



## 3N-3010P, No-Till Flat Fold Marker Option

Used with:

- 3N-3010P Drills



When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

## General Information

These instructions explain how to assemble, install and setup the optional hydraulic markers for your three-section, folding no-till drill. The units are operated hydraulically and have a cast hub, tapered roller bearings and a bolt-on notched blade to cut through heavy residue, leaving a line to follow on the next field pass. Markers are sold as single or dual units. Dual markers are equipped with a sequence valve for easy operation.

These instructions apply to:

113-735A 30P-Left-Hand Flat-Fold Marker

113-736A 30P-Dual Flat-Fold Markers

### Manual Update

Refer to the drill operator's manual for detailed information on safely operating, adjusting, troubleshooting and maintaining the markers. Refer to the drill parts manual for part identification.

- 3N-3010P and 3N-3020P Operator's Manual . . . . 196-248M
- 3N-3010P and 3N-3020P Parts Manual . . . . . 196-248P

### Definitions

Right and left as used in this manual are determined by facing the direction the machine will travel while in use unless otherwise stated.

**IMPORTANT:** A crucial point of information related to the preceding topic. For safe and correct operation, read and follow the directions provided before continuing.

NOTE: Useful information related to the preceding topic.

## Before You Start

Pages 8 through 9 are detailed listings of parts included in the marker kit. Use these lists to inventory parts received.

# Assembly and Setup Instructions

## Marker Assembly

Refer to Figure 1.

1. Park the drill in an area large enough for folding and unfolding the assembled markers. A single marker will increase the width of the drill by 15 feet.
2. Unfold and lower the drill. Park and shut off the tractor.
3. The marker sections are pre-assembled and banded together for shipment. Unpack the shipment and group the assemblies according to right-hand or left-hand.



## CAUTION!

Do not lift the assemblies unassisted. Lifting the assemblies without mechanical aid could cause severe injury. Use a forklift or hoist to move the assemblies during installation, or disassemble the assemblies into smaller pieces before installation.



## WARNING!

You could be severely injured by a failing assembly. Obey all safety instructions from lifting-equipment manufacturer. Do not walk or place any body part under the raised sections. Be sure lifting equipment has enough capacity.

NOTE: These instructions explain how to assemble the marker if the sections are completely disassembled. If you do not have adequate lifting equipment, disassemble the sections before proceeding. If you do have a forklift or hoist large enough to lift the pre-assembled sections, you can skip many of the following steps.

4. Install the left-hand marker mount (1) on the left wing (2) of the drill. Install the mount on the marker mount pads at the end of the wing frame. Fasten the marker mount to the mount pad (12) and the "A" cylinder gusset (13) with 3/4" x 2 1/4" bolts (3), lock washers (4), and nuts (5). Install the first section of the marker (6) on the mount (1) by pushing the pivot shaft (7) through the pivot holes on the mount and the first section. Use the bolt (8) and lock nut (9) to secure the shaft.

Mount the left-hand breakaway hinge (10) onto the first section (6) by pushing the pivot shaft (11) through the pivot holes in each part. Use the bolt (8) and lock nut (9) to secure the shaft.

