TATU

MARCHESAN

INSTRUCTIONS MANUAL

USAP

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

USAP and USAP Suprema planters were developed based on the plantation row units that equip the Tatu Marchesan planters and which have been tested for several years and used widely for a no-till plantation.

The frame allows several spacings between the row units, being their adjustments quick and easy. A single planter facilitates the plantation and the need for different spacings.

The permanent flotation control can follow an irregular terrain easily while keeping the seed depth uniformly for the proper plant germination.

A great clearance on the frame allows an excellent income, since the straw pass through the planter easily and there is no need to stop the plantation for cleaning up the residues.

Reduced transportation width; hydraulic system activation to fold the equipment frames.

This instructions manual contains the necessary information for the best performance of this planter. 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;

• Instructions manual;

• Technical assistance by the dealer on equipment delivery.

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

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

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

This manual should be read by operators and maintenance staff.

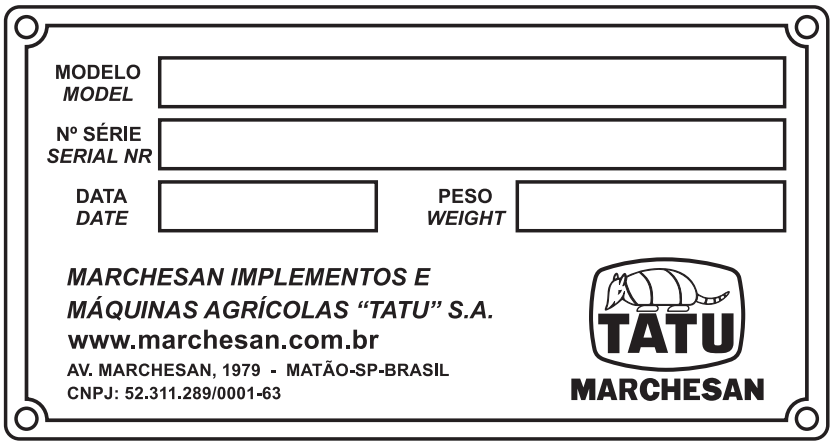
Important

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

General information

Right and left hand side indication are made observing the equipment from the rear.

To order any parts or request assistance services, it is required to provide the data contained on the nameplate, which is located on the equipment frame.



NOTE

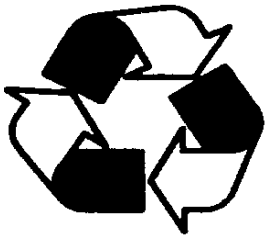
The warranty shall not be applied to any equipment, or any parts thereof, which has been altered elsewhere than at the place of manufacture or which the original purchaser thereof, at retail, has used or allowed to be used parts, not made or supplied by Marchesan S/A.

To the operator

Be careful with the environment

Dear user!

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



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

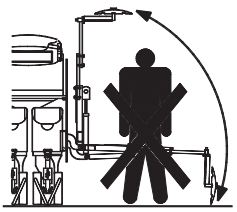
Working safely

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

USAP and USAP SUPREMA planters are simple to operate, requiring however the basic and essential cautions to their handling.

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

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



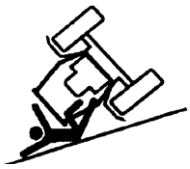
Before activating the equipment, check if there are no people or animals on the row operation area or over the equipment.

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

To the operator

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

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



Be careful while driving on slopes. Risk of overturn.

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

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

Never transport the equipment on highways or paved roads 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 maintenance operations and to transport the equipment.

To the operator

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

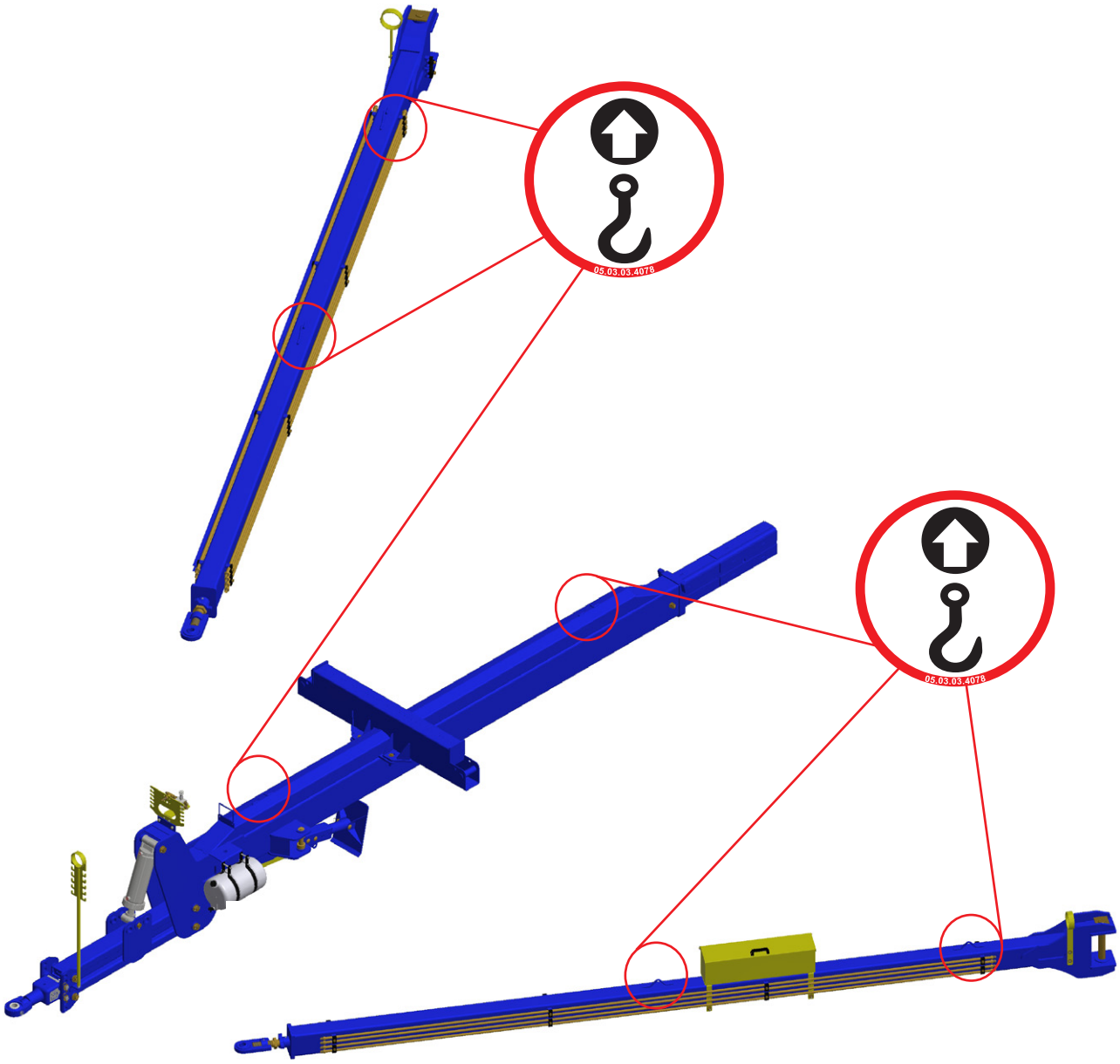
Transportation over truck or trailer

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

- Use adequate ramps to load or unload the equipment. Do not make the loading on ditch banks, it can cause a serious accident.
- When lifting with a hoist, use the appropriate points to lift.
- Use the parking stands to support the equipment properly.
- The equipment drawbar must be lifted and locked in a vertical position or it must be removed and locked 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.
- After 8 to 10 km transporting, please inspect the load condition. Repeat this procedure every 80 to 100 km. Give more attention when transporting the equipment on rough roads, slopes and other adverse conditions.
- Always be careful with the load height, especially when passing under electrical power lines, bridges and others.
- Check all laws and regulations regarding the height limits and load width while transporting the equipment to the truck or trailer. If necessary use banners, lights and other devices in order to give adequate warning to the other drivers.

Lifting points

USAP and USAP SUPREMA planters have 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.



Safety stickers

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

ADVERTÊNCIA
WARNING
ADVERTENCIA

Abastecer a plantadeira somente no local de trabalho. Não transitar com excesso de carga sobre a plantadeira.

It is recommended to fill up the planter in the working area. Don't transit with loading excess.

Abastecer la sembradora solamente en el local de trabajo. No transitar con exceso de carga sobre la sembradora.

05.03.03.3621

ATENÇÃO
ATTENTION
ATENCIÓN

Leia o manual antes de iniciar o uso do equipamento.

Read the manual before attempting to work with the equipment.

Lea el manual antes de iniciar el uso del equipo.

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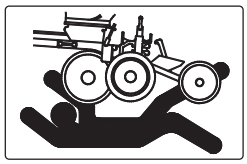
ADVERTÊNCIA
WARNING
ADVERTENCIA



EVITE ACIDENTES
AVOID ACCIDENTS
EVITE ACCIDENTES

- Utilize as **Travas de Segurança** antes de efetuar ajustes ou manutenção embaixo da plantadeira.
- Use the **Safety Locks** before adjusting or servicing under the planter.
- *Utilice las **Trabas de Seguridad** antes de efectuar ajustes o mantenimiento debajo de la sembradora.*

05.03.03.1425

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

ATENÇÃO
ATTENTION
ATENCIÓN

540 RPM

Este equipamento é fabricado para operar a 540 RPM na TDP. Todas as capas de proteção dos cardans devem ser mantidas no local.

This equiment is designed to operate at 540 RPM maximum tractor PTO speed. All drive line shields must be kept in place.

Este equipo es fabricado para operar a 540 RPM en la TDP. Todas las capas de protección de los cardanes deben ser mantenidas en el local.

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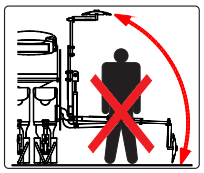
ADVERTÊNCIA
WARNING
ADVERTENCIA



- Antes de acionar a plantadeira, observe se não há pessoas ou animais na área de ação dos marcadores de linha ou embaixo da plantadeira.
- Coloque as travas nos cilindros hidráulicos antes de transportar, armazenar ou efetuar serviços de manutenção.
- Before starting to raise or move the planter check for people or animals near or under it, especially in the row markers action area.
- Place the hydraulic cylinders lock before transporting, servicing or storing the planter.
- *Antes de accionar la sembradora observe si no hay personas o animales en el área de acción de los marcadores de línea o debajo de la sembradora.*
- *Coloque las trabas en los cilindros hidráulicos antes de transportar, almacenar o efectuar servicios de mantenimiento.*

05.03.03.1424

When the planter is equipped with a row marker.

ADVERTÊNCIA
WARNING
ADVERTENCIA

Ao operar com a tomada de força tenha o máximo cuidado. Não se aproxime quando estiver em acionamento.

When working near the PTO shaft have a special care. Never come closer to rotating parts.

Al operar con la toma de fuerza tenga el máximo cuidado. No se aproxime al estar en funcionamiento.

05.03.03.1427

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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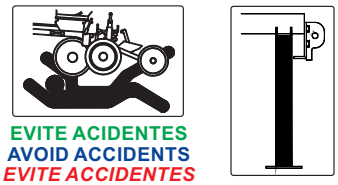
ADVERTÊNCIA
WARNING
ADVERTENCIA



EVITE ACIDENTES
AVOID ACCIDENTS
EVITE ACCIDENTES

- Utilize as escoras e os descansos antes de efetuar ajustes ou manutenção embaixo da plantadeira.
- Use parking stands, before adjusting or servicing under the planter.
- *Utilice los apoyos y los descansos antes de efectuar ajustes o mantenimiento debajo de la sembradora.*

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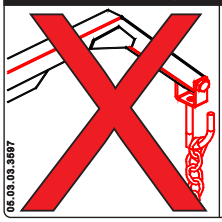
ATENÇÃO / ATTENTION / *ATENCIÓN*



Proibido içar ou fazer qualquer amarra nos cilindros hidráulicos.

Lifting or using any fastening in the hydraulic cylinders is prohibited.

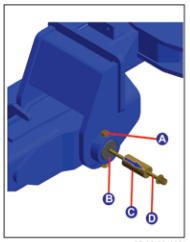
Prohibido izar o amarrar en los cilindros hidráulicos.

ATENÇÃO / ATTENTION
ATENCIÓN

Primeiramente remova a porca, a arruela de pressão e o parafuso "A" para remover o eixo de articulação "B", dos braços de articulação. Coloque a luva "C" no eixo sacador "D" (se encontram na caixa de componentes) e rosqueie o sacador no orifício do eixo de articulação. Bata a luva contra a arruela lisa do sacador até que o eixo de articulação saia.

First remove the nut, spring washer and bolt "A" in order to remove the pivot axle "B" from the pivot arms. Insert the bushing "C" on the withdrawer axle "D" (both parts can be found inside the components box) and screw it on the articulation axle hole. Tap the bushing against the flat washer from the withdrawer axle until the pivot axle comes out.

Primero retire la tuerca, la arandela de presión y el tornillo "A" para retirar el eje de articulación "B" de los brazos de articulación. Coloque el buje "C" en el eje sacador "D" (se encuentran en la caja de componentes) y atornille el sacador en el orificio del eje de articulación. Golpee el buje contra la arandela lisa del sacador hasta que el eje de articulación salga.



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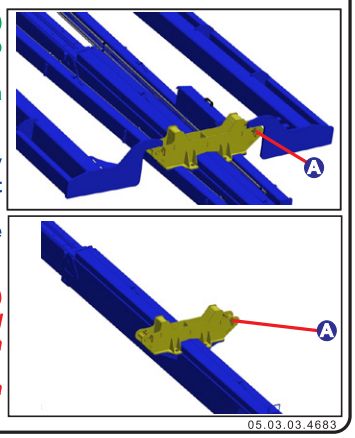
ADVERTÊNCIA
WARNING
ADVERTENCIA

Utilize a trava (A) somente durante o transporte da plantadeira. Retire sempre a trava para o trabalho.

Use the lock (A) only during the transport of the planter. Always remove the lock to work.

Utilice la traba (A) solamente durante el transporte de la sembradora. Retire siempre la traba para el trabajo.



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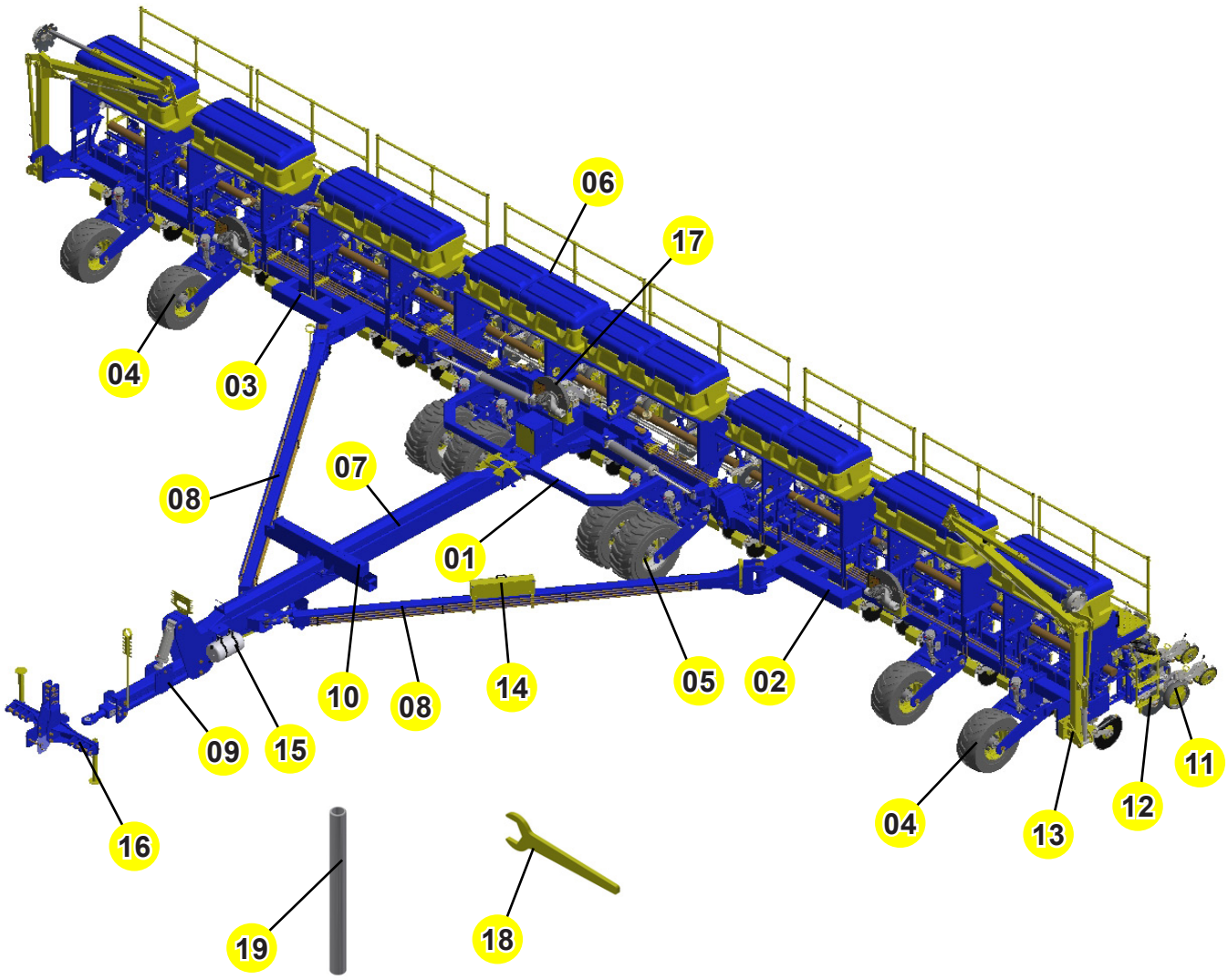
Safety stickers

Model	Sticker code	Sticker code	Sticker code
USAP	05.03.03.3853 Small logo	05.03.03.3854 Big logo	05.03.03.3873 USAP logo
USAP SUPREMA			05.03.03.3888 USAP SUPREMA logo
USAP CSH (Central seed hopper)	05.03.03.4334 USAP CSH rear	05.03.03.4335 TATU rear logo	_____
	05.03.03.4336 USAP CSH front	05.03.03.4337 TATU front logo	_____
	05.03.03.4338 USAP CSH lateral	05.03.03.4339 TATU lateral logo	_____

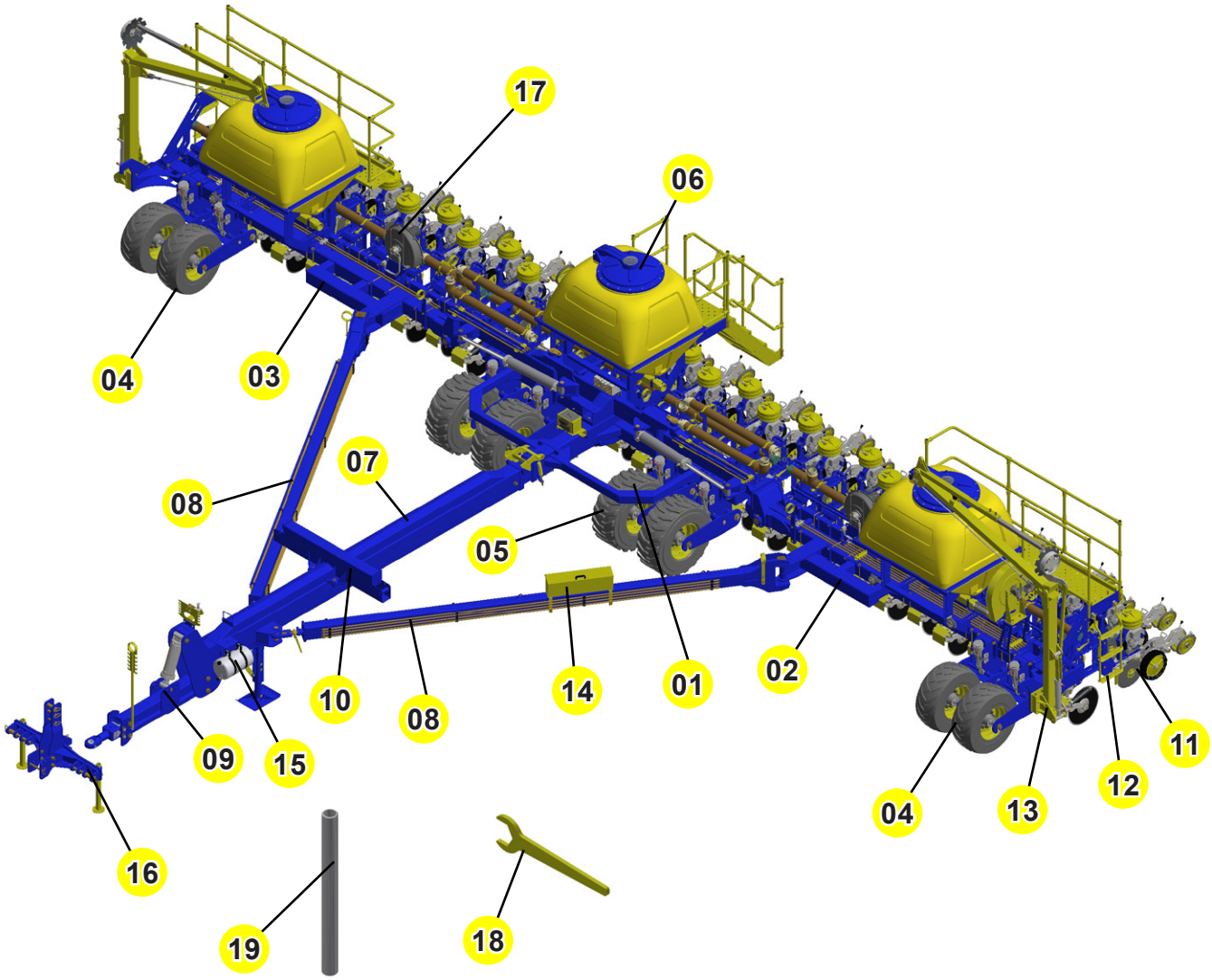
USAP SUPREMA

01 - Central frame
02 - Left lateral frame
03 - Right lateral frame
04 - Lateral wheelsets
05 - Central wheelset
06 - Seed hopper
07 - Telescopic bar
08 - Extension bars
09 - Drawbar
10 - Transport lock
11 - Pneumatic seed row unit
12 - Ladder
13 - Hydraulic marker
14 - Tool box
15 - Water reservoir (25 liters)
16 - Three-point hitch drawbar
17 - Pneumatic system
18 - Open end wrench (71)
19 - Pressure adjustment lever



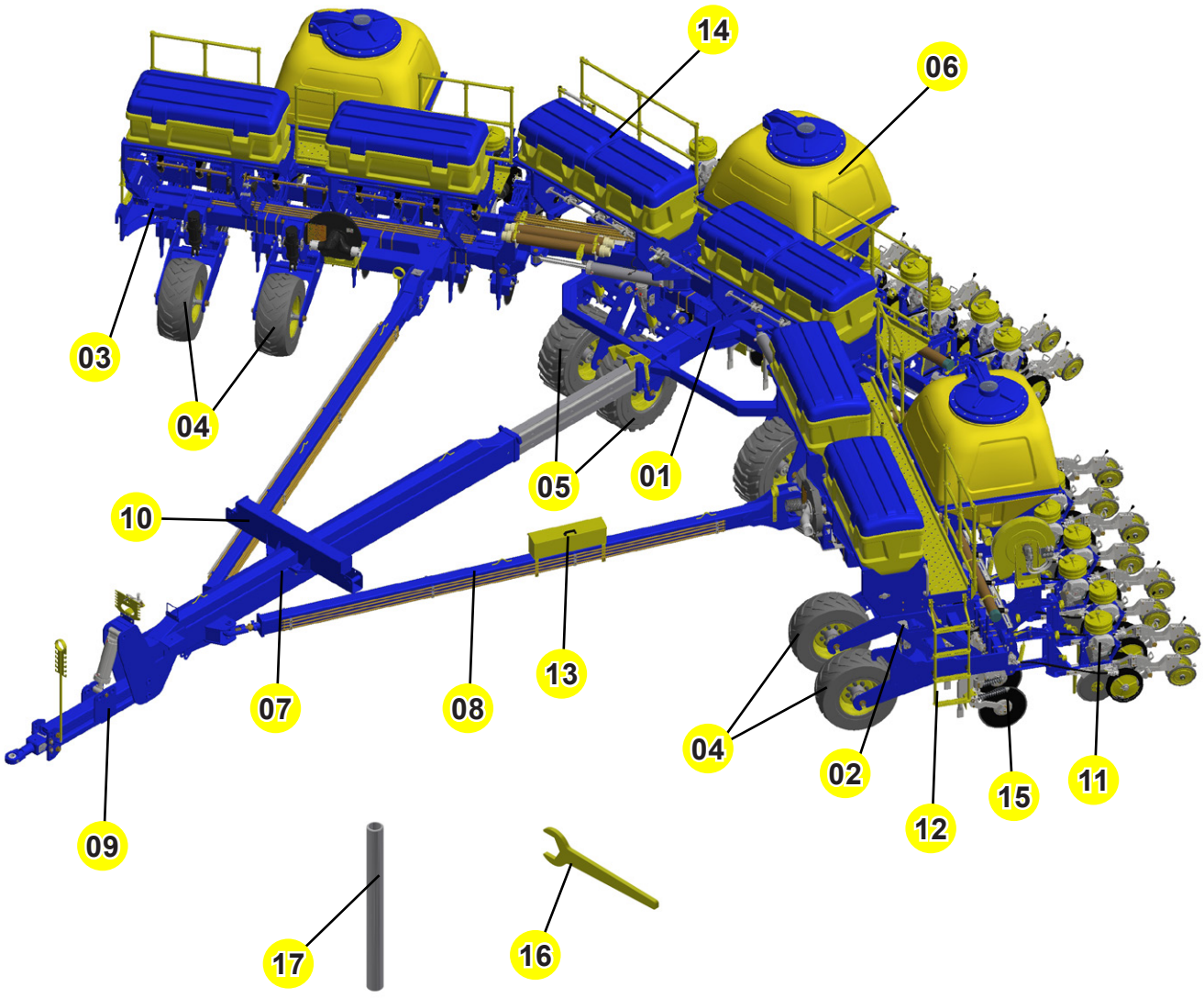
USAP SUPREMA - central seed hopper

01 - Central frame
02 - Left lateral frame
03 - Right lateral frame
04 - Lateral wheelsets
05 - Central wheelset
06 - Central seed hopper
07 - Telescopic bar
08 - Extension bars
09 - Drawbar
10 - Transport lock
11 - Pneumatic seed row unit
12 - Ladder
13 - Hydraulic marker
14 - Tool box
15 - Water reservoir (25 liters)
16 - Three-point hitch drawbar
17 - Pneumatic system
18 - Open end wrench (71)
19 - Pressure adjustment lever



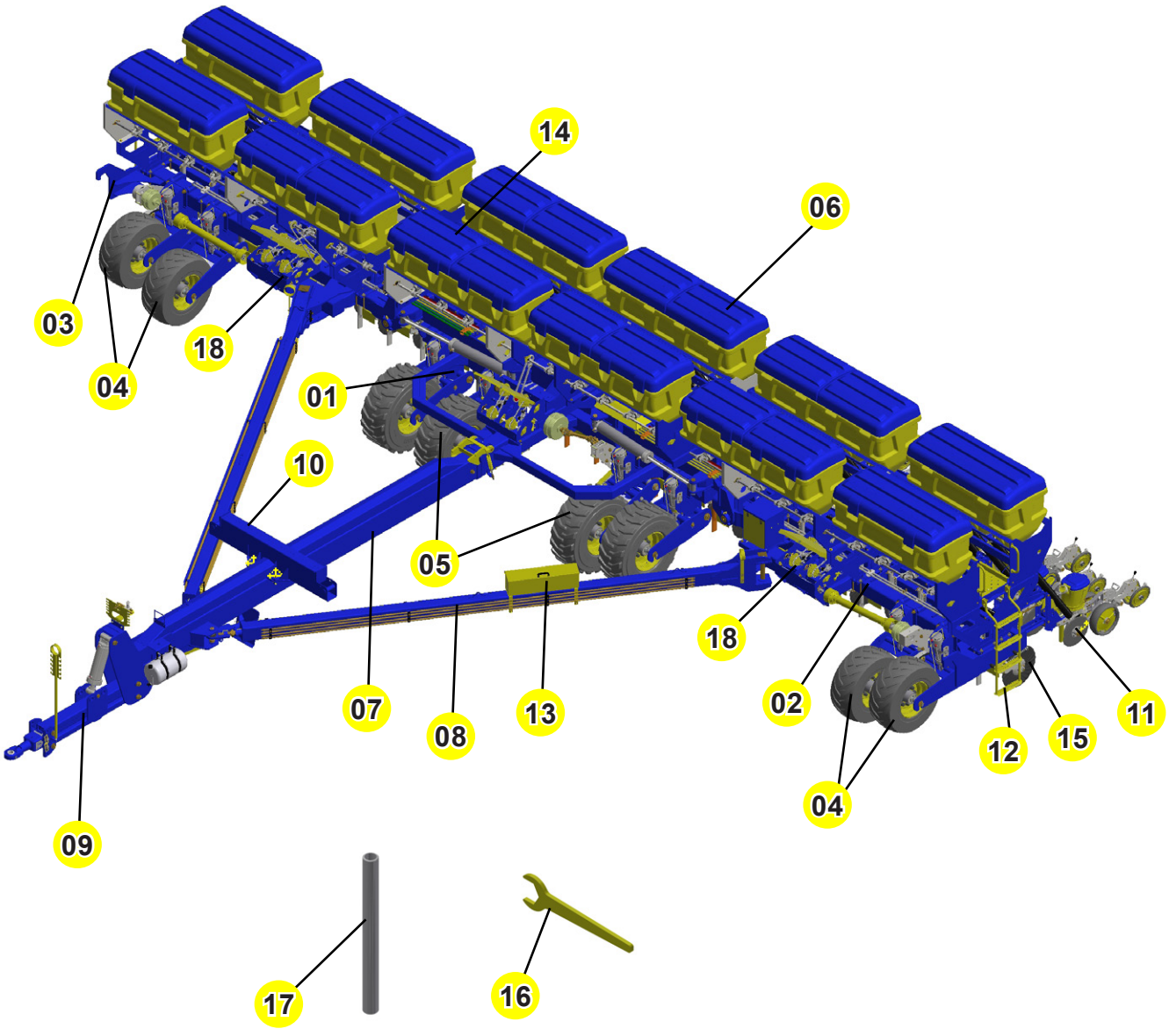
USAP SUPREMA - fertilizer hopper and central seed hopper

01 - Central frame
02 - Left lateral frame
03 - Right lateral frame
04 - Lateral wheelsets
05 - Central wheelset
06 - Central seed hopper
07 - Telescopic bar
08 - Extension bars
09 - Drawbar
10 - Transport lock
11 - Pneumatic seed row unit
12 - Ladder
13 - Tool box
14 - Fertilizer hopper
15 - Disc blades
16 - Open end wrench (71)
17 - Pressure adjustment lever

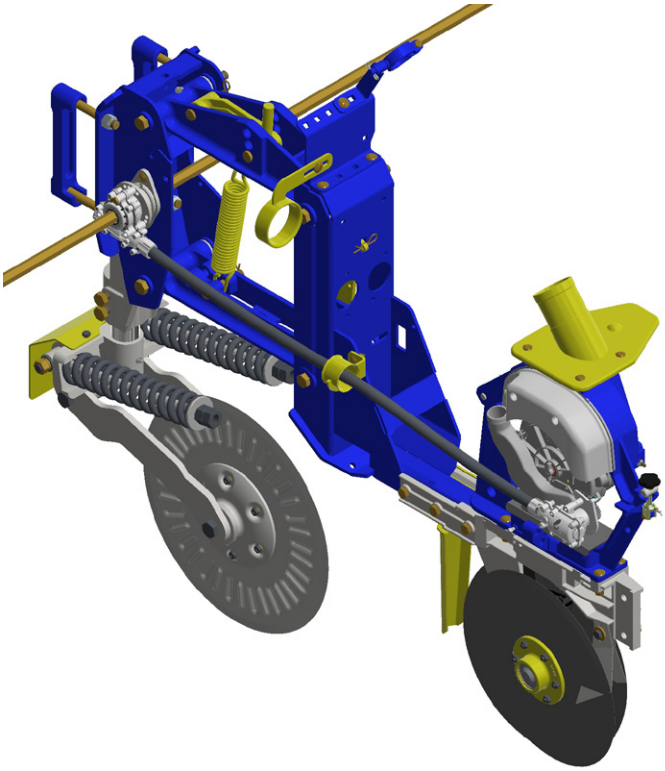


USAP - Seed and fertilizer hopper

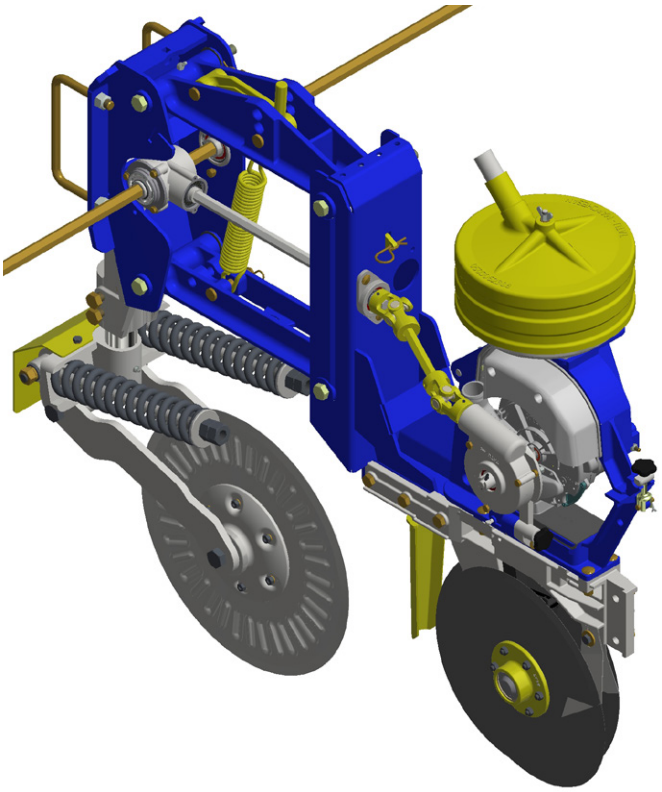
01 - Central frame
02 - Left lateral frame
03 - Right lateral frame
04 - Lateral wheelsets
05 - Central wheelset
06 - Seed hopper
07 - Telescopic bar
08 - Extension bars
09 - Drawbar
10 - Transport lock
11 - Seed row unit
12 - Ladder
13 - Tool box
14 - Fertilizer row unit
15 - Disc blades
16 - Open end wrench (71)
17 - Pressure adjustment lever
18 - Gearbox



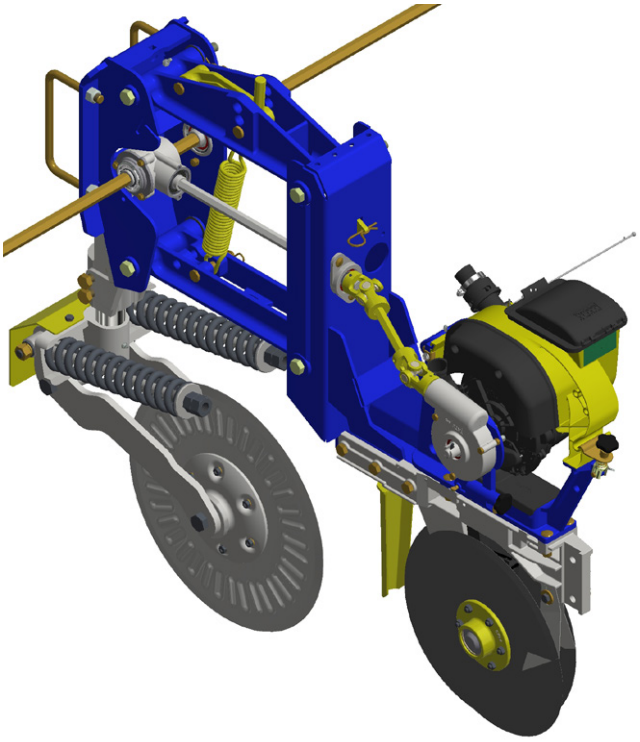
Seed row unit models for USAP



Precision planting seed row unit with steel cable

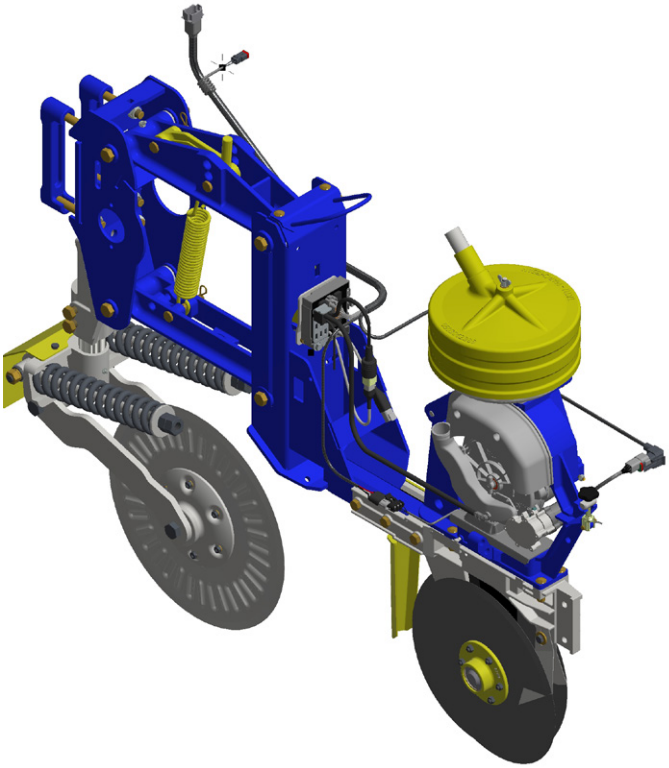


Precision planting seed row unit

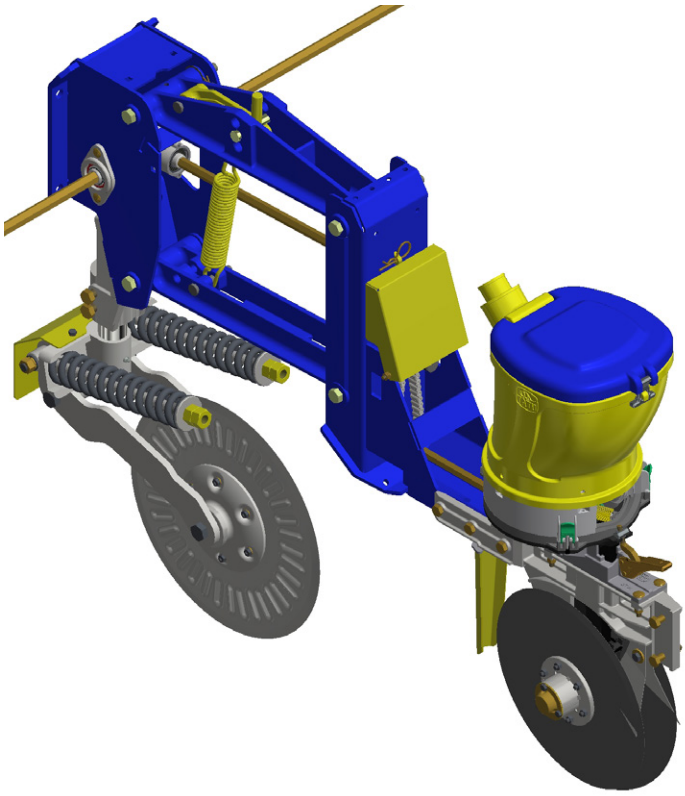


Precision planting seed row unit with mini hopper

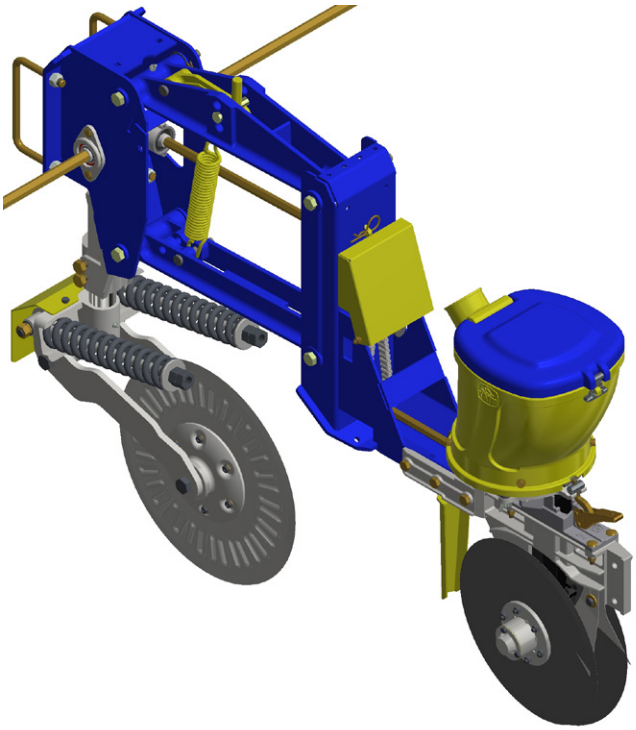
Seed row unit models for USAP



Precision planting seed row unit with electric vDrive



Titanium seed row unit



Mechanical seed row unit

Data sheet

Type: ..... Planter
Model: ..... USAP and USAP Suprema
Spacing between row units (mm): ..... 450, 500 and 550
Working width: ..... 7,500 mm to 17,890 mm
Transport width: ..... 6,500 mm
Height: ..... 2,700 m
Transport length: ..... 9,500 mm to 23,000 mm
Maximum transport speed: ..... 15 km/h
Tires:
Central tires: ..... 14 x 17.5/14 TR SK 900 **(55 PSI)**
Central tires: ..... 385/65 R 22.50 D 711 DRC 15-19.50 20 tarps **(130 PSI)**
Lateral tires: ..... 12 x 16.50 / 12 tarps TR SK 900 **(65 PSI).**

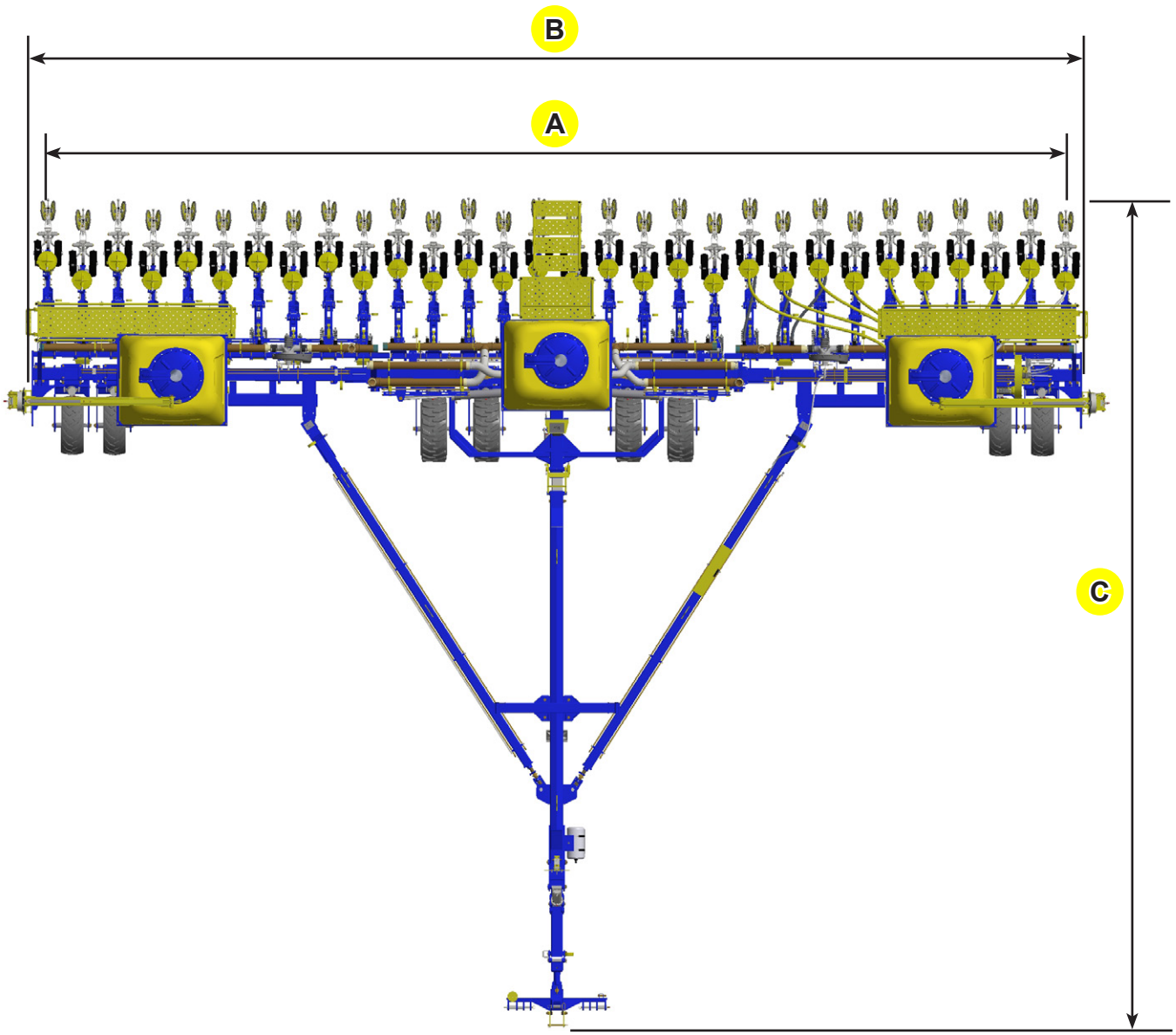
NOTE *** Series connection.**

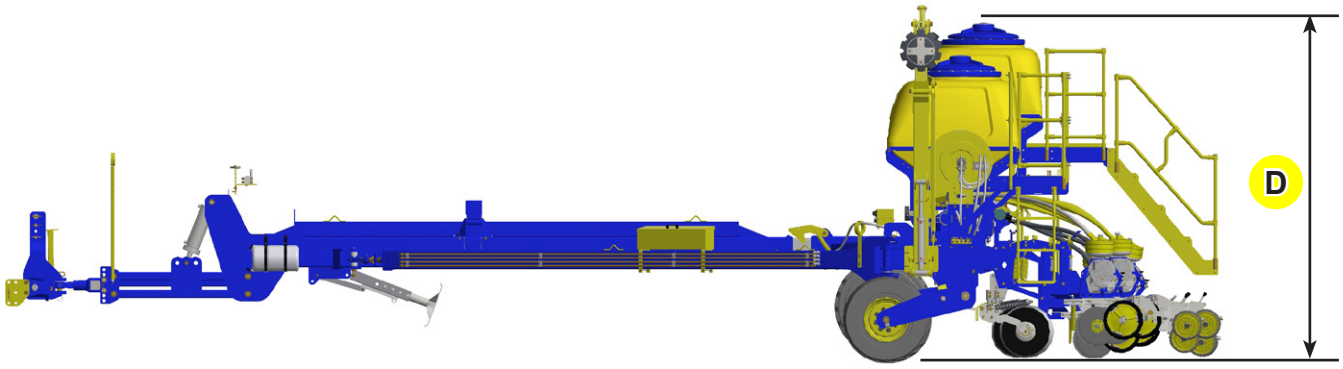
USAP seed hopper Tractor required (cv) table		
Number of row units	USAP	USAP SUPREMA
18	120 - 140	160 - 180
20	140 - 160	180 - 200
22	150 - 170	190 - 210
24	160 - 180	200 - 220
25	170 - 190	210 - 230
26	180 - 200	220 - 240
27	190 - 210	230 - 250
28	200 - 220	240 - 260
29	200 - 220	240 - 260
30	210 - 230	250 - 270
32	220 - 240	260 - 280
33	230 - 250	270 - 290
35	240 - 260	280 - 300
36	250 - 270	300 - 320
40	280 - 300	320 - 340
42	290 - 310	340 - 360
45	310 - 330	350 - 370
46	320 - 340	370 - 390
50	350 - 370	400 - 420

