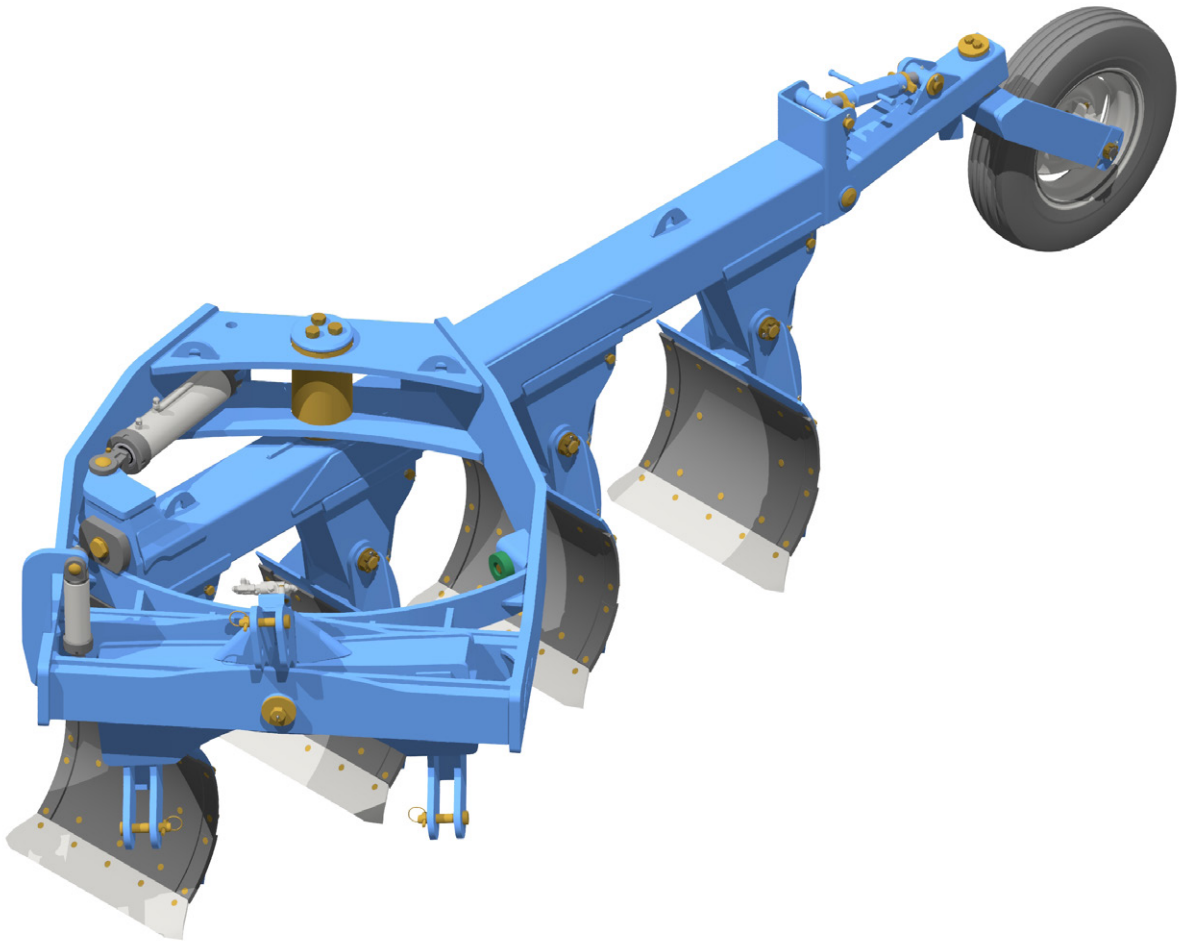


**MARCHESAN**

# **OPERATOR'S MANUAL**



# **AAR<sup>2</sup>**

# IDENTIFICATION

Dealer: \_\_\_\_\_

Owner: \_\_\_\_\_

Firm / Farm: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

No. of the Certificate of Guarantee: \_\_\_\_\_

Serial / No.: \_\_\_\_\_

Date:\_\_\_\_/\_\_\_\_/\_\_\_\_ Invoice No.:\_\_\_\_\_

Product: \_\_\_\_\_

Notes: \_\_\_\_\_

[illegible]

# Introduction

The AAR<sup>2</sup> plow has a modern and rugged structure with a better weight distribution, thus offering a new concept in the plowing job.

It has an horizontal retrieving system that is quick and simple, which is activated through a double-action hydraulic cylinder, thus having a great performance in every type of soil. The drawbar three-point hitch is pivoted along with the plow structure and has the help of a cylinder that level the moldboards automatically on both sides of the plowing.

The retention valve of the hydraulic system keeps the set firmly locked on the desired position.

This plow is equipped with cylindrical moldboards that have high-density polyethylene coatings, so that the earth do not stick to it, offering a low maintenance and greater lifetime.

With practical and simple adjustments, this plow can keep an uniform depth, clod breaking and incorporating stubbles.

This operator's manual contains the necessary information for the best performance of this plow. 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 plow.



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## To the owner

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

- Warranty certificate;
- Operator's 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 transport, operate and carry out any maintenance on 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 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.

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> <b>www.marchesan.com.br</b> 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 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 Marchesan S/A.

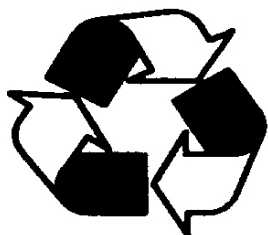
# To the operator

## Be careful with the environment



Dear operator!

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



Products such as oil, fuel, filters, batteries and others are spilt over the soil and can penetrate to the underground layers, thus 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 used 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. When the safety instructions are not being followed, a serious accident or even death may occur.

The AAR<sup>2</sup> plow 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 transportation, maintenance and storage.



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 injuries.



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



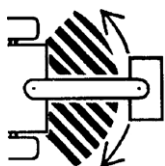
Be careful while driving on slopes. Risk of overturn.



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. 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 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.
- When setting the plow to transport position, check if there are no people or animals close or under it.
- 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.
- Wear protective gloves to work near the cutting parts.
- Never operate the equipment without its **protective devices**.
- Have full knowledge of the soil before starting to work. Use the speed which is suitable to the conditions of the ground or pathways to be covered. Provide the delineation of obstacles or hazardous locations.
- Carefully check the transport width on narrow locations.
- Be careful while hitching the equipment to the tractor.
- Only pull the equipment using a tractor with appropriate power.
- Do not drive the equipment under the influence of alcohol or any soothing/stimulating medicine, 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 at hands.
- In case of emergency, know how to stop the tractor and plow quickly.
- Always shut down the engine, remove the key and use the handbrake before leaving the tractor seat.
- Never attempt to change the adjustments, clean or lubricate the equipment while it is moving.
- Whenever you unhitch the equipment, either in the field or shed, do it on a flat and firm surface and use parking jacks. Make sure the equipment is properly supported.
- We suggest that you carefully read the manual, as it will be a guide for periodic verifications that need to be done and will allow that you assure the maintenance of your equipment.
- If there is any doubt after reading it, ask your dealer. For more complicated operations, there will be the right person to help you there.
- Please check the general safety instructions on the back cover of this manual.



# To the operator

## Transportation over truck or trailer



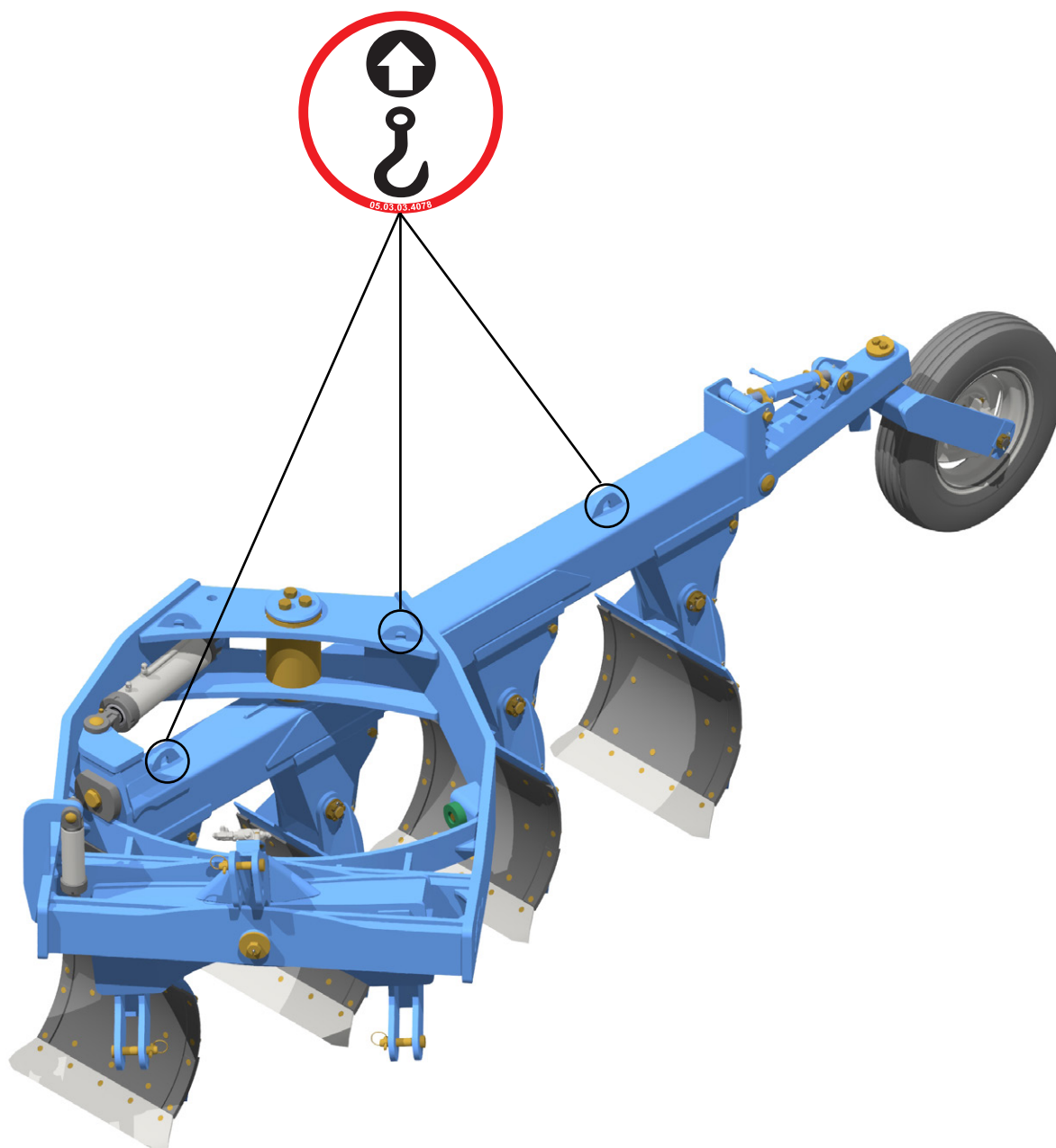
Marchesan does not advise the equipment traffic on highways, because this practice involves serious security risks in addition to being prohibited by the current existing traffic law. The transportation for long distances should be done on truck, trailer or other by following these safety guidelines:

- Use adequate ramps to load or unload the equipment. Do not make the loading on ditch banks, as it may cause a serious accident.
- When lifting with a hoist, use the appropriate points to lift.
- Underpin the equipment appropriately.
- Use chock blocks and safety chains to secure the equipment to the truck or trailer during the transport.
- Make sure the SMV (Slow Moving Vehicle) sign, and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.
- 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 to the truck or trailer. If necessary use banners, lights and other devices in order to give adequate warning to the other drivers.

