ROUGHRIDER

Model RR-1210

OPERATIONS MANUAL

March 2019

TRUAX COMPANY
4300 Quebec Avenue North
New Hope, MN 55428
Phone: 763/537-6639
E-mail: truax3@qwestoffice.net

TRUAX COMPANY, INC.

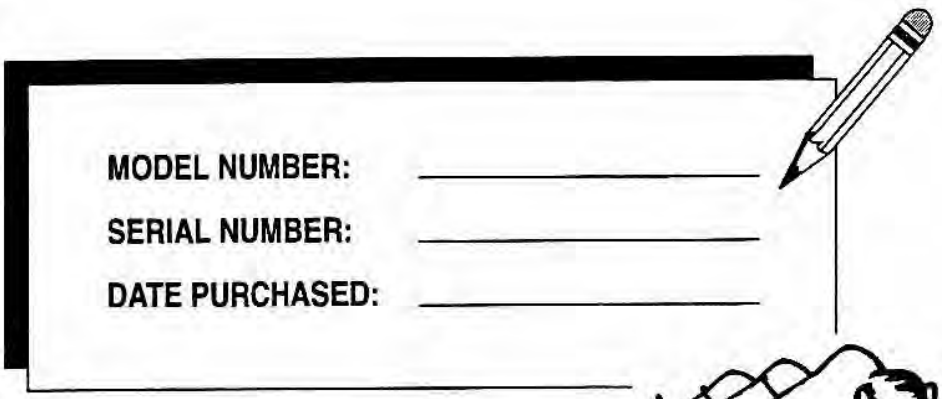
New Hope, Minnesota 55428 (763) 537-6639

PLEASE NOTE:

Information, figures, specifications, and parts in this operator's manual are based on the latest available at the time of publication. The right is reserved to make updates at any time without notice.

The model and serial numbers of your new *RoughRider* drill are stamped on a serial plate that is mounted on your machine beside the derailleur speed changer for the fluffy seed box. The serial plate can be viewed by opening the speed changer cover.

For your future reference and protection, we suggest that these numbers be recorded in the space provided below:



truax COMPANY, INC.

New Hope, MN 55428
Tel: (763) 537-6639
Fax: (763) 537-8353
E-mail: truax@pclink.com

PATENT NOTE

Truax equipment is covered by the following U.S. patents: #7,387,077 B1, #5,074,227 A, #5,297,236 A, #5,359,948 A, #6,688,242 B2, and 6,752,094 B1. Other U.S. and foreign patents are pending.

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WARRANTY

FARM EQUIPMENT LIMITED WARRANTY

TRUAX COMPANY, INC. ("Manufacturer") warrants to the original purchaser that the Farm Equipment will be free from defects in material and workmanship under normal use and condition for a period of one (1) year after the date of delivery. This warranty is limited to replacement or repairs, at the Manufacturer's facilities in New Hope, Minnesota, USA, of such parts as shall under normal use and service appear to have been defective in material or workmanship. This warranty is null and void if parts other than the Manufacturer's parts are used. This warranty does not extend to Farm Equipment and parts that have been subject to misuse, accident, tampering, alteration or installation in a manner not approved by the Manufacturer in writing. **This warranty is exclusive, and the manufacturer makes no other warranty, express or implied, including but not limited to any warranty of merchantability or fitness for a particular purpose.**

Parts claimed to be defective shall be returned to the Manufacturer at New Hope, Minnesota, transportation prepaid. If upon inspection by the Manufacturer, the part(s) are determined to have been defective, the Manufacturer will replace or repair such defective part(s) without charge except for transportation. Prior to returning any Farm Equipment or part(s) alleged to be defective, the purchaser shall notify the Manufacturer in writing of the claimed defect. **This is the exclusive remedy for any breach of warranty.** The sole purpose of this remedy shall be to provide the purchaser with the replacement or repair of defective part(s). This exclusive remedy shall not be deemed to have failed its essential purpose so long as the Manufacturer is willing and able to replace or repair the defective part(s).

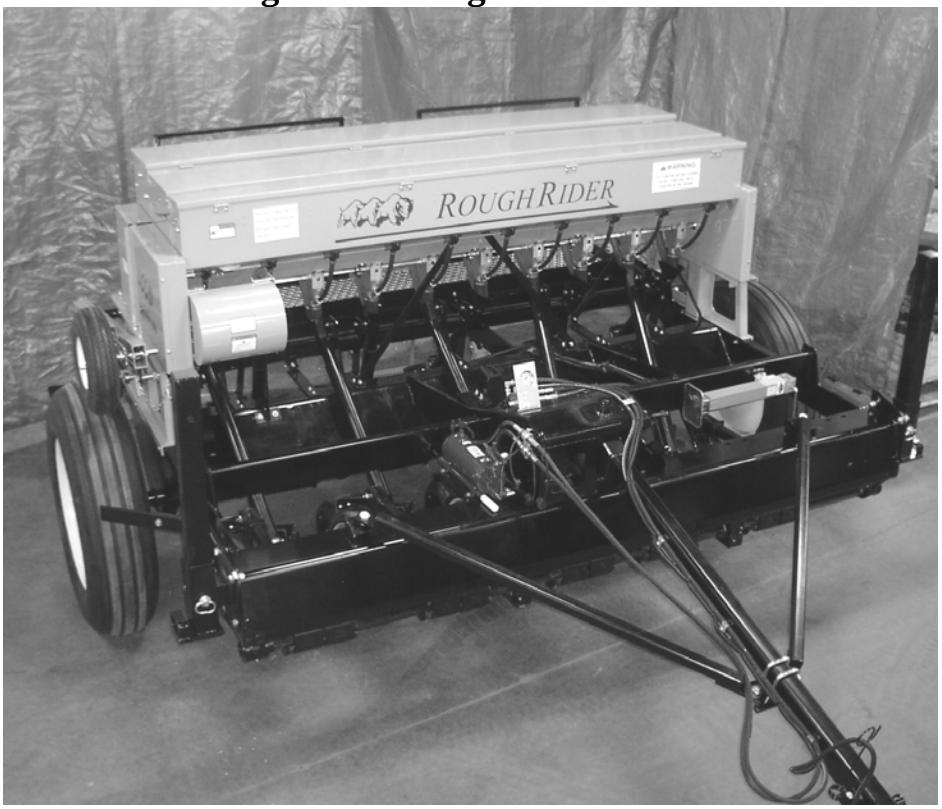
No person, agent, distributor, or dealer is authorized to give any warranty other than the one herein expressed on the Manufacturer's behalf or assume for it any liability pertaining to Farm Equipment. **In no event shall Manufacturer or its dealers be liable for any amount in excess of the price paid by the purchaser for the farm equipment or for any incidental or consequential damages of any kind, whether for breach of any warranty, for breach or repudiation of any other term of condition of sale, for negligence, on the basis of strict liability or otherwise.**

A defect, within the meaning of this warranty, in any part of the Farm Equipment shall not, when such part is capable of being repaired or replaced, operate to condemn the entire Farm Equipment.

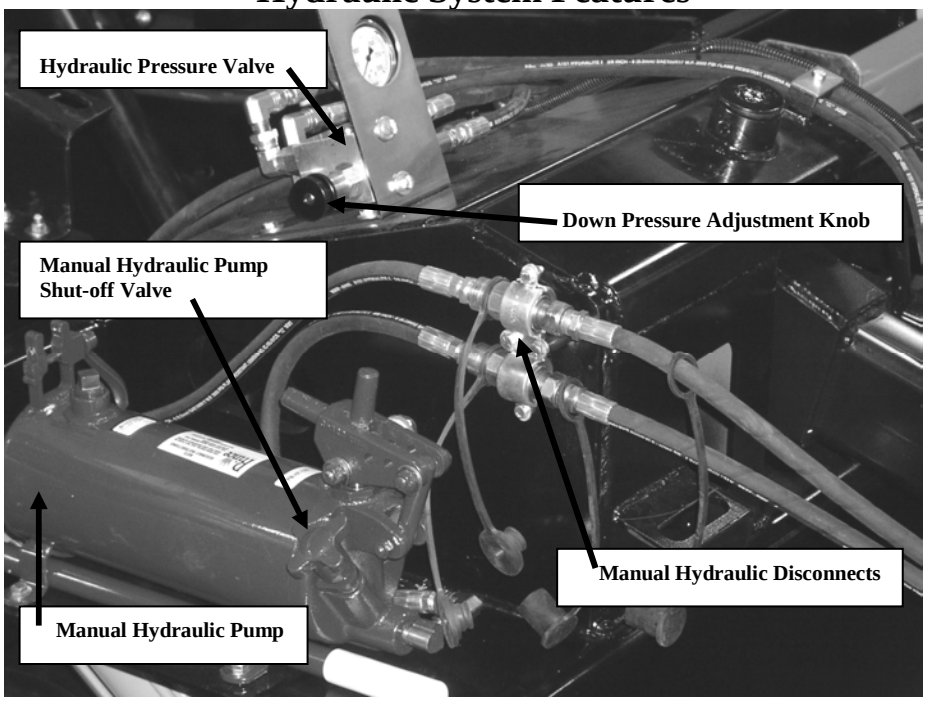
This warranty is expressly in lieu of all warranties, guarantees, allegations, or liabilities expressed or implied, by the Manufacturer, its dealers or its representatives.

truax COMPANY, INC.

RoughRider Rangeland Drill

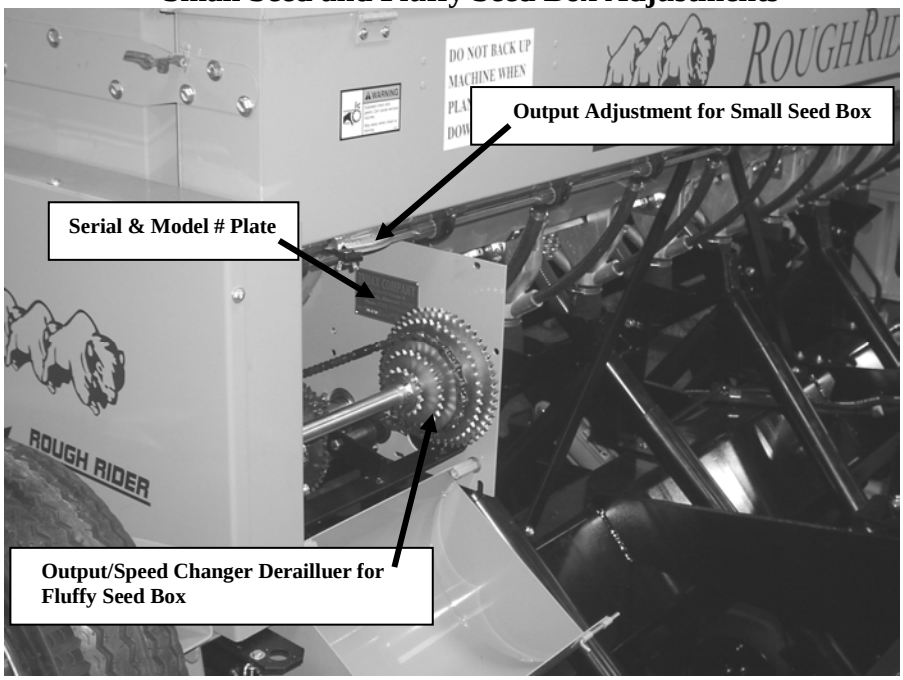


Hydraulic System Features



Seed Box Features

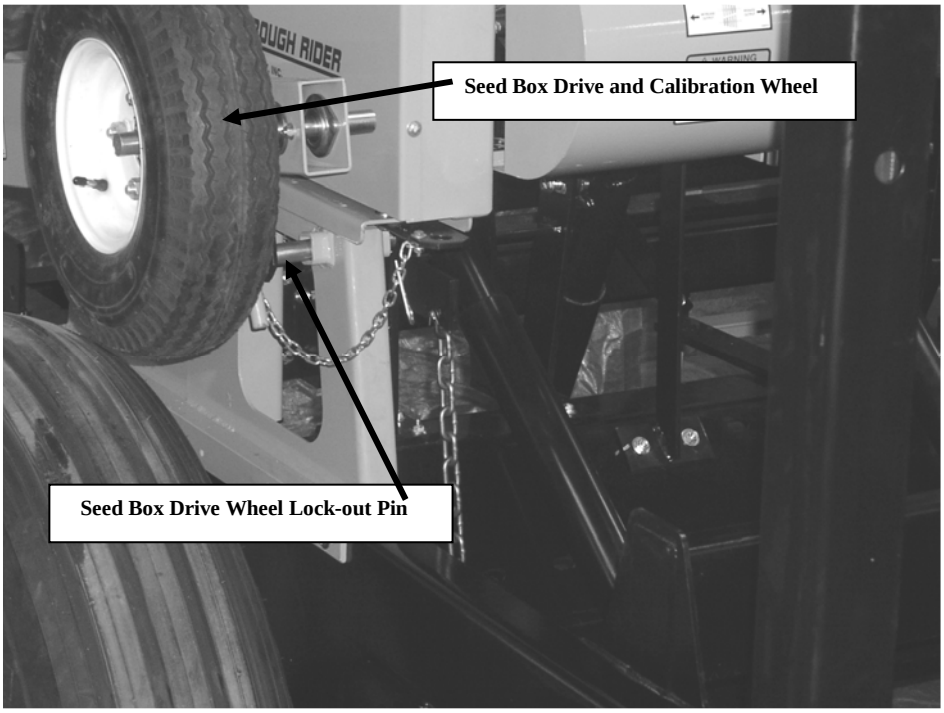
Small Seed and Fluffy Seed Box Adjustments



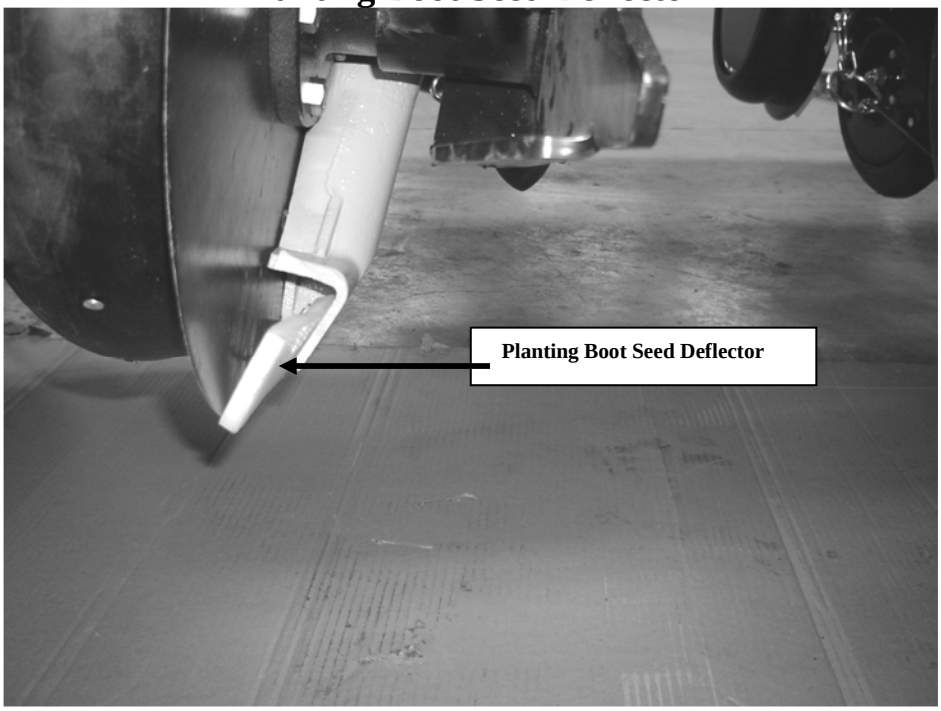
Cool Season/Grain Seed Box Adjustment

RoughRider Rangeland Drill Features

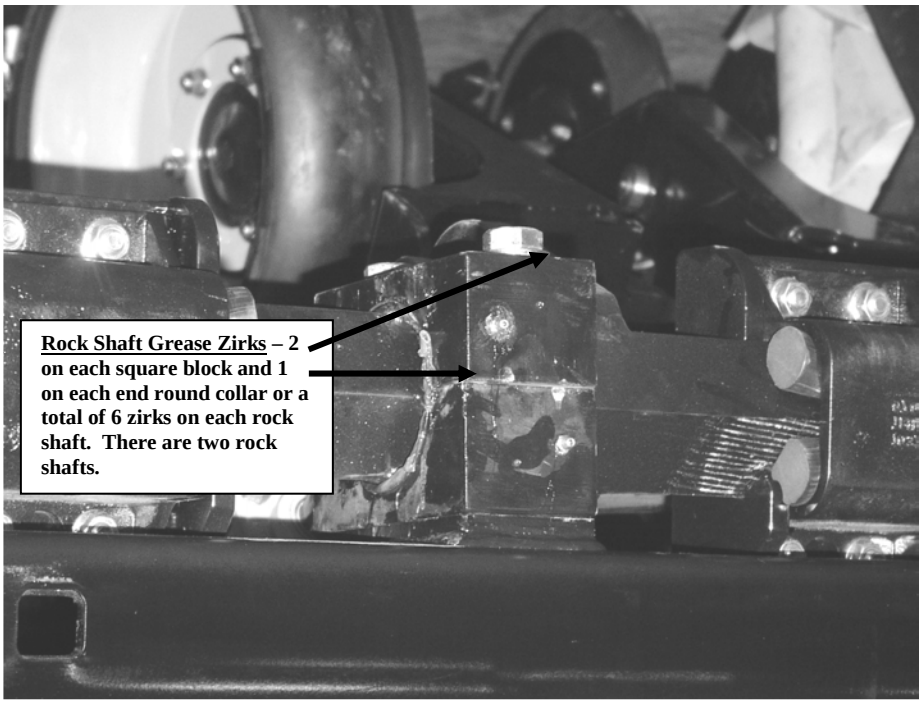
Seed Box Drive Wheel



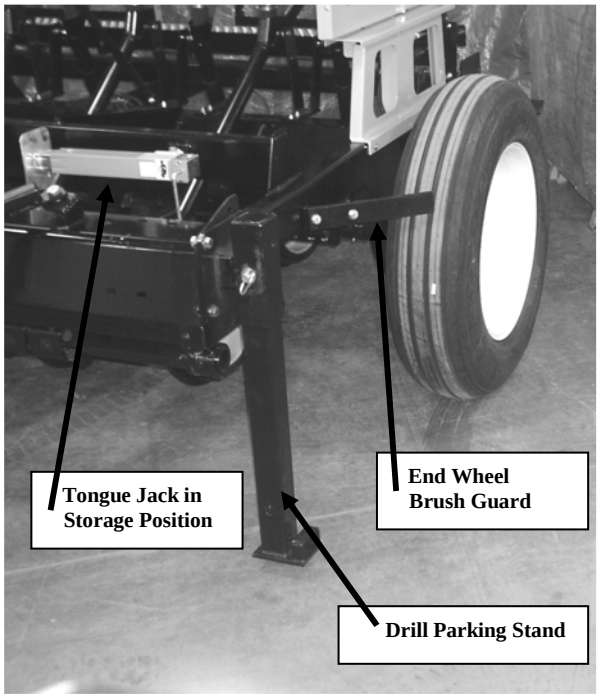
Planting Boot Seed Deflector



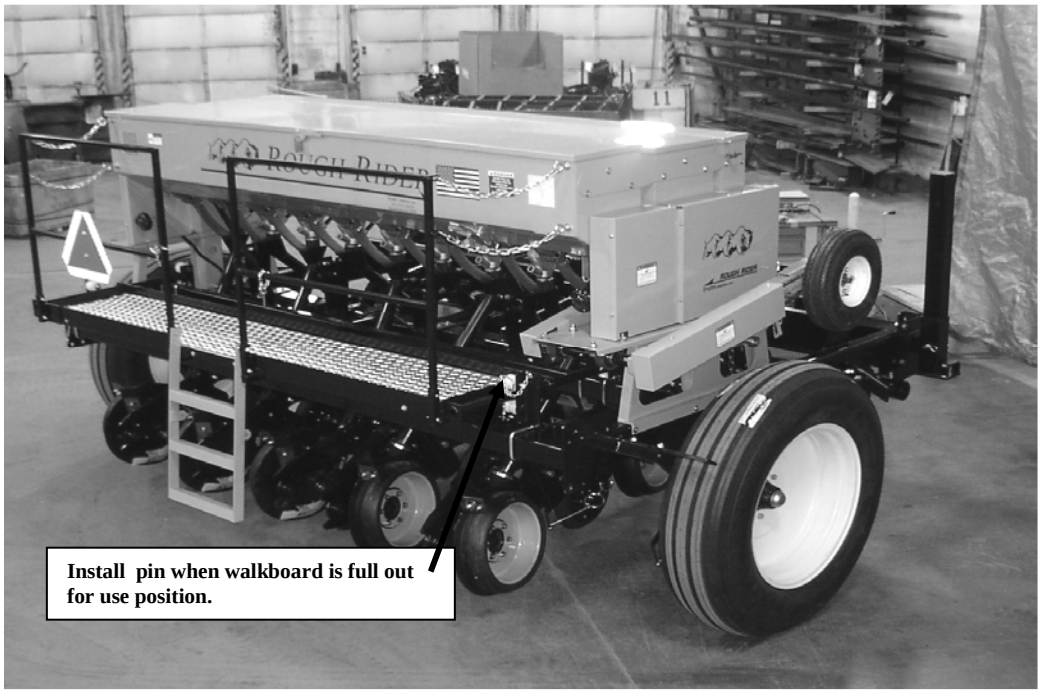
Rock Shaft Grease Points



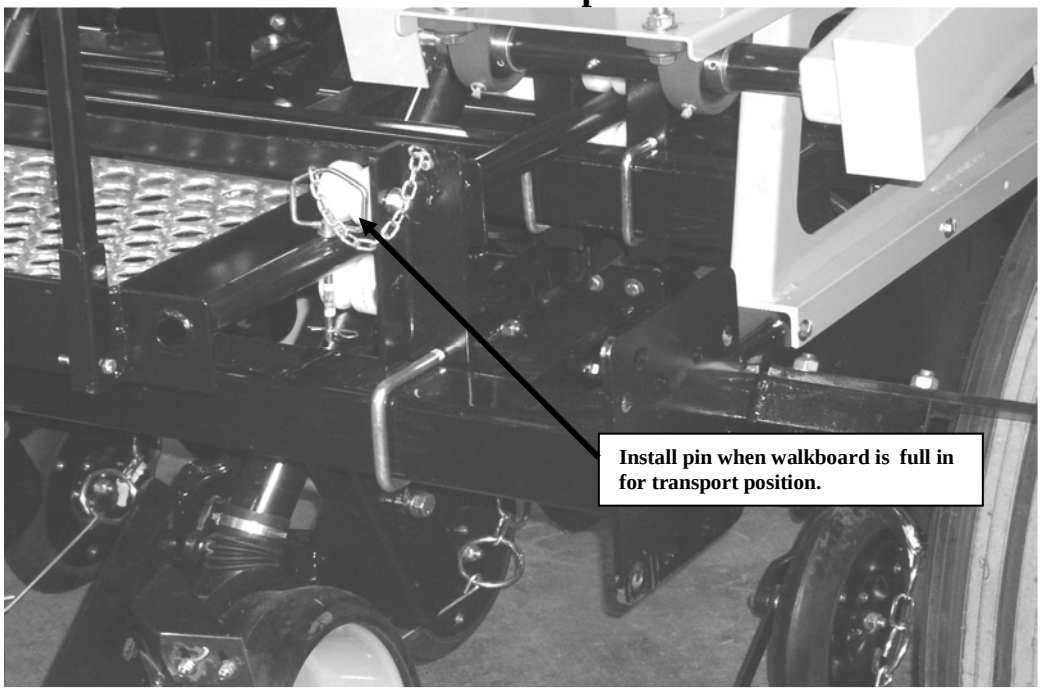
Other Drill Features



Walkboard in Position to Use



Walkboard in Transport Position



RECOGNIZE SAFETY INFORMATION

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, become alert, as your safety is involved.

Follow recommended precautions and safe operating practices.

SAFETY ALERT SYMBOL

UNDERSTAND SIGNAL WORDS

These are typical safety signs that appear with the safety-alert symbol and signal words **(DANGER, WARNING, and CAUTION).** Safety signs are displayed to alert the operator and others of the risk of personal injury during normal operations and servicing.

DANGER identifies the most serious potential hazard. The sign is displayed in the area of the hazard.

WARNING identifies a serious hazard. The sign is displayed in the area of the hazard.

CAUTION is used for a general reminder of good safety practices or to direct attention to unsafe practices.

TYPICAL SAFETY SIGNS

SAFETY FIRST!

Carefully read, understand, and follow all safety instructions in each section prior to setting up, transporting, and operating your drill.

It is important that no one be allowed to operate ***Truax*** equipment until they have been properly trained on the safe operation of this equipment. All operators must clearly understand the importance of replacing **all** guards and safety devices before operating the equipment.

SAFETY DECALS

The maintenance and care given to the safety decals and features will result in a "user friendly" machine. It is important that decals be replaced if they become damaged or lost. It is also important that the decals be cleaned frequently.

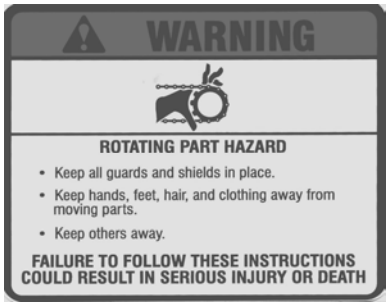
When applying decals to the equipment, be sure to clean the surface to remove any dirt or residue. Firmly adhere the decals to the cleaned surface.

Keep safety decals in good condition. Replace torn, missing, or defective decals. If replacement safety decals are needed, they may be ordered by part number from the following address:

Truax Company, Inc.
4300 Quebec Avenue North
New Hope, Minnesota 55428
(763) 537-6639

These are the safety decals provided for *Truax* drills:

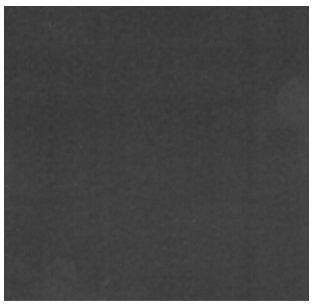
Part #1046C3-A



Part #1046C4-A

Part # 1046C2-A

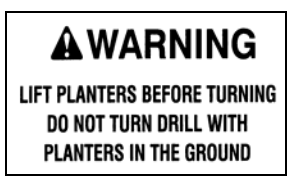
Part #1046C8



Red Reflector 5" x 5"
Part #2008C2

Part #1046C5-A

Part #1046C5-B



Part #1046C81

PLACEMENT OF SAFETY DECALS

The placement of safety decals is shown in the following pictures:

Left Front Corner

Right Rear Corner

Rear of *RoughRider* Drill

SAFETY PRECAUTIONS

For your own safety and to avoid harm to yourself and others, please observe the following safety precautions:

1) **DO NOT** operate this drill without reading this Operator's Manual!

2) **DO NOT** operate this drill with anyone riding on the drill!

3) **DO NOT** operate this drill unless the walk board is locked in the closed position. Secure the walk board ladder with the safety chain during operation and transport.

4) **DO NOT** operate drill when other people are near the drill!

5) **DO NOT** obstruct or paint over safety decals!

6) **DO NOT** operate machinery without guards and safety devices as injury may result!

7) **DO NOT** operate drill with lids open - injury may result!

8) **DO NOT** tow over 20 m.p.h. as tire, wheel, and/or bearing failure may result!

9) **DO NOT** operate without chain guards as injury may result!

10) Use caution when operating close to fences, tree lines, ditches or streams.

11) Reduce operating speed on inclines and rough terrain and shift to a lower gear before going up or down steep slopes.

12) Slow down when turning.

13) **DO NOT** turn sharply! Check the clearance between the tractor tire and the tongue when turning.

14) Install safety chains between the drill and the tractor. Follow the tractor manufacturer's instructions for proper hookup to the tractor.

15) Use extra caution when moving equipment on roadways.

16) Be careful of over-sized equipment on narrow bridges.

17) Lock the four locking points on the tongue and secure the safety pin with the tongue folded in the transport position when moving the drill on a trailer.

18) Raise and secure the rear planting unit press wheels in the transport position when moving the drill on a trailer.

19) When moving on a trailer, over-sized equipment must be permitted, flagged, and have approved lights.

20) **NEVER** work in or near seed boxes while tractor is running!

21) When servicing the drill (when it is attached to the tractor), turn the tractor **"off"** and put it in gear or park.

22) When servicing the drill (when detached from the tractor), block both wheels (front and rear) and secure the tongue.

23) Securely support drill, block wheels (front and rear), and restrain tongue when performing the following work:
- Moving on a trailer.
- Changing a tire.
- Replacing or repacking wheel bearings.
- Changing furrow openers.

24) **AVOID HIGH PRESSURE FLUIDS:**

Hydraulic systems operate under high pressure. Fluid leaking from around connections and pinholes may penetrate the skin, causing infection and serious injury. See a doctor immediately if hydraulic fluid penetrates the skin.

Relieve pressure from hydraulic systems before disconnecting or servicing hydraulic lines. Ensure that all connections are tight and that the hoses are not damaged.

25) **USE EXTREME CAUTION** when working near or handling disc furrow openers! Wear leather gloves! ***SHARP EDGES ON BLADES COULD RESULT IN SERIOUS INJURY!***

HIGHWAY AND TRANSPORT PRECAUTIONS

1) Adopt safe driving practices:
   - Keep the tractor brake pedals latched together at all times. **Never use independent braking with machine in tow, as loss of control and/or upset of unit may result!**
   - Always drive at a safe speed relative to local conditions and ensure that your speed is low enough for an emergency stop to be safe and secure. Keep speed to a minimum.
   - Reduce speed prior to turns to avoid the risk of overturning.
   - Avoid sudden uphill and downhill turns on steep slopes.
   - **DO NOT** coast! Always keep the tractor or towing vehicle in gear to provide engine braking when going downhill.
   - **DO NOT** eat, drink, or use a cell phone while driving!

2) Comply with state and local laws governing highway safety and movement of farm machinery on public roads.

3) Use approved accessory lighting flags, and necessary warning devices to protect operators of other vehicles on the highway during day and night transporting. Various safety lights and devices are available from your dealer.

4) The use of flashing amber lights is acceptable in most localities. However, some areas may prohibit their use. Local laws should be checked for all highway lighting and marking requirements.

5) When driving the tractor and equipment on the road or highway under 20 m.p.h. at night or during the day, use flashing amber warning lights and a slow moving vehicle **(SMV)** identification emblem.

6) Always tow with a vehicle that is heavier than the drill.

7) Implement tires are designed for field use and will not stand up under sustained highway travel.

8) Place parking jack from tongue in storage position.

9) Always raise the drill openers to the highest position before transporting the drill.

10) Plan your route to avoid heavy traffic.

11) Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.

12) Be observant of bridge loading ratings. **DO NOT** cross bridges rated lower than the gross weight at which you are operating. Know the weight of your tractor and drill.

13) Watch for overhead and side obstructions while transporting.

14) Always operate equipment in a position to provide maximum visibility at all times. Make allowances for increased length and weight of the equipment when making turns, stopping the unit, etc.

TRANSPORTING THE DRILL

1) Raise the drill to the highest position.

2) Be sure that the "slow moving vehicle" **(SMV)** emblem is clean and visible.

3) Attach safety chains between the drill and the tractor.

4) When roading a drill it is essential to raise the floating drive wheel that drives the seed boxes from the drill end wheel and to lock it in place with the lock-out device.

5) When starting out in the transport mode, insure that the floating seed box drive wheel has disengaged the drive and the shafts are not turning.

6) Make sure that the drill reflectors are clean and in place.

7) **NEVER** transport the drill faster than **20 M.P.H.** unless the drill is on a trailer.

8) **DO NOT** transport or haul the drill with seed in boxes, as this will cause settling and packing, which is hard on drive chains when planting is resumed.

9) **DO NOT** leave seed sacks (empty or partially full) in seed boxes as they may become entangled in the agitators during transport.

10) Be extremely cautious when crossing narrow bridges.

11) When towing the drill on roadways, it is important to watch ground clearance (especially on a crowned road or one that has low shoulders). A towed drill should be secured to the tractor with a safety chain.

12) Transport on a trailer requires chaining or strapping the drill's main frame **(not the seed boxes)** to the trailer. Lower the hydraulics so the planters are on the trailer deck. Lower the transport jacks to stabilize the drill. Fasten red flags to oversized units. Follow all state and local regulations when transporting a drill.

13) Secure box lids with an additional rope or rubber tie downs **(not the seed box cover lid retainers)** when moving the drill on the highway. The seed box cover lid retainers may break due to excessive bounce if hooked during transport.

14) Before towing a drill or loading it onto a truck or trailer, the walk board assembly must be parked and secured. In addition, the folding steps for the walk board must be folded up for transport and secured.

OPERATING THE DRILL

RESULTS

Planting results and the life of planting equipment can be improved by following several basic steps. Check over the equipment to be sure that it is attached to the power unit so it will operate properly.

Think and work safely!

1) **THE DRILL SHOULD BE NEARLY LEVEL WHEN IN THE PLANTING POSTION.** The flat bottom of the planter boot should operate parallel to the ground surface. Level the drill by adjusting the tongue clevis.

2) **DO NOT BACK UP THE ROUGHRIDER AFTER THE PLANTERS HAVE BEEN LOWERED TO THE PLANTING POSITION.** Plugging will occur if the drill is backed up after the planters have been lowered. Dirt will be forced into the boot and between the boot and blade.

3) **DO NOT TURN THE ROUGHRIDER WHEN THE PLANTING DISCS ARE IN THE PLANTING POSITION.** Do not make sharp turns when the planters are down and planting. Hydraulics allow the operator to lift the planters for turns and quickly return planters to their working position. Large sweeping turns greater than a 250 foot radius circle can be made with the planters in the planting position.

SEED PLACEMENT

PLANTING UNITS

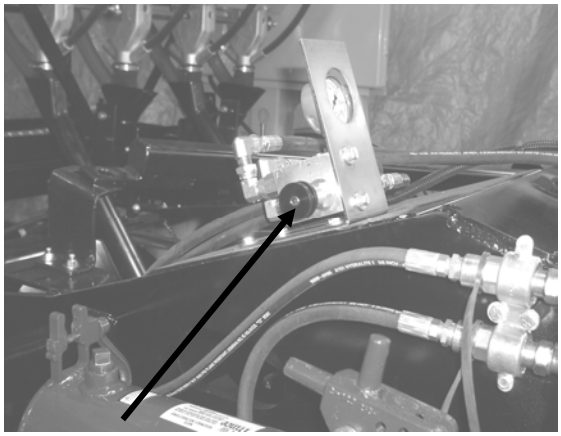
RoughRider planting units are arranged with five planting units in each of two ranks that have a front to back separation of 48-inches. Individual planting units on each rank are spaced twenty-four inches apart for maximum surface trash clearance. The configuration of the ten planters results in a twelve-inch row spacing. The planting units have 24-inches of vertical travel between the low and high points. There is ten inches of ground clearance in the transport position.

Planting units are mounted to the rockshaft utilizing a parallelogram design to facilitate movement. The parallelogram design allows movement in a vertical plane rather than in an arc as on a typical grain drill.

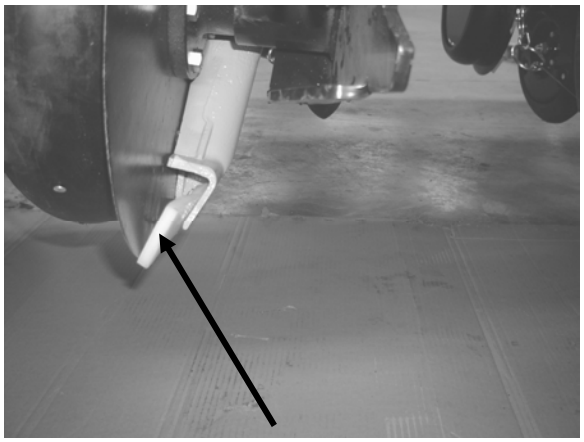
The amount of hydraulic pressure delivered to the planting units is of critical importance. The adjustment of the hydraulic control **(See Figure 20-1)** changes the amount of down pressure applied to the planters. This control delivers from 0 to 8,000 pounds of total force to the 10 planters or allows the weight to be carried by the drill's end wheels. This is an automatic transfer between rockshafts so there is uniform application of weight to the individual planters. The operator adjusts hydraulic pressure to the planting unit rockshafts, which in turn controls their independent movement. When the front planting units travel over a high spot in the field, greater pressure is transferred to the rear rockshaft planting units.

The operator decides how much force is needed on the planters and dials in the appropriate hydraulic pressure to achieve the desired action. This allows the operator to impact the soil with only enough force to precisely place the seed with minimum disturbance of surrounding areas.

Observe the site and field conditions and make adjustments as needed. Adjust hydraulic down pressure so that the planting discs cut the soil enough to allow seed to be deposited without excessive soil disturbance in the seed furrow. Start by adjusting the hydraulic valve to 300 psi. Make a trial run to check the amount of disturbance. Adjust hydraulic pressure up or down from this point to achieve desired results. Check to be sure the seed boot, seed deflectors, press wheels, and drag chains are adjusted to cover the seed without burying it to deep.



Hydraulic Control Valve and Control Knob
Figure 20-1



Seed Deflector in Seed Boot
Figure 20-2

DISC OPENERS and OPENER PENETRATION

The disc openers create a slot in the soil surface for seed placement. The 20-inch diameter planting discs are mounted on 6-bolt hubs with tapered roller bearings. Hydraulics transfer machine weight to the planting units. Ground penetration is achieved with planting discs mounted at an angle to vertical and with a slight degree of toe. A white poly seed deflector is attached to the bottom of each seed boot to maintain the seed furrow shape until the seed is fully deposited in the bottom of the seed slot. **See Figure 20-2.**

SIDE MOUNTED DEPTH GAUGE WHEELS

This standard feature helps control seeding depth for precise seed placement. The semi-pneumatic tire on the gauge wheel flexes during use to resist mud buildup, heavy liter, or loose soil. All *RoughRiders* manufactured after fall 2005 utilize a rigidly attached gauge wheel that does not allow change in the amount of blade penetration. Beginning in fall 2007 gauge wheel tires are foam filled to reduce tire flex and the chance that mud on the tire surface will work between the disc blade and gauge wheel tire. When the planting plan requires the creation of furrows or when planting into heavy, dense sod the gauge wheels can be removed for additional penetration.

DRAG CHAINS

Improved soil covering is achieved with the addition of drag chains behind each planter. **See photo of drag chain attached to a planter unit on Page 30-9.**

PRESS WHEELS

This feature adds a semi-pneumatic rubber press wheel that tracks behind the disc opener to firm the soil over and around the planted seed. The 3-inch by 15-inch tire with "V" style tread is mounted to each planting unit assembly. The wheel is mounted on double row ball bearings.

SEED CALIBRATION AND METERING

SEED CALIBRATION PROCEDURE:

1) Truax drills have been designed to operate using all three boxes (fluffy, small seed, and cool season/grain) simultaneously or in any combination desired.

2) When using the drill, it is important to remember that when the floating drive wheel that drives the seed boxes is engaged, the mechanisms in all seed boxes operate and deliver seed through the seed hoses.

3) To avoid errors during calibration, **calibrate each seed box individually**. Changing the calibration of one box does not affect the other boxes.

4) Calibrate the small seed box first, then the cool season box, and finally the fluffy box.

5) All Truax drills can be calibrated using the same procedure. **Refer to "Calibration Procedures" for more detail.**

METHODS OF CALIBRATION:

1) Seed Weight Method of Calibration - Weight/Acre in Grams
2) Seed Weight Method of Calibration - Weight/Acre in Ounces
3) Seeds Per Row Foot
4) Trial Seeding/Bag

PRELIMINARIES TO CALIBRATION (WEIGHT/ACRE)

1) Attach the drill to a tractor or other vehicle, park on a level surface, set parking brake, and shut off the engine.

2) Block the end wheels (both front and rear).

3) Remove seed hoses from prescribed number of seed cups or aluminum transitions.

4) **Only** place seed in drill box compartment over the seed tubes previously removed. Use enough seed to fill to the top of agitators in the box being calibrated.

5) Turn the floating drive wheel that drives the seed boxes **counter clockwise** and check to be sure that all mechanisms are working. Check to see that seed falls from the seed cups or transitions.

FACTORS AFFECTING SEEDING RATE CALIBRATION

Several factors will affect the seeding rate. These include humidity, seed density, seed purity (inert matter in seed lot), seed germination, mixing of seed types, seed box used, site conditions, and speed of travel.

For more precise calibration, two or more of the calibration methods should be used, and repeated several times a day. It is **not recommended** that suggested procedures be used when controlled "plot planting" is being done.

The procedures provided for the calibration of Truax drills are to be used as a guide only - as several factors could affect the rate at which the seed will flow through the seedway passages.

The operator of the equipment must constantly monitor the seed delivery and placement!

SEEDING RATE VARIABLES:

1) Different bags of seed weighing the same amount may contain different amounts of pure live seed, due to seed germination, seed purity and inert material, unfilled kernels, moisture content, or seed size.

2) The drill wheels may slip due to seedbed condition, soil type, lay of the land (i.e. slope), and speed of drilling.

3) The tire size, type, pressure and tire wear will affect the seeding rates. Note: The standard tire is an 11.25 x 28, 12-ply Rib Implement style on the drill. The floating seed box drive tire is a 5.70-8 tire.

4) Leaving a gap wider than the drill row spacing between drill passes, overlapping drill passes, and failure to fully stop and lift the drill when turning at the end of the field will affect uniform seed distribution.

5) The operator may have false information as to the land area.

IMPORTANT: Remember that the feed cups meter volume, not weight!

SEED CONSIDERATIONS AND DRILL CALIBRATION

Calibration of the seeding equipment is done to predict the rate that seed will be metered from the seed boxes and delivered to the soil during the planting operation and can be done prior to going to the field.

Prior to calibrating the drill it is important that the operator be familiar with the equipment operation and ensure that it is in proper operating condition. This includes making sure that the metal fluted metering devices on seed cups with this style of metering mechanism slide freely when the shaft is moved to open and close exposed fluted metering system in each seed cup and that they turn when the drive wheel is turned. In addition, on seed cups with adjustable gates or flaps to be sure they are positioned for the size of seed to be planted through that seed box and metered from those seed cups. Also be sure the seed tubes from the seed cups and the planting boots are not plugged with rodent nesting materials, cobwebs, or any other materials that will block seed flow.

Several factors can affect the seeding rate output from the drill. These include seed characteristics such as seed density or weight, seed shape and size, seed texture (smooth versus rough), and seed appendages such as awns or hairs; mixed seed types; amount and characteristics of inert material in the seed lot; moisture content of the seed lot, as well as humidity in the air the day of seeding. In addition the amount of seed in the seed box can affect flow rate. For many species the flow rate will decrease as the seed box empties.

Additional factors that affect seed actually delivered to the soil include seedbed condition, topography, and speed of operation.

Despite all of these variables it is important to project seed drill output with equipment calibration before going to the field. Usually a given amount of seed is purchased or supplied for the acreage to be seeded. It is important that the seed be uniformly distributed across those acres without running out of seed before the job is completed or to not have a large quantity of seed left over resulting in the need to overseed the area with a second trip.

TERMS

Bulk Seed – This is the total amount of material in the seed bag or any sample size from the seed bag or seed lot. It includes viable seed, hard seed, inert material, weed seed, and other crop seed. All of these components are listed on the seed tag of a properly labeled bag of seed. This is the material that will actually be planted and is the weight that the equipment is calibrated for to determine the seeding rate.

Germination – This is the percentage of seed that has germinated by the end of a specified test period at a seed-testing laboratory. Germination is listed on the seed tag. In seed mixtures germination for each mixture component should be listed.

Purity – Purity is the percentage by weight of each species of viable seed in the seed bag or seed lot. Purity is determined by a seed-testing laboratory and is listed on the seed tag. In seed mixtures purity for each mixture component should be listed.

Pure Live Seed – This is the percentage of pure seed that can be expected to germinate from the seed lot. **Percent PLS is determined by multiplying % seed purity by % germination.** This computation can be determined for single seed species or seed mixtures. Percent PLS is usually determined by the seed supplier and listed on the seed tag or report from the seed supplier.

Bulk Seeding Rate – This is the total pounds of material including seed, inert material, and other components of the seed lot or seed in the bag that will be planted per acre. **Bulk seeding rate** is determined by dividing the planned seeding rate **pure live seed (PLS)** pounds per acre by the percent **pure live seed (% PLS)** times 100**.**

Prior to calibrating the drill, the equipment operator needs to know the **bulk seeding rate** for individual seed species or seed mixtures to be planted.

Table 1 – Example Drill Seed Mix for 40 Acre Planting

Species[1]	% Germination[2]	% Purity[3]	% Pure LiveSeed[4]	PLS Seeding Rate/Ac[5]	PLS Lbs. for Site[6]	Bulk Seed Seeding Rate/Ac[7]	Bulk Seed Lbs. for Site[8]
Indian ricegrass	86.00%	99.70%	85.74%	1.00 lbs.	40.00 lbs.	1.17 lbs.	46.8 lbs.
Munro globemallow	64.00%	83.07%	53.16%	0.50 lbs.	20.00lbs.	0.94 lbs.	37.6 lbs.
Bluebunch wheatgrass	93.00%	92.75%	86.26%	2.00 lbs.	80.00 lbs.	2.32 lbs.	92.8 lbs.
Bottlebrush squirreltail	94.00%	97.41%	91.57%	1.00 lbs.	40.00lbs.	1.09 lbs.	43.6 lbs.
Sulfur flower buckwheat	68.11%	97.00%	66.07%	0.50 lbs.	20.00 lbs.	0.76 lbs.	30.4 lbs.
Hotrock penstemon	77.17%	72.86%	56.23%	0.18 lbs.	7.20 lbs.	0.32 lbs	12.8 lbs.
Total				5.18 lbs	207.20 lbs.	6.60 lbs.	264.0 lbs.

1/ Species list is taken from seeding plan for the site.

2/ Percent germination is taken from seed tag or analysis report from the seed supplier.

3/ Percent purity is taken from seed tag or seed analysis report from the seed supplier.

4/ Percent Pure Live Seed (PLS) is a computed value of % purity times % germination.

5/ PLS seeding rate in pounds per acre is taken from seeding plan for the site.

6/ PLS pounds for the site is calculated by multiplying the PLS seeding rate per acre times the acres to be seeded.

7/ Bulk seed seeding rate pounds per acre is calculated by dividing the PLS seeding rate/acre by the % PLS x 100.

8/ Bulk pounds for the site is calculated by multiplying the bulk seed seeding rate per acre times the acres to be seeded.

DRILL CALIBRATION

The drill calibration procedure simulates operating the drill over a defined land area to project what the drill output will be in **bulk seed pounds per acre** for the seed lot being used. Thus it is required that calibration be performed using seed from the seed lot that will actually be planted. Calibration allows the operator to adjust the drill output, either increase or decrease output, to achieve the planned seeding rate of **bulk seed pounds per acre** before actually going to the field and putting seed in the ground.

Truax Company recommends using the Wheel Circumference – Seed Weight Method of calibration. This procedure will work for any drill brand, model, and row spacing. This method requires that you determine the row spacing of the drill and the circumference of the seed box drive wheel in feet and calculate the number of drive wheel revolutions to collect a seed sample. It also requires that you decide if the seed sample collected will be weighed in ounces or grams.

