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# Owner's / Parts Manual

## 13' End Wheel Drill Single/Dual Hydraulic Marker

# Great Plains

Manufacturing, Inc.

P.O. Box 218  
Assaria, Kansas 67416



## General Information

### Important Notice

Great Plains Manufacturing, Inc. provides this publication "as is" without warranty of any kind, either expressed or implied, while every precaution has been taken in the preparation of this manual, Great Plains Manufacturing, Inc. assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein. Great Plains Manufacturing, Inc. reserves the right to revise and improve its products as it sees fit. This

publication describes the state of this product at the time of its publication, and may not reflect the product at all times in the future.

Printed in the United States of America.

For your convenience, record your Serial Number, Model Number and the Date Purchased, of your drill, in the spaces provided below. Have this information before you when calling a Great Plains Authorized Dealer.

### Owner's Information

Name: \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Model Number \_\_\_\_\_

Date Purchased \_\_\_\_\_

Name of Dealership \_\_\_\_\_

Dealer's Name \_\_\_\_\_

## Using this Manual

For your safety and to help in developing a better understanding of your equipment we highly recommend that you read the operator sections of this manual. Reading these sections not only provides valuable training but also familiarizes you with helpful information and its lo-

cation. The parts sections are for reference only and don't require cover to cover reading. After reviewing your manual store it in a dry, easily accessible location for future reference.

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## Introduction

This manual has been prepared to instruct you in the safe and efficient operation of your End Wheel Marker. Read and follow all instructions and safety precautions carefully.

The parts on your End Wheel Marker have been specially designed and should only be replaced with genuine Great Plains parts. Therefore, should your End Wheel Marker require replacement parts go to your Great Plains Dealer.

The right hand and left hand as used throughout this manual is determined by facing in the direction the machine will travel when in use unless otherwise stated.



The SAFETY ALERT SYMBOL indicates that there is a potential hazard to personal safety involved and extra safety precautions must be taken. When you see this symbol, be alert and carefully read the message that follows it. In addition to design and configuration of equipment; hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

**Watch for the following safety notations throughout your Operators Manual:**



### **DANGER!**

*Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.*



### **WARNING!**

*Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.*



### **CAUTION!**

*Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.*

**Note:** Indicates a special point of information which requires your attention.

# Section 1 Safety Rules

Most accidents are the result of negligence and carelessness, usually caused by failure of the operator to follow simple but necessary safety precautions. The following safety precautions are suggested to help prevent such accidents. The safe operation of any machinery is a big concern to consumers and manufacturers. Your End Wheel Marker has been designed with many built-in safety features. However, no one should operate this product before carefully reading this Operators Manual.

## General Operation & Repair

1. *Never allow the Marker to be operated by anyone who is unfamiliar with the operation of all functions of the unit. All operators should read and thoroughly understand the instructions given in this manual prior to moving the unit.*
2. *Make sure safety rules are understood before operating machinery or tractor.*
3. *Never permit any persons other than the operator to ride on the tractor.*
4. *Never permit any persons to stand near the Marker while it is in operation.*
5. *Regulate your speed to the field conditions, maintaining complete control at all times.*
6. *After repairing or adjusting, make sure all tools and parts are removed from the implement before attempting to operate it.*
7. *Do not grease or oil machine while it is in operation.*
8. *Loose fitting clothing should not be worn as it may catch in moving parts.*
9. *Never dismount from a moving tractor.*
10. *Do not leave the tractor or the implement unattended with the engine running.*
11. *Do not stand between the tractor and the implement during hitching.*
12. *Detach and store implements in an area where children normally do not play. Stabilize implements by using suitable supports and block wheels.*
13. *If a hydraulic leak develops, correct it immediately. Escaping hydraulic oil can have extremely high pressure. A stream of high pressure oil may easily penetrate the skin as with modern needle-less vaccination equipment - but with the exception that hydraulic fluid may cause blood poisoning. It is imperative that the connections are tight and that all lines and pipes are in good condition. If an injury is caused by the escaping hydraulic fluid, see doctor at once!*
14. *Use a piece of cardboard or wood to detect leaks of hydraulic oil under pressure.*
15. *Be sure to relieve all hydraulic pressure before disconnecting any lines or pipes between the implement and the tractor hydraulic system. Keep all guards and shields in place.*

## Transporting

1. *Use good judgement when transporting tractor and implements on the highway. Always maintain complete control of the machine.*
2. *Limit transport speed to 20 mph. Transport only with a farm tractor of sufficient size and horse power.*
3. *Always make sure flashing safety lights, "Slow Moving Vehicle" emblem, and reflectors are in place and visible prior to transporting the machine on public roads.*
4. *Know your state and local laws concerning highway safety and regulations. Comply with these laws when transporting machinery.*
5. *Use warning flags or approved warning lights at night and during other periods of poor visibility. Do your best to prevent highway accidents*

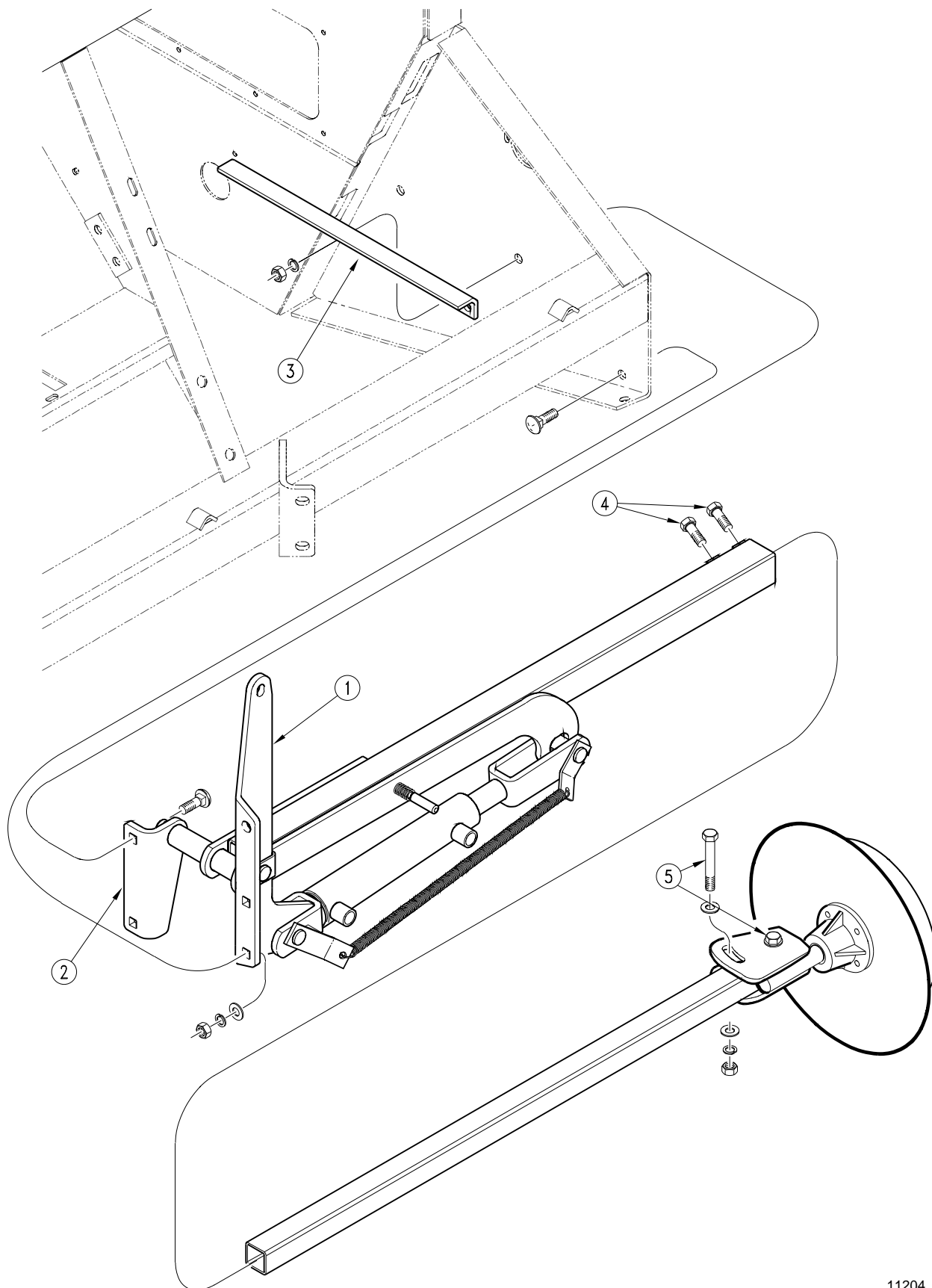
# Section 2 Assembly Instructions & Set-Up

