ORTHMAN
by Unverferth

1tRIPr 3-POINT
STRIP-TILLAGE TOOL

1tRIPr 3-POINT STRIP-TILLAGE TOOL **MAINTENANCE MANUAL**

Unverferth Manufacturing Company, Inc.

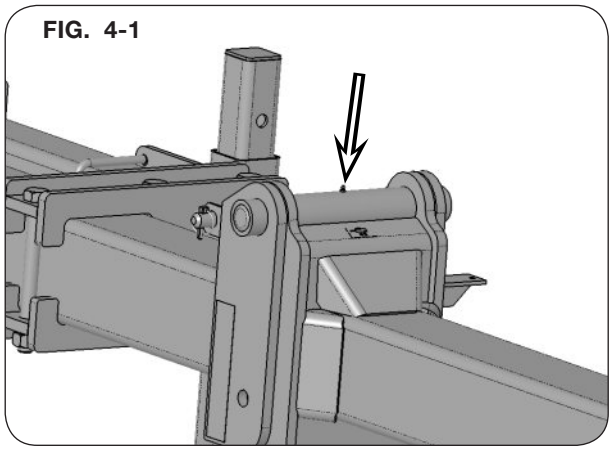
SECTION IV
Maintenance

Lubrication

Lubrication Service Intervals		
	# of Grease Points	Interval (Hours)
Wing Hinge	2	50
Wing Cylinder Links	6	50

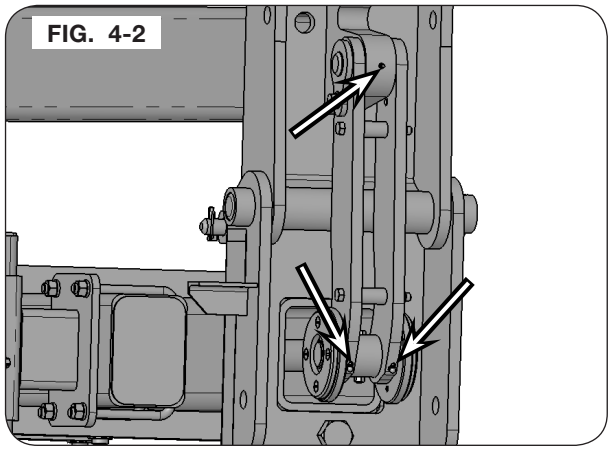
Wing Hinge

FIG. 4-1



Wing Cylinder Links

FIG. 4-2



Mount and Parallel Linkage Disassembly and Assembly

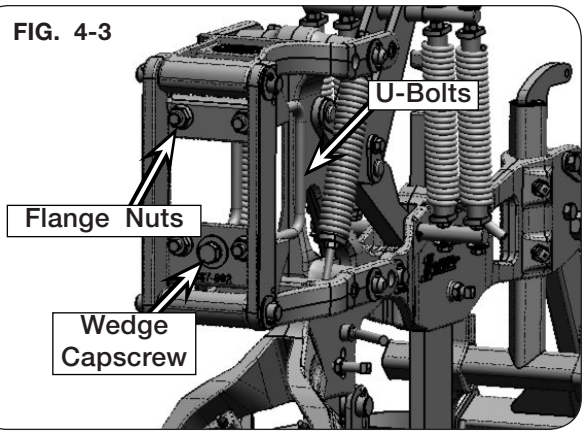
⚠ WARNING

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

1. Leave the unit attached to the tractor, raise the unit, then lower the support stands.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.

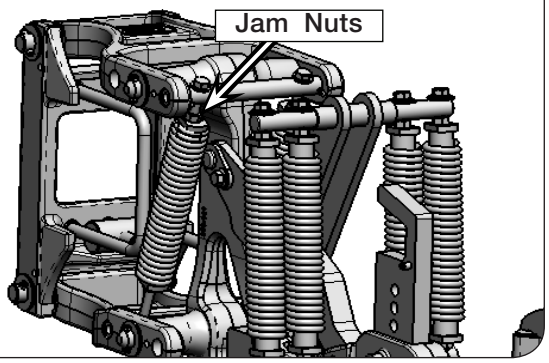
3. Unhitch the implement from the tractor and support the implement with its support stands.
4. Using a safe lifting device rated for a minimum of 1,000 lbs. remove the row unit from the toolbar by loosening the wedge capscrew, then remove the flange nuts and u-bolts from the mounting plate. (Fig. 4-3)

FIG. 4-3



5. Loosen the jam nuts, then remove the capscrews, flat washers, and tension spring assemblies. (Fig. 4-4)

FIG. 4-4



Mount and Parallel Linkage Disassembly and Assembly

6. Remove the cotter pins and spring trunnions from the top and bottom linkages. (Fig. 4-5)

7. Remove the roll pin, flat washer and pins from the front side of the top and bottom parallel linkages, then remove the roll pin, flat washer, and pins from the back side of the top and bottom linkages. (Fig. 4-6)

8. Remove the parallel linkages from the mounting plate, then remove the bushings from the top and bottom parallel linkages. (Fig. 4-7)

9. Inspect parts for wear or damage and replace if neccesary.

10. Install the bushings into the top and bottom linkages. (Fig. 4-7)

11. Install the top and bottom parallel linkages onto the mounting plate, then install the pins, flat washers, and roll pins. (Fig. 4-6)

12. Install the spring trunnions and cotter pins into the top and bottom parallel linkages. (Fig. 4-5)

13. Install the tension spring assemblies, flat washers, and capscrews. (Fig. 4-4)

14. Install the row unit onto the toolbar using the u-bolts, flange screws, then tighten the wedge capscrew. (Fig. 4-3)

15. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-5

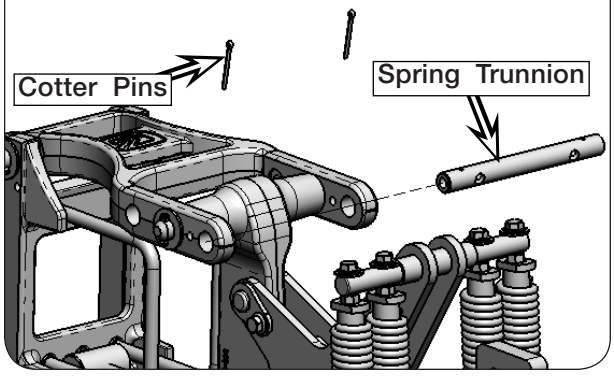


FIG. 4-6

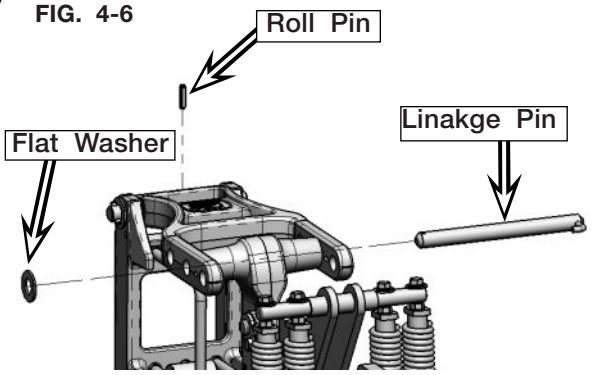
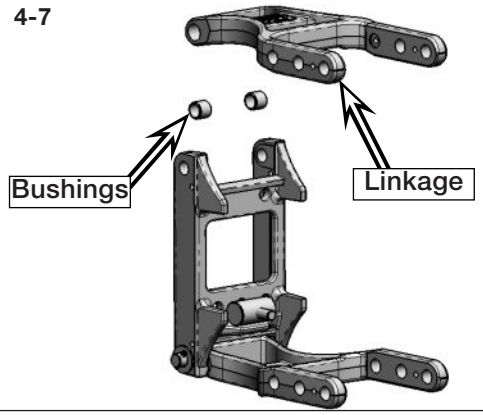


FIG. 4-7



Front Coulter Disassembly and Assembly

⚠ CAUTION

- **SHARP EDGES ON THE MACHINE CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THE MACHINE.**

1. Leave the unit attached to the tractor, raise the unit, then lower the support stands.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.
3. Remove the capscrew and flange nut from the coulter assembly, then remove the coulter from the row unit. (Fig. 4-8)
4. Remove the capscrews and flange nut from the coulter hub, then remove the hub flange and hub from the coulter.
5. Inspect parts for wear or damage and replace if neccesary.
6. Install the hub and hub flange onto the coulter, then install the capscrews and flange nuts onto the hub assmebly.
7. Install the coulter assembly onto row unit using the capscrew and flange nut. (Fig. 4-8)
8. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-8

