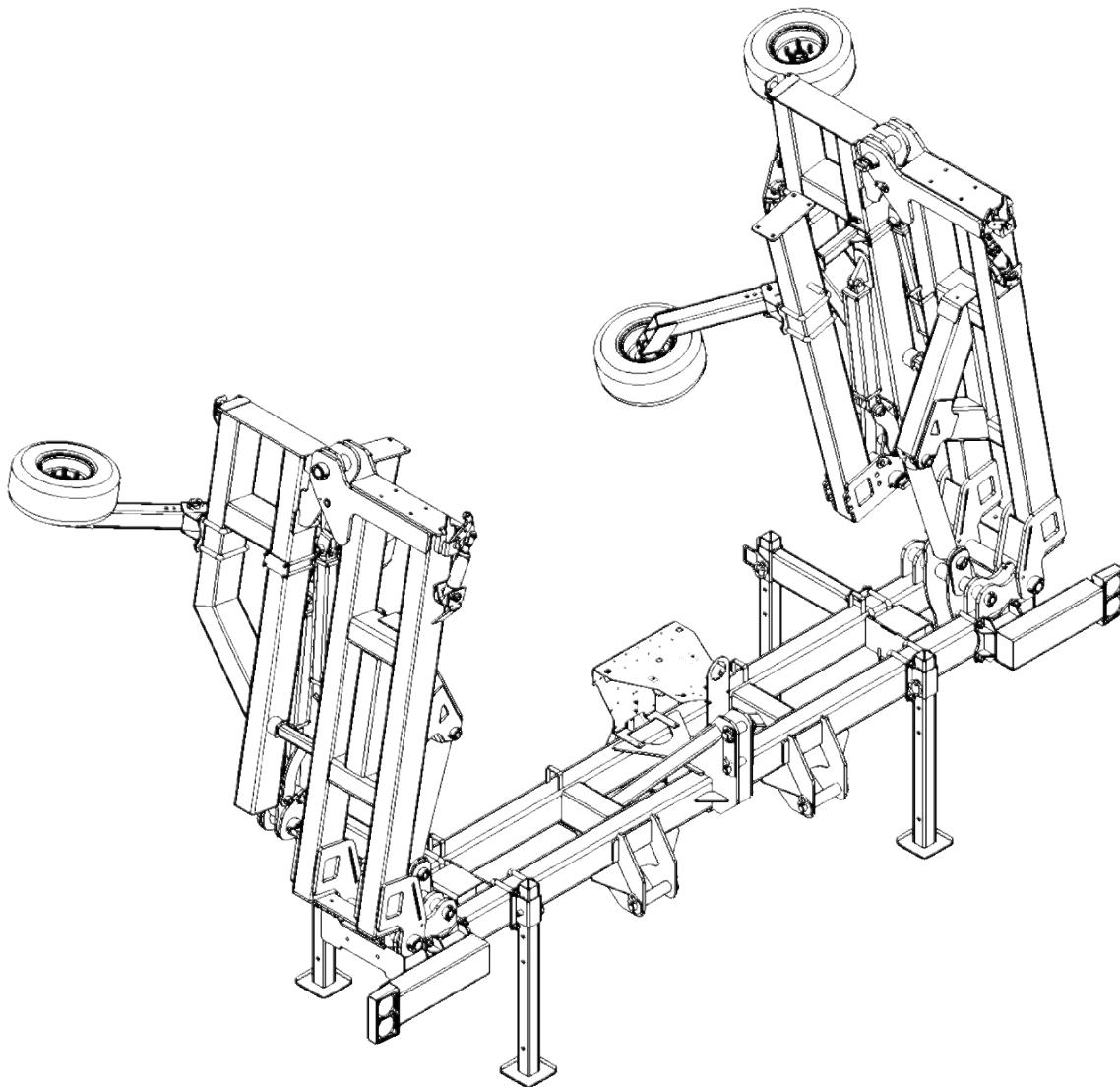




3 POINT TOOLBAR

40-60'

8/18
AF20058, Rev 1



ASSEMBLY
CALIBRATION
OPERATION
REPLACEMENT PARTS

READ *complete manual CAREFULLY*
BEFORE attempting operation.

Doing Our Best To Provide You The Best

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WARRANTY POLICY, OPERATOR MANUALS & REGISTRATION

Go online to www.demco-products.com to review Demco warranty policies, operator manuals and register your Demco product.

INTRODUCTION

Thank you for purchasing a Demco fertilizer applicator. We feel you have made a wise choice and hope you are completely satisfied with your new fertilizer applicator. If you have any questions regarding the applications of certain solutions or chemicals, contact your chemical supplier and follow chemical manufacturer recommendations as well as all licensing and use restrictions or regulations.



WARNING: TO AVOID PERSONAL INJURY OR PROPERTY DAMAGE, OBSERVE FOLLOWING INSTRUCTIONS:

Chemicals are dangerous. Know exactly what you're going to do and what is going to happen before attempting to work with these products. Improper selection or use can injure people, animals, plants and soil.

Always wear protective clothing such as coveralls, goggles and gloves when working with chemicals or sprayer.

Be sure to dispose of all unused chemicals or solutions in a proper and ecologically sound manner.

GENERAL INFORMATION

1. Unless otherwise specified, high-strength (grade5) (3 radial-line head markings) hex head bolts are used throughout assembly of this piece of equipment.
2. Whenever terms “**LEFT**” and “**RIGHT**” are used in this manual it means from a position behind wagon box and facing forward.
3. When placing a parts order, refer to this manual for proper part numbers and place order by **PART NO. and DESCRIPTION**.
4. Read assembly instructions carefully. Study assembly procedures and all illustrations before you begin assembly. Note which parts are used in each step. This unit must be assembled in proper sequence or complications will result.

SAFETY

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.



THIS SYMBOL MEANS

-ATTENTION

-BECOME ALERT

-YOUR SAFETY IS INVOLVED!

SIGNAL WORDS

Note the use of the following signal words DANGER, WARNING, and CAUTION with the safety messages. The appropriate signal word for each has been selected using the following guidelines:

DANGER:

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

WARNING:

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION:

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

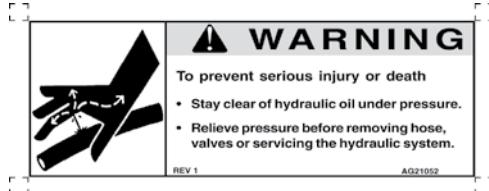
If you have questions not answered in this manual, require additional copies, or if your manual is damaged, please contact your dealer or Demco, 4010 320th Street, Boyden, IA 51234

ph: (712) 725-2311 Toll Free: 1-800-543-3626 Fax: (712) 725-2380 www.demco-products.com



SAFETY SIGN LOCATIONS

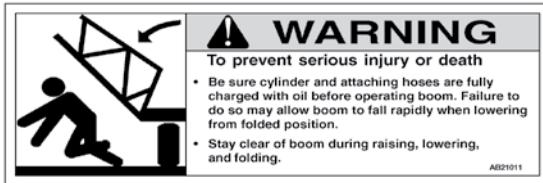
Types of safety sign and locations on equipment are shown in illustration below. Good safety requires that you familiarize yourself with various safety signs, type of warning, and area or particular function related to that area, that requires your SAFETY AWARENESS.



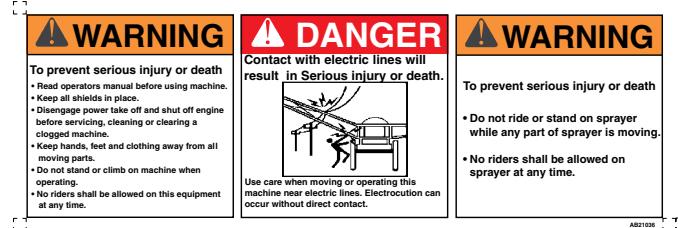
#3 Warning : Stay clear of hydraulic oil under pressure



#4 Warning : PINCH POINTS



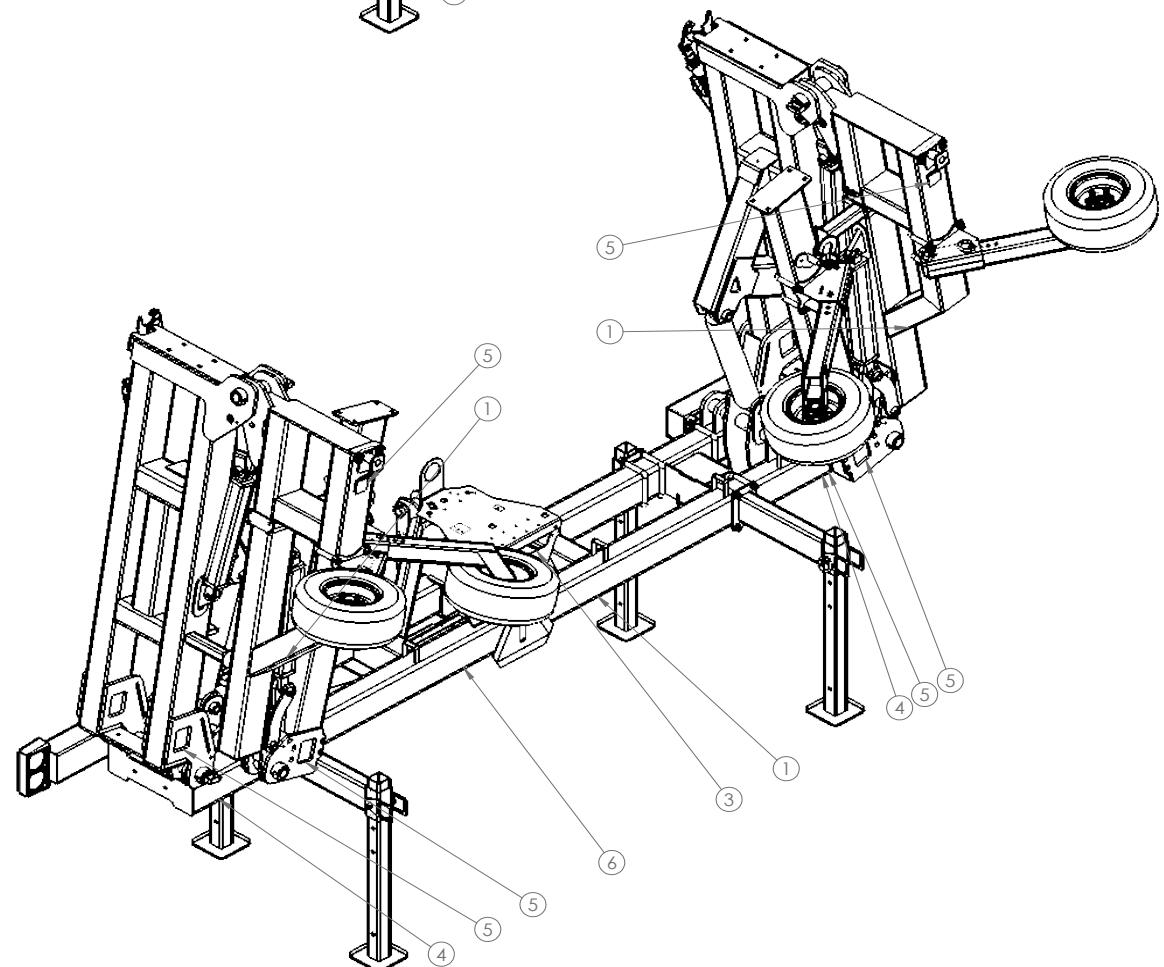
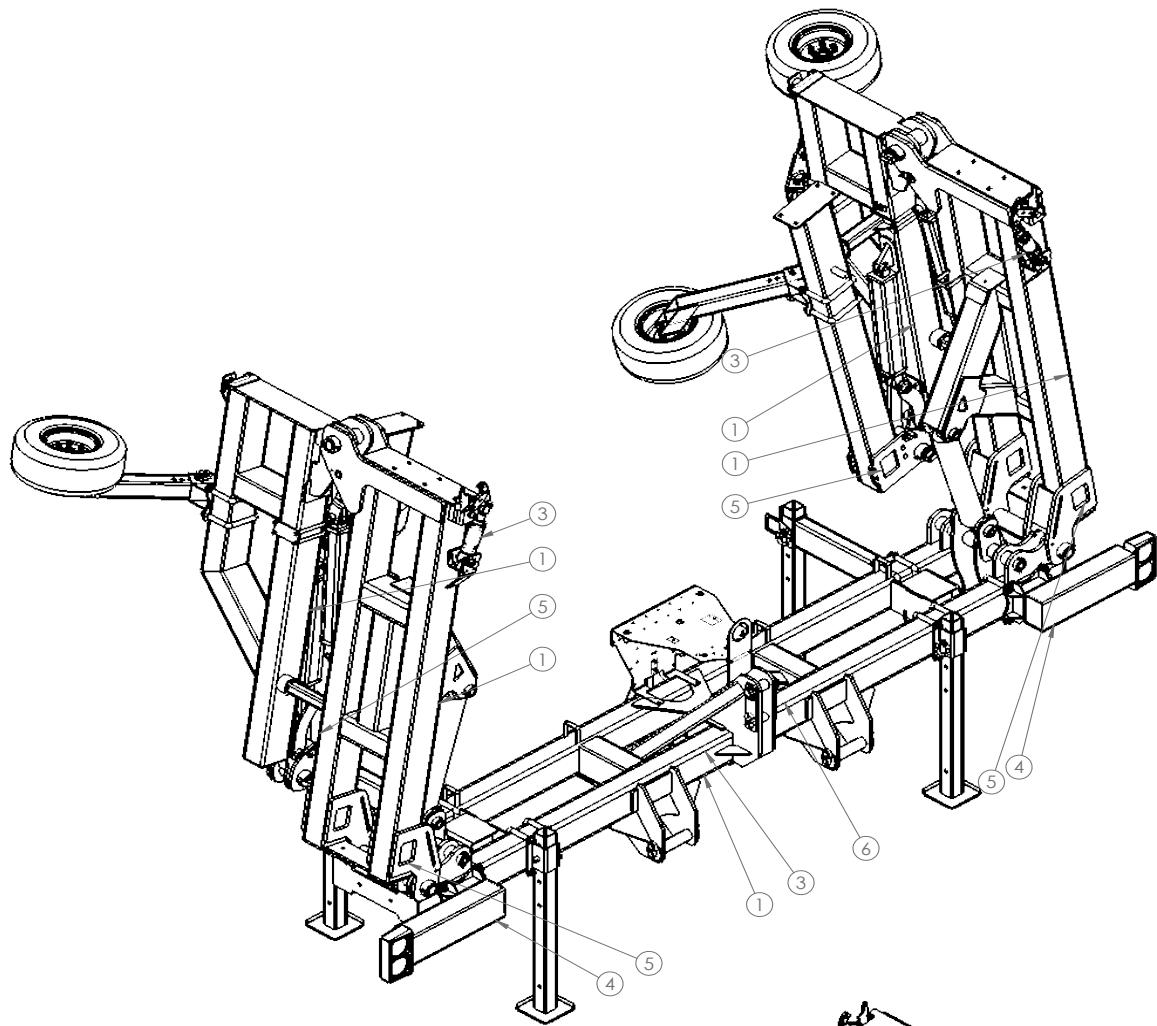
#5 Warning : Stay clear of boom during raising, lowering and folding