Calculate the number of revolutions using the appropriate line from the Table 2 where "C" is the drive wheel circumference measured in feet and tenths; and the calculated "R" is the number of revolutions of the seed box drive wheel to collect the seed sample for weighing:

TABLE 2:

Seed Weight in Ounces			Seed Weight in Grams		
Row Spacing[1/]	**Number of Seed Spouts to Use**	**Calculation of Drive Wheel Revolutions**	**Row Spacing[1/]**	**Number of Seed Spouts to Use**	**Calculation of Drive Wheel Revolutions**
6"	**4**	**217.8/C = R**	**6"**	**4**	**96/C = R**
7"	**4**	**186.7/C = R**	**7"**	**4**	**82/C = R**
7.5"	**4**	**174.2/C = R**	**7.5"**	**4**	**77/C = R**
8"	**3**	**217.8/C = R**	**8"**	**3**	**96/C = R**
10"	**3**	**174.2/C = R**	**10"**	**3**	**77/C = R**
12"	**3**	**145.2/C = R**	**12"**	**3**	**64/C = R**
12"	**2**	**217.8/C = R**	**12"**	**2**	**96/C = R**
24"	**1**	**217.8/C = R**	**24"**	**1**	**96/C = R**
36"	**1**	**145.2/C = R**	**36"**	**1**	**64/C = R**
48"	**1**	**108.9/C = R**	**48"**	**1**	**48/C = R**

1/ Row spacing is the actual distance between the drill rows used for the species to be planted. When alternate rows are being planted to different species from a separate seed box the row spacing will be some multiple of the drill planter spacing.

Steps to Perform the Wheel Circumference – Seed Weight Method of Calibration

1. Decide if seed sample will be weighed in grams or ounces.
2. Attach the drill to a tractor. Park on a nearly level area and block as necessary to keep the drill from moving.
3. Determine the drill row spacing in inches.
4. Using **Table 2**, based on row spacing and method of weighing (Grams or Ounces) determine the number of seed spouts to collect seed from and calculate the number of drive wheel revolutions required. Measure the circumference of the seed box drive wheel in feet and tenths to calculate the number of revolutions required for collecting the seed sample.
5. Disconnect seed tubes from the seed boxes for the number of seed spouts determined in Step 4.
6. Place a collection container (pan, can, plastic bag, etc.) under these seed outlets.
7. Place seed in the seed box over the seed spouts where seed will be collected. Use enough seed to fill the box to the top of the agitator in the box.
8. Turn the drive wheel to make sure all mechanisms are working. Check to see that seed is flowing from the seed cups into the collection containers.
9. Empty the containers back into the seed box and reposition them under the seed cups.
10. Turn the drive wheel the number of revolutions calculated in Step 4.
11. Combine the seed collected into one sample and determine the actual weight of the seed collected. Do not include the weight of the container holding the sample.
12. Convert the seed sample weight to pounds of bulk seed per acre using one of these conversion factors:
    A. Seed Weight in Ounces – Multiply weight by 6.25
    B. Seed Weight in Grams – Divide weight by 2
13. Compare these results with the planned seeding rate of **bulk seed pounds per acre**.
14. Adjust the drill setting as needed to increase or decrease output to achieve planned seeding rate and repeat calibration Steps 9-13.
15. Once you reach the desired output, repeat calibration Steps 9-13 twice more to verify setting is correct.
16. During actual seeding operation monitor the amount of seed planted versus the acreage covered to insure you are planting at the desired seeding rate.

CALIBRATION PROCEDURE FOR 12" ROW SPACING (GRAMS)

1) Disconnect seed tubes from **three** seed cups for each seed box you are calibrating. Place a bag or can to catch the seed under each of the seed cup outlets where seed will be dispersed.

2) Measure the circumference of the floating seed box drive wheel in feet. Divide 64 by the wheel circumference in feet to determine the number of wheel revolutions. Example: Wheel circumference is 4.7 ft.; 64 divided by 4.7 equals 13.6 (use 13-1/2) wheel revolutions.

3) Use the valve stem or a paint mark on the wheel to keep track of the revolutions. Turn the drive wheel the required number of revolutions determined in step #2.

4) Combine the seed from the three rows of each seed box into separate containers.

5) Weigh the collected seed in grams.

6) Divide the weight by two (2).

7) The result equals the seeding rate in **bulk pounds per acre**. This is not Pure Live Seed (PLS).

8) Repeat at least three (3) times and determine an average output per box.

9) See Pages 20-12 and 20-13 for adjusting seed flow from each seed box.

CALIBRATION PROCEDURE FOR 12" ROW SPACING (OUNCES)

1) Disconnect seed tubes from **three** seed cups for each seed box you are calibrating. Place a bag or can to catch the seed under each of the seed cup outlets where seed will be dispersed.

2) Measure the circumference of the floating seed box drive wheel in feet. Divide 145.2 by the wheel circumference in feet to determine the number of wheel revolutions. Example: Wheel circumference is 4.7 ft.; 145.2 divided by 4.7 equals 30.9 (use 31) wheel revolutions.

3) Use the valve stem or a paint mark on the wheel to keep track of the revolutions. Turn the drive wheel the required number of revolutions determined in step #2.

4) Combine the seed from the three rows of each seed box into separate containers.

5) Weigh the collected seed in ounces.

6) Multiply the results by 6.25.

7) The result equals the seeding rate in **bulk pounds per acre**. This is not Pure Live Seed (PLS).

8) Repeat at least three (3) times and determine an average output per seed box.

9) See Pages 20-12 and 20-13 for adjusting seed flow from each seed box.

CALIBRATION PROCEDURE (SEED PER ROW FOOT)

To calculate the number of seeds per row foot/pound of a specified crop, determine the number of seeds per pound from Table #1. Then, use the following formula:

When:

1 acre = 43,560 square feet
A = number of seeds per pound (from Table #1)
B = number of seeds per square foot @ 1 pound per acre
C = planting width of drill
D = number of seeds per one (1) row foot per pound
E = number of rows planted by drill

A/43,560 = B
(C/E) x B = D

For Example: Using big bluestem, which has 165,000 seeds per pound and a *RoughRider* Model RR1210 Drill, which has a ten (10) foot planting width and plants ten (10) rows:

A = 165,000 seeds per pound
C = 10 feet
E = 10 drill openers or rows

B = 165,000/43,560 = 3.8 seeds per square foot
D = (10 ft/10 rows) x 3.8 = 3.8 seeds per one (1) row foot/pound

This figure is bulk seeds per row foot/pound. When planting Pure Live Seed (PLS), divide "D" by the PLS percent of your seed lot.

For Example: Your seed lot of big bluestem has a PLS percent of 60% (0.60).

3.8/0.60 = 6.33 bulk seeds per row foot/pound

This figure represents one PLS pound of seed. Multiply by the desired planting rate per acre to obtain the correct number of seeds per foot of row.

For Example: Your desired planting rate for big bluestem is 6 PLS pounds per acre.

6.33 x 6 = 38 bulk seeds per row foot for a six (6) PLS pound seeding rate.

In the above example, 38-40 seeds per row foot would be required to achieve the desired seeding rate.

CALIBRATION PROCEDURE (SAMPLE BAG PER LAND AREA)

1) Select or measure a known field area (1-2 acres).
2) Put the proper quantity of seed (PLS) in the seed boxes and drill the known field area.
3) Check periodically while drilling to see if there is enough material to seed the area.
4) Adjust the drill to achieve the desired seeding rate.

TABLE 1 - SEED INFORMATION[1]

SPECIES	NUMBER SEEDS PER POUND	SEEDS PER SQUARE FOOT @ 1 POUND PER ACRE[2]
Native Warm Season		
Alkali sacaton	1,758,000	40.4
Big bluestem	165,000	3.8
Blue grama	825,000	18.9
Buffalograss (Burs)	56,000	1.3
Eastern gamagrass	7,280	0.17
Indiangrass	175,000	4.0
Little bluestem	260,000	6.0
Prairie cordgrass	183,000	4.2
Prairie sandreed	273,000	6.3
Sand bluestem	113,000	2.6
Sand dropseed	5,289,000	121.4
Sand lovegrass	1,300,000	29.8
Sideoats grama	191,000	4.4
Switchgrass	389,000	8.9
Native Cool Season		
Canada wildrye	115,000	2.6
Green needlegrass	181,000	4.2
Needle-and-thread	115,000	2.6
Reed canarygrass	533,000	12.2
Slender wheatgrass	159,000	3.7
Western wheatgrass	110,000	2.5
Introduced Cool Season		
Creeping foxtail	750,000	17.2
Creeping red fescue	615,000	14.1
Crested wheatgrass	175,000	4.0
Hard fescue	680,000	15.6
Intermediate wheatgrass	88,000	2.0
Kentucky bluegrass	2,177,000	50.0
Meadow bromegrass	71,000	1.6
Orchardgrass	654,000	15.0
Perennial ryegrass	227,000	5.2
Pubescent wheatgrass	100,000	2.3
Redtop	4,990,000	114.6
Russian wildrye	175,000	4.0
Smooth bromegrass	136,000	3.1
Tall fescue	227,000	5.2
Tall wheatgrass	79,000	1.8
Timothy	1,230,000	28.2

TABLE 1 (CON'T) - SEED INFORMATION

SPECIES	NUMBER SEEDS PER POUND	SEEDS PER SQUARE FOOT @ 1 POUND PER ACRE[2]
Legumes		
Alfalfa	200,000	4.6
Alsike clover	700,000	16.1
Birdsfoot trefoil	375,000	8.6
Cicer milkvetch	130,000	3.0
Crownvetch	109,000	2.5
Hairyvetch	20,000	0.50
Purple vetch	10,000	0.23
Korean lespedeza	225,000	5.2
Sericea lespedeza	350,000	8.0
Crimson clover	149,700	3.4
Ladino clover	871,650	20.0
Red clover	275,000	6.3
Strawberry clover	300,000	6.9
Sweetclover	260,000	6.0
White clover	800,000	18.4
Forbs		
Maximillian sunflower	150,000	3.4
Purple prairieclover	275,000	6.3
Pitcher sage	150,000	3.4
Roundhead lespedeza	151,000	3.5
Thickspike gayfeather	110,000	2.5
Dotted gayfeather	141,000	3.2
Shell-leaf penstemon	272,200	6.3
Cereal Grain		
Barley	14,000	0.32
Oats	13,000	0.30
Regreen	11,000	0.25
Rye	18,000	0.41
Wheat	15,000	0.34

1. Source - Grass, USDA Yearbook of Agriculture 1948
2. Seeds Per Sq. Ft @ 1 LB Per Acre - Number of Seeds Per Pound divided by 43,560 Sq. Ft Per Acre

ADJUSTING THE CALIBRATION

Fluted feed rolls meter the seed from the bottom of the small seed and cool season seed boxes. The amount of exposed flute in the cool season/grain and small seed feed rolls controls the amount of seed delivered with each revolution of the seed box shafts. Shift levers on the outside bottoms of these boxes control the amount of exposed flute.

Utilize the Output Reduction feature of the *RoughRider* if reduced seeding rates are desired from all seed boxes on the drill. This is done by removing the chain from the floating drive wheel jackshaft to the small sprocket side of the double sprocket attached to the 5-Step Cone Sprocket shaft. Replace it with a longer chain running from the alternate small sprocket on the floating wheel jackshaft to the larger sprocket side of the double sprocket attached to the 5-Step Cone Sprocket shaft.

SMALL SEED BOX:

The shift lever on the bottom of the seed box on the drive end of the drill exposes or closes the flutes to control the seeding rate. The exposed flute area for each cup (inside the box) should equal at least twice the diameter of the largest seed being seeded from the box. **Carefully control the exposed flute so that no seeds are crushed or ground.** When very low seeding rates are desired from the small seed box, replace the original **sprocket** (part # 1055) on the end of the box with a larger **sprocket** (part #1054A).

If seed box shafts walks (moves) left or right when in use, ensure that there is no free play in the shaft. A **machine bushing** (part #MB12-.15 or JD# N160437) next to the **shifter spool** (part #1130) reduces shaft movement. By taking up free play in the shaft and preventing the start of shaft movement, it is easier for the retaining wing nut (part #WN14) to hold the shaft in place.

To Correct Irregular Feeding From Different Cups:

First, with the seed cup shaft shifted fully to the left, check whether the drive **coupler** (part #1010) is touching the roll pin preventing full movement to the left. When there is contact between the coupler and the roll pin it is necessary to loosen the set screws of the two bearings holding the coupler and move the coupler slightly to the left. The small seed box chain will then need to be realigned.

Second, if further adjustment is needed, loosen up the cup mounting bolts and move the cups so that the exposed flute is the same on all seed cups. This will result in equal feeding from the seed cups.

COOL SEASON OR GRAIN BOX:

Raise the clean-out levers on the side of the seed cups to the highest position. As with the small seed box, exposing more of the flutes will result in a higher seeding rate. If feeding differs among the seed cups, adjustment may be made by loosening up the cups and moving them so the exposed flute is the same on all seed cups resulting in equal feeding.

If the seeding rate changes during planting, it may be caused from the **feed shaft** (part #3013R) moving. This may be caused by a loose or worn **bolt** (part #B38-ISQ), a lost or broken **spring** (part #TS-72M), lost or broken **spring pin** (part #RP18-1.25), a worn or loose **shifter lever** (part #3205), a worn **shifter bearing** (part #M608621), or a worn **thrust washer** (part #TM60826).

When the output of the cool season box can not be reduced low enough, the **double sprocket** (part#3095X) on the drive end of the box can be changed to the **low output sprocket** (part #3095X1).

COOL SEASON OR GRAIN BOX (Con't):

If the seed box **feed shaft** (part #3103R) is *difficult or impossible* to shift to the left or right, it may be caused from dust and dirt in the cups or by seed jammed in the flutes. It may be necessary to clean the box and cups before shifting the feed shaft. Application of WD-40 or liquid graphite on contact points will help. Turn the **feed shaft** (part #3103R) with a 5/8" wrench while shifting.

When planting large seed the size of corn or beans, move the clean-out lever (on the side of each cup) to the middle or bottom setting to prevent crushing or chipping the seed, which could result in an irregular seeding rate and poor stand establishment.

We do not recommend the application of fertilizer with Truax drills.

LARGE (FLUFFY SEED) BOX:

One of the distinguishing features of Truax drills is the means to control output from the fluffy seed box. Truax drills use a simple derailleur speed changer to vary the RPM of the picker wheel shaft of the fluffy box and thereby the output of seed from the box. A 5/16" wide picker wheel that is controlled by the speed changer meters the large seed box for fluffy, chaffy seed. The faster the RPM of the picker wheel shaft the higher the output of bulk seed.

The derailleur controls the output only from the fluffy seed box.

The derailleur consists of (two) five-step sprockets and a spring tension idler that takes the slack from the roller chain between any of the two stepped sprockets. There are five settings for seed output from the fluffy seed box. The idler is on top of the upper chain. To change output settings, lift the idler and move the chain from one set of sprockets to another. The rear sprocket is the drive and the sprocket closest to the tongue is the driven one. The lowest output RPM, and therefore the lowest seed output is achieved when the chain is on the furthest to the right combination of sprockets (when standing at the tongue looking back). As the chain is moved to different combinations to the left, the drive sprocket diameter increases in relation to the driven and therefore increases the RPM and the seed output.

If plugging occurs when planting fluffy seed, it may be prevented by stepping the RPM of the speed changer down several notches. This will reduce the seeding rate. Before proceeding to drill after a plug, be sure to clean all debris from the seed passageway down to and including the furrow opener.

Additional changes in output from the large, fluffy box can be achieved by:

1) Adding **seed gaskets** (part #1005) and **retainer plates** (part #1006) inside the seed box to restrict output.

2) Increasing the size of the picker wheel sprocket located under the end cover on the drive side. The standard is a **30-tooth** (part #1055A1) square holed sprocket, and can be changed to a **36-tooth** (part #1055A2) or a **42-tooth** (part #1055A212) sprocket to further reduce output.

3) Reduced seeding rates from all seed boxes on the drill can be achieved by using the **Output Reduction feature of the Rough Rider**.

4) After trying the above alternatives, if further reduction in output is needed, try one of several fillers such as rice hulls, cotton hulls, bran, or ground corncobs.

DRILL SEEDING CAPACITY

The theoretical field capacity for a drill can be estimated with the following formula:

$$\frac{\text{Drill Width (feet)} \times \text{Speed (mph)}}{8.25} = \text{Acres per Hour}$$

The actual field efficiency or amount of fieldwork accomplished is somewhat less than this theoretical calculated rate due to turns at the end of the fields, time spent filling seed boxes, other down time, etc. Field efficiency may be between 65% and 80%. For estimating purposes use the lower end (65%) for small fields, low quality seed, steep terrain, etc. and the higher end (80%) for larger fields, high quality seed, gentler terrain, etc.

ACRE METERS

NON-RESETTABLE, HUB STYLE, ACRE METER:

This acre meter is calibrated and sealed with the sprocket combination on the face of the meter. Field change of the acre meter is not possible. If sprockets are field changed, calculate the ratio between actual area covered and the reading on the counter and use this **"factor"** to determine acreage readings in the future.

ELECTRONIC ACRE METER:

This acre meter is battery operated and can be changed in the field to accommodate changes in tire size or sprocket sizes. The acre meter can be reset to zero for each seeding project. See the instruction sheet provided with the acre meter or Pages 30-12, 30-13, and 30-14 for correct operation.

MAINTENANCE & SERVICE

PROPER MAINTENANCE & SERVICE

Proper maintenance and service of the drill will save time and increase the life of the drill.

CAUTION: Use cleaning solvents only in a well-ventilated area away from all sparks or flames.

LARGE (FLUFFY SEED) BOX

The box integrity including welds and bolted assemblies must be inspected and maintained. All seed, debris (such as seed sacks), and unused material must be removed before transport and storage.

DO NOT use any Truax equipment with the lids of the seed boxes open.

Problems caused by shaft interference between the **picker wheel shaft** (part #2003R) and the **transitions** (part #1033) can be repaired by loosening **bolts** (part #B38-.750) that hold the box to the end plates and slightly rotating the box. The bearings holding the picker wheel shaft can also be loosened and the shaft can be moved slightly. The center bearing of the picker wheel shaft is held to the fluffy box bottom by a **bearing support bracket** (part #10316) that can be loosened and moved for increased shaft clearance. Also, each transition can be moved in either direction.

When removing or adjusting the **picker wheels** (part #2002), remove the set screws entirely, as they tend to screw themselves in and tighten up again during shaft removal. Use a plastic or lead hammer when removing the shafts from the drill so the shaft ends do not become marred.

If it is necessary to remove the picker wheel shaft after it becomes bent or twisted, it is best to use a sawsall power hand hacksaw to cut the shaft next to each bearing mount. Then clamp the cut pieces in a vice and cut beside each picker wheel to remove them from the shaft.

SMALL (LEGUME) BOX

Irregular seeding rates can be corrected by adjusting the individual cups. After loosening the cup mounting bolts it is possible to move each cup about 1/8" and thereby change the cup output in relation to the others. If a plastic seed cup is broken, a field repair can be made with **"super glue"** if all the parts can be found. All plastic seed tubes **should** be removed annually and cleaned thoroughly.

If the seed box shaft tends to "walk" left or right when in use, the cause is usually wear of the shifter spool. This problem can be corrected by installing a thin **spacer** (part #MB 12-.15 or JD #N160437) over the 3/8" shaft between the roll pins and the shifter spool.

The two spur gears installed on the input shaft of the small seed box change direction of rotation to the feed rolls of the small seed box. **See Figure 30-3.**

COOL SEASON BOX

On a daily basis when planting dense seed that tends to settle and compact, before starting to drill it is a good idea to turn the feed shaft with a wrench in the direction it normally turns. If it turns hard, remove the drive chain to the box and apply a dry silicone based lubricant to each cup while turning feed shaft with a wrench.

When moving the shifter to a new position and the box is filled with seed, it may be necessary to turn the feed shaft with a 5/8" wrench while moving the lever.

COOL SEASON BOX (Con't)

If the seed box feed shaft continues to **"walk"** after checking the above items, then check each seed cup. Loosen the two retaining bolts on each cup and tap (lightly) with a plastic hammer to check the alignment. Retighten and proceed to the next one.

Next check the **shifter bearing** (part #M60862) for excess endplay. Drills have a Delrin® **thrust washer** (part #TM60826) and longer **shifter bearing** (part #M608621). This helps prevent the **5/8" shaft** (part #3103) from "walking". **See Figure 30-1** for an illustration of the assembly.

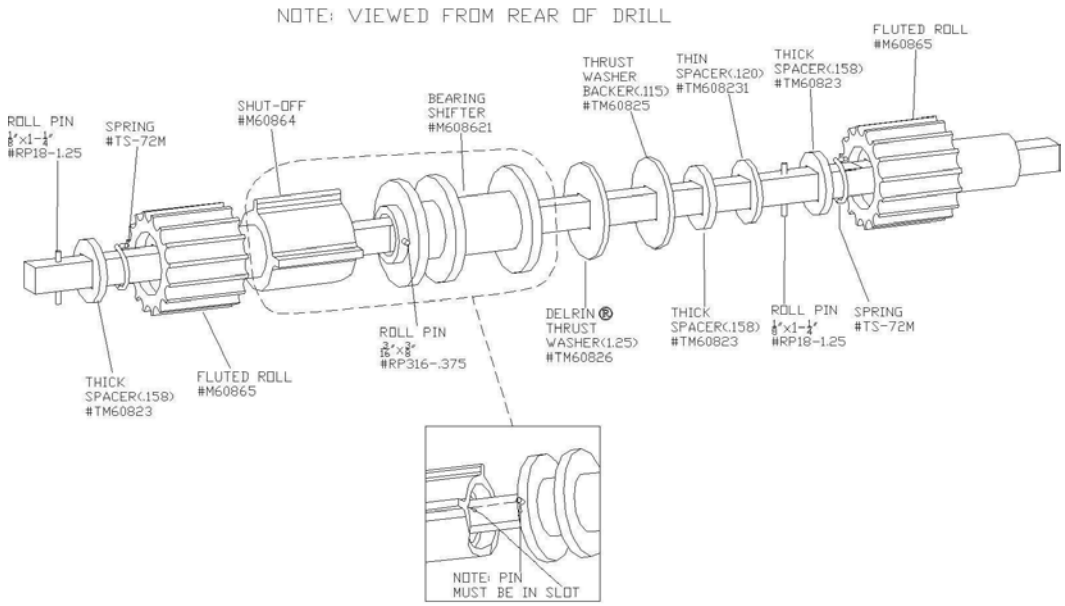


FIGURE 30-1

NOTE: The configuration of spacers TM60823 and TM608231 may vary between machines. The configuration may be one of each as shown in Figure 30-1, or it may be two TM60823 spacers, or two TM608231 spacers.

COOL SEASON FLUTED FEED CUPS

The feed gate latch on the side of the cool-season cup serves as an adjustment for seed size and as a means to clean out the cup. The setting may need to be changed when drilling larger seeds similar in size to soybeans to prevent them from being crushed.

A **repair kit** (AN161511) is available to repair a broken latch or gate.

SERVICING THE COOL SEASON FLUTED FEED CUPS

It may be necessary to service the feed cups whenever the shaft becomes difficult to shift, the rolling torque is too high, or when one or more of the cups have been removed from the Rough Rider. **See Figure 40-2 for diagram of part identified below.**

1) Open the **feed gate levers**.

2) Start at the end of the drill near the shifter lever and loosen the bolts holding the **seed cups** to the bottom of the box.

3) Move the **seed cup** until the end of the **fluted feed roll** is flush with the inside surface of the seed retainer ring on the lower radius of the seed reservoir.

4) Reset all the **seed cups** in the same manner (beginning with the cups next to the shifter) working alternately in both directions.

5) Tighten the bolts on each **seed cup** as soon as resetting is complete.

   Note: The cup retaining bolts require a **washer** (part #W14) between the bolt head and the seed cup.

6) Recheck the adjustment by moving the feed shaft shifter back and forth. Recheck all **fluted feed rolls** to insure that they are flush at the lower radius of each seed cup.

7) Close the **feed gates** to the desired setting, making sure that all gates are in identical positions.

Note: During installation, if the cup retaining bolts pull through the plastic cup, it will be necessary to place a **washer** (part #W14) on the bolt before installation.

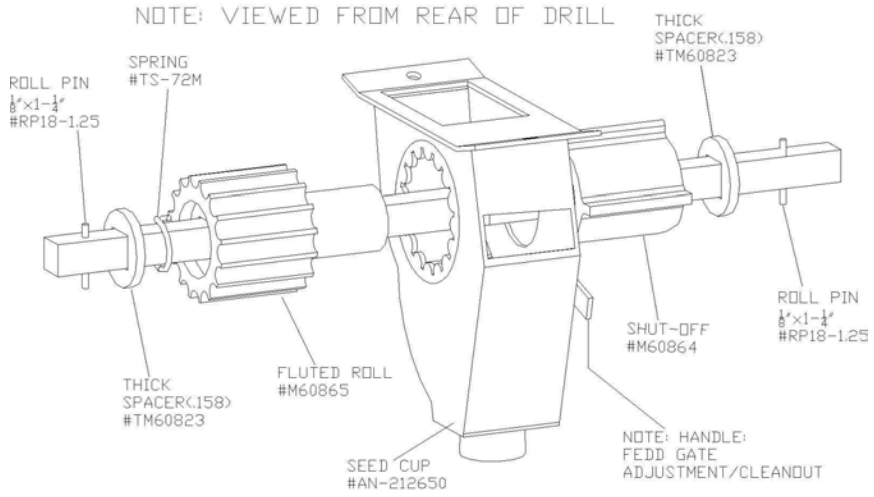


Figure 30-2

IDLER ASSEMBLIES

The idler assemblies put tension on the chains to prevent them from "walking" off the sprockets. All idlers, using plastic rolls, are installed on the slack side of the chain. If it is necessary to install an idler on the drive side, then an idler sprocket with a sealed bearing is used as an idler. The following procedure should be followed when servicing idlers:

1) Before servicing chain idlers, be sure that the sprockets are in alignment and that the chain runs freely.

2) Raise the seed box floating drive wheel from the transport tire to freely turn the drive chains to check alignment.

3) **See Figure 30-3** for detail of seed box chain and idler alignment.

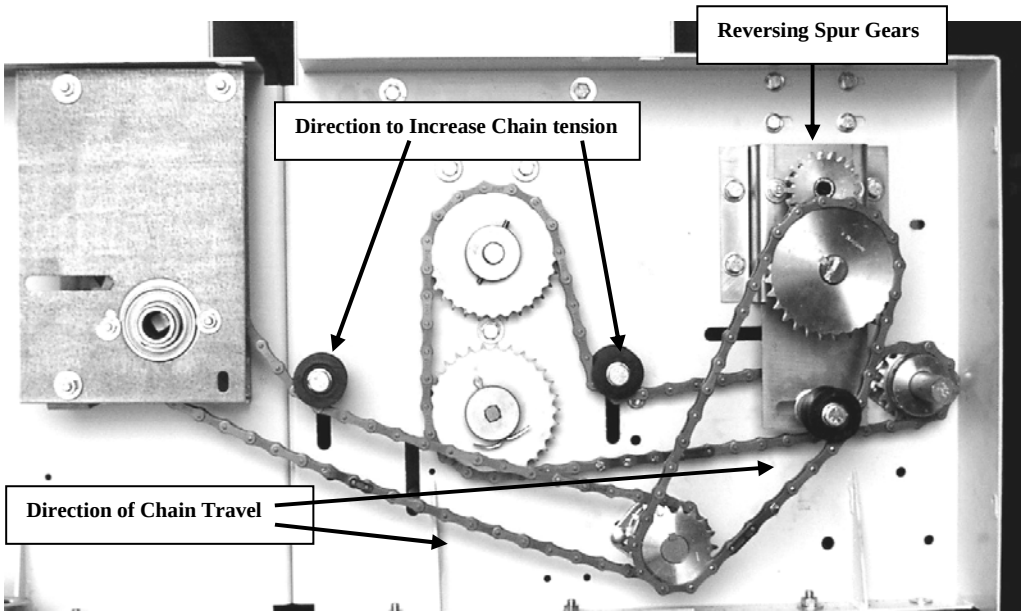


FIGURE 30-3

MAIN FRAME

IMPORTANT: When cleaning with high pressure water be careful not to force water into pillow block bearings, planter hubs, and press wheel bearings.

HYDRAULICS

The hydraulic system of the Rough Rider drill consists of two 3-1/2" x 8" cylinders **(SAE – 9308AS)** connected through a filter **(AN260207)**, valve/float control, and a dial gauge to the tractor. The optional hand pump **(PM-HP-10B)** when installed is also connected to the system. The hydraulic system is filled with Anti Wear ISO Viscosity 46 hydraulic fluid during manufacture of the drill.

This hydraulic system allows the operator to control the amount force applied to the planters. This in turn makes it possible to control the impact that planting discs make on the soil surface. The operator can observe the amount of soil disturbance being made and adjust the hydraulics accordingly. The valve/float control applies force uniformly to the rear and front ranks of planters.

The hand hydraulic pump provides a manual method to hydraulically lift the planters when the tractor hydraulics is not available. The hydraulic system is one-way, therefore if down pressure is needed the operator will have to reverse the hoses to achieve this function.

CHAINS

Chains for Rough Rider Drill are listed below:

Chain Name	Chain Part #	Connector Link(s)	Connector Link(s) Part #
Speed Changer (39 Links)	2040D	Full & Offset Link	2040L1& 2040L
Cool Season Box Agitator (17 Links)	2040F	Full & Offset Link	2040L1& 2040L
Cool Season Box Drive (51 Links)	2040XG	Full Link	2040L1
Middle Seed Box Picker Wheel (51 Links)	2040C	Full Link	2040L1
Small Seed Box (33 Links)	2040RR	Full & Offset Link	2040L1& 2040L
Floating Drive Wheel (94 Links)	2040RN	Offset Link	2040L
Drive to Speed Changer (71 Links)	2040RP	Full & Offset Link	2040L1& 2040L

LUBRICATION SCHEDULE & RECOMMENDED LUBRICANTS

Moving parts and bearings on all drills require regular lubrication. For optimum life of the drill it is recommended that synthetic **grease** (such as Kerr-McGee Mystik JT-Truax part #9991) be used every 100 acres on all the zirks. The pillow block bearings on the two rockshafts require service every 100 acres. The tapered roller bearings on each planter should be cleaned and repacked annually.

At points requiring lubrication that do not have a grease zirk, it is recommended that a light lubricant, such as LPS Silicone lubricant be applied on a daily basis.

Sliding surfaces, such as the idler in the speed changer, should have a silicone-based lubricant applied frequently.

LUBRICATION TYPE - QUICK CHECK	
PARTS REQUIRING LUBRICATION	**TYPE OF LUBRICATION**
All Chains	LPS Silicone Lubricant
Feed Rolls	LPS Silicone Lubricant
Press Wheel Bearings	LPS Silicone Lubricant
Idler Bushings	LPS Silicone Lubricant
Box Hinges	LPS Silicone Lubricant
Bronze Bushings	LPS Silicone Lubricant
Main Frame - Rockshaft Pillow Blocks	Synthetic Grease
Main Frame - Rockshaft End Bearings	Synthetic Grease
Seed Box Drive - Jackshaft Tube	Synthetic Grease
Lift Arm for Seed Box Drive Wheel	Synthetic Grease
End Wheel - Repack	Synthetic Grease

REMEMBER: The first rule of good lubrication and maintenance is **common sense!**
Keep it clean and keep it oiled!

It is recommended that lubrication be done immediately after drill usage (while the surfaces are still warm). This will allow the grease to cover the bare metal parts before they cool and condensation has begun to form.

LUBRICATION SCHEDULE:

ITEM	SCHEDULE
Chains	Apply LPS Silicone Lubricant, WD-40, or equivalent. At the end of the season, remove the chains and soak them in light oil for storage purposes.
Seed Boxes (all styles)	Apply LPS Silicone Lubricant, WD-40, or equivalent to the hinges.
Speed Changer	The derailleur style of speed changer for the fluffy box requires lubrication maintenance. LPS Silicone should be applied to the idler bushing that retains tension on the chain between the two cone sprockets once a day. Also, LPS Silicone should be applied to the derailleur chain on a daily basis.
Idlers	All idlers have a steel bushing that should be lubricated weekly with a silicone lubricant.
Disc Openers	The 20-inch planting discs are mounted on 6-bolt hubs with tapered roller bearings. Disassemble and repack annually.
Press Wheel Bearings	Press wheels do not have a zirk in the press wheel bearing. Apply a WD-40 lubricant daily for optimum life of the bearing.
End Wheel Bearings	The wheel bearings on all drills use a tapered roller bearing. Repack annually. When servicing these bearings, clean, check for wear, and repack with synthetic grease. Check seals for leaking.
Main Frame	The main frames on all drills have zirk fittings on the four **end bearing mounts** and the two zirks on each of the four **pillow blocks**. They should be greased daily.
Seed Box Drive Jackshaft Tube	The three zirks located on the mounting bearings and the jackshaft tube should be greased twice per season or every 500 acres.
Lift Arm for Seed Box Drive Wheel	The zirk located on the bottom side of the arm should be greased twice per season or every 500 acres.

CHECKING BOLT TORQUE

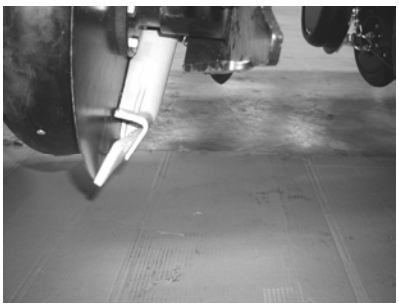
The table shown below provides the correct values for various bolts and cap screws. Tighten all bolts to the torque specified in the chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with same strength bolt.

TORQUE SPECIFICATIONS				
BOLT DIAMETER	BOLT TORQUE			
	SAE 5		SAE 8	
	lb-ft	(N.m)	lb-ft	(N.m)
1/4"	9	(12)	12	(17)
5/16"	19	(25)	27	(36)
3/8"	33	(45)	45	(63)
1/2"	80	(110)	115	(155)
5/8"	160	(215)	220	(305)
3/4"	290	(390)	400	(540)
1"	630	(850)	970	(1320)

Torque figures indicated above 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%. Torque value for bolts and cap screws are identified by their head markings.

ROUGH RIDER FEATURES

SEED DEFLECTORS



A white poly deflector (UHMW) is attached to the bottom of each seed boot to help deflect seed into the newly opened seed slot. When the deflector **(Part #303733RH & 303733LH)** wears to less than 1" wide or is missing it must be replaced.

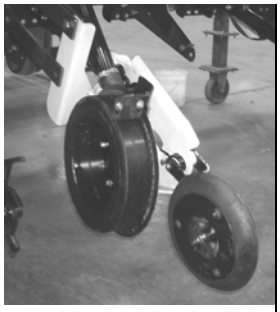
An optional deflector (**Part #303734RH & 303734LH)** is available that mounts in the same location. This deflector narrows the seed slot and thereby helps control placement of smaller seeds.

ROUGHRIDER FEATURES (Con't)

SIDE MOUNTED DEPTH/GAUGE WHEEL:

This standard feature helps control seeding depth for precise seed placement at between 1/2 to 1 inch. Actual seeding depth within this range will be determined by the amount of surface litter and soil type on the field being planted. The semi-pneumatic tire on the gauge wheels flex during use to resist mud buildup. When the planting plan requires the creation of furrows or when planting into heavy, dense sod, the gauge wheels can be removed for additional penetration.

PRESS WHEEL:

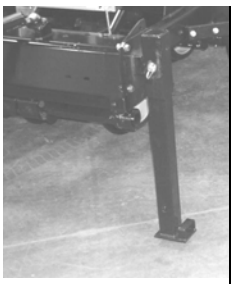


Press wheel assembly includes individual tension springs to create down pressure. Press wheel assembly allows vertical movement to accommodate uneven ground conditions.

Rear press wheels must be removed for transporting the drill on a trailer. Remove the 1/2" bolt through the press wheel "h" frame where it is attached to the planting unit. Reinstall the press wheel for planting.

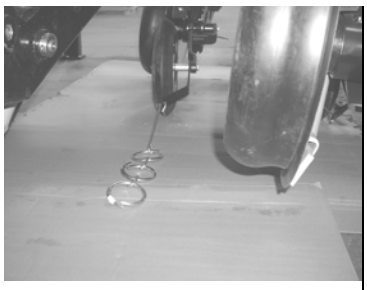
Drag chains (covering chains). The drag chain assembly **(Part #WF1093C)** is attached to the press wheel attaching bolt. This attachment helps scatter soil onto the newly planted seed after the press wheel has firmed the soil. See Drag Chain Photo Below.

SUPPORT STANDS:



Telescoping supports mounted on both front corners of the drill help stabilize the drill when positioned on a truck or trailer for transport

DRAG CHAINS:

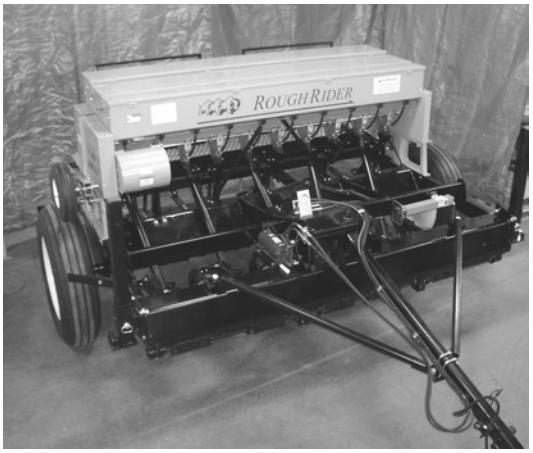


Drag Chains behind each planter improve soil covering of seed

FOLDING TONGUE:

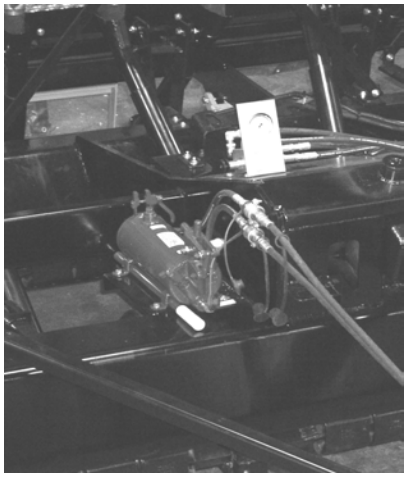
A folding tongue facilitates transport of the drill on a trailer and reduces inside storage requirements.

Tongue Folded Against Main Frame



Tongue Extended For Drill Operation

MANUAL HYDRAULICS:



The hand operated, mounted hydraulic pump with hoses and attachments can be used to manually raise and lower the drill planting units in the event a vehicle with suitable hydraulics is not available.

The hand operated pump is **single directional**, therefore if you want to change from raising the planters to lowering them you must unplug the hydraulic disconnects and reverse them to change the direction of movement.

Be sure the manual cylinder shut-off valve is in the full closed position before transporting the drill.

ROUGHRIDER OPTIONAL FEATURES:

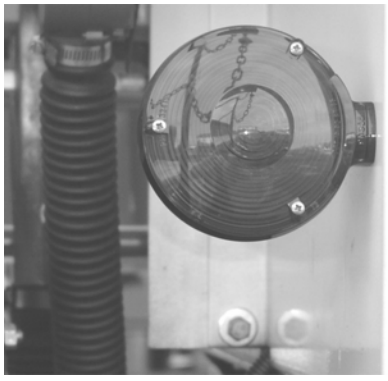
IMPRINTER:

The optional Truax imprinter units interchange with the planter assemblies on the *RoughRider* and allow for surface seeding of many species. The imprinter utilizes Brillion style rollers that are 8 inches in width and are mounted in place of the planters either on the total machine or on selected rows. Seed is delivered just in front of the imprinter and is rolled into the soil surface. The *RoughRider*'s hydraulic down pressure assures seed-to-soil contact. Down pressure is adjustable between "zero" to as much as 800 pounds per planter row.

The imprinters are designed to be used in sets of 10 with one imprinter replacing each planter. By installing them on both the front and rear ranks, they will maintain their uniform spacing. If they are installed only on the rear rank with planters or the front rank, they will be slightly miss spaced. The planters are tipped 7 degrees. Therefore, they pull at a slight angle and become off centered to the imprinters that are mounted perpendicular to the frame. If it is desired to maintain the exact row spacing with imprinters only on one rank, then optional imprinters **(Part #303666LH)** and **(Part #303666RH)** will need to be installed.

The seed deflector hose **(Part #303744)** and clamp, hose #44 **(Part #32133)** must be attached to the bottom of the metal tube of the imprinter to help direct seed to the ground before it is imprinted into the soil surface. This deflector is especially important when planting in windy conditions.

LIGHT PACKAGE:



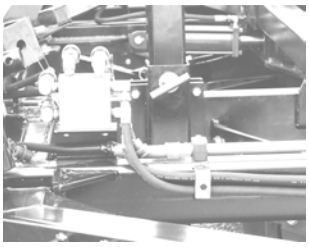
Trailer style taillights and turn signals with a wiring harness to the hitch on the tongue. A 4-pin plug is used on the wiring harness. Wiring can be extended to the trailing drill(s) in a multi-drill hook-up.

ROUGH RIDER OPTIONAL FEATURES (Con't)

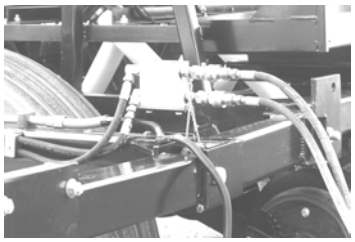
MULTI-DRILL HITCH:

A single or double multi-drill hitch is used for pulling two drills together. The multi-drill hitch includes a dual castor wheel for the tongue hook-up, hydraulic interface to connect the hydraulics to the tractor, and wiring harness to extend taillights to the trailing drill(s).

Dual Castor Wheel



Hydraulic Interface on Lead Drill



Hydraulics to Second Drill

ACRE METER:

The **Non-Resettable, Hub style** acre meter (Part #060088X) is calibrated and sealed with the sprocket combination on the face of the meter. This acre meter may register as much as 10% under the actual acreage planted. Field change of the acre meter is not possible. If sprockets are field changed, calculate the ratio between actual area covered and the reading on the counter and use this **"factor"** to determine acreage readings in the future. **Using the Output Reduction feature will affect the acre meter reading. The acre meter reading will need to be doubled to determine the actual acres planted.**

The **Electronic** acre meter (Part #060086E) is the most accurate style, is battery operated, and can be changed in the field to accommodate changes in tire size or sprocket sizes. The acre meter can be reset to zero for each seeding project. See the instruction sheet provided with the acre meter or pages 30-13 and 30-14 for correct operation.

Electronic Acre Counter Calibration

			Pulses Per Mile	
Drill Model	**Planting Width (ft)**	**Tire Circumference (Inches)**	**With Output Reduction**	**Without Output Reduction**
RR-1210	**10 ft**	**57**	**333**	**667**

Battery Operated Acre Counter – USER GUIDE

The battery operated acre counter operates in one of two modes. In sleep mode, the display is blank, and the counter is accumulating acres. Sleep mode will be entered if a button is not pressed for 20 seconds. In entry mode, the display is on, and the operator can enter values. To get into entry mode, press the FUNC button. If you continue to press the FUNC button, the acre counter will cycle through the functions that it can perform. The icons above the digits indicate which function is selected. The available functions are: **Field Acres, Total Acres, Pulses per Mile, Width, and Password.**

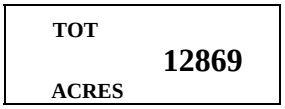
Field Acres:
Press the FUNC button until the "FIELD" icon appears in the display. The digits indicate the acres covered since the field acre counter was cleared.

To clear the field acre count, depress the UP and DOWN buttons for 2 seconds.

Field acres will count in tenths of an acre up to 9999.9 acres.

Total Acres:
Press the FUNC button until the "TOTAL" icon appears in the display. The digits indicate the acres covered since the total acre counter was cleared.

To clear the total acre count, press and hold the UP and DOWN buttons for 2 seconds. If a password has been entered, you will not be able to clear the total acre count.

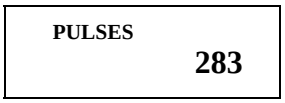


Total acres will count from 1 to 99999 acres.

Pulses per mile:
Press the FUNC button until the "PULSES" icon appears in the display. The number in the display indicates how many times the shaft rotates for every mile driven.

There are 2 methods to enter the pulses per mile:

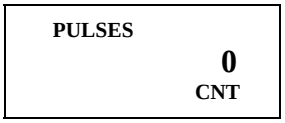
1) If you know the number, select it using the UP or Down buttons. When you press the FUNC button, the Landtracker will accept the number in the display as the new pulses per mile.



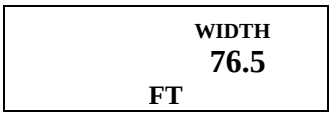
2) If you do not know the pulses per mile, press and hold the up and down buttons until "0000" appears in the display. The "COUNT" icon will appear. The acre counter is now counting shaft rotations. Enter the cab and drive 1 mile. Press the FUNC button to wake up the acre counter. The "PULSES" and "COUNT" icons will re-appear. The number display is the pulses per mile. Press the FUNC button to accept the setting. The "COUNT" icon will disappear. If you could not drive a mile, you can calculate the pulses per mile using a formula:

   pulses per mile = pulse count/distance in miles

   If a password is set, you will not be able to adjust the pulses per mile.



Width:
Press the FUNC button until the "WIDTH" icon appears in the display. The number displayed is the planting width of your drill in feet. See Table on Page 30-15 for planting widths for Truax drill models.



To adjust the width, press the UP and Down buttons. If a password has been entered, you will not be able to adjust the width.

The planting width can be adjusted from 0 to 99.9 feet, in tenths of a foot.

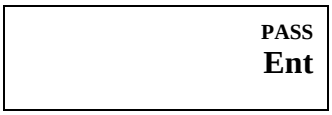
Password:
The password function allows you to protect the total acre count, pulses per mile, and width settings with a password. This stops anyone from accidentally changing these settings. When the acre counter is shipped, the password is disabled. You can modify the pulses per mile and implement width at any time.

Press the FUNC button until the "PASS" icon appears. The digits will display the word "Ent" or "dIS" and allow entry.

If the display shows "dIS":

The password is disabled. The total acre count, pulses/mile, planting width, and password settings can be adjusted using the UP and DOWN buttons. The password can also be changed using the UP and DOWN buttons.

If the display shows "Ent":



You must enter your password using the UP and DOWN buttons. When your password is displayed, press the FUNC button to test the password. If the password is correct, you will be able to change the acre counter settings. The password will be viewable until the acre counter powers down. When the acre counter is powered up again, you will have to re-enter the password to change settings.

If the password is not correct, you will not be able to change the acre counter settings. When the "PASS" function is selected again, "Ent" will appear in the display.

Changing the password:

Select a new password using the UP and DOWN buttons. Press the FUNC button until the word "SEt" appears in the display. Release the FUNC button. The number in the display is your new pass code. Make sure you write it down. To disable the password, try setting it to 0000. Press and hold the FUNC button until the word "dIS" appears in the display.

If the password is forgotten, it can be disabled by removing the batteries. The password is intended for rental units. It is recommended that a seal be affixed to the rear plate of the acre counter to determine if settings have been tampered with.

BATTERY REPLACEMENT

The battery operated acre counter uses 3 AA batteries. The batteries should last between 5 and 10 years. The acre counter will last much longer than that. Eventually, you will have to replace the batteries. The acre counter will display "LObAt" when the batteries require replacement. Remove the acre counter from the implement and undo the 4 screws on the back of the case. This will separate the housing from the rear plate. Replace the batteries with 3 high quality AA alkaline batteries.

NOTE: This unit is dust and splash resistant. Under no circumstances should this unit be submerged in any conductive, corrosive, or flammable liquid.

OPTIONAL ACCESSORIES

SPECIFICATIONS

Model RR-1210	
Row Spacing	10 Rows on 12" Centers
Planting Width	10 Feet
Overall Width	13.5 Feet
Height	7.5 Feet
Front to Back Length	17 Feet (Includes Tongue)
Weight	Approximately 8,000 Pounds

OPTIONAL ACCESSORIES – ROUGH RIDER DRILL

ITEM	DESCRIPTION
Brillion Style Imprinter	Drops seed on the soil surface and presses it into soil surface.
Multi-Drill Hitch	Multi-drill hitch to pull two drills together. Includes the hydraulic interface with the tractor, light package as applicable, and a dual castor wheel hitch support.
Light Package	Trailer style tail and turn lights with a 4-pin plug on the wiring harness.
Acre Meter - Mechanical/Hub Style	Record acreage planted by the drill. Use **Part # 0600088X.**
Acre Meter - Electronic	Record acreage planted by the drill. Use **Part # 060086E**
Scale (Pesola 93628-M)	Hand held scale that weighs both in grams and ounces used in drill calibration.
Hitch - Double Swivel "I"	The Double Swivel "I" style hitch interchanges with the pintle/clevis hitch assembly. The double swivel rotates 360 degrees horizontal and 180 degrees in the vertical plane. The "I" style allows more movement when planting severe sites.

