PST TRIO FLEX
PST TRIO FLEX SUPREMA

OPERATOR'S MANUAL

TATU MARCHESAN

IDENTIFICATION

Dealer: _____

Owner: _____

Firm / Farm: _____

City: _____ State: _____

No. of the Certificate of Guarantee: _____

Serial / No.: _____

Date: ____ / ____ / ____ Invoice No.: _____

Product: _____

Notes: _____

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Introduction

PST TRIO FLEX and PST TRIO FLEX SUPREMA planters were specially designed to work on rough soils that have level curves and also to work on broad-based terraces, assuring a greater uniformity in the depth of the row units.

The planter drawbar allows the equipment to overcome several types of obstacles that can be found on the field, assuring a great connection between the tractor and planter.

The double discs provide a higher efficiency and a better straw flow rate.

Equipped with a transversal fertilizer metering that has a lateral drop, which assures an uniform distribution on sloping terrains.

Another advantage of this planter is the wide, anti-slip, articulating platform that has an extensor and facilitate the filling process.

This planter features an articulating ladder with handrail that follows the NBR standards.

It also features independent and sequential hydraulic markers, which have length and disc angle adjustments.

This operator's manual contains the necessary information for the best performance of these planters. 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 planter.

TATU
MARCHESAN

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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.

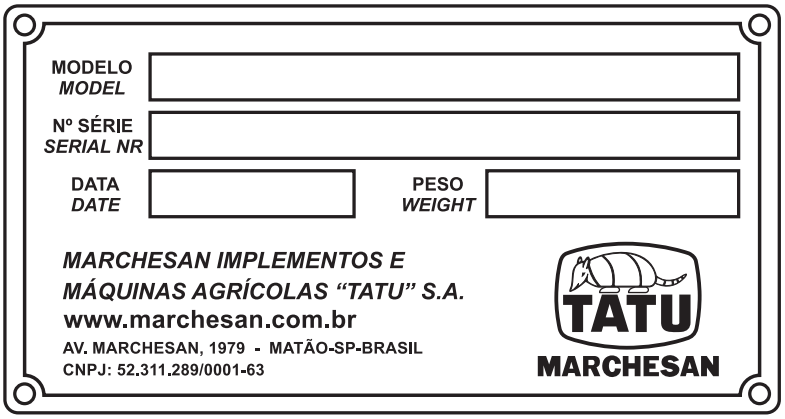
Important

- **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.



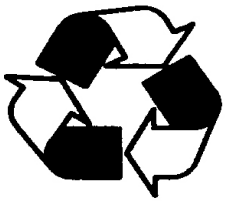
NOTE **The warranty shall not be applied to any equipment or any part thereof which has been altered elsewhere than at the place of manufacture or which the original purchaser thereof at retail has used or allowed to be used parts, not made or supplied by Marchesan.**

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 must not be spilt over the soil as they can penetrate to the underground layers, thus compromising nature. Ecological and conscious disposal of them should be done.

Working safely

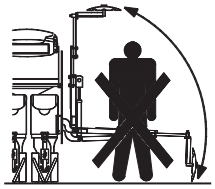
- **Security aspects must be carefully observed to avoid accidents.**
- **This symbol is a warning used to prevent accidents.**
- **The instructions near this symbol refers to the safety of the operator, mechanician or third parties, therefore it should be carefully read and observed. If the safety instructions are not being followed, a serious accident or even death may occur.**

This planter 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 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.



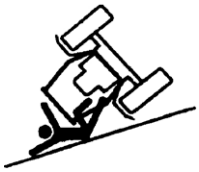
Before activating the equipment, check if there are no people or animals on the row operation area or over the equipment.

When hitching the equipment to the tractor, use a chain to lock the equipment drawbar to the tractor hitch bar. This measure will prevent a possible rupture of any hydraulic hose or breaks on the hitching system, what would make the equipment tilt up.

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 or 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 stricly 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 any maintenance or 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 near or 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 or pathways to be covered. 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 protective gloves to work near the disc blades.
- When raising or lowering the planter, 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 planter quickly.
- Always shut down the engine, remove the key and use the handbrake before leaving the tractor seat.
- Only pull 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 jacks. Make sure the equipment is properly supported.
- 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.
- Do not allow people or animals to get under the equipment at any time.
- 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 left 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.

Transportation over truck or trailer

Marchesan recommends to consult the traffic norms as well as to be sure that the equipment has all traffic signs required to carry out the transportation before transporting the equipment over the road. 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, as it can cause a serious accident;
- When lifting with a hoist, use the appropriate points to lift;
- Use the jacks to support the equipment appropriately;
- The equipment drawbar must be lifted and locked in a vertical position or removed and fastened to the load;
- 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;
- Stay away from the straps, cables and chains that are used on the load;
- Make sure the SMV (Slow Moving Vehicle) sign, and all the lights and reflectors that are required by the local highway and transport autorithies 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 on truck or trailer. If necessary use banners, lights and other devices in order to give adequate warning to the other drivers.

Working safety standards

It is important to have knowledge not only about the functioning, operation of the equipment and its technologies, but also the working legal aspects when using the equipment, such as: safety standards, operator's manual and working safety.

The equipment and tools used on the rural area must be properly handled, otherwise health and safety of involved personnel may be compromised.

The operator must be capable and authorized to operate the tractor, meaning that that person must comprehend the functioning instructions of the tractor and know about the safety standards regarding the job that will be performed.

The Ministry of Labor and Employment created safety standards that aim to decrease the risk of accidents that may occur to the rural worker. Related to the subject of agicultural machines and equipments, we specifically cited the **NR 06**, **NR 12** and **NR 31** standards.

Regulatory Standard - **NR 06**:

• For purposes of applying this Regulatory Standard, Personal Protective Equipment (PPE) is considered any device or product that is worn by an individual worker for protection against risks that could threaten safety and health at work.

Regulatory Standard - **NR 12**:

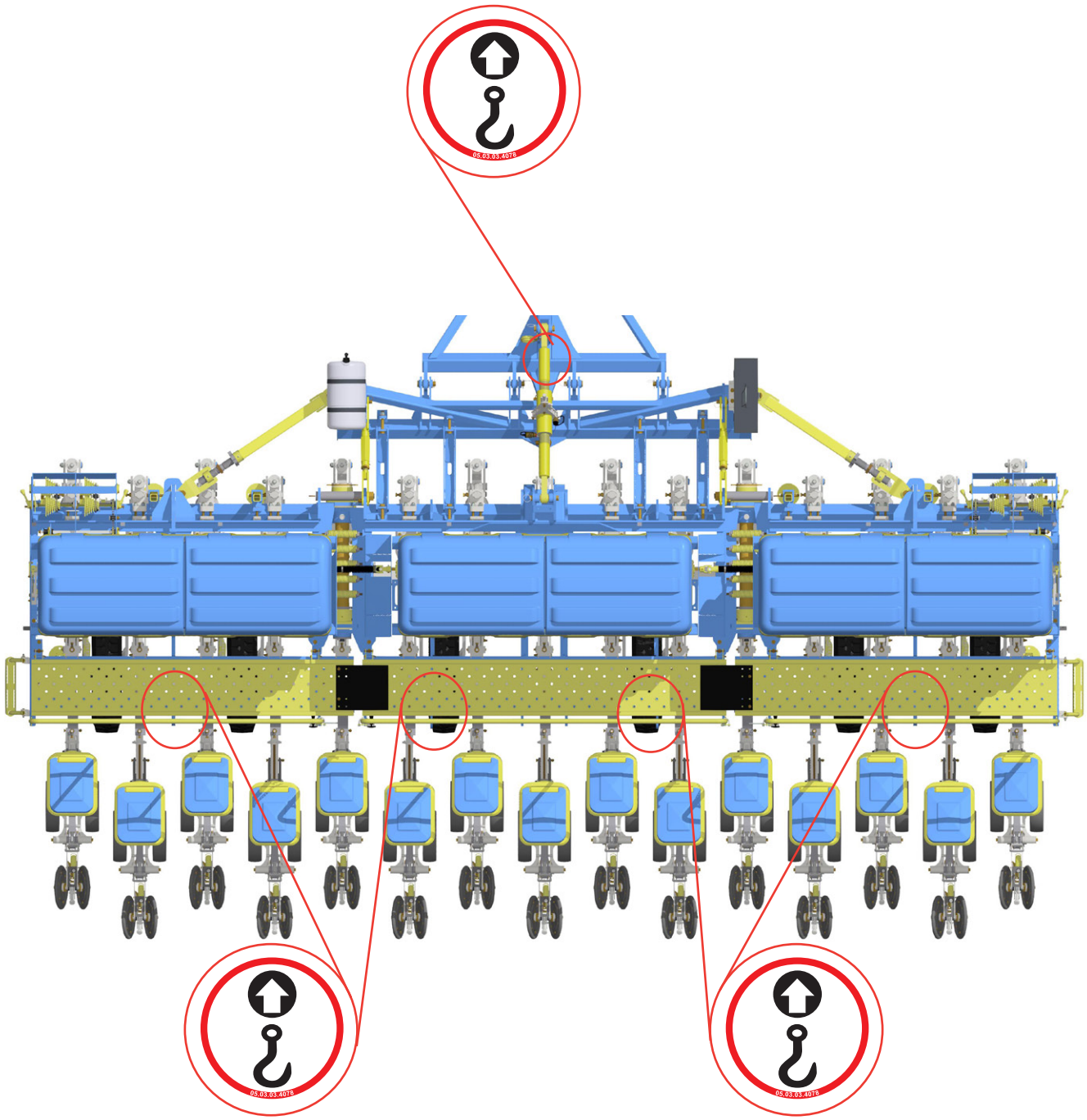
• This Regulatory Standard and its annexes provide technical references, basic principles and protective measures to ensure the health and physical integrity of workers and establishes minimum requirements for the prevention of accidents and occupational diseases in the design stages and use of machinery and equipment of all kinds, and also to its manufacture, importation, trading, exhibition and cession in any way. It is understood as using phase the construction, transportation, assembly, installation, adjustment, operation, cleaning, maintenance, inspection, disabling and dismantling of machinery or equipment.

Regulatory Standard - **NR 31**:

• This Regulatory Standard has the purpose to establish the precept to be applied on the organization and on the working environment, in order to make compatible the planning and development of agriculture, livestock, forestry, forest exploration and aquaculture with safety on the working environment.

Lifting points

This planter has adequate lifting points, being two in the rear and one in the front part of the equipment. When lifting with a hoist, it is essential to hitch the cables to 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.**

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.

Safety decals

ADVERTÊNCIA / WARNING / ADVERTENCIA

Cuidados Durante o Trabalho e Transporte

As escadas de acesso à plataforma devem ser erguidas. Nunca transporte pessoas sobre a plataforma, escada ou qualquer outra parte da plantadeira.

Cuidados Durante as Regulagens

Todas as tampas de proteção devem ser mantidas no lugar e em bom estado, para evitar acidentes.

Precautions During Working and Transportation

The ladders to the platform must be raised.
Never transport any person on the ladders, seat, platform or any planter parts.

Precautions During Adjustments

All the protection guards must be kept in place and in good conditions to avoid accidents.

Cuidados Durante el Trabajo y el Transporte

Las escaleras de acceso a la plataforma deben estar levantadas. Nunca transporte personas sobre la plataforma, escalera o cualquier otra parte de la sembradora.

Cuidados Durante las Regulaciones

Todas las tapas de protección deben ser mantenidas en su sitio y en buen estado, para evitar accidentes.

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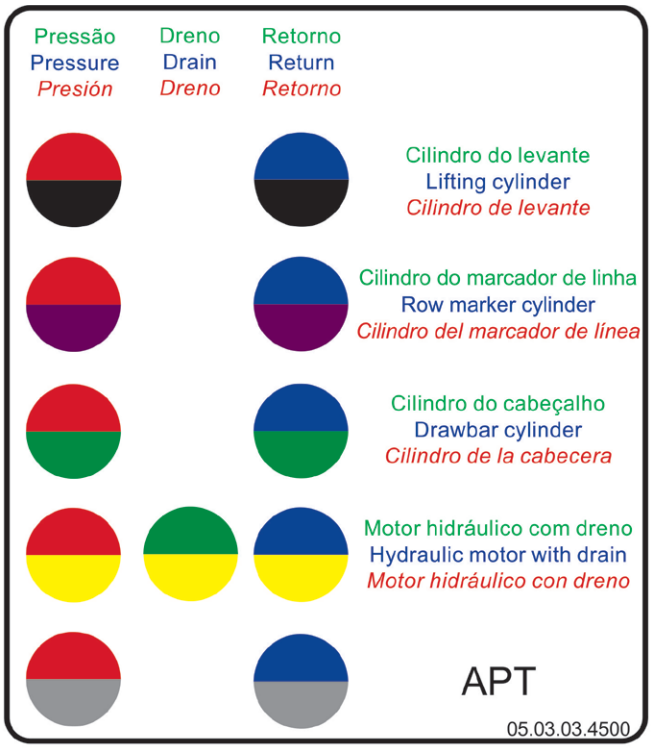


ATENÇÃO / ATTENTION / ATENCIÓN

A TURBINA EXPELE RESÍDUOS OU GASES DE PRODUTOS TÓXICOS UTILIZADOS NO TRATAMENTO DAS SEMENTES

- Não fique exposto aos gases que saem da turbina durante o funcionamento.

LEIA ATENTAMENTE O RÓTULO DO PRODUTO QUÍMICO PARA O TRATAMENTO DAS SEMENTES

- Durante a manipulação, aplicação e plantio utilize os equipamentos de proteção individual.
- Lave bem as mãos antes de comer, beber ou fumar.
- Faça a regulagem da plantadeira após o tratamento das sementes, tomando todos os cuidados citados.
- As sementes tratadas não devem ficar expostas às crianças, pessoas alheias ao serviço, animais domésticos, aves ou em contato com produtos de consumo humano ou animal.
- Destrua ou dê o destino adequado para as embalagens utilizadas no armazenamento e transporte das sementes tratadas, evitando contaminar o meio ambiente.
- Em caso de intoxicação por inalação ou aspiração mantenha a pessoa em local arejado. Procure um médico imediatamente, levando o rótulo ou a embalagem do produto químico.
- Não dê nada por via oral à uma pessoa inconsciente.
- Sintomas de intoxicação: Fraqueza, dor de cabeça, opressão no peito, visão turva, pupilas não reagem, salivação abundante, suores, vômitos e cólicas abdominais.

Maiores informações:
Centro de controle de intoxicações
www.anvisa.gov.br/toxicologia
Fones: 0800 721 3000 – (011) 5012-5311

THE TURBINE EXPELS RESIDUES OR GASES OF USED TOXICANT PRODUCTS IN THE SEEDS TREATMENT

- Be not exposed to the gases that leave the turbine during the operation.

READ THE LABEL OF THE CHEMICAL PRODUCT SINCERELY FOR THE TREATMENT OF SEEDS

- During the manipulation, application and cultivation, use the equipments for individual protection.
- Wash your hands well before eating, drinking or smoking.
- Make the adjustment of the planter, after treating the seeds, taking all the mentioned cares.
- The treated seeds should not be exposed to children, people strange to the service, domestic animals, birds or in contact with products for human or animal consumption.
- Eliminate or give the proper destination to the packings used in the storage and transport of the treated seeds, avoiding the contamination of the environment.
- In case of intoxication by inhalation or aspiration maintain the person in an airy place. Seek for a doctor immediately, taking the label or the packing of the chemical product with you.
- Don't give anything orally to an unconscious person.
- Symptoms of intoxication: Weakness, headache, oppression in the chest, blurred vision, pupils don't react, abundant salivation, perspirations, nauseas, vomits and abdominal cramps.

FOR MORE INFORMATION:
SEARCH THE CENTER OF INTOXICATION CONTROL OF YOUR COUNTRY.

LA TURBINA EXPELE RESIDUOS O GASES DE PRODUCTOS TÓXICOS UTILIZADOS EN EL TRATAMIENTO DE LAS SEMILLAS

- *No quede expuesto a los gases que salem de la turbina durante el funcionamiento.*

LEA ATENTAMENTE EL RÓTULO DEL PROCDUTO QUÍMICO PARA EL TRATAMIENTO DE LAS SEMILLAS

- *Durante la manipulación, aplicación y siembra utilice los equipos de protección individual.*
- *Lave bien las manos antes de comer, beber o fumar.*
- *Haga la calibración de la sembradora después del tratamiento de las semillas, tomando todos los cuidados citados.*
- *Las semillas tratadas no deben quedar expuestas a los niños, personas ajenas a los servicios, animales domésticos, aves o en contacto con productos de consumo humano ou animal.*
- *Destruya o de un destino adecuado para los envases utilizados en el almacenamiento y transporte de las semillas tratadas, evitando contaminar el medio ambiente.*
- *En caso de intoxicación por inhalación o aspiración mantenga la persona en local aireado. Procure un médico inmediatamente, llevando la etiqueta o el envase del producto químico.*
- *No dé nada por vía oral a una persona inconsciente.*
- *Síntomas de intoxicación: Debilidad, dolor de cabeza, opresión en el pecho, visión turbia, pupilas no reaccionan, salivación abundante, sudores, nuseas, vómitos y cólicas abdominales.*

MAYORES INFORMACIONES:
PROCURE EL CENTRO DE CONTROL DE INTOXICACIONES DE VUESTRO PAÍS.

05.03.03.1426

Safety decals list

Quantity	Model	Serial number
*	Greater logotype decal	**05.03.03.3854**
*	**PST TRIO FLEX** logotype decal	**05.03.03.3899**
*	**PST TRIO FLEX** logotype decal	**05.03.03.4382**
*	**PST TRIO FLEX** logotype decal	**05.03.03.4381**
*	**PST TRIO FLEX SUPREMA** logotype decal	**05.03.03.4420**
*	**PST TRIO FLEX SUPREMA** logotype decal	**05.03.03.4419**
*	**PST TRIO FLEX SUPREMA** logotype decal	**05.03.03.4056**
*	**TATU** hopper logotype decal	**05.03.03.4114**
*	**TATU** smaller logotype decal	**05.03.03.4229**
02	Number 0 decal	**05.03.03.3414**
02	Number 1 decal	**05.03.03.3415**
02	Number 4 decal	**05.03.03.3418**
02	Number 5 decal	**05.03.03.3419**
02	Number 6 decal	**05.03.03.3420**
02	Number 7 decal	**05.03.03.3421**
02	Number 8 decal	**05.03.03.3422**
02	Number 9 decal	**05.03.03.3423**
02	No-till decal	**05.03.03.3426**
02	Turning the clutch on/off decal	**05.03.03.3008**
02	Decals for letters A B C D	**05.03.03.2979**
02	Precautions during working / transportation decal	**05.03.03.1565**
02	Prop / Jack decal	**05.03.03.1566**
02	Hydraulic row marker decal	**05.03.03.1424**
01	Final test decal	**05.03.03.1087**
02	PST ACT wheelset lock decal	**05.03.03.1425**
01	Read the manual decal	**05.03.03.1428**
01	Auger decal	**05.03.03.1669**
02	2" coil pitch auger decal	**05.03.03.1546**
02	1" coil pitch auger decal	**05.03.03.1547**
01	Manual seal decal	**05.03.03.1942**
02	Seed distribution table decal	**05.03.03.2997**
02	G2/PP table decal	**05.03.03.4249**
01	Left sprocket combination for seeds / fertilizer decal	**05.03.03.3012**
01	Right sprocket combination for seeds / fertilizer decal	**05.03.03.3013**
01	Grip coupler colors decal	**05.03.03.4500**
01	Danger decal	**05.03.03.2930**
03	Lifting points decal	**05.03.03.4078**
02	Axle lock removal decal	**05.03.03.3676**

NOTE • **(*) Quantities are subjected to change to match the equipment configuration.**

Safety decals

Model	Serial number	Serial number
PST TRIO FLEX (Hopper with 04 outlets)	05.03.03.4382 PST TRIO FLEX decal	05.03.03.4114 TATU logotype

Model	Serial number	Serial number
PST TRIO FLEX (Hopper with 05 outlets)	05.03.03.4381 PST TRIO FLEX decal	05.03.03.4229 TATU logotype

Equipped with single seed hopper		
Model	**Serial number**	**Serial number**
PST TRIO FLEX (Hopper with 4 and 5 outlets)	05.03.03.3899 PST TRIO FLEX decal	05.03.03.3854 TATU logotype

Model	Serial number	Serial number
PST TRIO FLEX SUPREMA (Hopper with 4 outlets)	05.03.03.4420 PST TRIO FLEX SUPREMA decal	05.03.03.4114 TATU logotype

Model	Serial number	Serial number
PST TRIO FLEX SUPREMA (Hopper with 5 outlets)	05.03.03.4419 PST TRIO FLEX SUPREMA decal	05.03.03.4229 TATU logotype

Equipped with single seed hopper		
Model	**Serial number**	**Serial number**
PST TRIO FLEX SUPREMA (Hopper with 4 and 5 outlets)	05.03.03.4056 PST TRIO FLEX SUPREMA decal	05.03.03.3854 TATU logotype

Data sheet

Model	# of row units	Spacing between row units (mm)	Wheelsets	Transport width (mm)	Working width (mm)	Weight (Kg)	Tractor required power (cv)*	
							UDD	Shank
5850	12	500	6	7,845	5,500	7,625	96-108	144-156
5750	13	450		7,750	5,400	7,825	104-117	156-169
6450		500		8,450	6,000	8,007		
6850	15	450		8,850	6,300	9,254	120-135	180-195
7450		500		9,450	7,000	9,365		
8160		550	8	10,155	7,700	9,408		
7450	16	450	6	9,450	6750	9,507	128-144	192-208
7960		500	8	9,960	7,500	9,570		
7860	17	450		9,860	7,200	9,953	136-153	204-221
8460		500		10,460	8,500	9,942		
8460	18	450	10	10,460	5,608	10,332	144-162	216-234
8960		500		10,960	8,500	10,604		
8960	19	450		10,960	8,100	11,330	152-171	228-247
9460		500		11,460	9,000	11,430		
9460	20	450		11,460	8,550	11,685	160-180	240-260
9960	20	500		11,960	9,500	11,832		
9960	21	450		11,960	11,000	12,041	168-189	252-273
10460		500		12,460	10,000	12,246		
10460	22	450		12,460	9,450	12,495	176-198	264-286
10985	22	500	12	12,985	10,500	12,949		
10985	24	450		12,985	10,350	13,416	192-216	288-312

Data sheet

Row marker: ..... Hydraulic with 1 or 2 extensors

Hoppers capacity: ..... Fertilizer

5 outlets: ..... 640 liters

6 outlets: ..... 760 liters

4 outlets: ..... 520 liters

Hoppers capacity: ..... Seeds

7 outlets: ..... 370 liters

6 outlets: ..... 260 liters

Individual hoppers capacity: ..... Seeds

Seed hopper: ..... 50 liters

Working speed:

Soybean plantation: ..... 7 km/h

Bean / Sorghum / Acid delinted cotton plantation: ..... 6 to 6.5 km/h

Sunflower / Corn plantation: ..... 5 to 5.5 km/h

Maximum transport speed: ..... 15 Km/h

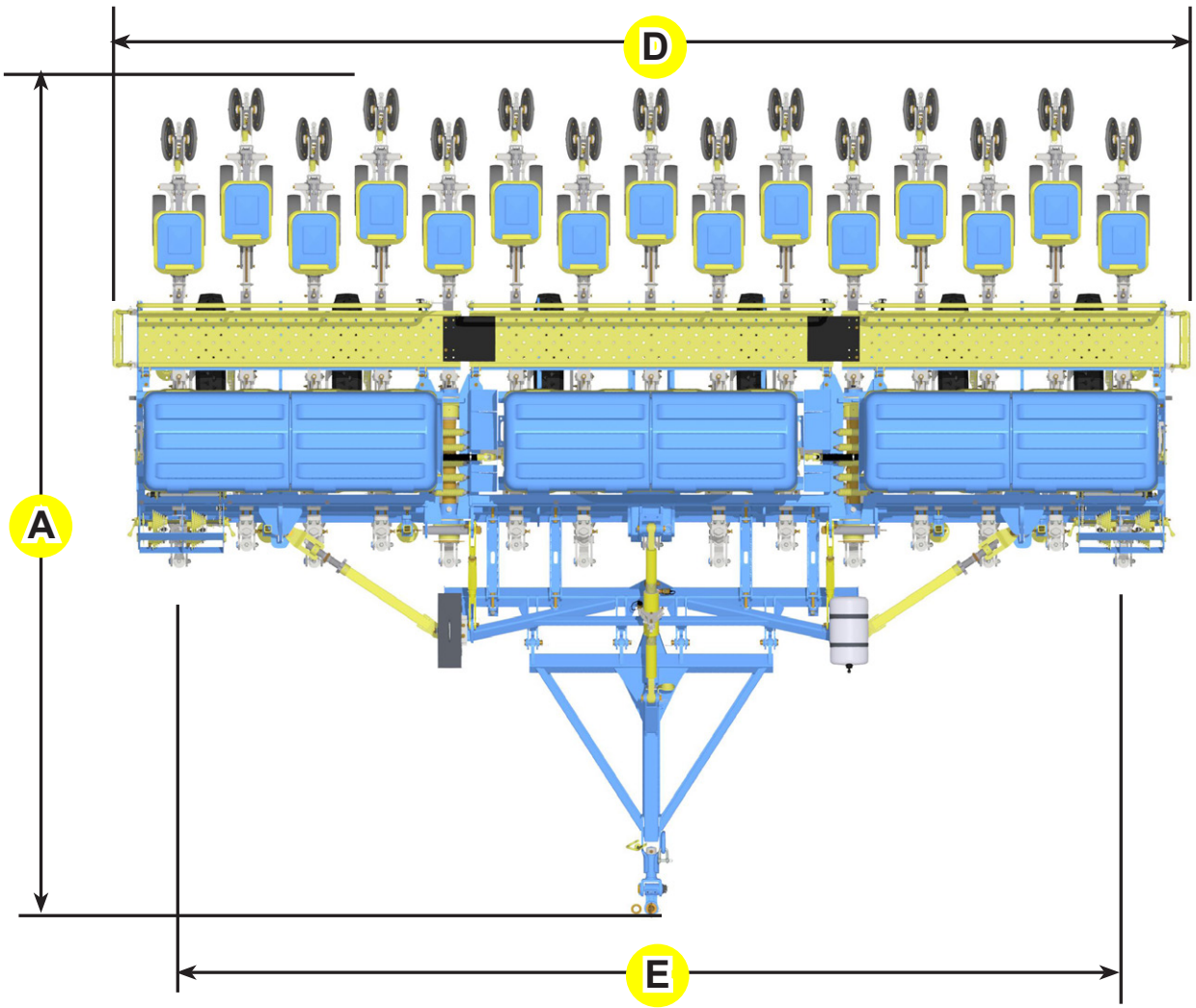
Tires:

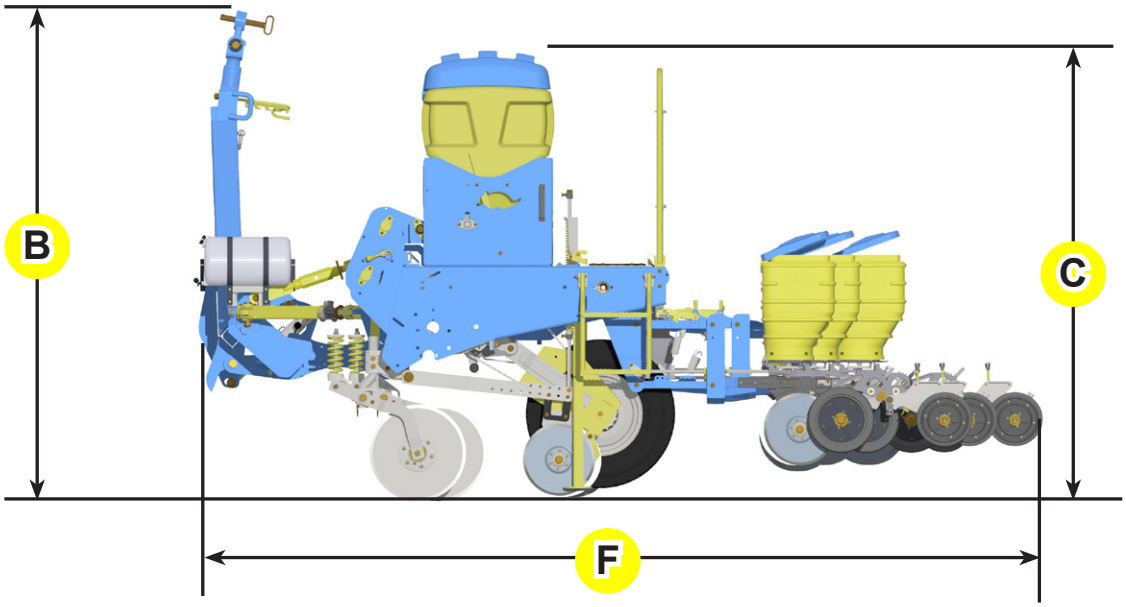
Check page: ..... Tires inflation

Fertilizer distribution: 154 to 1131 kg/ha using a 2" coil pitch auger (Standard); 75 to 549 kg/ha using a 1" coil pitch auger (optional).

NOTE • **For the other configurations, either for the number of rows or spacings that can not be found on the table above, the owner must contact the technical assistance service for more information.**

PST TRIO FLEX dimensions





PST TRIO FLEX dimensions

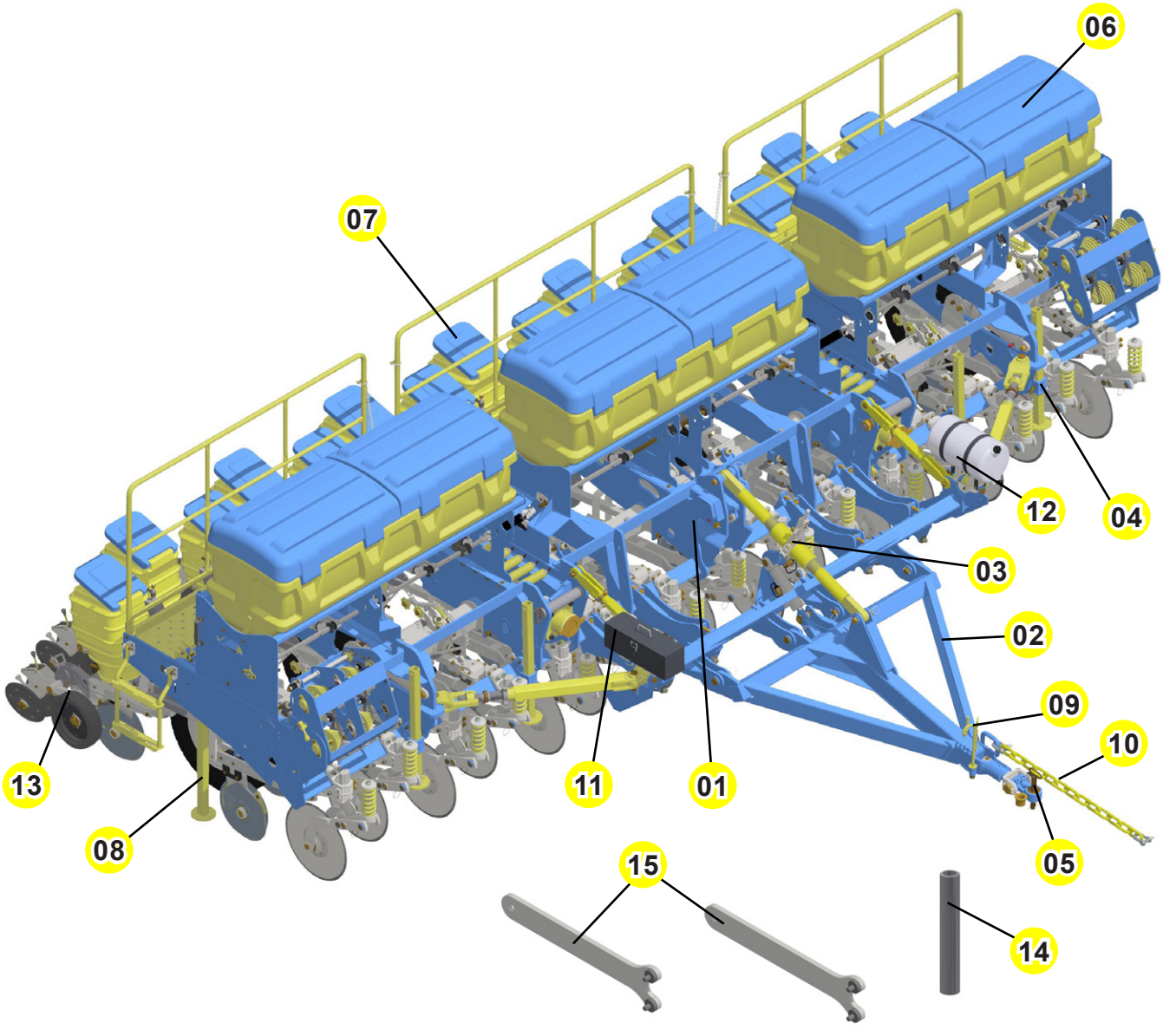
Dimensions table							
Models	A	B	C	D*	D**	E	F
5750	6,100	2,520	2,310	7,750	8,900	5,210	4,200
5850				7,850	9,000	5,310	
6450				8,450	9,600	5,910	
6850				8,850	10,000	6,310	
7450				9,450	10,600	6,910	
7860				9,860	11,000	7,320	
7960				9,960	11,110	7,420	
8160				10,155	11,305	7,620	
8460				10,460	11,600	7,920	
8960				10,960	12,110	8,420	
9460				11,460	12,610	8,920	
9960				11,960	13,110	9,000	
10460				12,460	13,610	9,920	
10985				12,985	14,135	10,445	

NOTE

- *** Without row markers.**
- **** With row markers.**

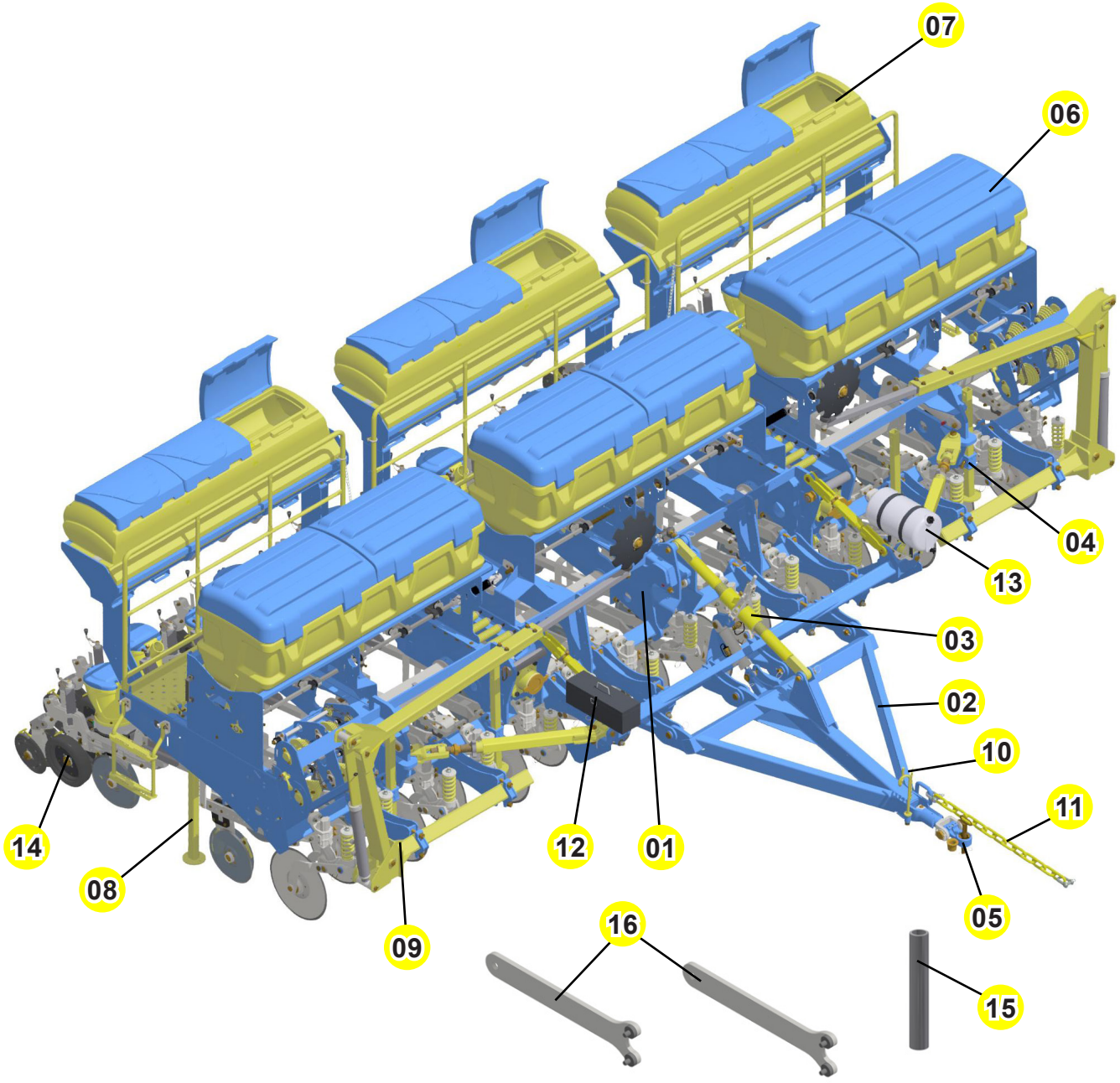
PST TRIO FLEX

01 - Frame
02 - Drawbar
03 - Stabilizer
04 - Jack
05 - Tractor hitch
06 - Fertilizer hopper
07 - Seed hopper
08 - Prop
09 - Hose support
10 - Safety chain
11 - Tool box
12 - Water reservoir (non potable)
13 - Mechanical seed row unit
14 - Extensor lever
15 - Disc blade spanner wrench



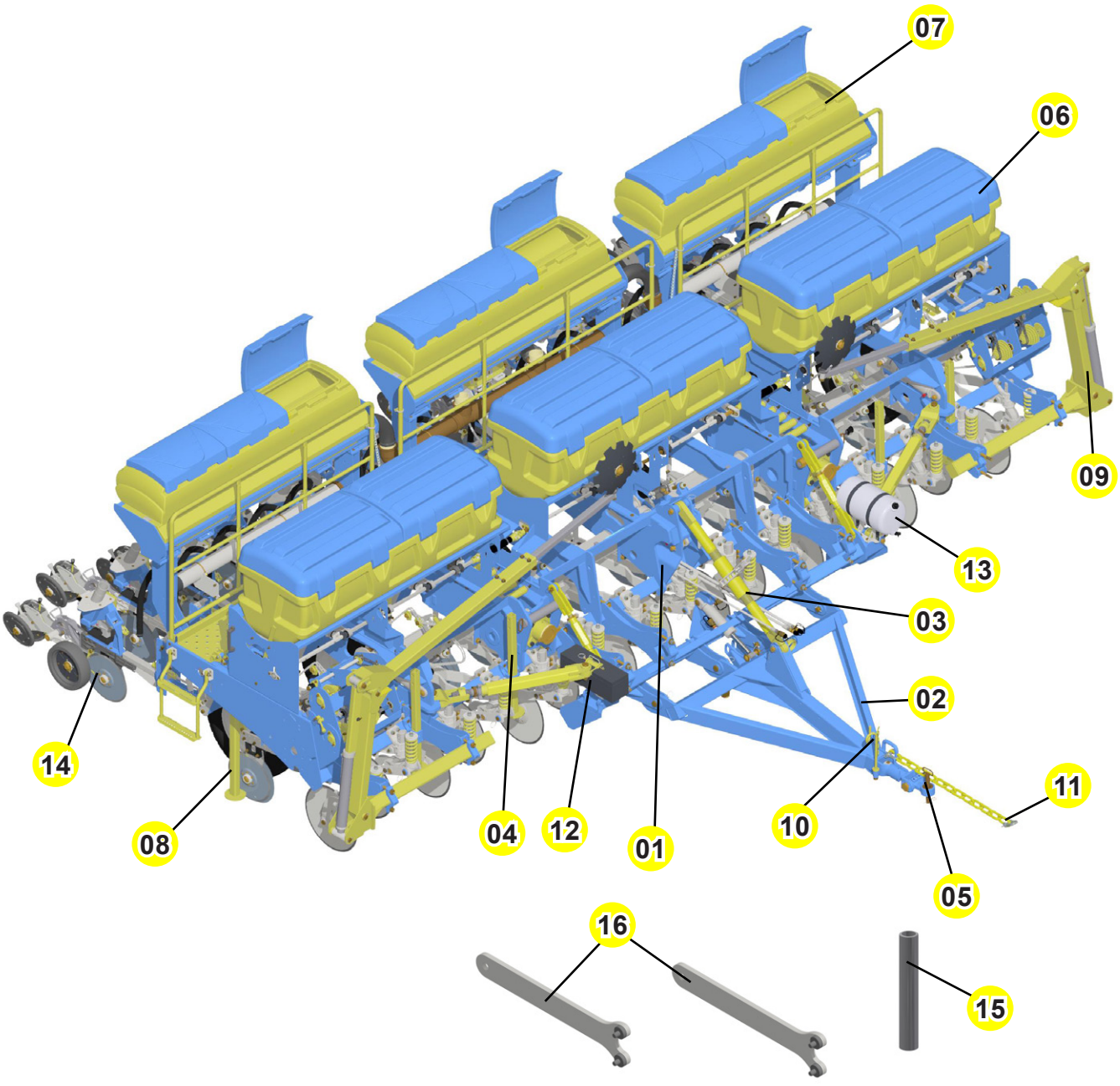
PST TRIO FLEX with single seed hopper

01 - Frame
02 - Drawbar
03 - Stabilizer
04 - Jack
05 - Tractor hitch
06 - Fertilizer hopper
07 - Single seed hopper
08 - Prop
09 - Hydraulic row marker
10 - Hose support
11 - Safety chain
12 - Tool box
13 - Water reservoir (non potable)
14 - Titanium seed row unit
15 - Extensor lever
16 - Disc blade spanner wrench



PST TRIO FLEX with single seed hopper and pneumatic turbine

01 - Frame
02 - Drawbar
03 - Stabilizer
04 - Jack
05 - Tractor hitch
06 - Fertilizer hopper
07 - Single seed hopper
08 - Prop
09 - Hydraulic row marker
10 - Hose support
11 - Safety chain
12 - Tool box
13 - Water reservoir (non potable)
14 - Pneumatic seed row unit
15 - Extensor lever
16 - Disc blade spanner wrench



Row units

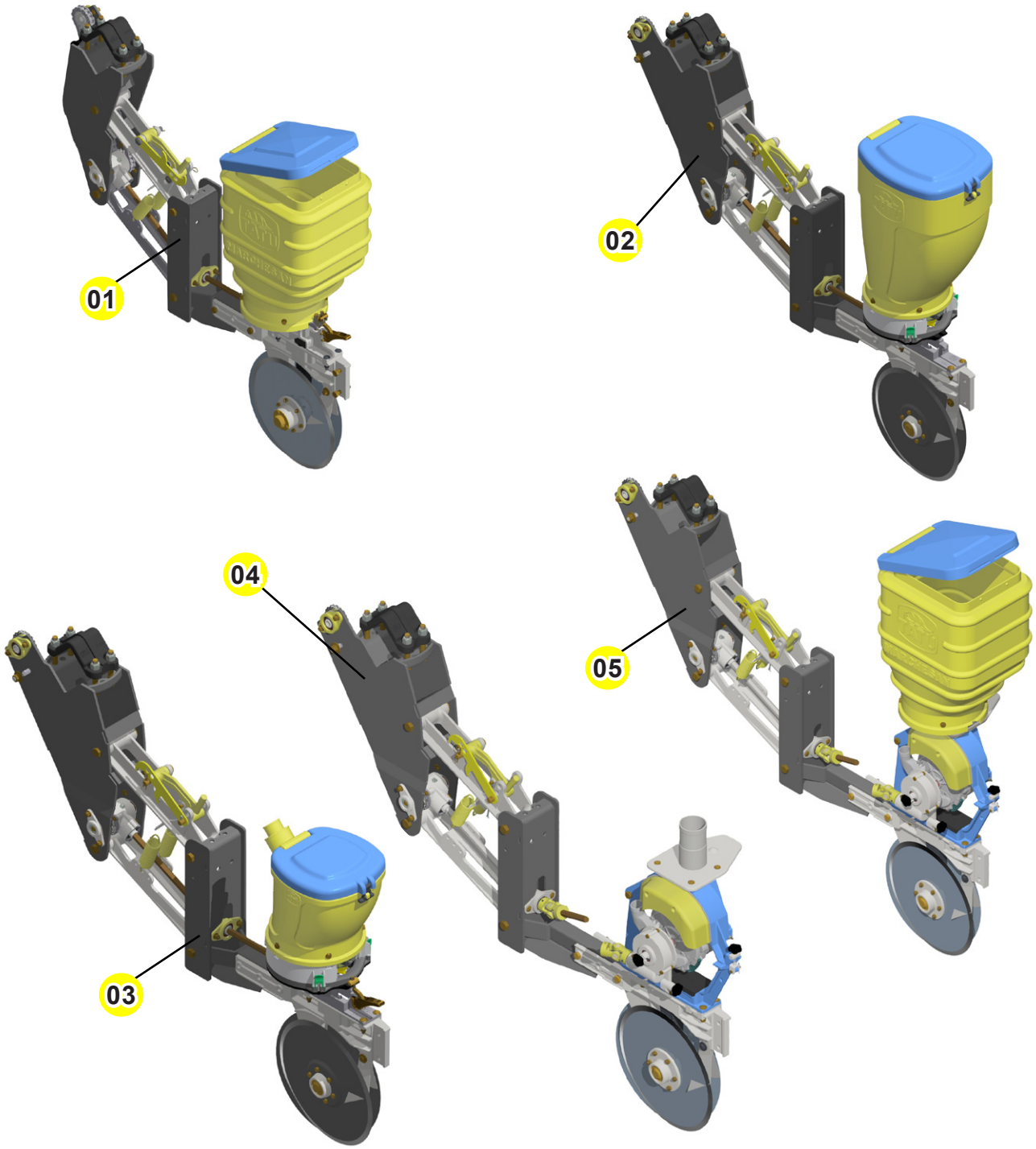
01 - Seed and fertilizer row unit - Mechanical

02 - Seed and fertilizer row unit - Titanium

03 - Seed and fertilizer row unit - Titanium / Single seed hopper

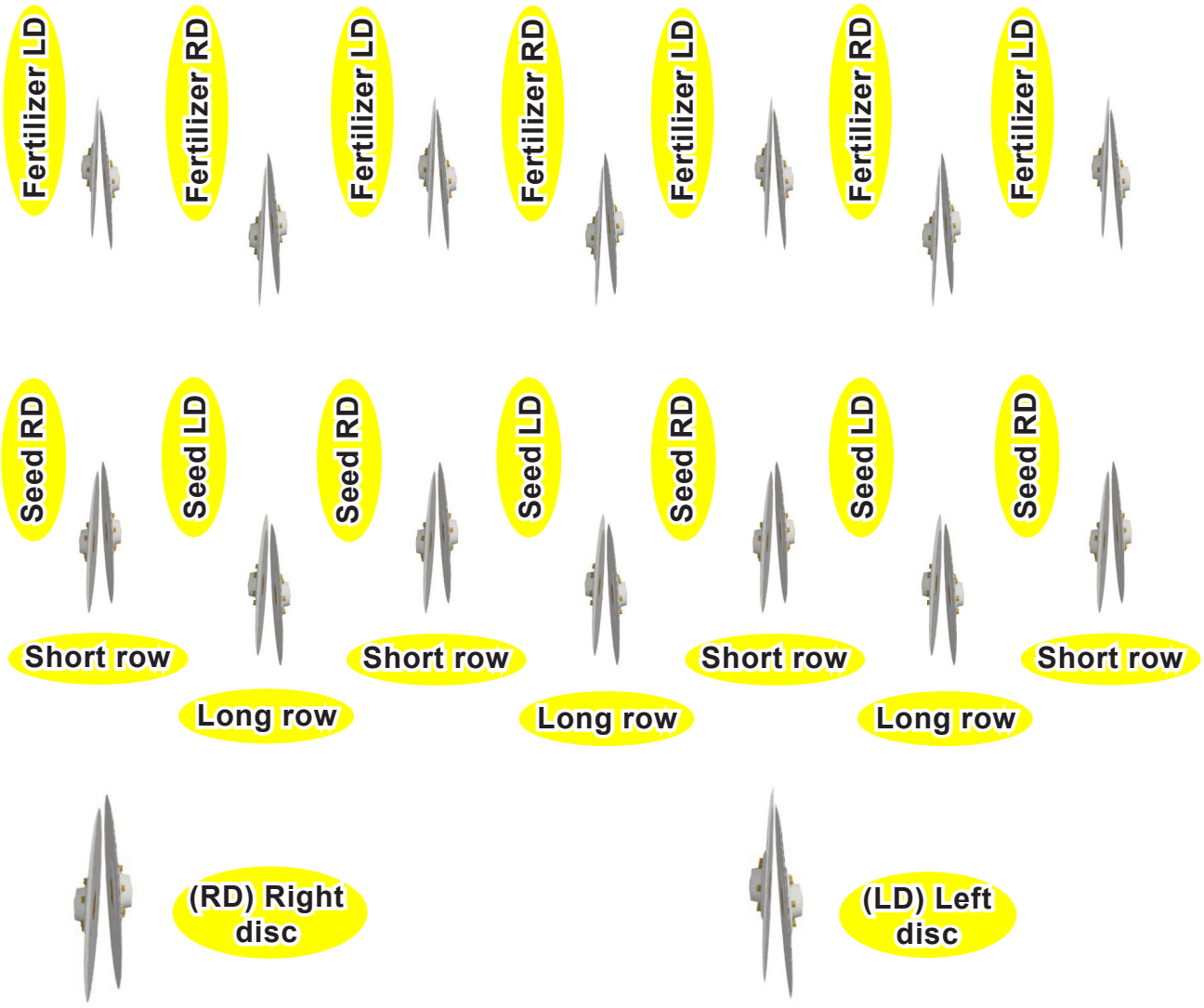
04 - Seed and fertilizer row unit - Precision Planting with single seed hopper

05 - Seed and fertilizer row unit - Precision Planting with individual seed hopper



Unaligned double discs assembly sequence

Odd number of row units	Even number of row units
If the equipment has an odd number of rows. • Fertilizer row units (From left to right): Starts with a short left fertilizer row unit; Ends with a short left fertilizer row unit. • Seed row units (From left to right): Starts with a short right seed row unit; Ends with a short right seed row unit.	If the equipment has an even number of rows. • Fertilizer row units (From left to right): Starts with a short left fertilizer row unit; Ends with a long right fertilizer row unit. • Seed row units (From left to right): Starts with a short right seed row unit; Ends with a long left seed row unit.



NOTE • **The right and left hand side indication are done observing the equipment from the rear.**

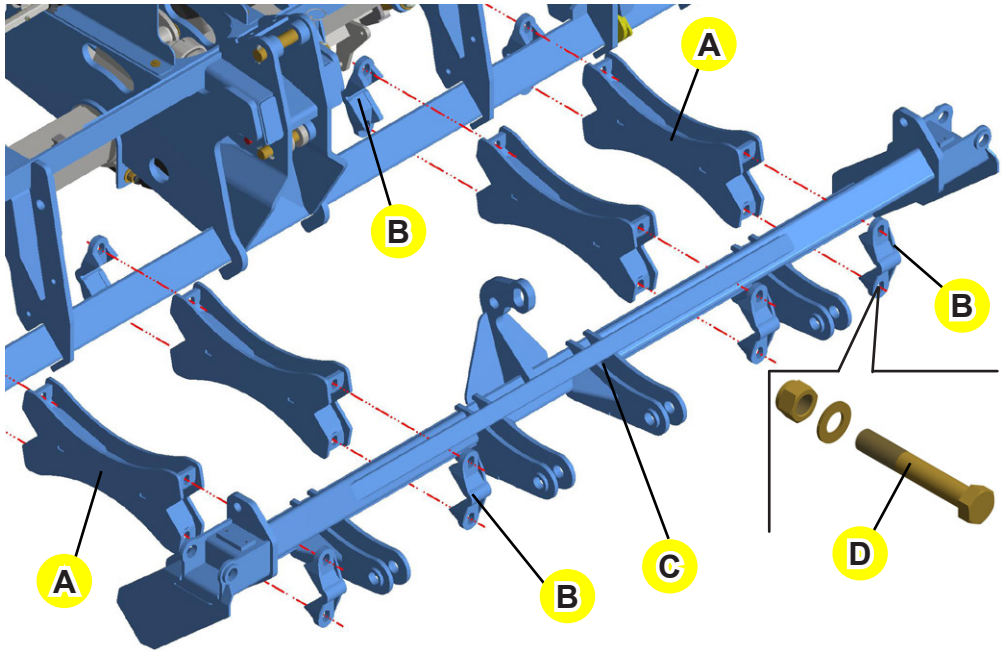
Assembly

The planter leaves the factory semi-assembled to facilitate transportation, being necessary just a few adjustments to start the job. Follow the instructions below:

Intermediate drawbar

Place the clamps (A) in the frame using fasteners (B), bolts, flat washers and nuts.

Then, fasten the intermediate drawbar (C) to the other end of the clamps (A) using fasteners (B), bolts (D), flat washers and nuts.

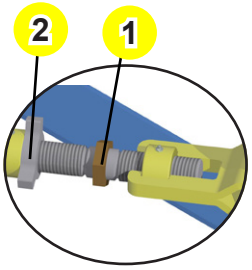


Upper extensors

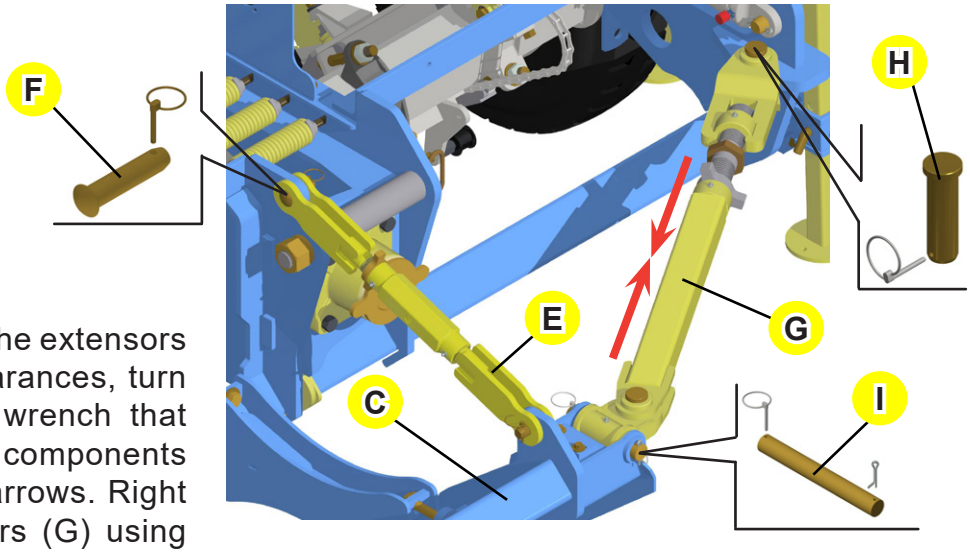
Couple the upper extensors (E) to the frame and intermediate drawbar (C) using pins (F) and lock pins.

Assemble the right and left extensors (G) to the frame using pins (H) and lock pin. Lock the intermediate drawbar (C) using an axle (I), cotter pins and lock pins.

Repeat the same assembly procedure on the other drawbar (C) side.



