



SERVICE MANUAL

C1 CONTOUR AIR DRILL

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Specifications

25 and 31 foot Contour Air Drill Specifications and Options

Base Size		25' (7.62 m)	31' (9.45 m)
Weight	- 10" Spacing	14,738 lb	16,025 lb
	25.4 cm Spacing	6,685 kg	7,269 kg
	- 12" Spacing	13,933 lb	15,155 lb
	30.5 cm Spacing	6,320 kg	6,874 kg
Working Width	- 10" (25.4 cm) Spacing	25' (7.62 m)	30' (9.14 m)
	- 12" (30.5 cm) Spacing	25' (7.62 m)	31' (9.45 m)
Number of Shanks	- 10" (25.4 cm) Spacing	30	36
	- 12" (30.5 cm) Spacing	25	31
Frame Extentions	- 2 Ft (61 cm)	1 (12" spacing only)	1
Frame Width	- Main	5' (1.524 m)	5' (1.524 m)
	- Wing	10' (3.048 m)	13' (3.962 m)
Transport Position	- Width	9' 10" (3 m)	9' 10" (3 m)
	- Height	13' 6" (4.12 m)	15' 11" (4.851 m)
	- Length	31' 6" (9.6 m)	31' 6" (9.6 m)
Opener to Ground Clearance		12" (30.5 cm)	12" (30.5 cm)
Tires	- Main Frame Wheels	(4) 12.5L x 15 FI Load Range F	(4) 12.5L x 15 FI Load Range F
	- Wing Frame Front Castor Wheels (1 per wing)	(2) 12.5SL x 15 12 Ply Rating	(2) 12.5SL x 15 12 Ply Rating
	- Wing Frame Rear Wheels (1 per wing)	(2) 12.5SL x 15 12 Ply Rating	(2) 12.5SL x 15 12 Ply Rating
Opener	- Trip Out Force	Increases proportionally with Packing Force to a maximum of 600 lbs (272 kg)	
	- Packing Force	Adjustable from 70 lbs to 170 lbs (31.7 kg - 77.1 kg)	
	- Packer Wheel	4.80" x 16" Semi Pneumatic or Pneumatic 5.50" x 16" Semi-Pneumatic 4.00" x 16" "V" Crown	
Frame to Ground Clearance		32" (81 cm)	
Frame Depth		94" (238.8 cm) center to center	
Rank to Rank Spacing		47" (119.4 cm) center to center	
Number of Ranks		3 Rows	
Shank to Shank Spacing		30" (76.2 cm) on 10" (25.4 cm) Spacing 36" (91.4 cm) on 12" (30.5 cm) Spacing	
Weight Kit		Optional	
Safety Lights		Standard	
Safety Chain		Standard	

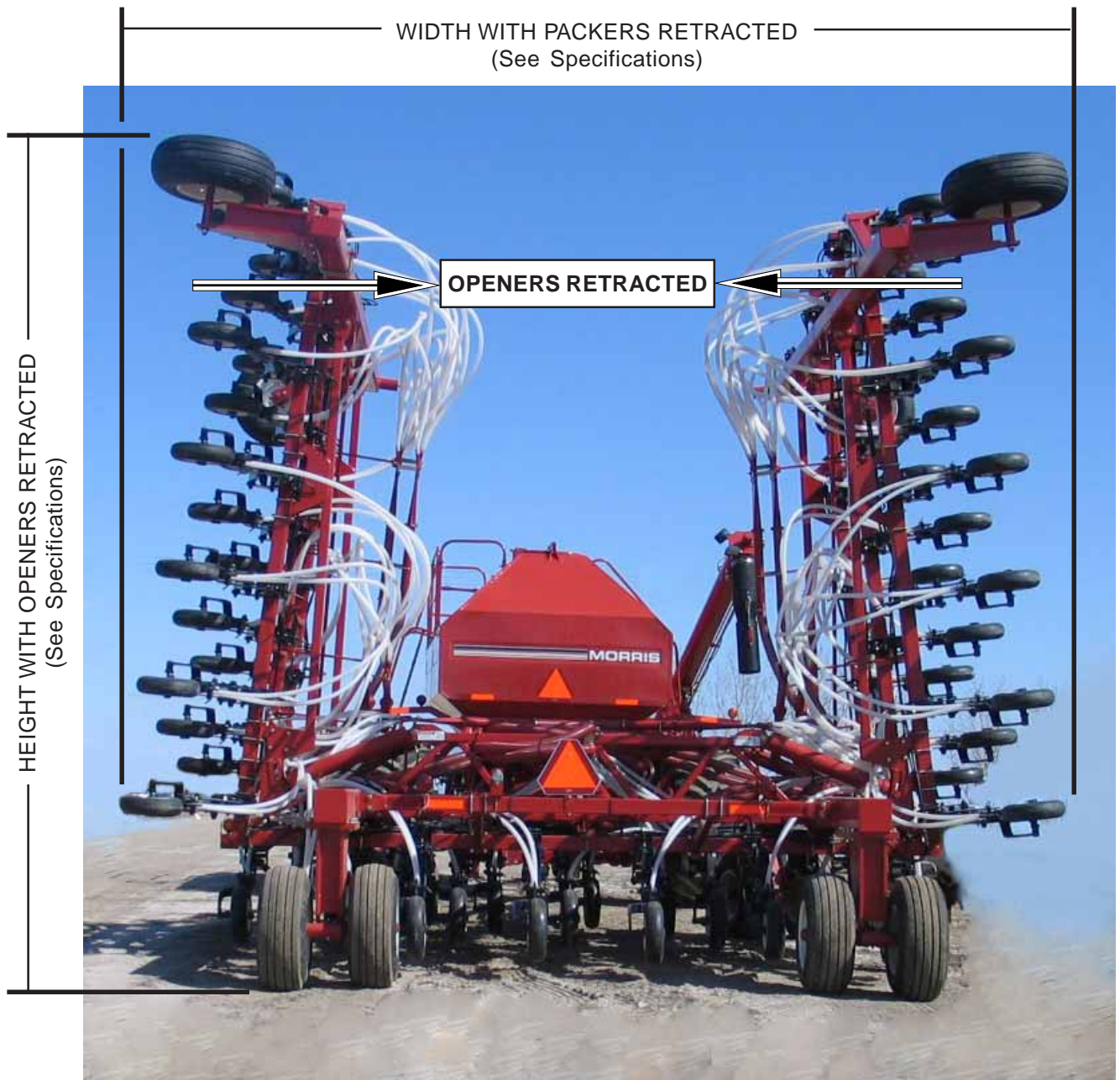
Specifications are estimates and subject to change.

41 to 86 foot Contour Air Drill Specifications and Options

Base Size	3 Frame Models			5 Frame Models			
	41' (12.5 m)	47' (14.32 m)	51' (15.54 m)	61' (18.59 m)	71' (21.64 m)	80' (24.38 m)	86' (26.21 m)
Weight	- 10" Spacing	20,928 lb	22,873 lb	24,622 lb	31,392 lb	35,441 lb	NA
	25.4 cm Spacing	9,470 kg	10,350 kg	11,168 kg	14,239 kg	16,109kg	NA
	- 12" Spacing	19,572 lb	21,366 lb	23,137 lb	29,358 lb	33,264 lb	41,000 lb
	30.5 cm Spacing	8,856 kg	9,668 kg	10,495 kg	13,317 kg	15,120 kg	18,600 kg
Working Width	- 10" (25.4 cm) Spacing	41.67' (12.70 m)	46.67' (14.22 m)	50' (15.24 m)	60' (18.29 m)	70' (21.34 m)	NA
	- 12" (30.5 cm) Spacing	41' (12.5 m)	47' (14.32 m)	51' (15.54 m)	61' (18.59 m)	71' (21.64 m)	80' (24.38 m)
Number of Shanks	- 10" (25.4 cm) Spacing	50	56	60	72	84	NA
	- 12" (30.5 cm) Spacing	41	47	51	61	71	80
Frame Width	- Main	16' (4.88 m)	16' (4.88 m)	16' (4.88 m)	16' (4.88 m)	16' (4.88 m)	21' (6.40 m)
	- Wing Inner	12' (3.66 m)	15' (4.57 m)	17.5' (5.334 m)	12' (3.66 m)	15' (4.57 m)	15' (4.57 m)
	- Wing Outer	N/A	N/A	N/A	10' (3.05 m)	12' (3.66 m)	14.45 (4.4 m)
Transport Position	- Width	20' 6" (6.25 m)	20' 6" (6.25 m)	20' 6" (6.25 m)	20' 6" (6.25 m)	20' 6" (6.25 m)	25' (7.62 m)
	- Height	15' 2" (4.62 m)	18' 2" (5.54 m)	15' 2" (4.62 m)	15' 2" (4.62 m)	17' 10" (5.44 m)	17' 10" (5.44 m)
	- Length	31' 6" (9.6 m)	31' 6" (9.6 m)	31' 6" (9.6 m)	34' 10" (10.62 m)	34' 10" (10.62 m)	34' 10" (10.62 m)
Opener to Ground Clearance		12" (30.5 cm)	12" (30.5 cm)	12" (30.5 cm)	12" (30.5 cm)	12" (30.5 cm)	12" (30.5 cm)
Tires	- Main Frame Wheels	(8) 11L x 15 FI Load Range F	(8) 11L x 15 FI Load Range F	(8) 11L x 15 FI Load Range F	(8) 12.5L x 15 FI Load Range F	(8) 12.5L x 15 FI Load Range F	(8) 16.5 x16.1 FI Load Range E
	- Wing Frame Front Castor Wheels	Dual Castor (4) 11SL x 15 12 Ply Rating	Dual Castor (4) 11SL x 15 12 Ply Rating	Dual Castor (4) 11SL x 15 12 Ply Rating	Dual Castor (8) 12.5SL x 15 12 Ply Rating	Dual Castor (8) 12.5SL x 15 12 Ply Rating	Dual Castor (8) 12.5SL x 15 12 Ply Rating
	- Wing Frame Rear Wheels	(1 per wing) (2) 11SL x 15 12 Ply Rating	(1 per wing) (2) 11SL x 15 12 Ply Rating	(1 per wing) (2) 11SL x 15 12 Ply Rating	(1 per wing) (4) 12.5SL x 15 12 Ply Rating	(1 per wing) (4) 12.5SL x 15 12 Ply Rating	(2 per wing) (8) 12.5SL x 15 12 Ply Rating
Opener	- Trip Out Force	Increases proportionally with Packing Force to a maximum of 600 lbs (272 kg)					
	- Packing Force	Adjustable from 70 lbs to 170 lbs (31.7 kg - 77.1 kg)					
	- Packer Wheel	4.80" x 16" Semi Pneumatic or Pneumatic 5.50" x 16" Semi-Pneumatic 4.00" x 16" "V" Crown					
Frame to Ground Clearance		32" (81 cm)					
Frame Depth		94" (238.8 cm) center to center					
Rank to Rank Spacing		47" (119.4 cm) center to center					
Number of Ranks		3 Rows					
Shank to Shank Spacing		30" (76.2 cm) on 10" (25.4 cm) Spacing 36" (91.4 cm) on 12" (30.5 cm) Spacing					
Weight Kit		Optional					
Safety Lights		Standard					
Safety Chain		Standard					

Specifications are estimates and subject to change.

Transport Dimensions





Service

Bolt Torque Specifications

- Use Bolt Torque Chart for correct values on various bolts.
- Note dashes on hex heads to determine correct grade.

Note: DO NOT use the values in the Bolt Torque Chart if a different torque value or tightening procedure is given for a specific application.

Bolt Torque Chart				
Grade 5 Bolt Marking 		Bolt Size	Grade 8 Bolt Marking 	
Nm	lb. ft.		lb. ft.	Nm
11	8	1/4	12	16
23	17	5/16	24	33
41	30	3/8	45	61
68	50	7/16	70	95
102	75	1/2	105	142
149	110	9/16	155	210
203	150	5/8	210	285
366	270	3/4	375	508
536	395	7/8	610	827
800	590	1	910	1234
1150	850	1-1/8	1350	1850
1650	1200	1-1/4	1950	2600
2150	1550	1-3/8	2550	3400
2850	2100	1-1/2	3350	4550

Tires

- Inspect tires and wheels daily for tread wear, side wall abrasions, damaged rims or missing lug bolts and nuts. Replace if necessary.
- Tighten wheel bolts - refer to Bolt Torque Chart.
- Check tire pressure daily, when tires are cold.
- Correct tire pressure is important.
- Do not inflate tire above the recommended pressure.



Caution

Tire replacement should be done by trained personnel using the proper equipment.

Tire Specifications

SIZE	LOAD RANGE	PRESSURE
4.80-8 NHS	4 ply rating	12 P.S.I.
11L x 15SL	6 ply rating	28 P.S.I.
11L x 15SL	12 ply rating	52 P.S.I.
11L x 15FI	F	90 P.S.I.
12.5L x 15SL	8 ply rating	36 P.S.I.
12.5L x 15SL	12 ply rating	52 P.S.I.
12.5L x 15FI	F	90 P.S.I.
16.5L x 16.1FI	E	60 P.S.I.

Wheel Bolt Torque

SIZE	Torque
1/2	80 lb. ft. (108 Nm)
9/16	110 lb. ft. (149 Nm)
5/8	150 lb. ft. (203 Nm)

C1 Opener



Service

Opener Maintenance

Bushing Replacement

In the event the pivot pin bushings need replacing, use the following procedure.

- Move “System” ball valve to bleed off/service position and **relieve all pressure** from the accumulator circuit using the tractor remote.
- Shut tractor engine off and ensure park brake is engaged before proceeding.
- Place “Openers” ball valve into locked position to prevent accidental oil flow to openers.
- Once the pressure is off of the accumulator circuit, opener can be disassembled as illustrated in diagram on the following page.

Reverse the above procedure to reassemble trip.

Note: Bleed air from hydraulic circuit before using unit. Refer to “Bleeding Hydraulic System” for details.

Cylinder Replacement

In the event the opener cylinder needs repair or replacing, use the following procedure.

- Move “System” ball valve to bleed off/service position and **relieve all pressure** from the accumulator circuit using the tractor remote.
- Shut tractor engine off and ensure park brake is engaged before proceeding.
- Place “Openers” ball valve into locked position to prevent accidental oil flow to openers.
- Once the pressure is off of the accumulator circuit, disconnect hydraulic hoses from opener cylinder.
- Refer to diagram on following page to remove the pins from the opener cylinder.
- Remove the cylinder. Repair or replace cylinder as necessary.

Reverse the above procedure to reassemble trip.

Note: Bleed air from hydraulic circuit before using unit. Refer to “Bleeding Hydraulic System” for details.

Warning



HIGH-PRESSURE FLUID HAZARD

To prevent serious injury or death:

- **Relieve pressure on hydraulic system before servicing or disconnecting hoses.**
- **Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.**
- **Keep all components in good repair.**

Warning

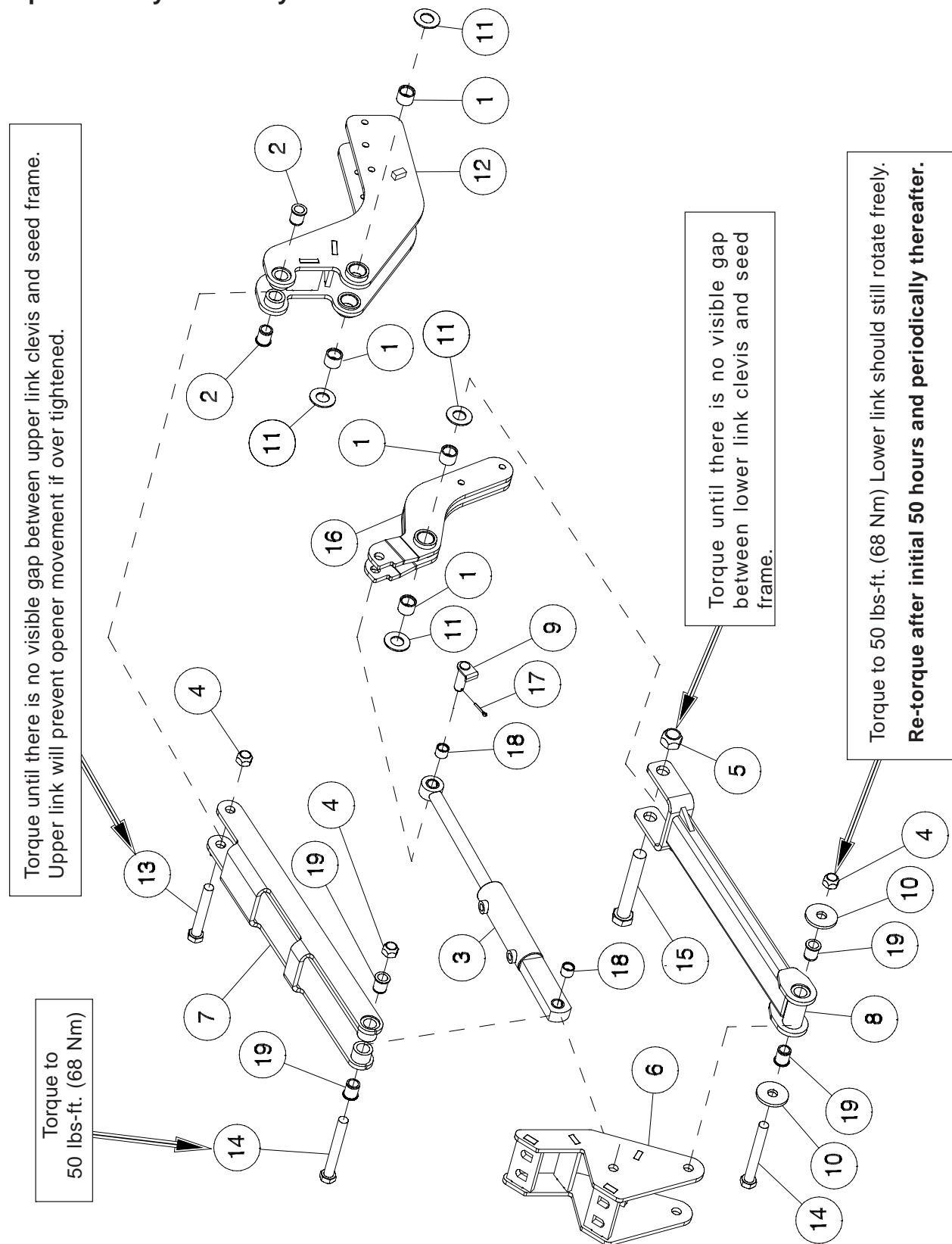
CRUSHING HAZARD

To prevent serious injury or death:

- **Stand clear - openers move rapidly under hydraulic pressure.**
- **Place valve in service position.**
- **Relieve pressure on hydraulic system before servicing.**
- **Lower openers to ground before adjusting depth.**
- **Shut tractor off and remove key.**

Opener Maintenance - Continued

Opener Body Assembly



Service

Opener Maintenance - Continued

Opener Body Assembly

Item	Part No.	Description	Qty
1	S47527	Bottom Bushing - 1.0062 ID x 1.261 OD x 1 Lg	4
2	C26525	Nylon Bushing	2
3	C42912	Hyd Cylinder - 1 3/4 Bore x 3 1/4 Stroke	1
	C44461	Seal Kit	
4	D-5273	Unitorque Locknut - 3/4	3
5	D-5274	Unitorque Locknut - 1	1
6	S42565	Mounting Bracket	1
7	S48852	Top Link - C2 (Replaces S42583)	1
8	S48853	Lower Link - C2 (Replaces S42661)	1
9	S42673	Lipped Pin - 3/4 Dia x 1 29/32 UL	1
10	S42674	Washer - 2 1/2 OD x 25/32 ID x 1/4	2
11	S42675	Washer - 1 1/32 ID x 2 OD x 1/8	4
12	S42690	Seed Frame	1
13	S42949	Hex Bolt - 3/4 x 5 Lg	1
14	S42951	Hex Bolt - 3/4 x 5 7/8 Lg	2
15	S42952	Hex Bolt - 1 x 6 1/2 Lg	1
16	S44920	Shank Holder - Cast	1
17	W-530	Cotter Pin - 5/32 x 1 Lg	1
18	S44397	Bushing - 3/4 ID x 1 OD x 1 Lg	2
19	S44397	Polygon Bushing - C2 (Used in links S48852 & S48853)	4
19A	C26525	Nylon Bushing - C1 (Used in links S42583 & S42661)	4

Note: Openers should drop to the ground under their own weight, when the tractor remote is placed into float position relieving oil pressure.

If it requires pressure to push an opener down to the ground during this procedure, one or more of the pivot bolts are over tightened.

Check and adjust pivot bolts as required.

Important

Put ball valve in "Service" position and remove all pressure from hydraulic systems before attempting any service work on hydraulic components.

