MT MODELS

RAPTOR STRIP-TILLAGE TOOL

MODEL 2115MT & 2130MT 3-POINT MAINTENANCE

MODEL 2015MT & 2030MT 3-POINT MAINTENANCE

STRIP-TILLAGE

INNOVATING
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AGRICULTURE

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SECTION IV
Maintenance

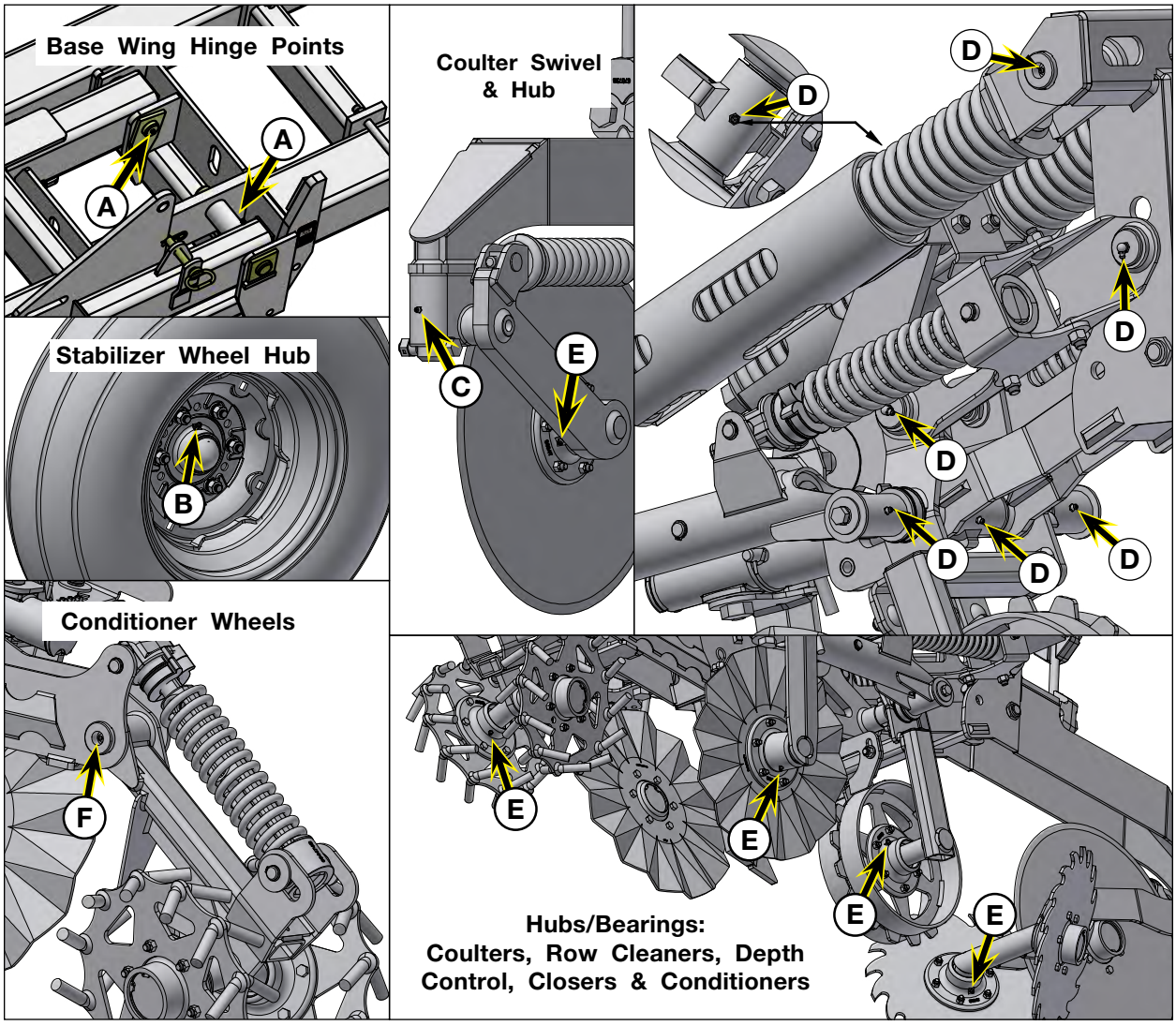
Lubrication

To keep your implement in top operating condition and to assure its proper performance and reliability for a long period of time, periodic inspection and lubrication is a must.

Use EP-2 lubricant at the locations described in the chart. All exposed cylinder rods should be coated with grease before seasonal storage to prevent rusting. After seasonal storage, check wing latch for freedom of movement.

The lubrication locations and recommended schedule are as follows:

ITEM	DESCRIPTION	POINT	QTY	HOURS
A	Base Wing Hinge Points	4	2 Shots	Weekly
B	Stabilizer Wheel Hubs	1	2 Shots	Weekly
C	Lead Coulter Swivel	1	1 Shot	Weekly
D	Depth Control & Parallel Arms	10	2 Shots	Weekly
E	Hubs/Bearings	8	2 Shots	Weekly
F	Conditioner Wheels	1	2 Shots	Weekly



Service Schedule

Beginning of Day

NOTE: Before initial use, ensure all lubrication points have been greased, outlined in "Lubrication" in this section.

Check all U-bolts and bolts for tightness. This is especially important during the first days of operation. See "Torque Chart" in this section.

Check stabilizer tire air pressure and inflate to correct pressure if necessary.

IMPORTANT

- *Inspect mast pins for any wear or damage. Replace any worn or damaged pins.*
- *To assure level penetration of shanks, both tires must be inflated to the same pressure.*

End of Day

Clean off dirt and residue which may have accumulated on implement during operation.

Check implement for damage which could have occurred during operation, and repair.

Beginning of Season

⚠ WARNING

- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**

Check all bolts, U-bolts, and wheel bolts for tightness. Refer to "Torque Chart" in this section.

Lubricate implement (see "Lubrication" in this section).

Check air pressure in tires and inflate to correct pressure if necessary (see Wheels and Tires).

End of Season

Your implement is an important investment. Spend a little time to protect it from destructive rust and corrosion. You will be repaid in longer service life and better performance.

Perform the following before placing the implement in storage:

1. Remove dirt and residue which could cause rusting.
2. Repaint any chipped or scraped areas.
3. Lubricate implement (see "Lubrication" in this section).
4. Coat all earth moving surfaces with grease or suitable rust preventatives.
5. Inspect for damaged parts. Replace before next season.
6. Store implement inside, away from livestock.
7. Use support stands to keep implement tires and points up off bare ground.
8. Replace all worn, torn or faded decals and reflectors.

TerrainPro2 Row Unit

⚠ WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **CHANGE ONLY ONE SHANK AT A TIME. IF PRESSURE IS RELIEVED ON ALL SHANKS, THE UNIT COULD TIP OVER BACKWARDS.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **FALLING OBJECTS CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT WORK UNDER THE MACHINE AT ANY TIME WHILE BEING HOISTED. BE SURE ALL LIFTING DEVICES AND SUPPORTS ARE RATED FOR THE LOADS BEING HOISTED. THESE ASSEMBLY INSTRUCTIONS WILL REQUIRE SAFE LIFTING DEVICES UP TO 100 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.**

Point & Wear Plates Replacement

The shank has replaceable wear plates and points which, after a period of time, will need to be replaced (FIG. 4-1). To replace these components on your machine, refer to the following guidelines:

1. With the implement attached to a tractor, find a firm, level surface and unfold the wings, if applicable. Lower the unit's jack stands until they are 1-2 inches below the points, and lower the machine to the ground so that the stands support the entire implement and all points are off the ground. Shut off the tractor engine, set the parking brake, and remove the ignition key.
2. If applicable, remove and save the fertilizer option 1/2"-13UNC x 1 3/4" capscrew (9390-102) and 1/2"-13UNC lock nut (9800). (FIG. 4-1)
3. Loosen the center wear plates 1/2"-13UNC x 1 3/4" capscrews (9390-102) and 1/2"-13UNC lock nuts (9800). (FIG. 4-1)
4. Remove the point 1/2"-13UNC x 1 3/4" capscrew (9390-102) and 1/2"-13UNC lock nut (9800). (FIG. 4-1)
5. Remove the point. (FIG. 4-1)

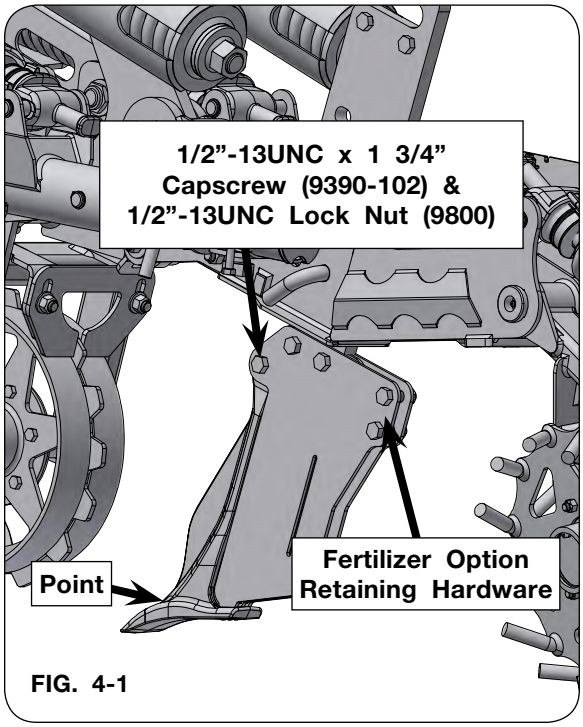


FIG. 4-1

TerrainPro2 Row Unit (continued)

6. If replacing wear plates, continue with step 7 otherwise skip to step 9.

7. Remove the 1/2”-13UNC x 1 3/4” capscrews (9390-102) and 1/2”-13UNC lock nuts (9800) securing the wear plates. (FIG. 4-2)

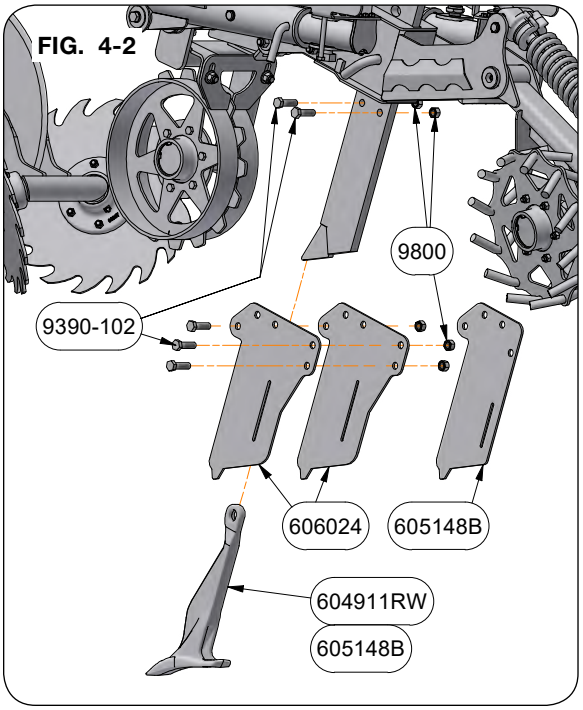
8. Replace wear plates (606024 or 605148B) and loosely secure with provided 1/2”-13UNC x 1 3/4” capscrews (9390-102) and 1/2”-13UNC lock nuts (9800). (FIG. 4-2)

9. Install new point and secure with provided 1/2”-13UNC x 1 3/4” capscrew (9390-102) and 1/2”-13UNC lock nut (9800) (FIG. 4-2). DO NOT TORQUE HARDWARE.

10. If applicable, install the fertilizer option and secure with 1/2”-13UNC x 1 3/4” capscrew (9390-102) and 1/2”-13UNC lock nut (9800) (FIG. 4-2). DO NOT TORQUE HARDWARE.

11. Torque the 1/2”-13UNC x 1 3/4” capscrews (9390-102) and 1/2”-13UNC lock nuts (9800) to 62-68 Ft.-Lbs as shown in (FIG. 4-2).

FIG. 4-2



TerrainPro2 Row Unit (continued)

Shear bolt Replacement

The shear bolt should shear only when the shank encounters an obstacle.

⚠ WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**

IMPORTANT

- *On the wing fold units, be sure to replace the shear bolt on the shanks on the wing before folding the wings. Damage to the equipment could occur.*

1. With the Raptor implement attached to a tractor, find a firm, level surface and unfold the wings, if applicable. Lower the unit's support stands until they are 1-2 inches below the points, and lower the machine to the ground so that the stands support the entire implement and all points are off the ground. Shut off the tractor engine, set the parking brake, and remove the ignition key.
2. Remove any remaining portions of the shear bolt from the assembly. Inspect shear bolt holes. Severely distorted holes will result in shorter shear bolt life and should be repaired or replaced.
3. Remove a new shear bolt from the storage location.
4. Align the hole in the shank mount bracket to the hole in the shank trip bracket.
5. Insert the new shear bolt. Tighten nut on the shear bolt until snug. Do not overtighten or torque to specification. Tightening the shear bolt will prevent proper trip function."

