MULTIVA

CULTIVATING THE FUTURE

Operation and maintenance manual

Seed drill

FX300 and FX400 SeedPilot

Translation of the original manual

EN

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1. Foreword

Thank you for trusting us by choosing a high-quality Multiva Forte FX seed drill. We hope that you find the product to meet your requirements and provide years of reliable service. Please read this manual thoroughly before operating the machine. It is important that you follow the inspection and maintenance measures provided in this manual to ensure flawless operation of the machine and validity of the warranty. You must absolutely follow all the instructions, warnings and prohibitions related to the use of the machine. They are provided to ensure operator safety and the long service life of the machine.

1.1. Purpose of the machine

The operator of the seed drill must acquaint themselves with the machine and read and understand the contents of its operating manual before operating the machine. The seed drill may only be operated when it is in a flawless technical condition. The seed drill must be used in accordance with regulations, identifying hazards and following the safety and operating instructions.

Original Multiva spare parts and accessories are designed for this particular seed drill. The manufacturer bears no responsibility for spare parts and accessories provided by other suppliers. Using them in certain circumstances may weaken the machine and compromise personal safety.

The machine is intended for sowing seeds and applying fertiliser. The construction of the machine allows road transport with the hoppers full. Any use exceeding this, such as using the machine as for transport, is not considered to be in accordance with the regulations. Use in accordance with the regulations includes following the operating instructions and manufacturer's instructions as well as regulations concerning service and maintenance. Occupational safety regulations concerning agricultural machinery, other rules and regulations on general safety technology and occupational health as well as traffic rules and regulations must be followed.

1.2. Specifications

Table. 1.2. - 1. Specifications

Specifications	**FX300**	**FX400**
Working width (cm)	300	400
Transportation height (cm)	340 (with middle markers) 260 (without middle markers)	
Transportation width (cm)	300	409
Hopper filling height (cm)	210	
Weight (kg)	4,200	5,500
Hopper volume (l)	3,500	4,800
Coulter pressure (kg)	50–250	

Tyres	250/80-18	
Coulters (pcs)	20	26
Furrow spacing (mm)	150	154
Recommended working speed (km/h)	8-12	
Normal track width of tramline (mm)	1,650	1,694
Alternative track width of tramline (mm)	1,950	2,002
Extended track width of tramline (mm)	1,800	1,848
Tractor power requirement (hp)	90	120

Table. 1.2. - 2. Standard equipment

Standard equipment, FX300 and FX400
Back and front railings
Working platform stairs on the left
Sieves for fertiliser hopper
Wheel drive from transport wheels
Adjustable hopper dividers
Covering wheel scrapers
Coulter pressure adjustment indicator
Controller type (choose one of the following): • Lykketronic area counter • Comfort controller • SeedPilot controller with a 7" display • SeedPilot ISOBUS controller   ◦ Display not included
Towing method (choose one of the following) • Hitch (drawbar with a Scharmuller towing eye) • Hitch with a drawbar cylinder • Wheel packer with a drawbar cylinder
Transmission (choose one of the following) • Chain gear (no gearbox) • Gearbox on the seed side • Gearbox on the fertiliser and seed side (dual gearbox)

Table. 1.2. - 3. Accessories, FX300 and FX400

Accessories
Dual hopper level sensor • Available with Comfort, SeedPilot or SeedPilot ISOBUS control systems
Adjusting of fertiliser target rate - basic model • Available with Comfort, SeedPilot or SeedPilot ISOBUS control systems • Available on a machine with a chain gear or gearbox on the seed side
Adjusting of fertiliser target rate - machine with gearbox • Available with Comfort, SeedPilot or SeedPilot ISOBUS control systems • Available on a machine with a gearbox on the fertiliser and seed side
Dispersing axle
Front platform
Front levelling board • Available with a wheel packer
Middle markers • Available with Comfort, SeedPilot or SeedPilot ISOBUS control systems
Transport set 2.45 m
Rear harrow
Rear markers on the rear harrow
Feeder cover - front
Feeder cover - rear
Small seed hopper
Scraper for the rear wheels
Tramline extensions • Available with Comfort, SeedPilot or SeedPilot ISOBUS control systems

1.3. Type plate

The type plate is located under the transmission cover in the left end.

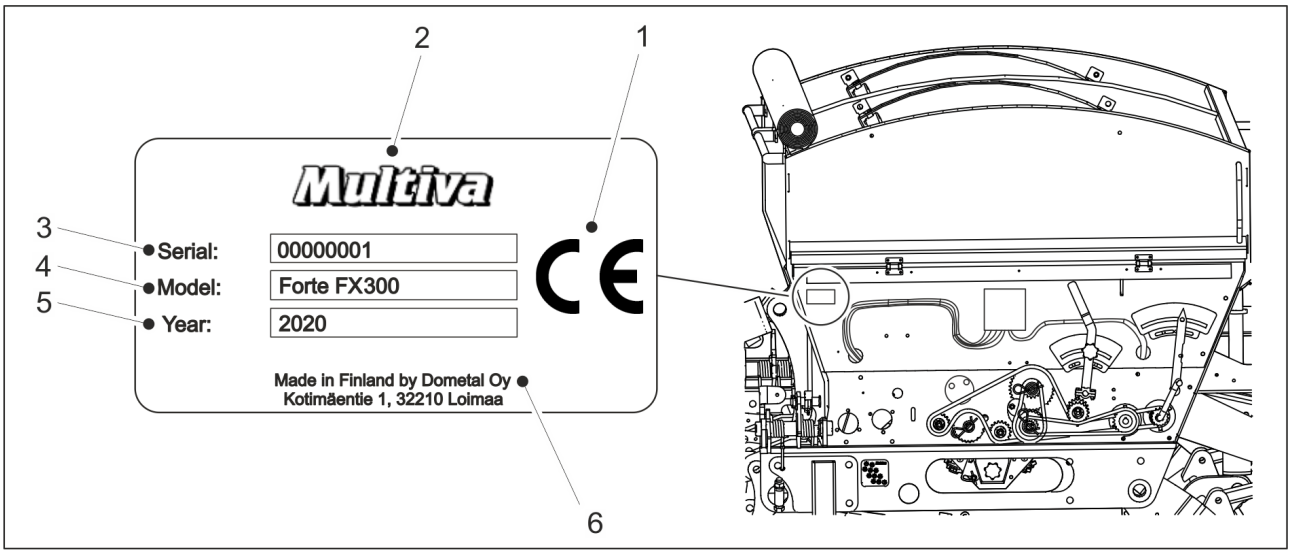


Figure. 1.3. - 1. Location and details of the type plate

Table. 1.3. - 4. Details of the type plate

1.	CE marking
2.	Machine manufacturer
3.	Machine serial number
4.	Machine model
5.	Manufacturing year
6.	Manufacturer's information

1.4. Liability terms and conditions

The FX seed drills have been quality inspected and their operation has been tested before delivery. However, the owner/operator is responsible for the operation of the machine in practical circumstances. Damage compensation claims not concerning the machine itself as well as those concerning damages caused by misuse or incorrect adjustments of the machine will be rejected.

The machine manufacturer is not liable for any use of the machine that is in violation of laws, safety regulations or this operating manual.

Note that inappropriate use of fertilisers and plant protecting agents may cause damage to plants, humans, animals, water system or soil. Follow the instructions provided by the manufacturers of these substances and other experts as well as the authorities in handling and using said substances.

The manufacturer is not responsible for the selection of an incorrect quantity of seeds, plant protecting agents or fertiliser or incorrect seeding depth. The operator must constantly make sure that the desired seeding depth is maintained. If you lack information or knowledge gained through experience, please consult an expert for advice. The manufacturer is not responsible for any failures in seeding. The operator must continuously monitor the consumption of seeds and fertiliser in order to make sure that sowing quantities stay at a proper level.

The manufacturer is not liable for damages caused by the use of components provided by other manufacturers. The manufacturer is not liable for damage caused to other machines or equipment that result from the use of this machine. The manufacturer reserves the right to develop or modify the construction of the machine. The owner of the machine is responsible for ensuring that all operators of the machine acquaint themselves with the machine's operating and safety instructions.

1.5. Tightening torques

The table below shows the tightening torques of steel screws and nuts. If the tightening torque to be used should be something other than what is listed in the table, the tightening torque will be provided with the task instructions.

Table. 1.5. - 5. Tightening torques of steel screws and nuts

Steel screws and nuts: 8.8 Zn	
Thread	**Torque (Nm)**
M8	15
M12	90
M16	230
M18	250
M20	350

2. Warranty terms

1. The machine's warranty period is 12 months.
2. The warranty period starts on the date when an authorised retailer delivers the machine.
3. The warranty covers manufacturing and raw material defects. Damaged parts are repaired or replaced with parts in proper operating condition at the customer's facilities, factory or authorised repair shop.
4. A warranty repair does not extend the warranty period.
5. Warranty does not cover:
    - damage caused by incorrect operation or maintenance in violation of the operating manual, excessive loading or normal wear.
    - loss of income, downtime, other consequential or indirect damage caused to the product's owner or a third party
    - travel or freight expenses, daily allowances
    - changing the original construction of the product.

In warranty matters, please contact the machine retailer or manufacturer. Any measures and costs must always be agreed upon with the manufacturer before the measures are taken.

3. Safety instructions

3.1. Residual risks

	Read this operating and maintenance manual thoroughly before operating the machine and follow the instructions given.
	Crushing hazard when connecting and disconnecting the seed drill. Minimum safe distance 5 m. Be extremely careful if someone else is near the seed drill and tractor giving instructions on connecting and disconnecting.
	Crushing and impact hazard when lifting and lowering the middle markers. When lifting and lowering the middle markers, ensure that there are no personnel in the vicinity. When raising and lowering the machine, the minimum safe distance is 5 m. Prior to performing the calibration test, ensure that the STOP ALL function is on in the SeedPilot or SeedPilot ISOBUS control system and the middle marker ball valves are closed.
	Crushing and impact hazard when lifting and lowering the middle markers. When lifting and lowering the middle markers ensure that there are no personnel in the vicinity. When raising and lowering the machine, the minimum safe distance is 5 m.
	Crushing hazard when the accessories are being adjusted. Before adjusting the accessories, make sure that the tractor is turned off, the key is removed from the ignition and the parking brake is engaged.
	Be careful not to crush or cut your hand or fingers in the feeder of the hopper. Ensure that the controller and tractor are turned off, the key is removed from the ignition and the parking brake is engaged when there are people in the hopper or near the machine.
	There is a crushing hazard underneath the machine and a cutting hazard in the machine's transmission when performing servicing and maintenance. Before servicing, make sure that power is switched off in the tractor, the key is removed from the ignition and the parking brake is engaged.
	Crushing hazard when lifting and lowering the seed drill. When lifting and lowering the machine, make sure nobody is in its vicinity. Minimum safe distance 5 m. There is a crushing hazard when performing servicing and maintenance. Before servicing, ensure that stoppers have been placed on the cylinder rods and that the machine has been supported from underneath with a block or similar. Never go under the machine that is not securely propped up.

	Hydraulic hoses under pressure may release a life-threatening jet of liquid. High-pressure liquid may also cause a crushing, cutting or impact hazard. The hydraulic system must be depressurised before pressure hoses are handled, connected or disconnected. Depressurise the hydraulic system and disconnect the hoses before maintenance work. Never touch the hydraulic cylinders, hoses and hydraulic connectors when the cylinders are in operation.
	Falling hazard when performing work on the working platform and front platform. Accessing the steps of the platform is allowed only when the machine is lowered. Be careful when performing work on the working platform and front platform.
	Falling hazard. Staying on top of the machine, wheels and sensors is always prohibited.
	Prior to performing the calibration test, ensure that the STOP ALL function is on in the SeedPilot or SeedPilot ISOBUS control system, the middle markers have settled in the transport position and their ball valves are closed.
	Prior to performing the calibration test, ensure that the tractor parking brake is engaged, the STOP ALL function is on in the SeedPilot or SeedPilot ISOBUS control system, the middle markers have settled into the transport position and their ball valves are closed.

	Crushing hazard when lifting the seed drill from a truck bed using a hoist. Minimum safe distance 10 m. Exercise special caution.
	Crushing and cutting hazard when installing the drawbar, front equipment, rear harrow, middle markers and drawbar cylinders. Exercise special caution.
	Before moving, ensure that the tractor's hitch is locked.
	Crushing and cutting hazard when removing the wheels. Exercise caution when handling the wheels.
	Depressurise the hydraulic system, disconnect the hoses and tractor's electrical connections and let the machine cool off before servicing.
	Avoid breathing seed dressing dust and fertiliser dust when filling the hopper. The seed dressing causes a serious health risk. Read the material safety data sheet of the dressing agent and fertiliser and pay attention to their warnings.

	Never go under a lifted load when filling the hopper.
	Make sure that nobody is on top of the seed drill or inside the hopper when filling the hopper.

	Wear protective gloves when handling oil or grease and when connecting and disconnecting hydraulic components. Avoid skin contact with oil and grease to prevent skin irritation and damage.

3.2. Symbols used in the operating manual

	**DANGER** warns of a dangerous situation which may lead to death or serious physical injury.
	**NOTE** warns of a dangerous situation which may lead to damage to the equipment.
•	**ADVICE** contains useful tips, advice and information in the instructions e.g. on tightening torques, adjusting values, liquid quantities and special tools.

DANGER
When connecting and disconnecting hydraulic hoses and electric wires that the tractor is turned off and the key is removed from the ignition.

DANGER
Never adjust or clean a moving seed drill.

DANGER
Never stay on top of the seed drill or within its operating area during operation. Minimum safe distance 5 m.

DANGER
Inspect the condition of the seed drill at least visually before moving or operating it. Items to be inspected include tyre pressure, machine cleanliness and the tightness of the bolts of the towing device.

DANGER
Before seeding, make sure that the machine is in working order. Make sure that the hoses are intact and have no leaks. Make sure that the coulters and mechanics are intact. Specifically ensure that all the pins are in place.

DANGER
When transporting the seed drill on public roads, exercise caution and observe all road traffic regulations, as well as specific regulations concerning slow-moving vehicles.

DANGER
Before moving the tractor, check that the slow-vehicle triangle is visible and tractor lights are lit and visible. Keep the triangle and lights clean, because they have a considerable impact on the vehicle's traffic safety.

DANGER
The maximum allowed transportation speed of the seed drill is 40 km/h on a road that is in good condition and even. The maximum allowed transportation speed of the seed drill is 25 km/h on damaged roads

DANGER
When replacing hydraulic system components and conductors, only use spare parts with sufficient pressure resistance.

DANGER
Never use oil or lubrication grease to clean skin. These substances may contain small metal particles, which cause irritation of the skin or cuts. Follow the handling instructions and safety regulations of the lubricant manufacturers. Synthetic oils are often corrosive and cause strong irritation of the skin. Contact a doctor, if oil or grease causes injuries.

DANGER
Never spray water directly on electric equipment.

CAUTION
Before servicing, ensure that the machine lifting ball valve is closed and the cylinders are equipped with stoppers.

CAUTION
Use original spare parts of the machine whenever servicing and repairing the seed drill. Using generic parts invalidates the warranty.

CAUTION
Collect oil waste and dispose of it appropriately in accordance with national regulations.

CAUTION
If oil is spilled on the ground, absorb it with absorption material, such as turf, to prevent the oil spill from spreading. Handle the absorption material in accordance with regulations.

CAUTION
Clean the machine whenever you change fertiliser or seed types.

CAUTION
If the machine will be unused overnight or over a long rain season, empty its fertiliser hopper in advance and clean the roller grooves of the feeder by adjusting feed quantity from one extreme position to the other. Otherwise, the fertiliser may dissolve and clog the feeders.

CAUTION
Before using a detergent, make sure it is appropriate for washing a seed drill. Follow the safety and operating instructions of the detergent manufacturer.

3.3. Warning labels used on the machine

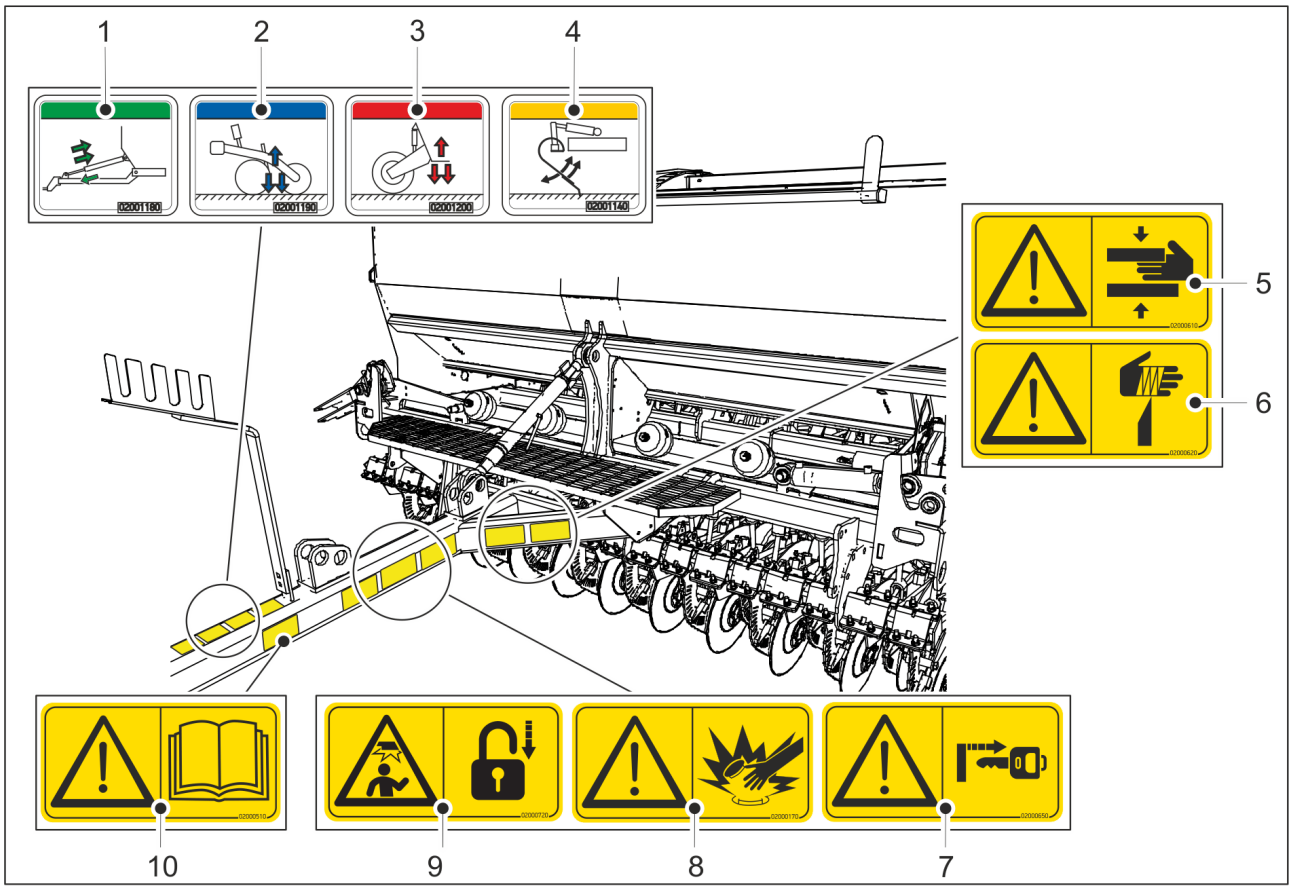


Figure. 3.3. - 2. Labels on the seed drill drawbar and front

Table. 3.3. - 6. Labels on the seed drill drawbar and front

1.	Hydraulic connection of the drawbar adjustment (optional)	1 pc
2.	Hydraulic connection of the coulter pressure	1 pc
3.	Machine lifting hydraulic connection	1 pc
4.	Hydraulic connection of the adjustment of the front levelling board position	1 pc
5.	Danger of crushing when connecting and disconnecting the seed drill, Minimum safe distance 5 m.	1 pc
6.	Cutting hazard	1 pc
7.	Before adjusting the seeding depth and accessories, make sure that the tractor is turned off, the key is removed from the ignition and the parking brake is engaged.	1 pc
8.	Beware of pressurised hydraulic hoses	1 pc

9.	Ensure that the tractor's parking brake is engaged and the middle marker ball valve is in the closed position before performing the calibration test. Ensure that the markers have settled in the transport position and their ball valves have been closed before moving.	1 pc
10.	Read the operation and maintenance manual carefully before operation	1 pc

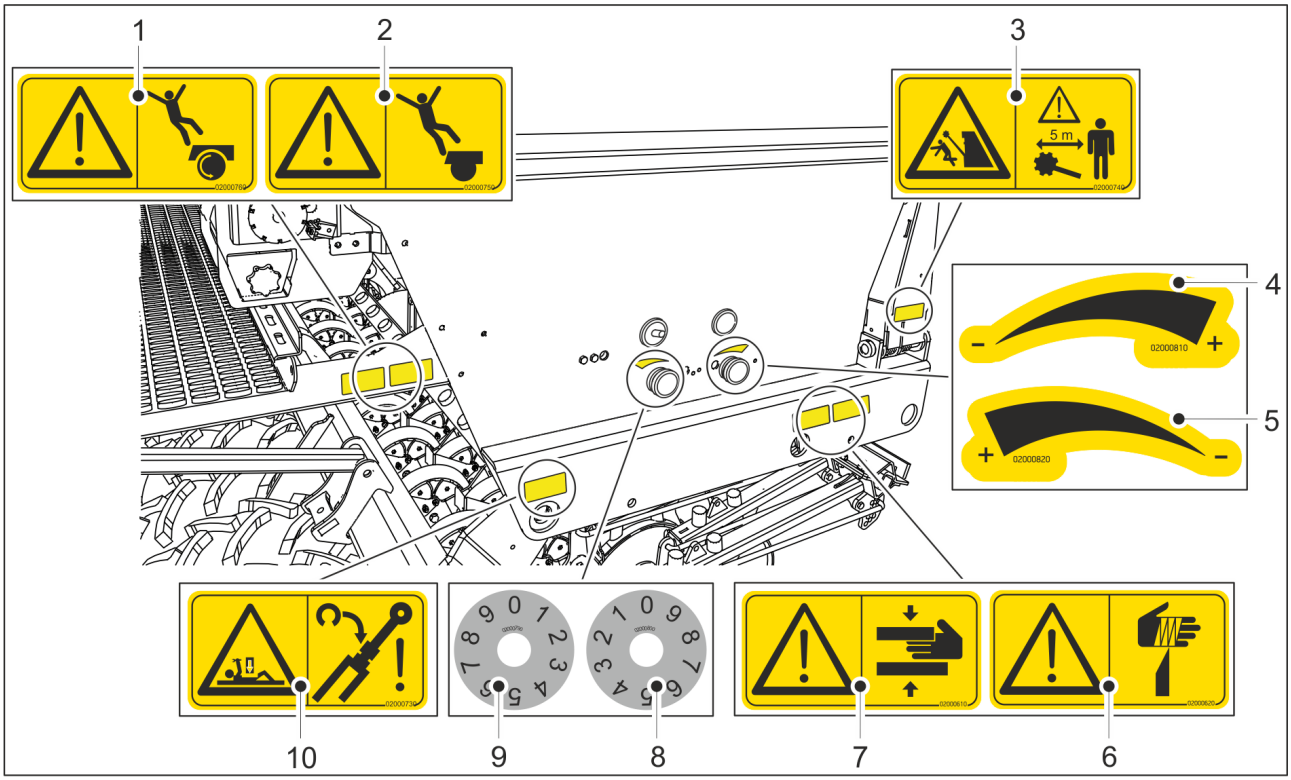


Figure. 3.3. - 3. Right side labels of the seed drill

Table. 3.3. - 7. Right side labels of the seed drill

1.	Falling hazard, do not climb on top of the wheel	2 pcs, at both ends of the working platform
2.	Falling hazard	2 pcs, at both ends of the working platform
3.	Crushing and impact hazard when lifting and lowering the middle markers	2 pcs, on both middle markers
4.	Adjustment direction, increases clockwise	1 pc
5.	Adjustment direction, increases counterclockwise	1 pc
6.	Cutting hazard	2 pcs, on both sides of the machine
7.	Crushing hazard	2 pcs, on both sides of the machine

8.	Scale of the adjustment disc, clockwise number sequence	1 pc
9.	Scale of the adjustment disc, counterclockwise number sequence	1 pc
10.	Crushing hazard when performing servicing and maintenance.	2 pcs, on both sides of the machine

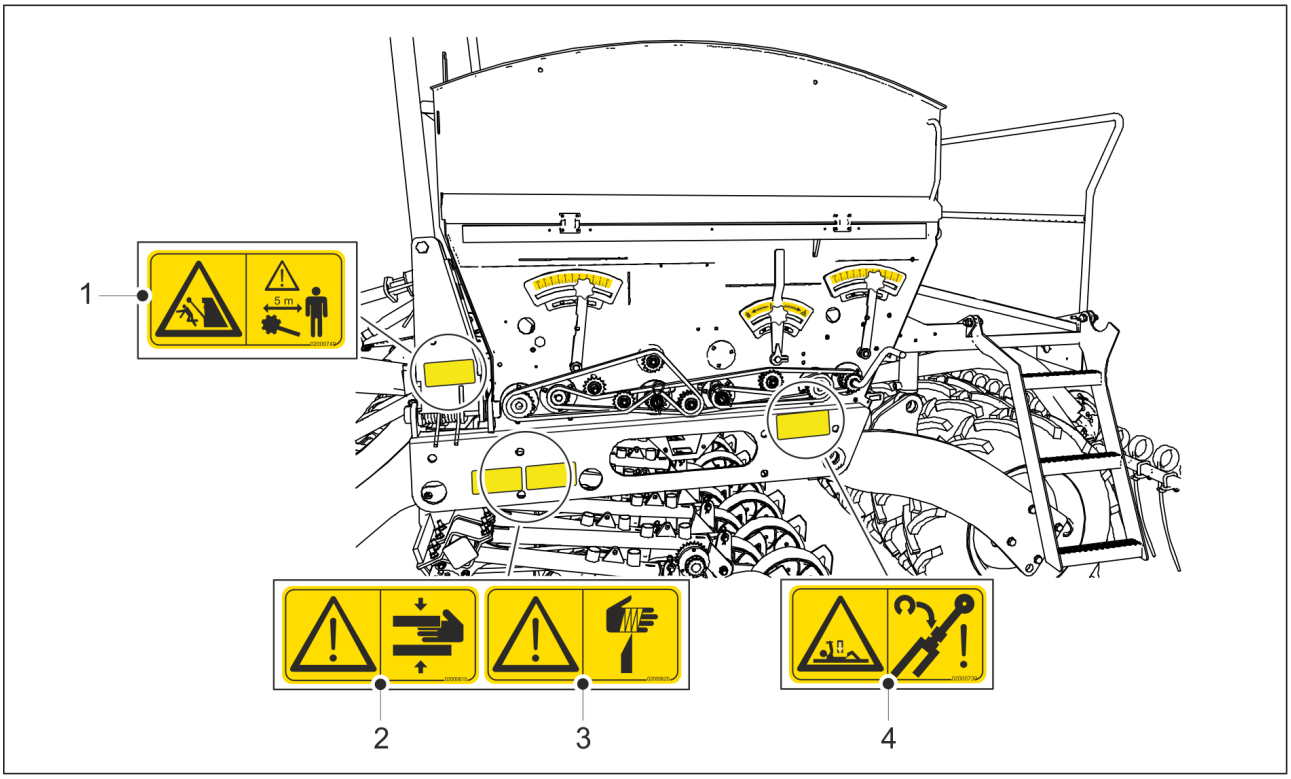


Figure. 3.3. - 4. Warning labels on the left side of the seed drill

Table. 3.3. - 8. Warning labels on the left side of the seed drill

1.	Crushing and impact hazard when lifting and lowering the middle markers	2 pcs, on both middle markers
2.	Crushing hazard	2 pcs, on both sides of the machine
3.	Cutting hazard	2 pcs, on both sides of the machine
4.	Crushing hazard when performing servicing and maintenance.	2 pcs, on both sides of the machine

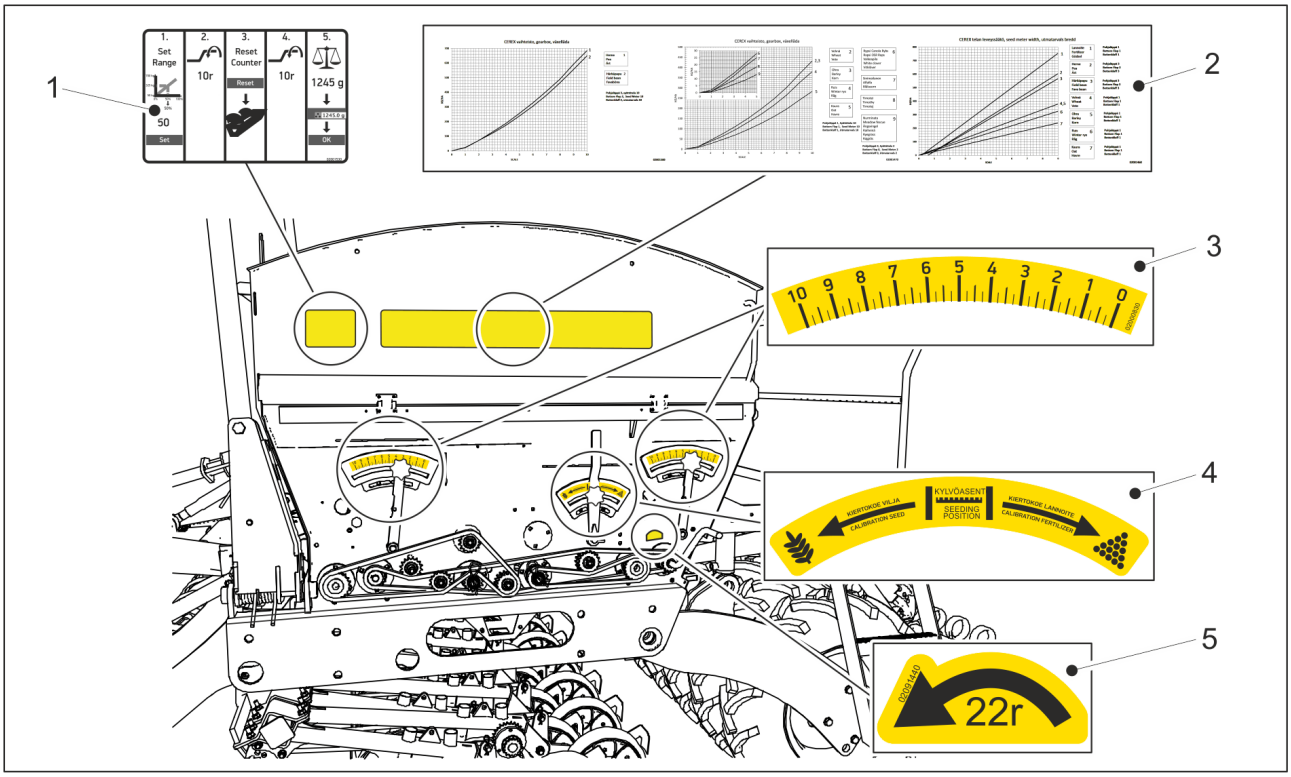


Figure. 3.3. - 5. Seeding and adjustment labels on the left side of the seed drill

Table. 3.3. - 9. Seeding and adjustment labels on the left side of the seed drill

1.	Performing the calibration test	1 pc, under the transmission cover on machines without a gearbox or a gearbox on the seed side
2.	Seeding quantities	1 pc, underneath the transmission cover
3.	Adjustment scale	0 pcs on a machine without a gearbox 1 pc on a machine with a gearbox on the seed side 2 pcs on a machine with a dual gearbox
4.	Product calibration	1 pc
5.	Rotation direction of the calibration test and number of rotations	1 pc

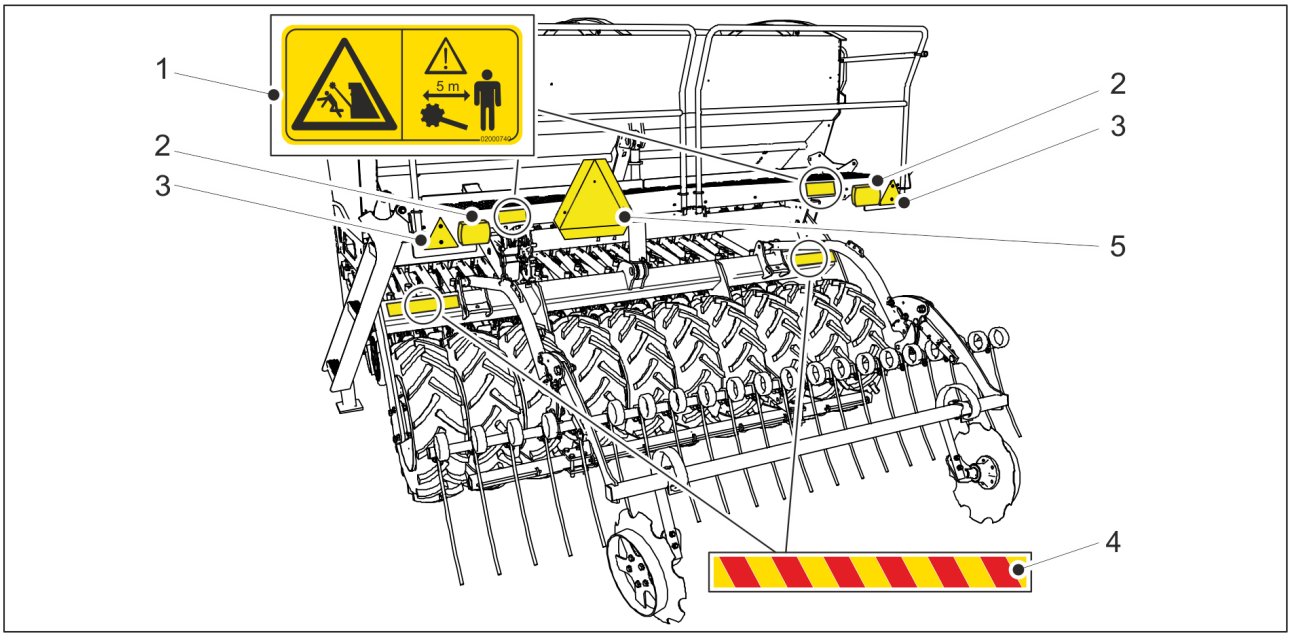


Figure. 3.3. - 6. Labels, reflectors and lights of the rear of the seed drill.

Table. 3.3. - 10. Labels, reflectors and lights of the rear of the seed drill

1.	Crushing and impact hazard when lifting and lowering the rear markers	2 pcs
2.	Rear lights	2 pcs
3.	Reflectors	2 pcs
4.	Warning tape	2 pcs
5.	Plate slow vehicle	1 pc

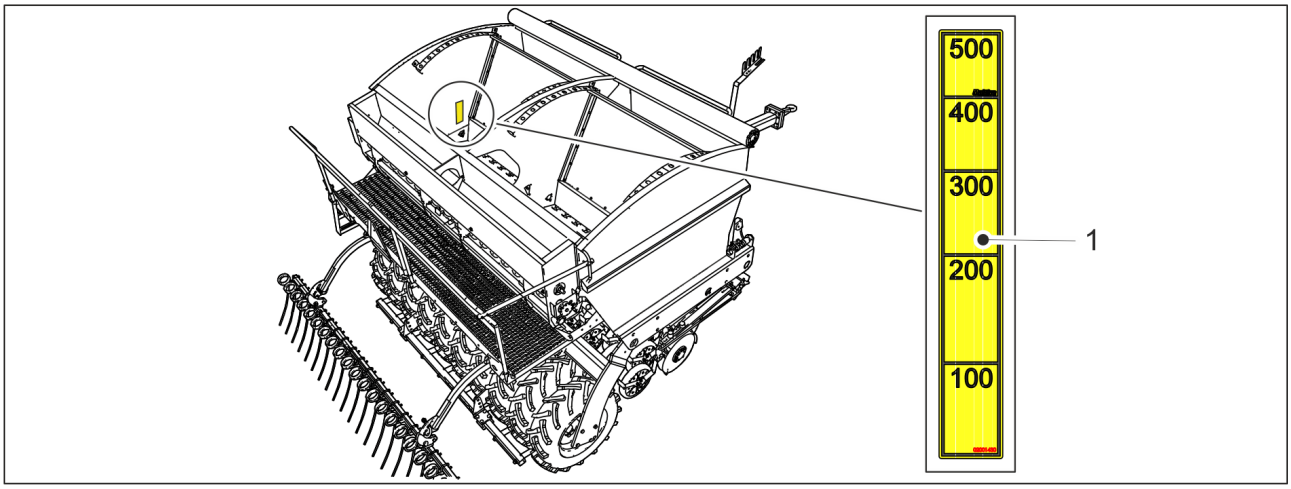


Figure. 3.3. - 7. Seed drill hopper

Table. 3.3. - 11. Markings on the seed drill

1.	Hopper fill level, markings at 100 litre intervals, scale up to 500 litres	2 pcs

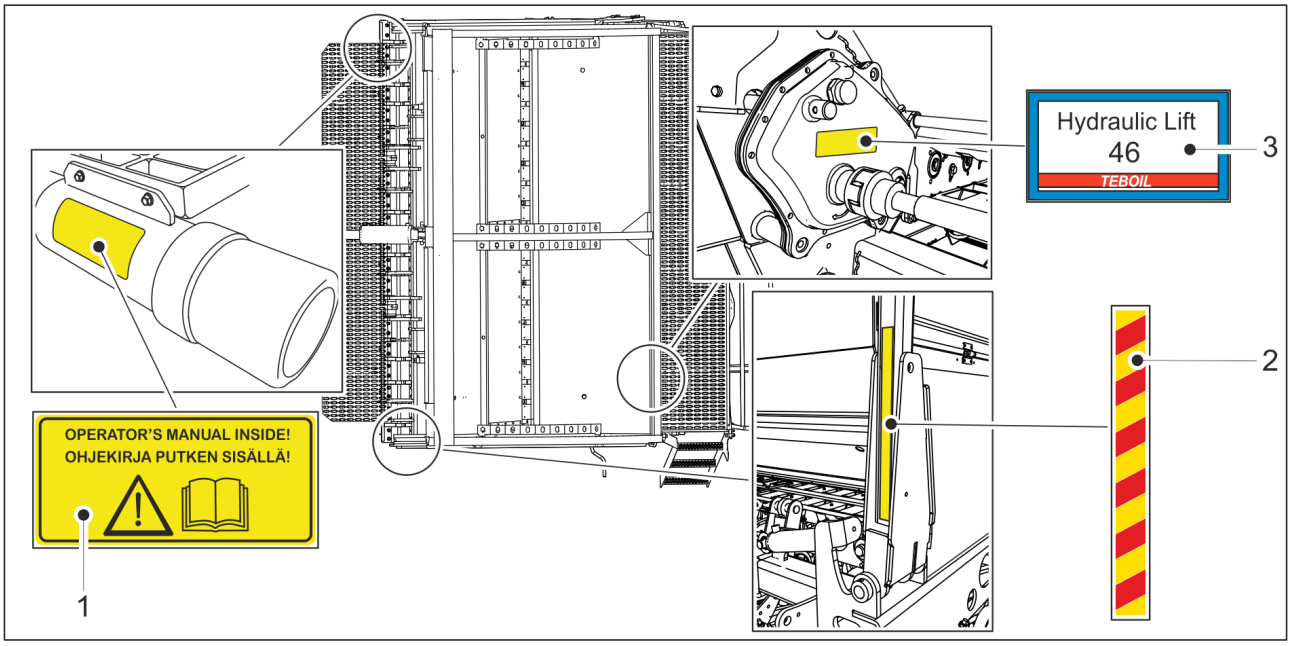


Figure. 3.3. - 8. Overhead view of the seed drill

Table. 3.3. - 12. Overhead view of the seed drill

1.	Label indicating the location of the operation manual	1 pc
2.	Warning tape	2 pcs, on both markers of the machine
3.	Label indicating the transmission oil to use, only in models equipped with a transmission	1 pc

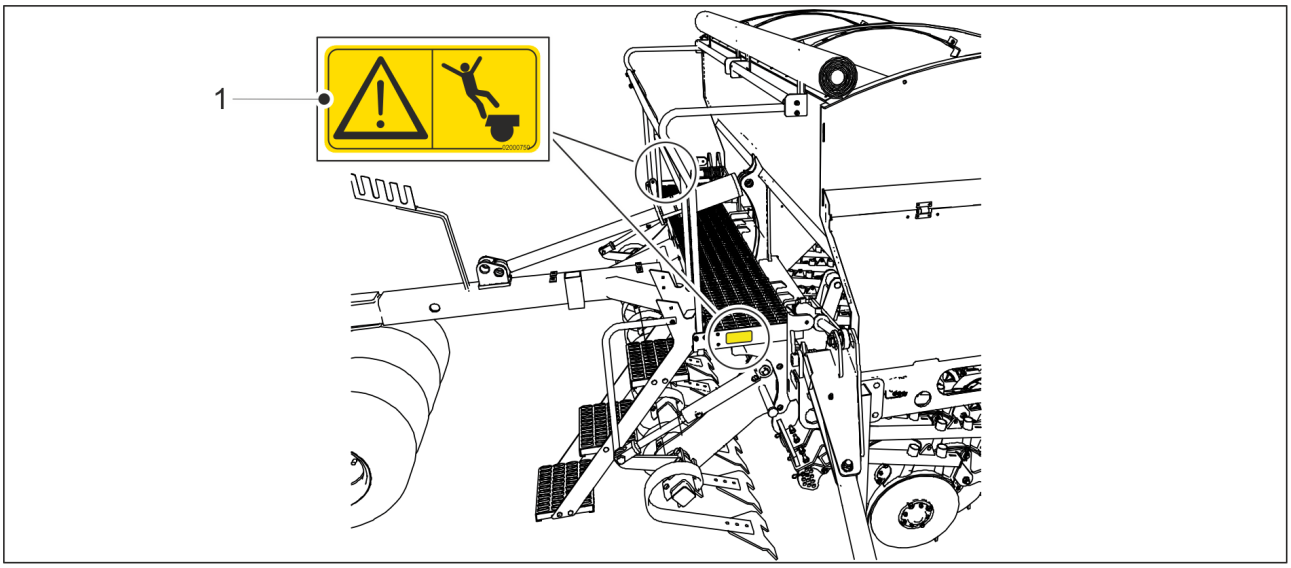


Figure. 3.3. - 9. Labels on the front platform

Table. 3.3. - 13. Labels on the front platform

1.	Falling hazard	2 pcs, on both ends of the front platform

3.4. Using the middle marker ball valves

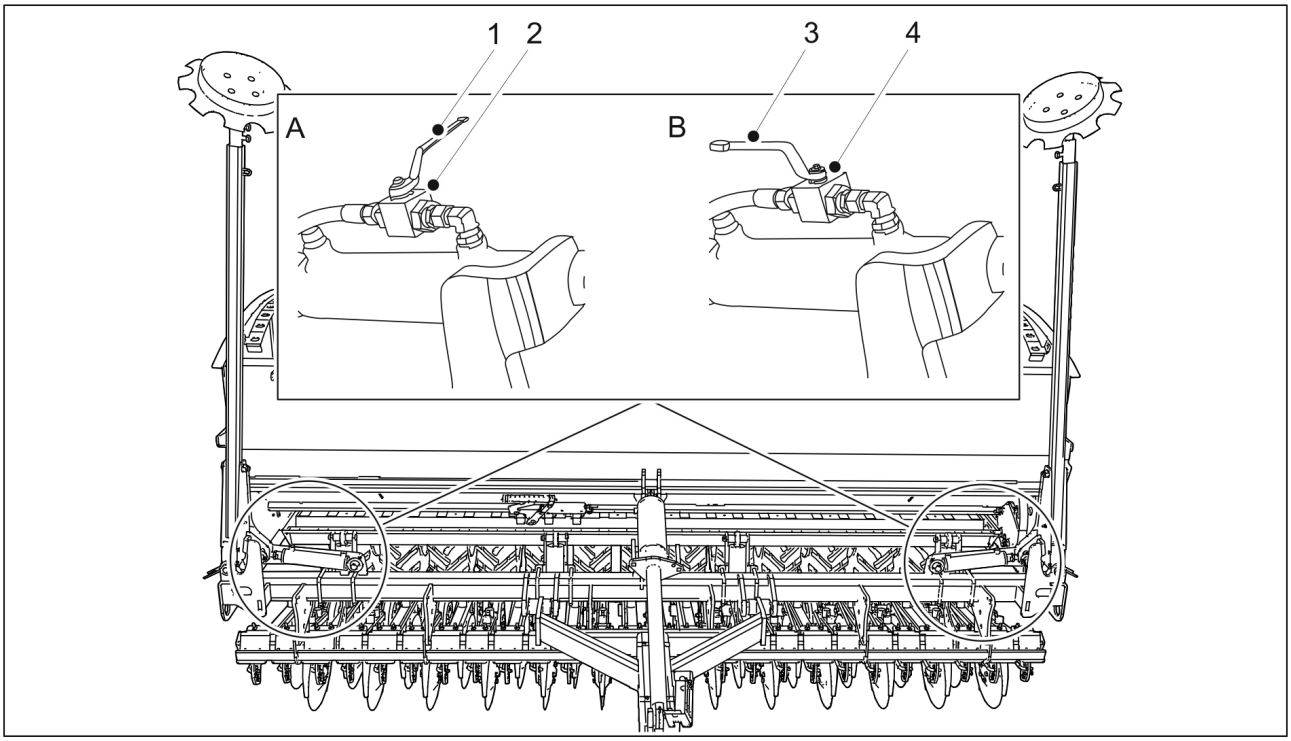


Figure. 3.4. - 10. Middle marker ball valves

DANGER

There is a crushing and impact hazard when lowering the middle markers. Close the 2 middle marker ball valves (2) before moving, performing a calibration test and servicing.

- The ball valve of the middle marker is closed when the handle (1) is perpendicular to the hydraulic hose (A).

- Open the 2 middle marker ball valves (4) when putting the machine in its working position.
  - The middle marker ball valve is open when the handle (3) is parallel with the hydraulic hose (B).

4. Controllers

Select one of the following controller types for the seed drill:

- Lykketronic area counter
- Comfort control system
- SeedPilot control system
- SeedPilot ISOBUS control system

These instructions describe the Lykketronic area counter and the SeedPilot and SeedPilot ISOBUS control systems.

4.1. Lykketronic area counter

4.1.1. Counter components

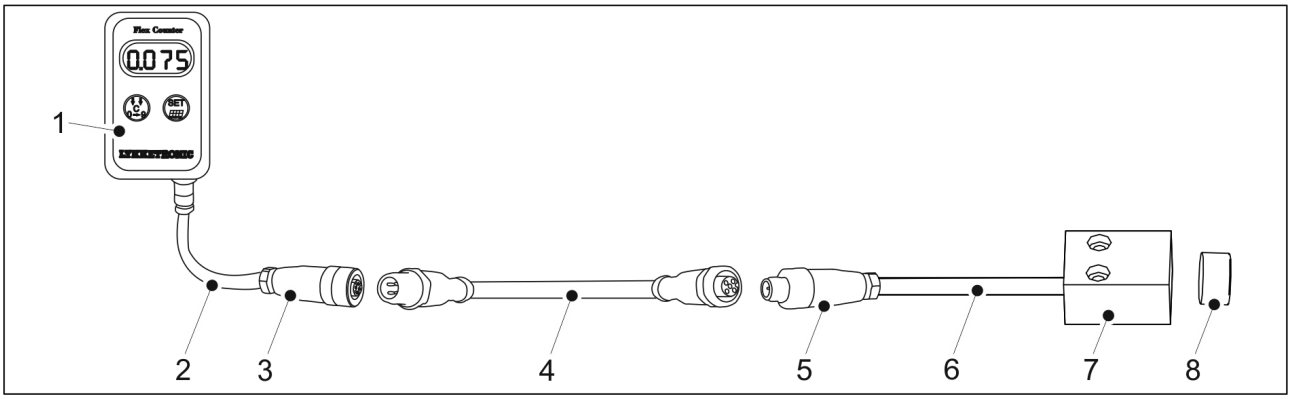


Figure. 4.1.1. - 11. Area counter components

1.	Display
2.	1 m cable
3.	M12 female connector
4.	5 m connecting cable
5.	M12 male connector
6.	3 m cable
7.	Sensor
8.	Magnet

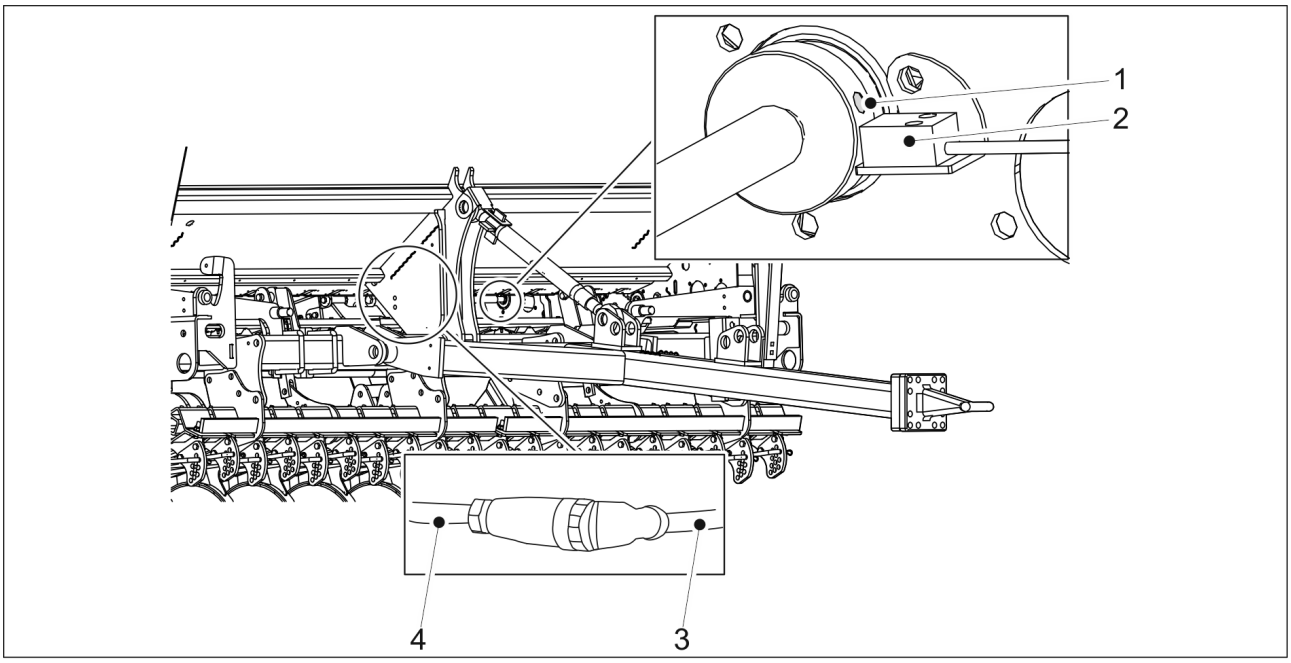


Figure. 4.1.1. - 12. Area counter

The sensor (2) and the magnet (1) have been installed behind the transmission. The 3-metre cable (4) is connected to the machine frame. The 5-metre connecting cable (3) is connected to the 3-metre cable.

4.1.2. Counter buttons and display

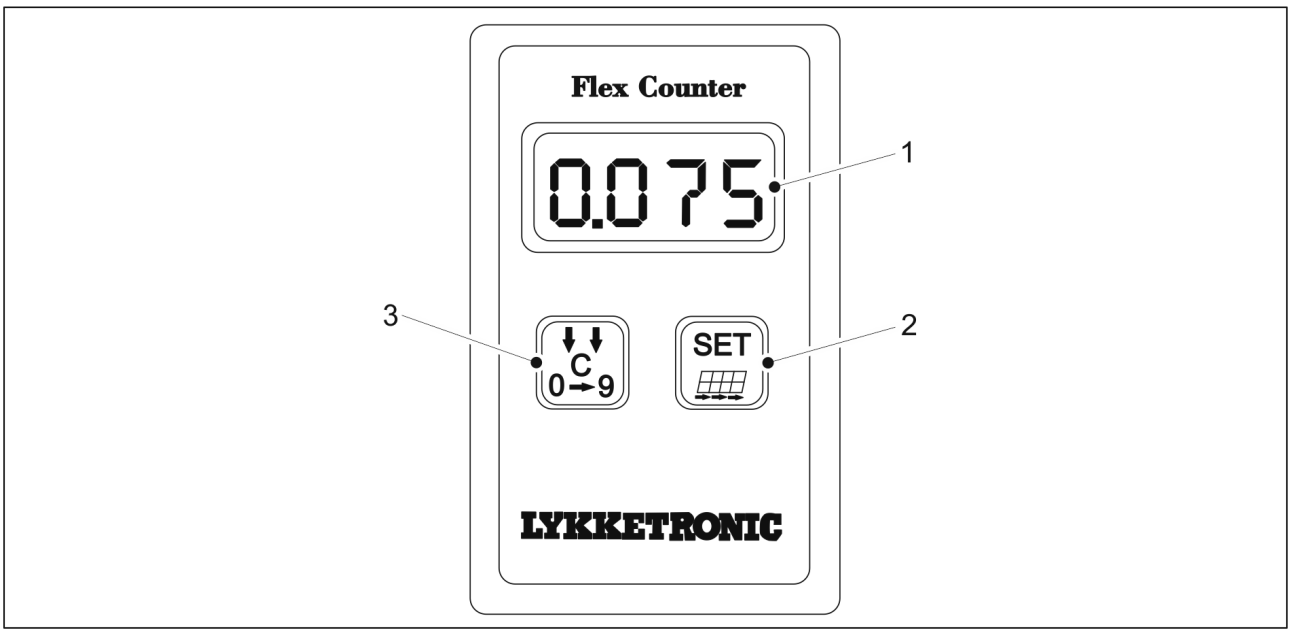


Figure. 4.1.2. - 13. Area counter

1.	Display
2.	SET key
3.	C key

Table. 4.1.2. - 14. Display symbols

Symbol displayed	Function
HA.1	Area I, partial area
HA.2	Area I, total area
|- - - -|	Working width
o	Advance

4.1.3. Using the counter

4.1.3.1. Setting the machine's working width

- The working width setting is 3.00 m. Enter the working width in metres.

1. Press the C key repeatedly until the working width symbol | - - - - | is displayed on the screen.
2. Press the SET key.
    - The first number starts to flash. The number can now be changed.
3. Press the C key repeatedly until the value is _.
4. Press the SET key, and the second number starts to flash. Press the C key repeatedly until the value is 3.
5. Press the SET key, and the third number starts to flash. Press the C key repeatedly until the value is 0.
6. Press the SET key, and the fourth number starts to flash. Press the C key repeatedly until the value is 0.

4.1.3.2. Setting the value of advance

- The advance is set to 150.0 cm. The value is entered in centimetres.

1. Press the C key repeatedly until the advance symbol o is displayed on the screen.
2. If the position of the comma must be changed, keep the SET key depressed for approximately 2 seconds until the comma starts to flash. Press the C key until the comma is in the correct position.
3. Press the SET key.
    - The first number starts to flash. The number can now be changed.
4. Press the C key repeatedly until the value is 1.
5. Press the SET key, and the second number starts to flash. Press the C key repeatedly until the value is 5.
6. Press the SET key, and the third number starts to flash. Press the C key repeatedly until the value is 0.
7. Press the SET key, and the fourth number starts to flash. Press the C key repeatedly until the value is 0.

4.1.3.3. Resetting the area counter

1. Press the C key repeatedly until the area symbol HA.1 and the value are displayed on the screen.
2. Keep the SET key depressed for approximately 2 seconds until the area value starts to flash.
3. Press the C key repeatedly until the value is reset.

4.1.3.4. Switching power on and off

- The device is powered by two 1.5 V AA batteries.
  The device starts operating when it receives a signal from the sensor.

1. Switch the device on manually by pressing the SET or C key.
   - The display shows the number of the program version.
     The device checks the condition of the batteries. If the display shows text "-bL" and the device switches off, change the batteries. If text "-bL" flashes during use, the battery voltage starts to decrease and the batteries should be changed.
     The device switches off automatically if it has bot received a pulse from the sensor for 0.5 - 1.5 hours or if no key has been pressed. All values are stored in the memory.
2. Switch the device off manually by depressing the C key for approximately 4 seconds.
   - The display shows text "stop" for approximately one second, after which the device switches off.

4.2. SeedPilot and SeedPilot ISOBUS control system

This section describes the SeedPilot and SeedPilot ISOBUS control systems.

SeedPilot is a basic controller and SeedPilot ISOBUS is an ISOBUS-compatible controller. The user interface for the SeedPilot and SeedPilot ISOBUS control systems is the same, with the exception of a few features that are only found on the SeedPilot ISOBUS version.

4.2.1. Control system components

4.2.1.1. Control unit

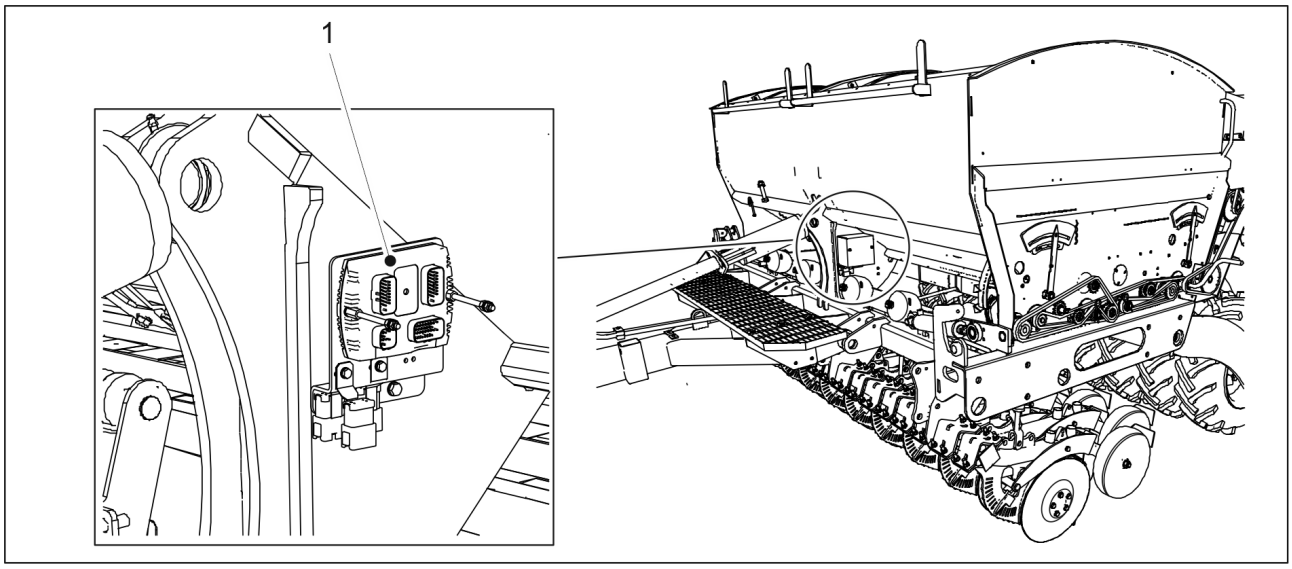


Figure. 4.2.1.1. - 14. Control unit

The control unit (1) of the SeedPilot and SeedPilot ISOBUS control system is located on the front of the machine's centre panel.

4.2.1.2. Seeding position sensor

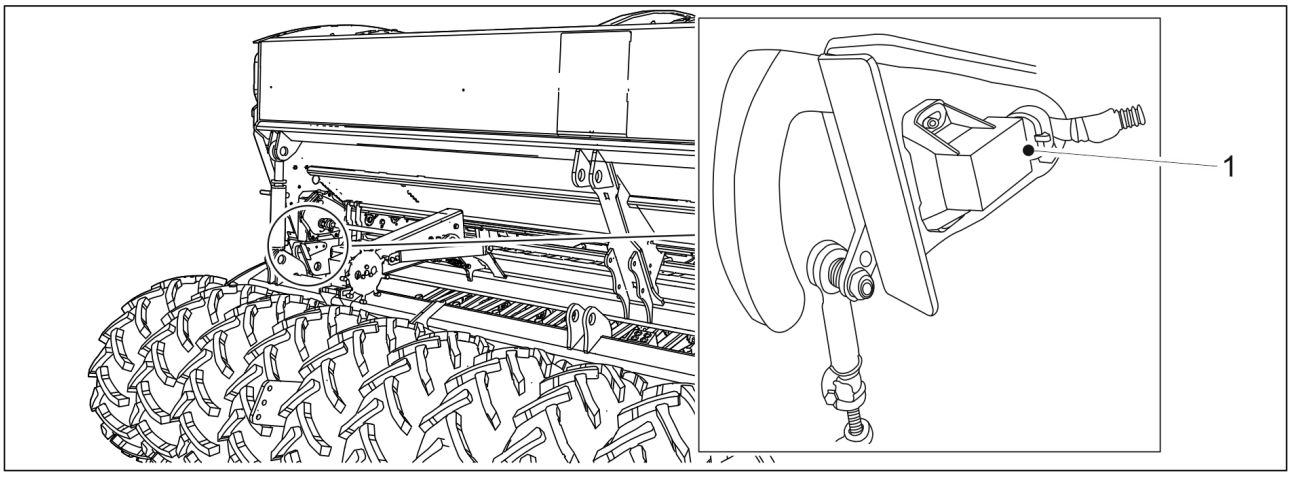


Figure. 4.2.1.2. - 15. Seeding position sensor

The seeding position sensor (1) recognises when the machine is in the transport or seeding position.

The seeding position sensor works as a counter. In normal mode of the lift inhibit function, the counters and the switching of the middle marker side operate at each lifting.

4.2.1.3. Speed sensor

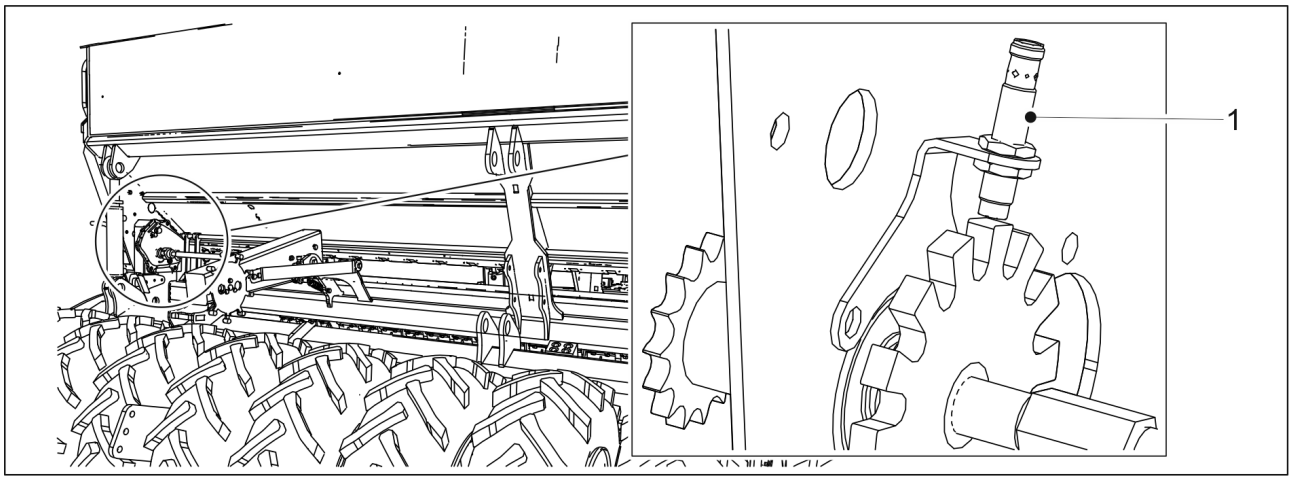


Figure. 4.2.1.3. - 16. Speed sensor

The speed sensor (1) is an inductive sensor, which measures the seed drill speed and seeded area. The controller display shows the driving speed and the seeded area.

4.2.1.4. Shaft rotation guards

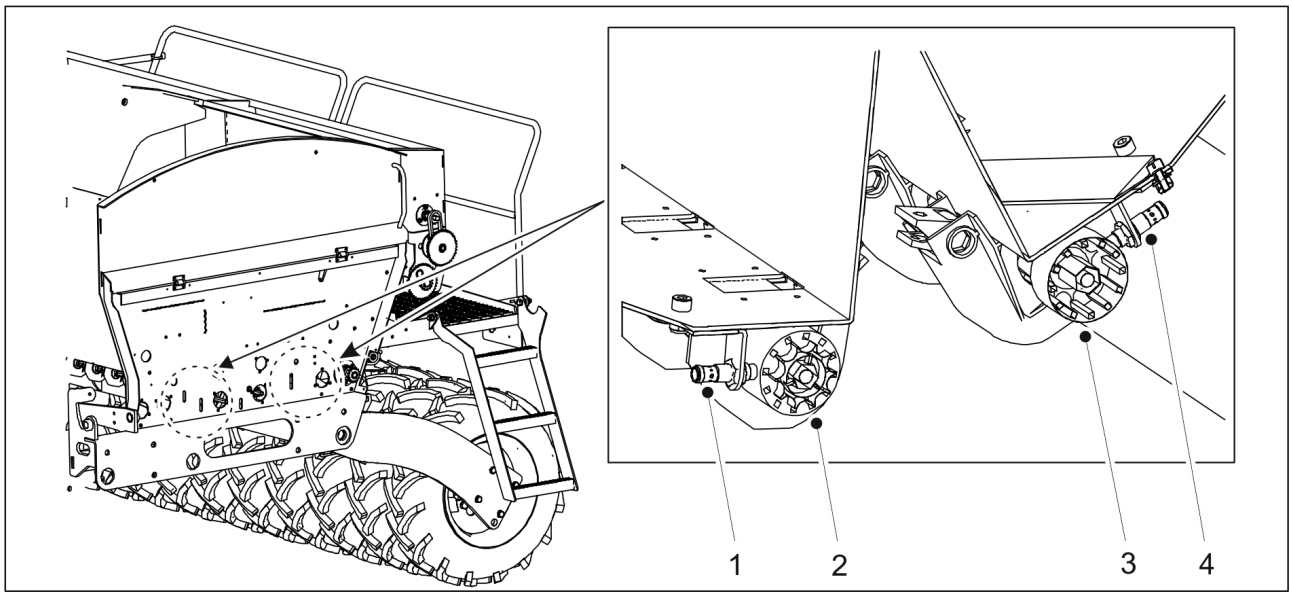


Figure. 4.2.1.4. - 17. Shaft rotation guards

There are 2 shaft rotation guards. An inductive sensor (1, 4) and sensor wheel (2, 3) are located on the left edge of the feeder unit on both the fertiliser and seed sides (viewed from the back of the machine). The sensor wheel has 12 key steel rods. The rotation monitors ensure that the feeder shaft is rotating and the feeder units are feeding seed and fertiliser. If the feeder shaft is not rotating, an alarm is triggered in the control system.

4.2.1.5. Hopper level sensors

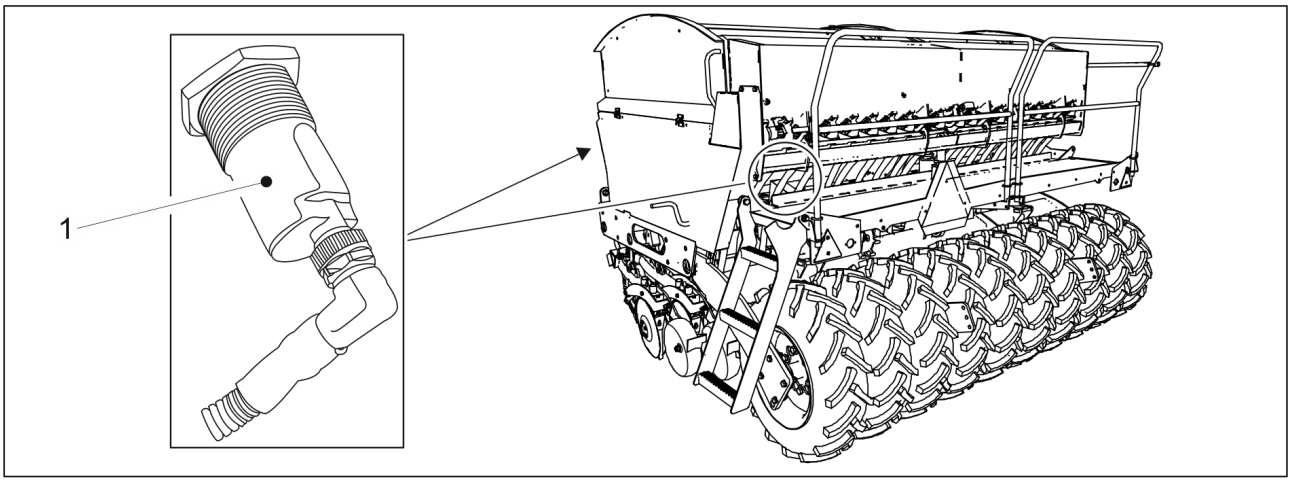


Figure. 4.2.1.5. - 18. Hopper level sensors

As a standard feature, there are two hopper level sensors (1) in the machine: one in the seed hopper and one in the fertiliser hopper on the left side of the machine. Hopper level sensors are also available as an accessory for hoppers on the right side of the machine, bringing the total number of hopper level sensors to 4. The hopper level sensors are capacitive sensors. If the seed or fertiliser level in the hopper is too low, an alarm is triggered in the controller.

4.2.1.6. Tramline clutches

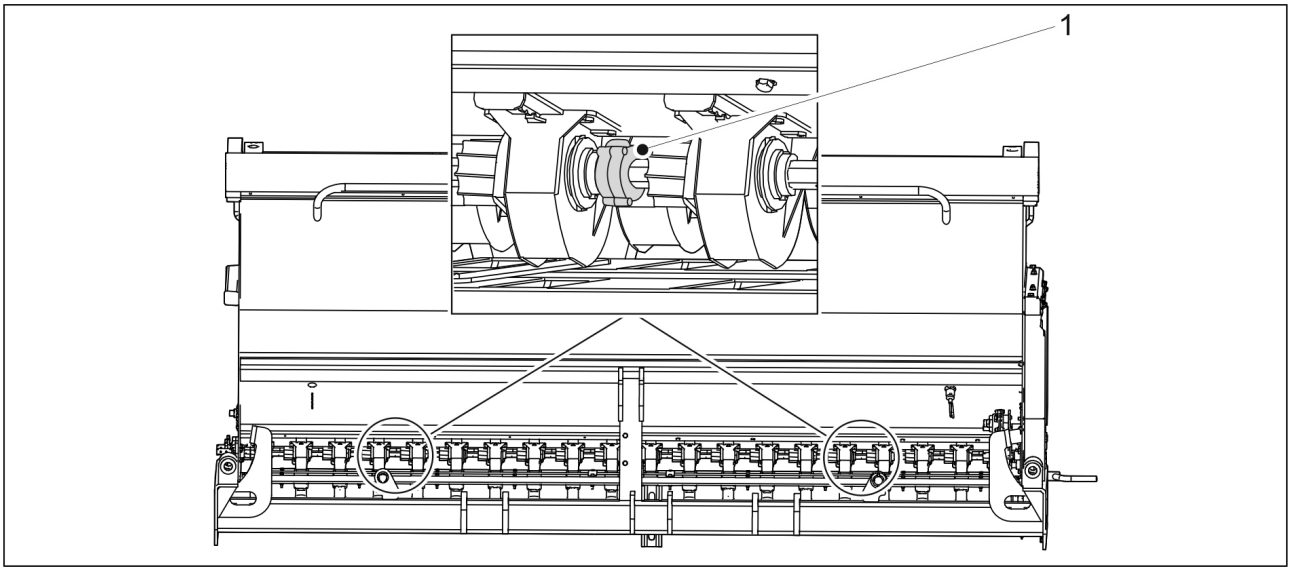


Figure. 4.2.1.6. - 19. Tramline clutches

The tramline clutches (1) are located on both sides of the feeder unit. The clutches have been installed on both the seed and the fertiliser side. The total number of tramline clutches in the machine is 4. The clutch can be used to disconnect one feeder.

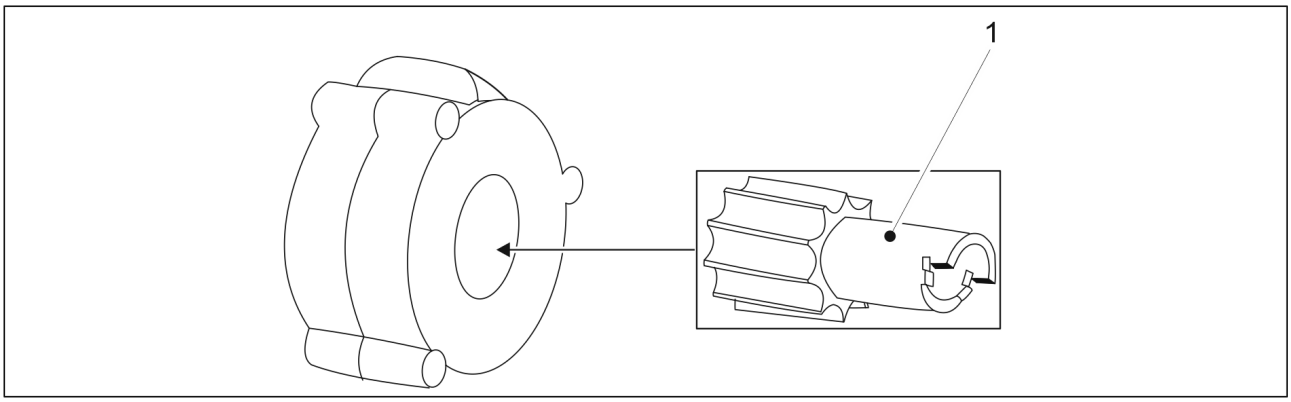


Figure. 4.2.1.6. - 20. Notched feeder roller

The tramline clutch comes with one notched feeder roller (1) as a standard feature. When the tramline clutch is powered on, the notched feeder roller does not rotate. During seeding, a tramline is generated when a row is not seeded.

4.2.1.7. Tramline extensions

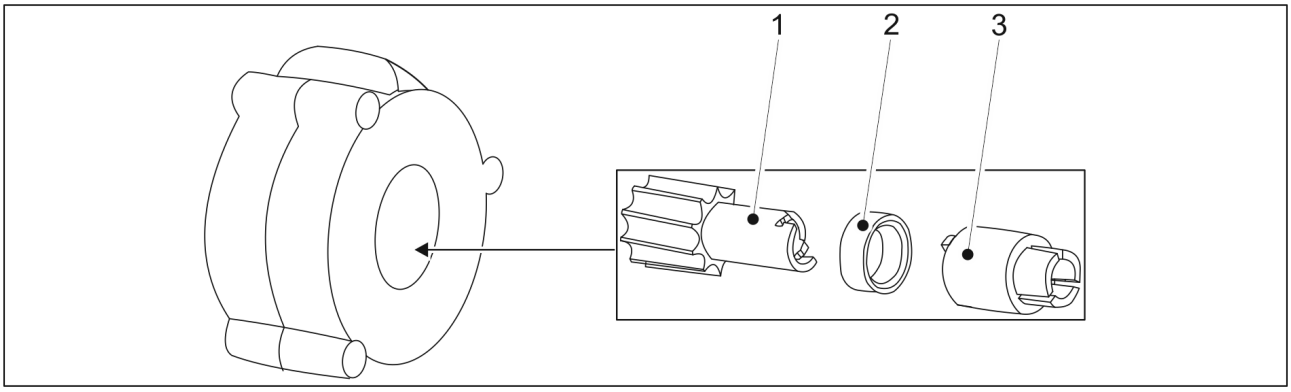


Figure. 4.2.1.7. - 21. Tramline extensions

The tramline clutch comes standard with one notched feeder roller; see section 4.2.1.6. Tramline clutches. The extension pack includes a notched feeder roller (1) and two sleeves (2, 3). When the tramline clutch is powered on, the notched feeder rollers do not rotate.

4.2.1.8. Linear actuator for remote control

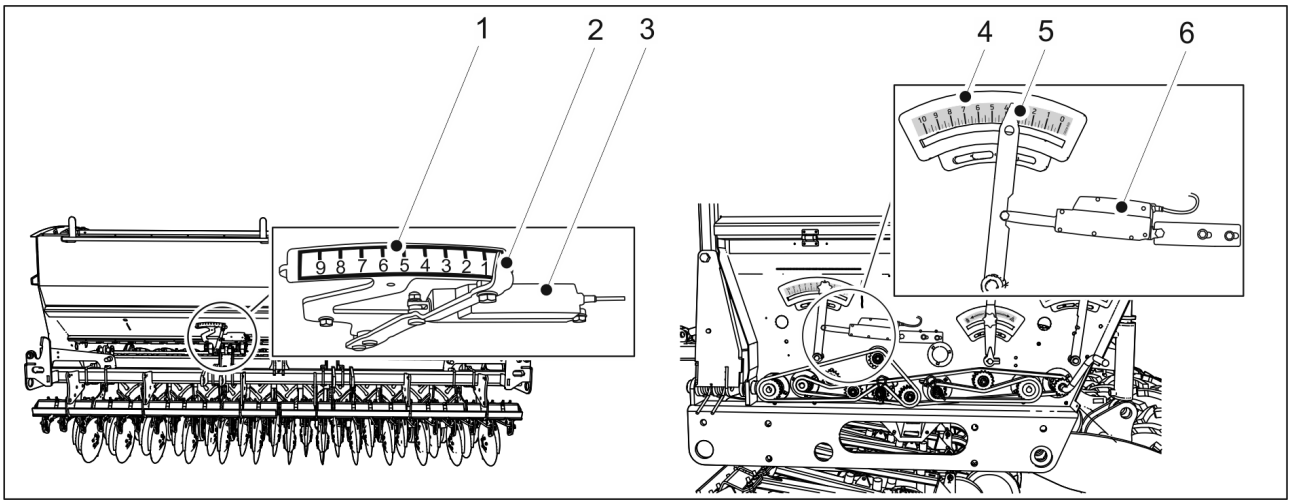


Figure. 4.2.1.8. - 22. Linear actuator for remote control. On the left, a machine without a gearbox and, on the right, a machine equipped with a gearbox on the seed side. On the right, a machine with a dual gearbox.

A LINAK linear actuator (3, 6) is used for remote control. A pointer (2, 5) indicates the fertiliser feed rate on a scale of (1, 4). The fertiliser remote control mode value (kg/ha) is shown on the user interface screen. The feed rate scale on the linear actuator describes the relative value of the fertiliser feed rate.

In machines without a gearbox or with one gearbox on the seed side, the linear actuator is found in the feeder unit (figure on the left). In machines with a dual gearbox, i.e. a gearbox on both the seed and fertiliser side, the linear actuator is found in the transmission (figure on the right).

4.2.1.9. Coulter pressure sensor

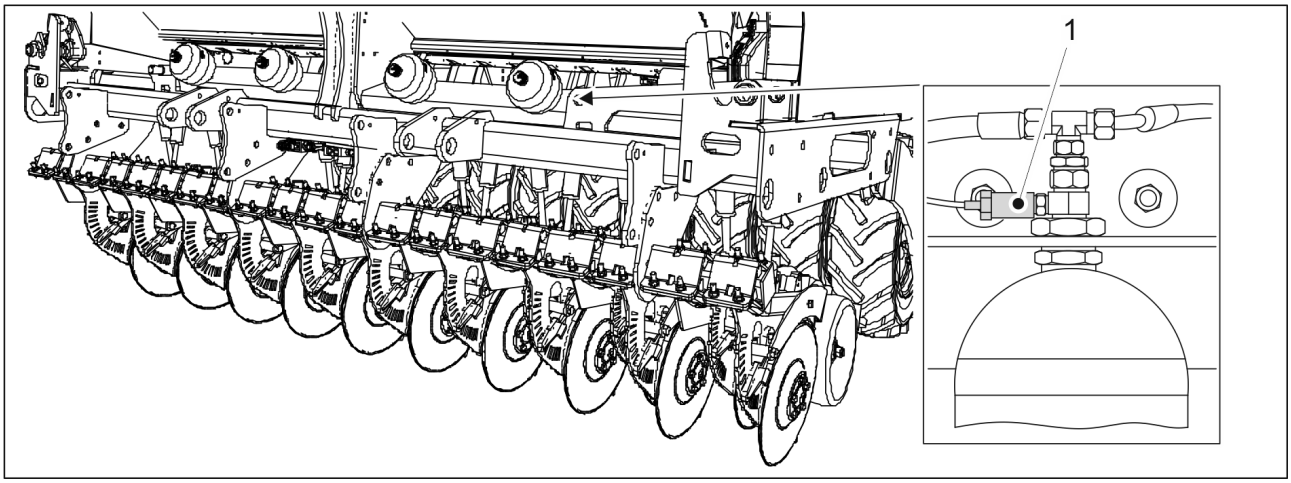


Figure. 4.2.1.9. - 23. Coulter pressure sensor

The coulter pressure sensor (1) is located on the left side of the machine on the outermost pressure accumulator. The coulter pressure sensor gauges the coulter pressure. The coulter pressure value is displayed on the user interface page - see section 4.2.4.1. Drive screen.

4.2.1.10. Pressure sensors of the lifting and lowering circuit

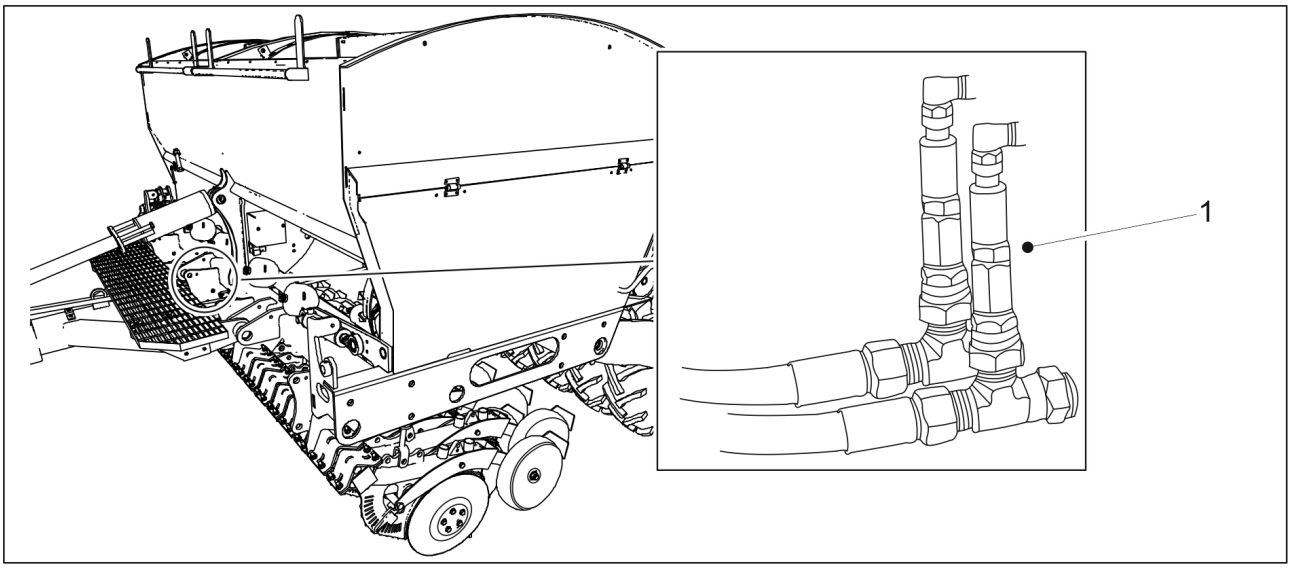


Figure. 4.2.1.10. - 24. Pressure sensors of the lifting and lowering circuit

The 2 lifting and lowering circuit pressure sensors (1) are located at the front of the machine. The pressure sensors are used to shut off the lift inhibit function once it has been run.

Lifting and lowering circuit pressure sensors are only in the SeedPilot ISOBUS control system.

4.2.1.11. Push button

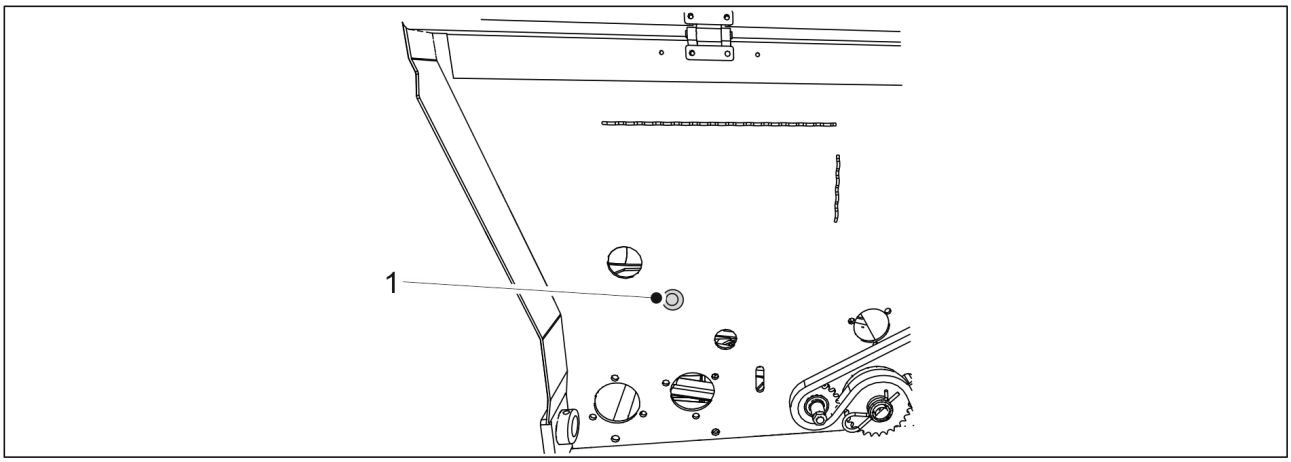


Figure. 4.2.1.11. - 25. Push button

A blue push button (1) is located under the transmission cover. The button light is blinking when the linear actuator seeks the correct position during the fertiliser calibration test when a machine is equipped with adjusting of fertiliser target rate. The button resets the calibration test rotations in adjusting of fertiliser target rate. See more detailed instructions in sections 6.8.3. Calibration test with adjusting of fertiliser target rate - basic model and 6.8.4. Calibration test with adjusting of fertiliser target rate - machine with gearbox. Push button only in the SeedPilot ISOBUS control system.

4.2.1.12. Reversing camera

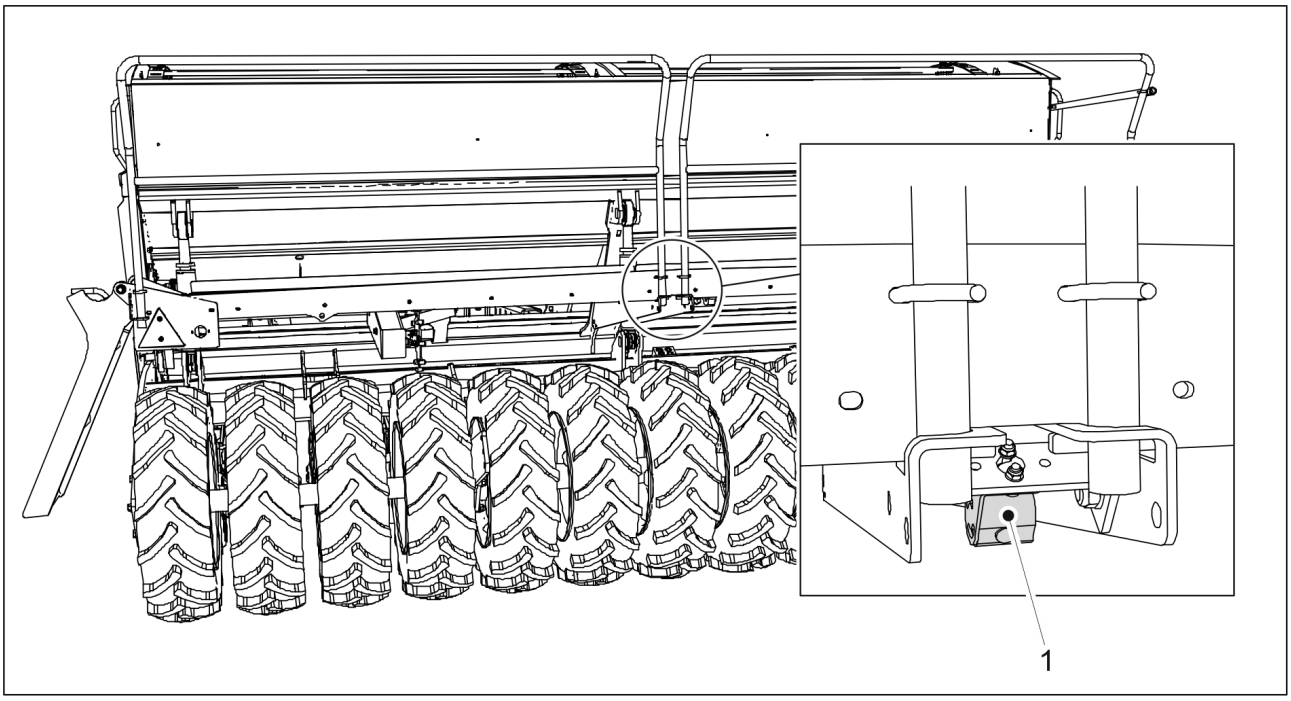


Figure. 4.2.1.12. - 26. Reversing camera

The reversing camera (1) is located at the rear of the machine. A video image appears in the user interface when backing up the machine. The reversing camera is optional.

4.2.1.13. Work lights

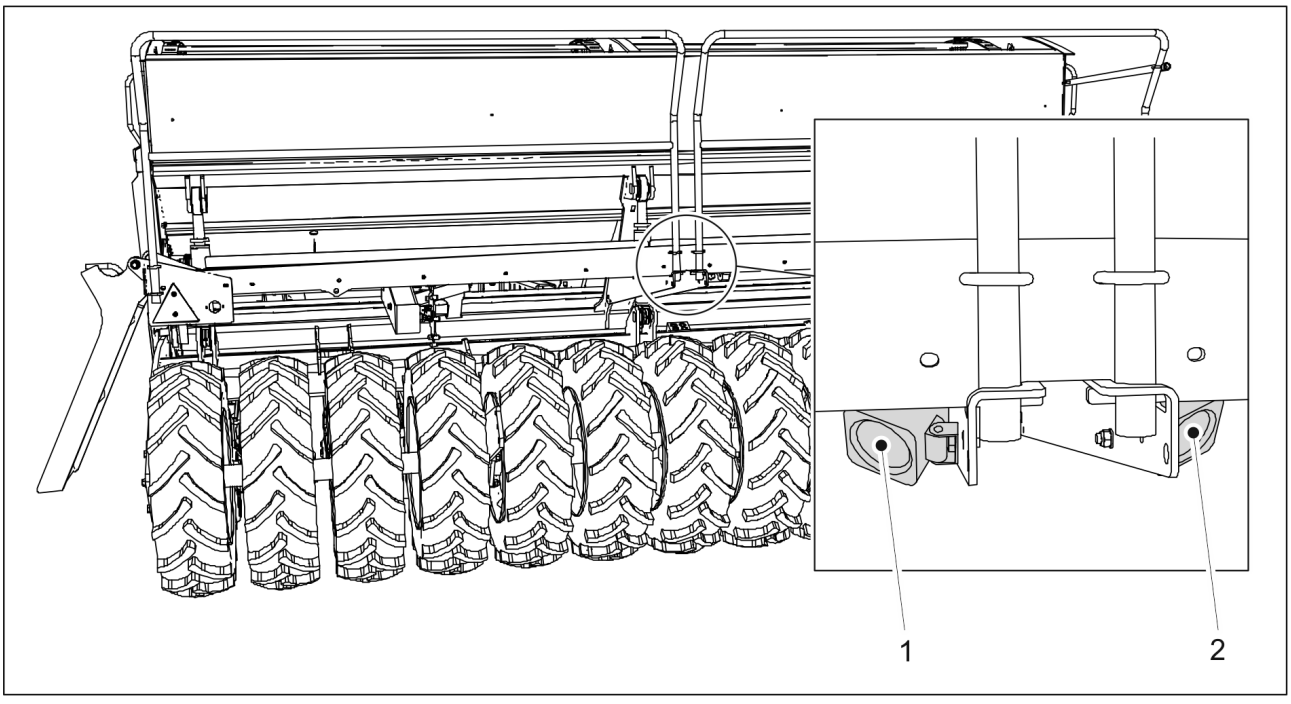


Figure. 4.2.1.13. - 27. Work lights

The work lights (1, 2) are located at the rear of the machine. The work lights are available as an option only in the SeedPilot ISOBUS control system.

4.2.2. SeedPilot control panel

4.2.2.1. SeedPilot control panel buttons

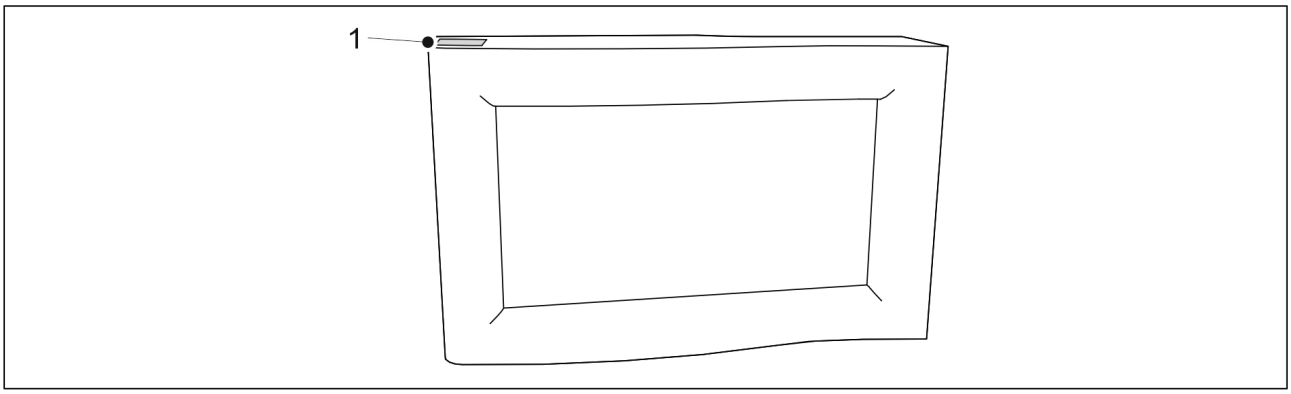


Figure. 4.2.2.1. - 28. Display

1.	Power button

4.2.2.2. SeedPilot control panel settings

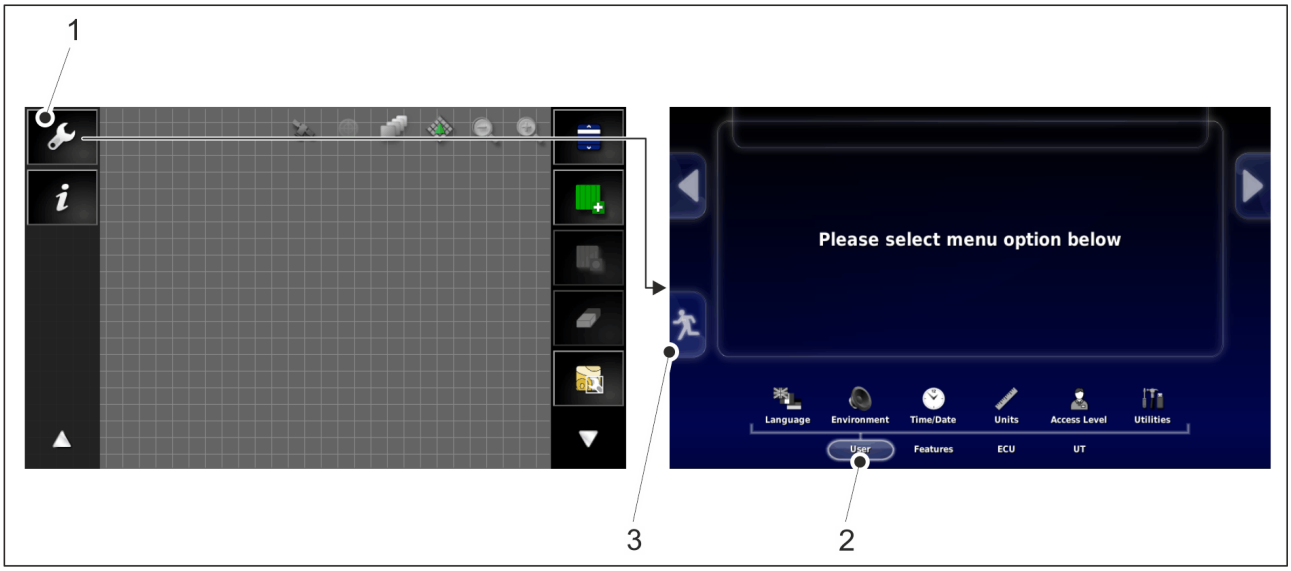


Figure. 4.2.2.2. - 29. Overview screen

- Bring up the menu by swiping to the right with two fingers.

