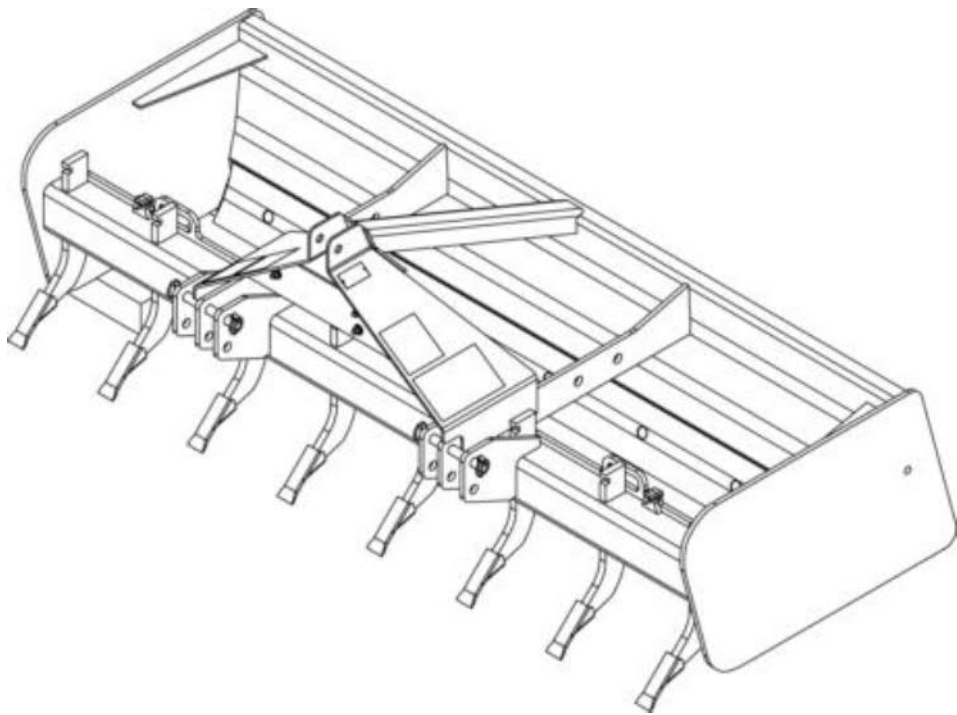


O P E R A T O R ' S M A N U A L

BOX BLADES

BB2272

BB2284



FRONTIER
EQUIPMENT™

TO THE DEALER:

Assembly and proper installation of this product is the responsibility of the Frontier dealer. Read manual instructions and safety rules. Make sure all items on the Dealer's Pre-Delivery and Delivery Check Lists in the Operator's Manual are completed before releasing equipment to the owner.

TO THE OWNER:

Read this manual before operating your Frontier equipment. The information presented will prepare you to do a better and safer job. Keep this manual handy for ready reference. Require all operators to read this manual carefully and become acquainted with all the adjustment and operating procedures before attempting to operate. Replacement manuals can be obtained from your selling dealer.

The equipment you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Lubricate the unit as specified. Observe all safety information in this manual and safety decals on the equipment.

For service, your authorized Frontier dealer has trained mechanics, genuine Frontier service parts, and the necessary tools and equipment to handle all your needs.

Use only genuine Frontier service parts. Substitute parts will void the warranty and may not meet standards required for safe and satisfactory operation. Record the model number and serial number of your equipment in the spaces provided:

Model: _____ **Date of Purchase:** _____

Serial Number: (see Safety Decal section for location) _____

Provide this information to your dealer to obtain correct repair parts.

Throughout this manual, the term **NOTICE** is used to indicate that failure to observe can cause damage to equipment. The terms **CAUTION**, **WARNING** and **DANGER** are used in conjunction with the Safety-Alert Symbol, (a triangle with an exclamation mark), to indicate the degree of hazard for items of personal safety.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

IMPORTANT
or **NOTICE**

Is used to address practices not related to personal injury.

NOTE Indicates helpful information.

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GENERAL INFORMATION

The purpose of this manual is to assist you in operating and maintaining your Box Blade. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance.

These instructions have been compiled from extensive field experience and engineering data. Some information may be general in nature, due to unknown and varying operating conditions. However, through experience and these instructions, you should be able to develop procedures suitable to your particular situation.

The illustrations and data used in this manual were current at the time of printing. However, due to possible inline production changes, your machine may vary slightly in detail. We reserve the right to redesign and change the machines as may be necessary without notification.

Throughout this manual, references are made to right and left direction. These are determined by standing behind the tractor facing the direction of forward travel.

SPECIFICATIONS

	<u>BB2272</u>	<u>BB2284</u>
Width	73 in. (1854.2 mm)	85 in. (2159.0 mm)
Height	33.3 in. (845.82 mm)	33.3 in. (845.82 mm)
Depth.....	39.4 in. (1000.76 mm)	39.4 in. (1000.76 mm)
Number of Cutting Edges	2	2
Front Cutting Edge Size.....	Curved 1/2 x 6 in. (12.7 x 152.4 mm) Reversible	-----
Rear Cutting Edge Size	Flat 1/2 x 6 in. (12.7 x 152.4 mm) Reversible	-----
Weight	850 lbs. (385.55 kg)	1005 lbs. (455.86 kg)
Number of Optional Shanks/Points	7	8
Tailgate	----- Removable Floating Hinged Tailgate -----	
Tractor HP Requirement	----- 40 - 80 hp (29.83 - 59.66 kW) Max.-----	
Tractor Hitch Class.....	Cat 1 & 2	Cat 1 & 2
Implement Code for Tractor Ballast49.7	58.7

SAFETY RULES



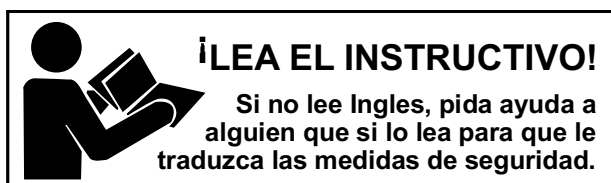
ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



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

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, judgement, and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

It has been said "The best safety device is an informed, careful operator." We ask you to be that kind of operator.



