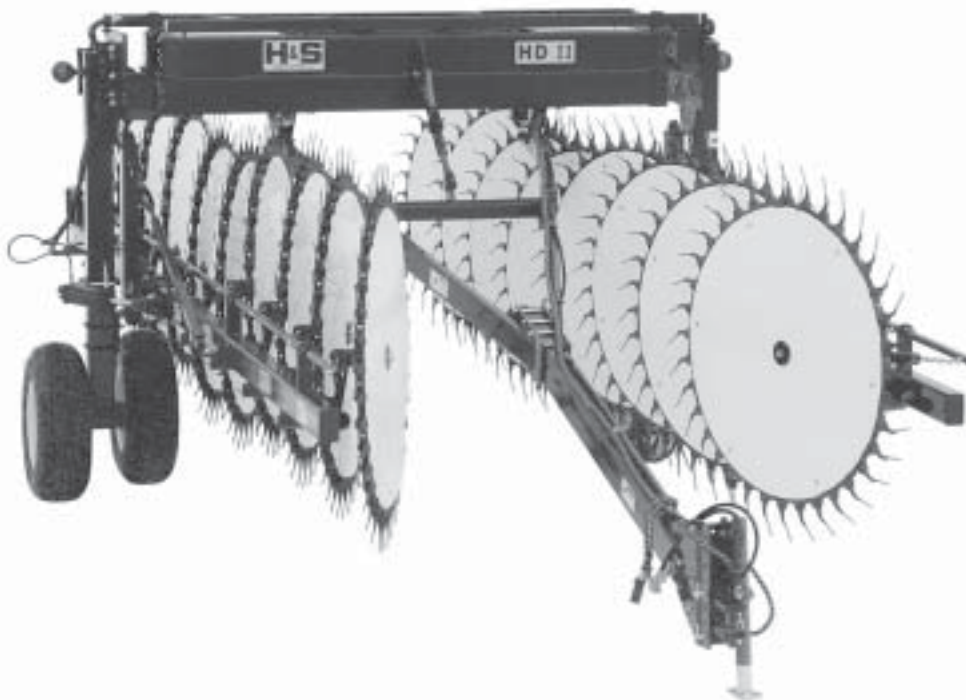




HD II RAKE



WARNING

READ AND UNDERSTAND THIS MANUAL BEFORE OPERATING THIS EQUIPMENT

UNSAFE OPERATION OR MAINTENANCE OF THIS EQUIPMENT CAN RESULT IN SERIOUS INJURY OR DEATH

OPERATOR'S MANUAL AND PARTS LIST

Revision # 1
Starting Serial #110429

HSMFG0311

Manufactured By
H&S MANUFACTURING CO., INC.

P.O. BOX 768 (715) 387-3414 FAX (715) 384-5463
MARSHFIELD, WISCONSIN 54449

H & S HDII RAKE

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WARRANTY

H & S WARRANTY

H & S Manufacturing Co., Inc. ("H & S") warrants this product to be free from defect in material and workmanship. Except as noted below, this warranty term is twelve (12) months from the date of delivery of the product to the original purchaser by an authorized H & S dealer. Under this warranty, H & S will repair or replace, at its option, any covered part which is found to be defective in material or workmanship during the applicable warranty term. In no case will the covered repair cost of a part or parts exceed the replacement cost of that part. Warranty service must be performed by H & S or a dealer authorized by H & S to sell and/or service the product involved, which will use only new or remanufactured parts or components furnished by H & S. This warranty includes approved parts and labor to fix the product but does not include, and the purchaser is responsible for, any service call and/or transportation of the product to and from the dealer's place of business, for any premium charged for overtime labor requested by the purchaser, and for any service work not directly related to any defect covered under this warranty. This warranty includes only those components of the product manufactured by H & S. Warranty for any component not manufactured by H & S including, but not limited to, engines, batteries, tires, rims, hydraulic motors, pumps, etc. are covered by the warranty, if any, provided separately by their respective manufacturers.

This warranty in all its parts, is extended solely to the original purchaser of the product, is terminated upon any subsequent transfer or sale from or by the original purchaser and extends no third party benefits or rights whatsoever.

The warranty term for any product used in any commercial, custom, for hire or rental application, is limited to six (6) months from the date of delivery of the product to the original purchaser by an authorized H & S dealer.

Polybonded (polyethylene and plywood) panels utilized in H & S Manure Spreaders are warranted, to the original purchaser, to not wear through and the polyethylene overlay to not tear free of the plywood for the functional life of the spreader. This specific warranty on polybonded panels includes only replacement of any defective panel part without any allowance for labor beyond the terms of the general warranty (12 or 6 months), and is further limited to manure spreaders used to spread normal agricultural manure.

This warranty does not include: (1) Any product that has been altered or modified in ways not approved by H & S; (2) Depreciation or damage caused by normal wear, misuse, improper or insufficient maintenance, improper operation, accident or failure to follow the product Operator's Manual recommendations and product decal recommendations; (3) Normal maintenance parts and service; (4) Repairs made with parts other than those available from H & S or performed by anyone other than H & S or a dealer authorized by H & S to sell and/or service the product involved.

To secure warranty service the purchaser must report the product defect to a dealer authorized by H & S to sell and/or service the product involved within the applicable warranty term together with evidence of the warranty start date and make the product available to that dealer within a reasonable period of time.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE OF THIS WARRANTY. H & S and the companies affiliated with it makes no warranties, representations, or promises, express or implied, as to the performance or freedom from defect of its products other than those set forth above and NO IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS OR FITNESS FOR A PARTICULAR PURPOSE IS MADE. IN NO EVENT WILL THE DEALER, H&S OR ANY COMPANY AFFILIATED WITH H&S BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. The ONLY REMEDY the purchaser has in connection with the breach of performance of any warranty on H & S products are those set forth above.

The selling dealer has no authority to make any representation or promise on behalf of H & S, or to modify the terms or limitations of this warranty in any way.

2/04

FILL OUT AND MAIL IMMEDIATELY TO MAKE WARRANTY EFFECTIVE



WARRANTY REGISTRATION

Date of Purchase _____

Purchaser _____ Address _____

City _____ State _____ Zip _____

Product _____ Model# _____ Serial# _____

Dealer _____ Address _____

City _____ State _____ Zip _____

Signature of Original Buyer

IMPORTANT!

Tear on dotted line, provide the information requested on the card. The H&S Warranty is valid **“only”** after this card is received and recorded at H&S Mfg. Co. Mail at once. No postage is required in the U.S.A.



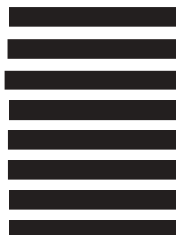
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL Permit No.195 Marshfield, WI 54449

POSTAGE WILL BE PAID BY ADDRESSEE

H&S Manufacturing Co., Inc.
PO Box 768
Marshfield, WI 54449-9963



H & S DEALER PRE-DELIVERY CHECK LIST

AFTER COMPLETION, DEALER SHOULD REMOVE AND RETAIN FOR RECORDS

After the HDII Rake has been completely set-up, check to be certain it is in correct operating order before delivering to the customer. The following is a list of points to inspect. Check off each item as you have made the proper adjustments and found the item operating satisfactorily.

- All grease fittings have been lubricated
(See lubrication guide in this manual).
- All mechanisms are operating trouble free.
- Rake wheels touch ground in unison when lowered into position.
(Rake setting level)
- All bolts and fasteners are tight.
- All decals are in place and legible.
- Control Box with mount accompanies rake.

(Dealer's Name)

Model Number

Serial Number

(Signature of Pre-Delivery Inspector)

(Inspection Date)

DEALER DELIVERY CHECK LIST

This check list that follows is an important reminder of valuable information that should be passed on to the customer at the time this HDII Rake is delivered.

Check off each item as you explain it to the customer.

This delivery check list, when properly filled out and signed assures the customer that the Pre-delivery service was satisfactorily performed.

- Explain to the customer that the pre-delivery inspection was made.
- Explain to the customer all the safety precautions they must exercise when operating this unit.
- Explain raking and windrow width adjustments.
- Explain to customer that regular lubrication is required for proper operation and long life of machine. Show customer the lubrication section of Owner's Manual.
- Give the customer Owner's Manual and make sure they read and understand all operating and service instructions.
- Record Serial Number on page 18 of this Manual.
- Have customer sign a completed "Warranty Registration," and mail it promptly.

(Dealer's Name)

(Date Delivered)

(By)

(Signature of Original Buyer)

Note: Warranty is not valid until warranty card is completed and returned to H & S Mfg. Co., Inc.

SAFETY INFORMATION



**BE
ALERT!**

**YOUR SAFETY
IS INVOLVED.**

THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER YOUR PERSONAL SAFETY IS INVOLVED. TAKE TIME TO BE CAREFUL. REMEMBER: THE CAREFUL OPERATOR IS THE BEST OPERATOR. MOST ACCIDENTS ARE CAUSED BY HUMAN ERROR. CERTAIN PRECAUTIONS MUST BE OBSERVED TO PREVENT THE POSSIBILITY OF INJURY OR DAMAGE.

TRACTORS

This operator's manual uses the term "Tractor" when identifying the power source.

H & S MANUFACTURING CO. INC.

SAFETY INFORMATION

RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



UNDERSTAND SIGNAL WORDS

A signal word- DANGER, WARNING, or CAUTION - is used with the safety-alert symbol. DANGER identifies the most serious hazards.

Safety signs with signal word DANGER or WARNING are typically near specific hazards.

General precautions are listed on CAUTION safety signs.



WARNING



CAUTION



FOLLOW SAFETY INSTRUCTIONS

Carefully read all safety messages in this manual, and all safety signs on your machine. Follow all recommended precautions and safe operating procedures.

Keep signs in good condition. Immediately replace any missing or damaged signs.


SAFETY INFORMATION

⚠ WARNING

HELP AVOID INJURY

- READ & UNDERSTAND THE OPERATORS MANUAL PROVIDED WITH THIS MACHINE. IF MISPLACED CALL H & S MANUFACTURING AT 715-387-3414 WITH MODEL AND SERIAL NUMBER.
- UNDERSTAND ALL SAFETY WARNINGS AND FUNCTION OF CONTROLS.
- KEEP SAFETY DEVICES IN PLACE AND WORKING.
- KEEP YOURSELF AND OTHERS WELL CLEAR OF MOVING PARTS.
- DISCONNECT ALL POWER BEFORE SERVICING OR CLEANING THIS MACHINE.
- DO NOT EXCEED 20 MPH

72203A




⚠ DANGER

STAY CLEAR OF RAKE WHEN OPENING OR CLOSING.

FAILURE TO HEED THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH

KEEP CLOTHING, YOURSELF AND OTHERS WELL CLEAR.

11594A



⚠ WARNING

STAY CLEAR OF RAKE WHEN RAISING OR LOWERING RAKE WHEELS.

FAILURE TO HEED THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH.

KEEP CLOTHING, YOURSELF AND OTHERS WELL CLEAR.

2195



⚠ WARNING

DO NOT GO NEAR LEAKS

- High pressure oil easily punctures skin causing serious injury, gangrene or death.
- If injured, seek emergency medical help. Immediate surgery is required to remove oil.
- Do not use finger or skin to check for leaks.
- Lower load or relieve hydraulic pressure before loosening fittings.

11599

TRACTORS

This operators manual uses the term “Tractor” when identifying the the power source.



WARNING

TO PREVENT SERIOUS INJURY OR DEATH

BEFORE YOU ATTEMPT TO OPERATE THIS EQUIPMENT, READ AND STUDY THE FOLLOWING INFORMATION. IN ADDITION, MAKE SURE THAT EVERY INDIVIDUAL WHO OPERATES OR WORKS WITH THIS EQUIPMENT, WHETHER FAMILY MEMBER OR EMPLOYEE, IS FAMILIAR WITH THESE SAFETY PRECAUTIONS.

DO NOT attempt to perform maintenance or repair with tractor running.

DO NOT step up on machine at any time.

DO NOT allow minors to operate or be near the machine.

DO NOT ALLOW PERSONNEL OTHER THAN THE QUALIFIED OPERATOR NEAR THE MACHINE.

Loose or floppy clothing should not be worn by the operator.

Stop the tractor engine, remove ignition key, and allow all mechanisms to stop before cleaning, working, or adjusting on machine.

Stay clear of hydraulic lines, they may be under extreme pressure or heat.

Stay clear of rake when opening or closing main rake arm beams, or raising or lowering rake wheels.

For transport, always make sure that the hair pin at the rear of the lift pipes, and the transport lock bracket with safety lynch pins for main rake beam cylinders, are securely locked in place.

To reduce stress on rake arms, lift pipe, springs and spring brackets, reduce oil flow from tractor to lift cylinders whenever possible.

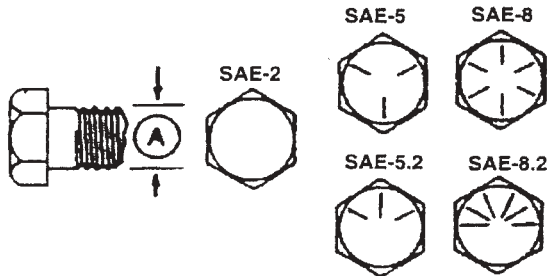
Be sure to raise rake wheels before opening or closing main rake beams.

H&S Mfg. Co. always takes the operator and his safety into consideration and guards exposed moving parts for their protection. However, some areas cannot be guarded or shielded in order to assure proper operation. In addition, the operators manual and decals on the machine itself warn you of further danger and should be read and observed closely.