1.	Settings
2.	User setup
3.	Return

4.2.2.3. SeedPilot control panel language settings

Figure. 4.2.2.3. - 30. Language settings

1. Press the USER button (1).
2. Press the LANGUAGE button (2).
    - The user interface language can be changed in the Language menu (3). Select point or comma as the decimal separator in the Decimal point format (4).

4.2.2.4. SeedPilot control panel environment setup

Figure. 4.2.2.4. - 31. Environment setup

1. Press the USER button (1).
2. Press the ENVIRONMENT button (2).
    - Set the user interface volume in Audio volume (3). Enable or disable button sounds in Button clicks (4). Enable or disable alarm tones in the Alarm audio (5).

4.2.2.5. SeedPilot control panel time and date setting

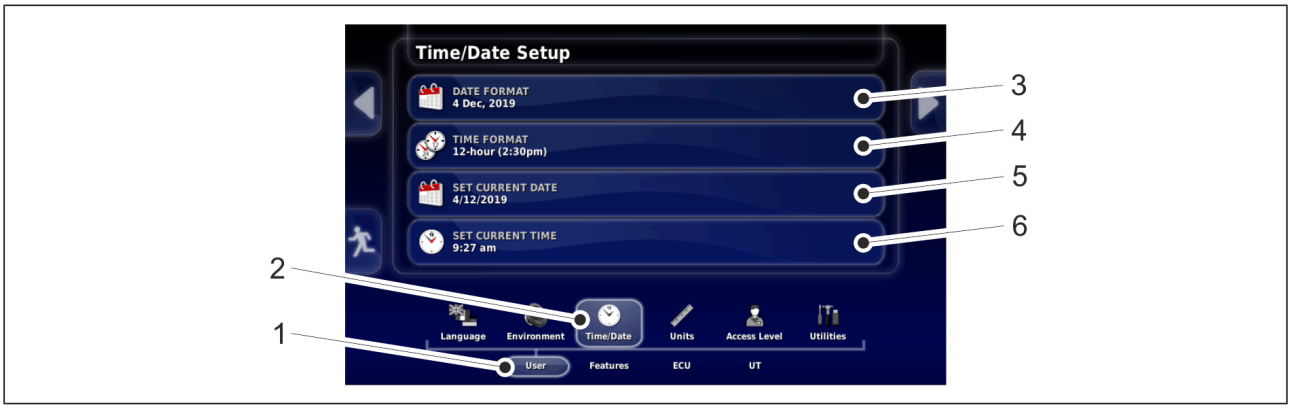


Figure. 4.2.2.5. - 32. Time and date setting

1. Press the USER button (1)
2. Press the TIME/DATE button (2).
    - Select the desired date format in the Date format menu (3). Select the desired time format in the Time format menu (4). Set the current date in the Current date menu (5). Set the current time in the Current time menu (6).

4.2.3. User interface

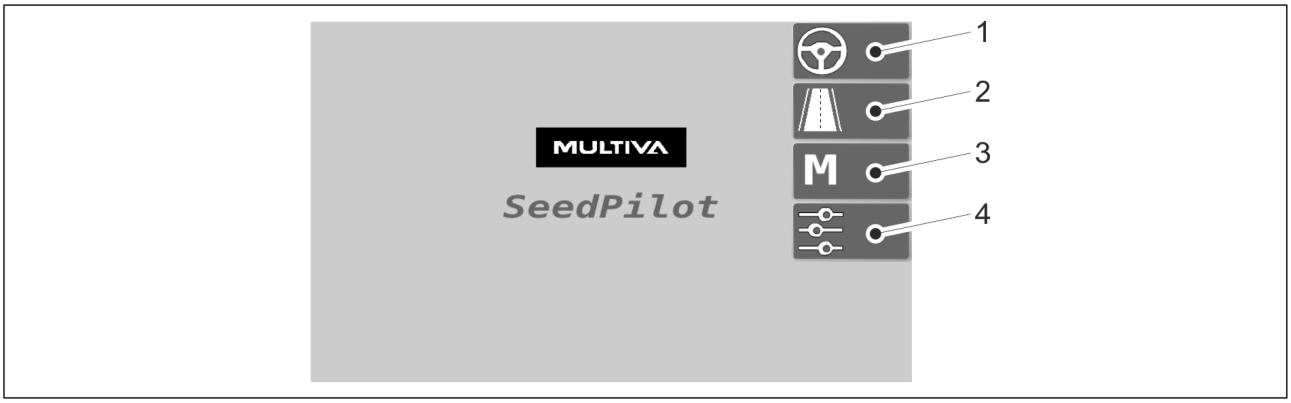


Figure. 4.2.3. - 33. Main screen

1.	Drive screen • Used while working
2.	Transport drive • Used while making a transport drive

3.	Manual mode • Allows the machine to be run manually to the end of the field if, for example, a sensor is malfunctioning
4.	Settings

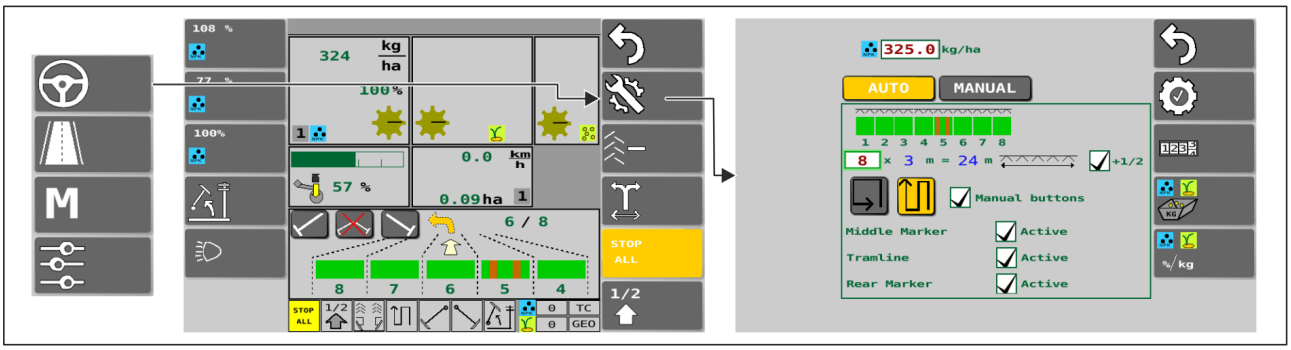


Figure. 4.2.3. - 34. Drive screen and seeding settings (automatic)

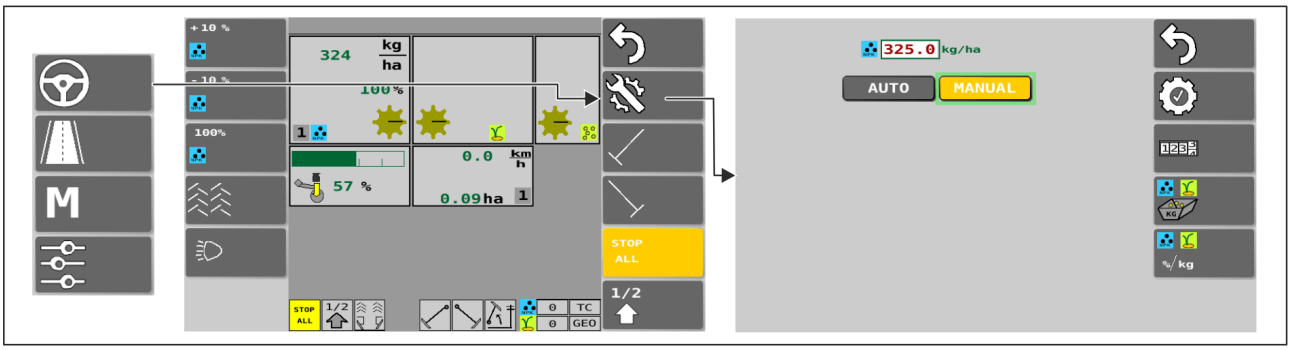


Figure. 4.2.3. - 35. Drive screen and seeding settings (manual)

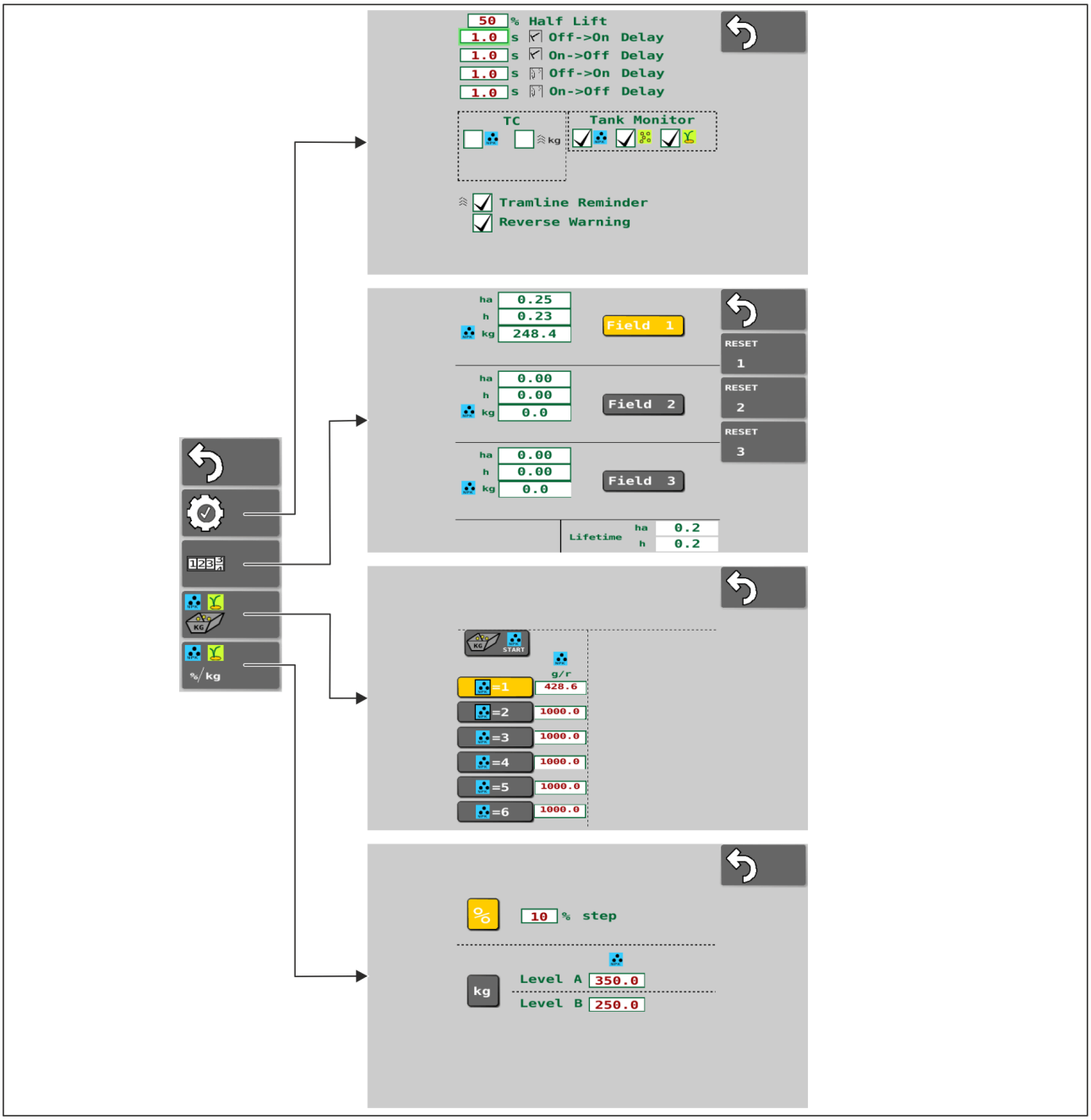


Figure. 4.2.3. - 36. Seeding settings

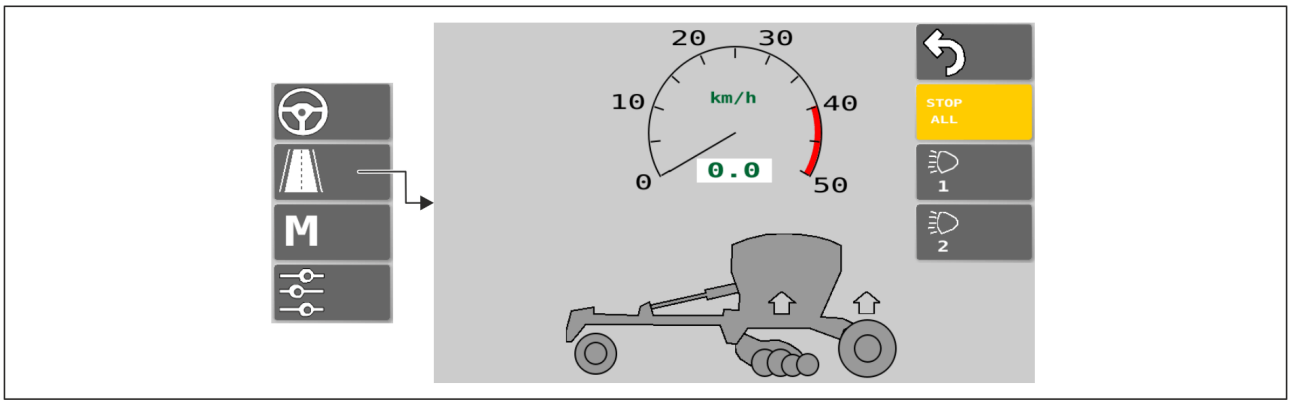


Figure. 4.2.3. - 37. Transport screen

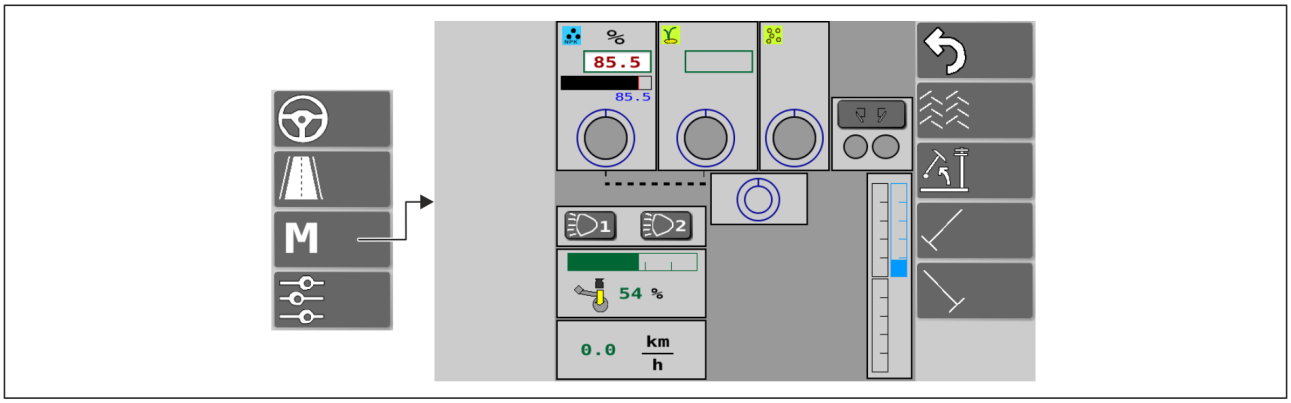


Figure. 4.2.3. - 38. Manual mode

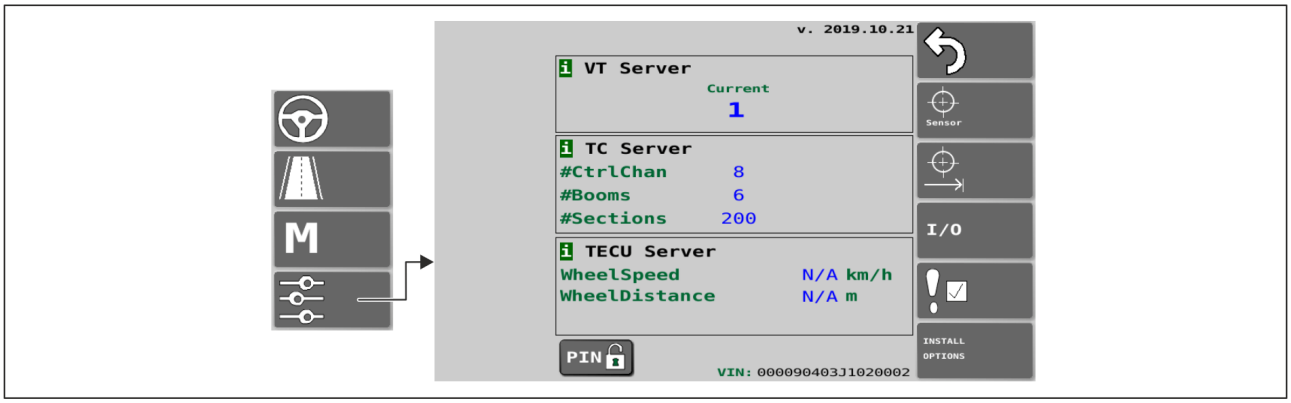


Figure. 4.2.3. - 39. Basic settings

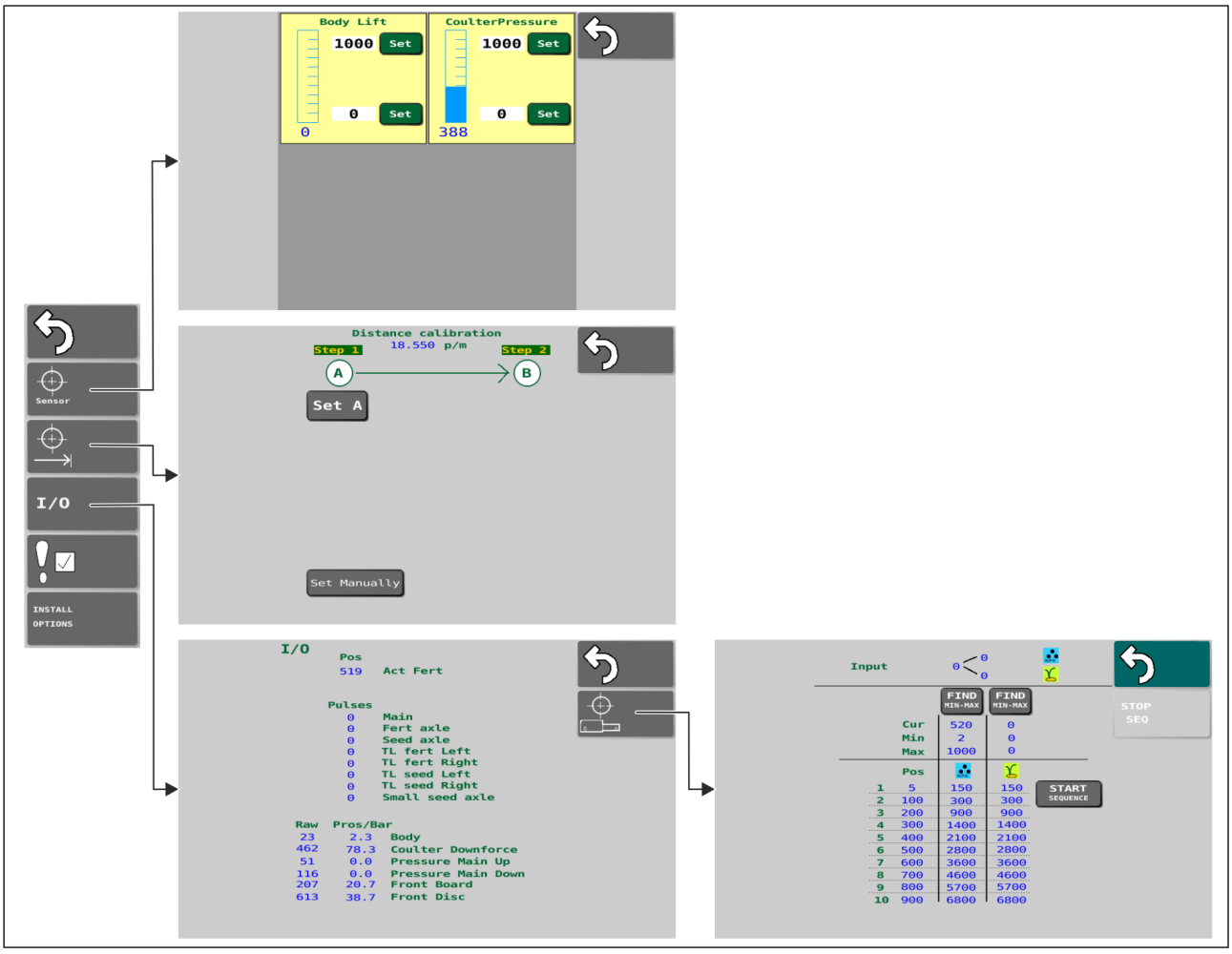


Figure. 4.2.3. - 40. Sensor settings

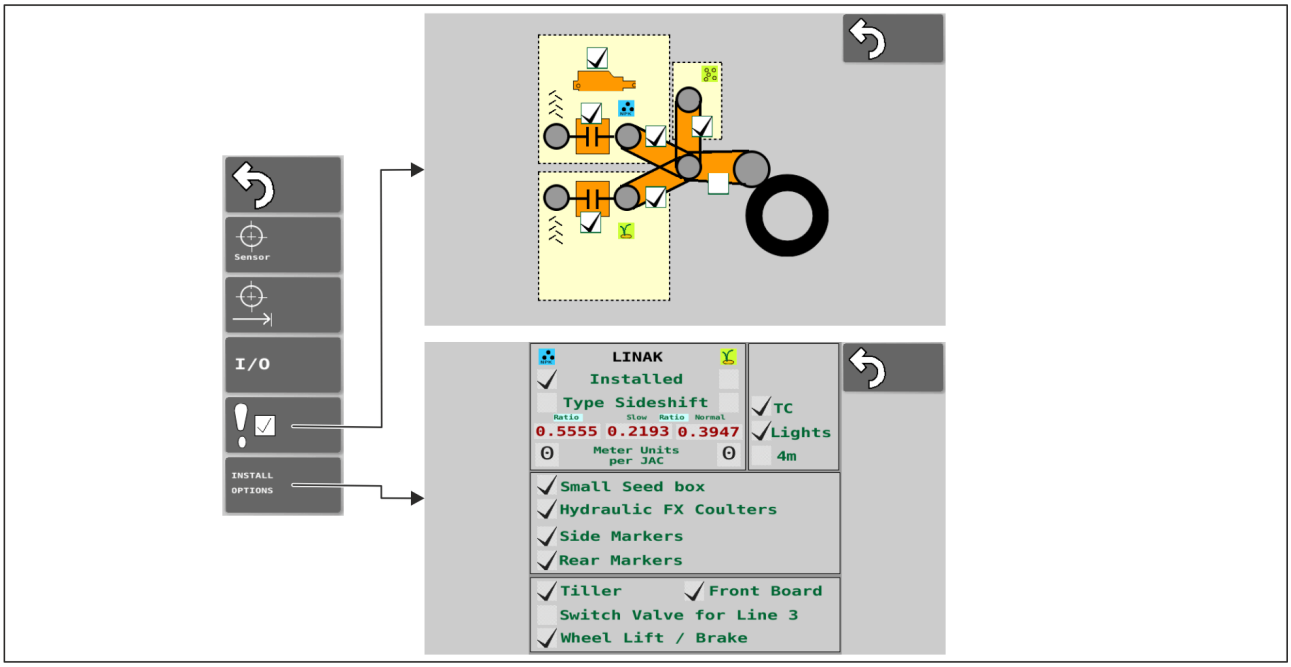


Figure. 4.2.3. - 41. Alarm and accessory settings

4.2.4. Using the user interface

4.2.4.1. Drive screen

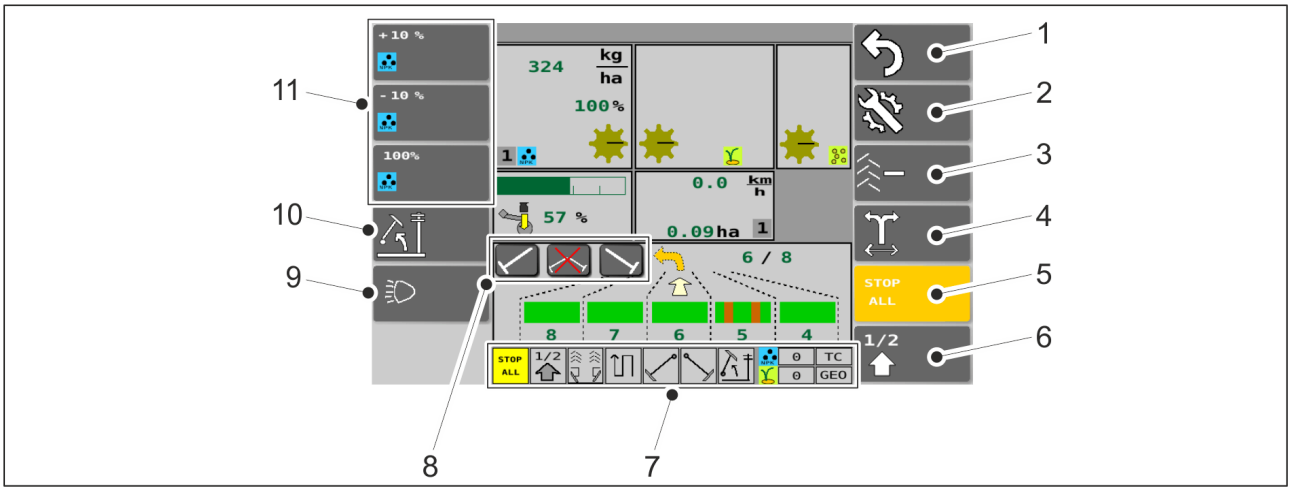


Figure. 4.2.4.1. - 42. Drive screen buttons

- The buttons are yellow when activated. The corresponding icon appears yellow in the Status bar screen (7) when the function is enabled. The icon is greyed out when the function is disabled.

1.	Return
2.	Settings
3.	Tramline counter correction • See section 6.3.7. Tramline counter correction.
4.	Switching of the middle marker side • See section 6.3.5. Using the middle marker automation.
5.	STOP ALL • See section 6.3.1. Using the STOP ALL function.
6.	Half lift
7.	Status bar
8.	Middle markers manual control • See section 6.3.6. Middle markers manual control and forcing operation.
9.	Work lights • Only in the SeedPilot ISOBUS control system.

10.	Lift inhibit function • When the lift inhibit function is on, the machine cannot be lifted even when the middle markers are raised. The lift inhibit button turns itself off when the middle markers are raised. Pressure sensor data from the machine's lifting and lowering circuit is used for this purpose.
11.	Adjusting of fertiliser target rate • See section 6.3.3. Selecting the remote control mode.

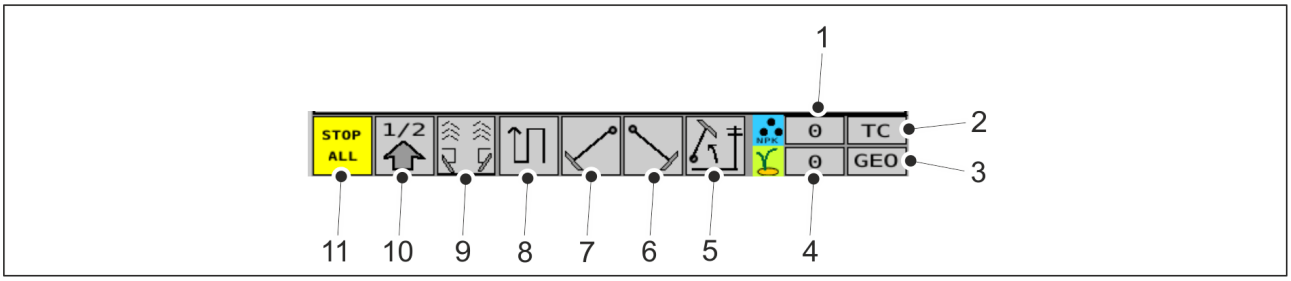


Figure. 4.2.4.1. - 43. Status bar

1.	Fertiliser target rate - data from the Task Controller
2.	TC (Task Controller) • The box is green when the Task Controller is on. • Only in the SeedPilot ISOBUS control system.
3.	Location-based variable rate seed setting • When the TC and GEO icons are green, the seed rate is set according to the active task. • TC and GEO are only in the SeedPilot ISOBUS control system.
4.	Target seed amount - data from the Task Controller
5.	Lift inhibit function
6.	Right middle marker
7.	Left middle marker
8.	Drive-around/back-and-forth
9.	Rear marker and tramline
10.	Half lift
11.	STOP ALL

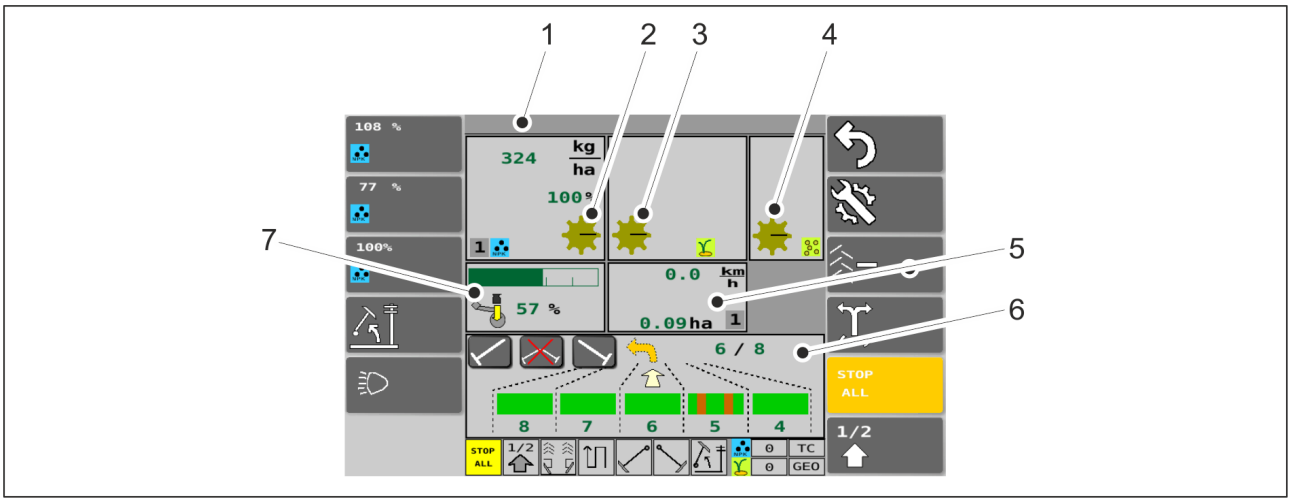


Figure. 4.2.4.1. - 44. Drive screen

1.	Adjusting of fertiliser target rate • See section 6.3.3. Selecting the remote control mode.
2.	Shaft rotation indicator • The feeder roller indicator spins when the shaft is rotating. If the shaft is not rotating even though the machine is running, an alarm is triggered in the control system and the fertiliser screen turns red. See section 8.1. Troubleshooting the SeedPilot and SeedPilot ISOBUS control system.
3.	Shaft rotation indicator - feeder roller for seed
4.	Shaft rotation indicator - feeder roller for small seed
5.	Driving speed and area • Displays the machine speed (km/h) and seeded area (ha). • If the lift sensor shows that the machine is in the raised position, an arrow on the screen indicates that the machine is fully raised. In the half lift function, a line appears above the arrow. When the machine is fully lowered, the arrow points down. • The grey box in the bottom corner of the screen displays which counter is active. See section 6.3.9. Area counter use.
6.	Tramline automation • See section 6.3.4. Using tramline automation.
7.	Coulter pressure • The coulter pressure value appears as a green bar in the bar gauge and as a percentage.

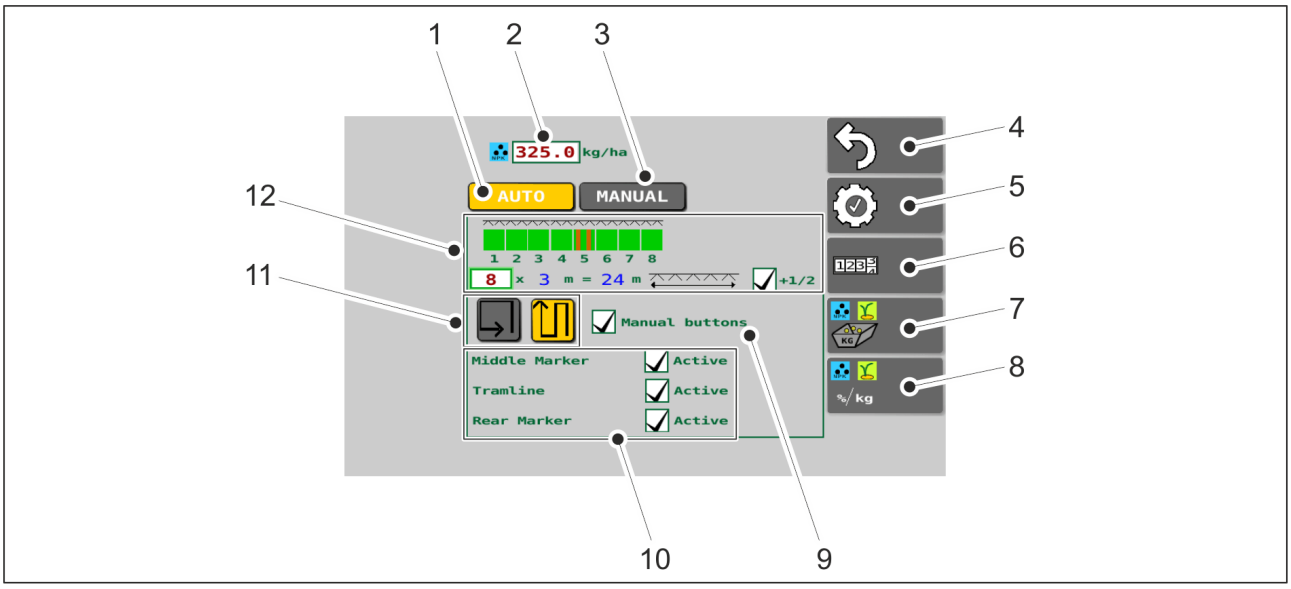


Figure. 4.2.4.1. - 45. Seed screen page buttons

1.	Mode selection
2.	Fertiliser target rate • See section 6.3.3. Selecting the remote control mode.
3.	Manual mode selection • See section 6.3.10. Manual mode selection.
4.	Return
5.	Settings
6.	Area counters • See section 6.3.9. Area counter use.
7.	Product calibration • See sections 6.8.3. Calibration test with adjusting of fertiliser target rate - basic model and 6.8.4. Calibration test with adjusting of fertiliser target rate - machine with gearbox.
8.	Remote control setting • See section 6.3.3. Selecting the remote control mode.
9.	Additional buttons • Manual middle marker control (see section 6.3.6. Middle markers manual control and forcing operation).

10.	Selecting accessories for use • Accessories are in use when the box is checked
11.	Drive-around/back-and-forth • See section 6.3.5. Using the middle marker automation.
12.	Tramline setup • See section 5.2.3. SeedPilot and SeedPilot ISOBUS control system commissioning.

4.2.4.2. Transport drive

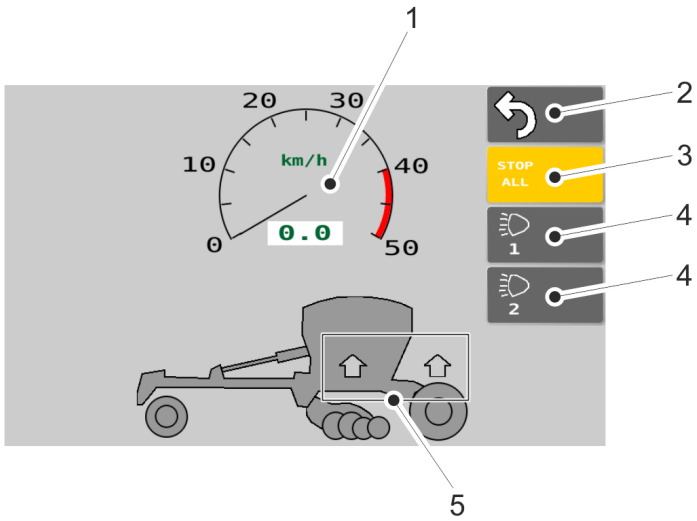


Figure. 4.2.4.2. - 46. Transport drive

1.	Driving speed screen • When speed data is received from the tractor. • Only with the SeedPilot ISOBUS control system.
2.	Return
3.	STOP ALL • Shuts off power from the marker solenoids. • The button is yellow when activated.
4.	Work light control • The button is yellow when activated - lights are on. • Only in the SeedPilot ISOBUS control system.

5.	Arrows • Green arrows: machine is raised in the transport position. • Grey arrows: machine is lowered in the working position.

4.2.4.3. Manual mode

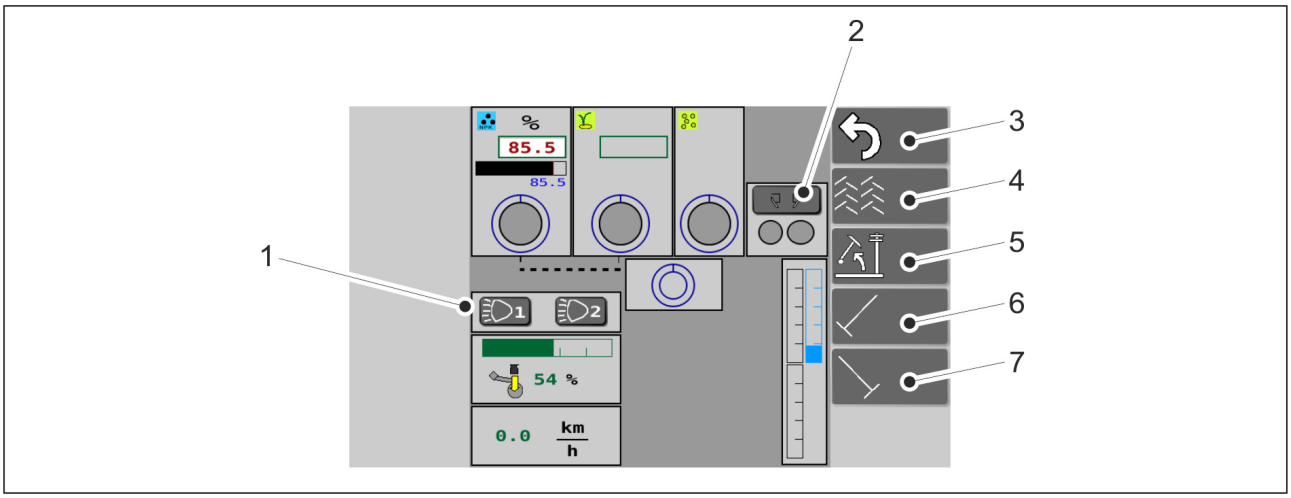


Figure. 4.2.4.3. - 47. Manual mode page buttons

- The buttons are yellow when activated.

1.	Work light control • Only in the SeedPilot ISOBUS control system.
2.	Rear markers • The rear markers are in use when activated.
3.	Return
4.	Tramlines • Tramlines are on when activated.
5.	Lift inhibit function • When activated, only the middle markers are raised
6.	Left middle marker • When activated, middle markers will be lowered when machine is lowered
7.	Right middle marker • When activated, middle markers will be lowered when machine is lowered

8.	Drawbar cylinder adjustment

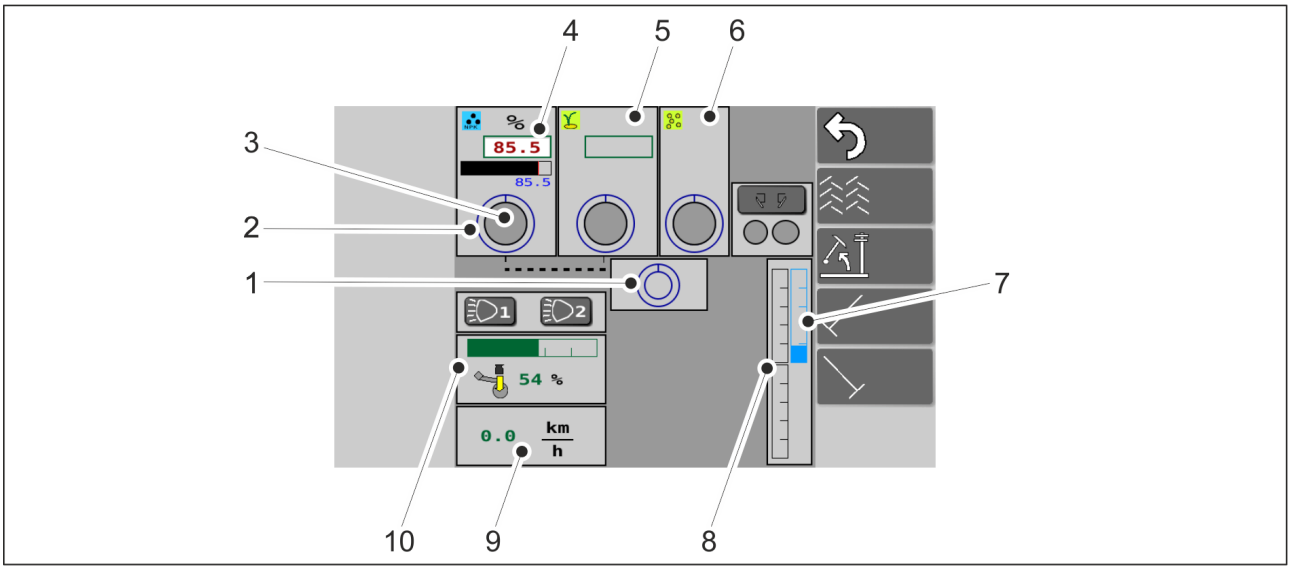


Figure. 4.2.4.3. - 48. Manual mode

1.	Area screen • Data from the speed sensors.
2.	Feeder shaft status • When the blue circle is spinning, the feeder shaft is rotating.
3.	Hopper level sensor status • The circle is green when everything is functioning properly. • The circle is red when the fertiliser level in the hopper is too low.
4.	Feed rate - fertiliser • Displays the fertiliser feed rate.
5.	Seed screen • The screen displays the seed feed rate and data from the feeder shaft and hopper level sensors.
6.	Small seed screen • The screen displays the small seed feed rate and data from the feeder shaft and hopper level sensors.
7.	Height adjustment

8.	Machine lifting and lowering pressure • Data from the lifting and lowering circuit pressure sensors. • Only in the SeedPilot ISOBUS control system.
9.	Machine speed
10.	Coulter pressure • The coulter pressure value appears as a green bar in the bar gauge and as a percentage.

4.2.4.4. Settings

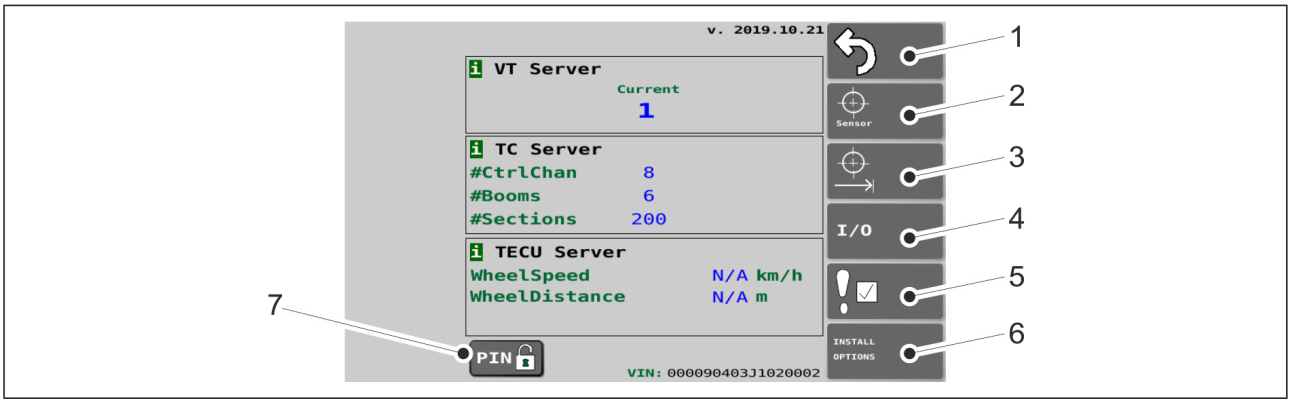


Figure. 4.2.4.4. - 49. Basic settings

1.	Return
2.	Sensor calibration • See section 7.10.1. Sensor calibration.
3.	Travel distance calibration • See section 7.10.2.1. Travel distance calibration while driving.
4.	I/O calibration diagnostics • Diagnostics data.
5.	Alarms • Alarm activation and deactivation.

6.	Install options / factory settings • Accessory screen. • Changing parameters using only a maintenance PIN code.
7.	PIN • Entering a PIN code. • The PIN code for sensor calibration is “3”. • The PIN code for travel distance calibration is “5”.

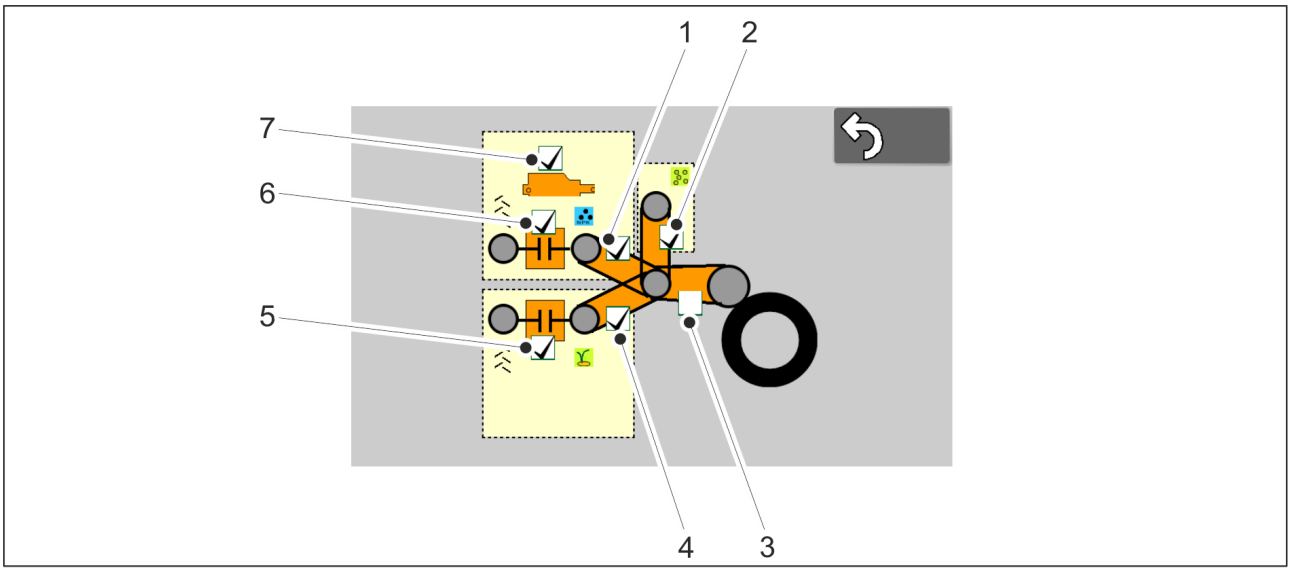


Figure. 4.2.4.4. - 50. Alarms

- The alarm is active when the box is checked.

1.	Shaft rotation guard - fertiliser
2.	Shaft rotation guard - small seed
3.	Main chain gear • Disabled. The alarm is not activated.
4.	Shaft rotation guard - seed
5.	Tramline clutch guard - seed • Monitors that the tramline clutch rotates when tramline is not on. • Monitors that the tramline clutch is not rotating when the tramline is on.
6.	Tramline clutch guard - fertiliser • Monitors that the tramline clutch rotates when tramline is not on. • Monitors that the tramline clutch is not rotating when the tramline is on.

7.	Linear actuator alarm • The alarm is triggered when the linear actuator fails to reach the desired position.

5. Commissioning and basic settings

5.1. Rendering to operating condition

5.1.1. Mounting the wheel packer

- The wheel packer is an accessory.

DANGER
The mounting of the wheel packer requires two people.

DANGER
Use a hoisting accessory when mounting the wheel packer.

DANGER
Lift and mount the wheel packer only when the machine is on a level surface.

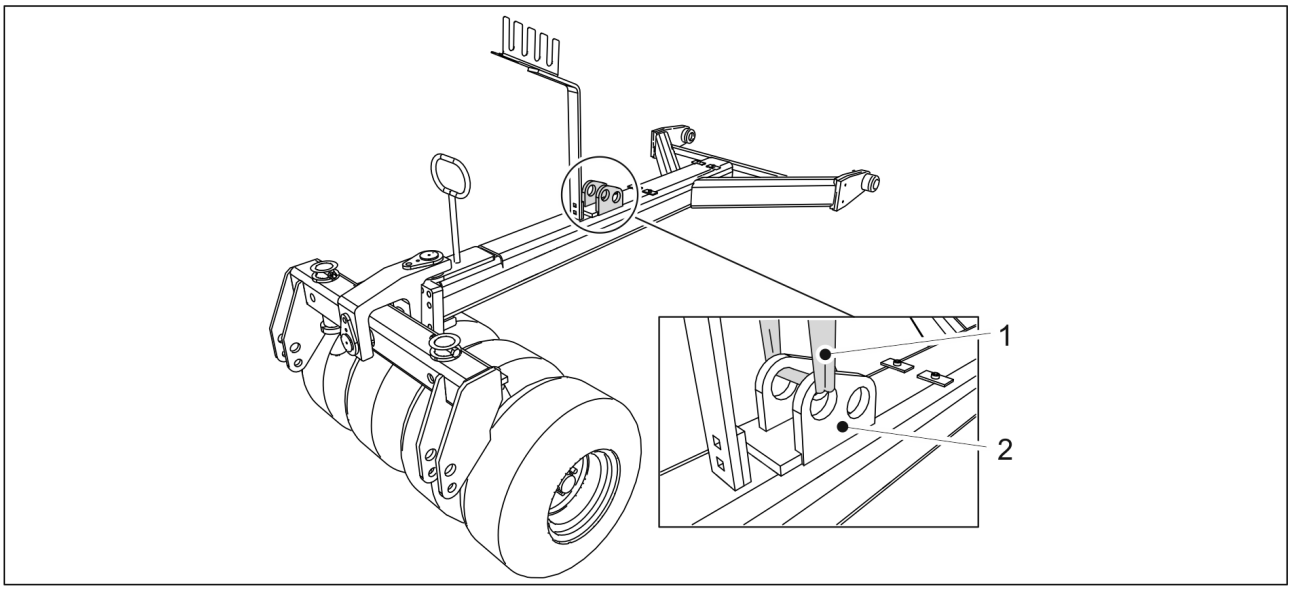


Figure. 5.1.1. - 51. Lifting the wheel packer

1. Place the wheel packer (1) to the centreline and to the front of the machine and attach the lifting sling (1) to the cylinder bracket (2).

   DANGER
   Ensure that the capacity of the lifting sling and the lifting device is sufficient. The wheel packer weighs 250 kg.

2. Lift the bar and align it with the attachment points.

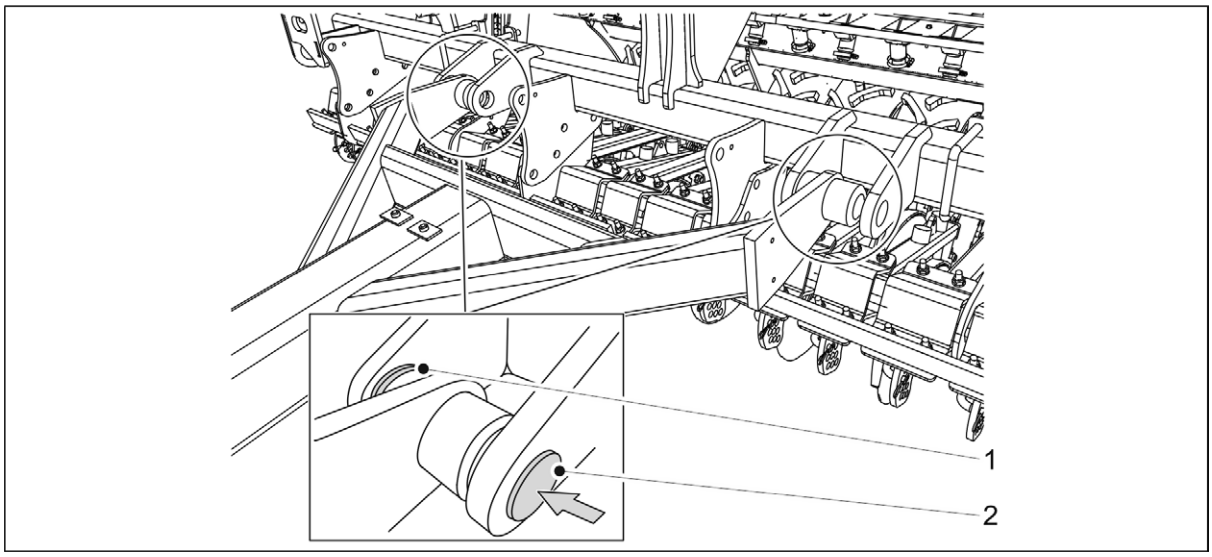


Figure. 5.1.1. - 52. Mounting the wheel packer

3. Place the washer (1) against the inner shoulder of the attachment points and insert the mounting pin (2) through the shoulders and the mounting cylinder of the bar.
4. Lock the mounting in place with a spring cotter.
5. Repeat steps 3-4 for the second attachment point.

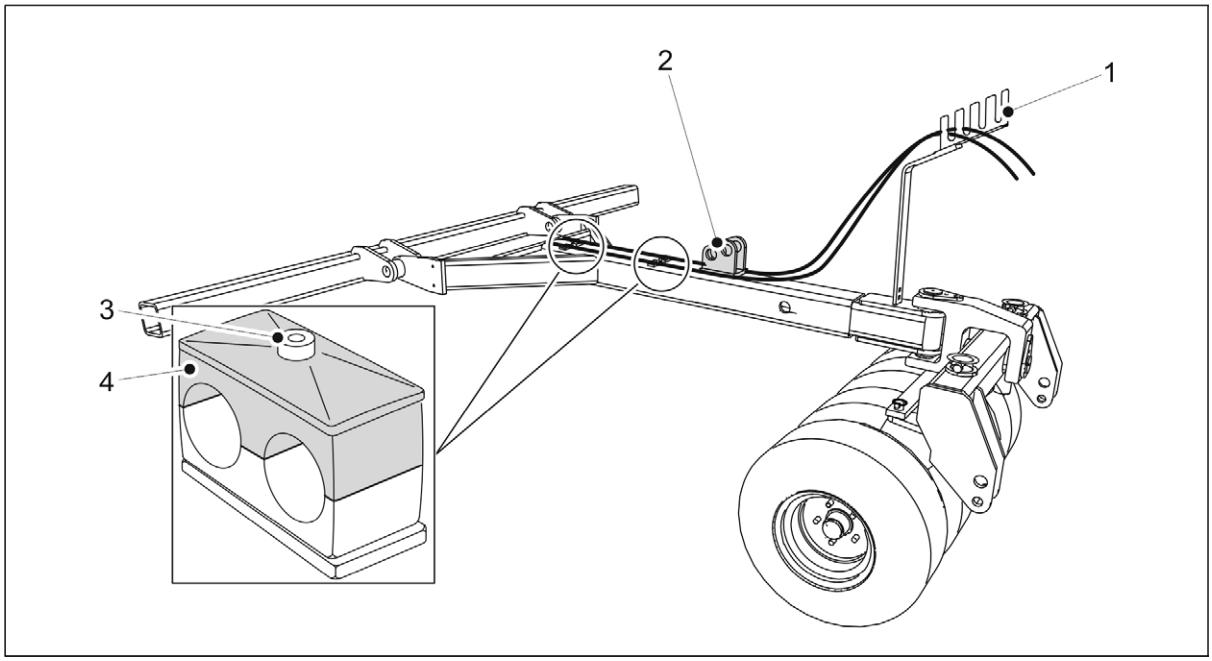


Figure. 5.1.1. - 53. Hydraulic hoses and electrical wires

6. Open the fastening screw (3) of the tube mounts and remove the top (4).
7. Draw the hydraulic hoses through the guide (1) and on both sides of the cylinder bracket (2).
8. Use cable ties to fasten the hoses on both sides of the cylinder bracket.
    - Do not tighten the cable ties to the final tightness.
9. Place the hoses in the tube mounts and fasten the top of the tube mounts and the fastening screws.

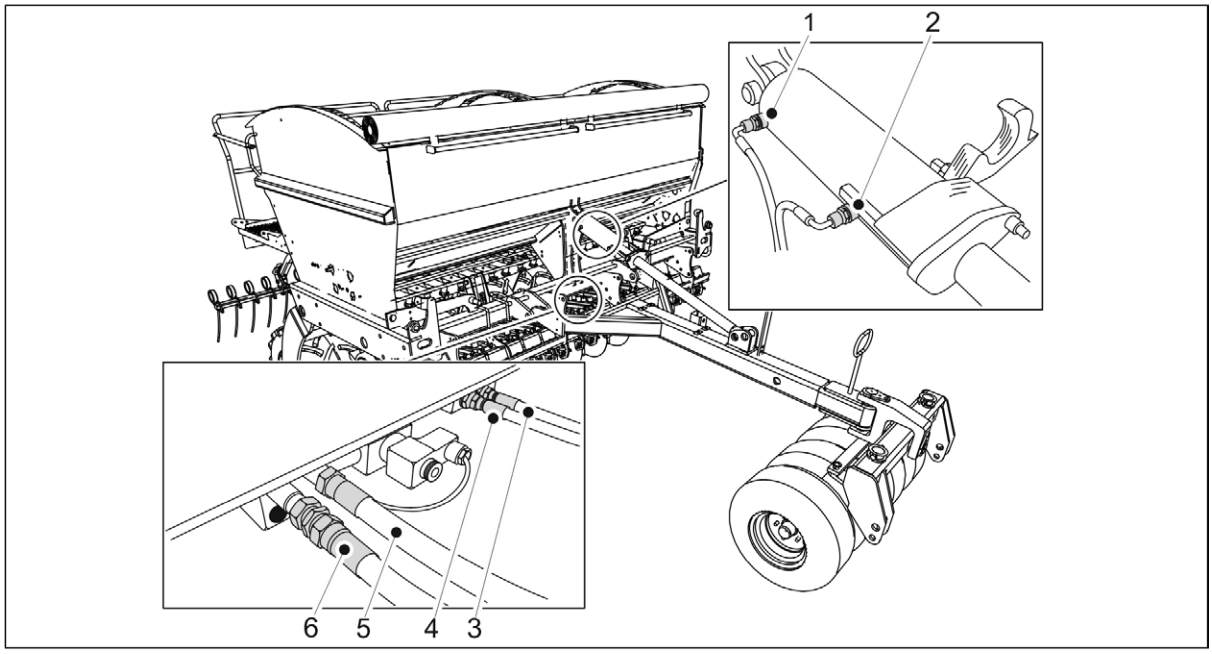


Figure. 5.1.1. - 54. Connecting the hydraulic hoses

1.	Green, one mark	Drawbar cylinder, cylinder extend
2.	Green, two marks	Drawbar cylinder, cylinder retract
3.	Blue, one mark	Coulter pressure, decreasing the coulter pressure
4.	Blue, two marks	Coulter pressure, increasing the coulter pressure
5.	Red, one mark	Vertical movement of the seed drill, cylinder extend
6.	Red, two marks	Vertical movement of the seed drill, cylinder retract

10. Connect the hydraulic hoses 3-6.
    - Connect the hydraulic hoses of the drawbar cylinder only when the drawbar cylinder is installed.
11. Push the hoses back towards the drawbar to eliminate slack and tighten the tube mounts and cable ties.
12. Attach the electrical wires contained in a protective tube to the hydraulic hoses with cable ties and guide the wires on the right side of the seed drill (viewed from the front).
13. Install the drawbar in accordance with section 5.1.2. Mounting the drawbar cylinder.

5.1.2. Mounting the drawbar cylinder

- The drawbar cylinder is an accessory. The drawbar cylinder is supplied with the wheel packer but it can also be used without the wheel packer.

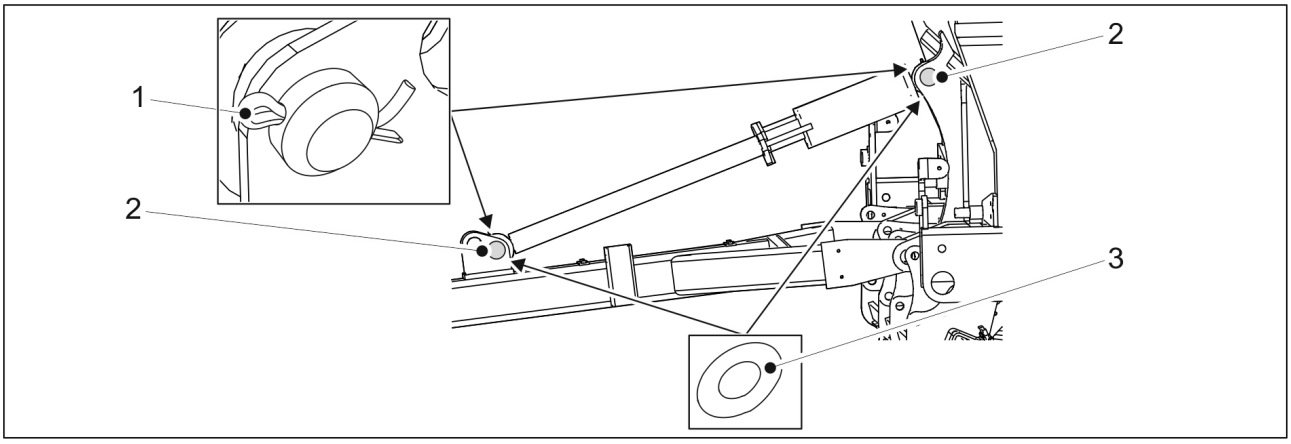


Figure. 5.1.2. - 55. Drawbar cylinder

Number	Component	Quantity
1.	Cotter Ø8x71	2 pcs
2.	Pin Ø45x110	2 pcs
3.	Washer M45	4 pcs

1. Replace the washer (3) and fasten the drawbar cylinder to the seed drill with a mounting pin (2).
2. Lock the mounting pin in place with the cotter (1).
3. Repeat steps 1-2 for the second attachment point of the cylinder.

5.1.3. Attaching the turnbuckle

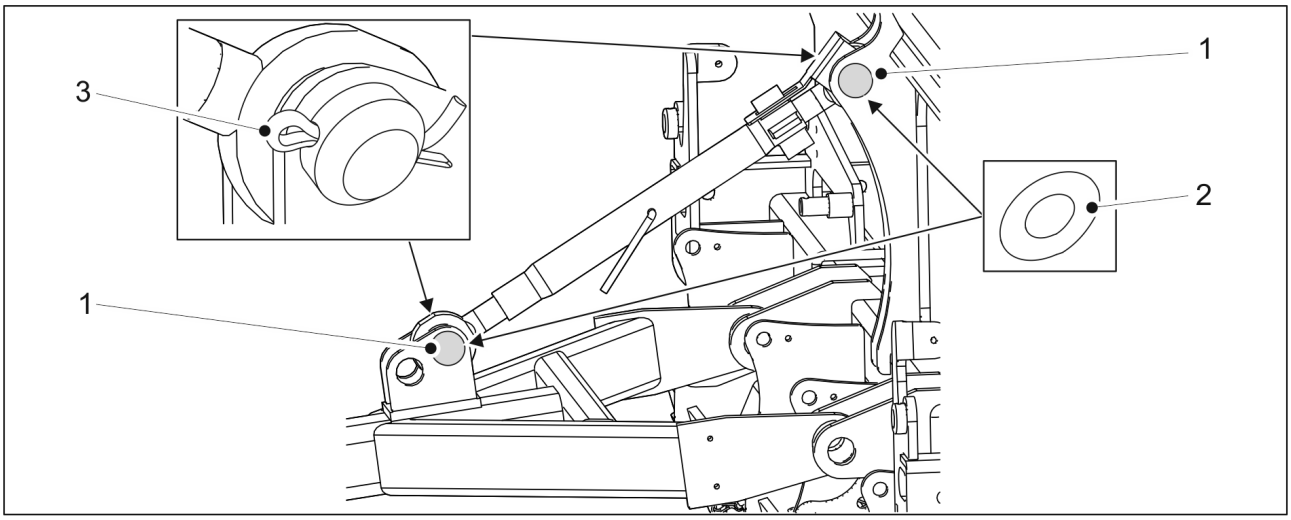


Figure. 5.1.3. - 56. Turnbuckle

Number	Component	Quantity
1.	Pin Ø45x110	2 pcs
2.	Washer M45	4 pcs
3.	Cotter Ø8x71	2 pcs

1. Replace the washer (2) and fasten the turnbuckle to the seed drill with a mounting pin (1).
2. Lock the mounting pin in place with the cotter (3).
3. Repeat steps 1-2 for the second turnbuckle of the cylinder.

5.1.4. Mounting the front levelling board

- The front levelling board is an accessory. Using the front levelling board requires that an wheel packer be installed.

DANGER
The mounting of the front levelling board requires two people.

DANGER
Use a hoisting accessory when mounting the fro9nt levelling board.

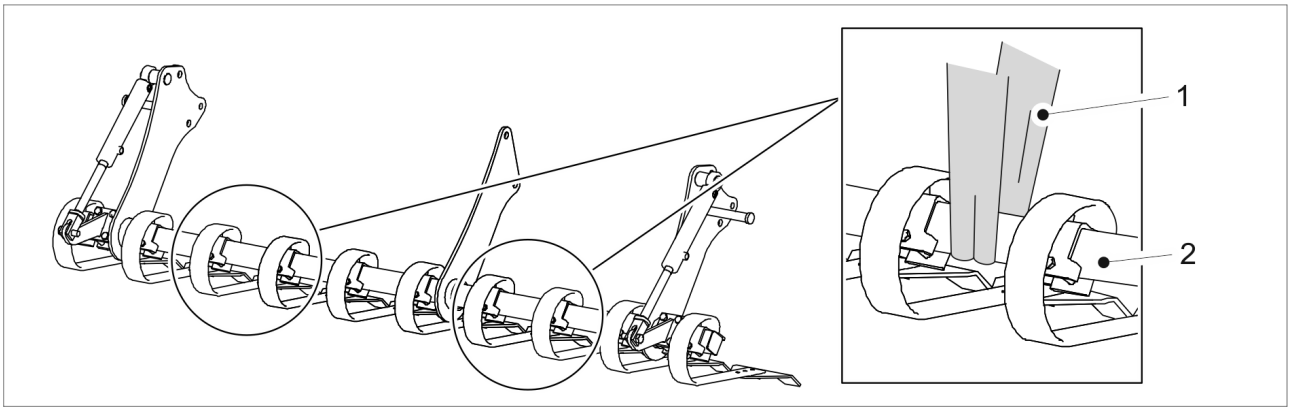


Figure. 5.1.4. - 57. Lifting the front levelling board

1. Fasten the lifting slings (1) around the tube (2).

DANGER
Ensure that the capacity of the lifting sling and the lifting device is sufficient. The front levelling board weighs 250 kg.

2. Follow the mounting instructions for the FX300 or FX400

Mounting the front levelling board on a FX300

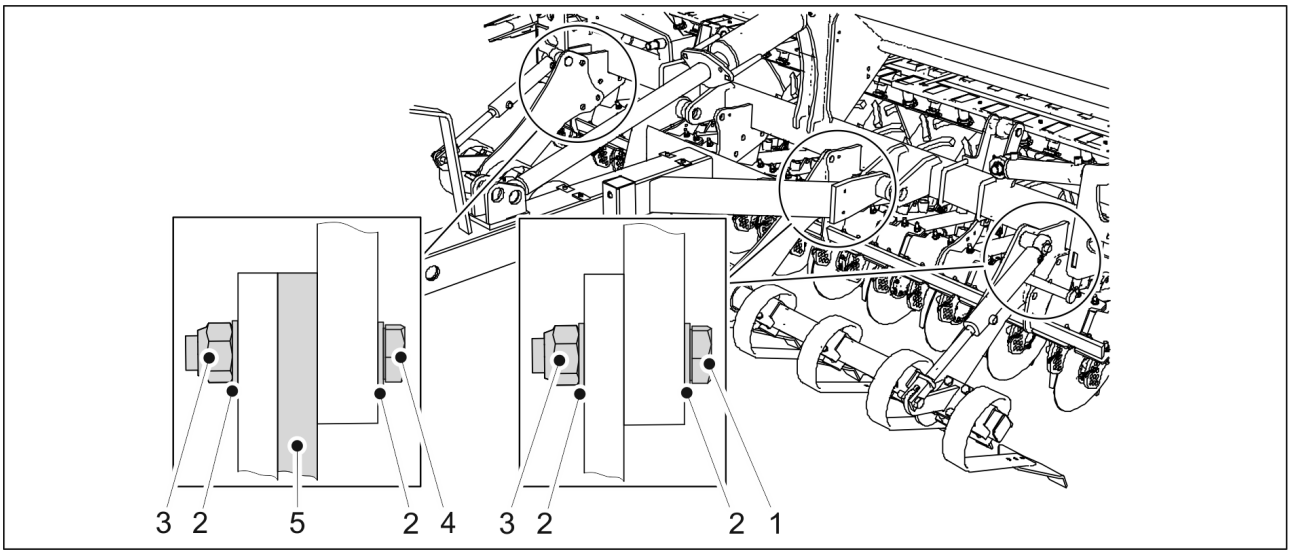


Figure. 5.1.4. - 58. Mounting the front levelling board on a FX300

Number	Component	Quantity
1.	Hex screw M24x60	5 pcs
2.	Washer M24	16 pcs
3.	Locking nut M24	8 pcs
4.	Hex screw M24x75	3 pcs
5.	Shim	1 pc

1. Raise the front levelling board using lifting slings and push it under the wheel packer drawbar to the body of the machine.
2. Fasten the front levelling board to the machine body with components (1-5).
    - The front levelling board is fastened to the machine body at three fastening points. Place a shim between the front levelling board and machine body at the fastening point on the left side of the machine (looking from the front).

Mounting the front levelling board on a FX400

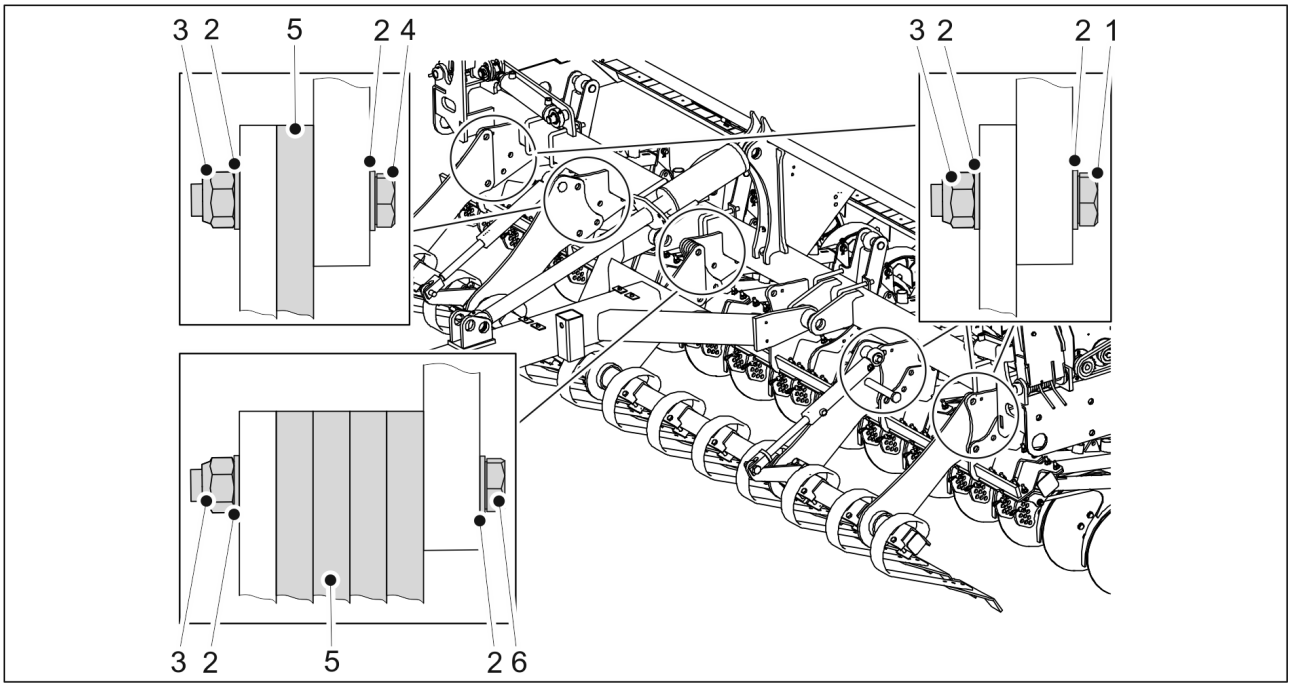


Figure. 5.1.4. - 59. Mounting the front levelling board on a FX400

Number	Component	Quantity
1.	Hex screw M24x60	7 pcs
2.	Washer M24	26 pcs
3.	Locking nut M24	13 pcs
4.	Hex screw M24x75	3 pcs
5.	Shim	5 pcs
6.	Hex screw M24x120	3 pcs

1. Raise the front levelling board using lifting slings and push it under the wheel packer drawbar to the body of the machine.
2. Attach the front levelling board to the machine body with components (1-6).
    - The front levelling board is fastened to the machine body at five fastening points. Place a shim between the front levelling board and machine body at the second fastening point on the left side of the machine (looking from the left side). Place 4 shims between the front levelling board and machine body at the centremost fastening point.

5.1.5. Mounting the middle markers

- The middle markers are an accessory.

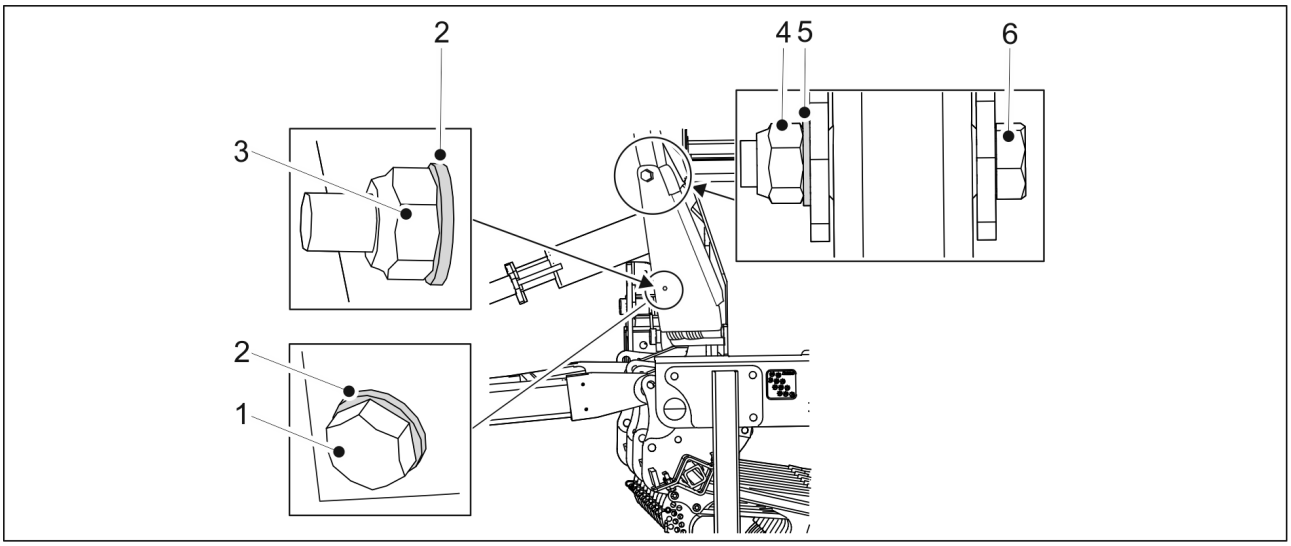


Figure. 5.1.5. - 60. Mounting the middle markers

Number	Component	Quantity
1.	Hex screw M8x100	2 pcs
2.	Washer M8	4 pcs
3.	Locking nut M8	2 pcs
4.	Locking nut M20	2 pcs
5.	Washer M20	2 pcs
6.	Hex screw M20x110	2 pcs

1. Mount the markers on the shaft of the markers on both sides of the seed drill by using components (1-6).
    - Tighten the bolts of the markers so that there is no clearance.

5.1.6. Removing the transport supports

- Once the front accessories have been mounted on the seed drill, it can be connected to the tractor in accordance with section 5.3. Connecting to tractor and the transport supports can be removed.

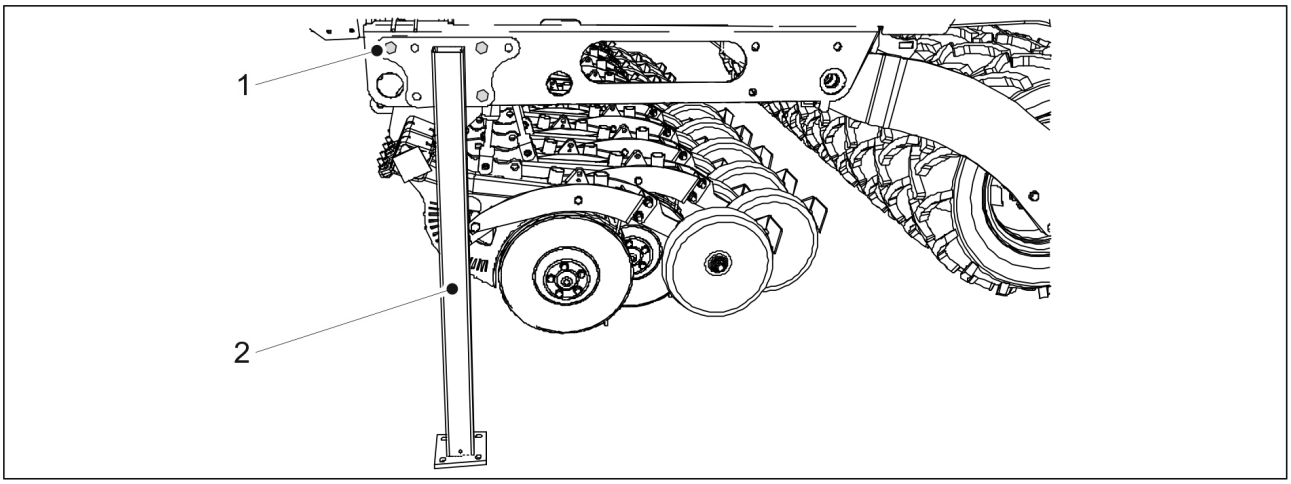


Figure. 5.1.6. - 61. Transport support

1. Open the three transport support bolts (1) and detach the transport supports (2) from both sides of the seed drill.

5.1.7. Mounting the scraper

- The scraper is an accessory.

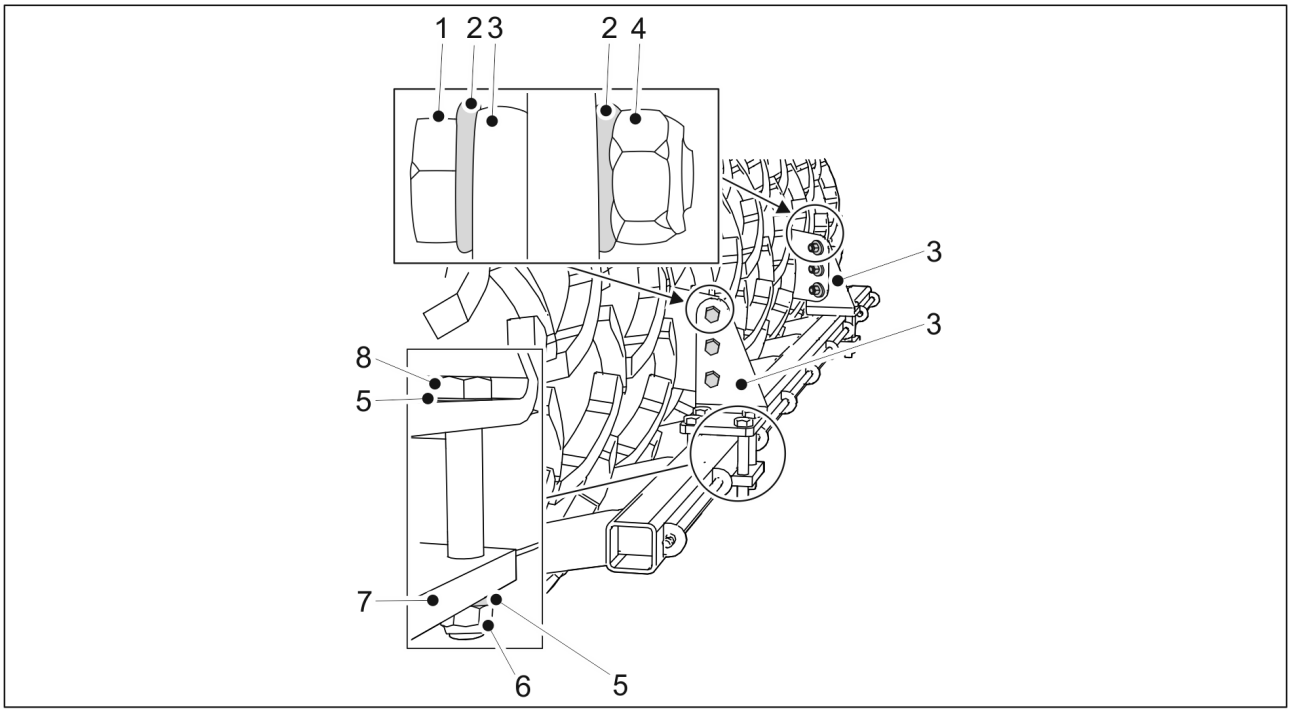


Figure. 5.1.7. - 62. Mounting the scraper

Number	Component	Quantity
1.	Hex screw M16X50	6 pcs
2.	Washer M16	12 pcs
3.	Scraper mounting plate	2 pcs
4.	Locking nut M16	6 pcs

5.	Washer M16	16 pcs
6.	Locking nut M16	8 pcs
7.	Plate	2 pcs
8.	Hex screw M16x110	8 pcs

1. Set the scraper mounting plate (3) into place and fasten it by using washers (2), hex screws (1) and locking nuts (4).
2. Repeat step 1 for the second mounting plate.
3. Fasten the plate (7) with washers (5), hex screws (8) and locking nuts (6).
4. Repeat step 3 for the second plate.

5.1.8. Mounting the rear harrow

- The rear harrow is an accessory.

DANGER
The mounting of the rear harrow requires two people.

DANGER
Use a hoisting accessory when mounting the rear harrow.

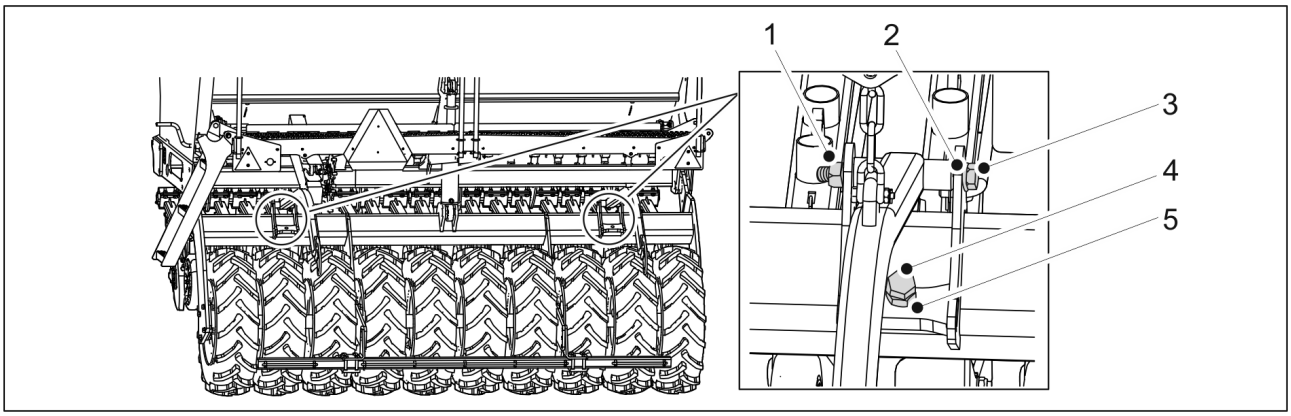


Figure. 5.1.8. - 63. Mounting the rear harrow arms

Number	Component	Quantity
1.	Locking nut M20	2 pcs
2.	Washer M20	4 pcs
3.	Hex screw M20x180	2 pcs
4.	Hex screw M24x55	2 pcs
5.	Hex nut M24	2 pcs

1. Attach the rear harrow arms to the seed drill with components (1-5).
   - Tighten the bolts of the rear harrow arms so that there is no clearance.

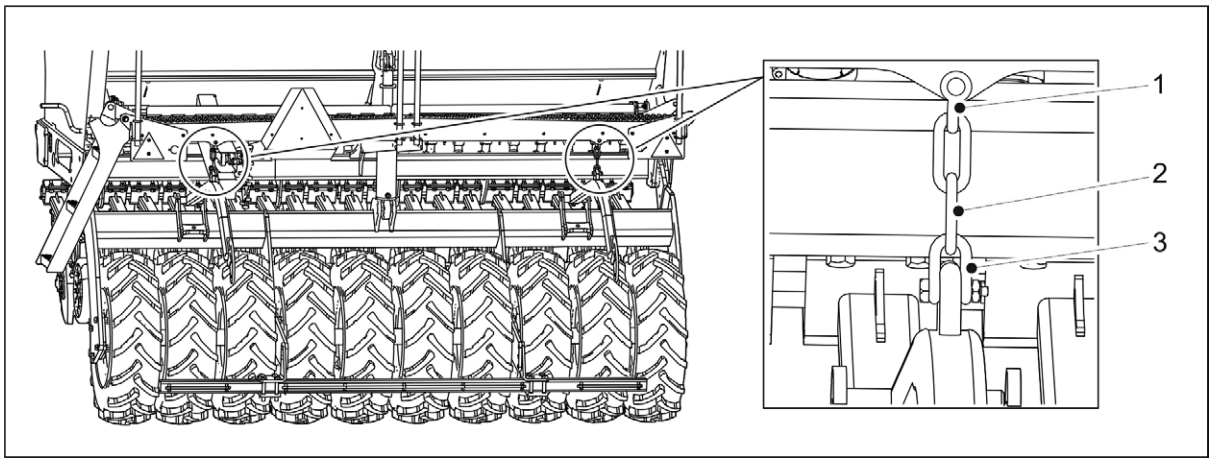


Figure. 5.1.8. - 64. Attaching the rear harrow chains

2. Attach the chains (2) to the working platform of the seed drill with shackles (1, 3).

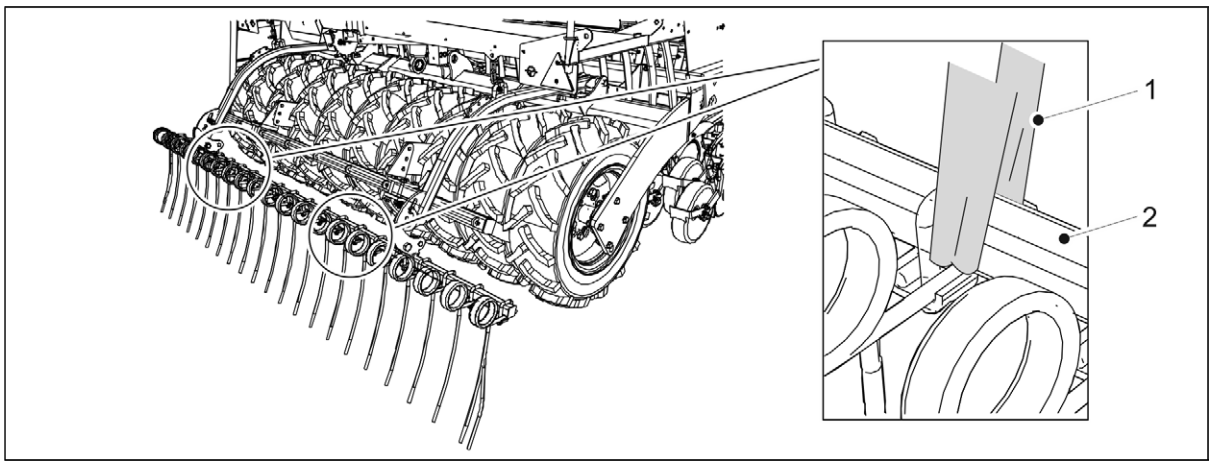


Figure. 5.1.8. - 65. Lifting the rear harrow

3. Fasten a lifting sling (1) around the tube (2).

DANGER
Ensure that the capacity of the lifting sling and the lifting device is sufficient. The rear harrow weighs 100 kg.

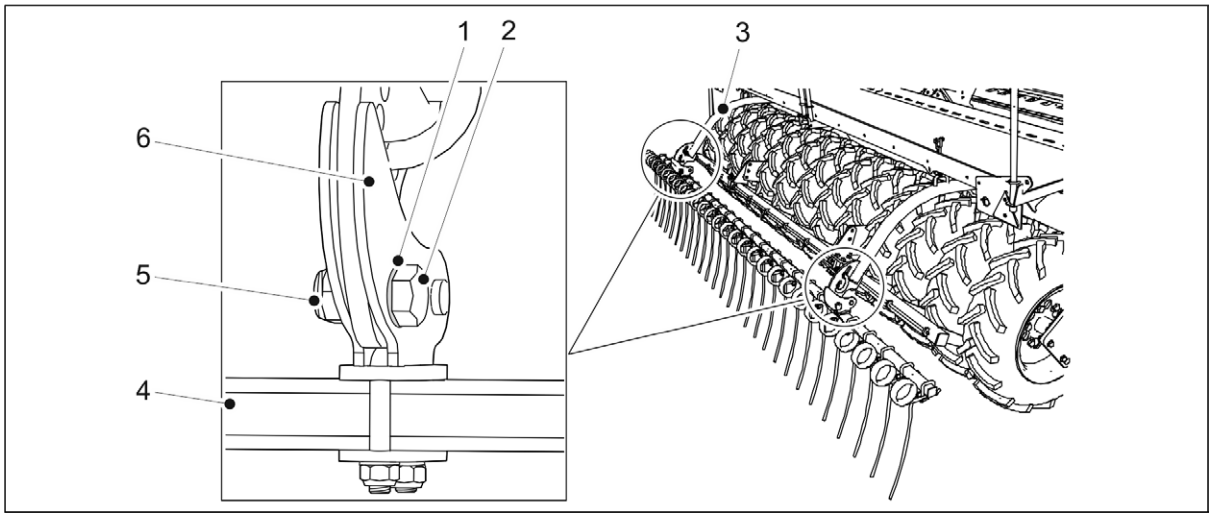


Figure. 5.1.8. - 66. Mounting the rear harrow

Number	Component	Quantity
1.	Washer M20	4 pcs
2.	Hex screw M20x60	2 pcs
3.	Rear harrow arm	2 pcs
4.	Tube	1 pc
5.	Locking nut M20	2 pcs
6.	Clamp	2 pcs

4. Use a lifting sling to raise the tube (4) of the rear harrow and position the tube so that the rear harrow arms (3) are between the clamps (6).
5. Attach the rear harrow tube to the rear harrow arms by fastening the clamp with washers (1), a hex screw (2) and a locking nut (5).
    - Tighten the bolts of the rear harrow so that there is no clearance.
6. Repeat step 5 for the other clamp.

5.1.9. Mounting rear markers to the rear harrow

- Rear markers are an accessory.

DANGER
Mounting rear markers requires two people.

DANGER
Use a hoisting accessory when mounting rear markers.

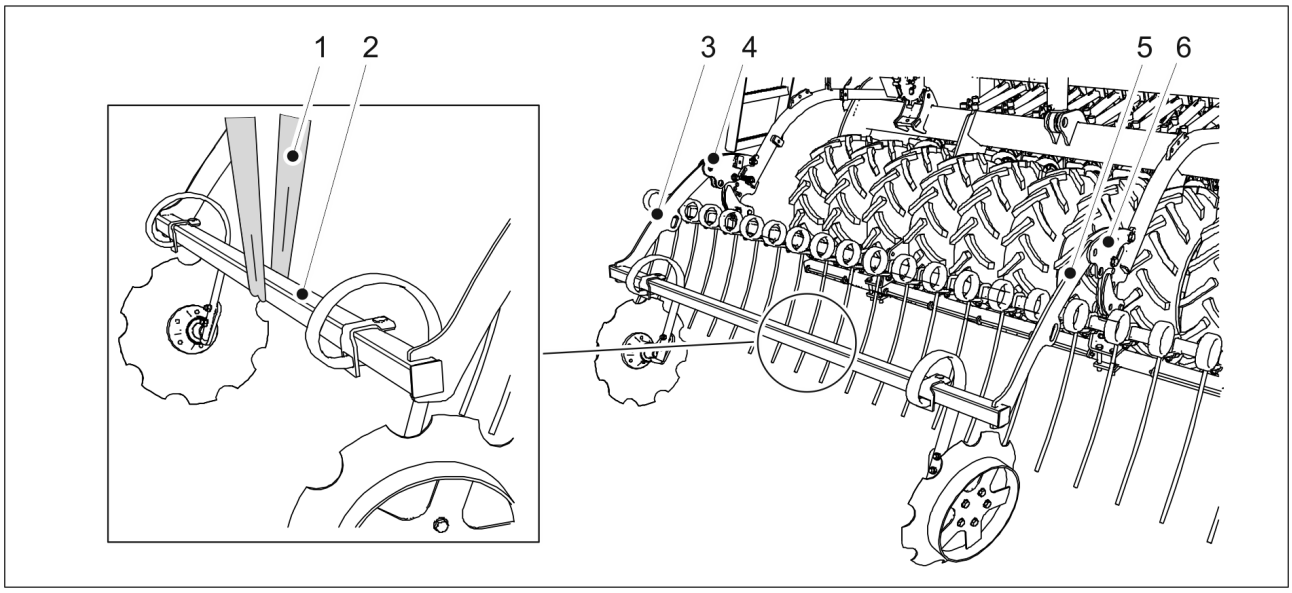


Figure. 5.1.9. - 67. Lifting the rear markers

1. Attach a lifting sling (1) around the marker frame (2).

DANGER
Ensure that the capacity of the lifting sling and the lifting device is sufficient. The rear markers weigh 75 kg.

