

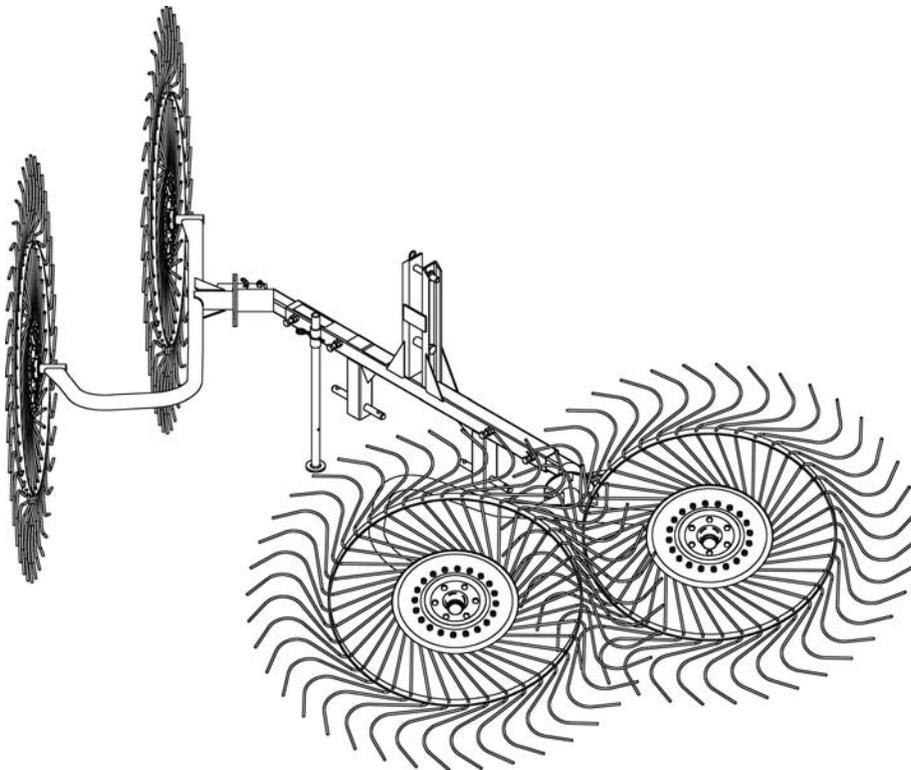
# **BEFCO<sup>®</sup>**

## **Operator's Manual**

# **HAY EQUIPMENT**

### **Hay Rakes**

**RS2-02R, RS2-03R, RS2-02L, RS2-03L  
RS2-04V, RS2-06V**



The operator's manual is a technical service guide and must always accompany the machine.

**Manual 960-392B**

**August 2013**

# SAFETY

Take note! This safety alert symbol found throughout this manual is used to call your attention to instructions involving your personal safety and the safety of others. Failure to follow these instructions can result in injury or death.



*This symbol means:  
ATTENTION!  
BECOME ALERT!  
YOUR SAFETY IS INVOLVED!*

## Signal Words

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



**DANGER:** Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.



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



**CAUTION:** Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

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# 1 - GENERAL INFORMATION

Thank you and congratulations for having chosen our implement. Your new hay rake is a technologically advanced machine constructed of high quality, sturdy components that will fulfill your working expectations. Read this manual carefully. It will instruct you on how to operate and service your implement safely and correctly. Failure to do so could result in personal injury and/or in equipment damage.

## 1.01 - General



**CAUTION:** Unless otherwise specified, all hardware is metric. Use only metric tools on metric hardware. Other tools that do not fit properly can slip and cause injury.



**CAUTION:** Right hand and left hand sides of the implement are determined by facing in the direction the implement will travel when going forward (see fig. 2).

## 1.02 - Warranty Information

Carefully read the Warranty section<sup>1</sup>, detailing coverage and limitations of this warranty. **Warranty** is provided for customers who operate and maintain their equipment as described in this manual. Warranty registration is accomplished by the dealer by completing and forwarding the **Warranty Registration** form to the Company, along with a copy of the dealer's invoice. It is in your best interest to insure that this has been done.

Warranty does not cover the following:

1. Cleaning, transporting, mailing and service call charges.
2. Normal wear items such as rake teeth, etc.
3. Depreciation or damage caused by normal wear, accidents, improper maintenance, improper protection or improper use.
4. The use of non-original spare parts and accessories.

Your Authorized Company Dealer has genuine parts in stock. Only these approved replacement parts should be used.

This limited warranty covers defective material and workmanship. The cost of normal maintenance or repairs for accidents or improper use and related labor will be borne by the owner.

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<sup>1</sup> See Chapter 8 - Warranty.

### 1.03 - Model and Serial Number ID

Attached to the frame is an ID plate showing the model and the serial number. Record your implement model and serial number in the space provided below. Your dealer needs this information to give you prompt, efficient service when you order parts.

<b>BEFCO</b>	1781 S. Wesleyan Blvd. – P.O. Box 6036 Rocky Mount, N.C. 27802 – U.S.A. Tel: 1.252.977.9920 Fax: 1.252.977.9718
<b>MODEL:</b>	
<b>SERIAL:</b>	
<b>VERSION:</b>	

## 2 - SAFETY PRECAUTIONS

Safety is the primary concern in the design and manufacture of our products. Unfortunately our efforts to provide safe equipment can be wiped out by a single careless act of an operator.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment. It is the operator's responsibility to read and understand all safety and operating instructions in the manual and to follow these.

Allow only properly trained personnel to operate the implement. Working with unfamiliar equipment can lead to careless injuries. Read this manual, and the manual for your tractor, before assembly or operation, to acquaint yourself with the machines. It is the owner's responsibility, if this machine is used by any person other than yourself, is loaned or rented, to make certain that the operator, prior to operating, reads and understands the operator's manuals and is instructed in safe and proper use.

### 2.01 - Preparation



1. Before operating equipment read and understand the operator's manual and the safety signs (**see fig. 2**).
2. Thoroughly inspect the implement before initial operation to assure that all packaging materials, i.e., wires, bands, and tape have been removed.
3. Personal protection equipment including hard hat, safety glasses, hearing protection, safety shoes, and gloves are recommended during assembly, installation, operation, adjustment, maintaining and/or repairing the implement.
4. Operate the implement only with a tractor equipped with an approved Roll-Over-Protective-System (ROPS). Always wear your seat belt. Serious injury or even death could result from falling off the tractor.
5. Clear area to be worked of stones, branches or other debris that might be thrown, causing injury or damage.
6. Before beginning operation, contact local utility companies to make certain there are no bundled gas lines, electrical cables, etc., in the work area.
7. Operate only in daylight or good artificial light.
8. Ensure implement is properly mounted, adjusted and in good operating condition.
9. Ensure that all safety decals are properly installed and in good condition.

## 2.02 - Starting and Stopping



1. Be sure that no one is near the machine prior to engaging or while the machine is working.
2. Be sure the tractor is in "Neutral" before starting engine.
3. Equipment operating power is ground driven. Know how to stop the tractor quickly in case of an emergency.
4. After striking an obstacle, shut the tractor off, remove key and thoroughly inspect for damage before restarting.

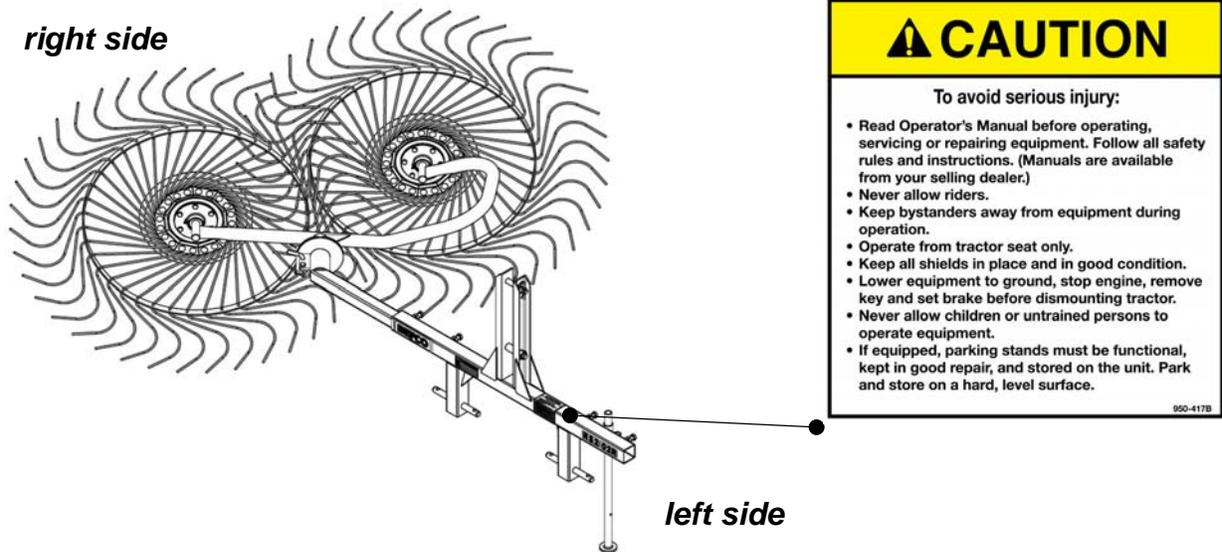
## 2.03 - Messages and Signs



1. Read and adhere to all safety and operating decals on this machine (**see fig. 2**).
2. Before dismounting tractor: Allow moving parts to stop, stop engine, set brake and remove the key of unattended equipment.
3. Keep safety decals in place and in good condition.
4. Do not use with bystanders in area.
5. Allow no riders on tractor or implement.
6. Allow moving parts to stop before repair.
7. Securely support implement before working underneath.

Additional warning and operating decals are available at no extra charge. Please specify model and serial number when ordering.

**Fig. 2 - Safety decals - implement; replace immediately if damaged.**



## 3 - OPERATION

You have purchased a ground driven hay rake which will provide you with high quality raking results with overall very low costs of ownership and maintenance.

As the tractor moves forward, the wheels on BEFCO's hay rakes gently turn the hay towards the back of the unit leaving all the hay raked in fluffy windrows suitable to form a compact and even bale. Tines are made of flexible steel for a more gentle and clean contact with the forage. The greasable wheel hubs on BEFCO's rakes are made of cast steel and contain tapered roller bearings that ensure the maximum possible lifetime of the wheel hub. Bearings are protected by dust caps.

With working widths ranging from 4'3" to 15'10" and working speeds of up to 14 mph there is no doubt that BEFCO offers the ideal rake for all your raking needs.