DRILL STORAGE

STORAGE & PLACING THE DRILL BACK INTO SERVICE

1) Store the drill on a flat, level surface, preferably in a shed. A source for custom made drill covers is: L&L Tarp, 47550 254th Street, Baltic, SD 57003; Phone 605-529-5264

2) Position a 2" x 8" board under the planting discs to prevent contact between the disc and the storage area floor surface. Lower the planting units so the weight of the drill is not supported by the hydraulic system.

3) Block the wheels and detach the drill from the tractor.

4) Vacuum the seed boxes.

5) Remove the convoluted seed hoses, clean and store them in a cardboard box.

6) Slide the cool-season and small box shifter back and forth.

7) Remove the cool-season box row dividers where installed and clean the bottom of the cool-season box.

8) Drop the gates on the cool-season box to its lowest level. The lever is located on the left side of the seed cup as you face the back of the drill.

9) Using an air hose, blow the seed **(all of it)** from the boxes, especially the small seed box cups and flutes.

10) Using a screwdriver, clean stems from the transitions.

11) Clean the drill with a high-pressure washer.

12) Using an air hose, blow **all the water** from the drill, including the inside of the boxes.

13) When cleaning with high pressure water be careful not to force water into pillow block bearings, planter hubs, and press wheel bearings.

13) Paint all bare metal and rust spots. Use Ford Automotive Paint (Tampico Yellow - 1972) or Krylon (Warm Yellow Gloss #1941) on drills manufactured between 2000 and July 2007 and RUST-OLEUM Professional High Performance Enamel (Gloss Black #7579) for a close match to original paint color. On drills manufactured after July 2007 use Cat Yellow Paint High Gloss Aerosol #4C-4200.

14) Spray all moving parts (sprockets, hinges, chains, press wheel bearings, etc) with a silicone based lubricant.

15) Grease all zirks.

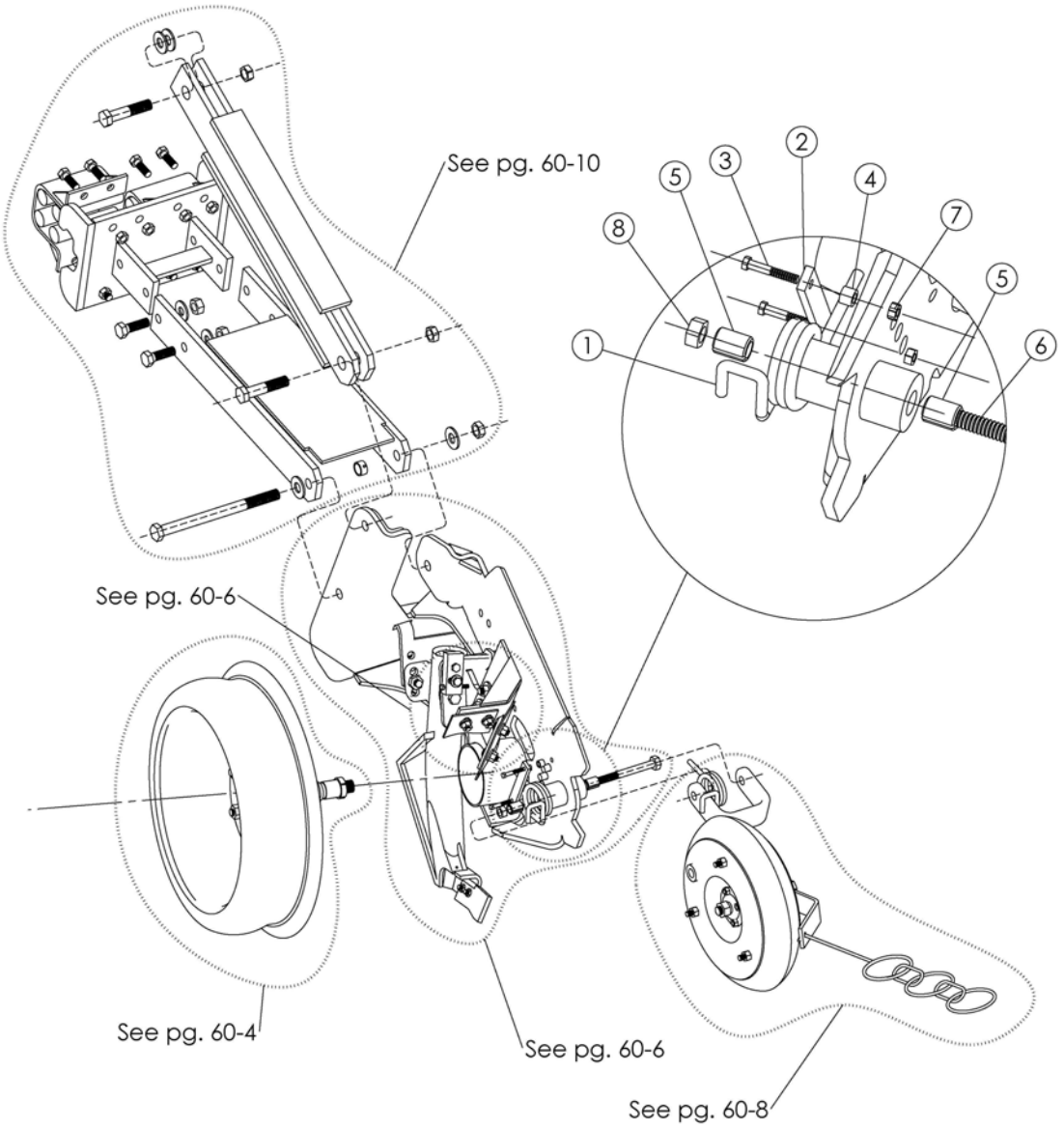
16) Repack wheel bearings and all tapered roller bearings.

17) Check the drill for bent or broken parts and remove or replace them as needed. Pay particular attention to safety decals and the parts of the drill they reference. Repair or replace them as needed so that the drill is **safety-conditioned.**

INDEX TO PARTS CALALOG

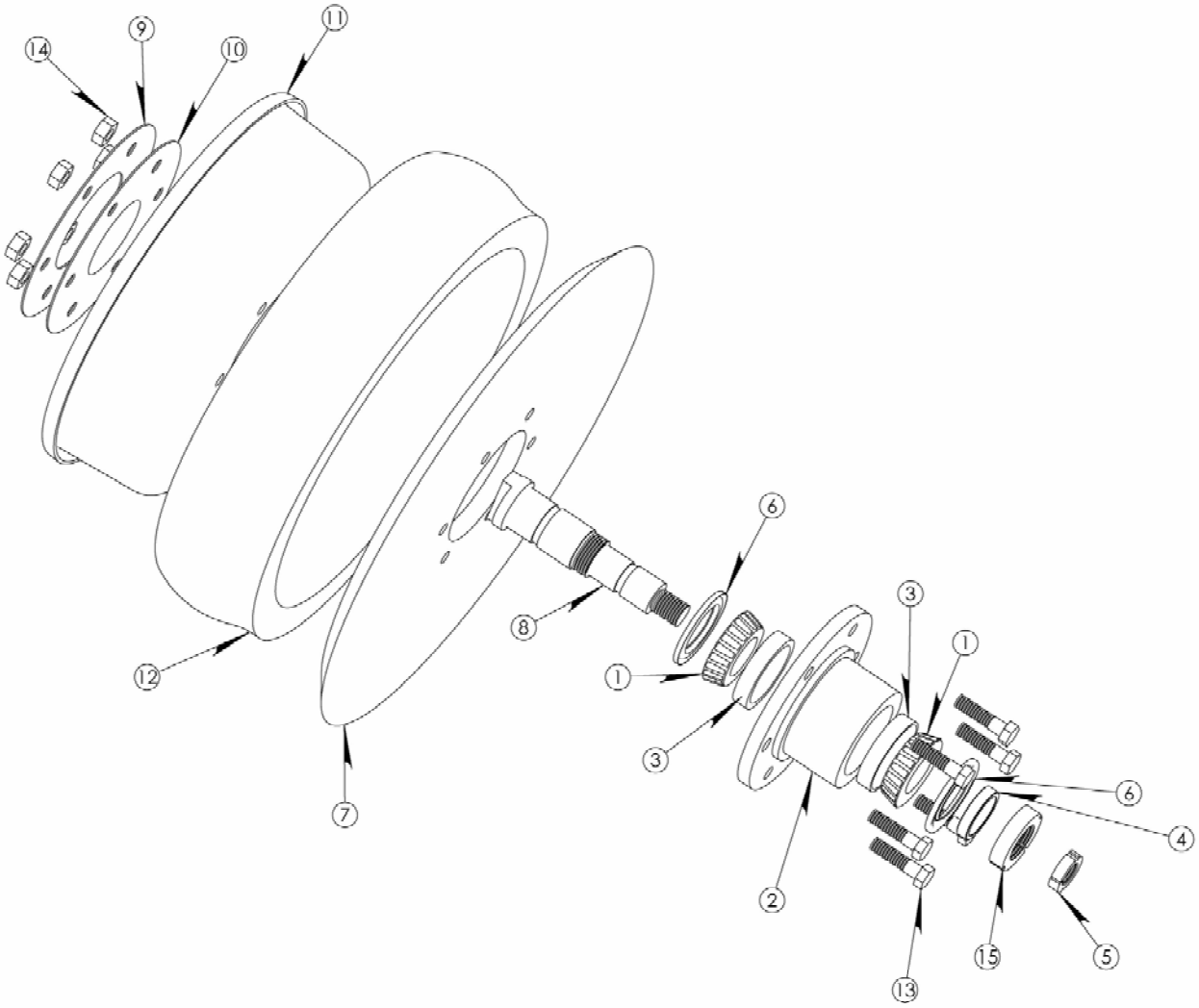
Planter Assembly (Left Hand) ..... **60-2 thru 60-3**
Planting Disc Assembly ..... **60-4 thru 60-5**
Planter Arm Assembly (Left Hand) ..... **60-6 thru 60-7**
Press Wheel ..... **60-8 thru 60-9**
Knuckle Assembly and Parallelogram ..... **60-10 thru 60-11**
Walkboard & Handrail Assembly ..... **60-12 thru 60-14**
Seed Tube Assembly ..... **60-15 thru 60-16**
Seed Box Assemblies ..... **60-17 thru 60-18**
Seed Box Drive Wheel ..... **60-19 thru 60-21**
Hydraulics ..... **60-22 thru 60-24**
Tongue Assembly ..... **60-25 thru 60-26**
Main Wheel Assembly **60-27**
Wheel Lift Assembly ..... **60-28 thru 60-29**
Wheel Lift Detailed ..... **60-30 thru 60-31**
Imprinter ..... **60-32 thru 60-33**
Planter Unit 2002-2005 ..... **60-34 thru 60-36**
Planter Modification ..... **60-37 thru 60-38**

PLANTER ASSEMBLY (LEFT HAND) - PAGE 1 OF 2



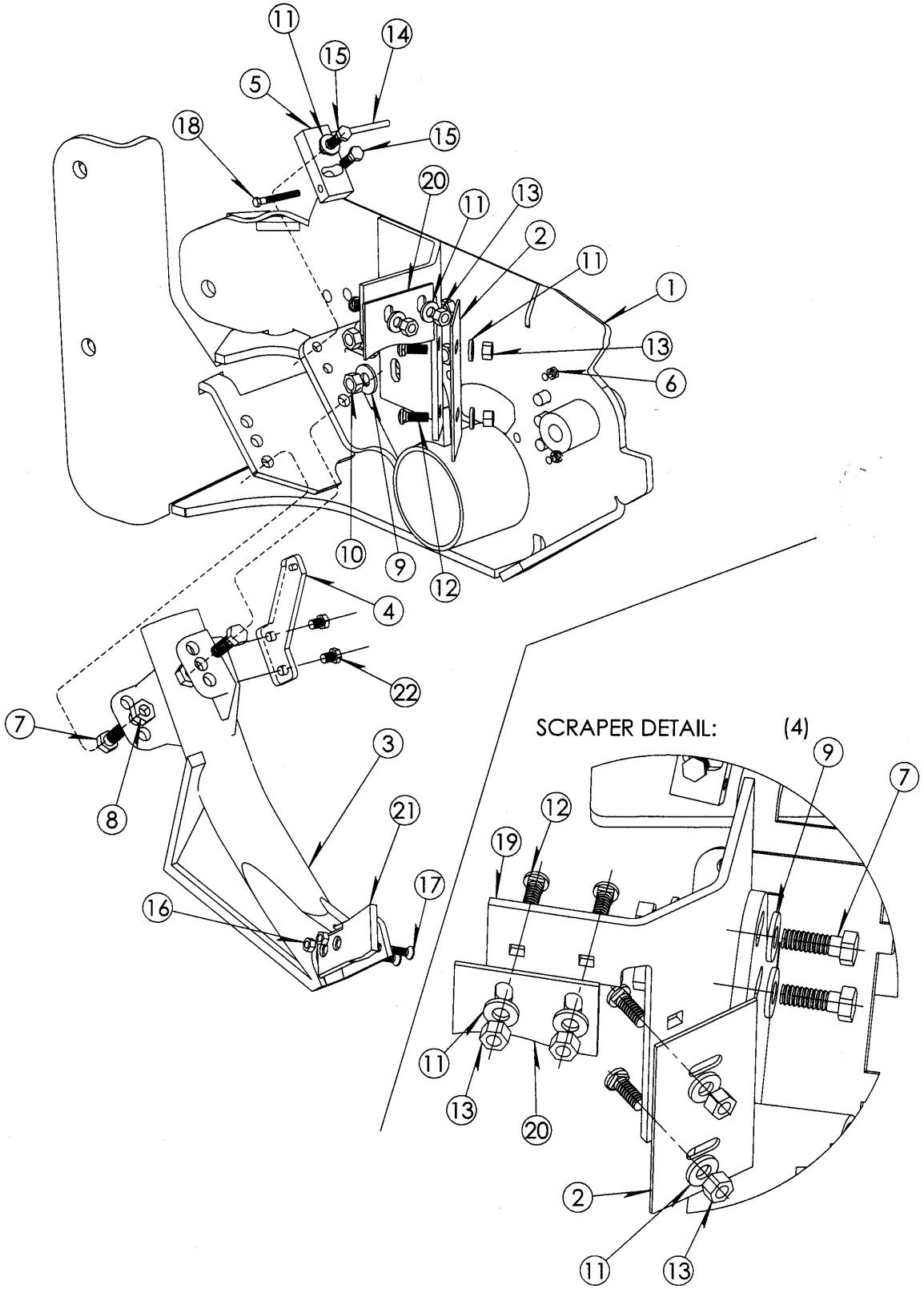
PLANTER ASSEMBLY (LEFT HAND) – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	10961	Spring, Tension
2	109630	Spring Retainer
3	B14-1.5	Bolt, 1/4"x 1-1/2"
4	303730	Press Wheel Spring Clamp Bushing
5	102520	Bushing, Connex - 3/4"OD 1/2"ID 3/4L
6	B12-5.25	Bolt, 1/2"x 5-1/4"
7	N14	Nut, 1/4”
8	N12	Nut, 1/2"

PLANTING DISC ASSEMBLY – PAGE 1 OF 2



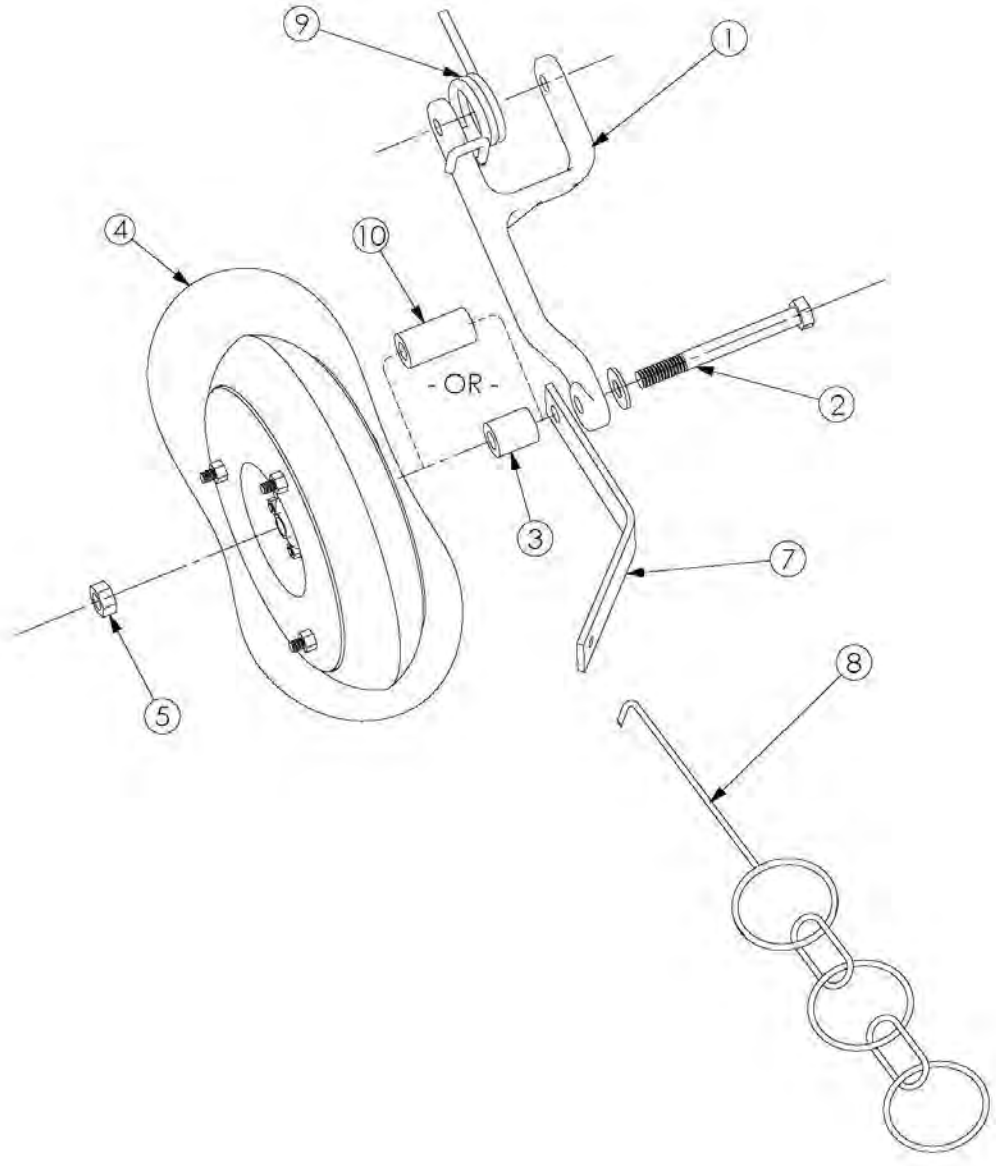
PLANTING DISC ASSEMBLY – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	1077C	Bearing, 6 Bolt Hub (LM501349)
2	1085RR	Disc Hub
3	1077CC	Cup, 6 Bolt Hub- Inner (LM501310)
4	1138DD	Bushing, Thrust Bearing
5	C78-14	Collar, 7/8" 14 Split
6	1138D	Seal, (203062VH)
7	K203M	Disc Blade, 20" – 6 Bolt
8	335121	Axle, Fixed Gauge Wheel
9	1097RR4	Dirt Guard, Retainer
10	1097RR3	Dirt Guard, Cap
11	1097RR	Rim, Gauge Wheel (2007-)
12	1094RR2	Tire, Gauge Wheel (2007-)
13	B12-2GRD8NF	Bolt, 1/2"x 2" Grade 8, National Fine Thread
14	N12-NF	Nut, 1/2" National Fine Thread
15	C150-12	Collar, 1-1/2" – 12 Split

PLANTER ARM ASSEMBLY (LEFT HAND) – PAGE 1 OF 2



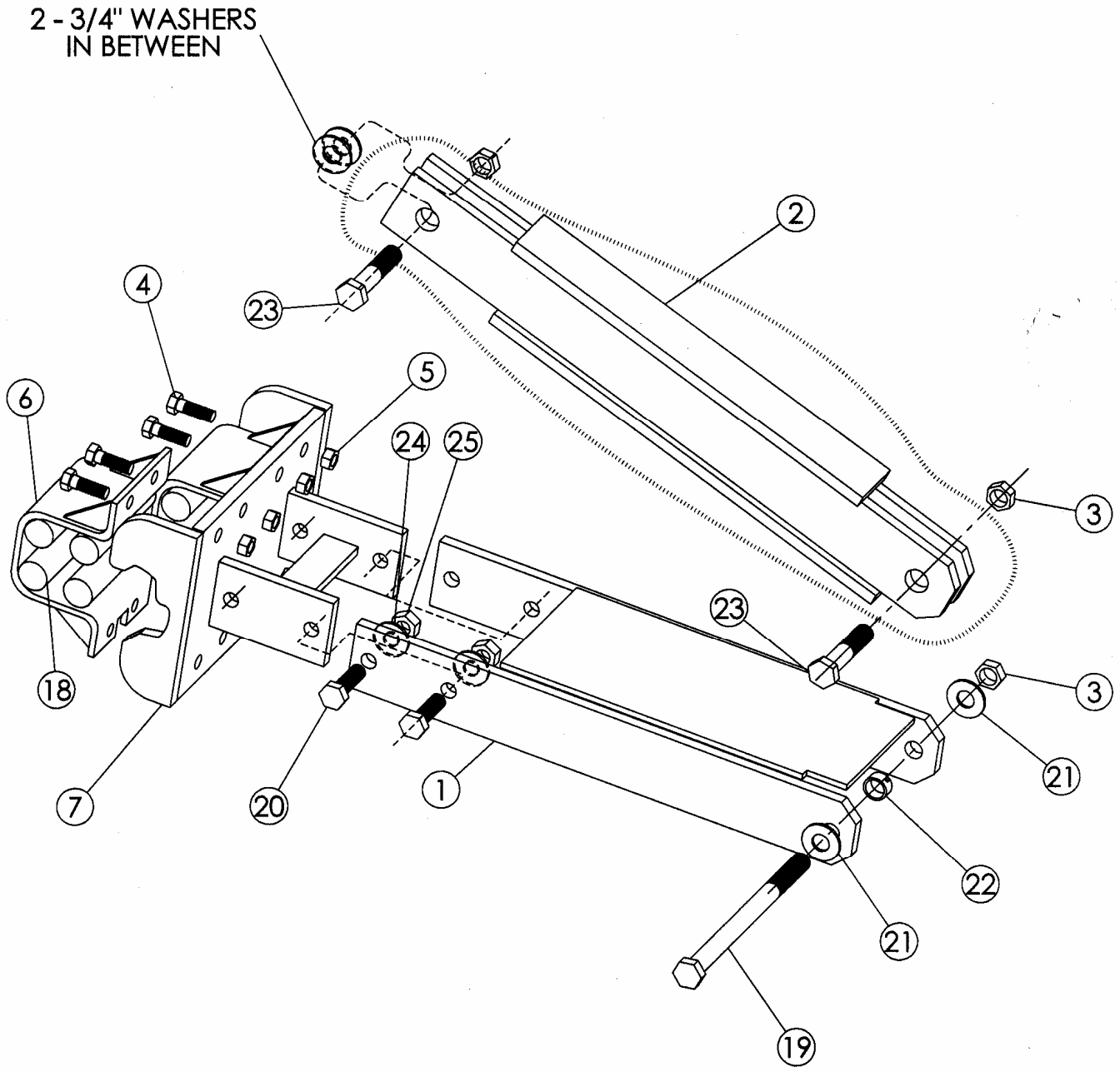
PLANTER ARM ASSEMBLY (LEFT HAND) – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303725	Planter Weldment, Left Hand
2	303740	Lower Scraper
3	0777LH	Boot, Left Hand
4	10997	Spring Mount Bar
5	109971	Spring Tensioner
6	N14	Nut, 1/4"
7	B12-1.5	Bolt, 1/2"x 1-1/2"
8	N12-CL	Nut, 1/2" Clincher
9	W12	Washer, 1/2"
10	N12	Nut, 1/2"
11	W38	Washer, 3/8"
12	CB38-1	Carriage Bolt, 3/8"x 1"
13	N38	Nut, 3/8"
14	303735	Boot Tension Spring
15	B38-1	Bolt, 3/8"x 1"
16	N516-TL	Nut, 5/16" Top Lock
17	S516-.75	Screw, Flat Head Socket Cap, 5/16"x 3/4"
18	B14-2	Bolt, 1/4"x 2"
19	10846ALH	Mud Scraper Mount, Left Hand
20	303741	Upper Scraper
21	303733LH	Seed Deflector
22	B38-.75	Bolt, 3/8"x 3/4"

PRESS WHEEL ASSEMBLY (LEFT HAND) – PAGE 1 OF 2



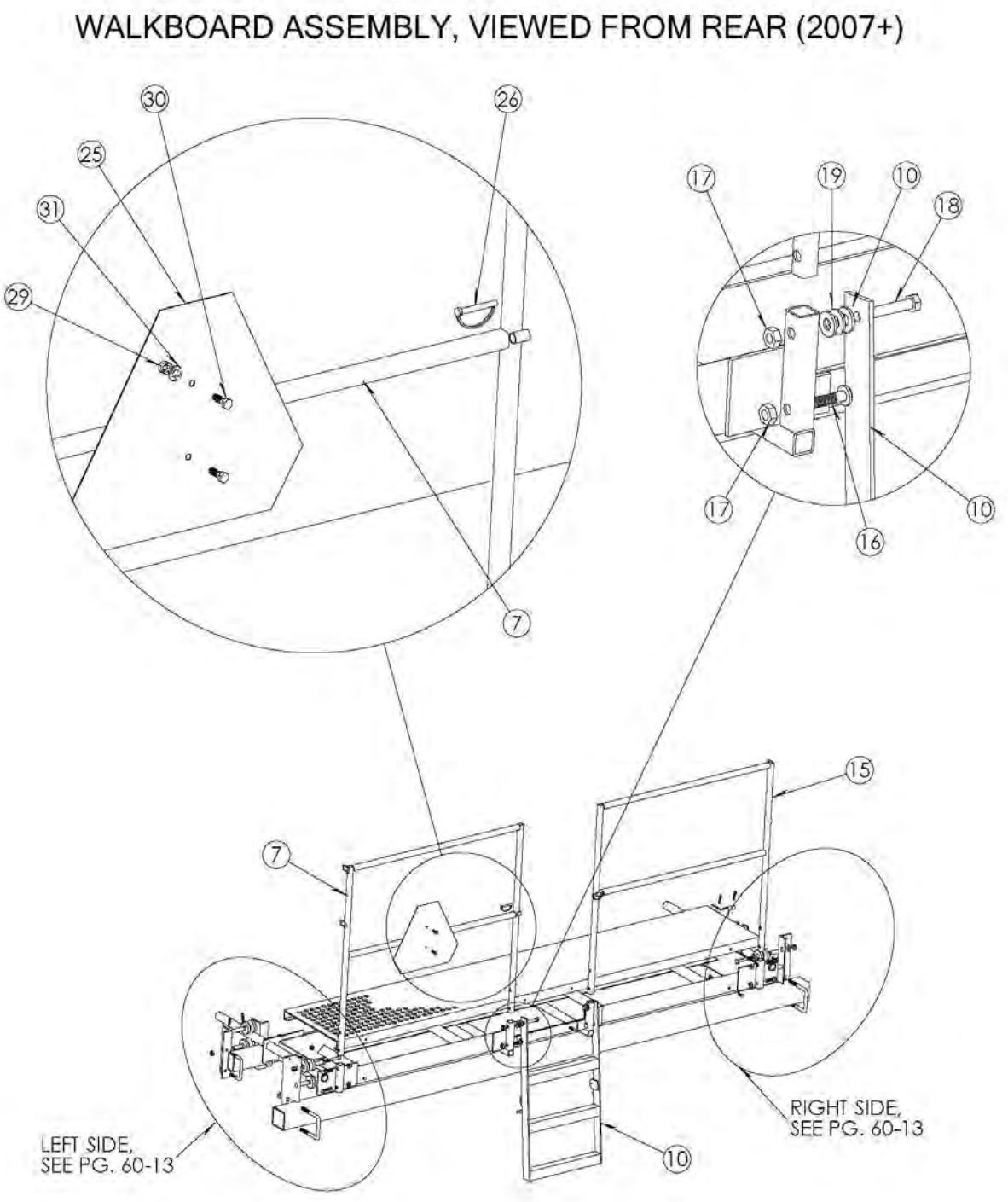
PRESS WHEEL ASSEMBLY (LEFT HAND) – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	10251	"h" Frame
2	B58-6GRD8	Bolt, 5/8"x 6", Grade 8
3	303729	Spacer, Short
4	303724	Press Wheel Tire and Rim
5	N58-TL	Nut, 5/8" Top Lock
6	W58GRD8	Washer, 5/8" Grade 8
7	1093C3	Drag Chain Mount
8	1093C	Covering Chain
9	10961	Spring, tension
10	303746	Spacer, Long

KNUCKLE ASSEMBLY & PARALLELOGRAM – PAGE 1 OF 2

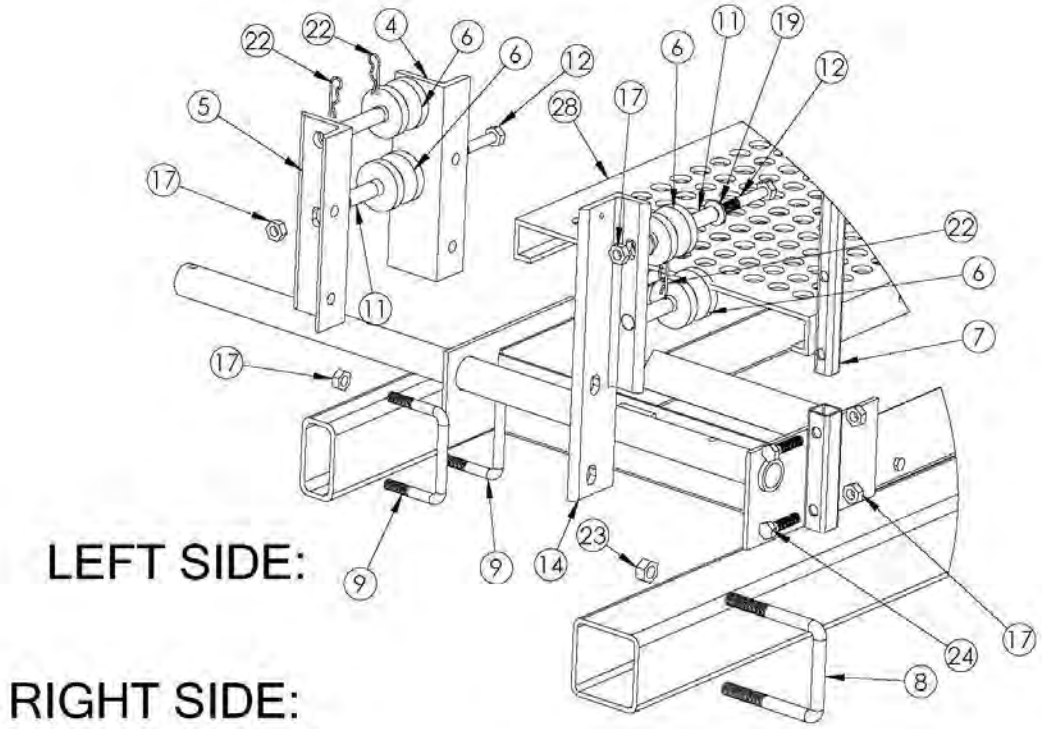


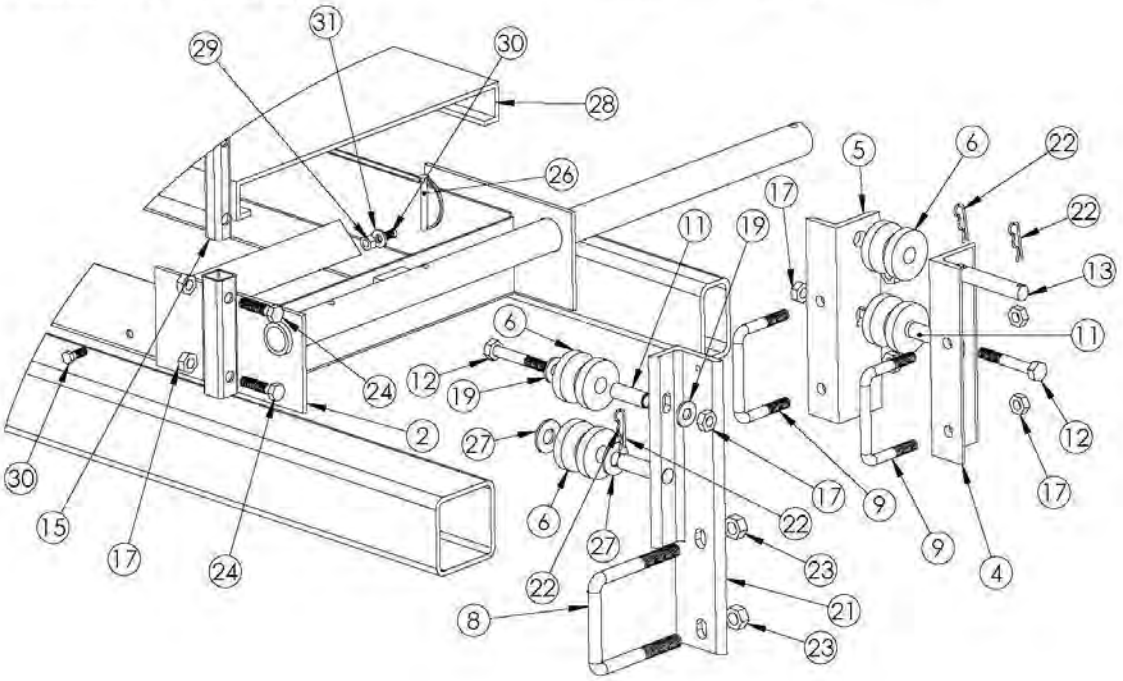
KNUCKLE ASSEMBLY & PARALLELOGRAM – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	10253	Planter H-Frame
2	10250	Upper Parallelogram Swing Arm
3	N34-CL	Nut, 3/4" Clincher
4	B12-1.5	Bolt, 1/2"x 1-1/2"
5	N12	Nut, 1/2"
6	103220	Clamp, Half Knuckle Casting
7	33813	Stroke Control Weldment
18	42202X	Rubber, Cord 1.375"x 5-1/4" – 80 Duro
19	B34-10	Bolt, 3/4"x 10"
20	B58-2	Bolt, 5/8"x 2"
21	W34	Washer, 3/4"
22	11244	Collar w/Set Screw, for 3/4" Bore Shaft
23	B34-3.5GR8	Bolt, 3/4"x 3-1/2" Grade 8
24	W58	Washer, 5/8"
25	N58-TL	Nut, 5/8" Top Lock

WALKBOARD ASSEMBLY – PAGE 1 OF 3



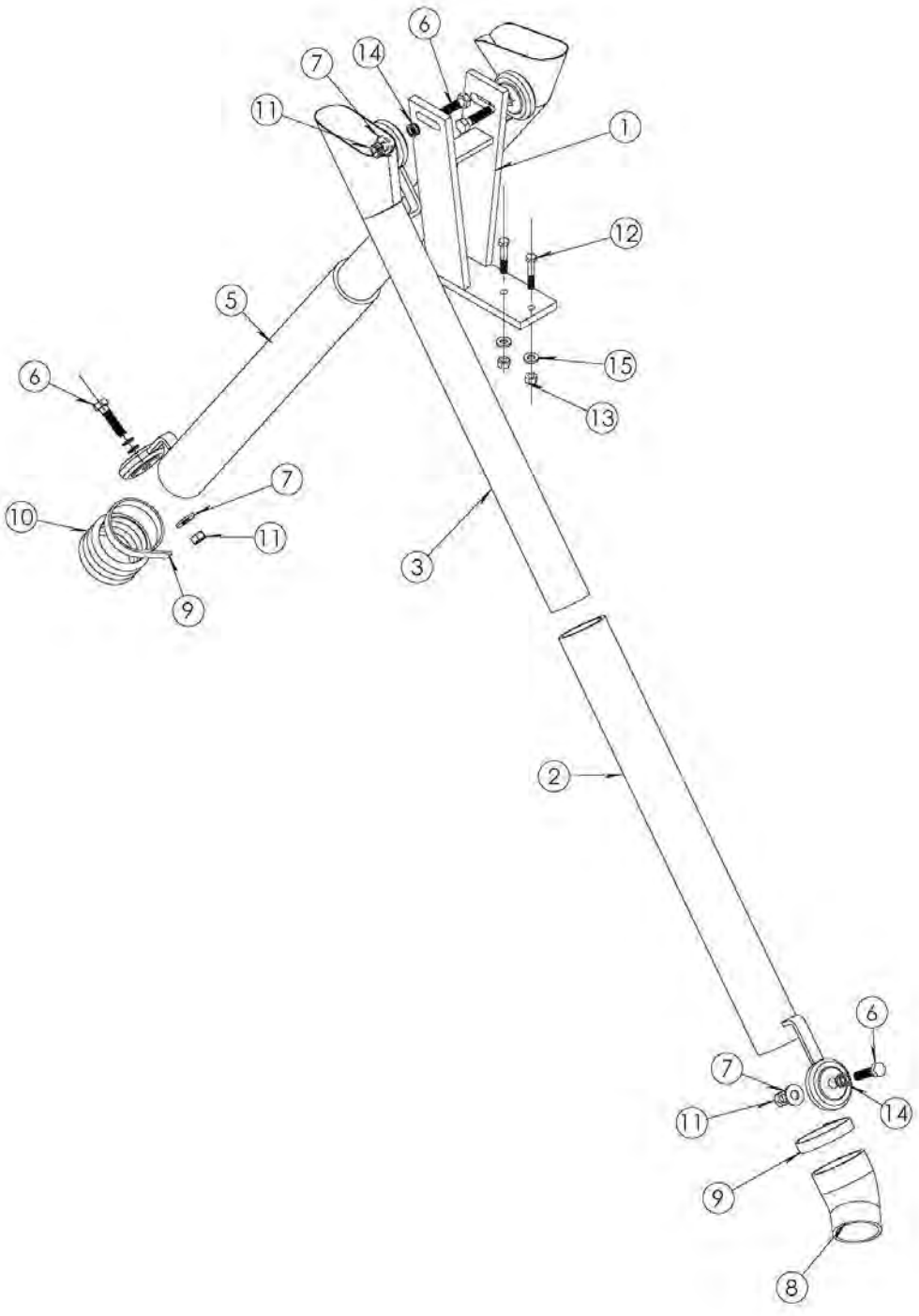
WALKBOARD ASSEMBLY – PAGE 2 OF 3





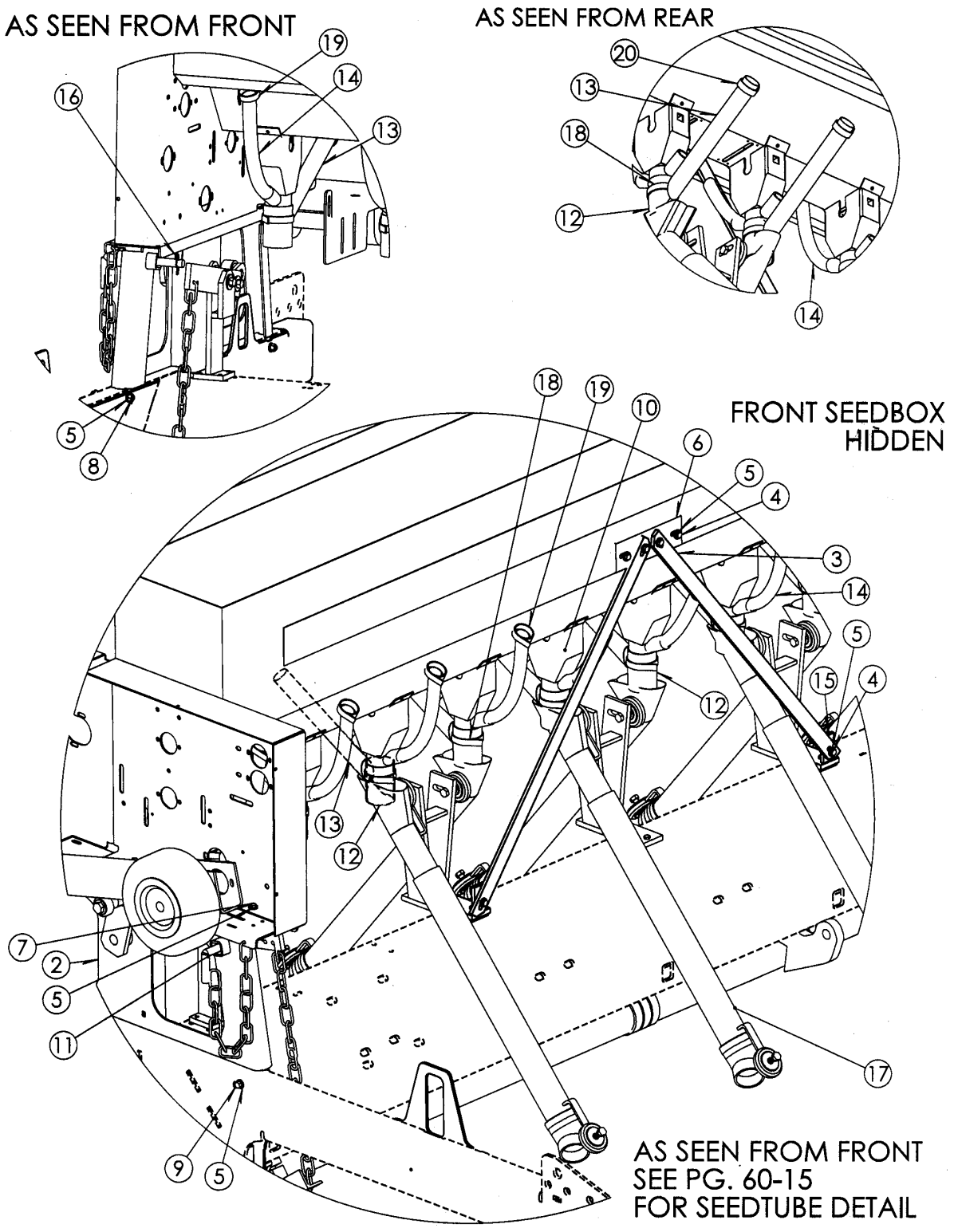
WALKBOARD ASSEMBLY – PAGE 3 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303656	Square Tube, 4"x 4"
2	303669	Walkboard Weldment
3	303637	Square Tube 2"x 4"
4	303689RH	Walkboard Support, Front Right Hand
5	303689LH	Walkboard Support, Front Left Hand
6	303697	Walkboard Roller
7	303684LH	Walkboard Railing, Left Hand
8	UB58-5.25-4	U-Bolt, 5/8"x 5-1/4"x 4"
9	UB12-3-4	U-Bolt, 1/2"x 3'x 4"
10	303686	Walkboard Ladder
11	3036100	Roller Bushing, Walkboard Support
12	B12-3.5	Bolt, 1/2"x 3-1/2"
13	303699	Roller Axle, rear Walkboard Support
14	303688LH	Walkboard Support, Rear Left Hand
15	303684RH	Walkboard Railing, Right Hand
16	CB12-2	Carriage Bolt, 1/2"x 2"
17	N12-CL	Nut, 1/2" Clincher
18	B12-2.5	Bolt, 1/2"x 2-1/2"
19	W12	Washer, 1/2"
21	303688RH	Walkboard Support, Rear Right Hand
22	HP116	Hitch Pin, 1/16"
23	N58-TL	Nut, 5/8" Top Lock
24	B12-2	Bolt, 1/2"x 2"
25	1046C72	Slow Moving Vehicle Sign, PM10-1105-2A
26	4226XG0	Lock Pin, Round
27	W34	Washer, 3/4"
28	303700	Open Grid Grate, 18"
29	N38	Nut, 3/8"
30	B38-1	Bolt, 3/8"x 1"
31	W38	Washer, 3/8"

SEED TUBE ASSEMBLY – PAGE 1 OF 2



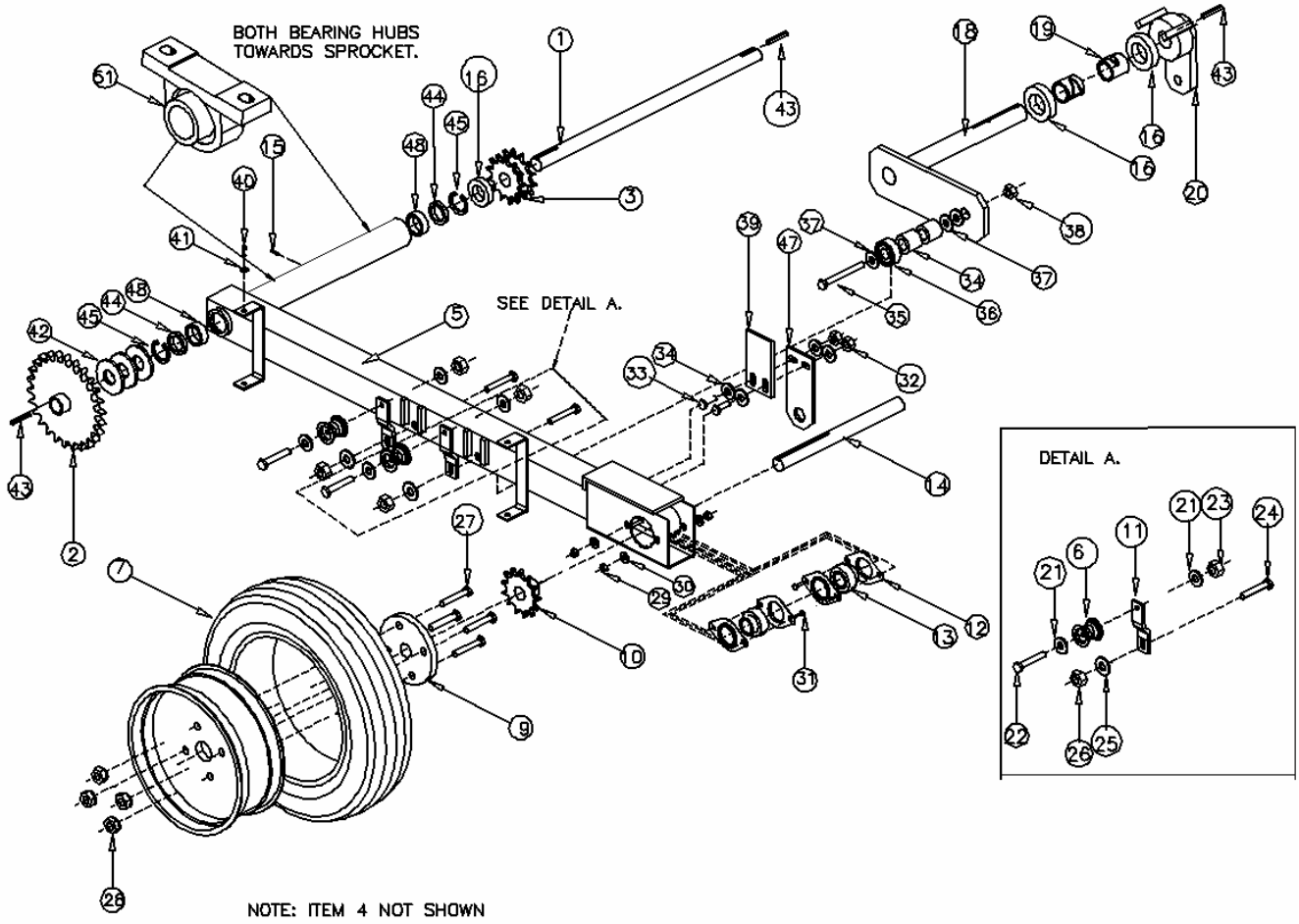
SEED TUBE ASSEMBLY – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303662	Seed Tube Mount
2	303692	Seed Tube, Front Bottom
3	303691	Seed Tube, Front Top
4	303693 (Not Illustrated)	Seed Tube, Rear Top
5	303694	Seed Tube, Rear Bottom
6	B12-2	Bolt, 1/2"x 2"
7	W12	Washer, 1/2"
8	777-2	Hose Elbow
9	321344	Clamp, Seed Hose #44
10	1016	Seed Hose, Convoluted, 2-1/2" ID x 3"
11	JN12	Jam Nut, 1/2" Locking
12	B38-2	Bolt, 3/8" x 1"
13	N38-TL	Nut, 3/8" Top Lock
14	MB12-.062	Machinery Bushing, 1/2"x 0.062 Thickness
15	W38	Washer, 3/8"