TRAINING

■ Safety instructions are important! Read all attachment and power unit manuals; follow all safety rules and safety decal information. (Replacement manuals and safety decals are available from your dealer.) Failure to follow instructions or safety rules can result in serious injury or death.

■ If you do not understand any part of this manual and need assistance, see your dealer.

■ Operators must be instructed in and be capable of the safe operation of the equipment, its attachments, and all controls. Do not allow anyone to operate this equipment without proper instructions.

■ Never allow children or untrained persons to operate equipment.

PREPARATION

■ Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.

■ Make sure attachment is properly secured, adjusted, and in good operating condition.

■ Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death

from being run over or crushed. Keep foldable ROPS system in "locked up" position at all times.

■ A minimum 20% of tractor and equipment weight must be on the tractor front wheels when attachments are in transport position. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a loader, front wheel weights, ballast in tires or front tractor weights. Weigh the tractor and equipment. Do not estimate.

TRANSPORTATION

■ Always comply with all state and local lighting and marking requirements.

■ Never allow riders on power unit or attachment.

■ Do not operate or transport on steep slopes.

■ Use extreme care and reduce ground speed on slopes and rough terrain.

■ Do not operate or transport equipment while under the influence of alcohol or drugs.

■ Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS system in "locked up" position at all times.

■ Always sit in power unit seat when operating controls or starting engine. Securely fasten seat belt, place transmission in neutral, engage brake, and ensure all other controls are disengaged before starting power unit engine.

■ A minimum 20% of tractor and equipment weight must be on the tractor front wheels when attachments are in transport position. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a loader, front wheel weights, ballast in tires or front tractor weights. Weigh the tractor and equipment. Do not estimate.

OPERATION

■ Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS system in "locked up" position at all times.

■ Operate only in daylight or good artificial light.

■ Keep bystanders away from equipment.

(Safety Rules continued on next page)

SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



(Safety Rules continued from previous page)

- Always comply with all state and local lighting and marking requirements.
- Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.
- Never allow riders on power unit or attachment.
- Always sit in power unit seat when operating controls or starting engine. Securely fasten seat belt, place transmission in neutral, engage brake, and ensure all other controls are disengaged before starting power unit engine.
- Look down and to the rear and make sure area is clear before operating in reverse.
- Use extreme care when working close to fences, ditches, other obstructions, or on hillsides.
- Do not operate or transport on steep slopes.
- Do not stop, start, or change directions suddenly on slopes.
- Use extreme care and reduce ground speed on slopes and rough terrain.
- Watch for hidden hazards on the terrain during operation.
- Stop power unit and equipment immediately upon striking an obstruction. Turn off engine, remove key, inspect, and repair any damage before resuming operation.
- Before leaving operator's seat, lower lift arms and put attachment on the ground. Engage brake, stop engine, remove key, and remove seat belt.

MAINTENANCE

- Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.
- Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death.
- Make sure attachment is properly secured, adjusted, and in good operating condition.
- Never perform service or maintenance with engine running.
- Keep all persons away from operator control area while performing adjustments, service, or maintenance.
- Eye protection must be used when removing or installing scarifier shank clips.
- Tighten all bolts, nuts, and screws to torque chart specifications. Check that all cotter pins are installed securely to ensure equipment is in a safe condition before putting unit into service.

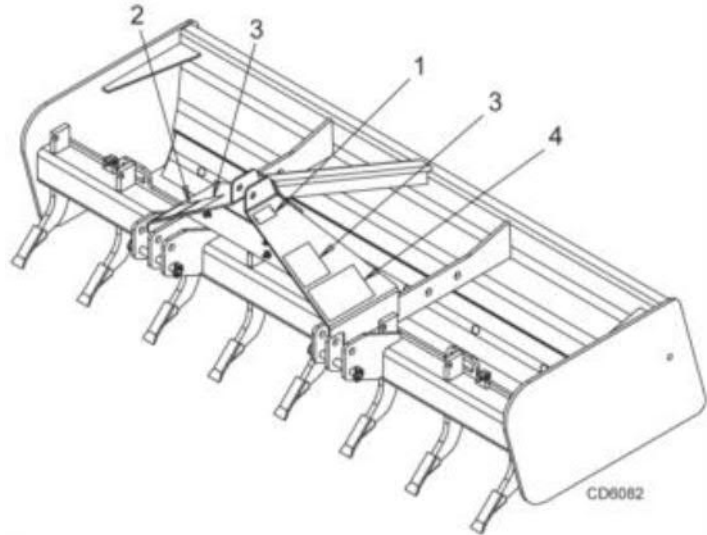
STORAGE

- Block equipment securely for storage.
- Keep children and bystanders away from storage area.

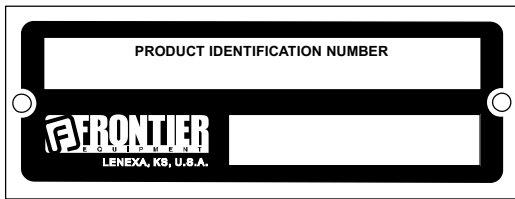


SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!
Replace Immediately If Damaged!