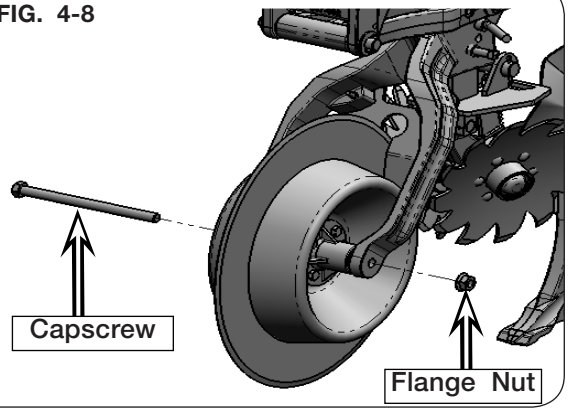
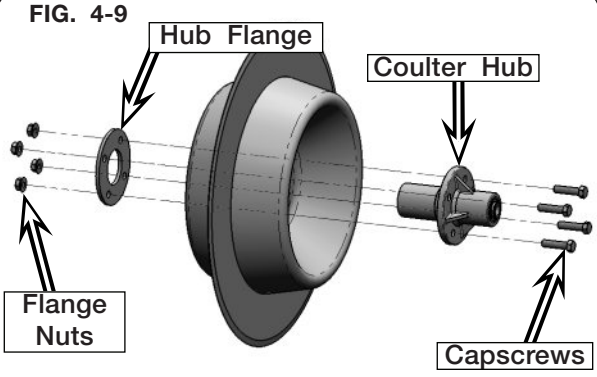


FIG. 4-9



Row Cleaner Disassembly and Assembly

⚠ WARNING

- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.**

1. Leave the unit attached to the tractor, raise the unit, then lower the support stands.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.

3. Unhitch the implement from the tractor and support the implement with its support stands.
4. Loosen the jam nut and set screw. (Fig. 4-10)
5. Using a safe lifting device rated for a minimum of 100 lbs to support the row cleaner assembly, remove the adjustment pin and row celaner assembly from the row unit. (Fig. 4-10)

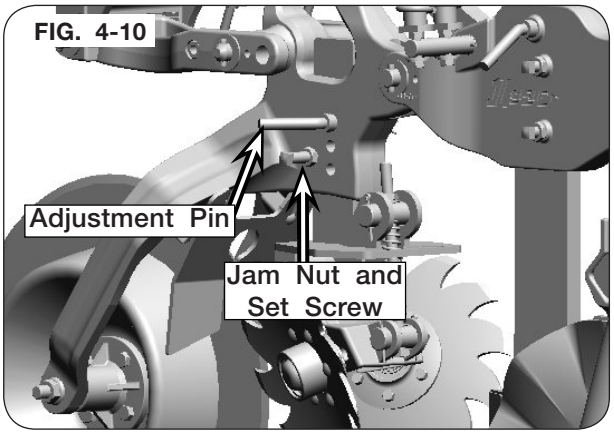


FIG. 4-10

For Floating Row Cleaner:

6. Remove the lock nut and flat washer from the spring assembly, then remove the spring and capscrew. (Fig. 4-11)
7. Remove the cotter pins, top and bottom spring trunnions. (Fig. 4-12)

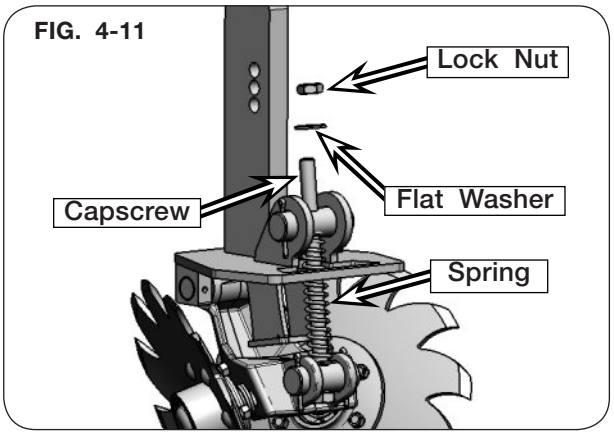


FIG. 4-11

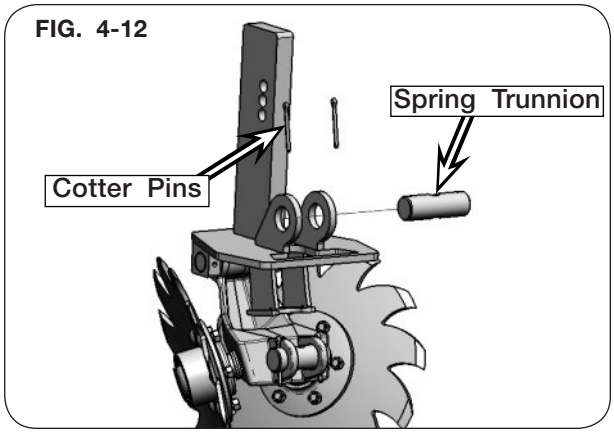


FIG. 4-12

Row Cleaner Disassembly and Assembly (continued)

8. Remove the capscrew and hex nut, then remove the row cleaner trunnion from the assembly. (Fig. 4-13)

9. Remove the carriage bolts, lock nuts, and disc from the assembly. (Fig. 4-14)

10. Remove the snap ring, dust cover and o-ring, then remove the capscrew, lock nut, and spacers from the hub. (Fig. 4-15)

11. Remove the snap rings and bearings from the hub. (Fig. 4-16)

12. Inspect parts and replace as necessary.

13. Install bearings and snap rings into the hub. (Fig. 4-16)

14. Install the hub onto the row cleaner assembly using the capscrew, spacers, and hex nuts. (Fig. 4-15)

15. Install the disc onto the hub using the carriage bolts and lock nuts. (Fig. 4-14)

16. Install the row cleaner assembly onto the shank with the trunnion, capscrew, and hex nut. (Fig. 4-13)

17. Install the upper and lower trunnions using the cotter pins. (Fig. 4-12)

18. Install the capscrews, spring, flat washers, and lock nuts onto the assembly. (Fig. 4-12)

19. Install the row cleaner assembly into the row unit using the adjustment pin, hair pin, then tighten the set screw and jam nut. (Fig. 4-11)

20. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-13

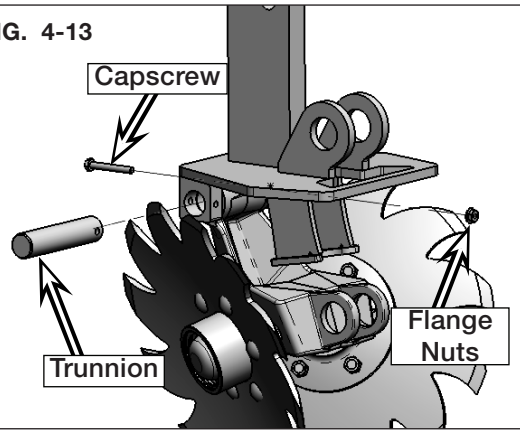


FIG. 4-14

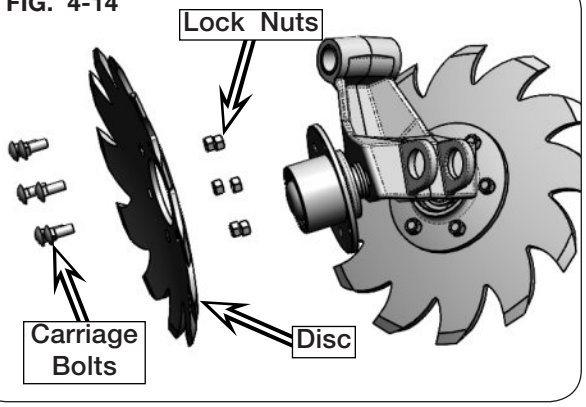


FIG. 4-15

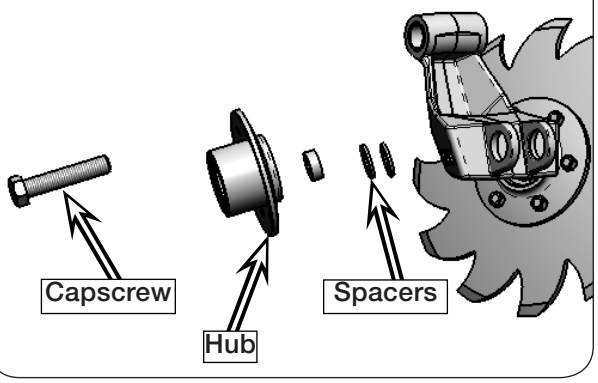
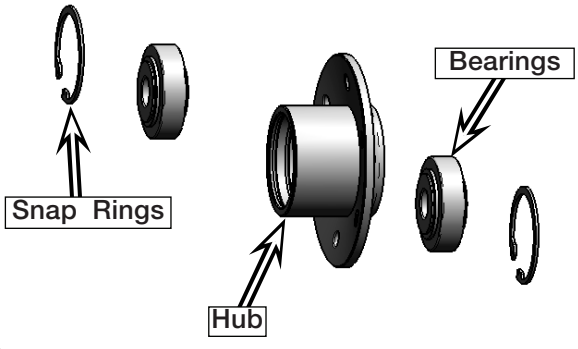