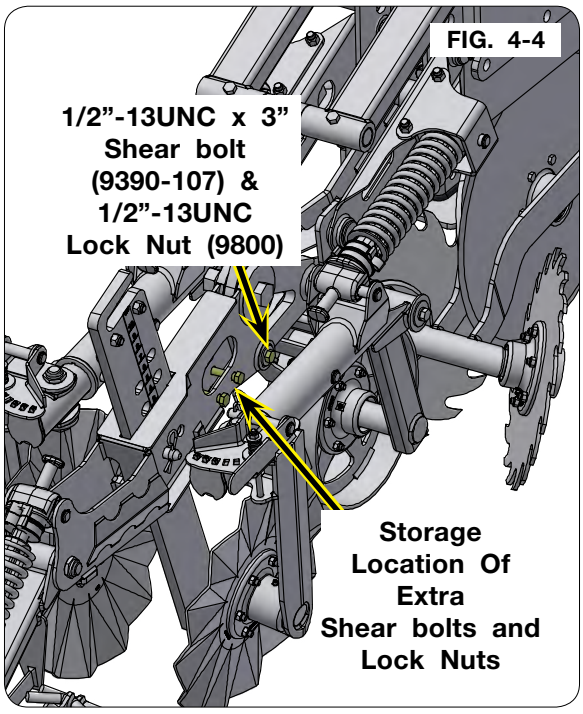


FIG. 4-4

TerrainPro2 Row Unit (continued)

Lead Coulter Spring Replacement

The following guidelines are for replacing the spring on the coulters.

⚠ WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

⚠ CAUTION

- **SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

IMPORTANT

- *The spring should only be adjusted when repairs are being made. The springs have been preset before leaving the factory.*

1. Loosen the set screw retaining the spring bolt on the coulter arm (FIG. 4-5).
2. Slowly unscrew the spring bolt which will relieve spring pressure (FIG. 4-5).
3. Once the bolt is removed, replace with new spring and re-insert bolt.
4. Tighten bolt until the spring is compressed to 9 3/8” (FIG. 4-6).

The coulter springs are preset at the factory to 9 3/8”. This measurement is the total amount of exposed spring.

NOTE: Adjusting the spring below 9 3/8” could cause premature part failure and void any warranty considerations.

5. Tighten set screw to secure bolt.

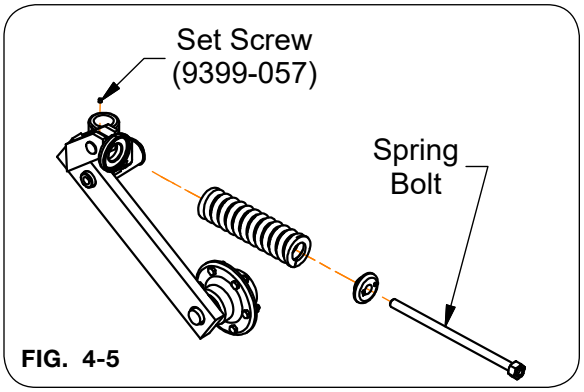


FIG. 4-5

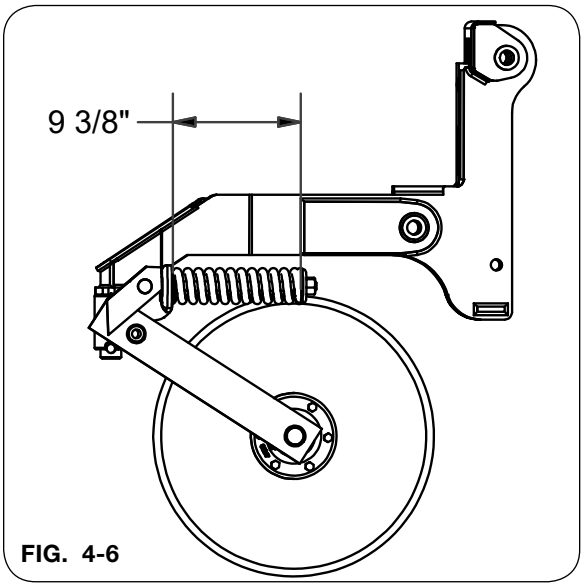


FIG. 4-6

Flex Hydraulics — Adjusting Wing Down Pressure

⚠ WARNING

- **RELIEVE HYDRAULIC SYSTEM OF ALL PRESSURE BEFORE ADJUSTING OR SERVICING. SEE TRACTOR OPERATOR'S MANUAL FOR PROPER PROCEDURES.**
- **HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

Due to many field factors, it may be necessary to adjust wing down pressure.

The adjustment Allen screw is located on top of pressure cartridge in valve PR port, can increase or decrease pressure as needed (FIG. 4-7). Set tractor SCV #2 to continuous flow.

IF WINGS DO NOT MAINTAIN SHANK DEPTH-INCREASE HYDRAULIC OPERATING PRESSURE. (tighten screw 1/4 turn clockwise).

IF CENTER SECTION RAISES OUT OF THE GROUND, OR WINGS DO NOT FLOAT IN FIELD, DECREASE HYDRAULIC OPERATING PRESSURE. (loosen screw 1/4 turn counter-clockwise).

Pressure setting can be increased (screw turned in) or decreased (screw turned out) at a rate of 125 PSI –PER QUARTER TURN. Only adjust the screw 1/4 turn each time. Check machine in field performance after each adjustment/repeat if necessary.

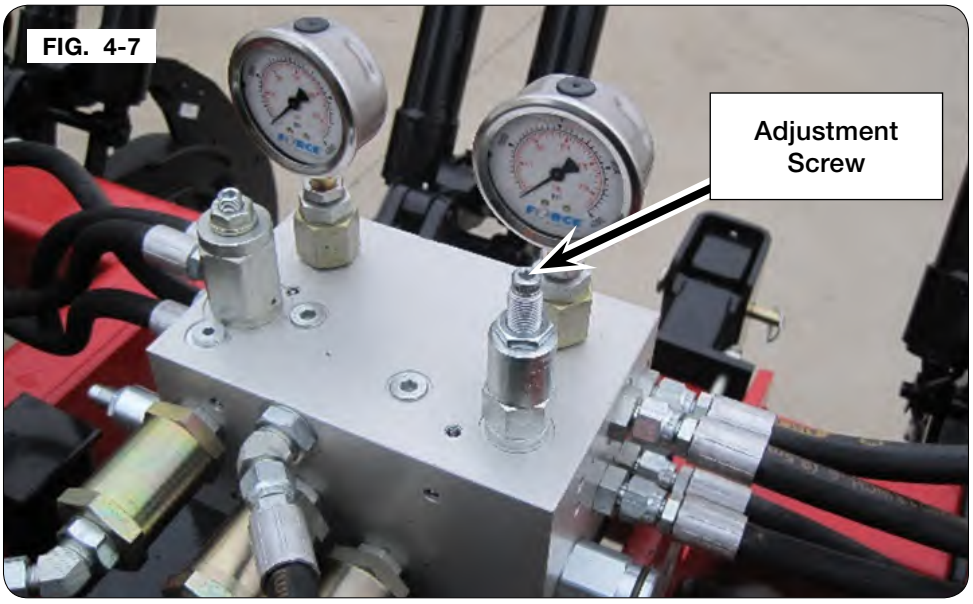


FIG. 4-7

Notes

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters

⚠ WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

⚠ CAUTION

- **SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THEM.**

IMPORTANT

- *Do not allow dirt and debris to contaminate the hub and its internal components. Neglecting to do so could result in failure of the hub and its components due to excessive wear.*

NOTE: After the first 100 acres, the hubs should be checked for tightness and wear.

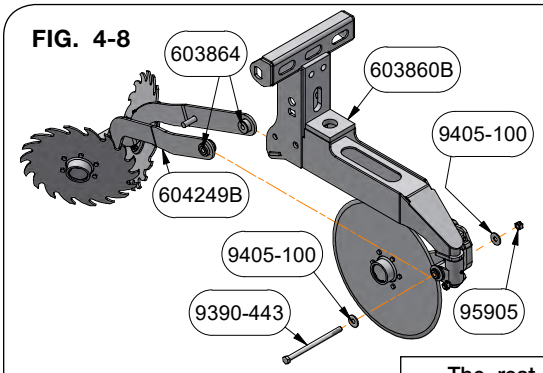
1. Park the unit on a firm, level surface. Block the wheels on the machine to keep it from moving. Set the vehicle parking brake, lower parking stands, shut-off the engine, and remove the ignition key.

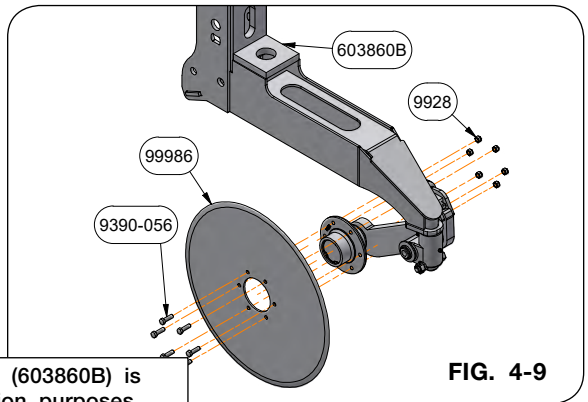
2. Using a safe lifting device rated for 50 lbs, remove the 5/8”-11UNCx10 Capscrew (9390-443), 5/8” flat washers (9405-100) and 5/8”-11UNC locknut (95905) and remove the Row Cleaner (604249).

NOTE: DO NOT LOSE the flanged bushings (603964) located in the mounting arms of the Row Cleaner (604249).

3. Remove the six 3/8”-16UNCx1 1/4” capscrews (9390-056) and 3/8”-16UNC Locknuts (9938) and remove the blade (9986).

FIG. 4-8





The rest of row unit (603860B) is removed for illustration purposes.

FIG. 4-9

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

4. Attach a C-clamp and apply pressure to both sides of the coulter hub (Fig. 4-10).

NOTE: Early production coulters with domed hub caps are not equipped with a snap ring. Use a pry bar or screwdriver to remove the hub cap and proceed to step 4.

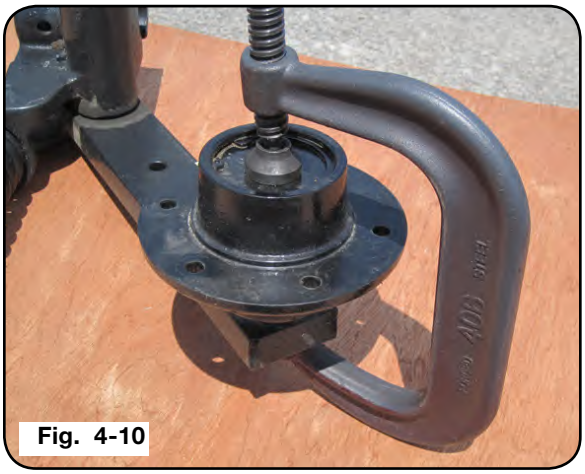


Fig. 4-10

5. Remove the retaining ring and hub cap. Refer to Fig. 4-11.

Fig. 4-11

6. Remove the cotter pin securing the slotted nut.

IMPORTANT

- *When removing the hub and its components, be sure to keep them free of debris and dirt. Failure to do so will result in contamination of the hub and bearing failure.*

7. Unscrew the nut and carefully remove the hub from the spindle.

8. Remove the components, clean and inspect for any damage or wear. If even the slightest imperfection exists, replace the component(s). Once the hub is dismantled, always replace the bearing and seal assembly, O-ring, and triple lip seal.

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

IMPORTANT

- *Always replace the O-rings and seals if dismantling the hub. Failure to do so could result in premature failure of the hub and its components.*

9. Replace any damaged parts before reassembling the components. Remove all grease and dirt from spindle and assemble O-ring (95565) to spindle.

10. Lubricate seal with grease.

IMPORTANT

- *Rotate the coulter hub when torquing the slotted nut. Doing this will prevent flats from forming on the bearings.*

11. While rotating hub, slide the hub, seal, and bearing onto spindle. Make sure not to damage seal. Be sure outer bearing and washer slide on the spindle and bearing seats in the cup.

NOTE: Press seal into hub with metal side of seal facing out on hub.

12. Assemble nut to spindle. While rotating hub, tighten nut to 40 Ft.-Lbs. DO NOT rotate hub again until step 14.

13. Back off nut until it becomes loose without rotating the hub.

14. Finger tighten nut without rotating the hub.

15. Tighten nut to align the next notch with hole in the spindle.

16. Check for looseness in the hub. It should not wiggle. If it does, tighten the nut one more slot and repeat this step.

17. Check hub rotation for excessive drag. There should be slight resistance. If there is excessive drag, repeat procedure starting at step 10.

18. Install Cotter Pin.

19. Add moly scent 2 grease through hub zerk until grease extends above the washer all around cavity. Also add grease to pivot arm zerk.

20. Install O-ring. Reinstall the hub cap, retaining ring, and blade.

21. Paint hub cap and retaining ring.

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

NOTE: Be sure to re-pack bearings with an SAE approved grease and keep it and its components free of dust and debris.