1 - Serial Number Plate



2 - 5WP1002423

 WARNING
TO AVOID SERIOUS INJURY OR DEATH:
<ul style="list-style-type: none"> ■ Read Operator's Manual before operating, servicing or repairing equipment. Follow all safety rules and instructions. (Manuals are available from your selling dealer.) ■ Never allow riders. ■ Keep bystanders away from equipment during operation. ■ Operate from tractor seat only. ■ Keep all shields in place and in good condition. ■ Lower equipment to ground, stop engine, remove key and set brake before dismounting tractor. ■ Never allow children or untrained persons to operate equipment. ■ Do not transport towed or semi-mounted units over 20 MPH.
FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH. 1002423-B

3 - 5WP1003751

 WARNING
   
CRUSHING AND PINCHING HAZARD
<ul style="list-style-type: none"> ■ Be extremely careful handling various parts of the machine. They are heavy and hands, fingers, feet, and other body parts could be crushed or pinched between tractor and implement. ■ Operate tractor controls from tractor seat only. ■ Do not stand between tractor and implement when tractor is in gear. ■ Make sure parking brake is engaged before going between tractor and implement. ■ Stand clear of machine while in operation or when it is being raised or lowered.
FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH. 1003751-A

BE CAREFUL!

Use a clean, damp cloth to clean safety decals.

Avoid spraying too close to decals when using a pressure washer; high-pressure water can enter through very small scratches or under edges of decals causing them to peel or come off.

Replacement safety decals can be ordered free from your dealer.

(Safety Decals continued on next page)



SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!



(Safety Decals continued from previous page)

WARNING	
	<p>FALLING OFF CAN RESULT IN BEING RUN OVER.</p> <ul style="list-style-type: none"> ■ Tractor must be equipped with ROPS (or ROPS CAB) and seat belt. Keep foldable ROPS systems in "locked up" position at all times. ■ Buckle Up! Keep seat belt securely fastened. ■ Allow no riders.
	<p>RAISED IMPLEMENT CAN DROP AND CRUSH.</p> <ul style="list-style-type: none"> ■ Never go underneath raised implement which can drop from equipment or tractor 3-point hitch hydraulic leak down, hydraulic system failures, movement of control levers or mechanical linkage failures. ■ Service work does not require going underneath implement. Read manual instructions.
<p>FALLING OFF OR GOING UNDERNEATH IMPLEMENT CAN RESULT IN SERIOUS INJURY OR DEATH.</p>	
4 - 5WP55121	<small>55121-C</small>

DEALER CHECK LISTS

PRE-DELIVERY CHECK LIST

(DEALER'S RESPONSIBILITY)

Inspect the equipment thoroughly after assembly to ensure it is set up properly before delivering it to the customer.

The following check lists are a reminder of points to inspect. Check off each item as it is found satisfactory or after proper adjustment is made.

- ___ Check that all safety decals are installed and in good condition. Replace if damaged.
- ___ Properly attach implement to tractor and make all necessary adjustments.
- ___ Check all bolts to be sure they are properly torqued.
- ___ Check that all cotter pins and safety pins are properly installed. Replace if damaged.

DELIVERY CHECK LIST

(DEALER'S RESPONSIBILITY)

- ___ Show customer how to make adjustments.
- ___ Point out the safety decals. Explain their meaning and the need to keep them in place and in good

condition. Emphasize the increased safety hazards when instructions are not followed.

- ___ Present Operator's Manual and request that customer and all operators read it before operating equipment. Point out the manual safety rules, explain their meanings and emphasize the increased safety hazards that exist when safety rules are not followed.
- ___ Explain to customer the potential crushing hazards of going underneath raised equipment. Instruct customer that service work does not require going underneath unit and never to do so.
- ___ Show customer the safe, proper procedures to be used when mounting, dismounting, and storing equipment.
- ___ For mounted units, add wheel weights, ballast in front tires, and/or front tractor weight to enhance front end stability. A minimum 20% of tractor and equipment gross weight must be on front tractor wheels. When adding weight to attain 20% of tractor and equipment weight on front tractor wheels, you must not exceed the ROPS weight certification. Weigh the tractor and equipment. Do not estimate!
- ___ Make customer aware of optional equipment available so that customer can make proper choices as required.

OPERATION

The operator is responsible for the safe operation of this equipment. The operator must be properly trained. Operators should be familiar with the equipment, the tractor, and all safety practices before starting operation. Read the safety rules and safety decals, page 4 through page 7.

The box blades are designed for a wide range of applications: scarifying, scraping, leveling, grading, and backfilling.

WARNING

■ Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS system in “locked up” position at all times.

■ Never allow children or untrained persons to operate equipment.

■ Keep bystanders away from equipment.

■ Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.

CAUTION

■ Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.

PRE-OPERATION CHECK LIST

(OWNER'S RESPONSIBILITY)

- ___ Review and follow all safety rules and safety decal instructions, page 4 through page 7.
- ___ Check that equipment is properly and securely attached to tractor.
- ___ Check that all safety decals are installed and in good condition. Replace if damaged.

- ___ Check that all hardware is properly installed and secured.
- ___ Do not allow riders.
- ___ Make sure tractor ROPS or ROPS cab and seat belt are in good condition. Keep seat belt securely fastened during operation.

CONNECTING BOX BLADE TO TRACTOR

The box blade is compatible with tractors equipped with Category 1 or Category 2, 3-point hitch systems that use side-swing type lower lift arms.

