

SERVICE MANUAL

PS2030 Seeder

Part number 47918064
English
January 2015



Product: New Holland PS2030 Seeder Service Repair Manual
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SERVICE MANUAL

PS2030 Standard

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INTRODUCTION

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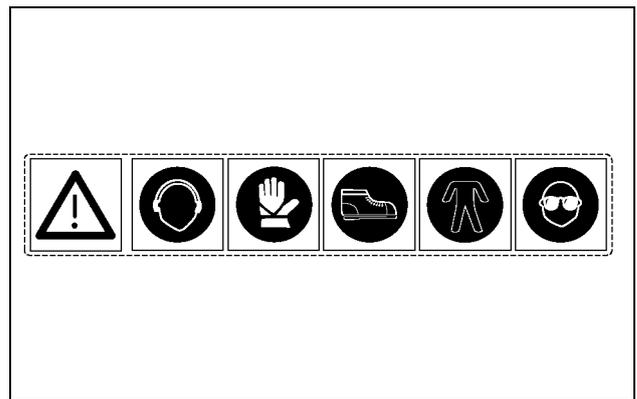
Safety rules

PERSONAL PROTECTIVE EQUIPMENT (PPE) RECOMMENDED

1. Ear protector.
2. Gloves.
3. Boots (with steel toe).
4. Overalls.
5. Glasses.



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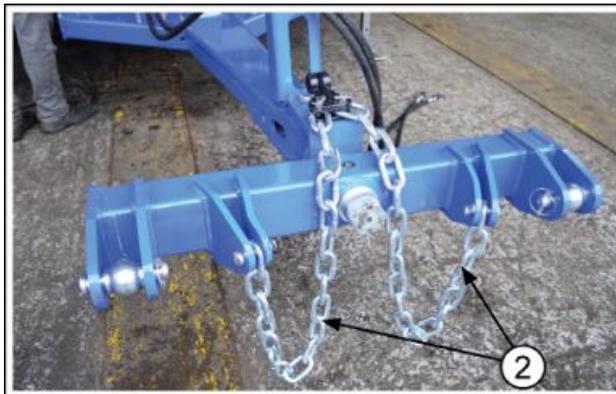
SAFETY FEATURES FOUND IN THE MACHINE

1. Support stands: provide safe support of the front part of the machine when performing maintenance and adjustments.



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2. Safety chains: avoid lack of control over machine in case of accidental disengagement between the drawbar of the Seeder and the drawbar of the tractor. Also, they limit the descent of the lift arms and the drawbar.

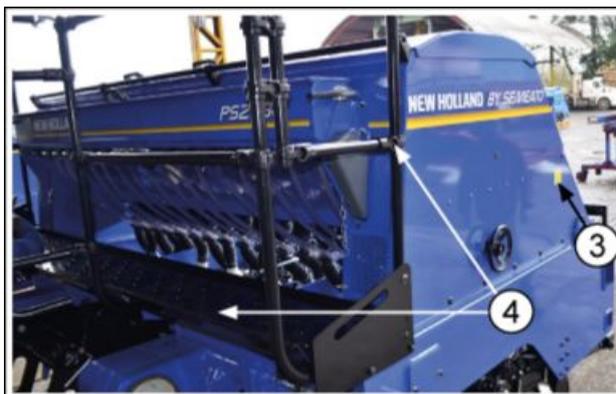


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3. Decals: there are decals with warnings about the major safety risks and others, with technical instructions such as metering tables.
4. Platforms (footrests) and protections: they should not be used during machine operation; only for filling and maintenance.
5. Row lift cylinder locks: provide safety against the lowering of the planting rows when transporting the machine and performing maintenance. When you start planting, disconnect these locks.



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WARNING NOTES USED IN THIS MANUAL

NOTE: This word indicates special technical instructions that, if not observed, can cause malfunction and eventually, damage to the machine.

ATTENTION: This word indicates special technical instructions that, if not observed, can cause malfunction, damage to the machine and even risk of injury.

ATTENTION: This word indicates special technical instructions that, if not observed, can cause damage to the machine and imminent risk of injury, and even death.

Displacement or transportation of the machine

In cases where the machine needs to be moved to another location to perform maintenance observe rules such as:

- Prefer the use of trucks to transport the machine, especially when it comes to public roads.

For transporting the machine towing it with the tractor:

- Seek information about what is allowed and the order recommended by the local traffic authorities.

- For operations performed by default of the current regulations, the consequences must be borne by the operator.

When displacement with the tractor is allowed:

- Use alerting devices, such as flags, slow vehicle emblems, lights, etc., approved by the current local traffic laws. Keep these devices clean and in good condition.
- Practice speeds compatible with the road conditions and traffic, but never exceeding 12.5 MPH (20 km/h). Reduce the speed considerably when the surface is uneven.

NOTE: Do not transport the machine loaded: supply the seed at the planting site.

- Use the brake pedals of the tractor for a smooth braking.
- Be careful with the power grid, trees, crossing points of restricted width and other obstacles.
- Never allow people on the machine while moving it.

For maintenance services performed with the Seeder coupled onto the tractor.

For many maintenance tasks, especially those performed in the field, it is convenient to leave the Seeder coupled to the tractor to ensure the firmness and stability of the machine. In addition:

- Remove the ignition key.
- Engage the first gear and actuate the parking brake.
- Put a sign next to the tractor panel:

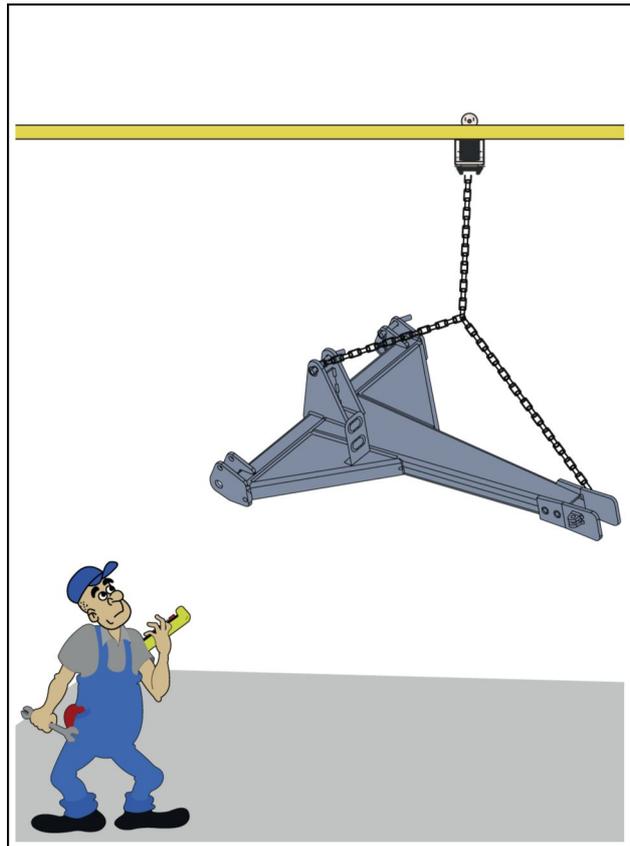
**UNDER MAINTENANCE
DO NOT OPERATE**



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When removing, reinstalling or moving heavy assemblies

- Always use appropriate devices to attach and lift whole and/or heavy assemblies.
- Never stand under suspended loads. As safe as the lifting equipment may be, it is not worth running the risk!
- Check that the devices used have the necessary capacity and that they are in perfect storage and operating conditions.



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Safety recommendations to follow when performing maintenance on the Seeder

NOTE: The following recommendations are specific to the maintenance work of the Seeder, in the workshop or in the field.

