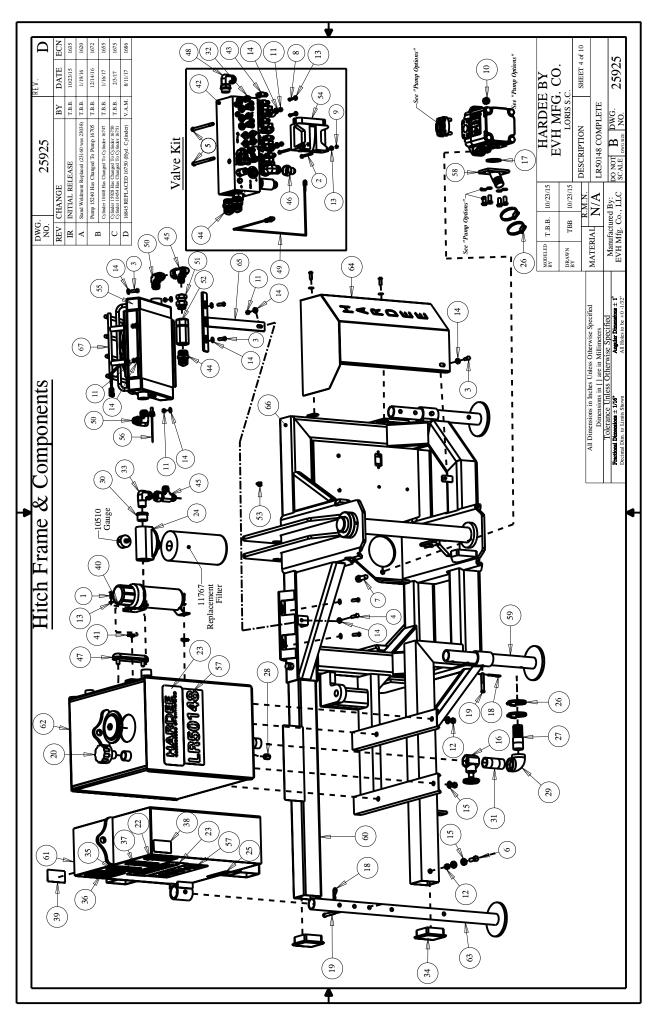


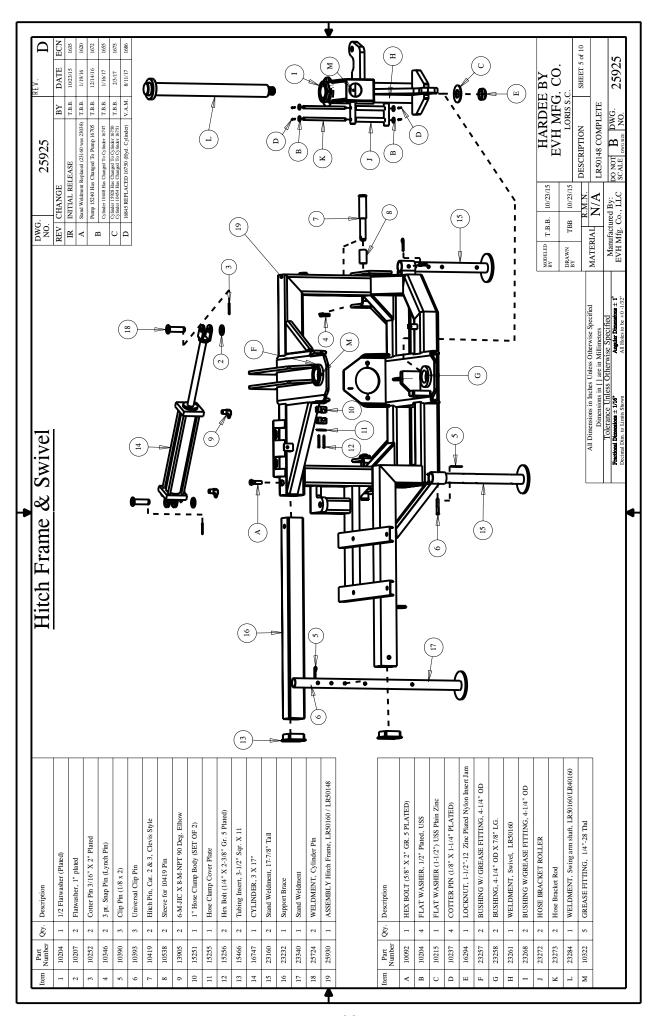
### **Summary of Specifications**

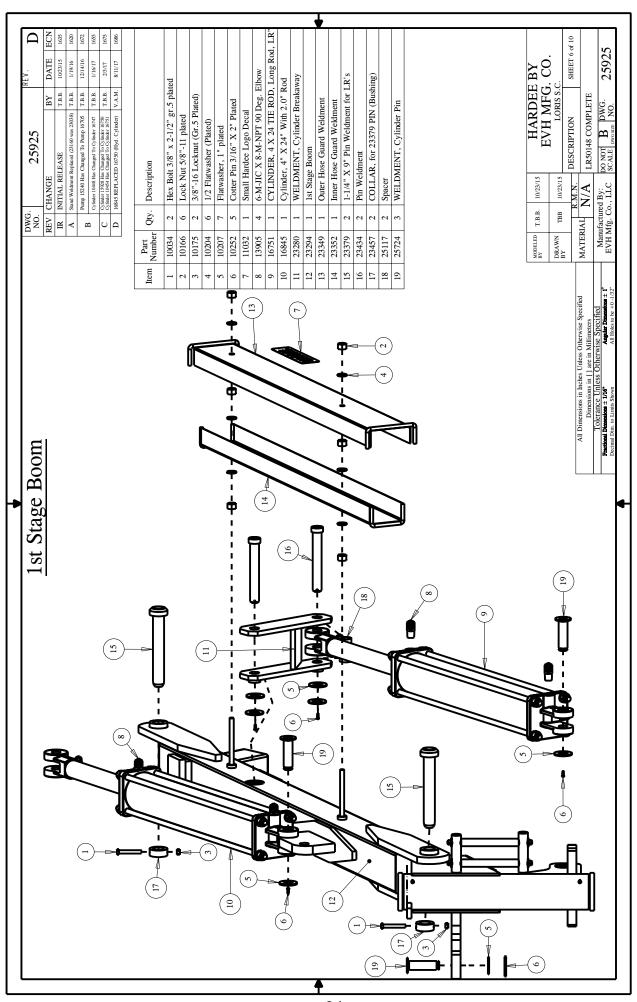
| Model                             | LR50148  |
|-----------------------------------|--|
| Approximate Weight (lbs.)         | Approximately 3,085 lbs Ready To Mow   |
| Blade Tip Speed (ft/min)          | 540 PTO – 15,210 ft/min with pump # 22758<br>1,000 PTO – 15,320 ft/min with pump # 22759 |
| Blades                            | Heavy 1/2" Thick - Free Swinging   |
| Mowing Capacity / Suggested Usage | Grass, Heavy Brush Up To 4" In Diameter  |
| Mowing Width                      | 48"  |
| Deck Height                       | 8 1/8"   |
| Deck Thickness                    | 10 Gauge   |
| Driveline                         | Category 3   |
| Driveline Protection              | Hydraulic Relief Valve   |
| Hitch                             | Standard Hitch, Category 2 Or 3 Quick Hitch  |
| Motor                             | Hydraulic Vane Motor   |
| Overall Length                    | 260"   |
| Overall Width                     | 68"  |
| Transport Width                   | 86"  |
| PTO Operating Speed               | 540 OR 1000 RPM  |
| Pump                              | Hydraulic Spring Loaded Vane Pump  |
| Rubber Shielding                  | Standard – Front & Rear  |
| Skids                             | Standard – Weld On   |
| Tractor HP Required               | 80 And Up  |
| Hydraulic Oil System Capacity     | 35 Gallons   |
| Controls                          | Tethered/Pendant Joystick Grip   |