Oil flow table USAP USAP SUPREMA	
Model	Flow rate (Liters)
Central hopper turbine	10 to 25
Precision planting turbine	(05 to 24)*
APT engine	15 to 30
Alternator engine	20

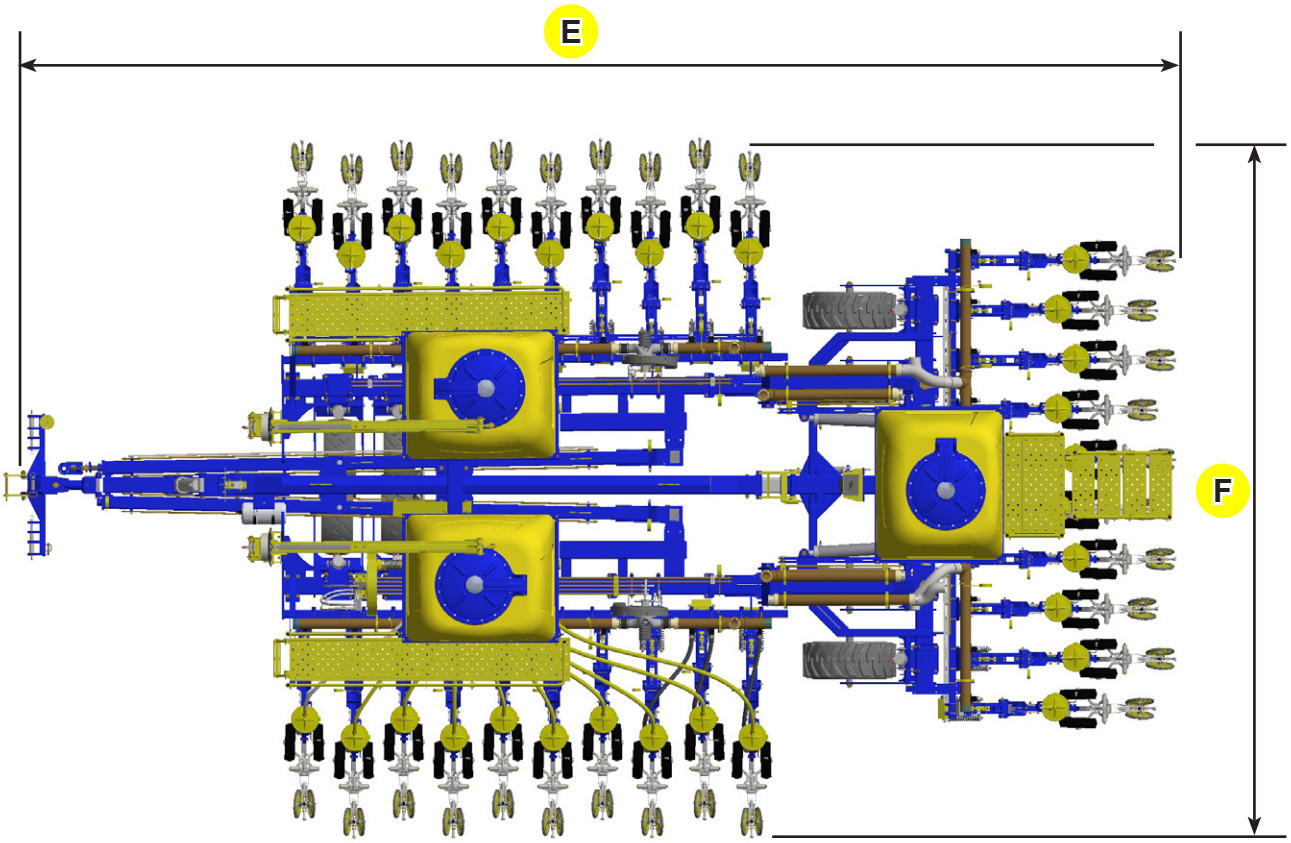
USAP seed and fertilizer hopper Tractor required (cv) table		
Number of row units	USAP	USAP SUPREMA
18	150 - 170	180 - 200
20	170 - 190	200 - 220
22	180 - 200	210 - 230
24	200 - 220	230 - 250
25	210 - 230	240 - 260
26	220 - 240	250 - 270
27	230 - 250	260 - 280
28	240 - 260	270 - 290
29	250 - 260	280 - 300
30	260 - 280	290 - 310
32	270 - 290	300 - 320

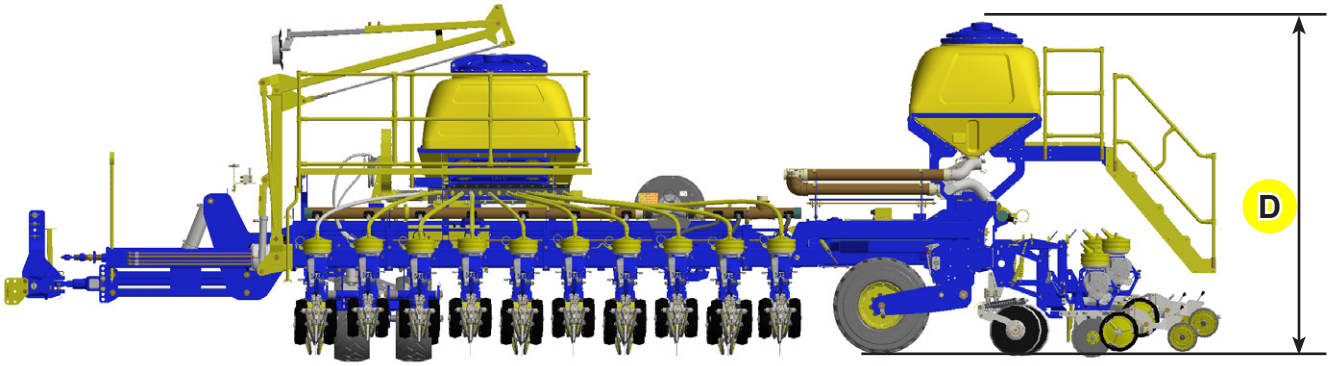
USAP dimensions





USAP dimensions





USAP/USAP SUPREMA dimensions						
Number of row units	Working width (A)	Total width without markers (B)	Total length (C)	Height when supported on the ground (D)	Transport length (E)	Transport length without markers (F)
18	8880	8940	9290	2900	11170	6500
20	9880	8940	9290	2900	11170	6500
22	10880	9860	10300	2900	11300	6500
24	11800	12040	10300	3020	12290	6500
25	12300	12910	10300	3020	12800	6500
26	12800	12910	10300	3020	12800	6500
27	13300	14910	10300	3020	12300	6500
28	13800	14910	10300	3020	12300	6500
29	14300	14910	10300	3020	12300	6500
30	14800	14910	10300	3020	12300	6500
32	15800	15890	10300	3020	13200	6500
33	16300	16280	11500	3020	14780	6500
35	17300	17890	11500	3020	14780	6500
36	17800	17890	11500	3020	18600	6500
40	19800	20900	14900	3020	18600	6500
42	20800	20900	14900	3020	18600	6500
45	22300	20900	14900	3020	18600	6500
46	22800	22400	14900	3020	19400	6500
50	22800	22400	14900	3020	19400	6500

Assembly

The planters leave the factory semi-assembled to facilitate transportation, being necessary the placement of just a few components by following the instructions below:

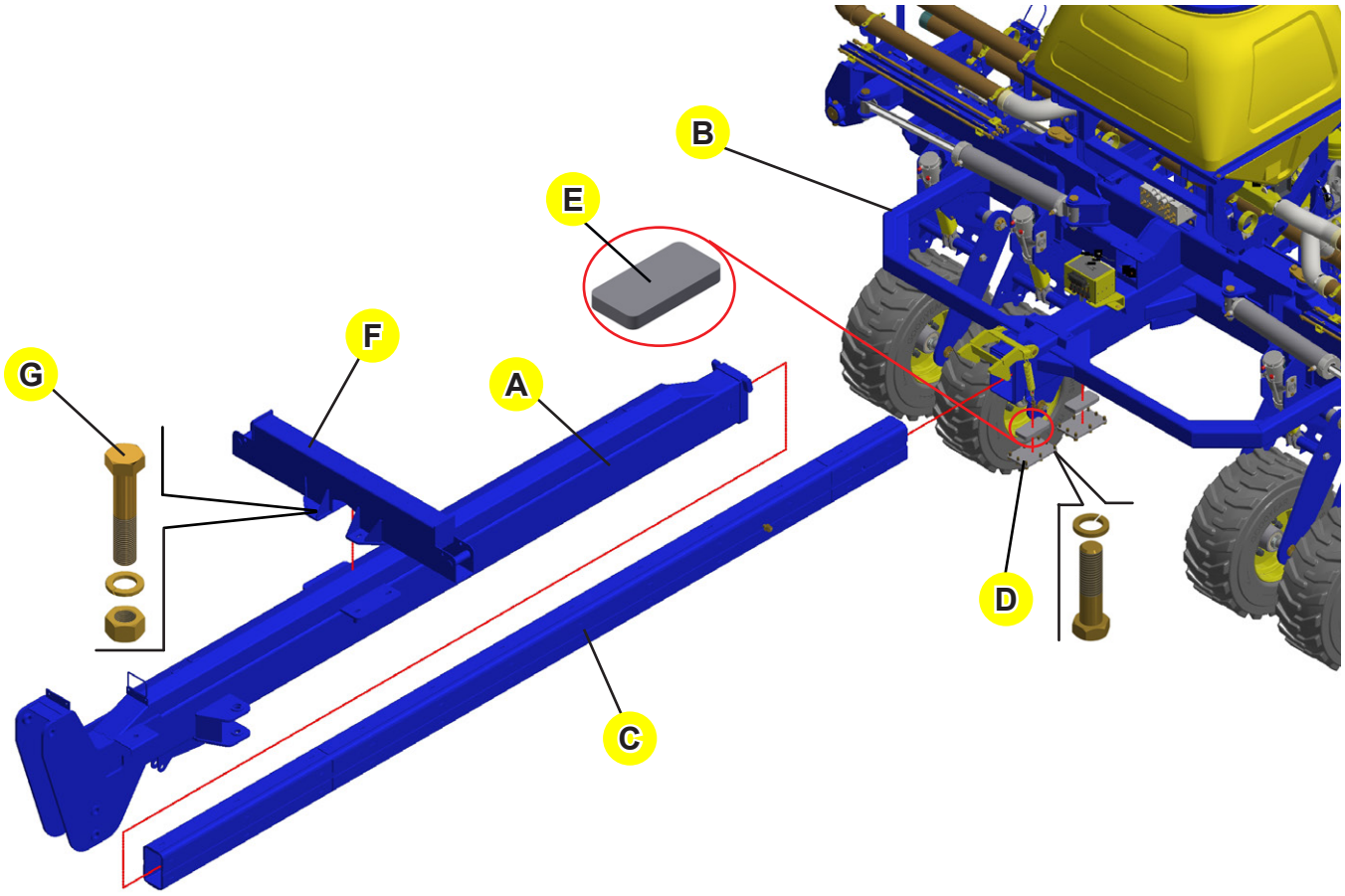
Smaller inner bar assembly

Before assembling the telescopic bar (A) to the central frame (B) it is necessary to place the inner bar (C). To do so, follow the instructions:

First of all, loosen up the bolts that fasten the plate (D), which is located below the central frame (B). Then, place the shims (E) inside the central frame.

Lastly, place the inner bar (C) on the telescopic bar (A) and on the central frame (B). Tighten up the bolts of the plate (D) again.

Assemble the transport lock (F) to the telescopic bar (A) using bolts (G), spring washers and nuts.



Greater inner bar assembly

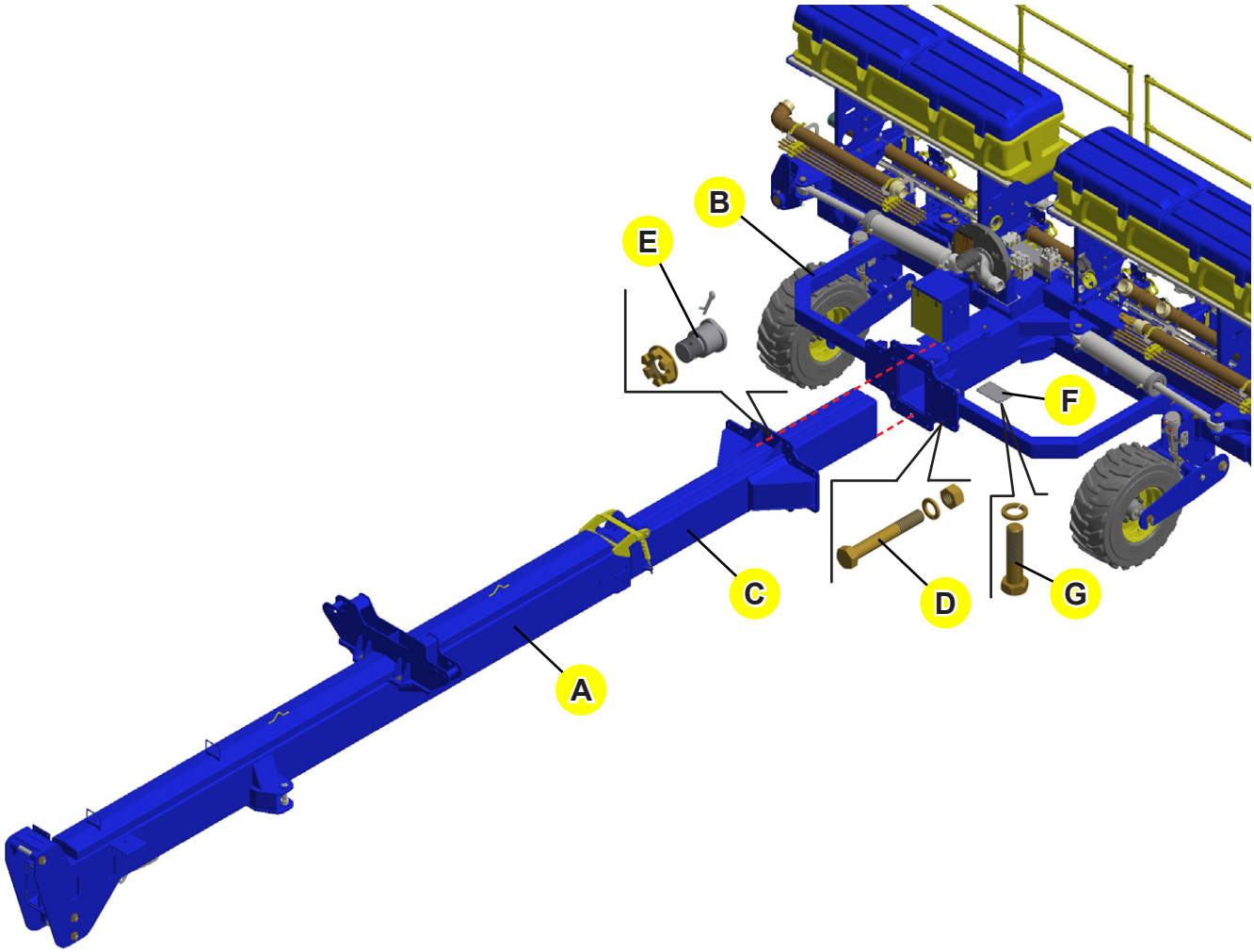
For greater equipments, the telescopic bar assembly differs from the smaller ones.

Assemble the telescopic bar (A) to the central frame (B). It is not necessary to place the inner bar (C), as it leaves the factory already assembled.

Use the bolt (D), spring washer and nut to join the telescopic bar (A) with the central frame (B).

The pin (E), castle nut and cotter pin work as a guide to assemble the telescopic bar (A) to the central frame (B) to facilitate the placement and tightening of the bolts (D).

Fasten the plate (F) to the frame (B) using a bolt (G) and spring washer.



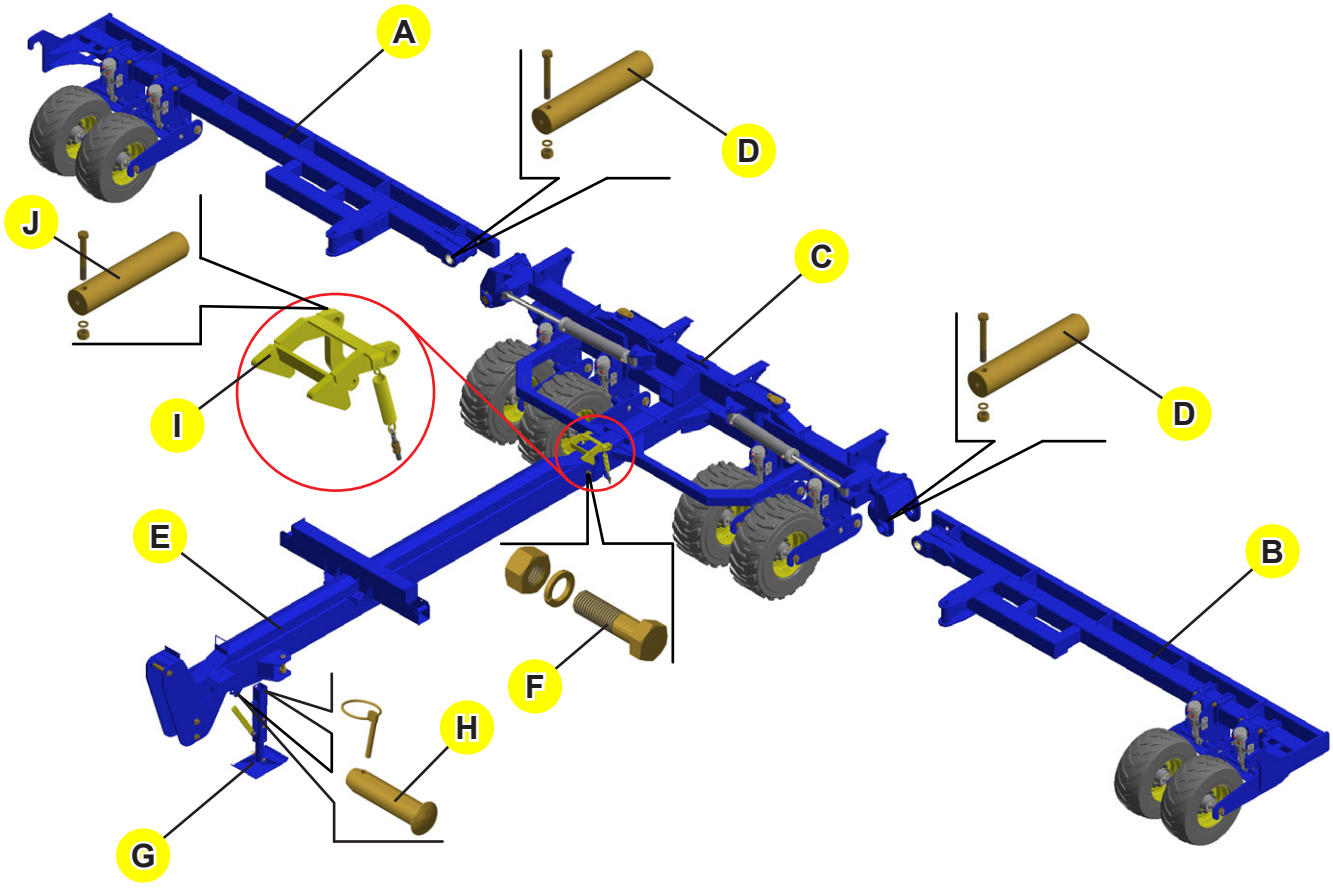
Frame assembly

Couple the right (A) and left (B) lateral frames to the central (C) one, using the axles (D) and fastening with bolts, spring washers and nuts.

Fasten the telescopic inner bar (E) using bolts (F), spring washers and nuts.

Couple the parking stand (G) to the telescopic bar (E) using a pin (H) and lock pin.

Assemble the telescopic bar lock (I) to the central frame (C) using an axle (J) lock.



NOTE **To remove the pin (D), use the bushing and the retrieving axle that can be found inside the components box.**

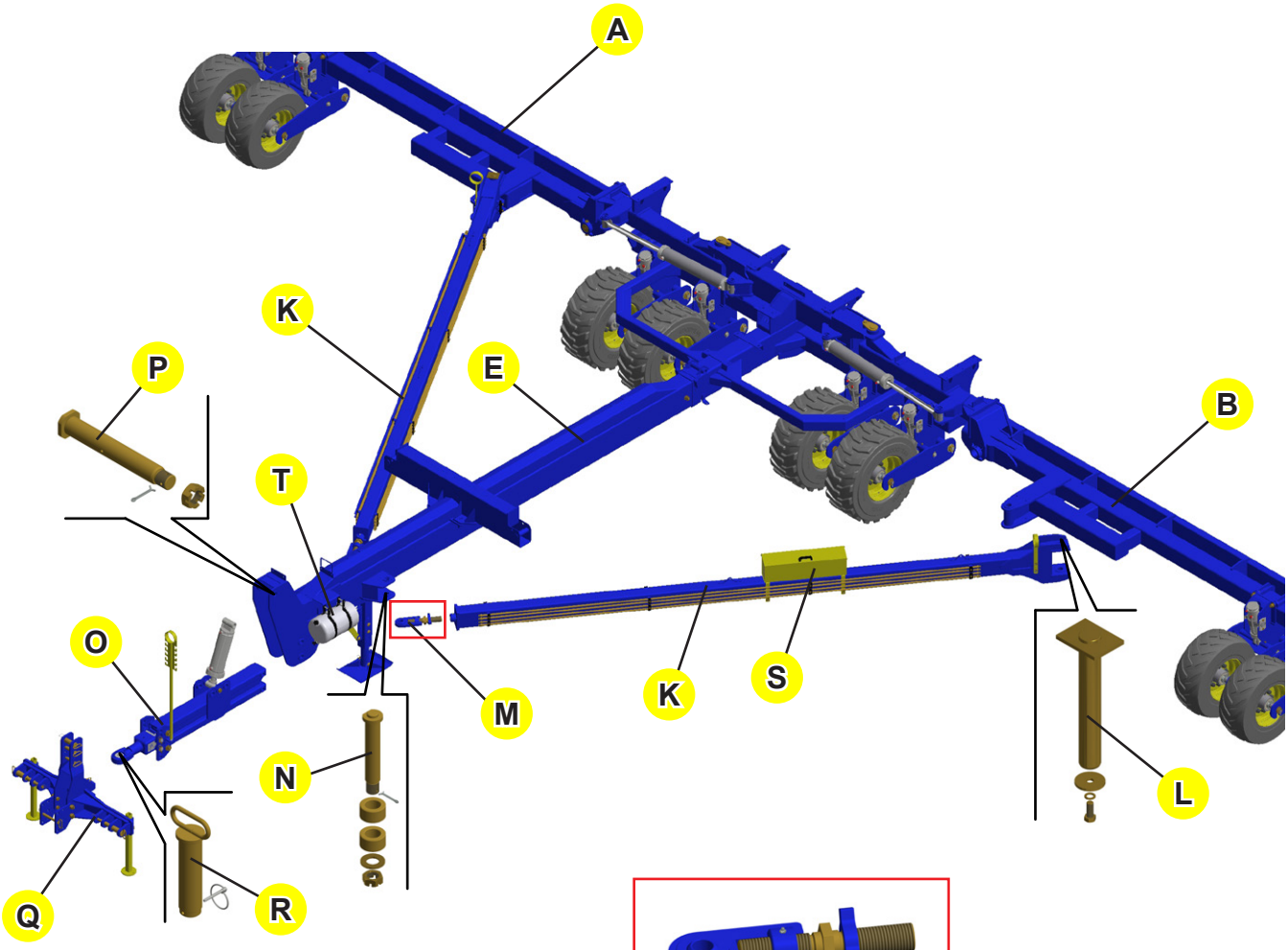
Extension bars assembly

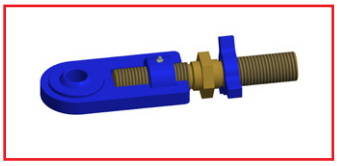
Assemble the extension bars (K) to the right (A) and left (B) frames using an axle (L) on one end; couple the swivel joint (M) on the other end and on the telescopic bar using the front axle (N) of the extension bar.

Couple the drawbar (O) to the front part of the telescopic bar (E) using the axle lock (P) of the drawbar.

Then, couple the three-point hitch (Q) to the drawbar (O) using the axle (R) of the hitch and cotter pin.

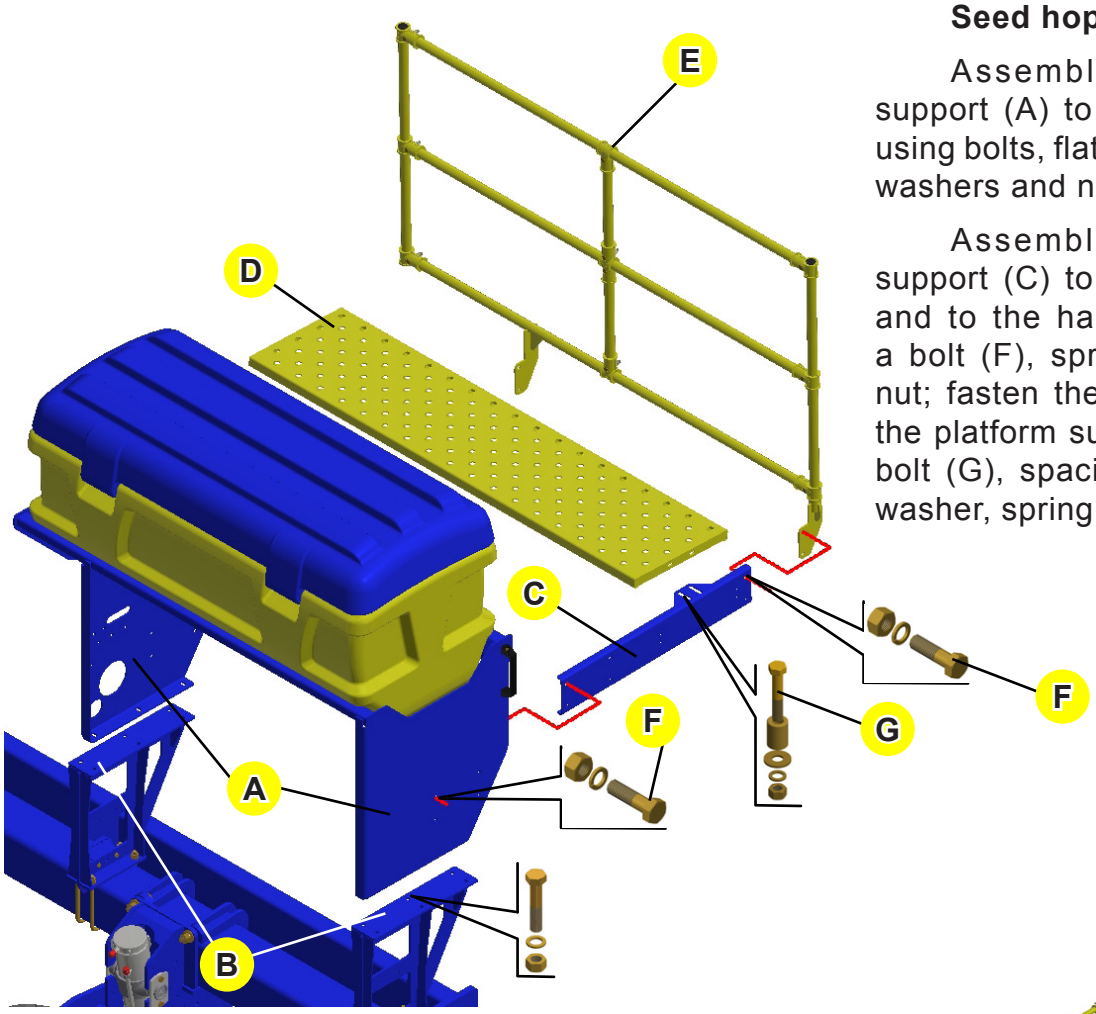
Lastly, fasten the tool box (S) to the extension bar (K) and also fasten the water reservoir (T) to the telescopic bar (E).





Swivel joint detail (M)

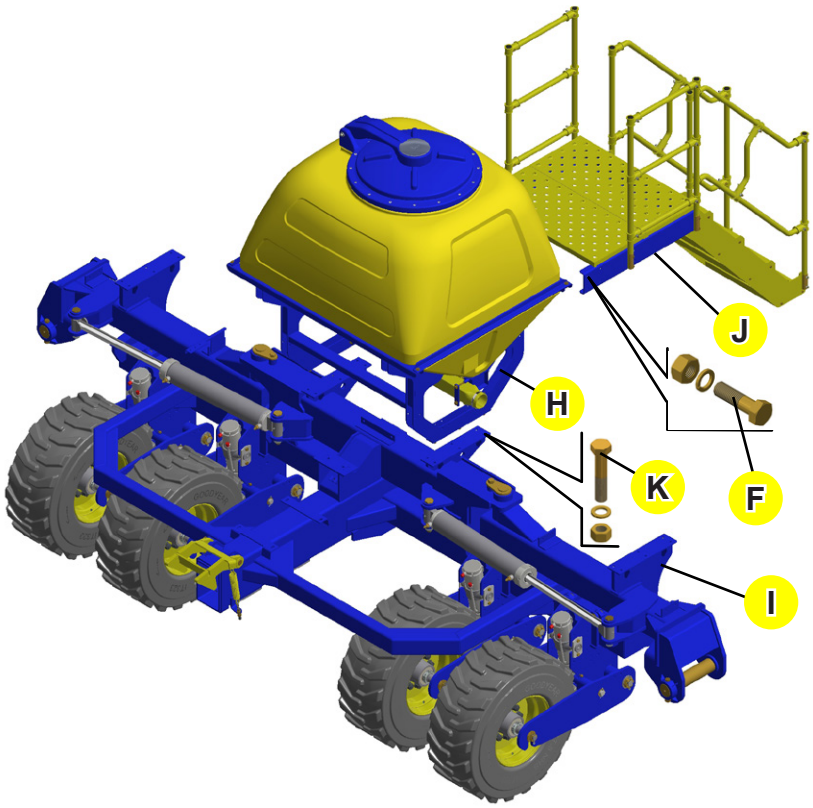
Hoppers assembly



Seed hopper

Assemble the hoppers support (A) to the support (B) using bolts, flat washers, spring washers and nuts.

Assemble the platform support (C) to the support (A) and to the handrail (E) using a bolt (F), spring washer and nut; fasten the platform (D) to the platform support (C) with a bolt (G), spacing bushing, flat washer, spring washer and nut.



Central seed hopper

Assemble the hoppers support (H) to the frame (I) using bolts, spring washers and nuts.

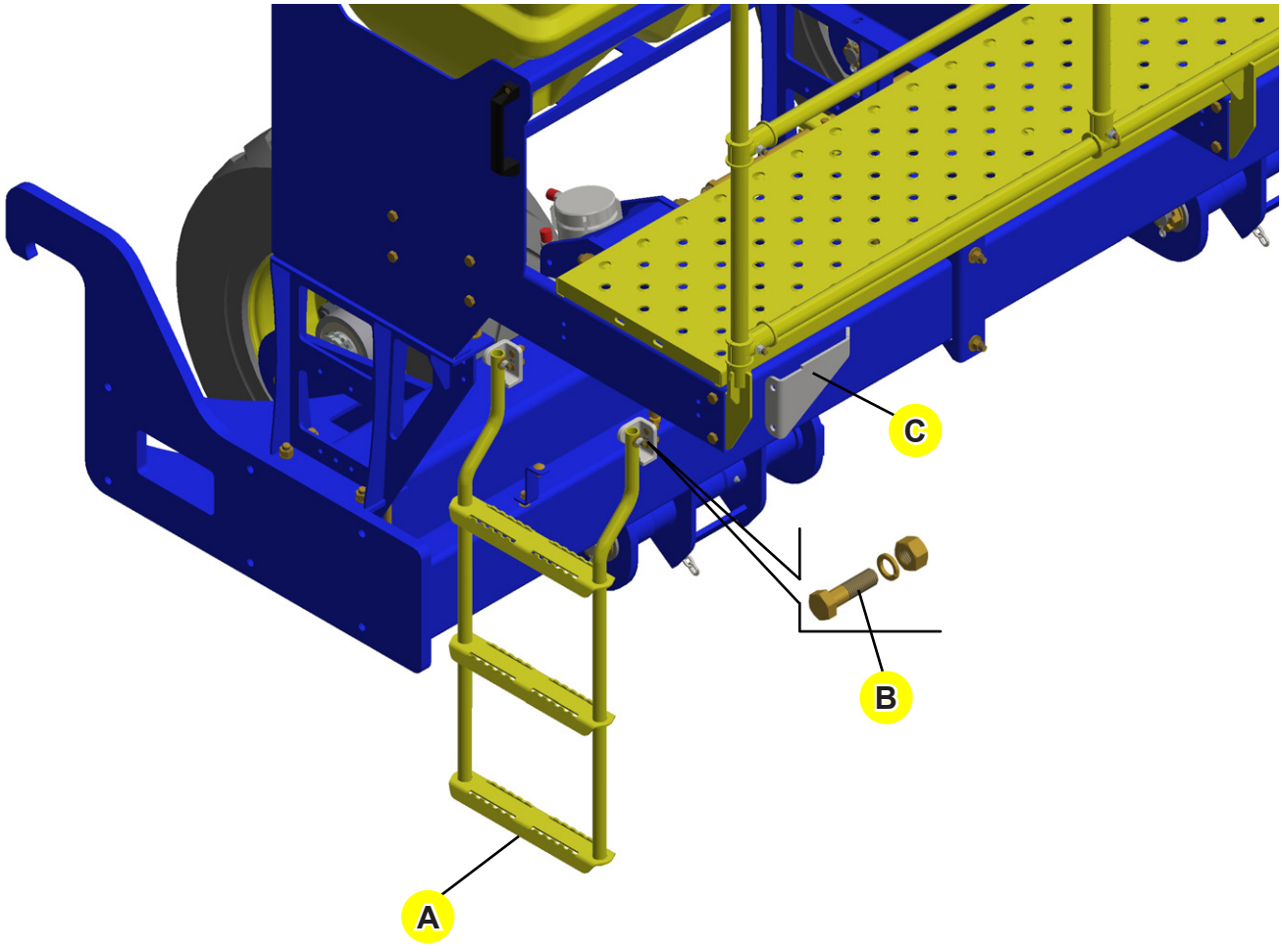
Assemble the ladder support (J) to the support (H) using bolts (K), spring washers and nuts.

Ladder assembly

The ladder is positioned on the lateral, with anti-skid steps and free access to the platform, according to the NR12 standard.

Fasten the ladder (A) to the equipment lateral using bolts (B), spring washers and nuts.

Fasten the platform aisle (found inside the components box) (C) to the platform support using the same bolts that hold up the handrail.



Row marker assembly

The row markers leave the factory unassembled and inside the components box. To assemble them, follow the instructions below.

Fasten the marker support (A) to the frame lateral (B) using bolts (C), spring washers and nuts.

Then, fasten the bar (D) to the support (A) using a pin (E), castle nut and cotter pin.

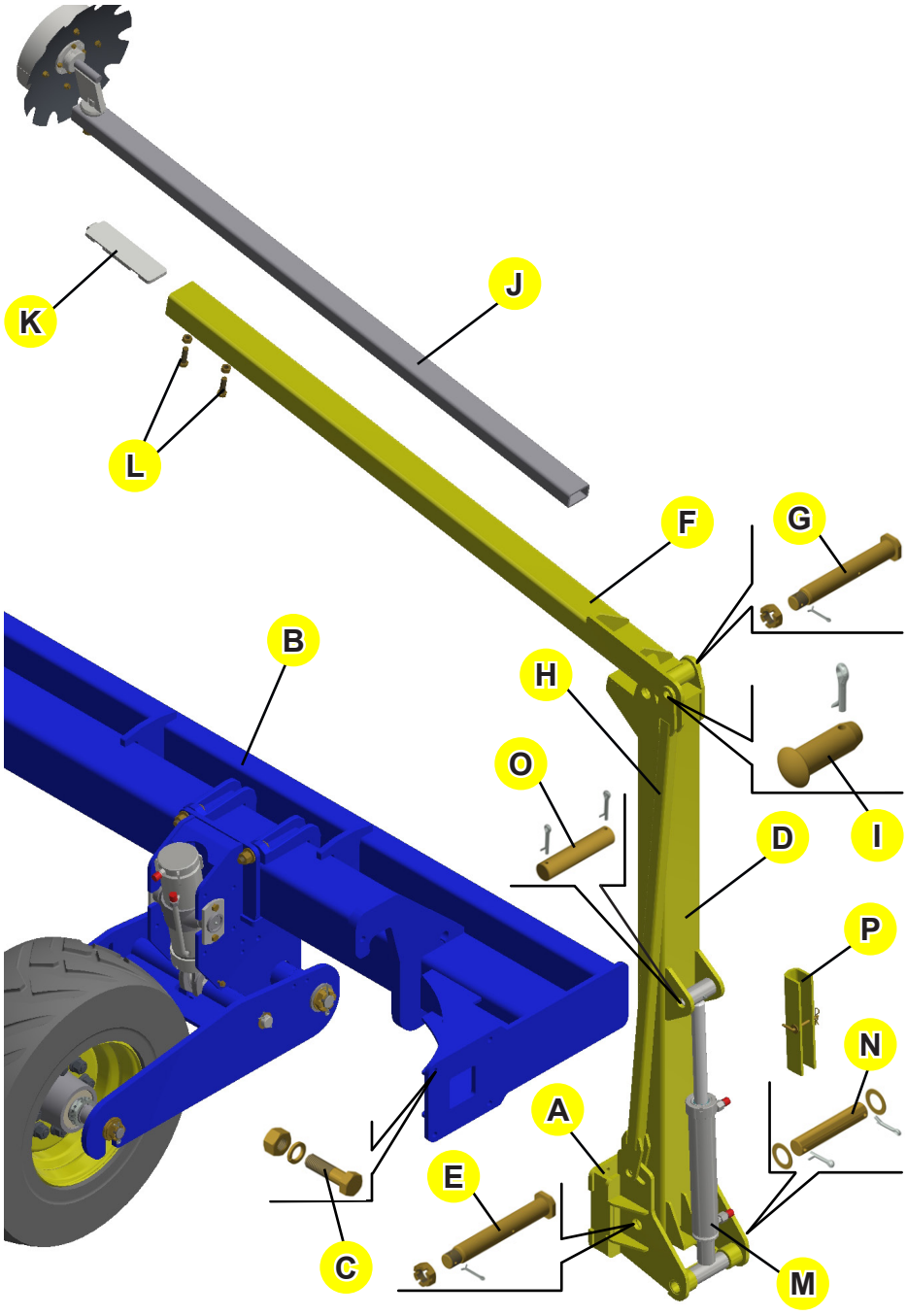
Fasten the arm (F) to the bar using a pin (G), castle nut and cotter pin.

Then, fasten the lever (H) to the support (A) and to the arm (F) using a pin (I) and cotter pin.

Couple the extensor (J) to the arm (F) using a shim (K) and locking with bolts (L) and nuts.

Lastly, lock the hydraulic cylinder (M) to the support (A) and to the bar (D) using a pin (N), flat washer and cotter pin.

Couple the pin (O) and cotter pin to the bar (D).



NOTE

The transport lock (P), which can be found inside the components box, is used only when transporting the equipment.

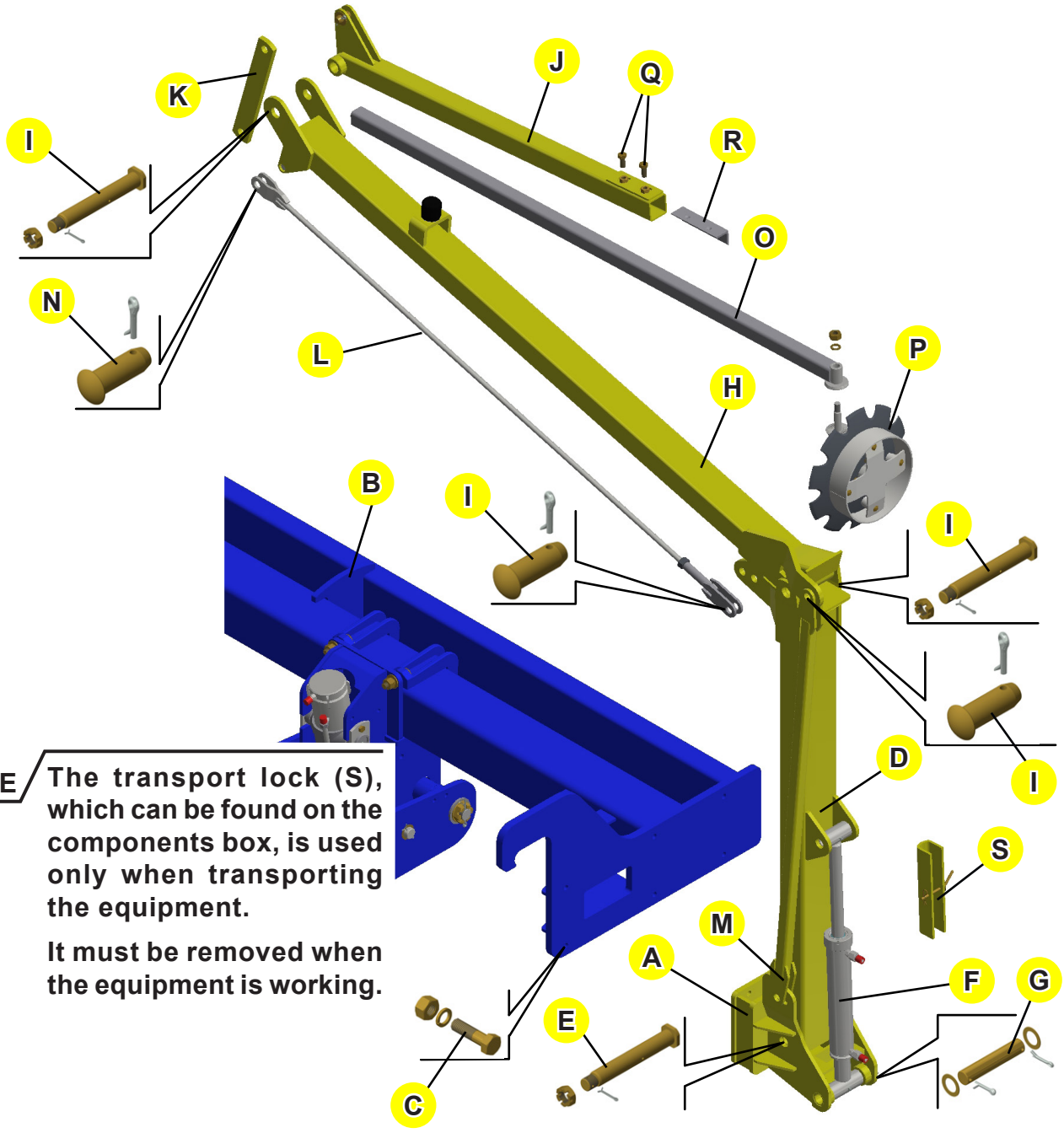
It must be removed when the equipment is working.

Row marker assembly

Fasten the row marker support (A) to the frame (B) using bolts (C), spring washers and nuts. Then, lock the arm (D) to the marker support using an axle (E), castle nut and cotter pin.

Fasten the cylinder (F) to the arm and to the marker support using the axle (G), flat washers and cotter pins. Then, lock the intermediate arm (H) to the arm using the axle (I), castle nut and cotter pin. Lock the intermediate arm to the marker arm (J) using the axle (I), castle nut and cotter pin.

Assemble the smaller lever (K), the rod (L) and the greater lever (M) to the intermediate arm and to the marker support using a pin (N) and cotter pin. Lastly, assemble the extensor (O) and the marker disc (P) using the bolts (Q) and arm guide (R).



NOTE **The transport lock (S), which can be found on the components box, is used only when transporting the equipment.**

It must be removed when the equipment is working.

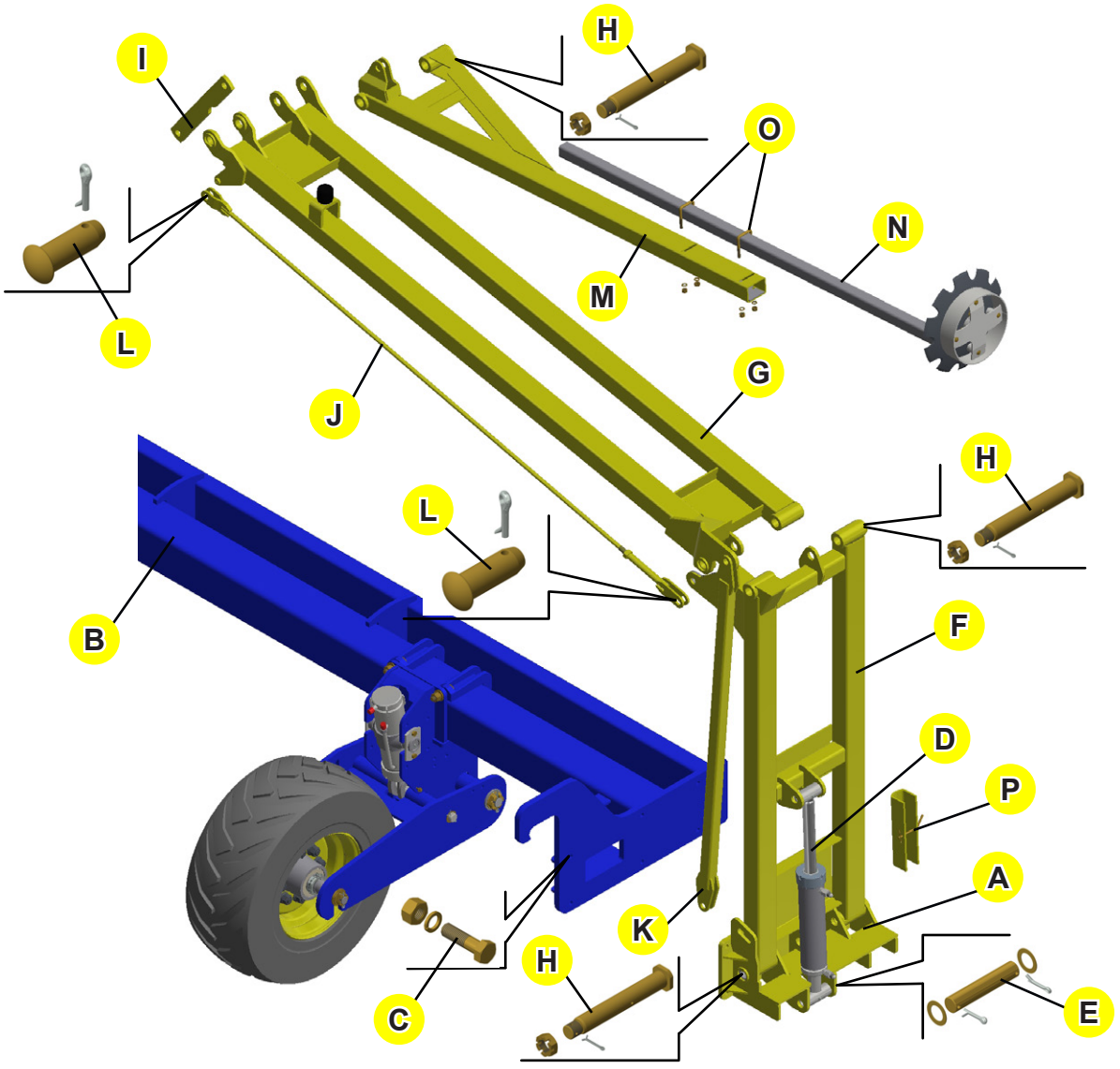
Row marker assembly

Fasten the marker support (A) to the frame lateral (B) using bolts (C), spring washers and nuts.