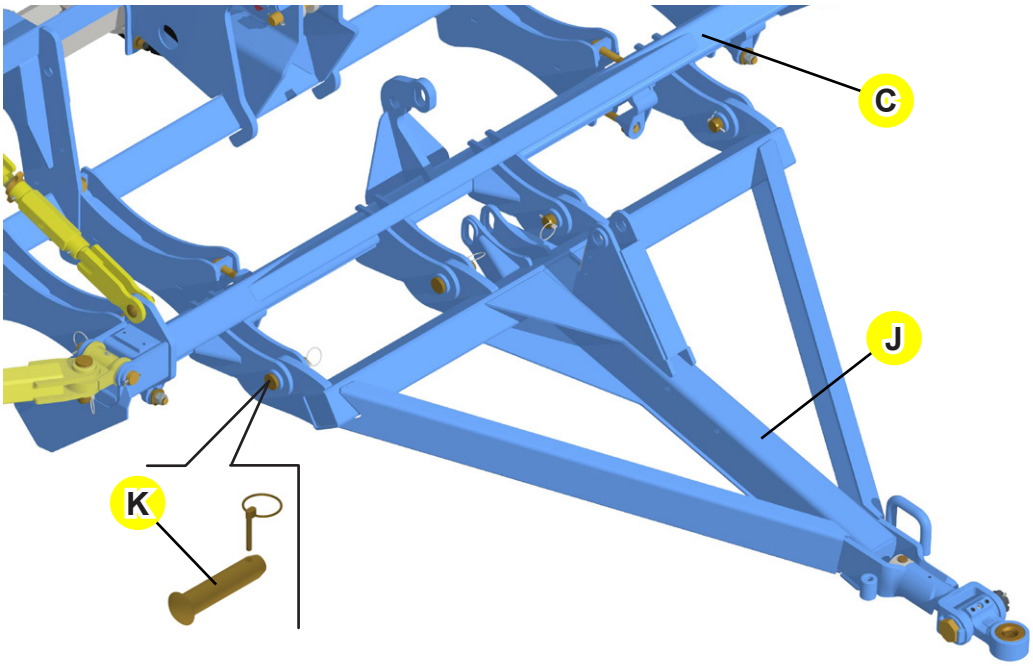
Lateral extensor detail



After assembling the extensors (G) and due to the clearances, turn the nut (1) using the wrench that can be found inside the components box, as shown by the arrows. Right after, lock the extensors (G) using the angle bar lock (2).

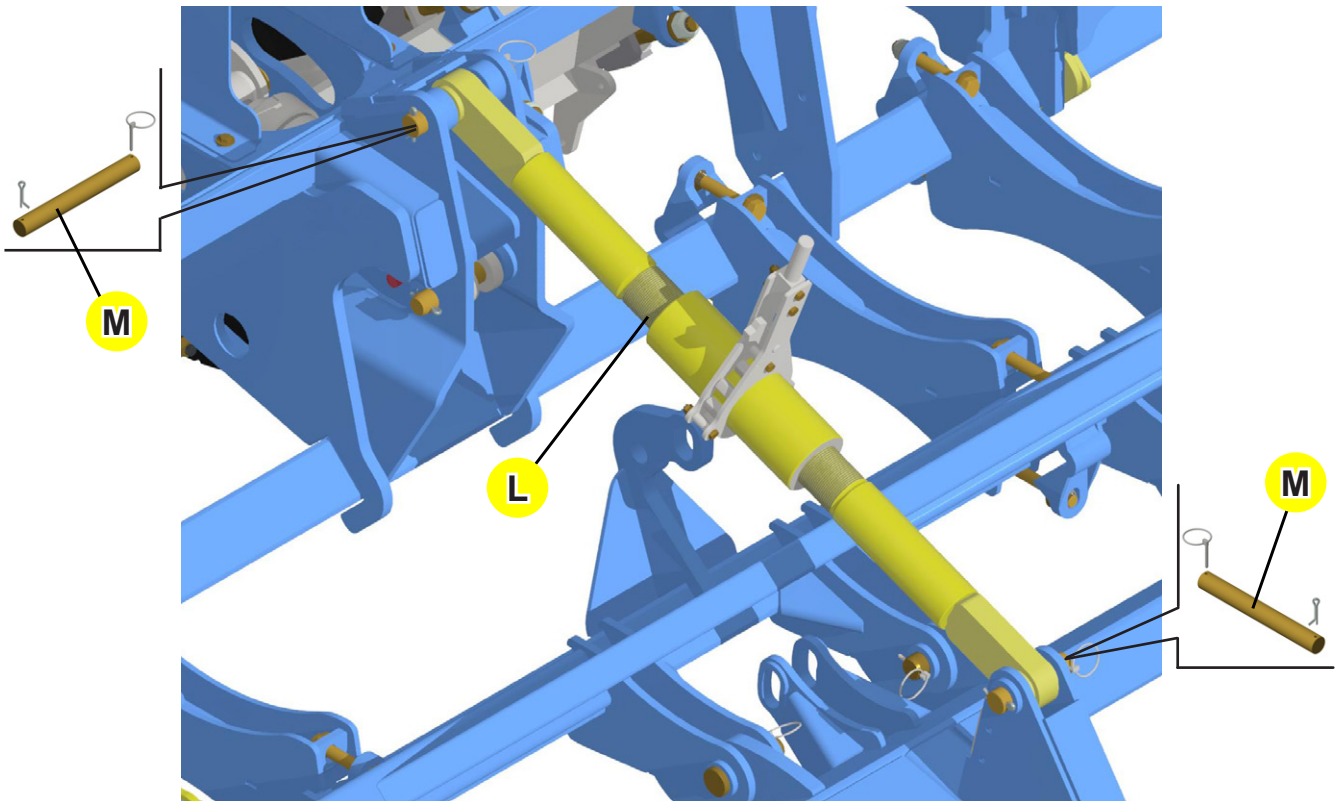
Drawbar assembly

Fasten the drawbar (J) to the intermediate drawbar (C) using pins (K) and lock pins.



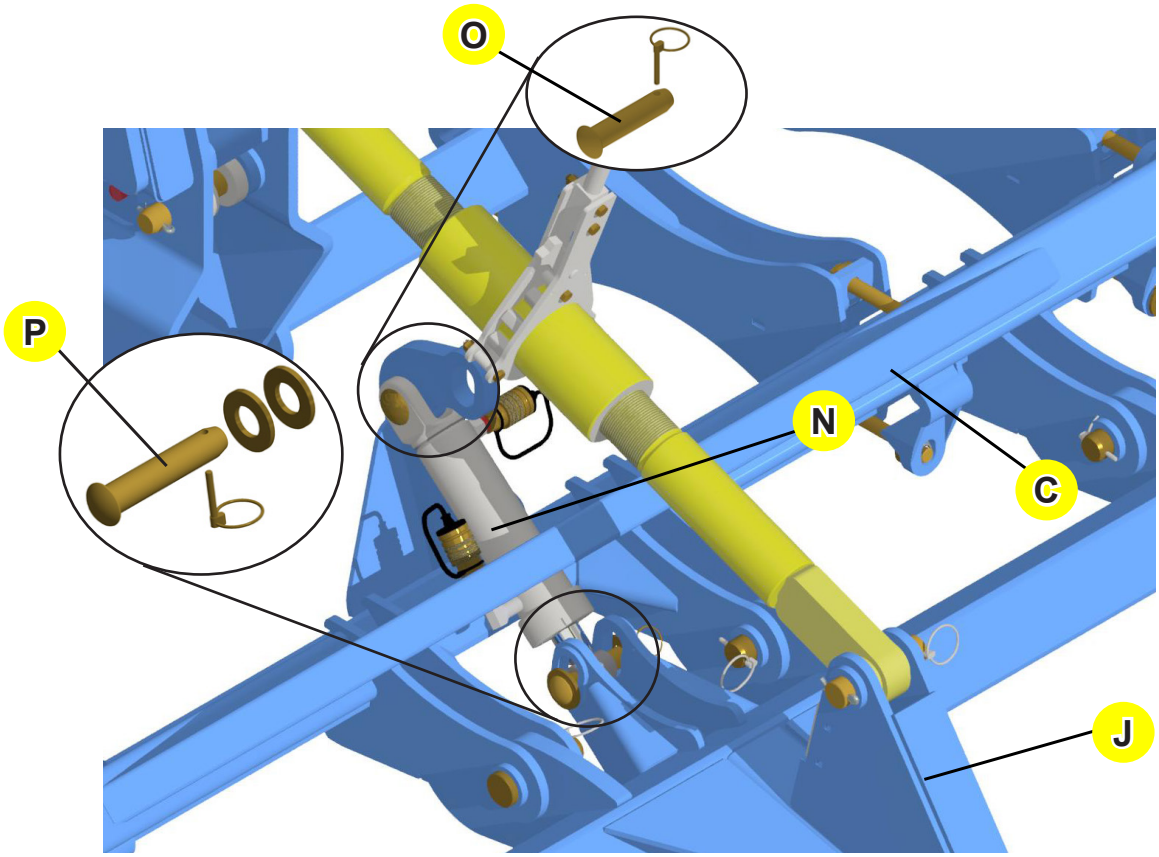
Drawbar stabilizer

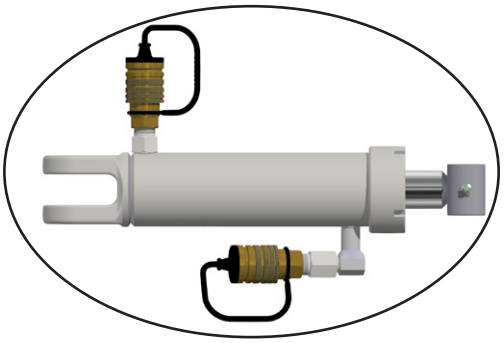
To assemble this stabilizer (L) on the frame and drawbar, use pins (M) and lock pins.



Drawbar cylinder

Assemble the lifting cylinder (N) to the drawbar (C) using the small pin (O) and lock pin. Use the pin (P), flat washers and lock pin to lock the moving part of the cylinder.



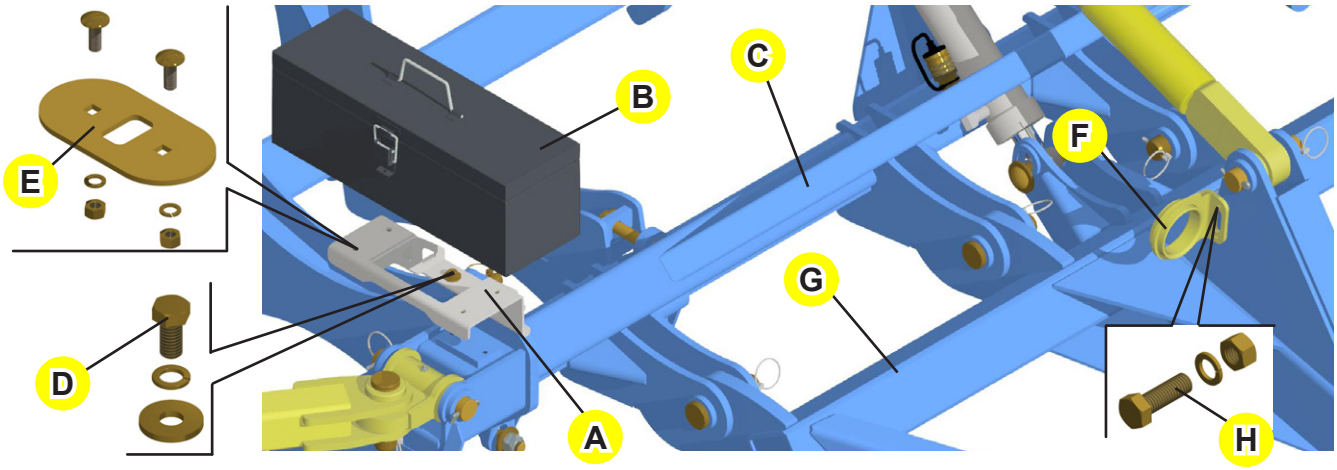


To use the drawbar cylinder (N), the operator must use the hoses from the hydraulic circuit (found on the component box) and remove and store the hoses in an easy-to-access place right after placing the drawbar (J) in the tractor hitch.

IMPORTANT

- **The drawbar cylinder (N) is specifically used to articulate the drawbar (J) for when the equipment is not operating.**
- **Do not try to work when the cylinder is activated. This may cause damages to the equipment structure.**
- **Keep the hose ends clean and do not let them touch the soil.**

Drawbar parts

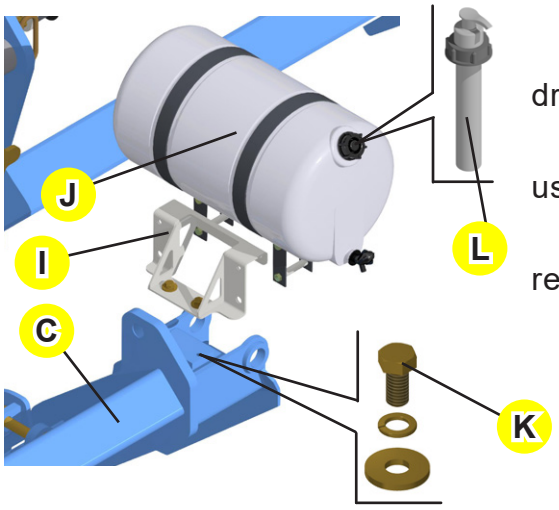


Assemble the parts that can be found inside the components box, which includes the hose support, tool box, water reservoir, safety chain, tractor hitch and others following the instructions below:

Assemble the tool box (B) support (A) to the drawbar (C) using bolts (D), flat and spring washers.

Lock the tool box (B) to the support (A) using fixation plates (E), bolts, spring washers and nuts.

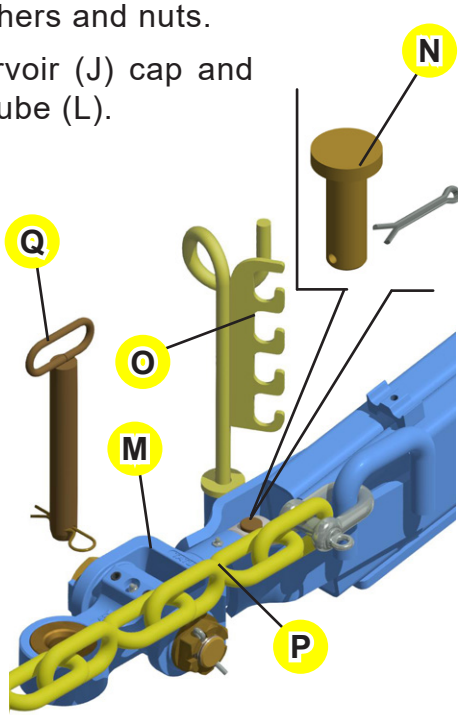
Fasten the hose guide (F) on the drawbar (G) using bolts (H) and spring washers.



Assemble the water reservoir (J) support (I) to the drawbar (C) using bolts (K), flat and spring washers.

Lock the water reservoir (J) to the support (I) using bolts, spring washers and nuts.

Remove the reservoir (J) cap and replace it by the soap tube (L).



Couple the tractor hitch (M) using a pin (N) and cotter pin;

Lock the hose support (O) to the drawbar using spring washers and nut;

Fasten the safety chain (P) to the drawbar (G).

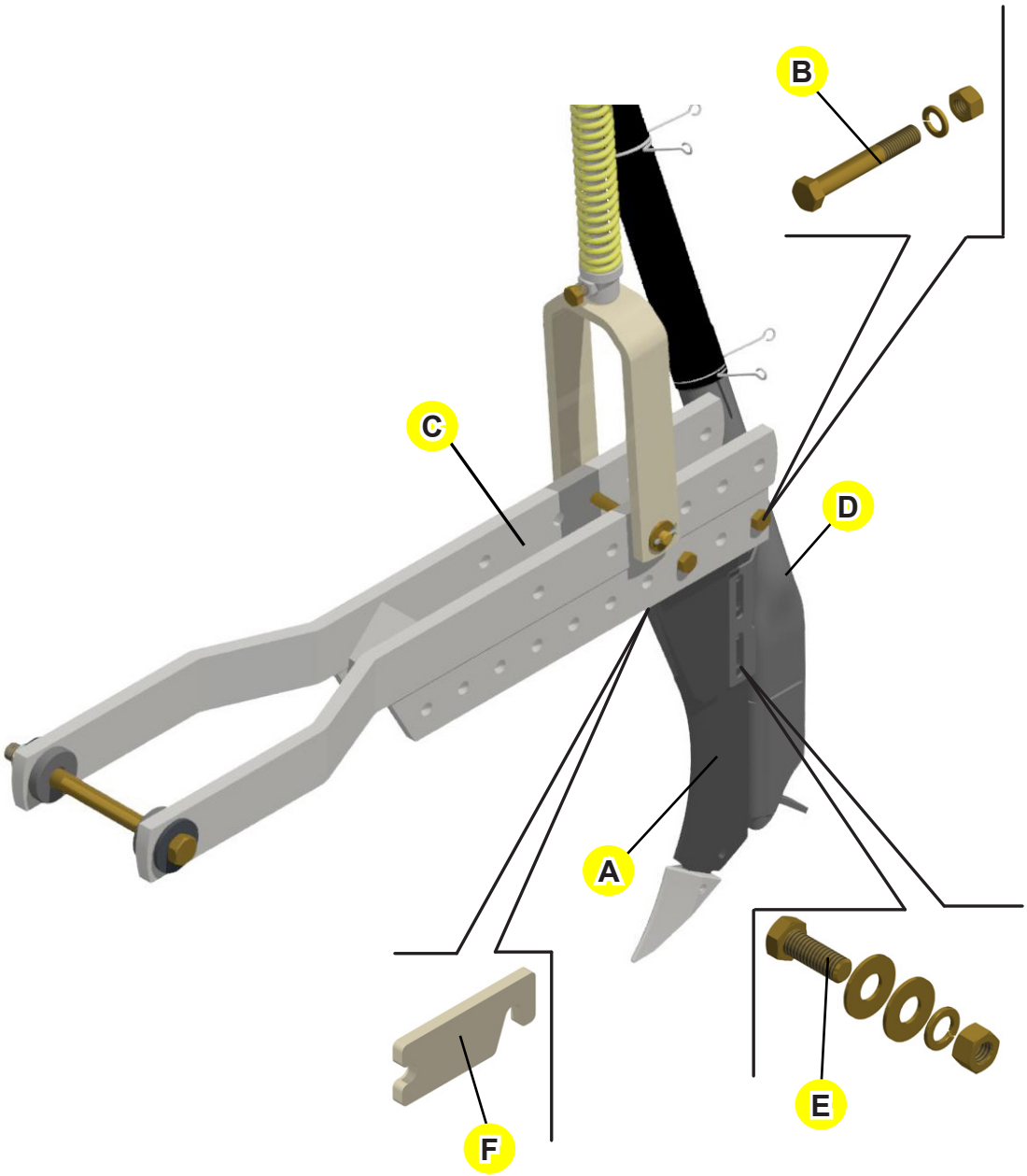
Assemble the pin (Q) to the tractor hitch (M).

Scarifier shank

To assemble the shank (A), remove the unaligned double disc by loosening up the bolt (B), flat washer and nut from the fertilizer row unit arm (C).

Place the shank (A) on the unaligned double disc position and lock using the bolts (B) that were fastening the disc blade.

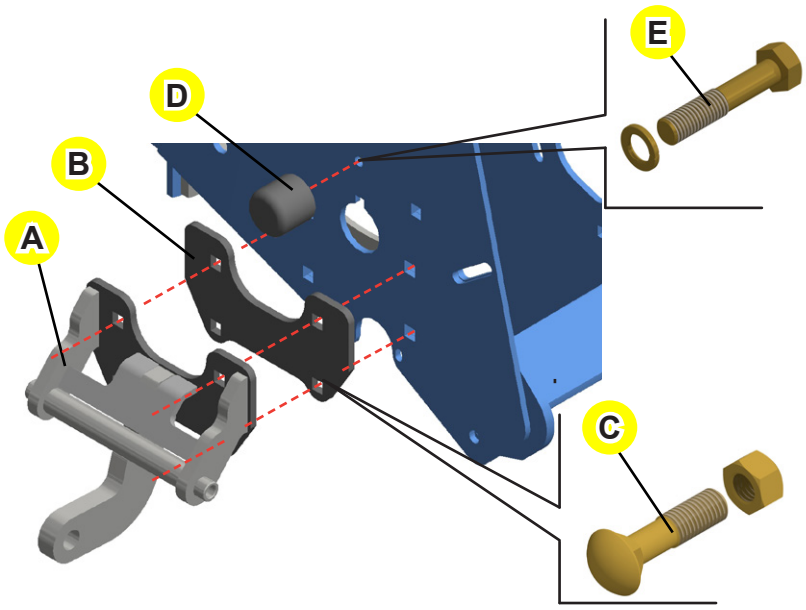
Assemble the right and left fertilizer tubes (D) to the shank (A) using bolts (E), flat and spring washers and nuts.



ATTENTION

- **The shank (A) position on the row arm (C) must be displaced related to the seed row unit. Use the spacers (F) for the displacement.**

Hydraulic row markers - 5750 to 6450

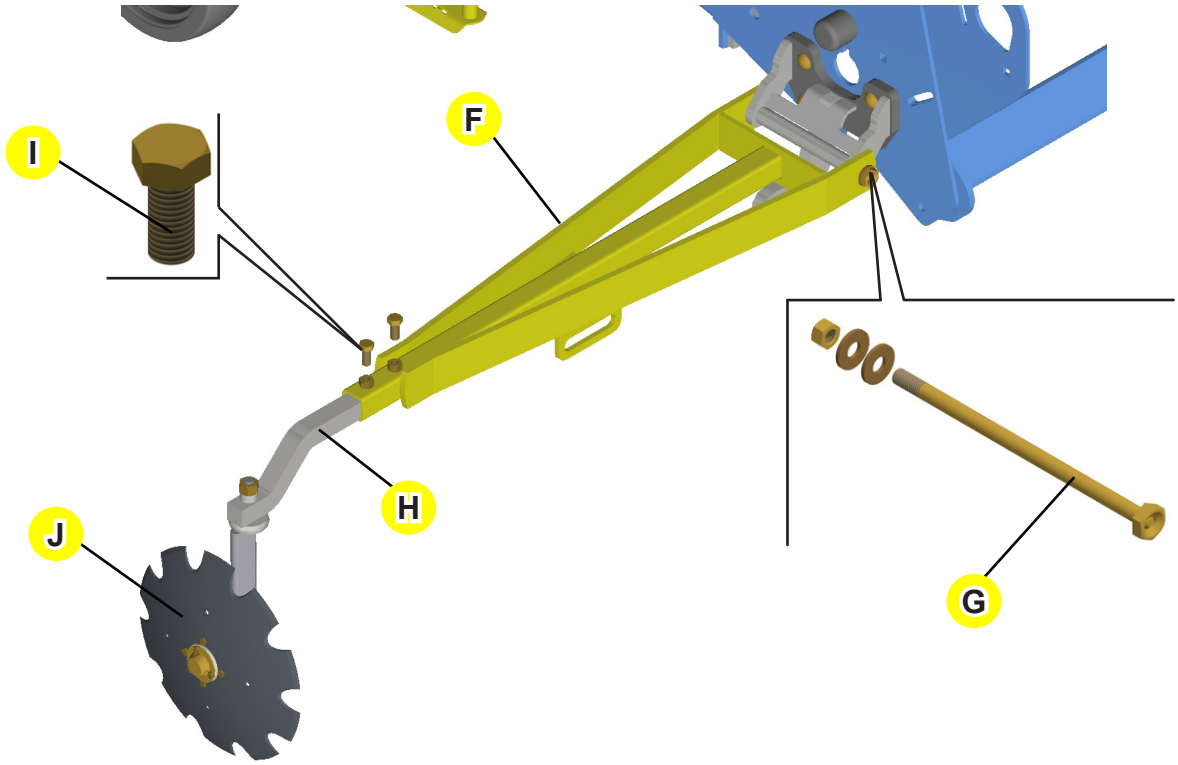


Fasten the hydraulic row marker support (A) to the frame side using a spacing plate (B), bolts (C), spring washers and nuts.

Lock the shock absorber (D) to the frame using a bolt (E) and spring washer.

Couple the row marker arm (F) to the support (A) using bolts (G), flat washers and nuts.

Then, fasten the extensor (H) using bolts (I) and the row marker disc (J) using a spring washer and nut.



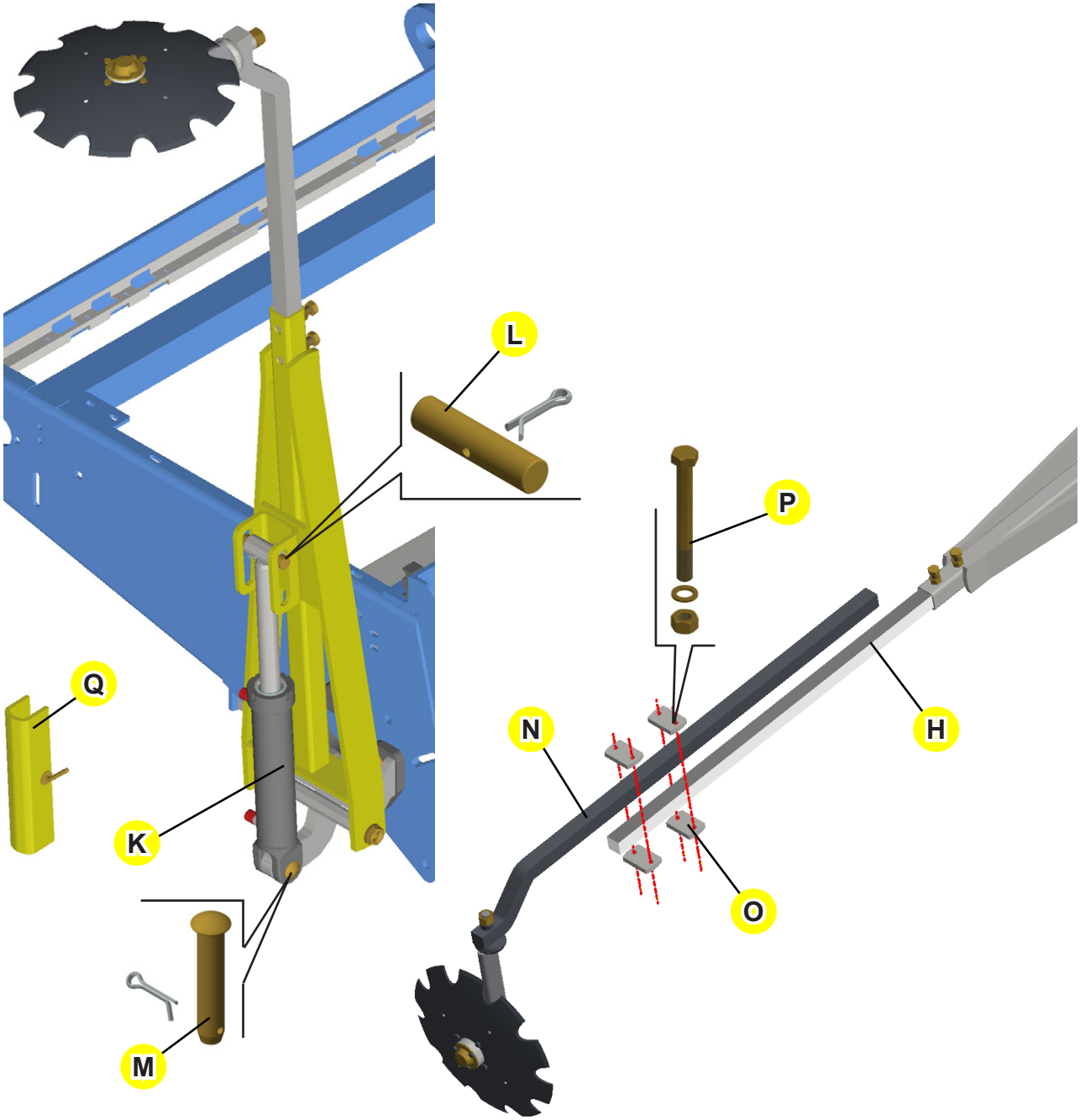
NOTE

- **The row markers feature an independent lift activation that can be activated without raising or lowering the planter.**

Hydraulic row markers

Fasten the hydraulic cylinder (K) to the row marker arm using an axle (L) and to the support using a junction axle (M).

To assemble the extensor (N) us the locks (O), bolts (P), spring washers and nuts.



- **Have a special care to not let people or animals close to the marker disc operation area.**
- **Use the safety lock (Q) on the row marker cylinder to transport the equipment.**

Hydraulic row markers

Fasten the hydraulic row marker clamps (A) to the front part of the frame (B) using fasteners (C) with bolts, spring washers and nuts.

On the other end of the clamps (A), fasten the row marker support (D) with fasteners (C), bolts, spring washers and nuts.

Fasten the marker first extensor (E) to the support (D) using an axle, flat washer and cotter pins.

Fasten the marker second extensor (F) to the first one (E) using an axle, flat washer and cotter pins.

Assemble the third extensor (G) to the second one (F) using clamps, flat and spring washers and nuts.

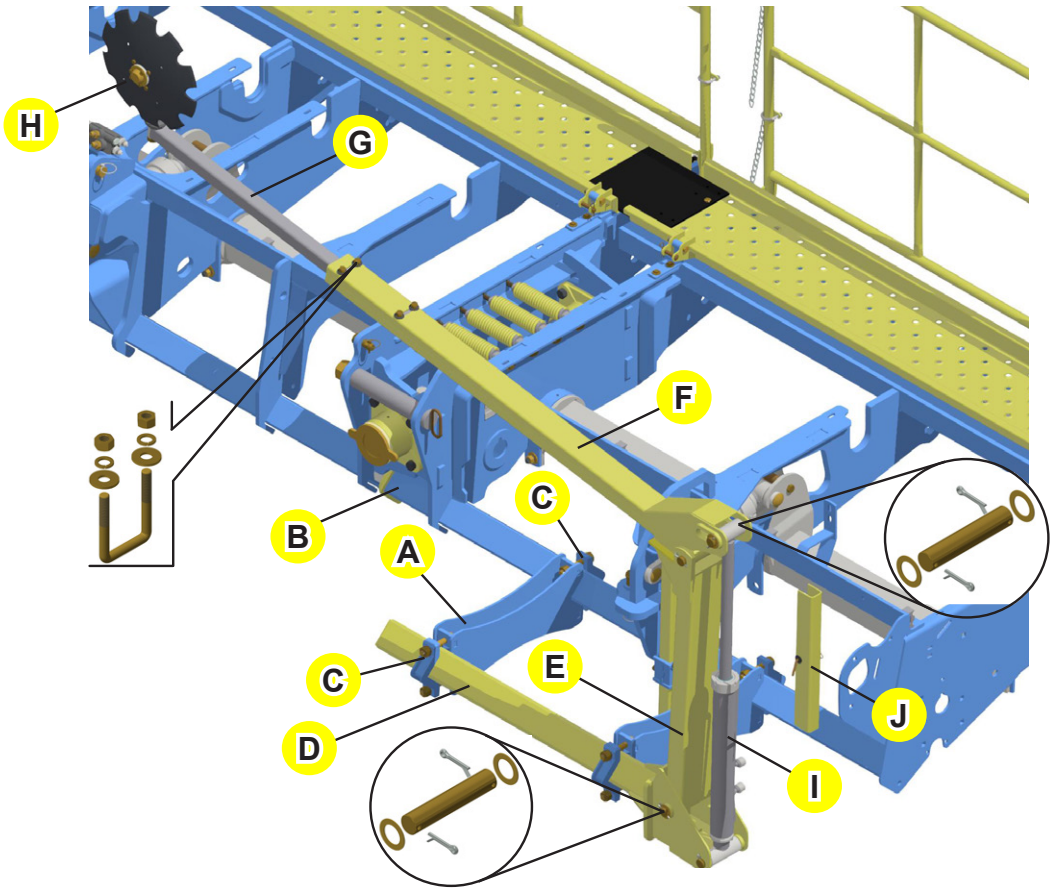
Fasten the marker disc (H) to the third extensor (G) using spring washer and nut.

Assemble the cylinder (I) to the marker support (D) and fasten it to the cylinder rod on the marker second extensor (F) using axles, flat washers and cotter pins.

Use the transport lock (J) (that can be found inside the components box) on the cylinder (I) rod when transporting the equipment.

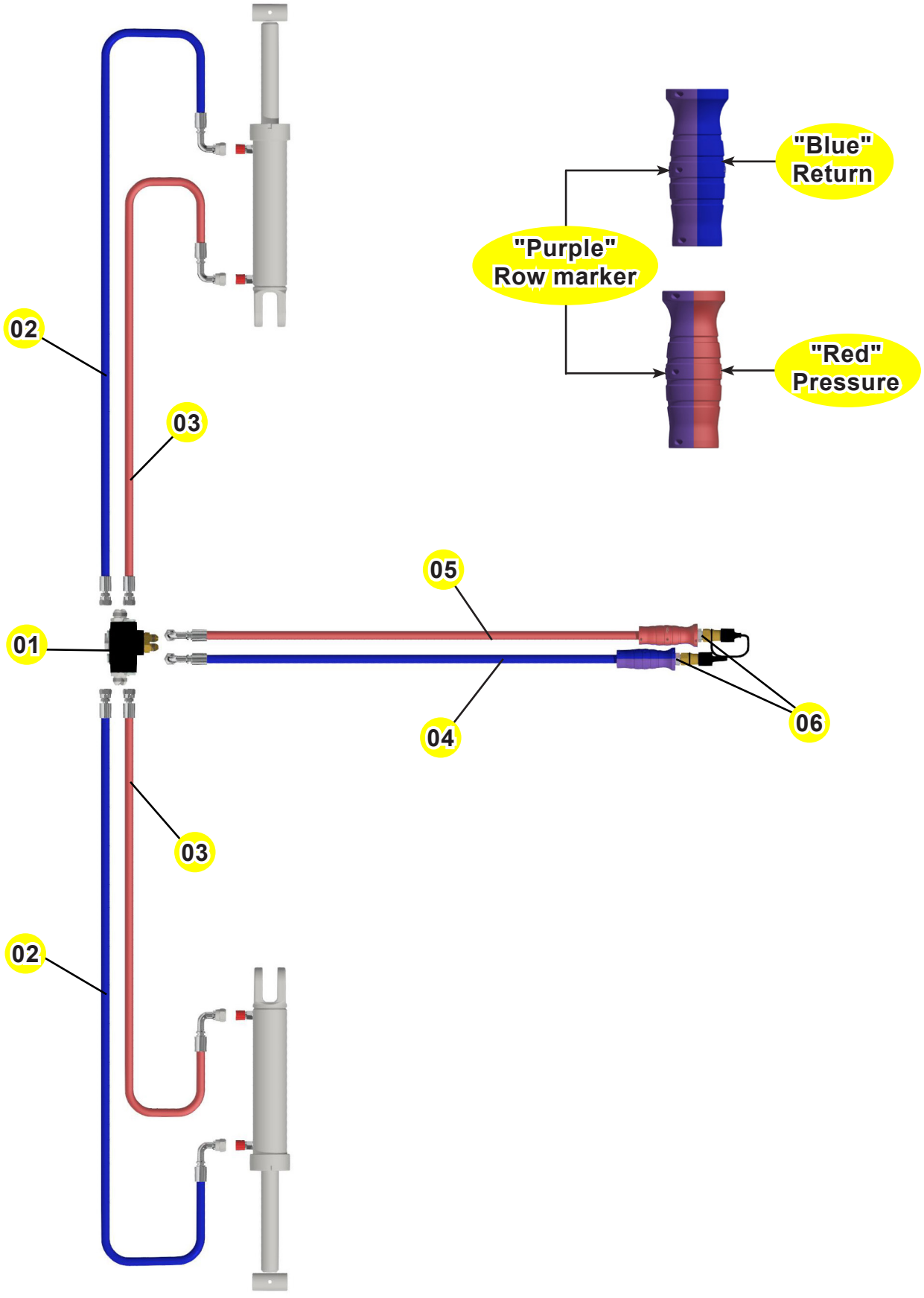
NOTE

- **The row markers feature an independent lift activation that can be activated without raising or lowering the planter.**



- **Have a special care to not let people or animals close to the marker disc operation area.**

Hydraulic row marker circuit



Assembly

Item	Quantity	Model 5750 / 5850	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 4100 TR-TC hose	Return
04	01	3/8 X 3850 TR-TC hose	Pressure
05	01	3/8 X 4100 TR-TC hose	Return
06	01	3/8 X 3850 TR-TC hose	Pressure
07	01	3/8 X 4212 TC-TM hose	Return
08	01	3/8 X 4212 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 6450	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 4450 TR-TC hose	Return
04	01	3/8 X 4200 TR-TC hose	Pressure
05	01	3/8 X 4450 TR-TC hose	Return
06	01	3/8 X 4200 TR-TC hose	Pressure
07	01	3/8 X 4212 TC-TM hose	Return
08	01	3/8 X 4212 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 6850	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 4550 TR-TC hose	Return
04	01	3/8 X 4300 TR-TC hose	Pressure
05	01	3/8 X 4550 TR-TC hose	Return
06	01	3/8 X 4300 TR-TC hose	Pressure
07	01	3/8 X 4212 TC-TM hose	Return
08	01	3/8 X 4212 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 7450	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 4800 TR-TC hose	Return
04	01	3/8 X 4600 TR-TC hose	Pressure
05	01	3/8 X 4800 TR-TC hose	Return
06	01	3/8 X 4600 TR-TC hose	Pressure
07	01	3/8 X 4212 TC-TM hose	Return
08	01	3/8 X 4212 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Hydraulic row marker circuit

Item	Quantity	Model 7860	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 5350 TR-TC hose	Return
04	01	3/8 X 5150 TR-TC hose	Pressure
05	01	3/8 X 5350 TR-TC hose	Return
06	01	3/8 X 5150 TR-TC hose	Pressure
07	01	3/8 X 4650 TC-TM hose	Return
08	01	3/8 X 4650 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 7960	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 5000 TR-TC hose	Return
04	01	3/8 X 4890 TR-TC hose	Pressure
05	01	3/8 X 5000 TR-TC hose	Return
06	01	3/8 X 4890 TR-TC hose	Pressure
07	01	3/8 X 4200 TC-TM hose	Return
08	01	3/8 X 4200 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 8160	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 5150 TR-TC hose	Return
04	01	3/8 X 4940 TR-TC hose	Pressure
05	01	3/8 X 5150 TR-TC hose	Return
06	01	3/8 X 4940 TR-TC hose	Pressure
07	01	3/8 X 4200 TC-TM hose	Return
08	01	3/8 X 4200 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Hydraulic row marker circuit

Item	Quantity	Model 8460	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 5500 TR-TC hose	Return
04	01	3/8 X 5700 TR-TC hose	Pressure
05	01	3/8 X 5500 TR-TC hose	Return
06	01	3/8 X 5700 TR-TC hose	Pressure
07	01	3/8 X 5000 TC-TM hose	Return
08	01	3/8 X 5000 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 8960	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 5900 TR-TC hose	Return
04	01	3/8 X 5700 TR-TC hose	Pressure
05	01	3/8 X 5900 TR-TC hose	Return
06	01	3/8 X 5700 TR-TC hose	Pressure
07	01	3/8 X 5200 TC-TM hose	Return
08	01	3/8 X 5200 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 9460	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 6300 TR-TC hose	Return
04	01	3/8 X 6100 TR-TC hose	Pressure
05	01	3/8 X 6300 TR-TC hose	Return
06	01	3/8 X 6100 TR-TC hose	Pressure
07	01	3/8 X 5200 TC-TM hose	Return
08	01	3/8 X 5200 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Hydraulic row marker circuit

Item	Quantity	Model 9960	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 6600 TR-TC hose	Return
04	01	3/8 X 6300 TR-TC hose	Pressure
05	01	3/8 X 6600 TR-TC hose	Return
06	01	3/8 X 6300 TR-TC hose	Pressure
07	01	3/8 X 5200 TC-TM hose	Return
08	01	3/8 X 5200 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 10460	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	02	3/8 X 7800 TR-TC hose	Return
04	01	3/8 X 7600 TR-TC hose	Pressure
05	01	3/8 X 7800 TR-TC hose	Return
06	01	3/8 X 7600 TR-TC hose	Pressure
07	01	3/8 X 5200 TC-TM hose	Return
08	01	3/8 X 5200 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

Item	Quantity	Model 10985	
01	01	HBM complete sequence valve	
02	02	Hydraulic cylinder	
03	01	3/8 X 8100 TR-TC hose	Return
04	01	3/8 X 7900 TR-TC hose	Pressure
05	01	3/8 X 8100 TR-TC hose	Return
06	01	3/8 X 7900 TR-TC hose	Pressure
07	01	3/8 X 5200 TC-TM hose	Return
08	01	3/8 X 5200 TC-TM hose	Pressure
09	02	Male quick coupler 1/2 NPT	

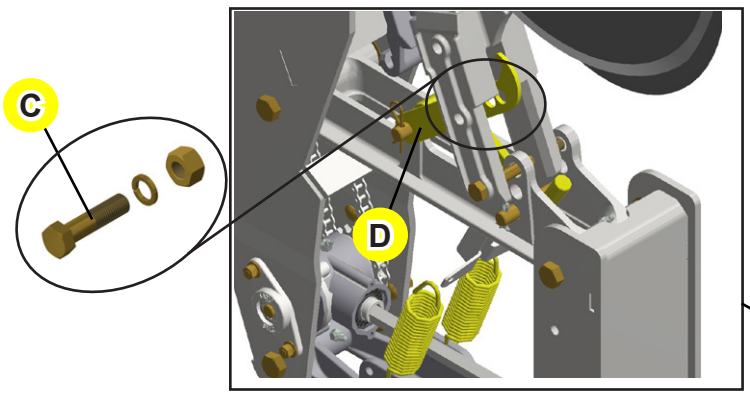
Sequence valve operation

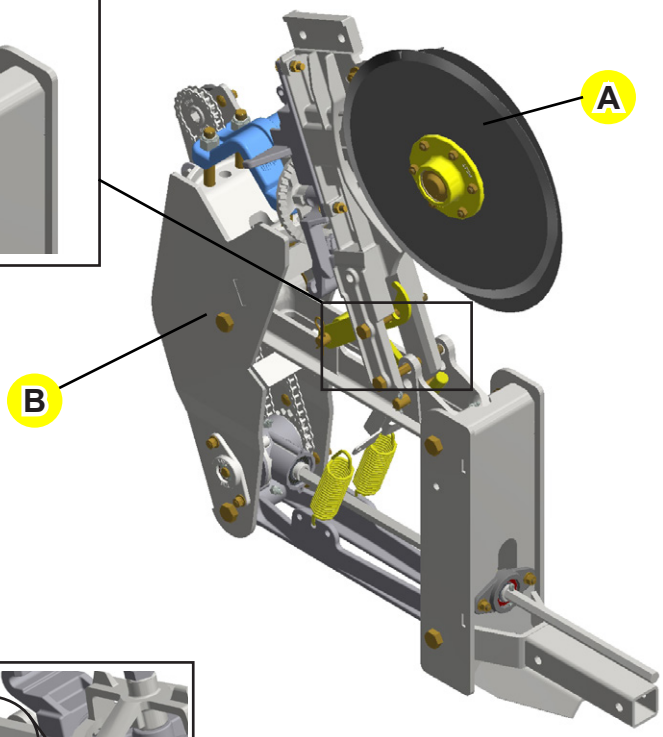
For the correct operation of the sequence valve and the proper alternation of the row markers, it is necessary to always activate the command lever until the hydraulic cylinders stroke is completed and keep the lever activated for more three or four seconds.

NOTE

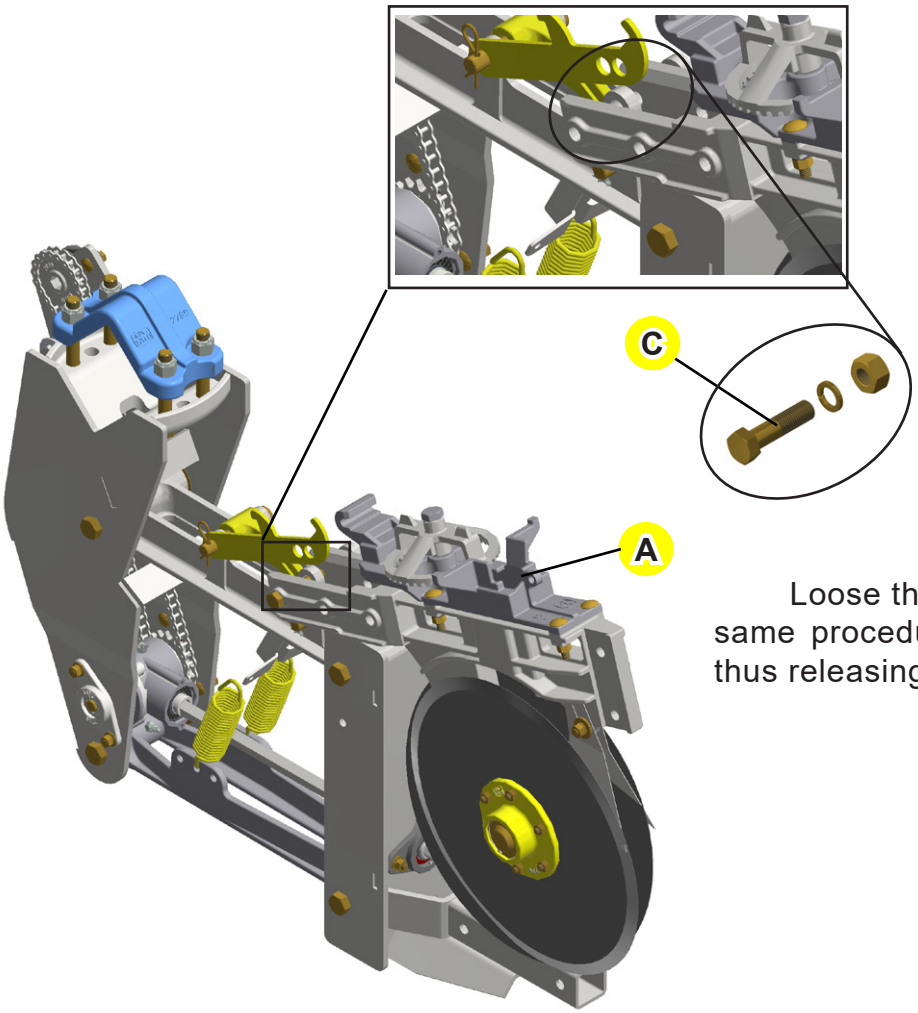
- **Never activate the hydraulic cylinders partially. Either when raising or lowering the planter, fully activate it.**

Assembly of the row unit (rear part)





The row unit (A) goes fastened in a vertical position on the parallelogram (B). To lower it, release the spring washer, nut and bolt (C) that fasten the row unit lock (D) using a 3/4" open end wrench to hold the bolt and another wrench to loose the spring washer and nut.



Loose the nut and bolt (C) using the same procedure with the wrenches and thus releasing the row unit (A).

Set-up instructions

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

Preparing the tractor

The addition of water ballasts 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. Check if the tractor is in its full condition before using it.

The drawbar is used to get a better power supplied by the tractor to perform the equipment dragging.

Drawbar types:

Straight up and positioned on a single height related to the soil, without the option to adjust the hitching height;

Angled drawbar with two height adjustments (going up or down).

When the bar is totally retreated on its length, the operator must be aware for any curve or maneuvers, as the equipment drawbar may touch the tractor tires or damage the hydraulic hoses.

When using the tractor drawbar, totally lift the three-point hitches.

The tractor drawbar must be compatible with the equipment. Do not exceed the static load capacity of the tractor drawbar.

Preparing the equipment

The equipment must always be parked on a dry and flat place, free from any debris or strange objects. Follow this procedure to set the equipment up:

Clean up to remove strange objects from the equipment and from the working area;

Make sure that there is enough room to maneuver the tractor until it hitches to the equipment;

Turn on the tractor and slowly approach it to the hitching point direction;

Use a clean cloth or a paper towel to clean the hoses end of the quick couplers. Also, clean the area around the tractor couplers;

Activate the clutch levers to turn the equipment activation system on or off;

Check if the fertilizer tubes are properly fixed;

Check the seed hoppers functioning and if the fertilizer tubes are free, because the equipment paintwork may block them. If blocked, clean the fertilizer tube outlet by scraping the paint excess to let the tubes free;

Check the tires inflation and keep the same pressure on all of them (See the 'tires inflation' page on the 'maintenance' section).

Lubricate all grease fittings appropriately. (See the 'lubrication' page on the 'maintenance' section).

Hitching to the tractor

Check the hitch bar type of your tractor. To hitch the equipment, it is necessary to use the tractor drawbar.

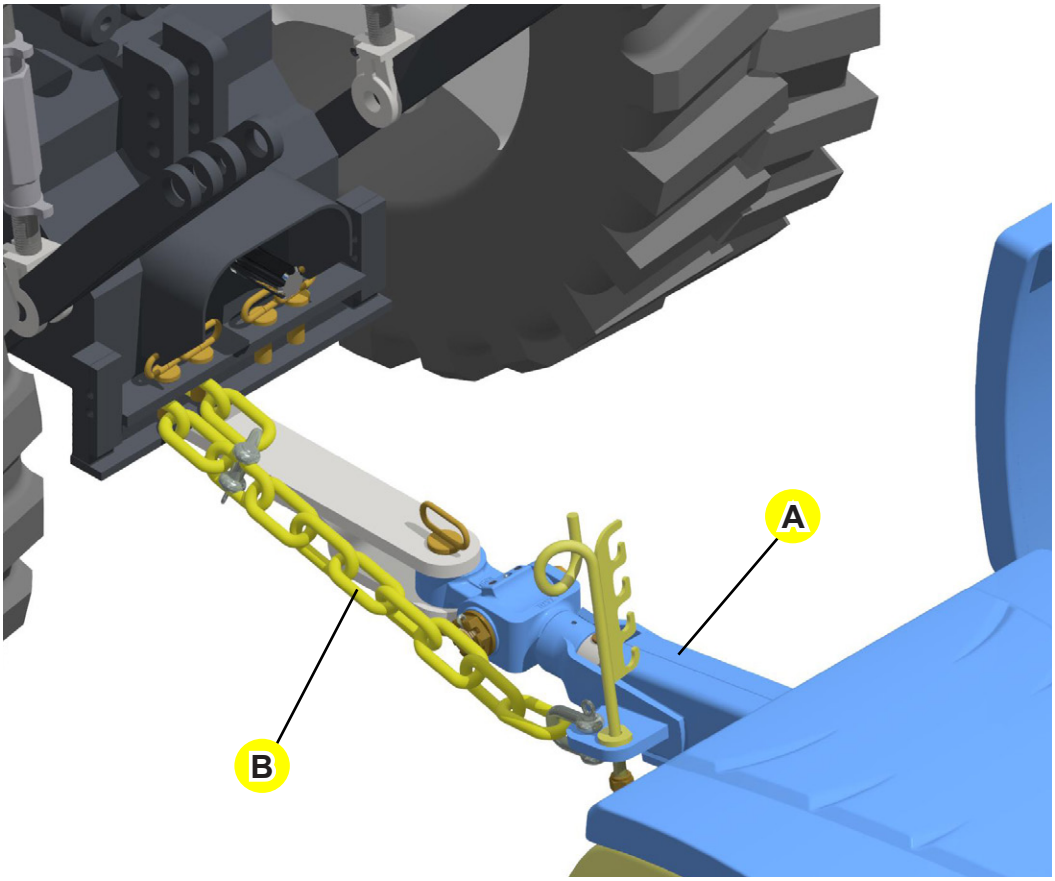
Use the drawbar extensor to lift or lower the hitch to align it with the tractor drawbar;

The tractor drawbar must always remain fixed and centralized;

Couple the drawbar (A) to the tractor drawbar with proper locking. Lock the safety chain (B) to the equipment and tractor, but leaving a small clearance to allow maneuvers.

WARNING

- **When preparing for working, the tractor-equipment set must be leveled related to the soil. Besides that, the tractor must be coupled to the equipment hitch to avoid unnecessary efforts during the set-up.**
- **When hitching the equipment to the tractor, use a chain to lock the equipment drawbar to the tractor hitch bar. This measure will prevent a possible rupture of any hydraulic hose or breaks on the hitching system, what would make the equipment tilt up.**



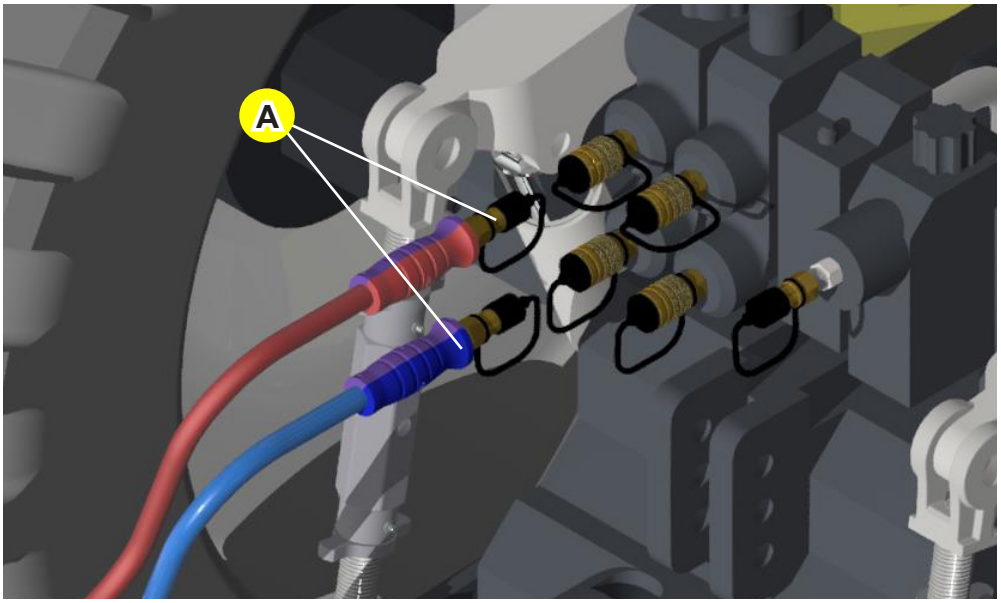
Coupling the hydraulic hose to the tractor

Before coupling the hoses (A), clean the quick coupler surface.

Couple the hoses by pushing the quick coupler on the connections until it locks. The uncoupling is done by pulling the quick coupler; this is the Push/Pull system.

Before uncoupling the hoses, shut down the tractor engine and move the levers forward or backward until noting that the cylinder is not activated anymore.

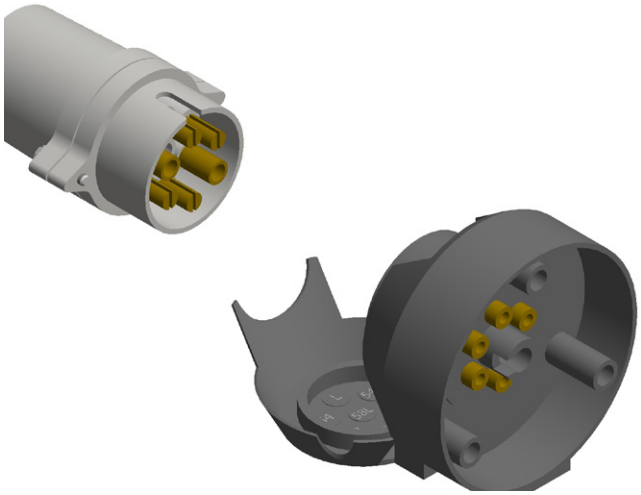
When the quick couplers are not being used, keep the rubber cap on its place either on the tractor or on the equipment.



Light hitching socket to the tractor

After connecting the hydraulic hoses to their respective places on the tractor, connect the socket that turns on the equipment lights to the tractor electric system.

Consult the tractor manual to carry out the proper connections.