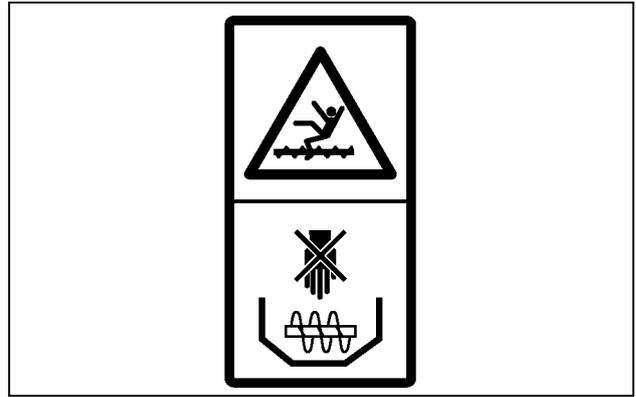
For safety information related to the operation, handling of chemical fertilizers and others, see the operator's manual.

- Keep the machine properly supported: Always lower both support stands and install the locking latches in the lift cylinders, See the item "Safety features found in the machine", and Do not support the machine on improvised objects which can collapse under the load. also Do not work on the machine supported only by a hydraulic jack.
- If equipped with row markers, do not forget to lower them. If it was necessary to leave them raised, ensure a complete locking.
- Especially, when handling parts that have a cutting edge, such as the lagged and coulter disks, use appropriate gloves.



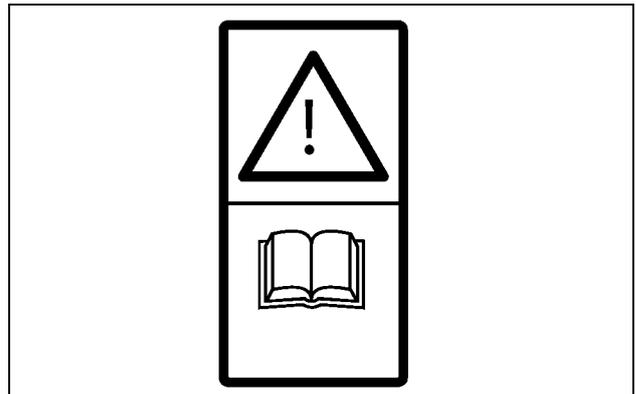
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- With the engine running: Do not touch or enter the seed or fertilizer box and not perform any repairs or adjustments, and also Do not access the supply platform.
- Do not wear loose clothing, blankets or loose hair (if long), jewellery such as rings, bracelets and necklaces: moving parts could wind, pull and tear such items, with a risk of serious injury!



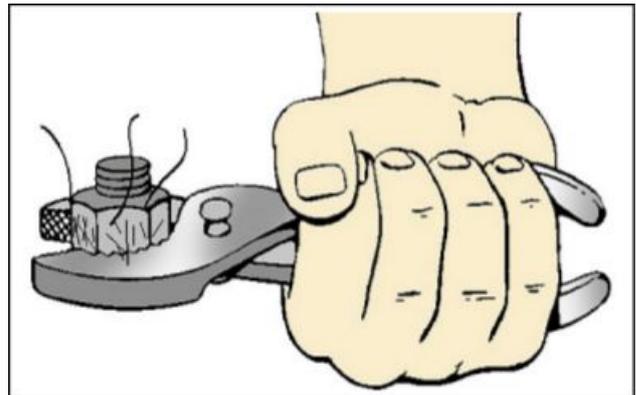
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- Understand the procedure before performing work. Refer to this manual when necessary.
- Prolonged exposure to loud noise can cause hearing damage. Use ear protectors such as: noise dampers and plugs.
- Operating the equipment safely requires your full attention. Avoid using headphones while operating the machine.
- Use original parts only. Similar parts, apart from compromising the functioning of the machine, also pose safety hazards.



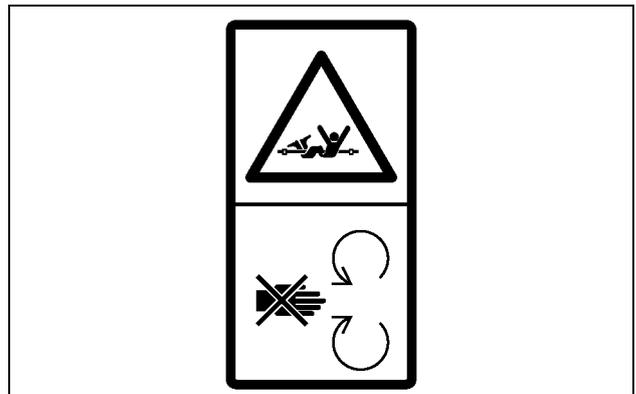
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- Use appropriate tools and equipment, do not accept improvisations and refer to this manual whenever necessary. Improvisations constitute a potential safety risk. Special precautions should be taken when using electrical tools. To loosen and tighten bolts, use the correct type, size and pattern (millimetric) of tools.



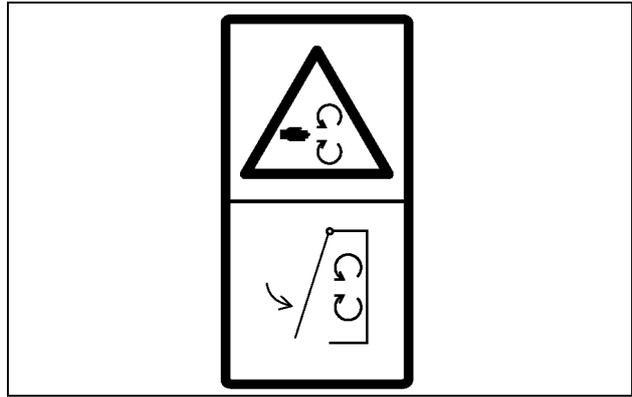
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- Work in dry, clean and ventilated areas.
- Whenever possible and if necessary, clean the machine before performing maintenance: the operation becomes safer, with better quality. Remove accumulations of grease, oil and debris, which apart from hindering work, they represent potential sources of fire outbreaks.
- Remove all tools and unused parts before starting maintenance. In the same way, analyze the work to be performed and remove parts or protections to allow easier access, making this work safer, more productive and with quality.
- Do not perform repairs in areas with transmission (chains and gears) when the machine is running; risk of mutilation!



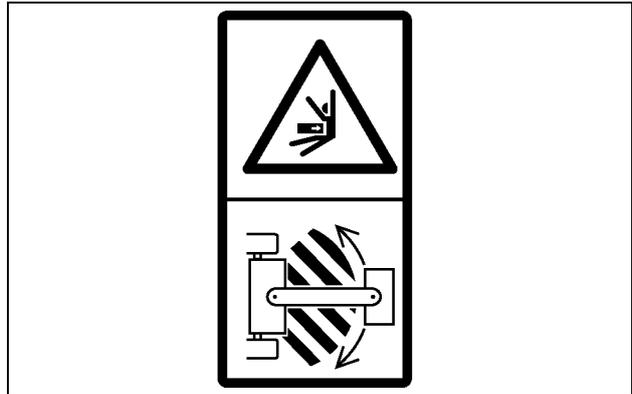
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- Close all safety devices before starting the machine. This will prevent other materials from getting tangled on gears, chains, shafts and other moving parts of the system.



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- Keep away from the articulated parts of the machine, such as row markers.
- Do not walk on the ladders or platform of the machine when the tractor is running.



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Tire calibration:

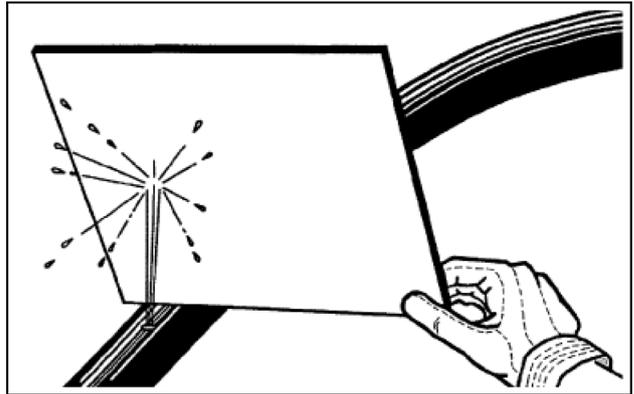
- Never exceed the recommended pressure to seat the edges of the tire on the rim.
- Replace the tire if it presents any defects. Replace the rim if you observe any sign of cracks, wear, deformation or severe corrosion.
- Make sure all the air was removed prior to removing the tire from the rim.
- Make sure the tire is properly seated on the rim during its filling.
- Tire replacement can be dangerous and must be performed by trained personnel with proper tools and equipment.
- Never stand in front or on top during the mounting of a tire.
- When removing and installing wheels, use suitable handling equipment for the weight involved. If available, use a safety cage to perform this type of operation.



