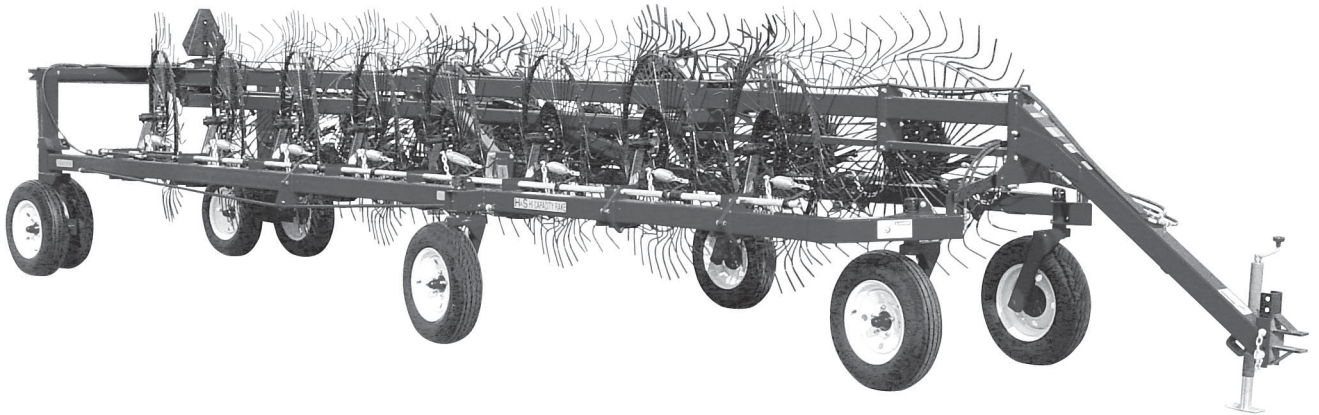


H&S

1460 - 1660 HI-CAPACITY 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

HSMFG93008

Manufactured By
H&S MANUFACTURING CO.,INC.

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

H & S
1460 - 1660 HI-CAPACITY RAKE
PARTS AND OPERATOR'S MANUAL

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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.



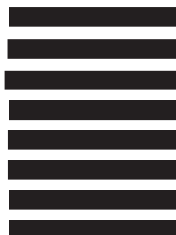
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

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



AFTER COMPLETION, DEALER SHOULD REMOVE AND RETAIN FOR RECORDS

**H&S
DEALER PRE-DELIVERY CHECK LIST**

After the 1460-1660 Hi-Capacity 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 sitting level)
- All bolts and fasteners are tight.
- All decals are in place and legible.

(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 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 19 of this Manual.
- Have customer sign a completed "Warranty Registration," and mail it promptly.

Date Delivered _____

Dealer's Name _____

By _____

Signature of Original Buyer

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



**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 for towing and lifting rake.

H & S MANUFACTURING CO. INC.

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.

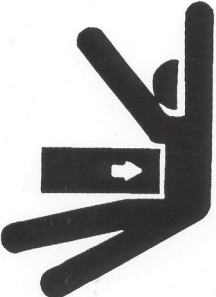
Keep signs in good condition. Immediately replace any missing or damaged signs.

! 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



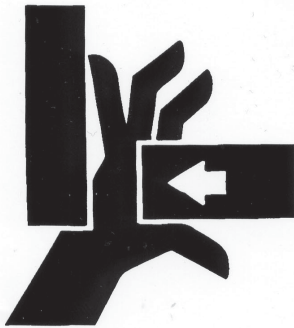
! DANGER

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.

11694A




! 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 for towing and lifting rake.



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 bars with safety clip pins for main rake beam, 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.

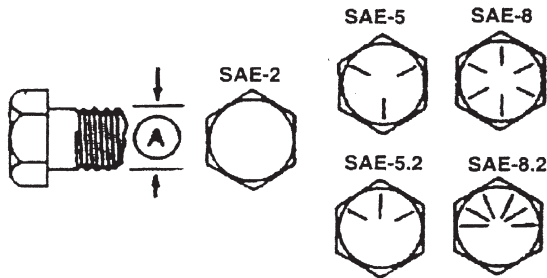
Be sure to raise rake wheels before opening or closing main rake beams.

H&S Mfg. Co. always takes the operator and their 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.

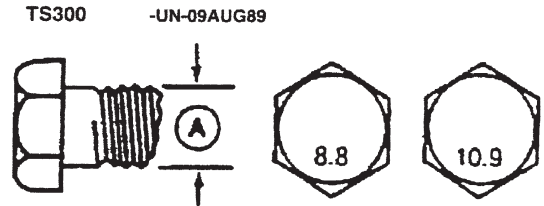
Study The Above Safety Rules

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.

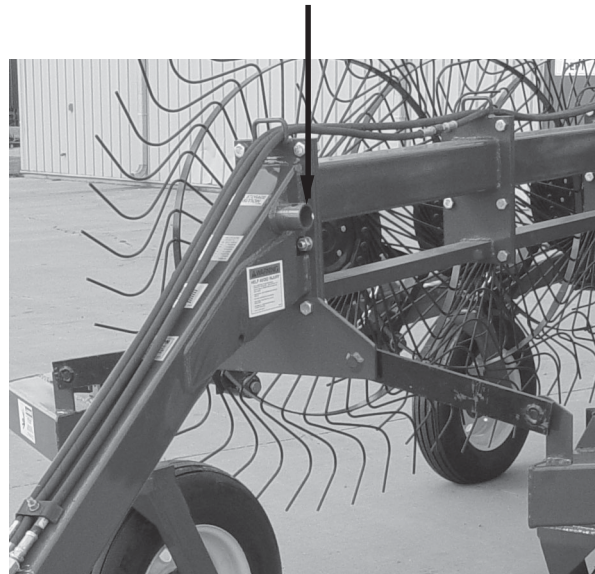
OPERATION

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 to 85-95 ft./lbs. of torque.
2. Check tires and inflate to pressure (6.70 x 15 to 36 pounds).
3. Adjust the tractor hitch (13 to 17 inches above ground) and attach rake to tractor with a **hitch pin with a safety locking device**.
4. Remove weight from lift jack. Remove jack from pipe mount and place on convenient storage mount located on the front top of pole (see below).
5. Connect hydraulic hose for raising and lowering rake wheels from rake to a double acting valve on the tractor.
6. Connect hydraulic hoses for opening and closing the rake to a double acting valve on the tractor.
7. Connect 7-pin electrical connector to tractor (If equipped with optional lighting).
8. Lubricate the machine completely.
9. On all rake wheels, tooth bolts must be torqued to 40 ft./lbs. to help prevent excessive tooth breakage. **Re-torque rake tooth bolts after the first 100 acres. (Part No. T175). Check periodically thereafter.**

NOTE: Determine right or left side of your 1460-1660 Hi-Capacity Rake by viewing it from the rear. If instructions or parts lists call for hardened bolts, refer to bolt torque chart on page 9.



JACK STORAGE POSITION

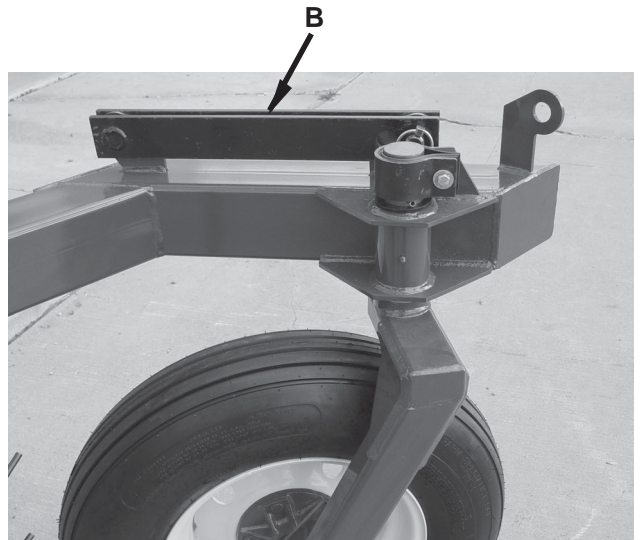
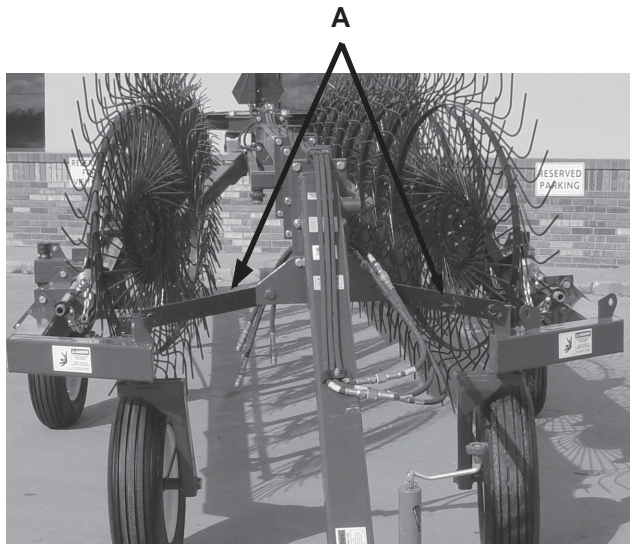


OPERATION *(Continued)*

TRANSPORT LOCKS, FRONT & REAR

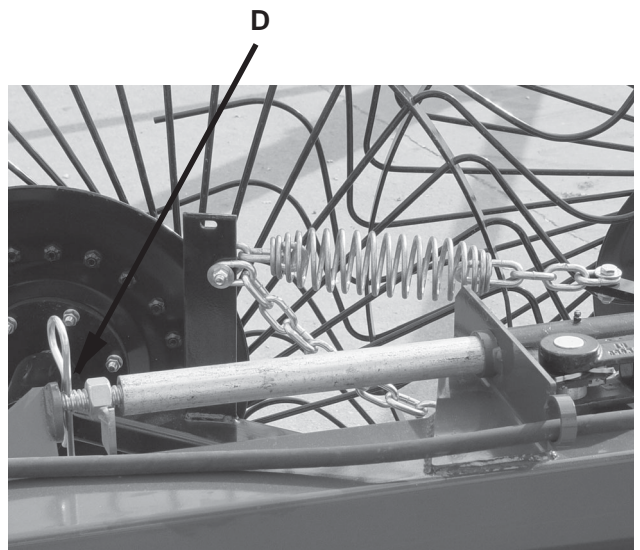
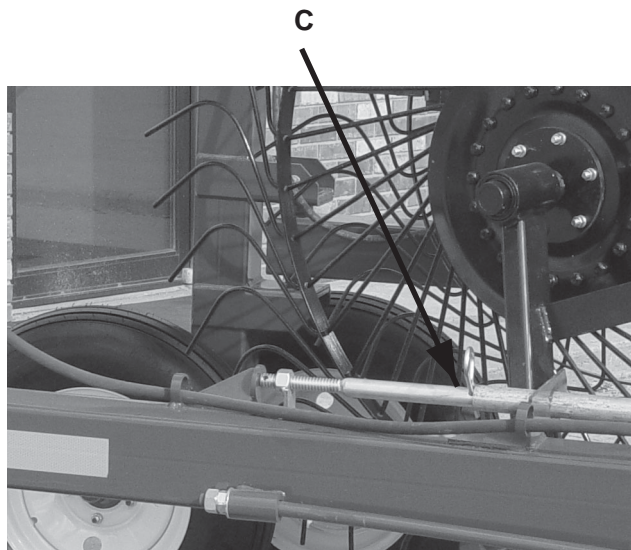
RAKE BEAM LOCKS

Transport locks are mounted to the front of the pole. (A) Shows the rake locked into transport position. (B) Shows the transport locks in the convenient storage position, to be used when in the raking mode.