2. Lift the rear marker from its frame (2) using a lifting sling (1) and set the frame so that the rear marker arms (3, 5) are between the board actuating arms (4, 6).

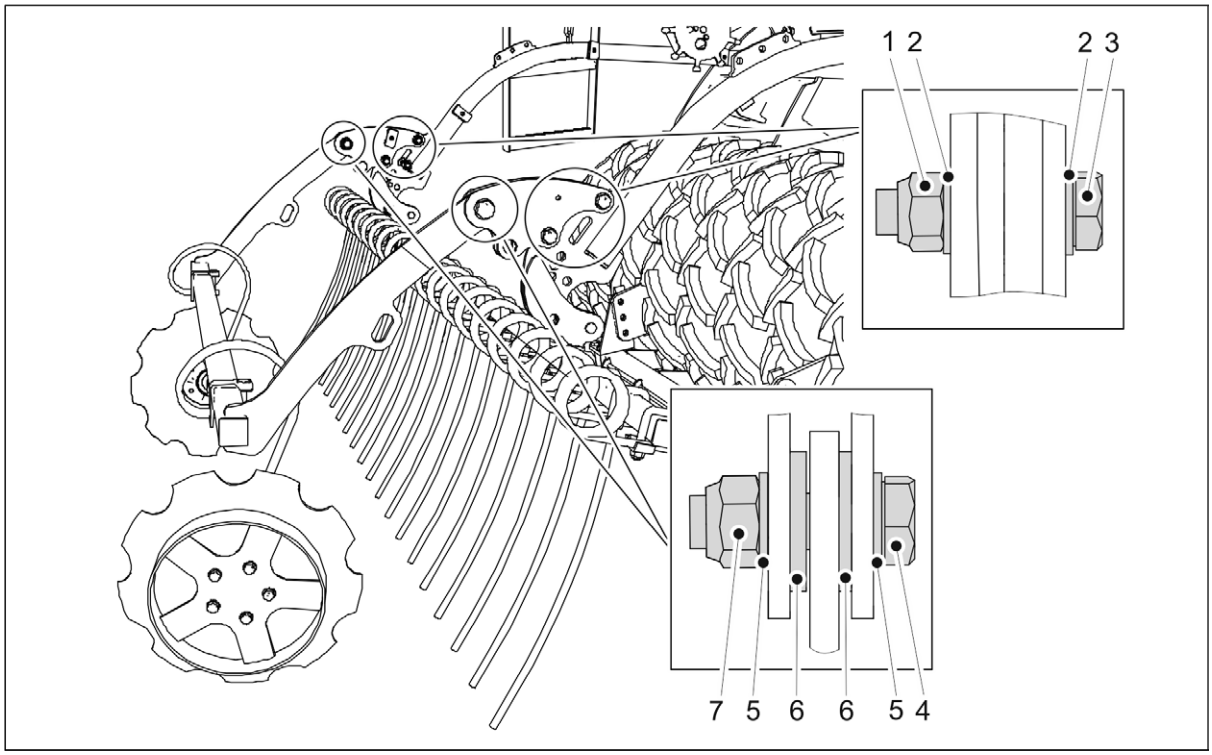


Figure. 5.1.9. - 68. Mounting rear markers to the rear harrow

Number	Component	Quantity
1.	Locking nut M16	4 pcs
2.	Washer M16	8 pcs
3.	Hex screw M16x70	4 pcs
4.	Hex screw M20x70	2 pcs
5.	Washer M20	4 pcs
6.	Washer M20	4 pcs
7.	Locking nut M20	2 pcs

3. Attach the rear markers to the front levelling board actuating arms with washers (2, 5, 6), hex screws (3, 4) and locking nuts (1, 7).
4. Repeat step 3 for the second attachment point.

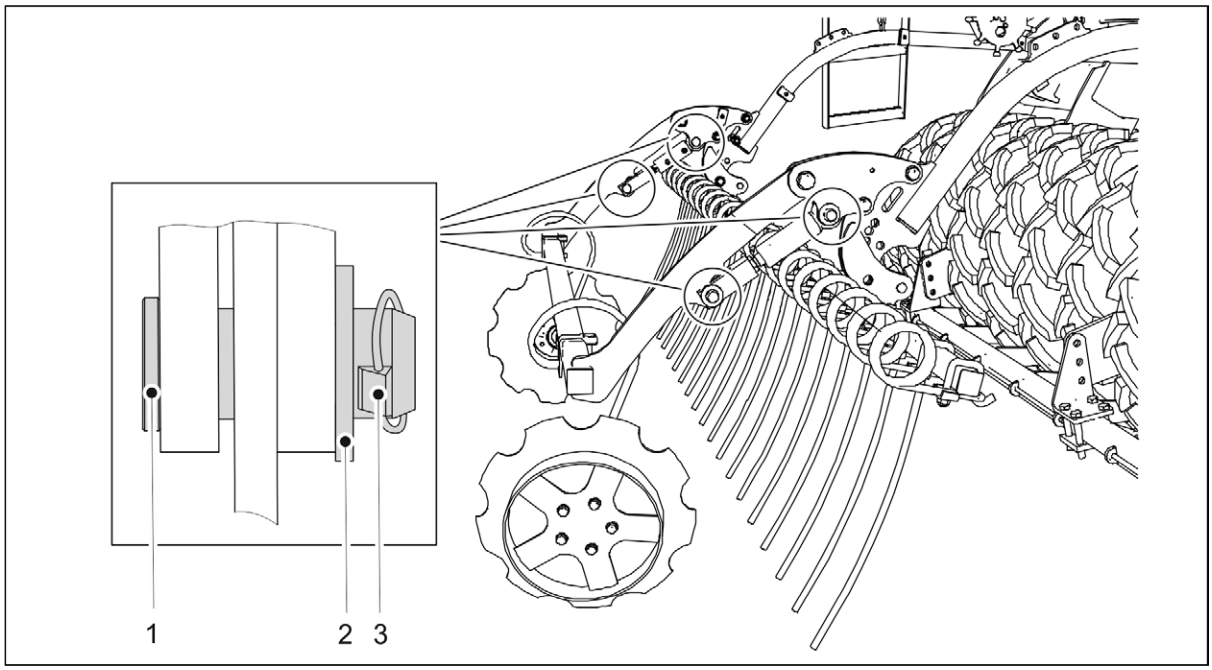


Figure. 5.1.9. - 69. Mounting rear marker cylinders

Number	Component	Quantity
1.	Pin Ø24	4 pcs
2.	Washer M24	4 pcs
3.	Linchpin	4 pcs

5. Take the cylinder from the working platform and mount it on the actuating arm with pins (1) and washers (2).
6. Lock the mounting pin in place with the linchpin (3).
7. Repeat steps 5-6 for the second cylinder.

5.1.10. Turning the rear railing of the working platform and attaching the end railing

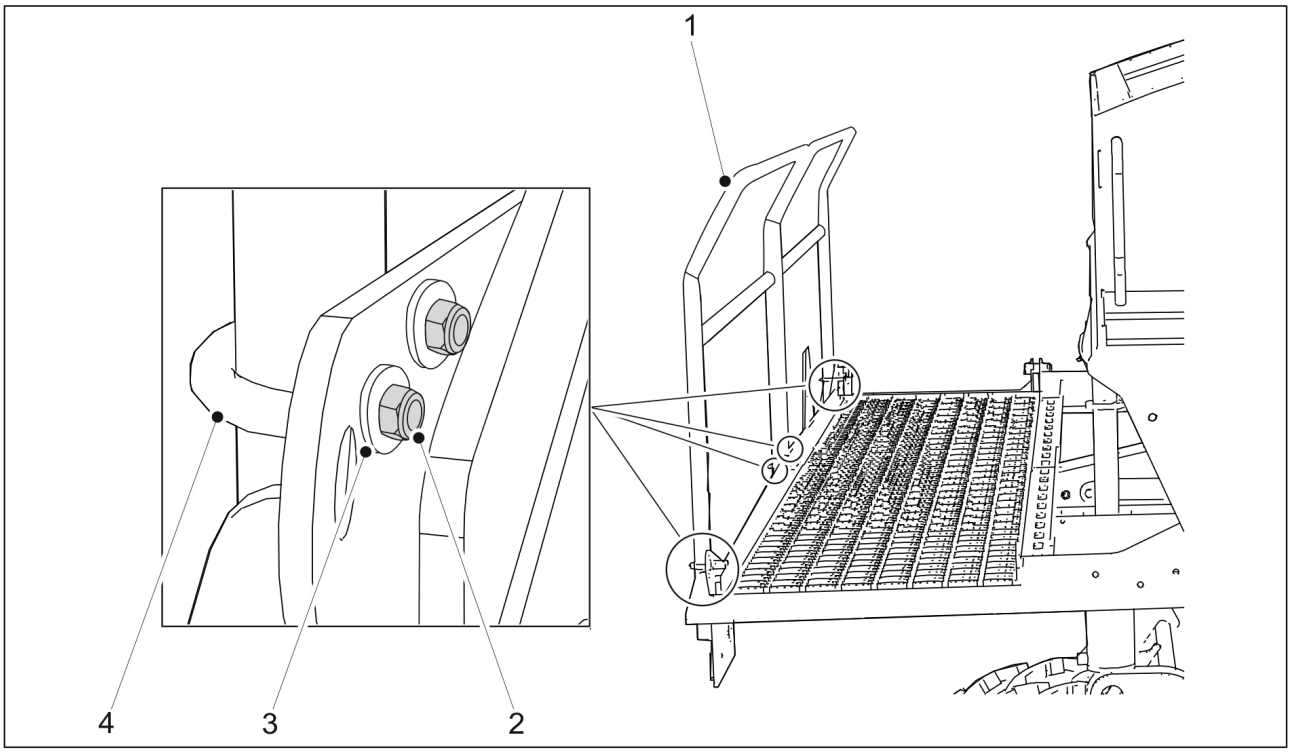


Figure. 5.1.10. - 70. Turning the rear railing of the working platform

Number	Component	Quantity
1.	Rear railing	1 pc
2.	Locking nut M8	8 pcs
3.	Washer M8	8 pcs
4.	U-bolt	4 pcs

- For transport, the rear railing (1) of the working platform has been turned inward.

1. Open the bolts of the rear railing of the working platform.
2. Turn the railing outward and attach the railing to the working platform with washers (3), U-bolt (4) and locking nuts (2).
3. Repeat step 2 for all attachment points of the rear railing.

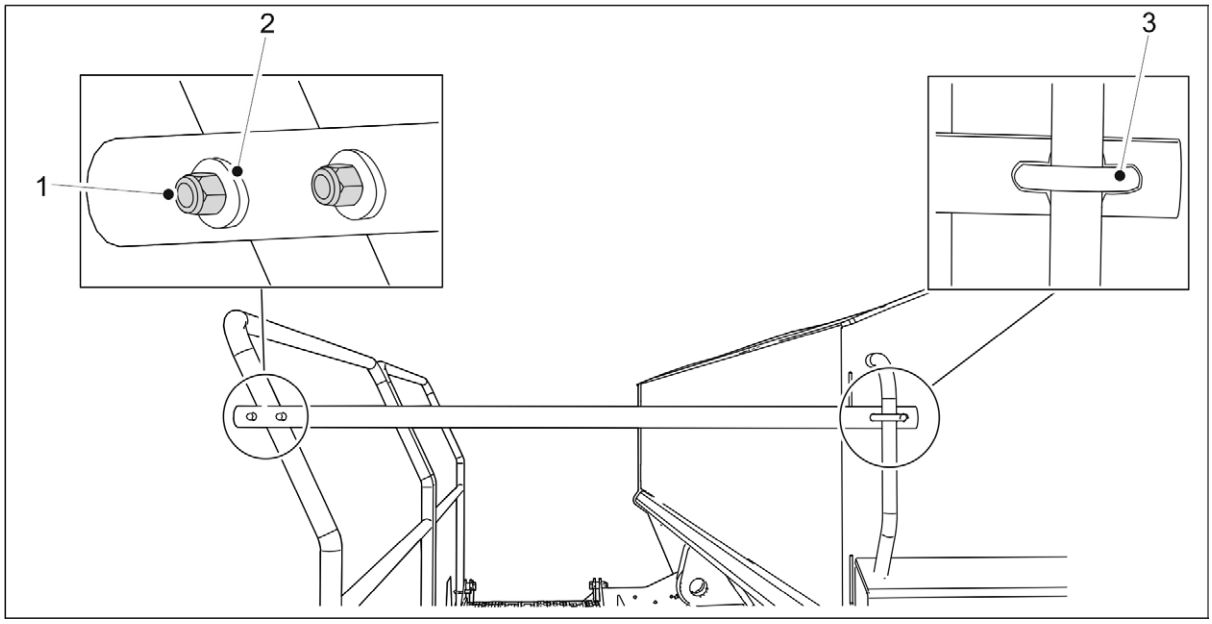


Figure. 5.1.10. - 71. Attaching the end railing of the working platform

Number	Component	Quantity
1.	Locking nut M8	4 pcs
2.	Washer M8	4 pcs
3.	U-bolt	2 pcs

4. Attach the end railing to the working platform with washers (2), U-bolt (3) and locking nuts (1).
5. Repeat step 4 for the second attachment point.

5.2. Commissioning

5.2.1. Installing the Lykketronic area counter

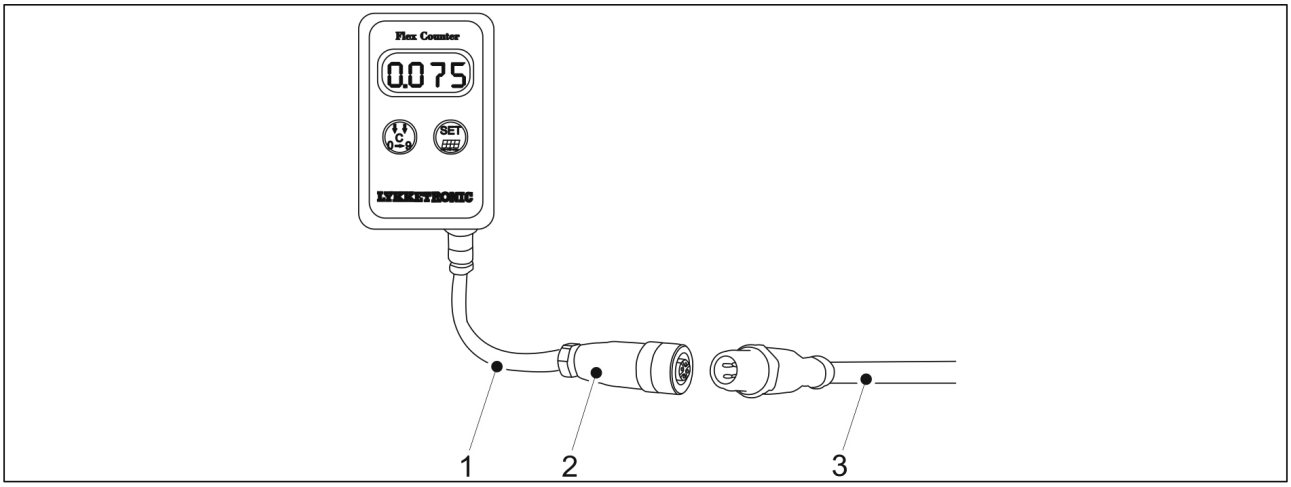


Figure. 5.2.1. - 72. Installing the area counter

1. Connect the 5-metre connecting cable (3) to the 1-metre cable (1) with connector M12 (2).
    - The 5-metre connecting cable will be connected to the tractor cabin. Fasten the cable properly so that it is not pinched during turns or lifting.

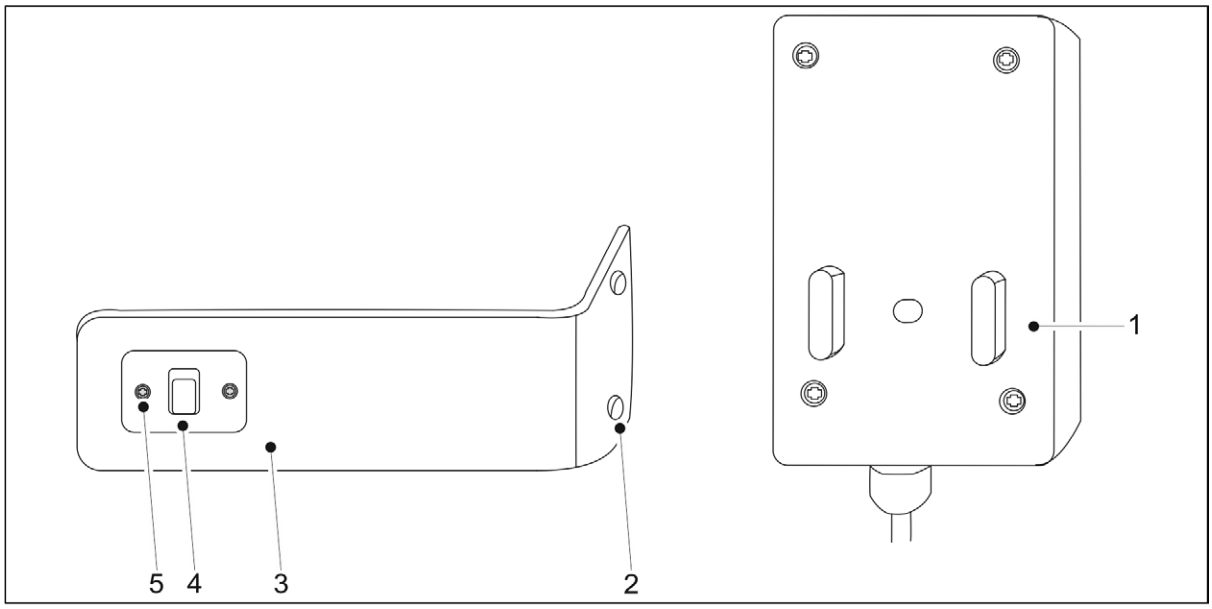


Figure. 5.2.1. - 73. Fastening of the area counter

2. Fasten the display counterpart (4) to the metal plate (3) with two fastening screws (5).
3. Attach the metal plate to the cabin from the fastening holes (2) by two fastening screws
    - Attach the display in a location where view is not obstructed but where the display is easily viewable by turning one's glance while driving. Ensure that the cable is sufficiently long to reach the display fastening spot.
4. Snap the area counter display (1) to the metal plate.

5.2.2. Installing the SeedPilot control panel

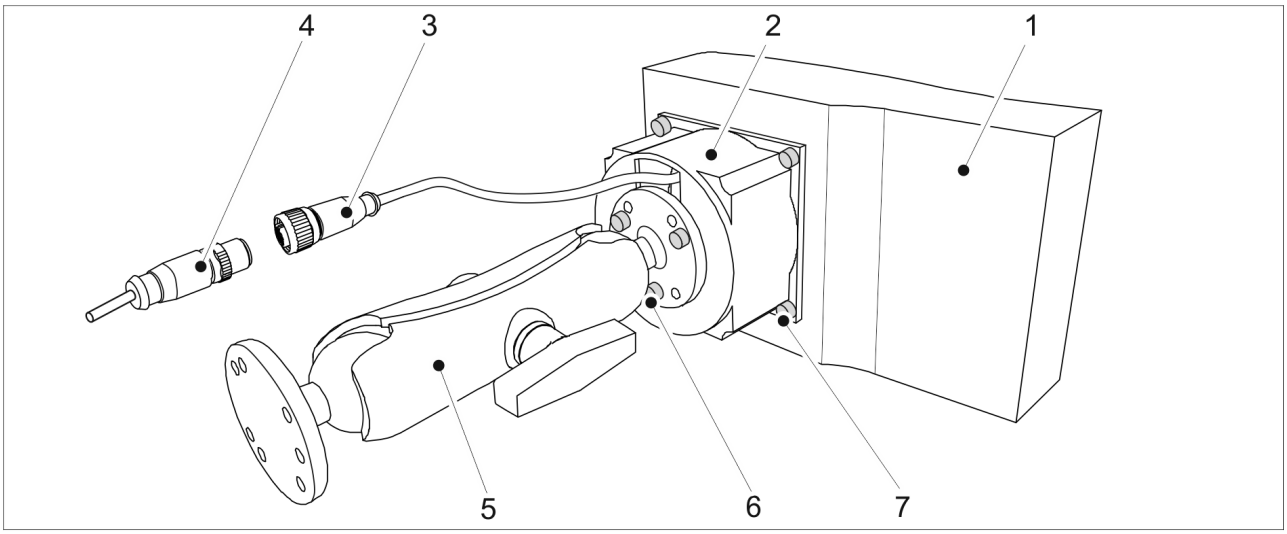


Figure. 5.2.2. - 74. Installing the SeedPilot control panel

1. Push the control panel wiring harness through the hole in the mounting adapter (2).

2. Fasten the adapter (2) to the control panel (1) with 4 M5x12 screws (7).
3. Fasten the RAM MOUNT (5) to the adapter (2) with 3 M5x12 screws (6).
4. Fasten the RAM MOUNT (5) to the tractor cabin with M5 screws or (max.) 5 mm self-tapping screws.
    - Screws are not included in the delivery
5. Connect the camera cable (4) and control panel camera cable (3) plugs to each other.

5.2.3. SeedPilot and SeedPilot ISOBUS control system commissioning

5.2.3.1. Tramline setup setting

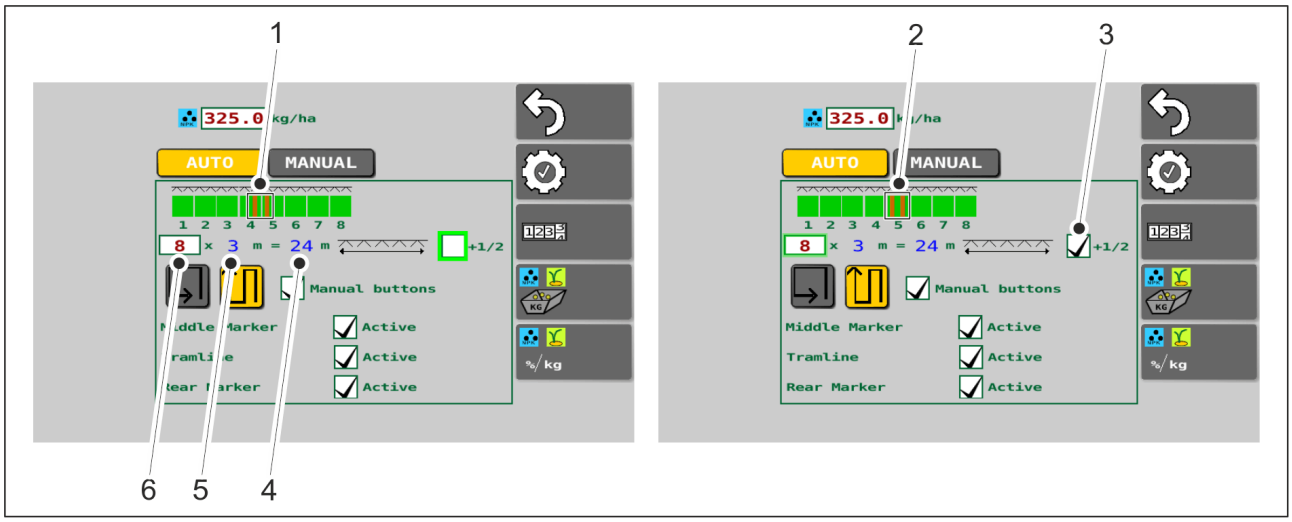


Figure. 5.2.3.1. - 75. Tramline setup setting

- Tramline automation is used to turn the tramline clutch on or off. When the tramline clutch is on, the rows assigned for tramlines will not be seeded, but a tramline will be made.
  Tramline automation settings are made on the Seeding settings. The width (5) of the seed drill is displayed on the screen. The number of seed drill widths applied to one sprayer width, i.e. the number of passes (6), is entered on the page. The system measures the width of the application (4). The tramlines (1) are made in the centre as a default. If the number of passes is even, the tramlines will be asymmetric. In this case, when there are 8 passes, the tramlines are made on passes 4 and 5 (left figure). The ½ button (3) overrides the asymmetric tramline automation and makes it a symmetric tramline. A symmetric tramline is selected when the box is checked. In this case, the tramlines (2) are made on the fifth pass (right figure).

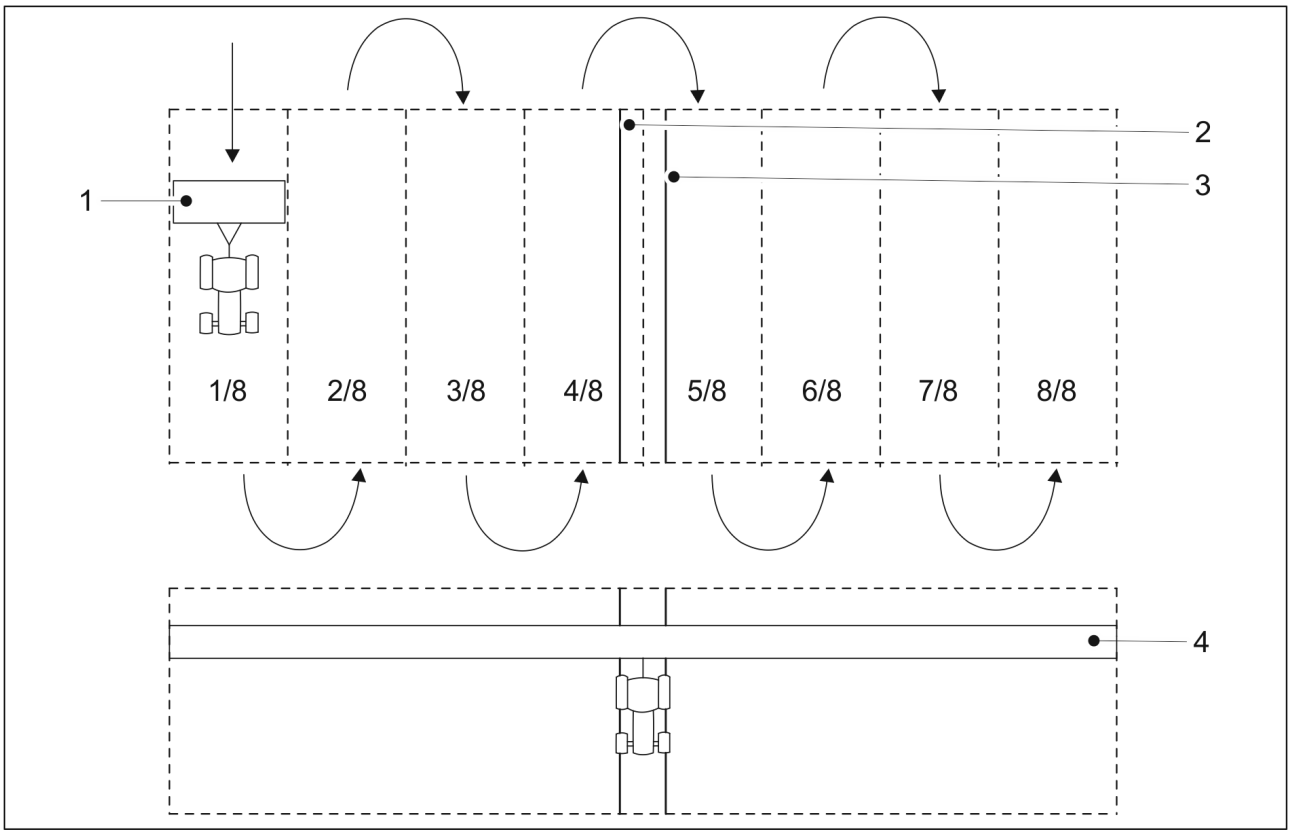


Figure. 5.2.3.1. - 76. Asymmetric tramlines

- The width of the pass is the same as the width of the seed drill (1). In this case, there are 8 passes, thus making the application width (4) 24 m. When asymmetric tramline automation is selected, tramlines (2, 3) are made on passes 4 and 5.

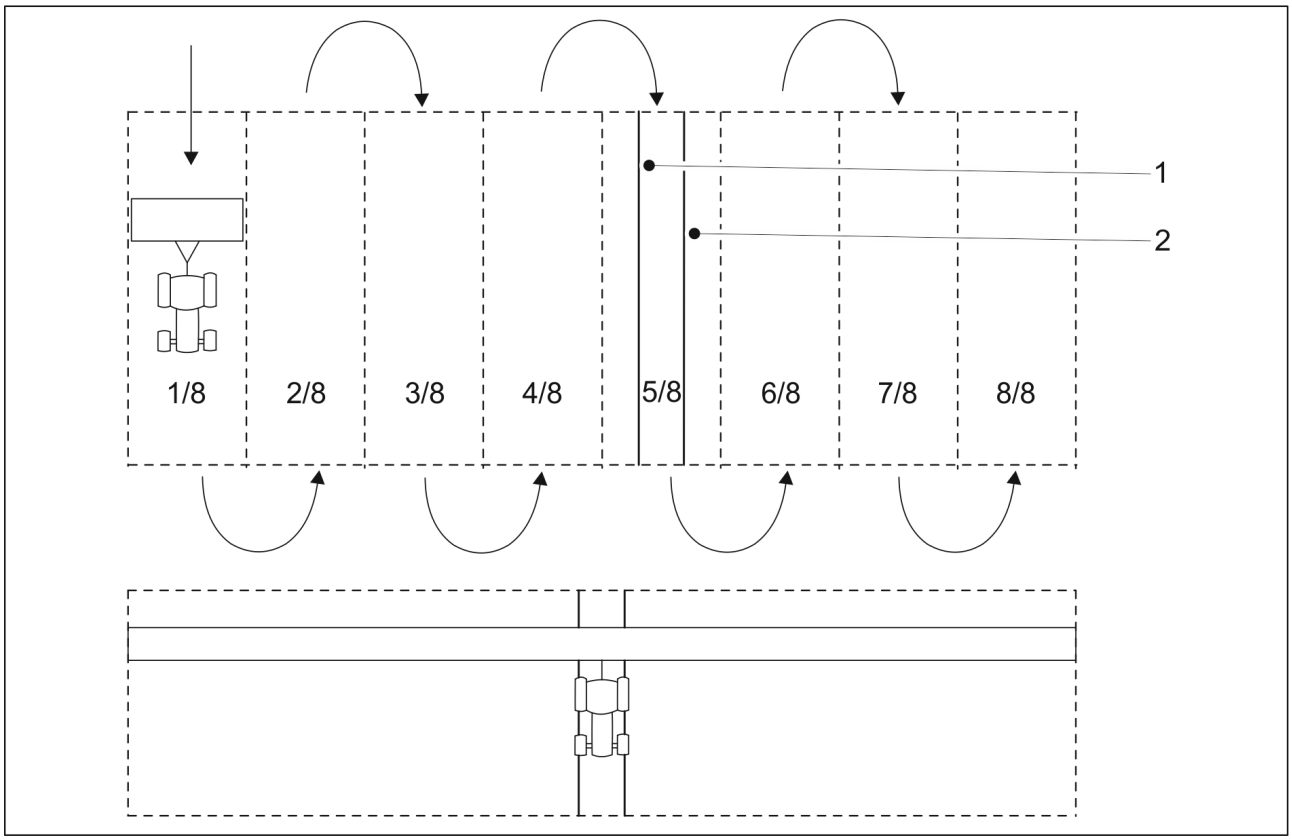


Figure. 5.2.3.1. - 77. Symmetric tramlines

- When symmetric tramline automation is selected, tramlines (1, 2) are made on the fifth pass.

5.2.3.2. Commissioning

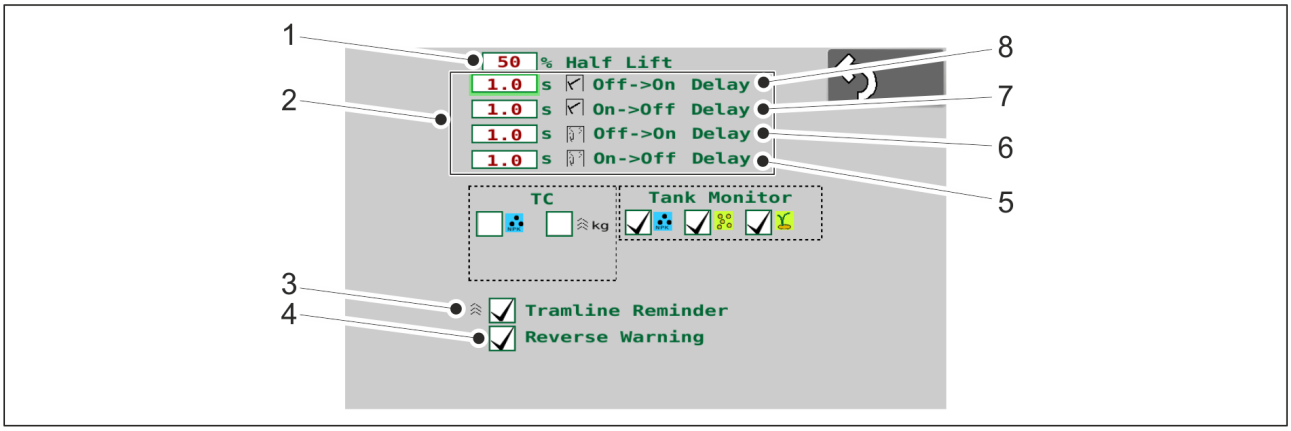


Figure. 5.2.3.2. - 78. Commissioning

1.	Setting the half lift height limit • The number value (%) is the height limit (from ground level) at which the half lift stops the raising of the machine. When the set limit is reached, the machine lift is stopped with the same valve as used for the lift inhibit function. • The factory setting is 50%. A new height limit value is set by pressing the HALF LIFT button (1).
2.	Setting the delays for marker valves • (8) is the middle marker delay when turned on (7) is the middle marker delay when turned off, (6) is the rear marker delay when turned on and (5) is the rear marker delay when turned off. • The delay when turned on is the delay (in seconds) from when the machine has been lowered to when the marker solenoid opens and the marker begins lowering. • The delay when turned off is the delay (in seconds) from when the machine has been raised until the marker solenoid closes and the marker begins rising. • The set default values are displayed on the screen. A new delay is set by pressing the desired number value.
3.	Selecting a tramline reminder • The tramline reminder is active when the box (3) is checked. • When active, the tramline reminder will issue a short “beep” every 20 seconds when making passes with a tramline.

4.	Using the reverse warning • The reverse warning is in use when the box (4) is checked. • When active, the reverse warning will issue a warning tone when the machine is lowered and being backed up. • Only available in the SeedPilot ISOBUS control system.

5.3. Connecting to tractor

DANGER
Crushing hazard when connecting and disconnecting the seed drill. The minimum safe distance - 5 m. Exercise extreme caution when there are personnel near the seed drill and tractor giving instructions on connecting and disconnecting.

- Wear protective gloves when connecting the seed drill to the tractor.

1. If the machine is equipped with a wheel packer, adjust the length of the wheel packer drawbar in accordance with section 5.3.1. Adjusting the length of the boom of the wheel packer.
2. Connect the drawbar of the seed drill to the tractor hitch or the wheel packer to the tractor's link arms.
3. Raise the machine with the tractor hydraulics.
4. Raise the ground support to the top position in accordance with the instructions given in section 5.3.2. Using the ground support.

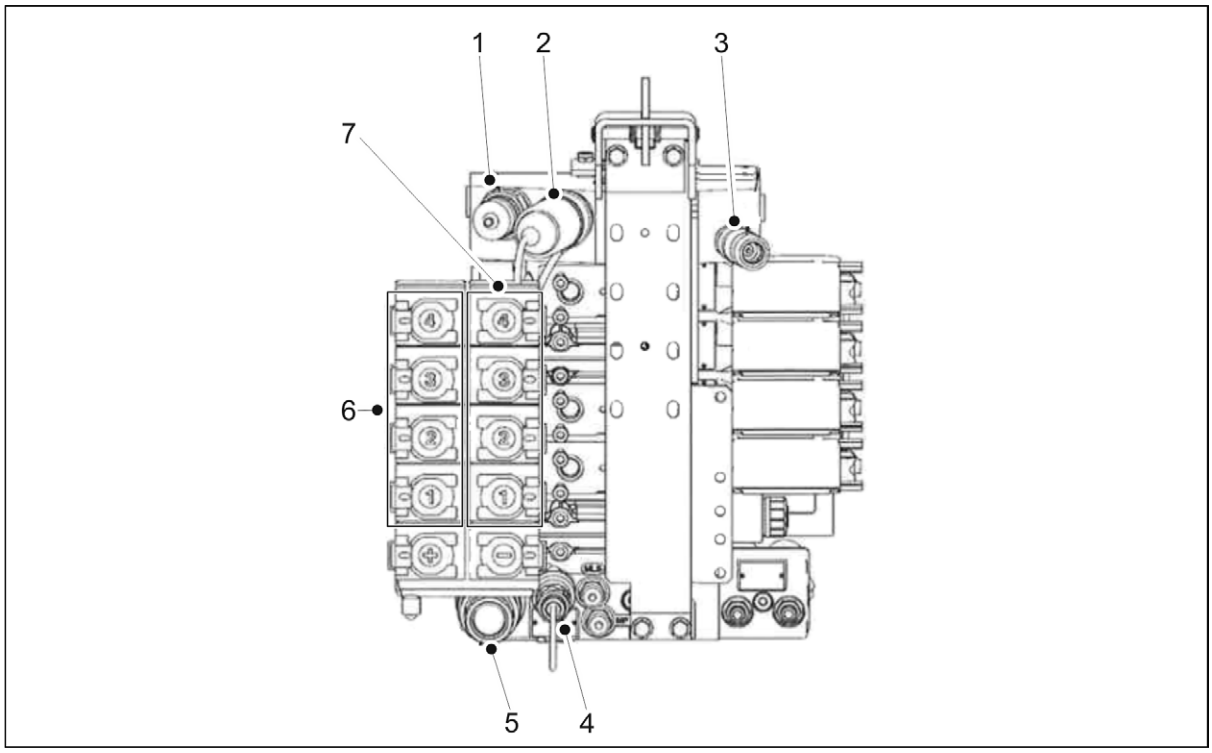


Figure. 5.3. - 79. Valtra T series hydraulic couplings are provided as a coupling reference

1.	Power Beyond return (back pressure 8 bar)
2.	Power Beyond pressure

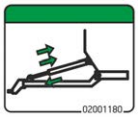
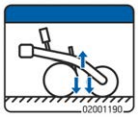
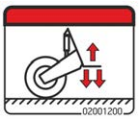
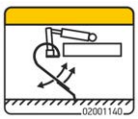
3.	LS control
4.	Overflow connector (do not connect a return line)
5.	Free return connector
6.	Double-acting connections 1-4. + function connections
7.	Double-acting connections 1-4. - function connections

5. Connect the hydraulic hoses of the seed drill to the tractor's double-acting spool valve (6, 7).

DANGER
Ensure that the tractor is turned off and the key is removed from the ignition.

DANGER
Hydraulic hoses must be depressurised when connecting them.

- Connect hydraulic hoses in pairs so that the directions of flow are correct. The hydraulic hoses are marked with colour-coded collars. Check the tractor manual to ensure the hydraulic connections are suitable.

Number	**Hydraulic hose**	**Colour code and symbol**
1.	Drawbar adjustment connection ◦ 2 male connectors of ½"	
2.	Hydraulic connection of the coulter pressure adjustment ◦ 2 male connectors of ½"	
3.	Hydraulic connection for raising the machine to the transport position ◦ 2 male connectors of ½"	
4.	Hydraulic connection of the adjustment of the front levelling board position ◦ 2 male connectors of ½"	

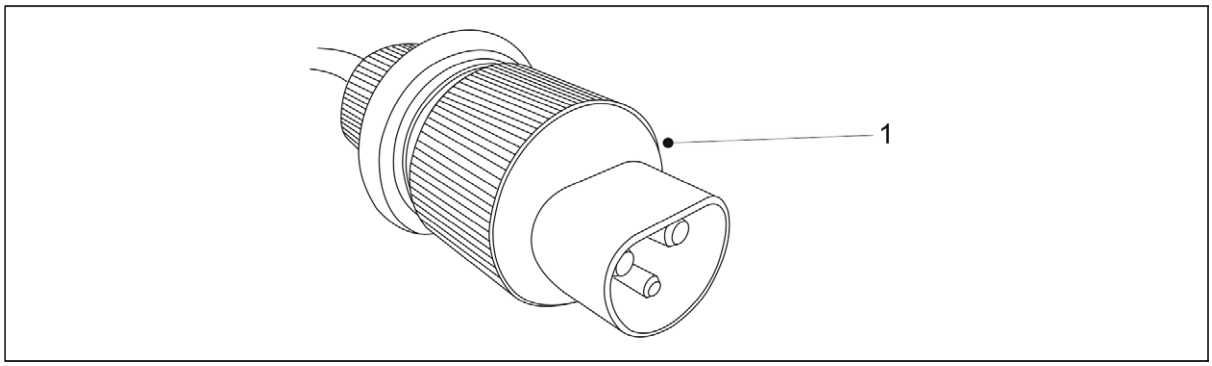


Figure. 5.3. - 80. SeedPilot controller power cable DIN 9680

6. If the machine is equipped with a SeedPilot control system, plug the controller power cable (1) into the tractor cabin plug.

DANGER
Ensure that the tractor is turned off and the key is removed from the ignition.

- Ensure the cable is not crushed by the tractor's rear window. Fasten the cable properly so that it is not pinched during turns or lifting.

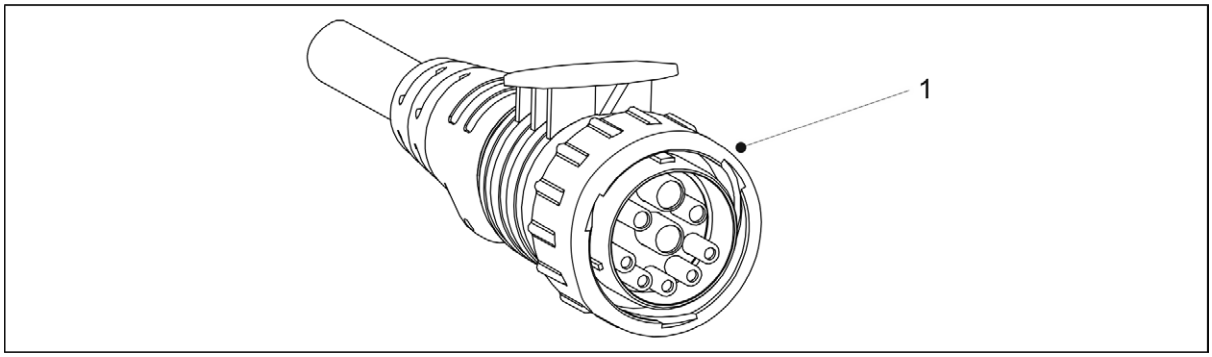


Figure. 5.3. - 81. SeedPilot ISOBUS controller power cable

7. If the machine is equipped with a SeedPilot ISOBUS control system, plug the controller power cable (1) into the ISOBUS connector (on IBBC tractors).

DANGER
Ensure that the tractor is turned off and the key is removed from the ignition.

8. If necessary, straighten the machine in accordance with the instructions in section 5.3.3. Adjusting the lengthwise level of the machine with a turnbuckle or 5.3.4. Adjusting the lengthwise level of the machine with a drawbar cylinder.

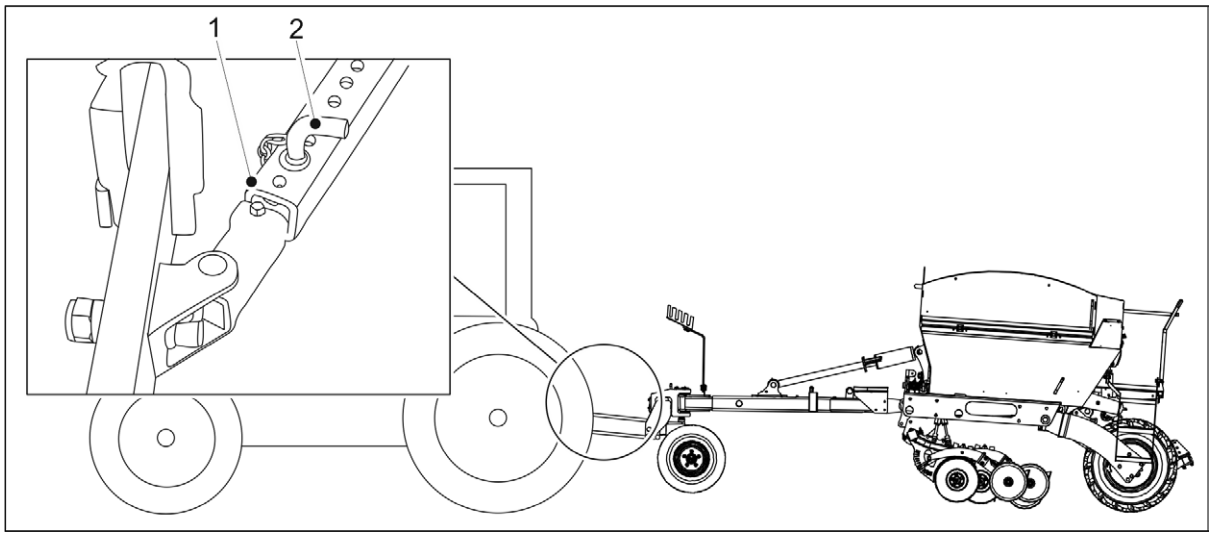


Figure. 5.3. - 82. Side stoppers of the tractor link arms

9. Lock the side stoppers (1) of the tractor link arms by inserting the pin (2) to the appropriate hole so that the link arm does not touch the tyres.
10. Open the machine lifting circuit ball valve in accordance with the instructions in section 5.3.5. Using the machine lifting circuit ball valve.
11. Ensure the steerability of the tractor in accordance with the instructions in section 5.3.6. Ensuring the steerability of the tractor.
12. When driving on a field for the first time, set the middle markers in accordance with the instructions given in section 5.3.7. Adjusting the middle markers.

5.3.1. Adjusting the length of the boom of the wheel packer

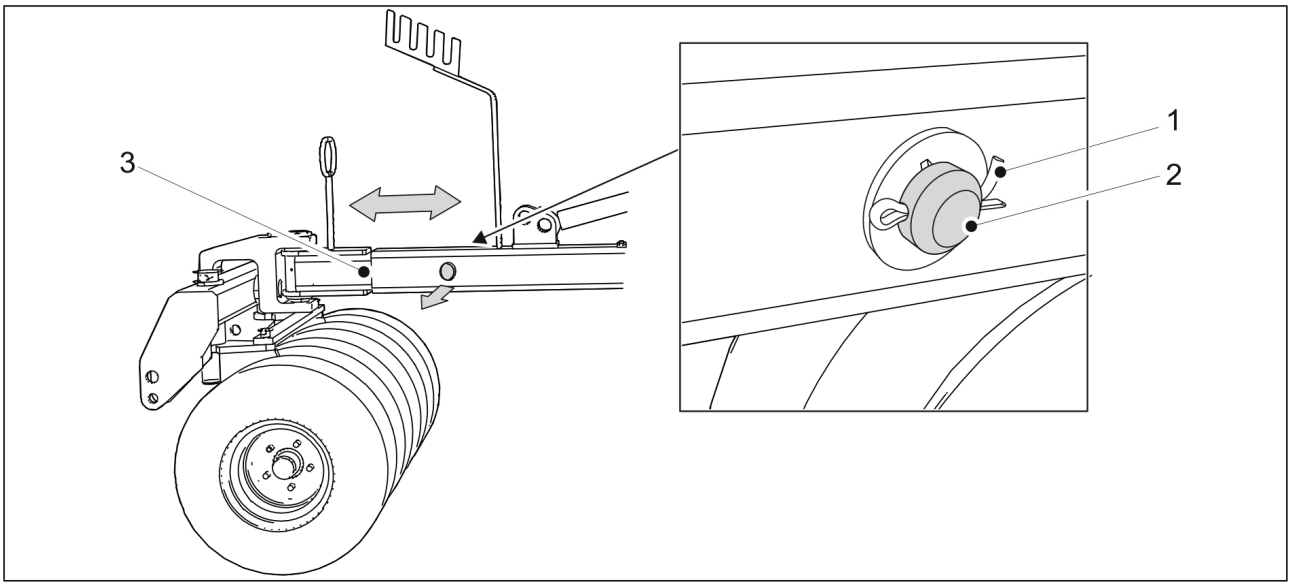


Figure. 5.3.1. - 83. Adjusting the length of the boom

1. Remove the cotter (1) of the boom mounting pin (2) and pull the mounting pin out of the boom.
2. Adjust the length of the boom (3) so that it is appropriate for the tractor.

- The boom has three adjustment position at 200 mm intervals. The maximum length adjustment is 400 mm.

3. Insert the mounting pin in the boom and lock it in place with the cotter.

5.3.2. Using the ground support

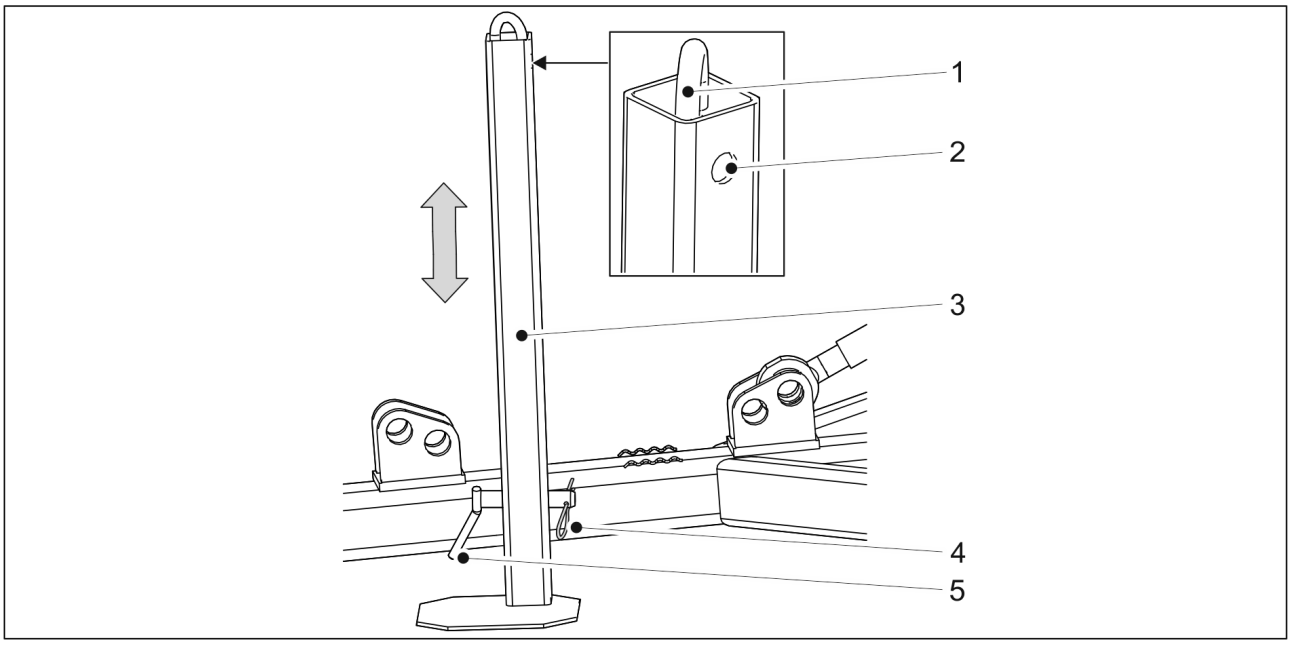


Figure. 5.3.2. - 84. Ground support

1. Remove the cotter (4) of the ground support (3) mounting pin (5) and pull the mounting pin out of the ground support.
2. Move the ground support up or down by the lever (1).
3. Lock the ground support in the mounting hole. Attach the mounting pin and the cotter.
   - The upper mounting hole (2) locks the ground support in the down position. The lower mounting hole locks the ground support in the up position.

5.3.3. Adjusting the lengthwise level of the machine with a turnbuckle

- Perform the adjustment when the machine is on a level surface.

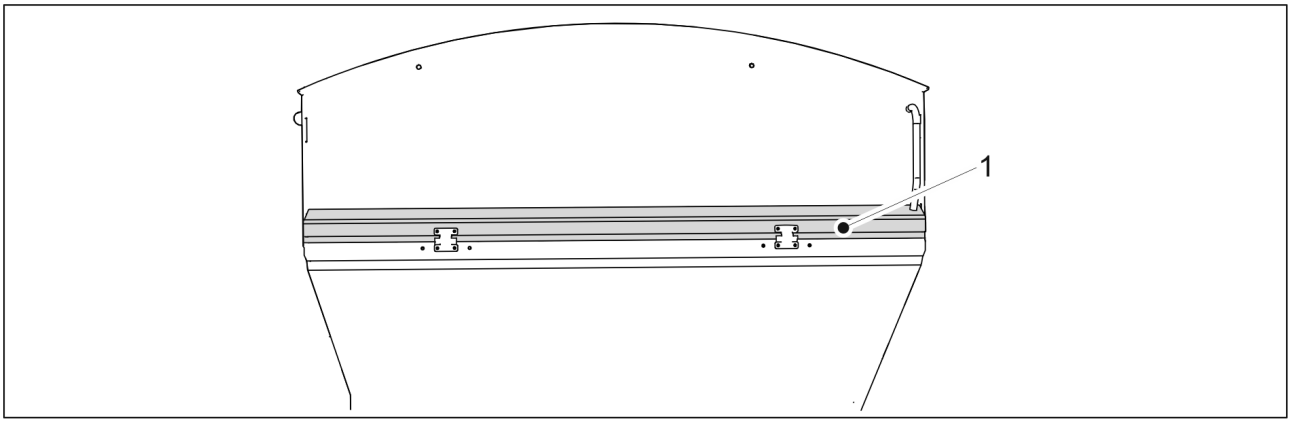


Figure. 5.3.3. - 85. Lengthwise level

- The machine is level when the sidebar (1) of the machine is horizontal.
  Connect the seed drill to the tractor in accordance with section 5.3. Connecting to tractor.

1. Lower the machine by using the tractor hydraulics.
2. Switch off power in the tractor, remove the key from the ignition and engage the parking brake.

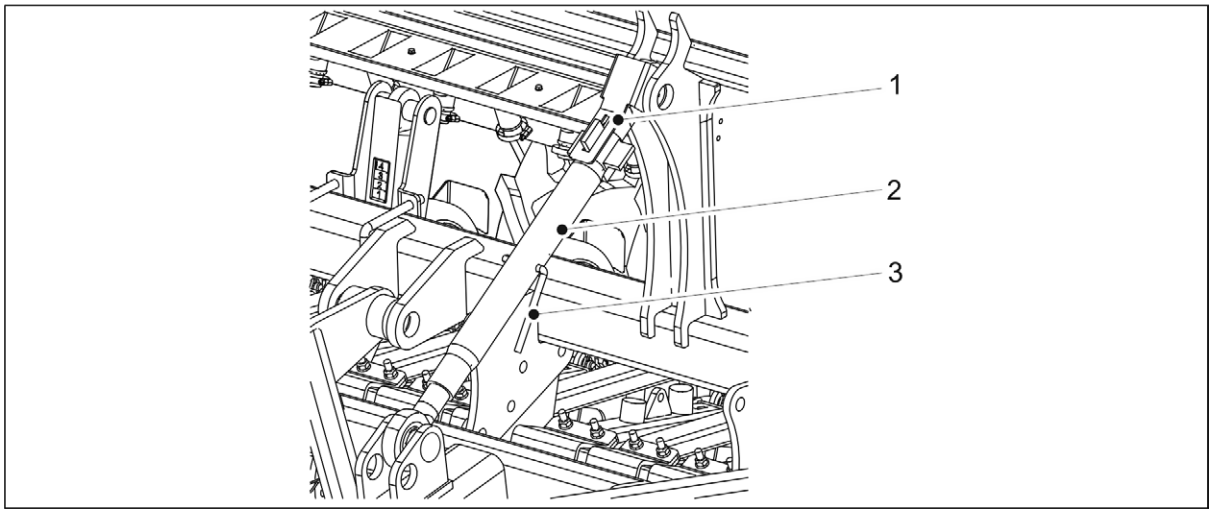


Figure. 5.3.3. - 86. Adjustment with a turnbuckle

3. Release the locking by turning the plate (1) upward.
4. Turn the turnbuckle (2) by the handle (1) and check visually that the machine is straight.
5. When the machine is straight, turn the plate downward to engage the lock.

5.3.4. Adjusting the lengthwise level of the machine with a drawbar cylinder

- Connect the seed drill to the tractor before adjusting the lengthwise level in accordance with section 5.3. Connecting to tractor. The tractor should be on during the adjustment. Perform the adjustment when the machine is on a level surface.

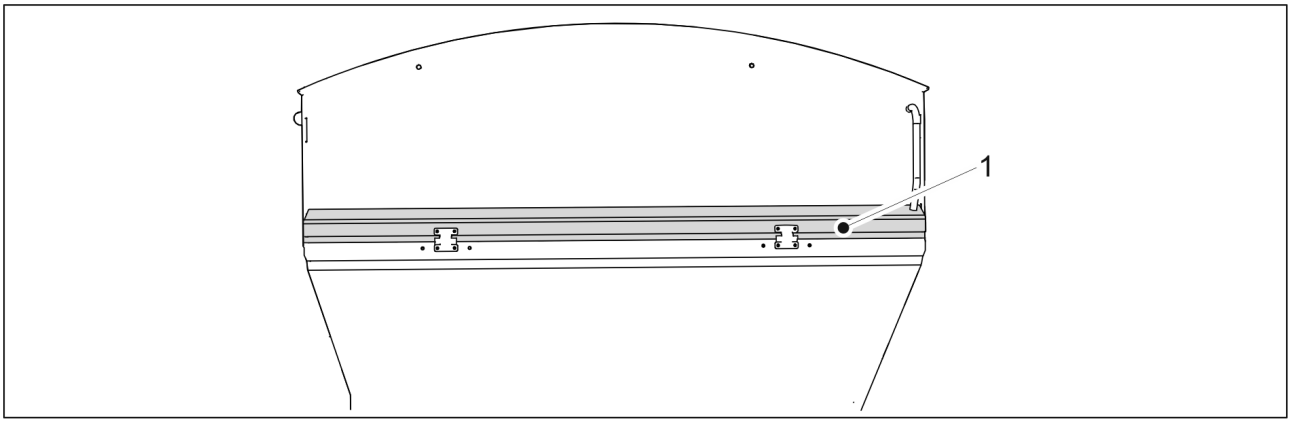


Figure. 5.3.4. - 87. Lengthwise level

- The machine is level when the sidebar (1) of the machine is horizontal.

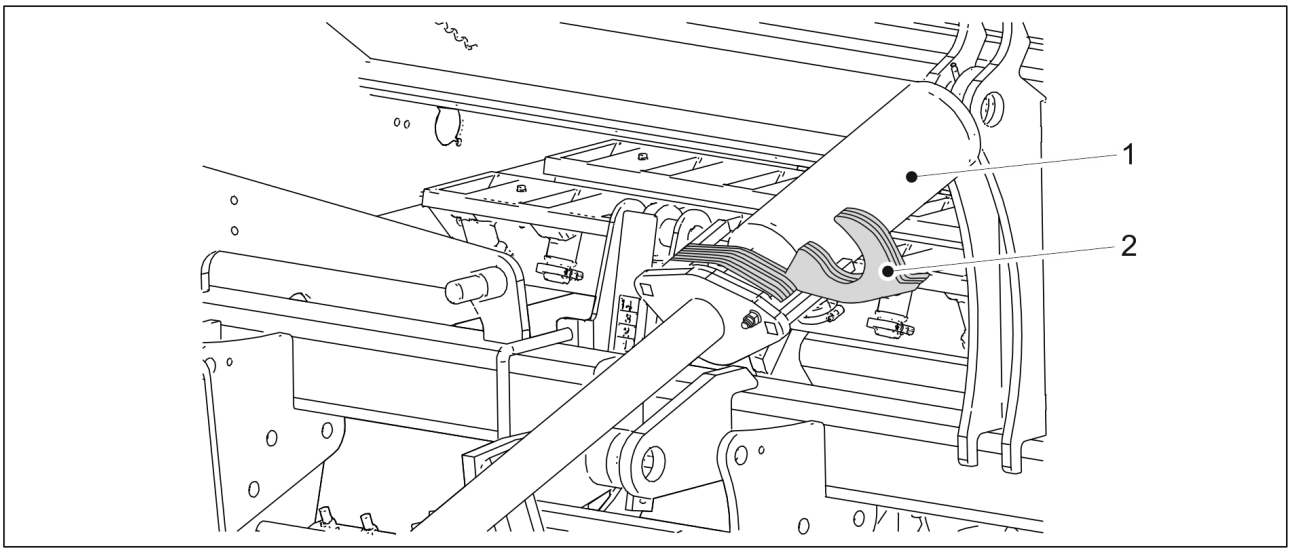


Figure. 5.3.4. - 88. Cylinder adjustment slats

1. Turn slats (2) over the cylinder (1) shaft.
2. Carefully run the cylinder against the slats and check visually that the machine is straight.
    - If needed, extend the cylinder and add or remove slats, if needed, until the machine is straight.

5.3.5. Using the machine lifting circuit ball valve

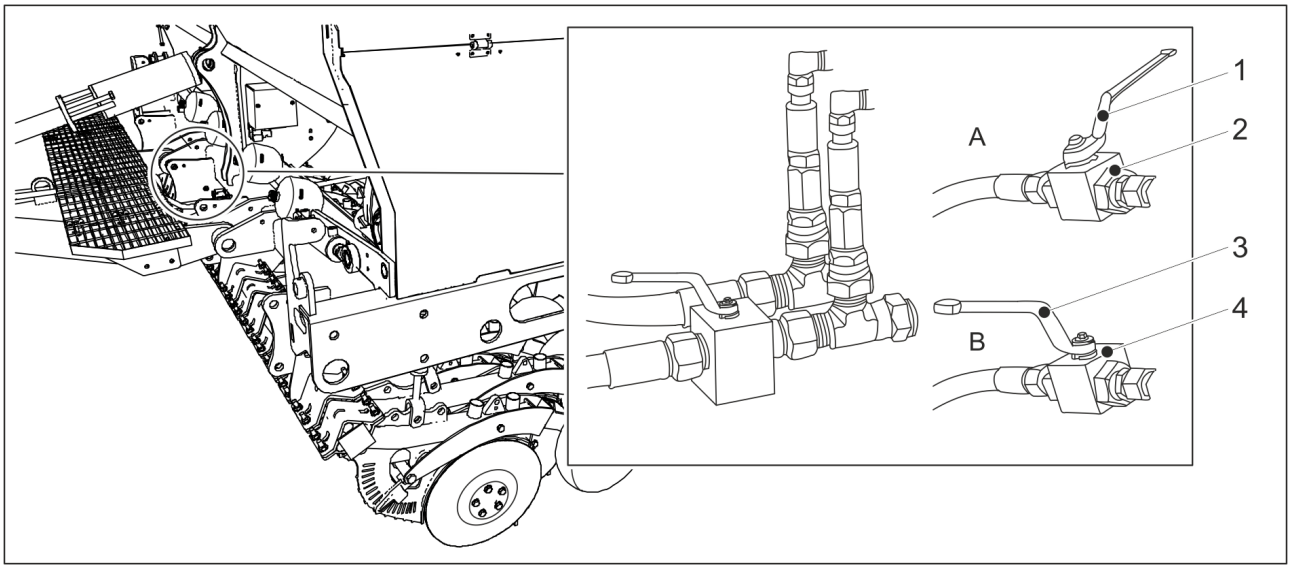


Figure. 5.3.5. - 89. Lifting circuit ball valves

DANGER

Close the lifting circuit ball valve (2) before starting out and performing maintenance

- The ball valve of the lifting circuit is closed when the handle (1) is perpendicular to the hydraulic hose (A).

- Open the machine's lifting circuit ball valve (4) after moving the machine into its working position.
    - The ball valve of the lifting circuit is open when the handle (3) is parallel with the hydraulic hose (B).

5.3.6. Ensuring the steerability of the tractor

The calculation of the stability of the tractor - seed drill combination is provided in the attachment *Calculating the stability of the tractor - seed drill combination*. The steering response of a small tractor may be compromised when it pulls the seed drill, because some of the weight of the seed drill rests on the tractor's rear axle. If steering response is weak, we recommend the use of front weights on the tractor. The tractor's weight transfer system should also be switched off, since when using the weight control system, the height of the lifting device may change based on the load and impact the seeding depth.

5.3.7. Adjusting the middle markers

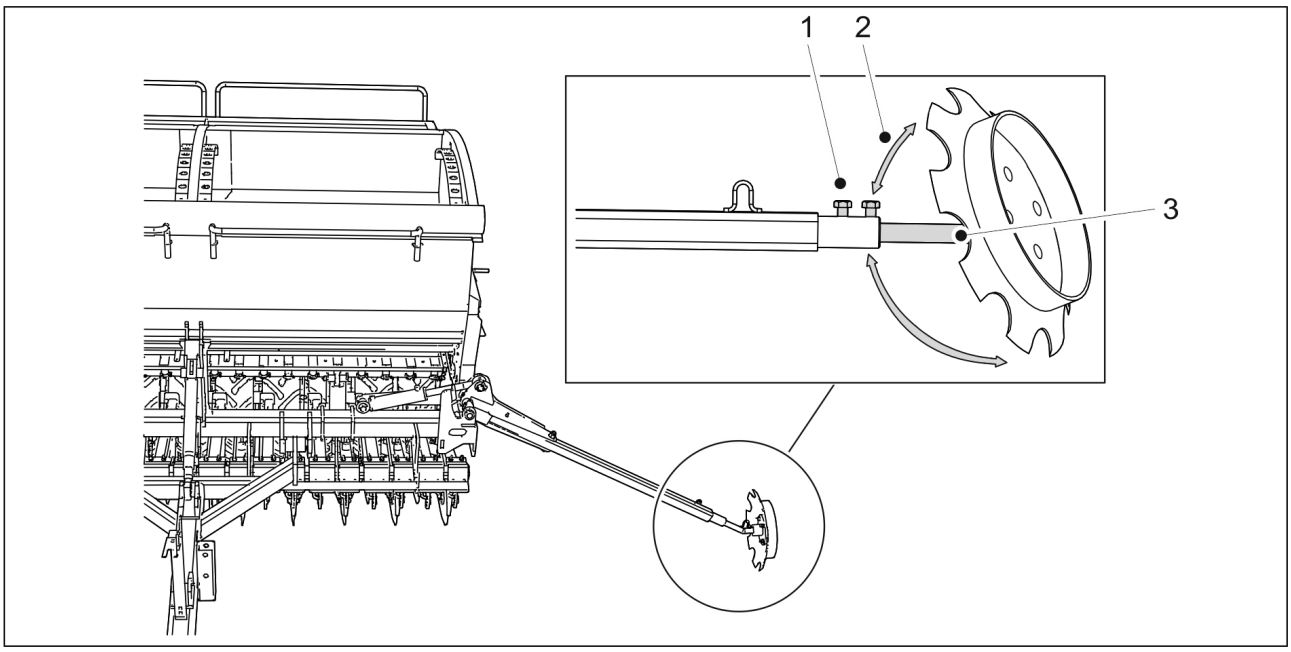


Figure. 5.3.7. - 90. Adjusting the middle markers

1. Loosen the two screws (1).
2. Adjust the width of the marker axle (3).
3. Adjust the toe-in (2) by rotating the disc around the axle (3).
    - The marker should plough a furrow deep enough to be visible in the ground. The distance between the centreline of the seed drill and the furrow made by the middle marker should be 3 metres for the FX300 and 4 metres for the FX400. However, the adjustment is indicative. Check the adjustment in the field to avoid overlapping seeding and stripes in accordance with section 6.14. Securing the position of the middle markers. Overlapping seeding and stripes may be generated if the operator sits at an angle in the tractor, for example.
4. Tighten the two screws (1).

6. Machine adjustment and use

6.1. Rendering the machine to the transport position

1. Fold the working platform stairs up.

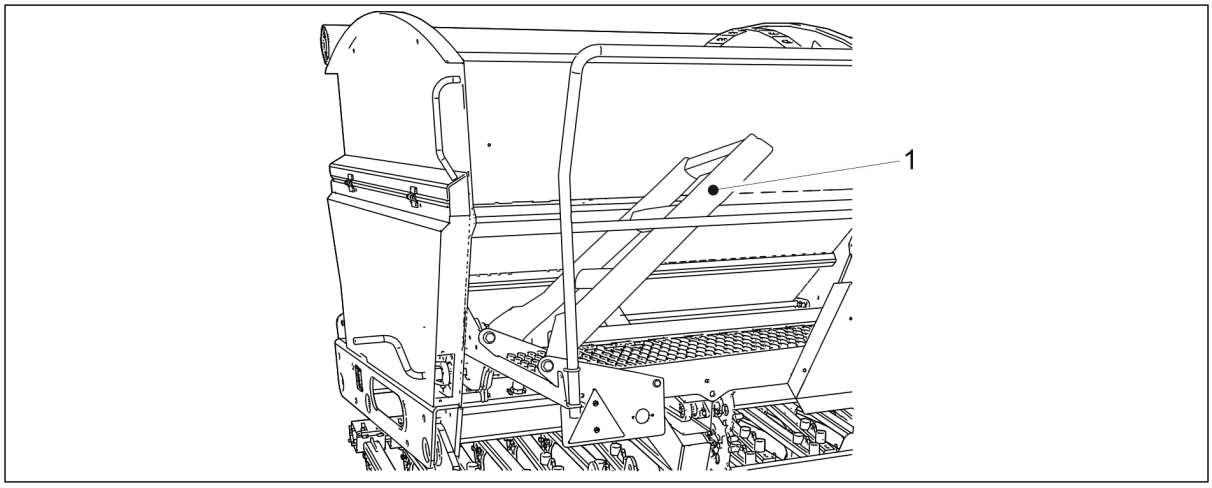


Figure. 6.1. - 91. Working platform stairs

   - When raised, the stairs (1) will be at an approximately 40 degree angle to the working platform.
2. Raise the machine with the tractor hydraulics.
3. If the machine is equipped with a SeedPilot or SeedPilot ISOBUS control system, switch on the STOP ALL function in accordance with section 6.3.1. Using the STOP ALL function.
4. If the machine is equipped with middle markers, ensure that they have settled into their transport position and their ball valves are closed, in accordance with section 3.4. Using the middle marker ball valves.
5. Close the machine lifting circuit ball valve in accordance with the instructions in section 5.3.5. Using the machine lifting circuit ball valve.
6. Check the tyre pressure in accordance with section 7.1.3. Checking tyre pressure.
7. Ensure that the machine is clean.
   - If necessary, clean the machine according to the instructions in section 7.3. Cleaning.
8. Visually check that the bolts of the transport wheels are tight in accordance with section 7.1.2.1. Checking the tightness of the wheel bolts of the transport wheels and tighten if necessary.
9. Check that the bolts of the bearings are tight in accordance with section 7.1.2.2. Checking the tightness of the bolts in the flange bearings of the transport wheels and tighten if necessary.
10. If the machine is equipped with a standard drawbar, visually check that the bolts of the towing device are tight in accordance with section 7.1.2.6. Checking the tightness of the towing eye bolts and tighten if necessary.

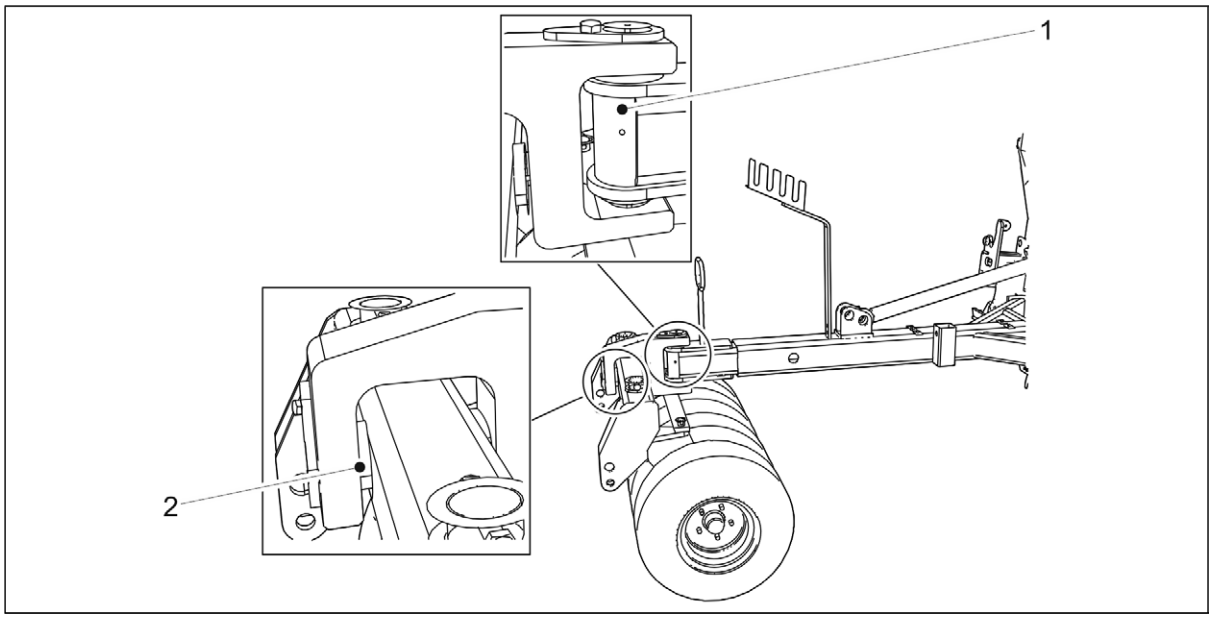


Figure. 6.1. - 92. Wheel packer pins

11. If the machine is equipped with a wheel packer as an accessory, visually check that the wheel packer pins (1, 2) are closed.
12. If the seed drill is equipped with a standard drawbar, ensure that the tractor hitch is engaged and locked.
13. If the seed drill is equipped with a wheel packer, ensure that the tractor's link arms are locked to the wheel packer.

6.2. Rendering the machine to the working position

1. Open the machine lifting circuit ball valve in accordance with the instructions in section 5.3.5. Using the machine lifting circuit ball valve.
2. If the machine is equipped with a SeedPilot or SeedPilot ISOBUS control system, switch off the STOP ALL function on the user interface in accordance with the instructions in section 6.3.1. Using the STOP ALL function.
3. If the machine is equipped with middle markers, open the middle marker ball valves in accordance with the instructions in section 3.4. Using the middle marker ball valves.

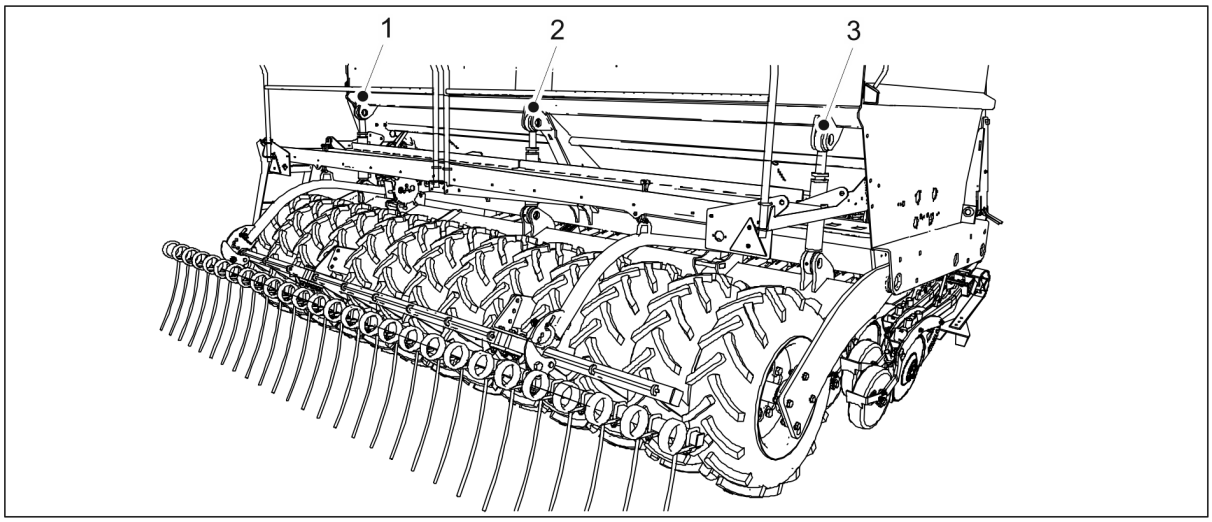


Figure. 6.2. - 93. Lifting cylinder

4. Lower the lifting cylinders to their lowest position using the tractor hydraulics.
   - The FX300 has 1 lifting cylinder (2). The FX400 has 3 lifting cylinders (1 -3).

6.3. SeedPilot and SeedPilot ISOBUS control system settings

6.3.1. Using the STOP ALL function

DANGER
STOP ALL must be turned on before starting and running a calibration test.

DANGER
Turning on the STOP ALL function alone is not sufficient - the middle marker ball valves must also be closed. See the instructions in section3.4. Using the middle marker ball valves.

- The STOP ALL function cuts the power to the middle and rear marker solenoids.
  The linear actuator for adjusting of fertiliser target rate has power even though STOP ALL is on.

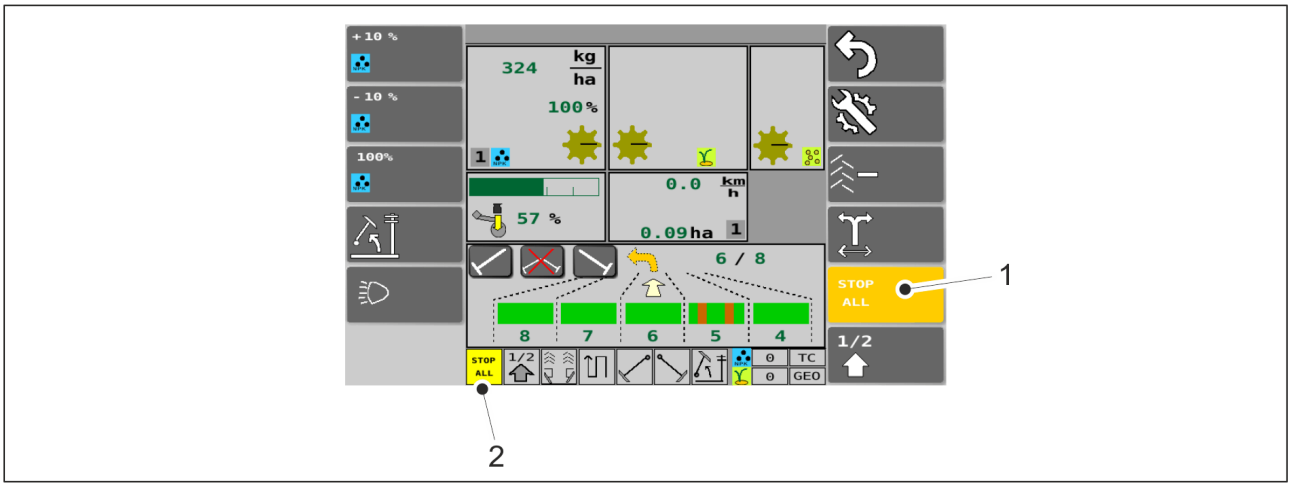


Figure. 6.3.1. - 94. STOP ALL

- The STOP ALL function is on automatically. The function is turned off in the Drive screen by pressing the STOP ALL button (1). When STOP ALL is on, the box (2) is yellow; when it is off, the box is grey.

6.3.2. Calibration test result memory slots

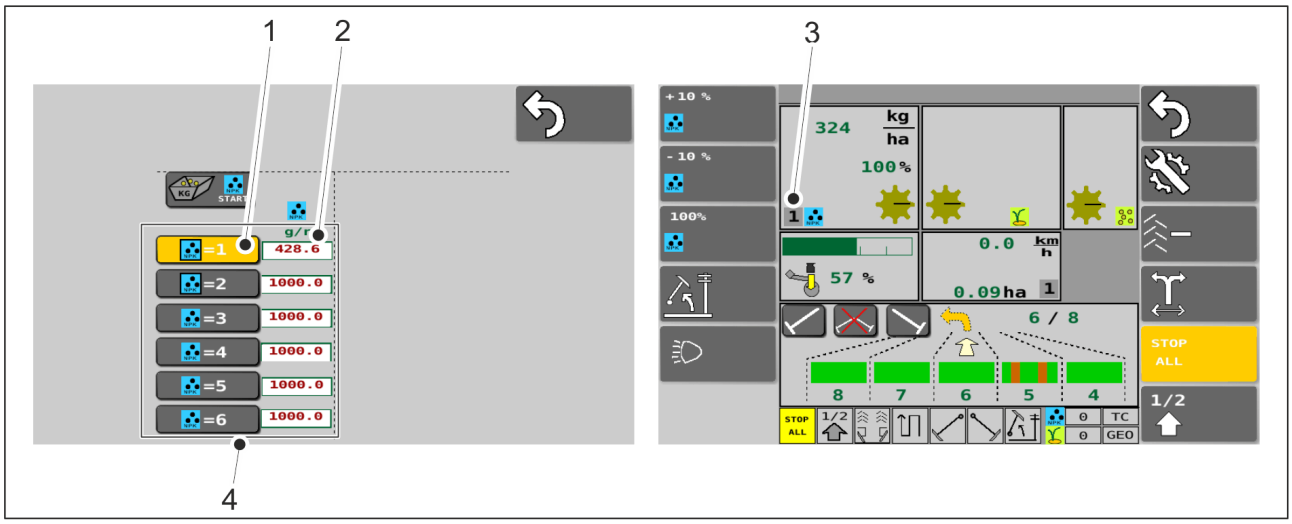


Figure. 6.3.2. - 95. Calibration test result memory slots

- Calibration test results are saved on the Calibration test page. There are 6 memory slots (4) for fertiliser and seed. Press the number button (1) to select the desired calibration test result. The corresponding number is displayed in the drive screen (3). The calibration test result is entered manually by pressing the desired number value (2).
  Instructions on performing the calibration test are provided in section 6.8. Product calibration.

6.3.3. Selecting the remote control mode

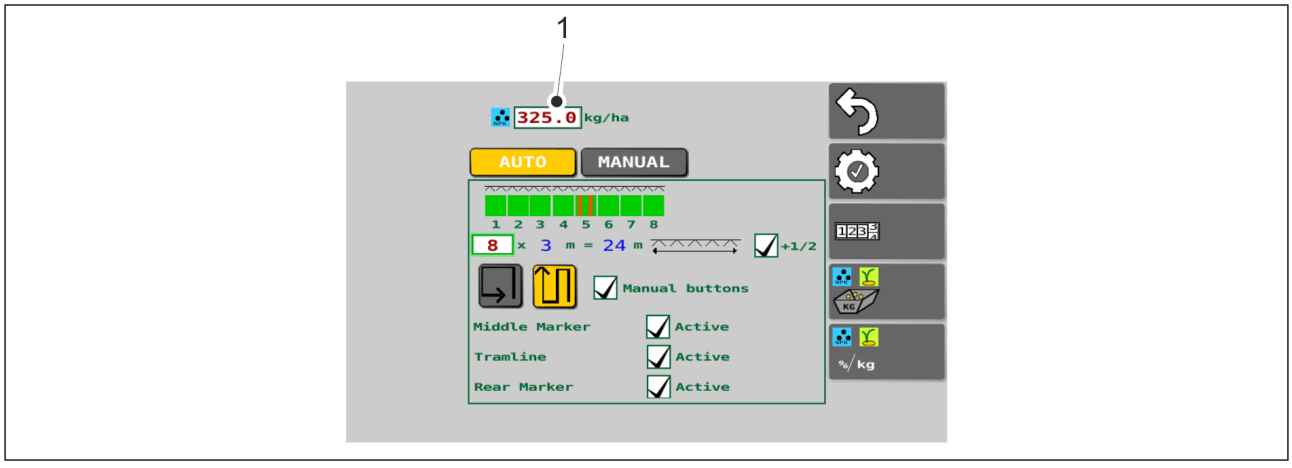


Figure. 6.3.3. - 96. Fertiliser target rate

- The fertiliser target rate (1) is set on the Seeding settings. Set the new target value by pressing the FERTILISER TARGET RATE button (1).
  There are two options for selecting a control method.

6.3.3.1. Control method selection - Option 1

- Control is carried out by adjusting the step value.

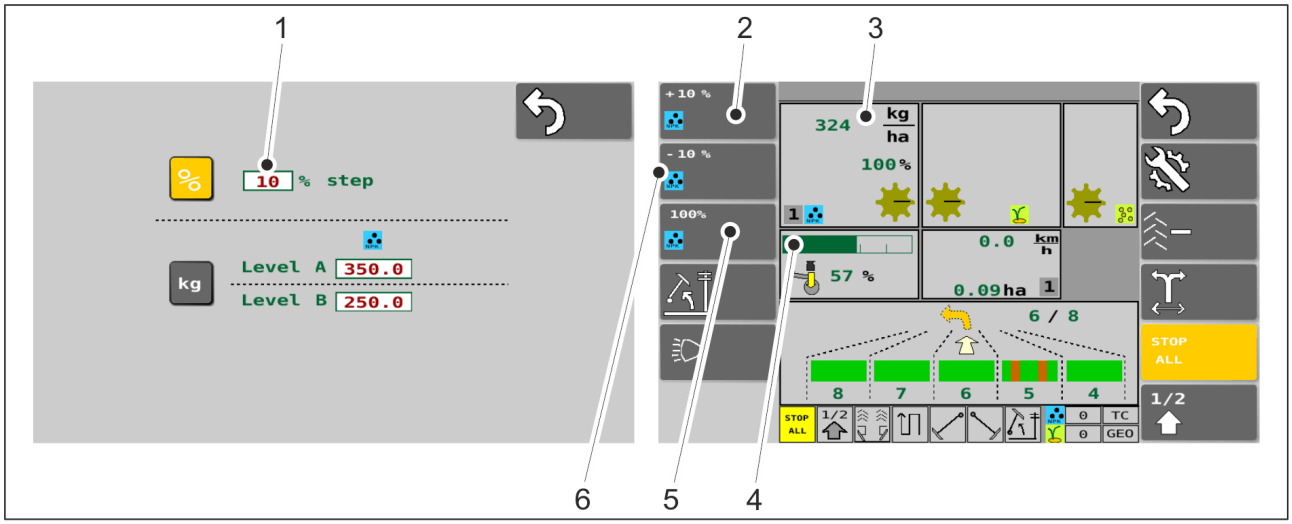


Figure. 6.3.3.1. - 97. Control method selection - Option 1

1. Press the STEP VALUE (1) on the Control method page and enter the new value.

- The amount of fertiliser (3) being fed from the machine is displayed on the drive screen. The kilograms are set according to the position of the linear actuator. The buttons for selecting a control method are found on the drive screen. Press the +10% button (2) to increase the fertiliser target rate by the preset step. Press the -10% button (6) to decrease the fertiliser target rate by the preset step. In this case, the set step amount is 10%. Press the 100% button (5) to change the fertiliser target rate to the set value. The active calibration test calibration preset (value 1-6) is displayed in the box (4). The calibration test memory slots are described in section 6.3.2. Calibration test result memory slots.

6.3.3.2. Control method selection - Option 2

- The control method is selected by setting levels A and B.

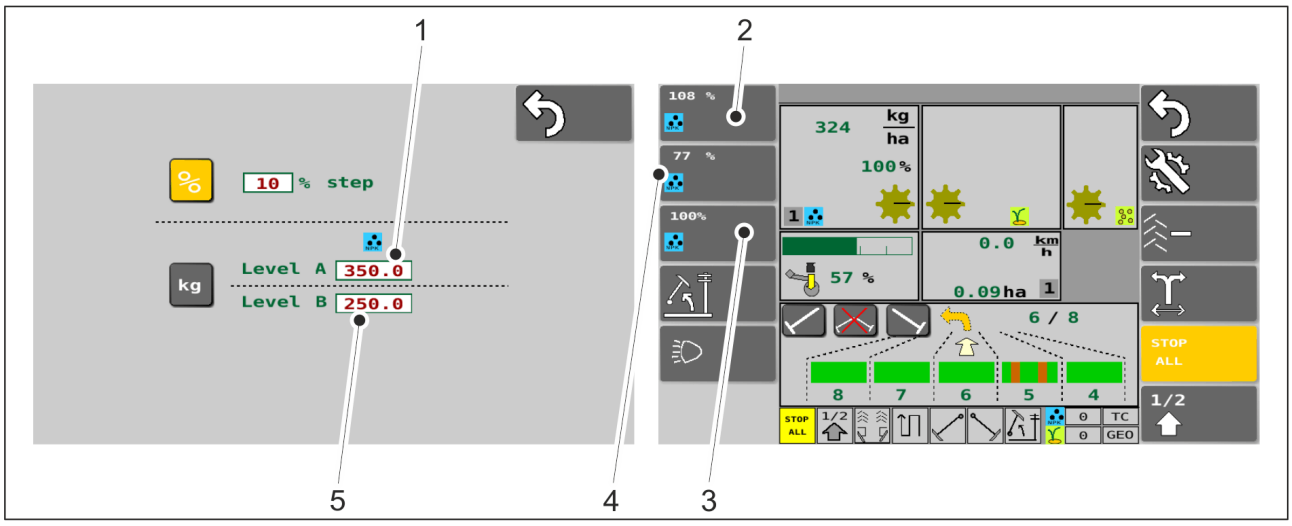


Figure. 6.3.3.2. - 98. Control method selection - Option 2

1. Press the LEVEL A button (1) on the Control method page and set the new value.
2. Press the LEVEL B button (5) and set the new value.
    - The buttons for selecting a control method are found on the drive screen. Press the 108% button (2) to change the fertiliser target rate to calibration preset A. Press the 77% button (4) to change the fertiliser target rate to calibration preset B. The set percentages indicate the calibration preset percentage of the fertiliser target rate In this case, calibration preset A is 108% and calibration preset B is 77% of the fertiliser target rate of 325 kg/ha. Press the 100% button (3) to change the fertiliser target rate to the calibration preset.

6.3.4. Using tramline automation

- Tramline automation is used to turn the tramline clutch on or off. When the tramline clutch is on, the rows assigned for tramlines will not be seeded, but a tramline will be made.

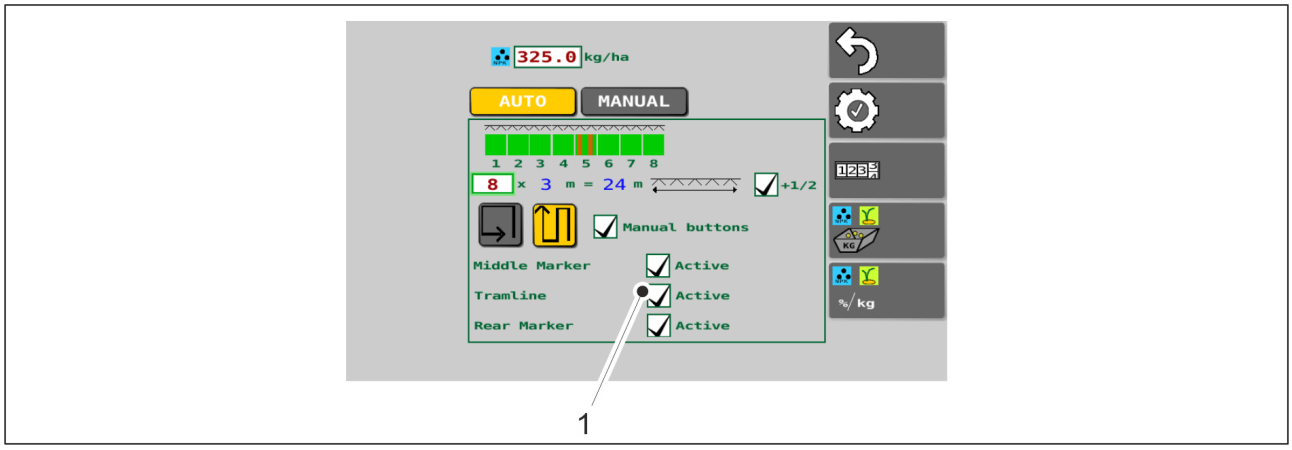


Figure. 6.3.4. - 99. Tramlines

1. Activate the tramline automation by selecting the box (1) on the Seeding settings.
    - The tramline is on when the box (1) is checked.

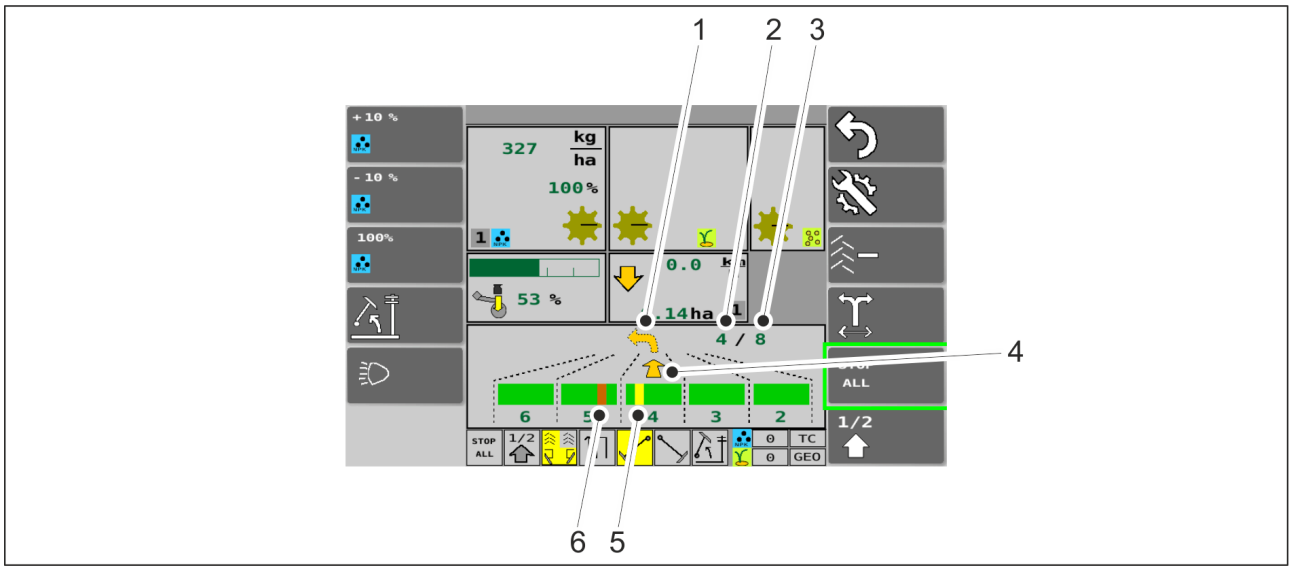


Figure. 6.3.4. - 100. Using tramline automation

- Tramline automation can be found on the Drive screen. The lower arrow (4) and number in the upper corner (2) indicate which pass is being driven. The second number (3) indicates the number of passes. The upper arrow (1) indicates the direction of the next turn. The tramline is red (6) when it is not made on the pass being driven. The tramline is yellow (5) when it is not made on the pass being driven. The animation updates each time the machine is raised when coming to a headland.

