Serafin MACHINERY

YOUR SEEDING & TILLAGE SPECIALISTS

DOUBLE DISC SEEDER

OPERATOR MANUAL

Serafin PASTUREKING

T +61 2 6963 5588 E info@serafin.com.au
243 Burley Griffin Way, PO BOX 901, Griffith NSW 2680, Australia
ABN 98 890 270 213

SERAFINMACHINERY.COM.AU

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INTRODUCTION

Congratulations on the purchase of your new SERAFIN PASTURE KING!

Serafin Machinery is based in Griffith, NSW in the heart of one of Australia's leading agricultural centres. Serafin Machinery has more than 20 years' experience in manufacturing and designing high quality farm machinery for some of the most demanding farming requirements.

The team at Serafin Machinery is totally committed to the No-Till concept of disc seeders for cereals and pastures. Serafin Machinery's dedicated parts support and back up service ensures customers receive exceptional service every time.

Our aim is to continually improve our machinery to ensure low maintenance costs, reliability and long-lasting machinery that does the best job possible.

Serafin Machinery work hard to keep developing new models of seeders to meet the demand of our future customers and strive for continual improvement of our imported components from our suppliers. We hope you enjoy using your new seeder as much as we enjoyed producing it.

IMPORTANT NUMBERS

Serafin Machinery – Head Office	**02 6963 5588**
Parts Manager	0458 635 588
Service Manager	0487 055 588
Sales Manager	0459 755 881

CONSERVATION AGRICULTURE

According to the FAO (Food and Agriculture Organization of the United Nations), “Conservation Agriculture” (CA) aims to achieve sustainable and profitable agriculture and subsequently aims at improved livelihoods of farmers through the application of the three CA principles: minimal soil disturbance, permanent soil cover and crop rotations.

CA holds tremendous potential for all sizes of farms and agro-ecological systems, but its adoption is perhaps most urgently required by smallholder farmers, especially those facing acute labour shortages. It is a way to combine profitable agricultural production with environmental concerns and sustainability and it has been proven to work in a variety of agro ecological zones and farming systems. It is been perceived by practitioners as a valid tool for Sustainable Land Management (SLM).

Head to the Food and Agriculture Organisation website for more information:

http://www.fao.org/ag/ca/index.html

NO-TILL SYSTEMS

“No-Tillage” is a ‘cornerstone’ of CA, and can be practiced in both large and small farming systems. With No-Till (also termed zero tillage and direct drilling) the only tillage operations are low disturbance seeding techniques for the application of seeds and fertilizers directly into the stubble of the previous crop. Gradually, organic matter of the surface layers of zero tilled land increases, due to reduced erosion, increasing yields and resulting in more crop residue added to the soil surface.

Gradually, organic mulch is developed on the soil surface, and this is eventually converted to stable soil organic matter because of reduced biological oxidation compared to conventionally tilled soils. No-Tillage is effective in mitigating many of the negative on-farm and off-site effects of tillage, principally humidity loss, organic matter loss, reduced biodiversity and reduced runoff. These conditions are replaced with permanent soil cover, improvements in soil structure, improved organic matter status, improved water use efficiency, and improved soil biology and nutrient cycling.

GENERAL INFORMATION

READ THIS MANUAL carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage and will not be covered by the warranty and/or insurance.

This manual is part of your machine and must remain with the machine when you sell it. Right hand and left hand sides are determined by facing in the direction the machine will travel when going forward.

Warranty is provided as part of Serafin's support program for customers who operate and maintain their equipment as described in this manual. The warranty is explained on the warranty certificate which you should receive when the machine is delivered.

Set up is the responsibility of the operator. Correct seed dept and amount of soil coverage is adjustable for each sowing situation. Cover and press wheel pressure are all adjustable. There is no standard factory setting for all situations as each requirement is different.

Serafin Machinery will demonstrate all adjustments necessary on set up of machine. Serafin Machinery will NOT be responsible or liable for seeding rate, depth of seed / fertiliser or closing wheel pressures.

Consult your agronomist for sowing depth and seeding rate.

SAFETY

Read all safety instructions before operating the machine. If you do not understand any part of this manual and need assistance, please contact Serafin Machinery.

Operation of the Machine

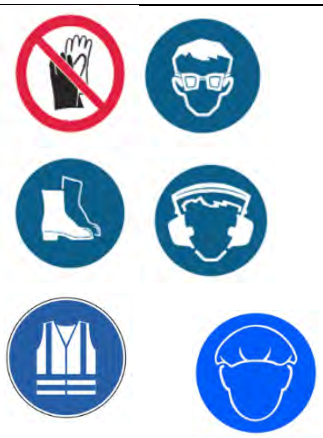
- Carefully read and understand the instruction manual before use.
- Serafin Machinery will instruct correct use of the machine during installation/delivery. It is the owner's responsibility to train staff/operator prior to using the machine.
- Ensure no one is near the machine while it is attached to the tractor and the tractor is running.
- Incorrect handling of this equipment could result in serious or fatal accidents.
- Adhere to all working (12km/h) and transport (30km/h) speeds, in rough terrain and turning speeds will need to be reduced further to prevent damage or roll over.
- Unauthorized modifications to the machine may impair the function and/or safety and effect machine life. This will also void warranty.

Disconnecting the Machine

- Be sure to clear the area around the machine before raising or lowering the machine or wings.
- Stop the tractor on level ground before raising or lowering wings.
- Operate the machine from the tractor seat only.
- Ensure safety locks are fitted to wings if storing in folded position.
- Lower machine to the ground
- Turn tractor off and remove key.
- Release any hydraulic pressure on remotes.
- Disconnect hydraulic couplers, electric couplers and any primary hose breakaway couplers and fold onto machine.
- Disconnect hitch from tractor.

SAFETY

OPERATOR SAFETY

			
Read and understand Operators manual	Wear appropriate Personal Protective Equipment	Do not operate machine when under the influence of drugs or alcohol	Use Seat Belts

WARNING **TO AVOID SERIOUS INJURY OR DEATH DO THE FOLLOWING:**

- **READ, UNDERSTAND** and **FOLLOW** Operator's Manual instructions, Warnings and Safety Messages.
- **WEAR PERSONAL PROTECTIVE EQUIPMENT** when operating or repairing equipment.
- **DO NOT USE DRUGS** or **ALCOHOL** before or while operating equipment
- **DO NOT ALLOW** anyone to operate equipment under the influence of drug or alcohol.
- **CONSULT** medical professional for medication impairment side effects.
- **STAY ALERT**, prolonged operation can cause fatigue; **STOP** and **REST**.

GENERAL OPERATING SAFETY

Visibility Conditions while in use
- OPERATE IN DAYLIGHT or with lights that give clear workplace visibility
- Tractor operator must be able to see seeder operation without obstruction
- Tractor operator must be able to see ahead and avoid obstructions while operating equipment

Ground Speed while operating
- Operator should control ground speed to achieve optimum seeding performance
- Adjust working speed to suit terrain conditions
- Reduce speed near steep slopes, ditches or foreign objects

Safety Signs and Warning Decals
- Replace missing, damaged or unreadable safety signs immediately

Safety Shielding and Sensors
- Never remove or modify any safety devices

Communication
- Verbal communication can be difficult and dangerous near the seeder
- Operating instructions and directions should be made prior to operation
- Never allow anyone to approach seeder while in operation

Riding Passengers
- Never allow passengers to ride on seeder

Table 1 Operator Safetey

PERSONAL PROTECTIVE EQUIPMENT - PPE

			
Wear hearing protection	Wear Hi-Visibility clothing.	Wear eye protection.	Wear enclosed footwear.

WE RECOMMEND THIS MACHINERY IS USED WITH A TRACTOR THAT IS FITTED WITH A CABIN. IF THE OPERATION OF THIS EQUIPMENT IS DONE USING A TRACTOR WITH AN OPEN CABIN, IT IS SUGGESTED THAT PERSONAL PROTECTIVE EQUIPMENT IS WORN BY THE OPERATOR.

ALWAYS FOLLOW SUGGESTIONS CONCERNING ALL PROTECTIVE CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT ISSUED TO YOU, OR CALLED BY FOR THE JOB CONDITIONS. THIS SHOULD ALWAYS INCLUDE;

- **USE HEARING PROTECTION** if using open cab tractor to stop hearing fatigue when operation for extended times
- **WEAR HI VISIBILITY CLOTHING** to ensure you are visible to others on the worksite
- **WEAR EYE PROTECTION** if using open cab tractor to stop dust or other foreign matter entering your eyes
- **WEAR SAFETY FOOT WEAR** to protect feet from crush hazards
- **RESPIRATION PROTECTION** if using open cab tractor to stop dust or other foreign matter entering your lungs

Table 2 Personal Protective Equipment

CRUSHING HAZARDS

STAY CLEAR OF MACHINE WHILE HYDRAULIC SYSTEM PRESSURISED

WARNING

DEPRESSURISE HYDRAULIC SYSTEM TO AVOID SERIOUS INJURY OR DEATH FROM ACCIDENTAL MACHINE MOVEMENT CAUSING POTENTIAL CRUSH INJURIES.

THIS SEEDER USES HYDRAULIC ACTUATION TO MOVE PARTS DURING OPERATION OR WHILE STATIONARY. BE AWARE OF CRUSHING HAZARDS WHEN THE MACHINES HYDRAULIC SYSTEM IS PRESSURISED.

TO AVOID CRUSH INJURIES

- **OPERATE FROM TRACTOR SEAT** never operate machine from the ground or in close proximity to moving parts.
- **DO NOT OPERATE WHILE MAINTAINING MACHINE** ensure all people are clear prior to operation.

TO AVOID FALLING OFF IMPLEMENT

- **USE EXTREME CARE WHEN CLIMBING ONTO EQUIPMENT**. Always use three-point contact using available handles and steps on implement while exiting.
- Never attempt to mount the implement while unit is moving.

TO AVOID CHILDREN FALLING OFF OR BEING CRUSHED BY EQUIPMENT:

- **NEVER ALLOW** children to play on or around tractor or equipment.

CRUSHING BY TRAPPING FINGERS/HANDS/ARMS in EQUIPMENT

- **KEEP ARMS AND LEGS CLEAR** of hydraulic actuators and ground engaging parts
- **KEEP SEATED** while operating the machinery
- **LOWER WINGS AND ROW UNITS AND STOP TRACTOR ENGINE** before attempting maintenance
- **KEEP CLEAR OF TRACTOR DRAWBAR** when connecting and disconnecting machine

Table 3 Crushing Hazards

CONNECTING OR DISCONNECTING IMPLEMENT HAZARDS

		
FOOT CRUSHING HAZARD	HAND CRUSH	STOP TRACTOR, REMOVE KEY READ OPERATING MANUAL

WARNING **TO AVOID SERIOUS INJURY OR DEATH FROM BEING CRUSHED BY TRACTOR OR IMPLEMENT:**

WHEN ATTACHING UNIT TO TRACTOR:
- **DO NOT ALLOW BYSTANDERS** between tractor and seeder
- **KEEP HANDS AND BODY CLEAR** of drawbar and fold points

BEFORE CONNECTING OR DISCONNECTING COMPONENTS
- **STOP TRACTOR ENGINE** before connecting hydraulic hoses.

WHEN CONNECTING OR DISCONNECTING SEEDER TO TRACTOR DRAWBAR OR LINKAGE:
- **DO NOT CRAWL OR WALK** under seeder whilst in storage position

Table 4 Connecting or Disconnecting Implements

HIGH PRESSURE HYDRAULIC FLUID HAZARDS


HYDRAULIC FLUID INJECTION HAZARD

WARNING **TO AVOID SERIOUS INJURY OR DEATH FROM HYDRAULIC FLUID INJECTION INJURY:**

WHEN ATTACHING HYDRAULIC HOSES:
- **INSPECT HOSES** for wear and leaks prior to connecting implement to tractor
- **INSPECT HYDRAULIC COUPLINGS** for leaks and damage whilst connecting to tractor

WHEN USING THE IMPLEMENT
- **CHECK ALL HOSES FOR WEAR & LEAKS** prior to operating implement.

Table 5 High Pressure Hydraulic Fluids

ENVIRONMENTAL HAZARDS

		
DUST HAZARD	NOISE HAZARD	DUST HAZARD

IMPORTANT **TO AVOID INJURY FROM DUST INJESTION OR TEMPORARY HEARING ISSUES IS RECOMMENDED:**

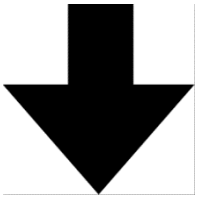
We recommend operation of this seeder be done using a tractor with a cabin. If you intend to use this implement with an open type tractor cabin, observe the following use of Personal Protective Equipment;

WHEN IMPLEMENT IS IN OPERATION:

- **USE RESPIRATION PROTECTION** to reduce dust ingestion
- **WEAR HEARING PROTECTION**
- **WEAR GOGGLES** to reduce dust irritating the operators eyes

Table 6 Environmental Hazards

HAZARDS WHEN MAINTAINING THE MACHINE

		
PERIODICALLY INSPECT ALL MOVING PARTS AND TIGHTEN ALL FASTENERS	STOP TRACTOR ENGINE & HYDRAULICS BEFORE CONDUCTING MAINTENANCE	PLACE UNIT ONTO GROUND BEFORE DOING ANY MAINTENANCE

WARNING

AVOID SERIOUS INJURY OR DEATH FROM COMPONENT FAILURE BY KEEPING IMPLEMENT IN GOOD OPERATING CONDITION BY PERFORMING CORRECT SERVICE, REPAIRS, AND MAINTENANCE.

WARNING

BEFORE CARRYING OUT ANY MAINTENANCE ENSURE THE TRACTOR ENGINE IS SWITCHED OFF, KEY REMOVED AND PARK BRAKE ENGAGED.

BEFORE PERFORMING SERVICE, REPAIRS, AND MAINTENANCE ON THE IMPLEMENT:

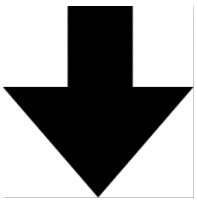
SECURE EQUIPMENT FOR SERVICE

- **STOP TRACTOR ENGINE** , engage parking brake, and allow all moving parts to stop
- **LOWER WINGS ONTO GROUND** Before commencing work
- **CYCLE HYDRAULIC CONTROLS** to release any trapped hydraulic pressure

WEAR SAFETY GLASSES, PROTECTIVE GLOVES AND FOLLOW SAFETY PROCEDURES WHEN PERFORMING SERVICE, REPAIRS, AND MAINTENANCE ON THE IMPLEMENT:

- Always **WEAR GLOVES** to guard against worn component with sharp edges.
- Always **WEAR SAFETY GLASSES** when servicing components
- **AVOID CONTACT** with hot hydraulic oil.
- **SECURELY** support or **BLOCK UP** raised implement, framework, and lifted components before working underneath equipment.
- **STOP** any implement movements and **SHUT-OFF TRACTOR** engine before doing any work procedures.
- **USE** stepladder or raised stands to reach high equipment areas inaccessible from ground.
- **ENSURE** good footing by standing on solid flat surfaces when getting on implement to perform work
- **FOLLOW** manufacturer's instructions in handling oils, solvents, cleansers, and other chemical agents.
- **DO NOT** change any factory-set hydraulic calibrations to avoid component or equipment failures.
- **DO NOT** modify or alter implement, functions or components.

HAZARDS WHEN MAINTAINING THE MACHINE (CONTINUED)

		
PERIODICALLY INSPECT ALL MOVING PARTS AND TIGHTEN ALL FASTENERS	STOP TRACTOR ENGINE & HYDRAULICS BEFORE CONDUCTING MAINTENANCE	PLACE UNIT ONTO GROUND BEFORE DOING ANY MAITENANCE

WARNING

AVOID SERIOUS INJURY OR DEATH FROM COMPONENT FAILURE BY KEEPING IMPLEMENT IN GOOD OPERATING CONDITION BY PERFORMING CORRECT SERVICE, REPAIRS, AND MAINTENANCE.

PERFORM SERVICE, REPAIRS, LUBRICATION AND MAINTENANCE OUTLINED IN IMPLEMENT MAINTENANCE SECTION:

- **INSPECT** before each use for loose fasteners, worn or broken parts, leaky or loose fittings and all moving parts for wear.
- **REPLACE** any worn or broken parts with new parts.
- **LUBRICATE** unit as specified by maintenance checklist.
- **NEVER** lubricate, adjust or remove material while it is running or in motion.
- **TORQUE** all bolts and nuts as specified.
- **CHECK** tire conditions.
- **AVOID CONTACT** with recently used equipment that may still be hot.
- **DO NOT MODIFY** or alter equipment
- **DO NOT CRAWL** or walk under unsecured raised equipment.

SAFETY SHIELDS, GUARDS AND SAFETY DEVICES INSPECTION:

- **MAINTAIN SAFETY SIGNS** and Decals in good readable condition.
- **REPLACE** any missing, broken or worn safety shields, guards and safety devices.

BEFORE YOU START

Check List

1. Read and understand the operators manual on how to operate Pasture King correctly.
2. Check tyre pressure and inflate to 40PSI Refer page 25.
3. Lubricate frame and units with recommended grease at stated service intervals Refer to Page 20.
4. Inspect for loose, damaged or missing parts. Repair or replace before entering the field.
5. Make sure air and hydraulic hoses do not interfere with moving parts. If there is interference, relocate hoses and secure in position.

Tighten Wheel Nuts & Wheel Bearings

Tighten all wheel nuts and wheel bearings during the first week of operation and periodically after that. Refer to page 25. This is part of general servicing.

To adjust wheel bearings:

1. Jack up machine.
2. Remove centre hub cap and split pin
3. Tighten nut until there is a slight drag on the bearings, while turning wheel.
4. Back nut off until split pin can be placed in hole.
5. Replace hub cap.
6. Torque wheel nuts to 255 ftlb as per recommendation on page 25

Guidelines for Use

1. Ensure units are fully raised before lowering or raising the wings.
2. Clear wing area of people and obstacles and ensure locking pins are removed before lowering or raising the wings.
3. Raise units fully out of the ground before making sharp turns, such as at row ends or turnarounds or when backing up the machine.
4. Have machine moving forward before lowering units, to avoid blockages.
5. Travelling speed with units raised and wings folded is a maximum of 30km/h. It is desirable to run machine in straight lines and refrain from 90 degree turns. As this will create excess wear of the seeding unit and possible damage to the cover wheel arm.

Connecting to the Seed Box

- Ensure all hydraulic lines and machine connections are in place before operation.
- Checked that couplers are clicked in correctly, especially on low pressure return or case drain hoses to avoid blowing motor seals on fan.

Checking the Wing Fold Operation

1. Ensure units are fully raised and locking pins removed before lowering or raising the wings
2. Keep all persons away from the machine when raising or lowering wings.
3. Always locate machine on level ground when raising or lowering wings.
4. Never raise or lower wings when moving.
5. Use care when raising wings near electricity lines to avoid contact. Serious injury or death can result from contact with electricity lines.

TRANSPORT GUIDELINES

1. Proceed cautiously under overhead power lines and around utility poles.
2. Know the transport height of your machine.
3. Electrocution can occur with direct contact to overhead electrical lines.
4. Install transport lock pins before transporting.
5. Do not transport with tractor that is under specified for this seeder – EG too light.
6. Never tow this implement with a motor vehicle.
7. Latch the tractor brakes together.
8. Adhere to recommended maximum transportation speed 30km/h.