RAKE WHEEL LOCKS

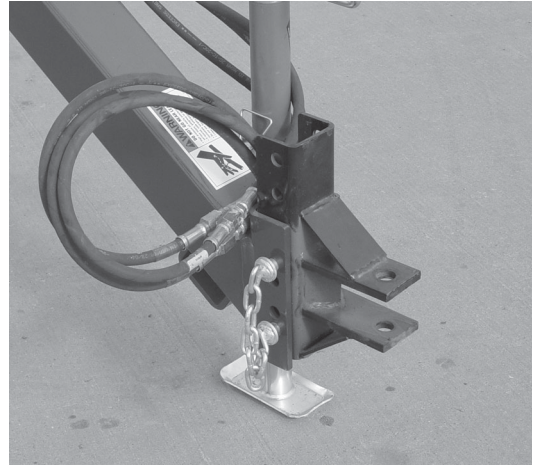
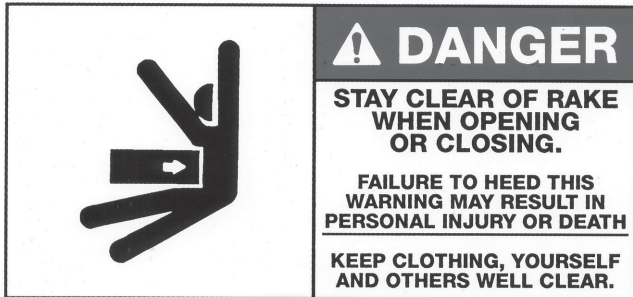
Located at the rear of the lift pipe, is a hair pin which is used to secure the rake wheels in the up position for transport (C). When in the down, or raking position, place the locking hair pin in the convenient storage position as shown (D).



ADJUSTMENTS

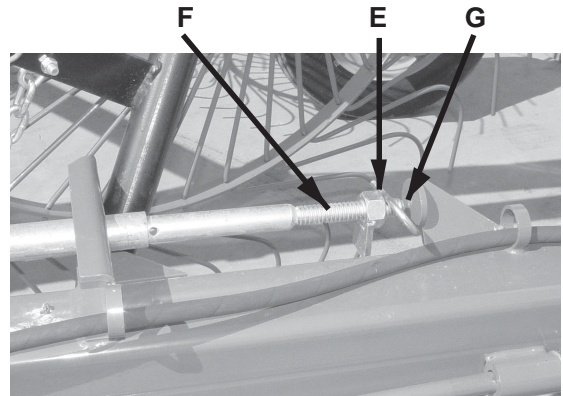
HITCH

There are ten different positions to adjust the hitch on your new Hi-Capacity Rake. Hitch should be adjusted so main frame of the rake is level or parallel to the ground.



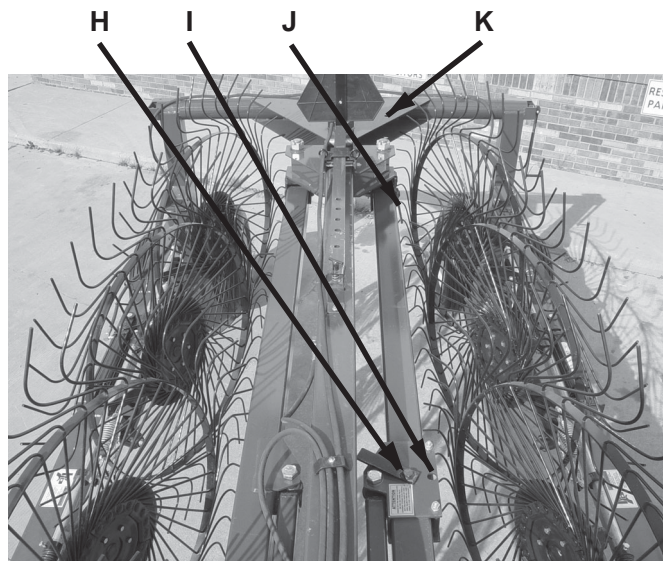
GROUND PRESSURE

Rake wheel to ground pressure is adjusted by turning Locking Nut and Collar (E) in to decrease pressure, or out to increase pressure. The length of the Threaded Bolt (F), between (E) and Stop (G), will determine the rake wheel to ground pressure.



ONE SIDED RAKING

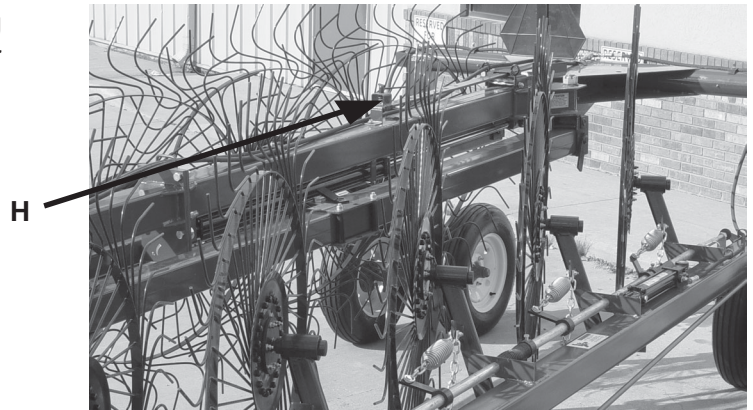
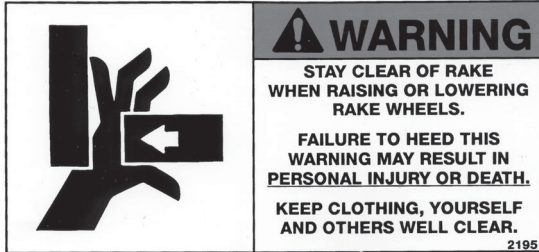
Raking with one side only can be accomplished by first locking the left side of the rake into transport position utilizing both the front and rear transport locks. Next, remove Pin (H) attaching front linkage arm to main linkage arm, and place in storage hole (I). Also remove Pin (J) at the rear of the main linkage arm and place in the storage position (K) located in hitch attachment gusset at the rear of the rake (Lowering of rake wheels will aid in removal/installation of pins. Be sure rear transport lock is in transport position prior to raking with one side.). The right side can now be opened, and used to rake.
NOTE: Only the right side of your Hi Capacity Rake can be used in this manner.



ADJUSTMENTS *(Continued)*

RAKING WIDTH

Raking width is determined by setting the spring loaded stop, located above the rear pole section as shown. (H)



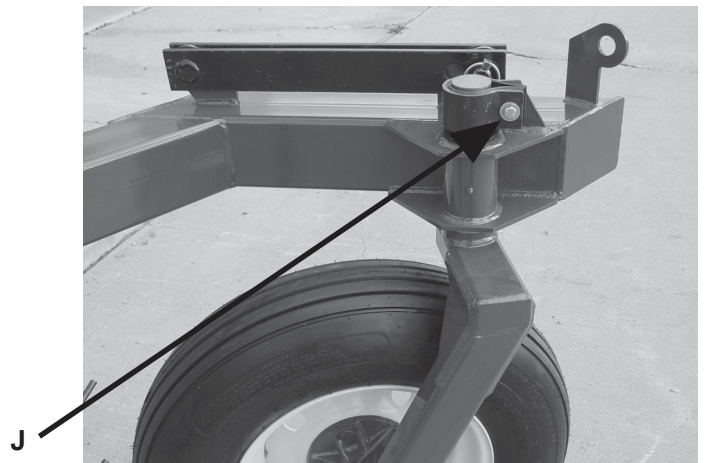
WINDROW WIDTH

Windrow width is adjustable from 38" to 58". Adjustment is made by turning crank (I), located on the left of the rear of the rake as shown.



GAUGE WHEELS

Outboard gauge wheels are located on the forward section of each rake beam. These gauge wheels support the rake beams to allow the rake wheels to better follow the contour of the ground. Located on the gauge wheel pivot spindle is an adjustable brake assembly. Adjust brake by tightening bolt (J). The brake should have enough tension to prevent zig-zag motion, but still allow the wheel to pivot when making corners.



LUBRICATION GUIDE

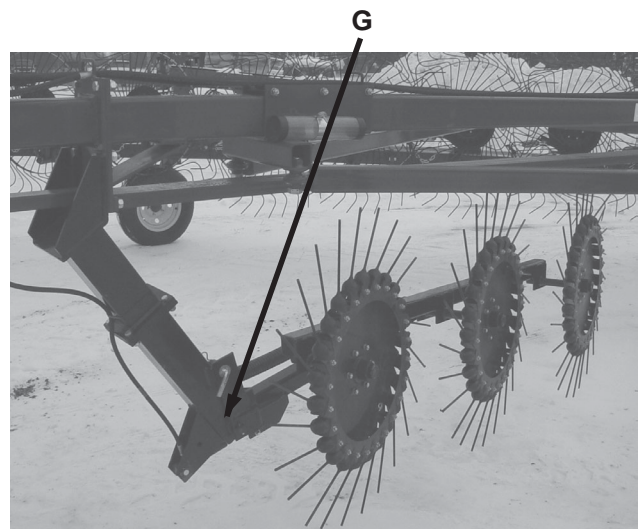
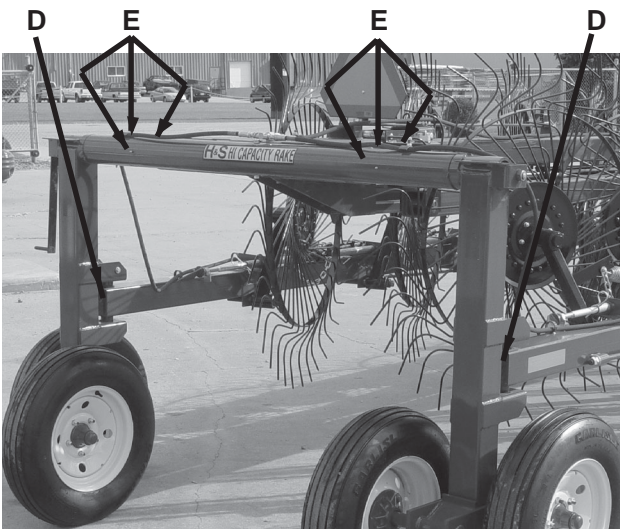
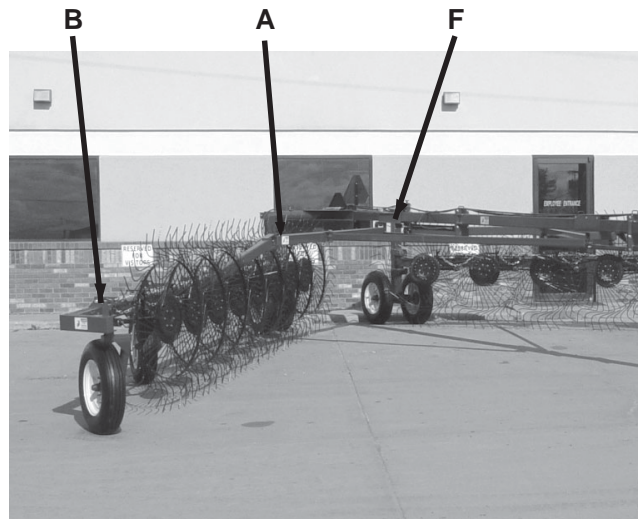
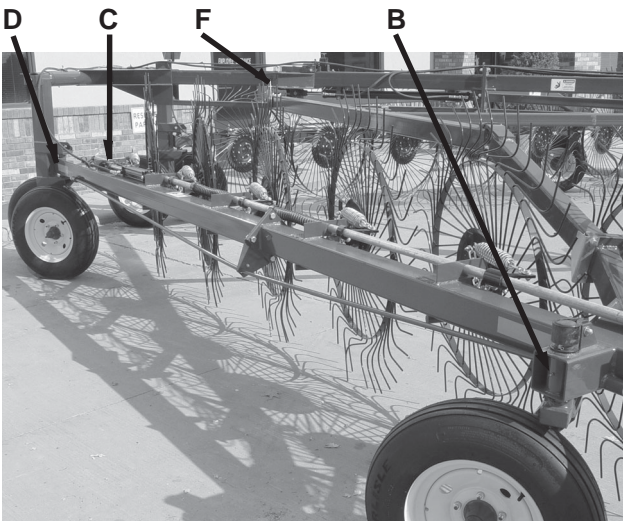
GREASE FITTINGS