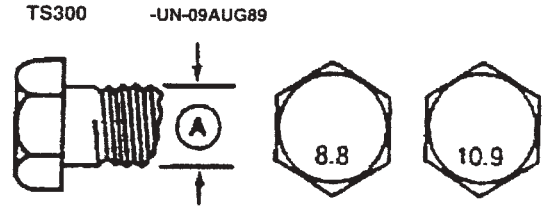
Study The Above Safety Rules

ATTENTION - BE ALERT - YOUR SAFETY IS INVOLVED

CAP SCREW TORQUE VALUES



Inch Cap Screw Head Markings



Metric Cap Screw Head Markings

INCH CAP SCREW TORQUE VALUES

Bolt Diameter (A)	Wrench Size	Cap Screw Grade					
		SAE 2		SAE 5		SAE 8	
		N-m	lb.-ft	N-m	lb.-ft	N-m	lb.-ft
1/4"	7/16"	7	(5)	11	(8)	16	(12)
5/16"	1/2"	14	(10)	23	(17)	33	(24)
3/8"	9/16"	24	(18)	41	(30)	54	(40)
7/16"	5/8"	41	(30)	68	(50)	95	(70)
1/2"	3/4"	61	(45)	102	(75)	142	(105)
9/16"	13/16"	88	(65)	142	(105)	203	(150)
5/8"	15/16"	122	(90)	197	(145)	278	(205)
3/4"	1-1/8"	217	(160)	353	(260)	495	(365)
7/8"	1-5/16"	224	(165)	563	(415)	800	(590)
1"	1-1/2"	332	(245)	848	(625)	1193	(880)
1-1/4"	1-7/8"	665	(490)	1492	(1100)	2393	(1765)

METRIC CAP SCREW TORQUE VALUES

Bolt Diameter (A)	Wrench Size	Markings on Cap Screw Heads			
		8.8		10.9	
		N-m	lb.-ft	N-m	lb.-ft
5 mm	8 mm	6	(4.5)	9	(6.5)
6 mm	10 mm	10	(7.5)	15	(11)
8 mm	13 mm	25	(18)	35	(26)
10 mm	16 mm	50	(37)	75	(55)
12 mm	18 mm	85	(63)	130	(97)
16 mm	24 mm	215	(159)	315	(232)
20 mm	30 mm	435	(321)	620	(457)
24 mm	36 mm	750	(553)	1070	(789)
30 mm	46 mm	1495	(1103)	2130	(1571)



CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

DO NOT use these values if a different torque value tightening procedure is listed for a specific application. Torque values listed are for general use only. Check tightness of cap screws periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade. Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

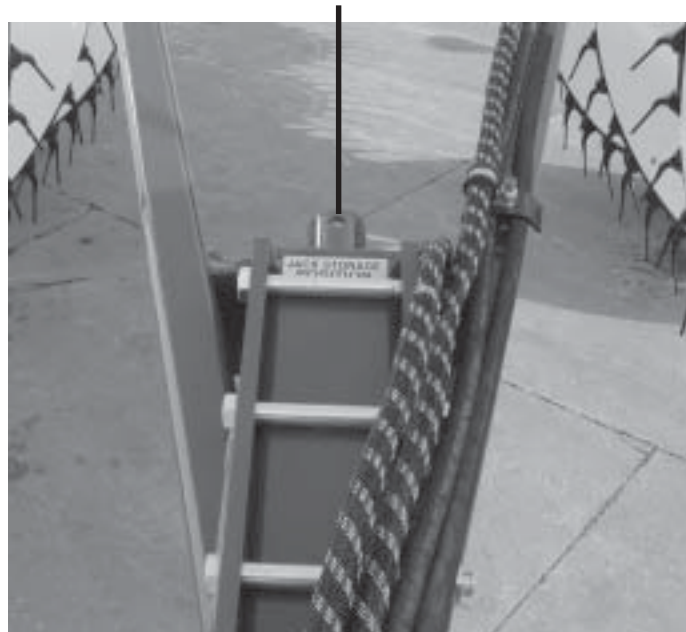
Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of amount shown in chart. Tighten toothed or serrated-type lock nuts to full torque value.

OPERATION

1. Check for proper assembly and adjustment and make sure that all bolts are tightened. Securely retighten after a few hours of operation as bolts can loosen up on new machinery. Check wheel bolts upon delivery and periodically thereafter. Wheel bolts should be tightened at 85-95 ft./lbs. torque.
2. Check tires and inflate to recommended pressure (9.5L x 15SL to 44 PSI).
3. Adjust the tractor hitch (13 to 17 inches above ground) and attach to tractor with a **hitch pin that has a safety locking device.**
4. Remove weight from lift jack. Remove jack from pipe mount and place on convenient storage mount located at the rear of the front pole assembly (See Picture Below).
5. Connect hydraulic hoses for all rake functions to a double acting valve on the tractor.
6. Check tractor hydraulic system, determine if tractor is closed or open center system. The rake is factory set-up for closed center (To change to open center, see instructions on page 33).
7. Mount control box in a convenient location on tractor. Plug 7-pin electrical connector on main harness of rake into tractor (This will power up the control box, work lighting and safety(lighting). Plug control box into main harness. Note: If tractor is not equipped with a 7-pin connector the tractor must be outfitted with one.
8. Lubricate the rake completely (See Lubrication Section in This Manual).
9. Check all bolts on rake after 100 acres. Re-torque if necessary.

NOTE: Determine right or left side of your HDII Rake by viewing it from the rear. If instructions or parts lists call for hardened bolts. See page # 9 to identify.

JACK STORAGE POSITION

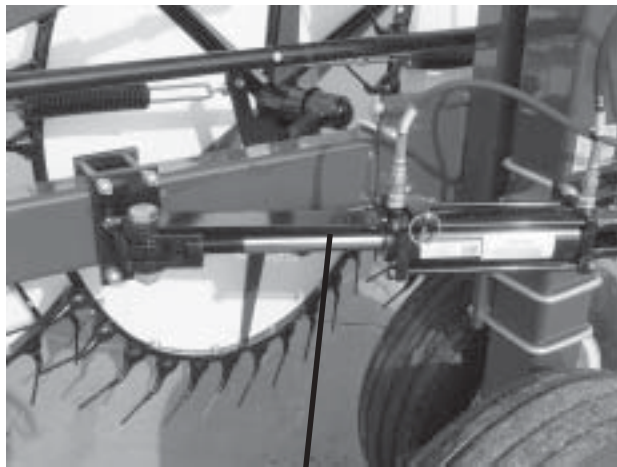


OPERATION

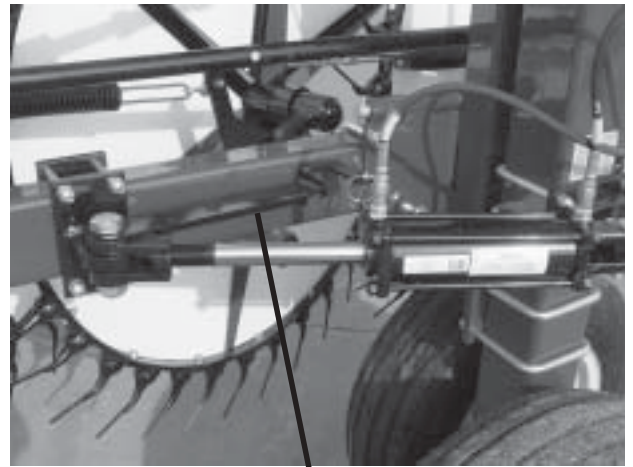
TRANSPORT LOCKS

RAKE BEAM LOCKS

Mounted on the rake beams are Self-storing transport locks for rake beam arms. Remove the clip pin and swing the transport lock toward the rake beam. There should be a fair amount of drag required to swing the lock. (A) shows the transport lock in the engaged position. (B) shows the transport lock in the storage position, to be used when in the raking mode.



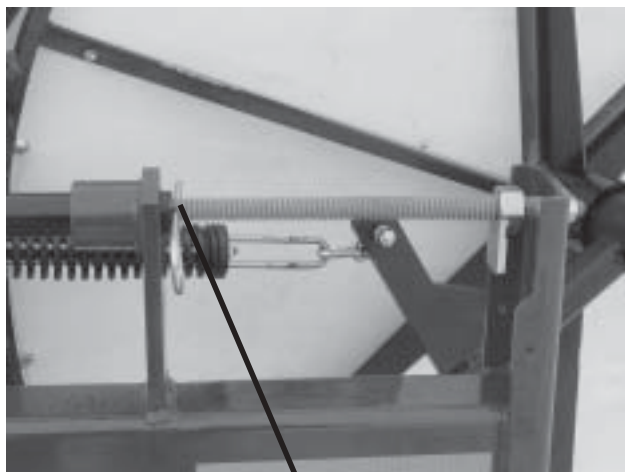
A



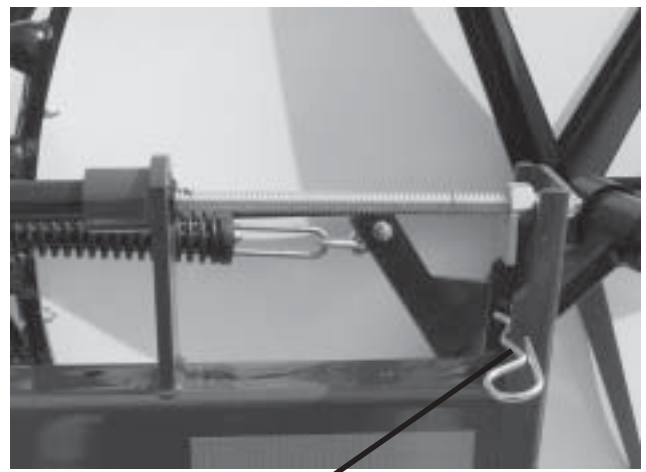
B

RAKE WHEEL LOCKS

Located at the rear of the lift pipe, is a hair pin which is used to secure the rake wheels in the up position for transport (C). When in the down, or raking position, place the locking hair pin in the convenient storage position as shown (D).



C



D

OPERATION

NOTE: TRACTOR HYDRAULIC LEVER MUST BE ENGAGED TO PROVIDE OIL FLOW TO RAKE.

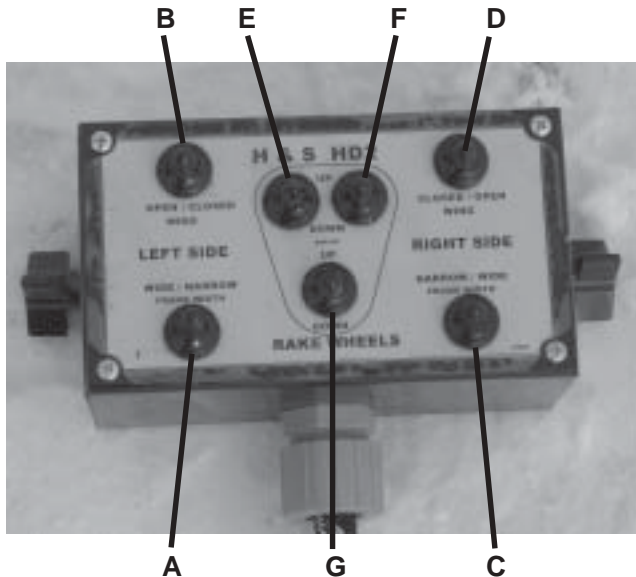
CENTER FRAME

When opening or closing the center frame of the rake, it is **necessary to have forward or rearward motion to prevent any serious damage to rake.** Each side has its own switch on the control box. There is a convenient number system on the two slider tubes to let the operator know where each side is located.

ATTENTION
NEVER ADJUST MAIN FRAME WIDTH WITHOUT FORWARD OR REARWARD MOTION OF RAKE. FAILURE TO HEED WILL CAUSE DAMAGE TO MAIN FRAME OR AXLE UPRIGHTS.



NUMBERS

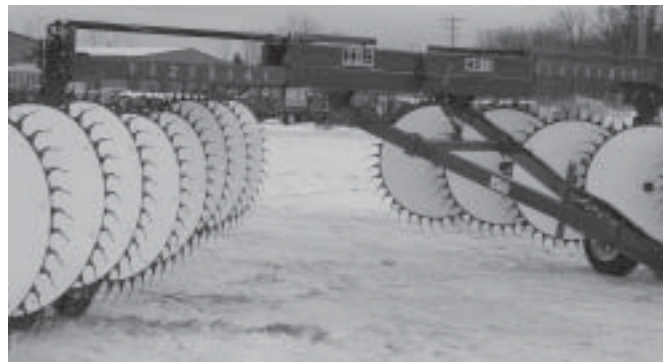


CONTROL BOX

The control box allows the operator to make many adjustments from the tractor seat. It is set up in three basic areas. The left side has two switches, one (A) for sliding the left center frame in or out, the other switch (B) controls the rake wheel beam angle. The right side also has two switches one (C) for sliding the right center frame in or out, the other switch (D) controls the rake wheel beam angle. In the center of the control box there are three switches. The switch on the left (E) will raise and lower the the left side rake wheels. The switch on the right (F) will raise and lower the right side rake wheels. The switch in the center (G) will raise and lower both left and right rake wheels.

RAKING ANGLE/WINDROW WIDTH

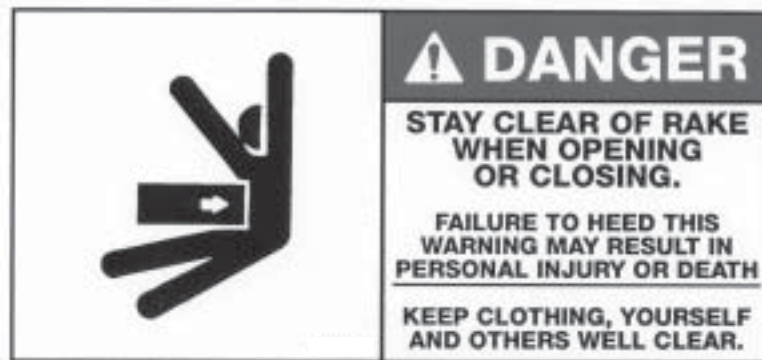
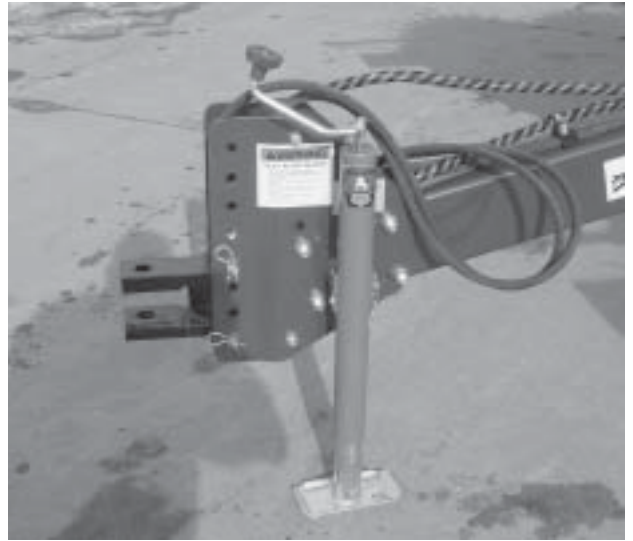
The right and left rake wheel beam can be angled separately by their own switch on the control box. By angling each side more or less the desired windrow width can be accomplished.



ADJUSTMENTS

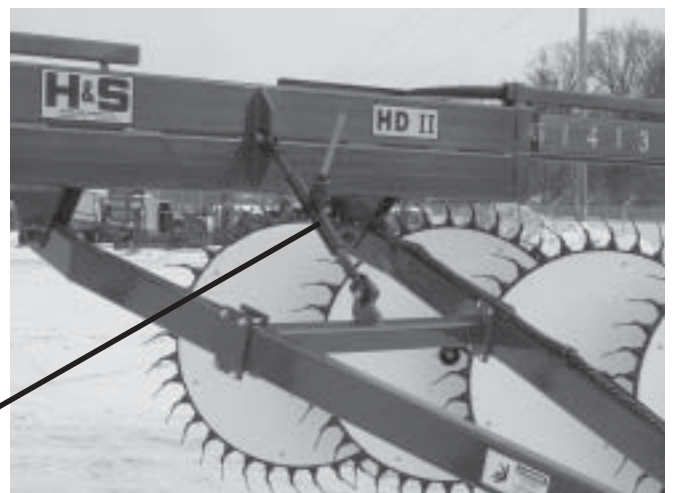
HITCH

There are ten different positions to adjust the hitch on the HDII Rake. Hitch should be adjusted so rake beams are level or parallel to the ground.



RAKE BEAM

Rake beams should be adjusted so they are level to slightly up in the front. They can be adjusted by using the ratchet jack located near the center of the rake. This adjustment is important to keep rake wheel ground pressure even along the rake beam. Failure to do this will cause the front wheels to make heavier contact with the ground.