*** Parts contained in seal kit #68281.**

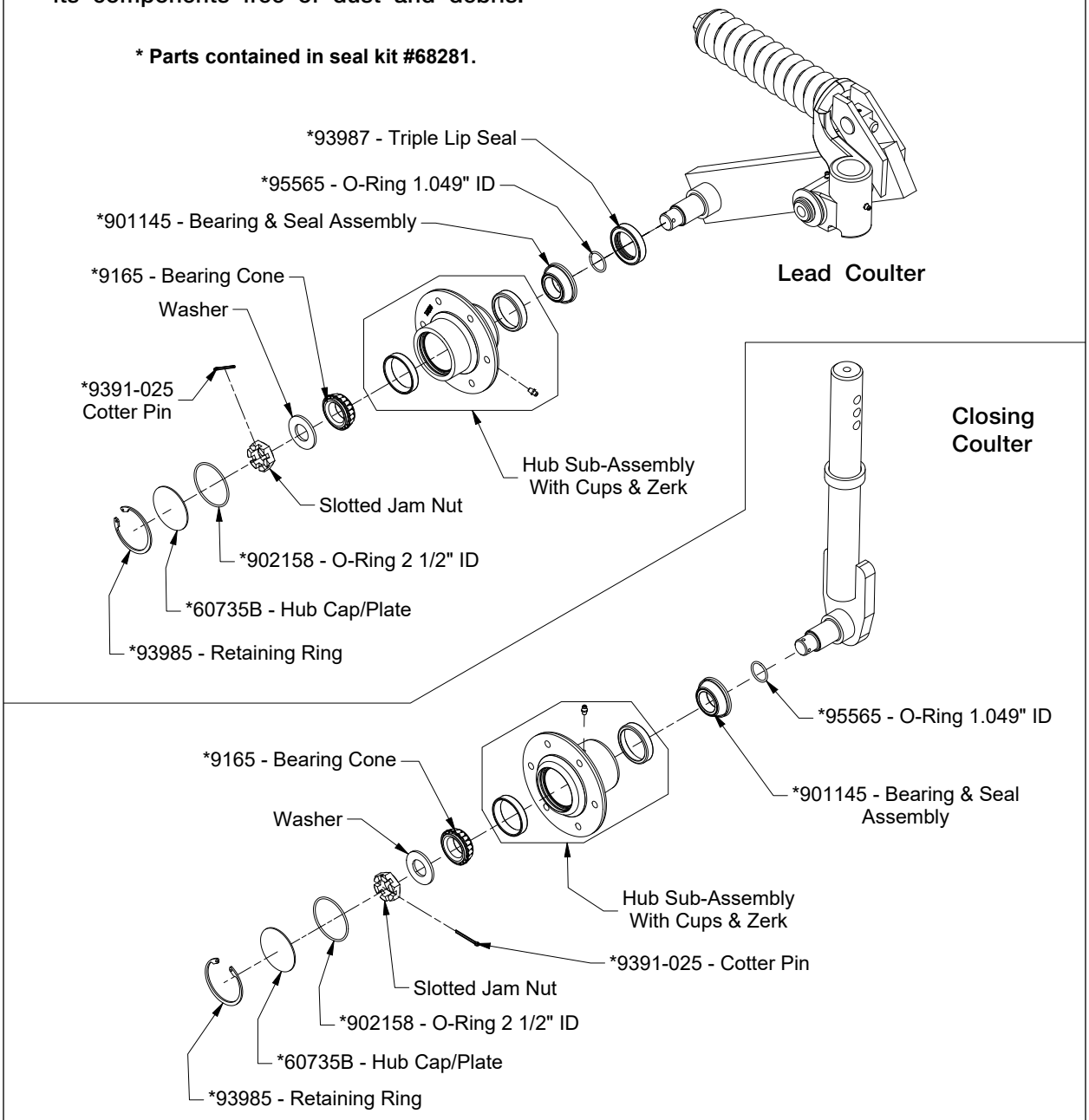


FIG. 4-12

Row Cleaner Wheel Hub Adjustment

⚠ WARNING

- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE MACHINE IS SECURELY BLOCKED.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

⚠ CAUTION

- **SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

IMPORTANT

- *Do not allow dirt and debris to contaminate the hub and its internal components. Neglecting to do so could result in failure of the hub and its components due to excessive wear.*

NOTE: After the first 100 acres, the hubs should be checked for tightness and wear.

1. Check the row cleaner wheel hub and bearing for looseness or wobble. Rotate and laterally push and pull on the row cleaner wheel. A tight hub will have no wobble and will rotate smoothly with a slight resistance.

2. If there is wobble in the hub, the hub must be tightened to the spindle. To do this, remove hub cap (60735) with a 3/16" adjustable spanner wrench. Torque jam nut (94725) to 20 ft.-lbs. and back off 1/4 of a turn. Apply a light coating of thread sealant to the O.D. of the hub cap and tighten onto the hub.

3. After tightening, retest the hub for wobble by repeating Step #1. If wobble still exists, continue with the following steps.

a. Remove the Row Cleaner Blade (604207B) and hub from the spindle.

IMPORTANT

- *When removing the hub, be sure to keep it free of debris and dirt. Failure to do so will result in contamination of hub and bearing failure.*
- *Always replace the seal if dismantling the hub. Failure to do so could result in premature failure of hub and its components.*

b. Clean and inspect all parts for any damage or wear. If even the slightest imperfection exists, replace the component(s). Once the hub is dismantled, always replace the bearing and seal assembly, o-ring, and seal.

d. Replace any damaged parts before reassembling the components. Be sure to remove any debris or dirt and repack bearings with an SAE approved hub grease.

e. Assemble seal and bearings into hub and position onto spindle.

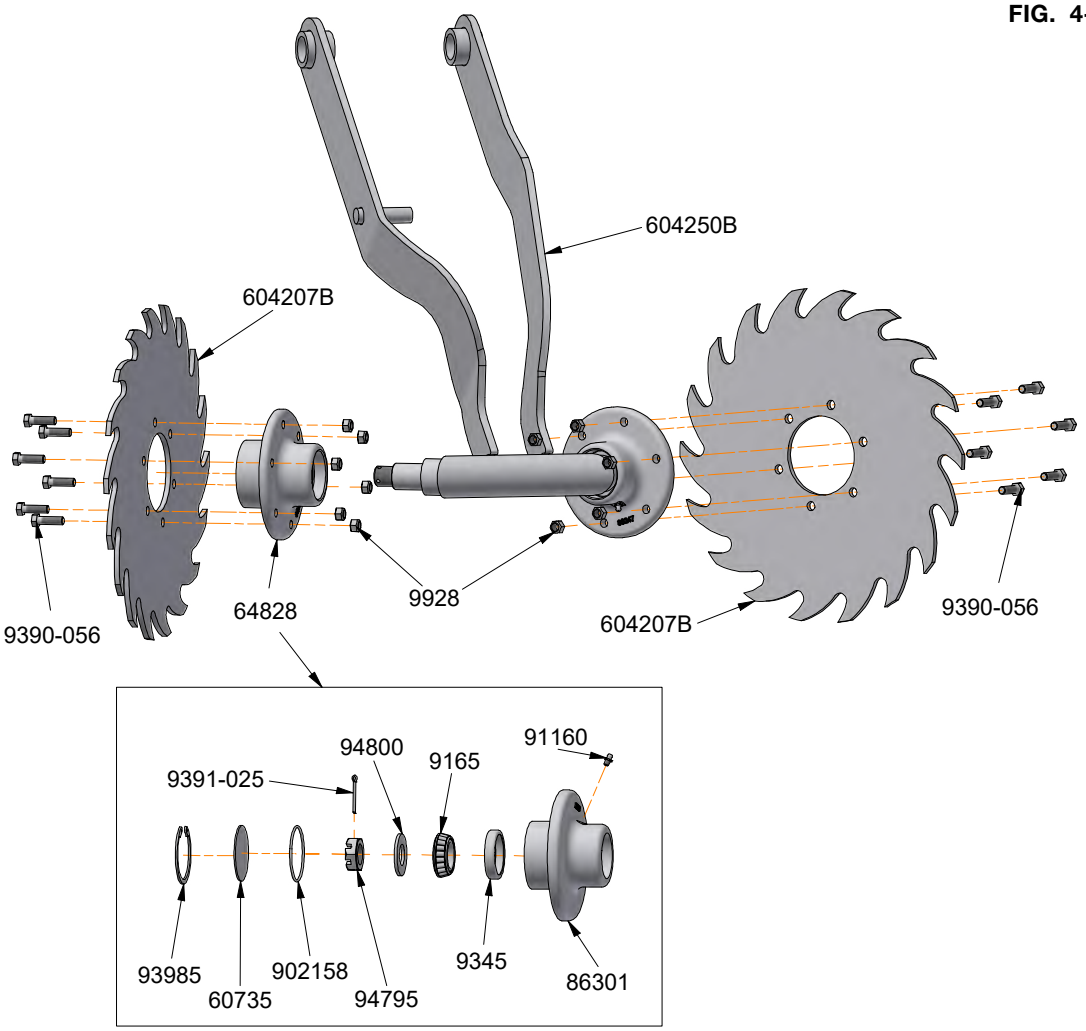
Row Cleaner Wheel Hub Adjustment (continued)

f. Apply grease to the I.D. of the seal (902158). While rotating the hub, place the hub on the spindle, making sure not to damage the seal. Assemble the washer and nut. Torque the jam nut (94725) to 20 ft.-lbs. and back off 1/4 of a turn. Apply a light coating of thread sealant to the O.D. of the hub cap and tighten onto the hub.

IMPORTANT

- Rotate hub when torquing jam nut, this will prevent flats from forming on bearings.

FIG. 4-14



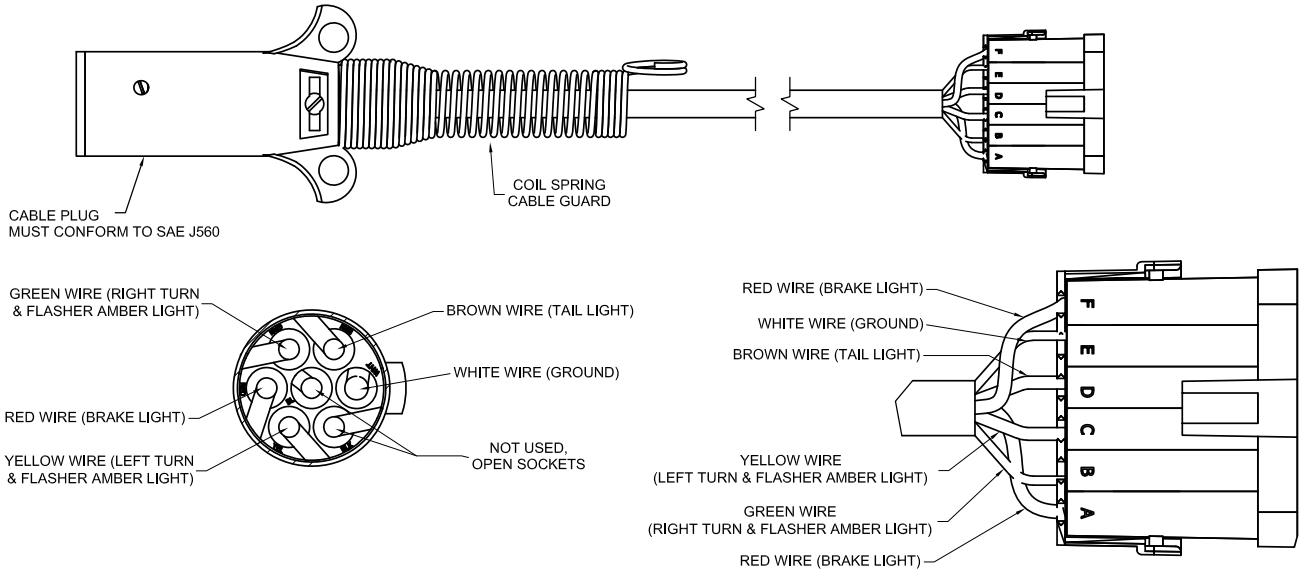
Row Cleaner Wheel Replacement

1. Remove and save the six 3/8”x1 1/4” capscrews (9390-056) and 3/8” lock nuts (9928) securing it to the hub (64828). (FIG. 4-14)

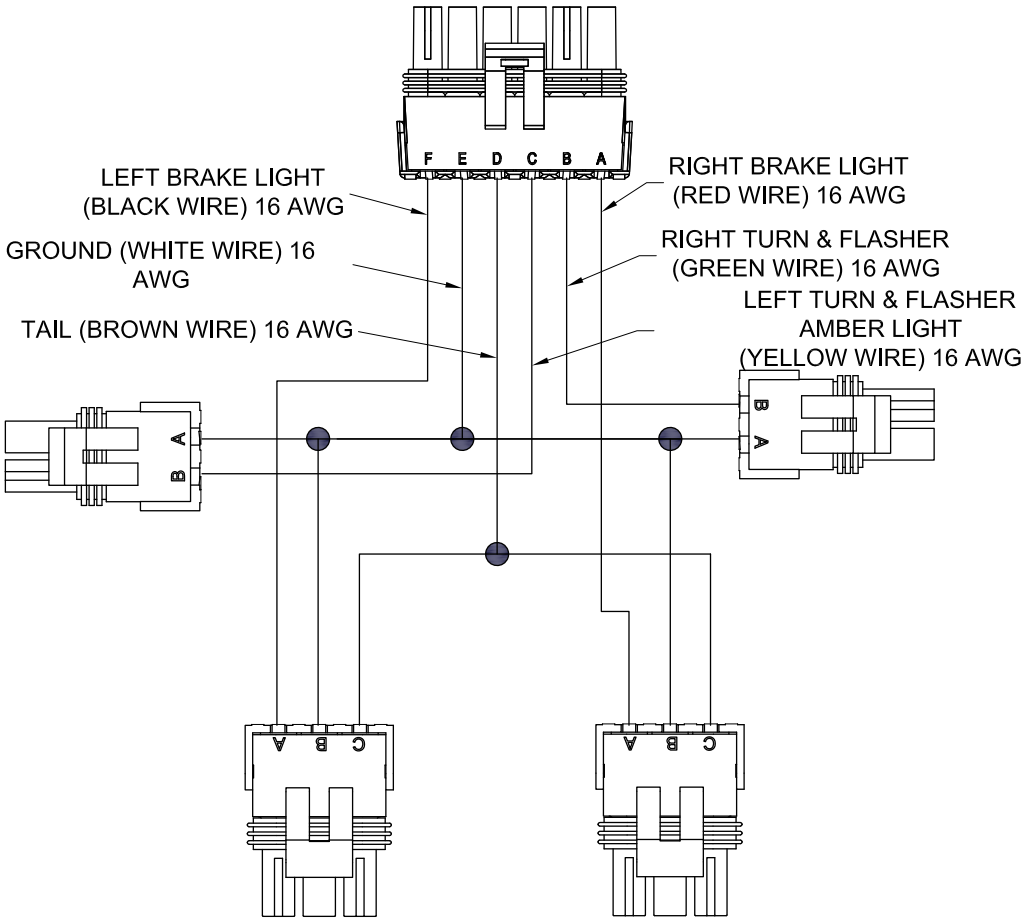
2. Remove the worn tooth wheel (604207B) and dispose of.