There are 20 grease fittings on the 1460 and 1660 Hi-Capacity Rakes. If equipped with a center kicker wheel, there will be one more on the pivot point. If lubricated properly and often enough, it will prolong the life of your Hi-Capacity 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. (2) Top Opening Arm Front Pivot
- B. (4) One on Each Gauge Wheel
- C. (2) One on Each Lift Cylinder Mounting Bracket
- D. (2) One on Each Rake Beam Pivot
- E. (6) Top Rear Window Width Adjustment
- F. (4) Top Opening Arm Rear Pivot
- G. (1) Center Kicker Wheel Pivots (If Equipped)



DECAL LOCATION

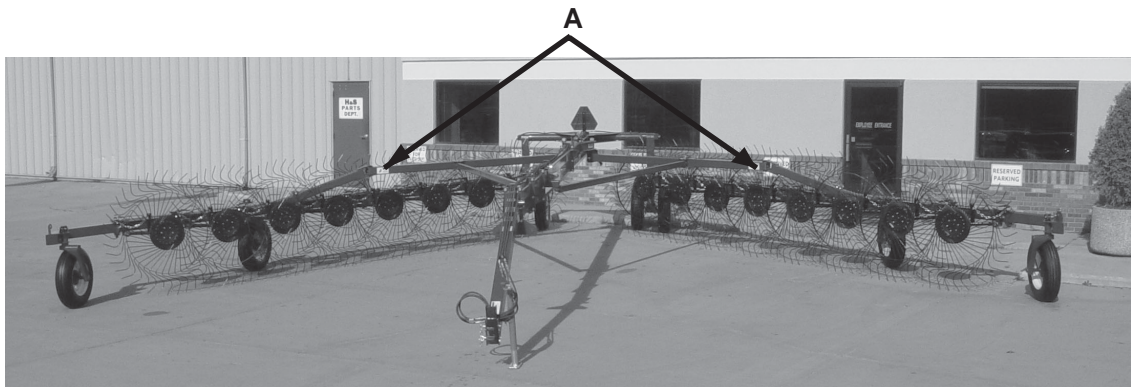
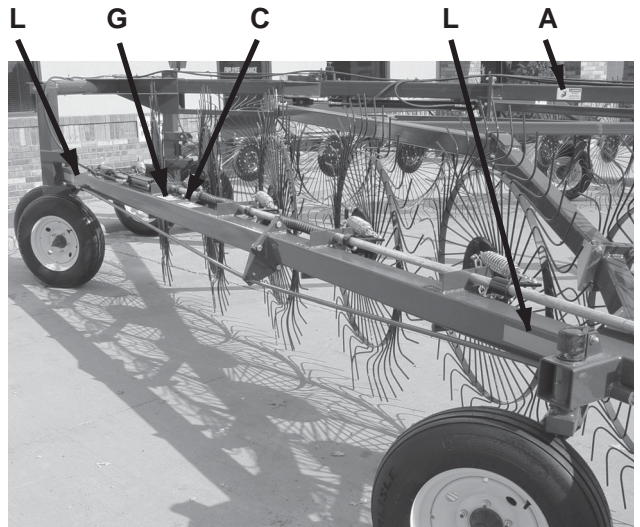
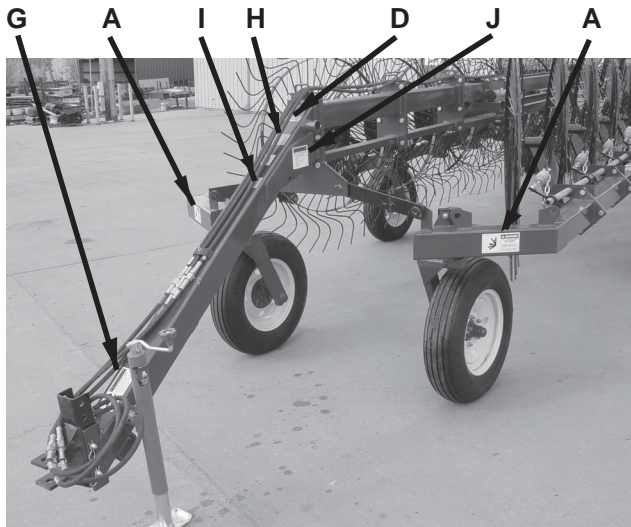
Your H&S 1460 and 1660 Hi-Capacity Rake was manufactured with operator safety in mind. Located on the Hi-Capacity Rake are various decals to aid in operation, and warn of danger or caution areas. Pay close attention to all the decals.



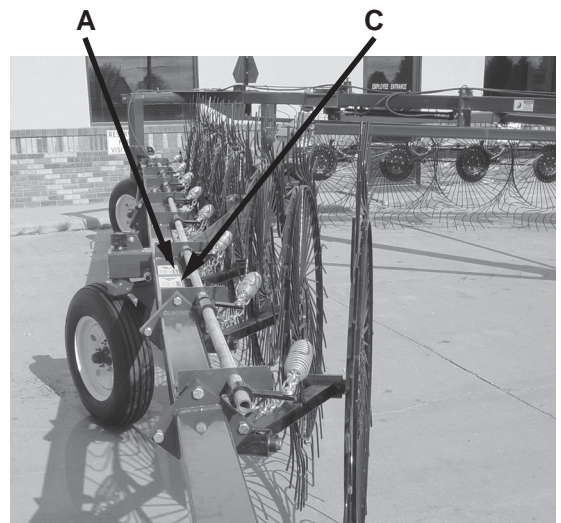
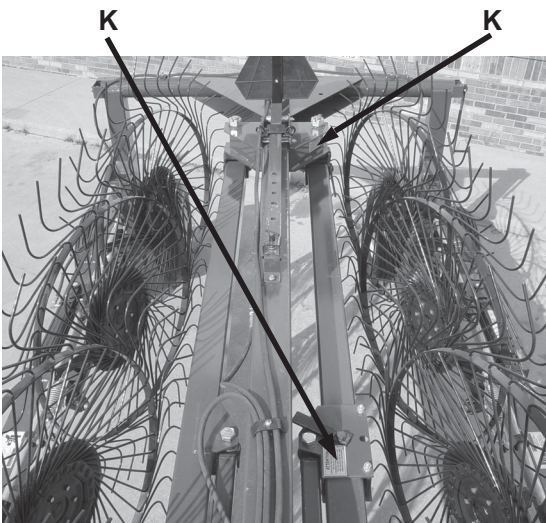
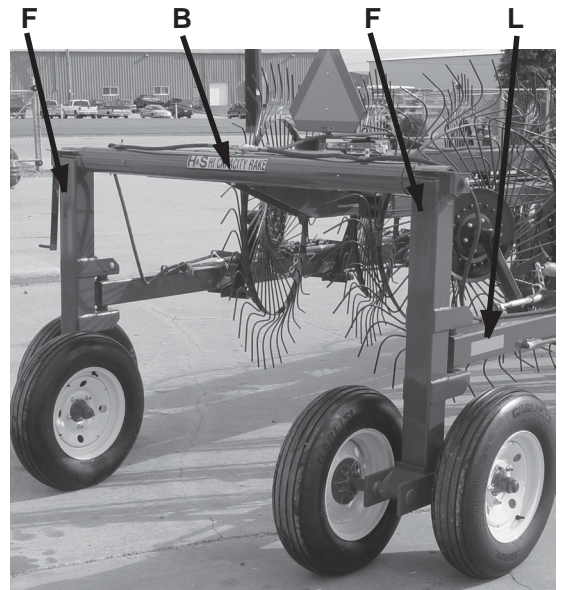
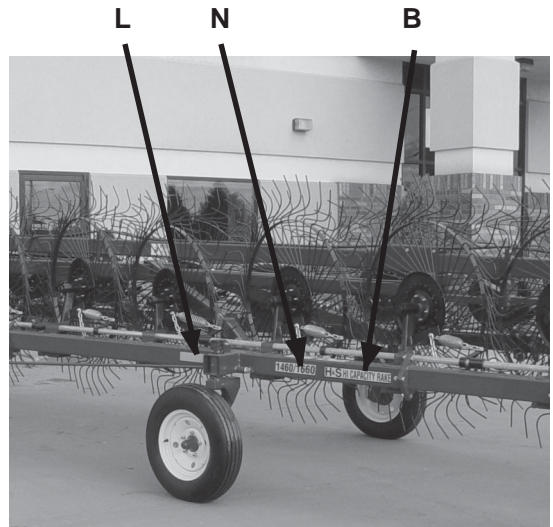
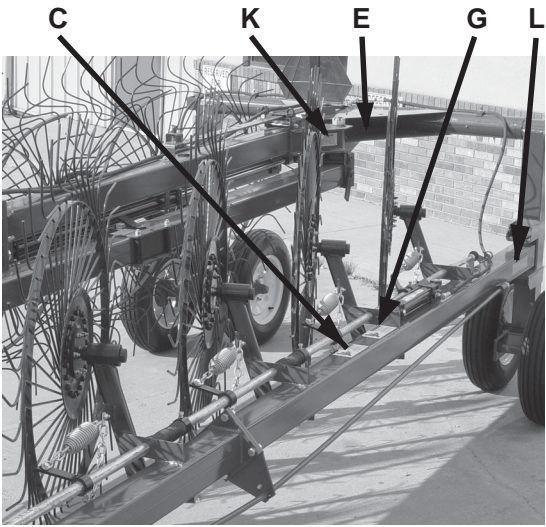
DO NOT REMOVE ANY OF THESE DECALS. IF DECALS ARE LOST, DAMAGED, OR IF THE HI-CAPACITY RAKE IS REPAINTED, REPLACE DECALS. REMEMBER: DECALS ARE FOR YOUR PROTECTION AND INFORMATION.

Listed below are the decals on your H&S Hi-Capacity Rake. These decals may be ordered individually by part number or by ordering complete set.