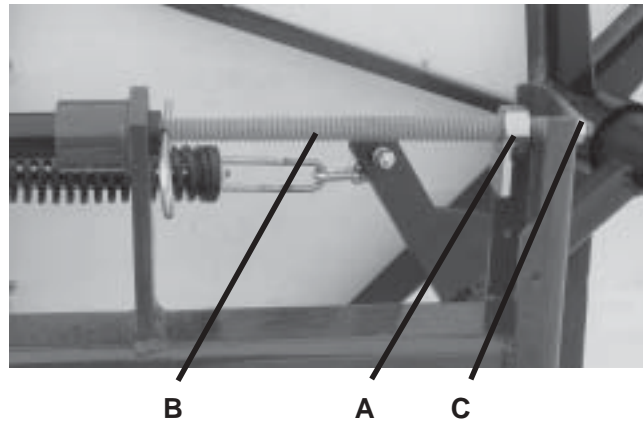


RATCHET JACK

ADJUSTMENTS

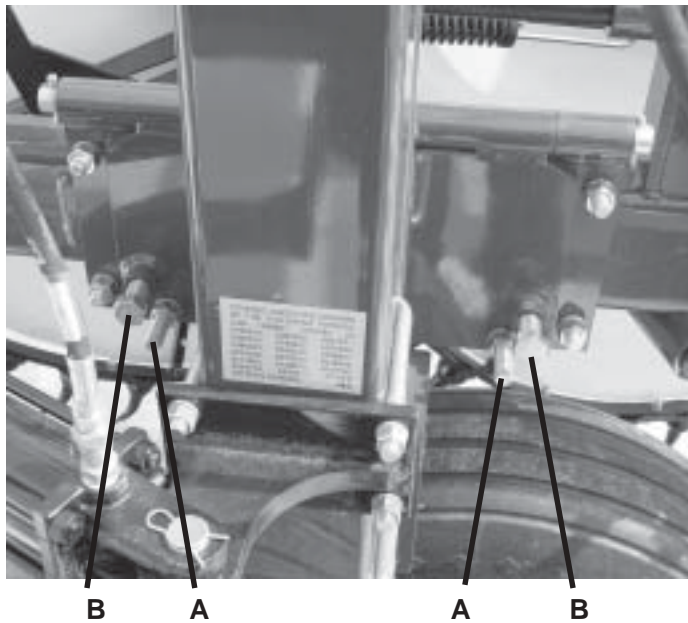
GROUND PRESSURE

Rake wheel ground pressure is adjusted by turning locking Nut and Collar (A) in to decrease pressure or out to increase pressure. The length of the Threaded Rod (B), between (A) and rear Support (C), will determine the rake wheel ground pressure. Measuring this distance or counting the threads will give you the same ground pressure on both rake beams.



RAKE BEAM TILT

The rake beam can be tilted from 0° to 10°. The 0° setting is to be used in normal conditions (dry and fluffy hay). The settings up to 10° are used in harsh conditions (heavy green hay or rained on hay that is matted into the stubble). To adjust the beam tilt, loosen the two Tension Bolts (A). Turn the two Adjustment Bolts (B) to desired tilt (make sure the two adjustment bolts are turned in evenly). Retighten the two Tension Bolts (A) securely. Repeat the same process on opposite rake beam.



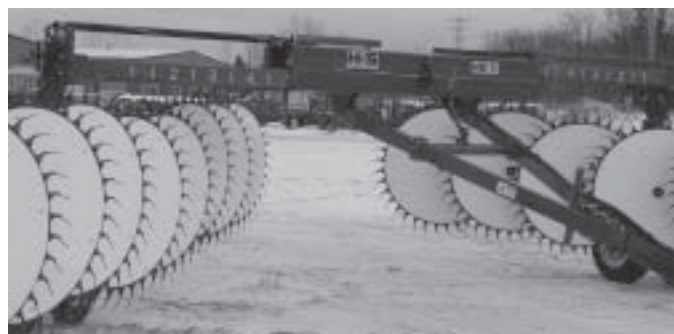
NO BEAM TILT



FULL BEAM TILT

RAKE BEAM ANGLE

Before the rake beams can be angled the center frame must be widened first (as described in the operation section), or the rear rake wheels will make contact. After the center frame has been widened, angle the rake beams to the desired angle by using the left and right switches located on the control box.



LUBRICATION GUIDE

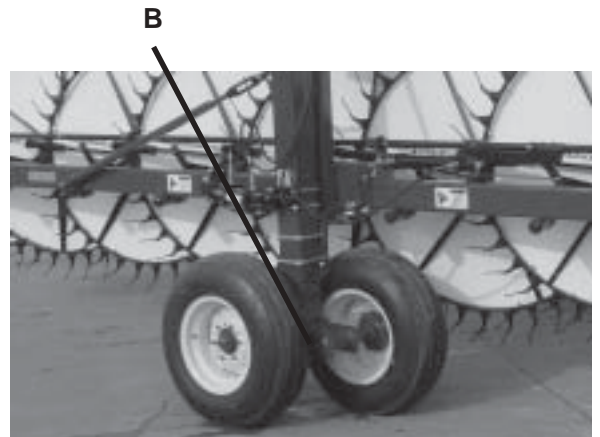
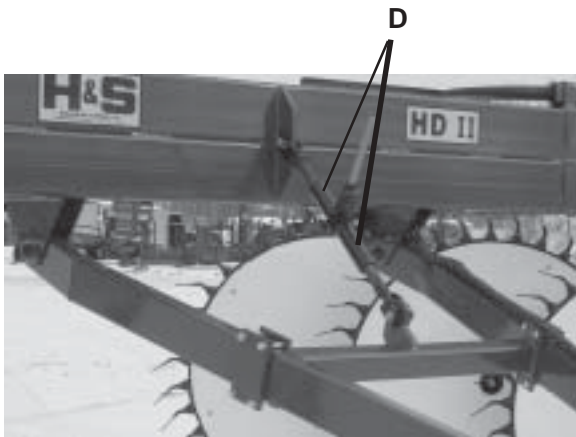
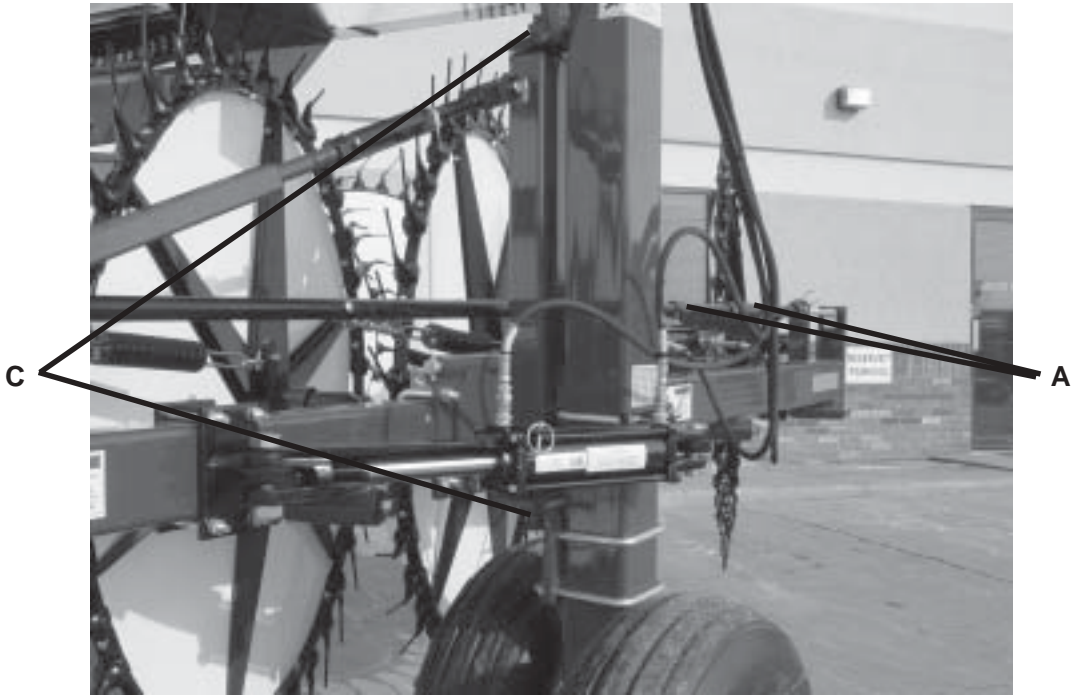
GREASE FITTINGS

There are twelve grease fittings on the HDII Rake. If lubricated properly and often enough, it will prolong the life of your HDII Rake. Grease daily during normal use and **before and after storage and after power washing**. Use a good grade of high quality grease. Make sure that grease comes out around the shaft on sleeve type bearings. Wipe off excessive grease to prevent accumulation of chaff or grit around the bearing.

LOCATION

Listed and shown are the description of location and number of grease fittings.

- A. (4) Two on each Lifting Cylinder Mount
- B. (2) One on each Tandem Pin
- C. (4) Two on each Beam Pivot (1) Top Pivot (1) Bottom Pivot
- D. (2) Ratchet Jack



DECAL LOCATION

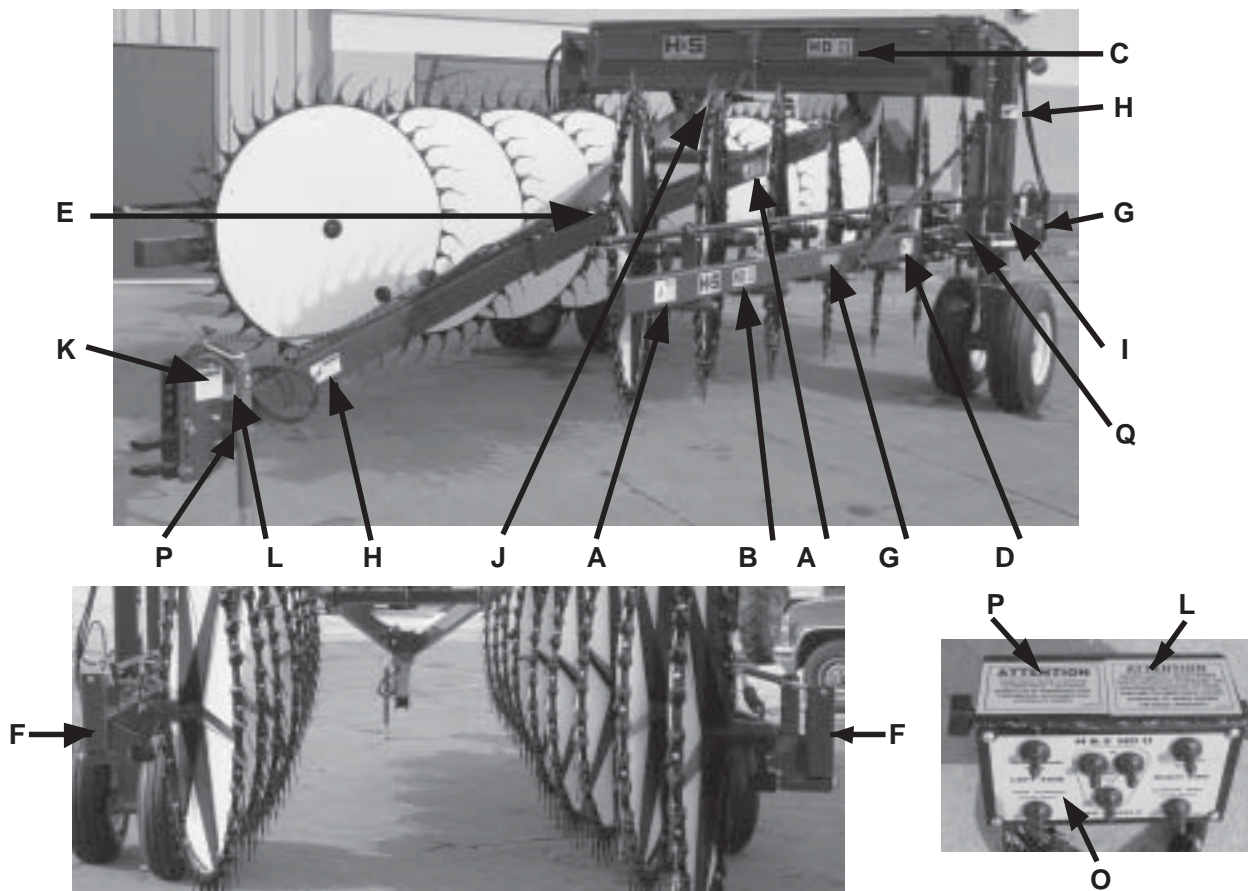
Your H & S HDII Rake was manufactured with operator safety in mind. Located on the HDII Rake are various decals to aid in operation, and warn of caution areas. Pay close attention to all decals.



DO NOT REMOVE ANY OF THESE DECALS. IF DECALS ARE LOST, DAMAGED, OR IF HDII RAKE IS REPAINTED, REPLACE DECALS. REMEMBER: DECALS ARE FOR YOUR PROTECTION AND INFORMATION.

Listed below are the decals on your HDII Rake. These decals may be ordered individually by part number or by ordering a complete set.

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
A.	11694A	(4) DANGER - Stay Clear of Rake
B.		(1) H&S HDII - Decal (Right)
B.		(1) H&S HDII - Decal (Left)
C.		(2) H&S HDII - Front / Back
D.	2195	(4) WARNING - Stay Clear of Rake
E.	71188B	Jack Storage
F.	102-3185	(2) Red Reflectors (2x9)
G.		(4) Amber Reflectors
H.	11599	(4) WARNING - Do Not Go Near Leaks
I.	H&S	Patent Numbers
J.		Serial Number
K.	72203	(2) WARNING - Help Avoid Injury
L.	12197A	(2) ATTENTION - Raise Rake Wheels
O.	61003	Control Box Decal
P.	21804	(2) ATTENTION - Never Adjust Frame
Q.	22405	(2) WARNING - Install Transport Locks
	0204-HDII	Complete Set of Decals



TROUBLE SHOOTING



WARNING

MAKE SURE THAT THE TRACTOR IS SHUT OFF AND THE RAKE CAN NOT MOVE BEFORE SERVICING THE HDII RAKE. MAINTENANCE AND REPAIR SERVICE WORK TO BE PERFORMED BY A QUALIFIED SERVICE PERSON ONLY.

TROUBLE

POSSIBLE CAUSE

POSSIBLE REMEDY

Main Frame Will Not Open or Close

No Electrical Power to Control Box

Check and Make Sure There is Power to Control Box

Blown Fuse or Circuit Breaker on Tractor

Check and Replace Fuse or Circuit Breaker

Hydraulic Lever Not Engaged or Engaged in Wrong Direction

Engage Hydraulic Lever or Move Hydraulic Lever in Opposite Direction

Hydraulic Hoses Not Connected to Tractor Properly

Check Hydraulic Hoses For Proper Connection

Solenoid Valve Sticking or Not Working Properly

Check Solenoid and Valve

Rake Beams Will Not Open or Close

No Electrical Power to Control Box

Check and Make Sure There is Power to Control Box

Transport Locks Still Engaged

Remove Clip Pin and Swing Self Storing Transport Locks Toward Frame (See Page # 11)

Blown Fuse or Circuit Breaker on Tractor

Check and Replace Fuse or Circuit Breaker

Hydraulic Lever Not Engaged or Engaged in Wrong Direction

Engage Hydraulic Lever or Move Hydraulic Lever in Opposite Direction

Hydraulic Hoses Not Connected to Tractor Properly

Check Hydraulic Hoses For Proper Connection

Solenoid Valve Sticking or Not Working Properly

Check Solenoid and Valve

Rake Wheels Will Not Raise or Lower

No Electrical Power to Control Box

Check and Make Sure There is Power to Control Box

Transport Lock Hair Pins Still Engaged

Remove Transport Lock Hair Pins and Place in Storage Position (See Page #11)

Blown Fuse or Circuit Breaker on Tractor

Check and Replace Fuse or Circuit Breaker

Hydraulic Lever Not Engaged or Engaged in Wrong Direction

Engage Hydraulic Lever or Move Hydraulic Lever in Opposite Direction

Hydraulic Hoses Not Connected to Tractor Properly

Check Hydraulic Hoses For Proper Connection

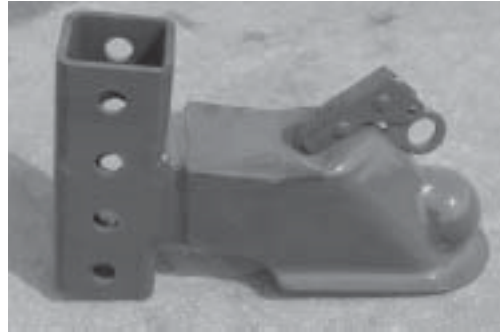
Solenoid Valve Sticking or Not Working Properly

Check Solenoid and Valve

OPTIONAL EQUIPMENT

BALL HITCH

The ball hitch is an option that can be added at any time. It allows for smoother operation in the field, by eliminating the distance between the clevis hitch and the tractor drawbar. Simply remove the clevis hitch and replace it with the ball coupler and install a 2-5/16" ball to the tractor drawbar.



