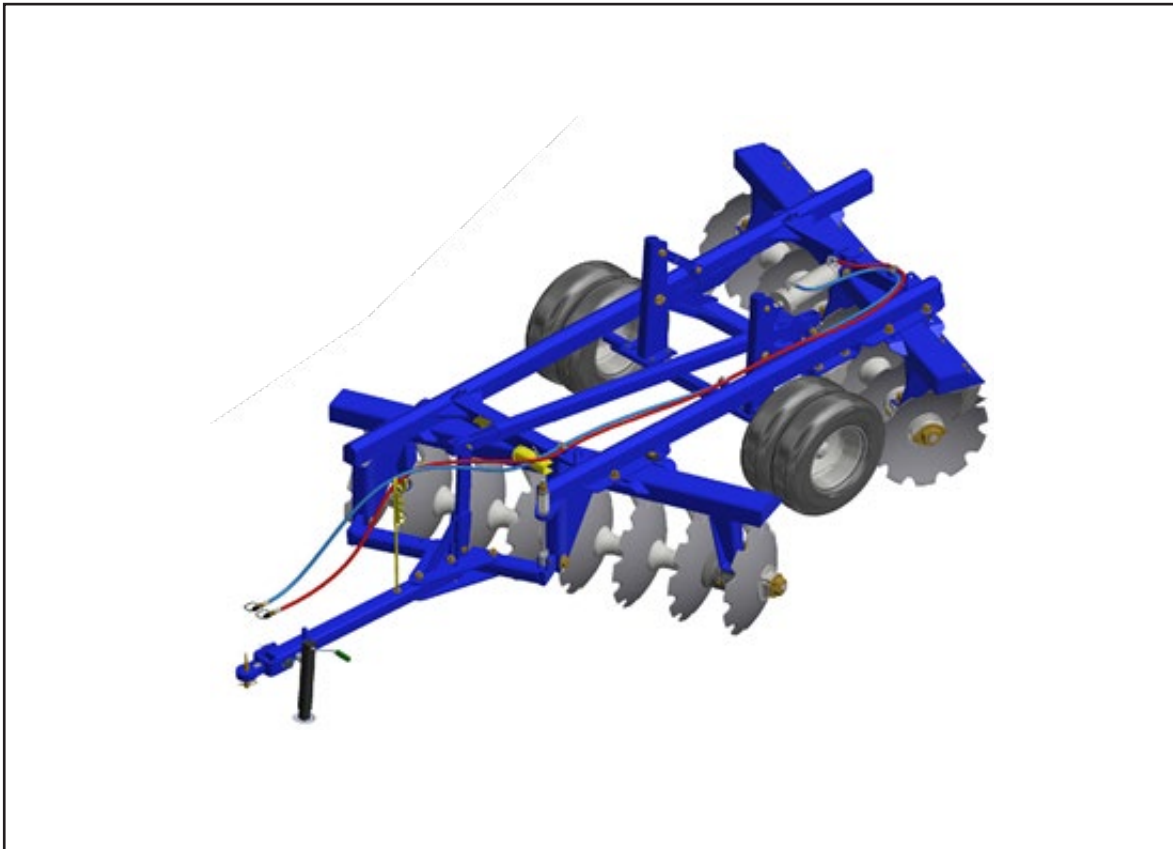




INSTRUCTION MANUAL



HDW & EHDW FRAME MODELS

IDENTIFICATION

INTRODUCTION

ASHLAND INDUSTRIES disc harrows are designed to work in any kind of soil with excellent application, mainly in newly cleared areas, in the heavy sugar cane renewal, pasture recovery, construction of highways or in the simple primary soil tillage for annual and perennial crops, disaggregating and incorporating stubbles to greater depths.

The heavy-duty structure with proper dimensioning is made of bent steel plates joined by a good penetration and fine finishing welding process, with tough parts in the mechanical load concentrations.

These harrows transportation are made through an efficient wheel-set system composed on tires and hydraulic cylinder, which allows long-distance transportation. The wheel-set system also activates the operation by the fast and precise working depth control as well as facilitates the accomplishment of maneuvers during the service.

This instruction manual contains the necessary information for the best performance of these harrows. The operator must carefully read the entire manual before working with the equipment. Also, read and understand the safety recommendations.



TABLE OF CONTENTS

TO THE OWNER	3
TO THE OPERATOR	4 - 8
Working Safely	4
Truck or Trailer Transportation	7
Safety Stickers	8
DATA SHEET	9
COMPONENTS	10
ASSEMBLY	11-22
Using the Set of Wrenches / Disc Gangs Assembly	11
Assembly of Bearings and Spacer Spools	12
Disc Gangs Assembly Sequence	13-14
Assembly of the Disc Gangs on the Frame	15
Scraper Assembly	16
Assembling the Disc Carrier to the Frame / Tire Assembly	17
Wheel-set Bearings Adjustment	18
Drawbar Assembly	19
Hose Assembly	20
Hydraulic Circuit - HDW3217-18 & EHDW3620-14	21
SET-UP INSTRUCTIONS	22-24
Preparing the Tractor / Preparing the Harrow / Hitching to the Tractor	22
Important Recommendations	23
Cutting Depth - Opening the Disc Gangs	24
ADJUSTMENTS & OPERATIONS	25-30
Tractor Position Related to the Previous Pass - Lateral Displacement	25
Drawbar Angles	26
Ways to Start the Harrowing	27
Correct Way for Harrowing	28
Troubleshooting	29
Operations - Important Points	30
MAINTENANCE	31-34
Lubrication	31
Lubrication Points	32
Harrow Maintenance / Maintenance Precautions	33
Lifting Points	34
TORQUE TABLE	35
IMPORTANT	36

TO THE OWNER

The acquisition of any ASHLAND INDUSTRIES product assures to the original purchaser, the following rights:

- Warranty certificate
- Instruction manual
- Technical assistance by the dealer on equipment delivery

However, the owner must check the condition of the equipment on delivery, as well as know the warranty terms.

Special attention should be given to the safety recommendations, operation precautions and maintenance of the equipment.

The instructions in this manual indicate how to get the best performance and allow the operator to get maximum income, increasing the equipment lifetime.

This manual should be read by operators and maintenance staff.

IMPORTANT

- **Only people who own a full knowledge of the tractor and equipment must operate them**
- **Ashland Industries is not responsible for any damage caused by accident on transporting, incorrect utilization or inadequate storage, either by negligence and/or lack of experience from any person**
- **Ashland Industries is not responsible for any damage caused by unpredictable situations or the incorrect use of the equipment**

GENERAL INFORMATION

Right and left hand side indication are made observing the equipment from the rear.
To order any parts or request technical assistance services, it is required to provide the data contained on the nameplate, which is located on the equipment frame.

NOTE

The warranty shall not be applied to any equipment, or any parts thereof, which has been altered elsewhere than at the place of manufacture or which the original purchaser thereof, at retail, has used or allowed to be used parts, not made or supplied by Ashland Industries.

TO THE OPERATOR

BE CAREFUL WITH THE ENVIRONMENT



Dear User! Respect the environment. Do not throw trash away. This gesture of goodwill helps to protect our environment.



Products such as oil, fuel, filter, batteries and others that are spilled to the soil and can penetrate to the underground layers, compromising nature. Ecological and conscious disposal of them should be done.

WORKING SAFELY



- **Security aspects must be carefully observed to avoid accidents**
- **This symbol is a warning to prevent accidents**
- **The instructions under this symbol refers to the safety of the operator or third parties, therefore they should be carefully read and observed.**

These disc harrows are simple to operate, requiring however the basic and essential cautions to their handling.

Always keep in mind that safety requires constant attention, observation and prudence during the transportation, maintenance and storage.



Read and understand the information before making any adjustments or maintenance.



Have extreme caution when operating with the power take-off (PTO). Do not get closer during operation.

TO THE OPERATOR



Never use your bare hands to check hydraulic leaks, the high pressure can cause injuries.



Never attempt to change the adjustments, clean or lubricate the equipment when the same is switched on or in movement.



Be careful while driving on slopes. Risk of overturn.



Prevent chemical products (i.e.: fertilizers, treated seeds) from making any contact with your skin or clothes.



Keep access and work places clean or free from oil and grease. Risk of accidents.



Never transport the equipment on highways or paved roads during the night. Prevent tractor wheels from touching the drawbar in sharp turns.



The presence of any other people on the tractor or equipment is strictly forbidden.



Have extreme caution when driving under electrical power lines. Any contact may result in severe shocks, injuries or death.



For your protection and safety, always wear adequate clothes and footwear while operating the equipment.



Always use the safety locks to carry out maintenance operations and to transport the equipment.

TO THE OPERATOR



- Only trained and qualified personnel are allowed to operate the equipment.
- While working or during transportation, only the presence of the operator is allowed on the tractor.
- Do not allow children to play or to get over the equipment while it is operating, during transportation or storage.
- Have full knowledge of the soil before starting to work. Use the speed which is suitable to the conditions of the ground. Provide the delineation of obstacles or hazardous locations.
- Use personal protective equipment (PPE).
- Wear appropriate clothes and footwear. Avoid clothes that are either loose or hanging from the body, which may become entangled in moving parts.
- Never operate the equipment without its **protective devices**.
- Be careful while hitching the equipment to the tractor.
- Wear appropriate gloves near the disc blades.
- When setting the harrow to transport position, check if there are no people or animals close or under the equipment.
- Never attempt to change the adjustments, clean or lubricate the equipment while it is moving.
- In case of emergency, know how to stop the tractor and harrow quickly.
- Always shut down the engine, remove the key and use the handbrake before leaving the tractor seat.
- Only drive the equipment using a tractor with appropriate power.
- Carefully check the transport width on narrow locations.
- Whenever you unhitch the equipment, either in the field or shed, do it on a flat and firm surface and use the parking stands. Make sure the equipment is properly supported.
- Do not drive the equipment under the influence of alcohol or any medication, as it may result in a serious accident.
- In case of a fire outbreak or any possible hazard, the operator must leave the area as fast as possible and look for a safe place. Always have emergency numbers on hand.
- Please check the general safety instructions on the back cover of this manual.

TO THE OPERATOR

TRUCK OR TRAILER TRANSPORTATION



Ashland Industries does not advise the equipment traffic on highways, because this practice involves serious security risks in addition to being prohibited by the current existing traffic law. The transportation for long distances should be done on truck, trailer or other by following these safety guidelines.

- Use adequate ramps to load or unload the equipment. Do not make the loading on ditch banks, it can cause a serious accident
- When lifting with a hoist, use the appropriate points to lift.
- Fasten the moving parts that may get loose and cause accidents.
- Underpin the equipment wheels appropriately.
- Use chock blocks and safety chains to secure the equipment to the truck or trailer during the transport.
- After 5 to 7 miles transporting, please inspect the load condition. Repeat this procedure every 50 to 60 miles. Give more attention when transporting the equipment on rough roads, slopes and other adverse conditions.
- Always be careful with the load height, especially when passing under electrical power lines, bridges and others.
- Check all laws and regulations regarding the height limits and load width while transporting the equipment to the truck or trailer. If necessary use banners, lights and other devices in order to give adequate warning to other drivers.

TO THE OPERATOR

SAFETY STICKERS

The safety stickers warn about the equipment points that require more attention and they should be kept in good repair. IF these stickers become damaged or illegible, replace them. Ashland Industries provides stickers, upon request and indication of the respective serial number.