The box blades will also fit tractors equipped with a Category 1 Quick Hitch system.

NOTE: When attaching box blade to any hitch other than a standard Category 1 hitch, bushings (Kit 5WP1003832) must be purchased separately.

Category 1 Standard (Figure 1)

1. Attach the tractor's lower lift arms to the box blade through the lower, inner set of holes.
2. Use the mounting pin supplied with your box blade and re-install the lynch pins.
3. Attach the tractor's top link to the box blade's mast using the heavy-duty top link pin and retaining pin supplied with the top link.

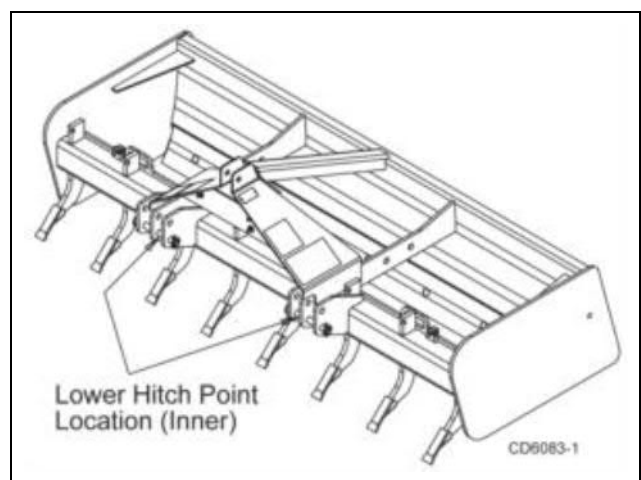


Figure 1. Category 1 Hitch Set-Up

Category 2 Standard (Figure 2)

1. Attach the tractor's lower lift arms to the box blade through the lower, outer set of holes.
2. Slide lower sleeve 5WP1003831 (sold separately) over the mounting pin supplied with box blade. Insert through lower link and re-install the lynch pins.
3. Place upper sleeve 5WP1003886 (sold separately) over top link pin before inserting into top link.
4. Attach the tractor's top link to the box blade's mast using the heavy-duty top link pin supplied with the top link.

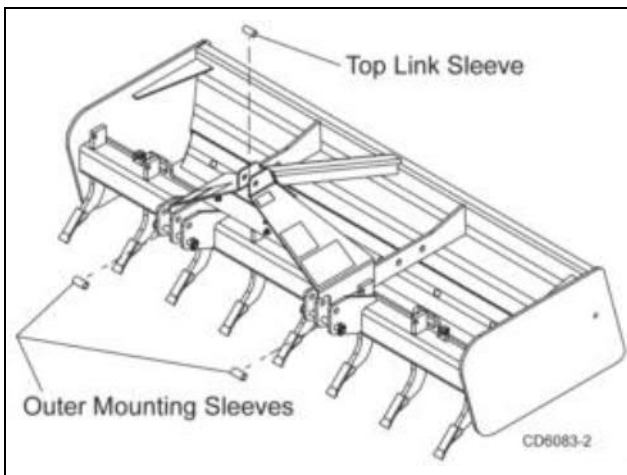


Figure 2. Category 2 Hitch Set-up

Category 1 Quick Hitch (Figure 3)

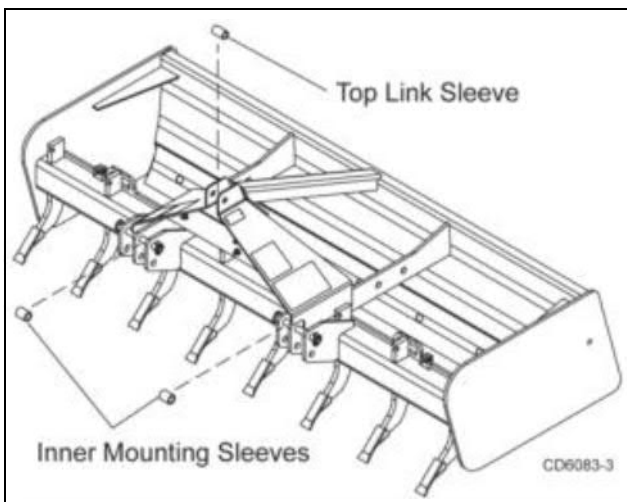


Figure 3. Category 1 Quick Hitch Set-Up

1. Connect the tractor's Quick Hitch to the box blade through the upper, inner set of holes.

2. Slide lower sleeve 5WP1003830 (sold separately) over the mounting pin supplied with box blade. Re-install lynch pins.
3. Slide upper sleeve 5WP1002018 (sold separately) over the heavy-duty top link pin supplied with top link. Re-install retaining pin.

ADJUSTING TOP LINK

The box blade is leveled by adjusting the length of the tractor's top link.

- Shortening the top link will deepen the scarifier tooth penetration.
- Lengthening the top link will provide better scraping and leveling action.

Experience will allow the operator to determine the best setting for the application being done.

SCARIFYING

1. Place the scarifier shanks in position with the points facing toward the tractor.
2. Lock into position with the lock bars provided. The lower shank position provides the greatest ground penetration.
3. Lower the box blade and drive the tractor ahead to begin the scarifying operation.
4. Adjust the depth of the scarifier by tilting the unit with the tractor top link. Shortening the top link will provide deeper and more aggressive operation.

SCRAPING

1. Raise or remove the scarifier shanks. Lower the box blade and drive forward to move material.
2. Adjust the depth of the blade by tilting the unit with the tractor top link.

Shortening the top link when scraping will transfer more weight on the front of the box blade and will raise the cutting blade to provide a more shallow cut.