ITEM	PART NO.	DESCRIPTION
A.	11694A	(8) DANGER - Stay Clear of Rake
B.		H&S Hi-Capacity Rake
C.	2195	(4) WARNING - Stay Clear of Rake
D.	71188B	Jack Storage Position
E.		Model/Serial Number
F.		(2) Red Reflectors
G.	11599	(4) WARNING - Do Not Go Near Leaks
H.	H&S	Patent Numbers
I.	121797A	Attention: Raise Rake Wheels
J.	72203A	WARNING - Help Avoid Injury
K.	11501B	(2) ATTENTION: Remove Both Pins
L.		(4) Amber Reflector - 2" x 9" (2 On Each Main Rake Beam)
M.		Amber Reflector - 3-1/4" x 5-5/8"
N.	10406	(2) 1460/1660 Decal Complete Set of Decals



DECAL LOCATION (Continued)



TROUBLE SHOOTING



WARNING

MAKE SURE THAT THE TRACTOR IS SHUT OFF AND THE RAKE CAN NOT MOVE BEFORE SERVICING THE 1460-1660 HI-CAPACITY RAKE. MAINTENANCE AND REPAIR SERVICE WORK TO BE PERFORMED BY A QUALIFIED SERVICE PERSON ONLY.

<u>TROUBLE...</u>	<u>POSSIBLE CAUSE...</u>	<u>POSSIBLE REMEDY...</u>
Rake Will Not Open	Rake Locked In Transport	Remove Transport Locks And Return To Storage Position (See Page#11)
	Hydraulic Couplers Not Coupled To Tractor Properly	Couple Hydraulic Hoses To Tractor (See page#10)
	Hydraulic Hoses Mixed Up With Rake Wheel Lift Hose	Sort Hoses Correctly And Re-couple To Tractor
	Tractor Hydraulics Do Not Have Sufficient Pressure	Tractor Should Have At Least 1500 PSI To Operate Rake NOTE: If Tractor Has Low PSI Drive Forward Slowly And Open Rake At The Same Time
Rake Will Not Close	Tractor Hydraulics Do Not Have Sufficient Pressure	Tractor Should Have At Least 1500 PSI To Operate Rake NOTE: If Tractor Has Low PSI Back-up Slowly And Close Rake At The Same Time
Rake Wheels Will Not Lower	Rake Wheels Locked In Transport	Remove Hair Pin From Adjuster, Place In Storage Position (See Page#11)
	Lift Pipe Binding	Check Lift Pipe Make Sure It Is Free Moving
	Tractor Hydraulics Not Able To Operate Single Acting Cylinder	Consult Your Tractor Dealer on How This Can Be Accomplished

OPTIONAL EQUIPMENT

OPTIONAL KICKER WHEEL

There are two optional center kicker wheel assemblies available for the 1460-1660 Hi-Capacity Rakes. If the hay is laying out flat, these extra wheels allow you to raise the hay laying in the center of the rake out of the stubble for faster drying, and easier pick-up. A separate cylinder controls the kicker wheel assembly. It raises and lowers with the rake wheels.

2-WHEEL KICKER WHEEL

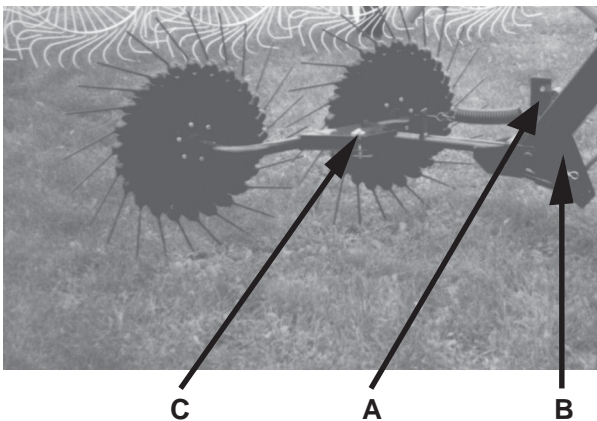
To engage center kicker wheels, hydraulically open rake to desired raking width. Remove Locking Pin (C), swivel kicker wheel assembly to the desired raking angle. Re-insert the locking pin. Next, remove Locking Pin (A) from transport lock position, and insert into convenient Storage Position (B). Lower rake wheels to begin raking.

To return to transport position, PRIOR TO CLOSING RAKE, raise rake wheels. (This will also raise the center kicker wheel assembly). Remove Locking Pin (C), Swivel kicker wheel assembly so that it is in line with the hitch pole. Re-insert Pin (C). Remove locking pin from Storage Position (B), and insert to lock the unit into the up, or Transport Position (A). Rake beams may now be closed for transport.

3-WHEEL KICKER WHEEL

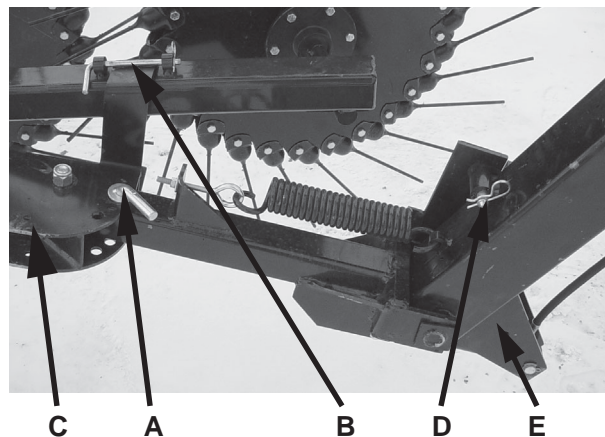
To engage center kicker wheels, hydraulically open rake to desired raking width. Remove Locking Pin (A), swivel kicker wheel assembly to the desired raking angle. Re-insert the Locking Pin. Next, remove Locking Pin (B) from the oscillation lock position, and insert into the convenient storage position (C). Next remove the transport lock pin (D) and insert into the convenient storage position (E). Lower rake wheels to begin raking.

To return to transport position, PRIOR TO CLOSING RAKE, raise rake wheels. (This will also raise the center kicker wheel assembly). Remove Locking Pin (A), Swivel kicker wheel assembly so that it is in line with the hitch pole. Re-insert Pin (A). Remove locking pin from Storage Position (C), and re-insert pin (B) into the oscillation lock position. Next remove lock pin (D) from storage position (E) and insert to lock the unit into the up, or Transport Position. Rake beams may now be closed for transport.



2-WHEEL KICKER WHEEL

3-WHEEL KICKER WHEEL



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 left, rear main frame of your unit.
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