INSTRUCTIONS FOR ORDERING PARTS

All service parts should be ordered through your authorized H & S dealer. They will be able to give you faster service if you will provide them with the following

1. Model & Serial number is located on the inside right pole mount, under center frame.
2. All reference to left or right apply to the machine as viewed from the rear.
3. Parts should not be ordered from illustration only. Please order by complete part number.
4. If your dealer has to order parts - give shipping instructions:

VIA truck - large pieces (please specify local truck lines)

VIA United Parcel Service (include full address)

H&S MFG. CO. INC.	
MARSHFIELD, WIS.	
MOD. NO.	<input type="text"/>
SER. NO.	<input type="text"/>
DESCR.	<input type="text"/>

PLEASE RECORD NUMBERS FOR YOUR UNIT FOR QUICK REFERENCE

ABOUT IMPROVEMENTS

H & S IS CONTINUALLY STRIVING TO IMPROVE IT'S PRODUCTS

We must therefore, reserve the right to make improvements or changes whenever it becomes practical to do so without incurring any obligation to make changes or additions to the equipment previously sold.

FIGURE 1

MAIN FRAME

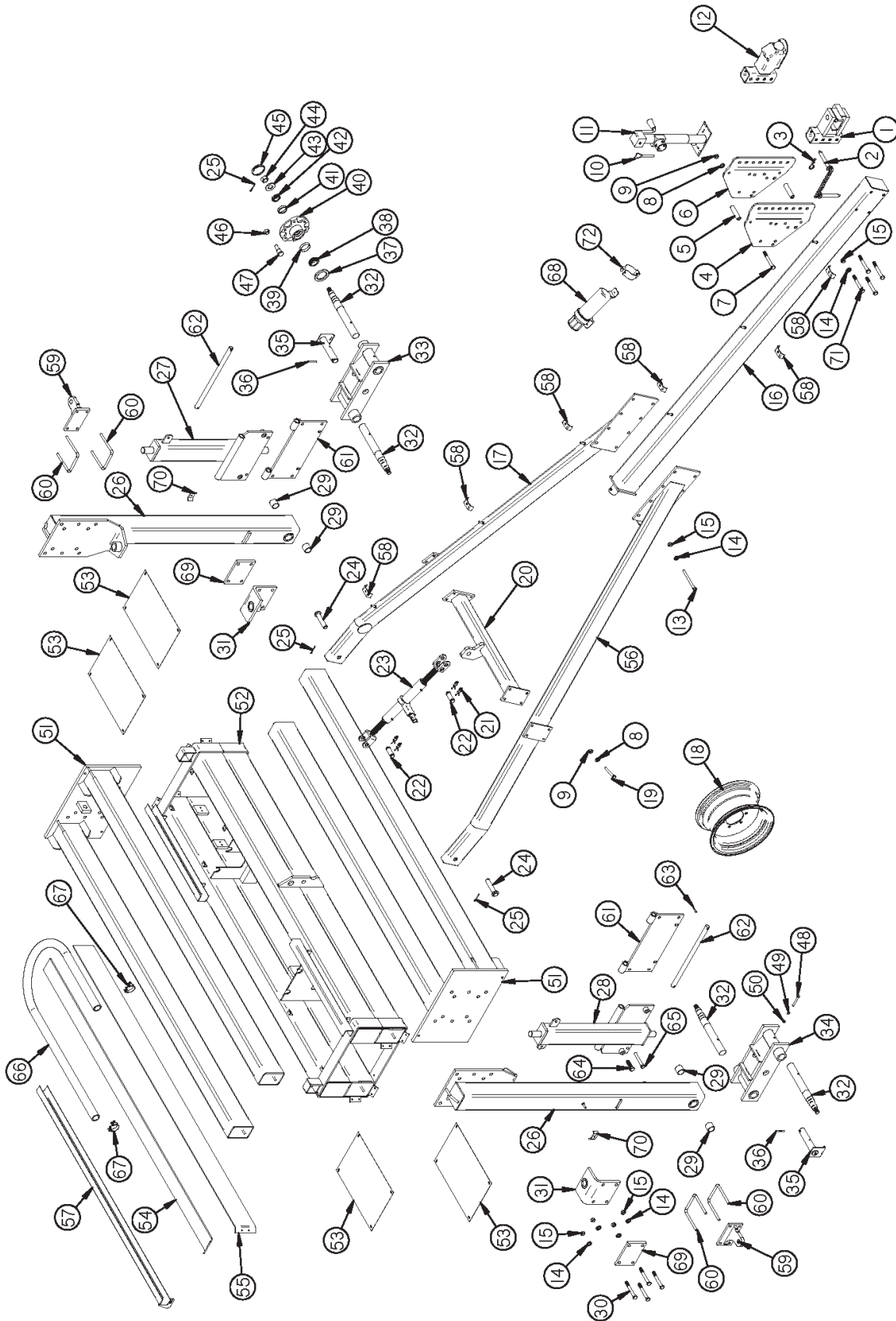


FIGURE 1

MAIN FRAME

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	HD83	HITCH CLEVIS
2	BFR450	HITCH PIN
3	ES7	HAIR PIN
4	HD84	HITCH MOUNT RIGHT
5	HD85	HITCH MOUNT SPACER
6	HD86	HITCH MOUNT LEFT
7	YBHH16160	BOLT, 1/2" X 5-1/2" GR. 5
8	YWLO16005	WASHER, LOCK, 1/2"
9	YNHX16005	HEX NUT, 1/2"
10	12N117	JACK PIN & CHAIN
11	BFR773	JACK
12	HD172	BALL COUPLER (OPTIONAL)
13	YBHH20100	BOLT, 5/8" X 6" GR. 5
14	YWLO20005	WASHER, LOCK, 5/8"
15	YNHX20005	HEX NUT, 5/8"-11 PLATED
16	HD89	POLE FRONT
17	HD90	POLE BACK LEFT
18	12N24	WHEEL 15 X 8
*	RG128	TIRE 9.5L X 15
19	YBHH16125	BOLT, 1/2" X 3-3/4" GR. 5
20	HD92	JACK MOUNT TUBING
21	YPHR02020	HAIR PIN, #23-10
22	T143	JACK PIN & CHAIN
23	T138	RATCHET JACK
24	HD93	POLE PIVOT PIN
25	YPCT05010	COTTER PIN, 5/32" X 1-1/2"
26	HD94	AXLE UPRIGHT
27	HD95	BEAM PIVOT LEFT
28	HD96	BEAM PIVOT RIGHT
29	HD153	BUSHING
30	YBHH20105	BOLT, 5/8" X 7" GR. 5
31	HD98	UPRIGHT BOTTOM PIVOT
32	HD99	SPINDLE
33	HD100	TANDEM AXLE LEFT
34	HD101	TANDEM AXLE RIGHT
35	HD102	TANDEM PIN
36	YPEX12025	EXPANSION PIN, 3/8" X 2-3/4"
37	RG98	SEAL
38	RG99	INNER BEARING
39	RG100	INNER RACE
40	RG101	HUB

NOTE: * MEANS NOT SHOWN

FIGURE 1

MAIN FRAME

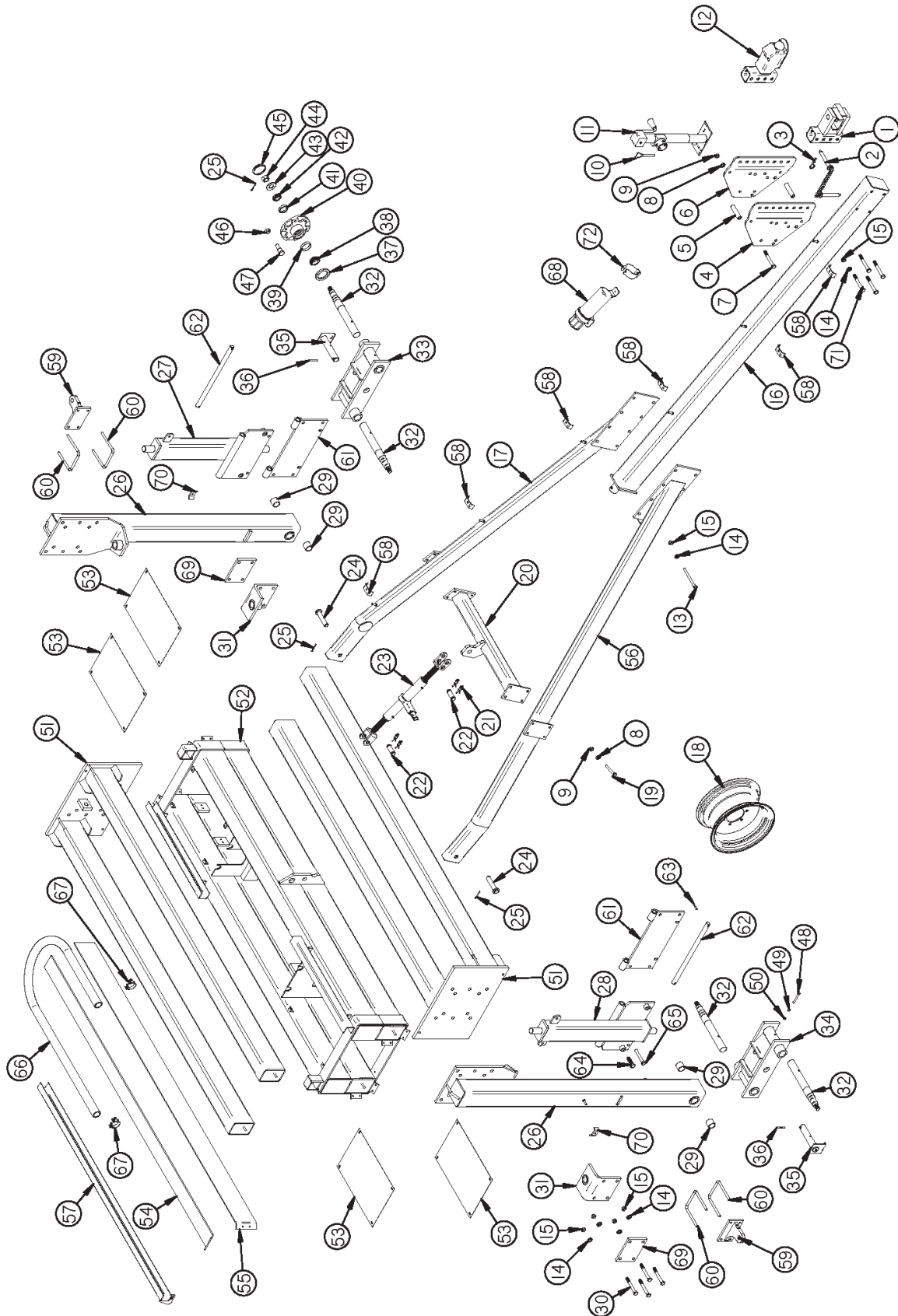


FIGURE 1

MAIN FRAME

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
41	RG47	OUTER RACE
42	RG48	OUTER BEARING
43	HD200	WASHER
44	RG105	NUT
45	RG103	DUST CAP
46	YNWL16005	WHEEL NUT, 1/2"-20 UNF
47	YBSD16010	STUD BOLT, 1/2"-20 UNF X 1-7/8" (3/4" SHOULDER)
48	YBHH12145	BOLT, 3/8" X 3-1/2" GR. 5
49	YWLO12005	WASHER, LOCK, 3/8"
50	YNHX12005	HEX NUT, 3/8"-16
51	HD103	INNER SLIDER
52**	HD104	CENTER SLIDER OUTSIDE
***	HD183	CENTER SLIDER OUTSIDE
53	HD105	SHIELD
54	HD106	POLY SLIDE NARROW 1/4"
55	HD107	POLY SLIDE WIDE 1/4"
*	HD155	POLY SLIDE NARROW 3/16"
*	HD156	POLY SLIDE WIDE 3/16"
56	HD108	POLE BACK RIGHT
57**	HD140	HOSE CHANNEL
***	HD184	HOSE CHANNEL
58	23N67	HOSE BRACKET
59	HD151	CYLINDER MOUNT UPRIGHT END
60	HD152	1/2" U-Bolt
61	HD164	BEAM PIVOT PLATE
62	HD165	HINGE PIN
63	YPEX10015	EXPANSION PIN, 5/16" X 1-3/4"
64	YBHH24020	BOLT, 3/4" X 2-1/2" GR. 5
65	YBHH20055	BOLT, 5/8" X 3-1/2" GR. 5
66**	HD169	HOSE SHIELD
***	HD185	HOSE SHIELD
67**	HD170	HOSE CLAMP (Size 40)
***	HD186	HOSE CLAMP (Size 48)
68	S522	MANUAL HOLDER
69	HD182	PIVOT MOUNT PLATE
70	HE42	HOSE CLAMP
71	YBHH20095	BOLT, 5/8" X 5-1/2" GR. 5
72	S23	MANUAL CLAMP - LARGE