NOTE: When the top link is adjusted properly, the bowl of the blade should fill easily and material can be pulled to a desired location.

3. To change the level of the blade, shorten or lengthen the tractor lift arm top link to provide the correct slope.
4. Spread material by gradually raising the box blade as the tractor moves forward.

Top link adjustment for loose or previously scarified material will differ from adjustment for hard or compacted material.

BACKFILLING

1. Raise or remove scarifier shanks.
2. Lower the blade to the ground and back up into the fill material.
3. Shorten the top link to raise the cutting blade and control how much the blade digs in.

LEVELING

1. Raise or remove scarifier shanks.
2. Shorten the top link so the cutting edge clears the ground.

3. Drive forward with the box blade in this position and loose material will be leveled.

STORAGE



- Block equipment securely for storage (see Blocking Up Box Blade, page 11).
- Keep children and bystanders away from storage area.



OWNER SERVICE

The information in this section is written for operators who possess basic mechanical skills. If you need help, your dealer has trained service technicians available. For your protection, read and follow the safety information in this manual.

WARNING

■ **NEVER GO UNDERNEATH EQUIPMENT.** Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak-down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death.

- Service work does not require going underneath.
- Read Operator's Manual for service instructions or have service performed by a qualified dealer.

■ **Keep all persons away from operator control area while performing adjustments, service, or maintenance.**

■ **Before leaving operator's seat, lower lift arms and put attachment on the ground. Engage brake, stop engine, remove key, and remove seat belt.**

CAUTION

■ **Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.**

BLOCKING UP BOX BLADE

NOTE: To service the box blade when attached to the tractor, it must be blocked up off the ground.

1. Place two 4" x 4" blocks under each side frame of the box blade as shown in Figure 4.
2. Lower the box blade to rest securely on the blocks.
3. Do not block the machine any higher than needed for removing the shanks or cutting edge.

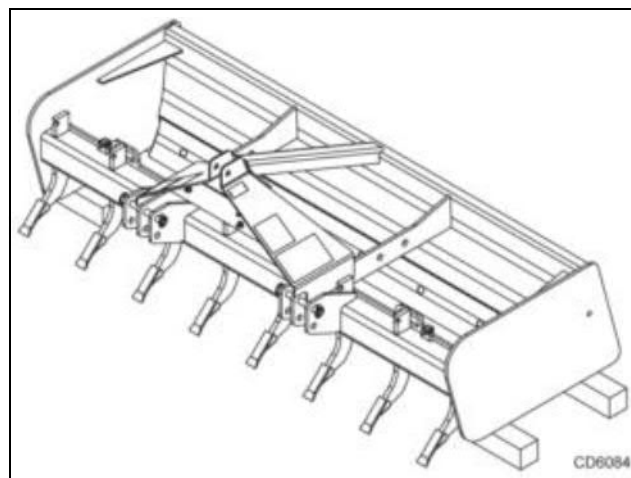


Figure 4. Box Blade Blocked Up

REMOVING SCARIFIER SHANKS

WARNING

■ **Eye protection must be used when removing or installing scarifier shank clips.**

Scarifier shanks have two operating positions in the box blade. They may be removed if scarifying action is not needed

1. Block up machine (see Figure 4).
2. Remove lynch pin and lift lock bar upward to disengage locking lug from behind shank.
3. Disengage shank retaining notch from box blade frame.
4. Remove shank from bottom of tube. Replace lockbars and lynch pins (see Figure 5).

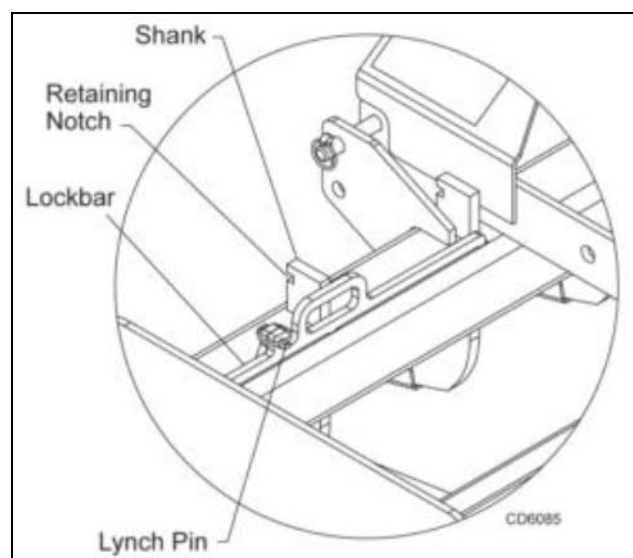


Figure 5. Scarifier Shanks (lock bar installed)

REPLACING SCARIFIER TOOTH

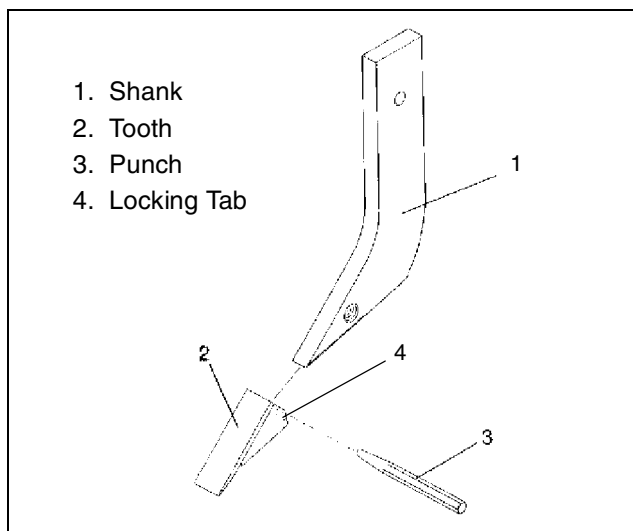


Figure 6. Scarifier Point Replacement

1. Remove scarifier shank from the scarifier bar.
2. Refer to Figure 6. Remove worn tooth by driving a chisel between the shank (1) and tooth (2).
3. Install replacement tooth and use a punch (3) topeen the locking tab (4) into the retaining hole on both sides of the shank.
4. Reinstall the shank in the scarifier bar.