LUBRICATE AND TIGHTEN DAILY

STICKER SET

Model

HDW3217-18

EHDW3620-14

Serial Number

05.03.06.0788

05.03.06.0832

DATA SHEET

Type:.....Wheel Type Offset Disc Harrow
Model:.....EHDW3620-14
Number of disc blades:.....14
Spacing between disc blades (mm):.....340
Disc blades dimension:32" x 12.0mm
Disc blade type:.....Concave notched
Bearings - Length:.....330 mm
- Type:.....Tapered roller bearings
Spacer spools - Length:.....330 mm
- Type:.....Cast
Axle diameter:.....2 1/8"
Hitching type:.....Drawbar
Tires (4):.....7.5 x 16 - 10 tarps (60 PSI)
Working speed:.....3 to 4.5 mph

Type:.....Offset Disc Harrow
Model:.....HDW3217-18
Number of disc blades:.....18
Spacing between disc blades (mm):.....440
Disc blades dimension:32" x 12.0 mm
Disc blade type:.....Concave notched
Bearings - Length:.....430 mm
- Type:.....Tapered roller bearings
Spacer spools - Length:.....430 mm
- Type:.....Cast
Axle diameter:.....2 1/2"
Hitching type:.....Drawbar
Tires (2):.....9.0 x 0 - 14 tarps (90 PSI)
Working speed:.....3.1 to 4.3 mph

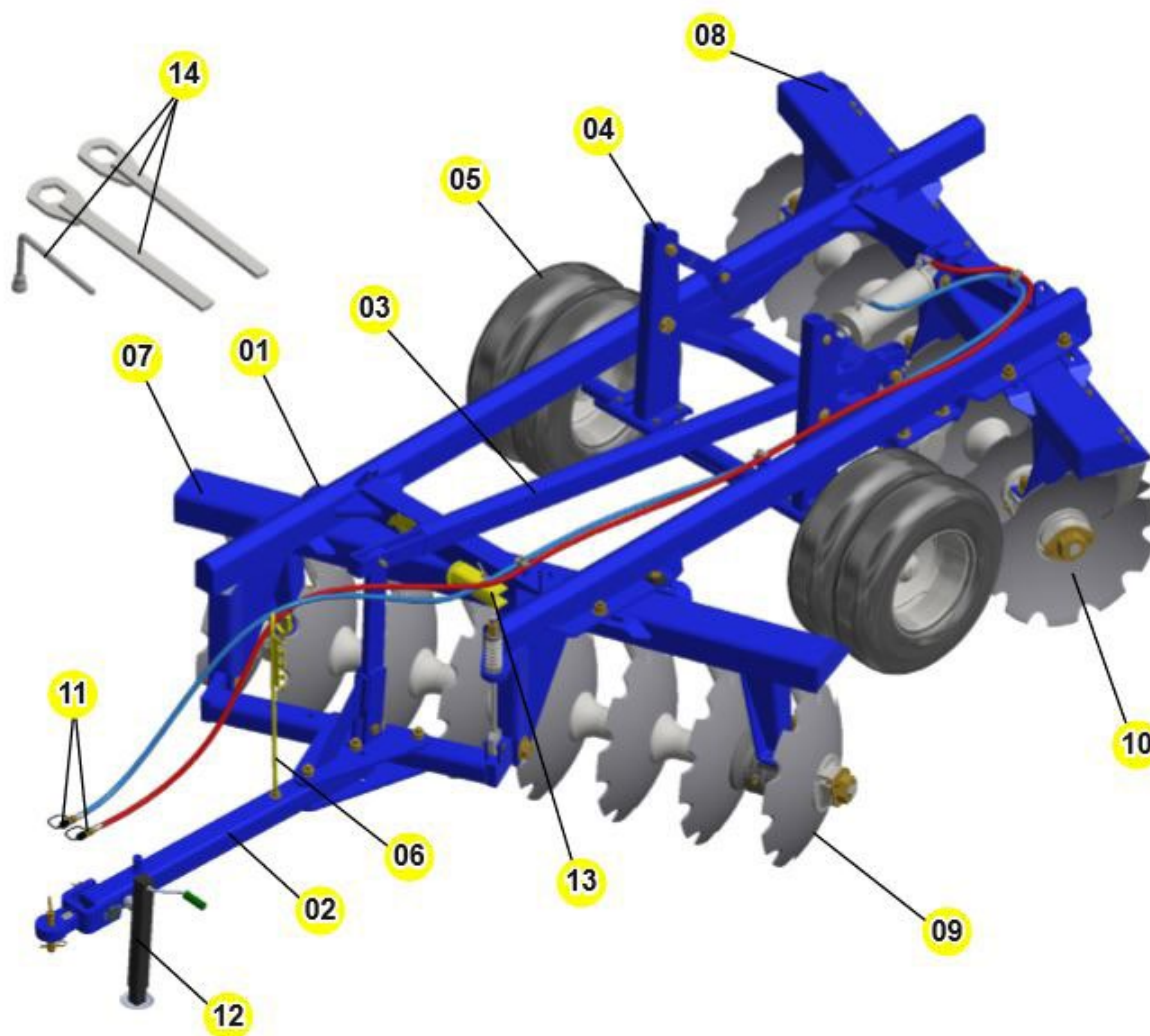
NOTE

The weights above were obtained using 34' x 12 mm disc blades.

COMPONENTS

HDW3217-18

- | | |
|------------------------------------|------------------------|
| 01 - Frame | 08 - Rear disc carrier |
| 02 - Drawbar | 09 - Front disc gang |
| 03 - Stabilizer bar | 10 - Rear disc gang |
| 04 - Wheel-set articulation system | 11 - Hydraulic circuit |
| 05 - Tires | 12 - Jack |
| 06 - Hose support | 13 - Transport lock |
| 07 - Front disc carrier | 14 - Wrenches |



ASSEMBLY

First of all, put the parts in a clean place to identify them easier. Check the parts using the list that comes inside the packing box.

USING THE SET OF WRENCHES

Use two box end wrenches (A) to tighten the nuts of the disc gang, being one to hold the axle nut on one side while the other tightens the nut to the other end, thereby preventing the axle from rotating.

The box end wrench (B) is used to tighten the nuts that hold the bolts on the bearings from the HDW3217-18 model (18 blades); the same wrench (B) is used to tighten the nuts on the wheel-set posts from HDW3217-18 (18 blades) and EHDW3620-14 (14 blades) models.

The box end wrench (D) is used to tighten the bolts on the drawbar from HDW3217-18 (18 blades) and EHDW3620-14 (14 blade) models.



NOTE

We recommend wearing gloves, especially while assembling the disc gangs.

DISC GANG ASSEMBLY

Before starting to assemble the disc gangs, check the correct position of the bearings and spacer spools, according to the following pages.

ASSEMBLY

ASSEMBLY OF BEARINGS AND SPACER SPOOLS



EHDW3620-14
14 Disc blades
04 bearings
08 spacer spools



EHDW3620-14
14 Disc blades
04 bearings
08 spacer spools



ASSEMBLY

DISC GANGS ASSEMBLY SEQUENCE

Place the outer lock (A) along with the axle (B).

Tighten the nut (C) passing 5mm from the axle face.

Place the disc blades (D), bearings (E) and spacer spools (F), following the instructions on page 12.

Place the inner lock (G) and the outer nut (C-1).

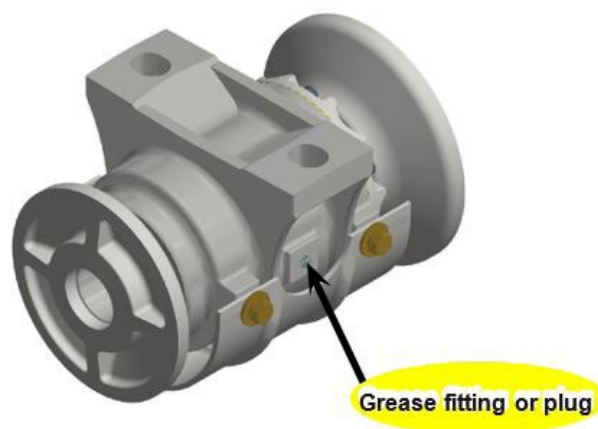
Place the bolt (H) that fasten the nut lock (I) along with a spring washer and nut. (Only on the outer side of the gangs).

Use the wrenches from page 11 to tighten the gangs, as follows:

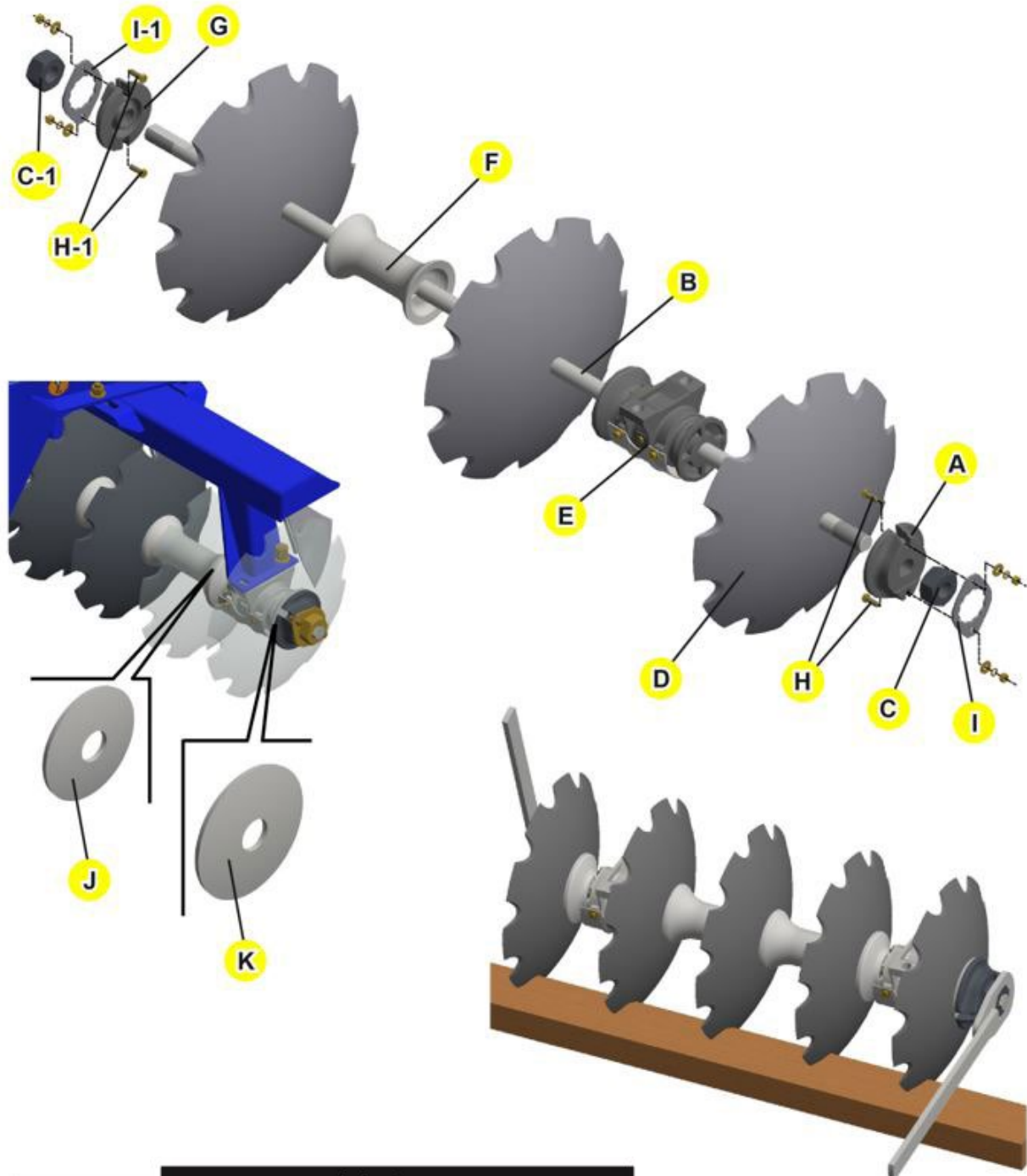
1. Place one of the wrenches on the outer side of the gangs (locked side), supporting it on the ground. (Figure on page 14).
2. On the outer side, use the other wrench and tighten the gangs to get maximum torque.
3. To tighten, the gangs must remain underpinned with a piece of wood or another object, preventing them from moving. (Figure on page 14).
4. Lastly, place the bolt (H-1) and position the lock nut (I-1), fastening with a spring washer and nut.