6.3.5. Using the middle marker automation

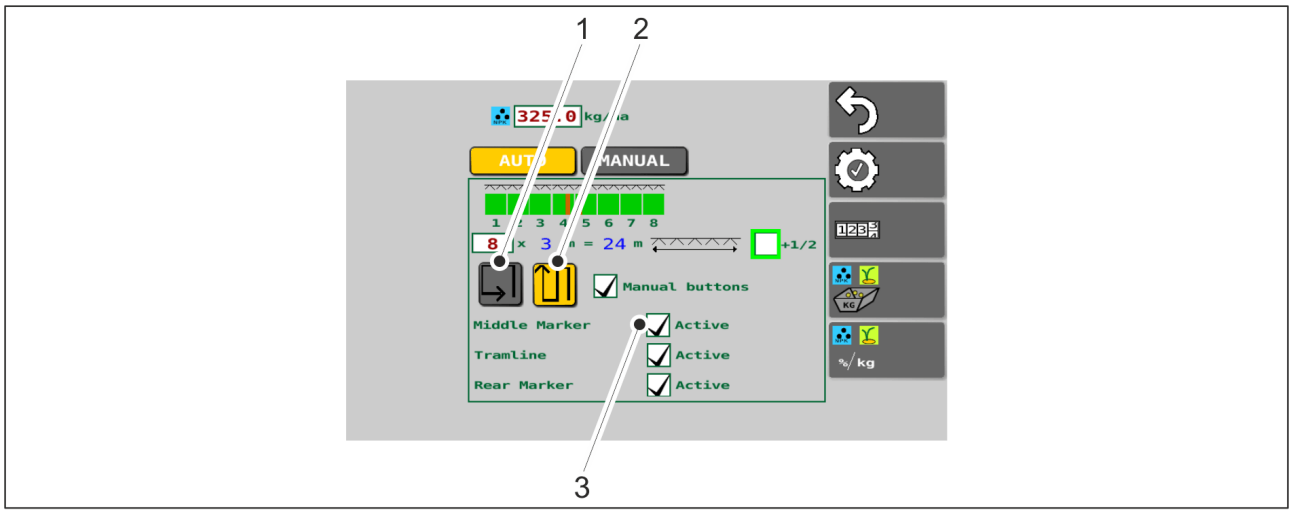


Figure. 6.3.5. - 101. Selecting the middle markers and driving mode

1. Press the MIDDLE MARKER button (3) on the Seeding settings to select the middle marker.
   - The middle marker is in use when the box (3) is checked.
2. Select the driving mode on the Seeding settings.
   - Using the buttons, select the mode to drive around the field (1) or back and forth (2). When driving around the field, the counters do not run. When driving back and forth, the counters run and the middle markers switch sides. The button is yellow when activated.

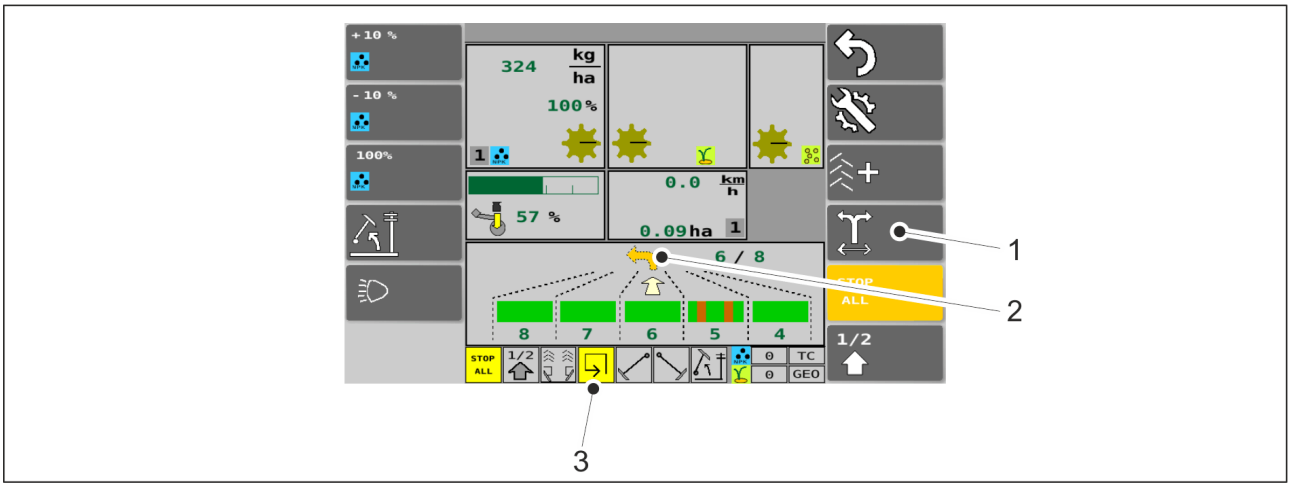


Figure. 6.3.5. - 102. Middle marker automation

- When driving around the field, the drive-around box (3) on the Drive screen is yellow. When driving back and forth, the back-and-forth icon is displayed on the screen. The middle marker side is switched by pressing the SWITCHING OF THE MIDDLE MARKER SIDE button (1). The yellow arrow (2) shows the direction of the next turn (left/right).

6.3.6. Middle markers manual control and forcing operation

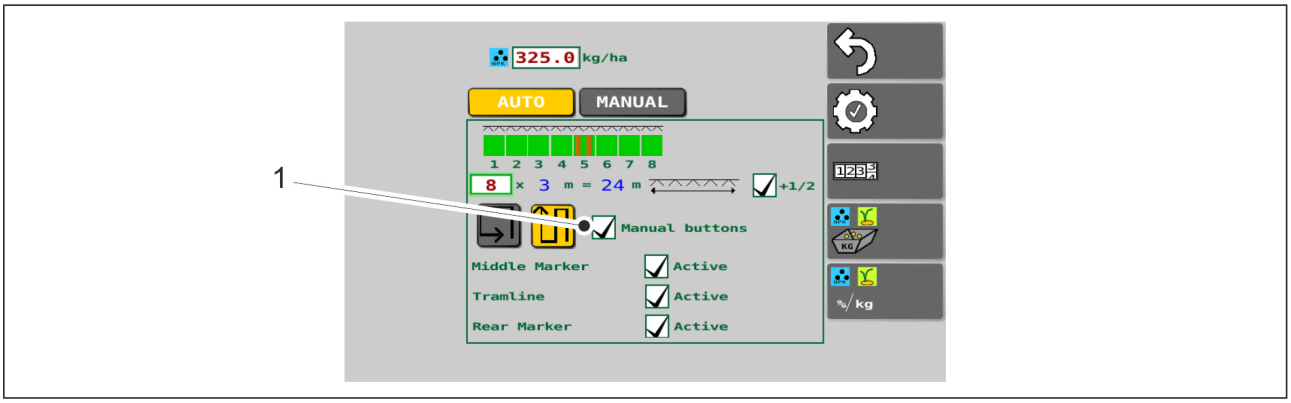


Figure. 6.3.6. - 103. Selecting additional buttons

1. Press the ADDITIONAL BUTTONS button (1) on the Seeding settings to select additional buttons for the middle marker.
    - Additional buttons are in use when the box (1) is checked.

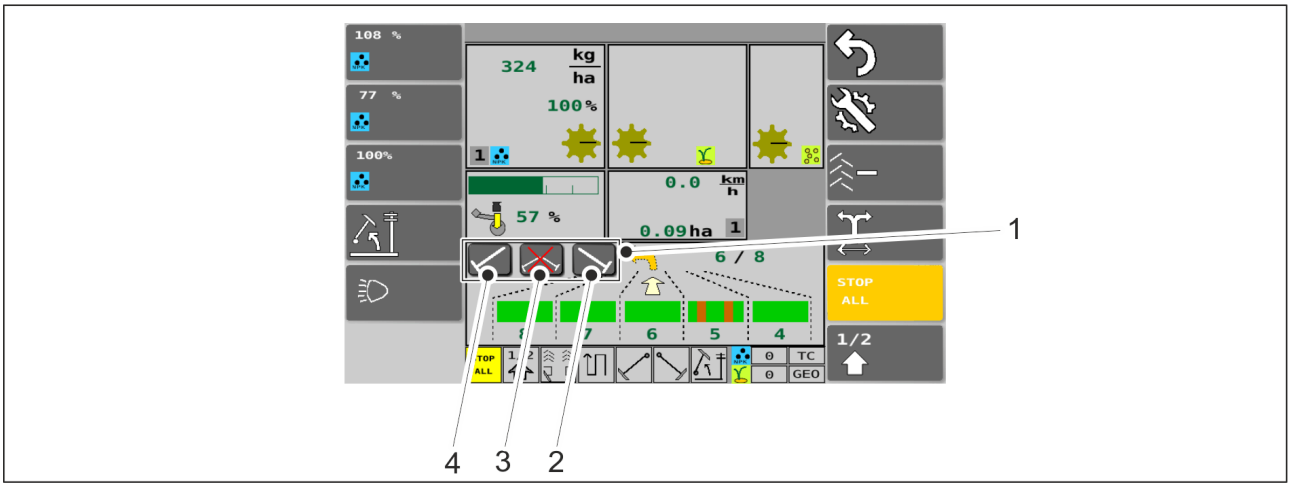


Figure. 6.3.6. - 104. Middle markers manual control and forcing operation

- When additional buttons have been selected, three middle marker selection buttons (1) are displayed on the Drive screen. Button (4) forces the left middle marker on in both automatic and manual mode. Button (2) forces the right middle marker on in both automatic and manual mode. Button (3) prevents both middle markers from lowering in both automatic and manual mode, even if (4) and (2) are on. The buttons are yellow when activated.

6.3.7. Tramline counter correction

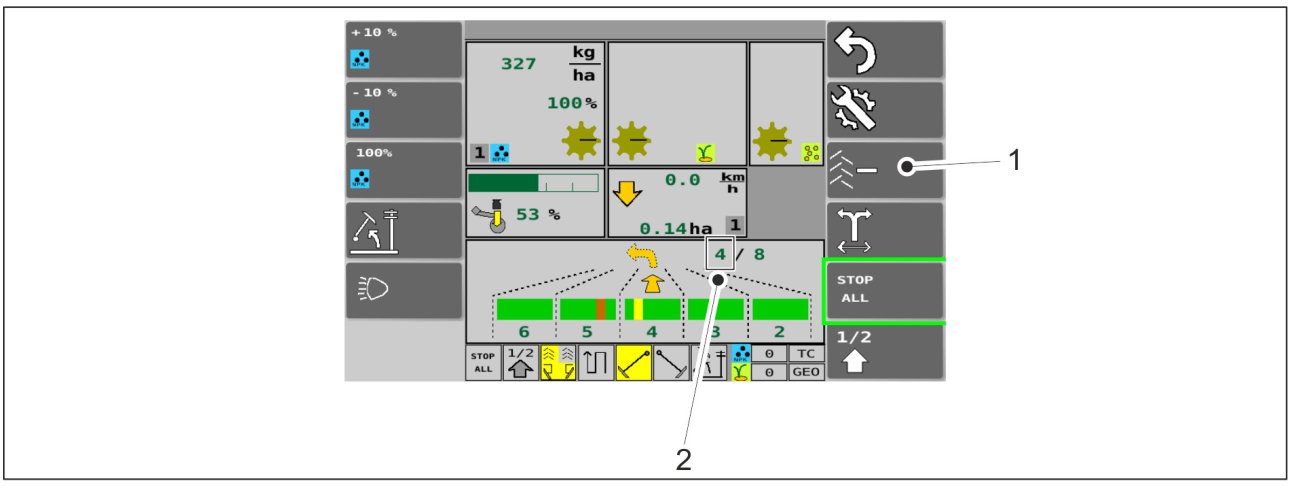


Figure. 6.3.7. - 105. Tramline counter correction

- The tramline counter correction function is used when the machine is raised an extra time unintentionally. Press the TRAMLINE COUNTER button (1) to decrease the value of the counter (2) in back-and-forth mode and increase the value in drive-around mode. Depending on the driving mode, there is a - or + symbol in the button.

6.3.8. Selecting hopper level sensors

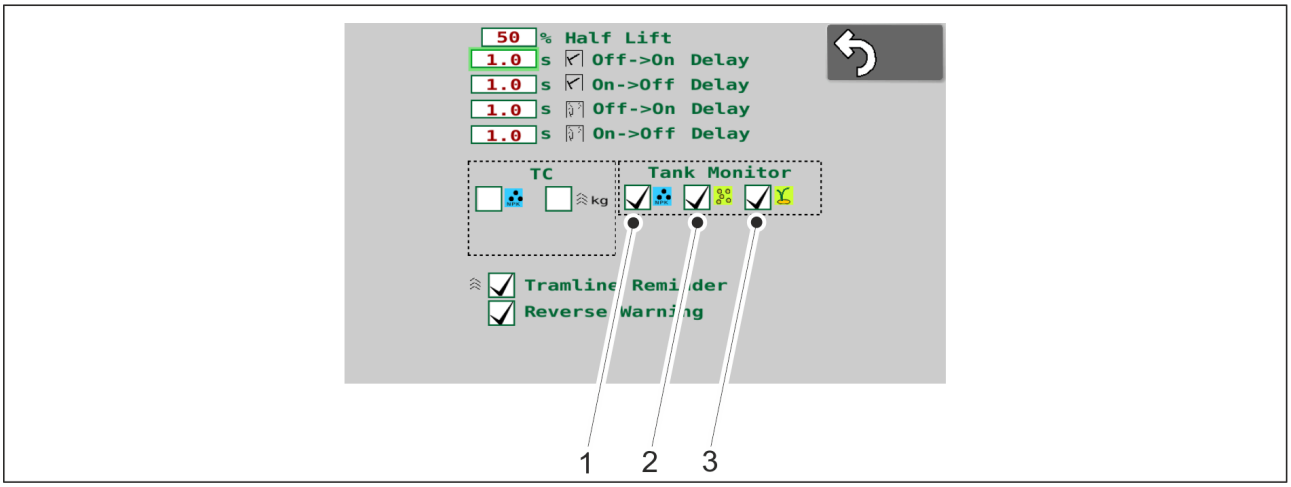


Figure. 6.3.8. - 106. Selecting hopper level sensors

1. Press the TANK MONITOR (1-3) button to select a hopper level sensor
   - (1) is for fertiliser, (2) is for seed and (3) is for small seed. The hopper level sensor is in use when the box is checked.

6.3.9. Area counter use

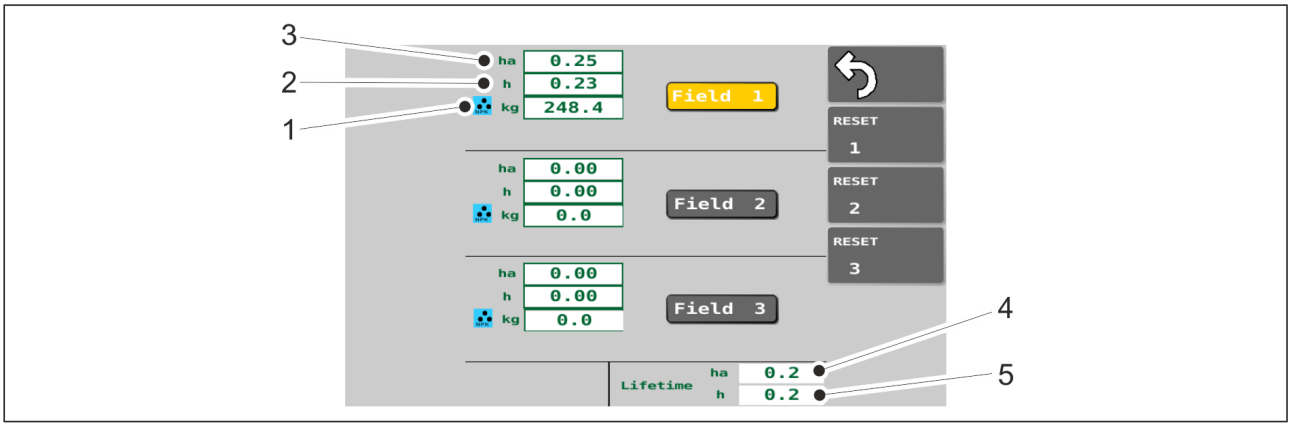


Figure. 6.3.9. - 107. Area counters

- Field-specific counters display each field's seeded area (3), effective work time (2) and the total quantity of seed or fertiliser used (1). The history displays the seeded area (4) and effective work time (5) over the entire service life of the machine. History data cannot be reset.

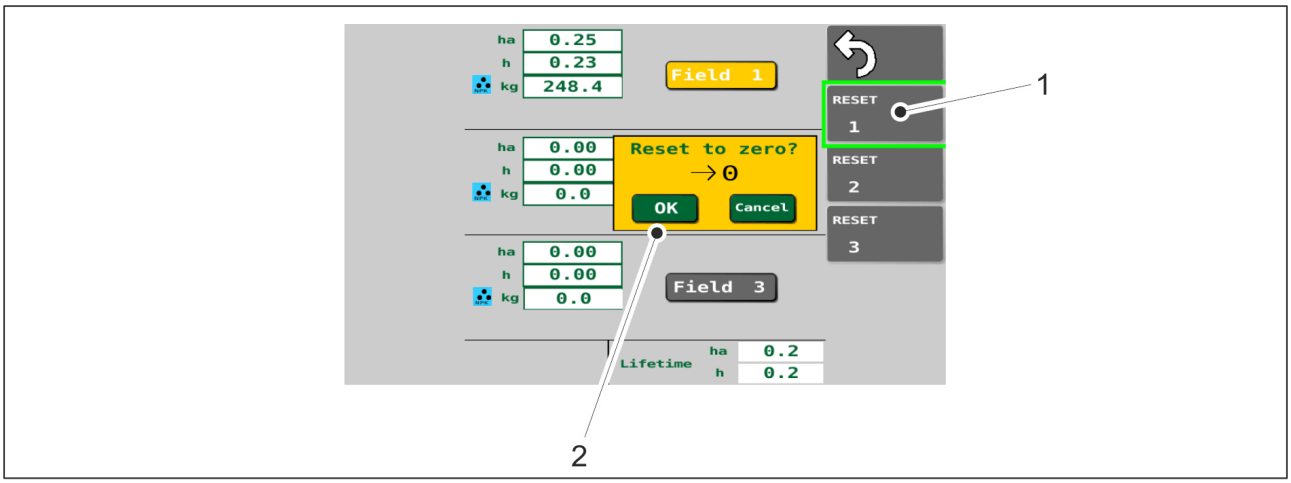


Figure. 6.3.9. - 108. Resetting area counters

1. Press the RESET button (1) corresponding to the field number.
2. Press OK (2) to accept the reset.

6.3.10. Manual mode selection

- The manual mode is selected when using the tramline and markers manually.

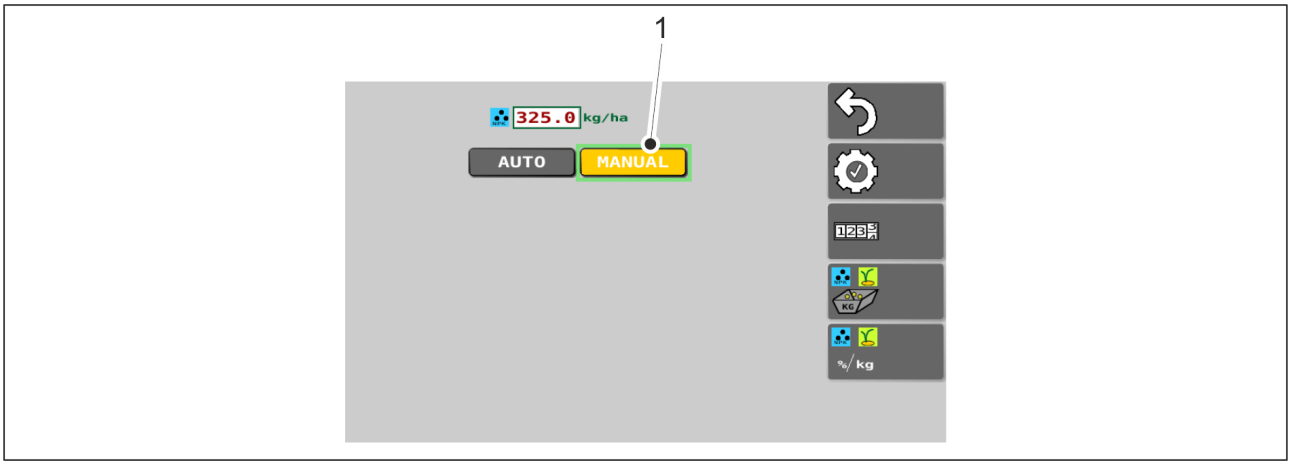


Figure. 6.3.10. - 109. Manual mode selection

1. Press MANUAL (1).
   - The button is yellow when activated.

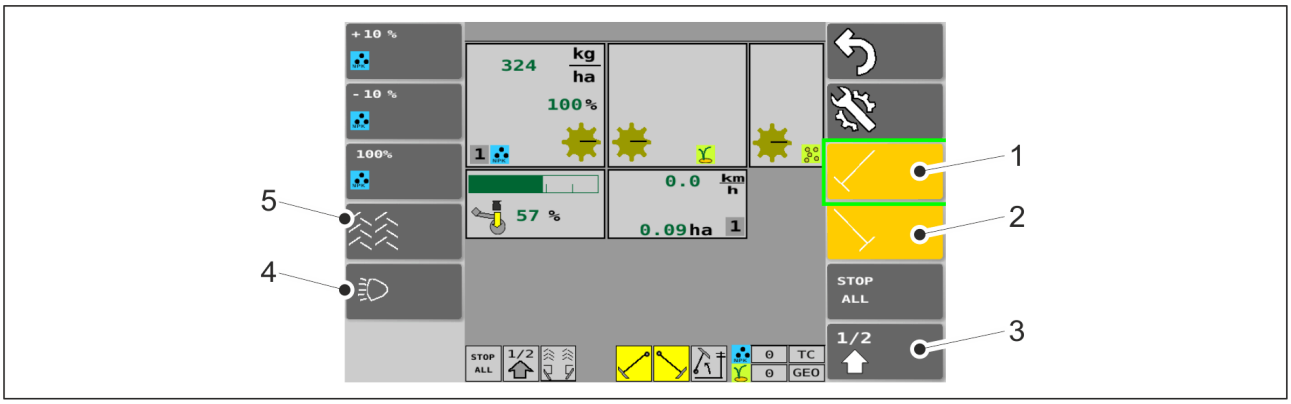


Figure. 6.3.10. - 110. Drive screen in manual mode

- The buttons are yellow when activated.

1.	Left middle marker • When activated, middle markers will be lowered when machine is lowered
2.	Right middle marker • When activated, middle markers will be lowered when machine is lowered
3.	Half lift • Half lift is on when activated
4.	Work light control • Only in the SeedPilot ISOBUS control system
5.	Tramlines • Tramlines are on when activated

6.4. Feed units

The feed units are equipped with a push roller. In seed drills with a gearbox, the basic set-up of feed quantities is done by altering the effective roller length with screw-type control wheels. Fine-tuning is done from the machine's transmission by adjusting the gearbox control lever.

In seed drills without a gearbox, the rough tuning of the feed rate is done by chain gears and fine-tuning by altering the effective roller length with screw-type control wheels.

The feeders are powered by the machine's left running gear via a chain. In the feeder, there is a shut-off plate between the feeder chamber and the hopper to completely shut off the feed of the feeder chamber. Shutting part of the feeder with a shut-off plate allows seeding with incomplete working width or, for example, increasing row spacing by seeding with only every second coulter.

6.5. Seeding quantities

The seeding tables containing basic values for seed setting adjustment are located under the seed drill's transmission cover. The seeding tables for different varieties are presented below.

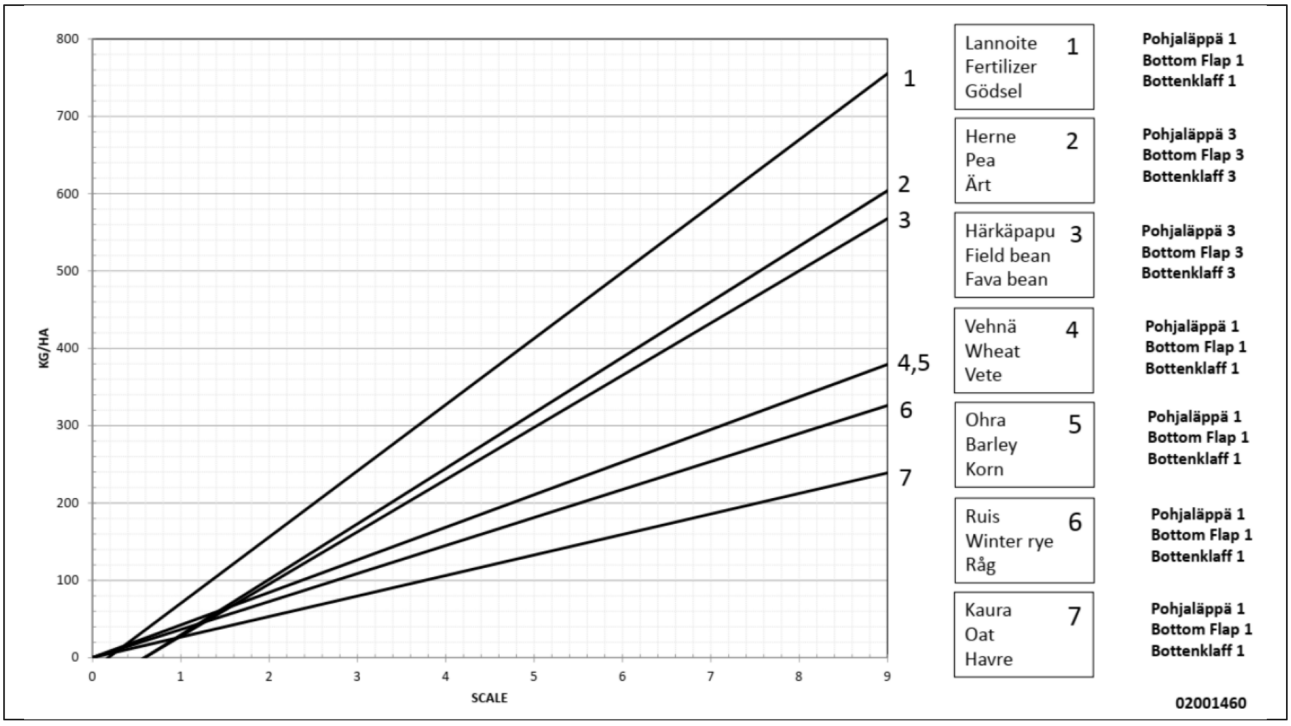


Figure. 6.5. - 111. Seeding table for machines with standard equipment

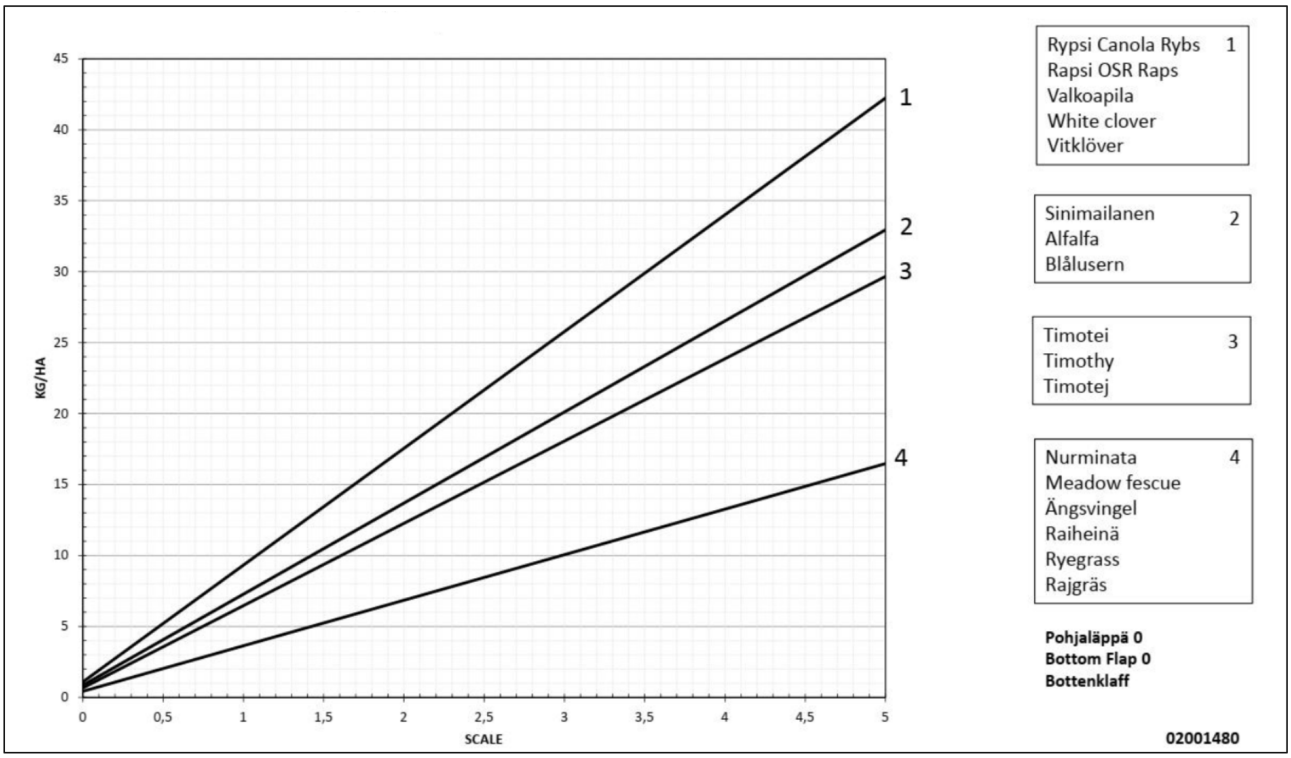


Figure. 6.5. - 112. Seeding table - small seed hopper

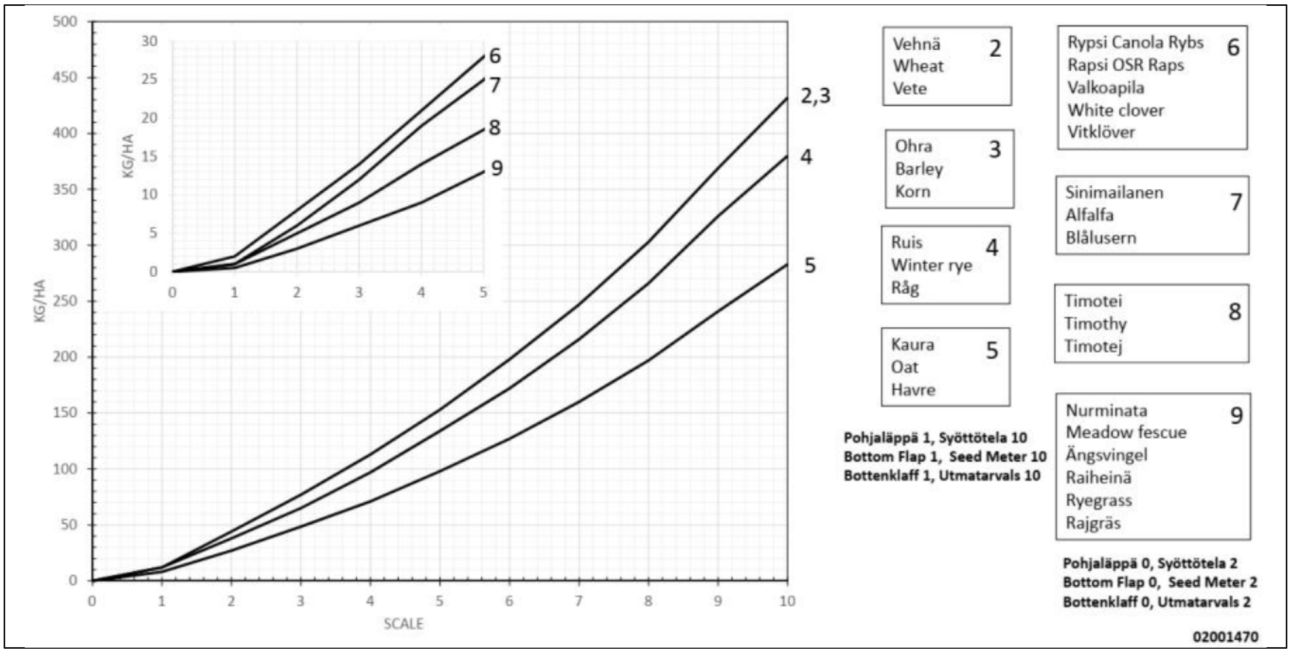


Figure. 6.5. - 113. Seeding table - seed gearbox 1

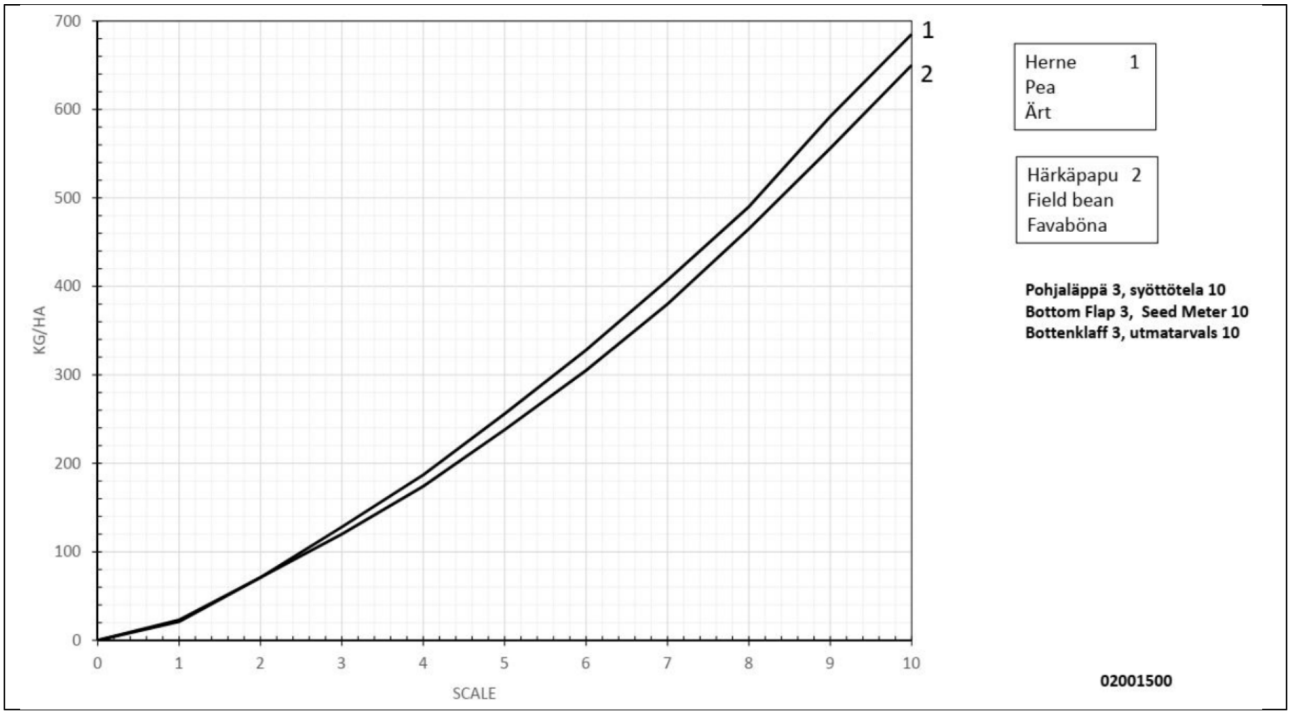


Figure. 6.5. - 114. Seeding table - seed gearbox 2

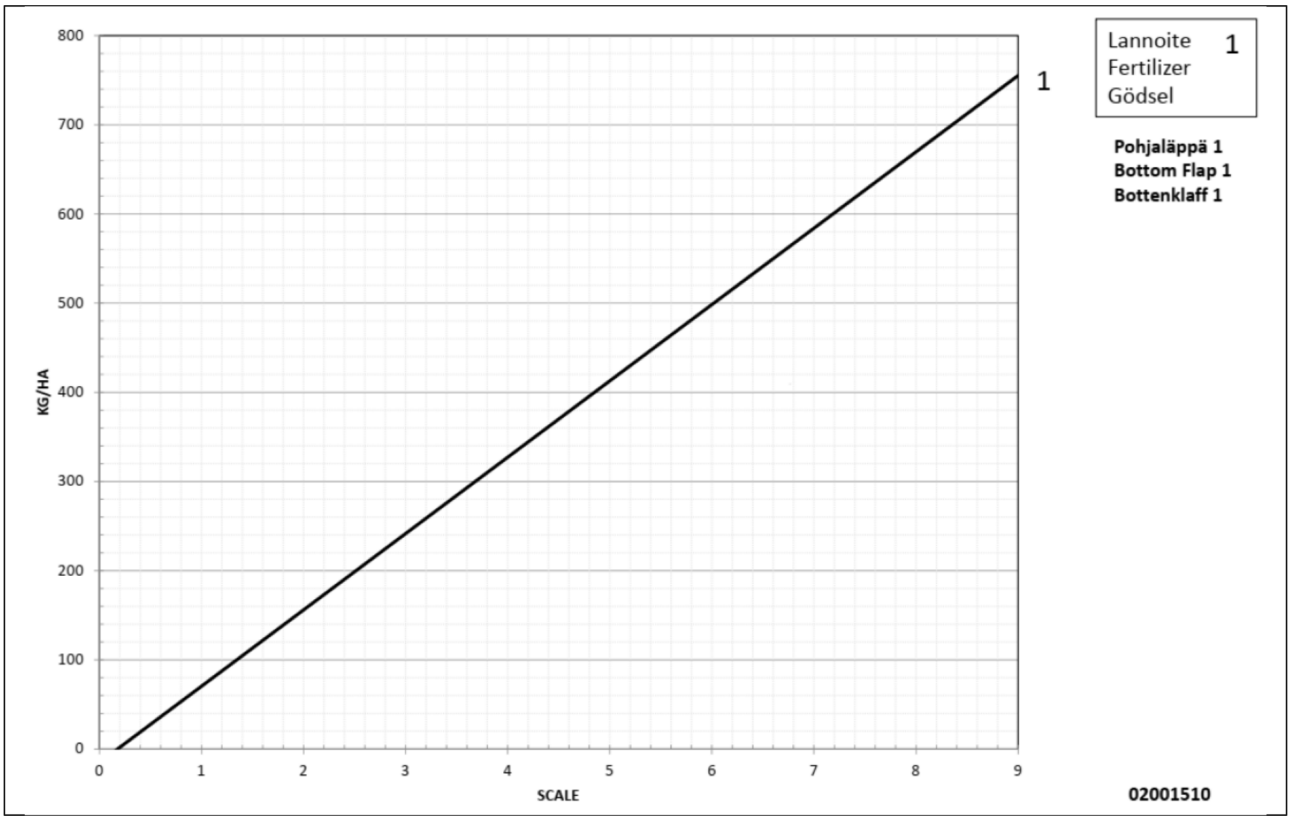


Figure. 6.5. - 115. Seeding table - seed gearbox 3

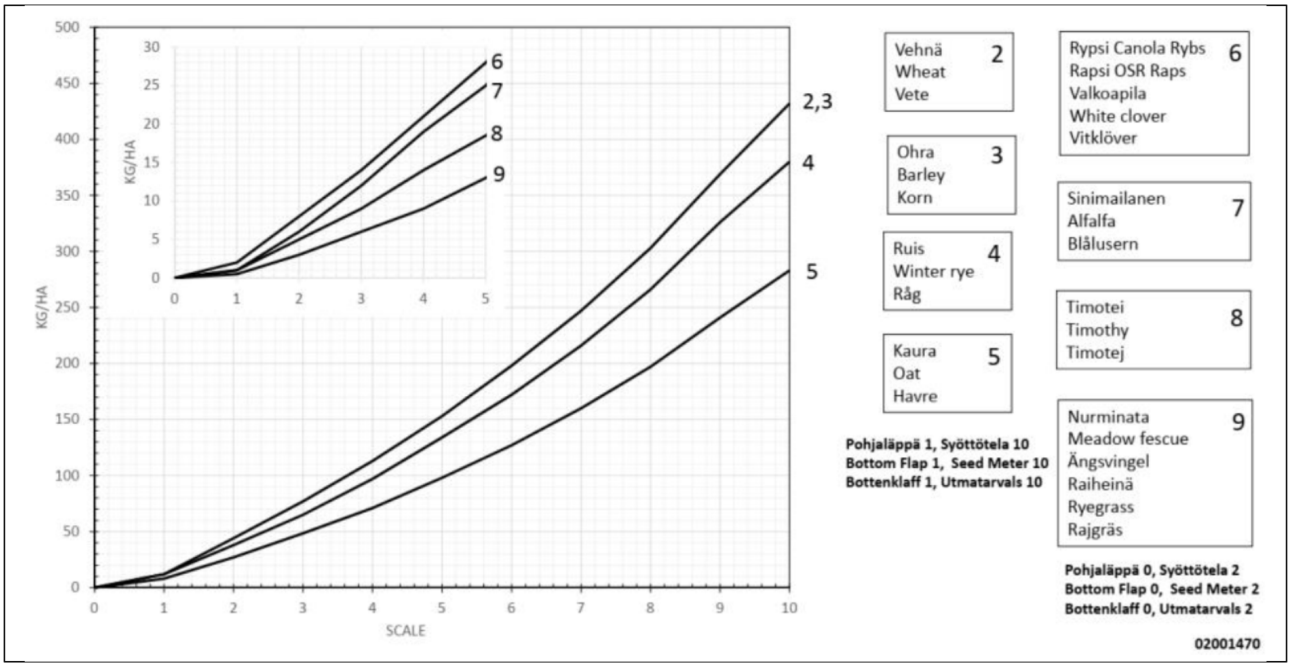


Figure. 6.5. - 116. Seeding table - seed and fertiliser gearbox 1

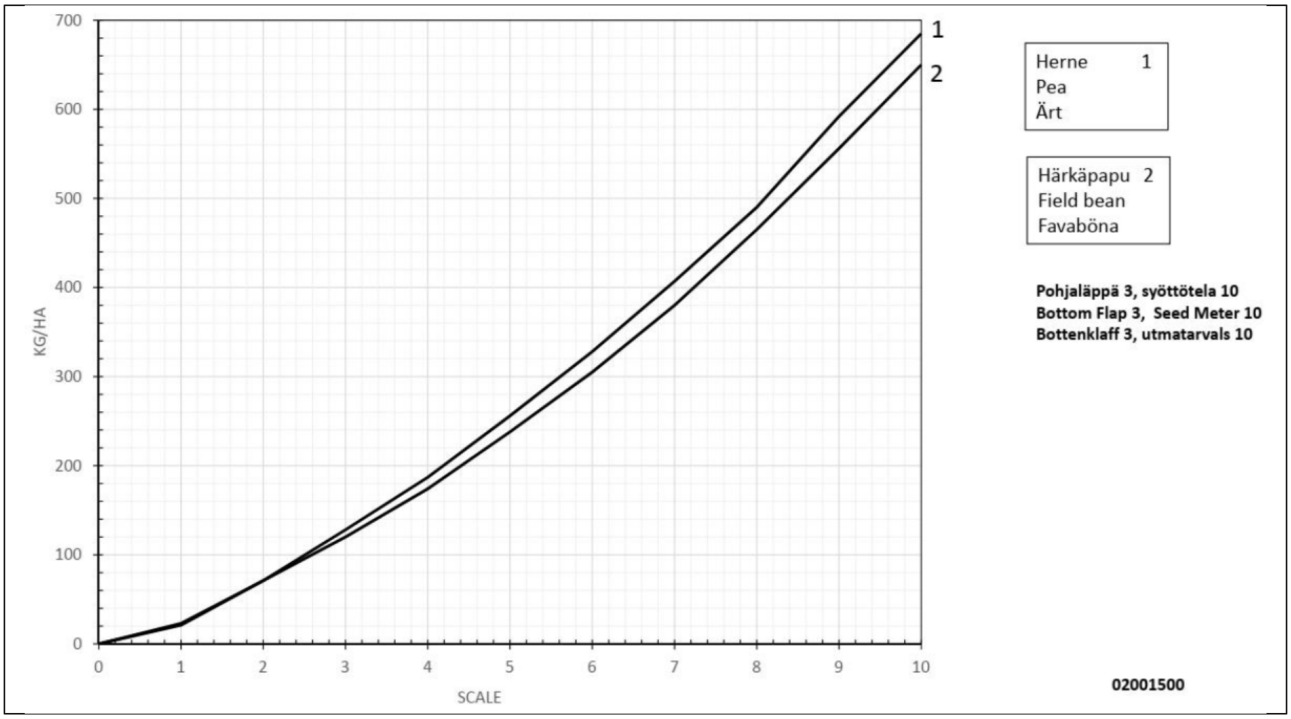


Figure. 6.5. - 117. Seeding table - seed and fertiliser gearbox 2

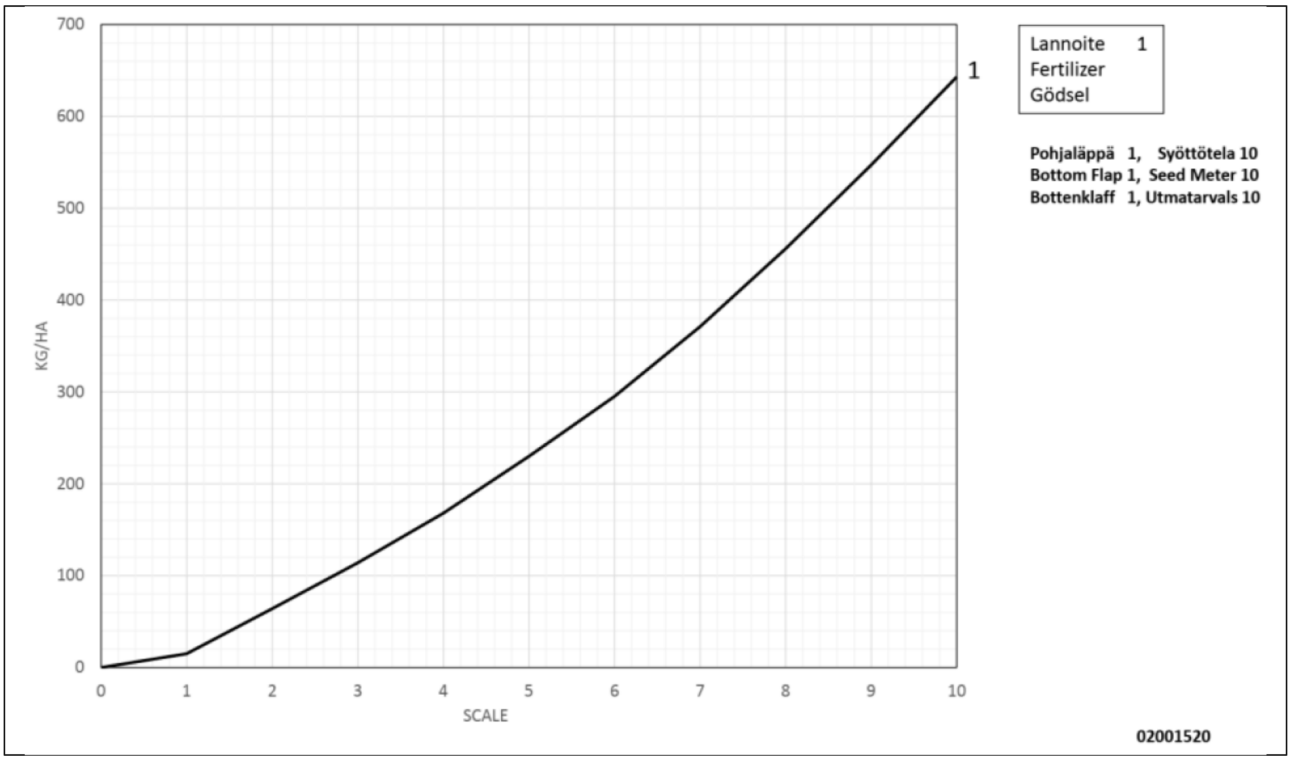


Figure. 6.5. - 118. Seeding table - seed and fertiliser gearbox 3

6.6. Preparations preceding hopper filling

6.6.1. Preparations preceding hopper filling in a machine without a gearbox

1. Ensure that the stability of the tractor-seed drill combination has been calculated.

- Guidelines on calculating the stability are found in the attachment *Calculating the stability of the tractor - seed drill combination*.

2. Ensure that the hopper is empty, clean and dry.
   - If needed, clean the hopper in accordance with the instructions in section 7.3.1. Cleaning the hoppers.
3. Check that the hopper divider is in the desired position.
   - If needed, adjust the divider in accordance with section 6.6.4. Adjusting the hopper divider.
4. Perform the rough adjustment of the feeding quantity by using the chain gears in accordance with section 6.6.6. Adjusting the feeding quantity with chain gears.
5. Perform the fine adjustment of the feeding quantity in accordance with section 6.6.5. Adjusting the width of the feeder roller.
6. Adjust the position of the bottom flap of the feeder units in accordance with section 6.6.8. Adjusting the bottom flap position.
7. Adjust the position of the shut-off plates of the feeder units in accordance with section 6.6.9. Adjusting the shut-off plate position

6.6.2. Preparations preceding hopper filling in a machine with a gearbox on the seed side or a dual gearbox

1. Ensure that the stability of the tractor-seed drill combination has been calculated.
   - The calculation of the stability is provided in the attachment *Calculating the stability of the tractor - seed drill combination*.
2. Ensure that the hopper is empty, clean and dry.
   - If needed, clean the hopper in accordance with the instructions in section 7.3.1. Cleaning the hoppers.
3. Check that the hopper divider is in the desired position.
   - If needed, adjust the divider in accordance with section 6.6.4. Adjusting the hopper divider.
4. Perform the rough adjustment of the feeding quantity in accordance with section 6.6.5. Adjusting the width of the feeder roller.
5. Perform the fine adjustment of the feeding quantity in accordance with section 6.6.7. Adjusting the feeding quantity with the gearbox control lever.
6. Adjust the position of the bottom flap of the feeder units in accordance with section 6.6.8. Adjusting the bottom flap position.
7. Adjust the position of the shut-off plates of the feeder units in accordance with section. 6.6.9. Adjusting the shut-off plate position

6.6.3. Preparations preceding hopper filling in a machine with a small seed hopper

1. Ensure that the stability of the tractor-seed drill combination has been calculated.
   - The calculation of the stability is provided in the attachment *Calculating the stability of the tractor - seed drill combination*.
2. Ensure that the small seed hopper is empty, clean and dry.
   - If needed, clean the small seed hopper in accordance with the instructions in section 7.3.2. Cleaning of the small seed hopper.

3. Adjust the feeding quantity in accordance with section 6.6.10. Adjusting the width of the small seed feeder roller.
4. Adjust the position of the bottom flap of the small seed hopper's feeder units in accordance with section 6.6.11. Adjusting the bottom flap position in the feeder units of the small seed hopper.
5. Adjust the shut-off plates of of the small seed hopper's feeder units in accordance with section 6.6.12. Adjusting the shut-off plate position in the feeder units of the small seed hopper.

6.6.4. Adjusting the hopper divider

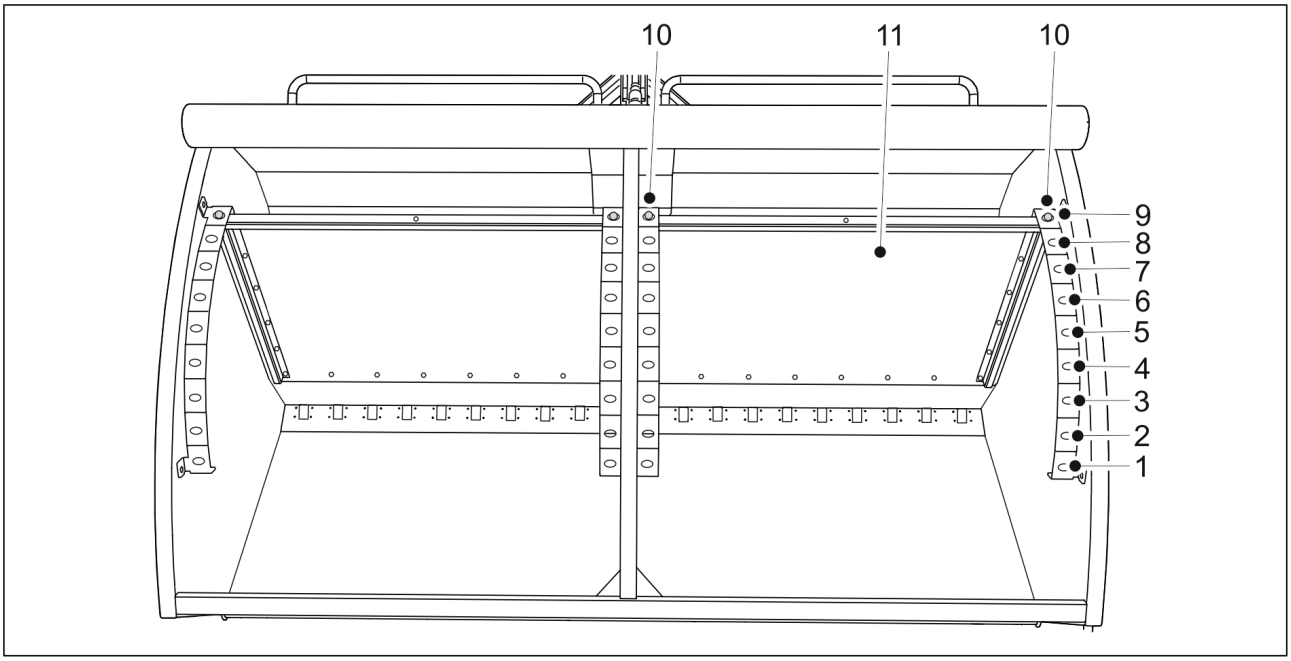


Figure. 6.6.4. - 119. Adjusting the hopper divider

DANGER
Before adjusting the divider, ensure that the hoppers are empty.

1. Remove the two locking pins (10) of one side of the divider (11).
2. Push the divider to the appropriate position.
3. Reinsert the locking pins.
4. Adjust the other side.

Table. 6.6.4. - 15. Hopper volumes in different positions of the divider on the FX300.

FX300	Seed (L)	Fertiliser (L)	Total (L)
1.	1,100	2,400	3,500
2.	1,250	2,250	3,500
3.	1,350	2,150	3,500
4.	1,450	2,050	3,500

5.	1,600	1,900	3,500
6.	1,700	1,800	3,500
7.	1,850	1,650	3,500
8.	1,950	1,550	3,500
9.	2,150	1,350	3,500

Table. 6.6.4. - 16. Hopper volumes in different positions of the divider on the FX400

FX400	**Seed (L)**	**Fertiliser (L)**	**Total (L)**
1.	1,500	3,300	4,800
2.	1,700	3,100	4,800
3.	1,850	2,950	4,800
4.	2,050	2,750	4,800
5.	2,200	2,600	4,800
6.	2,350	2,450	4,800
7.	2,500	2,300	4,800
8.	2,650	2,150	4,800
9.	2,800	2,000	4,800

6.6.5. Adjusting the width of the feeder roller

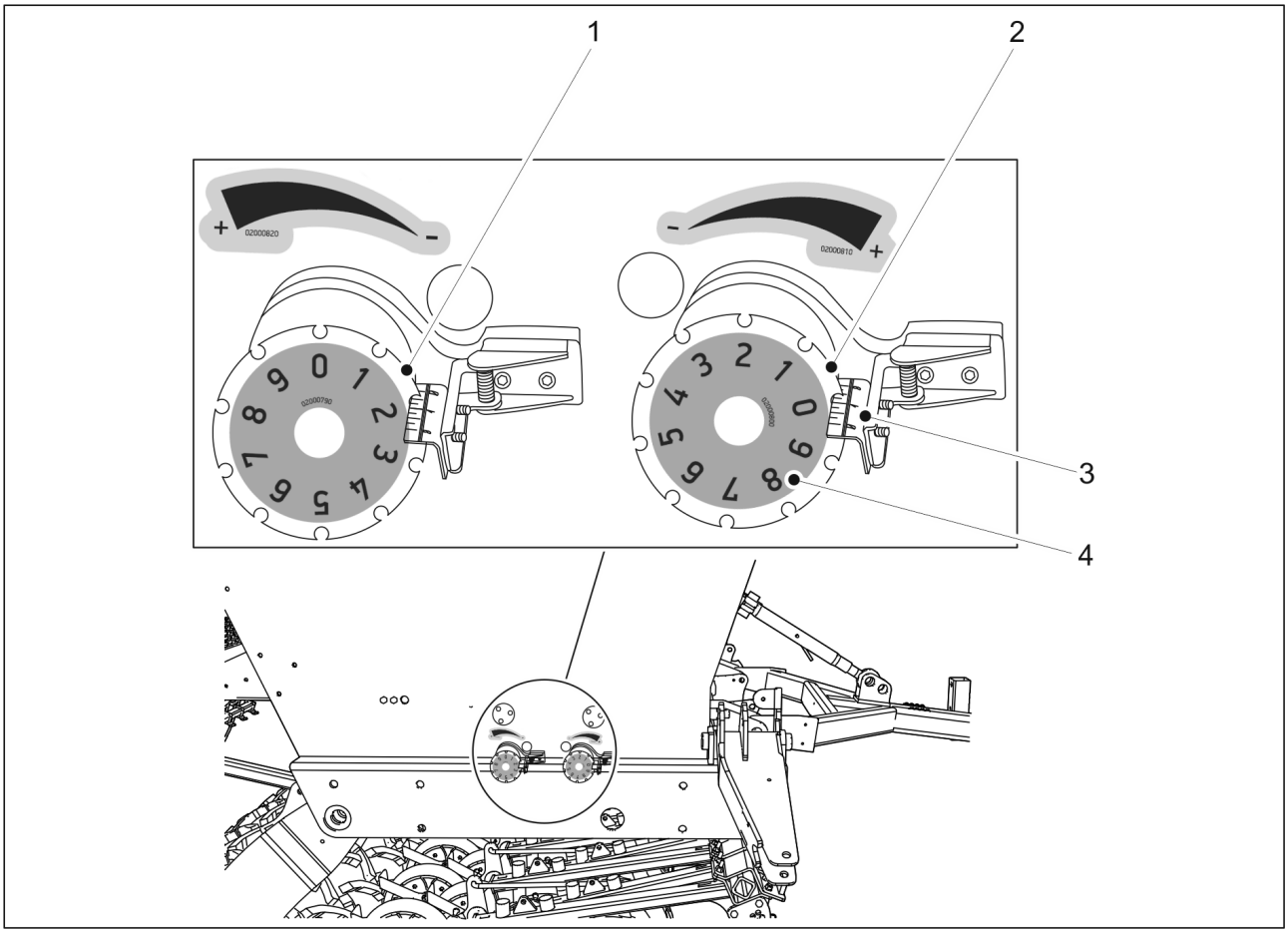


Figure. 6.6.5. - 120. Adjusting the width of the feeder roller

1. Adjust the width of the feeder roller to the settings provided in the seeding table by using the screw-type control wheels on the right-hand side of the hopper.
    - The seeding tables are provided in section 6.5. Seeding quantities.
      The control wheel (1) is for seeds and control wheel (2) is for fertiliser. If the machine is equipped with adjusting of fertiliser target rate, there is no fertiliser control wheel.
      The seed quantity increases when the seed control wheel is turned clockwise. The fertiliser quantity increases when the fertiliser control wheel is turned clockwise.
      The main scale of seeding quantity is on the control wheel lock (3) and the secondary scale on the control wheel rim (4).

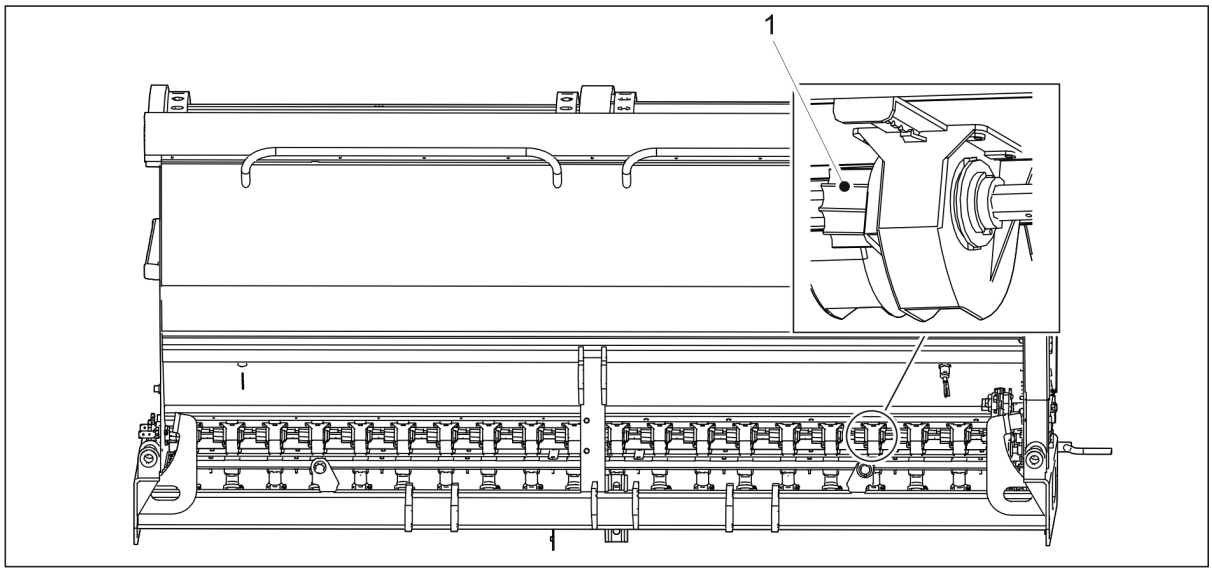


Figure. 6.6.5. - 121. Feeder roller

- Fed quantities increase when the roller (1) is inserted into the feeder and decreases when the roller is pulled out of the feeder.

6.6.6. Adjusting the feeding quantity with chain gears

- If the seed drill is not equipped with a gearbox, the rough adjustment of the feeding quantity is carried out with the chain gears and the fine adjustment by adjusting the width of the roller.

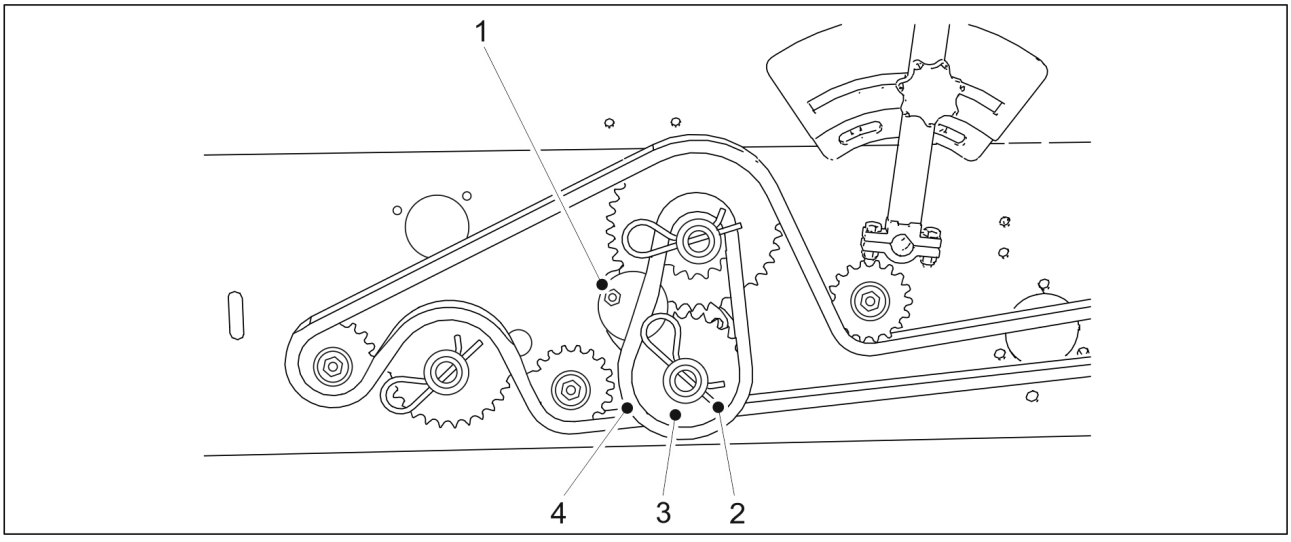


Figure. 6.6.6. - 122. Changing the chain gears and chain

1. Loosen the tensioning wheel (1).
2. Remove the cotter (2) from the chain gear (3). Detach the chain (4) and the chain gear (3).
3. Attach a new chain gear and chain.
    - When seeding grain, use a chain gear with a pitch of z = 15.
      When seeding grass, use a chain gear with a pitch of z = 29.
4. Replace the cotter and tighten the tensioning wheel.

6.6.7. Adjusting the feeding quantity with the gearbox control lever

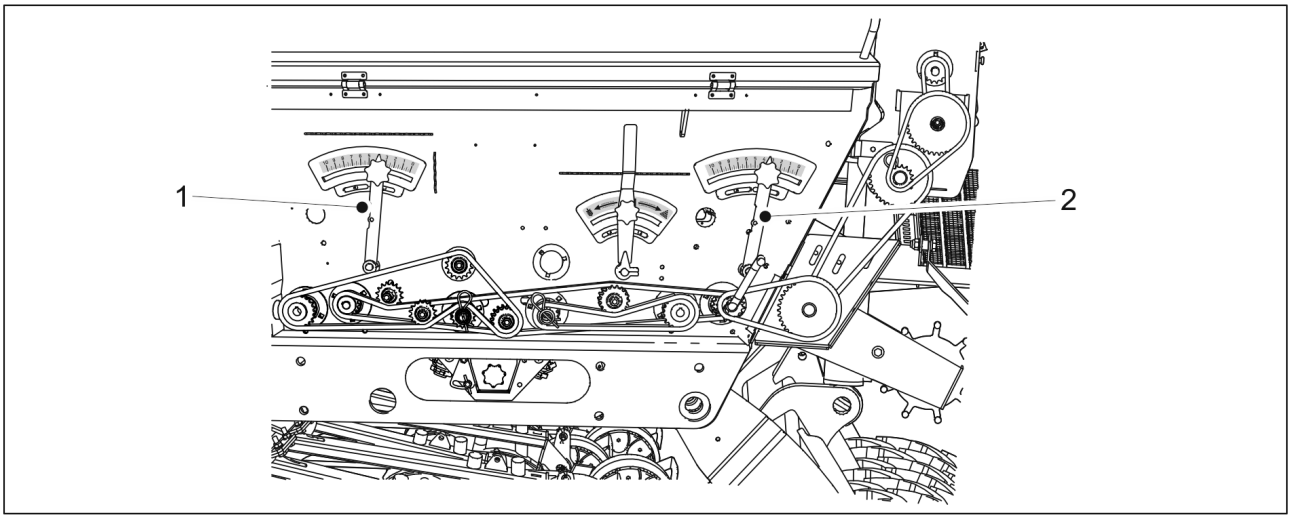


Figure. 6.6.7. - 123. Gearbox control levers

- If the seed drill is equipped with a gearbox, the rough adjustment of the feeding quantity is carried out by adjusting the roller width and the fine adjustment is carried out from the machine transmission by adjusting the gearbox control lever. Control lever (1) is for fertiliser and control lever (2) is for seed. The feeding quantity increases when the value of the adjustment scale increases and vice versa.
  Adjust the width of the feeder roller in accordance with section 6.6.5. Adjusting the width of the feeder roller. When seeding grain and fertiliser, the rollers should be in position 10. When seeding small seeds, the rollers should be in position 2.

6.6.8. Adjusting the bottom flap position

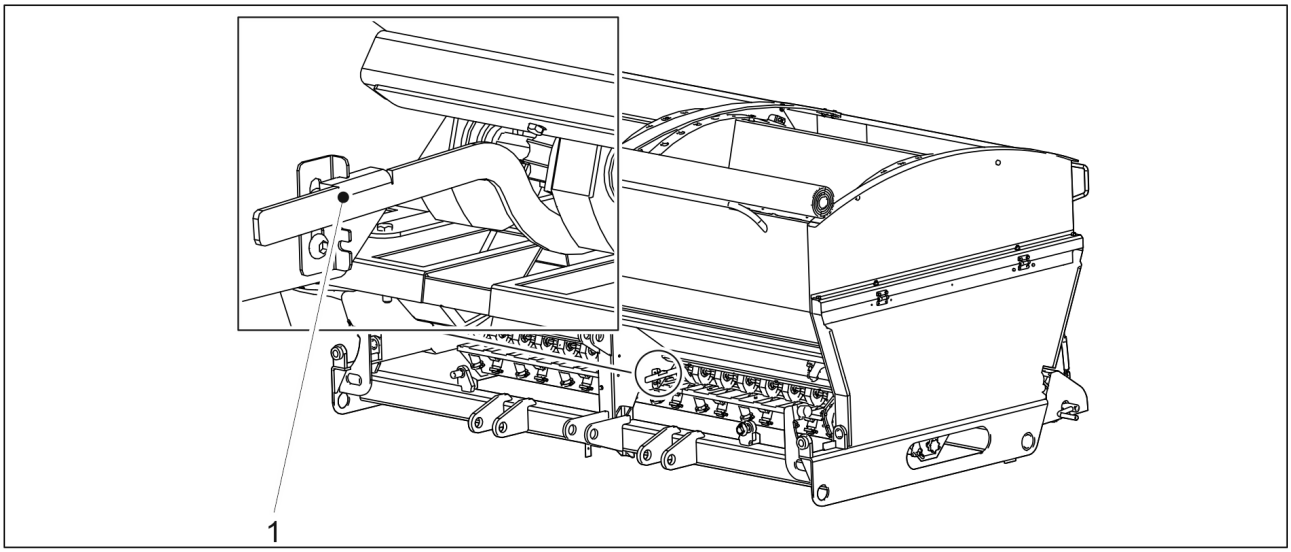


Figure. 6.6.8. - 124. Adjusting the bottom flap position

1. Change the position of the control lever (1) in the front of the seed drill on the notch scale based on the material to be seeded.

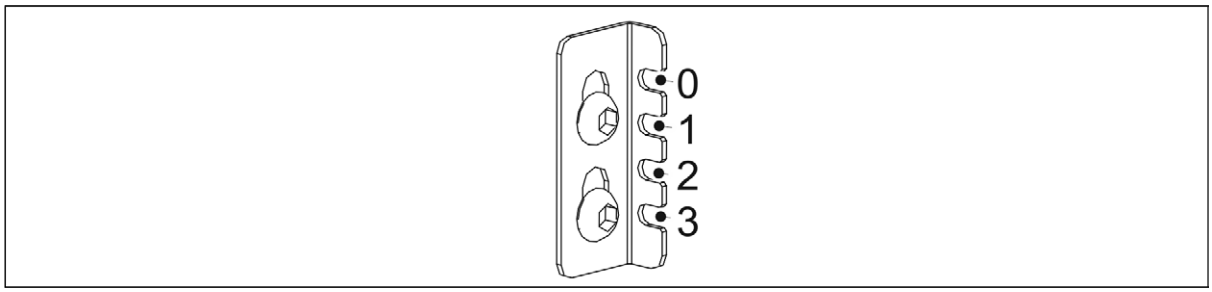


Figure. 6.6.8. - 125. Bottom flap positions

- When seeding small seeds, the bottom flap should be in position 0.
  When seeding grain and fertiliser, the bottom flap should be in position 1.
  When seeding large seeds, such as peas or bean, the bottom flap should be in position 3.
  When seeding organic fertilisers, the bottom flap should be in position 3.

2. Change the position of the control lever in the rear of the seed drill accordingly.
   - The rear control lever is adjusted from the working platform.

6.6.9. Adjusting the shut-off plate position

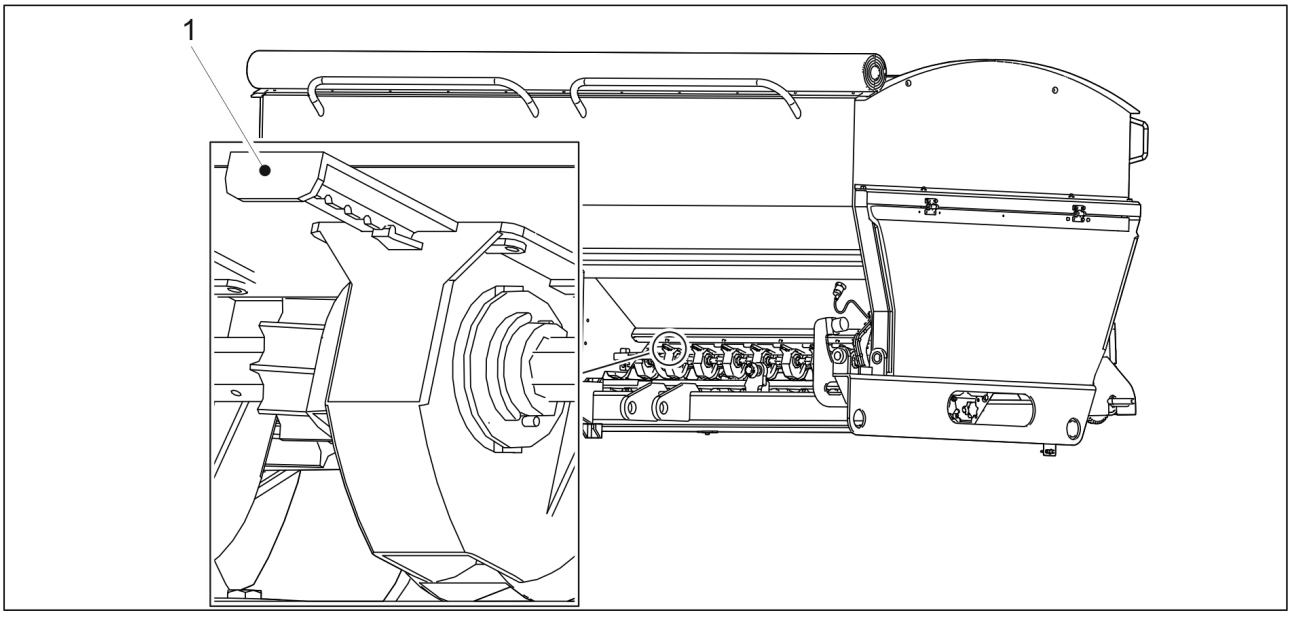


Figure. 6.6.9. - 126. Adjusting the shut-off plate position

1. Adjust the position of the shut-off plates (1) of the feeders in the seed and fertiliser side in accordance with the material to be seeded.
   - When seeding turnip rape and oilseed, the shut-off plate must be closed three notches.
     When seeding grass, the shut-off plate must be closed two notches.
     When seeding grain, fertiliser and beans, the shut-off plate must be completely open.
     All shut-off plates should be in the same position.

6.6.10. Adjusting the width of the small seed feeder roller

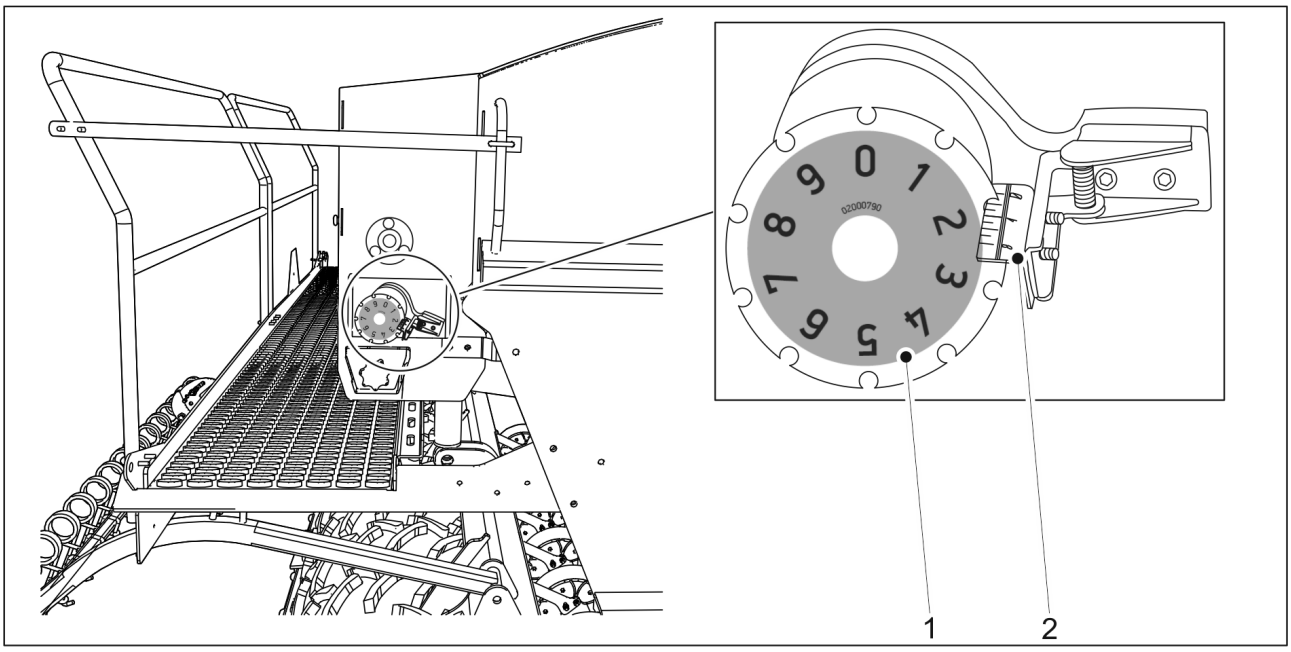


Figure. 6.6.10. - 127. Adjusting the width of the small seed feeder roller

1. Adjust the width of the feeder roller to the settings provided in the seeding table by using the screw-type control wheel on the right-hand side of the small seed hopper.
    - The seeding tables are provided in section 6.5. Seeding quantities.
      The main scale of seeding quantity is on the control wheel lock (2) and the secondary scale on the control wheel rim (1).

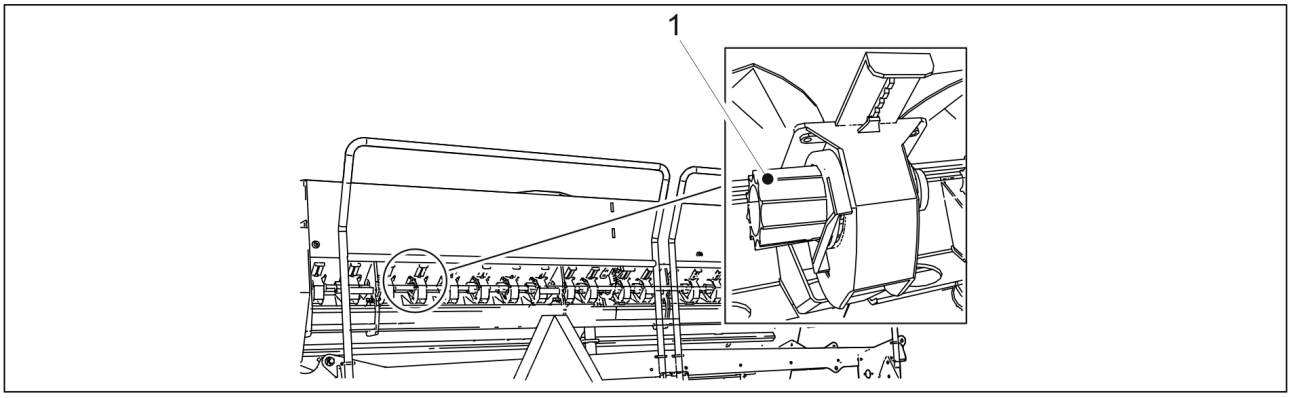


Figure. 6.6.10. - 128. Feeder roller of the small seed hopper

- Fed quantities increase when the roller (1) is inserted into the feeder and decreases when the roller is pulled out of the feeder.

6.6.11. Adjusting the bottom flap position in the feeder units of the small seed hopper

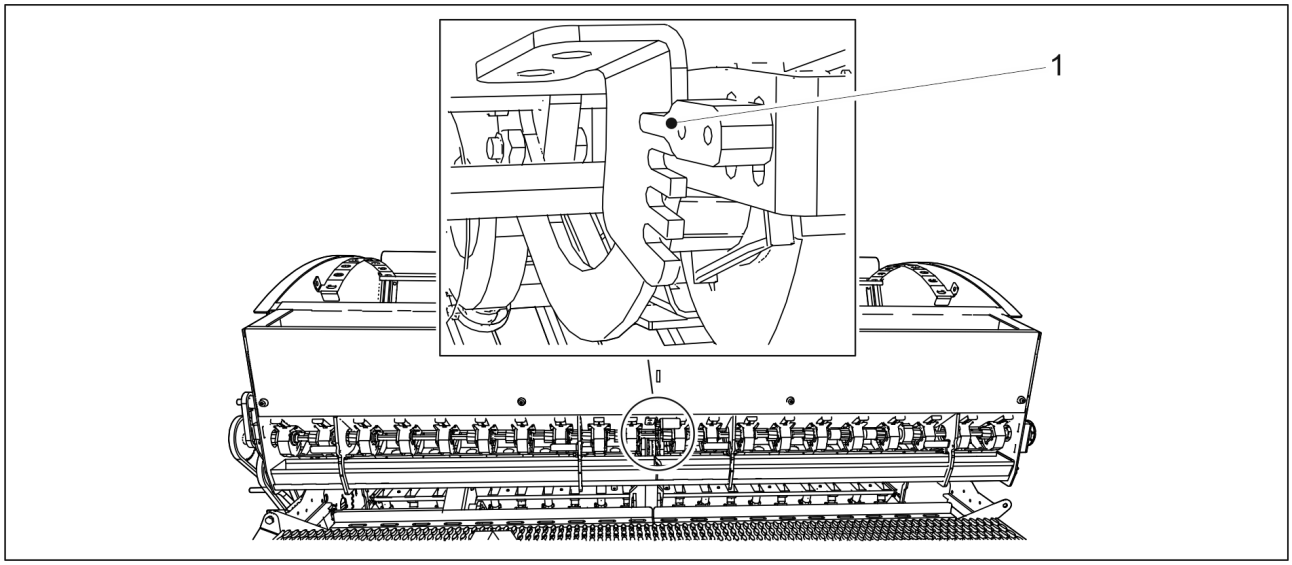


Figure. 6.6.11. - 129. Adjusting the bottom flap position in the feeder units of the small seed hopper

1. Change the position of the control lever (1) on the notch scale.

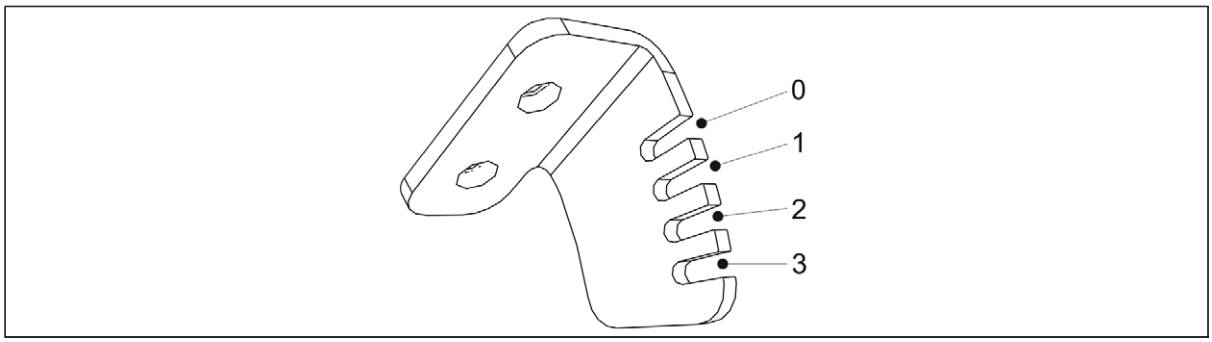


Figure. 6.6.11. - 130. Bottom flap positions in the feeder units of the small seed hopper

- When seeding small seeds, the bottom flap should be in position 0.

6.6.12. Adjusting the shut-off plate position in the feeder units of the small seed hopper

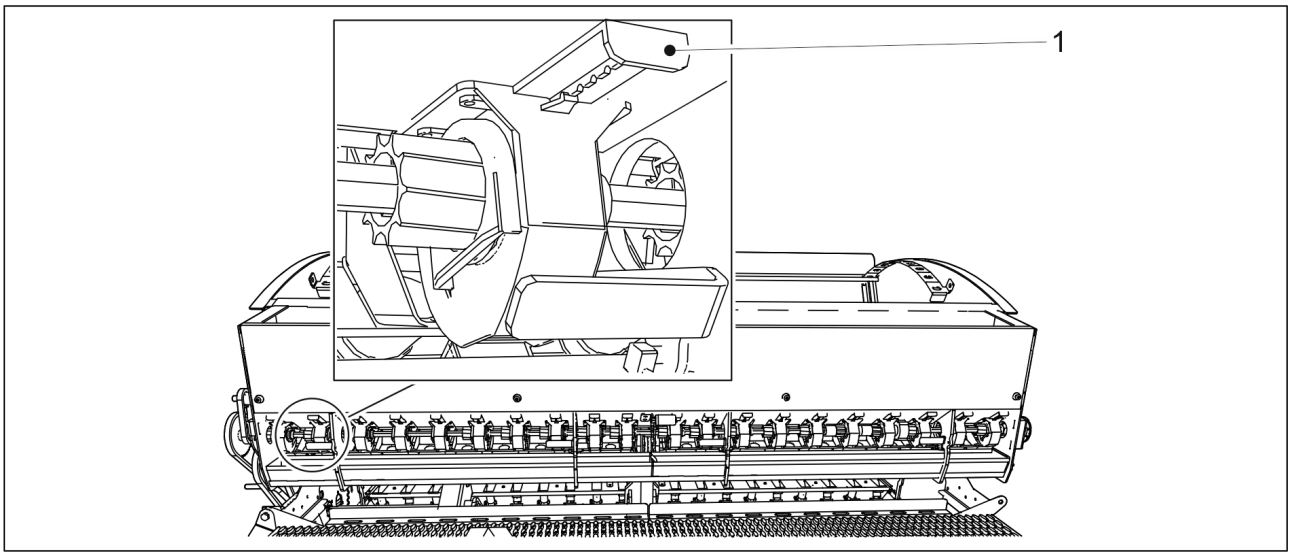


Figure. 6.6.12. - 131. Adjusting the shut-off plate position in the feeder units of the small seed hopper

1. Adjust the position of the shut-off plates (1) by the material to be seeded.
   - When seeding meadow fescue and ryegrass, the shut-off plate must be closed two notches.
     When seeding clover, the shut-off plate must be closed three notches.
     All shut-off plates should be in the same position.

6.7. Filling the hoppers

DANGER
Falling hazard when performing work on the platform. Be careful when performing work on the platform. Accessing the steps of the platform is allowed only when the machine is lowered.

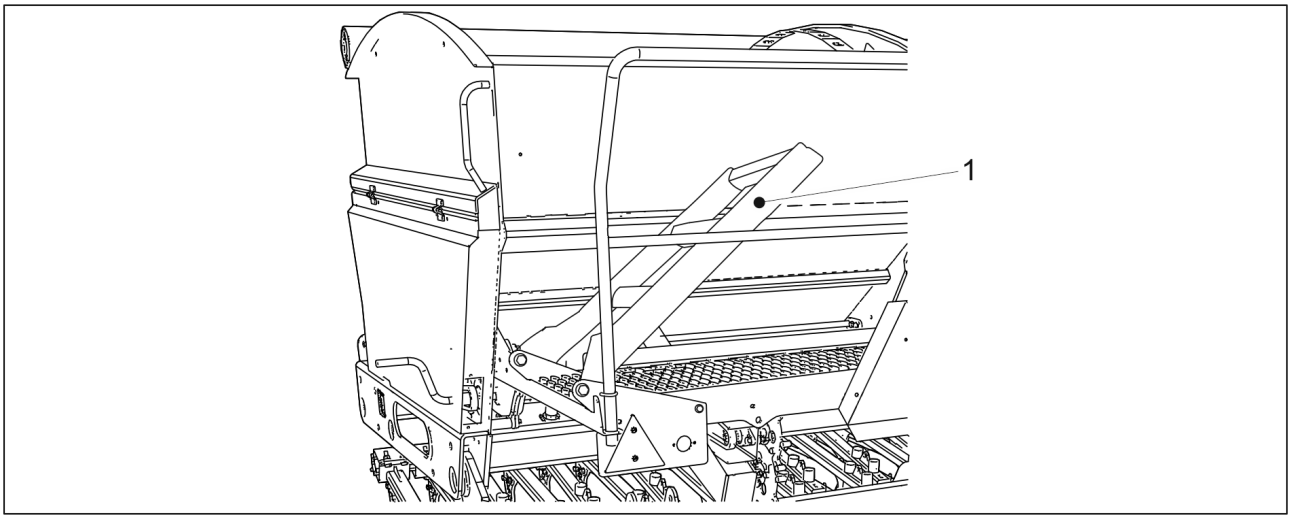


Figure. 6.7. - 132. Working platform stairs

1. Lower the machine to its working position in accordance with the instructions in section 6.2. Rendering the machine to the working position and fold the working platform stairs (1) down.

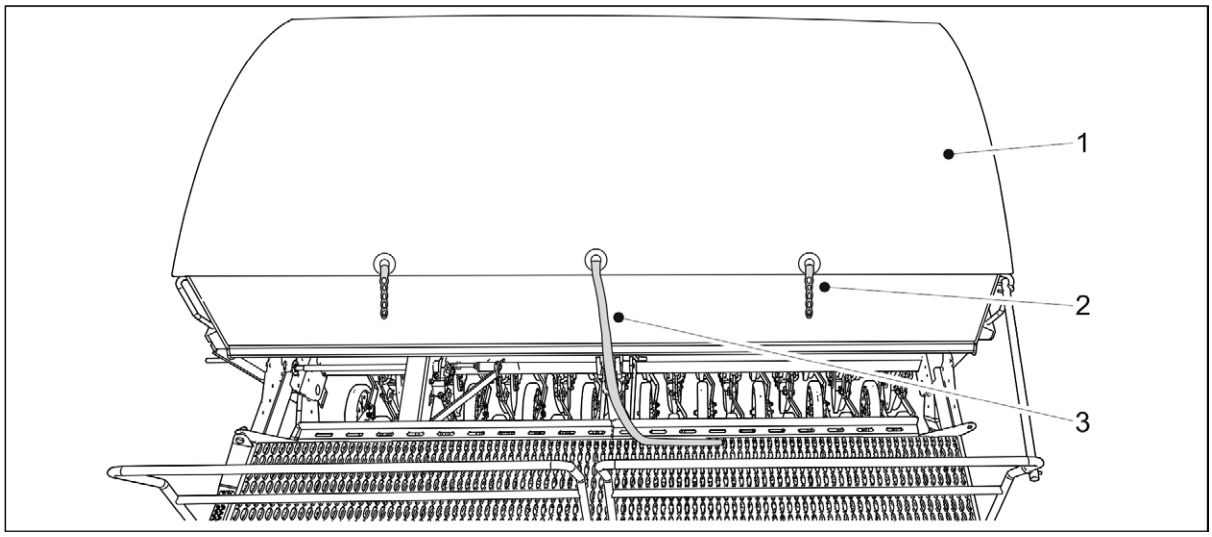


Figure. 6.7. - 133. Hopper tarp

2. Detach the two loops (2) of the hopper tarp (1).
3. Pull the cord (3).
    - There is a spring inside the tarp that will roll it up. Never let the go of the tarp, but hold the end until the tarp is open.
4. Fill the hopper(s) with seeds and/or fertiliser.

DANGER
Never go under a lifted load.

DANGER
Make sure that nobody is on top of the seed drill or inside the hoppers when the hoppers are being filled.

DANGER
Avoid breathing seed dressing dust and fertiliser dust. The seed dressing causes a serious health risk.

DANGER
Read the material safety data sheet of the dressing agent and fertiliser and pay attention to their warnings.

- It is recommended that the hoppers be filled from the side of the hoppers.
  We recommend that you open the bulk bags using a knife with a long handle or a pruning hook.

5. Close the tarp (1) and attach the two tarp loops (2).
6. Fold the working platform stairs up.
    - When raised, the stairs will be at an approximately 40 degree angle to the working platform.

6.8. Product calibration

The seeding tables that contain the basic values for adjusting the seeding quantity are located under the transmission cover in the seed drill. The seeding tables are provided in section 6.5. Seeding quantities. However, there are great differences between various seeds, which is why the actual seeding quantity must always be checked with a calibration test. Seed treatment, such as seed dressing, has considerable impact on fluidity.

The calibration test should be performed whenever changes are made to the feeding quantities. In particular, fertiliser quantities may vary a lot due to the moisture and fluidity of the fertiliser

When driving on the road with hoppers full of fertiliser and seeds, the vibration may cause arching in the hoppers. In the autumn or after rain, the fertiliser may absorb humidity in the feeders, changing fertiliser fluidity. For this reason, it is good to monitor that fertiliser or seed flow evenly from all feeders when seeding begins. Performing a calibration test is in order and visually checking that the feed quantity is even is all feeders.

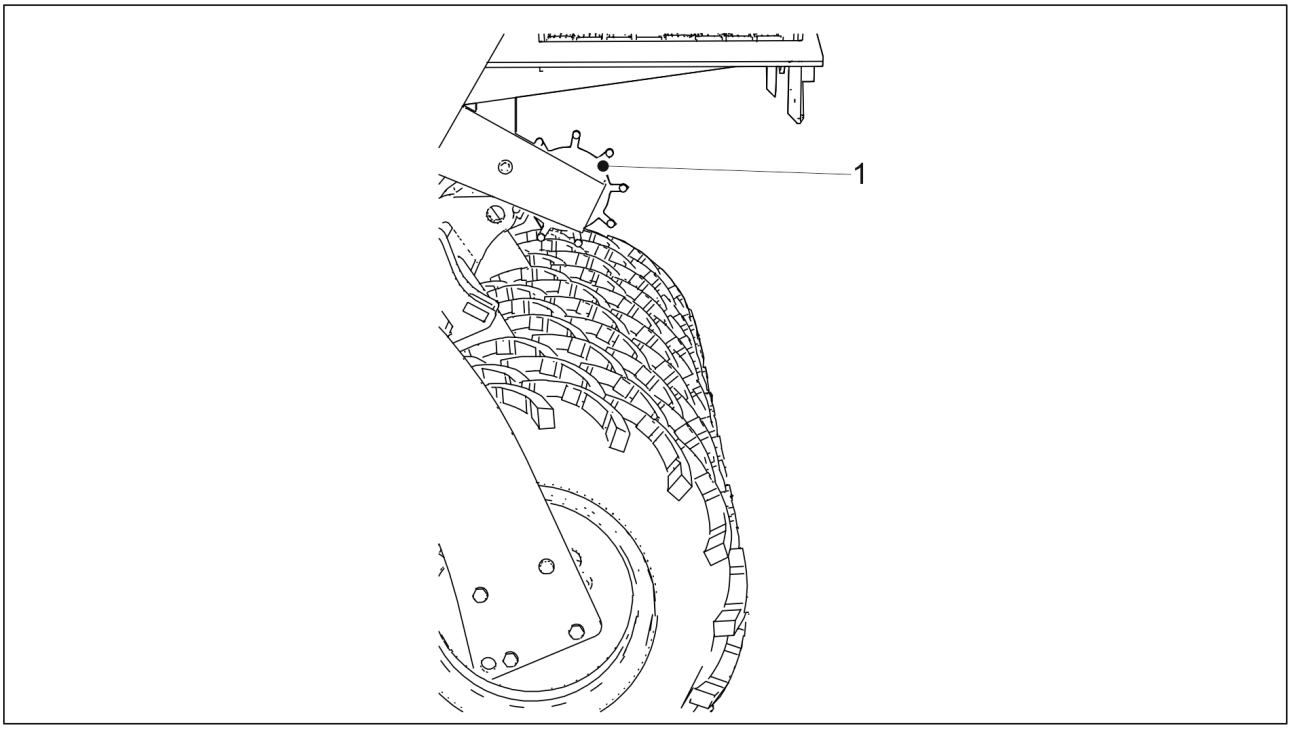


Figure. 6.8. - 134. Pulley

- When performing a calibration test, the machine must be raised from its working position so that the pulley (1) comes off of the tyres.