## End Wheel Marker Installation Instructions

Refer to Figure 2-1 for Installation Instructions.

Your marker system comes to you from Great Plains pre-assembled except for installing it on the drill and a few minor adjustments.

1. Attach marker hinge angles, (#1) & (#2), to the front box end panel through existing holes using (6) 1/2" x 1" long carriage bolts, lock washers, and nuts with support angle (#3), bolted on inside using the three in-line mounting holes as shown in Figure 2-1
2. Adjust the cutting angle of the disk blade by loosening the two locking bolts, (#5) at the end of the marker tube and rotate disk in or out as needed. At the same time this is being done, you will need to adjust the in and out position of the disk from the drill to your desired mark width and tighten locking bolts (#4) as shown.



Assembly Diagram  
Figure 2-1

11204

## Single Hydraulics Installation Instructions

Refer to Figure 2-2 for Installation Instructions.

1. Attach hydraulic hose (#3) directly into base end port of marker cylinder as shown

**Important:** When using sealant on pipe threads the friction between the threads is reduced. Therefore, be certain not to over tighten causing damage to the cylinder port or fitting.

2. Route hydraulic hose through slot between pull bar and opener mount channel and pull through to tongue.
3. Attach hose clamps (#5) approximately every 12" - 16" to front of disk opener channel using existing flange headed bolts as shown.

**Note:** When attaching a clamp close to the cylinder, be sure to pull hydraulic hose out and loop around so when the cylinder rotates it will not kink the hose. This can be done by unpinning the marker and rotating the cylinder out and down then retighten the clamp bolts to 45 foot pounds.

4. Route hydraulic hose on top of tongue and through spring type hose loop (#8). Secure hydraulic hose to the tongue with two plastic tie straps (#4) at approximately 24" apart.
5. At the tractor end of the hydraulic hose, attach the 3/8" NPT one-way restrictor valve (#2) with the flow

arrow on the valve pointing towards the marker cylinder. Then attach 3/8" MNPT - 1/2" MNPT adapter (#1) and the hydraulic male coupler {furnished by the customer} to the one-way restrictor valve as shown. Now screw the knob in all the way on the one-way restrictor valve and back it out 1/4 turn. This sets the approximate desired lifting speed you wish to see your marker rise.



### CAUTION!

*Raising the marker too fast can cause damage!*

**Note:** The one-way restrictor valve only controls the speed of the marker while lifting. The speed of the marker being lowered is dependent upon several factors: the temperature and viscosity of your hydraulic oil, the restriction of oil flow back to the tractor and the tightness of the marker hinge. Your marker is equipped with an extension spring to assist your marker when lowering.

6. Plug male coupler into the tractor, unpin marker and hydraulically cycle marker several times to work the air out of the system.



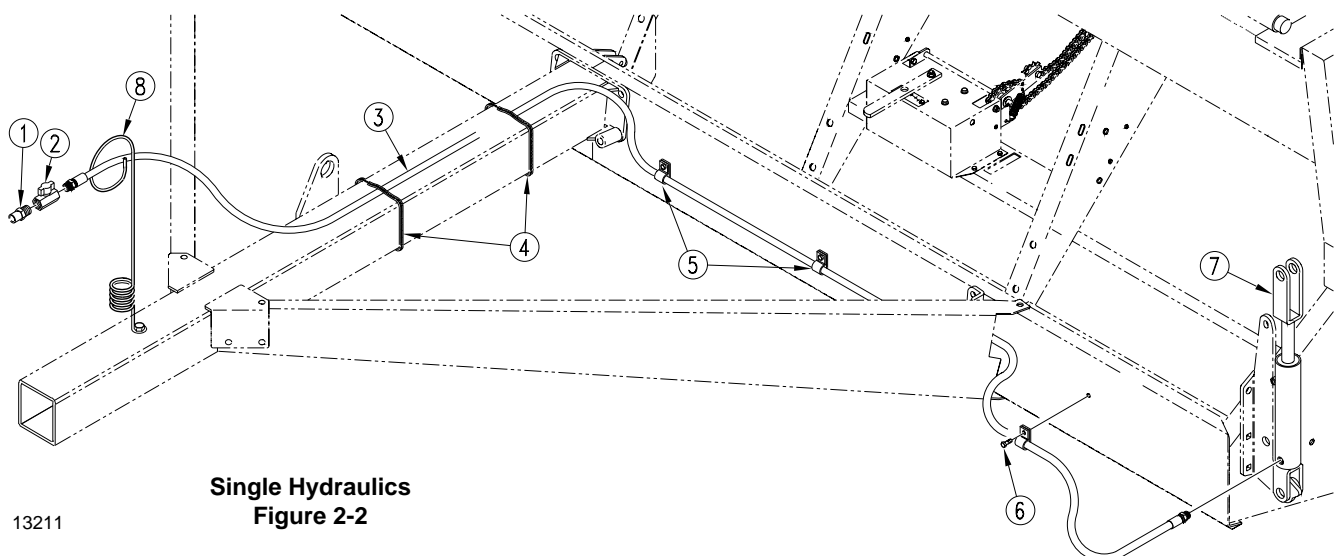
### CAUTION!

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



### WARNING!

*Always pin marker up for safe transporting!*



Single Hydraulics  
Figure 2-2

13211

## Dual Hydraulics Installation Instructions

Refer to Figure 2-3 for Installation Instructions.

1. Attach hydraulic hose (#1) directly into base end port of marker cylinder as shown

**Important:** When using sealant on pipe threads the friction between the threads is reduced. Therefore, be certain not to over tighten causing damage to the cylinder port or fitting.