Lock the cylinder (D) with the axle (E), flat washers and cotter pins. Then, fasten the bar (F) to the intermediate arm (G) and to the marker support (A) using axles (H), castle nut and cotter pin.

Assemble the smaller lever (I) and the adjustable rod (J). Assemble the greater lever (K) to the intermediate arm (G) and to the support (A) using a pin (L) and cotter pin.

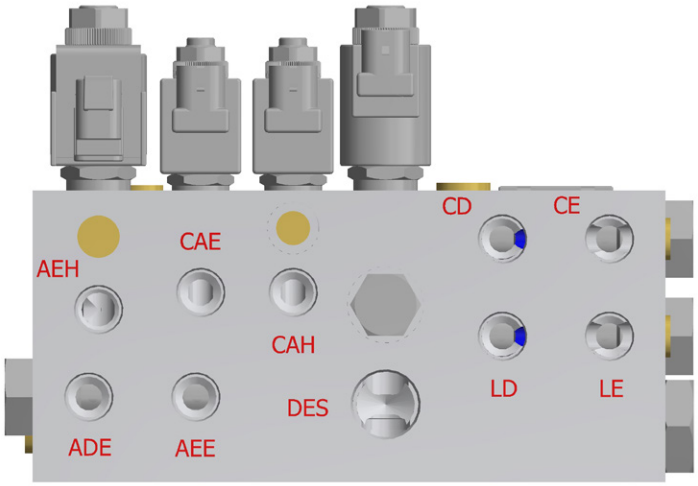
Lock the arm (M) to the intermediate arm (G) using an axle (H), castle nut and cotter pin. Right after, assemble the extensor (N) along with the disc blade to the arm (M) and lock using clamps (O), spring washers and nuts.

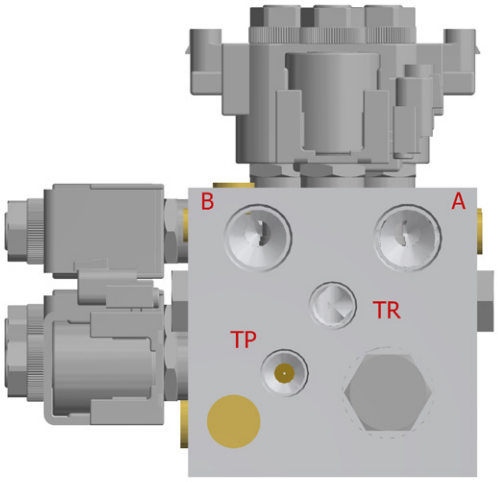


NOTE **The transport lock (P), which can be found on the components box, is used only when transporting the equipment.**

It must be removed when the equipment is working.

Optimization control valve BLFP 2866 (Fluid Power)

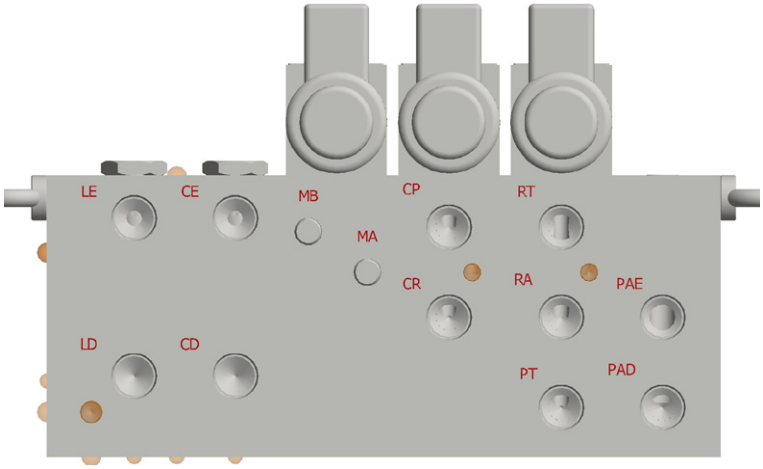


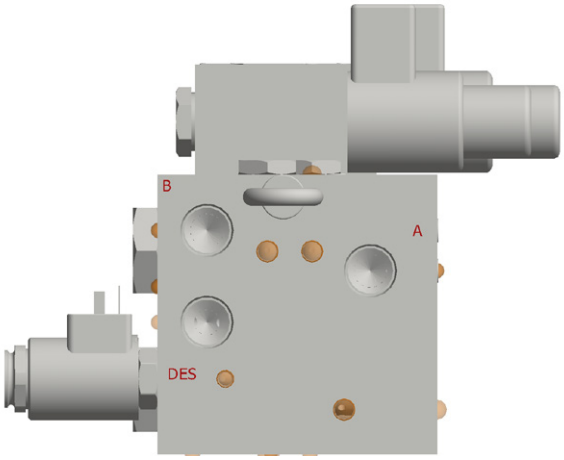


Acronym	Description
DES	Descent movement
ADE	Right articulation pressure
AEE	Left articulation pressure
CD	Central right
CAE	Drawbar pressure
CAH	Drawbar return
CE	Central left

Acronym	Description
AEH	Left/right articulation return
LD	Right lateral
LE	Left lateral
B	Tractor pressure
A	Tractor return
TR	Lock return
TP	Lock pressure

Optimization control valve BMH 1657 (Argo Hytos)

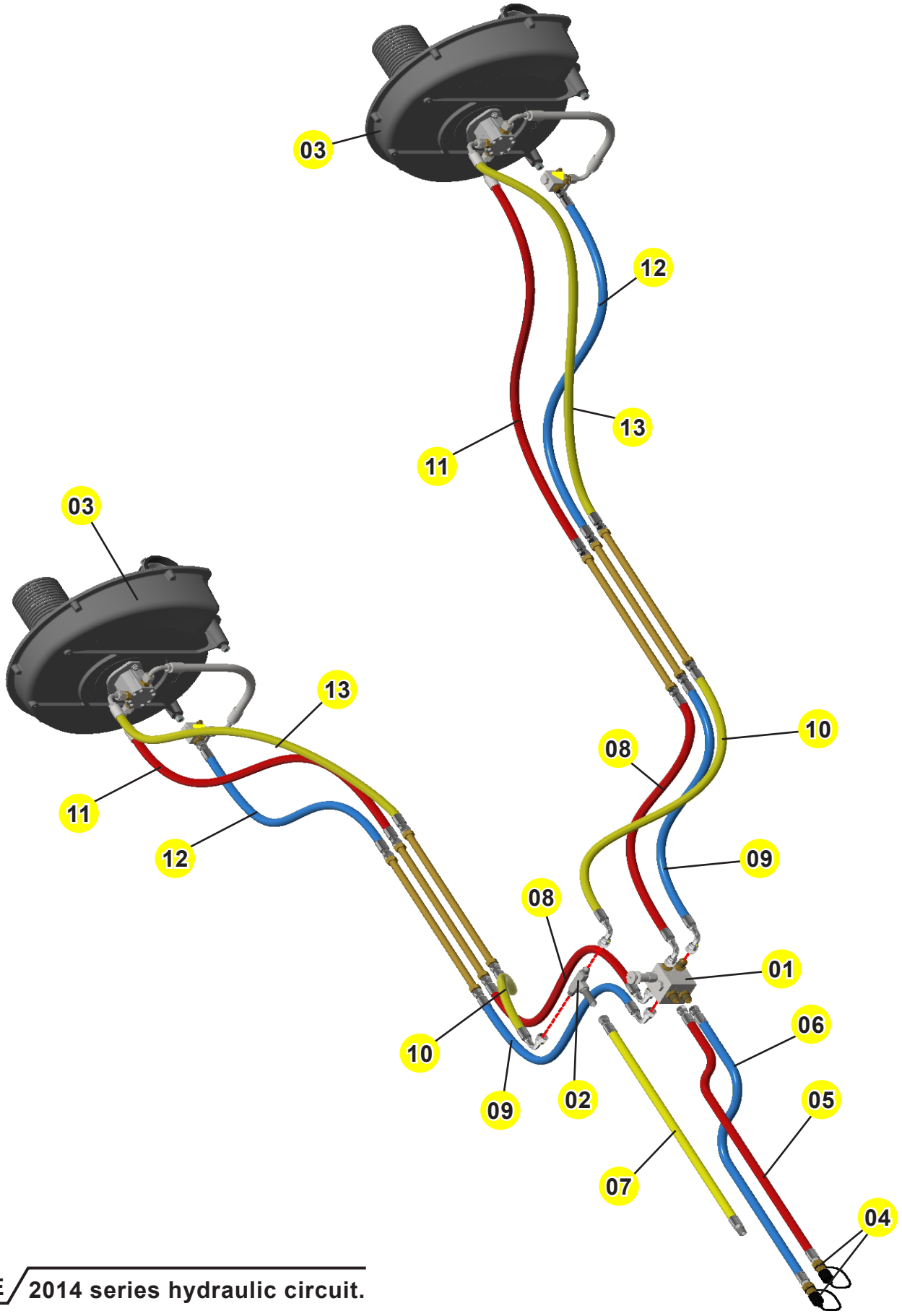




Acronym	Description
LE	Left lateral
CE	Central left
CP	Drawbar pressure
CR	Drawbar return
RT	Lock return
RA	Articulation return
DES	Descent movement

Acronym	Description
PAE	Left articulation pressure
PAD	Right articulation pressure
PT	Lock pressure
LD	Right lateral
CD	Central right
B	Control valve pressure
A	Control valve return

USAP hydraulic circuit with 2 Precision Planting turbines



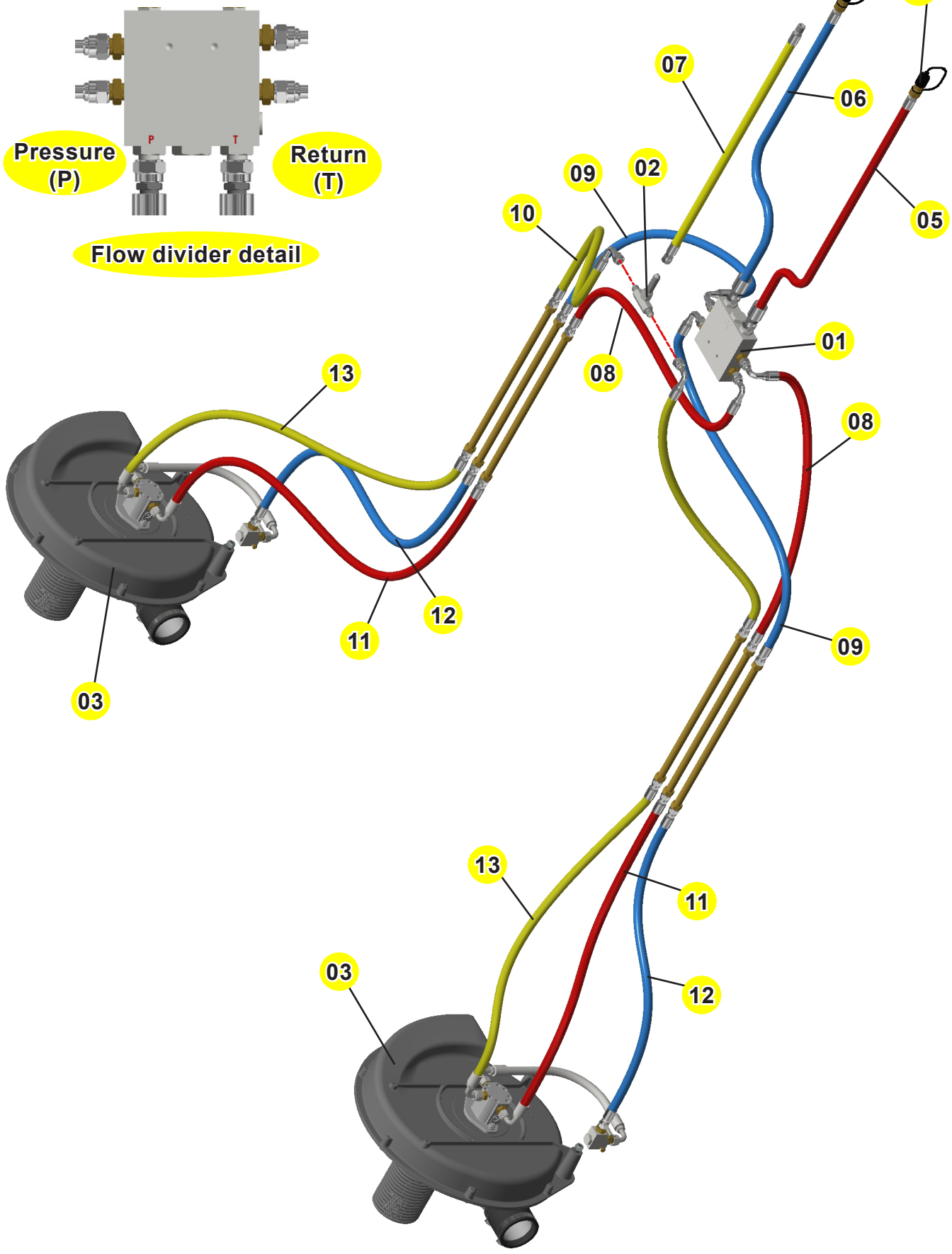
NOTE 2014 series hydraulic circuit.

USAP hydraulic circuit with 2 Precision Planting turbines

Item	2 Precision Planting turbines	Qty.	
01	Control valve with nipple	01	
02	"T" terminal	01	
03	Precision planting turbine	02	
04	Male quick coupler 1/2 NPT	02	
05	1/2 X 3200 TR-TM hose	01	Pressure
06	1/2 X 3200 TR-TM hose	01	Return
07	3/8 X 3200 TR-TR hose	01	Drain
08	1/2 X 2300 TR-TC hose	02	Pressure
09	1/2 X 2300 TR-TC hose	02	Return
10	3/8 X 2300 TR-TC hose	02	Drain
11	1/2 X 1350 TR-TC hose	02	Pressure
12	1/2 X 1200 TR-TR hose	02	Return
13	3/8 X 1300 TR-TC hose	02	Drain

NOTE 2014 series hydraulic circuit.

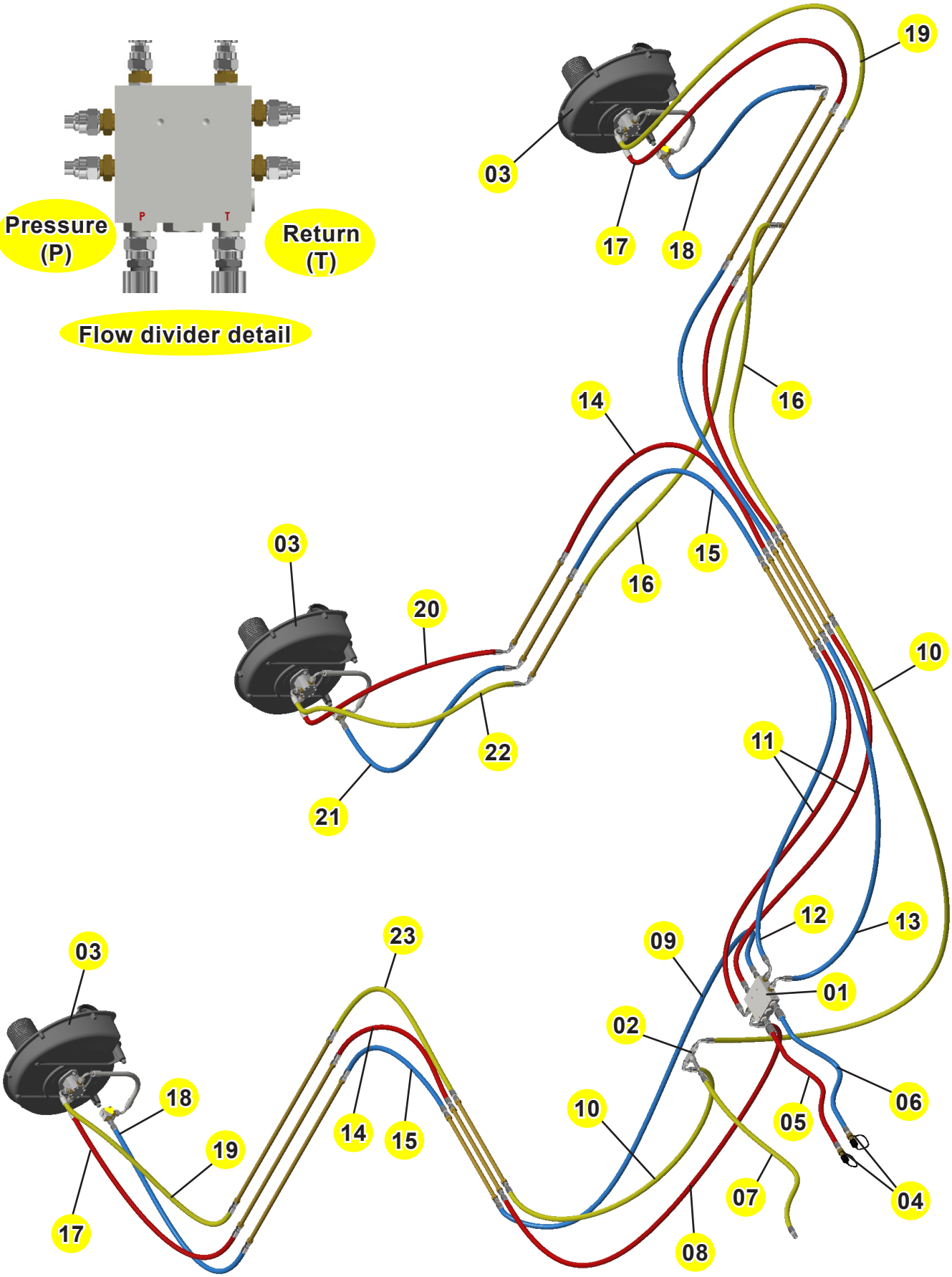
USAP hydraulic circuit with 2 Precision Planting turbines



USAP hydraulic circuit with 2 Precision Planting turbines

Item	2 Precision planting turbines	Qty.	
01	BLFP flow divider control valve	01	
02	"T" terminal	01	
03	Precision planting turbine	02	
04	Male quick coupler 1/2 NPT	02	
05	1/2 X 3200 TR-TM hose	01	Pressure
06	1/2 X 3200 TR-TM hose	01	Return
07	3/8 X 3200 TR-TR hose	01	Drain
08	1/2 X 2300 TR-TC hose	02	Pressure
09	1/2 X 2300 TR-TC hose	02	Return
10	3/8 X 2300 TR-TC hose	02	Drain
11	1/2 X 1350 TR-TC hose	02	Pressure
12	1/2 X 1200 TR-TR hose	02	Return
13	3/8 X 1300 TR-TC hose	02	Drain

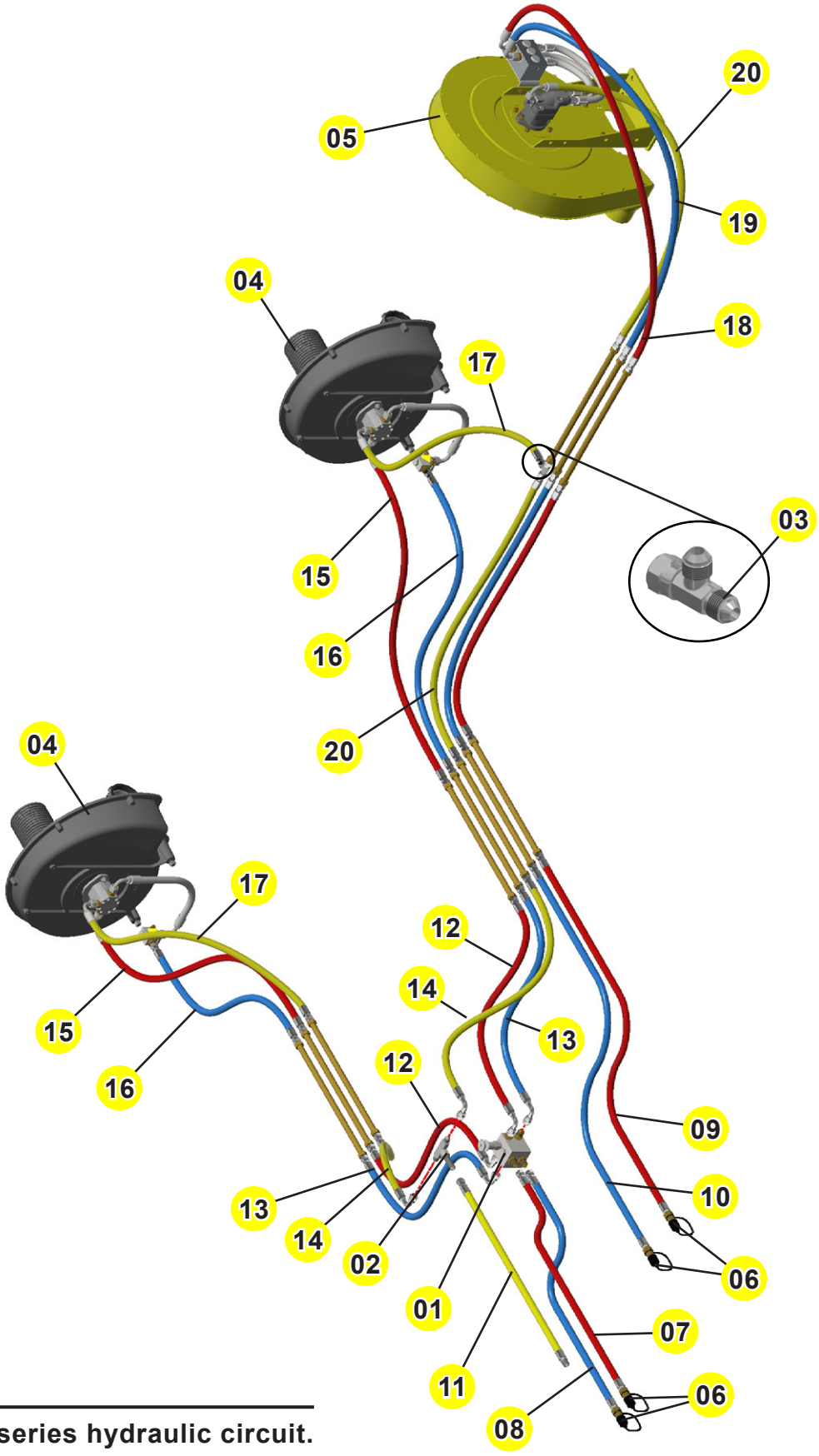
USAP hydraulic circuit with 3 Precision Planting turbines



USAP hydraulic circuit with 3 Precision Planting turbines

Item	3 Precision planting turbines	Qty.	
01	BLFP flow divider control valve	01	
02	"T" terminal	01	
03	Precision planting turbine	03	
04	Male quick coupler 1/2 NPT	02	
05	3/4 X 3300 TR-TM hose	01	Pressure
06	3/4 X 3300 TR-TM hose	01	Return
07	3/8 X 3200 TR-TR hose	01	Drain
08	1/2 X 2200 TR-TR hose	01	Pressure
09	1/2 X 2200 TR-TC hose	01	Return
10	3/8 X 2300 TR-TC hose	02	Drain
11	1/2 X 2200 TR-TC hose	02	Pressure
12	1/2 X 2200 TR-TR hose	01	Return
13	1/2 X 2200 TR-TC hose	01	Return
14	1/2 X 2900 TR-TR hose	02	Pressure
15	1/2 X 2900 TR-TR hose	02	Return
16	3/8 X 1800 TR-TR hose	02	Drain
17	1/2 X 650 TR-TC hose	02	Pressure
18	1/2 X 400 TR-TC hose	02	Return
19	3/8 X 500 TR-TC hose	02	Drain
20	1/2 X 1550 TC-TC hose	01	Pressure
21	1/2 X 1550 TC-TC hose	01	Return
22	3/8 x 1550 TC-TC hose	01	Drain
23	3/8 x 2800 TR-TR hose	01	Drain

USAP hydraulic circuit with 2 PP turbines and 1 CSH TATU turbine



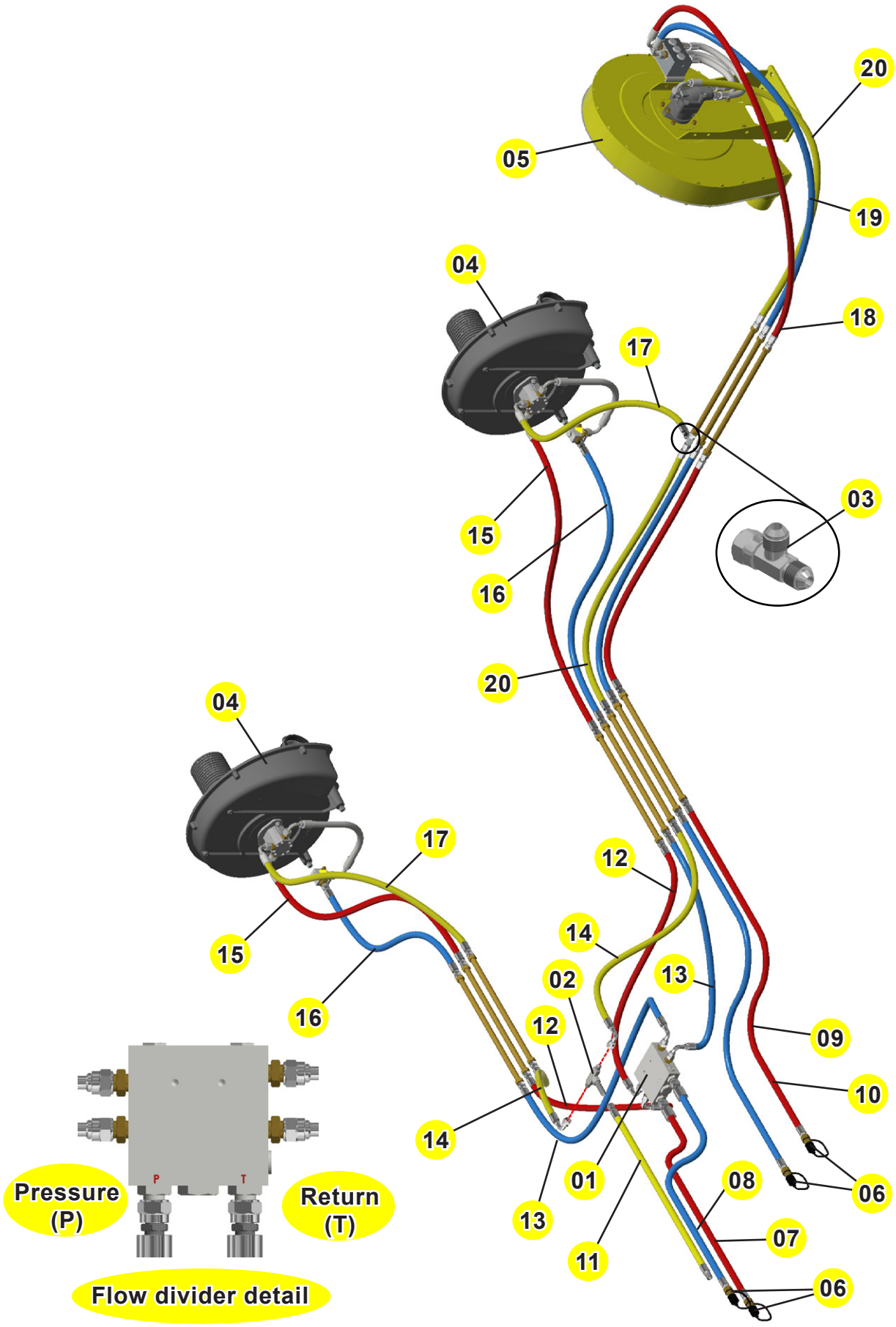
NOTE 2014 series hydraulic circuit.

USAP hydraulic circuit with 2 PP turbines and 1 CSH TATU turbine

Item	PP and TATU turbine	Qty.	
01	Control valve with nipple	01	
02	"T" terminal	01	
03	"T" adapter with lateral nut	01	
04	Precision planting turbine	02	
05	TATU hydraulic turbine	01	
06	Male quick coupler 1/2 NPT	04	
07	1/2 X 3200 TR-TM hose	01	Pressure
08	1/2 X 3200 TR-TM hose	01	Return
09	1/2 X 5900 TR-TM hose	01	Pressure
10	1/2 X 5900 TR-TM hose	01	Return
11	3/8 X 3200 TR-TR hose	01	Drain
12	1/2 X 2550 TR-TC hose	02	Pressure
13	1/2 X 2550 TR-TC hose	02	Return
14	3/8 X 2550 TR-TR hose	02	Drain
15	1/2 X 2200 TR-TC hose	02	Pressure
16	1/2 X 2000 TR-TR hose	02	Return
17	3/8 X 500 TR-TC hose	01	Drain
18	1/2 X 1000 TC-TC hose	01	Pressure
19	1/2 X 1000 TC-TC hose	01	Return
20	3/8 X 900 TC-TC hose	02	Drain

NOTE 2014 series hydraulic circuit.

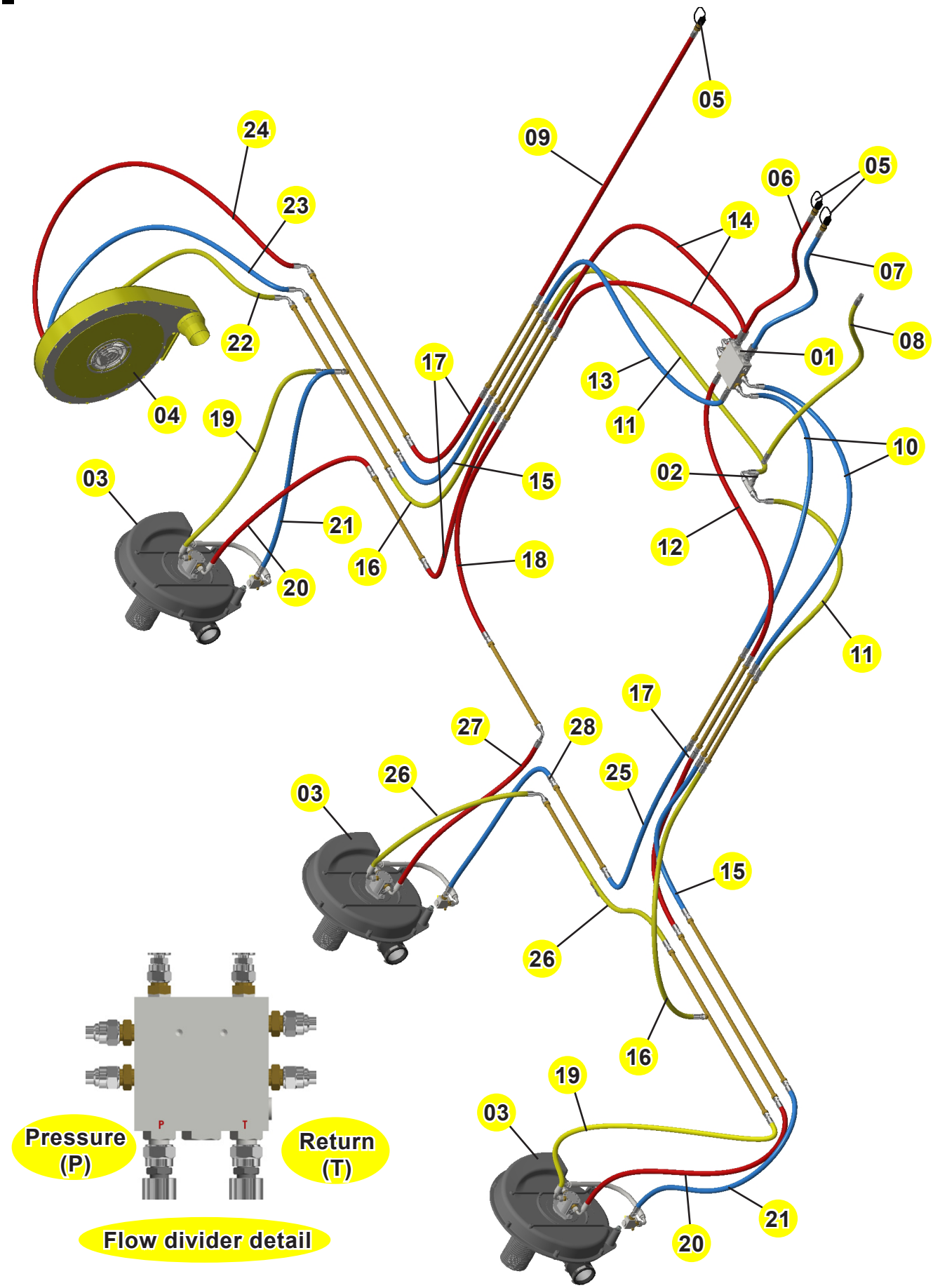
USAP hydraulic circuit with 2 PP turbines and 1 CSH TATU turbine



USAP hydraulic circuit with 2 PP turbines and 1 CSH TATU turbine

Item	PP and TATU turbines	Qty.	
01	BLFP flow divider control valve	01	
02	"T" terminal	01	
03	"T" adapter with lateral nut	01	
04	Precision planting turbine	02	
05	TATU hydraulic turbine	01	
06	Male quick coupler 1/2 NPT	04	
07	1/2 X 3200 TR-TM hose	01	Pressure
08	1/2 X 3200 TR-TM hose	01	Return
09	1/2 X 5900 TR-TM hose	01	Pressure
10	1/2 X 5900 TR-TM hose	01	Return
11	3/8 X 3200 TR-TR hose	01	Drain
12	1/2 X 2550 TR-TC hose	02	Pressure
13	1/2 X 2550 TR-TC hose	02	Return
14	3/8 X 2550 TR-TR hose	02	Drain
15	1/2 X 2200 TR-TC hose	02	Pressure
16	1/2 X 2000 TR-TR hose	02	Return
17	3/8 X 500 TR-TC hose	01	Drain
18	1/2 X 1000 TC-TC hose	01	Pressure
19	1/2 X 1000 TC-TC hose	01	Return
20	3/8 X 900 TC-TC hose	02	Drain

USAP hydraulic circuit with 3 PP turbines and 1 CSH TATU turbine

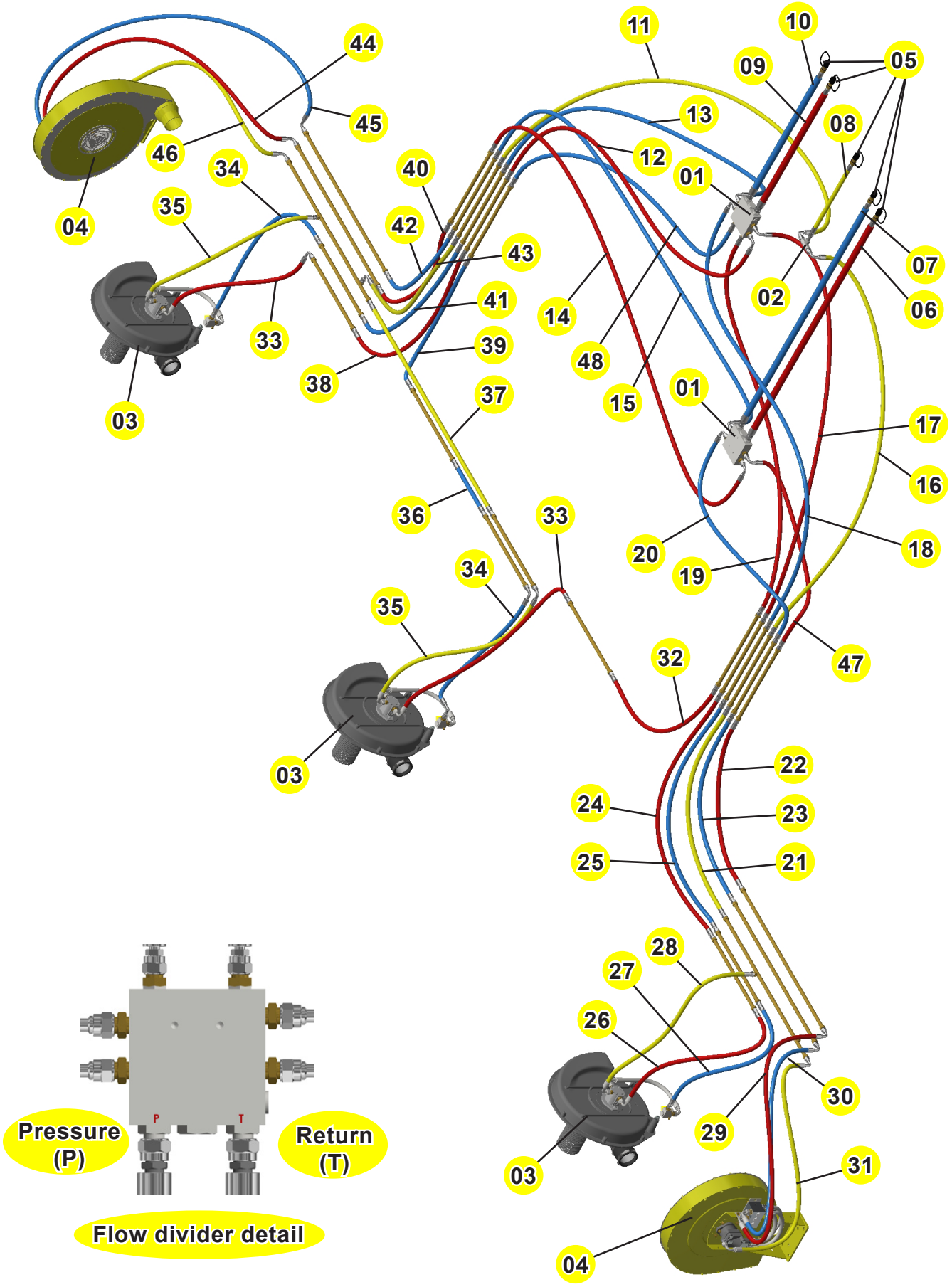


USAP hydraulic circuit with 3 PP turbines and 1 CSH TATU turbine

Item	PP and TATU turbine	Qty.	
01	BLFP flow divider control valve	01	
02	"T" terminal	01	
03	PP turbine	03	
04	TATU hydraulic turbine	01	
05	Male quick coupler 1/2 NPT	03	
06	3/4 X 3300 TR-TM hose	01	Pressure
07	3/4 X 3300 TR-TM hose	01	Return
08	3/8 X 3200 TR-TR hose	01	Drain
09	1/2 X 5900 TR-TM hose	01	Pressure
10	1/2 X 2200 TR-TC hose	02	Return
11	3/8 X 2300 TR-TC hose	02	Drain
12	1/2 X 2200 TR-TR hose	01	Pressure
13	1/2 X 2200 TR-TR hose	01	Return
14	1/2 X 2200 TR-TC hose	02	Pressure
15	1/2 X 1800 TR-TR hose	02	Return

Item	PP and TATU turbine	Qty.	
16	3/8 X 1800 TR-TR hose	02	Drain
17	1/2 X 1800 TR-TR hose	03	Pressure
18	1/2 X 2900 TR-TR hose	01	Pressure
19	3/8 X 700 TR-TC hose	02	Drain
20	1/2 X 650 TR-TC hose	02	Pressure
21	1/2 X 550 TR-TR hose	02	Return
22	3/8 X 900 TC-TC hose	01	Drain
23	1/2 X 1000 TC-TC hose	01	Return
24	1/2 X 1000 TC-TC hose	01	Pressure
25	1/2 X 2900 TR-TR hose	01	Return
26	3/8 X 1550 TC-TC hose	02	Drain
27	1/2 X 1800 TR-TR hose	02	Pressure
28	1/2 X 1400 TC-TC hose	02	Return

USAP hydraulic circuit with 3 PP turbines and 2 CSH TATU turbines

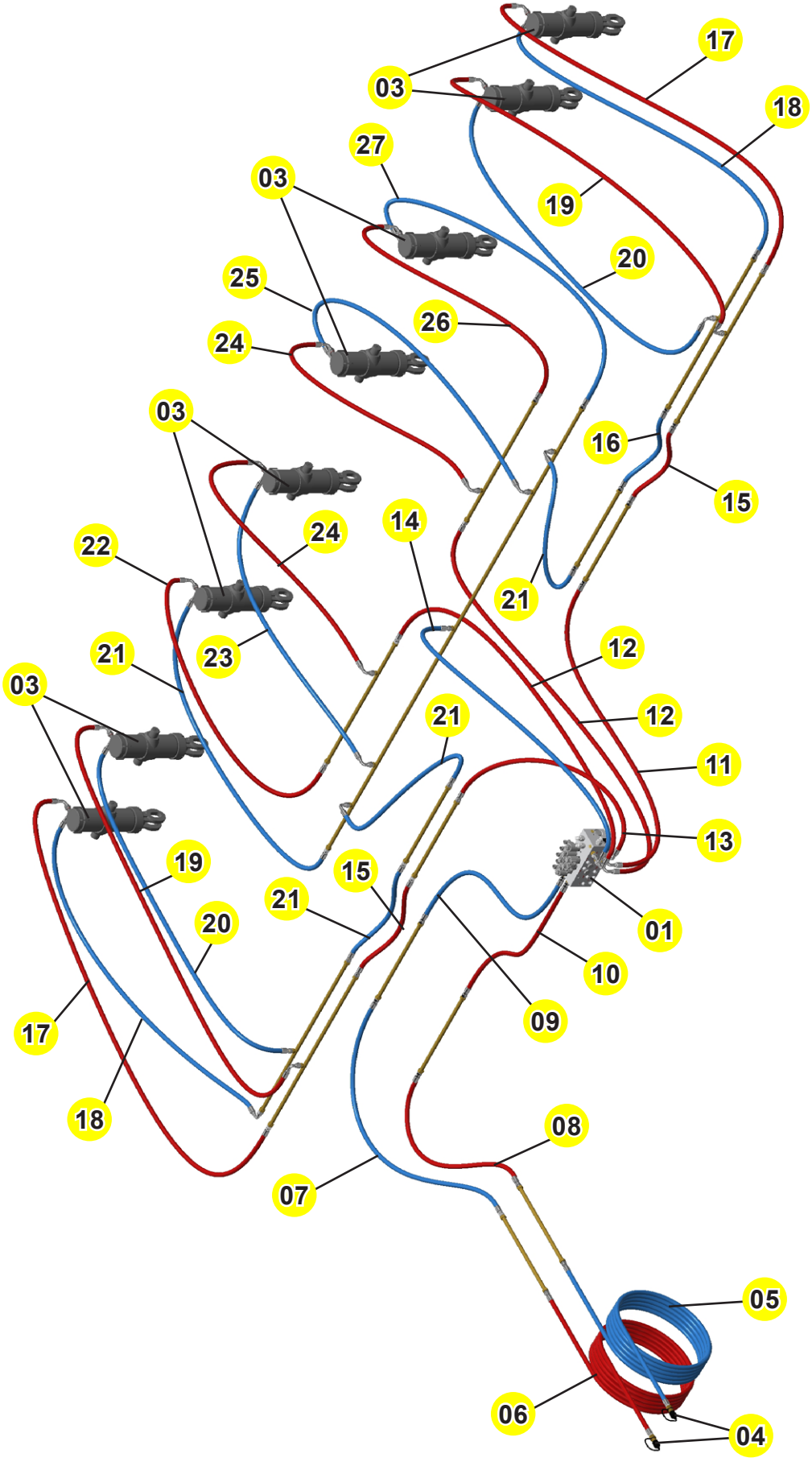


USAP hydraulic circuit with 3 PP turbines and 2 CSH TATU turbines

Item	PP and TATU turbine	Qty.	
01	BLFP flow divider control valve	02	
02	"T" terminal	01	
03	PP turbine	03	
04	TATU hydraulic turbine	02	
05	Male quick coupler 1/2 NPT	05	
06	3/4 X 3200 TR-TM hose	01	Pressure
07	3/4 X 3200 TR-TM hose	01	Return
08	3/8 X 3200 TR-TM hose	01	Drain
09	3/4 X 3200 TR-TM hose	01	Pressure
10	3/4 X 3200 TR-TM hose	01	Return
11	3/8 X 2550 TR-TC hose	01	Drain
12	1/2 X 2550 TR-TC hose	01	Pressure
13	1/2 X 2550 TR-TC hose	01	Return
14	1/2 X 2550 TR-TC hose	01	Pressure
15	1/2 X 2550 TR-TC hose	01	Return
16	3/8 X 2550 TR-TC hose	01	Drain
17	1/2 X 2550 TR-TC hose	01	Pressure
18	1/2 X 2550 TR-TC hose	01	Return
19	1/2 X 2550 TR-TC hose	01	Pressure
20	1/2 X 2550 TR-TC hose	01	Return
21	3/8 X 1800 TR-TR hose	01	Drain
22	1/2 X 1800 TR-TR hose	01	Pressure
23	1/2 X 1800 TR-TR hose	01	Return
24	1/2 X 1800 TR-TR hose	01	Pressure
25	1/2 X 550 TR-TR hose	01	Return

Item	PP and TATU turbine	Qty.	
26	1/2 X 650 TR-TC hose	01	Pressure
27	1/2 X 550 TR-TR hose	01	Return
28	1/2 X 700 TR-TC hose	01	Drain
29	1/2 X 1000 TC-TC hose	01	Pressure
30	1/2 X 1000 TC-TC hose	01	Return
31	3/8 X 900 TC-TC hose	01	Drain
32	1/2 X 2900 TR-TR hose	01	Pressure
33	1/2 X 1550 TC-TC hose	02	Pressure
34	1/2 X 1400 TC-TC hose	02	Return
35	3/8 X 1550 TC-TC hose	02	Drain
36	1/2 X 700 TR-TR hose	01	Return
37	3/8 X 700 TR-TR hose	01	Drain
38	1/2 X 1800 TR-TR hose	01	Pressure
39	1/2 X 1800 TR-TR hose	01	Return
40	1/2 X 1800 TR-TR hose	01	Pressure
41	1/2 X 1800 TR-TR hose	01	Return
42	1/2 X 1800 TR-TR hose	01	Return
43	3/8 X 1800 TR-TC hose	01	Drain
44	1/2 X 1000 TC-TC hose	01	Pressure
45	1/2 X 1000 TC-TC hose	01	Return
46	3/8 X 1000 TC-TC hose	01	Drain
47	1/2 X 2550 TR-TR hose	01	Pressure
48	1/2 X 2550 TR-TR hose	01	Return