FIG. 4-16



Row Cleaner Disassembly and Assembly (continued)

For Rigid Row Cleaner:

1. Remove the carriage bolts, disc and lock nuts from the row cleaner assembly. (Fig. 4-17)
2. Remove the snap ring, dust cover, and o-ring from the hub. (Fig. 4-18)
3. Remove the hub from the assembly by removing the capscrew, lock nut, and spacers. (Fig. 4-19)
4. Remove the snap rings and bearings from the hub. (Fig. 4-20)
5. Inspect parts and replace as necessary.
6. Install the bearings and snap rings into the hubs. (Fig. 4-20)
7. Install the hub onto the assembly using the capscrew, spacers and lock nut. (Fig. 4-19)
8. Install the o-ring, dust cover, and snap ring onto the hub. (Fig. 4-18)
9. Using the carriage bolts and lock nuts, install the blade onto the hub of the row cleaner assembly. (Fig. 4-17)
10. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-17

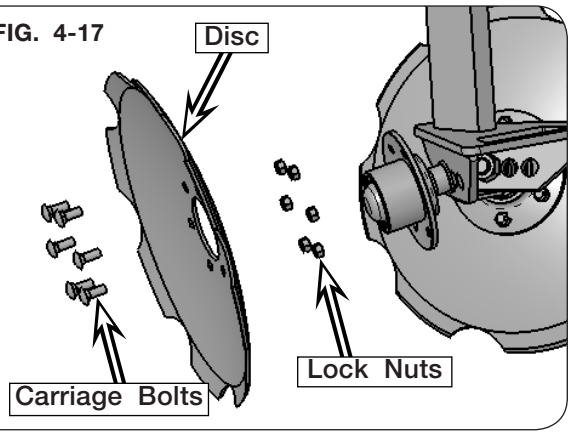


FIG. 4-18

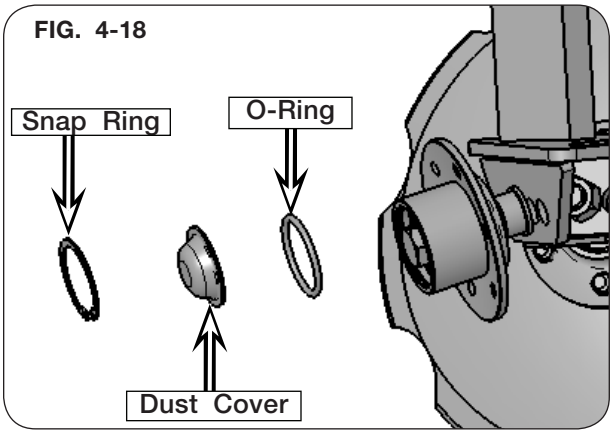


FIG. 4-19

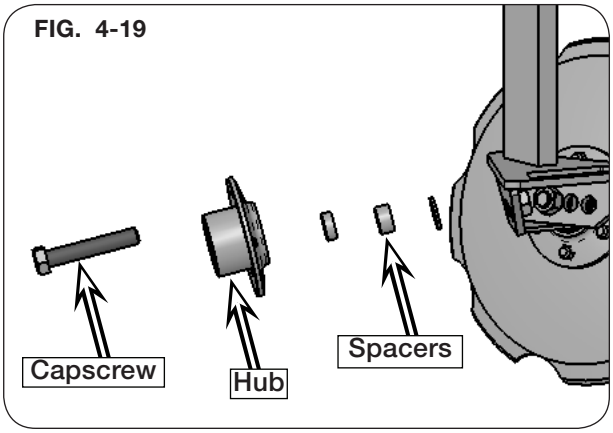
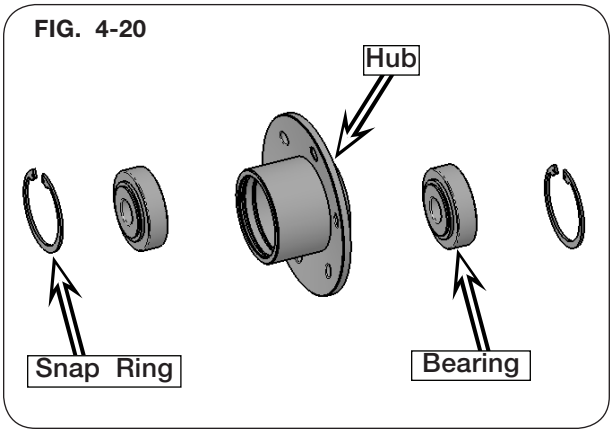


FIG. 4-20



Auto Reset Disassembly and Assembly

WARNING

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

1. Leave the unit attached to the tractor, raise the unit, then lower the support stands to the ground.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.
3. Remove the capscrews, flat washers, and then the spring assemblies from the auto reset. (Fig. 4-21)
4. Remove the upper trunnion, then remove the roll pins and lower trunnion. (Fig. 4-22)
5. Loosen the jam nuts, then remove the capscrews, flat washers, and tension spring assemblies. (Fig. 4-23)
6. Remove the capscrews and pins from the auto reset assembly, then remove the assembly from the row unit. (Fig. 4-24)

FIG. 4-21

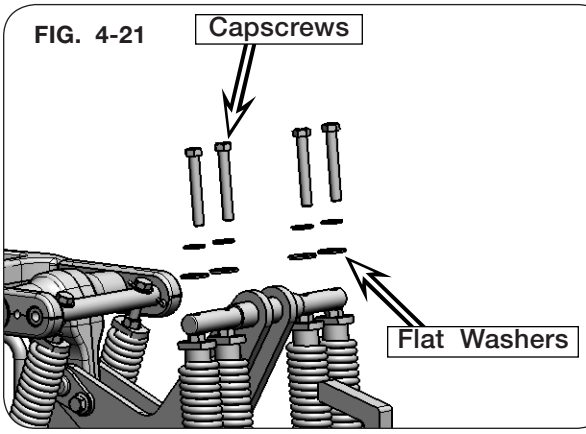


FIG. 4-22

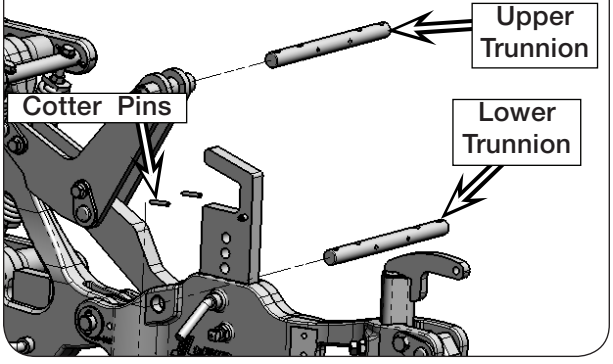


FIG. 4-23

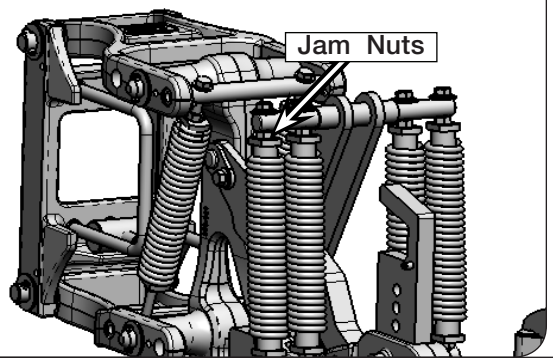
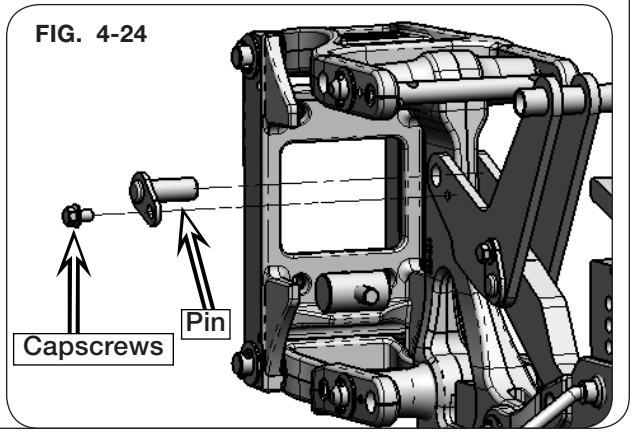