2. Route the two hydraulic cylinder hoses from each cylinder through slot between pull bar and opener mount channel and pull through to tongue.
3. Attach hose clamps (#12) approximately every 12" - 16" to front of disk opener channel using existing flange headed bolts (#13) as shown.

**Note:** When attaching the clamp closest to the cylinder, be sure to pull hydraulic hoses out and loop around so when the cylinder rotates it will not kink the hose. This can be done by unpinning the marker and rotating the cylinder out and down, then retighten the clamp bolts to 45 foot pounds.

4. Attach sequence valve mount angle (#9) to the left side of tongue at 12" from opener disk mount channel using 1/2" u-bolts, lock washers, and nuts as shown.
5. Attach sequence valve (#7) to mount angle with two 3/8" x 1 3/4" long bolts, lock washers, and nuts.
6. Screw the two 3/4" o-ring - 9/16" JIC straight adapters (#8) into sequence valve outlet ports.

**Note:** Clean ports and coat o-ring with a thin film of oil before assembling.

7. Attach the two marker hydraulic cylinder hoses

(#15) to the sequence valve adapters. Attach the left cylinder hose to the lower adapter and the right cylinder hose to the upper adapter.

**Note:** The sequence valve will allow you to have both markers up at the same time or one up and one down at the same time. The valve will shift automatically as you raise one marker and when you go to lower again the other marker will go down.

8. Screw the 3/4" o-ring - 3/8" MNPT straight adapter (#5) into the sequence valve inlet port. Now screw the one-way restrictor valve (#3) with the flow arrow on the valve pointing towards the sequence valve and tighten to a position where the knob on the one-way restrictor valve is accessible for adjustment. At this time screw the knob on the one-way restrictor valve in all the way and back it out 1/4 turn. This sets the approximate desired lifting speed of the markers. After all the air is worked out of the marker hydraulic system, you can adjust the one-way restrictor valve to the desired speed you wish to have your marker rise.

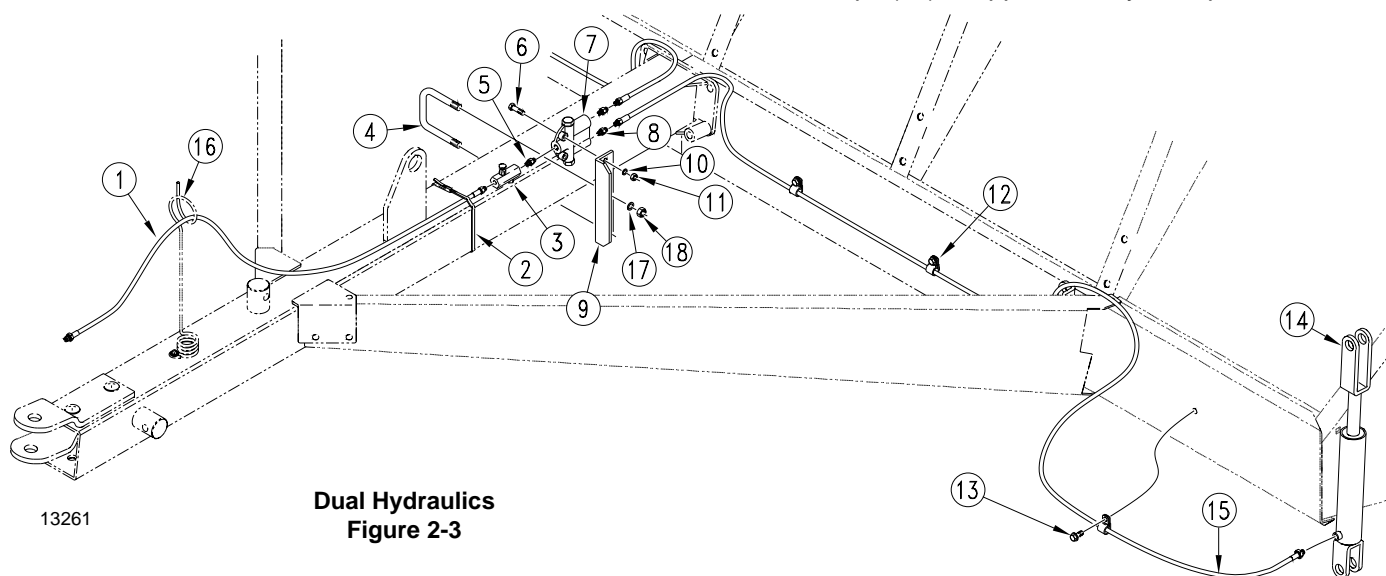


### CAUTION!

*Raising the marker too fast can cause damage!*

**Note:** The one-way restrictor valve only controls the speed of the marker while lifting. The speed of the marker being lowered is dependent upon several factors: the temperature and viscosity of your hydraulic oil, the restriction of oil flow back to the tractor and the tightness of the marker hinge. Your marker is equipped with an extension spring to assist your marker when lowering.

9. Attach the hydraulic hose (#1) to the one-way restrictor valve. Now route the hose on top of the tongue and through the spring type hose loop (#16). Secure hydraulic hose to the tongue with two plastic tie straps (#2) at approximately 24" apart. Then at-



Dual Hydraulics  
Figure 2-3

## Section 2 Assembly Instructions & Set-Up

Attach the hydraulic male coupler (furnished by the customer) to the end of the hydraulic hose and plug into the tractor. Unpin the markers and hydraulically cycle several times to work the air out of the system.



### CAUTION!

Never allow anyone near the drill when cycling the marker!



### WARNING!

Always pin marker up for safe transporting!

## Torque Values Chart for UNC Threads

Bolt Size (Inches)	Bolt Head Identification					
	Grade 2		Grade 5		Grade 8	
	N · m <sup>2</sup>	ft-lb <sup>3</sup>	N · m	ft-lb	N · m	ft-lb
in-tpi <sup>1</sup>						
1/4" - 20	7.4	5.6	11	8	16	12
1/4" - 28	8.5	6	13	10	18	14
5/16" - 18	15	11	24	17	33	25
5/16" - 24	17	13	26	19	37	27
3/8" - 16	27	20	42	31	59	44
3/8" - 24	31	22	47	35	67	49
7/16" - 14	43	32	67	49	95	70
7/16" - 20	49	36	75	55	105	78
1/2" - 13	66	49	105	76	145	105
1/2" - 20	75	55	115	85	165	120
9/16" - 12	95	70	150	110	210	155
9/16" - 18	105	79	165	120	235	170
5/8" - 11	130	97	205	150	285	210
5/8" - 18	150	110	230	170	325	240
3/4" - 10	235	170	360	265	510	375
3/4" - 16	260	190	405	295	570	420
7/8" - 9	225	165	585	430	820	605
7/8" - 14	250	185	640	475	905	670
1" - 8	340	250	875	645	1230	910
1" - 12	370	275	955	705	1350	995
1-1/8" - 7	480	355	1080	795	1750	1290
1 1/8" - 12	540	395	1210	890	1960	1440
1 1/4" - 7	680	500	1520	1120	2460	1820
1 1/4" - 12	750	555	1680	1240	2730	2010
1 3/8" - 6	890	655	1990	1470	3230	2380
1 3/8" - 12	1010	745	2270	1670	3680	2710
1 1/2" - 6	1180	870	2640	1950	4290	3160
1 1/2" - 12	1330	980	2970	2190	4820	3560