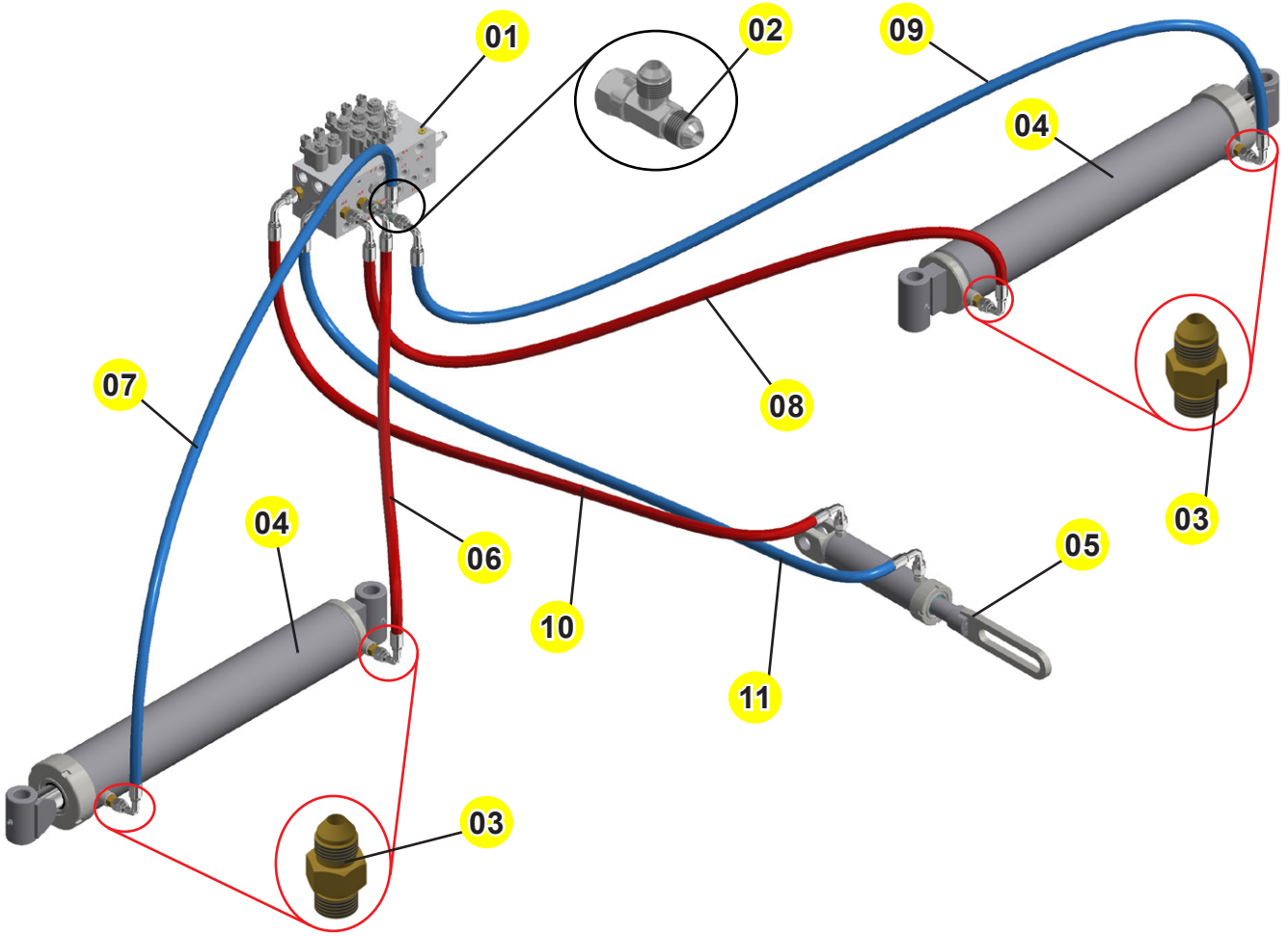
Wheelset hydraulic circuit



Wheelset hydraulic circuit

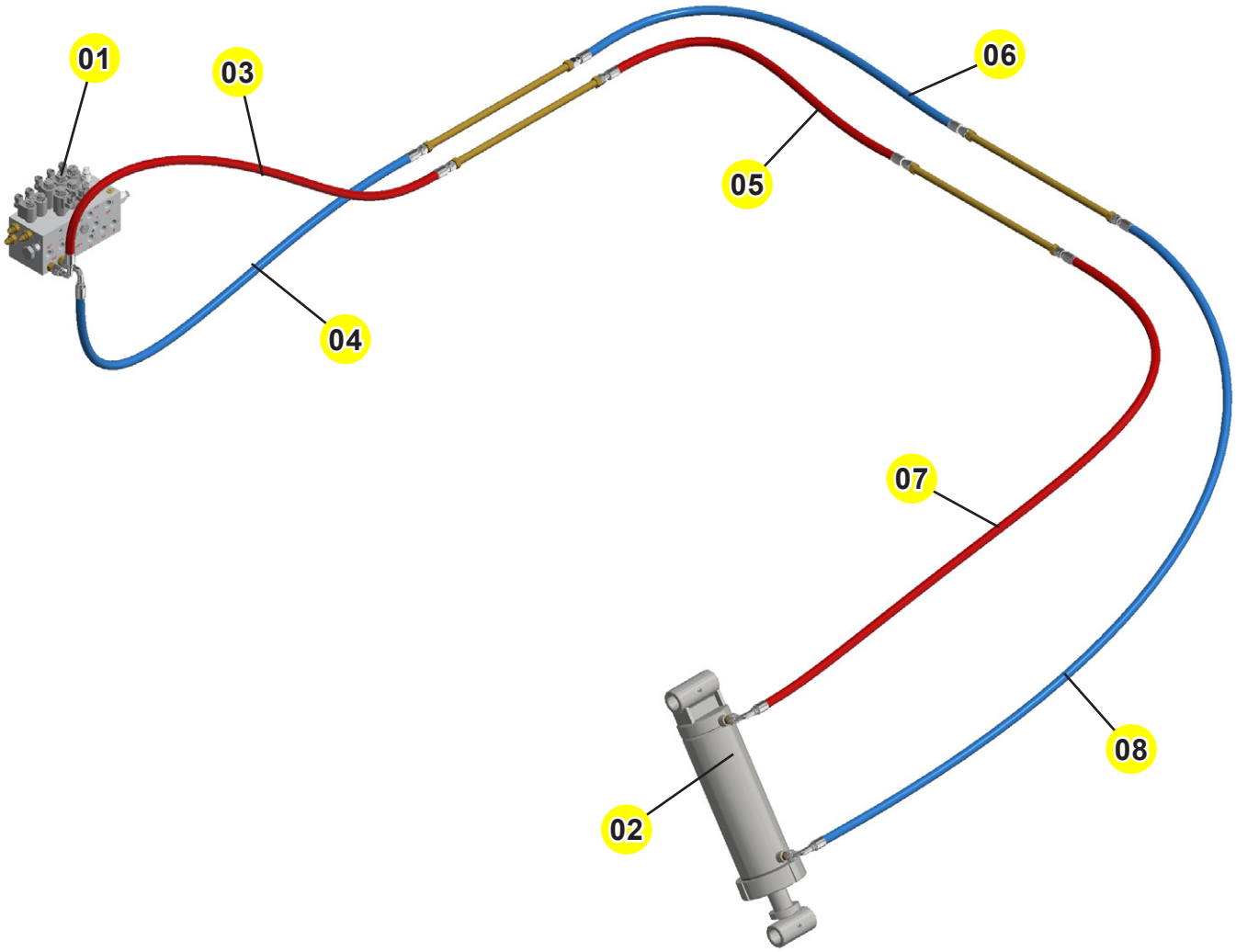
Item	USAP wheelset	Qty.	
01	BLFP 2604 control valve	01	
03	Hydraulic cylinder	08	
04	Male quick coupler 1/2 NPT	02	
05	3/4 X 5900 TR-TM hose	01	Return
06	3/4 X 5900 TR-TM hose	01	Pressure
07	3/4 X 2750 TR-TR hose	01	Return
08	3/4 X 2750 TR-TR hose	01	Pressure
09	3/4 X 1250 TR-TR hose	01	Return
10	3/4 X 1250 TR-TR hose	01	Pressure
11	3/8 X 1800 TR-TC hose	01	Pressure
12	3/8 X 1100 TR-TC hose	02	Pressure
13	3/8 X 1700 TR-TC hose	01	Pressure
14	3/4 X 950 TR-TC hose	01	Return
15	3/8 X 700 TR-TR hose	02	Pressure
16	3/8 X 700 TR-TR hose	02	Return
17	3/8 X 700 TR-TC hose	02	Pressure
18	3/8 X 700 TR-TC hose	02	Return
19	3/8 X 650 TC-TC hose	02	Pressure
20	3/8 X 650 TC-TC hose	02	Return
21	3/8 X 900 TR-TC hose	03	Return
22	3/8 X 1000 TR-TC hose	01	Pressure
23	3/8 X 750 TC-TC hose	01	Return
24	3/8 X 1000 TC-TC hose	02	Pressure
25	3/8 X 900 TC-TC hose	01	Return
26	3/8 X 900 TR-TC hose	01	Pressure
27	3/8 X 1100 TR-TC hose	01	Return

Articulation hydraulic circuit



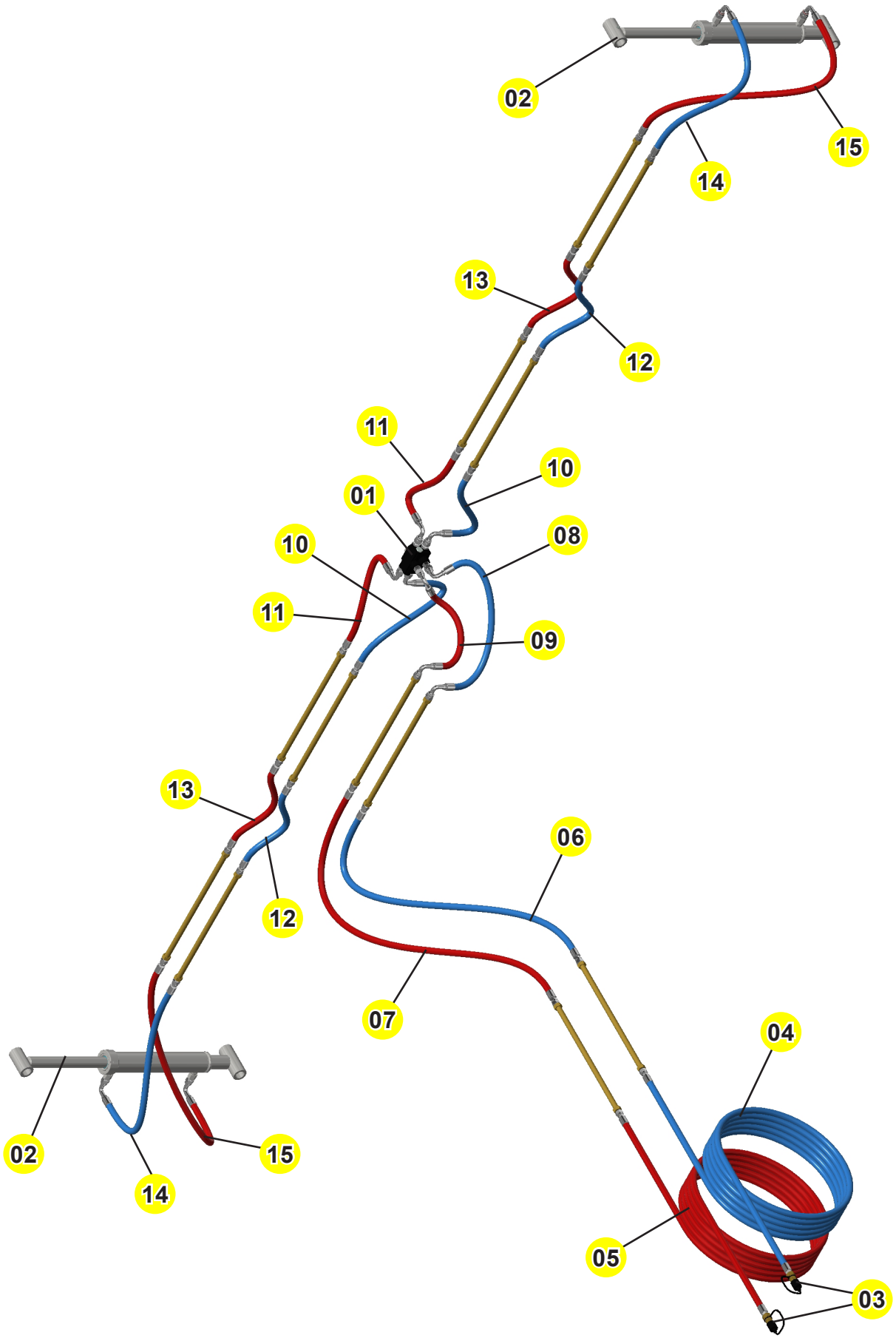
Item	USAP articulation	Qty.	
01	Optimization control valve	01	
02	"T" adapter with lateral nut	01	
03	Nipple 3/4" UNF	04	
04	Articulation hydraulic cylinder	02	
05	Hydraulic cylinder with telescopic lock	01	
06	3/8 X 1400 TC-TC hose	01	Pressure
07	3/8 X 2000 TR-TC hose	01	Return
08	3/8 X 1200 TC-TC hose	01	Pressure
09	3/8 X 1800 TC-TC hose	01	Return
10	3/8 X 1300 TC-TC hose	01	Pressure
11	3/8 X 1500 TC-TC hose	01	Return

Drawbar articulation hydraulic circuit



Item	USAP drawbar articulation	Qty.	
01	Optimization control valve	01	
02	Hydraulic cylinder	01	
03	3/8 X 1600 TR-TC hose	01	Pressure
04	3/8 X 1600 TR-TC hose	01	Return
05	3/8 X 2800 TR-TR hose	01	Pressure
06	3/8 X 2800 TR-TR hose	01	Return
07	3/8 X 2900 TR-TC hose	01	Pressure
08	3/8 X 3200 TR-TC hose	01	Return

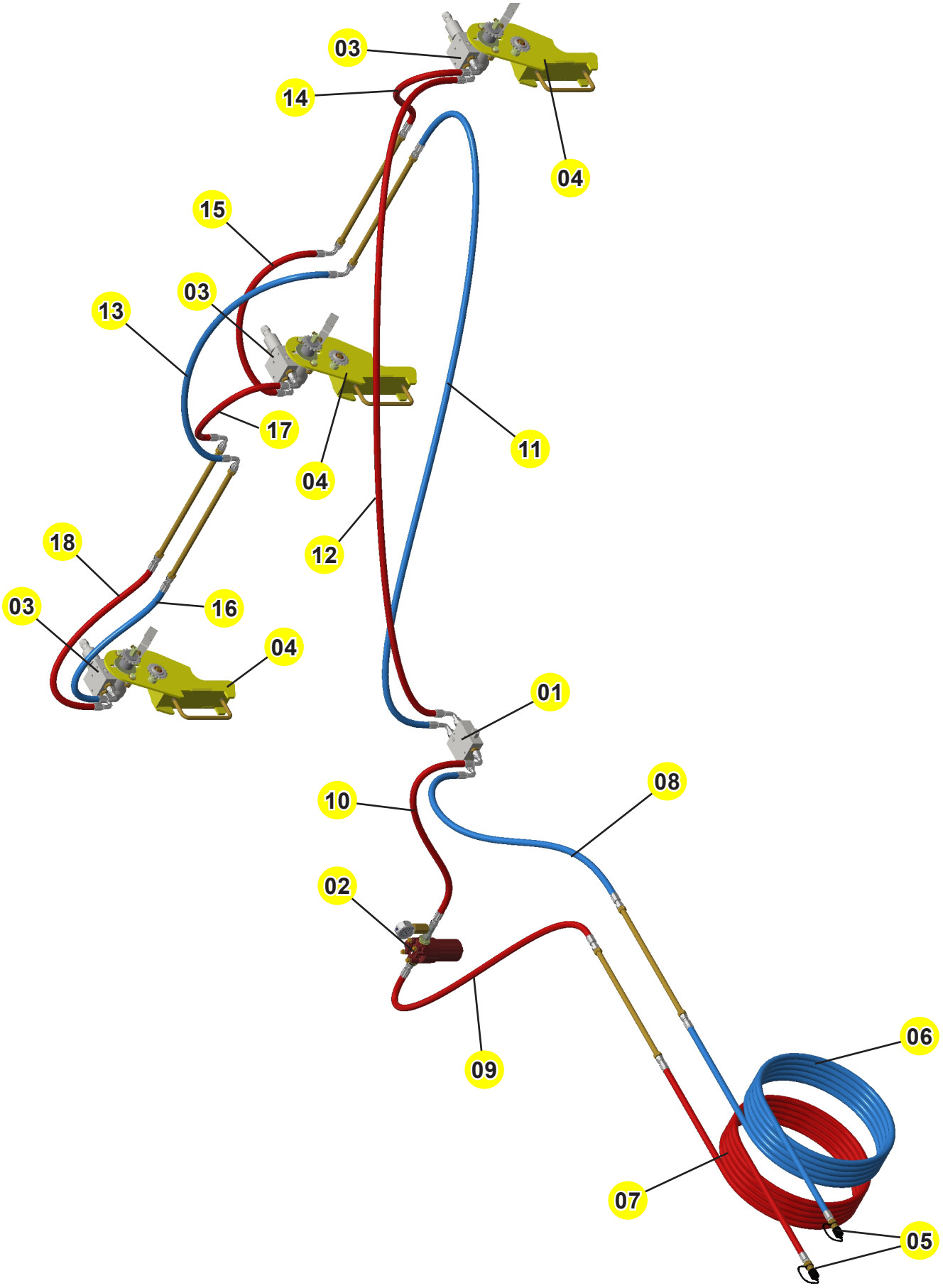
Row marker hydraulic circuit



Row marker hydraulic circuit

Item	USAP row marker	Qty.	
01	Complete sequence valve	01	
02	Hydraulic cylinder	02	
03	Male quick coupler 1/2 NPT	02	
04	3/8 X 5850 TR-TM hose	01	Return
05	3/8 X 5850 TR-TM hose	01	Pressure
06	3/8 X 2800 TR-TR hose	01	Return
07	3/8 X 2800 TR-TR hose	01	Pressure
08	3/8 X 1500 TC-TC hose	01	Return
09	3/8 X 1500 TC-TC hose	01	Pressure
10	3/8 X 1400 TR-TC hose	02	Return
11	3/8 X 1400 TR-TC hose	02	Pressure
12	3/8 X 700 TR-TR hose	02	Return
13	3/8 X 700 TR-TR hose	02	Pressure
14	3/8 X 1600 TR-TC hose	02	Return
15	3/8 X 1300 TR TC hose	02	Pressure

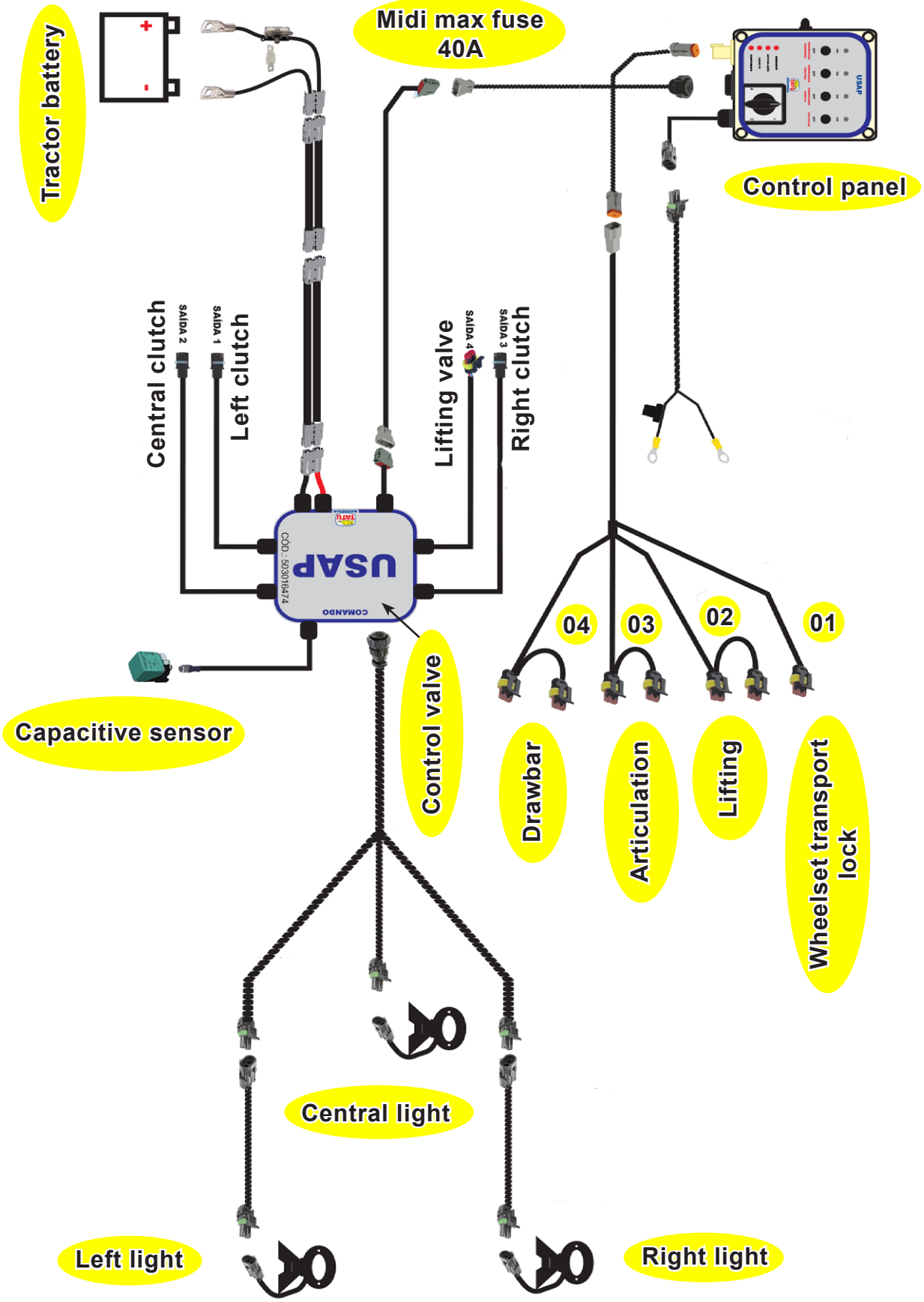
APT hydraulic circuit



APT hydraulic circuit

Item	APT USAP	Qty.	
01	Flow rate limiter control valve	01	
02	Filter with gauge	01	
03	OMP 80 hydraulic motor with valve	03	
04	APT motor support	03	
05	Male quick coupler 1/2 NPT	02	
06	1/2 X 5900 TR-TM hose	01	Return
07	1/2 X 5900 TR-TM hose	01	Pressure
08	1/2 X 2100 TR-TC hose	01	Return
09	1/2 X 1900 TR-TR hose	01	Pressure
10	1/2 X 400 TR-TC hose	01	Pressure
11	1/2 X 1200 TR-TC hose	01	Return
12	1/2 X 1000 TC-TC hose	01	Pressure
13	1/2 X 2800 TC-TC hose	01	Return
14	1/2 X 1200 TR-TC hose	01	Return
15	1/2 X 1700 TC-TC hose	01	Pressure
16	1/2 X 1200 TR-TC hose	01	Return
17	1/2 X 2000 TC-TC hose	01	Pressure
18	1/2 X 1200 TR-TC hose	01	Pressure

USAP electric system assembly (with clutch)



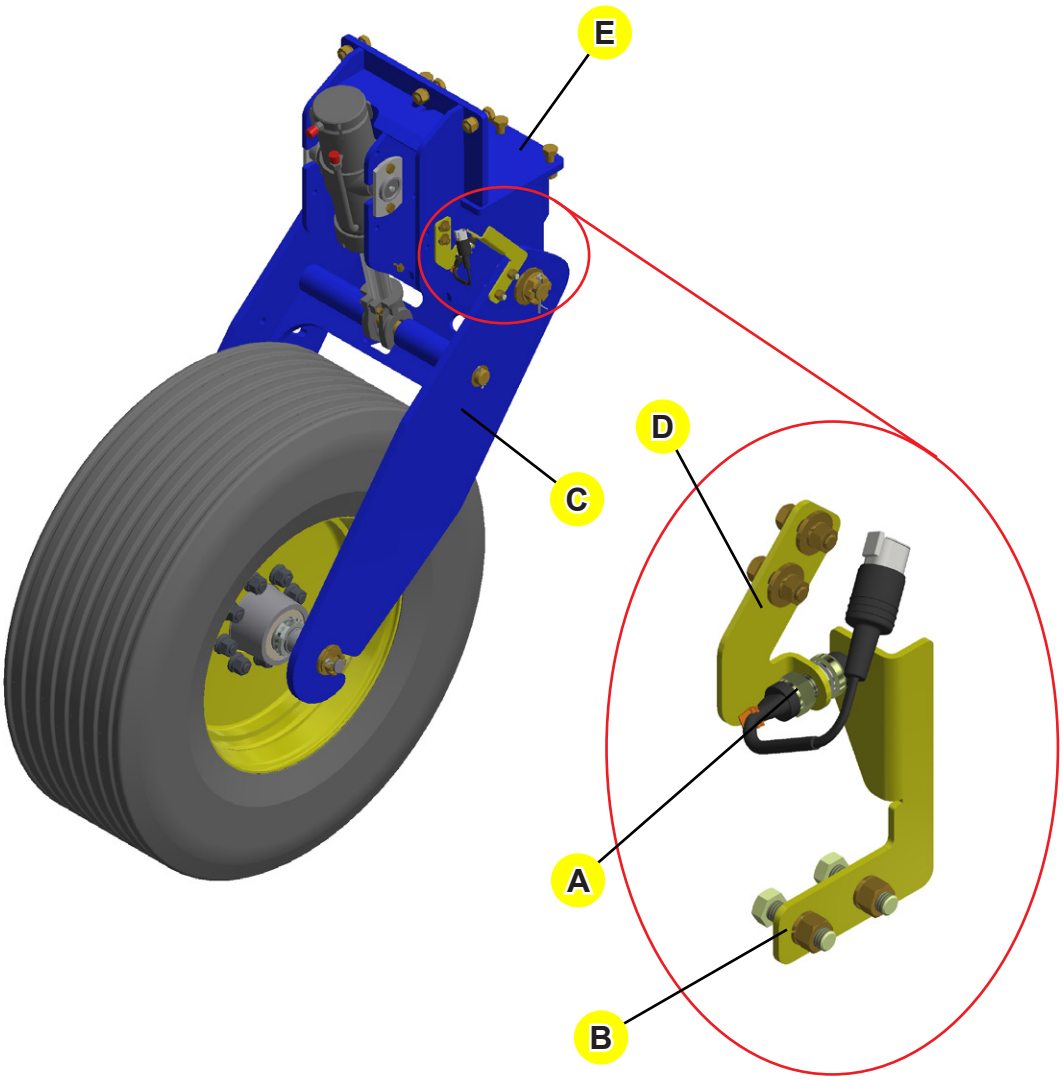
NOTE When the button is pressed and the light is off, the system is not working.

Lifting sensor

The lifting sensor (A) automatically turns on or off the seed distribution by lifting the equipment and when it is lowered, the seeds start to being released again.

Fasten the retrieving mechanism (B) to the wheelset fork (C) using bolts, spring washers and nuts.

Then, fasten the sensor support (D) to the wheelset support (E) using bolts, flat washers, spring washers and nuts.

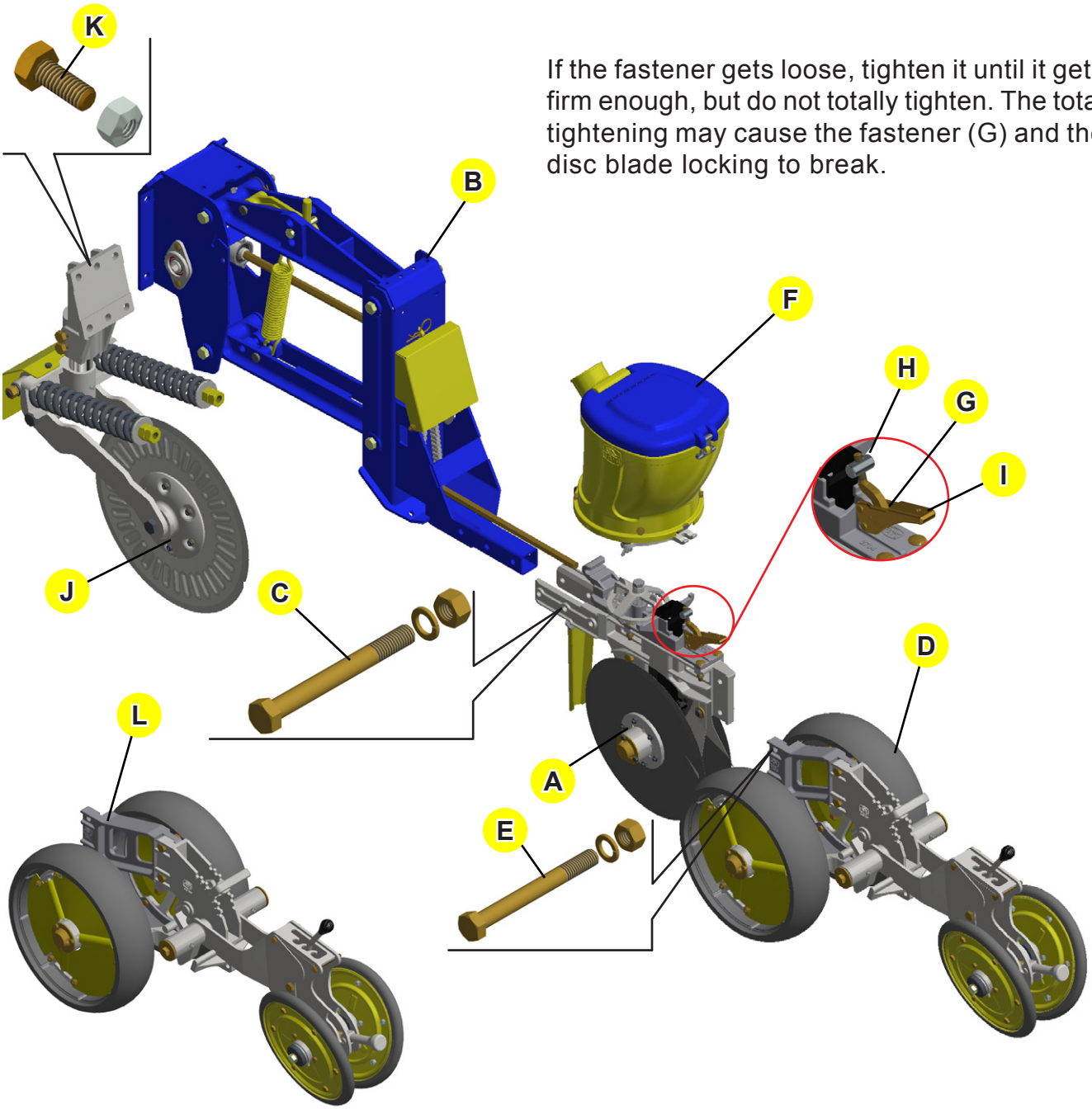


Seed row unit with disc blade (mechanical)

Lock the rear part of the row unit (A) to the parallelogram (B) using bolts (C), spring washers and nuts. Then, fasten the depth control (D) using bolts (E), spring washers and nuts. Then, lock the hopper (F) with fastener (G).

To avoid damages to the fastener and the seed disc blade locking, never tighten the fastener adjustment (H) totally; leave it facing the threaded stud (I).

Lastly, lock the disc blade (J) to the parallelogram (B) using a bolt (K) and nut.



If the fastener gets loose, tighten it until it gets firm enough, but do not totally tighten. The total tightening may cause the fastener (G) and the disc blade locking to break.

For a long row unit with a spacing of 450 mm, always use the depth control with an extensor of 230 (L) for a displacement of 40 mm.

Seed row unit with disc blade (Titanium)

The seed row unit leaves the factory assembled, being only necessary to fix some items.

Fix the depth control (A) to the unaligned double disc (B) using bolts (C), spring washers and nuts.

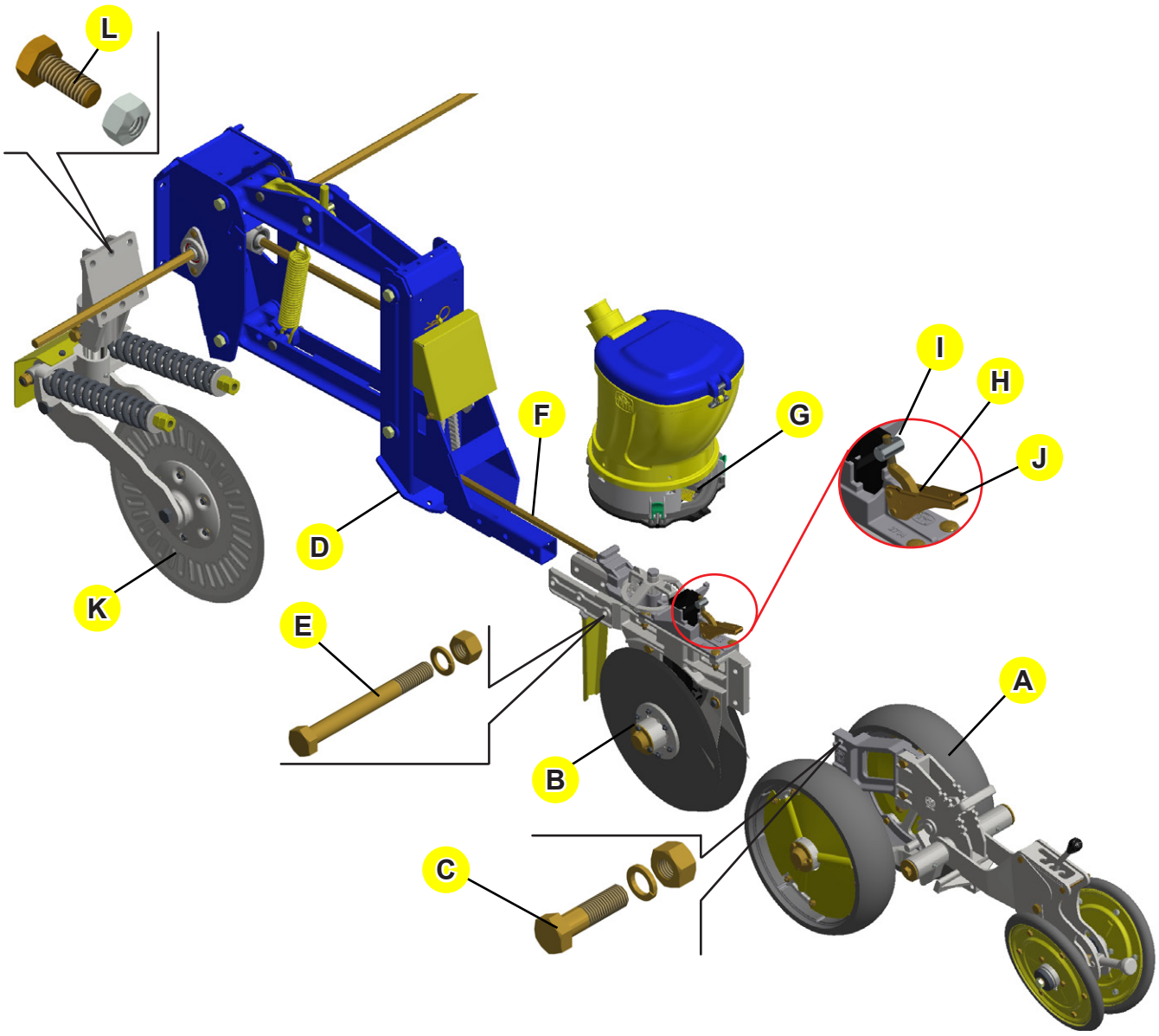
Then, fasten the double disc (B) on the front of the row unit (D) using bolts (E), spring washers and nuts.

Couple the hexagonal axle (F) to the double disc (B).

Lock the Titanium seed metering (G) to the double disc (B) with the fastener (H).

To avoid damages to the fastener and the seed disc blade locking, never tighten the fastener adjustment (I) totally; leave it facing the threaded stud (J).

Lastly, lock the disc blade (K) to the parallelogram (D) using bolts (L) and nut.



Seed row unit with disc blade (Precision Planting)

The seed row unit leaves the factory assembled, being only necessary to fix some items.

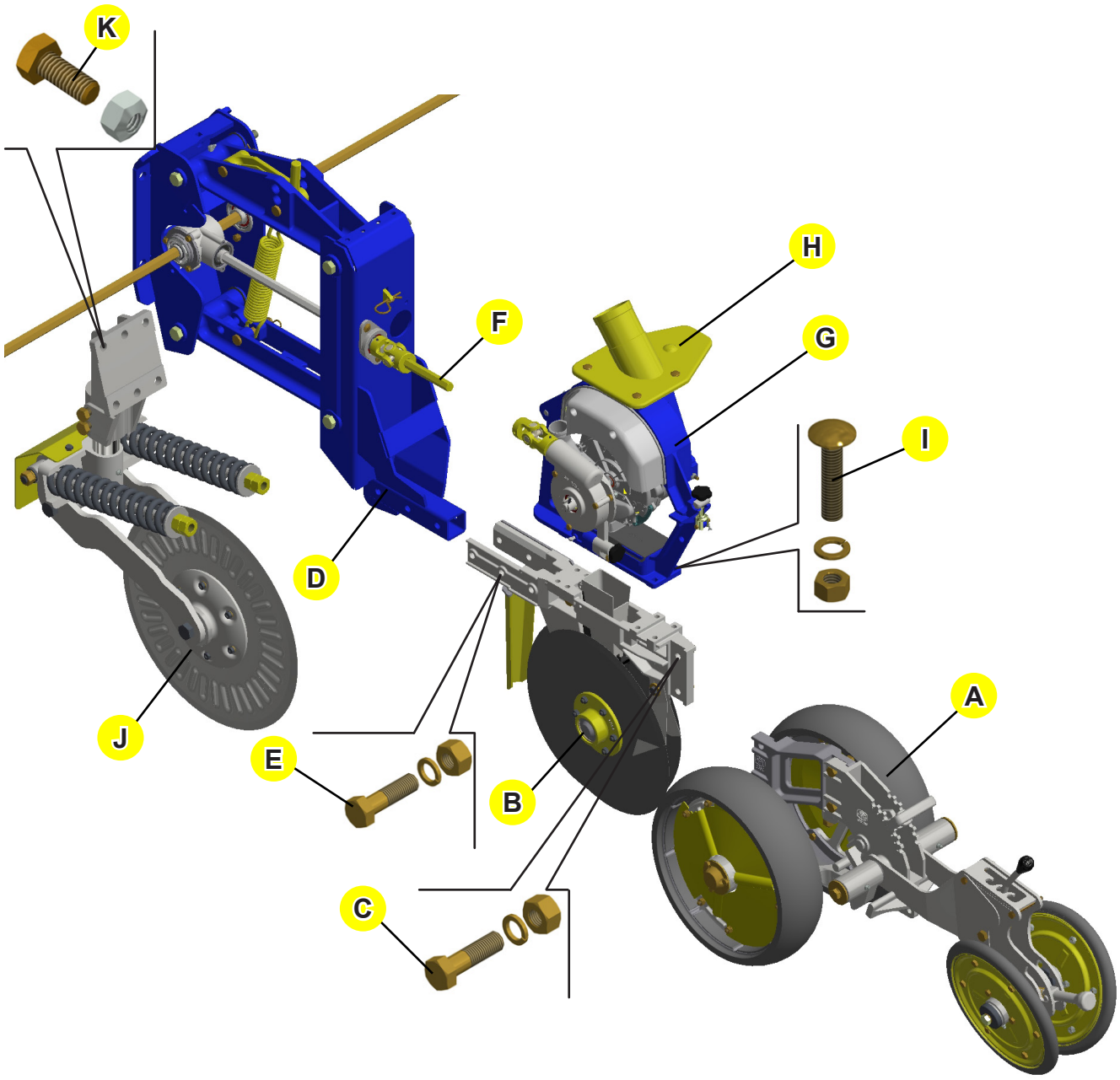
Fix the depth control (A) to the unaligned double disc (B) using bolts (C), spring washers and nuts.

Then, fasten the double disc (B) to the front part of the row unit (D) using bolts (E), spring washers and nuts.

Couple the hexagonal axle (F) to the Precision Planting seed metering (G).

Lock the metering (G) to the double disc (B) along with the seed tube (H) using a bolt (I), spring washer and nut.

Lastly, lock the disc blade (J) to the parallelogram (D) using bolts (K) and nut.



Seed row unit with disc blade (Vdrive)

The rear part of the row unit leaves the factory assembled, being only necessary to fix some items.

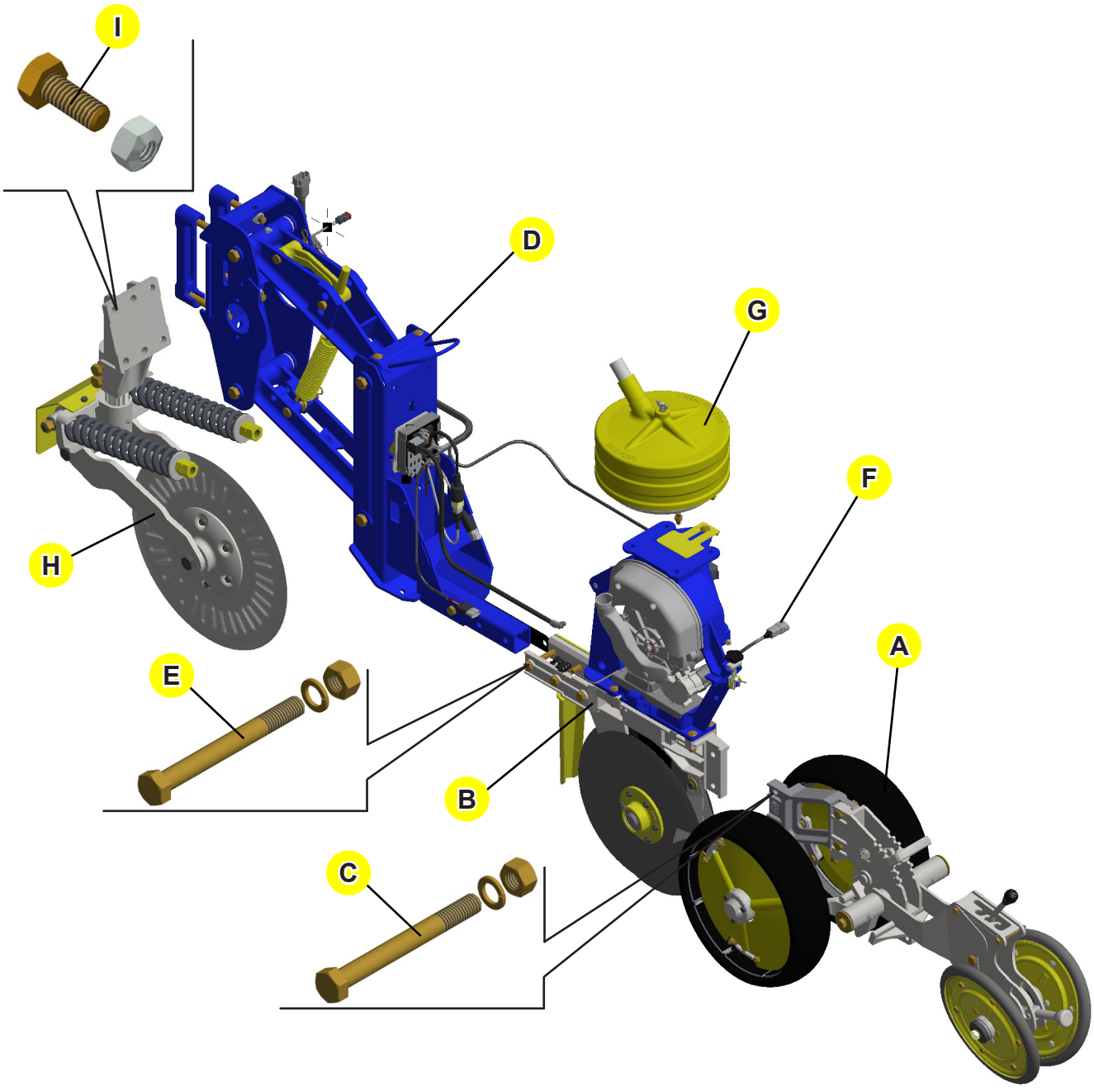
Fix the depth control (A) to the unaligned double disc (B) using bolts (C), spring washers and nuts.

Then, fasten the rear part of the row unit to the front part (D) using bolts (E), spring washers and nuts.

Couple the Vdrive system (F) to the Precision Planting seed metering.

Fasten the hopper (G) to the Precision Planting seed metering.

Lastly, lock the disc blade (H) to the parallelogram (D) using bolts (I) and nut.



Hose assembly on the seed hoppers

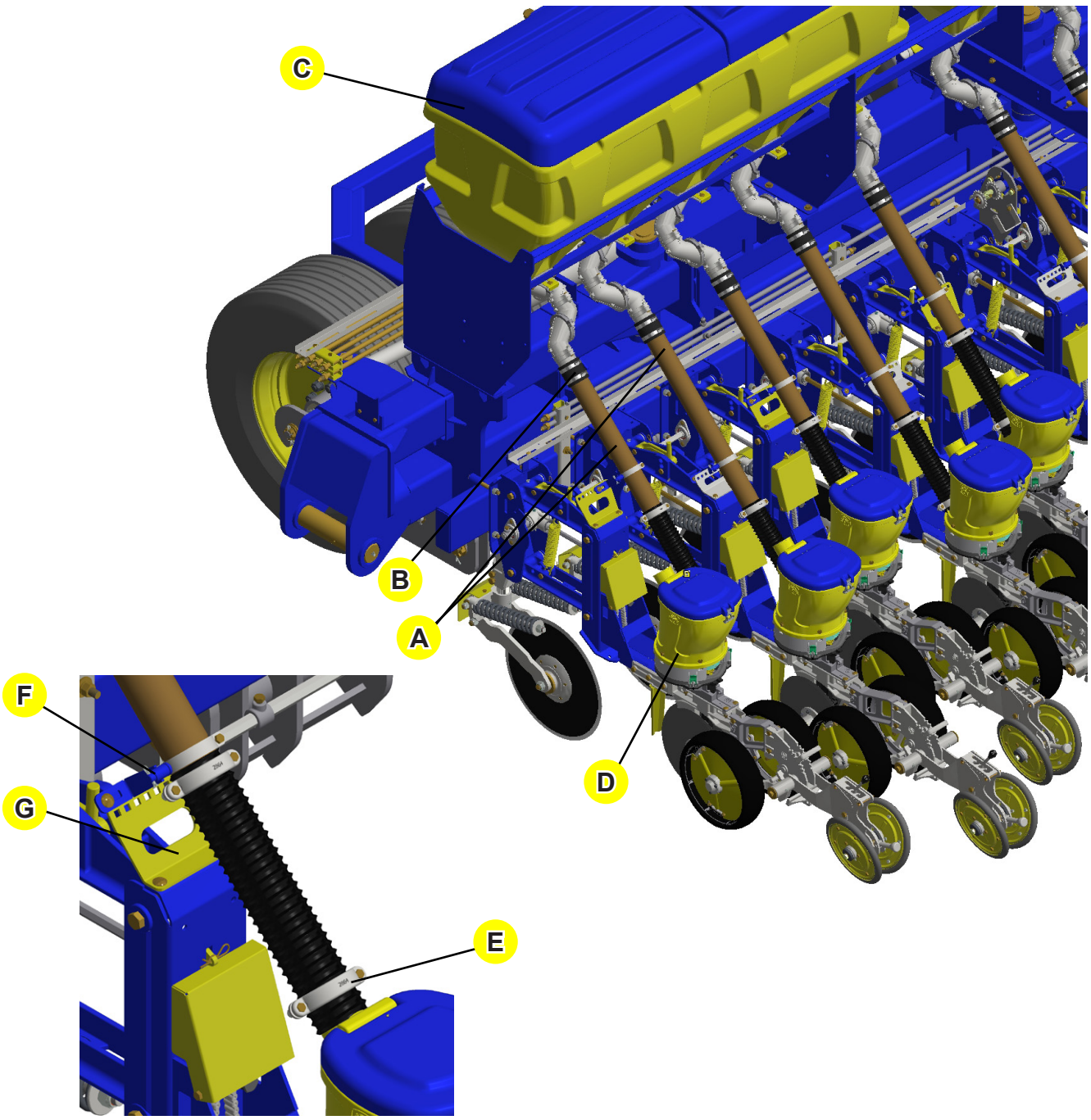
To assemble the hoses on the seed hoppers, proceed as follows:

1) Totally lift the planter until the upper arm touch the shock absorber.

2) Place the seed tube (A) with clamps (B) on the greater seed hopper (C).

3) Secure the seed tube (A) on the smaller seed hopper (D) using the clamp (E).