3. Install the new tooth wheel (604207B) with the saved hardware and torque to spec.

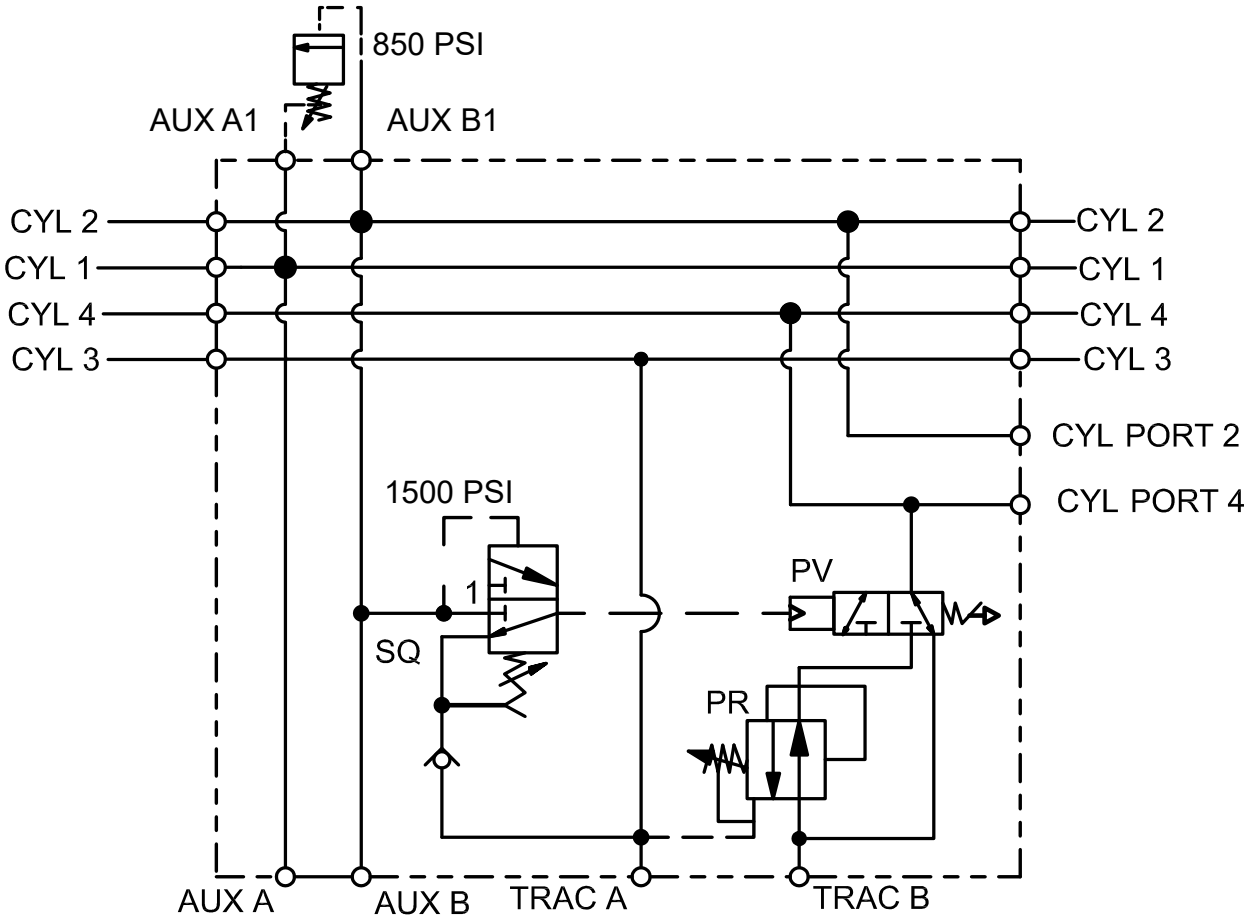
Schematic - Electrical Harness - Main 114” (86466)



Schematic - Electrical Harness - Rear 422” (69407)



Schematic - Hydraulic Valve Block (9503620)



Troubleshooting

PROBABLE CAUSE	CORRECTION
Poor Penetration	
Frame is not level	See the OPERATION section “Leveling Frame” for instructions
Ground too hard for hitch control setting	Adjust the hitch control position. See the OPERATION section “Load and Depth control”
Worn or dull tool points	Replace with new tool points
Plugging	
Poor field conditions	Wait until the field is dry enough to till properly without excessive slippage
Machine not level	Level Machine
Implement Running Crooked In Field	
Coulter blades not cutting residue	Wait until the field is dry enough to allow blades to cut through residue
Shanks are not spaced correctly	See “Overhead Layouts” for correct spacing of the shanks
Stabilizer wheels are not adjusted equally from side-to-side	Check the side-to-side adjustment and tire pressure
Tractor tires are not properly spaced or equally inflated	Find the cause and correct. See OPERATION section “Wheel Spacing”
Tractor 3-point lift linkage is not adjusted for level operation	Re-level Raptor frame. See OPERATION section “Leveling Frame”
Tractor 3-point lift linkage lateral float pin are not set properly	Check the position of the lateral float pins. See OPERATION section “Left Link Lateral Float”

Troubleshooting (continued)

PROBABLE CAUSE	CORRECTION
Shanks Not Resetting Into Ground After Tripping	
Ground conditions hard or the unit is being operated very deep	While moving, raise Raptor slightly to reset, then lower and resume operation
Excessive Soil Disturbance	
Main frame not level, running downhill	Level main frame
Dry soil conditions	Wait for additional rain
Running implement too fast	Slower speeds create less disturbances
Too much sealing	Decrease closing down pressure, decrease coulter angle or move coulters apart
Not enough sealing	Increase closing down pressure, increase coulter angle or move coulters closer

Storage

Your tool is an important investment. Spend a little time to protect it from destructive rust and corrosion, You will be repaid in longer service life and better performance.

Do the following before placing the cart in storage:

1. Remove dirt and trash which could cause rust.
2. Repaint any chipped or scraped areas.
3. Lubricate points as shown on previous page.
4. Inspect for damage or worn parts, replace before next season.
5. Store inside, away from livestock.
6. Replace all worn, torn or faded decals and reflectors.

Wheels and Tires

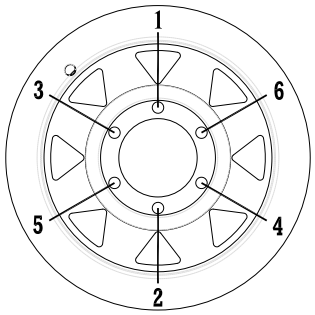
Wheel Nut Torque

⚠ CAUTION

- **IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF USE, AND EACH HOUR UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THERE-AFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.**

Failure to check torque before first use may damage wheel nut/bolt seats. Once seats are damaged, it will become impossible to keep nuts/bolts tight. Tighten nuts/bolts to applicable torque value shown in table. Start all nuts/bolts by hand to prevent cross threading. Torque nuts/bolts in the recommended sequence as shown in Diagram 1.

WHEEL HARDWARE	
SIZE	FOOT-POUNDS
1/2”-20 (UNF)	75 Ft.-Lbs.



6 Bolt
Diagram 1

Wheels and Tires (continued)

Tire Pressure

- The following is to be used as a general guide for tire inflation and figures can vary depending on specific brand of tire used. **It is important that tires are inspected after unit is loaded.** Start with minimum pressure indicated. The tire should stand up with no side-wall buckling or distress as tire rolls. Record the pressure needed to support the full load and maintain this pressure to achieve proper tire life.

Do not exceed maximum recommended tire pressure.

TIRE	INFLATION
7.60 x 15 - 8 Ply	max. 52 PSI
9.5 x 15 - 6 Ply	max. 32 PSI
12.5 x 15 - 10 Ply	max. 44 PSI

Tire Warranty

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Following are phone numbers and Websites for your convenience:

Firestone
www.firestoneag.com
Phone 800-847-3364

Titan / Goodyear
www.titan-intl.com
Phone 800-USA-BEAR
Fax 515-265-9301

Carlisle
www.carlisletire.com
Phone 800-260-7959
Fax 800-352-0075

Greenball
www.greenball.com
Phone nearest location:
California 800-937-5204
Georgia 800-283-4569
Florida 800-935-0200
Indiana 800-426-4068
Tennessee 800-946-9412
Ohio 800-840-7295
Pennsylvania 800-869-6787

Complete Torque Chart

Capscrews - Grade 5

NOTE:

- Grade 5 capscrews can be identified by three radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.

SIZE	FOOT POUNDS	NEWTON METERS
1/4-20 1/4-28	8-10 9-11	11-13 12-15
5/16-18 5/16-24	15-17 17-19	20-23 23-26
3/8-16 3/8-24	25-28 28-31	34-38 38-42
7/16-14 7/16-20	40-45 45-50	54-61 61-68
1/2-13 1/2-20	62-68 68-75	84-92 92-102
9/16-12 9/16-18	90-98 100-110	122-133 134-148
5/8-11 5/8-18	120-135 124-137	162-183 168-186
3/4-10 3/4-16	200-220 210-230	270-300 285-310
7/8-9 7/8-14	330-350 360-380	425-475 460-515
1-8 1-14	500-525 540-560	675-710 730-760
1 1/8-7 1 1/8-12	600-635 665-700	815-860 920-950
1 1/4-7 1 1/4-12	850-895 940-990	1150-1215 1275-1340
1 3/8-6 1 3/8-12	1125-1175 1280-1335	1525-1590 1735-1810
1 1/2-6 1 1/2-12	1500-1560 1685-1755	2035-2115 2285-2380

IMPORTANT

- *Follow these torque recommendations except when specified in text.*

Complete Torque Chart

Capscrews - Grade 8

NOTE:

- Grade 8 capscrews can be identified by six radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.

SIZE	FOOT POUNDS	NEWTON METERS
5/16-18 5/16-24	20-22 21-23	27-30 28-31
3/8-16 3/8-24	35-39 36-41	47-53 49-55
7/16-14 7/16-20	54-58 55-60	73-78 75-80
1/2-13 1/2-20	82-88 94-99	110-120 125-135
9/16-12 9/16-18	127-134 147-155	170-180 199-210
5/8-11 5/8-18	160-170 165-175	215-230 225-235
3/4-10 3/4-16	280-295 330-365	380-400 445-495
7/8-9 7/8-14	410-430 420-440	555-580 570-595
1-8 1-14	630-650 680-700	850-880 920-950
1 1/8-7 1 1/8-12	900-930 930-950	1220-1260 1260-1290
1 1/4-7 1 1/4-12	1250-1300 1280-1320	1695-1760 1735-1790

IMPORTANT

- *Follow these torque recommendations except when specified in text.*

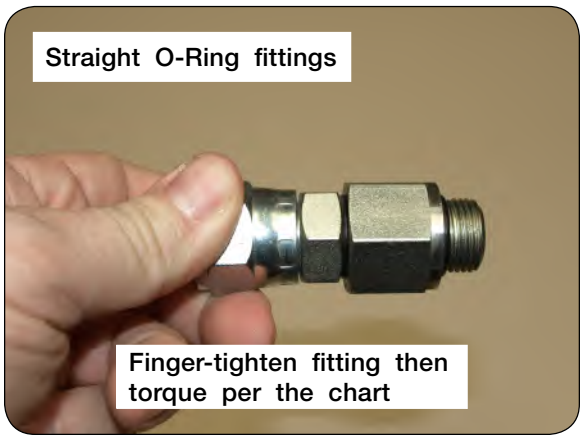
Hydraulic Fittings

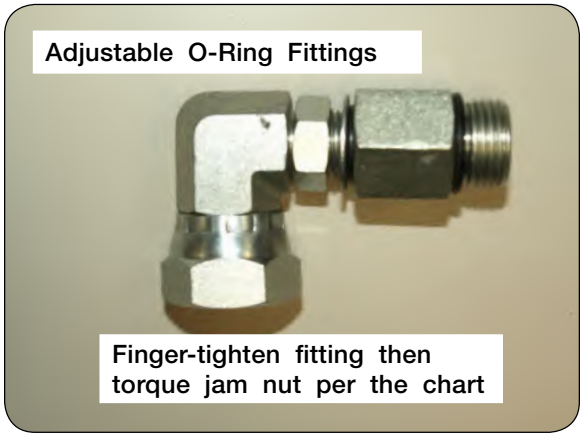
Tightening O-Ring Fittings

1. Inspect components for damage or contamination. Do not connect any other type of fitting to an O-ring fitting.
2. For adjustable fittings, insure the jam nut and washer are fully backed up.
3. Lubricate the O-ring and threads on the fitting.
4. Turn the fitting into the port until it is finger tight.
5. For adjustable fittings, set in the desired position.
6. Using a wrench, torque the fitting to the value in the below table. For adjustable fittings the jam nut will be tightened.

Note: Never use a power tool to install a fitting.