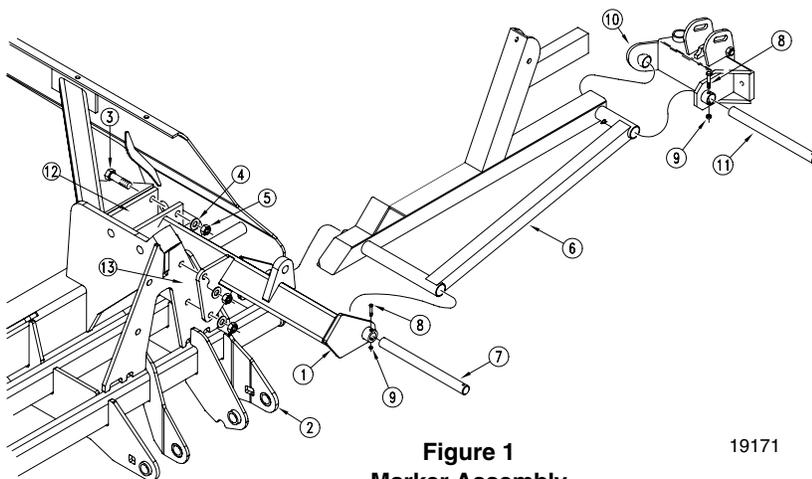


Figure 1  
Marker Assembly

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## Assembly Instructions

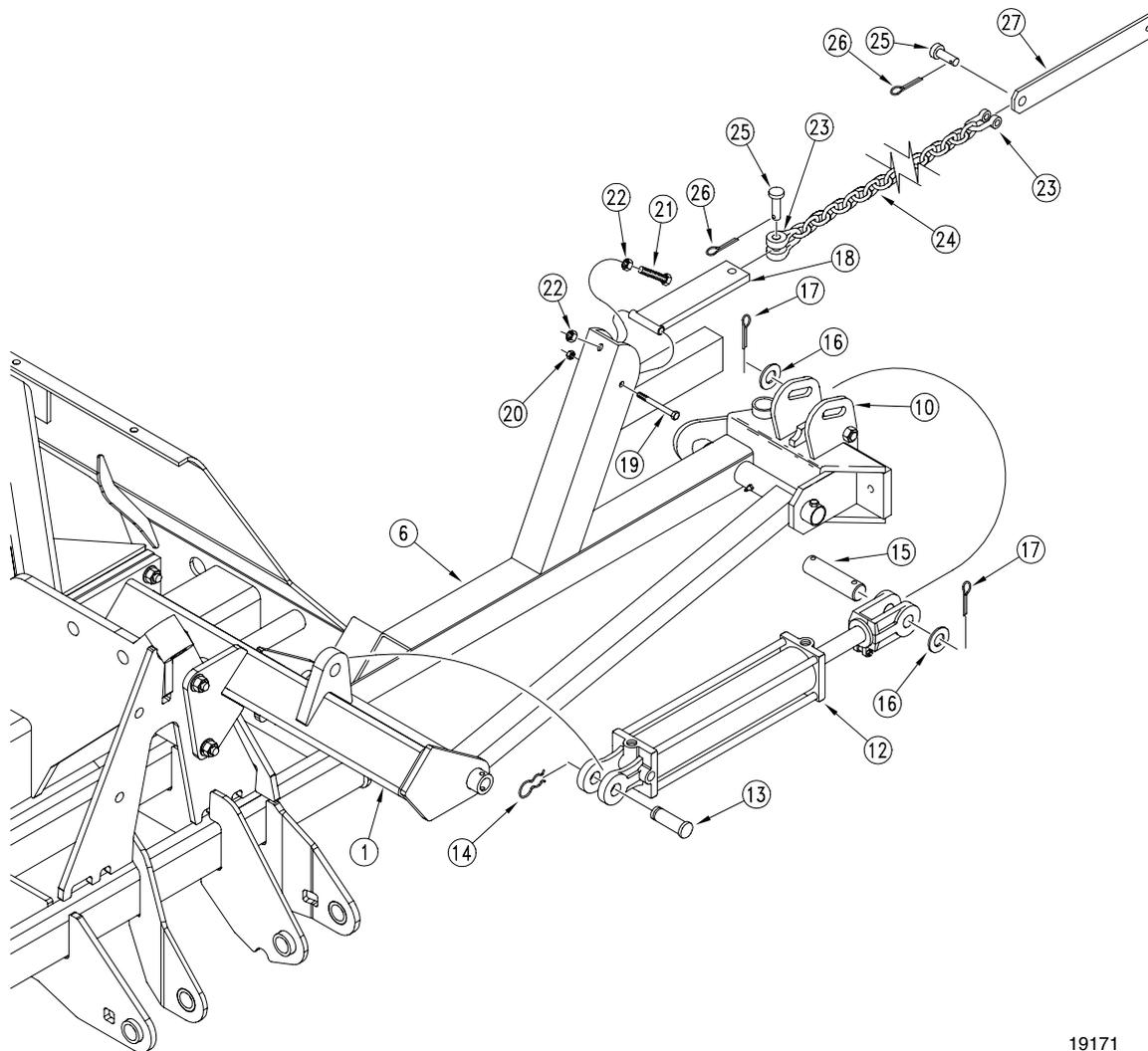
### Refer to Figure 2.

5. Pin the base end of the hydraulic cylinder (12) to the marker mount (1) using the pin and clip (13 and 14). Remove the plastic plugs from the cylinder ports. Pull the rod end of the cylinder out to its maximum length. Pin the rod end of the cylinder to the breakaway hinge using the cylinder pin (15), flat washers (16) and cotter pins (17) provided.
6. Install the chain bar (18) on the first section (6) with the bolt (19) and lock nut (20). The chain bar should pivot freely around the bolt (19).
7. Install the full-threaded adjustment bolt (21) in the hole directly above the pivot bolt (19). To install, first thread one lock nut (22) up the entire length of the adjustment bolt.

Next, push the bolt with nut through the hole. Complete the assembly by threading a second lock nut (22) up the entire remaining length of the adjustment bolt.

After marker assembly, use the adjustment bolt to control folding slack. For now, turn the adjustment bolt so its head extends as little as possible to prevent damage the first time the marker is folded.

8. Thread a utility clevis (23) through one end of the chain (24). Pin this clevis to the chain bar (18) using the pin and cotter pin (25 and 26) provided. Do not fully bend the cotter pin at this time. Thread a second utility clevis (23) through the last link at the opposite end of the chain (24). Pin this clevis to the rounded end of the chain bar (27) using the pin and cotter pin (25 and 26) provided.