Bolt Size (Metric)	Bolt Head Identification					
	Class 5.8		Class 8.8		Class 10.9	
	N · m	ft-lb	N · m	ft-lb	N · m	ft-lb
mm x pitch <sup>4</sup>						
M 5 X 0.8	4	3	6	5	9	7
M 6 X 1	7	5	11	8	15	11
M 8 X 1.25	17	12	26	19	36	27
M 8 X 1	18	13	28	21	39	29
M10 X 1.5	33	24	52	39	72	53
M10 X 0.75	39	29	61	45	85	62
M12 X 1.75	58	42	91	67	125	93
M12 X 1.5	60	44	95	70	130	97
M12 X 1	90	66	105	77	145	105
M14 X 2	92	68	145	105	200	150
M14 X 1.5	99	73	155	115	215	160
M16 X 2	145	105	225	165	315	230
M16 X 1.5	155	115	240	180	335	245
M18 X 2.5	195	145	310	230	405	300
M18 X 1.5	220	165	350	260	485	355
M20 X 2.5	280	205	440	325	610	450
M20 X 1.5	310	230	650	480	900	665
M24 X 3	480	355	760	560	1050	780
M24 X 2	525	390	830	610	1150	845
M30 X 3.5	960	705	1510	1120	2100	1550
M30 X 2	1060	785	1680	1240	2320	1710
M36 X 3.5	1730	1270	2650	1950	3660	2700
M36 X 2	1880	1380	2960	2190	4100	3220

<sup>1</sup> in-tpi = bolt size in inches-threads per inch

<sup>2</sup> N · m = newton-meters

<sup>3</sup> ft-lb = foot pounds

<sup>4</sup> mm x pitch = millimeters x thread pitch



## Section 3 Hydraulic System

### Adjusting The Hydraulics

1. Be sure tractor hydraulic reservoir is full
2. Fold and unfold the marker(s) slowly in order to work all the air out of your marker hydraulics. Use caution when folding and unfolding the marker for the first time, and check for pinching and kinking of hoses.



#### CAUTION!

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

3. The marker hydraulic system is equipped with needle valves to control how fast each marker operates. The needle valves are built into the sequence valve body. There are two hex adjustment heads, one for raising the markers, and one for lowering the markers. These are stamped in the valve body. To adjust the speed of each marker, screw the needle valve clockwise to adjust the raise or lower marker speed to a low setting. Fold the marker up and down a few times and recheck for pinching and kinking of hoses. With the tractor engine at an operating rpm, adjust the needle valve to limit the marker to a safe operating speed. Excessive folding speeds can cause marker damage.



#### CAUTION!

*Escaping Fluid under pressure can have sufficient force to penetrate the skin. Check all hydraulic lines and hoses before applying pressure. Fluid escaping from a very small hole can be almost invisible. Use paper or cardboard, not body parts, to check for suspected leaks. If injured, seek medical assistance from a doctor that is familiar with this type of injury. Foreign fluids in the tissue must be surgically removed within a few hours or gangrene will result.*

#### General Notes

The markers cycle in the following sequence

- (1) Right Up, Left Up
- (2) Right Down, Left Up
- (3) Right Up, Left Up
- (4) Right Up, Left Down
- (5) Sequence Repeats

NOTE: 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 possible danger of cracking hydraulic fittings from over tightening, DO NOT use plastic sealant tape.

## Section 4 Maintenance & Lubrication

### Maintenance

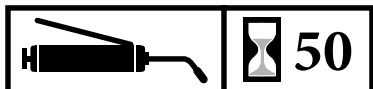
Proper servicing and adjustment is the key to the long life of any farm implement. With careful and systematic inspection, you can avoid costly maintenance, time and repair.

### Marker Transporting

Always transport the marker with it folded in the upright position.

### Lubrication

#### Lubrication Symbols



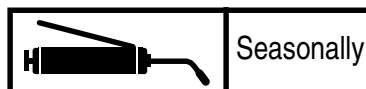
Lubrication is required every 50 hours of operation.



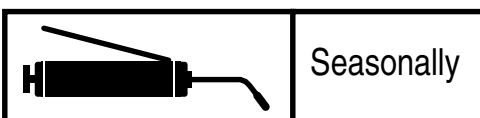
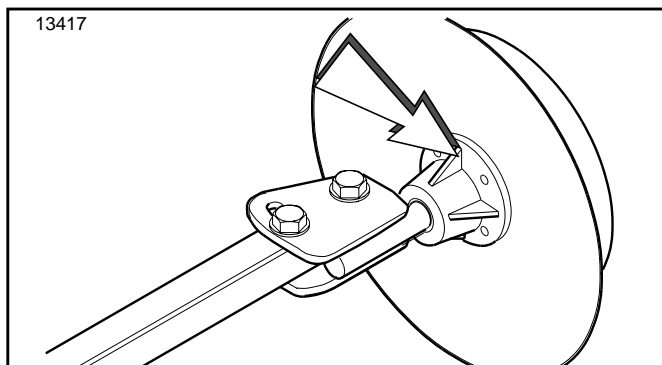
Use a multipurpose spray lub. Use as required.  
Do not over lubricate.



Lubrication is required every 10 hours of operation.

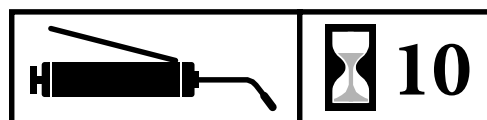
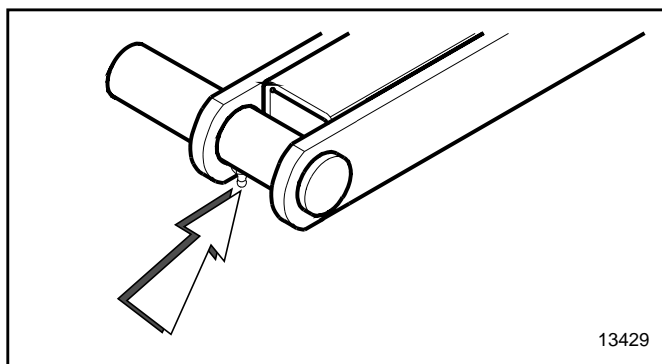


Lubrication is required \_\_\_\_\_.