#6 Warning : ELECTRICAL DANGER

ITEM	PART #	QTY	DESCRIPTION
1	AA21010	8	DEMCO DECAL
2	AA21070	12	10 HOUR GREASE DECAL
3	AB21009	4	WARNING DECAL
4	*AB21011	4	WARNING DECAL FOR BOOM
5	*AB21027	10	WARNING DECAL PINCH POINTS
6	AB21036	2	TWO PANEL WARNING ONE PANEL DANGER

*Order # AC21004





SAFETY...YOU CAN LIVE WITH IT



EQUIPMENT SAFETY GUIDELINES

Every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury, study the following precautions and insist those working with you, or you yourself, follow them.

In order to provide a better view, certain illustrations in this manual may show an assembly with a safety shield removed. However, equipment should never be operated in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace the shield prior to use.

Replace any caution, warning, danger or instruction safety decal that is not readable or is missing. Location of such decals is indicated in this booklet.

Do not attempt to operate this equipment under the influence of alcohol or drugs.

Review the safety instructions with all users annually.

Operator should be a responsible adult. DO NOT ALLOW PERSONS TO OPERATE OR ASSEMBLE THIS UNIT UNTIL THEY HAVE DEVELOPED A THOROUGH UNDERSTANDING OF THE SAFETY PRECAUTIONS AND HOW IT WORKS.

To prevent injury or death, use a tractor equipped with a roll over protective system (ROPS). Do not paint over, remove, or deface any safety signs or warning decals on your equipment. Observe all safety signs and practice the instructions on them.

Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely is in question-DON'T TRY IT.



LIGHTING AND MARKING

It is the responsibility of the customer to know the lighting and marking requirements of the local highway authorities and to install and maintain the equipment to provide compliance with the regulations. Add extra lights when transporting at night or during periods of limited visibility.

Lighting kits are available from your dealer or from the manufacturer.



SAFETY SIGN CARE

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or have become illegible.
- Replaced parts that displayed a safety sign should also display the current sign.
- Safety signs are available from your distributor, dealer parts department, or the factory.

How to install safety signs:

- Be sure that the installation area is clean and dry.
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal into place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of decal backing paper.



BEFORE OPERATION:

- Carefully study and understand this manual.
- Do not wear loose-fitting clothing which may catch in moving parts.
- Always wear protective clothing and substantial shoes.
- It is recommended that suitable protective hearing and eye protection be worn.
- The operator may come in contact with certain materials which may require specific safety equipment relative to the handling of such materials. (Examples: extremely dusty, molds, fungus, bulk fertilizers, etc.)
- Keep wheel and lug nuts tightened to specified torque.
- Assure that agricultural implement tires are inflated evenly.
- Give the unit a visual inspection for any loose bolts, worn parts, or cracked welds, and make necessary repairs. Follow the maintenance safety instructions included in this manual.
- Be sure there are no tools lying on or in the equipment
- Do not use the unit until you are sure that the area is clear, especially around children and animals.
- Don't hurry the learning process or take the unit for granted. Ease into it and become familiar with your new equipment.
- Practice operation of your equipment and it's attachments. Completely familiarize yourself and other operators with it's operation before using.
- Make sure that the brakes are evenly adjusted (if equipped with brakes)
- Use a tractor equipped with Roll Over Protection System (ROPS) and fasten your seat belt prior to starting the engine.
- The manufacturer does not recommend usage of a tractor with the ROPS removed.
- Move the tractor wheels to the widest recommended settings to increase stability.
- Securely attach to towing unit. Use a high strength, appropriately sized hitch pin with a mechanical retainer and attach a safety chain.
- Do not allow anyone to stand between the tongue or hitch and the towing vehicle when backing up to the equipment.



DURING OPERATION

- **SAFETY CHAIN** -If equipment is going to be transported on a public highway, a safety chain should be obtained and installed. Always follow state and local regulations regarding safety chain and auxiliary lighting when towing farm equipment on a public highway. Be sure to check with local law enforcement agencies for your own particular regulations. Only a safety chain (not an elastic or nylon/plastic tow strap) should be used to retain the connection between the towing and towed machines in the event of separation of the primary attaching system.

- Install the safety chain by crossing the chains under the tongue and secure to the draw bar cage, hitch, or bumper frame.
- Beware of bystanders, **PARTICULARLY CHILDREN!** Always look around to make sure that it is safe to start the engine of the towing vehicle or move the unit. This is particularly important with higher noise levels and quiet cabs, as you may not hear people shouting.
- **NO PASSENGERS ALLOWED-** Do not carry passengers anywhere on or in the tractor or equipment.
- Keep hands and clothing clear of moving parts.
- Do not clean, lubricate, or adjust your equipment while it is moving.
- When halting operation, even periodically, set the tractor or towing vehicle brakes, disengage the PTO, shut off the engine, and **remove the ignition key**.
- Be especially observant of the operating area and terrain- watch for holes, rocks, or other hidden hazards. Always inspect the area prior to operation.
 - DO NOT operate near the edge of drop-offs or banks.
 - DO NOT operate on steep slopes as overturn may result.
 - Operate up and down (not across) intermediate slopes. Avoid sudden starts and stops.
- Pick the levelest possible route when transporting across fields. Avoid the edges of ditches, gullies, and steep hillsides.
- Be extra careful when working on inclines.
- Periodically clear the equipment of brush, twigs, or other materials to prevent buildup of dry combustible materials.
- Maneuver the tractor or towing vehicle at safe speeds.
- Avoid overhead wires or other obstacles. Contact with overhead lines could cause serious injury or death.
- Avoid loose fill, rocks, and holes; they can be dangerous for equipment operation or movement.
- Allow for unit length when making turns.
- Do not walk or work under raised components or attachments unless securely positioned and blocked.
- Keep all bystanders, pets, and livestock clear of the work area.
- Operate the towing vehicle from the operators seat only.
- Never stand alongside of unit with engine running or attempt to start engine and/or operate machine while standing alongside of unit.
- Never leave running equipment attachments unattended.
- As a precaution, always recheck the hardware on equipment following every 100 hours of operation. Correct all problems. Follow the maintenance safety procedures.



FOLLOWING OPERATION

- Following operation, or when unhitching, stop the tractor or towing vehicle, set the brakes, disengage the PTO and all power drives, shut off the engine and **remove the ignition keys**.
- Store the unit in an area away from human activity.
- Do not park equipment where it will be exposed to livestock for long periods of time. Damage and livestock injury could result.
- Do not permit children to play on or around the stored unit.
- Make sure all parked machines are on a hard, level surface and engage all safety devices.
- Wheel chocks may be needed to prevent unit from rolling.



HIGHWAY AND TRANSPORT OPERATIONS

- Adopt safe driving practices:
 - Keep the brake pedals latched together at all times. **NEVER USE INDEPENDENT BRAKING WITH MACHINE IN TOW, LOSS OF CONTROL AND/OR UPSET OF UNIT CAN RESULT.**
 - Always drive at a safe speed relative to local conditions and ensure that your speed is low enough for an emergency stop to be safe and secure. Keep speed to a minimum.
 - Reduce speed prior to turns to avoid the risk of overturning.
 - Always keep the tractor or towing vehicle in gear to provide engine braking when going downhill. Do not coast.
 - Do not drink and drive!
- Comply with state and local laws governing highway safety and movement of farm machinery on public roads.
- Use approved accessory lighting flags and necessary warning devices to protect operators of other vehicles on the highway during daylight and nighttime transport. Various safety lights and devices are available from your dealer.
- The use of flashing amber lights is acceptable in most localities. However, some localities prohibit their use. Local laws should be checked for all highway lighting and marking requirements.
- When driving the tractor and equipment on the road under 20 mph (40 kph) at night or during the day, use flashing amber warning lights and a slow moving vehicle (SMV) identification emblem.
- Plan your route to avoid heavy traffic.
- Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.
- Be observant of bridge loading ratings. Do not cross bridges rated lower than the gross weight at which you are operating.

- Watch for obstructions overhead and to the side while transporting.
- Always operate equipment in a position to provide maximum visibility at all times. Make allowances for increased length and weight of the equipment when making turns, stopping the unit, etc.