REPLACING CUTTING EDGE

To service the box blade when attached to the tractor, it must be blocked up off the ground (see Figure 4).

1. Lower the box blade to rest securely on the blocks.
NOTE: Do not block the machine any higher than necessary to remove the shanks or cutting edge.
2. Refer to parts drawing, page 13. Remove the lock nuts (5) and plow bolts (4) from blade. Turn cutting edge over and use new edge, or replace it if both edges have been used.

3. Attach cutting edge to box blade and secure with plow bolts and hex nuts previously removed.
4. Torque plow bolts to 170 lbs-ft. See specifications given in Bolt Torque Chart, page 14.

CLEANING

After Each Use

- Remove large debris such as clumps of dirt, grass, crop residue, etc. from machine.
- Inspect machine and replace worn or damaged parts.
- Replace any safety decals that are missing or not readable.

Periodically or Before Extended Storage

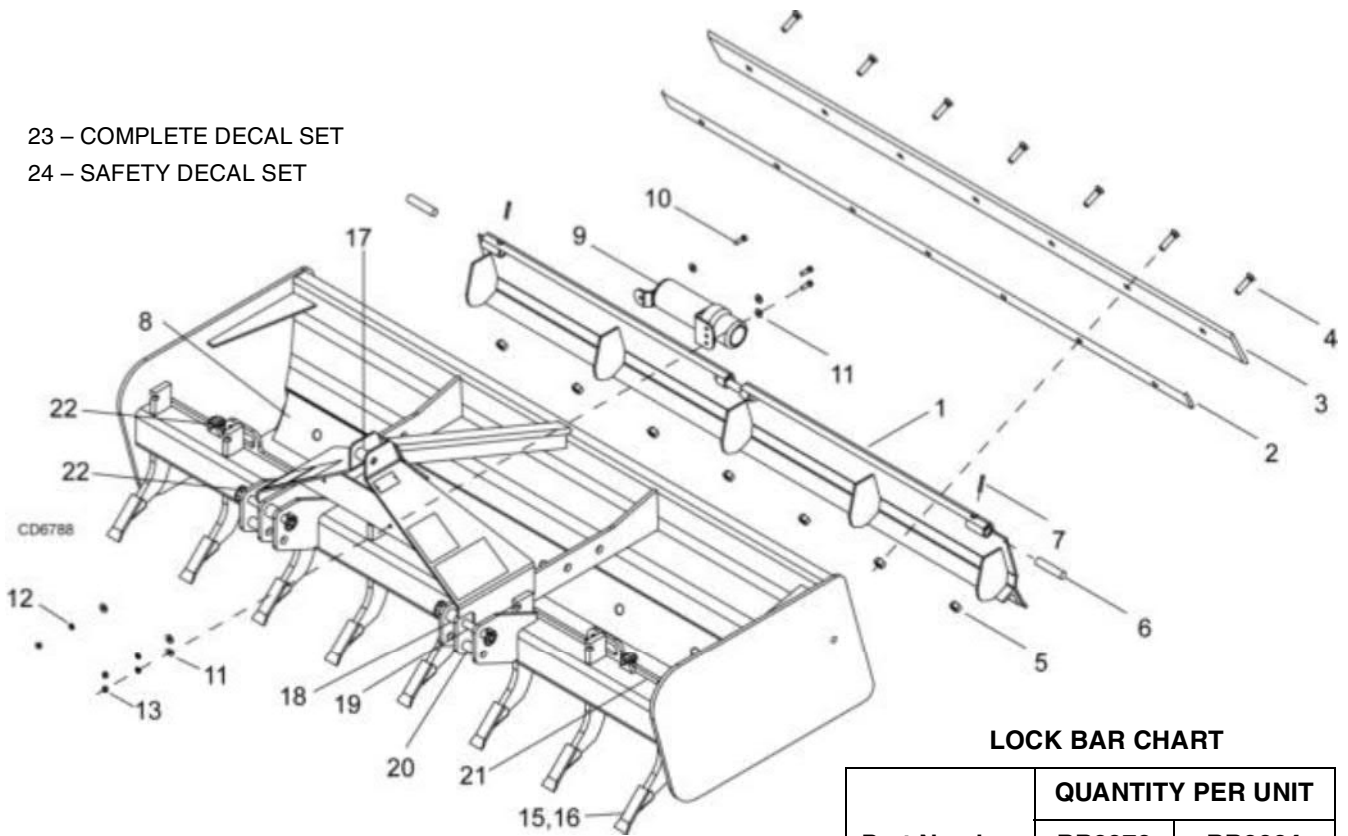
- Clean large debris such as clumps of dirt, grass, crop residue, etc. from machine.
- Remove the remainder using a low-pressure water spray.
 1. Be careful when spraying near scratched or torn safety decals or near edges of decals as water spray can peel decal off surface.
 2. Be careful when spraying near chipped or scratched paint as water spray can lift paint.
 3. If a pressure washer is used, follow the advice of the pressure washer manufacturer.
- Inspect machine and replace worn or damaged parts.
- Sand down scratches and the edges of areas of missing paint and coat with spray paint of matching color (purchase from your dealer).
- Replace any safety decals that are missing or not readable (supplied free by your dealer). See Safety Decals section for location drawing.