Dash Size	Thread Size	Straight Stud Torque (Ft-Lbs)	Adjustable Stud Torque (Ft-Lbs)
-5	1/2-20	14-19	10-14
-6	9/16-18	18-24	12-16
-8	3/4-16	27-43	20-30
-10	7/8-14	36-48	30-36
-12	1-1/16-12	65-75	44-54
-14	1-3/16-12	75-99	53-70
-16	1-5/16-12	85-123	59-80
-20	1-5/8”-12	115-161	75-100
-24	1-7/8”-12	125-170	105-125





Hydraulic Fittings

Tightening JIC Fittings

1. Inspect all components for damage or contamination. Do not connect any other type of fitting to a JIC fitting.

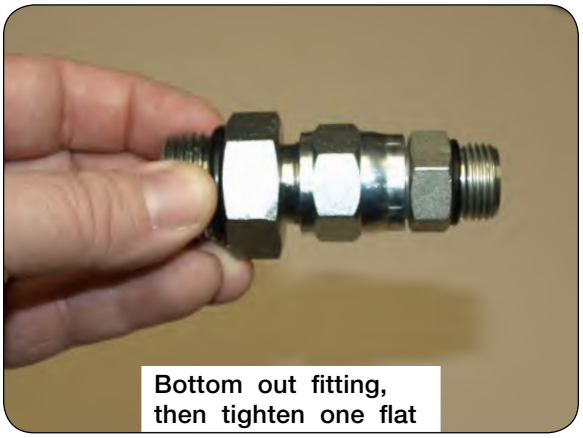
2. Lubricate the threads.

3. Turn the fitting into the port until it bottoms out.

4. Use one wrench on the fixed hex on the hose to prevent twisting and a second on the swivel. Tighten the fitting another 60 degrees (or one flat).

Note: Never use a power tool to install a fitting.

JIC fittings



Bottom out fitting, then tighten one flat

SECTION IV
Maintenance

Daily Service

Beginning of Day

NOTE: Before initial use, ensure all lubrication points have been greased.

Check all U-bolts and bolts for tightness. This is especially important during the first days of operation. See "Torque Chart" in this section.

IMPORTANT

- *Inspect mast pins for any wear or damage. Replace any worn or damaged pins.*

Perform any daily lubrication outlined in "Lubrication" in this section.

Check stabilizer tire air pressure and inflate to correct pressure, if necessary.

IMPORTANT

- *To assure level penetration of shanks, both tires must be inflated to the same pressure.*

End of Day

Clean off dirt and residue which may have accumulated on implement during operation.

Check implement for damage which could have occurred during operation, and repair.

Annual Service

Beginning of Season

⚠ WARNING

- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**

Check all bolts, U-bolts, and wheel bolts for tightness. Refer to “Torque Chart” in this section.

Lubricate implement (see “Lubrication” in this section).

Check air pressure in tires and inflate to correct pressure if necessary (see “Daily Service” in this section).

End of Season

Your implement is an important investment. Spend a little time to protect it from destructive rust and corrosion. You will be repaid in longer service life and better performance.

Perform the following before placing the implement in storage:

1. Remove dirt and residue which could cause rusting.
2. Repaint any chipped or scraped areas.
3. Lubricate implement (see “Lubrication” in this section).
4. Coat all earth moving surfaces with grease or suitable rust preventatives.
5. Inspect for damaged parts. Replace before next season.
6. Store implement inside, away from livestock.
7. Use support stands to keep implement tires and points up off bare ground.
8. Replace all worn, torn or faded decals and reflectors.

Complete Torque Chart – Capscrews - Grade 5

NOTE: Grade 5 capscrews can be identified by three radial dashes on head.

NOTE: For wheel torque requirements, refer to **Wheels and Tires**.

NOTE: Tighten U-bolts to have the same number of threads exposed on each end.

SIZE	FOOT POUNDS	NEWTON METERS	SIZE	FOOT POUNDS	NEWTON METERS
1/4-20 1/4-28	8-10 9-11	11-13 12-15	3/4-10 3/4-16	200-220 210-230	270-300 285-310
5/16-18 5/16-24	15-17 17-19	20-23 23-26	7/8-9 7/8-14	330-350 360-380	425-475 460-515
3/8-16 3/8-24	25-28 28-31	34-38 38-42	1-8 1-14	500-525 540-560	675-710 730-760
7/16-14 7/16-20	40-45 45-50	54-61 61-68	1 1/8-7 1 1/8-12	600-635 665-700	815-860 920-950
1/2-13 1/2-20	62-68 68-75	84-92 92-102	1 1/4-7 1 1/4-12	850-895 940-990	1150-1215 1275-1340
9/16-12 9/16-18	90-98 100-110	22-133 134-148	1 3/8-6 1 3/8-12	1125-1175 1280-1335	1525-1590 1735-1810
5/8-11 5/8-18	120-135 124-137	162-183 168-186	1 1/2-6 1 1/2-12	1500-1560 1685-1755	2035-2115 2285-2380

U-BOLTS - GRADE 7

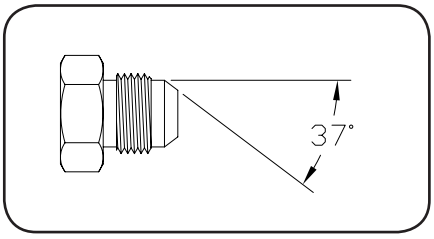
Torque 3/4”-10UNC U-Bolts to 240 Ft.-Lbs.
Torque 3/4”-10UNC Shank Mount Capscrews to 375-400 Ft.-Lbs.
Torque 3/4”-10UNC Shank Mount V-bolts to 240 Ft.-Lbs.

Torque 1 1/2” Dia. Pull Arm Pins to 225-275 ft.-lbs.

Hydraulic Fittings – Torque and Installation

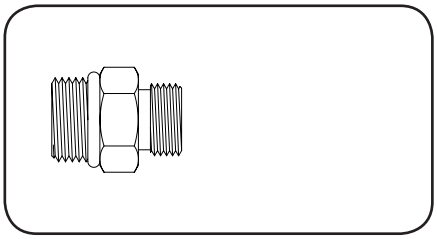
SAE FLARE CONNECTION (J. I. C.)

1. Tighten nut with finger until it bottoms the seat.
2. Using a wrench, rotate nut to tighten. Turn nut 1/3 turn to apply proper torque.



SAE STRAIGHT THREAD O-RING SEAL

1. Insure jam nut and washer are backed up to the back side of smooth portion of elbow adapter.
2. Lubricate o-ring -- VERY IMPORTANT!
3. Thread into port until washer bottoms onto spot face.
4. Position elbows by backing up adapter.
5. Tighten jam nut.



Wheels and Tires

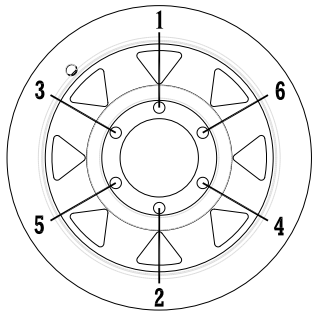
Wheel Nut Torque

⚠ CAUTION

- **IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF USE, AND EACH HOUR UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THERE-AFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.**

Failure to check torque before first use may damage wheel nut/bolt seats. Once seats are damaged, it will become impossible to keep nuts/bolts tight. Tighten nuts/bolts to applicable torque value shown in table. Start all nuts/bolts by hand to prevent cross threading. Torque nuts/bolts in the recommended sequence as shown in Diagram 1.

WHEEL HARDWARE	
SIZE	FOOT-POUNDS
1/2"-20 (UNF)	75 Ft.-Lbs.



6 Bolt
Diagram 1

Tire Pressure

- The following is to be used as a general guide for tire inflation and figures can vary depending on specific brand of tire used. **It is important that tires are inspected after unit is loaded.** Start with minimum pressure indicated. The tire should stand up with no side-wall buckling or distress as tire rolls. Record the pressure needed to support the full load and maintain this pressure to achieve proper tire life. **Do not exceed maximum recommended tire pressure.**

TIRE	INFLATION
7.60 x 15 - 8 Ply	max. 52 PSI
9.5 x 15 - 6 Ply	max. 32 PSI
12.5 x 15 - 10 Ply	max. 44 PSI

(All tire pressures in psi)

Wheels and Tires

Tire Warranty

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Following are phone numbers and Websites for your convenience:

Firestone
www.firestoneag.com
Phone 800-847-3364

Titan
or
Goodyear
www.titan-intl.com
Phone 800-USA-BEAR
Fax 515-265-9301

Carlisle
www.carlisletire.com
Phone 800-260-7959
Fax 800-352-0075

Greenball
www.greenball.com
Phone nearest location:
California 800-937-5204
Georgia 800-283-4569
Florida 800-935-0200
Indiana 800-426-4068
Tennessee 800-946-9412
Ohio 800-840-7295
Pennsylvania 800-869-6787

Lubrication Points

To keep your implement in top operating condition and to assure its proper performance and reliability for a long period of time, periodic inspection and lubrication is a must.

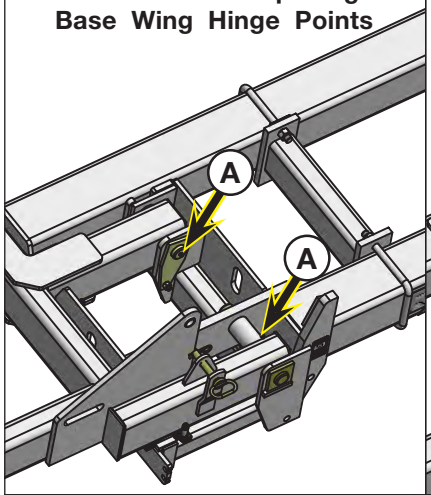
Use EP-2 lubricant at the locations described in the chart. All exposed cylinder rods should be coated with grease before seasonal storage to prevent rusting. After seasonal storage, check wing latch for freedom of movement.

The lubrication locations and recommended schedule are as follows:

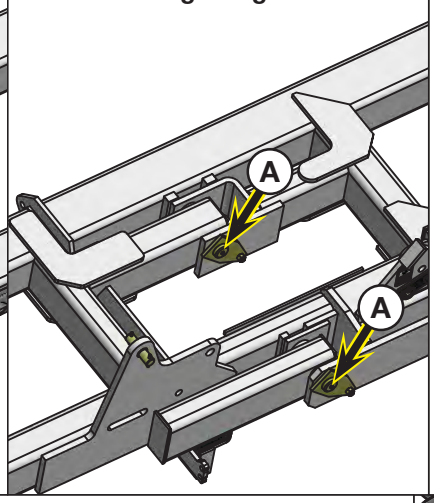
ITEM	DESCRIPTION	POINT	QTY	HOURS
A	Base Wing Hinge Points	4	2 Shots	Weekly
B	Stabilizer Wheel Hubs	1	1 Shot	Weekly
C	Lead Coulter Swivel Arms	1	1 Shot	Weekly
D	Lead Coulter Hubs & Depth Control Hubs	1	2 Shots	Weekly
E	Row Cleaner Hubs	1	2 Shots	Weekly
F	Closing Coulter Hubs	1	2 Shots	Weekly
G	Closing Coulter & Conditioner Springs	3	2 Shots	Weekly
H	Conditioner Hubs/Bearings	1	2 Shots	Weekly

Lubrication Points (continued)

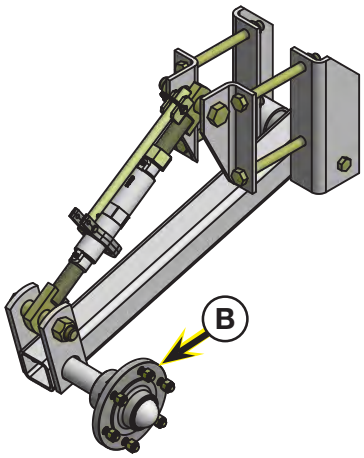
8 Shank 30/36/38" Spacing & 12 Shank 30" Spacing Base Wing Hinge Points



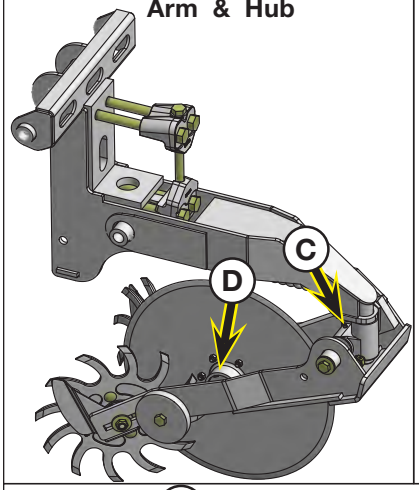
12 Shank 36/38" Spacing Base Wing Hinge Points