PERFORMING MAINTENANCE

- Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.
- Make sure there is plenty of ventilation. Never operate the engine of the towing vehicle in a closed building. The exhaust fumes may cause asphyxiation.
- Before working on this machine, stop the towing vehicle, set the brakes, disengage the PTO and all power drives, shut off the engine and **remove the ignition keys**.
- Be certain all moving parts and attachments have come to a complete stop before attempting to perform maintenance.
- **Always** use a safety support and block wheels. Never use a jack to support the machine.
- Always use the proper tools or equipment for the job at hand.
- Use extreme caution when making adjustments.
- Follow the torque chart in this manual when tightening bolts and nuts.
- Never use your hands to locate a hydraulic leak on attachments. Use a small piece of cardboard or wood. Hydraulic fluid escaping under pressure can penetrate the skin.
- When disconnecting hydraulic lines, shut off hydraulic supply and relieve all hydraulic pressure.
- Openings in the skin and minor cuts are susceptible to infection from hydraulic fluid. **Without immediate medical treatment, serious infection and reactions can occur.**
- Replace **all shields** and guards after servicing and before moving.
- After servicing, be sure all tools, parts and service equipment are removed.
- Do not allow grease or oil to build up on any step or platform.
- Never replace hex bolts with less than grade five bolts unless otherwise specified.
- Refer to bolt torque chart for head identification marking.
- Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications. The Manufacturer will not claim responsibility for use of unapproved parts and/or accessories and other damages as a result of their use.
- If equipment has been altered in any way from original design, the manufacturer does not accept any liability for injury or warranty.
- A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment.

BOLT TORQUE

TORQUE DATA FOR STANDARD NUTS, BOLTS, AND CAPSCREWS.

Tighten all bolts to torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt chart as guide. Replace hardware with same grade bolt.

NOTE: Unless otherwise specified, high-strength Grade 5 hex bolts are used throughout assembly of equipment.

Bolt Torque for Standard bolts *



Torque Specifications

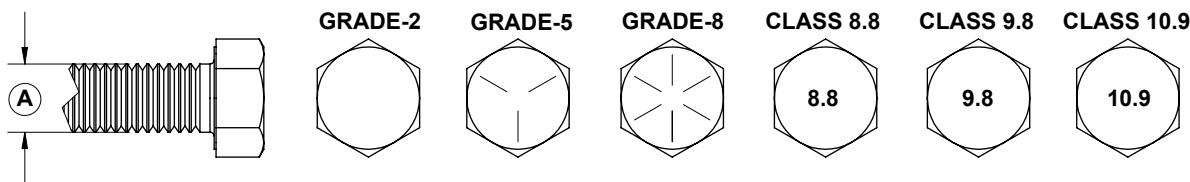
"A"	GRADE 2		GRADE 5		GRADE 8	
	Ib-ft	(N.m)	Ib-ft	(N.m)	Ib-ft	(N.m)
1/4"	6	(8)	9	(12)	12	(16)
5/16"	10	(13)	18	(25)	25	(35)
3/8"	20	(27)	30	(40)	45	(60)
7/16"	30	(40)	50	(70)	80	(110)
1/2"	45	(60)	75	(100)	115	(155)
9/16"	70	(95)	115	(155)	165	(220)
5/8"	95	(130)	150	(200)	225	(300)
3/4"	165	(225)	290	(390)	400	(540)
7/8"	170	(230)	420	(570)	650	(880)
1"	225	(300)	630	(850)	970	(1310)

Bolt Torque for Metric bolts *

"A"	CLASS 8.8		CLASS 9.8		CLASS 10.9	
	Ib-ft	(N.m)	Ib-ft	(N.m)	Ib-ft	(N.m)
6	9	(13)	10	(14)	13	(17)
7	15	(21)	18	(24)	21	(29)
8	23	(31)	25	(34)	31	(42)
10	45	(61)	50	(68)	61	(83)
12	78	(106)	88	(118)	106	(144)
14	125	(169)	140	(189)	170	(230)
16	194	(263)	216	(293)	263	(357)
18	268	(363)	--	--	364	(493)
20	378	(513)	--	--	515	(689)
22	516	(699)	--	--	702	(952)
24	654	(886)	--	--	890	(1206)

Torque figures indicated are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

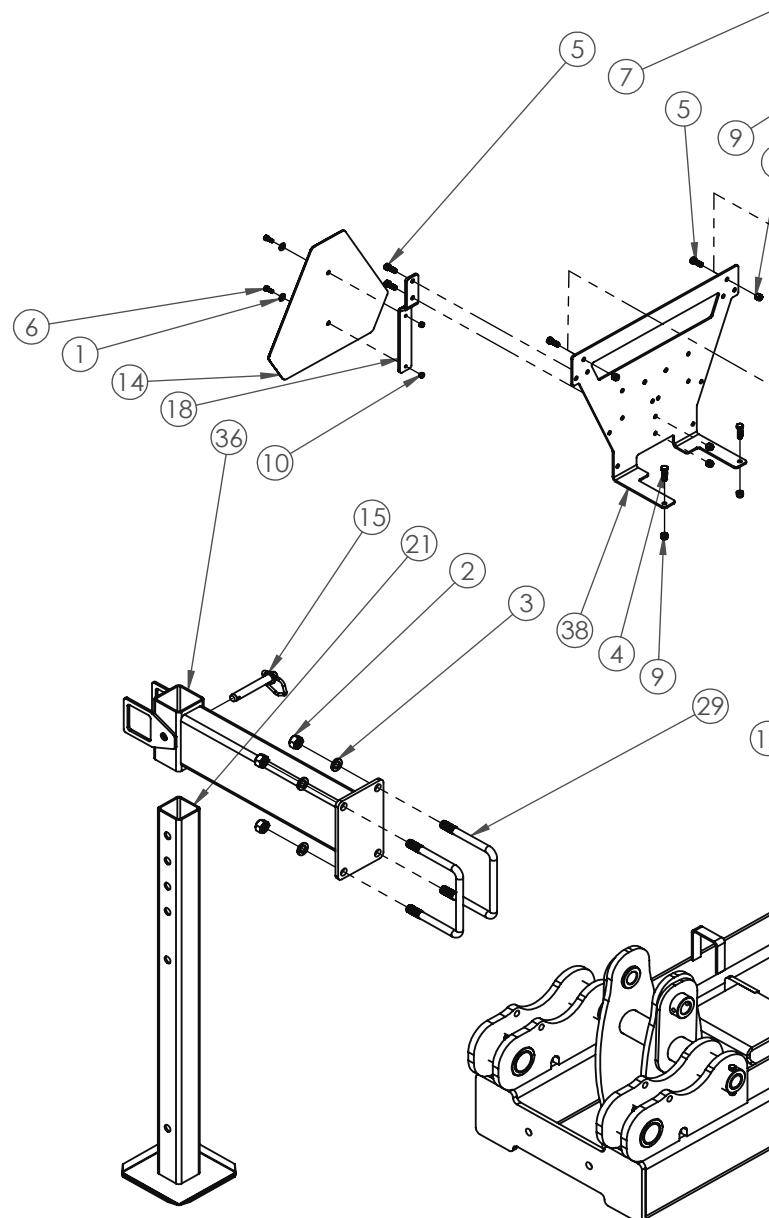
* GRADE or CLASS value for bolts and capscrews are identified by their head markings.



CENTER SECTION PARTS BREAKDOWN

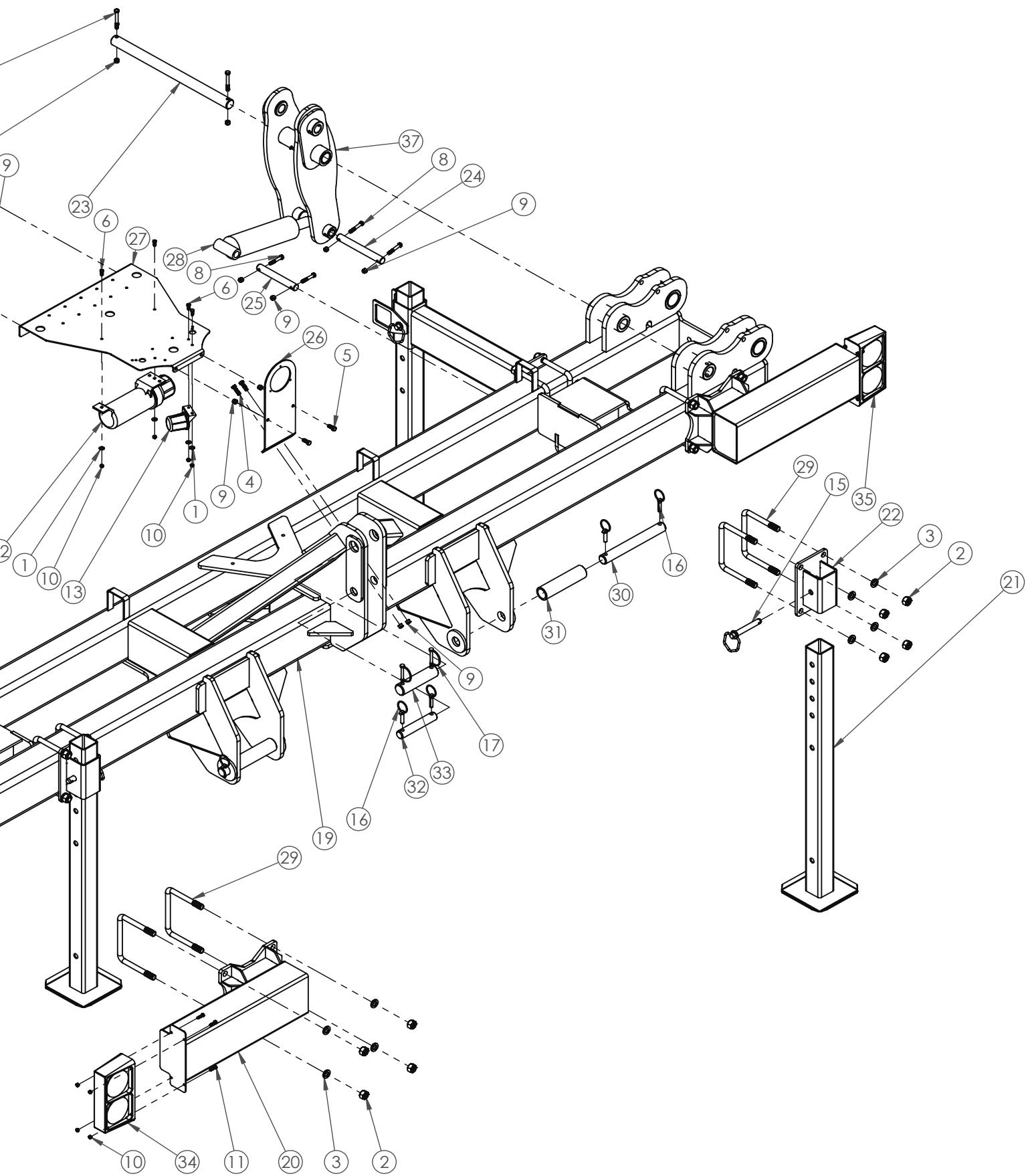
ITEM	PART #	QTY	DESCRIPTION
1	00214	6	WASHER, FLAT .25
2	00253	24	.75 NC HEX NUT
3	00254	24	.75 LOCK WASHER
4	00523	4	BOLT, .375NC X 1.25 HEX HEAD GR. 5
5	00907	6	BOLT, .375NC X 1.00 HEX HEAD GR. 5
6	01076	6	BOLT, .25NC X .75 HEX HEAD GR. 5
7	02207	4	BOLT, .375NC X 3.00 HEX HEAD GR.5
8	02494	8	BOLT, .375NC X 2.25 HEX HEAD GR. 5
9	02592	22	NUT, .375NC NYLON LOCK
10	02772	14	NUT, .25NC NYLON LOCK
11	04055	8	BOLT, .25NC X 1.00 HEX HEAD GR. 5
12	10241	1	DOCUMENT HOLDER
13	10277	1	ELECTRICAL PLUG HOLDER
14	12126	1	SMV SIGN
15	14681	4	HITCH PIN
16	14724	6	SAFETY LOCK PIN, .438
17	14725	2	SAFETY LOCK PIN, .313
18	14952-76	1	SMV HOLDER
19	15013-76	1	3 POINT CENTER SECTION
20	15014-76	2	CENTER EXTENSION
21	15051-76	4	LEG STAND
22	15055-76	2	FRONT STAND MOUNT
23	15065-95	2	CENTER LINKAGE PIN
24	15066-95	2	LINKAGE PIN
25	15067-95	2	LIFT CYLINDER PIN
26	15075-76	1	CENTER FRONT COVER
27	15076-76	1	CENTER TOP COVER
28	15082	2	3 X 6 CYLINDER
29	15091	12	U-BOLT .75 X 7.00 X 5.00 GR. 5
30	15092-95	2	LOWER 3 POINT PIN
31	15093-95	2	CATEGORY 4 BUSHING
32	15094-95	1	UPPER CATEGORY 3 PIN
33	15095-95	1	UPPER CATEGORY 4 PIN
34	15271	1	LEFT LIGHT, LED
35	15272	1	RIGHT LIGHT, LED
-	09058	1	WIRE HARNESS FOR LIGHTS
36	15420-76	2	BACK STAND MOUNT
37	15465-76	2	60" CENTER LINKAGE
38	15549-76	1	CENTER BACK SUPPORT

Please order replacement parts by PART NO., DESCRIPTION, and COLOR.