### 3.01 - Operational Safety



**CAUTION:** Our ground driven hay rakes are designed considering safety as the most important aspect and are the safest available in today's market. Unfortunately, human carelessness can override the safety features built into our machines. Injury prevention and work safety, aside from the features on our hay rakes, are very much due to the responsible use of the equipment. It must always be operated prudently following with great care, the safety instructions laid out in this manual.



1. The use of this equipment is subject to certain hazards which cannot be prevented by mechanical means or product design. All operators of this equipment must read and understand this entire manual, paying particular attention to safety and operating instructions, prior to using.
2. Do not operate the tractor and implement when you are tired, sick or when using medication.
3. Keep all helpers and bystanders at least 100 feet from the implement. Only properly trained people should operate this machine.
4. Accidents are most likely to occur with machines that are loaned or rented to someone who has not read the operator's manual and is not familiar with the implement.
5. Always stop the tractor, set brake, shut off the tractor engine, remove the ignition key and lower implement to the ground before dismounting tractor. Never leave equipment unattended with the tractor running.
6. Never place hands or feet under implement with tractor engine running or before you are sure all motion has stopped. Stay clear of all moving parts.

7. Do not reach or place yourself under equipment until it is blocked securely.
8. Do not allow riders on the implement or tractor at any time. There is no safe place for riders.
9. Before backing up, look behind carefully.
10. Never operate tractor and implement under trees with low hanging limbs. Operators can be knocked off the tractor and then run over by the implement.
11. The parts of this machine have been designed and tested for rugged use. However, they could fail upon impact with heavy, solid objects such as steel guard rails and concrete abutments. Such impact could cause the broken objects to be thrown outward at very high velocities. To reduce the possibility of property damage, serious injury, or even death, never allow the machine to contact such obstacles.
12. Frequently check rake teeth. They should be free of nicks and cracks and securely fastened.
13. Stop implement immediately upon striking an obstruction. Turn engine off, remove key, inspect and repair any damage before resuming operation.
14. Stay alert for holes, rocks and roots in the terrain and other hidden hazards. Keep away from drop-offs.
15. Use extreme care and maintain minimum ground speed when transporting on hillside, over rough ground and when operating close to ditches or fences. Be careful when turning sharp corners.
16. Before beginning operation, contact local utility companies to make certain there are no bundled gas lines, electrical cables, etc., in the work area.
17. Reduce speed on slopes and sharp turns to minimize tipping or loss of control. Be careful when changing directions on slopes. Do not start or stop suddenly on slopes. Avoid operation on steep slopes.
18. When using a unit, a minimum 20% of tractor and equipment weight must be on tractor front wheels. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a front end loader, front wheel weights, ballast in tires or front tractor weights. When attaining a minimum 20% of tractor and equipment weight on the front wheels, you must not exceed the ROPS weight certification. Weigh the tractor and equipment. Do not guess or estimate!
19. Inspect the entire machine periodically<sup>2</sup>. Look for loose fasteners, worn or broken parts, and leaky or loose fittings.
20. Pass diagonally through sharp dips and avoid sharp drops to prevent "hanging up" tractor and implement.
21. Avoid sudden starts and stops while traveling up or downhill.
22. Always operate down slopes; never across the face. Avoid operation on steep slopes. Slow down on sharp turns and slopes to prevent tipping and/or loss of control.
23. Comply with all federal, state and local laws during transport on roads.
24. Before parking the machine, lower the foot stand and secure it with the lock pins.

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<sup>2</sup> See Chapter 4 - Maintenance.

## 3.02 - Setup

**Notice to dealer:** Pre-delivery setup and service including lubrication is the responsibility of the authorized dealer. It is up to him to assure that the machine is in perfect condition and ready to be used. It is his responsibility to ensure that the customer is aware of all safety aspects and operational procedures for the implement. He must also fill out the Pre-Delivery Checklist<sup>3</sup> prior to delivering the implement.

## 3.03 - Assembly Instructions

Each unit is shipped as a kit that consists of the following:				
Description	RS2-02 Qty.	RS2-03 Qty.	RS2-04V Qty.	RS2-06V Qty.
Support arm assembly	1	1	2	2
Three point hitch frame w/foot stand assembly	1	1	1	1
Arm w/hub (2 wheel)	1	-	2	-
Arm w/hub (3 wheel)	-	1	-	2
Rake wheel	2	3	4	6
<b>Hardware bag contains:</b>				
Bolt HH M10-1.50x25 C8.8 Z F	12	18	24	36
Nut HH M10-1.50 C6 Z MD	12	18	24	36
Washer external lock Ø10 Z	12	18	24	36

Note: All hardware needed for assembly will be found either on the machine or in the hardware bag. Assembly will be easier if all parts are loosely assembled before tightening the hardware.



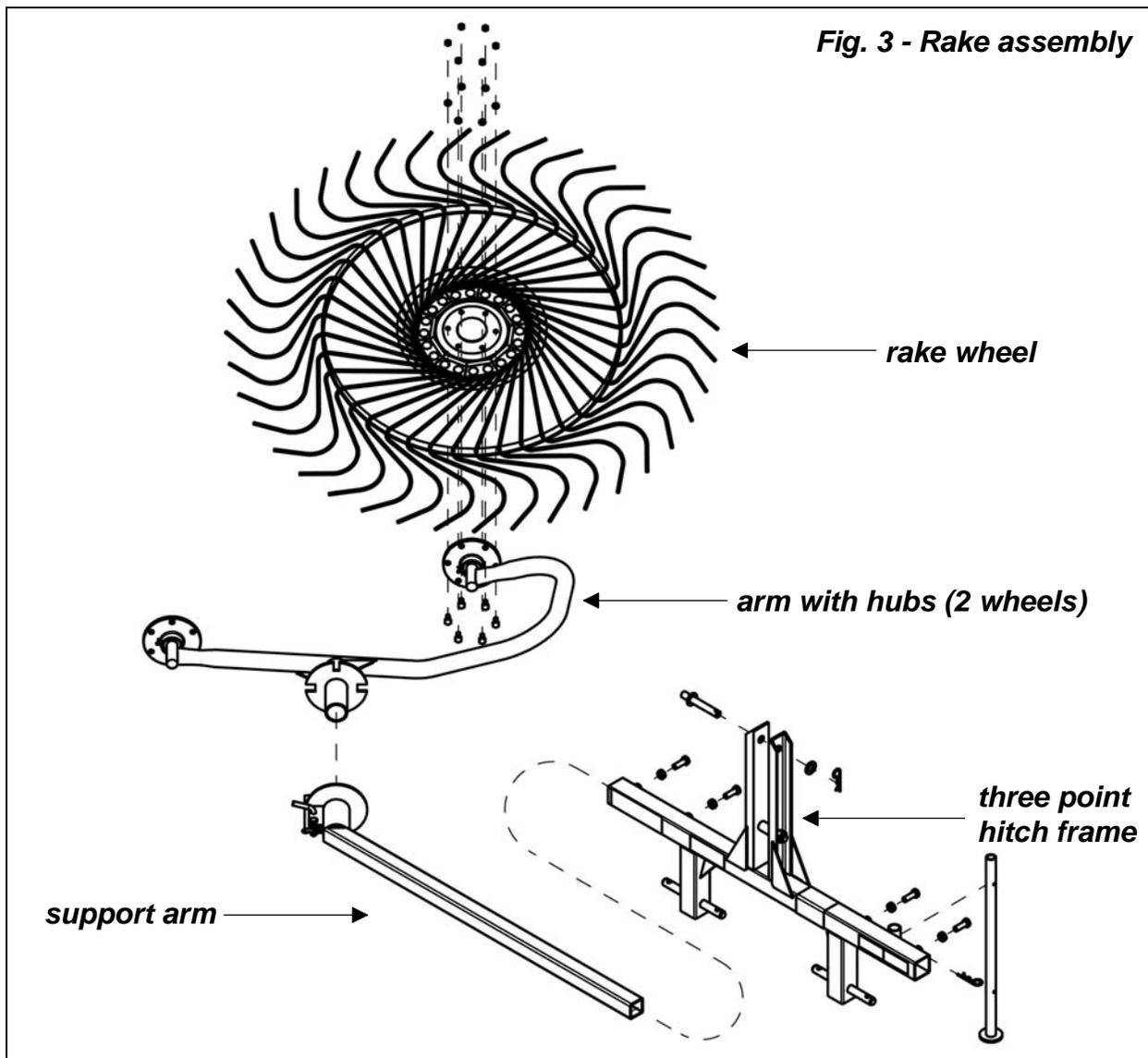
**CAUTION:** Stand clear of bands when cutting as they could be under sufficient tension to cause them to fly loose. Take care in removing bands and wire. They often have extremely sharp edges and cut very easily.

**To assemble the hay rake do the following (see fig. 3):**

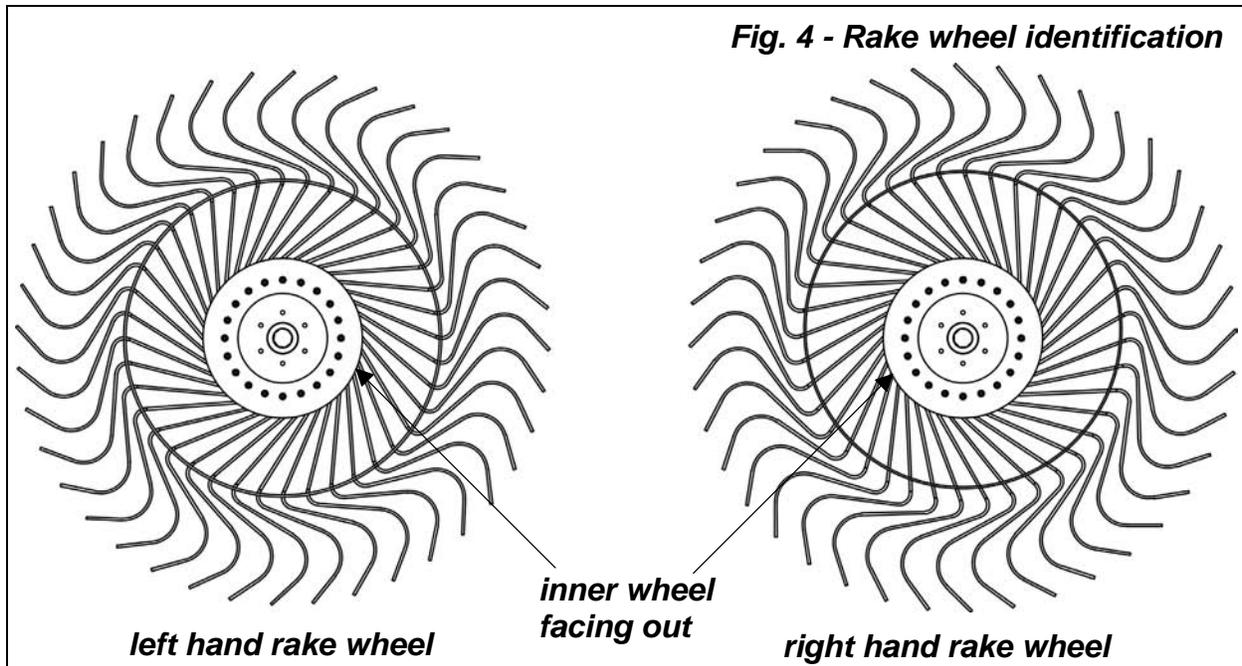
1. To facilitate assembly begin by using a hoist to attach the hay rake three point hitch frame to the three point hitch of the tractor. Secure the top link with the top hitch pin and the Ø4 hairpin cotter, and the bottom hitches with lynch pins.
2. Slide the support arm to the right (if the implement is a right rake), or to the left (if the implement is a left rake) of the 3 point hitch frame and secure it using the M14x40 bolts and M14 nuts.
3. If the implement is a "V" rake, slide one support arm to the right and the other to the left of the 3 point hitch frame and secure them using the M14x40 bolts and M14 nuts. Note: The support arms may need to be cut to obtain the desired windrow width (**see fig. 7 and 8**).
4. Slide the arm with hubs in the hole at the end of the support arm until the flanges on both pieces are bumped up to one another. Secure the arm with the locking lever then secure the lever with the Ø12x56 locking pin and the Ø3 hairpin cotter.