#### Disk Bearings

Type of Lubrication: Grease

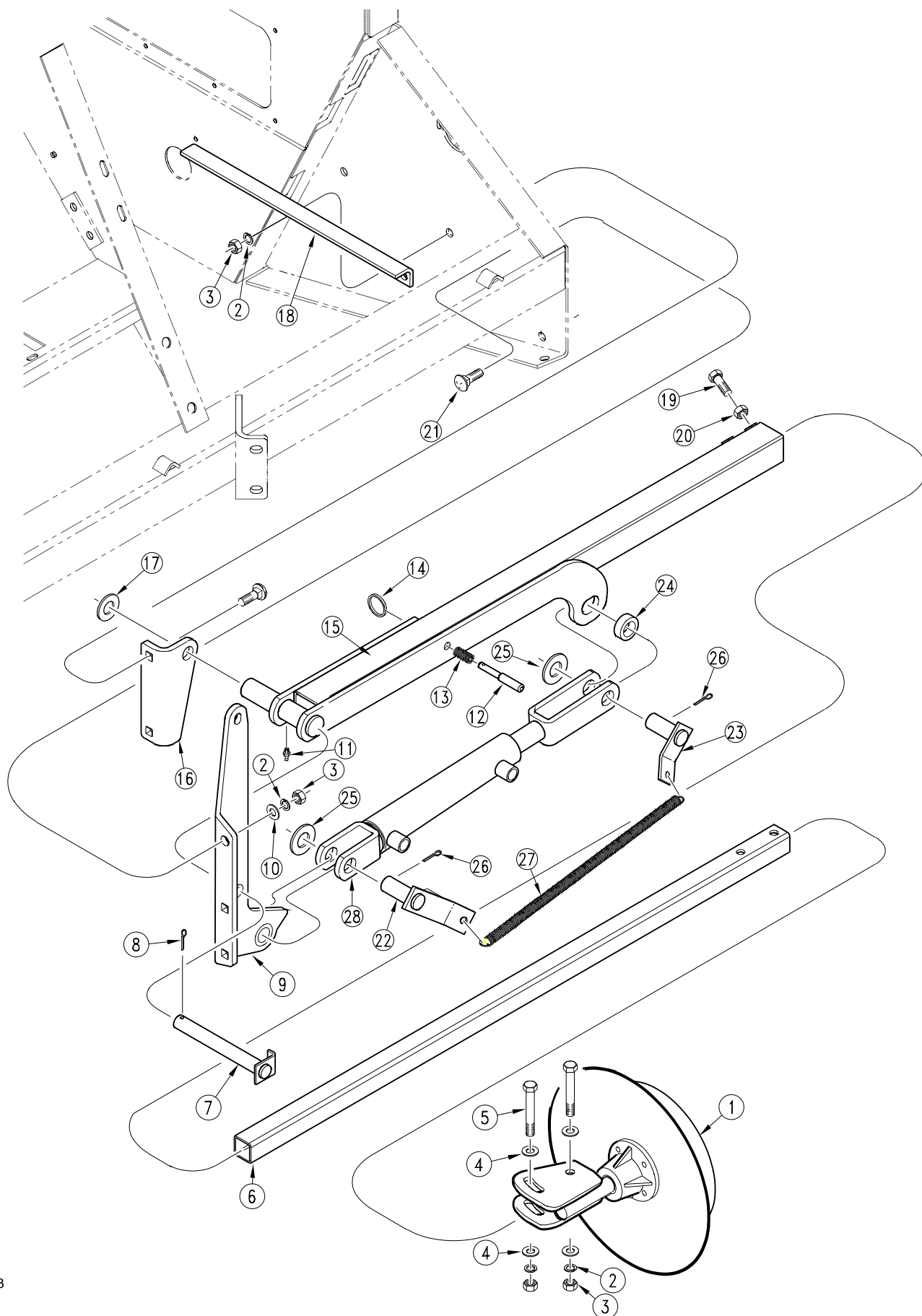


#### Pivot Zerk

Type of Lubrication: Grease

## Section 5 *Troubleshooting*

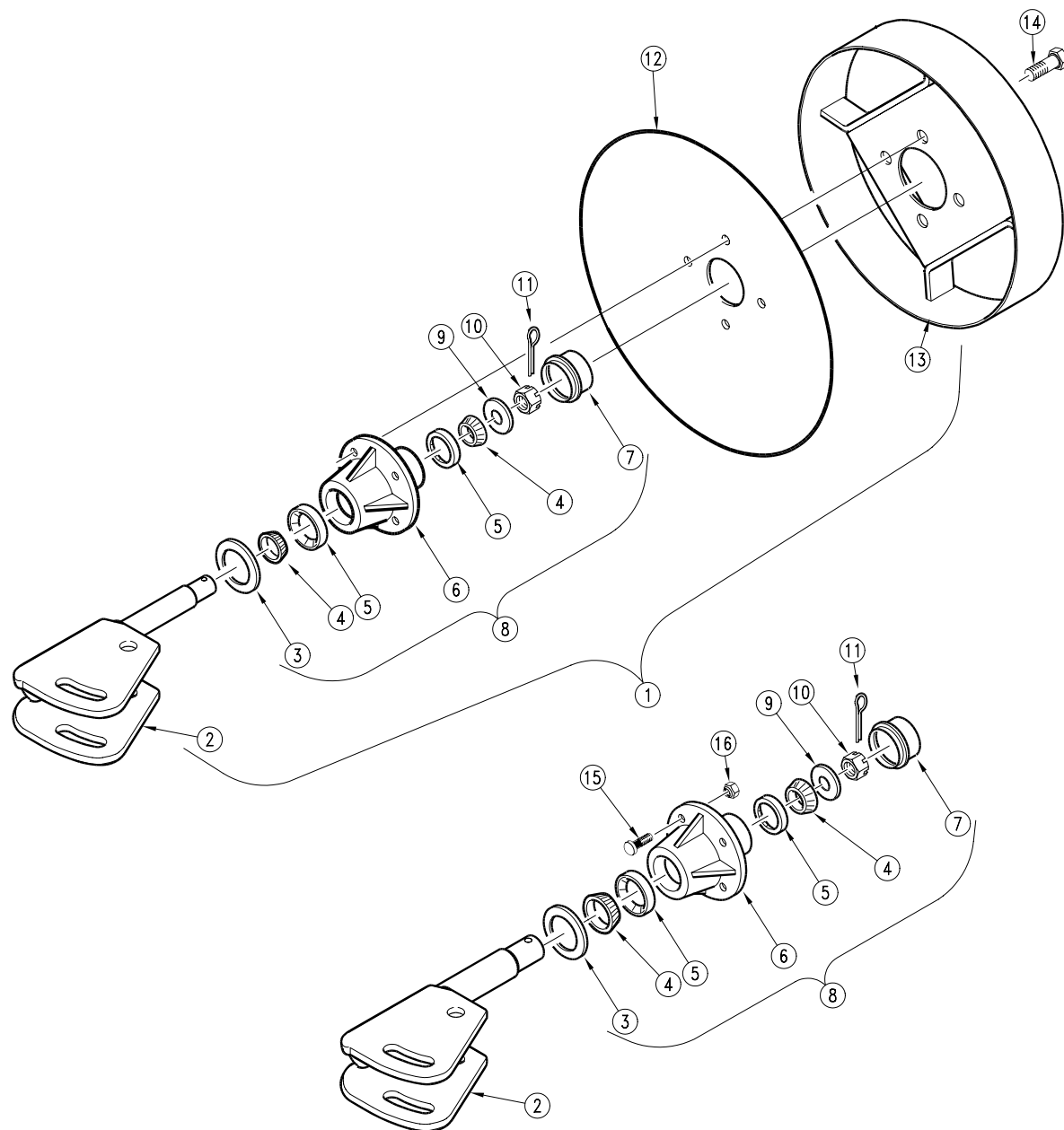
	Solution
Hydraulic marker functioning improperly	Check all hose fittings and connections for air and oil leaks.
	Check tractor hydraulic oil level.
	Check all bolts and fasteners.
	If needle valve is plugged; open valve, cycle markers, and reset the needle valve.
Blade does not mark	The maximum marker down float is limited by the slot in the pivot link. If the blade does not drop down to follow depressions in the field, make sure the marker cylinder is fully extended.
	The blade may be reversed to pull dirt in or throw dirt out depending on soil conditions.