- **Auxiliary batteries or electric connection cables may be properly connected to avoid that the battery explodes and/or damages to the electric system. Connect positive pole to other positive and negative pole to other negative.**
- **Failure to follow these recommendations may lead to serious wounds or even death.**

Leveling the equipment

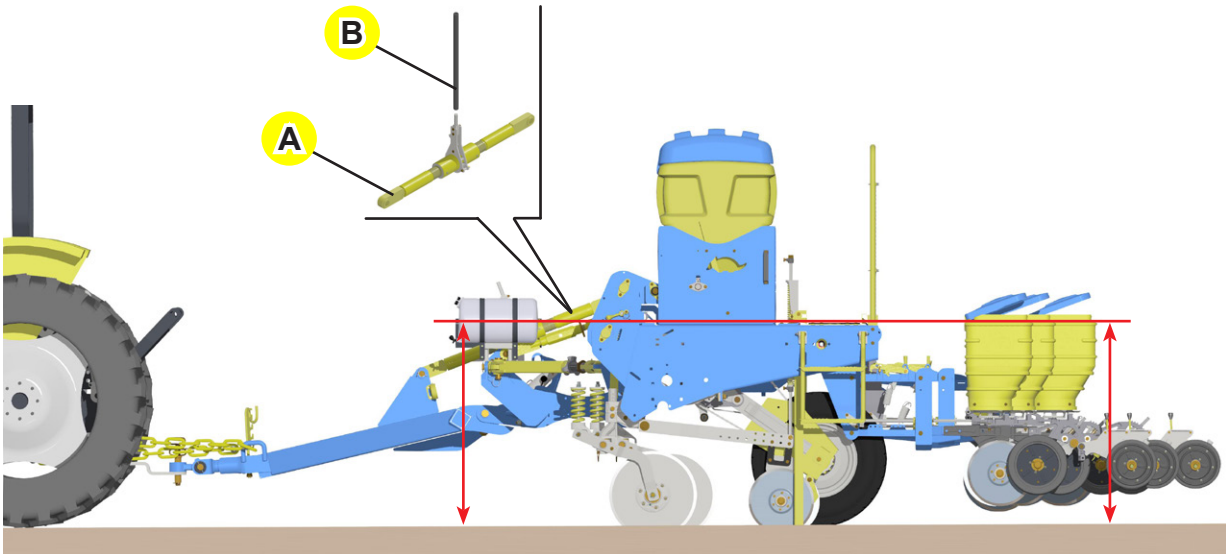
Use the drawbar extensor (A) length variation to adjust the longitudinal leveling of the equipment, meaning that is possible to level or unlevel the front part of the equipment related to the rear part and vice-versa.

The longer the extensor (A), the lower will be the rear part of the equipment.

The shorter the extensor (A), the greater will be the action of the front part of the equipment.

For helping adjusting the extensor, use the lever (B).

It is recommended to work with a leveled equipment related to the soil.



Procedures before the plantation

Before starting the plantation, make a general inspection on the equipment. Retighten all bolts and nuts and check the condition of all pins and cotter pins, avoiding future damages. Repeat this operation after the first day of work.

Check the tire pressure and keep the maximum pressure possible on all of them (Check the 'tire inflation' page on the 'general application' section).

Also check if there is no strange object inside the hoppers, which may damage the metering mechanisms.

Lubricate all grease fittings appropriately.

NOTE

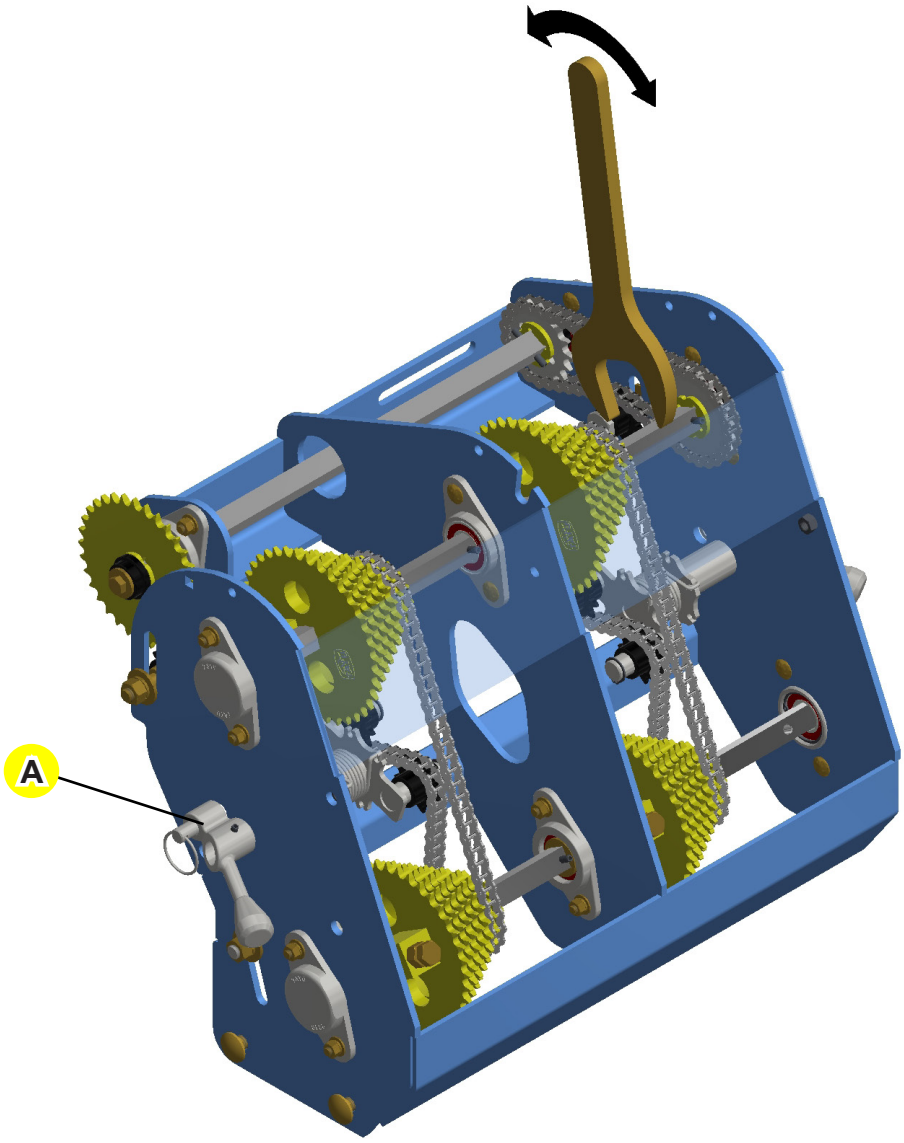
- **Only fill up the planter on the working station.**
- **Do not transit with load excess over the planter.**

Setting up the equipment before operation

The following instructions must be carefully observed to get the best working performance and to increase the lifetime of your equipment. When setting the equipment to operation for the first time, after the off-season or after a long inactive period, follow the instructions below:

1) Move and lock the lever (A) to relieve the chain tightener;

2) Displace the chain on the sprockets;



3) Use a **19 mm (3/4")** wrench to turn the driven shaft, checking if it is turning freely with small effort.

Place the chain again on the sprockets. Release the lever by loosening the chain tightener pin.

NOTE • **Always turn the drive shaft to the clockwise direction.**

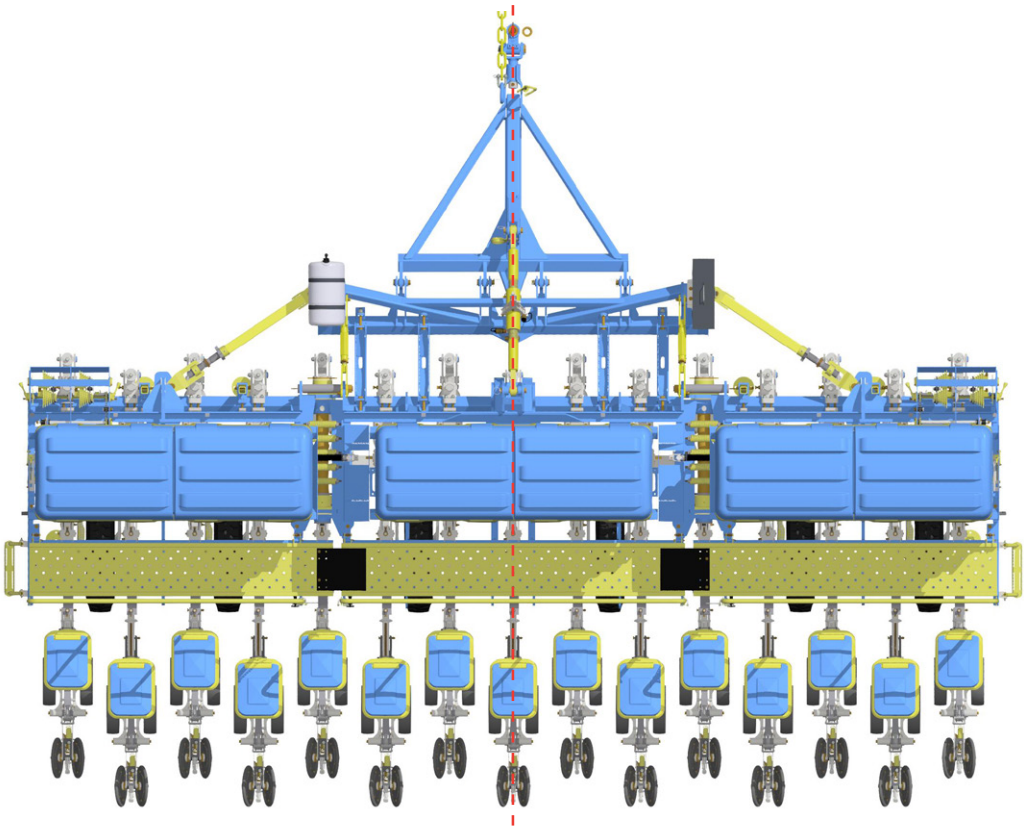
Spacing between row units

This planter leaves the factory with a minimum row spacing according to the requested number of row units, allowing a possibility of other spacing if the crop needs it.

Positioning the row units on the frame

Even number of row units:

Set the frame center and measure half of a spacing to the right and half to the left, placing on these points the first two row units; from these rows, set the other ones with one spacing to each side.



Odd number of row units:

Place one row unit in the frame center and set the other ones with the desired spacing.

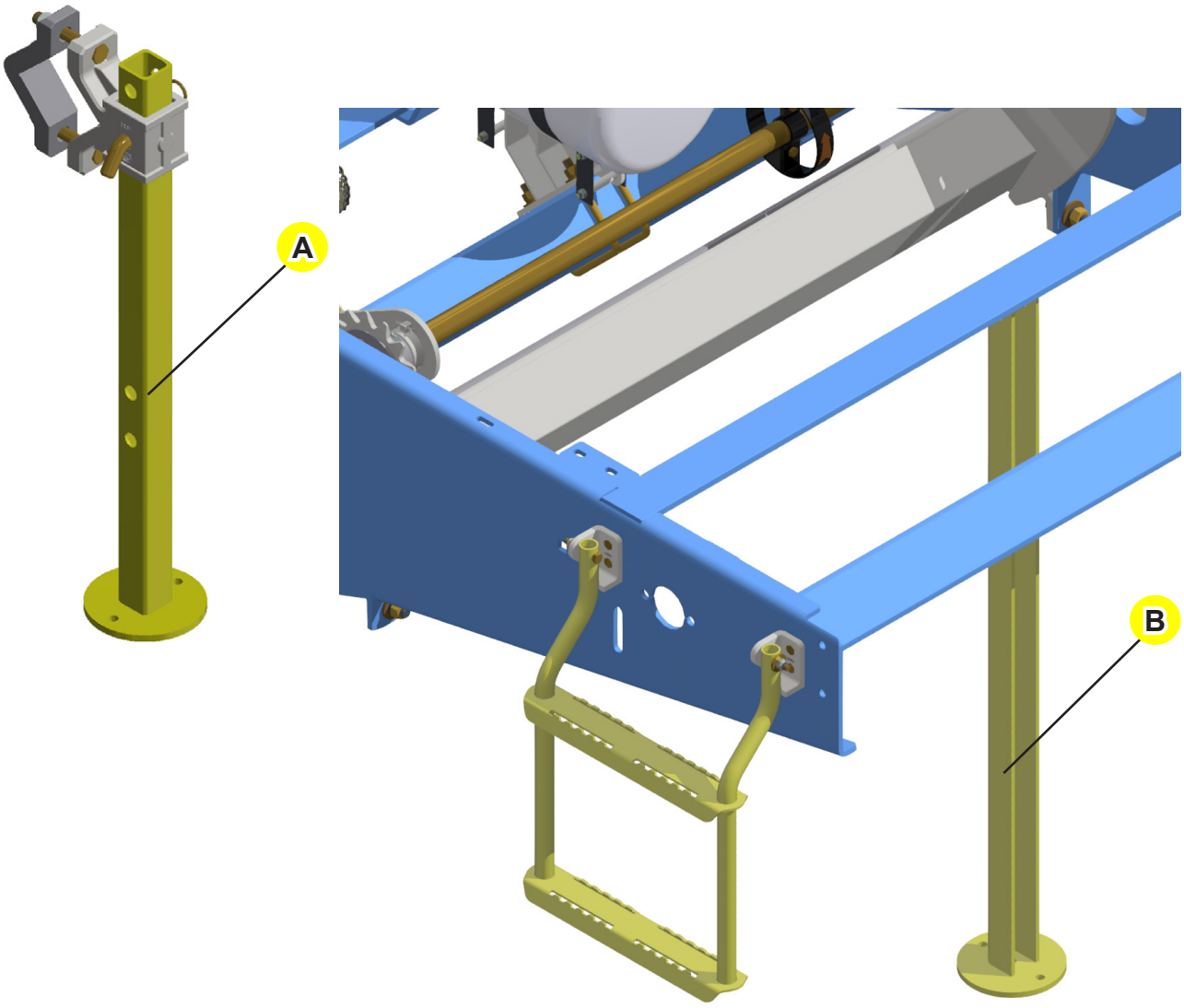
NOTE

- **Every fertilizer short row unit is a left one; seed short row unit is a right one.**
- **Every fertilizer long row unit is a right one; seed long row unit is a left one.**
- **Either for a model with an even or odd number of row units, the first row unit on the left side will always be short (seeing the equipment from behind). A model with an odd number of row units will always have one more short row and a model with an even number of row units will have the same amount of short and long rows. The unalignment between the fertilizer row unit with scarifier shank will be of 450 mm.**

Procedures to change the spacing

To change the spacing choose a flat, firm and clean place.

Before lowering the jack (A), it is necessary to position them between the row units that already have the desired spacing.



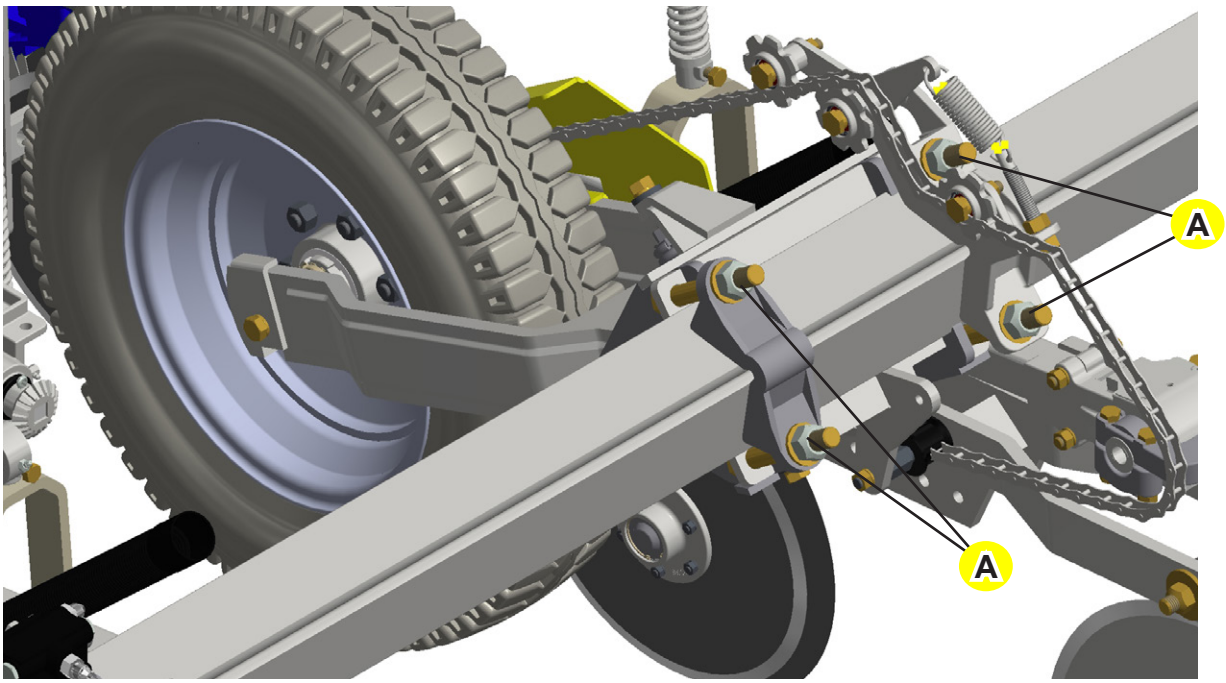
Place the props (B) in the rear angle bracket ends. Activate the hydraulic cylinder to lower the equipment.

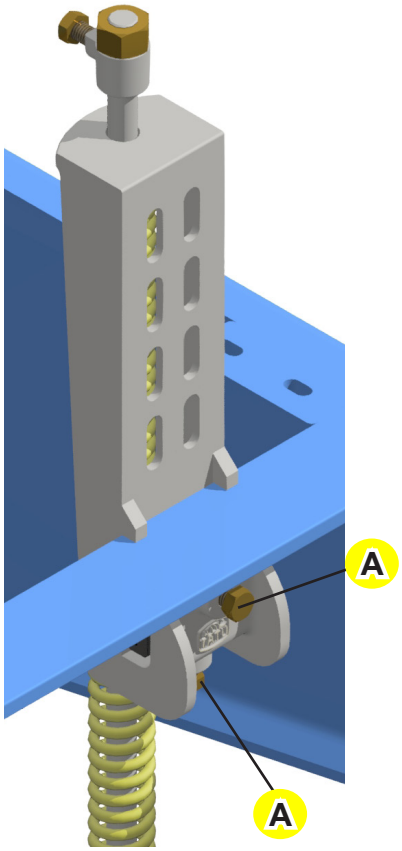
- **Check if the planter is properly supported to avoid accidents.**
- **The following instructions are necessary when placing or removing any row unit in the equipment.**

Procedures to change the spacing

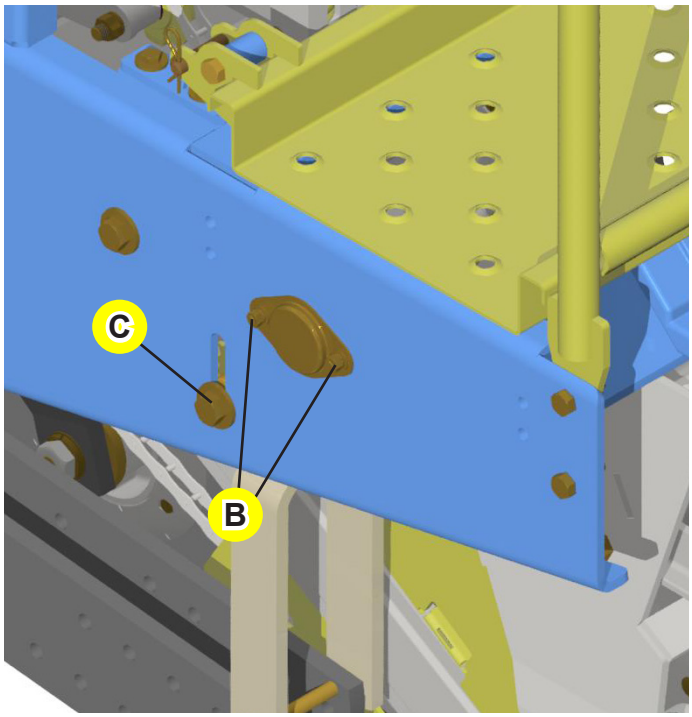
Relieve the control valve pressure and follow the instructions below:

1) Loosen the bolts (A) and fixation nuts of the springs, wheelsets, clutches, levers, disc blades and fertilizer rows, so it is possible to displace these components in the frame.





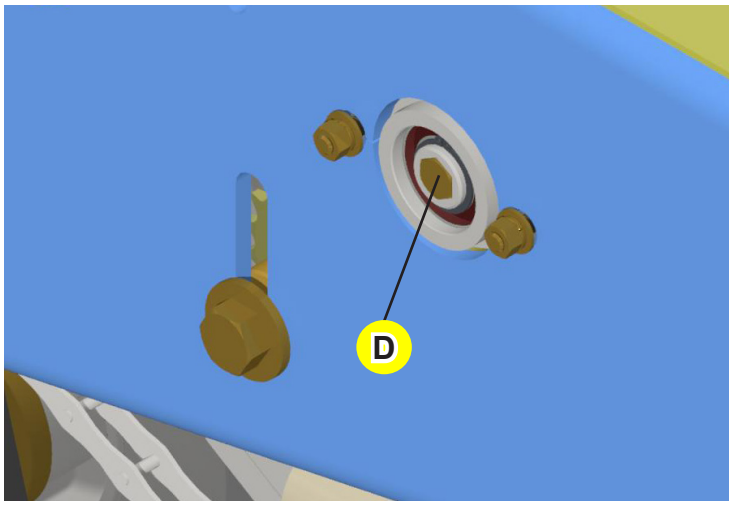
2) Loose the bolts (B) that fasten the support bearing from the hexagonal axle and release the chain tightener (C), if necessary.

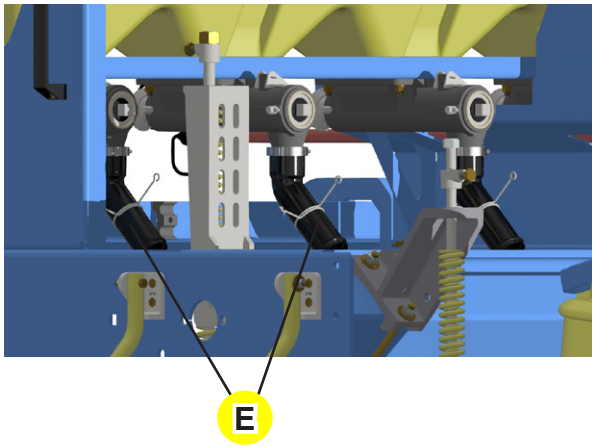


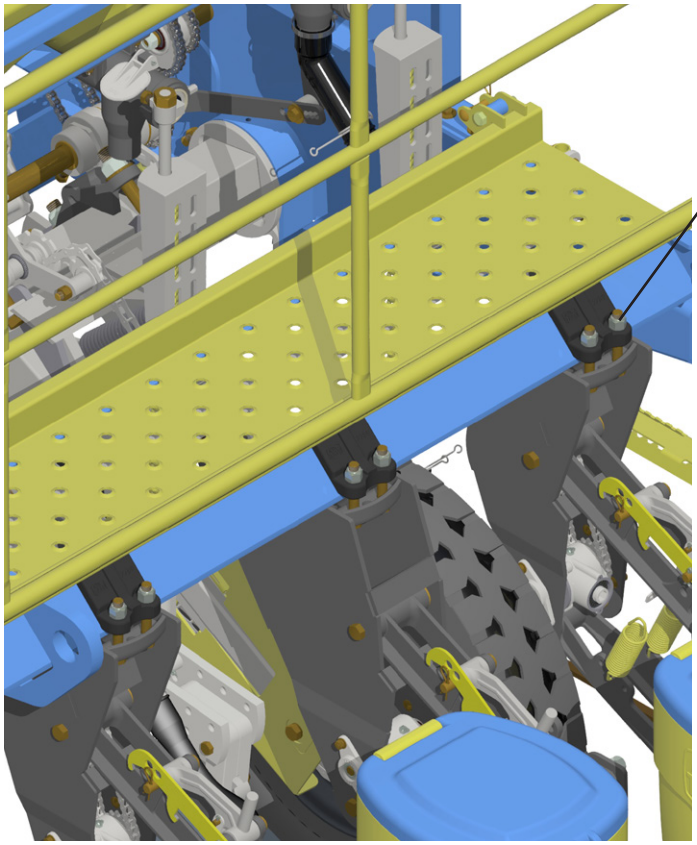
Procedures to change the spacing

3) Totally remove the hexagonal shaft (D).

4) Release the fertilizer hoses (E).







5) Release the nuts (F) to facilitate the movement of the rod support. Adjust as desired and retighten the nuts.

6) Remove or move away the row units in the lateral of the tires, allowing a greater working range.

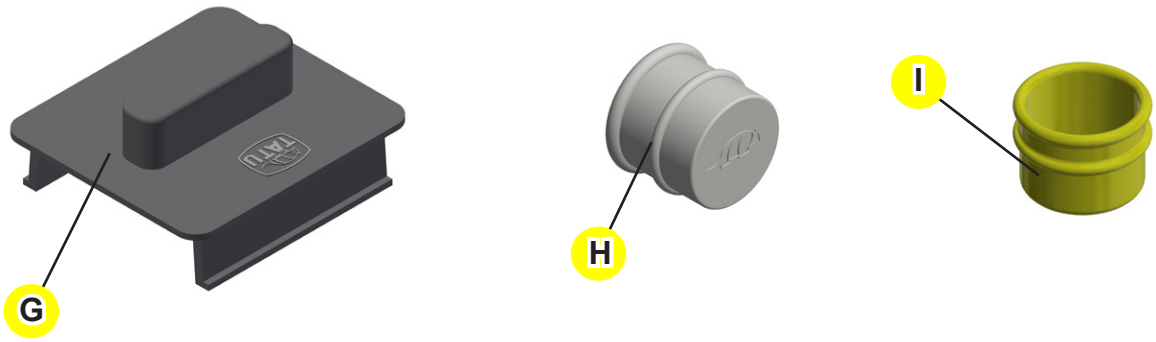
Displace all sets to the desired position, according to the chosen spacing. Assemble the hexagonal shaft and check if it is easy to turn. Fasten the bearings and tighteners and place the drawbar following the instructions on the 'Drawbar assembly' page, always keeping the spacing as great as possible.

Procedures to change the spacing

7) To close the fertilizer outlet place the chutes (G) over the augers that will not be used;

The air system interruption to the metering is done using the cap (H).

For the seed interruption, use the cap (I).



To work with some of the row units lifted, you must:

- Remove all the rear part of the row units;
- Remove the traction spring;
- Release the frontal part of the upper rocker arm;
- Lift the row unit and lock it using the upper rocker arm;
- Remove the fertilizer tube from the fertilizer row unit.

IMPORTANT

Retighten all sets, paying attention to the following points:

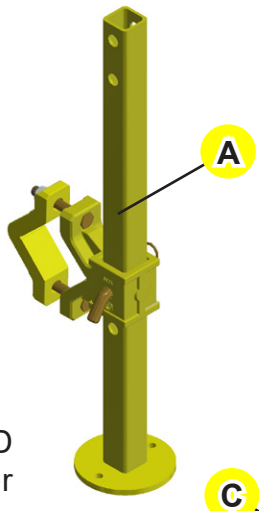
- **Retighten the nuts that fasten the seed rows on the frame gradually, avoiding to totally tighten each nut at a time.**
- **That information is also useful between a row unit and another. So, do not totally tighten a row unit at a time, but gradually.**
- **When switching between this nut tightening operation of a row unit and passing to another, it is necessary to spin the hexagonal axle to keep the proper alignment and avoid locking.**
- **The tightening of the bearings that fasten the hexagonal axle should be done in the end.**

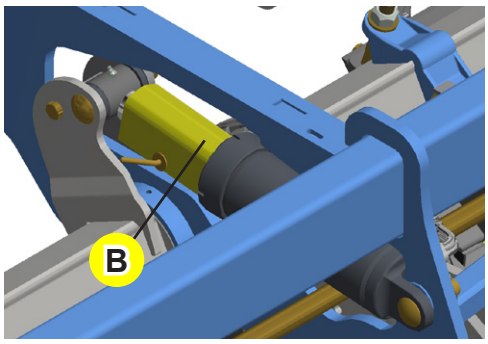
Setting the planter to transport position

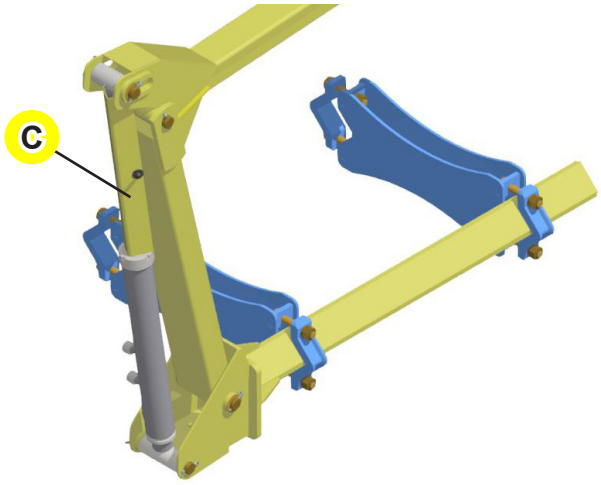
After hitching the planter, totally lift the row units by activating the hydraulic cylinder.

Lift the jacks (A), according to the illustration.

During transportation and maintenance, always use the safety locks (B) on the hydraulic cylinder rods of the wheelsets and the lock (C) from the hydraulic row markers.

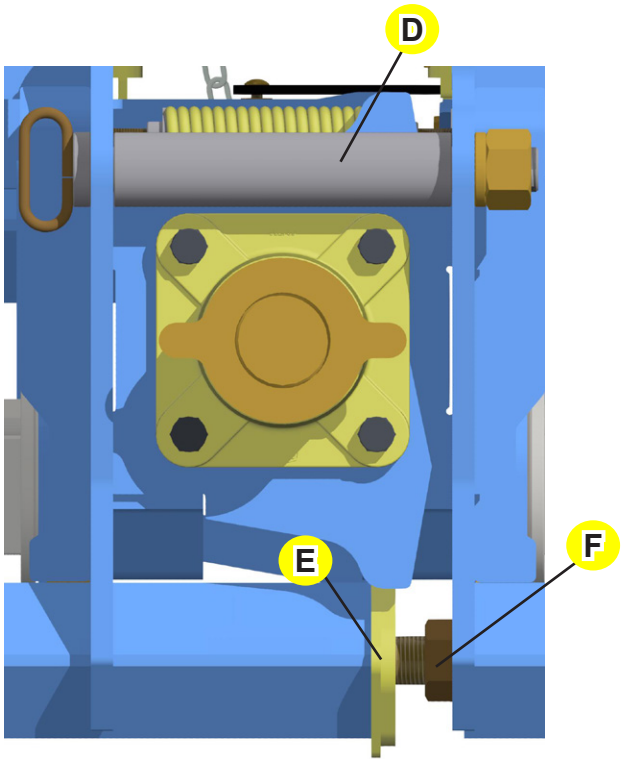




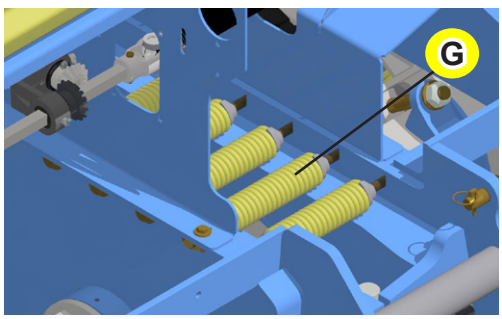


Always use the safety locks (D and E) to lift or transport the planter to avoid possible damages to the equipment.

Use the open end wrench (found inside the components box) to tighten the nut (F).



NOTE • **Use the compensation springs (G) if it is necessary to stabilize the sides of the planter, according to the type of soil.**



IMPORTANT

- **Only fill the planter in the working place.**
- **Never transport the planter with load excess.**

Planning the plantation - Slippage index

Consider that the amount of plants in the harvest is always smaller than the number of seeds distributed in the planting operation, due to the following factors: germination rate, physical purity, vigor (provided in the seed pack), plagues and diseases that may take place during the cultivation cycle. The strategy to minimize the loss of plants on the cultivation is to “compensate” the deposition of seeds on the furrow, considering the following methods.

During operation, the tires may slip frequently, due to the local conditions regarding the soil, weather, adjustment and set-up of the mechanized set (tractor-equipment) and others. Considering this, the main slippage factors are:

• Tractor fuel consumption increase;

• Efficiency loss;

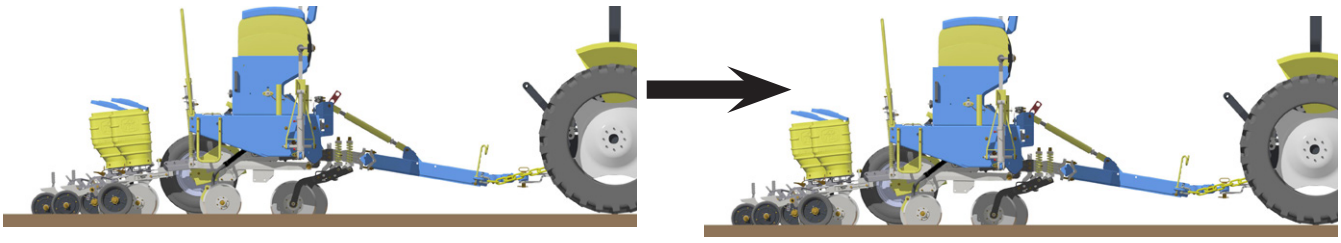
• Excessive and premature wear on the tires;

• Premature wear on the mechanical components of the equipment;

• If the metering mechanism is activated by the wheelsets, there may be a bad seed distribution per meter, leading to skips or doubles. A bad fertilizer distribution may also have negative results, leading to excess or lack of deposition.

To avoid these problems, it is recommended to calculate the slippage index to compensate the deposition of seeds per linear meter (as described on the following page), as well as to calibrate and to add liquid ballast to the tires.

This index is obtained by comparing the number of spins the tire will perform, being the planter with empty hoppers related to the equipment filled up. Being the planter empty and normally hitched to the tractor, set a starting point on the ground and on the tire. Move the planter until the tire complete 10 (ten) spins. Measure and write down the traveled distance.



Fill up the hopper, repeat the previous procedure and write down the traveled distance.

After that, insert the data on the formula below and check the slippage index of your equipment. This calculation is part of the dimension of the desired number of plants on the field, located on the next page.

Planning the plantation - Slippage index

Calculation:

$$\frac{\text{(Distance with load - Distance without load x 100)}}{\text{Distance without load}}$$

NOTE

- **The tires must have the same calibration.**
- **Fill up the equipment on the working place only.**
- **Do not transit with the equipment when there is a load excess.**

Calculation of seeds and number of plants per meter

To obtain an amount of 100,000 plants per hectare, whose seeds contain:

Germination index = 95%

Physical purity = 90%

Slippage index = 1.05 (5%)

It is necessary to use the formula below to determine the number of seeds to be used on 1 hectare, considering the losses that may happen due to the germination index, physical purity and slippage index of the equipment.

Seeds / ha on the plantation = 0.95 x 0.90 = 0.855

$\frac{100{,}000}{0.855}$ = 116,959.06 x 1.05 = **122,807.00 plants / hectare.**

Based on this and considering the seed compensation to reach the plants number estipulated beforehand (100,000 plants / ha), the new number of plants must be 122,807.00 plants / ha. Thus, to determine the **number of seeds per linear meter** that the equipment must deposit to reach this next number, define how many linear meters exist on 1 (one) hectare, according to the adopted spacing between row units (a spacing of 0.90 m was adopted on this example). After that, divide the value of the **new number of plants** by the obtained result.

$\frac{10{,}000}{0.90}$ = 11,111.11 linear meters.

$\frac{122{,}807.00}{11{,}111.11}$ = **11.05** seeds per linear meter.

This equipment must deposit **11.05** seeds per linear meter. To reach this result, it will be necessary to adjust the sprockets according to the technical table that can be found on the **'Seed distribution table'** page ('Adjustments and operations' section).

Ideal working speed

The equipment works with higher efficiency on a speed range of **5 to 7 Km/h**.

To transport the planter, the speed must not exceed **15 km/h**.

NOTE

- **When planting corn, operate on a speed range of 5 to 5.5 km/h.**
- **Keep a constant speed during the whole plantation.**

Seeds distribution

The amount and size of the holes/slots and the thickness of the seed plates can vary according to the grain size and the desired plant amount.

Adjust the seed rate per linear meter through the sprocket combinations of the Drive shaft **{A}** (14, 18, 22, 26, 30 and 38 teeth) and Driven shaft **{B}** (14,18, 22, 26, 30, 34 and 38 teeth).

ATTENTION

- **The procedure to change the sprockets to either the mechanical and pneumatic system is the same.**

Procedures to change the sprockets

Move the lever (C) to relieve the chain tightener and lock it using the pin.

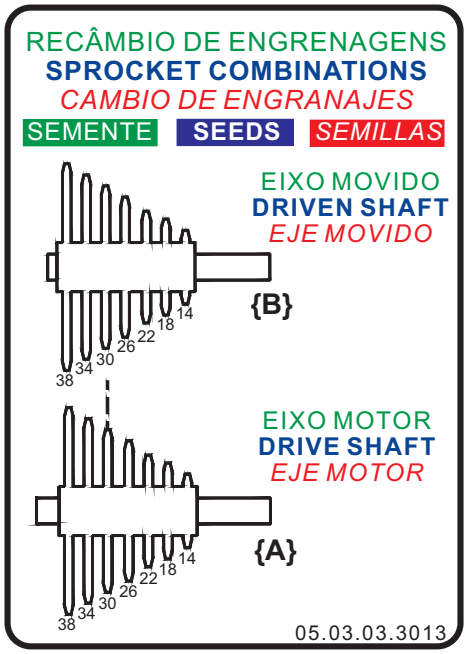
Manually displace the set of sprockets in the shaft and align the chosen sprocket with the chain.

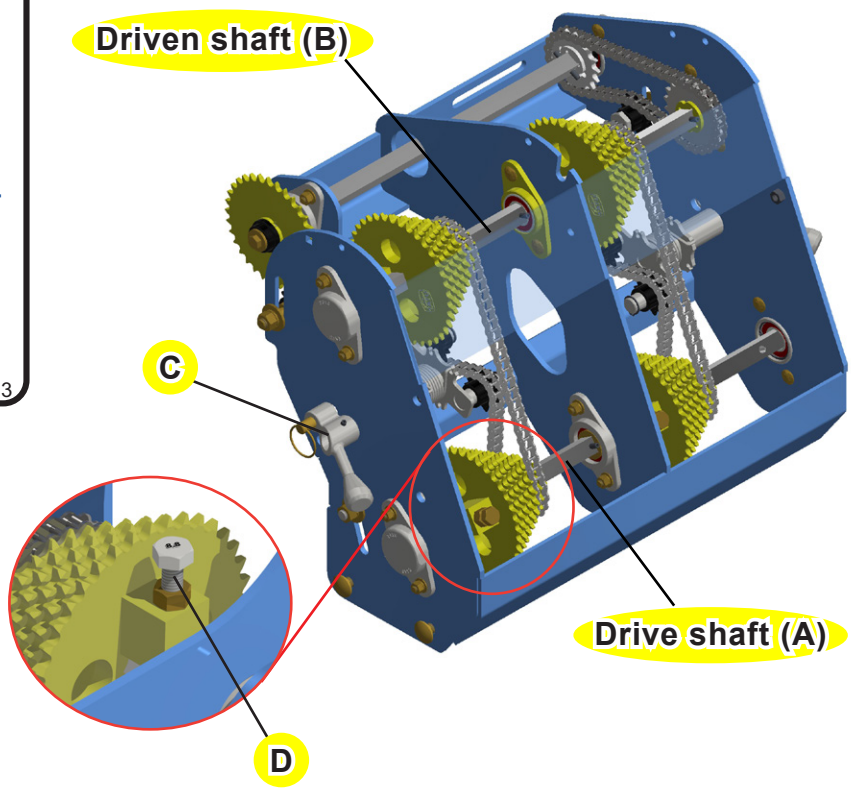
Release the lever to loose the lock pin.

NOTE

- **The cone bolts (D) on the sprocket handling "TRA" are pre-adjusted on the factory, allowing to change the sprockets without using any tool.**
- **In case of any sliding motion on the cone shaft, just release the counter nut and turn around the bolt to re-lock.**
- **In order to avoid damage to the spring and shafts, never apply excessive torque when tightening.**

Procedures to change the sprockets





IMPORTANT

- **The following page shows the different amount of fertilizer distributed for several crops, according to the sprocket combinations.**
- **The correct seed plate matching to the used seeds is very important.**
- **Never combine seeds of different sizes.**
- **The seed and fertilizer distribution tables in this manual must be used as a reference to start the planter adjustment. Factors such as the slippage index of the planter wheels (skidding), working speed, tire inflation, field conditions, seed type and others can make the values differ from the ones in the table. Therefore, it is always indispensable to check the 'Practical test for seeds and fertilizer distribution' page.**

Seed distribution table - 05.03.03.2997

TABELA DE DISTRIBUIÇÃO DE SEMENTES
TABLE FOR DISTRIBUTION OF SEEDS
TABLA DE DISTRIBUCIÓN DE SEMILLAS

Número de Furos / Rasgos **Number of Holes / Slots** *Número de Agujeros*		24	28	34	34	34	38	38	40	40	40	64	90	100
Qtde. Sementes por Furos/Rasgo **Quantity of Seeds per Hole/Slot** *Cantidad de semillas por Agujero*		1	1	1	2	5	2	3	1	2	3	1	1	1
Engrenagens/**Sprockets**/*Engranajes*		Sementes em 1 Metro* / **Seeds in 1 Meter*** / *Semillas en 1 Metro**												
Eixo Motor **Drive Shaft** *Eje Motor*	Eixo Movido **Driven Shaft** *Eje Movido*													
14	**38**	1,20	1,40	1,70	3,40	8,49	3,80	5,70	2,00	4,00	6,00	3,20	4,50	5,00
14	**34**	1,34	1,56	1,90	3,80	9,49	4,24	6,37	2,23	4,47	6,70	3,57	5,03	5,58
14	**30**	1,52	1,77	2,15	4,30	10,76	4,81	7,21	2,53	5,06	7,59	4,05	5,70	6,33
18	**38**	1,54	1,80	2,18	4,37	10,92	4,88	7,32	2,57	5,14	7,71	4,11	5,78	6,42
18	**34**	1,72	2,01	2,44	4,88	12,20	5,46	8,18	2,87	5,74	8,61	4,59	6,46	7,18
14	**26**	1,75	2,04	2,48	4,97	12,41	5,55	8,32	2,92	5,84	8,76	4,67	6,57	7,30
22	**38**	1,88	2,20	2,67	5,34	13,35	5,97	8,95	3,14	6,28	9,42	5,02	7,07	7,85
18	**30**	1,95	2,28	2,77	5,53	13,83	6,18	9,28	3,25	6,51	9,76	5,21	7,32	8,14
14	**22**	2,07	2,42	2,93	5,87	14,67	6,56	9,84	3,45	6,90	10,36	5,52	7,77	8,63
22	**34**	2,11	2,46	2,98	5,97	14,92	6,67	10,00	3,51	7,02	10,53	5,62	7,90	8,77
26	**38**	2,23	2,60	3,15	6,31	15,77	7,05	10,58	3,71	7,42	11,13	5,94	8,35	9,28
18	**26**	2,25	2,63	3,19	6,38	15,96	7,13	10,70	3,76	7,51	11,27	6,01	8,45	9,39
22	**30**	2,39	2,78	3,38	6,76	16,91	7,56	11,34	3,98	7,96	11,93	6,36	8,95	9,94
26	**34**	2,49	2,90	3,53	7,05	17,63	7,88	11,82	4,15	8,30	12,44	6,64	9,33	10,37
14	**18**	2,53	2,95	3,59	7,17	17,93	8,02	12,02	4,22	8,44	12,66	6,75	9,49	10,55
30	**38**	2,57	3,00	3,64	7,28	18,20	8,14	12,20	4,28	8,56	12,85	6,85	9,63	10,71
18	**22**	2,66	3,11	3,77	7,54	18,86	8,43	12,65	4,44	8,88	13,31	7,10	9,99	11,09
22	**26**	2,75	3,21	3,90	7,80	19,51	8,72	13,08	4,59	9,18	13,77	7,34	10,33	11,47
26	**30**	2,82	3,29	4,00	7,99	19,98	8,93	13,40	4,70	9,40	14,10	7,52	10,58	11,75
30	**34**	2,87	3,35	4,07	8,14	20,34	9,09	13,64	4,79	9,57	14,36	7,66	10,77	11,96
34	**38**	2,91	3,40	4,13	8,25	20,63	9,22	13,83	4,85	9,71	14,56	7,77	10,92	12,13
22	**22**	3,25	3,80	4,61	9,22	23,05	10,31	15,46	5,42	10,85	16,27	8,68	12,20	13,56
38	**34**	3,64	4,24	5,15	10,31	25,76	11,52	17,28	6,06	12,12	18,19	9,70	13,64	15,16
34	**30**	3,69	4,30	5,23	10,45	26,13	11,68	17,52	6,15	12,29	18,44	9,84	13,83	15,37
30	**26**	3,76	4,38	5,32	10,64	26,60	11,89	17,84	6,26	12,52	18,78	10,01	14,08	15,65
26	**22**	3,85	4,49	5,45	10,90	27,24	12,18	18,27	6,41	12,82	19,23	10,26	14,42	16,03
22	**18**	3,98	4,64	5,64	11,27	28,18	12,60	18,89	6,63	13,26	19,89	10,61	14,92	16,57
38	**30**	4,12	4,81	5,84	11,68	29,20	13,05	19,58	6,87	13,74	20,61	10,99	15,46	17,18
18	**14**	4,18	4,88	5,93	11,86	29,64	13,25	19,88	6,97	13,95	20,92	11,16	15,69	17,43
34	**26**	4,26	4,97	6,03	12,06	30,15	13,48	20,22	7,09	14,19	21,28	11,35	15,96	17,73
30	**22**	4,44	5,18	6,29	12,57	31,44	14,05	21,08	7,40	14,79	22,19	11,83	16,64	18,49
26	**18**	4,70	5,48	6,66	13,32	33,30	14,89	22,33	7,83	15,67	23,50	12,54	17,63	19,59
38	**26**	4,76	5,55	6,74	13,48	33,69	15,06	22,59	7,93	15,86	23,78	12,68	17,84	19,82
34	**22**	5,03	5,87	7,13	14,25	35,63	15,93	23,89	8,38	16,77	25,15	13,41	18,86	20,96
22	**14**	5,11	5,97	7,25	14,49	36,23	16,19	24,29	8,52	17,05	25,57	13,64	19,18	21,31
30	**18**	5,42	6,33	7,68	15,37	38,42	17,18	25,76	9,04	18,08	27,12	14,46	20,34	22,60
38	**22**	5,62	6,56	7,96	15,93	39,82	17,80	26,70	9,37	18,74	28,11	14,99	21,08	23,42
26	**14**	6,04	7,05	8,56	17,12	42,81	19,14	28,71	10,07	20,15	30,22	16,12	22,67	25,18
34	**18**	6,15	7,17	8,71	17,42	43,54	19,47	29,20	10,25	20,49	30,74	16,39	23,05	25,61
38	**18**	6,87	8,02	9,73	19,47	48,67	21,76	32,64	11,45	22,90	34,35	18,32	25,76	28,63
30	**14**	6,97	8,14	9,88	19,76	49,40	22,08	33,13	11,62	23,25	34,87	18,60	26,15	29,06
34	**14**	7,90	9,22	11,20	22,39	55,98	25,03	37,54	13,17	26,35	39,52	21,08	29,64	32,93
38	**14**	8,83	10,31	12,51	25,03	62,57	27,97	41,96	14,72	29,45	44,17	23,56	33,13	36,81

* Metro Linear / **Linear Meter** / *Metro Lineal*

0503032997

Precision Planting seed distribution table - 05.03.03.4249

TABELA DE DISTRIBUIÇÃO DE SEMENTES TABLE FOR DISTRIBUTION OF SEEDS TABLA DE DISTRIBUCIÓN DE SEMILLAS						
Número de Furos **Number of Holes** *Número de Agujeros*		27	32	56	70	80
Engrenagens / **Sprockets** / *Engranajes*		Sementes em 1 Metro Linear / **Seeds in 1 Linear Meter** / *Semillas en 1 Metro Lineal*				
Eixo Motor **Drive Shaft** *Eje Motor*	Eixo Movido **Driven Shaft** *Eje Movido*					
14	38	1,97	2,33	4,08	5,10	5,83
14	34	2,20	2,61	4,56	5,70	6,52
14	30	2,49	2,95	5,17	6,46	7,38
18	38	2,53	3,00	5,25	6,56	7,50
18	34	2,83	3,35	5,86	7,33	8,38
14	26	2,88	3,41	5,96	7,46	8,52
22	38	3,09	3,66	6,41	8,02	9,16
18	30	3,20	3,80	6,65	8,31	9,49
14	22	3,40	4,03	7,05	8,81	10,07
22	34	3,46	4,10	7,17	8,96	10,24
26	38	3,65	4,33	7,58	9,47	10,83
18	26	3,70	4,38	7,67	9,59	10,96
22	30	3,92	4,64	8,12	10,15	11,60
26	34	4,08	4,84	8,47	10,59	12,10
14	18	4,15	4,92	8,62	10,77	12,31
30	38	4,22	5,00	8,75	10,93	12,49
18	22	4,37	5,18	9,06	11,33	12,95
22	26	4,52	5,36	9,37	11,72	13,39
26	30	4,63	5,49	9,60	12,00	13,71
30	34	4,71	5,59	9,77	12,22	13,96
34	38	4,78	5,66	9,91	12,39	14,16
22	22	5,34	6,33	11,08	13,85	15,82
38	34	5,97	7,07	12,38	15,48	17,69
34	30	6,05	7,17	12,55	15,69	17,93
30	26	6,16	7,30	12,78	15,98	18,26
26	22	6,31	7,48	13,09	16,36	18,70
22	18	6,53	7,74	13,54	16,92	19,34
38	30	6,77	8,02	14,03	17,54	20,04
18	14	6,87	8,14	14,24	17,80	20,35
34	26	6,98	8,28	14,49	18,11	20,69
30	22	7,28	8,63	15,11	18,88	21,58
26	18	7,71	9,14	16,00	20,00	22,86
38	26	7,81	9,25	16,19	20,24	23,13
34	22	8,25	9,78	17,12	21,40	24,46
22	14	8,39	9,95	17,41	21,76	24,87
30	18	8,90	10,55	18,46	23,08	26,37
38	22	9,23	10,93	19,13	23,92	27,33
26	14	9,92	11,76	20,57	25,72	29,39
34	18	10,09	11,96	20,92	26,15	29,89
38	18	11,28	13,36	23,39	29,23	33,41
30	14	11,44	13,56	23,74	29,67	33,91
34	14	12,97	15,37	26,90	33,63	38,43
38	14	14,50	17,18	30,07	37,58	42,95

Sistema PRECISION PLANTING

05.03.03.4249 - Revisão 01 - 1118

Calculation of seeds/meter for the different number of holes on the plates

Calculation of seeds/meter according to the different number of holes in the seed plates.

When using a seed plate that has a number of holes that is not included in the table, it is possible to find the amount of seeds/meter it will distribute by doing the calculation below:

Example:

It is desired to use a seed plate with **20 holes**, on a **26 x 38** combination.

The tables from the previous pages do not have a seed plate with **20 holes**. The amount of holes that is closer to that number is **24 holes** (mechanical) or **27 holes** (pneumatic). For the **26 x 38** combination, the amount of seeds per meter is **2.23** (mechanical or pneumatic), according to the table.

For the example, use the mechanical seed distribution table (**05.03.03.2997**).

Data:

Amount of seeds per meter (Table) = **2.23**.

Number of holes on the new seed plate: **20** (Not in the table).

Number of holes on the seed distribution table to use as reference: **24**.

Multiply the amount of seeds per meter **(2.23)** by the number of holes on the new desired seed plate **(20)**. Divide the value by the number of holes used as reference **(24)**.

Calculation:

$$\frac{2.23 \times 20}{24} = \frac{44.6}{24} = \textbf{1.86 seeds per linear meter.}$$

Answer:

1.86 seeds per meter will be distributed using a plate with **20 holes**, on a 26 x 38 combination.

NOTE

- **Use the same method for every table to calculate the amount of seeds/meter, being it mechanical or pneumatic.**

Fertilizer distribution

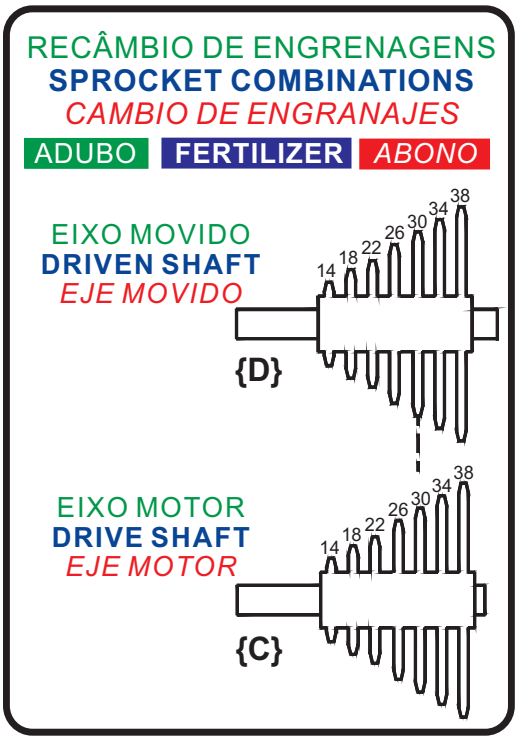
The fertilizer distribution is made through the augers and the different rates are adjusted by the sprocket combinations of the Drive shaft {C} (14, 18, 22, 26, 30, 34 and 38 teeth) and Driven shaft {D} (14, 18, 22, 26, 30, 34 and 38 teeth).

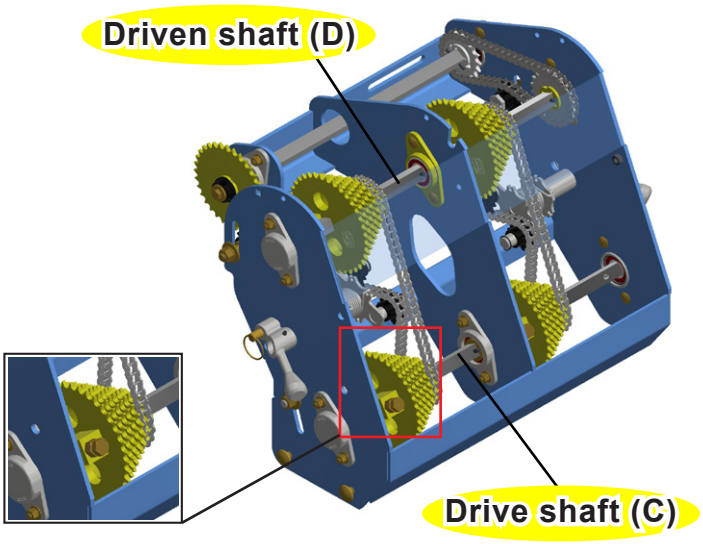
Procedures to change the sprockets

Move the lever to relieve the chain tightener and lock it using a pin.

Manually displace the set of sprockets in the shaft and align the chosen sprocket with the chain.

Release the lever to loose the lock pin.