Hydraulic system must be bled after it has been serviced (if any portion of the system has been opened to atmosphere)

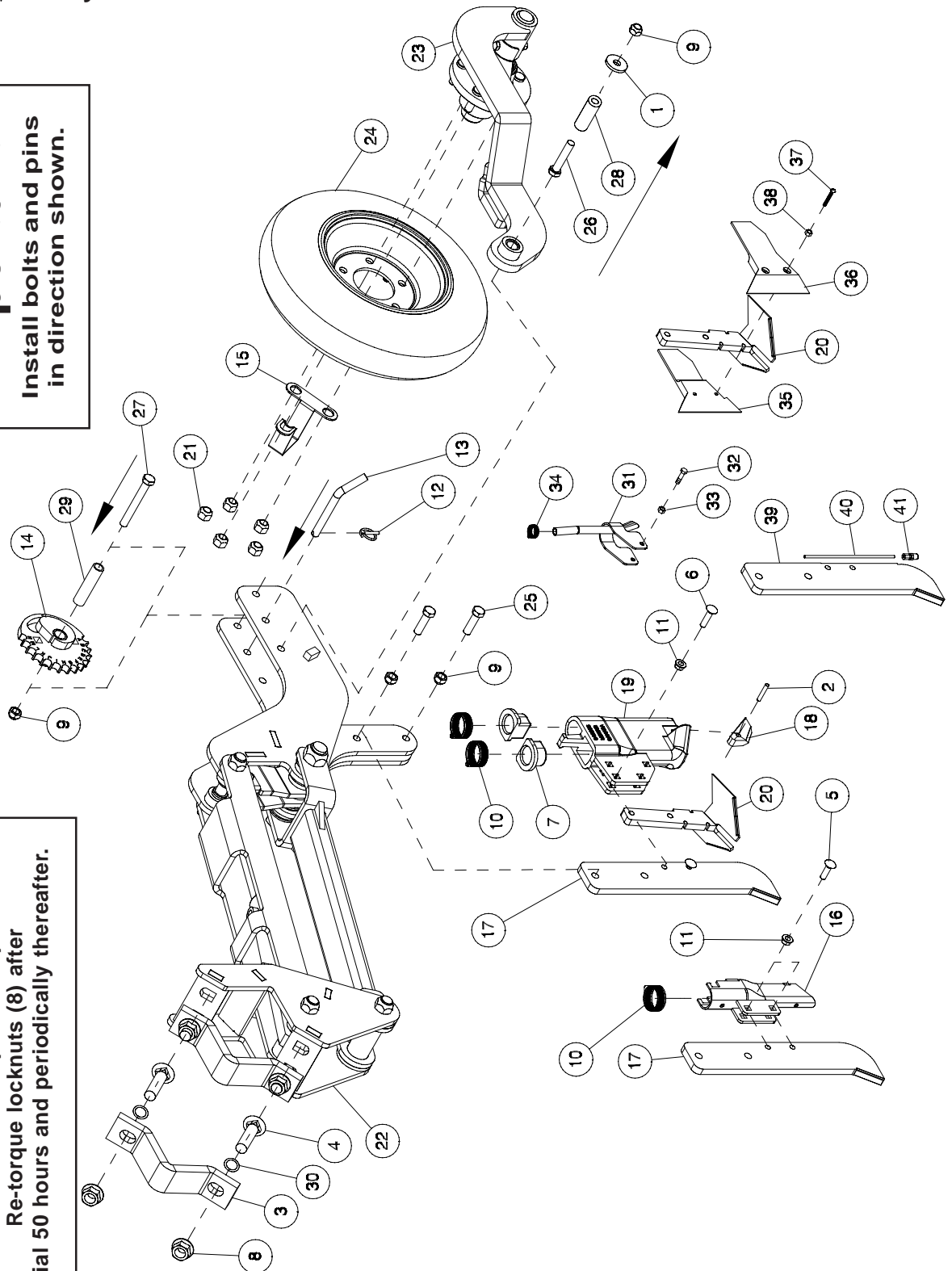
Opener Maintenance - Continued

Opener Assembly

Important
Install bolts and pins
in direction shown.

Important

Torque Locknuts (8) to
170 ft. lbs. (230 Nm)
Re-torque locknuts (8) after
initial 50 hours and periodically thereafter.



Service

Opener Maintenance - Continued

Opener Assembly

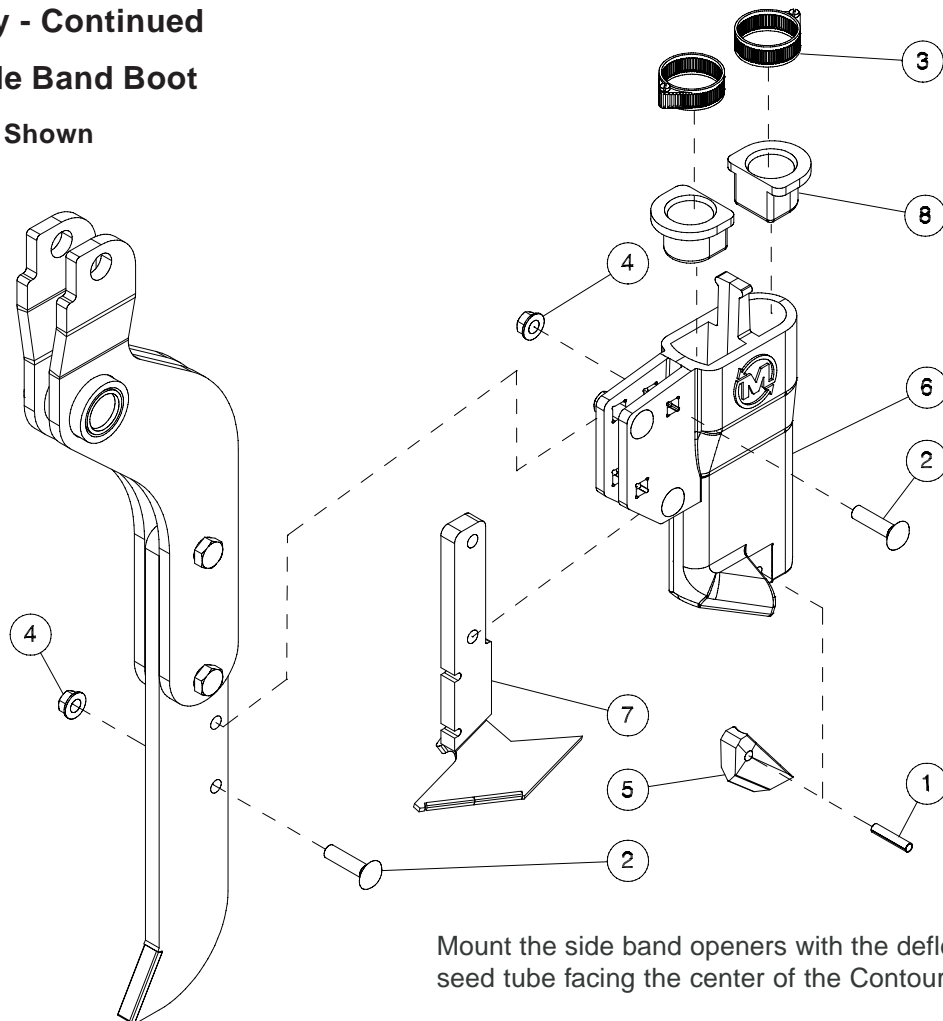
Item	Part No.	Description	Qty
1	C-333	Washer - 33/64 ID x 1 1/2 OD X 3/16 Thick	1
2	D-5243	Spiral Pin - 1/4 x 1 1/4 Lg	1
3	C26506	Clamp Strap	2
4	C33957	Carriage Bolt - 3/4 x 3 Lg	4
5	D-5260	Carriage Bolt - 3/8 x 1-1/4 Lg - Single Shoot Opener	2
6	D-5261	Carriage Bolt - 3/8 x 1-1/2 Lg - Double Shoot Opener	4
7	S47076	Grommet - For .929 ID x 1.169 OD Secondary Hose - Double Shoot Boot	2
8	D12942	Flange Lock Nut - 3/4	4
9	S47110	Locknut - 1/2	4
10	N11470	Hose Clamp - Single Shoot	1
		Hose Clamp - Double Shoot	2
11	S27987	Flange Lock Nut - 3/8 W/Center Lock	6
12	S42294	Lynch Pin - 3/16 Dia	1
13	S42659	Depth Pin - 1/2	1
14	S42687	Adjustment Cam	1
15	S42698	Dust Cap Retainer	1
16	S42865	Single Shoot Boot	1
17	S42940	Shank	1
	S47993	Shank - Heavy Duty	1
18	S42962	Cast Wear Tail	1
	S47980	Carbide Wear Tail	1
19	S42965	Double Shoot Boot	1
20	S42978	Paired Row Sweep	1
21	S-1196	Tapered Wheel Nut - 1/2	1
22	S44330	Subassembly - Parallel Link/Seed Frame	1
23	S44363	Packer Arm - Sub Assembly	1
24	S44405	Pneumatic Tire - 480	1
	S44300	Semi Pneumatic Tire - 480	1
	S44900	Semi Pneumatic Tire - 550	1
	S47093	"V" Crown Packer Tire - 400	1
25	W-487	Hex Bolt - 1/2 x 1 3/4 Lg	2
26	W-490	Hex Bolt - 1/2 x 2 1/2 Lg	1
27	W-495	Hex Bolt - 1/2 x 4 Lg	1
28	S42593	Bushing - 3/4 OD x .510 ID x 1.391 Lg	1
29	S44402	Bushing - 3/4 OD x .510 ID x 2 9/16 Lg	1
30	C33958	Retaining Ring	4
31	S44450	NH3 Tube	1
32	S45286	Hex Bolt - 1/4 x 1 13/16 Lg (Special)	1
33	N42510	Lock Nut - 1/4 Center	1
34	S31745	Hose Clamp - 3/4	1
35	S45313	Mud Guard - Right	1
36	S45312	Mud Guard - Left	1
37	S47128	Machine Screw - #10-24 x 1 3/4 Lg	2
38	N37787	Locknut - #10-24 UNC	2
39	S48832	Shank - High Pressure NH3	1
40	S48813	Injector tube - High Pressure NH3	1
41	S48814	Compression fitting - High Pressure NH3 - 1/8 tube x 1/8 male pipe	1

Opener Maintenance - Continued

Opener Assembly - Continued

Double Shoot Side Band Boot

Left Side Band Boot Shown



Mount the side band openers with the deflector and seed tube facing the center of the Contour Air Drill.

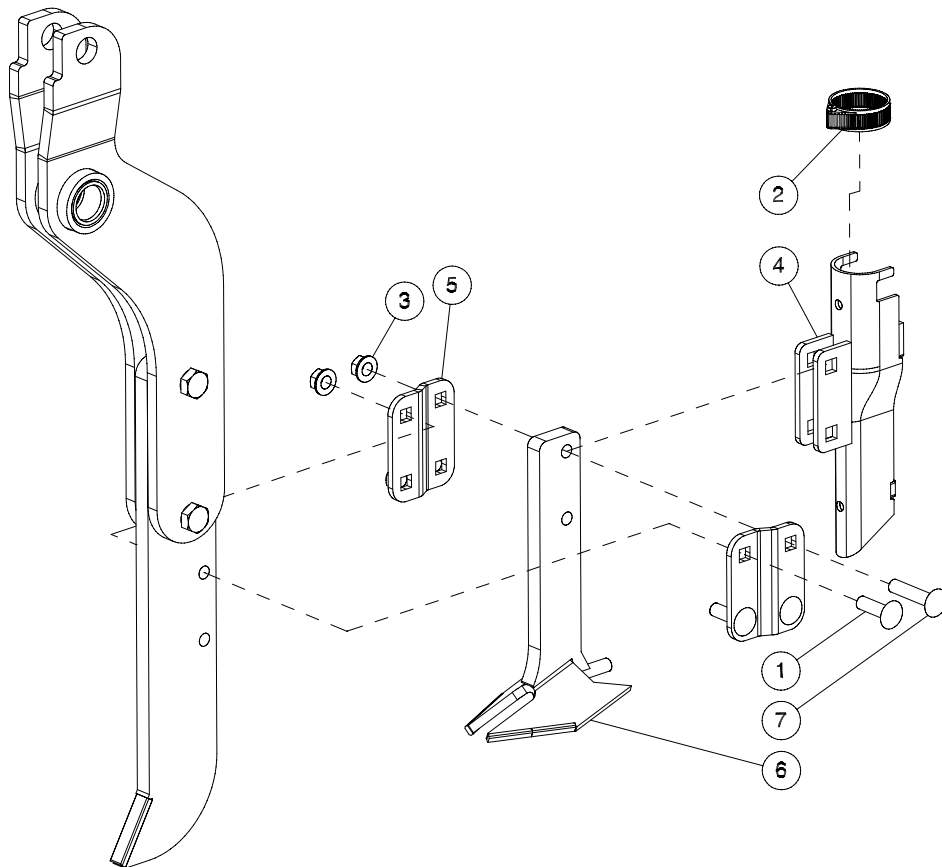
Item	Part No.	Description	Qty
1	D-5243	Roll Pin	1
2	D-5261	Carriage Bolt - 3/8 x 1 1/2 Lg.....	4
3	N11470	Hose Clamp	2
4	S27987	Flange Lock Nut - 3/8	4
5	S42962	Cast Wear Tail	1
	S47980	Carbide Wear Tail	1
6	S44977	Side Band Boot - Left	1
6A	S44976	Side Band Boot - Right	1
7	S44425	Seed Shovel - Side Band Boot - Left	1
7A	S45715	Seed Shovel - Side Band Boot - Right	1
8	S47076	Grommet - For .929 ID x 1.169 OD Secondary Hose	2
	N46131	Double Shoot Side Band BTS Kit - Left - (Includes items 1, 2, 3, 4, 5, 6, 7 and 8)	
	N46130	Double Shoot Side Band BTS Kit - Right - (Includes items 1, 2, 3, 4, 5, 6A, 7A and 8)	

Service

Opener Maintenance - Continued

Opener Assembly - Continued

Single Shoot 3" Spreader



Item	Part No.	Description	Qty
1	D-5260	Carriage Bolt - 3/8 x 1 1/2 Lg.....	2
2	N11470	Hose Clamp	1
3	S27987	Flange Lock Nut - 3/8	4
4	S42865	Single Shoot Boot	1
5	S45269	Mounting Plate	2
6	S45270	3" Wear Shovel.....	1
7	W14502	Carriage Bolt - 3/8 x 1 3/4 Lg.....	2
	N46129	Single Shoot 3" Spreader Kit - Includes all above Items	

Openers



Single shoot boot



**Single shoot boot with
3" SPREADER TIP**



**Double shoot boot with
High Pressure NH3**



**Double Shoot
Side Band boot**



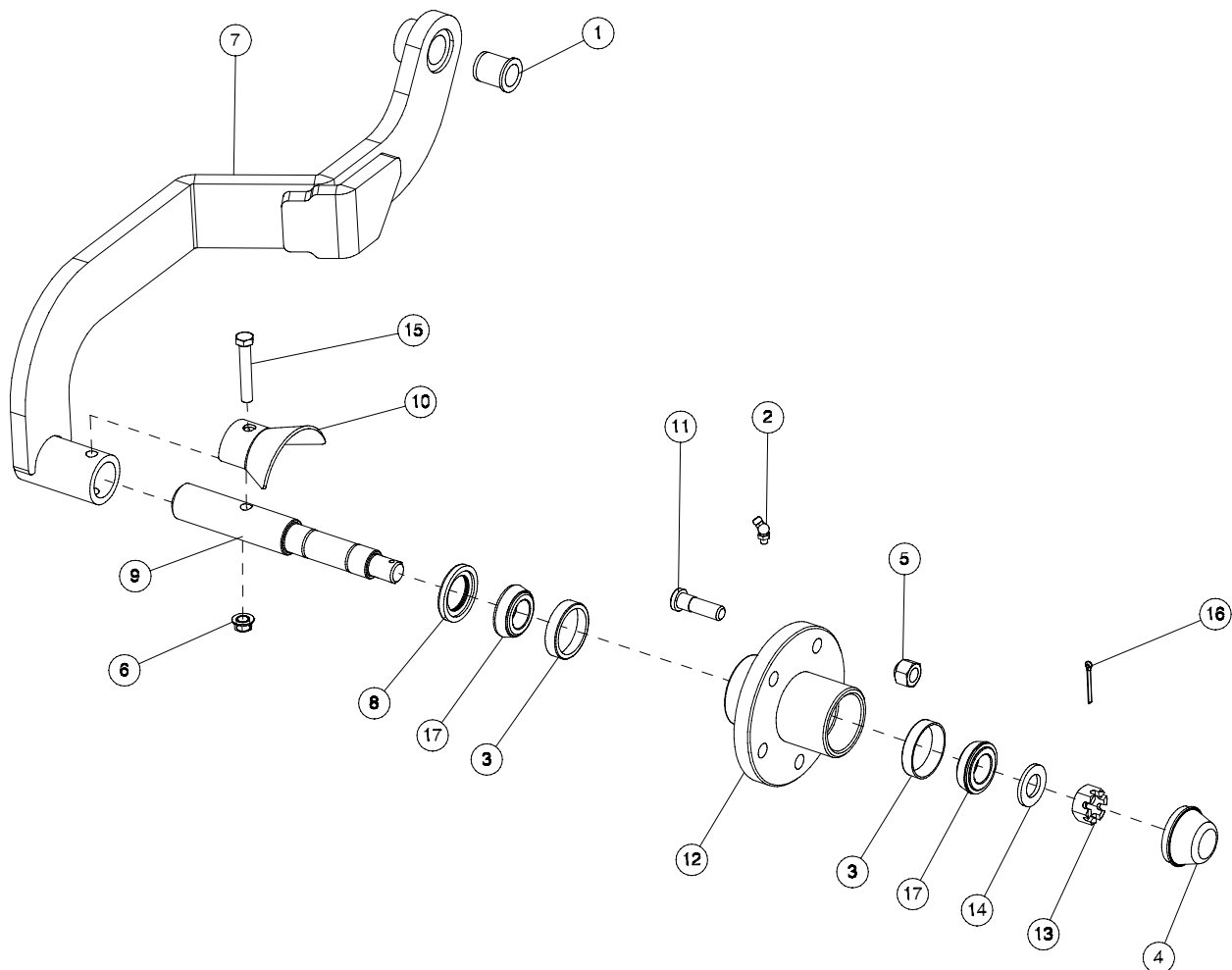
**Double shoot
Paired Row with
MUD GUARDS**



**Double shoot boot with
NH3**

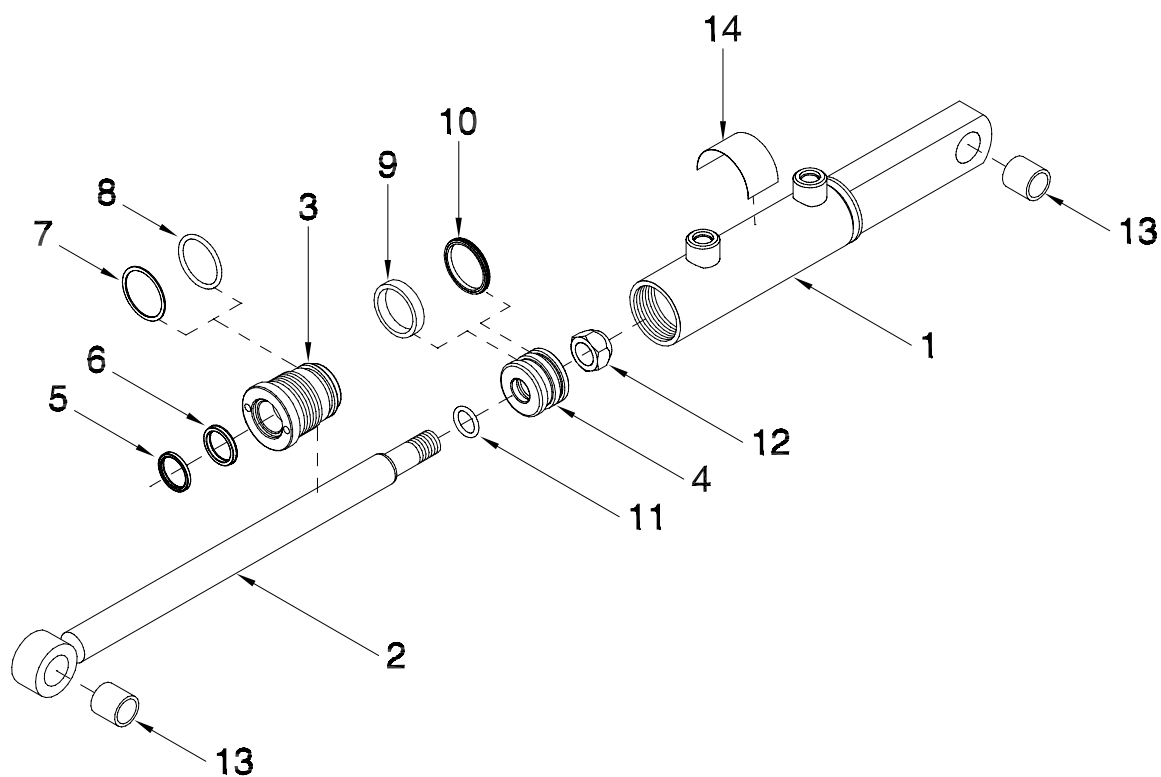


Opener Packer Arm Assembly



Item	Part No.	Description	Qty
1	C26525	Nylon Bushing	1
2	F-3009	Grease Zerk - 1/4 x 45 Degree	1
3	N14009	Bearing Cup - L44610	2
4	N14011	Dust Cap - DC11	1
5	S-1196	Tapered Wheel Nut - 1/2 20UNF	5
6	S27987	Flange Lock Nut - 3/8 W/Center Lock	1
7	S42689	Packer Arm	1
8	S42765	Dust Seal	1
9	S42908	Spindle - 1 1/4 Dia	1
10	S42932	Twine Guard	1
11	S44303	Press In Wheel Stud -1/2 20UNF	5
12	S44305	Hub - 5 Bolt (Includes items 2, 3, 11 and 12)	1
13	W-94	Hex Slotted Nut - 3/4 16 UNF	1
14	W-476	Flat Washer - 3/4	1
15	W-479	Hex Bolt - 3/8 x 2 1/4 Lg	1
16	W-529	Cotter Pin - 1/8 x 1 1/4 Lg	1
17	W-4187	Bearing Cone - L44643	2

Hydraulic Cylinders Opener Cylinder



Item	Part No.	Description	Qty
		Opener Cylinder - C42912 - 1 3/4 x 3 1/4	
1	C44939	Barrel - ORB	1
2	C44952	Cylinder Shaft	1
3	C44948	Gland	1
4	C44942	Piston	1
5	C44951	Wiper	1
6	C44949	Shaft Seal	1
7	C44947	Backup Ring	1
8	C44946	Gland Seal	1
9	C44943	Wear Ring	1
10	C44941	Piston Seal	1
11	C44944	Shaft Seal	1
12	K-5703	Locknut - 5/8 UNF Unitorque	1
13	S44397	Bushing	2
14	C42959	Part # Plate for C42912	1
	C42912	Cylinder Assembly (Includes All Above Items)	
	C44461	Seal Kit (Includes Items #5, 6, 7, 8, 9, 10 & 11)	

Wing Lift

Outer Wing Lift Rod

Check seasonally to ensure the wing lift rods on the outer wings are adjusted correctly.