4) Lastly, fasten the support guide (F) of the seed tube on the support (G) to avoid that the seed tube escape from the seed hoppers. Repeat this operation on every row unit.



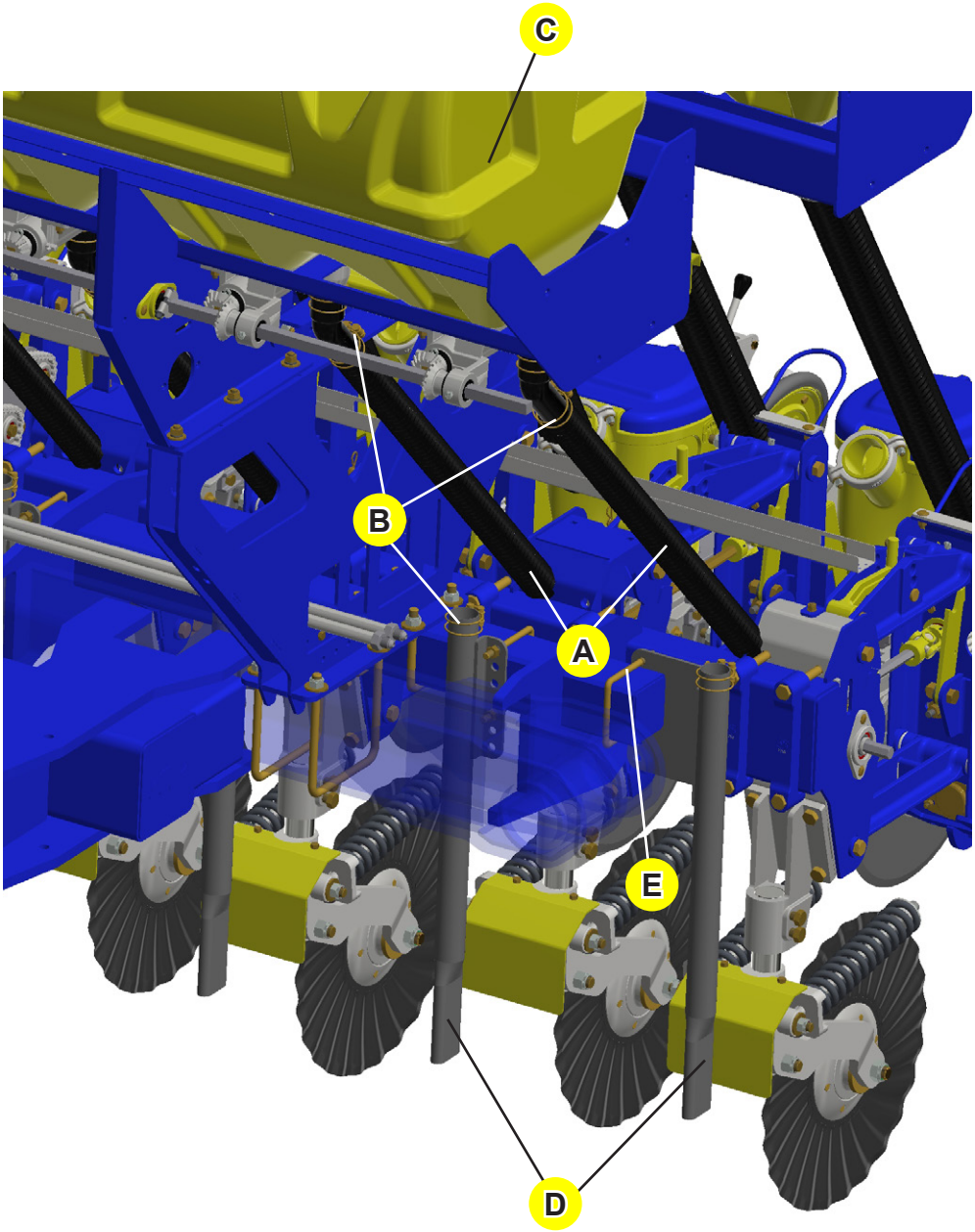
Hose assembly on the fertilizer hoppers

To assemble the hoses on the fertilizer hoppers, proceed as follows:

1) Place the fertilizer hose (A) with clamps (B) on the greater fertilizer hopper (C).

2) Lock the fertilizer hose (A) on the fertilizer tube (D) using the clamp (B).

3) Lastly, secure the clamp (E) with a spring washer and nut to avoid its movement on the frame.



Tractor preparation

If necessary, use counterweights on the frontal part of the tractor.

Hitching to the tractor

Choose a place as flat as possible for hitching.

Drive the tractor slowly in reverse gear to reach the equipment and be ready to apply the brakes. When close enough, use the lever to control the hydraulic position and let the left lower arm on the same level as the equipment hitch pin.

1) Hitch the right and left arms that have ascent and descent movements through the lower arm adjustment and place the lock pins. At this moment, the extensor thread of the upper arm can be used to approach or move away the equipment, thus facilitating the hitching.

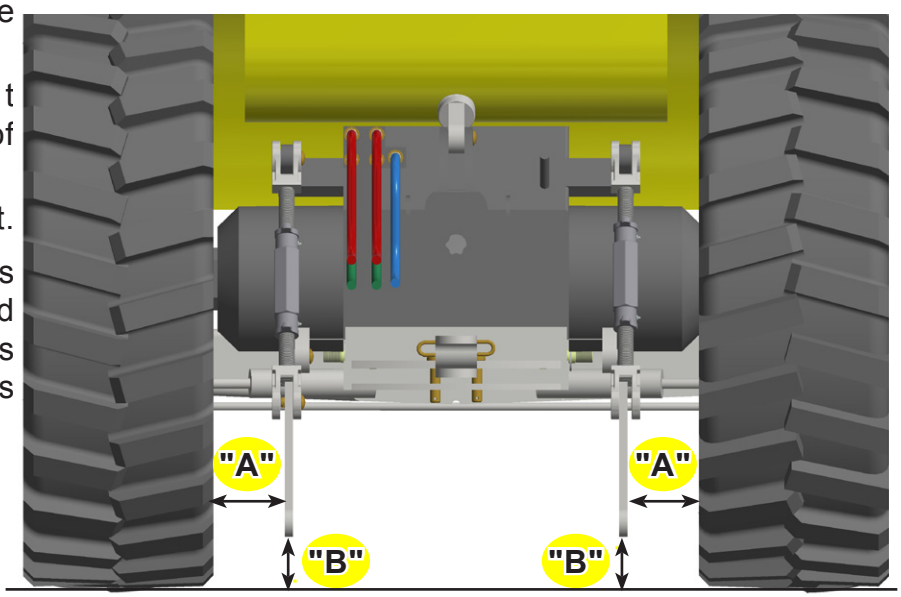
2) Place the upper arm (third point) and fasten it using a lock pin.

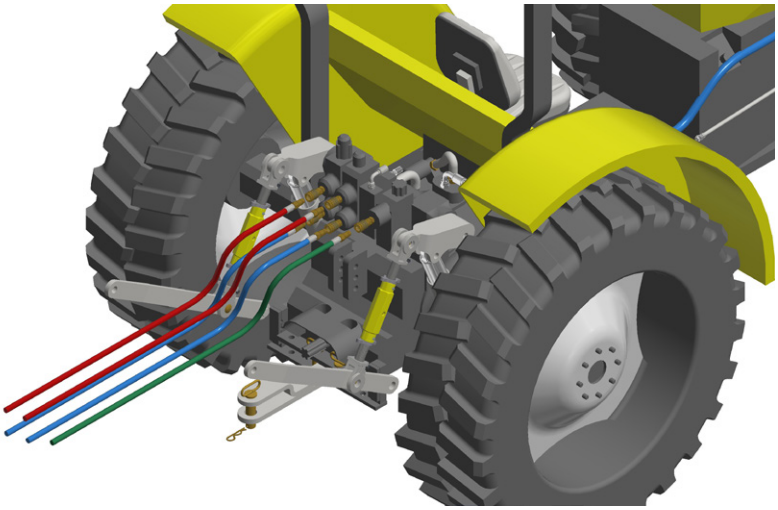
For a perfect hitching, the equipment must be centralized with the tractor, which is done as follows:

• Align the equipment drawbar with the third point of the tractor.

• Totally lift the equipment.

• Check if the distances between the lower arms and tires are equal on both sides (as in "A"), being them leveled (as in "B").



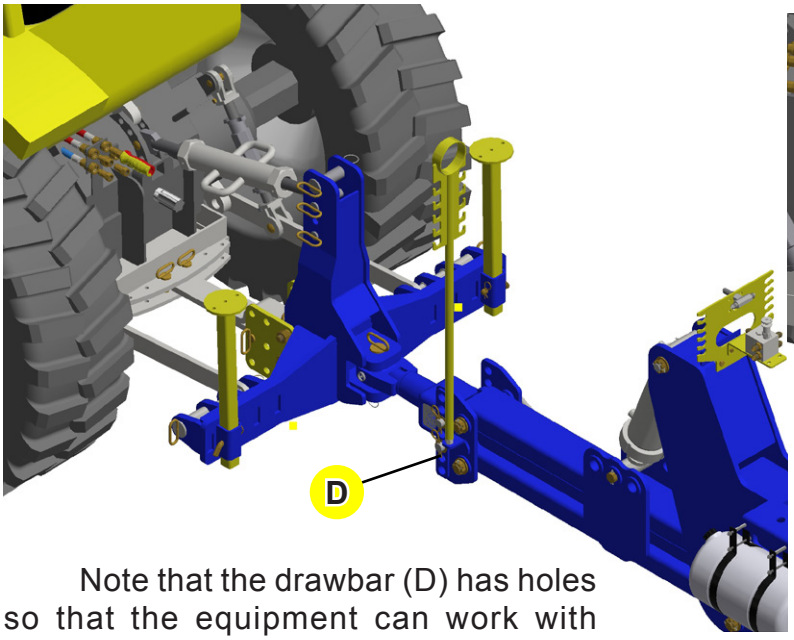


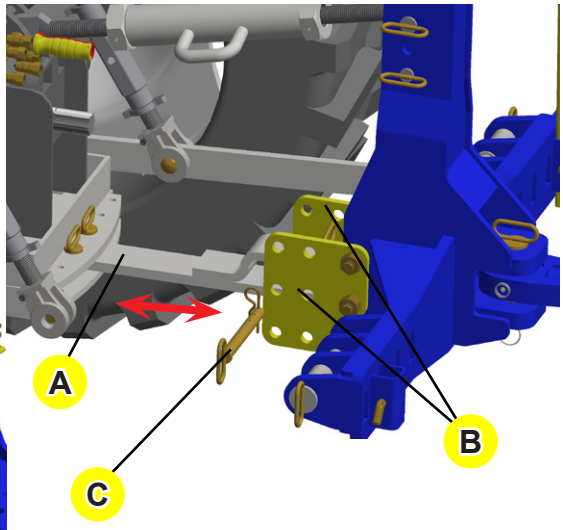
• Couple the hoses to the tractor quick couplers with double command. There are two hoses to lift or lower the equipment and two to activate the row marker cylinders.

Hitching to the tractor

When the equipment is already leveled and coupled to the tractor third point and before starting planting, it is necessary to adjust the tractor hitch bar (A) on the center of the third point drawbar between the plates (B) and lock using a pin (C) and cotter pin.

This procedure will prevent damages to the equipment.





Note that the drawbar (D) has holes so that the equipment can work with several tractor models.

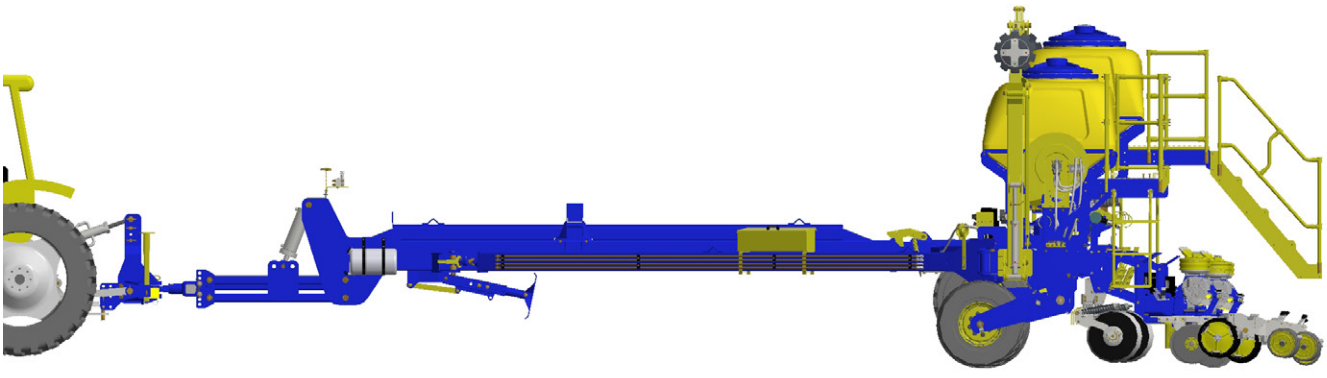
NOTE **Do not activate the tractor third point when the hitch bar is locked on the drawbar, otherwise there may be damages on the rear part of the tractor.**

To transport the equipment, remove the pin (C) from the hitch bar.

Planter leveling

Level the equipment through the upper arm of the third point.

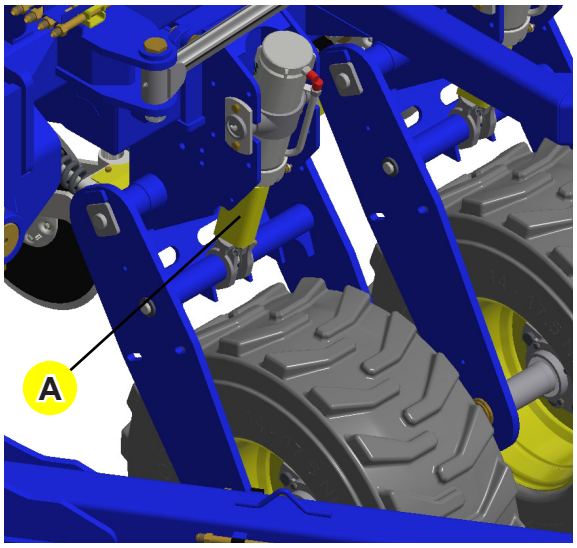
To facilitate the upper arm usage, activate the hydraulic cylinder to relieve the drawbar on the hitch bar.

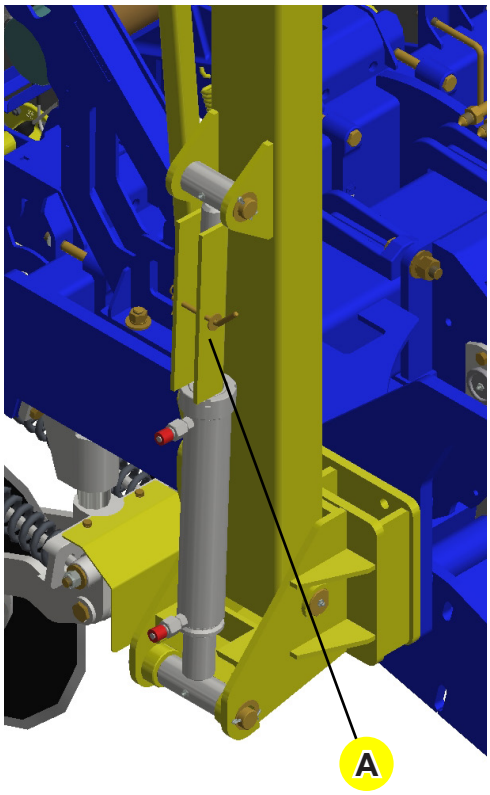


Setting the planter to transport position

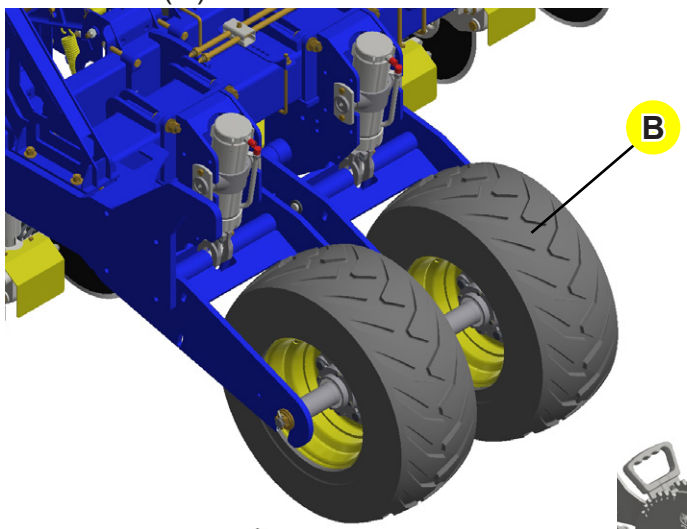
After hitching the equipment, totally lift the row units by activating the hydraulic cylinder.

Place the safety locks (A) on the hydraulic cylinder rods located on the central wheelset of the central frame and hydraulic row markers.

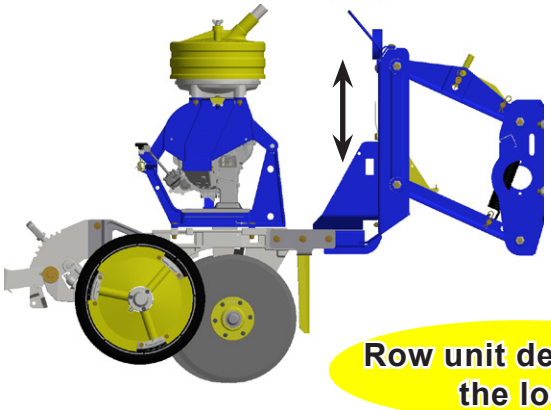


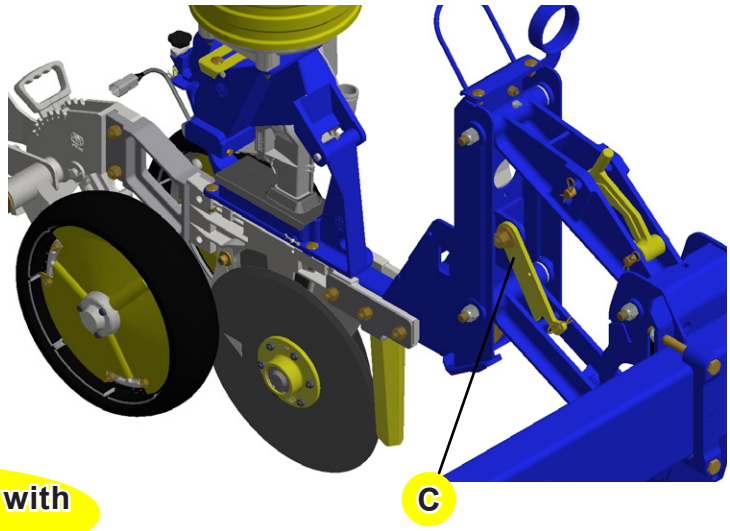


Fold the planter, lift the third point of the equipment and articulate the lateral wheelsets (B).



To transport the equipment, use the lock (C), so the seed row unit will stay in an elevated position to avoid irregular terrains.





Row unit detail with the lock

Setting the planter to transport position

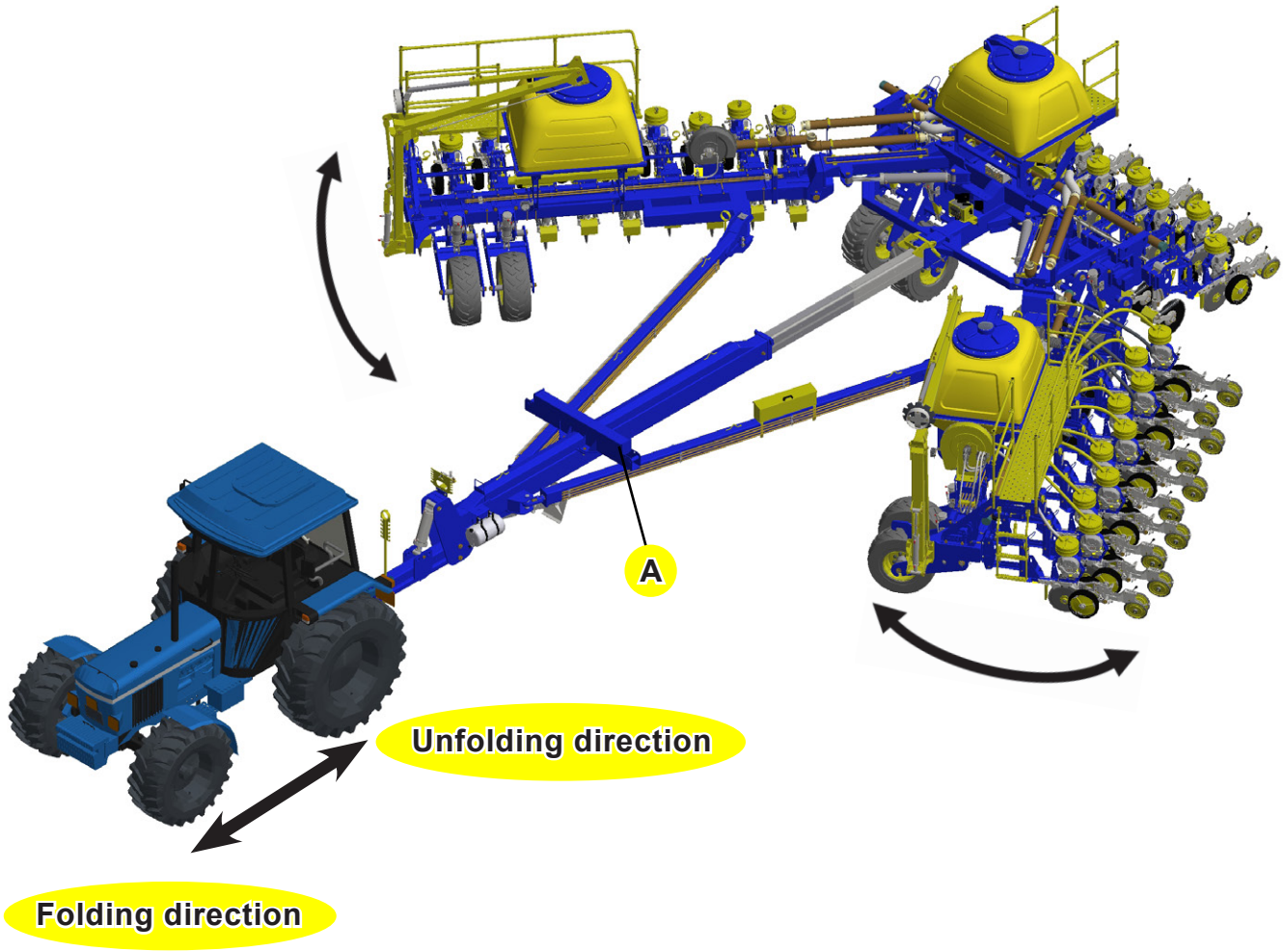
The equipment has articulation cylinders that helps to fold the planter.

To make the planter moves in the folding direction, activate the wheelset circuit to let the planter suspended and then activate the hydraulic circuit of the articulation. When the circuit is activated the lock of the telescopic bar will be lifted first, so unlock it to release the lateral cylinders and they will start to fold, thus moving the lateral frames to the greater lock (A) direction.

When the equipment is folding, the operator must drive the tractor forward on a compatible speed to help the folding process until the operation is concluded.

After hitching the equipment on the greater lock, lift the lateral wheelsets.

To unfold the planter, do the procedures in reverse order.



ATTENTION

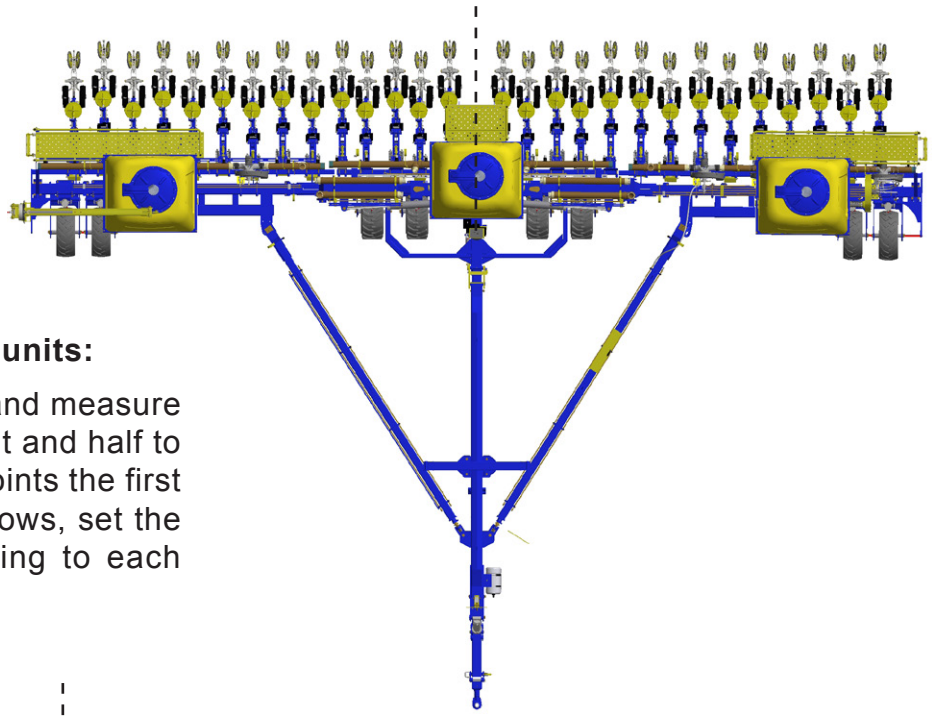
Never transport or store the planter when the reservoir is full, as this may cause damages to the equipment.

Maximum transportation speed: 15 km/h.

Spacing between row units

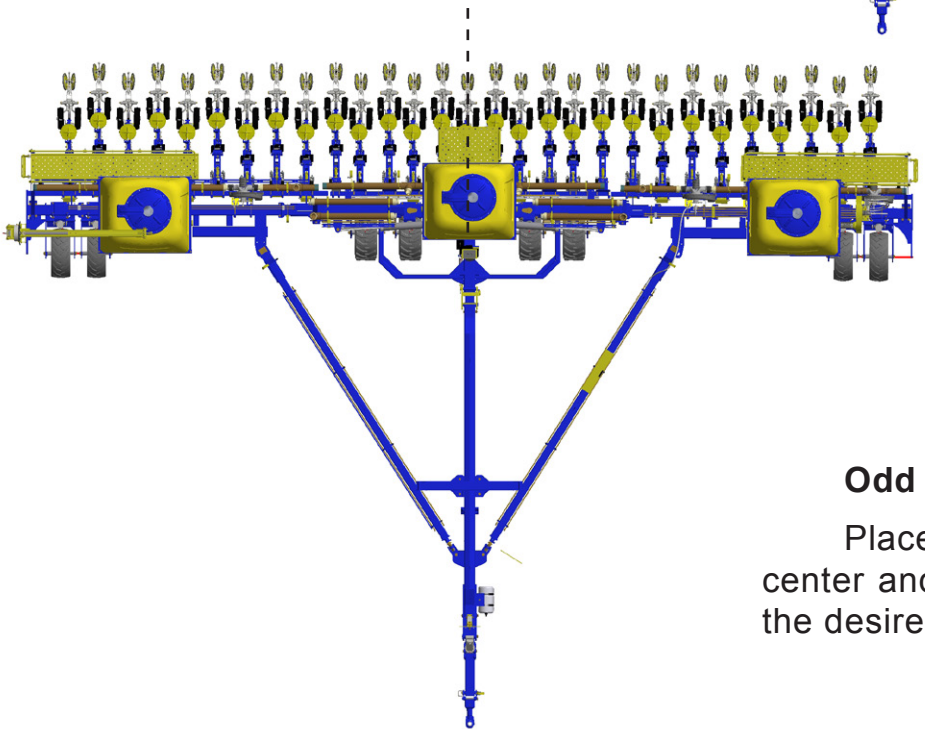
The USAP planter leaves the factory with a minimum row spacing according to the requested number of row units, allowing a possibility of other spacing if the crop needs it.

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

See all the possible spacings on the next pages, following the example of these illustrations.

For the long row units with a spacing of 450 mm, use extensors of 230 mm to have a displacement of 40 mm.

Spacing tables

See every possible spacing on the table below.

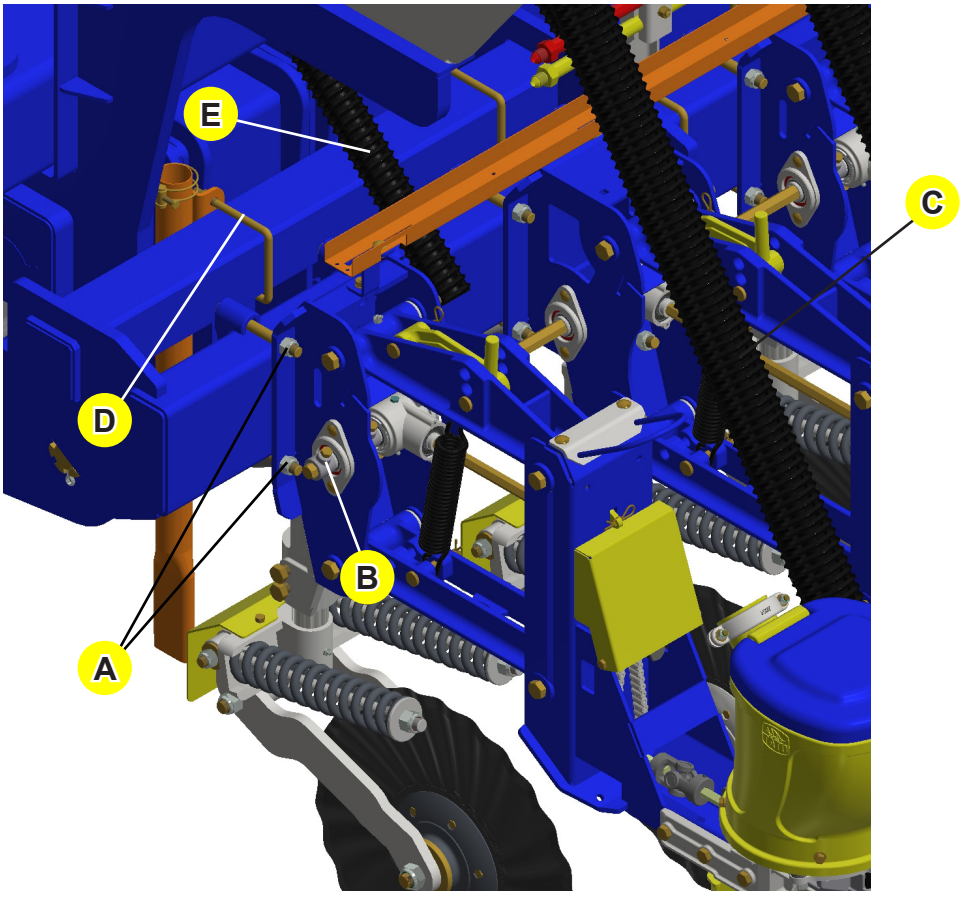
Number of row units	Spacing (mm)
18	450, 500, 550
20	450, 500, 550
22	450, 500, 550
24	450, 500, 550
25	450, 500, 550
26	450, 500, 550
27	450, 500, 550
28	450, 500, 550
29	450, 500, 550
30	450, 500, 550
32	450, 500, 550
33	450, 500, 550
35	450, 500, 550
36	450, 500, 550
40	450, 500, 550
42	450, 500, 550
45	450, 500, 550
46	450, 500, 550
50	450, 500, 550

Procedures to change the spacing

To change the spacing, lift the equipment with the help of the wheelsets and underpin them to avoid accidents.

- Loosen up the bolt (A) of the clamp on the seed row unit.
- Remove the bushing (B) of the axle lock of the transmission by loosening up the bolt.
- Remove the seed hose (C) from the seed row unit.
- Release the clamp (D) that fasten the fertilizer tube.
- Remove the hose (E) from the fertilizer hopper.

Then, move the seed and fertilizer row unit by following the table on the page (**68**).

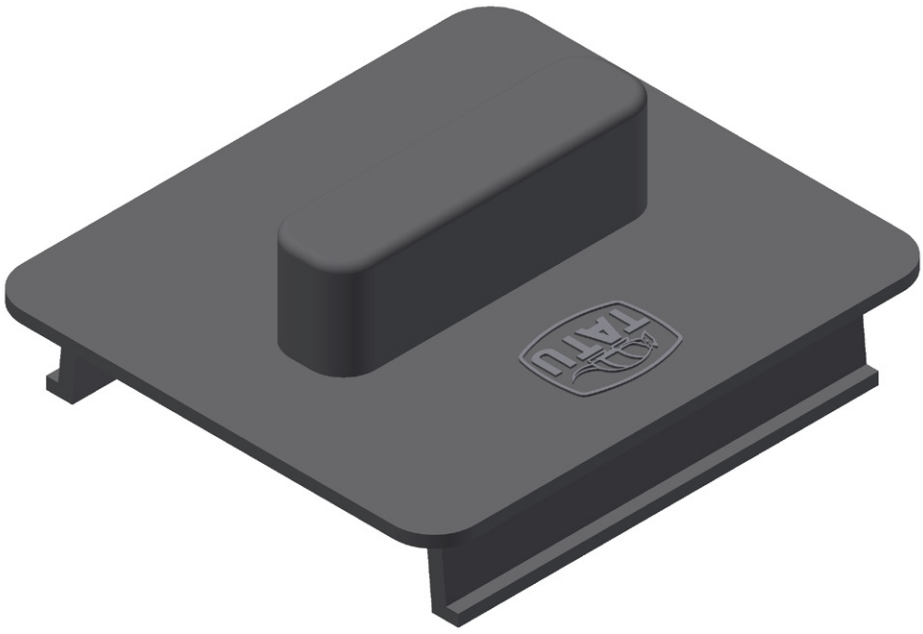


IMPORTANT

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.**
- **Check the correct alignment of the chains (clutches / wheelsets).**

• To close the fertilizer outlet, place the chutes (A) over the augers that will not be used.



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;

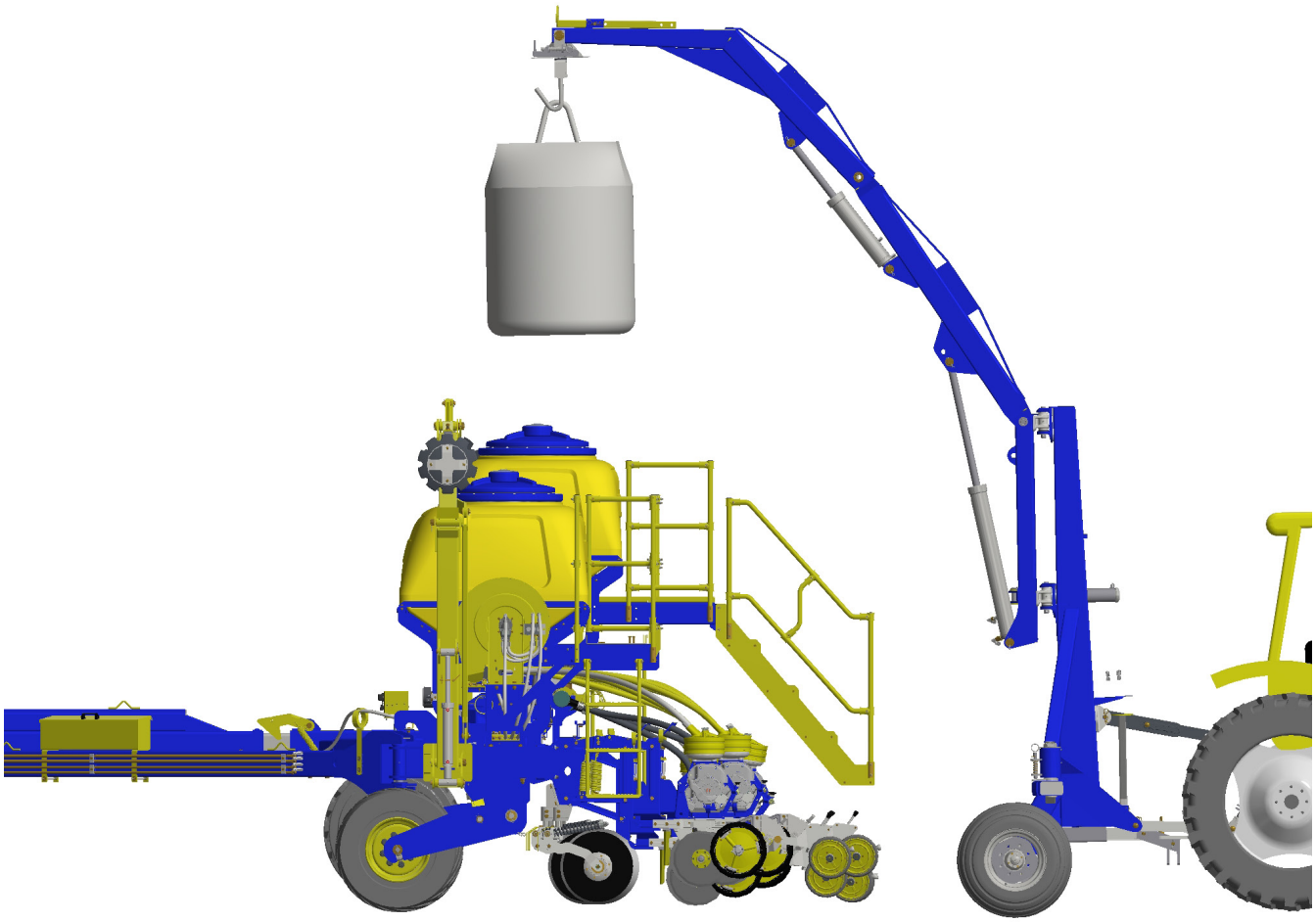
• Lift the row unit and lock it using the upper rocker arm;

• Remove the fertilizer tube from the fertilizer row unit.

Filling up the planter

With the aid of a hoist and a Big-bag, fill up the central seed hoppers as shown below.

Approach the tractor to a safe distance from the planter and use the lateral ladders and the central one to have acess to the platforms when filling up the planter.



ATTENTION

When filling up the planter, be careful to not stay under the Big-bag.

Keep a distance to manipulate the Big-bag safely.

Planning the plantation - Correct seed rate

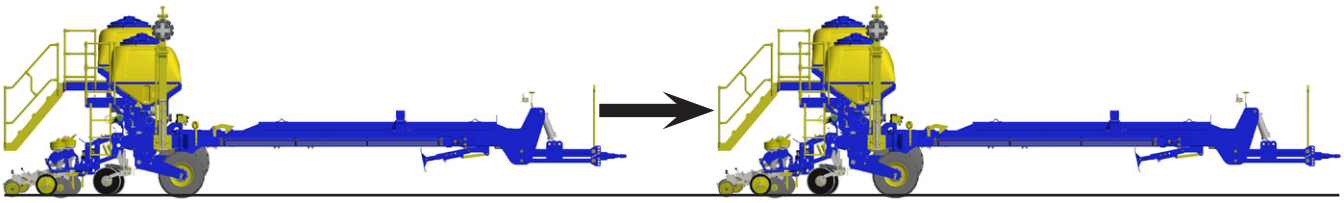
Consider that the amount of plants in the harvest is always smaller than the number of seeds distributed in the planting operation, due to the following factors: germination rate, physical purity, vigor (provided in the seed pack), plagues and diseases that may take place during the cultivation cycle.

Also, consider that during the plantation slippage or skidding of the planter tires can occur, according to the local working conditions.

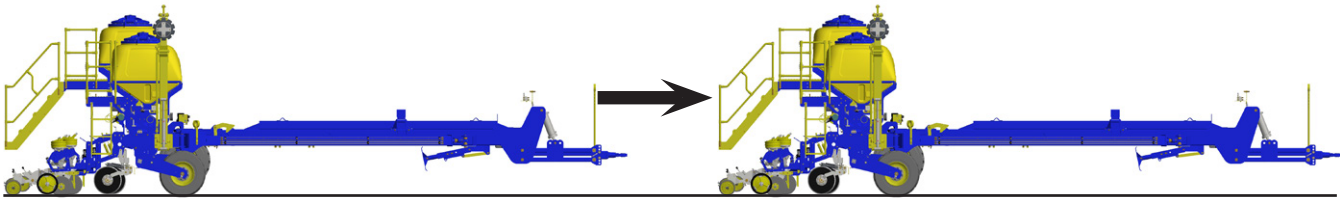
How to calculate the slippage index of the planter:

This index is obtained by comparing the number of spins the tire will perform, being the planter with empty hoppers and then filling it up, moving the planter around to see the difference.

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



Calculation:

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

NOTE **The tires must have the same design, same inflation and same adjustment of springs over the wheelset arms.**

Calculation of seeds per hectare

To obtain an amount of 50,000 plants per hectare in the cultivation, whose seeds contain:

Germination index = 95%

Physical purity = 90

Slippage index = 1.03 (3%)

The following calculation should be made to know how many seeds should be distributed in a hectare.

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

$$\frac{50{,}000}{0.855} = 58{,}479.53 \times 1.03 = \mathbf{60{,}233.91}$$

To know the amount of seeds per meter, per 10 meters and so on, calculate how many linear meters of rows exist in a hectare, in the desired spacing.

Example: $\frac{10{,}000}{0.85\ m}$ = 11,764.70 linear meters, so: $\frac{60{,}233.91}{11.764{,}7}$ = **5.1198**

Approximately **5.12** seeds per meter.

Procedures before the plantation

- Before starting the plantation, make a general inspection of 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 tires inflation and keep all tires with the same pressure. Check the correct pressure on page **129.**
- Also check if there is no strange object inside the hoppers, which may damage the metering mechanisms.
- Lubricate all grease fitting appropriately.

NOTE

- **Only fill up the planter on the work station.**
- **Do not pull the planter with load excess.**

Ideal working speed

USAP works with higher efficiency from 5 to 7 Km/h.

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

NOTE

When planting corn, operate from 5 to 5.5 km/h.

Keep a constant speed during the whole job.

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
Horizontal seed plates	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

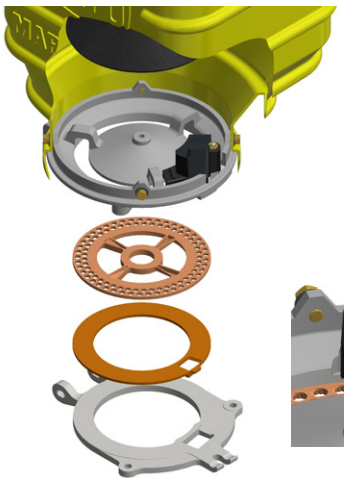
Description	Serial number
Ø 9 mm soybean seed plate (pink)	05.03.01.6218
Ø 12 mm corn seed plate (orange)	05.03.01.6204

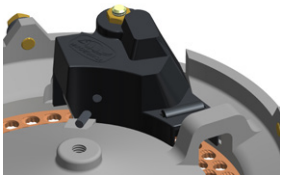
Optional seed plates list on page **102**.

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.**

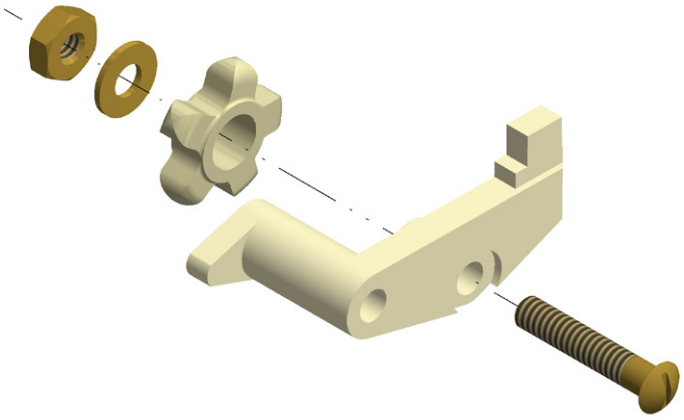




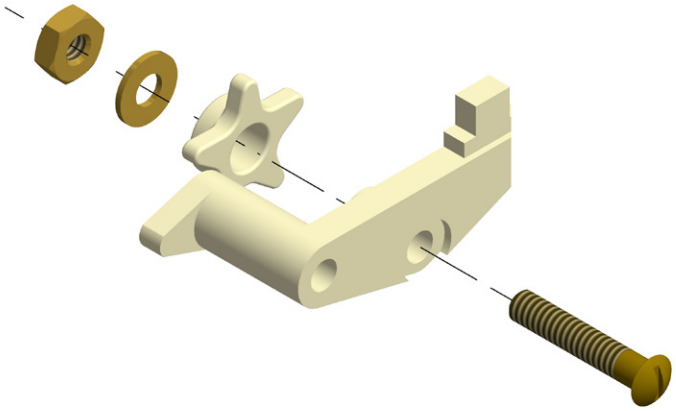
• Special attention should be given to the rocker arm and seed sprocket, as well as the good operation of all seed meterings.

• 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.

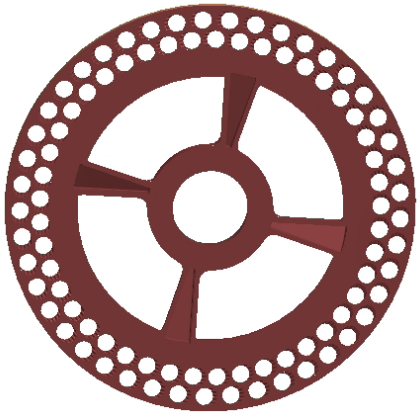
• For the plate for corn with oblong holes use the pulley with 4 teeth, which is not included with the equipment.

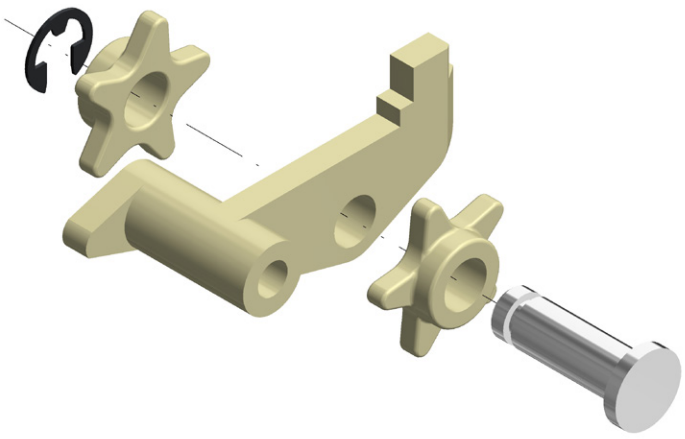


• For planting sorghum, it is necessary to use special pulleys, so that they enter in the holes and execute their function.



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





Seeds distribution

Gearbox (mechanical and pneumatic) to distribute the seeds.

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, 34 and 38 teeth) and Driven shaft **{B}** (14,18, 22, 26, 30, 34 and 38 teeth).