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Care taken with hydraulic systems and fluids under pressure in general

- Fluids escaping under pressure can penetrate the skin, causing injury and serious poisoning; fluids injected into the skin must be surgically removed as soon as possible, as they may cause gangrene.
- To check for leaks, use a piece of paper or cardboard, not body parts.
- If an accident occurs, see a doctor immediately.
- Wear protective gloves and goggles when working with hydraulic systems.



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Avoid fires

- Keep a fire extinguisher and a first aid kit always at hand also Keep emergency numbers for doctor, ambulance, hospital and firefighter near the phone.
- Never allow open flame or welding near fluids, flammable gases, paints, solvents and other!
- Do not smoke at the work place. There is always the risk of fire due to the wide range of flammable products.
- When welding, remove any flammable products from near the area to be welded, such as fuels, solvents or lubricants.



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Chemicals and the Environment

- Being exposed to or come into contact with chemical pesticides, coolant, lubricants, paints, decals and others, can be harmful to your health.
- Protect yourself from the waste or gases of chemical products derived from the treatment of seeds.

ATTENTION: See a doctor immediately if you notice symptoms of poisoning such as headaches, sweating, nausea, vomiting, abdominal cramps, weakness, profuse salivation, chest tightness, blurred vision and nonreactive pupils. Take the container or, at least, the label of the suspected chemical product. Manufacturers of these products provide a phone number for contact at any time if in doubt.

- Before disposing of used fluids and lubricants, always remember the environment: Do not pour or spill these products on the ground or water, or place them in containers that could cause leaks.
- Dispose of oils, solvents, paints and other products adequately, as established in the existing environmental legislation. Many of these products may offer recycling alternatives.



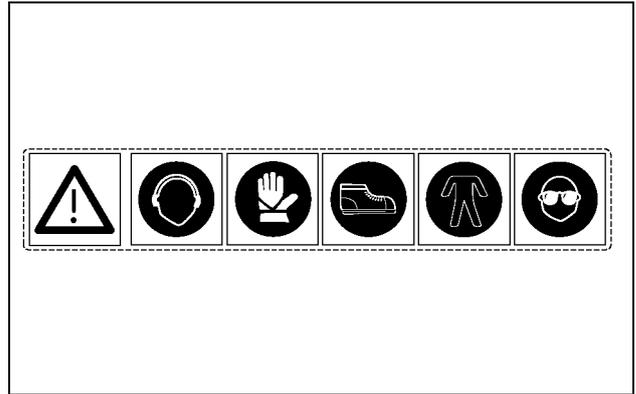
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Conditions of the workplace

- At the workshop: separate and organize used and discarded parts; at the first opportunity, take them to collection points for recycling, All materials, including tires, currently have recycling alternatives.
- Do not allow the floor of the workshop to get drenched with oil; this is cause for slipping and falling, apart from compromising the appearance of the workshop. Remember: organization is the mirror of quality for the professional who works there.
- Provide the necessary illumination in the work area. If necessary, use a portable safety light for working in places hard to reach and/or with lack of good light. Regarding the portable lamp, be aware of the insulating conditions of both the electric power cable and the lamp itself: the heat of the lamp, cables not properly insulated or of poor quality and an accidentally broken bulb are factors that may cause burns or a fire.

Welding work

- Use the proper PPE for this activity: mask, gloves and a leather apron.
- In case of electric welding: always seek to connect the negative electrode near the point to be welded.
- Only perform welding in well ventilated areas to avoid the concentration of toxic gases and dust.
- Before welding, remove the paint, thus preventing the formation of toxic gases and dust.
If you cannot remove the paint, use an appropriate mask to protect against the inhalation of toxic gases.
When sanding surfaces, especially with paint, also wear a mask.
If you use a solvent to remove the paint, do not forget to wash the area with soap and water before welding: fire hazard!



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Basic instructions

HITCH THE MACHINE ONTO THE TRACTOR

⚠ CAUTION

Transport hazard!

Always connect a safety chain between the machine and the implement. Only use a safety chain with a strength rating equal to or greater than the gross weight of the implement. Failure to comply could result in minor or moderate injury.

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⚠ CAUTION

Avoid injury!

Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.

Failure to comply could result in minor or moderate injury.

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⚠ DANGER

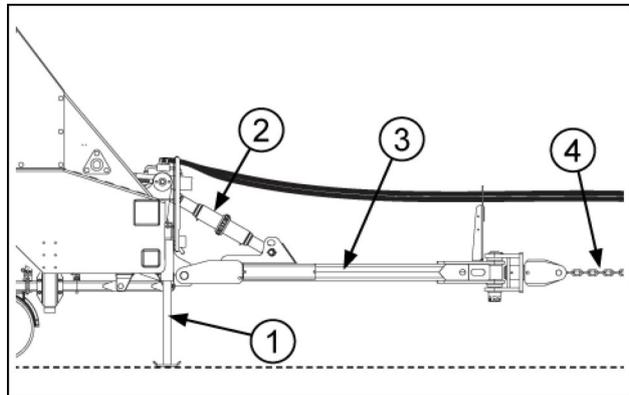
Crushing hazard!

Do not stand or place any body part between the implement and a moving tractor. Stop the tractor engine and set the parking brake before you attach cables and hoses.

Failure to comply will result in death or serious injury.

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- On level ground, lock the machine with the support stands (1).
- With the spindle (2) lift or lower the drawbar (3) until matching it with the tractor's drawbar.
- Back the tractor carefully and do the coupling, securing with a coupling pin.
- Install the safety chain (4).



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BAIL14SE00802AD 2

CUTTING CAPACITY ADJUSTMENT AND LEVELING

- To level the machine, turn the spindle (2) as needed.
- The machine is properly leveled for planting when the frame (chassis) is parallel with the ground: see dotted line in the figure.

Couple the seeder's quick coupling hoses onto the hydraulic system of the tractor.

NOTICE: Ensure thorough cleaning of the quick couplers of hydraulic cylinder hoses. Keep the plastic caps in place while not in use.

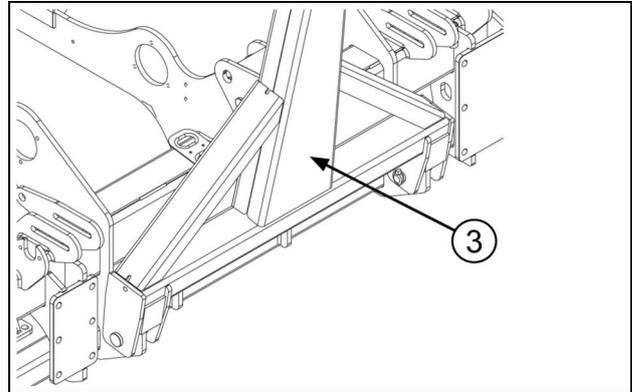
Do not couple hydraulic systems with impurities in the circuit into the tractor: serious damage can occur to the tractor.

NOTE: Do not drive the hydraulic system without removing the locks (5).

DRAWBAR

The drawbar (3) can be raised for transportation on truck and storage.

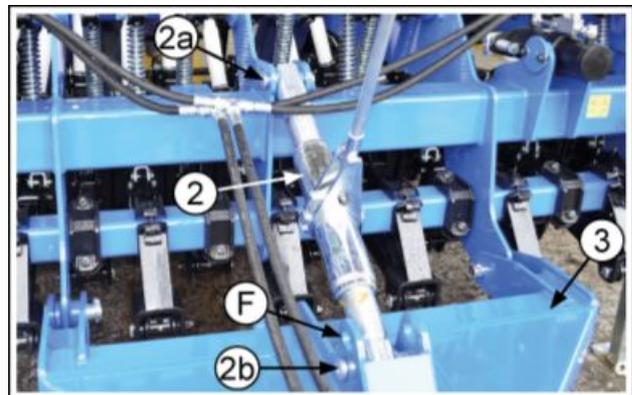
Raise the drawbar and lock the arms of the drive wheels.