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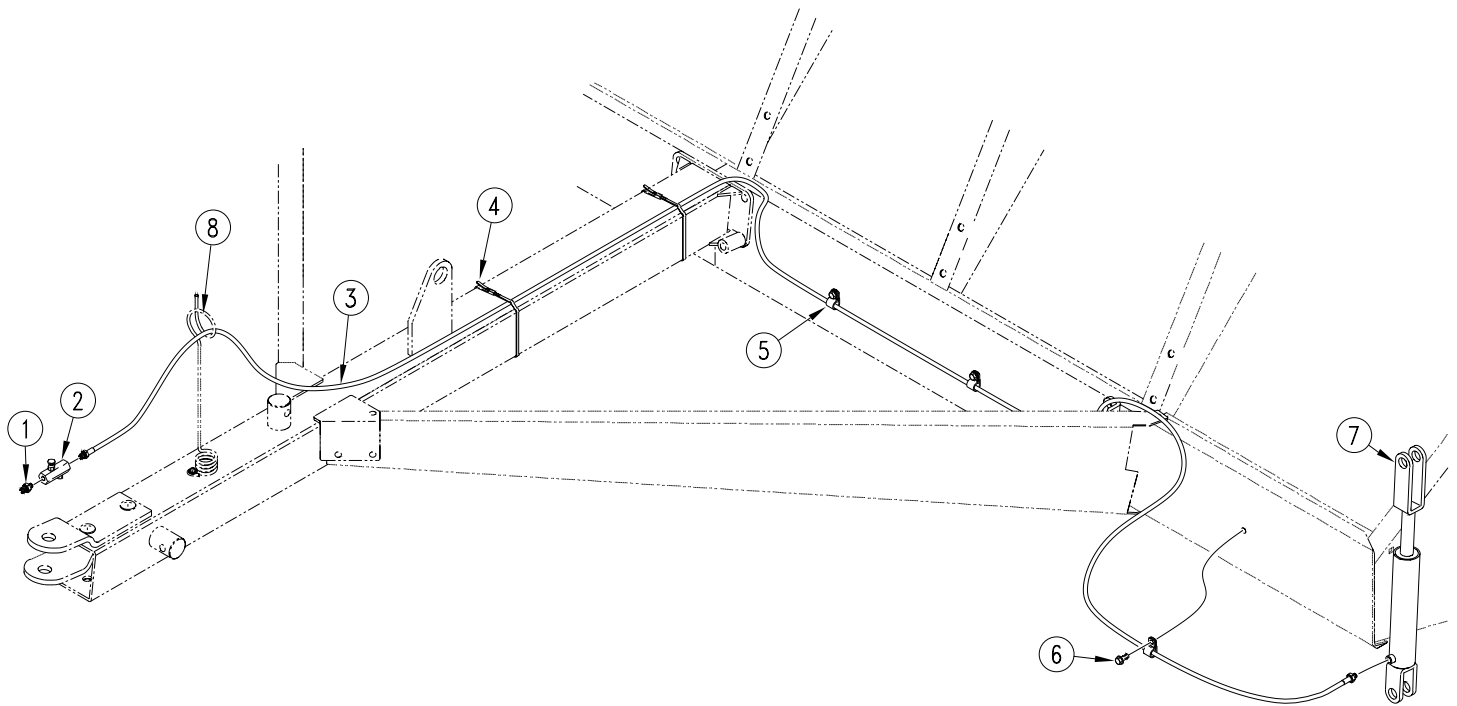
## Section 6 Marker Assembly

Ref.	Part No.	Part Description
1.	113-364S	Marker Disk & 4-Bolt Hub Assembly
2.	804-015C	Washer, Lock Spring 1/2"
3.	803-020C	Nut, Hex 1/2"-13 Gr 2
4.	804-017C	Washer, Flat 1/2" USS
5.	802-039C	Bolt, Hex Head Cap 1/2"-13 x 3" Long
6.	113-354D	13' Marker Tube 46 1/2" Long
7.	113-148H	Marker Pivot Pin Weldment
8.	805-016C	Pin, Cotter 3/16" x 1 1/4" Long
9.	113-149H	Marker Pivot Angle Weldment - Left Hand
	113-150H	Marker Pivot Angle Weldment - Right Hand
10.	804-016C	Washer, Flat 1/2" SAE
11.	800-001C	Zerk, Straight 1/4"-28
12.	113-164D	Marker Lock Pin
13.	807-031C	Marker Lock Spring
14.	800-051C	Ring, Split 1 1/4" ID
15.	113-143H	End Wheel 13' Marker Left Hand Hydraulic
	113-144H	End Wheel 13' Marker Right Hand Hydraulic
16.	113-173D	Pivot Support Angle - Left Hand
	113-172D	Pivot Support Angle - Right Hand
17.	804-026C	Washer, Flat 7/8" SAE
18.	113-174D	Marker Support Angle - Left Hand
	113-175D	Marker Support Angle - Right Hand
19.	802-034C	Bolt, Hex Head Cap 1/2"-13 x 1 1/4" Long
20.	803-036C	Nut, Hex Jam 1/2"-13
21.	802-106C	Bolt, Round Head Square Neck 1/2"-13 x 1 1/2" Long
22.	113-155H	Spring Strap Weldment - Left Hand
	113-151H	Spring Strap Weldment - Right Hand
23.	113-156H	Spring Strap Weldment - Top
24.	113-182D	Clevis Spacer Bushing
25.	804-029C	Washer, Flat 1" SAE
26.	805-017C	Pin, Cotter 3/16" x 1 3/4" Long
27.	807-030C	Marker Spring
28.	810-075C	Cylinder 2" x 8" x 1.12 Rod - Single Acting