NOTE: * MEANS NOT SHOWN

** (USED SERIAL #0032 AND BEFORE)

*** (USED SERIAL #0033 AND AFTER)

FIGURE 2
RAKE BEAMS

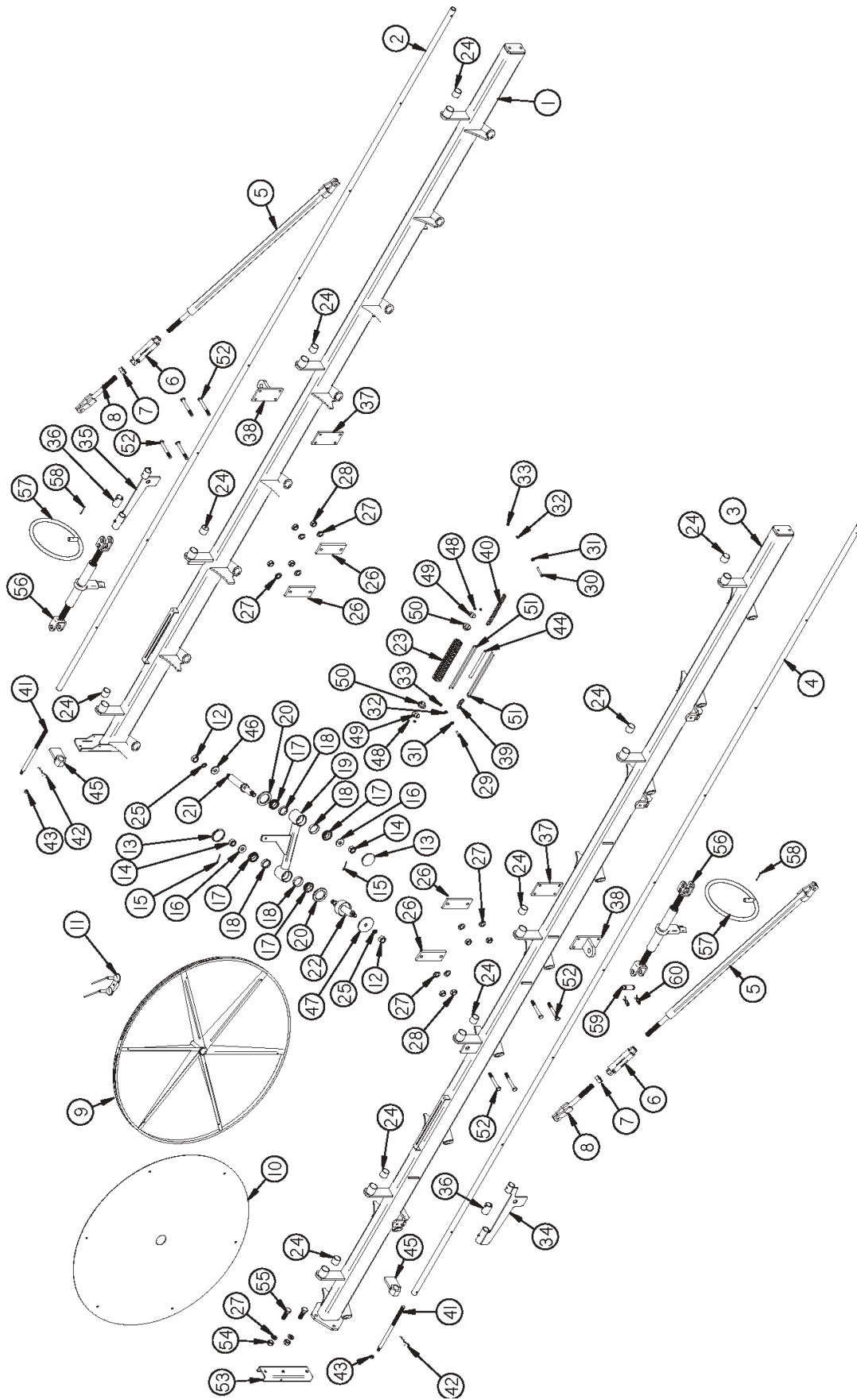


FIGURE 2

RAKE BEAMS

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	HD229	RAKE BEAM LEFT A
2	HD110	LIFTING PIPE LEFT
3	HD230	RAKE BEAM RIGHT A
4	HD112	LIFTING PIPE RIGHT
5	HD113	STABILIZER TUBING
6	HD114	TURNBUCKLE
7	YNJM32010	HEX NUT, JAM, 1"-8
8	HD116	TURNBUCKLE END
9	HD117	RAKE WHEEL
*	HD203	COMPLETE LH RAKE WHEEL
*	HD204	COMPLETE RH RAKE WHEEL
10	HD118	WIND GUARD
11	HD119	RAKE TOOTH
12	YNHX24005	HEX NUT, 3/4"-10 PLATED
13	RG103	DUST CAP
14	YNSL28005	HEX NUT, SLOTTED, 7/8"-14
15	YPCT05010	COTTER PIN, 5/32" X 1-1/2"
16	YWFL28005	WASHER, FLAT, 7/8" USS
17	HD122	BEARING
18	3G18	BEARING RACE
19	HD123	RAKE ARM
20	HD124	SEAL
21	HD125	PIVOT SPINDLE
22	HD126	RAKE WHEEL SPINDLE
23	HD127	SPRING
*	HD201	COMPLETE SPRING ASSEMBLY
24	HD128	BUSHING
25	YWSI24005	WASHER, LOCK, STAR, INTERNAL, 3/4"
26	HD202	BEAM PLATE
27	YWLO20005	WASHER, LOCK, 5/8"
28	YNTL20005	HEX NUT, TOP LOCK, 5/8"-11
29	YBHH12035	BOLT, 3/8" X 1-1/4" GR. 5
30	YBHH12100	BOLT, 3/8" X 2-1/4" GR. 5

NOTE: * MEANS NOT SHOWN

FIGURE 2

RAKE BEAMS

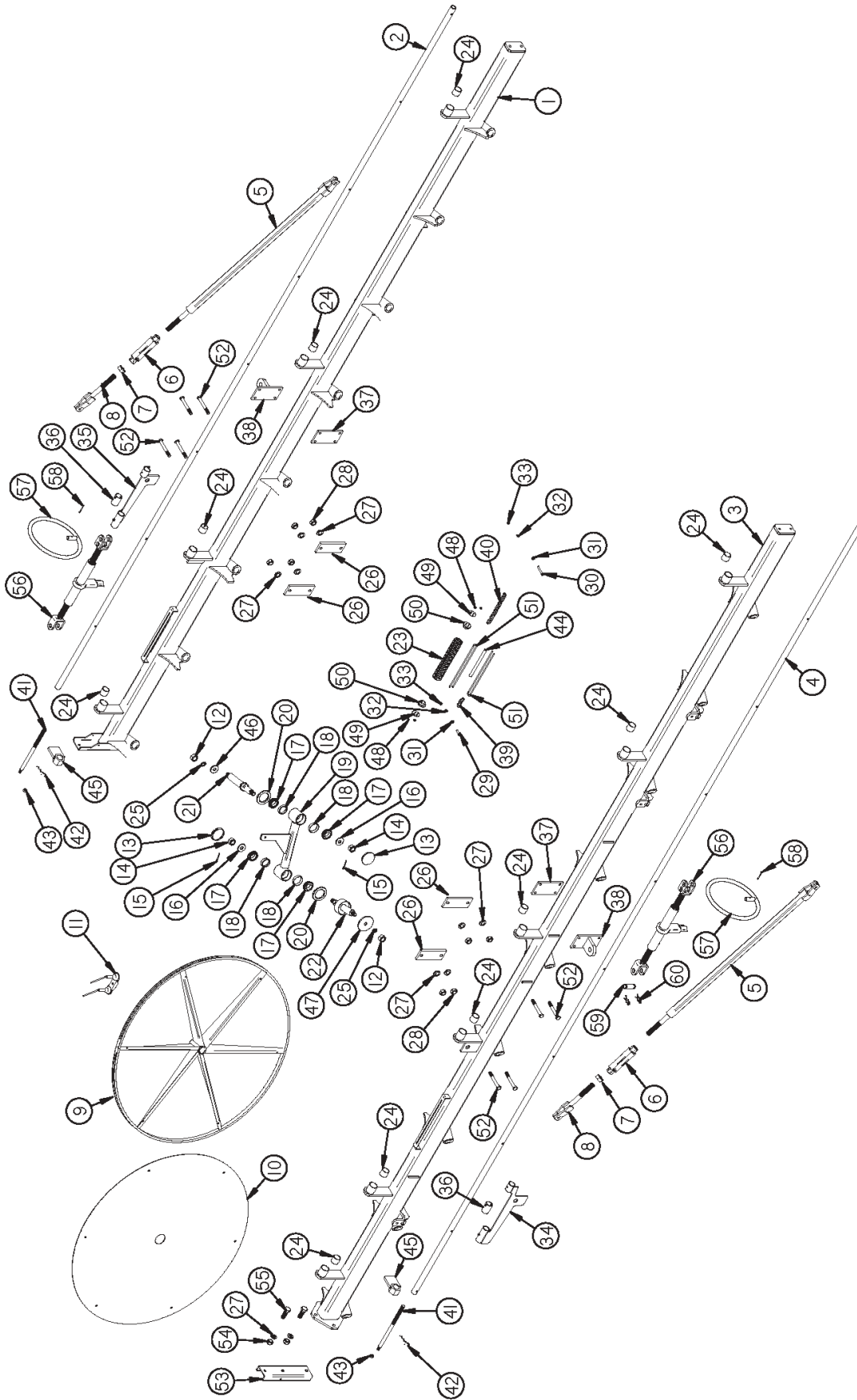


FIGURE 2

RAKE BEAMS

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
31	YWFL12005	WASHER, FLAT, 3/8" USS
32	YWLO12005	WASHER, LOCK, 3/8"
33	YNTL12005	HEX NUT, TOP LOCK, 3/8"-16
34	HD130	LIFTING CYLINDER MOUNT RIGHT
35	HD131	LIFTING CYLINDER MOUNT LEFT
36	HD175	LIFTING PIPE COLLAR
37	HD91	STANDOFF MOUNTING PLATE
38	HD132	CYLINDER MOUNT
39	HD214	RAKE WHEEL SHORT CHAIN
40	HD210	RAKE WHEEL CHAIN
41	HD154	ACME ROD
42	YPHR08040	HAIR PIN, 1/4" X 5"
43	YNHX16005	HEX NUT, 1/2"
44	HD179	SPRING STOPPER
45	BFR426	RAKE PRESSURE HANDLE
46	HD157	PIVOT WASHER
47	HD158	SPINDLE WASHER
48	YNNY08005	HEX NUT, NYLON LOCKNUT, 1/4"-20
49	HD176	SPRING HOLDER WASHER
50	HD177	POLY SPRING HOLDER
51	HD178	TORSION BAR
52	YBHH20085	BOLT, 5/8" X 5" GR. 5
53	HD231	ADJUSTMENT POST RIGHT
54	YNHX20005	HEX NUT, 5/8"-11 PLATED
55	YBHH20010	BOLT, 5/8" X 1-1/2" GR. 5
ITEM 56-60 USED ON MANUAL MODEL ONLY		
56	T138	RATCHET JACK
57	HD213	HANDLE BAND
58	YPCT06020	COTTER PIN, 3/16" X 2"
59	T143	JACK PIN
60	T144	HAIR PIN

FIGURE 3
HYDRAULICS (MODEL)

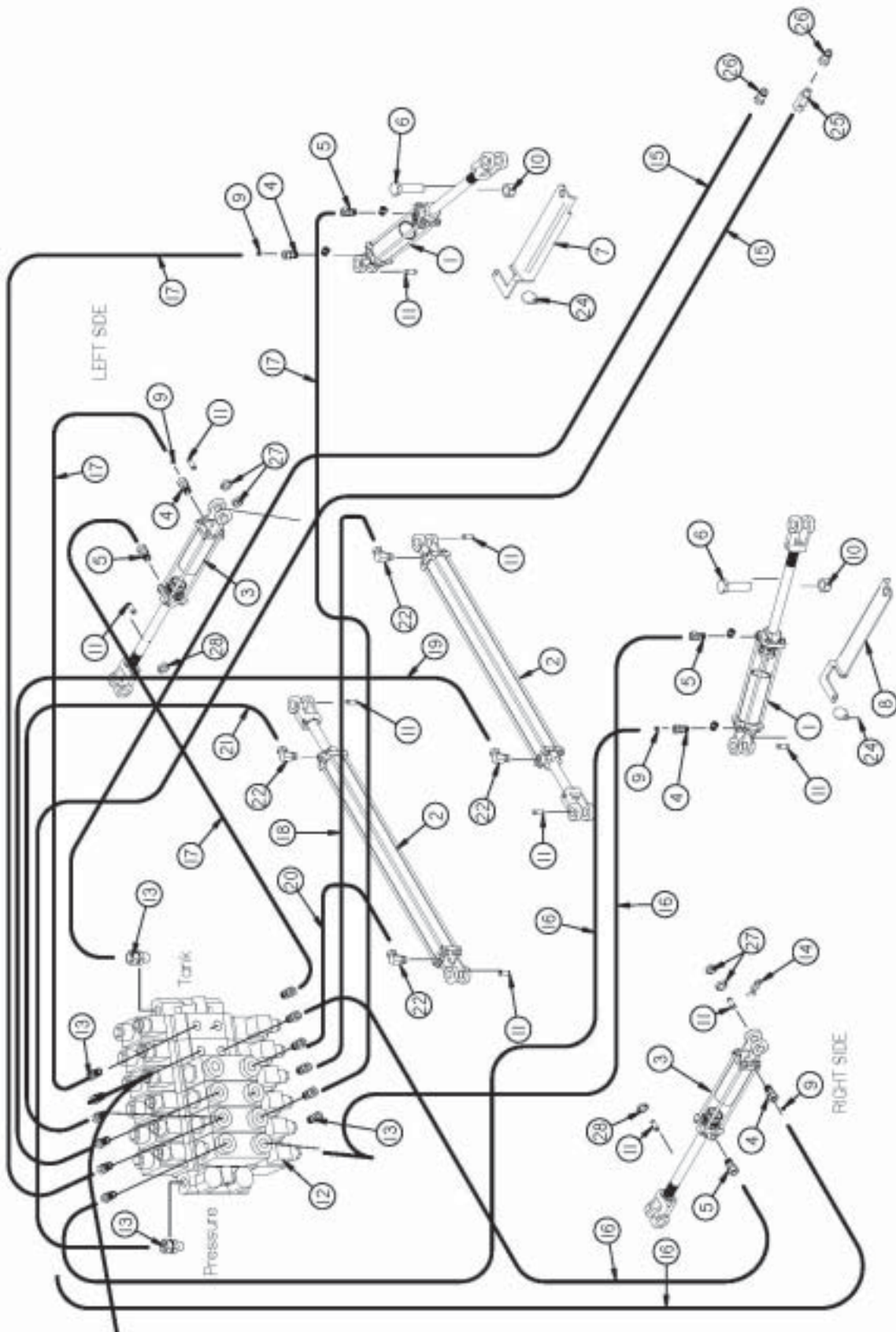


FIGURE 3

HYDRAULICS (MODEL)

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	HD135	HYDRAULIC CYLINDER 3" x 8"
2	HD136	HYDRAULIC CYLINDER 3-1/2" x 60"
3	16SV171	HYDRAULIC LIFT CYLINDER 2" x10"
4	BFR122	3/8" UNION ADAPTER
5	DWM233	3/8" UNION ADAPTER
6	YBHH32015	BOLT, 1"-8 X 4" GR. 5
7	HD137	TRANSPORT LOCK LEFT
8	HD138	TRANSPORT LOCK RIGHT
9	BFR120	.062 ORIFICE
10	YNTL32005	HEX NUT, TOP LOCK, 1"-8
11	T143	HYDRAULIC CYLINDER PIN
12	HD139	HYDRAULIC VALVE
*	HD216	SOLENOID TUBE ASSEMBLY
13	DWM268	9/16" MALE O-RING TO 3/8" PIPE UNION ADAPTER
14	T144	CYLINDER CLIP PIN
15	HD141	HYD. HOSE 3/8 X 288" 1/2MP & 3/8MP
16	HD142	HYD. HOSE 1/4 X 288" 3/8MP & 3/8MP
17	HD143	HYD. HOSE 1/4 X 210" 3/8MP & 3/8MP
18	HD144	HYD. HOSE 1/4 X 36" 3/8MP & 1/2MP
19	HD145	HYD. HOSE 1/4 X 96" 3/8MP & 1/2MP
20	HD147	HYD. HOSE 1/4 X 60" 3/8MP & 1/2MP
21	HD146	HYD. HOSE 1/4 X 20" 3/8MP & 1/2MP
22	WM175	1/2" 90° UNION ADAPTER
23	JB82	BUSHING 1/2" TO 3/8"
24	YPLY12010	LYNCH PIN, 7/16" X 1-3/4"
25	DF18	1/2" CHECK VALVE
26	DWM205	1/2" MALE QUICK COUPLER
27	X94	SPACER 5/16 x 1"
28	HD187	SPACER 3/4 x 1"

