

**MARCHESAN**

# **INSTRUCTIONS MANUAL**



# ***GHD<sup>2</sup> 3009A***



# Introduction

The GHD<sup>2</sup> 3009A - Mounted Offset Disk Harrow - is designed for extra strength and offers a wide range of adjustments that permit efficient cultivation in groves, orchards and vineyards.

Different cutting angle adjustments and the opening of both gangs allow the best performance according to your work needs.

Lateral displacement in the rear gang.

Universal three point lift arrangement for category II and III tractors and quick connection.

This instructions manual contains the necessary information for the best performance of this disk harrow. The operator must carefully read the entire manual before working with the equipment. Also, read and understand the safety recommendations.

For any further clarification or in the event of technical problems that may arise during the service, consult your dealer and the Technical Support department of the factory. They can ensure the fully functioning of your TATU disk harrow.



# Table of contents

<b>1. To the owner</b>	<b>3</b>
<b>2. To the operator</b>	<b>4 to 8</b>
Working safely	4 to 6
Transportation on truck or trailer	7
Safety stickers / Sticker set	8
<b>3. Technical specifications</b>	<b>9</b>
<b>4. Components</b>	<b>10</b>
<b>5. Assembly</b>	<b>11 to 19</b>
Using the set of wrenches	11
Assembly of bearings and spacer spools	12 & 13
Assembly sequence of the disc gangs	14 & 15
Assembly of disc gangs on the chassis	16 to 18
Drawbar assembly	19
Stabilizer set assembly	19
<b>6. Preparing for work</b>	<b>20 &amp; 21</b>
Tractor preparation	20
Hitching to the tractor	20
Leveling the harrow	21
<b>7. Adjustments and operations</b>	<b>22 to 24</b>
Disc gangs opening	22
Ways to start the harrowing	23
Operations - Important points	24
<b>8. Maintenance</b>	<b>25 &amp; 26</b>
Lubrication	25
Lubrication points	25
Harrow maintenance / Maintenance precautions	26
<b>9. Important data</b>	<b>27 to 29</b>
Calculation of hourly income	27
Average income table	28
Torque table	29
<b>10. Important</b>	<b>30</b>

## To the owner

The acquisition of any TATU product assures to the original purchaser the following rights:

- Warranty certificate;
- Instructions manual;
- Technical assistance by the dealer on equipment delivery.

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

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

The instructions in this manual indicates 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;
- Marchesan 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;
- Marchesan is not responsible for any damage caused by unpredictable situations or the incorrect use of the equipment.

## General information

Right and left 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 chassis.

MODELO MODEL	<input type="text"/>
Nº SÉRIE SERIAL NR	<input type="text"/>
DATA DATE	<input type="text"/>
PESO WEIGHT	<input type="text"/>
<b>MARCHESAN IMPLEMENTOS E MÁQUINAS AGRÍCOLAS "TATU" S.A.</b> <a href="http://www.marchesan.com.br">www.marchesan.com.br</a> AV. MARCHESAN, 1979 - MATÃO-SP-BRASIL CNPJ: 52.311.289/0001-63	
 <b>MARCHESAN</b>	

### NOTE

The warranty shall not be applied to any equipment or any part 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 Marchesan S/A.

# To the operator

## Be careful with the environment

---



Dear user!

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

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Products such as oil, fuel, filters, batteries and others 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

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

The GHD<sup>2</sup> 3009A disk harrow is simple to operate, requiring however the basic and essential cautions to its handling.

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

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Read and understand the information before making any adjustment 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 several 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 that chemical products (i.e.: fertilizers, treated seeds) make any contact with your skin or clothes.

---



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

---



Never transport the equipment on highways or paved roads during the night. Avoid that the tractor wheels touch 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 transport the equipment.

## To the operator



- Only trained and qualified personnel is 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 near or over the equipment, while it is operating, during transportation or storage.
- Have full knowledge of the soil before starting to work. Provide the delineation of obstacles or hazardous locations. Use the speed which is suitable to the conditions of the ground or pathways to be covered.
- 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 proper **protective devices**.
- Be careful while hitching the drawbar to the third point.
- Wear protective gloves to work near the discs.
- When raising or lowering the harrow, check if there are no people or animals close or under it.
- 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 tractors 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.
- Please check the general safety instructions on the back of this manual.



# To the operator

## Transportation on truck or trailer



Marchesan 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 others 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 8 to 10 km transporting, please inspect the load condition. Repeat this procedure every 80 to 100 km. 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 on truck or trailer. If necessary use banners, lights and other devices in order to give adequate warning to the 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. Marchesan provide stickers, upon request and indication of the respective serial numbers.



05.03.03.1428

**LUBRIFICAR E REAPERTAR DIARIAMENTE**  
**LUBRICATE AND TIGHTEN DAILY**  
**LUBRICAR Y REAPRETAR DIARIAMENTE**

05.03.03.1827

## Sticker set

Model	Serial number
GHD <sup>2</sup> 3009A sticker set	05.03.06.1542

# Technical specifications

Type: ..... Mounted Offset Disk Harrow

Model: ..... GHD<sup>2</sup> 3009A

Number of disc blades: ..... 18, 20, 22, 24 and 26

Spacing between disc blades: ..... 230 mm

Disc blade dimension: ..... Ø20" x 4,5, Ø22" x 4,5 and Ø 24" x 4,75 mm

Disc blade type: ..... Concave plain and notched

Bearings - Length: ..... 230 mm

- Type: ..... Regresable or Oil bath

Spacer spools - Length: ..... 230 mm

- Type: ..... Cast

Axis diameter: ..... Ø 1.1/2" (38,1 mm)

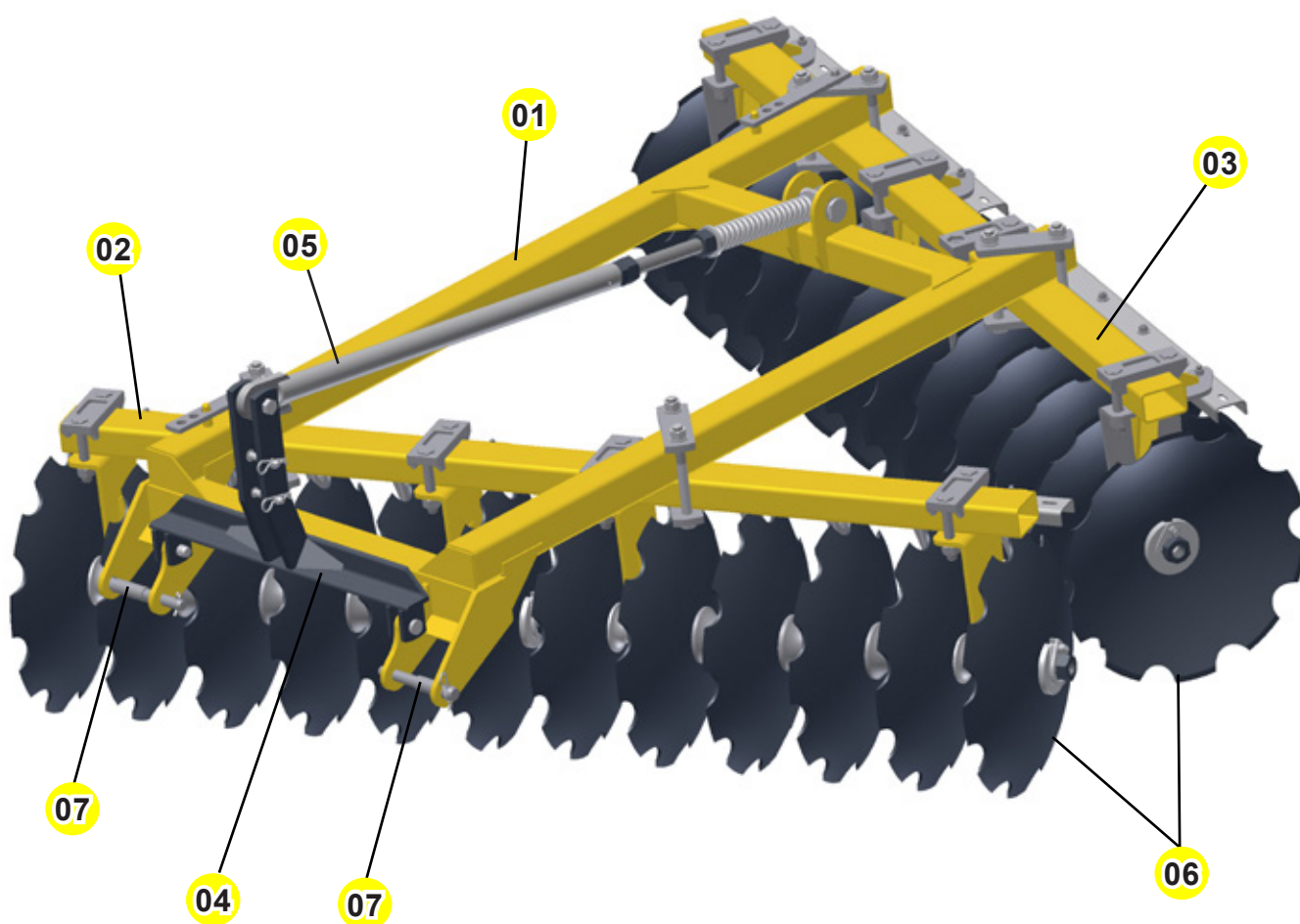
Hitching type: ..... Category II and III 3-point lift