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To lock the drawbar up:

- A. Disconnect and remove the spindle (2), removing the pins (2a) and (2b).
- B. Raise the drawbar (3), to allow the mounting of the pin (2a) in the hole (F) of the drawbar.
- C. Install the pin (2a), locking the drawbar on the frame.
- D. To lower the drawbar, perform the above steps in reverse and reinstall the spindle (2).



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Basic instructions

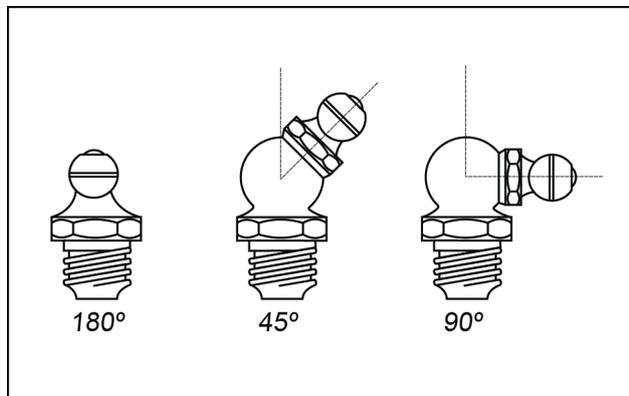
PERIODIC MAINTENANCE TABLE

Item / Frequency	Every 10 h or daily	Every 50 h or daily	After the planting season
Grease all grease fittings.	X		
Calibrate the tires		X	
Re-tighten bolts and nuts in general		X	For a new machine, do the tightening daily, throughout the first week.
Check the transmission chains: clean them, lubricate them and adjust the tension.		X	
Perform a general washing of the machine and protect the metal parts with oil			X

ATTENTION: Read and follow the safety recommendations regarding maintenance contained in this Section of the Manual.

GREASING

- Recommended grease: Use Lithium-based grease only, NLGI-2 grade.
- Lubricate all fittings every 10 h or daily.
- There are grease fittings with different angles to facilitate access: straight fitting 0° - inclined 45° and 90° - see figure.
- Avoid excess grease: the correct amount to be applied is reached at the time the old grease begins to seep out of the housing.
- Damaged grease fittings should be replaced immediately to avoid compromising the greasing of the respective fitting.
- Before greasing, clean the grease fittings to avoid the penetration of dust in lubricated components (bearings and bushings).
- Wheel hubs (1) : it is recommended that at the beginning of each season the hubs are disassembled, cleaned and checked: replace the seals and other components as needed.
Then, make the adjustment of the pre-load of the bearings (see **Transport wheel Axle - Overview (44.530)** of this manual) and lubricate with new grease.



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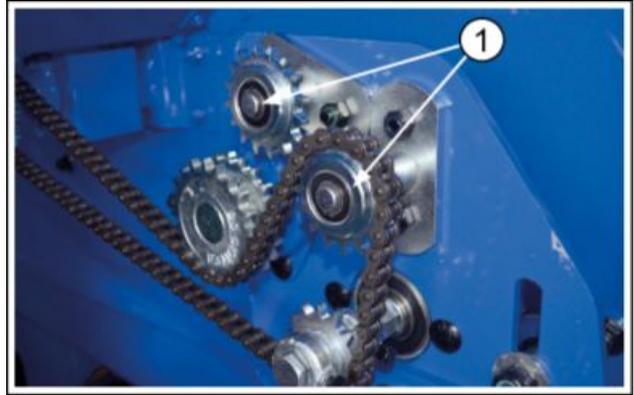
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CHAINS AND GEARS

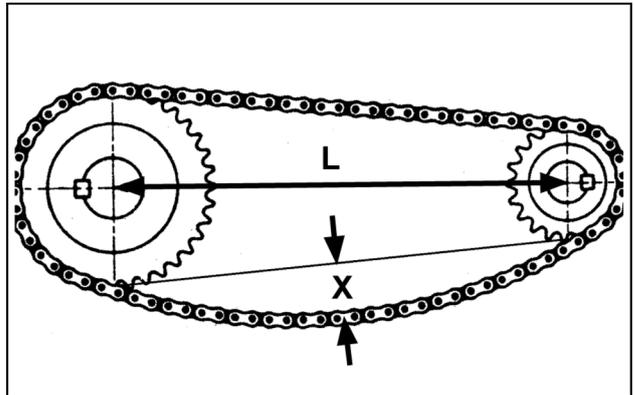
There are two different ways to adjust the chains in Seeders:

Clearance, adjusted by sprockets or fixed pulleys (1)

- The chain, in this case, works with a clearance, measured by deflection "X" in the longest free length of the chain.
- The "X" deflection must be 1 to 2% of the "L" distance, measured between the centers of the farthest shafts.
- To adjust, loosen the sprocket or pulley's support attachment (1), re-position and re-attach the support.



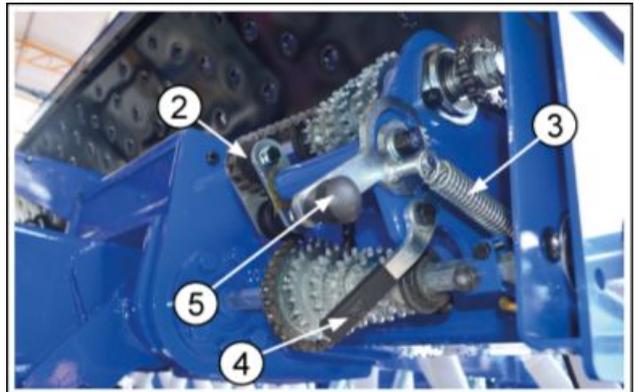
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Chain adjusted by spring tension

- The chain, in this case, works with a slight tension on the free side. This tension is maintained and adjusted by sprockets or pulleys (2), loaded by springs (3).
- This type of tension is applied when changing the seed metering rates.
To adjust: loosen lock (4) and turn lever (5) until the position that corresponds to the correct tension for the chain.
After that, refit the lock (4).



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Cleaning chains and gears

- Cleaning is as important as lubrication itself, as it prevents the accumulation of dust, which accelerates wear by abrasion.
The removal of the old grease, already contaminated, also favors the action of the new grease applied.
- The most effective way to promote a good cleaning, is to use a water jet under pressure, hot and/or with detergent.

Lubricating chains and gears

- The lubrication must be performed with oil.
- The application of oil can be by drops (with oiler) with a brush or spray directed onto the chains.

NOTE: When opening (dismantle) a chain, note the correct position of the lock (6) of the pins: the side with the opening should be facing the side opposite the direction of displacement (X) of the chain.

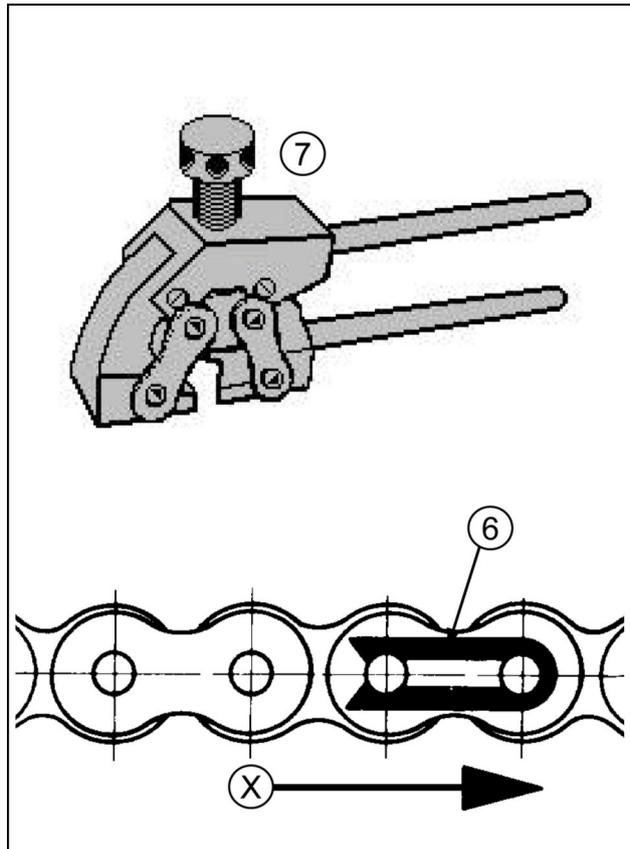
NOTE: This prevents any interference of the chain with crop residues (such as corn stalks) from causing the removal of the lock (6).