TRANSPORT ON PUBLIC ROADS

1. Always travel at a reasonable and safe speed. ***Never exceed 30 km/h***.
2. Always use the flashing warning lights when transporting on public roadway. Keep reflective material and flags clean and visible. Ensure oversize signs are fitted and visible front and rear.
3. Prevent collisions between motorist and slow moving equipment on public roads.
4. Frequently check for traffic from the rear, especially in turns, and use the turn signals.
5. Shift the tractor into a lower gear when transporting down steep slopes or hills.
6. Never transport machine with air seeder fan running.

   It is recommended you check with Roads and maritime Service website for rules and regulations while transporting agricultural machinery in your area.

Head to the RMS website for more information: https://www.rms.nsw.gov.au/

MANUAL/ELECTRIC PRESSUE VALVE SET UP

Down pressure is important to ensure even seed depth across the machine on variable soil conditions. But the depth wheel is the main control for depth. Each paddock can vary in soil compaction, so adjust accordingly.

- There is a Hex head screw under the manual valve. See image below.
- Loosen the lock nut, to reduce pressure turn the screw anti clockwise, to increase pressure turn clockwise.
- To set pressure lower the units, drive forward 5 metres then check the depth wheels. Optimum pressure you should be able to just turn the limiter disc while the disc is in the ground. This way the majority of the pressure is on the disc not the depth limiter. The depth limiter is designed to follow the ground, not carry the unit or the machine.
- Excess pressure will cause damage to the axles and bearings and may void your warranty.
- Pressure ranges between 500psi and 800psi are considered to be in the acceptable range.
    - In some sandy and lighter soils pressures of 350 psi is recommended.
- Avoid running pressures exceeding 1000psi especially for extended periods. This may cause premature wear of the units and void your warranty.
- When setting pressure, it is normal to see the pressure gauge drop 150 – 200psi quickly and settle. This is because you are overloading the valve with oil and it will drain back to where you have set the valve. EG. If you have set the valve at 500psi it may build up to 700psi and when you let the remote go it will quickly settle back to 500psi.

ELECTRIC VALVE:

- Electric valve pressure is controlled by the dial on the control box in the cab. Adjust the dial and push the remote, this will build the pressure up to where it is set on the dial and divert the rest of the oil back to tank.
- **DO NOT** run electric or manual pressure valves in constant flow.

Manual Valve

Hex Head Screw to adjust down pressure

Electric Valve

MACHINE OPERATION/FIELD SET UP

- Ensure all hydraulic hoses have been correctly fitted.
- Ensure all primary breakaway couplers are correctly connected where necessary. (Tow behind models)
- Connect all electrical plugs.
- Power up monitor and run fan, walk around seeder to ensure air is getting to all units and there are no blockages. Turn fan off when you are happy with even air distribution.
- Calibrate product (it is recommended to use clean graded seed to prevent blockages or bridging).
- Once desired rate is achieved you can fill bins.
- Assess paddock to be planted for conditions and stubble/trash load.
- Set estimated down pressure.
- Lower units drive forward 20m stop and check depth limiter is touching the surface. Try to turn the depth limiter, if the depth limiter can be turned with some resistance pressure is ok. If the depth wheel is not touching the surface more pressure will need to be applied. If you cannot turn the depth limiter excess pressure is being applied and will need to be reduced.
- Check correct depth directly behind the disc is being achieved. Once desired depth and pressure are achieved you are ready to plant.
- Check the rear cover wheel is closing the furrow correctly. If the ground is heavily compacted, you may need to move the wheel closer to the furrow edge. There is also spring adjustment around the pivot at the top of the arm which can be tightened to press firmer. If you are in soft or sandy soil you may need to move the wheel further away from the furrow and reduce spring pressure. *Image Below: Cover Wheel*

Grease Points

Grease all grease points shown on the pictures below.

• Grease every 20 hours – 5 pumps	• Grease every 20 hours - 5 pumps • Rolling bar should be set at different position each greasing interval	• Grease every 20 hours – 5 pumps.

• Grease every 10 hours – 2 pumps. (front pivot)	• Grease every 10 hours – 3 pumps. (rear pivot)	• Only grease once per season – 5 pumps • Check pre-load of bearings on hub every 100 hours. If loose re-tighten. Wheel nuts should be carefully checked after first 4 hours of work then periodically. See page 25.

MAINTENANCE

- Protective gloves must be worn during assembly or changing of discs.
- If replacing components try to work in an area which is clean and dry.
- Never lubricate service or adjust machine while it is moving.
- Securely support all machine elements; these must be raised for service work.
- Always use a safety support when working on, under or around the machine.
- If support is not available, completely lower the wings and openers.
- Keep all parts in good condition and properly installed and fix any damage immediately.
- Replace worn or broken parts.
- Remove any build-up of stubble/soil or debris.
- Disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.
- Service tyres check wheels for correct pressure (see chart on page 25), cuts, bubbles, damaged rims or missing lugs. 40 psi – 2.7bar @ 30km.
- When inflating tyres, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tyre assembly. Use a safety cage if available.
- Check wheel nuts are tightened to correct specifications - See chart on page 25.
- When replacing a tyre ensure the machine is parked on a flat area with wings unfolded prior to removing.
- **Never weld or heat a wheel and tyre assembly.** The heat can cause an increase in air pressure resulting in a tyre explosion. Welding can structurally weaken or deform the wheel.
- If hydraulic hoses or cylinders have air in the system, bleed the system before use. If there is a failure in the hydraulic system, unsupported raised equipment could lower itself, causing serious personal injury or death.

IMPORTANT

- Tighten all bolts, U-bolts and cap screws **after 10 hours** of operation, and again at the end of the first week, or after **50 hours** of operation. All bolts are to be then tightened periodically.
- Checking bolts on machine are all part of GENERAL servicing and are responsible of the owner or operator.

CLEANING & STORAGE

1. Wash the machine with pressure washer and store undercover on a level hard surface in a dry place.
2. If storing outdoors, place a wooden board under the discs to prevent them from resting in the ground and rusting.
3. Use oil or grease as anti-rust to coat discs, and then lower onto a wooden board.
4. Lubricate entire machine as specified in the lubrication section of this manual.
5. Check for loose or damaged parts; replace and tighten as needed.
6. Scratches should be re-painted as necessary to prevent rust.
7. Make sure no fertilizer or seed debris is on the machine, as they are treated with chemicals that could damage the machine paint and rubber hoses.
8. It is recommended to drain a small amount of oil from the hydraulic hoses when disconnecting the seeder from the tractor. By draining 60ml from the hoses will reduce the opportunity of pressure build up in the hoses which will prevent seal damage

IMPORTANT NOTICE: Unit components work together to open the furrow, place the seed and close the furrow. Adjusting one of these actions can affect the other two, so additional adjustments may be needed to achieve desired seed placement.
After making any adjustments to unit components, a short test planting is recommended to ensure that changes have the desired effect.
Check seed placement periodically and whenever planting conditions change. Depending on soil/field conditions, adjust settings as needed to achieve correct seed placement.

REPLACING DISCS/SEED BOOT

Disc and seed boot are often overlooked, this can cause blockages in the field particularly in moist conditions where stubble/trash retention is high. Using a 15” (380mm) x 4mm disc gives great wear life but some minor adjustments should be made as the disc wears down.

As the disc wears it is necessary to check the 2 discs touch at the front (should touch 15-20mm). If the discs do not touch it can leave a bone in the furrow compromising seed placement. To repair this, you will need to remove the shim from behind the disc axle.

It is also suggested to check the internal scrapers between discs have a small amount of pressure against the disc and the depth limiter scraper is to the inside corner of the limiter and disc. This will prevent blocking the internal seed tubes and help to maintain consistent seed depth.

Discs should be replaced when they reach a diameter of 14” (350mm).

There are 3 different limiter sizes available:
15mm (hardly used), 25mm and 40mm.

Most machines are set up with 25mm limiters as the discs begin to wear the 25mm limiter can be replaced with 40mm limiter extending the disc wear life.

Contact Serafin Machinery Parts Department on (02) 6963 5588 for all disc and parts purchases.

DEPTH CONTROL RINGS

15mm depth limiter
- Maintains the depth of the seed at approx 1.5cm. (½")

25mm depth limiter
- Maintains the depth of the seed at approx 2.5cm (1")
*STANDARD FITMENT ON MOST NEW MACHINES

40mm depth limiter
- Maintains the depth of the seed at approx 4.0cm (1 ½ ")

60mm depth limiter
- Maintains the depth of the seed at approx 6.0cm (2 ½")

TITAN ANDYS AUSTRALIAN PTY. LTD.

RECOMMENDATIONS FOR TORQUE SETTINGS & INSPECTION INTERVALS

MINIMUM RECOMMENDED TENSION INTERVALS FOR AGRICULTURAL WHEELS

	INITIAL FITMENT
RETENSION AT	4 HOURS OF OPERATION
	8 HOURS OF OPERATION
	24 HOURS OF OPERATION
	48 HOURS OF OPERATION

Alternatively, after the first 50km and subsequently every 100km, the stud bolt nuts are to be tightened by means of a dynamometric key and with the torque values listed below. Male and female treads are to be dry, however a small amount of anti-corrosive oil covering is permitted. Ongoing inspection and **retention** should be done in accordance with the daily wheel/tyre inspection procedures. These inspection periods may vary depending on vehicle operating conditions.

RECOMMENDED TORQUE VALUES FOR TITAN ANDYS AXLES

METRIC WHEEL STUDS

STUD SIZE	**TORQUE**
M12	75 ft.lbs (101 N.m)
M14	125 ft.lbs (169 N.m)
M16	175 ft.lbs (237 N.m)
M18	**255 ft.lbs (345 N.m) – Common Sizes**
M20	**375 ft.lbs (508 N.m) – Common Sizes**
M22	475 ft.lbs (644 N.m)
M24	565 ft.lbs (766 N.m)

IMPERIAL WHEEL STUDS

7/16”	60 ft.lbs (81 N.m)
1/2”	85 ft.lbs (115 N.m)
9/16”	135 ft.lbs (183 N.m)
5/8”	180 ft.lbs (244 N.m)
3/4"	295 ft.lbs (400 N.m)
7/8”	485 ft.lbs (657 N.m)

TYRES

Standard – 400/60 x 15.5 OR 500/45 x 22.5

Speed	1.6 bar (23 PSI)	1.8 bar (26 PSI)	2.0 bar (29 PSI)	2.2 bar (32 PSI)	2.4 bar (35 PSI)	2.6 bar (38 PSI)	2.8 bar (41 PSI)	3.0 bar (44 PSI)	3.2 bar (46 PSI)	3.4 bar (49 PSI)	3.6 bar (52 PSI)	3.8 bar (55 PSI)	4.0 bar (58 PSI)	4.1 bar (59 PSI)	62psi	65psi	68psi
50 FR	1625	2070	2380	2700	2995	3285	3555	3825	4105	4390	4650						
40 FR	1805	2300	2645	3000	3325	3650	3950	4250	4565	4875	5165						
10 FR	2380	2980	3390	3820	4240	4635	5030	5415	5770	6140	6515						
10 C	2225	2715	3040	3365	3690	4015	4335	4650	4965	5260	5560	5860	6155	6465	6780	7075	7375

ROW UNIT – TATU Double Disc

Seed & Fertilizer Row Unit fitted with 2 x offset 15"" plain disc coulters. The leading disc & reduced angle gives better penetration, less soil disturbance and zero hair pinning in heavy stubble residue. It has proven penetration through corn, sorghum & barley stubble. Cast depth closing wheel is independent to the discs and the limiter. NG cast closing wheel is independent to the disc which is very important in rocky and varying soil conditions. This closing design avoids crusting and eliminates air pockets giving perfect germination. Lastly, the long spring design allows the unit to independently follow changing ground conditions such as rocks, contour banks & melon holes.

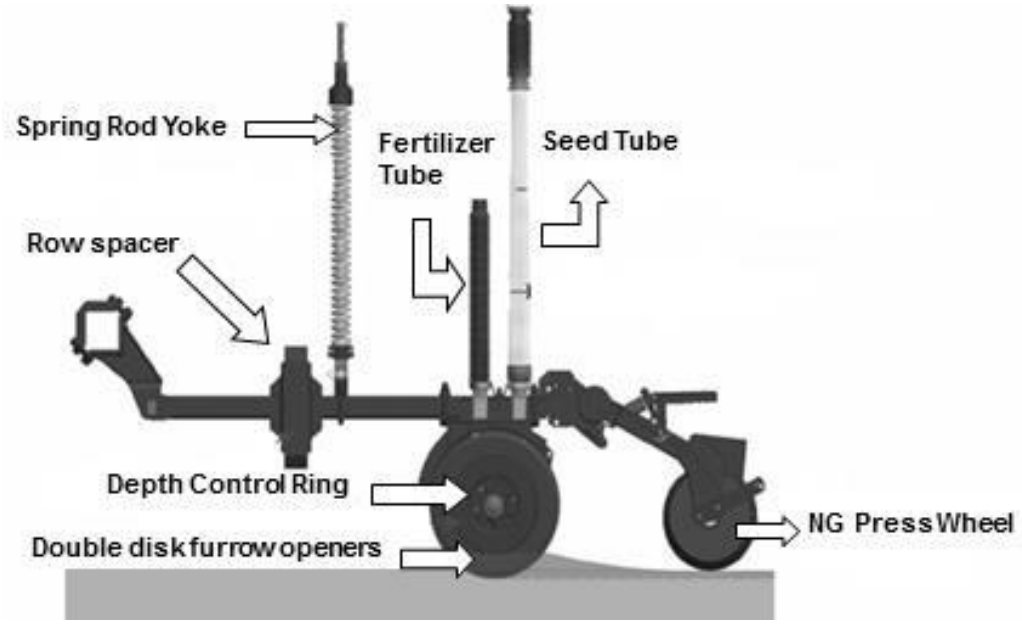
WORKING DEPTH: 15mm to 40mm (With limiters on)
ROW/DISC SPACING (MM): 155mm minimum
WEIGHT (KG): 68KGS
HP REQUIREMENT: 5HP per row

ROW UNITS

All TATU models have a great fluctuation, made possible by the pivot row units. With this system, you are able to sow efficiently in different kinds of terrains and soils.

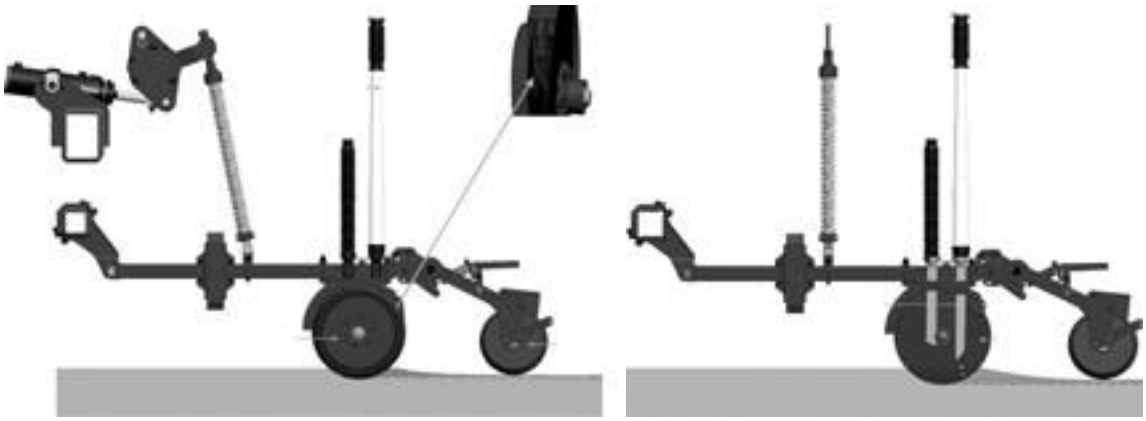
The NG press wheels gently firms around the seed, without compacting the soil directly above it. This process eliminates air pockets, avoids crusting and creates good seed-to-soil contact. Seeds get the best shot at quick germination at an even stand.

ROW UNIT COMPONENTS



SEED AND FERTILISER OPENERS

TATU models are equipped with pivot row units which permit it to have a lot of travel.
Each row unit has three down force springs which are independently used in different soil types during the sowing process.
A double disc opener is used on each row unit to provide a furrow for placing seed, grains and fertiliser.



SEED AND FERTILISER OPENERS

The TATU models have only one furrow opener, with offset 15” double disc for seeds and fertiliser. The seeds/fertiliser are distributed through the same conductor on the Pasture King air seeder.

DEPTH CONTROL RING SCRAPER

For the 15”, 25” and 40” rings, use the straight scraper.

NOTE: The scrapers are all the same, but the supports are different. There are right scraper supports and the left scraper supports.

For 60” depth control rings you need to use a special twisted scraper, these scrapers influence the seed depth.

The depth control rings must always be clean.

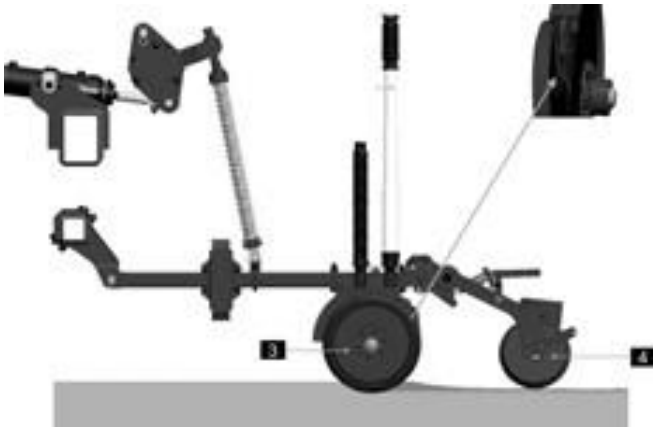
PRESS WHEELS

The NG Cast Press Wheel is specially designed for great seed-to-soil contact, promoting the best germination. Perfect to match all kinds of soils and sowing conditions.

It simultaneously closes the seeds and firms it into the bottom of the furrow. The down pressure on the press wheel can be adjusted in 3 positions without the use of a wrench.

DOWN FORCE SYSTEM

Down Force Adjustments – there are three down force springs on each row unit. Remove the springs, always starting with the bigger spring for less pressure or add a bushing on the rod yoke for more pressure.



The TATU Double Disc opener uses 3 springs for disc pressure on each row unit. This is an important system to ensure a consistent and proper seed depth control. If you are working in lighter soil conditions you can control the pressure by the hydraulic cylinder or by removing springs. To remove springs, you have to always start from the external spring (big one).

For More Pressure

Add the bushing at the bottom of the springs, between the stop holding and the springs support.

REMOVING SPRINGS

1- Lower the row units.

2 – Take the cotter pin and stoppers out.

3 – Lift up the row units until the spring rod yoke comes out from the guide.

4 – Remove the down pin from the rod. Take the whole set and remove the big external spring out.

After this, put everything back again, in order as it was removed.

GASON QUICK REFERENCE GUIDE

QUICK REFERENCE GUIDE

GASON VRT HYDRAULIC DRIVE METERING SYSTEM WITH FARMSCAN AG 7500 MONITOR Software Version 2.16.06

Calibration Procedure.