Amber light goes to the top
Red light must face the rear

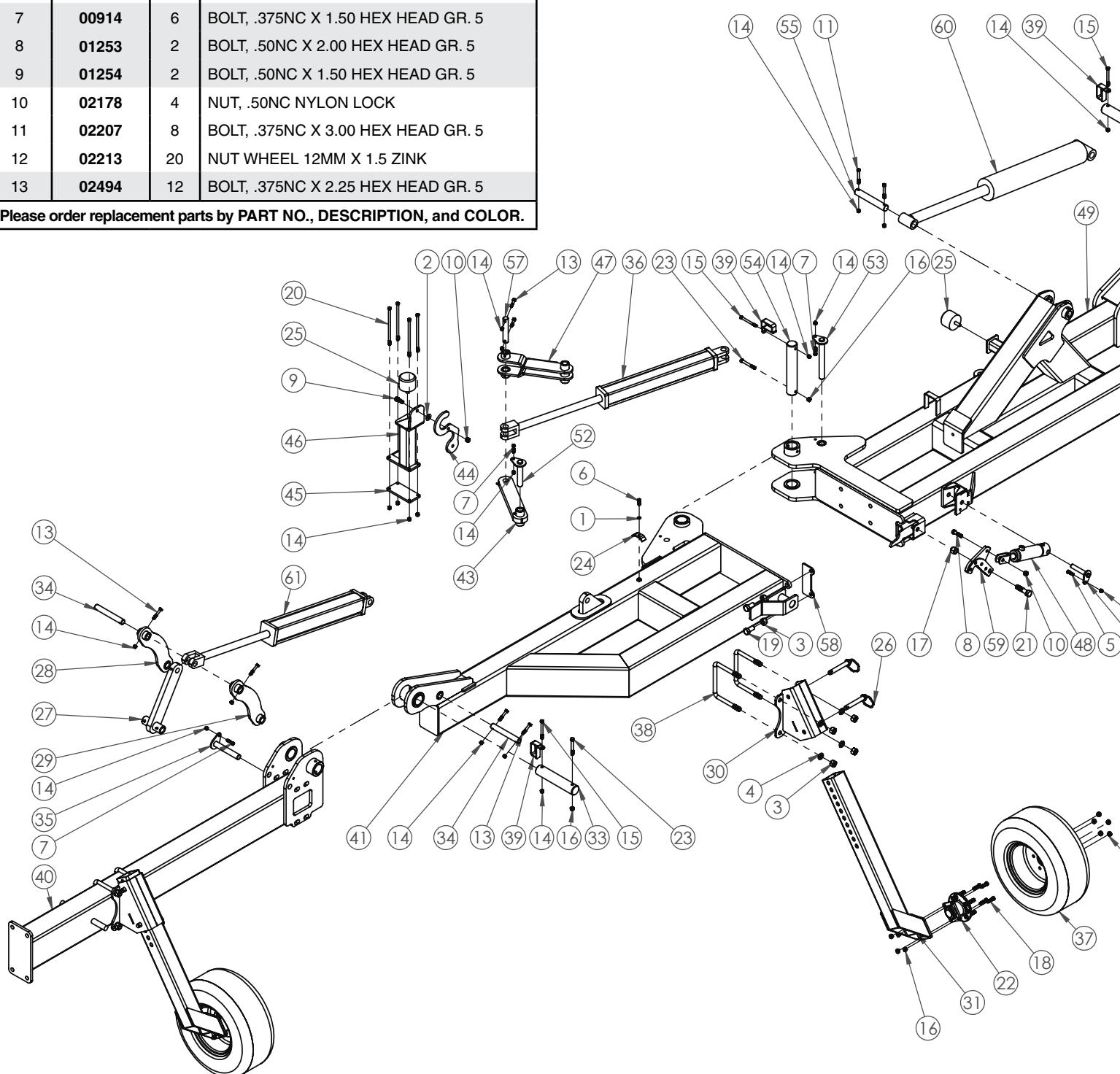
Connect Yellow wire to left light
Connect Green wire to right light

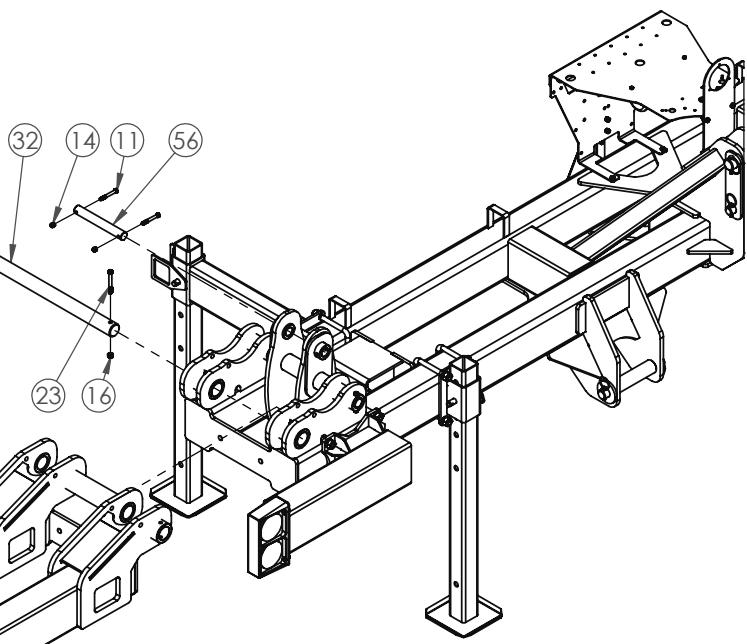


WING ASSEMBLY AND PARTS BREAKDOWN

ITEM	PART #	QTY	DESCRIPTION
1	00060	2	WASHER, LOCK .375
2	00085	2	WASHER, FLAT .50
3	00253	20	NUT, .75NC HEX
4	00254	16	WASHER, LOCK .75
5	00523	2	BOLT, .375NC X 1.25 HEX HEAD GR. 5
6	00907	2	BOLT, .375NC X 1.00 HEX HEAD GR. 5
7	00914	6	BOLT, .375NC X 1.50 HEX HEAD GR. 5
8	01253	2	BOLT, .50NC X 2.00 HEX HEAD GR. 5
9	01254	2	BOLT, .50NC X 1.50 HEX HEAD GR. 5
10	02178	4	NUT, .50NC NYLON LOCK
11	02207	8	BOLT, .375NC X 3.00 HEX HEAD GR. 5
12	02213	20	NUT WHEEL 12MM X 1.5 ZINK
13	02494	12	BOLT, .375NC X 2.25 HEX HEAD GR. 5

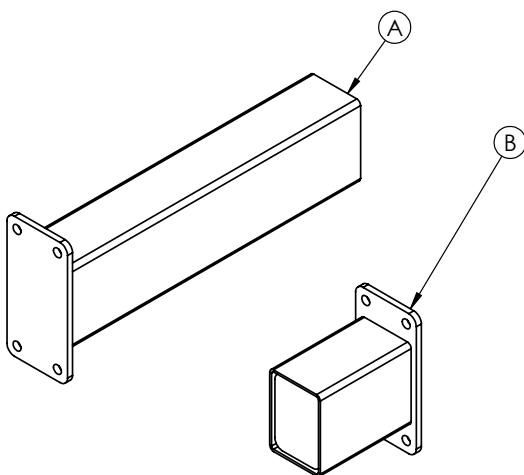
Please order replacement parts by PART NO., DESCRIPTION, and COLOR.





OPTIONAL ADD-ONS

* Left side is opposite



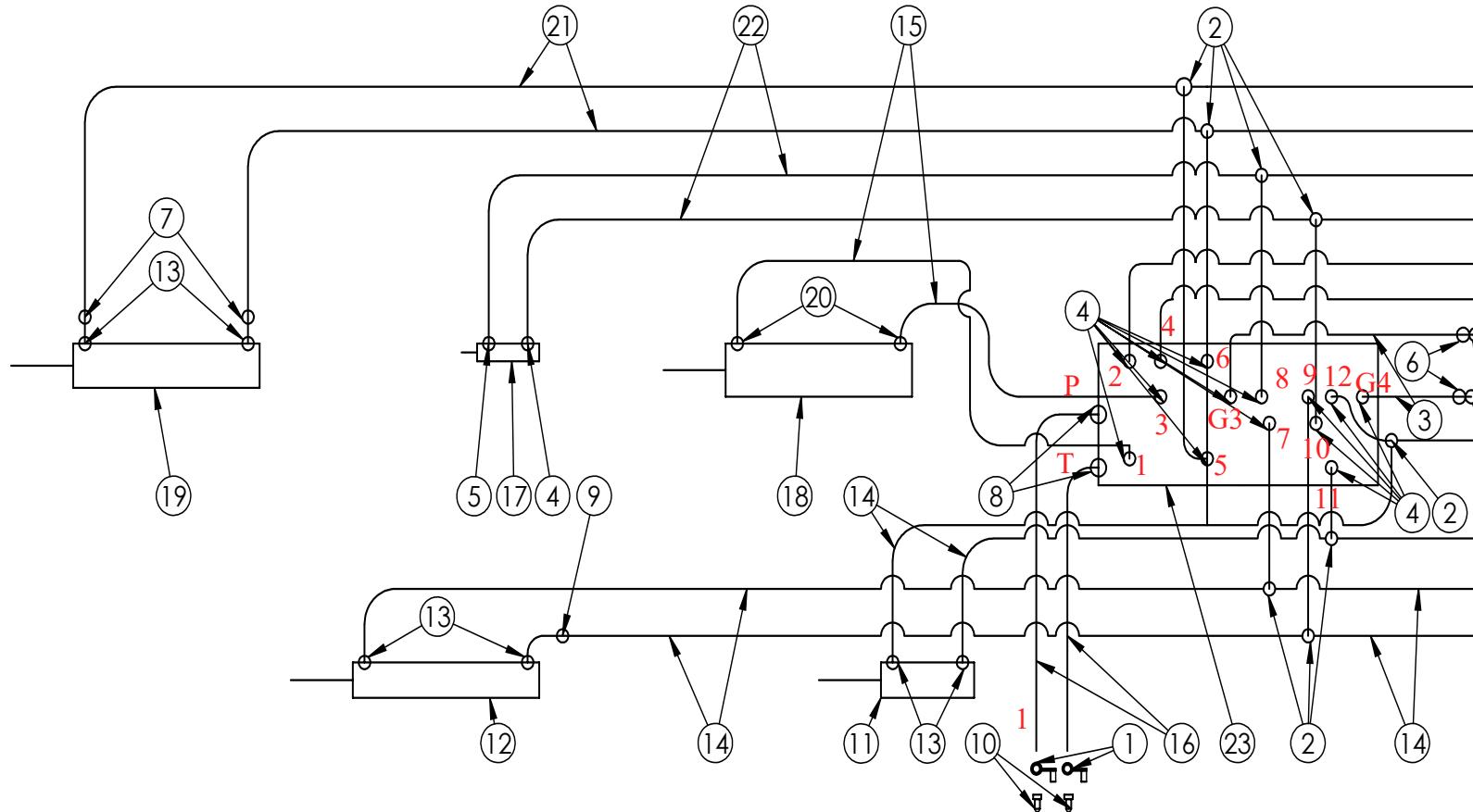
ITEM	PART #	DESCRIPTION
A	15015-76	GUESS ROW EXTENSION
B	15016-76	20" END ROW EXTENSION

Please order replacement parts by PART NO., DESCRIPTION, and COLOR.