SEED BOX ASSEMBLIES – PAGE 1 OF 2



SEED BOX ASSEMBLIES – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303671 (Not Illustrated)	Seed Box Tower, Left Hand
2	303672	Seed Box Tower, Right Hand
3	303673	Seed Box Strut
4	B38-1.5	Bolt, 3/8"x 1-1/5"
5	W38	Washer, 3/8"
6	303720	Strut Mount Plate
7	B38-1	Bolt, 3/8"x 1"
8	N38-CL	Nut, 3/8" Clincher
9	B38-4	Bolt, 3/8"x 4"
10	1033	Transition
11	33317	Drive Wheel Pin & Chain
12	303743	Transition Hose
13	303745	Vinyl Feed Tube
14	1012	Seed Hose, Small
15	303747	Support Mount, Front seed Box
16	HP116	Hitch Pin, 1/16"
17	303707	Seed Tubes and Mounts
18	1009	Clamp, Seed Hose #36
19	1013	Clamp, Seed Hose #10
20	3213	Clamp, Seed Hose #20

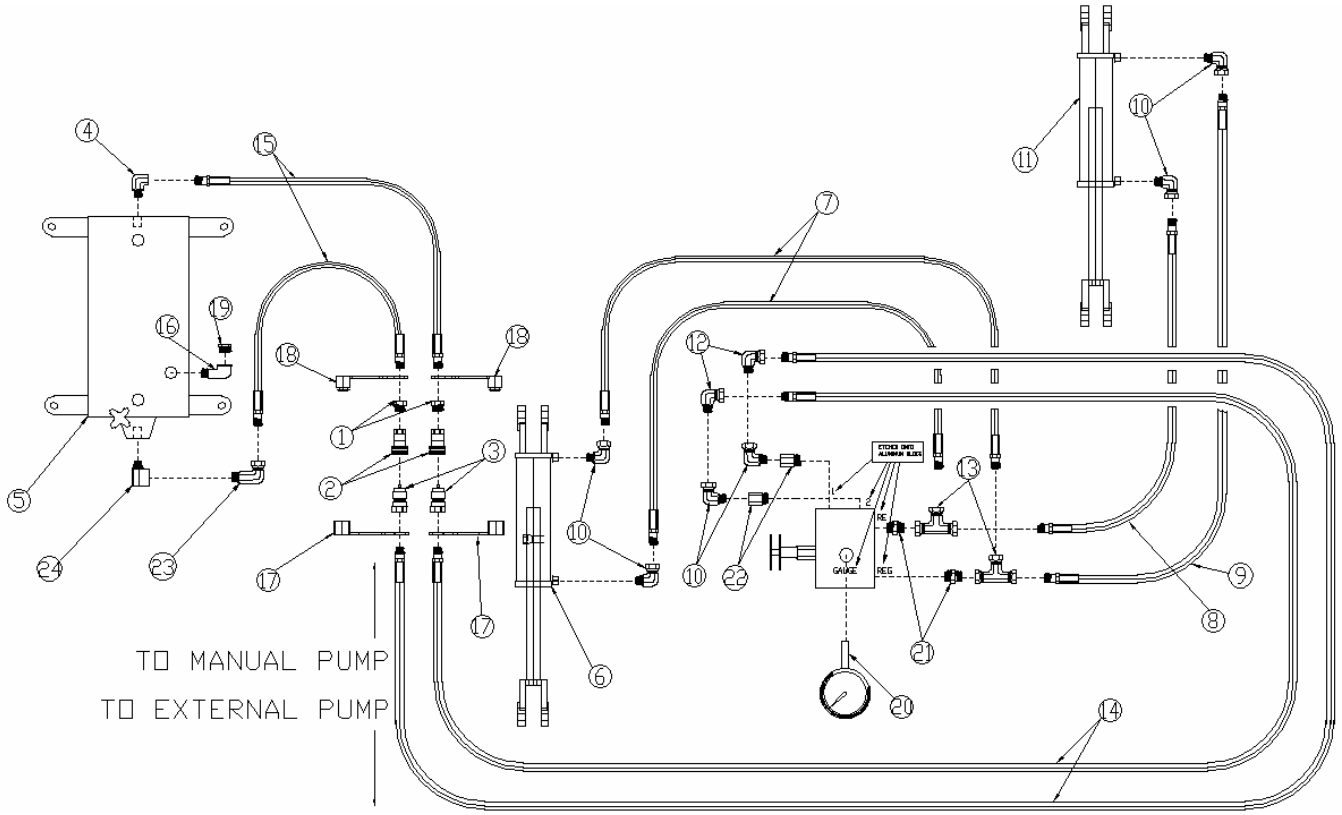
SEED BOX DRIVE WHEEL – PAGE 1 OF 3

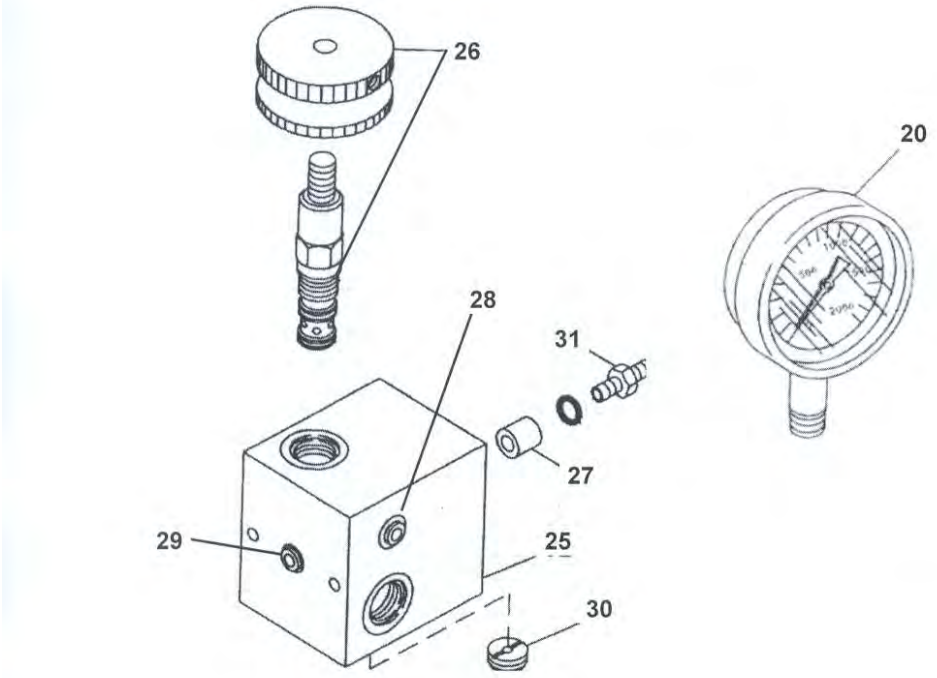


SEED BOX DRIVE WHEEL – PAGE 2 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	33306	Shaft, 1" OD x 21-1/2" L
2	1055A2 (40B36)	Sprocket, 1" Round Bore – KY & SS
3	710531	Sprocket, Double 18/18 – KY & SS
4	1037LDXP	Bracket, Chain Guard
5	33302	Tube, Rectangular Wheel Arm
6	1041A	Spool, Plastic
7	WF1072	Wheel Assembly, 5.70 x 8
8	33320	Spacer
9	303739	Hub, 4 Bolt
10	1057F (40B18)	Sprocket, , 1" Round Bore – KY & SS
11	3237X	Idler Support
12	3007A	Flangette (52MST)
13	3007	Bearing, 1" Spherical
14	33305	Shaft, 1" OD x 12" L
15	1093DD	Zirk, 1/4"-28
16	1124	Collar, Shaft – 1" Bore
18	33855-3	Wheel Arm Lift w/Shaft, 1" OD x 7-3/4" L
19	10256	Bushing, Connex
21	W12H	Washer, 1/2" Hardened
22	B12-2	Bolt, 1/2"x 2
23	N12-CL	Nut, 1/2" Clincher Nut
24	B12-3	Bolt, 1/2"x 3"
25	W12H	Washer, 1/2" Hardened
26	N12-TL	Nut, 1/2" Top Lock
27	1083A	Wheel Bolt, 1/2"x 2"
28	WN12-20	Wheel Nut, 1/2"-20 With 45^0 Bevel From Centerline
29	N516-FN	Nut, 5/16" Flanged Nut
30	W516	Washer, 5/16"
31	CB516-1	Bolt, Carriage 5/16"x 1"
32	N12-TL	Nut, 1/2" Top Lock
33	B12-1.5	Bolt, 1/2"x 1-1/2"
34	W12	Washer, 1/2"
35	B58-4.5	Bolt, 5/8"x 4-1/2"
36	1037DBX1	Bearing, 1" Bore Cylindrical OD
37	W58	Washer, 5/8"
38	N58-FN	Nut, 5/8" Flanged Nut
40	B14-.625	Bolt, 1/4"x 5/8"
41	W14	Washer, 1/4"
42	W1	Washer, 1"
43	1110	Key, Square 1/4"x 1-1/4"
44	1138D	Seal, 1"

SEED BOX DRIVE WHEEL – PAGE 3 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
45	HO156ST	Retaining Ring, 1"
46	33301	Tube, Wheel Arm Cylindrical
47	33307	Mount, Wheel Arm Support
48	33002	Bearing, 1" Bore Needle
50	1057HUB1	Hub, Sprocket 1" Bore
51	3015	Pillow Block Bearing

HYDRAULICS - PAGE 1 OF 3





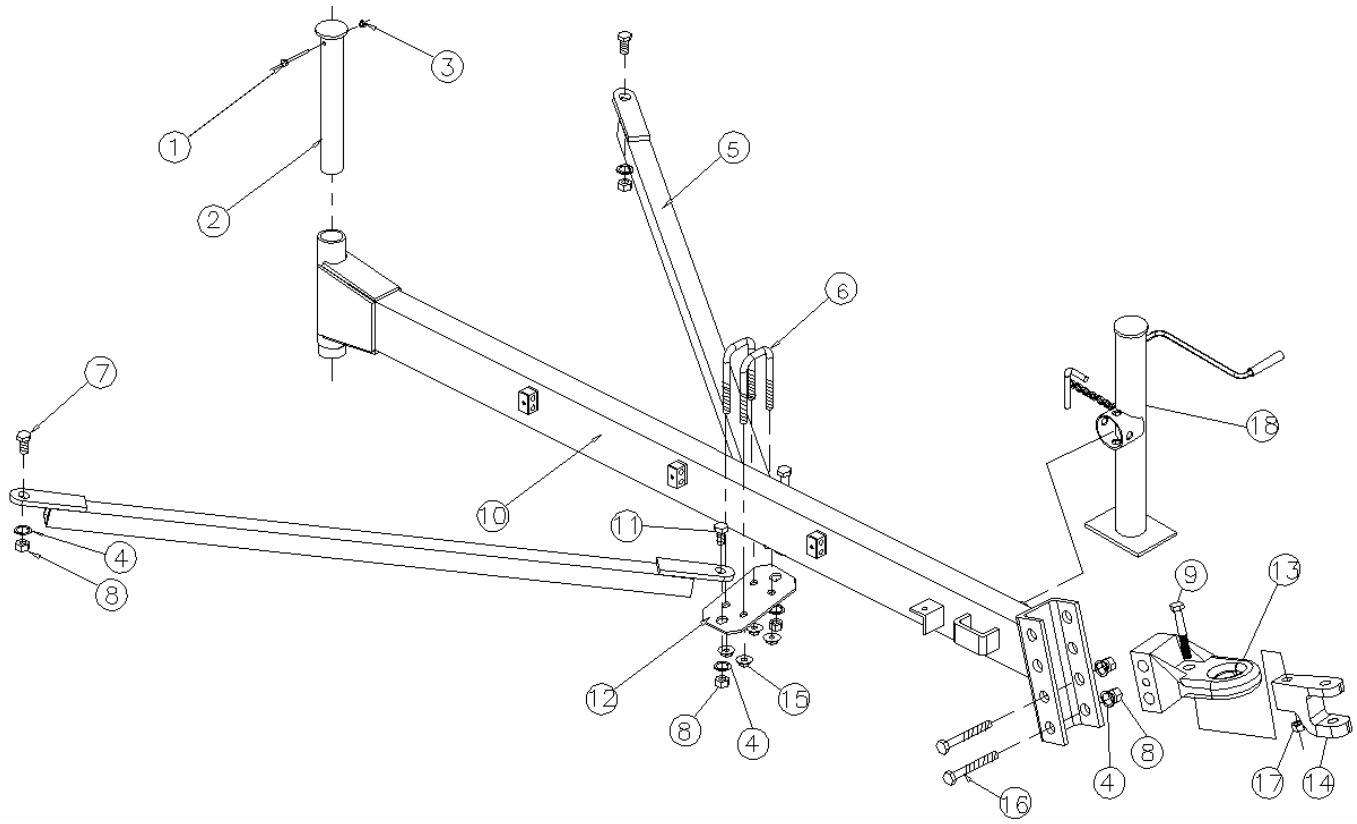
HYDRAULICS – PAGE 2 OF 3			
ITEM NO.	**PART NUMBER**		**DESCRIPTION**
1	422201		Reducer Bushing, Hex Brass NPT – 1/2"M to 3/8 “F
2	42220A		Quick Coupler, 1/2” NPT, AG QD, AF15-08-NV-12-F
3	42220		Quick Tip, NPT, AG QD, AF15-08-NV-12-M
4	4224A22		Street Elbow NPT, 90^0 1/2”M x 3/8”F
5	422602		Pump, Manual Hydraulic
6	42260		Cylinder, Hydraulic 3"x 8" 2500psi
7	4222X3		Hose, Hydraulic - 3 ft
8	4222X8		Hose, Hydraulic - 8 ft
9	4222X9		Hose, Hydraulic - 9 ft
10	4224A1		Swivel Adapter, O-Ring style, 90^0 1/2”M x 3/8”F
11	42260		Cylinder, Hydraulic 3"x 8" 2500psi
12	422603		Swivel Adapter NPT, 90 3/8”M x 3/8”F
13	422617		Tee, Swivel, 3/8” x 3/8”’ x 3/8” FG1603-06-06-06
14	4222X15		Hose, Hydraulic - 15 ft
15	4222X2		Hose, Hydraulic - 2 ft
16	422619		Street Elbow NPT, Galvanized Steel, 3/8”M x 3/8”F
17	42202C		Dust Cover, Hydraulic Rubber, Female
18	422031		Dust Cover, Hydraulic Rubber, Male
19	422618		Breather Plug - Flat, NPT 1/2"
20	4226G		Pressure Gauge
21	4224C		Adapter, Pipe, O-Ring to NPT 3/4”NF x 3/8”NPT
22	422206		Reducer Bushing, Hex, Brass NPT 1/2”M x 3/8”F
23	422406		Swivel Adapter, Extra Long, NPT 90^0 3/8”M x 3/8”F
24	422612		Street Elbow NPT, Brass 90^0 1/2”M x 1/2”F 3400-6
25	4226C3		Manifold, Aluminum
26	4226C1		Control Cartridge w/Knob
27	4226C2		Check Valve, Control Cartridge
28	422615		Plug, O-Ring Hex Hollow, 5/16”-24
29	422616		Plug, O-Ring Hex Hollow, 7/16”-20
30	4226C4		Orifice
	4224A4	(Not Illustrated)	Port Reducer, O-Ring Style, 7/8”-14M x 7/8”-14F
	422620	(Not Illustrated)	Adapter, Pipe, O-Ring to NPT, 3/4”NF x 1/4”
	33177	(Not Illustrated)	Gauge Mount
	B516-.75	(Not Illustrated)	Bolt, 5/16” x 3/4”
	N516-FN	(Not Illustrated)	Nut, 5/16” Flanged Nut
	4226151	(Not Illustrated)	O-Ring, Thread 5/16”-24, Size 02, ID .239
	4226161	(Not Illustrated)	O-Ring, Thread 7/16”-20, Size 04, ID .351
	422621	(Not Illustrated)	O-Ring, Thread 3/4”-16, Size 08, ID .644
	422622	(Not Illustrated)	O-Ring, Thread 7/8”-14, Size 10, ID .755

HYDRAULICS - PAGE 3 OF 3

Servicing the Rangeland Hydraulic Control Valve Assembly:

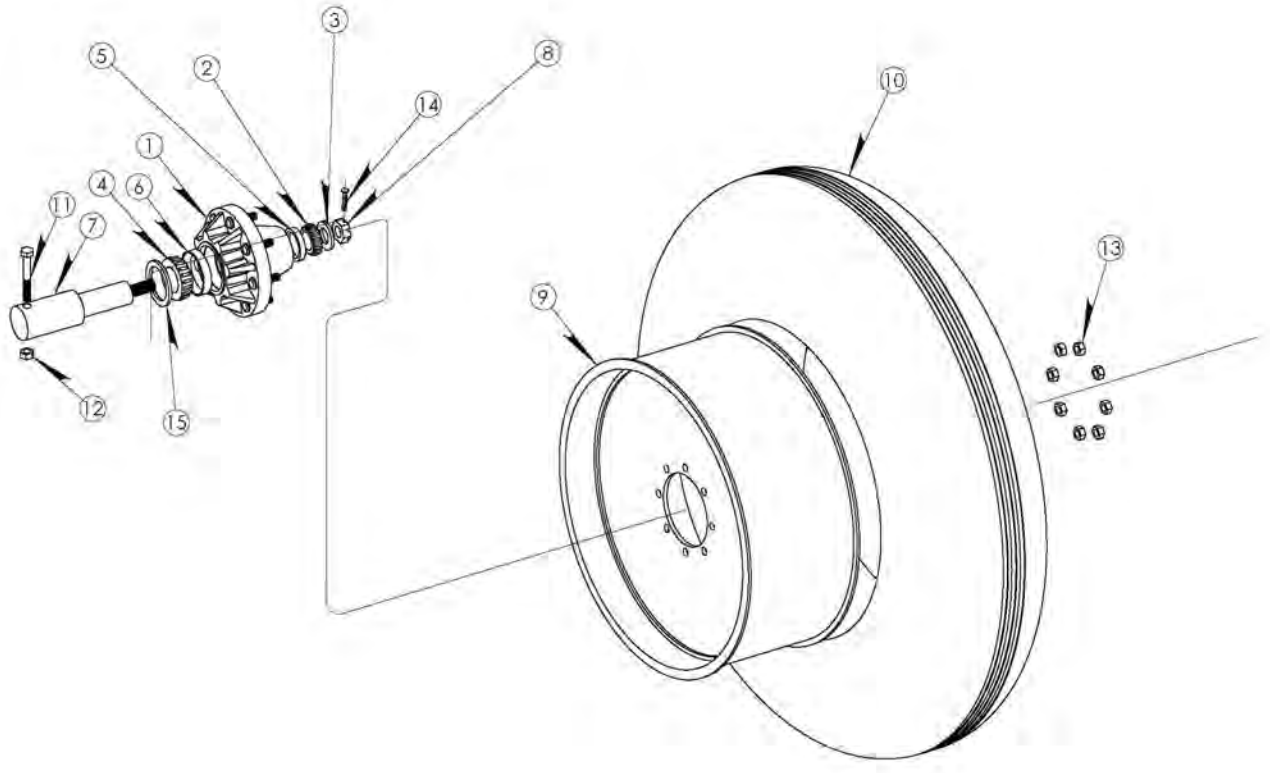
1. **Clean Valve Block – Soak in mineral spirits and blow out all openings with compressed air.**
2. **Place valve block on a clean surface such as newspaper. Orient valve block with ports stamped "RE" and "REG" down. Keeping "RE" and "REG" ports on newspaper, rotate valve block until two 5/16-18 tapped blind holes for the mounting bolts face the assemblies. This is side 1.**
3. **Obtain a squeeze bottle filled with hydraulic oil. All O-Rings and threads (both female and male) must be generously lubricated prior to installing any item!**
4. **Side 1 (5/16-24 O-Ring port and two 5/16-18 blind holes for mounting bolts)**
   – Lubricate and install 5/16-24 O-Ring plug with 1/8" allen wrench.
5. **Side 2 (3/4-16 gauge port and 7/16-20 O-Ring port)**
   - Lubricate and install 7/16-20 O-Ring plug with 3/16" allen wrench.
   - Lubricate and install 3/4-16 O-Ring to 1/4 NPTF gauge adaptor fitting with 7/8" box end wrench.
6. **Side 3 (Ports 1 and 2 – 7/8-14 O-Ring)**
   - Lubricate and install check valves into both ports with a 3/4" wood or plastic rod. DO NOT HAMMER! Plastic end of check valve must face outward. –
   - Lubricate and install 7/8-14 male O-Ring x 3/4-16 female O-Ring fittings into both ports using a 1" box end wrench.
7. **Side 4 (Blank, no assembly operations required).**
8. **Side 5 (Top – One 7/8x14 cavity for Control Cartridge).**
   - Lubricate the entire cartridge and cavity. Install the Adjustable Pressure Control Cartridge using a 1" open-end wrench.
9. **Side 6 (Bottom – Two 3/4-16 O-Ring ports and One 7/16-20 O-Ring port marked "RE" and "REG"). Caution: The "RE" port must have a .100" diameter orifice. Two types of orifices may be encountered. Early production used a John Deere valve assembly with a slotted orifice installed in the aluminum block. Late production used a hex socket orifice screwed into the steel adapter fitting which in turn is screwed into the block. In either case the orifice is in the "RE" port.**
   - Lubricate and install the 7/16-20 plug using a 3/16" allen wrench. Lubricate and install the modified 3/4-16 x 3/8 male pipe adaptor into the "RE" port using a 7/8" box end wrench. Verify the orifice presence.
   - Lubricate and install a standard 3/4-16 x 3/8 male pipe adaptor into the "REG" port. "REG" port does not have an orifice. Note: Early production John Deere valves use standard adaptors in both ports because the orifice is in the aluminum block.

TONGUE ASSEMBLY – PAGE 1 OF 2



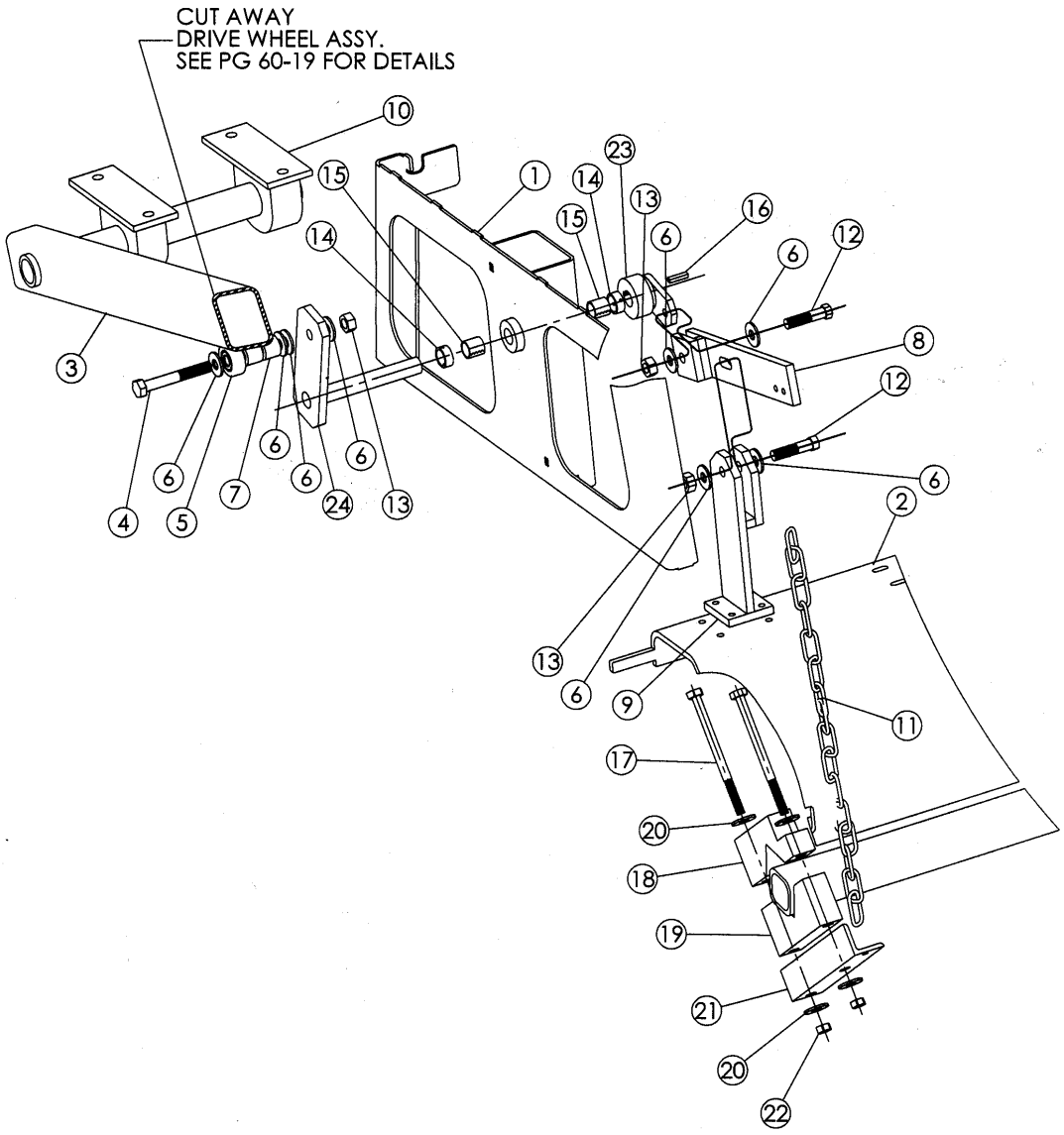
TONGUE ASSEMBLY – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B38-3	Bolt, 3/8"x 3"
2	3370011	Tongue Pin
3	N38	Nut, 3/8"
4	W1	Washer, 1"
5	33711	Strut, Tongue
6	UB58-6.5-3	U-Bolt, 5/8"x 6-1/2"x 3"
7	B1-2.5	Bolt, 1"x 2-1/2"
8	N1	Nut, 1"
9	B34-6	Bolt, 3/4"x 6"
10	33700	Tongue, RoughRider
11	B1-2.5	Bolt, 1"x 2-1/2"
12	33716	Plate, Tongue Clamp
13	1022B2	Hitch Base, Canadian Tool & Die (#PPI-206VR)
14	1022C2	Hitch Clevis, Canadian Tool & Die (#PPI-331VH)
15	N58-TL	Nut, 5/8" Top Lock
16	B1-6.5	Bolt, 1"x 6-1/2"
17	N34-TL	Nut, 3/4" Top Lock
18	10691N	Parking Jack, Pin Style RoughRider

MAIN WHEEL ASSEMBLY – PAGE 1 OF 1



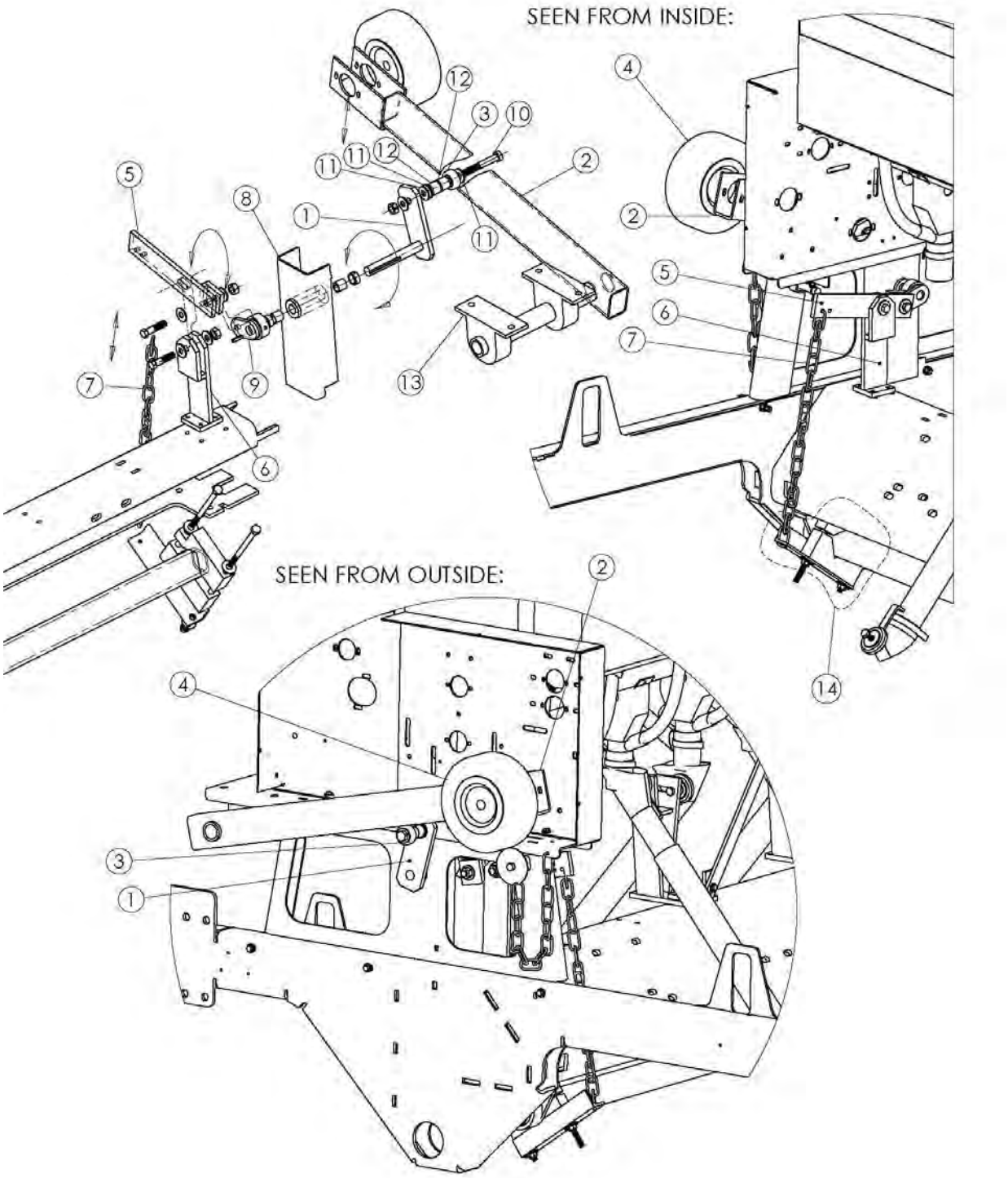
MAIN WHEEL ASSEMBLY		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	335140	Hub, 8 Bolt
2	1076RR	Outer Bearing (LM501349)
3	W1	Washer, 1”
4	1077RR	Inner Bearing (387AS)
5	1076CRR	Cup, Outer for 8 Bolt Hub (LM501310)
6	1077CRR	Cup, Inner for 8 Bolt Hub (382A)
7	2036RR	End Wheel Axle
8	CN11.25	Castle Nut, 1 1/4 -12
9	1072B2	Wheel
10	107215	Tire, Rib Implement 11.25-28SL 12 Ply
11	B58-4.5	Bolt, 5/8"x 4-1/2"
12	N58-TL	Nut, 5/8" Top Lock
13	WN58NF	Wheel Nut, 5/8" National Fine Thread
14	CP316-2	Cotter Pin, 3/16"x 2"
15	1138RR	Seal, 8 Bolt Hub (CR29968)
16	1082C (Not Illustrated)	Dust Cap

WHEEL LIFT ASSEMBLY – PAGE 1 OF 2



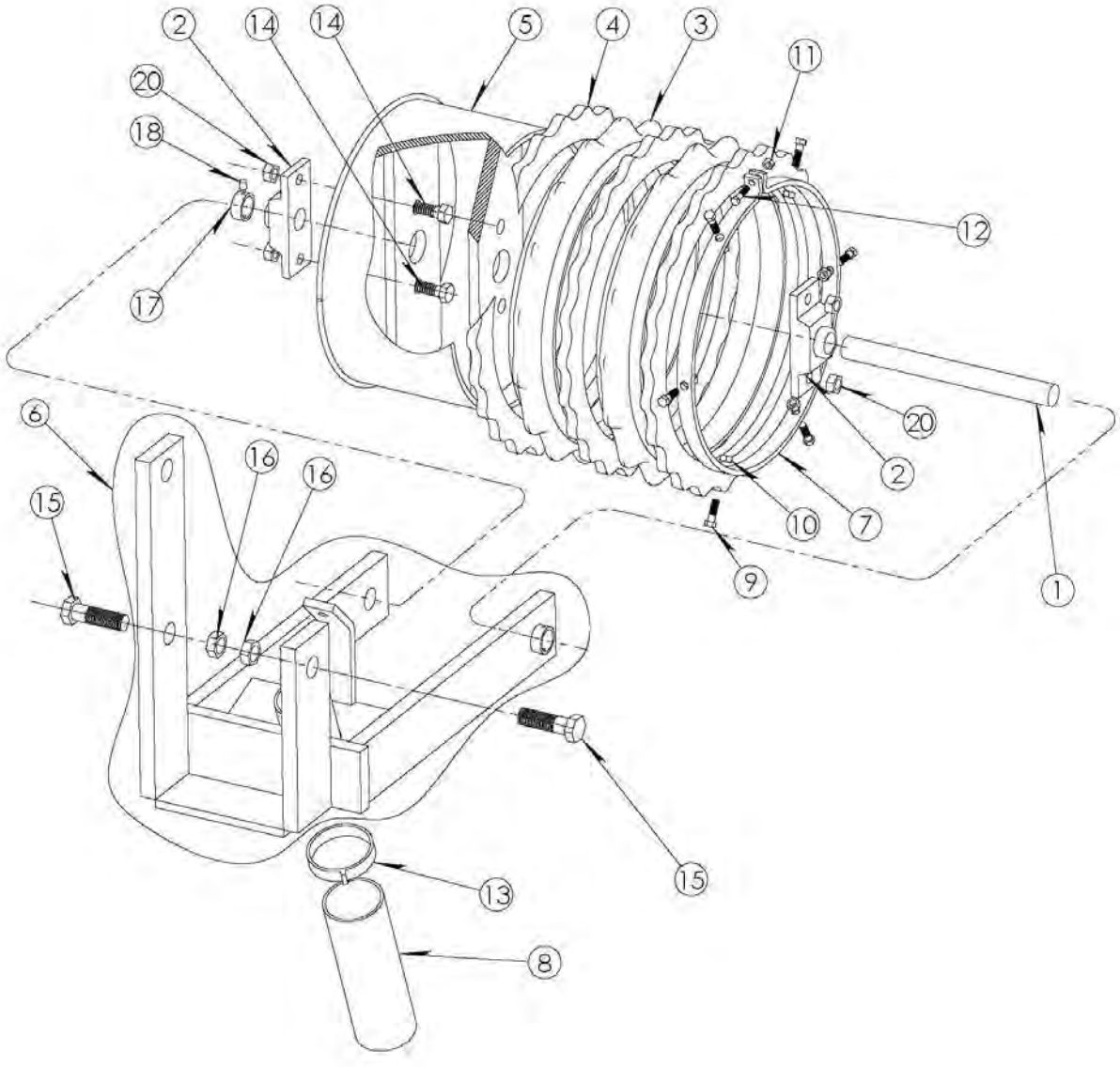
WHEEL LIFT ASSEMBLY – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303672 303671	Seed Box Tower, Right Seed Box Tower, Left
2	303614	Main Frame
3	3302	Arm, Drive Wheel
4	B58-4.5	Bolt, 5/8"x 4-1/2"
5	1037DBX1	Bearing
6	W58	Washer, 5/8"
7	33320	Spacer
8	303682	Cantilever, Drive Wheel Lift Assembly
9	303683	Base, Drive Wheel Lift Assembly
10	3015	Bearing, Drive Wheel Assembly (UPC210-32)
11	8955XC	Chain, Drive Wheel Assembly (19 Chain Links)
12	B58-2.5	Bolt, 5/8"x 2-1/2"
13	N58-TL	Nut, 5/8" Top Lock
14	1124	Collar, Shaft 1"
15	10256	Bushing, Connex
16	1110	Square Key, 1/4"x 1-1/4"
17	B12-7.5	Bolt, 1/2"x 7-1/2"
18	33314	Rock Shaft Clamp, Upper
19	33315	Rock Shaft Clamp, Lower
20	W12GRD8	Washer, 1/2" Grade 8
21	33316	Angle
22	N12	Nut, 1/2"
23	338551	Hub, Lifting
24	338552	Lift Arm, Drive Wheel Assembly

WHEEL LIFT DETAILED – PAGE 1 OF 2



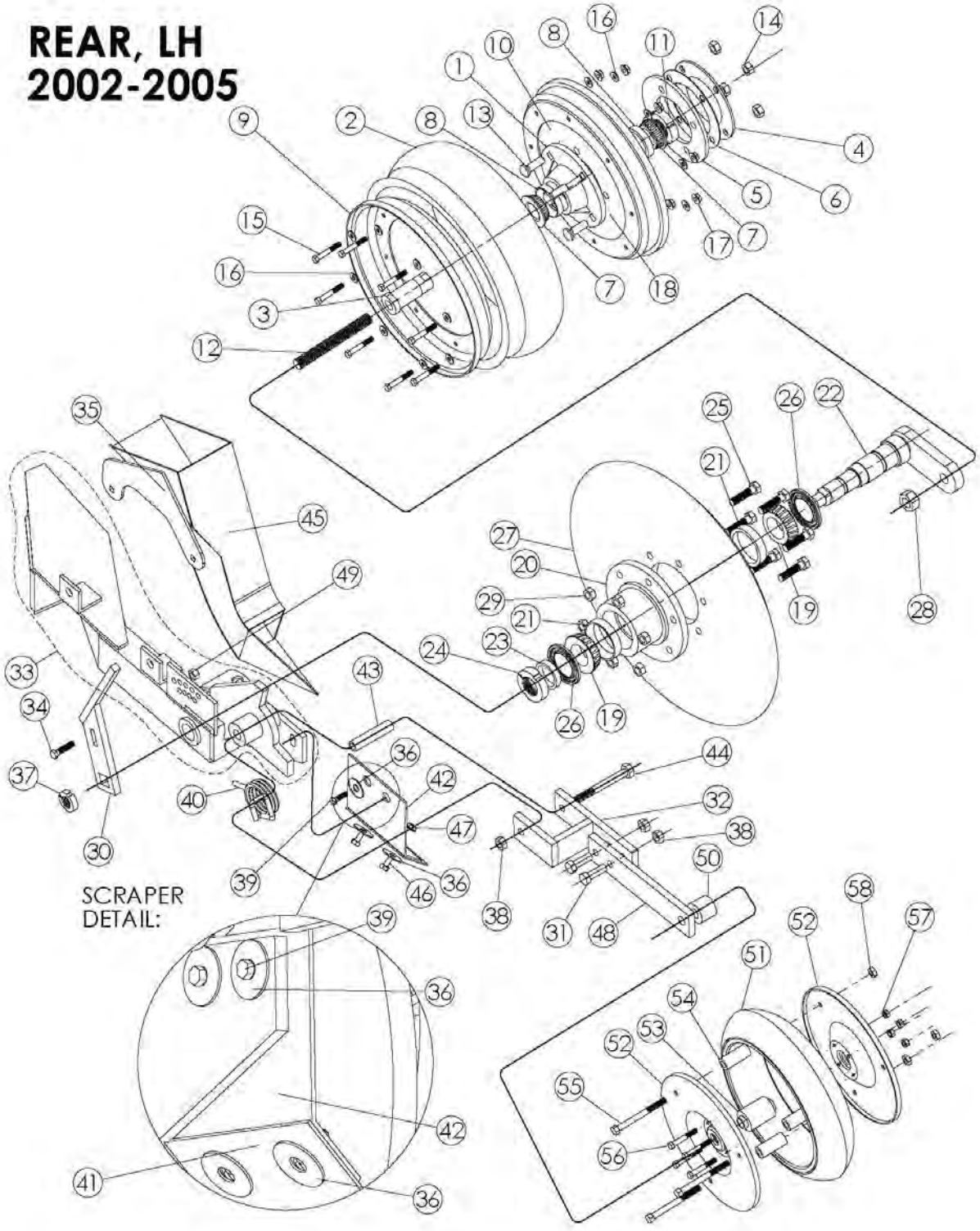
WHEEL LIFT DETAILED – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	338551	Lift Arm, Drive Wheel Assembly
2	33302	Arm, Drive Wheel
3	1037DBX1	Bearing
4	WF1072	Wheel, Dive Wheel Assembly
5	303682	Cantilever, Drive Wheel Assembly
6	303683	Base, Drive Wheel Lift Assembly
7	8955XC	Chain, Drive Wheel Assembly
8	303672	Seed Box Tower, Right
9	338551	Hub, Lifting
10	B58-4.5	Bolt, 5/8"x 4-1/2"
11	W58	Washer, 5/8"
12	33320	Spacer
13	3015	Bearing
14	33313	Rock Shaft Clamp, Drive Wheel Lift

IMPRINTER – PAGE 1 OF 2



IMPRINTER – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
0	303666RHF 303666LHF 303666RHR 303666LHR	Imprinter Assembly, Right Hand, Front Rank Imprinter Assembly, Left Hand, Front Rank Imprinter Assembly, Right Hand, Rear Rank Imprinter Assembly, Left Hand, Front Rank
1	303679	Axle, Imprinter Roller
2	303690	Bearing, Imprinter Roller Axle
3	6063	Cultipacker Roller, 12" (4C688)
4	303678	Cultipacker Roller, Narrow, 12"
5	303677	Roller
6	303667RH 303667LH	Imprinter Frame, Right Imprinter Frame, Left
7	303680	Band, Imprinter
8	303744	Feed Hose
9	B516-1	Bolt, 5/16"x 1"
10	N516	Nut, 5/16"
11	N14	Nut, 1/4"
12	B14-1	Bolt, 1/4"x 1"
13	321344	Clamp, Hose #44
14	B12-1.5	Bolt, 1/2"x 1-1/2"
15	B34-2.5	Bolt, 3/4"x 2-1/2"
16	N34-CL	Nut, 3/4" Clincher
17	1124	Shaft Collar, 1"
18	SC516-.375	Set Screw, 5/16"x 3/8"
19	RP316-1.25 (Not Illustrated)	Roll Pin, 3/16"x 1-1/4"
20	N12	Nut, 1/2"

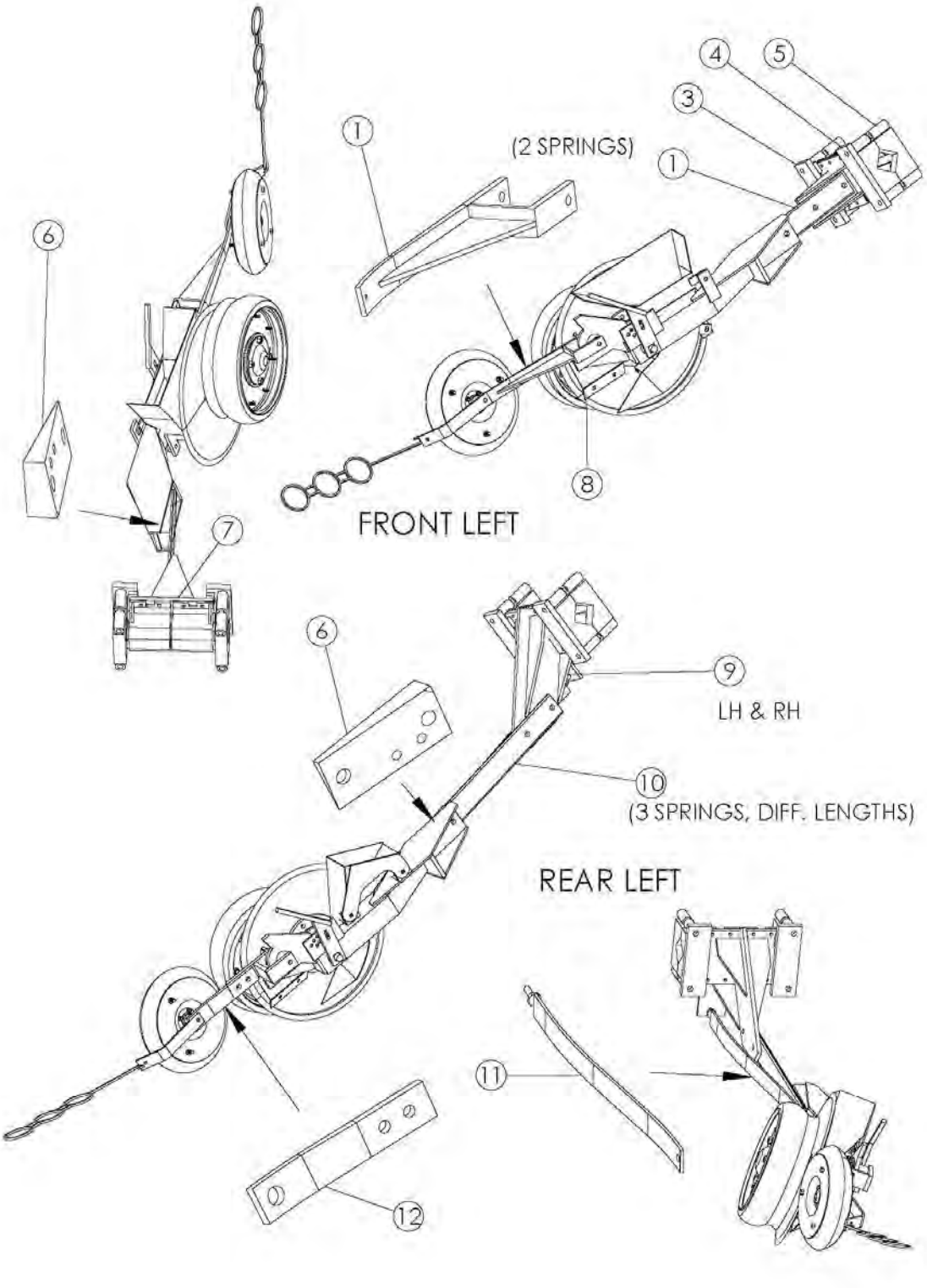
PLANTER UNIT 2002-2005 – PAGE 1 OF 3



PLANTER UNIT 2002-2005 – PAGE 2 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	42201E	Gauge Wheel Hub
2	1094RR2	Tire, Planter Gauge Wheel (2000-2003)
3	335121	Axle, Gauge Wheel – Adjustable
4	1097RR3	Dust Cap
5	1097RR4	Spacer, Dust Cap
6	42201CX	G asket, 4 Bolt Hub
7	LM67000LA	Bearing, 1-1/4" (Integral Seal)
8	1077X	Cup, Bearing (LM67010)
9	1097RR	Gauge Wheel Rim, Inner
10	1097RR1	Gauge Wheel Rim, Outer
11	C150-12	Collar, 1-1/2"-12 Split
12	33511	Axle, Threaded 3/4"x 16"
13	CB12-1.5	Carriage Bolt, 1/2"x 1-1/2"
14	N12	Nut, 1/2"
15	B516-2	Bolt, 5/16"x 2"
16	W516	Washer, 5/16"
17	N516	Nut, 5/16"
18	LW12-PN	Lock Washer, 1/2" Push Nut
19	1077C	Bearing, Inner (LM501349)
20	1085B	Hub, 6 Bolt
21	1077CC	Cup, Inner Bearing (LM501310)
22	33513	Axle, Planter (2000-2003)
23	1138DD	Bushing, Thrust Bearing
24	C150-12	Collar, 1-1/2"-12 Split
25	B12-2	Bolt, 1/2"x 2"
26	1138D	Seal, (203063VH)
27	K203M	Blade, 20"x 0.178"
28	N34-NF	Nut, 3/4" National Fine Thread
29	N12-TL	Nut, 1/2" Top Lock
30	010-30022-01	Gauge Wheel Control Handle
31	B12-1.5	Bolt, 1/2"x 1-1/2"
32	33643	Arm, Upper Press Wheel – Rear
33	33640RR	Arm, Planter LH (2001-2004)
34	B38-1.5	Bolt, 3/8"x 1-1/2"
35	33890	Seed Boot Mount Plate
36	W12	Washer, 1/2"
37	C78-14	Collar, 7/8"-14 Split
38	N12	Nut, 1/2"
39	B516-1	Bolt, 5/16"x 1"
40	10961	Spring, Torsion

