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FERTILIZER APPLICATOR OPERATOR'S MANUAL

Models:

GENESIS RAZER

Foreword

READ THIS MANUAL carefully to learn how to operate and service your toolbar correctly. Failure to do so could result in personal injury or damage to the applicator.

THIS MANUAL MUST ALWAYS BE KEPT with the applicator and when the applicator is sold.

MEASUREMENTS in this manual are given in only standard units. Use only correct replacement parts and fasteners. Standard fasteners will require a specific inch wrench.

RIGHT-HAND AND LEFT-HAND sides are determined by facing in the direction the applicator will travel when going forward.

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2 - Delivery

When the toolbar is delivered, use the checklist that follows as a guide to explain basic information about the toolbar to the customer.

- [] Use the correct tools when you service or repair the toolbar.
- [] Explain that proper preventative maintenance, as directed by the Operator's Manual, is necessary to achieve the maximum performance and life of the toolbar.
- [] Explain how to adjust the settings of the toolbar per the Operator's Manual.
- [] Review all of the safety precautions associated with the toolbar per the Operator's Manual.
- [] Review the proper precautions associated with transporting the toolbar on a road or highway at night or during the day. Have the customer check the local laws and regulations.
- [] To the best of my knowledge, this toolbar is ready for field use and the customer has been fully informed as to the preventative maintenance and operation.

Signed: _____

Date: _____

3 - Safety

3.1 Operate Safely



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3.1.A Review the list below before operating:

- (1) Make sure there is sufficient room around and above the toolbar before you raise or lower the wings.
- (2) Make sure you bleed the air from the wing fold and row unit hydraulic systems.
- (3) Do not operate with the wings folded.
- (4) Avoid operating in areas with sharp drop-offs.
- (5) Operate at a minimum speed when you turn or when you are on rough ground.
- (6) Put the tractor in PARK and shut off the engine or set the brakes when you leave the tractor.
- (7) Never leave the key in an unattended tractor.
- (8) Never raise or lower the wings while the tractor is in motion.
- (9) Only operate from the tractor seat.
- (10) Follow the safety precautions for Anhydrous Ammonia.
- (11) Use only the recommended tractor size to operate this toolbar.

3.2 Supplying Anhydrous Ammonia Information



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Despite the common odor, anhydrous ammonia properties are dramatically different from those of household ammonia (dilute ammonium hydroxide) cleaning solutions. An uncontrolled release of NH₃ anhydrous ammonia can easily be fatal or cause permanent disabling injury.

3.2.A Please see the attached manufacturers anhydrous ammonia distribution system operators manual.

3.2 Supplying Dry Fertilizer Information



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Dry Fertilizer is a highly caustic material. Contact with unprotected skin or eyes can easily cause permanent disabling injury. Inhalation of dust produced from dry fertilizer can lead to permanent lung damage.

3.2.A Please see the attached manufacturers dry fertilizer distribution system operators manual.

4.1 Preparing The Row Unit

4.1.A Attaching Hardware

- (1) After the first 12-15 hours of operation, it is recommended that you check all attaching hardware for tightness.

4.2 Row Unit Operation Test

4.2.A Use the following procedure to operate and test the tractors row units.

Ensure that toolbar is unfolded before testing row units. See Section 7 of TR 430 440 Operators Manual for Wing Fold/Unfold Operation.

- (1) Make sure the tractor transmission is in PARK and/or the brakes are set.
- (2) Start the tractor engine.
- (3) Put the tractors hydraulic controls in the NEUTRAL position.
- (4) Move the control lever for the row units back and forth several times while observing operation of the row units. The row units should raise when the control lever is pulled back and lower when the control lever is pushed forward. If the action is reversed, reverse the hose connections, refer to the Install Hydraulic Hoses to Tractor section.
- (5) After cycling the row units, check the tractor hydraulic fluid reservoir. Add hydraulic fluid if necessary. Refer to the Tractors Operation Manual.

4.2.B Check the following components for possible malfunctions and leaks.

- (1) Damaged, cracked, or charred hoses.
- (2) Cracked, damaged or badly corroded fittings.
- (3) Kinked, crushed, flattened, or twisted hoses.
- (4) Leaking hydraulic cylinders.

NOTE: When replacing hydraulic hoses on the applicator, make sure to use the same high pressure rating and hose diameter, failure to do so can affect the compatibility of this applicator.

4.3 Row Unit Down Pressure Preparation and Operation

4.3.A Using the in-cab down pressure control box set the row unit hydraulic down pressure to 800-1200 PSI (NOT TO EXCEED 1800 PSI)



5 - Operating Row Unit

5.1 Tractor Requirements

5.1.A Tractor horsepower (HP) requirements are generally 20-25 HP per row, but can vary depending on terrain and speed. Refer to the tractor's manual.

5.2 Operating Rules

5.2.A Make sure the wing wheels are set in the correct position. Refer to Section 7.2 of TR 430/440 Operators Manual.

5.2.B Raise row units off the ground before making turns.