NOTE: There are tools (7) with the purpose of removing pins from chains.

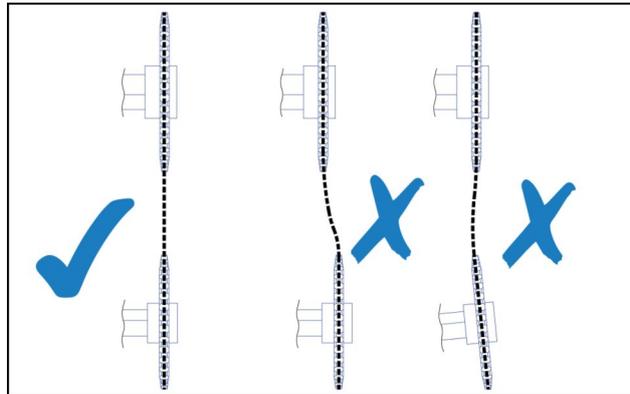
NOTE: Never install new links in a worn out chain.

NOTE: Always ensure the correct alignment of the gears and parallelism of the shafts. Misalignments cause accelerated wear of chains and gears, even under lubrication.

NOTE: It is recommended that, in off-season periods, the chains are removed and washed in kerosene or diesel oil. After that, place the chains in an oil bath for 24 h and then, allow the excess oil to drain.



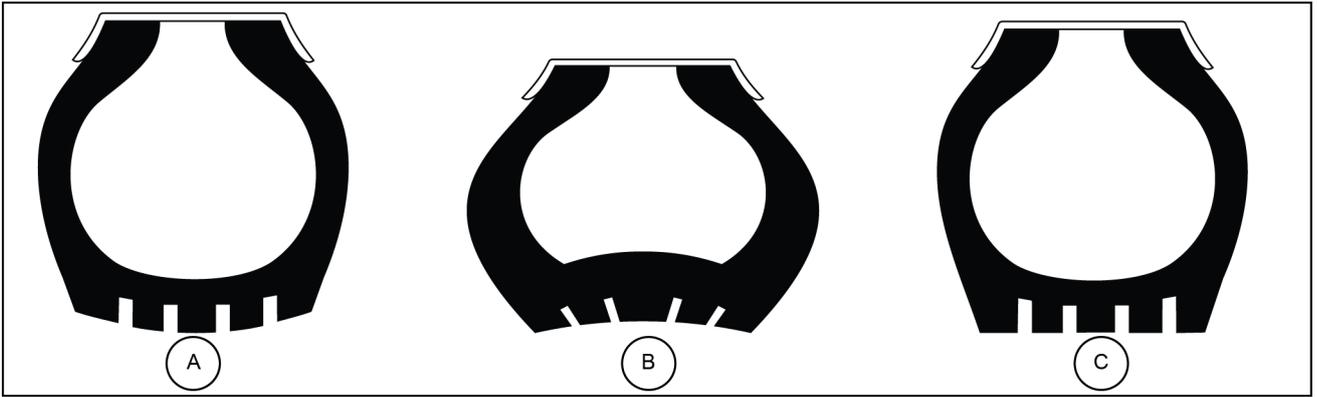
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BAIL14SE00802AM 7

TIRE CALIBRATION

- The tires must be always calibrated cold.
- Frequency: weekly.
- Pressure recommended: **1 - 3 bar (15 - 38 psi)**
- Importance of the correct pressure: apart from affecting the service life of the tires, the correct contact of the Seeder tires is critical for the correct grip (no slippage), avoiding failures in the transmission of the seed meters.



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Item	Description
A.	Excessive pressure
B	Low pressure
C	Correct pressure: 1 - 3 bar (15 - 38 psi)

GENERAL TIGHTENING OF BOLTS

For further information refer to **Torque ()**.

- Incorrectly tightened bolts can drop a part, which may bend or break, damaging others.
- Under certain circumstances, until the safety of the operation could be compromised.
- Pay special attention to fixing bolts and nuts of structural components, such as: clamps for fixing planting rows to the frame, drawbar components, box attachment components, among others.
- In the case of a new machine or one that has undergone repairs, increase the tightening frequency during the first week of operation.



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OFFSEASON MACHINE STORAGE

Soon after finishing the planting season:

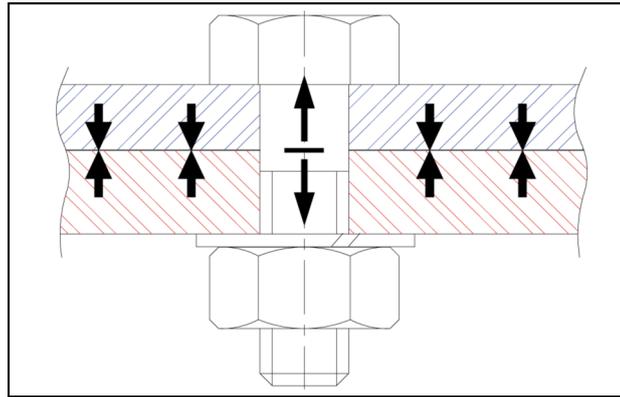
- Completely remove remnants of seed left in the boxes.
- Remove the hoses, clean them and store them separately.
- Perform a thorough cleaning of the machine, leaving it free of dust, and general abrasive impurities that could cause rust.
- Provide all necessary conditions for complete drying by placing the machine in a sunny and ventilated place.
- Store the machine in a covered place.
- Wash the chains thoroughly in diesel oil or kerosene.
- Grease all grease fittings.
- Inspect the machine for worn or broken parts. Provide them when the machine is not in operation.
- Perform refinishing of all worn metal parts.

Preparation for restart of operation

- Grease all grease fittings. This will eliminate any absorbed moisture.
- Re-tighten all bolts and nuts.
- Calibrate the tires.

Torque

NOTE: The machines are designed with SI standard metric measurements.



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NOTE: In case a special torque is specified for a given bolt or nut, do not use the values in the tables below.

NOTE: When applying the recommended torque, make sure the threads are clean.

NOTE: When replacing bolts and/or nuts, use new items with a class equal or superior to the original ones. However, when using a new bolt or nut of a higher class, apply the original torque only.

Recommended torques for class 8.8 bolts, nuts and studs

Size (or gauge)	Torque - in N.m
4 mm	3 - 4
5 mm	7 - 8
6 mm	11 - 12
8 mm	26 - 31
10 mm	52 - 61
12 mm	90 - 107
14 mm	144 - 172
16 mm	217 - 271
20 mm	434 - 515
24 mm	675 - 815
30 mm	1250 - 1500
36 mm	2175 - 2600

Recommended torques for class 10.9 bolts, nuts and studs

Size (or gauge)	Torque - in N.m
4 mm	4 - 5
5 mm	9 - 11
6 mm	15 - 18
8 mm	37 - 43
10 mm	73 - 87
12 mm	125 - 150
14 mm	200 - 245
16 mm	310 - 380
20 mm	610 - 730
24 mm	1050 - 1275
30 mm	2000 - 2400
36 mm	3500 - 3200

Recommended torques for class 12.9 bolts, nuts and studs

Generally, the torque values specified for class 10.9 hardware can be used in class 12.9 hardware.