FIG. 4-24



Auto Reset Disassembly and Assembly (continued)

7. Remove the capscrew and pin from the middle of the assembly, then seperate the arms of the auto reset assembly. (Fig. 4-25)

8. Remove the bushings from the lower arm of the auto reset assembly. (Fig. 4-26)

9. Inspect parts and replace as necessary.

10. Install the bushings into the lower arm of the auto reset assembly, then assemble the upper and lower arms with the pin and capscrew. (Figs. 4-25 and 4-26)

11. Install the auto reset arms onto the row unit using the pins and capscrews. (Fig. 4-24)

12. Install the tension spring assemblies, flat washers, and capscrews onto the row unit. (Fig. 4-23)

13. Install the upper and lower spring trunnions and roll pins. (Fig. 4-22)

14. Install the spring assemblies, flat washers, and capscrews onto the auto reset assembly. (Fig. 4-21)

15. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-25

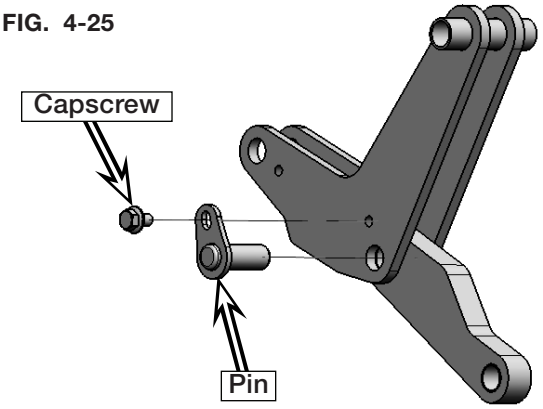
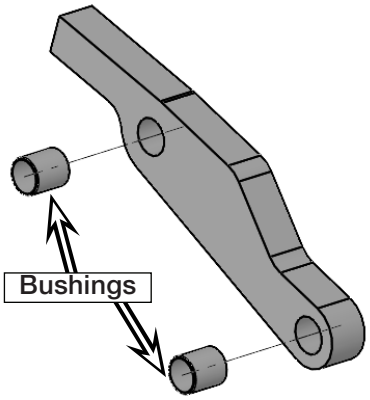


FIG. 4-26



Shear Bolt Trip Disassembly and Assembly

WARNING

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

1. Leave the unit attached to the tractor, raise the unit, then lower the support stands to the ground.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.
3. Remove the capscrews, washers, and jam nuts from the tops and bottoms of the tension springs. (Fig. 4-27)
4. Remove the cotter pins and spring trunnions from the upper and lower linkages. (Fig. 4-27)
5. Remove the capscrew and pin from the front of the trip assembly, then remove the roll pins and pin from the back of the assembly. (Fig. 4-28)
6. Remove the shear bolt trip assembly from the row unit.

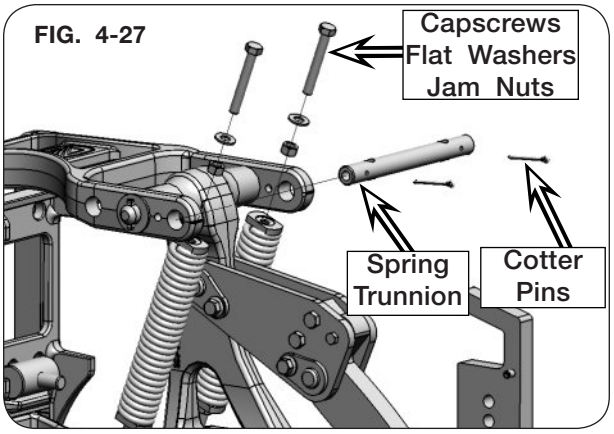


FIG. 4-27

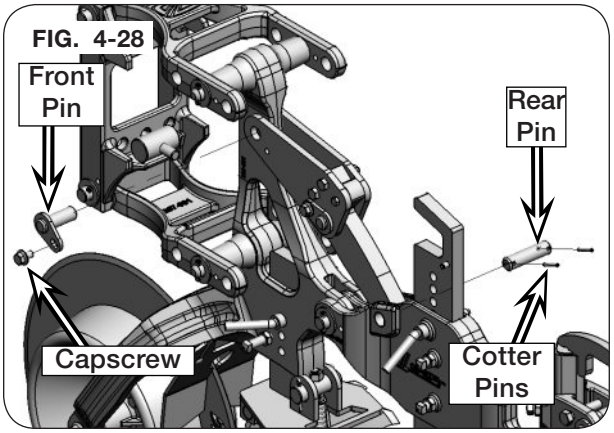


FIG. 4-28

Shear Bolt Reset Disassembly and Assembly (continued)

7. Remove the capscrews, shear bolt, lock washers, and hex nuts from the assembly. (Fig. 4-29)
8. Remove the capscrew and pivot pin. (Fig. 4-29)
9. Remove the bushings from the lower arm of the trip assembly. (Fig. 4-30)
10. Inspect parts and replace as necessary.
11. Install the bushings into the lower arm of the trip assembly (Fig. 4-30)
12. Install the pivot pin and capscrew. (Fig. 4-29)
13. Install the shear bolt, capscrews, lock washers, and hex nuts. (Fig. 4-29)
14. Install the trip assmebly onto the row unit using the front pin and capscrew along with the rear pin and roll pins. (Fig. 4-28)
15. Install the spring trunnions and cotter pins into the upper and lower linkages. (Fig. 4-27)
16. Install the springs, jam nuts, washers, and capscrews. (Fig. 4-27)
17. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-29

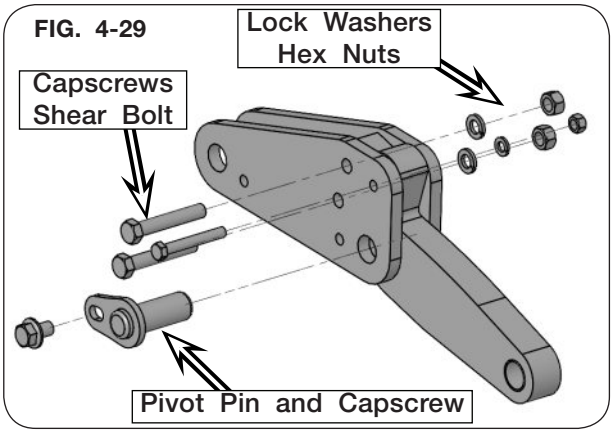
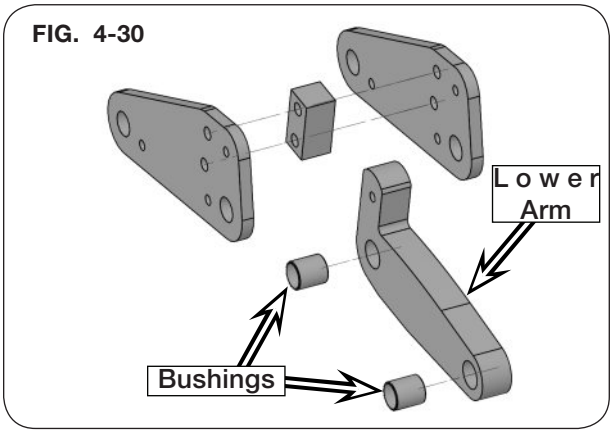


FIG. 4-30



Tillage Shank Disassembly and Assembly

WARNING

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

1. Leave the unit attached to the tractor, raise the unit, then lower the support stands to the ground.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.
3. Using a safe lifting device rated for a minimum of 100 lbs. to support the shank assembly. Loosen the jam nuts and set screws, then remove the roll pin, adjustment pin, and shank assembly from the row unit. (Fig. 4-27)

For Liquid Fertilizer Units:

4. Remove the roll pins and fertilizer tubes from the shank. (Fig. 4-28)
5. Remove the capscrew, flat washers, lock washer, hex nut, and guard from the shank. (Fig. 4-29)