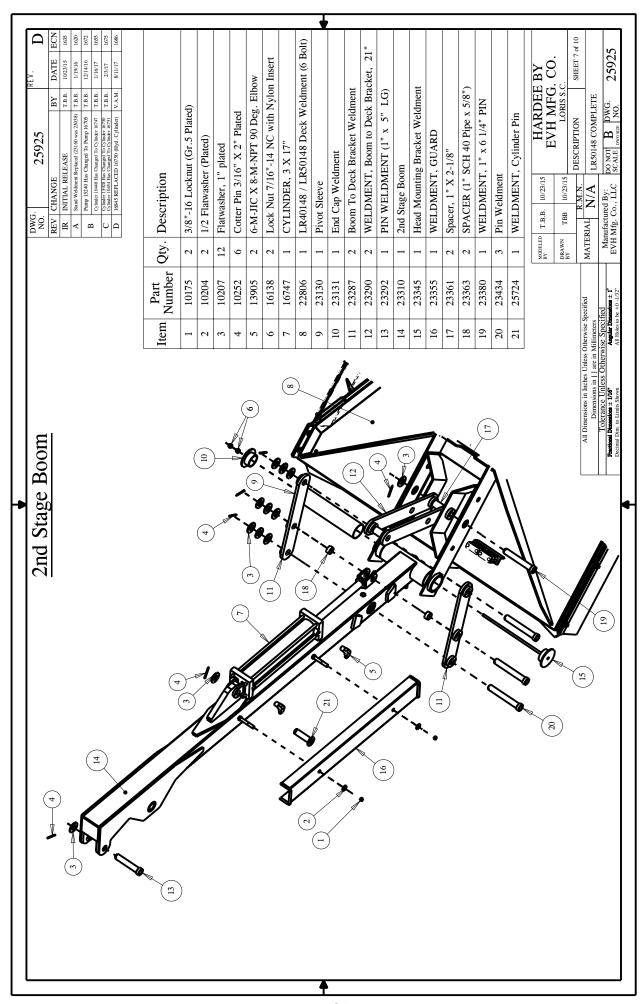


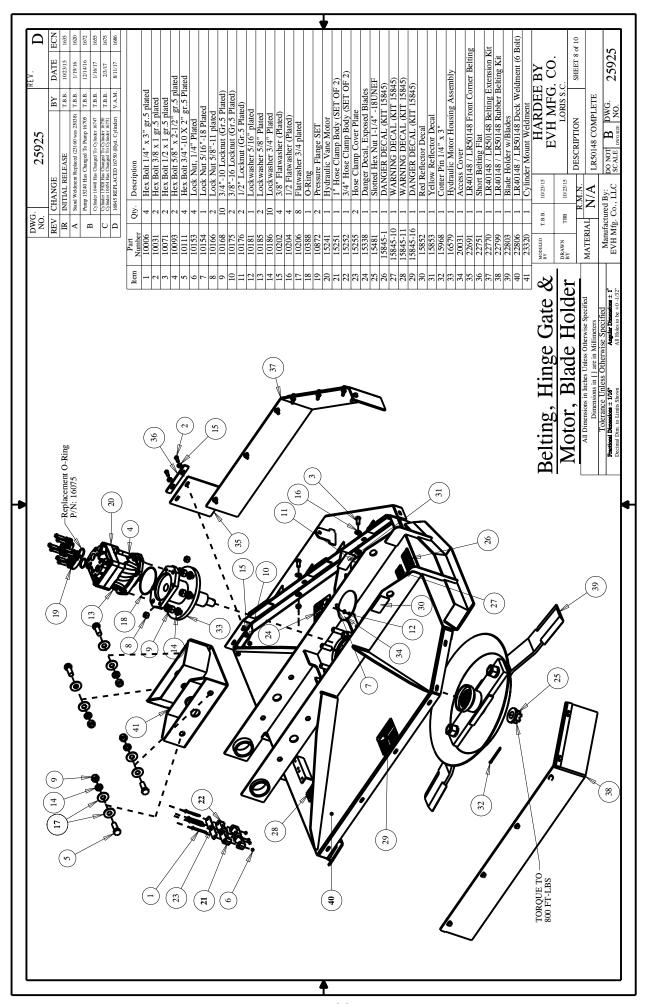
|   | $\frac{\text{DWG}}{\text{NO}}$ 25925 $\frac{\text{NEV.}}{\text{O}}$ D | CHANGE BY DATE                     | IR   INITIAL RELEASE   T.B.B.   1023/15   1635 | Pump 15240 Has Changed To Pump 16705 T.B.B. 12/14/16 | Cylinder 10448 Has Changed To Cylinder 16747 T.B.B. 1/16/17 | C Cynner 1964-188 Changea to Cylinder 16731 Cylinder 1064-188 Changea to Cylinder 16731 D Kest SEPEN A TEN 16750 (Head Colinder) V A M 8711/17 1686 | 10095 NEFEACED 10750 (1994: Cyllinds) V.A.IVI. 0.1D.I. |                                    |                                       |                                  |                                   |                               |                            |                             |                           |                               |                                  |            |                    | •                    |                   |                              |                                 |                         |                        |                |   |                                       |   |                                     |       |                                 |                             |                                   | MODELED T.B.B. 10/23/15 ITANDEE DI FVH MFG CO | DRAWN TBB 10/23/15 LORIS S.C. | ×                        | MATERIAL N/A LR50148 COMPLETE  | Manufactured By: DO NOT B DWG. 25925 | SCALE   DWG SIZE   NO.                                   |
|---|---|------------------------------------|--|--|---|---|--|------------------------------------|---------------------------------------|----------------------------------|-----------------------------------|-------------------------------|----------------------------|-----------------------------|---------------------------|-------------------------------|----------------------------------|------------|--------------------|----------------------|-------------------|------------------------------|---------------------------------|-------------------------|------------------------|----------------|---|---------------------------------------|---|-------------------------------------|-------|---------------------------------|-----------------------------|-----------------------------------|---|-------------------------------|--------------------------|--|--------------------------------------|--|
| • | itch Frame & Components   | Yellow Reflector Decal             | Manual Holder                                  | U-Nut, 1/4"-20                                       | CONTROL VALVE & Joy Stick Kit                               | 3/8" - 90DEG. SWIVEL NUT  | Straight Fitting - 1"                                  | Swivel Nut Run Tee - 37 Deg. Flare | Reducer 37 Deg. Flare (16-12 TRTXN-S) | Sight Gauge 5", With Thermometer | 16-M-JIC X 16-M-NPT 90 Deg. Elbow | PROX SENSOR                   | 16 M-IIC - 12 MORB Elbow   | Fitting, 16-M-ORB/16-F-JIC0 | CHECK VALVE- INLINE 5 PSI | Clamp, 1/2" Plated Steel Loom | CONTROLLER, MC 024 020 for 16065 | OIL COOLER | TEMPERATURE SWITCH | DECAL, MODEL LR50148 | Fluid Connector   | Stand Weldment, 17-7/8" Tall | Support Brace                   | WELDMENT, Weight Box    | Weldment, Oil Tank     | Stand Weldment | WELDMENT, Hardee Logo                   | WELDMENT-OIL COOLER SUPPORT           | ASSEMBLY Hitch Frame, LR50160 / LR50148 | WELDMENT - FAN GUARD FOR OIL COOLER |       |                                 |                             |                                   |   |                               |                          | All Dimensions in Inches Unless Otherwise Specified Dimensions in [ ] are in Millimeters | Unless Otherwi                       | Decimal Dint. to Limits Shown All Holes to be +10 -1/32" |
|   | H   |                                    |  | 2  |   | ∞   | 3  | 2                                  | -                                     |                                  | 2                                 |                               | 2                          |                             |                           | -                             | 1                                |            |                    | е                    |                   | 2                            |                                 |                         | 1                      |                |   |                                       | 1                                       | 1                                   |       |                                 |                             |                                   |   |                               |                          |  |                                      |  |
|   |   | 15853                              | 15854  | 15860  | 16065   | 16070   | 16077  | 16084                              | 16086                                 | 16100                            | 16191                             | 16249                         | 16353                      | 16354                       | 16404                     | 16436                         | 16496                            | 16617      | 16618              | 16717                | 22833             | 23160                        | 23232                           | 23325                   | 23335                  | 23340          | 25725                                   | 25857                                 | 25930                                   | 26855                               |       |                                 |                             |                                   |   |                               |                          |  |                                      |  |