## Section 6 Disk Assembly

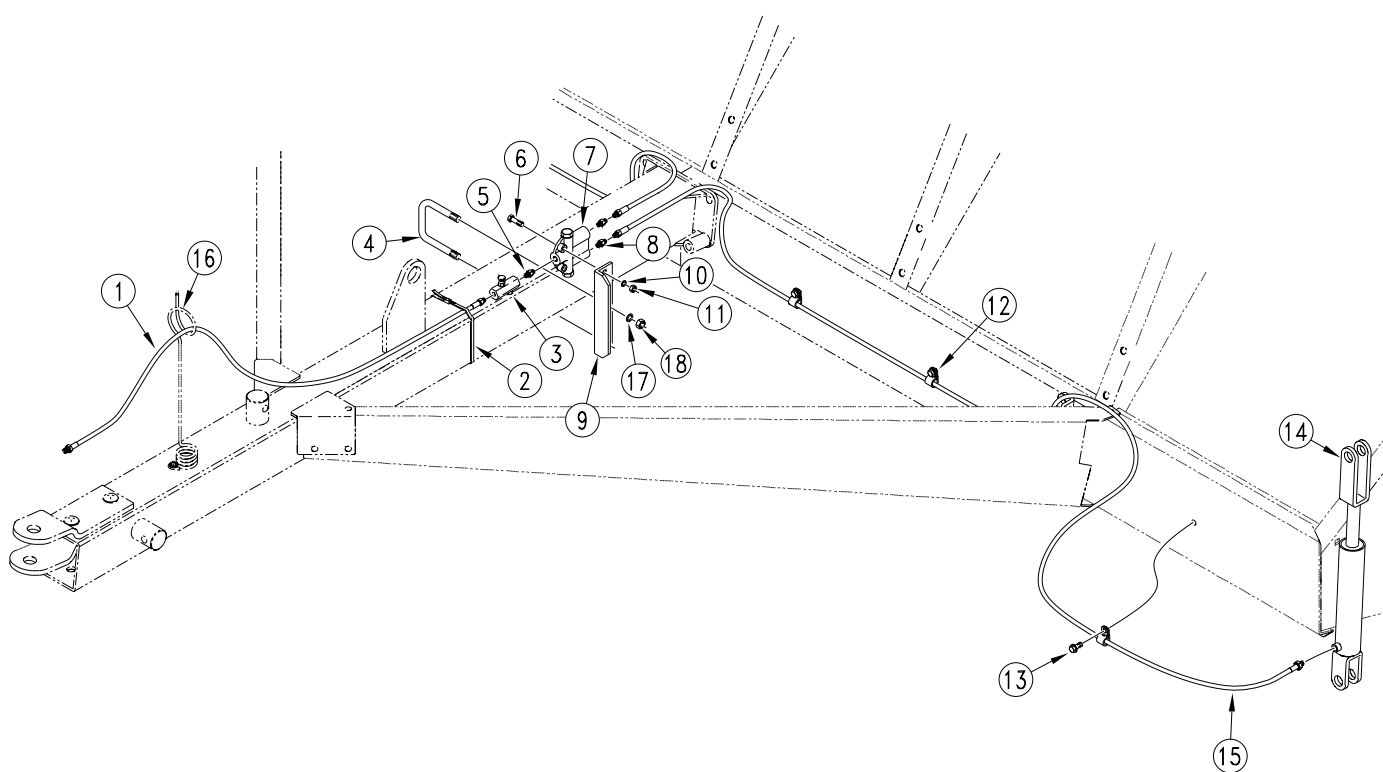
Ref.	Part No.	Part Description
1.	113-364S	Marker Disk & 4-Bolt Hub Assembly
2.	113-363H	Marker Disk Spindle
3.	816-135C	Seal, 1" x 1.785" x 0.469"
4.	822-045C	Bearing Cone
5.	822-050C	Bearing Cup
6.	815-039C	Hub Machined With Cups
7.	890-213C	Cap, Grease 1.785" x 0.89"
8.	815-038C	Hub Assembly 4" 4-Bolt 2.25" 3/4" Bearing
9.	804-021C	Washer, Flat 5/8" SAE
10.	803-185C	Nut, Hex Slotted 5/8"-18
11.	805-019C	Pin, Cotter 5/32" x 1" Long
12.	820-098C	Disk, Marker 14" x 4-Bolt
13.	113-369H	Depth Band 10" x 4-Bolt {For Smooth Blade Only}
14.	802-240C	Bolt, Hex Head 1/2"-20 x 1" Long





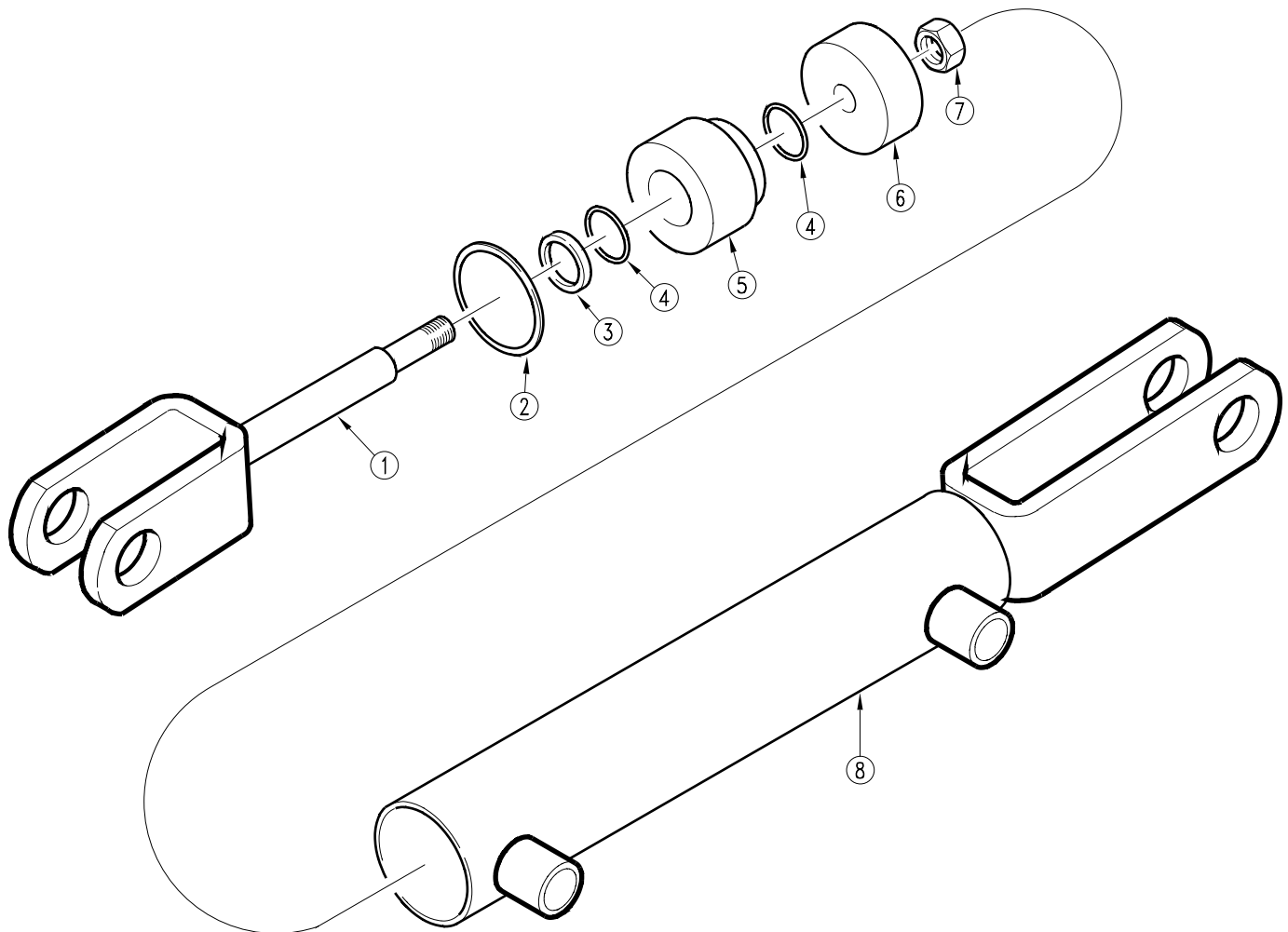
## Section 7 Single Hydraulic Assembly

Ref.	Part No.	Part Description
1.	811-155C	Fitting 1/2" M Pipe x 3/8" M Pipe
2.	810-024C	One-Way Restrictor
3.	811-210C	Hydraulic Hose 1/4" R1 x 234" Long x 3/8" MNPT
4.	800-035C	Plastic Tie Strap
5.	800-052C	Hose Clamp
6.	802-191C	Bolt, Flanged 3/8"-16 x 2 1/2" Long {Existing}
7.	810-075C	Cylinder 2" x 8" Stroke
8.	807-023C	Spring Type Hose Loop {Existing}