Working speed: ..... 6,0 to 8,0 km/h

Model	Number of discs	Cutting width (mm)	Weight (kg)	Power (cv) on tractor engine
<b>GHD<sup>2</sup> 3009A</b>	18	2070	585	65
	20	2280	634	70
	22	2490	1050	75
	24	2745	1138	90
	26	3000	1234	95

# Components

- 01 - Frame
- 02 - Front chassis
- 03 - Rear chassis
- 04 - Drawbar
- 05 - Stabilizer
- 06 - Disc blades
- 07 - Hitching pins



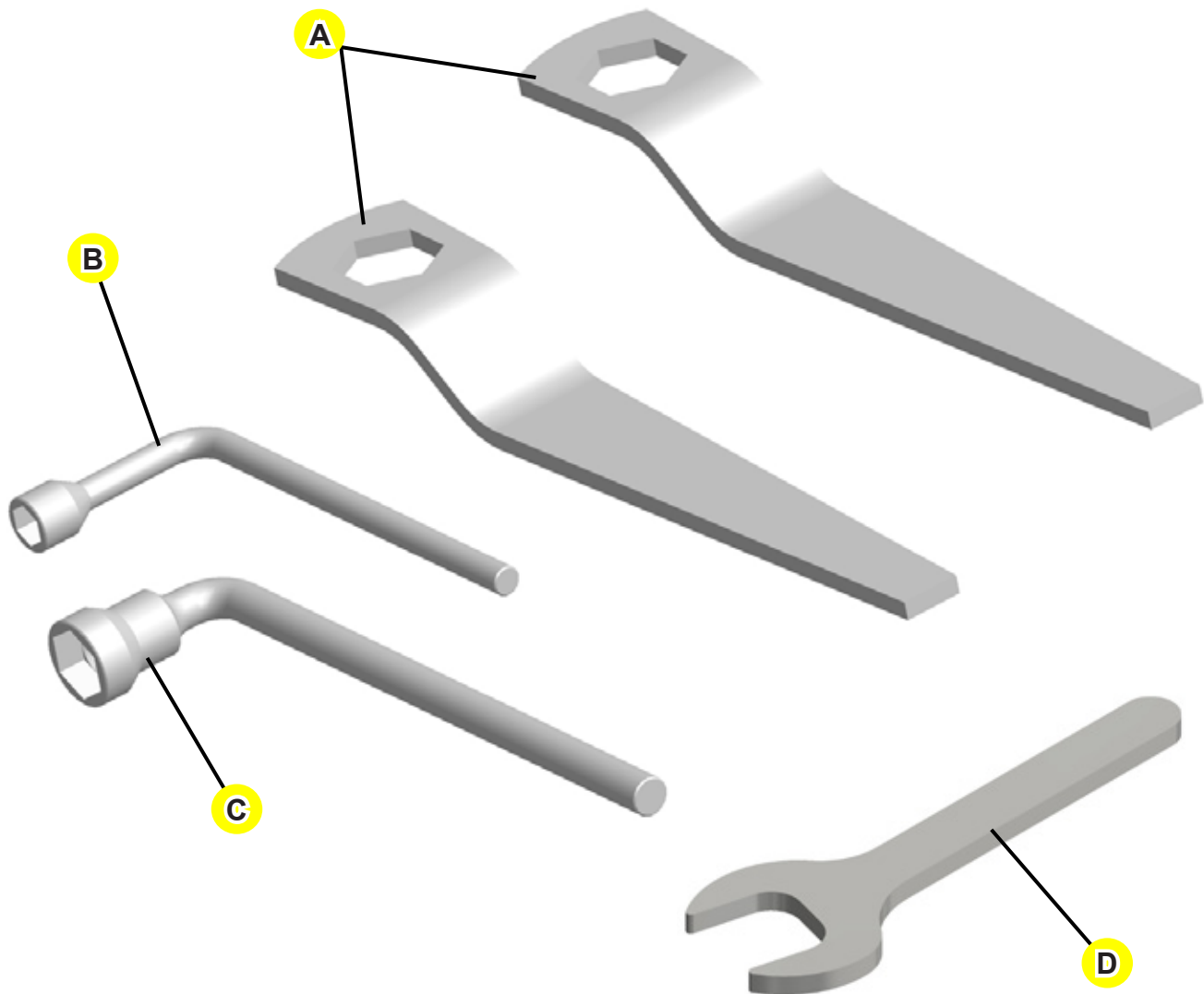
# Assembly

To facilitate the transportation, the harrow is usually delivered disassembled. Therefore, the next instructions have the necessary details and procedures to assemble it properly.

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 the box wrenches (A) to tighten the nuts of the disc gangs, one to hold the axis nut on one side while tightening the nut to the other end, thereby preventing the axis from rotating, according to the illustration on page 15.
- Use the L-type wrench (B) to tighten the nuts of the bearing bolts.
- Use the L-type wrench (C) to tighten the nuts from the chassis to the frame and bearing hangers.
- Use the adjustable wrench (D) to tighten the nuts of the stabilizer bar.



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

# Assembly

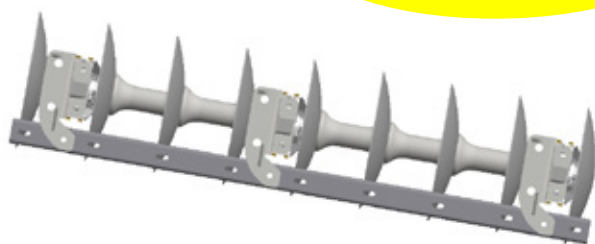
## Assembly of bearings and spacer spools

Before starting to assemble the disc gangs, check the correct position of the bearings and spacer spools:

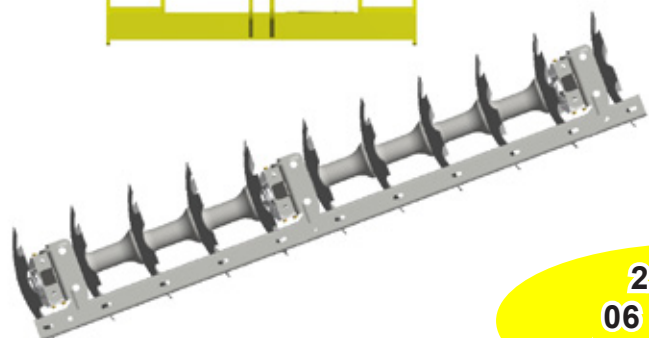
Assembly of bearings and spacer spools.



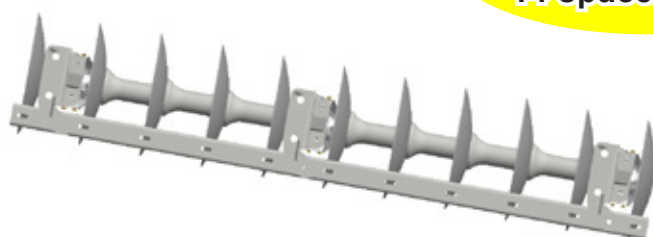
**18 discs**  
**06 bearings**  
**10 spacer spools**



**20 discs**  
**06 bearings**  
**12 spacer spools**

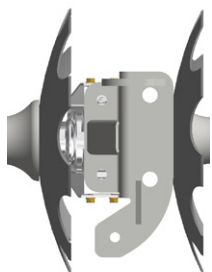
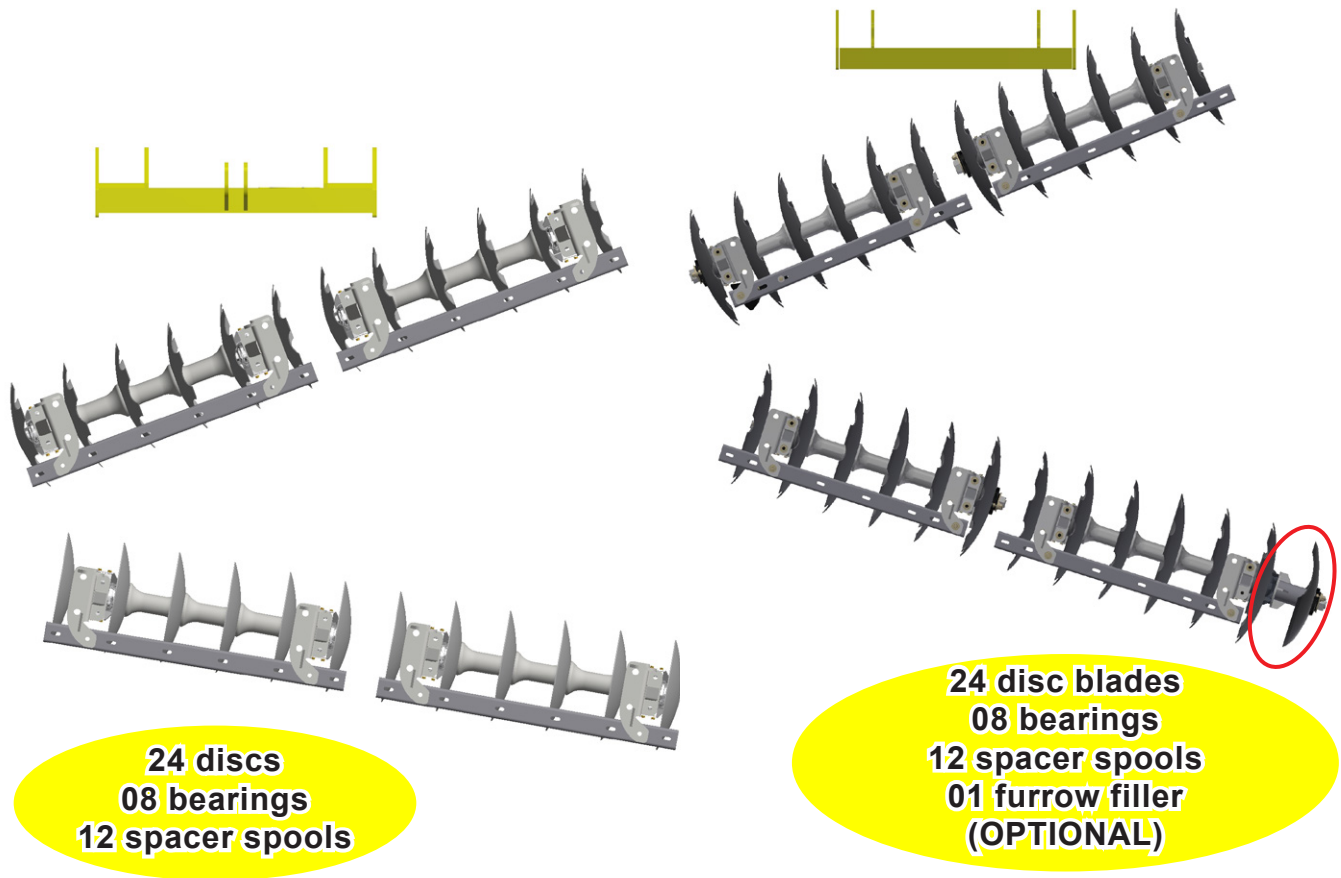