BB2272 / BB2284 PARTS LIST

23 – COMPLETE DECAL SET

24 – SAFETY DECAL SET



LOCK BAR CHART

Part Number	QUANTITY PER UNIT	
	BB2272	BB2284
5WP1003797	2	1
5WP1003798	1	2

REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	5WP1003887	1	WA 72" Tailgate	15	5WPR34B15P	A/R	Double notch point/shank asy
1	5WP1003820	1	WA 84" Tailgate	16	5WP28765	A/R	Point
2	5WP1003895	1	Adapter flat cutting edge 72"	17	5WP1003886	∇ A/R	Upper hitch sleeve, Cat 2 standard
2	5WP1003809	1	Adapter flat cutting edge 84"	17	5WP1002018	∇ A/R	Upper hitch sleeve, Cat 1 quick hitch
3	5WP1003894	1	Flat cutting edge 72"	18	5WP1003831	∇ A/R	Lower hitch sleeve, Cat 2 standard
3	5WP1003817	1	Flat cutting edge 84"	19	5WP1003830	∇ A/R	Lower hitch sleeve, Cat 1 quick hitch
4	5WP26169	A/R	Bolt, plow 5/8 NC x 2-1/2"	20	5WPHBL233	2	Pin headless .875 x 6.94"
5		* A/R	Nut, lock 5/8 NC	21			Lock bar scarifier (Refer to Lock Bar Chart)
6	5WP1002449	2	Outer hinge pin	22	5WP27542	A/R	Pin, Klik 7/16 x 2"
7		* 2	Spring pin 5/16 x 2"	23	5WP1007130	1	Complete decal set, English
8	5WP25258	1	Curved cutting edge 72"	24	5WP1007129	1	Safety decal set, English -or-
8	5WP46440	1	Curved cutting edge 84"	24	5WP1011261	-	Safety decal set & manual, French
9	5WP1003828	1	Manual tube assembly				A/R As Required
10		* 3	HHCS 3/8 NC x 1-1/4"				* Standard Hardware, Obtain Locally
11		* 3	Washer, flat 3/8"				∇ Included in Kit 5WP1003832
12		* 3	Washer, lock 3/8"				
13		* 3	Nut, hex 3/8 NC				

BOLT TORQUE CHART

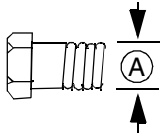
Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application.

Fasteners must always be replaced with the same grade as specified in the manual parts list.

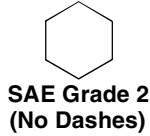
Always use the proper tool for tightening hardware: SAE for SAE hardware and Metric for metric hardware.

Make sure fastener threads are clean and you start thread engagement properly.

All torque values are given to specifications used on hardware defined by SAE J1701 MAR 99 & J1701M JUL 96.



SAE SERIES TORQUE CHART



SAE Bolt Head Identification

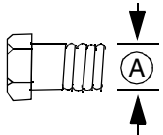


SAE Grade 5
(3 Radial Dashes)



SAE Grade 8
(6 Radial Dashes)

Ⓐ Diameter (Inches)	Wrench Size	MARKING ON HEAD					
		SAE 2		SAE 5		SAE 8	
		lbs-ft	N-m	lbs-ft	N-m	lbs-ft	N-m
1/4"	7/16"	6	8	10	13	14	18
5/16"	1/2"	12	17	19	26	27	37
3/8"	9/16"	23	31	35	47	49	67
7/16"	5/8"	36	48	55	75	78	106
1/2"	3/4"	55	75	85	115	120	163
9/16"	13/16"	78	106	121	164	171	232
5/8"	15/16"	110	149	170	230	240	325
3/4"	1-1/8"	192	261	297	403	420	569
7/8"	1-5/16"	306	416	474	642	669	907
1"	1-1/2"	467	634	722	979	1020	1383



METRIC SERIES TORQUE CHART



Metric
Grade 8.8

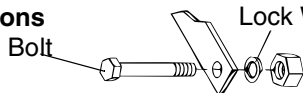
Metric Bolt Head Identification



Metric
Grade 10.9

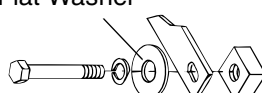
Ⓐ Diameter & Thread Pitch (Millimeters)	Wrench Size	Coarse Thread				Fine Thread				Ⓐ Diameter & Thread Pitch (Millimeters)
		Marking on Head				Marking on Head				
		Metric 8.8		Metric 10.9		Metric 8.8		Metric 10.9		
		N-m	lbs-ft	N-m	lbs-ft	N-m	lbs-ft	N-m	lbs-ft	
6 x 1.0	10 mm	8	6	11	8	8	6	11	8	6 x 1.0
8 x 1.25	13 mm	20	15	27	20	21	16	29	22	8 x 1.0
10 x 1.5	16 mm	39	29	54	40	41	30	57	42	10 x 1.25
12 x 1.75	18 mm	68	50	94	70	75	55	103	76	12 x 1.25
14 x 2.0	21 mm	109	80	151	111	118	87	163	120	14 x 1.5
16 x 2.0	24 mm	169	125	234	173	181	133	250	184	16 x 1.5
18 x 2.5	27 mm	234	172	323	239	263	194	363	268	18 x 1.5
20 x 2.5	30 mm	330	244	457	337	367	270	507	374	20 x 1.5
22 x 2.5	34 mm	451	332	623	460	495	365	684	505	22 x 1.5
24 x 3.0	36 mm	571	421	790	583	623	459	861	635	24 x 2.0
30 x 3.0	46 mm	1175	867	1626	1199	1258	928	1740	1283	30 x 2.0