Recommended torque for steel hydraulic connections: 37° expansion connection

Tube's external diameter / hose's internal diameter		Thread size	Torque in N.m
mm	in		
6.4 mm	1/4 in	7/16-20 in	8 - 16 N.m
7.9 mm	5/16 in	1/2-20 in	11 - 22 N.m
9.5 mm	3/8 in	9/16-18 in	14 - 34 N.m
12.7 mm	1/2 in	3/4-16 in	20 - 57 N.m
15.9 mm	5/6 in	7/8-14 in	34 - 79 N.m
19.0 mm	3/4 in	1-1/16-12 in	54 - 108 N.m
22.2 mm	7/8 in	1-3/16-12 in	81 - 135 N.m
25.4 mm	1 in	1-5/16-12 in	102 - 158 N.m
31.8 mm	1-1/4 in	1-5/8-12 in	169 - 223 N.m
38.1 mm	1-1/2 in	1-7/8-12 in	285 - 338 N.m

Recommended torque for steel hydraulic connections: straight threads with "O" ring

Tube's external diameter / hose's internal diameter		Thread size	Torque in N.m
mm	in		
6.4 mm	1/4 in	7/16-20 in	8 - 16 N.m
7.9 mm	5/16 in	1/2-20 in	11 - 22 N.m
9.5 mm	3/8 in	9/16-18 in	14 - 34 N.m
12.7 mm	1/2 in	3/4-16 in	20 - 57 N.m
15.9 mm	5/6 in	7/8-14 in	34 - 79 N.m
19.0 mm	3/4 in	1-1/16-12 in	54 - 108 N.m
22.2 mm	7/8 in	1-3/16-12 in	81 - 135 N.m
25.4 mm	1 in	1-5/16-12 in	102 - 158 N.m
31.8 mm	1-1/4 in	1-5/8-12 in	169 - 223 N.m
38.1 mm	1-1/2 in	1-7/8-12 in	285 - 338 N.m

Recommended torque for steel hydraulic connections: straight threads with "O" ring

Tube's external diameter / hose's internal diameter		Thread size	Torque in N.m
mm	in		
6.4 mm	1/4 in	7/16-20 in	8 - 16 N.m
7.9 mm	5/16 in	1/2-20 in	11 - 22 N.m
9.5 mm	3/8 in	9/16-18 in	14 - 34 N.m
12.7 mm	1/2 in	3/4-16 in	20 - 57 N.m
15.9 mm	5/6 in	7/8-14 in	34 - 79 N.m
19.0 mm	3/4 in	1-1/16-12 in	54 - 108 N.m
22.2 mm	7/8 in	1-3/16-12 in	81 - 135 N.m
25.4 mm	1 in	1-5/16-12 in	102 - 158 N.m
31.8 mm	1-1/4 in	1-5/8-12 in	169 - 223 N.m
38.1 mm	1-1/2 in	1-7/8-12 in	285 - 338 N.m

Recommended torque for mounting bolts with split flange

Size	Torque in N.m
5/16-18 in	20 - 27 N.m
3/8-16 in	27 - 34 N.m
7/16-14 in	47 - 61 N.m
1/2-13 in	74 - 88 N.m
5/8-11 in	190 - 203 N.m

Basic instructions

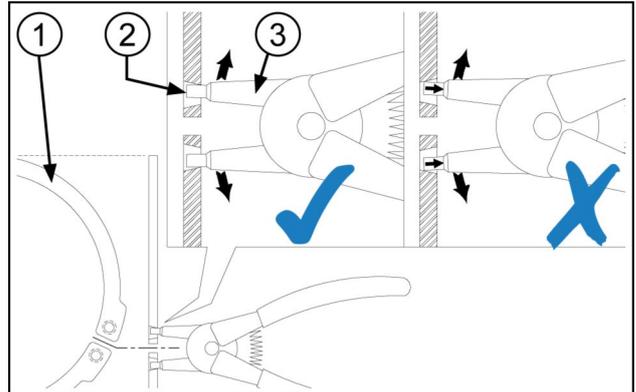
INSTALLATION OF SNAP RINGS

In the case of Seeger type rings (1) internal or external, installed and removed with pliers fitted in two holes (2) check for the correct side in the installation of the rings.

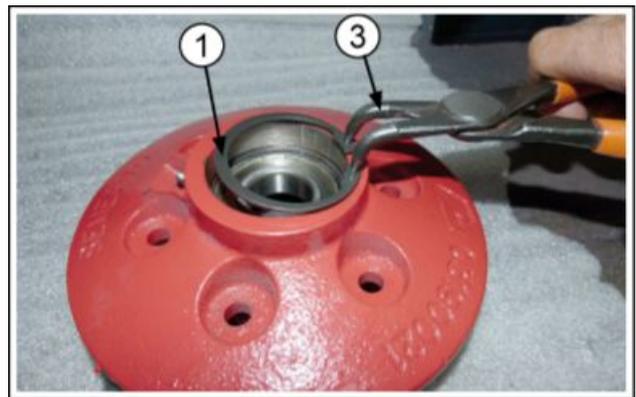
This is because the holes (2) for fitting the pliers (3) are tapered:

- Correct way of installation: the side with the smallest diameter of the tapered holes (2) must face the pliers (3). Thus, the ring (1) does not escape from the pliers.
- Incorrect way: if the ring (1) was installed with the side with the largest diameter of the tapered holes facing the pliers, their tips would be pushed inside out, preventing or hindering the coupling.

ATTENTION: Always wear protective goggles when working with snap rings. The escape of a snap ring from the plier tips causes a violent fling of the ring!



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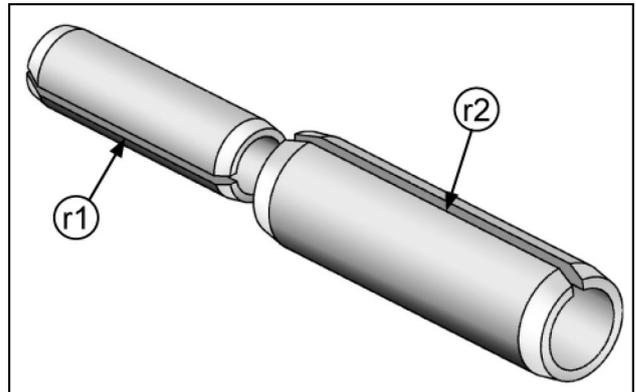
BAIL14SE00802AQ 2

INSTALLATION OF DOUBLE SPRING PINS

The precaution consists in not to install the two pins with the slots (r1) and (r2) aligned.

This is especially critical in the case of compartments containing grease: the aligned slots allow the escape of grease.

For proper installation, mount the pins with the slots (r1) and (r2) lagged, as shown in the figure.



BAIL14SE00802AR 3

BUSHING REPLACEMENT

Bushing removal

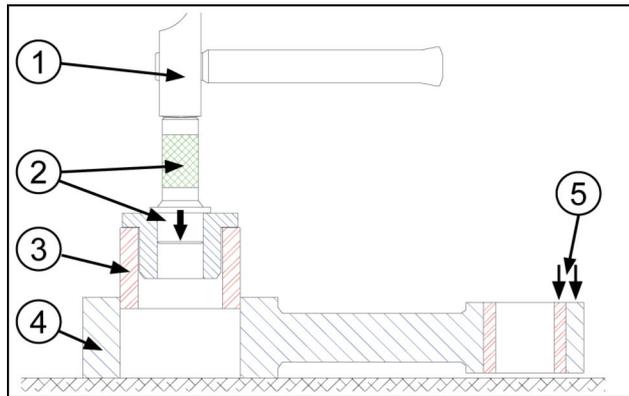
- Generally, bushings mounted under interference are removed only when they need to be replaced.
- The removal can therefore be destructive. However, be careful not to damage the part where the bushing is mounted.