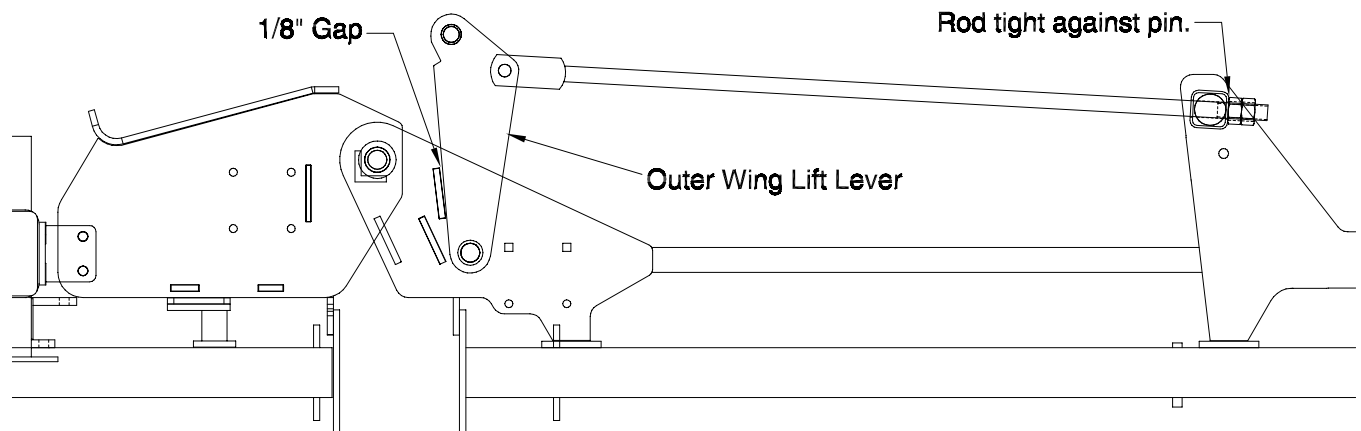
Adjust the Outer Wing Lift Rod as follows:

- With the cylinder disconnected pull the outer wing lift lever against the gusset in the lift arm.
- Adjust rod length until there is an 1/8" (3 mm) clearance between the outer wing lift lever and gusset.

Note: Do not exceed 1/8" (3 mm) clearance. Damage to frame components may result.

- Tighten jam nut to secure in place.

After initial wing-up the clearance will decrease, but do not re-adjust clearance.



Gravity Lock

Ensure gravity locks move freely in both directions.

Note: Damage to wing lift components will result if gravity locks malfunction.



Winged Up

Winged Down

Service

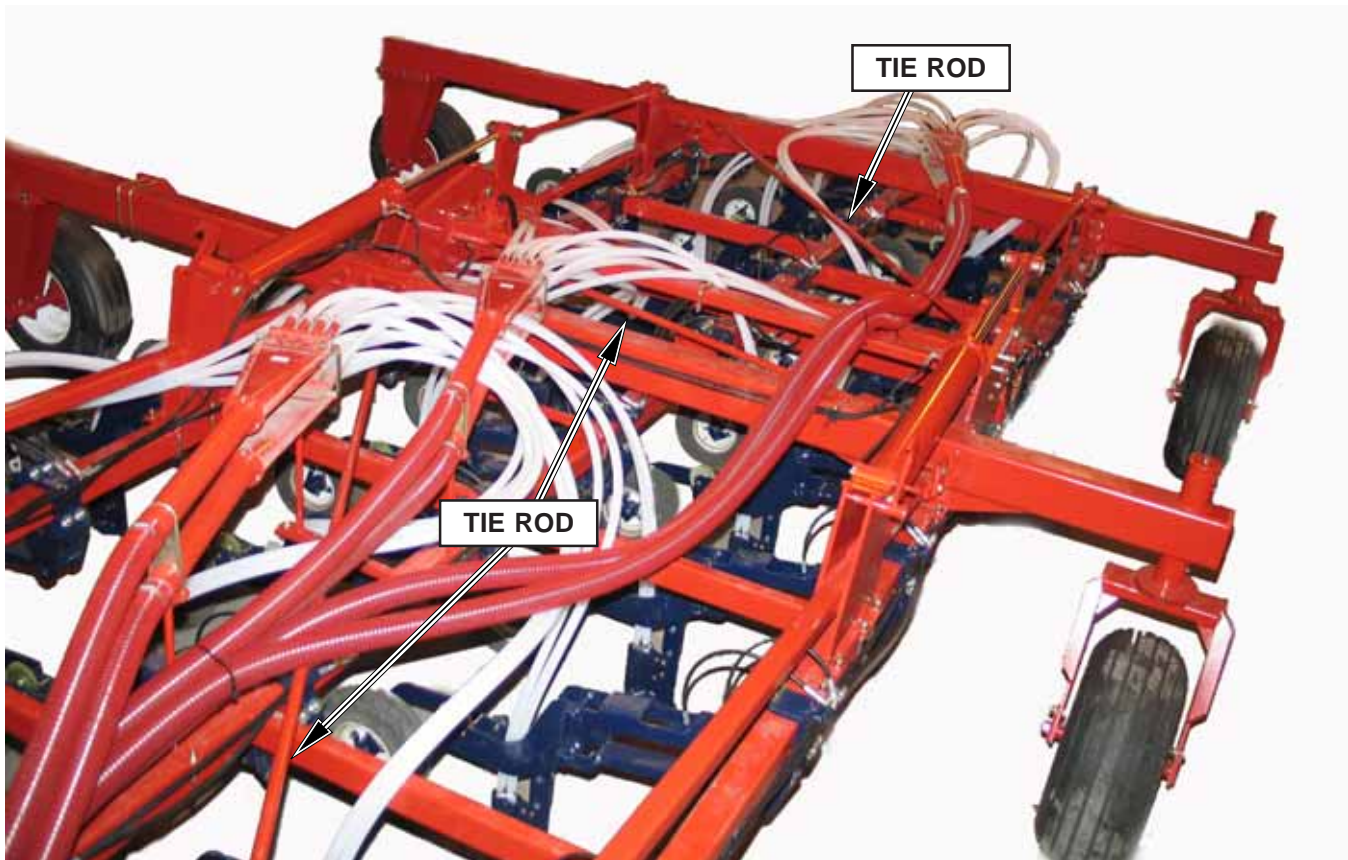
Wing Section Tie Rods

The tie rods are an integral part of the frame structure.

The wing tie rods must be torque to 175 ft lbs. (237 Nm). Check periodically as indicated below:

1. On delivery before field operation.
2. After first 1 hour of use.
3. After first 50 hours of use.
4. Check seasonally to ensure the tie rods on the wings are tight.

Note: Damage to frame components could result if tie rod tension is not maintained.



Wing Lift Hydraulics

The wing lift hydraulic system is controlled by a parallel hydraulic system. A pressure compensated Flow Control Valve is used to control the flow of oil to the cylinders allowing both wings to fold and unfold simultaneously. A hydraulic circuit Shut Off valve is used to lock the hydraulic circuit and prevent any leak back, this ensures the wings remain in transport.

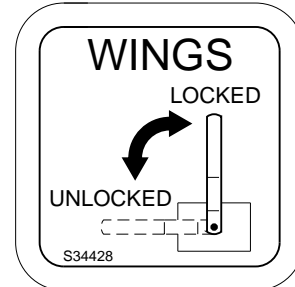
The Flow Control Valve is located on the main frame and there are no adjustments associated with the valve.

The Shut Off valve is located on the front wing lift truss for easy access.

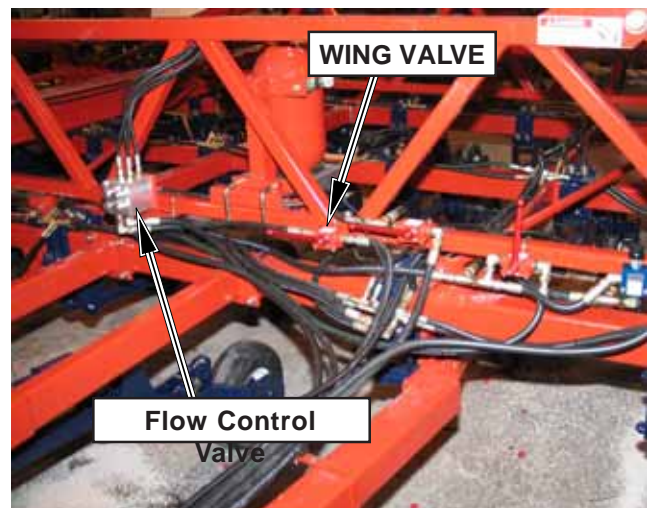
To unfold the Air Drill, the oil flows to the Flow Control Valve, from there to the butt end of all the wing lift cylinders extending the shafts and lowering the wings. All cylinders must be fully extended to ensure correct operation of the machine.

Placing the unit into transport is the reverse of unfolding the unit. Oil is fed to the shaft end of the cylinders retracting the cylinders and lifting the wings into transport position.

Note: When raising or lowering wings, do so in one continuous motion until fully up or down. Do not stop flow part way allowing wings to fold on their own. This may disrupt the sequence of operation.

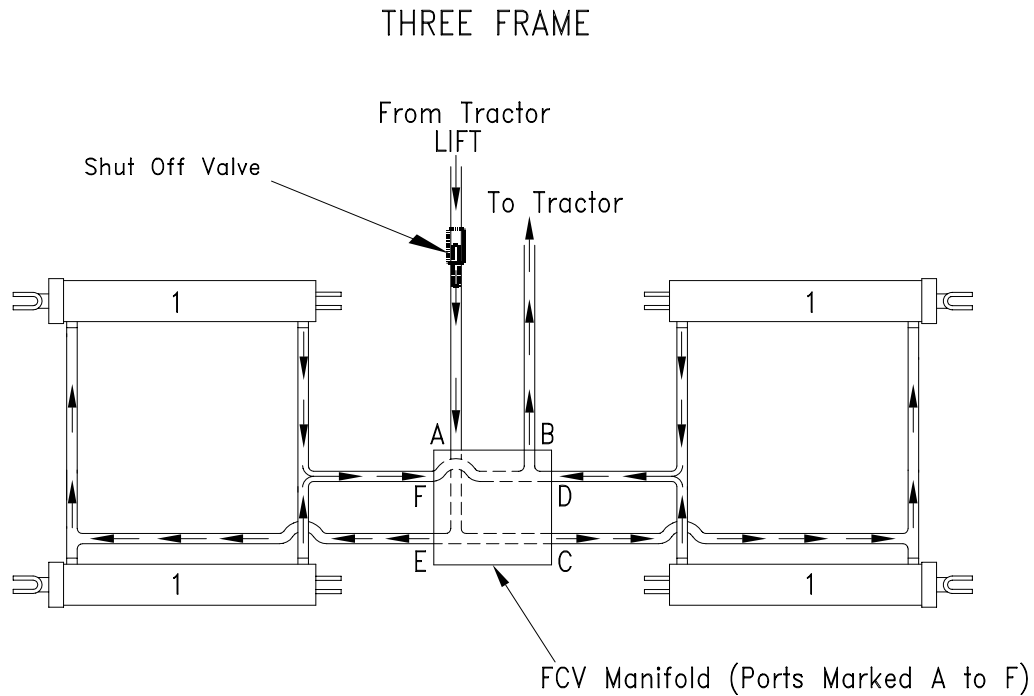


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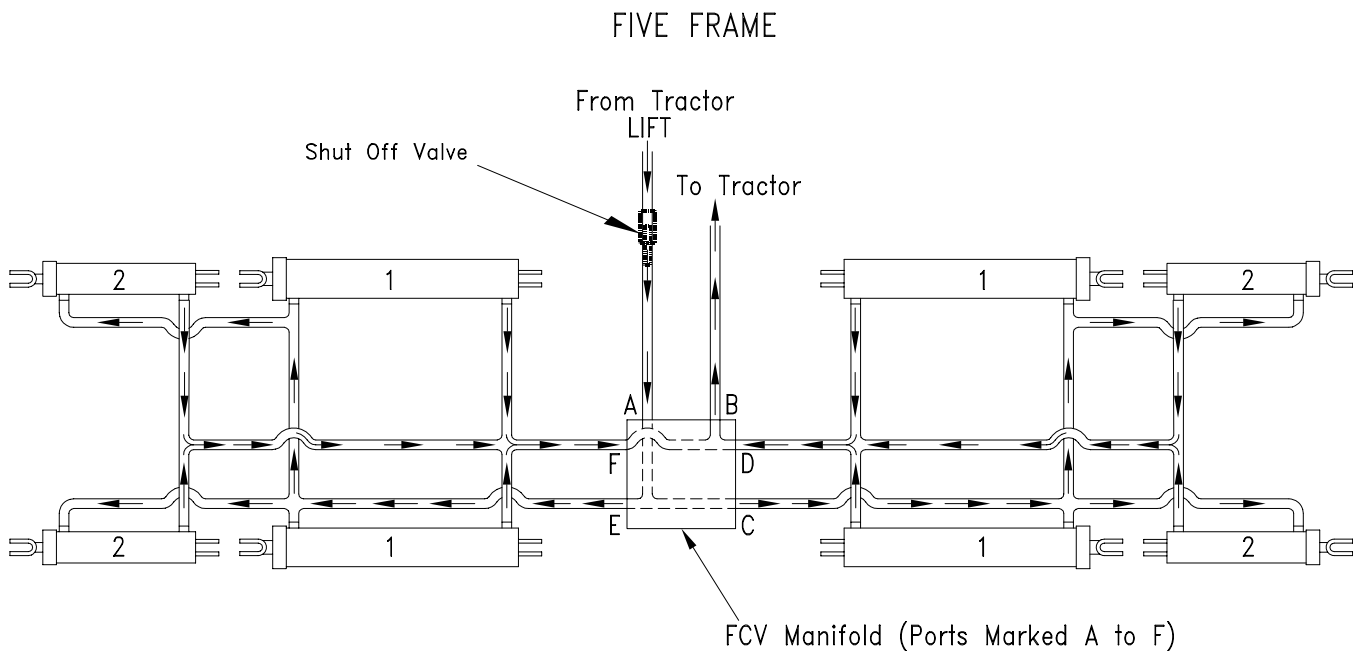