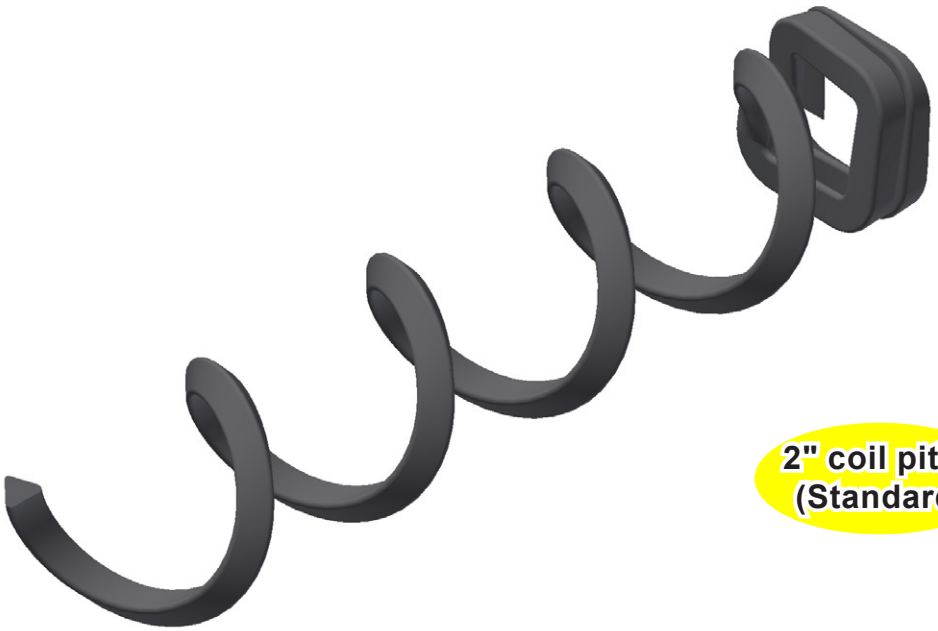
NOTE

- **The cone bolts on the sprockets handling "TRA" are pre-adjusted on the factory, allowing to change the sprockets without using any tool.**
- **In case of any sliding motion on the cone shaft, just release the counter nut and turn around the bolt to re-lock.**
- **In order to avoid damage to the spring and shafts, never apply excessive torque when tightening.**

IMPORTANT

- **See the different amounts of fertilizer distributed for several spacings, according to the sprocket combinations.**
- **The seed and fertilizer distribution tables of this manual must be used as a reference to start the planter adjustment. Factors such as the slippage index of the planter wheels (skidding), working speed, tire inflation, field conditions, seed type and others can make the values differ from the ones in the table. Therefore, it is always indispensable to make the practical distribution tests, as indicated on the 'Practical test for seeds and fertilizer distribution' page.**

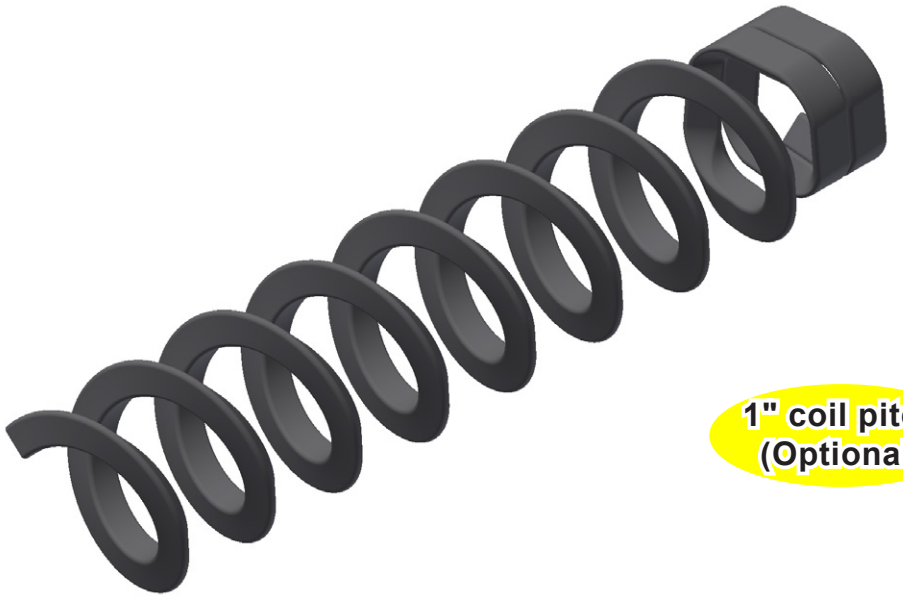
Helical coil



2" coil pitch
(Standard)

ATTENTION

- **The table {A} on the following page shows the obtained amount with the 2" coil pitch auger (standard). This auger transports approximately 35 grams of granulated commercial fertilizer per turn.**



1" coil pitch
(Optional)

ATTENTION

- **The table {B} on the following page shows the obtained amount with the 1" coil pitch augers (optional). This auger transports approximately 17 grams of granulated commercial fertilizer per turn.**

DISTRIBUTION TABLE OF GRANULATED COMMERCIAL FERTILIZER - Amount in kg/ha (Kilograms per hectare) - Augers of 2" (50,8 mm) coil pitch - STANDARD

SPROCKETS Drive shaft (C) Driven shaft (D)		14x38	14x34	14x30	18x38	18x34	14x26	22x38	18x30	14x22	22x34	26x38	18x26	22x30	26x34	14x18	30x38	18x22	22x26	26x30	30x34	34x38	22x22	38x34	34x30	30x26	26x22	22x18	38x30	18x14	34x26	30x22	26x18	38x26	34x22	22x14	30x18	38x22	26x14	34x18	38x18	30x14	34x14	38x14
Grams in 50 m Per row		***307***	***343***	***389***	***395***	***441***	***449***	***483***	***500***	***530***	***539***	***570***	***577***	***611***	***637***	***648***	***658***	***682***	***705***	***722***	***735***	***746***	***834***	***932***	***945***	***962***	***985***	***1019***	***1056***	***1072***	***1090***	***1137***	***1204***	***1218***	***1288***	***1310***	***1389***	***1440***	***1548***	***1575***	***1760***	***1786***	***2024***	***2263***
ROW SPACINGS (mm)	**400**	154	172	194	197	221	224	241	250	265	270	285	289	306	319	324	329	341	353	361	368	373	417	466	472	481	493	509	528	536	545	568	602	609	644	655	695	720	774	787	880	893	1012	1131
	450	136	153	173	175	196	199	214	222	236	240	253	256	272	283	288	292	303	313	321	327	331	370	414	420	427	438	453	469	476	484	505	535	541	573	582	617	640	688	700	782	794	900	1006
	500	123	137	156	158	177	180	193	200	212	216	228	231	245	255	259	263	273	282	289	294	298	333	373	378	385	394	408	422	429	436	455	482	487	515	524	556	576	619	630	704	714	810	905
	550	112	125	141	144	160	163	175	182	193	196	207	210	222	232	236	239	248	256	263	267	271	303	339	344	350	358	370	384	390	396	413	438	443	468	476	505	524	563	573	640	650	736	823
	600	102	114	130	132	147	150	161	167	177	180	190	192	204	212	216	219	227	235	241	245	249	278	311	315	321	328	340	352	357	363	379	401	406	429	437	463	480	516	525	587	595	675	754
	650	94	106	120	121	136	138	148	154	163	166	175	178	188	196	199	202	210	217	222	226	229	256	287	291	296	303	313	325	330	335	350	370	375	396	403	427	443	476	484	541	550	623	696
	700	88	98	111	113	126	128	138	143	152	154	163	165	175	182	185	188	195	202	206	210	213	238	266	270	275	281	291	302	306	311	325	344	348	368	374	397	411	442	450	503	510	578	646
	750	82	92	104	105	118	120	129	133	141	144	152	154	163	170	173	175	182	188	193	196	199	222	248	252	256	263	272	282	286	291	303	321	325	344	349	370	384	413	420	469	476	540	603
	800	77	86	97	99	110	112	121	125	133	135	143	144	153	159	162	165	171	176	181	184	186	208	233	236	240	246	255	264	268	273	284	301	305	322	327	347	360	387	394	440	447	506	566
	850	72	81	92	93	104	106	114	118	125	127	134	136	144	150	153	155	160	166	170	173	175	196	219	222	226	232	240	248	252	256	267	283	287	303	308	327	339	364	370	414	420	476	532
	900	68	76	86	88	98	100	107	111	118	120	127	128	136	142	144	146	152	157	161	163	166	185	207	210	214	219	226	235	238	242	253	268	271	286	291	309	320	344	350	391	397	450	503
	950	65	72	82	83	93	94	102	105	112	114	120	121	129	134	136	139	144	148	152	155	157	175	196	199	202	207	214	222	226	229	239	253	256	271	276	292	303	326	331	370	376	426	476

NOTE: WE RECOMMEND TO MAKE A PRACTICAL TEST OF FERTILIZER DISTRIBUTION ALONG 50 LINEAR METERS AND COMPARE WITH THE 3RD LINE OF THIS TABLE **(Grams in 50 meters).**
THE TEST SHOULD BE MADE IN THE OWN FIELD WHERE THE PLANTATION WILL TAKE PLACE AND IN NORMAL WORKING SPEED. HECTARE = 10.000 m² AVERAGE SPEED - 06 Km/h

05.03.03.1912

DISTRIBUTION TABLE OF GRANULATED COMMERCIAL FERTILIZER - Amount in kg/ha (Kilograms per hectare) - Augers of 1" (25,4 mm) coil pitch - OPTIONAL

SPROCKETS Drive shaft (C) Driven shaft (D)		14x38	14x34	14x30	18x38	18x34	14x26	22x38	18x30	14x22	22x34	26x38	18x26	22x30	26x34	14x18	30x38	18x22	22x26	26x30	30x34	34x38	22x22	38x34	34x30	30x26	26x22	22x18	38x30	18x14	34x26	30x22	26x18	38x26	34x22	22x14	30x18	38x22	26x14	34x18	38x18	30x14	34x14	38x14
Grams in 50 m Per row		***149***	***167***	***189***	***192***	***214***	***218***	***234***	***243***	***258***	***262***	***277***	***280***	***297***	***310***	***315***	***320***	***331***	***343***	***351***	***357***	***362***	***405***	***453***	***459***	***467***	***478***	***495***	***513***	***521***	***529***	***552***	***585***	***592***	***626***	***636***	***675***	***699***	***752***	***765***	***855***	***868***	***983***	***1099***
ROW SPACINGS (mm)	**400**	75	83	94	96	107	109	117	121	129	131	139	140	148	155	157	160	166	171	175	179	181	202	226	229	234	239	247	256	260	265	276	292	296	313	318	337	350	376	382	427	434	492	549
	450	66	74	84	85	95	97	104	108	115	116	123	125	132	138	140	142	147	152	156	159	161	180	201	204	208	213	220	228	231	235	245	260	263	278	283	300	311	334	340	380	386	437	488
	500	60	67	76	77	86	87	94	97	103	105	111	112	119	124	126	128	133	137	140	143	145	162	181	184	187	191	198	205	208	212	221	234	237	250	254	270	280	301	306	342	347	393	440
	550	54	61	69	70	78	79	85	88	94	95	101	102	108	113	115	116	120	125	128	130	132	147	165	167	170	174	180	186	189	193	201	213	215	228	231	245	254	273	278	311	315	358	400
	600	50	56	63	64	71	73	78	81	86	87	92	93	99	103	105	107	110	114	117	119	121	135	151	153	156	159	165	171	174	176	184	195	197	209	212	225	233	251	255	285	289	328	366
	650	46	51	58	59	66	67	72	75	79	81	85	86	91	95	97	98	102	105	108	110	111	125	139	141	144	147	152	158	160	163	170	180	182	193	196	208	215	231	235	263	267	303	338
	700	43	48	54	55	61	62	67	69	74	75	79	80	85	88	90	91	95	98	100	102	104	116	129	131	133	137	141	147	149	151	158	167	169	179	182	193	200	215	219	244	248	281	314
	750	40	44	50	51	57	58	63	65	69	70	74	75	79	83	84	85	88	91	94	95	97	108	121	122	125	128	132	137	139	141	147	156	158	167	170	180	186	201	204	228	231	262	293
	800	37	42	47	48	54	55	59	61	64	65	69	70	74	77	79	80	83	86	88	89	91	101	113	115	117	120	124	128	130	132	138	146	148	156	159	169	175	188	191	214	217	246	275
	850	35	39	44	45	50	51	55	57	61	62	65	66	70	73	74	75	78	81	83	84	85	95	106	108	110	113	116	121	122	125	130	138	139	147	150	159	165	177	180	201	204	231	259
	900	33	37	42	43	48	48	52	54	57	58	62	62	66	69	70	71	74	76	78	79	81	90	101	102	104	106	110	114	116	118	123	130	131	139	141	150	155	167	170	190	193	219	244
	950	31	35	40	40	45	46	49	51	54	55	58	59	63	65	66	67	70	72	74	75	76	85	95	97	98	101	104	108	110	111	116	123	125	132	134	142	147	158	161	180	183	207	231

NOTE: WE RECOMMEND TO MAKE A PRACTICAL TEST OF FERTILIZER DISTRIBUTION ALONG 50 LINEAR METERS AND COMPARE WITH THE 3RD LINE OF THIS TABLE **(Grams in 50 meters).**
THE TEST SHOULD BE MADE IN THE OWN FIELD WHERE THE PLANTATION WILL TAKE PLACE AND IN NORMAL WORKING SPEED. HECTARE = 10.000 m AVERAGE SPEED - 06 Km/h

05.03.03.1911

IMPORTANT

• The data on the previous tables (seed and fertilizer) can vary due to several factors. Therefore, carefully observe the following procedures:

Practical test for seeds and fertilizer distribution

The most indicated way to assess the amount of seed and fertilizer rate is performing the test on the same field the plantation will take place, following these steps:

• Whenever possible, use the same tractor and operator to perform the plantation;

• The correct inflation of the planter tires is important to maintain uniformity in the plantation. Keep the same pressure on all tires;

• Mark the distance for the test. Fertilizer table example: **50 linear meters**;

• Fill up the planter hoppers at least to the half and then travel some meters to completely fill the meterings before entering in the delimited area;

• Place the collection bags in the fertilizer dispensers (preferably use plastic bags). In the seed dispensers, use cotton waste to hinder the exits;

• Drive the tractor in the delimited space, using the same speed that will be used in the whole plantation.

• Recommended speeds:

5 to 5.5 km/h for corn and sunflower plantation;

6 to 6.5 km/h for bean/sorghum/acid delinted cotton plantation;

7 km/h for soybean plantation;

• Weigh the fertilizer contained in the bags and compare it to the second line of the previous tables (grams in 50 meters per row unit);

• Remove the cotton waste of the seed dispensers, picking up the seeds for counting;

• Compare with the table and, if necessary, redo the tests changing the adjustments;

• After getting the desired amount and still in the field, move the tractor in the same speed, leaving the fertilizer and seed to reach the soil for better verifying the distribution uniformity.

ATTENTION

• The working speed affects the uniform seed distribution.

• When there is a change in the batch of seeds as well as in the fertilizer manufacturer, everything must be assessed again.

• It is important to assess all adjustments again after the first day of work.

Auxiliary calculation for fertilizer distribution

To distribute other amounts of fertilizer in different spacings and areas from those presented in the tables we suggest a quick calculation, where all used data can be changed to one of your own interest. Use the formula below, which contains the following elements:

A = Area to be fertilized (m^2).

B = Spacing between rows of the crop (m).

C = Amount of fertilizer to be distributed in the area (Kg).

D = Distance to travel for the distribution test (m).

X = How many grams should be dropped in "d"?

Formula:

$$X = \frac{B \times C \times D}{A}$$

Example:

A = 10,000 m^2

B = 0.90 m

C = 250 kg

D = 50 m

X = ?

$$X = \frac{0.90 \times 250 \times 50}{10{,}000}$$

$$X = \frac{11{,}250}{10{,}000}$$

X = 1.125 kg or

X = 1,125 grams in 50 meters in each row unit.

Adjust the equipment to distribute the found amount or the best approximation in the delimited space for the test.

Oscillating disc blades (no-till)

These disc blades have lateral oscillation movements to follow the curves on the terrain.

Do not perform sharp turns during working, as this act may cause damages to the row components.

Horizontal and vertical movements with the self-lubricating bushings.

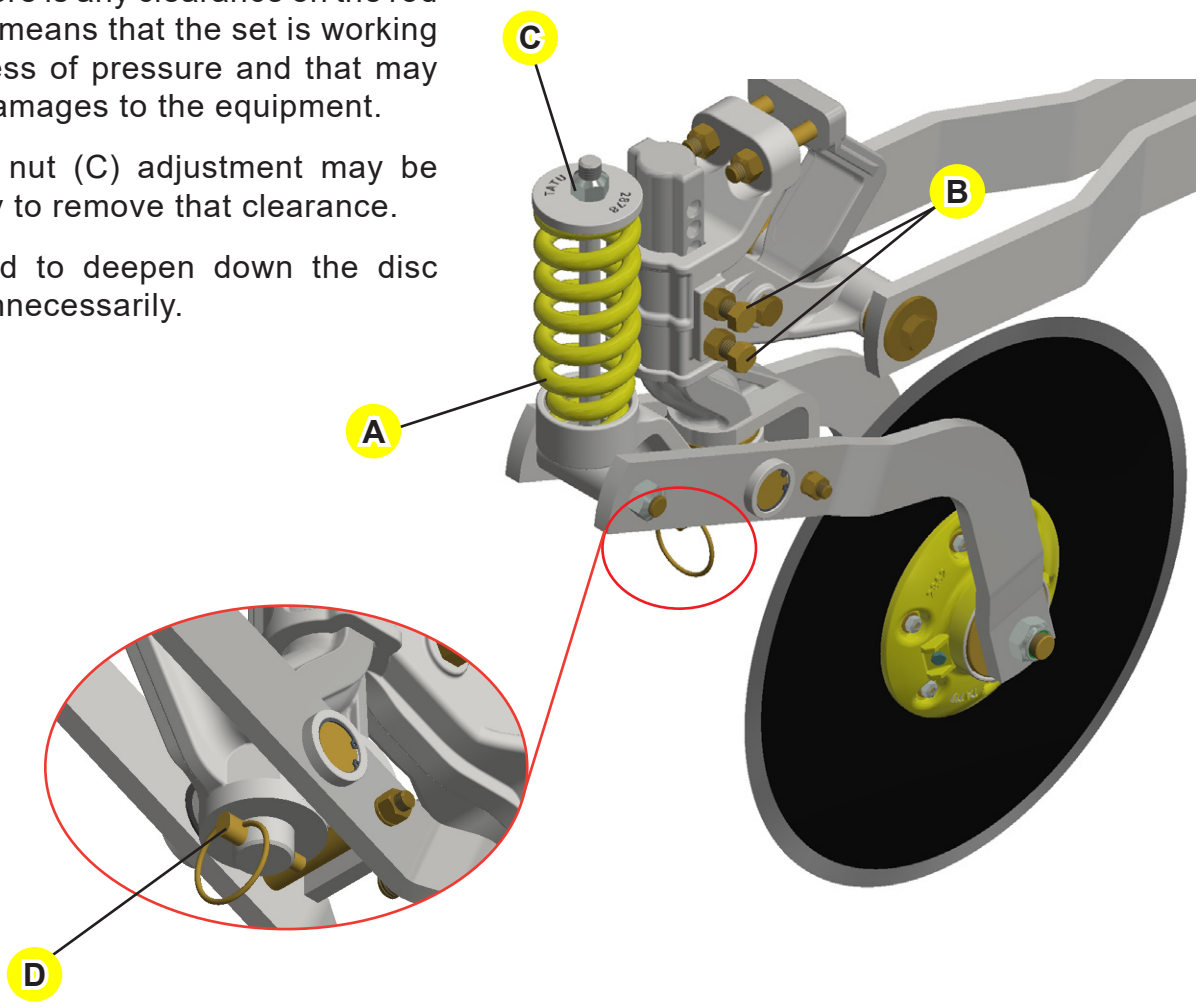
The vertical oscillation (or flotation) of the disc blades is provided by the spring (A), which allows the necessary articulation to follow the soil profile and to transpose obstacles.

The disc blades has a height adjustment and it should be used to increase or decrease the cutting depth through the bolt (B).

If there is any clearance on the rod spring, it means that the set is working with excess of pressure and that may lead to damages to the equipment.

The nut (C) adjustment may be used only to remove that clearance.

Avoid to deepen down the disc blades unnecessarily.



ATTENTION

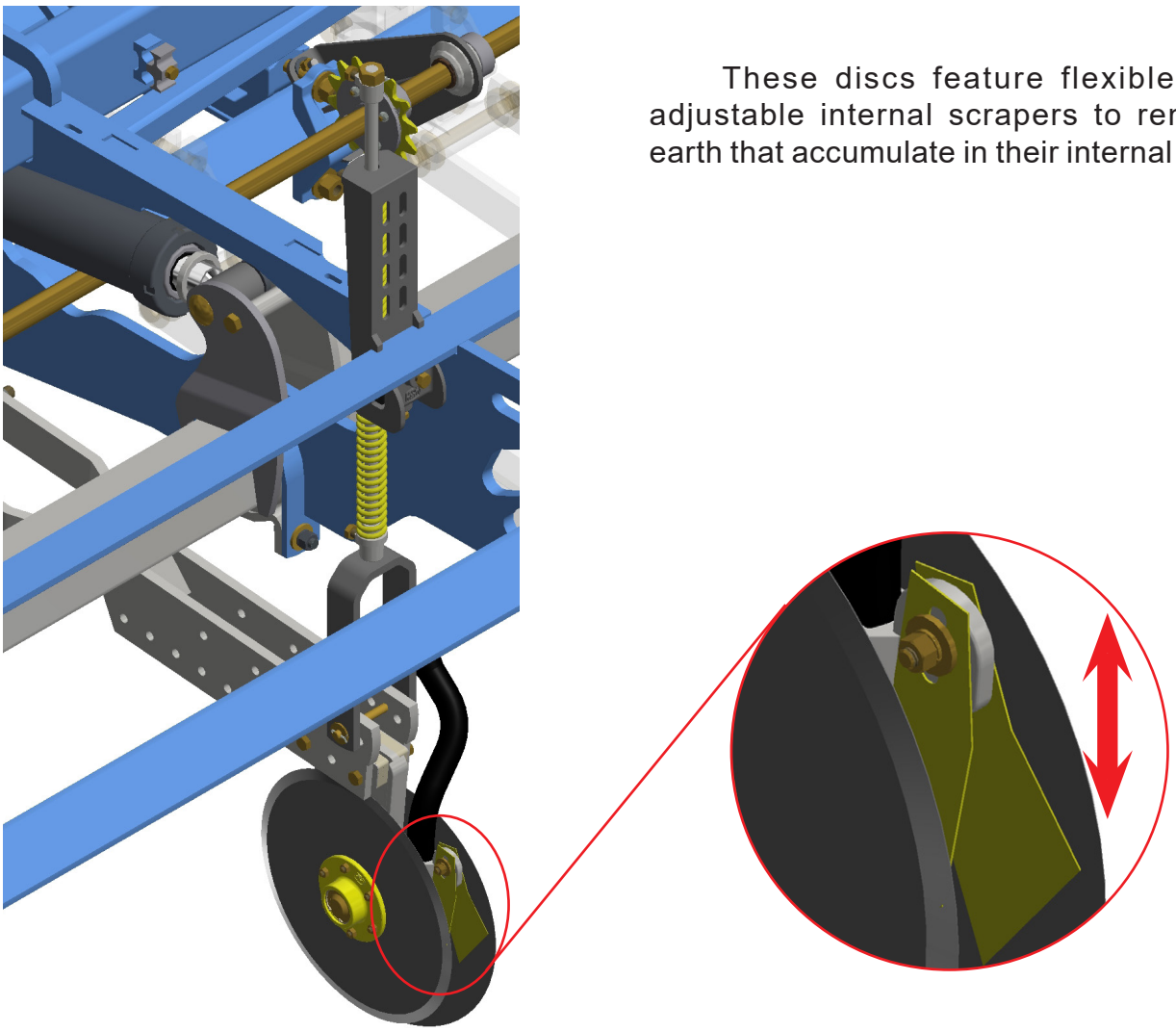
- **The spring pressure (A) must be as minimal as possible so that it will not suffer any deformation and lose the pressure on the disc blade, thus leading to damages to the equipment.**
- **Assemble the lock pin (D) as shown on the illustration, otherwise it will unlock when facing any obstacle, meaning that the pin (D) will get loose and the disc axle will fall off.**

Furrow opening and fertilizer position on the soil

Fertilization on the same row and below the seed (either to the no-till and conventional system).

The furrow opening for the fertilizer placement can be made by the unaligned double discs or scarifier spindle.

Unaligned double discs



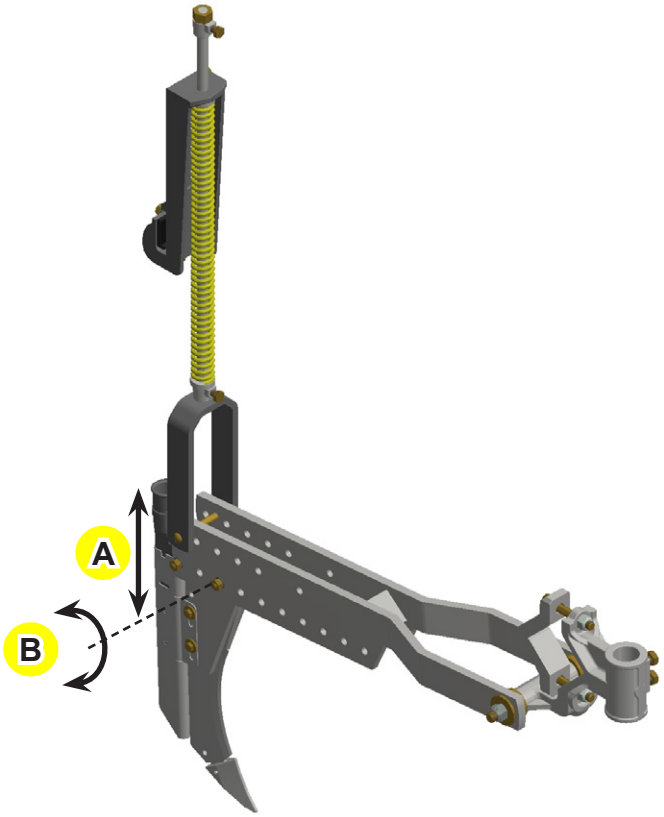
These discs feature flexible and adjustable internal scrapers to remove earth that accumulate in their internal side.

Scarifier shank

The scarifier spindles feature height adjustment (A) in the fertilizer dispensers, regardless of the rods, allowing the placement of the product in different depths, regardless of the rods working depth.

The working angle (B) of the rods can also be adjusted according to the soil hardness. For hard soils, use the superior hole of the scarifier, leaving it in a vertical position.

Do not make sharp turns during working. This act can cause damage to the row components.

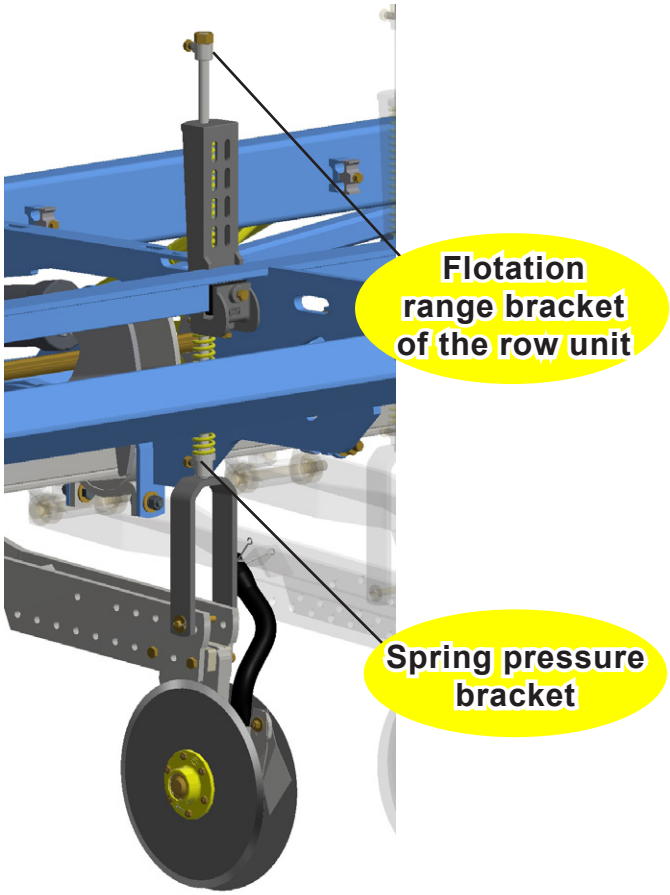


NOTE

- **Assemble the scarifier spindles as unaligned as possible between the long and short row units.**

Fertilizer depth and flotation range of the row units

The brackets on the lower part of the rod adjust the depth, according to the alteration in the working pressure of the springs. The flotation range of the row units is fitting by the adjustment established by the rod.

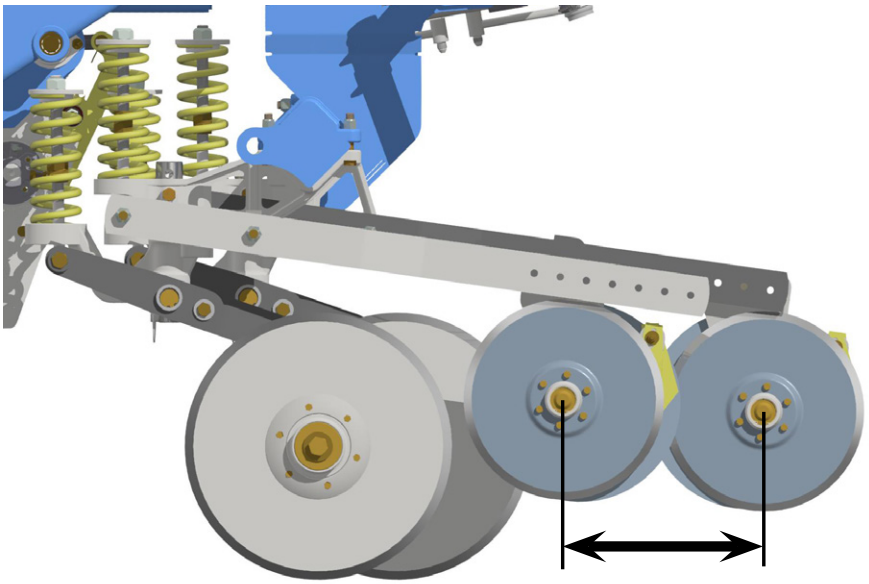


NOTE

- **The fertilizer position related to the seed should be carefully observed. The ideal is to deposit the fertilizer twice as much of the seed depth.**

Fertilizer unaligned double discs adjustment

The more distance between the unaligned double discs, the greater will be the straw flow.



Opening the seed furrows

The furrows for seeds are opened through unaligned double discs; which possess flexible and adjustable scrapers in order to remove earth that accumulate in their internal parts.

The seed rows feature adjustments to control the working pressure over the soil:

Holes in the upper bar of the parallelogram.

"1" - Greater pressure.

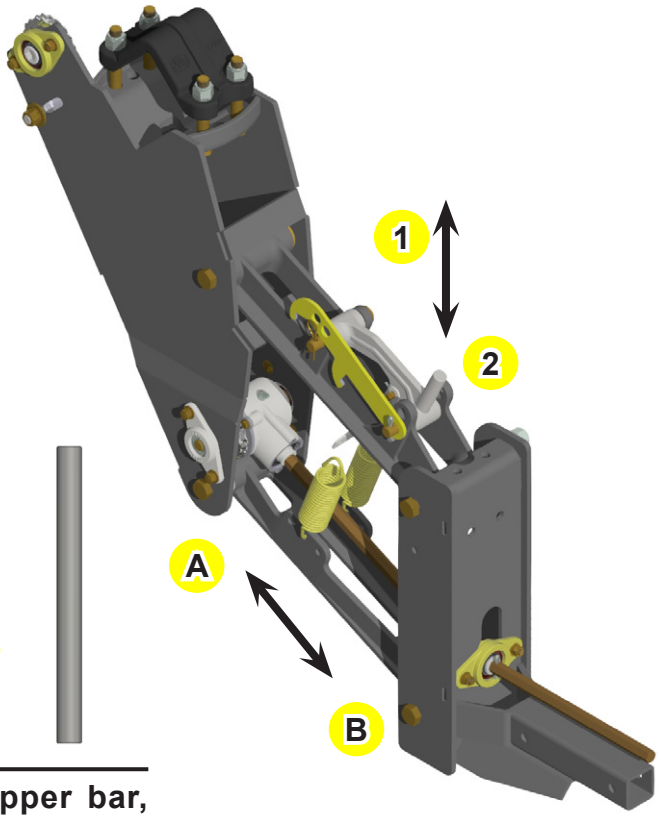
"2" - Smaller pressure.

Holes in the lower bar of the parallelogram.

"A" - Greater pressure.

"B" - Smaller pressure.

Set the same adjustment for every row unit.

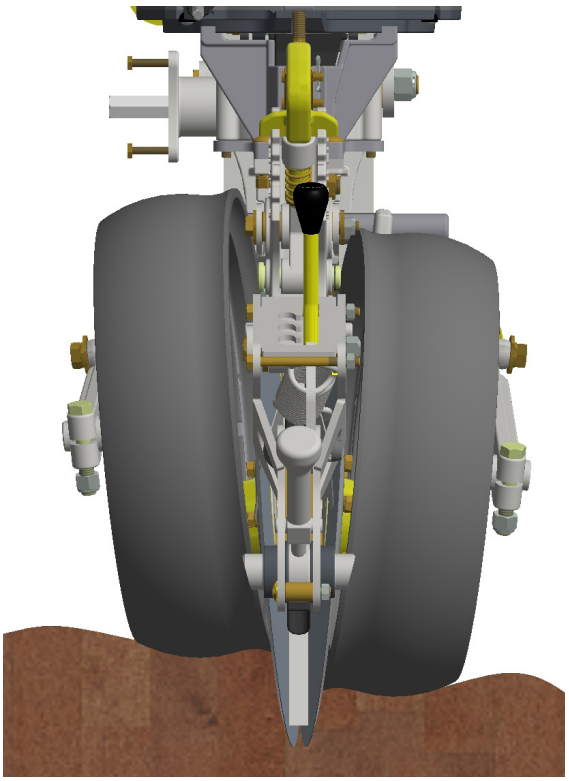


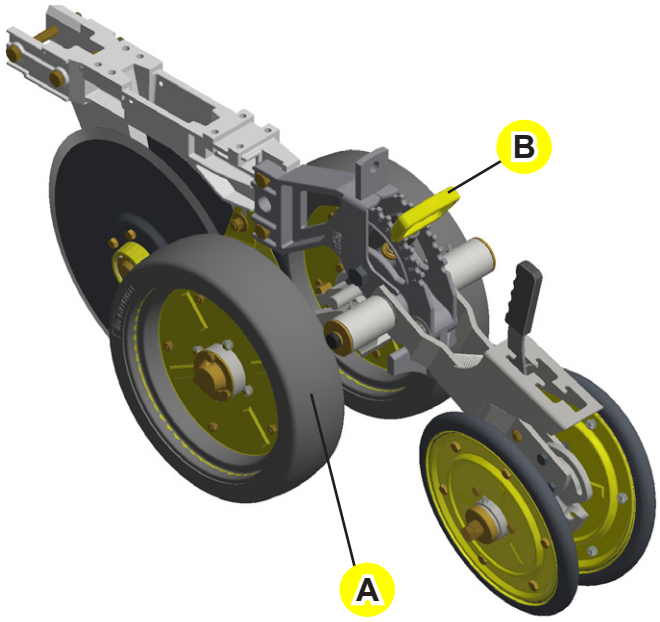
NOTE

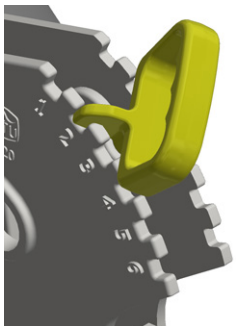
- **To adjust the pressure on the upper bar, use the adjustment lever that can be found inside the components box.**

Seed depth and floating range of the row units

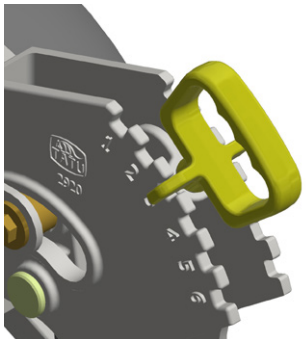
The seed depth control is made individually through the gauge wheels (A), which possess adjustments through the handler (B). The graduation allows to adjust the seed depth in intervals of **0.5 cm** or **1 cm**.







0.5 cm



1 cm

NOTE • **The gauge wheels have independent lateral and vertical oscillation to follow the soil unevenness.**

Gauge wheels adjustment

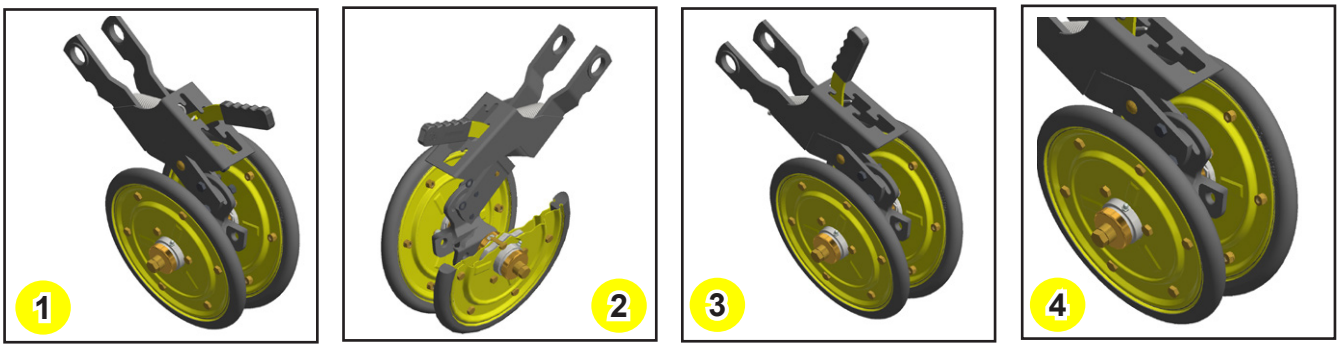
The "V" gauge wheels press the soil laterally and can work in several positions, according to the type of soil and straw condition.

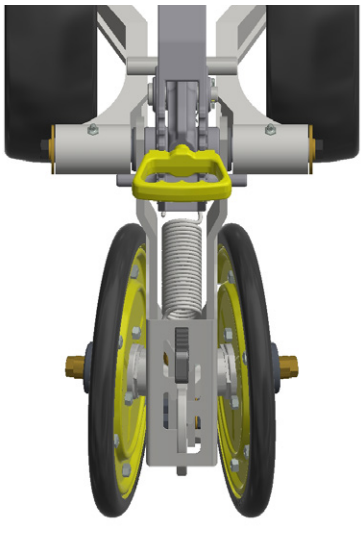
1) Adjust the articulation and compaction pressure properly through the lever that allows the operation in four positions or one free position.

2) Adjust the angle between the tires (vertex) through the bolt and slot.

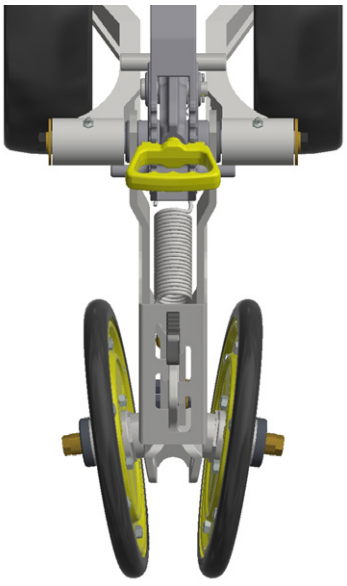
3) Do the discrepancy between the compactors through the bolts that fasten the tires.

4) Increase or decrease the lateral distance between the compaction tires through the spacers that can be passed to the inner part of the axle.





Use a smaller opening angle to throw less earth over the seed.

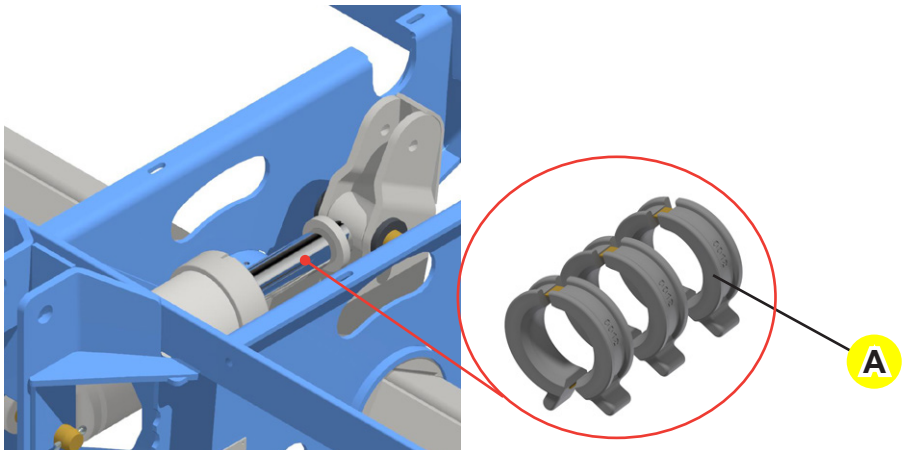


Use a greater opening angle to throw more earth over the seed.

NOTE • **While adjusting the press wheels it is important to consider the soil type, seed type and depth of planting to not affect the plants emergence.**

Auxiliary depth control

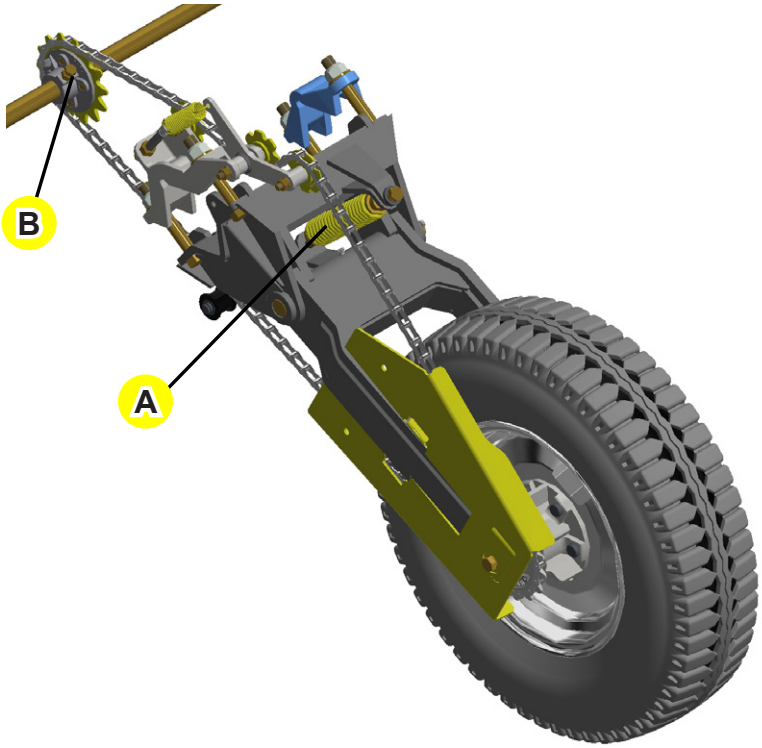
In light and loose soils (sandy), it may be necessary to use the depth stops (A) on the cylinder rod to help on the depth control.



Wheelset springs adjustment

The wheelsets have free articulation to follow the soil profile. The wheelset pressure over the soil can be adjusted through the springs (A). Every wheelset must have the same adjustment.

The sprocket (B) must always be assembled as shown on the illustration.

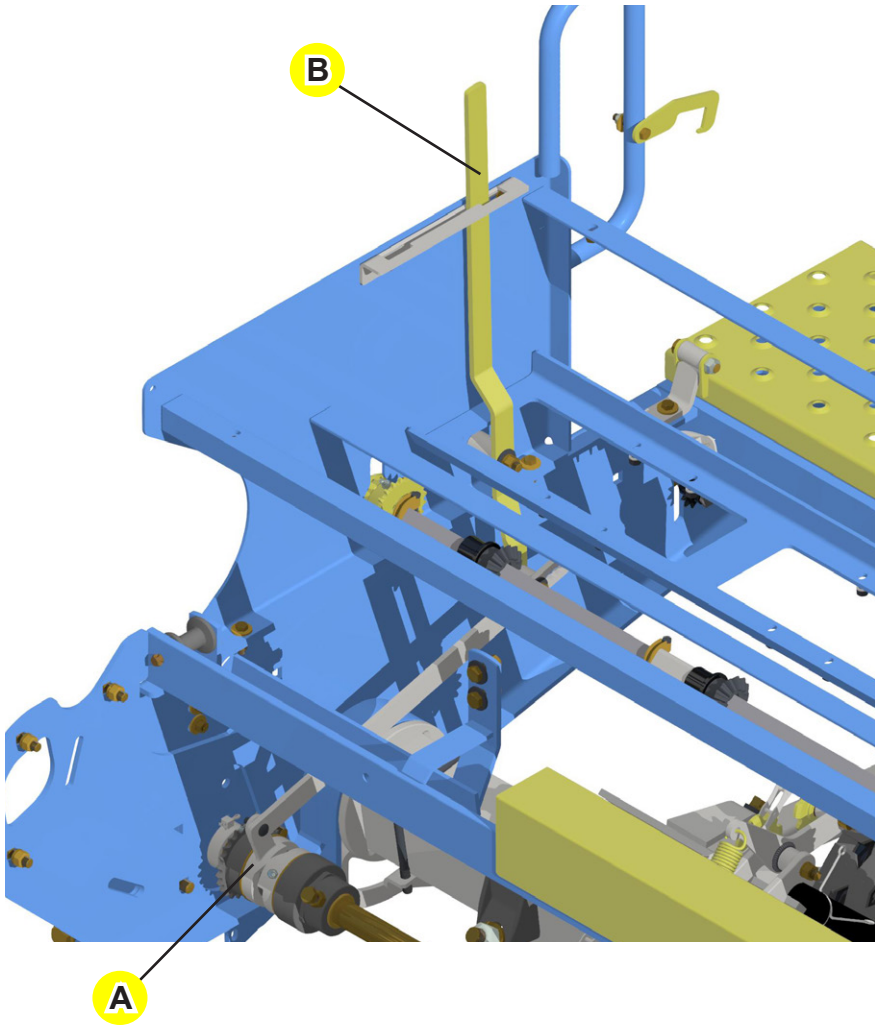


NOTE

- **Always use the same inflation in the tires.**
- **Always use tires that have the same design and width to start planting.**
- **If necessary, put 3/4 of water in the tires and keep the same inflation.**

Finishing instructions

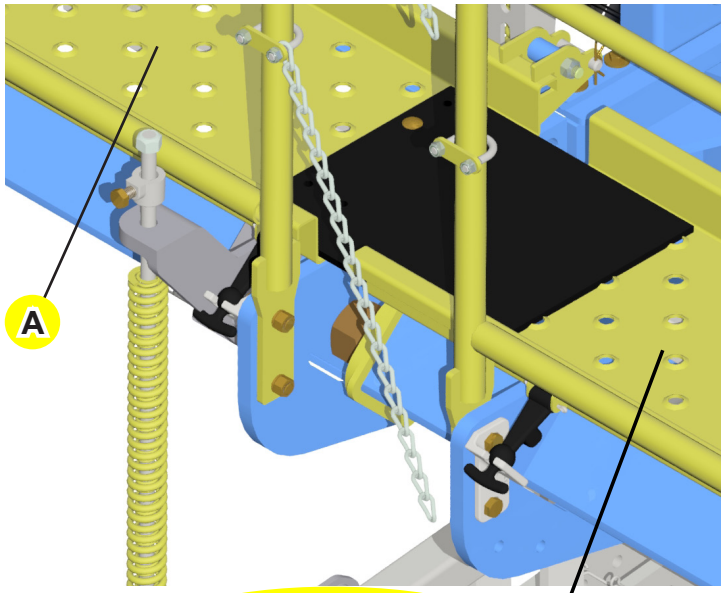
The clutches (A) can toggle the seed and fertilizer distribution to on or off automatically but can also be turned off manually so it is possible to perform the finishings and it just uses half planter. In order to do so, activate the lever (B) on the frame lateral to turn off the clutches.



Service platform

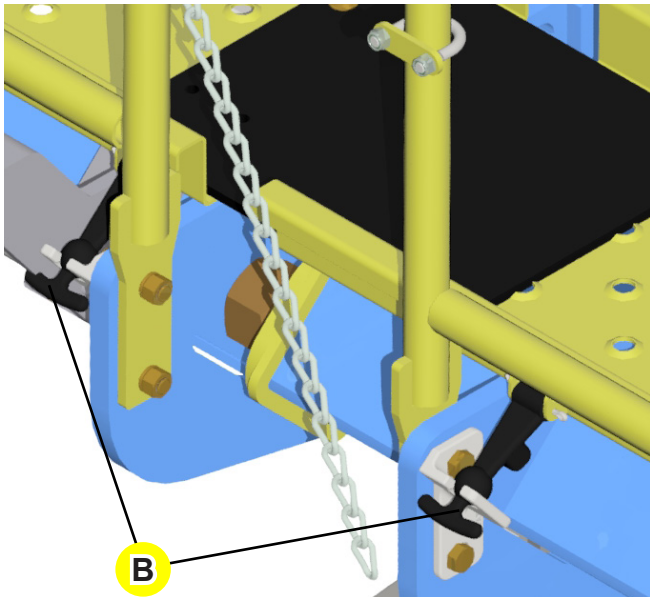
The service platform is antiskid, wide and with articulation to facilitate maintenance and to fill up the planter.

It has protections in the fasteners, handrail chains and where the platforms are joined for a greater safety.

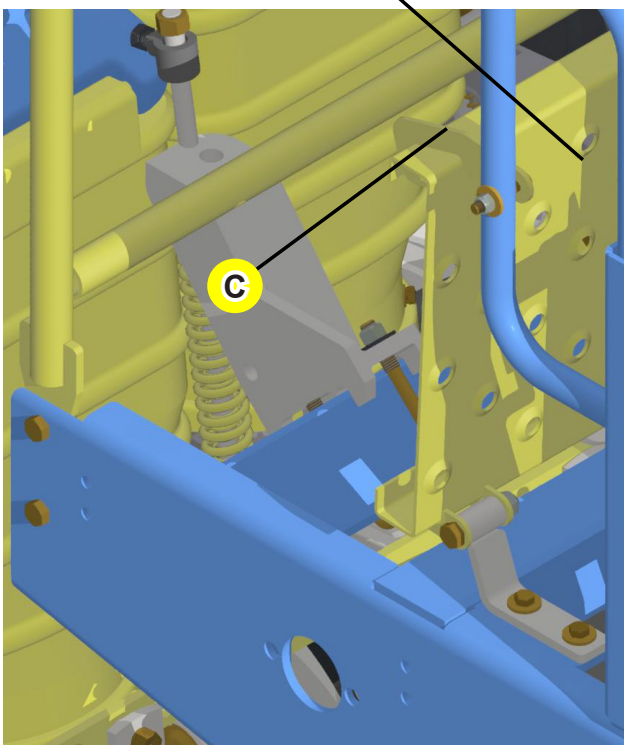


Platform on position for filling up

When in use, the platform (A) should be hold by the frame support (B) and when articulated, it should be hold by the lock.



Platform on transport position



To lock the platform to transport position, articulate the platform (A) and fasten it using the lock (C) that is fixed to the fertilizer hopper support.

NOTE • **The platform (A) must only be used to fill up the planter.**

Row markers

To adjust the row marker, it is important to keep the same measure on the front and rear gauges (“A”) and define the spacing between row units (“B”).

To adjust the marker discs, loosen up the nuts and displace the extensor to the desired position. This distance must be obtained as follows:

• Activate the hydraulic system and lower the equipment to leave it in working position, and then do the same procedure with the row marker.

• To obtain the “C” measure drive the equipment over a few meters and measure the distance between the center of the tractor trace and the center of the first seed row unit.

• Loosen up the fixation bolts on the marker rod and then displace it to the “C” position. Tighten up the bolts again.

• Adjust the marker disc action in a way that it leaves a visible mark on the soil. The marks left by the marker discs must be a reference to pass the tractor tire.

• Activate the tractor hydraulic control valve to lift or lower the equipment. Check if the row markers are properly working.

• Use the formula below to find the marker distance.

Example:

A - Front gauge of the tractor = 1420 mm

B - Spacing between row units = 450 mm

L - Number of row units

C - Marker distance that needs to be found out (millimeters).

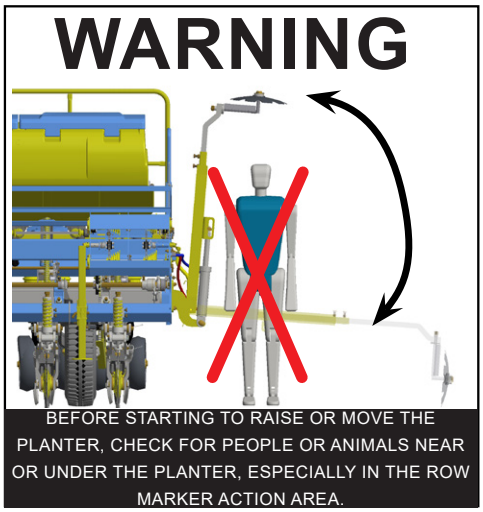
Considering an equipment with 9 row units, spacing of 450 mm and tractor gauge of 1420 mm, determine the row marker distance.

$$C = \frac{B \times (L+1) - A}{2} \rightarrow \frac{450 \times (9+1) - 1420}{2} \rightarrow \frac{3080}{2} \rightarrow 1540 \text{ mm}$$

NOTE

• For this practical adjustment, it is necessary to keep the front and rear gauges with the same measure and to keep the center-to-center measure of the front tires equal as the rear ones.

• Follow the instructions that can be found on the next page.



Working angle

The marker discs feature angle and distance adjustments to facilitate the soil opening. In order to do so, loosen up the fixation nut and adjust as necessary.

Troubleshooting guide

TYPE	PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Seed and fertilizer spreader	Slippage	Ballasts	Check the liquid ballast on the tires.
		Tires inflation	Inflate the tires appropriately.
		Tire design	Check and replace worn tires or if they are not matching the design. Always use equal tires.
		Wheelset with low friction with the soil	Check the wheelset springs, retighten them and replace them if necessary.
	Sprockets are not activating	Worn out gears	Check the conditions of the gears and replace them if they are worn.
		Unactive gears	Check if the gears are activated and, if not, activate them.
	Row units with different dosages	Different combination of drive and driven shafts	Check the combination of drive and driven shafts on every sprocket.
		Oxidized chains	Lubricate and unlock the chains.
	Suction pressure oscillation	Variation on the turbine RPM.	Check and adjust the pressure as necessary. If the turbine is activated by the PTO, keep a rotation speed of 540 RPM; If the activation is done through the hydraulic motor, check the working pressure, flow rate and free return to the reservoir.

TYPE	PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Fertilizer spreader	Clogging	Improper operation by the tractor operator	Performing maneuvers being the equipment lowered (either forward or when in reverse gear) may lead to a clogging on the metering system.
		Product quality	Be sure about the fertilizer quality. Normally when a product has excess of powder, it may get in contact with humidity and transform to a pasty product, thus clogging the metering.
		Strange material inside the fertilizer metering	Check the existence of strange objects that may eventually fall inside the hoppers during the filling process.
	Excess or lack of fertilizer	Sprockets	Check the drive-driven shafts combination. Carry out a practical test on the field to determine the correct amount.
		Springs pitch	Check the condition of the springs as well as their pitch.
	Heavy/hard to turn metering	Lack of lubrication	Check and lubricate the metering mechanism.
		Cobbled fertilizer	Clean the fertilizer meterings.