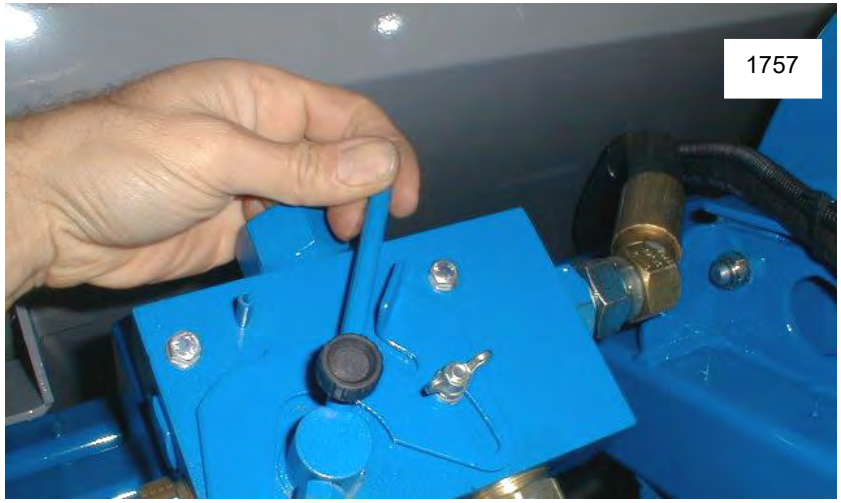
1. Change meterbox settings to suit product being sown.

   Low application rates (below 15 kg/ha)
   -fit metershaft sleeves/restrictor plates (refer manual).
   -use low sprocket ratio drive.

   Medium to High application rates (above 15kg/ha)
   -Select either low or high ratio sprocket drive (refer manual).

2. Place at least 2 bags of the appropriate product in the bin being calibrated.

3. Disengage fan by shutting off flow at the flow control valve located next to the fan. Rotate the handle anti-clockwise to shut off.



4. Now turn monitor on at the tractor.

5. Select new Job (paddock) or reset a previously used one. This can be done by entering 'Jobs Menu' via the 'Setting Menu' screen. Refer to the Farmscan Ag 7500 operators' manual for further details.

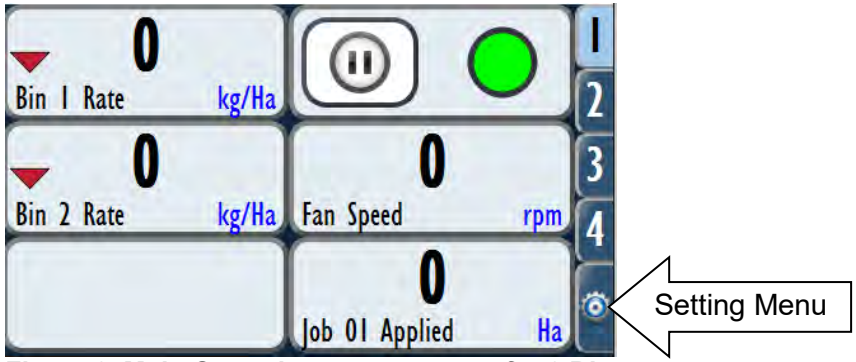


Figure 2. Main Operating screen set up for 2 Bin

Figure 3 'Setting Menu' screen

6. Calibrate seeder meterbox's for product to be sown from the 'Setup Menu' (Refer Fig. 4,5 & 6) :-
   a) Select bin to calibrate (1,2 or others)
   b) Input application rate (eg. 60 kg/ha).
   c) Input increment steps (eg. 5 kg/ha).
   d) Select product for that bin (WHEAT B1) or create a new product name.
   e) Add product details such a Bulk Density (Optional).
   f) Calibrate product to determine calibration 'Factor' (pulse/kg)

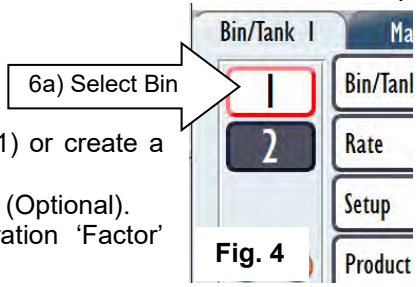


Fig. 4

WARNING! SWITCH TRACTOR OFF BEFORE WORKING ON THE SEEDER'S METERING SYSTEM. METERSHAFT AND MOTORS COULD TURN AT ANYTIME.

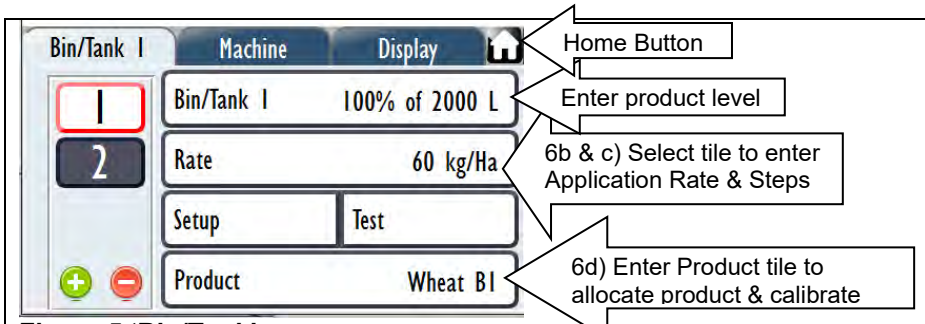


Figure 5 'Bin/Tank' screen

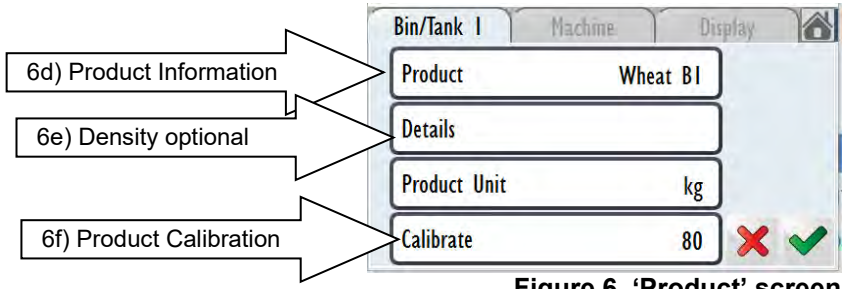


Figure 6 'Product' screen

7. Preparing to run a product calibration test:-
a) If setting up a new product with no previous calibration 'Factor', enter a manual factor of 80 to allow the system to operate.

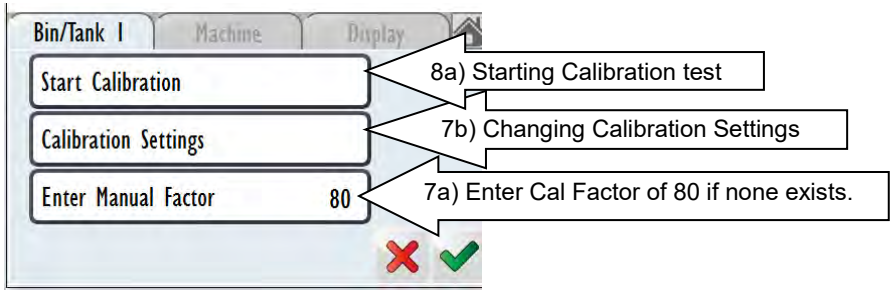


Figure 7 'Calibrate' screen

b) If bin has not previously been calibrated, enter the 'Calibration Settings' (refer Fig. 7) to check settings suit your requirements. It is possible to select either 'Weight', 'Count' or 'Time' (refer Fig.8) as the Calibration Method. In most cases selecting Weight is the preferred setting where you will be asked to enter a desired sample weight to be metered. 'Calibration Rate' should reflect actual paddock rate and 'Simulation Speed' set to your average seeding speed.

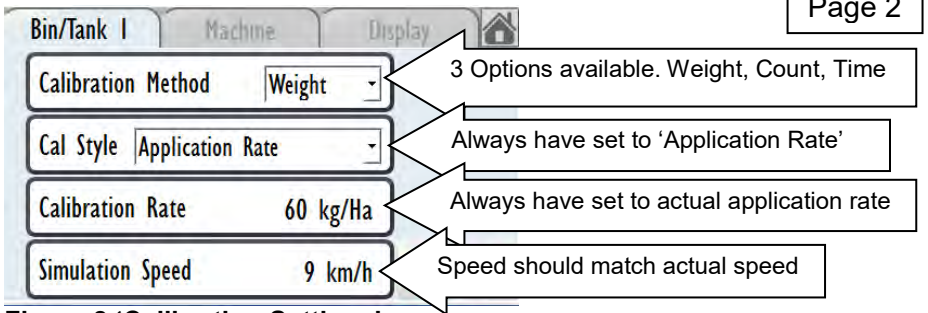


Figure 8 'Calibration Settings' screen

NOTE: The most accurate calibration results will be achieved if settings simulate actual in paddock conditions.

8. Starting the Calibration test (refer Fig. 7 & 9):-
a) Enter the Calibration process by pressing 'Start Calibration' (Fig. 7).
b) Enter the weight in kg's you wish to collect during the calibration. Depending on your product type, 0.5kg for small seeds in the pasture planter and 2 - 4kg's for cereal and fertilizer in the main bins.

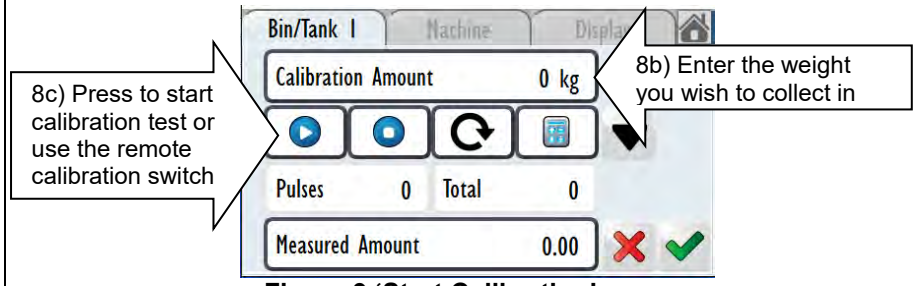


Figure 9 'Start Calibration' screen

c) With the seeder prepared, tractors hydraulics engaged, fan turned off at the seeder, calibration tray fitted to the meterbox and meterwheel's primed, you can either start the metering system at the monitor by pressing the start button or go to the seeder and press the remote calibration button (Fig.10).

Fig. 10

Pressing once to start the calibration. Pressing a second time will stop the hyd. motor. This can be useful if the tray overflows.

9. Entering the sample weight (Refer Fig.10):-
Weigh sample of product on scales supplied. If there is any concern about how reliable the sample test was, run the test again. You can run several tests from the seeder before entering a weight by using the calibration button at the seeder to stop and restart tests.
NOTE:- It is the responsibility of the operator to check the accuracy of the scales on a regular basis. Uncertified test weight supplied.

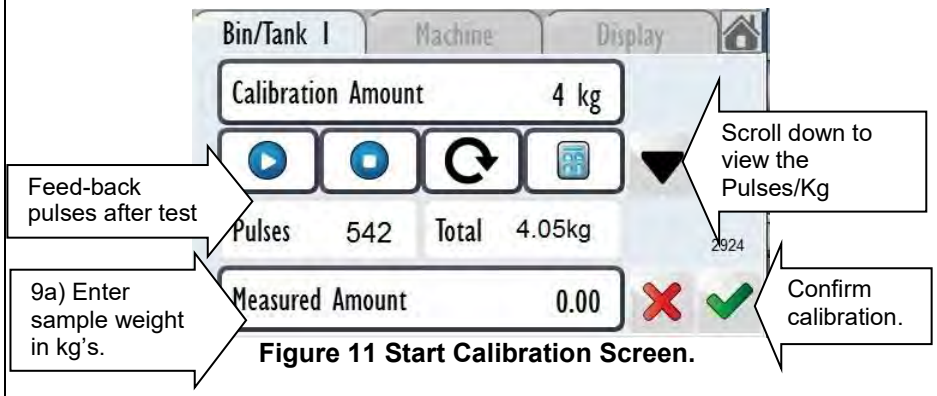


Figure 11 Start Calibration Screen.

a) Enter the sample weight into the 'Measured Amount' tile.
b) You will be asked to confirm that there was a change in the Pulse per kg rate. Press 'Ok' to accept.

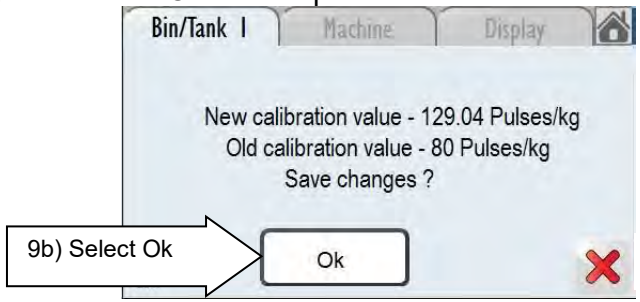


Fig. 12

You can continue with more calibration tests if you wish by repeating the process or leave the calibration area altogether by selecting the green tick & home button. Repeat the process for all bins being used.

Note: If a product has previously been calibrated, the pulses/kg figure will already be assigned to that product. Gason's recommend that the operator should always confirm that this previous figure is still relevant for the particular seed/fertiliser batch and bulk density.

10. When all of the bins have been calibrated return to the main operating screen.

11. Ensure that all the information displayed on the main page is correct. Bins should show the correct application rates. Reset the 'Load Applied' and 'Job Applied' area totals by touching the tile and using the reset function.

12. Re-engage the fan's flow control valve by turning the valve.

13. Start the fan by engaging the tractor's remote system. Check and alter the fan speed if required at the tractor if closed centre hydraulics or at the seeder's flow control valve if open centre hydraulics.

14. To begin seeding operation simply push the RUN/HOLD tile or press the button on the optional remote switch in the cab if fitted.

Brief Trouble Shooting Guide:- (Refer to the Monitor manual for more information).

<u>Reason's why the Monitor will not come off Hold</u>:-
a) Fan has not been engaged or is running below the low fan alarm.
b) Main harness not connected or not responding. Check connections.
c) No ground speed is being detected at the seeder. Check display and sensor distance to target on drive speed wheel.

<u>Reason's why a particular bin does not start</u>:-
a) Bin is switched off.
b) Bin is not calibrated.
c) Monitor has lost vital settings or is not communicating with the Unipod.

<u>Reason's why the desired application rate may not be obtained</u>:-
a) Ground speed too fast.
b) Sprocket ratio needs to be changed. This occurs on the right-hand side of the meterbox. **WARNING!** Switch tractor off before working on the seeder's metering system. Metershaft and motors could turn at anytime.
c) Meterwheel sleeves may still be in place, restricting max. output.
d) Check meterwheel's are not clogged with material.

<u>General checklist before operation</u>:-
a) Sowing width has been recorded in the 'Machine' / 'Measurement' page.
b) The correct wheel factor has also been recorded on the 'Machine' / 'Speed-GPS' / Wheel Sensor' / 'Calibration' / 'm/Pulses' page. This may vary depending on the ground being sown. It is advisable to perform your own test to check the preset value. Refer Air Seeder Operators manual or Farmscan Ag monitor manual for further details.
c) Alarms are functional and have their correct preset values.
-FAN speed alarms, low and high, should be set (refer below).
-BIN sensors should be enabled for all active bins (p/planter not included).

Typical use of Screens/Tiles for a 2 Bin Seeder

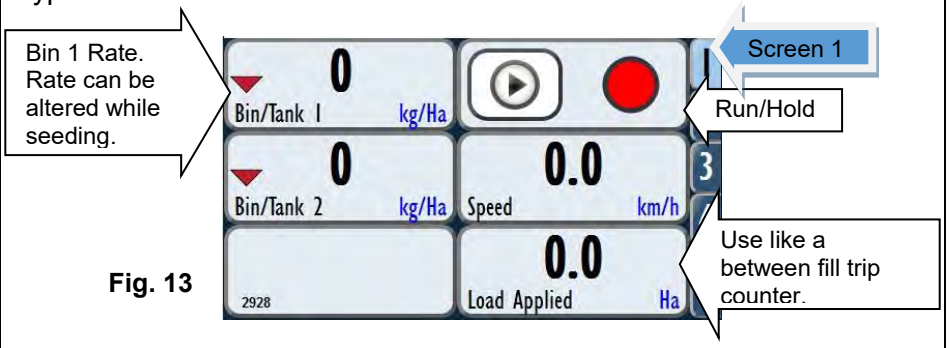


Fig. 13

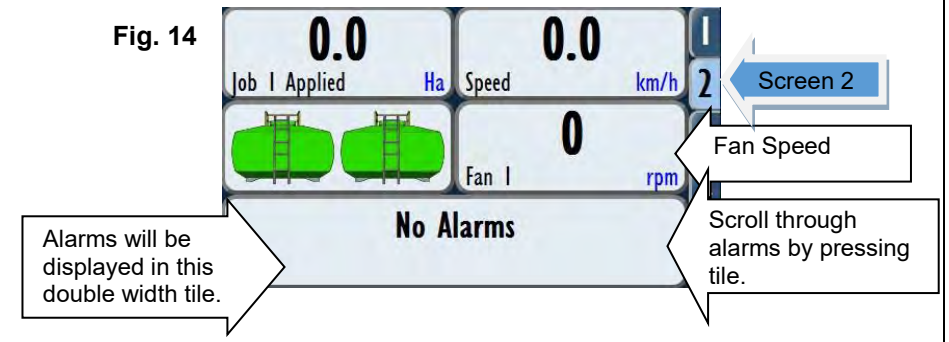


Fig. 14

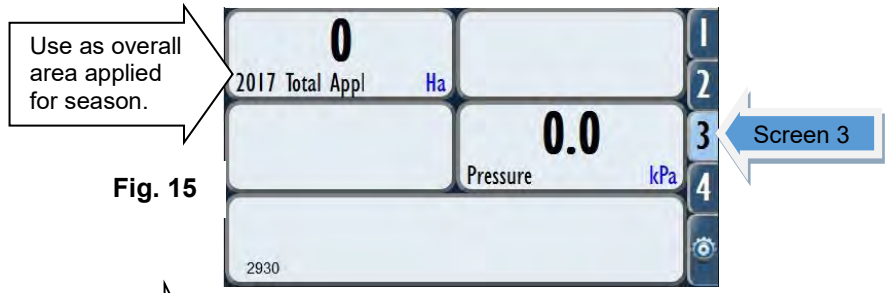


Fig. 15

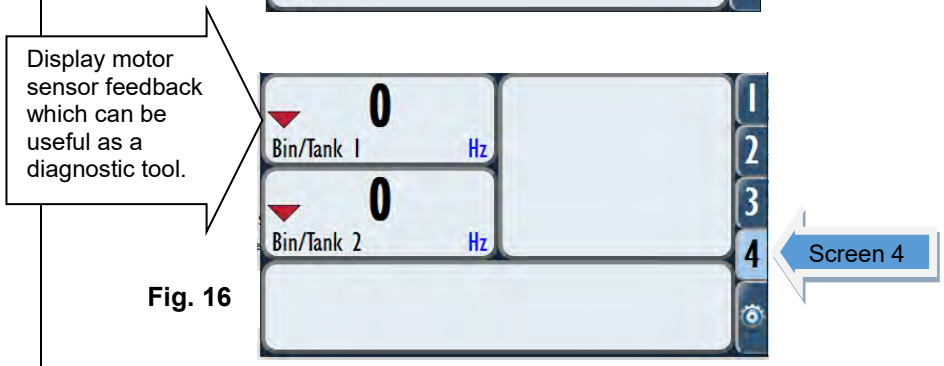


Fig. 16

Typical Factory Monitor Settings:-
'Bin/Tank'-'Setup'-'Control Output' PWMVolt
'Maximum' varies between 6-8 volts
'Minimum' varies between 1.8-2.2 volts
'Advanced Settings' Span 50%
Dead Band 0.5%
Time constant 3s

Implement width:-
'Machine'-'Measurements'-'Width' ~ operator set

Prime Function:-
'Machine'-'Control Speeds'- Minimum Speed 2km/h
Slow Hold Speed 4km/h
Enable Prime ticked
Prime Time Mode Set Time (Constant)
Prime Time 5s
Prime Speed 7km/h

Bin Level Function:-
'Machine'-'Auxiliary Setup'- #1:POD#1 Bin/Tank 1 Level Input
#2:POD#1 Bin/Tank 2 Level Input
If 3 bin seeder
#3:POD#1 Bin/Tank 3 Level Input

Fan Speed Sensor:-
'Machine'-'Fan Setup'- 'No. of Fans' 1
'Fan 1 Setup' 'Sensor Type' AA-112C/P
'Pulse/Revolutions 1

Air Pressure Sensor:-
'Machine'-'Pressure Sensor'- 'Pressure Sensor #' 1
'Select Type' 2080

Alarm Settings:-
'Low Fan 1–RPM'-Critical-Run Only-Manual Reset-Minimum 2600rpm
'High Fan 1- RPM'-Normal-Always-Automatic-Maximum 4550rpm
'Bin # Rate-%'-Normal-Run Only-Automatic-Maximum 10%
'Bin # Level Low-T/F'-Normal-Always-Automatic-T/F
'Bin # Shaft Stopped-T/F'-Critical-Run Only-Manual Reset-T/F

For Further information:-
Refer to the Farmscan Ag 7500 Seed Rate Controller Operators Manual. Comprehensive instructions are in the manual regarding all aspects of the various monitor's features.