IMPORTANT

Check the correct side of the bearings and spacer spools according to the concavity of the disc blades.



ASSEMBLY



Axle torque	
Axle diameter	Ft. - lbs.
1.1/2"	2670
1.5/8"	2890
2.1/8"	3300
2.1/2"	3500

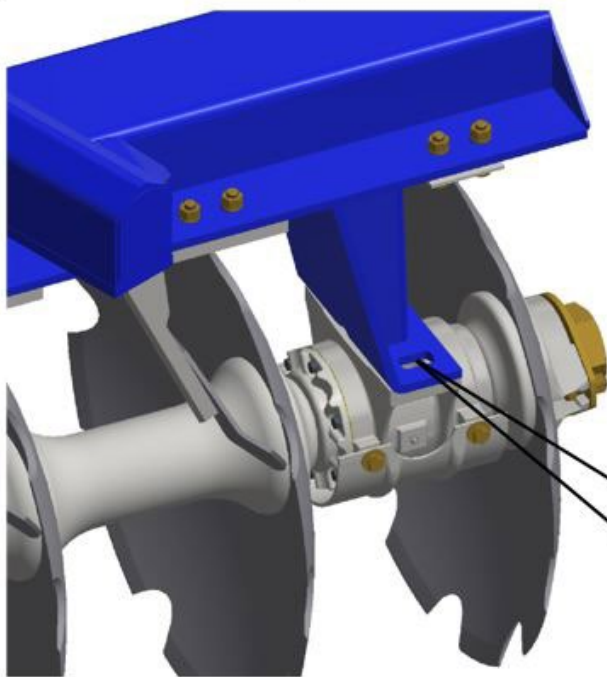
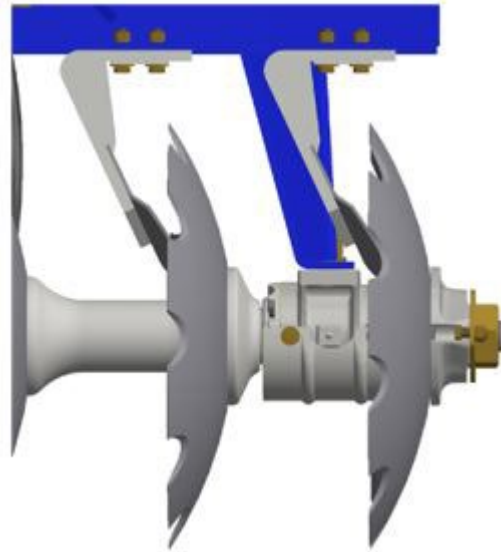
ASSEMBLY

ASSEMBLY OF THE DISC GANGS ON THE FRAME

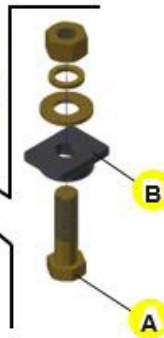
IMPORTANT

*The rear gang turns earth to the left and the front gang turns earth to the right.
(Check figure on page 12).*

In the gang assembly to the carriers, the bearing hangers should remain facing the disc blades concavity.



Place a bolt (A) with square washer (B) and pass it through the bearing and the bearing hanger hole, On top, place a flat washer and nuts. Repeat this operation for the other bearings.

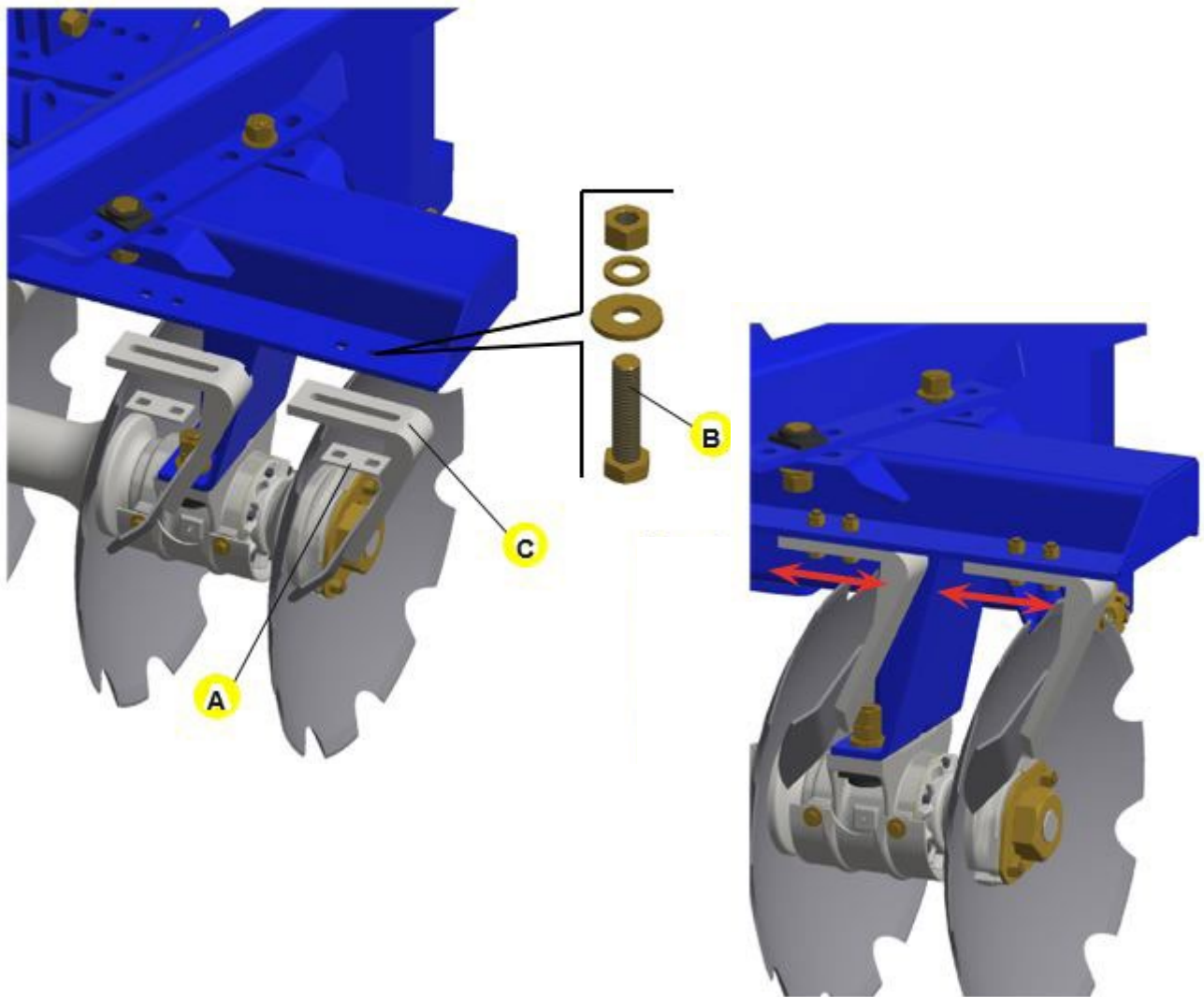


ASSEMBLY

SCRAPERS ASSEMBLY

Note the fixing points of the scrapers with the end facing the concave side of the disc blades.

Assemble the scrapers (A) using a bolt (B) underneath the fixation plate (C). On top, place a flat washer, spring washer and nut.



NOTE

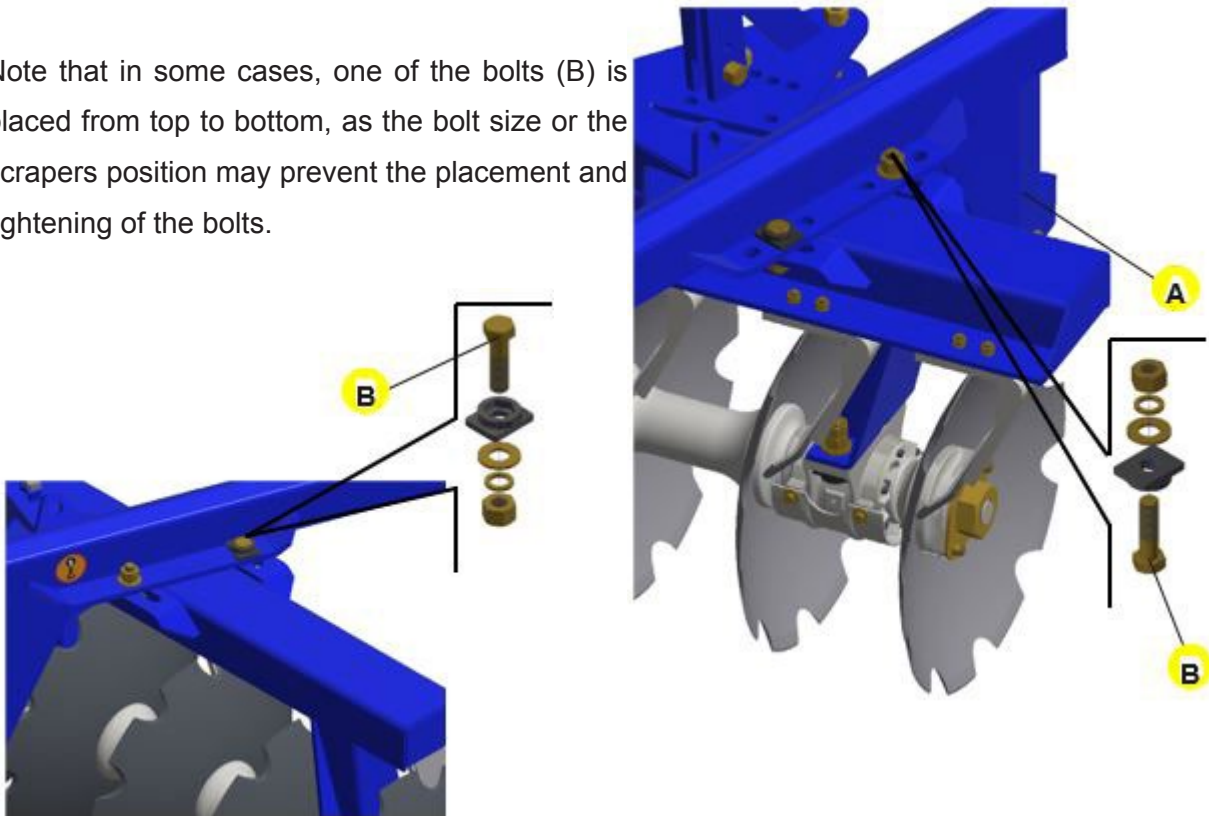
The scrapers feature an adjustment to approach or distance them from the disc blades, on a range from 5 to 10 mm.