<sup>3</sup> See Chapter 7 - Pre-Delivery Checklist.

5. Assemble the wheels making sure the inner wheel is facing away from the tractor (**see fig. 4**).
6. Secure each wheel by inserting the supplied M10x25 bolts on the hub side and the Ø10 external lock washers and M10 nuts on the inner wheel side.
7. Assemble the foot stand on the 3 point hitch frame and secure it with the Ø4 hairpin cotter.
8. Tighten all hardware securely.



To identify right hand and left hand rake wheels, set the rake wheels up against a wall with the tine clips facing the wall and the inner wheel facing away from the wall. On a right hand wheel the rake teeth touching the ground will bend towards the right. On a left hand rake the rake teeth touching the ground will bend towards the left (**see fig. 4**).



### 3.04 - Pre-Operational Check

**IMPORTANT:** Check each of the following, carefully, prior to engaging the equipment:

1. No wrappings or foreign objects are around the implement.
2. The teeth are properly installed and the bolts properly torqued<sup>4</sup>.
3. All hardware is tight.
4. No people or animals are in the work area.

### 3.05 - Attaching to the Tractor

Models RS2-02, RS2-03, RS2-04V and RS2-06V may be used on tractors from 16 to 30 HP and a category 1 three point hitch or a category 1 quick hitch<sup>5</sup>.



**DANGER:** Never allow anyone to stand between the hay rake and tractor during hookup operations.

To attach the hay rake to the tractor proceed as follows:

1. Back up the tractor to the hay rake until the draft links align with the lower hitch pins.
2. Stop engine, engage parking brakes and remove key before dismounting tractor.
3. Secure the draft links to the hitch pins and secure them in place with cotter pins.
4. Raise foot stand all the way up and secure with hairpin cotter.
5. Attach top link to the top hitch of the hay rake using a top link pin.

<sup>4</sup> Refer to Table 1 - Torque Specifications, page 22.

<sup>5</sup> Refer to Table 2 - Technical Features, page 22.

6. Adjust the tractor sway chains/bars to center the hay rake behind the tractor and control the side sway.
7. Ensure rake is level by adjusting draft links and top link.
8. Slowly operate tractor controls up and down to ensure that the drawbar, tires and other equipment on the tractor does not touch the rake frame and wheels. If necessary adjust or remove tractor drawbar to eliminate interference with rake. Ensure rake is at least 6" from tractor tires throughout the complete range of three point movement.



**DANGER:** Never attempt to attach the implement to the tractor or make any adjustments to it without first turning the tractor off.



**DANGER:** Failure to ensure a secure coupling of the implement to the tractor can cause injury and damage to the implement or tractor.

### 3.06 - Startup



**DANGER:** Never allow anyone around the implement when it is in operation.



**CAUTION:** For emergency reasons, learn how to stop the tractor and implement quickly.

Before starting to work, never forget that the **operator is responsible** for the following:

1. Safe and correct driving of the tractor and implement.
2. To learn precise safe operating procedures for both the tractor and the implement.
3. To ensure all maintenance and lubrication has been performed on the implement.
4. To have read and understood all safety aspects for the implement in the operator's manual.
5. To have read and understood all safety decals on the implement.
6. To have contacted the local utility companies to make certain there are no bundled gas lines, electrical cables, etc., in the work area.
7. Checking the overall condition of the machine.
8. Checking to see if front weights need to be added to the tractor in order to maintain balance.
9. Checking the tractor tires for the proper pressure in accordance with the tractor operator's manual.
10. Making sure the proper attire is worn. Avoiding loose fitting clothing which can become entangled. Wearing sturdy, tough-soled work shoes and protective

equipment for eyes, hands, ears and head. Never operate tractor or implements in bare feet, sandals or sneakers.

11. Checking area for stones, branches and other debris that might be thrown.
12. Ensuring proper lighting is available, sunlight or good artificial lighting.

### 3.07 - Working Speed

Ground speed is determined by the soil condition and tractor power. Simple experimentation will determine the best speed for the desired results, usually 8 to 14 mph.

### 3.08 - Operating Techniques

When working, rake wheels should slightly touch the ground. This gives the individual wheels and tines maximum flexibility to insure clean raking on any terrain. The correct pressure will always depend on field conditions, quantity and type of forage being windrowed. For heavy crops, more down pressure may be needed. Too much pressure may cause dirt and debris to be rolled into the windrow. The ideal setting allows rake to float smoothly across ground contour while moving crop cleanly into a row.

If the crop was mowed with a sickle bar mower, operate the rake in the same direction the crop was mowed, while if the crop was mowed with a rotary mower, best results are obtained by operating the rake in the opposite direction the crop was mowed.

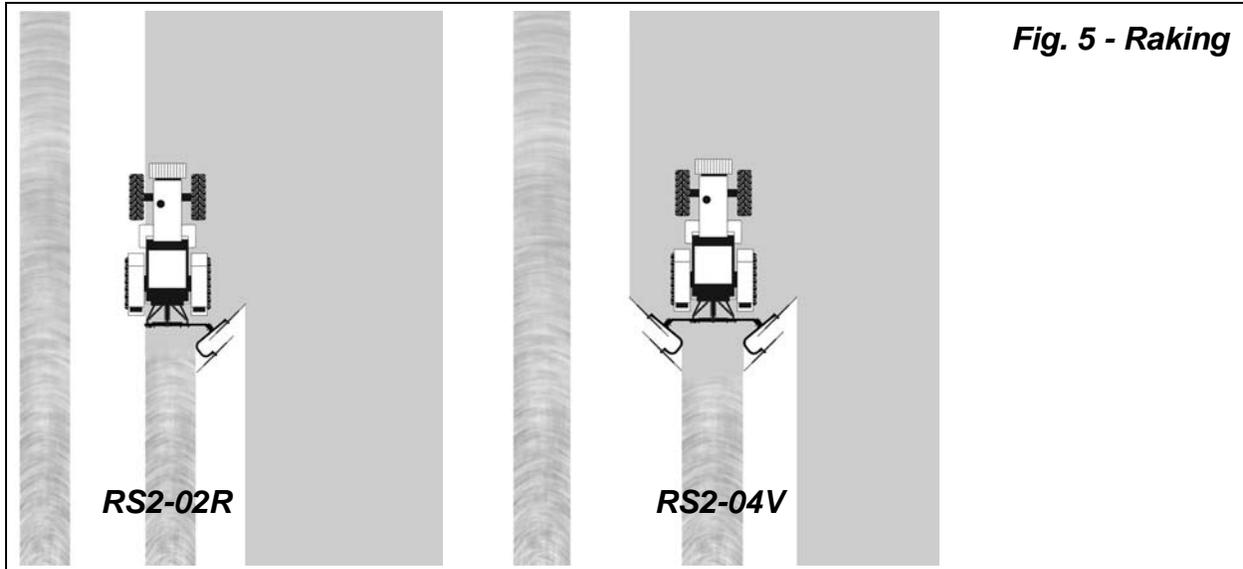
To set ground pressure do the following:

1. Lower rake so that wheels are slightly touching the ground. Adjust the tractor's lift arms so that they are approximately 19" from the ground when raking (**see fig. 5**) and 22" from the ground when spreading the hay (**see fig. 6**).
2. Setting the rake with the least amount of pressure will help to keep the finger wheels cleaner and therefore keep dirt off the forage.
3. Adjust top link of tractor hitch to hold rake three point assembly vertical.

To further adjust ground pressure, shortening the tractor top link will decrease pressure while lengthening the top link will increase the pressure.

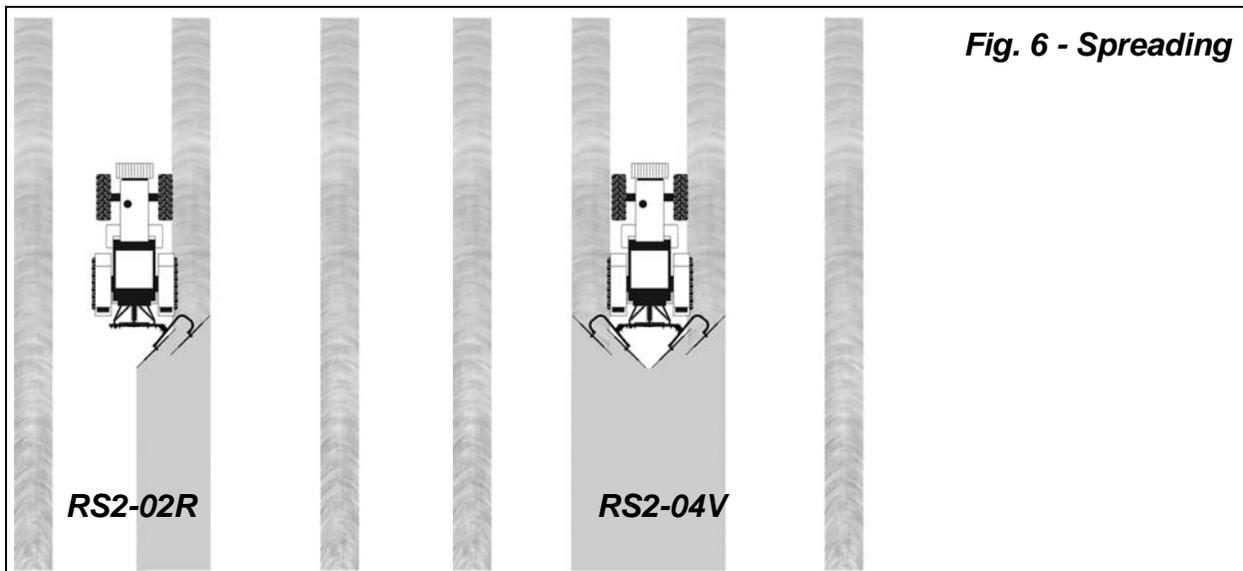
**Raking**

In the raking position, the rake wheels overlap front to back moving the crop to the center (see fig. 5). Proper raking is obtained by positioning the bends, on both the support arm and the arms with hubs, towards the back of the unit.