**22 discs**  
**06 bearings**  
**14 spacer spools**



# Assembly

## Assembly of bearings and spacer spools



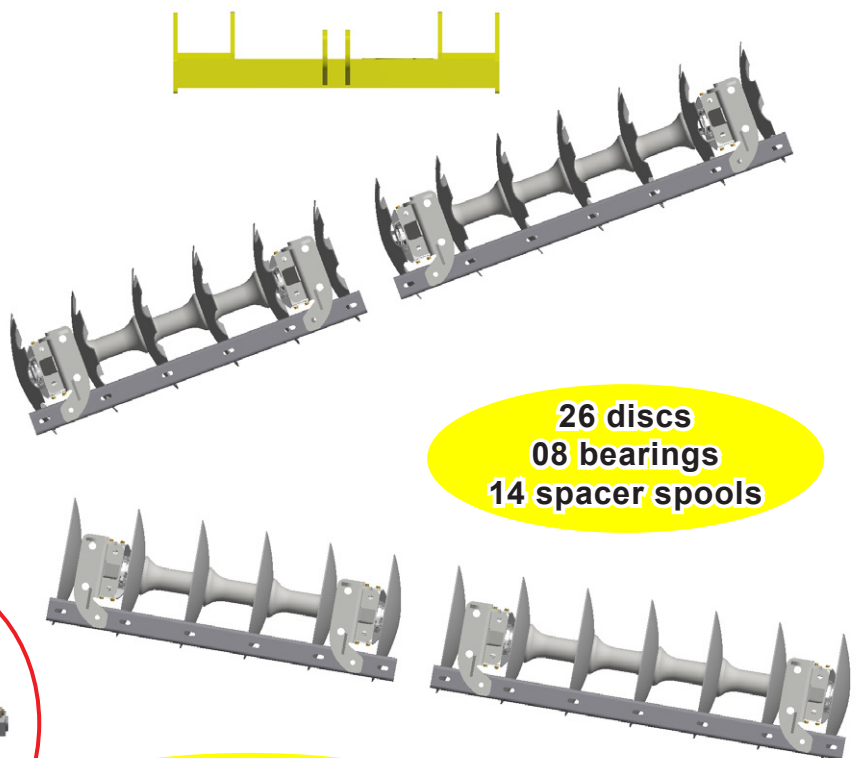
**Bearing**



**Spacer spool**



**Furrow filler  
(OPTIONAL)**





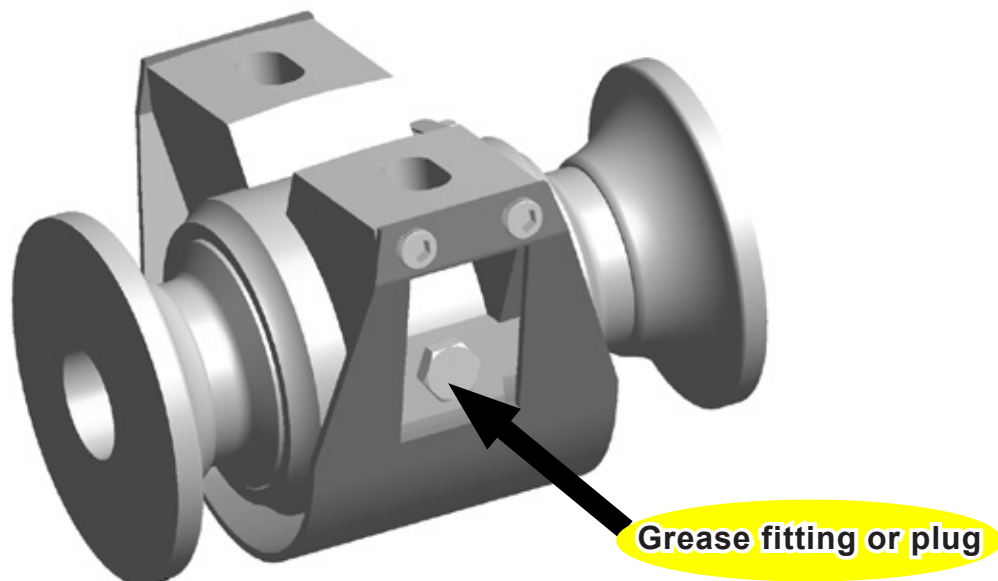
# Assembly

## Assembly sequence of the disc gangs

- Place the external lock (A) along with the axis (B).
- Tighten the nut (C) passing 5 mm from the axis end.
- Place the disc blades (D), bearings (E) and spacer spools (F), following the instructions on the previous pages.
- Now place the internal lock (G) and the nut (C-1).
- Place the bolt (H) that holds the lock nut (I), along with the spring washer and nut, only on the external side of the gangs.
- Now, use the box wrenches (A) from page 11 to tight the gangs, as follows:
  - 1) Place one of the wrenches in the external side of the gangs (locked side), supporting it on the ground (Figure on page 15).
  - 2) On the inside, 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 it from moving. (Figure on page 15).
- Finally, put the bolt (H-1) and place the lock nut (I-1), fixing with a spring washer and a nut.

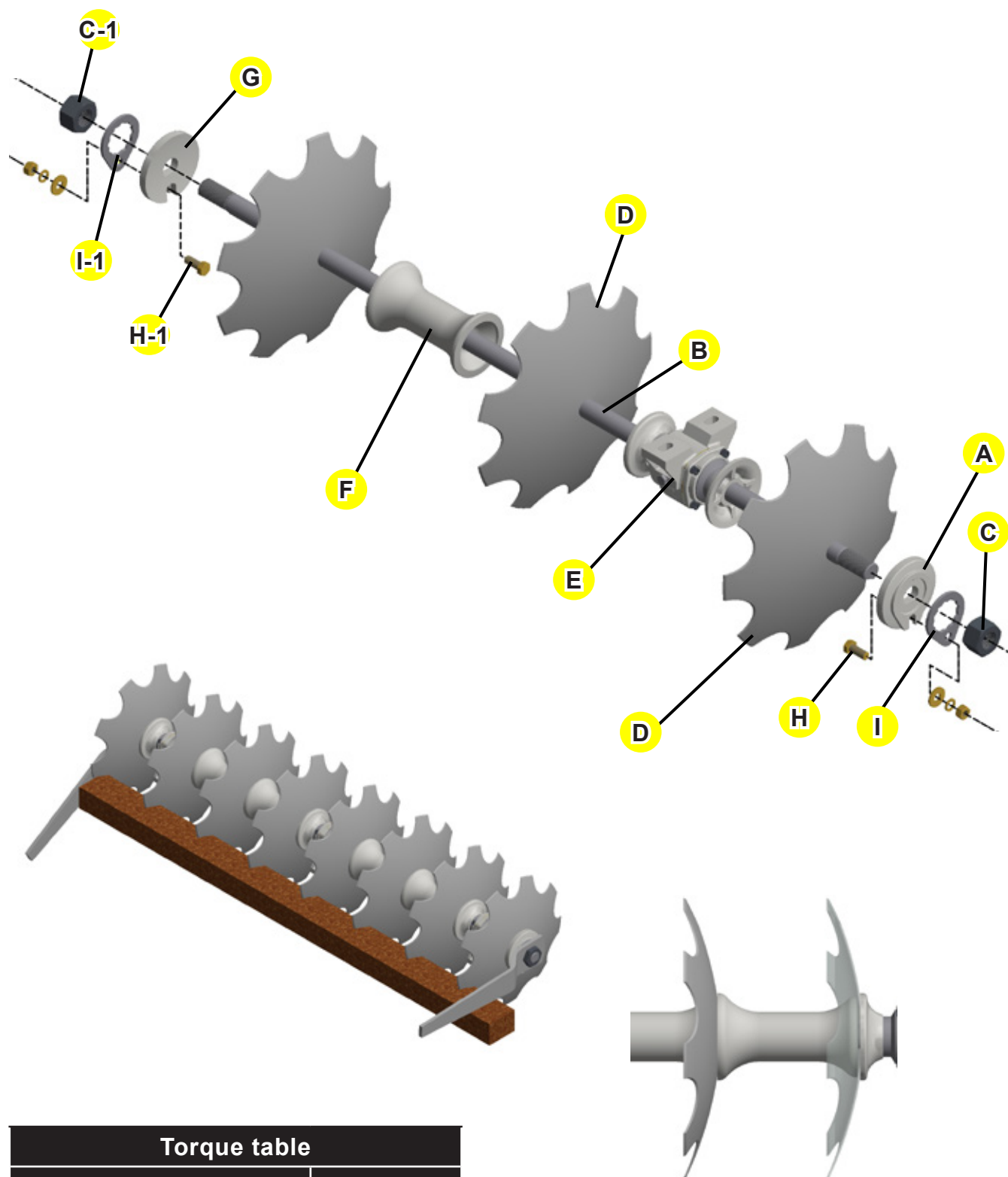
### IMPORTANT

- Check the correct side of the bearings and spacer spools according to the concavity of the discs.