ITEM	PART #	QTY	DESCRIPTION
14	02592	42	NUT, .375NC NYLON LOCK
15	02769	6	BOLT .375NC X 4.00 HEX HEAD GR. 5
16	02771	22	NUT, .434NC NYLON LOCK
17	02961	2	NUT, .75NC NYLON LOCK
18	04050	16	BOLT, .438NC X 1.50 HEX HEAD GR. 5
19	04052	4	BOLT, .75NC X 1.50 HEX HEAD GR. 5
20	00782	8	BOLT, .375NC X 8.50 HEX HEAD GR. 5
21	04222	2	BOLT, .75NC X 3.00 HEX HEAD GR.5
22	04369-76	4	5-BOLT HUB / SPINDLE
23	04796	6	BOLT, .438NC X 3.50 HEX HEAD GR. 5
24	09218-95	4	HOSE KEEPER, 2 HOSE
25	10443	4	RUBBER BUMPER
26	14681	8	HITCH PIN
27	15035-76	2	END WING LINKAGE
28	*15036-76	2	RIGHT CURVED LINKAGE
29	*15037-76	2	LEFT CURVED LINKAGE
30	15052-76	4	GAUGE WHEEL MOUNT
31	15053-76	4	GAUGE WHEEL ARM
32	15063-95	2	CENTER HINGE PIN
33	15064-95	2	END HINGE PIN
34	15067-95	4	LINKAGE PIN
35	15079-95	2	LINKAGE PIN
36	15084	2	3 X 20 CYLINDER
37	15090	4	TIRE 20.5 X 8.0 - 10 PLY WITH RIM
38	15091	8	U-BOLT, .75 X 7.00 X 5.00 GR. 5
39	15102-76	6	HOSE HOLDER
40	15457-76	2	60' TOOLBAR OUTER WING
41	15458-76	1	60' TOOLBAR SECOND RIGHT WING
42	15459-76	1	60" TOOLBAR SECOND LEFT WING
43	15460-76	2	SIDE HINGE LINKAGE
44	15461-76	2	SAFETY LATCH
45	15462-76	2	LATCH MOUNT PLATE
46	15463-76	2	BUMPER STOP
47	15464-76	2	SIDE HINGE LINKAGE
48	15466-30	2	CYLINDER 2.0 X 3.0
49	15469-76	1	60' TOOLBAR RIGHT FIRST WING
50	15470-76	1	60' TOOLBAR LEFT FIRST WING
51	15485-95	2	LOCK CYLINDER PIN
52	15486-95	2	SIDE LINKAGE PIN
53	15487-95	2	SIDE LINKAGE PIN
54	15488-95	2	SIDE LINKAGE PIN
55	15489-95	2	CYLINDER PIN
56	15490-95	2	CENTER LINKAGE PIN
57	15491-95	2	SIDE LINKAGE PIN
58	15492-76	2	SPACER
59	15493-76	2	LOCKING LATCH
60	15494	2	4 X 20 CYLINDER
61	15495	2	3.5 X 20 CYLINDER

Please order replacement parts by PART NO., DESCRIPTION, and COLOR.

60' TOOLBAR HYDRAULICS SCHEMATIC



Initial Operation:

WARNING: To avoid personal injury or property damage, observe the following instructions. Do not attempt to operate the toolbar until the hydraulic lines and cylinders are completely charged with hydraulic fluid. Failure to do so may cause erratic and unpredictable toolbar operation that may cause personal injury and physical damage to the toolbar.

WARNING: To avoid personal injury or property damage, observe the following instructions. Make sure whenever operating the toolbar that no one is in the line of unfolding and that no electric lines or tree branches will come in contact with the toolbar during folding or unfolding.

When doing this the first time it would be advisable to have another person standing safely behind the fertilizer applicator to ensure that none of the hoses or coulter are interfering with the toolbar operation and that the toolbar is correctly unfolding.

Note: Follow fold out and fold in procedure.

Note: Do not select more than one switch at a time.

Note: Tractor hydraulic flow control lever should be reduced to 25% for initial start up. Increased oil flow may be required on certain model tractors.

(See tractor manual for location and procedure)

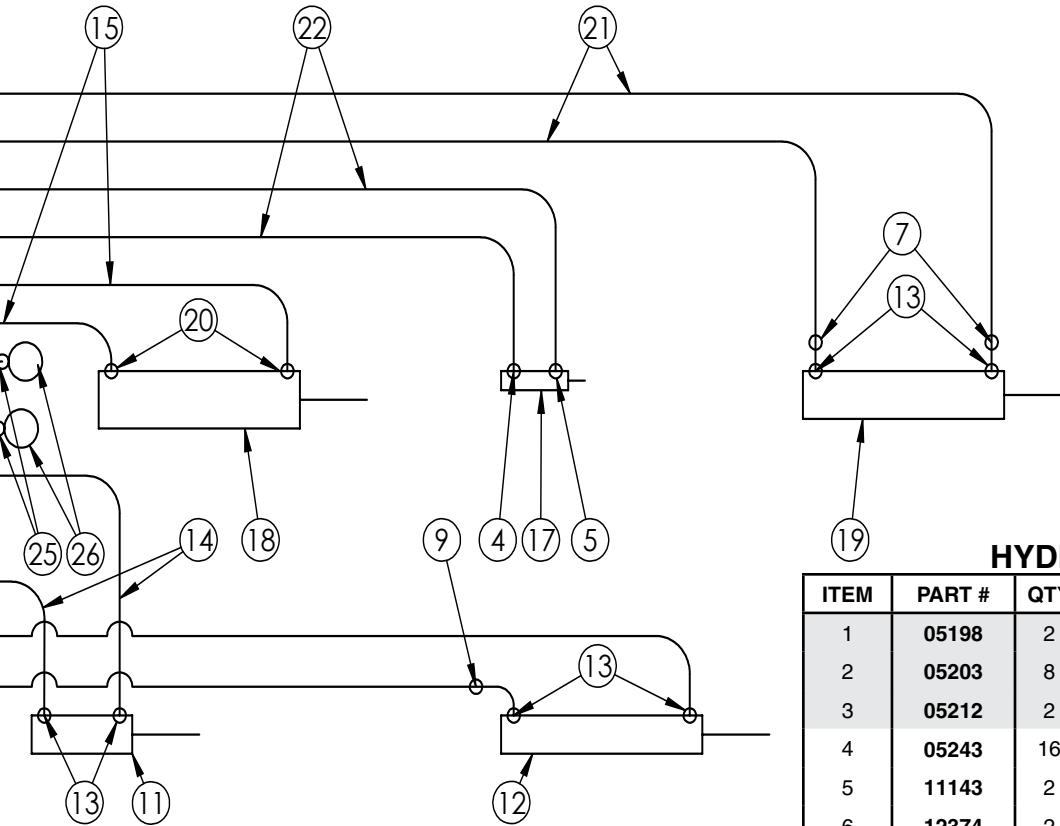
Unfolding the Toolbar :

1. Raise the three point
2. Connect the controller to the toolbar and a power supply source. Make sure the hydraulic lever is locked on the pressure side and will not time out.
3. Select 40 or 60. If 40 is selected the outer wings will not fold out and the bar will function like a 40' bar. If 60 is selected the full bar will be utilized.
4. Before unfolding the bar make sure the bar is kicked up. Press and hold the kick up button.
5. To unfold the toolbar first press and hold the center extend button until cylinders are fully extended.
6. Next press and hold the middle extend button. Hold this button until the wing cylinders fully extend and the latch cylinders on the front side fully latch. **Failure to fully latch the cylinders will cause the toolbar to open up during operation.**
7. If the bar is in 40' mode continue to activate the down pressure. If the bar is in 60' mode press and hold the outer extend until the wings are level with the rest of the bar.

After the toolbar has been unfolded the first time, stop and take a moment to make sure all hoses are routed correctly and there are no interference problems.

Folding the Toolbar:

1. Raise the three point.
2. Press and hold the kick up button until wings are raised
3. Press and hold the outer retract button until wings are fully folded.
4. Press and hold the middle retract button until wings are fully folded.
5. Press and hold center retract button until wings are fully folded. After folding shut off the hydraulic lever for transportation.



24

HYDRAULIC PARTS LIST

ITEM	PART #	QTY	DESCRIPTION
1	05198	2	COUPLER RUBBER CAP
2	05203	8	#6 FEMALE JIC TO #6 MALE JIC (2X) TEE
3	05212	2	.25" X 18.50" HYD HOSE
4	05243	16	#6 MALE O-RING TO #6 JIC MALE STR
5	11143	2	#6 O-RING X #6 MALE JIC 90°
6	12374	2	#6 JIC BULKHEAD 45°
7	13255	6	#6 JIC ORIFICE .045
8	13548	2	#8 MALE O-RING TO #8 JIC MALE STR
9	13631	2	#6 JIC ORIFICE .060
10	13786	2	HYDRAULIC QUICK COUPLER 5/8" O-RING
11	15082	2	CYLINDER HYD, 3.00 X 6.00
12	15084	2	CYLINDER HYD, 3.00 X 20.00
13	15158	12	#8 O-RING X #6 MALE JIC 90°
14	15277	4	.375" X 168" HYD HOSE
15	15279	8	.375" X 108" HYD HOSE
16	15280	2	.50" X 96" HYD HOSE
17	15466	2	CYLINDER HYD 2.00 X 3.00
18	15494	2	CYLINDER HYD, 4.00 X 20.00
19	15495	2	CYLINDER HYD, 3.50 X 20.00
20	15496	4	#10 O-RING X #6 MALE JIC 90°
21	15497	4	.375" X 252" HYD HOSE
22	15498	4	.25" X 192" HYD HOSE
23	15499	1	60' TOOLBAR HYDRAULIC BLOCK
24	15500	1	CONTROLER F/ 60' TOOLBAR
25	15502	2	#6 FEMALE JIC SWIVEL TO #4 FEMALE PIPE
26	15548	2	GAUGE HYD 3000 PSI #4 PIPE

Please order replacement parts by PART NO., DESCRIPTION, and COLOR



Down Pressure Operation:

The amount of down pressure can be seen on the hydraulic pressure gauge. Only use as much down pressure required to keep the coulter at the proper depth. **Do not exceed 1500 PSI** to prevent the wings from lifting up the center section.