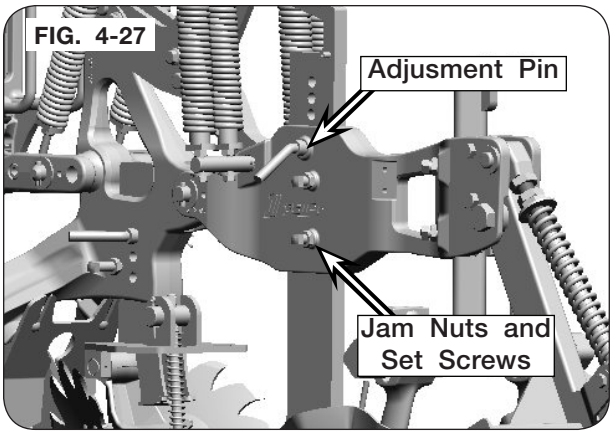


FIG. 4-27

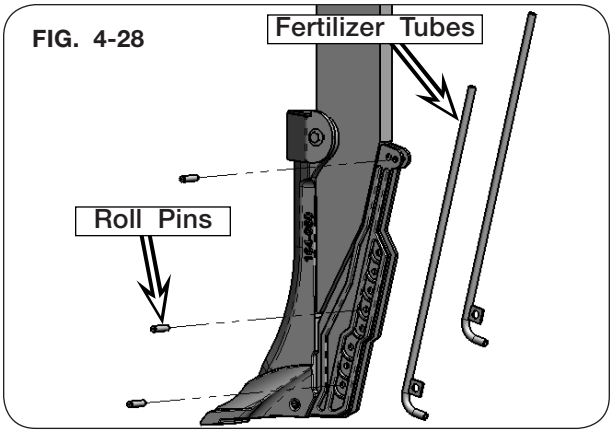


FIG. 4-28

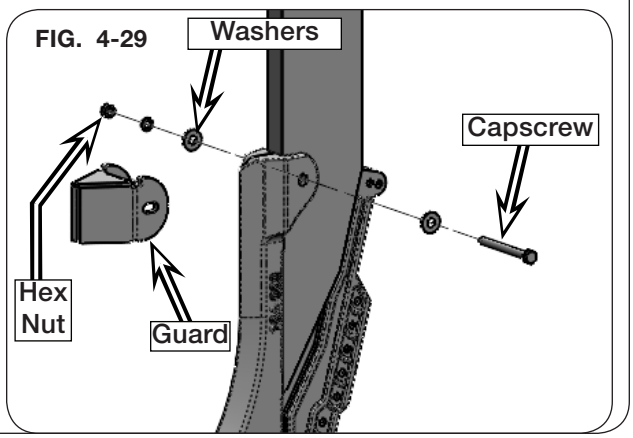


FIG. 4-29

Tillage Shank Disassembly and Assembly (continued)

6. Remove the roll pin and mole shank from the shank. (Fig. 4-30)

7. Inspect parts and replace as necessary.

8. Install the mole shank and roll pin onto the shank. (Fig. 4-30)

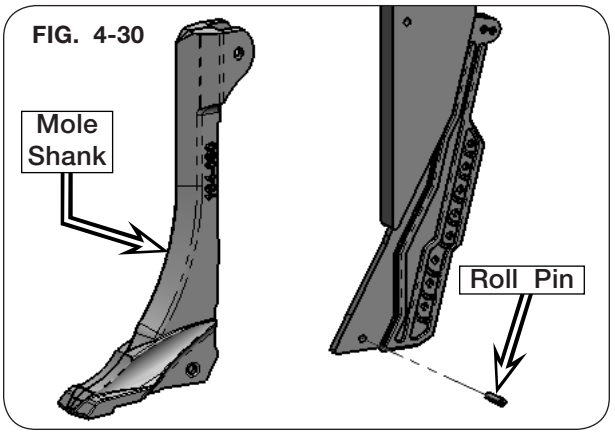
9. Install the guard onto the mole shank using the capscrew, flat washers, lock washer, and hex nut. (Fig. 4-29)

10. Install the fertilizer tubes and roll pins onto the shank. (Fig. 4-28)

11. Install the shank onto the row unit, then install the roll pin, adjustment pin, and hair pin. Tighten the the set screws and jam nuts. (Fig. 4-27)

12. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-30



For Dry Fertilizer Units:

1. Remove the allen head bolts and side plates. (Fig. 4-31)

2. Remove the roll pins and dry fertilizer tube. (Fig. 4-32)

FIG. 4-31

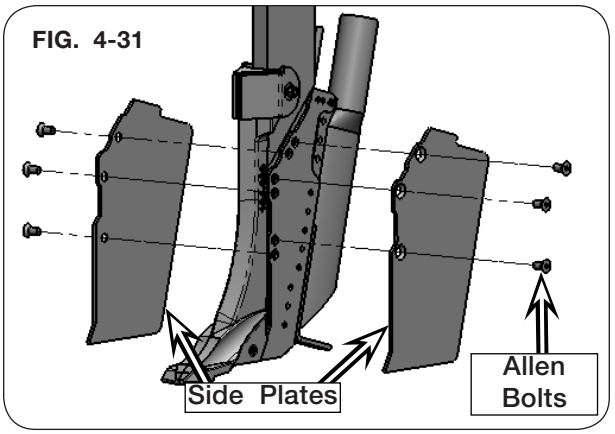
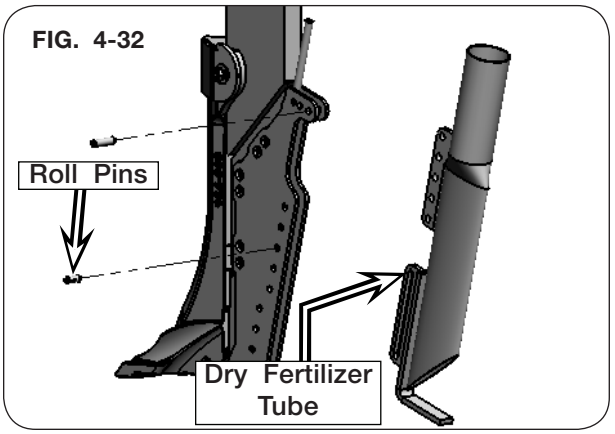


FIG. 4-32



Tillage Shank Disassembly and Assembly (continued)

3. Remove the roll pin and liquid fertilizer tube. (Fig. 4-33)
4. Remove the capscrew, flat washers, lock washer and hex nut, then remove the guard from the mole shank. (Fig. 4-34)
5. Remove the roll pin and mole shank. (Fig. 4-35)
6. Inspect parts and replace as necessary.
7. Install the mole shank using the roll pin. (Fig. 4-35)
8. Install the guard onto the mole shank using the capscrew, flat washers, lock washer, and hex nut. (Fig. 4-34)
9. Install the liquid and dry fertilizer tubes using the roll pins. (Figs. 4-33 and 4-32)
10. Install the side plates and allen bolts. (Fig. 4-31)
11. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-33

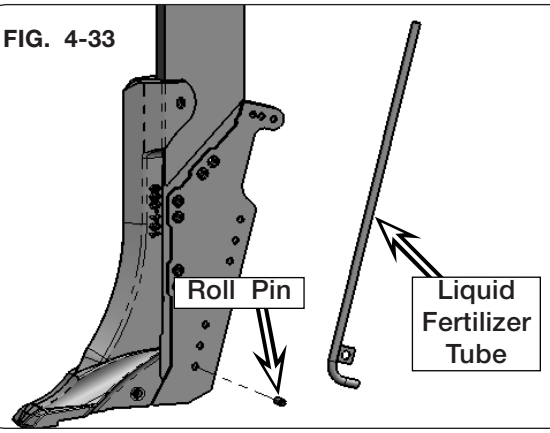


FIG. 4-34

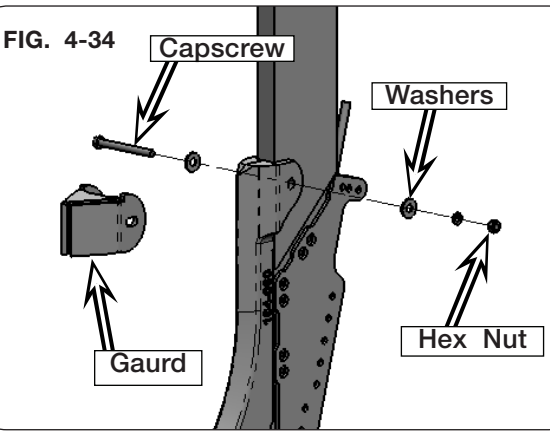
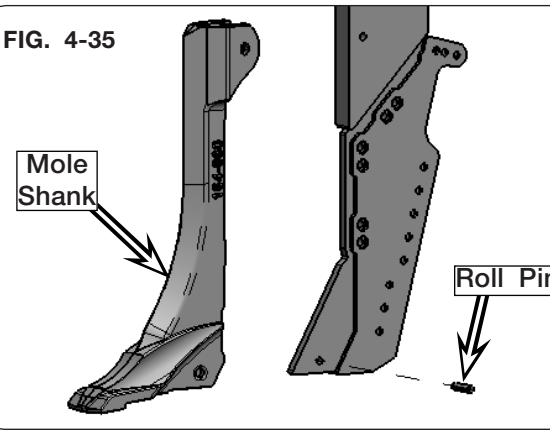