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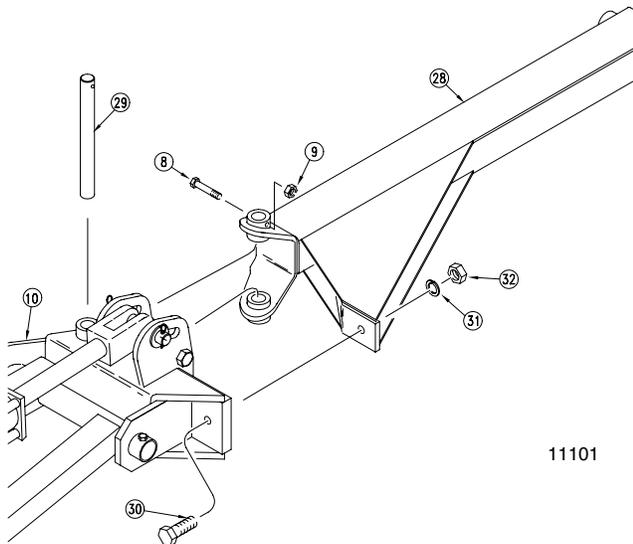
**Figure 2**  
**Marker Assembly**

## Assembly Instructions

### Refer to Figure 3.

9. Attach the second section (28) to the breakaway hinge (10) with the pivot pin (29). Secure the pivot pin (29) with the bolt and lock nut (8 and 9). Complete this joint by passing the grade 5 breakaway bolt (30) through the holes in the hinge and second section. Install the lock washer (31) and nut (32) on the breakaway bolt.

**IMPORTANT:** The breakaway bolt (30) is a 7/16 x 2 1/4-inch, grade 5 (G.P. # 802-234C). It is identified as a grade 5 by having three marks on the head. If it breaks, replace it with an equivalent grade 5 bolt to prevent marker damage.

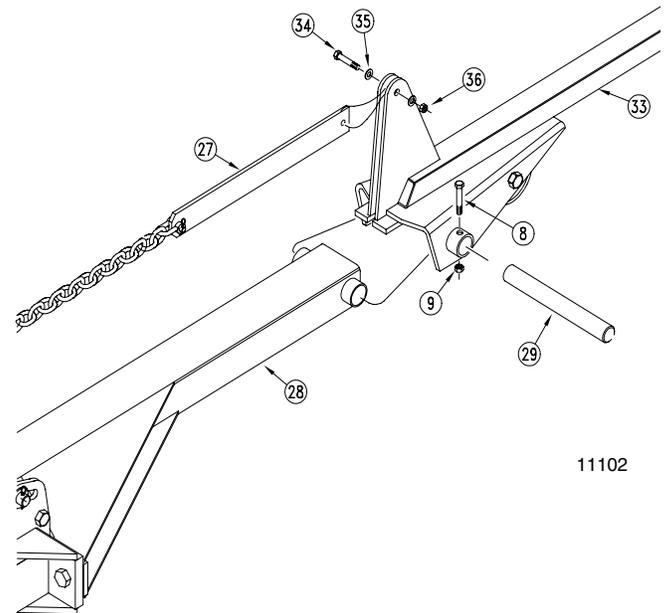


**Figure 3**  
Attaching Second Section

### Refer to Figure 4.

10. Attach the third section (33) to the second section (28) by using the pivot pin (29). Secure the pivot pin with the bolt (8) and lock nut (9).

Fasten the loose end of chain bar (27) to the ears on the third section (33) by using the bolt (34) flat washers (35) and lock nut (36). Do not over tighten this pivot, which would cause the ears to bend in. The chain bar must pivot freely around the bolt.

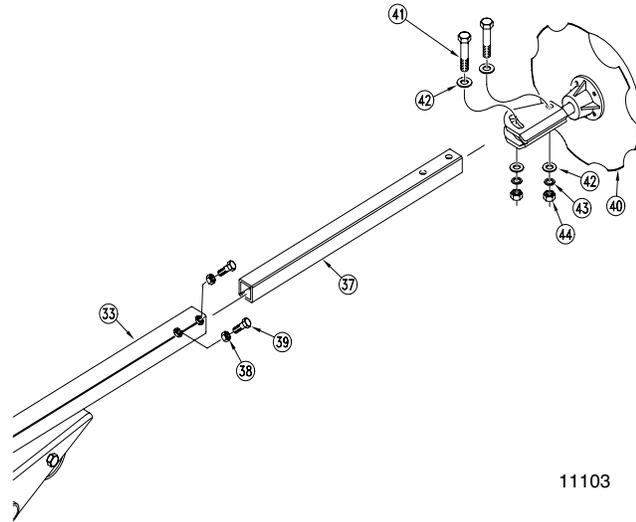


**Figure 4**  
Attaching Third Section

## Assembly Instructions

### Refer to Figure 5.

11. Slide the fourth-section tube (37) inside the third section (33). The holes in the fourth section must be to the outside of the drill and on the top and bottom side as shown. Thread the jam nuts (38) on the square-headed set screws (39). Thread the set screws into the nuts welded to the outer end of the third section (33). Tighten the set screws and jam nuts.
12. Slide the blade and spindle (40) over the fourth-section tube (37). Secure the spindle to the tube with bolts (41), flat washers (42), lock washers (43) and nuts (44). Tighten the two nuts.