**Spreading**

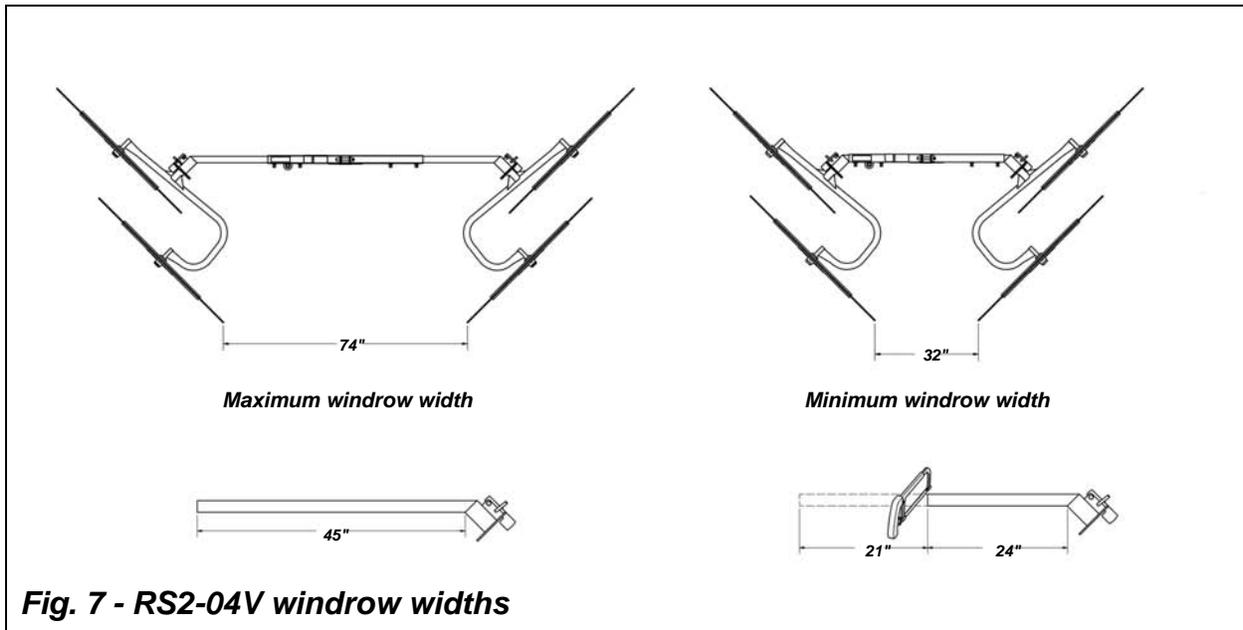
Hay rakes can be used to spread hay that has already been windrowed. This is normally done to help wet hay dry faster. If the machine is assembled in the spreading position, all rake wheels will be aligned causing them to spread the hay across the width of the machine. Proper spreading is obtained by positioning the bends on the arms with hubs towards the tractor (see fig. 6).



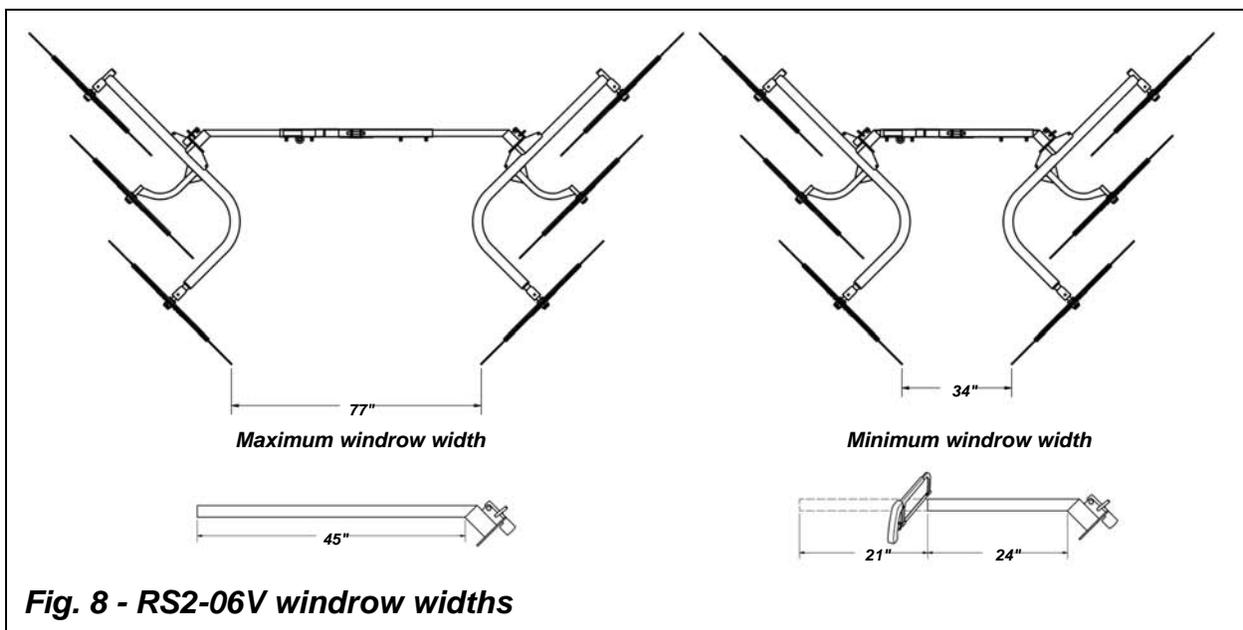
**Adjusting the windrow width on RS2-04V and RS2-06V rakes**

RS2-04V rakes have a windrow width that can be adjusted from a minimum of 32" to a maximum of 74" (see fig. 7) while the RS2-06V rakes have a windrow width that can be adjusted from a minimum of 34" to a maximum of 77" (see fig. 8). Typically operators adjust the windrow width so that it's the same as the opening on their baler.

The support arms provided with the implement are normally longer than necessary. It is up to the operator to saw off the excess piping from each support arm to obtain the desired windrow width. The piping on the support arms is approximately 45" in length. So, for example, to obtain the minimum windrow width on the RS2-04V of 32", the operator will need to saw off a total of 21" from each support arm (see fig. 7).



**Fig. 7 - RS2-04V windrow widths**



**Fig. 8 - RS2-06V windrow widths**

### 3.09 - Uneven Terrain



**DANGER:** Be careful of rollover when operating tractor and implement over uneven ground.

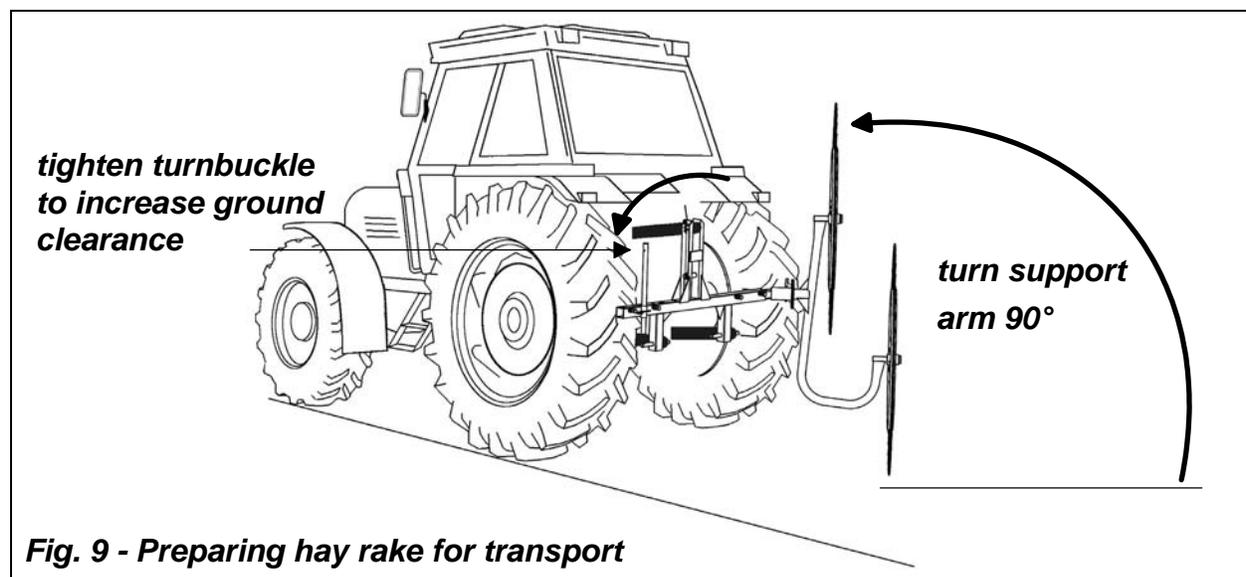
The following precautions should always be observed when working on uneven terrain:

1. In extremely uneven terrain rear wheel weights, front tractor weights, and/or tire ballast should be used to improve stability.
2. Observe the type of terrain and develop a safe working pattern.
3. Operate the implement up and down steep slopes, not across slopes, to prevent the tractor from tipping. Avoid sudden stops and starts, and slow down before changing directions on a slope.
4. Pass diagonally through sharp dips and avoid sharp drops to prevent hanging up the tractor and implement.
5. Slow down on sharp turns and slopes to prevent tipping or loss of control.
6. Watch for holes, roots or other hidden objects. Do not use near the edge of a gully, ditch or stream bank.