ASSEMBLY

ASSEMBLING THE DISC CARRIER TO THE FRAME

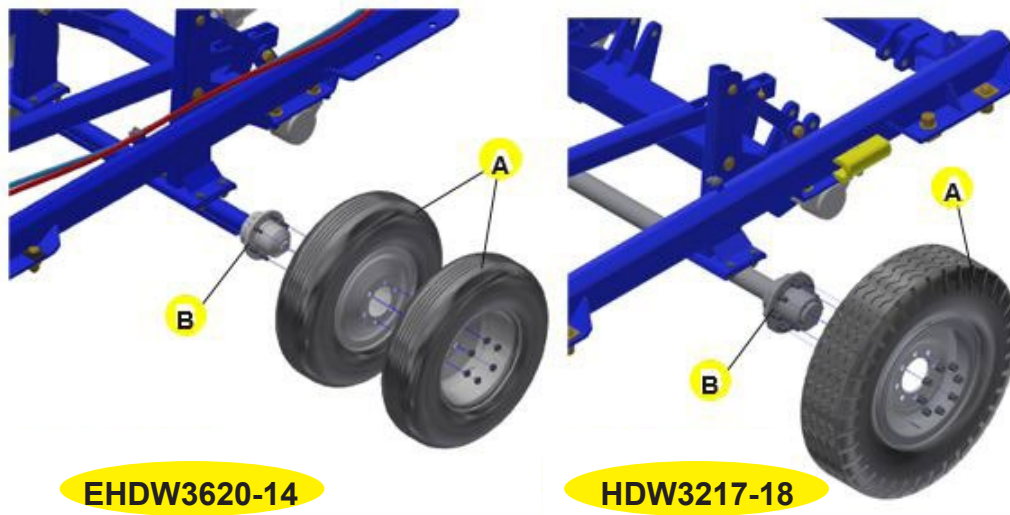
Fasten the disc carrier (front and rear) to the frame (A) using bolts (B), square washer, flat washer and nuts from bottom to top.

Note that in some cases, one of the bolts (B) is placed from top to bottom, as the bolt size or the scrapers position may prevent the placement and tightening of the bolts.



TIRES ASSEMBLY

Assemble the tires (A) to the hubs (B) using the nuts.



EHDW3620-14

HDW3217-18

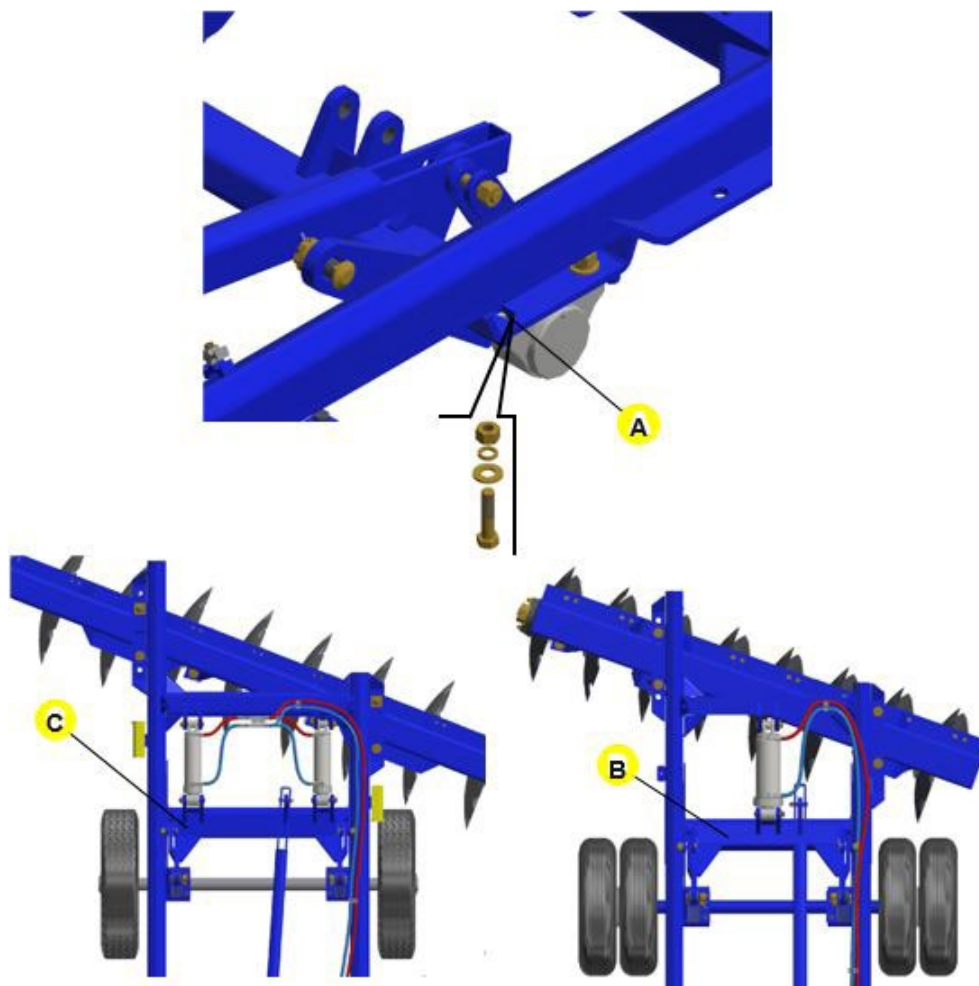
ASSEMBLY

WHEEL-SET BEARINGS ADJUSTMENT

The harrows allow adjustments on the wheel-sets through slots (A). This adjustment is done to centralize the wheel-sets with the harrow structure and to eliminate lateral gaps between the articulation axle and the bearings.

Harrows with one cylinder: Adjust the bearings centralizing the wheel-set with the frame. Note that the tires must have the same distance in relation to the frame. The wheel-set axle (B) should be without inner gaps against the bearings.

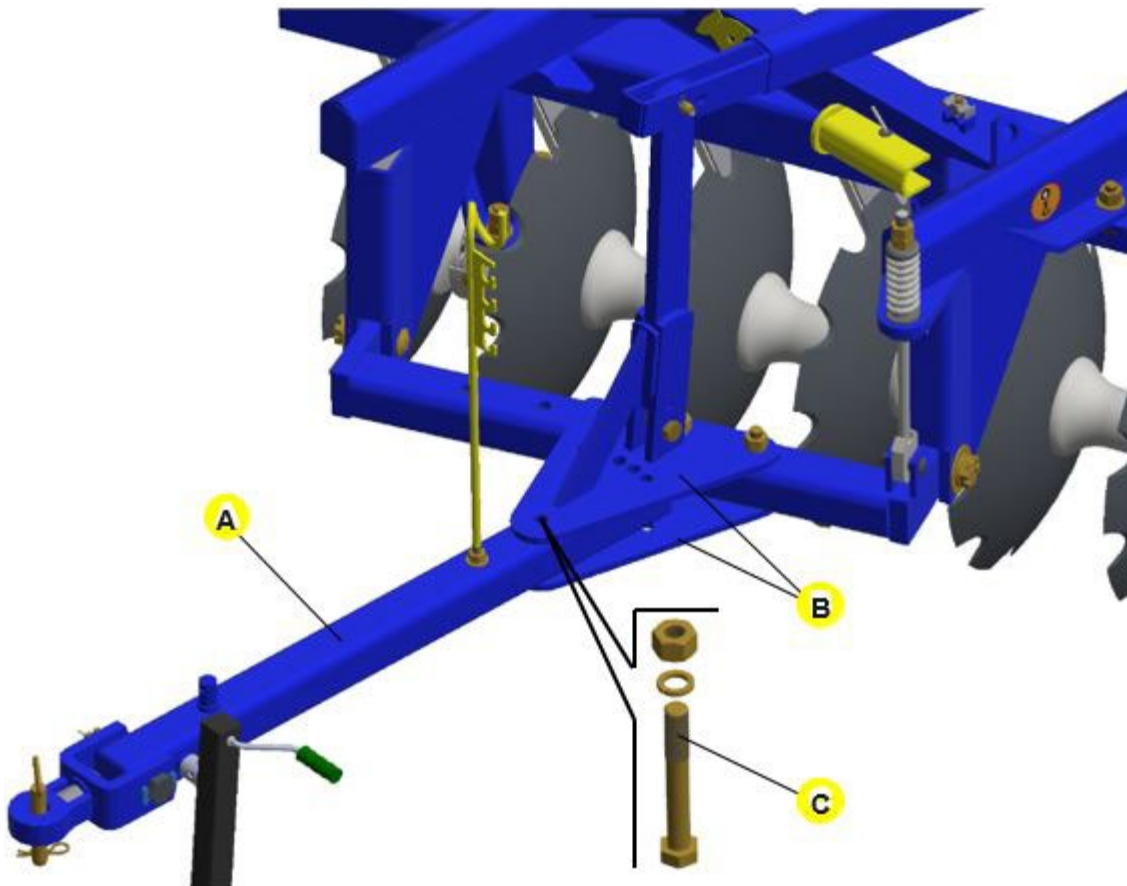
Harrows with two cylinders: Adjust the bearings centralizing the wheel-set with the frame. Note that the tires or the supporting posts must have the same distance in relation to the frame. The wheel-set axle (C) should be without inner gaps against the bearings.



ASSEMBLY

DRAWBAR ASSEMBLY

Couple the drawbar (A) to the plates (B) using bolts (C), spring washers and nut for lighter harrows. For heavier harrows, use bolts (D), castle nuts and cotter pins. Check the plates (B) adjustment on page 29.



ASSEMBLY

HOSES ASSEMBLY

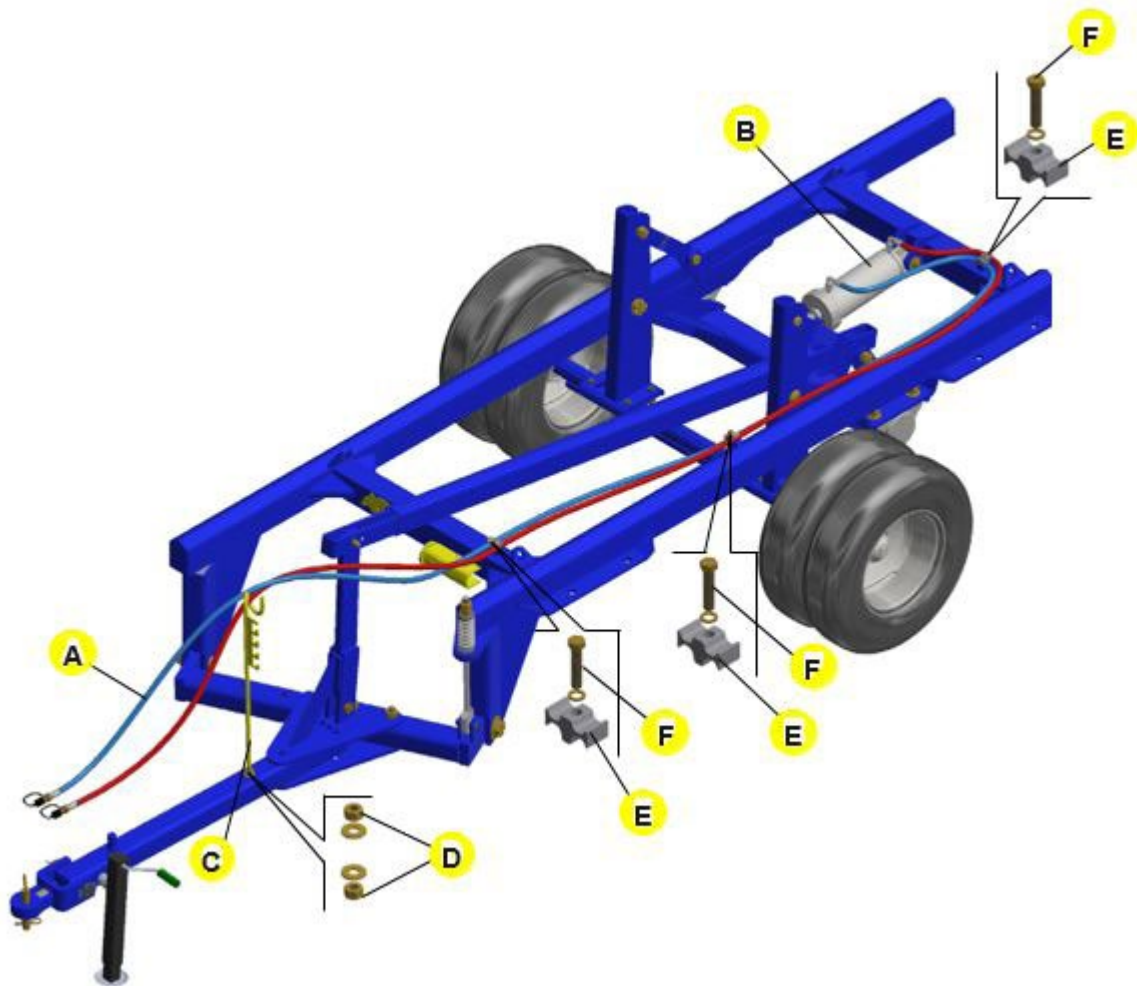
Connect the hoses (A) to the hydraulic cylinder (B) with proper tightening and avoid that the terminals touch the soil.