Activating the Down Pressure

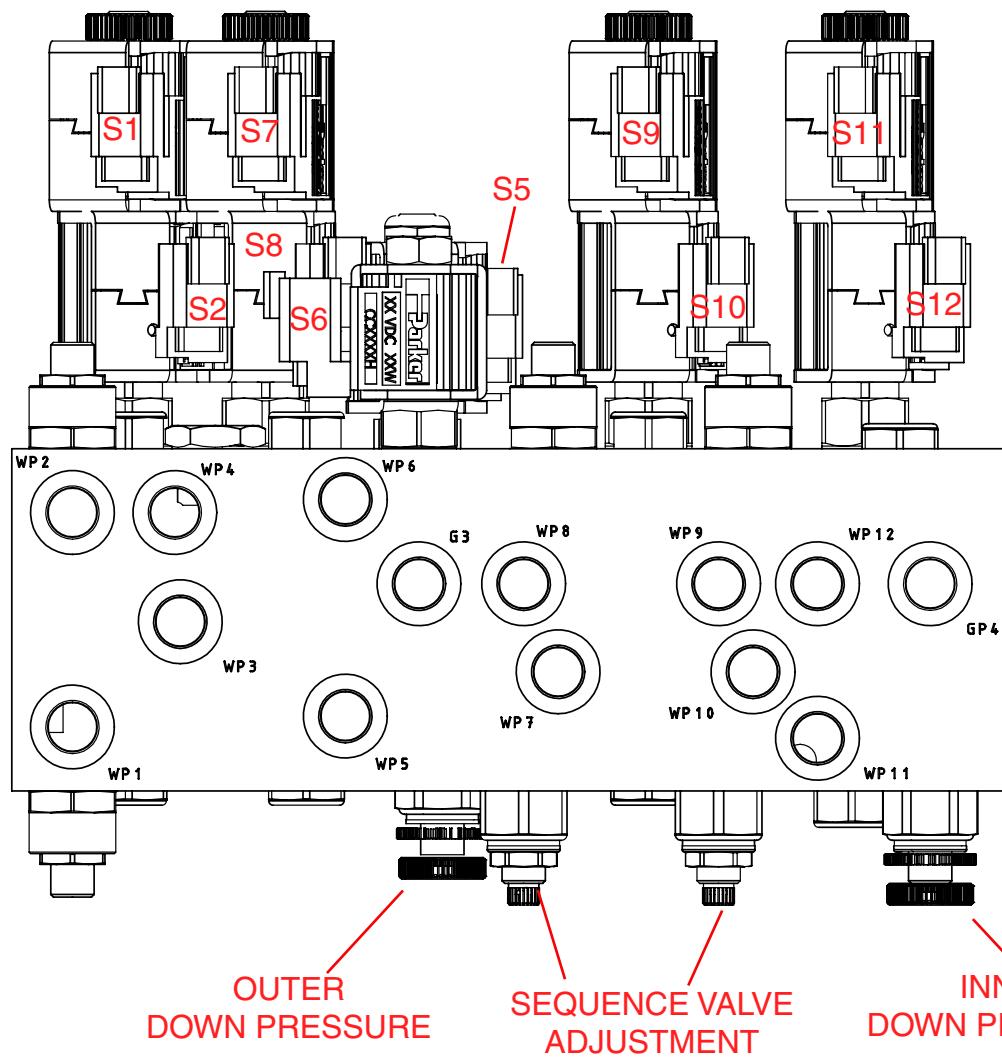
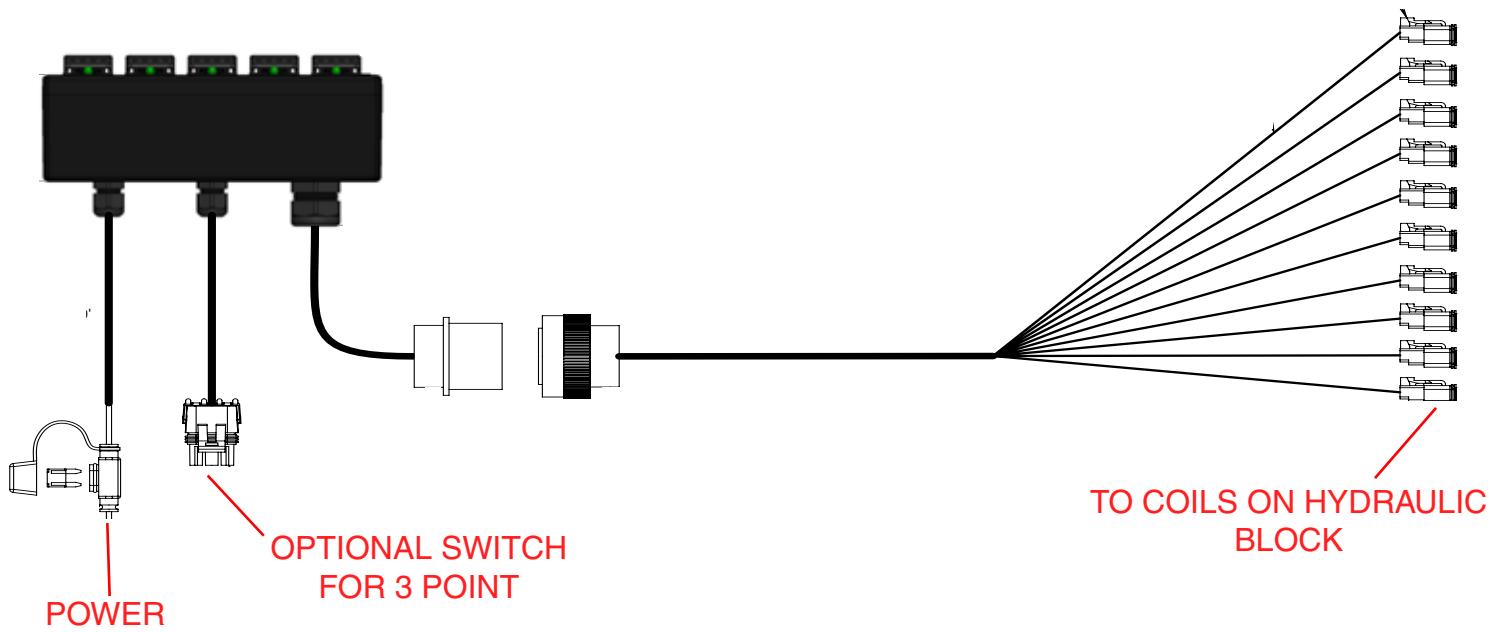
1. After the toolbar has been fully unfolded press the pressure down button.
2. During operation hydraulic pressure will now show up on the gauge. (If the bar is equipped with the automatic down pressure and kick up switch, lower the three point and press the pressure down button. Now the bar is in automatic mode, raise and lower the three point when the switch is set to activate down pressure and kick up.)
3. To deactivate the down pressure, press and hold the kick up button until the wings are raised.

*** NOTE WHEN IN 60' MODE IF THE OUTER RETRACT BUTTON IS PRESSED THE PRESSURE DOWN WILL NOT WORK UNTIL OUTER EXTEND BUTTON HAS BEEN PRESSED AGAIN.**

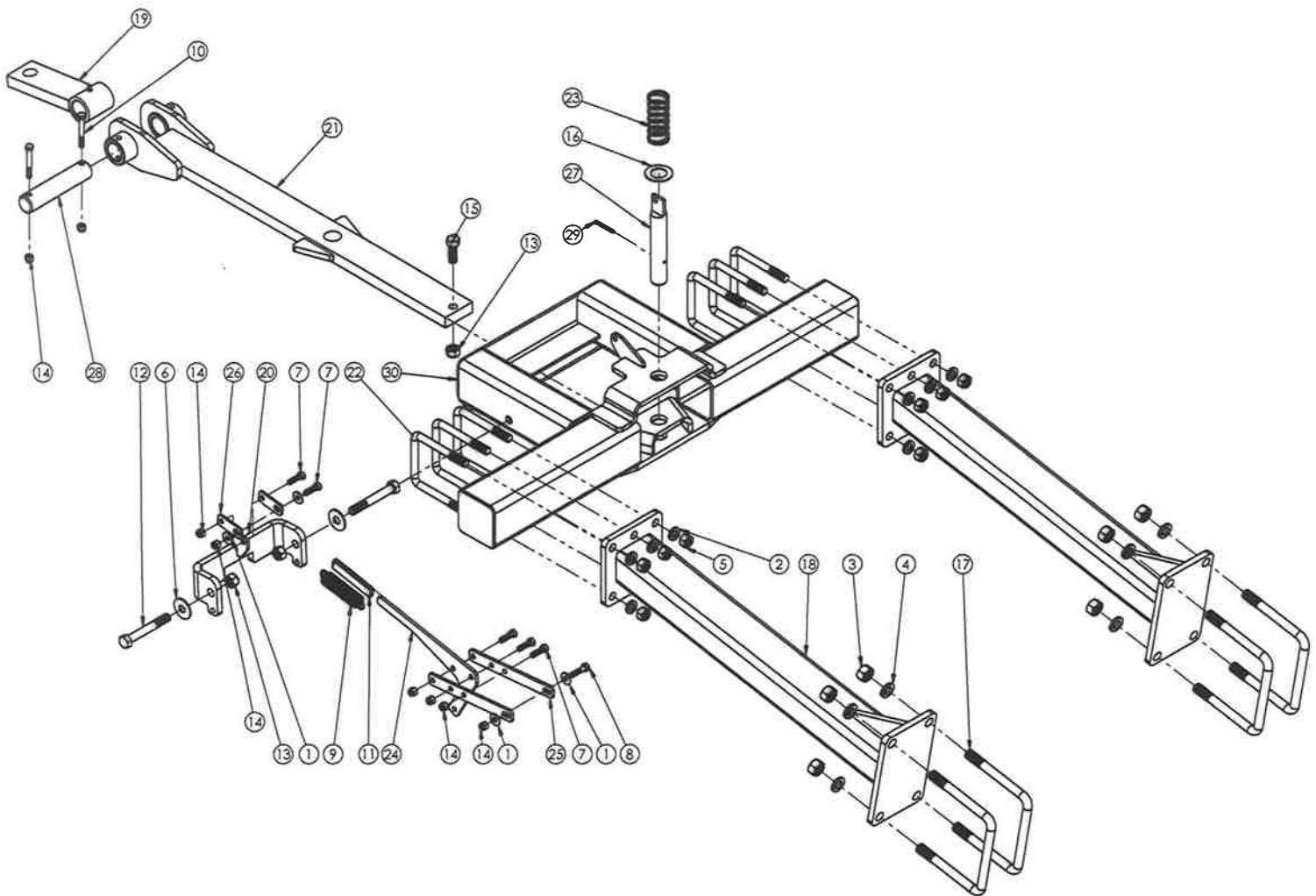
Adjusting the down pressure:

1. Loosen the jam nut (A)
2. To increase pressure turn the screw clockwise one turn at a time. (B)
3. To lower the pressure turn the screw counter clockwise one turn at a time.
4. Once the desired pressure is reached tighten the jam nut.

HYDRAULIC BLOCK WIRING



HITCH BREAKDOWN (OPTIONAL)