TROUBLESHOOTING

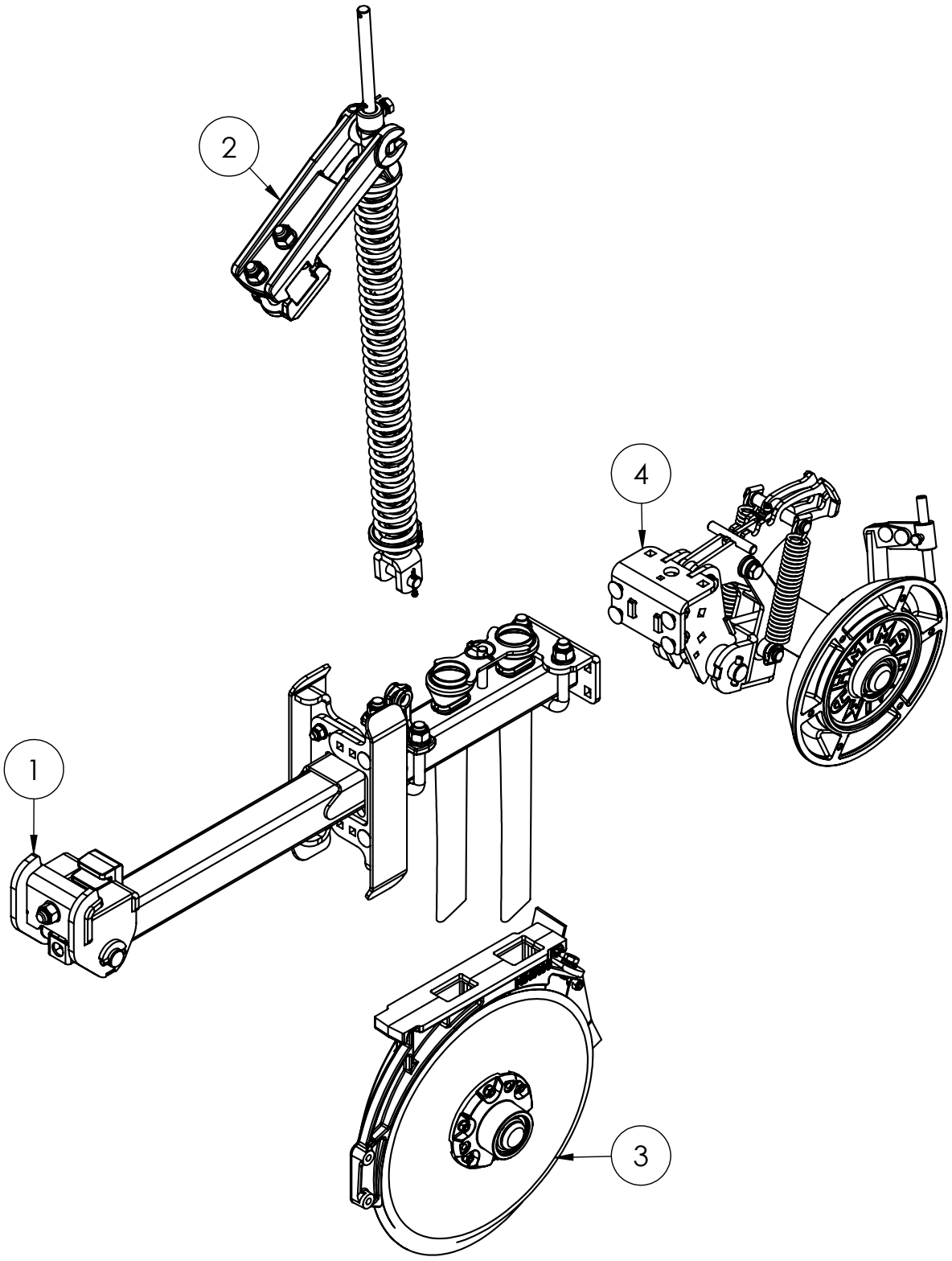
PROBLEM	POSSIBLE CAUSE	POSSIBLE REPAIR
Plant Misses No seed in Slot	• Air leaks on bin lids or metering box • Blocked seed boot • Blocked hoses	• Fan speed • Check airflow at base of seed boot and clean if necessary – check seed hoses
Plant Multiples	• Bridging in seed box • Bridging in seed boot • Kinked hoses	• Seed not graded. • Need to fit ½ plate over meter rollers to improve seed flow. • Ensure hoses are free flowing to the boot, check for crushed/pinched hoses around fold areas and replace if necessary.
Seed out of furrow	• Excess air speed (seed bounces) • Press wheel picking up seed • Seed boot partially blocked at bottom of boot with soil • Thick stubble causing hair pinning	• Reduce air speed or fit diffusers if this cannot be achieved. • Conditions may be too wet. • Clean seed boot. • Need to set depth deeper to achieve soil/seed contact.
Units Bulldozing Trash/dirt building up	• Too much hydraulic down pressure (units may lift wheels off the ground)	• Reduce pressure to a point you can almost turn depth wheels by hand. (Optimum pressure 500psi) • Sandy soils down to 350 psi
	• Fallon Soils / Sandy soils	• Remove outer spring (large) from row unit.
	• Excess disc wear • Disc worn below 14”	• When discs wear the unit must roll around further and will not allow trash to flow through, this also exposes the bottom of seed boot to soil and trash build up.
Poor disc penetration	• Worn blunt discs • Hard soil conditions • Depth wheel not adjusted correctly	• Replace discs at 14” • Raise unit pressure (avoid using pressure 1000psi & above for long periods as unit damage may occur)
	• Deep stubble	• You may need to use deeper setting (change / remove depth limiter) than usual on the unit, this will also help with hair-pinning. (Seed left on top of ground)
	• Excess disc wear	• Replace discs if close to 14"

Cover wheels not closing or throwing too much soil or lifting seed from slot	• Cover wheel too far away from furrow	• Adjust /slide cover wheel to get desired fill. Soil conditions may vary. Eg: Sandy soil requires less spring pressure & further away from slot. Dry clay soil, more spring pressure required and closer to furrow
		• Less spring pressure, too close to furrow, excess ground speed (9-10km/h).

Stubble & dirt build up between disc & seed boot	• Internal scrapers worn	• Tighten or replace internal scrapers
	• Stubble & soil may be too wet.	• In heavy dew/ fog conditions you may need to wait until it dries a little
	• Too much hydraulic pressure same as bulldozing	• Reduce pressure if possible

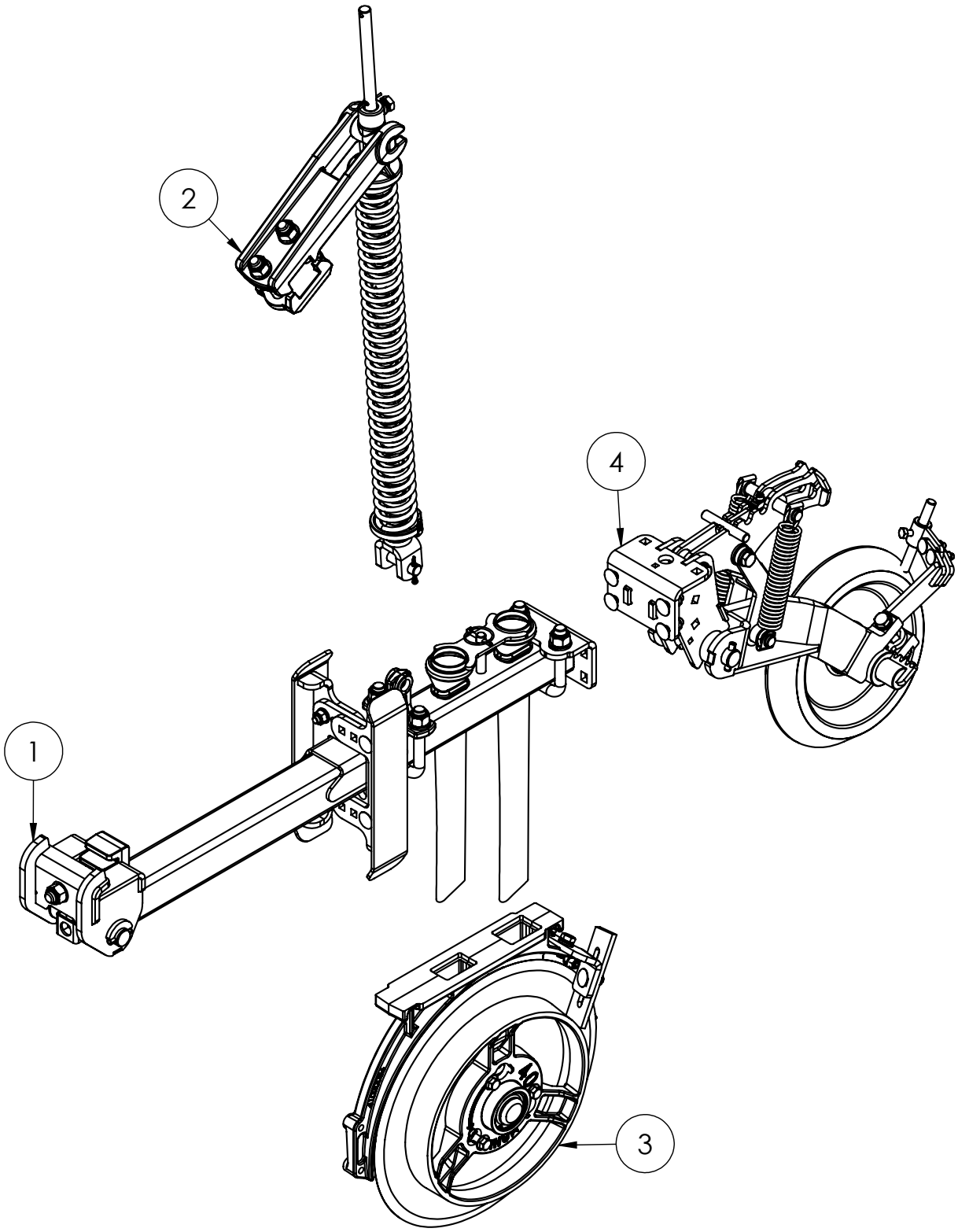
Uneven seed placement. Seed on top of ground	• Seed boots worn running in soil & partially blocking	• Check disc wear.
	• Too much ground speed. (disc may grab seed & soil & throw)	• Reduce speed to approx. 9 kms/hr
	• Too much air, seed bouncing out.	• Reduce fan pressure.
	• Not enough air.	• Increase air if hoses are curved/bent so they don't build up and with enough vibration all fall to seed boot together.
	• Heavy stubble	• Set depth deeper than usual to allow seed to fall into furrow.

41029755 - SHORT STRAIGHT ARM SINGLE PIVOT ROW UNIT/ RIGHT-HAND D. DISC OPENER 15" x 16" W/ **15mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.
41029757 - SHORT STRAIGHT ARM SINGLE PIVOT ROW UNIT/ RIGHT-HAND D. DISC OPENER 15" x 16" W/ **25mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.
41029759 - SHORT STRAIGHT ARM SINGLE PIVOT ROW UNIT/ RIGHT-HAND D. DISC OPENER 15" x 16" W/ **40mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.



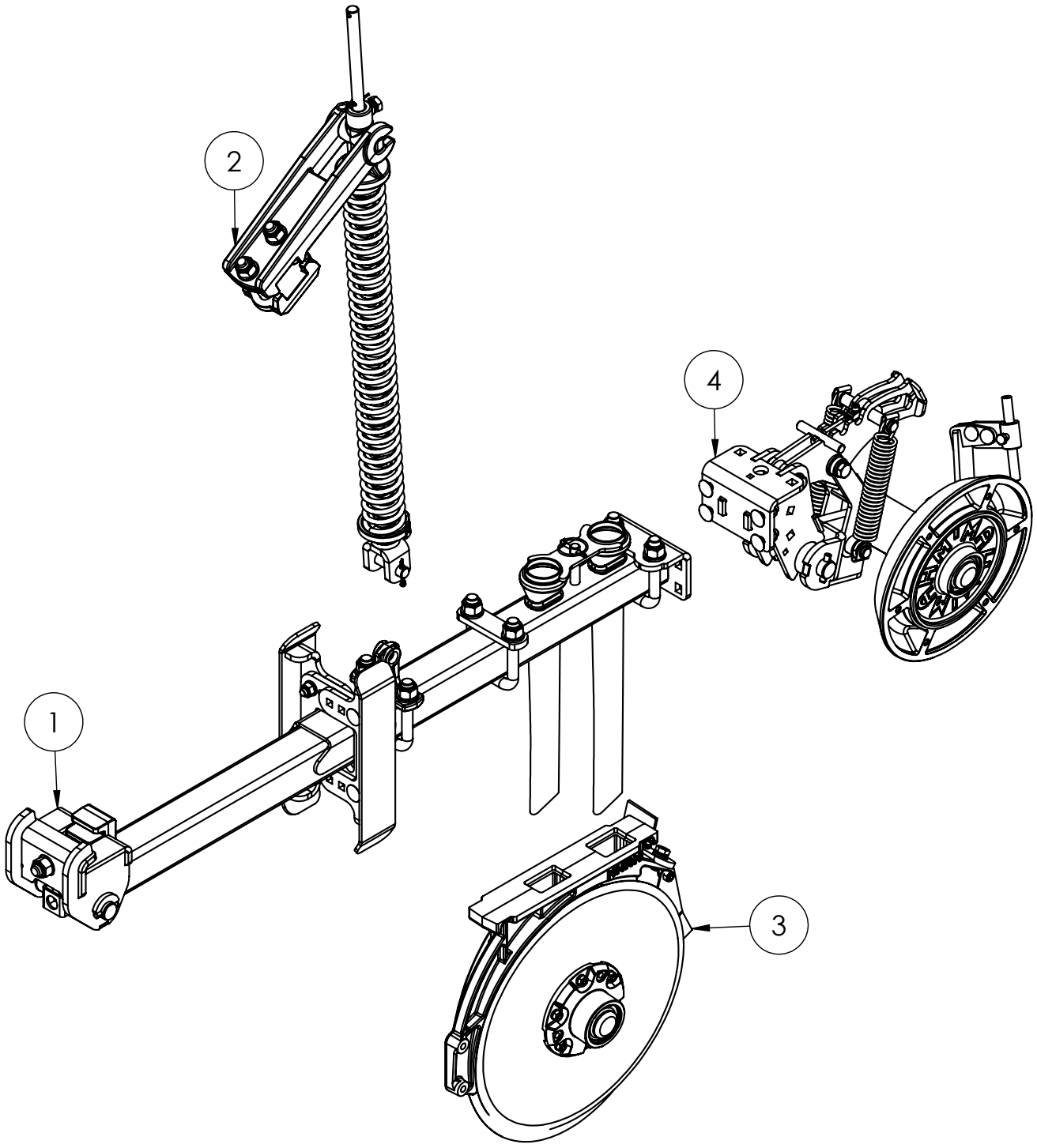
REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029551	SHORT STRAIGHT ARM SINGLE PIVOT SET	1
2	41029553	SPRINGS LOADING SET	1
3	41029561	RIGHT-HAND D. DISC OPENER 15"x16" - 15mm DEPTH CONTROL RING SET	1
4	41029566	LEFT-HAND PRESS WHEEL SET	1

41029756 - SHORT STRAIGHT ARM SINGLE PIVOT ROW UNIT/ LEFT-HAND D. DISC OPENER 15" x 16" W/ **15mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.
41029758 - SHORT STRAIGHT ARM SINGLE PIVOT ROW UNIT/ LEFT-HAND D. DISC OPENER 15" x 16" W/ **25mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.
41029760 - SHORT STRAIGHT ARM SINGLE PIVOT ROW UNIT/ LEFT-HAND D. DISC OPENER 15" x 16" W/ **40mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.