|   |   | 39                                 | 40   | 41   | 42  | 43  | 44   | 45                                 | 46                                    | 47                               | 48                                | 49                            | 20                         | 51                          | 52                        | 53                            | 54                               | 55         | 99                 | 57                   | 58                | 59                           | 09                              | 61                      | 62                     | 63             | 64                                      | 65                                    | 99                                      | 29                                  |       |                                 |                             |                                   |   |                               | _                        | _  |                                      |  |
|   | y. Description  | Hex Bolt, 1/4"-20 X 1" Gr.5 Plated | Hex Bolt 1/4" x 3" gr.5 plated                 | Hex Bolt 3/8 x 1 gr.5 plated                         | Hex Bolt 3/8 x 1-1/2 gr.5 plated                            | HEX BOLT (3/8" X 6" GR. 5 PLATED)   | Hex Bolt 1/2 x 1 1/2 gr.5 plated                       | Hex Bolt 5/8 x 2 gr.5 plated       |                                       | Lock Nut, 1/4" Plated            | Lock Nut 5/8"-11 plated           | 3/8"-16 Locknut (Gr.5 Plated) | 1/2" Locknut (Gr.5 Plated) | 1/4" Plated Flatwasher      | 3/8" Flatwasher (Plated)  | 1/2 Flatwasher (Plated)       | 1-1/4" Gate Valve                | O-ring     | Clip Pin (1/8 x 2) | Universal Clip Pin   | FLOW EZY BREATHER | Pressure Flange SET          | Decal, Warning - Thrown Objects | Large Hardee Logo Decal | Return Filter Assembly | Web Site Decal | STAINLESS STEEL CLAMP, 1-1/2" TO 1-3/4" | 1-1/4"-M-NPT X 1-1/2" Metal Hose Barb | 1/4" NPT Metal Cap                      | 1-1/4" NPT Female Threaded Elbow    |       | 1-1/4" X 3-1/2" Long NPT Nipple | STRAIGHT, 6-M-JIC X 8-M-ORB | 16-M-JIC X 16-M-NPT 90 Deg. Elbow | Tubing Insert, 3-1/2" Sqr. X 11               | DANGER DECAL (KIT 15845)      | DANGER DECAL (KIT 15845) | WARNING DECAL (KIT 15845)  | Red Reflector Decal                  |  |
|   | er Qty.   | 2                                  | 2  | 11   |   | 2   | 2  | 2                                  | 2                                     | 2                                | 2                                 | 7                             | 9                          | 9                           | 19                        | ∞                             |                                  |            |                    | e.                   |                   |                              |                                 | 6                       | 1                      | -              | 4                                       |                                       | 1                                       | . 1                                 | -     | 1                               | ∞                           |                                   | 2   | 1 1                           | 1 91                     | 9 1  |                                      |  |
| 1 | Number  | 10002                              | 10006  | 10031  | 10032   | 10041   | 10072  | 10092                              | 10135                                 | 10153                            | 10166                             | 10175                         | 10176                      | 10200                       | 10202                     | 10204                         | 10368                            | 10387      | 10390              | 10393                | 10501             | 10872                        | 11005                           | 11010                   | 11675                  | 11850          | 13535                                   | 13563                                 | 13632                                   | 13697                               | 13758 | 13778                           | 13902                       | 13974                             | 15466   | 15845-15                      | 15845-16                 | 15845-9  | 15852                                |  |
|   | Item  | -                                  | 2  | 3  | 4   | 5   | 9  | 7                                  | ∞                                     | 6                                | 10                                | 11                            | 12                         | 13                          | 14                        | 15                            | 16                               | 17         | 18                 | 19                   | 20                | 21                           | 22                              | 23                      | 24                     | 22             | 56                                      | 27                                    | 28                                      | 53                                  | 30    | 31                              | 32                          | 33                                | 8   | 35                            | 36                       | 37   | 38                                   | J  |