NOTE: * MEANS NOT SHOWN

FIGURE 4
HYDRAULICS (MANUAL MODEL)

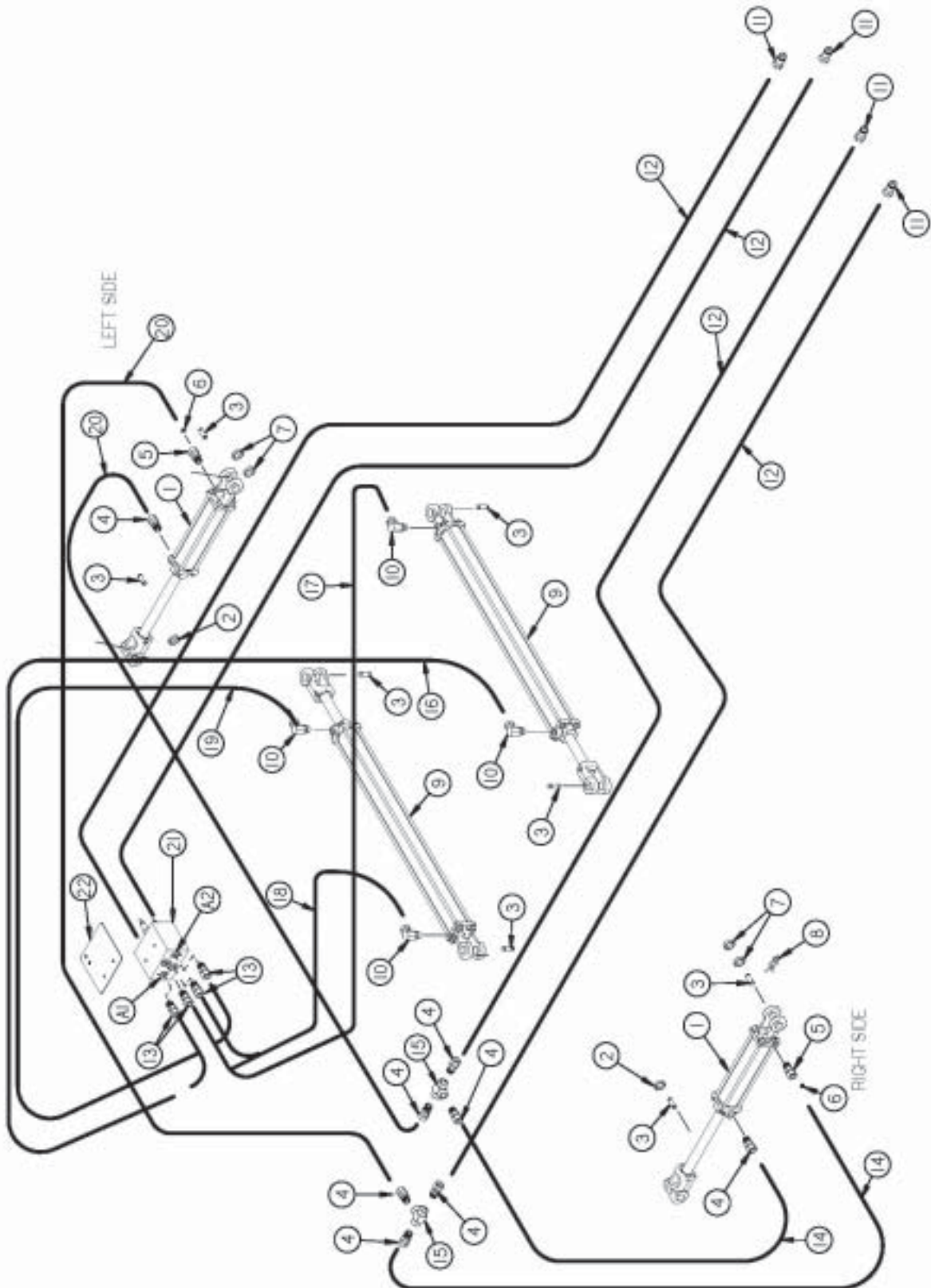


FIGURE 4

HYDRAULICS(MANUAL MODEL)

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	16SV171	HYDRAULIC LIFT CYLINDER 2" x10"
2	HD187	SPACER 3/4 X 1"
3	T143	HYDRAULIC CYLINDER PIN
4	DWM233	3/8" UNION ADAPTER
5	BFR122	3/8" UNION ADAPTER
6	BFR120	.062 ORIFICE
7	X94	SPACER 5/16 X 1"
8	YPHR02020	HAIR PIN, #23-10
9	HD136	HYDRAULIC CYLINDER 3-1/2" x 60"
10	WM175	1/2" 90° UNION ADAPTER
11	DWM205	1/2" MALE QUICK COUPLER
12	HD141	HYD. HOSE 3/8 X 288" 1/2MP & 3/8MP
13	DWM269	BOSS UNION ADAPTER
14	HD142	HYD. HOSE 1/4 X 288" 3/8MP & 3/8MP
15	BFR74	3/8" FEMALE TEE
16	HD145	HYD. HOSE 1/4 X 96" 3/8MP & 1/2MP
17	HD144	HYD. HOSE 1/4 X 36" 3/8MP & 1/2MP
18	HD147	HYD. HOSE 1/4 X 60" 3/8MP & 1/2MP
19	HD146	HYD. HOSE 1/4 X 20" 3/8MP & 1/2MP
20	HD143	HYD. HOSE 1/4 X 210" 3/8MP & 3/8MP
21	XR100	FLOW DIVIDER VALVE
22	HD212	VALVE MOUNT

FIGURE 5 WIRING (HYDRAULIC MODEL)

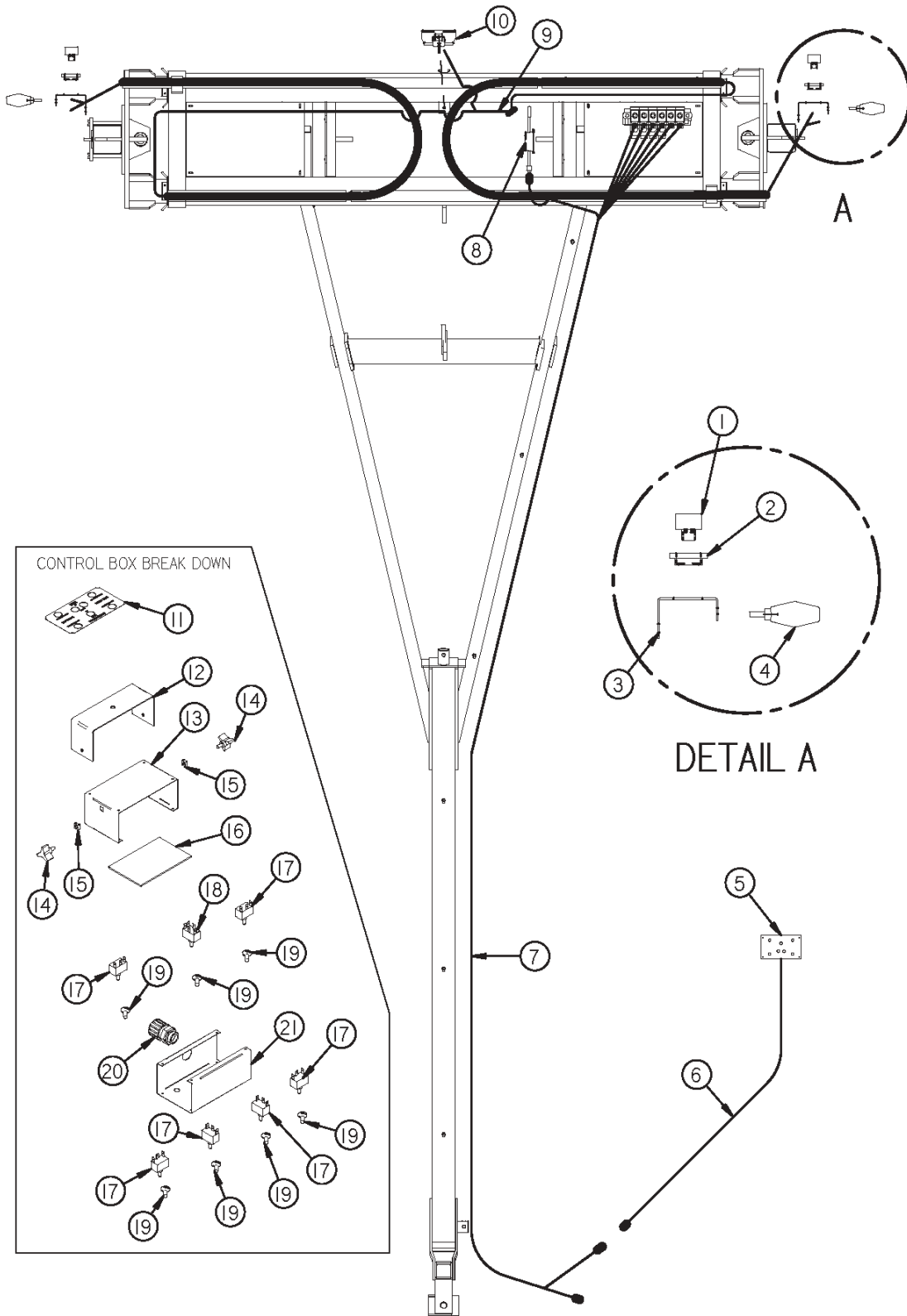


FIGURE 5

WIRING (HYDRAULIC MODEL)

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	S310	RED TAIL LIGHT
2	S308	RUBBER LIGHT MOUNT
3	HD148	LIGHT BRACKET
4	DWM129	YELLOW HAZARD LIGHT
5	HD180	COMPLETE CONTROL BOX W/ HARNESS
6	HD160	CONTROL BOX WHIP
7	HD161	MAIN HARNESS
8	S441	LIGHT MODULE
9	HD149	TAIL LIGHT LOOM
10	DWM130	FLOOD/WORK LIGHT
11	61003	CONTROL BOX DECAL
12	DWM326	CONTROL BOX MOUNT
13	DWM140	CONTROL BOX BOTTOM
14	HD174	KNOB
15	HD173	PANEL NUT
16	HD163	POLY SHIELD
17	HD207	MOMENTARY SWITCH
18	HD159	MASTER SWITCH
19	16SV235	SWITCH BOOT
20	DWM175	STRAIN RELIEF
21	HD150	CONTROL BOX TOP

FIGURE 6
WIRING(MANUAL MODEL)

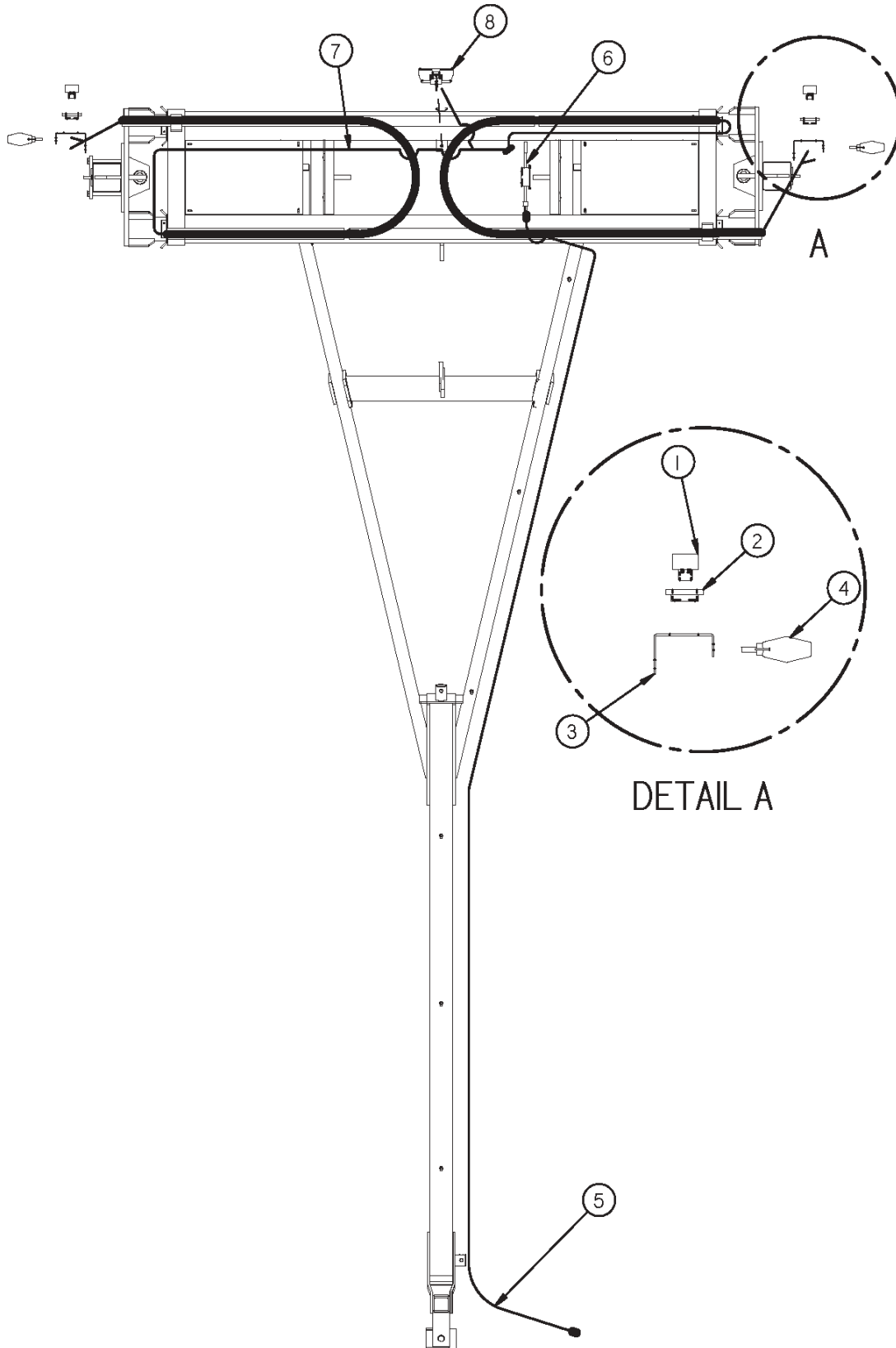


FIGURE 6

WIRING(MANUAL MODEL)

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	S310	RED TAIL LIGHT
2	S308	RUBBER LIGHT MOUNT
3	HD148	LIGHT BRACKET
4	DWM129	YELLOW HAZARD LIGHT
5	MHD1	FRONT LIGHT LOOM
6	S441	LIGHT MODULE
7	HD149	TAIL LIGHT LOOM
8	DWM130	FLOOD/WORK LIGHT