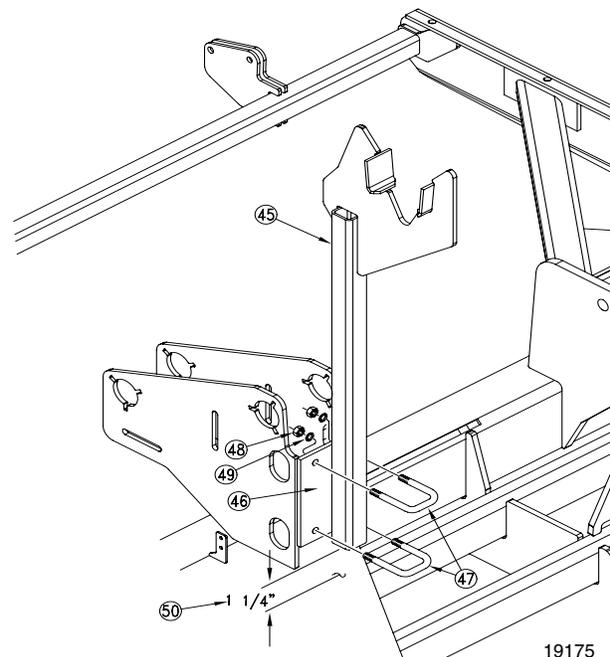


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**Figure 5**  
**Attaching Fourth Section**

### Refer to Figure 6.

13. Mount the transport carrier (45) to the wing box frame drive support (46) and secure it with two 1/2" x 2 1/32" x 3 1/4" u-bolts (47), lock washers (49), and nuts (48)..
14. Fasten the carrier to the mount using the two u-bolts (47). Tighten the u-bolts with the lock washers (48) and nuts (49) so that the bottom of the support tube is about 1 1/4 inches above the frame plate. You may need to re-adjust carrier height after assembly. Refer to *Transport Carrier, "Setup Adjustments,"* page 6. To complete assembly for dual markers, repeat steps three through twelve.
15. After all parts are in place, tighten all bolts and u-bolts. Refer to the torque chart in your drill operator's manual. Torque u-bolts to grade 5 values.



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**Figure 6**  
**Transport Carrier Mounting**

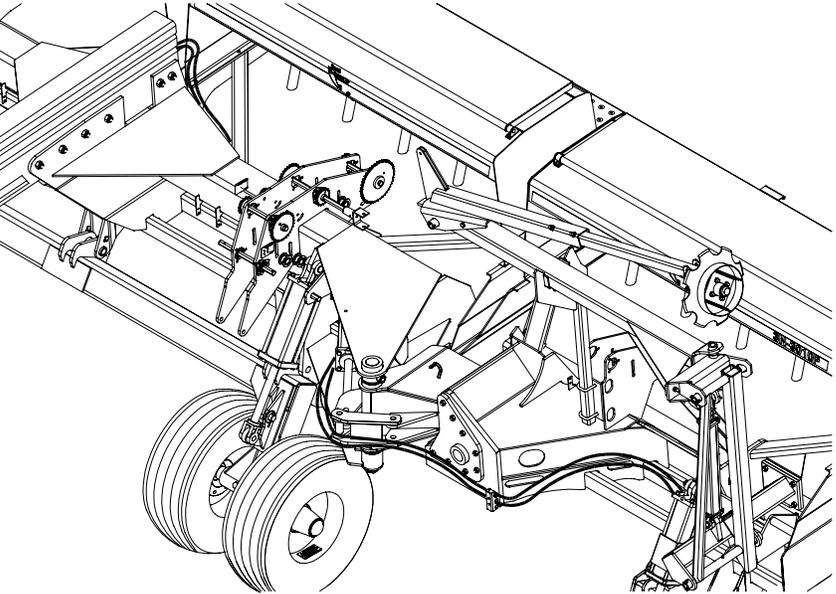
## Single-Marker Hydraulics

**IMPORTANT:** JIC fittings do not require high torque. JIC and O-ring fittings do not require sealant. To avoid cracking fittings or castings from overtightening, do not use plastic sealant tape.

### Refer to Figure 7.

1. Attach the 90-degree swivel elbow (1) to the rod end of the marker cylinder (2). Insert the orifice (3) in the base end of the marker cylinder (2). Attach the 90-degree swivel elbow (1) to the base end of the marker cylinder (2).
2. Uncoil and attach hose (4) 288" to the swivel elbow at the rod end of the marker cylinder (2). Uncoil and attach hose (5) 252" to the swivel elbow (1) at the base end of the marker cylinder (2).
3. Assemble the elbow fittings (7) to the end of the hoses (4) 288" and (5) 252". Route hoses through the frame member cut-outs and hose clamps parallel to the hoses feeding the outer gauge-wheel cylinder. Route the hoses (8) 348" down the center of the tongue tube and connect them to the elbow fittings (7).