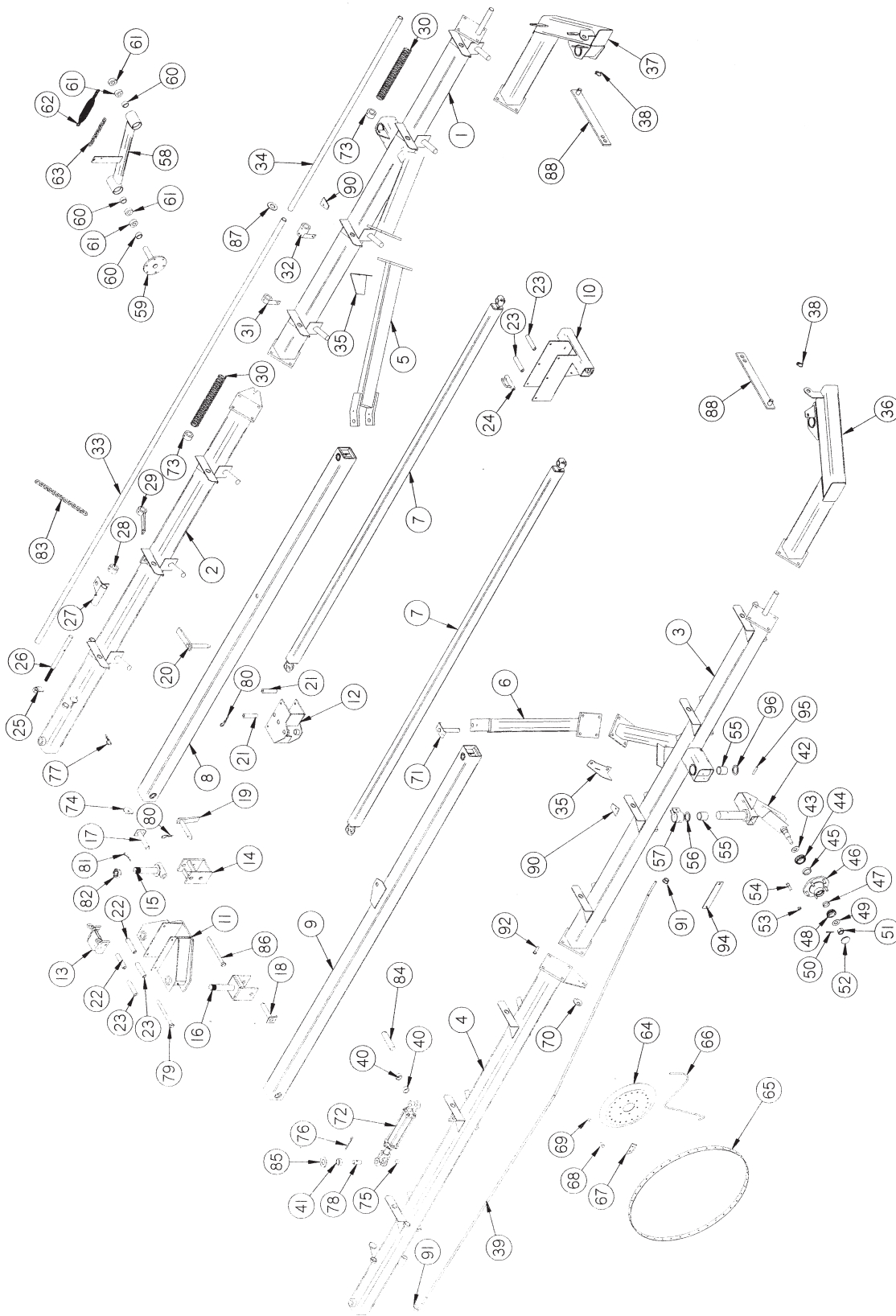


FIGURE 1
1460-1660 HI-CAPACITY RAKE
BEAMS AND LINKAGE

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1.	BFR473	Front Rake Beam LH	48.	BFR62	Outer Bearing
2.	BFR475	Back Rake Beam LH	49.	BFR63	Washer
3.	BFR472	Front Rake Beam RH	50.	BFR65	Cotter Pin
4.	BFR474	Back Rake Beam RH	51.	BFR64	Nut
5.	BFR745	Rake Beam Arm LH	52.	BFR66	Hub Cap
6.	BFR744	Rake Beam Arm RH	53.	BFR144	Nut
7.	BFR458	Front Linkage	54.	BFR143	Stud
8.	BFR463	Left Rear Linkage	55.	BFR527	Bronze Bushing
9.	BFR462	Right Rear Linkage	56.	BFR309	Gauge Wheel Washer
10.	BFR455	Front Linkage Slider	57.	BFR311	Brake Collar
11.	BFR491	Back Linkage Slider	58.	BFR489	Rake Arm LH
12.	BFR465	Center Slider	*	BFR490	Rake Arm RH
13.	BFR616	Width Adjustment Stop	59.	BFR657	Rake Wheel Hub
14.	BFR477	Back Linkage Yoke LH	60.	F16	Lock Collar
15.	BFR480	Left Pivot Yoke Shaft	61.	BFR525	Bearing
16.	BFR476	Back Linkage Yoke RH	62.	FR44	Rake Arm Spring
17.	BFR505	Pivot Yoke Shaft Pin LH	63.	BFR140	Rake Arm Adjusting Chain
18.	BFR479	Pivot Yoke Shaft Pin RH	64.	FR71	Rake Wheel Center
19.	BFR468	Linkage Pins	65.	FR72	Outer Ring
20.	BFR716	Center Slider Pin	66.	FR73	Rake Wheel Tooth
21.	BFR467	Center Slider Spacer	67.	FR74	Rake Tooth Clip
22.	BFR471	Back Slider Roller	68.	T175	10mm x 25mm Carriage Bolt
23.	BFR457	Slider Spacer	69.	BFR652	10mm Lock Nut
24.	BFR456	Hose Guide Spacer	*	FR69	Rake Wheel LH
25.	BFR426	Rake Pressure Handle	*	FR70	Rake Wheel RH
26.	BFR486	Rake Arm Lock-up Shaft	70.	DF22	Washer
27.	BFR530	Hydraulic Cylinder End Slide LH	71.	BFR461	Rake Beam Arm Pin
*	BFR531	Hydraulic Cylinder End Slide RH	72.	16SV171A	Hydraulic Lift Cylinder (2"x10")
28.	BFR83	Pipe Clamp (2 Holes)	73.	BFR82	Pipe Clamp (1 Hole)
29.	BFR430	RH Spring Bracket	74.	BFR693	Stop Washer
30.	BFR84	Compression Spring	75.	BFR506	Nylon Wear Block
31.	BFR431	LH Spring Bracket	76.	23N108	Cotter Pin
32.	BFR432	LH Lifting Pipe Connector	77.	BFR137	Hair Pin
*	BFR433	RH Lifting Pipe Connector	78.	BFR517	Cylinder Pin - Back
33.	BFR521	Lifting Pipe Back	79.	16SV77	1/2" x 6" Bolt GR. 5
34.	BFR520	Lifting Pipe Front	80.	ES7	Hair Pin
35.	BFR549	Tooth Deflector	81.	BFR7	3/16" x 3-3/4" Cotter Pin
36.	BFR726	Right Extension	82.	BFR481	1-1/2" Slotted Nut
37.	BFR727	Left Extension	83.	BFR111	Back Rake Arm Adjustment Chain
38.	BFR443	Lynch Pin	84.	T143	Cylinder Pin
39.	BFR612	Side Arm Stabilizer Rod	85.	16SV136	Washer
40.	X94	Cylinder Spacer	86.	BFR494	1/2" x 6-1/2" Bolt GR. 5
41.	K106	Cylinder Spacer	87.	BFR641	Washer
42.	BFR312	Complete Fork RH	88.	BFR597	Safety Bar
*	BFR316	Complete Fork LH	90.	BFR729	Rake Arm Stop
43.	BFR57	Seal	91.	BFR716	3/4" Flange Nut
44.	BFR58	Inner Bearing	92.	BFR438	5/8"x2" Bolt GR. 5
45.	BFR59	Inner Race	93.	RG24	Bronze Washer
46.	BFR60	Hub	94.	BFR310	Brake Pad (2)
47.	BFR61	Outer Race	95.	BFR313	5/16"x2-3/4" Roll Pin
NOTE: * (MEANS NOT SHOWN)			96.	RG24	Bronze Washer

FIGURE 2

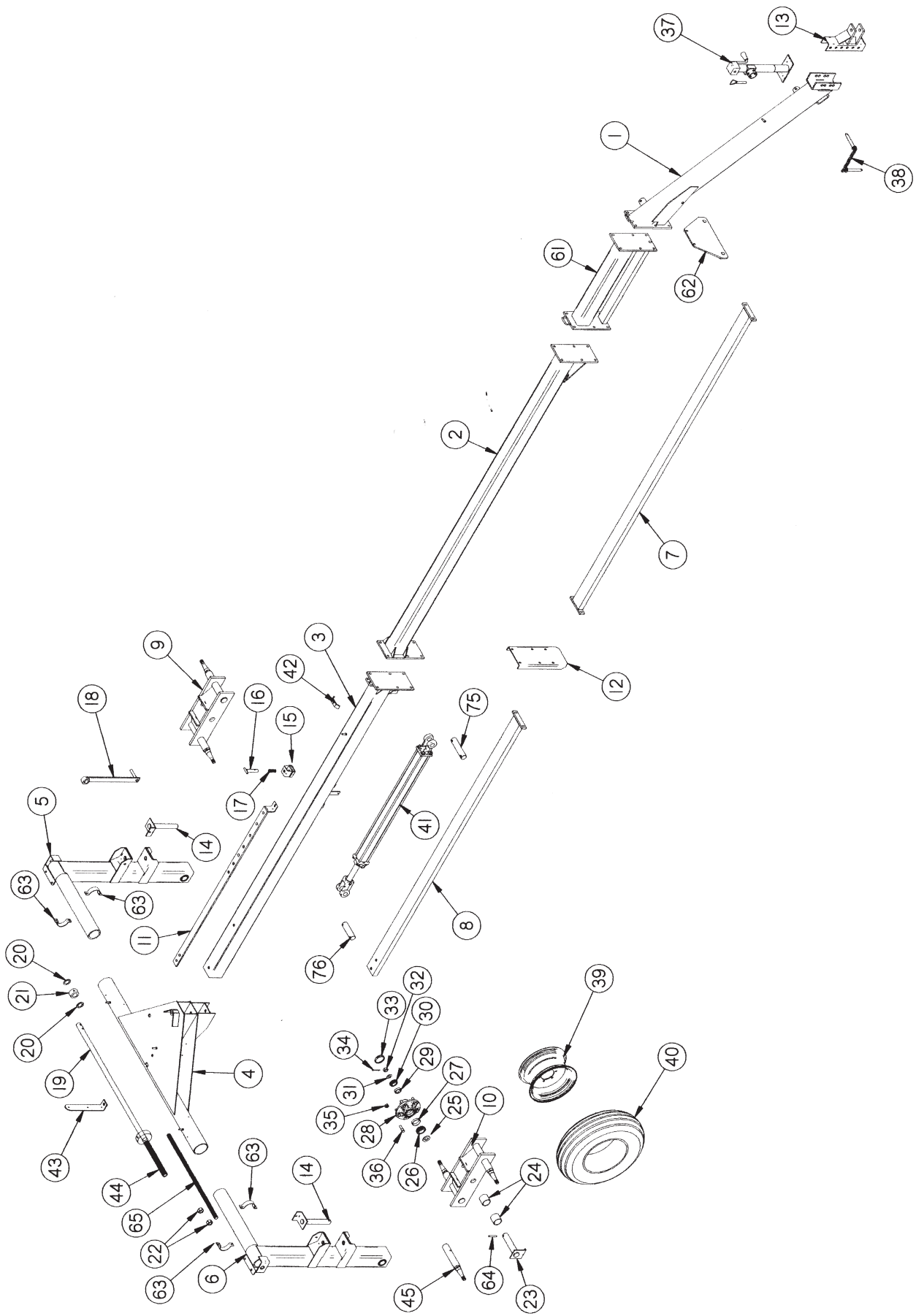


FIGURE 2
1460-1660 HI-CAPACITY RAKE
MAIN FRAME

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1.	BFR730	Pole	34.	BFR65	Cotter Pin
2.	BFR714	Center Pole Section	35.	BFR144	Nut
3.	BFR715	Back Pole Section	36.	BFR143	Stud
4.	BFR709	Rear Pivot Assembly	37.	BFR223	Jack
5.	BFR662	Left Axle Upright	38.	BFR450	Hitch Pins
6.	BFR661	Right Axle Upright	39.	BFR67	Wheel (15 x 5)
7.	BFR711	Center Pole Brace-Removable	40.	BFR128	Tire (6.70 x 15)
8.	BFR710	Back Pole Brace-Removable	41.	BFR653	Hydraulic Cylinder (2" X 40")
9.	BFR510	LH Tandem Axle	42.	HE42	Hose Holder
10.	BFR509	RH Tandem Axle	43.	BFR649	SMV Bracket
11.	BFR611	Width Adjustment Bar	44.	BFR420	Rear Width Adjustment Rod
12.	BFR712	Middle Linkage Stop	45.	BFR522	Spindle
13.	BFR157	Hitch	46.	BFR396	Cylinder Pin
14.	BFR499	Beam Pivot Shaft	47.	12N14	Jack Mount
15.	BFR239	Sleeve Adjustment Lock	48.	BFR4	Jack Pin & Chain
16.	BFR241	Adjustment Handle	49.	B17B	Jack Handle
17.	BFR240	Spring	50.	BFR107	3/4" x 8-1/2" Bolt GR. 5
18.	BFR423	Width Adjustment Handle	51.	BFR518	3/4" - 16 nut
19.	BFR485	Rear Width Adjustment Tube	52.	BFR634	Front Width Cylinder Pin
20.	BFR523	Poly Washer	53.	BFR724	Self Tapping Bolt
21.	BFR422	Width Adjustment Collar	54.	BFR642	Width Adjustment Spacer
22.	BFR419	3/4" Acme Nut	55.	23N67	Hose Holder
23.	BFR524	Tandem Pin	56.	RG135	1/2" x 1" Bolt GR. 5
24.	BFR625	Bushing	57.	50N129	3/4" x 6" Bolt GR. 5
25.	BFR57	Seal	58.	BFR438	5/8" x 2" Bolt GR. 5
26.	BFR58	Inner Bearing	59.	12V59	3/8" x 2-3/4" Roll Pin
27.	BFR59	Inner Race	60.	BFR117	3/8" x 2-1/2" Bolt GR. 5
28.	BFR60	Hub	61.	BFR534	Pole Extension
29.	BFR61	Outer Race	62.	BFR731	Transport Mount
30.	BFR62	Outer Bearing	63.	BFR732	Width Stop Ring
31.	BFR63	Washer	64.	12V59	3/8" x 2-3/4" Roll Pin
32.	BFR64	Nut	65.	BFR420	Rear Width Adjustment Rod
33.	BFR66	Hub Cap			