NOTE

Keep the terminals upwards.

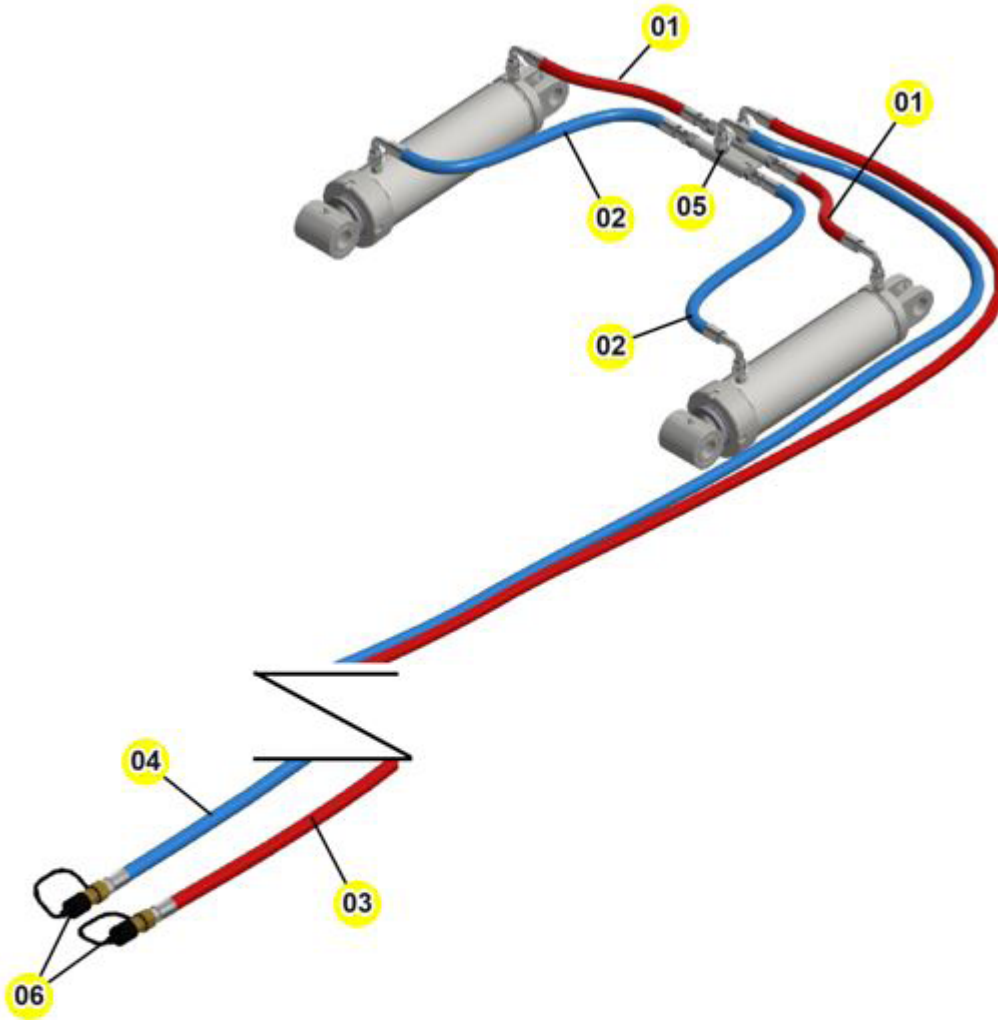
Always use thread sealing tape to couple the 'male' quick couplers to the hoses.

Then, fasten the hose support (C) to the drawbar hole using nuts (D), flat washers and spring washers. Couple the clamps (E) to the frame using bolts (F).



ASSEMBLY

HYDRAULIC CIRCUIT HDW3217-18 & EHDW3620-14



Item	Description	Quantity	
01	3/8 X 450 TR - TC hose	02	Pressure
02	3/8 X 700 TR - TC hose	02	Return
03	3/8 X 8000 TC - TM hose	01	Pressure
04	3/8 X 8200 TC - TM hose	01	Return
05	Double connection	01	
06	Male quick couplers	02	

SET-UP INSTRUCTIONS

The following instructions should be carefully observed in order to maintain the best performance at work.

PREPARING THE TRACTOR

The addition of water ballasts in the tires and extra counterweights in the front or at rear tractor wheels, are the most useful ways to increase the traction in the soil and get larger stability to the tractor.

PREPARING THE HARROW

- Verify the conditions of all parts and re-tighten nuts and bolts, mainly the ones on the disc gangs, as damage to the axles and other components may occur if they work loose.
- Check the tire inflation; keep the same pressure in both.
- Lubricate all grease fittings appropriately. (See lubrication instructions on pages 33-34).

HITCHING TO THE TRACTOR

Approach the tractor and couple the hoses to the quick couplers. To do so, turn off the engine, relieve the control valve pressure and check if the couplers are clean.

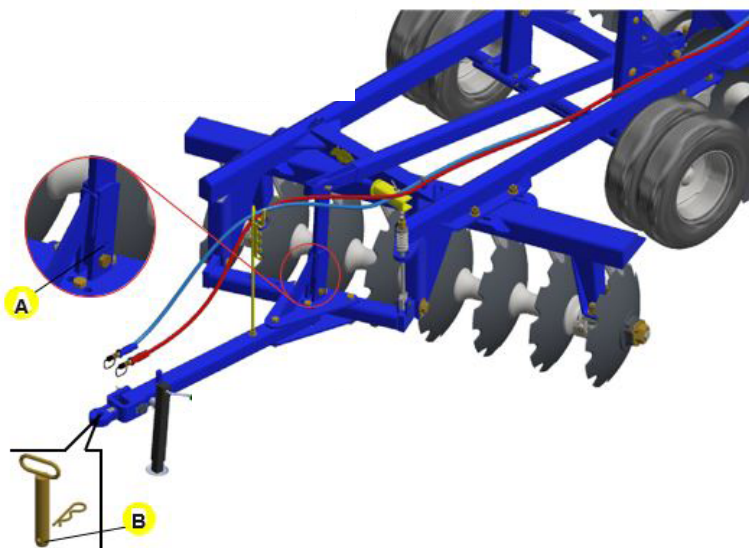
- Activate the control valve to lower the tires in order to put a pin in the hole (A).
- Activate the control valve to lift the tires so that the drawbar will be at the same height of the tractor bar.
- Place the hitch pin (B) and lock it.

NOTE

The pin (A) is not included with the equipment.

ATTENTION

- After the harrow was hitched to the tractor, do not forget to remove the pin from the hole (A). Relieve the pin to activate the control valve and lower the tires.,
- Keep the tractor drawbar fixed on the center to transport the harrow.
- Lower the harrow before removing the hoses and relieve the control valve pressure.



SET-UP INSTRUCTIONS

IMPORTANT RECOMMENDATIONS

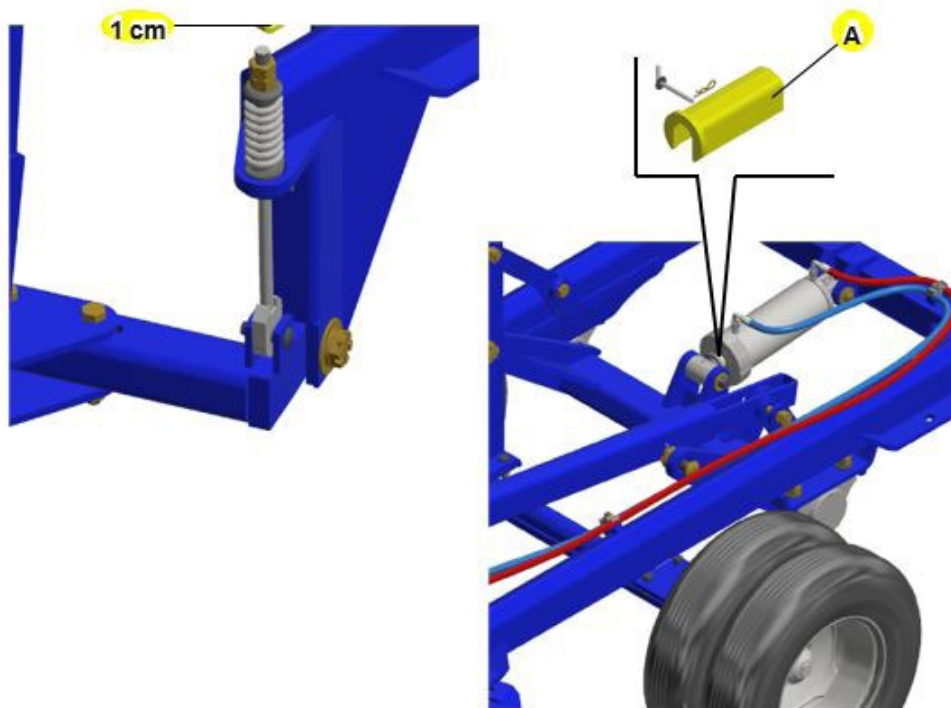
The tractor drawbar must remain loose during working and fixed during transportation. The spring of the drawbar assembly should be adjusted leaving 1 cm of thread in the rod, above the nut and locknut. The adjustment should be maintained both in transport and work.

Get the harrow down until all the discs touch the ground. Adjust the nuts on the rod just to touch the spring guide, without compressing it. So, it is correctly adjusted both for work and transport.

Before starting to work, verify the conditions of all parts and re-tighten nuts and bolts, mainly the ones on the disc gangs, as damage to the axles and other components may occur if they work loose.

To transport the disc harrow in larger distances, it is necessary to use the transport lock (A) that is coupled with the hydraulic cylinder rod.

Lubricate all grease fittings appropriately. (See lubrication instructions).



NOTE

Note that the cylinder must remain as shown in the figure above, being its rod facing the disc harrow front.

In case of using a tractor with a different drawbar height, it is necessary to redo these adjustments.

SET-UP INSTRUCTIONS

CUTTING DEPTH - OPENING THE DISC GANGS

The cutting depth can be basically adjusted in two ways:

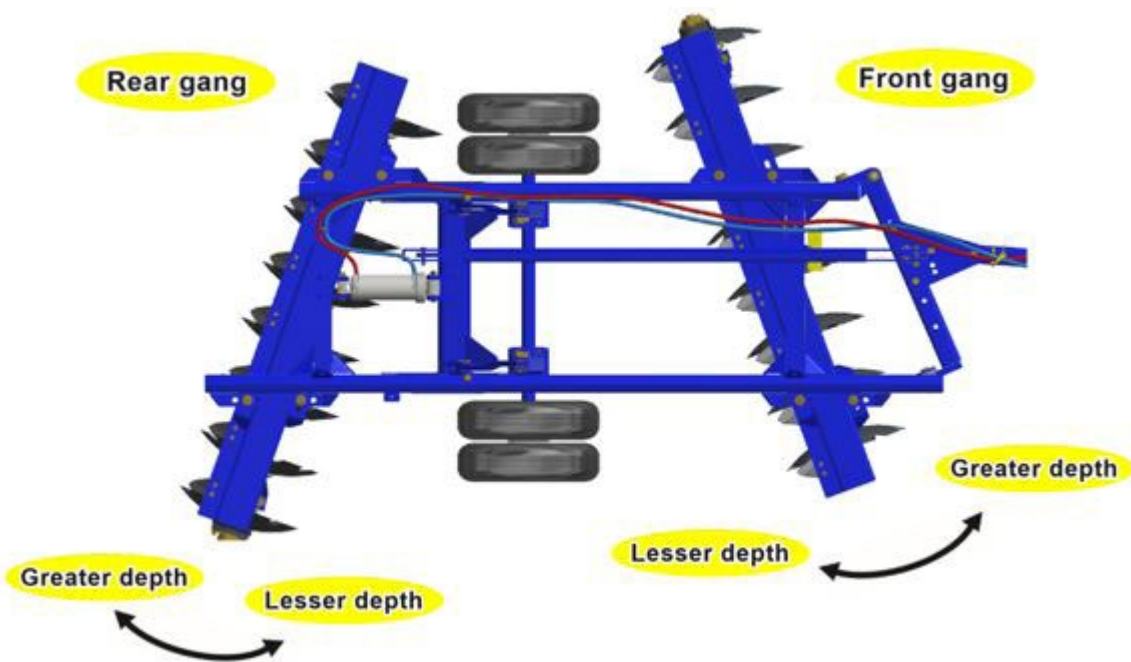
1. Adjust the opening angle (lock) of the disc gangs.
2. Activate the hydraulic cylinder so the tires will limit the depth.