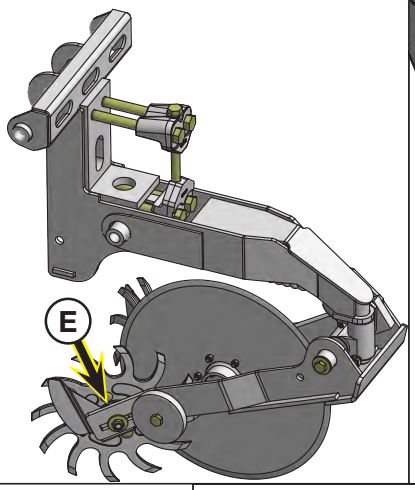
Stabilizer Wheel Hub

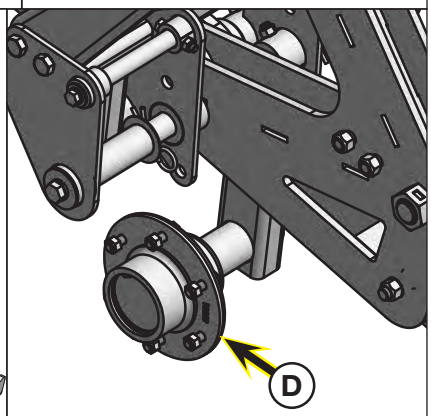


Lead Coulter Swivel Arm & Hub

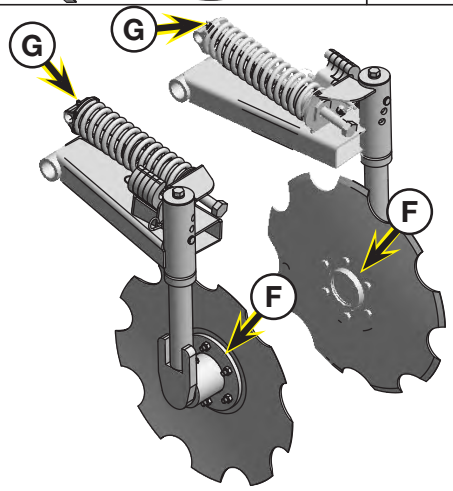


Row Cleaner Hubs



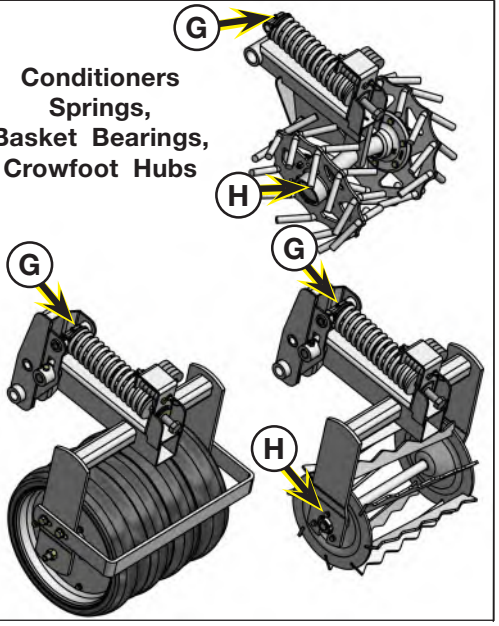


Depth Control Hub



Closing Coulters Springs & Hubs

Conditioners Springs, Basket Bearings, Crowfoot Hubs



Troubleshooting

PROBABLE CAUSE	CORRECTION
Poor Penetration	
Frame is not level	See the OPERATION section "Leveling Frame" for instructions
Ground is too hard for hitch control setting	Adjust the hitch control position. See the OPERATION section "Load and Depth control"
Worn or dull tool points	Replace with new tool points
Plugging	
Poor field conditions	Wait until the field is dry enough to till properly without excessive slippage
Machine not level	Level Machine
Coulter blades not cutting residue	Wait until the field is dry enough to allow blades to cut through residue
Implement Running Crooked In Field	
Shanks are not spaced correctly	See "Overhead Layouts" for correct spacing of the shanks
Stabilizer wheels are not adjusted equally from side-to-side	Check the side-to-side adjustment and tire pressure
Tractor tires are not properly spaced or equally inflated	Find the cause and correct. See OPERATION section "Wheel Spacing"
Tractor 3-point lift linkage is not adjusted for level operation	Re-level Raptor frame. See OPERATION section "Leveling Frame"
Tractor 3-point lift linkage lateral float pin are not set properly	Check the position of the lateral float pins. See OPERATION section "Left Link Lateral Float"

Troubleshooting (continued)

PROBABLE CAUSE	CORRECTION
Shanks Not Resetting Into Ground After Tripping	
Ground conditions hard or the unit is being operated very deep	While moving, raise Raptor slightly to reset, then lower and resume operation
Excessive Soil Disturbance	
Main frame not level, running downhill	Level main frame
Dry soil conditions	Wait for additional rain
Running implement too fast	Slower speeds create less disturbances
Too much sealing	Decrease closing down pressure, decrease coulter angle or move coulters apart
Not enough sealing	Increase closing down pressure, increase coulter angle or move coulters closer

TerrainPro Row Unit

WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **CHANGE ONLY ONE SHANK AT A TIME. IF PRESSURE IS RELIEVED ON ALL SHANKS, THE UNIT COULD TIP OVER BACKWARDS.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **FALLING OBJECTS CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT WORK UNDER THE MACHINE AT ANY TIME WHILE BEING HOISTED. BE SURE ALL LIFTING DEVICES AND SUPPORTS ARE RATED FOR THE LOADS BEING HOISTED. THESE ASSEMBLY INSTRUCTIONS WILL REQUIRE SAFE LIFTING DEVICES UP TO 100 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.**

The shank has replaceable wear plates and point which, after a period of time, will need to be replaced (FIG. 4-1). To replace these components on your machine, refer to the following guidelines:

Point & Wear Plates Replacement

1. With the implement attached to a tractor, find a firm, level surface and unfold the wings, if applicable. Lower the unit's jack stands until they are 1-2 inches below the points, and lower the machine to the ground so that the stands support the entire implement and all points are off the ground. Shut off the tractor engine, set the parking brake, and remove the ignition key.
2. If applicable, remove and save the fertilizer option 1/2”-13UNC x 1 3/4” capscrew (9390-102) and 1/2”-13UNC lock nut (9800). (FIG. 4-1)
3. Loosen the center wear plates 1/2”-13UNC x 1 3/4” capscrews (9390-102) and 1/2”-13UNC lock nuts (9800). (FIG. 4-1)
4. Remove and save the point 1/2”-13UNC x 1 3/4” capscrew (9390-102) and 1/2”-13UNC lock nut (9800). (FIG. 4-1)
5. Remove the point (602025B). (FIG. 4-1)

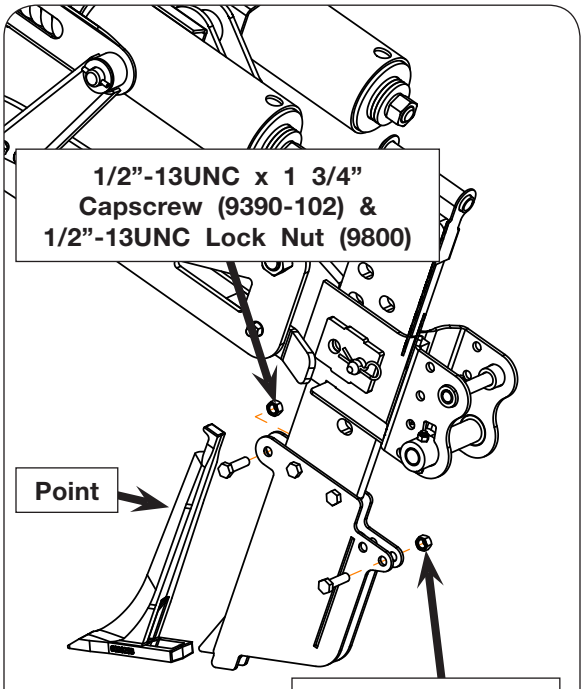


FIG. 4-1

TerrainPro Row Unit (continued)

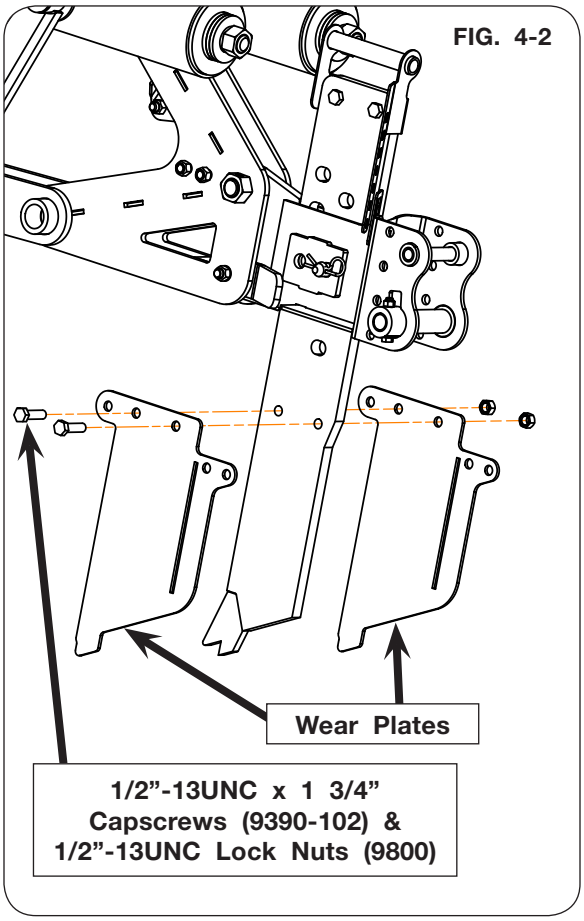
6. If replacing wear plates, continue with step 7 otherwise skip to step 9.

7. Remove the center wear plate 1/2”-13UNC x 1 3/4” capscrews (9390-102) and 1/2”-13UNC lock nuts (9800). (FIG. 4-2)

8. Replace wear plates (601999B) and loosely secure with previously removed 1/2”-13UNC x 1 3/4” capscrews (9390-102) and 1/2”-13UNC lock nuts (9800). (FIG. 4-2)

9. Install new point (602025B) and secure with previously removed 1/2”-13UNC x 1 3/4” capscrew (9390-102) and 1/2”-13UNC lock nut (9800) (FIG. 4-2). DO NOT TORQUE HARDWARE.

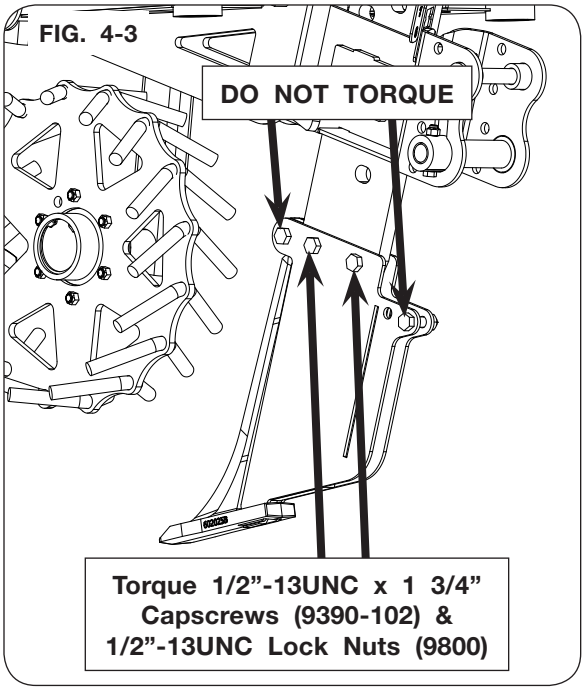
FIG. 4-2



10. If applicable, install the fertilizer option and secure with 1/2”-13UNC x 1 3/4” capscrew (9390-102) and 1/2”-13UNC lock nut (9800) (FIG. 4-3). DO NOT TORQUE HARDWARE.

11. Torque the center wear plates 1/2”-13UNC x 1 3/4” capscrews (9390-102) and 1/2”-13UNC lock nuts (9800) to 62-68 Ft.-Lbs. (FIG. 4-3)

FIG. 4-3



TerrainPro Row Unit (continued)

Shear-Bolt Replacement

The shear-bolt should shear only when the shank encounters an obstacle.

WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**

IMPORTANT

- *On the wing fold units, be sure to replace the shear-bolt on the shanks on the wing before folding the wings. Damage to the equipment could occur.*

1. With the Raptor implement attached to a tractor, find a firm, level surface and unfold the wings, if applicable. Lower the unit's support stands until they are 1-2 inches below the points, and lower the machine to the ground so that the stands support the entire implement and all points are off the ground. Shut off the tractor engine, set the parking brake, and remove the ignition key.

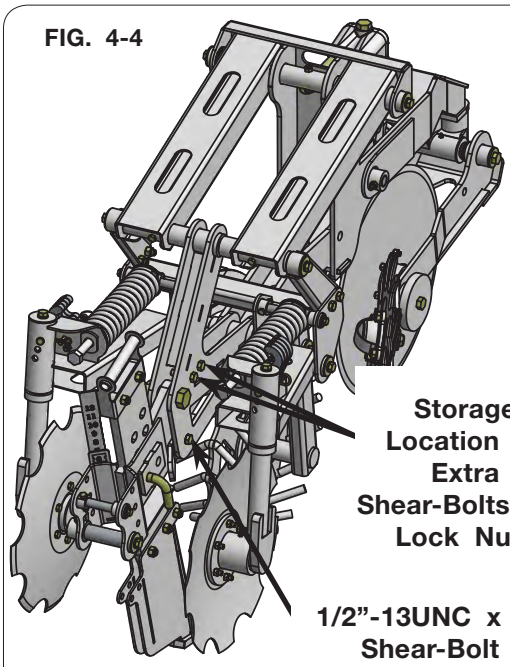
2. Remove any remaining portions of the shear-bolt from the assembly. Inspect shear-bolt holes. Severely distorted holes will result in shorter shear-bolt life and should be repaired or replaced.

3. Remove a new shear-bolt from the storage location.

4. Align the hole in the shank mount bracket to the hole in the shank trip bracket.

5. Insert the new shear-bolt. Tighten nut on the shear-bolt until snug. Do not torque to specification. Tightening the shear-bolt will prevent proper trip function."

FIG. 4-4



TerrainPro Row Unit (continued)

Lead Coulter Spring Replacement

The following guidelines are for replacing the spring on the coulters.

⚠ WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

⚠ CAUTION

- **SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

IMPORTANT

- *The spring should only be adjusted when repairs are being made. The springs have been preset before leaving the factory.*

1. Loosen the set screw retaining the spring bolt on the coulter arm (FIG. 4-5).
2. Slowly unscrew the spring bolt which will relieve spring pressure (FIG. 4-5).
3. Once the bolt is removed, replace with new spring and re-insert bolt.