**Figure 7**  
Hydraulic Hose Routing

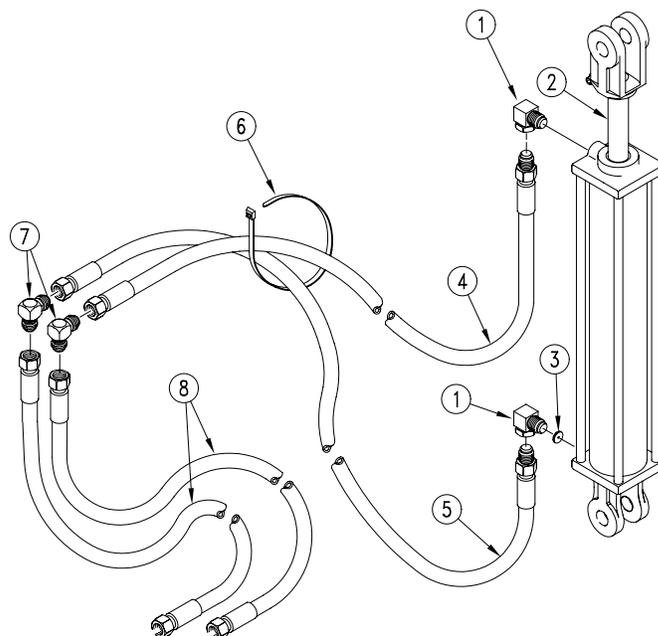


**Figure 8**  
Hose Placement

### Refer to Figure 8.

4. Fine tune the hose placement. Make a loop in both hoses near the folding hinge. This loop should be large enough to allow the outer wing to flex without the hoses pulling tight. Maintain the loops by clamping the hoses in the center hole of the existing hose clamps. Use the split rubber sleeves as bushings between the clamps and the marker hose. Use the cable ties (6) supplied with the kit to hold the hoses away from any pinch point. Check to be sure hoses do not rub on tires when folded in transport. This can happen if too much slack is provided.

**IMPORTANT:** Read and complete *Setup Adjustments*, page 6 before folding the markers.



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## Assembly Instructions

### Dual Marker Hydraulics

NOTE: JIC fittings do not require high torque. JIC and O-ring fittings do not require sealant. To avoid cracking fittings or castings from overtightening, do not use plastic sealant tape.

#### Refer to Figure 9.

1. Assemble elbow fittings (1) 3/8FNPT 9/16MORB on the marker cylinder (2) ports..
2. Uncoil and attach hoses (3) 288" longs and (4) 252" long to the swivel elbows (1). Notice that the longer hoses go to the rod end of the cylinders.
3. Attach the 90° elbow fittings (5) 9-16MJIC to the sequence valve (6). Attach the sequence valve to the mount bracket (7) with 3/8-16 X 3 1/4 bolts (8) and 3/8-16 PLT (9) lock nuts.
4. Attach the mounting bracket with valve to the left inside the tongue (15) as shown in Figure 10 with u-bolt (12), lock washers (13) and nuts (14).
5. Route the hoses 3 (288") and 4 (252") from the marker cylinders to the center of the drill using the same path as the

opener lift hoses allowing the same slack at the drill toolbar pivots as the other hoses. Use the rubber hose protectors and hose clamp brackets which are already bolted to your drill to secure the hoses in place. DO NOT alter the routing or amount of hose slack of the existing hoses when you loosen the clamp brackets to insert the marker hoses.

6. Connect the four hoses coming from the marker cylinders to the sequence valve. Connect the base-end hoses (4) to ports R1 and R2 (6) and the rod hoses (3) to ports C1 and C2 (6) as shown.
7. Route hoses through the frame member cut-outs and hose clamps parallel to the hoses feeding the outer gauge-wheel cylinder. Route the hoses (10) 348" down the center of the tongue tube and connect them to the elbow fittings (5).
8. Fine tune the hose placement. Make a loop in both hoses near the box flex hinge. This loop should be large enough to allow the outer wing to flex without the hoses pulling tight. Maintain the loops by clamping the hoses in the center hole of the existing hose clamps. Use the split rubber sleeves as bushings between the clamps and the marker hose. Use the cable ties (11) supplied with the kit to hold the hoses away from any pinch point. Check to be sure hoses do not rub on tires when folded in transport. This can happen if too much slack is provided.

IMPORTANT: Read and complete *Setup Adjustments*, page 6 before folding the markers.