5.2.C Avoid making sharp turns that may cause tractor tires to make contact with the applicator.

5.2.D Never raise or lower the wings while applicator is in motion. Refer to Section 5.

5.2.E Never operate in the field with wings raised.

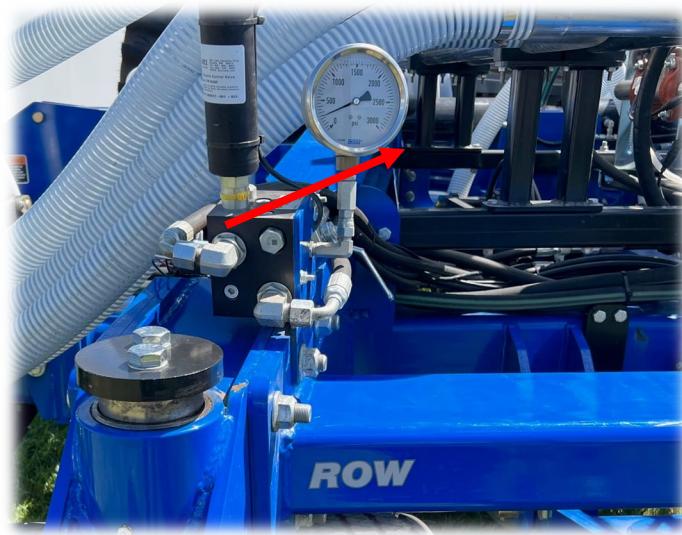
5.2.F Make sure the applicator is on level ground before raising or lowering wings.

5.2.G Make sure tractor and applicator have been properly prepared. Refer to Section 5 and 6.

5.3 Prepare To Operate Row Unit In Field

5.3.A Verify the following procedures are completed:

- (1) Set the row unit down pressure to 800-1200 PSI (NOT TO EXCEED 1800 PSI) using the in cab pressure control box.



5.3.A Continued Verify the following procedures are completed:

- (2) Set the wing down pressure to 600-700 PSI using the in cab pressure control box.



- (3) For rate controller and anhydrous ammonia applicator, refer to manufacturer's operation manual.

5.4 Adjust Row Unit Down Force

5.4.A The row unit down pressure should not exceed 1800 psi. The wing wheels can be off the ground during row unit down pressure setting.

- (1) Do not add suitcase weights to the wings. Only hang suitcase weights on the rear of the tool bar on the weight rack.
- (2) Begin operating and observe that the row units are making full contact to the ground and that the wing wheels are making contact to the ground without excessive compacting.
- (3) After setting the pressure gauge, make a trial pass in the field (20-40 yards). If the penetration is not satisfactory, adjust hydraulic pressure as necessary.

5.5 Row Unit Depth Adjustment

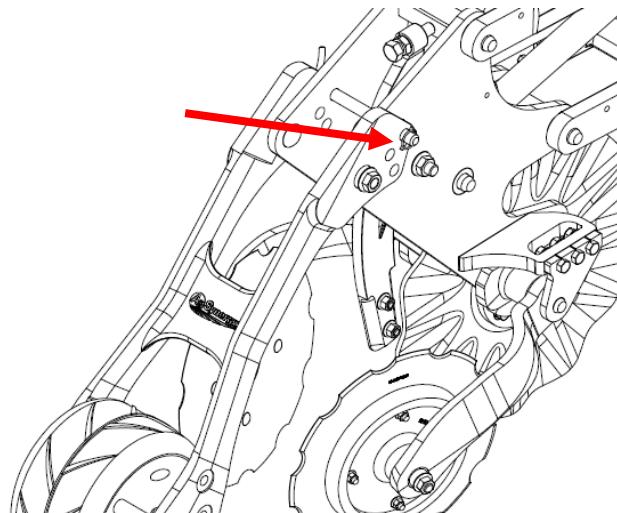
- (1) There are three blade adjustments positions on the row unit, 6", 5", and 4".
- (2) The factory sets the blade in the 5" position. When a blade starts to wear or when a deeper or shallower application is required, blade adjustment is necessary. To adjust the blade, refer to the steps below.
- (3) Ensure row unit is fully raised and row unit lock out valve is closed to prevent row unit settling. ***Failure to do so could result in crushing injury or death.***



- 4) Use the follow procedure to Adjust the application depth.
 - (a) The application depth is changed using the 4", 5" and 6" depth holes at the front of the gauge wheel are shown below:



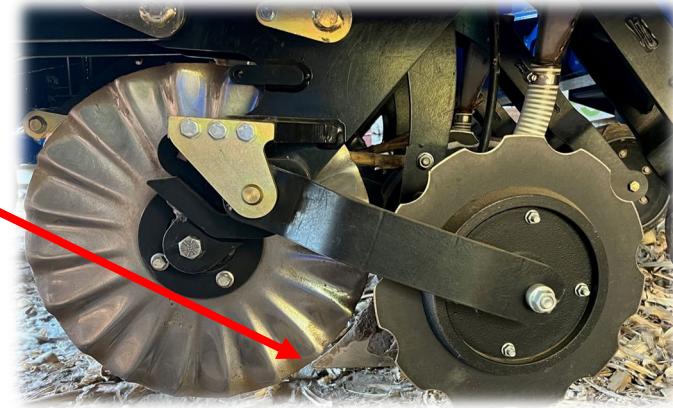
- (b) Remove the lynch pin on the depth adjustment pin shown below.