PLANTER UNIT 2002-2005 – PAGE 3 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
41	10816ALH	Blade, Scraper
42	10846LH	Mount Bracket, Scraper
43	10252	Bushing, Connex 3/4"x 1/2"x 3-1/4"
44	B12-5	Bolt, 1/2"x 5"
45	33820	Seed Boot, LH (2002-2005)
46	B516-.75	Bolt, 5/16"x 0.75
47	N516	Nut, 5/16"
48	10253A	Press Arm, Lower Rear
49	N38-TL	Nut, 3/8" Top Lock
50	303754	Spacer, press Wheel
51	1094PR	Tire, Press Wheel 3"x 14" "V"
52	1093AC	Rim, Press Wheel
53	1092A2	Bearing, Double Row ball (AN212132)
54	1093AC5	Spacer, press Wheel
55	B38-4	Bolt, 3/8"x 4"
56	B516-2	Bolt 5/16"x 2"
57	N516-TL	Nut, 5/16" Top Lock
58	N38	Nut, 3/8"

PLANTER MODIFICATION – PAGE 1 OF 2



PLANTER MODIFICATION – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303751	Press Wheel, Twisted Frame (2001-2004)
2	33210	Spring, Planter Arm – Front
3	33810-2LH	Knuckle, Back LH
4	33810-2RH	Knuckle, Back RH
5	33810-1	Knuckle Bracket
6	303750	Wedge, Planter Adjustable (2001-2004)
7	33819-2	Knuckle Back Plate, Front
8	33880	Scraper, Inside
9	33812LH & RH	Knuckle Back Plate, Rear
10	33201	Spring, Planter Arm, Rear
	33202	Spring, Planter Arm, Rear
	33203	Spring, Planter Arm, Rear
11	303753	Anti-Sway Bar, Rear (2001-2004)
12	303752	Twisted Frame Press Wheel, Rear (2001-2004)

INDEX TO PART CATALOG

Planter Unit (2002-2005).....70-1 thru 70-3
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Planter Assembly.....70-10 thru 70-13
Knuckle Assembly & Parellelogram (2004-2011).. .....70-14 thru 70-15
Parellelogram Assembly (2011 -).....70-16 thru 70-17
Press Wheel Assembly.....70-18 thru 70-19
Planting Disc Assembly.....70-20 thru 70-21
Planter Arm Assembly.....70-23 thru 70-24
H Frame and Knuckle Assembly (2012 -).....70-25 thru 70-26
Walkboard Assembly.....70-27 thru 70-32
Small Seed Box Assembly.....70-33 thru 70-34
Large (Fluffy) Seed Box Assembly.....70-35 thru 70-36
Cool Season Seed Box Assembly.....70-37 thru 70-39
Seedbox Support Assembly.....70-40 thru 70-41
End Plate Assembly.....70-42 thru 70-43
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Rockshaft (Front) Assembly.....70-47 thru 70-48
Grease Lines.....70-49 thru 70-50
Tongue Assembly.....70-51 thru 70-52
Wheel Lift Assembly.....70-53 thru 70-56
Drive Wheel Assmbly.....70-57 thru 70-62
Drive Wheel Chain.....70-63
Main Wheel Assembly.....70-64 thru 70-65
Frame Assembly.....70-66 thru 70-67
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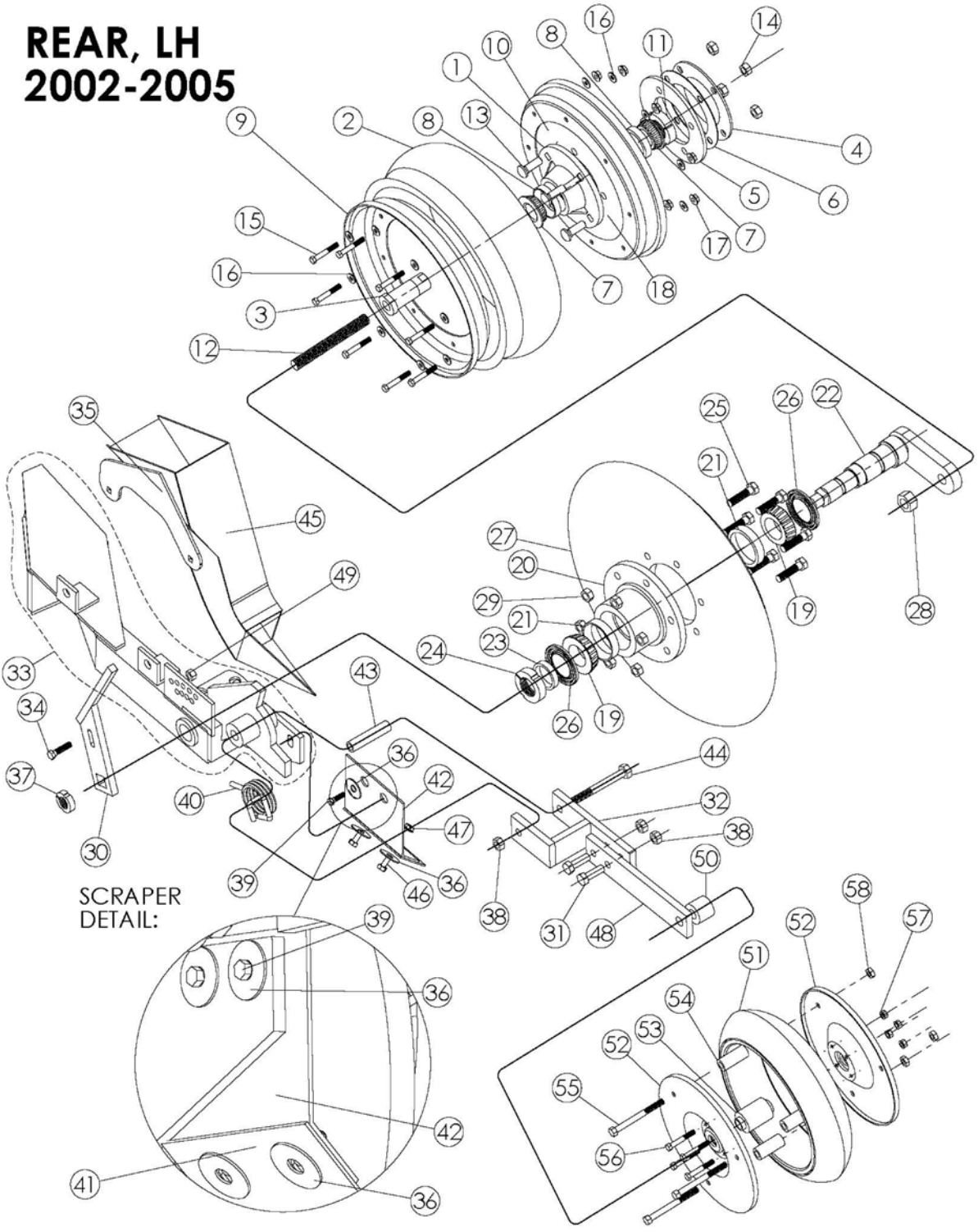
Imprinter.....70-72 thru 70-73
Speed Changer & Idler Assembly.....70-74
Tail Lights.....70-75 thru 70-76

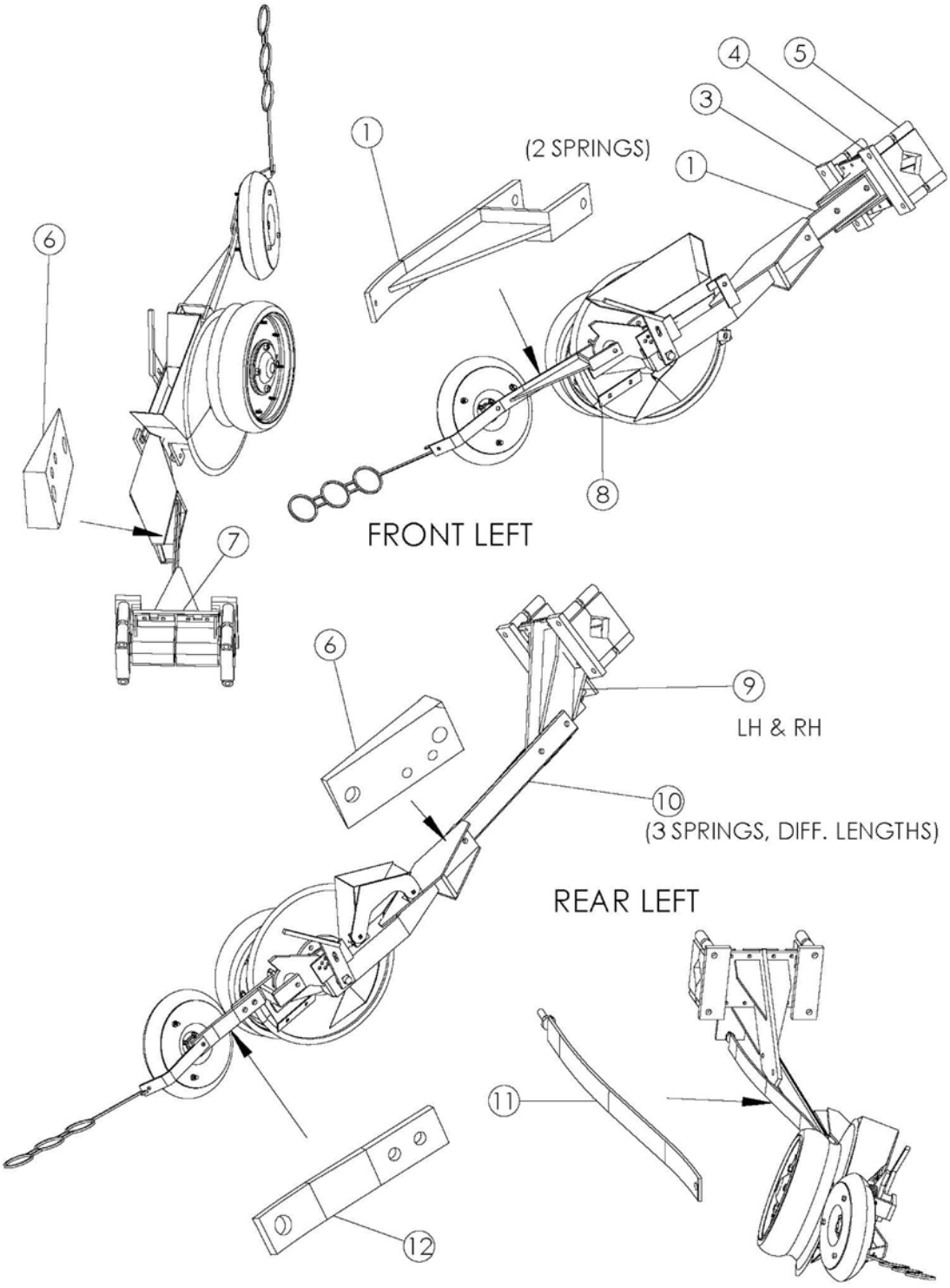
PLANTER UNIT 2002-2005 – PAGE 1 OF 3



PLANTER UNIT 2002-2005 – PAGE 2 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	42201E	Gauge Wheel Hub
2	1094RR2	Tire, Planter Gauge Wheel (2000-2003)
3	335121	Axle, Gauge Wheel – Adjustable
4	1097RR3	Dust Cap
5	1097RR4	Spacer, Dust Cap
6	42201CX	G asket, 4 Bolt Hub
7	LM67000LA	Bearing, 1-1/4" (Integral Seal)
8	1077X	Cup, Bearing (LM67010)
9	1097RR	Gauge Wheel Rim, Inner
10	1097RR1	Gauge Wheel Rim, Outer
11	C150-12	Collar, 1-1/2"-12 Split
12	33511	Axle, Threaded 3/4"x 16"
13	CB12-1.5	Carriage Bolt, 1/2"x 1-1/2"
14	N12	Nut, 1/2"
15	B516-2	Bolt, 5/16"x 2"
16	W516	Washer, 5/16"
17	N516	Nut, 5/16"
18	LW12-PN	Lock Washer, 1/2" Push Nut
19	1077C	Bearing, Inner (LM501349)
20	1085B	Hub, 6 Bolt
21	1077CC	Cup, Inner Bearing (LM501310)
22	33513	Axle, Planter (2000-2003)
23	1138DD	Bushing, Thrust Bearing
24	C150-12	Collar, 1-1/2"-12 Split
25	B12-2	Bolt, 1/2"x 2"
26	1138D	Seal, (203063VH)
27	K203M	Blade, 20"x 0.178"
28	N34-NF	Nut, 3/4" National Fine Thread
29	N12-TL	Nut, 1/2" Top Lock
30	010-30022-01	Gauge Wheel Control Handle
31	B12-1.5	Bolt, 1/2"x 1-1/2"
32	33643	Arm, Upper Press Wheel – Rear
33	33640RR	Arm, Planter LH (2001-2004)
34	B38-1.5	Bolt, 3/8"x 1-1/2"
35	33890	Seed Boot Mount Plate
36	W12	Washer, 1/2"
37	C78-14	Collar, 7/8"-14 Split
38	N12	Nut, 1/2"
39	B516-1	Bolt, 5/16"x 1"
40	10961	Spring, Torsion

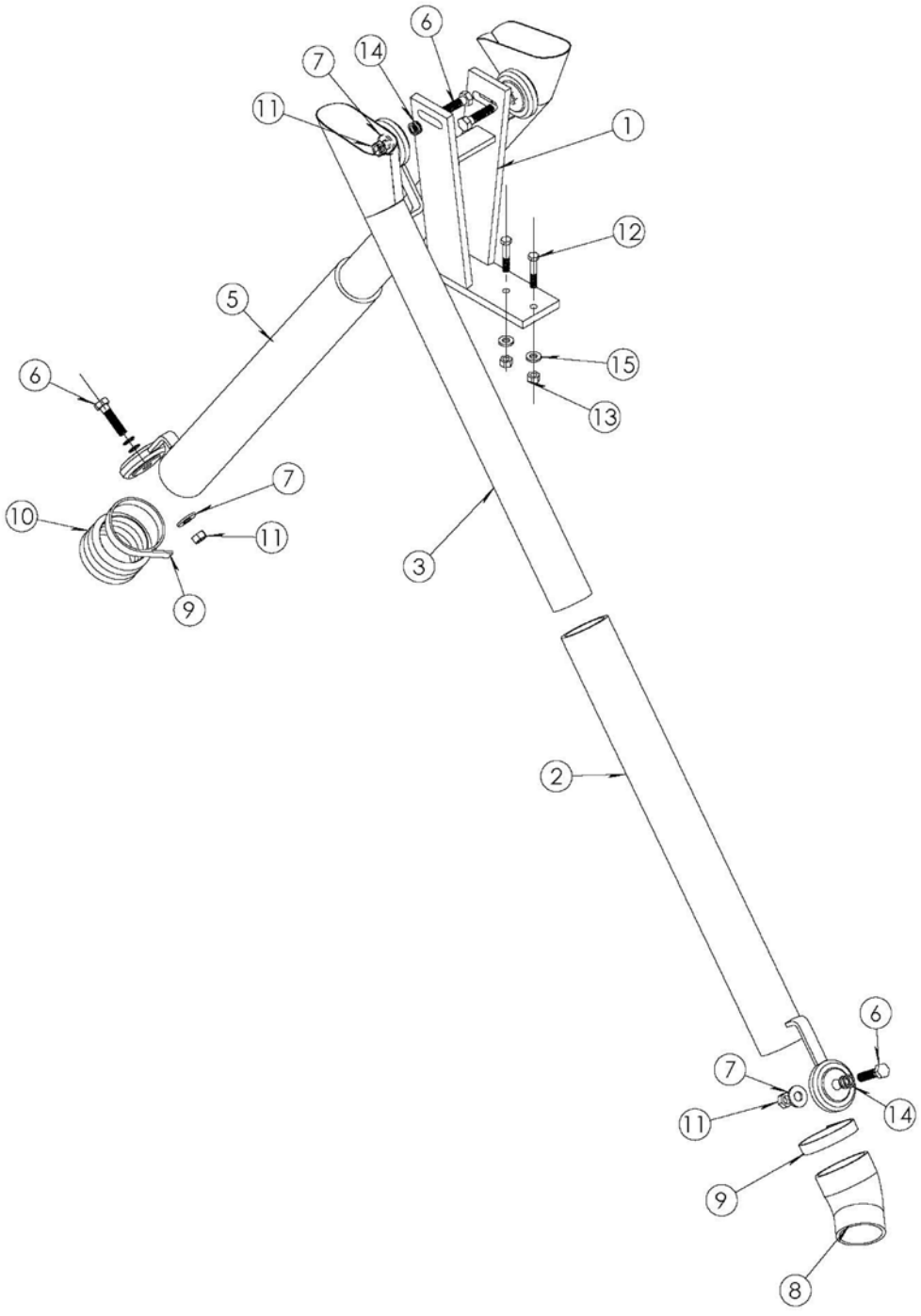
PLANTER UNIT 2002-2005 – PAGE 3 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
41	10816ALH	Blade, Scraper
42	10846LH	Mount Bracket, Scraper
43	10252	Bushing, Connex 3/4"x 1/2"x 3-1/4"
44	B12-5	Bolt, 1/2"x 5"
45	33820	Seed Boot, LH (2002-2005)
46	B516-.75	Bolt, 5/16"x 0.75
47	N516	Nut, 5/16"
48	10253A	Press Arm, Lower Rear
49	N38-TL	Nut, 3/8" Top Lock
50	303754	Spacer, press Wheel
51	1094PR	Tire, Press Wheel 3"x 14" "V"
52	1093AC	Rim, Press Wheel
53	1092A2	Bearing, Double Row ball (AN212132)
54	1093AC5	Spacer, press Wheel
55	B38-4	Bolt, 3/8"x 4"
56	B516-2	Bolt 5/16"x 2"
57	N516-TL	Nut, 5/16" Top Lock
58	N38	Nut, 3/8"

PLANTER MODIFICATION – PAGE 1 OF 2



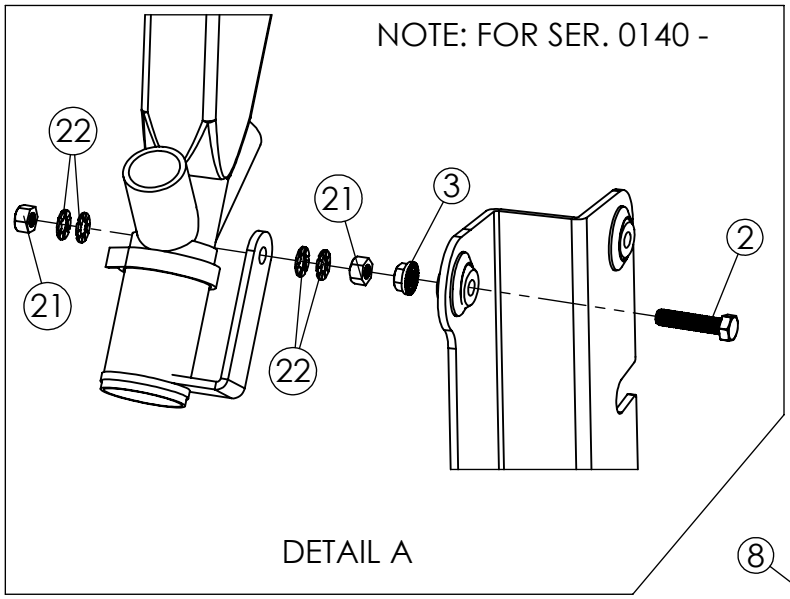
PLANTER MODIFICATION – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303751	Press Wheel, Twisted Frame (2001-2004)
2	33210	Spring, Planter Arm – Front
3	33810-2LH	Knuckle, Back LH
4	33810-2RH	Knuckle, Back RH
5	33810-1	Knuckle Bracket
6	303750	Wedge, Planter Adjustable (2001-2004)
7	33819-2	Knuckle Back Plate, Front
8	33880	Scraper, Inside
9	33812LH & RH	Knuckle Back Plate, Rear
10	33201	Spring, Planter Arm, Rear
	33202	Spring, Planter Arm, Rear
	33203	Spring, Planter Arm, Rear
11	303753	Anti-Sway Bar, Rear (2001-2004)
12	303752	Twisted Frame Press Wheel, Rear (2001-2004)

SEED TUBE ASSEMBLY – PAGE 1 OF 2



SEED TUBE ASSEMBLY – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303662	Seed Tube Mount
2	303692	Seed Tube, Front Bottom
3	303691	Seed Tube, Front Top
4	303693 (Not Illustrated)	Seed Tube, Rear Top
5	303694	Seed Tube, Rear Bottom
6	B12-2	Bolt, 1/2"x 2"
7	W12	Washer, 1/2"
8	777-2	Hose Elbow
9	321344	Clamp, Seed Hose #44
10	1016	Seed Hose, Convoluted, 2-1/2" ID x 3"
11	JN12	Jam Nut, 1/2" Locking
12	B38-2	Bolt, 3/8" x 1"
13	N38-TL	Nut, 3/8" Top Lock
14	MB12-.062	Machinery Bushing, 1/2"x 0.062 Thickness
15	W38	Washer, 3/8"

SEED TUBE ASSEMBLY - PAGE 1 OF 2



NOTE: ITEM 22 IS ORDERED AS A PAIR OF WASHERS WITH INTERLOCKING CAMS

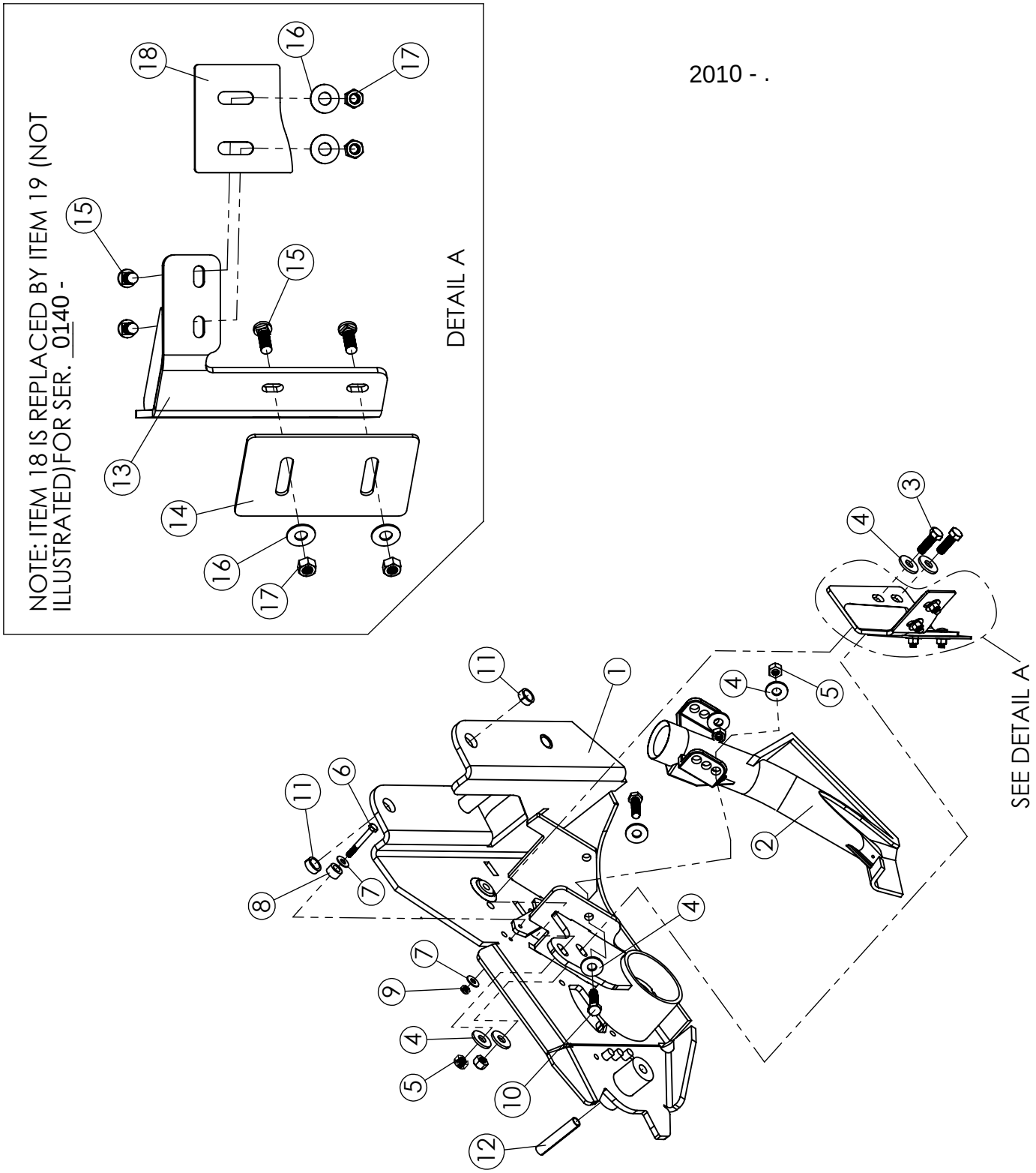
NOTE: SEE DETAIL A FOR CONFIGURATION ON MACHINES WITH SER. 0140 -

NOTE: THIS CONNECTION USES ITEMS 21 AND 22 TO REPLACE ITEM 5 FOR MACHINES WITH SER. 0140-

SEED TUBE ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303622	Seed Tube Mount?
2	B12-3	Bolt, 1/2" x 3" Grade 5
3	N12-FN	Nut, 1/2" Flange Nut
4	N12	Nut, 1/2" Grade 5
5	N12-NC	Nut, 1/2" Slotted Hex Nut
6	10333	Transition - Long
7	321344	Clamp, Hose
8	303745	Rubber Sleeve
9	4222B	Zip-Tie
10	303693A	Seed Tube Rear, Top, 2-1/2"OD x 2-1/4" ID x 26" L
11	303694A	Seed Tube Rear, Bottom, 3" OD x 2-1/2" ID x 25-1/2" L
12	777-2	Rubber Hose Elbow
13	303691A	Seed Tube Front, Top, 2-1/2"OD x 2-1/4" ID x 25-12" L
14	303692	Seed Tube Front, Bottom, 3" OD x 2-1/2" ID x 27" L
15	707R 707L	Arm, Planter, RH Arm, Planter, LH
16	10252	Bushing, Connex, 5/8"OD, 1/2"ID, ?L
17	10256	Bushing, Connex, 1"OD, 3/4"ID, 3/8"L
18	B38-1.25	Bolt, 3/8" x 1-1/4"
19	W38	Washer, 3/8"
20	N38-TL	Nut, 3/8" Top Lock
21	N12-JN	Nut, 1/2" Jam Nut
22	W12-DL	Washer, 1/2" Disc Lock (Pair)

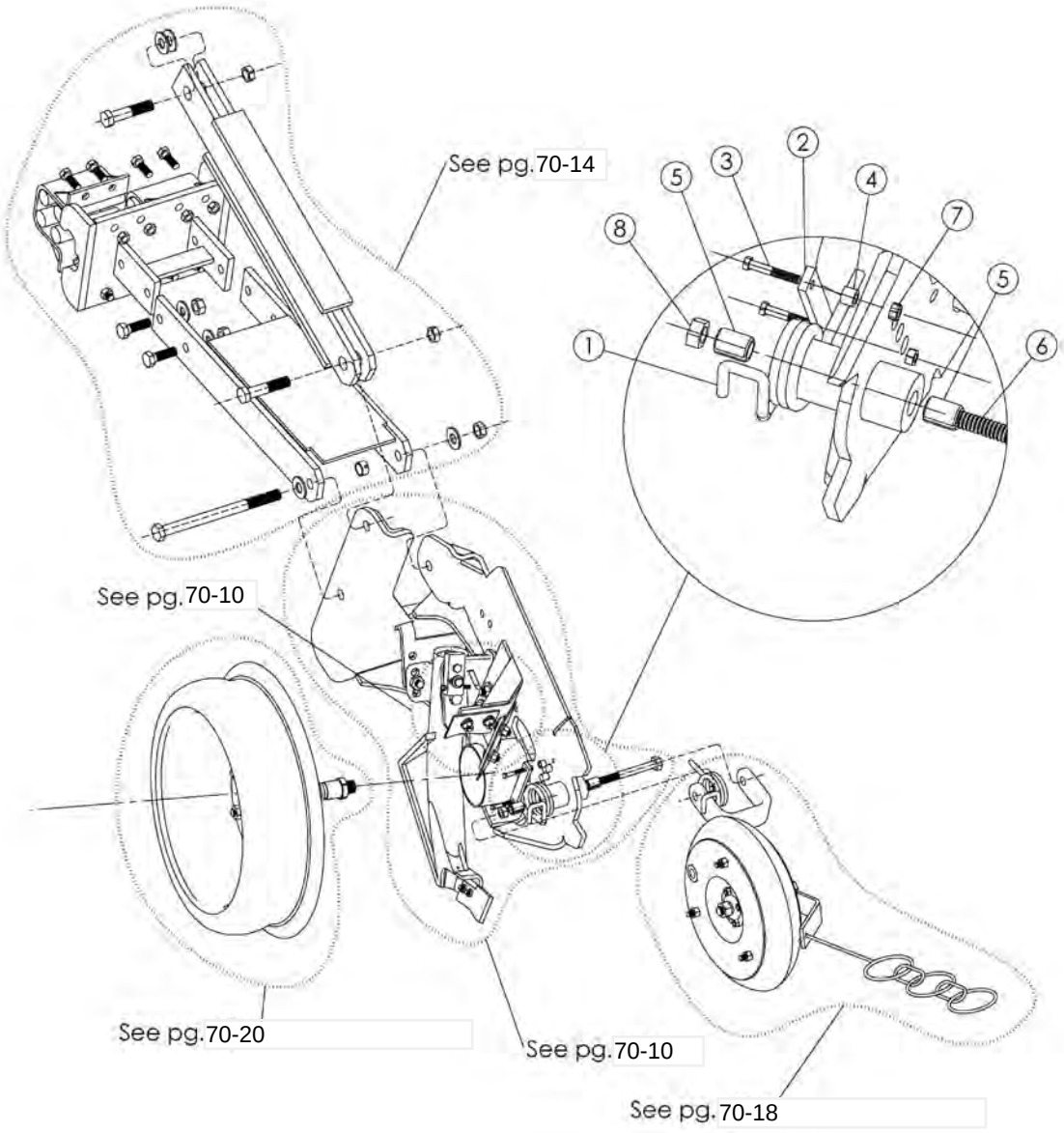
PLANTER ASSEMBLY - PAGE 1 OF 2

2010 - .



PLANTER ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	707R 707L	Arm, Planter, RH Arm, Planter, LH (not shown)
2	0777R 0777L	Boot, RH, RR Boot, LH, RR (not shown)
3	B12-1.5	Bolt, 1/2" x 1-1/2" Grade 8
4	W12	Washer, 1/2" Grade 8
5	N12	Nut, 1/2" Grade 8
6	B516-2.5	Bolt, 5/16" x 2-1/2" Grade 5
7	W516	Washer, 5/16" Grade 5
8	42209XR	Tension Bushing, Boot
9	N516	Nut, 5/16" Grade 5
10	B12-1.75	Bolt, 1/2" x 1-3/4" Grade 8
11	102526	Bushing, Connex, 1"OD, 3/4"ID, 3/8"L
12	10252	Bushing, Connex, 5/8"OD, 1/2"ID, ?L
13	10846ARH 10846ALH	Scraper Bracket RH Scraper Bracket LH (not shown)
14	303740	Scraper, Lower, RR
15	CB38-1	Carriage Bolt, 3/8" x 1"
16	W38	Washer, 3/8"
17	N38-TL	Nut, 3/8" Top Lock
18	303741	Scraper, Upper, RR
19	303742	NEW UPPER SCRAPER FOR SER. - (not shown)

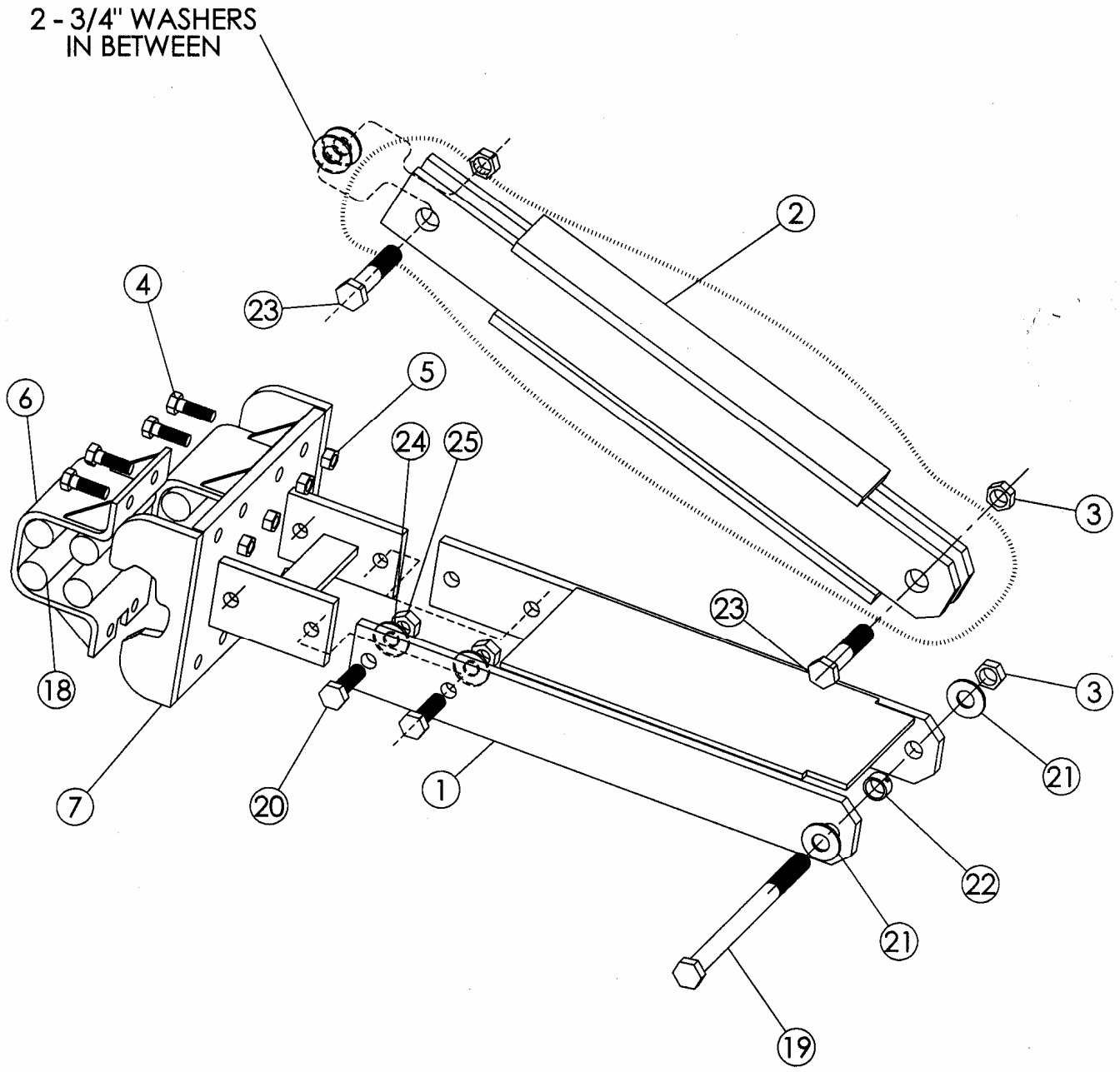
PLANTER ASSEMBLY (LEFT HAND) - PAGE 1 OF 2



PLANTER ASSEMBLY (LEFT HAND) – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	10961	Spring, Tension
2	109630	Spring Retainer
3	B14-1.5	Bolt, 1/4"x 1-1/2"
4	303730	Press Wheel Spring Clamp Bushing
5	102520	Bushing, Connex - 3/4"OD 1/2"ID 3/4L
6	B12-5.25	Bolt, 1/2"x 5-1/4"
7	N14	Nut, 1/4”
8	N12	Nut, 1/2"

KNUCKLE ASSEMBLY & PARALLELOGRAM – PAGE 1 OF 2

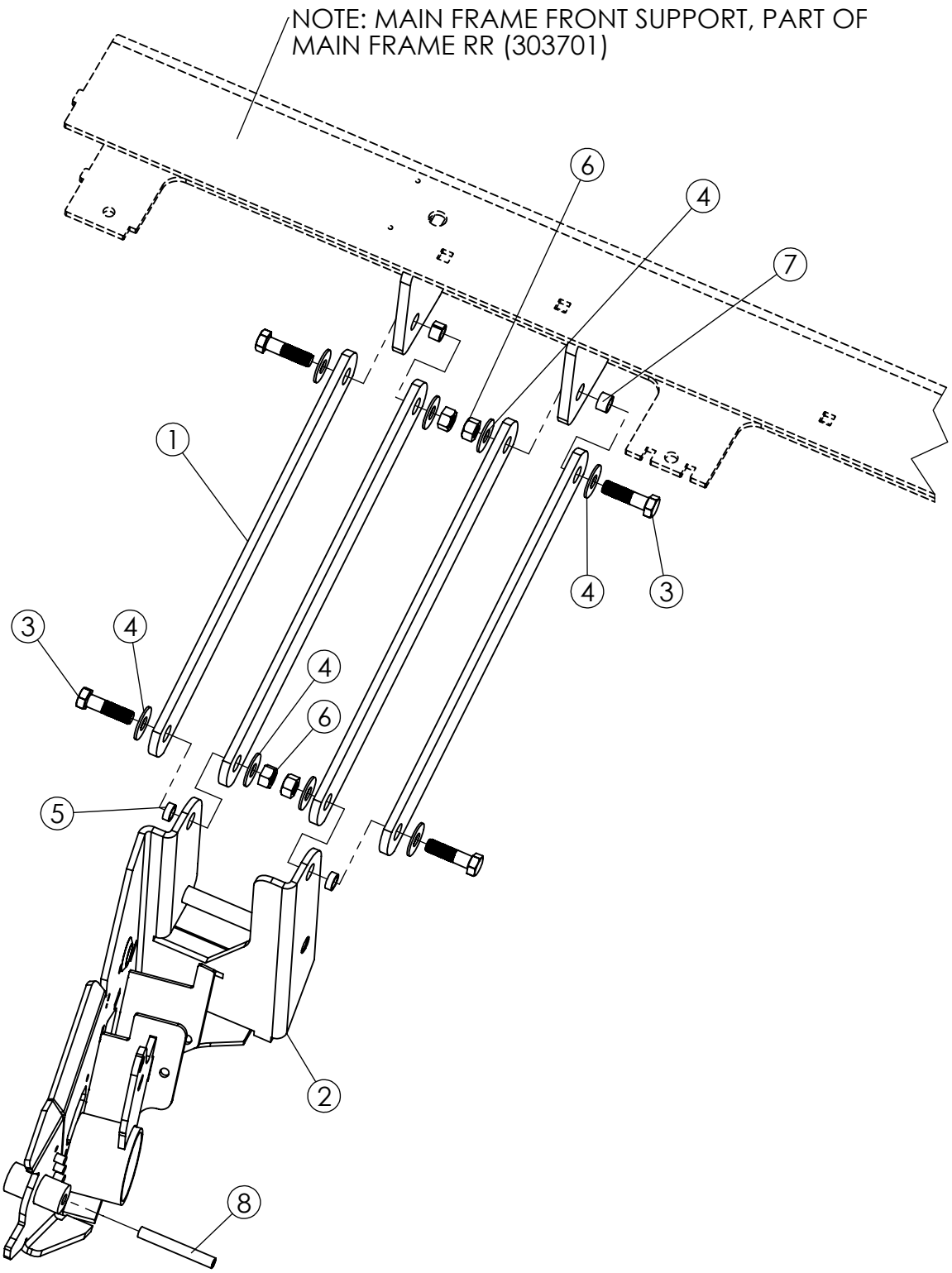
(2004 - 2011)



KNUCKLE ASSEMBLY & PARALLELOGRAM – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	10253	Planter H-Frame
2	10250	Upper Parallelogram Swing Arm
3	N34-CL	Nut, 3/4" Clincher
4	B12-1.5	Bolt, 1/2"x 1-1/2"
5	N12	Nut, 1/2"
6	103220	Clamp, Half Knuckle Casting
7	33813	Stroke Control Weldment
18	42202X	Rubber, Cord 1.375"x 5-1/4" – 80 Duro
19	B34-10	Bolt, 3/4"x 10"
20	B58-2	Bolt, 5/8"x 2"
21	W34	Washer, 3/4"
22	11244	Collar w/Set Screw, for 3/4" Bore Shaft
23	B34-3.5GR8	Bolt, 3/4"x 3-1/2" Grade 8
24	W58	Washer, 5/8"
25	N58-TL	Nut, 5/8" Top Lock

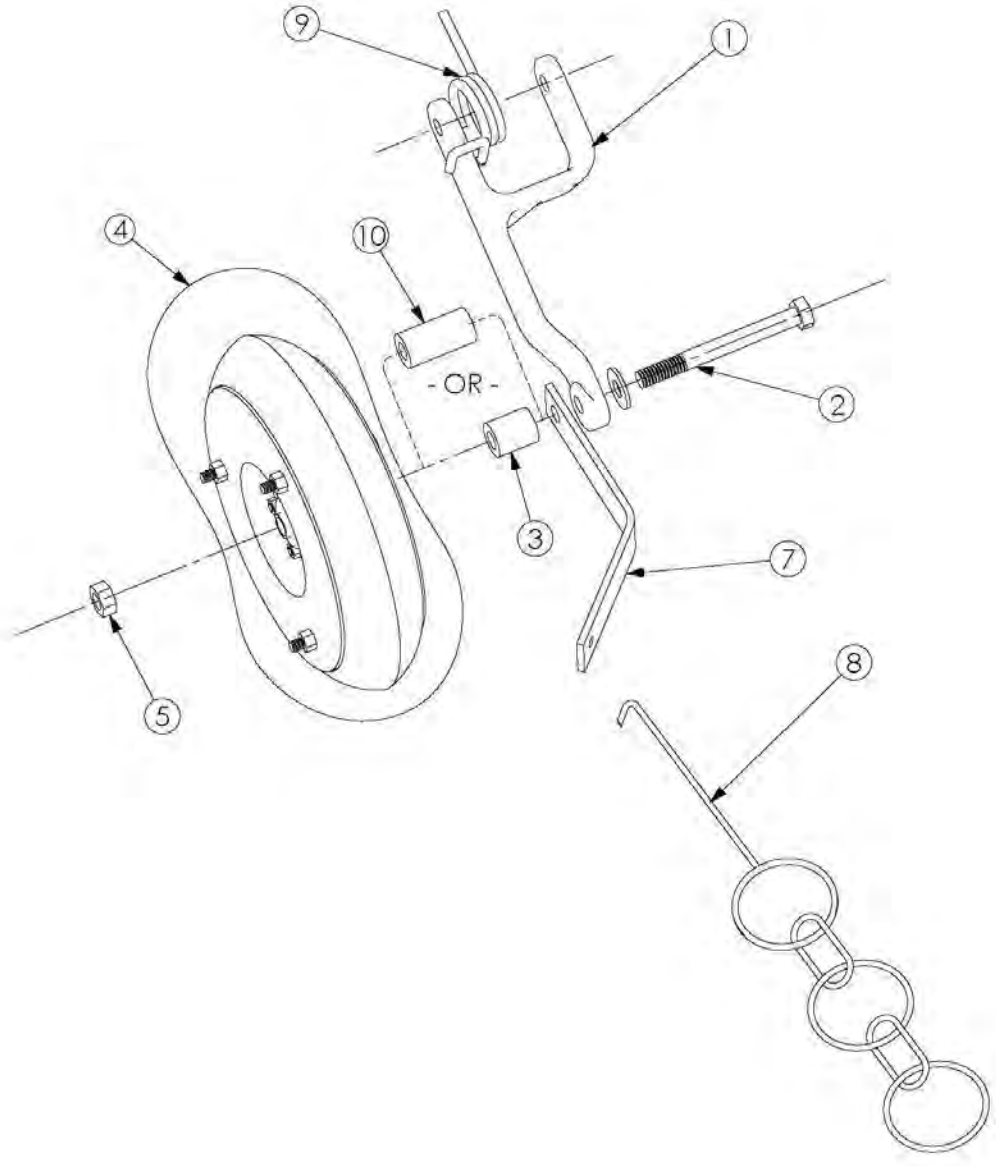
PARALLELOGRAM ASSEMBLY - PAGE 1 OF 2

2011 -



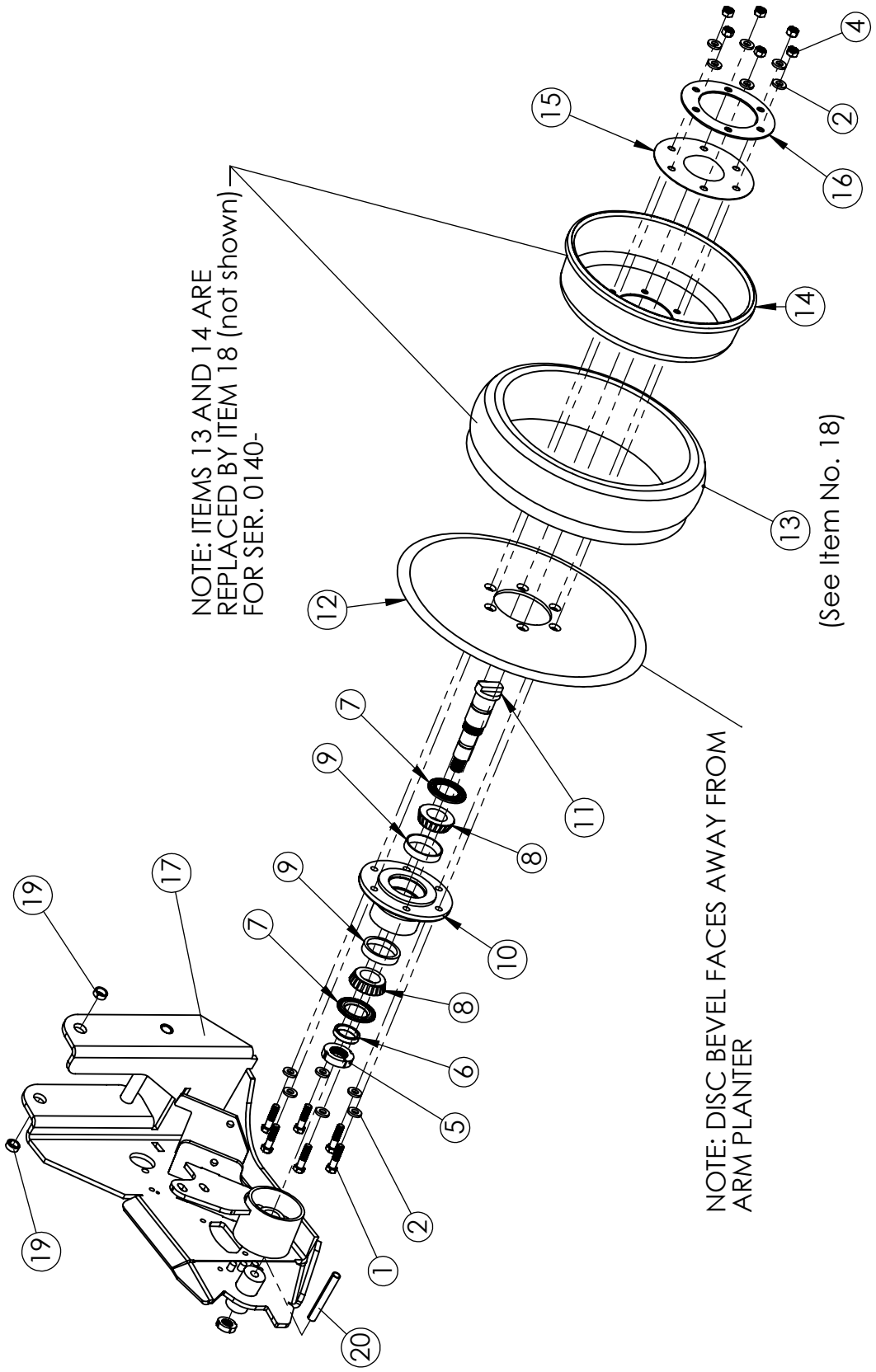
PARALLELOGRAM ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	10250	Upper Parallelogram Bar
2	707R 707L	Arm, Planter, RH Arm, Planter, LH
3	B34-2.75	Bolt, 3/4" x 2-3/4" Grade 8
4	W34	Washer, 3/4" Grade 8
5	102526	Bushing, Connex, 1"OD, 3/4"ID, 3/8"L
6	N34-TL	Nut, 3/4" Top Lock
7	102525	Bushing, Connex, 1"OD, 3/4"ID, 5/8"L
8	10252	Bushing, Connex, 5/8"OD, 1/2"ID, 3-3/8"L