FIGURE 7
HYDRAULIC CYLINDERS

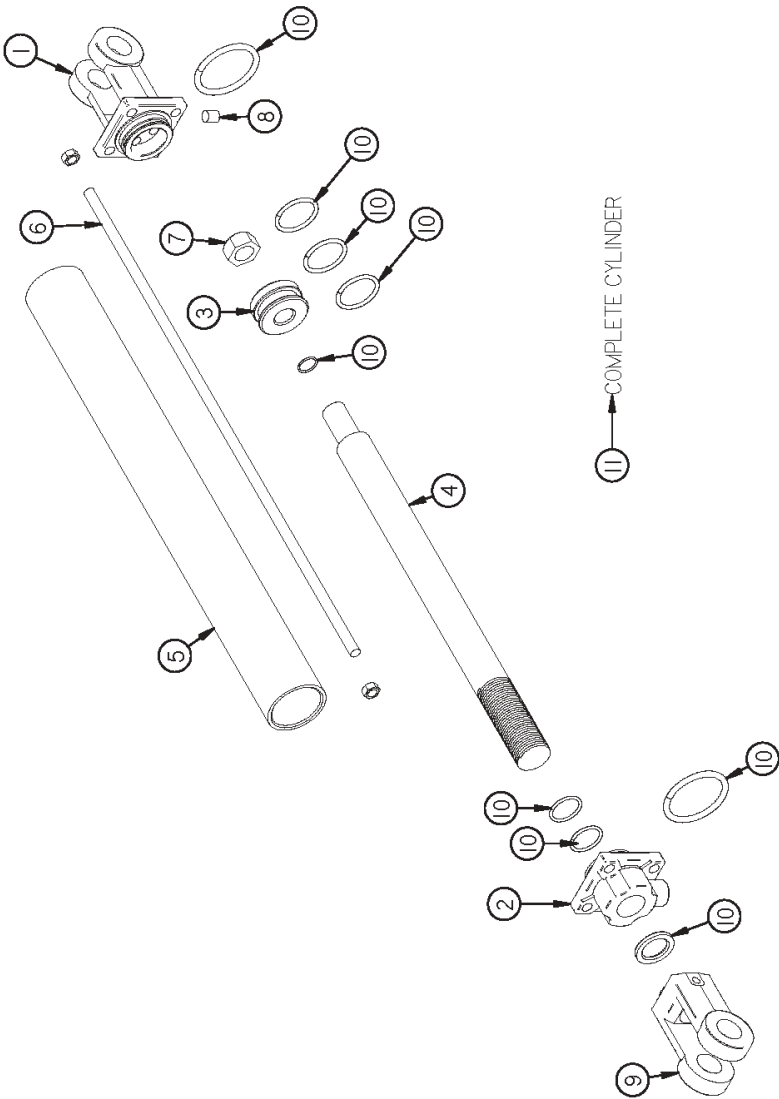


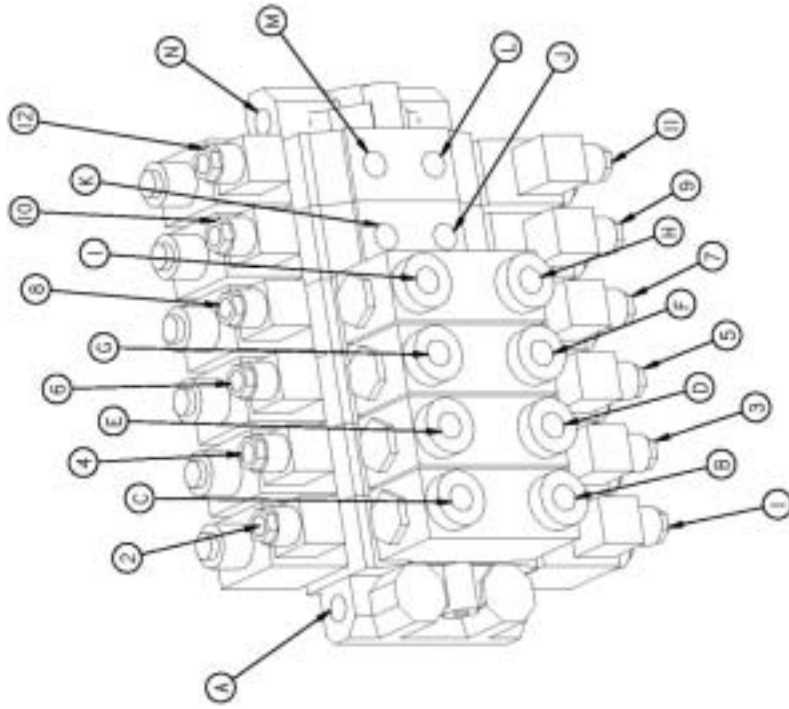
FIGURE 7

HYDRAULIC CYLINDERS

	<u>LIFT CYLINDER</u>	<u>WING CYLINDER</u>	<u>FRAME WIDTH</u>	
	2" x 10"	3" x 8"	3-1/2" x 60"	
<u>ITEM</u>	<u>PART #</u>	<u>PART #</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1.	23N142A	DWM192	16SV157A	Clevis Cap
2.	23N143A	HD188	HD189	Rod Cap
3.	23N144	DWM194	HD198	Piston
4.	16SV168A	HD190	HD191	Rod
5.	16SV169	HD192	HD193	Cylinder Tube
6.	16SV170	HD194	HD195	Tie Rod
7.	23N148	DWM198	DWM198	Piston Nut
8.	23N149	DWM199	DWM199	Plug
9.	23N150A	DWM200	DWM200	Rod Clevis
10.	23N151	HD196	HD197	Seal Kit
11.	16SV171A	HD135	HD136	Hydraulic Cylinder

FIGURE 8

HYDRAULIC VALVE



A	PRESSURE PORT	
B	RIGHT BEAM OPEN	Din # 1
C	RIGHT BEAM CLOSED	Din # 2
D	LEFT BEAM OPEN	Din # 3
E	LEFT BEAM CLOSED	Din # 4
F	RIGHT WIDTH OUT	Din # 5
G	RIGHT WIDTH IN	Din # 6
H	LEFT WIDTH OUT	Din # 7
I	LEFT WIDTH IN	Din # 8
J	RIGHT RAKE WHEEL UP	Din # 9
K	RIGHT RAKE WHEEL DOWN	Din # 10
L	LEFT RAKE WHEEL UP	Din # 11
M	LEFT RAKE WHEEL DOWN	Din # 12
N	TANK PORT	

FIGURE 9 MAIN HARNESS

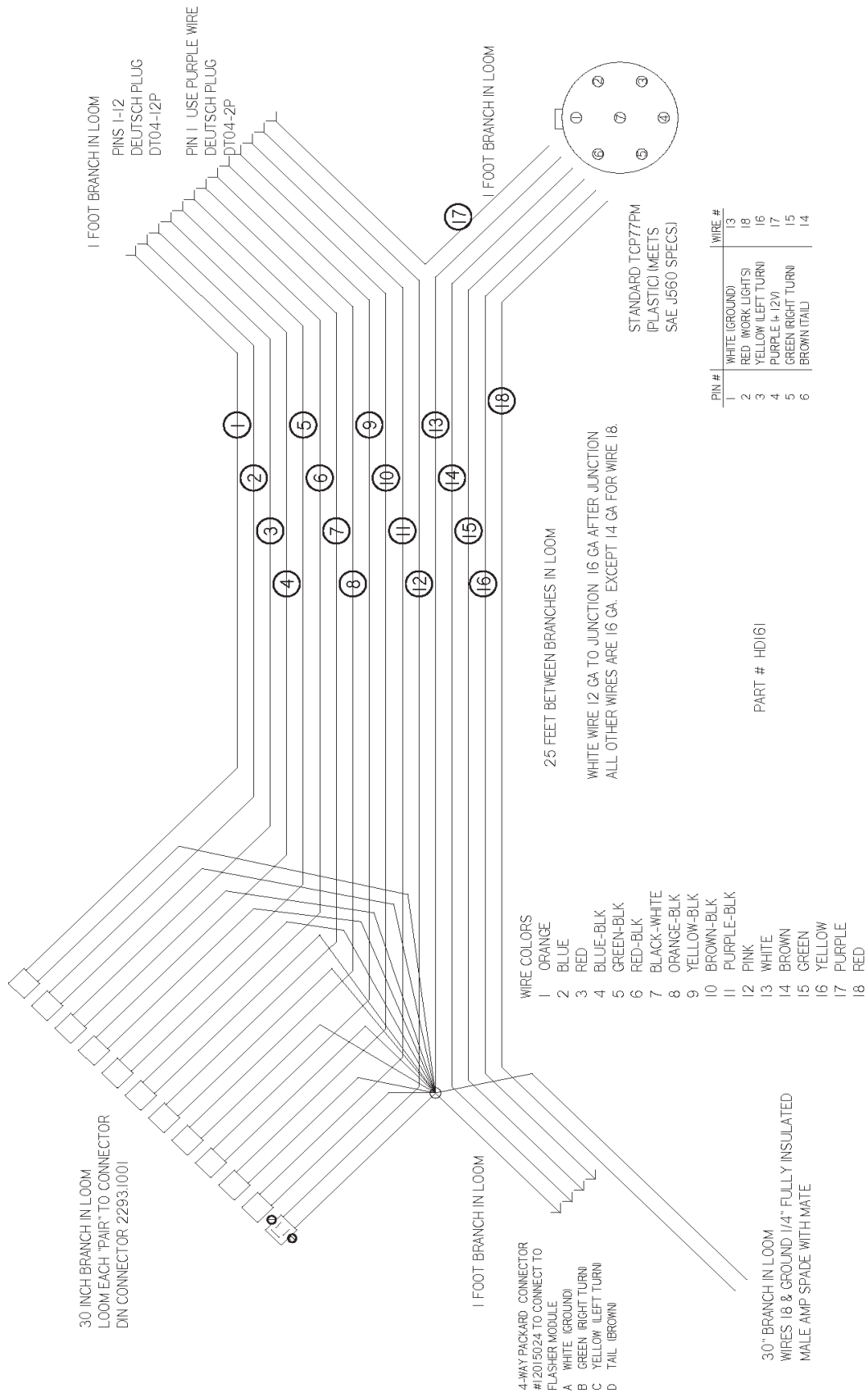


FIGURE 10

CONTROL BOX WIRING

CONTROL BOX WHIP

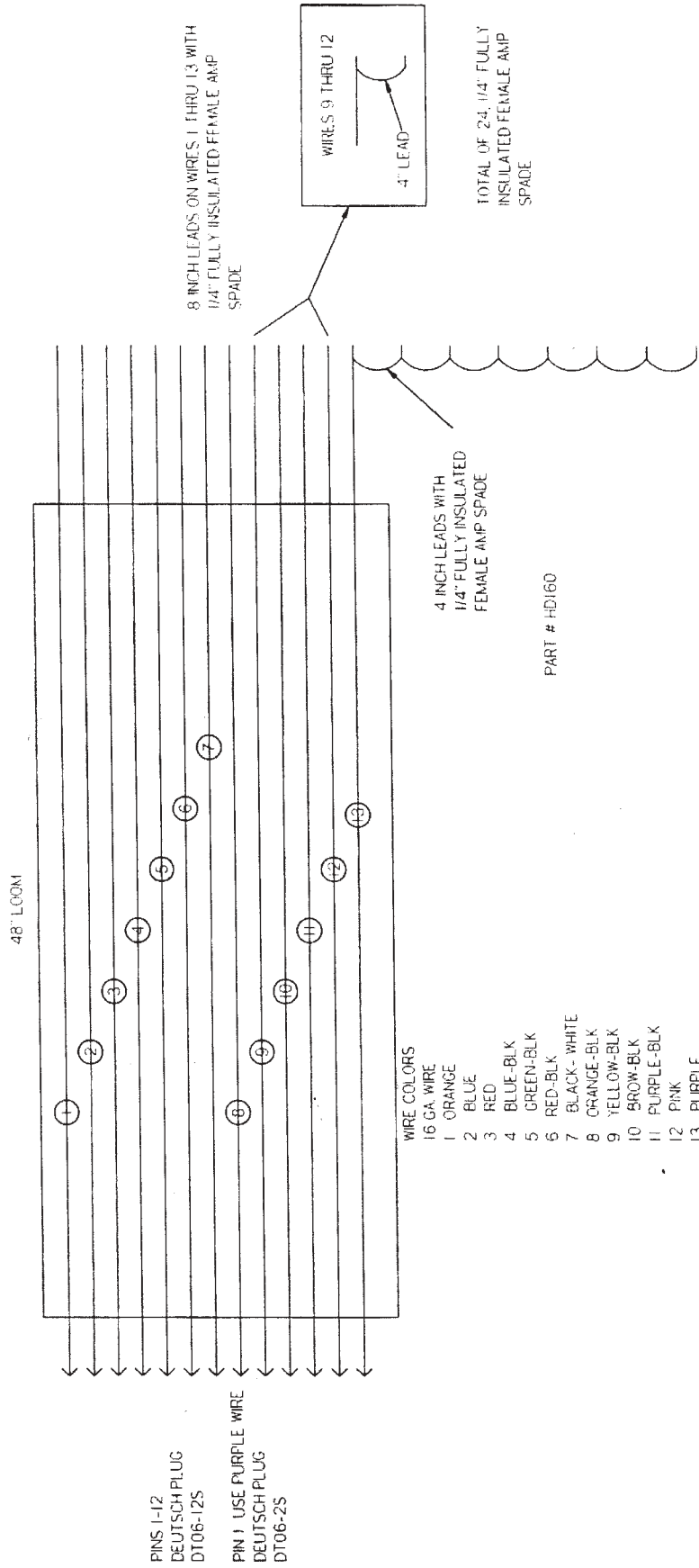
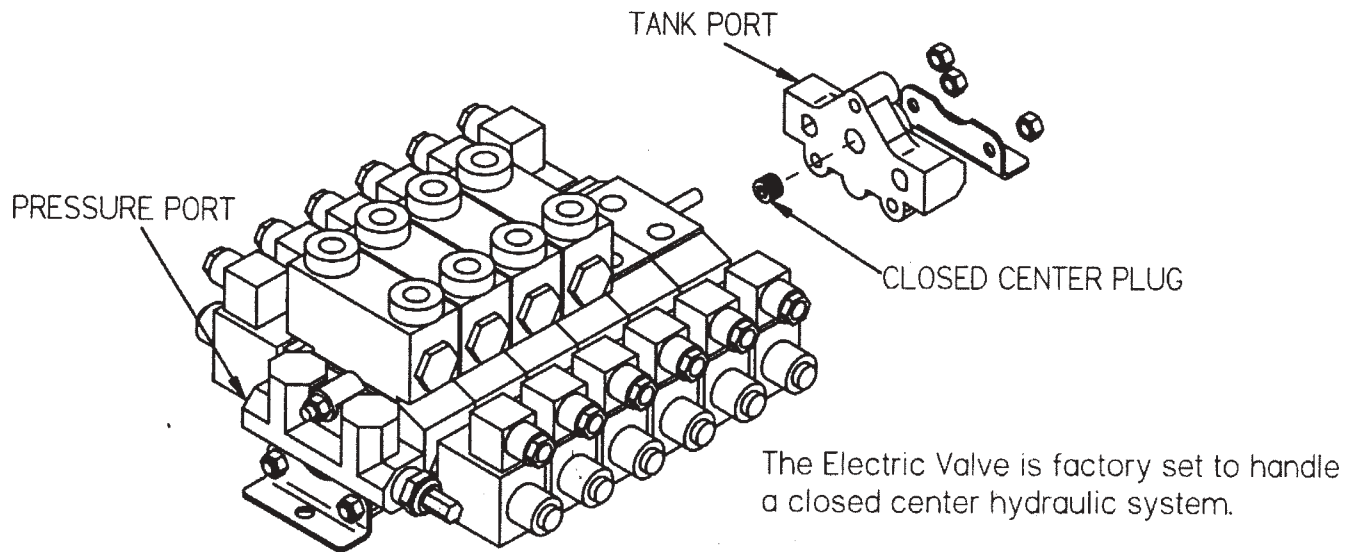


FIGURE 11

OPEN CENTER CHANGE



If closed center valve is used on a open center tractor it will cause the oil to heat because oil is dumping over relief.