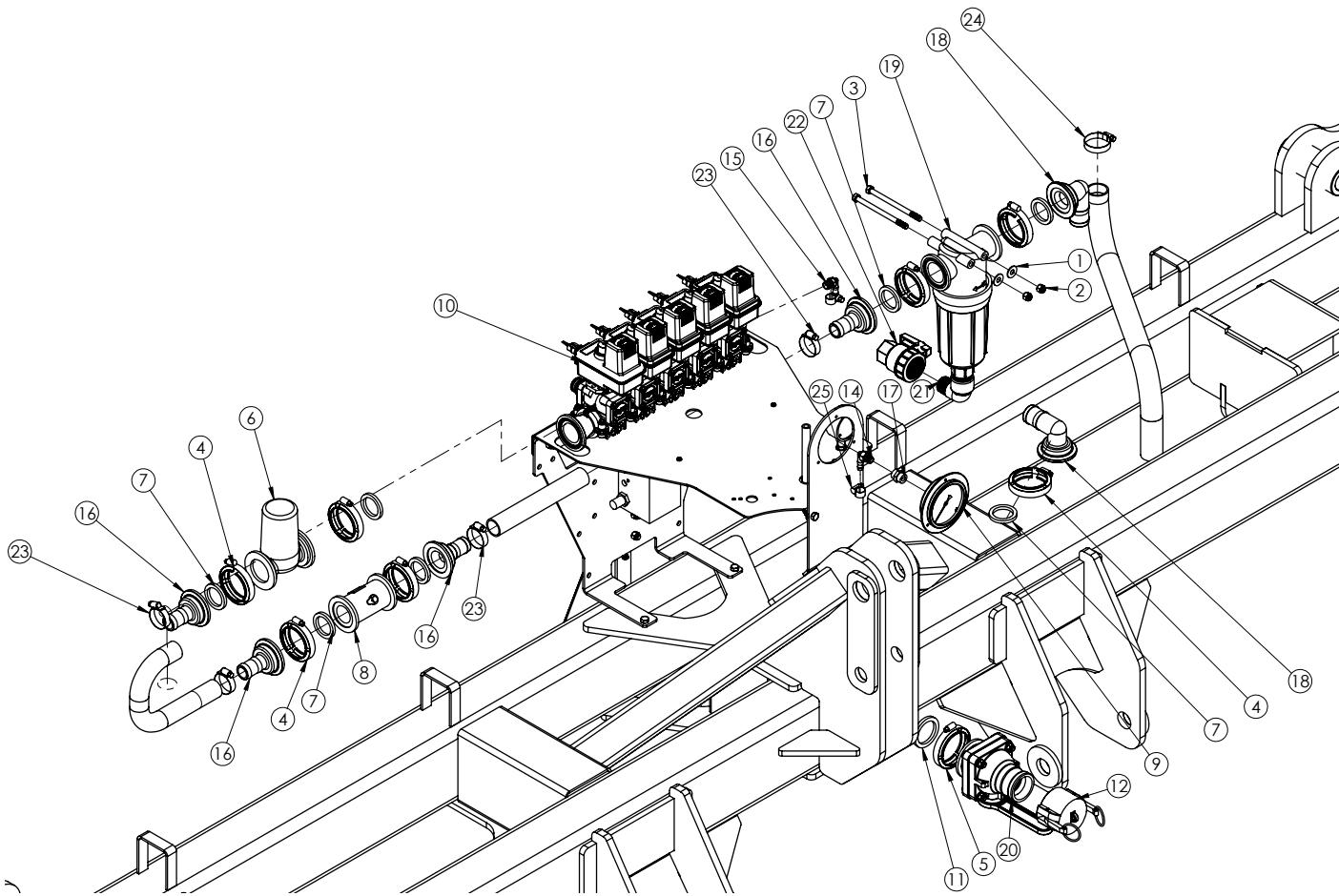


ITEM	PART #	QTY	DESCRIPTION	ITEM	PART #	QTY	DESCRIPTION
1	00059	4	WASHER, FLAT .375	16	05089	1	WASHER MACHINE 1.25 X 14 GA
2	00248	12	WASHER, LOCK .625	17	15091	4	.75 U-BOLT FOR 7 X 5 TUBE
3	00253	8	NUT, .75NC HEX	18	15575-76	2	HITCH MOUNT
4	00254	8	WASHER, LOCK .75	19	15576-76	1	HITCH RECEIVER
5	00291	12	NUT, .625NC HEX	20	15577-76	1	BAR STOP
6	00477	2	WASHER, FLAT .625	21	15578-76	1	TOW BAR
7	00523	5	BOLT, .375NC X 1.25 HEX HEAD GR. 5	22	15579	6	.625 U-BOLT FOR 4X4 TUBE
8	00914	1	BOLT, .375NC X 1.50 HEX HEAD GR. 5	23	15580	1	COMPRESSION SPRING
9	01564	1	SPRING, EXTENSION	24	15581-76	1	LATCH HANDLE
10	02166	2	BOLT, .375NC X 2.75 HEX HEAD GR. 5	25	15582-76	2	HITCH HANDLE LINKAGE
11	02243	1	Hand Grip, BLACK VINYL	26	15583	2	HITCH LINKAGE
12	02434	2	BOLT, .625NC X 4.50 HEX HEAD GR. 5	27	15584-95	1	HITCH PIN
13	02587	3	NUT, .625NC NYLON LOCK	28	15585-95	1	RECEIVER PIN
14	02592	8	NUT, .375NC NYLON LOCK	29	15586	1	PIN, ROLL, .188 X 2.00
15	03698	1	BOLT, .625NC X 1.75 HEX HEAD GR. 5	30	15587-76	1	ADJUSTABLE HITCH FRAME

Please order replacement parts by PART NO., DESCRIPTION, and COLOR.

Please order replacement parts by PART NO., DESCRIPTION, and COLOR.

3 POINT TOOLBAR PLUMBING



PLUMBING PARTS LIST

ITEM	PART #	QTY	DESCRIPTION	ITEM	PART #	QTY	DESCRIPTION
1	00059	2	WASHER, FLAT .375	14	EL1438	1	FTG, ELB, .25" MPT X .375" HOSE BARB
2	02592	2	NUT, .375NC NYLON LOCK	15	EL3838	1	FTG, ELB .375" MPT X .375" HOSE BARB
3	05032	2	BOLT, .375NC X 5.50 HEX GR. 5	16	FA200 125HB	4	FTG, STR, 2" FLG X 1.25" HOSE BARB
4	09939	7	CLAMP, 2" F/ FLG FTG	17	FC1400	1	FTG, COUPLING .25" FPT POLY
-	*09940	1	CLAMP, 2" F/ FLG FTG FULL PORT	18	FEL200 150HB	2	FTG, ELB, 2" FLG X 1.50" HOSE BARB
5	09940	1	CLAMP, 2" F/ FLG FTG FULL PORT	-	*FEL220 150HB	1	FTG, ELB, 2" FP. ELB X 1.5" HOSE BARB
6	10311	1	FLOW METER	19	FLST150 50	1	FILTER
7	112G	7	GASKET, 1.50" X .25"	-	11538	1	REPLACEMENT 50 MESH SCREEN
-	*200G	1	GASKET, 2.00" X .25"	-	11537	1	REPLACEMENT GASKET
8	12780	1	FLOW METER	20	MVSF220FP	1	2" FP FLANGE X 2" MALE ADAPTER
9	15180	1	GAUGE 4" LIQUID FILLED S.S. (0 - 160 PSI)	21	SE100	1	1" 90° STREET ELBOW
10	16656	5	BALL VALVE (5 OR 3 VALVES)	22	UV100FP	1	1" FTP VALVE
11	200G	1	GASKET 2.00" X .25"	23	B24H	4	CLAMP, GEAR, SS, 1.25" HOSE
12	634B2020	1	VALVE CAP	24	B32H	2	CLAMP, GEAR, SS, 1.50" HOSE
13	FMC150HYD304	1	ACE HYD CENTRIFUGAL PUMP	25	B4H	2	CLAMP, GEAR, SS, .375" HOSE
-	C9314HM1	1	HYPRO HYD CENTRIFUGAL PUMP	Please order replacement parts by PART NO., DESCRIPTION, and COLOR.			
-	15152	1	SS. HYPRO HYD CENTRIFUGAL PUMP	Please order replacement parts by PART NO., DESCRIPTION, and COLOR.			
-	15153	1	SS. ACE HYD CENTRIFUGAL PUMP	* USED WITH C9314HM1 PUMP			

Please order replacement parts by PART NO., DESCRIPTION, and COLOR.

* USED WITH C9314HM1 PUMP

BOOM NOZZLES

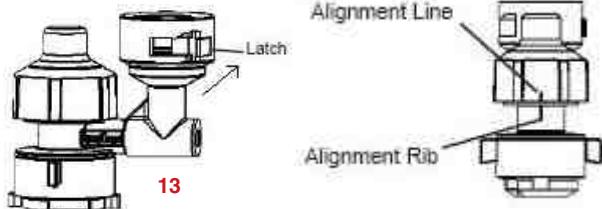
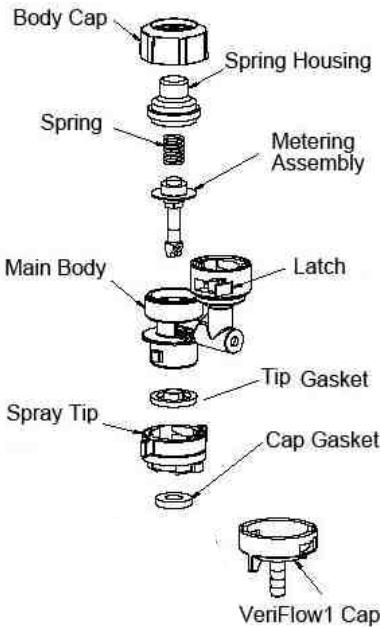


Fig. 1

To remove the nozzle from the spray boom, apply thumb pressure to Latch in the direction shown. Then turn the nozzle in opposition

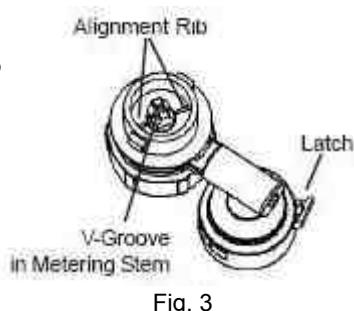
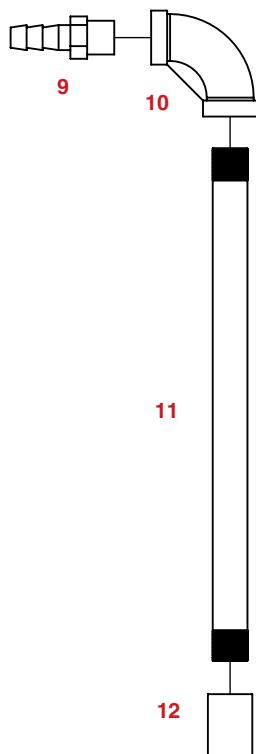