FIG. 4-35



Wavy Coulter Disassembly and Assembly

WARNING

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

1. Leave the unit attached to the tractor, raise the unit, then lower the support stands to the ground.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.
3. Using a safe lifting device rated for a minimum of 100 lbs. to support the wavy coulter assembly. Loosen the jam nuts and set screws, then remove the wavy coulter assembly from the row unit. (Fig. 4-36)
4. Remove the lock nuts and carriage bolts on the wavy coulter assembly remove the wavy coulter asembly from the shank. (Fig. 4-37)
5. Remove the carriage bolts, lock nuts, and coulters from the hubs. (Fig. 4-38)

FIG. 4-36

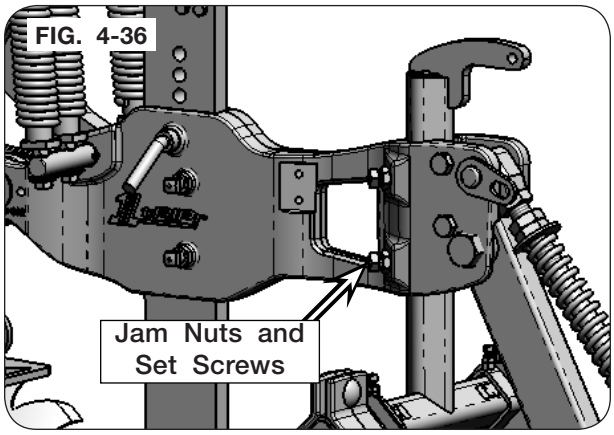


FIG. 4-37

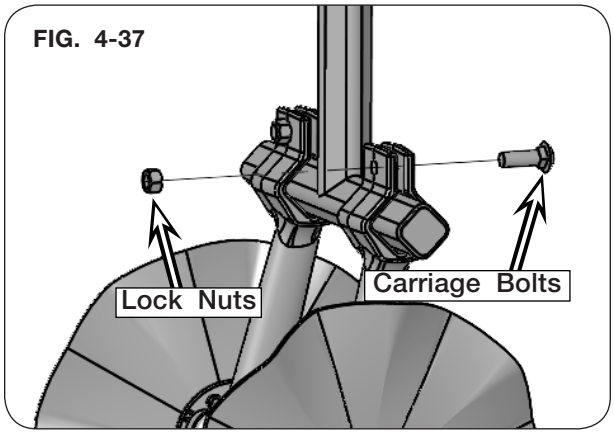
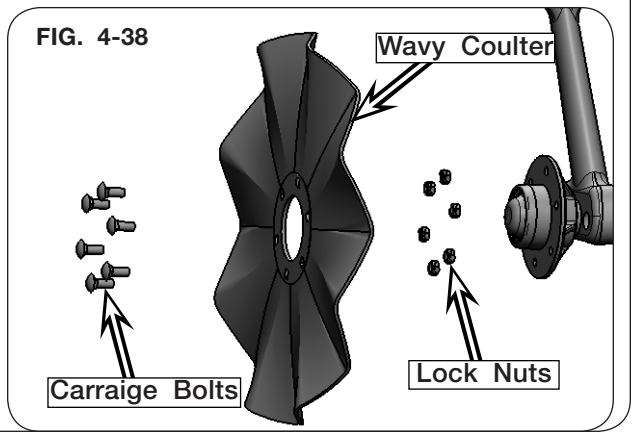


FIG. 4-38



Wavy Coulter Disassembly and Assembly (continued)

6. Remove the snap ring, dust cover, and o-ring from the hub. (Fig. 4-38)

7. Remove the cap screw, hex nut, lock washer, and spacer. Then remove the hub from the assembly. (Fig. 4-39)

8. Remove the snap rings and bearings from the hub. (Fig. 4-40)

9. Inspect parts and replace as necessary, then install the bearings and snap rings into the hubs. (Fig. 4-40)

10. Install the hub onto the assembly using the capscrew, spacer, lock washer, and hex nut. (Fig. 4-39)

11. Install the o-ring, dust cover, and snap ring. (Fig. 4-38)

12. Install the coulter, carriage bolts and lock nuts onto the hub. (Fig. 4-38)

13. Install the wavy coulter assembly onto the shank using the carriage bolts and lock nuts. (Fig. 4-37)

14. Install the assembly onto the row unit, then tighten the set screws and jam nuts. (Fig. 4-36)

15. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-38

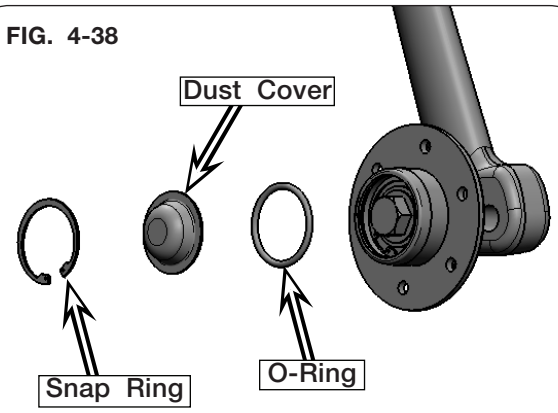


FIG. 4-39

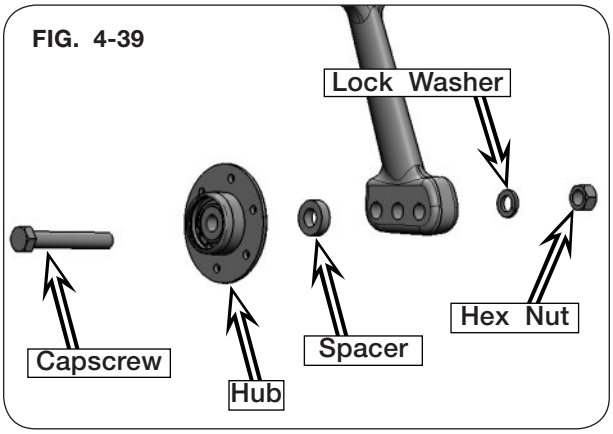
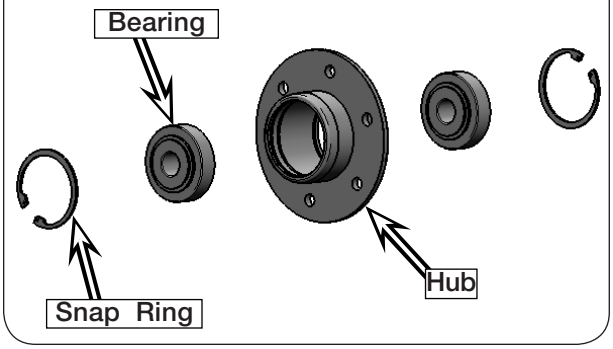


FIG. 4-40



Conditioning Basket Disassembly and Assembly

WARNING

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

1. Leave the unit attached to the tractor, raise the unit, then lower the support stands to the ground.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.
3. Using a safe lifting device rated for a minimum of 100 lbs. to support the conditioning basket assembly, then remove the capscrew, hex nut and pin. (Fig. 4-41)
4. Remove the capscrews, flat washers, and bushings, then remove the spring assembly from the conditioning basket. (Fig. 4-42)
5. Remove the capscrew and lock nut, then remove the condtioning basket assembly from the row unit. (Fig. 4-43)