# To the operator

## Lifting points

This moldboard plow has adequate lifting points located on the frame. When lifting with a hoist, it is essential to hitch the cables to all of these points.



**Use chains, of at least 3 meters long, to lift the equipment safely.**

**Use the adequate points for lifting and be sure that the equipment is safe. Avoid accidents.**

**Always keep a safe distance from the equipment.**

## To the operator

### Safety decals

The safety decals warn about the equipment points that require more attention and they should be kept in good repair. If these decals become damaged or illegible, replace them. Marchesan provide decals, upon request and indication of the respective serial number.



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

05.03.03.1827

### Decal set

Qty.	Model	Serial number
1	AAR <sup>2</sup> decal	05.03.06.1768
1	Read the manual decal	05.03.03.1428
1	Lubricate and retighten daily decal	05.03.03.1827

# Data sheet

Type: ..... Two-way moldboard plow

Model: ..... AAR<sup>2</sup>

Hitching type: ..... Three-point hitch

Working speed: ..... 5 to 6 Km/h

Height: ..... 950mm

Moldboard dimension: ..... 24" (609.6 mm)

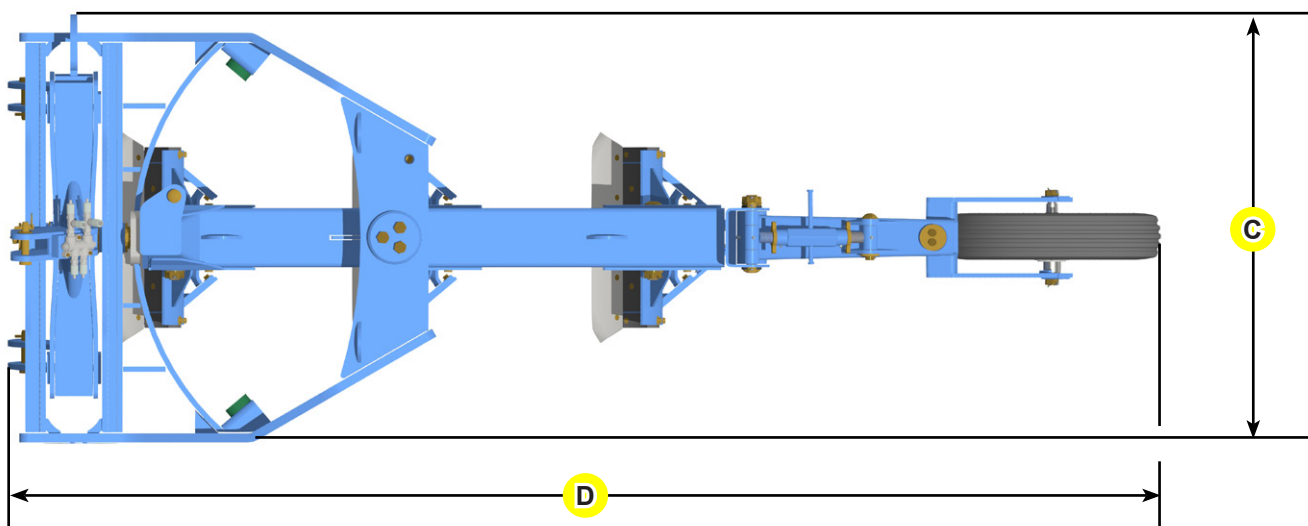
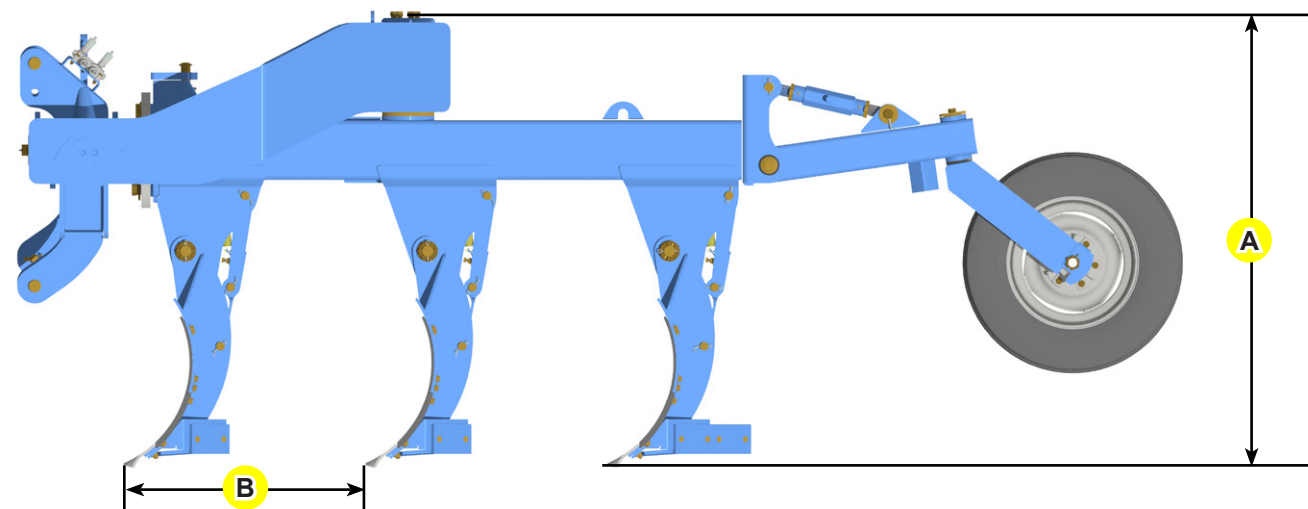
Moldboard depth: ..... up to 400 mm

Model	Number of moldboards	Spacing between moldboards (mm)	Cutting width (mm)	Weight (Kg)	Tractor required (hp)*
AAR <sup>2</sup>	03	810	1440	1420	120 - 140
	04	810	1920	1610	160 - 180
	05	810	2400	1770	180 - 200

**NOTE** / \* The tractor engine power may change according to the soil type.

# Data sheet

## Dimensions for transportation and storage



Model	Number of moldboards	A	B	C	D
AAR <sup>2</sup>	03	1520	810	1450	3885
	04	1520	810	1450	4700
	05	1520	810	1450	5520