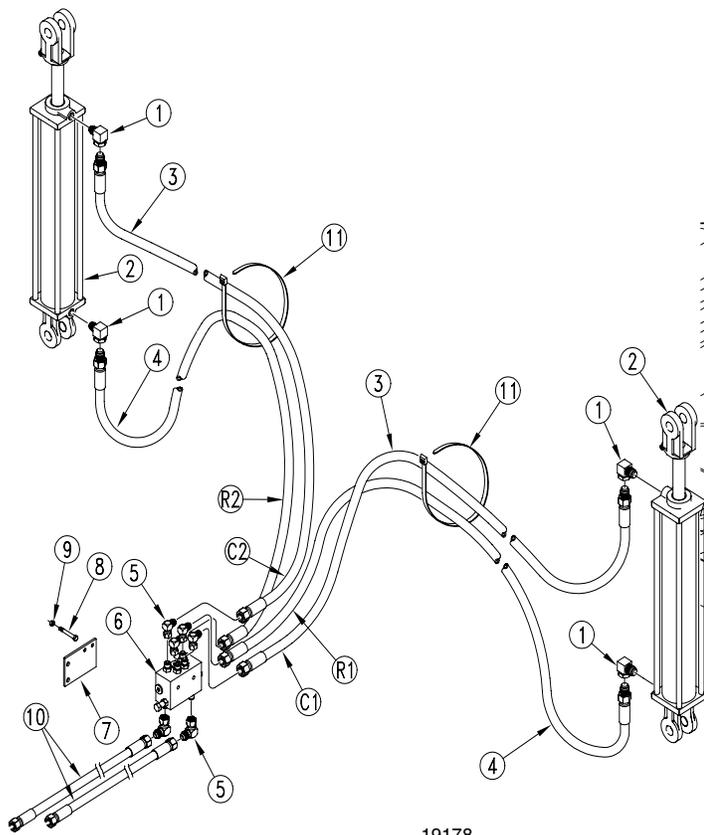


Figure 9  
Dual Marker Hydraulic Schematic

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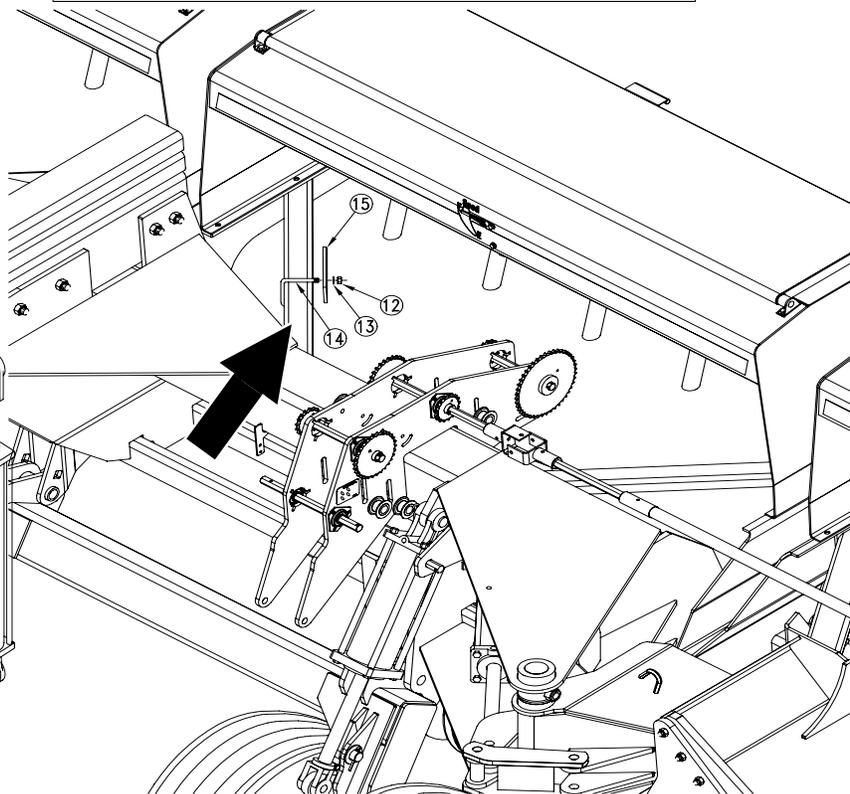


Figure 10  
Placement for Mounting Bracket

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## Assembly Instructions

### Setup Adjustments

1. **Transport Carrier.** After centering the storage saddle and folding the marker, visually check the height of the transport carrier. The second section of the marker should appear parallel with the top of the drill box. If not, loosen the transport carrier u-bolts and adjust the carrier up or down.
2. **Marker Chain.** There are two basic adjustments needed on the marker chain, especially in new installations. They are interrelated and should be done in the following order.
  - a. **Lifting Slack.** Start with the marker in the unfolded position. Back the adjustment bolt (Figure 2, page 2, 21) down until the head extends as little as possible. Slowly fold the marker, observing the motion of the disk. If the marker disk slides across the ground more than about one foot before the chain and linkage lifts it up, the chain is too slack. Tighten the chain by moving the clevis one or two links at the inboard end of the chain. Recheck by repeating this process.  
  
If the chain does not have enough slack when the marker is in the unfolded field position, the chain will prevent the end of the marker from dropping down to follow a depression in the field. Correct this condition by moving the utility clevis one or two links, giving the chain more slack.
  - b. **Folding Slack.** Fold the marker. Extend the adjustment bolt until the slack is out of the chain. Lock the bolt in this position by tightening the nuts on either side of the upright channel.