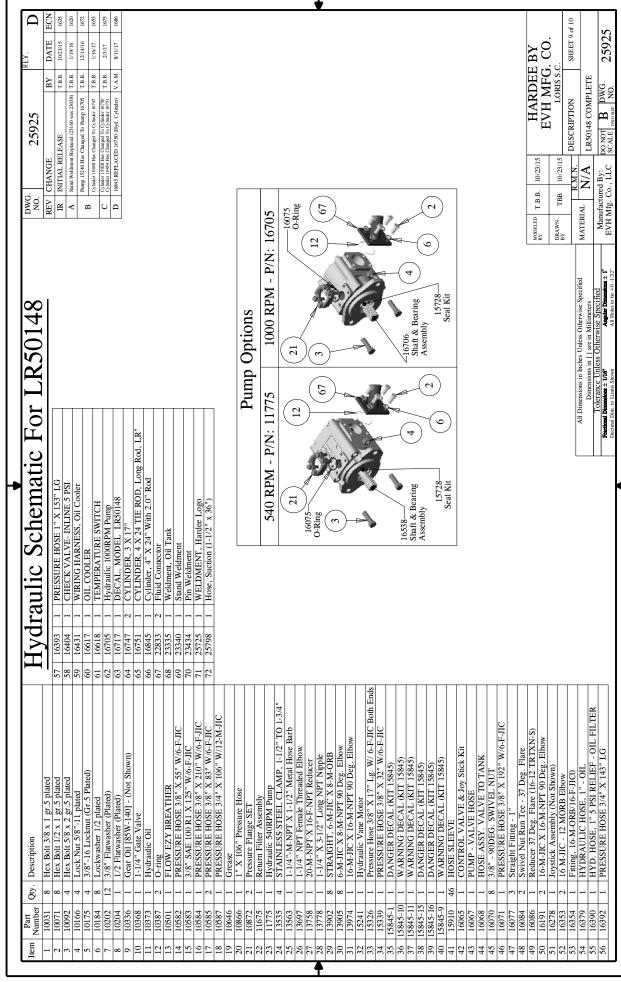


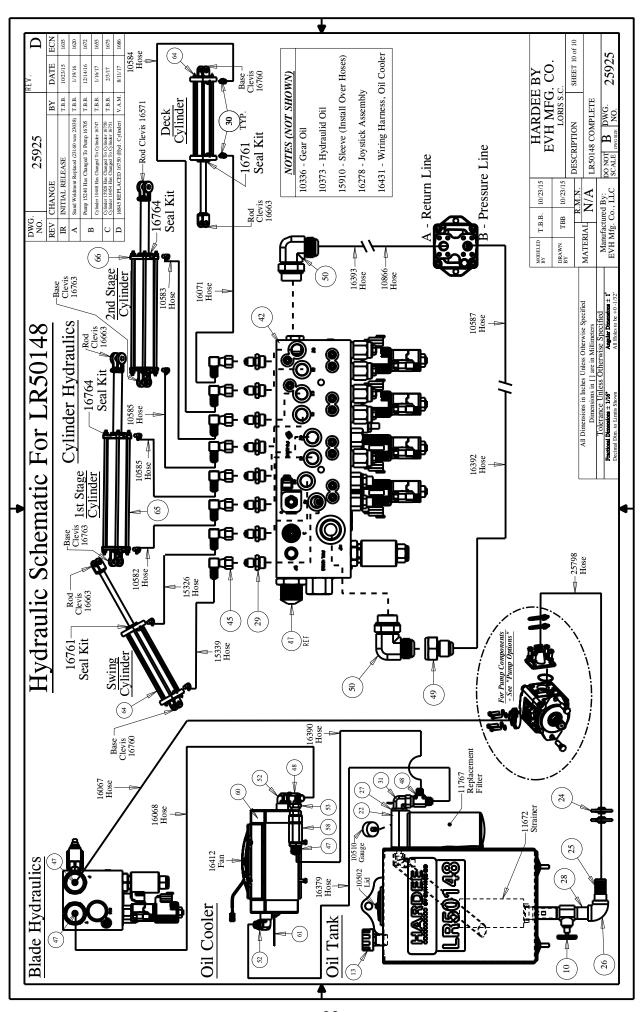




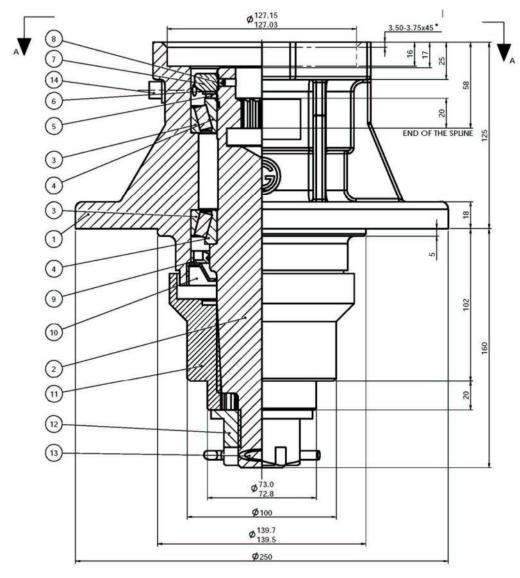








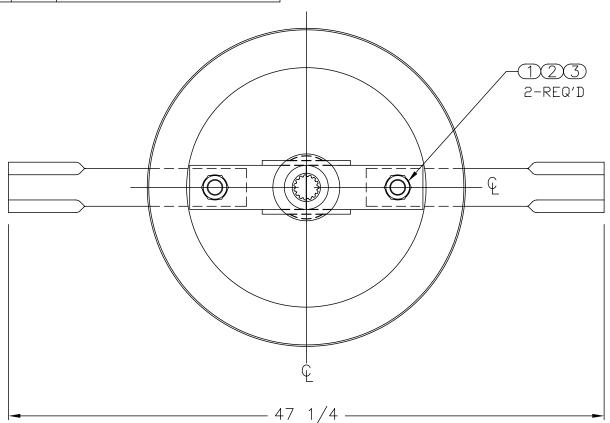
# Hydraulic Motor Housing EVH P/N 16579

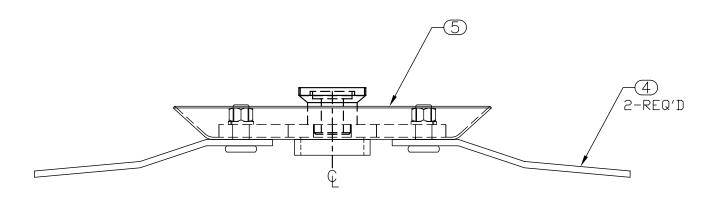


| Key # | Part No. | <b>Description</b> | Key# | Part No. | <b>Description</b> |
|-------|----------|--------------------|------|----------|--------------------|
| 1     | N/A      | Housing            | 8    | 16480    | Set Screw          |
| 2     | N/A      | Shaft              | 9    | 16491    | Lip Seal-Output    |
| 3     | 15952    | Cup                | 10   | 16488    | Seal Protector     |
| 4     | 15953    | Bearing            | 11   | 16580    | Blade Hub          |
| 5     | 16492    | Washer w/tang      | 12   | 15481    | Nut, Hex Slotted   |
| 6     | 15965    | Lockwasher         | 13   | 15968    | Cotter Pin         |
| 7     | 15966    | Locknut            | 14   | 15784    | Plug, Pipe         |

| ITEM<br>NO. | PART<br>NUMBER | QTY<br>REQD. | NOMENCLATURE OR<br>DESCRIPTION |
|-------------|----------------|--------------|--------------------------------|
| 1           | 10311          | 2            | BLADE BOLT NUT GR.8            |
| 2           | 10312          | 2            | BLADE BOLT LOCKWASHER GR.8     |
| 3           | 10313          | 2            | BLADE BOLT GR.8                |
| 4           | 10427          | 2            | NON-DIRECTIONAL BLADE          |
| 5           | 22804          | 1            | BLADE HOLDER WELDMENT          |

|     | DWG. NO. 22803  |        | REV.   | IR   |
|-----|-----------------|--------|--------|------|
| REV | CHANGE          | BY     | DATE   | ECN  |
| IR  | INITIAL RELEASE | C.K.N. | 9/2/10 | 1372 |





All Dimensions in Inches Unless Otherwise Specified

Dimensions in [ ] are in Millimeters

Tolerances Unless Otherwise Specified

Fractional Dimensions ±1/16" Angular Dimensions ±1\*

Decimal Dim. to Limits Shown All holes to be -1/32

DRAWN
BY
C.K.N. 9/2/10
CHECKED
BY

MATERIAL
R.M.N.

MANUFACTURED BY: HARDEE BY EVH MFG. HARDEE BY EVH MFG. CO. LORIS S.C.