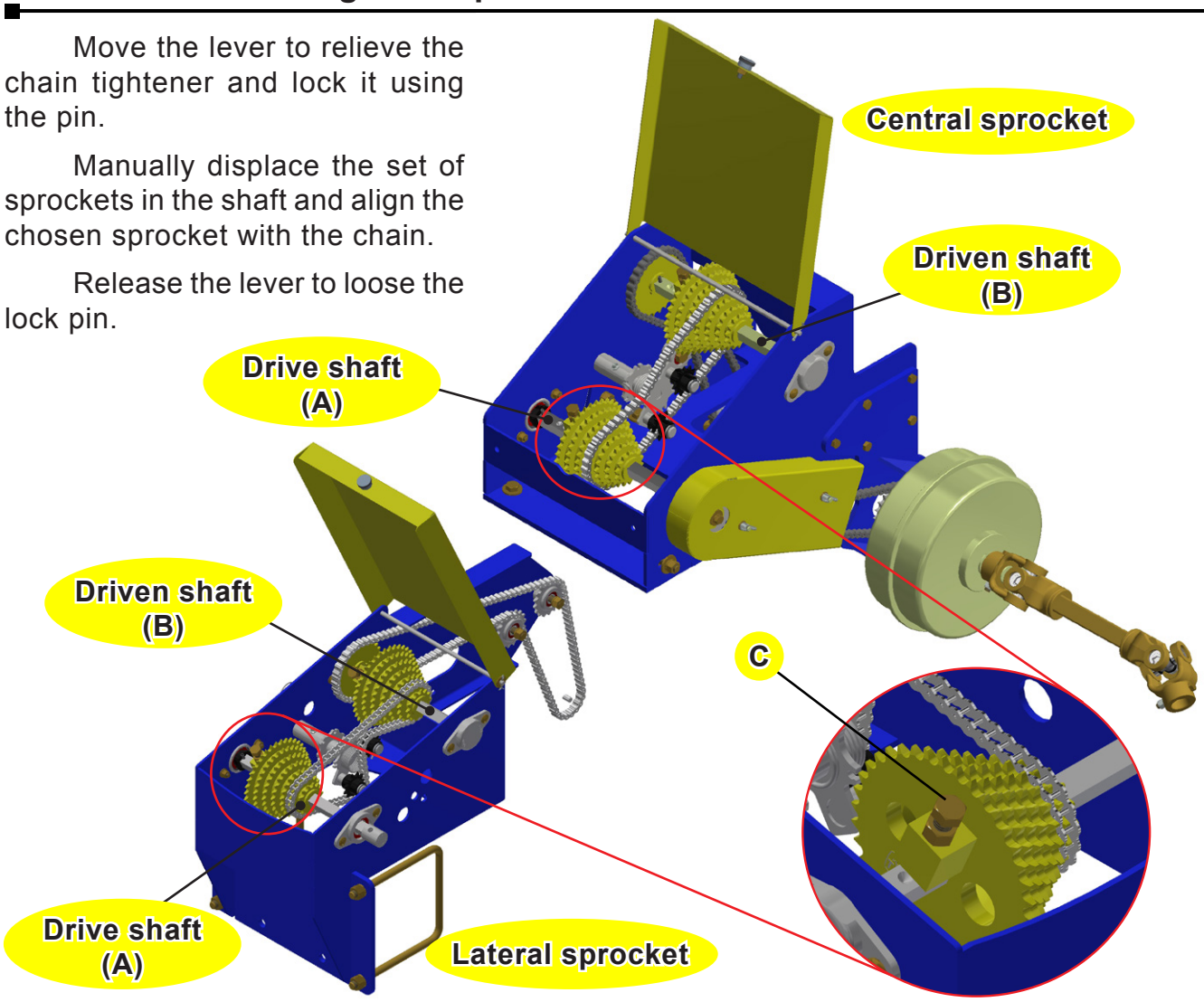
ATTENTION **The procedure to change the sprockets to either the mechanical and pneumatic system is the same.**

Procedures to change the sprockets

Move the lever 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.

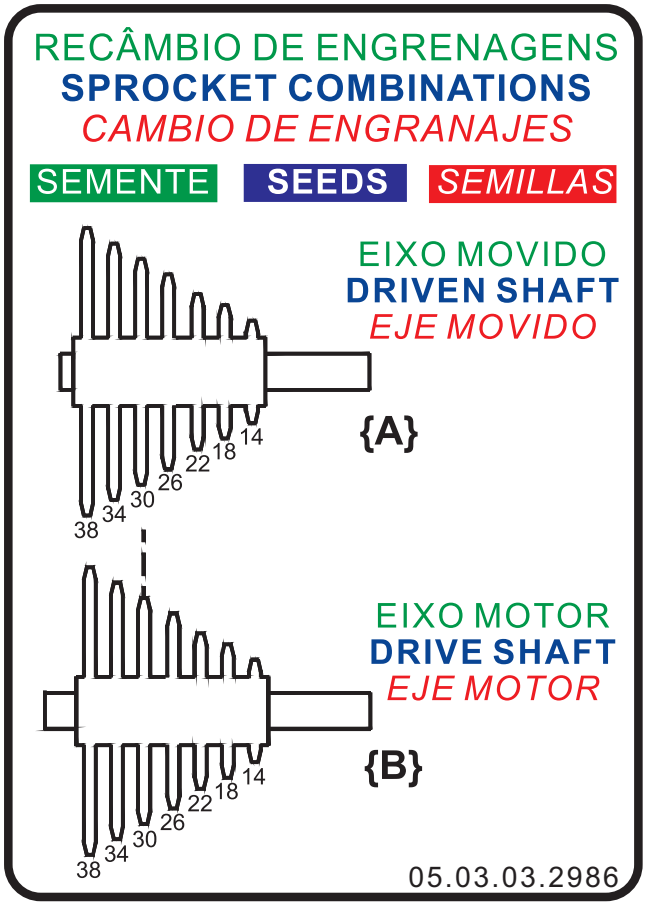
Release the lever to loose the lock pin.

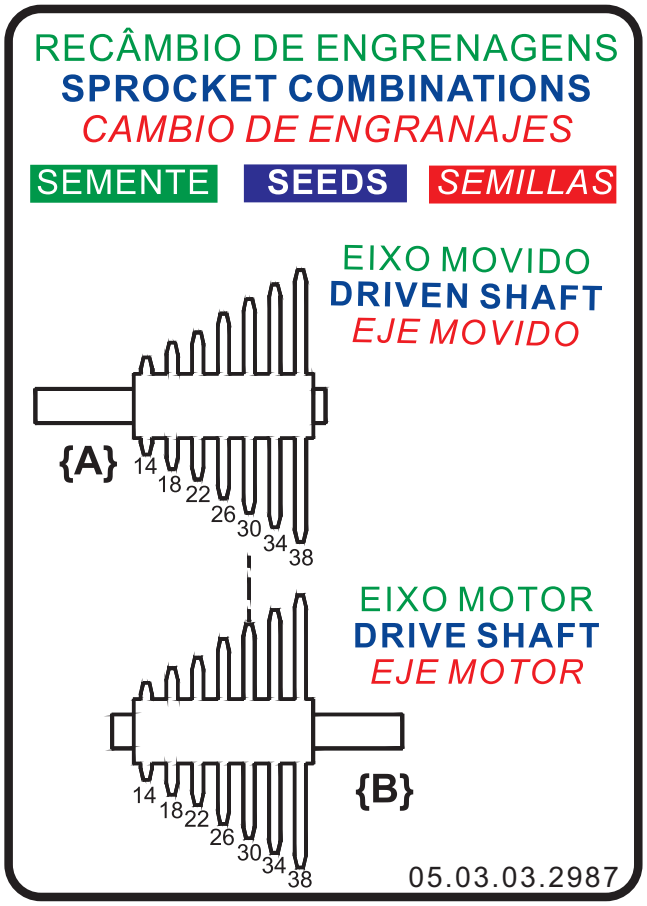


NOTE

- **The cone bolts (C) 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 pages show the different amount of fertilizer distributed using several spacings, 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 make the practical distribution tests, as indicated on page 86.

Mechanical seeds distribution table - (tire Ø 831/ 921)

Check how to calculate the amount of seed using the example on page **82**.

Tires list according to the table below:

Central frame:- 14 x 17.5/14 TR SK 900 tire (Ø 921);

Lateral frame:- 12 x 16.5/12 L TR SK 900 tire (Ø 831)

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

Número de Furos / **Number of Holes** / *Número de Agujeros*		24	28	34	38	40	62	64	90	94	100
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**	1,41	1,65	2,00	2,24	2,36	3,65	3,77	5,31	5,54	5,89
14	**34**	1,58	1,84	2,24	2,50	2,64	4,08	4,22	5,93	6,19	6,59
14	**30**	1,79	2,09	2,54	2,84	2,99	4,63	4,78	6,72	7,02	7,74
18	**38**	1,82	2,12	2,58	2,88	3,03	4,70	4,85	6,82	7,12	7,58
18	**34**	2,03	2,37	2,88	3,22	3,39	5,25	5,42	7,62	7,96	8,47
14	**26**	2,07	2,41	2,93	3,27	3,45	5,34	5,51	7,75	8,10	8,62
22	**38**	2,22	2,59	3,15	3,52	3,71	5,74	5,93	8,34	8,71	9,26
18	**30**	2,30	2,69	3,26	3,65	3,84	5,95	6,14	8,64	9,02	9,60
14	**22**	2,44	2,85	3,46	3,87	4,07	6,31	6,52	9,16	9,57	10,18
22	**34**	2,48	2,90	3,52	3,93	4,14	6,42	6,63	9,32	9,73	10,35
26	**38**	2,63	3,07	3,72	4,16	4,38	6,79	7,01	9,85	10,29	10,95
18	**26**	2,66	3,10	3,77	4,21	4,43	6,87	7,09	9,97	10,41	11,08
22	**30**	2,82	3,29	3,99	4,46	4,69	7,27	7,51	10,56	11,03	11,73
26	**34**	2,94	3,43	4,16	4,65	4,89	7,59	7,83	11,01	11,50	12,24
14	**18**	2,99	3,48	4,23	4,73	4,98	7,72	7,96	11,20	11,70	12,44
30	**38**	3,03	3,54	4,29	4,80	5,05	7,83	8,08	11,37	11,87	12,63
18	**22**	3,14	3,67	4,45	4,97	5,24	8,12	8,38	11,78	12,31	13,09
22	**26**	3,25	3,79	4,60	5,14	5,42	8,39	8,66	12,19	12,73	13,54
26	**30**	3,33	3,88	4,71	5,27	5,55	8,60	8,88	12,48	13,04	13,87
30	**34**	3,39	3,95	4,80	5,36	5,65	8,75	9,04	12,71	13,27	14,12
34	**38**	3,44	4,01	4,87	5,44	5,73	8,88	9,16	12,88	13,46	14,32
22	**22**	3,84	4,48	5,44	6,08	6,40	9,92	10,24	14,40	15,04	16,00
38	**34**	4,29	5,01	6,08	6,80	7,15	11,09	11,45	16,09	16,81	17,88
34	**30**	4,35	5,08	6,17	6,89	7,25	11,24	11,61	16,32	17,05	18,13
30	**26**	4,43	5,17	6,28	7,02	7,38	11,45	11,82	16,62	17,35	18,46
26	**22**	4,54	5,29	6,43	7,19	7,56	11,72	12,10	17,02	17,78	18,91
22	**18**	4,69	5,48	6,65	7,43	7,82	12,12	12,52	17,60	18,38	19,56
38	**30**	4,86	5,67	6,89	7,70	8,11	12,57	12.97	18,24	19,05	20,27
18	**14**	4,94	5,76	6,99	7,82	8,23	12,75	13,17	18,52	19,34	20,57
34	**26**	5,02	5,86	7,11	7,95	8,37	12,97	13,39	18,83	19,67	20,92
30	**22**	5,24	6,11	7,42	8,29	8,73	13,53	13,96	19,64	20,51	21,82
26	**18**	5,55	6,47	7,86	8,78	9,24	14,33	14,79	20,80	21,73	23,11
38	**26**	5,61	6,55	7,95	8,89	9,35	14,50	14,97	21,05	21,98	23,39
34	**22**	5,93	6,92	8,41	9,40	9,89	15,33	15,83	22,26	23,24	24,73
22	**14**	6,03	7,04	8,55	9,55	10,06	15,59	16,09	22,63	23,64	25,14
30	**18**	6,40	7,47	9,07	10,13	10,67	16,53	17,07	24,00	25,07	26,67
38	**22**	6,63	7,74	9,40	10,50	11,05	17,14	17,69	24,87	25,98	27,64
26	**14**	7,13	8,32	10,10	11,29	11,89	18,42	19,02	26,74	27,93	29,72
34	**18**	7,25	8,46	10,28	11,48	12,09	18,74	19,34	27,20	28,41	30,22
38	**18**	8,11	9,46	11,48	12,84	13,51	20,94	21,62	30,40	31,75	33,78
30	**14**	8,23	9,60	11,66	13,03	13,71	21,26	21,94	30,86	32,23	34,29
34	**14**	9,33	10,88	13,21	14,77	15,54	24,09	24,87	34,97	36,53	38,86
38	**14**	10,42	12,16	14,77	16,50	17,37	26,93	27,80	39,09	40,82	43,43

Sistema TATU / TITANIUM - PNEU Ø 921 * Metro Linear / **Linear Meter** / *Metro Lineal* 05.03.03.4679 - Revisão 00 - 0618

Precision planting seeds distribution table - (tire Ø 831 / 921)

Check how to calculate the amount of seed using the example on page **82**.

Tires list according to the table below:

Central frame:- 14 x 17.5/14 TR SK 900 tire (Ø 921);

Lateral frame:- 12 x 16,5/12 L TR SK 900 tire (Ø 831).

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	39	40	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**	1,59	1,89	2,30	2,36	4,13	4,72
14	**34**	1,78	2,11	2,57	2,64	4,61	5,27
14	**30**	2,02	2,39	2,91	2,99	5,23	5,97
18	**38**	2,05	2,43	2,96	3,03	5,31	6,06
18	**34**	2,29	2,71	3,30	3,39	5,93	6,78
14	**26**	2,33	2,76	3,36	3,45	6,03	6,89
22	**38**	2,50	2,96	3,61	3,71	6,48	7,41
18	**30**	2,59	3,07	3,74	3,84	6,72	7,68
14	**22**	2,75	3,26	3,97	4,07	7,13	8,15
22	**34**	2,80	3,31	4,04	4,14	7,25	8,28
26	**38**	2,96	3,50	4,27	4,38	7,66	8,76
18	**26**	2,99	3,54	4,32	4,43	7,75	8,86
22	**30**	3,17	3,75	4,58	4,69	8,21	9,39
26	**34**	3,30	3,92	4,77	4,89	8,57	9,79
14	**18**	3,36	3,98	4,85	4,98	8,71	9,96
30	**38**	3,41	4,04	4,93	5,05	8,84	10,11
18	**22**	3,53	4,19	5,11	5,24	9,16	10,47
22	**26**	3,66	4,33	5,28	5,42	9,48	10,83
26	**30**	3,74	4,44	5,41	5,55	9,71	11,09
30	**34**	3,81	4,52	5,51	5,65	9,88	11,29
34	**38**	3,87	4,58	5,58	5,73	10,02	11,45
22	**22**	4,32	5,12	6,24	6,40	11,20	12,80
38	**34**	4,83	5,72	6,97	7,15	12,52	14,31
34	**30**	4,90	5,80	7,07	7,25	12,69	14,51
30	**26**	4,98	5,91	7,20	7,38	12,92	14,77
26	**22**	5,11	6,05	7,37	7,56	13,24	15,13
22	**18**	5,28	6,26	7,63	7,82	13,69	15,65
38	**30**	5,47	6,49	7,90	8,11	14,19	16,21
18	**14**	5,55	6,58	8,02	8,23	14,40	16,46
34	**26**	5,65	6,70	8,16	8,37	14,65	16,74
30	**22**	5,89	6,98	8,51	8,73	15,27	17,46
26	**18**	6,24	7,40	9,01	9,24	16,18	18,49
38	**26**	6,31	7,48	9,12	9,35	16,37	18,71
34	**22**	6,68	7,91	9,64	9,89	17,31	19,78
22	**14**	6,79	8,05	9,81	10,06	17,60	20,12
30	**18**	7,20	8,53	10,40	10,67	18,67	21,33
38	**22**	7,46	8,84	10,78	11,05	19,35	22,11
26	**14**	8,02	9,51	11,59	11,89	20,80	23,77
34	**18**	8,16	9,67	11,79	12,09	21,16	24,18
38	**18**	9,12	10,81	13,17	13,51	23,65	27,02
30	**14**	9,26	10,97	13,37	13,71	24,00	27,43
34	**14**	10,49	12,43	15,15	15,54	27,20	31,09
38	**14**	11,73	13,90	16,94	17,37	30,40	34,74

Sistema PRECISION PLANTING - PNEU Ø 921 * Metro Linear / **Linear Meter** / *Metro Lineal* 05.03.03.4680 - Revisão 00 - 0618

Mechanical seed distribution table - (tire Ø 921/ 1072)

Check how to calculate the amount of seed using the example on page **82**.

Tires list according to the table below:

Central frame:- 385/65 R 22.50 D 711 DRC 15-19.50 20 L tire (Ø 1072)

Lateral frame:- 14 x 17.5/14 TR SK 900 tire (Ø 921)

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

Número de Furos / **Number of Holes** / *Número de Agujeros*		24	28	34	38	40	62	64	90	94	100
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**	1,40	1,63	1,98	2,21	2,33	3,61	3,72	5,23	5,47	5,81
14	**34**	1,56	1,82	2,21	2,47	2,60	4,03	4,16	5,85	6,11	6,50
14	**30**	1,77	2,06	2,50	2,80	2,95	4,57	4,71	6,63	6,92	7,37
18	**38**	1,79	2,09	2,54	2,84	2,99	4,64	4,78	6,73	7,03	7,48
18	**34**	2,01	2,34	2,84	3,18	3,34	5,18	5,35	7,52	7,85	8,36
14	**26**	2,04	2,38	2,89	3,23	3,40	5,27	5,44	7,65	7,99	8,50
22	**38**	2,19	2,56	3,11	3,47	3,66	5,67	5,85	8,22	8,59	9,14
18	**30**	2,27	2,65	3,22	3,60	3,79	5,87	6,06	8,52	8,90	9,47
14	**22**	2,41	2,81	3,41	3,82	4,02	6,23	6,43	9,04	9,44	10,04
22	**34**	2,45	2,86	3,47	3,88	4,09	6,33	6,54	9,19	9,60	10,21
26	**38**	2,59	3,02	3,67	4,10	4,32	6,70	6,91	9,72	10,15	10,80
18	**26**	2,62	3,06	3,72	4,15	4,37	6,77	6,99	9,83	10,27	10,93
22	**30**	2,78	3,24	3,94	4,40	4,63	7,18	7,41	10,42	10,88	11,57
26	**34**	2,90	3,38	4,10	4,59	4,83	7,48	7,72	10,86	11,35	12,07
14	**18**	2,95	3,44	4,17	4,66	4,91	7,61	7,86	11,05	11,54	12,28
30	**38**	2,99	3,49	4,24	4,74	4,98	7,73	7,97	11,21	11,71	12,46
18	**22**	3,10	3,62	4,39	4,91	5,17	8,01	8,26	11,62	12,14	12,91
22	**26**	3,21	3,74	4,54	5,07	5,34	8,28	8,55	12,02	12,55	13,36
26	**30**	3,28	3,83	4,65	5,20	5,47	8,48	8,75	12,31	12,86	13,68
30	**34**	3,34	3,90	4,74	5,29	5,57	8,63	8,91	12,53	13,09	13,93
34	**38**	3,39	3,95	4,80	5,37	5,65	8,76	9,04	12,71	13,27	14,12
22	**22**	3,79	4,42	5,37	6,00	6,31	9,79	10,10	14,21	14,84	15,78
38	**34**	4,23	4,94	6,00	6,70	7,06	10,94	11,29	15,88	16,58	17,64
34	**30**	4,29	5,01	6,08	6,80	7,16	11,09	11,45	16,10	16,81	17,89
30	**26**	4,37	5,10	6,19	6,92	7,28	11,29	11,66	16,39	17,12	18,21
26	**22**	4,48	5,22	6,34	7,09	7,46	11,56	11,94	16,79	17,53	18,65
22	**18**	4,63	5,40	6,56	7,33	7,72	11,96	12,35	17,36	18,13	19,29
38	**30**	4,80	5,60	6,80	7,60	8,00	12,40	12,80	17,99	18,79	19,99
18	**14**	4,87	5,68	6,90	7,71	8,12	12,58	12,99	18,26	19,08	20,29
34	**26**	4,95	5,78	7,02	7,84	8,26	12,80	13,21	18,58	19,40	20,64
30	**22**	5,17	6,03	7,32	8,18	8,61	13,34	13,77	19,37	20,23	21,52
26	**18**	5,47	6,38	7,75	8,66	9,12	14,13	14,59	20,52	21,43	22,80
38	**26**	5,54	6,46	7,84	8,77	9,23	14,30	14,76	20,76	21,68	23,07
34	**22**	5,85	6,83	8,29	9,27	9,76	15,12	15,61	21,95	22,93	24,39
22	**14**	5,95	6,94	8,43	9,42	9,92	15,38	15,87	22,32	23,31	24,80
30	**18**	6,31	7,37	8,94	10,00	10,52	16,31	16,84	23,68	24,73	26,31
38	**22**	6,54	7,63	9,27	10,36	10,90	16,90	17,45	24,54	25,63	27,26
26	**14**	7,03	8,21	9,97	11,14	11,72	18,17	18,76	26,38	27,55	29,31
34	**18**	7,16	8,35	10,14	11,33	11,93	18,48	19,08	26,83	28,02	29,81
38	**18**	8,00	9,33	11,33	12,66	13,33	20,66	21,33	29,99	31,32	33,32
30	**14**	8,12	9,47	11,50	12,85	13,53	20,97	21,65	30,44	31,79	33,82
34	**14**	9,20	10,73	13,03	14,57	15,33	23,77	24,53	34,50	36,03	38,33
38	**14**	10,28	12,00	14,57	16,28	17,14	26,56	27,42	38,56	40,27	42,84

Sistema TATU / TITANIUM - PNEU Ø 1072 * Metro Linear / **Linear Meter** / *Metro Lineal* 05.03.03.4681 - Revisão 00 - 0618

Precision planting seed distribution table - (tire Ø 921/ 1072)

Check how to calculate the amount of seed using the example on page **82**.

Tires list according to the table below:

Central frame:- 385/65 R 22.50 D 711 DRC 15-19.50 20 L tire (Ø 1072)

Lateral frame:- 14 x 17.5/14 TR SK 900 tire (Ø 921)

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	39	40	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**	1,57	1,86	2,27	2,33	4,07	4,65
14	**34**	1,75	2,08	2,53	2,60	4,55	5,20
14	**30**	1,99	2,36	2,87	2,95	5,16	5,89
18	**38**	2,02	2,39	2,92	2,99	5,23	5,98
18	**34**	2,26	2,67	3,26	3,34	5,85	6,68
14	**26**	2,29	2,72	3,31	3,40	5,95	6,80
22	**38**	2,47	2,92	3,56	3,66	6,40	7,31
18	**30**	2,56	3,03	3,69	3,79	6,63	7,58
14	**22**	2,71	3,21	3,92	4,02	7,03	8,04
22	**34**	2,76	3,27	3,98	4,09	7,05	8,17
26	**38**	2,92	3,46	4,21	4,32	7,56	8,64
18	**26**	2,95	3,50	4,26	4,37	7,65	8,74
22	**30**	3,13	3,70	4,51	4,63	8,10	9,26
26	**34**	3,26	3,86	4,71	4,83	8,45	9,66
14	**18**	3,31	3,93	4,79	4,91	8,59	9,82
30	**38**	3,36	3,99	4,86	4,98	8,72	9,97
18	**22**	3,49	4,13	5,04	5,17	9,04	10,33
22	**26**	3,61	4,27	5,21	5,34	9,35	10,68
26	**30**	3,69	4,38	5,33	5,47	9,58	10,94
30	**34**	3,76	4,46	5,43	5,57	9,75	11,14
34	**38**	3,81	4,52	5,51	5,65	9,89	11,30
22	**22**	4,26	5,05	6,16	6,31	11,05	12,63
38	**34**	4,76	5,64	6,88	7,06	12,35	14,11
34	**30**	4,83	5,72	6,98	7,16	12,52	14,31
30	**26**	4,92	5,83	7,10	7,28	12,75	14,57
26	**22**	5,04	5,97	7,27	7,46	13,06	14,92
22	**18**	5,21	6,17	7,52	7,72	13,50	15,43
38	**30**	5,40	6,40	7,80	8,00	13,99	15,99
18	**14**	5,48	6,49	7,91	8,12	14,21	16,23
34	**26**	5,57	6,60	8,05	8,26	14,45	16,51
30	**22**	5,81	6,89	8,39	8,61	15,07	17,22
26	**18**	6,16	7,30	8,89	9,12	15,96	18,24
38	**26**	6,23	7,38	9,00	9,23	16,15	18,45
34	**22**	6,59	7,81	9,51	9,76	17,07	19,51
22	**14**	6,70	7,94	9,67	9,92	17,36	19,84
30	**18**	7,10	8,42	10,26	10,52	18,41	21,04
38	**22**	7,36	8,72	10,63	10,90	19,08	21,81
26	**14**	7,91	9,38	11,43	11,72	20,52	23,45
34	**18**	8,05	9,54	11,63	11,93	20,87	23,85
38	**18**	9,00	10,66	12,99	13,33	23,32	26,66
30	**14**	9,13	10,82	13,19	13,53	23,68	27,06
34	**14**	10,35	12,27	14,95	15,33	26,83	30,66
38	**14**	11,57	13,71	16,71	17,14	29,99	34,27

Sistema PRECISION PLANTING - PNEU Ø 1072

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

05.03.03.4682 - Revisão 00 - 0618

Calculation of the amount of seeds

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:

In the table from the previous pages, for a seed plate that has 24 holes **(mechanical)** or 27 holes **(pneumatic)** on a **26 x 38** combination, the amount of seeds/meter is **2.63 (mechanical)** or **2.96 (pneumatic).**

Use the table from the page 78 as an example.

Example:

Using the same transmission combination **(26 x 38)** but now using a seed plate with **20 holes**, follow the calculation below.

Formula:

Multiply the amount of seeds per meter (table = **2.63**) by the amount of holes (holes in the new plate = **20**) and divide by the amount of holes (seed plate on the table = **24**).

Calculation:

$$\frac{2.63 \times 20}{24} = \frac{54.6}{24} = \textbf{2.19}$$ seeds per linear meter.

Answer:

Using a seed plate with 20 holes, **2.19** seeds per linear meter will be distributed (**26 x 38** combination).

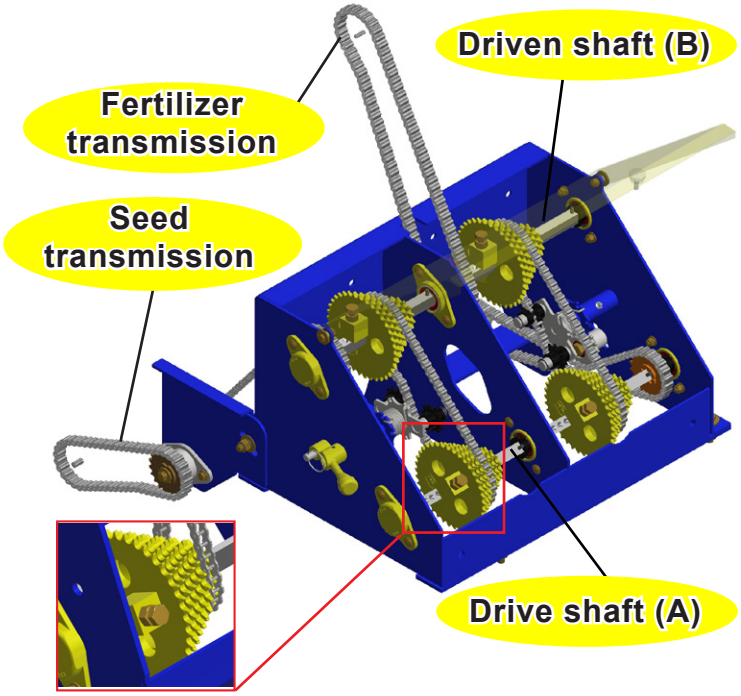
NOTE **Use the same method for every table to calculate the amount of seeds/meter, being it mechanical or pneumatic.**

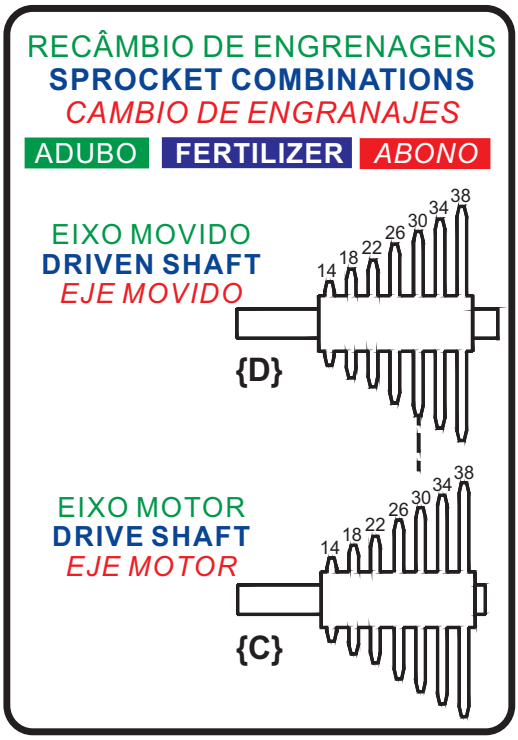
Fertilizer distribution

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

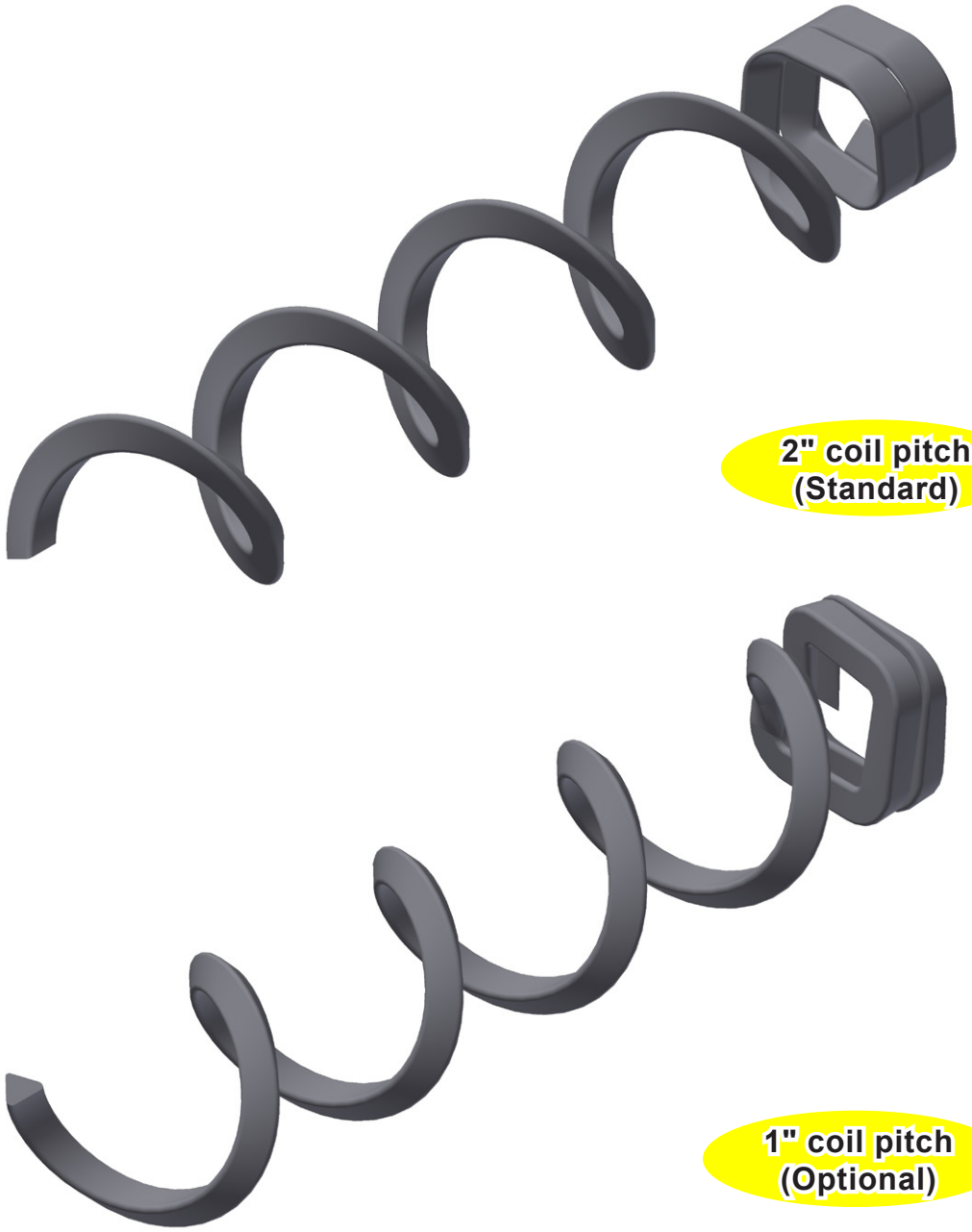
IMPORTANT

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 page 86.

ATTENTION

- **The table {A} on the following page shows the obtained amount with the 2" coil pitch augers (standard). This auger transports approximately 35 grams of granulated commercial fertilizer per turn.**
- **The table {B} on the following page shows the obtained amount with the 1" coil pitch auger (optional). This auger transports approximately 17 grams of granulated commercial fertilizer per turn.**



Safety fuse of the transmission

To protect the seed and fertilizer system, the planter has safety fuses on the drive shafts and hexagonal shafts. Whenever necessary, replace for an original one.

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 of seed 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.

Maximum transport speed: 15 km/h.

• 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)

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

The disc blade will be useful when cutting straw and not for opening furrows.

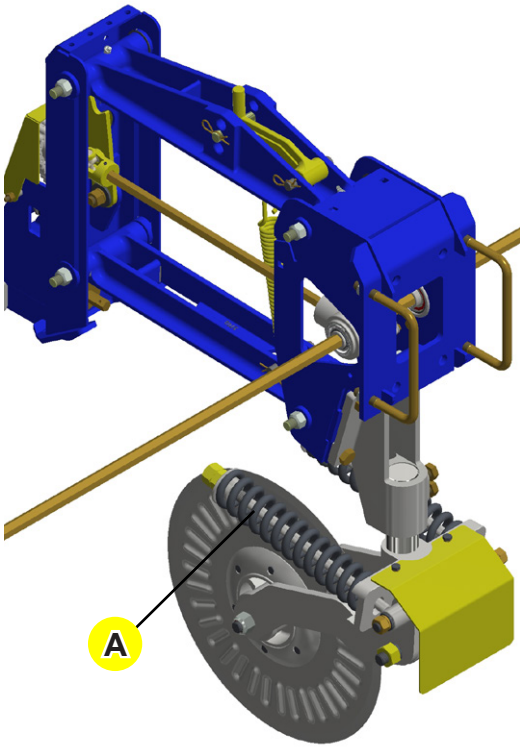
Adjust the spring (A) according to the situation of the terrain.

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

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

The disc blades support have a height adjustment and it should be used to increase or to decrease the depth cut of the disc blades related to the soil.

Avoid to deepen the disc blades unnecessarily.

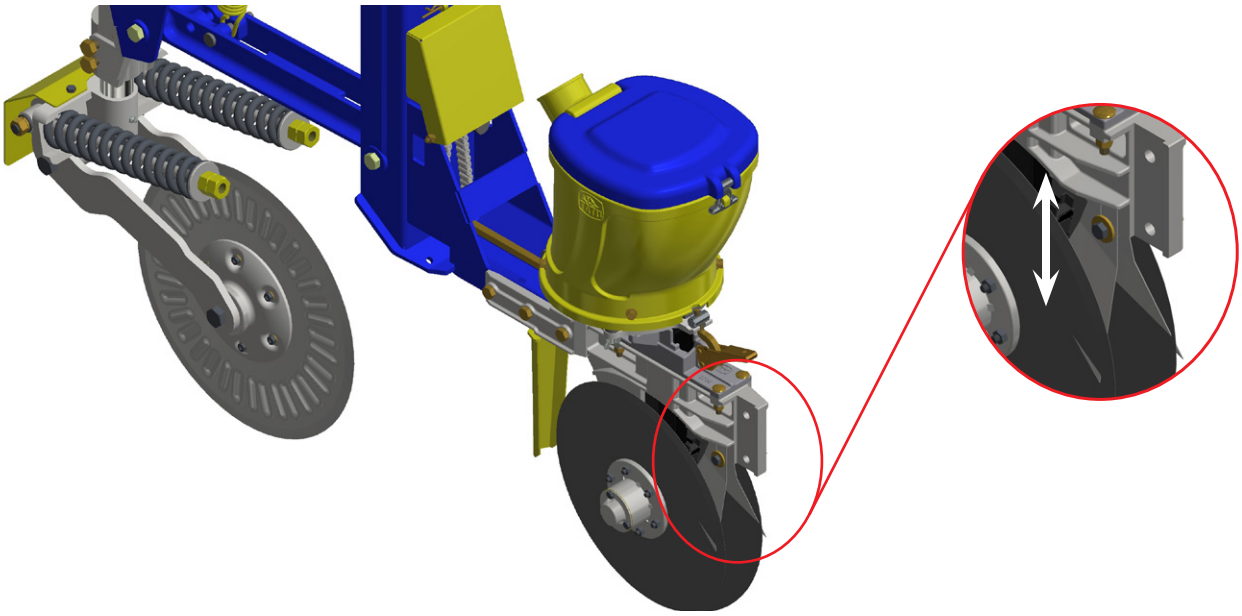


ATTENTION **Avoid that the disc flange touch the soil.**

Adjust the spring pressure uniformly on every row unit.

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.



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.

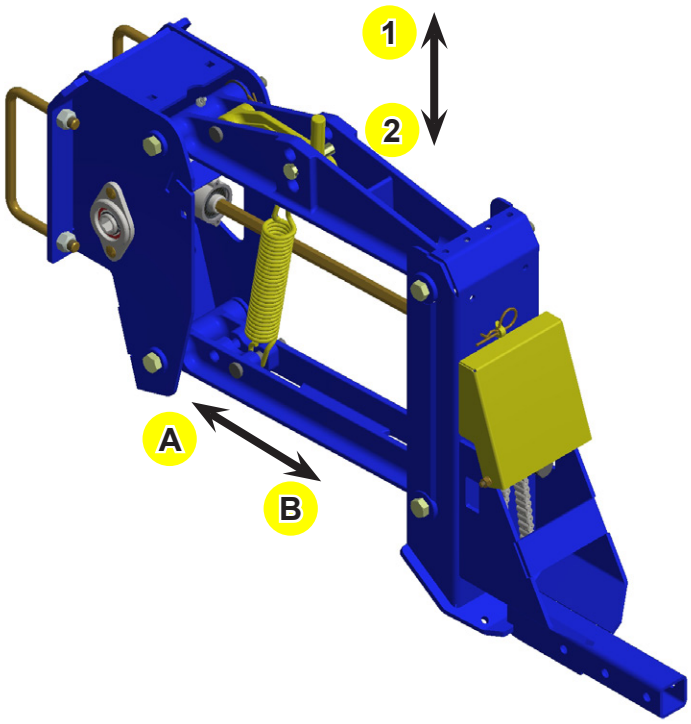
"2" - Smaller pressure.

Holes in the lower bar of the parallelogram.

"A" - Greater pressure.

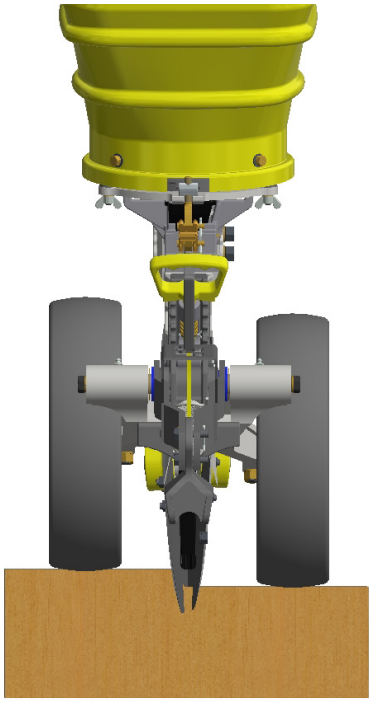
"B" - Smaller pressure.

Set the same adjustment for every row unit.



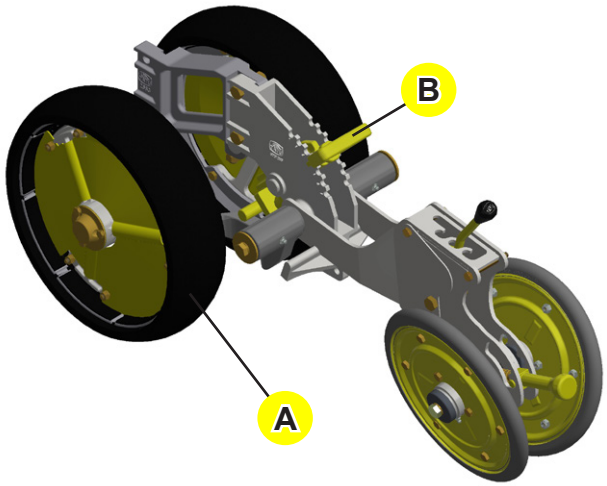
Seed depth and floating range of the row unit

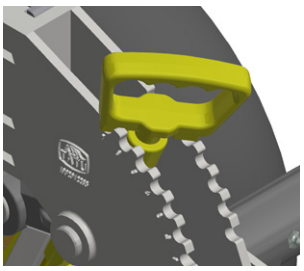
The seed depth control is made individually through the gauge wheels (A), which possess adjustments through the handler (B). The graduation allows to adjust the seed depth in intervals of **0.5 cm** or **1 cm**. (Check figure on the following page).

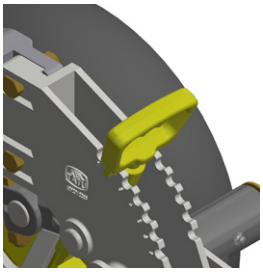


NOTE **The depth gauge wheels possess independent lateral and vertical oscillation to follow the differences of the ground ondulation.**

Seed depth and floating range of the row unit





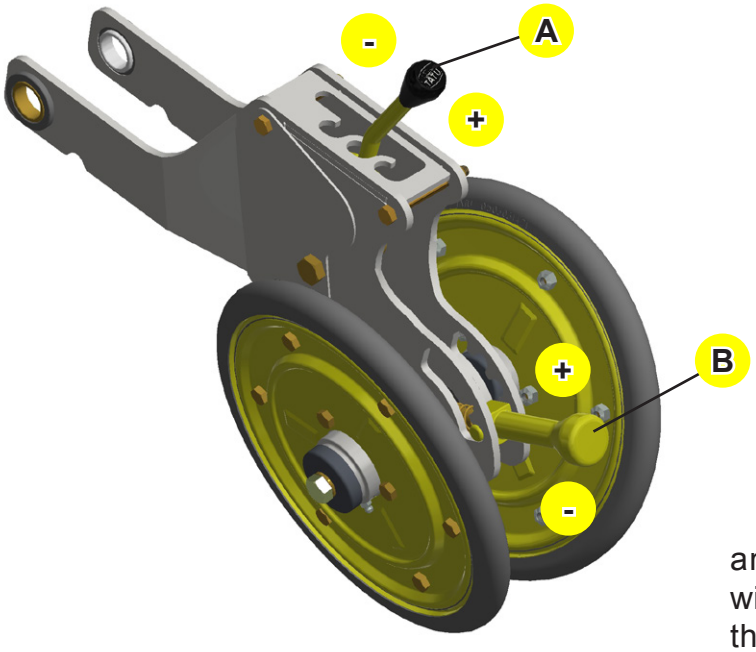


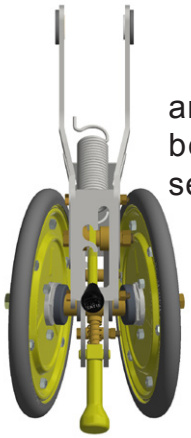
Press wheels adjustment

The press wheels in "V" shape firm the soil around the seed and are able to work in several positions according to the soil type and conditions of the straw.

1) Make the correct adjustment of the floating range and the downward pressure by the lever (A) that allows to operate in four positions and one neutral position.

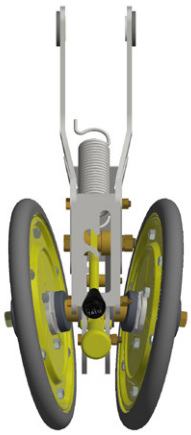
2) Adjust the angle between the tires (vertex) through the lever (B) that allows more or less pressure on the wheel.





With the wheel angle closed, there will be less earth over the seed.

With the wheel angle opened, there will be more earth over the seed.

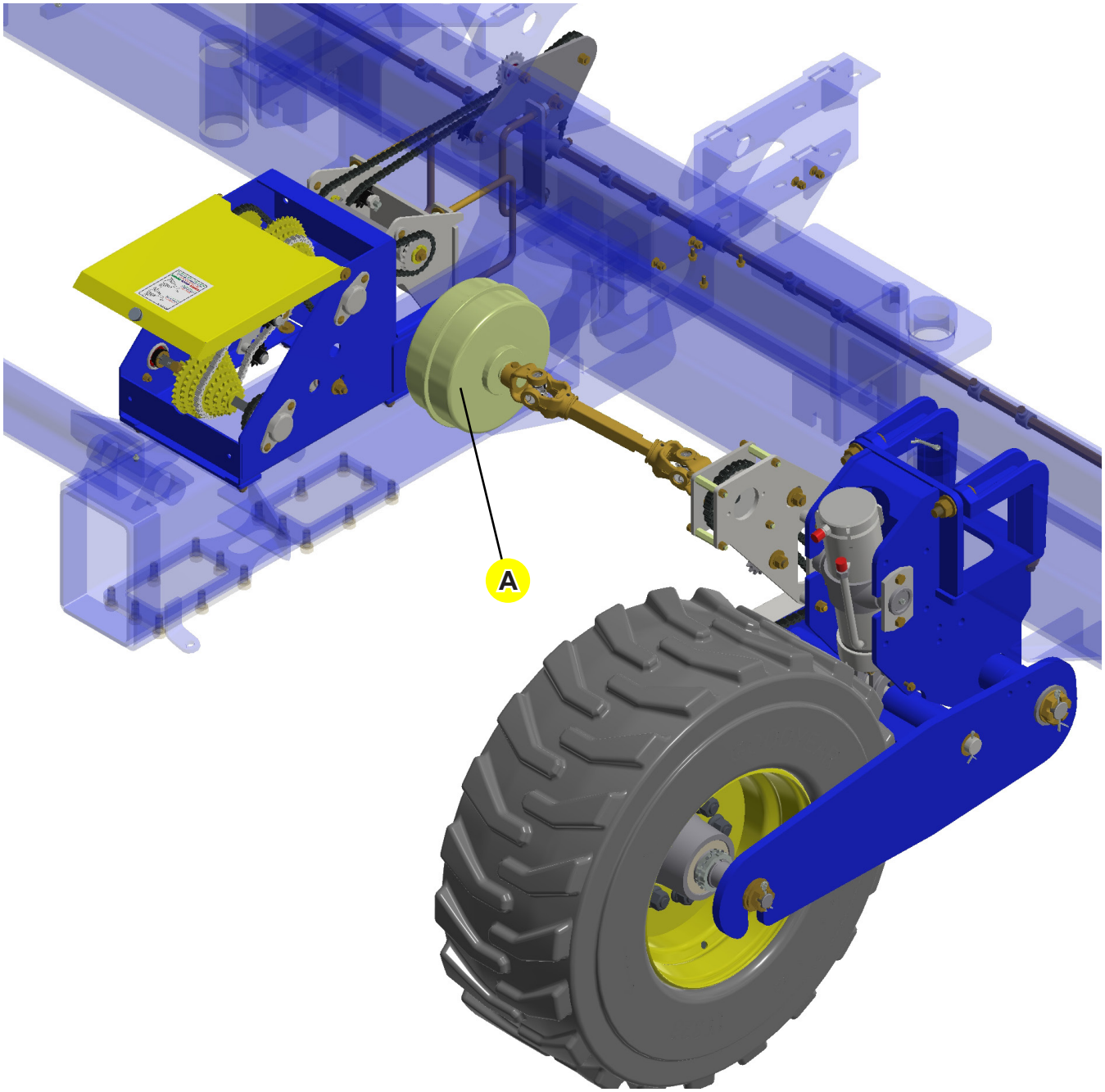


NOTE **While adjusting the press wheels it is important to consider the soil type, seed type and depth of planting to not affect the plants emergence.**

Electromagnetic clutch

With automatic activation for maneuvers and finishings.