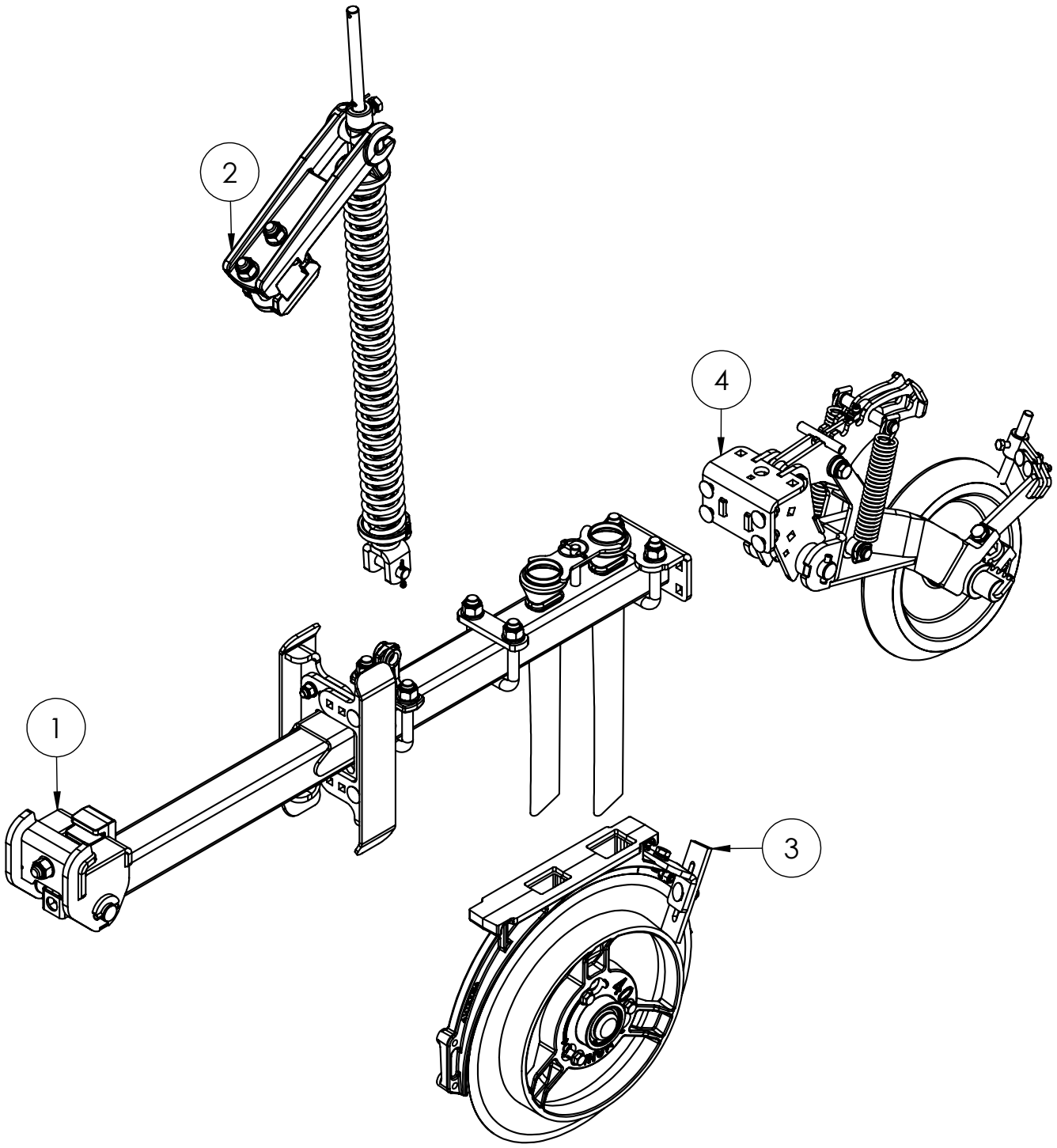
REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029551	SHORT STRAIGHT ARM SINGLE PIVOT SET	1
2	41029553	SPRINGS LOADING SET	1
3	41029562	LEFT-HAND D. DISC OPENER 15"x16" - 15mm DEPTH CONTROL RING SET	1
4	41029565	RIGHT-HAND PRESS WHEEL SET	1

41029855 - LONG STRAIGHT ARM SINGLE PIVOT ROW UNIT/ RIGHT-HAND D. DISC OPENER 15" x 16" W/ **15mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.
41029857 - LONG STRAIGHT ARM SINGLE PIVOT ROW UNIT/ RIGHT-HAND D. DISC OPENER 15" x 16" W/ **25mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.
41029859 - LONG STRAIGHT ARM SINGLE PIVOT ROW UNIT/ RIGHT-HAND D. DISC OPENER 15" x 16" W/ **40mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029552	SHORT STRAIGHT ARM SINGLE PIVOT SET	1
2	41029553	SPRINGS LOADING SET	1
3	41029561	RIGHT-HAND D. DISC OPENER 15"x16" - 15mm DEPTH CONTROL RING SET	1
4	41029566	LEFT-HAND PRESS WHEEL SET	1

41029856 - LONG STRAIGHT ARM SINGLE PIVOT ROW UNIT/ LEFT-HAND D. DISC OPENER 15" x 16" W/ **15mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.
41029858 - LONG STRAIGHT ARM SINGLE PIVOT ROW UNIT/ LEFT-HAND D. DISC OPENER 15" x 16" W/ **25mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.
41029860 - LONG STRAIGHT ARM SINGLE PIVOT ROW UNIT/ LEFT-HAND D. DISC OPENER 15" x 16" W/ **40mm** DEPTH CONTROL RING AND LEFT-HAND PRESS WHEEL ASSEMBLY.



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1	41029552	SHORT STRAIGHT ARM SINGLE PIVOT SET	1
2	41029553	SPRINGS LOADING SET	1
3	41029562	LEFT-HAND D. DISC OPENER 15"x16" - 15mm DEPTH CONTROL RING SET	1
4	41029565	RIGHT-HAND PRESS WHEEL SET	1

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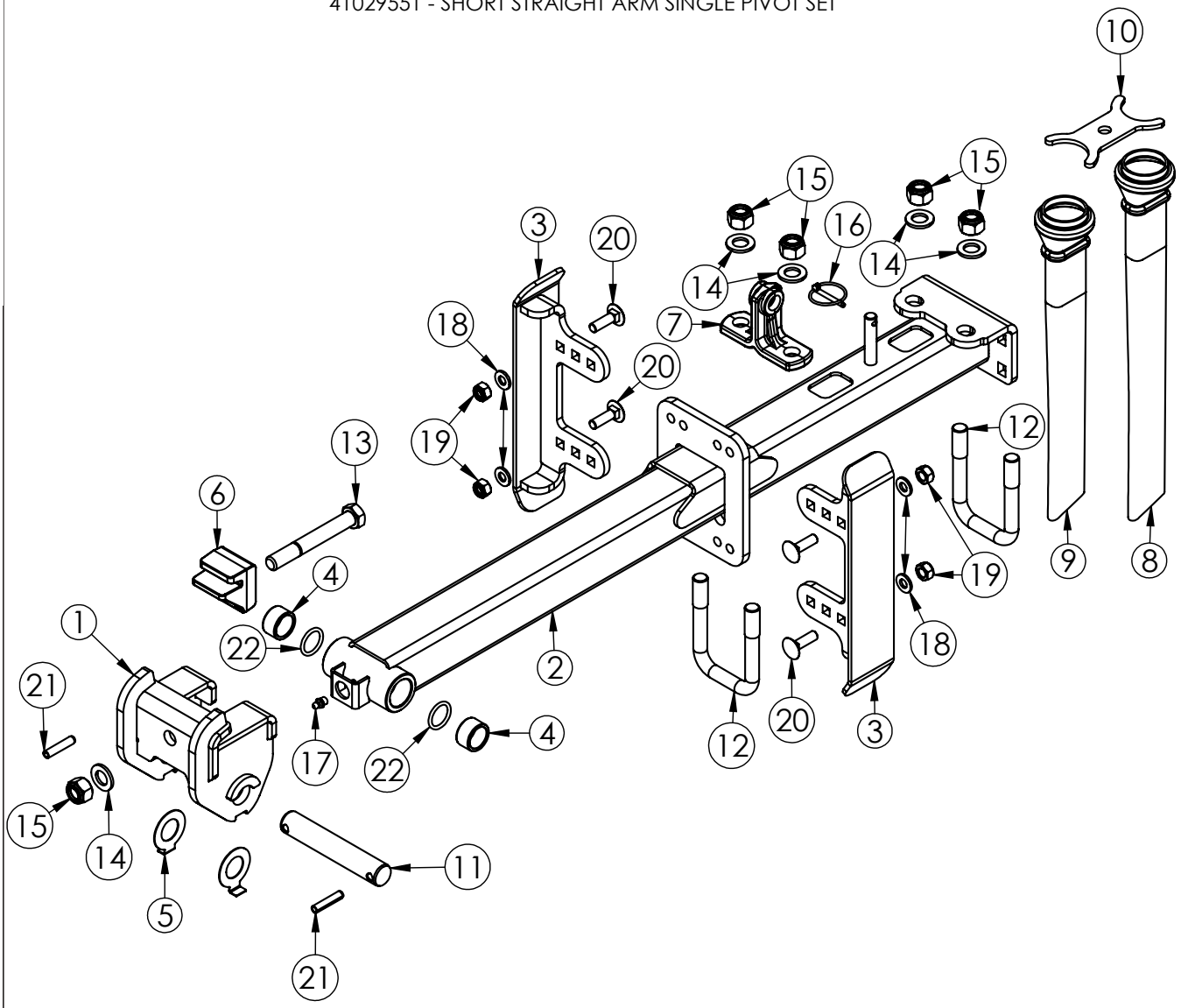
41029551 - SHORT STRAIGHT ARM SINGLE PIVOT SET



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029051	PIVOT ARM SUPPORT	1
2	41029053	SHORT PIVOT ARM FRAME	1
3	41029055	ROW SPACER	2
4	41020015	BUSHING	2
5	41020016	ADJUSTMENT WASHER	2
6	41020019	RETAINER (15070017)	1
7	41020020	'T' BRACKET (15070021)	1
8	41020022	SEED TUBE (25070091)	1
9	41020023	FERTILIZER TUBE (25070092)	1
10	41020024	TUBE LOCK	1
11	41020096	PIN	1
12	91110018	"U" BOLT (SIMILAR 15070012)	2
13	931.088.16.120	HEX. HEAD BOLT DIN931 8.8 M16x120 PT Zn	1
14	125.S2.16	FLAT WASHER DIN125 M16 Zn	5
15	985B.C8.16	LOCKING NUT DIN985 C-8 M16x2.0 Zn	5
16	01000316	SPRING LOADED PIN 3/16" x 1.1/2"	1
17	71412.C1.081	STRAIGHT GREASE NIPPLE DIN71412 M8x1.25 Zn	1
18	125.S2.10	FLAT WASHER DIN125 M10 Zn	4
19	985B.C8.10	LOCKING NUT DIN985 C-8 M10x1.5 Zn	4
20	603.088.10.035	ROUND HEAD SQUARE NECK BOLT DIN603 8.8 M10x35 PT Zn	4
21	1481.08.040	SPRING PIN DIN1481 ∅8x40mm	2
22	3601.2-214	O´RING ISO 3601 W3.53xID24.99	2

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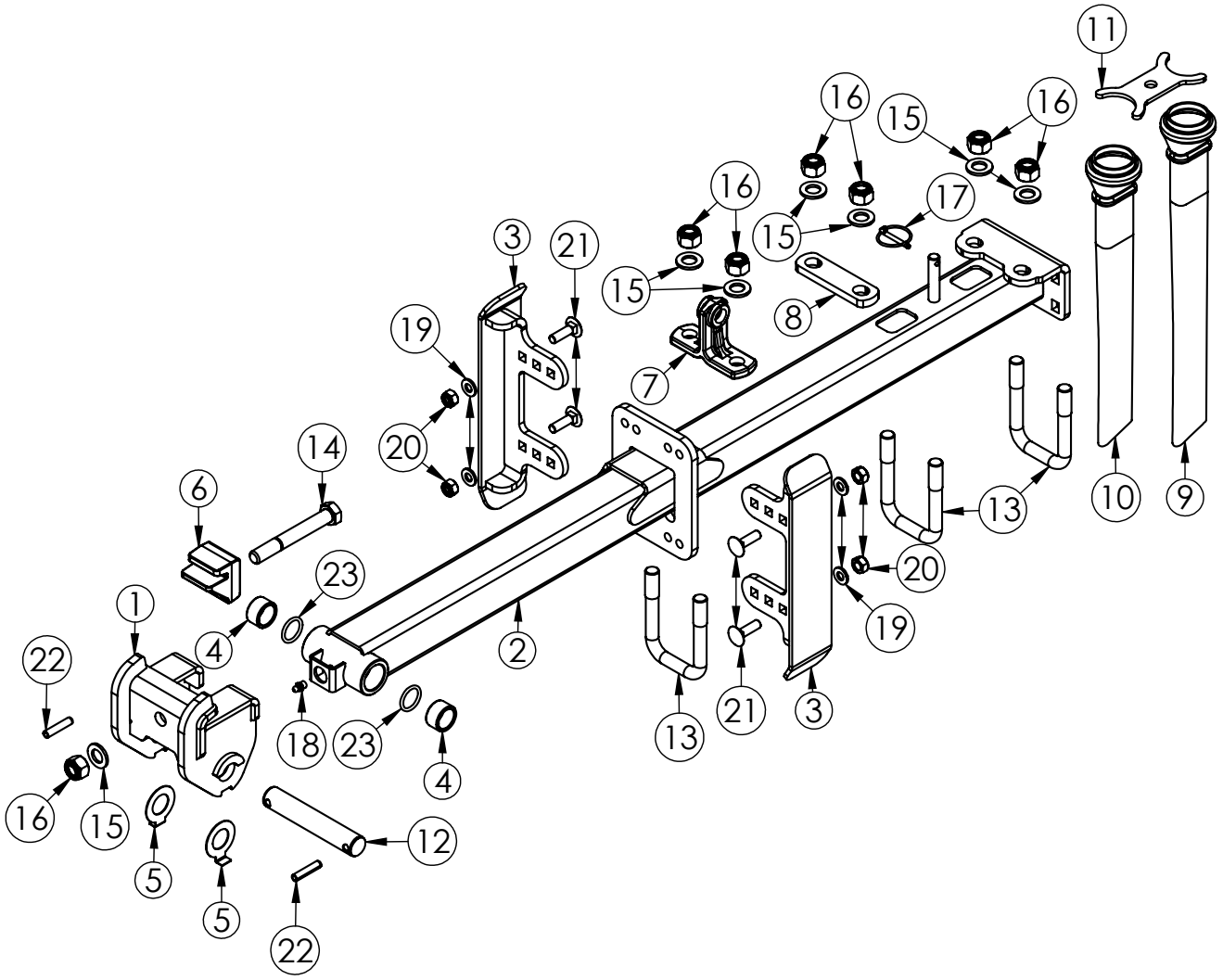
41029552 - LONG STRAIGHT ARM SINGLE PIVOT SET



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029051	PIVOT ARM SUPPORT	1
2	41029054	LONG PIVOT ARM FRAME	1
3	41029055	ROW SPACER	2
4	41020015	BUSHING	2
5	41020016	ADJUSTMENT WASHER	2
6	41020019	RETAINER (15070017)	1
7	41020020	'T' BRACKET (15070021)	1
8	41020021	FLAT BRACKET	1
9	41020022	SEED TUBE (25070091)	1
10	41020023	FERTILIZER TUBE (25070092)	1
11	41020024	TUBE LOCK	1
12	41020096	PIN	1
13	91110018	"U" BOLT (SIMILAR 15070012)	3
14	931.088.16.120	HEX. HEAD BOLT DIN931 8.8 M16x120 PT Zn	1
15	125.S2.16	FLAT WASHER DIN125 M16 Zn	7
16	985B.C8.16	LOCKING NUT DIN985 C-8 M16x2.0 Zn	7
17	01000316	SPRING LOADED PIN 3/16" x 1.1/2"	1
18	71412.C1.081	STRAIGHT GREASE NIPPLE DIN71412 M8x1.25 Zn	1
19	125.S2.10	FLAT WASHER DIN125 M10 Zn	4
20	985B.C8.10	LOCKING NUT DIN985 C-8 M10x1.5 Zn	4
21	603.088.10.035	ROUND HEAD SQUARE NECK BOLT DIN603 8.8 M10x35 PT Zn	4
22	1481.08.040	SPRING PIN DIN1481 ∅8x40mm	2
23	3601.2-214	O´RING ISO 3601 W3.53xID24.99	2

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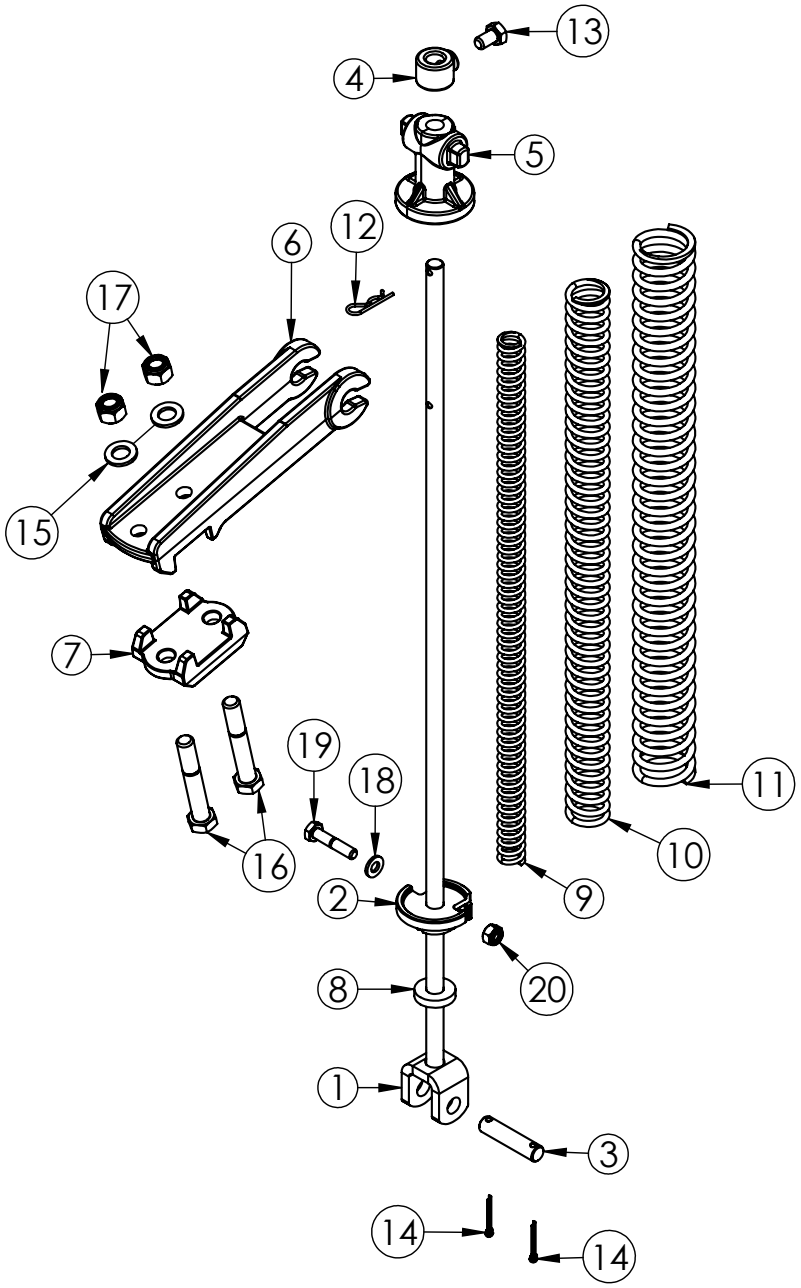
41029553 - SPRINGS LOADING SET