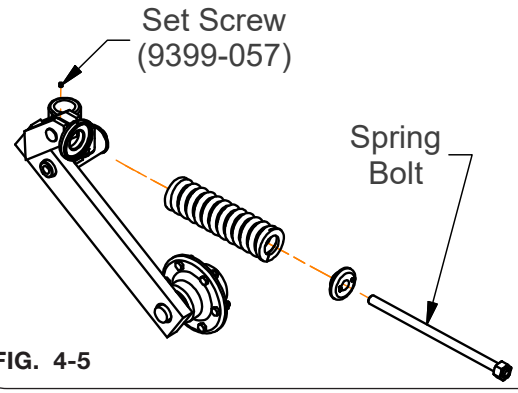


FIG. 4-5

4. Tighten bolt until the spring is compressed to 9 3/8" (FIG. 4-6).

The coulter springs are preset at the factory to 9 3/8". This measurement is the total amount of exposed spring.

NOTE: Adjusting the spring below 9 3/8" could cause premature part failure and void any warranty considerations.

5. Tighten set screw to secure bolt.

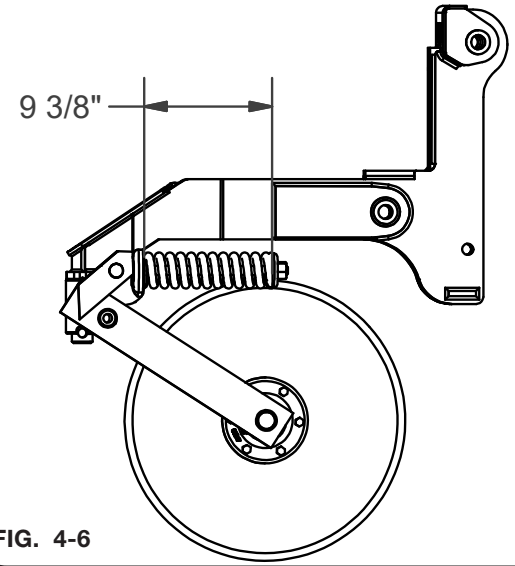


FIG. 4-6

Adjusting Wing Down Pressure For Units with Flex Hydraulic Option Only

⚠ WARNING

- **RELIEVE HYDRAULIC SYSTEM OF ALL PRESSURE BEFORE ADJUSTING OR SERVICING. SEE TRACTOR OPERATOR'S MANUAL FOR PROPER PROCEDURES.**
- **HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

Due to many field factors, it may be necessary to adjust wing down pressure.

The adjustment Allen screw is located on top of pressure cartridge in valve PR port, can increase or decrease pressure as needed (FIG. 4-7). Set tractor SCV #2 to continuous flow.

IF WINGS DO NOT MAINTAIN SHANK DEPTH-INCREASE HYDRAULIC OPERATING PRESSURE. (tighten screw 1/4 turn clockwise).

IF CENTER SECTION RAISES OUT OF THE GROUND, OR WINGS DO NOT FLOAT IN FIELD, DECREASE HYDRAULIC OPERATING PRESSURE. (loosen screw 1/4 turn counter-clockwise).

Pressure setting can be increased (screw turned in) or decreased (screw turned out) at a rate of 125 PSI –PER QUARTER TURN. Only adjust the screw 1/4 turn each time. Check machine in field performance after each adjustment/repeat if necessary.

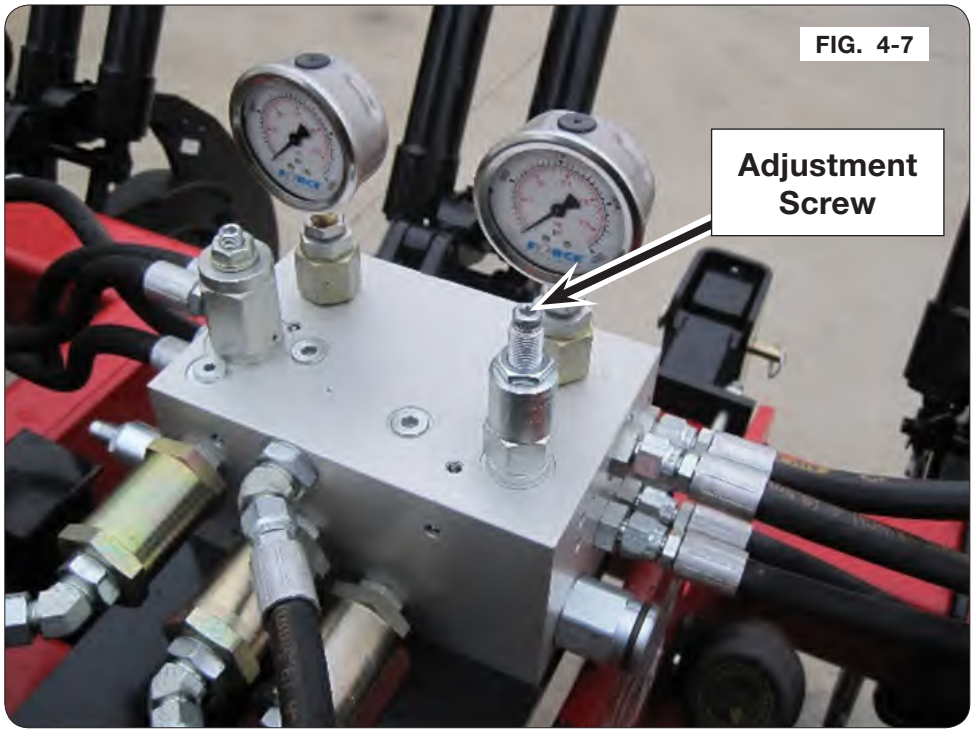


FIG. 4-7

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters

Park the unit on a firm, level surface. Block the wheels on the machine to keep it from moving. Set the vehicle parking brake, lower parking stands, shut-off the engine, and remove the ignition key.

After the first 100 acres, the hubs should be checked for tightness and wear.

⚠ WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

⚠ CAUTION

- **SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

IMPORTANT

- *Do not allow dirt and debris to contaminate the hub and its internal components. Neglecting to do so could result in failure of the hub and its components due to excessive wear.*

1. Remove the blade.
2. Attach a C-clamp and apply pressure to both sides of the coulter hub (FIG. 4-8).

FIG. 4-8

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

3. Remove the retaining ring and hub cap. Refer to FIG. 4-9 and 4-10.

FIG. 4-9

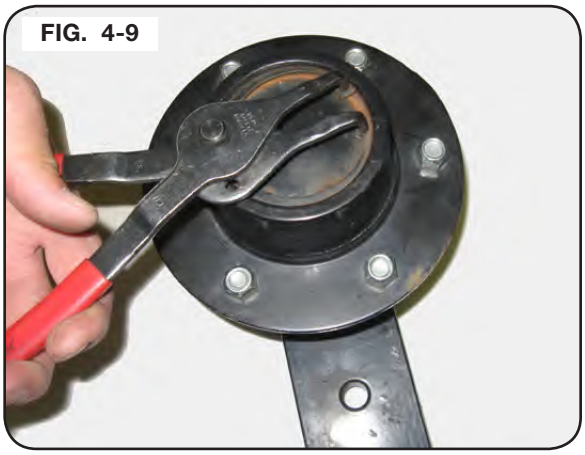


FIG. 4-10

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

4. Remove the retainer securing the slotted nut.

IMPORTANT

- *Removal of the C-ring is best accomplished by using two screwdrivers or similar tools and prying on the outside ends to spread the ring. If the ring is damaged discard and replace.*
- *When removing the hub and its components, be sure to keep them free of debris and dirt. Failure to do so will result in contamination of the hub and bearing failure.*

5. Unscrew the nut and carefully remove the hub from the spindle.
6. Remove the components, clean and inspect for any damage or wear. If even the slightest imperfection exists, replace the component(s). Once the hub is dismantled, always replace the bearing and seal assembly, O-ring, and triple lip seal.

IMPORTANT

- *Always replace the O-rings and seals if dismantling the hub. Failure to do so could result in premature failure of the hub and its components.*

7. Replace any damaged parts before reassembling the components. Be sure to remove any debris or dirt and repack the bearings with an SAE approved hub grease.
8. Slide the O-ring onto the spindle first. Assemble the seal and bearings into the hub and position onto the spindle.
9. After reassembling the hub, position the slotted nut back onto the spindle and torque to 40-45 ft.-lbs. Align the slotted nut with the next closest cotter pin hole.
10. Install the C-ring or roll pin and O-ring (902158) (FIG. 4-12 on the following page).

IMPORTANT

- *Rotate the coulter hub when torquing the slotted nut. Doing this will prevent flats from forming on the bearings.*
- *Assembly of the C-ring is best accomplished by the use of a hog ring type pliers or similar tool. After the installation be sure the C-ring will lay flat against the spindle retaining the nut to allow for proper installation of the hub cap.*

11. Reinstall the hub cap and blade. Use a C-clamp to compress dust cap and then seat retaining ring.

FIG. 4-11

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

NOTE: Be sure to re-pack bearings with an SAE approved grease and keep it and its components free of dust and debris.

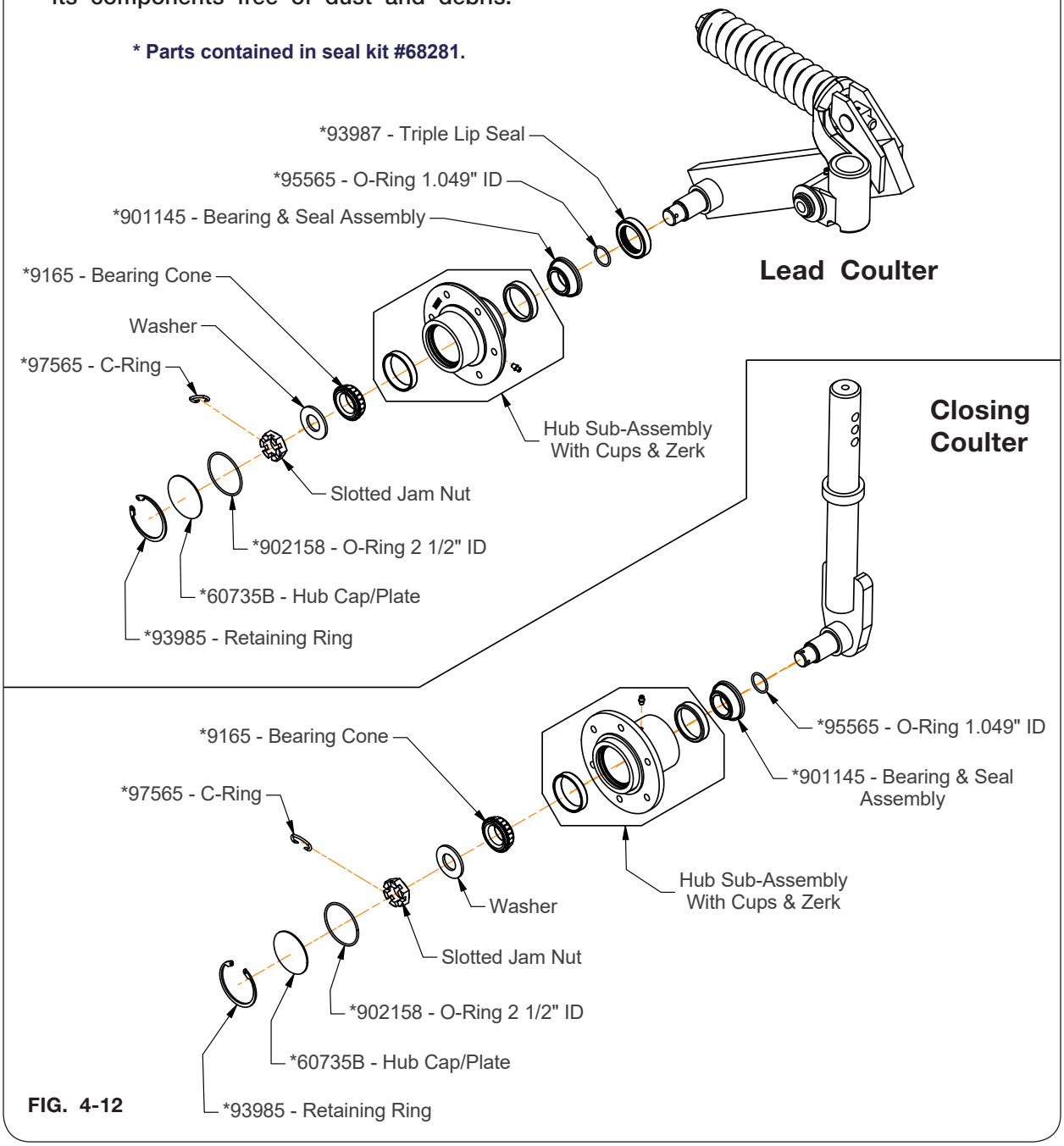


FIG. 4-12

Replacing Bearings In Conditioner Rolling Harrow Baskets

WARNING

- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

1. Lower support stand and implement to the ground and securely block to prevent tipping, or moving. Shut off tractor, set parking brake, and remove ignition key.
2. Install block under each basket to support weight of basket.
3. Remove the three 5/1”6-18UNC carriage bolts which hold the bearing to the frame.
4. Use a crowbar or similiar to pry the end of the basket out of the basket frame slot.
5. Loosen the set screw in the lock collar. Loosen lock collar by turning with punch in direction of basket travel.
6. Remove the bearing.
7. File off any burrs left on the shaft. Finish with a strip of emery cloth. Make sure bearing will slide on the shaft.
8. Slide a new bearing (87175) on the shaft with the lock collar on the outside (FIG. 4-13).
9. Pry the end of the basket into the slot of the frame (FIG. 4-13).
10. Assemble the new 5/16”-18 capscrews through the holes in the frame and into the bearing housing (FIG. 4-13). Tighten screws according to Torque Chart, in this section.