6.8.1. Fertiliser calibration test on a machine without a gearbox or with a gearbox on the seed side

DANGER
If the machine is equipped with a SeedPilot or SeedPilot ISOBUS control system, turn on the STOP ALL function in accordance with section 6.3.1. Using the STOP ALL function.

DANGER
Shut off the tractor, remove the key from the ignition and engage the parking brake before running a calibration test. If the machine is equipped with middle markers, close the middle marker shut-off valves in accordance with the instructions in section 3.4. Using the middle marker ball valves.

1. Raise the transmission cover.

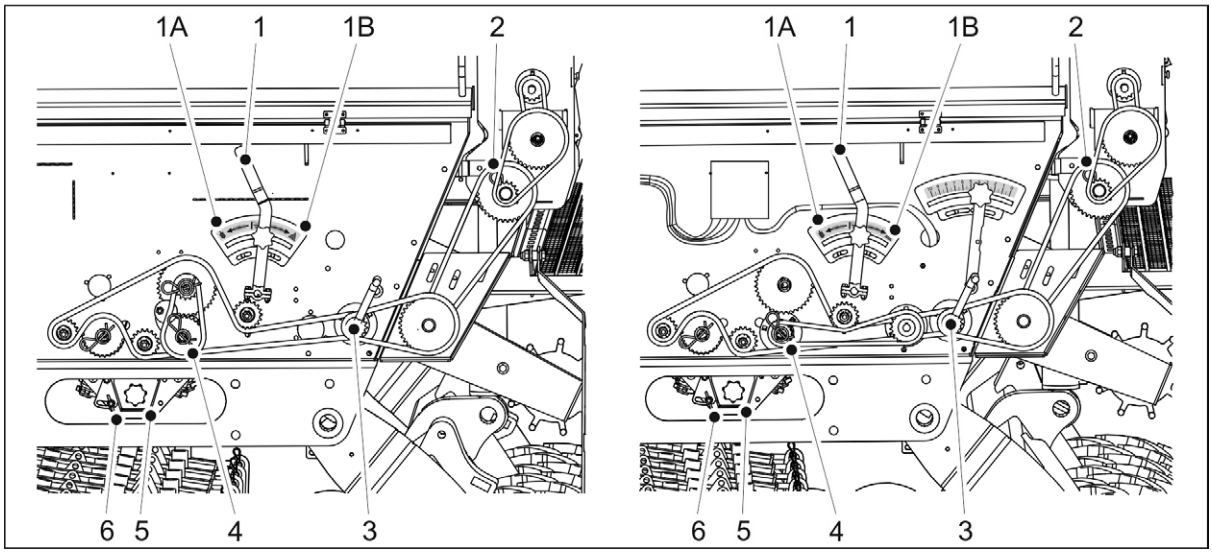


Figure. 6.8.1. - 135. Fertiliser calibration test. On the left, a machine without a gearbox and on the right, a machine equipped with a gearbox on the seed side.

2. Align the calibration trays (5) with the fertiliser side feeder shaft by turning the crank (1) to position 1B.
    - The crank position 1A is for the seed side and the centre position is for seeding.
3. Check that the calibration trays are at the feeders and their lock (6) is turned to the side.
4. Remove the cotter pin (4) on the seed side from the feed shaft chain gear. If the machine is equipped with a small seed hopper, remove the cotter pin (2) of the small seed hopper.
5. Attach the calibration test crank (3) to the calibration test axle. Turn the crank until an even flow of fertiliser comes out of all feeders. Empty the calibration trays.
6. Rotate the axle counterclockwise by 1 round per second using the calibration test crank.
    - An area of 100 m^2 is obtained by turning the crank 22 rounds on the FX300 and 16.5 rounds on the FX400.
7. Pull out the calibration trays and weigh the quantities they now contain.
    - The calibration test quantity obtained corresponds to the area of 100 m^2, so the quantities for a hectare will be hundredfold.
      If the weighing result does not match the desired quantity, adjust the length of the roller in accordance with section 6.6.5. Adjusting the width of the feeder roller.
8. Repeat the calibration test. Ensure the result is close enough to the target quantity.
9. Place the calibration trays in the machine. Ensure that the trays are in the correct order and that they are connected to each other correctly.
10. Insert the cotter pins.
11. Turn the crank to bring the calibration trays to the seeding position.
12. Put the transmission cover back in place.

6.8.2. Fertiliser calibration test on a machine with a dual gearbox

DANGER
If the machine is equipped with a SeedPilot or SeedPilot ISOBUS control system, switch on the STOP ALL function in accordance with section 6.3.1. Using the STOP ALL function.

DANGER
Shut off the tractor, remove the key from the ignition and engage the parking brake before running a calibration test. If the machine is equipped with middle markers, close the middle marker shut-off valves in accordance with the instructions in section 3.4. Using the middle marker ball valves.

1. Raise the transmission cover.

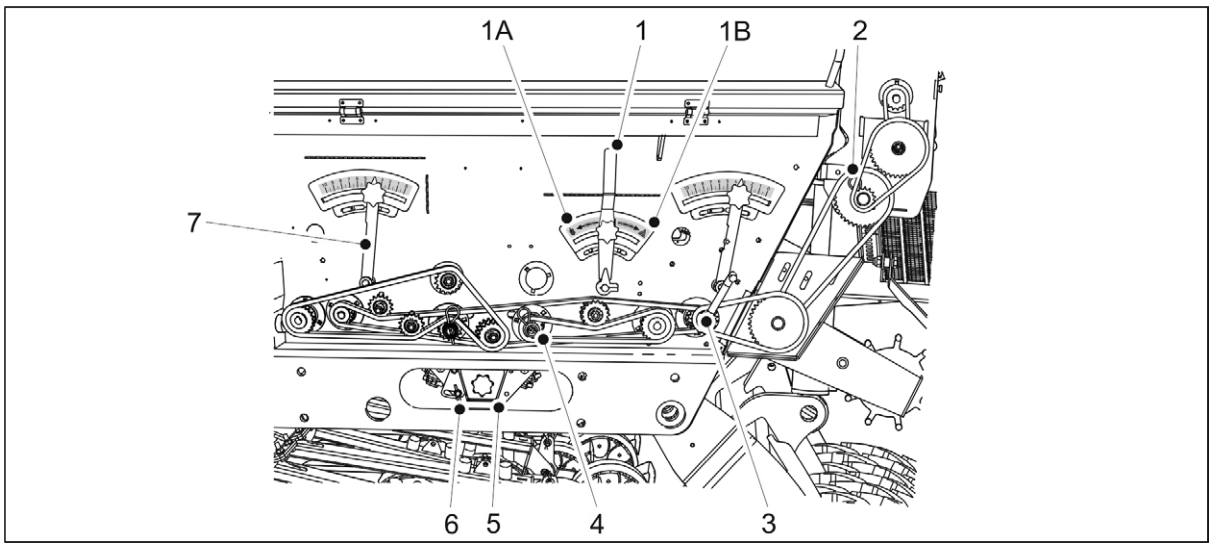


Figure. 6.8.2. - 136. Fertiliser calibration test on a machine with a dual gearbox

2. Align the calibration trays (5) with the fertiliser side feeder axle by turning the crank (1) to position 1B.
    - The crank position 1A is for the seed side and the centre position is for seeding.
3. Check that the calibration test trays are at the feeders and their lock (6) is turned to the side.
4. Remove the cotter (4) of the seed side from the feed shaft chain gear. If the machine is equipped with a small seed hopper, remove the cotter pin (2) of the small seed hopper.
5. Attach the calibration test crank (3) to the calibration test axle. Turn the crank until an even flow of fertiliser comes out of all feeders. Empty the calibration trays.
6. Rotate the shaft counterclockwise by 1 round per second using the calibration test crank.
    - An area of 100 m^2 is obtained by turning the crank 22 rounds on the FX300 and 16.5 rounds on the FX400.
7. Pull out the calibration trays and weigh the quantities they now contain.
    - The calibration test quantity obtained corresponds to the area of 100 m^2, so the quantities for a hectare will be hundredfold.
      If the weighing result does not match the desired quantity, adjust the gearbox control lever (7). The feeding quantity increases when the value of the adjustment scale increases.
8. Repeat the calibration test. Ensure the result is close enough to the target quantity.

9. Insert the cotter pins.
10. Turn the crank to bring the calibration trays to the seeding position.
11. Put the transmission cover back in place.

6.8.3. Calibration test with adjusting of fertiliser target rate - basic model

- This section contains instructions on running calibration tests using the adjusting of fertiliser target rate in the SeedPilot and SeedPilot ISOBUS control system. If the machine does not have a gearbox or has a gearbox for the seed side, the calibration test must be run according to these instructions.

DANGER
Activate the STOP ALL function from the control system in accordance with the instructions in section 6.3.1. Using the STOP ALL function.

DANGER
Engage the tractor handbrake before running the calibration test. If the machine is equipped with middle markers, close the middle marker shut-off valves according to the instructions in section 3.4. Using the middle marker ball valves.

- The linear actuator only moves when the feeder shaft is rotating to prevent the feeders from being damaged.

Preparations

1. Raise the transmission cover.

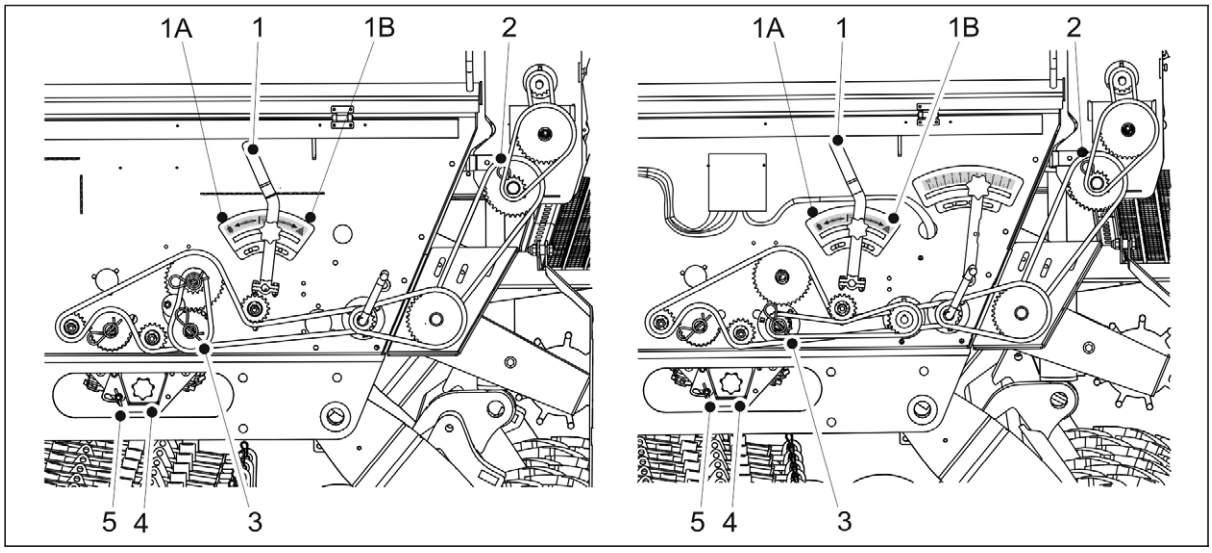


Figure. 6.8.3. - 137. Calibration test with adjusting of fertiliser target rate On the left, a machine without a gearbox and on the right, a machine equipped with a gearbox on the seed side.

2. Align the calibration trays (4) with the fertiliser side feeder shaft by turning the crank (1) to position 1B.
    - The crank position 1A is for the seed side and the centre position is for seeding.
3. Check that the calibration trays are at the feeders and their lock (5) is turned to the side.
4. Remove the cotter pin (3) on the seed side from the feed shaft chain gear. If the machine is equipped with a small seed hopper, remove the cotter pin (2) of the small seed hopper.

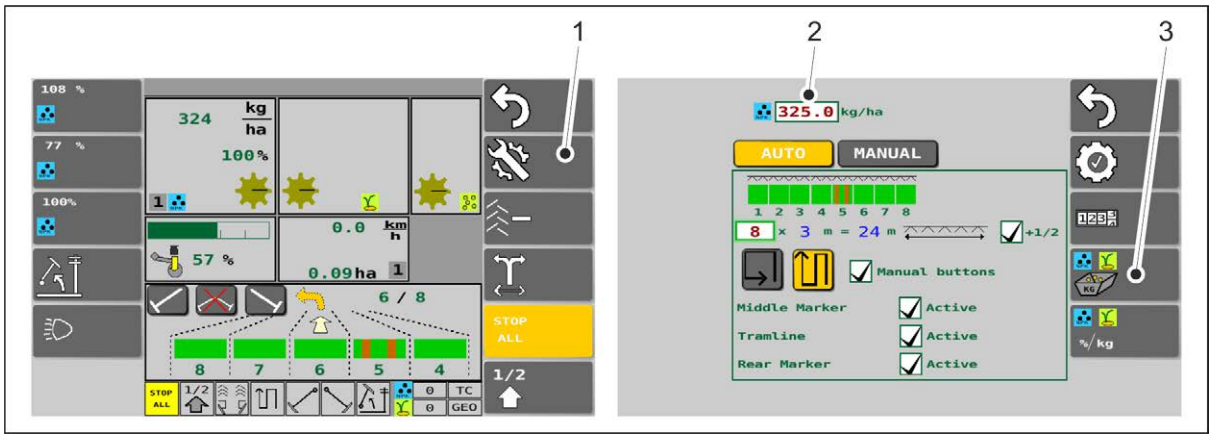


Figure. 6.8.3. - 138. User interface

5. Select the user interface under Settings (1) on the Drive screen.
6. Enter the fertiliser target rate in the input field (2) and select Calibration test (3).

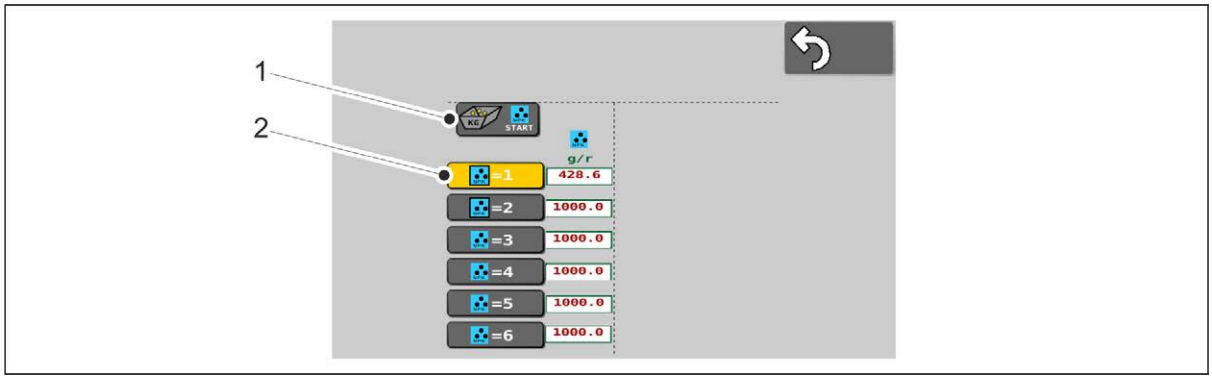


Figure. 6.8.3. - 139. Starting the calibration test

7. Select the memory slot (2) for saving data.
   - Instructions on the calibration test memory slots are found in section 6.3.2. Calibration test result memory slots.
8. Press START (1).

Product calibration

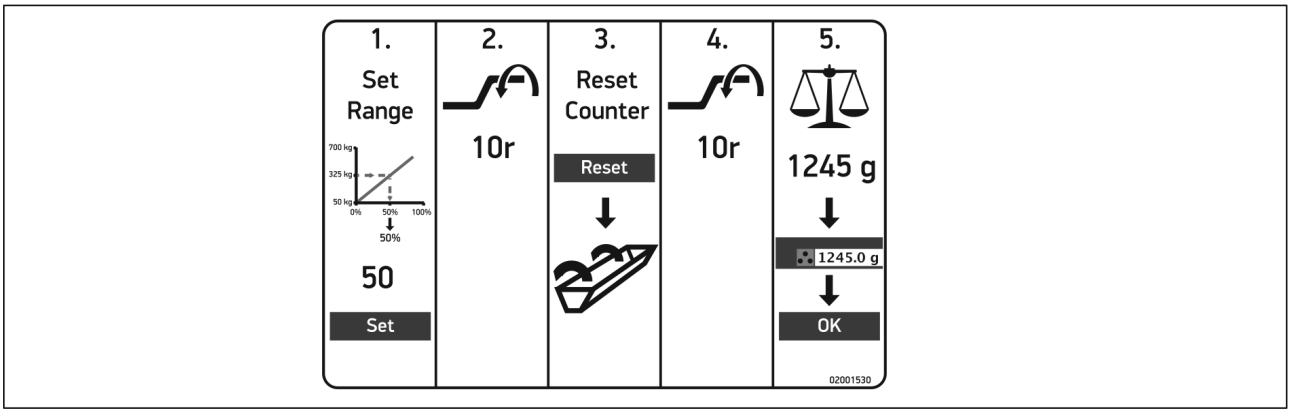


Figure. 6.8.3. - 140. Calibration test with adjusting of fertiliser target rate - basic model

- Above is a quick guide for running a calibration test. Detailed instructions are presented below.

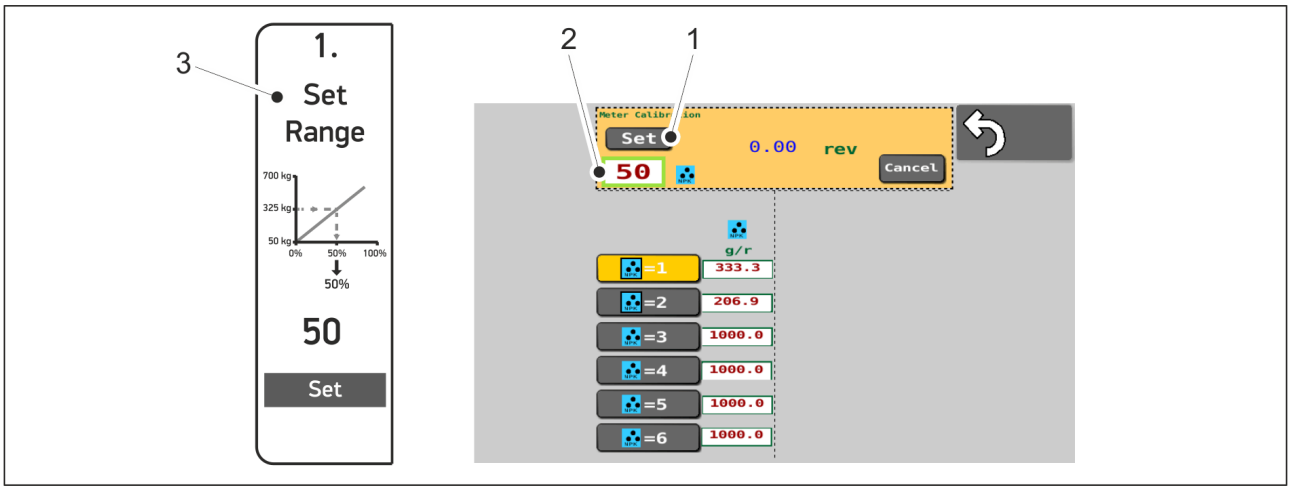


Figure. 6.8.3. - 141. Adjusting the width of the feeder roller

1. Adjust the width of the roller in accordance with the set target rate.
    - The roller width is set by pressing the number value (2). The roller width is adjusted within a range of 0-100%. The figure is the relative value of the seeding rate (50-700 kg) as shown in the table (3). Press SET (1) to accept the value.

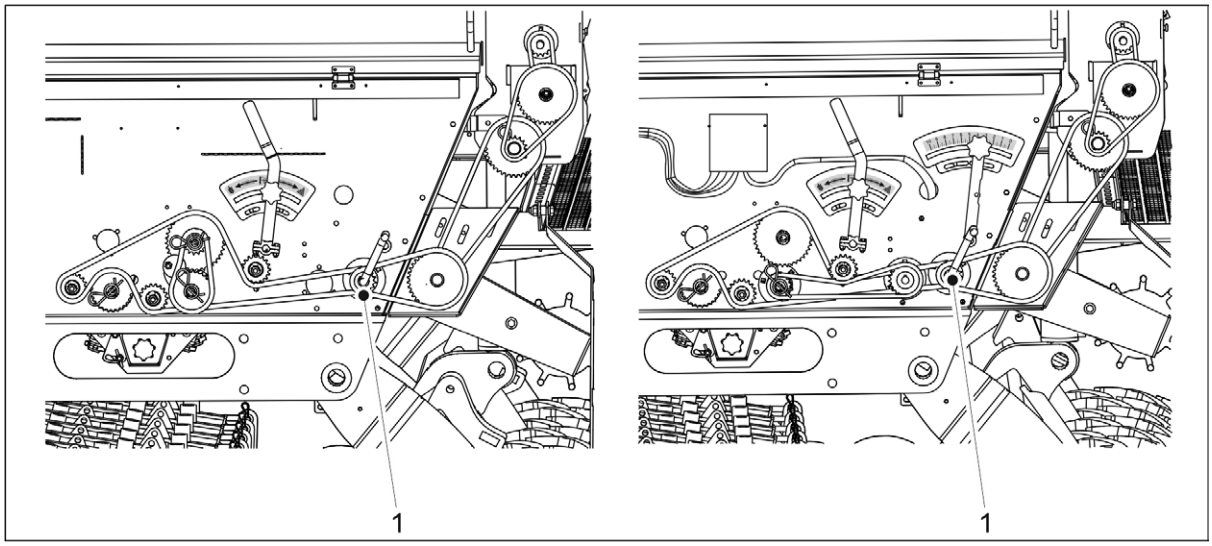


Figure. 6.8.3. - 142. Calibration test crank. On the left, a machine without a gearbox and on the right, a machine equipped with a gearbox.

2. Attach the calibration test crank (1) to the calibration test shaft. Rotate the crank until the linear actuator has moved to the correct position.
    - When the linear actuator reaches the correct position, it appears in the SeedPilot ISOBUS control system push button or on the SeedPilot and SeedPilot ISOBUS control system controller screen.

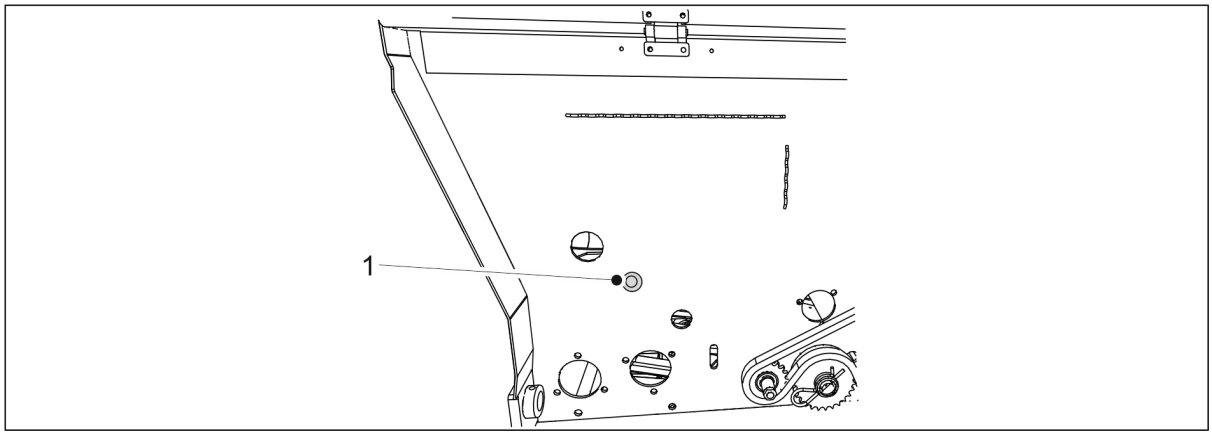


Figure. 6.8.3. - 143. Push button. Only in the SeedPilot ISOBUS control system.

- The push button (1) light begins blinking when the linear actuator seeks the correct position. When the linear actuator is in the correct position, the button light stays on.

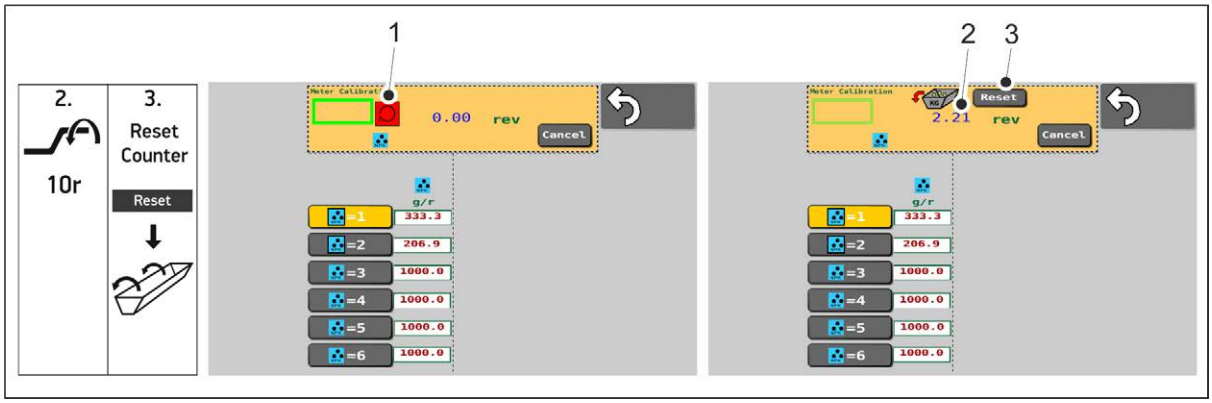


Figure. 6.8.3. - 144. Adjusting the linear actuator position

- A red box (1) is displayed in the user interface page when the linear actuator seeks the correct position. The red box disappears when the linear actuator is in the correct position. The number of calibration test crank turns (2) are displayed on the screen.
  If the linear actuator is already in the correct position, the red box will not appear. In this case, move directly to step 4.

3. Empty the calibration test tray and reset by pressing the rotation counter button or the control system RESET button (3).
4. Turn the calibration test crank counterclockwise so that the feeder shaft makes at least 5 full rotations.
   - When a sufficient number of rotations are made, a number value input field will open on the user interface page.
5. Pull out the calibration trays and weigh the quantities they now contain.

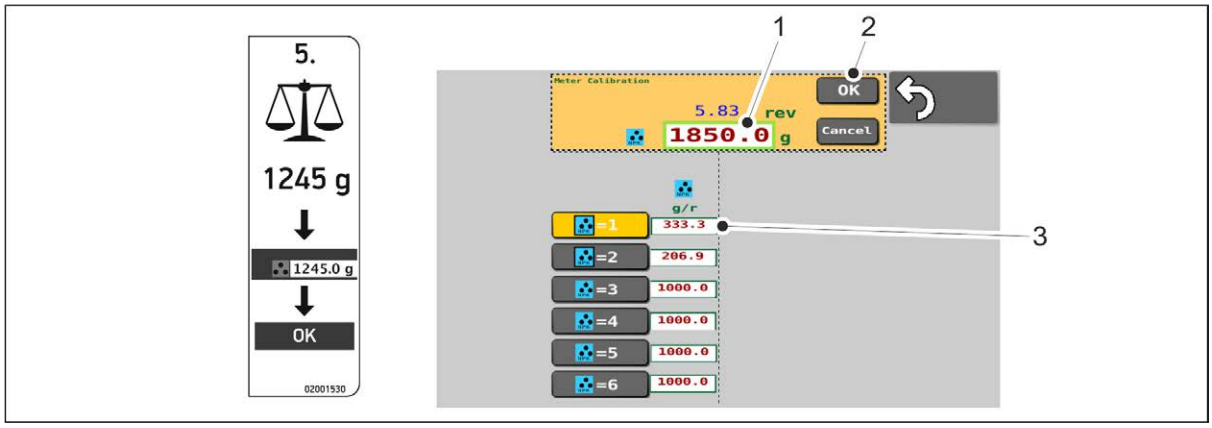


Figure. 6.8.3. - 145. Entering the weighing result

6. Press the number (1) and enter the weighing result.
7. Press OK (2).
    - The system will calculate the calibration value (g/r) from the weighing result. The calibration value (3) is displayed on the screen next to the selected memory slot.
8. Return to the Drive screen.

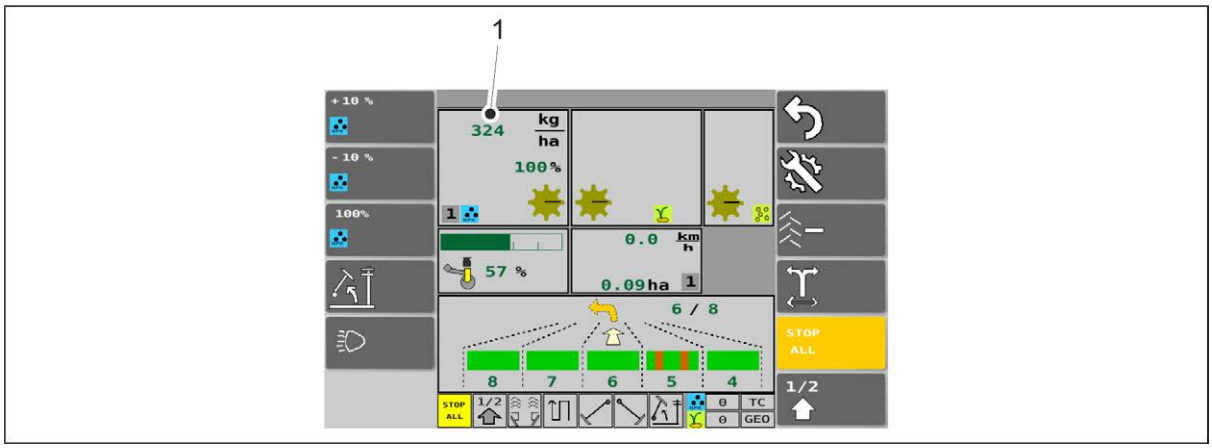


Figure. 6.8.3. - 146. Feed rate according to the linear actuator position

- The feed rate according to the linear actuator position (1) is displayed as the fertiliser rate. Linear actuator works only when seed shafts rotate until the feeder shaft begins rotating when starting the first pass.

9. Insert the cotter pins.
10. Turn the crank to bring the calibration trays to the seeding position.
11. Put the transmission cover back in place.

6.8.4. Calibration test with adjusting of fertiliser target rate - machine with gearbox

- This section contains instructions on running calibration tests with the adjusting of fertiliser target rate in the SeedPilot and SeedPilot ISOBUS control system. If the machine has a dual gearbox, a calibration test must be run in accordance with these instructions.

DANGER
Activate the STOP ALL function from the control system in accordance with the instructions in section 6.3.1. Using the STOP ALL function.

DANGER
Engage the tractor handbrake before running the calibration test. If the machine is equipped with middle markers, close the middle marker shut-off valves in accordance with the instructions in section 3.4. Using the middle marker ball valves.

Preparations

1. Raise the transmission cover.

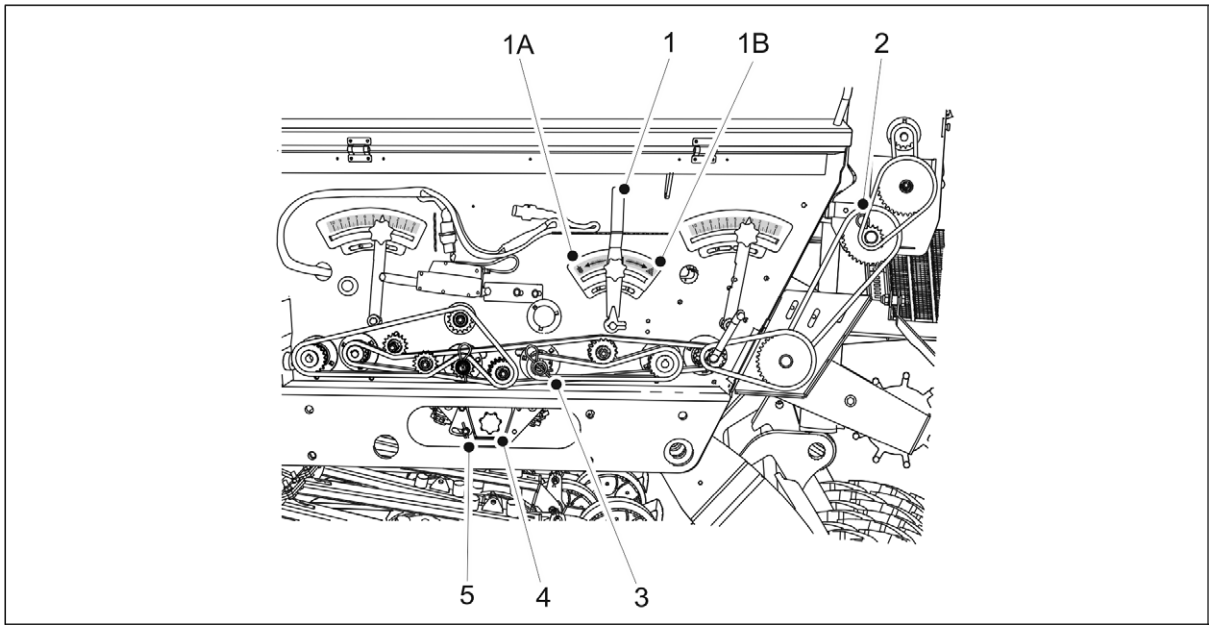


Figure. 6.8.4. - 147. Calibration test with adjusting of fertiliser target rate on a machine with a dual gearbox

2. Align the calibration trays (4) with the fertiliser side feeder shaft by turning the crank (1) to position 1B.
    - The crank position 1A is for the seed side and the centre position is for seeding.
3. Check that the calibration trays are at the feeders and their lock (5) is turned to the side.
4. Remove the cotter pin (3) on the seed side from the feed shaft chain gear. If the machine is equipped with a small seed hopper, remove the cotter pin (2) of the small seed hopper.

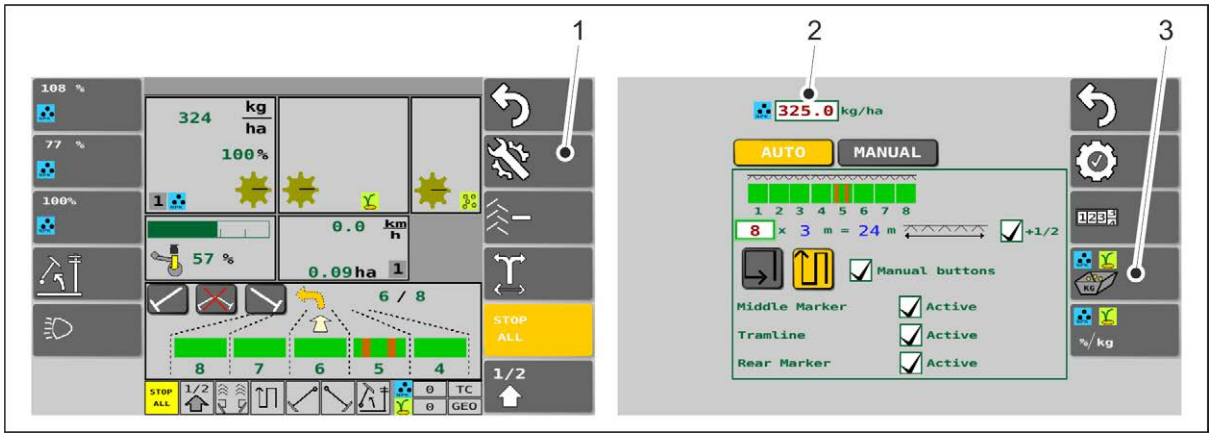


Figure. 6.8.4. - 148. User interface

5. Select the user interface under Settings (1) on the Drive screen.
6. Enter the fertiliser target rate in the input field (2) and select Calibration test (3).

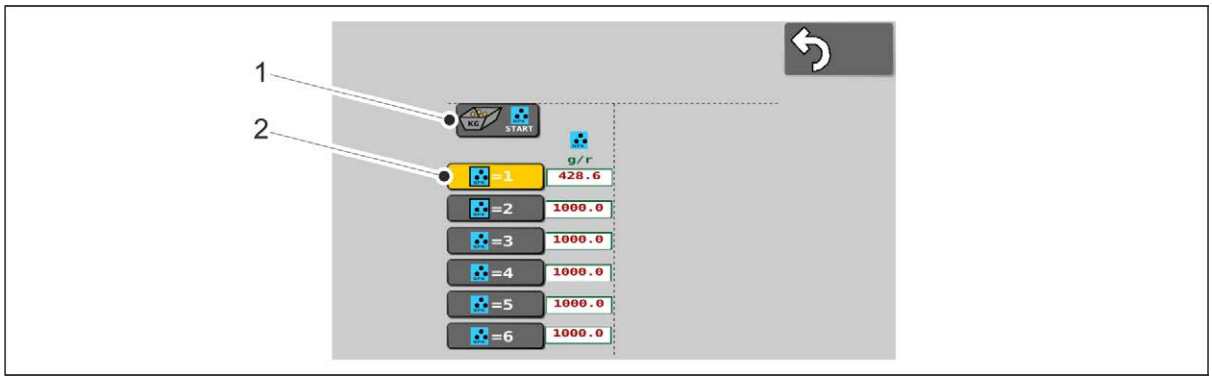


Figure. 6.8.4. - 149. Starting the calibration test

7. Select the memory slot (2) for saving data.
   - Instructions on the calibration test memory slots are found in section 6.3.2. Calibration test result memory slots.
8. Press START (1).

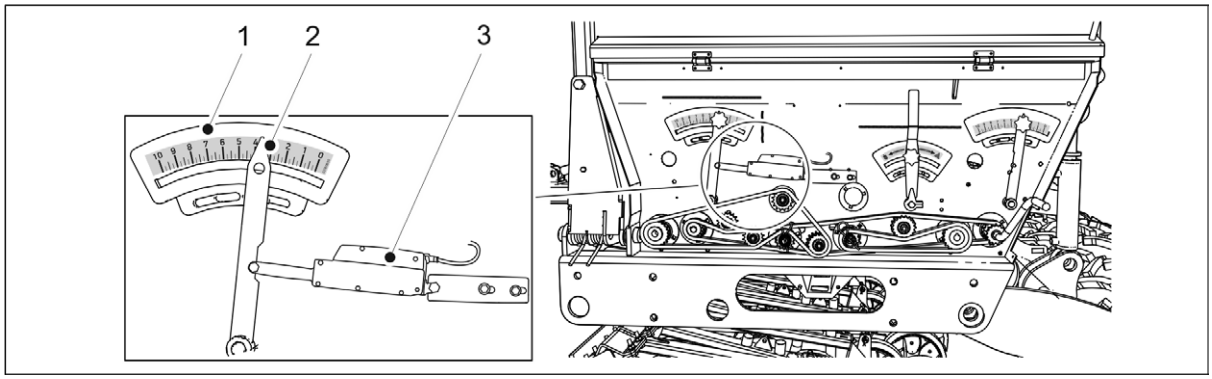


Figure. 6.8.4. - 150. Linear actuator

- The linear actuator (3) begins to move. The linear actuator moves the pointer (2) on the fertiliser feed rate scale (1).

Product calibration

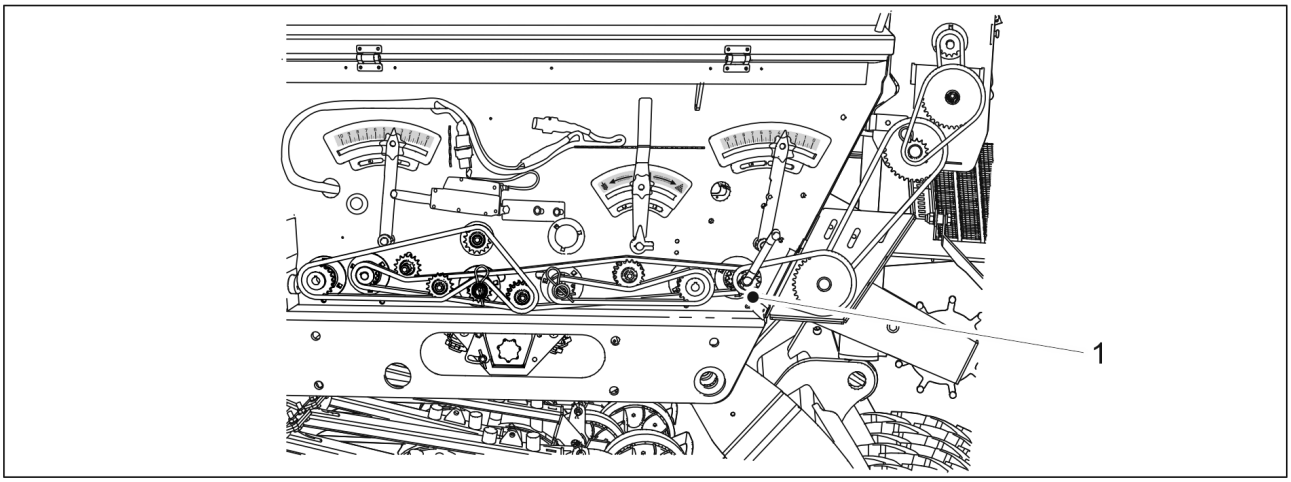


Figure. 6.8.4. - 151. Calibration test crank

1. Attach the calibration test crank (1) to the calibration test shaft. Turn the crank counterclockwise until at least 5.00 rotations appears on the controller screen.

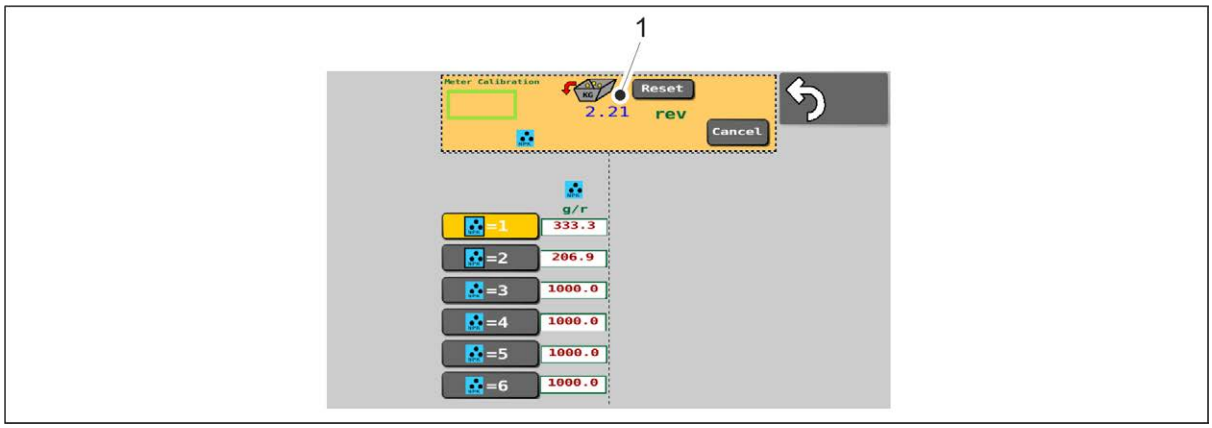


Figure. 6.8.4. - 152. Rotations made with the calibration test crank

- The number of calibration test crank turns (1) will appear on the user interface page.

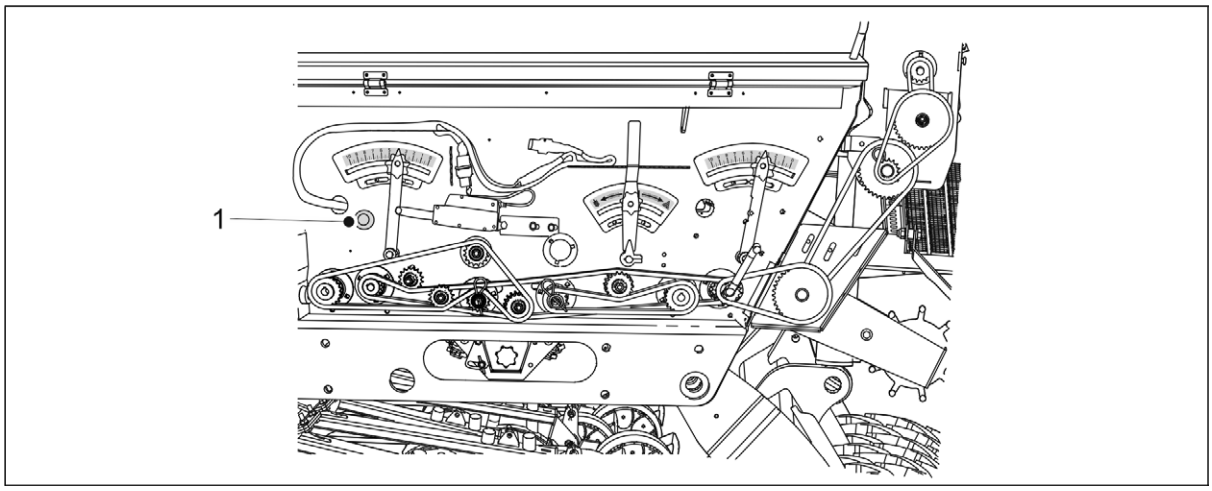


Figure. 6.8.4. - 153. Push button. Only in the SeedPilot ISOBUS control system.

- When 5 turns have been made, the light in the push button (1) stays on.

2. Pull out the calibration trays and weigh the quantities they now contain.

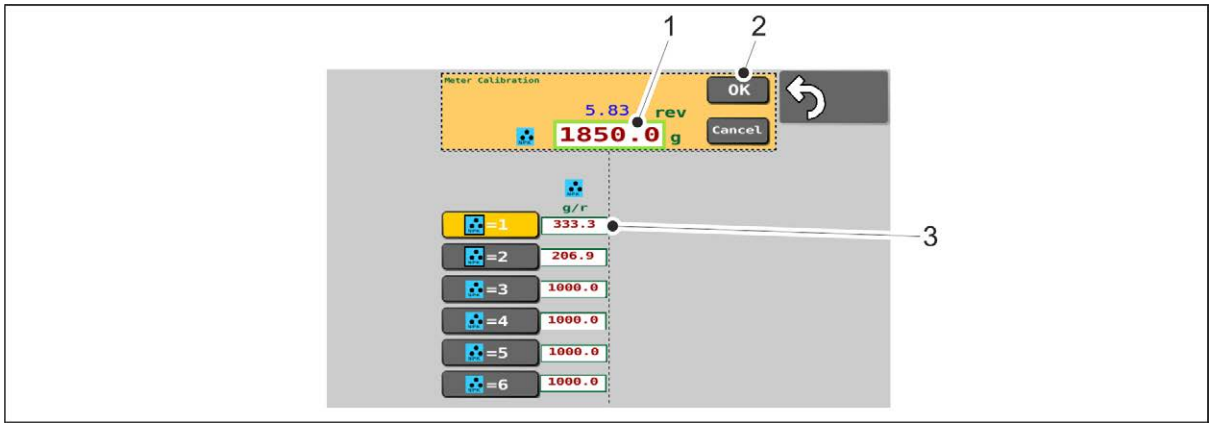


Figure. 6.8.4. - 154. Entering the weighing result

3. Press the number (1) and enter the weighing result.

4. Press OK (2).
    - The system will calculate the calibration value (g/r) from the weighing result. The calibration value (3) is displayed on the screen next to the selected memory slot.
5. Return to the Drive screen.

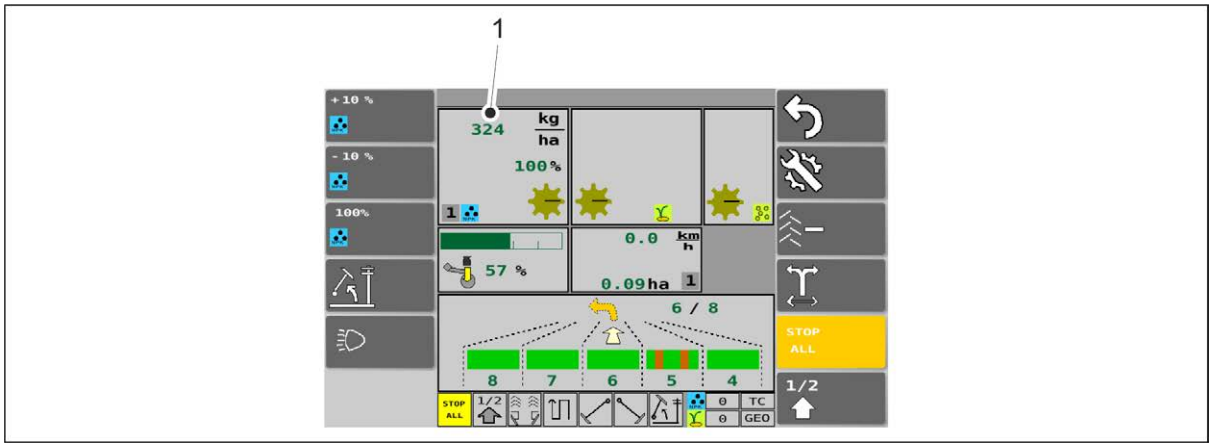


Figure. 6.8.4. - 155. Feed rate according to the linear actuator position

- In the machine with gearbox, the linear actuator will move immediately to the right and into place. The fertiliser target rate (1) will appear on the Drive screen.

6. Insert the cotter pins.
7. Turn the crank to bring the calibration trays to the seeding position.
8. Put the transmission cover back in place.

6.8.5. Seed calibration test in a machine without a gearbox

DANGER
If the machine is equipped with a SeedPilot or SeedPilot ISOBUS control system, switch on the STOP ALL function in accordance with section 6.3.1. Using the STOP ALL function.

DANGER
Shut off the tractor, remove the key from the ignition and engage the parking brake before running a calibration test. If the machine is equipped with middle markers, close the middle marker shut-off valves in accordance with the instructions in section 3.4. Using the middle marker ball valves.

1. Raise the transmission cover.

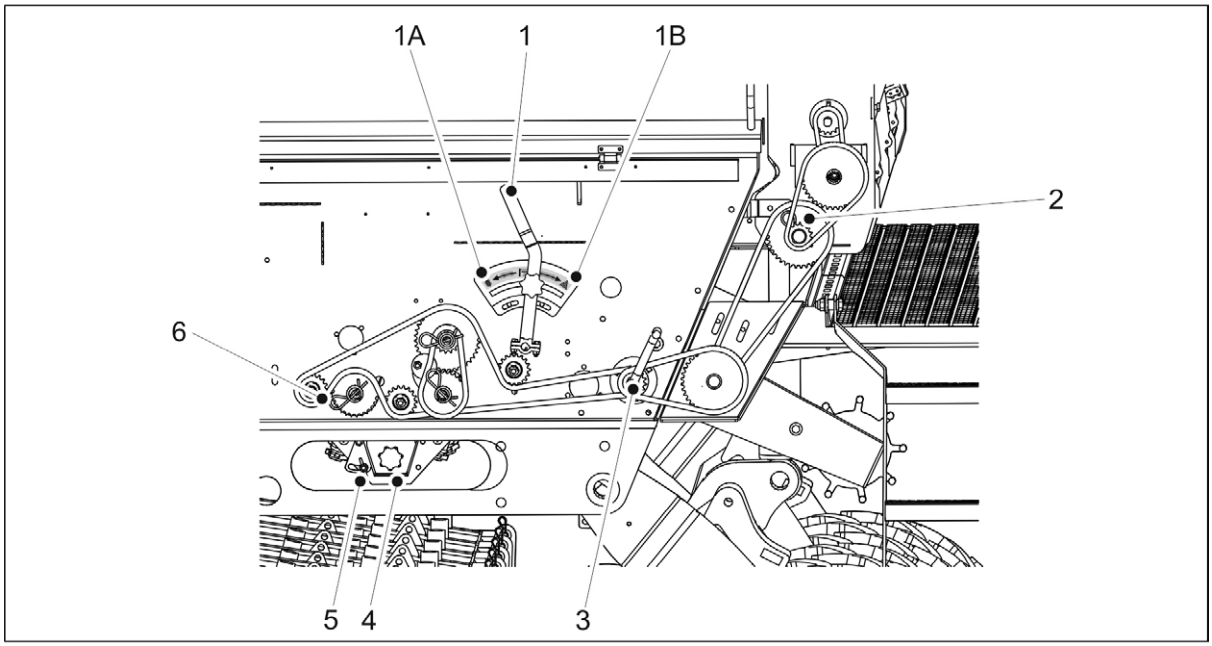


Figure. 6.8.5. - 156. Seed calibration test on a machine without a gearbox.

2. Align the calibration trays (4) with the seed side feeder shaft by turning the crank to position 1A.
    - The crank position 1B is for the fertiliser side and the centre position is for seeding.
3. Check that the calibration trays are at the feeders and their lock (5) is turned to the side.
4. Remove the cotter (6) of the fertiliser side from the feed shaft chain gear. If the machine is equipped with a small seed hopper, remove the cotter pin (2) of the small seed hopper.
5. Attach the calibration test crank (3) to the calibration test shaft. Turn the crank until an even flow of fertiliser or seed comes out of all feeders. Empty the calibration trays.
6. Rotate the shaft counterclockwise by 1 round per second using the calibration test crank.
    - An area of 100 m^2 is obtained by turning the crank 22 rounds on the FX300 and 16.5 rounds on the FX400.
7. Pull out the calibration trays and weigh the quantities they now contain.
    - The calibration test quantity obtained corresponds to the area of 100 m^2, so the quantities for a hectare will be hundredfold.
      If the weighing result does not match the desired quantity, adjust the length of the roller in accordance with section 6.6.5. Adjusting the width of the feeder roller.
8. Repeat the calibration test. Ensure that the result is close enough to the target quantity.
9. Place the calibration trays in the machine. Ensure that the trays are in the correct order and that they are connected to each other correctly.
10. Insert the cotter pins.
11. Turn the crank to bring the calibration trays to the seeding position.
12. Put the transmission cover back in place.

6.8.6. Seed calibration test in a machine with a gearbox on the seed side or a dual gearbox

DANGER
If the machine is equipped with a SeedPilot or SeedPilot ISOBUS control system, switch on the STOP ALL function accordance with section 6.3.1. Using the STOP ALL function.

DANGER
Shut off the tractor, remove the key from the ignition and engage the parking brake before running a calibration test. If the machine is equipped with middle markers, close the middle marker shut-off valves in accordance with the instructions in section 3.4. Using the middle marker ball valves.

1. Raise the transmission cover.

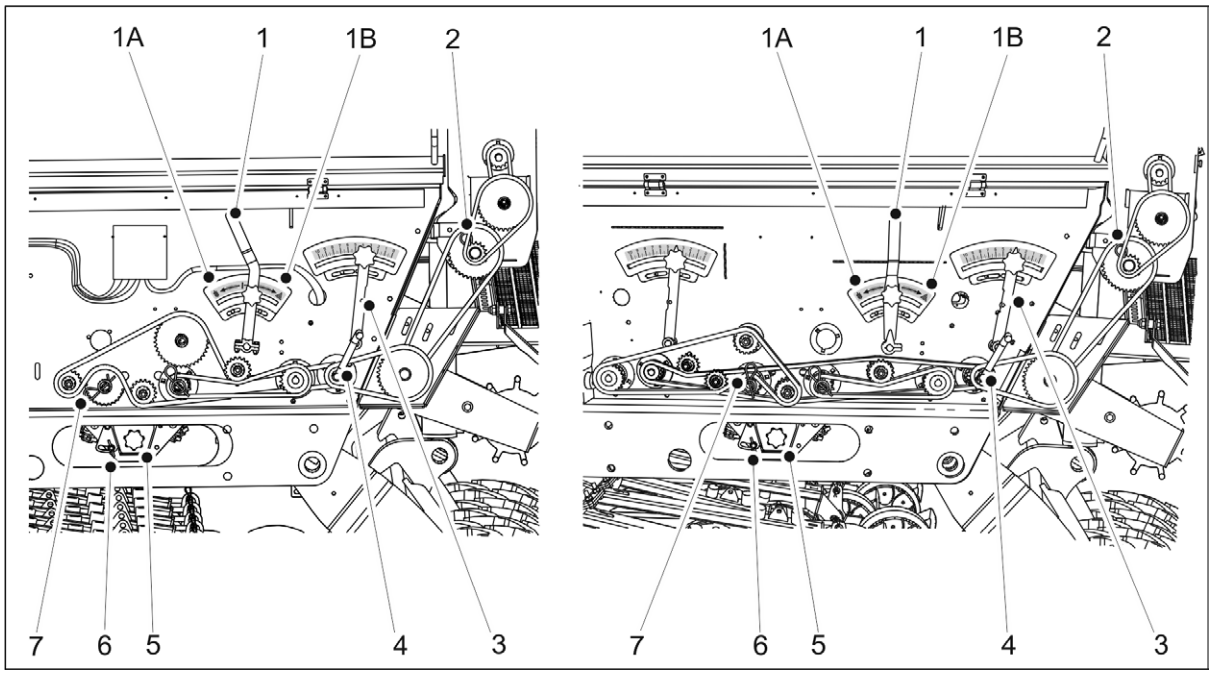


Figure. 6.8.6. - 157. Seed calibration test. On the left, a machine with a gearbox on the seed side and on the right, a machine equipped with a dual gearbox.

2. Align the calibration trays (5) with the seed side feeder shaft by turning the crank (1) to position 1A.
    - The crank position 1B is for the fertiliser side and the centre position is for seeding.
3. Check that the calibration trays are at the feeders and their lock (6) is turned to the side.
4. Remove the cotter (7) of the fertiliser side from the feed shaft chain gear. If the machine is equipped with a small seed hopper, remove the cotter pin (2) of the small seed hopper.
5. Attach the calibration test crank (4) to the calibration test axle. Turn the crank until an even low of fertiliser or seed comes out of all feeders. Empty the calibration trays.
6. Rotate the shaft counterclockwise by 1 round per second using the calibration test crank.
    - An area of 100 m^2 is obtained by turning the crank 22 rounds on the FX300 and 16.5 rounds on the FX400.
7. Pull out the calibration trays and weigh the quantities they now contain.

- The calibration test quantity obtained corresponds to the area of 100 m^2, so the quantities for a hectare will be hundredfold.
  If the weighing result does not match the desired quantity, adjust the length of the roller with the gearbox control lever. The feeding quantity increases when the value of the adjustment scale increases.

8. Repeat the calibration test. Ensure the result is close enough to the target quantity.
9. Place the calibration trays in the machine. Ensure that the trays are in the correct order and that they are connected to each other correctly.
10. Insert the cotter pins.
11. Turn the crank to bring the calibration trays to the seeding position.
12. Put the transmission cover back in place.

6.8.7. Calibration test of small seed hopper

DANGER
If the machine is equipped with a SeedPilot or SeedPilot ISOBUS control system, switch on the STOP ALL function in accordance with section 6.3.1. Using the STOP ALL function.

DANGER
Shut off the tractor, remove the key from the ignition and engage the parking brake before running a calibration test. If the machine is equipped with middle markers, close the middle marker shut-off valves in accordance with the instructions in section 3.4. Using the middle marker ball valves.

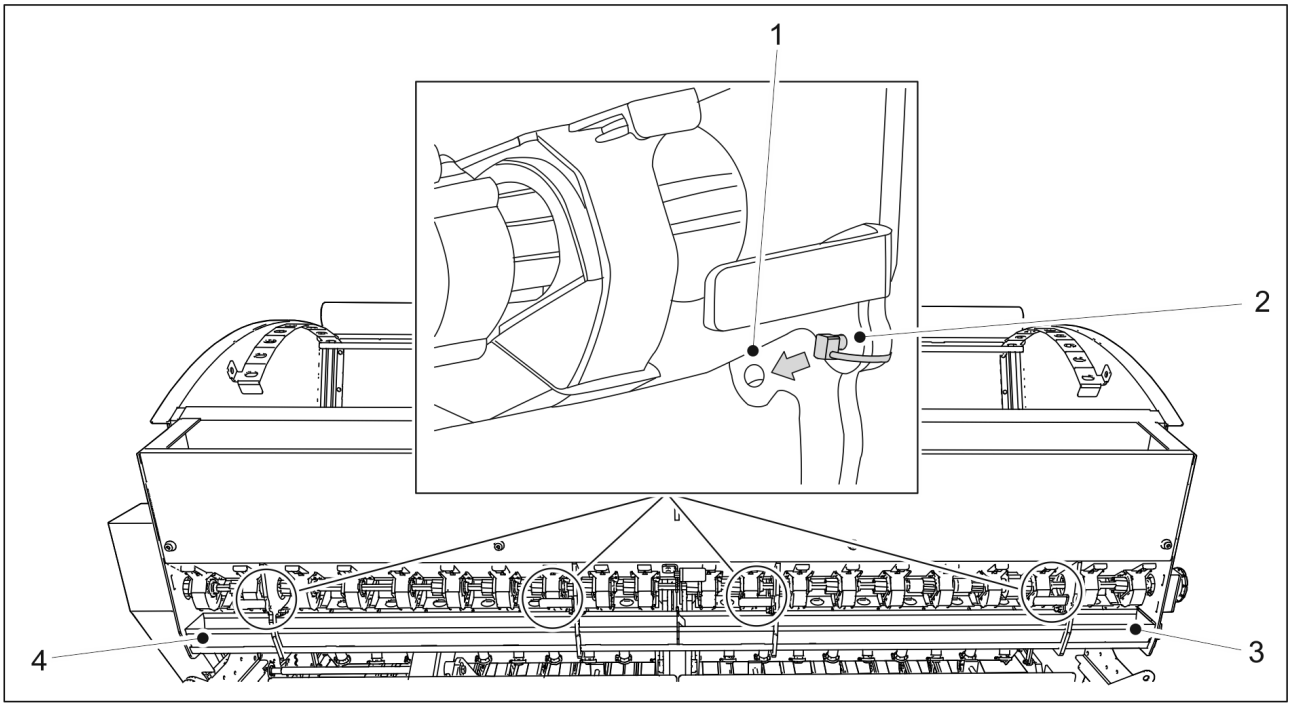


Figure. 6.8.7. - 158. Feeder funnel assembly of the small seed hopper

1. Open the four locking pins (2) of the feeder funnel assembly.
2. Set the feeder funnel assembly in the calibration test position by folding the funnel down and pushing it towards the hopper. Lock the feeder funnel assembly in place by using the locking pins and the lower hole (1).
3. Insert the 2 calibration trays (3, 4) into place on the rail under the small seed hopper.

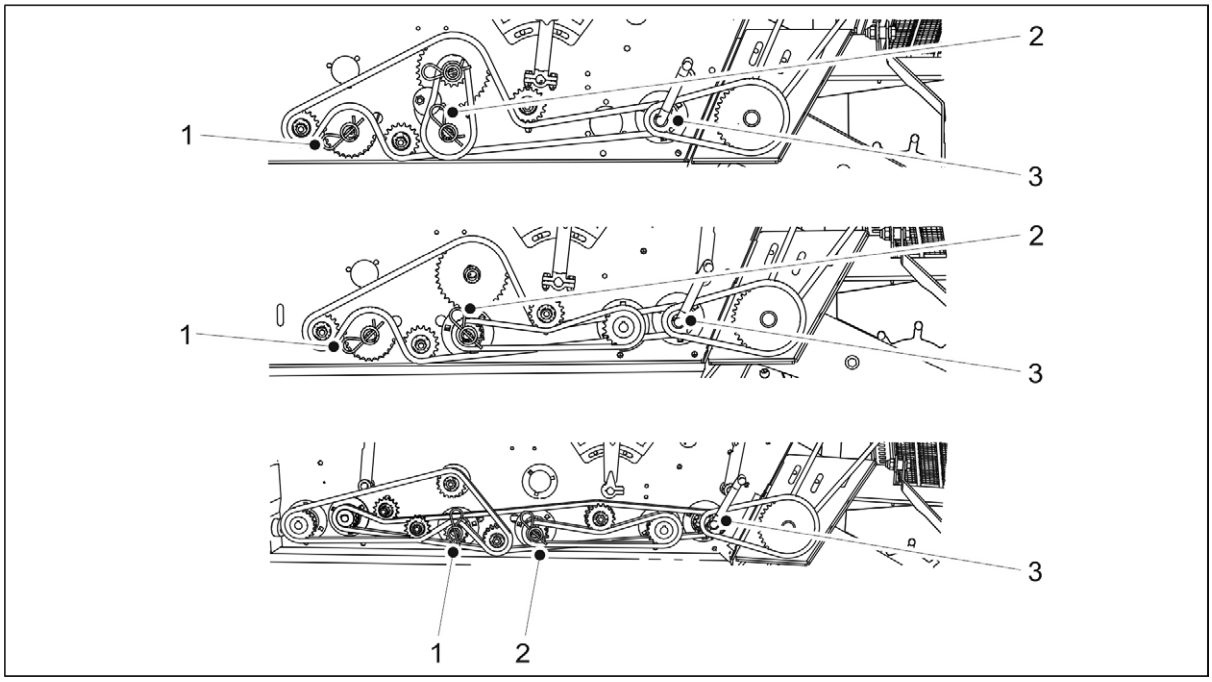


Figure. 6.8.7. - 159. Calibration test of the small seed hopper. The top figure shows a machine without a gearbox; the middle figure shows a machine with a gearbox on the seed side; and the bottom figure shows a machine with a dual gearbox.

4. Remove the cotters of the fertiliser (1) or seed (2) side from the feed shaft chain gear.
5. Attach the calibration test crank (3) to the calibration test shaft and turn it until an even flow of fertiliser or seed comes out of all feeders. Empty the calibration trays of the small seed hopper.
6. Rotate the shaft counterclockwise by 1 round per second using the calibration test crank.
    - An area of 100 m^2 is obtained by turning the crank 22 rounds on the FX300 and 16.5 rounds on the FX400.
7. Pull out the calibration trays of the small seed hopper and weigh the quantities they now contain.
    - The calibration test quantity obtained corresponds to the area of 100 m^2, so the quantities for a hectare will be hundredfold.
      If the weighing result does not match the desired quantity, adjust the length of the roller in accordance with section 6.6.10. Adjusting the width of the small seed feeder roller.
8. Repeat the calibration test Make sure that the result is sufficiently close to the target quantity.
9. Put the feeder funnel assembly and cotters back in place.
10. Attach the calibration trays.
11. Put the transmission cover back in place.

6.9. Adjusting the seeding depth of the coulter

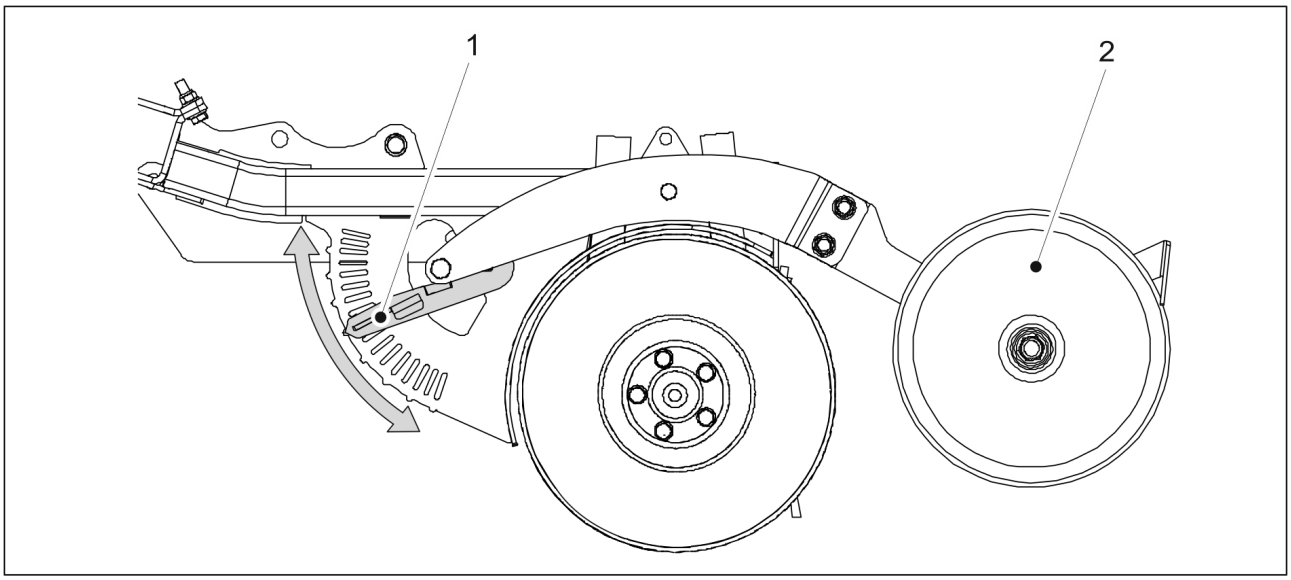


Figure. 6.9. - 160. Adjusting the seeding depth of the coulter

1. Adjust the height of the covering wheel (2) in relation to the seeding coulter by moving the lever (1) to the desired notch in the adjuster plate.
   - When the lever is down, the seeding depth is at maximum, i.e. 8 cm.
     When the lever is up, the seeding depth is 0 cm.
     The height adjustment is indexed in approx. 0.5 cm increments.
2. Repeat step 1 for all coulters.

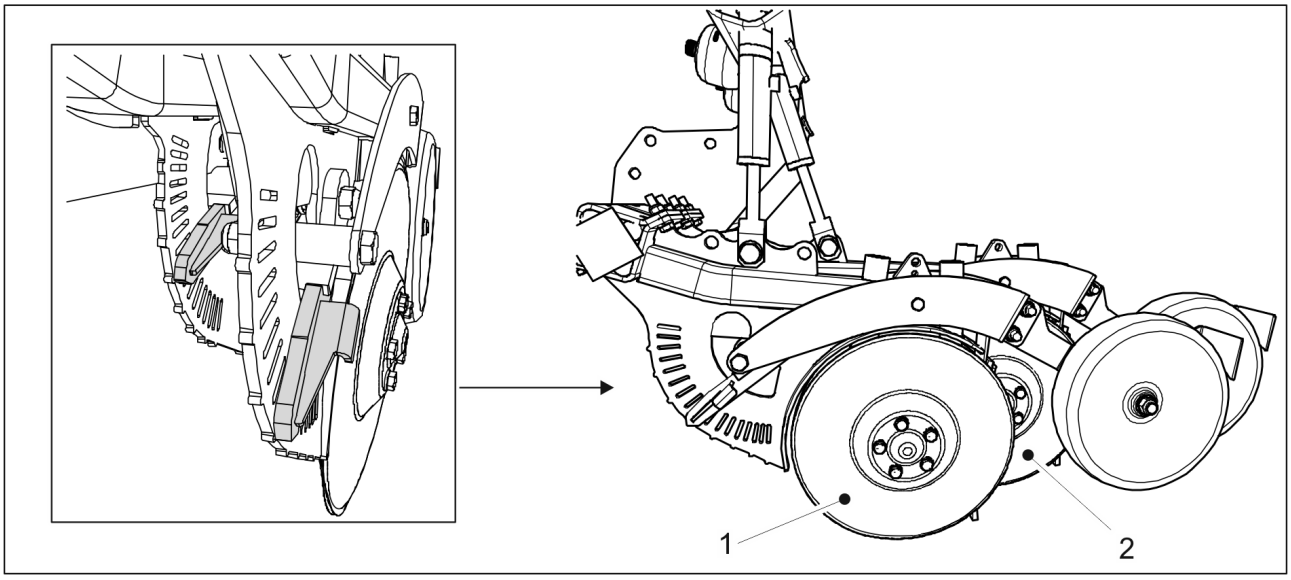


Figure. 6.9. - 161. Foremost and rearmost coulter

- The foremost (1) and rearmost (2) coulter must be adjusted in the same way. Ensure that the levers are set to the same notch in both adjuster plates.

6.10. Adjusting the coulter pressure

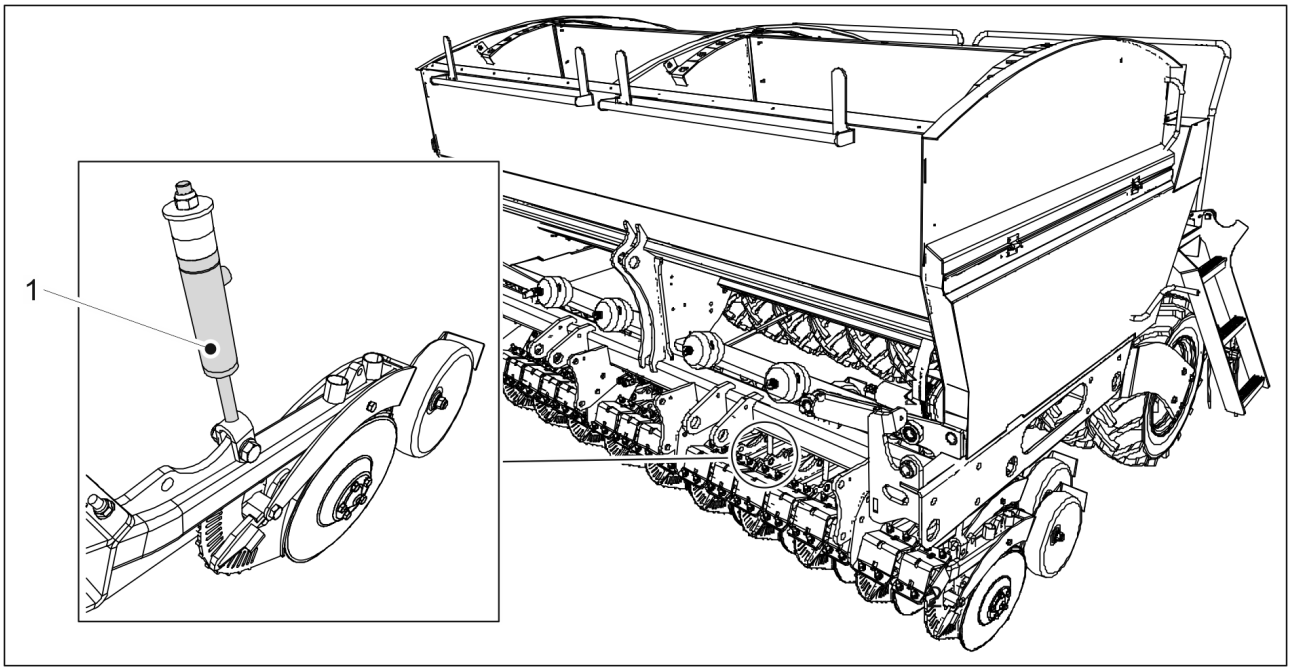


Figure. 6.10. - 162. Adjusting the coulter pressure

1. Adjust the coulter pressure by changing the pressure in the coulter pressure cylinders (1).
    - There are 20 coulter pressure cylinders on the FX300 and 26 on the FX400.
      The cylinder presses the frame of the coulter disc down. The system is equipped with pressure accumulators, which allow the coulters to follow contours in the terrain by changing the length of the cylinder stroke.
      The coulter pressure adjustment range is 50-250 kg. Use less pressure on light soil and more pressure on hard soil. The pressure should first be set too high and then lowered, if needed, rather than adjusting the pressure too low in the first place. The coulter pressure can be adjusted during operation. For example, it can be decreased at the end of the field with deep soil and increased at the end with clay soil, to maintain the desired seeding depth.
      The coulter pressure status is displayed on the user interface (see section 4.2.4.1. Drive screen).

6.11. Adjusting the rear harrow

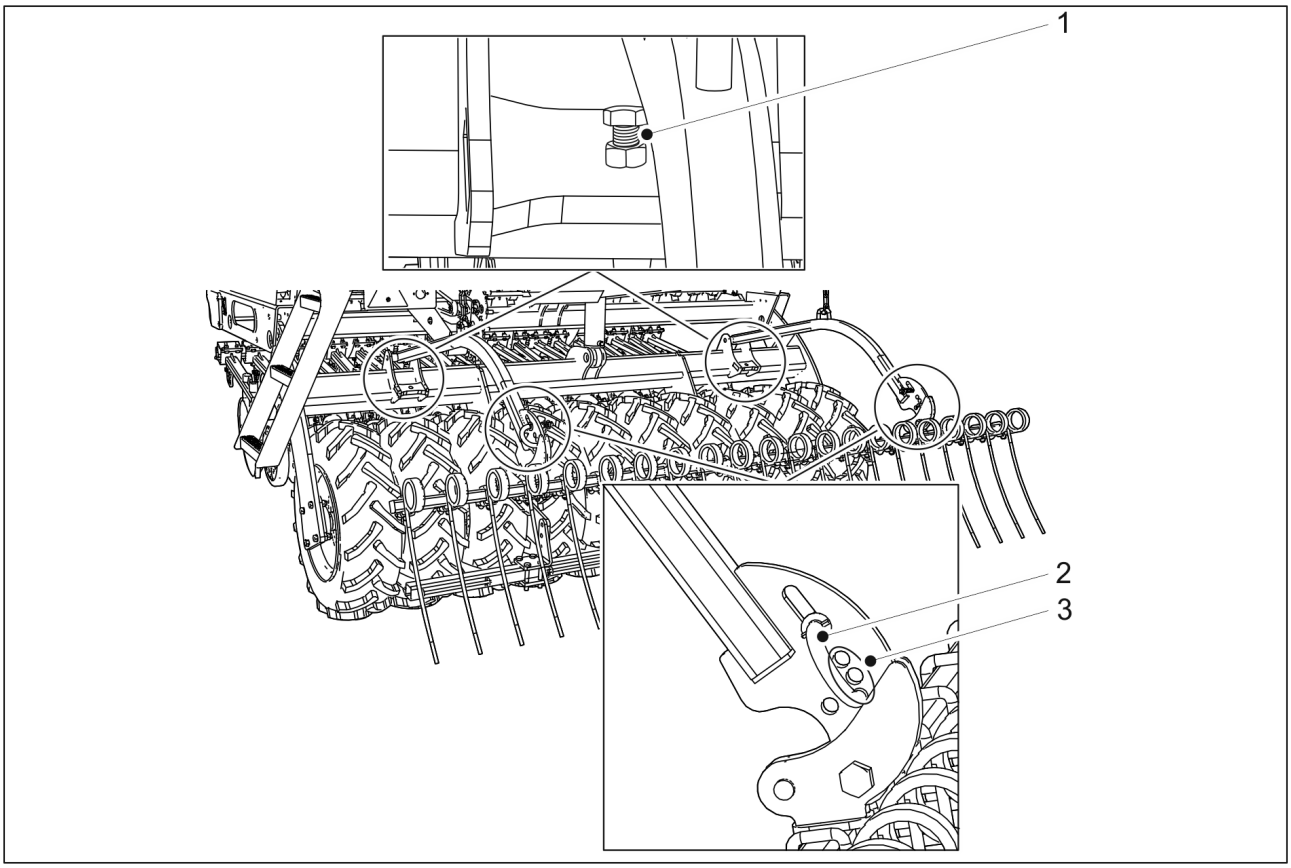


Figure. 6.11. - 163. Adjusting the rear harrow

1. Use the bolt (1) to adjust the height of the rear harrow.
    - The longer the visible portion of the bolt, the higher the position of the rear harrow.
2. Adjust the angle of the rear harrow by inserting the rear harrow pin (2) in the appropriate hole (3).
    - There are three holes to choose from.
      When the pin is in the bottom hole, the rear harrow is in an upright position. This position enables the rear harrow to move the most soil.
      When the pin is in the top hole, the angle of the rear harrow position is the widest. This position is used if there is a lot of mass on the ground. This position enables the rear harrow to penetrate the ground best.

6.12. Adjusting the front levelling board

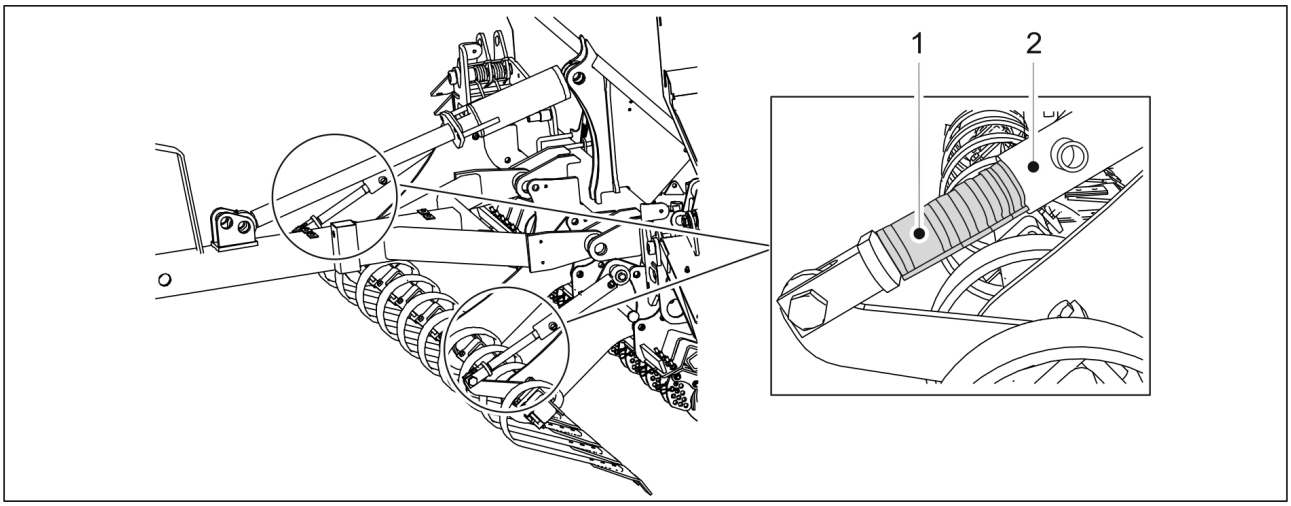


Figure. 6.12. - 164. Adjusting the front levelling board

1. Adjust the height of the front levelling board by placing clips (1) along the shafts of the two hydraulic cylinders of the front levelling board.

Table. 6.12. - 17. The thicknesses and quantities of front levelling board clips

Clip colour	Clip thickness	Quantity
Yellow	31.8 mm	1 pc
Red	25.4 mm	2 pcs
Black	22.2 mm	2 pcs
Blue	19.2 mm	2 pcs

- The more and the thicker the clips attached to the shaft of the cylinder, the higher the position of the front levelling board.

6.13. Controlling the seeding depth

1. Drive at the normal seeding speed (8–12 km/h) approximately 10 metres and stop.
2. Stop the tractor, switch off the power and engage the parking brake.
3. Walk to the area you just sowed in the field and sweep loose soil from the surface of the field.
4. Check the depth of the seeding furrow and that there are seeds and fertiliser in the furrow.
   - If needed, adjust the seeding depth in accordance with section 6.9. Adjusting the seeding depth of the coulter.

6.14. Securing the position of the middle markers

1. When you drive along the second sowing lane, stop.

2. Stop the tractor, switch off the power and engage the parking brake.
3. Check the distance between the outermost rows of the sowing lanes.
    - The distance between the outermost rows should be 150 mm for the FX300 and 154 mm for the FX400.
4. If the distance is incorrect, adjust the middle markers in accordance with the instructions in section 5.3.7. Adjusting the middle markers.

6.15. Emptying the hoppers

6.15.1. Emptying the hoppers to the calibration tray

- If the hopper is almost empty, the seed or fertiliser is directed to the calibration tray through the feeders and the tray is emptied. Instructions on performing the calibration test are provided in section 6.8. Product calibration.

6.15.2. Emptying the hoppers through the coulters

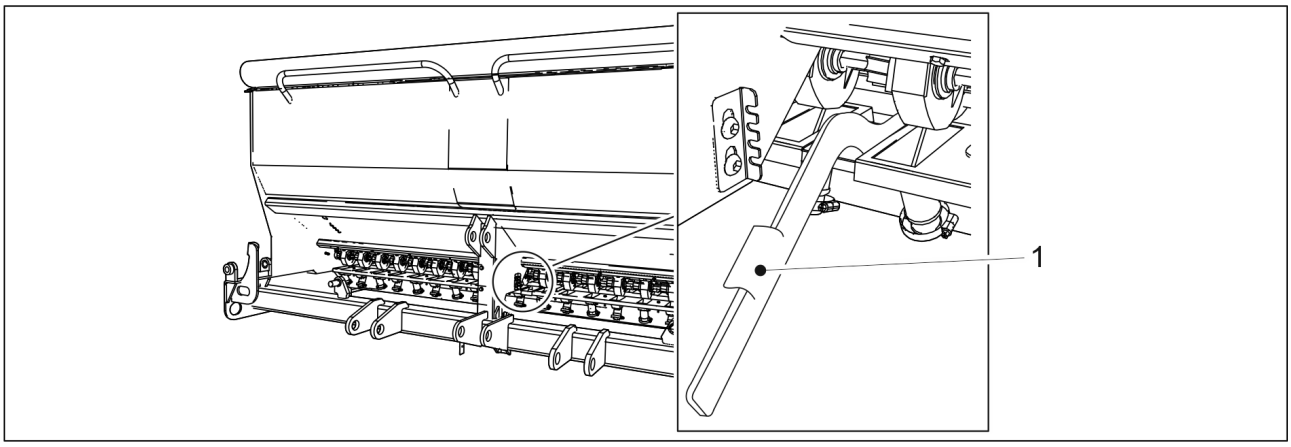


Figure. 6.15.2. - 165. Bottom flap open

1. Open the bottom flap (1) of the seed or fertiliser side for the hopper to be emptied.

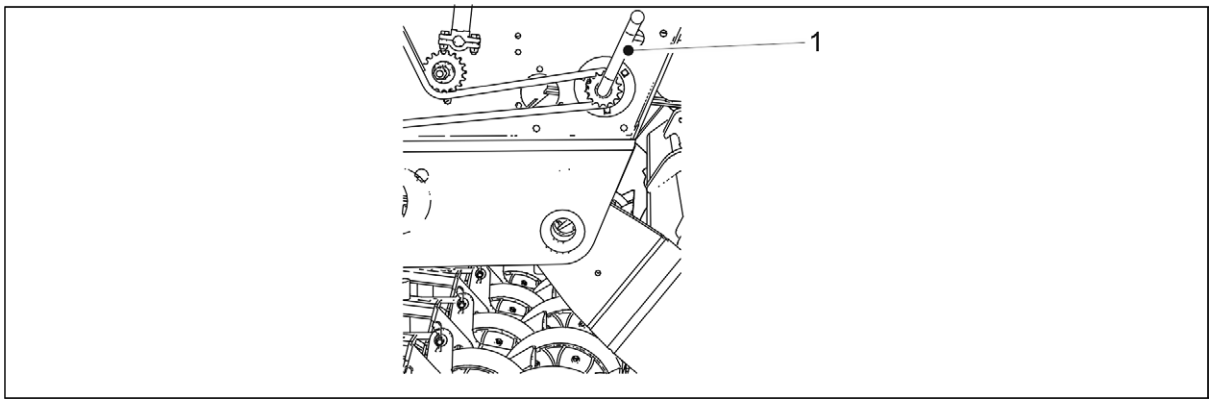


Figure. 6.15.2. - 166. Calibration test crank

2. Use the calibration test crank (1) to rotate the feeders.
    - Emptying can be enhanced with compressed air to blow all seeds and fertiliser out of the hoppers and feeders.

6.16. Emptying the small seed hopper

6.16.1. Emptying the hopper to the calibration test tray

- If the small seed hopper is almost empty, the seeds are directed to the calibration test tray through the feeders and the tray is emptied. The calibration test of small seed hopper is provided in section 6.8.7. Calibration test of small seed hopper.

6.16.2. Emptying the small seed hopper through pipes

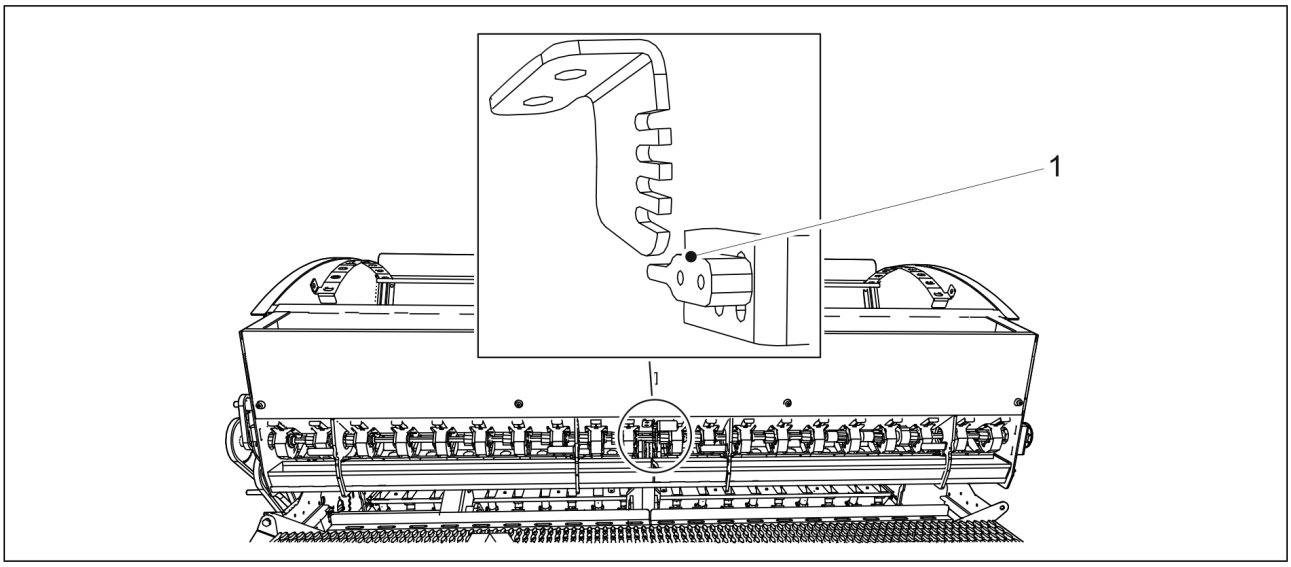


Figure. 6.16.2. - 167. Bottom flap of the small seed hopper open

1. Open the small seed hopper bottom flap by turning the control lever (1) downward.

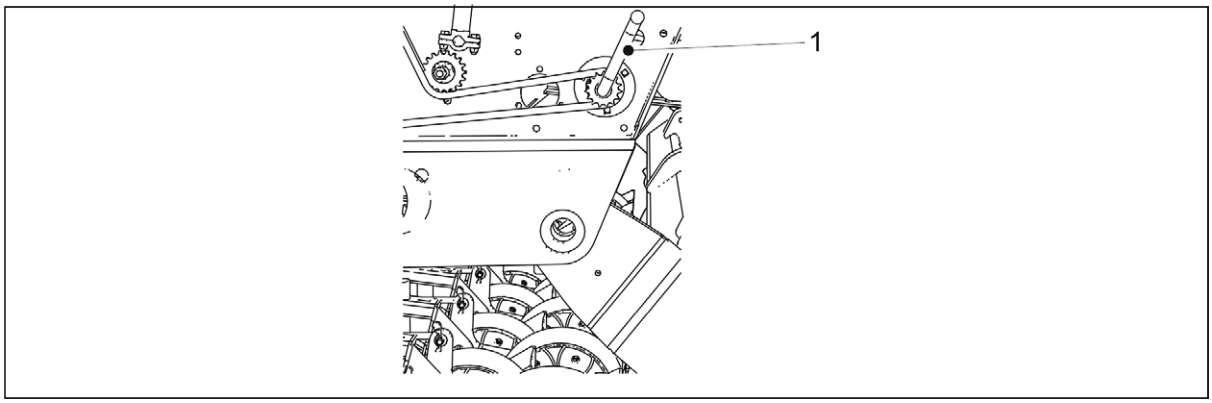


Figure. 6.16.2. - 168. Calibration test crank

2. Use the calibration test crank (1) to rotate the feeders.
   - Emptying can be enhanced with compressed air to blow all seeds and fertiliser out of the hoppers and feeders.

6.17. Disconnecting from the tractor

DANGER
Crushing hazard when connecting and disconnecting the seed drill. Minimum safe distance 5 m. Be extremely careful if someone else is near the seed drill and tractor giving instructions on connecting and disconnecting.

DANGER
Ensure that the tractor is turned off and the key is removed from the ignition.

1. Open the machine lifting circuit ball valve in accordance with the instructions in section 5.3.5. Using the machine lifting circuit ball valve.
2. Disconnect the electric connections of the seed drill.
3. Disconnect the hydraulic hoses of the seed drill from the tractor.

DANGER
Depressurise the hydraulic system before disconnecting it. Follow the tractor manufacturer's instructions.

DANGER
Wear protective gloves when disconnecting the hydraulics.

4. Disconnect the drawbar of the seed drill from the tractor's hitch or the wheel packer from the tractor's link arms.

6.18. Machine storage

1. Clean the machine in accordance with the instructions in section 7.3. Cleaning.
2. Lubricate all lubrication points in accordance with section 7.2. Lubrication.
   - Damaged paint can be touched up after washing. The painted surface can be protected with a light application of oil, using protective oil intended for the purpose.
3. For seasonal storage of the machine, use a dry place protected from sunlight.

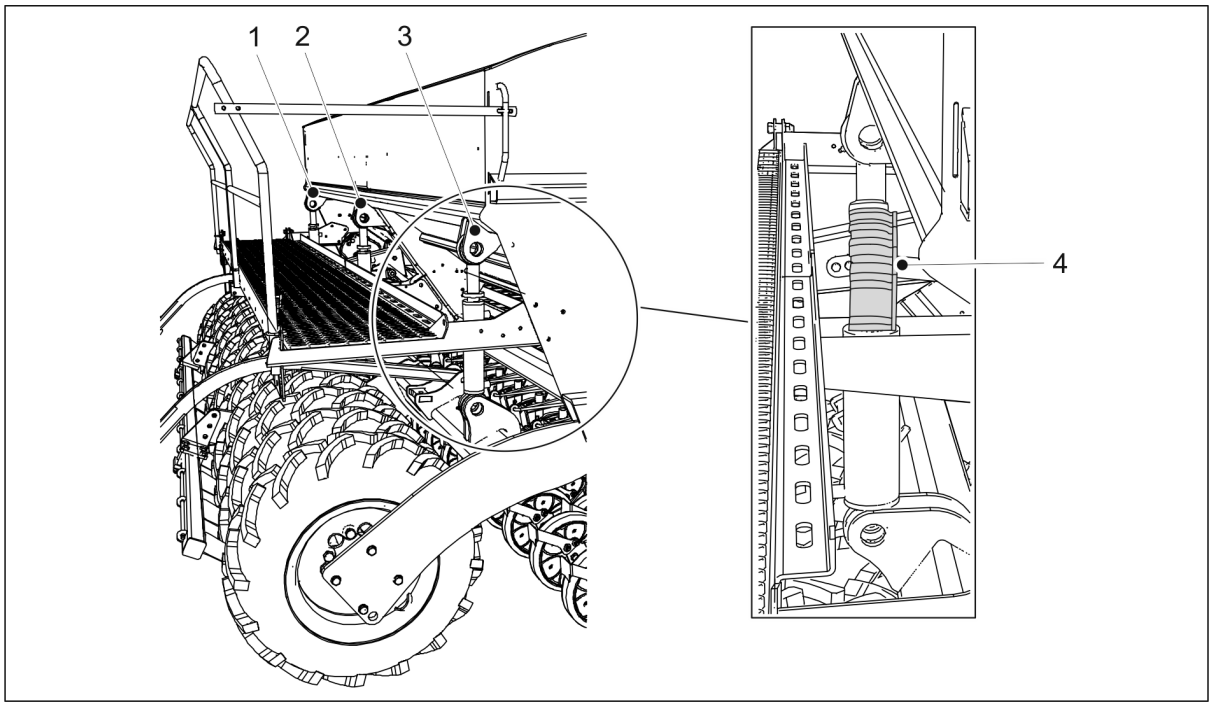


Figure. 6.18. - 169. Cylinder stoppers

4. Place the 4 cylinder stoppers (4) on the cylinder rod so that the coulters are slightly raised off of the ground.
    - The FX300 has 1 lifting cylinder (2) onto which the stoppers are placed. The FX400 has 3 lifting cylinders (1 -3). The stoppers are placed on the outermost cylinders (1, 3).
5. Depressurise the coulter pressure circuit by holding the tractor valve open for approx. 10 seconds.
    - The coulter pressure status is displayed on the user interface (see section 4.2.4.1. Drive screen).
6. Use wheel wedges or blocks to prevent the machine from moving during long-term storage.