Troubleshooting guide

TYPE	PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Pneumatic seed metering	Seed skips	Seed singulator	Check the seed singulator. Always use the adequate singulator and seed plate for each culture.
		Low seed level	Check the amount of seeds on the hopper and on the metering. Adjust the seed deflector to the compatible position for the used seed.
		Strange object inside the metering	Check the physical purity of the seeds that are about to be sowed, as well as the presence of strange objects inside the hoppers or system. Normally, seeds with a lower physical purity are more prone to clog and lock the system due to strange objects.
		Disc blade shims	Check the number of shims on the disc to level the system; check if the shims are not worn out. If so, replace them.
		Vacuum system	Increase the vacuum system and check it on every row unit.
		Seed and fertilizer chute outlet	Check the condition of all components and replace them if necessary; check a possible clogging caused by strange material or greater flow of seeds on the chute and clean it; Adjust the deflector according to the culture that are about to be sowed to avoid seed cloggings.
		Bad metering alignment	Check the metering alignment related to the equipment and to the components which are responsible to drop the seeds.
		Lack/excess of graphite	Check the amount of graphite (solid lubricant) inside the metering.
		Obstruction of the system breathers	Check and unobstruct the breathers of the pneumatic system, allowing a free air flow on the metering.
		Equipment speed	The equipment speed is one of the main factors that cause problems on the number of plants. Always keep the ideal plantation speed. Marchesan recommends a speed of 5 - 7 km/h.

Troubleshooting guide

TYPE	PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Pneumatic seed metering	Double seeds	Metering components assembly	Check the singulator, seed plate and seed ejector assembly. Always use these components to match the type of culture that are about to be sowed.
		Worn out seed ejector	Check the condition of the seed ejector and replace it if worn out. Always use a seed ejector to match the type of culture that are about to be sowed.
		System spring	Check if the spring is installed correctly, pushing the singulator to the center of the disc blade direction.
		Excessive wear on the seed singulator	Check and replace the seed singulator. Always use a seed singulator to match the type of culture that are about to be sowed.
		Vacuum excess on the system	Reduce the vacuum pressure and check if there is any improvement on the seed deposition. It is recommended to adjust the pressure according to the culture need, aiming for a great seed distribution on the soil. Marchesan recommends a speed of 5 - 7 km/h.
		Equipment speed	The equipment speed is one of the main factors that cause problems on the number of plants. Always keep the ideal plantation speed. Marchesan recommends a speed of 5 - 7 km/h.
	Seed metering	Metering activation system	Check if the chains and components are well lubricated. It is essential to keep such components in good functioning to assure a greater efficiency.
		Malfunctioning metering	Check if there is any seed on the metering; check for eventual clutch failures or if the vacuum system is properly fitted.
		Cracks or wears on the vacuum sealing	Check and replace the rubber seal on the system to assure a great metering efficiency.
		Safety pin	The equipment speed is one of the main factors that cause problems on the number of plants. Always keep the ideal plantation speed. Marchesan recommends a speed of 5 - 7 km/h.
		Obstruction on the metering	Check eventual obstructions on the metering caused by strange objects, bad positioning or incorrect fixation.
		Shims dropped inside the metering	Check the installation and fixation of the shims inside the metering.

Troubleshooting guide

TYPE	PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Mechanical seed metering	Seed skips on the culture	Seed plate and ring	Always use the adequate seed plate-ring for each seed that are about to be sowed. It is important to mention that due to the diversity and format of the cultures, the seeds must be well placed and in a way that only one fits the hole.
		Lack of seeds on the metering	Check the lack of seeds on the hopper and always respect the weight limit to assure the system efficiency.
		Obstructed seed plate hole	Clean the seed plate and ring before the plantation.
		Seed tube	Check the seed singulator. Always use the adequate singulator and seed plate for each culture.
		Vacuum excess on the system	Check the components condition and replace them if necessary; Check if there is any strange object obstructing the tube and clean it. Be sure that the seed hopper is positioned in a way that the metering release the seeds on the center of the tube.
		Strange object inside the metering	Check the physical purity of the seeds that are about to be sowed, as well as the presence of strange objects inside the hoppers or system. Normally, seeds with a lower physical purity are more prone to clog and lock the system due to strange objects.
		Graphite utilization	It is recommended to use the graphite (solid lubricant) to increase the system efficiency and to decrease mechanical wears.
		Equipment speed	The equipment speed is one of the main factors that cause problems on the number of plants. Always keep the ideal plantation speed. Marchesan recommends a speed of 5 - 7 km/h.

Troubleshooting guide

TYPE	PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Mechanical seed metering	Double seeds on the culture	Seed plate and ring	Always use the adequate seed plate-ring for each seed that are about to be sowed. It is important to mention that due to the diversity and format of the cultures, the seeds must be well placed and in a way that only one fits the hole.
	Seed metering	Seeds treatment	Treating the seeds with oil or liquid inoculants applied directly to the hopper may compromise the system efficiency.
		Locking seed ejector	Check the conditions of the seed ejector and clean the brush to assure a good functioning.
		Brittle seeds (milling)	Check the graphite utilization during operation, as well as the adequate choice of seed plate and ring.
		Weight limiter	Never remove the weight limiter from the metering to avoid overloads and physical damages to the system.

Operations - Important points

- Retighten nuts and bolts after the first day of work and check the conditions of all pins and cotter pins. Then, retighten every 24 operating hours.
- Carefully observe the lubrication intervals.
- Always inflate the tires with the aid of a contention device (tire inflation cage).
- The correct tire inflation is important; keep the same pressure on every tire. (Check the 'tires inflation' page on the 'general application' section).
- 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 5 to 7 km/h, which is not advisable to overcome to maintain service efficiency and avoid possible damages to the equipment.
- Only people who own a complete knowledge of the tractor and equipment must operate them.
- Be on a wide field and maneuver on slow gear to hitch the equipment, being ready to brake when necessary.
- When filling up the planter, observe its proper hitching to the tractor. Verify if there is any object inside the hoppers that may cause damage to the metering devices.
- Always use seeds and fertilizer free from impurities.
- Inspect the seed hoppers twice a day and check the good functioning of the fertilizer metering system.
- Maintain the equipment leveled.
- Periodically check the established adjustments in the beginning of the plantation.
- Give special attention to the fertilizer position on the soil related to the seed.
- Check the seed depth and compaction pressure.
- Never maneuver or use reverse gear when the row units are lowered on the soil.
- Never make sharp turns during the service, especially in a no-till plantation. The row components may be damaged.
- To make any verification in the equipment, it is necessary to lower it to the ground and shut down the tractor engine.
- During working or transportation, the presence of passengers on the tractor or equipment is not allowed.
- For adjustment and verification of the cutting parts (row units) of the equipment, it is necessary to disconnect the clutches to avoid wastes.
- As previously mentioned this planter features several adjustments. However, only the local conditions can determine its best adjustment.

Lubrication

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

• Be sure about the lubricant quality, with relation to its efficiency and purity, avoiding the use of products contaminated by water, earth and others.

• Use medium consistency grease.

• Remove the remainder old grease around the articulations.

• Clean the grease fitting with a cloth before inserting lubricant and replace the damaged ones.

• Apply an enough amount of new grease.

• Clean and lubricate the bearings properly to assure a greater lifetime.

• Lubricate the chains daily.

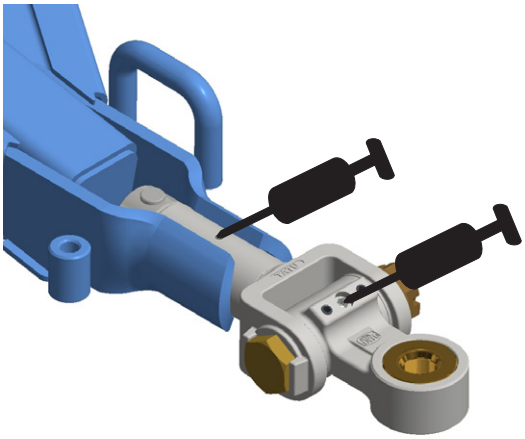
• The self-lubricating bushings are maintenance and lubrication free.

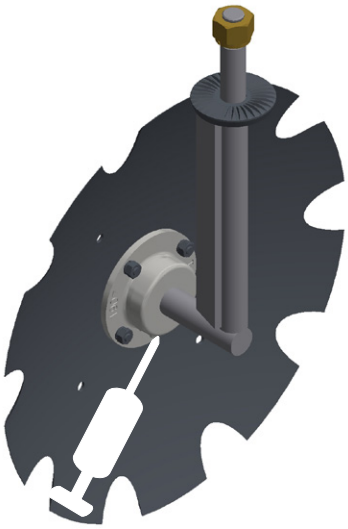
• The self-lubricating bushings have a greater resistance to dusty and dirty places and require low maintenance.

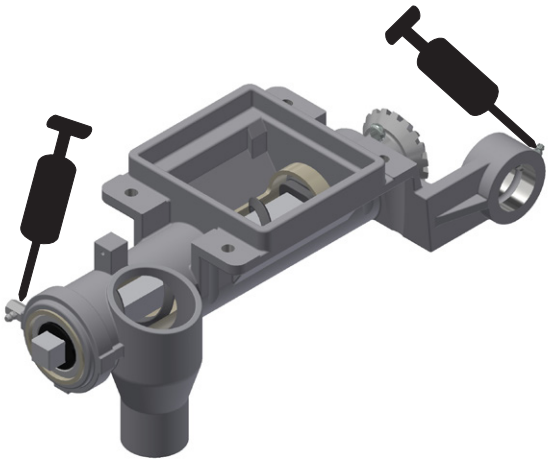
• Periodically clean the rings, retainers, bushings and rollers.

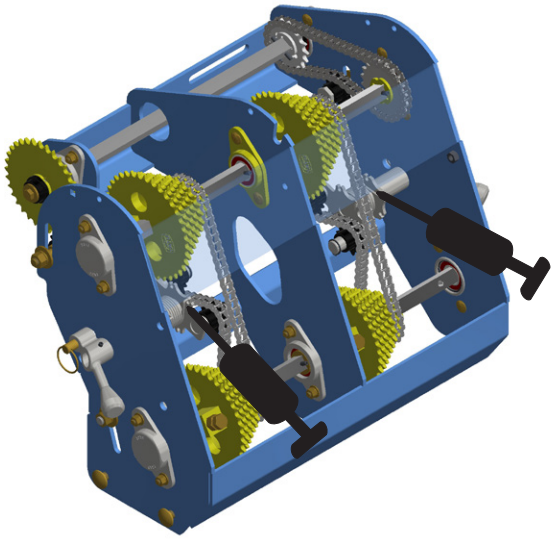
ATTENTION **• Carefully observe the lubrication intervals on the different points of the planter.**

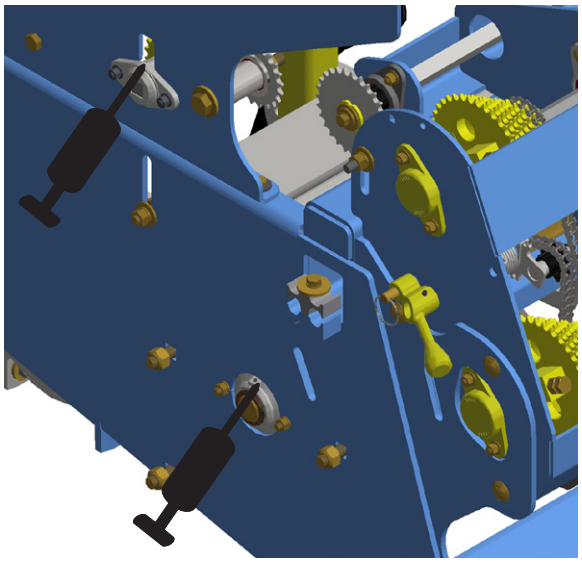
Lubricate every 10 service hours





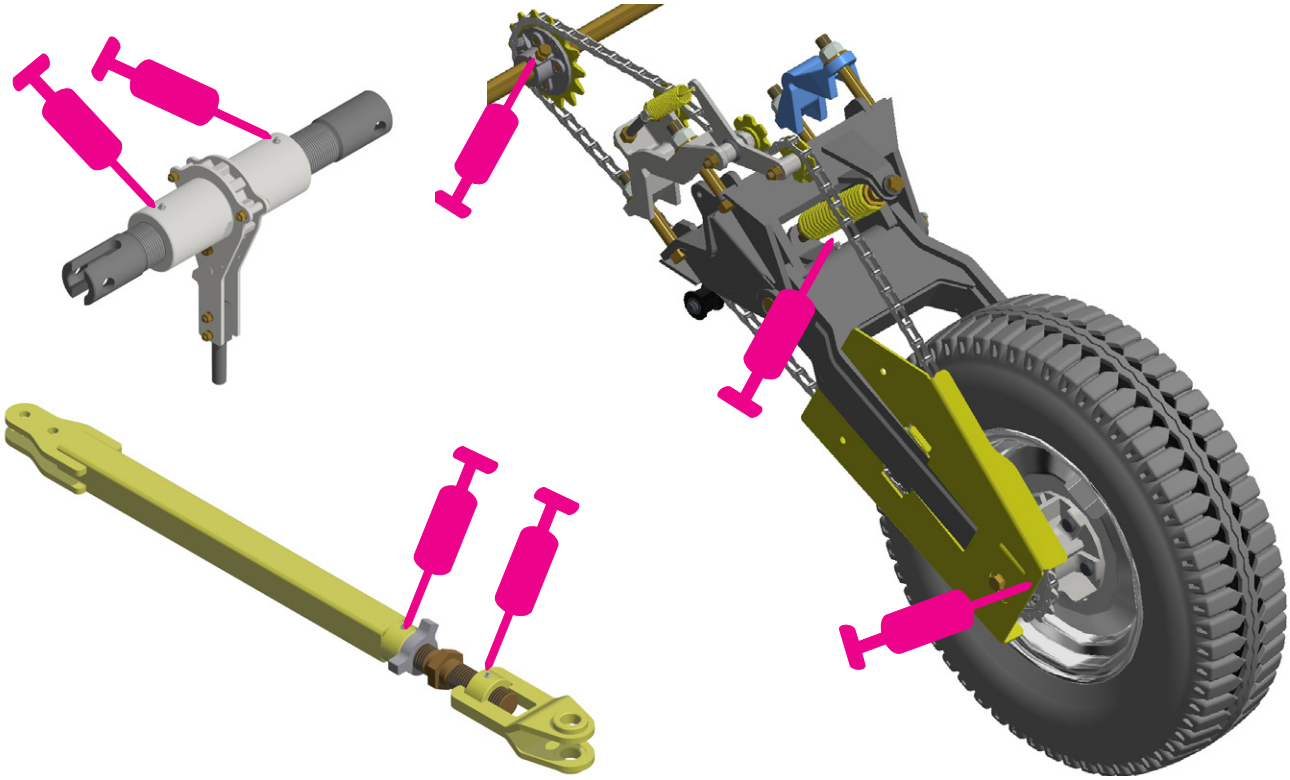






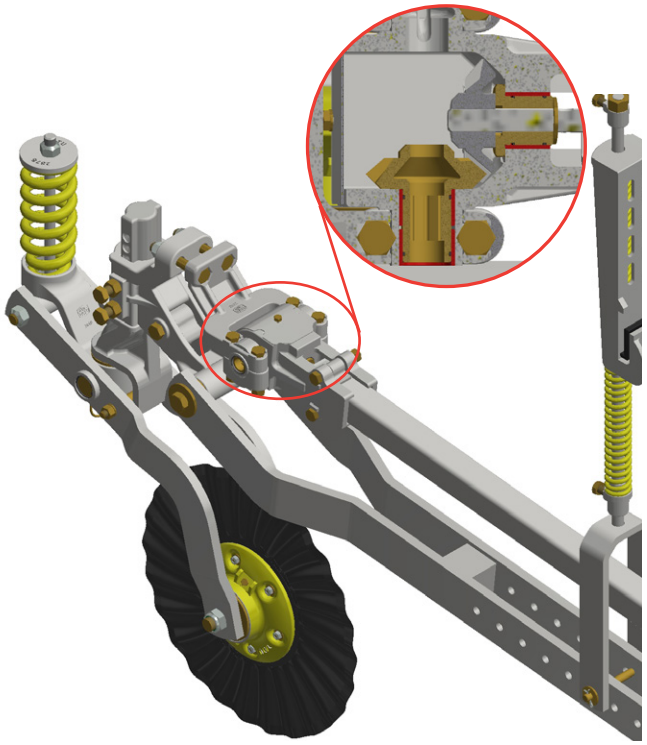
ATTENTION • Lubricate the points shown above and all grease fittings as well.

Lubricate every 50 service hours



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

Self-lubricating system



To reduce the wear caused by the friction between the moving parts of the equipment, a self-lubricating system was created, used on every articulation of the disc blades, fertilizer row units and seed row units.

The self-lubricating bushings have a great resistance to dirty and dusty places, thus requiring low maintenance.

Clean the rings, retainers, bushings and bearings periodically.

Check the existence of clearances periodically and replace the bushings and o'rings if necessary. Assemble them using grease.

Fertilizer metering maintenance

For the correct fertilizer metering system maintenance or to make any kind of repair in its internal parts, proceed as follows:

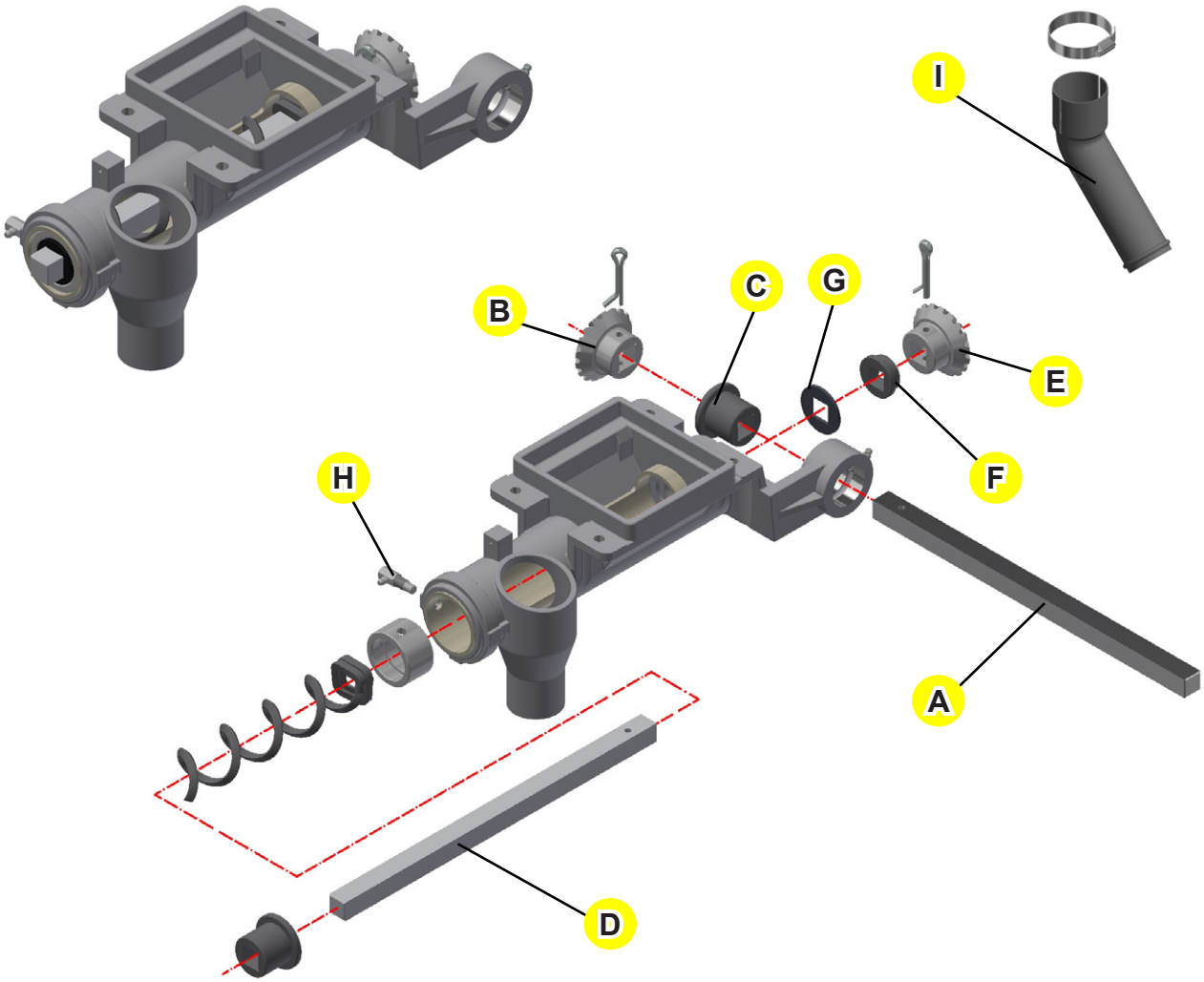
• Remove the squared shaft (A) with bevel gear (B) and the bearing (C).

• Remove the inner squared shaft (D), along with the bevel gear (E), bearing (F) and the fixation nut (G) by the frontal part of the metering.

• Remove the grease fitting (H) from the rear part of the metering to release the other parts as shown in the illustration and replace the defective ones.

• Assemble the metering system again observing the correct position of the right and left augers.

• Do not forget to lubricate the metering grease fittings daily, as mentioned on the 'lubrication' section to avoid future problems.



NOTE • **To improve the fertilizer dropping, use the fertilizer tube (I).**

Disc blade adjustment

Give maintenance to the disc blade periodically or when the crop has ended.

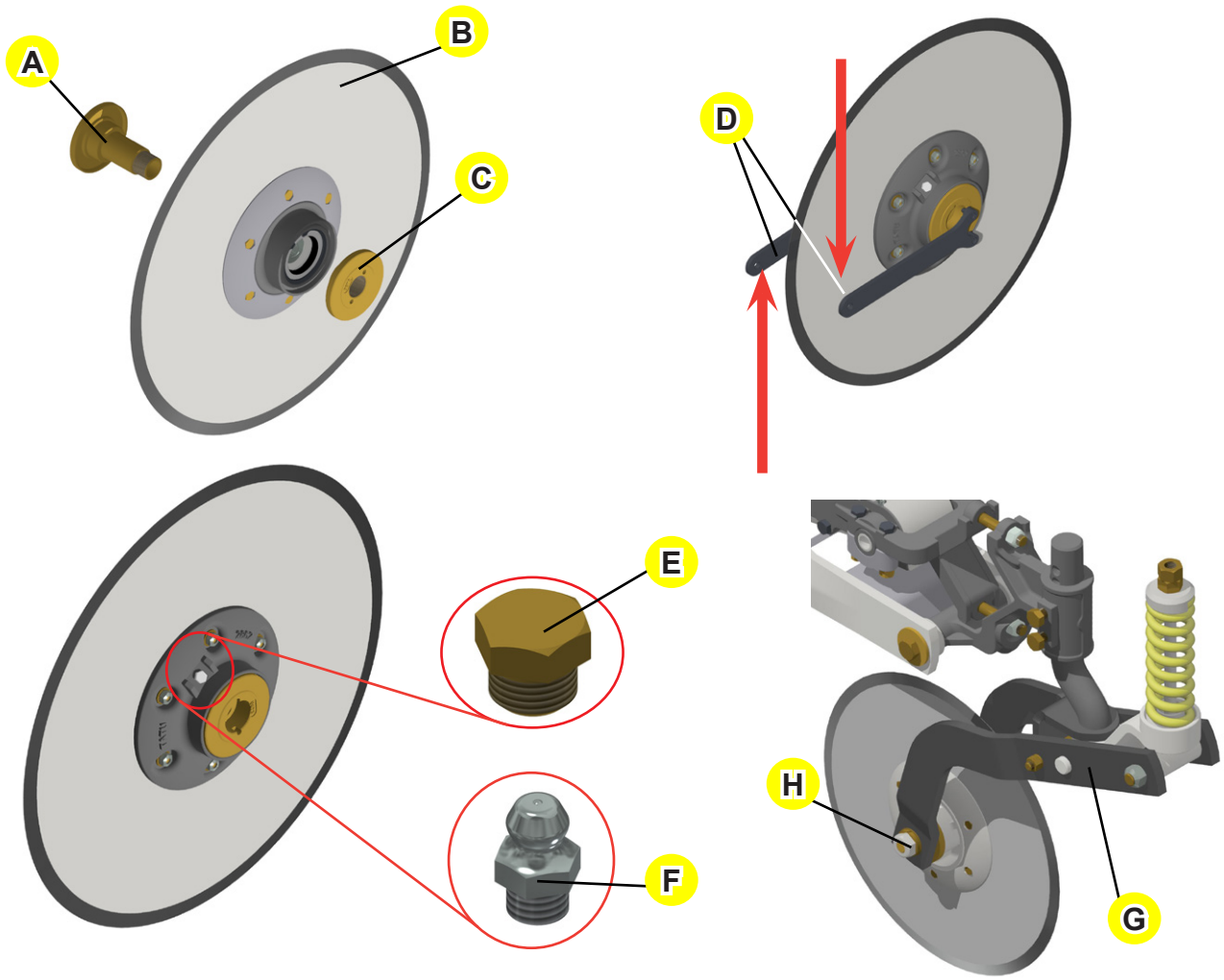
After assembling the inner components of the hub it is necessary to tighten the disc blade (B) axle (A) using the nut (C).

To tighten the nut (C) on the axle (A), use two wrenches (D) as shown below. (Tighten fully and loose 1/4).

Then, remove both plugs (E) and couple the grease fitting (F) on the hole. Add grease until it starts to fall from the other hole to assure that is completely full.

Let the air leave in order to fill it up using grease. Return the plug (E) to the disc blade hub.

Lastly, couple the disc blade to the support (G) of the fertilizer row unit using a bolt (H) and nut.



NOTE

- **The procedure to grease the hub is made on the factory and must be made again during off-season to assure the preventive maintenance of the planter.**
- **If it is necessary to grease the self-lubricating bushings, grease the bushing housing and axle before assembling it.**

Changing and adjusting the unaligned double discs

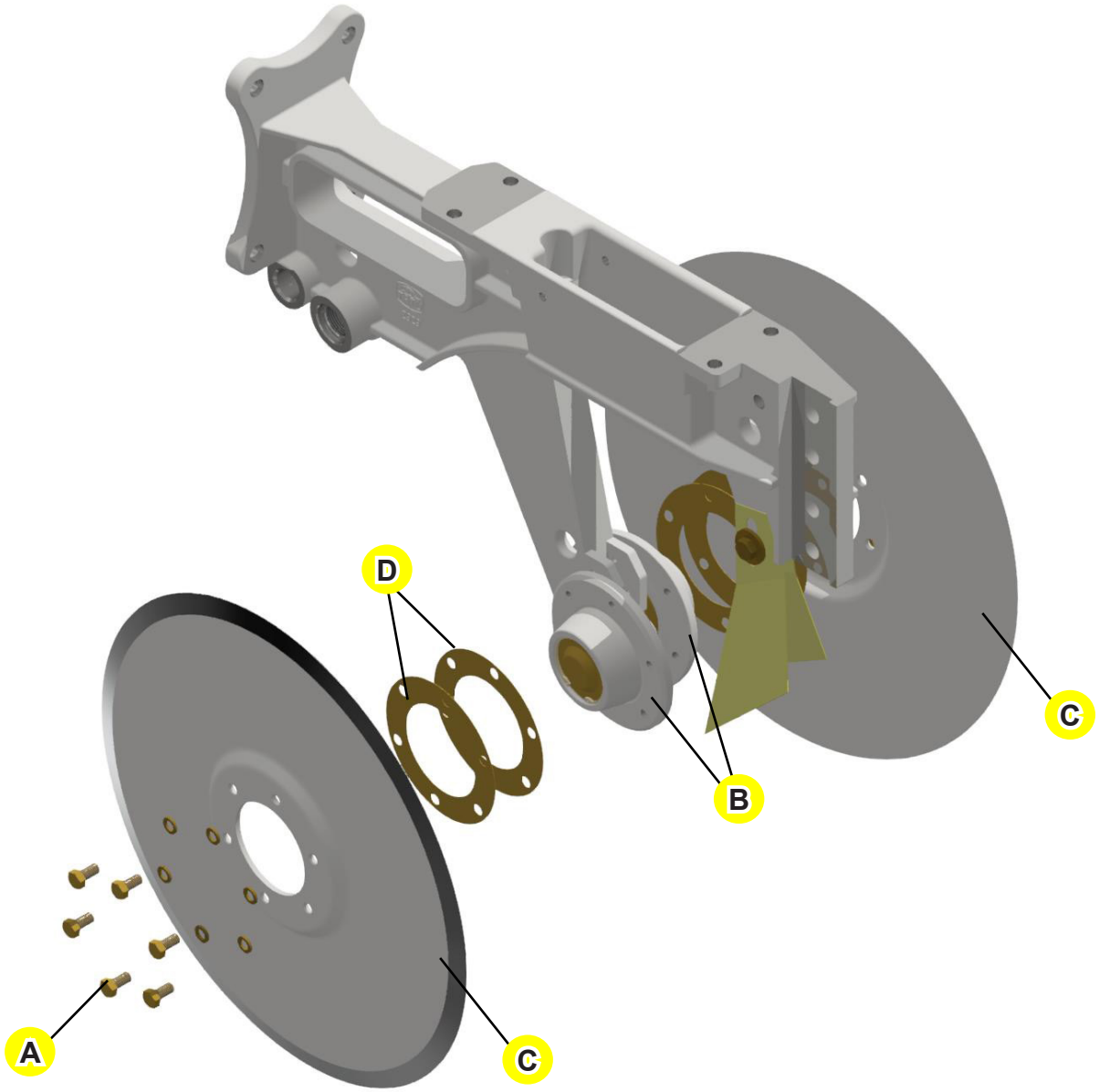
The maintenance of the unaligned double discs must be done when a clearance between the discs are noted.

Remove the bolts (A) and spring washers from the hub (B).

After changing the discs (C), retighten both sides of the hub.

After assembling the hubs, be sure that they can swing freely. If there is any contact between them or if they are being forced, add a thrust washer (D) on the side with more wear. To do so, remove from one side of the disc and place on the other side.

After this procedure, the disc blades (C) will work free and there will not have any friction between them.



Row hubs

When the existence of looseness is noticed, it is necessary to make the maintenance in the hubs of the disc blades, unaligned double discs, gauge wheels and press wheels.

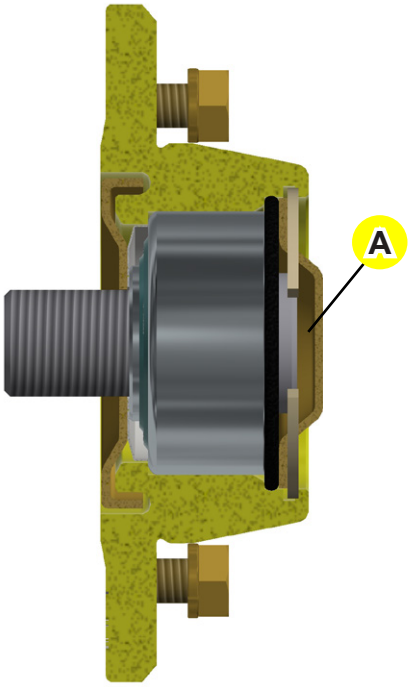
Disassemble the hubs and remove the internal components.

Clean all parts with a specific degreaser for the maintenance operation.

Verify the existence of looseness and the conditions of bearings, retainers and bushings. Replace the damaged components or with excessive wear.

The hubs without grease fittings should be assembled with a good amount of lubricant on the inner part of the hub.

The hubs should rotate with the hand applying a small effort.



NOTE

- **Whenever the bearings are replaced, it will be necessary to change the sealing rings and o-rings as well.**
- **Fill up the inner part of the hub with grease and put the cover (A) using an elastic ring.**

How to replace the transmission chains

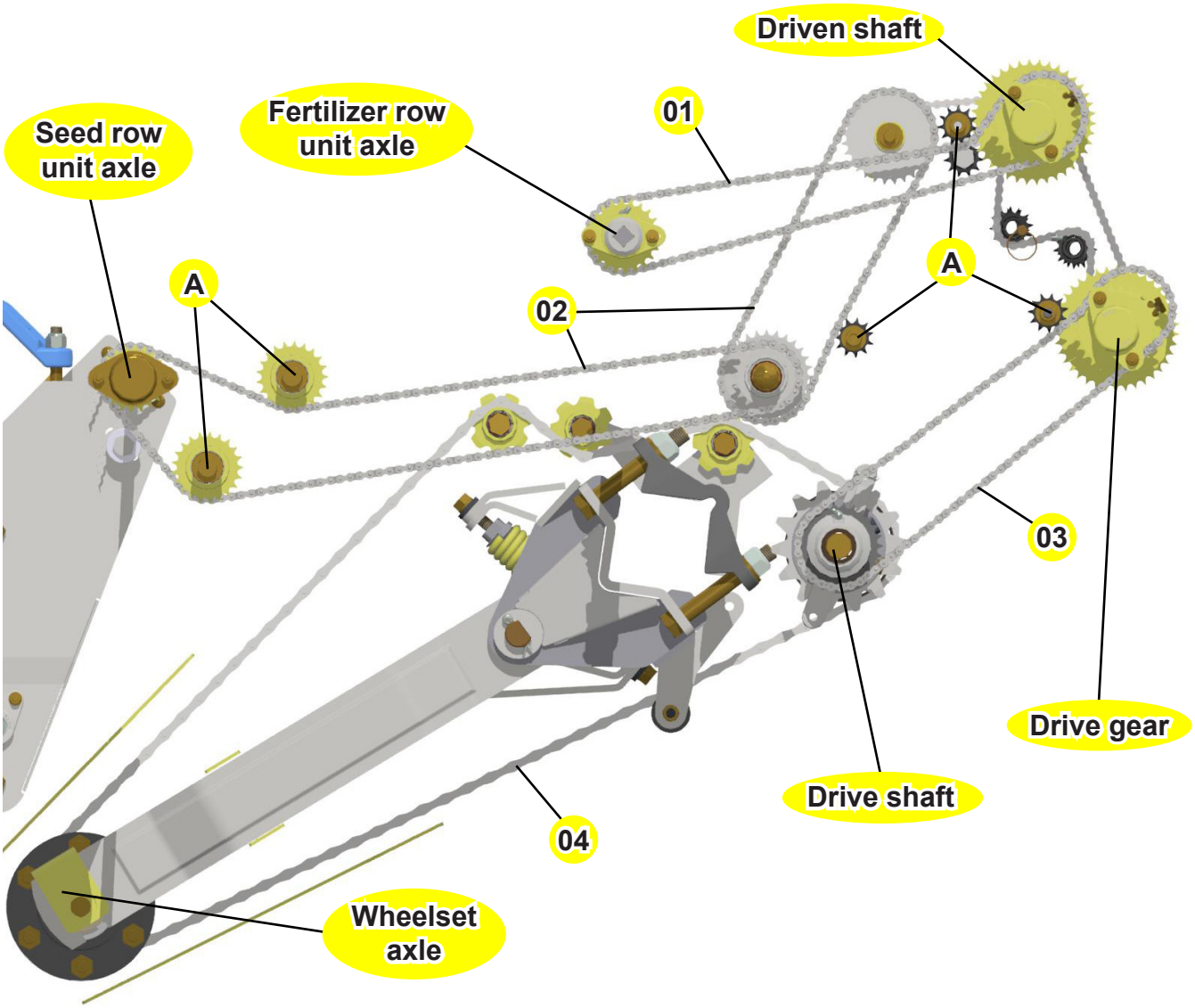
If it is necessary to repair the transmissions, proceed as follows:

• Support the equipment in the rear angle bracket using the props and on the front part use the jacks;

• Totally retreat the hydraulic cylinder to lift the tire from the soil;

• It is not necessary to release all the sprocket set, just release the chain tighteners (A). Right after, remove the chain that is in need of a repair.

• After repairing or replacing the chain, return it to its original position and adjust the tighteners until the chain is totally stretched out.



01 Fertilizer row unit chain

02 Seed row unit chain

03 Drive shaft chain

04 Wheelset chain

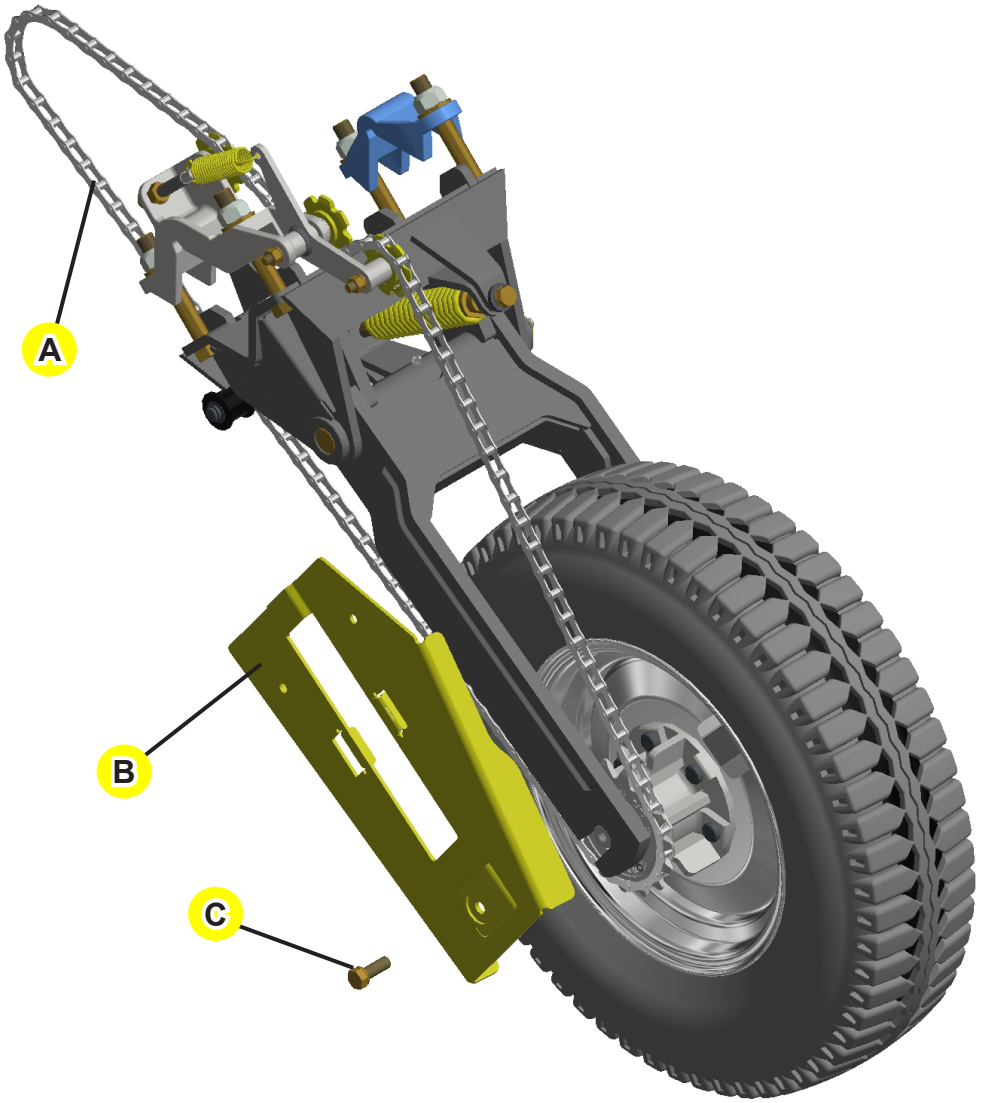
How to replace the tires

When the planter tires need repairs, proceed as follows:

• Support the equipment in the rear angle bracket using the props and jacks;

• Totally retreat the hydraulic cylinder to lift the tire from the soil;

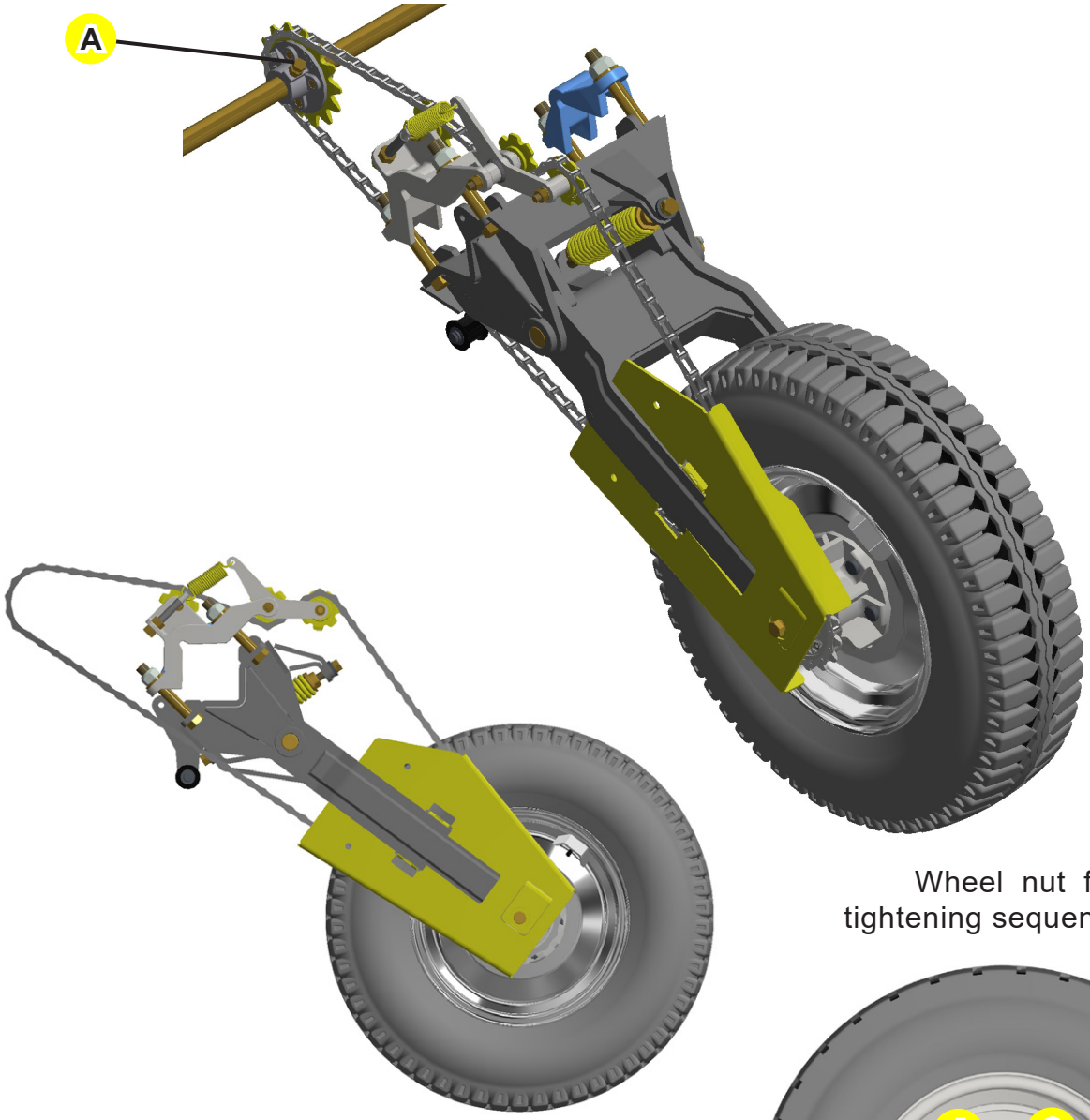
• It is not necessary to release all the clutch set; just remove the chain (A) and the protection cover (B) by loosening up the bolt (C).



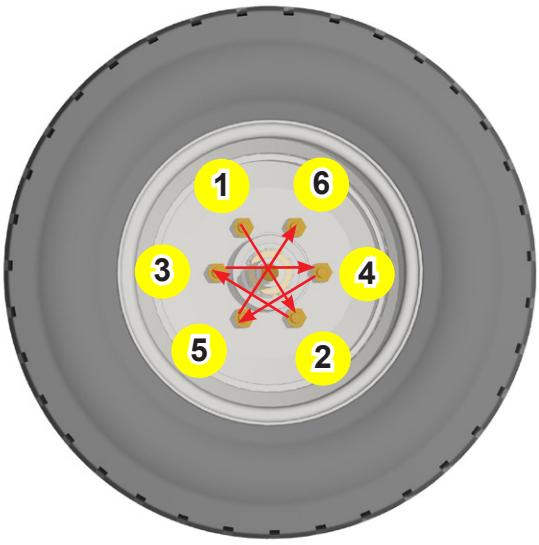
• Check if the planter is properly supported in order to avoid accidents.

How to replace the tires

Carefully observe the correct position of the chain and wheelset tighteners.



Wheel nut flange tightening sequence.



NOTE • **If it is necessary to remove the transmission (A) activation, observe its correct assembly as shown on the illustration.**

Wheelset hub lubrication

The wheelset hubs must be lubricated every 150 hours. When there is any clearance, it is necessary to give maintenance to the wheelset hubs.

Disassemble the hubs and remove the inner components. Clean all parts with diesel oil or kerosene.

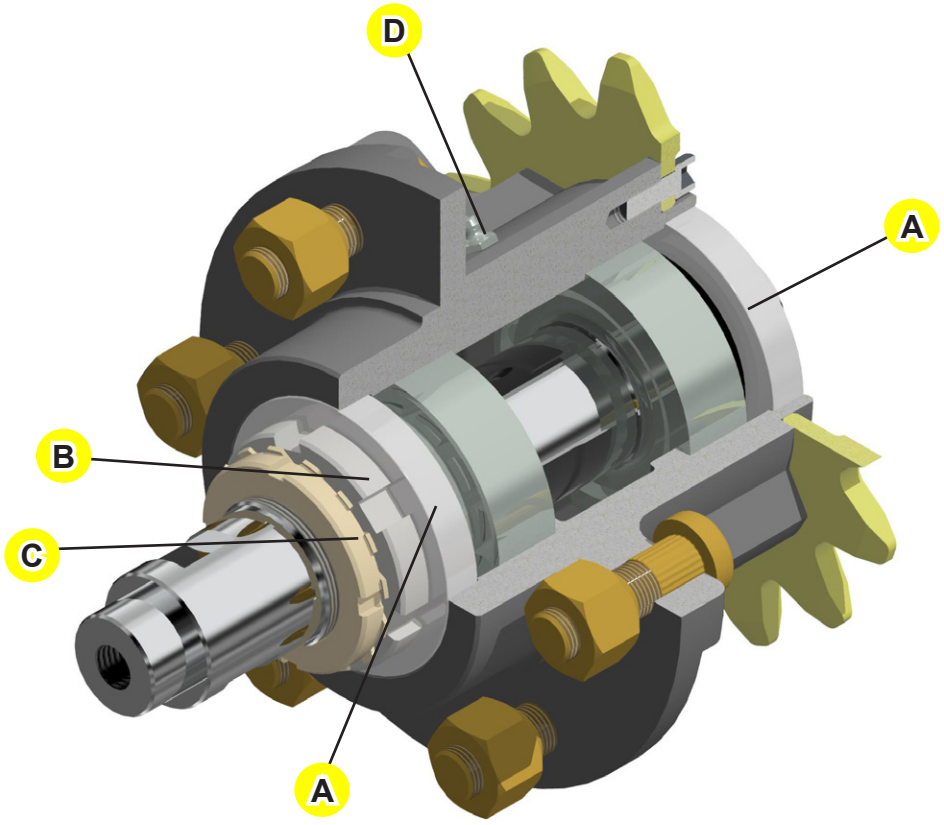
Check the existence of clearances and the condition of the bearings and retainers. Replace any damaged component or with excessive wear.

The bearing must be replaced in a preventive way to avoid breaking it and the unavailability of the equipment, as well as a higher cost for repairing it, because when the bearing breaks during working, more parts of the set gets damaged.

Check the retainer (A) position to allow that the excess of grease gets out and be careful to not damage it.

Adjust the castle nut (B) from the hub using a wrench until reaching a small resistance while turning the hub. Do not overtight. Lock using a nut (C).

Fasten the grease fitting (D) on the hub.



Whenever the retainer is damaged, replace it immediately.

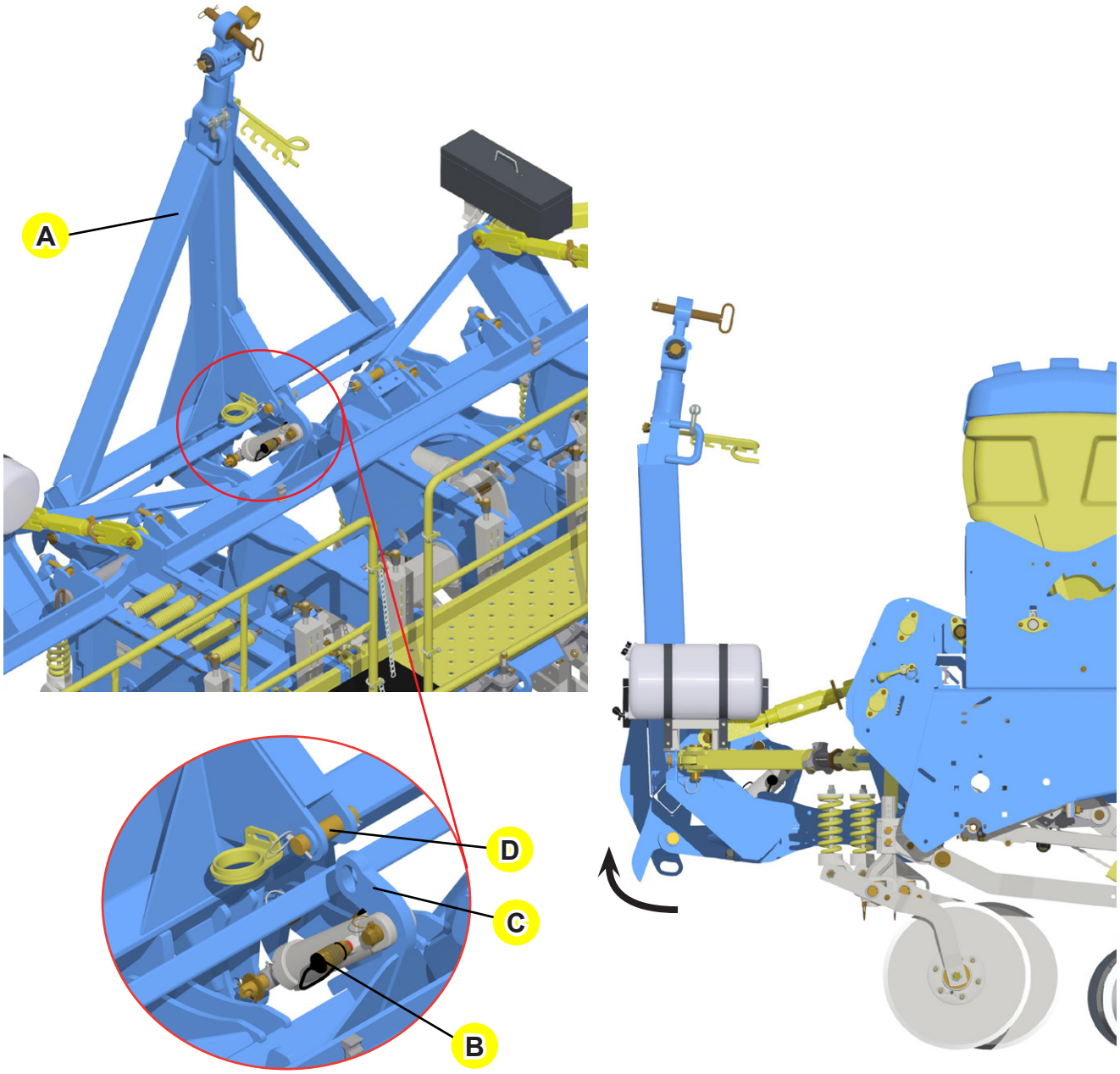
Do not forget to apply the specific grease for this equipment, that is a lithium soap grease, grade NLGI 2 with Extreme Pressure additive, anticorrosive and antioxidant.

Drawbar articulation

In order to occupy a smaller area when storing the equipment, the operator must lift the drawbar (A) as shown below.

With the help of the cylinder (B), lift the drawbar (A) up until reaching the lock (C) and fasten using a pin (D) and lock pin.

To use the equipment for planting, carry out the steps in reverse order as shown on the 'Extensor assembly' page ("Assembly" section).



NOTE • **Any removed component from the drawbar must remain near the equipment.**

Tatu mechanical metering

Individual seed hopper

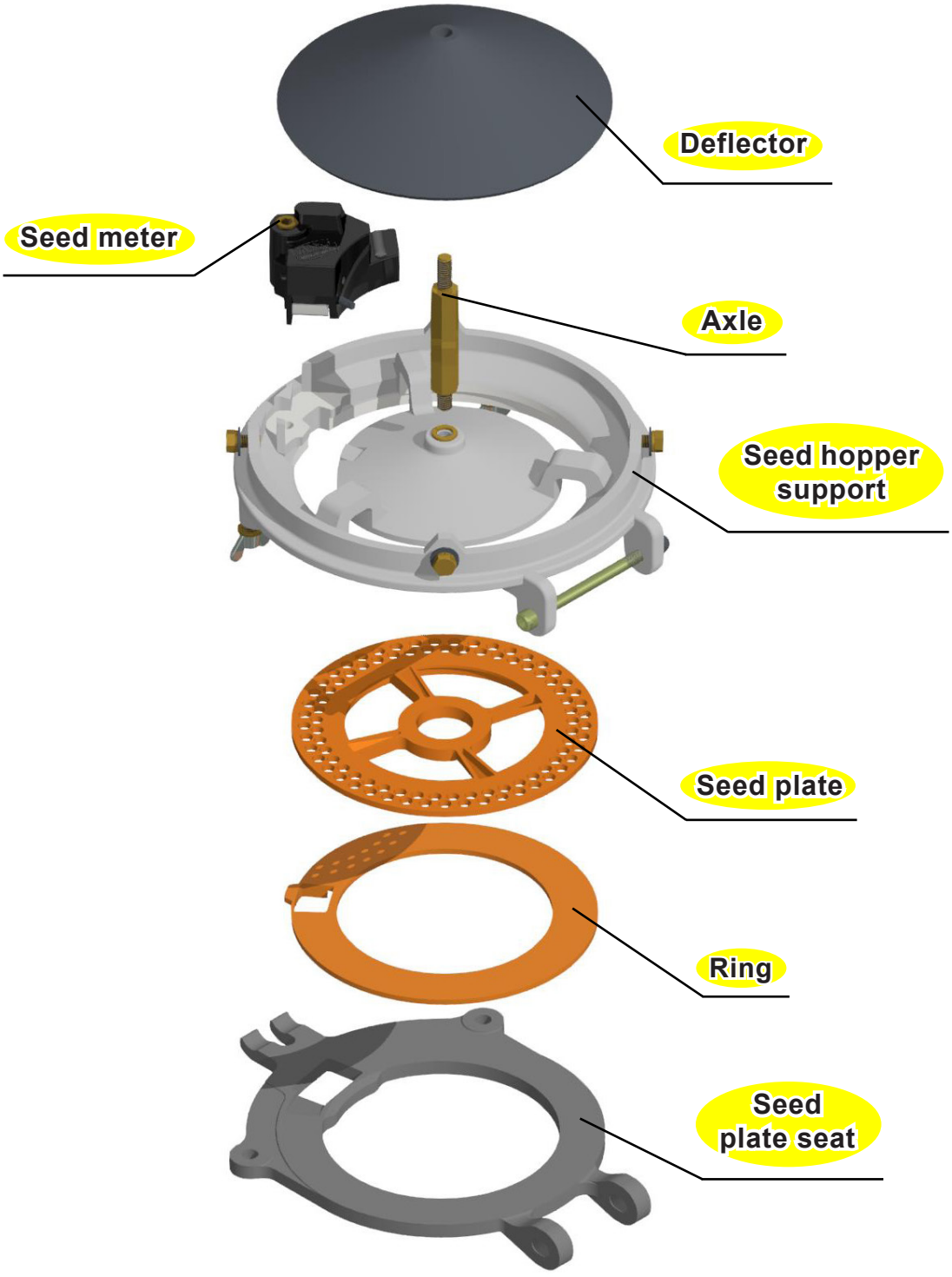
Single seed hopper

Seed dosing system for mechanical machines

The **TATU** seed metering is a mechanical distribution seed system. It provides an easy maintenance to the farmer.