- (c) While supporting the gauge wheel arm, remove the depth adjustment pin.
Use caution when removing the depth adjustment pin as the gauge wheel arm will fall when the pin is removed.
- (d) Align the desired depth adjustment hole in the gauge wheel arm with the corresponding hole in the blade yoke.
- (e) Reinstall the depth adjustment pin and replace the lynch pin the depth adjustment pin.
- (f) Open Row Unit Lockout Valve to resume normal field operation.

5.6 Row Unit Knife Adjustment

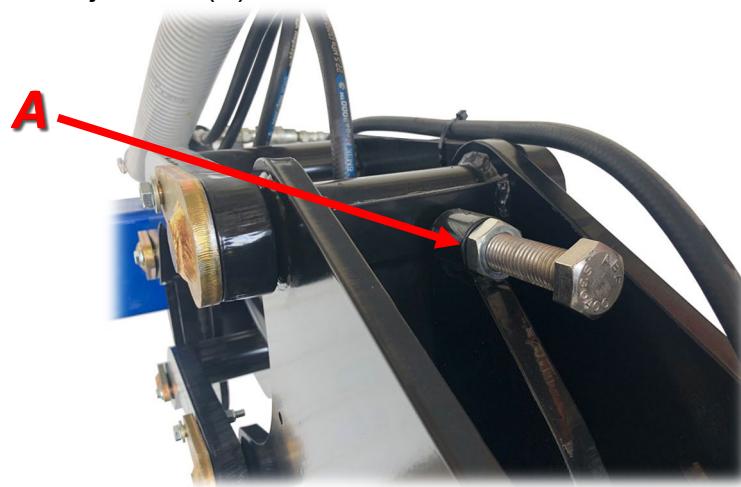
5.6.A Clearance between knife point and coulter must be maintained between 1/8"-1/4". Failure to do so will result in residue hair pinning between the coulter and the knife and will cause row unit plugging.



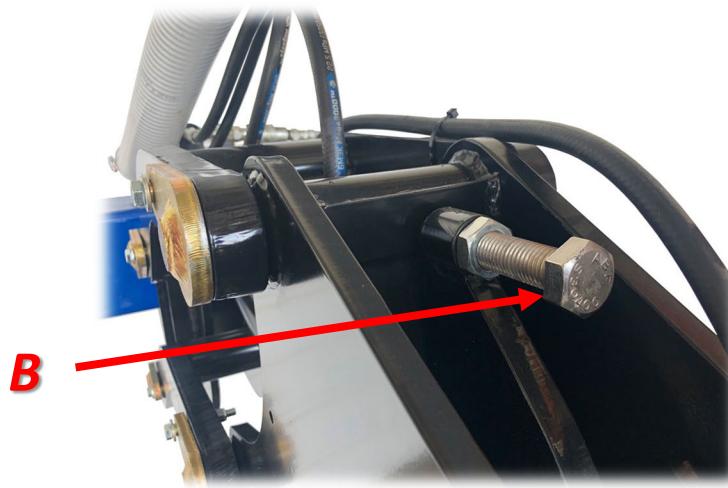
- (1) Coulter-Knife clearance will need to be adjusted as the coulter wears or if hair pinning of residue is leading to row unit plugging.
- (2) Ensure row unit is fully raised and row unit lock out valve is closed to prevent row unit settling. ***Failure to do so could result in crushing injury or death.***



- (3) Use the following procedure to adjust coulter-knife clearance:
- (a) Loosen $\frac{3}{4}$ " jam nut (A) shown below.



- (b) Rotate $\frac{3}{4}$ " knife holder adjustment bolt (B) to adjust clearance.
Rotate clockwise to decrease clearance, counterclockwise to increase clearance. Optimal clearance is $\frac{1}{8}$ " to $\frac{1}{4}$ ".