**NOTE** Measures in millimeters.

# Components

## AAR<sup>2</sup> - Two-way moldboard plow

01 - Frame

02 - Drawbar

03 - Retention valve

04 - Hitch bar

05 - Hydraulic cylinders

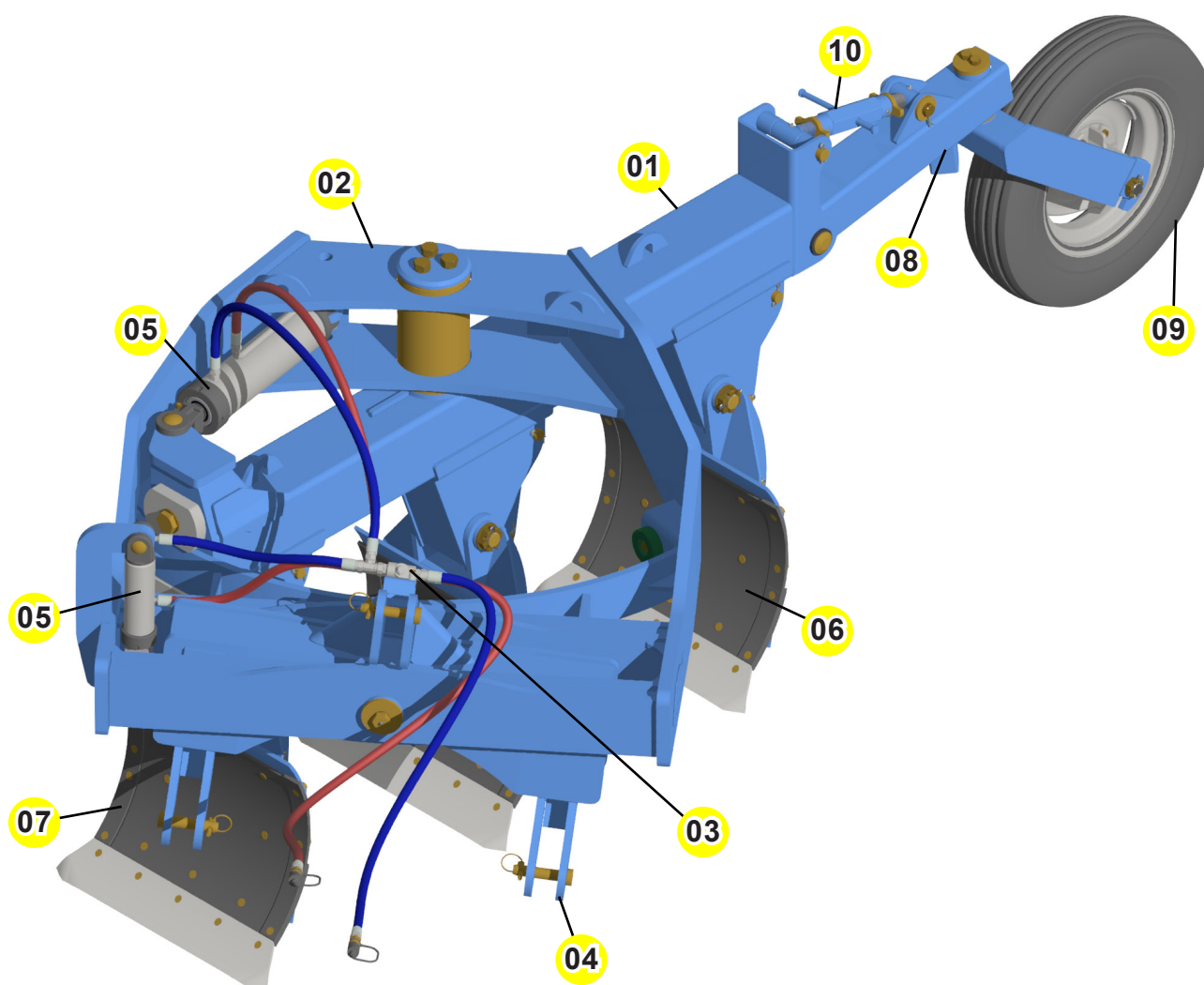
06 - Polyethylene coating

07 - Moldboards

08 - Bracket

09 - Gauge wheel

10 - Stabilizer



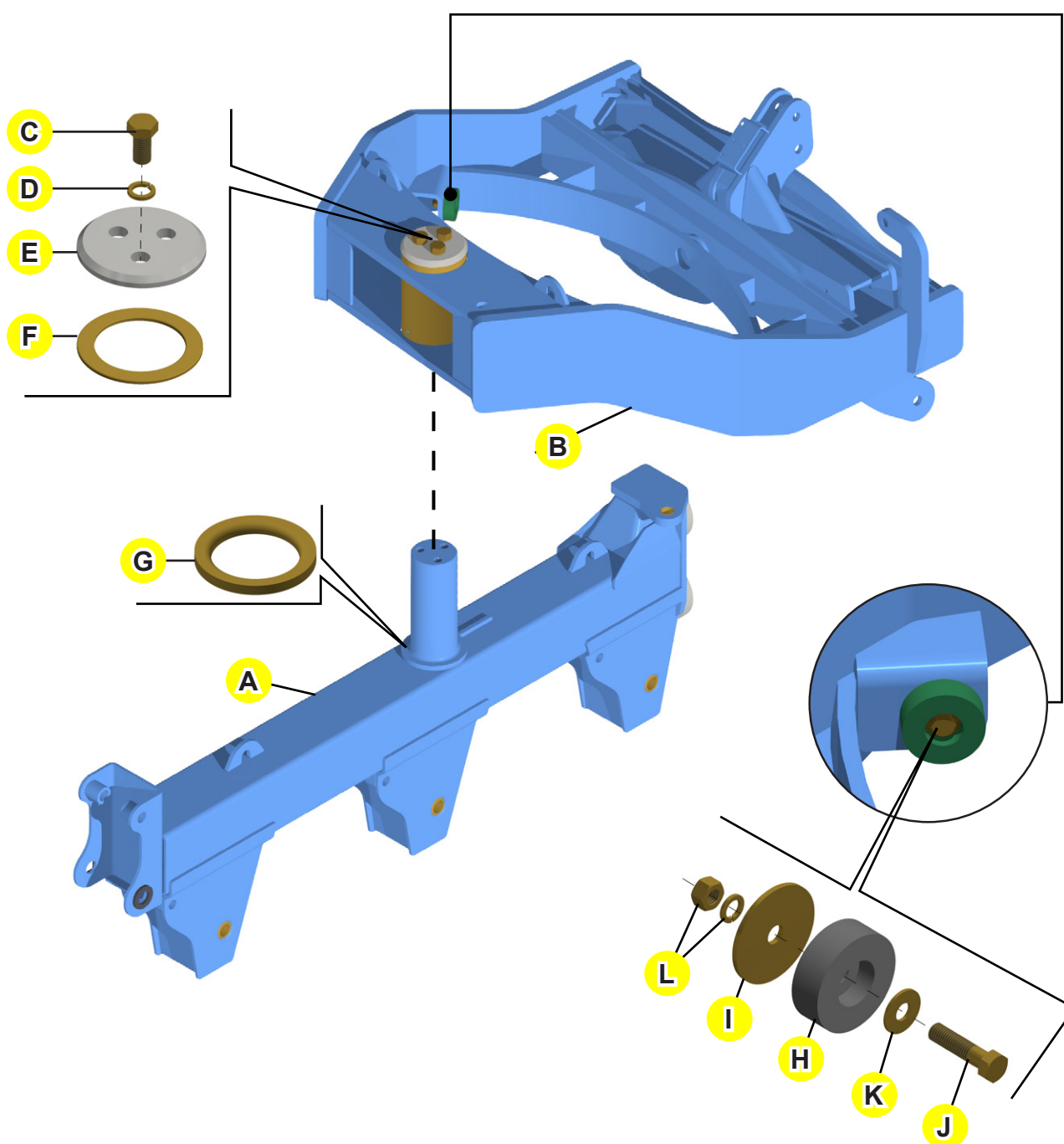
# Assembly

First of all, separate the parts to facilitate identification and check them using the list that can be found inside the components box.

## Moldboard carrier frame and shock absorbers

Assemble the moldboard carrier frame (A) on the rear part of the drawbar (B) using bolts (C), spring washers (D), upper frame fixation flange (E), flat washer (F) and axle bushing (G).

Fasten the lateral shock absorbers (H) to the frame (B) with a flat washer (I) using a bolt (J), flat washer (K), spring washer and nut (L).





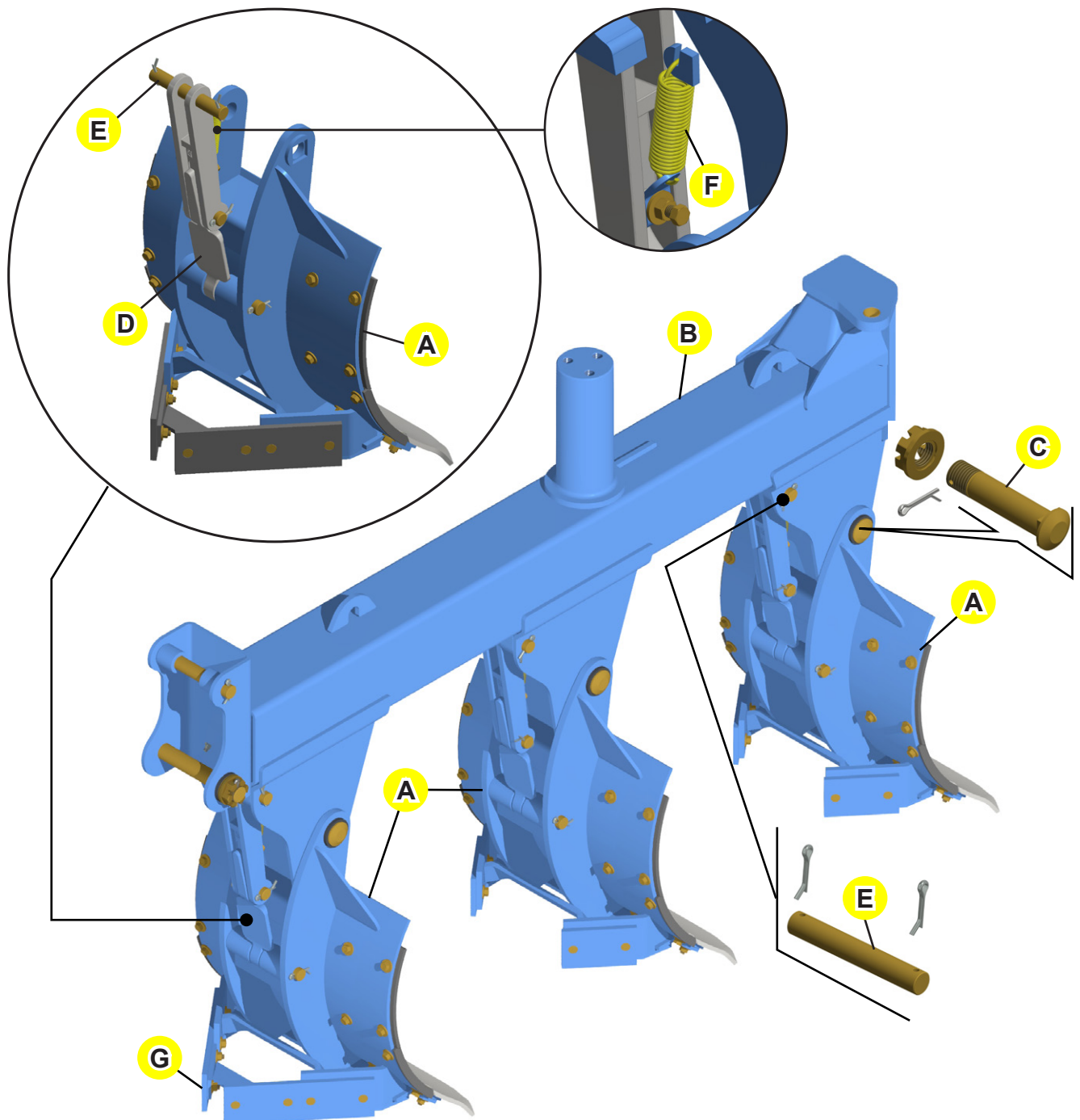
# Assembly

## Moldboard assembly

Couple the moldboards (A) to the moldboard carrier frame (B) using a pin (C), castle nut and cotter pin.

Then, couple the automatic retrieving set (D) with junction axle (E) and cotter pin.

Lastly, lock the traction spring (F) to the automatic retrieving set (D). Repeat this operation for every moldboard.



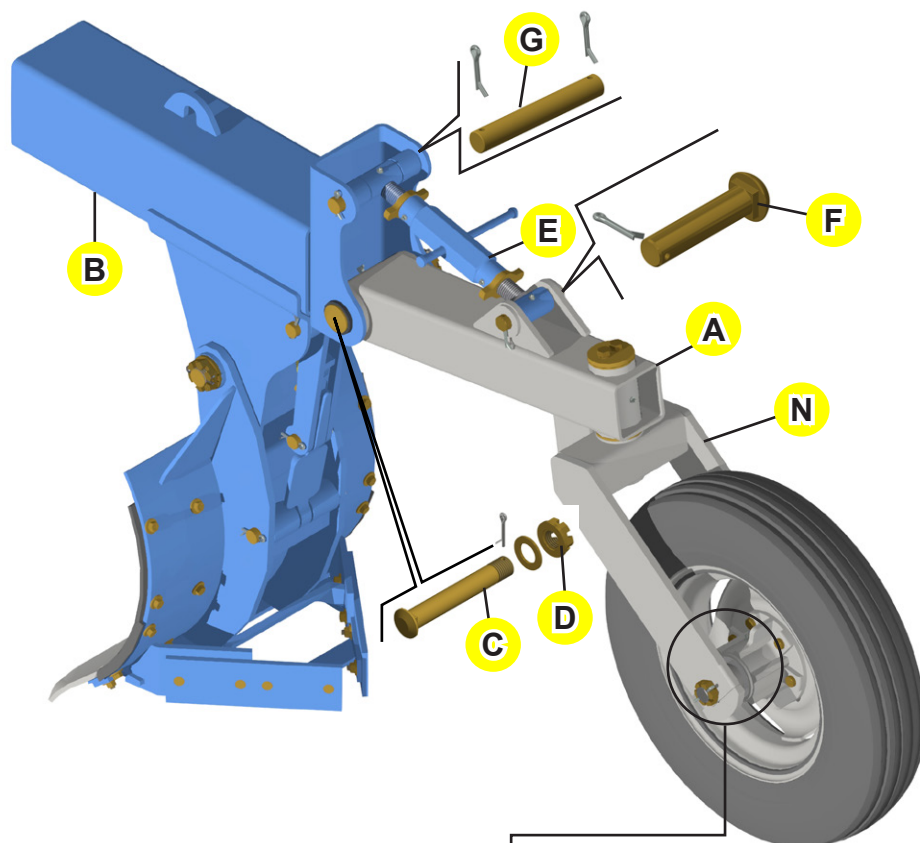
**NOTE** The last moldboard has a long guide (G) to help stabilizing the plow.