It is an easy-to-use equipment because it works as a seed plate. It features several technologies in order to provide a greater security and an excellent planting to the farmer.

Components and assembly

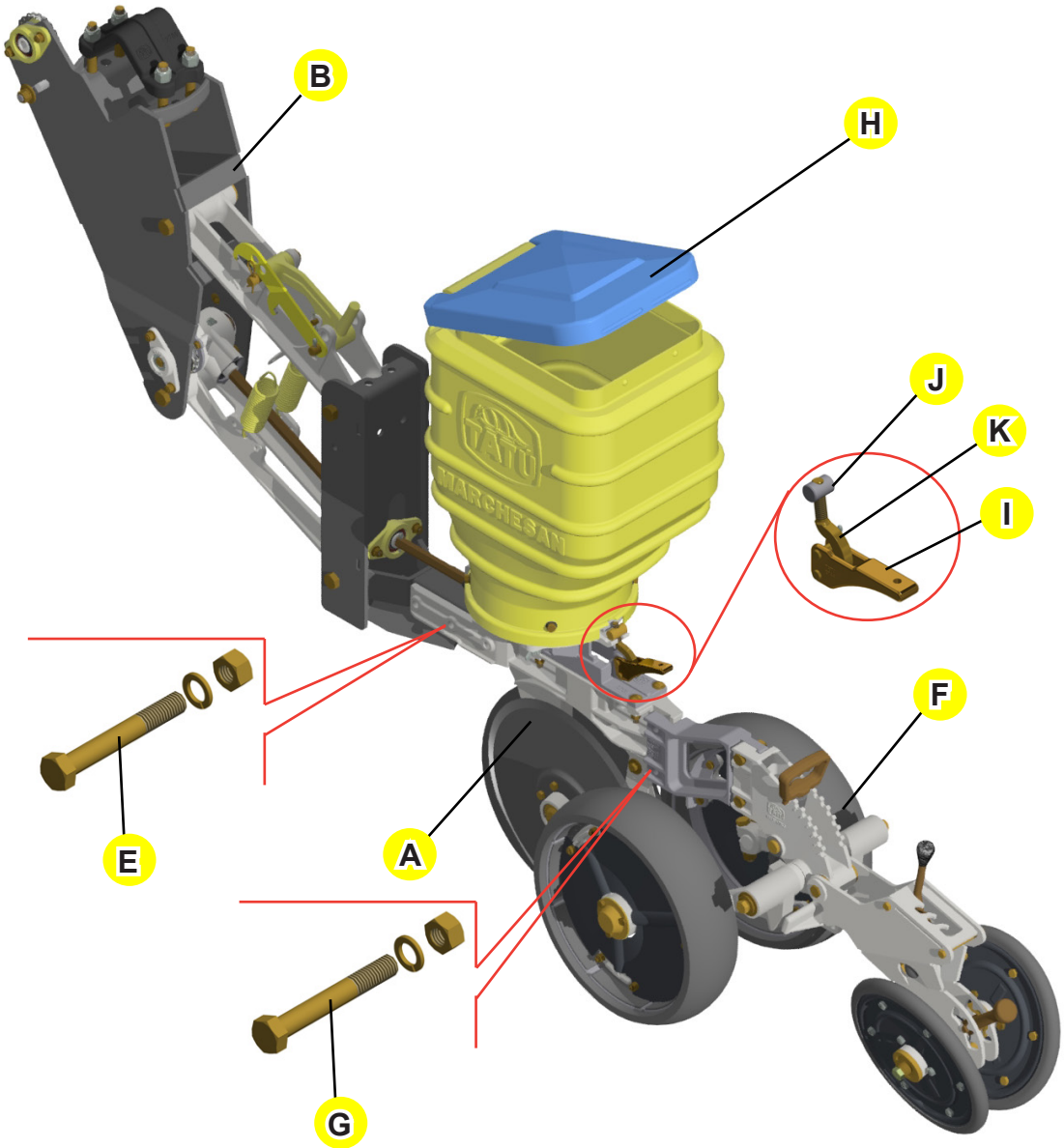


Row units rear part assembly - Mechanical

Fasten the row unit (A) to the seed row arm (B) using bolts (E), spring washers and nuts.

Fasten the row unit rear part (F) using bolts (G), spring washers and nuts.

Couple the seed hopper (H) that has a quick locking (I). To avoid damages to the quick locking and seed disc locking, never overtight the quick lock adjuster (J) and leave it facing the quick lock lever (K). If the adjuster gets loose, fasten the thread until it tighten properly. Overtightening it may break the quick locking and lock the plate.



NOTE

- **During offseason disassemble the moving parts, check the sealing rings, bushings and retention rings and replace these parts if necessary.**
- **Reassemble the moving parts using grease.**

Graphite powder use

The graphite powder should be combined to the seeds to facilitate the distribution and to increase the lifetime of the metering device.

Amount of graphite per kilogram of seed			
Planter distribution system:	Seeds treated with insecticide		
	Small and round	Big and round	Flattened
Mechanical	04 grams	02 grams	04 grams

- The graphite should not be combined before the seed treatment.
- The graphite should not be combined to the insecticide to apply in the seeds.
- For non-treated seeds, use only half of the graphite mentioned in the previous table.

NOTE

- **The seed metering feature buttons, rocker arm and pulley. They must be cleaned internally at least once a day for the plantation of non-treated seeds and twice a day for the plantation of treated seeds.**

List of standard seed plates in the planter

Description	Serial number
8 mm soybean seed plate (orange)	05.03.01.6217
9 mm soybean seed plate (pink)	05.03.01.6218
12 mm corn seed plate (orange)	05.03.01.6204

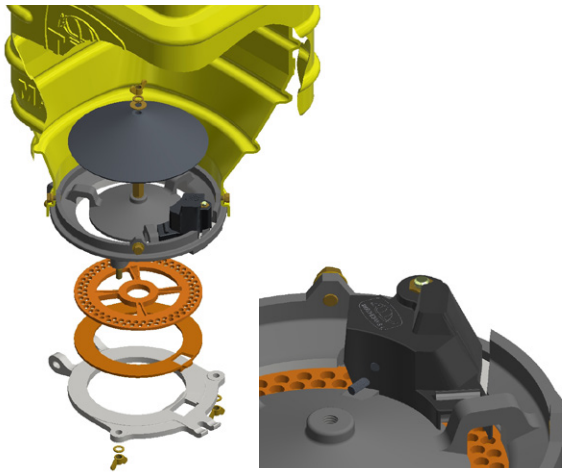
Check the optional seed plates list page.

ATTENTION

- **The amount of seed plates that are included with the planter corresponds to the number of row units.**

NOTE

- **The available height for the placement of the plate plus the false ring is 8.5 mm, however:**
- **If a plate has a thickness of 4.5 mm, the false ring must have 4 mm.**
- **To use a plate that has a thickness of 5.5 mm, place a false ring of 3 mm.**
- **Do not put a false ring if a plate that has 8.5 mm of thickness is used.**

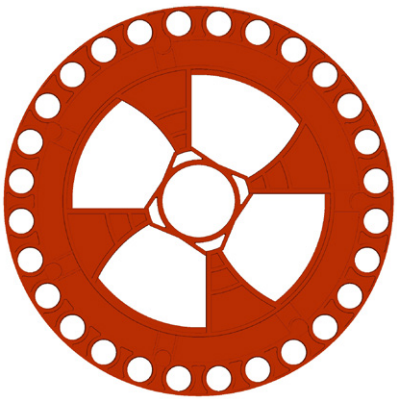


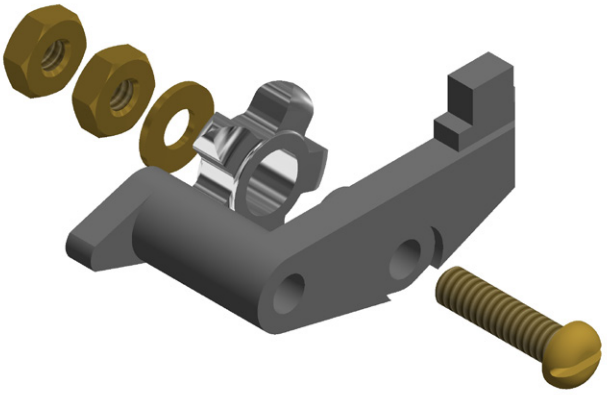
Seed plate kit

Special attention should be given to the rocker arm and seed sprocket, as well as the good operation of all seed meterings.

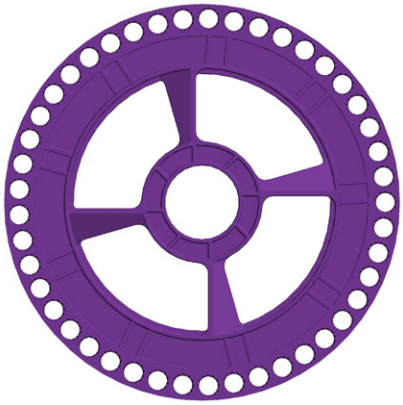
The rocker arm and the pulley of 5 teeth goes assembled with the equipment and can be used in all places with one row of slots or holes, i.e.: corn in round shape, soybean, delinted cotton, bean and others.

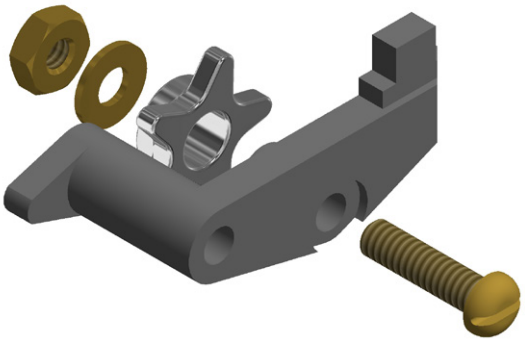
For the plate for corn with oblong holes use the pulley with 4 teeth, which is not included with the equipment.



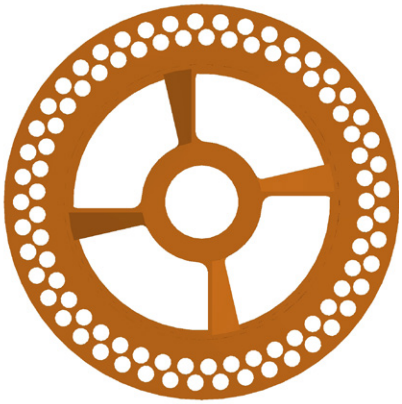


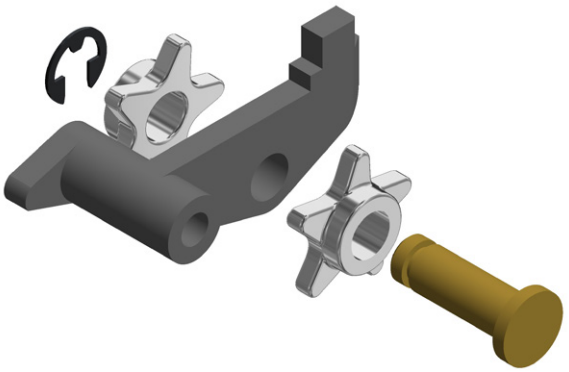
For planting sorghum, it is necessary to use special pulleys, so that they enter in the holes and execute their function.





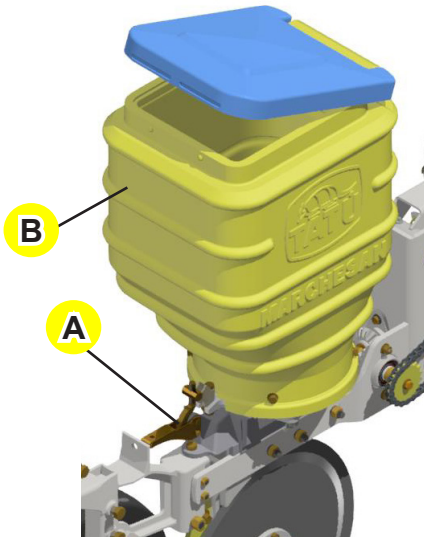
For the soybean plate that features a double row of holes, it is necessary to use the double rocker arm (with two pulleys).

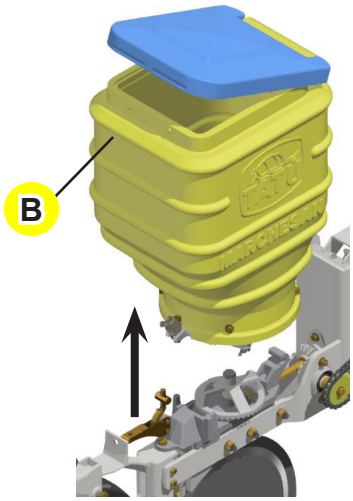




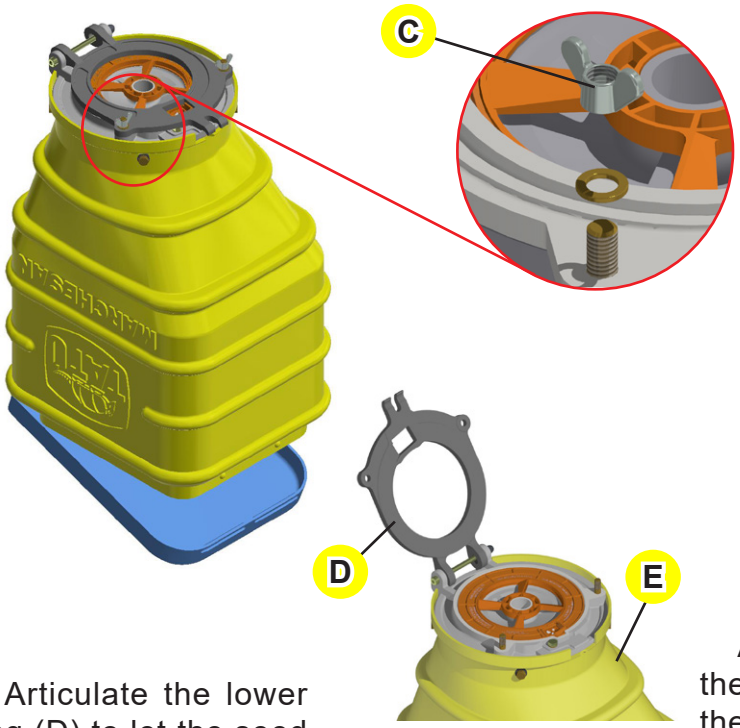
Seed plate replacement

Before replacing the seed plate, loosen up the lock (A) to free the seed hopper (B). Then, remove the seed hopper (B) from the row unit.

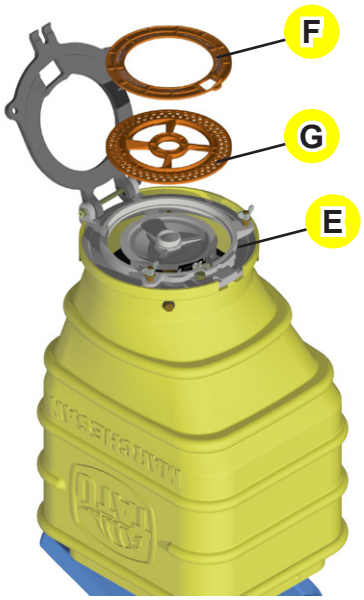




Turn the hopper upside down and loosen up the butterfly nut (C) and spring washer.



Articulate the lower ring (D) to let the seed hopper support (E) completely free.



After articulating the seat (D), remove the hopper support (E), the ring (F) and the seed plate (G).

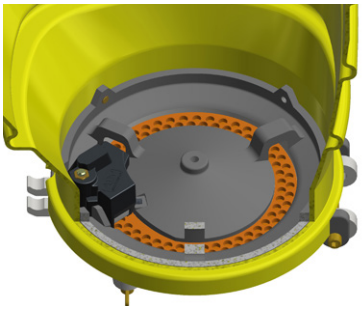
Now it is possible to replace the seed plate (G) and the ring (F).

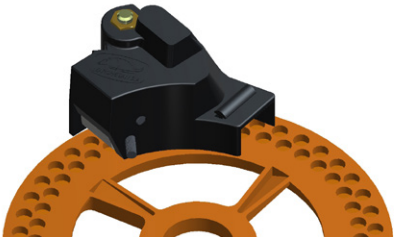
IMPORTANT

- **Always use the ring (F) along with the seed plate (G). Be sure that both have the same measure.**

Cleaning the seed metering

Carry out a general cleaning on the seed system daily. To do so, remove the seed plate and check the functioning of the distribution hopper to assure the best planting performance.





NOTE

- **When using graphite with the treated/ inoculated seeds, it is necessary to clean the system twice a day.**

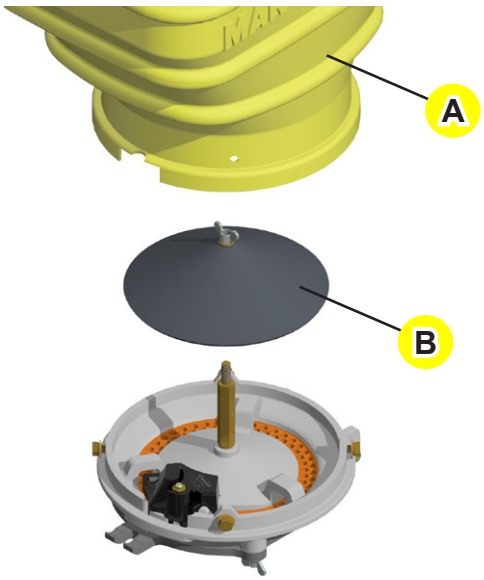
Replacing the seed ejector and pulleys:

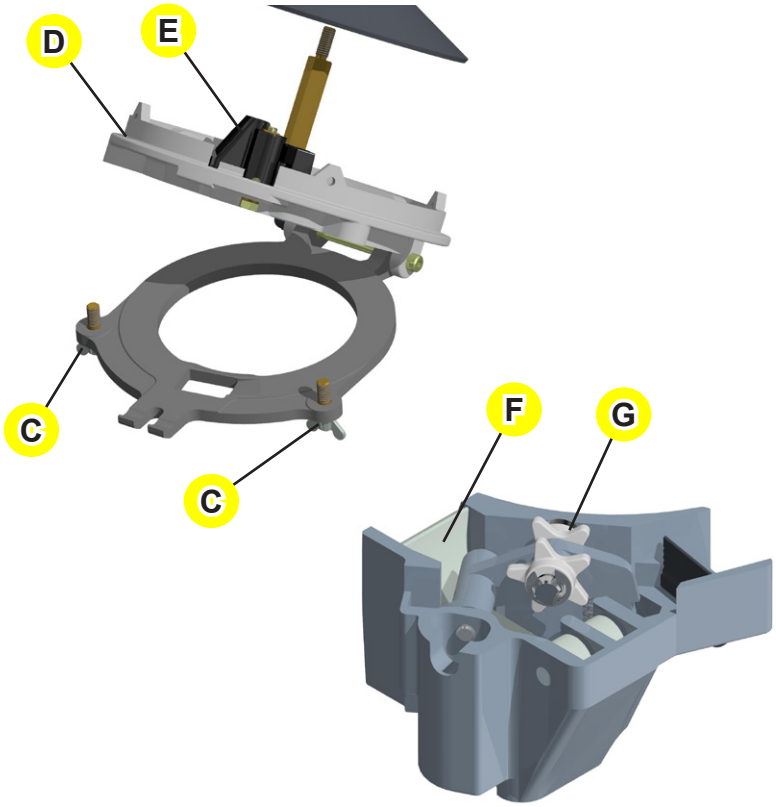
To replace the seed ejector and pulley set, proceed as follows:

Release the seed hopper (A) and the deflector (B) that is locked with butterfly nut;

Remove the butterfly nuts (C) that fasten the support (D) on the hopper, articulate the support to let the bolt that lock the seed metering (E) free;

Replace the seed ejector (F) and the pulley set (G) according to the planting needs or when wear is noticed.





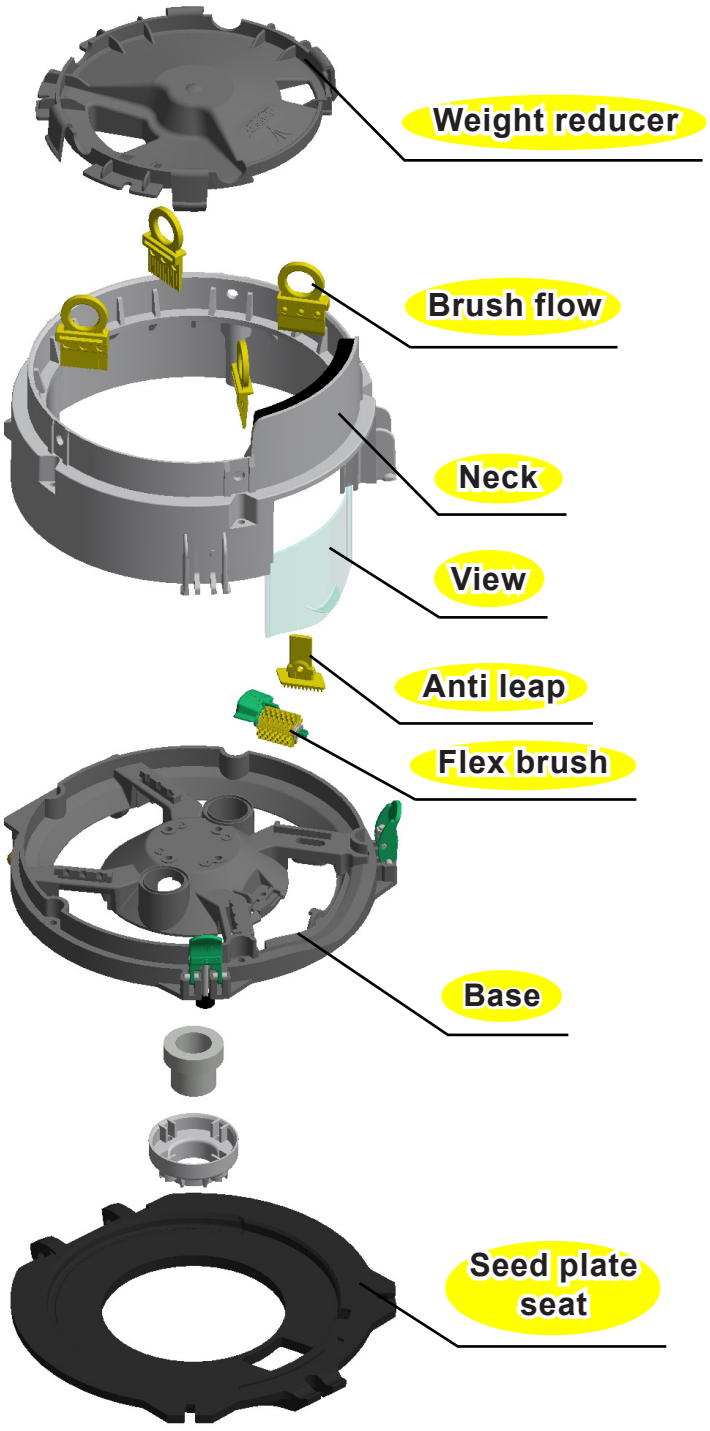
Titanium meterings

Seed dosing system for mechanical machines - TITANIUM

Titanium is a mechanical distribution seed system. It provides an easy maintenance to the farmer.

It is an easy-to-use equipment because it works as a seed plate. It features several technologies in order to provide a greater security and an excellent planting to the farmer.

Components and assembly

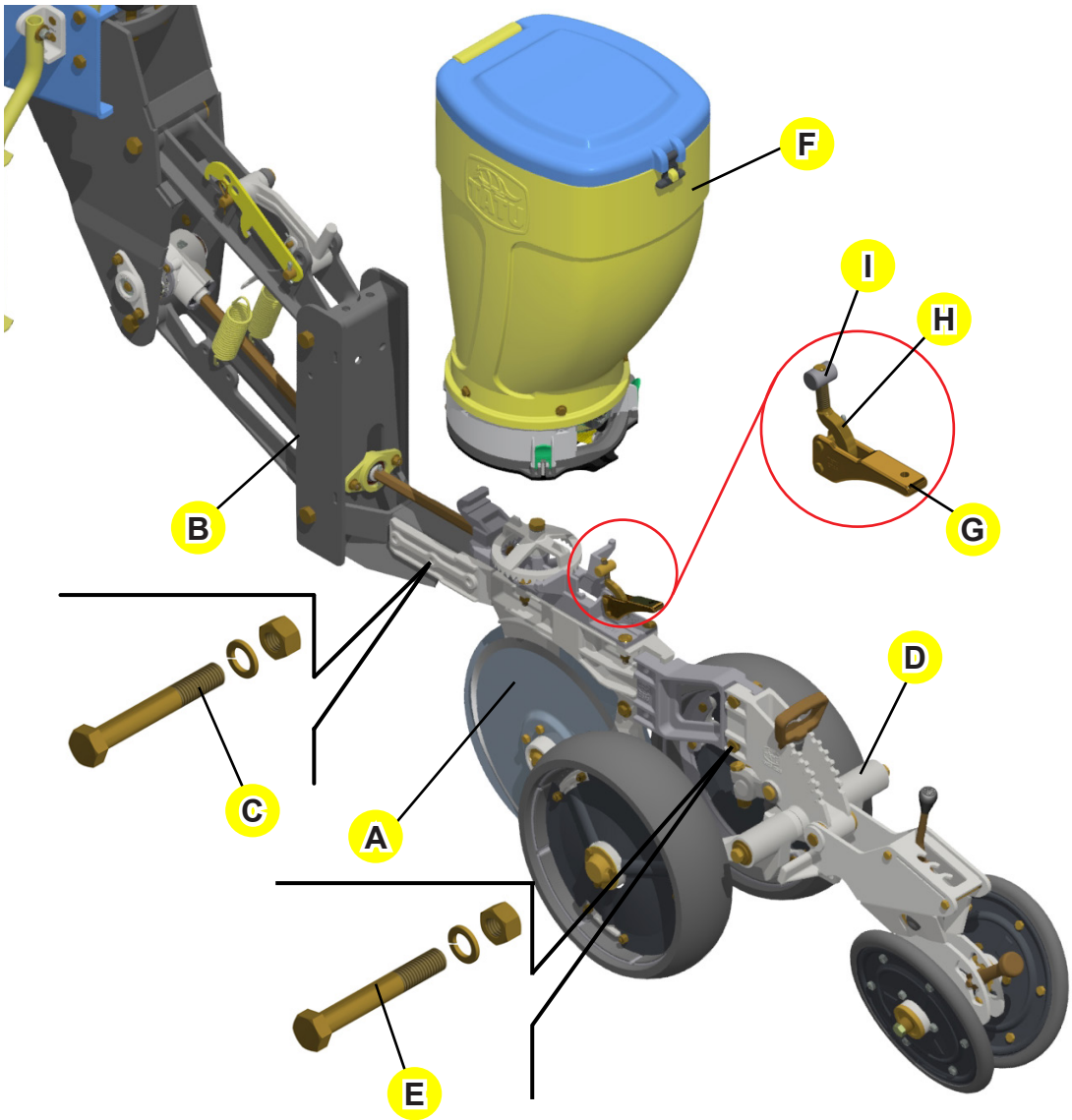


Row units rear part assembly - TITANIUM

Fasten the unaligned double disc support (A) to the seed row arm (B) using bolts (C), spring washers and nuts.

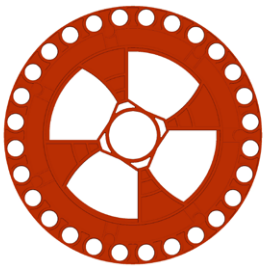
Fasten the gauge wheel (D) using bolts (E), spring washers and nuts.

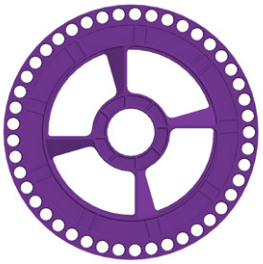
Couple the seed hopper (F) that has a quick locking (G) to the support (A). To avoid damages to the quick locking and locking on the seed plate, never overtight the quick lock adjuster (H) and leave it facing the quick lock lever (I). If the adjuster gets loose, fasten the thread until it tighten properly. Overtightening it may break the quick locking and lock the plate.



Standard seed plates - TITANIUM

Seed plate	Amount of holes	Serial number
CORN (Red)	28 holes	**05.03.01.6204**
SOYBEAN (Orange)	90 holes	**05.03.01.6217**
SOYBEAN (Pink)	45 holes	**05.03.01.6218**





NOTE

- **The seed plate works along with the ring. When changing to another culture, change the set (seed plate and ring).**
- **Check the rings to be paired with the seed plates on the TITANIUM manual.**

Changing the metering set - TITANIUM

Place the seed metering (A) upside down.

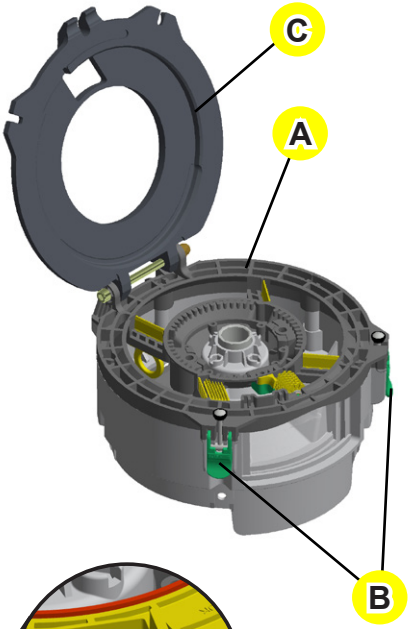
Open the locks (B) and lift the seed plate seat (C).

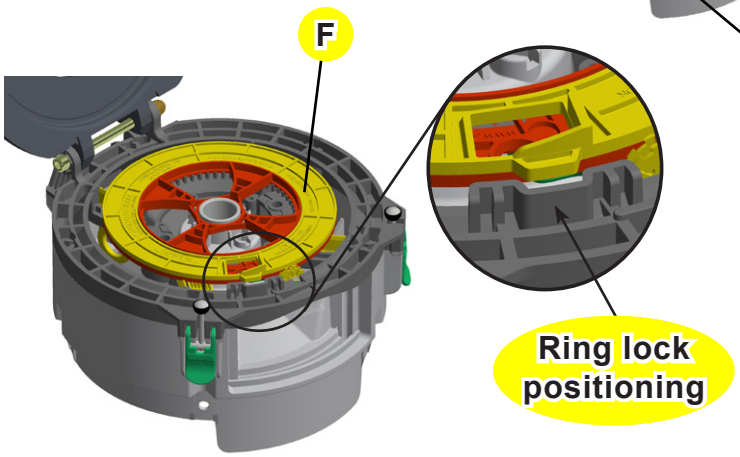
Insert the seed plate (D), being sure to place it on the correct position as shown below.

Fit the central hole of the seed plate (D) on the centralization bushing (E).

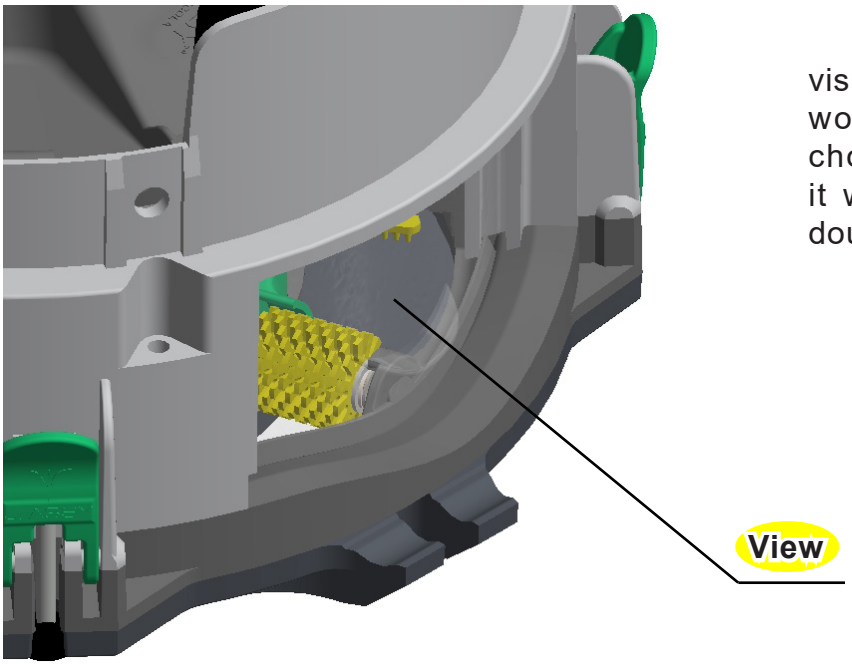
Fit the adapter ring (F) on the seed plate and respect its correct positioning.

Close the seat (C) and use the locks (B) to lock the system.





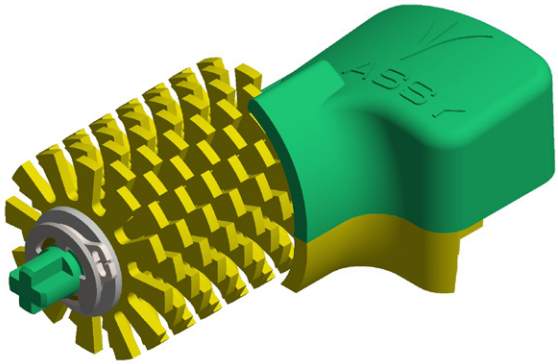
Main technologies

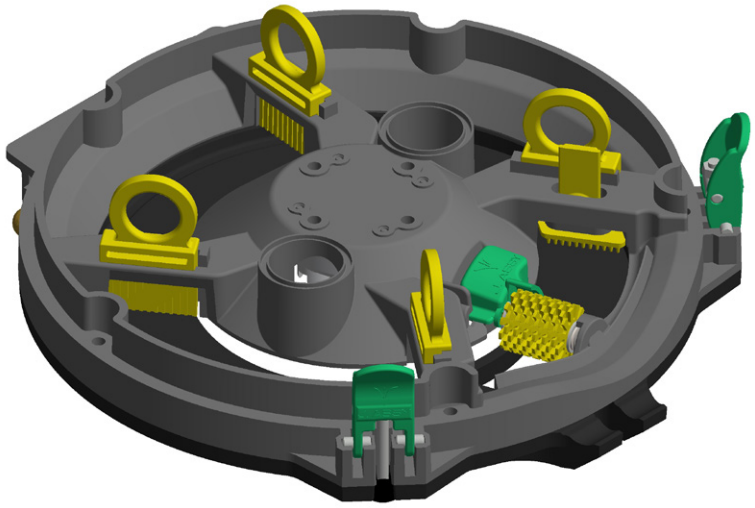


View: Allows a real time visualization of the seed plate while working, what is practical when choosing the plate and to adjust it when planting incorrectly (skip/ double seeds).

Flex brush: Remove the seeds that did not fall off by gravity. Its contact with the seeds provide less friction and less damage to them. It is possible to plant 05 (five) cultures without changing it, just being necessary to change the seed plate and rings.

When the flex brush is worn out, replace it.



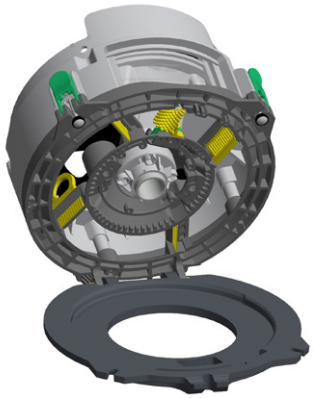


Brush flow (Organizers): There are four organizers inside the box, designed in polyurethane. This system drastically reduces the possibility of mechanical damages (breaks, cracks and others) in the seeds and also raise the chances of the seeds to remain organized in the seed plate holes.

When the brush flow is worn out, replace it.

Cleaning the metering

After the plantation is over, clean the seed plate and ring housing of the TITANIUM metering. Wash using water, brush and neutral detergent.



Graphite powder use

The non-usage of graphite, incorrect choice of seed plate/ring and the working hours are factors that directly changes the wear of seed plates and rings.

To maintain the excellence and efficiency of the TITANIUM metering, change the seed plate and ring for every new plantation.

The wear may increase the number of double seeds on the same hole.

It is very important to use graphite on TITANIUM. The average use of graphite per seed hopper is 200 - 240 grams, depending on the seed type or the treatment that was applied on them.

The graphite must be mixed to the seeds uniformly during plantation and always on the dry seeds.

Never mix graphite with the liquid treatment, because it takes away the lubricant capacity of the graphite, so the seeds will turn to black but will not be lubricated.

Graphite (powder) is the last treatment that should be applied to the seeds and has the purpose to lubricate them to eliminate doubles, skipping, wearing on the rings, seed breaking and premature wear on Brush flow and Flex brush components.

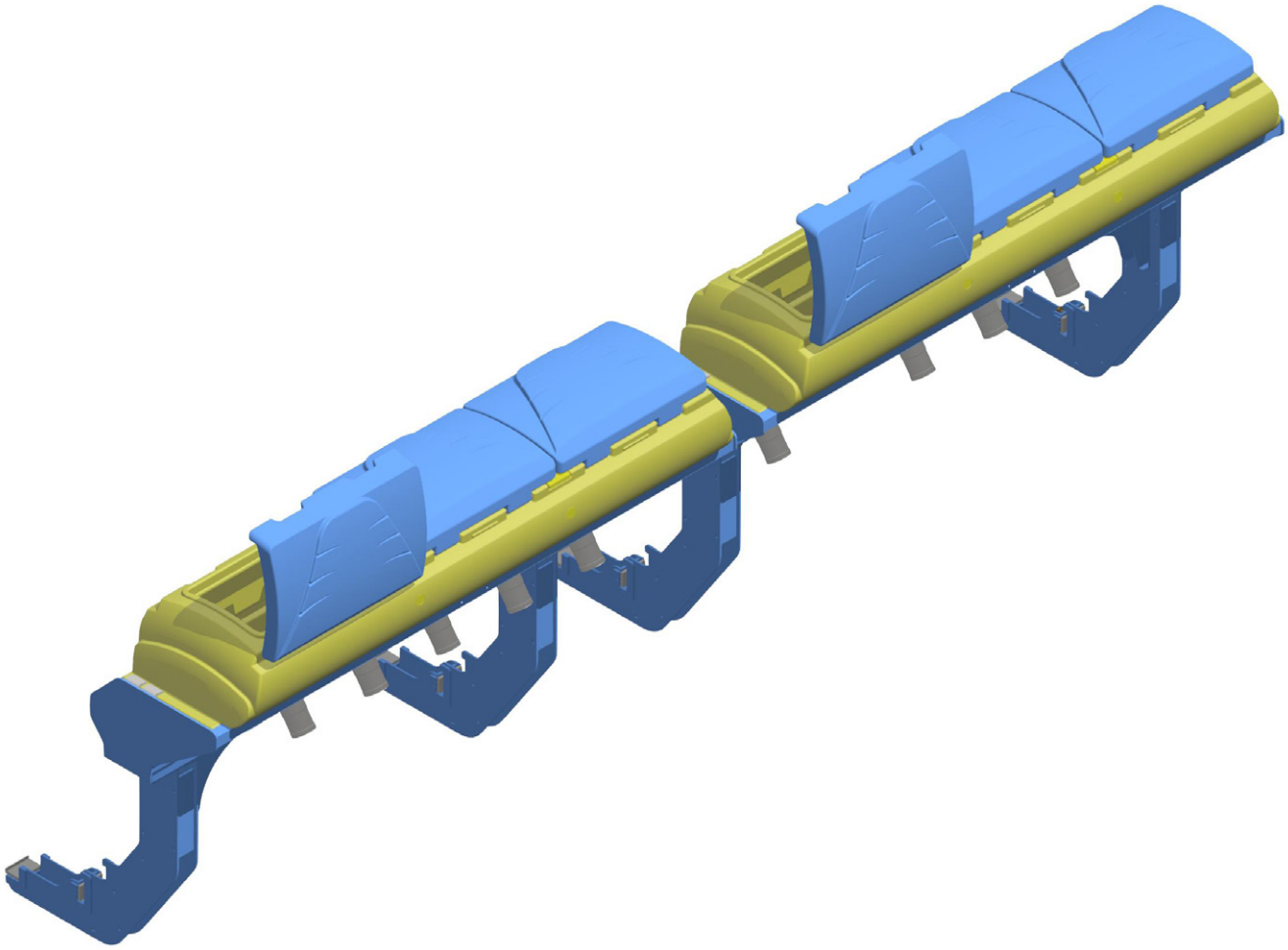
Some farmers know the benefits of using graphite for a perfect distribution and usually mix the graphite to the seeds by putting half of a seed bag on a plastic bag (fertilizer bag, for example) and shaking to assure that all seeds will be equally lubricated.

Amount of graphite per kilogram of seed			
Planter distribution system:	Seeds treated with insecticide		
	Small and round	Big and round	Flattened
Mechanical	04 grams	02 grams	04 grams

- The graphite should not be combined before the seed treatment.
- The graphite should not be combined to the insecticide to apply in the seeds.
- For non-treated seeds, use only half of the graphite mentioned in the previous table.

NOTE **• For more information, consult the TITANIUM manual.**

Single seed hopper



Hopper support and single seed hopper

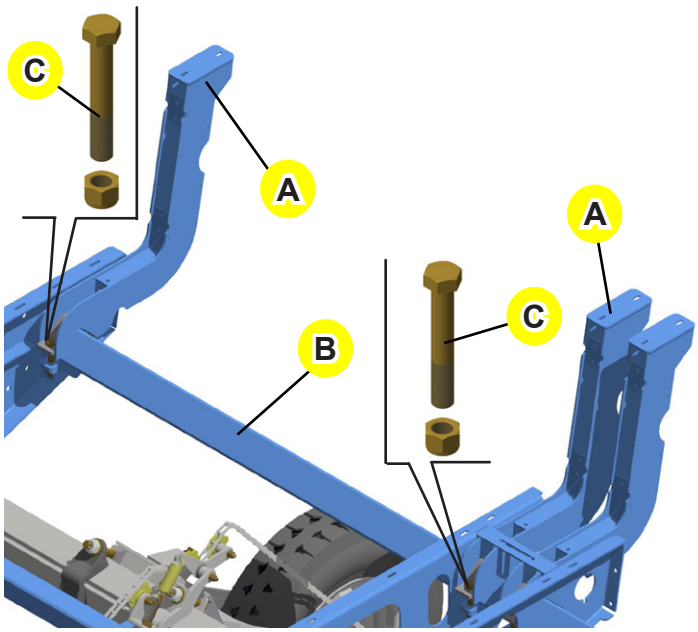
Assemble the hopper support (A) to the frame (B) using bolts (C) and nuts.

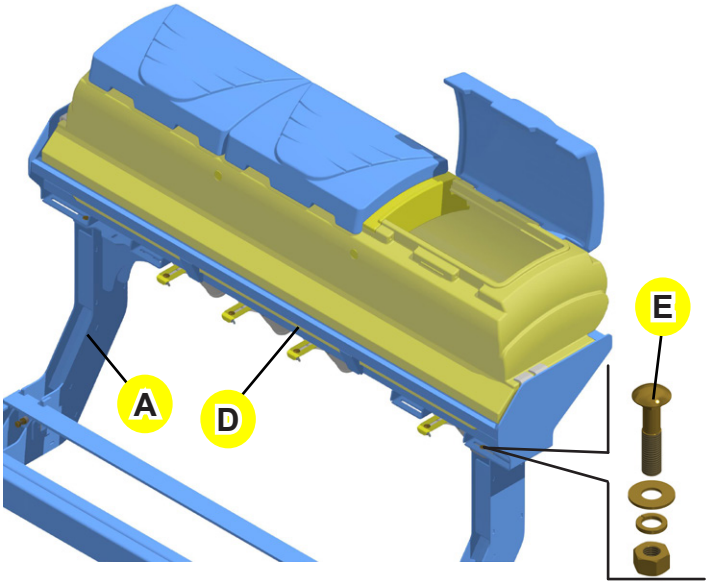
The supports must be assembled between the row units to avoid that they interfere on the seed row movement, what would lead to damages.

Assemble the single seed hopper (D) on the support (A) and lock using bolts (E), flat washers, spring washers and nuts.

Use the slots (D) on the support to adjust it.

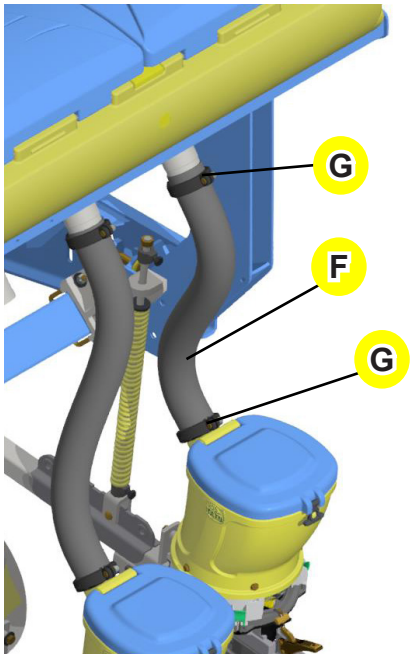
The seed singulator must be positioned directioned to the platform.





Lock the hose (F) to the single seed hopper output using the fastener (G).

Lock the other end of the hose (F) to the individual seed hoppers using the fastener (G).



NOTE

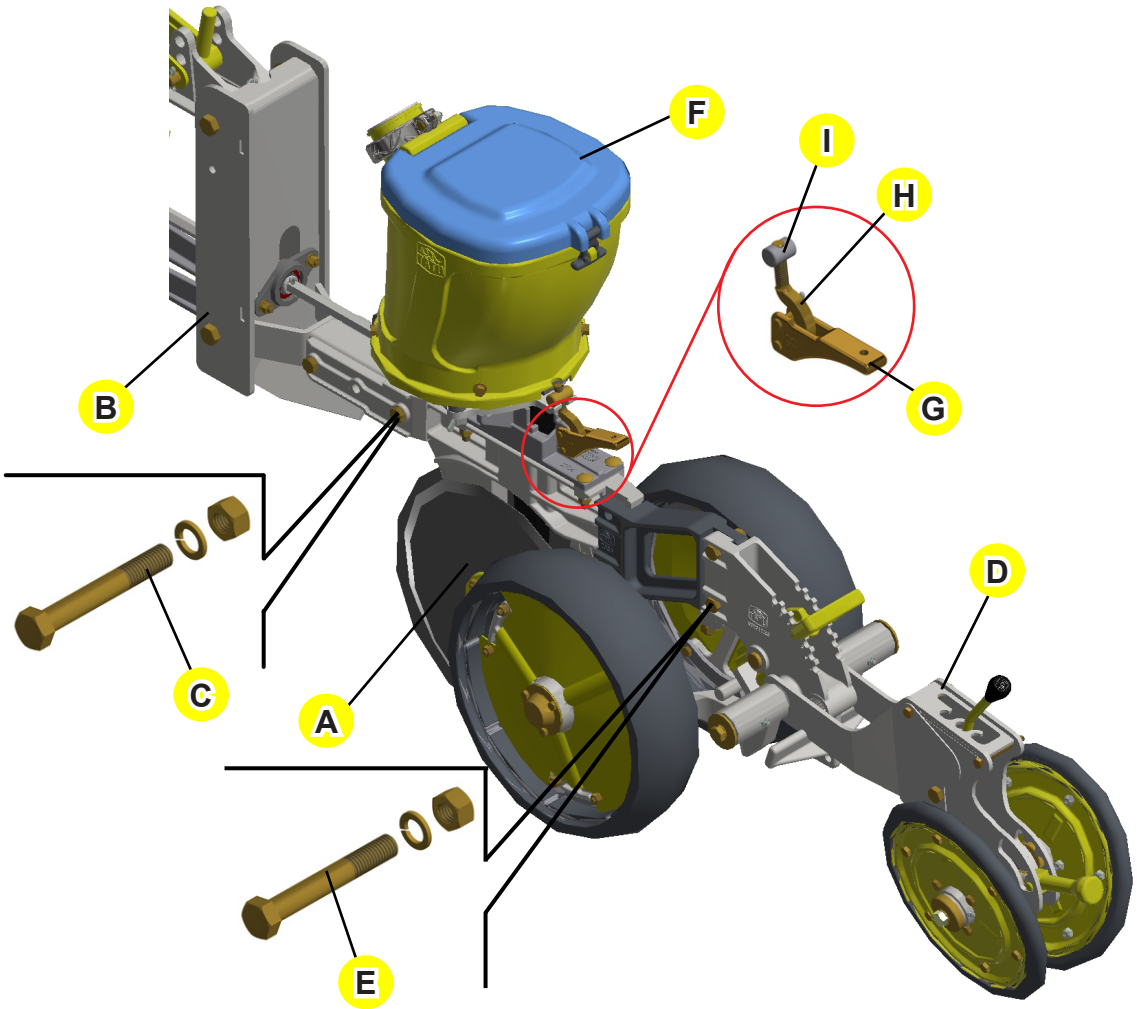
- **On this single seed hopper system with mechanical metering, the seeds fall off by gravity.**
- **Keep the fasteners (G) always tightened up so they will not get loose during the plantation.**
- **It is recommended to leave a clearance on the hoses (F) so that the seed row units can work free.**

Row units rear part assembly - Single seed hopper

Fasten the unaligned double disc support (A) to the seed row arm (B) using bolts (C), spring washers and nuts.

Fasten the gauge wheel (D) using bolts (E), spring washers and nuts.

Couple the seed hopper (F) that has a quick locking (G) to the support (A). To avoid damages to the quick locking and locking on the seed plate, never overtight the quick lock adjuster (H) and leave it facing the quick lock lever (I). If the adjuster gets loose, fasten the thread until it tighten properly. Overtightening it may break the quick locking and lock the plate.



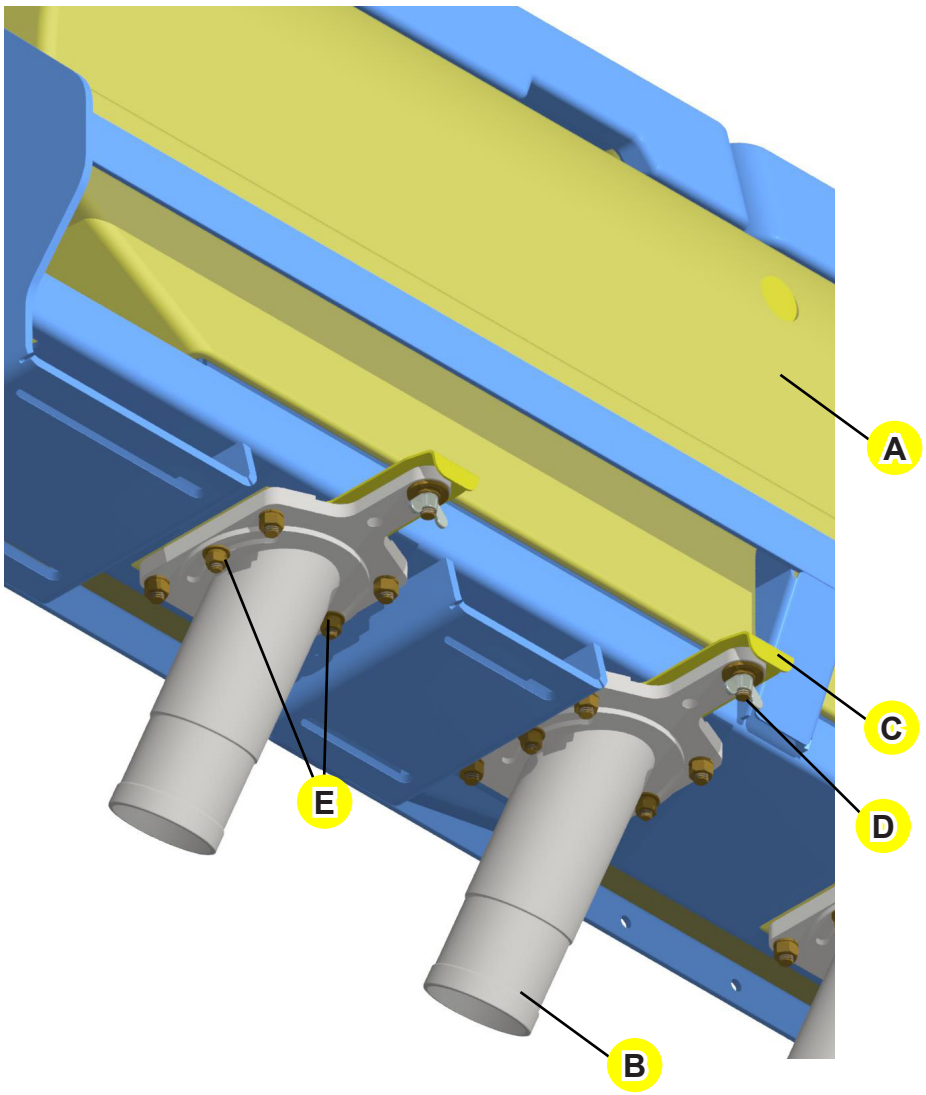
Single seed hopper outlet

The single seed hopper (A) outlets are aligned with the individual seed hoppers to allow a smaller working angle for the seed tubes, thus providing a distribution by gravity going from the single seed hopper to the row units.

On the hopper base, fasten the seed tube (B) with the opening adjustment plate (C) and butterfly nut.

The plate (C) allows the seed drop directioned to the row units. To adjust the opening, just loosen up the butterfly nut (D) and move the plate. After the adjustments, retighten the nut (D).

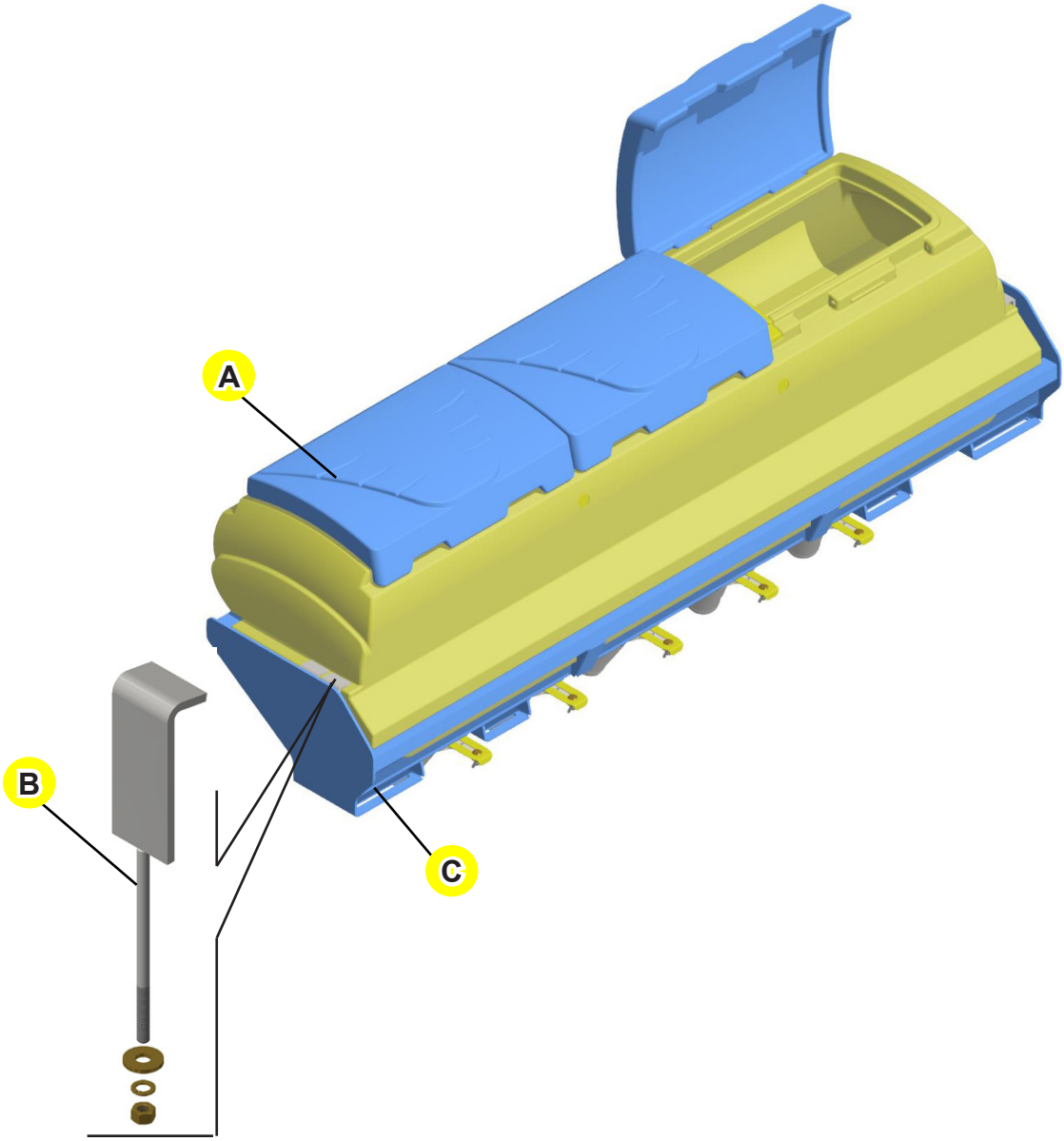
If there is any alteration on the row units configuration, adjust the seeds outlet by loosening up the bolts (E) and moving the tube to a position that allows a smaller working angle.