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029056	SPRINGS FORK ROD	1
2	41029058	SPRINGS STAND GUIDE	1
3	41020029	PIN	1
4	41020032	ROUND LOCKING COLLAR (03100022)	1
5	41020093	SPRING ROD GUIDE (SIMILAR 0502010228)	1
6	41020094	GUIDE BRACKET (SIMILAR 0502012523)	1
7	41020095	FLAT RETAINER (SIMILAR 0502012522)	1
8	41020124	FLAT SPACING WASHER	1
9	91020009	INNER COMPRESSION SPRING (SIMILAR 61070009)	1
10	91020010	MIDDLE COMPRESSION SPRING (SIMILAR 61070008)	1
11	91020011	OUTER COMPRESSION SPRING (SIMILAR 61070007)	1
12	GR030050	SPRING LOCKING PIN "R" ∅3,0x50mm	1
13	933.088.12.020	HEX. HEAD BOLT DIN 933 8.8 M12x20 FT Zn	1
14	171.40.032	COTTER PIN ABNT P-PB-171 ∅4,0x32mm	2
15	125.S2.16	FLAT WASHER DIN125 M16 Zn	2
16	931.088.16.100	HEX. HEAD BOLT DIN931 8.8 M16x100 PT Zn	2
17	985B.C8.16	LOCKING NUT DIN985 C-8 M16x2.0 Zn	2
18	125.S2.10	FLAT WASHER DIN125 M10 Zn	1
19	931.088.10.050	HEX. HEAD BOLT DIN931 8.8 M10x50 PT Zn	1
20	985B.C8.10	LOCKING NUT DIN985 C-8 M10x1.5 Zn	1

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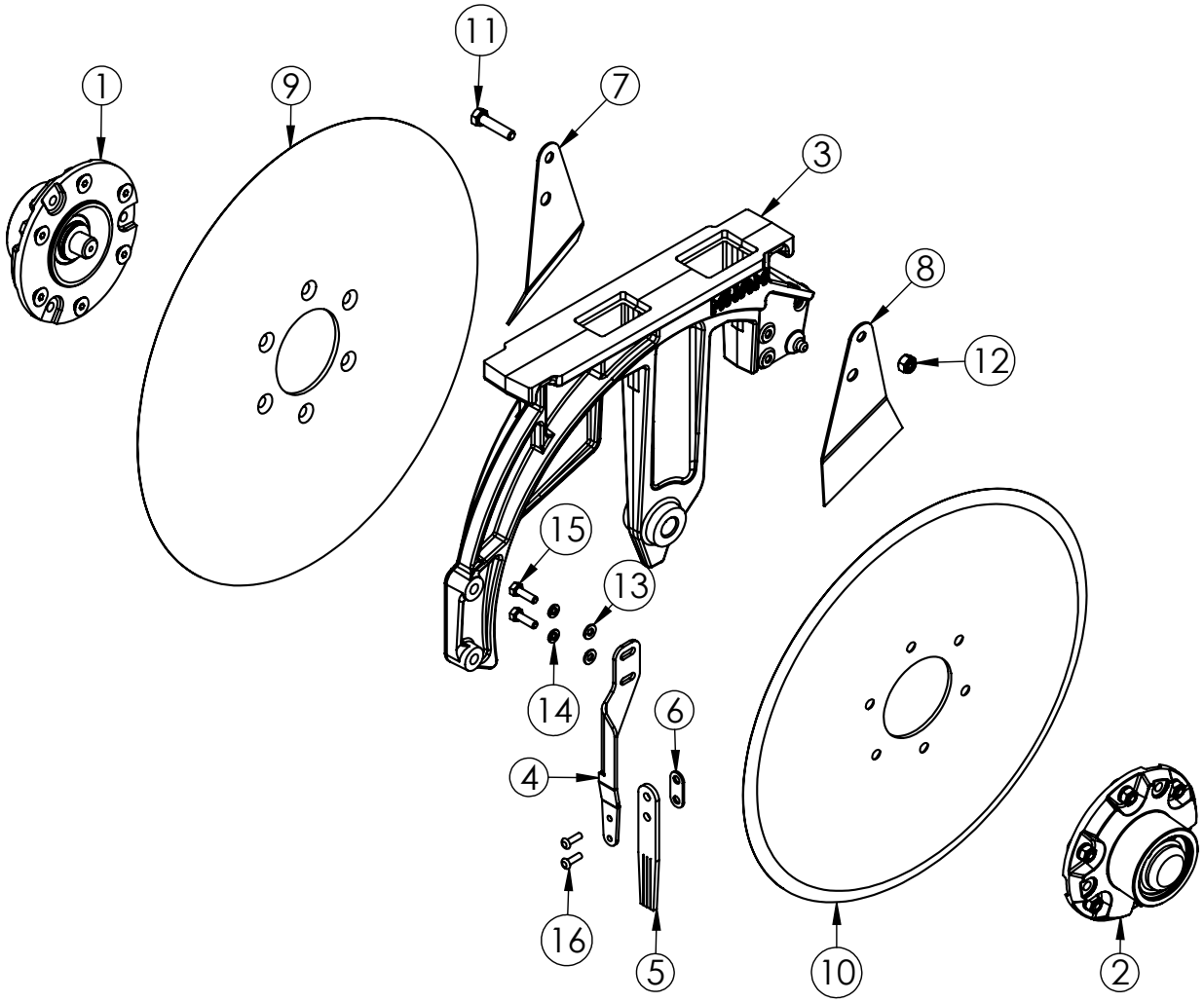
41029555 - RIGHT-HAND DOUBLE DISC. OPENER 15" x 16" SET



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	89009551	RIGHT-HAND HUB SET	1
2	89009552	LEFT-HAND HUB SET	1
3	41020035	RIGHT-HAND OPENER SUPPORT (SIMILAR 25070026)	1
4	41020037	DEFLECTOR BRACKET	1
5	41020038	DEFLECTOR	1
6	41020039	FLAT BRACKET	1
7	41020041	RIGHT-HAND DISC SCRAPER	1
8	41020042	LEFT-HAND DISC SCRAPER	1
9	88014016	FLAT DISC 16" x 4,0mm	1
10	88013515	FLAT DISC 15" x 3,5mm	1
11	933.088.08.035	HEX. HEAD BOLT DIN933 8.8 M8x35 FT Zn	1
12	985B.C8.08	LOCKING NUT DIN985 C-8 M8x1.25 Zn	1
13	125.S2.06	FLAT WASHER DIN125 M6 Zn	2
14	127.006	SPRING WASHER DIN127 M6 Zn	2
15	933.088.06.020	HEX. HEAD BOLT DIN933 8.8 M6x20 FT Zn	2
16	RR048016	UNIVERSAL SOFT RIVET 3/16" x 1/2"	2

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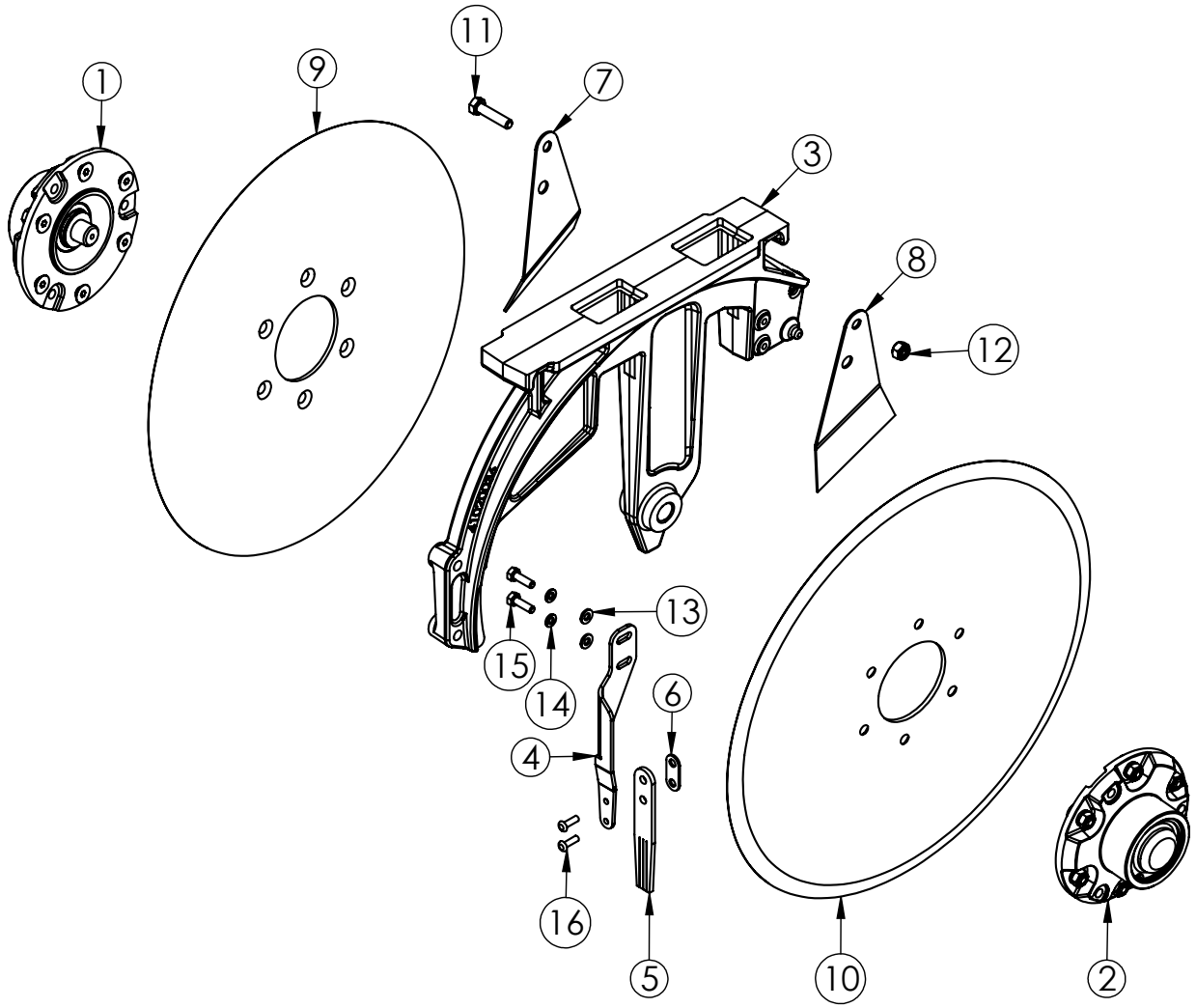
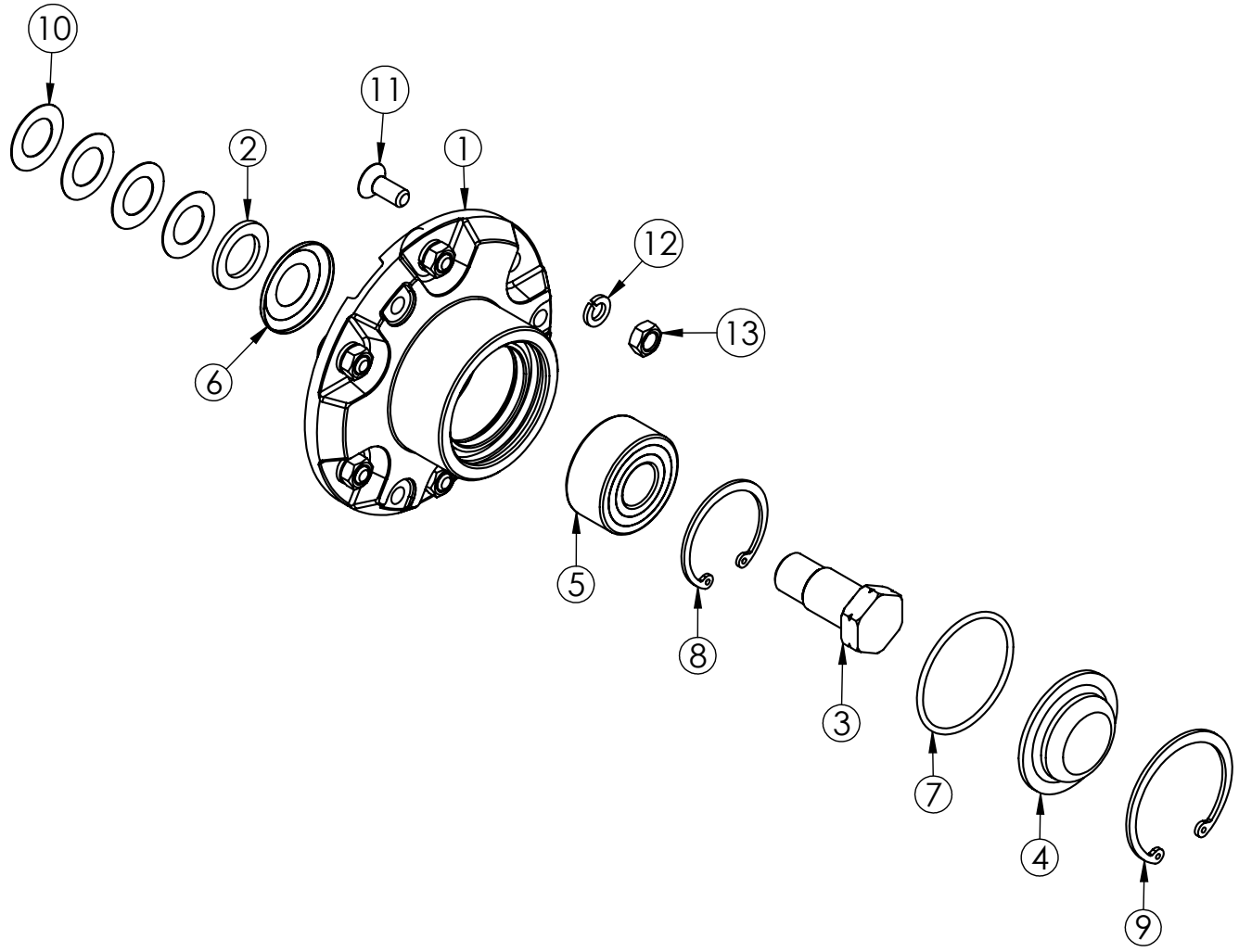
41029556 - LEFT-HAND DOUBLE DISC OPENER 15" x 16" SET



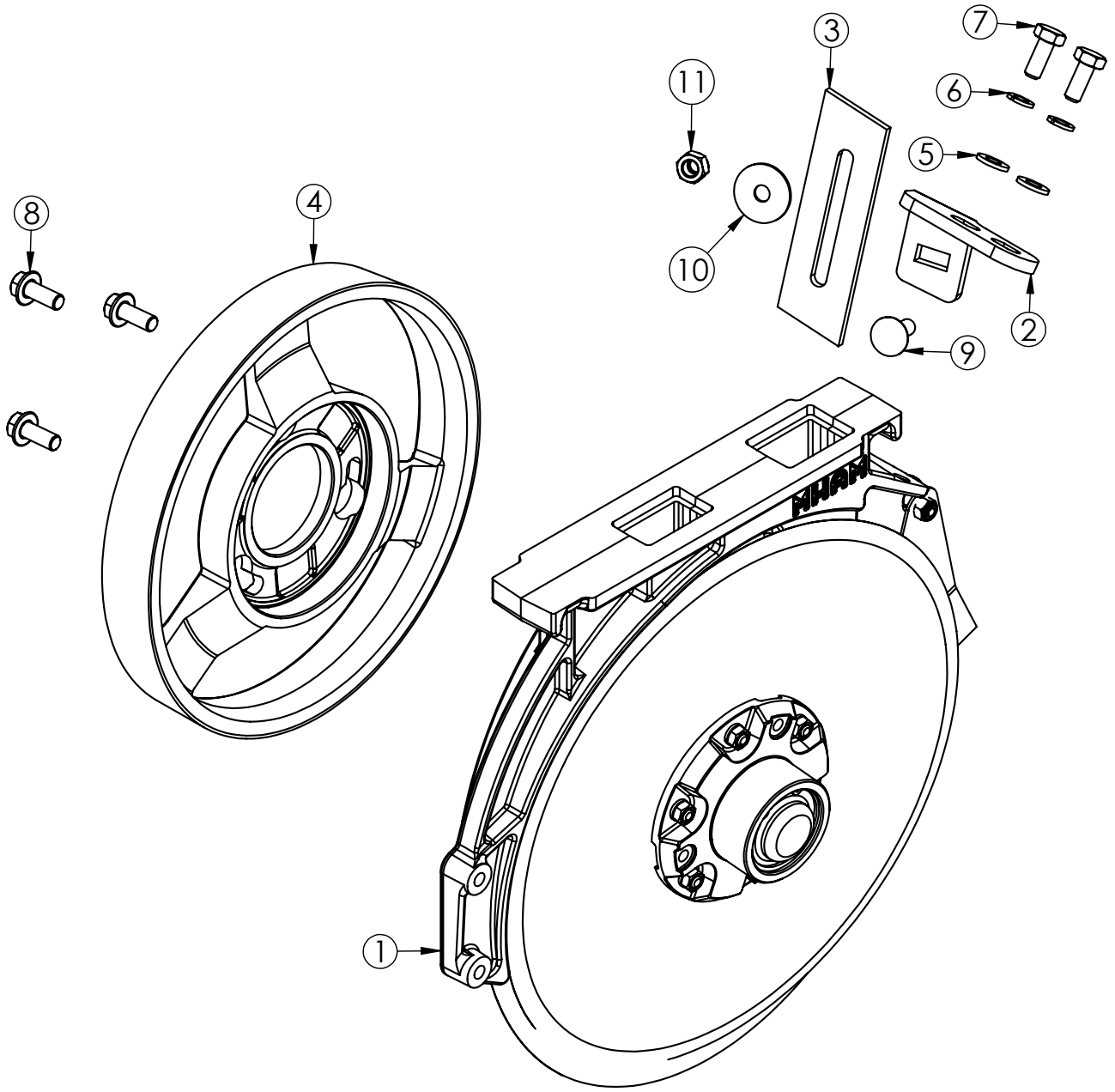
REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	89009551	RIGHT-HAND HUB SET	1
2	89009552	LEFT-HAND HUB SET	1
3	41020036	LEFT-HAND OPENER SUPPORT (25070081)	1
4	41020037	DEFLECTOR BRACKET	1
5	41020038	DEFLECTOR	1
6	41020039	FLAT BRACKET	1
7	41020041	RIGHT-HAND DISC SCRAPER	1
8	41020042	LEFT-HAND DISC SCRAPER	1
9	88013515	FLAT DISC 15" x 3,5mm	1
10	88014016	FLAT DISC 16" x 4,0mm	1
11	933.088.08.035	HEX. HEAD BOLT DIN933 8.8 M8x35 FT Zn	1
12	985B.C8.08	LOCKING NUT DIN985 C-8 M8x1.25 Zn	1
13	125.S2.06	FLAT WASHER DIN125 M6 Zn	2
14	127.006	SPRING WASHER DIN127 M6 Zn	2
15	933.088.06.020	HEX. HEAD BOLT DIN933 8.8 M6x20 FT Zn	2
16	RR048016	UNIVERSAL SOFT RIVET 3/16" x 1/2"	2