# Assembly



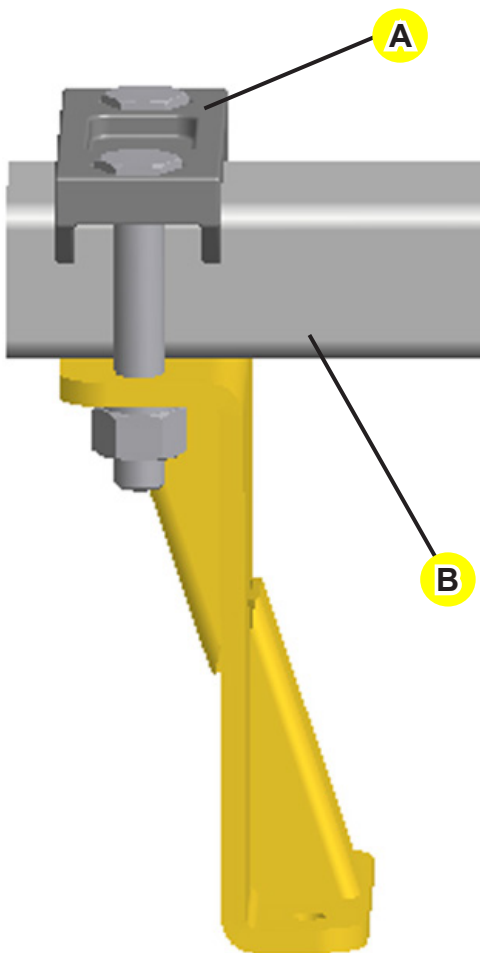
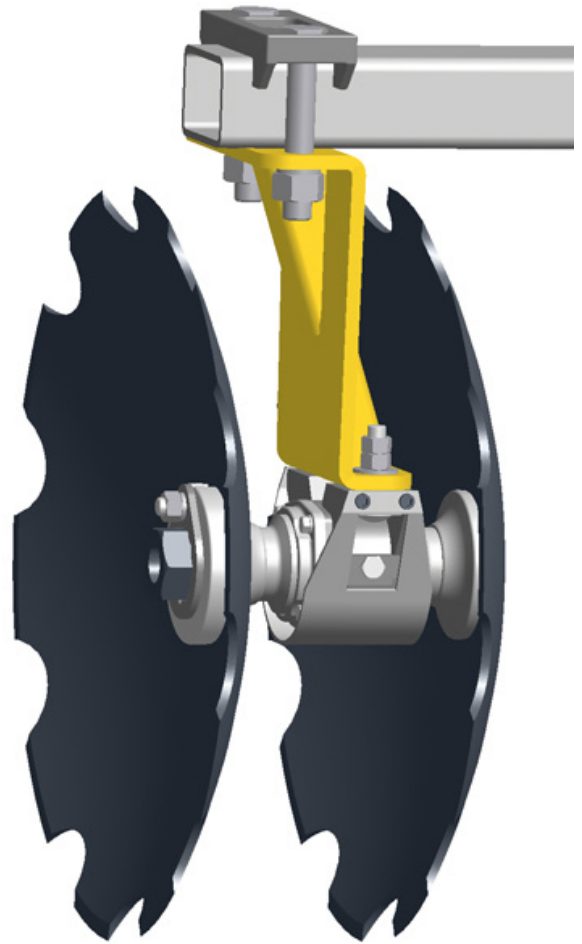
Torque table	
Axis diameter	Ft. - lbs.
1.1/2"	1600
1.5/8"	1900
2.1/8"	2100
2.1/2"	2300

**NOTE** Consult torque table on page 29.

# Assembly

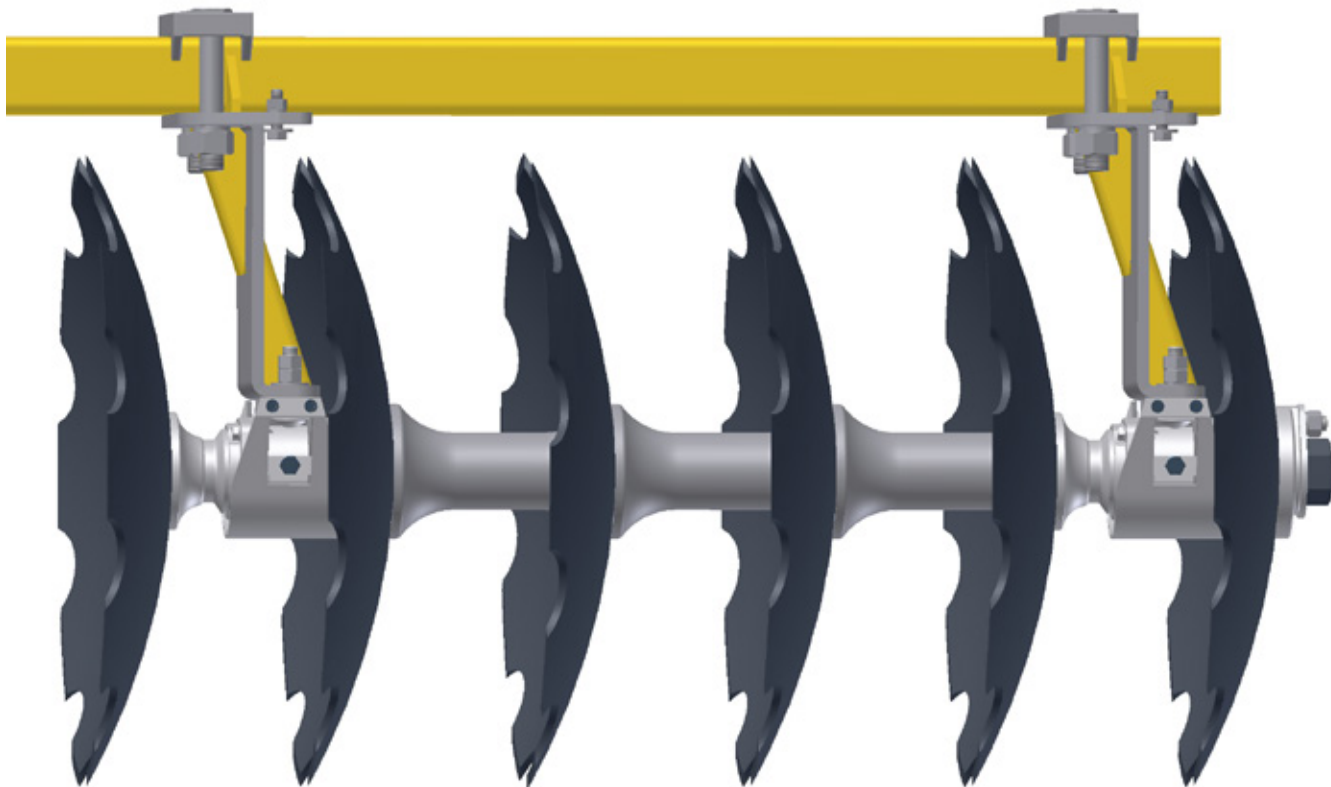
## Assembly of disc gangs on the chassis

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

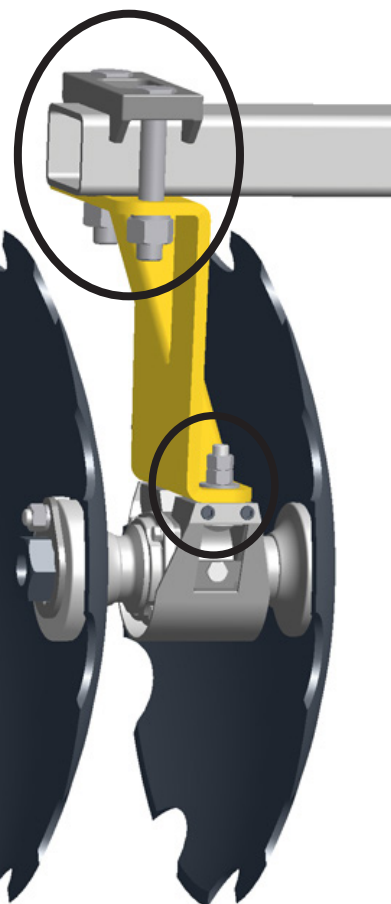


- Assemble the retainer plates of the bearing hangers (A) to the tube (B) using bolts, spring washers and nuts. Do not tighten it totally in order to facilitate its positioning. Assemble the disc gangs to the retainer plates of the bearing hangers (A), tightening the bearings properly.