Wing Lift Hydraulics - Continued

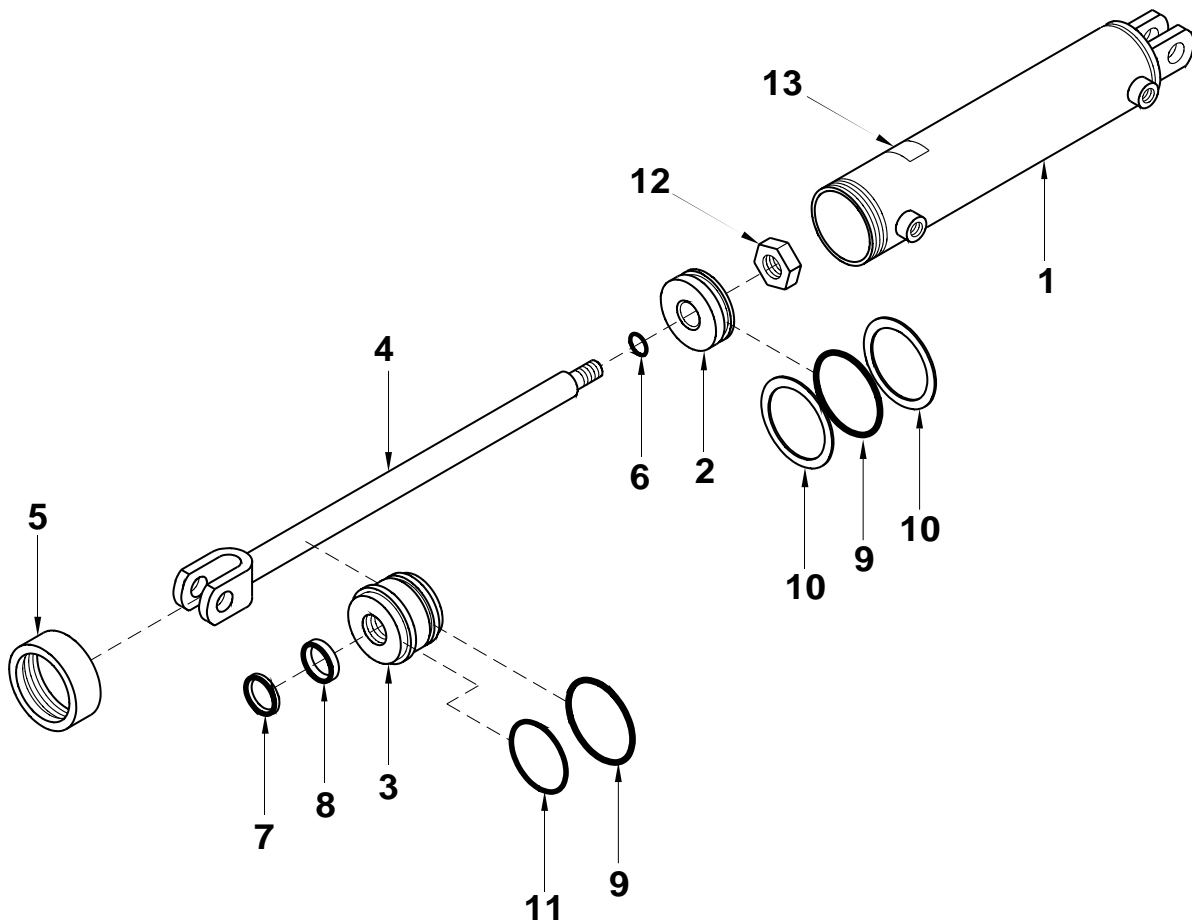
Three Frame Models



Five Frame Models

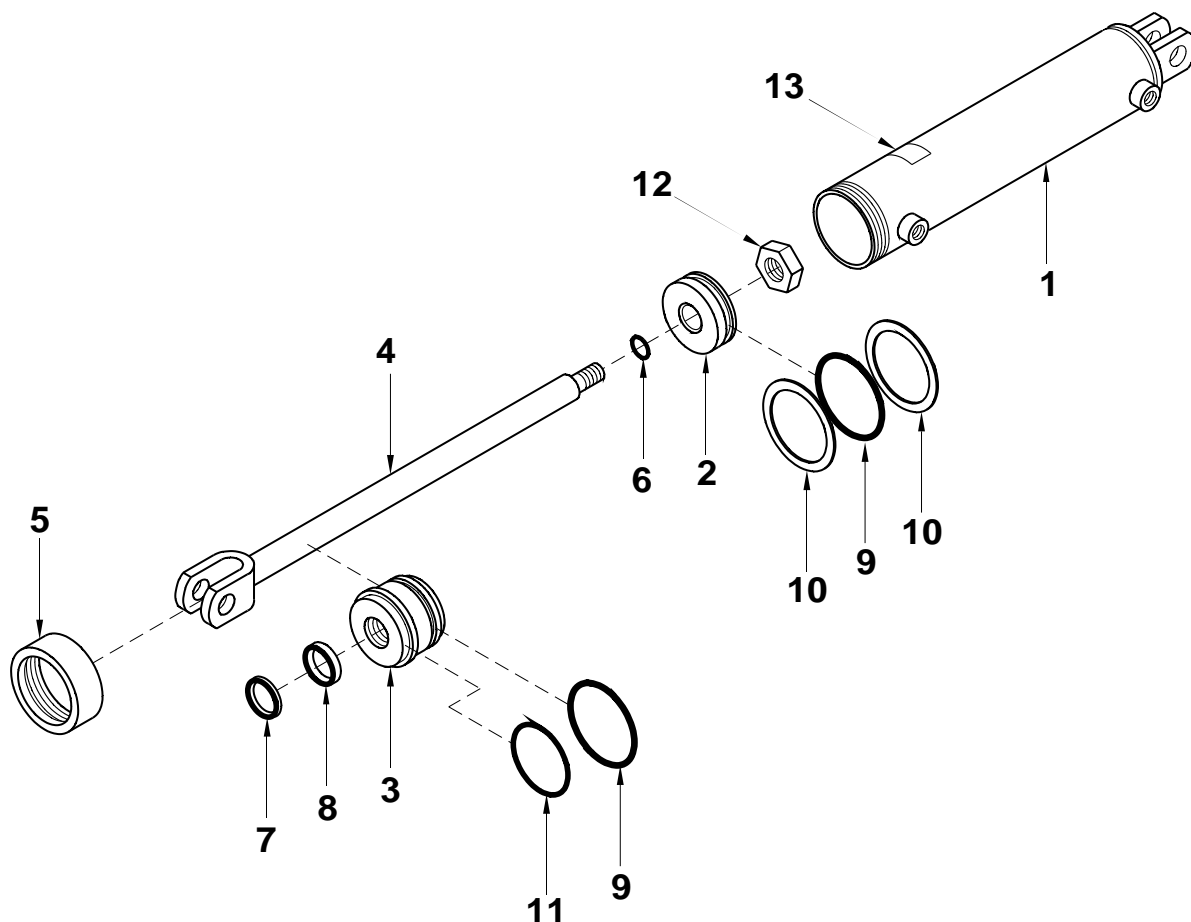


Hydraulic Cylinders Wing Lift



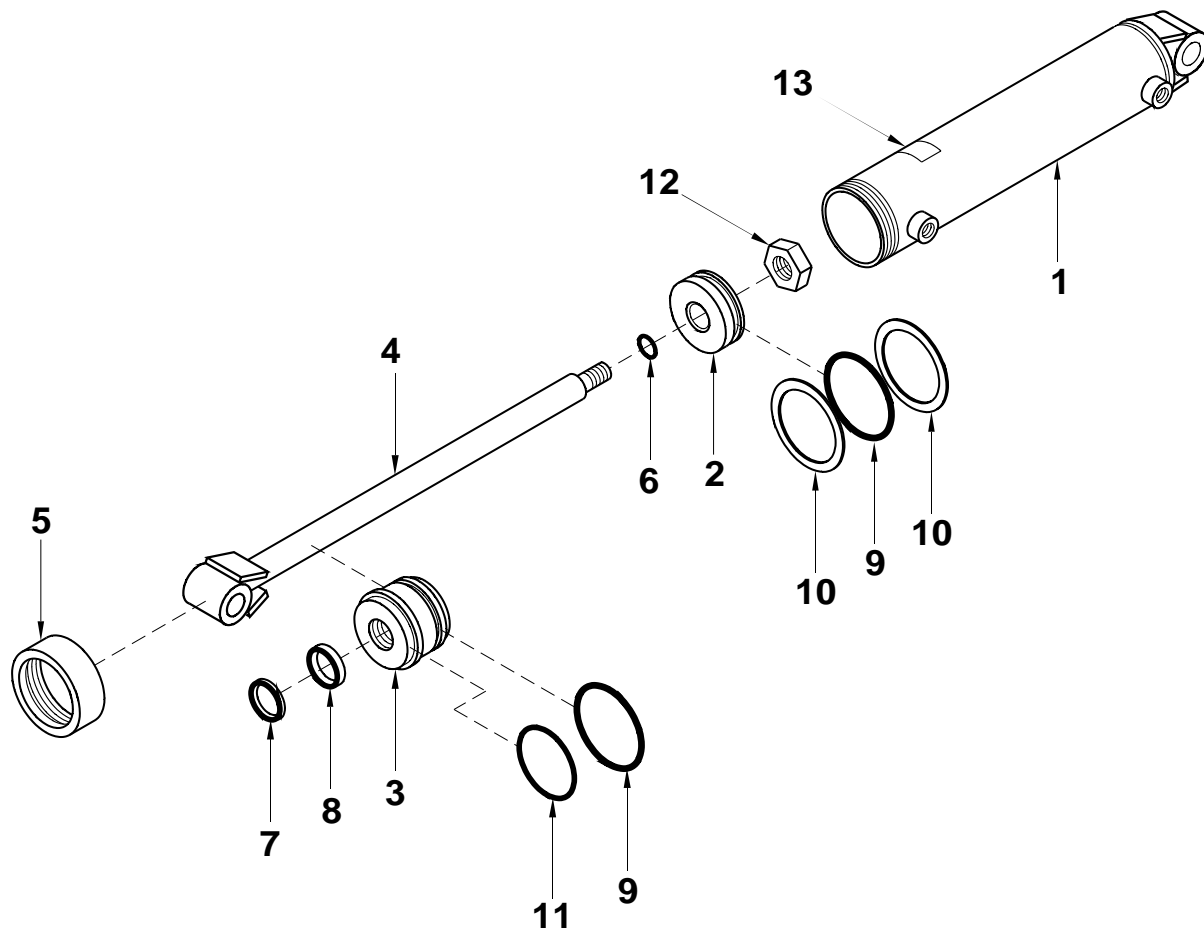
Item	Part No.	Description	Qty
		Wing Lift Cylinder - C26436 - 4 x 18	
1	C26437	Barrel - 4 x 18 ORB	1
2	C16637	Piston - 4 Dia - 7/8 Shaft	1
3	C-2026	Gland - 4 Dia - 1 1/4 Shaft	1
4	C32025	Cylinder Shaft - 1 1/4 Dia x 25 7/8	1
5	C-2023	Collar - 4 Cylinder	1
6	C-2187	1 OD x 1/16 C/S 90D BUNA O-Ring	1
7	C-2007	1 1/4 ID x 3/16 C/S 90D URTH Wiper	1
8	C-2008	1 1/4 ID x 5/16 C/S 90D URTH U-Cup	1
9	C-2030	4 OD x 3/16 C/S 90D BUNA O-Ring	2
10	C15386	Backup Washer - 4 Dia - #342	2
11	C-2215	3 7/8 OD x 1/16 C/S 70A BUNA-N O-Ring	1
12	C-2017	Locknut - 7/8 UNF Unitorque	1
13	C26846	Part # Plate for C26436	1
	C26436	Cylinder Assembly (Includes All Above Items)	
	C20449	Seal Kit (Includes Items #6, 7, 8, 9, 10 & 11)	

Wing Lift Hydraulics - Continued Wing Lift Cylinders



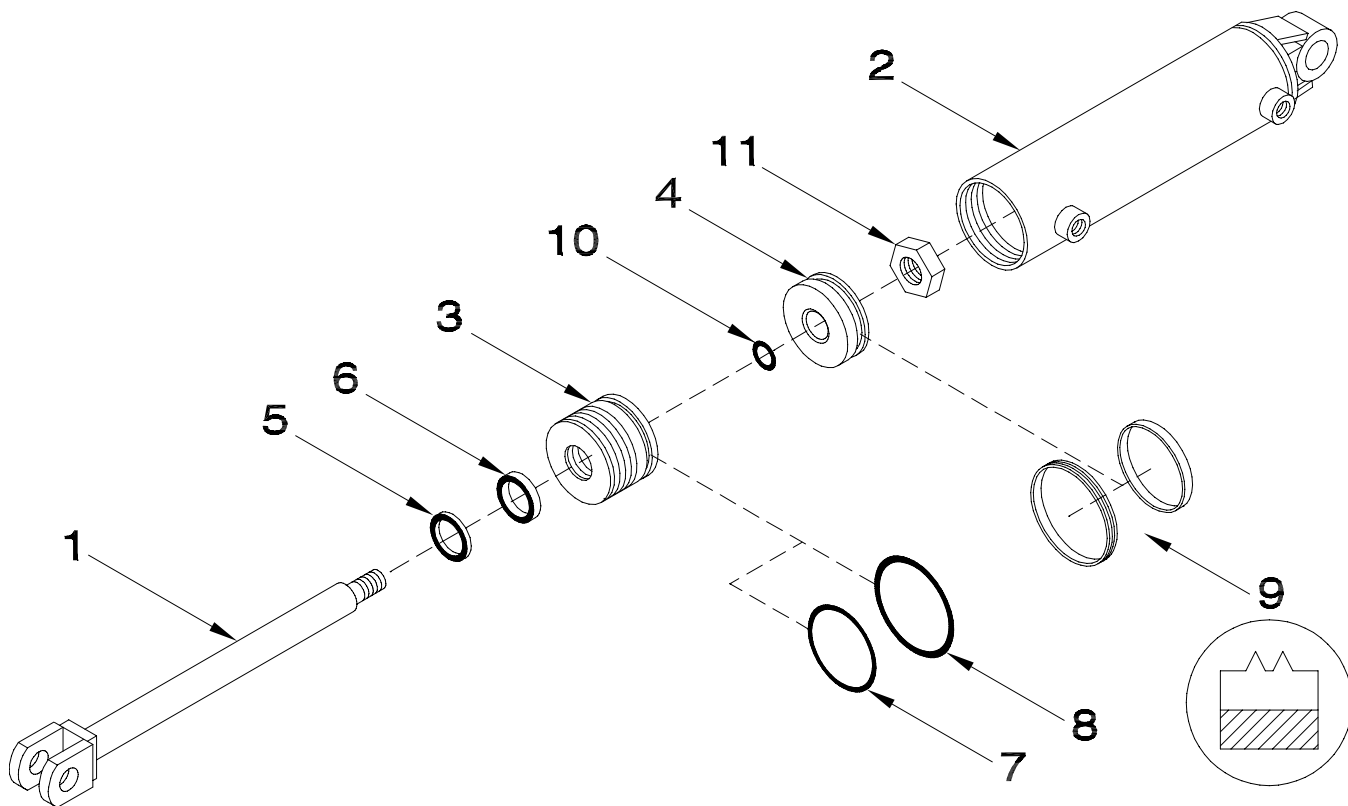
Item	Part No.	Description	Qty
		Wing Lift Cylinder - C34442 - 4 1/2 x 30	
1	C34441	Barrel - 4 1/2 x 30 - 1 1/4 clevis hole	1
2	C12836	Piston - 4 1/2 Dia - 1 Shaft	1
3	C-2154	Gland - 4 1/2 Dia - 1 3/4 Shaft	1
4	C26190	Cylinder Shaft - 1 3/4 Dia	1
5	C-2155	Collar - 4 1/2 Cylinder	1
6	C13282	1 1/8 OD x 1/16 C/S 90D BUNA O-Ring	1
7	C-2136	1 3/4 ID x 3/16 C/S 90D URTH Wiper	1
8	C-2135	1 3/4 ID x 3/8 C/S 90D URTH U-Cup	1
9	C-2164	4 1/2 OD x 3/16 C/S 90D BUNA O-Ring	2
10	C15387	Backup Washer - 4 1/2 Dia - #346	2
11	C-2215	3 7/8 OD x 1/16 C/S 70A BUNA-N O-Ring	1
12	C13763	Locknut - 1-14 UNS Unitorque	1
13	C36064	Part # Plate for C34442	1
	C34442	Cylinder Assembly (Includes All Above Items)	
	C12849	Seal Kit (Includes Items #6, 7, 8, 9, 10 & 11)	

Hydraulic Cylinders Wing Lift



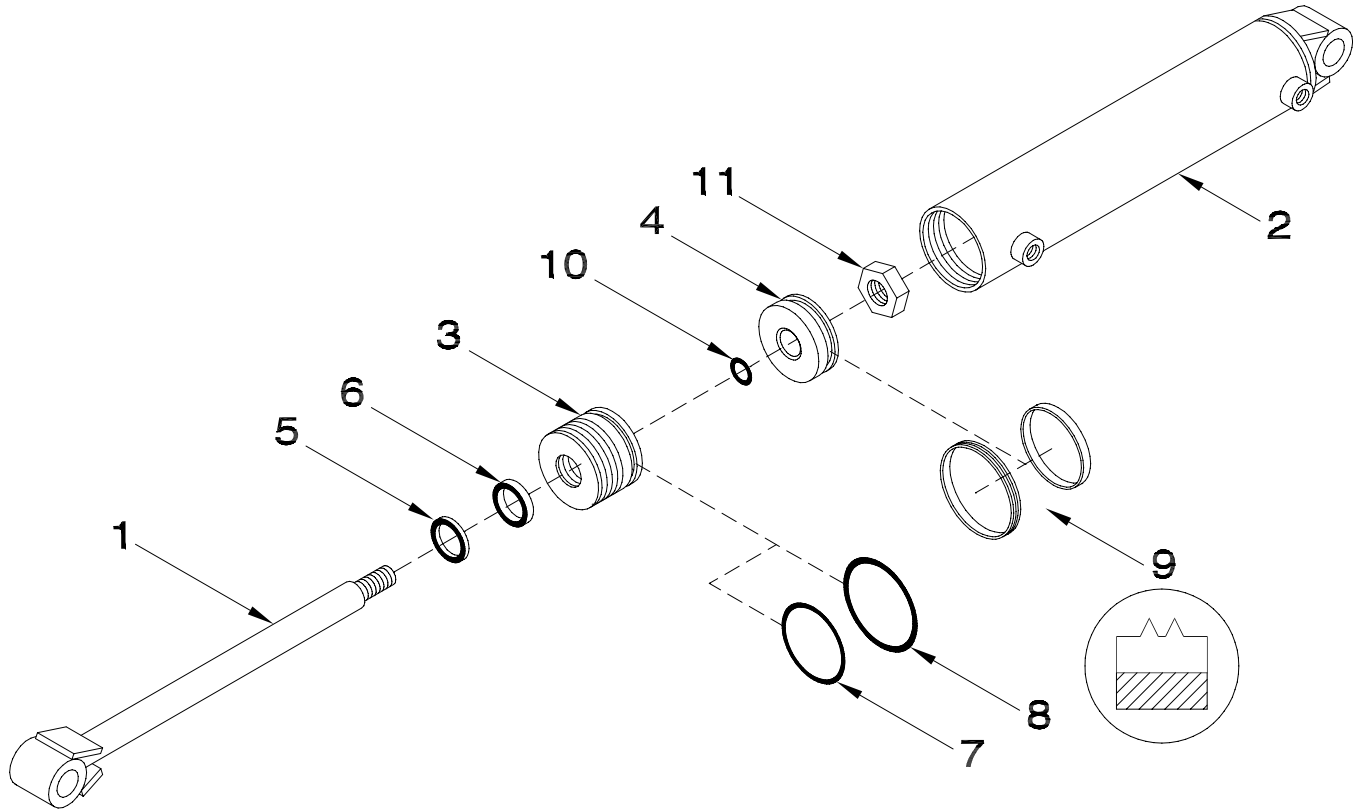
Item	Part No.	Description	Qty
		Wing Lift Cylinder - C39030 - 4 1/2 x 36	
1	C39027	Barrel - 4 1/2 x 36 - 1 1/4 clevis hole.....	1
2	C12836	Piston - 4 1/2 Dia - 1 Shaft	1
3	C-2154	Gland - 4 1/2 Dia - 1 3/4 Shaft	1
4	C39029	Cylinder Shaft - 1 3/4 Dia	1
5	C-2155	Collar - 4 1/2 Cylinder	1
6	C13282	1 1/8 OD x 1/16 C/S 90D BUNA O-Ring	1
7	C-2136	1 3/4 ID x 3/16 C/S 90D URTH Wiper	1
8	C-2135	1 3/4 ID x 3/8 C/S 90D URTH U-Cup	1
9	C-2164	4 1/2 OD x 3/16 C/S 90D BUNA O-Ring	2
10	C15387	Backup Washer - 4 1/2 Dia - #346	2
11	C-2215	3 7/8 OD x 1/16 C/S 70A BUNA-N O-Ring	1
12	C13763	Locknut - 1-14 UNS Unitorque	1
13	C39031	Part # Plate for C39030	1
	C39030	Cylinder Assembly (Includes All Above Items)	
	C12849	Seal Kit (Includes Items #6, 7, 8, 9, 10 & 11)	

Hydraulic Cylinders Wing Lift



Item	Part No.	Description	Qty
		Wing Lift Cylinder - C47594 - 5 x 30	
1	C50179	Cylinder Shaft	1
2	C45675	Barrel - 5 x 30 ORB	1
3	C39916	Gland - 5 Dia	1
4	C39913	Piston - 5 Dia	1
5	C34598	Wiper	1
6	C34599	Shaft Seal	1
7	C39904	Backup Ring	1
8	C39900	Gland Seal (O-Ring)	1
9	C39892	Piston Seal - (PSP-A) (2 part seal)	1
10	C34592	Shaft Seal	1
11	C34596	Locknut	1
	C47594	Cylinder Assembly (Includes All Above Items)	
	C39906	Seal Kit (Includes Items #5, 6, 7, 8, 9 & 10)	

Hydraulic Cylinders Wing Lift



Item	Part No.	Description	Qty
		Wing Lift Cylinder - C39490 - 5 x 36	
1	C39910	Cylinder Shaft	1
2	C39919	Barrel - 5 x 36 ORB	1
3	C39916	Gland - 5 Dia	1
4	C39913	Piston - 5 Dia	1
5	C34598	Wiper	1
6	C34599	Shaft Seal	1
7	C39904	Backup Ring	1
8	C39900	Gland Seal (O-Ring)	1
9	C39892	Piston Seal - (PSP-A) (2 part seal)	1
10	C34592	Shaft Seal	1
11	C34596	Locknut	1
	C39490	Cylinder Assembly (Includes All Above Items)	
	C39906	Seal Kit (Includes Items #5, 6, 7, 8, 9 & 10)	

Service

Operation

Hydraulic Opener

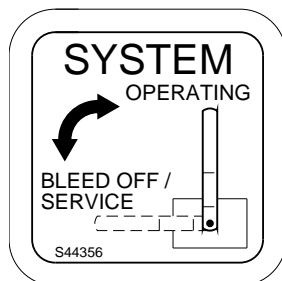
Accumulator System Operation and Pre-Charge Information

- Always place “System” ball valve into bleed off/ service position and relieve hydraulic pressure from the system before performing maintenance or repairs.

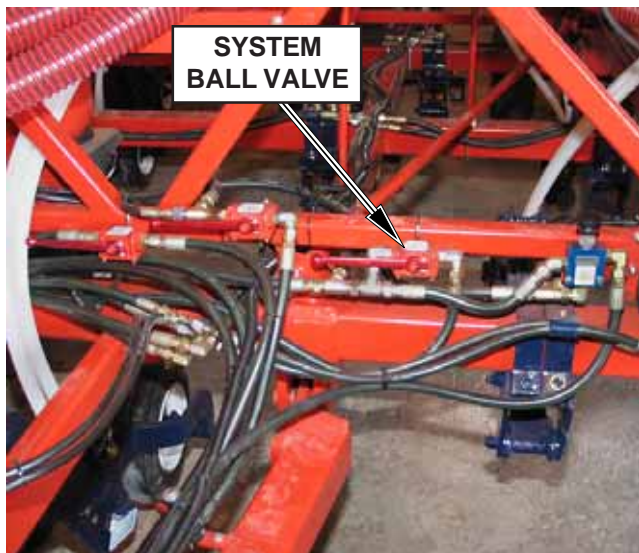
Note: Accumulator can store pressure even when disconnected from tractor.

- The gas bladder in the hydraulic accumulator should be pre-charged with dry nitrogen gas before being mounted on the unit.
- Different accumulator pre-charge pressures will allow for different ranges of trip out force, as shown in the chart.
- Pre-charge pressure should be set for the most common working conditions.
- Lower pre-charge pressures with higher operating pressures will give longer lifting and lowering times.

Note: Refer to C2 Operation for late model C1's which used the single valve block.



DECAL - S44356



Warning

HIGH-PRESSURE FLUID HAZARD

To prevent serious injury or death:

- Relieve pressure on hydraulic system before servicing or disconnecting hoses.
- Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.
- Keep all components in good repair.

Accumulator Operating Range		
Nitrogen Pre-charge Pressure	Trip Force	
	Minimum	Maximum
500 psi (3,445 kPa)	250 lbs (113 kg)	600 lbs (272 kg)

* Maximum system hydraulic pressure is 1200 psi or 4 times the pre-charge pressure, whichever is the lower number.



Hydraulic Opener - Continued

Setting Maximum System Pressure (Trip Out Force)

- To determine the approximate trip out force in pounds on each shank, divide the system hydraulic pressure in the circuit by 2.

For example: A system hydraulic pressure of 1000 psi would be approximately 500 lbs trip force at each shank.

Note: Due to the variation of friction effects, this trip force is approximate.

- Maximum hydraulic operating pressure can be set by dialing the reducing valve in to increase allowable pressure, and dialing it out to decrease allowable pressure. This adjustment is done in order to set a maximum working pressure; pressure can be decreased below the set point and increased back up to the set point on the go from the tractor.

1. Ensure the "System" ball valve in the circuit is set to operating position and the "Openers" ball valve is set to unlocked position to allow flow.
2. Begin by dialing the adjustment all the way out on the reducing valve.
3. Dial the reducing valve setting in 1 full turn.
4. Operate the tractor remote to pressurize the accumulator circuit. Once the pressure has stopped climbing check the system pressure on the gauge.

Note: Set reducing valve pressure 100 - 150 psi above the desired working pressure in order to allow for pressure drop from accumulator cooling and valve hysteresis. System pressure will level off and hold after approximately 1 minute.

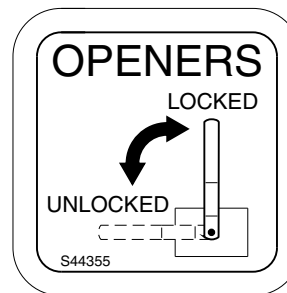
5. If the pressure in the system is high enough to achieve the desired trip out force, setting is complete. If the pressure is too low, relieve the circuit pressure using the tractor remote and repeat steps 3 and 4 until the desired pressure is achieved.
6. If the system pressure is too high, relieve the circuit pressure using the tractor remote, and then dial the reducing valve adjustment out incrementally. Repeat step 4 until the desired system pressure has been reached.

Note: Operate system at the lowest system pressure that will keep shanks locked vertical during seeding and provide adequate packing pressure. Excessive hydraulic pressure may disturb rocks and damage carbides.

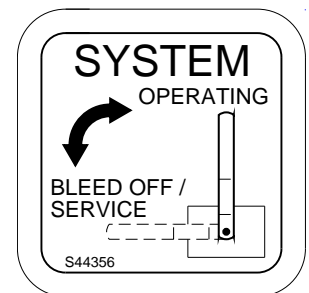
Note: Refer to C2 Operation for late model C1's which used the single valve block.

Important

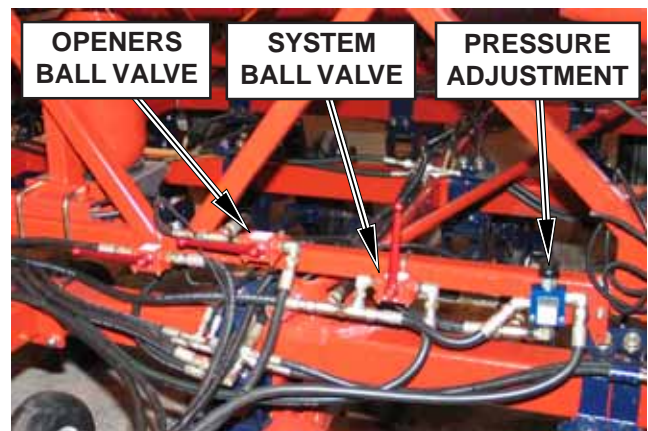
Do not exceed 4 times the nitrogen pre-charge pressure or 1200 psi, whichever is the lower number.