### Bleeding Marker Hydraulics

To operate correctly, the marker hydraulics must be free of air. If not properly bled, the markers will fold in jerky, uneven motions. Follow these instructions to bleed the marker hydraulics

#### CAUTION!

*Never allow anyone near the drill when cycling the markers!*

#### WARNING!

*Escaping fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic lines. Use a piece of paper or cardboard, NOT BODY PARTS, to check for leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene will result.*

### Bleeding Marker Hydraulics cont.

1. Check that tractor hydraulic reservoir is full.
2. With both markers lowered into field position, loosen hydraulic-hose fittings at rod and base ends of marker cylinders. If applicable, loosen fittings on back side of sequence valve.

**IMPORTANT:** Never bleed an O-ring fitting. Instead, bleed a nearby pipe or JIC fitting.

3. With tractor idling, activate tractor hydraulic valve until oil seeps out around a loosened fitting. Tighten that fitting.

**IMPORTANT:** JIC fittings do not require high torque. JIC and O-ring fittings do not require sealant. Always use liquid pipe sealant when adding or replacing pipe-thread fittings. To avoid cracking hydraulic fittings from over tightening, do not use plastic sealant tape.

4. Reactivate tractor hydraulic valve until oil seeps out around another loosened fitting. Tighten that fitting. Repeat process until all loosened fitting have been bled and tightened.
5. Adjust marker folding to a safe speed. Refer to "Marker Adjustments" in the operator's manual.

## Listing of Parts

**113-735A 30P Left-Hand Flat-Fold Marker**

Your Kit Includes:

Qty.	Part No.	Part Description
<b>1</b>	<b>113-733K</b>	<b>30P LH MARKER ASSEMBLY includes:</b>
1	113-180H	LH FIRST SECTION
1	113-248D	PIN 1 OD X 4.34 USABLE
1	113-312D	FIRST PIVOT SHAFT
1	113-313D	SECOND PIVOT SHAFT
1	113-324D	CYLINDER STOP
2	113-325D	STOP BUSHING
1	113-341H	NO-TILL MARKER 30' 2ND SECTION
1	113-343H	NO-TILL MARKER 30' 3RD SECTION
1	113-350H	NO-TILL BREAKAWAY JOINT LH
1	113-360S	NOTILL MRKR DSK & 4BLT HUB ASY
1	113-378D	NO-TILL 30' 4TH SECTION TUBE
1	113-731H	30P LH MARKER MOUNT
1	113-734H	MARKER TRANSPORT SUPPORT WLDMENTT
4	800-001C	GREASE ZERK STRAIGHT 1/4-28
2	801-013C	SCREW SER SQ HD 1/2-12x1 1/2 +
2	802-042C	HHCS 1/2-13X3 3/4 GR5
2	802-115C	HHCS 5/16-18X2 GR5
1	802-201C	HHCS 1/2-13X4 3/4 GR5
1	802-234C	HHCS 7/16-14X2 1/4 GR5
1	802-260C	HHCS 1/2-13X7 GR5
2	803-011C	NUT LOCK 5/16-18 PLT
1	803-015C	NUT HEX 7/16-14 PLT
2	803-019C	NUT LOCK 1/2-13 PLT
2	803-020C	NUT HEX 1/2-13 PLT
2	803-036C	NUT HEX JAM 1/2-13 PLT
1	804-014C	WASHER LOCK 7/16 PLT
2	804-015C	WASHER LOCK SPRING 1/2 PLT
4	804-017C	WASHER FLAT 1/2 USS PLT
2	804-029C	WASHER FLAT 1 SAE
2	805-058C	PIN COTTER 3/16 X 2
1	810-118C	CYL 2.5X20X1.12 ROD (TIE)1 PIN
<b>1</b>	<b>113-738K</b>	<b>30P LH MARKER HDW BUNDLE includes:</b>
1	113-200H	CHAIN BAR WELDMENT
2	113-311D	HINGE PIN
1	113-319D	MARKER CHAIN 30'
1	113-323D	CHAIN BAR
1	113-398D	RUBBER TUBE RD 3 OD X 5 LONG
1	113-739M	MANUAL 30P NT FF MARKERS
6	800-082C	CABLE TIE .31X21.5 6DIA 120LB
1	802-022C	HHCS 3/8-16X1 1/2 GR5
6	802-065C	HHCS 3/4 X 10X2 1/4 GR 5
1	802-115C	HHCS 5/16-18X2 GR5
1	802-168C	HHCS 3/8-16X3 1/4 GR5
1	802-261C	HHCS 3/8-16X2 1/2 GR5 FTHD
1	803-011C	NUT LOCK 5/16-18 PLT
4	803-013C	NUT LOCK 3/8-16 PLT
5	803-020C	NUT HEX 1/2-13 PLT
6	803-027C	NUT HEX 3/4-10 PLT
2	804-011C	WASHER FLAT 3/8 USS PLT
5	804-015C	WASHER LOCK SPRING 1/2 PLT
2	804-023C	WASHER LOCK SPRING 3/4 PLT
2	806-023C	U-BOLT 1/2-13 X 2 1/32 X 3 1/4
2	811-281C	EL 3/8FNPT 9/16MORB
1	811-347C	ORPL 1/16 9/16MORB
2	811-393C	EL 9/16MJIC
2	890-018C	UTILITY CLEVIS 5/16
<b>1</b>	<b>113-743V</b>	<b>30P LH FF HOSE BUNDLE includes:</b>
1	811-014C	HH 1/4 288 9/16 FJIC 3/8 MNPT
1	811-035C	HH 1/4 252 9/16FJIC 3/8MNPT
2	811-580C	HH 1/4 348 1/2MNPT 9-16FJIC