89009551 - RIGHT-HAND HUB SET
89009552 - LEFT-HAND HUB SET



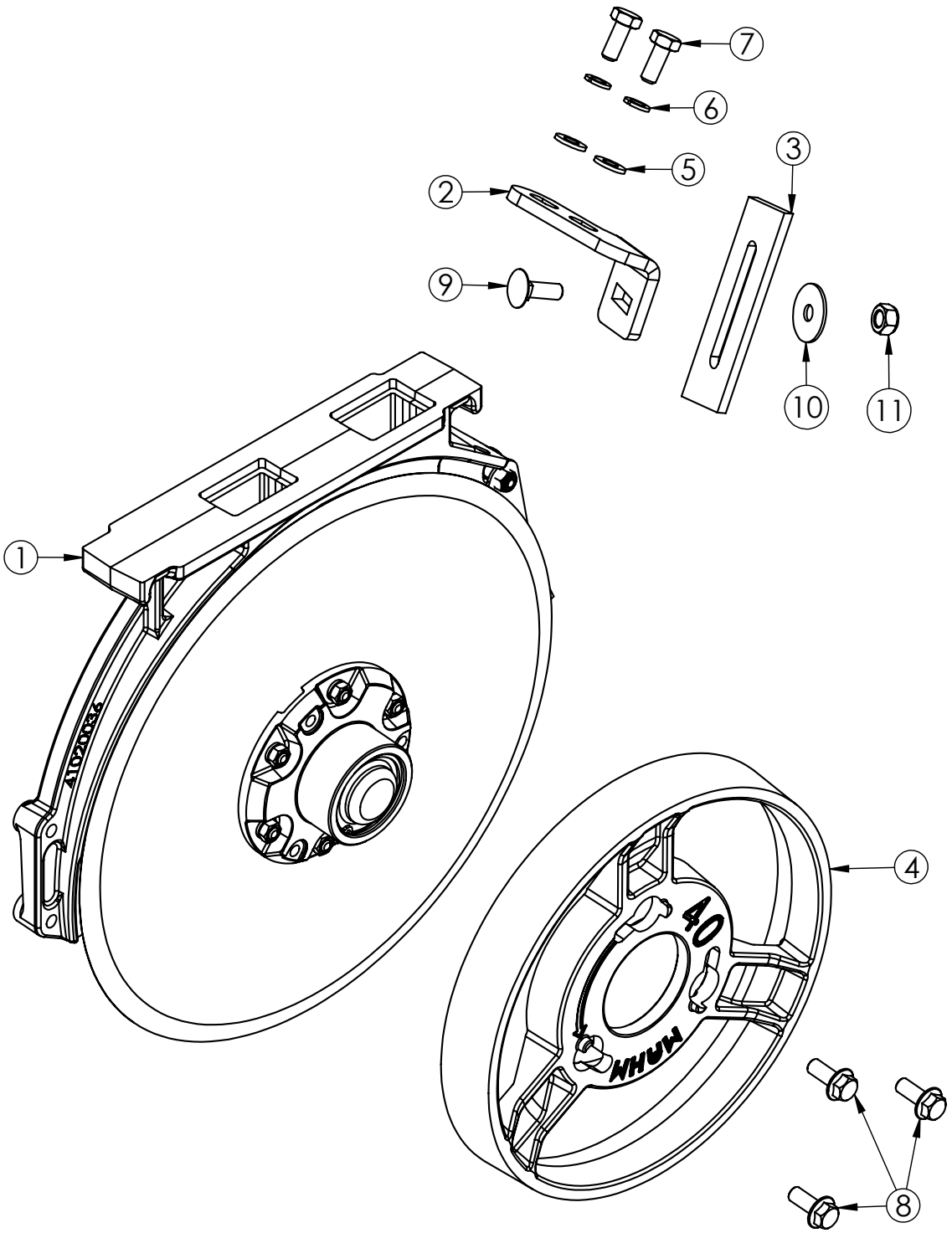
REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	89000001	OPENER HUB	1
2	89000002	FLAT SPACER WASHER	1
3	89000003	RIGHT-HAND SPINDLE (FOR SET 89009551 ONLY)	1
3	89000004	LEFT-HAND SPINDLE (FOR SET 89009552 ONLY)	1
4	89000005	DUST SHIELD	1
5	F-110390 INA	BEARING INA F-110390	1
6	F-110390 AV-1	DUST SHIELD NILOS F-110390 AV-1	1
7	3601.2-137	O´RING ISO 3601 W2.62xID52.07	1
8	472.047	SPRING RETAINING RING DIN472 I-47	1
9	472.058	SPRING RETAINING RING DIN472 I-58	1
10	988.18.31.050	ADJUSTMENT WASHER DIN988 ∅18 x ∅31 x 0,5mm	4
11	7991T.08.020	FLAT SOCKET HEAD BOLT DIN7991 10.9 M8x20 FT Zn	6
12	127.008	SPRING WASHER DIN127 M8 Zn	6
13	934.C8.08	HEX. NUT DIN934 C-8 M8x1.25 Zn	6

41029561 - RIGHT-HAND D. DISC OPENER 15" x 16" W/ 15mm DEPTH CONTROL RING
41029563 - RIGHT-HAND D. DISC OPENER 15" x 16" W/ 25mm DEPTH CONTROL RING
41029565 - RIGHT-HAND D. DISC OPENER 15" x 16" W/ 40mm DEPTH CONTROL RING



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029555	RIGHT-HAND D. DISC OPENER 15"x16" SET	1
2	41020043	RIGHT-HAND RING SCRAPER BRACKET	1
3	41020048	RING SCRAPER (SIMILAR 25070068)	1
3	41020055	RIGHT-HAND 15mm DEPTH CONTROL RING (FOR 41029561 ONLY)	1
3	41020057	RIGHT-HAND 25mm DEPTH CONTROL RING (FOR 41029563 ONLY)	1
4	41020059	RIGHT-HAND 40mm DEPTH CONTROL RING (FOR 41029565 ONLY)	1
5	125.S2.10	FLAT WASHER DIN125 M10 Zn	2
6	127.010	SPRING WASHER DIN127 M10 Zn	2
7	933.088.10.025	HEX. HEAD BOLT DIN933 8.8 M10x25 FT Zn	2
8	6921.088.10.025	HEX. HEAD FLANGE BOLT DIN6921 8.8 M10x25 FT Zn	3
9	603.088.10.030	ROUND HEAD SQUARE NECK BOLT DIN603 8.8 M10x30 FT Zn	1
10	C8090308	FLAT WASHER C-809 3/8" Zn	1
11	985B.C8.10	LOCKING NUT DIN985 C-8 M10x1.5 Zn	1

41029562 - LEFT-HAND D. DISC OPENER 15" x 16" W/ 15mm DEPTH CONTROL RING
41029564 - LEFT-HAND D. DISC OPENER 15" x 16" W/ 25mm DEPTH CONTROL RING
41029566 - LEFT-HAND D. DISC OPENER 15" x 16" W/ 40mm DEPTH CONTROL RING



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029556	LEFT-HAND D. DISC OPENER 15"x16" SET	1
2	41020044	LEFT-HAND RING SCRAPER BRACKET	1
3	41020048	RING SCRAPER (SIMILAR 25070068)	1
3	41020056	LEFT-HAND 15mm DEPTH CONTROL RING (FOR 41029562 ONLY)	1
3	41020058	LEFT-HAND 25mm DEPTH CONTROL RING (FOR 41029564 ONLY)	1
4	41020060	LEFT-HAND 40mm DEPTH CONTROL RING (FOR 41029566 ONLY)	1
5	125.S2.10	FLAT WASHER DIN125 M10 Zn	2
6	127.010	SPRING WASHER DIN127 M10 Zn	2
7	933.088.10.025	HEX. HEAD BOLT DIN933 8.8 M10x25 FT Zn	2
8	6921.088.10.025	HEX. HEAD FLANGE BOLT DIN6921 8.8 M10x25 FT Zn	3
9	603.088.10.030	ROUND HEAD SQUARE NECK BOLT DIN603 8.8 M10x30 FT Zn	1
10	C8090308	FLAT WASHER C-809 3/8" Zn	1
11	985B.C8.10	LOCKING NUT DIN985 C-8 M10x1.5 Zn	1

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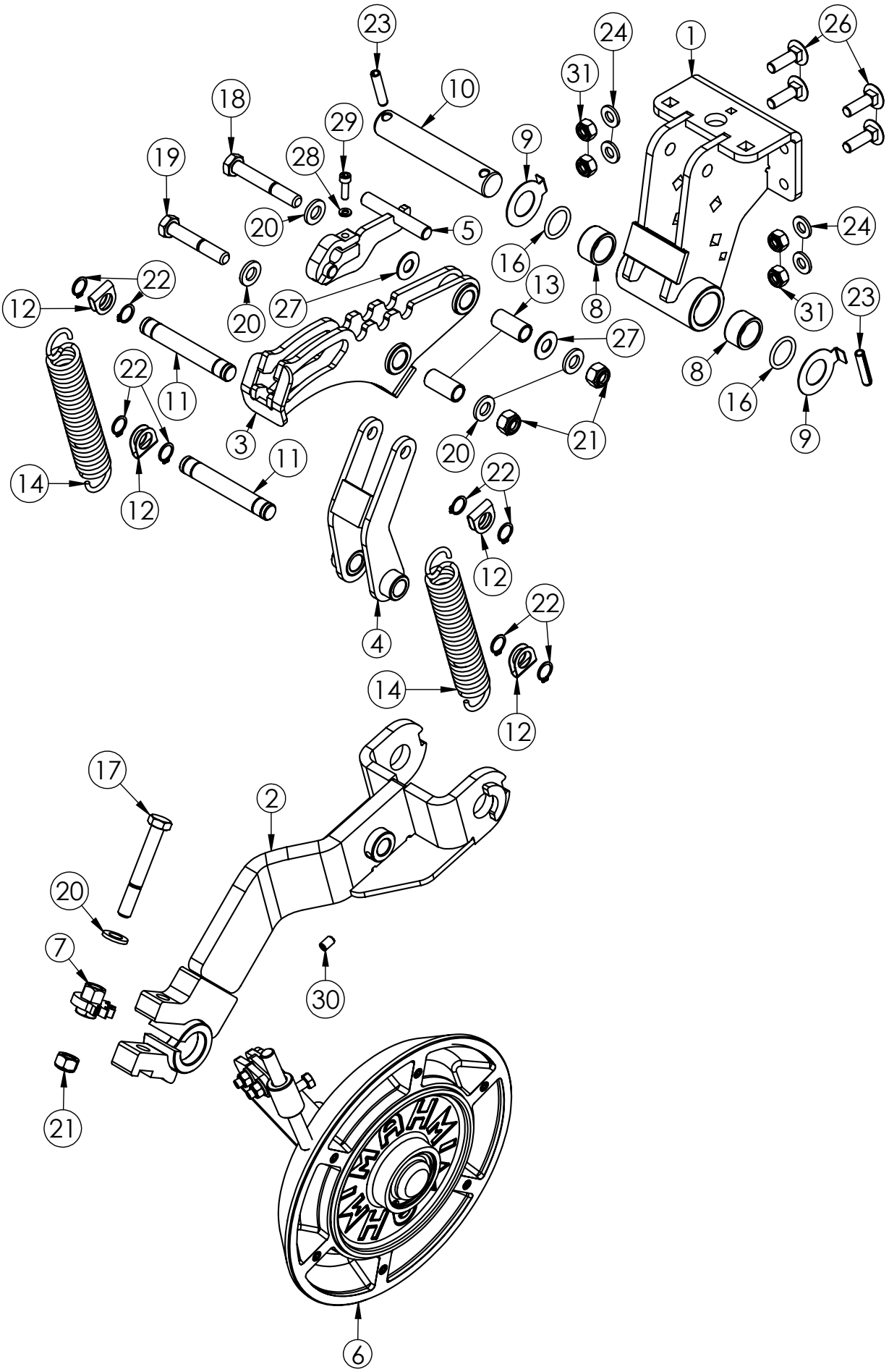
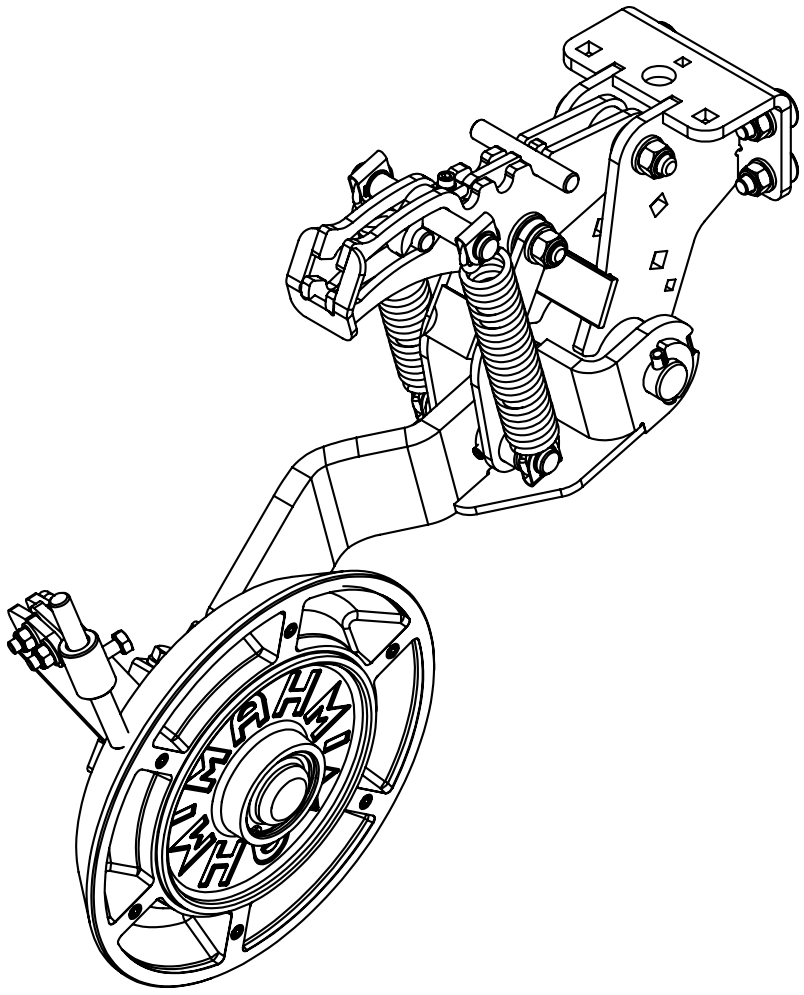
41029565 - RIGHT-HAND PRESS WHEEL SET



MAHM

REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029072	PRESS WHEEL MAIN BRACKET	1
2	41029073	RIGHT-HAND PRESS WHEEL ARM	1
3	41029075	SPRING ARM	1
4	41029076	TORQUE LINK ARM	1
5	41029077	SPRING CONTROLLER	1
6	41029567	RIGHT-HAND WHEEL SET	1
7	41029067	PINION	1
8	41020015	BUSHING	2
9	41020016	ADJUSTMENT WASHER	2
10	41020096	PIN	1
11	41020119	SPRING CONTROLLER PIN	2
12	41020120	RETAINER	4
13	41020121	BUSHING	2
14	91010015	EXTENSION SPRING (SIMILAR 53060008)	2
15	71412.C1.081	STRAIGHT GREASE NIPPLE DIN71412 M8x1.25 Zn	1
16	3601.2-214	O´RING ISO 3601 W3.53xID24.99	2
17	931.088.12.090	HEX. HEAD BOLT DIN931 8.8 M12x90 PT Zn	1
18	931.088.12.080	HEX. HEAD BOLT DIN931 8.8 M12x80 PT Zn	1
19	931.088.12.070	HEX. HEAD BOLT DIN931 8.8 M12x70 PT Zn	1
20	125.S2.12	FLAT WASHER DIN125 M12 Zn	5
21	985B.C8.12	LOCKING NUT DIN985 C-8 M12x1.75 Zn	3
22	471.016	SPRING RETAINING RING DIN471 E-16	8
23	1481.08.040	SPRING PIN DIN1481 ∅8x40mm	2
24	125.S2.10	FLAT WASHER DIN125 M10 Zn	4
26	603.088.10.035	ROUND HEAD SQUARE NECK BOLT DIN603 8.8 M10x35 PT Zn	4
27	C8100716	FLAT WASHER C-810 7/16" Zn	2
31	985B.C8.10	LOCKING NUT DIN985 C-8 M10x1.5 Zn	4
29	912T.06.020	HEX. SOCKET HEAD CAP SCREW DIN912 12.9 M6x20 FT Zn	1
28	127.006	SPRING WASHER DIN127 M6 Zn	1
30	91608012	HEX. SOCKET CUP POINT SET SCREW DIN916 12.9 M8x12 FT	1



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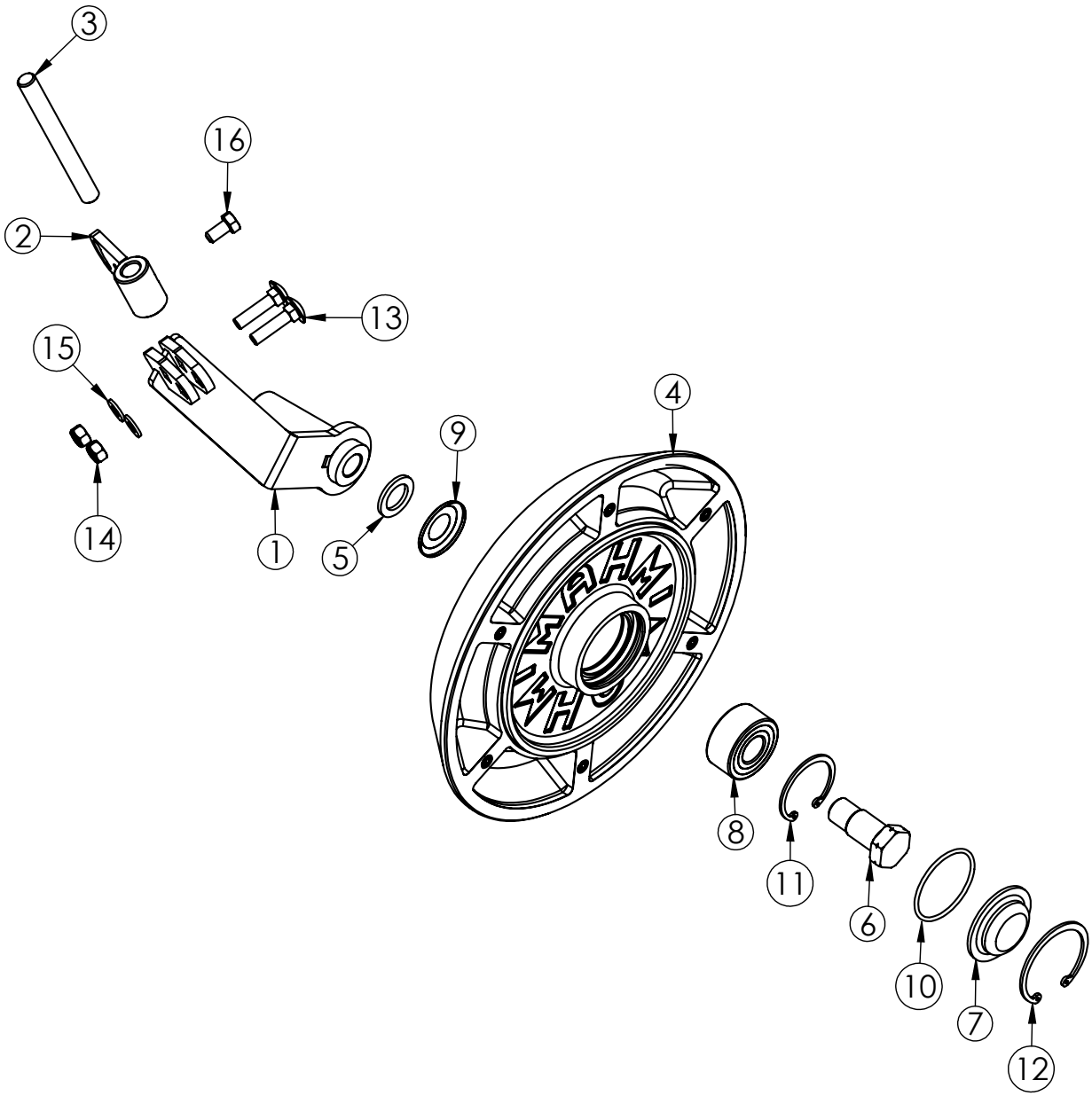
41029567 - RIGHT-HAND WHEEL SET