7. Maintenance

DANGER
Depressurise the hydraulic system, disconnect the hoses and tractor's electrical connections and let the machine cool off before servicing.

DANGER
There is a crushing and cutting hazard in the machine's transmission when performing servicing and maintenance. Switch off power in the tractor, remove the key from the ignition and engage the parking brake before servicing.

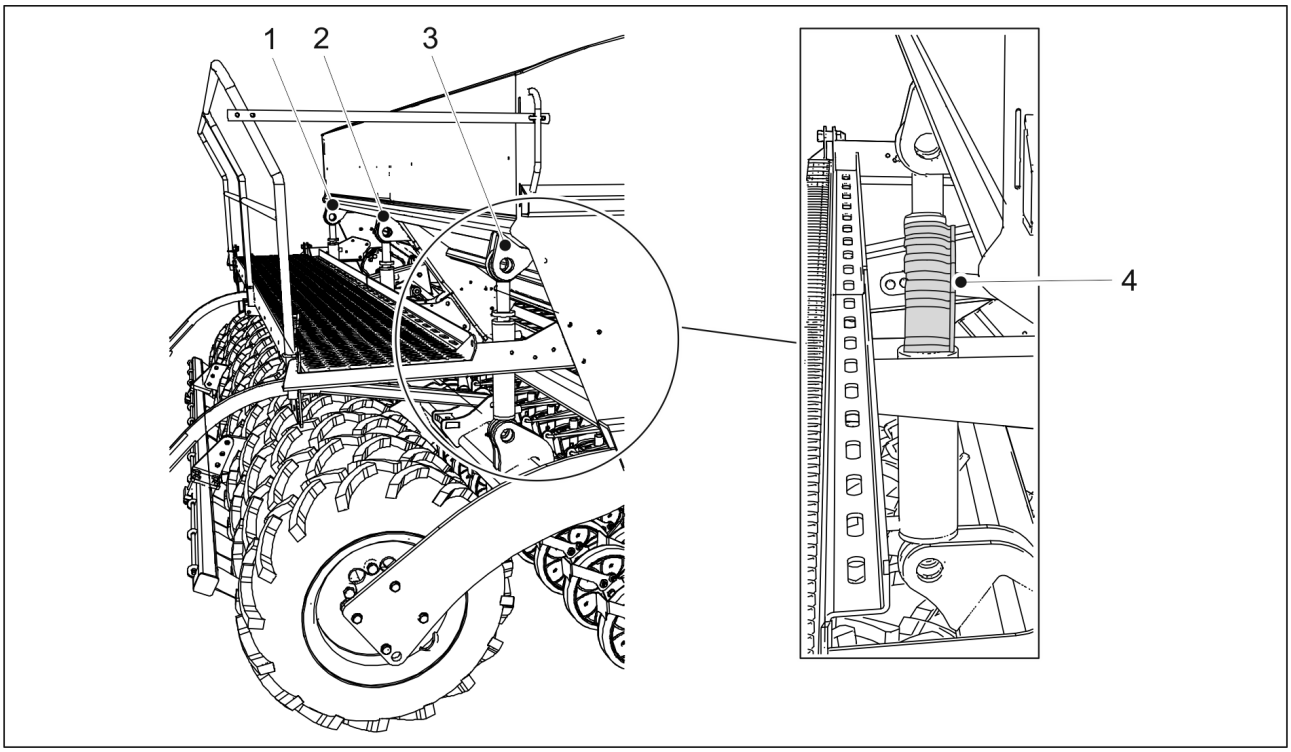


Figure. 7. - 170. Cylinder stoppers

DANGER
There is a crushing hazard when performing servicing and maintenance. Place 4 stoppers (4) on the lifting cylinder rods. The FX300 has 1 lifting cylinder (2) onto which the stoppers are placed. The FX400 has 3 lifting cylinders (1 -3). The stoppers are placed on the outermost cylinders (1, 3). Place a stand or other suitable support under the machine. Never go under the machine that is not propped up.

DANGER
Close the machine lifting circuit ball valve according to the instructions in section 5.3.5. Using the machine lifting circuit ball valve.

DANGER
There is a crushing hazard underneath the machine and a cutting hazard in the machine's transmission when performing servicing and maintenance. Before servicing, make sure that power is switched off in the tractor, the key is removed from the ignition and the parking brake is engaged.

DANGER
If the machine is equipped with middle markers, ensure that they have settled into their transport position and their ball valves are closed, as specified in section 3.4. Using the middle marker ball valves.

7.1. Inspections

7.1.1. Quick instructions, inspections

The inspections to be performed on the seed drill are shown in the table below. The inspections to be carried out once per operating season are performed in the spring when the machine is commissioned after winter storage.

Table. 7.1.1. - 18. Inspections to be performed on the seed drill

	1) After the first 10 hectares	2) Every 50 hectares	3) Every 500 hectares or once per operating season
7.1.2. Checking bolt tightness	X		X
7.1.3. Checking tyre pressure		X	X
7.1.4. Checking the bearing clearance of the wheel packer hubs			X
7.1.5. Checking the tightness of the transmission chains	X		X
7.1.6. Checking the tightness of the wheel drive chain	X		X
7.1.7. Inspecting the wheel drive clutch			X
7.1.8. Inspecting the wheel drive clearance	X		X
7.1.9. Checking the condition of hydraulics			X
7.1.10. Checking the condition of electric wires			X
7.1.11. Inspecting the towing eye			X
7.1.12. Checking the gearbox oil level			X
7.1.13. Inspecting the coulter discs			X
7.1.14. Checking the functioning of the adjusting of fertiliser target rate			X

7.1.2. Checking bolt tightness

7.1.2.1. Checking the tightness of the wheel bolts of the transport wheels

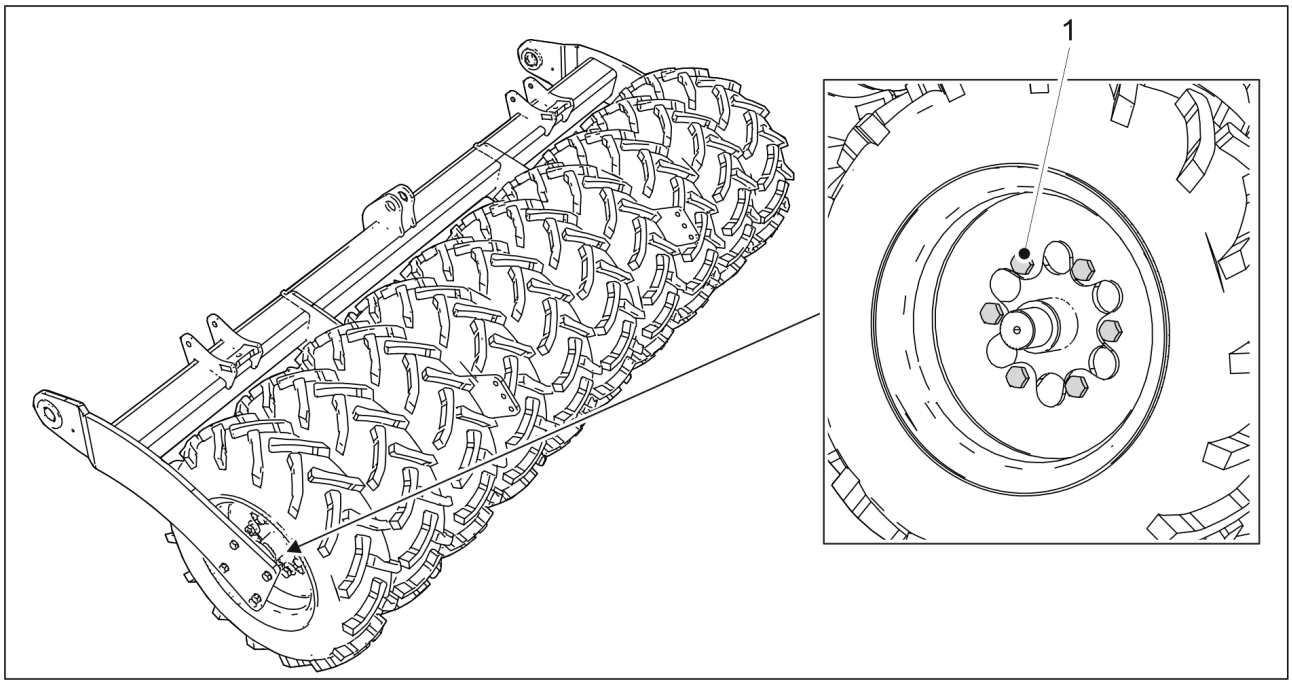


Figure. 7.1.2.1. - 171. Wheel bolts of the transport wheels

1. Check that all the M20 x 1.5 wheel bolts (1) of the transport wheels are tight.
   - Each transport wheel has 6 bolts. There are 10 transport wheels on the FX300 and 13 on the FX400.
     Tighten the bolts, if needed. If the gap between the tyres is narrow, tighten the bolts from the next gap by using a ratchet and a handle.
     The bolts have been factory-installed with a locking compound.

7.1.2.2. Checking the tightness of the bolts in the flange bearings of the transport wheels

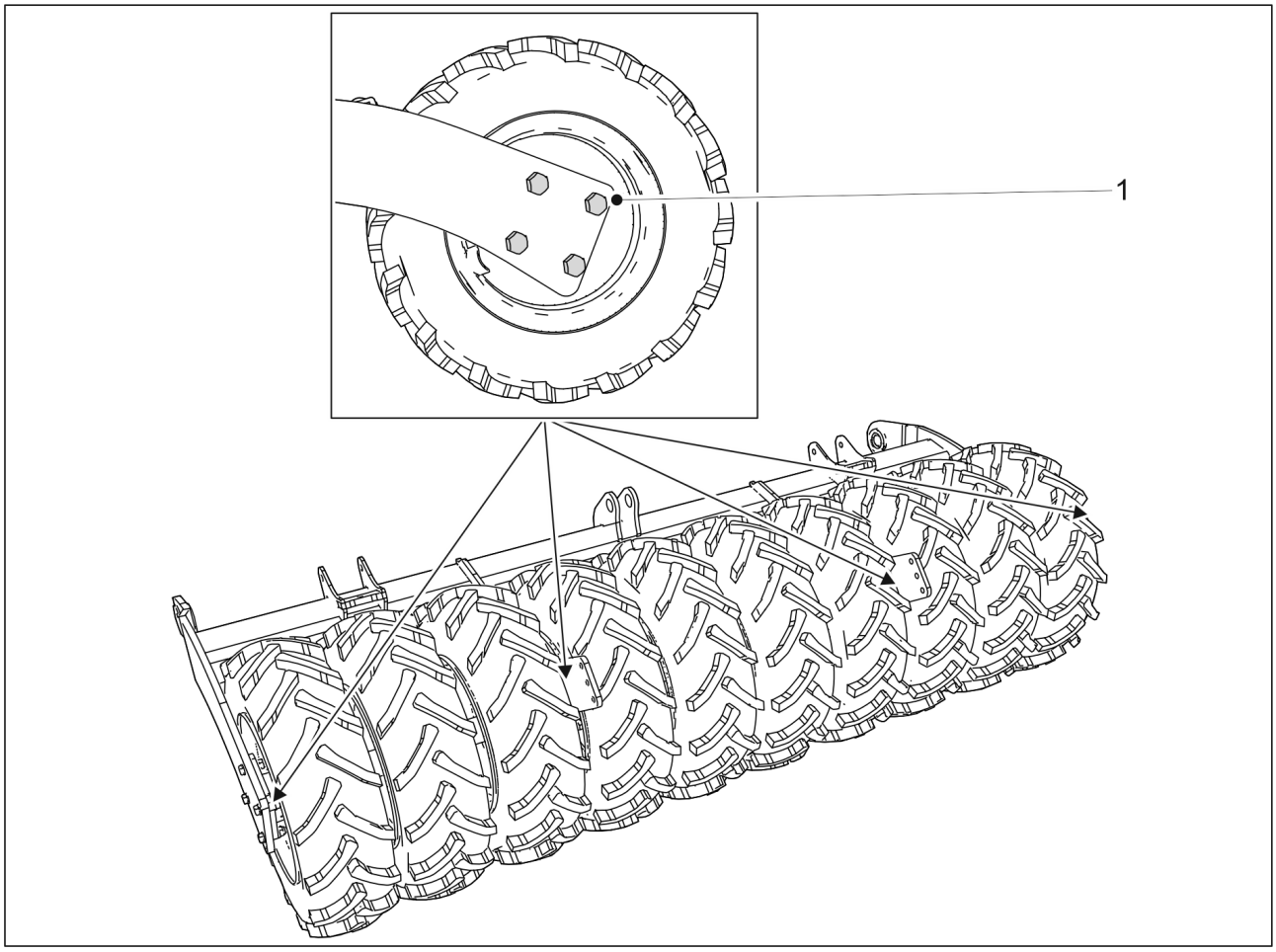


Figure. 7.1.2.2. - 172. Flange bearing bolts of the transportation running gear

1. Check that all the 24 M16 flange bearing bolts (1) of the transport wheel assembly are tight.
    - Each bearing has four bolts. There are six bearings.
      Tighten the bolts, if needed. If the gap between the tyres is narrow, tighten the bolts from the next gap by using a ratchet and a handle.

7.1.2.3. Checking the tightness of the wheel bolts of the wheel packer

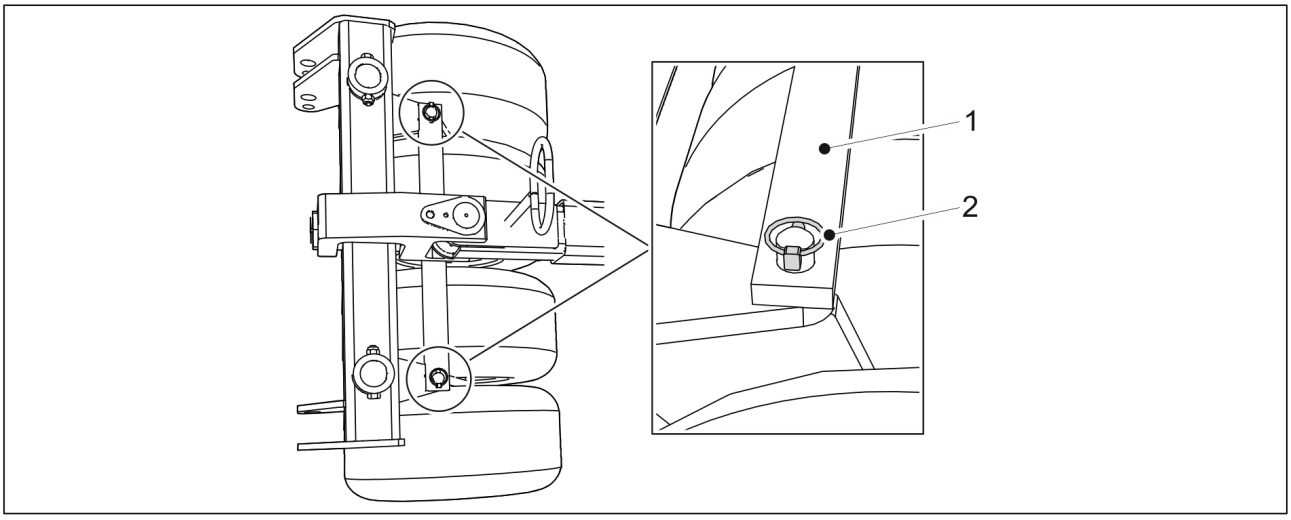


Figure. 7.1.2.3. - 173. Wheel packer bar

1. Detach the two cotters (2) of the wheel packer bar (1).
2. Detach the wheel packer bar by lifting it.

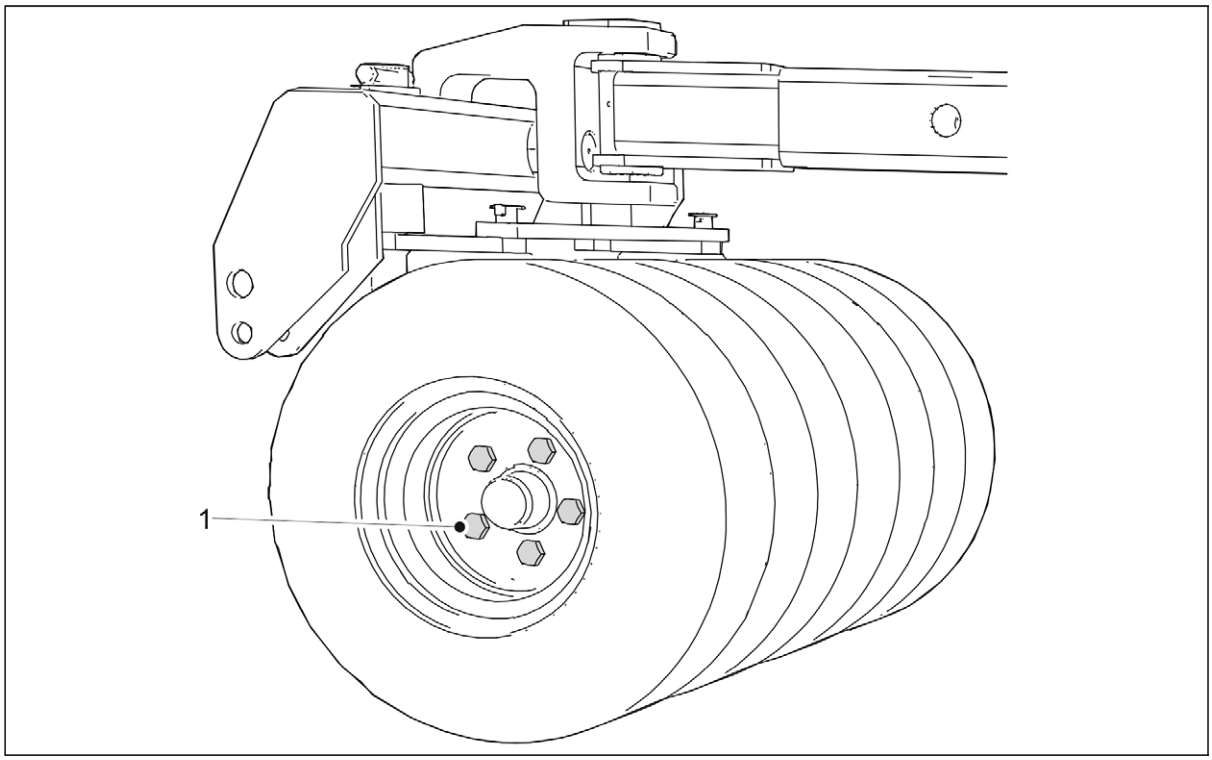


Figure. 7.1.2.3. - 174. Wheel bolts of the wheel packer

3. Check that all the 20 M18 wheel bolts (1) of the wheel packer are tight.
   - Tighten the bolts, if needed.
4. Replace the wheel packer bar and lock the bar with cotters.

7.1.2.4. Checking the tightness of coulter bolts

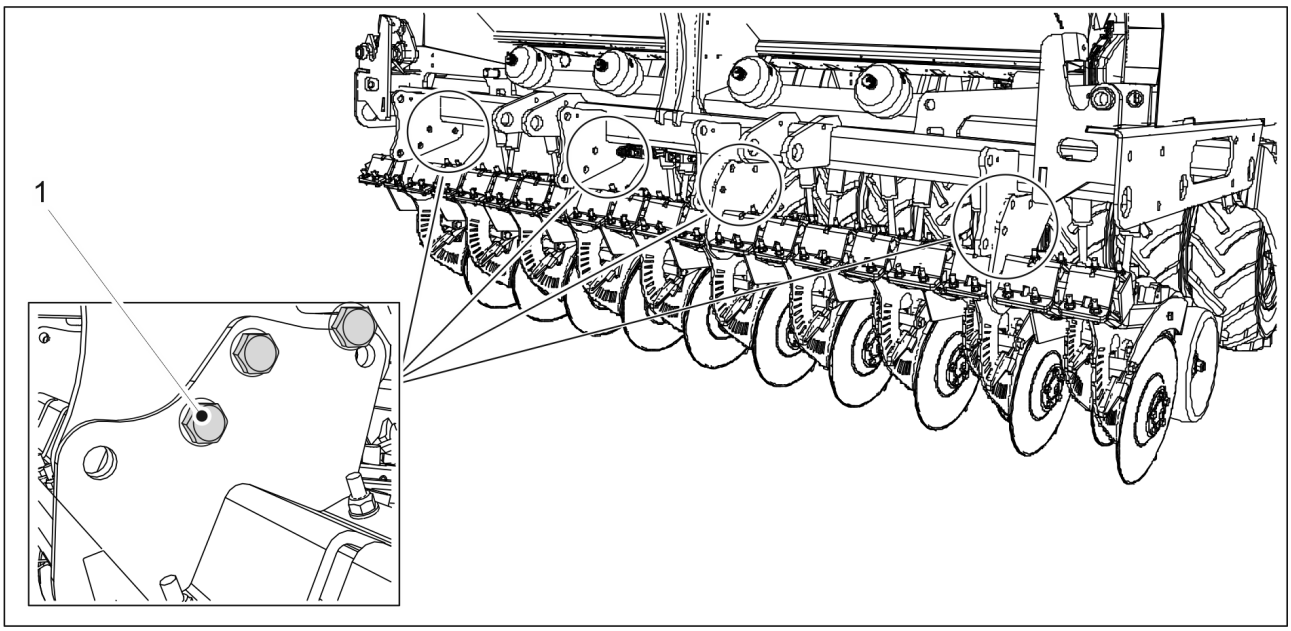


Figure. 7.1.2.4. - 175. Coulter shank bolts

1. Check that the coulter shank M20 bolts (1) are tight.
    - There are 12 coulter shank bolts on the FX300 and 18 on the FX400.
      If needed, tighten the bolts to torque 300 Nm.

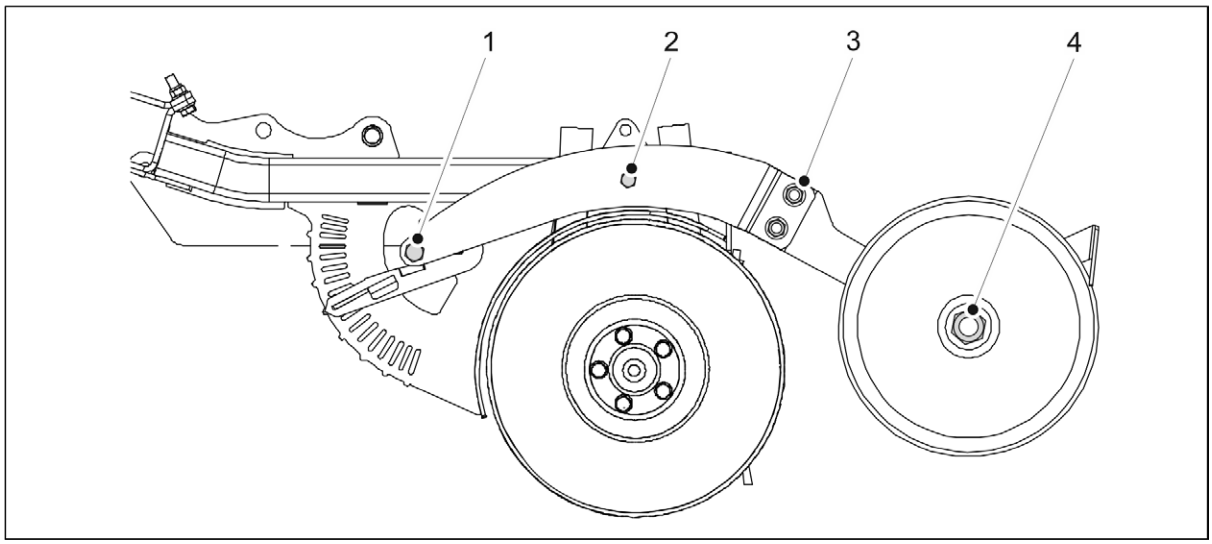


Figure. 7.1.2.4. - 176. Bolts of the coulter covering wheel and depth adjustment

2. Check that the 2 M16 (3) and M20 (4) bolts on all the coulter covering wheels are tight.
    - Tighten the bolts, if needed.
3. Check that the M16 (1) and M12 (2) coulter depth adjustment bolts are tight.
    - Tighten the bolts, if needed. The tightening torque is 120 Nm for the M12 bolt (2).

7.1.2.5. Checking the tightness of the working platform bolts

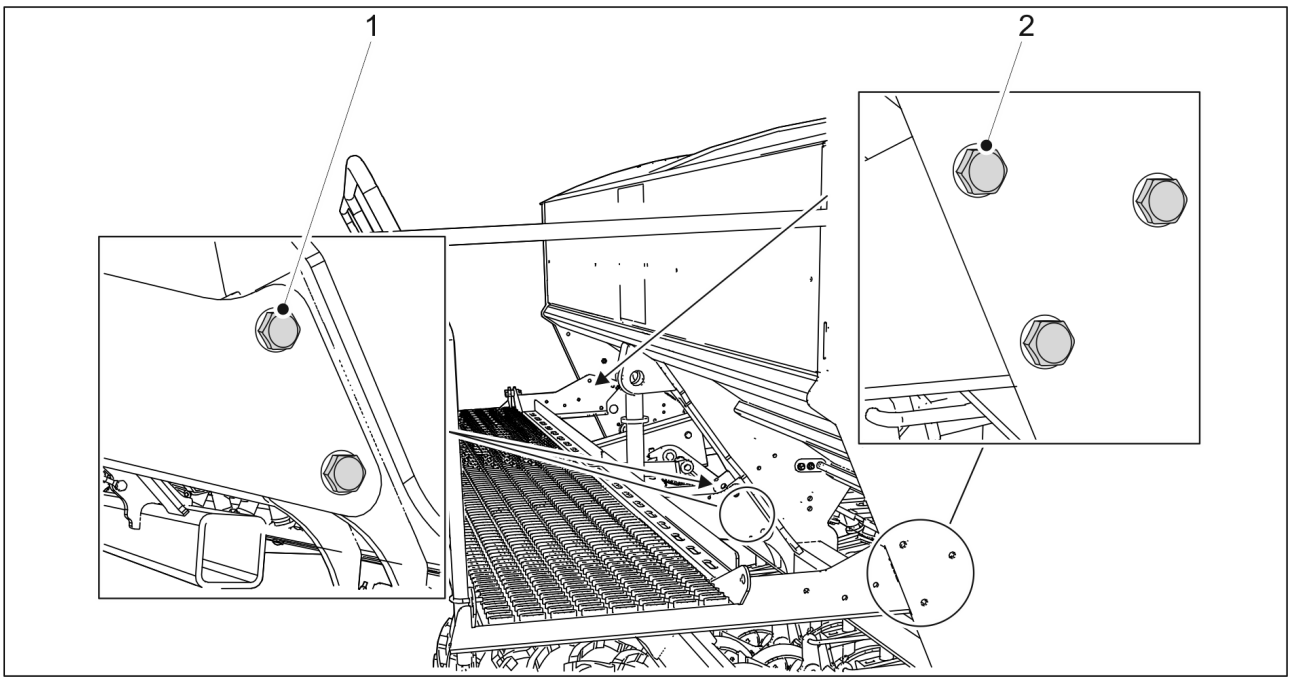


Figure. 7.1.2.5. - 177. Working platform bolts

1. Check that the 6 M12 bolts (2) of the working platform are tight.
    - Tighten the bolts, if needed.
2. Check that the 4 M16 bolts (1) near the lifting cylinder are tight.
    - Tighten the bolts, if needed.

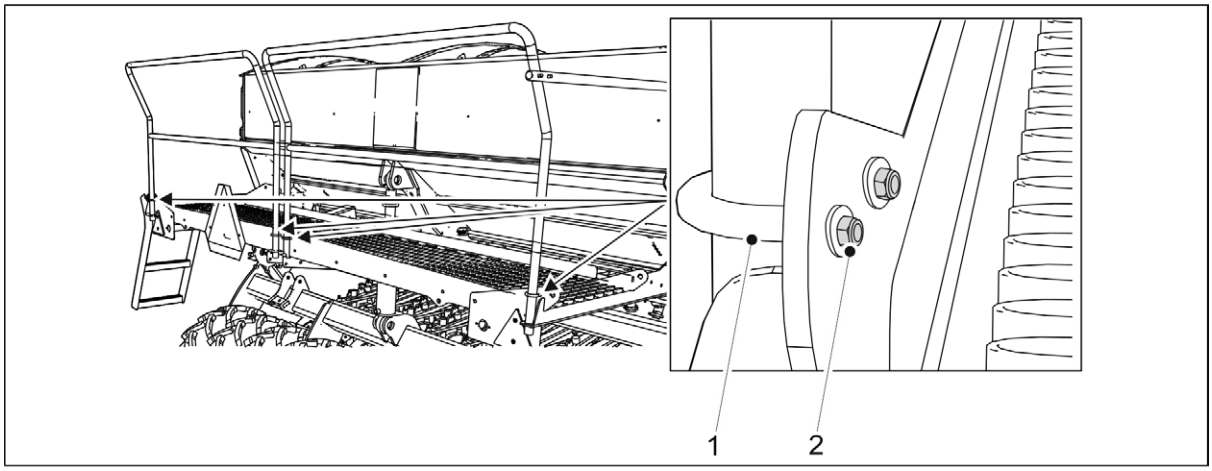


Figure. 7.1.2.5. - 178. Working platform U-bolts

3. Check that the 8 M8 nuts (2) on the 4 U-bolts (1) are tight.
    - Tighten the bolts, if needed.

7.1.2.6. Checking the tightness of the towing eye bolts

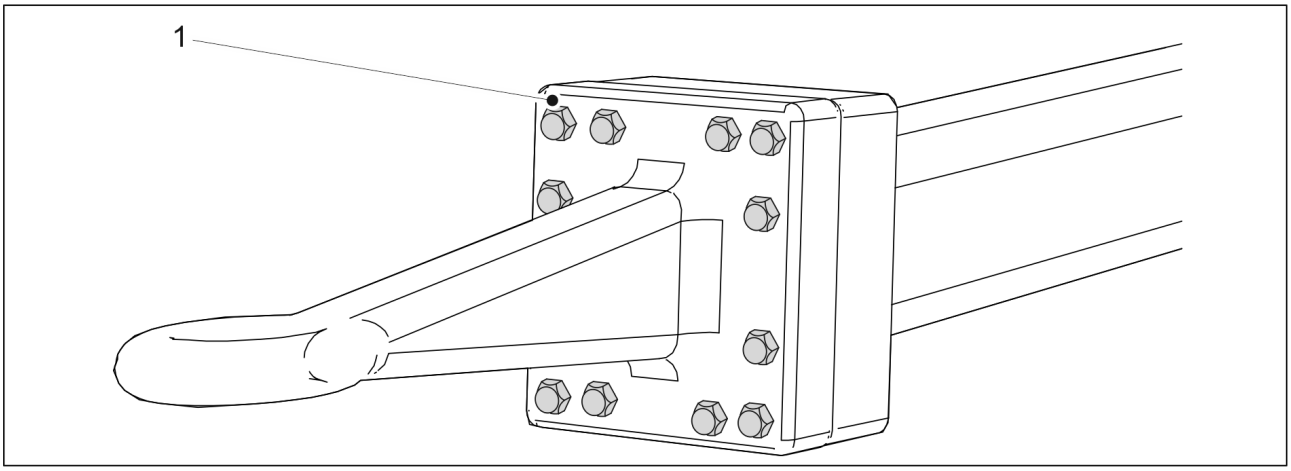


Figure. 7.1.2.6. - 179. Towing eye bolts

1. Check that the 12 bolts (1) of the towing eye are tight.
    - If needed, tighten the bolts to torque 400 Nm.

7.1.3. Checking tyre pressure

- The correct rear tyre (250/80-18) pressure is 1.5 bar.
  The correct tyre pressure of the wheel packer, available as an accessory, is 3.0 bar.

7.1.4. Checking the bearing clearance of the wheel packer hubs

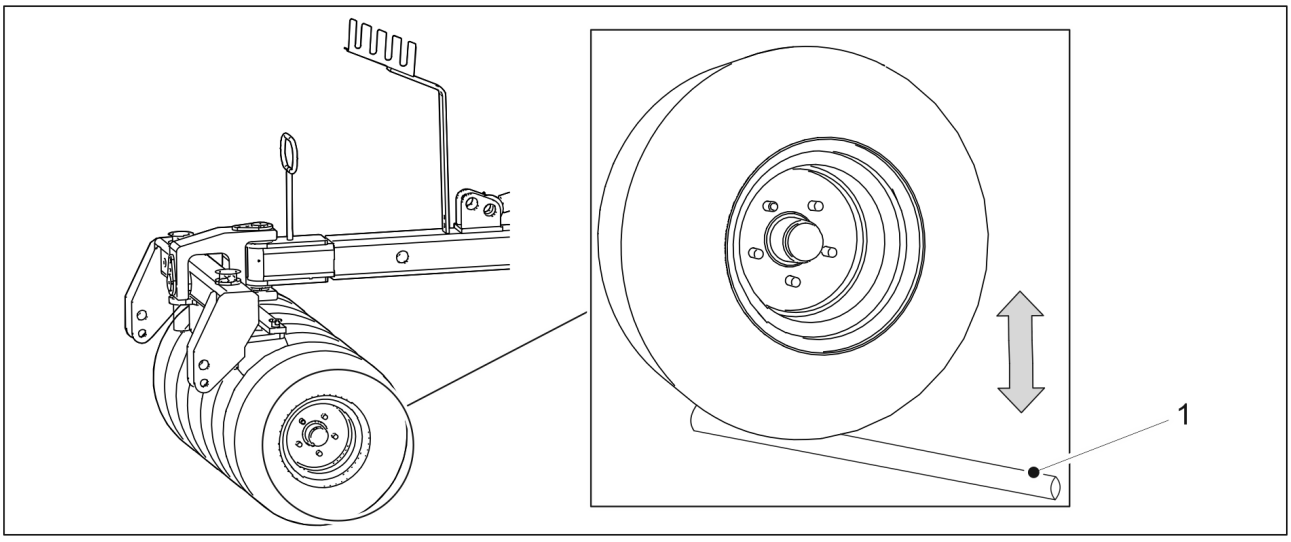


Figure. 7.1.4. - 180. Checking the bearing clearance of the wheel packer hubs

1. Insert a bar (1) between the wheel and the platform.
2. Move the bar to ensure that the beating of the wheel is not loose.
    - If the bearing of the wheel hubs is loose, tighten the bearing in accordance with section 7.6.1. Tightening the bearing.

7.1.5. Checking the tightness of the transmission chains

7.1.5.1. Checking the tightness of chains in a machine without a gearbox

1. Raise the transmission cover.

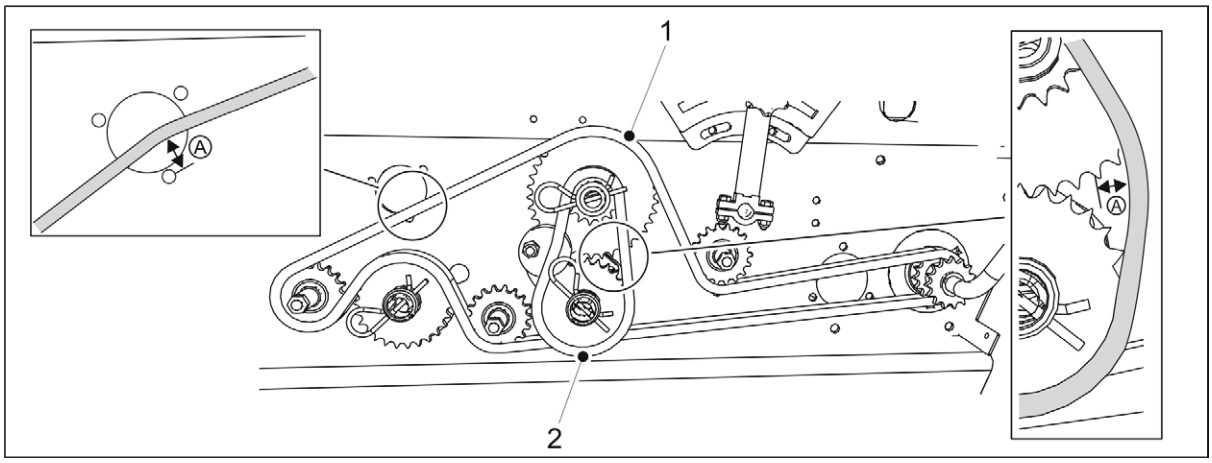


Figure. 7.1.5.1. - 181. Checking the tightness of chains in a machine without a gearbox

2. Check the deflection of the fertiliser side chain (1) and the seed side chain (2) by pressing the chain down and lifting it up with your finger.
   - The maximum allowed chain deflection (A) is 10 mm. If needed, tighten the chains in accordance with section 7.5.1. Tightening the chains in a machine without a gearbox.
3. Put the transmission cover back in place.

7.1.5.2. Checking the tightness of chains in a machine with a gearbox on the seed side

1. Raise the transmission cover.

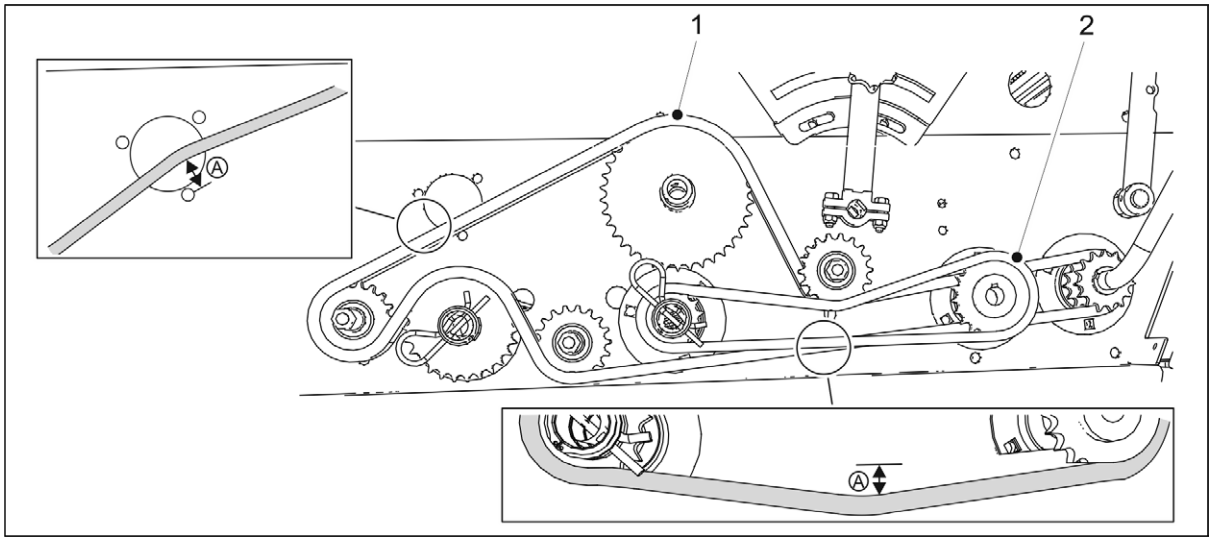


Figure. 7.1.5.2. - 182. Checking the tightness of the transmission chains in a machine with a gearbox on the seed side

2. Check the deflection of the fertiliser side chain (1) and the seed side chain (2) by pressing the chain down and lifting it up with your finger.
    - The maximum allowed deflection (A) is 10 mm. If needed, tighten the chains in accordance with section 7.5.2. Tightening the chains in a machine with a gearbox on the seed side.
3. Put the transmission cover back in place.

7.1.5.3. Checking the tightness of chains in a machine with a dual gearbox

1. Raise the transmission cover.

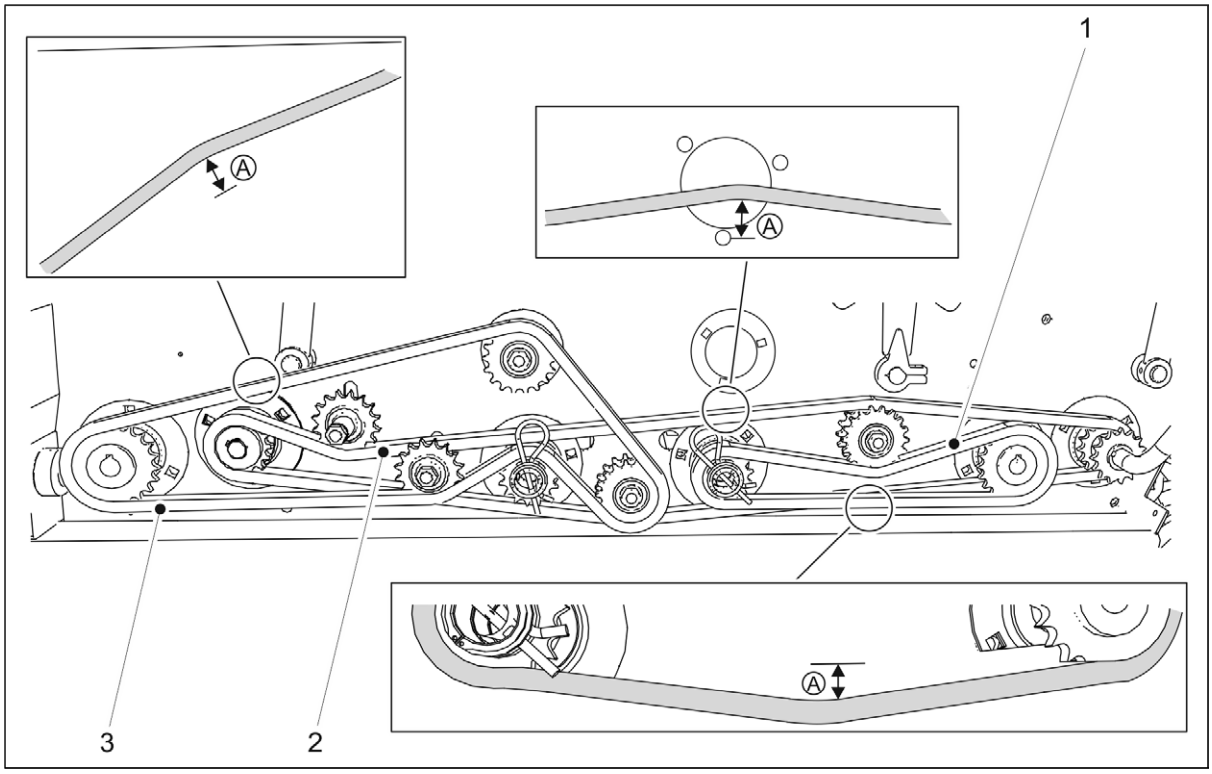


Figure. 7.1.5.3. - 183. Checking the tightness of the transmission chains in a machine with a dual gearbox

2. Check the deflection of the transmission chain (2), fertiliser side chain (3) and the seed side chain (1) by pressing the chain down and lifting it up with your finger.
    - The maximum allowed deflection (A) is 10 mm. If needed, tighten the chains in accordance with section 7.5.3. Tightening the chains in a machine with a dual gearbox.
3. Put the transmission cover back in place.

7.1.5.4. Checking the tightness of the chains in the small seed hopper transmission

1. Raise the transmission cover.

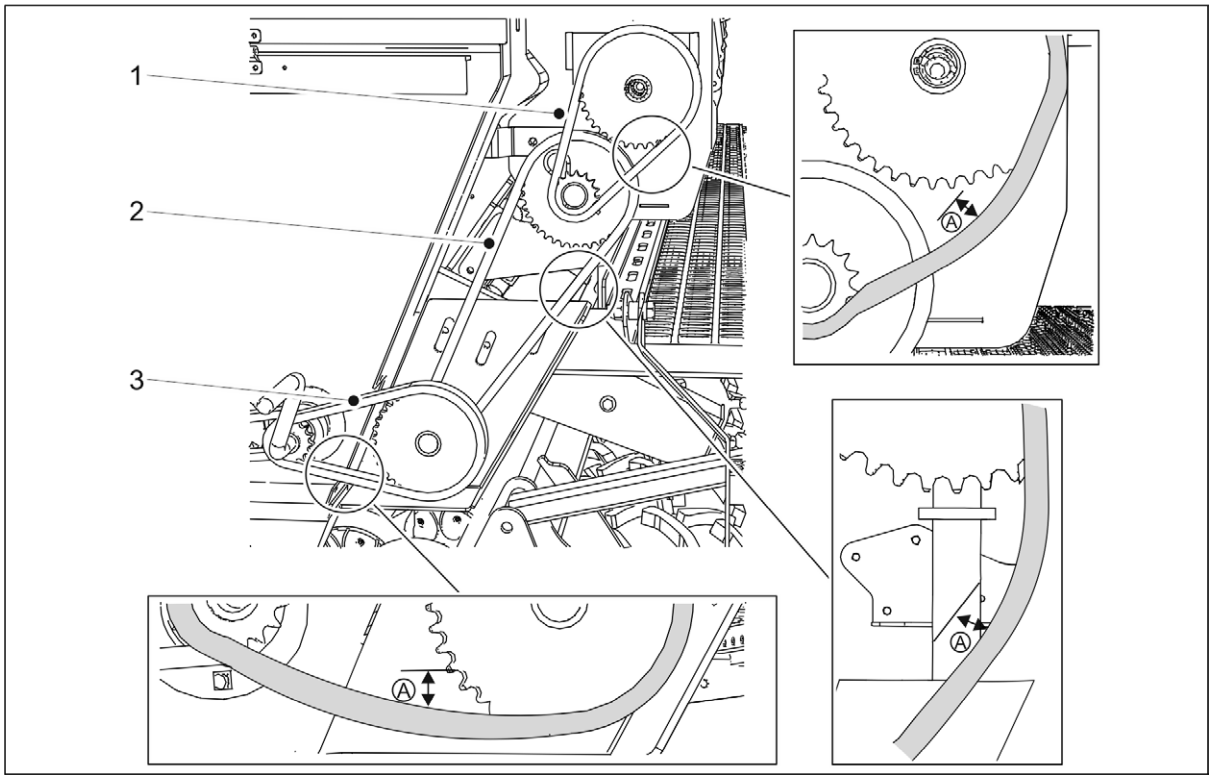


Figure. 7.1.5.4. - 184. Checking the tightness of the chains in the small seed hopper transmission

2. Check the deflection of the chains (1-3) by pressing the chain down and lifting it up with your finger.
    - The maximum allowed deflection (A) is 10 mm. If needed, tighten the chains in accordance with section 7.5.4. Tightening the transmission chains of the small seed hopper.
3. Put the transmission cover back in place.

7.1.6. Checking the tightness of the wheel drive chain

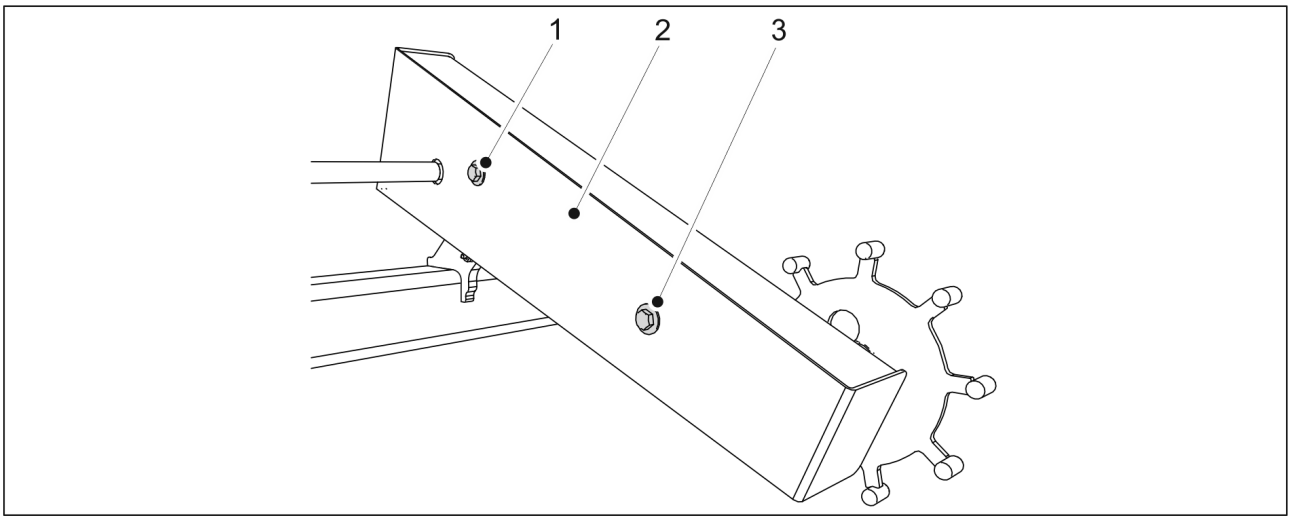


Figure. 7.1.6. - 185. Cover of the wheel drive housing

1. Open and remove the fastening bolts (1,3) of the wheel drive housing and the housing cover (2).

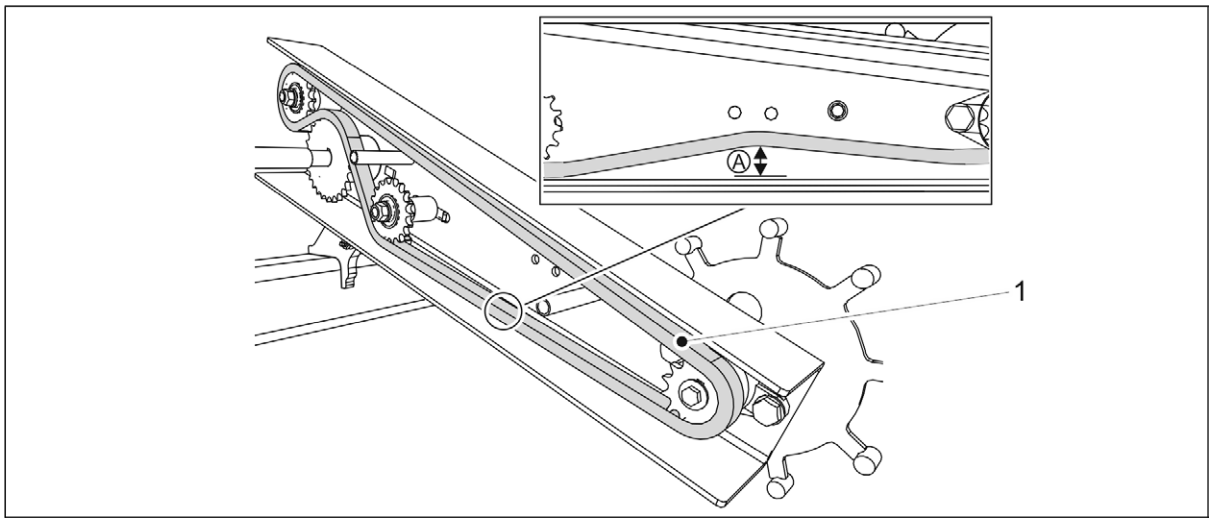


Figure. 7.1.6. - 186. Wheel drive chain

2. Check the chain (1) deflection.
   - The maximum allowed chain deflection (A) is 10 mm. If needed, adjust the chain tension in accordance with section 7.7.1. Tightening the wheel drive chain.
3. Reattach the housing cover and fasten the two bolts of the cover.
   - Always use new locknuts to install.

7.1.7. Inspecting the wheel drive clutch

- The clutch should be inspected once per year / seeding season.

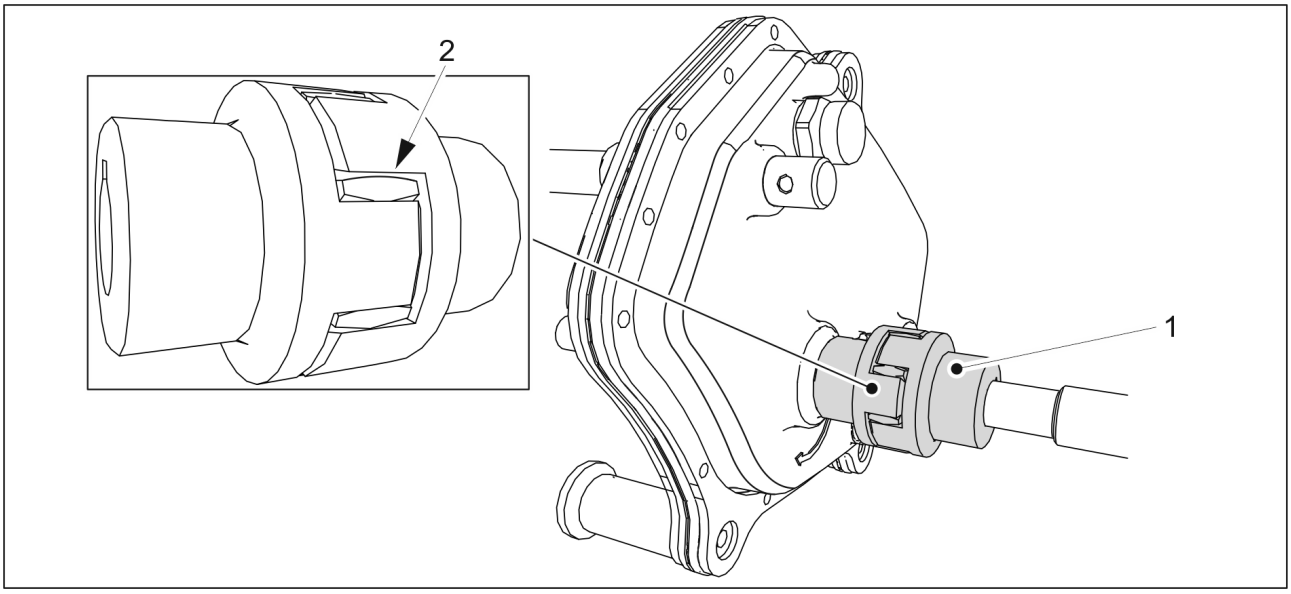


Figure. 7.1.7. - 187. Inspecting the clutch

1. Check the clearance of the flexible coupling element of the clutch (1).
   - Check the clearance of the flexible coupling element by measuring the distance between the hub and the flexible coupling element (2) by using a clearance gauge.
     If the clearance is 3 mm or more, replace the flexible coupling element in accordance with section 7.7.2. Replacing the wheel drive clutch.

7.1.8. Inspecting the wheel drive clearance

1. Lower the machine to its working position.

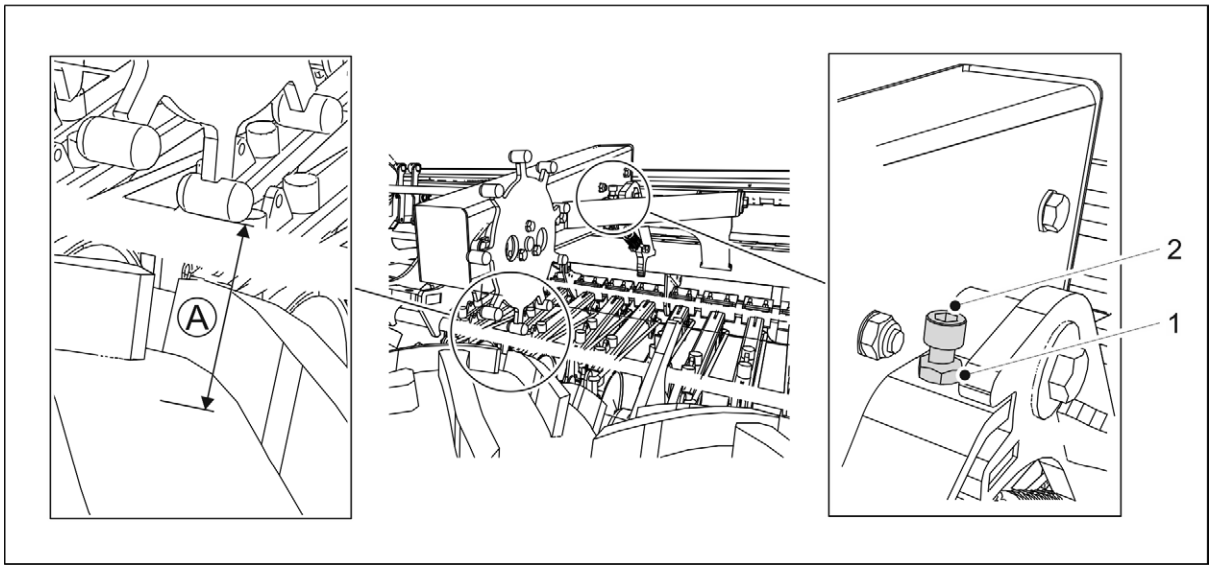


Figure. 7.1.8. - 188. Inspecting the wheel drive clearance

2. Inspect the wheel drive clearance (A).
   - Measure the clearance between the wheel drive head and lower surface of the transport wheel. The clearance should be 3-5 mm.
     First loosen the locking nut (1) to adjust the clearance.
     If the clearance is less than 3 mm, raise the drive wheel by turning the bolt (2) clockwise.
     If the clearance is more than 5 mm, lower the drive wheel by turning the bolt (2) counterclockwise.
     After adjusting, tighten the locking nut (1).

7.1.9. Checking the condition of hydraulics

1. Check the tightness of the hydraulic system.
2. If needed, tighten the joints.
3. Make sure that the hoses are intact and have no leaks.

   - If needed, contact maintenance.

7.1.10. Checking the condition of electric wires

1. Ensure that the insulation of the wires is not worn and that the wires are visible.
2. Ensure that the insulation of the wires have not melted and have no signs of heating or burning.

   If needed, repair by using tape as additional insulation.
   If a wire or leads of the wire are cut, contact maintenance.

7.1.11. Inspecting the towing eye

1. Check that the towing eye is not too worn.

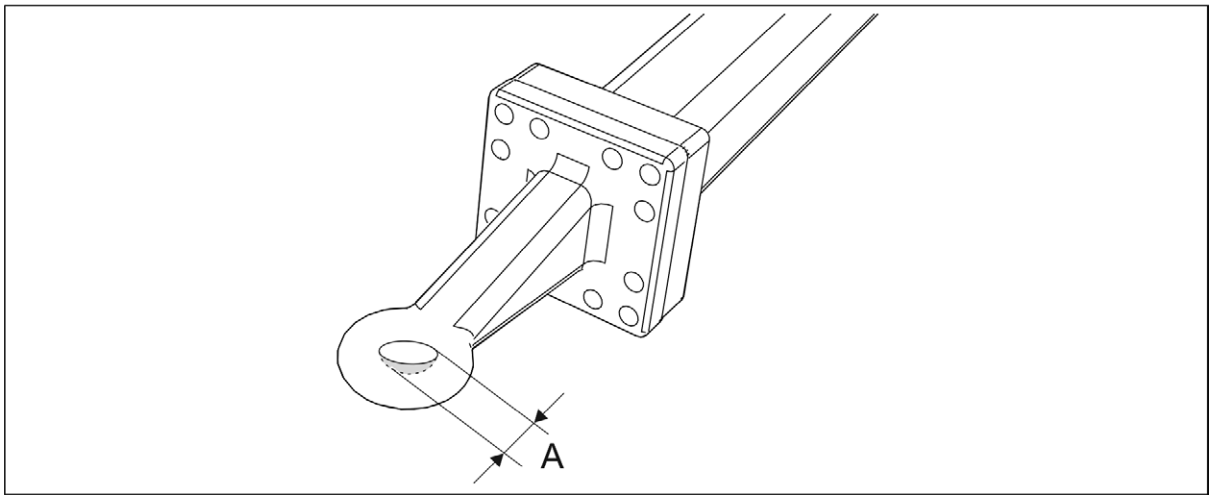


Figure. 7.1.11. - 189. Wear in the towing eye

- The maximum wear (A) is 2.5 mm. The maximum size for the opening is 52.5 mm.

2. Check that there are no fractures in the towing eye.

- If necessary, replace the towing eye in accordance with the instructions in section 7.8.1. Replacing the towing eye.

7.1.12. Checking the gearbox oil level

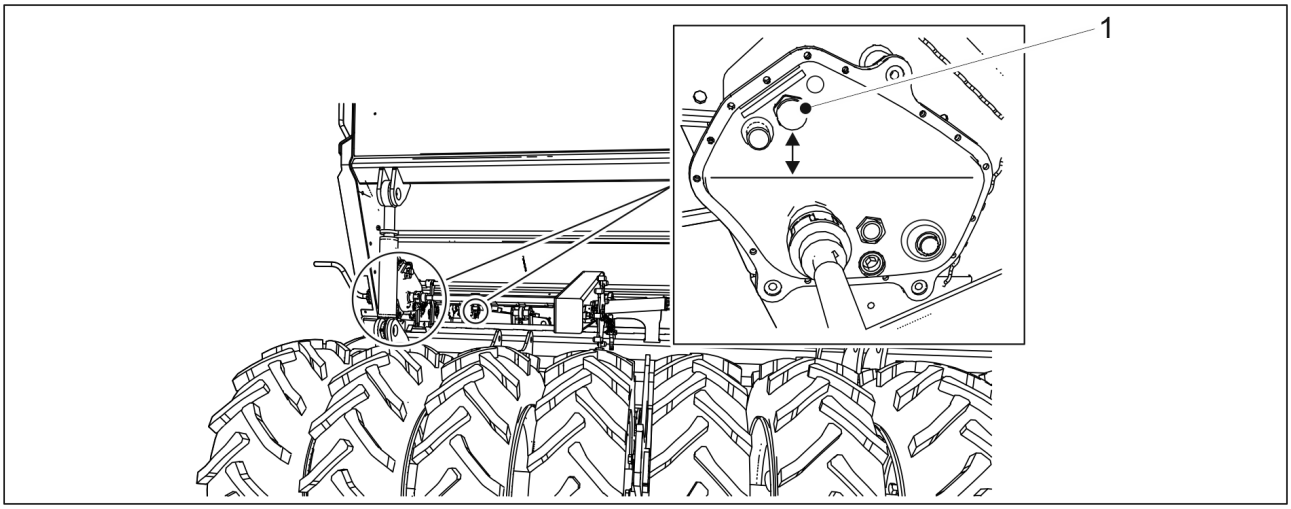


Figure. 7.1.12. - 190. Gearbox oil level

1. Check the oil level in the gearbox(es).
   - The oil level should be at 40-45 mm from the bottom of the fill hole (1). If needed, add oil.
     The oil must be changed at least every five years to remove condensed water from the gearbox.
     The correct oil volume is 0.8 litres. Use ISO VG32 grade hydraulic oil.

7.1.13. Inspecting the coulter discs

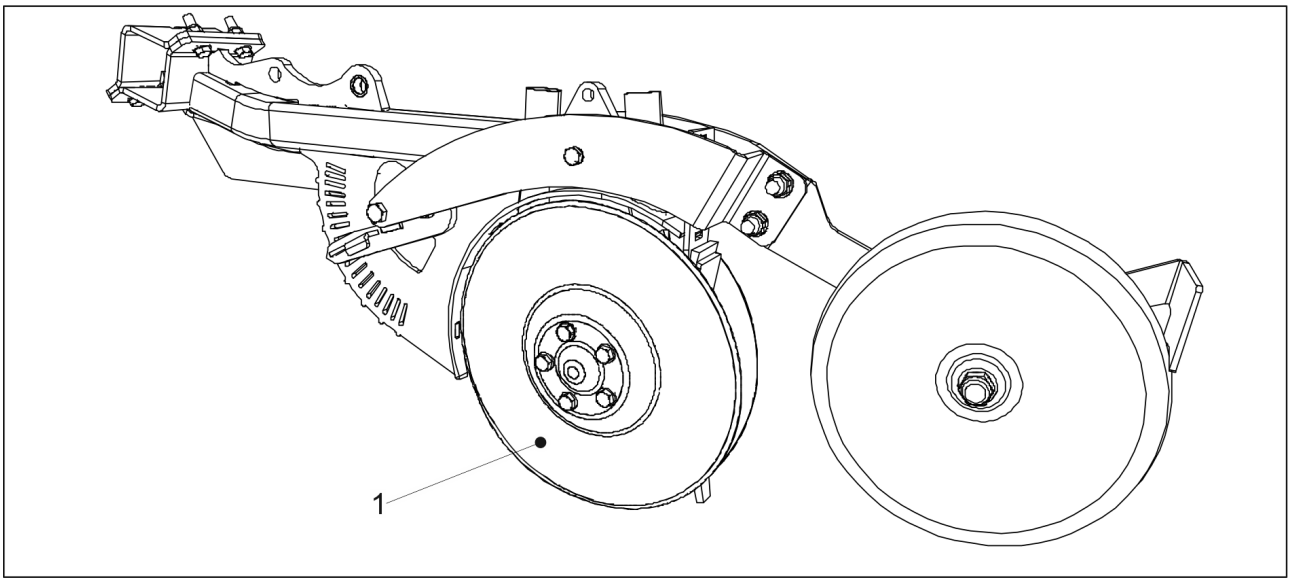


Figure. 7.1.13. - 191. Discs of the coulters

1. Check that the movement of discs (1) in relation to one another is slightly restrained and no clearance is felt in the bearing when turning a disc from the rear edge.
    - If the discs move easily in relation to one another or the bearing clearance is excessive, adjust the pretension with a shim.
      If a disc does not rotate, clean the discs, if needed, in accordance with section 7.3.4. Cleaning the coulter discs. If the disc still does not rotate, replace the disc, if needed, in accordance with section 7.9.2. Replacing a coulter disc or replace the bearing in accordance with section 7.9.3. Replacing a coulter bearing.
2. Measure the diameter of the disc.
    - The disc should be round, with a minimum diameter of 350 mm. If the diameter is less than 350 mm, replace the disc in accordance with section 7.9.2. Replacing a coulter disc.

7.1.14. Checking the functioning of the adjusting of fertiliser target rate

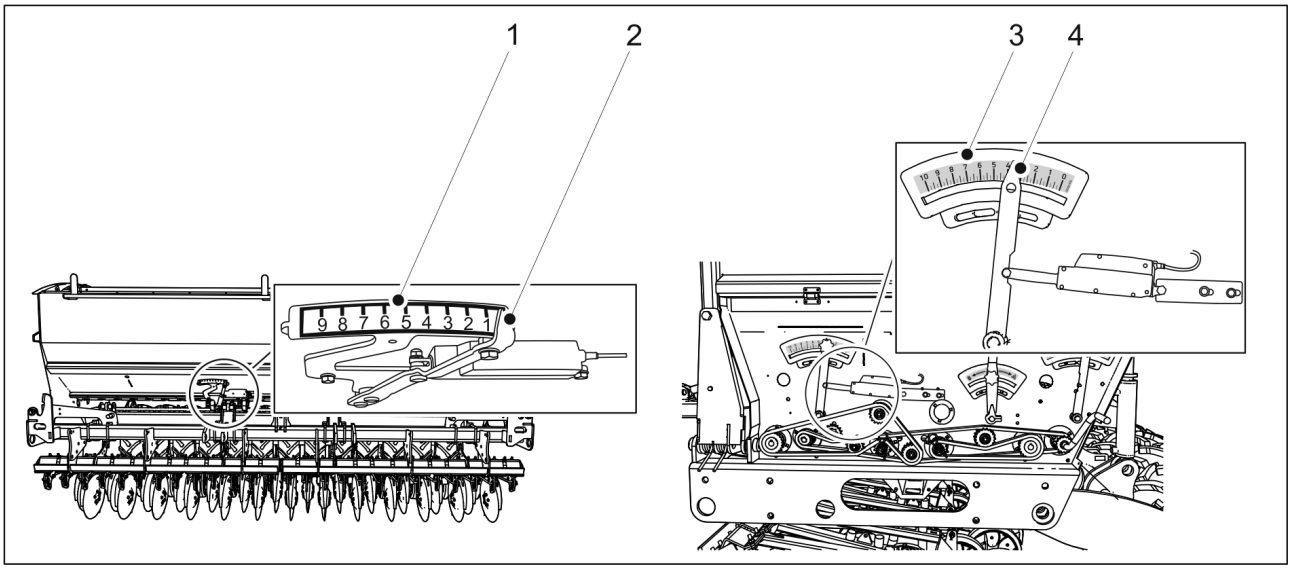


Figure. 7.1.14. - 192. Checking the functioning of the adjusting of fertiliser target rate On the left, a machine without a gearbox and, on the right, a machine equipped with a gearbox on the seed side (basic model). On the right, a machine with a dual gearbox (machine with gearbox).

1. Enable the adjusting of fertiliser target rate and ensure that the pointer (2, 4) moves on the fertiliser feeding quantity scale (1, 3).
    - On the basic model, the adjustment only moves when the seed shafts rotate. On the machine with gearbox, the adjustment moves even when the seed shafts do not rotate.

7.2. Lubrication

- After the commissioning of the machine, all lubrication points should be lubricated after the first 10 hectares.
  The coulter discs are equipped with permanently lubricated bearings, which do not need to be lubricated.
  When lubricating, make sure that the grease nipple is open. Lubricate the point until grease flows out of the joint. Usually, 1-2 squeezes of a grease gun is enough for the grease nipples. Wipe off excess grease.
  Use lithium-based lubricating grease for lubrication. The chains are lubricated with high-quality motor oil.
  The use of heavy, long-fibre greases and greases containing solid lubricant particles (molybdenum sulphide and graphite) is prohibited.

7.2.1. Quick instructions, lubrication

Table. 7.2.1. - 19. Lubrication points

	1) Every 50 hectares	2) Every 500 hectares or once per operating season	Number of lubricating nipples in the machine (pcs)
7.2.2. Lubricating the transmission chains		X	
7.2.3.1. Lubricating the wheel drive chain		X	
7.2.3.2. Lubricating wheel axle bearings		X	3
7.2.4. Lubricating the rear axle mounting		X	2
7.2.5. Lubricating wheel axle bearings		X	6
7.2.6. Lubricating the lifting cylinder		X	FX300: 2 FX400: 6
7.2.7. Lubricating the towing eye		X	
7.2.8. Lubricating the middle marker cylinders		X	4
7.2.9. Lubricating the rear marker cylinders		X	4
7.2.10. Lubricating the wheel packer pins and wheel hubs.	X	X	6 (in pins) 4 (in wheels)
7.2.11. Lubricating the cylinders of the front levelling board		X	2
7.2.12. Lubricating the drawbar cylinder		X	2
7.2.13. Lubricating the turnbuckle		X	4

7.2.2. Lubricating the transmission chains

7.2.2.1. Lubricating the chains in a machine without a gearbox

1. Raise the transmission cover.

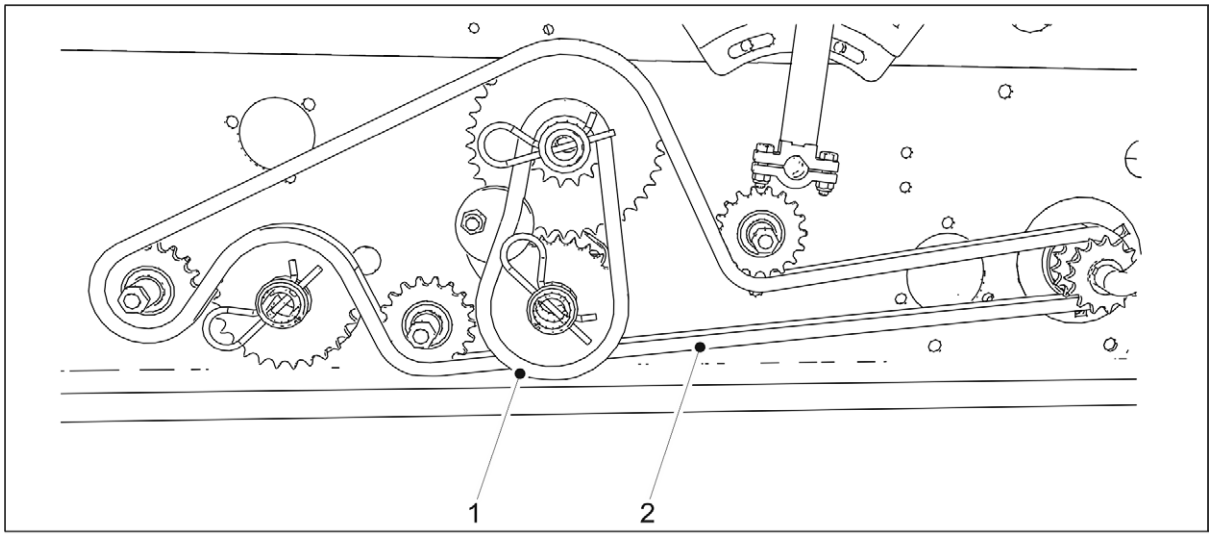


Figure. 7.2.2.1. - 193. Lubricating the chains in a machine without a gearbox

2. Lubricate the seed side chain (1) and the fertiliser side chain (2).
   - Make sure that oil also flows between the chain discs and not only in the reel.
3. Put the transmission cover back in place.

7.2.2.2. Lubricating the chains in a machine with a gearbox on the seed side

1. Raise the transmission cover.

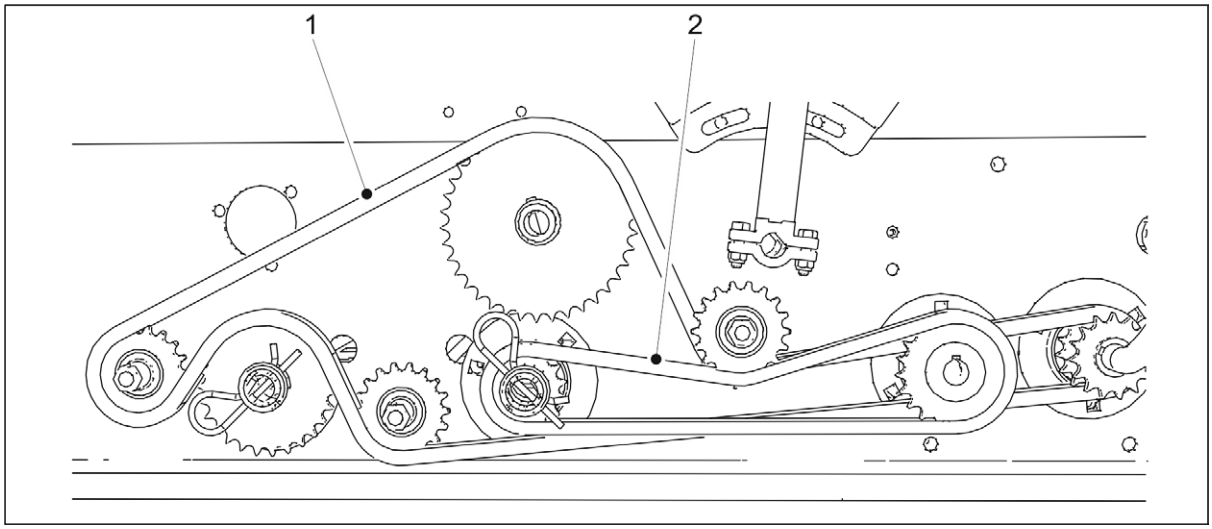


Figure. 7.2.2.2. - 194. Lubricating the chains in a machine with a gearbox on the seed side

2. Lubricate the fertiliser side chain (1) and the seed side chain (2).
   - Make sure that oil also flows between the chain discs and not only in the reel.
3. Put the transmission cover back in place.

7.2.2.3. Lubricating chains in a machine with a dual gearbox

1. Raise the transmission cover.

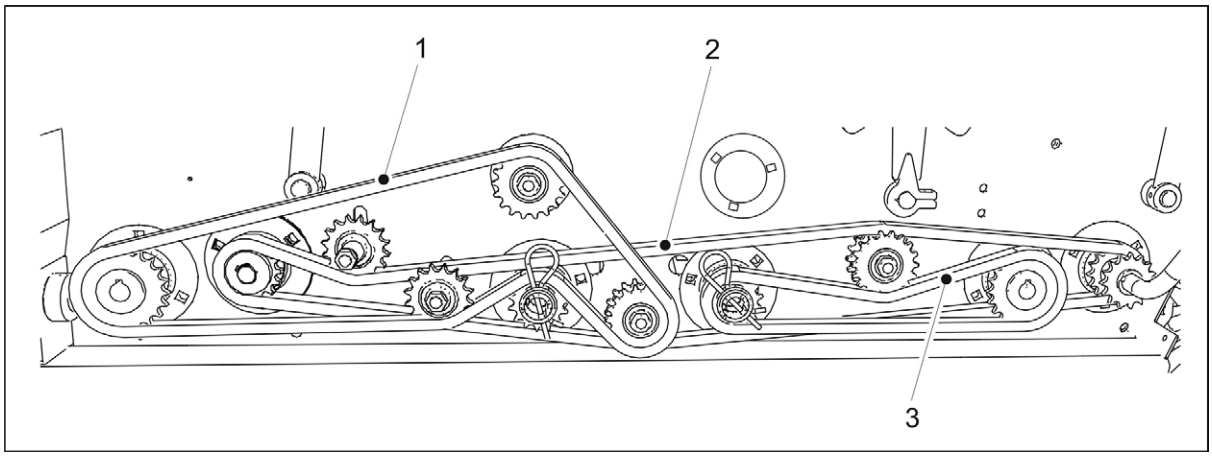


Figure. 7.2.2.3. - 195. Lubricating chains in a machine with a dual gearbox

2. Lubricate the transmission chain (2), fertiliser side chain (1) and the seed side chain (3).
    - Make sure that oil also flows between the chain discs and not only in the reel.
3. Put the transmission cover back in place.

7.2.2.4. Lubricating the small seed hopper transmission chains

1. Raise the transmission cover.

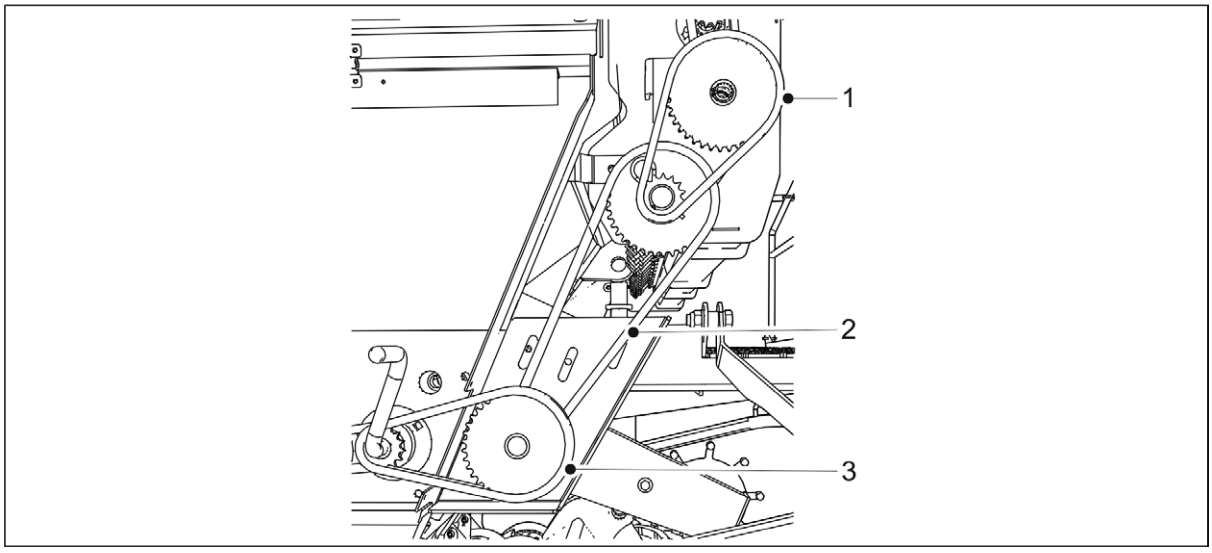


Figure. 7.2.2.4. - 196. Lubricating the small seed hopper transmission chains

2. Lubricate the chains (1-3).
    - Make sure that oil also flows between the chain discs and not only in the reel.
3. Put the transmission cover back in place.

7.2.3. Lubricating the wheel drive

7.2.3.1. Lubricating the wheel drive chain

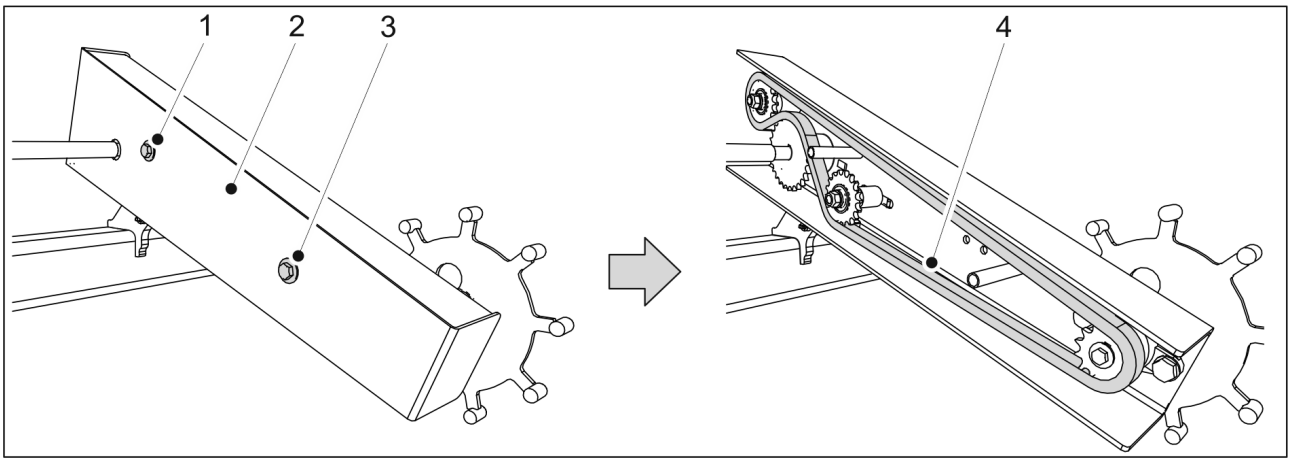


Figure. 7.2.3.1. - 197. Wheel drive chain

1. Open and remove the two fastening bolts (1,3) of the wheel drive housing and the housing cover (2).
2. Lubricate the chain (4).
    - Make sure that oil also flows between the chain discs and not only in the reel.
3. Reattach the housing cover and fasten the two fastening bolts of the cover.
    - Always use new locknuts to fasten.

7.2.3.2. Lubricating wheel axle bearings

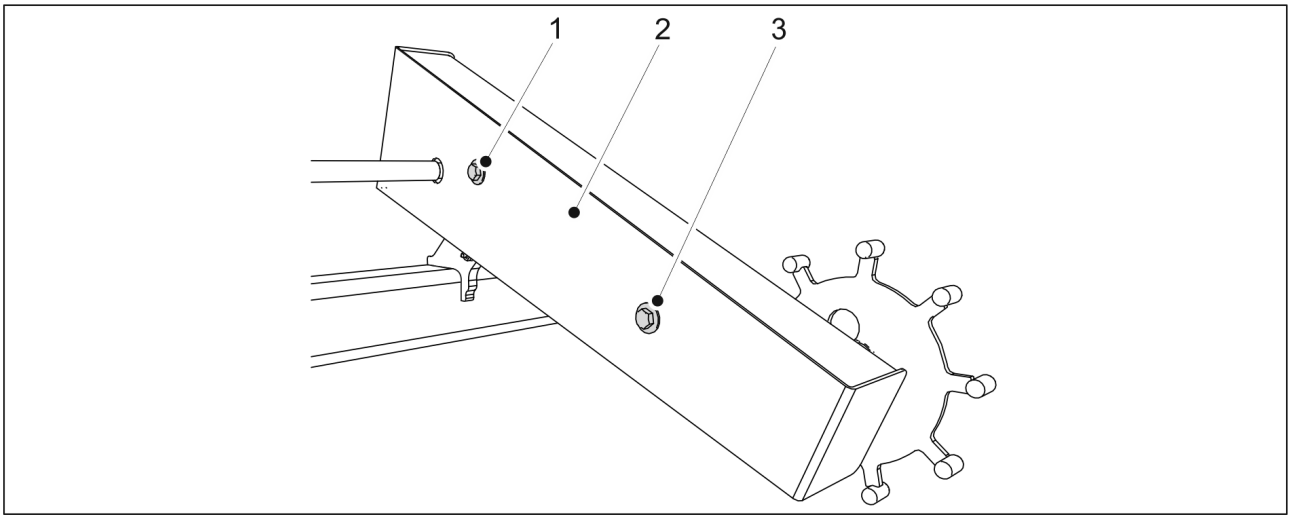


Figure. 7.2.3.2. - 198. Cover of the wheel drive housing

1. Open and remove the two fastening bolts (1,3) of the wheel drive housing and the housing cover (2).

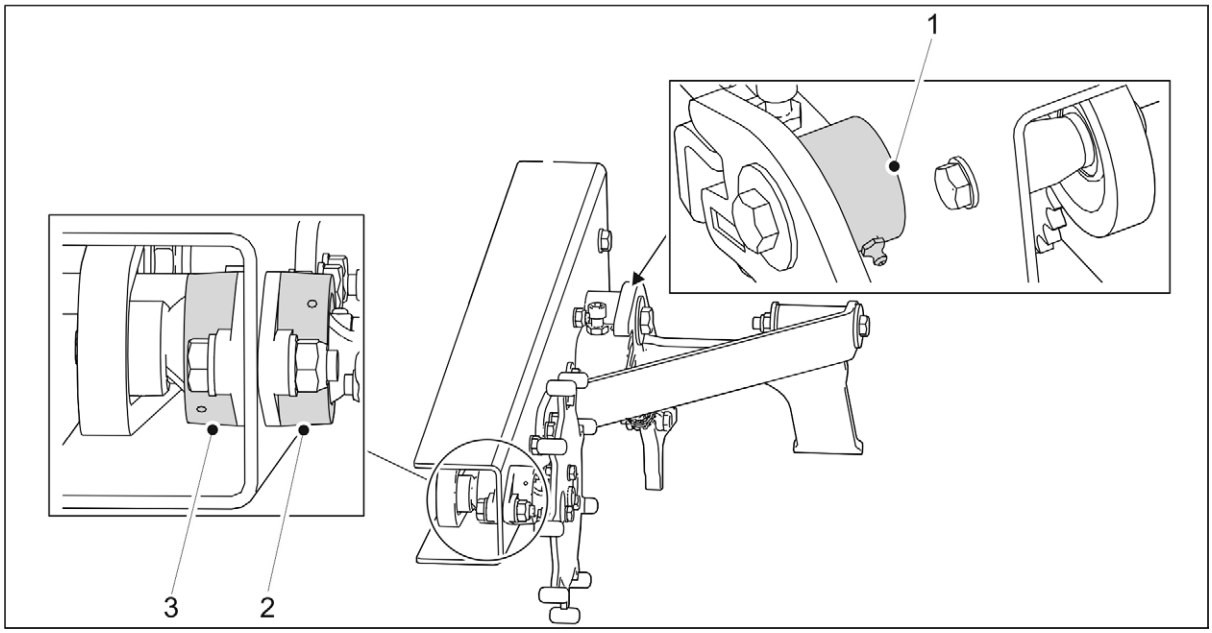


Figure. 7.2.3.2. - 199. Lubricating wheel axle bearings

2. Lubricate the wheel drive bearing (2, 3) and the bearing (2) of the wheel drive support through the lubricating nipple.
    - Remove the extruding old grease from the bearing.
3. Reattach the housing cover and fasten the two fastening bolts of the cover.
    - Use new locknuts to fasten.

7.2.4. Lubricating the rear axle mounting

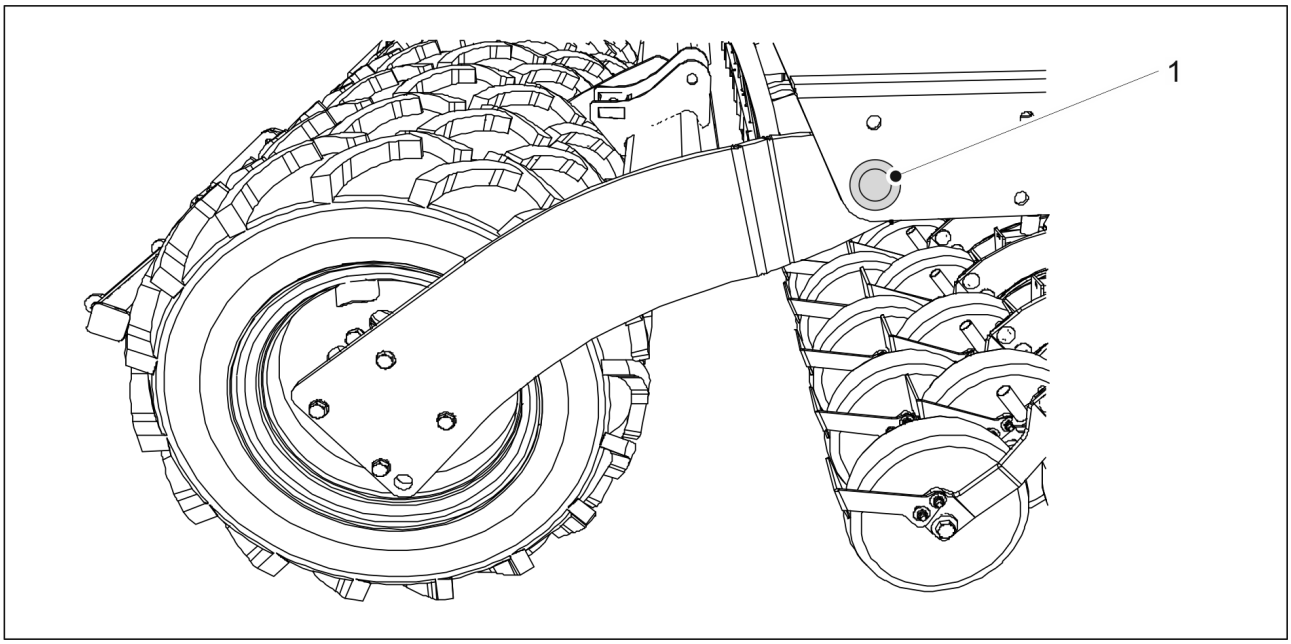


Figure. 7.2.4. - 200. Rear axle mounting

1. Lubricate the two link bushings of the rear axles mounting (1).
    - The link bushings are located in the rear corners of the hopper on both sides of the seed drill.

7.2.5. Lubricating wheel axle bearings

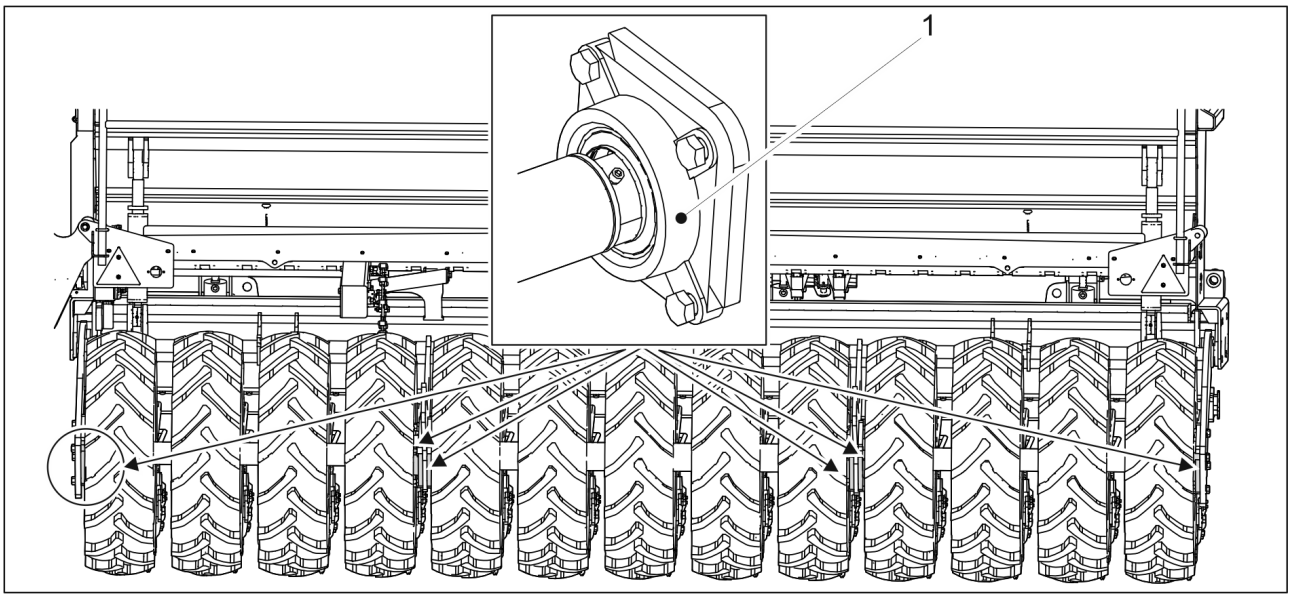


Figure. 7.2.5. - 201. Wheel axle bearings

1. Lubricate the six wheel axle bearings (1).

7.2.6. Lubricating the lifting cylinder

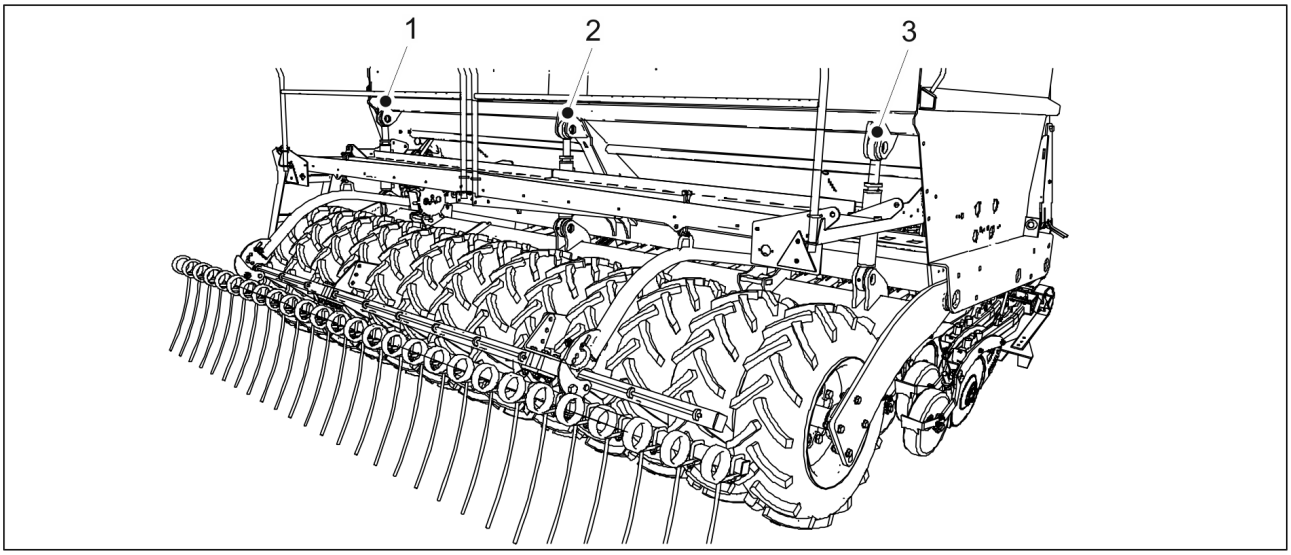


Figure. 7.2.6. - 202. Lifting cylinder

1. Lubricate the lifting cylinder(s).
    - The FX300 has 1 lifting cylinder (2) and the FX400 has 3 lifting cylinders (1-3). There is a grease nipple at the top and bottom of the lifting cylinder.