## Listing of Parts

**113-736A 30P Dual Flat-Fold Marker**

Your Kit Includes:

Qty.	Part No.	Part Description
<b>1</b>	<b>113-732K</b>	<b>30P DUAL MARKER ASSEMBLY includes:</b>
1	113-180H	LH FIRST SECTION
1	113-188H	RH FIRST SECTION
2	113-248D	PIN 1.0 OD X 4.34 USABLE
2	113-312D	FIRST PIVOT SHAFT
2	113-313D	SECOND PIVOT SHAFT
2	113-324D	CYLINDER STOP
4	113-325D	STOP BUSHING
2	113-341H	NO-TILL MARKER 30' 2ND SECTION
2	113-343H	NO-TILL MARKER 30' 3RD SECTION
1	113-350H	NO-TILL BREAKAWAY JOINT LH
1	113-351H	NO-TILL BREAKAWAY JOINT RH
2	113-360S	NOTILL MRKR DSK & 4BLT HUB ASY
2	113-378D	NO-TILL 30' 4TH SECTION TUBE
2	113-398D	RUBBER TUBE RD 3 OD X 5 LONG
1	113-730H	30P RH MARKER MOUNT
1	113-731H	30P LH MARKER MOUNT
2	113-734H	MARKER TRANSPORT SUPPORT WLDMENT
8	800-001C	GREASE ZERK STRAIGHT 1/4-28
4	801-013C	SCREW SET SQ HD 1/2-13X1 1/2G5
4	802-042C	HHCS 1/2-13X3 3/4 GR5
4	802-115C	HHCS 5/16-18X2 GR5
2	802-201C	HHCS 1/2-13X4 3/4 GR5
2	802-234C	HHCS 7/16-14X2 1/4 GR5
2	802-260C	HHCS 1/2-13X7 GR5
4	803-011C	NUT LOCK 5/16-18 PLT
2	803-015C	NUT HEX 7/16-14 PLT
4	803-019C	NUT LOCK 1/2-13 PLT
4	803-020C	NUT HEX 1/2-13 PLT
4	803-036C	NUT HEX JAM 1/2-13 PLT
2	804-014C	WASHER LOCK 7/16 PLT
4	804-015C	WASHER LOCK SPRING 1/2 PLT
8	804-017C	WASHER FLAT 1/2 USS PLT
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4	805-058C	PIN COTTER 3/16 X 2
2	810-118C	CYL 2.5X20X1.12 ROD (TIE)1 PIN
<b>1</b>	<b>113-737K</b>	<b>30P DUAL MARKER HDW BUNDLE includes:</b>
2	113-200H	CHAIN BAR WELDMENT
4	113-311D	HINGE PIN
1	113-319D	MARKER CHAIN 30'
2	113-323D	CHAIN BAR
1	113-739M	MANUAL 30P NT FF MARKERS
12	800-082C	CABLE TIE .31X21.5 6DIA 120LB
2	802-022C	HHCS 3/8-16X1 1/2 GR
12	802-065C	HHCS 3/4-10X2 1/4 GR5
4	802-115C	HHCS 5/16-18X2 GR5
2	802-168C	HHCS 3/8-16X3 1/4 GR5
2	802-261C	HHCS 3/8-16X2 1/2 GR5 FTTHD
2	802-417C	HHCS 3/8-16X7/8 GR5
4	803-011C	NUT LOCK 5/16-18 PLT
8	803-013C	NUT LOCK 3/8-16 PLT
12	803-020C	NUT HEX 1/2-13 PLT
12	803-027C	NUT HEX 3/4-10 PLT
4	804-011C	WASHER FLAT 3/8 USS PLT
2	804-013C	WASHER LOCK SPRING 3/8 PLT
12	804-015C	WASHER LOCK SPRING 1/2 PLT
12	804-023C	WASHER LOCK SPRING 3/4 PLT
4	806-023C	U-BOLT 1/2-13 X 2 1/32 X 3 1/4
1	806-092C	U-BOLT 1/2-13 X 2 X 4
1	810-197C	VALVE,SEQUENCE SHOEMAKER
6	811-169C	EL 9/16MJIC 9-16FJIC
4	811-281C	EL 3/8FNPT 9/16MORB
4	890-018C	UTILITY CLEVIS 5/16
<b>1</b>	<b>113-744V30P</b>	<b>DUAL FF HOSE BUNDLE includes:</b>
2	811-014C	HH 1/4R1 288 9/16FJIC 3/8MNPT
2	811-035C	HH 1/4R1 252 9/16FJIC 3/8MNPT
2	811-580C	HH 1/4R1 348 1/2MNPT 9/16FJIC