PRESS WHEEL ASSEMBLY (LEFT HAND) – PAGE 1 OF 2



PRESS WHEEL ASSEMBLY (LEFT HAND) – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	10251	"h" Frame
2	B58-6GRD8	Bolt, 5/8"x 6", Grade 8
3	303729	Spacer, Short
4	303724	Press Wheel Tire and Rim
5	N58-TL	Nut, 5/8" Top Lock
6	W58GRD8	Washer, 5/8" Grade 8
7	1093C3	Drag Chain Mount
8	1093C	Covering Chain
9	10961	Spring, tension
10	303746	Spacer, Long

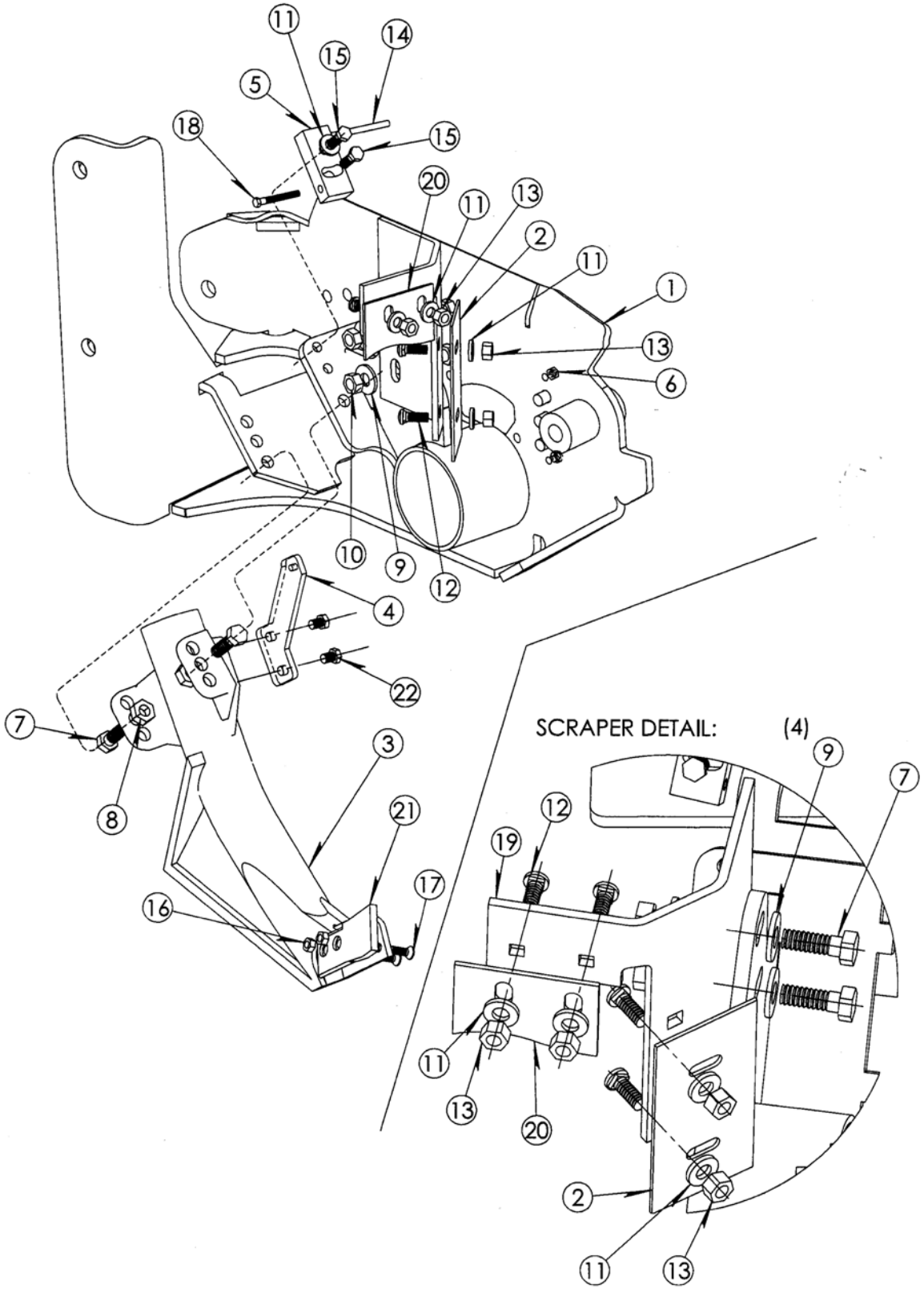
PLANTING DISC ASSEMBLY - PAGE 1 OF 2



PLANTING DISC ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B12-2NF	Bolt, 1/2" x 2" NF
2	W12	Washer, 1/2"
3	C78-14	Collar, 7/8" - 14 Split
4	N12-NF	Nut, 1/2" NF
5	C150-12	Collar, 1 1/2" - 12 Split
6	1138DD	Bushing, Thrust, 2" OD x 1 5/8" ID
7	1138D	Seal, RR, 203062VH
8	1077C	Inner Bearing, 6 Bolt Hub 93-LM501349
9	1077CC	Cup, 6 Bolt Hub Inner LM501310
10	335140	Hub, 6 Bolt, RR
11	335121	Axle, Fixed Gauge Wheel, RR
12	K203M	Disc, 20" x .187" 6 Bolt
13	1094RR2	Tire, Gauge Wheel, RR, 2007-
14	1097RR	Rim, Gauge Wheel, RR, 2007 -
15	1097RR3	Dirt Guard, Cap, RR
16	1097RR4	Dirt Guard, Retainer, RR
17	707R 707L	Arm, Planter, RH Arm, Planter, LH (not shown)
18	1097RR5	Depth Gage Wheel Vulcanized
19	1025826	Bushing, Connex, 1"OD, 3/4"ID, 3/8"L
20	10252	Bushing, Connex, 5/8"OD, 1/2"ID, ?L

PRESS WHEEL ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B58-6.5	Bolt, 5/8" x 6-1/2"
2	W58	Washer, 5/8"
3	N58-TL	Nut, 5/8" Top Lock
4	30374601	Spacer, 5/8" x 2"
5	30372901	Spacer, 5/8" x 1/2"
6	10251	"h" Frame
7	10961	Spring, Torsion
8	10252	Bushing, Connex, 5/8" OD, 1/2" ID, ?" L
9	1093C3	Drag Chain Mount
10	1093C	Drag Chain
11	B38-3	Bolt, 3/8" x 3" Grade 5
12	109AC5	Spacer
13	N38	Nut, 3/8"
14	B38-4	Bolt, 3/8" x 4"
15	N38	Nut, 3/8"
16	1093AC	Rim, Press Wheel
17	1092A2	Bearing, Press Wheel
18	1094PR	Tire, Press Wheel
19	707R 707L	Arm, Planter, RH Arm, Planter, LH (not shown)
20	B516-1.5	Bolt, 5/16" x 1-1/2" Grade 5
21	606873	Spacer, 7/16" OD x 1/4" ID x 5/16" L
22	109971	Torsion Spring Retainer 3" x 3/4" x 1-1/4" RR
23	N516-TL	Nut, 5/16" Top Lock
24	B12-5.5	Bolt, 1/2" x 5-1/2" Grade 5
25	W12	Washer, 1/2" Grade 5
26	N12-TL	Nut, 1/2" Top Lock
27	102526	Bushing, Connex, 1"OD, 3/4"ID, 3/8"L

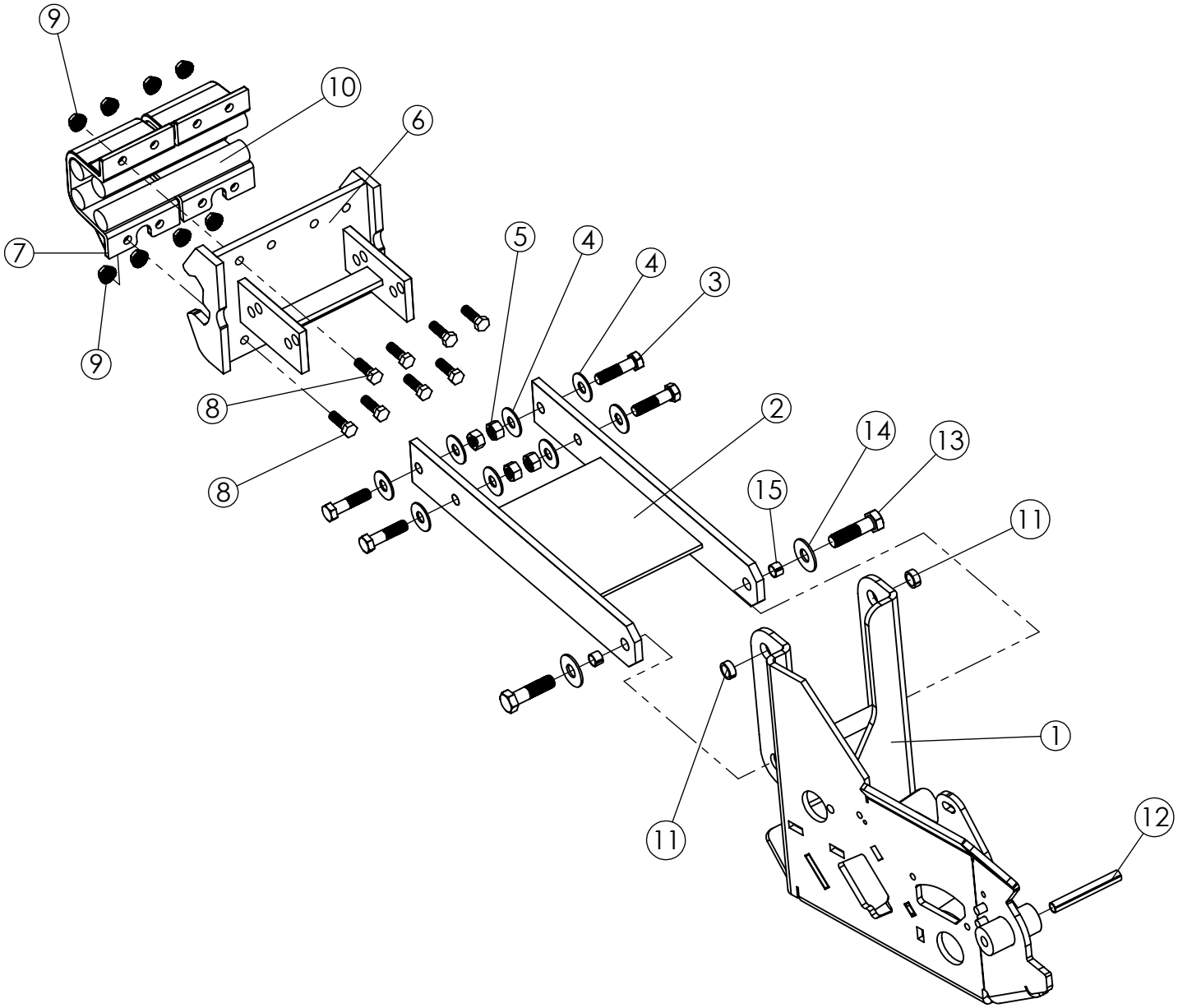
PLANTER ARM ASSEMBLY (LEFT HAND) – PAGE 1 OF 2



PLANTER ARM ASSEMBLY (LEFT HAND) – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303725	Planter Weldment, Left Hand
2	303740	Lower Scraper
3	0777LH	Boot, Left Hand
4	10997	Spring Mount Bar
5	109971	Spring Tensioner
6	N14	Nut, 1/4"
7	B12-1.5	Bolt, 1/2"x 1-1/2"
8	N12-CL	Nut, 1/2" Clincher
9	W12	Washer, 1/2"
10	N12	Nut, 1/2"
11	W38	Washer, 3/8"
12	CB38-1	Carriage Bolt, 3/8"x 1"
13	N38	Nut, 3/8"
14	303735	Boot Tension Spring
15	B38-1	Bolt, 3/8"x 1"
16	N516-TL	Nut, 5/16" Top Lock
17	S516-.75	Screw, Flat Head Socket Cap, 5/16"x 3/4"
18	B14-2	Bolt, 1/4"x 2"
19	10846ALH	Mud Scraper Mount, Left Hand
20	303741	Upper Scraper
21	303733LH	Seed Deflector
22	B38-.75	Bolt, 3/8"x 3/4"

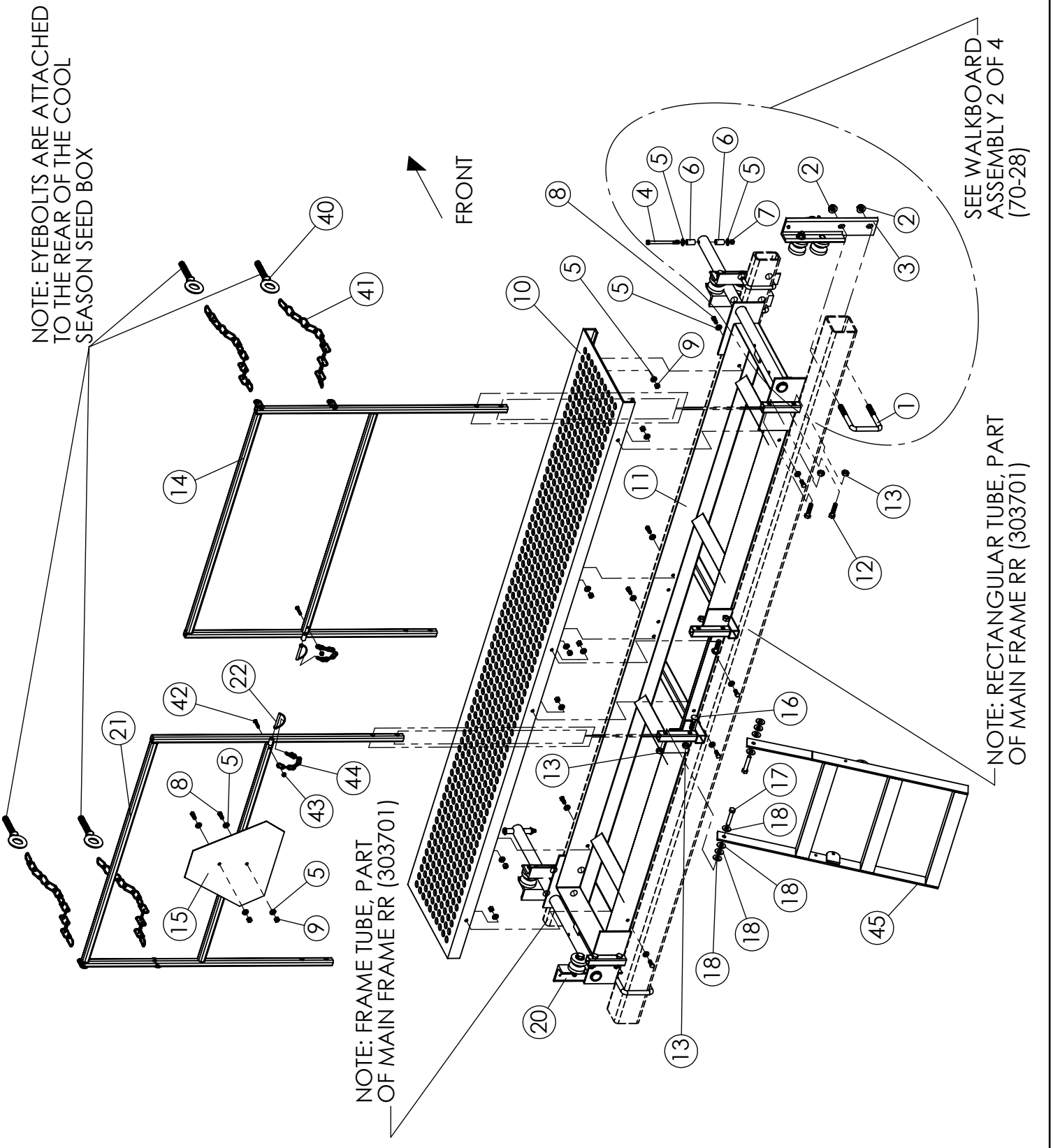
H FRAME AND KNUCKLE ASSEMBLY - PAGE 1 OF 2

2012 - .

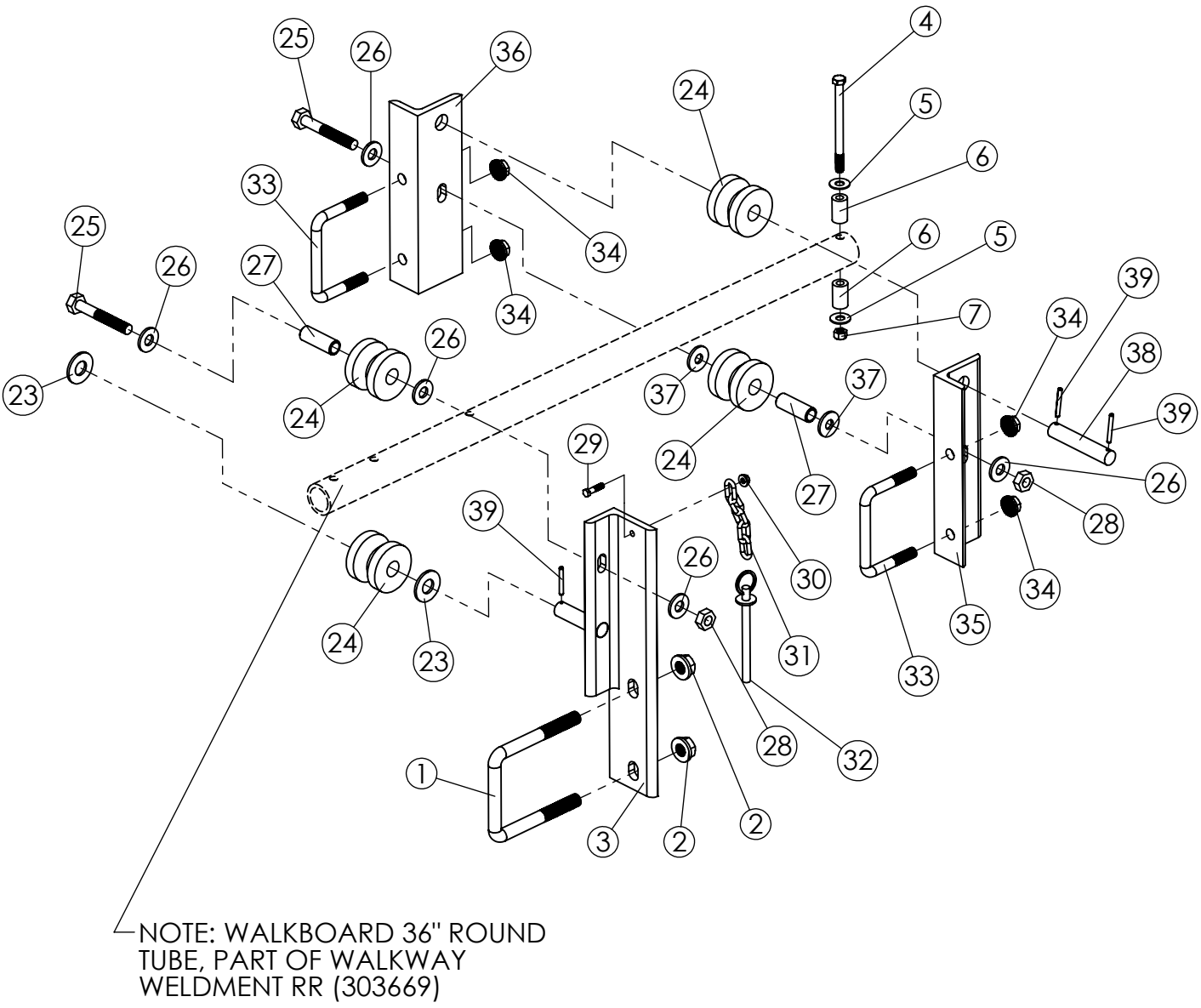


H-FRAME AND KNUCKLE ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	707R 707L	Arm, Planter, RH Arm, Planter, LH (not shown)
2	10253	H-Frame, RR
3	B58-2.25	Bolt, 5/8" x 2-1/4" Grade 8
4	W58	Washer, 5/8" Grade 8
5	N58-TL	Nut, 5/8" Top Lock
6	33813	Knuckle, Stroke Control
7	103220	Clamp Half, Knuckle
8	B12-1.5	Bolt, 1/2" x 1-1/2"
9	N12-FN	Nut, 1/2" Flange Nut
10	42202XR	Rubber Cord, 1-3/8" x 10", 80duro
11	102526	Bushing, Connex, 1"OD, 3/4"ID, 3/8"L
12	10252	Bushing, Connex, 5/8"OD, 1/2"ID, 3-3/8"L
13	B58-2.25GRD8	Bolt, 5/8" x 2-1/4" Grade 8
14	W58	Washer, 5/8"
15	102523	Bushing, Connex, 3/4"OD, 5/8"ID, 1/2"L

WALKBOARD ASSEMBLY - PAGE 1 OF 4



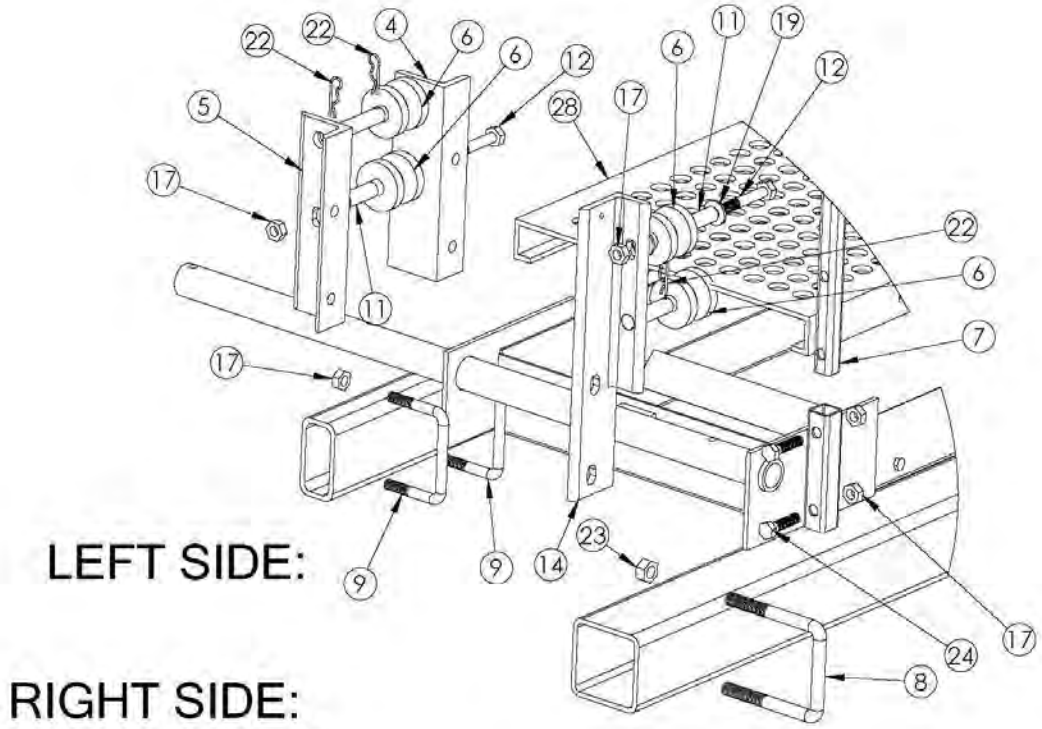
WALKBOARD ASSEMBLY - PAGE 2 OF 4

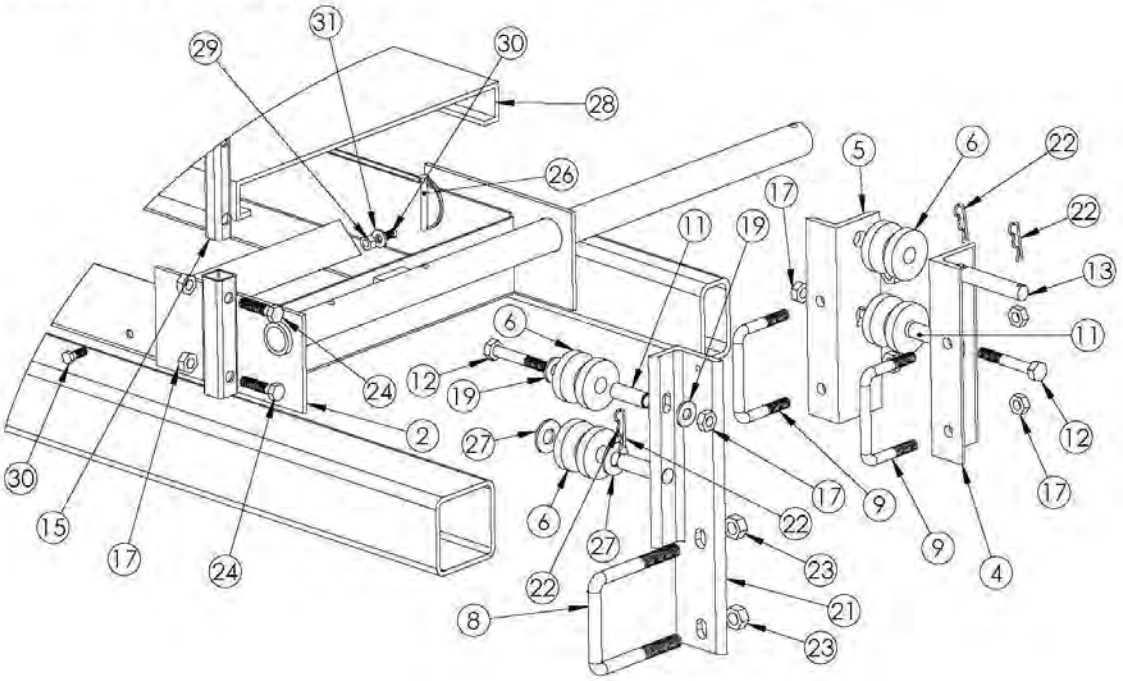


WALKBOARD ASSEMBLY - PAGE 3 OF 4		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	UB58-5.25-4	U-Bolt, 5/8" x 5-1/4" x 4"
2	N58-FN	Nut, 5/8" Flange Nut
3	303688RH	Walkboard Roller Support Bracket RH
4	B38-5	Bolt, 3/8" x 5" Grade 5
5	W38	Washer, 3/8"
6	1041A2	Spacer, 3/8" x 1-1/4"
7	N38-TL	Nut, 3/8" Top Lock
8	B38-1	Bolt, 3/8" x 1" Grade 5
9	N38	Nut, 3/8"
10	303700	Open Grid Grate 10'
11	303669	Walkway Weldment, RR
12	B12-2	Bolt, 1/2" x 2" Grade 5
13	N12-TL	Nut, 1/2" Top Lock
14	303684RH	Walkboard Railing RH, RR
15	1046C72	Sign SMV - on metal
16	CB12-2	Carriage Bolt, 1/2" x 2" Grade 5
17	B12-2.5	Bolt, 1/2" x 2.5" Grade 5
18	W12	Washer, 1/2"
19	303686	Walkboard Ladder, RR
20	303688LH	Walkboard Roller Support Bracket LH
21	303684LH	Walkboard Railing LH, RR
22	4226XGO	Retainer Hydraulic Transport???
23	W34	Washer, 3/4"
24	303697	Walkboard Roller
25	B12-3.5	Bolt, 1/2" x 3-1/2" Grade 5
26	W12	Washer, 1/2"
27	3036100	Roller Bushing Walkboard Support
28	N12-TL	Nut, 1/2" Top Lock
29	B14-1	Bolt, 1/4" x 1" Grade 5
30	N14-FN	Nut, 1/4" Flange Nut
31	8955XA	Chain, Twisted, Walkboard ladder retainer
32	HP116	Pin, 3/8" Diam x 4" Long
33	UB12-3-4	U-Bolt, 1/2" x 3" x 4"
34	N12- FN	Nut, 1/2" Flange Nut
35	303689RH	Walkboard Support Front RH
36	303689LH	Walkboard Support Front LH

WALKBOARD ASSEMBLY - PAGE 4 OF 4		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
37	W12	Washer, 1/2"
38	303699	Roller Axle Walkboard, RR
39	RP316-1.5	Spring Pin, 3/16" x 1-1/2"
40	3036691	Eyebolt, 1/2" x 2" x 4"
41	85712106A	Chain
42	B14-1.5	Bolt, 1/4" x 1-1/2"
43	N14-FN	Nut, 1/4" Flange Nut
44	8955XC	Chain
45	303686_01	Ladder

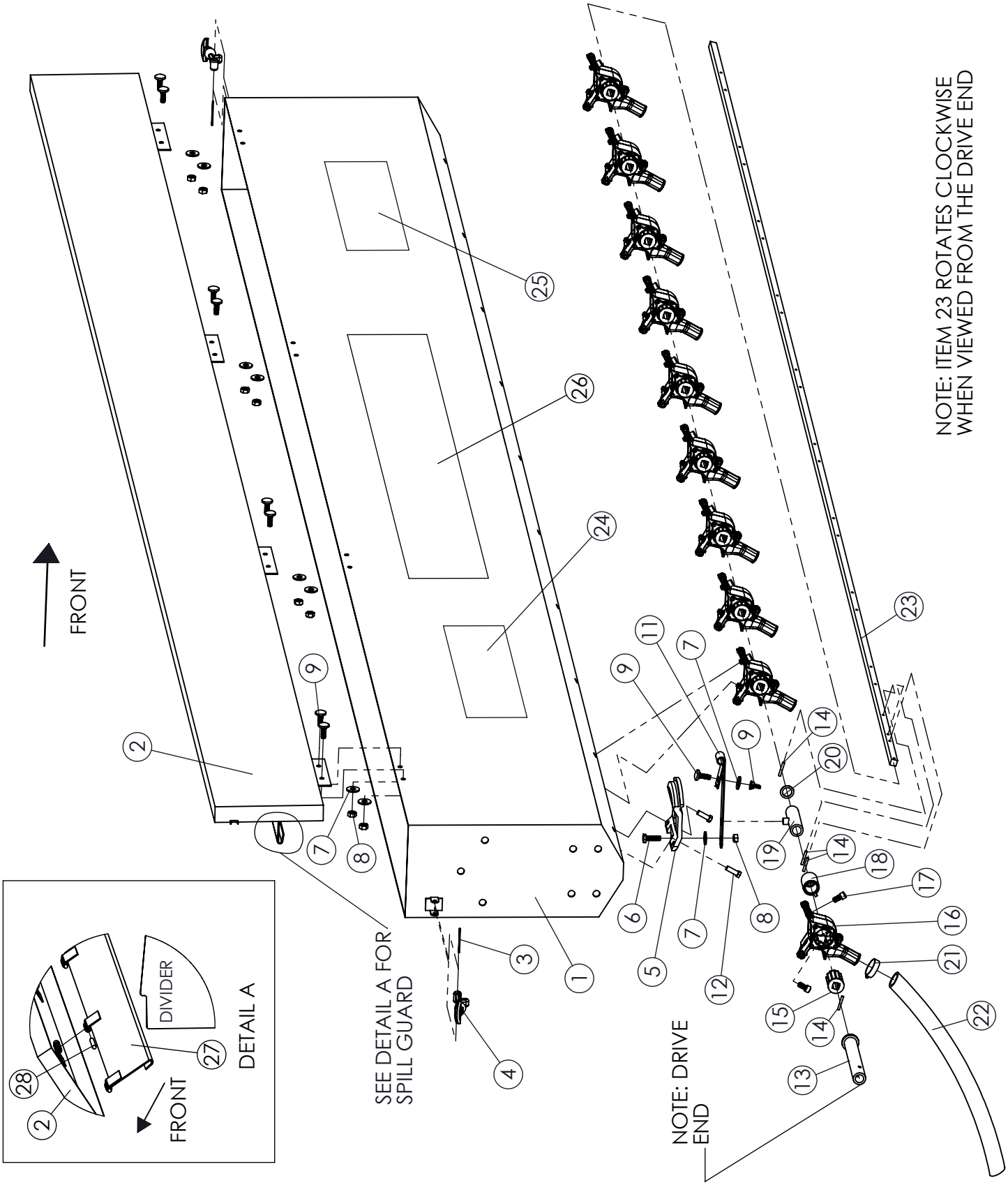
WALKBOARD ASSEMBLY (PART 2) - PAGE 1 OF 2





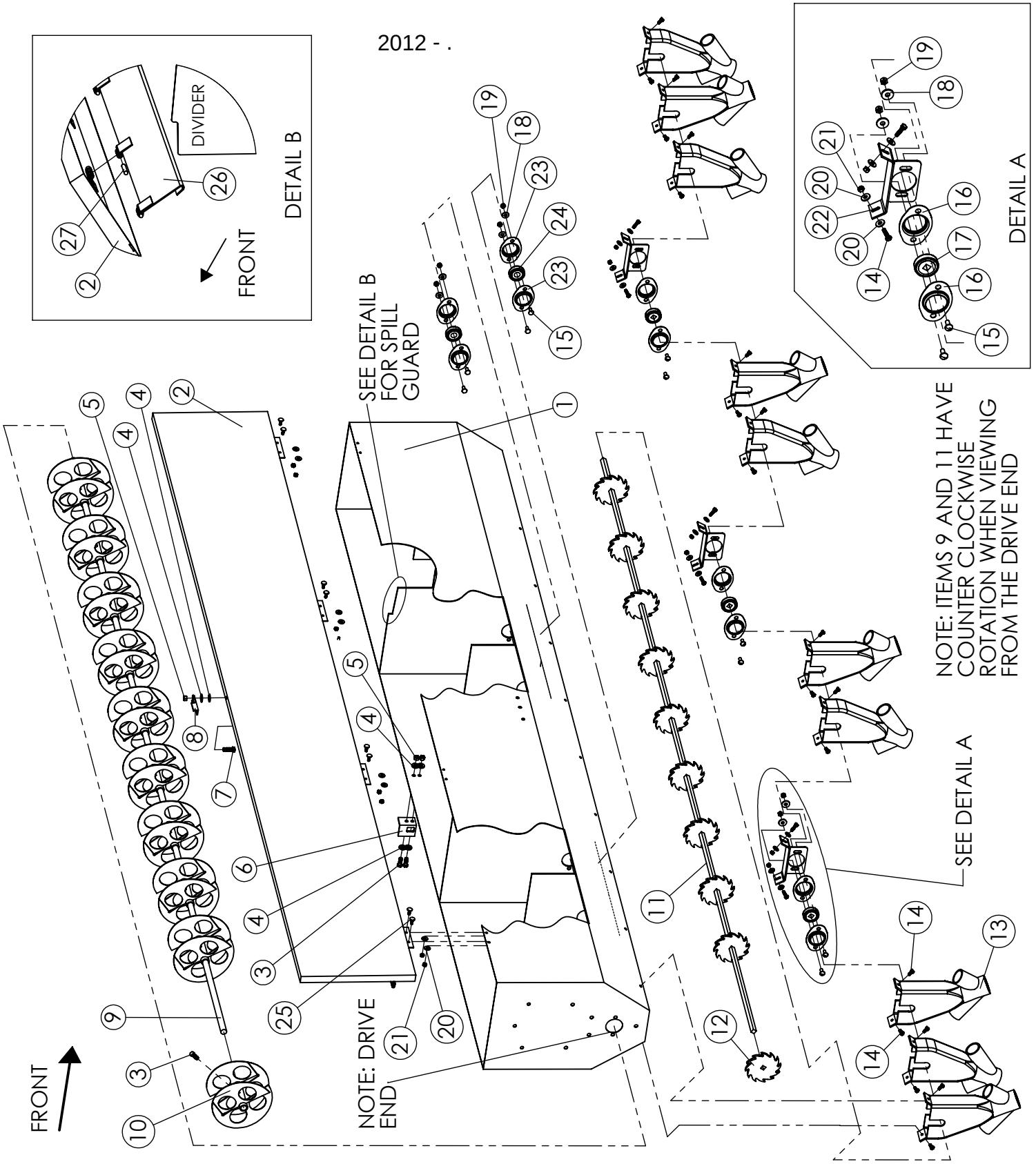
WALKBOARD ASSEMBLY(PART 2) - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303656	Square Tube, 4"x 4"
2	303669	Walkboard Weldment
3	303637	Square Tube 2"x 4"
4	303689RH	Walkboard Support, Front Right Hand
5	303689LH	Walkboard Support, Front Left Hand
6	303697	Walkboard Roller
7	303684LH	Walkboard Railing, Left Hand
8	UB58-5.25-4	U-Bolt, 5/8"x 5-1/4"x 4"
9	UB12-3-4	U-Bolt, 1/2"x 3'x 4"
10	303686	Walkboard Ladder
11	3036100	Roller Bushing, Walkboard Support
12	B12-3.5	Bolt, 1/2"x 3-1/2"
13	303699	Roller Axle, rear Walkboard Support
14	303688LH	Walkboard Support, Rear Left Hand
15	303684RH	Walkboard Railing, Right Hand
16	CB12-2	Carriage Bolt, 1/2"x 2"
17	N12-CL	Nut, 1/2" Clincher
18	B12-2.5	Bolt, 1/2"x 2-1/2"
19	W12	Washer, 1/2"
21	303688RH	Walkboard Support, Rear Right Hand
22	HP116	Hitch Pin, 1/16"
23	N58-TL	Nut, 5/8" Top Lock
24	B12-2	Bolt, 1/2"x 2"
25	1046C72	Slow Moving Vehicle Sign, PM10-1105-2A
26	4226XG0	Lock Pin, Round
27	W34	Washer, 3/4"
28	303700	Open Grid Grate, 18"
29	N38	Nut, 3/8"
30	B38-1	Bolt, 3/8"x 1"
31	W38	Washer, 3/8"

SMALL SEED BOX ASSEMBLY - PAGE 1 OF 2



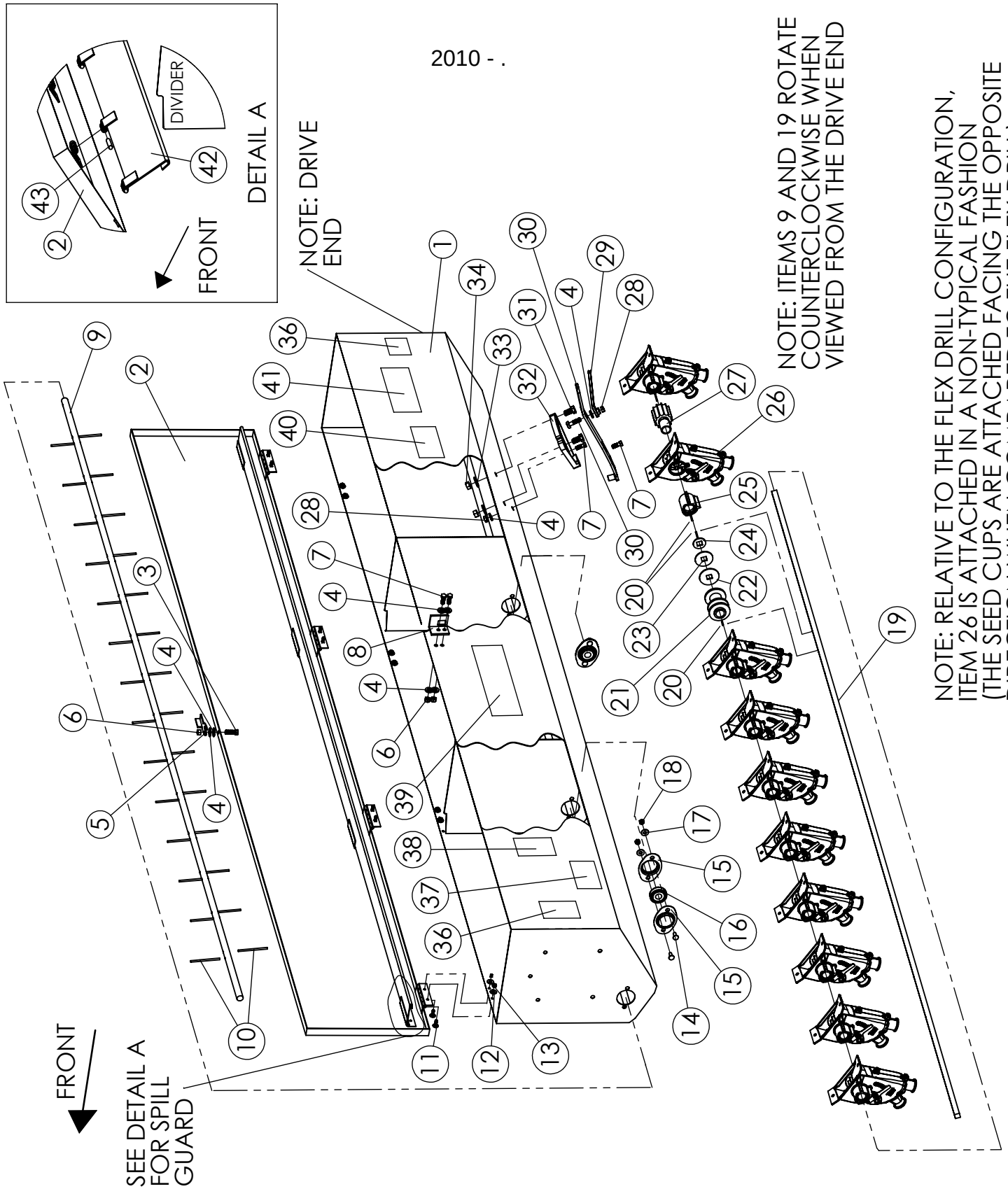
SMALL SEED BOX ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	1038RR	Small Seed Box, 10 Rows - 12" Spacing
2	1038RR1	Small Seed Box Lid
3	CP532-1.5	Cotter Pin, 5/32" x 1-1/2"
4	1038J	Lid Retainer
5	1129	Mount, Shifter
6	B14-1	Bolt, 1/4" x 1"
7	W14	Washer, 1/4"
8	N14	Nut, 1/4"
9	CB14-0.75	Carriage Bolt, 1/4" x 3/4"
10	WN14	Wing Nut, 1/4"
11	1131	Lever, Shifter
12	B14-0.75	Bolt, 1/4" x 3/4"
13	1010	Coupler
14	RP18-0.875	Roll Pin, 1/8" x 7/8"
15	M10274	Roll, Feed
16	AN-162555	Cup Assembly w/ Snap Ring
17	SHC14-0.5	Socket Head Cap Screw, 1/4" x 1/2"
18	M10017	Shut-Off, Feed
19	1130	Shifter Spool
20	MB12-0.015	Spacer, 0.015" Thick (Use as Needed)
21	1013	Clamp, Hose, #10 or # 12
22	1012A	Hose, Small, Black Plastic, 1991-
23	1048N	Shaft, 3/8" Square
24	1046C5-B	Decal - Do Not Back Up Machine When Planters Are Down
25	1046C81	Decal - Lift Planters Before Turning
26	1046C7RR	Decal - Rough Rider
27	1038HP	Hinge Pin

LARGE (FLUFFY) SEED BOX ASSEMBLY - PAGE 1 OF 2



LARGE (FLUFFY) SEED BOX ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	1001R	Large (Fluffy) Seed Box, 10 Rows - 12" Spacing
2	1001R1	Large (Fluffy) Seed Box Lid
3	B38-1	Bolt, 3/8" x 1"
4	W38	Washer, 3/8"
5	N38	Nut, 3/8"
6	1038J51	Seed Box Lid Latch Base
7	B38-1.25	Bolt, 3/8" x 1-1/4" Grade 5
8	1038J	Seed Box Lid Latch
9	1004R	Shaft, 3/8" Round
10	1049A	Agitator, Auger
11	2003R	Shaft, 1/2" Square
12	2002	Picker Wheel, 1/2" Square Bore
13	10333	Transition - Long
14	B14-0.625	Bolt, 1/4" x 5/8" Grade 5
15	CB516-0.75	Carriage Bolt, 5/16" x 3/4" Grade 5
16	1007B	Flangette, Bearing - 47MST (Flattened Edge)
17	2007	Bearing, 1/2" Square Bore
18	W516	Washer, 5/16"
19	N516	Nut, 5/16"
20	W14	Washer, 1/4"
21	N14	Nut, 1/4"
22	10316	Bearing Support
23	1007A	Flangette, Bearing - 47MST
24	1007	Bearing, 3/4" Round
25	CB14-0.75	Carriage Bolt, 1/4" x 3/4"
27	1038HP	Hinge Pin

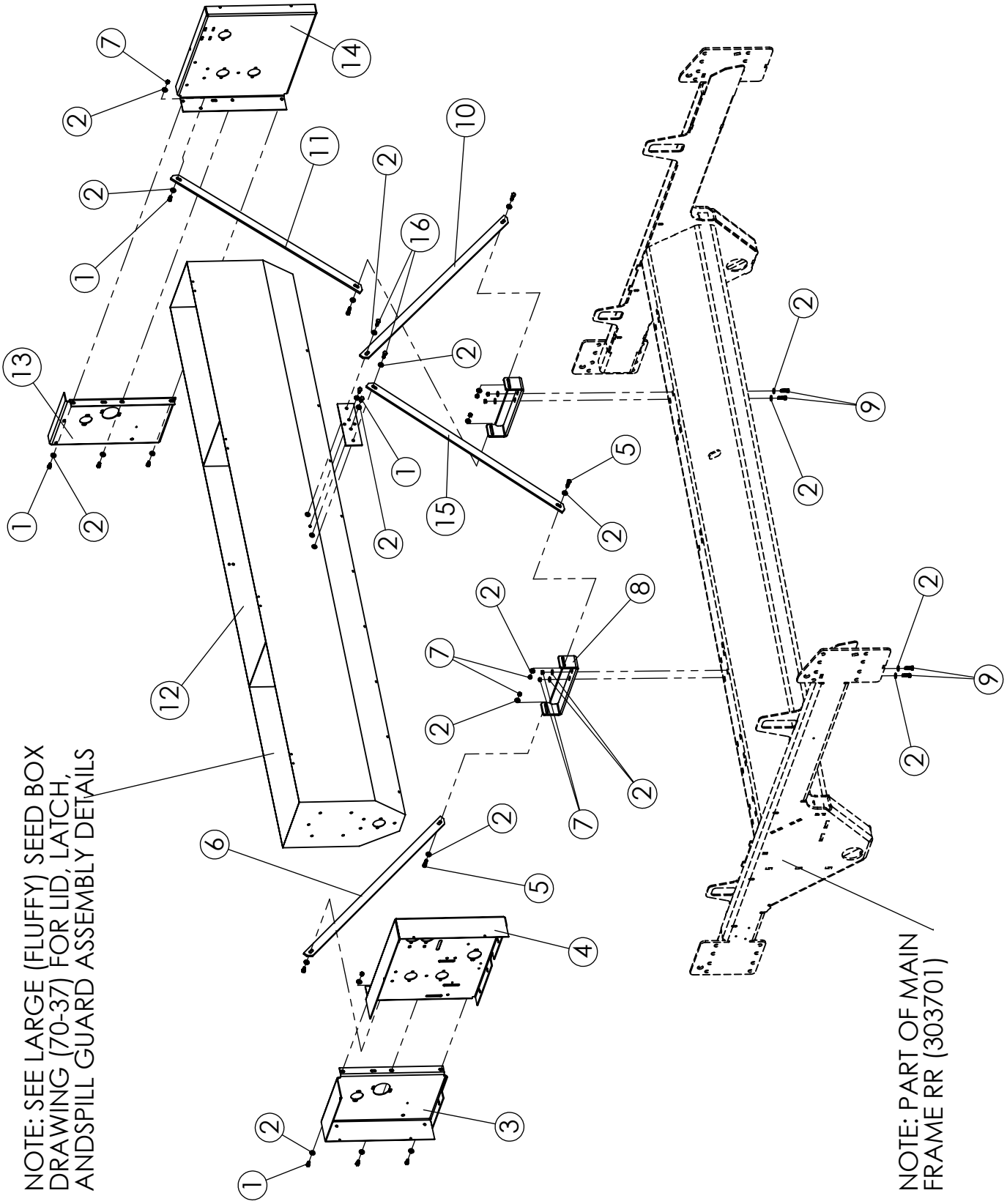
COOL SEASON SEED BOX ASSEMBLY - PAGE 1OF 3