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Valve Locations



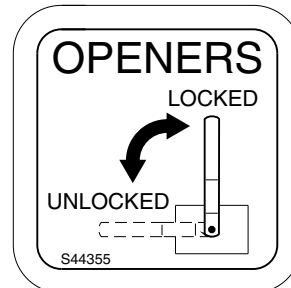
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Service

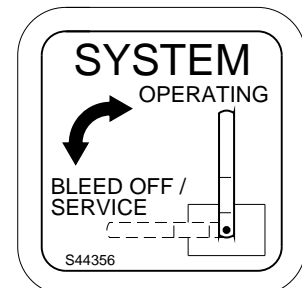
Hydraulic Opener - Continued

Normal Operation

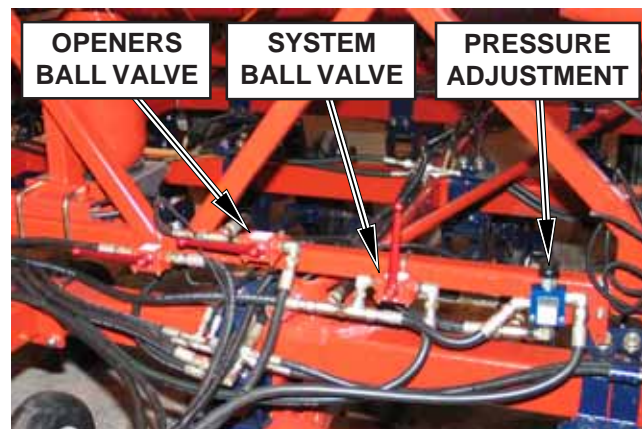
- Set operating pressure as described under “Setting Maximum System Pressure”.
- Ensure the “System” ball valve is set to operating position and the “Openers” ball valve is set to unlocked position to allow oil flow.
- With the Contour Air Drill moving forward, lower openers into the ground. Hold tractor hydraulic lever until the maximum preset operating pressure is reached (see “Setting Maximum System Pressure”). This ensures that all of the openers are fully charged and engaged.
- When turning at head land, the openers do not need to be completely cycled from working to fully lifted position. The openers can be lifted just to the point that they do not contact the ground. This will reduce the time required to fully recharge the hydraulic accumulator to the preset operating pressure.
- Avoid sharp turns with drill in ground. Turns sharp enough to cause the inside openers of the air drill to reverse direction may cause openers to plug.
- To fully raise openers, operate and hold tractor hydraulic lever until pressure gauge display drops to zero.



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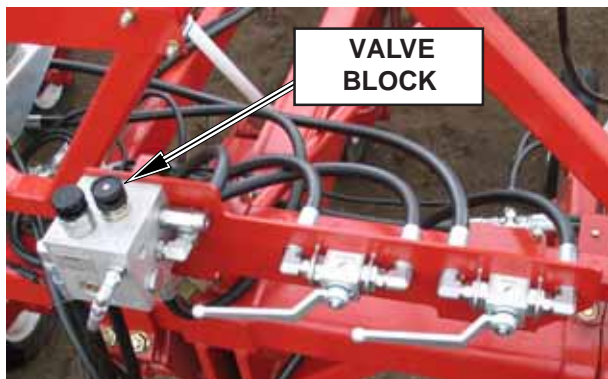
DECAL - S44356



Important

See C2 Section for details.

Late model C1 Contours came with a valve block which incorporated the Relief Valve, One-way check valve, Pilot operated check valve and System ball valve into a single Valve Block.



Hydraulic Opener - Continued

Pressure Adjustment (On the go)

Pressure can be changed on the go to adjust for variable field conditions by using the tractor remote.

In order to lower the accumulator pressure on the go, the "System" ball valve must be set to the bleed-off/service position.

Note: Operating pressure may drop more than the 100psi described under "Setting Maximum System Pressure" when the "System" ball valve is set to the bleed-off/service position. This is dependant on tractor valve leakage.

- Ensure "System" ball valve is in the bleed-off/service position before operation.

Operate the openers as usual:

- With the Contour Air Drill moving forward, lower openers into the ground. Hold tractor hydraulic lever until the maximum preset operating pressure is reached (see "Setting Maximum System Pressure"). This ensures that all of the openers are fully charged and engaged.

To reduce operating pressure on the go:

- Place tractor hydraulic lever into "Float Position" until pressure drops to desired operating point.
- Release hydraulic lever once desired pressure is reached.

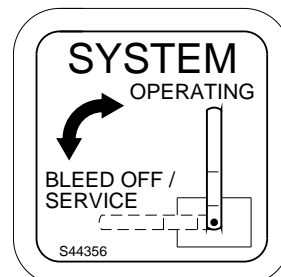
To increase operating pressure:

- Operate tractor hydraulic lever to increase pressure to desired operating point.

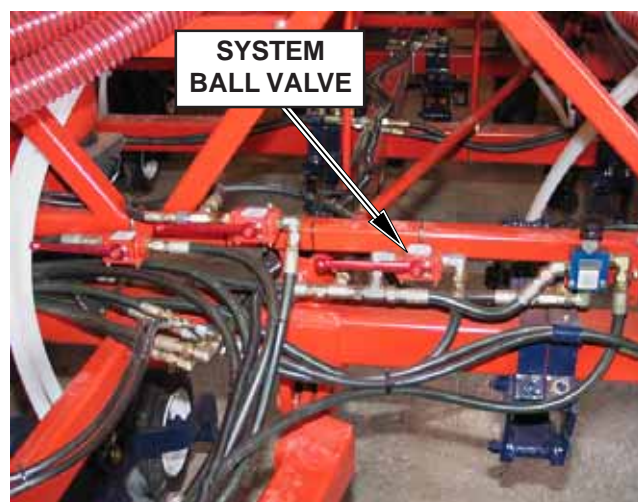
Note: Refer to C2 Operation for late model C1's which used the single valve block.

Important

The "System" ball valve must be set to the "Bleed Off / Service" Position in order to lower accumulator pressure with openers in operating position.



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Service

Opener Operation

The contour openers can be operated using two methods as described in the operators manual as Normal Operation and Pressure Adjustment (On the go).

The following is the oil flow for both operating types and can be used for problem diagnosis.

Normal Operation

The opener ball valve is in the unlocked position. This ball valve is open. The system ball valve is in the operating position. This ball valve is closed.

To lower the openers, oil flows through the hose to the “Valve” side of the pilot operated check valve. Oil also flows from this junction through another hose to the system valve. As this valve is closed in this position, oil is stopped at this point.

From the “Valve” side of the pilot operated check valve, oil flows into the check valve unseating the check valve and flows out the “Cylinder” side of the pilot operated check valve. The oil then flows to the relief valve and also to a one way check valve that is connected in this flow.

As the one way check valve is installed so that the flow is from the other direction this flow is blocked at the one way check valve.

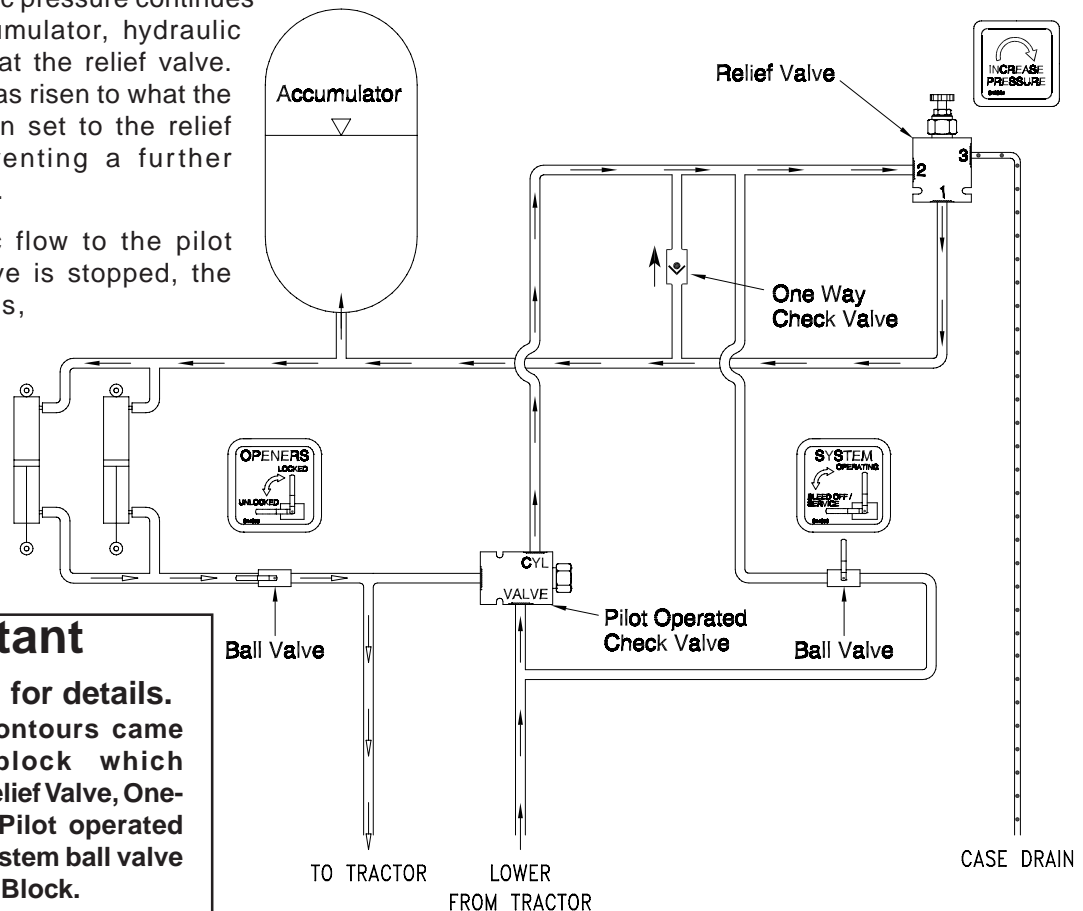
Oil is able to flow to the (adjustable) relief valve and through the relief valve, where it continues on to the hydraulic accumulator.

From the accumulator the oil can then proceed to all of the opener cylinders.

When all of the opener cylinders are fully extended the hydraulic pressure continues to build in the accumulator, hydraulic lines, cylinders and at the relief valve. When the pressure has risen to what the relief valve has been set to the relief valve closes, preventing a further increase in pressure.

When the hydraulic flow to the pilot operated check valve is stopped, the check valve seats, holding the pressure in the opener circuit.

The oil returning from the gland side of the cylinders flows to the opener ball valve and back to the tractor.



Important

See C2 Section for details.
Late model C1 Contours came with a valve block which incorporated the Relief Valve, One-way check valve, Pilot operated check valve and System ball valve into a single Valve Block.

Opener Operation - Continued

Normal Operation - Continued

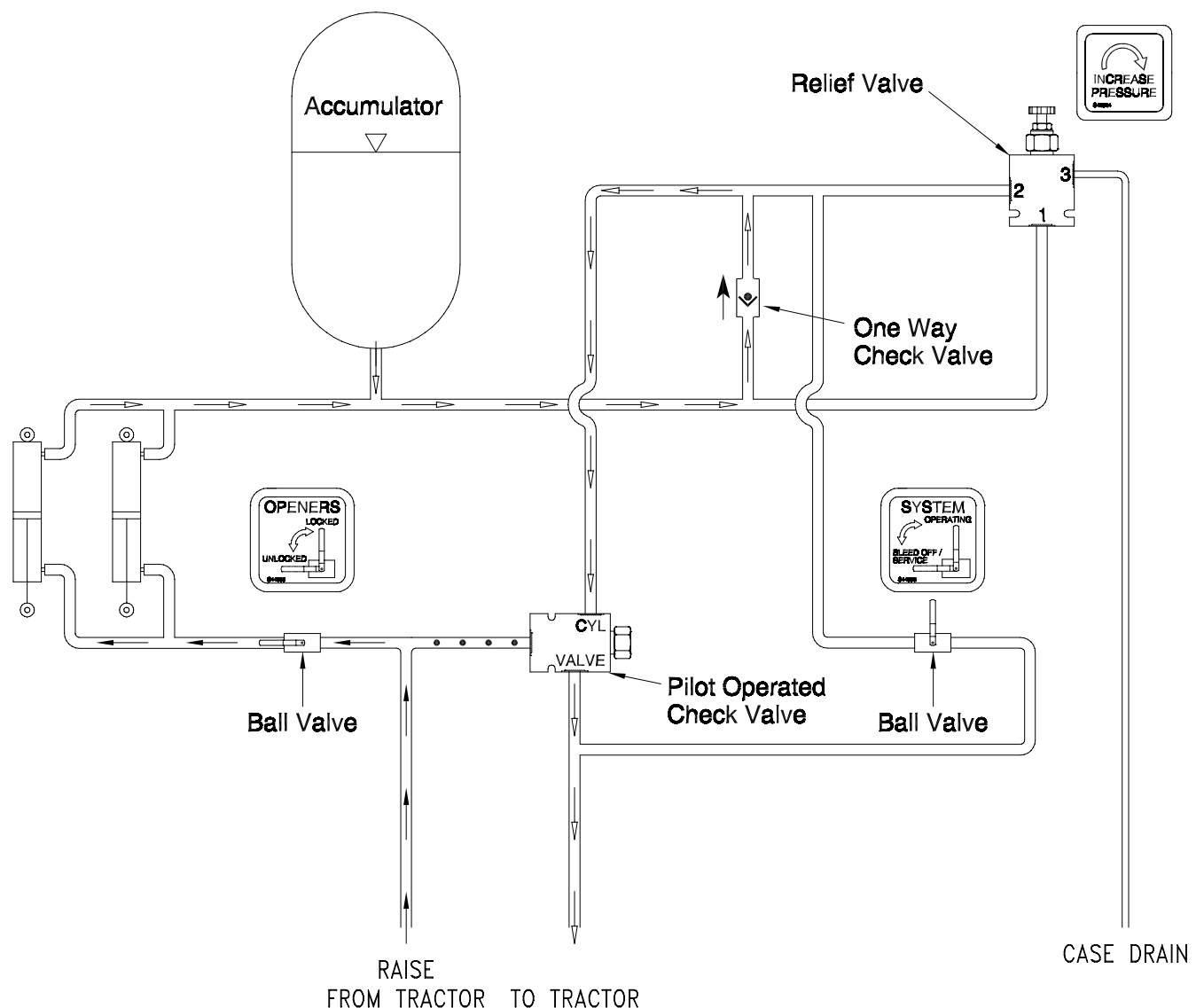
To raise the openers, oil flows from the tractor hose to the opener valve and on to the gland side of the cylinders. Oil is also felt on the line that operates the pilot operated check valve. This causes the check valve to open and allow return oil back to the tractor.

Oil from the butt side of the cylinders travels past the accumulator and onto the bottom side of the relief valve. Oil can not go through the relief valve in this direction and is directed to the one way check valve. The oil then travels through the one way check valve and back to the cylinder side of the check valve.

This check valve has been opened from the oil going to the gland side of the cylinders.

The oil flows through the check valve and back to the tractor. The pressure oil in the accumulator is also relieved via this route.

Note: Refer to C2 Operation for late model C1's which used the single valve block.



Opener Operation - Continued

Pressure Adjustment (On the Go)

The opener ball valve is in the unlocked position. The ball valve is open. The system valve is in the bleed off/ service position. The ball valve is open.

To lower the openers the oil flows from the tractor to the valve side of the pilot operated check valve. It also flows from this connection to the system valve which is now in the open position. From the system ball valve oil flows to the cylinder side of the pilot operated check valve. As the same pressure oil is felt on both sides of the check valve it remains closed.

Oil flows from the system ball valve to the one way check valve. It can not flow through the check valve. The oil can also flow to the (adjustable) relief valve.

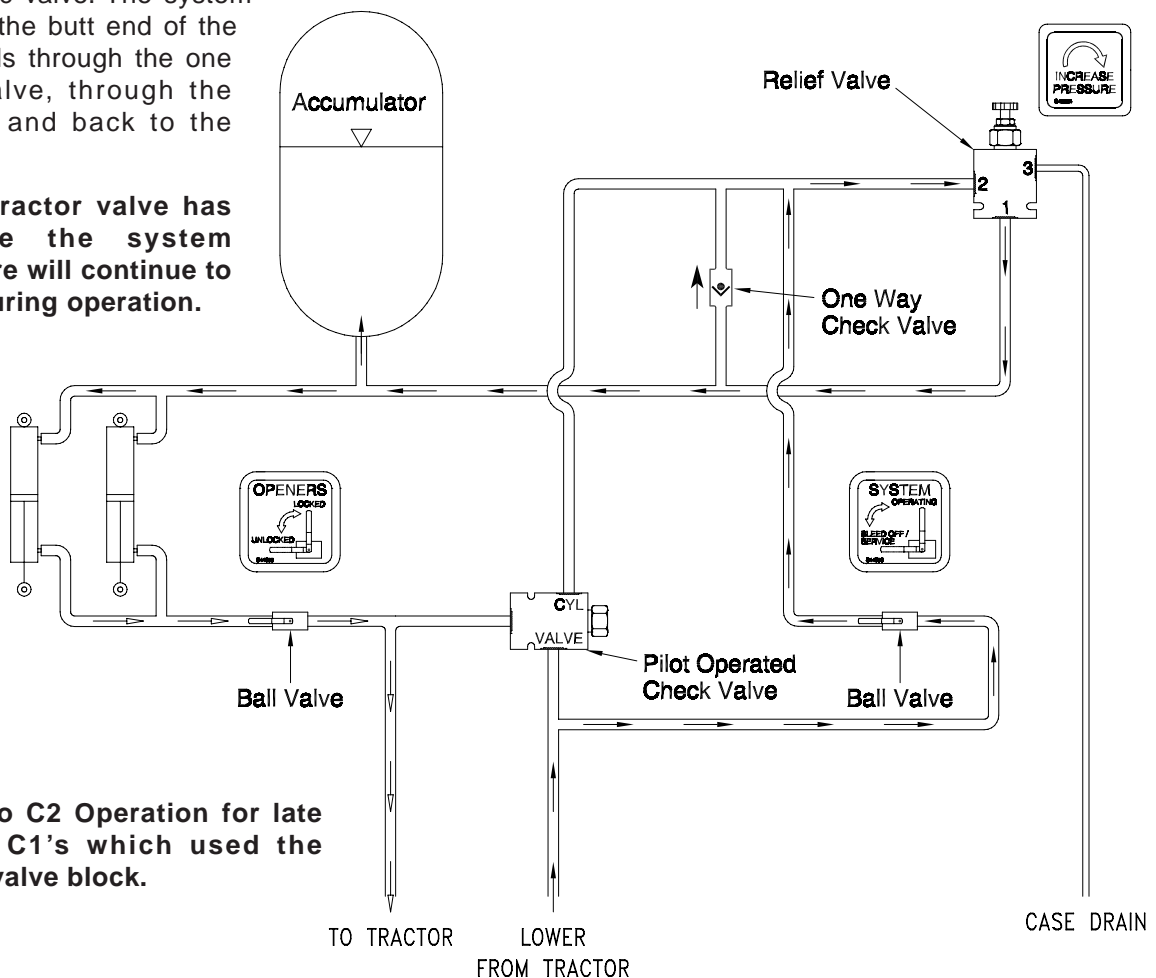
Oil is able to flow to the (adjustable) relief valve and through the relief valve, where it continues on to the hydraulic accumulator.

From the accumulator the oil can then proceed to all of the opener cylinders.

When all of the opener cylinders are fully extended the hydraulic pressure continues to build in the accumulator, hydraulic lines, cylinders and at the relief valve. When the pressure has risen to what the relief valve has been set to the relief valve closes, preventing a further increase in pressure.

When the operator releases the hydraulic lever the pressure that has been set by the adjustable relief valve is maintained in the system by the tractor hydraulic valve. The system pressure from the butt end of the cylinders travels through the one way check valve, through the system valve and back to the tractor valve.

Note: If the tractor valve has leakage the system pressure will continue to drop during operation.



Note: Refer to C2 Operation for late model C1's which used the single valve block.

Opener Operation - Continued

Pressure Adjustment (On the Go) - Continued

Pressure adjustment on the go, requires input from the operator to function.

The operator will have selected the system ball valve to be in the bleed off/service position.

The adjustable relief valve will be set to provide correct trip and packing pressure.

With the Contour Air Drill moving forward, lower openers into the ground. Hold tractor hydraulic lever until the maximum preset operating pressure is reached. This ensures that all of the openers are fully charged and engaged. To reduce operating pressure on the go:

- Place tractor hydraulic lever into "Float Position" until pressure drops to desired operating point.
- Release hydraulic lever once desired pressure is reached.

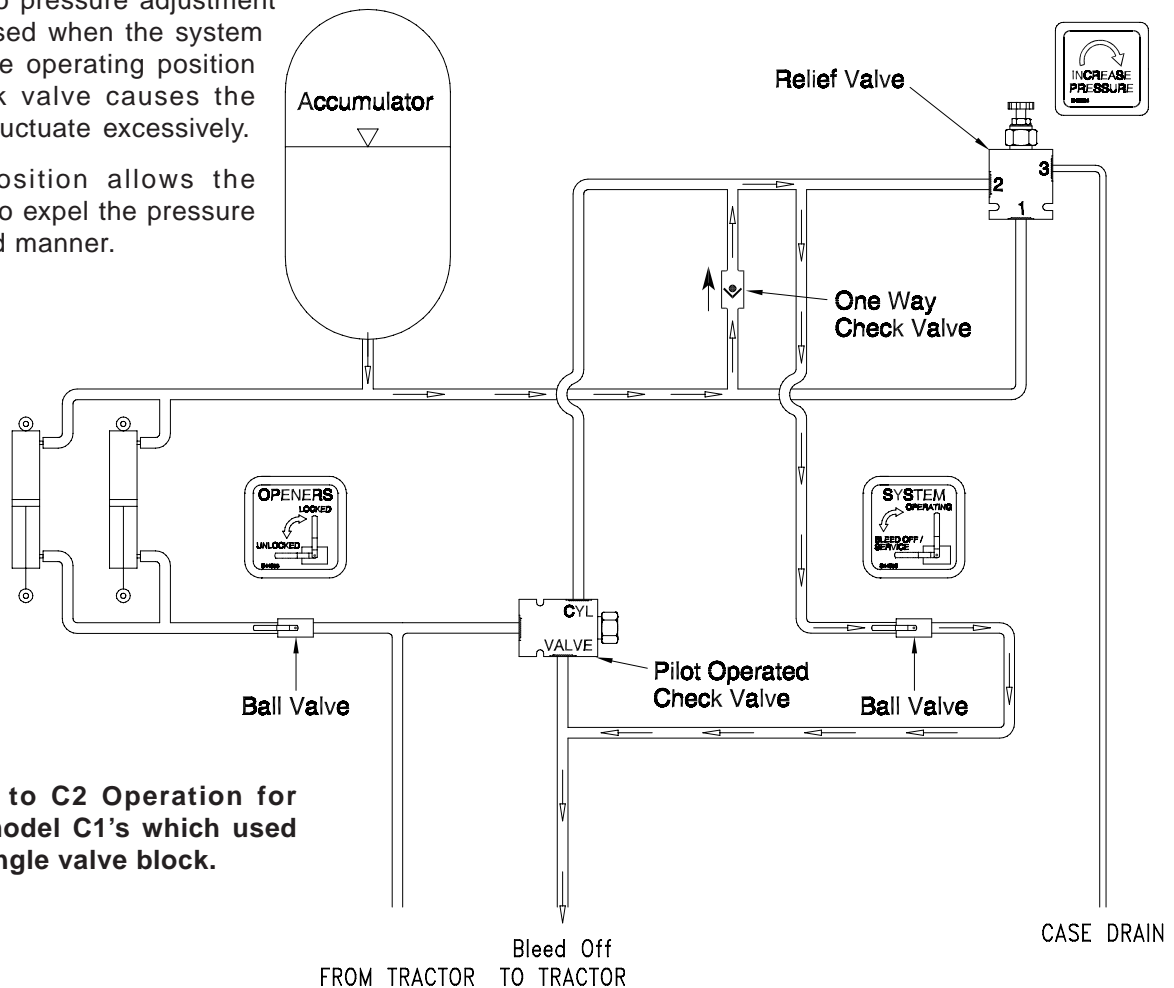
To increase operating pressure:

- Operate tractor hydraulic lever to increase pressure.