Fig. 3

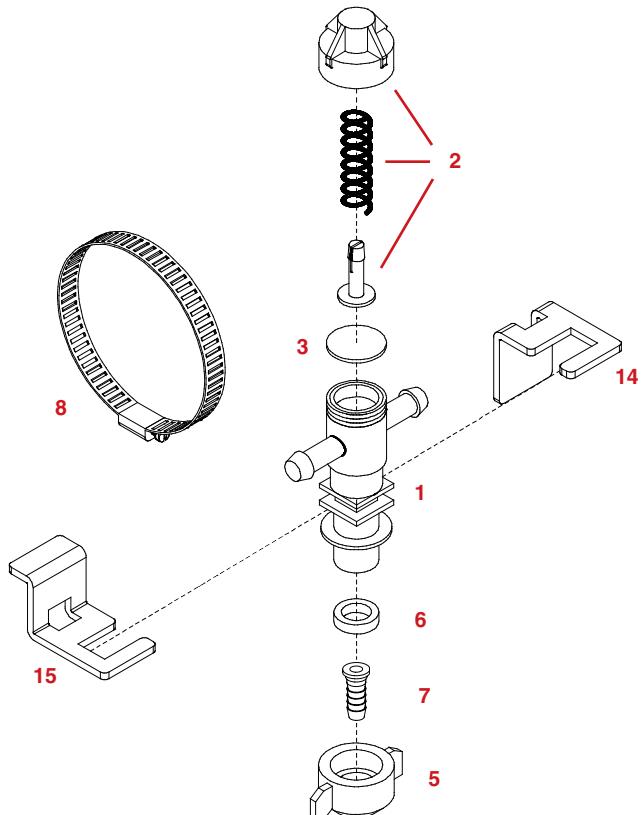


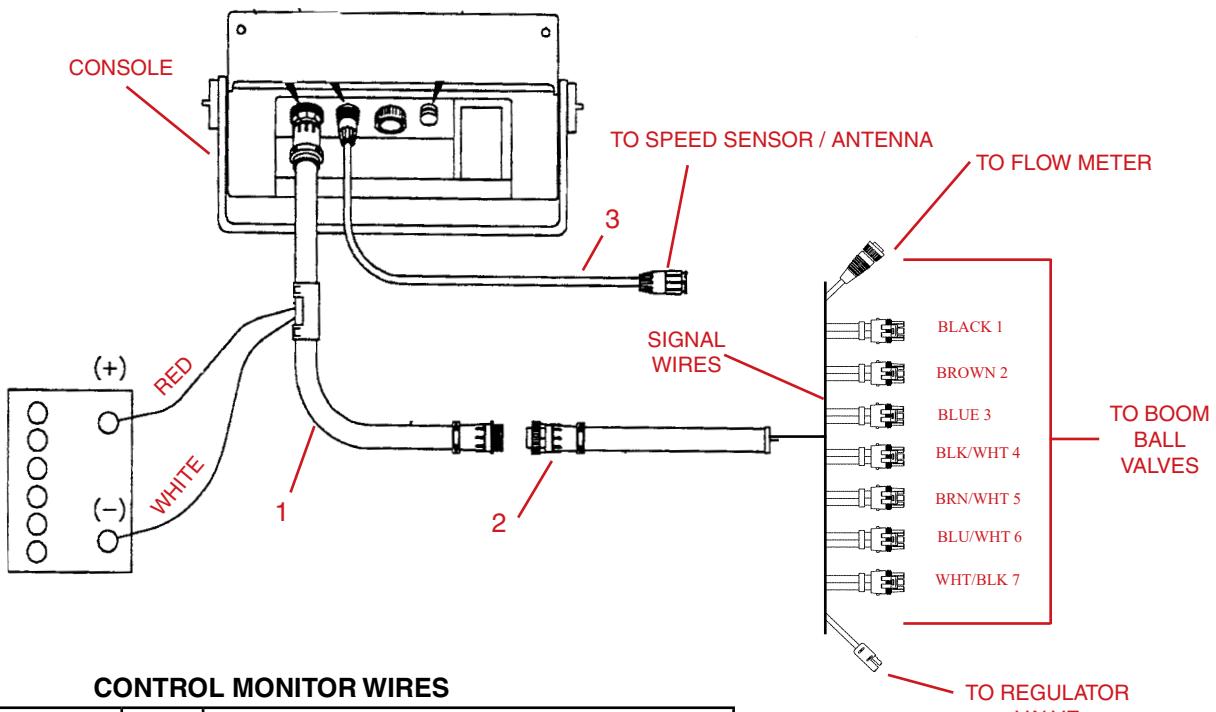
Fig. 2

NOZZLE PARTS LIST

ITEM	PART #	DESCRIPTION
1	09147	3/4" SINGLE END ASSEMBLY (ITEMS 1-3)
-	09148	3/4" SINGLE TEE ASSEMBLY (ITEMS 1-3)
2	21950 10PP	SPRING RETAINER CAP ASSEMBLY
3	21953VI	DIAPHRAGM (VITON)
5	07790	RED FLAT FAN CAP (W/ GASKET)
6	19438EPR	GASKET (EPDM)
7	K8400 3/8	FTG, STR .375 HOSE BARB
8	B128H	STAINLESS STEEL GEAR CLAMP
9	15121	FTG, S.S. .25" MPT X .375" HB
10	15122	FTG, S.S. ELB .25" FPT
11	15123	FTG, S.S. .25" MPT X 8" NIPPLE
12	15124	FTG, S.S. .25" FPT FEMALE COUPLER
13	15126	HI-VERIFLOW1 ADJUSTABLE REG
-	15127	VERIFLOW1 HALF RATE ADJUSTABLE REG
14	15160	STAINLESS STEEL LOWER TIP BRACKET
15	15161	STAINLESS STEEL UPPER TIP BRACKET

Please order replacement parts by PART NO., DESCRIPTION, and COLOR.

RAVEN CONTROL SYSTEM WIRING



REF #	PART #	QTY	DESCRIPTION
1.	10960	1	10' Console Control Cable
2.	15179	1	12' Flow Control Cable
3.	10046	1	12' Speed Sensor Harness

Please order replacement parts by PART NO. and DESCRIPTION.

CONTROL MONITOR

1 (SHOWN HERE IN A BANK OF FIVE)



CONTROL MONITOR SYSTEM

REF #	PART #	QTY	DESCRIPTION
1.	16661	1	BALL VALVE
2.	10826	-	RAVEN 450 CONSOLE (5 SECTION - SHOWN)
3.	12780	1	FLOW METER
4.	10311	1	1" REGULATING BUTTERFLY VALVE
5.	09859	-	TEEJET CLAMP AND O-RING
6.	09858	-	TEEJET O-RING (NOT SHOWN)
7.	FA200 100	-	2" FLANGE TO 1" FLANGE FITTING
8.	09856	-	S.S. CLIP FOR FITTING
9.	09857	-	OUTLET STRAIGHT FITTING

FERTILIZER APPLICATOR CALIBRATION PROCEDURES

Guidelines For Fertilizer Applicator Calibration

Calibrating the Fertilizer Applicator

1. Mark off 660 feet (1/8 mile).
2. Fill the tank with water.
3. Set the applicator to your desired operating pressure.
4. Turn the applicator on and drive at the constant speed you will be spraying. Calibration on a road or unplowed field will give different results than on soft cultivated ground. Note tachometer reading so same speed can be maintained later.
5. Measure the amount of water it takes to refill the tank completely.
6. Calculate the amount applied:

Number of gallons used x 66 (factor) = Gallons applied
Swath in Feet per acre

Example: If 10 gallons are used in 660 feet and the swath is 40 feet, spraying rate is 16.5 gallons per acre.

$$\frac{10 \times 66}{40} = \frac{660}{40} \text{ or } 16.5 \text{ gallons per acre}$$

7. To calculate the amount of chemical to put in the tank:

$$\frac{\text{Sprayer Tank Size}}{\text{Desired GPA}} = \frac{\text{Acres}}{\text{Covered}} \text{ then;}$$

$$\text{Recommended amount of chemical per acre} \times \frac{\text{Acres}}{\text{Covered}} = \frac{\text{Amount of chemical per tankful}}{\text{tankful}}$$

Example: If a 500 gallon tank is used and 16.5 gallons per acre are applied, one tank will cover 30.3 acres. If three pounds of chemical are required per acre, then 90 pounds of chemical are required per tankful.

$$\frac{500}{16.5} = 30.3 \text{ acres covered then;}$$

$$3 \text{ lbs. (gal.)} \times 30.3 = 90 \text{ lbs. (gal.) per tankful}$$

$$10 \text{ mph} \quad .50$$

Fertilizer Applicator Tips

Stream Jet NOZZLE for Injection

		PSI	CAPACITY ONE NOZZLE IN GPM	GPA 							
				4 MPH	6 MPH	8 MPH	10 MPH	12 MPH	14 MPH	16 MPH	
H1/4U-SS0004 TP0004-SS	10	0.20	9.9	6.6	5.0	4.0	3.3	2.8	2.5		
	20	0.28	13.9	9.2	6.9	5.5	4.6	4.0	3.5		
	30	0.35	17.3	11.6	8.7	6.9	5.8	5.0	4.3		
	40	0.40	19.8	13.2	9.9	7.9	6.6	5.7	5.0		
H1/4U-SS0006 TP0006-SS	10	0.30	14.9	9.9	7.4	5.9	5.0	4.2	3.7		
	20	0.42	21	13.9	10.4	8.3	6.9	5.9	5.2		
	30	0.52	26	17.2	12.9	10.3	8.6	7.4	6.4		
	40	0.60	30	19.8	14.9	11.9	9.9	8.5	7.4		
H1/4U-SS0008 TP0008-SS	10	0.40	19.8	13.2	9.9	7.9	6.6	5.7	5.0		
	20	0.57	28	18.8	14.1	11.3	9.4	8.1	7.1		
	30	0.69	34	23	17.1	13.7	11.4	9.8	8.5		
	40	0.80	40	26	19.8	15.8	13.2	11.3	9.9		
H1/4U-SS0010 TP0010-SS	10	0.50	25	16.5	12.4	9.9	8.3	7.1	6.2		
	20	0.71	35	23	17.6	14.1	11.7	10.0	8.8		
	30	0.87	43	29	22	17.2	14.4	12.3	10.8		
	40	1.00	50	33	25	19.8	16.5	14.1	12.4		
H1/4U-SS0015 TP0015-SS	10	0.75	37	25	19	14.9	12.4	10.6	9.3		
	20	1.06	52	35	26	21	17.5	15.0	13.1		
	30	1.30	64	43	32	26	21	18.4	16.1		
	40	1.50	74	50	37	30	25	21	18.6		
H1/4U-SS0020 TP0020-SS	10	1.00	50	33	25	19.8	16.5	14.1	12.4		
	20	1.41	70	47	35	28	23	19.9	17.4		
	30	1.73	86	57	43	34	29	24	21		
	40	2.00	99	66	50	40	33	28	25		
H1/4U-SS0030 TP0030-SS	10	1.50	74	50	37	30	25	21	18.6		
	20	2.12	105	70	52	42	35	30	26		
	30	2.60	129	86	64	51	43	37	32		
	40	3.00	149	99	74	59	50	42	37		
H1/4U-SS0040 TP0040-SS	10	2.00	99	66	50	40	33	28	25		
	20	2.83	140	93	70	56	47	40	35		
	30	3.46	171	114	86	69	57	49	43		
	40	4.00	198	132	99	79	66	57	50		
H1/4U-SS0050 TP0050-SS	10	2.50	124	83	62	50	41	35	31		
	20	3.54	175	117	88	70	58	50	44		
	30	4.33	214	143	107	86	71	61	54		
	40	5.00	248	165	124	99	83	71	62		
H1/4U-SS0060 TP0060-SS	10	3.00	149	99	74	59	50	42	37		
	20	4.24	210	140	105	84	70	60	52		
	30	5.20	257	172	129	103	86	74	64		
	40	6.00	297	198	149	119	99	85	74		

To determine GPA for solutions other than water, determine the weight per gallon or specific gravity and use the following conversion table.

Weight per Gallon	Specific Gravity	Multiply By
7.0 lbs.	.84	1.09
8.0 lbs.	.96	1.02
8.34 lbs. (water)	1.00	1.00
9.0 lbs.	1.08	.96
10.0 lbs.	1.20	.91
11.0 lbs.	1.32	.87
12.0 lbs.	1.44	.83

FERTILIZER APPLICATOR CHECKLIST:

Downtime caused by field breakdowns is costly and time consuming. Many breakdowns can be eliminated by periodic equipment maintenance. By spending time reviewing this checklist before seasonal fertilizer application time and following proper after season care, you can save time and money later.



WARNING: To Prevent Serious Injury Or Death

- Keep hands, feet, and loose clothing away from rotating parts.
- Wear protective clothing recommended by your chemical and fertilizer manufacturer when working with chemicals.

Check Before Going To The Field :

1. NOZZLES or KNIVES

Check tip or knife for excessive wear. Check nozzle spacing by starting at center and working outwards. Check that liquid comes out of each nozzle.

2. HOSES

Check all hoses for worn or soft spots. Be sure all hose clamps are tightened and hoses are not kinked or pinched. Check for leakage in any lines.

4. CONTROLS

Check for leakage, plugging, or wear on all valves, fittings, etc. Clean off any build up of foreign material.

5. PUMP

Check to be sure pump turns freely.

6. FRAME

Be sure all bolts are tightened.

7. LUBRICATE MACHINE

Grease all zerks every 10 hours.

8. REPLACEMENT PARTS

Replace all worn or damaged parts.

After Season Care:

NOTE: It is important to wear proper safety equipment when cleaning the SIDEQUEST®. See your chemical or fertilizer package for this information.

1. After applying chemicals, run water mixed with cleaners through tank, pump, filters, and all hose hookups.
2. When cleaned, tank should have all openings closed or covered to keep dirt from entering.
3. Pump should be flushed with soluble oil and pump ports plugged to keep out moisture and air.
4. Wash the machine using a pressure washer to remove all debris to prevent corrosion.
5. Lubricate all grease zerks.
6. Dispose of all unused chemicals or solutions in a proper and ecologically sound manner.
6. Water rinse and dry tips before storing.

NOTE: DEMCO does not and will not make any recommendations concerning application of various chemicals or solutions. These recommendations relate to either amount or procedure of materials applied. If you have any questions regarding application of certain chemicals or solutions, contact your chemical supplier and follow chemical manufacturer recommendations.

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