Typical Washer Installations



Lock Washer

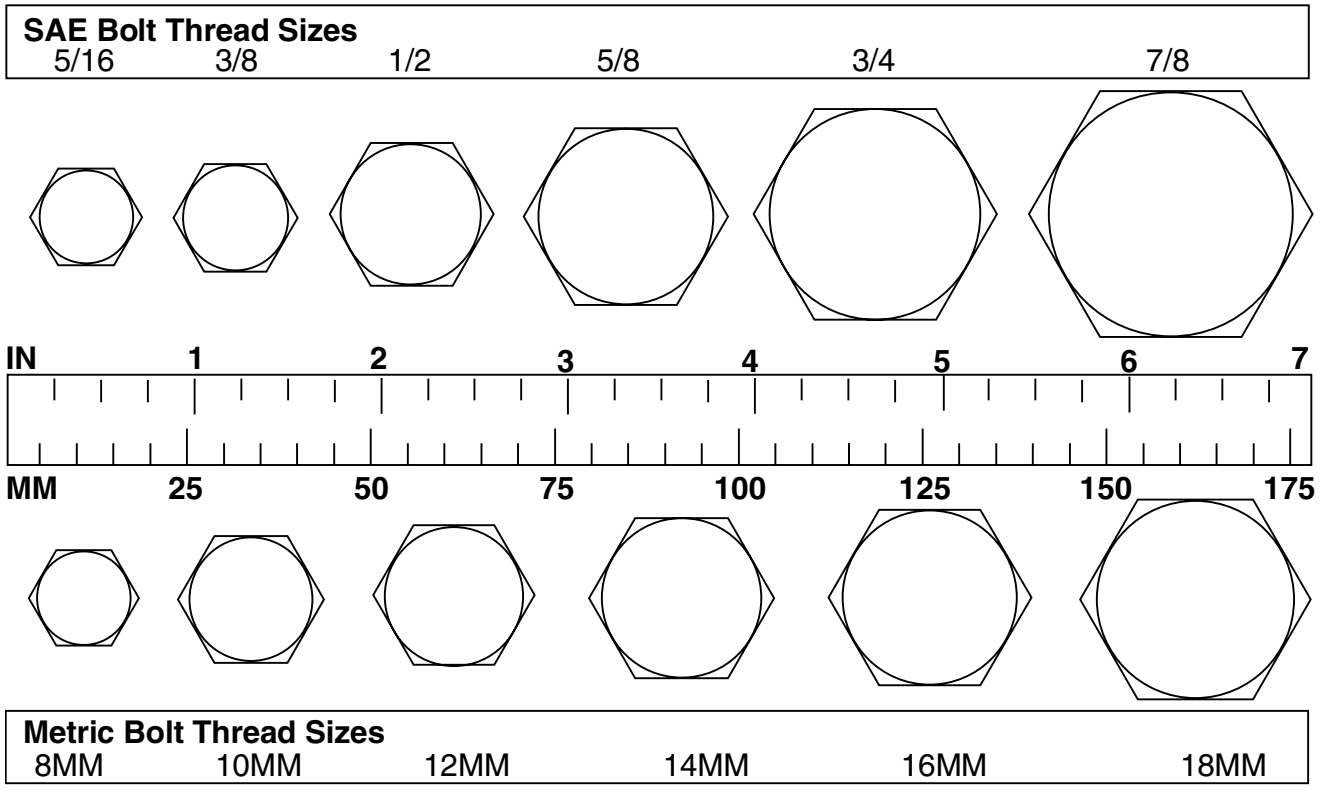
Flat Washer



8/9/00

BOLT SIZE CHART

NOTE: Chart shows bolt thread sizes and corresponding head (wrench) sizes for standard SAE and metric bolts.



ABBREVIATIONS

AG	Agriculture	MPa	Mega Pascal
ASABE.....	American Society of Agricultural & Biological Engineers (formerly ASAE)	N.....	Newton
ASAE	American Society of Agricultural Engineers	NC	National Coarse
ATF	Automatic Transmission Fluid	NF	National Fine
BSPP	British Standard Pipe Parallel	NPSM.....	National Pipe Straight Mechanical
BSPTM	British Standard Pipe Tapered Male	NPT	National Pipe Tapered
CV.....	Constant Velocity	NPT SWF	National Pipe Tapered Swivel Female
CCW	Counter-Clockwise	ORBM	O-Ring Boss - Male
CW.....	Clockwise	P.....	Pitch
F	Female	PBY	Power-Beyond
FT	Full Thread	psi.....	Pounds per Square Inch
GA	Gauge	PTO	Power Take Off
GR (5, etc.)	Grade (5, etc.)	QD.....	Quick Disconnect
HHCS	Hex Head Cap Screw	RH	Right Hand
HT	Heat-Treated	ROPS.....	Roll-Over Protective Structure
JIC	Joint Industry Council 37° Degree Flare	RPM	Revolutions Per Minute
LH.....	Left Hand	RT	Right
LT.....	Left	SAE	Society of Automotive Engineers
m.....	Meter	UNC	Unified Coarse
mm.....	Millimeter	UNF	Unified Fine
M.....	Male	UNS.....	Unified Special

PART NUMBER
5WPMAN0266

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