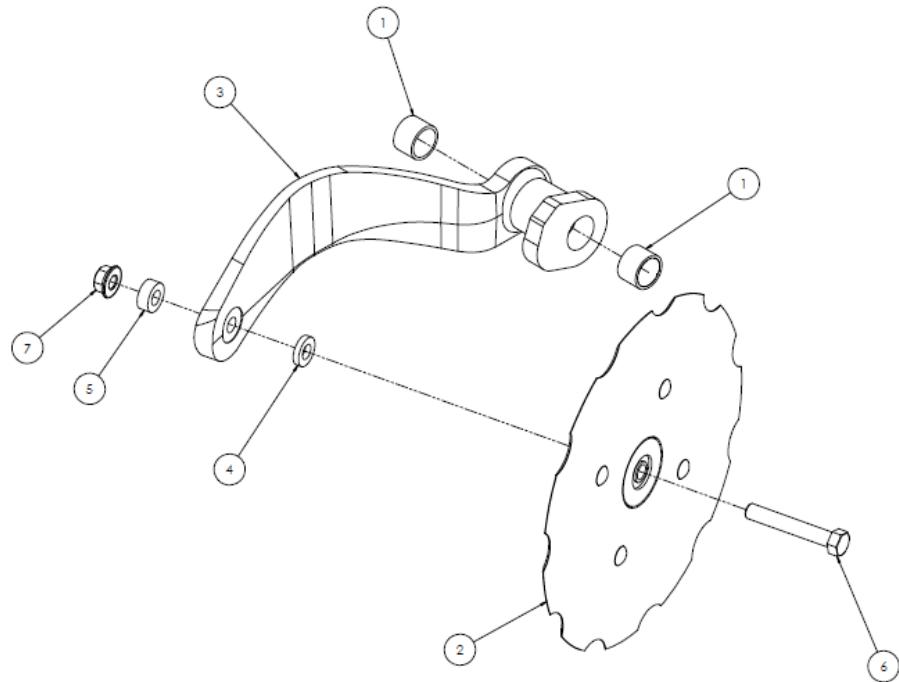
- (c) Tighten $\frac{3}{4}$ " jam nut (A).
(d) Open row unit lockout valve to resume normal field operation.

5.7 Closing Wheel Disc Adjustment

5.7.A From the factory both closing wheel disc bushings (4 and 5) below are installed as shown on the following drawing. If residue plugging occurs between the closing wheel blade and closing wheel arm it may be necessary to adjust the closing wheels

- (1) Ensure row unit is fully raised and row unit lock out valve is closed to prevent row unit settling. ***Failure to do so could result in crushing injury or death.***





- (2) Use the following procedure adjust the Closing Wheel Disc.
 - (a) Loosen 5/8" Bolt (6) and Nut (7)
 - (b) Remove 5/8" bolt from closing wheel arm (3). Use caution when removing 5/8" bolt as closing wheel disc blade will fall when bolt is removed.
 - (c) To increase clearance, install both 1/2" spacers (4,5) inside the closing wheel arm.
 - (d) Reinstall closing wheel disc blade on closing wheel arm using 5/8" nut and bolt.
 - (e) Torque 5/8" nut to 112 ft lbs
 - (f) Open Row Unit Lockout valve to resume normal field operation.

6 – Maintenance/Service

6.1 Radial Razer Coulter Removal/Installation

6.1.A Radial Razer Coulter Removal/Installation

- (1) Radial Razer Coulter blades typically need to be replaced every 250-300 row unit acres. (3000-4000 acres on 30' toolbars, 4000-5000 acres on 40' toolbars). This can vary based on soil type and field conditions. If coulter blades are less than 17" in diameter or tipping back as shown below, they should be replaced regardless of acre count.

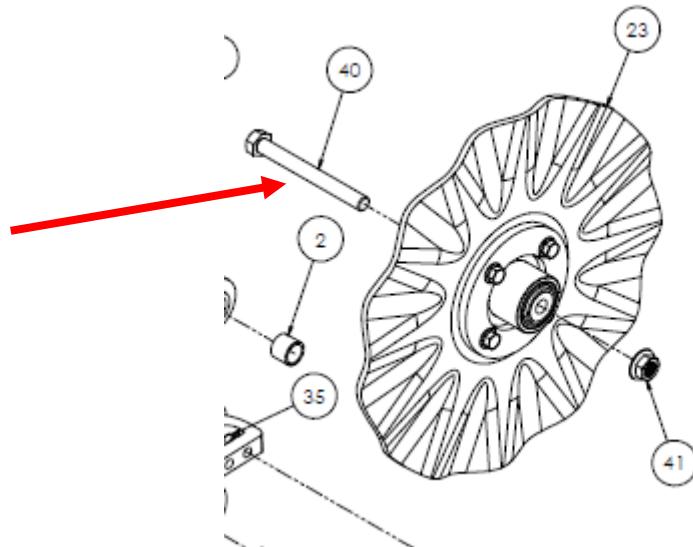


(2) Use the following procedure to remove the Radial Razer Coulter.

- (a) Ensure that the row unit is fully raised, and the row unit lockout valve is closed to prevent row unit settling. **Failure to do so could result in crushing injury or death.**



(b) Loosen the $\frac{3}{4}$ " coulter hub bolt and nut.



(c) Remove $\frac{3}{4}$ " bolt from blade yoke. Use caution when removing $\frac{3}{4}$ " bolt as the Radial Razer Coulter will fall when bolt is removed.