# Assembly

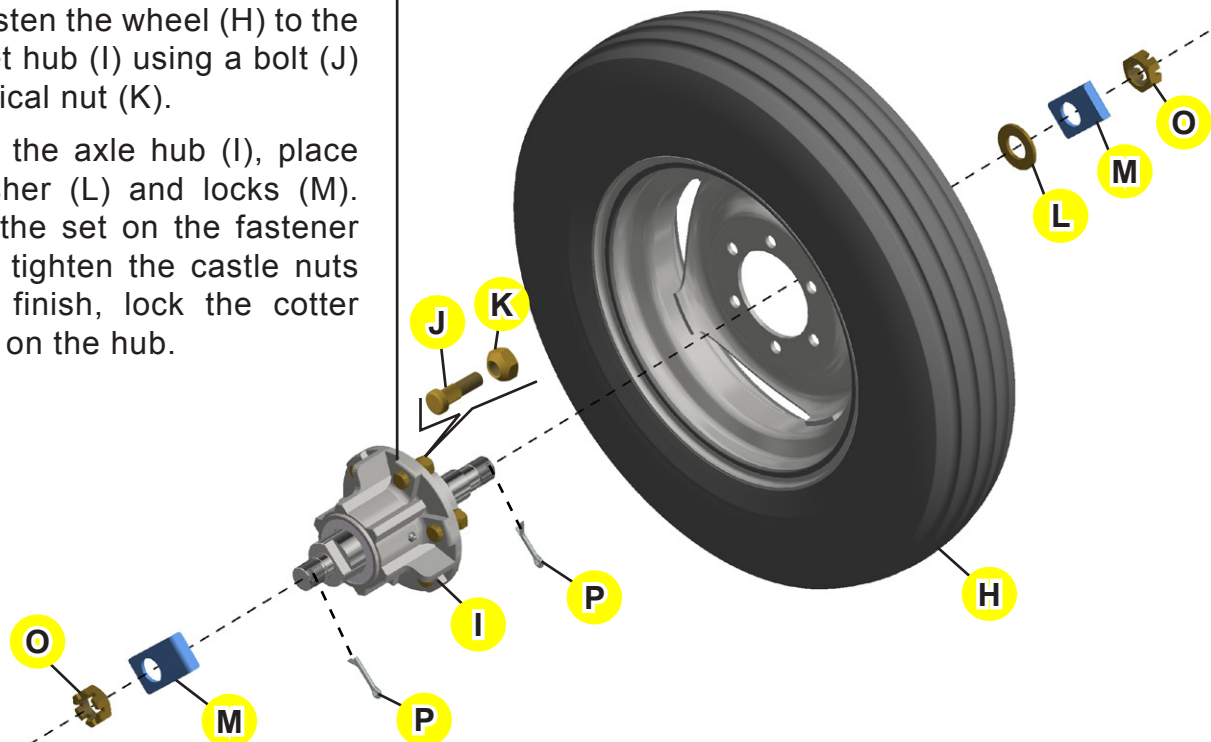
## Wheelset and rear tire

To couple the rear wheelset (A), fasten it to the moldboard carrier frame (B) using a junction axle (C), castle nut (D), flat washer and cotter pin. Place the stabilizer (E) to the wheelset (A) with junction axle (F) and cotter pin. On the other end, use the junction axle (G) and cotter pin.



Fasten the wheel (H) to the wheelset hub (I) using a bolt (J) and conical nut (K).

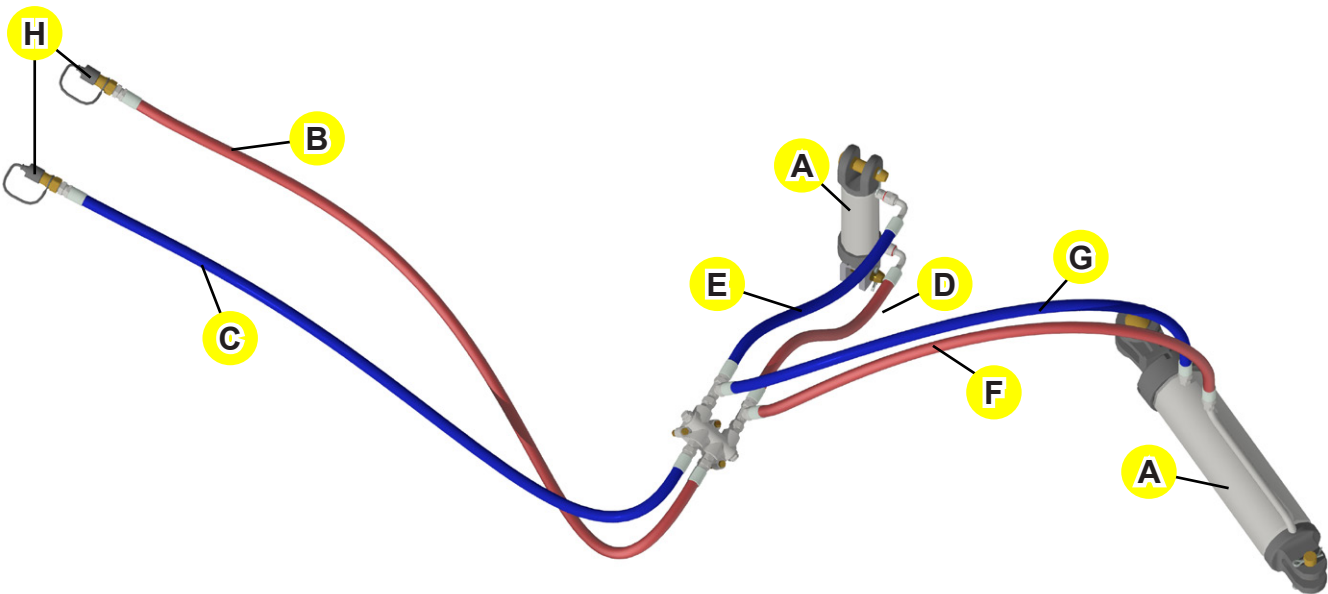
On the axle hub (I), place flat washer (L) and locks (M). Couple the set on the fastener (N) and tighten the castle nuts (O). To finish, lock the cotter pins (P) on the hub.



# Assembly

## Hoses assembly

Identify the hoses according to the illustration and specifications below:  
Assemble them with sufficient tightening to prevent leakages.



AAR <sup>2</sup>			
Item	Description		Quantity
A	Hydraulic cylinder		02
B	Ø 3/8" x 1350 TR-TM hose	Pressure	01
C	Ø 3/8" x 1350 TR-TM hose	Return	01
D	Ø 3/8" x 600 TR-TC hose	Pressure	01
E	Ø 3/8" x 600 TR-TC hose	Return	01
F	Ø 3/8" x 1100 TR-TR hose	Pressure	01
G	Ø 3/8" x 1100 TR-TR hose	Return	01
H	Male quick coupler with cap		02

**NOTE** If necessary, use thread sealing tape to couple the hoses and the male quick couplers.

Assemble the hoses following the illustrations below.

# Set-up instructions

The following instructions must be carefully observed in order to get the best working performance.

## Preparing the tractor

Check the general conditions for using the tractor, especially the good functioning of the hydraulic system (three-point hitch).

The gauges of the front and rear wheels must be equal (tires center-to-center measure). They must be adjusted according to the following indications:

Model	Number of moldboards	Gauges
AAR <sup>2</sup>	03	1.80 to 2 meters
	04	
	05	

The addition of water ballasts on the tires or a set of weights on the front part/rear wheels of the tractor are the most used ways to increase the traction over soil and to give a greater stability to the tractor.

## Preparing the plow

Check the conditions of all parts and retighten nuts and bolts.

Lubricate all grease fittings appropriately. (Check the instructions on the 'lubrication' section).

Follow the tractor and plow operator's manual appropriately for the best performance of both.

Carefully note the instructions of right and left hand sides, considering the plow seen by its rear.



**When transporting the plow or lifting it for maneuvers, check the tractor manual to be sure about the necessary weight to not affect the stability of the tractor-plow set. Without this proper weight distribution, serious accidents or even death may occur.**

**Marchesan is not responsible for the incorrect use of the equipment.**

# Set-up instructions

## Hitching to the tractor

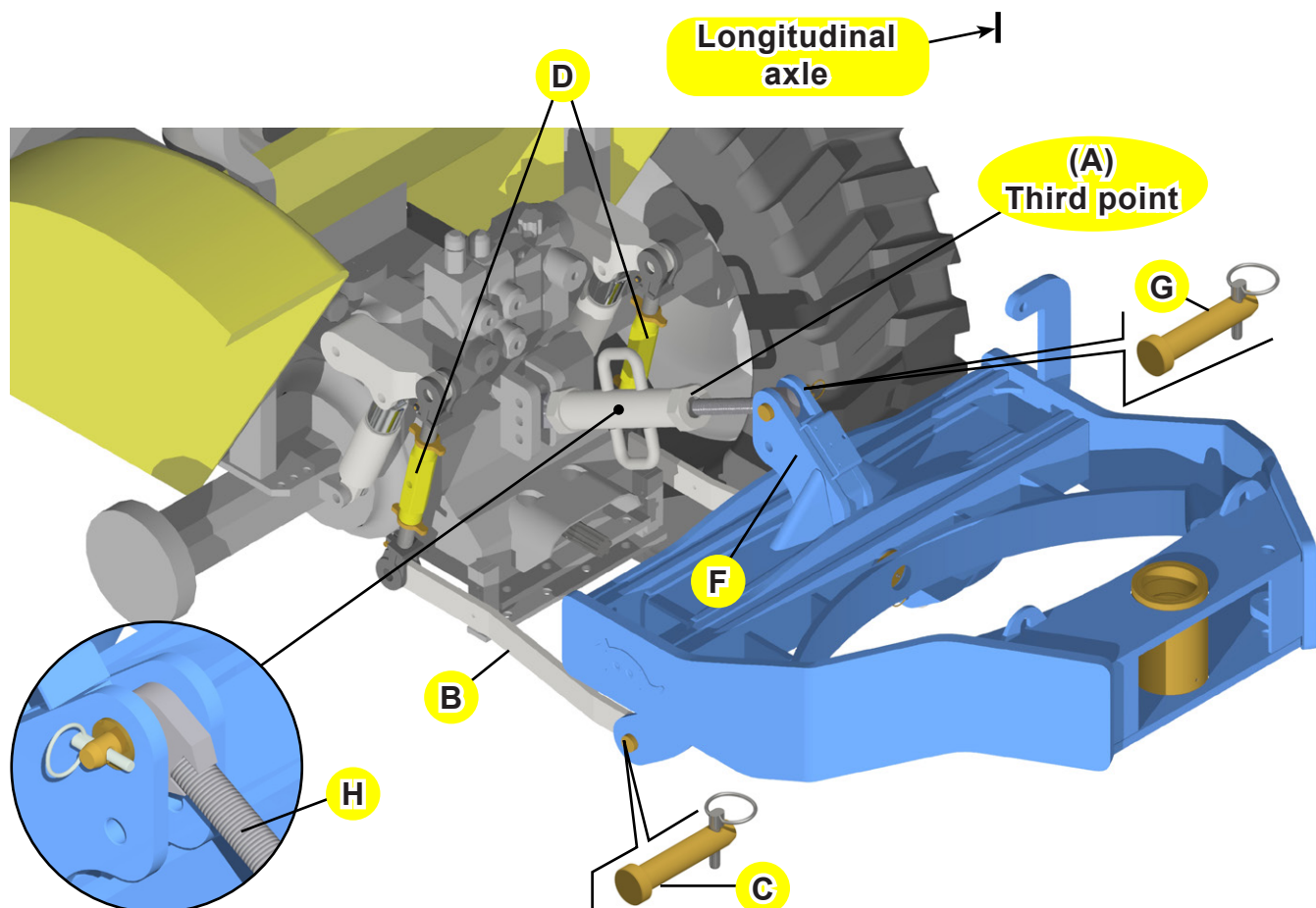
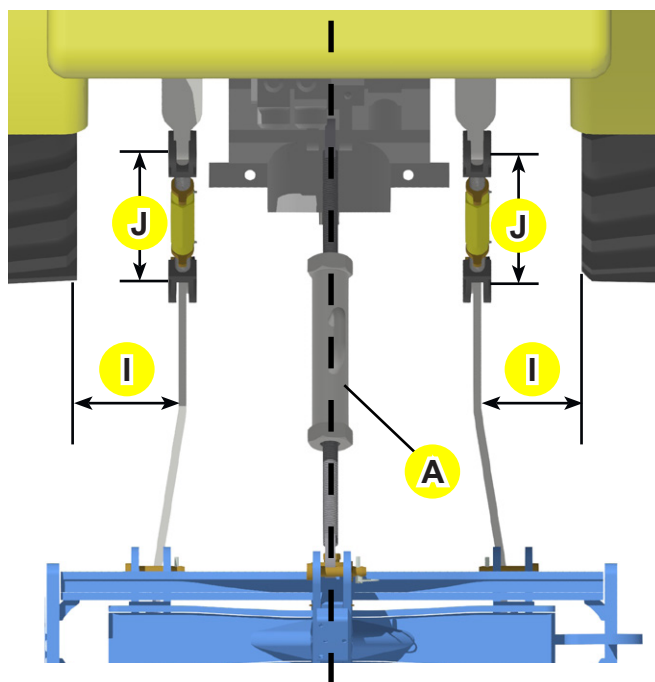
For the perfect hitching, the equipment must be centralized related to the tractor longitudinal axle on a flat place, which is done as follows:

Drive the tractor slowly in reverse gear to the plow direction and be ready to brake. When close enough, align the drawbar with the upper arm (A) - Tractor third point.

Use the lever to control the hydraulic position and let the left lower arm (B) on the same level as the plow hitch pin (C). Hitch the right and left lower arms (which have up and down movements) through the adjusters (D) and place the lock pins (C).

Lock the tractor third point (A) to the support (F) with lock pin (G). Use the third point extensor thread (H) to approach or move away the plow in order to facilitate hitching.

Totally lift the equipment and check if the distances between the lower arms and tires are equal on both sides (as in "I"), being them leveled (as in "J").



# Set-up instructions

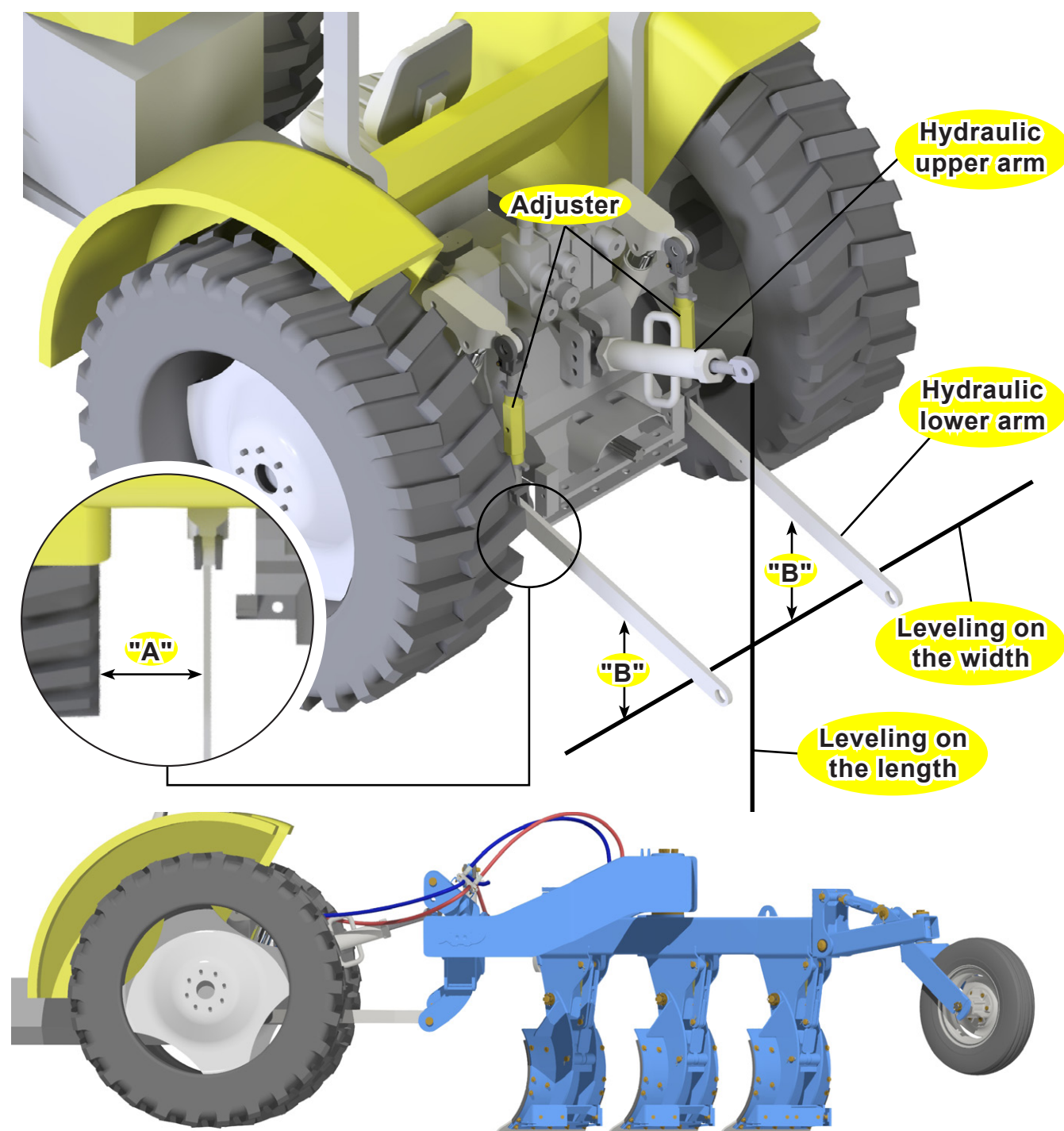
## Plow leveling

To level the plow, proceed as follows:

Place the tractor in a flat place and level it on its width (transversal) and length (longitudinal).

On its width, the leveling is done using the leveling crank of the hydraulic right lower arm; let the plow drawbar in a vertical position (as in "B").

On its length, the leveling is done through the hydraulic upper arm (third point), letting the moldboards parallel to the soil.





# Adjustments and operations

## Hydraulic system activation

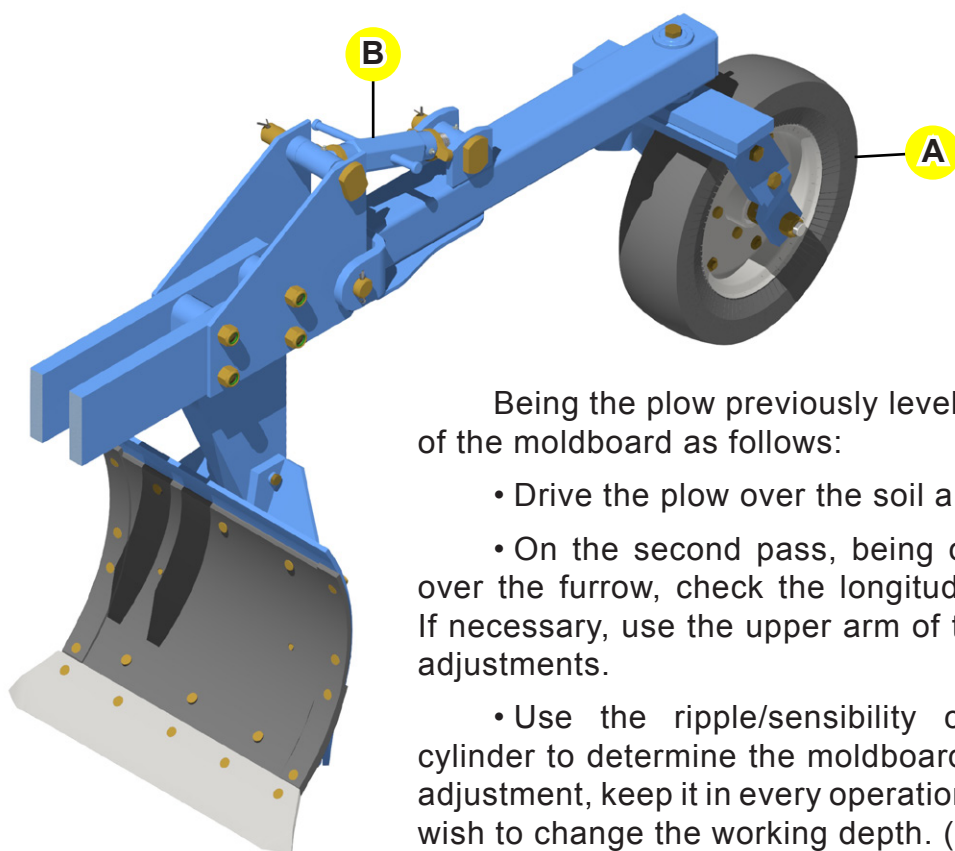
Totally lift the equipment.

Activate the control valve lever and see that the cylinders work on the opposite position, so that when the equipment is positioned to the left, the reversion cylinder is totally opened and the transversal one is totally retreated.

If the activation is not working as described above, check the hoses position to assure that they are not inverted.

Check for any leakages on the terminals.

## Moldboard depth



Being the plow previously leveled, set the working depth of the moldboard as follows:

- Drive the plow over the soil and make the first pass.
- On the second pass, being one of the tractor wheels over the furrow, check the longitudinal leveling of the plow. If necessary, use the upper arm of the third point to redo the adjustments.
- Use the ripple/sensibility control of the hydraulic cylinder to determine the moldboard depth. After making this adjustment, keep it in every operation and activate it only if you wish to change the working depth. (See the tractor manual).
- Adjust the gauge wheel (A) through the stabilizer (B) to reach the desired depth.

### IMPORTANT

To achieve an uniform depth in every moldboard, the plow must be leveled.