7.2.7. Lubricating the towing eye

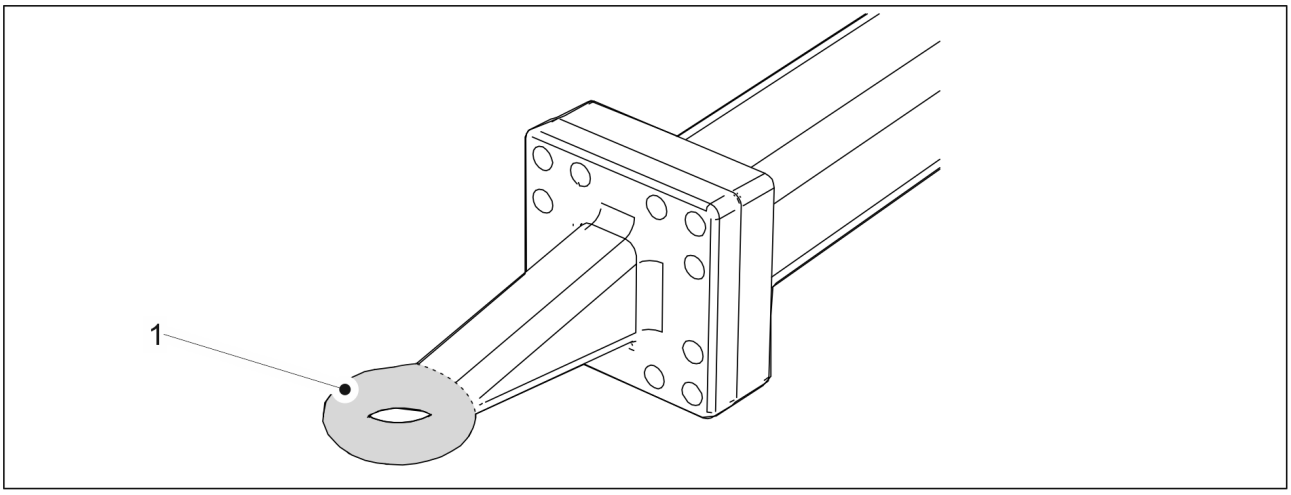


Figure. 7.2.7. - 203. Towing eye

1. Clean the towing eye (1) by wiping it.
2. Apply lubricant on the towing eye.

7.2.8. Lubricating the middle marker cylinders

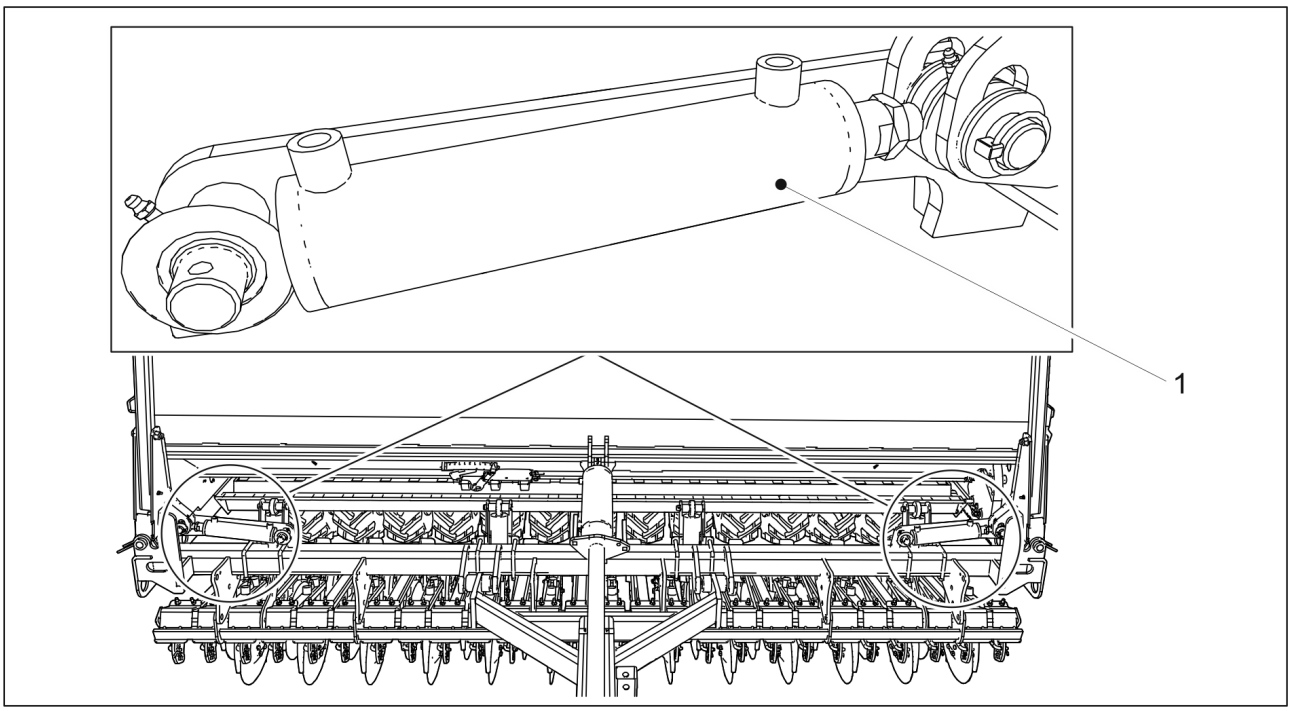


Figure. 7.2.8. - 204. Middle marker cylinders

1. Lubricate the 2 middle marker cylinders (1).
    - There is a grease nipple at the top and bottom of the middle marker cylinder.

7.2.9. Lubricating the rear marker cylinders

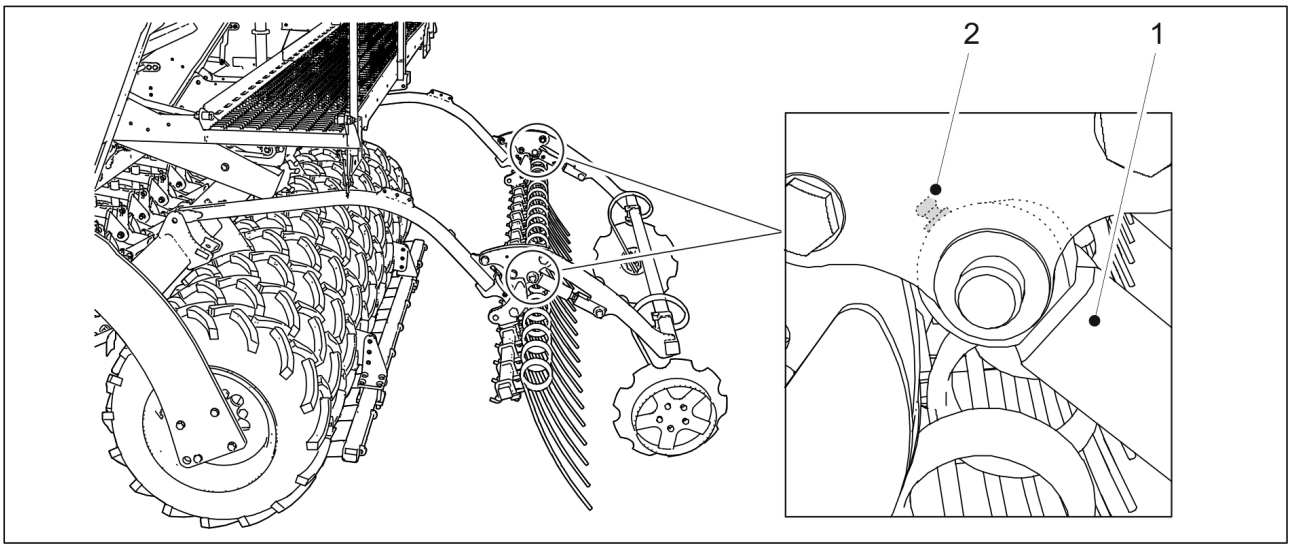


Figure. 7.2.9. - 205. Rear marker cylinders

1. Lubricate the 2 rear marker cylinders (1).
    - There is 1 grease nipple (2) in the bearing housing of both cylinders.

7.2.10. Lubricating the wheel packer pins and wheel hubs.

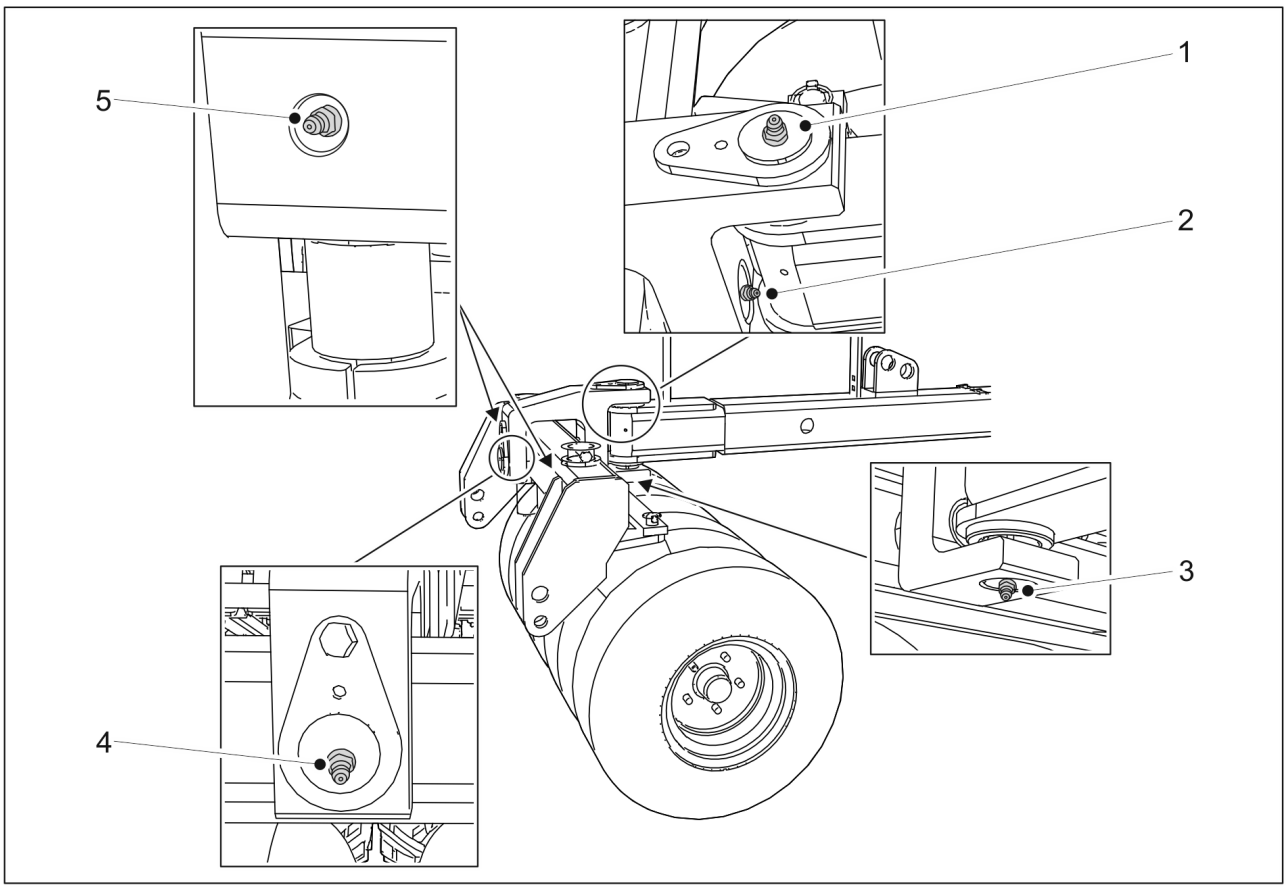


Figure. 7.2.10. - 206. Wheel packer pins

1. Lubricate the horizontal and vertical pin of the wheel packer.
    - The horizontal pin has two lubrication nipples (2,4). The vertical pin has two lubrication nipples (1,3).
2. Lubricate the two pins of the wheel packer bar.
    - There is one lubricating nipple (5) in both pins of the wheel packer bar.

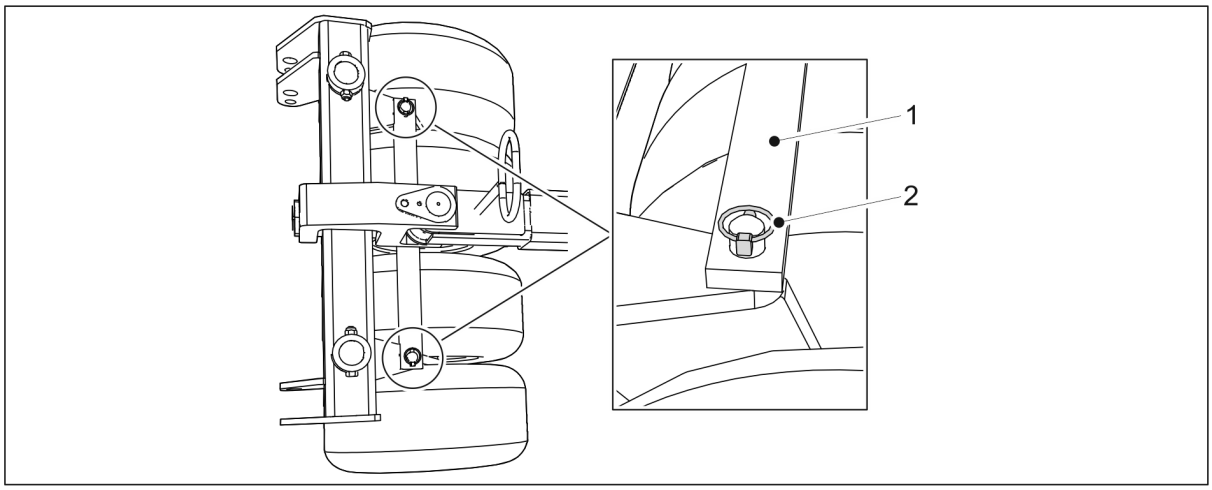


Figure. 7.2.10. - 207. Detaching the wheel packer bar

3. Detach the two cotters (2) of the wheel packer bar (1).
4. Detach the wheel packer bar by lifting it.

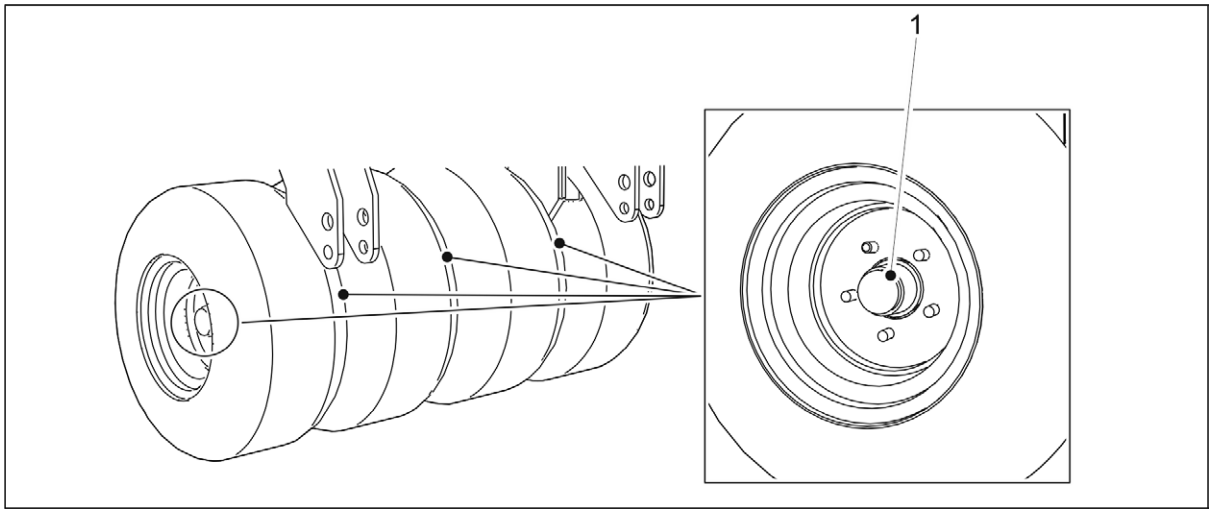


Figure. 7.2.10. - 208. Wheel hubs of the wheel packer

5. Lubricate the four wheel hubs (1).
    - There is one lubricating nipple in the wheel hubs.
6. Replace the wheel packer bar and lock the bar with cotters.

7.2.11. Lubricating the cylinders of the front levelling board

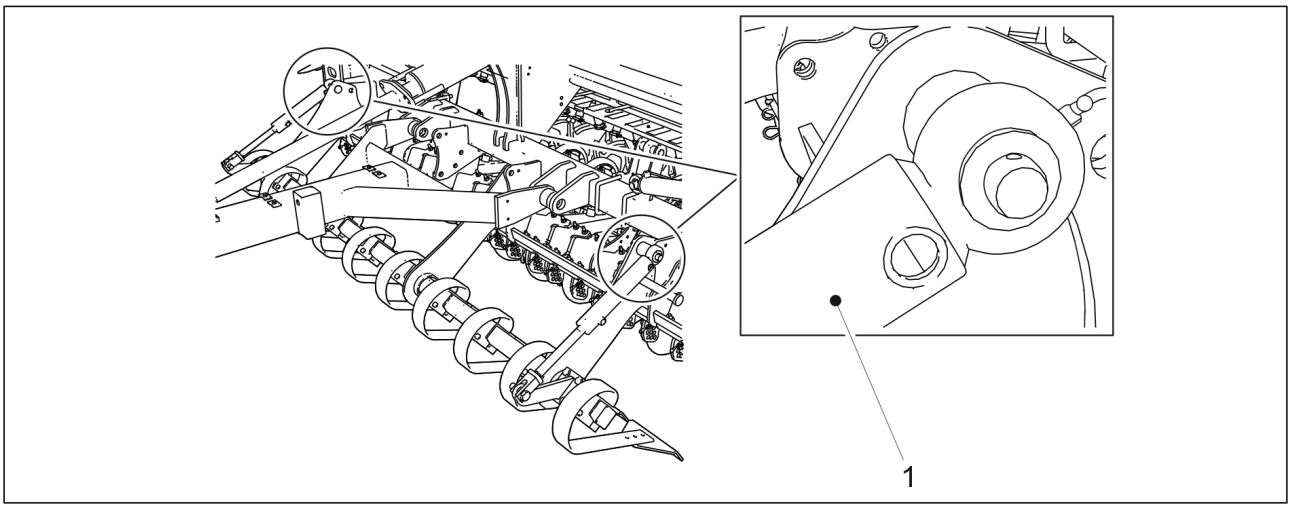


Figure. 7.2.11. - 209. Front levelling board cylinders

1. Lubricate the two front levelling board cylinders (1).
    - There is one lubricating nipple at the top of both cylinders.

7.2.12. Lubricating the drawbar cylinder

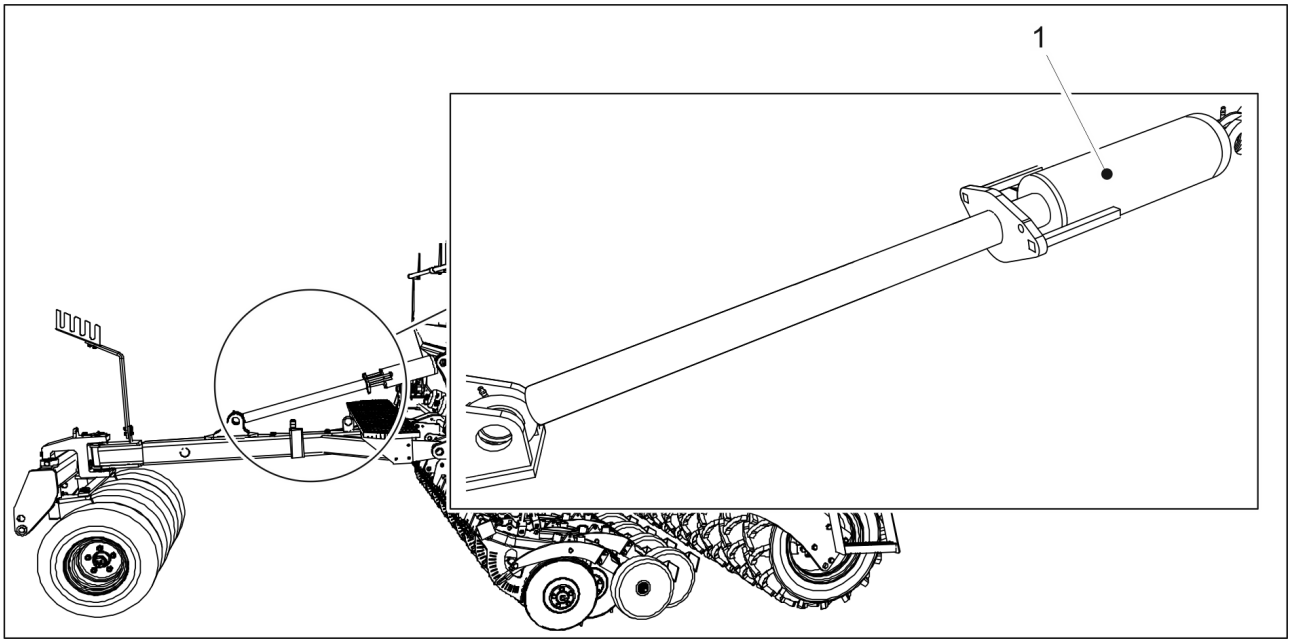


Figure. 7.2.12. - 210. Drawbar cylinder

1. Lubricate the drawbar cylinder (1).
    - There is a grease nipple at the top and bottom of the drawbar cylinder.

7.2.13. Lubricating the turnbuckle

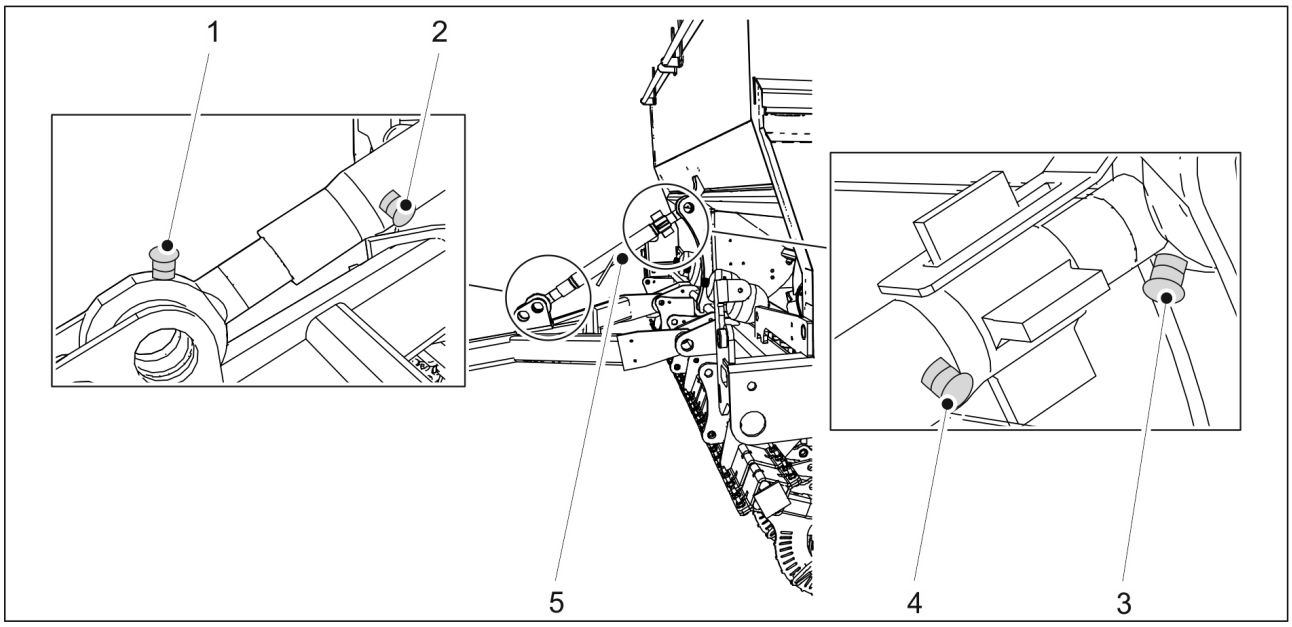


Figure. 7.2.13. - 211. Turnbuckle

1. Lubricate the turnbuckle (5).
    - The turnbuckle has four lubrication nipples (1-4).

7.3. Cleaning

7.3.1. Cleaning the hoppers

- Wear protective goggles and protective gloves when cleaning the hoppers.
  Clean the seed hopper when the variety to be seeded changes and at the end of the seeding season. Clean the fertiliser hopper at the end of the seeding season.

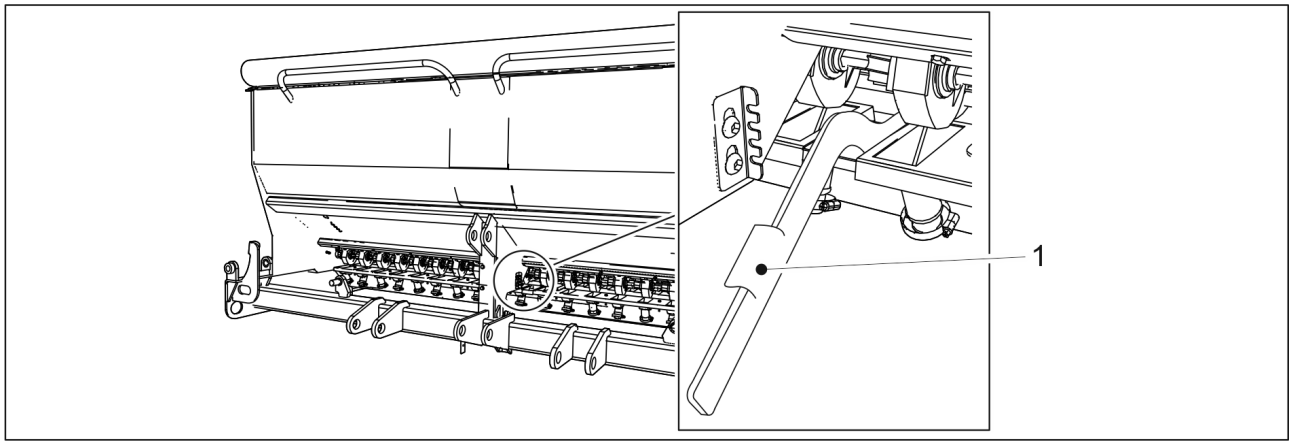


Figure. 7.3.1. - 212. Bottom flap

1. Open the bottom flap of the fertiliser side feed units in the front of the seed drill by turning the control lever (1) downward.

2. Open the bottom flap of the seed side feeder units in the back of the seed drill in the same way.
    - The back bottom flap should be opened from the working platform.

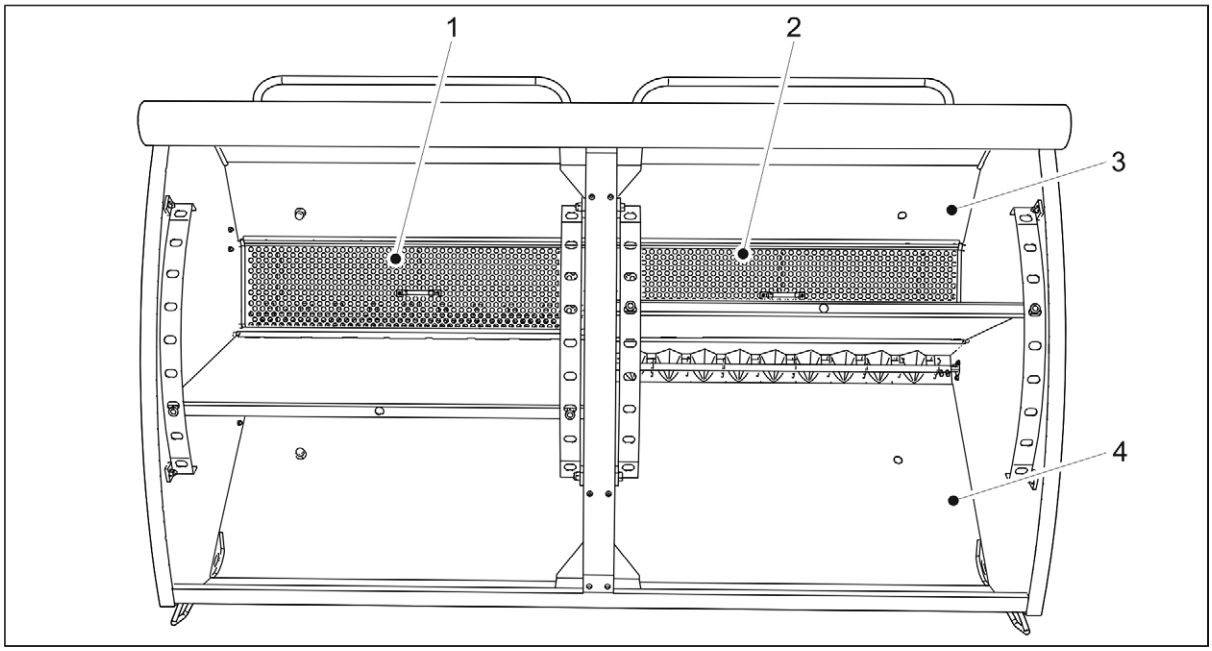


Figure. 7.3.1. - 213. Cleaning the hoppers

3. Remove the sieves (1, 2) of the fertiliser hopper (3).
4. Clean the fertiliser hopper with pressurised air.
5. Wash the fertiliser and seed hopper (3, 4) with a detergent and warm water.
6. If needed, clean the hoppers with power wash.

CAUTION
Do not allow water to enter electrical instruments.

7. Dry the hoppers with pressurised air.
8. Close the bottom flaps of the feeder units.

7.3.2. Cleaning of the small seed hopper

- Wear protective goggles and protective gloves when cleaning the hoppers.
  Clean the small seed hopper when the variety to be seeded changes and at the end of the seeding season.

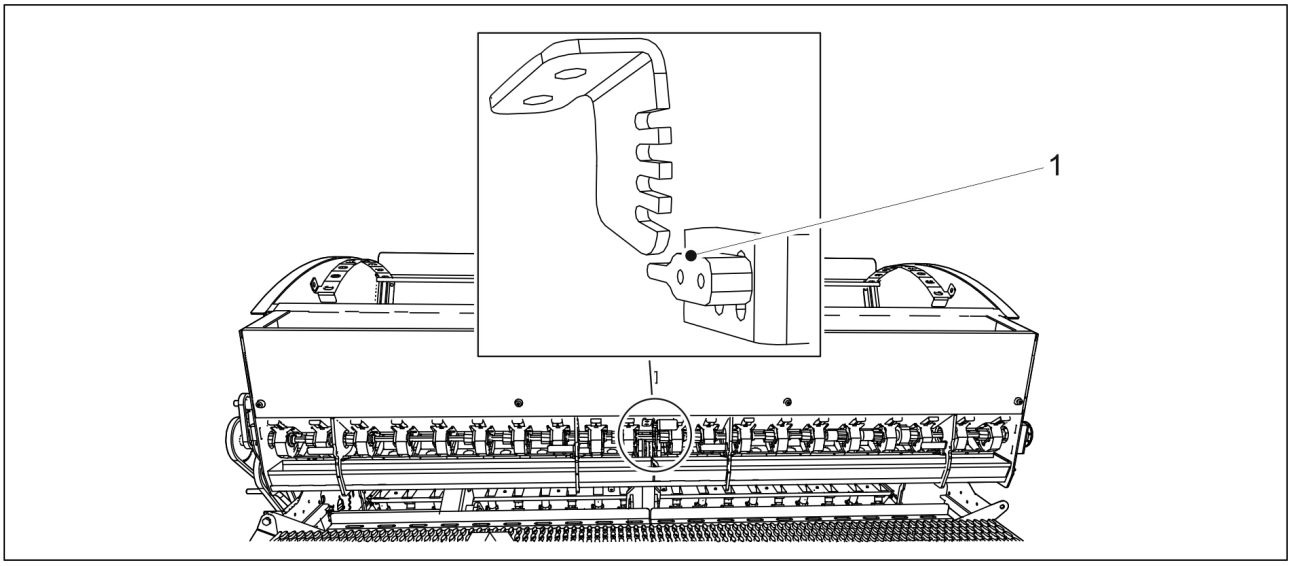


Figure. 7.3.2. - 214. Bottom flap open

1. Open the bottom flap by turning the control lever (1) downward.

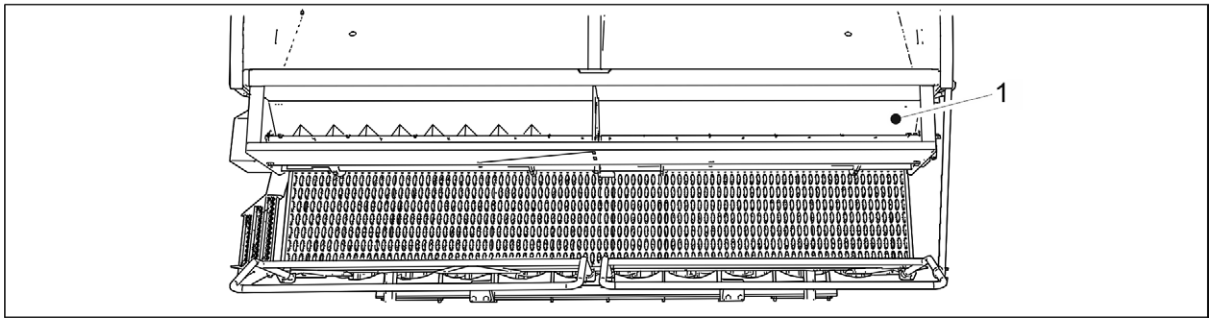


Figure. 7.3.2. - 215. Cleaning of the small seed hopper

2. Clean the small seed hopper (1) with pressurised air.
3. Wash the small seed hopper with detergent and warm water.
4. If needed, clean the hopper with power wash.

CAUTION
Do not allow water to enter electrical instruments.

5. Dry the hopper with pressurised air.
6. Close the bottom flap of the feeder unit.

7.3.3. Cleaning the paint surface

- Wear protective goggles and protective gloves when cleaning the paint surface. Clean the paint surface at the end of the seeding season.

1. Clean the seed drill's paint surface brushing and using pressurised air.
2. If needed, clean the paint surface with power wash.

CAUTION
Do not allow water to enter electrical instruments.

3. Lubricate all lubrication points in accordance with section 7.2. Lubrication.

- Damaged paint can be touched up after washing. The painted surface can be protected with a light application of oil, using protective oil intended for the purpose. Entry of protective oil on rubber and plastic parts should be avoided.

7.3.4. Cleaning the coulter discs

- Wear protective goggles and protective gloves when cleaning the discs of the coulters.

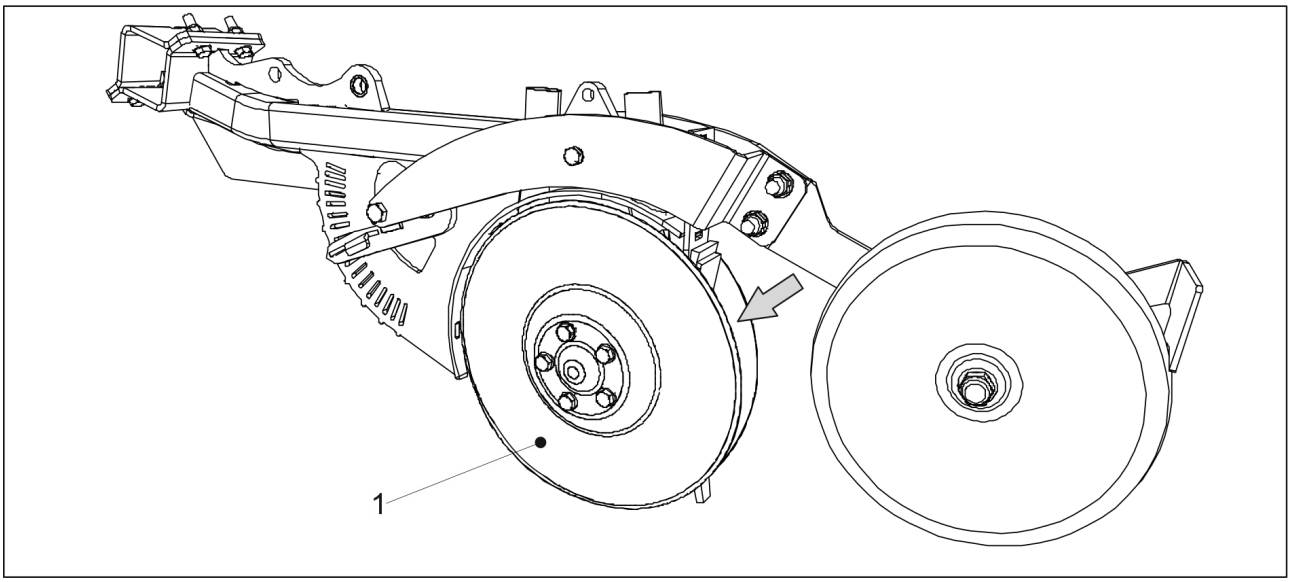


Figure. 7.3.4. - 216. Discs of the coulters

1. Clean the discs (1) of the coulters with a power washer.
   - Clean the clearance between the scraper and covering wheel as well.
2. Apply protective oil on wear parts to protect them from corrosion.
3. Once the discs are dry, turn each pair of coulter discs a few turns so that the scrapers remove the dry dirt from the inside of the discs.

7.3.5. Cleaning the feeder units

- Wear protective goggles and protective gloves when cleaning the feeder .
  Clean the feeder units at the end of the seeding season.

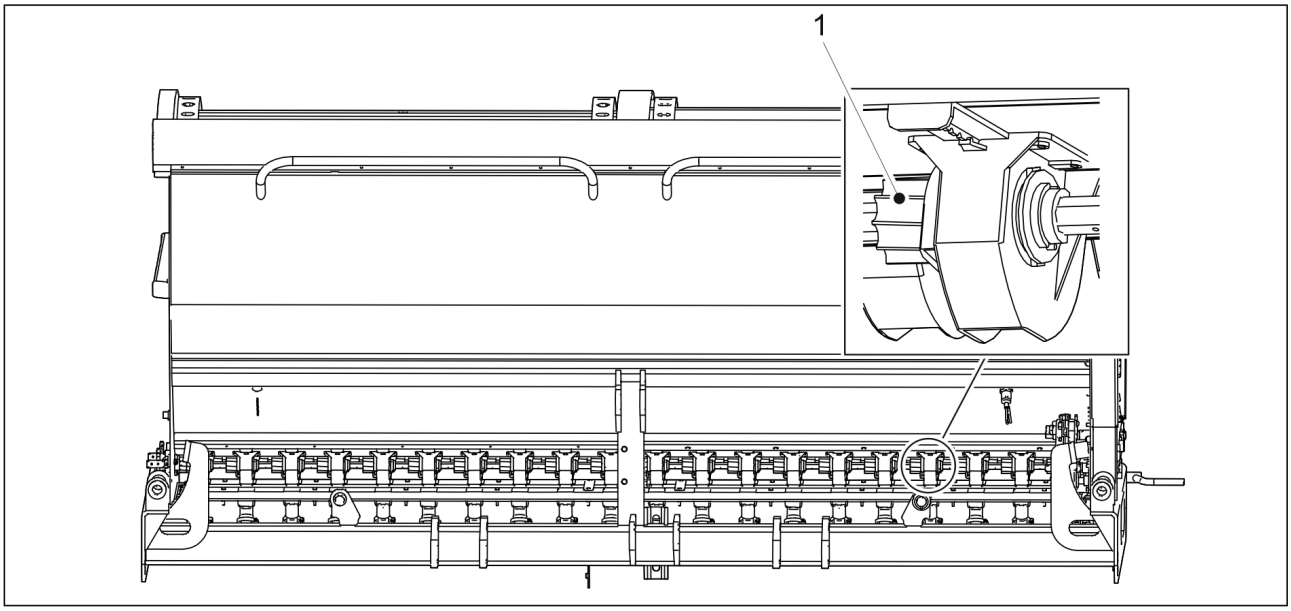


Figure. 7.3.5. - 217. Feeder roller

1. If there is seed or fertiliser residue left in the feeder roller (1), adjust the roller width in accordance with section 6.6.5. Adjusting the width of the feeder roller.
2. If there is still seed or fertiliser residue left in the feeder roller after the adjustment, clean the roller grooves with a wooden stick.

7.3.6. Cleaning of the small seed hopper feeder units

- Wear protective goggles and protective gloves when cleaning the feeder .
  Clean the feeder units at the end of the seeding season.

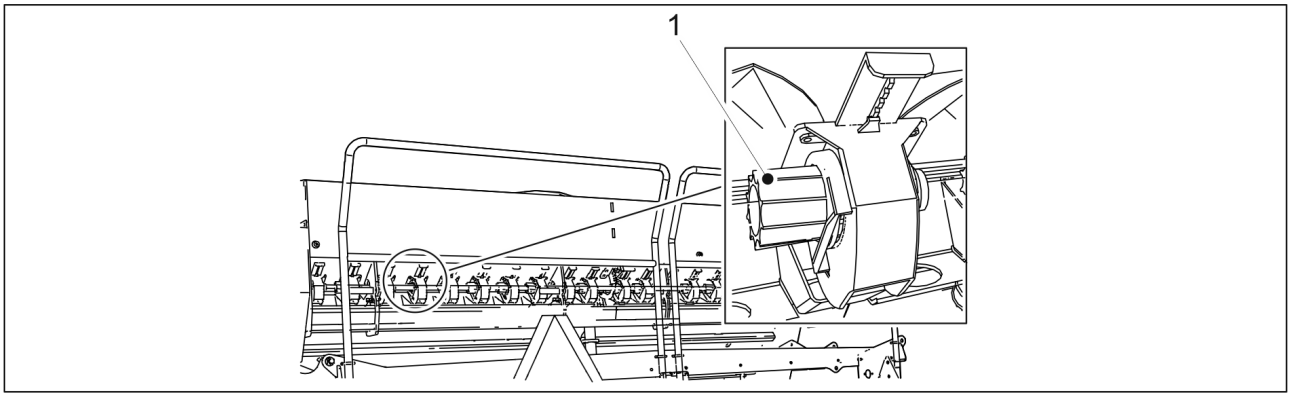


Figure. 7.3.6. - 218. Feeder roller

1. If there is seed or fertiliser residue left in the feeder roller, adjust the roller lengthwise in accordance with section 6.6.10. Adjusting the width of the small seed feeder roller.
2. If there is still seed residue left in the feeder roller after the adjustment, clean the roller grooves with a wooden stick.

7.4. Transport wheel assembly

- This chapter described the dismounting and mounting of the wheel assembly. If you are unsure about how to perform the work, contact maintenance.

7.4.1. Dismounting the wheel assembly

DANGER
Crushing and cutting hazard when removing the wheels.

DANGER
Ensure that the seed drill is properly in place and that the machine is in the transport position. Ensure that the seed drill cannot move in any direction.

DANGER
The wheel assembly dismounting should be carried out by two people.

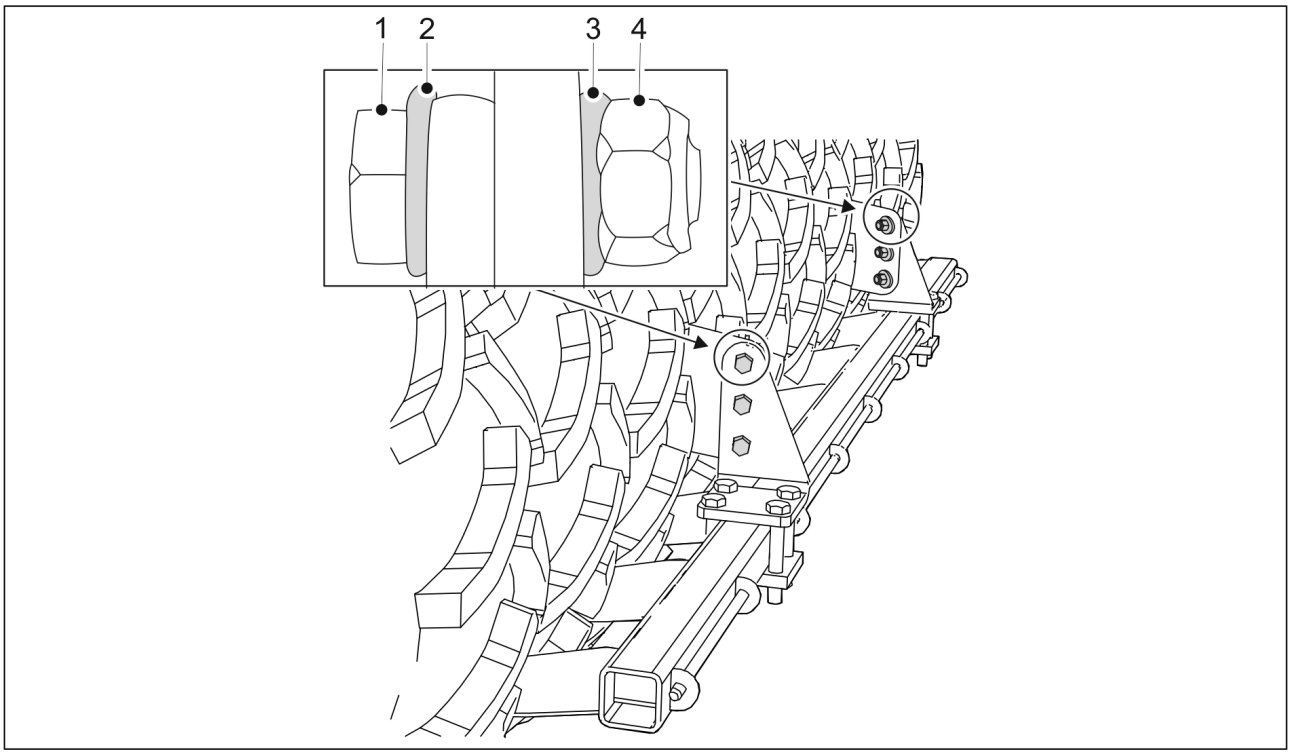


Figure. 7.4.1. - 219. Dismounting the scraper

1. If the machine is equipped with a scraper, dismount it by removing the bolts (1), washers (2, 3) and nuts (4).

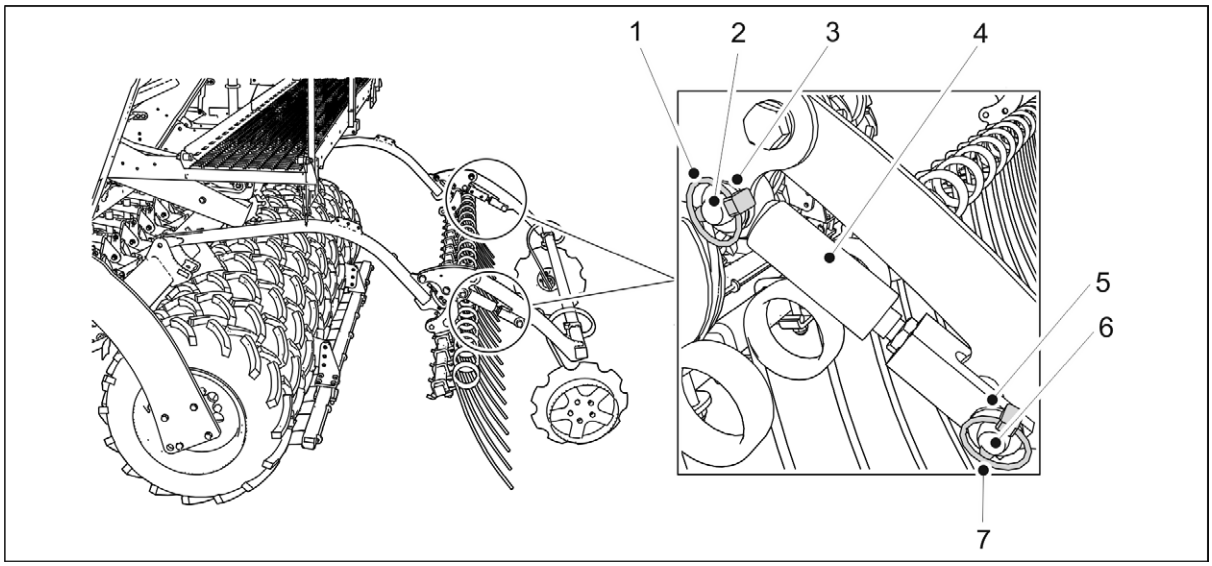


Figure. 7.4.1. - 220. Removal of the rear marker cylinders.

2. Remove the 2 rear marker cylinders (4) by removing the cotters (1, 7), pins (2, 6) and washers (3, 5) and then place the cylinders on the working platform.

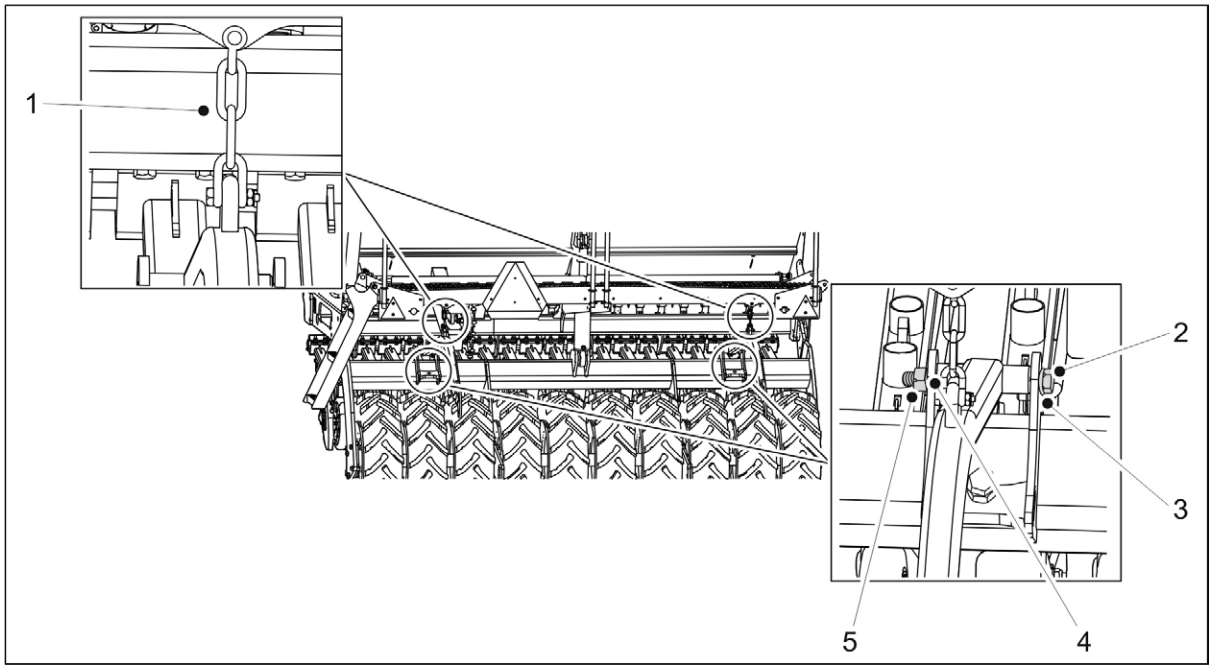


Figure. 7.4.1. - 221. Dismounting the rear harrow

3. If the machine is equipped with a rear harrow, dismount the rear harrow by removing the bolts (2), washers (3, 4) and nuts (5) of the rear harrow shaft and detaching the rear harrow chains (1) from the working platform.

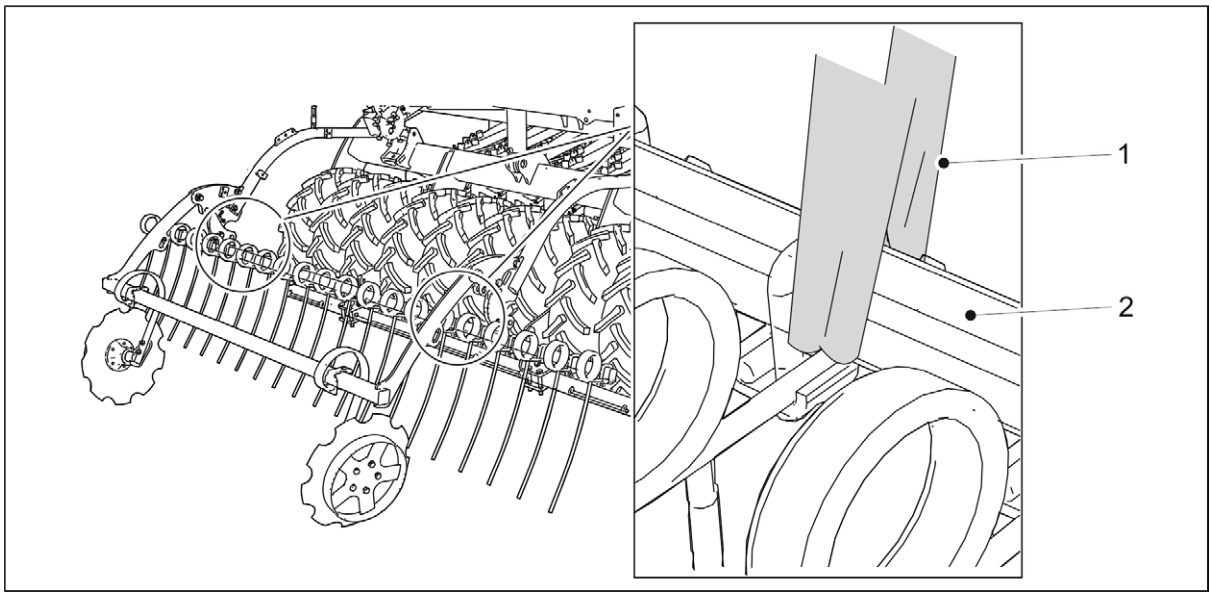


Figure. 7.4.1. - 222. Lifting the rear harrow

DANGER
Use a hoisting accessory when dismounting the rear harrow. Tie a lifting sling (1) around the tube (2).

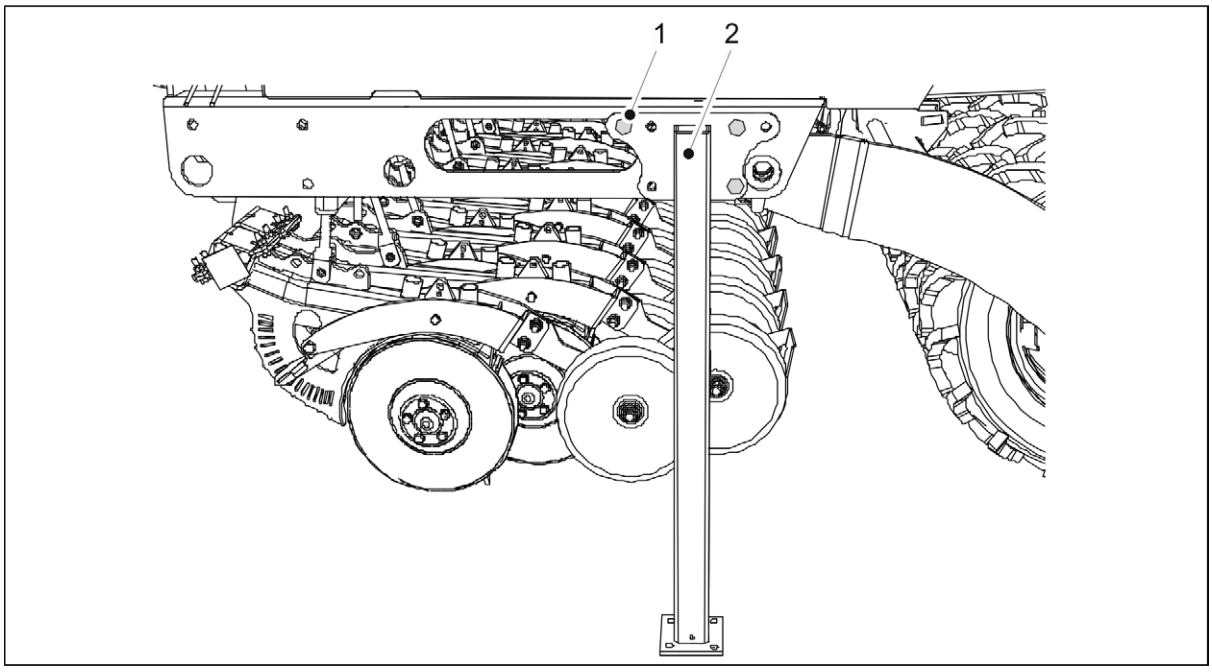


Figure. 7.4.1. - 223. Transport supports

4. Install the transport supports (2) on both sides of the seed drill with M20x50 bolts (1).

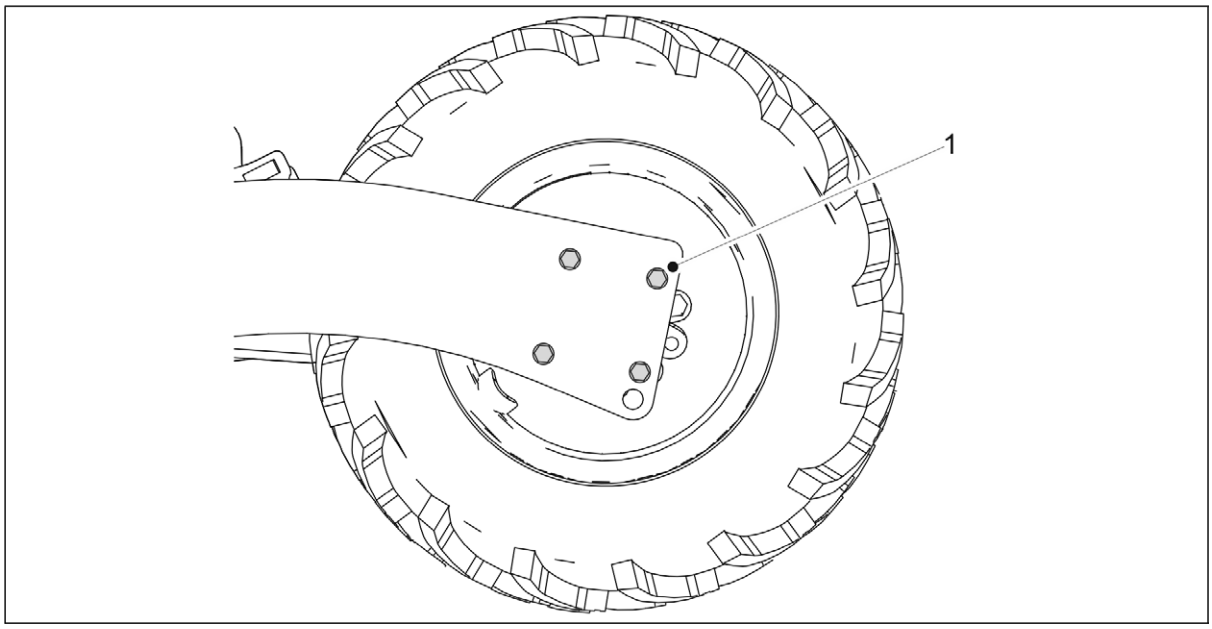


Figure. 7.4.1. - 224. Dismounting the wheel assembly

5. Remove the four bolts (1) of the flange bearing of the damaged wheel assembly from both sides of the wheel assembly.

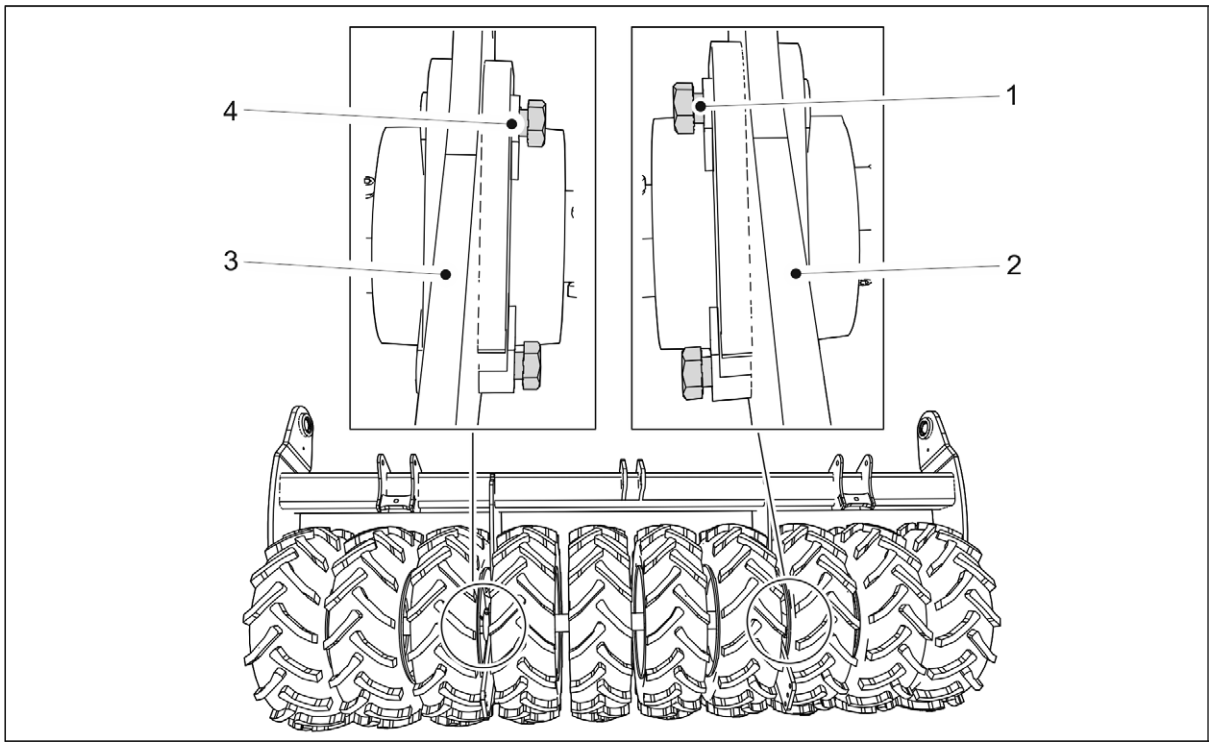


Figure. 7.4.1. - 225. Turning the bolts

6. If you are dismounting the outermost wheel assembly, turn the bearing bolts between the middle and the outermost wheel assembly to prevent the middle wheel assembly from falling.
    - Ensure that the bolts do not penetrate the back of the plate (2, 3).
      If you are dismounting the left-hand side wheel assembly, turn the bolts (4) so that their direction is from right to left. If you are dismounting the right-hand side wheel assembly, turn the bolts (1) so that their direction is from left to right.

7. Raise the wheel assembly slightly off the ground.

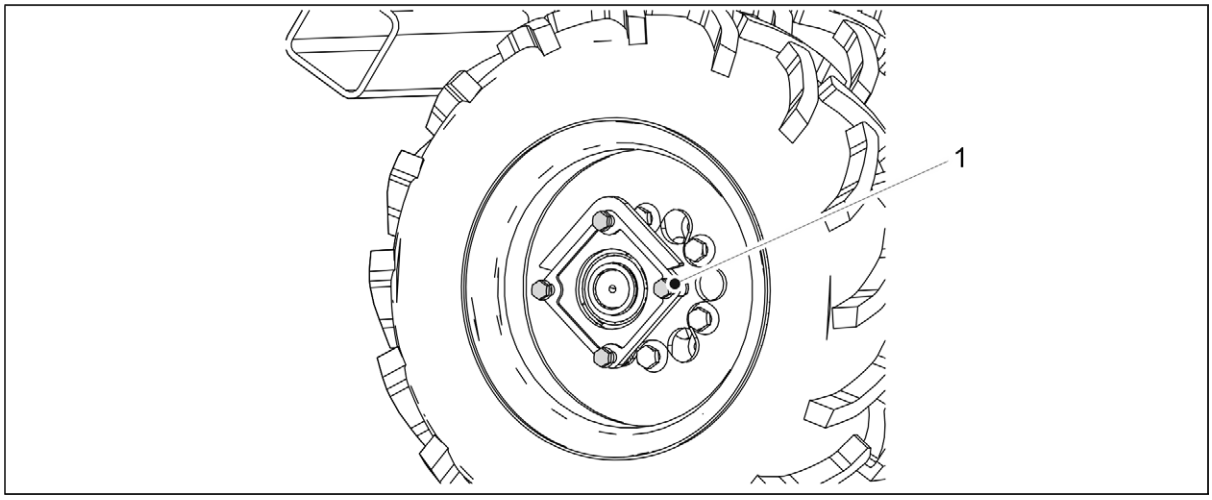


Figure. 7.4.1. - 226. The wheel assembly is supported by bolts

- The intact wheel assemblies remain supported by the bolts (1).

DANGER
Exercise caution when the wheel assembly comes loose.

7.4.2. Disassembling a wheel assembly

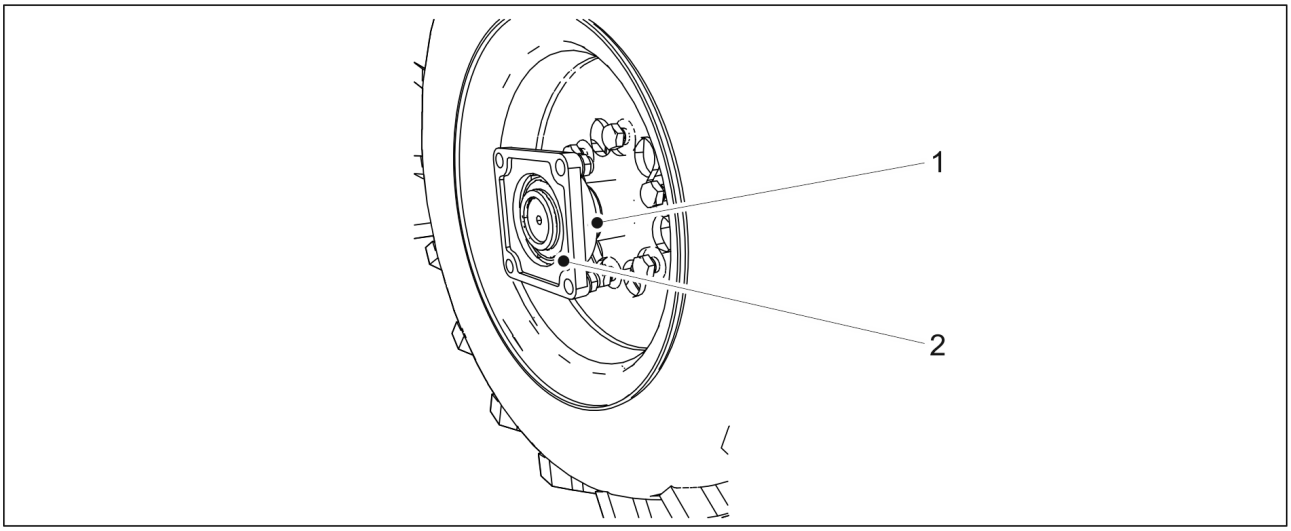


Figure. 7.4.2. - 227. Detaching a flange bearing

1. Open the locking screw (1).
2. Remove the flange bearing (2) from the axle.
   - Use an extraction tool to detach the bearing. Do not use a hammer to try to detach the bearing.
     If needed, replace the bearing.

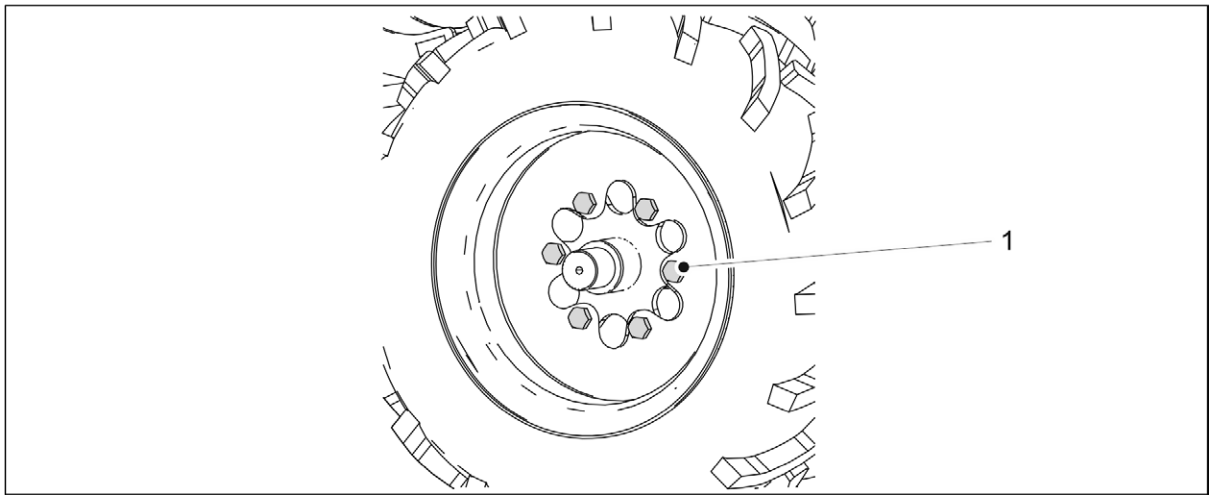


Figure. 7.4.2. - 228. Unfastening the wheel bolts

3. Remove the tyre by unfastening the six wheel bolts (1).
    - If the middle tyre of the wheel assembly needs to be replaced, the outermost tyre should also be dismounted. The tyre should be dismounted from the side of the centre tyre bolts in the pack.

7.4.3. Mounting a wheel assembly

1. Clean the surfaces before installing a wheel assembly.
2. Clean the threads of bolts.

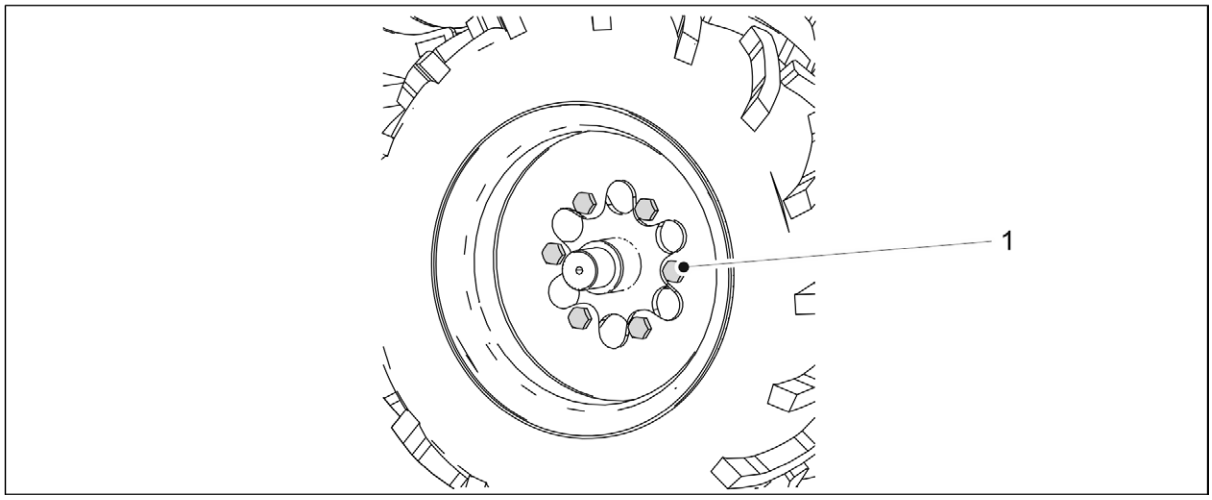


Figure. 7.4.3. - 229. Mounting a tyre

3. Mount the tyre by tightening the six wheel bolts (1).
    - The tightening torque is 350 Nm. Apply medium-hard locking compound.

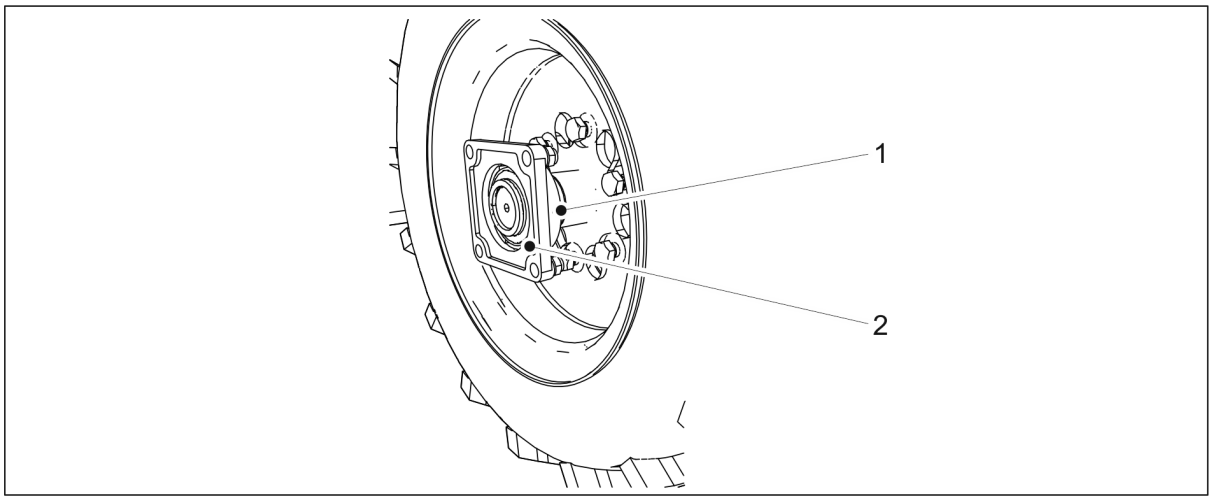


Figure. 7.4.3. - 230. Fastening the bearing

4. Fasten the flange bearing (2) to the axle and tighten the fastening screw (1).
    - If needed, replace a damaged bearing.

7.4.4. Mounting the wheel assembly

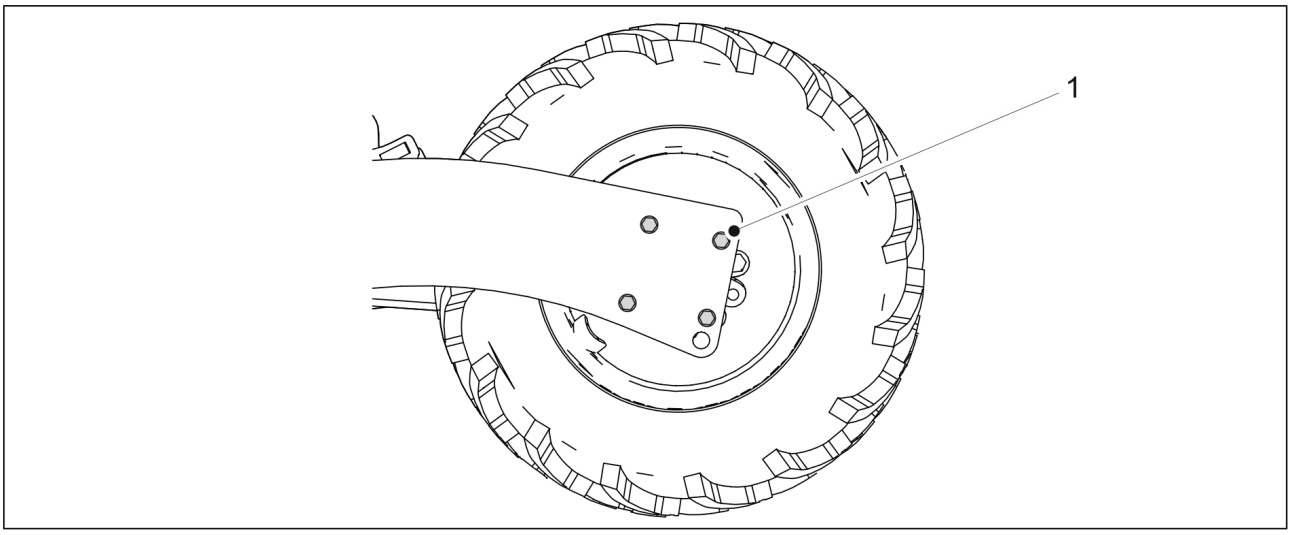


Figure. 7.4.4. - 231. Mounting the wheel assembly

1. Fasten the four bolts (1) of the flange bearing of the wheel assembly on both sides of the wheel assembly.
    - The tightening torque is 230 Nm. Use new locking nuts.
2. Remove the transport supports.
3. If necessary, mount the scraper in accordance with section 5.1.7. Mounting the scraper, the rear harrow in accordance with section 5.1.8. Mounting the rear harrow and the rear marker cylinder in accordance with section 5.1.9. Mounting rear markers to the rear harrow.

- The wheel bolts do not need to be retightened when locking compound has been applied during installation and the bolts have been tightened to the correct torque.

7.5. Tightening the transmission chains

7.5.1. Tightening the chains in a machine without a gearbox

1. Raise the transmission cover.

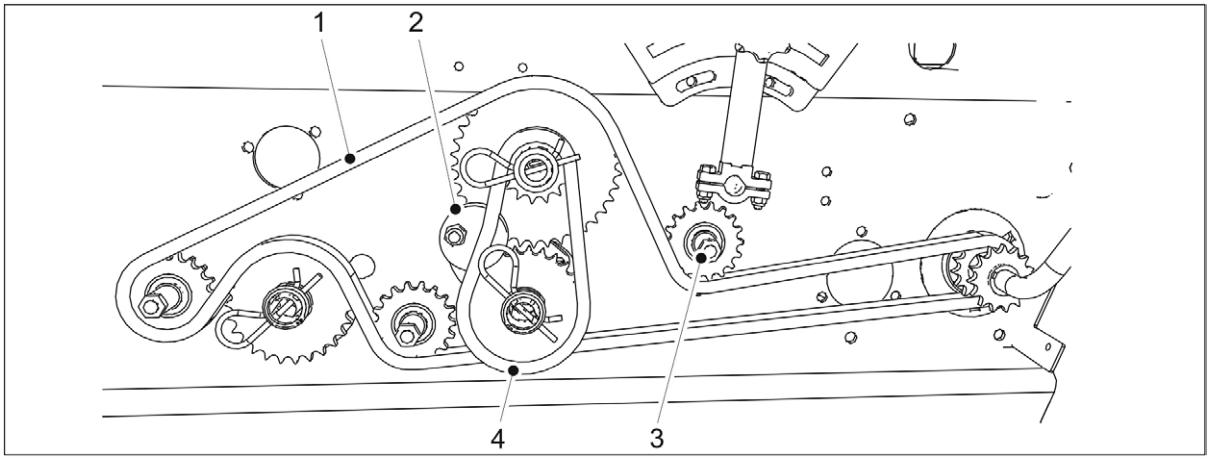


Figure. 7.5.1. - 232. Tightening the chains in a machine without a gearbox

2. Loosen the fertiliser side chain (1) by loosening the nut of the chain gear (3).
3. Loosen the seed side chain (4) by loosening the tensioning wheel (2).
4. Tighten the seed side chain by pushing the tensioning wheel to the right.
5. Tighten the tensioning wheel.
6. Tighten the fertiliser side chain by pushing the chain gear (3) down.
7. Tighten the chain gear nut (3).
8. Check the chains for deflection.
    - The deflection should be less than 10 mm.
9. Put the transmission cover back in place.

7.5.2. Tightening the chains in a machine with a gearbox on the seed side

1. Raise the transmission cover.

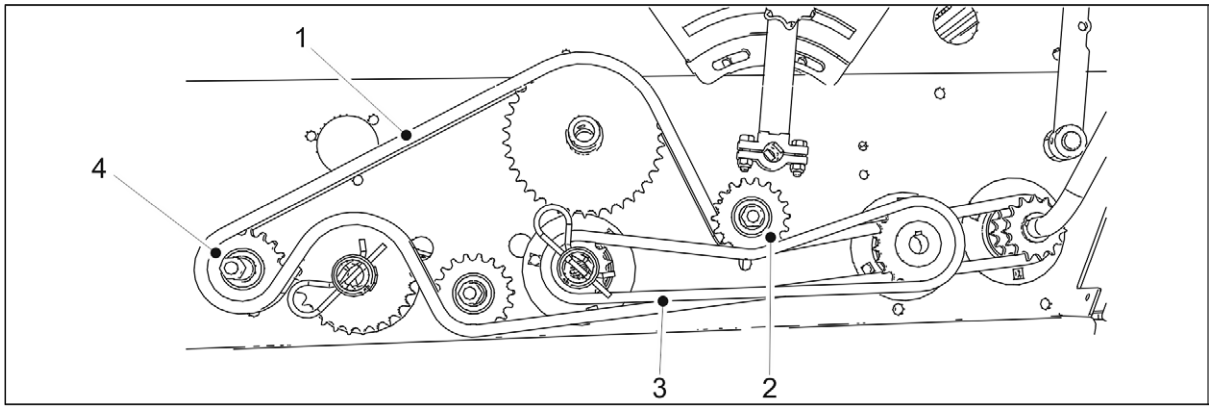


Figure. 7.5.2. - 233. Tightening the chains in a machine with a gearbox on the seed side

2. Loosen the fertiliser side chain (1) by loosening the nut of the chain gear (4).

3. Loosen the seed side chain (3) by loosening the nut of the chain gear (2).
4. Tighten the seed side chain by pushing the chain gear (2) downward.
5. Tighten the chain gear nut (2).
6. Tighten the fertiliser side chain by pushing the chain gear (4) downward.
7. Tighten the chain gear nut (4).
8. Check the chains for deflection.
    - The deflection should be less than 10 mm.
9. Put the transmission cover back in place.

7.5.3. Tightening the chains in a machine with a dual gearbox

1. Raise the transmission cover.

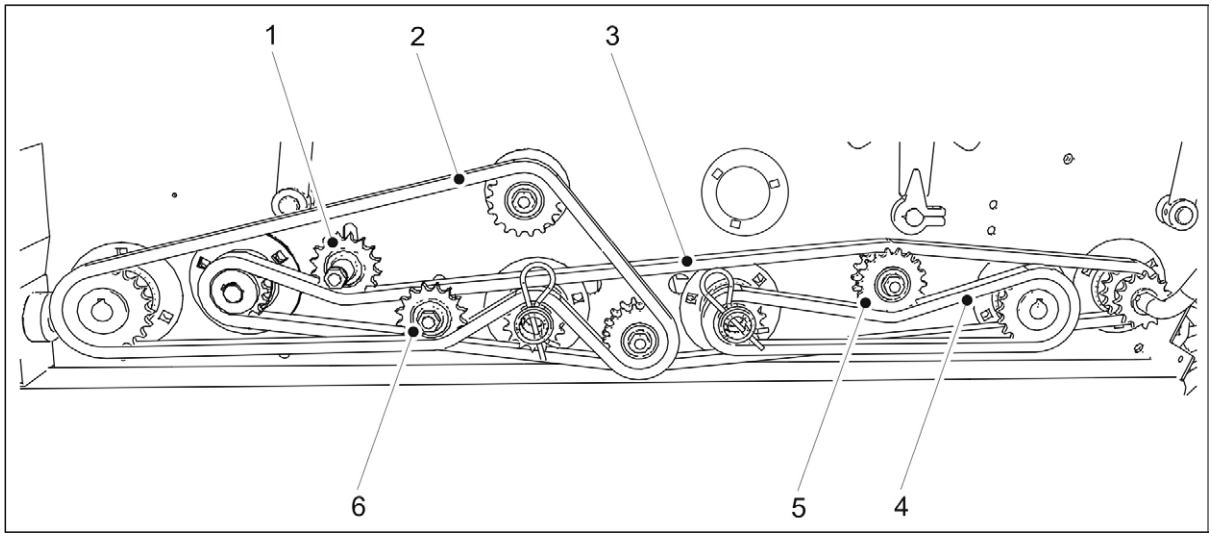


Figure. 7.5.3. - 234. Tightening the chains in a machine with a dual gearbox

2. Loosen the gearbox chain (3) by loosening the nut of the chain gears (1, 5).
3. Loosen the fertiliser side chain (2) by loosening the nut of the chain gear (6).
4. Tighten the seed side chain (4) by pushing the chain gear (5) downward.
5. Tighten the chain gear nut (5).
6. Tighten the transmission chain by pushing the chain gear (1) downward.
7. Tighten the chain gear nut (1).
8. Tighten the fertiliser side chain by pushing the chain gear (6) downward.
9. Tighten the chain gear nut (6).
10. Check the chains for deflection.
    - The deflection should be less than 10 mm.
11. Put the transmission cover back in place.

7.5.4. Tightening the transmission chains of the small seed hopper

1. Raise the transmission cover.

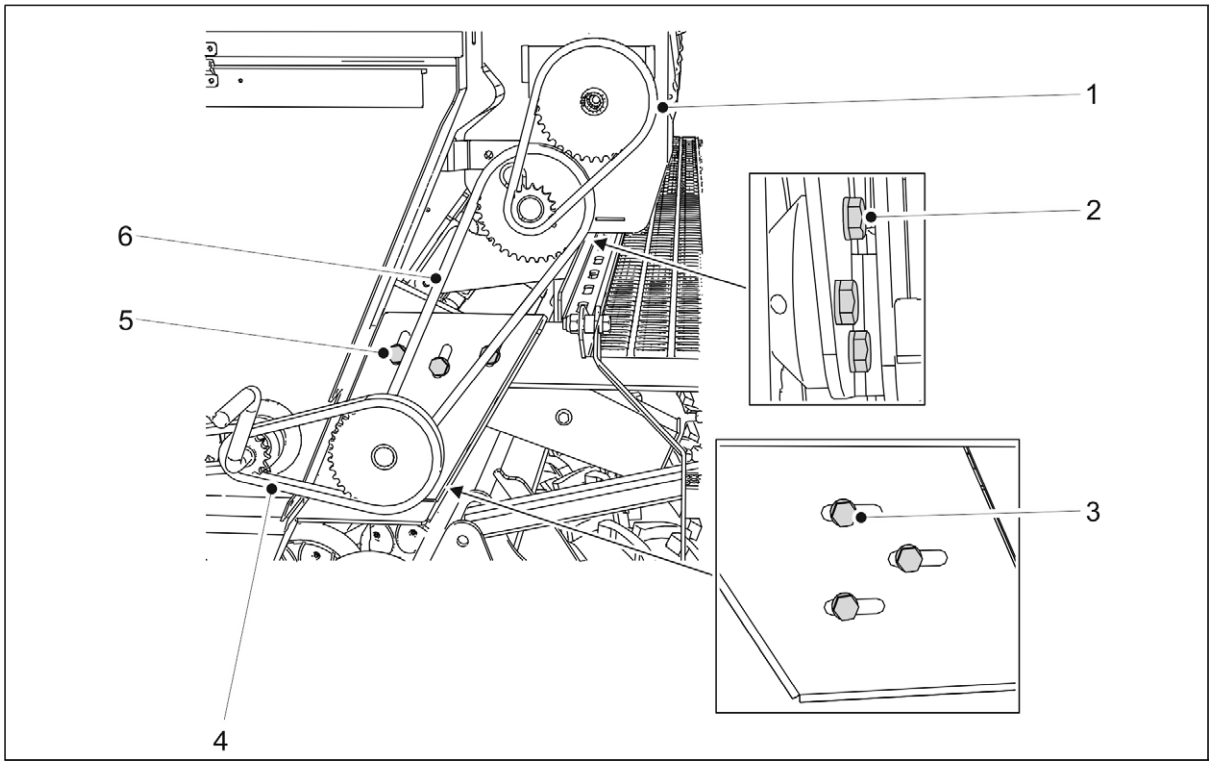


Figure. 7.5.4. - 235. Tightening the transmission chains of the small seed hopper

2. Loosen the chain (1) by loosening the three bolts of the bearing housing (2).
3. Loosen the chain (6) by loosening the three bolts of the casing (5).
4. Loosen the chain (4) by loosening the three bolts of the bearing housing (3).
5. Tighten the chain by moving the bearing downward. Tighten the 3 bolts (2) of the bearing housing.
6. Tighten the chain (6) by moving the casing vertically and the chain (4) by moving the casing horizontally.
7. Tighten the three casing bolts (5) and the three bearing housing bolts (3).
8. Check the chains for deflection.
    - The deflection should be less than 10 mm.
9. Put the transmission cover back in place.

7.6. Wheel hub bearing clearance of the wheel packer

7.6.1. Tightening the bearing

1. Raise the tyre of the wheel packer off the ground.

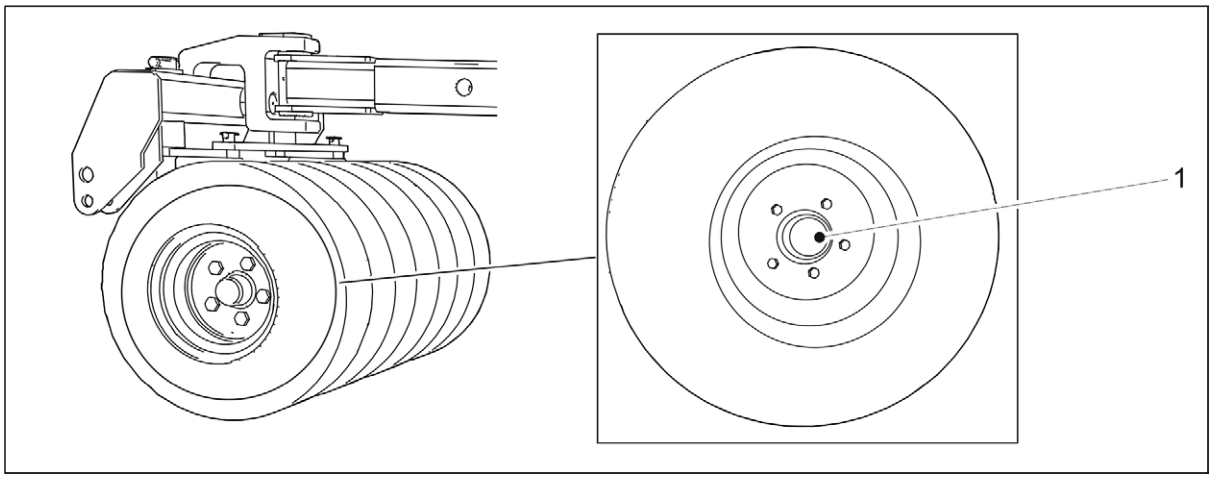


Figure. 7.6.1. - 236. Hub cap

2. Loosen the hub cap (1) by turning it counterclockwise.

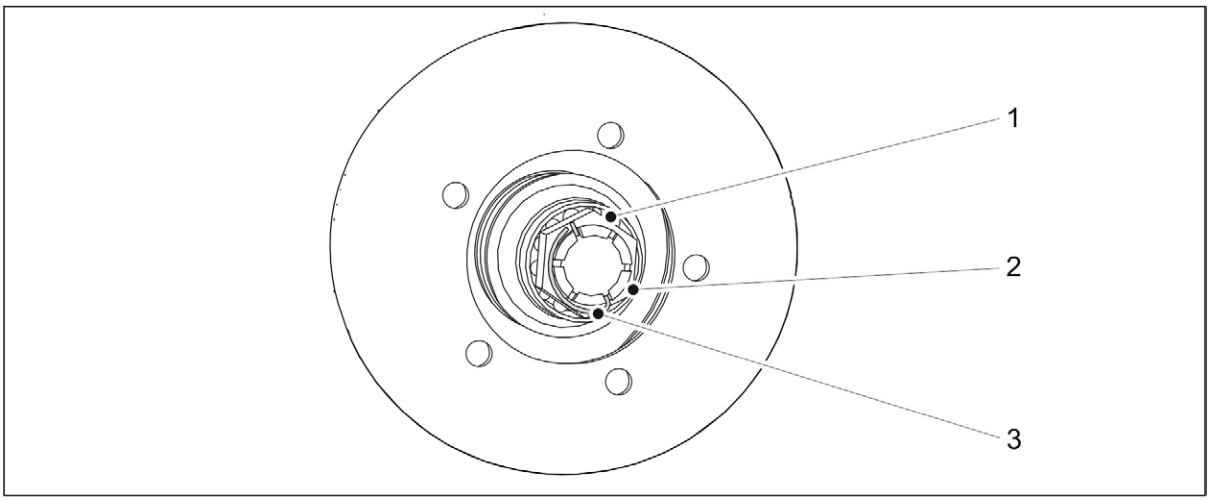


Figure. 7.6.1. - 237. Tightening the bearing of the wheel hub

3. Remove the closure pin (3) of the slotted nut (2) of the axle.
4. Tighten the nut by turning the wheel simultaneously until light resistance is felt in the bearing (1).
5. Loosen the nut until the closure pin fits into the next slot where the bearing is rotating freely.
6. Lock the pin in place.
7. Fill a third of the cup's volume with lubricant and reinstall the hub cap by turning it clockwise.
    - The tightening torque is 50 Nm.

7.7. Wheel drive

7.7.1. Tightening the wheel drive chain

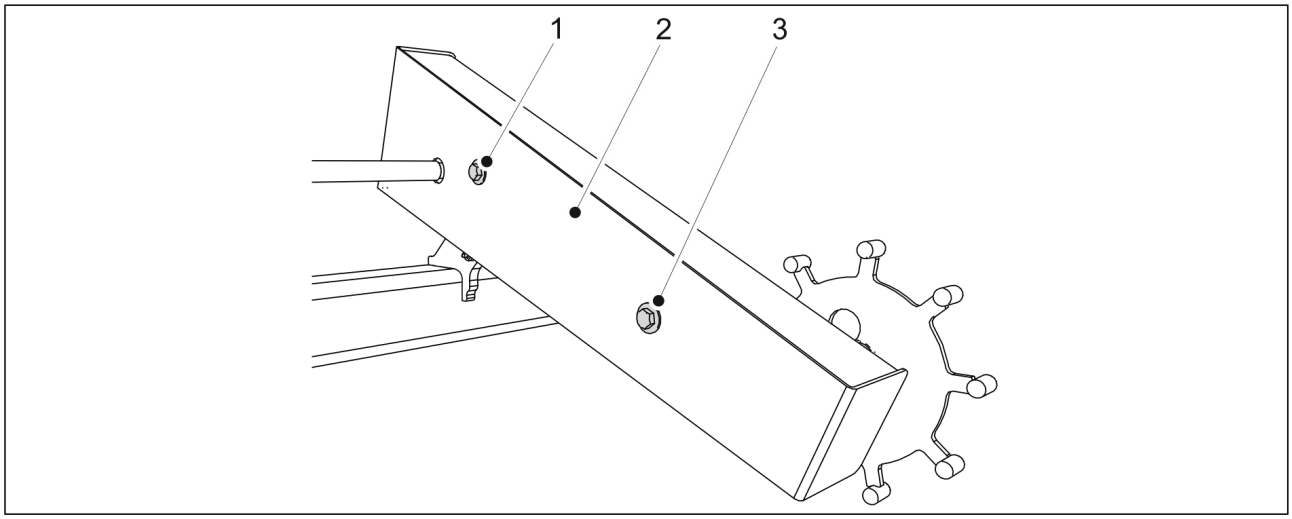


Figure. 7.7.1. - 238. Opening the wheel drive housing

1. Open and remove the two fastening bolts (1,3) of the wheel drive housing and the housing cover (2).

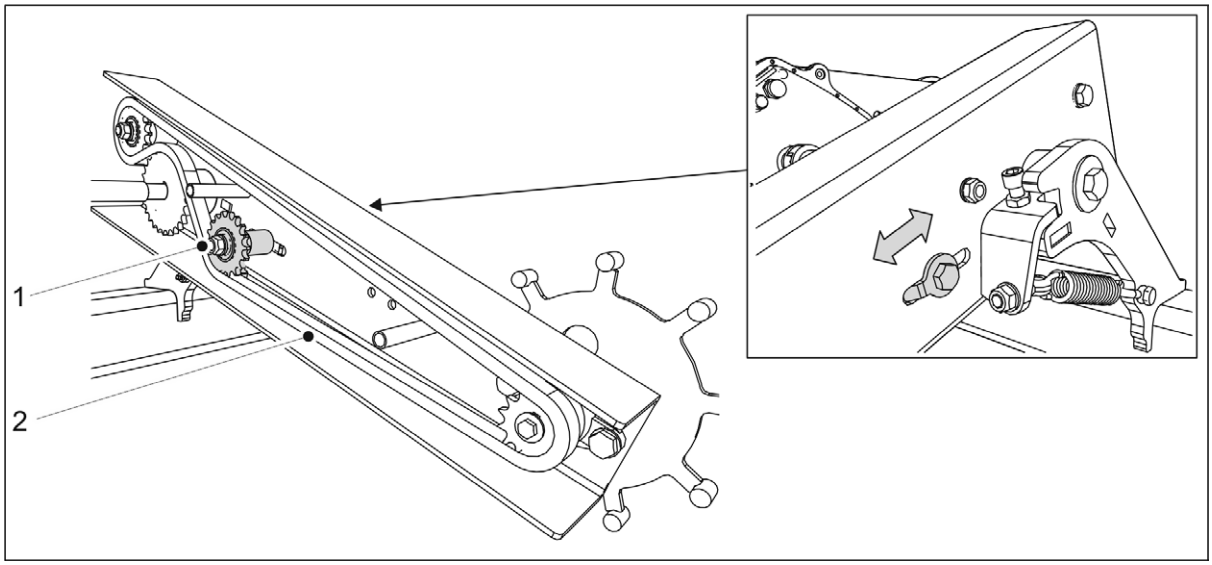


Figure. 7.7.1. - 239. Tightening the wheel drive chain

2. Open the mounting nut (1) located at the end of the chain guide.
3. Tighten the wheel drive chain (2) by moving the guide towards the transmission axle.
4. Tighten the mounting nut (1) of the chain guide and check the chain deflection.
    - The maximum allowed chain deflection is 10 mm.
5. Reattach the housing cover and fasten the two bolts of the cover.
    - Use new locknuts to install.