### 3.10 - Transport

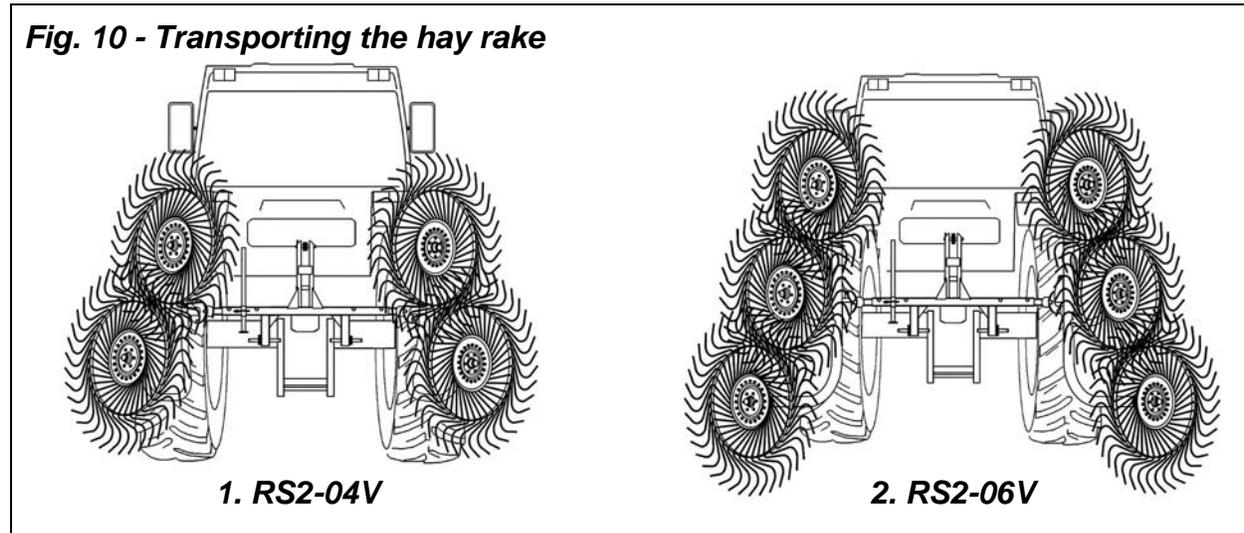


**CAUTION:** Do not tow tractor and implement behind other vehicles. Use a properly equipped trailer with heavy tie-downs for towing operations.



Once the field has been raked raise the three point hitch so the rake wheels are clear off the ground.

Before transporting the rake on public roads, turn the support arm 90° so that it sits vertical over the three point hitch (**see fig. 9**). Tighten the turnbuckle on the three point hitch in order to angle the rake forward and increase the rake wheels clearance from the ground (**see fig. 9**).



Some tractors may not have enough lift clearance to raise the support arm to the 90° position and off the ground enough to transport them on the road.

Before transporting:

1. Always select a safe ground speed that is appropriate for the terrain.
2. Beware of traffic on public roads. Install a SMV (Slow Moving Vehicle) sign when traveling on roads or streets. Comply with all federal, state and local laws.
3. Reduce ground speed when turning and take care that the implement does not strike obstacles such as trees, fences or buildings.

## 4 - MAINTENANCE



**DANGER: Stop engine, lock parking brake and remove key before performing any service or maintenance.**

**Never rely on the tractor lift system. Install blocks or stands under the implement to prevent it from falling.**

**Always use personal protection devices, such as glasses or gloves when performing maintenance.**

**Keep fingers out of slots to prevent injury.**

### 4.01 - Maintenance Safety



1. Good maintenance is your responsibility.
2. Keep service area clean and dry. Be sure electrical outlets and tools are properly grounded. Use adequate light for the job at hand.
3. Make sure there is plenty of ventilation. Never operate the engine of the towing vehicle in a closed building. The exhaust fumes may cause asphyxiation.
4. Make no repair or adjustments with the tractor engine running. Before working on the machine, shut off the engine, set the brakes, and remove the ignition key.
5. Be certain all moving parts have come to a complete stop before attempting to perform maintenance.
6. Never work under equipment unless it is blocked securely.
7. Always use personal protection devices such as eye, hand and hearing protectors, when performing any service or maintenance.
8. Frequently check teeth. They should be free of nicks and cracks and securely fastened.
9. Periodically tighten all bolts, nuts and screws and check that all cotter pins are properly installed to ensure unit is in a safe condition.
10. After servicing, be sure all tools, parts and service equipment are removed.
11. Never replace hex bolts with less than grade five bolts (or class eight for metric bolts) unless otherwise specified, i.e. shear bolts<sup>6</sup>.
12. Where replacement parts are necessary for periodic maintenance and servicing, genuine replacement parts must be used to restore your equipment to original specifications. The Company will not claim responsibility for use of unapproved parts and/or accessories and other damages as a result of their use.

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<sup>6</sup> Refer to Table 1 - Torque Specifications, page 22.

13. Unauthorized modifications to the machine may impair the function and/or safety of the machine and reduce its life. If equipment has been altered in any way from original design, the manufacturer does not accept any liability for injury or warranty.

## 4.02 - Service

### Before each use:

1. Check machine condition, particularly the rake wheels. Check for any loose teeth, bolts or missing hardware.
2. Replace any damaged or worn tooth.

### Hourly or whenever an obstacle is hit:

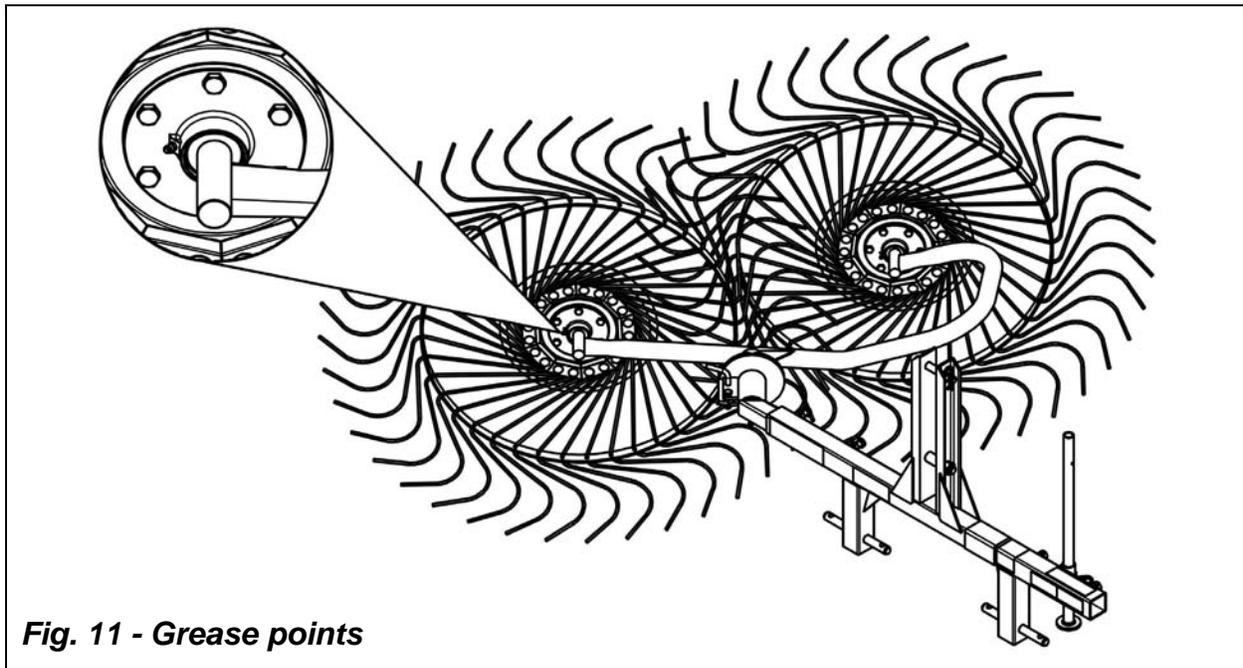
1. Check machine condition, particularly the rake wheel teeth.
2. Replace any damaged or worn tooth.
3. Remove any wrapping (stalks, weeds, trash, etc.) from implement.

### Every 8 hours:

Grease fittings on wheel hubs (see fig. 11).

### Every 25 hours:

Check hardware tightness; vibration can loosen bolts<sup>7</sup>.



<sup>7</sup> Refer to Table 1 - Torque Specifications, page 22.

**TABLE 1 - TORQUE SPECIFICATIONS**

Metric (ISO) treaded bolts head marking							Inch (SAE) treaded bolts head marking								
	Class 5.8		Class 8.8		Class 10.9			Grade 2		Grade 5		Grade 8			
Bolt size mm	Thread mm	N.m	ft-lb	N.m	ft-lb	N.m	ft-lb	Bolt size inch	Thread inch tpi	N.m	ft-lb	N.m	ft-lb	N.m	ft-lb
M5	0.8	4	3	6	4	9	7	1/4"	20	7	5	11	8	16	12
M6	1	6	4	10	7	15	11	1/4"	28	8	6	13	10	19	14
M8	1.25	16	12	25	18	36	27	5/16"	18	15	11	24	17	33	25
M8	1	17	13	26	19	38	28	5/16"	24	17	13	26	19	37	27
M10	1.5	31	23	48	35	71	52	3/8"	16	27	20	42	31	59	44
M10	1.25	33	24	51	38	75	55	3/8"	24	31	23	47	35	67	49
M10	1	35	26	53	39	78	58	7/16"	14	43	32	67	49	95	70
M12	1.75	54	40	84	62	123	91	7/16"	20	48	36	75	55	106	78
M12	1.5	56	41	87	64	128	94	1/2"	13	66	48	102	75	144	106
M12	1.25	59	44	90	66	133	98	1/2"	20	75	55	115	85	163	120
M14	2	84	62	133	98	195	144	9/16"	12	95	70	147	109	208	154
M14	1.5	94	69	142	105	209	154	9/16"	18	106	79	164	121	232	171
M16	2	131	97	206	152	302	223	5/8"	11	132	97	203	150	287	212
M16	1.5	141	104	218	161	320	236	5/8"	18	149	110	230	170	325	240
M18	2.5	181	133	295	218	421	310	3/4"	10	233	172	361	266	509	376
M18	2	196	145	311	229	443	327	3/4"	16	261	192	403	297	569	420
M18	1.5	203	150	327	241	465	343	7/8"	9	226	167	582	430	822	606
M20	2.5	256	189	415	306	592	437	7/8"	14	249	184	642	473	906	668
M20	1.5	288	212	454	335	646	476	1"	8	339	250	873	644	1232	909
M22	2.5	344	254	567	418	807	595	1"	12	371	273	955	704	1348	995
M22	1.5	381	281	613	452	873	644	1-1/8"	7	480	354	1077	794	1746	1288
M24	3	444	327	714	526	1017	750	1-1/8"	12	539	397	1208	891	1958	1445
M24	2	488	360	769	567	1095	808	1-1/4"	7	677	500	1519	1120	2463	1817
M27	3	656	484	1050	774	1496	1103	1-1/4"	12	750	553	1682	1241	2728	2012
M27	2	719	530	1119	825	1594	1176	1-3/8"	6	888	655	1992	1469	3230	2382
M30	3.5	906	668	1420	1047	2033	1499	1-3/8"	12	1011	746	2268	1673	3677	2712
M30	2	1000	738	1600	1180	2250	1659	1-1/2"	6	1179	869	2643	1949	4286	3161
M36	4	1534	1131	2482	1830	3535	2607	1-1/2"	12	1326	978	2974	2194	4823	3557

When using lock washers with nuts, increase torque values by 5%.