During operation, it is necessary to keep the hydraulic ripple/sensibility control on the operation position according to the desired depth. After this adjustment, use it again only when maneuvering or to lift the plow.

For better ridge tipping, it is necessary to keep a constant working speed.

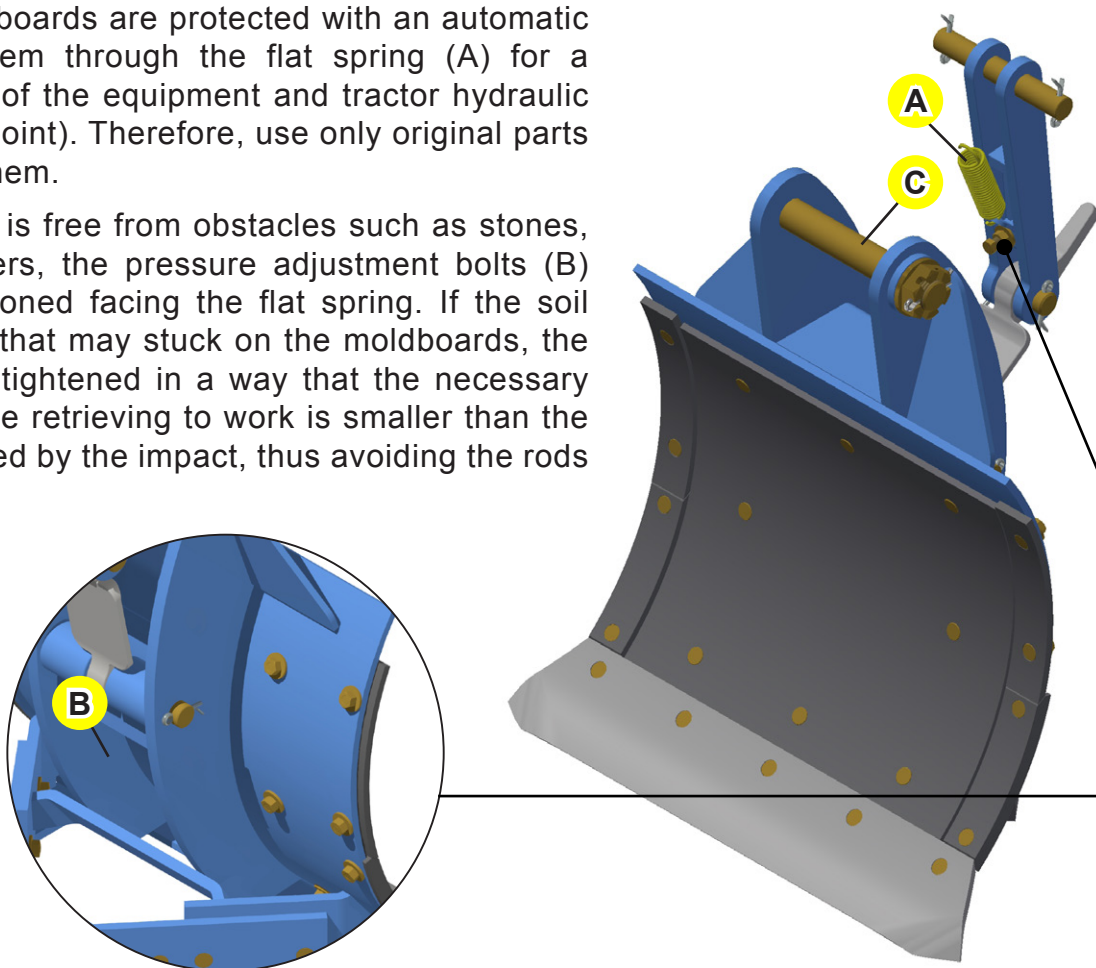
Ideal speed = 5 to 6 km/h.

# Adjustments and operations

## Automatic retrieving and pressure adjustment

The moldboards are protected with an automatic retrieving system through the flat spring (A) for a greater safety of the equipment and tractor hydraulic system (third point). Therefore, use only original parts for replacing them.

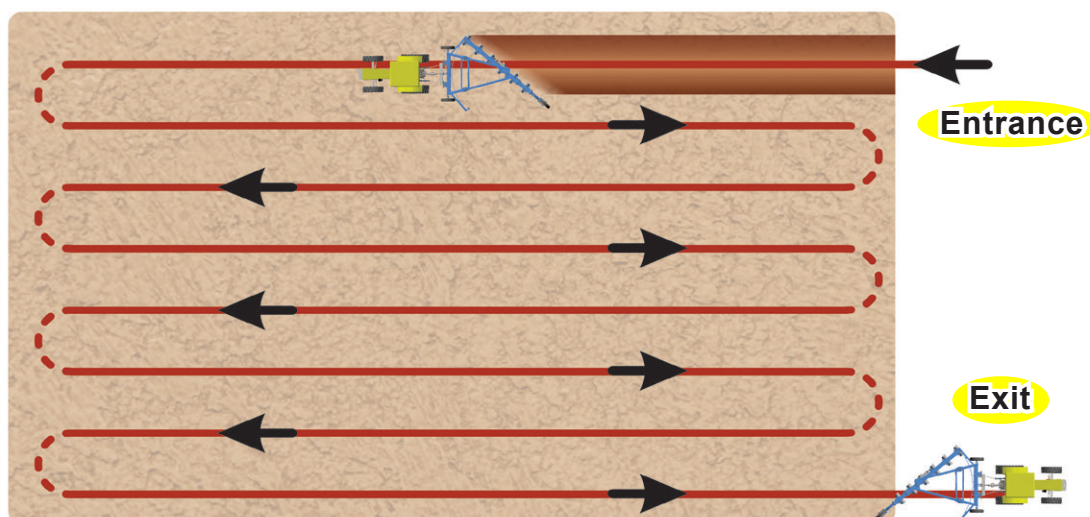
If the soil is free from obstacles such as stones, roots and others, the pressure adjustment bolts (B) must be positioned facing the flat spring. If the soil has obstacles that may stuck on the moldboards, the bolts must be tightened in a way that the necessary pressure for the retrieving to work is smaller than the pressure caused by the impact, thus avoiding the rods rupture.



**NOTE** The bolt (C) must be tightened until there is no clearance between the moldboard and frame support, thus allowing that the moldboard articulates freely.

## Ways to start the plowing

Regardless of the format of the field, the plowing is done in strips. To change the direction and to do the reversion of the equipment, lift it for maneuvering.



# Adjustments and operations

## Troubleshooting guide

Problem	Causes	Possible solutions
Poor penetration.	Hard and dry soil.	Carry out the subsoiling job before plowing.
	Blunt moldboard blade.	Replace it.
	Third-point control valve activation adjustment.	Consult the tractor manual to check how to properly adjust it.
	Forming ridges.	Adjust the upper arm of the third-point.
	Uneven equipment.	Level the equipment according to the instructions on the 'adjustments and operations' section (Plow leveling page).
Poor coverage.	Tractor is far from the furrow.	Position the tractor for a perfect finishing job.
	Blunt moldboard blade.	Replace it.
	Earth getting stuck on the polyethylene coating.	Moisture excess in the soil. Damaged coating that must be replaced.
Equipment pulling to the side.	Uneven equipment.	Adjust the level according to the instructions on the 'adjustments and operations' section (Plow leveling page).
Quick couplers do not adapt.	Different type of couplers.	Replace the male and female parts using the same type of quick coupler.
Hoses with fixed terminals leaking.	Insufficient tightening.	Retighten carefully.
	Lack of sealing material on the thread.	Use thread sealing tape and retighten carefully.
Hydraulic cylinder leaking.	Damaged repairings.	Replace the repairings.
	Damaged rod.	Replace the rod.
	Oil with impurities.	Replace oil, repairings and filtering elements.
	Working pressure superior than the recommended one.	Adjust the control valve through the relief valve with the aid of a manometer. Normal pressure: <b>180 Kg/cm<sup>2</sup></b> .
Quick couplers leaking.	Insufficient tightening.	Retighten carefully.
	Lack of sealing material on the thread.	Use thread sealing tape and retighten carefully.
	Damaged repairings.	Replace the repairings.



# Adjustments and operations

## Operations - Important points



- Retighten nuts and bolts after the first day of operation, as well as check the conditions of all pins and cotter pins. Then, retighten every 24 hours of service.
- Carefully observe the lubrication intervals.
- Choose a gear that allows the tractor to maintain certain power reserve, ensuring against unpredictable efforts.
- The speed is relative to the tractor gear and can only be determined by local conditions. We adopted an average 5 - 6 km/h, which is not advisable to overcome to maintain service efficiency and prevent possible damages to the equipment.
- Only people who own a complete knowledge of the tractor and equipment must operate them.
- For hitching the equipment, perform the maneuvers in slow gear and on a wide area, also being ready to brake when necessary.
- Remove pieces of wood or any object that may attach in the moldboard.
- Only pull the equipment using a tractor with enough engine power.
- During working or transportation, do not allow passengers on the tractor or plow.
- Keep the lower arms of the tractor hydraulic lift adjusted.
- Keep the equipment centralized with the tractor and on the same level of the soil surface.
- Never carry out the equipment reversion when it is supported on the ground.
- To carry out any verification on the equipment, lower it to the ground level and shut down the tractor engine.
- Whenever you unhitch the equipment, either in the field or shed, do it on a flat and firm surface and use parking jacks.
- Always make carefully and controlled operations.
- The position and ripple hydraulic levers have fundamental functions and may vary when the plow is not coupled with the gauge wheel (optional), according to the soil type.
- Regarding the correct positioning of the tractor, just drive the tractor being the right rear wheel close to the edge of the furrow that was left on the previous pass. The variation of this working position changes the cutting width of the first moldboard, thus it should be well observed.
- Carry out the plowing job by following the contour lines, always throwing the earth upwards.
- Relieve the control valve pressure before disconnecting the quick couplers and when doing any verification on the hydraulic cylinders / retention valves.
- As previously mentioned the AAR<sup>2</sup> plow has several settings, but only the local conditions can determine its best adjustment.