# Assembly



**Bearing hanger to the tube and bearing to the bearing hanger fastenings detail**



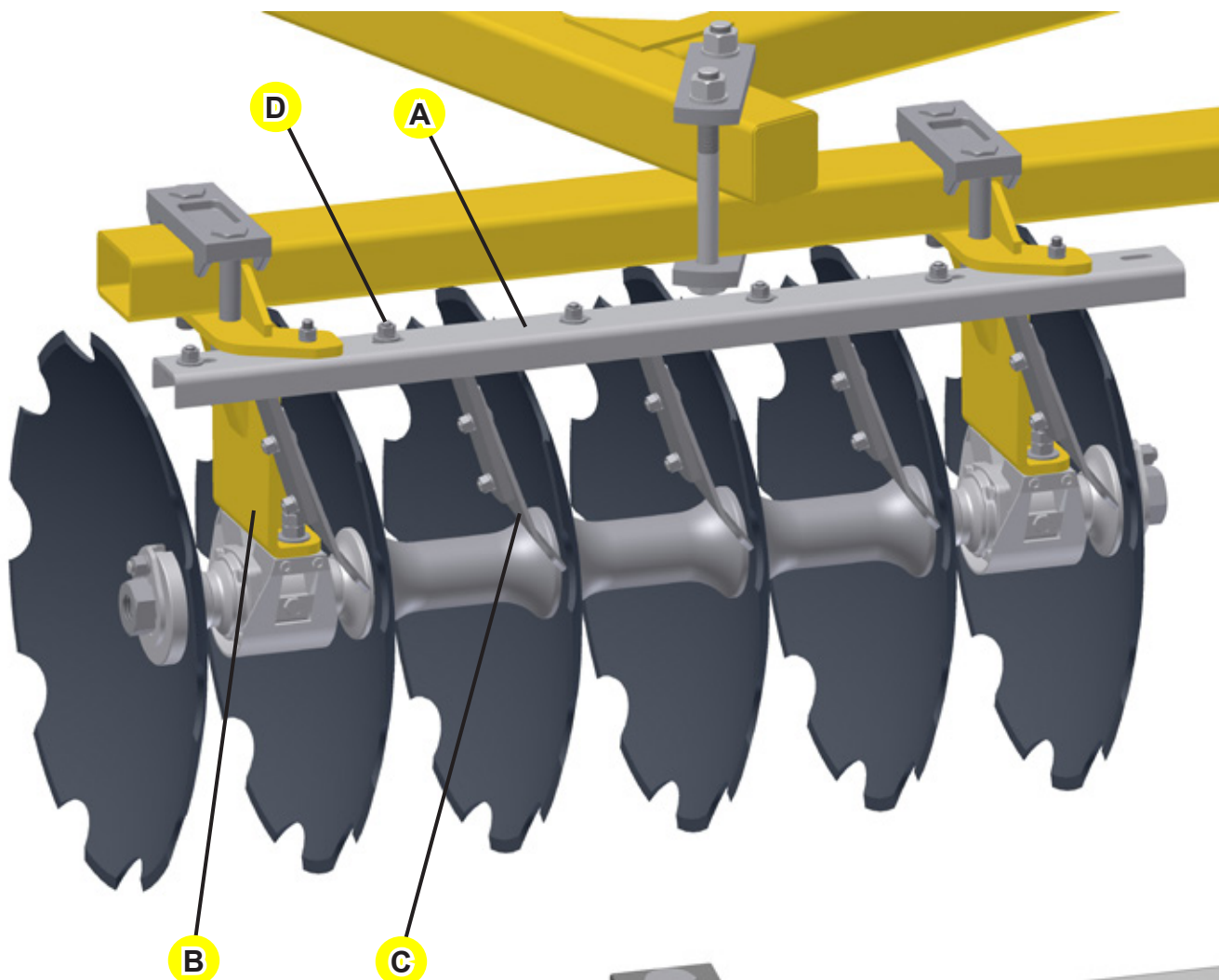
## NOTE

Assemble the frontal chassis to the frame firstly and then the rear one. Observe the correct position of each disc gang in the chassis. As previously mentioned, do not totally tighten the bolts from the bearing hangers in the tube.

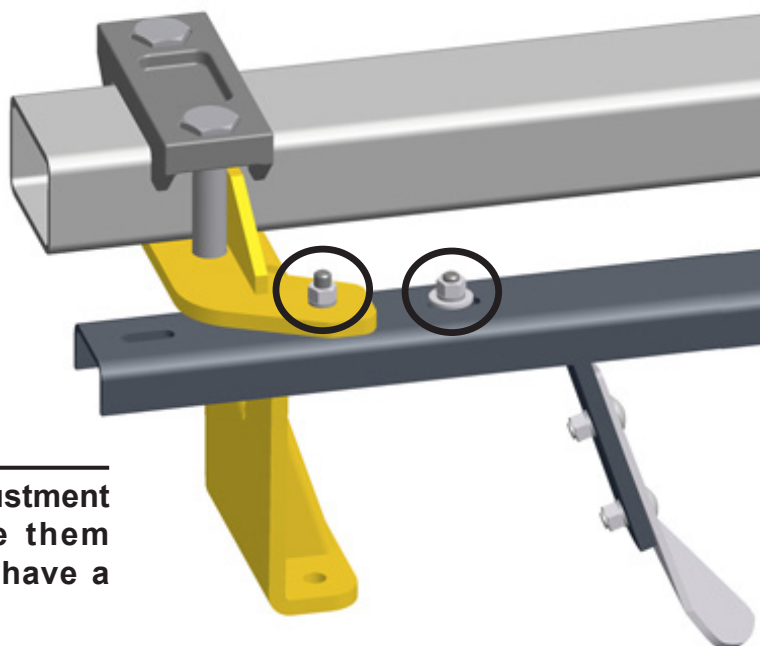
Repeat the same procedure in the other disc gang.

# Assembly

Assemble the scrapers support (A) to the bearing hangers (B) and then the scrapers (C), using a bolt (D) and a flat washer, which are placed underneath the scrapers support. On top, put a flat washer and a nut. Observe the scrapers position as they are facing the disc blades concavity.



Scraper support and  
scraper detail



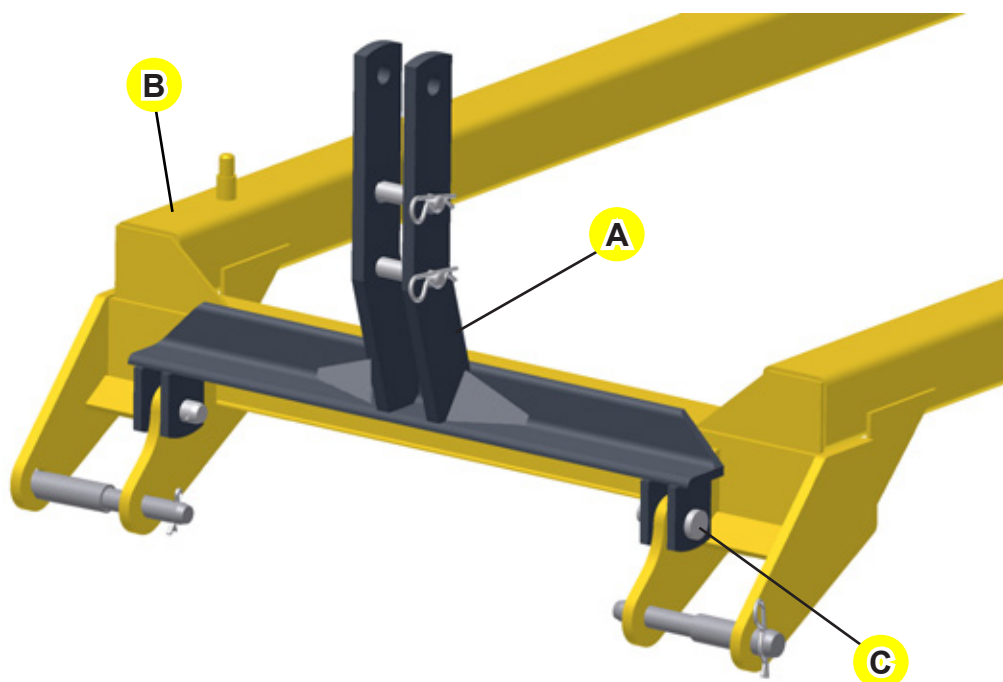
## NOTE

The scrapers feature an adjustment to approach or distance them from the discs. It should have a distance from 5 to 10 mm.