COOL SEASON SEED BOX ASSEMBLY - PAGE 2 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	300R	Cool Season Seed Box, 10 Rows - 12" Spacing
2	3001R1	Cool Season Seed Box Lid
3	B38-1.25	Bolt, 3/8" x 1-1/4"
4	W38	Washer, 3/8"
5	1038J	Seed Box Lid Latch
6	N38	Nut, 3/8"
7	B38-1	Bolt, 3/8" x 1"
8	1038J51	Seed Box Latch Base
9	3221N	Shaft, 3/4" Round
10	3225	Agitator, Cool Season Seed Box
11	CB14-.75	Carriage Bolt, 1/4" x 3/4"
12	W14	Washer, 1/4"
13	N14	Nut, 1/4"
14	CB516-.75	Carriage Bolt, 5/16" x 3/4"
15	1007A	Flangette, Bearing - 47MST
16	1007	Bearing, 3/4" Round
17	W516	Washer, 5/16"
18	N516	Nut, 5/16"
19	3103N	Shaft, 5/8" Square
20	RP18-1.25	Roll Pin, 1/8" x 1-1/4"
21	M608621	Shifter, Bearing
22	TM60826	Thrust Washer, Delrin - .125" Thickness
23	TM60825	Thrust Washer, Backer - .115" Thickness
24	TM608231	Spacer, 5/8" Square Hole - .120" Thickness
25	M60864	Shut-Off
26	AN-212650	Seed Cup, Cool Season Box
27	M60865	Fluted Roll
28	N38	Nut, 3/8"
29	NH38	Nut Handle, 3/8"
30	3205	Handle, Shifter
31	B12-1	Bolt, 1/2" x 1"
32	3229	Shifter Quad
33	W12	Washer, 1/2"
34	N12	Nut, 1/2"
35	B38-1SQ	Bolt, 3/8" x 1" Square Head

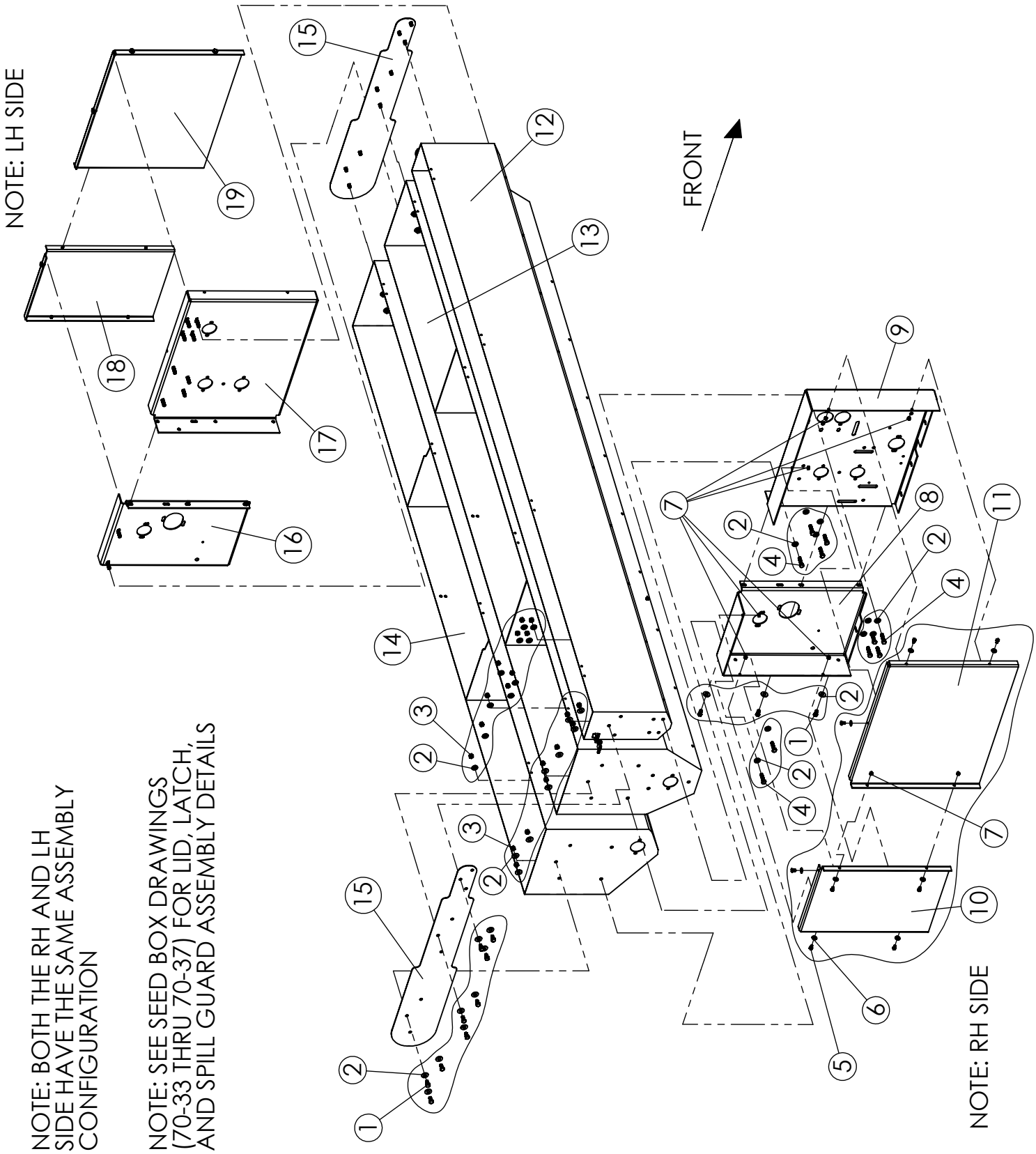
COOL SEASON SEED BOX ASSEMBLY - PAGE 3 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
36	2008C2	Decal - Red Reflector
37	1046C71	Decal - SMV Triangle
38	1046C8	Decal - Rotating Parts
39	1046C7RR	Decal - Rough Rider
40	1046C15	Decal - American Flag
41	1046C3-A	Decal - DO NOT RIDE (Danger)
43	1038HP	Hinge Pin

SEEDBOX SUPPORT ASSEMBLY - PAGE 1 OF 2



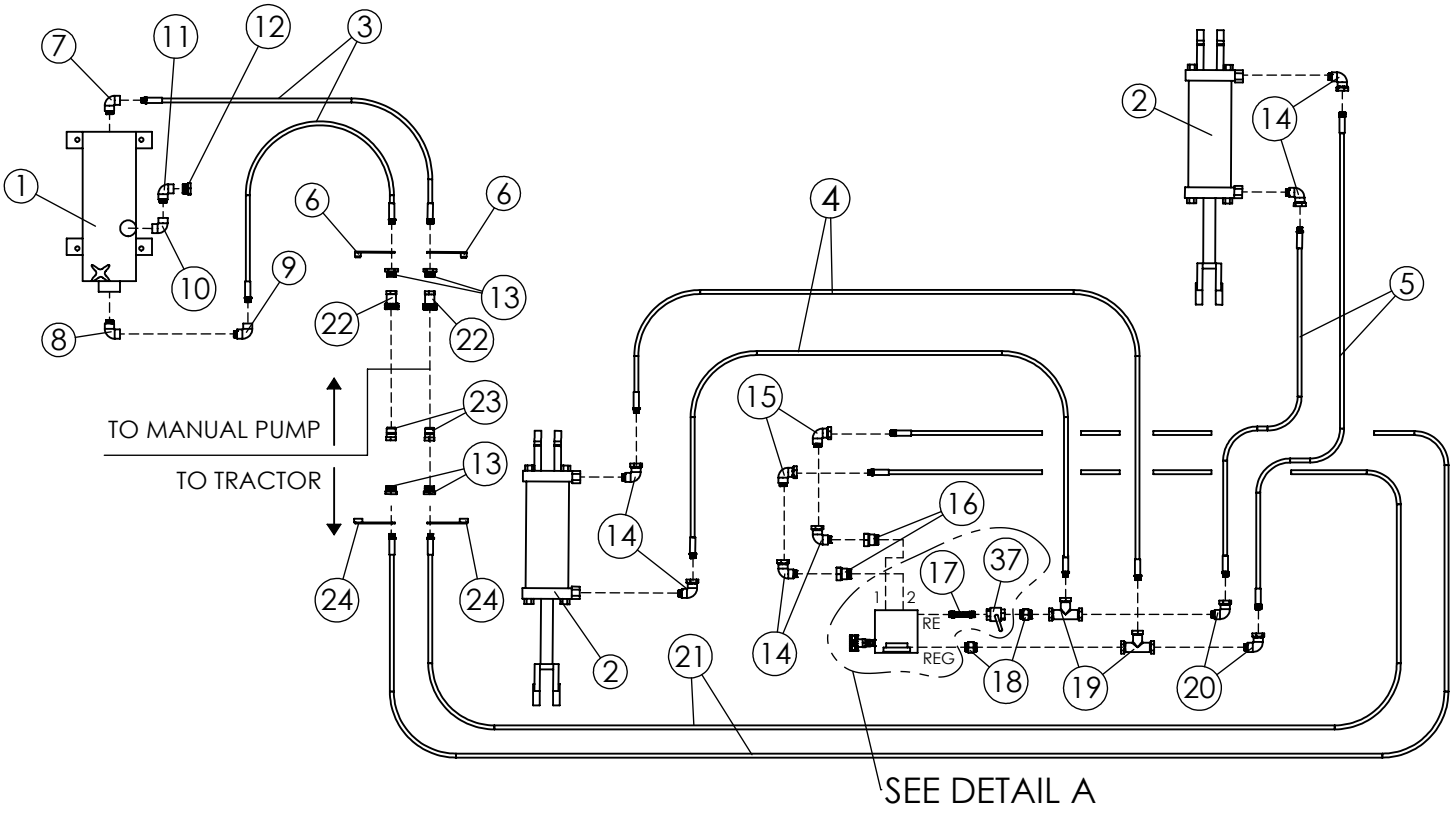
SEED BOX SUPPORT ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B38-0.75	Bolt, 3/8" x 3/4"
2	W38	Washer, 3/8"
3	1036241	End Plate, RH CS
4	103624	End Plate, RH
5	B38-1.5	Bolt, 3/8" x 1-1/2" Grade 5
6	303673B	RR Strut Frame 42" RR
7	N38-TL	Nut, 3/8" Top Lock
8	30367402	Seed Box Lower Strut Mount
9	B38-1.25	Bolt, 3/8" x 1-1/4" Grade 5
10	303673C	RR Strut Frame 43-1/2" RR
11	303673	RR Strut Frame 39-3/4"
12	1001R	Large (Fluffy) Seed Box, 10 Rows - 12" Spacing
13	1026231	End Plate, LH CS
14	103623	End Plate, LH
16	B38 - 1.5	Bolt, 3/8" x 1-12"

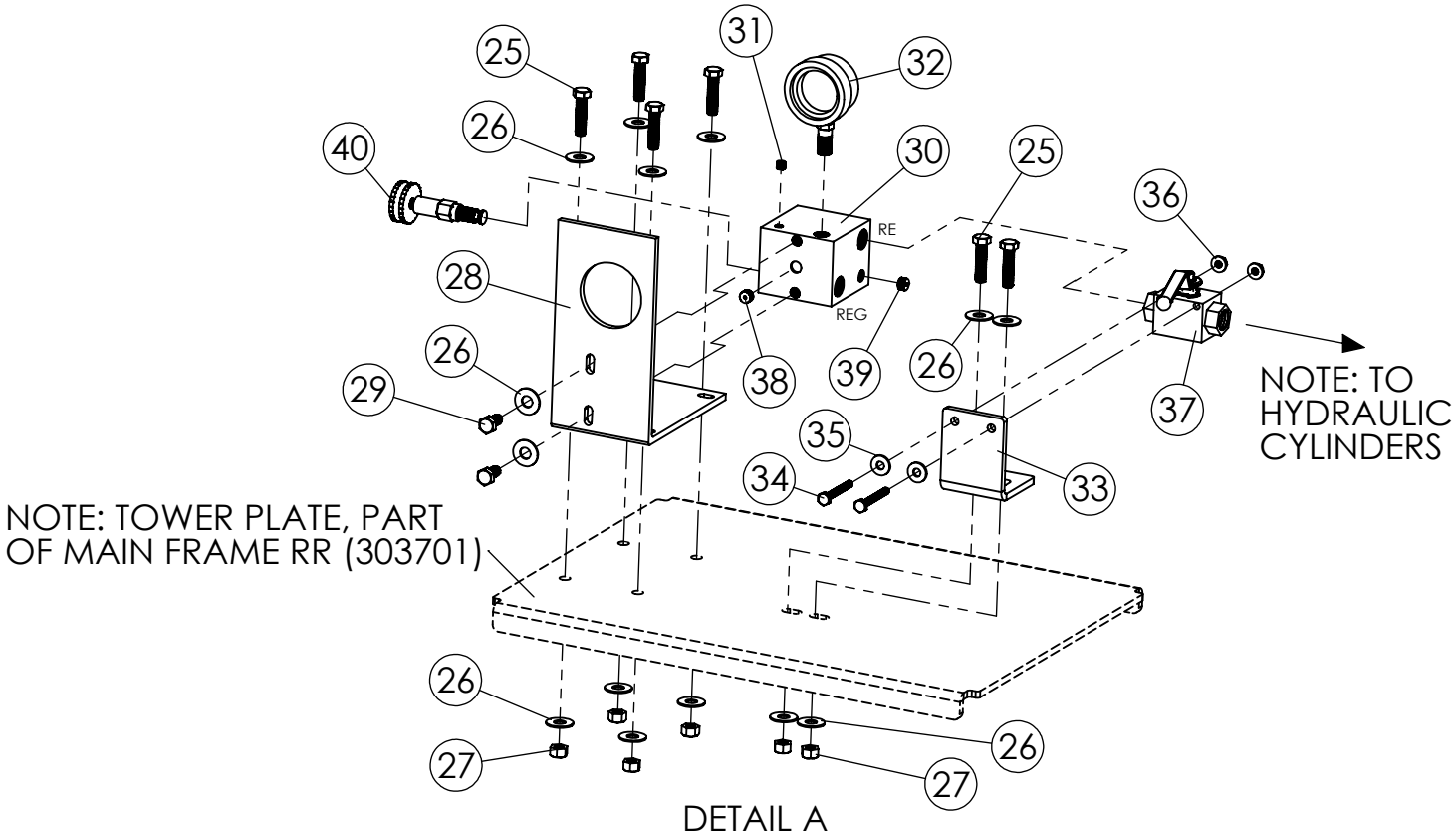
END PLATE ASSEMBLY - PAGE 1 OF 2



END PLATE ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B38-0.75	Bolt, 3/8" x 3/4" Grade 5
2	W38	Washer, 3/8"
3	N38	Nut, 3/8" (Top Lock?)
4	B38-1	Bolt, 3/8" x 1" Grade 5
5	B14-0.5	Bolt, 1/4" x 1/2" Grade 5
6	W14	Washer, 1/4"
7	N14	Nut, 1/4"
8	1036241	End Plate, RH CS
9	103624	End Plate, RH
10	1036245	Cover, RH CS End Plate
11	1036243	Cover, RH End Plate
12	1038R	Small Seed Box, 10 Rows - 12" Spacing
13	1001R	Large (Fluffy) Seed Box, 10 Rows - 12" Spacing
14	3001R	Cool Season Seed Box, 10 Rows - 12" Spacing
15	33100G	Seed Box Tie Strap
16	1036231	End Plate, LH CS
17	103623	End Plate, LH
18	1036236	Cover, LH CS End Plate
19	1036233	Cover, LH End Plate

HYDRAULICS - PAGE 1 OF 3



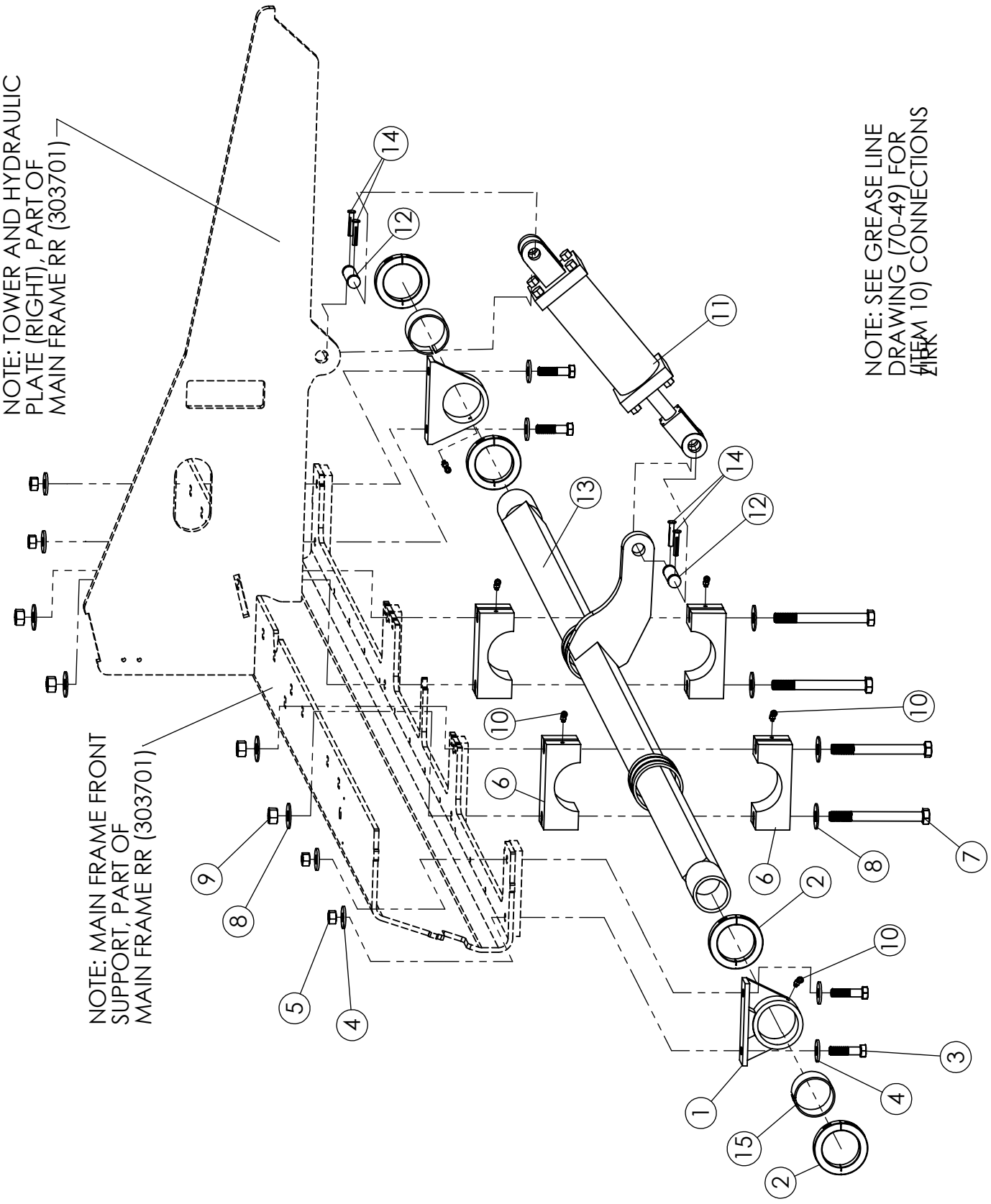


DETAIL A

HYDRAULICS - PAGE 2 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	422602	Pump, Manual Hydraulic
2	42260RR	Cylinder, Hydraulic 3" x 8" x 1-3/8"
3	4222X2	Hose, Hydraulic - 2'
4	4222X3	Hose, Hydraulic - 3'
5	4222X9	Hose, Hydraulic - 9'
6	422031	Dust Cover, Hydraulic Rubber, Male
7	4224A22	Elbow, Pipe, 90° 1/2" M x 3/8" F
8	422619	Elbow, Pipe, 90° 3/8" M x 3/8" F
9	422406	Swivel Adapter, Long, 3/8" M x 3/8" F
10	422619	Elbow, 90° 1/2" F x 1/2" F
11	422612	Street Elbow, 90° 1/2" M x 1/2" F
12	422618	Filter, 1/2" M
13	422202	Reducer, 1/2" M x 3/8" F
14	4224A1	Swivel Adapter, O-Ring Fitting, 90° 1/2" M x 3/8" F
15	422603	Swivel Elbow, 90° 3/8" M x 3/8" F
16	422206	Reducer?
17	4222X0.5	Hose, 3/8" x 6", 1/2" M To Valve
18	422201	O-Ring Fitting, 1/2" M x 3/8" M
19	422617	Swivel Tee, 3/8" F x 3/8" F x 3/8" F
20	4224A2	Swivel Elbow, 3/8" M x 3/8" F (Need Seat, Not Just Pipe Thread)
21	4222X14	Hose, Hydraulic - 14'
22	42220A	Quick Coupler, 1/2" F
23	42220	Quick Tip, 1/2" M
24	42202C	Dust Cover, Hydraulic Rubber, Female
25	B38-1.25	Bolt, 3/8" x 1-1/4"
26	W38	Washer, 3/8"
27	N38	Nut, 3/8"
28	33177	Gauge Mount, RR
29	B38-?	Bolt, 3/8" x ?
30	4226C3	Valve Body, Aluminum, RR
31	422615	Plug, O-Ring Hex Hollow, 5/16" - 24
32	4226G	Pressure Gauge
33	4226C5	Safety Mount Valve Bracket
34	B14-2	Bolt, 1/4" x 2"
35	W14	Washer, 1/4"
36	N14-FN	Nut, 1/4" Flange Nut

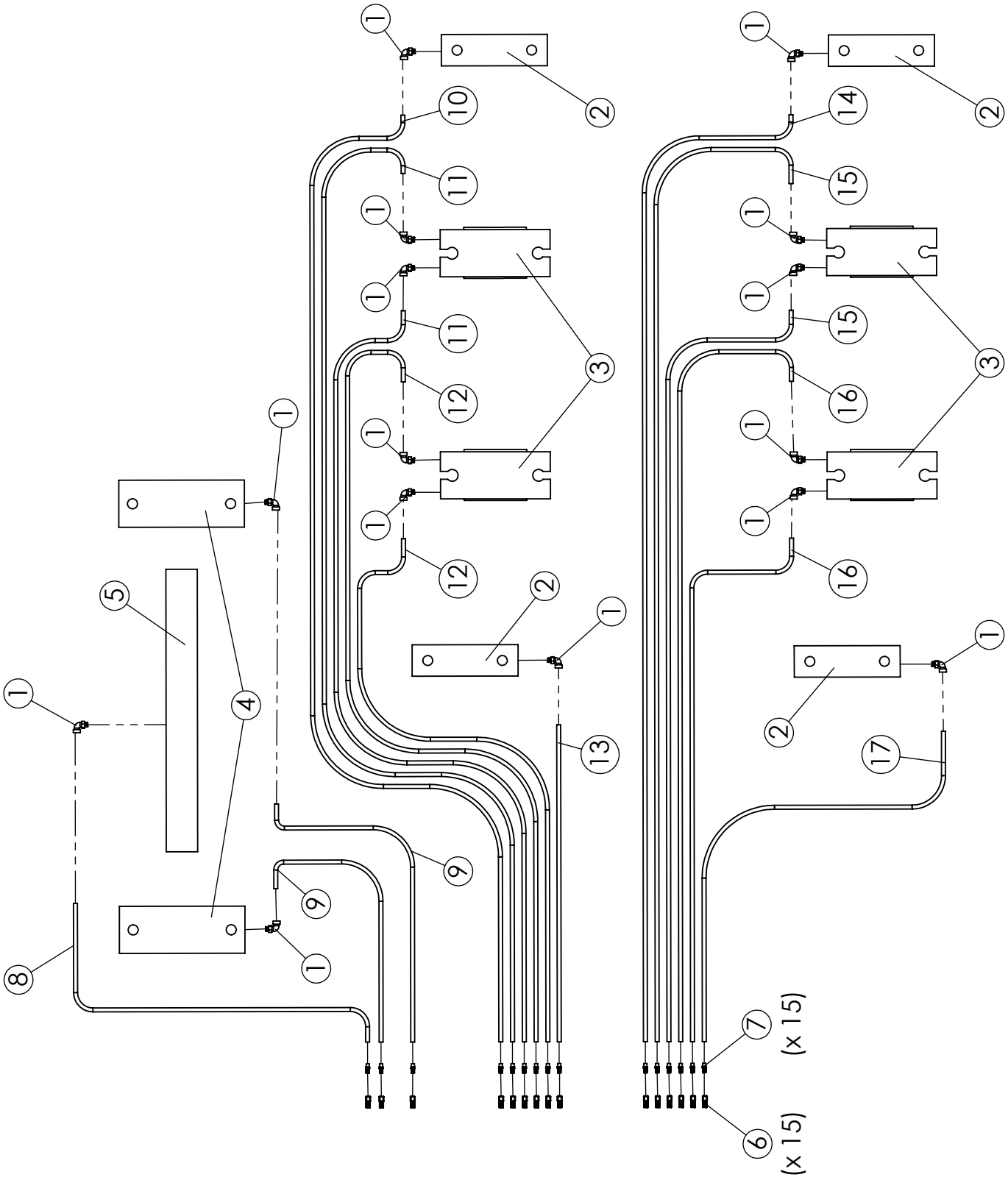
HYDRAULICS - PAGE 3 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
37	55750	Safety Shut-Off Valve
38	422616	Plug, O-Ring Hex Hollow, 7/16" - 20
39	4226C4	Orifice
40	4226C1	Control Cartridge w/ Knob

ROCKSHAFT (FRONT) ASSEMBLY - PAGE 1 OF 2



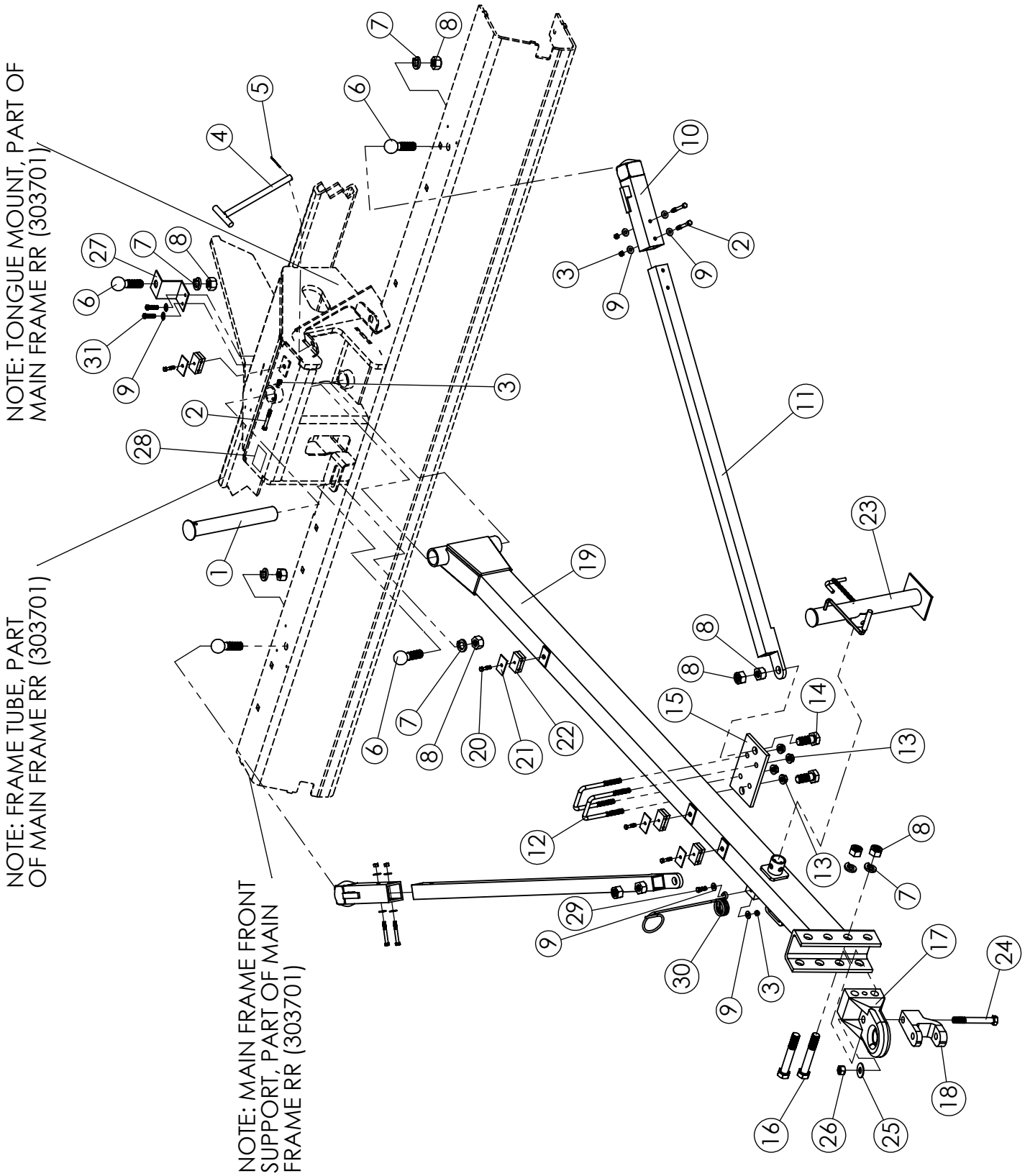
ROCKSHAFT (FRONT) ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	1037BHX3	Main Bearing Mount
2	1037CLX	Collar, 3" ID x 4-1/4" OD x 7/8" L
3	B58-2.5	Bolt, 5/8" x 2-1/2" Grade 8
4	W58	Washer, 5/8" Grade 8
5	N58-TL	Nut, 5/8" Top Lock
6	33815	Pillow Block
7	B34-7.5	Bolt, 3/4" x 7-1/2" Grade 8
8	W34	Washer, 3/4" Grade 8
9	N34-TL	Nut, 3/4" Top Lock
10	1093DD	Zirk, 90°, 1/4"
11	42260RR	Hydraulic Cylinder 3" x 8" x 1-3/8"
12	80111	Pin, Hydraulic, 1" x 3-1/2"
13	338402 338412	Rockshaft Front Rockshaft Rear (not shown)
14	CP316-2	Cotter Pin, 3/16" x 2"
15	1037FLM	Connex Bushing, 3-1/4"OD, 3"ID, 2"L
16	338174	Bell Crank

GREASE LINES - PAGE 1 OF 2



GREASE LINES - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	3244053	Grease Fitting, 90° 1/4"
2	1037BHX	Main Bearing - End
3	33815	Pillow Bearing Block
4	3015	Bearing, Pillow Block
5	33301	Tube, Drive Leg
6	313155	Grease Fitting Adapter, 90°
7	31168X4	Grease Fitting Adapter, Straight
8	9991-6	Grease Line Tubing - ~6'
9	9991-16	Grease Line Tubing - ~16'
10	9991-12	Grease Line Tubing - ~12'
11	9991-9	Grease Line Tubing - ~9'
12	9991-5	Grease Line Tubing - ~5'
13	9991-16	Grease Line Tubing - ~16'
14	9991-13	Grease Line Tubing - ~13'
15	9991-9	Grease Line Tubing - ~9
16	9991-5	Grease Line Tubing - ~5'

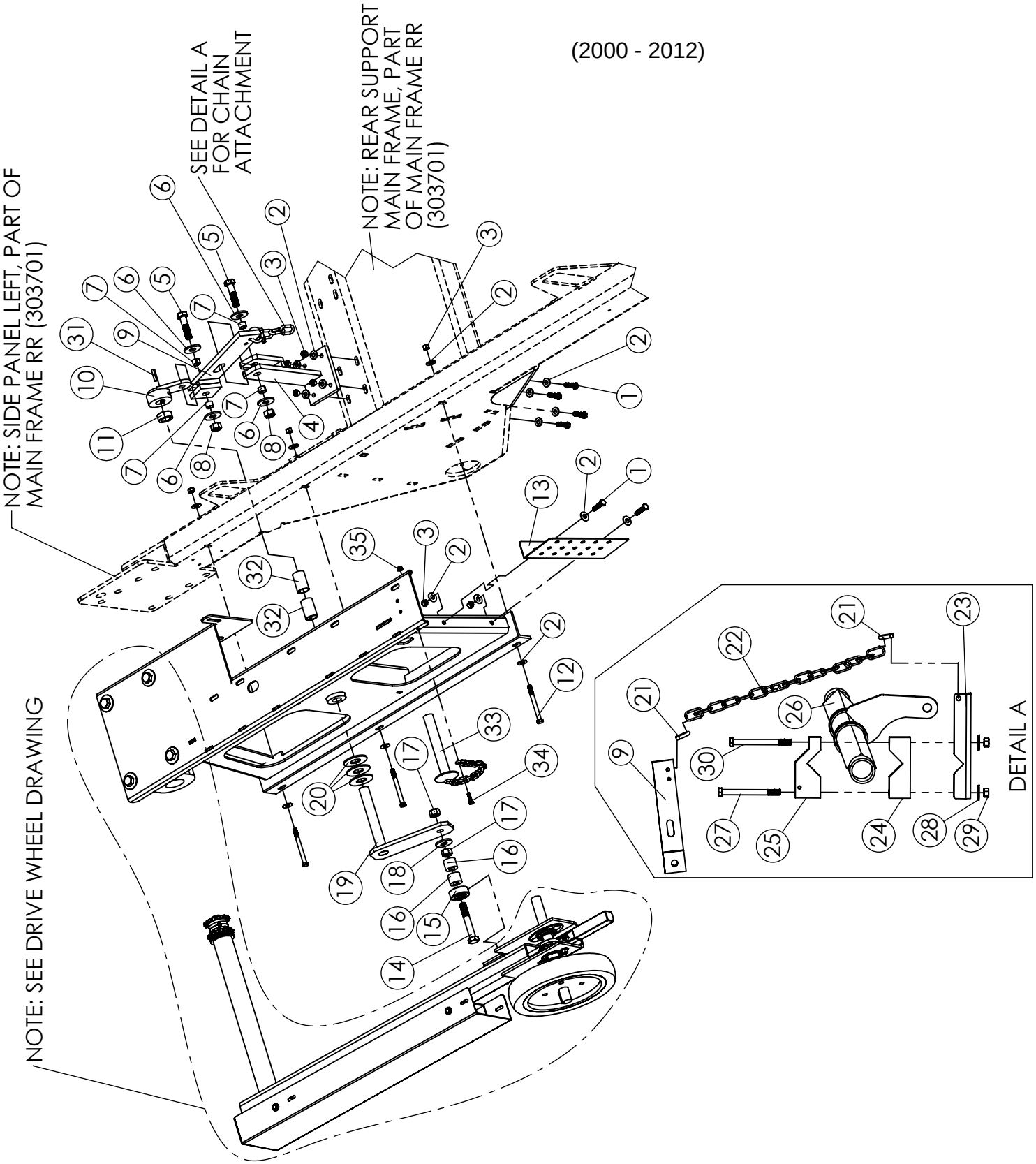
TONGUE ASSEMBLY - PAGE 1 OF 2



TONGUE ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	3370011	Tongue Pin?
2	B38-3	Bolt, 3/8" x 3" Grade 5
3	N38-TL	Nut, 3/8" Top Lock
4	33700-11	Tongue Retaining Pin
5	HP316	Hitch Pin, 3/16"
6	WF10223A	Hitch Ball, 1-7/8" Head, 1" Thread
7	LW1	Washer, 1" Split Lock Washer
8	N1-TL	Nut, 1" Top Lock
9	W38	Washer, 3/8" Grade 5
10	WF10223	Hitch Coupler 1-7/8" x 2"
11	33711	Tongue Strut
12	UB58-6.25-3	U-Bolt, 5/8" x 6-1/4" x 3"
13	N58-FN	Nut, 5/8" Flange Nut
14	B1-2.5	Bolt, 1" x 2-1/2" Grade 5
15	33716	Plate, Tongue Clamp
16	B1-6.5	Bolt, 1" x 6-1/2" Grade 5
17	1022B2	Hitch Clevis (99-)
18	1022C2	Hitch Body, Heavy Duty, RR
19	33700	Tongue, RR
20	B516-1.25	Bolt, 5/16" x 1-1/4"
21	337181	Assembly Hydraulic Tubing Clamp
23	10691N	Parking Jack, Pin Style, RR
24	B34-6GRD8	Bolt, 3/4" x 6" Grade 8
25	W34	Washer, 3/4"
26	N34-TL	Nut, 3/4" Top Lock
27	33715B	Tongue Hitch Ball Z-Mount
28	104653	Decal - Rotate Lever to Close (Warning)
29	B38-1.5	Bolt, 3/8" x 1-1/2" Grade 5
30	4214	Hose Guide 18
31	B38-1.75 Grade 8	Bolt, 3/8" x 1-1/4" Grade 8

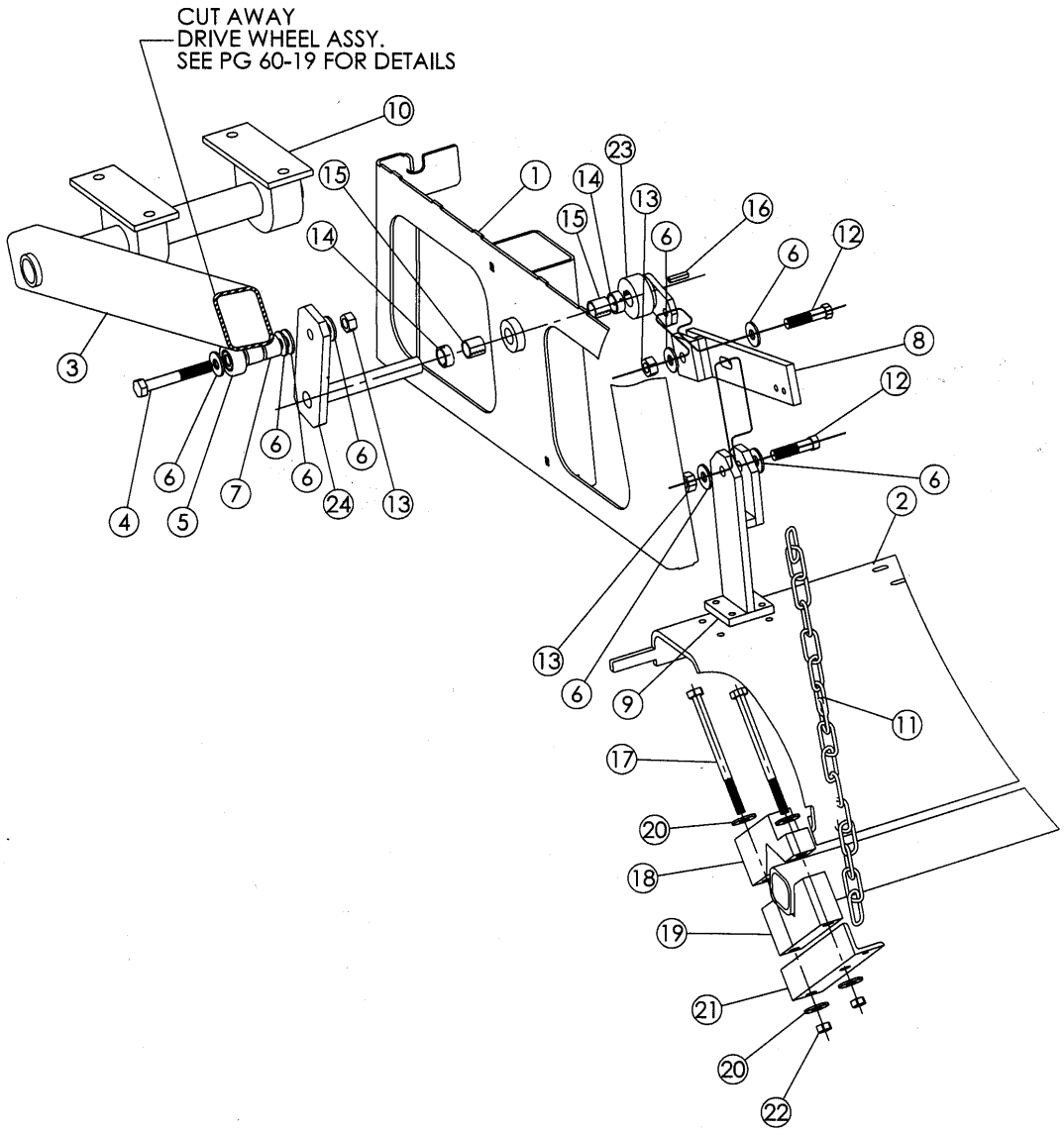
WHEEL LIFT ASSEMBLY - PAGE 1 OF 2

(2000 - 2012)



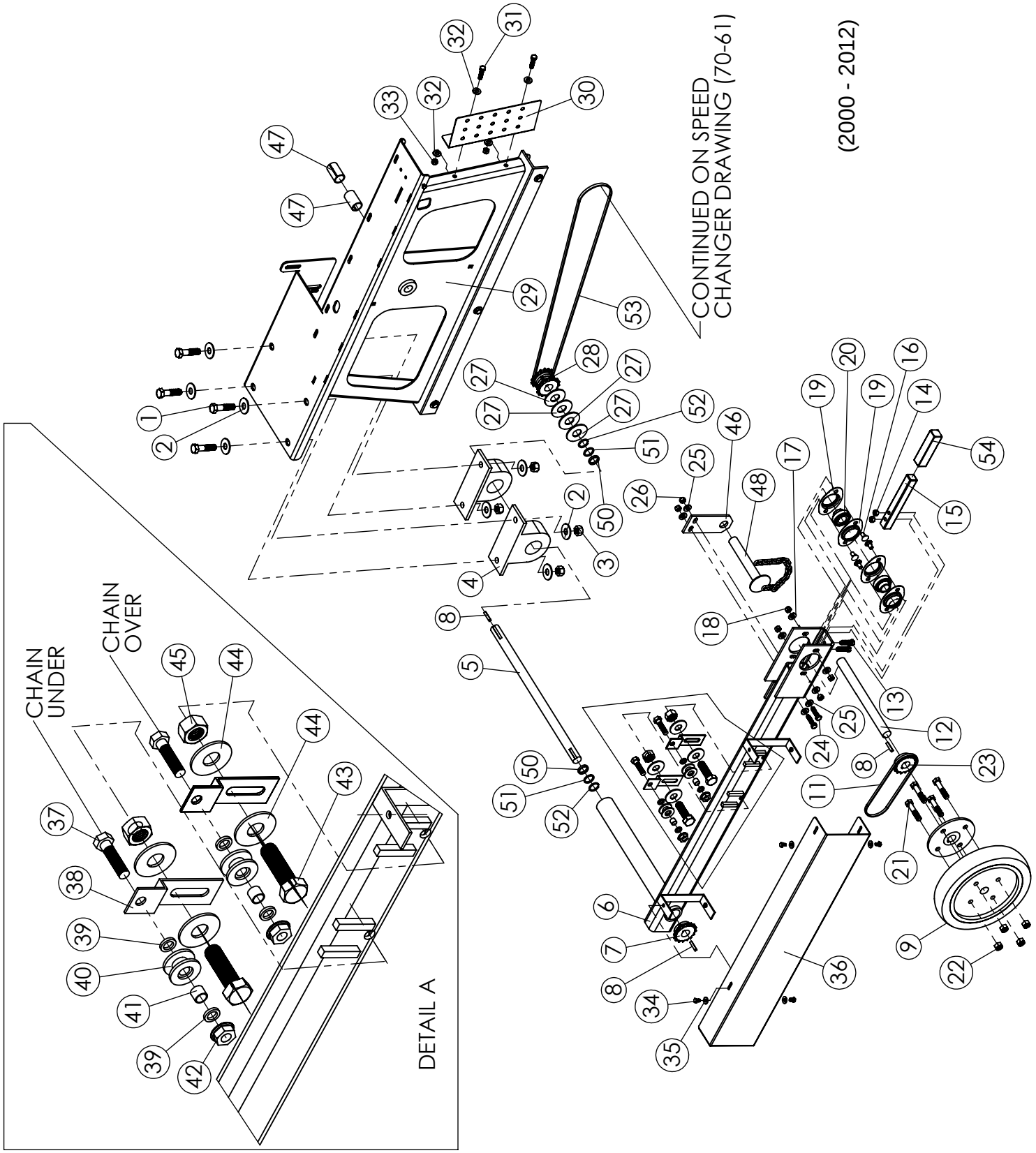
WHEEL LIFT ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B38-1.5	Bolt, 3/8" x 1-1/2" Grade 5
2	W38	Washer, 3/8"
3	N38	Nut, 3/8"
4	303683	Base, Drive Wheel Lift, RR
5	B58-2.5	Bolt, 5/8" x 2-1/2" Grade 5
6	W58	Washer, 5/8" Grade 5
7	102523	Bushing, Connex, 3/4" OD, 5/8" ID, 1/2" L
8	N58	Nut, 5/8" Grade 5
9	303682	Arm, Drive Wheel Lift, RR
10	1057HUB1	Sprocket Hub 1" Bore X
11	1124	Set Screw Collar, Shaft, 1" Bore
12	B38-4	Bolt, 3/8" x 4" Grade 5
13	303675	Grease Bank Plate
14	B58-4	Bolt, 5/8" x 4" Grade 8
15	1037DBX1	Bearing, 1" OD, Cylindrical
16	33320	Space, Wheel Arm
17	N58	Nut, 5/8" Grade 8
18	W58	Washer, 5/8" Grade 8
19	33857	Wheel Arm Lift Shaft with Keyway
20	W1	Washer, 1"
21	8955XC1	Pin Anchor
22	8955XC	Chain, 9/32, 19 Links, 24-1/2"
23	33316	Angle Iron Rock Shaft Clamp
24	33315	Lift Arm Pull Mount, Lower
25	33314	Lift Arm Pull Mount, Upper
26	338412	Rockshaft Rear
27	B58-7	Bolt, 5/8" x 7" Grade 5
28	W58	Washer, 5/8"
29	N58-TL	Nut, 5/8" Top Lock
30	B58-5.5	Bolt, 5/8" x 5-1/2" Grade 5
31	1110	Key, 1/4" x 1/4"
32	102521	Bushing, Connex, 1-1/4" OD, 1" ID, 2" L
33	33317	Lock Out Lift Pin & Chain
34	B14-1	Bolt, 1/4" x 1"
35	N14-FN	Nut, 1/4" Flange Nut