# Maintenance

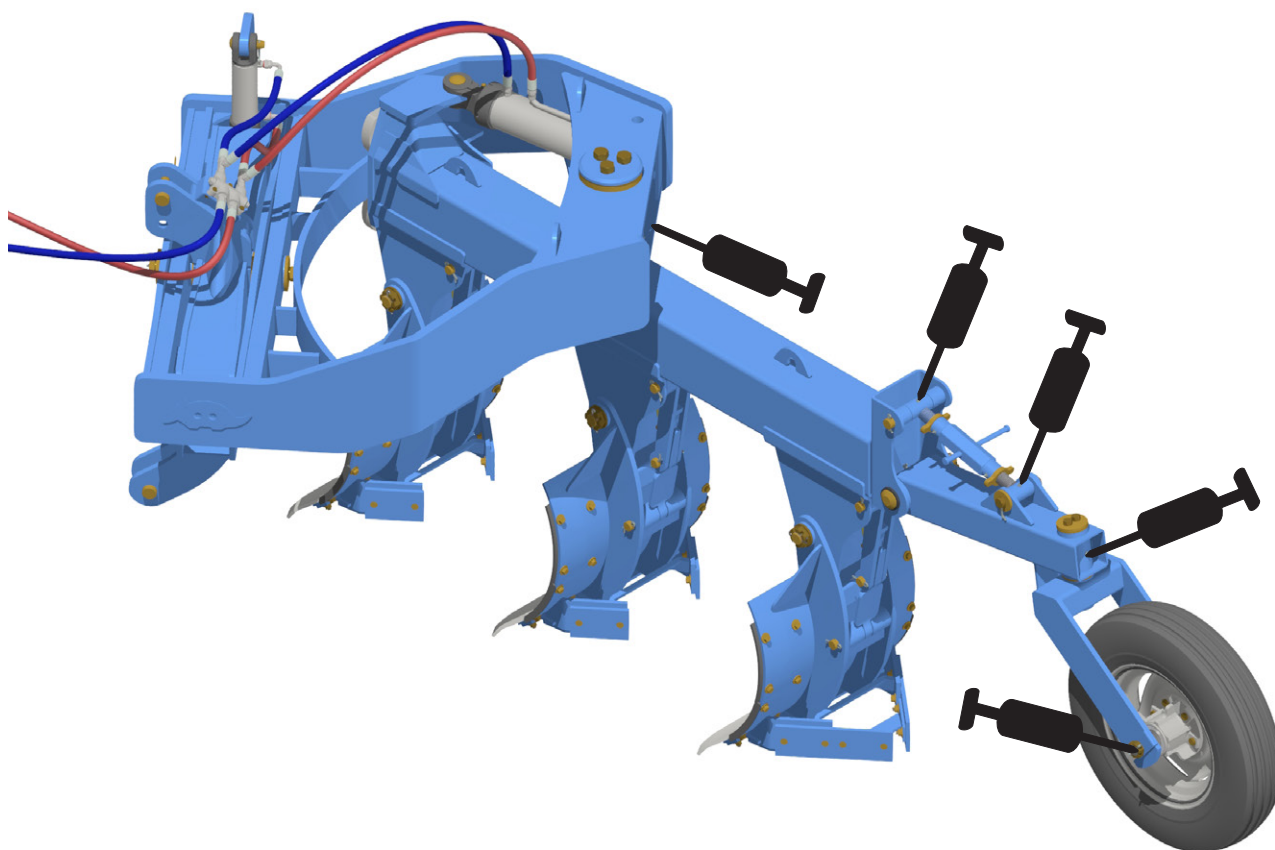
## Lubrication

To reduce the wear caused by the friction between the moving parts of the equipment, it is necessary to carry out a proper lubrication as follows:

- Be certified about the lubricant quality, regarding its efficiency and purity, avoiding the use of products contaminated by water, dirt and others.
- Remove the remainder old grease around the articulations.
- Clean up all grease fittings with a cloth before introducing the lubricant and replace the defective ones.
- Insert a sufficient amount of new grease.
- Use medium consistency grease.

## Lubrication points

Lubricate every 10 working hours.

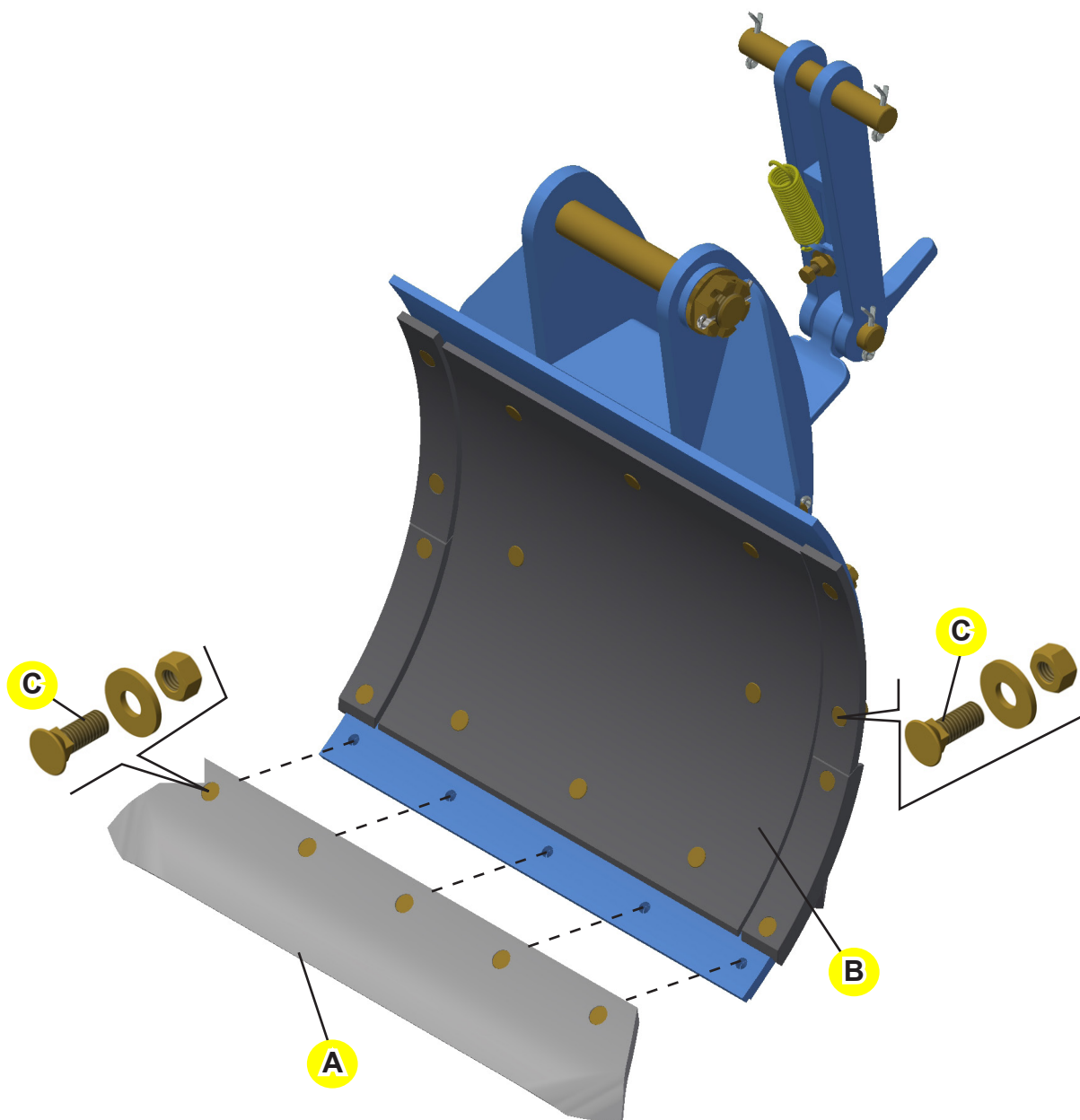


**ATTENTION** / Lubricate the points shown above and all grease fittings as well.

# Maintenance

## Replacement of the blades and polyethylene plates

When noticing excessive wear of the blades (A) and polyethylene plates (B), replace these parts by fully loosening the fixation bolts (C), flat washers and nuts.



# Maintenance

## Hydraulic cylinder maintenance

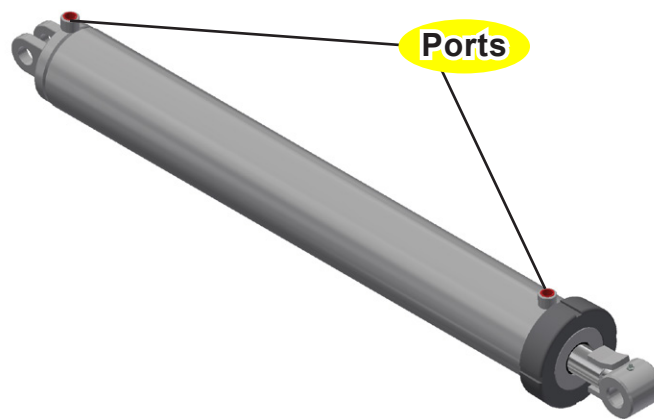
When cylinder repair is required, clean off unit, disconnect hoses and plug ports before removing cylinder.

When removed, open the cylinder ports and drain the cylinder's hydraulic fluid.

Examine the type of cylinder. Make sure you have the correct tools for the job.

You may require the following tools:

- Proper seal kit;
- Screwdriver and rubber cable;
- Pliers and wrenches.



**IMPORTANT/** Never make any verification or maintenance if the system is pressurized.

### Disassembly:

- 1) Remove the end cap (A);
- 2) Carefully remove inner assemblies (B);
- 3) Disassemble the piston (C) from the rod assembly by removing lock nut (D);
- 4) Slide off gland assembly (E) and end cap (A);
- 5) Remove seals and inspect all parts for damage;
- 6) Install new seals and replace damaged parts with new components;
- 7) Inspect the inside of the cylinder barrel, piston, rod and other polished parts for burrs and scratches. Smooth areas as needed with an emery cloth.