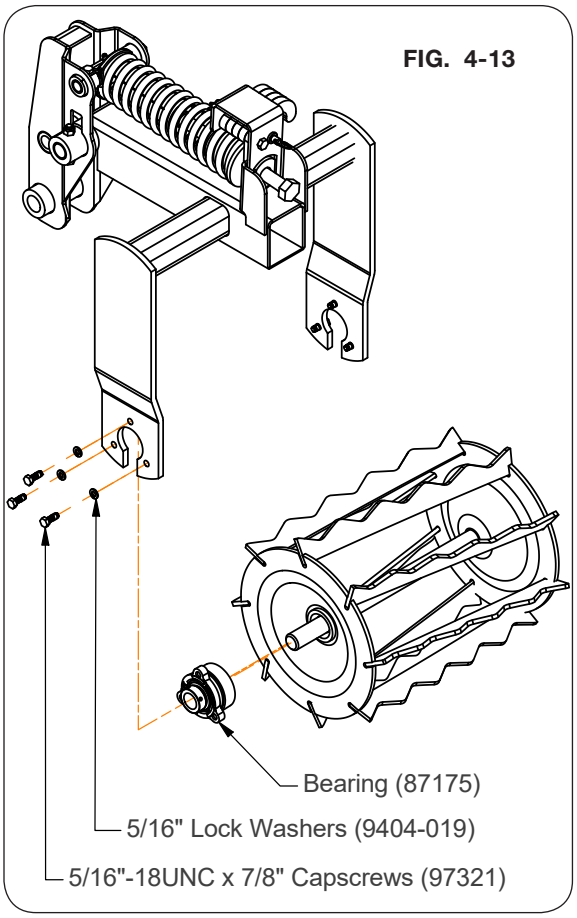
IMPORTANT

- *Tighten screws in bearing before tightening setscrew in lock collar.*

11. Tighten lock collar on shaft in direction of rotation.

Use UNVERFERTH bearing repair kit (87181) with triple lip seals for maximum life.

FIG. 4-13



Row Cleaner Wheel Hub Adjustment

After the first 100 acres, the hubs should be checked for tightness and wear.

⚠ WARNING

- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE MACHINE IS SECURELY BLOCKED.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

⚠ CAUTION

- **SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

IMPORTANT

- *Do not allow dirt and debris to contaminate the hub and its internal components. Neglecting to do so could result in failure of the hub and its components due to excessive wear.*

1. Check the row cleaner wheel hub and bearing for looseness or wobble. Rotate and laterally push and pull on the row cleaner wheel. A tight hub will have no wobble and will rotate smoothly with a slight resistance.

2. If there is wobble in the hub, the hub must be tightened to the spindle. To do this, remove hub cap (9501381) with a 3/16" adjustable spanner wrench. Torque nut (9397-016) to 20 ft.-lbs. and back off 1/4 of a turn. Apply a light coating of thread sealant to the O.D. of the hub cap and tighten onto the hub.

3. After tightening, retest the hub for wobble by repeating Step #1. If wobble still exists, continue with the following steps.

a. Remove the strap, hub cap, jam nut, and washer from the spindle.

IMPORTANT

- *When removing the hub and its components, be sure to keep them free of debris and dirt. Failure to do so will result in contamination of hub and bearing failure.*

b. Remove the bearing cones, hub with tooth wheel, O-ring and seals from the spindle.

c. Remove the components, clean, and inspect for any damage or wear. If even the slightest imperfection exists, replace the component(s). Once the hub is dismantled, always replace the bearing and seal assembly, o-ring, and triple lip seal.

IMPORTANT

- *Always replace the seal if dismantling the hub. Failure to do so could result in premature failure of hub and its components.*

d. Replace any damaged parts before reassembling the components. Be sure to remove any debris or dirt and repack bearings with an SAE approved hub grease.

Row Cleaner Wheel Hub Adjustment (continued)

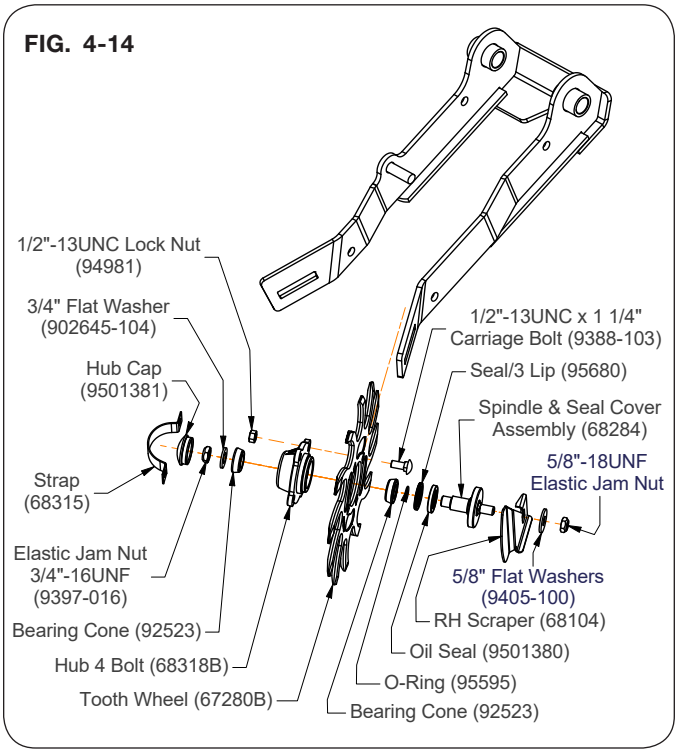
e. Assemble seal and bearings into hub and position onto spindle.

f. Apply grease to the I.D. of the seal (95680). While rotating the hub, place the hub on the spindle and seal cover (68284) making sure not to damage the seal. Assemble the washer and nut. Torque the jam nut (9397-016) to 20 ft.-lbs. and back off 1/4 of a turn. Apply a light coating of thread sealant to the O.D. of the hub cap and tighten onto the hub.

IMPORTANT

- *Rotate coulter hub when torquing jam nut. Doing this will prevent flats from forming on bearings.*

FIG. 4-14



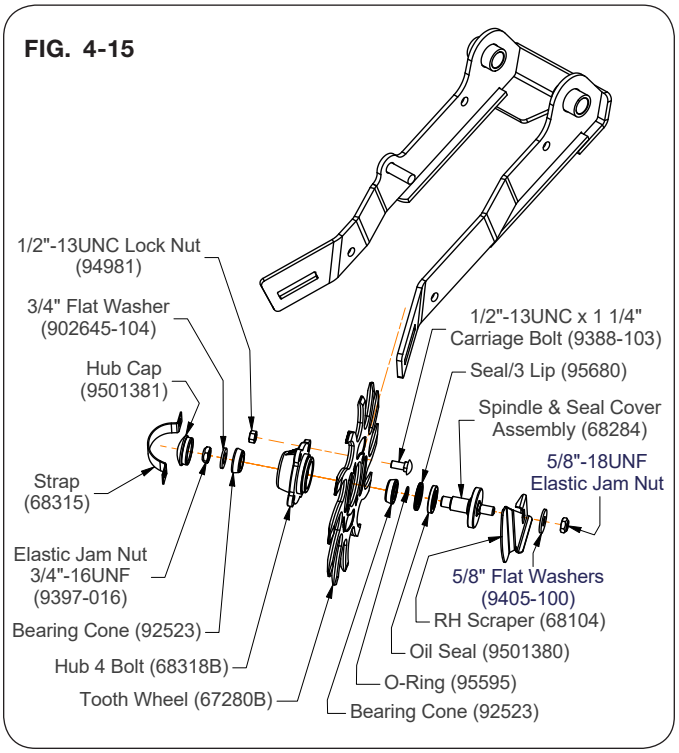
Row Cleaner Wheel Replacement

1. To replace a worn tooth wheel (67280B), remove and save the 5/8”-18UNF elastic jam nut (9397-015), 5/8” flat washer (9405-100), scraper and the hub/spindle assembly from the mounting arm. (FIG. 4-15)

2. Remove the four locknuts (94981) and carriage bolts (9388-103). Replace and reinstall tooth wheel (67280B) and hardware.

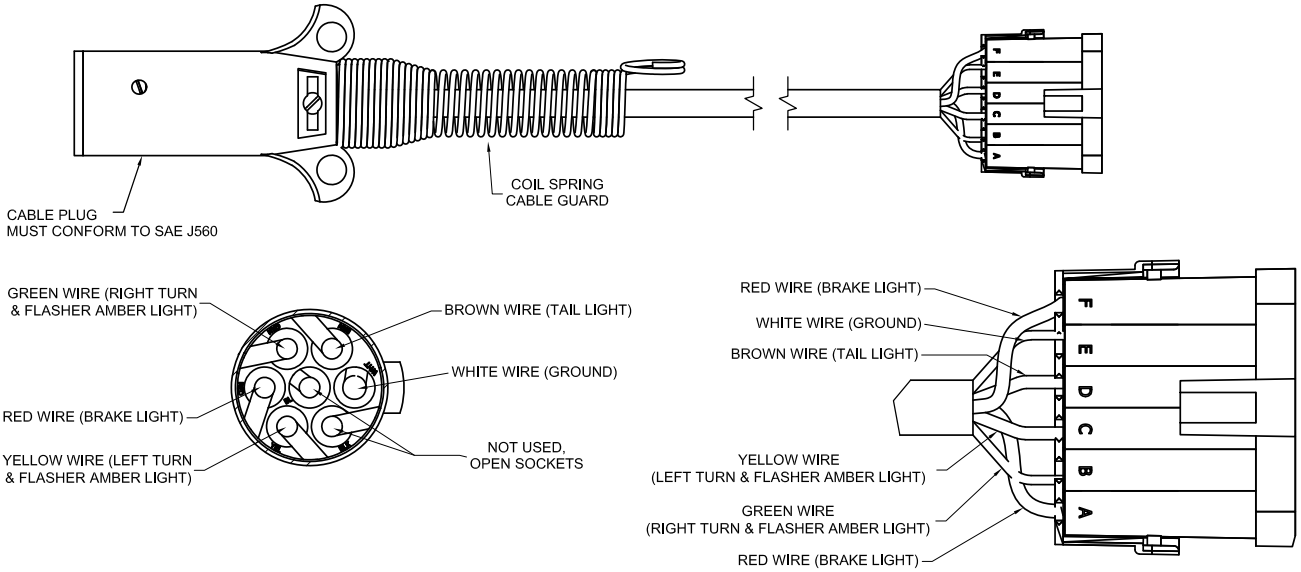
3. Reinstall the hub/spindle assembly onto the mounting plate and secure with scraper, 5/8” flat washer (9405-100), and 5/8”-18UNF elastic jam nut (9397-015). (FIG. 4-15)

FIG. 4-15

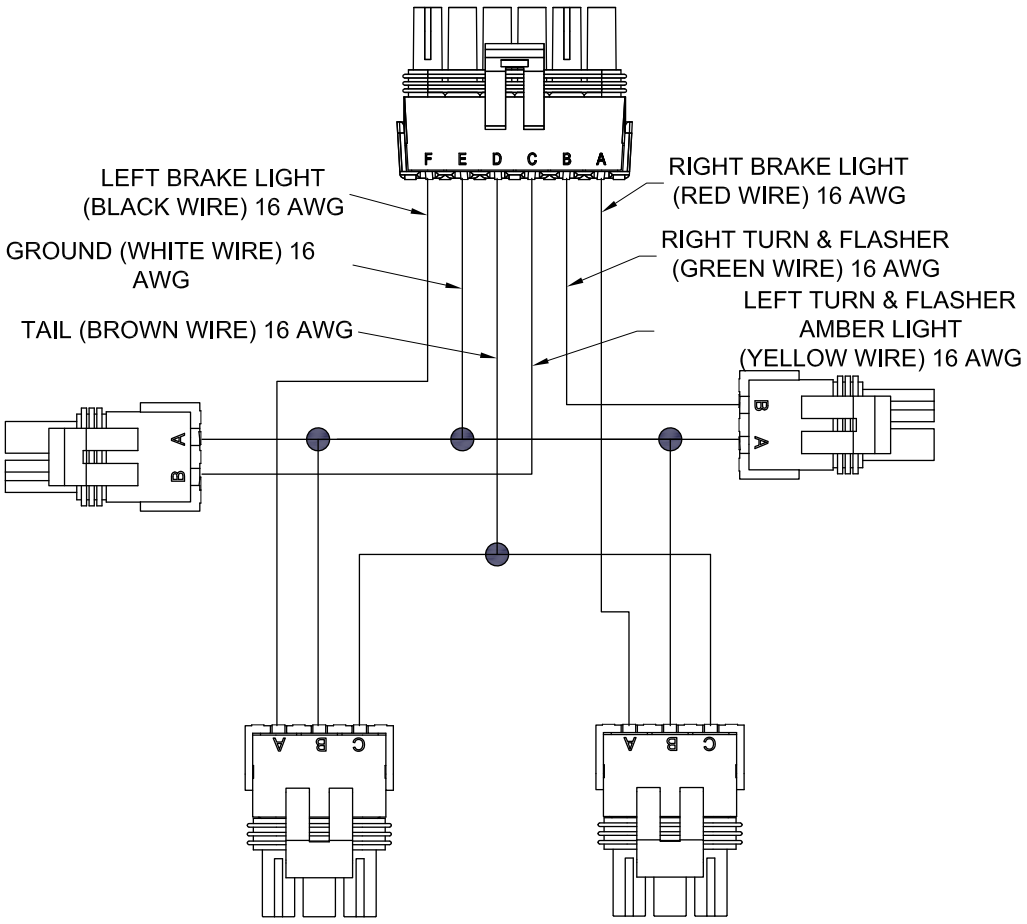


Schematics - Electrical

Electrical Harness - Main 114” (86466)



Electrical Harness - Rear 422” (69407)



Schematics - Hydraulic

Valve Block Assembly (9503620)