**TABLE 2 - HAY RAKES - TECHNICAL FEATURES**

Hay Rakes for tractors up to 30 HP, 3 point hitch cat. 1										
Model	HP	Number of wheels	Wheel diameter	Teeth per wheel	Teeth diameter	Working width	Transport width	Transport height	Working speed	Weight lb.
RS2-02	16-30	2	56"	40	9/32"	4'3"	7'4"	7'6"	14 mph	194
RS2-03	16-30	3	56"	40	9/32"	6'5"	8'4"	10'	14 mph	291
RS2-04V	16-30	4	56"	40	9/32"	11'6"	min. 10'2" max. 14'3"	7'6"	14 mph	353
RS2-06V	16-30	6	56"	40	9/32"	15'10"	min. 12'7" max. 16'2"	10'	14 mph	547

## 5 - REPAIR PROCEDURES



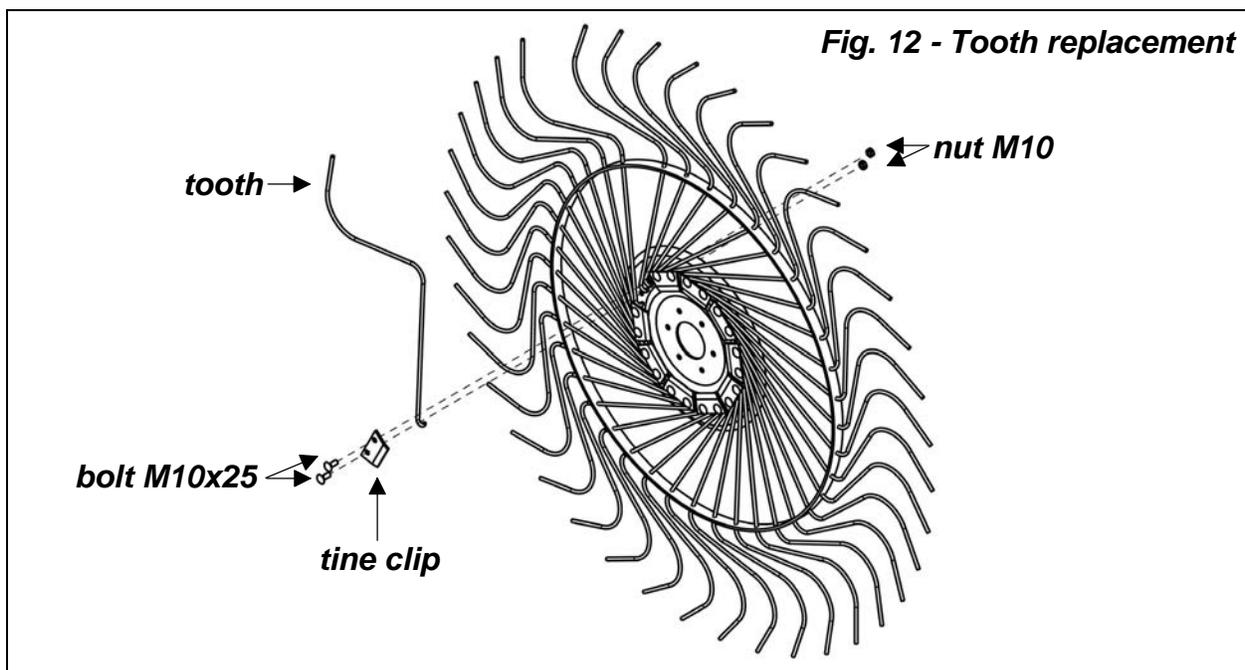
**CAUTION:** All repair procedures must be done by authorized dealerships. It is not recommended that untrained individuals perform any repair work. The following operations are detailed for qualified personnel only. Never work under the implement without properly blocking the unit.

### 5.01 - Rake Teeth Replacement

Teeth replacement is part of the regular maintenance that the operator will have to perform when using a hay rake. Rake teeth should be replaced when they are damaged, have lost their original shape or when they are worn to a point that forage is not being raked properly anymore.

To replace individual teeth do the following (see fig. 12):

1. Loosen the M10 nuts and remove the two M10x25 carriage bolts on the tine clip securing the damaged or worn tooth.
2. Slide the damaged tooth out of the wheel rake outer wheel frame and replace it with a new tooth.
3. Reassemble the tine clip using the M10x25 carriage bolts and secure it with the M10 nuts.



## 5.02 - Suggested Spare Parts

It is suggested that the following spare parts be kept on hand for the implement at all times to prevent a minor problem from delaying work.

Description	Quantity
Teeth	10
Carriage bolts & nuts	5

## 5.03 - Storage

After seasonal use it is important to perform the following for prolonged storage:

1. Wash the implement carefully.
2. Inspect the implement and replace worn or damaged parts.
3. Tighten all hardware<sup>8</sup>.
4. Grease all areas indicated under Maintenance<sup>9</sup>.
5. Apply a thin layer of grease to rake teeth to prevent them from rusting.
6. Touch up scratches by sanding the area and applying a light coat of primer and paint to prevent rust from forming.
7. Replace any damaged or missing decals.
8. Lower the foot stand and secure it with the hairpin cotter before lowering the unit to the ground.
9. Cover the implement from the elements in order to have it in perfect condition for the start of the next season.

Touch up paint available:	
Part #	Description
7300007	Primer, gray - aerosol spray can
7300008	Paint, Befco orange - aerosol spray can
7300010	Paint, Befco black - aerosol spray can



**WARNING:** Be sure to store the implement on a hard level surface and away from people especially children.

<sup>8</sup> Refer to Table 1 - Torque Specifications, page 22.

<sup>9</sup> See Chapter 4 - Maintenance.

## 6 - TROUBLESHOOTING



**WARNING:** Be sure tractor engine is off, parking brake is locked, and key is removed before making any adjustments.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Wheel does not unload hay.	New teeth. Wet hay. Mud on teeth ends.	Run rake wheels on gravel road for a short distance. Allow hay to dry. Shorten top link so teeth do not run so heavy on the ground.
Rake missing hay.	Rake wheels too high. Raking wheel not pitched back. Teeth missing or heavily worn. Rake wheels bounce excessively. Excessive ground pressure.	Adjust rake wheels lower to ground. Increase pitch by lengthening top link. Replace teeth so all are same length. Lower three point hitch. Ensure tractor SCV lever is in float position while working.
Hay bunching.	Incorrect ground speed. Wheels are stalling. Very light, fluffy hay, hay getting caught in wheel supports.	Increase or decrease ground speed. Adjust top link. Run at an angle to the hay or early in the morning when hay is damp.
Individual wheel is not turning.	Insufficient lubrication. Bearing failure. Excessive ground pressure.	Grease rake wheel. Replace bearing. Ensure tractor SCV lever is in float position while working.
Teeth breaking.	Excessive ground speed. Excessive ground pressure. Backing up with teeth on the ground. Too much machine weight on teeth. Teeth have become corroded.	Reduce ground speed. Reduce ground pressure. Raise rake before backing up. Raise three point hitch. Protect teeth from weather or treat with rust retardant.
Teeth bending.	Backing up with teeth on the ground. Too much machine weight on teeth. Excessive speed on rough terrain.	Raise rake before backing up. Raise three point hitch. Reduce speed.
Rake outer wheel breaking.	Excessive ground speed. Excessive ground pressure.	Reduce ground speed. Ensure tractor SCV lever is in float position while working.

## 7 - PRE-DELIVERY CHECKLIST

**To the dealer: Inspect the machine thoroughly after assembly to assure it is functioning properly before delivering it to the customer. The following checklist is a reminder of points to cover. Check off each item as it is found satisfactory or after proper adjustment is made.**

- Guards and shield properly fastened.
- Lubrication of grease fittings.
- All hardware properly tightened.
- All decals properly located and readable (**see fig. 2**).
- Tines properly installed, bolts and nuts tightened.
- Overall condition (touch up scratches, clean and polish).
- Test run, check for excessive vibration or overheating of bearings.
- Operator's Manual.

**Review the Operator's Manual with the customer. Explain the following:**

- Warranty.
- Safe operation and service.
- Correct machine installation and operation.
- Daily and periodic lubrication, maintenance and inspections.
- Troubleshooting.
- Operational procedures and storage.
- Parts and service.
- Fill out the Pre-Delivery Checklist and Warranty Registration form.
- Give customer the Operator's Manual and encourage the customer to read the manual carefully.

**IMPORTANT: Warranty is not valid unless Pre-Delivery Checklist and Warranty Registration form in Operator's Manual is completed in detail and mailed to the Company.**

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

Serial Number: \_\_\_\_\_

Delivery Date: \_\_\_\_\_

Dealer's Signature: \_\_\_\_\_

## 8 - WARRANTY

BEFCO's responsibility will be limited to substitution of the acknowledged defective merchandise to the same place of delivery as the previous one was supplied.

### 1. LIMITED WARRANTY

BEFCO, Inc. herein referred to as the Company, warrants its machines and related accessories, hereafter referred to as the Machine, to be free from defects in material and workmanship, for a period of twelve (12) months from the date of invoice to the first registered owner; this limited warranty does not apply to common wear items and excludes belts, shear pins, oil, grease, tires, tubes, hydraulic hoses, knives and PTO shafts.

Labor will be reimbursed at \$40.00 per hour based on BEFCO's time schedule.

Cost of transport to the servicing dealer is the responsibility of the customer.

Warranty coverage shall not be transferable from the first owner to any subsequent owner.

### 2. DISCLAIMER OF ALL OTHER WARRANTIES AND REMEDIES

Neither the Company nor any company affiliated with the Company makes any warranties, representations or promises, expressed or implied, as to the quality, performance or application of its products other than those set forth herein and does not make any implied warranty of merchantability or fitness.