**NOTE/** Do not clamp rod by chrome surface.

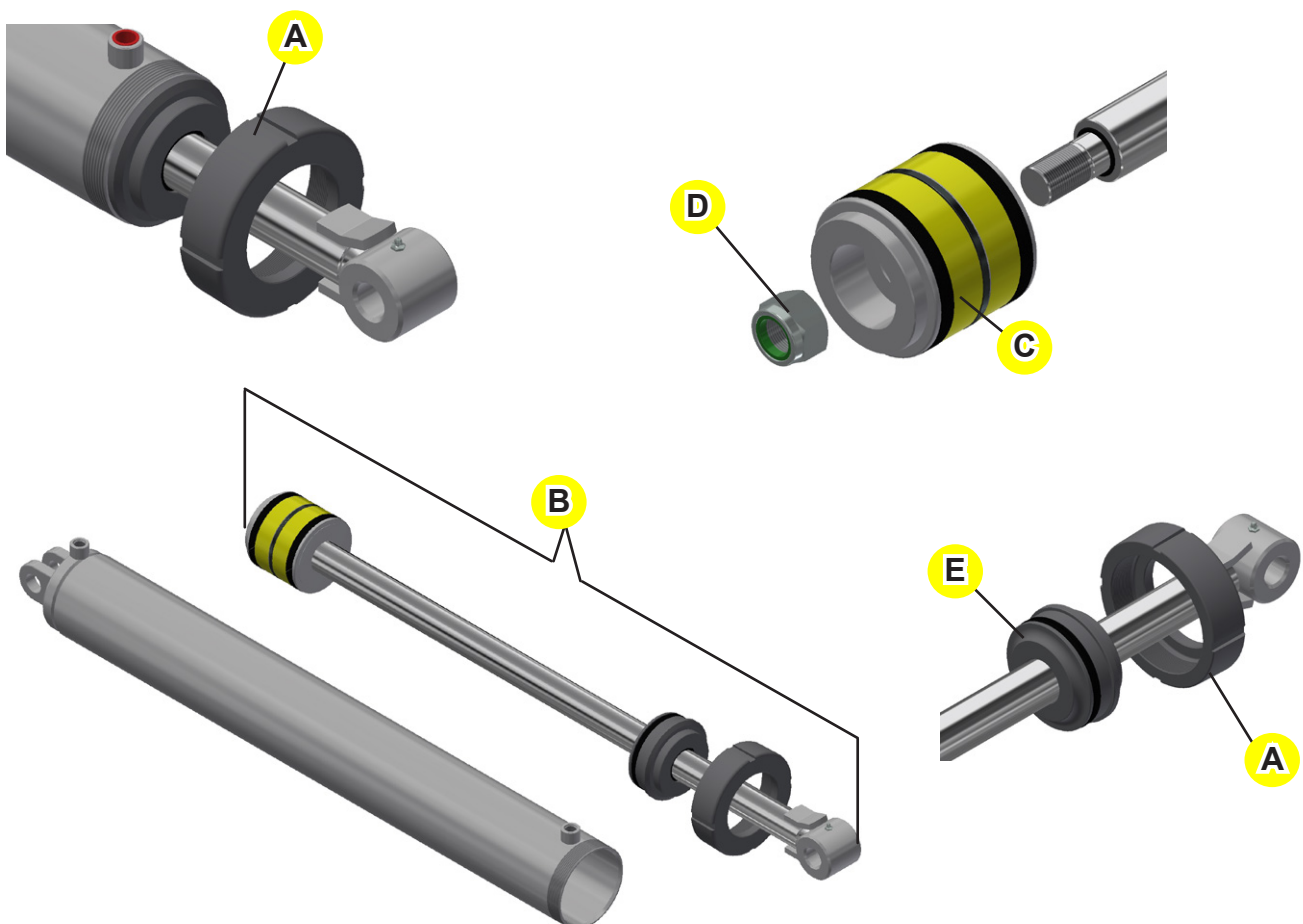
# Maintenance

## Hydraulic cylinder assembly

### Reassembly:

- 1) Reinstall rod through gland (E) and end cap (A);
- 2) Secure piston (C) to rod with lock nut (D). Torque lock nut to proper value (consult torque table on the "important data" section);
- 3) Lube inside of barrel, piston seals, and gland seals with hydraulic oil;
- 4) With cylinder body held gently, insert the inner assemblies (B) using a slight rocking motion;
- 5) Apply Loctite 277 before installing the cylinder end cap (A);
- 6) Torque cylinder end cap (A) to 400 lb.ft (600 N.m).

**IMPORTANT** Insert the gland (E) on the cylinder head and align it with the tube so it will fit correctly on the cylinder barrel.



**NOTE** Do not clamp rod by chrome surface.

# Maintenance

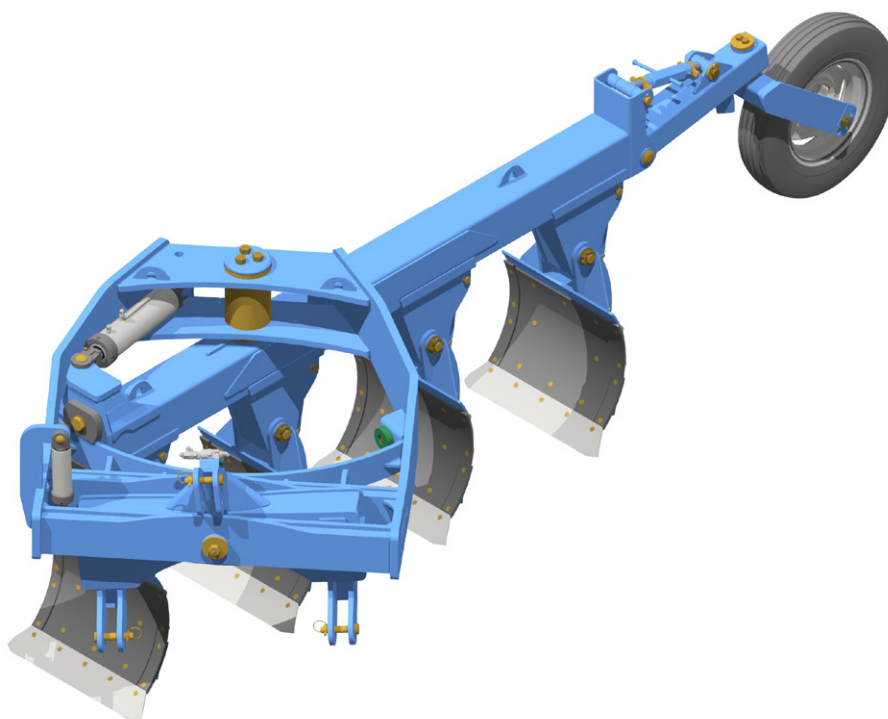
## Plow maintenance

Switch off the tractor completely, brake and use the chocks in the tires. Immobilize the equipment firmly before making any maintenance.

Do not carry out any repair on the hydraulic system if it is pressurized or if the cylinders are under load; a serious accident may result from this unsafe act.

During offseason wash the plow, repair the damaged painting, protect the moldboards with oil, lubricate all grease fittings and store it in a covered and dry location, avoiding contact with the soil.

The blades and the polyethylene plates must be replaced as soon as you notice an excessive wear.



After some hours of operation, the bolts on the plow 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 the moving parts for wear occurrence. Replace them, if necessary.

Replace the missing or damaged safety decals. Marchesan supplies these decals, upon request and indication of their respective serial numbers. The operator must know the need and importance to keep the decals in the proper place and in good conditions. The operator also have to know the need to follow the instructions, as the lack of safety may increase the risk of accidents.

**NOTE/** Use TATU original parts only.

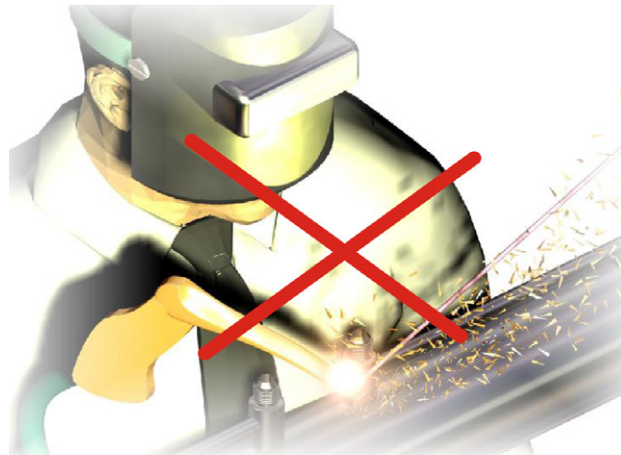


# Maintenance

## Hydraulic safety

Make sure that all components in the hydraulic system are kept in good condition and are clean. Carry out the maintenance of the hydraulic parts on a clean place, free from dust or contaminants. Otherwise, there may have malfunction or premature wear on the equipment.

The correct operation and maintenance of the hydraulic system will prevent damages, air infiltration on the system, oil and system overheating, damages to the rubber components, etc.



Periodically or when the oil is replaced anormally or even when there is loss of power, inspect the hydraulic system, fasten the connections that are leaking, replace the hoses that are almost reaching its expiration date or if they show any cut, crack or dryness. Regarding the hoses assembly, do it in a way that they always can flex, without twisting or pulling it.

If there is any problem with the hydraulic cylinder, do not carry out any maintenance procedure or weld heating, as both of this may cause roundness on the barrel or other problems, consequently leading to internal leakages, lack of power, gripping, damages to the cylinder rods, etc.

Do not attempt any makeshift repairs to the hydraulic lines, fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high-pressure. Such repairs will fall suddenly and create a hazardous and unsafe condition.

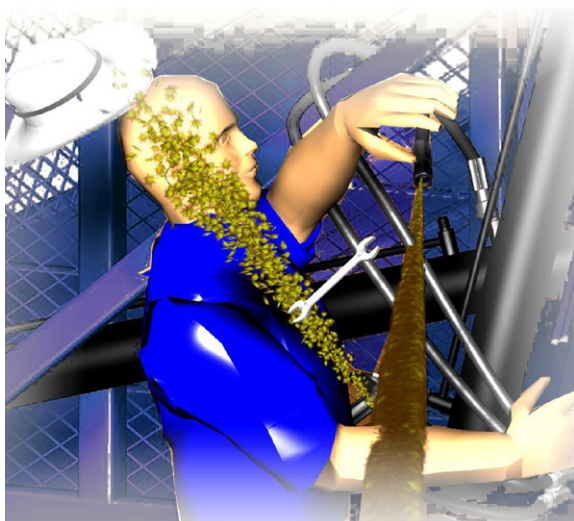
Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.

If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface. If this doctor is not aware of this type of problem, ask for a reference or look for another one to find the proper treatment.

Before applying pressure to the system, make sure all components are tight and that lines, hoses and coupling are not damaged.

Carry out the operations on a carefully and controlled manner. Avoid to let the hydraulic system working when it is not being used.

Failure to follow these procedures may lead to fatal accidents or even death.



# Important data

## Calculation of hourly income

To calculate the plow income, use the following calculation:

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

Where:

**R** = Hourly income;

**L** = Plow working width (meters);

**V** = Average speed of the tractor (meters per hour);

**E** = Efficiency: 0.90;

**X** = Hectare value = 10,000 m<sup>2</sup>.

Example with AAR<sup>2</sup> (3 moldboards):

**R** = ?

**L** = 1.44 m

**V** = 5,000 m/h

**E** = 0.90

**X** = 10,000 m<sup>2</sup>

$$R = \frac{1.44 \times 5,000 \times 0.90}{10,000} = 0.65$$

**R:** The hourly income working with an AAR<sup>2</sup> that has 3 moldboards will be of, approximately, 0.65 hectares per hour.

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

Based on this calculation, we prepared the table on the following page, which 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 moldboards	Cutting width (m)	Hourly income	Daily income (09 hours)
			Hectare	Hectare
AAR <sup>2</sup>	03	1.44	0.65	5.83
	04	1.92	0.86	7.77
	05	2.40	1.08	9.72

**NOTE** / An average speed of 5 km/h was assumed to prepare the table above.

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

Example: An area of 30 hectares to be worked with the plow, AAR<sup>2</sup> with 3 moldboards (Hourly income = 0.65 Hectare).




$$\text{So: } \frac{30}{0.65} = 46.15$$

It will be spent 46 (forty-six) hours to work 30 hectares.

# Important data

## Torque table

The table below gives correct torque values for various bolts. Tighten all bolts to the torques specified in chart unless otherwise noted. Check the tightness of bolts periodically, using this bolt torque chart as a guide. Replace hardware with the same strength (Grade/Class) bolt.

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.
<div>  <div>GRADE 2 No Marks.</div> </div> <div>  <div>GRADE 3 3 Marks.</div> </div> <div>  <div>GRADE 8 6 Marks.</div> </div>						

[G:\VALSON\Manuais\_Inglês\Torque]

### 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).

## **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.**

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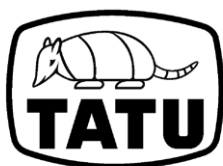
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## Notes

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