# Assembly

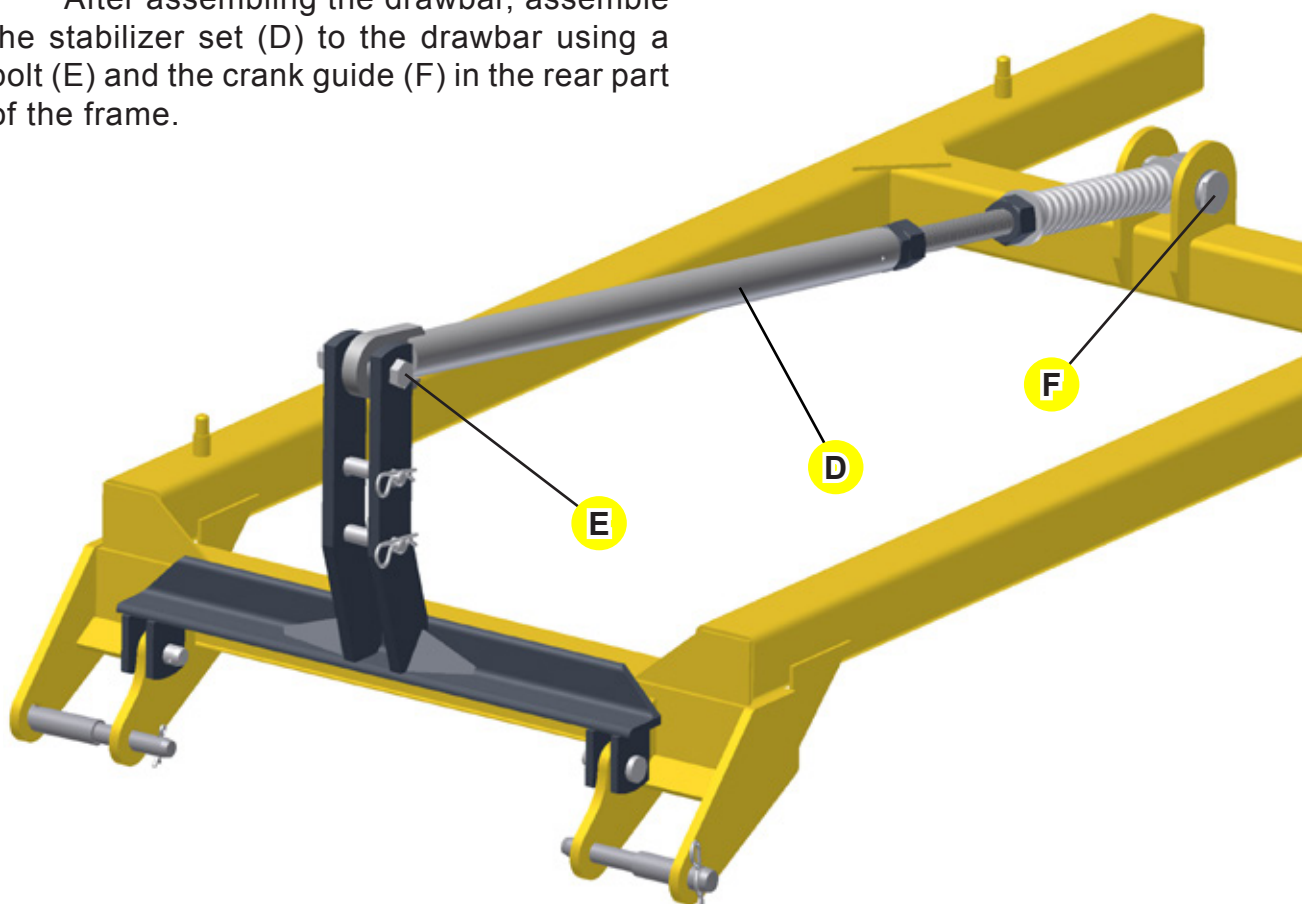
## Drawbar assembly

Assemble the drawbar (A) to the chassis (B), locking it with pins (C).



## Stabilizer set assembly

After assembling the drawbar, assemble the stabilizer set (D) to the drawbar using a bolt (E) and the crank guide (F) in the rear part of the frame.



# Preparing for work

## Tractor preparation

Before starting the operations, it is appropriate to prepare the tractor and equipment appropriately.

- First of all, check the general conditions of the tractor, mainly the functioning of the hydraulic system.
- The addition of ballast water in the tires and a set of weights on the front part and rear wheels of the tractor are the most used ways to increase the soil traction and give greater stability to the tractor.
- The gauges of the front and rear wheels should be equal (measured from the tires center).
- Carefully follow the instructions manual of the tractor and equipment to have a good performance with both of them.

## Hitching to the tractor

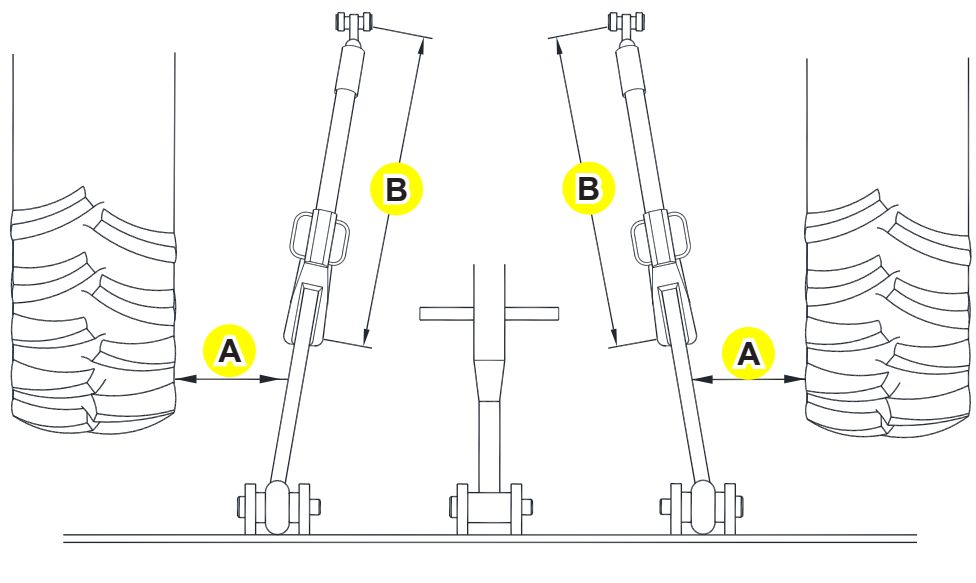
For hitching, choose a place as flat as possible.

Drive the tractor slowly in reverse gear to the equipment direction and be ready to brake. When close enough, use the lever to control the hydraulic position, leaving the left lower arm and the hitch pin of the equipment at the same level.

1) Hitch the right and left arms that feature ascent and descent movements by the arm regulator and place the lock pins. At this moment, the extension thread of the upper arm can be used to approach or put away the equipment to facilitate the hitching.

2) Place the upper arm (third point) and fasten it using a lock pin. For a perfect hitching, the equipment should be centralized with the tractor, which is made as follows:

- Align the equipment drawbar with the third point of the tractor.
- Totally raise the equipment.
- Check if the distances between the lower arms and tires are the same on both sides (as in "A"), being both in the same level (as in "B").





# Preparing for work

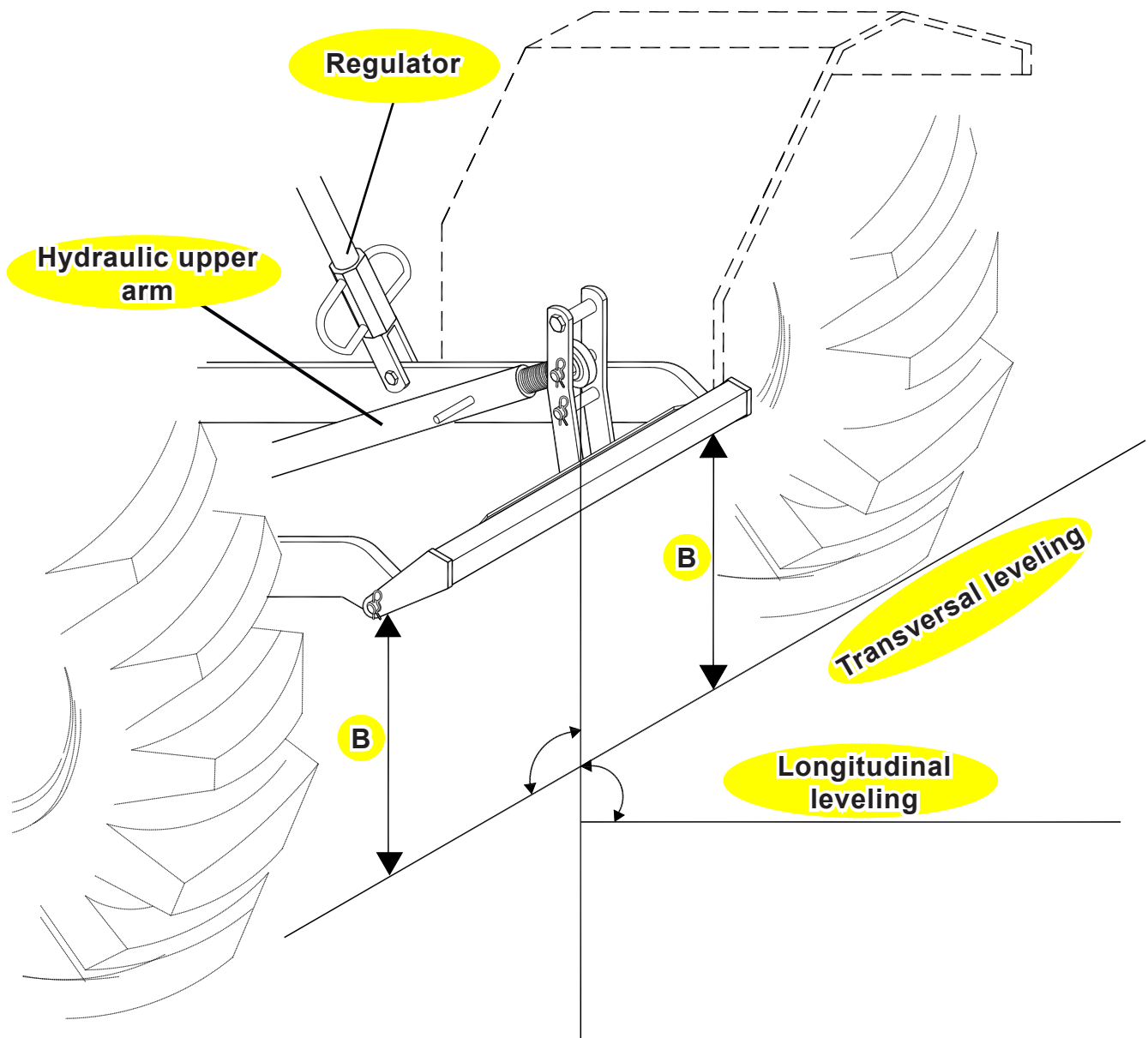
## Leveling the harrow

To level the harrow, proceed as follows:

Place the tractor in a flat location and level the harrow by its width (Transversal) and length (Longitudinal); according to the illustration below.