The only remedies the purchaser has in connection with the breach, or performance of any warranty on the Company's Machine are those set forth herein. In no event will the dealer, the Company, or any company affiliated with the Company, be liable for:

- a. Injuries or damages of any kind or nature, direct, consequential or contingent to person or property.
- b. Any expenses incurred by the owner to repair, replace or rework any allegedly defective item.
- c. Any loss, cost, forfeiture or damages (including loss of profits; loss of crops; loss because of delay in field operations; any expenses or loss incurred for labor, supplies, substitute machine rental; liabilities of the owner to its customers or third persons; and all other consequential damages, losses, liabilities or damages for any other reasons) whether direct or indirect, and whether or not resulting from or contributed to by the default or negligence of the Company, its agents, employees and subcontractors which might be claimed as a result of the use or failure of the equipment delivered.

The Company's liability based on this limited warranty or any other applicable laws shall be limited to replacement or refund of the purchase price of the product.

The limited warranty extended herein gives you specific rights and you may also have other rights which vary from state to state. Neither the dealer nor the Company personnel has the authority to make any representation or to modify the terms and limitations of this warranty in any way.

**Other than the limited warranty extended hereby there is no other expressed warranty in connection with the design, safety or use of any of the Company's products except as to title. All implied warranties are expressly disclaimed pursuant to the terms of this warranty.**

### **3. CUSTOM WORK**

If the Machine is used for commercial purposes such as custom work, the period warranted for the Machine is limited to six (6) months from the date of delivery to the first registered owner and does not cover any labor charges incurred.

### **4. RENTAL**

If the Machine is used for rental purposes the period warranted for the Machine is limited to thirty (30) days from the date of delivery to the first registered owner and does not cover any labor charges incurred.

### **5. REGISTRATION**

In order to qualify for coverage on this limited warranty, the product and name of the original purchaser must be registered with the Company by a completed Machine Pre-Delivery Checklist and Warranty Registration along with a copy of the dealer's invoice to the first registered owner to the Company within fourteen (14) days after the date of delivery to the original purchaser.

### **6. WARRANTY SERVICE**

Warranty Service must be performed by a dealer authorized by BEFCO. If the warranty service requested is approved, the owner shall pay only for labor beyond the rate allowed, for overtime labor, and for any mileage charge for transporting the equipment to and from the dealer's shop. It is assumed that the dealer has the appropriate general and special tools to service the machine. Time required for replacement of knives, oil, grease and to remove excessive dirt from the Machine is not subject to reimbursement by the Company. The owner is required to clean the Machine before presenting it to the dealer for service work. The Machine must be delivered within thirty (30) days after failure date by the owner to the dealer to be eligible for warranty consideration.

### **7. UNAPPROVED SERVICE OR MODIFICATION**

All obligations of the Company under this limited warranty shall be terminated if:

- a. Proper service and operation instructions as outlined in the Operator's Manual and on the instruction sticker on the Machine, are not followed.
- b. The Machine is modified or altered in any way not approved by the Company.
- c. The Company does not receive a copy of the dealer's invoice to the first registered owner within fourteen (14) days from the date of delivery.
- d. The Company has not been paid in full, by the dealer, for the Machine.

### **8. ACCIDENTS AND NORMAL MAINTENANCE**

This limited warranty covers defective material and workmanship. It does not cover depreciation or damage caused by normal wear, accidents, improper maintenance, improper protection or improper use. The costs of normal maintenance or repairs for accidents or improper use, and related labor will be borne by the owner.

### **9. REPLACEMENT PARTS**

BEFCO, Inc. warrants replacement parts to be free from defect in material and workmanship for a period of thirty (30) days from the date of delivery to the original purchaser.

# WARRANTY REGISTRATION

**BEFCO, Inc.**  
**P.O. Box 6036**  
**Rocky Mount, NC 27802-6036**

**Tel: (252) 977.9920 - Fax: (252) 977.9718**

Dealer _____ Acct. # _____	Retail Customer _____
Street _____ Country _____	Street _____
Town _____ State _____ Zip _____	Town _____ State _____ Zip _____
Date of delivery _____ Invoice # _____	Phone _____
Model # _____ Serial # _____	
<p>Pre-Delivery Checklist:</p> <p><input type="checkbox"/> Greased fittings.</p> <p><input type="checkbox"/> Safety guards in place.</p> <p><input type="checkbox"/> All hardware tight.</p> <p><input type="checkbox"/> Bolts torqued correctly.</p> <p><input type="checkbox"/> Attached unit to tractor. Yes/No.</p> <p><input type="checkbox"/> Field adjusted. Yes/No.</p> <p><input type="checkbox"/> Test run. Dry/Infield.</p> <p><input type="checkbox"/> Safety decals.</p> <p><input type="checkbox"/> Operator's Manual.</p> <p>The machine described above, had been prepared for delivery according to the Pre-Delivery Checklist and the Customer has been instructed in its care and operation and the condition of warranty.</p>	<p>Tractor make: _____</p> <p>Model: _____; HP _____</p> <p>Type of operation: Private homeowner, Landscaping, Commercial maintenance, Golf Course, Municipality, Turf Farm, others: _____</p> <p>Approximate number of acres machine will be used on annually: _____</p> <p>I hereby acknowledge that:  I have received and accepted delivery of the machine described.  The equipment was checked thoroughly for loose or missing parts and has been adjusted in accordance with the Pre-Delivery Checklist.  I have read and understand the nature and extent of the warranty and understand clearly that there were and are no other representations of warranties either expressed or implied, made by anyone. I have been advised on proper operation, maintenance and lubrication procedure of this equipment.  I have been instructed on and do understand the application, limitation and capacities this equipment was designed and recommended for, all as described in the Operator's Manual and literature published by the Company.</p>
Inspected by: _____	
Date: _____	Date: _____
Dealer's Signature: _____	Customer's Signature: _____