WHEEL LIFT ASSEMBLY – PAGE 1 OF 2



WHEEL LIFT ASSEMBLY – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	303672 303671	Seed Box Tower, Right Seed Box Tower, Left
2	303614	Main Frame
3	3302	Arm, Drive Wheel
4	B58-4.5	Bolt, 5/8"x 4-1/2"
5	1037DBX1	Bearing
6	W58	Washer, 5/8"
7	33320	Spacer
8	303682	Cantilever, Drive Wheel Lift Assembly
9	303683	Base, Drive Wheel Lift Assembly
10	3015	Bearing, Drive Wheel Assembly (UPC210-32)
11	8955XC	Chain, Drive Wheel Assembly (19 Chain Links)
12	B58-2.5	Bolt, 5/8"x 2-1/2"
13	N58-TL	Nut, 5/8" Top Lock
14	1124	Collar, Shaft 1"
15	10256	Bushing, Connex
16	1110	Square Key, 1/4"x 1-1/4"
17	B12-7.5	Bolt, 1/2"x 7-1/2"
18	33314	Rock Shaft Clamp, Upper
19	33315	Rock Shaft Clamp, Lower
20	W12GRD8	Washer, 1/2" Grade 8
21	33316	Angle
22	N12	Nut, 1/2"
23	338551	Hub, Lifting
24	338552	Lift Arm, Drive Wheel Assembly

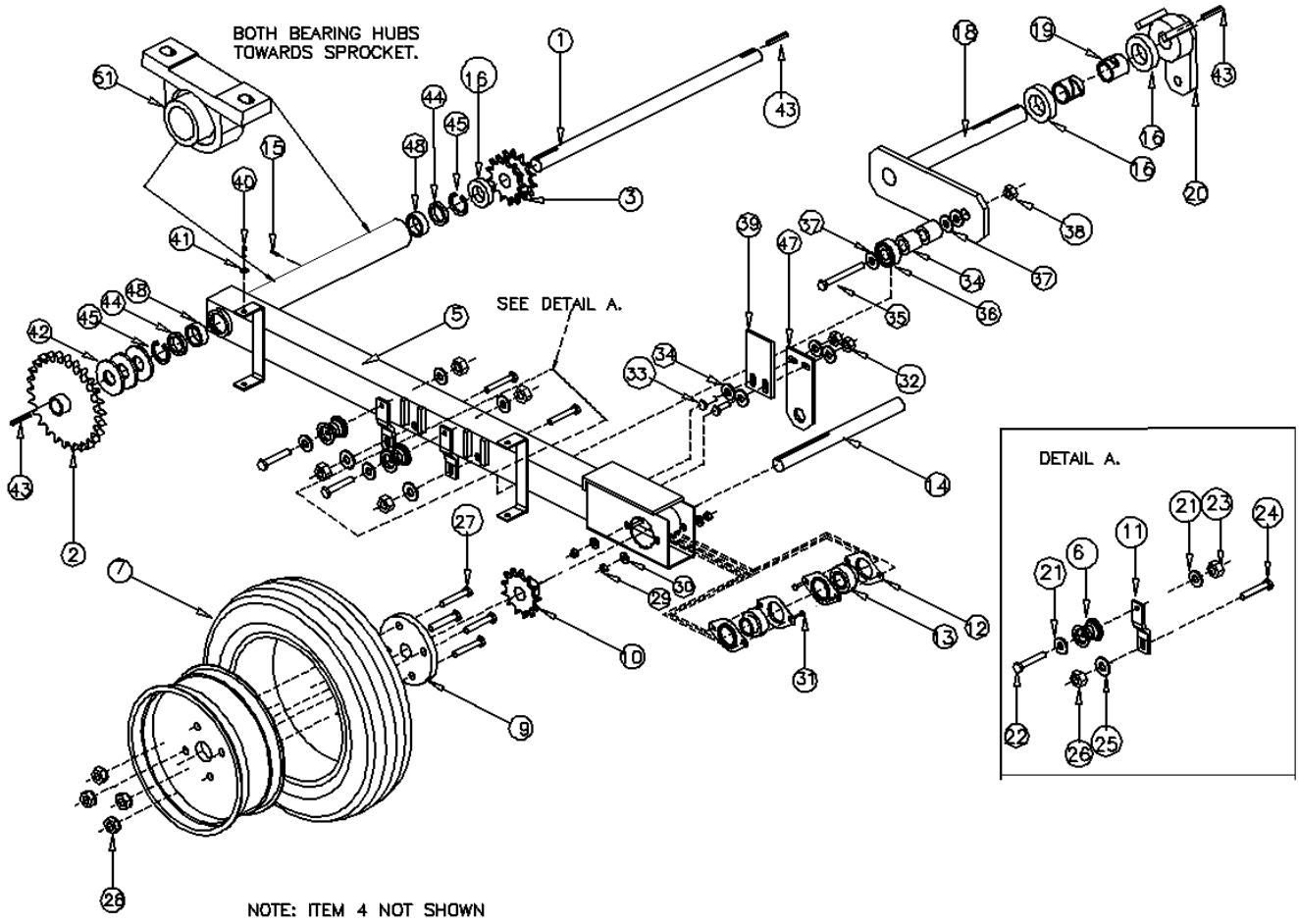
DRIVE WHEEL ASSEMBLY - PAGE 1 OF 3



DRIVE WHEEL ASSEMBLY 2 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B58-2.25	Bolt, 5/8" x 2-1/4" Grade 8
2	W58	Washer, 5/8" Grade 8
3	N58-TL	Nut, 5/8" Top Lock
4	3015	Bearing, Pillow Block, 2" UPC210-32
5	33306	Wheel Arm Shaft, 21-1/2"
6	33300	Wheel Arm Tube Frame, RR
7	1054	Sprocket, 1" Bore, #40 Chain 40B30
8	1110	Key, Square, 1/4" x 1-1/4"
9	WF1072	Drive Wheel, Tire and Rim
10	303739	Drive Wheel, 4 Bolt Hub
11	2040XA	Chain, Wheel Drive, 77 Links, #40 Chain?
12	33305	Wheel Arm Shaft, 12"
13	B38-1.5	Bolt, 3/8" x 1-1/2" Grade 5
14	N38	Nut, 3/8"
15	4213A18	Lift Handle
16	CB516-.75	Carriage Bolt, 5/16" x 3/4"
17	W516	Washer, 5/16"
18	N516	Nut, 5/16"
19	3007A	Flangette (T52MST)
20	3007	Bearing, 1" Spherical
21	1083A	Wheel Bolt, 1/2" x 2"
22	WN12-20	Wheel Nut, 1/2" - 20 NF w/ 45° Bevel
23	1057F	Sprocket, 1" Bore
24	B38-1.25	Bolt, 3/8" x 1-1/4" Grade 5
25	W38	Washer, 3/8"
26	N38-TL	Nut, 3/8" Top Lock
27	W1	Washer, 1"
28	710531	Sprocket, Double, 1" Bore
29	303672	Seed Box Tower Right
30	303675	Grease Bank Plate
31	B38-1.5	Bolt, 3/8" x 1-1/2"
32	W38	Washer, 3/8"
33	N38	Nut, 3/8"
34	B14-0.5	Bolt, 1/4" x 1/2"
35	W14	Washer, 1/4"
36	3245ENDX	Chain Guard, End Wheel
37	B12-2	Bolt, 1/2" x 2"

DRIVE WHEEL ASSEMBLY 3 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
38	3237X	Idler Support
39	1040B	Bushings, 1/2" ID, 3/4" OD
40	1041A	Spool, Plastic
41	1041A2	Bushing, Idler Spool, 1/2" ID, 5/8" OD, 1-1/8"L
42	N12-CL	Nut, 1/2" Clincher Nut
43	B12-3	Bolt, 1/2" x 3"
44	W12H	Washer, 1/2" Hardened
45	N12-JN	Nut, 1/2" Jam Nut
46	33307	Wheel Arm Mount, 6" x 2-1/2", 3 Holes
47	10256	Bushing, Connex, 1-1/4"OD, 1"ID, 2"L
48	3317	Lock Out Lift Pin & Chain 7-1/2" x 1"
49	2040	CHAIN
50	33002	Bearing, 1" Bore Needle
51	3000-X244ST	Retaining Ring, 1"
52	1138D	Seal, 1"
54	4213A19	Lift Handle Rubber Grip

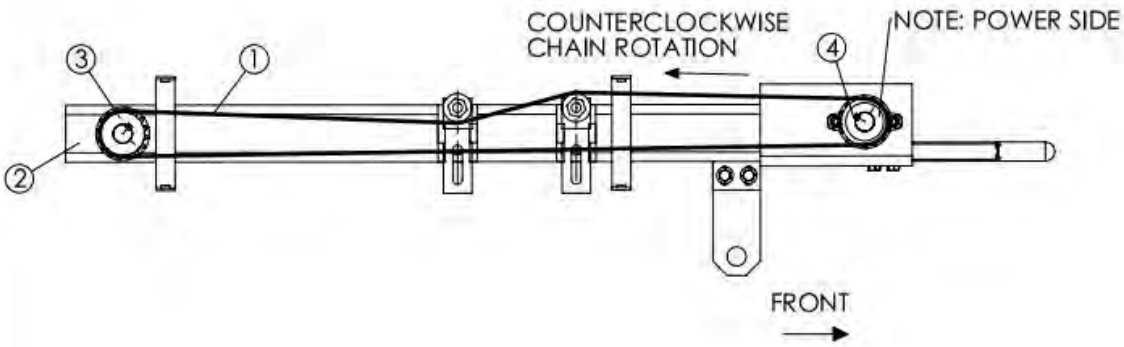
SEED BOX DRIVE WHEEL – PAGE 1 OF 3



SEED BOX DRIVE WHEEL – PAGE 2 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	33306	Shaft, 1" OD x 21-1/2" L
2	1055A2 (40B36)	Sprocket, 1" Round Bore – KY & SS
3	710531	Sprocket, Double 18/18 – KY & SS
4	1037LDXP	Bracket, Chain Guard
5	33302	Tube, Rectangular Wheel Arm
6	1041A	Spool, Plastic
7	WF1072	Wheel Assembly, 5.70 x 8
8	33320	Spacer
9	303739	Hub, 4 Bolt
10	1057F (40B18)	Sprocket, , 1" Round Bore – KY & SS
11	3237X	Idler Support
12	3007A	Flangette (52MST)
13	3007	Bearing, 1" Spherical
14	33305	Shaft, 1" OD x 12" L
15	1093DD	Zirk, 1/4"-28
16	1124	Collar, Shaft – 1" Bore
18	33855-3	Wheel Arm Lift w/Shaft, 1" OD x 7-3/4" L
19	10256	Bushing, Connex
21	W12H	Washer, 1/2" Hardened
22	B12-2	Bolt, 1/2"x 2
23	N12-CL	Nut, 1/2" Clincher Nut
24	B12-3	Bolt, 1/2"x 3"
25	W12H	Washer, 1/2" Hardened
26	N12-TL	Nut, 1/2" Top Lock
27	1083A	Wheel Bolt, 1/2"x 2"
28	WN12-20	Wheel Nut, 1/2"-20 With 45^0 Bevel From Centerline
29	N516-FN	Nut, 5/16" Flanged Nut
30	W516	Washer, 5/16"
31	CB516-1	Bolt, Carriage 5/16"x 1"
32	N12-TL	Nut, 1/2" Top Lock
33	B12-1.5	Bolt, 1/2"x 1-1/2"
34	W12	Washer, 1/2"
35	B58-4.5	Bolt, 5/8"x 4-1/2"
36	1037DBX1	Bearing, 1" Bore Cylindrical OD
37	W58	Washer, 5/8"
38	N58-FN	Nut, 5/8" Flanged Nut
40	B14-.625	Bolt, 1/4"x 5/8"
41	W14	Washer, 1/4"
42	W1	Washer, 1"
43	1110	Key, Square 1/4"x 1-1/4"
44	1138D	Seal, 1"

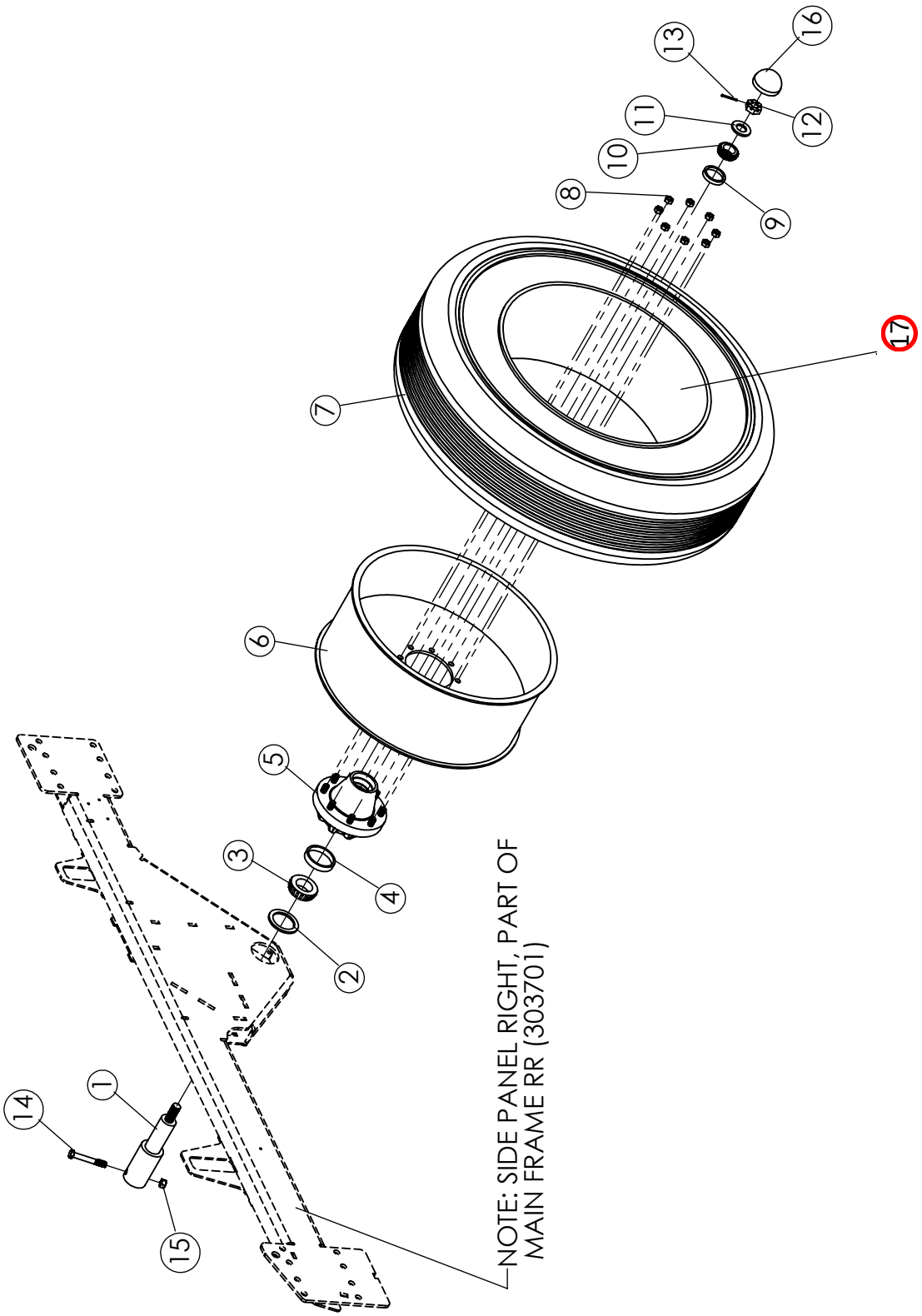
SEED BOX DRIVE WHEEL – PAGE 3 OF 3		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
45	HO156ST	Retaining Ring, 1"
46	33301	Tube, Wheel Arm Cylindrical
47	33307	Mount, Wheel Arm Support
48	33002	Bearing, 1" Bore Needle
50	1057HUB1	Hub, Sprocket 1" Bore
51	3015	Pillow Block Bearing

DRIVE WHEEL CHAIN - PAGE 1 OF 1



DRIVE WHEEL CHAIN		
ITEM NO.	PART NUMBER	DESCRIPTION
1	2040XA	Chain, Wheel Drive, 77 Links, 2040 Chain
2	33300	Wheel Arm Tube Frame, RR
3	1055A2	Sprocket, 1" Bore, 2040 Chain (40B36)
4	1057F	Sprocket, 1" Bore, 2040 Chain (40B18)

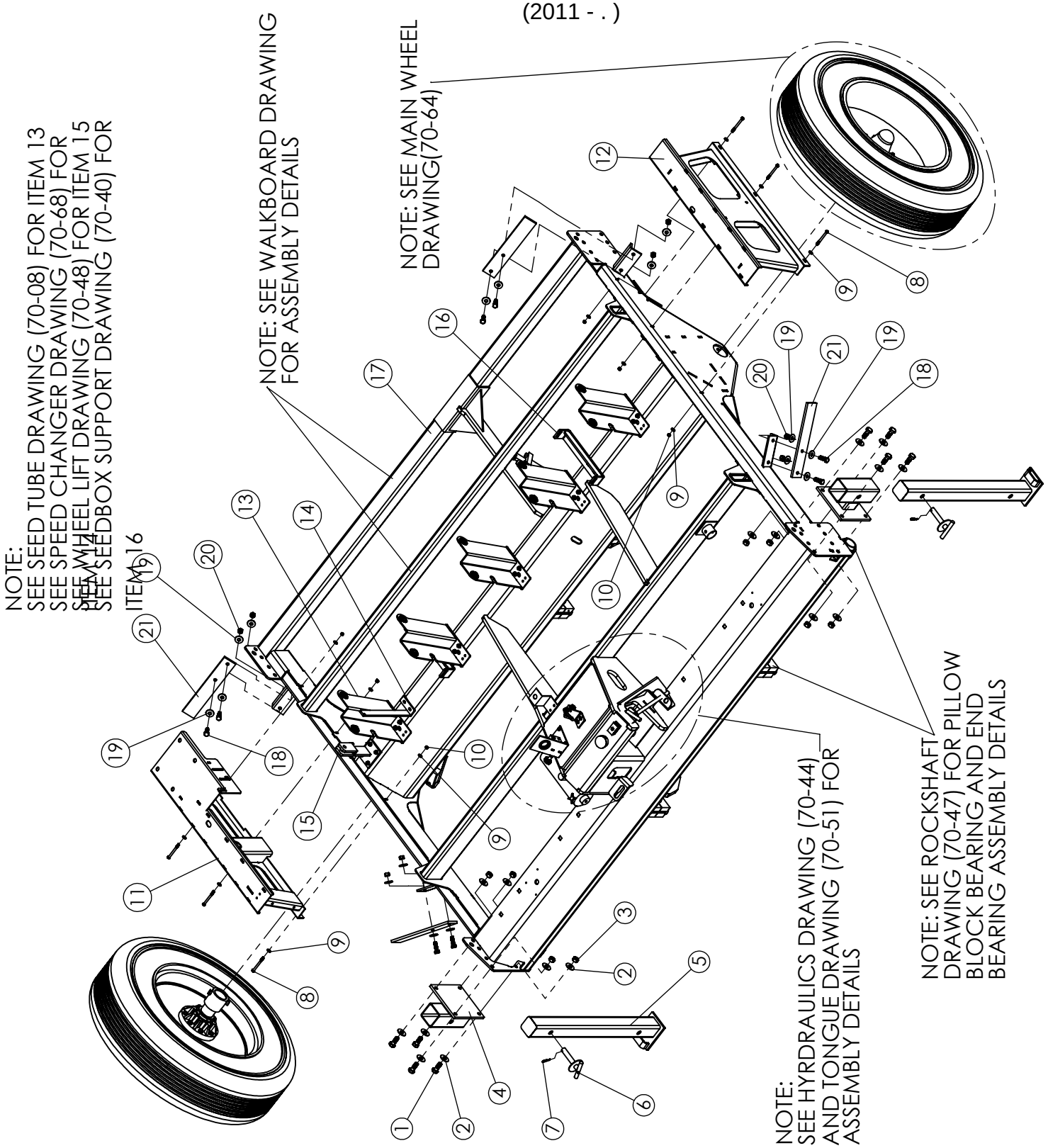
MAIN WHEEL ASSEMBLY - PAGE 1 OF 2



MAIN WHEEL ASSEMBLY		
ITEM NO.	PART NUMBER	DESCRIPTION
1	2036RR	Axle, 8 Bolt Serial# 101-156
	552036D	Axle, 8 Bolt Serial# 157 -
2	1138R	Seal Serial# 101-156
	551138C	Seal Serial# 157 -
3	1077RR	Inner Bearing, 8 Bolt Hub, RR Serial# 101-156
	551077B1	Inner Bearing, 8 Bolt Hub, RR Serial# 157 -
4	1077CRR	Cup, Inner, 8 Bolt Hub, RR Serial# 101-156
	551077C1	Cup, Inner, 8 Bolt Hub, RR Serial# 157 -
5	335140	Hub, 8 Bolt, RR Serial# 101-156
	55336140	Hub, 8 Bolt, RR Serial# 157 -
6	1072B2	Rim, 28" x 11", 8 Bolt Serial# 101-
7	107215	Tire, 11.25-28 SL, 12 Ply-Rib Implement Serial# 101-
8	WN58NF	Wheel Nut, 5/8" National Fine Serial# 101-
9	1076CRR	Cup, Outer, 8 Bolt Hub, RR Serial# 101-156
	551076C	Cup, Outer, 8 Bolt Hub, RR Serial# 157 -
10	1076CRR	Outer Bearing, 8 Bolt Hub, RR Serial# 101-156
	551076B	Outer Bearing, 8 Bolt Hub, RR Serial# 157 -
11	W 1	Washer, 1" Serial# 101-156
	W7/8"	Washer, 7/8" Serial# 157 -
12	CN 1"	Castle Nut, 1" National Fine Serial# 101-156
	CN 7/8"	Castle Nut, 7/8" National Fine Serial# 157 -
13	CP	Cotter Pin Serial# 101-156
	CP316-1.75	Cotter Pin Serial# 157 -
14	B58-4.5	Bolt, 5/8" x 4-1/2" Grade 8 Serial# 101-
15	N58-TL	Nut, 5/8" Grade 8 Serial# 101-
16	1082C	Tire Cap Serial# 101-
17	1072BC2	Inner Tube, Tire Serial# 101-

FRAME ASSEMBLY - PAGE 1 OF 2

(2011 - .)

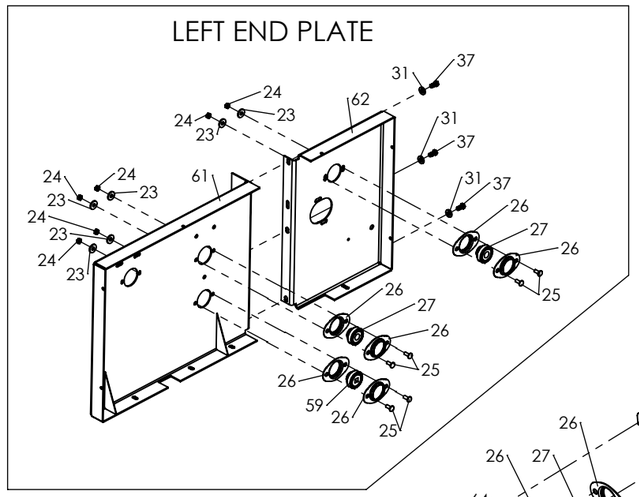


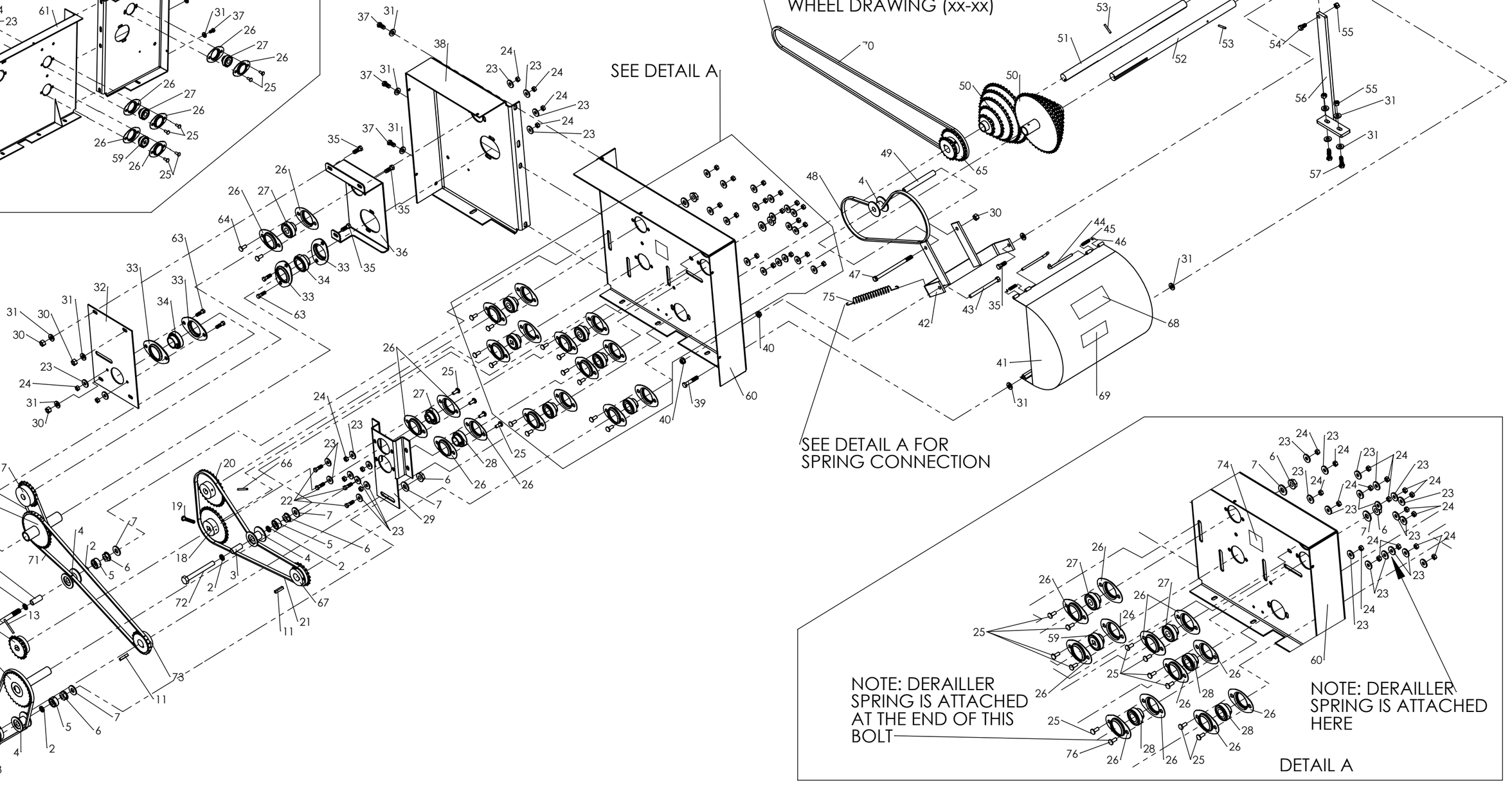
FRAME ASSEMBLY - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B34-2.5	Bolt, 3/4" x 2-1/2" Grade 5
2	W34	Washer, 3/4" Grade 5
3	N34-TL	Nut, 3/4" Top Lock
4	303748	Parking Leg Base
5	303749	Parking Leg
6	3204	Pin, 1" x 7"
7	HP116	Hitch Pin
8	B38-4	Bolt, 3/8" x 4" Grade 5
9	W38	Washer, 3/8" Grade 5
10	N38-TL	Nut, 3/8" Top Lock
11	303671	Seed Box Tower, LH
12	303672	Seed Box Tower, RH
13	303662	Seed Tube Support
14	103625N	Support Bearing & Clutch, RR
15	303683	Base, Drive Wheel Lift, RR
16	30367402	Seed Box Lower Strut Mount
17	303701	Main Frame, RR
18	B58-2	Bolt, 5/8" x 2" Grade 5
19	W58	Washer, 5/8" Grade 5
20	N58-TL	Nut, 5/8" Top Lock
21	303722	Mud Scraper, End Wheel

PARTS CATALOG

ALWAYS ORDER BY PART NUMBER – NOT BY ITEM NUMBER

SPEED CHANGER ASSEMBLY - PAGE 1 OF 4



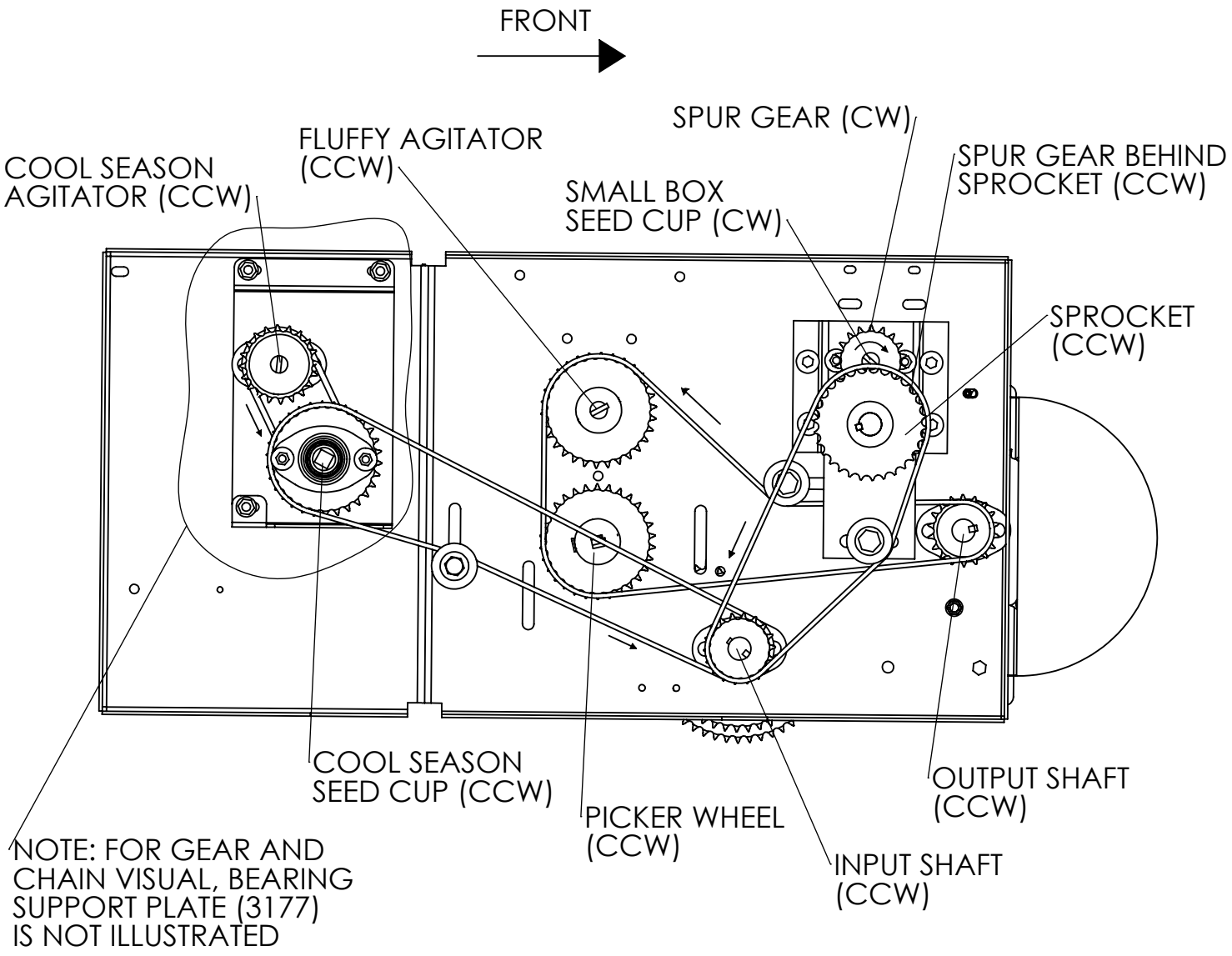


SPEED CHANGER ASSEMBLY - PAGE 2 OF 4		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
1	B12-4.5	Bolt, 1/2" x 4-1/2"
2	1040B	Machine Bushing
3	1041A2	Bushing, Idler Spool
4	1041A	Spool, Plastic
5	1040C	Collar, 1/2" ID - 3/4" OD (w/ set screw)
6	N12-TL	Nut, 1/2" Top Lock
7	W12	Washer, 1/2"
8	1045A	Sprocket 40B18, 1" Round Bore - KY & SS
9	2040RR	Chain - Small Seed Box (33 Links) Full & Offset Links (#2041L1, #2040L)
10	40A30-2.63	Sprocket 40A30 (2-5/8")
11	1110	Key, Square, 1/4" x 1/4" x 1-1/4"
12	12-204	Spur Gear
13	RP316-2	Roll Pin, 3/16" x 2"
14	B12-3.5	Bolt, 1/2" x 3-1/2"
15	3095X	Sprocket, Double 30/20 (93-)
16	2040F	Chain, Cool Season Box Agitator (17 Links), Offset and Full Links (#2040L, #2040L1)
17	1055	Sprocket, 40B20, 3/4" Bore
18	1055A (40B30)	Sprocket, 1/2" Square Bore
19	CP532-3	Cotter Pin, 5/32" x 3"
20	1054A1 (40B30	Sprocket, 3/4" Round Bore
21	2040C	Chain, Picker Wheel (51 Links), Full Link (#2040L1)
22	B516-1	Bolt, 5/16" x 1"
23	W516	Washer, 5/16"
24	N516-CL	Nut, 5/16" Clincher
25	CB516-0.75	Carriage Bolt, 5/16" x 3/4"
26	1007A	Flangette, Bearing - 47MST
27	1007	Bearing, 3/4" Spherical
28	3007	Bearing, 1" Spherical
29	1036261	Gear Direction Changer, RR
30	N38-CL	Nut, 3/8" Clincher
31	W38	Washer, 3/8"
32	3177	Bearing Support Plate
33	3181	Flangette, Bearing - 62MST
34	3175	Bearing, 1-1/4" Spherical
35	B38-1	Bolt, 3/8" x 1"
36	3176	Bearing Support, Cool Season Seed Box

SPEED CHANGER ASSEMBLY 3 OF 4		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
37	B38-0.75	Bolt, 3/8" x 3/4"
38	1036241	End Plate, RH CS
39	B38-2	Bolt, 3/8" x 2"
40	N38-FN	Nut, 3/8" Flange Nut
41	10596	Cover, Speed Changer
42	15-7117RR	Bracket, Derailler, RR
43	B38-4.5	Bolt, 3/8" x 4-1/2"
44	(Not Available For Purchase)	Cover Pin
45	(Not Available For Purchase)	Spring, Cover Pin
46	(Not Available For Purchase)	Clip, Cover Pin
47	B38-6	Bolt, 3/8" x 6"
48	2040D	Chain, Speed Changer (39 Links), Offset and Full Links (#2040L, #2040L1)
49	1041A3	Bushing Sleeve, Derailler Idler - 5" Length
50	13-201	Sprocket Cone, 5 Step
51	15-7102	Shaft, Input
52	15-711	Shaft, Output
53	RP316-1.25	Roll Pin, 3/16" x 1-1/4"
54	B38-1	Bolt, 3/8" x 1"
55	N38-TL	Nut, 3/8" Top Lock
56	103625N1	Center Plate Support
57	B38-1.75	Bolt, 3/8" x 1-3/4"
58	1036255N	Support Bearing & Clutch, RR
59	2007	Bearing, 1/2" Square Bore
60	103624	End Plate, RH
61	103623	End Plate, LH
62	1026231	End Plate, LH CS
63	CB38-1	Carriage Bolt, 3/8" x 1"
64	CB516-1	Carriage Bolt, 5/16" x 1"
65	3095X 3095X1	Sprocket Double - 3020 Sprocket Double - 4220
66	RP316-2.5	Roll Pin, 3/16" x 2-1/2"
67	1045A	Sprocket, 1" Round Bore - KY & SS
68	1046C14	Decal - Seedbox Output Control
69	1046C8	Decal - Rotating Parts Hazard (Warning)
70	2040RP	Chain - Floating Drive Wheel (94 Links) Full & Offset Links (#2040L1, #2040L)
71	2040XG	Chain - Cool Season Box Drive (51 Links) Full Link (#2040L1)
72	B12-2.5	Bolt, 1/2" x 2-1/2"

SPEED CHANGER ASSEMBLY 4 OF 4		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
74	1042C8	Decal
75	1046C2	Derailler Spring
76	CB516-1.25	Carriage Bolt, 5/16" x 1-1/4"

SPEED CHANGER CHAIN AND IDLER ASSEMBLY - PAGE 1 OF 1

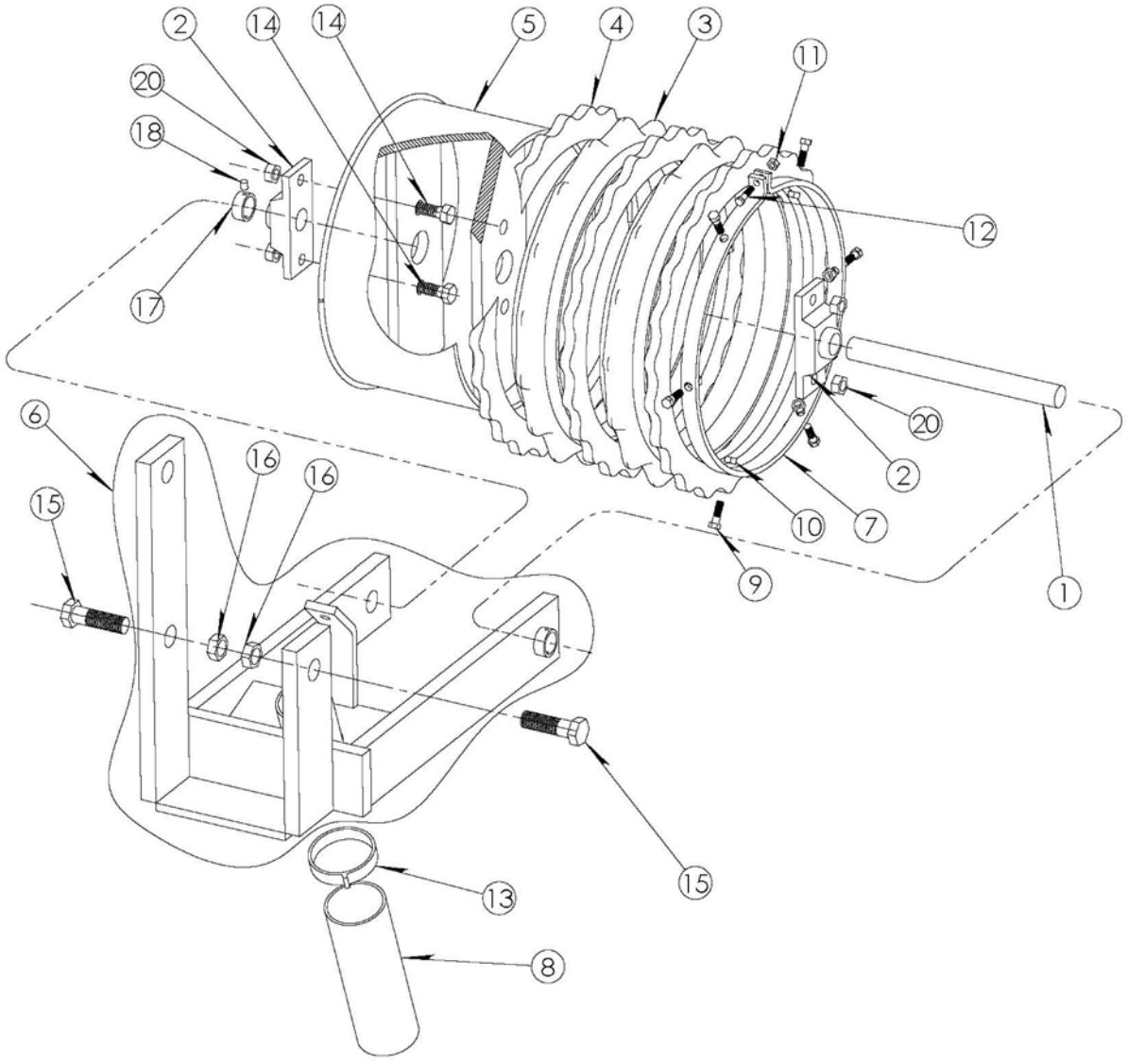


NOTE: ALL CHAINS ROTATE COUNTERCLOCKWISE WHEN THE DRIVE WHEEL IS ENGAGED

NOTE: GEAR AND SPROCKET ROTATION DIRECTION IS INDICATED IN PARENTHESIS AFTER EACH GEAR AND SPROCKET LABEL:
CW - CLOCKWISE
CCW - COUNTERCLOCKWISE

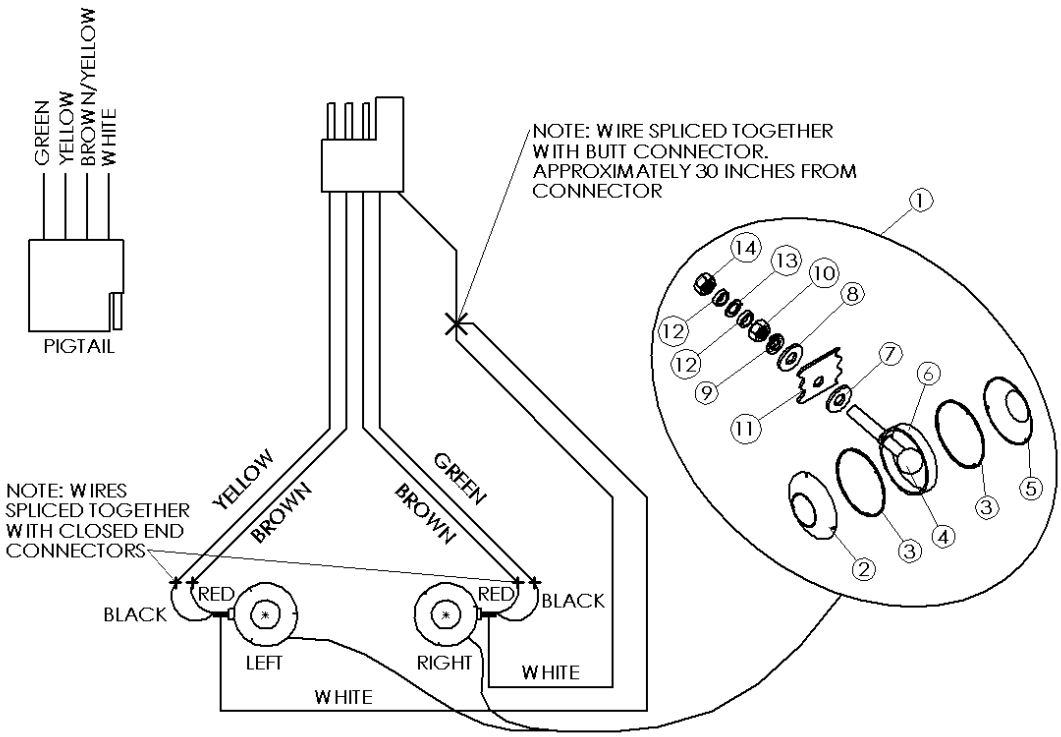
IMPRINTER – PAGE 1 OF 2

(2004 - 2011)



IMPRINTER – PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
0	303666RHF 303666LHF 303666RHR 303666LHR	Imprinter Assembly, Right Hand, Front Rank Imprinter Assembly, Left Hand, Front Rank Imprinter Assembly, Right Hand, Rear Rank Imprinter Assembly, Left Hand, Front Rank
1	303679	Axle, Imprinter Roller
2	303690	Bearing, Imprinter Roller Axle
3	6063	Cultipacker Roller, 12" (4C688)
4	303678	Cultipacker Roller, Narrow, 12"
5	303677	Roller
6	303667RH 303667LH	Imprinter Frame, Right Imprinter Frame, Left
7	303680	Band, Imprinter
8	303744	Feed Hose
9	B516-1	Bolt, 5/16"x 1"
10	N516	Nut, 5/16"
11	N14	Nut, 1/4"
12	B14-1	Bolt, 1/4"x 1"
13	321344	Clamp, Hose #44
14	B12-1.5	Bolt, 1/2"x 1-1/2"
15	B34-2.5	Bolt, 3/4"x 2-1/2"
16	N34-CL	Nut, 3/4" Clincher
17	1124	Shaft Collar, 1"
18	SC516-.375	Set Screw, 5/16"x 3/8"
19	RP316-1.25 (Not Illustrated)	Roll Pin, 3/16"x 1-1/4"
20	N12	Nut, 1/2"

TAIL LIGHTS - PAGE 1 OF 2



Note: "X" denotes a wire splice in the diagram (Note 5 wire splices).

Note: Wire connectors must be installed with the closed end up to prevent water from collecting in the connector and causing corrosion

Note: Dielectric Grease is used on all wire slices and connection during assembly to reduce the possibility of corrosion in the field and subsequent malfunction of the lights. It is recommended this product be used when wiring repairs are made.

Note: Some late model tow vehicles are equipped with separate circuits for the turn and brake lights. Most auto parts stores can supply a "converter" box to convert the split brake/turn signal system to a conventional "4-wire" trailer light hookup as used on the Truax drill. Contact you local tow vehicle manufacturer or dealer for additional information.

PIGTAIL WIRE FUNCTIONS	
Color	**Function**
Green	**Right Turn Signal/Brake**
Yellow	**Left Turn Signal/Brake**
Brown	**Tail Lights**
White	**Ground**

TAIL LIGHTS - PAGE 2 OF 2		
ITEM NO.	**PART NUMBER**	**DESCRIPTION**
0	1036EX2 (Mdl.88) 1036EX3 (Mdl.812) 1036EX4 (Mdl.816) 1036EX5 (Mdl.818) 1036EX6 (Mdl.822) 1036EX10 (Mdl.86)	Tail Light Kit - Complete With Wiring Harness (Includes Item 1, and Items 12 through 20)
1	1036EX8	Tail Light Assembly - For Both Right and Left Sides (Includes Items 2 through 10 Listed Below)
2**	PM33415	Lens, Red
3**	PM33415G	Gasket, Tail Light Lens
4**	2057-12V	Bulb, Tail light
5**	PM33416	Lens, Orange
6**	PM335	Tail Light Metal Standard with Socket
7**	RW12	Washer, Rubber 1/2"
8**	W12	Washer, 1/2"
9**	LW12	Lock Washer, 1/2"
10**	N12-20	Nut, 1/2"-20
11	End Plate	End Plate, Seed Box (Shown for reference)
12	MB12	Machine Bushing, 1/2"
13	GWT31207	Ring Terminal, 1/2" ID for Ground Wire
14	N12-20-CLJN	Nut, 1/2"-20 Clincher Jam Nut
15	NCP-500 (Not Illustrated)	Corrugated Loom, Non-Slit 1/2" ID - See Table below for lengths.
16	21100 (Not Illustrated)	Tee, Corrugated Loom Fitting (Joins 3 Pieces of Loom)
17	PM336	Tail Light Pigtail
18	37025 Waytec, Inc (Not Illustrated)	Closed End Connector
19	32070 Waytec, Inc (Not Illustrated)	Butt Connector, 12-10 Ga.
20	4222A (Not Illustrated)	Tie, Plastic - Short

**** Item included in Tail Light Assembly. Individual parts not sold by Truax Company.**

Tail Light Wire Requirements:

WIRE COLOR	YELLOW	BROWN	GREEN	WHITE	LOOM (3 PIECES)
Function	**Left Turn Light/Brake**	**Tail Light**	**Right Turn Light/Brake**	**Ground**	**Wire Cover**
Drill	**Lengths Shown in Feet**				
RoughRider	**25'**	**25'**	**25'**	**25'**	**25'**