- (d) Remove 4-1/2" bolts that attached hub to Radial Razer Coulter.
- (3) Use the following procedure to install the Radial Razer Coulter.
- Using 4-1/2" bolts attach hub to new Radial Razer Coulter. Torque to 57 ft lbs
 - Align hub with blade yoke and install ¾" bolt and nut.
 - Torque ¾" nut to 282 ft lbs.
 - Coulter-Knife clearance may need to be adjusted after replacing coulter.
Please see section 5.6 for Coulter-Knife Clearance Adjustment Instructions
 - Open Row Unit Lockout Valve to resume normal field operation.

6.2 Knife Removal/Installation

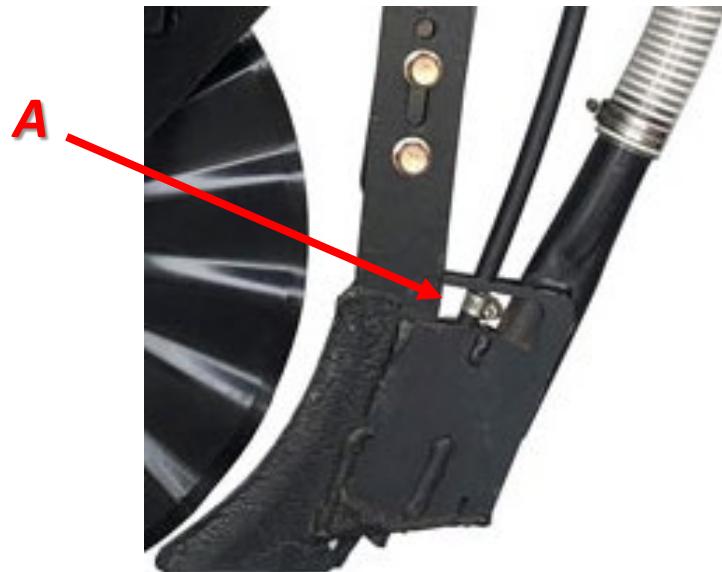
6.2.A Knife Removal/Installation

- Genesis Razer knives typically need to be replaced every 300-450 row unit acres. (4000-5000 acres on 30' toolbars, 5000-6000 acres on 40' toolbars). This can vary based on soil type and field conditions.
- Use the following procedure to remove the Genesis Razer knife.
 - Ensure that the row unit is fully raised, and the row unit lockout valve is closed to prevent row unit settling. **Failure to do so could result in crushing injury or death.**



(b) When working on Anhydrous Ammonia systems or components ensure that all lines are purged, and valves are closed before continuing. **Failure to do so could result in injury or death. See Section 3.2 for additional information.**

(c) If applicable remove band clamp (A) that secures 3/8" NH3 line to knife. NH3 Cooler Vapor Rows will have 2 NH3 Lines.



(d) If applicable remove band clamp (B) that secures 1.5" dry delivery line to knife.



(e) With NH3 and Dry Fertilizer lines removed from knife. Loosen and remove 2 ½" bolts (C) and nuts that secure the knife to the knife holder. Use caution when removing ½" bolts as knife will fall when removed.



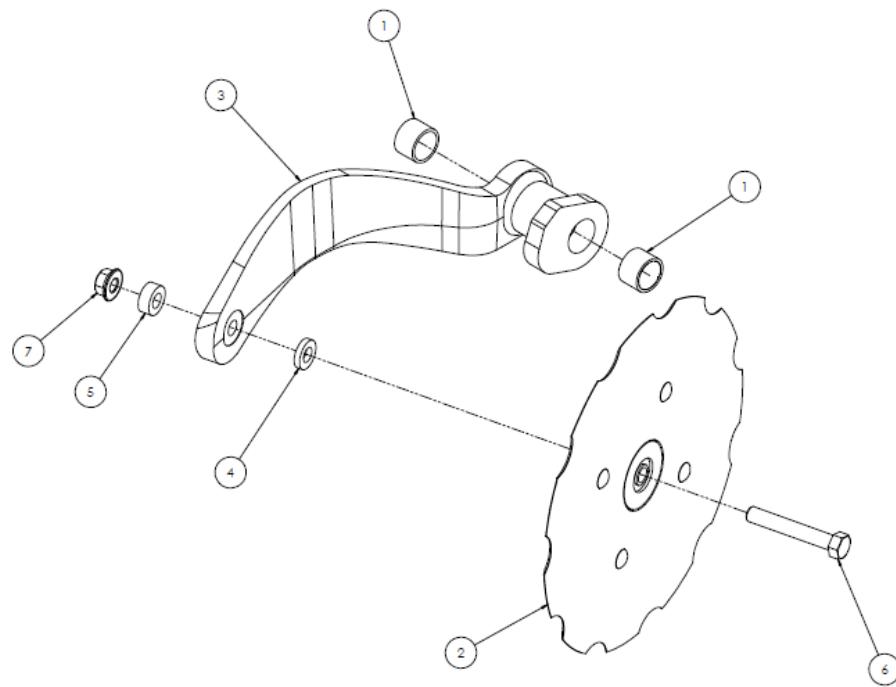
- (3) Use the following procedure to install the Genesis Razer Knife.
- Using 2 ½" bolts and nuts (C) attach knife to knife holder. Torque bolts to 57 ft lbs.
 - If applicable attach band clamp (B) that secures 2" dry delivery line to knife.
 - Fully Insert 3/8" NH3 line in slot behind knife. Ensure that hose extends below the lower edge of the hose holder as shown below (D)
 - If applicable attach band clamp (A) that secures 3/8" NH3 line to knife below clamp holder.
 - Open row unit closeout valve to resume normal field operation.