Widthwise, the leveling is made by the regulator of the right hydraulic lower arms, letting the harrow drawbar vertically or the (B) measures equally.

Lengthwise, the leveling is made by the hydraulic upper arm (Third point of the arrangement), letting the chassis parallel to the soil.

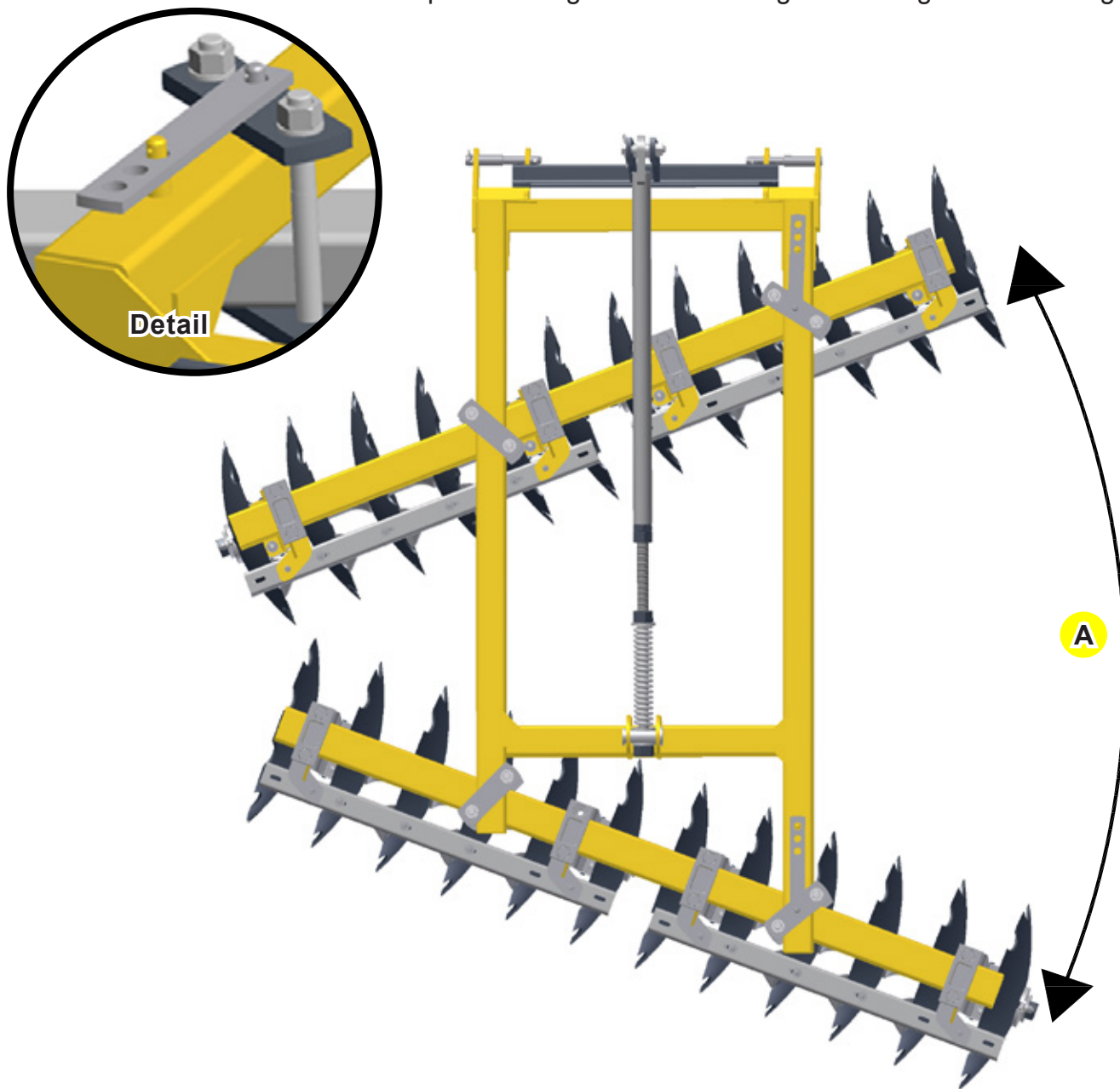


# Adjustments and operations

## Disc gangs opening

The GHD<sup>2</sup> 3009A has adjustments to open the disc gangs according to the soil type. This opening is adjusted by the chassis adjustment plate. To adjust the chassis opening angle, place the chassis adjustment plate in another hole, switching between 18°, 20° 22°.

The depth will be greater according to how big is the "A" angle.



### **IMPORTANT**

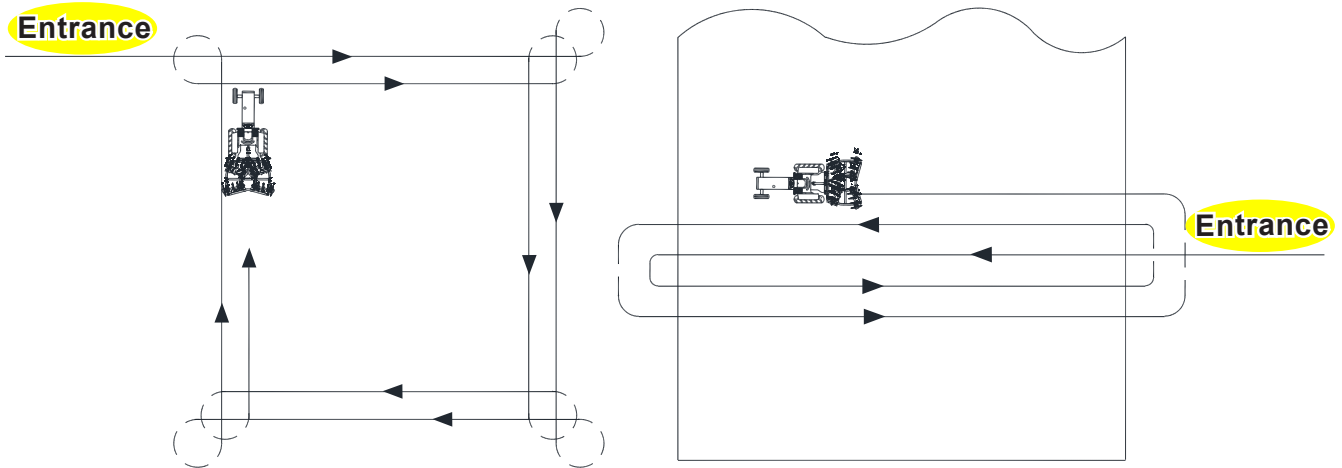
- To start the harrowing, we recommend using an average opening in the disc gangs. Adjust it, if necessary.
- The front gang usually operates with a greater opening than the rear one.
- Try to make a good finish between passes. Avoid the formation of furrows or untilled strips.



# Adjustments and operations

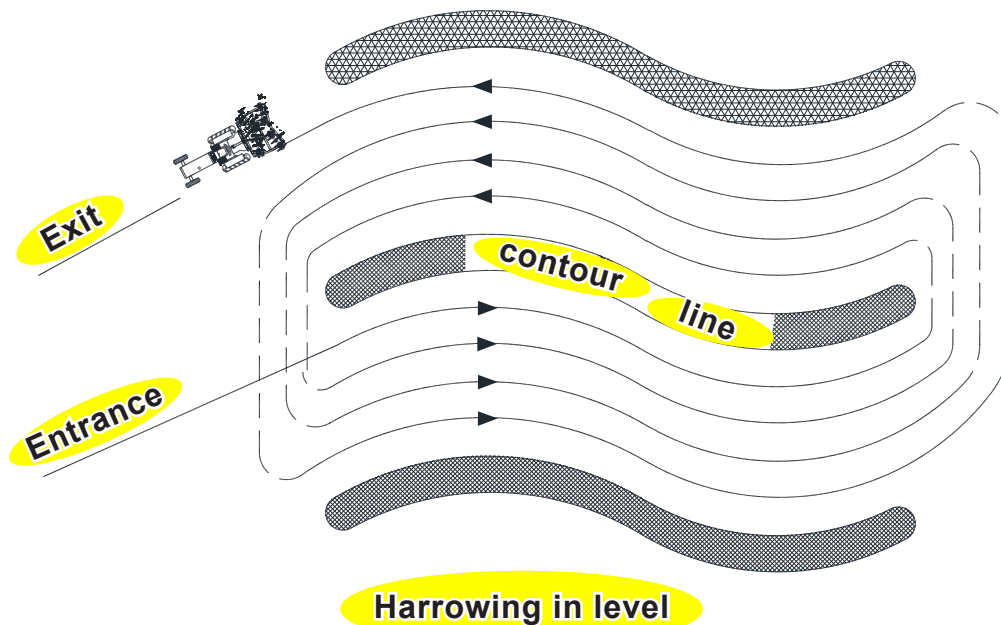
## Ways to start the harrowing

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.