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029069	RIGHT-HAND WHEEL SHAFT	1
2	41029071	SCRAPER BRACKET	1
3	41020089	SCRAPER PIN	1
4	41020090	PRESS WHEEL	1
5	89000002	FLAT SPACER WASHER	1
6	89000003	RIGHT-HAND SPINDLE (FOR SET 89009551 ONLY)	1
7	89000005	DUST SHIELD	1
8	F-110390 INA	BEARING INA F-110390	1
9	F-110390 AV-1	DUST SHIELD NILOS F-110390 AV-1	1
10	3601.2-136	O´RING ISO 3601 W2.62xID50.47	1
11	472.047	SPRING RETAINING RING DIN472 I-47	1
12	472.058	SPRING RETAINING RING DIN472 I-58	1
13	603.088.08.035	ROUND HEAD SQUARE NECK BOLT DIN603 8.8 M8x35 PT Zn	2
14	985B.C8.08	LOCKING NUT DIN985 C-8 M8x1.25 Zn	2
15	125.S2.08	FLAT WASHER DIN125 M8 Zn	2
16	933.088.08.016	HEX. HEAD BOLT DIN933 8.8 M8x16 FT Zn	1

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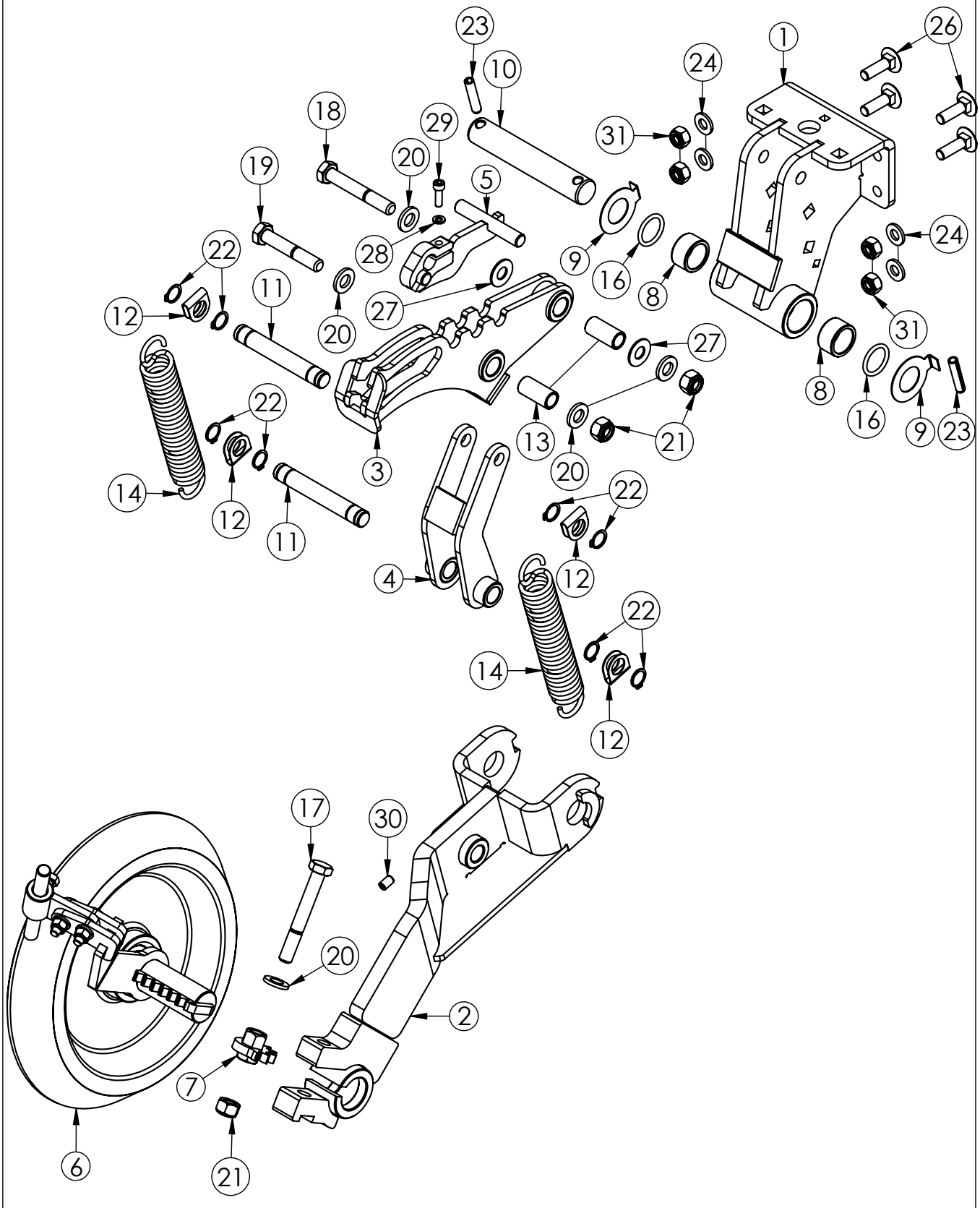
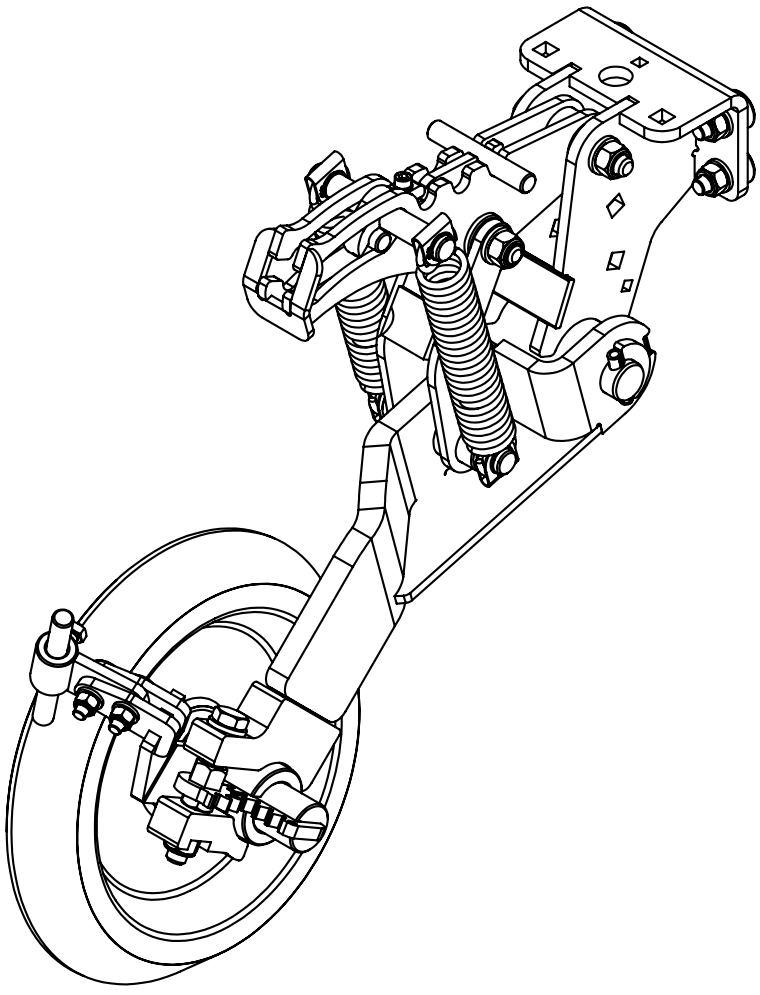
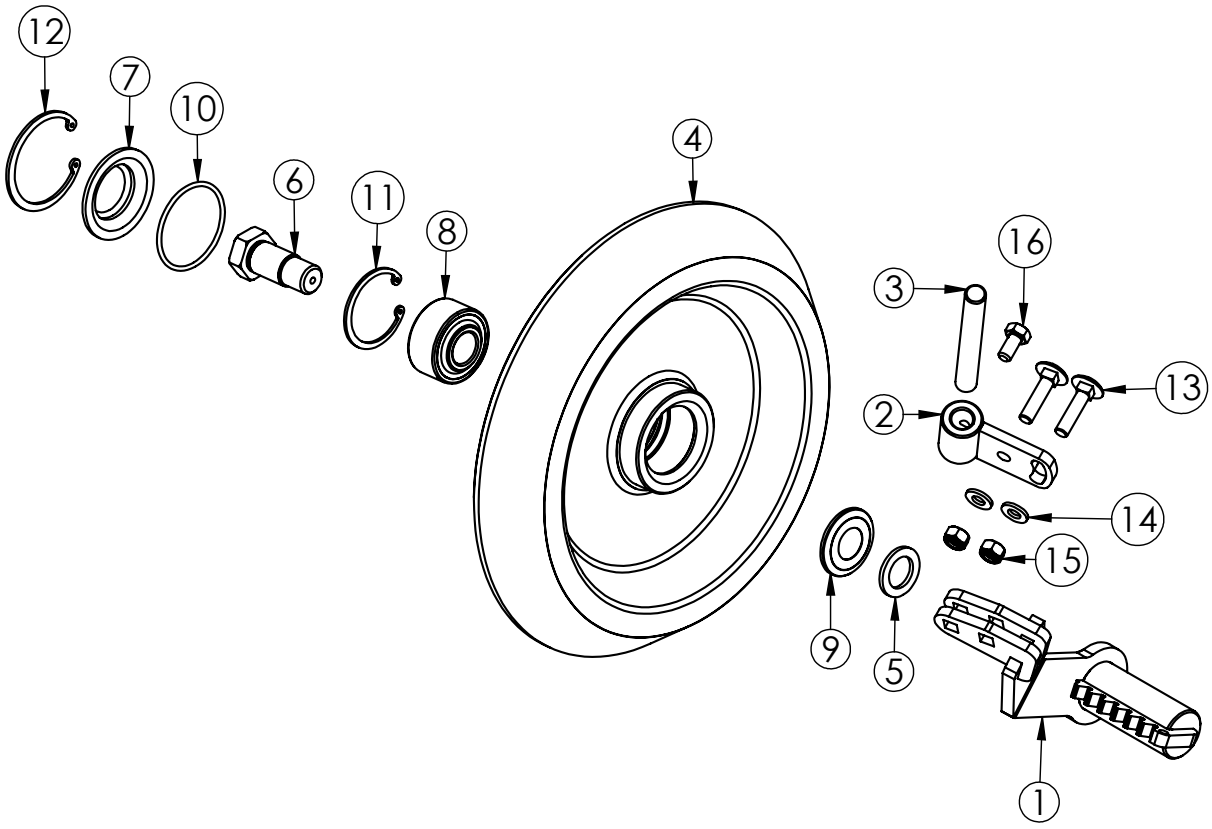
41029566 - LEFT-HAND PRESSING WHEEL SET



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029072	PRESS WHEEL MAIN BRACKET	1
2	41029074	RIGHT-HAND PRESS WHEEL ARM	1
3	41029075	SPRING ARM	1
4	41029076	TORQUE LINK ARM	1
5	41029077	SPRING CONTROLLER	1
6	41029568	LEFT-HAND WHEEL SET	1
7	41029067	PINION	1
8	41020015	BUSHING	2
9	41020016	ADJUSTMENT WASHER	2
10	41020096	PIN	1
11	41020119	SPRING CONTROLLER PIN	2
12	41020120	RETAINER	4
13	41020121	BUSHING	2
14	91010015	EXTENSION SPRING (SIMILAR 53060008)	2
15	71412.C1.081	STRAIGHT GREASE NIPPLE DIN71412 M8x1.25 Zn	1
16	3601.2-214	O´RING ISO 3601 W3.53xID24.99	2
17	931.088.12.090	HEX. HEAD BOLT DIN931 8.8 M12x90 PT Zn	1
18	931.088.12.080	HEX. HEAD BOLT DIN931 8.8 M12x80 PT Zn	1
19	931.088.12.070	HEX. HEAD BOLT DIN931 8.8 M12x70 PT Zn	1
20	125.S2.12	FLAT WASHER DIN125 M12 Zn	5
21	985B.C8.12	LOCKING NUT DIN985 C-8 M12x1.75 Zn	3
22	471.016	SPRING RETAINING RING DIN471 E-16	8
23	1481.08.040	SPRING PIN DIN1481 ∅8x40mm	2
24	125.S2.10	FLAT WASHER DIN125 M10 Zn	4
26	603.088.10.035	ROUND HEAD SQUARE NECK BOLT DIN603 8.8 M10x35 PT Zn	4
27	C8100716	FLAT WASHER C-810 7/16" Zn	2
28	127.006	SPRING WASHER DIN127 M6 Zn	1
29	912T.06.020	HEX. SOCKET HEAD CAP SCREW DIN912 12.9 M6x20 FT Zn	1
30	91608012	HEX. SOCKET CUP POINT SET SCREW DIN916 12.9 M8x12 FT	1
31	985B.C8.10	LOCKING NUT DIN985 C-8 M10x1.5 Zn	4



41029568 - LEFT-HAND WHEEL SET



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029070	LEFT-HAND WHEEL SHAFT	1
2	41029071	SCRAPER BRACKET	1
3	41020089	SCRAPER PIN	1
4	41020090	PRESS WHEEL	1
5	89000002	FLAT SPACER WASHER	1
6	89000004	LEFT-HAND SPINDLE	1
7	89000005	DUST SHIELD	1
8	F-110390 INA	BEARING INA F-110390	1
9	F-110390 AV-1	DUST SHIELD NILOS F-110390 AV-1	1
10	3601.2-136	O´RING ISO 3601 W2.62xID50.47	1
11	472.047	SPRING RETAINING RING DIN472 I-47	1
12	472.058	SPRING RETAINING RING DIN472 I-58	1
13	603.088.08.035	ROUND HEAD SQUARE NECK BOLT DIN603 8.8 M8x35 PT Zn	2
14	125.S2.08	FLAT WASHER DIN125 M8 Zn	2
15	985B.C8.08	LOCKING NUT DIN985 C-8 M8x1.25 Zn	2
16	933.088.08.016	HEX. HEAD BOLT DIN933 8.8 M8x16 FT Zn	1

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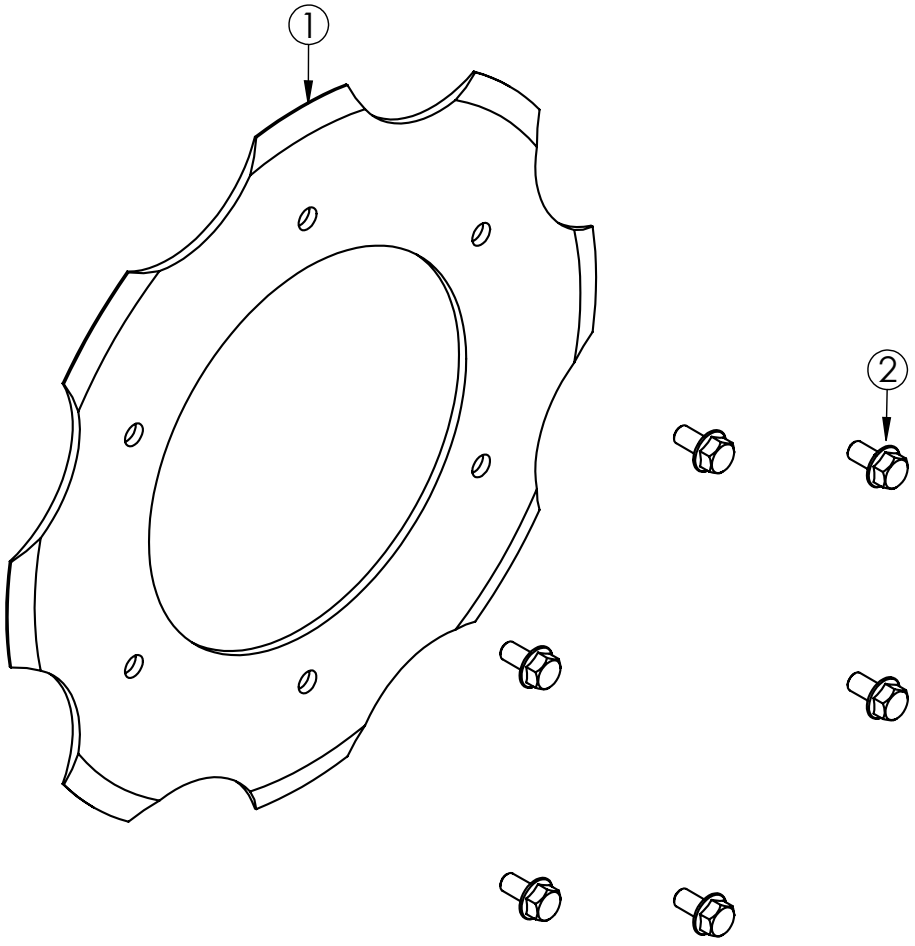
41029569 - PRESSING WHEEL NOTCHED DISC SET (OPCIONAL)



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	88024013	13" PRESS WHEEL NOTCHED DISC	1
2	6921.088.08.016	HEX. HEAD FLANGE BOLT DIN6921 8.8 M10x25 FT Zn	6

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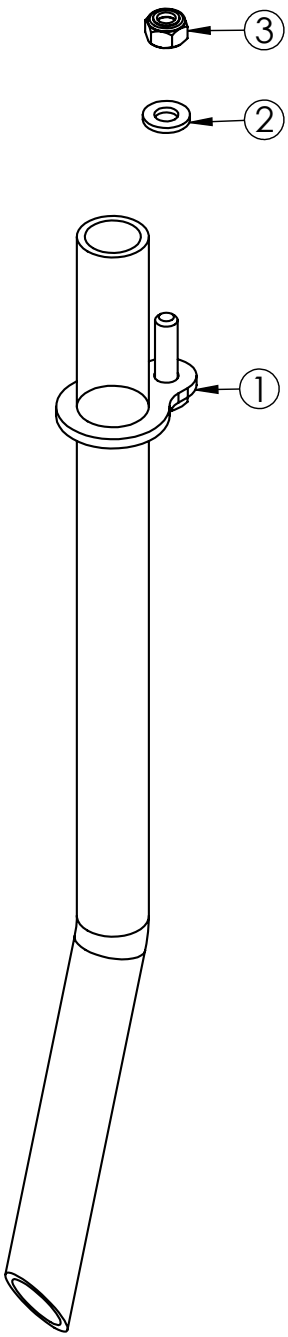
41029570 - PASTURE SEED TUBE SET (OPCIONAL)



REFERENCE	PART NUMBER	DESCRIPTION	QUANTITY/ SET
1	41029078	PASTURE SEED TUBE	1
2	125.S2.06	FLAT WASHER DIN125 M6 Zn	1
3	985B.C8.06	LOCKING NUT DIN985 C-8 M6x1.0 Zn	1