APPLICATION OLD PART #

DESCRIPTION BLADE HOLDER W/BLADES COMPLETE W/ANTI WRAP HUB

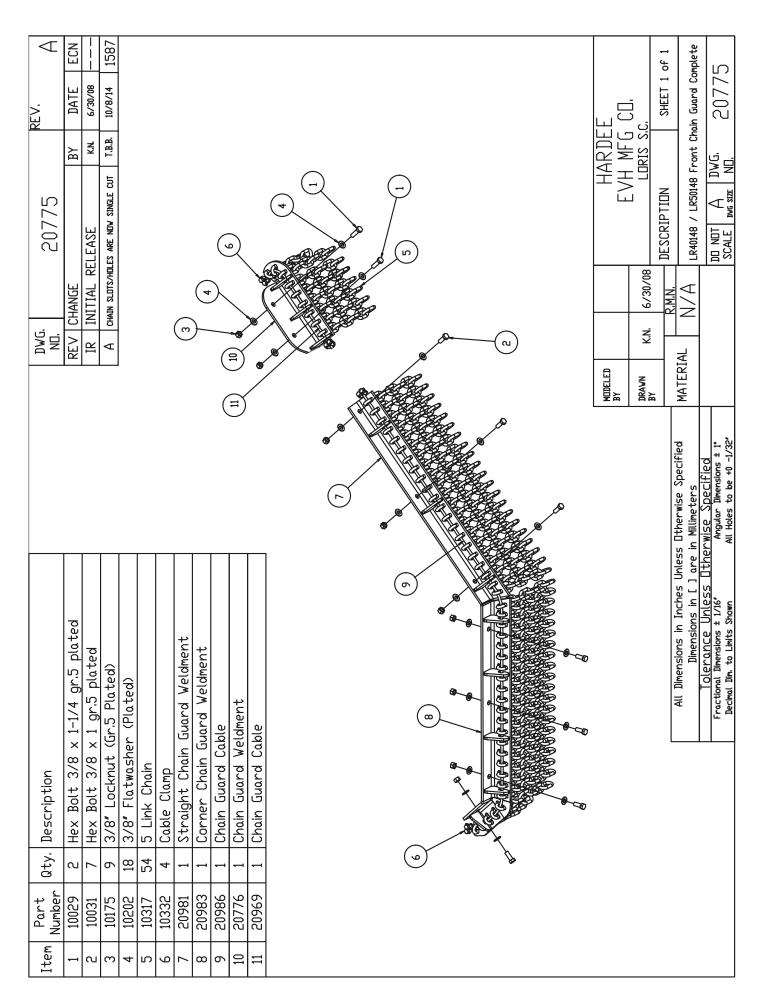
DO NOT A DWG. N

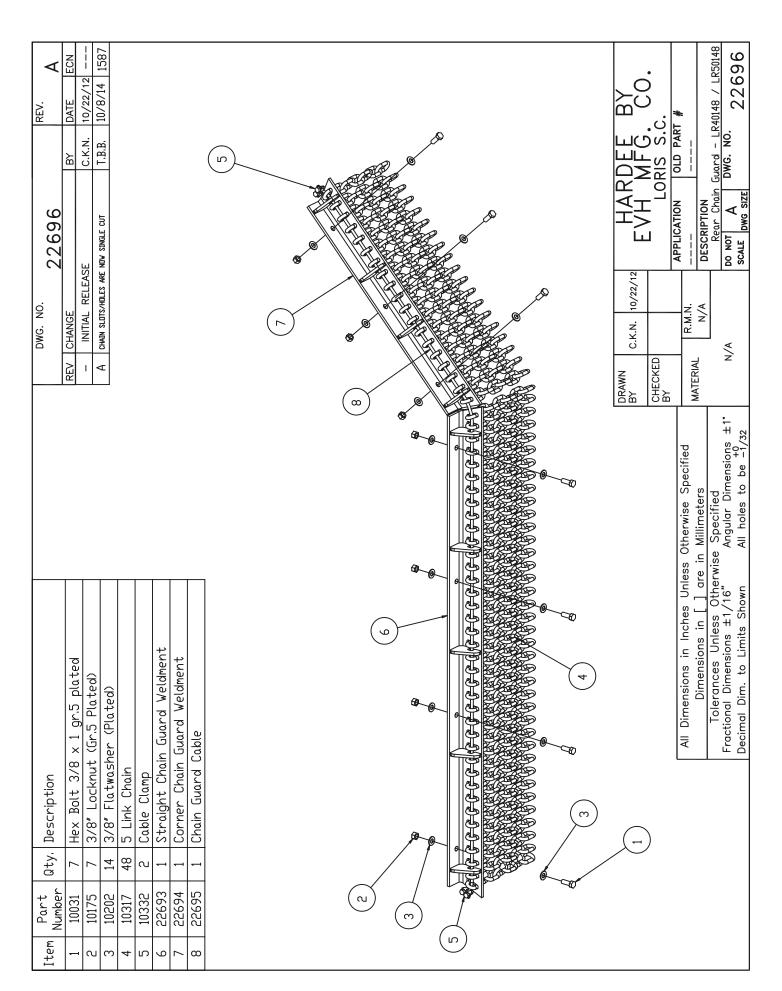
DWG. NÓ. 22803

40

| DWG. ND. REV. IR INITIAL RELEASE  BC   | HARDEE   BC   8/22/07   EVH MFG CD.   LORIS S.C.   BY MATERIAL   N/A   LR40148 / LR50148 Rear Belting Kit   BC   N/A   LR40148 / LR50148 Rear Belting Kit   EVH MFG CD, LLC   SCALE   DWG.   22799   BC   RAGING STARE   ND.   RAGING STARE |
|--|---|
| Part Number Number 10032         Gty.         Description           10032         6 Hex Bolt 3/8 x 1-1/2 gr.5 plated           10175         6 3/8" Locknut (Gr.5 Plated)           10202         12 3/8" Flatwasher (Plated)           22692         1 Belting for LR40148 Extension           22778         1 Short Rubber Belting Flat           22779         1 Belting Extension Flat | All Dimensions in Inches Unless Therwise Specified  Dimensions in [ ] are in Milineters  Tolerance Unless Therwise Specified Fractional Dimensions ± 1716* Angular Dimensions ± 1* Decimal Dim. to Limits Shown All Holes to be +0 -1732*   |

| 1   1002   7   Hex Bolt 3/8 x   1-1/2 gr/5 plated   1   3/8 | 22770 REV. A BY DATE ECN EASE RIM 9/3/04 IANGES BC 1/4/07 1110  | 2 2 2 | HARDEE EVH MFG CO, LORIS S.C.  DESCRIPTION  DRAG148 / LR50148 Belting Extension Kit  SOALE  SOALE  DWG.  C2770 |
|---|---|-------|--|
| Number 1019. Bescription  101032 7 Hex Bolt 3/8 x 1-1/2 gr.5 plated  1010502 14 3/8 Flatwasher (Plated)  22731 1 Short Rubber Belting Extension  22775 1 Belting Extension Flat  22776 1 Belting Extension Flat  (4)  (4)  (4)  (4)  (4)  (4)  (5)  (6)  (6)  (7)  (7)  (8)  (8)  (9)  (9)  (9)  (9)  (1)  (1)  (1)  (1   | 1. <del></del>  |       | J.D.C. 9/1/04  B.C. 1/4/07 R.M.N. IAL N/A Ifactured by: MFG CD, LLC  |
|   | <ul> <li>Qty. Description</li> <li>7 Hex Bolt 3/8 x 1-1/2 gr.5</li> <li>7 3/8" Locknut (Gr.5 Plated)</li> <li>14 3/8" Flatwasher (Plated)</li> <li>1 Short Rubber Belting Flat</li> <li>1 Belting for LR40160 Extens</li> <li>1 Belting Extension Flat</li> </ul> |       | Inches Unless ons in [ ] are ir Unlessther * 1/16*   |





#### **Logo Decals**

If the original decals applied to your mower at the factory become worn or damaged, you can order replacements by referencing the examples below.

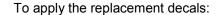
You can order new decals from any local Hardee dealer.



**OIL TANK** 



**WEIGHT BOX** 



- Clean the surface to place the new decal.
- Peel the decal away from the paper backing.
- Press firmly onto the clean surface.
- Squeeze out any air pockets using a straight edge.