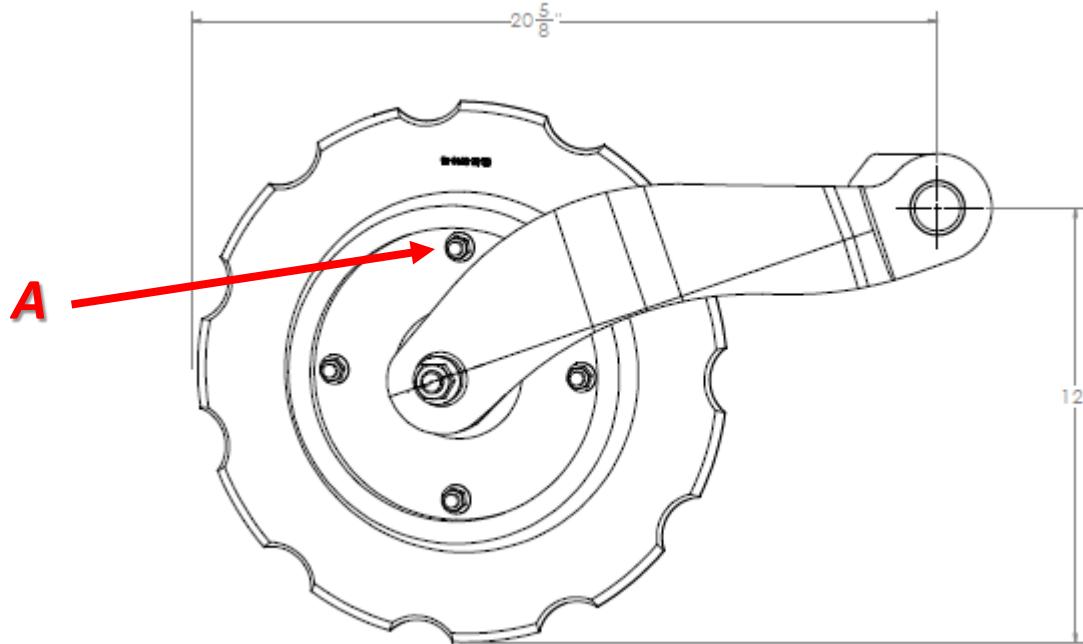
6.3 Closing Wheel Disc Removal/Installation

6.3.A Closing Wheel Removal/Installation

- (1) Ensure row unit is fully raised and row unit lock out valve is closed to prevent row unit settling. ***Failure to do so could result in crushing injury or death.***



- (2) Use the following procedure to remove the Closing Wheel Disc.
- Loosen 5/8" Bolt (6) and Nut (7)
 - Remove 5/8" bolt from closing wheel arm (3). Use caution when removing 5/8" bolt as closing wheel disc will fall when bolt is removed.