## Section 7 Dual Hydraulic Assembly

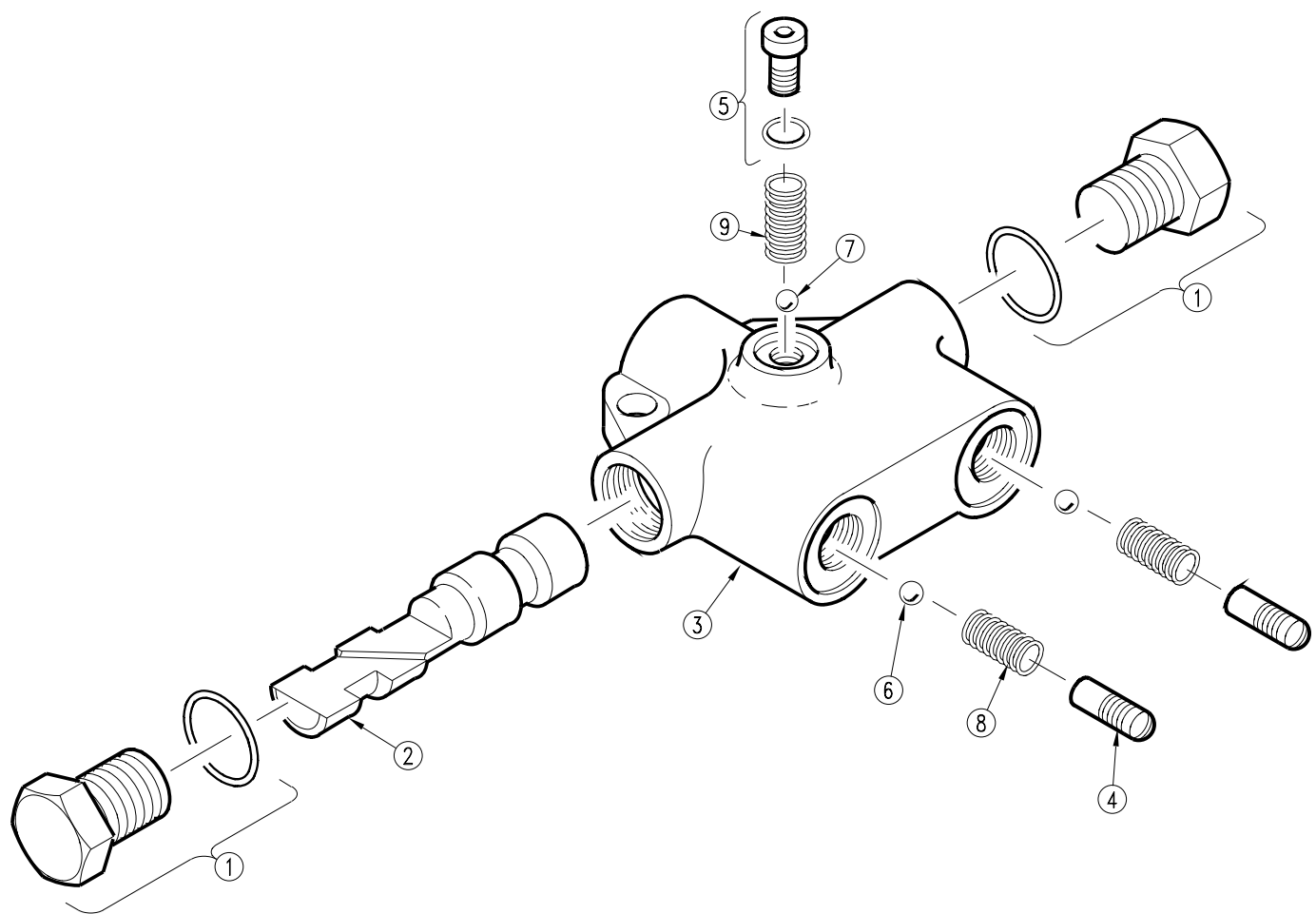
Ref.	Part No.	Part Description
1.	811-208C	Hydraulic Hose 1/4" x 1/2" MNPT x 3/8" MNPT 128" Long
2.	800-035C	Plastic Tie Strap
3.	810-024C	One-Way Restrictor Valve
4.	806-033C	U-Bolt 1/2"-13 x 4 1/32" x 6" Long
5.	811-190C	Fitting 3/8" MNPT x 3/4" MORB
6.	802-023C	Bolt, Hex Head 3/8"-16 x 1 3/4" Long
7.	810-006C	Sequence Valve
8.	811-133C	Adapter Fitting 3/4" ORB x 9/16" JIC
9.	113-181D	Sequence Valve Mount
10.	804-013C	Washer, Lock 3/8"
11.	803-014C	Nut, Hex 3/8"-16
12.	800-052C	Hose Clamp
13.	802-191C	Bolt, Flanged 3/8"-16 x 2 1/2" Long {Existing}
14.	810-075C	Cylinder 2" x 8" Stroke
15.	811-207C	Hydraulic Hose 1/4" x 100" Long
16.	807-023C	Spring Type Hose Loop {Existing}
17.	804-015C	Washer, Lock 1/2"
18.	803-020C	Nut, Hex 1/2"-13



## Section 7 Hydraulic Cylinder (810-075C)

Ref.	Part No.	Part Description
1.	A-2526	Piston Rod & Clevis
2.	83198	Retaining Ring
3.	*	Wiper Seal
4.	*	Piston Rod O-Ring
5.	A-1906	Head
6.	A-1845	Piston
7.	82464	Piston Locking Nut
8.	B-5704	Cylinder with Clevis
9.	810-012C	Seal Kit

\*Can Only Be Ordered In Seal Kit (#9)



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## Section 7 Sequence Valve (810-006C)

Ref.	Part No.	Part Description
1.	1V1880	O-Ring Boss Plug Assembly
2.	1V1882	Spool
3.	1V2003	Body Machining
4.	1V2003	Check Valve Retainer
5.	3-V4152-022	O-Ring Boss Plug Assembly
6.	2A0017-6	3/16" Ball
7.	2A0017-8	1/4" Ball
8.	2A9018-3	Check Valve Spring
9.	2A9024-1	Spring
	2A0353-12	Shipping Plug

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