11010 - Logo Decal, 4" x 13 1/2"



16339 - Model Number Decal

WWW.HARDEEBYEVH.COM

11850 - Web Site Decal

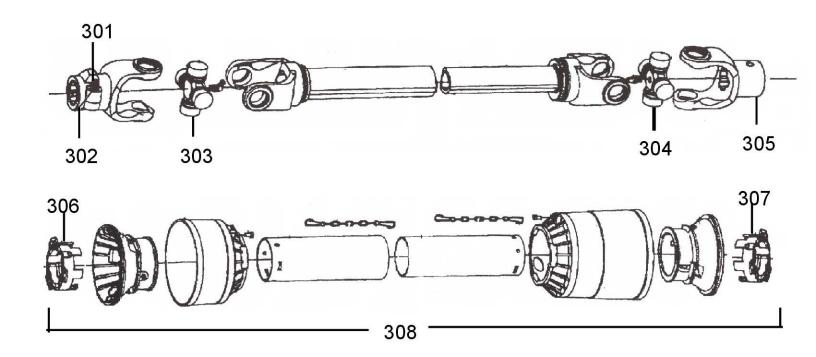


**Hose Guard / 1st Stage Boom** 



11032 – logo Decal, 2 1/4 " x 8 1/8"

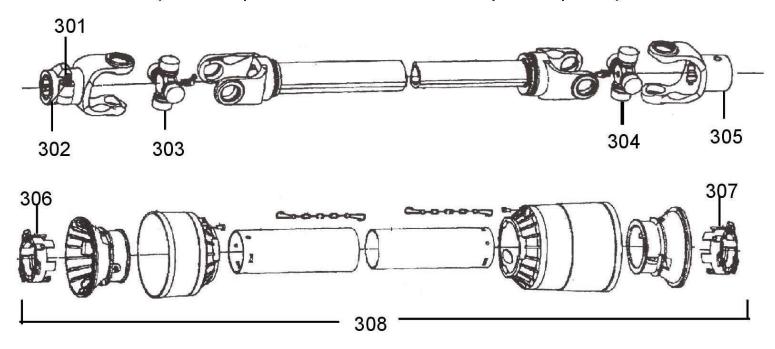
# 10601 Driveshaft



| Key # | Part No. | Description       | Key# | Part No. | Description         |
|-------|----------|-------------------|------|----------|---------------------|
| 301   | 15579    | Push pin complete | 305  | 11443    | Yoke, Imp end       |
| 302   | 11441    | Yoke, Tractor end | 306  | 15804    | Shield bearing      |
| 303   | 11200    | Cross kit         | 307  | 15805    | Shield bearing      |
| 304   | 11200    | Cross kit         | 308  | 11448    | Shield kit complete |

## 11716 Driveshaft

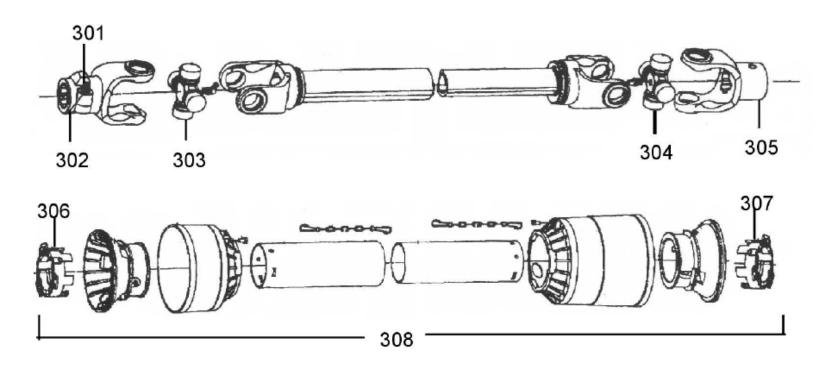
(1 3/4 20spline tractor end & 1 3/8 21spline Imp. end)



| Key# | Part No. | Description                      | Key # | Part No. | Description                           |
|------|----------|----------------------------------|-------|----------|---------------------------------------|
| 301  | 16857    | Push pin complete                | 305   | 15807    | 1 3/8 21 spline yoke w/swell pin cat5 |
| 302  | 11855    | 1 3/4 20 spline yoke tractor end | 306   | 15809    | Shield bearing                        |
| 303  | 15629    | Cross kit                        | 307   | 15810    | Shield bearing                        |
| 304  | 15629    | Cross kit                        | 308   | 15811    | Shield kit complete                   |

# 11717 Driveshaft

(1 3/8 - 21 Spline Yoke Both Ends)



| Key# | Part # | Description                      | Key # | Part # | Description                      |
|------|--------|----------------------------------|-------|--------|----------------------------------|
| 301  | 15579  | Push Pin complete                | 305   | 16708  | 1 3/8 21 yoke w/ swell pin cat 4 |
| 302  | 15900  | 1 3/8 21 spline yoke tractor end |       | 16765  | Swell Pin Kit For 16708          |
| 303  | 11437  | Cross Kit                        | 306   | 15804  | Shield bearing                   |
| 304  | 11437  | Cross Kit                        | 307   | 15805  | Shield Bearing                   |
|      |        |                                  | 308   | 11448  | Shield kit complete              |

### **Bolt Torque**

#### **Checking Bolt Torque**

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torque specified in the chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt. Torque figures indicated are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

NOTE: Bolt Torques shown are maximum allowable values for ultimate safe working strength or external load-carrying capacity. The bolt torque are not applicable in cases where bolts are used as a pin-like device, holding together two or more movable objects and keeping them from spreading apart. – "Clamping Torque" Being dependent upon the application of the bolt. -

Torque value for bolts and cap screws are identified by their head markings.
See Page 50

#### **Torque Specifications for Coarse Threads**

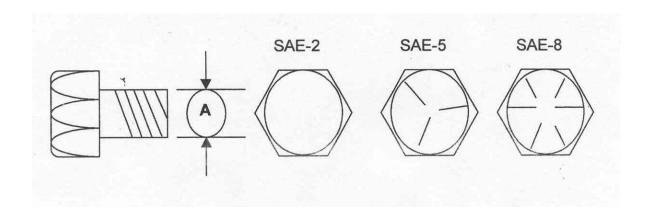
|            | Bolt Tor | que  | Coarse Thread |    |    |       |      |
|------------|----------|------|---------------|----|----|-------|------|
| Diameter   | SAE-2    |      | SAE-5         |    |    | SAE-8 |      |
| "A"        | LB-FT    | N.m  | LB-FT         | N. | .m | LB-FT | N.m  |
| 1/4" - 20  | 6        | 8    | 9             | 1  | 2  | 12    | 17   |
| 5/16" - 18 | 10       | 13   | 19            | 2  | :5 | 27    | 36   |
| 3/8" - 16  | 20       | 27   | 33            | 4  | .5 | 45    | 63   |
| 7/16" - 14 | 30       | 41   | 53            | 7  | 2  | 75    | 100  |
| 1/2" - 13  | 45       | 61   | 80            | 1  | 10 | 115   | 155  |
| 9/16" - 12 | 70       | 95   | 115           | 1  | 55 | 165   | 220  |
| 5/8" - 11  | 95       | 128  | 160           | 2  | 15 | 220   | 305  |
| 3/4" - 10  | 165      | 225  | 290           | 39 | 90 | 400   | 540  |
| 7/8" - 9   | 170      | 230  | 420           | 5  | 70 | 650   | 880  |
| 1" - 8     | 225      | 345  | 630           | 8  | 50 | 970   | 1320 |
| 1 1/8" - 7 | 354      | 478  | 794           | 10 | 72 | 1287  | 1737 |
| 1 1/4" - 7 | 500      | 675  | 1120          | 15 | 12 | 1875  | 2531 |
| 1 3/8" - 6 | 655      | 884  | 1470          | 19 | 85 | 2382  | 3216 |
| 1 1/2" - 6 | 870      | 1175 | 1950          | 26 | 32 | 3161  | 4267 |