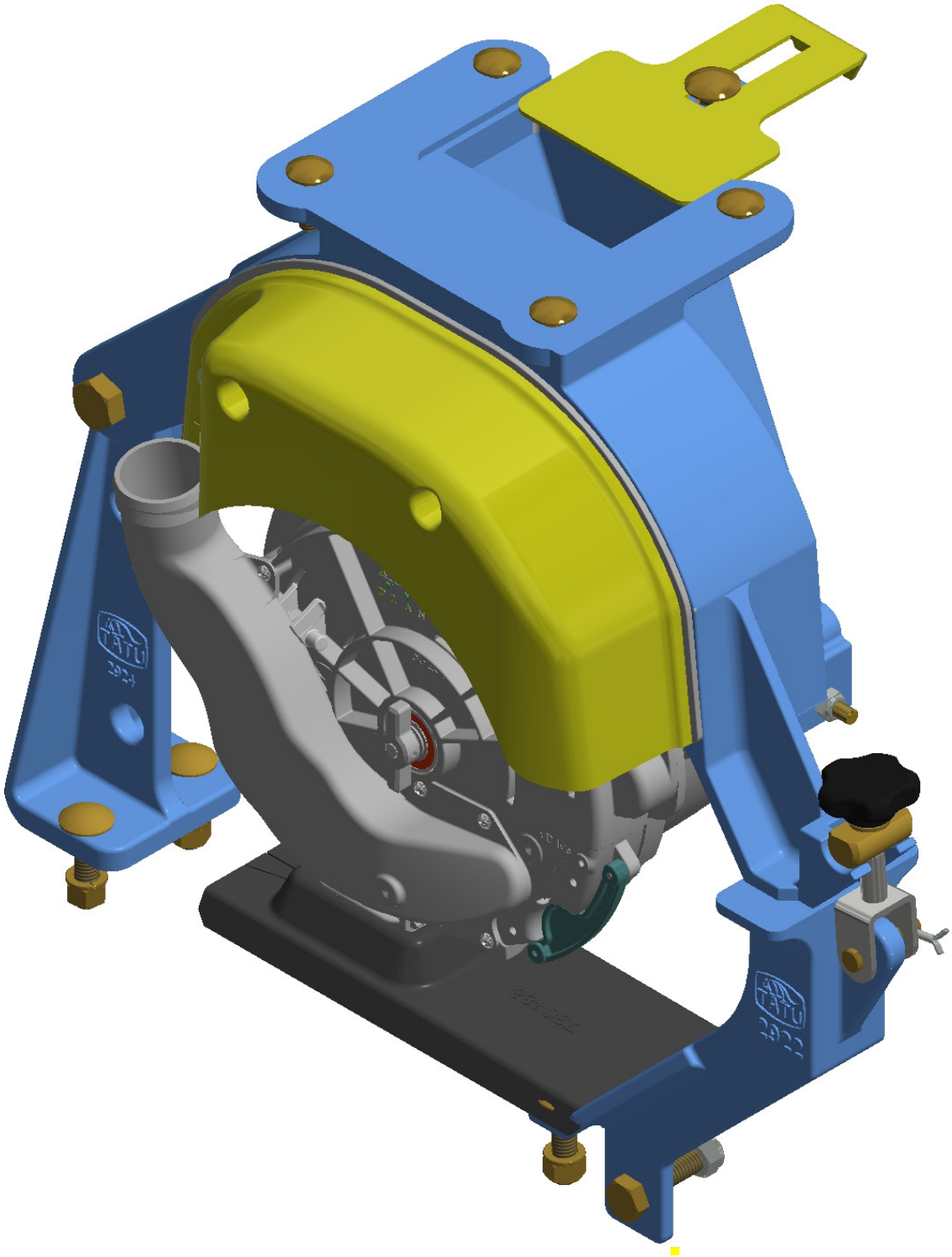


Cleaning the seed hopper

After every plantation, clean up the hoppers. Wash them using water, brush and neutral detergent.

To remove the hopper (A), loosen up the fixation lock (B) that is on the support (C) with flat and spring washer and nut.





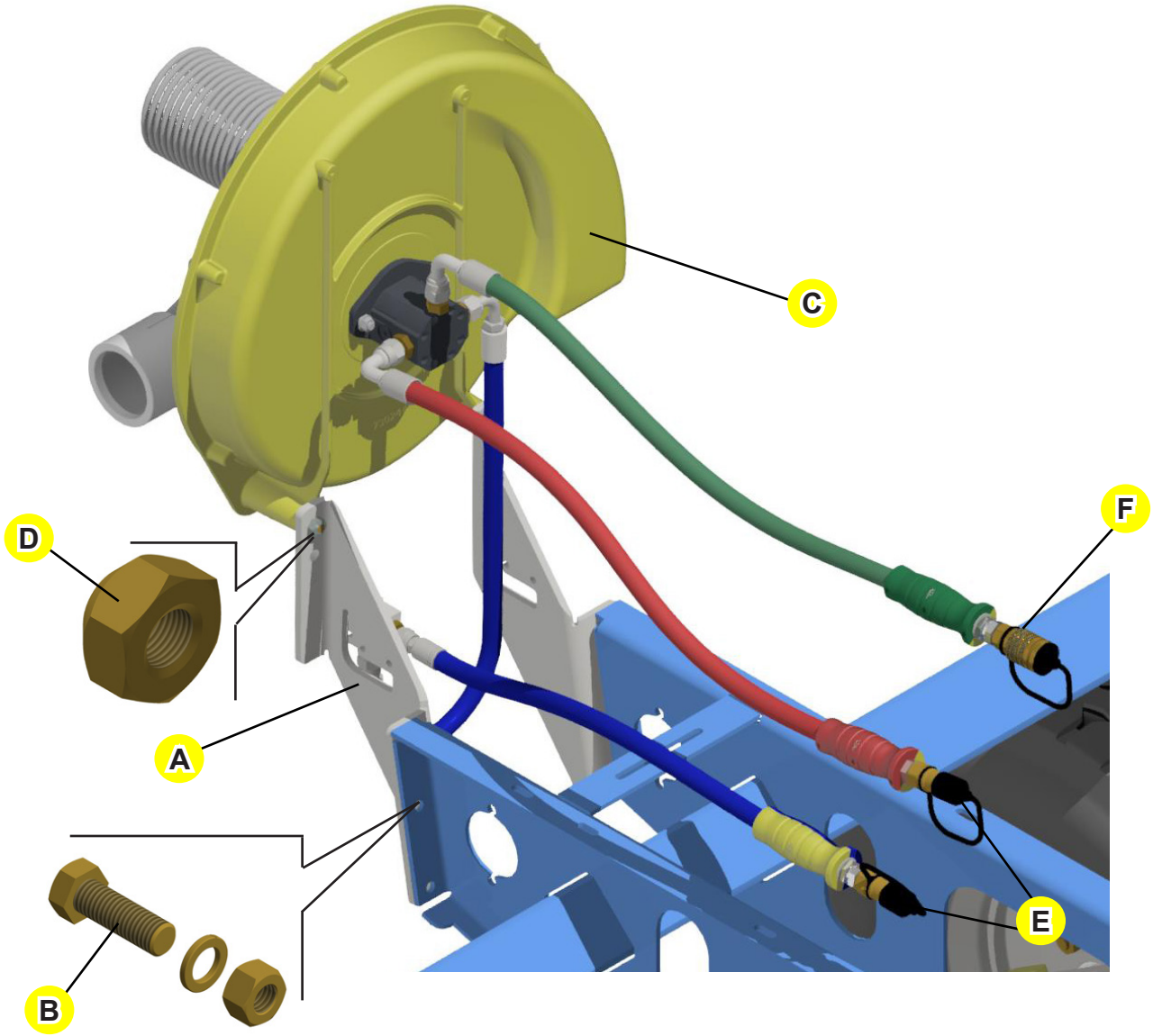
Precision Planting
pneumatic seed metering

Hydraulic turbine assembly

Assemble the rear support of the turbine (A) on the rear part of the frame locking with bolts (B), spring washers and nuts.

Assemble the turbine (C) on the rear support of the turbine (A) and lock using a nut (D).

• Carefully read the instructions that can be found on the turbine.



NOTE

• Male hitch (E) used on the pressure and return hoses.

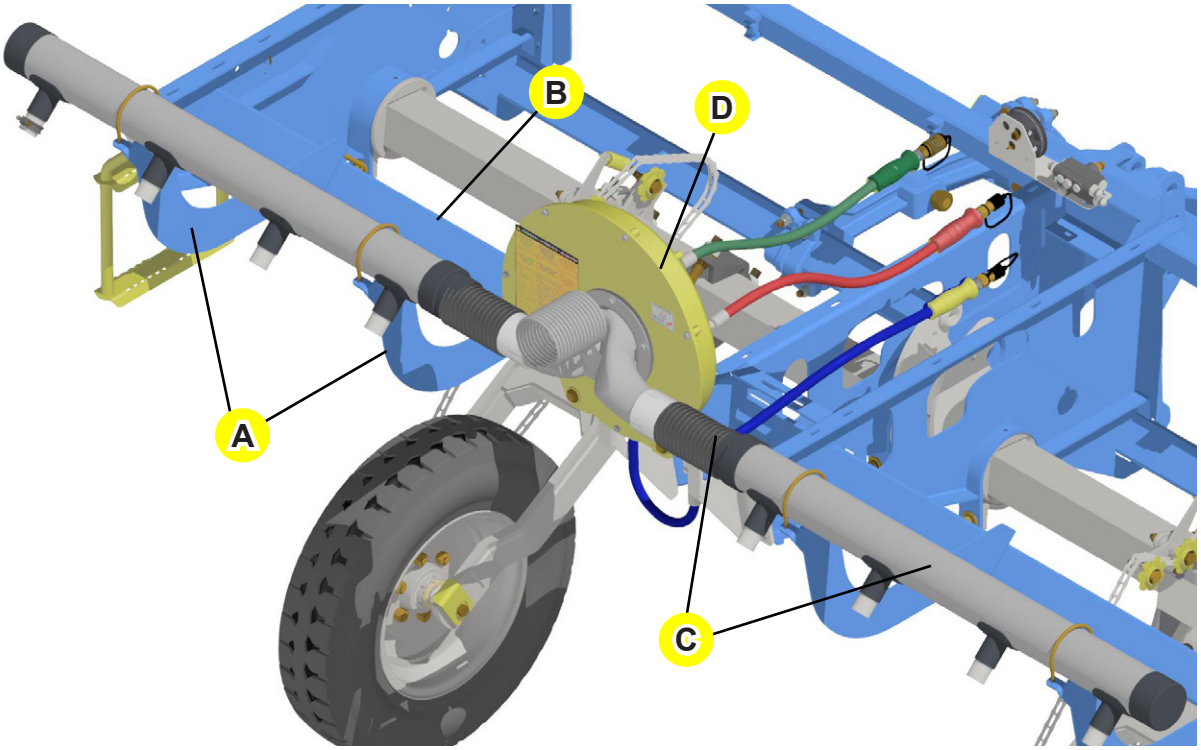
• Female hitch (F) used on the free return to the reservoir hose.

Air duct assembly for a single seed hopper system

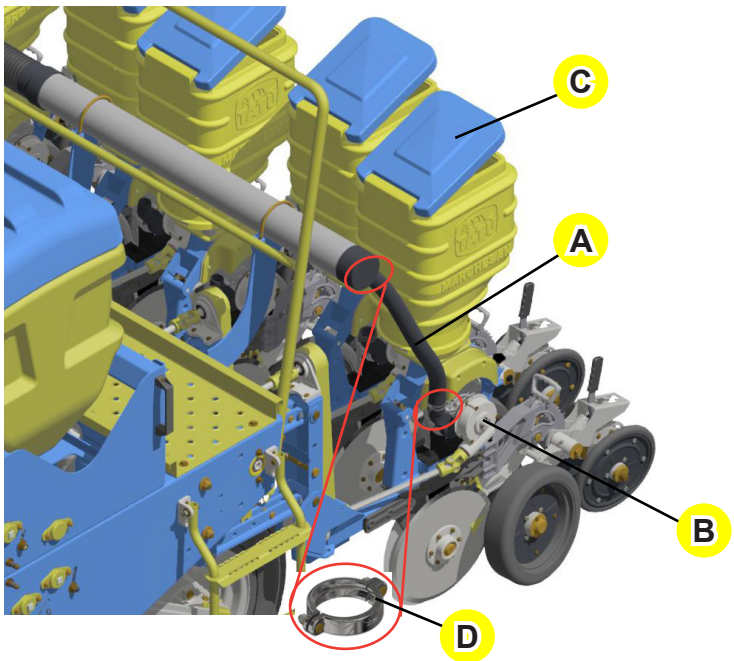
Assemble the air duct support (A) on the rear part of the equipment (B) using a clamp, flat washer, spring washer and nut.

Then, assemble the air ducts (C) to the support (A) and lock using a clamp, flat washer, spring washer and nut.

Couple the air ducts (C) to the turbine (D).



Air duct assembly



After assembling the air duct, install the hoses following the next steps.

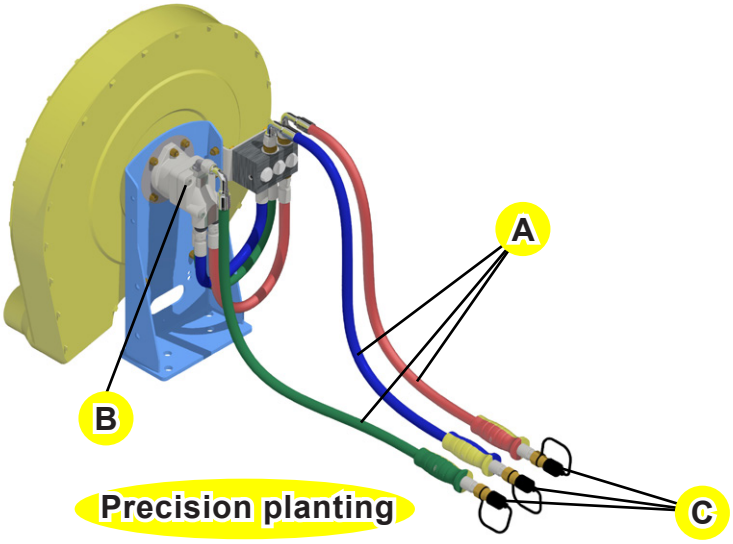
Assemble the hose (A) to the seed metering (B) and put the other end of the hose on the seed hopper (C), fastening both sides using the clamp (D).

Turbine with hydraulic motor

Fasten the hoses (A) to the hydraulic motor (B). Observe if the terminals are clean and avoid that they touch the soil.

Couple the male quick couplers (C) to the hoses, with proper tightening to avoid leaks.

NOTE • **Use thread sealing tape to couple the hoses to the male quick couplers.**

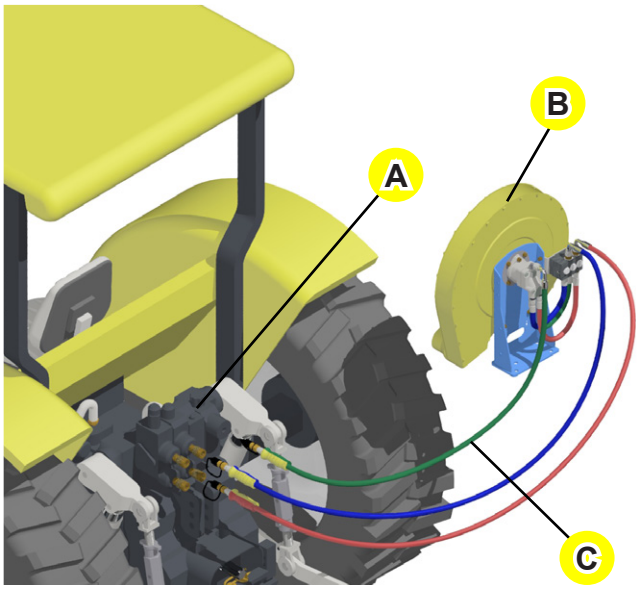


Precision planting

Vacuum meter detail

Hydraulic activation

Tractors with hydraulic system. Priority control valve with variable flow.



This valve has the hydraulic system and tractor priority and works when the equipment is lifted or when the tractor steering wheel is used and avoids a slower rotation in the turbine.

A - Priority valve with variable flow.

B - Turbine with hydraulic motor.

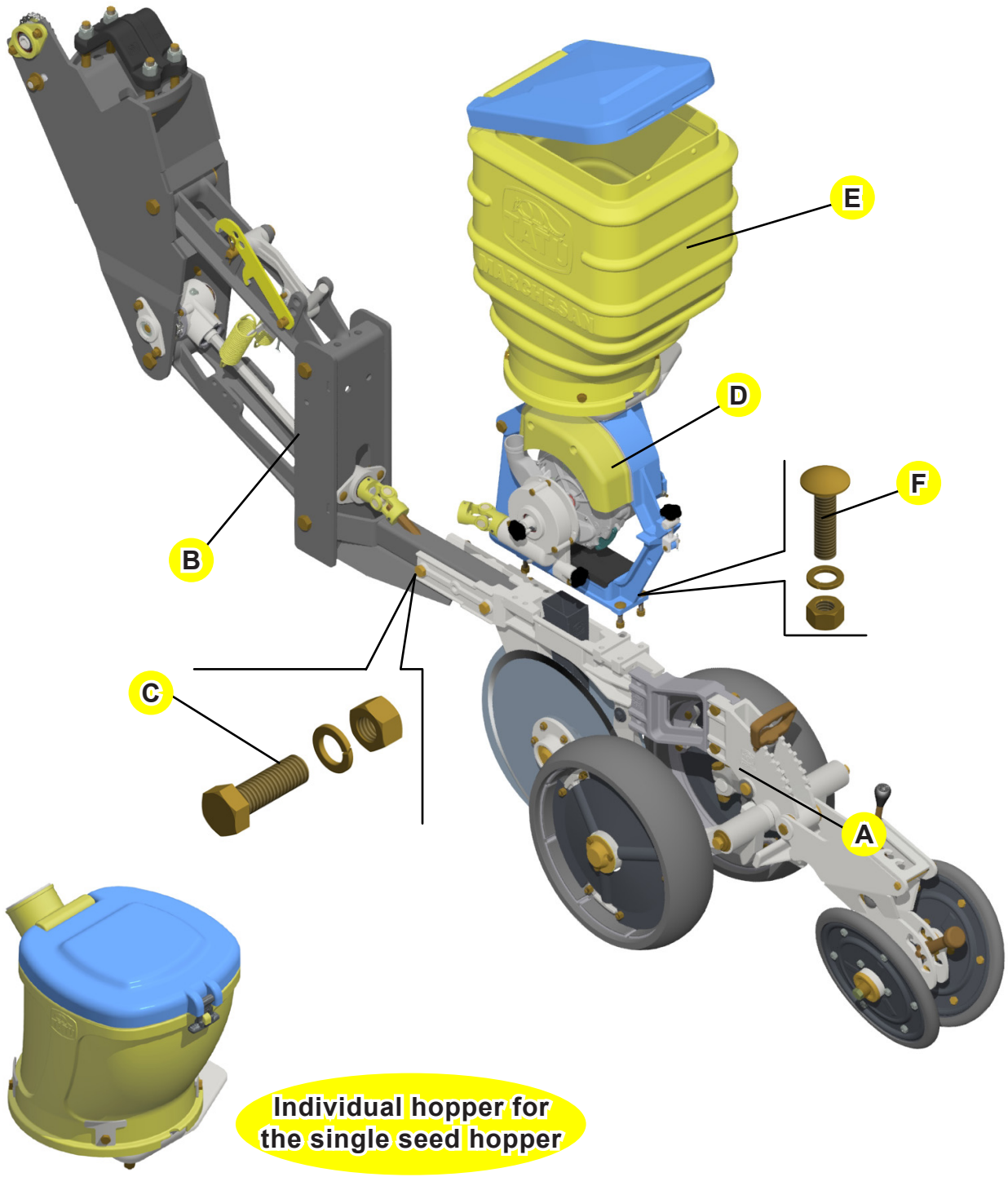
C - Free return to the reservoir, which should not have pressure in order to not damage the motor.

NOTE • **For tractors which not have a direct free return (C) to the reservoir, it is necessary to consult your dealer to make the adaption.**

Row unit rear part assembly

Lock the unaligned double disc (A) to the arm (B) of the seed row unit using bolts (C), spring washers and nuts.

Fasten the Precision Planting metering (D) along with the seed hopper (E) using bolts (F), spring washers and nuts.



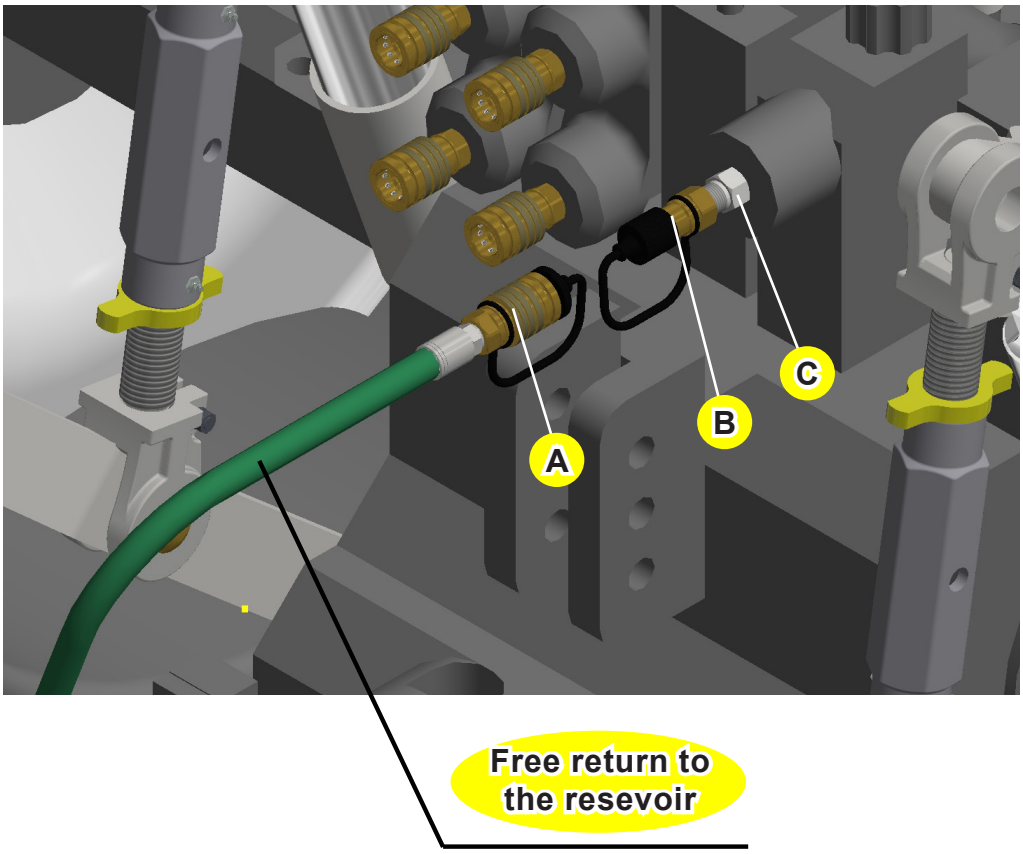
Coupling to the free return

The hose with 'female' coupler (A) should be coupled to the free return to the tractor reservoir. Find, in the components box, the 'male' coupler (B) that has to be coupled to the tractor.

Also find the nipple fitting (C) in the box, if the tractor does not have the proper fitting. This piece should be fixed to the reservoir only when necessary.

The following illustrations show the correct procedures to assemble the hose to the tractor.

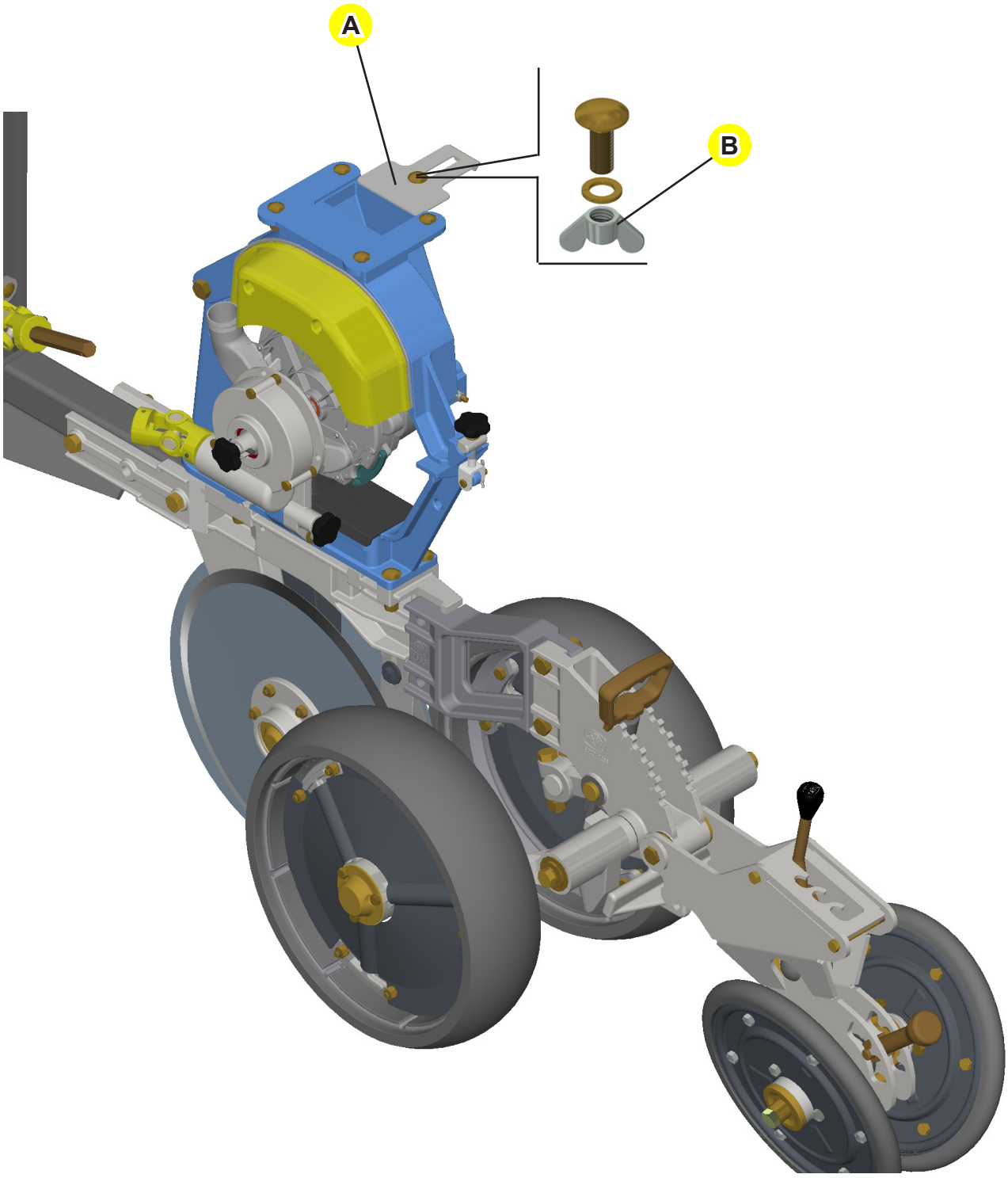
Couple the hoses from the hydraulic motor and planter cylinders to the respective tractor hydraulic outlets.



NOTE • **If there is any pressure on this hose, the hydraulic motor will be damaged.**

Stopping the seed flow

To replace the seed plate or to carry out any verification inside the meterings, loosen up the butterfly nut to use the flow stopper (A) in order to isolate the seeds inside the hoppers.



Vacuum meter set-up instructions

Due to the atmospheric pressure and the ambient temperature, the bolt (E) is used to adjust the vacuum meter to zero.

How to set the vacuum meter to zero:

• Turn off the turbine and wait for the blower to stop;

• Put a screwdriver on the bolt below "ZERO SET" to adjust the vacuum meter;

• Set it to zero with gentle movements;

• The indicator will move farther from zero on a clockwise movement and closer to zero on a counterclockwise movement;

• Never use sharp objects to adjust, such as a switchblade. They may damage the seal.

Appropriate suction

The appropriate suction is obtained after driving some meters with the planter, when the seeds are already housed in all the holes of the plate.

The activation by the hydraulic motor should keep the command lever in a constant activation, in a way that it keeps sending oil in the whole plantation process without interruption.

The proper adjustment of the flow control valve depends on the amount of row units and type of seeds.

NOTE

- **Consult the vacuum that corresponds to each culture on the seed plate table that can be found on the 'Seed plates - Precision Planting' on the 'optional' section.**

Vacuum meter detail

NOTE

- **Whenever adjusting the valve, it is necessary to make a verification in the seed plate.**

Attention: Safety hazard or damages to the equipment

- **PTO rotation should be kept in 540 rpm during the whole job when using the turbine.**
- **Consult the tractor manual and adjust the PTO rotation speed to 540 rpm before turning it on.**
- **If the rotation speed is not properly adjusted or is over 540 rpm, damages to the equipment or critical accident may occur.**
- **Marchesan is not responsible for the inadequate use of any equipment.**

Vacuum meter installation

The ambient temperature must not exceed **140°F (60°C)**. Also, avoid direct sunlight which accelerates discoloration of the clear plastic cover.

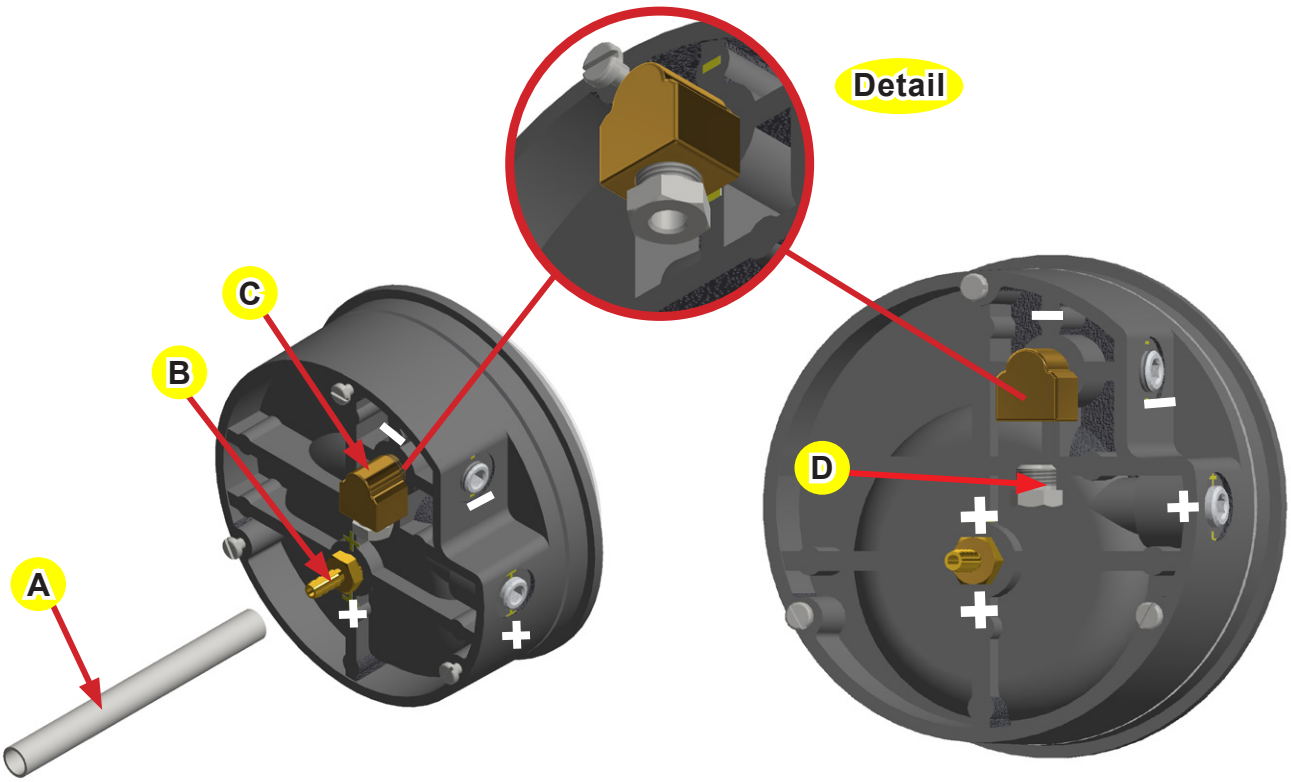
All vacuum meters are calibrated with the diaphragm on vertical and it should be used in that position for maximum precision.

Vacuum meter assembly

Couple the hose (A) from the turbine to the positive pressure thread (B) on the rear part.

Place the filter (C) with breather on the negative output [-] and always let the hole facing down.

Couple the breather (D) to the filter in order to protect the inner part of the meter.



Vacuum meter recommendations

• It is not necessary to lubricate the vacuum meter;

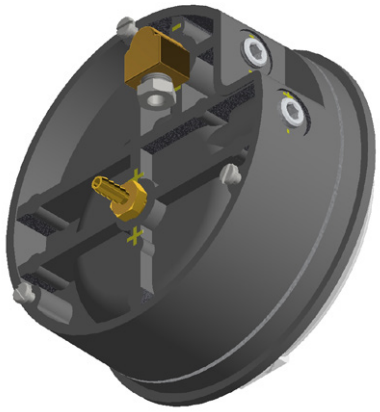
• Always keep the outer protection and the plastic cover cleaned;

• To equalize the inner and outer pressure it is necessary to use the filter on the rear part of the meter and keep it facing down, so water will not enter inside the equipment;

• When the vacuum meter stops working, the first procedure is to clean the filter;

• Never operate without the filter;

• When washing the equipment, protect the inner part from the water (if there is water inside the equipment, the warranty will void).



Troubleshooting tips

Vacuum meter do not indicate or is sluggish:

• Pressure port is without the relieve valve;

• Diaphragm ruptured due to overpressure;

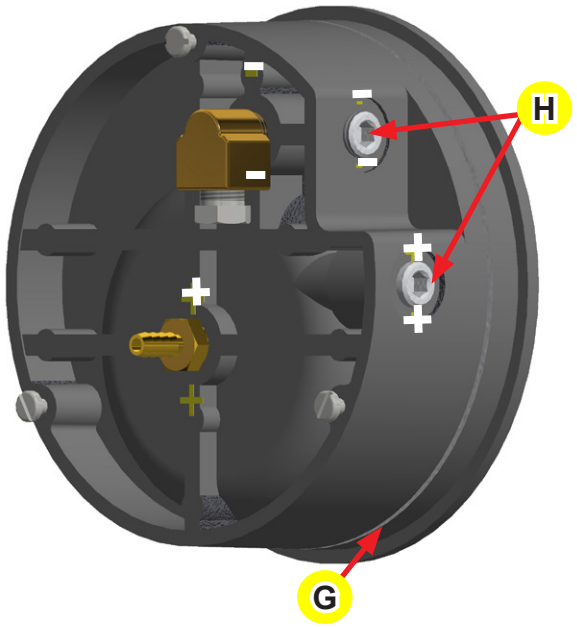
• Fittings or sensing lines blocked, pinched, or leaking;

• Cover loose or o-ring (G) damaged, missing;

• Do not loose or remove the lateral plugs (H);

• Pressure sensor improperly located;

• Never clean the filter using tools. Remove it, wash with water and dry using compressed air.



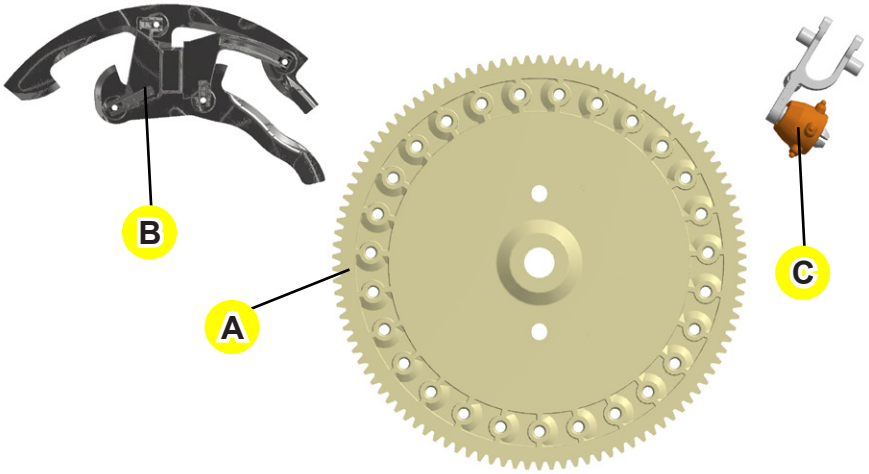
ATTENTION • **Never let water enter inside the vacuum meter, this act may damage your equipment and void your warranty.**

Changing the metering set

Precision Planting:

The metering set is composed by a seed plate (A), singulator (B) and ejector (C).

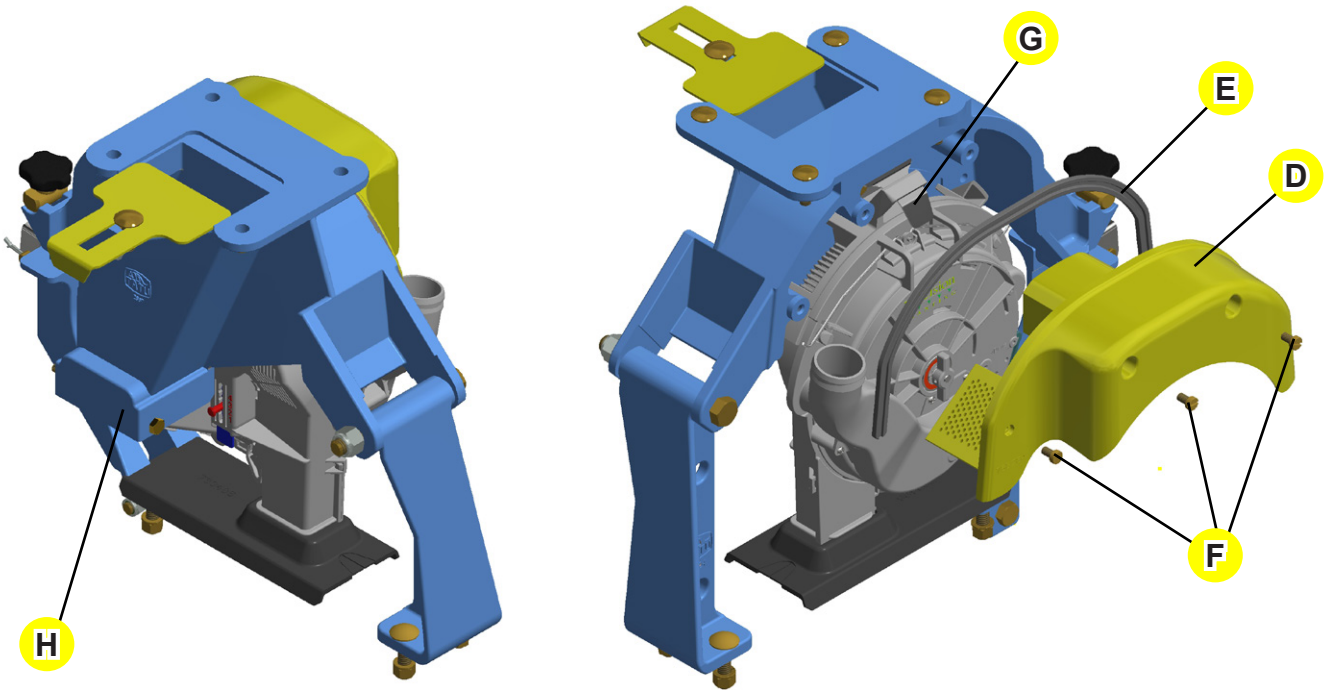
These three components were projected for specific types of culture. Whenever starting a different culture, change this set altogether.



To remove the cover from the metering, proceed as follows:

• Remove the straw cover (D) along with the seal (E) by loosening up the bolts (F);

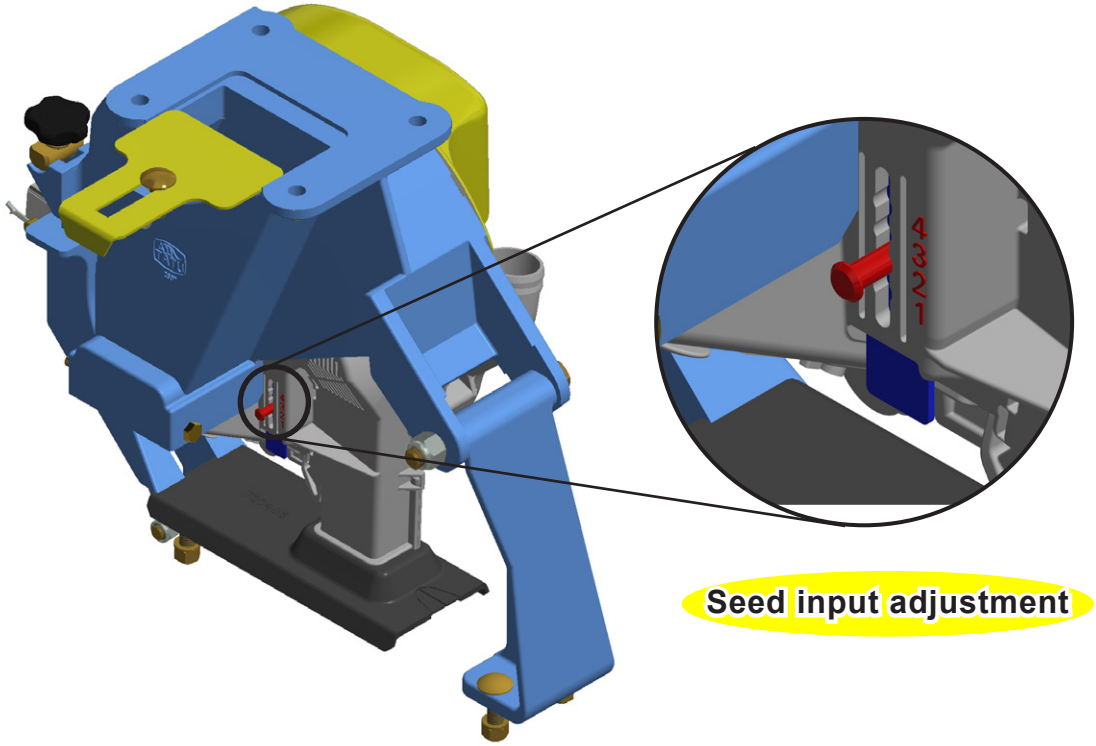
• Loose the metering, press the lock (G) and pull it out of the hopper (H) support. Twist the piece until the hooks of the seed outlet are free to slide out of the locks;



Seed input adjustment position

Precision planting has an adjustment to input the seeds situated in the metering with 4 (four) adjustment levels, which the operator can adjust according to the seed size.

For a better performance in the plantation, the operator should follow the **seed distribution tables**.



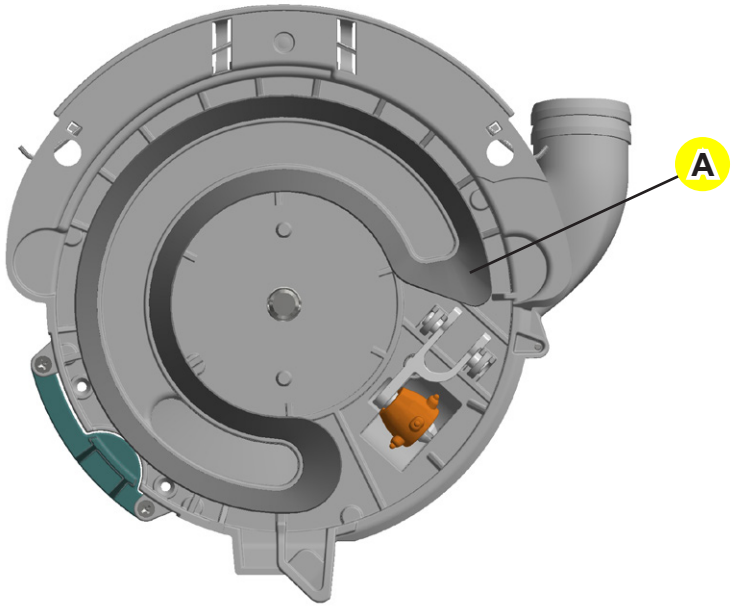
NOTE

- **WaveVision identify seeds starting from 3 mm.**
- **Milo screens needed for Central fill planters only.**
- **For optimal performance with large, long seeds, the singulator may need to be removed.**
- **For some seed sizes it may be necessary to remove the seed input adjustment completely to prevent bridging of large seeds.**
- **In some planting situations the owner should only replace the singulator, ejector or seed plate.**
- **For more information, consult the PRECISION PLANTING manual.**

Precision Planting - replacing the sealing system

1) Sealing:

• Check for excessive wear, cracks or holes on the vacuum sealing (A). If the sealing shows any of the cited problems, replace it.



Precision Planting

2) Graphite powder on the metering:

• Check if the metering is well lubricated with graphite powder before every plantation. If not, apply graphite powder on the metering before filling it up with seeds.

3) Graphite on the seed plate:

• Check the graphite on the rear part of the seed plate for wear. If positive, apply the J.Assy graphite spray all over the seed plate surface.

4) Storage:

• When not being used, store the seed plate set on a box for protecting it.

5) Cleaning:

• If there is any residue accumulation or dirty on the metering, clean the seed plate to assure the proper functioning of the product.

NOTE • **For a greater lifetime of the sealing, keep the back side of the seed plate well lubricated with graphite.**

Precision Planting - seed metering maintenance

1) Check for wear occurence on the singulator.

• Replace when there is excessive wear. An increase on doubles may indicate excessive wear on this piece.

• It is possible to check the singulator by using the tool for the eSet kit.

2) Check if there is any crack/wear on the vacuum sealing.

3) Check if the graphite from the seed plate was removed. (Re-apply graphite if necessary).

• Replace the seed plate if the holes become deformed or if the seeds are going to the vacuum side.

4) Check for any wear on the ejector wheel.

• Replace the set if there is any excessive wear on the arm inside the ejector wheel.

• Inspect each pin of the ejector wheel to see if they are intact.

• Check the plastic tension and replace it if it is loose on the assembly place.

5) Check for excessive wear on the brushes.

• If there is excessive clearance/wear that allows the seeds to pass through the brushes, replace them.

6) Test the meterings on the MeterMax Ultra test bench to assure a greater performance.

7) When in off-season, disassemble the meterings.

• Remove the crop components of the kit from the metering carcass.

• Store in a dry and flat place.

8) vSet2 vacuum sealing replacement

• Remove the sealing by pulling it out of the metering carcass.

• Check if both the new sealing and the slot on the metering carcass are free from debris. If they need to be cleaned, use hot water and a cloth or compressed air.

• Insert a new sealing on one of the ends of the carcass. As the sealing gets adjusted, check if the retention tongues on the surface of the metering are showing up. Be sure that the sealing is well fitted and that there are no protrusions.

• Every retention tongue must be used and the sealing must fit on the cavity. The tongues alignment will help to assure the proper sealing.

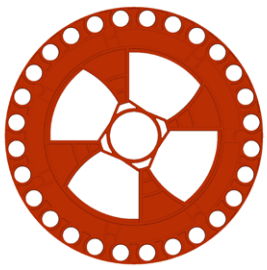
• When using a pressure washer, do not direct the jet to the electronic modules (SRM, Power Module, PDM, Smart Connector, RUM, vDrive and so on), seed meterings and connection harness.

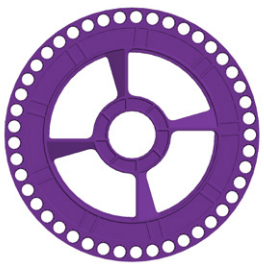
• When disconnecting any connection between crops for disassembling or maintenance purposes, the exposed connectors must be protected from the environment.

Seed plates

Optionally, MARCHESAN supplies slotted or perforated seed plates for several crops, according to the list below:

Seed plates	Amount of holes/ slots	Hole/slot dimension	Thickness	Serial number
Corn (Black)	28 slots	15.5 x 11.5 mm	4 mm	05.03.01.6194
Corn (Red)	28 slots	14.5 x 10 mm	4 mm	05.03.01.6195
Corn (Green)	28 slots	13.5 x 9 mm	4 mm	05.03.01.6196
Corn (Salmon)	28 slots	12.5 x 8.5 mm	4 mm	05.03.01.6197
Corn (Gray)	28 slots	12.3 x 9.4 mm	4 mm	05.03.01.6198
Corn (White)	28 slots	11.5 x 8.5 mm	4 mm	05.03.01.6199
Corn (Pumpkin)	28 slots	11 x 8 mm	4 mm	05.03.01.6200
Corn (Gray)	28 holes	13.5 mm	4 mm	05.03.01.6201
Corn (Pink)	28 holes	13 mm	4 mm	05.03.01.6202
Corn (Light blue)	28 holes	12.5 mm	4 mm	05.03.01.6203
Corn (Light green)	28 holes	11.5 mm	4 mm	05.03.01.6205
Corn (Blue)	28 holes	10.5 mm	4 mm	05.03.01.6207
Corn (Yellow)	28 holes	10 mm	4 mm	05.03.01.6208
Corn (Gray)	28 holes	9.5 mm	4 mm	05.03.01.6209
Corn (Dark green)	28 holes	9 mm	4 mm	05.03.01.6210
Corn (Purple)	28 holes	8 mm	4 mm	05.03.01.6211
Corn (Red)	28 holes	14 mm	4 mm	05.03.01.6212
Corn (Black)	28 holes	15 mm	4 mm	05.03.01.6213
Ring for corn with recess of 1 mm (Green)	———	———	1 mm	05.03.01.6215
Ring for corn with recess of 2 mm	———	———	2 mm	05.03.01.6216

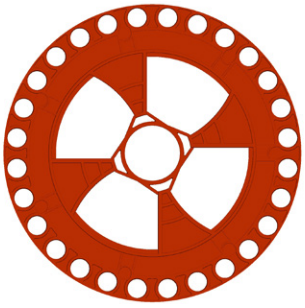


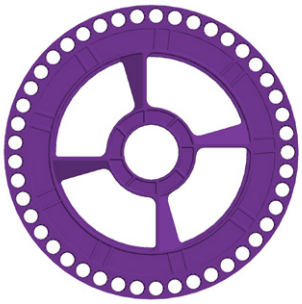


Titanium seed plates

MARCHESAN optionally supplies seed plates for several cultivations, according to the table below:

Seed plates	Amount of holes	Serial number
CORN	27 holes	05.03.01.8481
CORN	27 holes	05.03.01.8482
BEAN (MEDIUM)	70 holes	05.03.01.8468
SOYBEAN	80 holes	05.03.01.8483
BEET / ONION	32 holes	05.03.01.8496
SORGHUM	32 holes	05.03.01.8159
PEANUT	32 holes	05.03.01.8497
CANOLA	80 holes	05.03.01.8498





NOTE • **To change the seed plates, follow the instructions on the 'Changing the metering set - Titanium' on the 'set-up instructions' section.**

Precision Planting seed plates

MARCHESAN optionally supplies seed plates for several cultures, according to the table below:

Crop		Field Corn	Soybean	Sweet Corn				Popcorn		
Size (Qualitative)				Small	Medium	Large	X-Large	Small	Medium	Large
Size (Seeds/KG)		2200-6200	4400-10000	4400-10200				3300-10650		
Vacuum (inch of water)		20"	20"	18"-22"	18"-22"	18"-22"	18"-22"	20"	20"	20"
Vacuum (millibar)		50	50	45 - 50	45 - 50	45 - 50	45 - 50	60	60	60
Vacuum (PSI)		0.722	0.722	0.65-0.72	0.65-0.72	0.65-0.72	0.65-0.72	0.72	0.72	0.72
Baffle position		2	2	4	4	4	4	2	2	2
Kit Part #		05.03.06.2417	05.03.06.2407							
Seed plate	Name	Corn	Soybean	Specialty	Specialty	Specialty	Specialty	Specialty	Specialty	Specialty
	# of holes	27	80	27	27	27	27	27	27	27
	Rows on field	single	double	single	single	single	single	single	single	single
	Hole size (inches)	0.176	0.155	0.125	0.135	0.145	0.155	0.115	0.115	0.125
	Hole size (mm)	4.470	3.937	3.175	3.429	3.683	3.937	2.921	2.921	3.175
	PN	05.03.01.8481	05.03.01.8483	05.03.01.8491	05.03.01.8492	05.03.01.8493	05.03.01.8494	05.03.01.8482	05.03.01.8482	05.03.01.8491
Singulator	Name	Corn	Soybean	Corn	Corn	Corn	Corn	Corn	Corn	Corn
	PN	05.03.06.2472	05.03.06.2569	05.03.06.2472	05.03.06.2472	05.03.06.2472	05.03.06.2472	05.03.06.2472	05.03.06.2472	05.03.06.2472
Ejector	Name	Corn	Soybean	Specialty	Specialty	Specialty	Specialty	Specialty	Specialty	Specialty
	PN	05.03.06.2474	05.03.06.2566	05.03.06.2570	05.03.06.2570	05.03.06.2570	05.03.06.2570	05.03.06.2570	05.03.06.2570	05.03.06.2570
Additional Components	Description									
	PN									
WaveVision recommended for Population monitoring?		Yes	Yes							

* WaveVision identify seeds starting from 3mm

** Milo screens needed for Central fill planters only

***For optimal performance with large, long seeds, the singulator may need to be removed

****For some seed sizes it may be necessary to remove the baffle completely to prevent bridging of large seeds

Use a good amount of graphite

Color on table corresponds to actual color of parts

BOLD components are included in the kit

Use a good amount of graphite

Color on the table corresponds to actual color of parts

BOLD components are included in the kit

* WaveVision identify seeds starting from 3mm

** Milo screens needed for Central fill planters only

***For optimal performance with large, long seeds, the singulator may need to be removed

****For some seed sizes it may be necessary to remove the baffle completely to prevent bridging of large seeds

Crop		Sorghum/ Milo	Pumpkins	Cotton	Edible Beans		
Size (Qualitative)			Del Monte / Libby	Singulated (High rate)	Small	Medium	Large
Size (Seeds/KG)		26K-42K	-	9300-14000	> 4400	2860-4400	< 2860
Vacuum (Inch of water)		10"-16"	11"-12"	20"	18"-22"	18"-24"	18"-26"
Vacuum (millibar)		25 - 40	27 - 30	60	45 - 55	45 - 60	45 - 65
Vacuum (PSI)		0.36 - 0.58	0.4 - 0.43	0.72	0.65-0.8	0.65-0.87	0.65-0.94
Baffle position		1	3	2	2	3	4
Kit Part #		05.03.06.2471		05.03.06.2586	05.03.06.2407	05.03.06.2564	05.03.06.2573
Seed plate	Name	**Large sugar beet**	Specialty	Singulated High Rate Cotton	**Soybean**	**Medium Edible Bean**	**Large Edible Bean**
	# of holes	**32**	27	32	**80**	**70**	**32**
	Rows on field	**single**	single	single	**double**	**double**	**single**
	Hole size (inches)	**0.086**	0.125	0.115	**0.155**	**0.17**	**0.21**
	Hole size (mm)	**2.184**	3.175	2.921	**3.937**	**4.318**	**5.334**
	PN	**05.03.01.8159**	05.03.01.8491	**05.03.01.8529**	**05.03.01.8483**	**05.03.1.8468**	**05.03.01.8495**
Singulator	Name	Corn	Corn	Corn	**Soybean**	Bean	Soybean
	PN	05.03.06.2472	05.03.06.2472	05.03.06.2472	**05.03.06.2569**	**05.03.06.2565**	05.03.06.2569
Ejector	Name	**Sugar beet**	Specialty	**Sugar beet**	**Soybean**	**Soybean**	**Large Edible Bean**
	PN	**05.03.06.2473**	05.03.06.2570	**05.03.06.2473**	**05.03.06.2566**	**05.03.06.2566**	**05.03.06.2571**
Additional Components	Description	Milo screen**				L Seed Upper Brush	L Seed Upper Brush
	PN	05.03.01.8499**				05.03.01.8469	05.03.01.8469
WaveVision Recommended for Population monitoring?		Yes*			Yes	Yes	Yes

Use a good amount of graphite

Color on table corresponds to actual color of parts

BOLD components are included in the kit

* WaveVision identify seeds starting from 3mm

** Milo screens needed for Central fill planters only

***For optimal performance with large, long seeds, the singulator may need to be removed

****For some seed sizes it may be necessary to remove the baffle completely to prevent bridging of large seeds

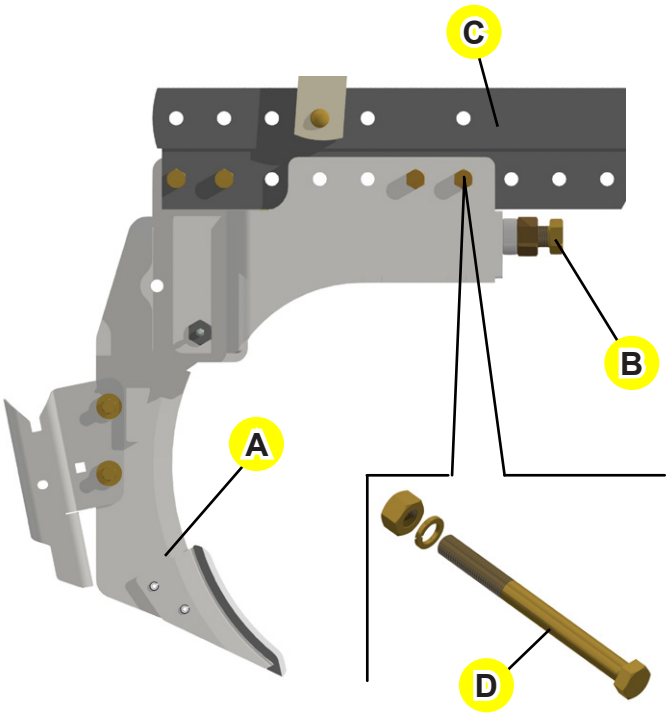
Crop		Sunflower						Canola	Peanut
Size (Qualitative)		Large Edible	Small Edible	#1	#2	#3	#4		
Size (Seeds/KG)		4400-8800		6,6K - 10K				166K-400K	445-3111
Vacuum (Inch of water)		12"-13"	11"-12"	11"-12"	11"-12"	7"-8"	6"-7"	22"-26"	20" - 30"
Vacuum (millibar)		30 - 32	27 - 30	27 - 30	27 - 30	27 - 30	15 - 17	55 - 65	50 - 70
Vacuum (PSI)		0.43-0.47	0.4 - 0.43	0.4 - 0.43	0.4 - 0.43	0.25 - 0.29	0.21-0.25	0.8 - 0.94	0.70 - 1.08
Baffle position		4	4	4	4	3	2	4	4****
Kit Part #		05.03.06.2417	05.03.06.2417					05.03.06.2575	05.03.06.2576
Seed plate	Name	**Corn**	**Corn**	Specialty	Specialty	Specialty	Specialty	**Canola**	**Peanut**
	# of holes	**27**	**27**	27	27	27	27	**80**	**32**
	Rows on field	**single**	**single**	single	single	single	single	**double**	**single**
	Hole size (inches)	**0.176**	**0.176**	0.155	0.135	0.115	0.115	**0.047**	**0.23**
	Hole size (mm)	**4.470**	**4.470**	3.937	3.429	2.921	2.921	**1.193**	**5.842**
	PN	**05.03.01.8481**	**05.03.01.8481**	05.03.01.8494	05.03.01.8492	05.03.01.8482	05.03.01.8482	**05.03.01.8489**	**05.03.01.8497**
Singulator	Name	**Corn**	**Corn**	Corn	Corn	Corn	Corn	Corn	**Soybean*** **
	PN	**05.03.06.2472**	**05.03.06.2472**	05.03.06.2472	05.03.06.2472	05.03.06.2472	05.03.06.2472	05.03.06.2472	05.03.06.2569
Ejector	Name	**Corn**	**Corn**	Specialty	Specialty	Specialty	Specialty	N/A	**Large Edible Bean**
	PN	**05.03.06.2474**	**05.03.06.2474**	05.03.06.2570	05.03.06.2570	05.03.06.2570	05.03.06.2570	**N/A**	**05.03.06.2571**
Additional Components	Description	L Seed Upper Brush						**Wiper Kit**	L Seed Upper Brush
	PN	05.03.01.8469						**05.03.06.2572**	**05.03.01.8469**
WaveVision Recommended for Population monitoring?								No Pop. Mon.	