The oil flows from the butt end of the opener cylinders through the one way check valve, through the system ball valve and back to the tractor. When the tractor hydraulic lever is released the oil is again trapped and the pressure will be reduced. If the pressure reduction is too great the operator will have to pressure the system up to the desired pressure.

The on the go pressure adjustment can not be used when the system valve is in the operating position as the check valve causes the pressure to fluctuate excessively.

The float position allows the accumulator to expel the pressure in a controlled manner.



Note: Refer to C2 Operation for late model C1's which used the single valve block.

Bleeding Air From Opener Hydraulic System

The Contour Air drill hydraulic system should be thoroughly bled of any trapped air before being put into service. The following steps can be used to bleed the hydraulic system:

Standard System

1. Assemble openers and hydraulic lines and fittings to frame and check the machine for leaks by operating hydraulics to move openers up and down.
2. Cycle the openers up and down repeatedly from working to transport position.

Three Frame Only

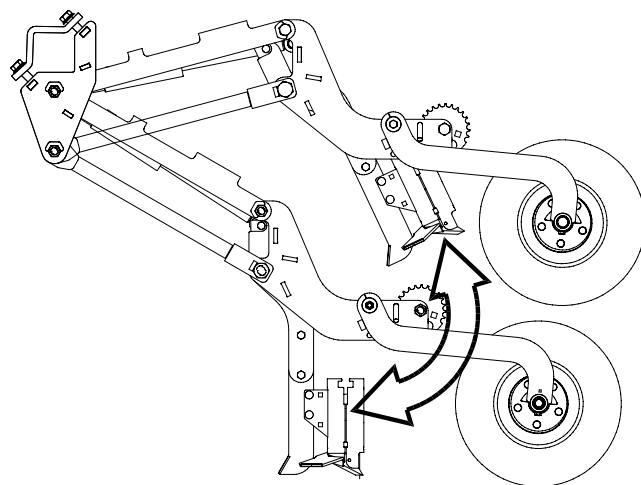
3. Operate the wing-lift circuit and lift the wings into transport position.
4. Cycle the openers up and down repeatedly from working to transport position.
5. Operate the wing-lift circuit and lower the wings back to working position (with openers in transport position).

Note: If steps 3 - 5 are performed on a Five Frame unit openers may contact and damage distribution system.

All Models

6. Starting with openers in lowered position, crack the hydraulic fitting going into the butt end of the last opener cylinder at the end of each rank and operate the hydraulic pump to pump oil through the circuit and push any trapped air out through the loosened fittings (once the air is gone, oil should flow smoothly out of the fittings, with no noticeable foaming).
7. Re-tighten cylinder fittings and cycle openers up and down.
8. Crack fittings on gland end of the last opener cylinder at the end of each rank and operate the hydraulic pump to pump oil through the circuit and push any trapped air out through the loosened fittings (once the air is gone, oil should flow smoothly out of the fittings, with no noticeable foaming).
9. Re-tighten cylinder fittings and cycle openers up and down checking to make sure that openers are solid in the transport position (and not spongy).
10. If openers seem spongy in transport position the system can be bled again, or checked for a leaking cylinder.

Note: Refer to C2 Operation for late model C1's which used the single valve block.



Caution

Use caution when cracking pressurized hydraulic fittings to bleed air from circuit, never loosen fittings all the way off; always catch expelled oil and dispose of it correctly.

Important

Once air is purged from the cylinders, raise openers fully.

Place hydraulic lever into float position, all openers should drop to the ground under their own weight.

If it requires pressure to push an opener down to the ground during this procedure, one or more of the pivot bolts are over tightened.

Check and adjust pivot bolts as required.

Bleeding Air From Opener Hydraulic System - Continued

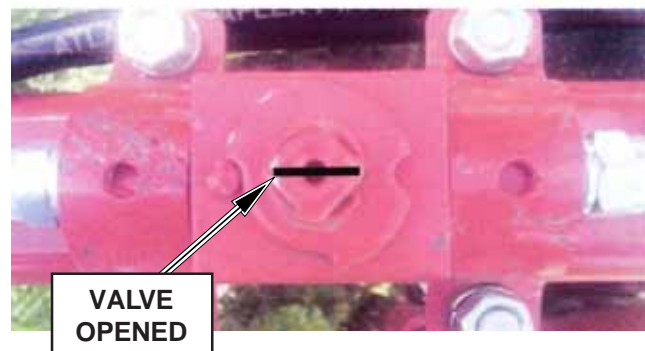
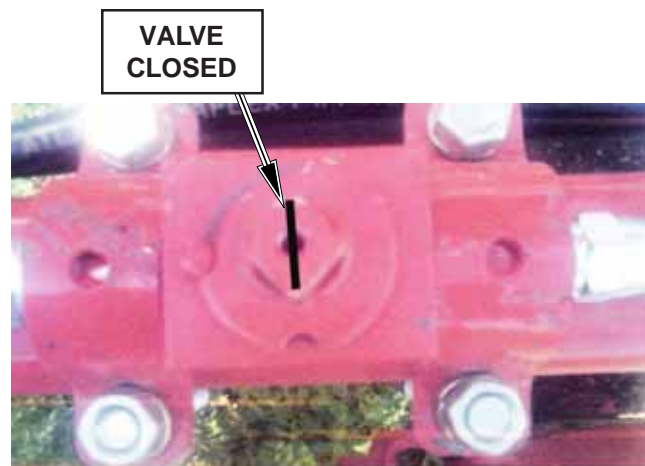
Bleed Off Kit - Option

September 2010 Morris introduced a Bleed-Off Kit to retrofit to any Contour Air Drill to improve the ease of servicing the opener hydraulic system.

See Tech Bulletin 343 for details.

The Contour Air drill hydraulic system should be thoroughly bled of any trapped air before being put into service. The following steps can be used to bleed the hydraulic system:

1. Assemble openers and hydraulic lines and fittings to frame and check the machine for leaks by operating hydraulics to move openers up and down.
2. Lift openers up and lock tractor remote in lift position.
3. With tractor hydraulics operating, open bleed-off ball valves on end of drill wings.
4. Allow oil to cycle for a few minutes then change direction of tractor remote to lower openers and cycle for a few more minutes.
5. Close bleed-off ball valves and lift openers up.
6. Repeat steps 2 to 5 for a second time.
7. Close bleed-off ball valves and lift openers up.
8. Lock "Openers" valve and check to see that openers stay firmly in position.
9. If openers are spongy repeat procedure until air is gone.



Opener Hydraulic System Trouble Shooting

If pressure can not be maintained in the hydraulic system, or openers drop rapidly from transport position, a leaky hydraulic cylinder (bypassing oil across the piston seal) may be present. To locate a hydraulic leak in the Contour Air Drill hydraulic system, the following procedure can be used:

Method 1

1. Put "SYSTEM" ball valve in "Bleed Off/Service" position and remove pressure from the hydraulic system.
2. Check the drill frame and hoses to make sure that the leak is not external (leaking oil out of the circuit).
3. Lift the contour openers into their raised position.
4. Put "OPENERS" ball valve in "Locked" position.
5. Watch the openers carefully across the drill and locate the first opener(s) to visibly drop down from the raised position (NOTE: this is the general area of the leaking cylinder, but the first opener to drop is not always the leaking cylinder).
6. Unlock the "OPENERS" hydraulic ball valve and lift the openers to the raised position and lock the hydraulic remote in the raised position to apply flow to the circuit for about five minutes.
7. Let the hydraulic remote go back to neutral, shut off the tractor, and then go and check the temperature of the opener cylinders by feeling the cylinder barrels. Start at the group of cylinders that were located in step 5) and then work from the outer openers in to center until a "hot" cylinder is located.
8. Under normal conditions the cylinders should remain cool (ambient temperature or slightly above); the opener with a "hot" cylinder barrel has the leaky seal and should be serviced or replaced.

If **Method 1** does not produce results and a leak is still suspected in a cylinder, **Method 2** (next page) can be employed to locate the leak.

Warning



HIGH-PRESSURE FLUID HAZARD

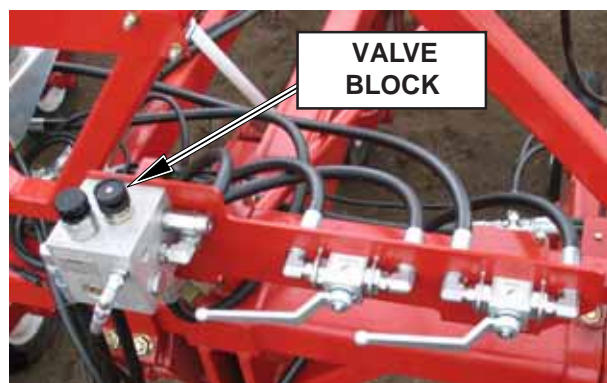
To prevent serious injury or death:

- Relieve pressure on hydraulic system before servicing or disconnecting hoses.
- Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.
- Keep all components in good repair.

Important

See C2 Section for details.

Late model C1 Contours came with a valve block which incorporated the Relief Valve, One-way check valve, Pilot operated check valve and System ball valve into a single Valve Block.



Opener Hydraulic System Trouble Shooting - Continued

Method 2

(Refer to hydraulic diagram next page).

1. Put "SYSTEM" ball valve in "Service" position and remove pressure from the hydraulic system.
2. Isolate 1st rank of cylinders by disconnecting end hoses, item(s) A, and capping tees with 1/4" cap nuts (on 1st rank only).

Important: Always plug disconnected hydraulic lines to avoid contamination of hydraulic system.

3. Disconnect hoses on 2nd and 3rd ranks at adapters, item(s) B, and cap adapters with 1/4" cap nuts.
4. Once cap nuts are tightened, cycle 1st rank openers repeatedly and then lift openers and put "OPENERS" ball valve in "Locked" position.
5. If openers remain solid for a period of at least 5 minutes and are still solid when manually pushed downwards, the problem cylinder(s) are not in the front rank.
6. If front rank drops within 5 minutes (or the openers are spongy when manually pushed downwards), use cap nuts to isolate the left side of the machine from the right side and repeat steps (3) and (4) on either side until the problem side is found (openers are spongy or drop quickly after being locked up).
7. At this stage you may be able to lift up the leaky rank, hold hydraulic pressure on it and push down on the openers individually to find the one that is easy to push down; if this doesn't work, move to step (8).
8. On the leaking rank, starting from the outside of the drill and moving towards center, disconnect individual opener cylinders and cap their tees and repeat steps (3) and (4) until the openers remain solid; the disconnected cylinder should be the leaky one.
9. Repeat the process by rank until all of the damaged/faulty cylinders are found.
10. Reconnect the circuit back to Assembly Manual specifications.
11. Bleed air from hydraulic circuit before resuming operation.



Caution

Ensure all hydraulic fittings have been retightened before applying hydraulic pressure.

Important

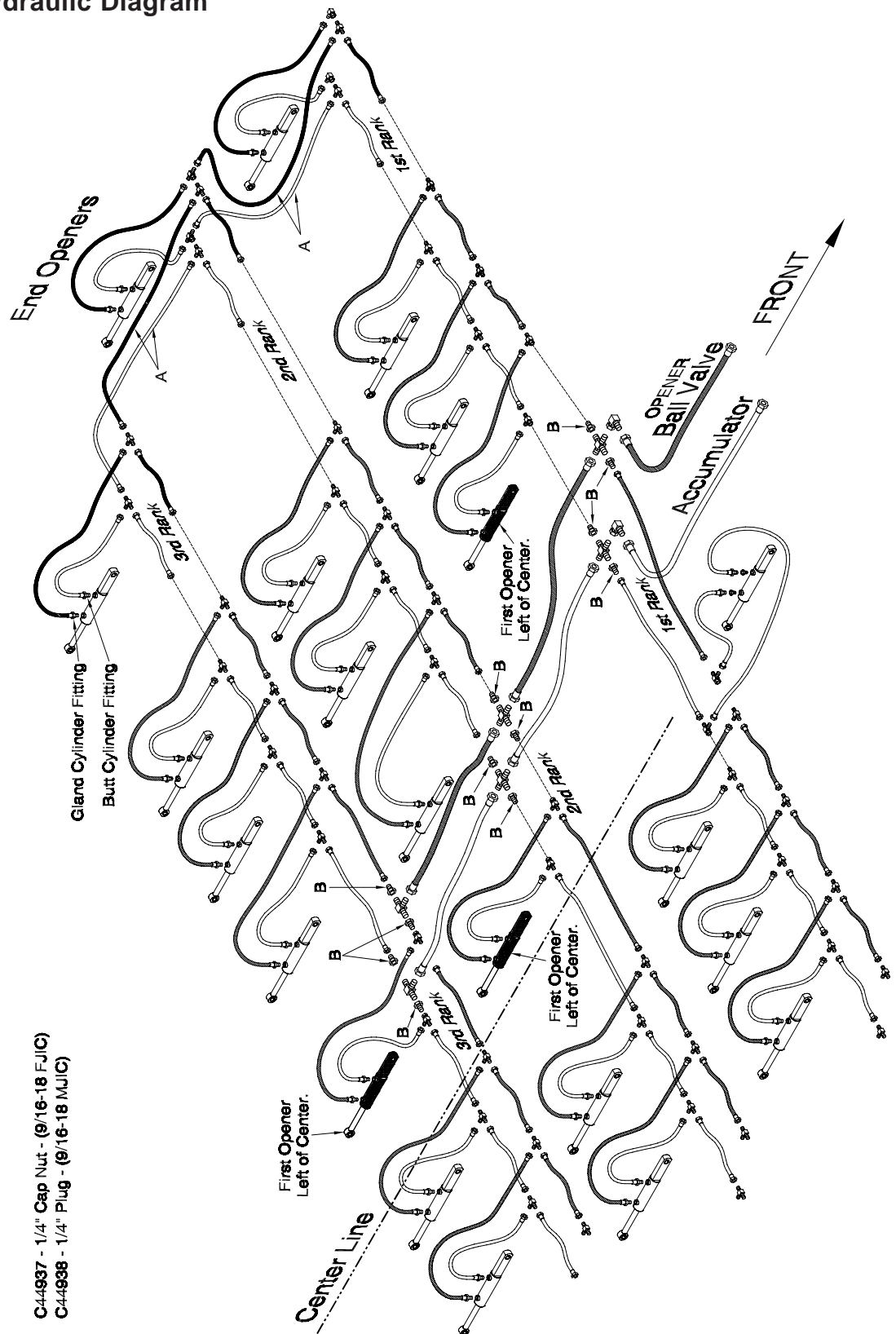
Put ball valve in "Service" position and remove all pressure from hydraulic systems before attempting any service work on hydraulic components.

Hydraulic system must be bled after it has been serviced (if any portion of the system has been opened to atmosphere)

Note: All hydraulic cylinders have a natural leakage rate. The openers on the contour drill will drop over a long period of time during storage; this is normal. Only check for leaky cylinders if accumulator system pressure drops rapidly during operation or openers drop rapidly from transport in a short period of time.

Opener Hydraulic System Trouble Shooting - Continued

Method 2 - Hydraulic Diagram



C44937 - 1/4" Cap Nut - (9/16-18 FJIC)
C44938 - 1/4" Plug - (9/16-18 MJIC)

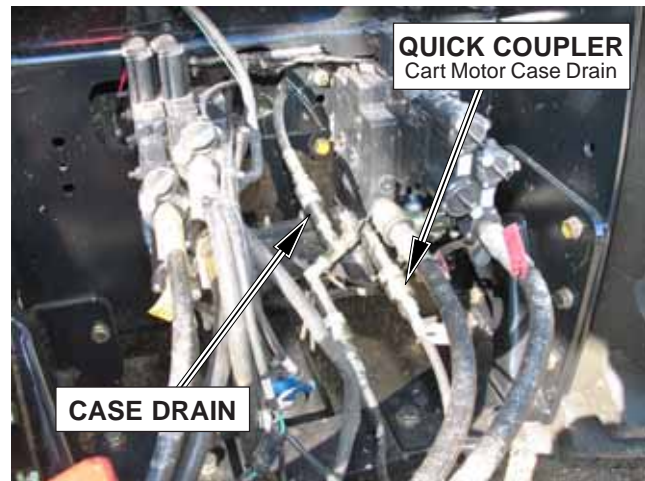
Service

Hitching to Tractor

- Ensure hydraulic hose quick couplers are dirt free.
- Inspect all fittings and hoses for leaks and kinks. Repair as necessary
- Connect the hydraulic hoses to the tractor quick couplers.

Note: For proper venting of the pressure reducing valve, the 1/4" diameter hose marked "Case Drain" must be run directly into the hydraulic tank. Also, the Air Cart motor "Case Drain" hose must be connected to this line at the quick coupler provided. If the hose is run through the filler cap then ensure the cap is **VENTED**. A quick coupler can still be used between the tractor and the seeding tool.

- Mount digital pressure gauge in tractor cab with the LCD visible and with in easy reach to operate. (See next page for details)
- Route the digital pressure gauge harness away from moving parts and sharp protrusions. Connect the red wires to the positive (+) terminal of the battery. Connect the black wires to the negative (-) terminal of the battery.



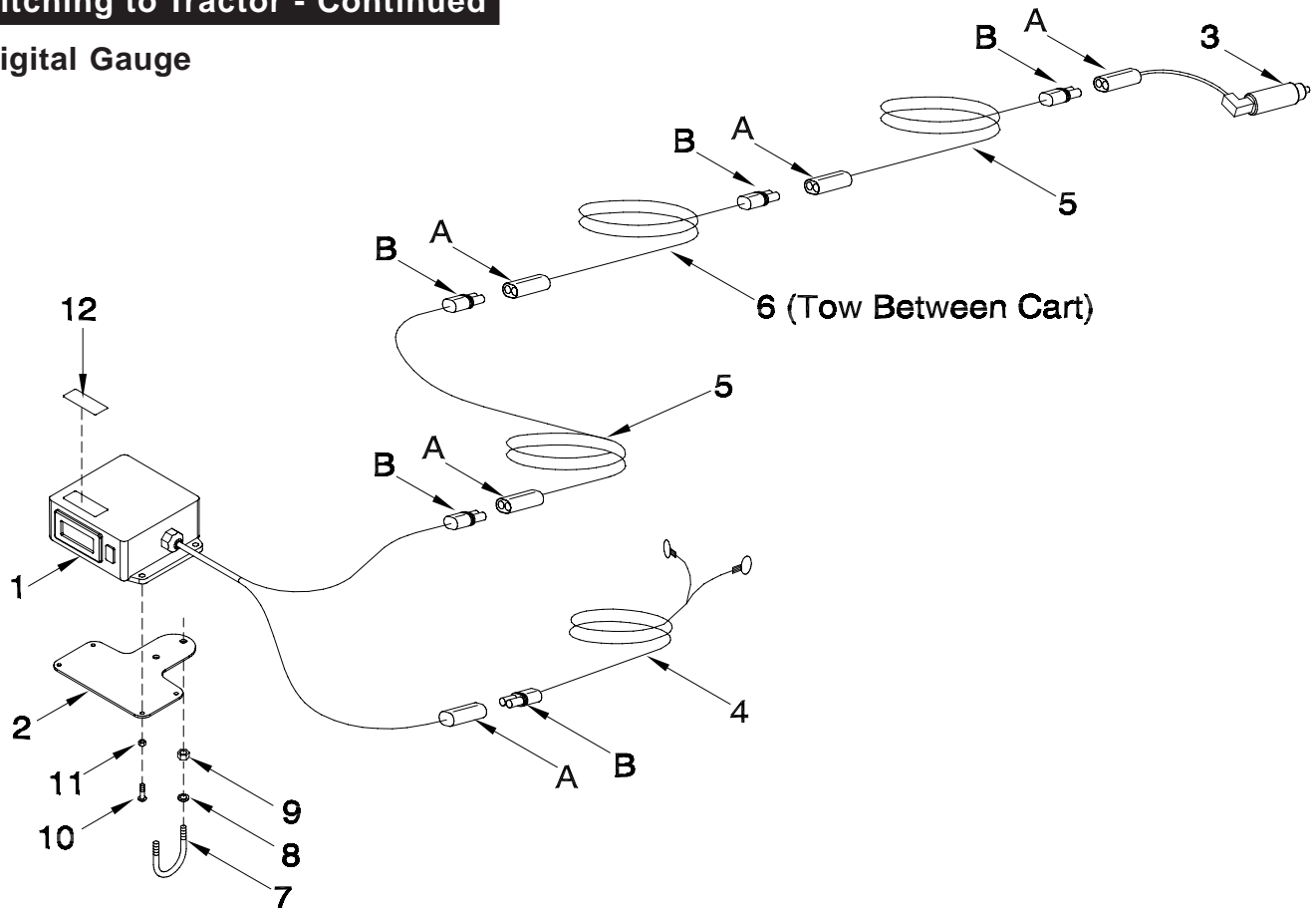
Hydraulic Coupling on Tractor



PRESSURE GAUGE

Hitching to Tractor - Continued

Digital Gauge



Note: TOPCON option only uses items 3, 5, and 6.