#### See page 50 for Torque Specifications for Fine Threads and Head Markings

### **Torque Specifications for Fine Threads**

|             | Bolt Tor | que   | Fine Thread |      |     |       |      |  |
|-------------|----------|-------|-------------|------|-----|-------|------|--|
| Diameter    | SAE-2    | SAE-2 |             | AE-5 |     | SAE-8 |      |  |
| "A"         | LB-FT    | N.m   | LB-FT       | N    | .m  | LB-FT | N.m  |  |
| 1/4" - 28   | 6        | 8     | 10          | 1    | 4   | 14    | 19   |  |
| 5/16" - 24  | 12       | 16    | 19          | 2    | 26  | 27    | 36   |  |
| 3/8" - 24   | 22       | 31    | 35          | 4    | 17  | 49    | 66   |  |
| 7/16" - 20  | 36       | 49    | 55          | 7    | '4  | 78    | 105  |  |
| 1/2" - 20   | 55       | 74    | 85          | 1    | 15  | 120   | 162  |  |
| 9/16" - 18  | 80       | 108   | 122         | 1    | 65  | 172   | 232  |  |
| 5/8" - 18   | 110      | 148   | 170         | 2    | 30  | 240   | 324  |  |
| 3/4" - 16   | 200      | 270   | 297         | 4    | 00  | 420   | 567  |  |
| 7/8" -14    | 180      | 243   | 474         | 6    | 40  | 668   | 402  |  |
| 1" - 12     | 274      | 370   | 705         | 9    | 52  | 995   | 1343 |  |
| 1" -14      | 280      | 378   | 721         | 9    | 73  | 1019  | 1376 |  |
| 1 1/8" - 12 | 397      | 536   | 890         | 12   | 201 | 1444  | 1950 |  |
| 1 1/4" - 12 | 553      | 747   | 1241        | 16   | 375 | 2012  | 2716 |  |
| 1 3/8" - 12 | 746      | 1007  | 1672        | 22   | 257 | 2712  | 3661 |  |
| 1 1/2" - 12 | 979      | 1322  | 2194        | 29   | 962 | 3557  | 4802 |  |

### **Head Markings**



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Revised 8/26/15

Warranty Hardee by EVH

#### Hardee by EVH Manufacturing Co., LLC Hydraulic Mower Limited Warranty

Hardee by EVH Manufacturing Co., LLC warrants its **Hydraulic Mowers** for one year or **350 hours** (whichever comes first) to the **original** non-commercial, non-governmental, or non-municipal purchaser. For the **original** commercial, industrial, or municipal purchaser, the goods are warranted for 90 days or **350 hours** (whichever comes first) to be free from defects in material or workmanship.

This limited warranty does not apply to any part of the goods which have been subjected to improper or abnormal use, negligence, alteration, modification, accident, or damage due to lack of maintenance, wrong oil or lubricants, or which has served its normal life.

Hardee by EVH Manufacturing Co., LLC **Hydraulic Mowers** include the following units: Miti Mike-35, Tiger SS, DB4048, DB4060, EV1442, MR1442, LR40142, LR40148, LR50148, LR50160, HR2360, and CM2160 Mowers.

The Warranty Card **must** be filled out and returned within **30 days** of purchase. **No** warranty will be allowed without a properly completed and returned warranty card.

"Our obligation under this warranty shall be limited to repair or replacement of any part or parts of this implement, which, in our judgement, shows evidence of such defect, and provided further, that said parts shall be removed and returned by the owner at the owner's expense to Hardee by EVH Manufacturing Co., LLC, Loris, SC, through an authorized dealer, transportation prepaid, free and clear of liens or encumbrances."

#### This warranty shall not include normal wear items.

Changes or alterations to the implement made without the **written** authorization of the manufacturer will render this warranty void. **Tampering with or removing the factory installed hour meter will void this warranty.** 

This warranty does not obligate this company to bear any labor costs in replacement of defective parts.

Hardee by EVH Manufacturing Co., LLC reserves the right to make changes or improvements in its equipment at any time, with the express understanding that such changes or improvements do not impose any obligation of the company to install such changes or improvements on implements previously manufactured.

Hardee by EVH Manufacturing Co., LLC Hydraulic Mowers are designed as **Agricultural** machines. They are designed to be used intermittently in **farm** use, **not** constantly as in "Commercial" use. Our machines are designed with brains instead of brawn, to fit the maximum number of tractors. They are not designed nor priced as Commercial machines that operate 8 hours a day / 5 days a week.

The CM2160 is the exception to the above statement, having been designed as a Commercial machine.

<u>IMPLIED WARRANTIES:</u> You may have some implied warranties. For example, you may have an implied warranty of merchantability (that the hydraulic mower is reasonably fit for the general purpose for which it was sold) or an implied warranty of fitness for a particular purpose (that the hydraulic mower is suitable for your special purposes). Special purposes must be specifically disclosed to Hardee by EVH Manufacturing Co., LLC, and not merely to the dealer before your purchase. Hardee by EVH Manufacturing Co., LLC itself must approve, in writing, that the special purpose is warrantable.

These implied warranties do not apply at all if you use your hydraulic mower for business or commercial use.

### **NOTES**





EVH MANUFACTURING COMPANY, LLC 4895 RED BLUFF ROAD LORIS, SC 29569 PHONE: 843-756-2555 OR 1-888-990-2555 WWW.HARDEEBYEVH.COM INFO@HARDEEBYEVH.COM