**This registration along with a copy of the invoice must be sent to BEFCO, Inc. within 14 days of date of purchase.**

*Sender:*

*Fold here*

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*Place stamp  
here*

**BEFCO, Inc.**

Warranty Department

P.O. Box 6036

Rocky Mount, NC 27802-6036

*Cut along this line*



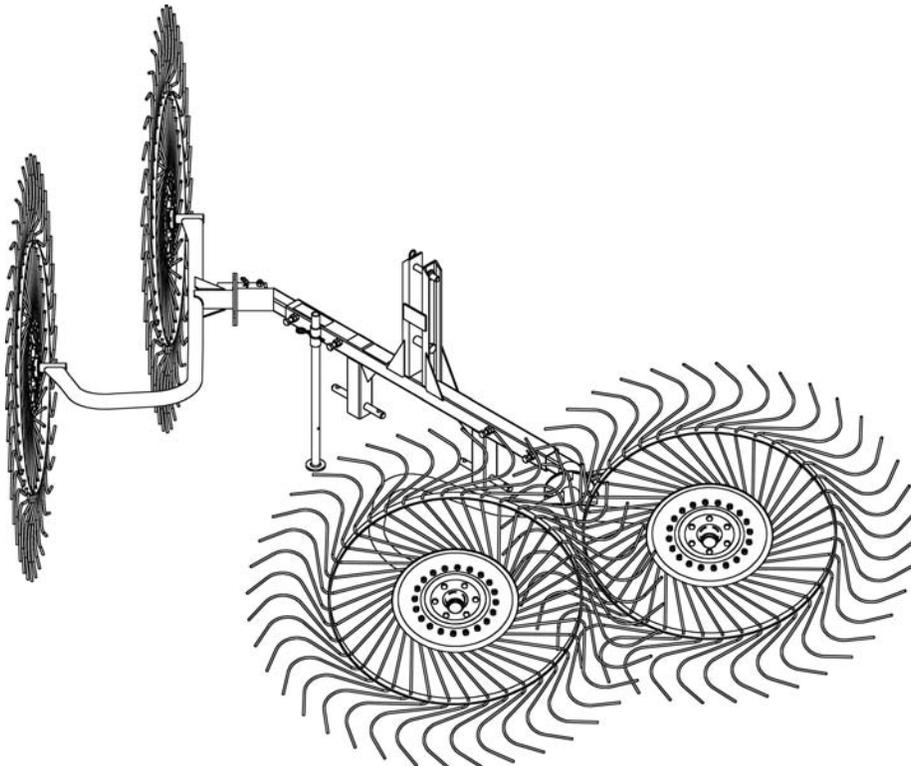
# BEFCO®

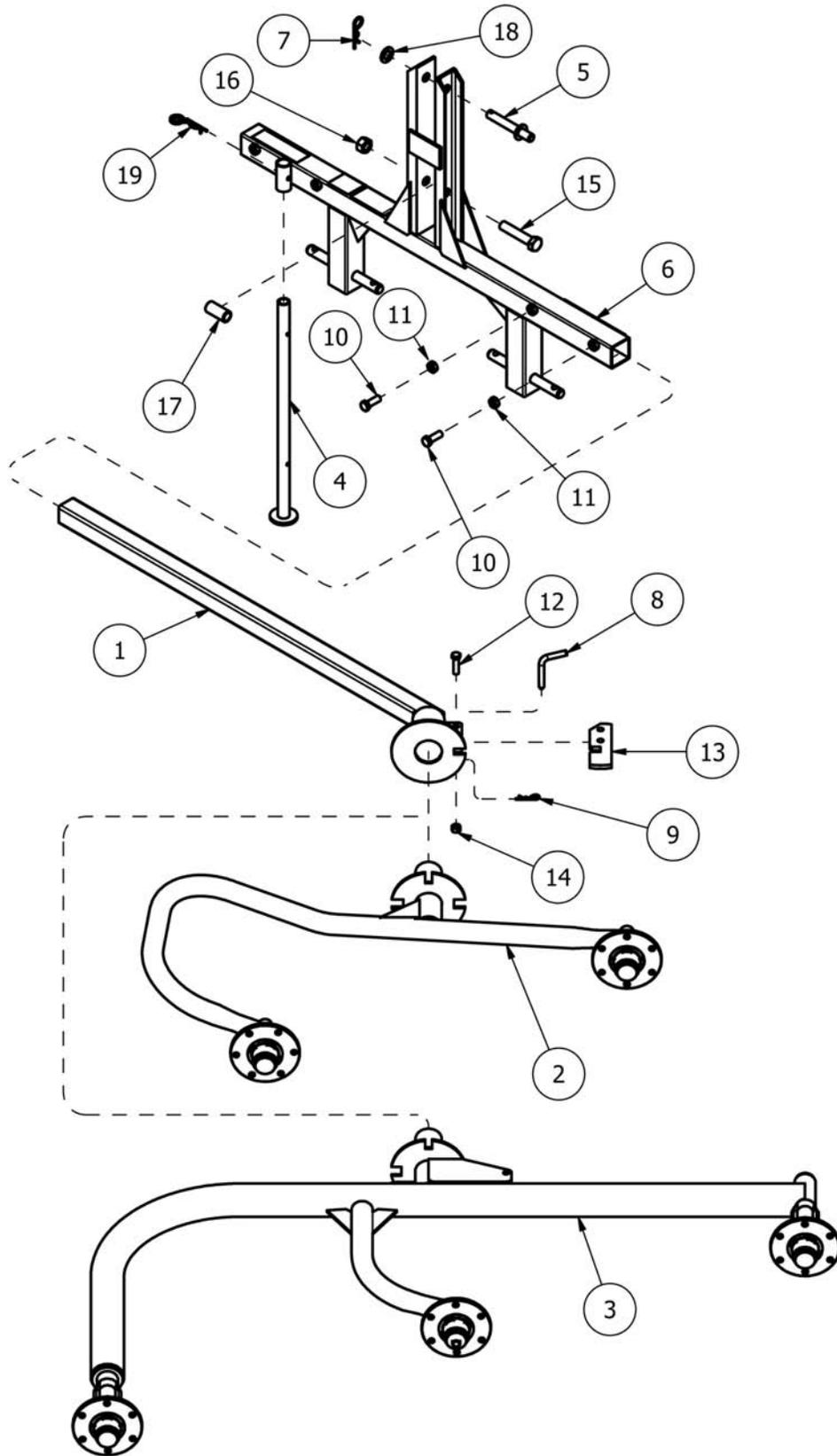
## Parts Manual

# HAY EQUIPMENT

## Hay Rakes

**RS2-02R, RS2-03R, RS2-02L, RS2-03L**  
**RS2-04V, RS2-06V**





Ref.	Part #	Description	Qty.
1	502-942B	Support arm; RS2-02 #281472 & below <sup>10</sup>	1
	503-271B	Support arm; RS2-02 #281473 & above	1
	503-271B	Support arm; RS2-03	1
2	503-274B	Arm w/hub right, 2 wheel; RS2-02R #281472 & below <sup>11</sup>	1
	502-947B	Arm w/hub right, 2 wheel; RS2-02R #281473 & above	1
	502-948B	Arm w/hub left, 2 wheel; RS2-02L #281473 & above	1
3	503-275B	Arm w/hub, 3 wheel; RS2-03	1
4	502-925B	Stand, three point hitch	1
5	502-933B	Pin, top hitch Ø19x140	1
6	503-270B	Frame, three point hitch	1
7	009-1507	Hairpin cotter Ø4	1
8	502-938B	Pin, locking Ø12x56 Z	1
9	001-5240	Hairpin cotter Ø3	1
10	007-4232	Bolt HH M14-2.00x40 C8.8 Z F	2
11	000-1177	Nut HH M14-2.00 C6 Z MD	2
12	000-7716	Bolt HH M12-1.75x45 C8.8 Z F	1
13	503-929B	Locking lever, pivot housing	1
14	003-0064	Nut PT M12-1.75 C6 Z TK	1
15	001-9291	Bolt HH M20-2.50X100 C8.8 Z P	1
16	000-5507	NUT PT M20-2.50 C6 Z TK	1
17	001-6116	Bushing	1
18	004-6555	Washer flat Ø21x37x3 Z	1
19	003-2366	Hairpin cotter double loop Ø4	1

<sup>10</sup> Support arm #502-942B is interchangeable with part #503-271B when part #502-947B is also ordered.

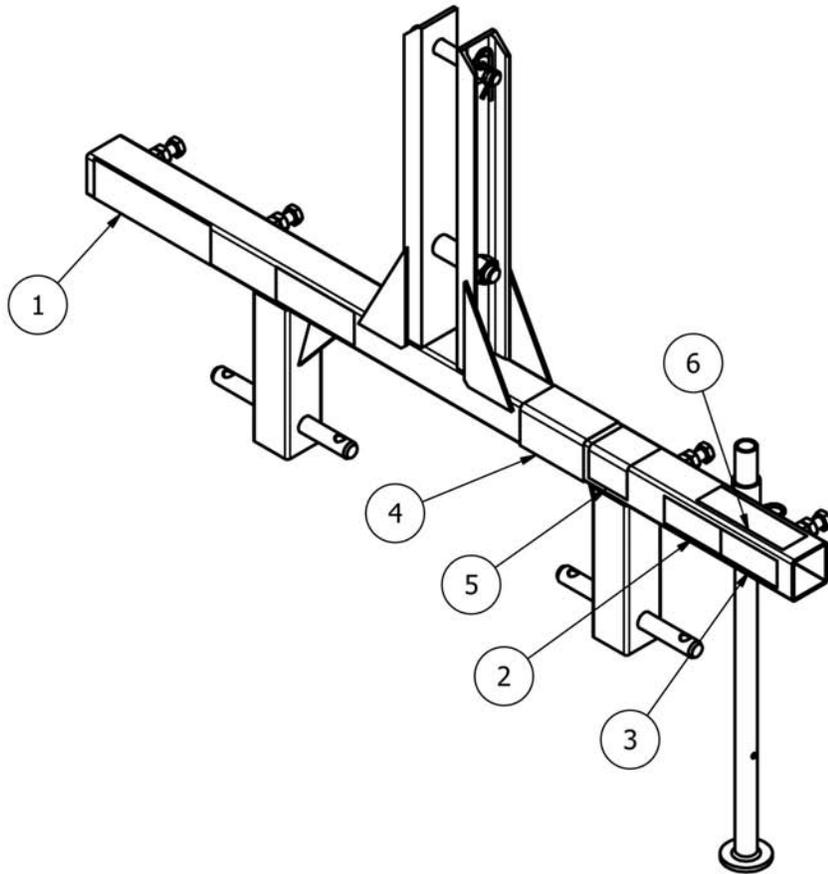
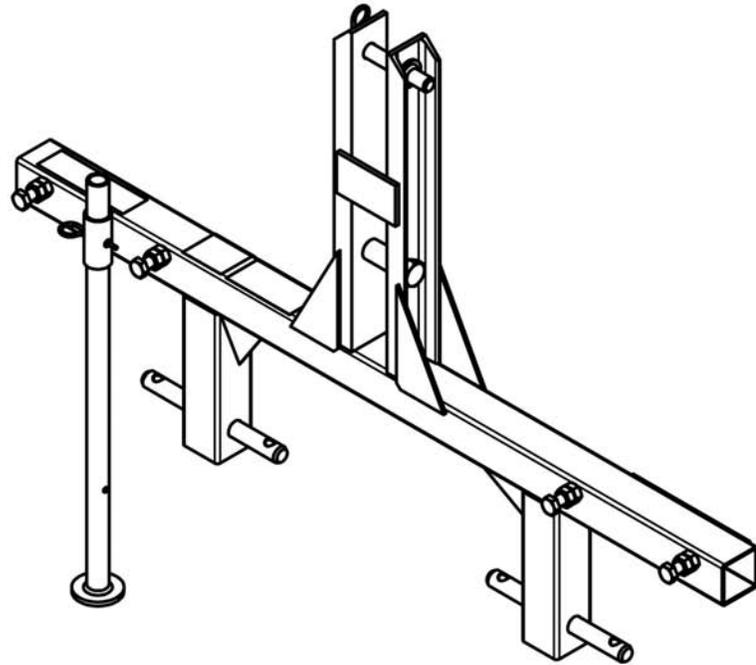
<sup>11</sup> Arm w/hub #503-274B is interchangeable with part #502-947B when part #503-271B is also ordered.



Ref.	Part #	Description	Qty.
1	503-271B	Support arm, 2 & 3 wheel	2
2	502-947B	Arm w/hub 2 wheel, right; RS2-04V	1
3	502-948B	Arm w/hub 2 wheel, left; RS2-04V	1
4	503-275B	Arm w/hub, 3 wheel; RS2-06V	2
5	502-925B	Stand, three point hitch	1
6	502-933B	Pin, top hitch Ø19x140 Z	1
7	503-270B	Frame, three point hitch	1
8	009-1507	Hairpin cotter Ø4 Z	1
9	502-938B	Pin, locking Ø12x56 Z	2
10	001-5240	Hairpin cotter Ø3 Z	2
11	007-4232	Bolt HH M14-2.00x40 C8.8 Z F	4
12	000-1177	Nut HH M14-2.00 C6 Z MD	4
13	000-7716	Bolt HH M12-1.75x45 C8.8 Z F	2
14	503-929B	Lock lever, pivot housing	2
15	003-0064	Nut PT M12-1.75 C6 Z TK	2
16	001-9291	Bolt HH M20-2.50x100 C8.8 Z P	1
17	000-5507	Nut PT M20-2.50 C6 Z TK	1
18	001-6116	Bushing	1
19	004-6555	Washer flat Ø20 Z	1
20	003-2366	Hairpin cotter, double loop Ø4 Z	1



Ref.	Part #	Description	Qty.
1	502-227B	Outer wheel	1
2	502-226B	Inner wheel	1
3	502-228B	Rake tooth	40
4	502-221B	Tine clip	10
5	006-0509	Bolt CR M10-1.50x25 C8.8 Z	20
6	009-0150	Nut HH M10-1.50 C6 Z MD	6
7	003-5060	Washer ext. lock Ø10 Z	6
8	502-223B	Hub, rake wheel	1
9	502-218B	Dust seal ring	1
10	000-9771	Bearing 30205	1
11	502-224B	Bearing 30204	1
12	502-953B	Nut castle M18-1.50 N	1
13	502-225B	Dust cover	1
14	003-3176	Bolt HH M10-1.50x25 C8.8 Z F	6
15	306-002F	Grease fitting M08-1.25 STR Z	1
16	006-7217	Pin cotter Ø3x35 N	1
17	003-0156	Nut PT M10-1.50 C6 Z	20
	502-949B	Wheel complete right	-
	502-950B	Wheel complete left (not shown)	-



## RS2-02, RS2-03, RS2-04V, RS2-06V

Ref.	Part #	Description	Qty.
1	950-106B	Decal "BEFCO"	1
2	950-477B	Decal "RS2"	1
3	950-478B	Decal "02R"	1
	950-479B	Decal "03R"	1
	950-966B	Decal "04V"	1
	950-967B	Decal "06V"	1
4	950-417B	Decal "CAUTION - To avoid serious injury"	1
5	950-940B	Decal "Quick Hitch Compatible"	1
6	950-381B	Decal "BEFCO Inc." address	1
	960-392B	Manual hay rakes RS2-02, 03, 04V, 06V	1

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**BEFCO**<sup>®</sup>

P.O. Box 6036  
Rocky Mount, NC 27802-6036  
Tel.: 252.977.9920 - Fax: 252.977.9718  
[www.befco.com](http://www.befco.com)