Instructions for converting valve to open center:

1. Widen left side of rake using left frame width switch on control box (Remember to be moving forward or rearward when doing this).
2. Release all pressure in hydraulic system (Shut tractor OFF and remove ignition Key).
3. Support valve bottom.
4. Remove left mounting bolt.
5. Remove 3 tie rod nuts on tank port (the outward side of valve).
6. Remove end cap, (do not loose the o-rings that are between the sections).
7. Remove plug in end cap with allen wrench, (save for future use).
8. Re-Assemble end cap and mounting angle, (torque tie rod nuts to 140 in.lbs. (16 N-M).
9. Install bolt in mounting angle.

FIGURE 12

FRONT RAKE WHEEL EXTENSION

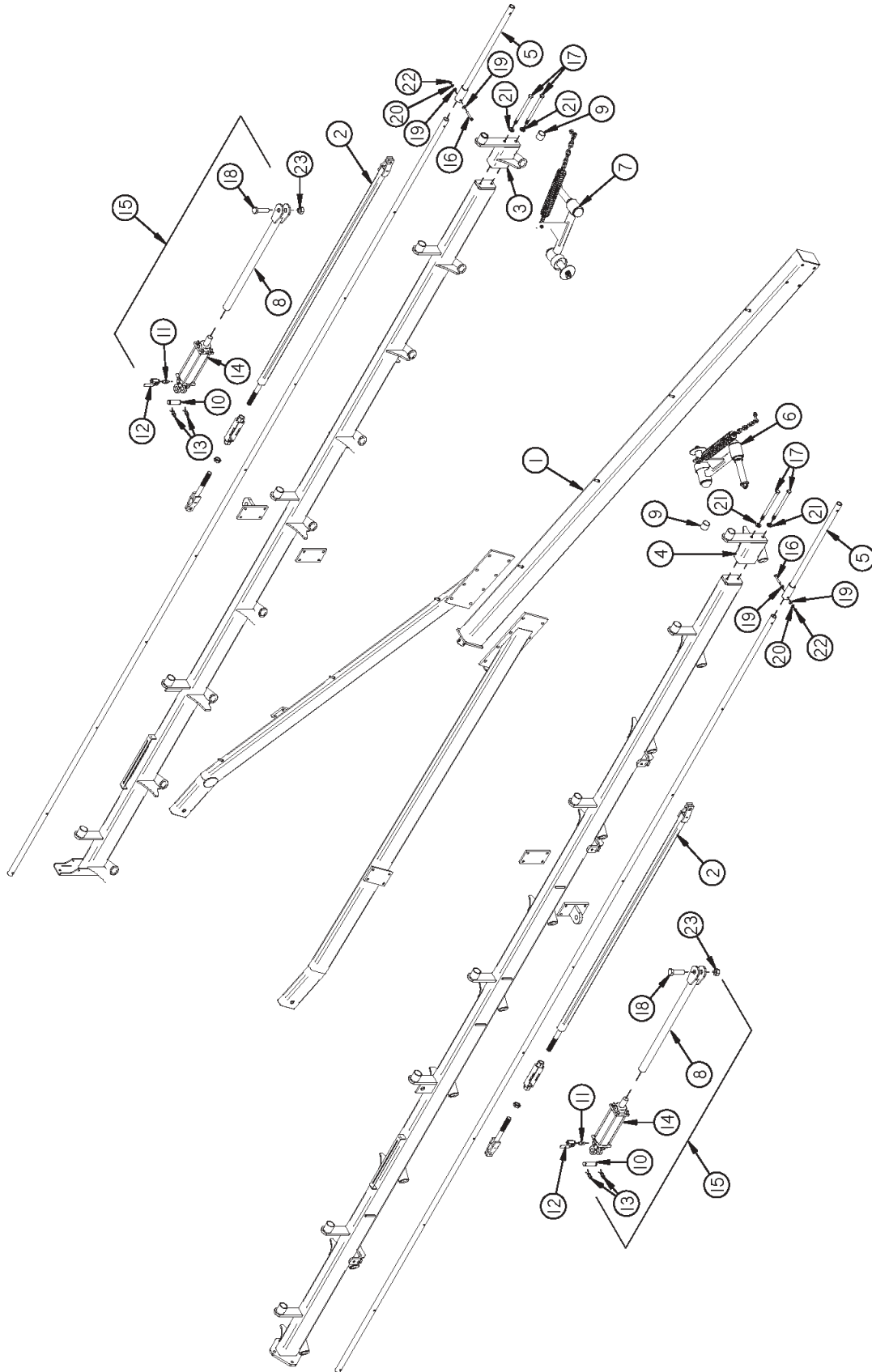


FIGURE 12

FRONT RAKE WHEEL EXTENSION

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	HD252	POLE
2	HD251	TURNBUCKLE LONG STUB LEFT
3	HD259	RAKE BEAM LEFT EXTENSION
4	HD260	RAKE BEAM RIGHT EXTENSION
5	HD253	LIFT PIPE
6	HD246	RAKE ARM RIGHT COMPLETE (INCLUDING SPRING ASSEMBLY) (SEE FIGURE 2 FOR DETAIL)
7	HD245	RAKE ARM LEFT COMPLETE (INCLUDING SPRING ASSEMBLY) (SEE FIGURE 2 FOR DETAIL)
8	HD248	CYLINDER ROD
9	HD128	BUSHING
10	T143	CYLINDER PIN
11	16SV351	CLOSE NIPPLE .375 X 2
12	WM140	1/2" BALL BALL VALVE
13	T144	CYLINDER CLIP PIN
14	HD135	CYLINDER (RE-USE STANDARD 3" X 8" CYLINDER)
15	HD247	REAR CYLINDER ASSEMBLY
16	YBHH12090	BOLT, 3/8" X 2-1/2" GR. 5
17	YBHH20120	BOLT, HEX HEAD, 5/8" X 9" GR. 5
18	YBHH32010	BOLT, 1"-8 X 3-1/2" GR. 5
19	YWFL12005	WASHER, FLAT, 3/8" USS
20	YWLO12005	WASHER, LOCK, 3/8"
21	YWLO20005	WASHER, LOCK, 5/8"
22	YNHX12005	HEX NUT, 3/8"-16
23	YNTL32005	HEX NUT, TOP LOCK, 1"-8
*	HD203	COMPLETE LH RAKE WHEEL
*	HD204	COMPLETE RH RAKE WHEEL
*	HD249	RIGHT EXTENSION COMPLETE
*	HD250	LEFT EXTENSION COMPLETE

NOTE: * MEANS NOT SHOWN

FIGURE 13
RIGHT REAR WHEEL EXTENSION

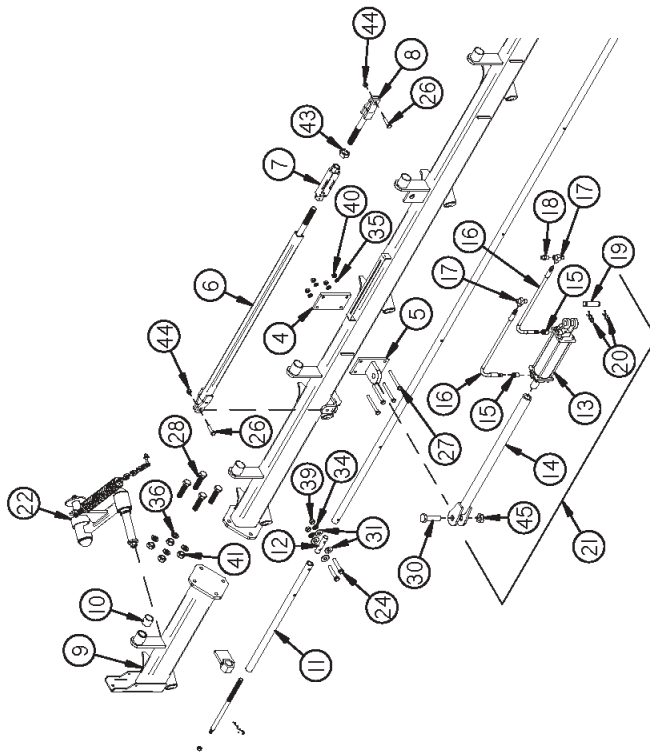
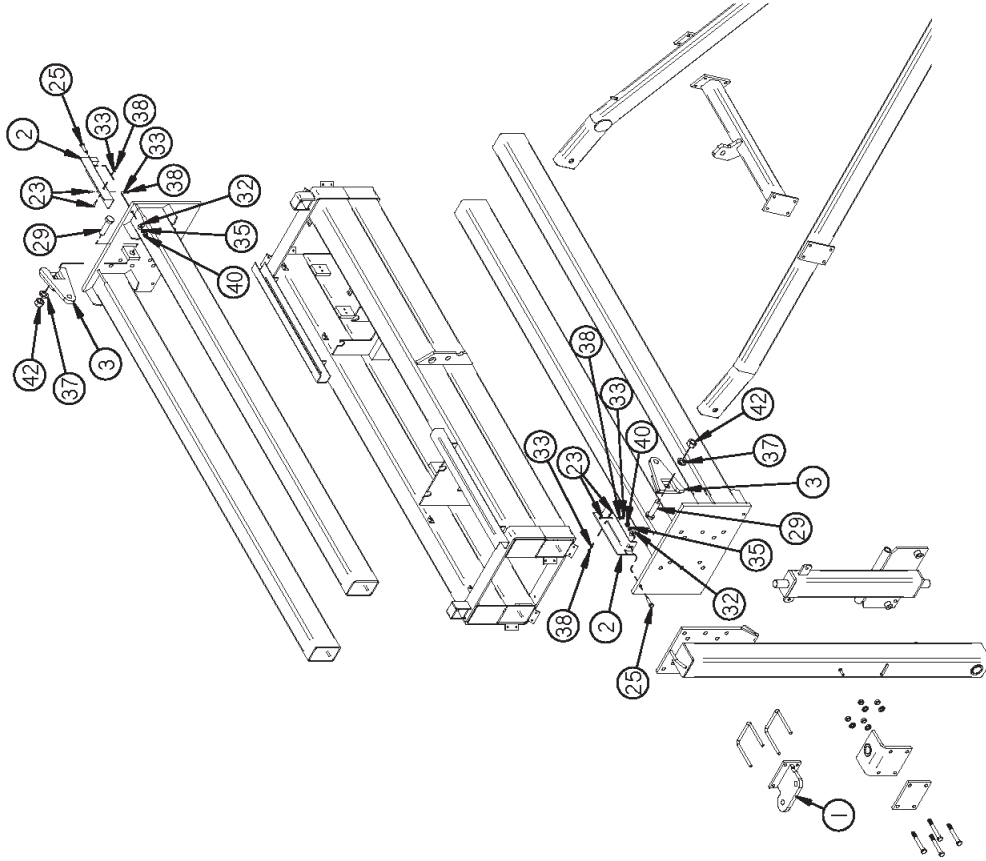


FIGURE 13

RIGHT REAR WHEEL EXTENSION

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	HD244	CYLINDER MOUNT DOUBLE
2	HD242	HOSE HOLDER
3	HD243	CYLINDER MOUNT EXTENSION
4	HD91	STANDOFF MOUNTING PLATE
5	HD132	CYLINDER MOUNT
6	HD113	STABILIZER TUBING
7	HD114	TURNBUCKLE
8	HD116	TURNBUCKLE END
9	HD239	RAKE BEAM REAR EXTENSION
10	HD128	BUSHING
11	HD241	LIFT PIPE
12	XR41	EXTENSION LIFT PIPE CONNECTOR
13	HD135	CYLINDER
14	HD248	CYLINDER ROD
*	HD256	REAR CYLINDER WITH ROD
15	HD257	MALE CONNECTOR FTX 4-8
16	HD258	1/4" X 22" HYDRAULIC HOSE (106HY-4-4 & 113HY-6-4) SERVICE TEE .375
17	23N116	CLOSE NIPPLE .375 X 2
18	16SV351	CYLINDER PIN
19	T143	CYLINDER CLIP PIN
20	T144	REAR CYLINDER ASSEMBLY
21	HD247	RAKE ARM RIGHT COMPLETE (INCLUDING SPRING
22	HD246	ASSEMBLY) (SEE FIGURE 2 FOR DETAIL)
23	YBHH08100	BOLT, 1/4" X 3/4" GR. 5
24	YBHH12075	BOLT, 3/8" X 2" GR. 5
25	YBHH16055	BOLT, 1/2" X 1-3/4" GR. 5
26	YBHH16065	BOLT, 1/2" X 2" GR. 5
27	YBHH16150	BOLT, 1/2" X 4-3/4" GR. 5
28	YBHH20025	BOLT, 5/8" X 2" GR. 5
29	YBHH32006	BOLT, 1"-8 X 2-3/4" GR. 5
30	YBHH32010	BOLT, 1"-8 X 3-1/2" GR. 5
31	YWFL12005	WASHER, FLAT, 3/8" USS
32	YWFL16005	WASHER, FLAT, 1/2" USS
33	YWLO08005	WASHER, LOCK, 1/4"
34	YWLO12005	WASHER, LOCK, 3/8"
35	YWLO16005	WASHER, LOCK, 1/2"
36	YWLO20005	WASHER, LOCK, 5/8"
37	YWLO32005	WASHER, LOCK, 1"
38	YNHX08005	HEX NUT, 1/4"-20
39	YNHX12005	HEX NUT, 3/8"-16
40	YNHX16005	HEX NUT, 1/2"
41	YNHX20005	HEX NUT, 5/8"-11 PLATED
42	YNHX32010	HEX NUT, 1"-8 PLATED
43	YNJM32010	HEX NUT, JAM, 1"-8
44	YNTL16005	HEX NUT, TOP LOCK, 1/2"-13
45	YNTL32005	HEX NUT, TOP LOCK, 1"-8
*	HD204	COMPLETE RH RAKE WHEEL (SEE FIGURE 2 FOR DETAIL)
*	HD240	RAKE BEAM REAR EXTENSION KIT (INCLUDES RAKE ARM, SPRING ASSEMBLY, REAR EXT.)

NOTE: * MEANS NOT SHOWN

SERVICE / MAINTENANCE RECORD

DATE	DESCRIPTION	NOTES

H&S HDII RAKE SPECIFICATIONS

Your new H&S HDII Rake has been manufactured of the finest quality materials and components. The performance you get from your machine is largely dependent upon how well you read and understand this manual and apply this knowledge. There is a right and a wrong way to do everything. Please do not assume that you know how to operate and maintain your HDII Rake before reading this manual carefully. Keep this manual available for ready reference.

Number of Wheels.17
Wheel Diameter.60"
Teeth per Wheel.	36 (18 sets of 2)
Teeth	Rubber Mounted In A Set Of 2
Transport Width.12' 3"
Transport Length.28' 3"
Weight.	5800 lbs.
Maximum Raking Width.30' 3"
Maximum Finished Windrow Width.72"
Rake Wheel Hubs.	Tapered Bearings
Rake Beam Tilt.	0° to 10°
Hitch Jack.	Standard
Tail & Work Lights.	Standard
Tires.9.5L x 15SL

Warranty:
See Warranty on Page #1

NOTE:
Determine right or left side of HDII Rake by viewing it from the rear. If instructions or parts lists call for hardened bolts see page 9 to identify.

H&S MANUFACTURING CO. INC.		
2608 S. Hume Ave.		H&S WAREHOUSE Rt #5 and 76
P.O. Box 768 - Telephone (715) 387-3414		P.O. Box 1260 - Telephone (716) 736-7595
FAX (715) 384-5463		FAX (716) 736-7596
MARSHFIELD, WI 54449		RIPLEY, NY 14775

H&S MFG. CO.

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