When the clutch (A) is activated, the TRA transmission axle stops turning.



Row markers

The row marker utilization is very important to achieve an uniform spacing in the plantation, thus facilitating the cultivation and harvest.

NOTE **For this practical adjustment it is necessary to keep the front and rear gauges with the same measure, being the central measure of the front tires equal to the rear ones.**

Follow the instructions that goes along with the illustration on the next page.

To adjust the marker discs it is just necessary to loosen the nuts and dispace the extensor to the desired position. This distance can be obtained as follows:

• Drive some meters on a prepared soil, being the planter hitched.

• Measure the distance (A) between the center of the tractor trace and the center of the first seed row (row in the planter extremity).

• Sum up the found measure with the spacing between rows (B) measure, considering the spacing that is being used in the equipment.

• The result is the distance (C) that should exist between the row marker disc and the center of the first seed row (row in the planter extremity).

Example:

A - Tractor trace center to the center of the first seed row = 800 mm.

B - Spacing between row crops = 500 mm.

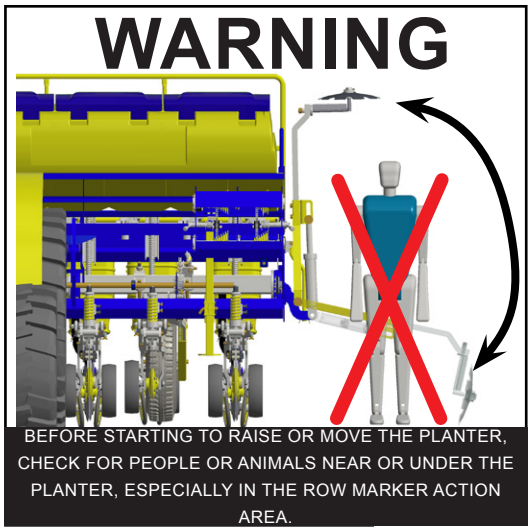
C - Distance to be found (?).

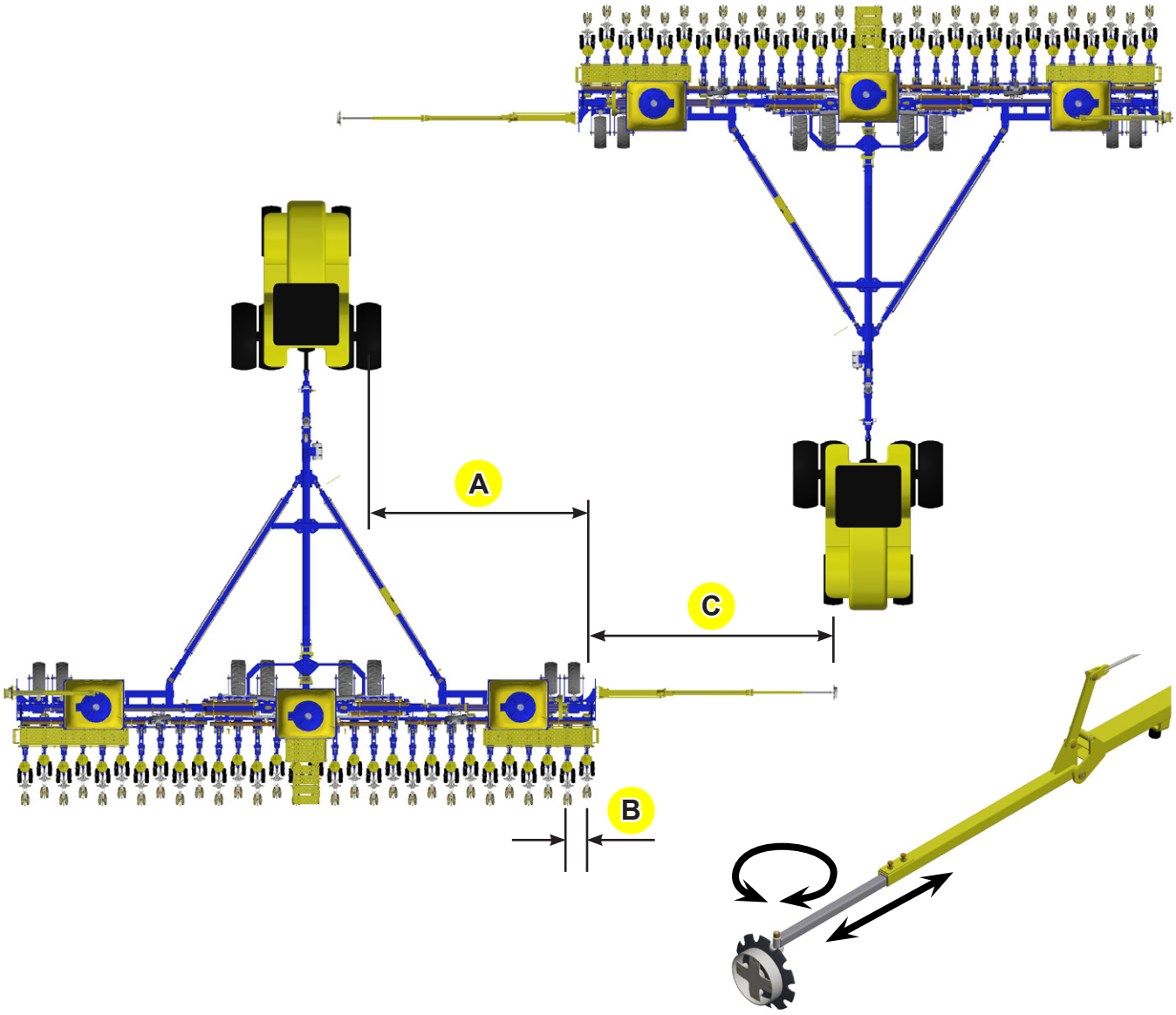
So: A + B = C

800 + 500 = 1,300 mm

C = 1,300 mm

This is the distance between the center of the first seed row and the marker disc lowered to the soil.



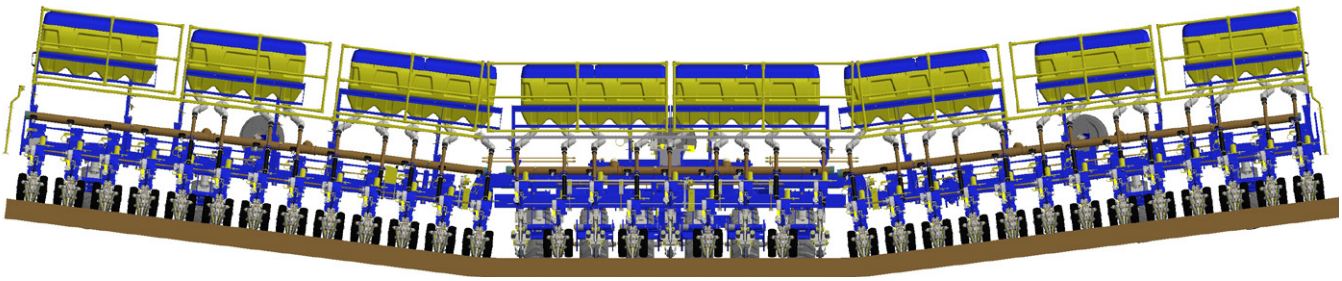


Working angle

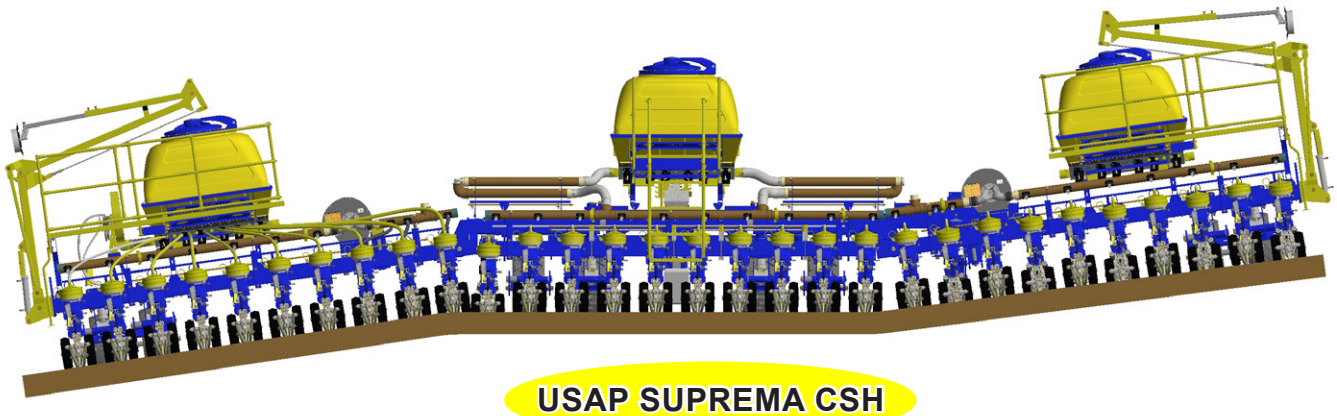
The marker discs feature angle and distance adjustments to facilitate the soil opening. In order to do so, loosen the nut and adjust as necessary.

Working angle related to the soil

Equipments composed by lateral articulated frames with angles that change from 1° to 7° degrees to make it easier to work on different types of soil.



USAP SUPREMA



USAP SUPREMA CSH

Operations - Important points

- Retighten nuts and bolts after the first day of planting. Check the conditions of all pins and cotter pins. Then, retighten every 24 working hours.
- Carefully observe the lubrication intervals.
- The correct inflation of the tires is important to maintain the planting uniformity. Keep the same inflation for all tires.
- 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 metering systems twice a day and remove the adherence of chemical products from them, if necessary.
- Keep the equipment leveled.
- Periodically check the established adjustments in the beginning of the plantation.
- Carefully check the seed depth and the compaction pressure.
- It is important to maintain a constant speed in the whole plantation.
- The tractor drawbar must remain fixed.
- Use the row markers correctly to avoid future wastes.
- Never make maneuvers or use reverse gear when the rows are touching 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.
- For adjustment and verification of the cutting parts (row units) of the equipment, it is necessary to disconnect the clutches to avoid wastes.
- During working or transportation, the presence of passengers on the tractor or equipment is not allowed.
- As previously mentioned, the planter features several adjustments. However, only the local conditions can determine the best adjustment thereof.

Lubrication

In order to reduce the wearing caused by the friction in the moving parts of the equipment, it is necessary to make a correct lubrication, as indicated below.

• Every 24 working hours, lubricate the articulations though the grease fittings according to the following instructions:

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

• Remove the remainder old grease around the articulations.

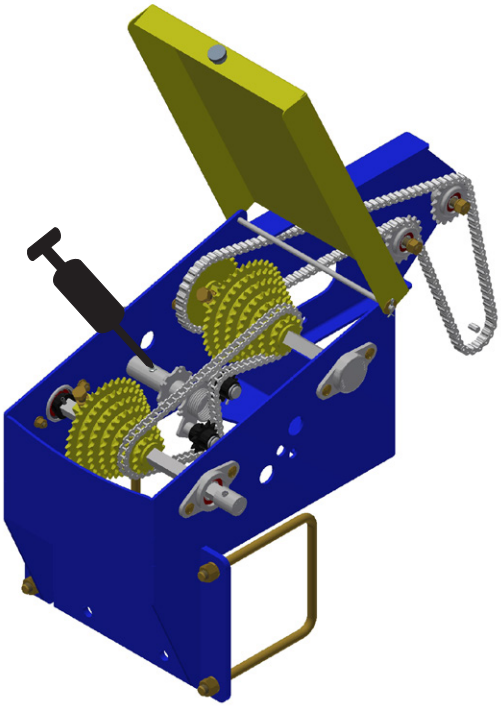
• Clean up all the grease fittings with a cloth before introducing the lubricant and replace the defective ones.

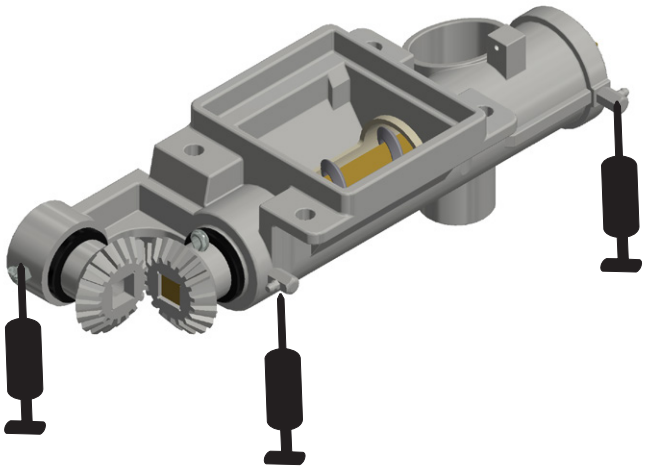
• Introduce an enough amount of new grease.

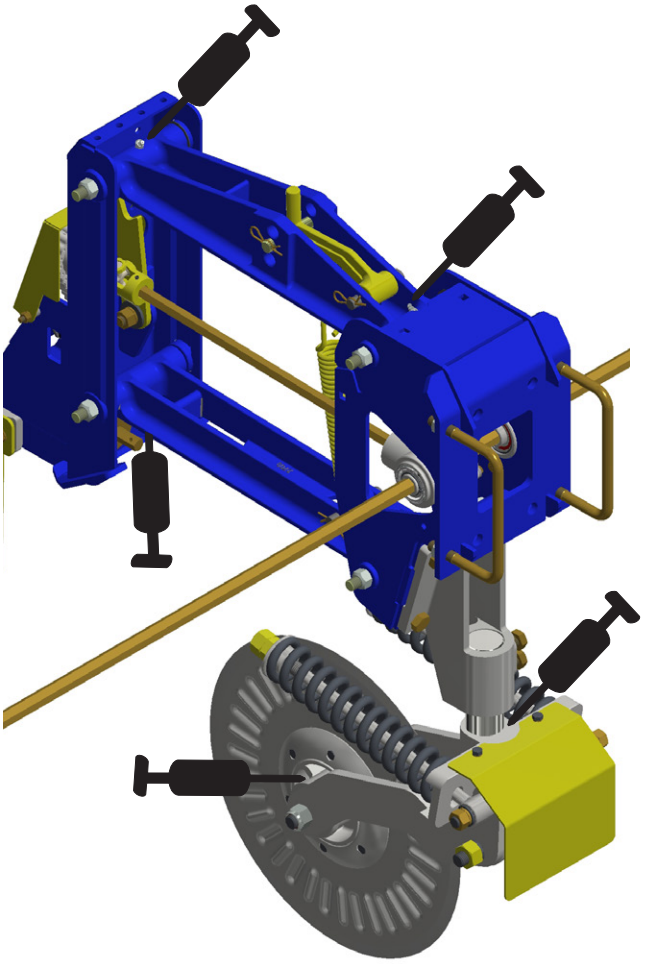
• Use medium consistency grease.

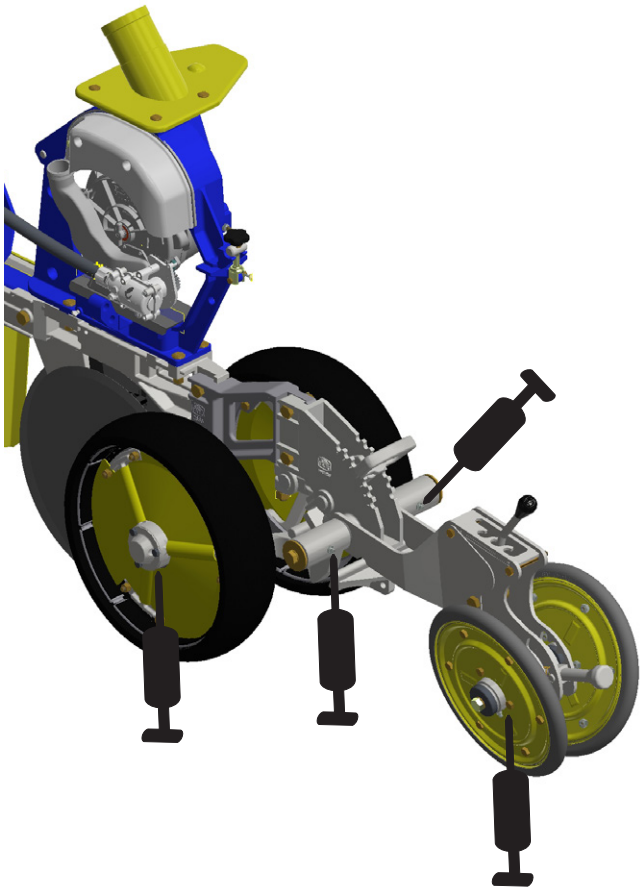
ATTENTION **Special attention should be given to the lubricant intervals on the different points of the planter.**

Lubrication points



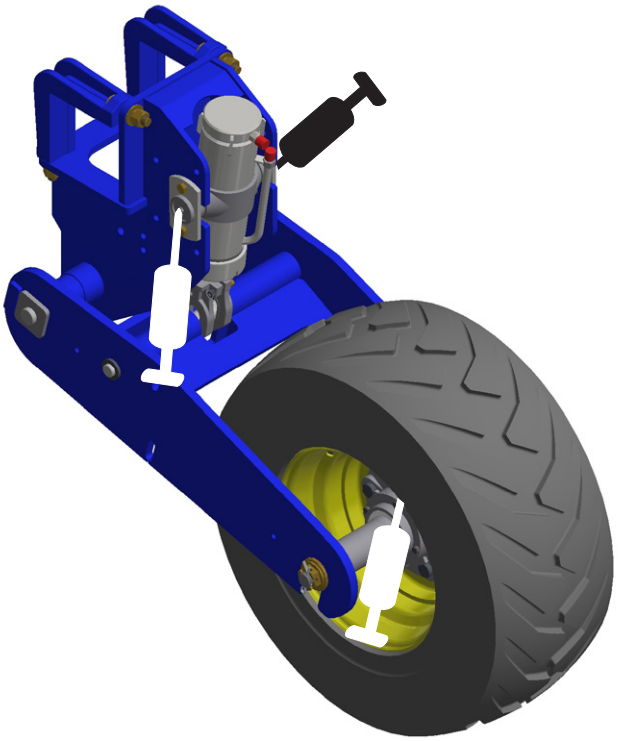






ATTENTION Lubricate the points shown above and all grease fittings as well.

Lubrication points



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

Fertilizer metering maintenance

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

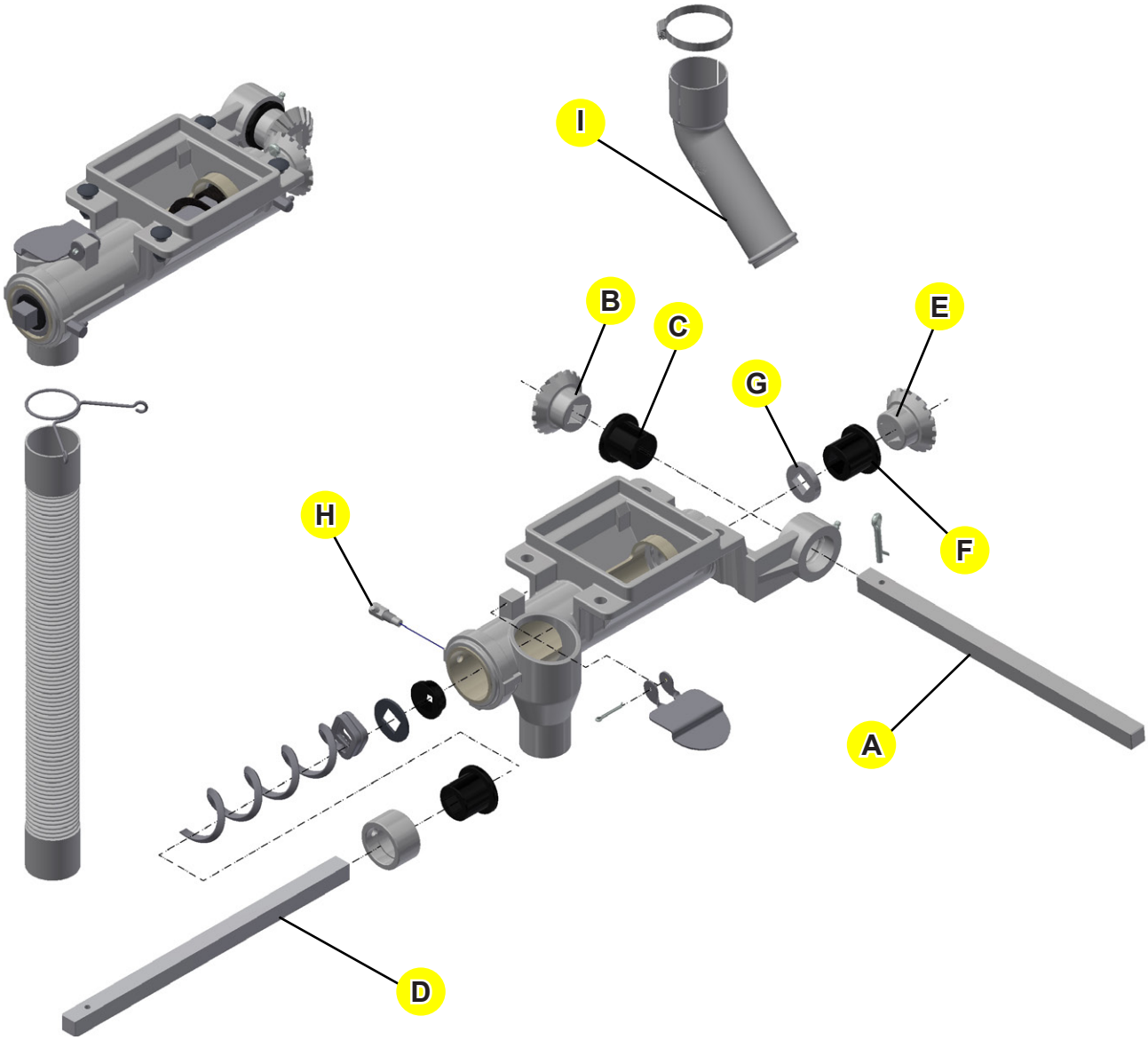
• Remove the squared shaft (A) with bevel gear (B) and the bearing (C).

• 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.

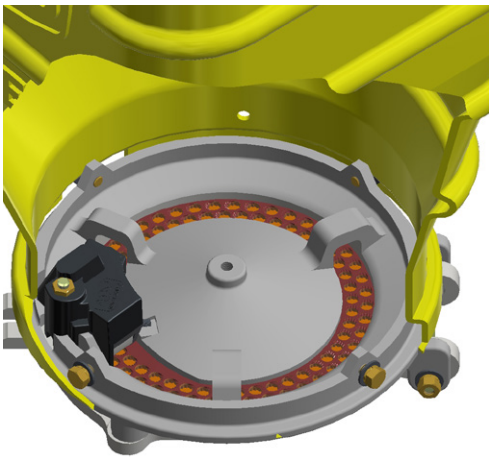
• Do not forget to lubricate the metering grease fittings daily, as mentioned on the 'lubrication' page, avoiding future problems.

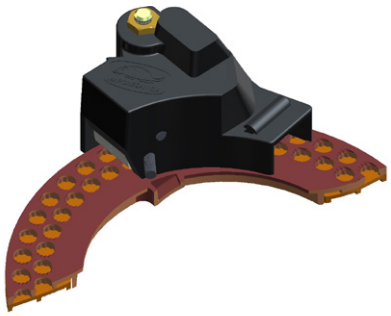


NOTE **To improve the fertilizer dropping, use the fertilizer tube (I).**

Cleaning the seed metering

It is necessary to make a general cleaning in each seed metering daily. To do this, remove the seed plate and observe the metering mechanism operation. By doing so, the best planting will be assured.





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

Maintenance of the 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.

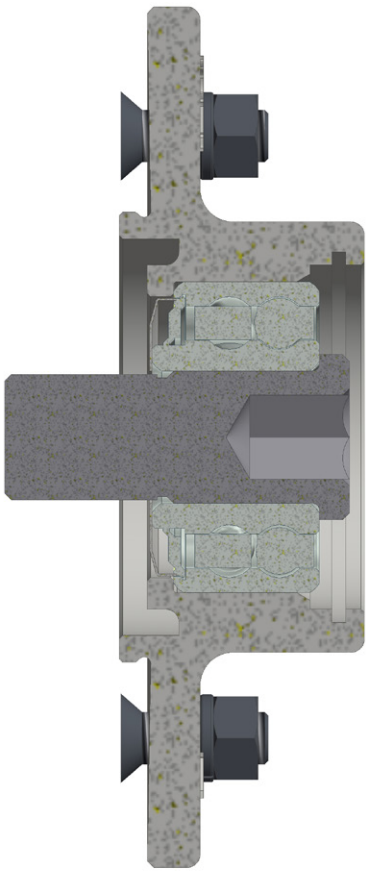
• Clean all parts with diesel oil and kerosene.

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

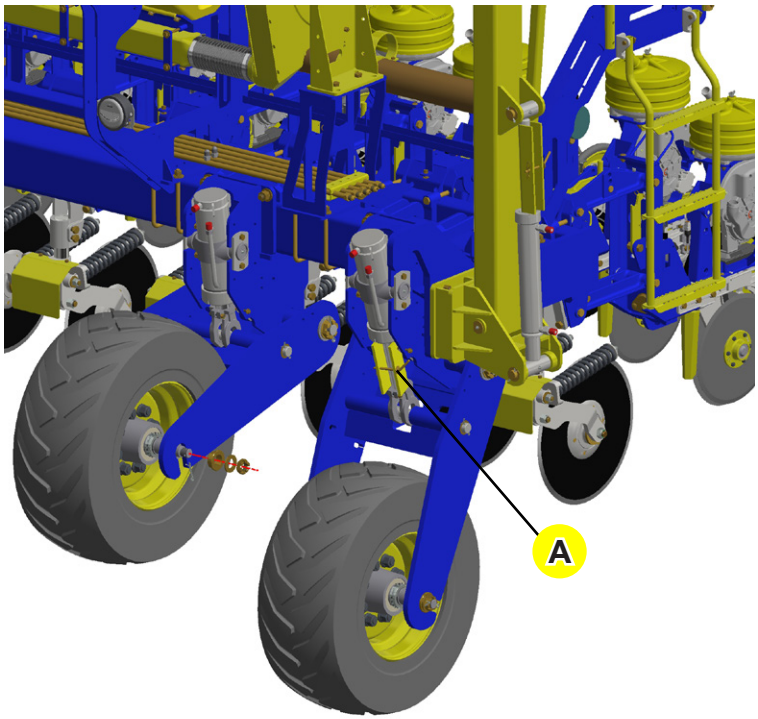
• The hubs without grease fittings should be reassembled with a good amount of lubricant.

• The hubs with grease fittings should be lubricated until the new grease is visible.

• The hubs with tapered roller bearings fastened by castle nut and cotter pin allow the adjustment of the inner clearance; excessive tightening should be avoided. The hubs should rotate with the hand applying a small effort.



How to replace the tires



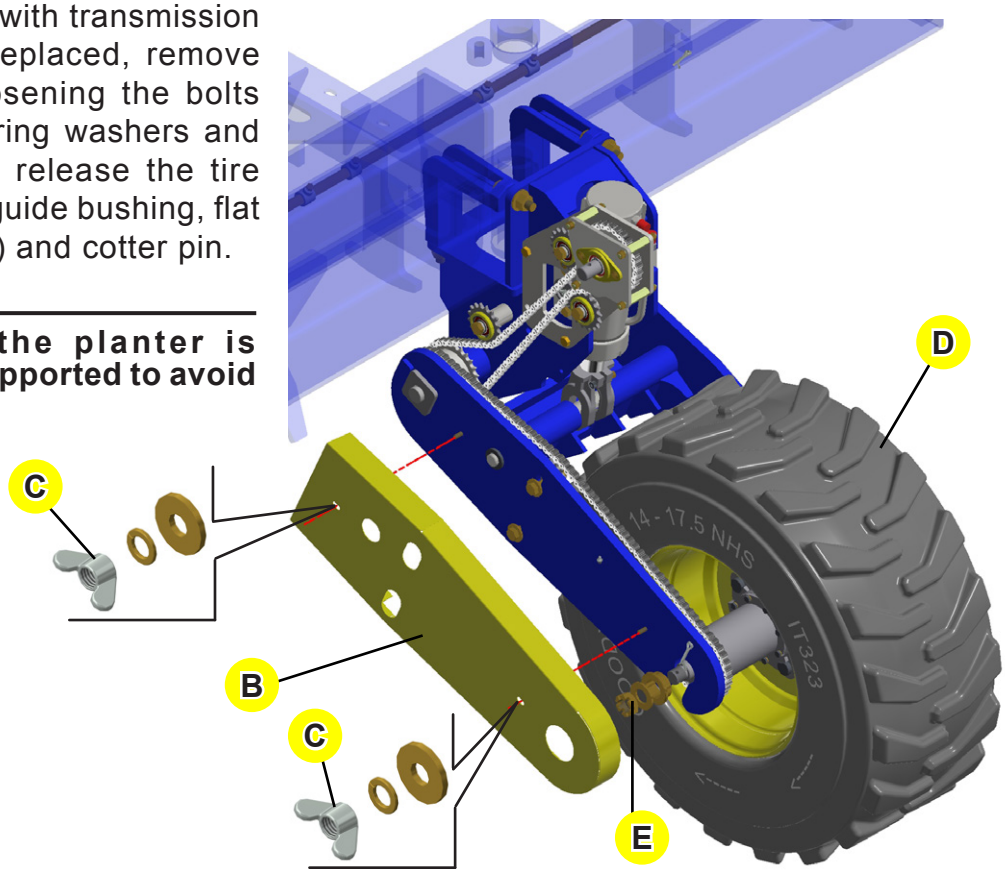
When the planter tires need repairs, proceed as follow:

Totally lift the planter and place the locks (A) on the cylinders, but leave the tire that is going to be replaced without a lock.

Totally retreat the hydraulic cylinder to lift the tire from the soil.

When it is a tire with transmission that is going to be replaced, remove the cover (B) by loosening the bolts (C), flat washers, spring washers and butterfly nuts. Then, release the tire (D) by loosening the guide bushing, flat washer, castle nut (E) and cotter pin.

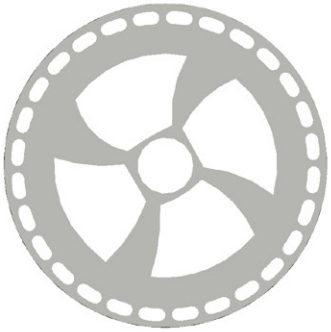
Check if the planter is properly supported to avoid accidents.

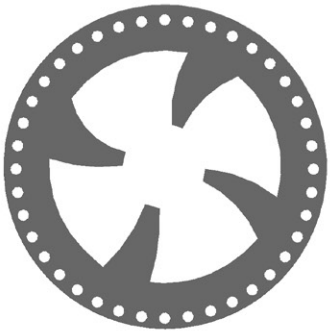


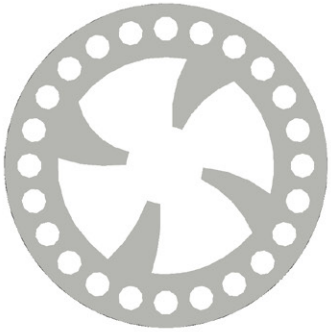
Seed plates

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





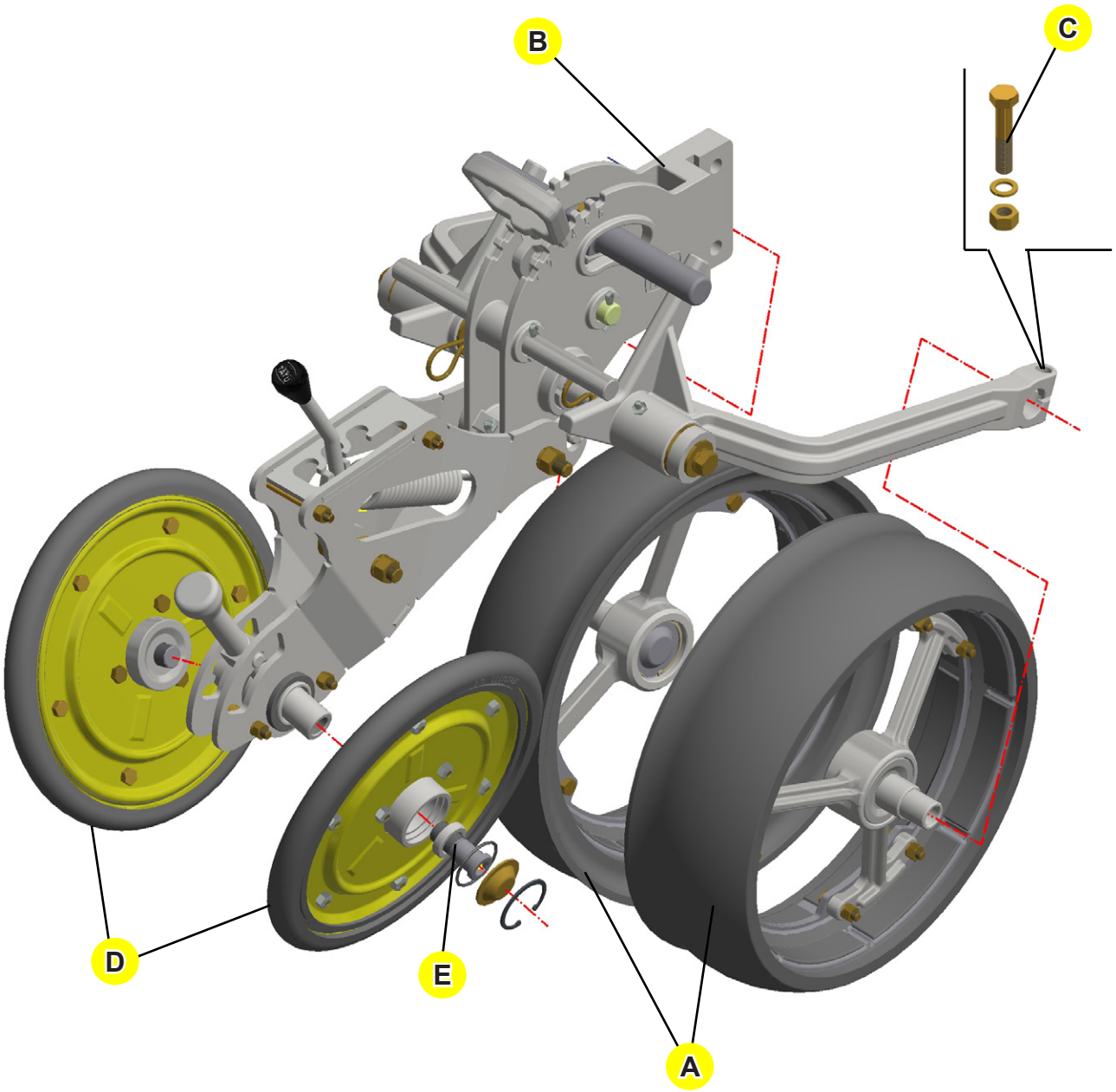


Depth control system with gauge wheel

Assemble the laced wheels (A) to the depth control (B) using bolts (C), spring washers and nuts.

Assemble the "V" gauge wheels (D) to the depth control (B) locking it using bolts (E), bearing cover, retention ring and adjustable shim.

Then, lock it to the seed unaligned double disc.



TATU precision agriculture (APT)

The APT 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 adaption 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, chain and wheelset tighteners, sprocket combinations, manual operations, seed and fertilizer tables) will be eliminated;

• Wheelset skidding that activates the transmission shafts;

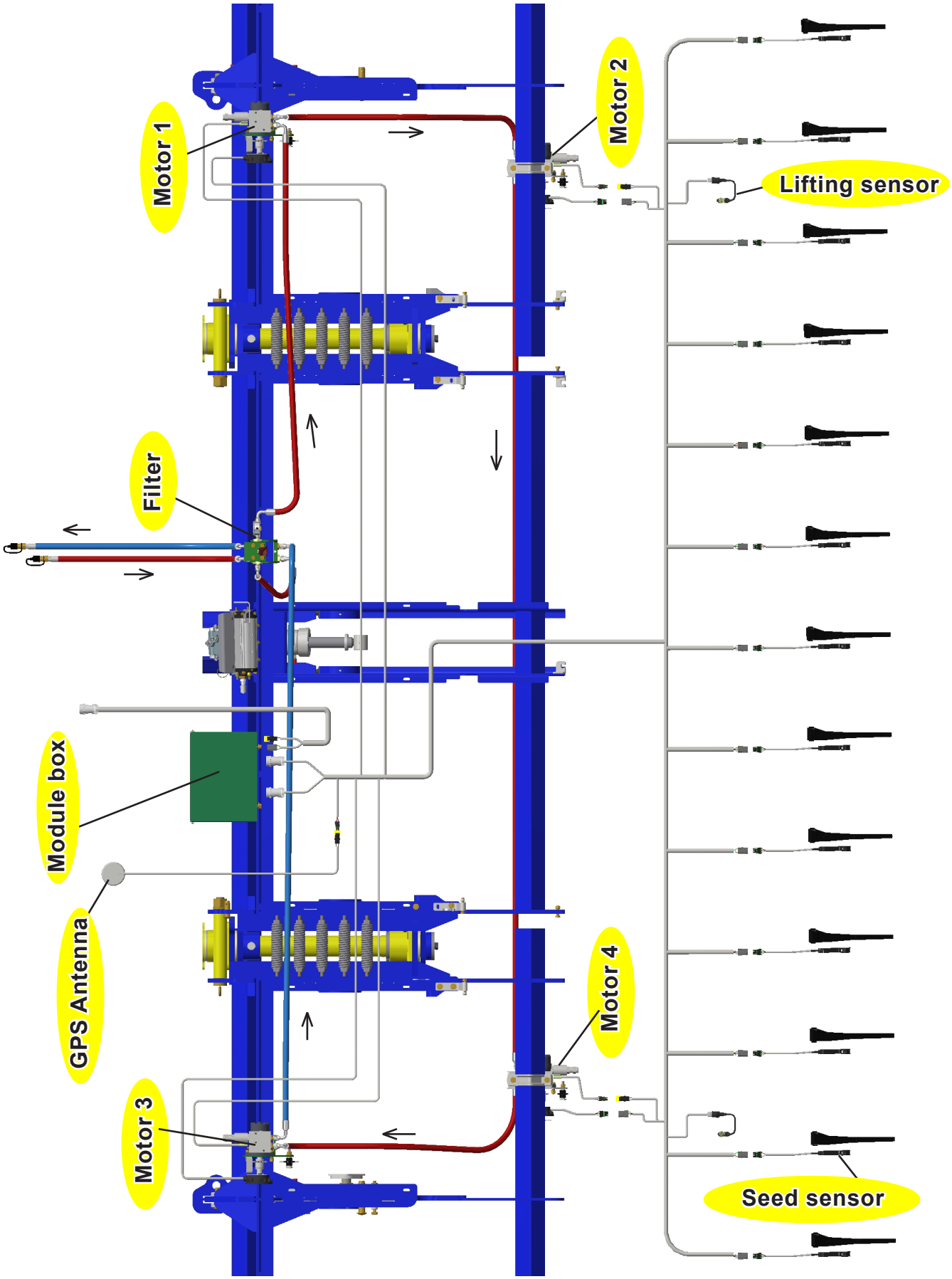
• Field tests and the subsequent adjustment fixes;

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

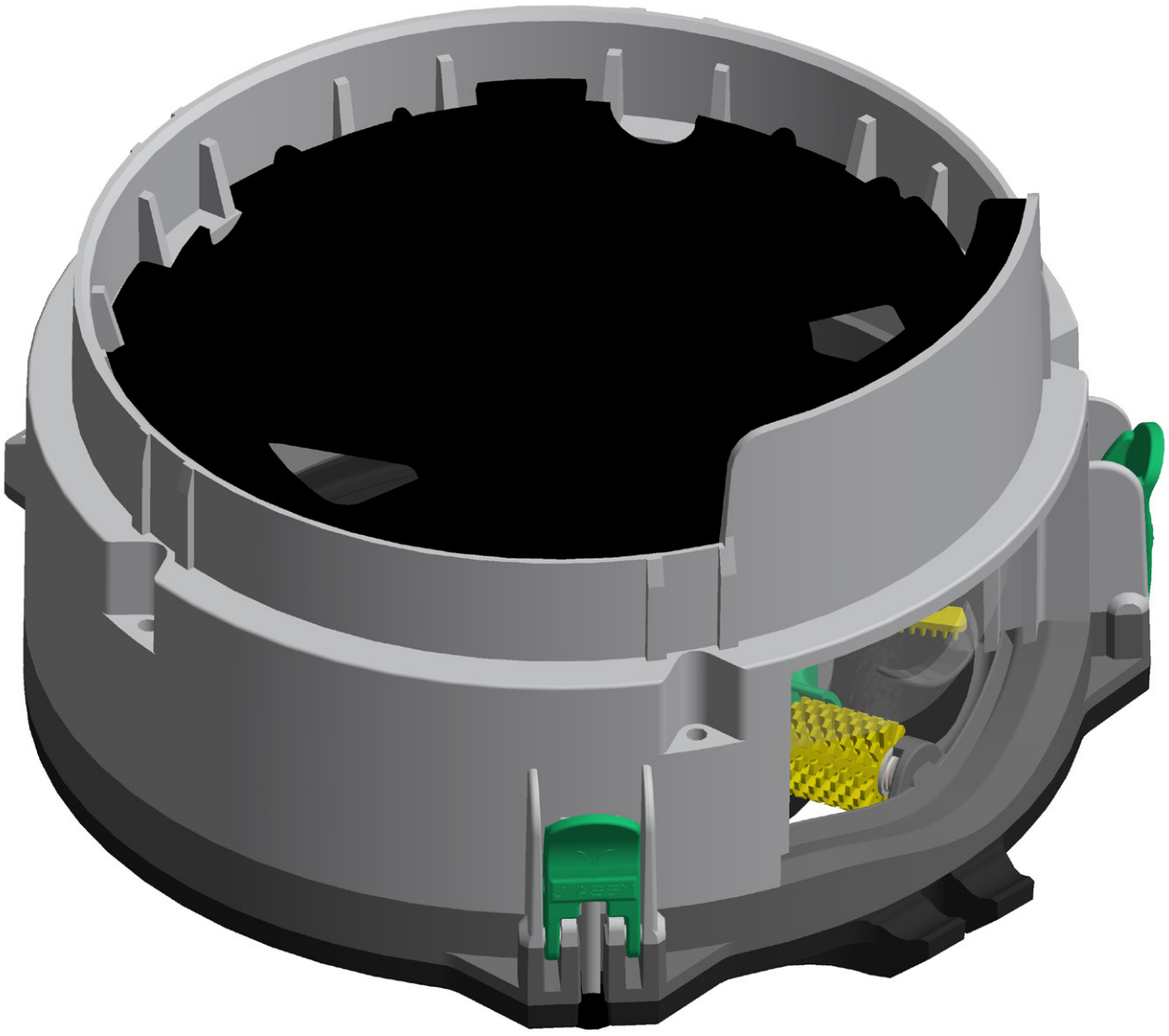
Easy maintenance:

• 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



Titanium Apollo

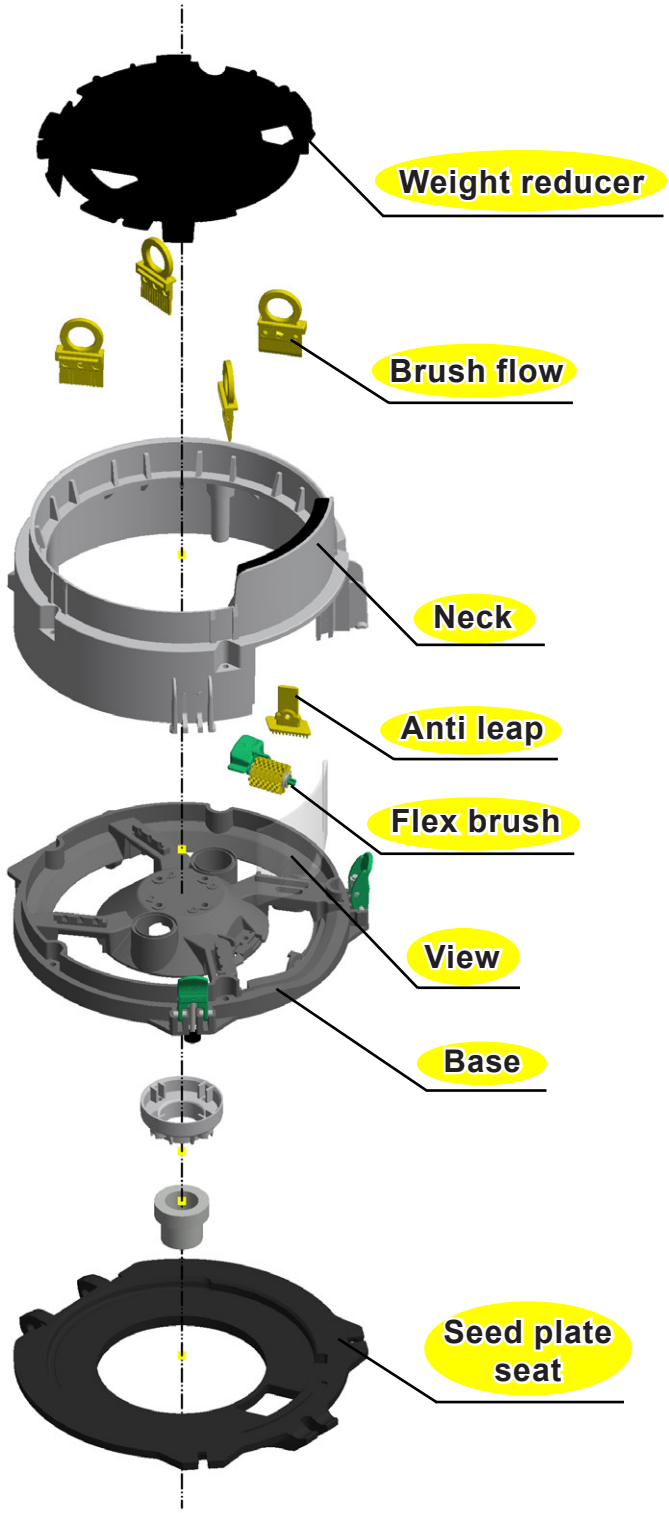


Seed dosing system for mechanical machines

• **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



Standard seed plates - TITANIUM

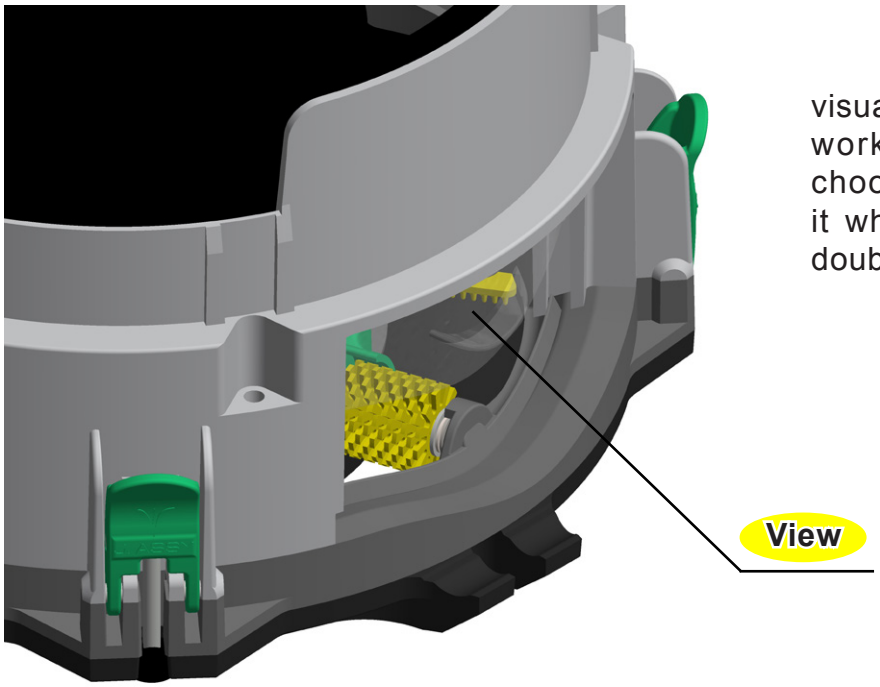
Seed plates	Amount of holes	Serial number
CORN	28 holes	05.03.01.6204
SOYBEAN	90 holes	05.03.01.6217
SOYBEAN	90 holes	05.03.01.6218

Optional seed plates - TITANIUM

MARCHESAN optionally supplied seed plates for several cultivations, according to the list below:

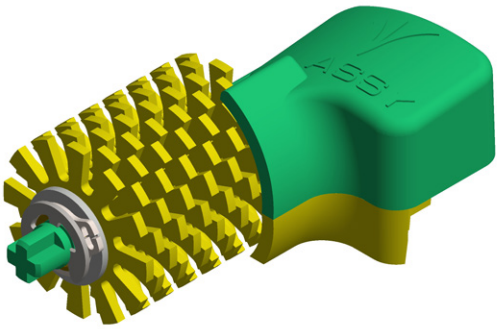
Seed plates	Amount of holes	Serial number
CORN	27 holes	05.03.01.8481
CORN	27 holes	05.03.01.8482
BEAN (MEDIUM)	70 holes	05.03.01.8468
SOYBEAN	80 holes	05.03.01.8483
BEET / ONION	32 holes	05.03.01.8496
SORGHUM	32 holes	05.03.01.8159
PEANUT	32 holes	05.03.01.8497
CANOLA	80 holes	05.03.01.8498

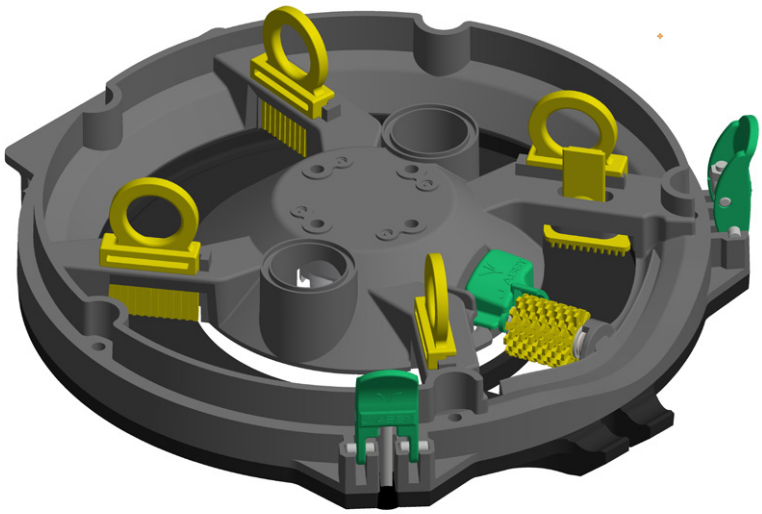
Main technologies



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 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.