BAIL14SE00802AS 4

Installing bushings under interference

- The bushings used in Seeders not require the application of glue for their installation.
- The ideal thing is to use a press. This way, an aligned installation and with the necessary force is ensured.
- However, in field situations where a press is not available, observe the following precautions:
- Use a suitable tool (2) to guide the bushing (3) in its installation.
- Apart from guiding the bushing, the tool prevents the bushing from being directly hit with a hammer, which would cause its deformation and may even impede its installation, in addition to forcing the disposal of the bushing.
- Use a hammer (1) to move the tool (2) and the bushing (3)
- The part (4) in which the bushing is installed needs to be lying on a flat, hard surface.
- Check the mounting depth of the bushings: usually, the end of the bushing must face the surface of the part in which it is installed; see indication (5).



BAIL14SE00802AT 5

REPLACEMENT OF SEALS

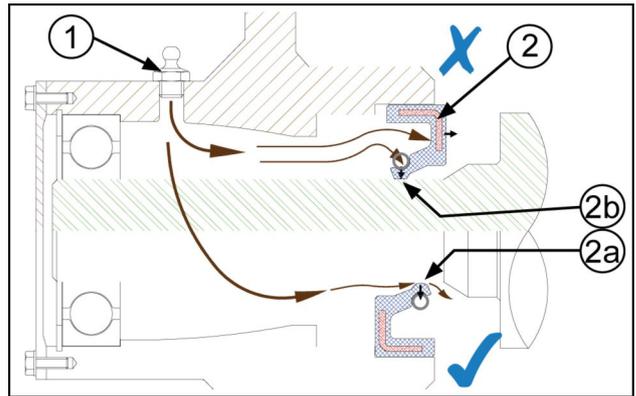
NOTE: The fundamental care in the installation of seals consists in not to deform them. This requires the use of appropriate tools

NOTE: Once removed, the seals cannot be reinstalled: replace them.

INSTALLATION OF SEALS IN HUBS WITH GREASE FITTING

By introducing grease through the grease fitting (1), the old grease must be eliminated through the seal (2)
 In this case, check for the following:

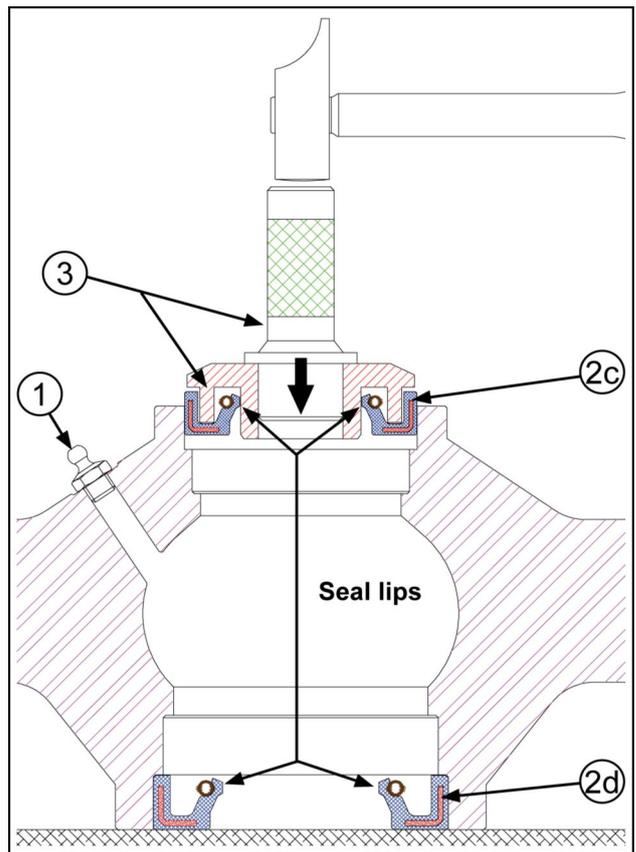
- Correct installation (2a): seal installed with the sealing lip turned out from the hub: the force of the grease moves the lip slightly away from the axis, allowing the outflow of the grease see indication by the arrows.
- Incorrect installation (2b): sealing with the lip inwards, the passage of grease is prevented. The lip of the seal is forced against the shaft, not allowing the passage of grease. With this, the seal will be damaged or forced out of the housing.



BAIL14SE00802AU 6

Hub with grease fitting and two seals

- One of the seals is installed with the lip outwards to allow the exit of old grease.
- The other seal is installed with the lip inwards.



BAIL14SE00802BF 7

Seal installation procedure (with lip facing outwards)

It is essential to use a tool **(3)** which supports the seal by its rigid base, without causing deformation or damage to the sealing lip.

Move the seal until the rigid face reaches the bottom of the housing, but without forcing it.

Observations:

- The displacement of the seal into the housing must be in an aligned manner. Therefore, it is important that the tool **(3)** has an extension that facilitates the alignment.
- Before installing a seal, make sure that the housing is clean and dry, free of grease or oil.
- After installing the seal, grease the seal lip.
- Take care when mounting the shaft that goes through the seal, especially spline shafts with key slot and another type of edge that can damage the retainer lip.
- Tiny cuts on the lip cause leaks.



BAIL14SE00802AV 8

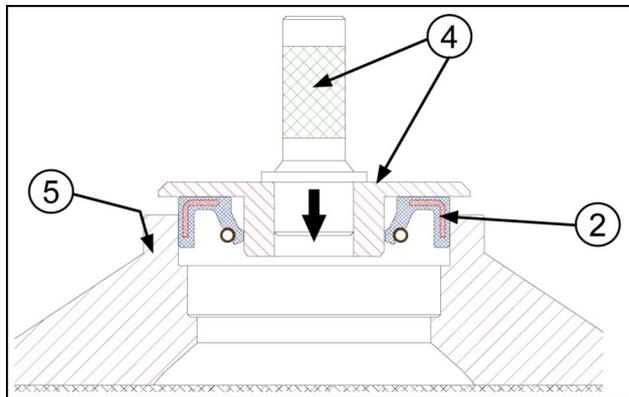
INSTALLATION OF SEALS IN HUBS WITHOUT GREASE FITTING

In these cases, the replacement is performed with the disassembly of the hub.

This way, the seal does not have the function of allowing the outflow of excess grease. Therefore, it is installed with the lip facing inward (and the flat face outwards).

To install it with the lip inwards:

- See the remarks of the previous item (seal with lip facing outwards).
- Lay the tool **(4)** on the rigid (flat) face of the seal **(2)**
- Typically, the depth of the seal installation must be such that the flat face is aligned with the outer surface **(5)** of the hub.

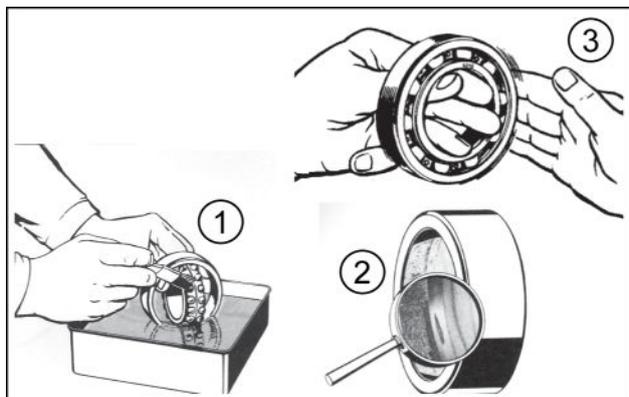


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REPLACEMENT OR REUSE OF BEARINGS

To decide on the reuse of bearings, the first step is to perform a thorough cleaning **(1)**.

In step **(2)** analyze the bearing for damage such as signs of overheating (bluish surfaces), wear, scratches or breaks in its rollers or balls, and the surface of the tracks and other damage.