NOTE

We recommend controlling the depth through the disc gangs opening and to use the tires only where the harrow penetrates excessively.

The opening angle should increase between the gangs to work in soils with greater difficulty to penetrate the disc blades. In light and loose soils, it is appropriate to work with a smaller opening angle.

This adjustment is done by changing the setting of the disc gang carriers on the main frame.



IMPORTANT

- *To start the harrowing, we recommend using an average opening on the disc gangs. If more penetration is needed, increase the opening angle of the rear disc gang.*
- *The front disc gang usually works with a smaller opening compared to the rear disc gang.*
- *The harrowed ground is always on the left hand side of the operator (harrow closed side).*
- *Try to make a good finish between the passes. Avoid the formation of furrows or untilled bands.*

ADJUSTMENTS & OPERATIONS

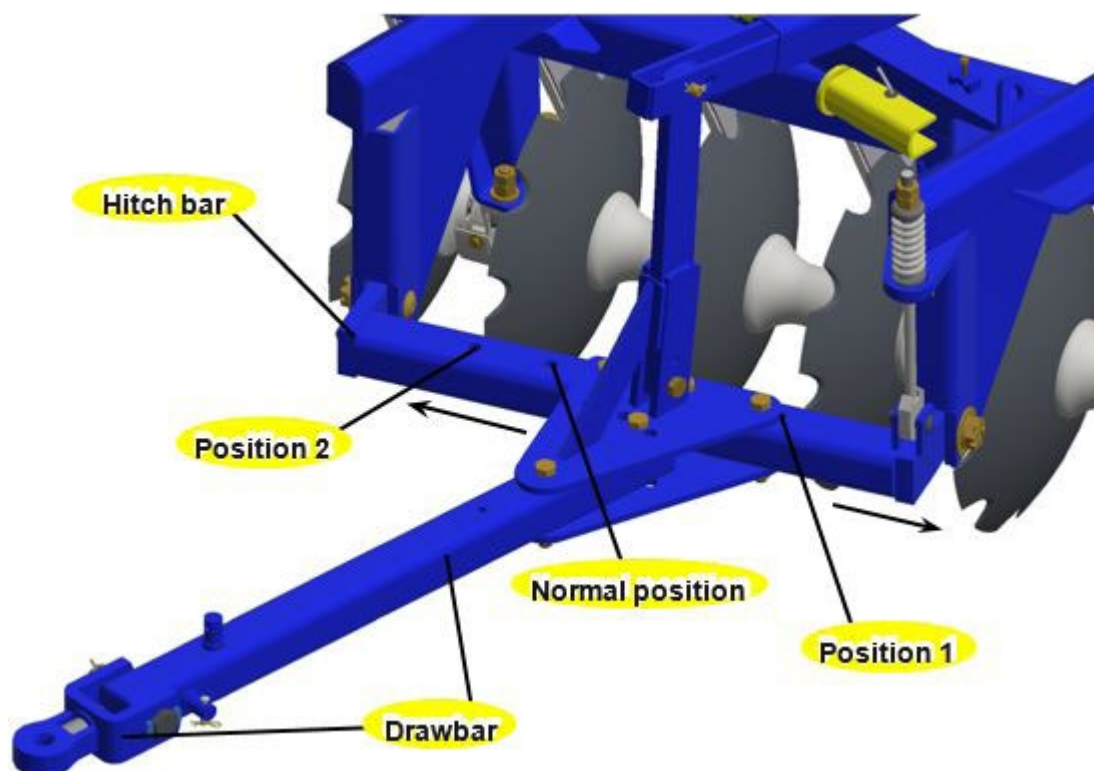
TRACTOR POSITION RELATED TO THE PREVIOUS PASS-LATERAL DISPLACEMENT

The lateral displacement is used to better position the tractor regarding the previous furrow, avoiding leaving a trace and giving a reference to the operator.

This position is obtained according to the tractor gauge and cutting width of the harrow.

Whenever possible, the tractor should pass over the unworked soil and near the previous furrow.

The displacement is done by changing the drawbar in the hitch bar, as follows:



Normal position (centralized): Used on most situations.

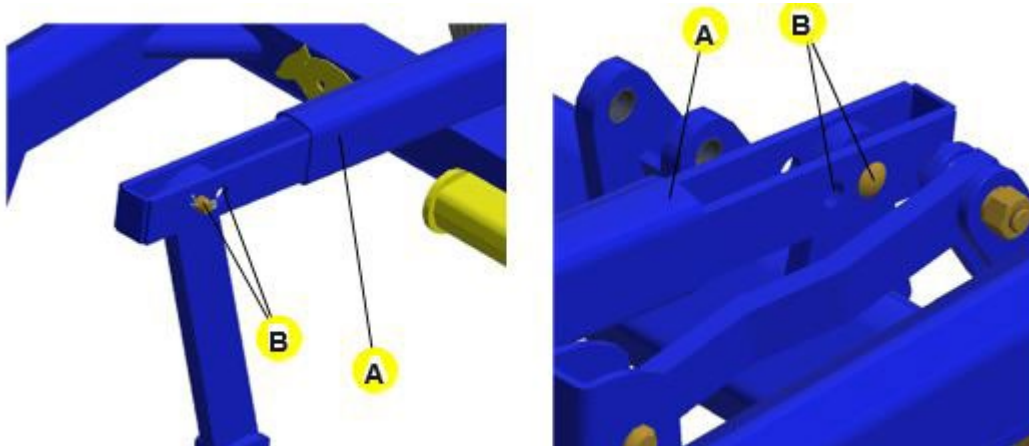
Position #1: Allows the tractor to approach the previous furrow.

Position #2: Allows the tractor to move away from the previous furrow.

ADJUSTMENTS & OPERATIONS

NOTE

When doing the lateral displacement, it is also necessary to fix the stabilizer bar (A) to keep the harrow leveled. To do so, use the holes (B) and let the disc gangs and the soil on the same height.



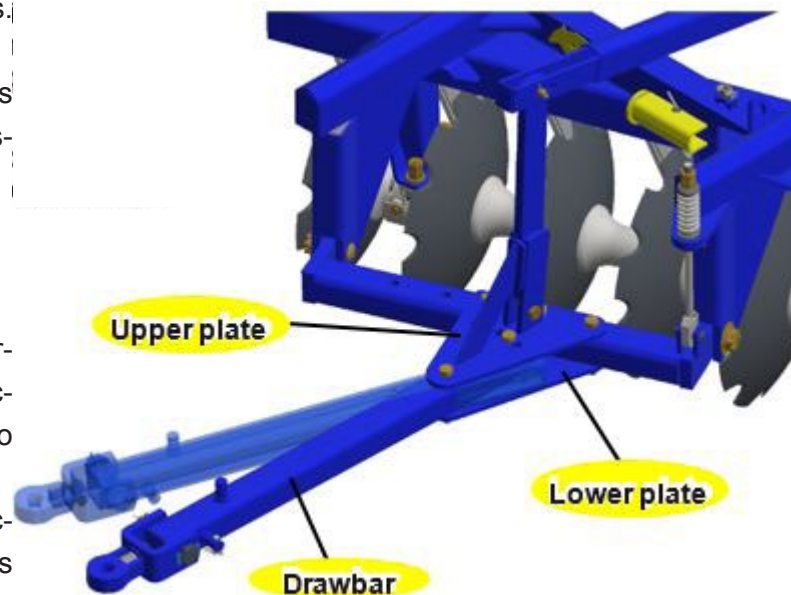
DRAWBAR ANGLES

In normal working services and during transportation, the drawbar must operate on the central hole of the upper and lower plates.

Change the bar to the other holes in order to get small lateral displacements of the harrow.

OVERVIEW:

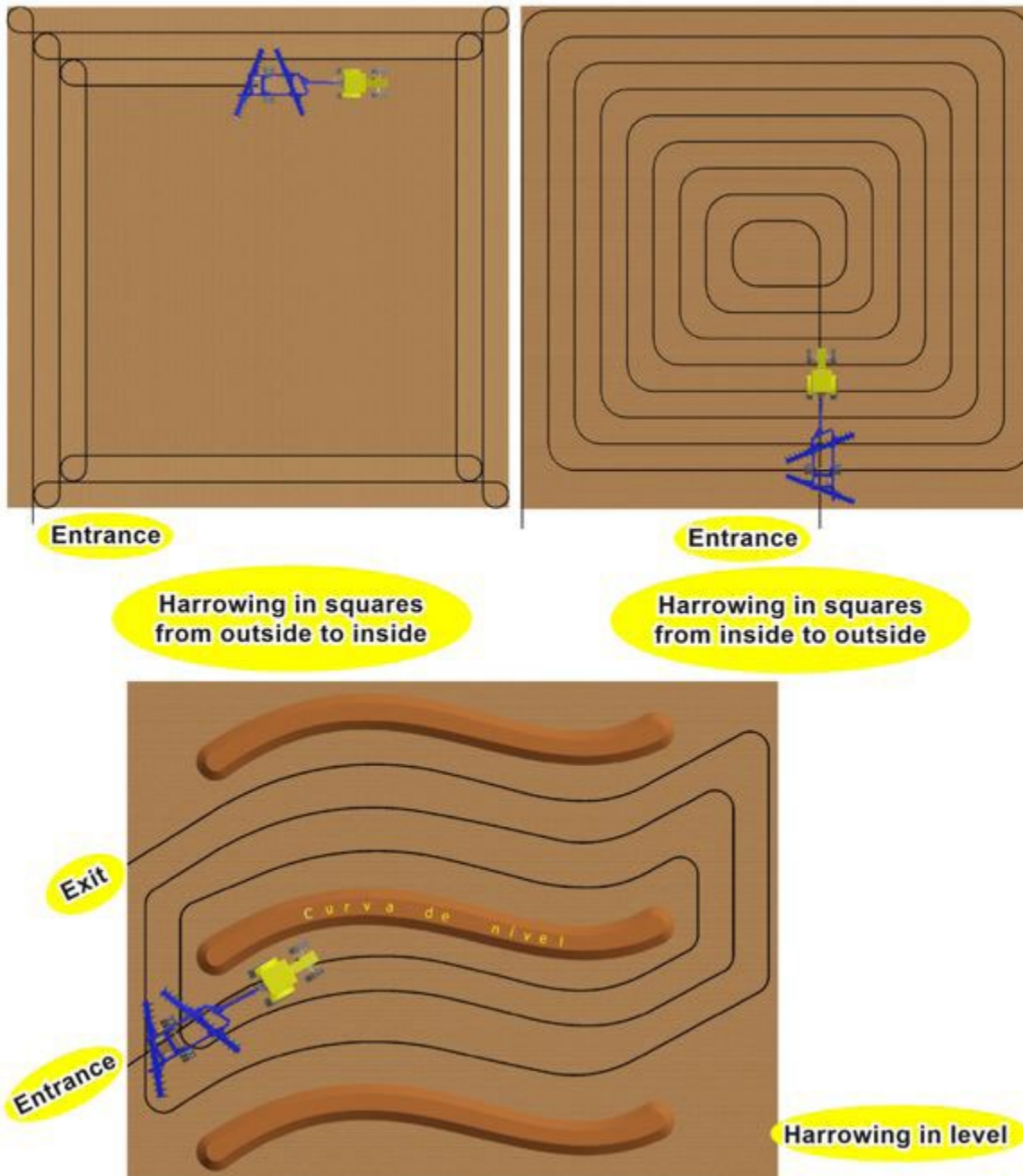
- The harrow will operate correctly if it is covering the tractor trace and if there are no side drafts.
- The drawbars from the tractor and harrow must be as aligned as possible regarding the working direction.
- The tractor drawbar must remain loose during working and fixed during transportation.



