

**OPERATOR'S MANUAL**

# **HI CAPACITY BI-FOLD RAKE**

**WR1212**

**WR1214**

**WR1216**



**HSMFG0412 Rev. 7**

**5HPOMR3**

# **FRONTIER WR1212/WR1214/WR1216**

## **PARTS AND OPERATOR'S MANUAL**

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## SAFETY INFORMATION



**BE  
ALERT!**

**YOUR SAFETY  
IS INVOLVED.**

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

### **TRACTORS**

This operator's manual uses the term "Tractor" when identifying the power source for towing and lifting rake.

# SAFETY INFORMATION

## RECOGNIZE SAFETY INFORMATION

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

Follow recommended precautions and safe operating practices.



## UNDERSTAND SIGNAL WORDS

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

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

General precautions are listed on CAUTION safety signs.



WARNING



CAUTION

## FOLLOW SAFETY INSTRUCTIONS

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

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



## OBSERVE MAXIMUM TRANSPORT SPEED

**The maximum transport speed for this implement is 32 km/h (20 mph).**

Some tractors are capable of operating at speeds that exceed the maximum transport speed of this implement. Regardless of the maximum speed capability of the tractor being used to tow this implement, do not exceed the implement's maximum transport speed.

Exceeding the implements maximum transport speed can result in:

- Loss of control of the tractor/implement combination
- Reduced or no ability to stop during braking
- Implement tire failure
- Damage to the implement structure or its components

Use additional caution and reduce speed when towing under adverse surface conditions, when turning, and when on inclines.

Do not attempt transport if the fully loaded implement weighs more than 1.5 times the weight of the tractor.



## TRACTORS

This operators manual uses the term “Tractor” when identifying 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 pipes with safety clip pins, 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 closing to transport position.

Frontier 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**


# SAFETY INFORMATION

	<p style="text-align: center;"><b>⚠ DANGER</b></p> <p style="text-align: center;"><b>STAY CLEAR OF RAKE WHEN OPENING OR CLOSING.</b></p> <p style="text-align: center;">FAILURE TO HEED THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH</p> <p style="text-align: center;">KEEP CLOTHING, YOURSELF AND OTHERS WELL CLEAR.</p>
11694A	

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>DO NOT GO NEAR LEAKS</b></p> <ul style="list-style-type: none"> <li>• High pressure oil easily punctures skin causing serious injury, gangrene or death.</li> <li>• If injured, seek emergency medical help. Immediate surgery is required to remove oil.</li> <li>• Do not use finger or skin to check for leaks.</li> <li>• Lower load or relieve hydraulic pressure before loosening fittings.</li> </ul>
11599	

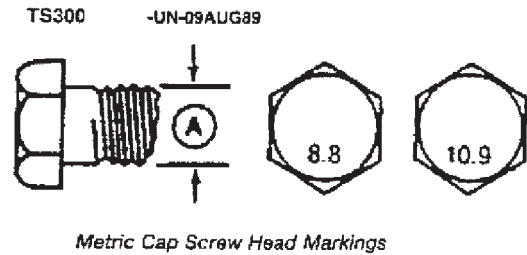
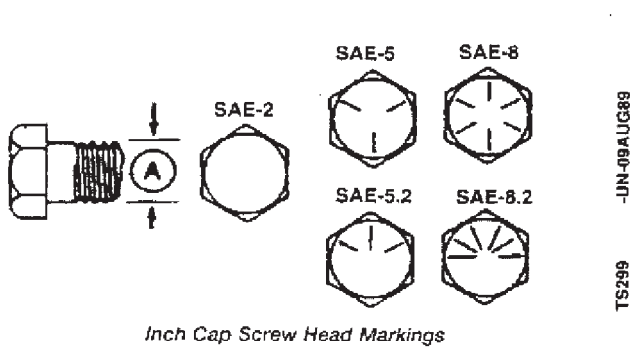
<p style="font-size: 2em;"><b>⚠ WARNING</b></p> <p style="font-size: 1.5em;"><b>HELP AVOID INJURY</b></p>
<ul style="list-style-type: none"> <li>• READ &amp; UNDERSTAND THE OPERATORS MANUAL PROVIDED WITH THIS MACHINE. IF MISPLACED CALL H &amp; S MANUFACTURING AT 715-387-3414 WITH MODEL AND SERIAL NUMBER.</li> <li>• UNDERSTAND ALL SAFETY WARNINGS AND FUNCTION OF CONTROLS.</li> <li>• KEEP SAFETY DEVICES IN PLACE AND WORKING.</li> <li>• KEEP YOURSELF AND OTHERS WELL CLEAR OF MOVING PARTS.</li> <li>• DISCONNECT ALL POWER BEFORE SERVICING OR CLEANING THIS MACHINE.</li> <li>• DO NOT EXCEED 20 MPH</li> </ul>
72203A

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>STAY CLEAR OF RAKE WHEN RAISING OR LOWERING RAKE WHEELS.</b></p> <p style="text-align: center;">FAILURE TO HEED THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH.</p> <p style="text-align: center;">KEEP CLOTHING, YOURSELF AND OTHERS WELL CLEAR.</p>
2195	

<p style="font-size: 1.5em;"><b>⚠ DANGER</b></p>	
	<p style="text-align: center;"><b>STAY CLEAR OF RAKE WHEN OPENING OR CLOSING.</b></p> <p style="text-align: center;">FAILURE TO HEED THIS WARNING MAY RESULT IN <u>PERSONAL INJURY OR DEATH.</u> KEEP CLOTHING, YOURSELF AND OTHERS WELL CLEAR.</p>
11694B	

<p style="font-size: 1.5em;"><b>⚠ WARNING</b></p>	
	<p>Do not exceed this implement's maximum transport speed of 32 km/h (20 mph). Exceeding this speed may result in loss of control during transport or braking and serious injury or death.</p> <p>Transport only with a properly ballasted tractor and a properly attached safety tow chain. Do not transport with a motor vehicle. Reduce speed and use additional caution when on inclines, towing under adverse surface conditions, and turning.</p>

# CAP SCREW TORQUE VALUES



## INCH CAP SCREW TORQUE VALUES

## METRIC 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)

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.

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