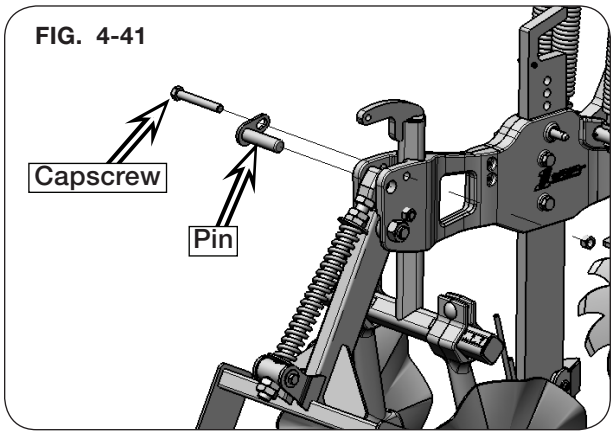


FIG. 4-41

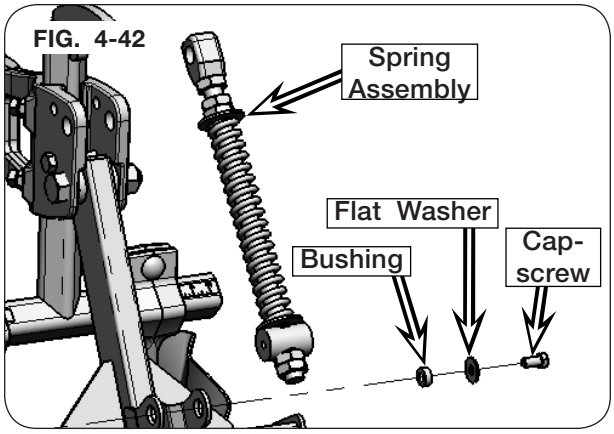


FIG. 4-42

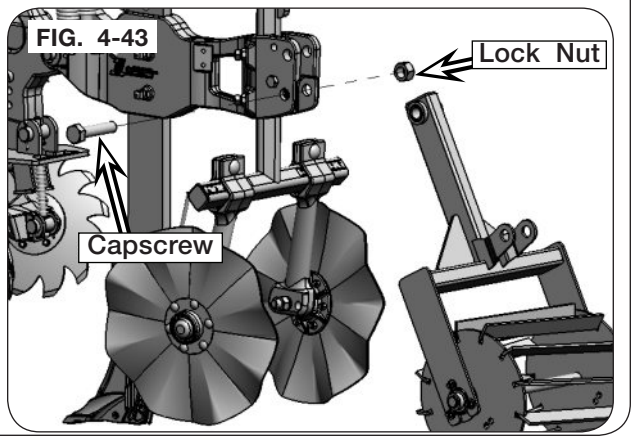


FIG. 4-43

Conditioning Basket Disassembly and Assembly (continued)

6. Remove the hex nuts, lock washers, and flat washers. Remove the outer bearing flange and bearing from the assembly. (Fig. 4-44)
7. Remove the basket from the assembly along with the inner bearing flange and carriage bolts. (Fig. 4-44)
8. Remove the crush sleeve and bushings from the conditioning basket arm. (Fig. 4-45)
9. Inspect parts and replace as necessary, then install the crush sleeve and bushings into the conditioning basket arm. (Fig. 4-45)
10. Install the basket, carriage bolts, and inner bearing flange into the arm. (Fig. 4-44)
11. Install the outer bearing and bearing flange, then install the flat washers, lock washers, and hex nuts. (Fig. 4-44)
12. Install the basket assembly onto the row unit using the capscrew and lock nut. (Fig. 4-43)
13. Install the spring assembly along with the bushings, flat washers and capscrews. (Fig. 4-42)
14. Install the pin, capscrew and lock nut. (Fig. 4-41)
15. Torque all hardware to the specification listed in the maintenance section.

FIG. 4-44

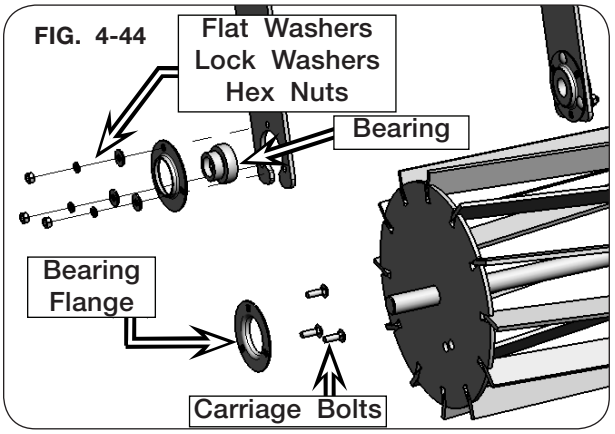
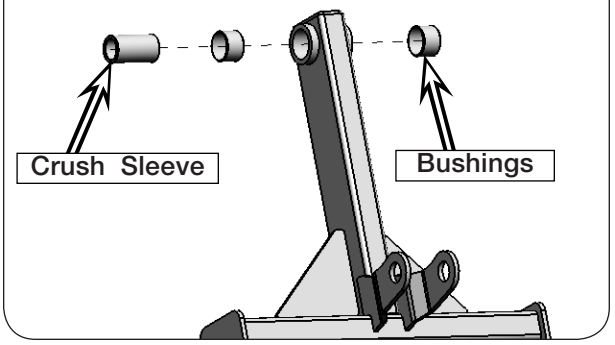


FIG. 4-45



Toolbar Internal Cylinder Removal

⚠ WARNING

- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**
- **HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. LEAKS OF HIGH-PRESSURE FLUIDS MAY NOT BE VISIBLE. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.**

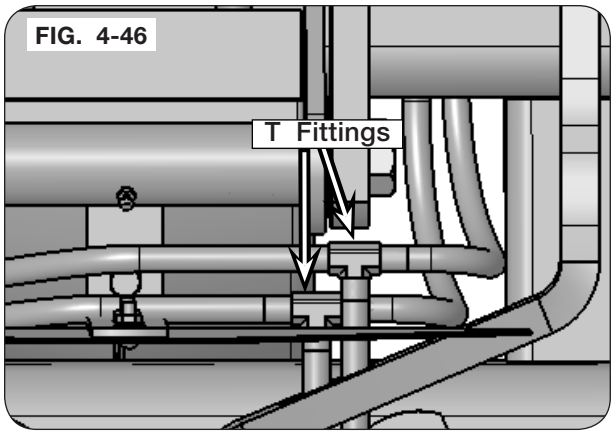
1. Leave the unit attached to the tractor, raise the unit, then lower the support stands to the ground.
2. Lower the unit until it is supported by the stands, then set the tractor's parking brake and remove the key.

3. Ensure that the cylinder locking pins are in the storage position, then fold the wings until they are fully resting on the wing stops.
4. Relieve hydraulic pressure from the lines, then store the hydraulic lines on the courtesy plaque.

For Single Cylinder Wings:

5. Locate the T fittings near the center of the toolbar. Mark the ends of the hoses and fitting for easy re-installation. (Fig. 4-46)
6. Remove the cylinder hoses from the fittings and cover the ends of the hoses and fitting to protect from debris.

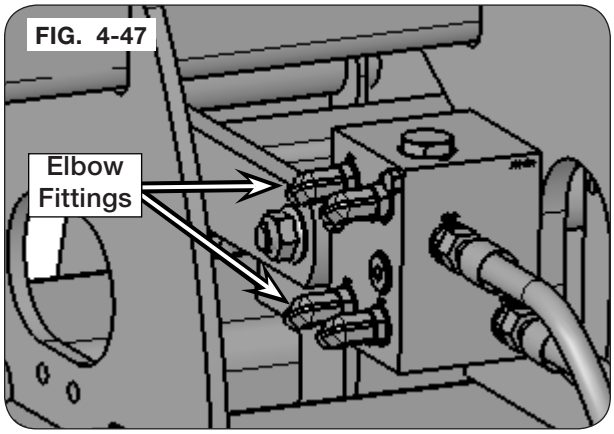
FIG. 4-46



For Dual Cylinder Wings:

7. Locate the hydraulic manifold elbows, then mark the hoses and elbows for easy re-installation. (Fig. 4-47)
8. Remove the hoses from the elbow fittings, then cover the ends of the hoses and fittings to protect from debris.

FIG. 4-47



Toolbar Internal Cylinder Removal (continued)

9. Remove the locking capscrew, lock washer and flat washer that hold the cylinder pin in place, then remove the cylinder pin from the assembly. (Fig. 4-48)

10. Remove the snap ring and rear cylinder pin, then remove the cylinder from the toolbar. (Fig. 4-49 and 4-50)

NOTE: Depending on configuration the rear cylinder pin may be hidden behind a row unit.