ADJUSTMENTS & OPERATIONS

WAYS TO START THE HARROWING

Regardless of the format and size of the field, the harrowing is made basically in two ways: from outside to inside or from inside to outside.

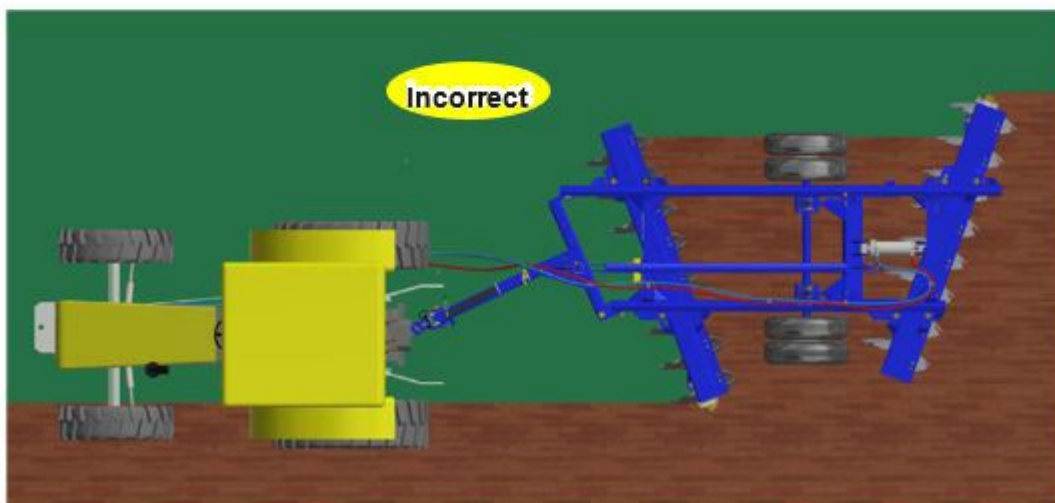
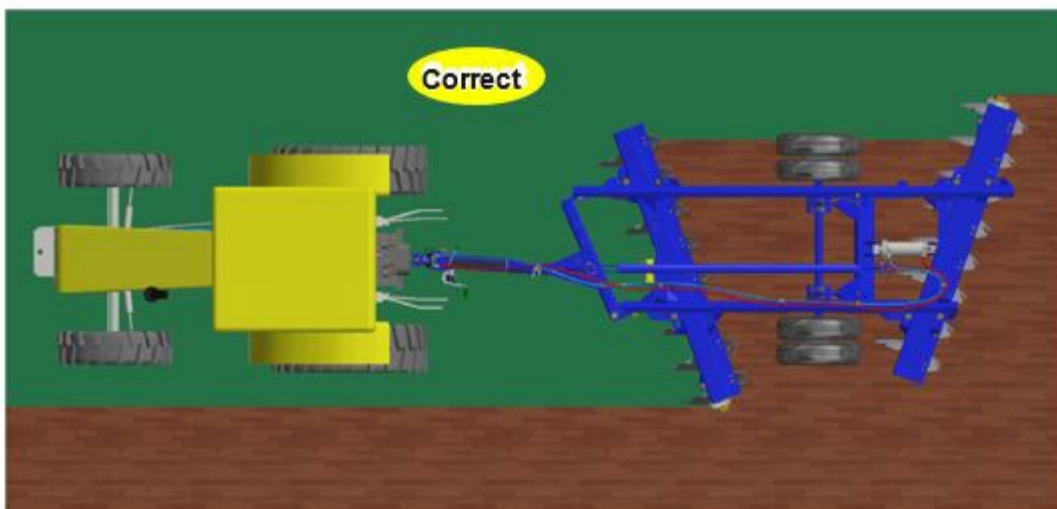


IMPORTANT

- Note that the harrowed soil is always on the left hand side of the operator.
- Being the disc gangs lowered, only maneuver to the left (harrow closed side).

ADJUSTMENTS & OPERATIONS

CORRECT WAY FOR HARROWING



IMPORTANT

- *Never let the tires pass over the area that was already harrowed.*

ADJUSTMENTS & OPERATIONS

TROUBLESHOOTING

PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Tractor steering wheel pulling to the right.	Too much angle on the front gang or too small on the rear gang.	Reduce the angle from the front gang or increase the angle from the rear gang.
	Drawbar touching the stop to the left.	Move the drawbar to the left.
Disc gangs are not on harrowing level.	Front and rear disc gangs are not operating the same depth.	Adjust the angle of the disc gangs.
Furrow opened on the left side.	Speed is too low for the soil conditions.	Increase the speed.
	Tractor being positioned far on the right.	Position the tractor in a way that the front disc on the left pass on the edge of the furrow.
	Incorrect adjustment of the disc gangs laterally.	Move the rear disc gang to the left or the front disc gang to the right.
Windrows forming on the left side.	Insufficient overlapping. Incorrect rear disc gang adjustment.	If windrows are forming, move the front disc gang to the left or the rear disc gang to the right.
Locked disc gangs.	Wet field.	Let the field dry out or penetrate the disc blade superficially to help the drying process.
	Maximum angle on the disc gangs adjustment.	Reduce the angle.
	Deep penetration on wet soil.	Use the rod stops to decrease the depth. Left the disc blade to reduce the penetration.
	Worn out/incorrectly adjusted scrapers.	Adjust or change the scrapers when necessary.
Quick couplers do not adapt.	Different type of quick couplers.	Use male and female quick couplers from the same type.
Hoses leaking with fixed terminals.	Insufficient tightening.	Re-tighten carefully.
	Lack of sealing material on the thread.	Use thread sealing tape and re-tighten carefully.
Hydraulic cylinder leaking.	Damaged repairings.	Replace the repairings.
	Damaged rod.	Replace the rod.
	Oil with impurities.	Replace the oil, repairings and the filter elements.
	Working pressure superior than the recommended one.	Adjust the control valve using the relief valve with the aid of a pressure gauge. Normal pressure 180 Kgf/cm ²
Quick couplers leaking.	Insufficient tightening.	Re-tighten carefully.
	Lack of sealing material on the thread.	Use thread sealing tape and re-tighten carefully.
	Damaged repairings.	Replace the repairings.

ADJUSTMENTS & OPERATIONS

OPERATIONS - IMPORTANT POINTS



- Re-tighten nuts and bolts after the first day of work and check the conditions of all pins and cotter pins. Then, re-tighten every 24 operating hours.
- Special attention should be given to the disc gangs, re-tightening daily during the first week of use. Then, re-tighten periodically.
- Carefully observe the lubrication intervals (see lubrications on the following pages).
- Always use a contention device to inflate the tires (tire inflation cage).
- The correct tire inflation is important; keep the pressure according to the instructions on page 9.
- Choose a gear that allows the tractor to maintain certain power reserve, ensuring against unforeseen efforts.
- Speed is relative to the tractor gear and can only be determined by local conditions. We adopted an average of 3 to 4 km/h, which is not advisable to overcome to maintain service efficiency and avoid possible damages to the equipment.
- Before maneuvering the headboards, activate the hydraulic cylinder gradually to lift the disc gangs.
- During the harrowing (being the disc blades on the soil), never maneuver to the right, because the angle formed by the disc gangs start to transmit great effort to the equipment, overloading the traction components.
- During working or transportation, do not allow passengers on the tractor or equipment.
- Remove pieces of wood or any object that may attach in the disc blades.
- When working on hard soils, which the disc blades penetration is difficult, the depth can be minimum and the operation may be unsatisfactory. On these cases, we recommend using an equipment that is more appropriate.
- Relieve the control valve pressure before relieving the quick couplers and when doing any verification in the hydraulic cylinder.
- The drawbar must remain loose during working and fixed during transportation.
- As previously mentioned, these harrows have several settings. However, the only local conditions can determine the best adjustment thereof.

MAINTENANCE

LUBRICATION

To reduce the wear caused by the friction between the moving parts of the harrow, it is necessary to carry out a correct lubrication, as described below.

1. Every 24 operating hours, lubricate the articulations through the grease fittings in the following way:
 - Be sure about the lubricant quality, with relation to its efficiency and purity, avoiding the use of products contaminated by water, earth and others.
 - Remove the remainder old grease around the articulations.
 - Clean the grease fittings with a cloth before inserting lubricant and replace the damaged ones.
 - Apply enough of an amount of new grease.
 - Use medium consistency grease.

2. The lubrication of the roller bearing should be done in the same aforementioned period (24 hours).

- 2.1 The roller bearings with oil bath work in constant lubrication, but it is still necessary to give them the following attention:
 - In a flat place, check the oil level of each bearing before using the harrow for the first time and every day of the first week.
 - Then, start to check weekly.
 - Change all the oil every 1,000 working hours.
 - Use only SAE 90 mineral oil.

NOTE

- *The suitable level is when the oil reaches the hole of the plug, being the harrow in a flat place.*
- *The oil volume on the DM bearings is 600 ml (EHDW3620-14)*
- *The grease volume on the CM bearings is 800 g (EHDW3620-14)*
- *The oil volume on the DM bearings is 980 ml (HDW3217-18)*
- *The grease volume on the CM bearings is 1000 g (HDW3217-18)*