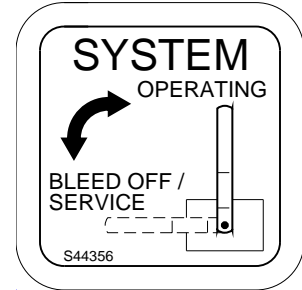
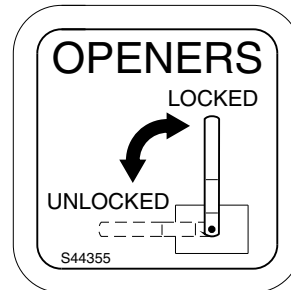
Item	Part No.	Description	Qty
1	S42999	Digital Gauge (Includes item 12)	1
2	S44350	Mounting Bracket - Digital Gauge	1
3	S49545	Pressure Transducer	1
4	N27609	Power Cable - Monitor	1
5	N37018	Extension Cable - 20 ft Lg	2
6	N37020	Extension Cable - 30 ft Lg (Tow Between Air Cart)	1
7	N34319	U-Bolt - 1/4 x 1 1/2 x 1 3/4 Lg	1
8	W-521	Lockwasher - 1/4	2
9	W-512	Hex Nut - 1/4	2
10	N29486	Machine Screw - #8 x 5/8	4
11	N16564	Locknut - #8 - Serrated	4
12	S44464	Decal - Digital Gauge Identification	1
Replacement Connectors			
A	N29384	Weather Pak Connector - BLACK - 2 Pin Plug	
B	N29385	Weather Pak Connector - BLACK - 2 Pin Socket	

Service

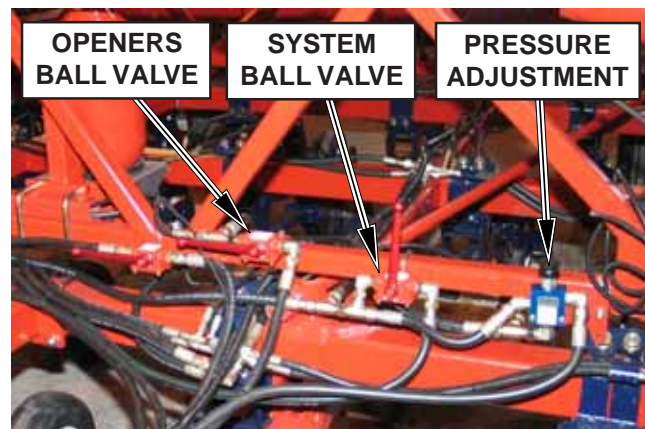
Depth Adjustment

To adjust seed depth:

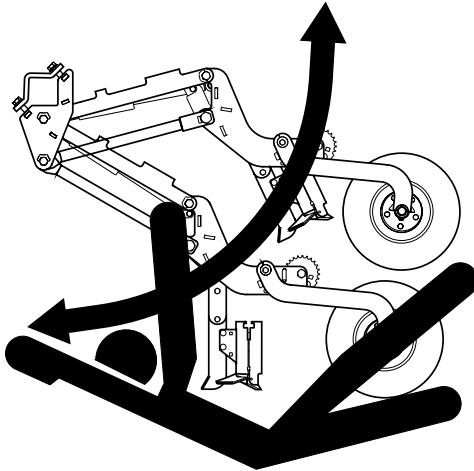
- Lift openers to raised position (allow pressure gauge to reach zero).
- Shut tractor off and remove key.
- Ensure tractor park brake is engaged before proceeding.
- Place "Openers" ball valve into locked position to prevent accidental oil flow to openers.



Note: Refer to C2 Operation for late model C1's which used the single valve block.



Valve Locations



S44446

WARNING

CRUSHING HAZARD

To prevent serious injury or death:

- **STAND CLEAR** - openers move rapidly under hydraulic pressure.
- Before servicing hydraulics - Place "System" valve in service position and relieve pressure from hydraulic system.
- Shut tractor off and remove key before servicing or adjusting depth.
- Place "Openers" valve in locked position before adjusting depth or transporting.

Depth Adjustment - Continued

- Remove lynch pin from 1/2" diameter depth pin.
- Remove depth pin.
- Rotate depth cam to desired lettered setting ("A" is the shallowest position). Each increment changes the depth a 1/4" (6.4 mm).
- Reinstall 1/2" pin and lynch pin noting letter position before adjusting other openers.

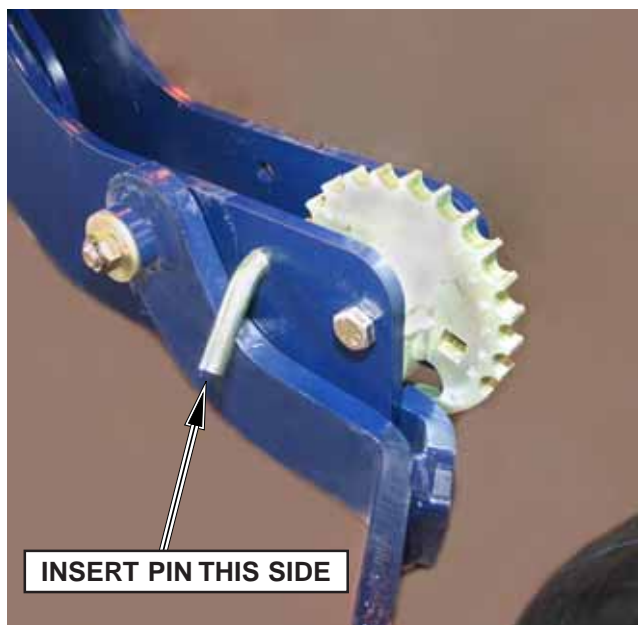
Note: For ease of adjustment, adjust a few openers across the drill to confirm desired seeding depth before adjusting the remaining openers.

- Move the "Openers" ball valve to the unlocked position before using drill.

Important

Pneumatic Tires Only.

Keep opener tires air pressure at the listed specifications to achieve and maintain proper seed depth.



Adjustment Cam



Service

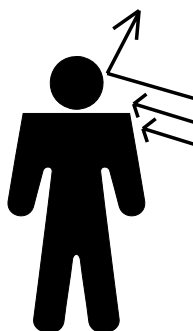
General Guidelines

The results obtained from the Morris Contour Drill are directly related to the depth uniformity of the unit. Worn points, uneven tire pressures, and bent shanks must be avoided to obtain optimum field results.

- Operating depth should be uniform at all opener locations, when spot checking the implement in the field.
- Check openers running in tractor or air cart tracks and adjust depth accordingly.
- Repair or replace bent shanks. Bent shanks cause openers to work at uneven depths and can cause unnecessary ridging. See Maintenance Section.
- Keep tire pressure at the listed specifications to maintain proper level. See Maintenance Section.
- Have Air Drill moving forward before lowering into ground to avoid plugging openers.
- Avoid sharp turns. Turns sharp enough to cause the inside openers of the air drill to reverse direction are not recommended. This may cause the seed openers to plug.



TAKE SAFETY SERIOUSLY.
Do Not Take Needless Chances!



Caution

Care should be taken when working near the air cart while the fan is running. Product blowing out of the system could cause personal injury.



Quick Tips

Note: Read the Operator's Manual for detailed operating and adjustment instructions.

Shank trip force

Shank trip force (lbs) is calculated by dividing the display pressure by 2 (ex. 1000psi display pressure = 500lbs shank trip force). Shank trip out pressure is generally set at the minimum pressure that keeps the shanks solid in the vertical position and prevents them from repeatedly "tripping out", while still providing adequate packing. Maximum recommended shank trip out pressure is 1200psi.

Packing force

Packing force is proportional to shank trip out force and is roughly 1/3 of the shank trip force (ex. 500lbs shank trip force would give approximately 167lbs of packing force).

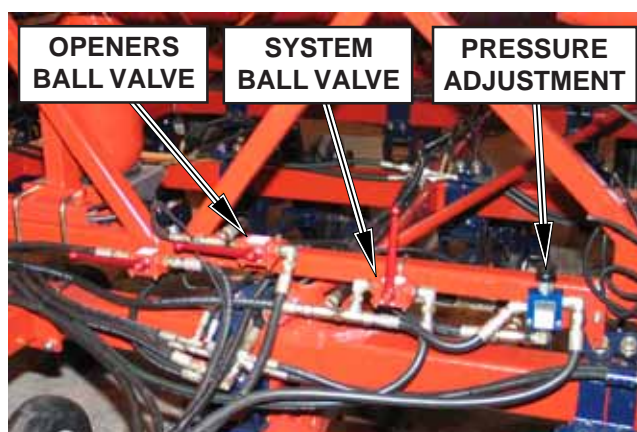
Hydraulic system

The Contour Air Drill uses a passive hydraulic system (no constant flow is needed from the tractor during seeding). Maximum operating pressure is set using the reducing valve on the frame (see "Setting Maximum System Pressure"). Pressure can be changed on the go to adjust for variable field conditions by using the tractor remote (see "Pressure Adjustment"). If full range adjustment of pressure is desired, the reducing valve can be set at its maximum pressure and the operator can then adjust pressure manually by watching the pressure display and opener shanks.

NOTE: It is normal for the pressure to drop 50 to 100psi from the initial set point while the accumulator cools (the reducing valve can be set higher to account for this initial pressure drop). If the pressure continues to drop quickly, check the machine for a cylinder, fitting, or hydraulic line leak.

Lifting and lowering the openers

The openers do not need to be completely cycled from working to fully lifted position while turning. Openers can be lifted just to the point that they do not contact the ground while turning, in order to save time by not having to fully recharge the hydraulic accumulator with fluid each cycle (the display pressure won't drop all the way to zero). When transporting the drill, lift the openers and ensure that the display pressure goes down to zero.

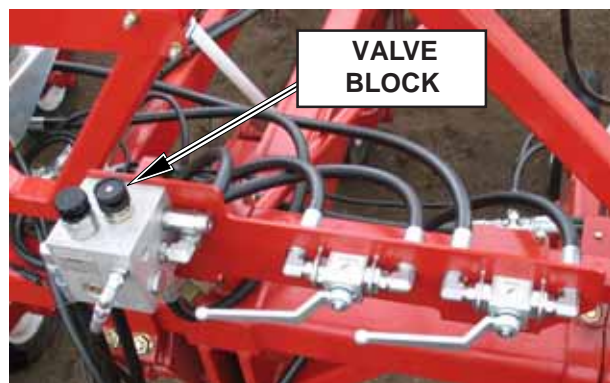


Valve Locations

Important

See C2 Section for details.

Late model C1 Contours came with a valve block which incorporated the Relief Valve, One-way check valve, Pilot operated check valve and System ball valve into a single Valve Block.



Service

Quick Tips - Continued

Setting the seed depth

Seed depth is measured from the packed soil surface to the seed. Set the seed depth on the drill by setting a few openers across the drill to different depths and seeding a test patch. Always seed the test patch at the same ground speed and opener pressure that you intend to maintain during regular seeding conditions. Then check the seed depth of these openers, pick the depth setting that you prefer, and set all openers to the desired letter setting on the depth adjustment cam. The openers perform best while seeding from 1/2" (13mm) to 1-1/2" (38 mm) seed depth, but each customer is responsible for choosing their own depth setting according to their preferences and experience. Each adjustment notch on the adjustment cam is 1/4" (6.4 mm) adjustment. Shallow depth settings can be consistently maintained with the Contour Air Drill system.

NOTE: Be sure to check tractor and/or air cart tracks to see if the added soil compaction has affected the seed depth; the independent openers can be adjusted separately to compensate for wheel tracks.

Seeding conditions

The Contour Air Drill is meant to be used as a minimum to no-till seeding system and care should be taken when attempting to seed into loose or pre-worked soil conditions. Shallow seeding depth, reducing operating speed and operating pressure may help reduce soil throw and ridging in soft conditions.

NOTE: Soil throw onto adjacent seed rows also occurs on conventional air drills with gang style packers, but is less visible because the gang packers pack all rows simultaneously at the back of the drill.

Straw Management

Successful seeding starts at harvest. The height of the straw should not exceed the row spacing of the seeding unit. The combine should chop the straw and spread the straw and chaff evenly across the entire swath width. A heavy harrow may also be required to spread and break down the straw after the field has been harvested. If the straw height does exceed the row spacing a mower should be used to shorten the straw length.



IMPORTANT

The Paired Row Opener with the NH3 adapter is intended to allow the operator the flexibility to switch between granular fertilizer and NH3 without having to change openers. The opener is not intended to apply granular fertilizer and NH3 in the same operation. Excessive gassing off of the NH3 will occur in such an operation. Producers are still able to place starter fertilizer with the seed.

Morris Industries shall have no obligation or liability of any kind on account of the end-user incorrectly using this opener.

Quick Tips - Continued

Air Drill Frame

The Contour Air Drill frame is a simple slab frame system, designed to let the parallel link openers do the work of depth control and leveling during seeding. No leveling of the frame is required. During normal operation of the drill there will be very little weight on the rear tires of the frame. The rear tires may even leave the ground while traveling through sharp gullies; this is normal, and it will not affect the seed depth control of the openers. If the tires are lifted in the air consistently, optional weight kits can be applied to the depth beams near the rear axles.



Weight Kit



Normal Frame Angle

Trouble Shooting Guide

***Note:** Put “Sysem” ball valve into “Bleed Off/Service” position and remove all pressure from hydraulic systems before attempting any service work on hydraulic components.

Hydraulic system must be bled after it has been serviced (if any portion of the system has been opened to atmosphere)



Service

Trouble Shooting

Problem	Cause	Correction
Machine not operating straight.	Uneven opener depth.	Refer to Operation Section on depth adjustment.
		Check tire pressure.
Lack of penetration.	Openers worn.	Replacement necessary.
	System pressure too low.	Refer to Operation Section on setting maximum system pressure.
	System valve in service position.	Place system valve into operating position.
Openers wearing unevenly	Tire tracks. Front row always wears more than the others.	Replace worn openers.
Wing lifting too slowly.	Tractor hydraulic pressure.	Repair pump. Pressure relief valve needs resetting.
	Hydraulic breakaways.	Foreign material or sticking. Check compatibility.
	Hose restriction.	Cylinder linkage binding.
Wings not lowering.	Transport valve in locked position.	Place opener valve into unlocked position.
One wing will lift, other will not.	Assembly.	Hoses reversed at cylinder.
	Restriction in line.	Clean.
	Internal cylinder leak.	Repair cylinder.
Oil accumulation.	Damaged seal.	Replace seals.
	Loose fittings.	Tighten hose and pipe connections.
	Scored cylinder shaft will damage shaft seal.	Replace.
	Normal.	Slight seepage from seal is normal.

Trouble Shooting		
Problem	Cause	Correction
Accumulator system pressure drop excessive.	System valve in service position.	Place system valve into operating position.
	Leaking opener cylinder.	Repair or replace cylinder.
Openers won't lift or lower.	Openers valve in locked position.	Place openers valve in unlocked position.
	Hydraulic line, fitting or cylinder leak.	Locate leaking line, fitting or cylinder and repair or replace.
	Low oil level.	Fill tractor reservoir.
	Hydraulics clogged.	Replace filter.
	Pivot bolts too tight.	Refer to Maintenance Section on Opener Body Assembly for adjusting procedure.
Openers can not be fully pressurized.	Hydraulic line, fitting or cylinder leak.	Locate leaking line, fitting or cylinder and repair or replace .
	Pressure reducing valve dirty or stuck.	Put openers in float and adjust the reducing valve fully in and out to loosen stuck spool.
Shanks hang back and trip out during normal operation.	System pressure too low for seed depth and soil conditions.	Adjust reducing valve to higher pressure until shanks no longer hang back.
	Air in hydraulic lines.	Bleed hydraulic system.
Seed rows covered in loose soil after seeding.	Ground speed too fast.	Reduce speed and check field finish.
	Back of drill frame is lifting.	Add factory weight kit to rear depth beams.
Packer wheels bounce and chatter excessively in field.	Packing pressure too low.	Adjust reducing valve to higher pressure until packer arms have desired pressure.
	Depth setting too deep.	Reduce opener seeding depth.
Openers drop quickly after transport lock valve is closed.	Hydraulic line, fitting or cylinder leak.	Locate leaking line, fitting or cylinder and repair or replace.

Service

Trouble Shooting

Problem	Cause	Correction
Opener pressure drops quickly during normal operation.	Hydraulic line, fitting or cylinder leak.	Locate leaking line, fitting or cylinder and repair or replace.
(more than 150psi after charging system).	Damaged or stuck pilot operated check valve.	Replace valve.
	Soft field conditions.	Reduce pressure and seed depth settings.
Excessive seed depth and soil throw.	Ground speed too fast.	Reduce speed and re-check depth.
	Hydraulic pressure too high.	Reduce pressure and re-check depth.
	Air in hydraulic lines.	Bleed hydraulic system.
	Parallel link pivot bolts too tight.	Loosen pivot bolts in small increments until all openers will drop quickly from raised position under their own weight (put tractor remote in float to allow openers to drop).
Openers not fully lifting to transport position.		

Technical Bulletins

Reference: Semi Pneumatic Tires and Pneumatic Tires

Due to the lack of availability of rims with out valve stem holes Morris currently has some semi pneumatic tires mounted on rims with the valve stem hole. This tire and rim combination have a rubber valve stem inserted into the hole to prevent moisture and dirt from getting inside of the rim.

Semi pneumatic tires do not require any checking or adding of air.

The pneumatic tires can be identified by the steel valve stem and require the tire pressure to be checked and adjusted.



Semi Pneumatic Tire - No Valve Stem



Semi Pneumatic Tire - Rubber Valve Stem

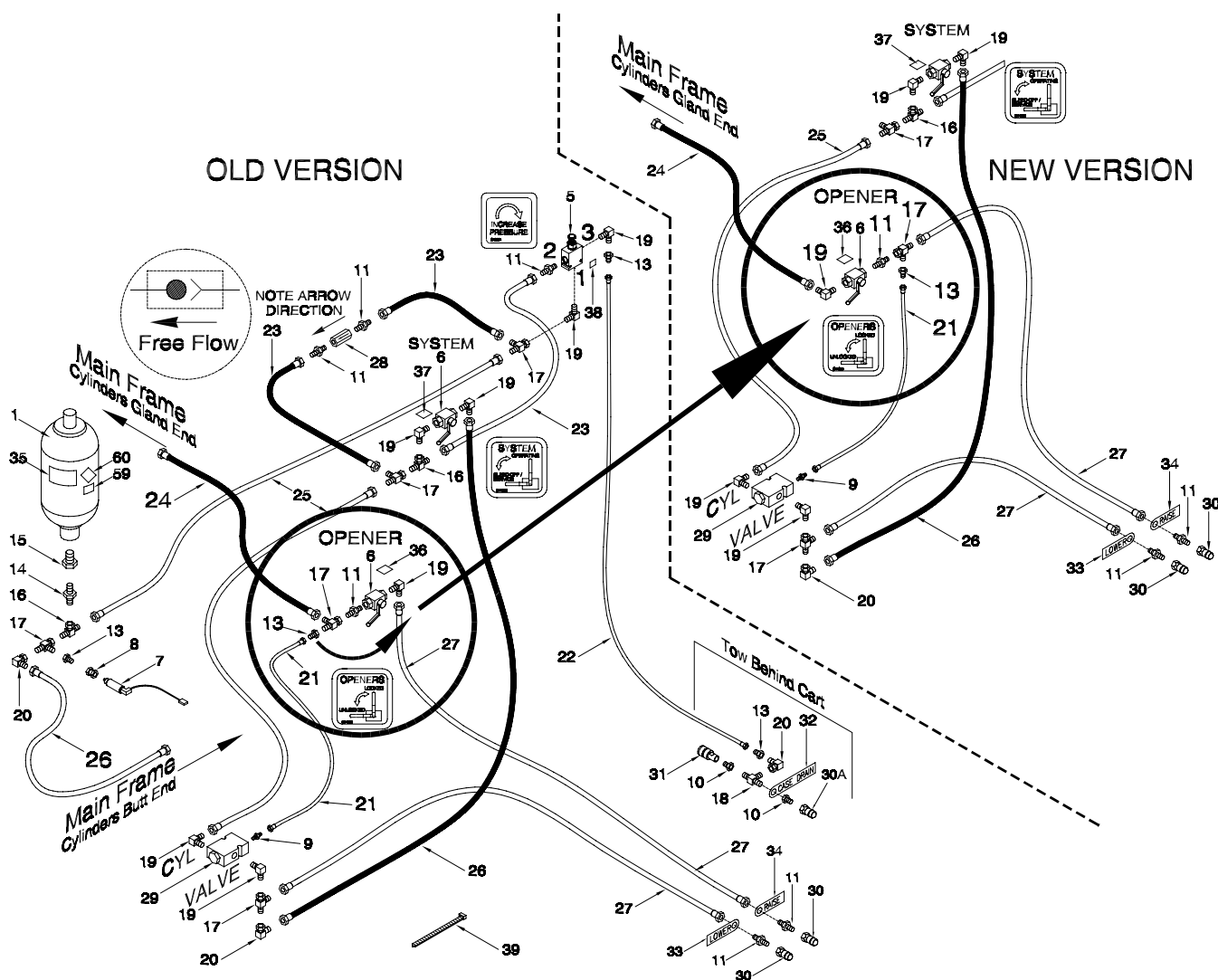


Pneumatic Tire - Steel Valve Stem

Reference: Opener Hydraulics

Lift openers fully and ensure that the digital pressure gauge display pressure goes down to zero. Release the hydraulic lever, if the digital pressure gauge display goes up to 500 psi. and/or the openers drop in a short time frame (2 to 3 hours), relocate hydraulic pilot line item 21 to the tractor side of the ball valve as illustrated below in the new version. Hydraulic fittings item 11, 13, 17 and 19 will have to be moved as well.