11. Inspect parts for wear or damage and replace if neccesary.

12. Route the hydraulic lines and install the wing cylinder into the tool bar, then install the rear cylinder pin and snap ring. (Fig. 4-50 and 4-49)

13. Install the cylinder pin and the capscrew that holds it in place. (Fig. 4-48)

14. Install the hydraulic lines onto the T fittings or elbow fittings depending on what the unit is equipped with, then torque all hardware to the specification listed in the maintenance section. Purge the hydraulic system and test for proper function. (Fig. 4-47 and 4-46)

FIG. 4-48

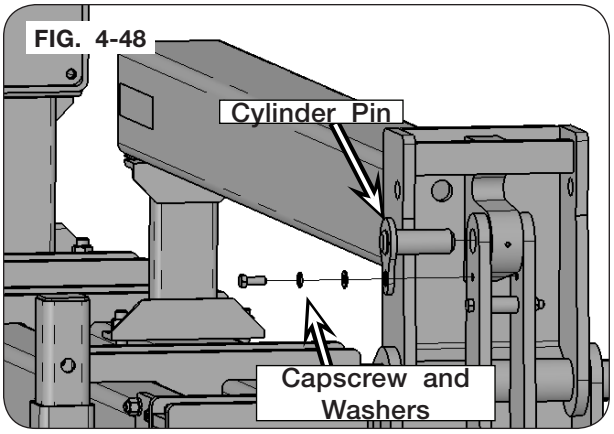


FIG. 4-49

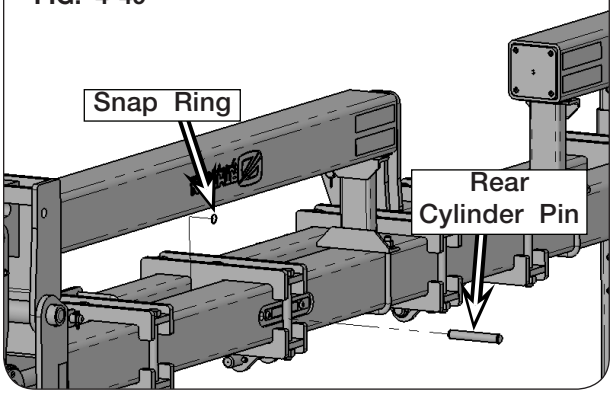
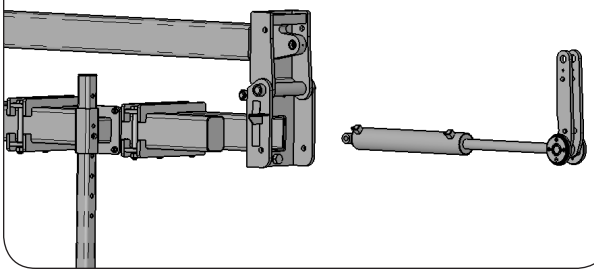


FIG. 4-50



Storage

Do the following before placing the implement in storage:

1. Remove dirt and trash which could cause rusting.
2. Repaint any chipped or scraped areas.
3. Coat all earth moving surfaces with grease or suitable rust preventative.
4. Inspect for damage or worn parts, replace before next season.
5. Store implement inside, away from livestock.
6. Block up implement to keep tires and ground tools off ground.
7. Replace all worn, torn or faded decals and reflectors.

Troubleshooting

Problem	Corrective Action
Row unit does not penetrate soil	Ensure that correct toolbar height and orientation is achieved. Refer to the operation section for more information.
	Adjust row unit down pressure springs to arrive at a setting where the parallel linkages operate independant of the toolbar.
	Raise Wavy Coulter assemblies
	Lower the Tillage Shank.
Row unit plugs with field residue between coulter and row cleaner	Make sure the depth band coulter is penetrating the soil in order that the depth band governs soil penetration.
	Alter ground speed to change rate at which field residue passes through the the row unit tooling.
	Slightly raise the row cleaner assembly to reduce the amount of residue in contact with the assembly.
Row unit plugs with field residue between row cleaner and tillage shank	Slightly lower the row cleaner assembly to reduce the amount of field residue in contact with the tillage shank.
	Alter ground speed to change the rate at which field residue passes through the row unit tooling.
Row unit plugs with field residue between tillage shank and wavy coulters	Slightly increase wavy coulter tillage width.
	Increase distance between tillage shank and wavy coulter assembly by adjusting wavy coulters fore and aft.
	Alter ground speed to change the rate at which field residue passes through the row unit tooling.
Field residue plugs between row units	Slightly raise the row cleaner assembly to reduce the amount of residue in contact with the assembly.
	Alter ground speed to change the rate at which field residue passes through the row unit tooling.
	Decrease wavy coulter tillage width. Decreaseing wavy coulter tillage width will allow more space between row units.
	Increase distance between tillage shank and wavy coulter assembly by adjusting wavy coulters fore and aft.
Row unit does not trip or trips too easily	Refer to the operations section to make sure that the trip assembly is installed and set correctly.

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 (continued)

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.*

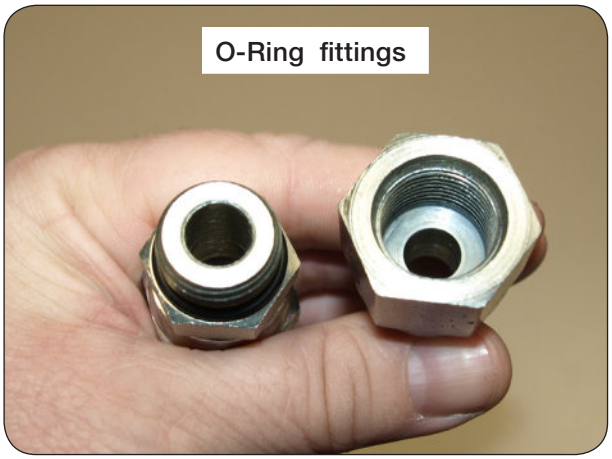
Hydraulic Fittings – Torque and Installation

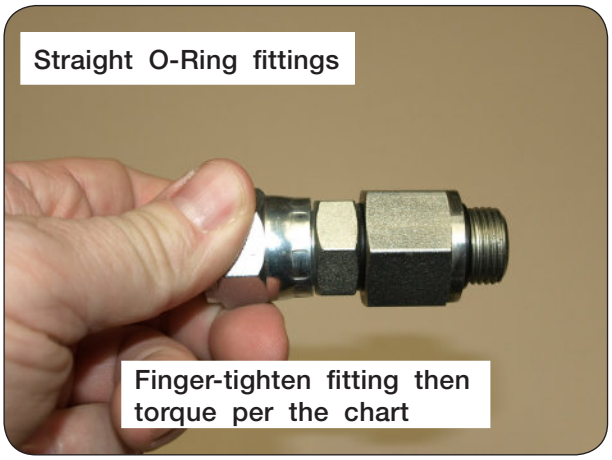
Tightening O-Ring Fittings

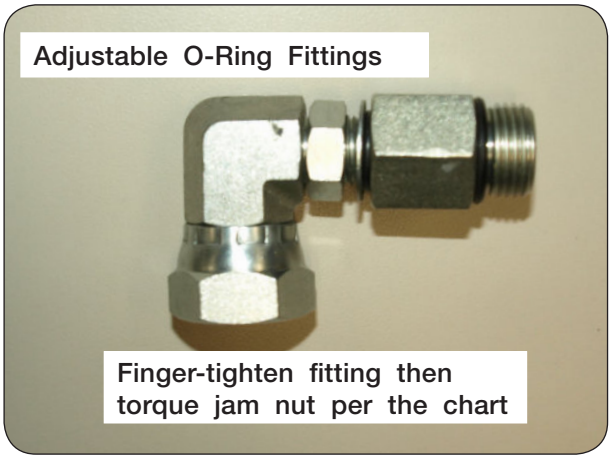
1. Inspect components for damage or contamination. Do not connect any other type of fitting to an O-ring fitting.
2. For adjustable fittings, insure the jam nut and washer are fully backed up.
3. Lubricate the O-ring and threads on the fitting.
4. Turn the fitting into the port until it is finger tight.
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







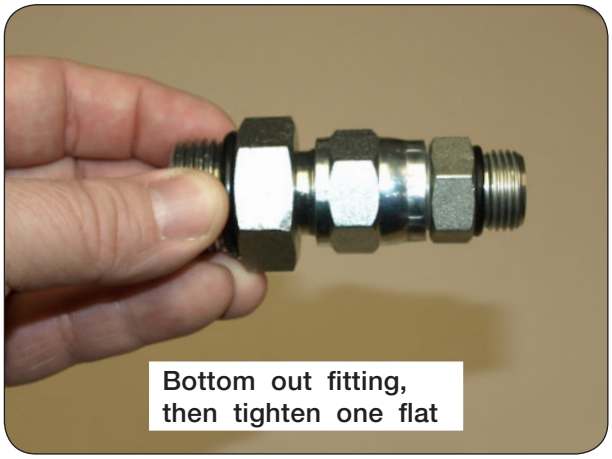
Hydraulic Fittings – Torque and Installation

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