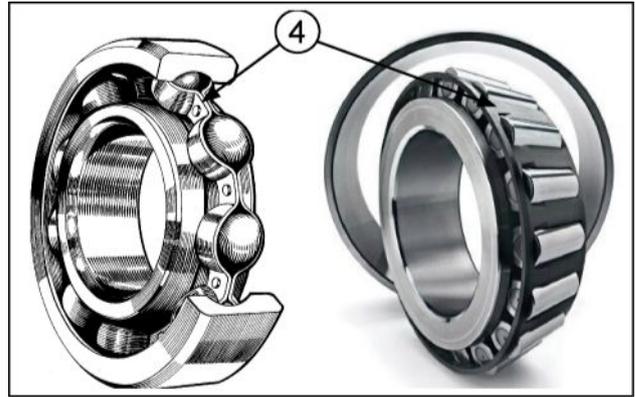


BAIL14SE00802AX 10

Also analyze the state of the cage (4).

If everything is in order, make a noise test (3) when rotating the bearing with the hands, it cannot present metallic noises and its spinning must be completely smooth.

The slightest irregularity in any of the above determines the replacement of the bearing.

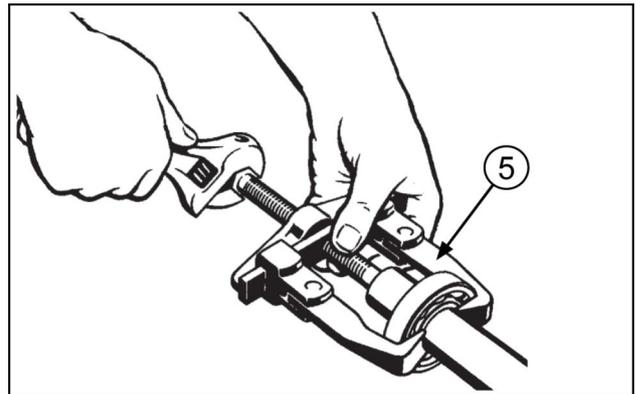


BAIL14SE00802AY 11

REPLACEMENT OF BALL BEARINGS

Ball bearings are normally made of one piece.

The removal must be done with appropriate pullers, generally universal type (5) of two or three legs.



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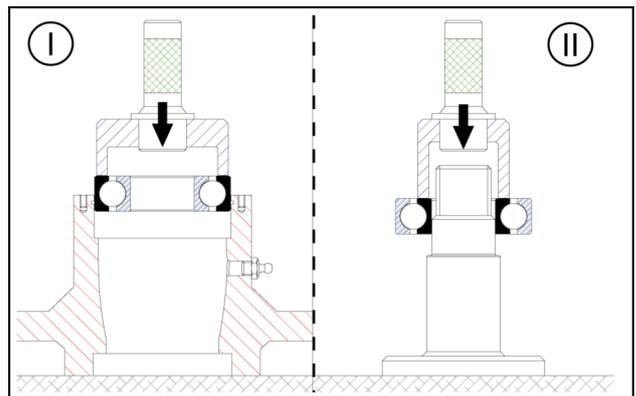
For installation

- Never install a bearing applying direct hammer blows on it!
- Prefer the use of presses for installing bearings. For field installations, a hammer can be used, however, the bearing needs to be displaced in an aligned manner by an appropriate tool.
- Lubricate the bearings before or after their installation.

NOTICE: The force to install the bearing should only be applied on the track (internal or external) which is installed with interference.

NOTICE: If the force (of the press or the hammer blows) is applied on the free track, the balls and cages of the bearing could suffer serious damage.

- So to install bearings in holes, press the outer ring, and to install bearings on shafts, press the inner ring.
- For the installation with both a press or a hammer, the bearing must be lying on a flat, firm surface and perpendicular to the tool or press used in the installation.



BAIL14SE00803AN 13

REPLACEMENT OF ROLLER BEARINGS

These bearings are usually made up of two parts:

- Outer ring (or cup) **(1)**.
- "bearing cone" assembly **(2)**, consisting of the inner track with the rollers (cylindrical or conical) and the cage.

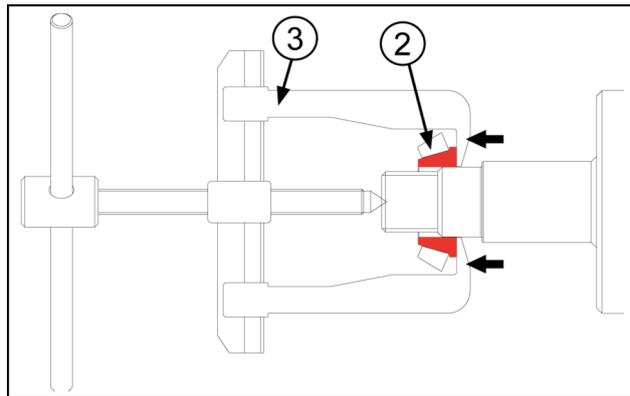
Thus, the removal and installation of tapered bearings is carried out in two parts: the cup and cone.



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To remove tapered bearing cups

- Normally, the cups are only removed in case of replacement.
- In this case, use pullers (if available) and then, blow the cup off the housing by means of a pin puller.
- In the latter case, removal can be destructive. However, take care not to damage the housing.



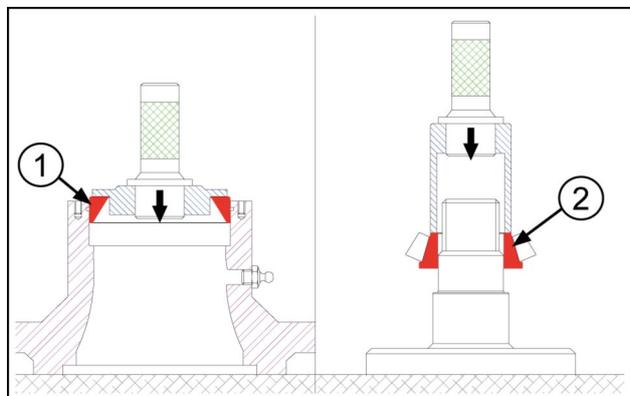
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To remove bearing cones

Whenever possible, use universal pullers, of two or three legs **(3)**

To install tapered bearing cups and cones

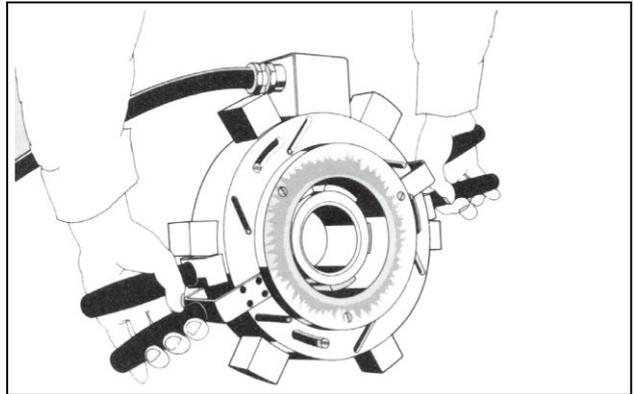
- For the cups **(1)**, use tools that fit the inner face (track) or behind the cup, on the longest side.
- To install the bearing cones **(2)** on axes, use a press (preferred) or a hammer combined with a suitable tool.
- Never apply hammer blows directly on any parts of a bearing!
- Also, check the alignment of the installation, done on a flat, hard and perpendicular surface.



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Heating or cooling of parts installed with interference

- In the case of bearings, it is a good practice to heat them for their installation. The expansion of the heated parts reduces the force needed for installation, facilitating the procedure and reducing the chance of damage to them.
- The heating should never be done under the action of direct fire on the parts. Use oil heated at 80 to 90 0 C or heating by electrical induction see figure.
- On the other hand, tapered bearing shafts and cups can be cooled to reduce its diameter, also facilitating their installation.
- Cooling can be done in freezers or with ice (dry or regular).



BAIL14SE00803AR 17

GENERAL RECOMMENDATIONS

ASSEMBLY SIDE

- Several components of the machine have parts whose assembly side must be observed.
- In the row units, such components have a marking, indicating it should be installed on the right side (from the point of view of who is behind the machine). See examples in the figure, indicated by the arrows.



BAIL14SE00803AS 18

Bolts in general

In the case of bolts that allow the installation in both directions, the standard factory installation is from left to right.



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