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.

Graphite powder use

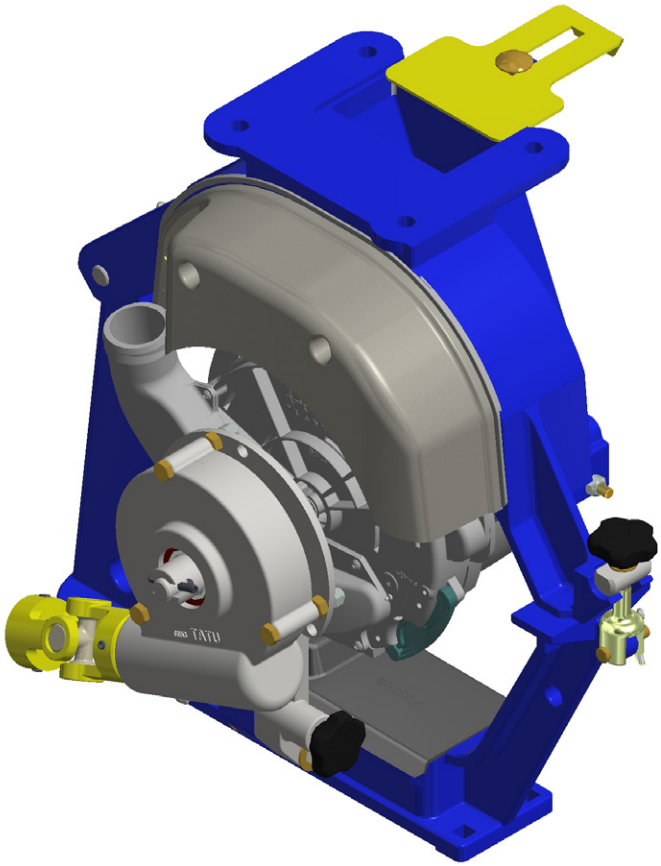
It is very important to use graphite on TITANIUM. The average use of graphite per seed hopper is 200 - 240 grams, depending on the seed type or the treatment that was applied on them.

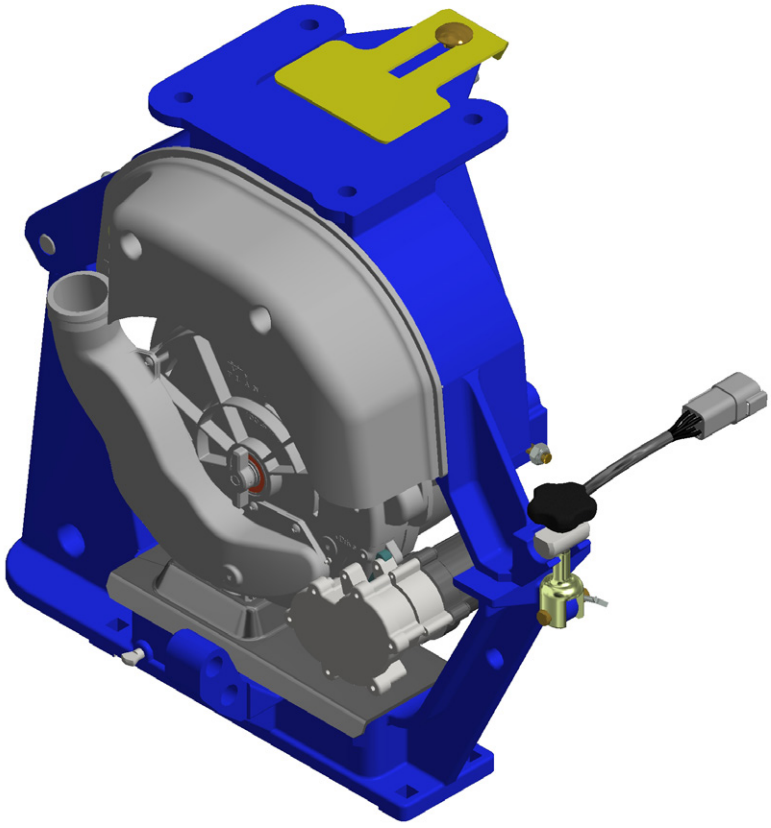
The graphite must be mixed to the seeds uniformly during plantation and always on the dry seeds.

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.





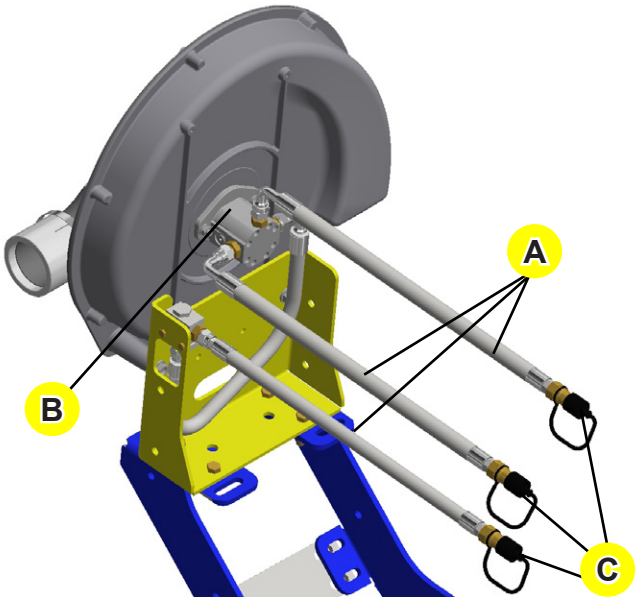
Precision Planting vacuum seed meter / Precision Planting with Vdrive

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.

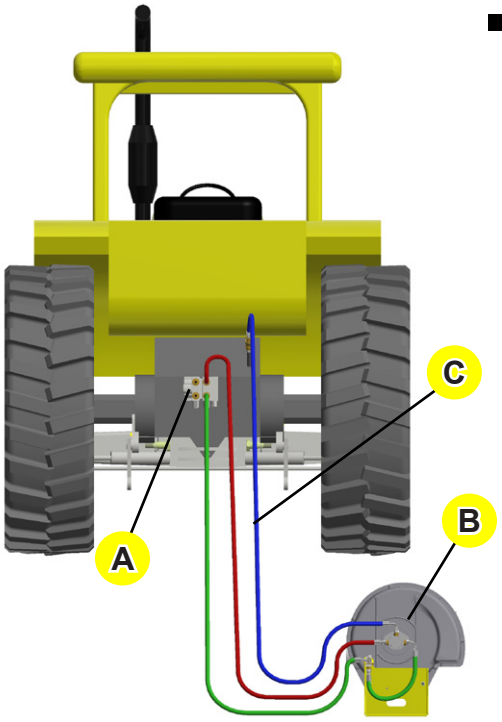
NOTE **Use thread sealing tape to couple the hoses to the male quick couplers.**



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.**

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

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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.	

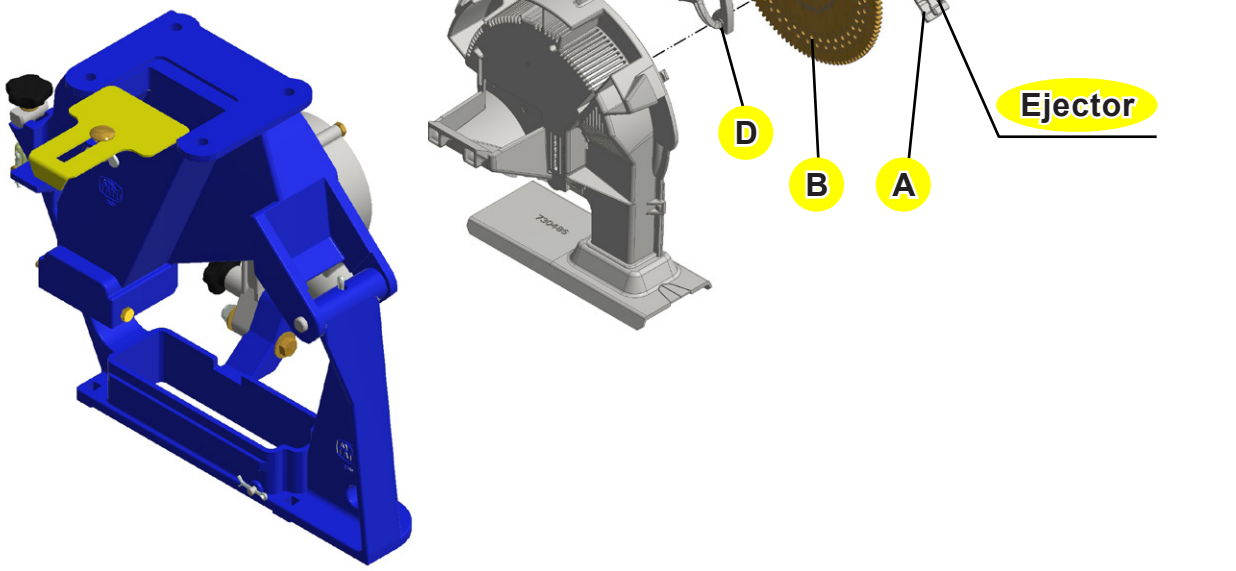
Changing the metering set

The metering set is composed by a seed plate, selector and ejector.

To change or fix the metering set, proceed as follows:

Place the ejector set (A) in the carcass; then place the seed plate (B) and lock using the pin (C). Lastly, place the selector (D).

To remove the parts, do the reverse operation.

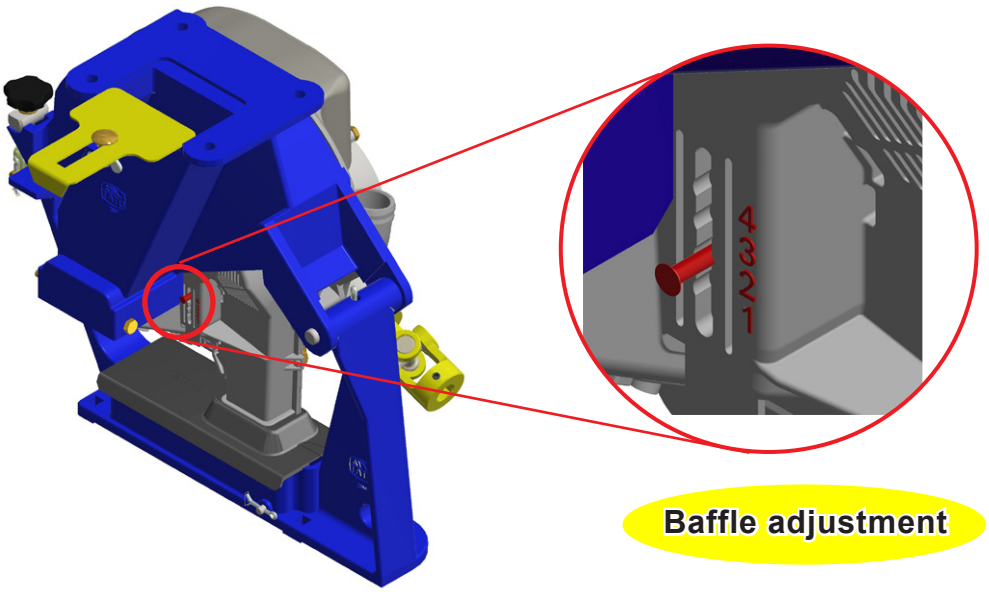


NOTE **Special attention should be given when placing the seed plate. Be sure to not curl or smash the seal. If there is any damage such as cracks or mends in the seal, replace it immediately.**

Baffle 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 tables from the previous pages.



vDrive components maintenance

• When finishing and restarting the planting season, clean the harness connection that were exposed to the environment.

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

• When disconnecting a connection during the planting season for maintenance or disassemble purposes, the exposed connectors must be protected from the environment.

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 baffle completely to prevent bridging of large seeds.**
- **In some planting situations the owner should only replace the singulator, ejector or seed plate.**

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.

Maintain the command lever constantly activated in a way that it keeps sending oil without interruptions during the whole plantation.

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

Vacuum meter suction verification

The values between 40 and 90 millibars of vacuum are adequate for most light, medium and heavy seeds.

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

Vacuum meter detail

Attention: Safety hazard or damages to the equipment

- **PTO rotation should be kept in 540 rpm during the whole job.**
- **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 its 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.

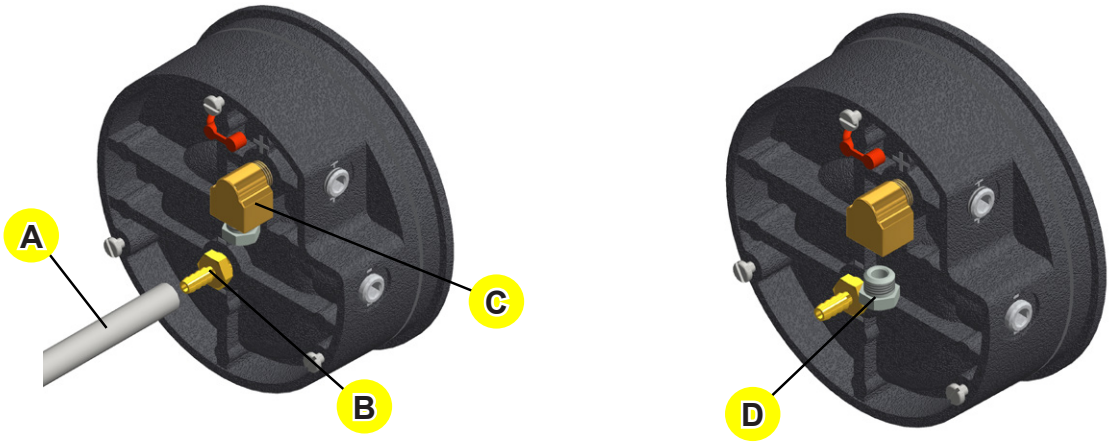
All vacuum meters are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy.

Vacuum meter assembly

Couple the hose (A) from the turbine to the negative pressure spigot (B) on the rear part.

Place the filter (C) on the positive 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.



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.

Vacuum meter recommendations

• It is not necessary to lubricate the vacuum meter;

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

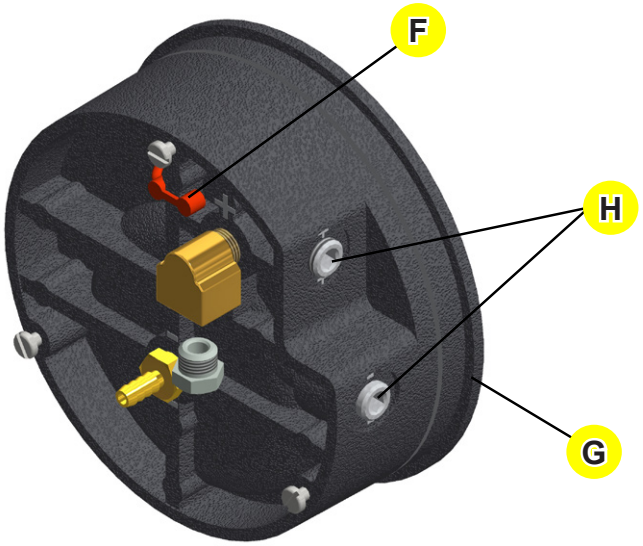
• To equalize the inner and outer pressure it is necessary to use the filter on the rear part of the meter and keep it facing down, so water will not enter inside the equipment;

• 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);

• There is a device that works as a relief valve (F) on the rear part of the meter. This device opens at approximately 25 psig. It is necessary to close it again to protect the inner part of the equipment.



Troubleshooting tips

Vacuum meter 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);

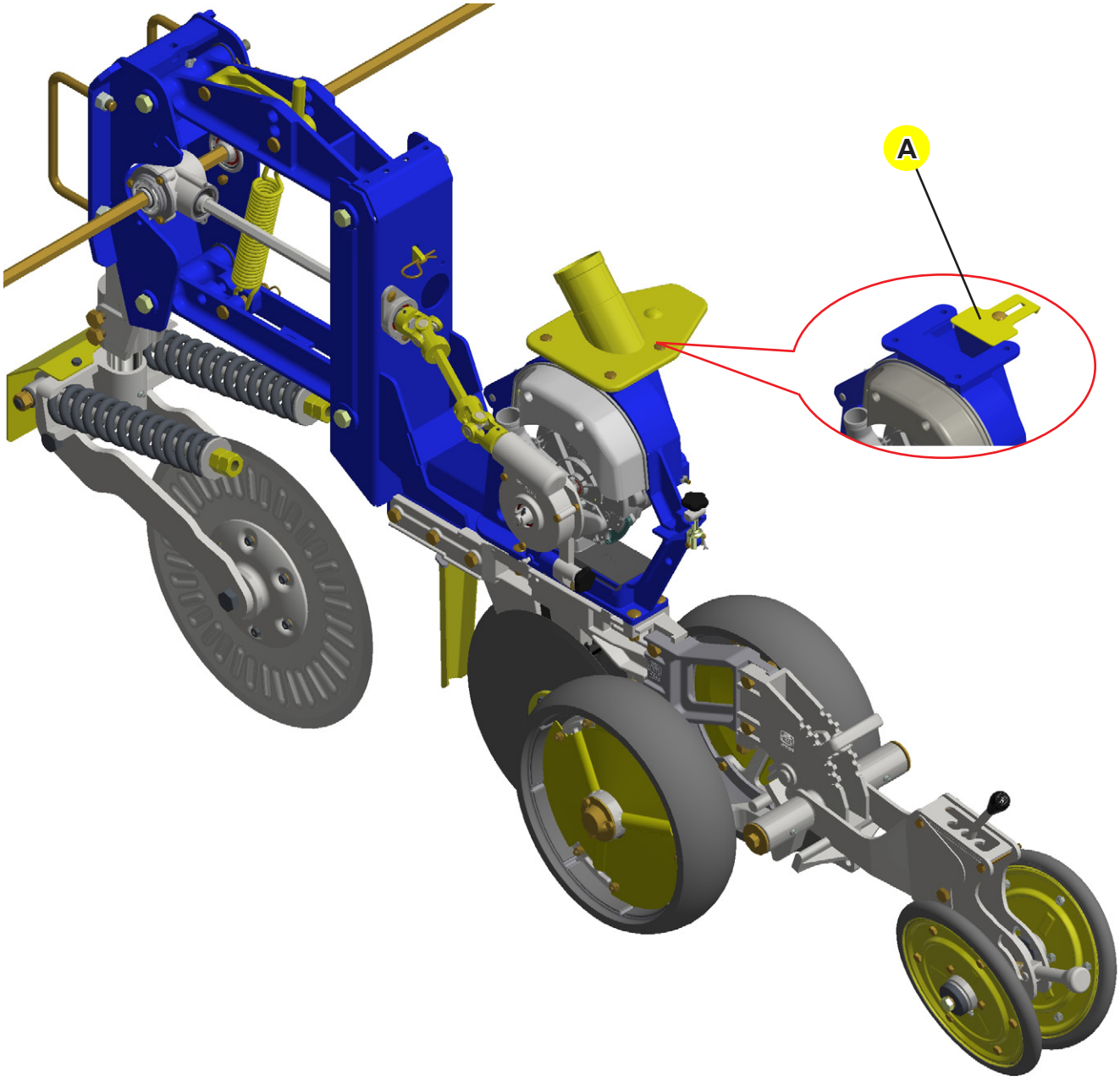
• Pressure sensor improperly located;

• 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.**

Stopping the seed flow

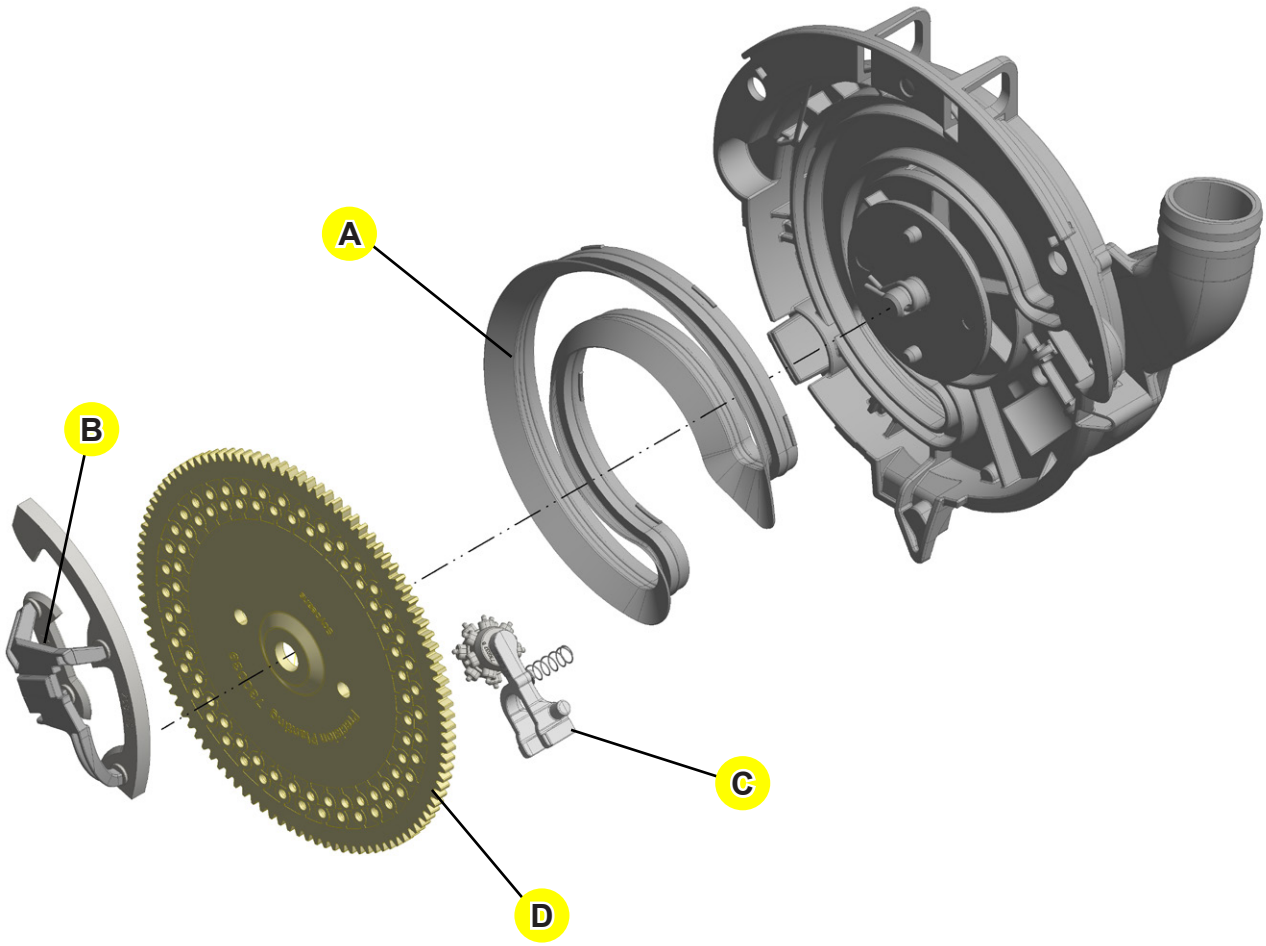
To change the seed plates or for any internal inspection in the metering, use the interrupters (A) and release the butterfly nut to isolate the amount of seeds in the hoppers.



NOTE **After the inspection, tight the butterfly nut properly so it will not get loose during operation.**

Pneumatic sealing

The pneumatic sealing (A) is a device that assures the vacuum directioning, where the suction only acts in the seed hoppers with no vacuum in the area of release. The seeds are released in the center of the conductor.



Seed metering maintenance - Precision Planting

During the planting recess, disassemble every seed metering and check the following points:

• Wearing of the seed selectors (B) and ejector (C).

• Pneumatic sealing (A) - check if there is no crack or wearing.

• Seed plates (D) - replace them if the holes get deformed or if the seeds are going to the vacuum side.

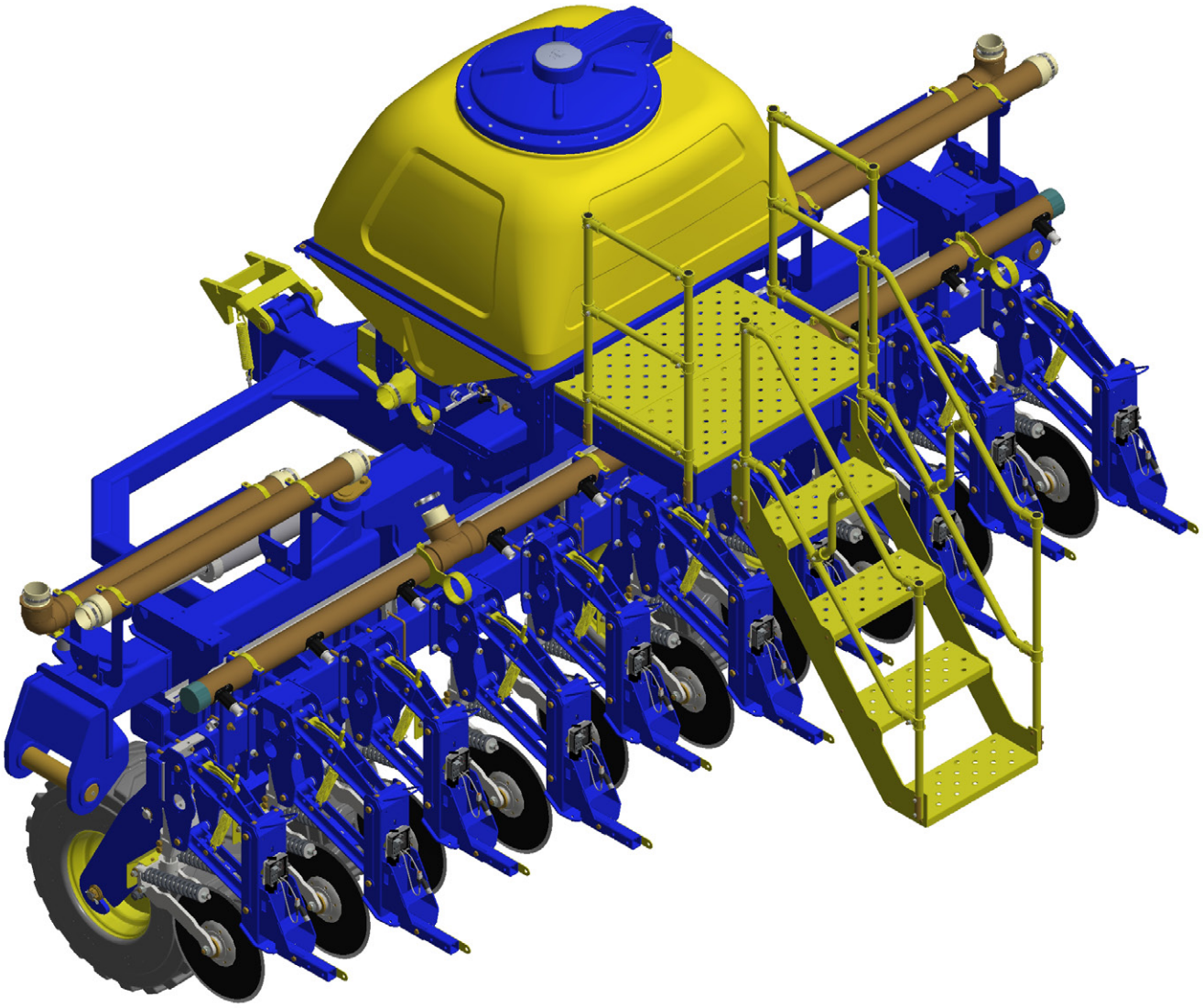
Then, use compressed air to clean every metering system.

In disuse period disassemble every metering system, remove all components of the metering set and store in a clean place.

NOTE

• Spray powder graphite in the pneumatic sealing (A).

• Never use sharp turns or metallic objects to scrape the seed plates.



USAP Suprema with central seed hopper

Air duct assembly on the central seed hopper

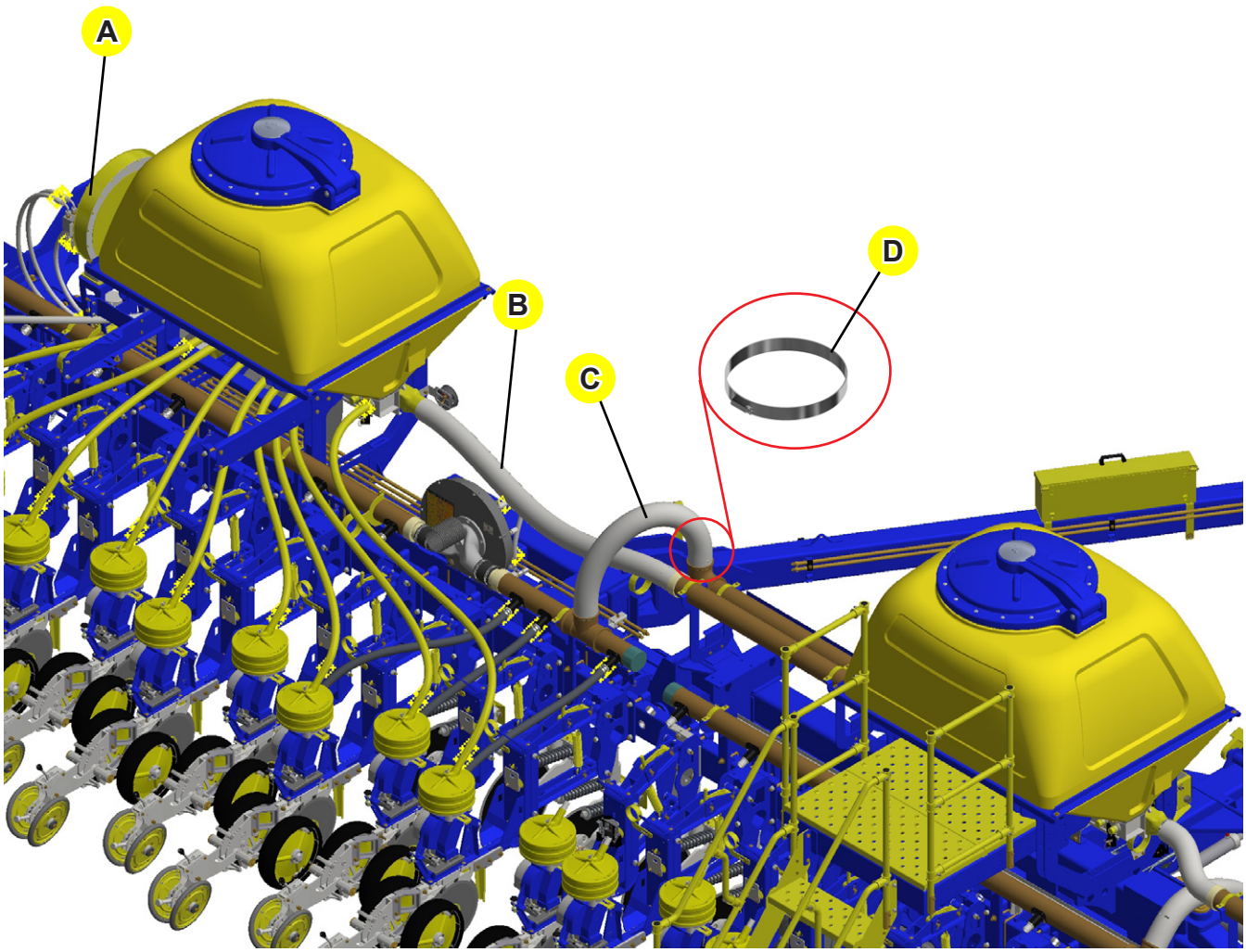
The USAP SUPREMA planter has a version with a central seed hopper that is pre-assembled on the frame.

For a better performance on the plantation, the hoppers were distributed on the frames to assure a proper weight distribution.

This seed hopper also has a suction/pressure system, which allows the suction or pressurization of the row units with the aid of the turbines (A).

The air hoses (B) on the seed hopper and air hoses (C) of the seed meterings are coupled to the air ducts using clamps (D) after joining the lateral frames.

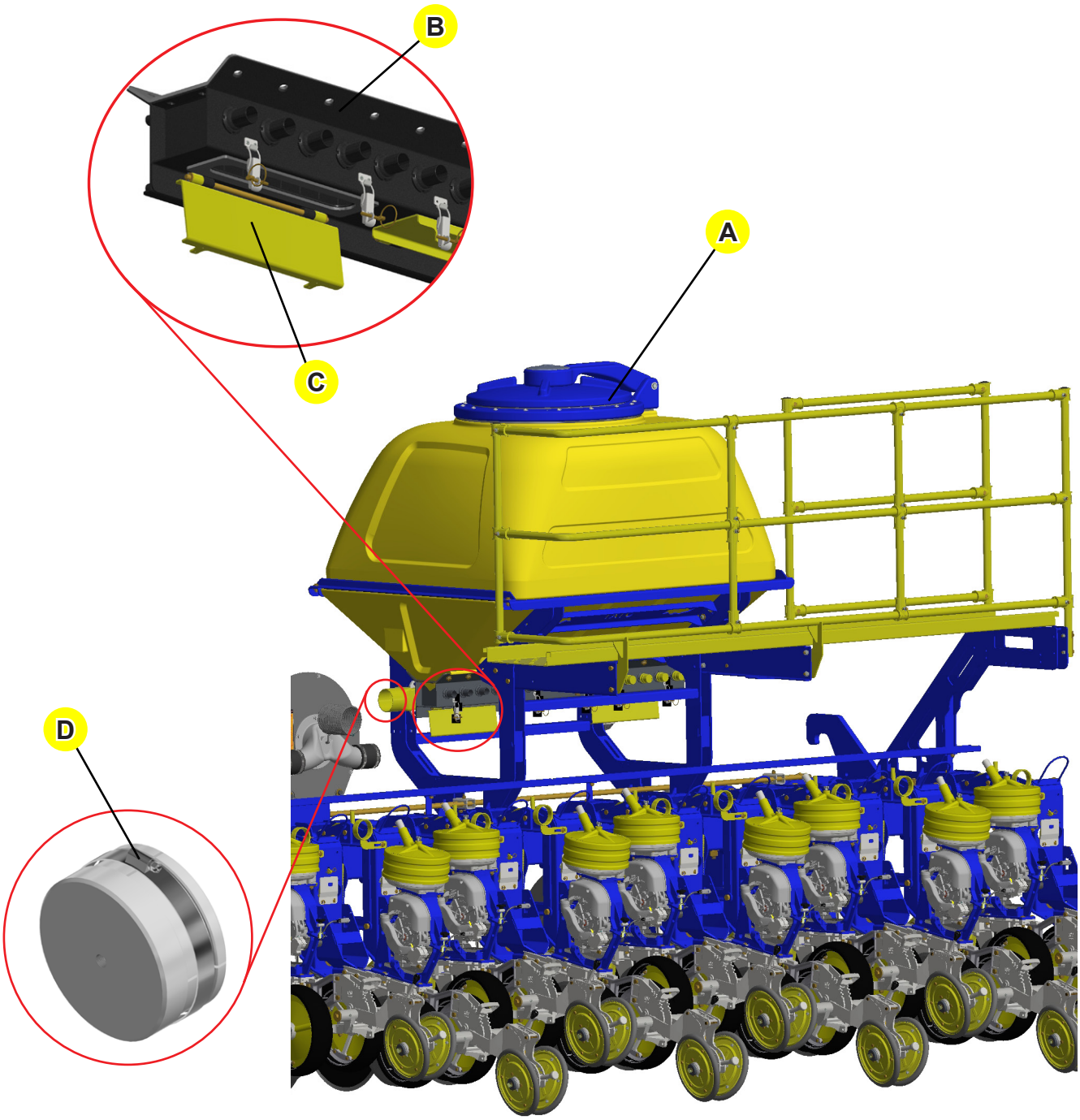
The other hoses (where the seeds go through and the air distribution ones) are pre-assembled on the factory.



Cleaning the central seed hopper

After using the equipment it is necessary to clean the central seed hoppers (A) by releasing the quick locking (B) and opening the bottom covers (C), thus having a free space to clean the hopper.

The cover (D) is used to couple the vacuum meter of the central seed hopper (A) and also to clean the hopper where it must be removed every two or three days for cleaning up.



NOTE **The cover (D) can be coupled to a vacuum meter for the verification of air entering inside the hopper (A).**

The ideal working pressure must be between 20 to 60 millibars, depending on the type of seed to be planted.

Planter maintenance

• Wash the whole planter using only water.

• 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.

• Clean and lubricate all grease fittings.

• Replace the missing or damaged safety stickers. Marchesan provide these stickers upon request and indication of the respective serial number. The operator must know the need to keep these stickers in place and in good conditions. Also, the operator must be aware that an accident can occur if the instructions are not followed.

• 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 them and position them on the same place from where they were removed.

• 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.

Troubleshooting

PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Seed failures	- Low suction.	- Ideal PTO rotation speed; - Check the air hoses.
	- Improper selectors adjustment.	- Adjust the selectors properly.
	- Very small diameter of the seed plate holes.	- Use a seed plate with suitable holes to the seeds.
	- Excessive working speed.	- Ideal working speed: 5 to 7 km/h.
	- Odd material.	- Use seeds with pre-cleaning at least.
	- Lack of seeds in the metering.	- Check the deflector plate opening; - Interrupters are closed or semi-closed.
	- Worn-out selectors.	- Replace the selectors.
	- Dirty selectors.	- Clean with water, detergent and steel wool.
	- Obstructed holes.	- Clean with compressed air.
Duplicate seeds	- Improper selectors adjustment.	- Adjust the selectors properly.
	- Very big diameter of the seed plate holes.	- Use a seed plate with suitable holes to the seeds.
	- High seed level in the metering.	- Adjust the deflector plate.
Seeds over the ground	- Seed excess in the metering/ too high level.	- Check the opening of the deflector plate/ adequate to the seed size.
Irregular plantation	- Totally disajusted seed plate.	- Adjust the hole diameter according to the seed.
	- Disajusted selectors.	- Adjust the selectors properly.
	- Low suction.	- Check the PTO rotation speed; - Check the oil flow rate; - Check the hoses.
	- Worn-out tires.	- Replace for original ones.
	- Tires with different inflation.	- Inflate properly.
	- Tires with different design.	- Use tires with the same design.
	- Seed density not observed.	- Check the drive and driven shaft on both sides.
	- Skidding excess.	- Ballast the tires with water and apply pressure in the wheelset springs.
Damaged seeds	- Very big seed plate holes.	- Use a seed plate with an appropriate hole in accordance to the seed.
	- Worn-out rubber switch.	- Replace it.
Interruptions in the fertilizer metering	- Odd material in the fertilizer or cobbled fertilizer.	- Check the fertilizer quality.
	- Deformed fertilizer tube.	- Replace the tube.

Troubleshooting

PROBLEM	CAUSES	POSSIBLE SOLUTIONS
Metering for the seed	• Row unit without seed.	• Check the clutch; • Verify the vacuum.
	• Damaged safety pin.	• Replace it.
	• Obstruction by seeds.	• Set the deflector to a higher position.
	• Seed milling.	• Check the seed plate chock.
	• Very small hole diameter.	• Use a seed plate with appropriate holes related to the seeds size.
	• Obstructed holes.	• Clean them using compressed air.
	• Locked metering.	• Check the distributor to find the locking cause.
	• Excessive working speed.	• Ideal speed: 5 to 7 Km/h.
Too many skips	• Fragments on the distributor.	• Be sure that there is no fragments on the seed plate holes.
	• Failure on the singulator.	• Check if it is installed properly and if the rebounds are leveled against the seed plate surface.
	• Debris on the distributor.	• Check the outlet chute and the outlet of the seed tube.
	• Lack of pressure on the vacuum meter.	• Check if there is any leaking on the vacuum system.
Bad spacing	• Seeds deviation.	• Check the metering outlet chute and the outlet of the seed tube.
	• Distributors activation failure.	• Check the system to confirm if the chains are in good conditions and well lubricated.
	• Metering with noises.	• Remove the disc blade and look for debris that may be causing the noises.
	• Seed fragments between the seed plate teeth.	• Clean up and add chocks.
	• Seed in contact with the seed tube and with the outlet chute.	• Be sure that the seed reservoir is positioned in a way that the metering release the seeds on the center of the seed tube.
	• Lack of graphite.	• Be sure that the graphite is being used and being mixed to the seed hoppers.
Wrong population	• Hydraulic motors.	• Check the calibration and settings of the motor twice. • Check if the seeds per distributor rotation setting is correct.

Tires inflation

The tires must always be properly inflated, so there will not be a premature wear for excess/lack of pressure and thus assuring precision on the distribution.

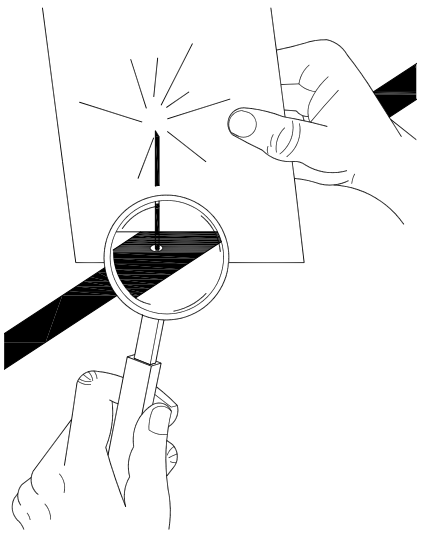
TIRE - 12 X 16.50 / 12 tarps TR SK 900 **(65 PSI).**

TIRE - 14 X 17.5/14 TR SK 900 **(55 PSI).**

TIRE - 385/65 R 22.50 D 711 DRC 15-19.50 20 tarps **(130 PSI).**

Maintenance precautions

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



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

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

NOTE **Use TATU original parts only.**

Torque table

TORQUE VALUES CHART						
Bolt Diameter	Grade 2		Grade 5		Grade 8	
	Coarse	Fine	Coarse	Fine	Coarse	Fine
1/4”	50 In. Lbs.	56 In. Lbs.	76 In. Lbs.	87 In. Lbs.	9 Ft. Lbs.	10 Ft. Lbs.
5/16”	8 Ft. Lbs.	9 Ft. Lbs.	13 Ft. Lbs.	14 Ft. Lbs.	18 Ft. Lbs.	20 Ft. Lbs.
3/8”	15 Ft. Lbs.	17 Ft. Lbs.	23 Ft. Lbs.	26 Ft. Lbs.	33 Ft. Lbs.	37 Ft. Lbs.
7/16”	25 Ft. Lbs.	27 Ft. Lbs.	37 Ft. Lbs.	41 Ft. Lbs.	52 Ft. Lbs.	58 Ft. Lbs.
1/2”	35 Ft. Lbs.	40 Ft. Lbs.	57 Ft. Lbs.	64 Ft. Lbs.	80 Ft. Lbs.	90 Ft. Lbs.
9/16”	50 Ft. Lbs.	60 Ft. Lbs.	80 Ft. Lbs.	90 Ft. Lbs.	115 Ft. Lbs.	130 Ft. Lbs.
5/8”	70 Ft. Lbs.	80 Ft. Lbs.	110 Ft. Lbs.	125 Ft. Lbs.	160 Ft. Lbs.	180 Ft. Lbs.
3/4”	130 Ft. Lbs.	145 Ft. Lbs.	200 Ft. Lbs.	220 Ft. Lbs.	280 Ft. Lbs.	315 Ft. Lbs.
7/8”	125 Ft. Lbs.	140 Ft. Lbs.	320 Ft. Lbs.	350 Ft. Lbs.	450 Ft. Lbs.	500 Ft. Lbs.
1”	190 Ft. Lbs.	205 Ft. Lbs.	480 Ft. Lbs.	530 Ft. Lbs.	675 Ft. Lbs.	750 Ft. Lbs.
1.1/8”	265 Ft. Lbs.	300 Ft. Lbs.	600 Ft. Lbs.	670 Ft. Lbs.	960 Ft. Lbs.	1075 Ft. Lbs.
1.1/4”	375 Ft. Lbs.	415 Ft. Lbs.	840 Ft. Lbs.	930 Ft. Lbs.	1360 Ft. Lbs.	1500 Ft. Lbs.
1.3/8”	490 Ft. Lbs.	560 Ft. Lbs.	1100 Ft. Lbs.	1250 Ft. Lbs.	1780 Ft. Lbs.	2030 Ft. Lbs.
1.1/2”	650 Ft. Lbs.	730 Ft. Lbs.	1450 Ft. Lbs.	1650 Ft. Lbs.	2307 Ft. Lbs.	2670 Ft. Lbs.

GRADE 2
No Marks.

GRADE 3
3 Marks.

GRADE 8
6 Marks.

NOTE **For metric conversion:**

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

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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Notes