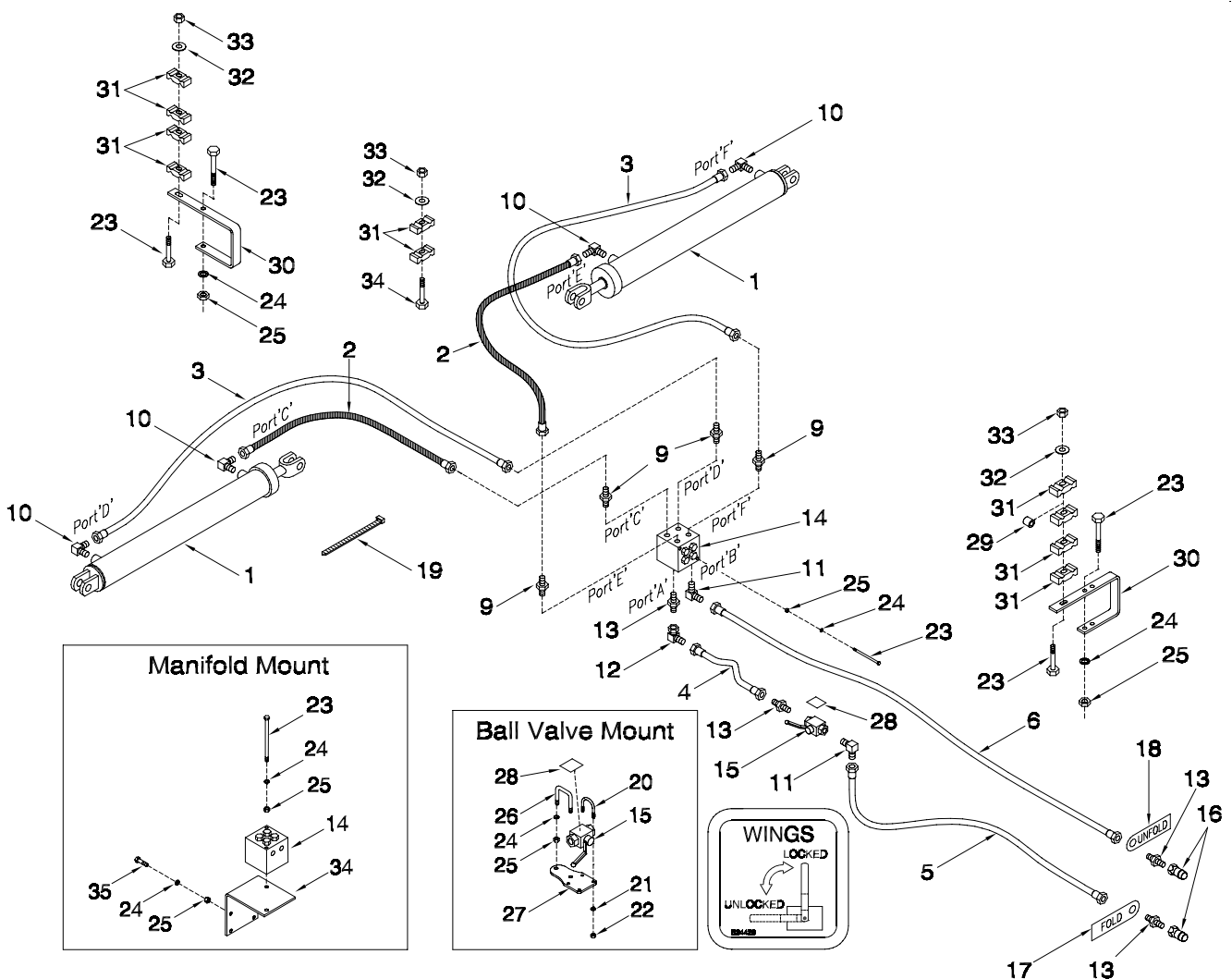
Note: Do not mistake symptoms for air in hydraulic system. Check and eliminate air in hydraulic system before relocating hydraulic hose.



Reference: 25 ft and 31 ft Wing Lift Hydraulics

It has come to Morris' attention the hydraulic hoses from the cylinders (item 1) were going to the wrong ports on the flow control manifold (item 14).

The diagram below indicates the correct ports for the hoses.



Reference: 71 ft Wing Lift Hydraulics

It has come to Morris' attention that some inner wing lift cylinder clevis' may contact the gusset on the wing lift truss when the wings are fully raised. This contact could cause damage to the cylinder clevis.

Check all 71 foot units to ensure there is an 1/8" (3 mm) clearance between the inner wing lift cylinder clevis and gusset on the wing lift truss when the wings are fully raised.

Grind gusset as required to obtain the required 1/8" (3 mm) clearance.



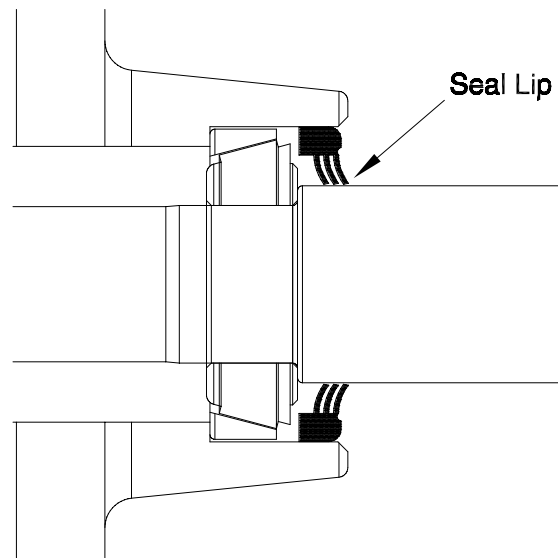


Reference: Packer Wheel Seal

The lips of the seal should be rolled outward when the hub is assembled to the spindle as illustrated below.

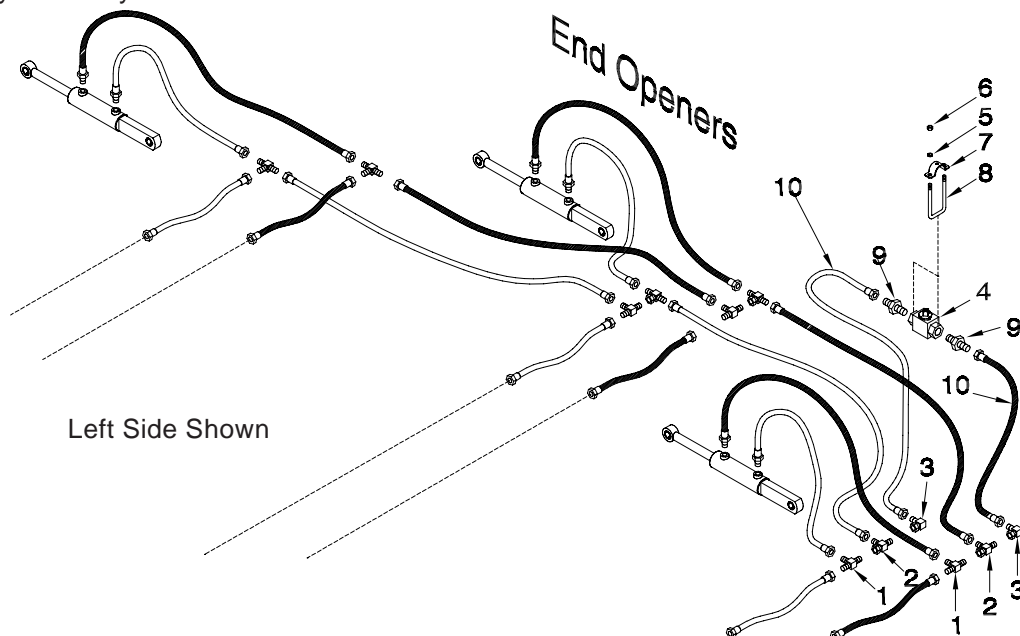
The seal lip may need to be pulled out using a lip seal pulling tool. Insert tip of seal puller tool along side of spindle and seal while gently rotating hub until the outside of the seal lip is raised.

Note: A shaft seal should never run without proper lubrication, both the seal lip and the shaft should be lubricated (typically with the same grease being sealed) prior to installation of the seal.



Reference: Bleed-Off Kit

Morris is pleased to introduce a Bleed-Off Kit to retrofit to any Contour Air Drill to improve the ease of servicing the opener hydraulic system.



Item	Part No.	Description	Qty
1	C-4393	Tee - (3) 9/16-18 MJIC	4
2	C-4403	Tee - (2) 9/16-18 MJIC x (1) 9/16-18 FJIC	4
3	S29967	90 Elbow - 9/16-18 FJIC x 9/16-18 MJIC	4
4	N42880	Lock Valve	2
5	W-523	Lockwasher - 3/8	8
6	W-514	Hex Nut - 3/8	8
7	S47556	Mount Plate - Ball Valve	4
8	N15097	U-Bolt - 3/8 x 2 3/8 x 5 Lg	4
9	C15348	Connector - 9/16-18 MJIC x 3/4-16 MORB	4
10	C-4467	Hyd Hose - 1/4 x 16 Lg w/ #6 9/16-18 FJIC	4
	S46144	Kit - Hydraulic Bleed-Off	

Use the following procedure to remove air from the opener hydraulic system::

- Lift openers up and lock tractor remote in lift position.
- With tractor hydraulics operating, open bleed-off ball valves on end of drill wings
- Allow oil to cycle for a few minutes then change direction of tractor remote to lower openers and cycle for a few more minutes.
- Close bleed-off ball valves and lift openers up.
- Repeat above procedure for a second time.
- Close bleed-off ball valves and lift openers up.
- Lock "Openers" valve and check to see that openers stay firmly in position.
- If openers are spongy repeat procedure until air is gone.



Reference: 61 Foot Accumulator

In very rolling, hilly conditions, major pressure changes can occur on a 61 ft Contour Air Drill due to the limited hydraulic capacity of the 2.5 gallon accumulator (ie. high pressure on hill tops, no pressure through draws).

The installation of the higher capacity 5 gallon accumulator will alleviate this issue.

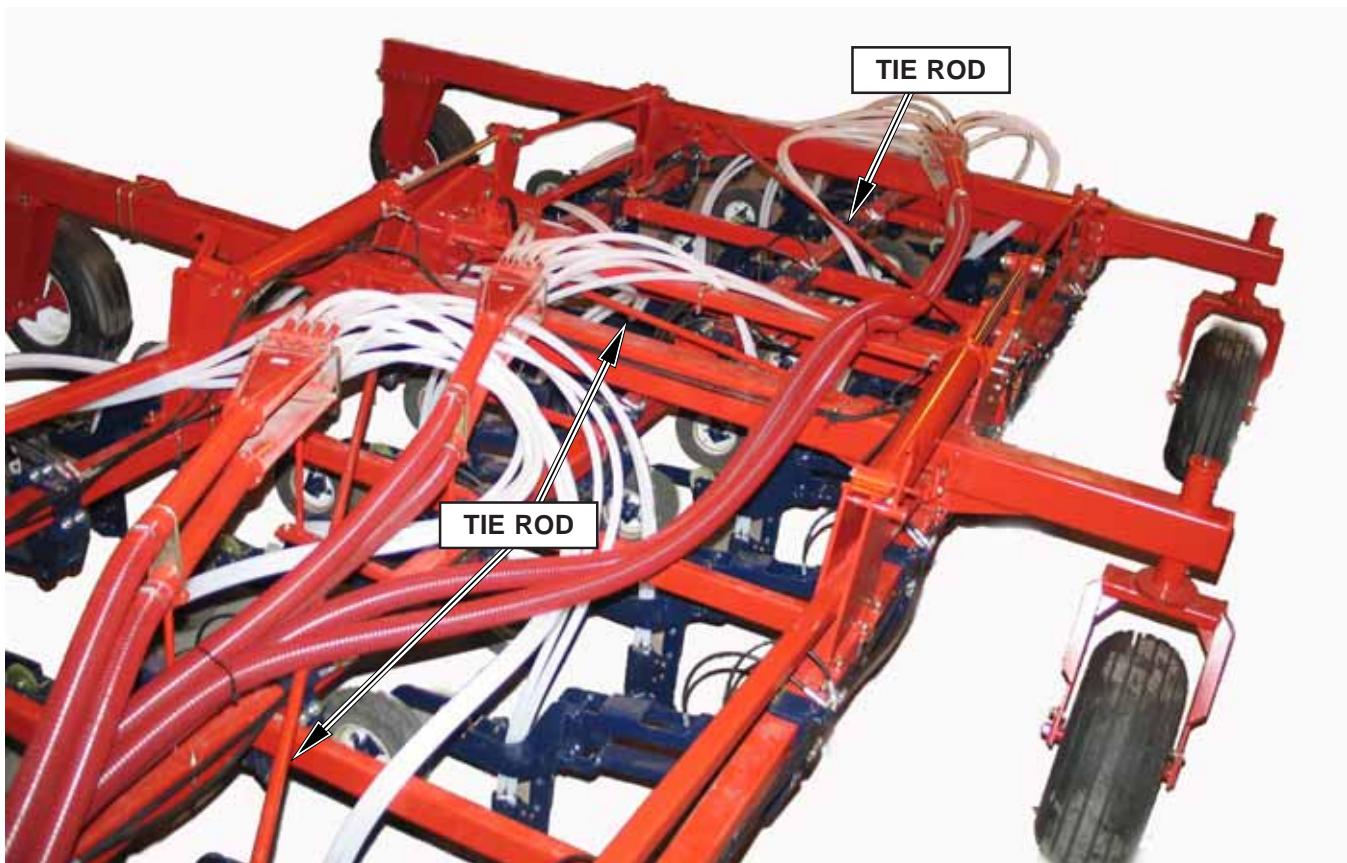


Reference: Wing Section Tie Rods

The tie rods are an integral part of the frame structure. Lack to maintain the correct tension on the tie rods could result in damage to frame components.

The wing tie rods must be torque to 175 - 200 ft lbs. (237 - 271 Nm). Check periodically as indicated below:

1. On delivery before field operation.
2. After first 1 hour of use.
3. After first 50 hours of use.
4. Check seasonally to ensure the tie rods on the wings are tight.



71 Foot Unit Shown

Reference: Outer Wing Lift - 5 Frame Units

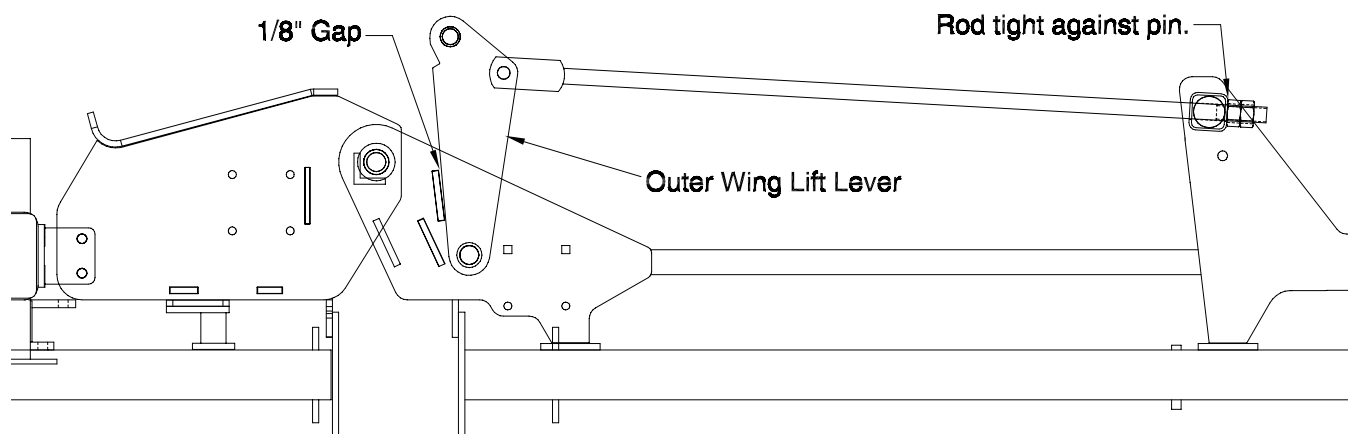
On initial set-up adjust the Outer Wing Lift Rod as follows:

- With the cylinder disconnected pull the outer wing lift lever against the gusset in the lift arm.
- Adjust rod length until there is an 1/8" (3 mm) clearance between the outer wing lift lever and gusset.

Note: Do not exceed 1/8" (3 mm) clearance. Damage to frame components may result.

- Tighten jam nut to secure in place.

After initial wing-up the clearance will decrease, but do not re-adjust clearance.



Reference: 25-31 Potential for Skewing

There are certain field conditions that could potentially cause the 25 foot and 31 foot Contour Air Drills to skew when equipped with the narrow single shoot knife (S42865) and the 480 Semi Pneumatic Tire (S44300) or the wider 550 Semi Pneumatic Tire (S44900).

To reduce the potential for skewing it is strongly recommended that the 480 and 550 Semi Pneumatic Tires **NOT** be used with the narrow single shoot knife. The suggested tire combinations to be used are the "V" Crown tire (S47093), 4.5 Otico tire (S49521), or 480 Pneumatic Tire (S44405).



Contour Air Drill Suggested Parts Order List

Item	Part No.	Description	Qty
1	C-1463	HUB ASSY. #HA615-1 WW/CUPS	1
2	C-1521	DUST SEAL #20674 PHLE	1
3	C-219	UBOLT-.625 DIA X 4 X 5.563	2
4	C-3258	WASHER - 2"O.DX 1.062" I.DX	1
5	C-4474	BOTTOM BUSHING-TRIP ROCKER	10
6	C16609	TIRE-11LX15"FI(12 PLY) T/L	1
7	C16611	RIM - 15 X 10" 6 HOLE	1
8	C26525	BUSHING - PIVOT	10
9	C33957	BOLT-CARRIAGE-SQ RD(.75"X3	6
10	C42912	HYD CYL - 1.75" X 3.25" ST	1
11	C44461	SEAL KIT - 1.75" X 3.25"	3
12	D-5260	CARRIAGE BOLT-.375 X 1.25"	10
13	D12942	LOCKNUT - .75" SERRATED	6
14	N19164	SPINDLE	1
15	N19172	SEAL - C/R #2510	1
16	N19484	SLOTTED NUT - 1.25"-12 UNF	1
17	N33342	U-BOLT-.625" X 7" X 6.5" C	1
18	N34315	VALVE-LOCK-SEE N42880/81	1
19	N34443	COUPLER-QUICK-0.75 - 16ORB	1
20	N34488	COUPLER-HYD-QUICK (8250-16	1
21	N34498	NIPPLE-NON-SLIP (8010	1
22	S27987	NUT-.375-16 FLANGE CENTRE.	10
23	S32545	SPINDLE - 2"DIA X 16"LG	1
24	S32556	SPINDLE - 2.5"DIA X 19"LG	1
25	S34114	VALVE-PILOT OPERATED CHECK	1
26	S39543	1.25" X 3.625" UL PIN	1
27	S42674	WASHER - CONTOUR OPENER	2
28	S42675	WASHER - CONTOUR OPENER	2
29	S42725	HINGE PIN - 1.5 X 6.875	1
30	S42765	DUST SEAL - PACKER WHEEL H	2
31	S42940	WEAR SHANK W/CARBIDE	1
32	W-1474	BEARING CONE-OUTER LM48548	1
33	W-1475	BEARING CONE-INNER LM60304	1
34	C-1471	BOLT - .25 X 1.75" HEX UNC	1
35	C14840	CONNECTOR-.5" MORB X .625" M	1
36	C14901	SW.TEE W/2-.375" MJIC X .375	4
37	C15348	CONNECTOR -.5" MORB X .375"	1
38	C16652	HYD HOSE-.25X60- 9/16-18 F	1
39	C24585	SW. ELBOW -90 DEGREE (ADJ.	1
40	C26333	ELBOW-45DEG-7/8-14 MJIC X	1
41	C-4393	UNION TEE - .375" JIC	4
42	C-4394	UNION TEE W/3 - .625" MJIC	1
43	C-4401	CROSS-.625" JIC	1
44	C-5561	UBOLT - .75" (PLATED)	1
45	C-695	BOLT -.75 X 2" HEX UNC GR.5	1
46	D-5260	CARRIAGE BOLT-.375 X 1.25"	1
47	F10384	REDUCER-.375" MJIC X .625" F	1
48	F-3405	LOCKNUT - .5" UNC UNITORQU	4
49	H18269	MALE UNION - .375 MM JIC	4

Service

Contour Air Drill Suggested Parts Order List

Item	Part No.	Description	Qty
50	H18746	SW.TEE - .625 MMF JIC	1
51	K-5806	SW.ELBOW -.875"-14 M/FJIC	2
52	N16143	ELBOW - 90 DEGREE MJIC X M	1
53	N31908	RUN TEE - ADJUSTABLE O.R.B	1
54	S42593	BUSHING - SEED SPACER	1
55	S42659	DEPTH PIN - 1/2" DIAMETER	1
56	S42962	CAST WEAR TAIL - CONTOUR DRILL	1
57	S44402	BUSHING-.75 OD X.51 ID X 2	1
58	W-487	BOLT - .5 X 1.75"W/.75 THR	1
59	W-490	BOLT - .5 X 2.5" HEX UNC G	1
60	W-495	BOLT - .5 X 4" HEX UNC GR	1
61	W-509	BOLT - .75 X 2.5" HEX UNC	1
62	W-518	NUT - .75" HEX UNC GR.5 (P	4
63	W-527	LOCKWASHER - .75" (PLTD)	4



877-360-4360
April 1 to June 15

When you have an emergency during seeding you need help right away. That's why we created Morris 360 Service™—to provide Morris customers with around-the-clock troubleshooting access to our Technical Support Specialists. With just one call, you'll be connected to a real person with technical expertise to help solve your problem, day or night.



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