FIGURE 3

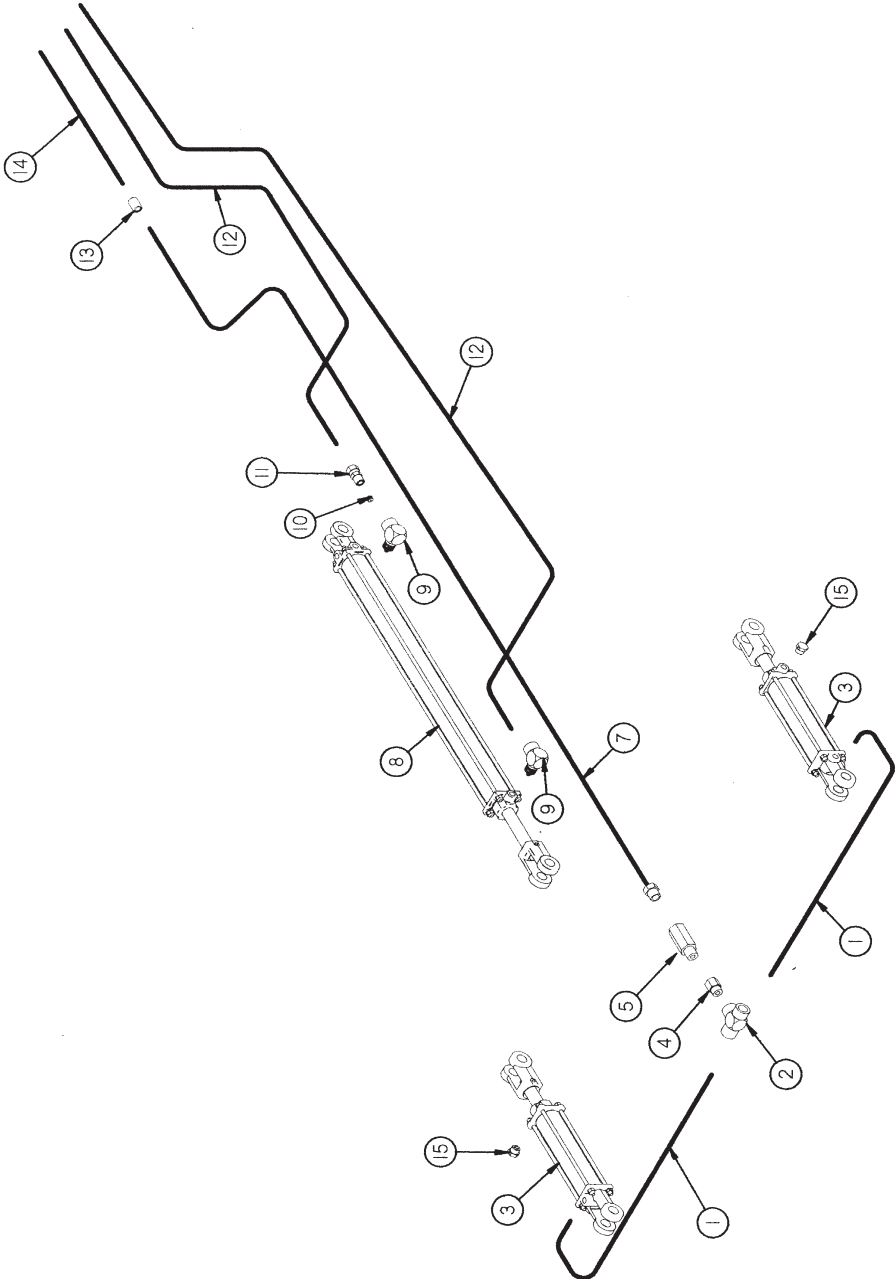


FIGURE 3
1460-1660 HI-CAPACITY RAKE
HYDRAULICS

ITEM	PART NO.	DESCRIPTION
1.	37N60	Hydraulic Hose 108"
2.	BFR74	3/8" Female Tee
3.	16SV171A	Hydraulic Lift Cylinder (2" x 10")
4.	BFR555	Adapter 3/8" Male To 1/2" Female
5.	BFR554	Flow Valve
7.	BFR738	Hydraulic Hose 3/8"x255" 1/2"MP x 3/8"MP
8.	BFR653	Hydraulic Cylinder (2" x 40")
9.	23N234	3/8" Street Elbow
10.	BFR120	Orifice
11.	BFR122	3/8" Male Union Adapter
12.	BFR739	Hydraulic Hose 3/8"x321" 3/8"MP x 1/2"MP
13.	HE60	3/8" Pipe Coupler
14.	BFR740	Hydraulic Hose 3/8"x132" 3/8"MP x 1/2"MP
15.	BFR70	Vent Plug
*	BFR635	Hose 1/2" FP X 1/2" MP X 33"
*	JB82	1/2" To 3/8" Bushing

NOTE (* MEANS NOT SHOWN)

FIGURE 4

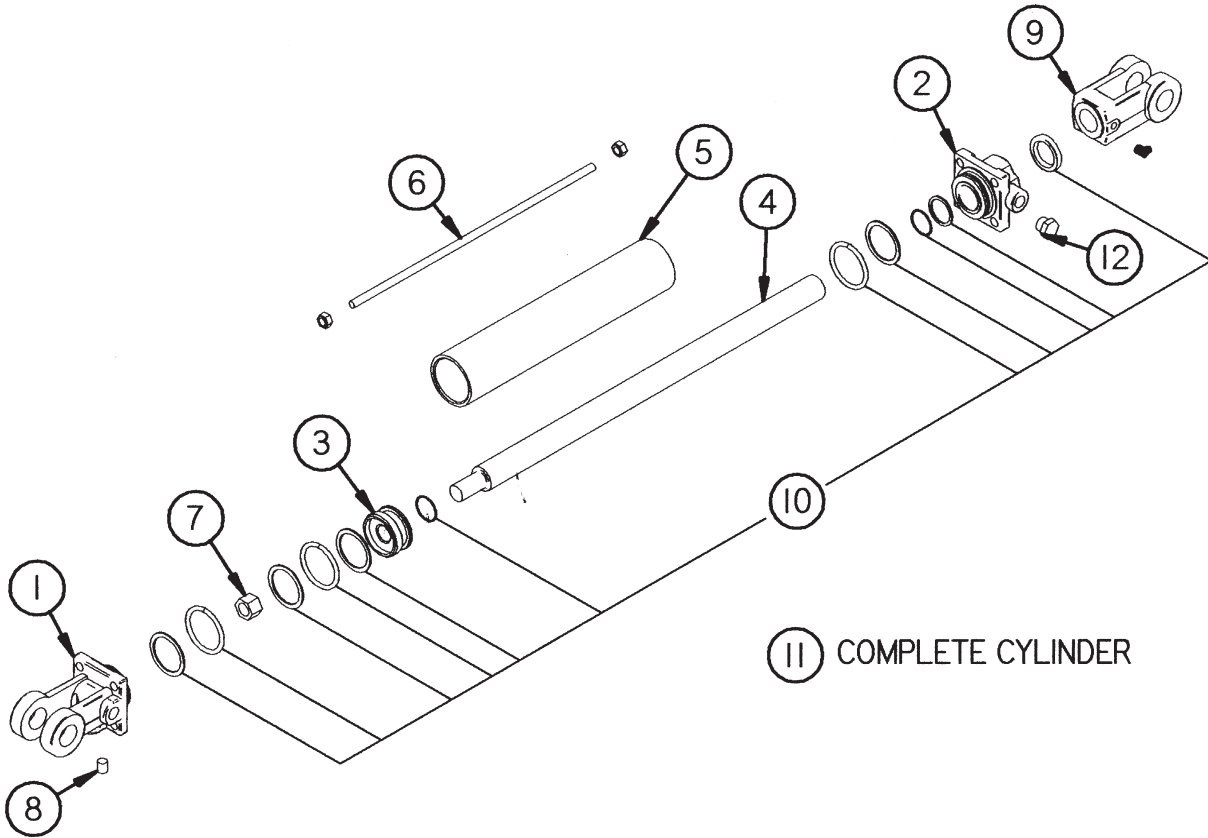


FIGURE 4
1460-1660 HI-CAPACITY RAKE
HYDRAULIC LIFT CYLINDER

ITEM	PART NO.	DESCRIPTION
1.	23N142A	Clevis Cap
2.	23N143A	Rod Cap
3.	23N144	Piston
4.	16SV168A	Rod
5.	16SV169	Cylinder Tube
6.	16SV170	Tie Rod
7.	23N148	Piston Nut
8.	23N149	Plug
9.	23N150A	Rod Clevis
10.	23N151	Seal Kit
11.	16SV171A	Complete Cylinder (2" x 10")
12.	BFR70	Vent PLug

FIGURE 5

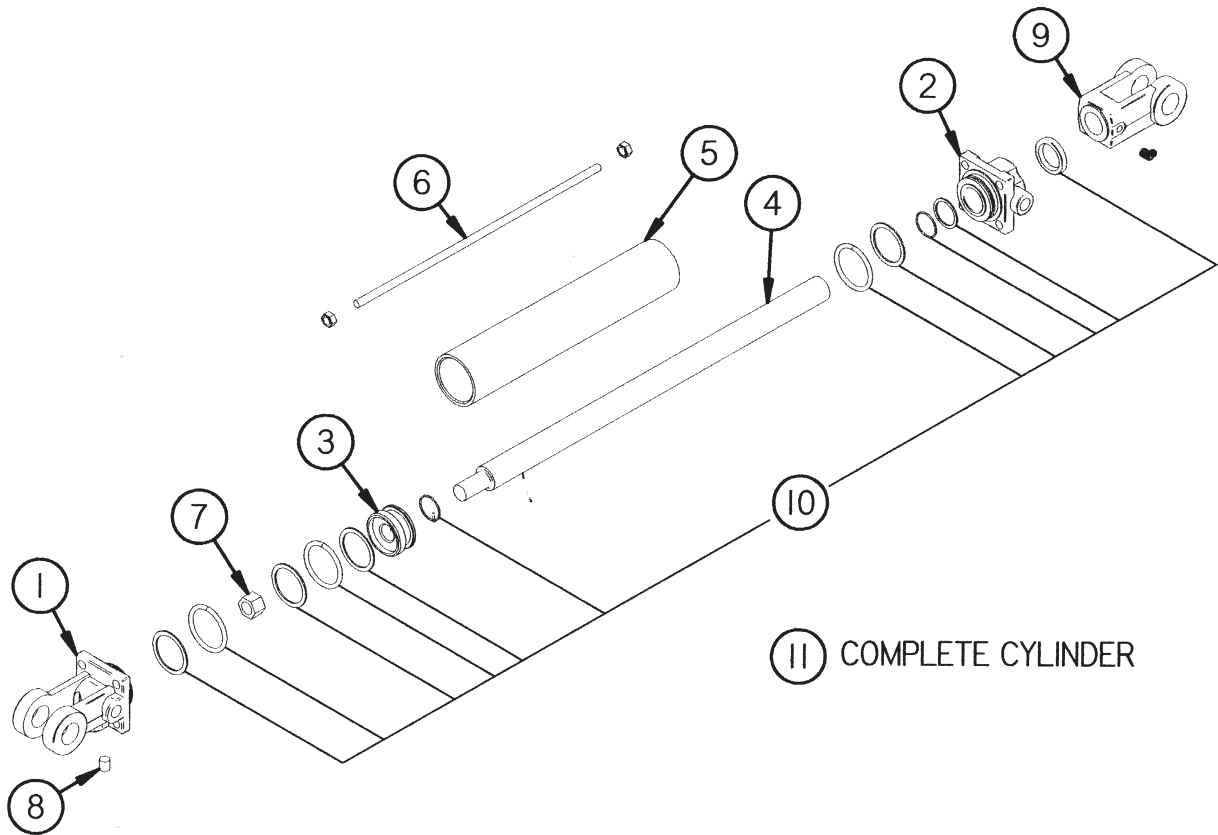


FIGURE 5
1460-1660 HI-CAPACITY RAKE
HYDRAULIC OPEN CYLINDER

ITEM	PART NO.	DESCRIPTION
1.	23N142A	Clevis Cap
2.	23N143A	Rod Cap
3.	23N144	Piston
4.	BFR 654	Rod
5.	BFR655	Cylinder Tube
6.	BFR656	Tie Rod
7.	23N148	Piston Nut
8.	23N149	Plug
9.	23N150A	Rod Clevis
10.	23N151	Seal Kit
11.	BFR653	Complete Cylinder (2" x 40")