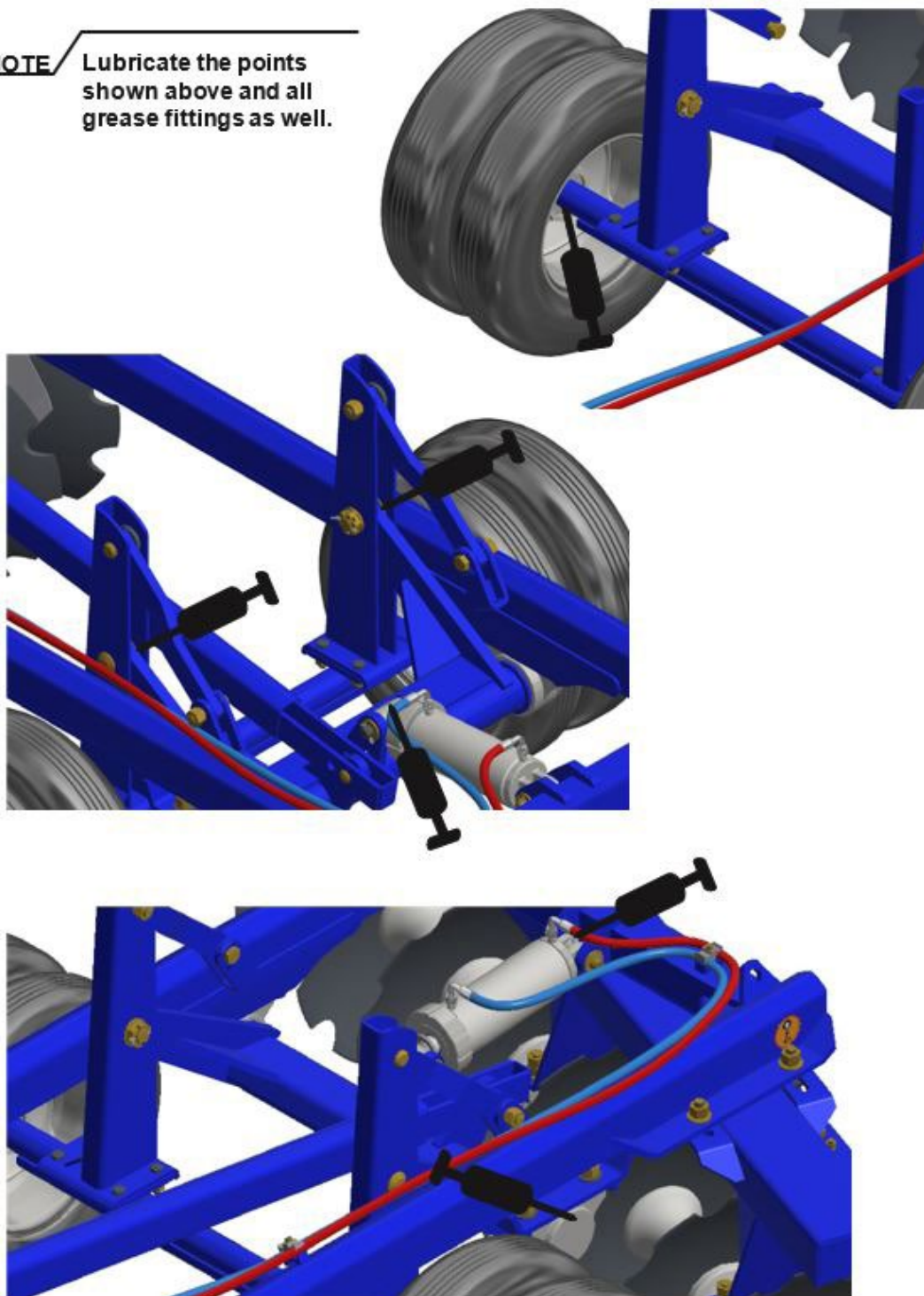
MAINTENANCE

LUBRICATION POINTS

NOTE

Lubricate the points shown as well as all grease fittings.

NOTE Lubricate the points shown above and all grease fittings as well.



MAINTENANCE

HARROW MAINTENANCE

- During off-season, wash the harrow, repair any damaged paintwork, protect the disc blades with oil, lubricate all grease fittings and store the plow in a covered and dry place, avoiding the direct contact of the disc blades with the soil.
- The disc blades must be replaced as soon as they are providing a low yield, mainly because the reduction in its diameter, loss of cut and other damages that may occur during the job.
- After some hours of operation, the bolts on the harrow must be checked to see if they are properly tightened. To assure a great performance and avoid wear and rupture, these bolts must be tightened every so often.
- Check wear occurrence on all moving parts. Replace any part, if necessary.
- Replace the missing or damaged safety stickers. Ashland Industries supplies these stickers upon request and indication of their respective serial numbers. The operator must know the need and importance to keep the stickers in the proper place and in good conditions. The operator should also know to follow the instructions, as the lack of safety may increase the risk of accidents.

MAINTENANCE PRECAUTIONS



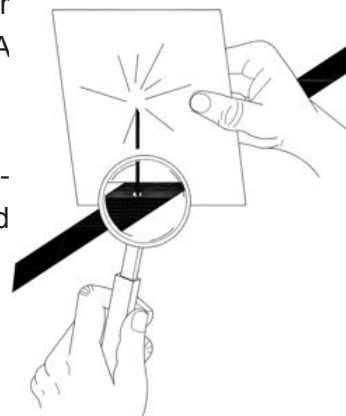
CAUTION! Hydraulic oil leakage may be strong enough to penetrate the skin and cause serious injuries to health. Oil leakage through a tiny hole may seem invisible. Use a piece of wood instead of your hand to check a possible leakage.

Keep unprotected parts of the body, such as your face, eyes and arms as far as possible from a suspected leak. A splash of hydraulic oil can even cause gangrene or other maladies.

In case of such kind of accidents or any other, consult a doctor immediately. If such doctor does not possess proper knowledge of this kind of problem, ask for a referral or search to find the proper treatment.

NOTE

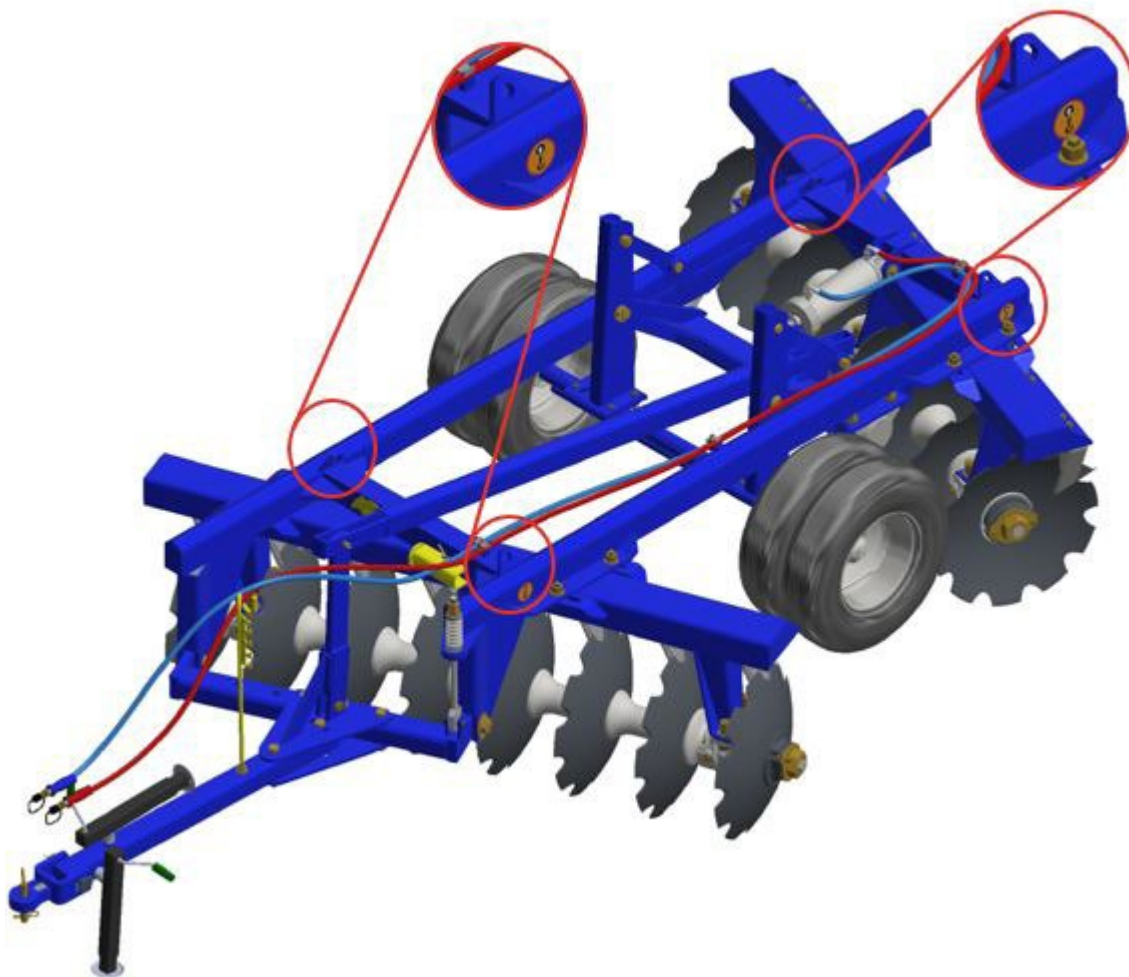
Use Ashland Industries original parts only.



MAINTENANCE

LIFTING POINTS




These harrows have adequate lifting points, being two located on the front part of the frame and two on the rear. When lifting with a hoist, it is necessary to hitch the cables to these points for lifting.



IMPORTANT DATA

TORQUE TABLE

TORQUE VALUES CHART						
Bolt Diameter	Grade 2		Grade 5		Grade 8	
	Coarse	Fine	Coarse	Fine	Coarse	Fine
1/4"	50 In. Lbs.	56 In. Lbs.	76 In. Lbs.	87 In. Lbs.	9 Ft. Lbs.	10 Ft. Lbs.
5/16"	8 Ft. Lbs.	9 Ft. Lbs.	13 Ft. Lbs.	14 Ft. Lbs.	18 Ft. Lbs.	20 Ft. Lbs.
3/8"	15 Ft. Lbs.	17 Ft. Lbs.	23 Ft. Lbs.	26 Ft. Lbs.	33 Ft. Lbs.	37 Ft. Lbs.
7/16"	25 Ft. Lbs.	27 Ft. Lbs.	37 Ft. Lbs.	41 Ft. Lbs.	52 Ft. Lbs.	58 Ft. Lbs.
1/2"	35 Ft. Lbs.	40 Ft. Lbs.	57 Ft. Lbs.	64 Ft. Lbs.	80 Ft. Lbs.	90 Ft. Lbs.
9/16"	50 Ft. Lbs.	60 Ft. Lbs.	80 Ft. Lbs.	90 Ft. Lbs.	115 Ft. Lbs.	130 Ft. Lbs.
5/8"	70 Ft. Lbs.	80 Ft. Lbs.	110 Ft. Lbs.	125 Ft. Lbs.	160 Ft. Lbs.	180 Ft. Lbs.
3/4"	130 Ft. Lbs.	145 Ft. Lbs.	200 Ft. Lbs.	220 Ft. Lbs.	280 Ft. Lbs.	315 Ft. Lbs.
7/8"	125 Ft. Lbs.	140 Ft. Lbs.	320 Ft. Lbs.	350 Ft. Lbs.	450 Ft. Lbs.	500 Ft. Lbs.
1"	190 Ft. Lbs.	205 Ft. Lbs.	480 Ft. Lbs.	530 Ft. Lbs.	675 Ft. Lbs.	750 Ft. Lbs.
1 1/8"	265 Ft. Lbs.	300 Ft. Lbs.	600 Ft. Lbs.	670 Ft. Lbs.	960 Ft. Lbs.	1075 Ft. Lbs.
1 1/4"	375 Ft. Lbs.	415 Ft. Lbs.	840 Ft. Lbs.	930 Ft. Lbs.	1360 Ft. Lbs.	1500 Ft. Lbs.
1 3/8"	490 Ft. Lbs.	560 Ft. Lbs.	1100 Ft. Lbs.	1250 Ft. Lbs.	1780 Ft. Lbs.	2030 Ft. Lbs.
1 1/2"	650 Ft. Lbs.	730 Ft. Lbs.	1450 Ft. Lbs.	1650 Ft. Lbs.	2307 Ft. Lbs.	2670 Ft. Lbs.

	GRADE 2 No Marks		GRADE 3 3 Marks		GRADE 8 6 Marks
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NOTE

For metric conversion:

- Multiply inch-pounds by .113 to convert to newton-meters (Nm).
- Multiply foot-pounds by 1.356 to convert to newton-meters (Nm).

IMPORTANT

ATTENTION

ASHLAND INDUSTRIES reserves the right at any time, to make improvements in the design, material or specifications of machinery, equipment or parts without thereby becoming liable to make similar changes in machinery, equipment or parts previously sold.

Images are for illustration purposes only.

Some illustrations in this manual appear without the safety devices, removed to allow a better view and detailed instructions. Never operate the equipment without these safety devices.



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