Automatic retrieving of the rod

The automatic retrieving rod (A) is used over rocky areas.

The bolt (B) adjusts the pressure on the rod spring.

To assemble the rod (A), fasten it on the arm of the fertilizer row (C) using bolts (D), flat washers and nuts.



Standard scarifier spindle.

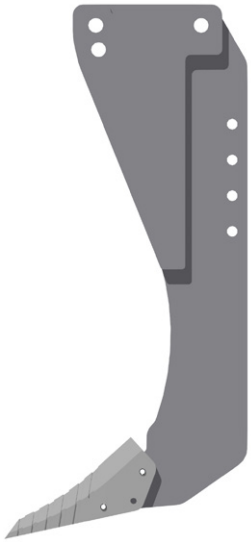
Indicated for every type of soil.

Shank tips: Duromark and high impact.

Shank with fuse pin.

Indicated for rocky soils.

If any friction occurs, the pin will be activated.



Scarifier spindle with 3 holes.

Different working angle that provides less soil movimentation.

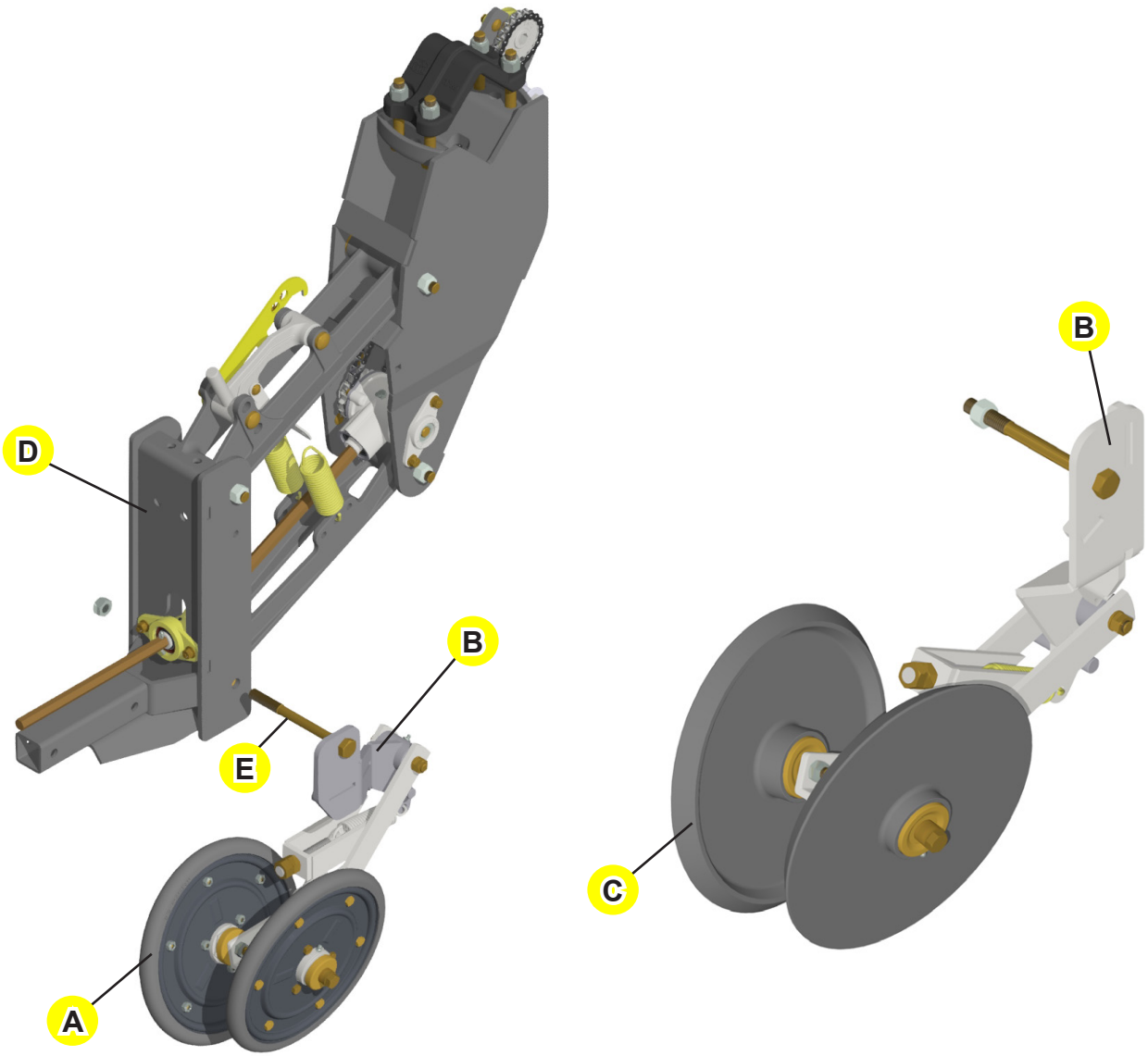
Gauge wheel

The gauge wheel have two design models:

• The rubber gauge wheel (A) has its arm (B) with the right and left sides according to the fertilizer row unit assembly (Check note on the bottom);

• The iron gauge wheel (C) has its arm (B) with the right and left sides according to the fertilizer row unit assembly (Check note on the bottom);

To assemble the gauge wheel, fasten it to the front seed row unit (D) using a bolt (E) and nut.

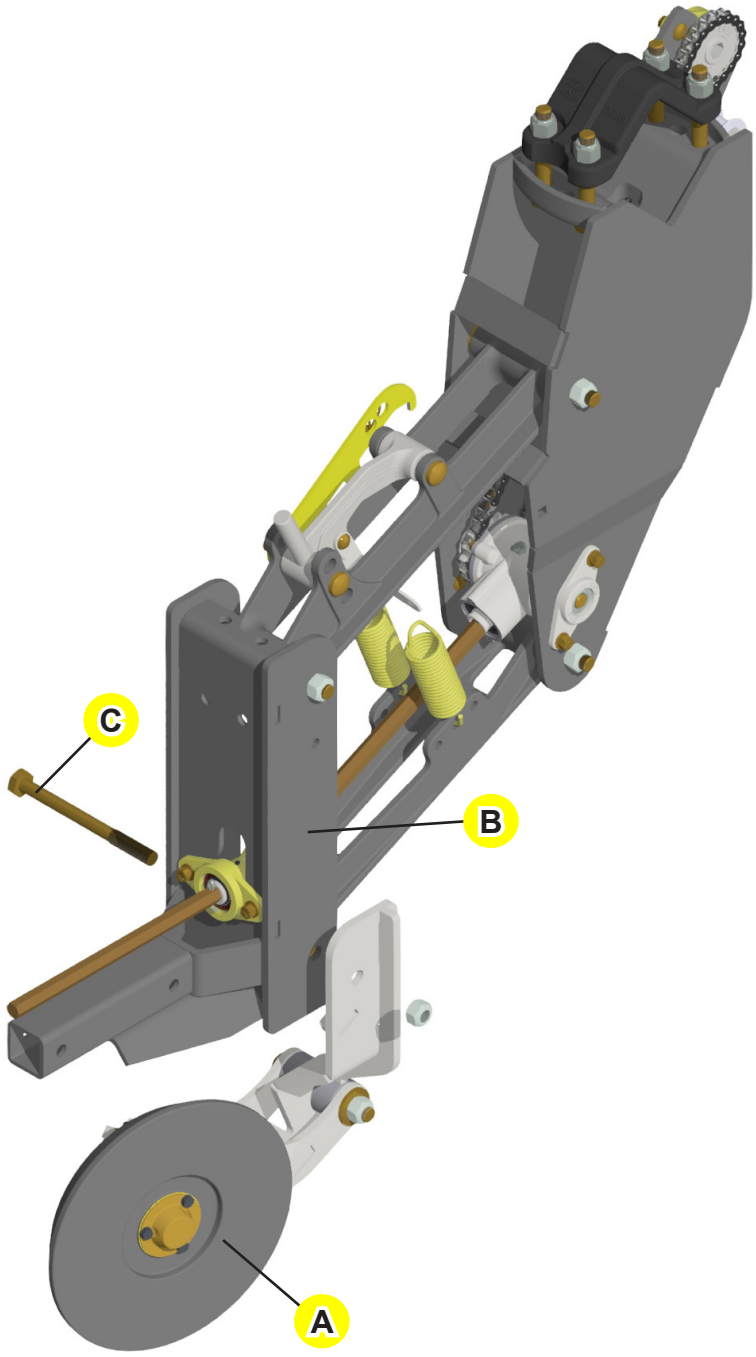


NOTE • **The fertilizer curved tubes must match the gauge wheels set (i.e.: left fertilizer curved tube with left gauge wheels set) on the fertilizer row unit assembly.**

Iron cast gauge wheel

The fertilizer curved tubes must match the gauge wheels set (i.e.: left fertilizer curved tube with left gauge wheels set) on the fertilizer row unit assembly.

To assemble the iron cast gauge wheel (A), fasten it to the front row unit (B) using bolt (C) and nut.



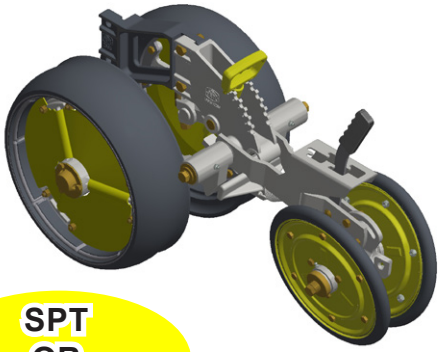
Depth control system / gauge wheels

Gauge wheels with flexible bands:

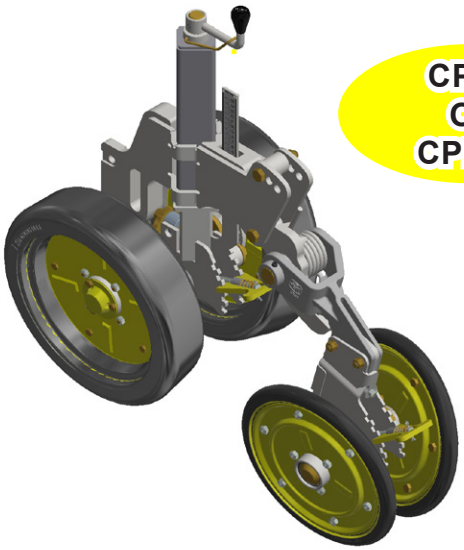
- Independent vertical movement;
- Effective action along with the double disc;
- Better flow rate of straw;
- Uniform emergence of plants;

Optional parts:

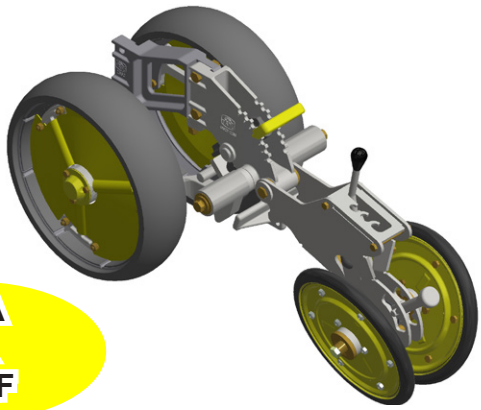
- Iron cast gauge wheel;
- Rubber gauge wheel.



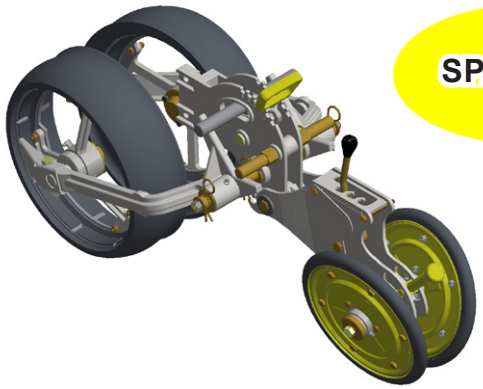
SPT
OR
SPTF



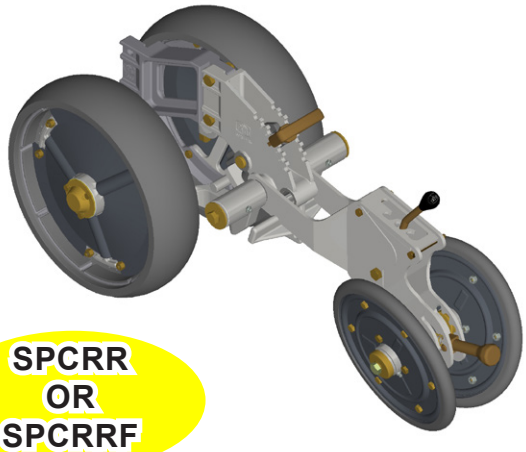
CPRA
OR
CPRAF



CPA
OR
CPAF



SPACRRA



SPCRR
OR
SPCRRF

Totally adjustable pressure wheels:

- Adjustment of the compaction pressure;
- Four adjustable positions for the working pressure over the soil and one neutral position;
- Adjustment of the compaction working angle;
- Adjustment of the distance between the gauge wheels.

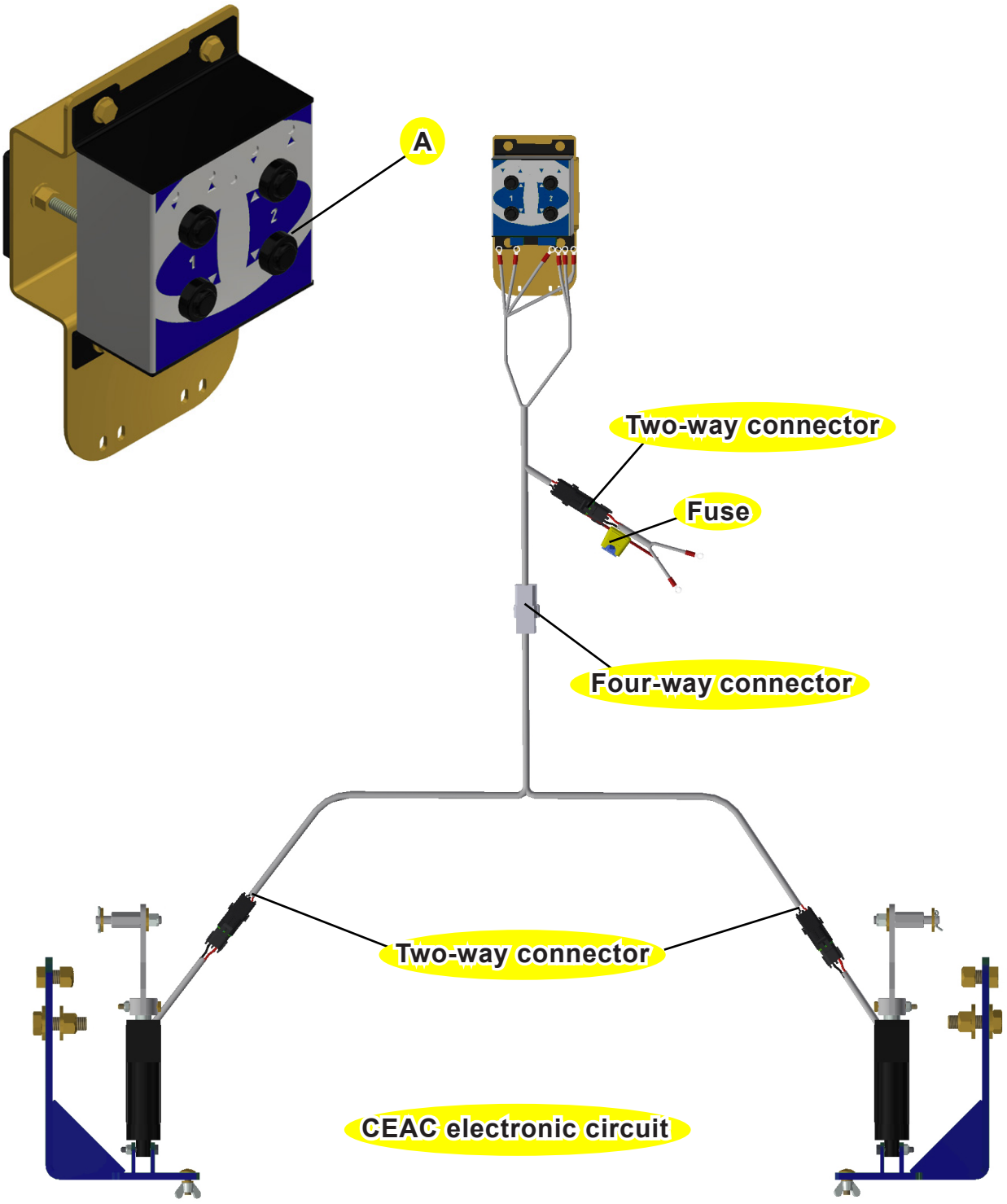
NOTE • **Recommended for mixed, sandy and clayey soils.**

Clutch electronic reset

Marchesan optionally supplies an electronic reset for the clutch.

The command panel (A) should be installed in a place that is easy to access for the tractor conductor.

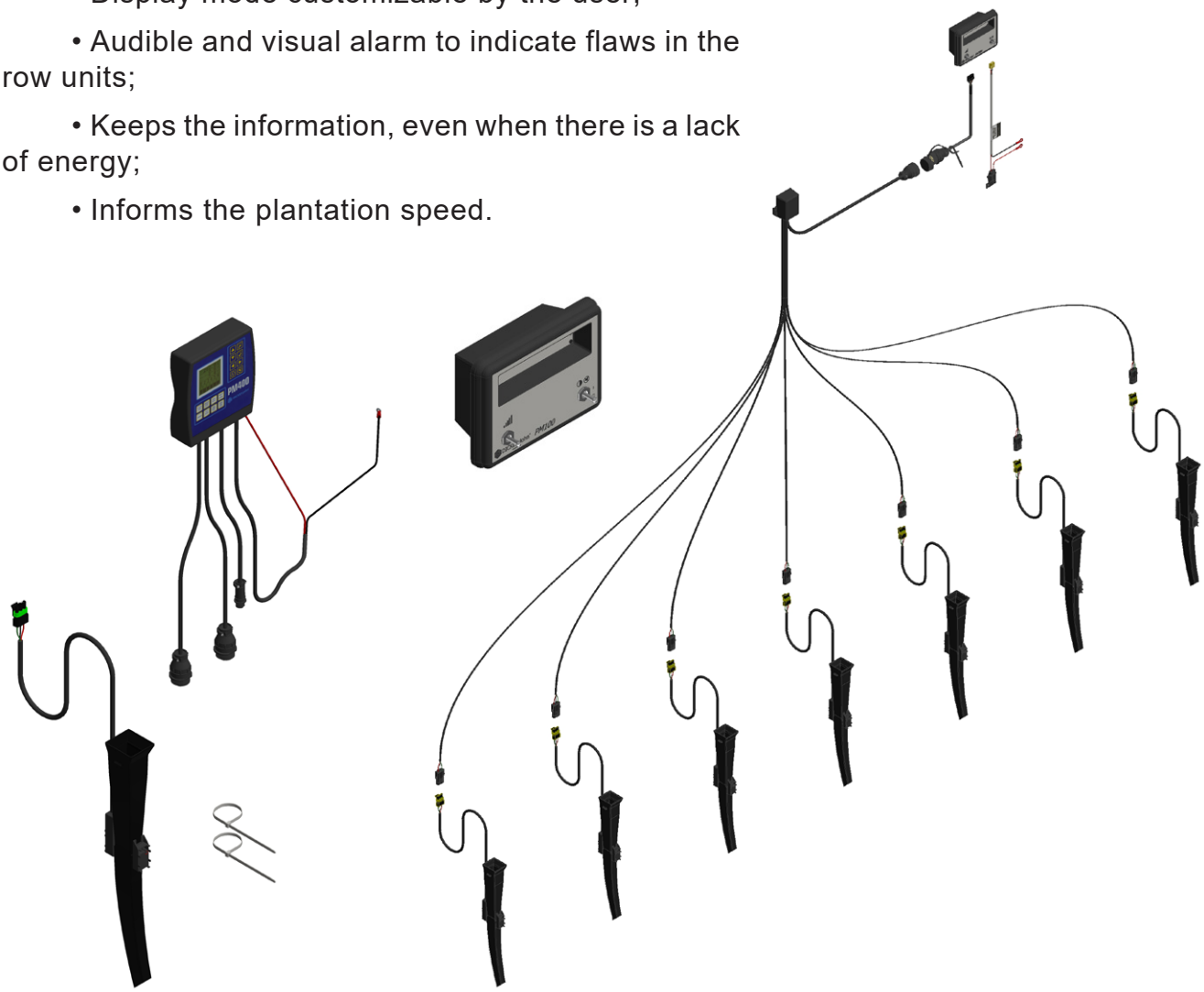
For a bigger commodity, we recommend installing the control panel (A) in the tractor cab, thus facilitating the clutch reset.



TATU PM 100/400 monitors

The **TATU PM 100/400** monitors are designed to suit the needs of each user. They were developed by the world's best seller of planter monitors and offers the finest technology on the market. The TATU PM 100 track seeds in planters up to 16 row units, while the TATU PM 400 track seeds up to 36 row units and they are a TATU optional part when a planter is acquired.

- Track seeds - up to 16-row unit planters (**TATU PM 100**);
- Tracks seed and fertilizer - with 36 sensors, being 18 for fertilizer and 18 for seeds (**TATU PM 400**);
- Gives precise informations, such as: area to be planted, population, spacing between seeds, number of seeds per meter (average, minimum and maximum);
- Allows the plantation at night with total precision, raising the planter income;
- Easy and flexible settings - password protected;
- Display mode customizable by the user;
- Audible and visual alarm to indicate flaws in the row units;
- Keeps the information, even when there is a lack of energy;
- Informs the plantation speed.



NOTE • **For more information, consult the PM 100/400 manual or search for a local representative.**

TATU precision agriculture

The TATU precision agriculture system was created with an electronic communication pattern that allows that products from different manufacturers communicate with one another. Thus, it is possible to control all equipments from a single terminal station.

The system will be operated from the tractor cab by a virtual terminal (VT) that can command every function.

Benefits:

• ISOBUS standard quick coupler connector for proper fitting and quick installation;

• ISOBUS communication, which allows a quick adaptation of tractor and equipments;

• Fullscreen alarms;

• Hydraulic control valves (PWM);

• Several monitoring and control systems in a single screen. More room in the cab and reduction in the amount of wires;

• Monitors up to 200 row units;

• Compatible with level monitoring, pressure and rotation sensors;

• Keeps the information, even when there is a lack of energy;

• Flat and floating rate application;

• Input reduction, productivity and profitability increasement;

Costs reduction:

• All the mechanical transmission system (clutches, clutches shafts, wheelset chain tensioners, sprocket combinations, manual operations, seed and fertilizer tables) will be eliminated;

• Wheelset skidding that activates the transmission shafts;

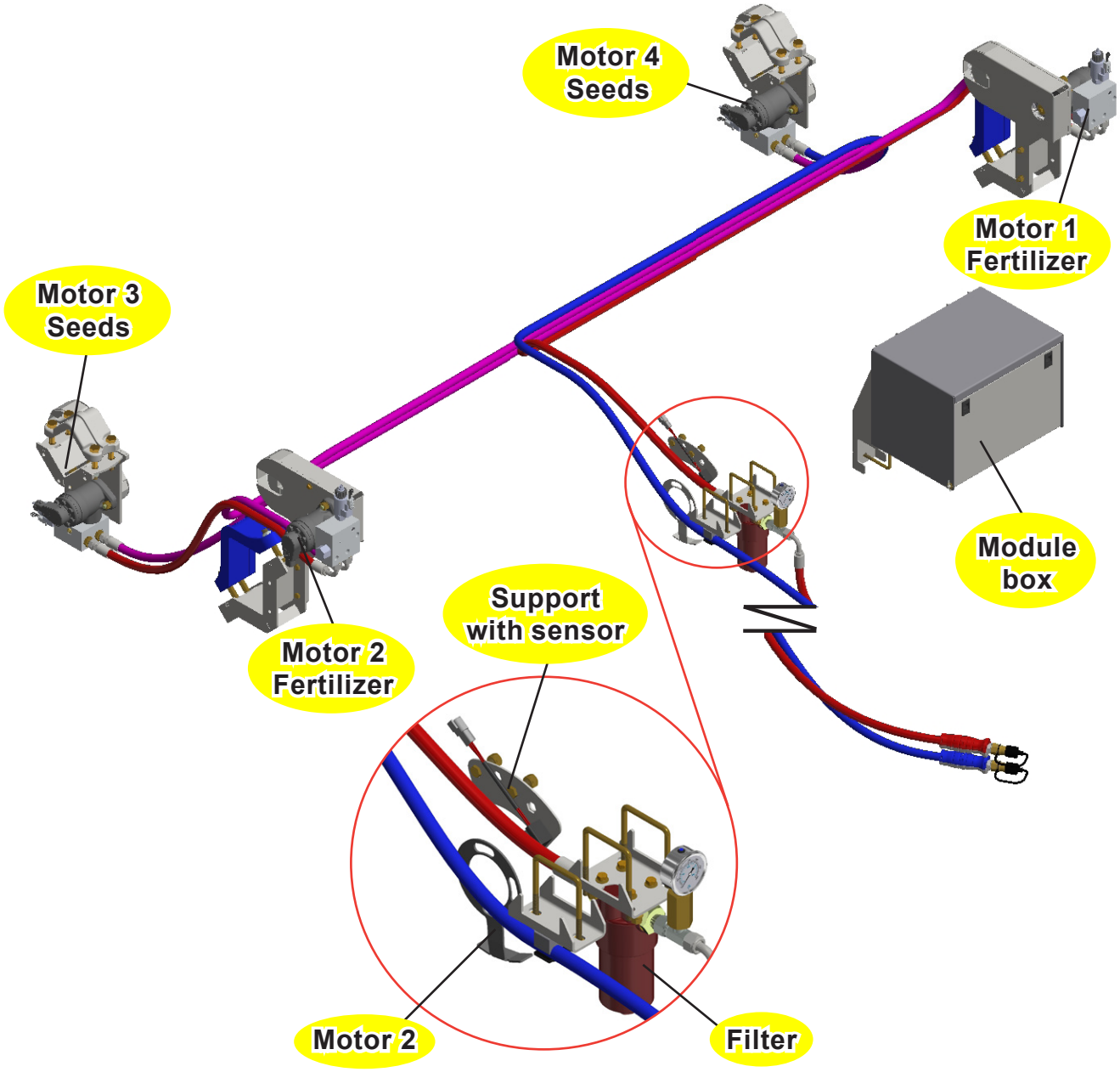
• Field tests and the subsequent adjustment fixes;

• Every planter model can receive the hydraulic/electronic system to replace the mechanical transmission.

Easy maintenance:

• The color pattern of the cables and the diagnosis center in a single terminal station facilitates the discovery of possible problems.

TATU precision agriculture - Components connection



Important recommendations

Before starting working, carry out a general inspection on the equipment and retighten all nuts and bolts, also checking the conditions of all pins and cotter pins to avoid future damages. Repeat this operation after the first day of work.

The tractor drawbar must remain fixed and centralized.

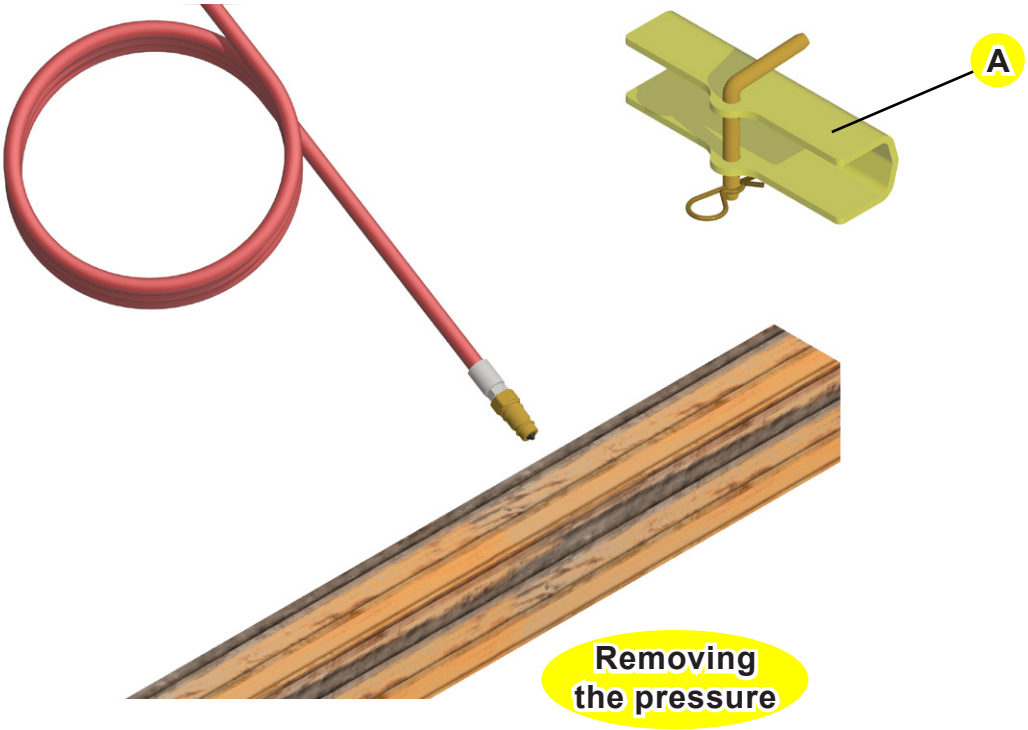
Inflate the tires following the pressure instructions on the 'tires inflation' page.

Before connecting the equipment hoses to the tractor, check if the hose is pressurized. If the answer is positive, the operator will not be able to connect the male part to the female one - and forcing this operation may lead to severe damages to the eye and skin as the fluid may escape. To remove the pressure on the tip of the hose, press the male coupling against a non-metallic surface to move the retention valve, until there is no oil leakage anymore.

On some cases, it may be necessary to use a wrench to loosen up the hose port to relieve the pressure.

After hitching the hoses, activate the control valve lever and check if there is no leakage on the ports and on the quick couplers.

To transport the equipment, it is recommended to lock the wheelsets using the transport lock (A), so they will not move during transportation.



Hydraulic cylinder maintenance

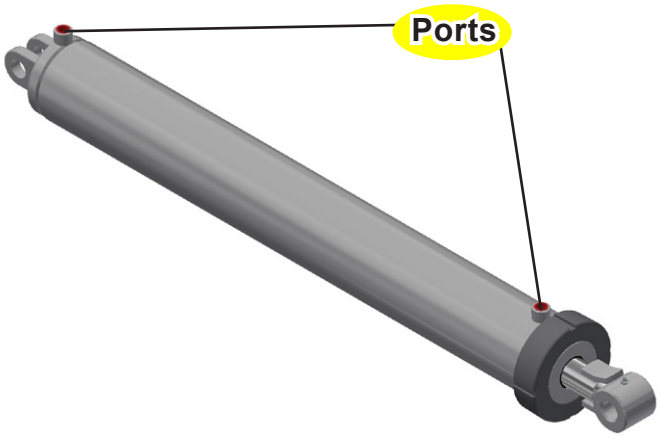
When cylinder repair is required, clean off unit, disconnect hoses and plug ports before removing cylinder.

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.**

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 "general application" section);

3) Lube inside of barrel, piston seals, and gland seals with hydraulic oil;

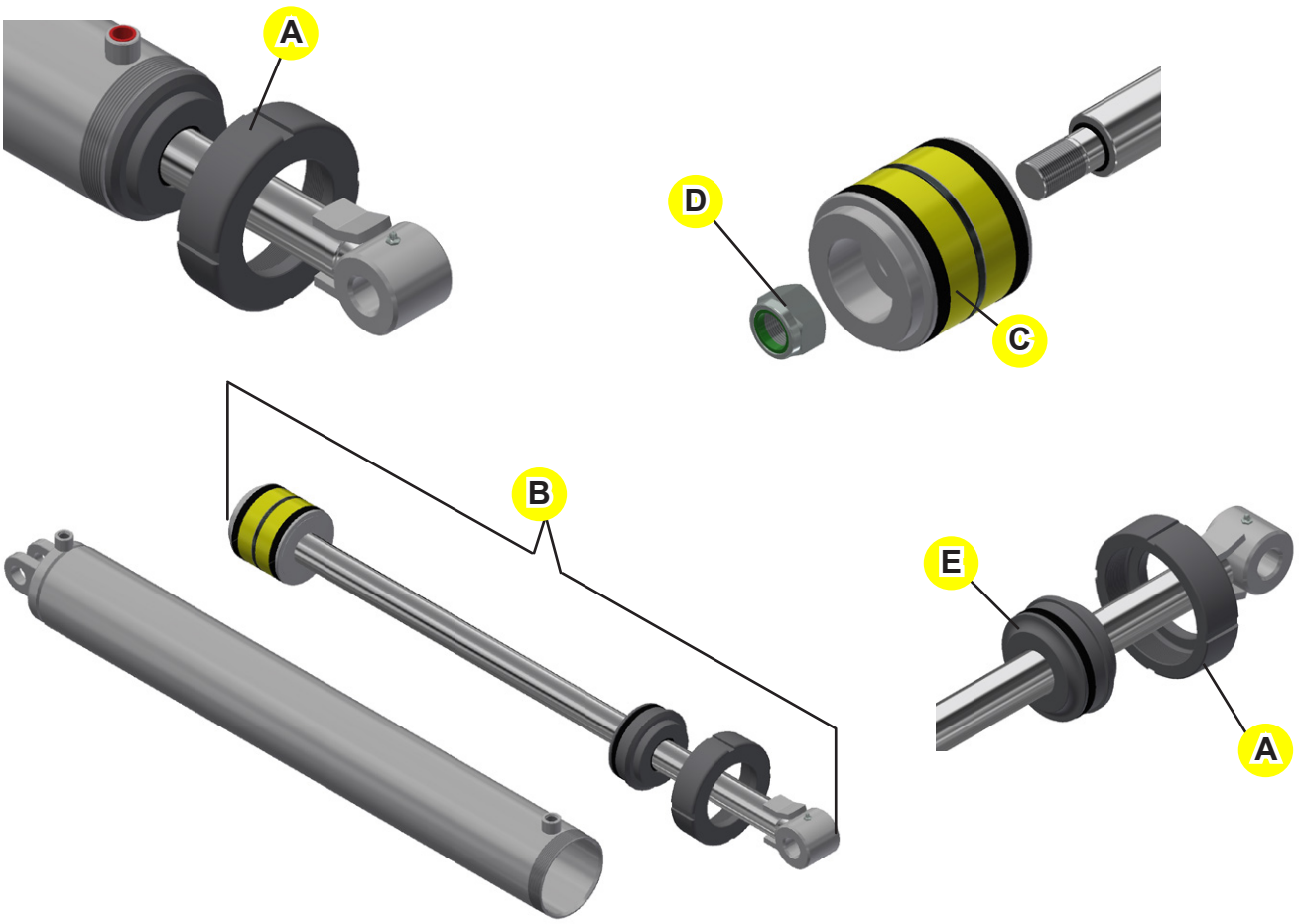
4) With cylinder body held gently, insert the inner assemblies (B) using a slight rocking motion;

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.**

Planter maintenance

Wash the whole planter using only water.

Remove the hoses and wash them immediately using water and neutral soap.

Verify all moving parts of the planter for wearing occurence. If necessary, replace some parts and leave the planter ready for the next planting season.

Repair the damaged paintwork.

Spray the metallic parts with protective oil. Never spray used engine lubricant oil.

The driving mechanism chains should be removed at the end of the planting season, cleaned and stored in a recipient with oil until the next planting season.

Tighten the bolts and nuts of all components that may get loose if any vibration occurs.

Clean and lubricate all grease fittings.

After making all repairs and maintenance cares, store the planter in a covered and dry place.

Keep the planter properly supported and avoid the direct contact of the disc blades and tires with the soil.

After finishing a job, clean up the seed hoppers by removing all the seeds and washing right after.

Remove the hoses and air ducts, clean up and place them on their original place.

Check if the battery used on the planter is in good conditions.

Watch carefully the installation and handling position of the planter cables, since more than half of the maintenance causes are related to that.

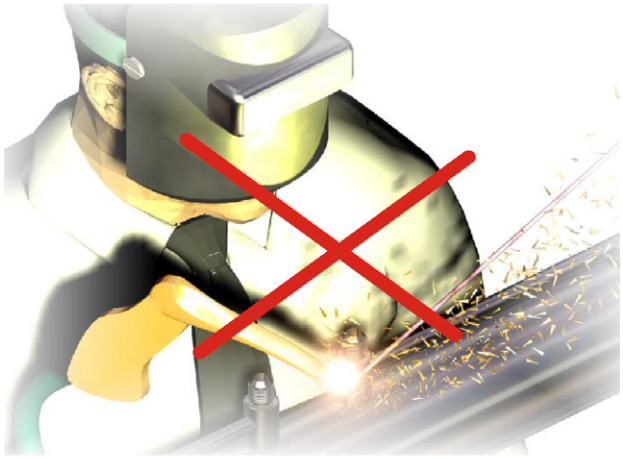
Regularly check the electric connections over the hydraulic control valve of the planter and also check the equipment - planter connector.

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.

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.

Tires inflation

The tires must always be properly inflated to avoid premature wear for excess or lack of pressure.

Do not attempt to mount the tires without experience and adequate equipment.

Maintain the correct tire pressure. Never inflate the tires beyond the recommended pressure.

Never weld or heat a wheel. The heat can cause increase in pressure, with a risk of tire explosion.

Welding can compromise the structure of the wheel or distort it.

When filling the tires, make sure the hose is long enough for you to stand. Also, do this process in a safety cage.

- 7 x 16 tire - 10 ply (maximum pressure **75 PSI**).

NOTE • **For the cases when the maximum pressure is not specified on the tires, consult the tire manufacturer and adopt the pressure indicated by them.**

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.

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TORQUE TABLE

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Bolt Size (Inches) (a)	Grade 2		Grade 5		Grade 8	
	Lbs-ft (b)	N.m (c)	Lbs-ft	N.m	Lbs-ft	N.m
1/4" - 20	5,5	7,5	8,5	11,5	12	16,3
1/4" - 28	6	8,1	9,5	12,9	14	19,0
5/16" - 18	10,5	14,2	17,5	23,7	24,5	33,2
5/16" - 24	12	16,3	19,5	26,4	27,5	37,3
3/8" - 16	19,5	26,4	31,5	42,7	44	59,7
3/8" - 24	22	29,8	35	47,5	50	67,8
7/16" - 14	31	42,0	50	67,8	70,5	95,6
7/16" - 14	34,5	46,8	56	75,9	79	107,1
1/2" - 13	47	63,7	76	103,1	107,5	145,8
1/2" - 20	53,5	72,5	86	116,6	121,5	164,8
9/16" - 12	68	92,2	110	149,2	155	210,2
9/16" - 18	76	103,1	122,5	166,1	173	234,6
5/8" - 11	94	127,5	151,5	205,4	214,5	290,9
5/8" - 18	106,5	144,4	171,5	232,6	242,5	328,8
3/4" - 10	167	226,5	269,5	365,4	380,5	516,0
3/4" - 16	186	252,2	300	406,8	424,5	575,6
7/8" - 9	169,5	229,8	434	588,5	612,5	830,6
7/8" - 14	187	253,6	478,5	648,8	676,5	917,3
1" - 8	254,5	345,1	650	881,4	918,5	1.245,5
1" - 12	285,5	387,1	729,5	989,2	1031	1.398,0
1.1/8" - 7	360,5	488,8	921,5	1.249,6	1302	1.765,5
1.1/8" - 12	404,5	548,5	1033,5	1.401,4	1460	1.979,8
1.1/4" - 7	508,5	689,5	1300	1.762,8	1837,5	2.491,7
1.1/4" - 12	563,5	764,1	1439,5	1.952,0	2034,5	2.758,8
1.3/8" - 6	667	904,5	1704,5	2.311,3	2408	3.265,2
1.3/8" - 12	759,5	1.029,9	1940	2.630,6	2741,5	3.717,5
1.1/2" - 6	885,5	1.200,7	2262,5	3.068,0	3197	4.335,1
1.1/2" - 12	996	1.350,6	2545,5	3.451,7	3597	4.877,5

Bolt Size (Metric) (D)	4.6		8.8		10.9	
	Lbs-ft	N.m	Lbs-ft	N.m	Lbs-ft	N.m
M5 x 0.8	2,5	3,39	5	6,78	8,5	11,526
M 6 x 1	3	4,068	8	10,85	11,5	15,594
M 6 x 0.75	3,5	4,746	8,5	11,53	13	17,628
M 8 x 1.25	7	9,492	19,5	26,44	28	37,968
M 8 x 1	8	10,848	21	28,48	30,5	41,358
M 10 x 1.5	14	18,984	38,5	52,21	56	75,936
M 10 x 1	16	21,696	43	58,31	63	85,428
M 12 x 1.75	25	33,9	66,5	90,17	98	132,888
M 12 x 1.25	27	36,612	73	98,99	107,5	145,77
M 14 x 2	40	54,24	107	145,09	156,5	212,214
M 14 x 1.5	43	58,308	115,5	156,62	169	229,164
M 16 x 2	62	84,072	165,5	224,42	243,5	330,186
M 16 x 1.5	66,5	90,174	177	240,01	260	352,56
M 18 x 2.5	86	116,616	229	310,52	336	455,616
M 18 x 1.5	96,5	130,854	257	348,49	378	512,568
M 20 x 2.5	121,5	164,754	323,5	438,67	475	644,1
M 20 x 1.5	134,5	182,382	359	486,80	527	714,612
M 22 x 2.5	165,5	224,418	441	598,00	647,5	878,01
M 22 x 1.5	182	246,792	484	656,30	711,5	964,794
M 24 x 3	210	284,76	559	758,00	821	1113,276
M 24 x 1.5	238,5	323,406	636	862,42	933,5	1265,826
M 27 x 3	307	416,292	820	1111,92	1204	1632,624
M 27 x 1.5	344	466,464	918	1244,81	1348,5	1828,566
M 30 x 3.5	416,5	564,774	1111,5	1507,19	1632,5	2213,67
M 30 x 1.5	477,5	647,49	1273	1726,19	1870	2535,72
M 33 x 3.5	567	768,852	1512,5	2050,95	2221,5	3012,354
M 33 x 1.5	641,5	869,874	1709,5	2318,08	2511	3404,916
M 36 x 4	729	988,524	1943	2634,71	2854	3870,024
M 36 x 1.5	838,5	1137,006	2236	3032,02	3284	4453,104
M 39 x 4	943	1278,708	2515	3410,34	3693,5	5008,386
M 39 x 1.5	1073	1454,988	2860,5	3878,84	4201,5	5697,234

a) Nominal thread diameter in inches-threads per inch
b) Foot pounds
c) Newton-meters
d) Nominal thread diameter in millimeters x thread pitch

Values are for reference and are based on average steel-to-steel friction conditions.

Important

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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September, 2021

Serial number.: 05.01.09.1865

Revision: 03

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ATENÇÃO

- RECOMENDAÇÕES GERAIS DE SEGURANÇA -

1 - Apenas pessoas que possuem o completo conhecimento do trator e dos implementos devem conduzi-los.

2 - Para engatar os implementos faça as manobras em marcha lenta, em local espaçoso e esteja preparado para aplicar os freios.

3 - Para acoplamento na tomada de força desligue o motor do trator.

4 - O motor não deve funcionar em locais sem o ideal arejamento, devido a toxidade dos gases expelidos.

5 - Faça todos os lastreamentos necessários para tracionar equipamentos que os exigem, assim as operações tornam-se mais seguras.

6 - Em operações com o trator estacionado trave os freios e calce as rodas.

7 - Todas as peças móveis como correias, polias, engrenagens, etc. merecem cuidados especiais.

8 - Vista roupas e calçados adequados para operação das máquinas e implementos agrícolas.

9 - Não permita que demais pessoas acompanhem o operador no trator ou no implemento.

10 - O uso das roçadeiras exige cuidados especiais. Não permita a aproximação de pessoas ou animais durante o serviço.

11 - Não efetue regulagens com o implemento em funcionamento.

12 - Não permita que crianças brinquem sobre ou próximo o implemento estando o mesmo em operação, transporte ou armazenado.

13 - A velocidade de operação deve ser cuidadosamente controlada.

14 - Em terreno inclinado mantenha a estabilidade ideal. Em início de desequilíbrio abaixe a aceleração e não levante o implemento.

15 - Os implementos de controle hidráulico devem ser abaixados até o solo e aliviados da pressão antes de desconectar qualquer tubulação.

16 - Não verifique vazamentos nos circuitos hidráulicos com as mãos, a alta pressão pode provocar lesões corporais; use papelão.

17 - No término do trabalho os implementos deverão ser desengatados e devidamente apoiados no solo ou sobre cavaletes, não podendo ficar suspensos pelo hidráulico do trator.

18 - Não transite em rodovias ou estradas pavimentadas.

19 - Os implementos agrícolas tais como grades, arados e outros, possuem normalmente órgãos ativos afiados, com bordas cortantes que oferecem riscos de acidentes mesmo quando não estão operando. Portanto estes devem ser mantidos em local apropriado, devidamente apoiados no solo; e impedindo-se o acesso de crianças e pessoas alheias ao manuseio dos mesmos.

20 - Para estacionar o trator, desligue o motor, neutralize a ação dos comandos e aplique os freios.

ATENCION

- RECOMENDACIONES GENERALES DE SEGURIDAD -

1 - Solamente personas con el completo conocimiento del tractor y de los implementos deben conduzirlos.

2 - Para enganchar los implementos, proceda con maniobras en marcha lenta, en local con espacio y este preparado para aplicar los frenos.

3 - Para acoples en la toma de potencia apague el motor del tractor.

4 - El motor no debe funcionar en locales sin ventilación suficiente debido la toxicidad de los gases expelidos.

5 - Proceda con los lastres necesarios para traccionar equipos que asi exigir de esta manera, las operaciones se tornan mas seguras.

6 - En operaciones con el tractor estacionado (parqueado) trabar los frenos y las ruedas.

7 - Todas las piezas movibles como: bandas, poleas, engranajes, etc... necesitan cuidados especiales.

8 - Vestir ropas y calzados adecuados para operación de las máquinas e implementos agrícolas.

9 - No permita que otras personas acompañen el operador en el tractor o en el implemento; salvo si posee asiento adecuado.

10 - El uso de las rotativas (cortamalezas) exige cuidados especiales. No permita la aproximación de personas o animales durante el trabajo.

11 - No efectuar regulajes con el equipo en funcionamiento.

12 - No permitir que niños jueguen sobre o próximo de los equipos, en operación, durante el transporte o almacenado.

13 - La velocidad de operación debe ser cuidadosamente controlada.

14 - En terreno inclinado mantenga la estabilidad ideal. En inicio de desequilibrio baje la aceleración y no levante el implemento.

15 - Los implementos de control hidráulico deben ser rebajados hasta el suelo y aliviar la presion antes de desconectar cualquier tuberia.

16 - No verificar filtraciones en los circuitos hidráulicos con las manos, la alta presión puede provocar lesiones corporales, use carton u otro objeto adecuado.

17 - Después del termino del trabajo, los equipos deberán ser desenganchados y debidamente apoyados en el suelo o sobre caballetes, aliviando el hidráulico del tractor.

18 - No transitar en carreteras o caminos pavimentados.

19 - Los implementos agrícolas, como: rastras, arados y otros, tienen normalmente organos activos afilados, con bordes cortantes que ofrecen riesgos de accidentes, aún cuando detenidos, por lo tanto, estos deben ser mantenidos en local apropriado, debidamente apoyados en el suelo e impidiendo el acceso de niños y personas ajenas al uso de los mismos.

20 - Para estacionar (parquear) el tractor, apague el motor, neutralice la acción de los comandos y aplique los frenos.

ATTENTION

- GENERAL RECOMMENDATION ABOUT SAFETY -

1 - Only person who owns a full knowledge of tractor and implements, must operate them.

2 - Take care to prevent injury to the hands or fingers when hitching the implement to the tractor.

3 - Always shut the tractor off before connecting the power take off.

4 - Never turn on the tractor engine within not aired places, due to toxic gases expelled.

5 - Before start the season it is necessary to prepare adequately the tractor and the implement to become the operations safer.

6 - Lock the tractors parking brake and block the wheels, before dismounting the tractor for service or to make adjustments.

7 - Never allow riders to accompany the operator on tractor or implement, except if there is an adequate seat.

8 - Be sure that everyone is standing clear before operating the agricultural implement or machinery.

9 - Use extreme caution and wear gloves when handling the disc blades or gang assemblies.

10 - Wear adequate clothes and shoes to operate agricultural implements and machinery.

11 - Do not attempt to make adjustments when the unit is running.

12 - Disconnect the hydraulic hoses from breakaway couplers after bleeding off the system.

13 - Always block-up raised equipment when servicing. Never rely on the hydraulic system.

14 - The speed must be controlled when transporting the implement on rough roads, bridges, steep grades or any other adverse conditions.

15 - Lower the implement or machinery completely to the ground before unhitching from the tractor.

16 - Before make any inspection on hydraulic hoses for leaks, cycle the hydraulic cylinders several times to purge entrapped air from the system.

17 - When the tractor is equipped with swinging drawbar, lock the drawbar in the fixed position.

18 - Agricultural implements such as: Disc Harrows, Disc Ploughs and others have disc blades that is sharp and could cut hands, feet, etc... even when they are not in operation. In other to avoid serious accidents, use chock blocks to prevent the gang assembly from rolling surfaces before assembly to the frame. Wear gloves when handling the blades or gang assemblies.

19 - On transport of the harrow always install transport lock devices.

20 - When parking the tractor, turn the engine off, lock the tractors parking brake and remove the key.

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