FIGURE 6

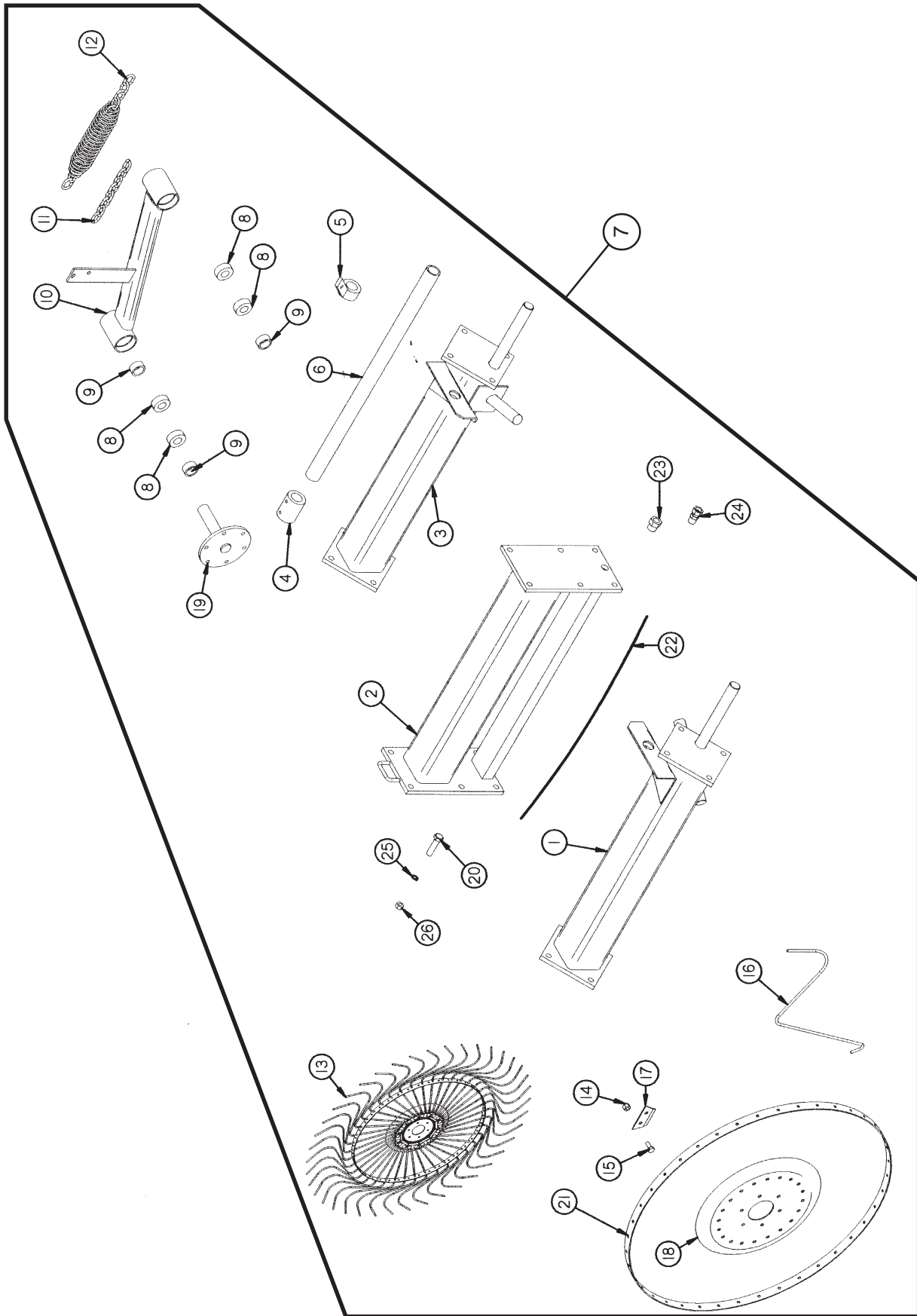


FIGURE 6
1460-1660 HI-CAPACITY RAKE
2-WHEEL EXTENSION KIT

ITEM	PART NO.	DESCRIPTION
1.	BFR733	Rake Beam Extension RH
2.	BFR534	Pole Extension
3.	BFR734	Rake Beam Extension LH
4.	BFR537	Lifting Pipe Connector
5.	BFR431	LH Spring Clamp
*	BFR430	RH Spring Clamp
6.	BFR536	Lifting Pipe Extension
7.	BFR735	Complete Extension Kit
8.	BFR525	Bearing
9.	F16	Lock Collar
10.	BFR489	Rake Arm LH
*	BFR490	Rake Arm RH
11.	BFR140	Rake Arm Adjustment Chain
12.	FR44	Spring
13.	FR69	Rake Wheel LH
*	FR70	Rake Wheel RH
14.	BFR652	10mm Lock Nut
15.	T175	10mm x 25mm Carriage Bolt
16.	FR73	Rake Wheel Tooth
17.	FR74	Rake Tooth Clip
18.	FR71	Rake Wheel Center
19.	BFR657	Rake Wheel Hub
20.	BFR438	5/8" x 2" Bolt GR. 5 (14 PCS.)
21.	FR72	Rake Wheel Band
22.	BFR635	Hose 1/2"FP x 1/2"MP x 33'
23.	JB82	1/2" To 3/8" Bushing
24.	BFR555	Adapter
25.	T69	Lock Washer
26.	T68	5/8" Nut

FIGURE 7

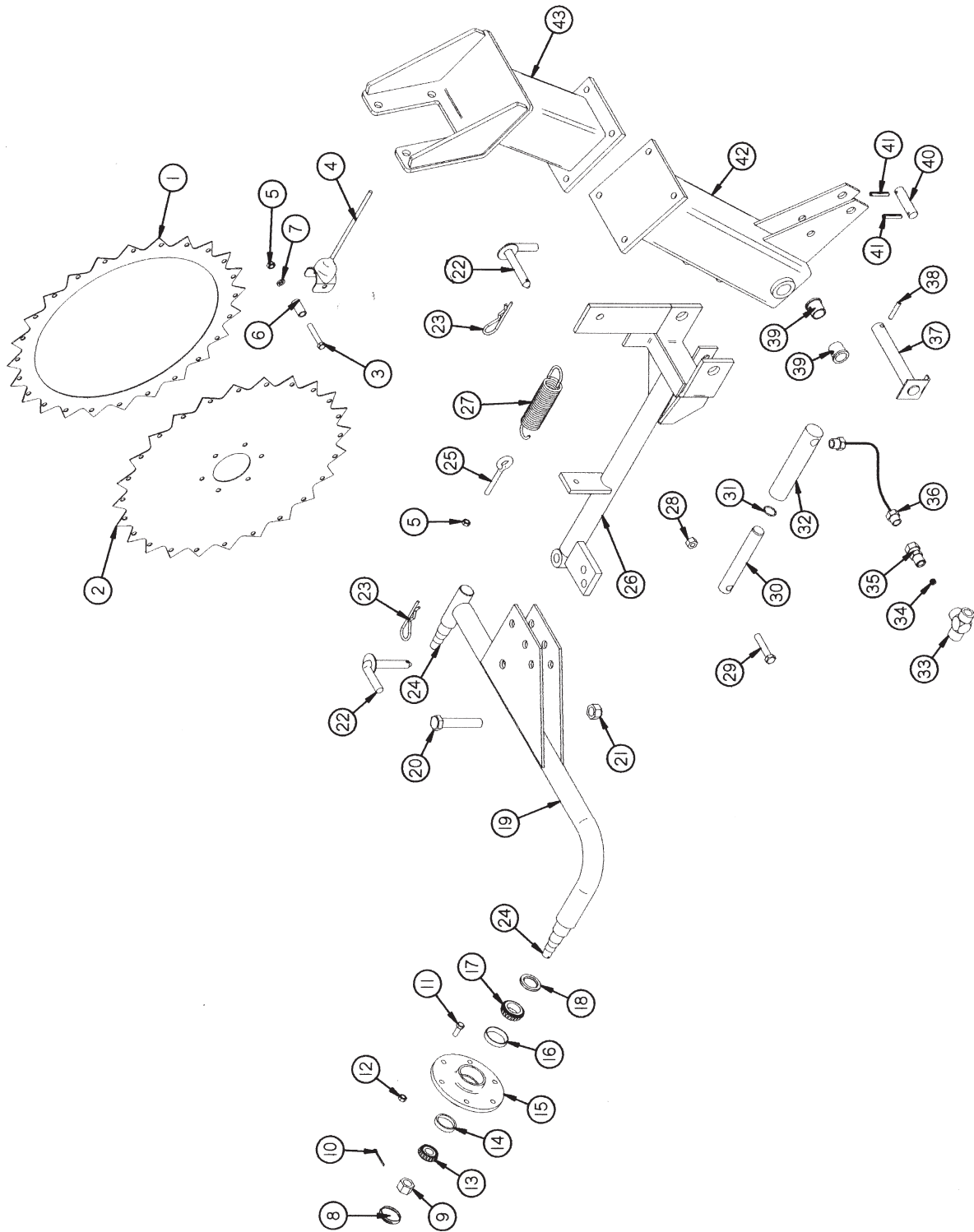


FIGURE 7
1460-1660 HI-CAPACITY RAKE
OPTIONAL 2-WHEEL KICKER WHEEL

ITEM	PART NO.	DESCRIPTION
1.	BFR369	Rake Wheel Ring
2.	BFR370	Rake Wheel Center
3.	T123	3/8" x 2-1/4" Bolt GR. 5
4.	T82	Rake Wheel Tooth
5.	K93	3/8" Lock Nut
6.	BFR371	Rake Wheel Spacer
7.	B68	3/8" Lock Washer
8.	T173	Hub Cap
9.	T172	Nut
10.	T169	Cotter Pin
11.	T168	10mm x 25mm Bolt
12.	T166	10mm Nut
13.	T170	Outer Bearing
14.	T171	Outer Race
15.	BFR32	Rake Wheel Hub
16.	T165	Inner Race
17.	T164	Inner Bearing
18.	T163	Seal
19.	BFR511	Center Kicker Wheel Arm
20.	18N48	3/4" x 3" Pivot Pin Bolt GR. 5
21.	HE7	Lock Nut
22.	BFR197	Locking Pin
23.	ES7	Hair Pin
24.	BFR369	Spindle
25.	BFR374	3/8" x 3" I-Bolt
26.	BFR512	Center Kicker Wheel Pivot
27.	BR62	Spring
28.	9S17	1/2" Lock Nut
29.	BFR375	1/2" x 2-1/2" Bolt GR. 5
30.	BFR114	Piston
31.	BFR115	O-Ring
32.	BFR116	Hydraulic Cylinder
33.	BFR74	3/8" Pipe Tee
34.	BFR380	Orifice
35.	BFR122	Union Adapter w/Orifice
36.	BFR737	Hydraulic Hose 1/4" x 53' 3/8"MP x 1/4"MP
37.	BFR379	Axle Shaft
38.	3G22	Roll Pin
39.	BFR27	Bushing
40.	BFR515	Cylinder Pin
41.	T72	5/32" x 1-1/2" Cotter Pin
42.	BFR514	Kicker Wheel Offset
43.	BFR736	Stand Off