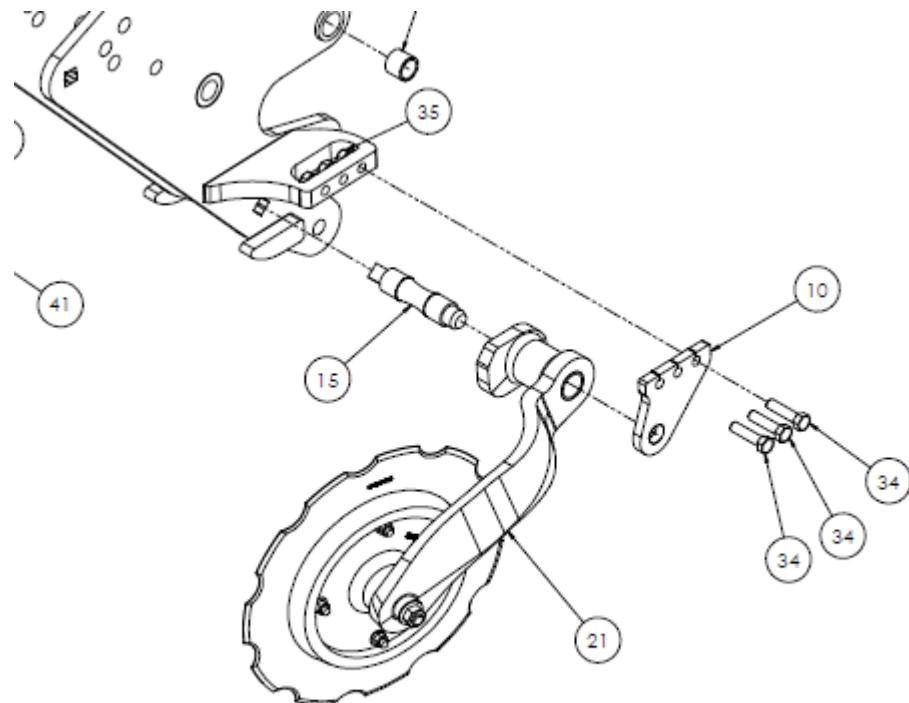


- With Closing Wheel Disc removed from Closing Wheel Arm. Loosen and remove 4 1/2" bolts (A) to remove Closing Wheel Disc Blade from Closing Wheel Hub.
- Reinstall new closing wheel disc blade on closing wheel hub using 4 1/2" bolts. Torque to 57 ft lbs.
- Attach Closing Wheel Disc to Closing wheel arm using 5/8" bolt (6) and nut and 1/2" spacer (5) and 1/4" spacer (4).
- Note that from the factory both spacers are assembled between the closing wheel disc and the closing wheel arm. See Section 5.7 for Closing Wheel Disc Adjustment
- Torque 5/8" nut to 112 ft lbs
- Open Row Unit Lockout valve to resume normal field operation.

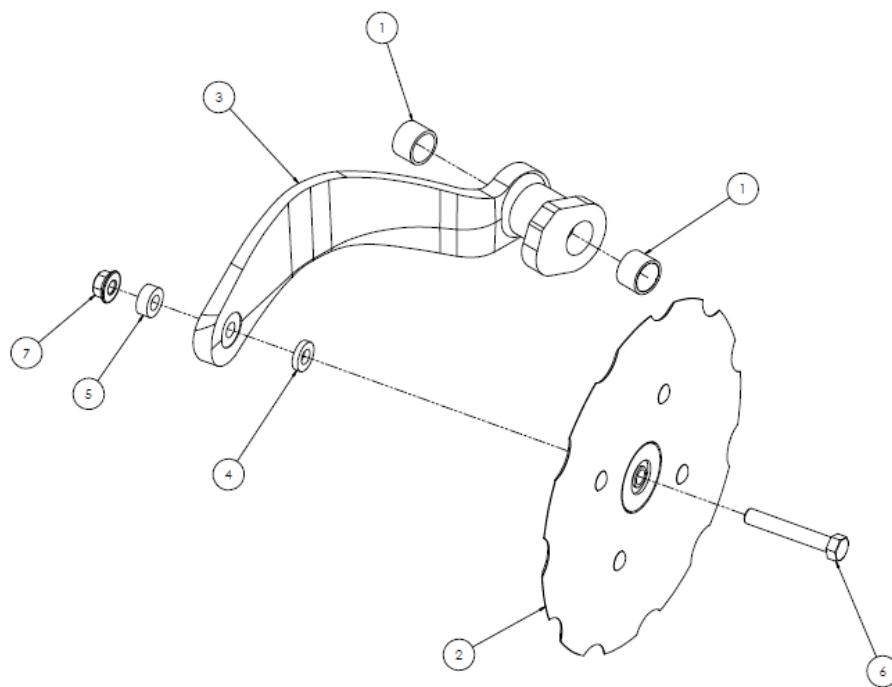
6.4 Closing Wheel Bushing Removal/Installation

6.4.A Closing Wheel Removal/Installation

- (1) Ensure row unit is fully raised and row unit lock out valve is closed to prevent row unit settling. ***Failure to do so could result in crushing injury or death.***



- (2) Use the following procedure to remove the Closing Wheel Arm.
- (a) Loosen 3 1/2" Bolts (34) and Nuts (35)
 - (b) Remove Bolt on Support Plate (10)
 - (c) Remove closing wheel arm (21) from Closing Wheel arm shaft (15).
 - (d) Remove Closing Wheel Arm Bushings (1)
 - (e) Reinstall Closing Wheel Arm Bushings (1). Lubricant may be necessary.
- (3) Use the following procedure to install the Closing Wheel Arm
- (a) Install closing wheel arm shaft (15) in the Blade Yoke Weldment
 - (b) Install closing wheel arm (21) on the closing wheel shaft (15)
 - (c) Using 3 ½" bolts (34) and Nuts (35) install bolt on support plate (10) on closing wheel support (35)
 - (d) Torque nuts to 57 ft lbs
 - (e) Open Row Unit Lockout valve to resume normal field operation.