Harrowing in squares from outside to inside

Harrowing in squares from inside to outside



Harrowing in level

### NOTE

It is necessary to perform the maneuvers in the left side to avoid overloading the equipment and allow it to operate normally. Following these instructions also avoids the undesirable formation of large furrows in the maneuver spots.

# Adjustments and operations

## Operations - Important points



- Retighten nuts and bolts after the first day of service and check the conditions of all pins and cotter. Then, retighten every 24 operating hours.
- Carefully observe the lubrication interval of the bearings. (See lubrication instructions on page 25).
- Only people who own a full knowledge of the tractor and equipment must operate them.
- Maintain the hydraulic lower arms of the tractor adjusted.
- Special attention should be given to the disc gangs, retightening daily during the first week of use. Then, retighten periodically.
- Use a tractor with enough power to operate the harrow.
- Choose a gear that allows the tractor to maintain certain power reserve, ensuring against unforeseen efforts.
- The work speed is relative to the tractor gear and can only be determined by local conditions. We adopted an average 6,0 to 8,0 km/h, which is not advisable to overcome to maintain service efficiency and avoid possible damage to the equipment.
- Only perform maneuvers when the harrow is lifted, otherwise the angle formed by the disc gangs will transmit great effort to the equipment, especially to the traction components.
- When unhitching the harrow from the tractor, check if it's properly underpinned.
- Remove pieces of wood or any object that may attach in the discs.
- During work or transportation, the presence of passengers on the tractor or equipment is not allowed.
- As previously mentioned, the GHD<sup>2</sup> 3009A has several settings. However, only local conditions can determine the best adjustment thereof.

# Maintenance

## Lubrication

The simplest way to extend the lifetime of your harrow and avoid interruptions during work is to lubricate it properly, as indicated below.

1) Every 24 hours of service, lubricate the articulations through the grease fittings in the following way:

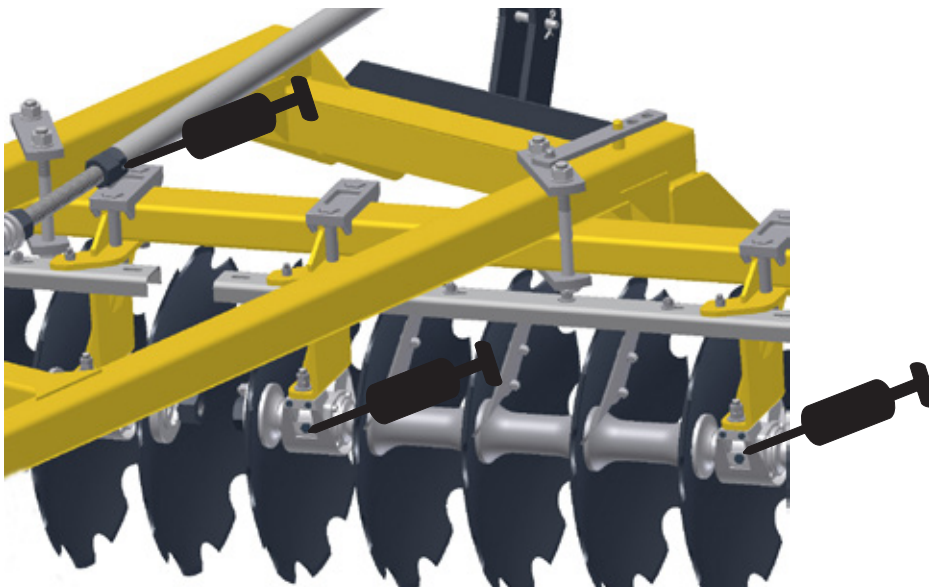
- Be sure about the lubricant quality, with relation to its efficiency and purity, avoiding the use of products contaminated by water, dirt and others.
- Remove the remainder old grease around the articulations.
- Clean the grease fittings with a cloth before inserting lubricant and replace the damaged ones.
- Introduce an enough amount of new grease.
- Use medium consistency grease.
- Use lithium soap-based grease (NLGI2-EP grade), which has a high resistance to water and large stability to oxidation.

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

2.1) The roller bearings with oil bath works 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.
- Then, start to check weekly.
- Change all the oil every 1,000 hours of service.
- Use only SAE 90 mineral oil.

## Lubrication points



**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 bearings is 110 ml.

# Maintenance

## Harrow maintenance

In disuse period wash the harrow, repair the paint failure, protect the discs with oil, lubricate all grease fittings and store in a covered and dry location, avoiding contact with the soil.

Discs should be replaced as soon as you notice a low-income thereof, characterized mainly by the reduction in diameter, cut loss and other damages to which they are subjected during work.

Make sure all moving parts have no wear. If necessary, make the replacement thereof.

**NOTE** Use TATU original parts only.

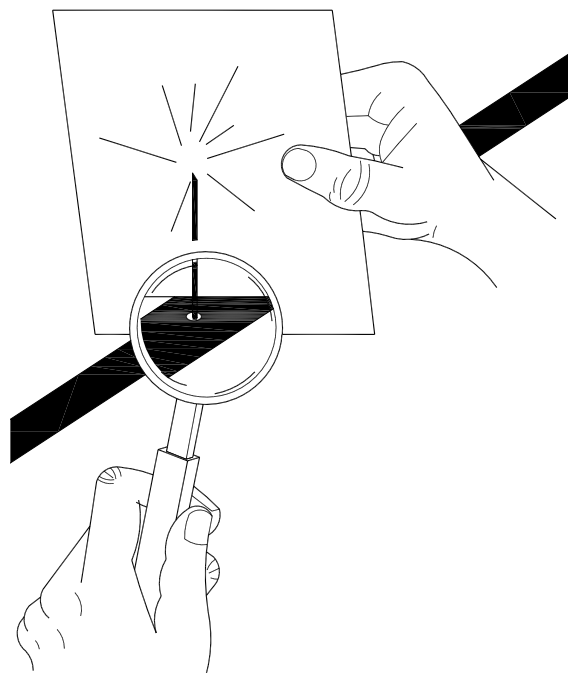
## Maintenance precautions



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 cardboard or 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.



# Important data

## Calculation of hourly income

To calculate the hourly income of the GHD<sup>2</sup> 3009A disk harrow, use the following calculation:

$$R = \frac{L \times V \times E}{X}$$

Where:

**R** = Hourly income;

**L** = Harrow working width, in meters;

**V** = Average speed of the tractor, in meters per hour;

**E** = Efficiency: 0,90;

**X** = Hectare value = 10.000 m<sup>2</sup>.

Example with a GHD<sup>2</sup> 3009A of 24 discs:

**R** = ?

**L** = 2,74 m

**V** = 6.000 m/h

**E** = 0,90

**X** = 10.000 m<sup>2</sup>

$$R = \frac{2,74 \times 6.000 \times 0,90}{10.000}$$

**R** = The hourly income working with an equipment of 24 discs will be approximately 1,48 hectares per hour.

**NOTE** The harrow hourly income can vary by physical factors such as humidity, slope, soil hardness, appropriate adjustments and especially the working speed.

Based on this calculation, the table on the following page shows the average hourly income and also for a day, that is, nine (9) hours of work.

# Important data

## Average income table

Model	Number of discs	Cutting width (m)	Hourly income (ha)	Daily income (ha)
GHD <sup>2</sup> 3009A	18	2,07	1,12	10,06
	20	2,28	1,23	11,08
	22	2,49	1,34	12,10
	24	2,74	1,48	13,32
	26	2,99	1,61	14,53

**NOTE** / An average speed of 6 km/h was assumed to prepare the table above.

To know how many hours will be spent to work a certain previously known area, it is necessary to divide the value of the area by the hourly income.

Example: An area of 100 hectares to be worked with a GHD<sup>2</sup> 3009A harrow of 24 discs (Hourly income = 1,48 hectares).

$$\text{So: } \frac{100}{1,48} = 67,56$$




Approximately will be spent 67 (sixty-seven) hours to work in an area of 100 hectares with a GHD<sup>2</sup> 3009A of 24 discs.

# 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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[G:\VALSON\Manuais\_Ingles\Torque]

### NOTE

For metric conversion:

- Multiply inch-pounds by 0,113 to convert to newton-meters (Nm).
- Multiply foot-pounds by 1,356 to convert to newton-meters (Nm).

## ATTENTION

**MARCHESAN S/A 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.**

## TECHNICAL PUBLICATION DIVISION

**Elaboration / Diagramming:** Valson Hernani de Souza

**Diagramming Assistant:** Ingrid Maiara G. S. Luis

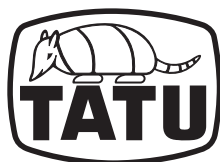
**Translation:** Matheus Freire de Souza

**Illustrations:** Reinaldo Tito Júnior

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**MARCHESAN IMPLEMENTOS E MÁQUINAS AGRÍCOLAS "TATU" S.A.**

Av. Marchesan, 1979 - P.O. Box 131 - Zip Code 15994-900 - Matão - SP - Brazil

Telephone 55.16.3382.8282 - Fax 55.16.3382.3316

Sales 55.16.3382.1009 - Parts 55.16.3382.8297 - Exportation 55.16.3382.1003

e-mail: [tatu@marchesan.com.br](mailto:tatu@marchesan.com.br)

[www.marchesan.com.br](http://www.marchesan.com.br)