FIGURE 8

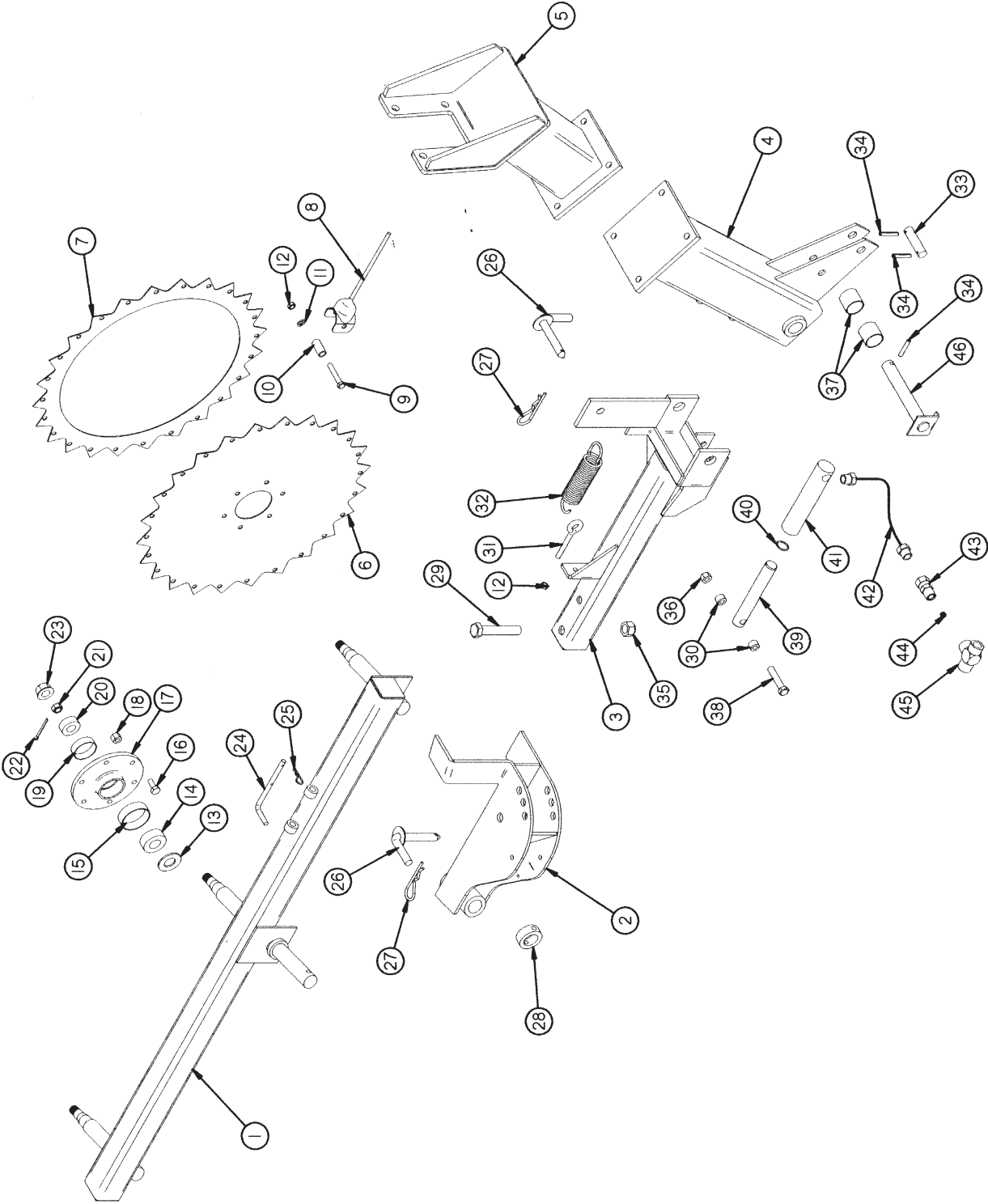


FIGURE 8
1460-1660 HI-CAPACITY RAKE
OPTIONAL 3-WHEEL KICKER WHEEL

ITEM	PART NO.	DESCRIPTION
1.	BFR717	Kicker Rake Beam
2.	BFR718	Pivot
3.	BFR719	Square Rake Arm
4.	BFR514	Kicker Wheel Offset
5.	BFR736	Standoff
6.	BFR370	Rake Wheel Center
7.	BFR369	Rake Wheel Ring
8.	T82	Rake Wheel Tooth
9.	T123	3/8" x 2-1/4" Bolt GR. 5
10.	BFR371	Rake Wheel Spacer
11.	B68	Lock Washer
12.	K93	3/8" Lock Nut
13.	T163	Seal
14.	T164	Inner Bearing
15.	T165	Inner Race
16.	T168	10mm x 25mm Bolt
17.	BFR32	Rake Wheel Hub
18.	T166	10mm Nut
19.	T171	Outer Race
20.	T170	Outer Bearing
21.	T172	Nut
22.	T169	Cotter Pin
23.	T173	Hub Cap
24.	BFR721	Beam Lock Pin
25.	X97	Hair Pin
26.	BFR197	Locking Pin
27.	ES7	Hair Pin
28.	BFR720	Pivot Lock Collar
29.	BFR23	3/4" x 4" Pivot Pin Bolt GR. 5
30.	BFR722	Lift Cylinder Spacer
31.	BFR374	3/8" x 3" I-Bolt
32.	BR62	Spring
33.	BFR515	Cylinder Pin
34.	3G22	Roll Pin
35.	HE7	Lock Nut
36.	9S17	1/2" Lock Nut
37.	BFR27	Bushing
38.	LW131	1/2" x 3-1/2" Bolt GR. 5
39.	BFR114	Piston
40.	BFR115	O-Ring
41.	BFR116	Hydraulic Cylinder
42.	BFR737	Hydraulic Hose 1/4"x53" 3/8"MPx1/4"MP
43.	BFR122	3/8" Union Adapter
44.	BFR380	Orifice
45.	BFR74	3/8" Pipe Tee
46.	BFR379	Axle Shaft

FIGURE 9

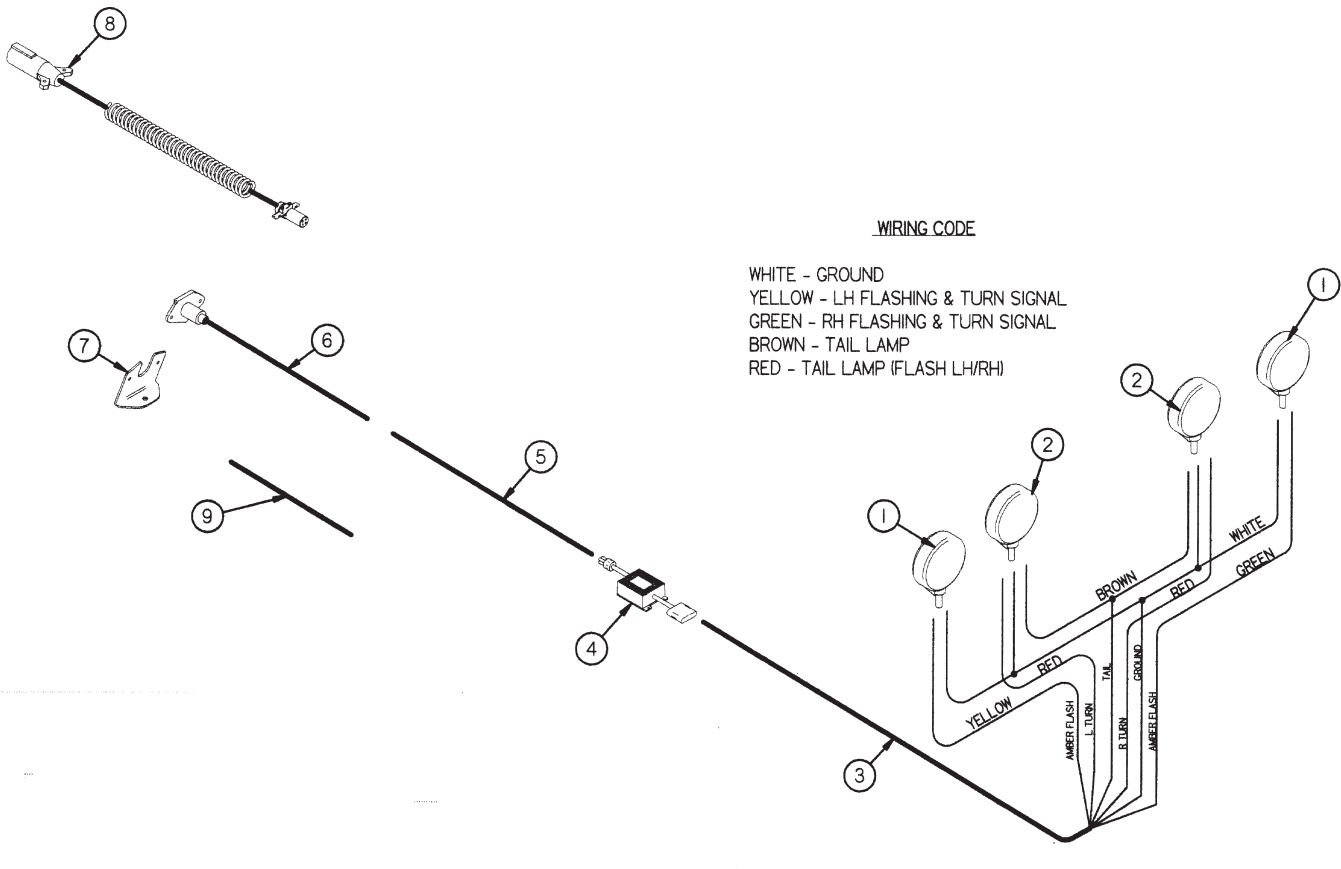


FIGURE 9
1460-1660 HI-CAPACITY RAKE
OPTIONAL LIGHTING

ITEM	PART NO.	DESCRIPTION
1.	DWM129	Amber Light
2.	BFR675	Red Light
3.	BFR667	Light Harness (6 Wire)
4.	S441	Light Module
5.	BFR741	1460 Light Harness
6.	BFR706	Front Pig Tail
7.	BFR659	Mounting Bracket
8.	S317	Tractor Cord (Optional)
9.	BFR666	1660 Harness Extension

SERVICE / MAINTENANCE RECORD

DATE	DESCRIPTION	NOTES

H&S 1460-1660 HI-CAPACITY RAKE

Your new H&S 1460-1660 Hi-Capacity 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 Rake before reading this manual carefully. Keep this manual available for ready reference.

1460-1660 SPECIFICATIONS

	1460	1660
Number of Wheels.....	14.....	16
Wheel Diameter.....	60".....	60"
Teeth per Wheel.....	40.....	40
Tooth Diameter.....	7mm.....	7mm
Transport Width.....	8'8".....	8'8"
Transport Length.....	27'3".....	30'3"
Maximum Raking Width.....	28'.....	32'
Windrow Width Adjustment.....	38"-58".....	38"-58"
Weight.....	4200 lbs.....	4600 lbs.
Rake Wheel Hubs.....		Ball Bearings.....
Hitch Jack.....		Standard.....
Tail Lights.....		Optional.....
Center Kicker Wheel.....		Optional.....
Tires.....		8 - 6.70 x 15.....

Warranty:

See Warranty on Page #1

NOTE:

Determine right or left side of 1460-1660 Hi-Capacity 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.

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