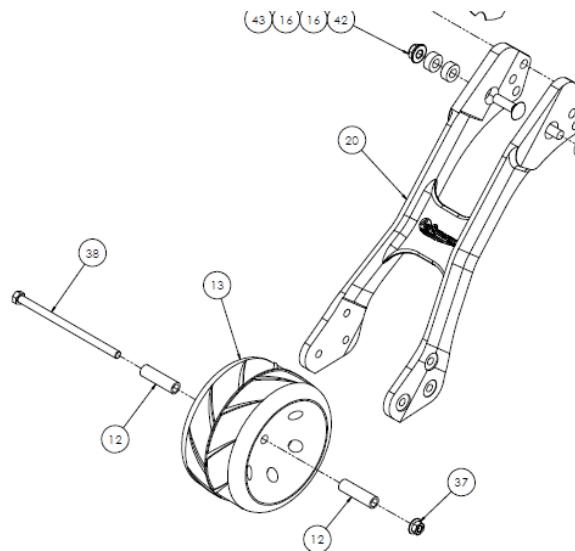
6.5 Gauge Wheel Removal/Installation

6.5.A Gauge Wheel Removal/Installation

- (1) Ensure row unit is fully raised and row unit lock out valve is closed to prevent row unit settling. ***Failure to do so could result in crushing injury or death.***



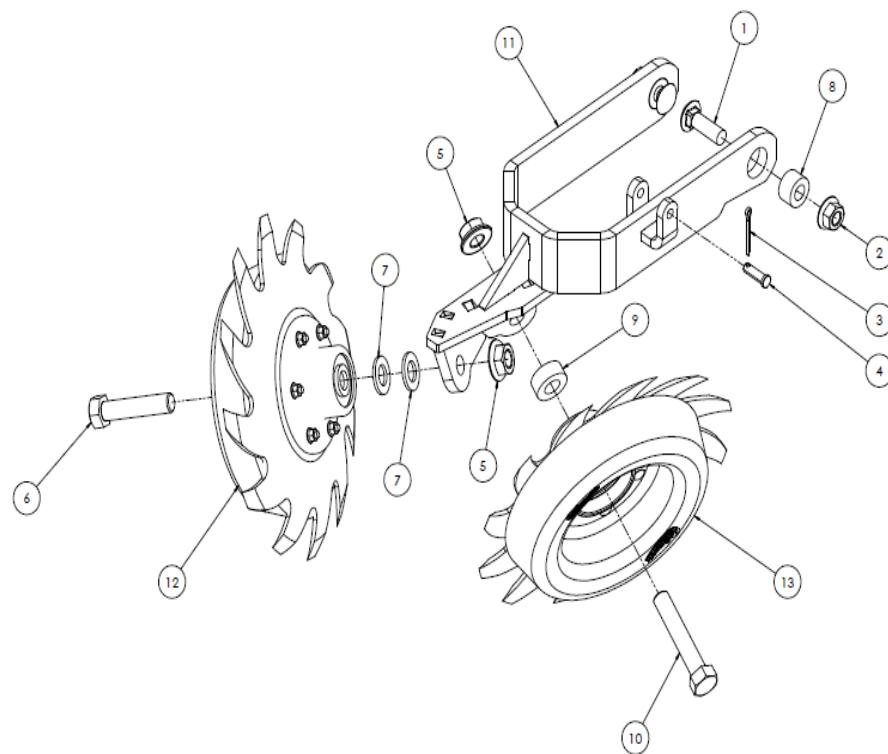
- (2) Use the following procedure to remove and install Gauge Wheel
- Loosen and remove 5/8" gauge wheel bolt (38) and nut (37). Use caution when removing gauge wheel bolt as gauge wheel (13) will fall when removing bolt.
 - Using 5/8" bolt, 5/8" nut and 2 gauge wheel spacers (12) install the new gauge wheel. Torque nut to 112 ft lbs.
 - Open row unit lockout valve to resume normal field operation.



6.6 InSynerator Row Cleaner Installation

6.6.A InSynerator Row Cleaner Installation

- (1) Ensure row unit is fully raised and row unit lock out valve is closed to prevent row unit settling. **Failure to do so could result in crushing injury or death.**



(2) Using (1) 5/8" x 2.5" Carriage Bolts, (8) Arm Bushing Qty. 2, and (2) 5/8" Lock Nut Qty. 2. Attach (11) Row Cleaner arms to Razer Blade Yoke.

(a) Note that half of the toolbar will utilize Left Hand Row Cleaners and half of the toolbar will utilize Right Hand Row Cleaners. Typically, the Left Hand Row Cleaners are mounted on the Left hand side of the toolbar and the Right Hand Row Cleaners are mounted on the right side of the toolbar.

(3) Torque (2) 5/8" Lock Nuts to 112 Ft. Lbs.

(4) Using (12) or (13) Blade Assembly, (6) 3/4" x 3.5" Bolt, (7) 3/4" Washer Qty. 2 and (5) 3/4" Lock Nut attach the leading blade assembly to (11) Row Cleaner Arm. Torque to 200 ft. lbs.

(a) Note that the blades are directional. Left hand blade must be mounted on the left-hand side of the Row Cleaner Arm. Failure to do so will result in residue plugging.

(5) Using (12) or (13) Blade Assembly, (10) 3/4" x 4" Bolt, (9) 3/4" Bushing and (5) 3/4" Lock Nut attach the trailing blade assembly to (11) Row Cleaner Arm. Torque to 200 ft. lbs.

(a) Note that the blades are directional. Left hand blade must be mounted on the left-hand side of the Row Cleaner Arm. Failure to do so will result in residue plugging.