7.7.2. Replacing the wheel drive clutch

7.7.2.1. Dismounting the clutch

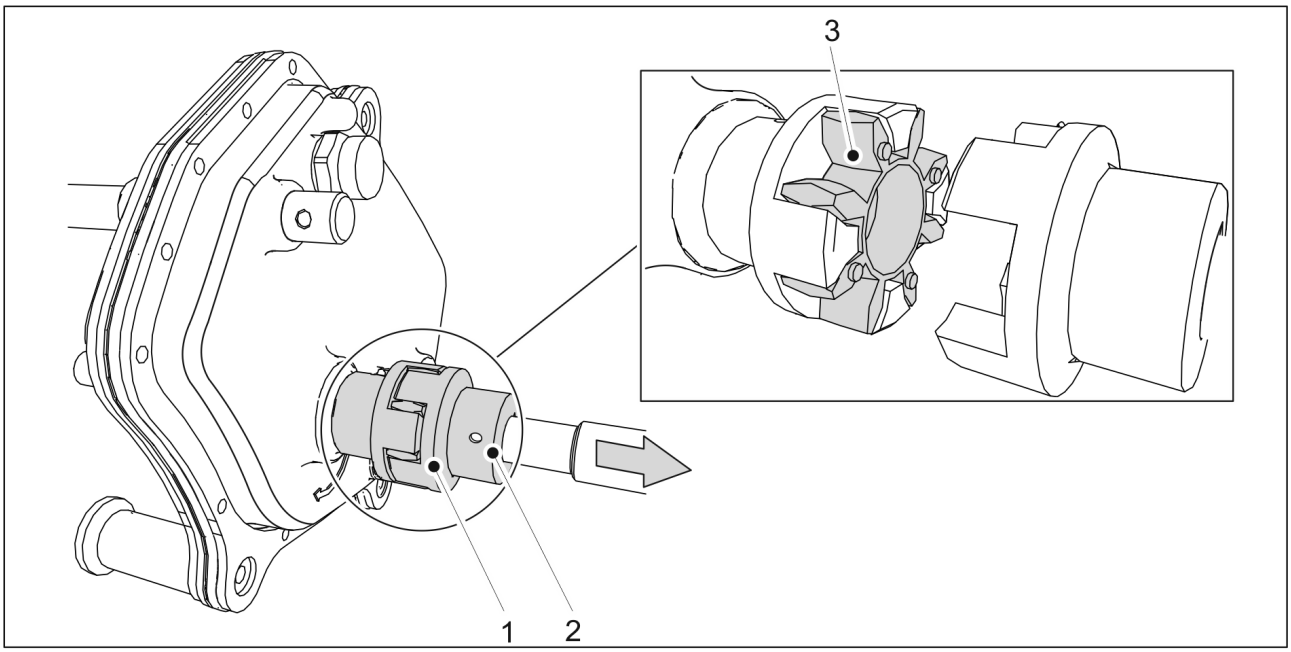


Figure. 7.7.2.1. - 240. Dismounting the clutch rubber

1. Open the locking screw (2) in the clutch body.
2. Separate the components of the clutch (1) by pulling the clutch on the axle towards the wheel drive mechanism.
3. Detach the flexible coupling element (3) of the clutch.

7.7.2.2. Installing the clutch

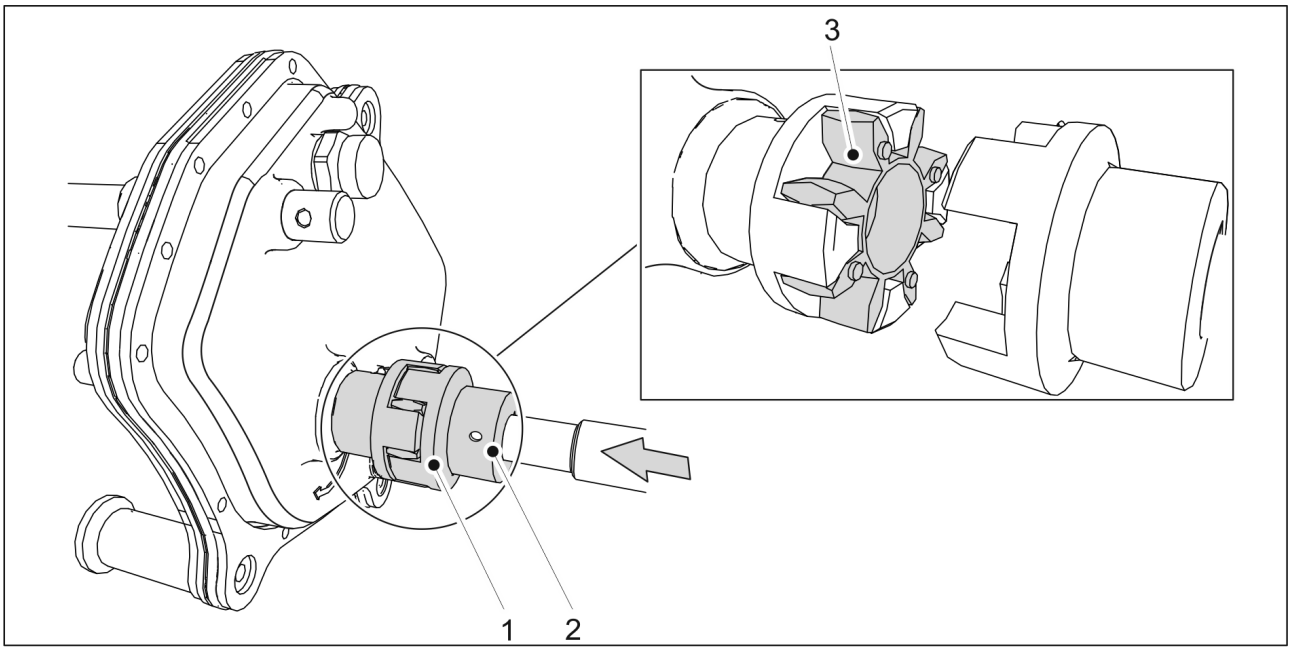


Figure. 7.7.2.2. - 241. Installing the clutch

1. Replace the flexible coupling element (3) of the clutch.
2. Push the clutch on the axle so that the clutch (1) terminals are tightly against each other.
3. Lock the clutch in place by tightening the locking screw (2).

7.8. Towing eye

7.8.1. Replacing the towing eye

7.8.1.1. Detaching the towing eye

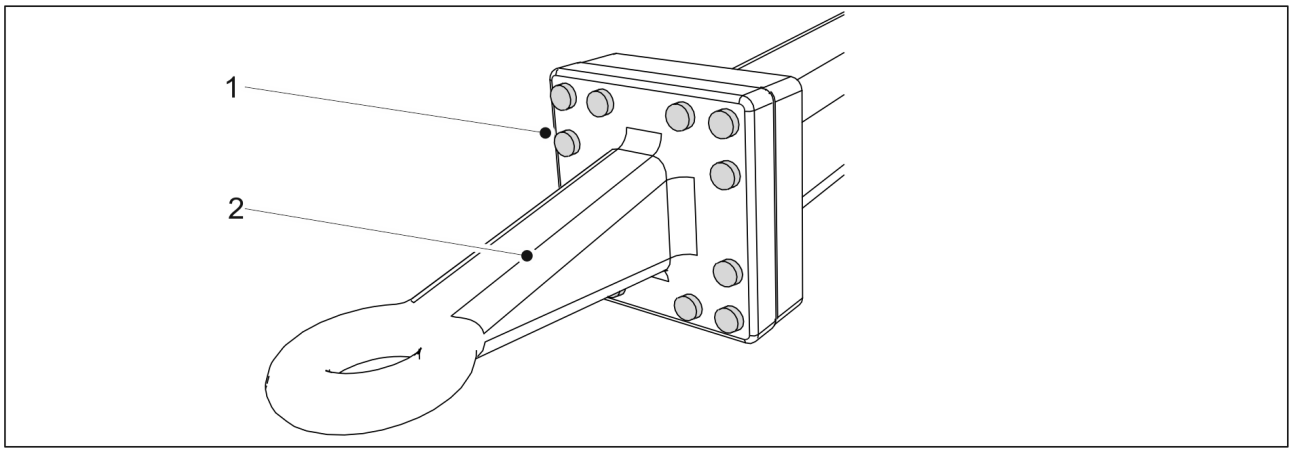


Figure. 7.8.1.1. - 242. Towing eye

1. Remove the 12 bolts (1) of the towing eye.
2. Remove the towing eye (2).

7.8.1.2. Installing the towing eye

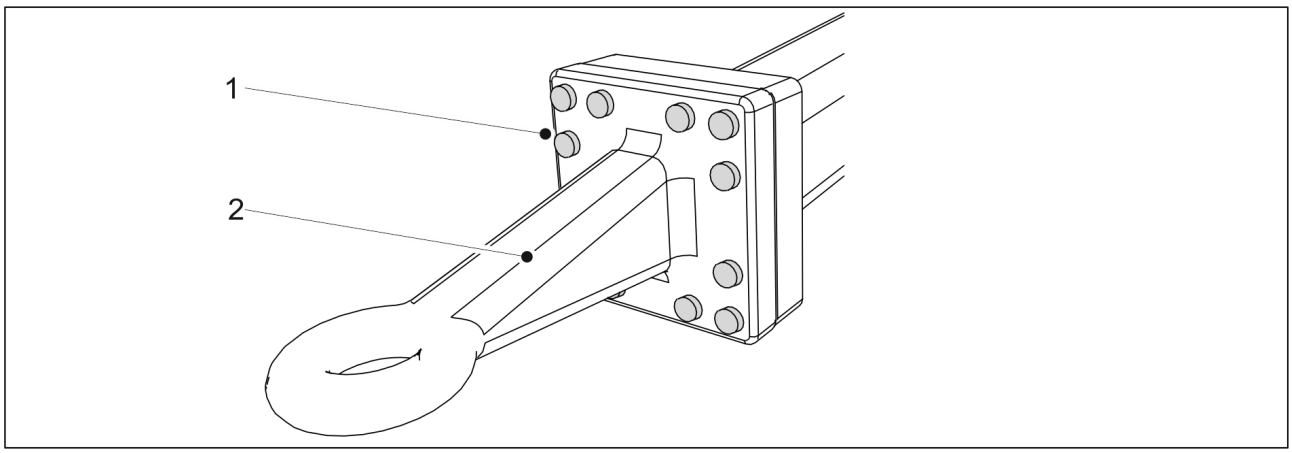


Figure. 7.8.1.2. - 243. Towing eye

1. Replace the towing eye (2).
2. Tighten the 12 bolts (1).
    - The tightening torque is 400 Nm.

7.9. Coulters

DANGER
Wear protective gloves during the servicing of the coulters.

- Wash the coulters before servicing.

7.9.1. Replacing a coulter

7.9.1.1. Dismounting a coulter

DANGER
Use a lifting aid to lift and move the coulter. The coulter weighs more than 60 kg and has sharp edges.

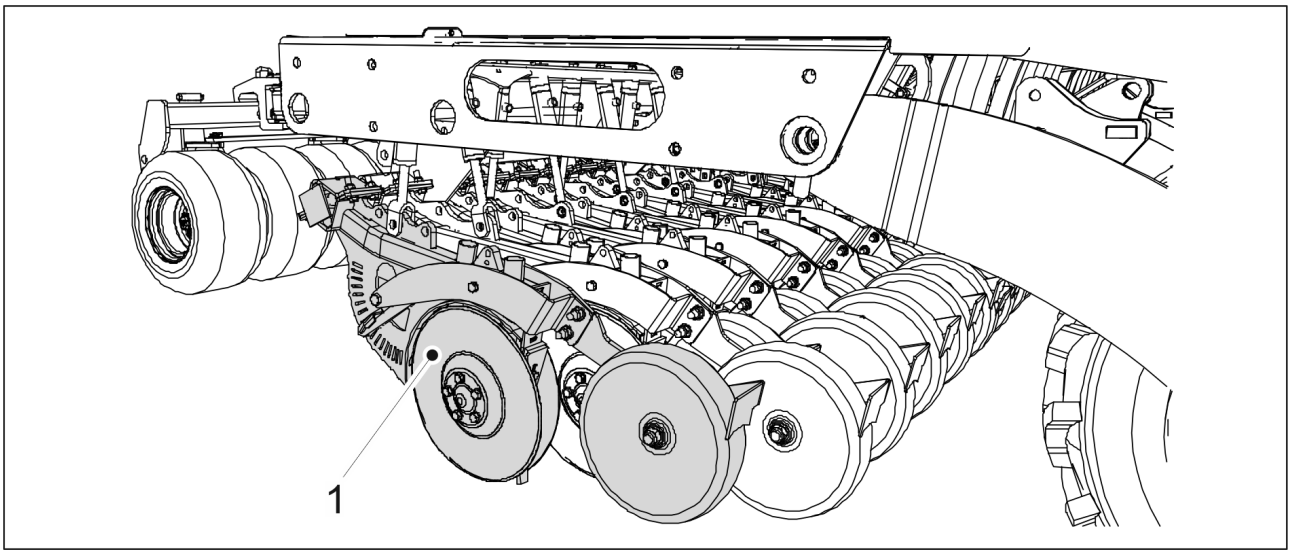


Figure. 7.9.1.1. - 244. Lowering coulters to the ground

1. Lower the coulters to the ground and support the coulter to be dismounted (1) to its place.

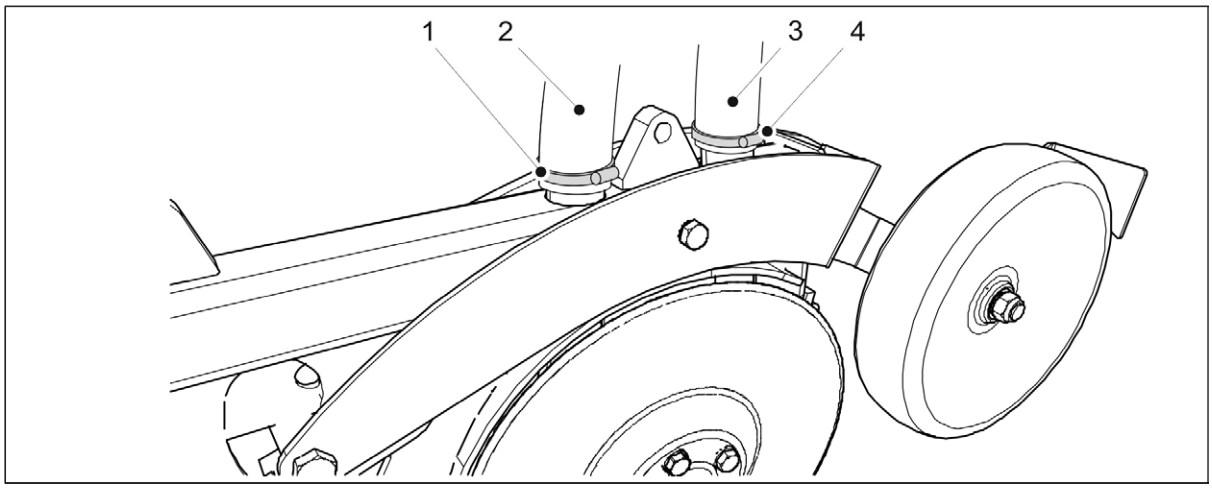


Figure. 7.9.1.1. - 245. Disconnecting coulter hoses

2. Open the hose clamps (1,4) of the hoses (2, 3) at the end of the coulter and pull the hoses off of the coulter.

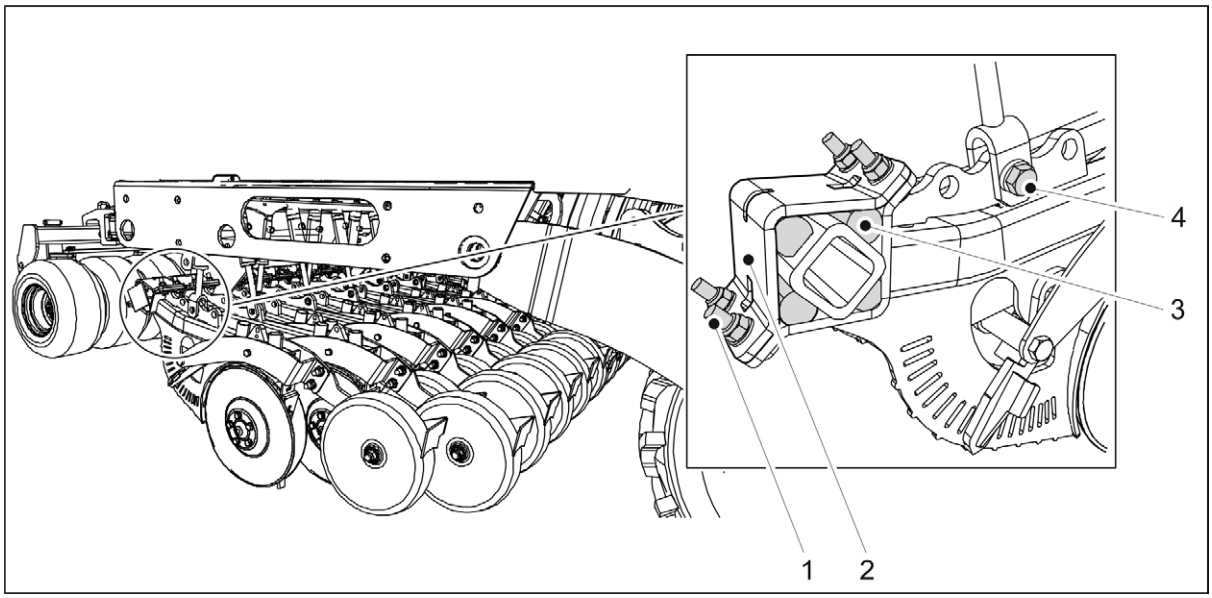


Figure. 7.9.1.1. - 246. Dismounting a coulter

3. Remove the bottom cylinder mounting bolt (4) M20 X 75.
4. Loosen the 4 mounting bolts (1) of the coulter.
    - Do not remove the bolt right away but loosen all four bolts equally.
5. Remove the bolts (1), installation plate (2) and 4 dampening rubbers (3).
6. Move the coulter from its location.

7.9.1.2. Installing a coulter

DANGER
Use a lifting aid to lift and move the coulter. The coulter weighs more than 60 kg and has sharp edges.

1. Move the coulter to its location.

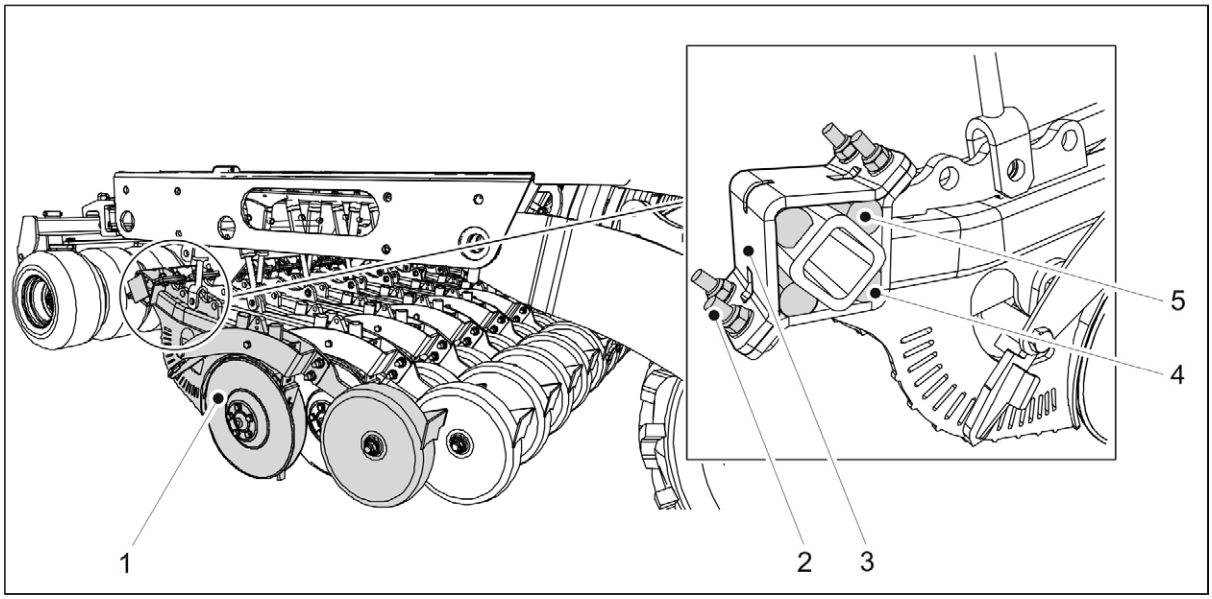


Figure. 7.9.1.2. - 247. Fastening the coulter

2. Set the lowest dampening rubber (4) in place and lift the coulter (1) against the mounting beam.
3. Install the remaining three dampening rubbers (5).
4. Replace the mounting plate (3).
5. Install the 4 mounting bolts and nuts (2) and tighten the bolts evenly to eliminate any gap between the mounting plates.
    - Use new locking nuts with a strength rating of 10 when mounting.

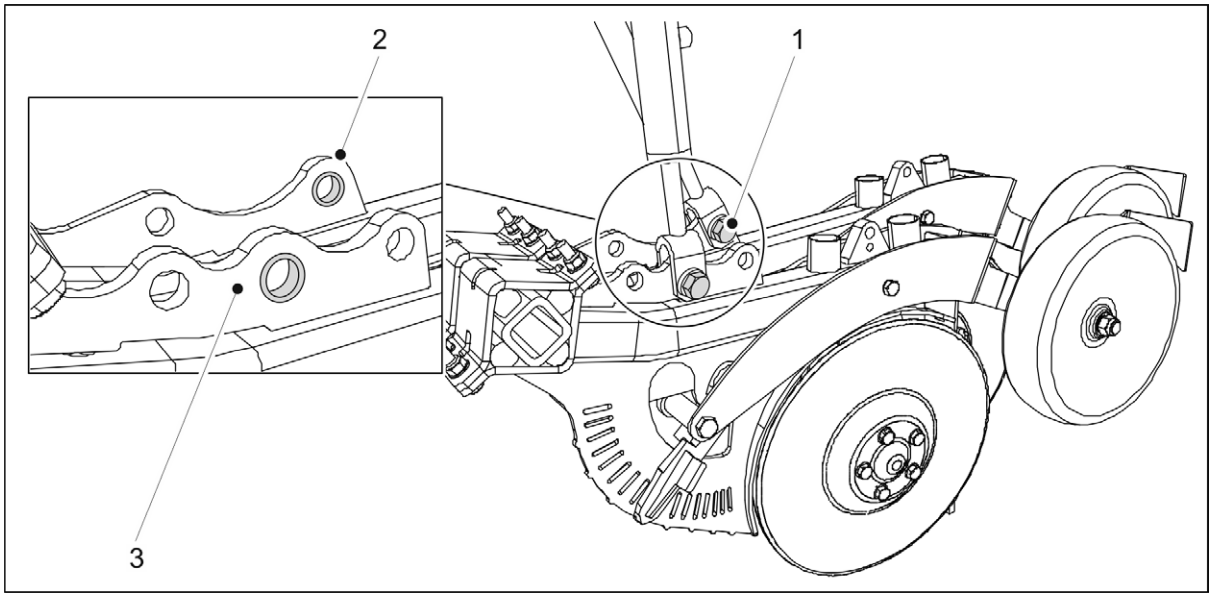


Figure. 7.9.1.2. - 248. Mounting the coulter cylinder

6. Insert the bottom cylinder bolt M20 X 75 (1) in the coulter mounting hole with the bushing.
    - Use new locking nuts to fasten.
      The bushing in the foremost coulter (3) is in the centremost hole. In the rearmost coulter (2) the bushing is found in the rearmost hole.

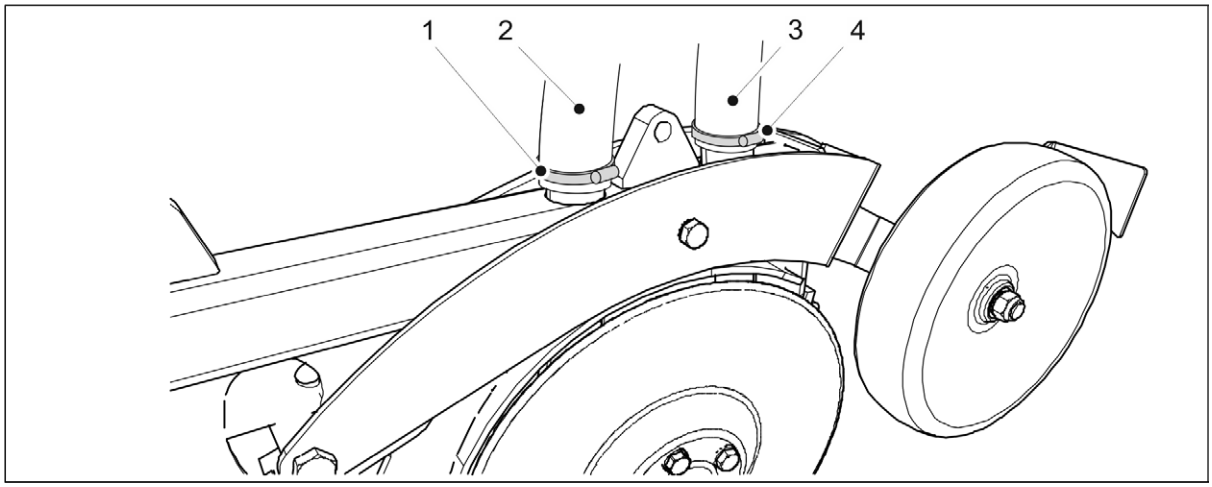


Figure. 7.9.1.2. - 249. Connecting coulter hoses

7. Connect the hoses (2,3) in the appropriate locations in the coulter.
   - The front hose (2) comes from the fertiliser hopper and the rear hose (3) comes from the seed hopper.
8. Tighten the hose clamps (1,4).

7.9.2. Replacing a coulter disc

7.9.2.1. Detaching a disc

- If necessary, remove the coulter in accordance with the instructions in section 7.9.1.1. Dismounting a coulter.

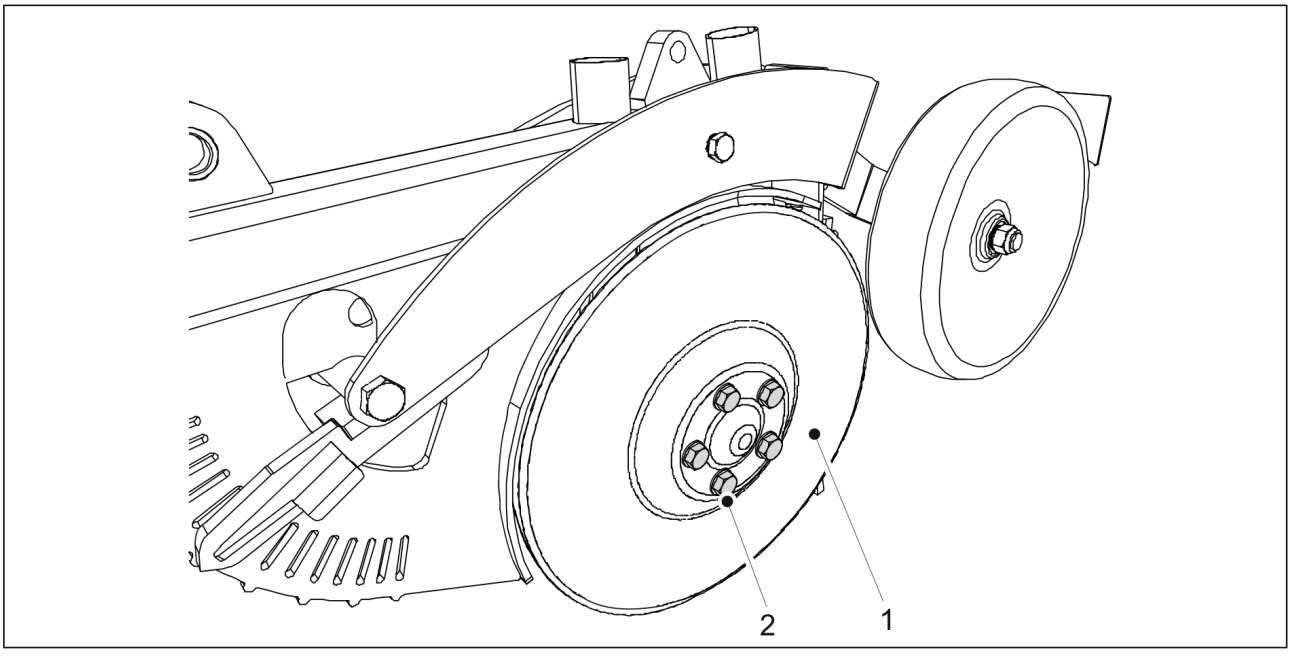


Figure. 7.9.2.1. - 250. Detaching a disc

1. Loosen the 5 mounting bolts (2) on the disc (1).
   - The disc will come loose.
     Replace the bearing when replacing the coulter.

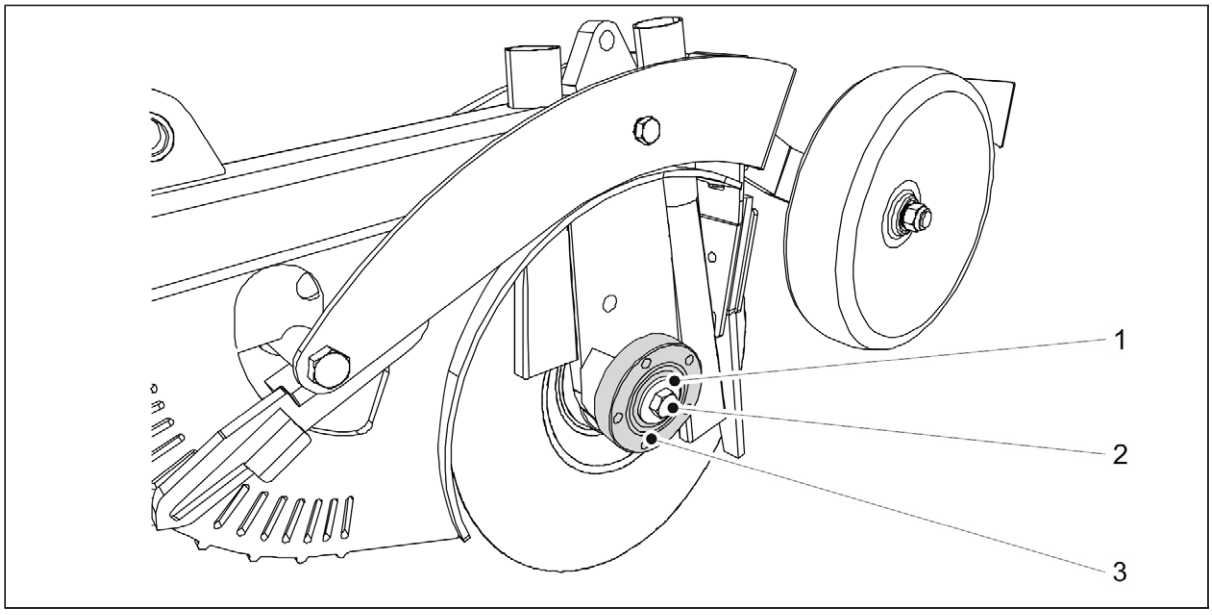


Figure. 7.9.2.1. - 251. Detaching the bearing housing

2. Loosen the bearing bolt (2) and remove the bolt and the washer (1).
    - The left-side disc has a left-handed thread and the right-side disc has a right-handed thread.
3. Remove the bearing housing (3).
    - Use a bearing puller to remove the bearing housing.

7.9.2.2. Installing the disc

- Install the bearing in accordance with section 7.9.3.2. Installing the bearing.

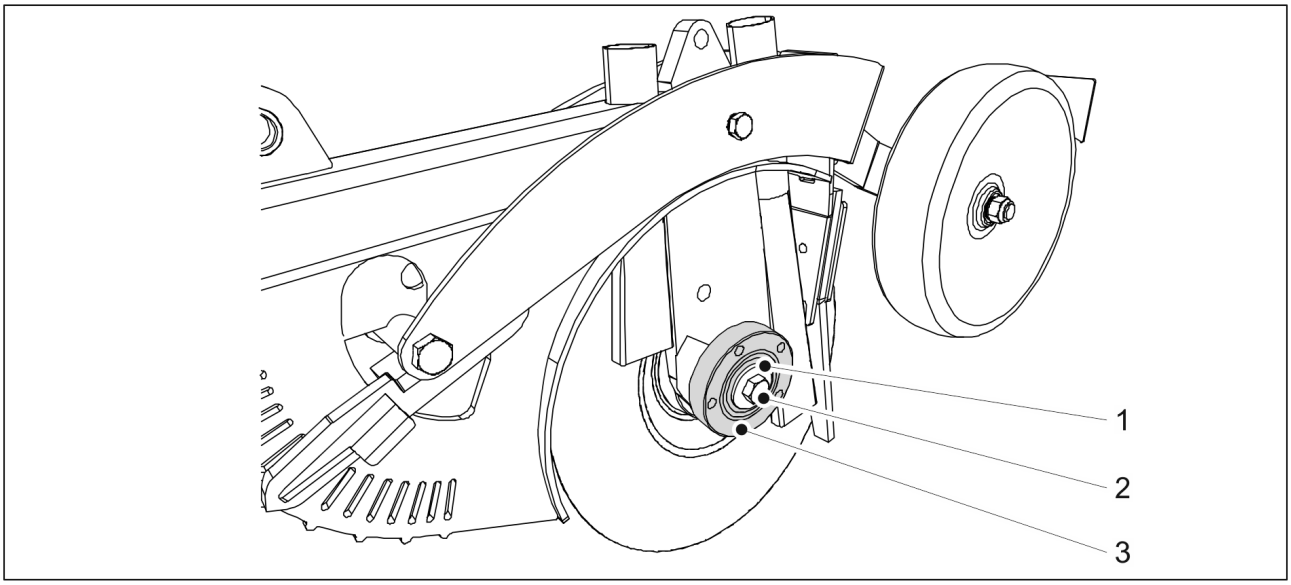


Figure. 7.9.2.2. - 252. Installing the bearing housing

1. Clean the plane surface (3) of the bearing housing.
2. Mount the bearing to the coulter axle.
3. Insert the M16 washer (1) and fasten the M16 bolt (2).

- The left-side disc has a left-handed thread and the right-side disc has a right-handed thread.

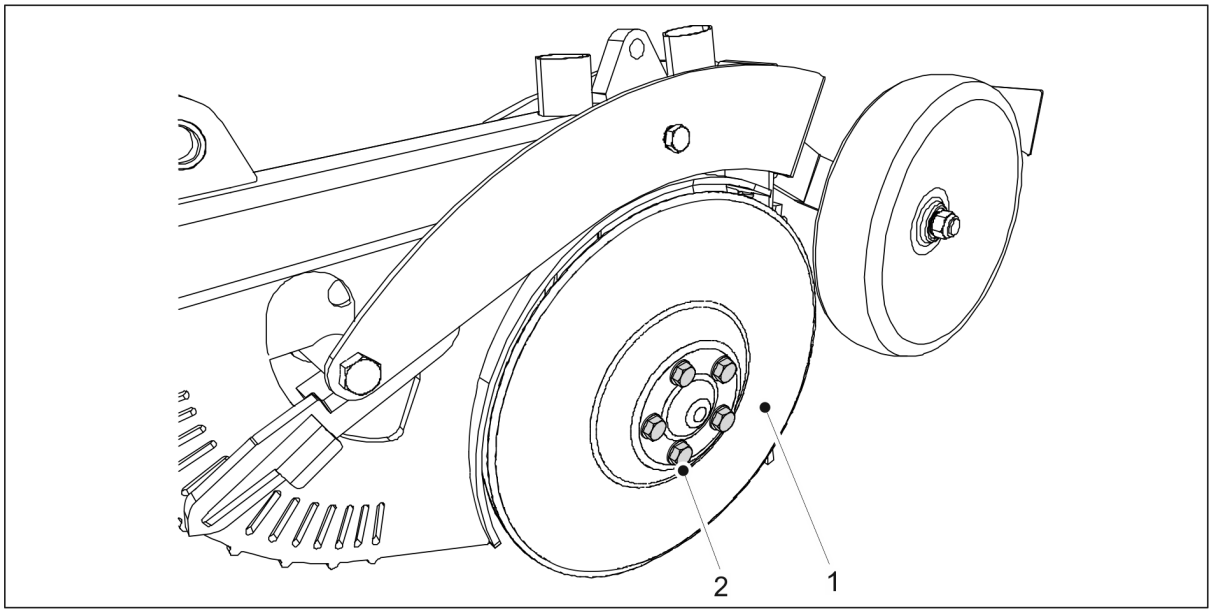


Figure. 7.9.2.2. - 253. Installing the disc

4. Replace the disc (1) onto to the coulter shaft.
5. Fasten the five M12 x 1.5 mounting bolts (2).

7.9.3. Replacing a coulter bearing

7.9.3.1. Detaching the bearing

- Remove the coulter disc in accordance with the instructions in section 7.9.2.1. Detaching a disc.

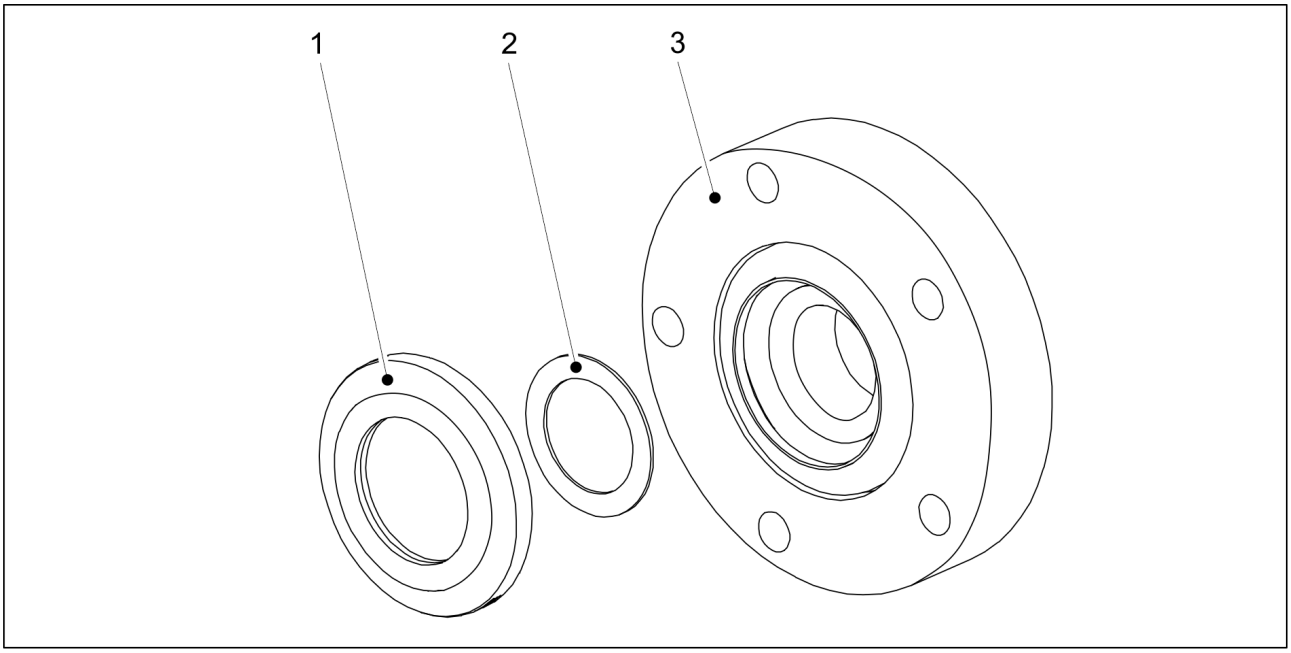


Figure. 7.9.3.1. - 254. Bearing seal and shim

1. Detach the bearing seal (1) and shim (2) from the back of the bearing housing (3).

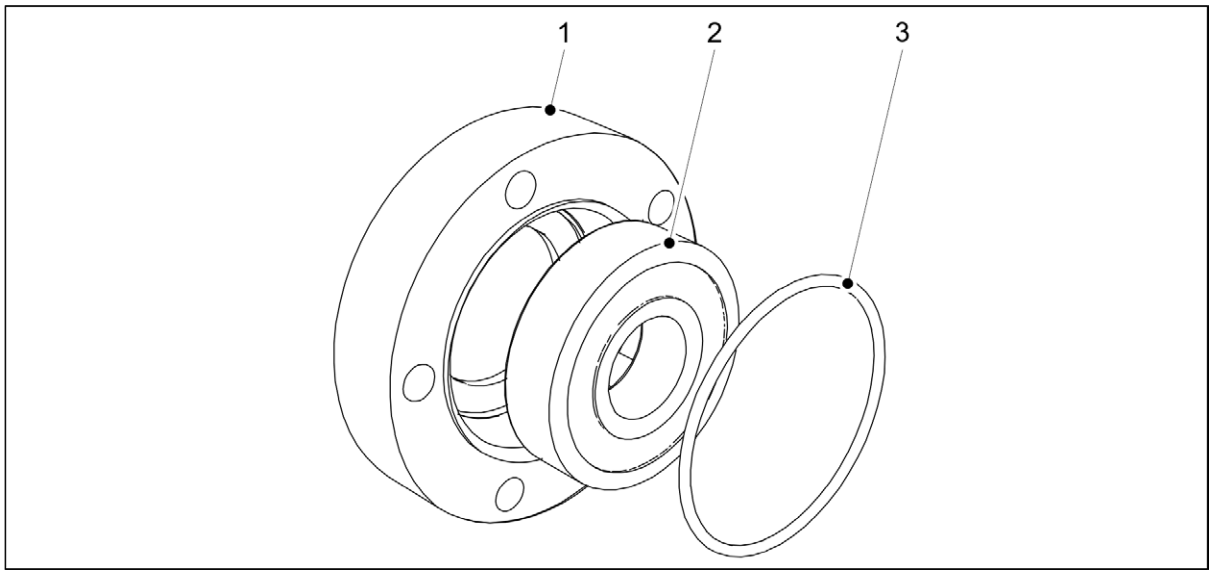


Figure. 7.9.3.1. - 255. Removing the bearing and O-ring

2. Detach the O-ring (3) from the front of the bearing.
3. Remove the bearing (2) from the bearing housing (1).
    - Pull the bearing using a clamp.

7.9.3.2. Installing the bearing

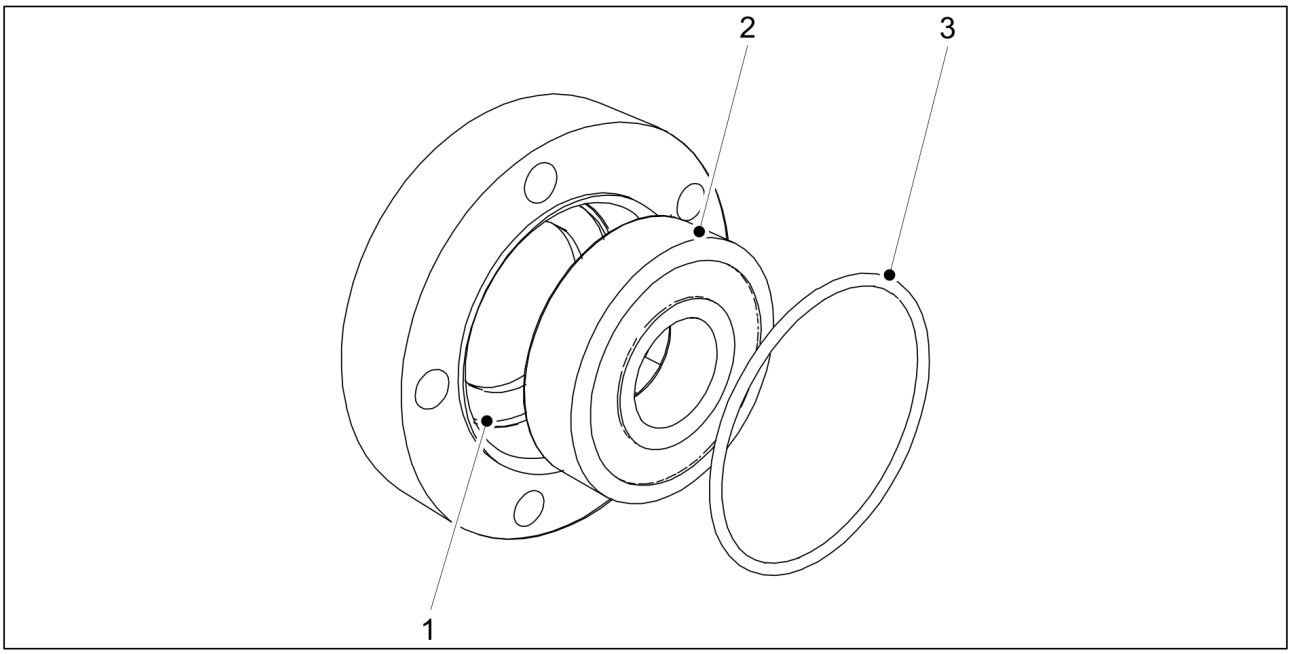


Figure. 7.9.3.2. - 256. Installing the bearing

1. Clean the bearing housing (1).
2. Install a new bearing (2).
    - Install the bearing using a clamp.
3. Replace the O-ring (3).

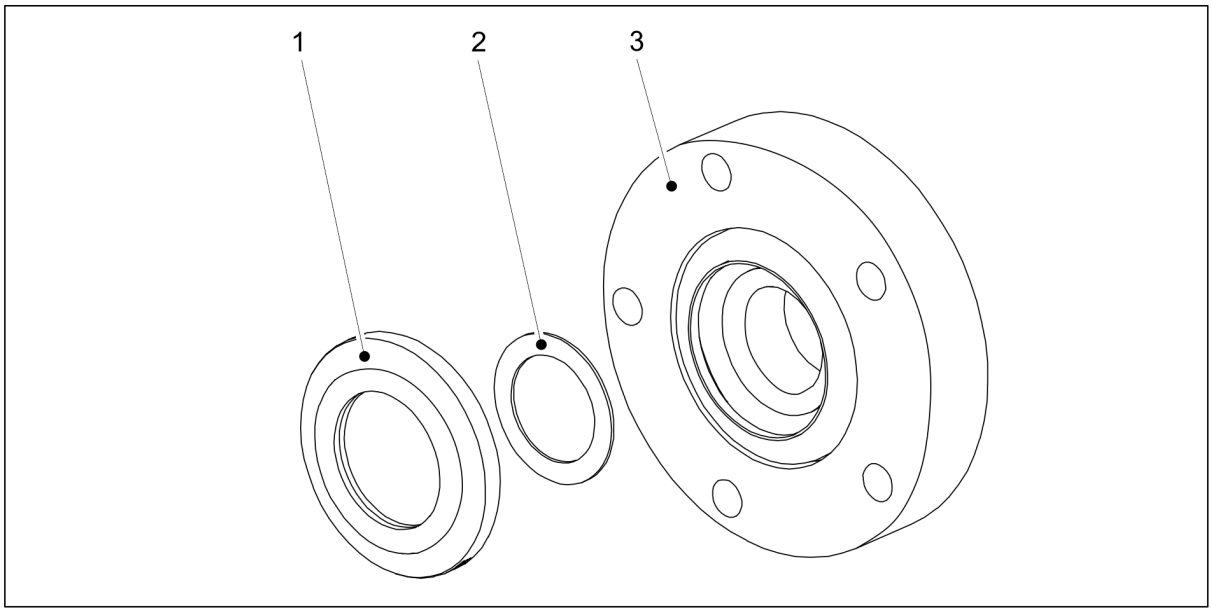


Figure. 7.9.3.2. - 257. Bearing seal and shim

4. Place the shim (2) and bearing seal (1) into the bearing housing (3).
   - The seal should be changed when the bearing is changed.

7.9.4. Replacing a coulter covering wheel

7.9.4.1. Dismounting the covering wheel

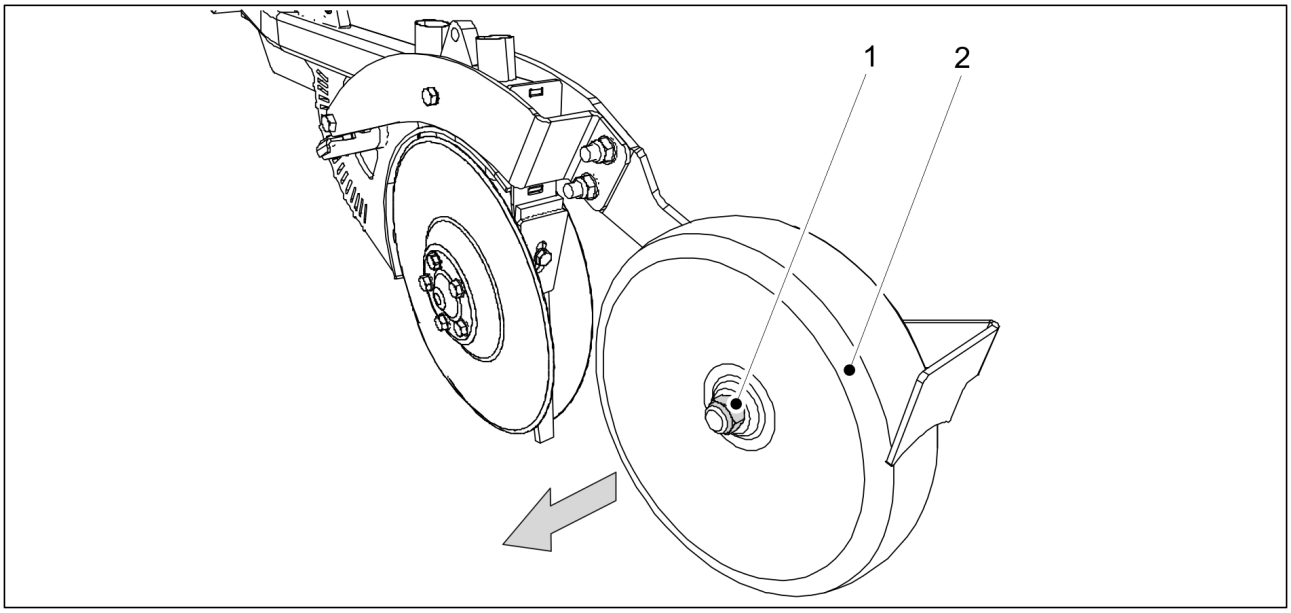


Figure. 7.9.4.1. - 258. Dismounting the covering wheel

1. Remove the locknut (1) of the covering wheel (2) and pull the covering wheel off of the coulter.

7.9.4.2. Installing the covering wheel

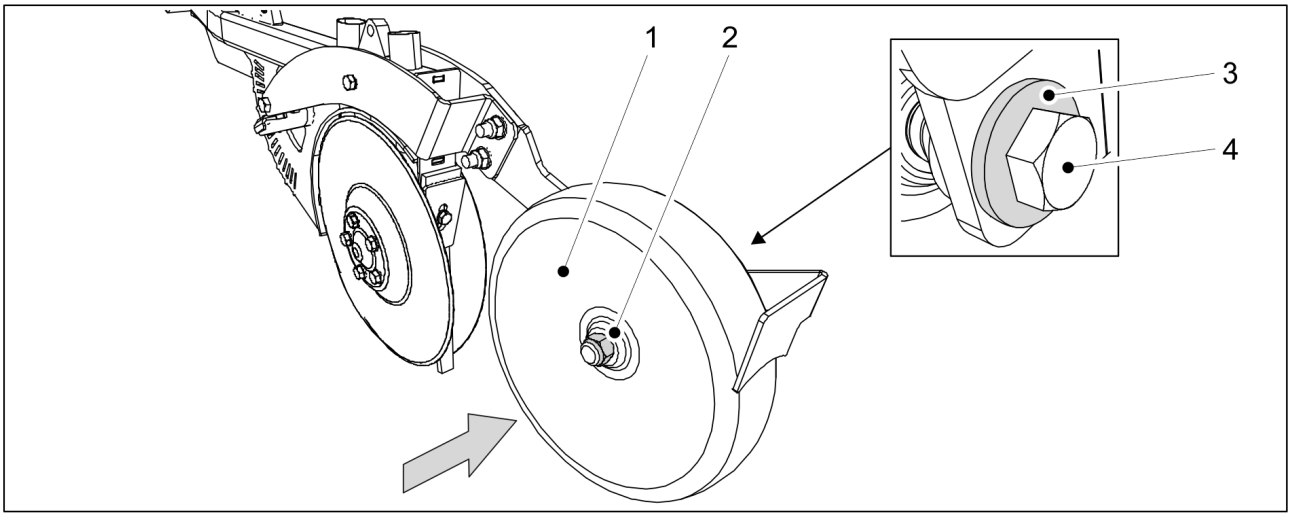


Figure. 7.9.4.2. - 259. Installing the covering wheel

1. Reattach the covering wheel (2) and fasten it with a M20 x 120 bolt (4), with a M20 washer (3) and a M20 nut (2).
    - Use new locking nuts when installing.

7.9.5. Adjusting the scrapers

7.9.5.1. Adjusting the disc scraper

DANGER
Beware the sharp edges of the discs.

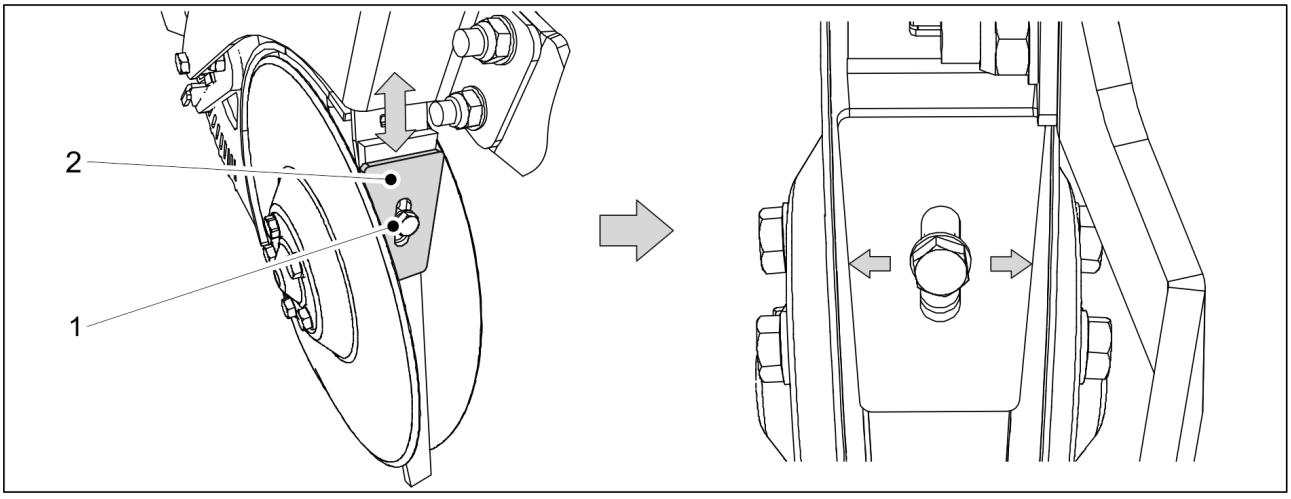


Figure. 7.9.5.1. - 260. Disc scraper

1. Loosen the bolt (1) of the scraper (2).
2. Adjust the distance between the scraper and the discs by moving the scraper up or down.

- The scraper and inner plate under it must be together. Set the scraper as close to the discs as possible but ensure that the disc does not make contact with the scraper at any point. The disc should turn freely.

3. Tighten the scraper fastening bolt.

7.9.5.2. Adjusting the cover wheel scraper

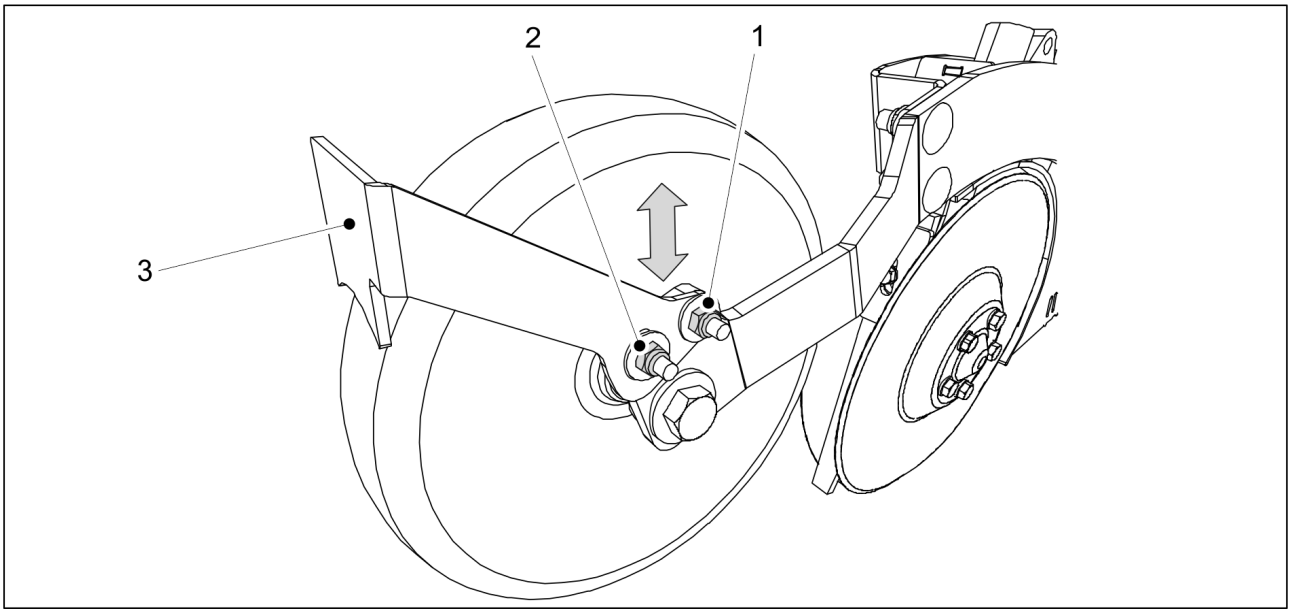


Figure. 7.9.5.2. - 261. Cover wheel scraper

1. Loosen the two fastening nuts (1, 2) of the cover wheel scraper (3)
2. Adjust the distance between the scraper and the cover wheel by moving the scraper up or down.
   - The distance between the scraper and the cover wheel should be 2-3 mm.
3. Tighten the scraper fastening nuts.

7.10. SeedPilot and SeedPilot ISOBUS control system maintenance

7.10.1. Sensor calibration

- The control system PIN code for sensor calibration is “3”.

7.10.1.1. Calibration of the machine seeding position sensor

1. Lower the machine to its working position.

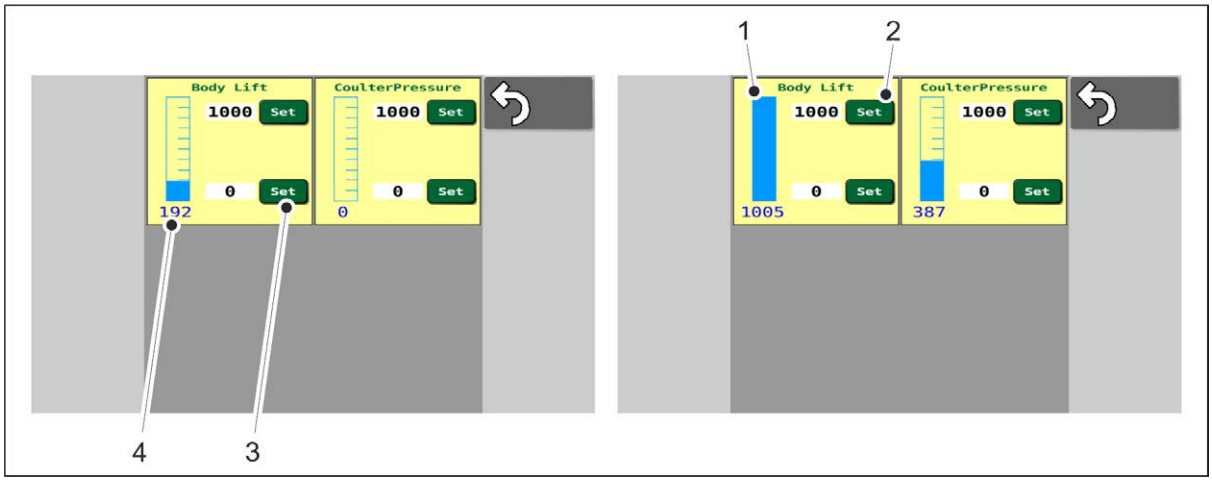


Figure. 7.10.1.1. - 262. Calibration of the machine seeding position sensor

- The number (4) indicates the sensor position. This is raw data from the controller.

2. Press SET (3).
3. Raise the machine into the transport position.
    - The blue bar (1) moves along the scale.
4. Press SET (2).

7.10.2. Travel distance calibration

7.10.2.1. Travel distance calibration while driving

- The control system PIN code for travel distance calibration is “5”.

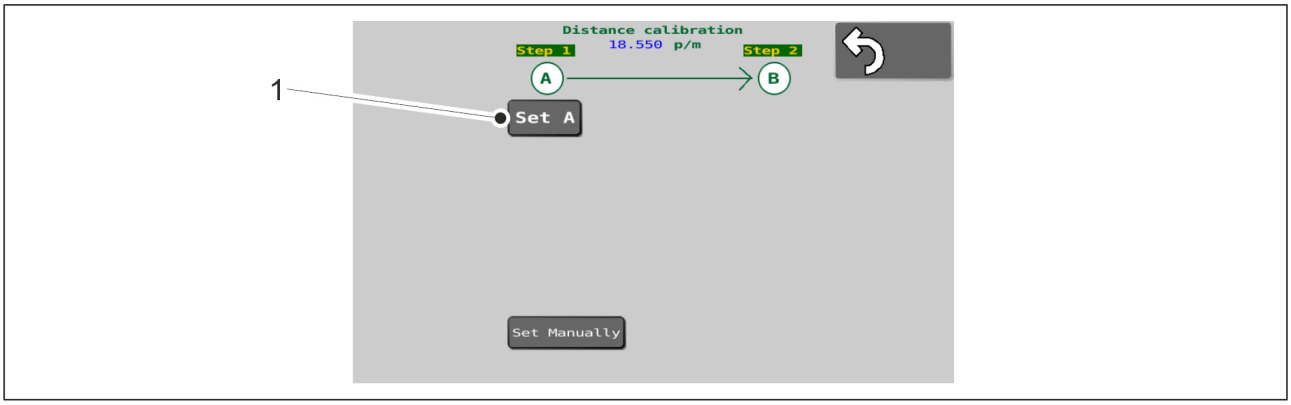


Figure. 7.10.2.1. - 263. Travel distance calibration 1

1. Press SET A (1).
2. Drive the desired distance.

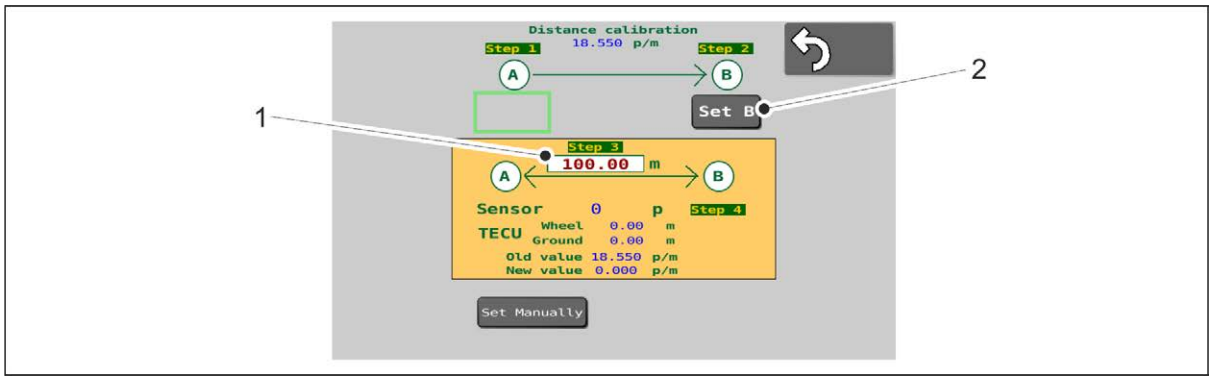


Figure. 7.10.2.1. - 264. Drive calibration 2

3. Enter the distance travelled on the screen (1).
4. Power down the machine.
    - The system will measure the speed sensor pulses.
5. Press SET B (2).

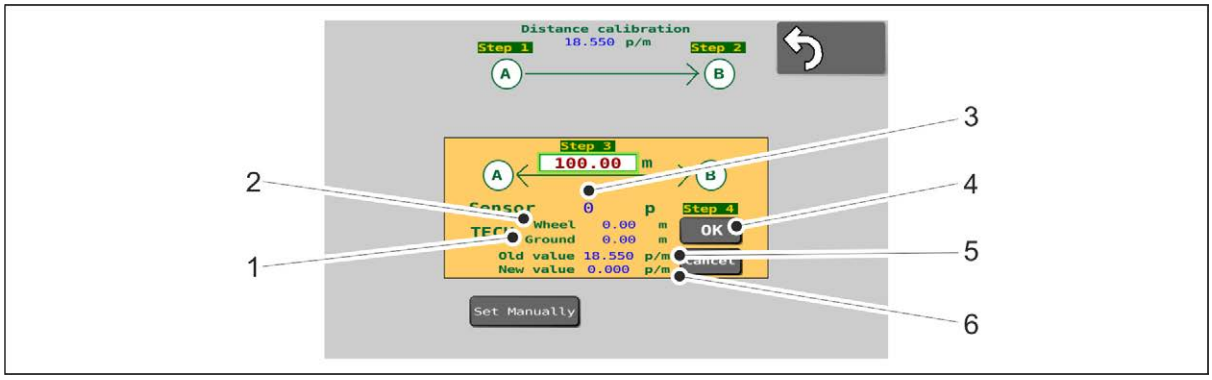


Figure. 7.10.2.1. - 265. Drive calibration 3

- Data from the tractor ISOBUS on the distance travelled (2) by the tractor wheels and the distance measured by the tractor radar (1) (only in SeedPilot ISOBUS), the default value (5) and the new value obtained in calibration (6) are displayed on the page. The system calibrates a new travel distance value based on the number (3) of pulses.

6. Press OK (4).
    - The new value is applied.

7.10.2.2. Manual calibration of travel distance

- The control system PIN code for travel distance calibration is “5”.
  With this function, the travel distance calibration value (pulses/metre [p/m]) can be set directly without driving.

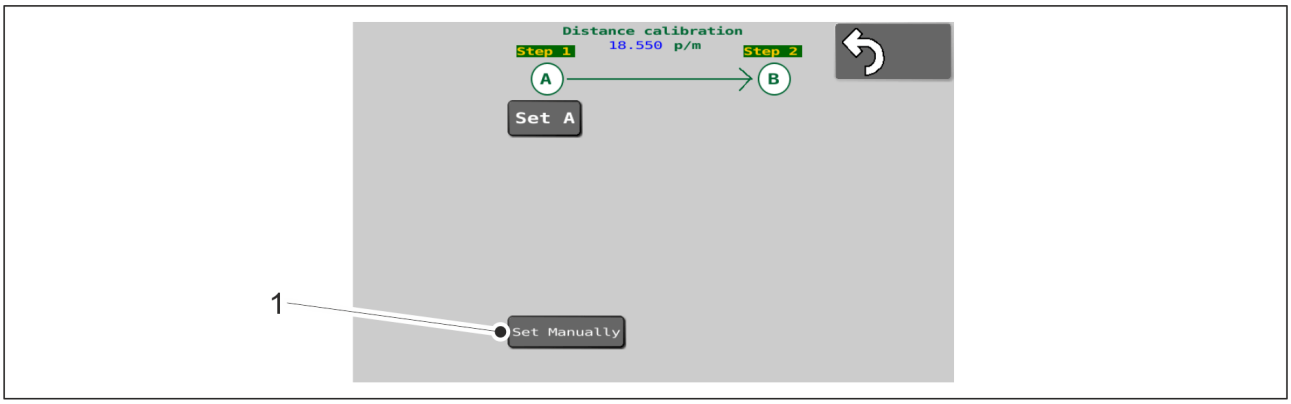


Figure. 7.10.2.2. - 266. Manual calibration of travel distance 1

1. Press Set Manually (1).

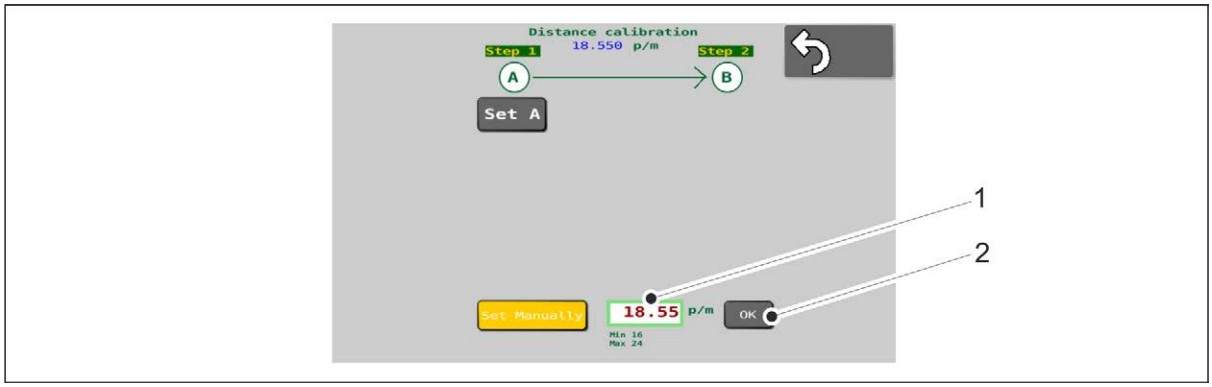


Figure. 7.10.2.2. - 267. Manual calibration of travel distance 2

2. Enter the desired value in the field (1).
    - The value must be between 16 and 24. Any values outside this range will not be saved.
      The factory setting is 18.55.
3. Press OK (2).
    - Pressing the OK button closes the input field and returns the screen to its start page.

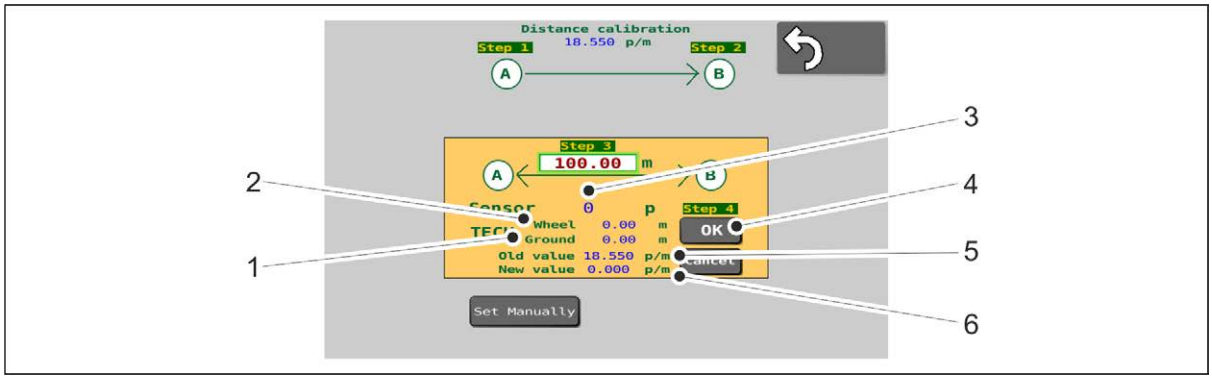


Figure. 7.10.2.2. - 268. Manual calibration of travel distance 3

- The value entered is displayed at the top of the screen (1).

7.10.3. I/O calibration diagnostics data

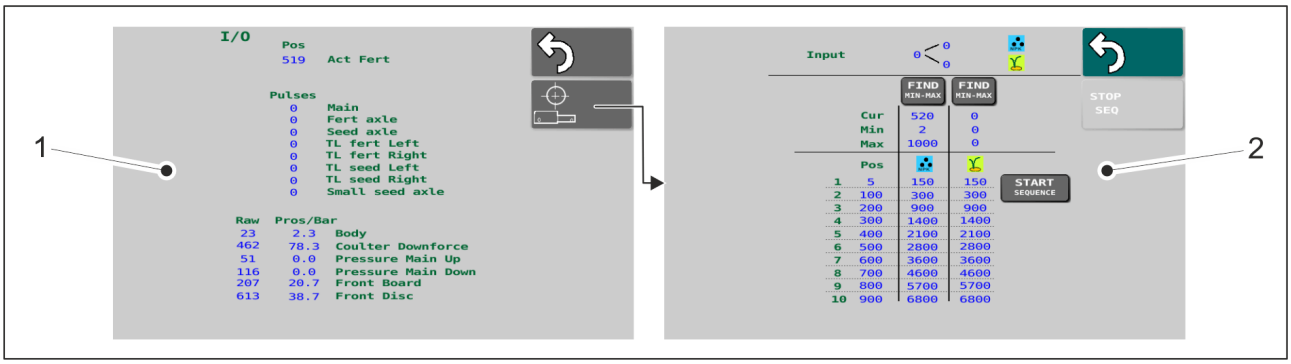


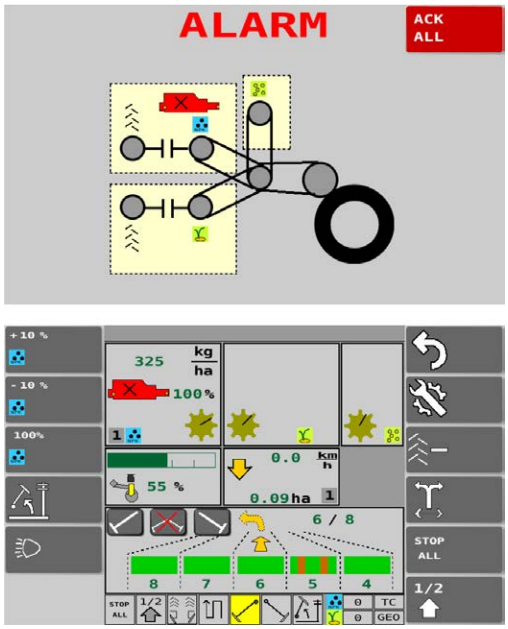
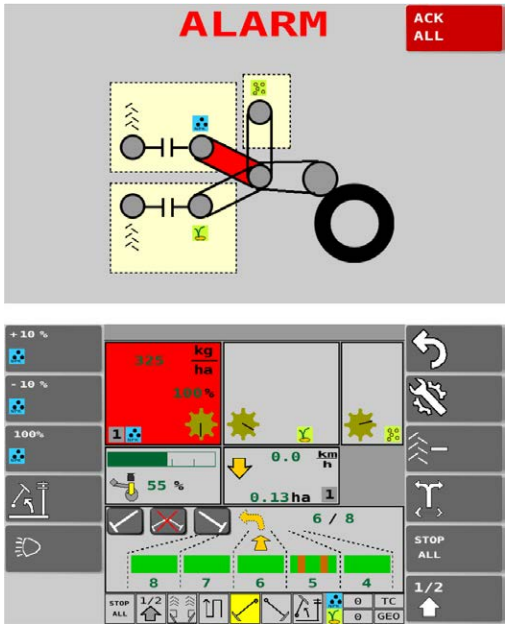
Figure. 7.10.3. - 269. I/O calibration diagnostics data and linear actuator data

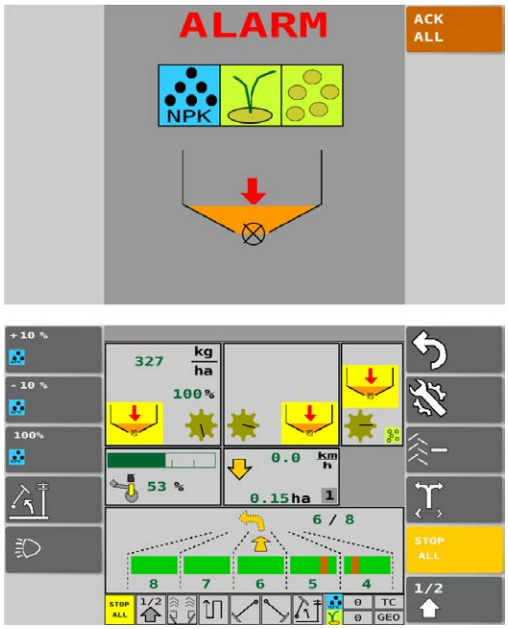
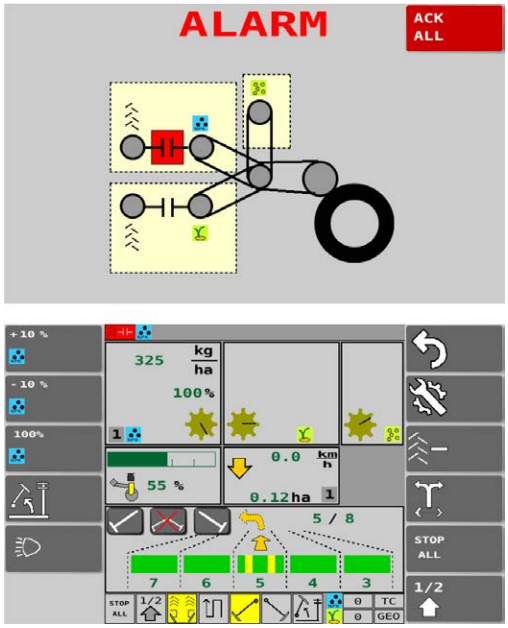
- I/O calibration diagnostics data (1) and linear actuator data (2) are displayed in Settings. Maintenance may request information from these pages.

8. Fault situations

8.1. Troubleshooting the SeedPilot and SeedPilot ISOBUS control system

Table. 8.1. - 20. Troubleshooting the control system

Error	Display	Measures
The linear actuator fails to reach the desired position.		1. Check for a mechanical obstruction blocking the actuator. Remove the obstruction, if necessary. 2. Run the actuator in the direction opposite to what was running before the alarm.
Shaft not rotating even though the machine is running.		1. Check for any mechanical obstructions blocking the chain gear. Remove the obstructions, if necessary. 2. Rotate the shaft with a calibration test crank to ensure that the feeder and shaft are rotating.

Fertiliser, seed and small seed level in the hopper is too low.		1. Fill the hopper.
Tramline clutch is not rotating even though it should be doing that. Tramline clutch is rotating even though the tramline is on.		1. Make sure that the wires and connectors are intact. 2. Rotate the shaft with a calibration test crank while tapping the clutch body.

- If the suggested measures do not work, contact authorised service.
  Reset the alarm by going to the Main screen and then the Drive screen. User interface pages are described in section 4.2.3. User interface.

8.2. Troubleshooting of the seed drill

Table. 8.2. - 21. Troubleshooting of the seed drill

Problem	Cause	Measures
The quantity of seed or fertiliser is higher than indicated by the calibration test.	1. The bottom flap position is incorrect	1. Check the position of the bottom flap in accordance with the instructions in section 6.6.8. Adjusting the bottom flap position or section 6.6.11. Adjusting the bottom flap position in the feeder units of the small seed hopper
	2. The calibration test table is indicative	2. Check the feeding quantity by means of the calibration test in accordance with section 6.8. Product calibration
	3. Seed moves in a different manner at the beginning and after a few hectares	3. Perform a calibration test after a few hectares in accordance with the instructions in section 6.8. Product calibration, particularly at the beginning of the season
The quantity of seed or fertiliser is lower than indicated by the calibration test.	1. The bottom flap position is incorrect	1. Check the position of the bottom flap in accordance with the instructions in section 6.6.8. Adjusting the bottom flap position or section 6.6.11. Adjusting the bottom flap position in the feeder units of the small seed hopper
	2. The calibration test table is indicative	2. Check the feeding quantity by means of the calibration test in accordance with section 6.8. Product calibration
	3. The seed or fertiliser bridging has occurred in the hopper.	3. Ensure that the fertiliser is not clumping and there are no foreign objects in the hopper.
	4. The feeder roller is obstructed.	4. Clean the feeder roller in accordance with the instructions in section 7.3.5. Cleaning the feeder units or section 7.3.6. Cleaning of the small seed hopper feeder units
	5. The wheel drive operation is compromised	5. Check the function of the wheel drive in accordance with the instructions in section 7.1.6. Checking the tightness of the wheel drive chain, section 7.1.7. Inspecting the wheel drive clutch and section 7.1.8. Inspecting the wheel drive clearance

The machine cannot be lifted	1. The lift inhibit function is enabled	1. Disable the lift inhibit function in accordance with section 4.2.4. Using the user interface
	2. Machine lifting circuit ball valve is closed	2. Open the machine lift ball valve in accordance with the instructions in section 5.3.5. Using the machine lifting circuit ball valve
	3. The quick coupling is open	3. Check the connection of the quick coupler
The machine cannot be lowered	1. Machine lifting circuit ball valve is closed	1. Open the machine lift ball valve in accordance with the instructions in section 5.3.5. Using the machine lifting circuit ball valve
	2. The quick coupling is open	2. Check the connection of the quick coupler
	3. The stoppers are in place in the lifting cylinder	3. Remove the stoppers from the lifting cylinder
Hopper alarm does not function	1. The alarm has been disabled	1. Enable the alarm from the settings in accordance with section 4.2.4.4. Settings.
The shaft rotation guard does not function	1. The alarm has been disabled	1. Enable the alarm from the settings in accordance with section 4.2.4.4. Settings.

9. Attachments

1. EC Declaration of Conformity
2. Hydraulic schematics
3. Electrical schematics
4. SeedPilot component and connection list
5. Connection socket in accordance with SFS 2473
6. Calculating the stability of the tractor - seed drill combination

MULTIVA

EC DECLARATION OF CONFORMITY

DOMETAL OY
Kotimäentie 1
FI-32210 Loimaa
Finland

hereby states that the following seed drills in question

Multiva Cerex 300 starting from serial number 000-090403-L1010001

Multiva Cerex 400 starting from serial number 000-090404-L1010001

Multiva FORTE FX300 starting from serial number 000-090303-L1010001

Multiva FORTE FX400 starting from serial number 000-090304-L1010001

meet the requirements of Machinery Directive 2006/42/EC with respect to the construction of machinery.

Furthermore, the following standards were applied in the design of the machine:

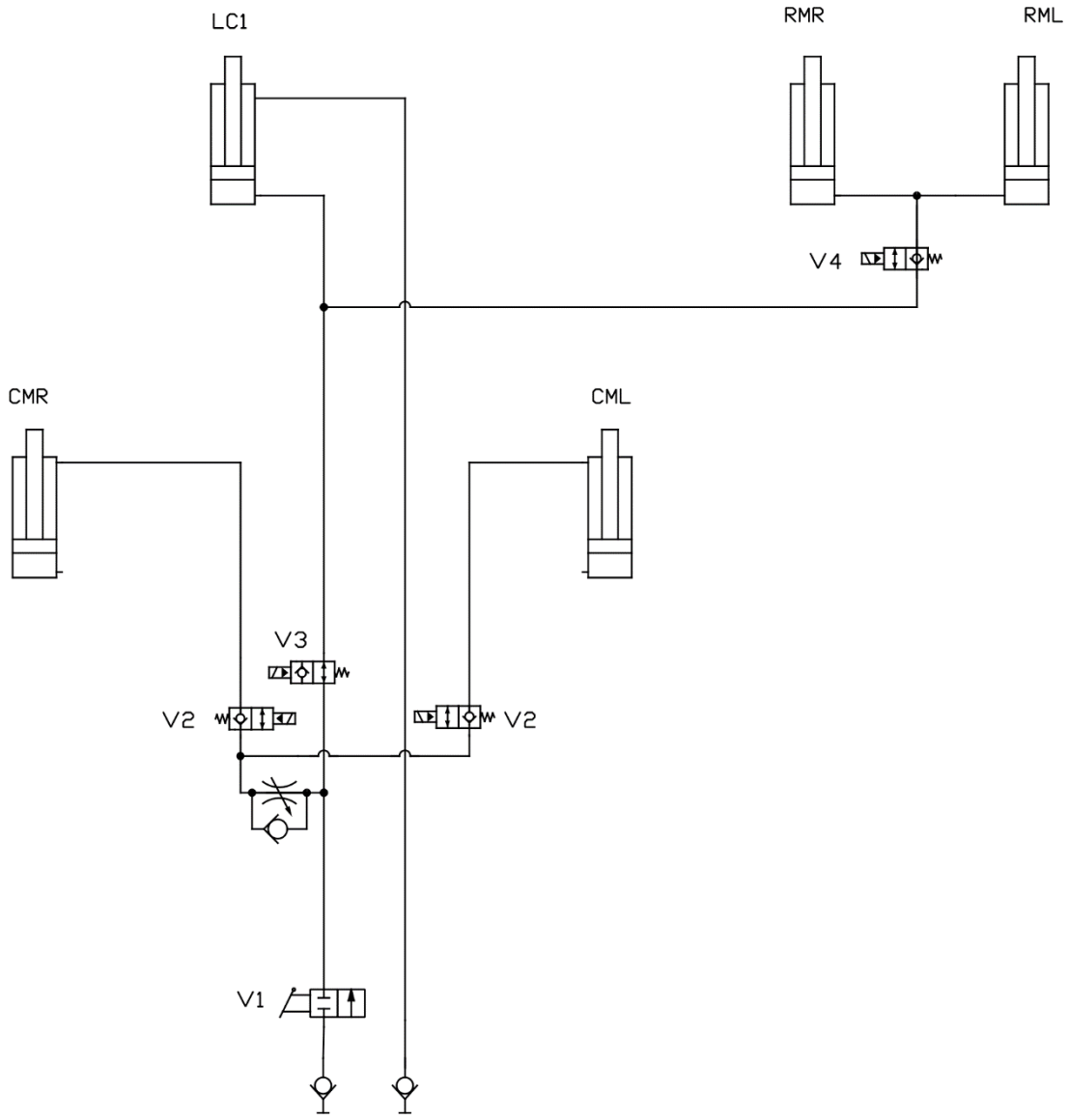
SFS-EN 12100 (2010)
SFS-EN 14018 + A1 (2010)
SFS-EN ISO 4254-1 (2013)

Loimaa, 28 October 2019

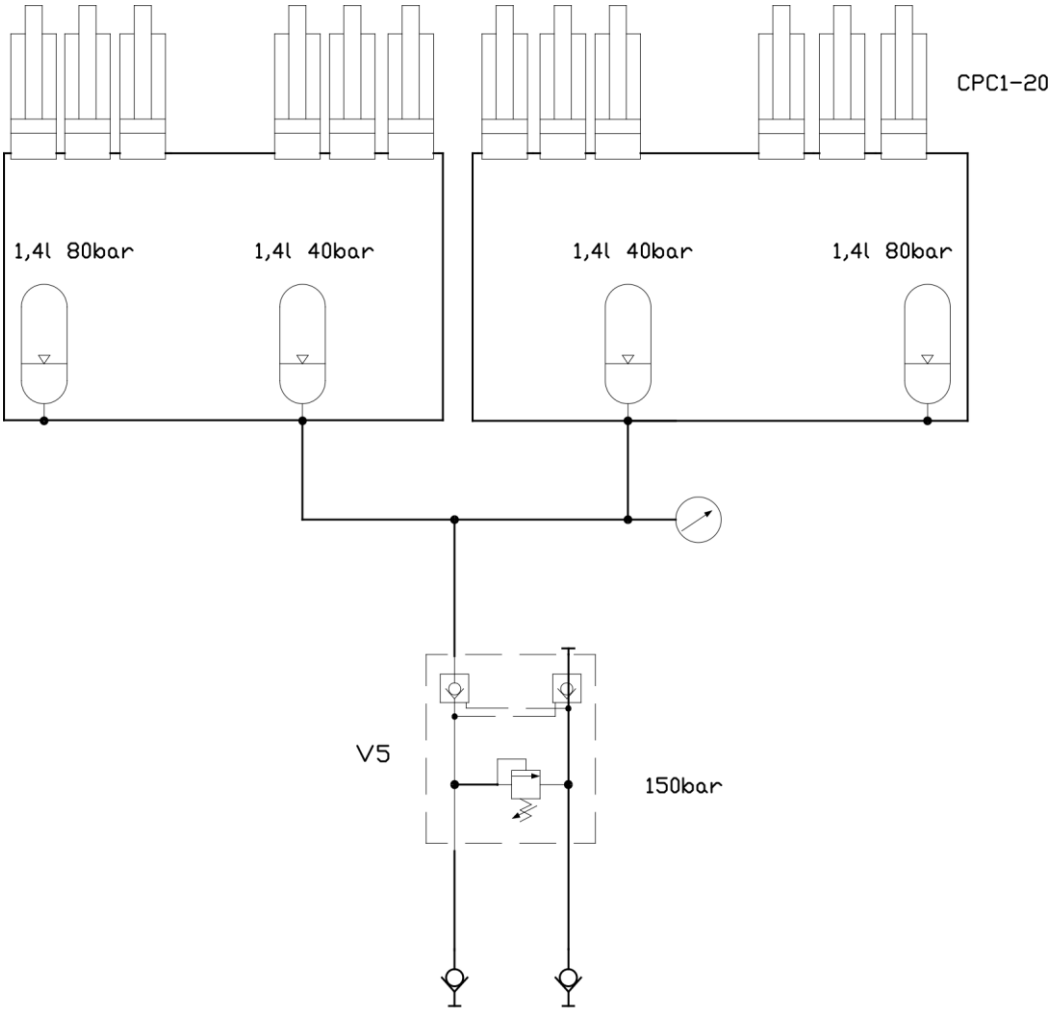
Vesa Mäkelä
Kotimäentie 1
FI-32210 Loimaa
Finland

The undersigned is also authorised to compile technical documentation for the above machines.
Translation of the original file

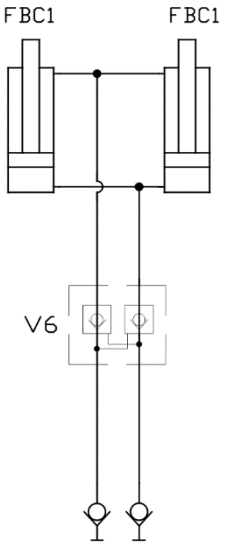
Hydraulic schematics FX300



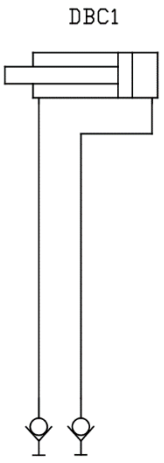
Lifting and lowering the machine (LC)
with middle markers (CMR/CML) and rear markers (RMR/RML)



Coulter pressure

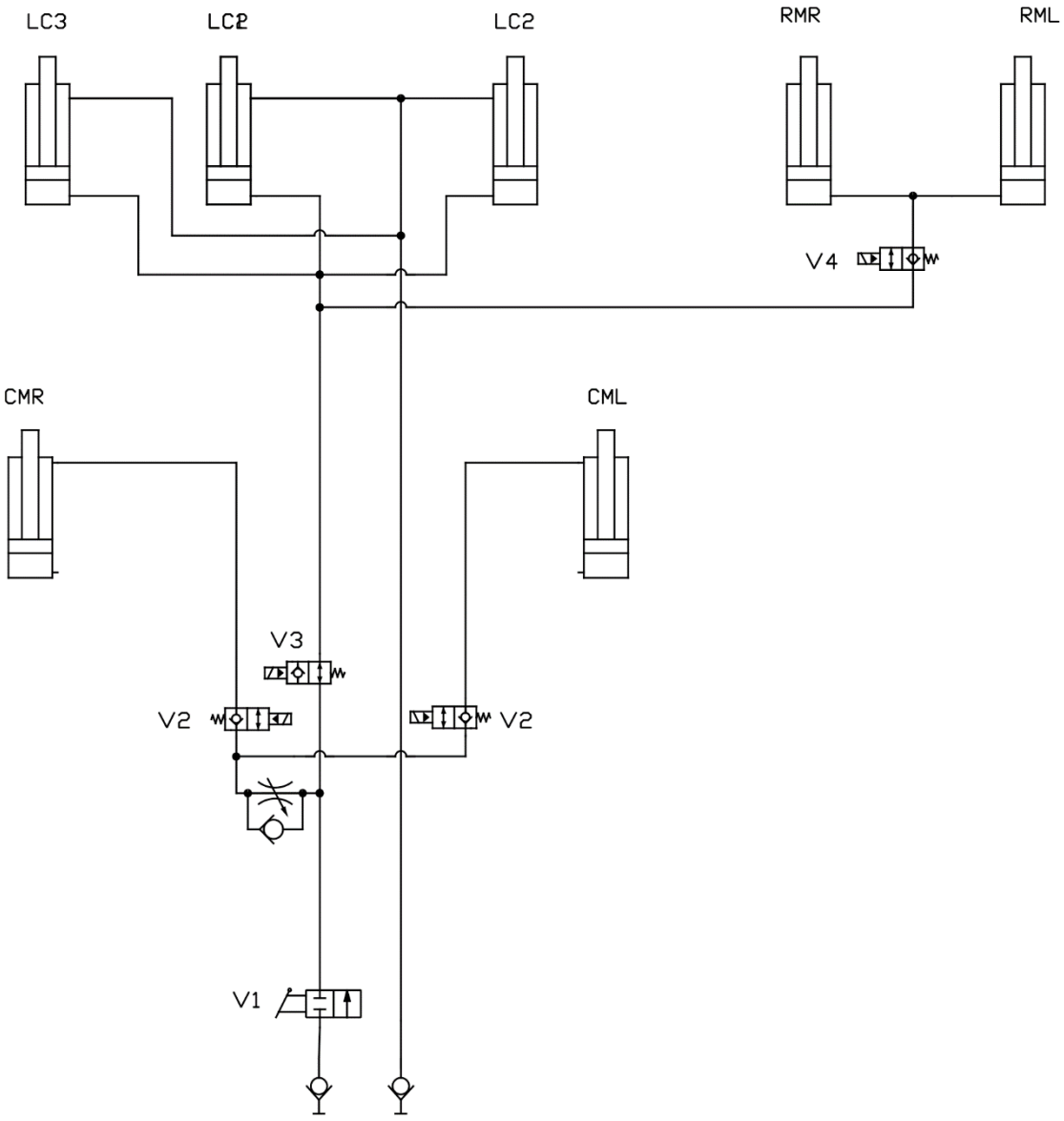


Front levelling board

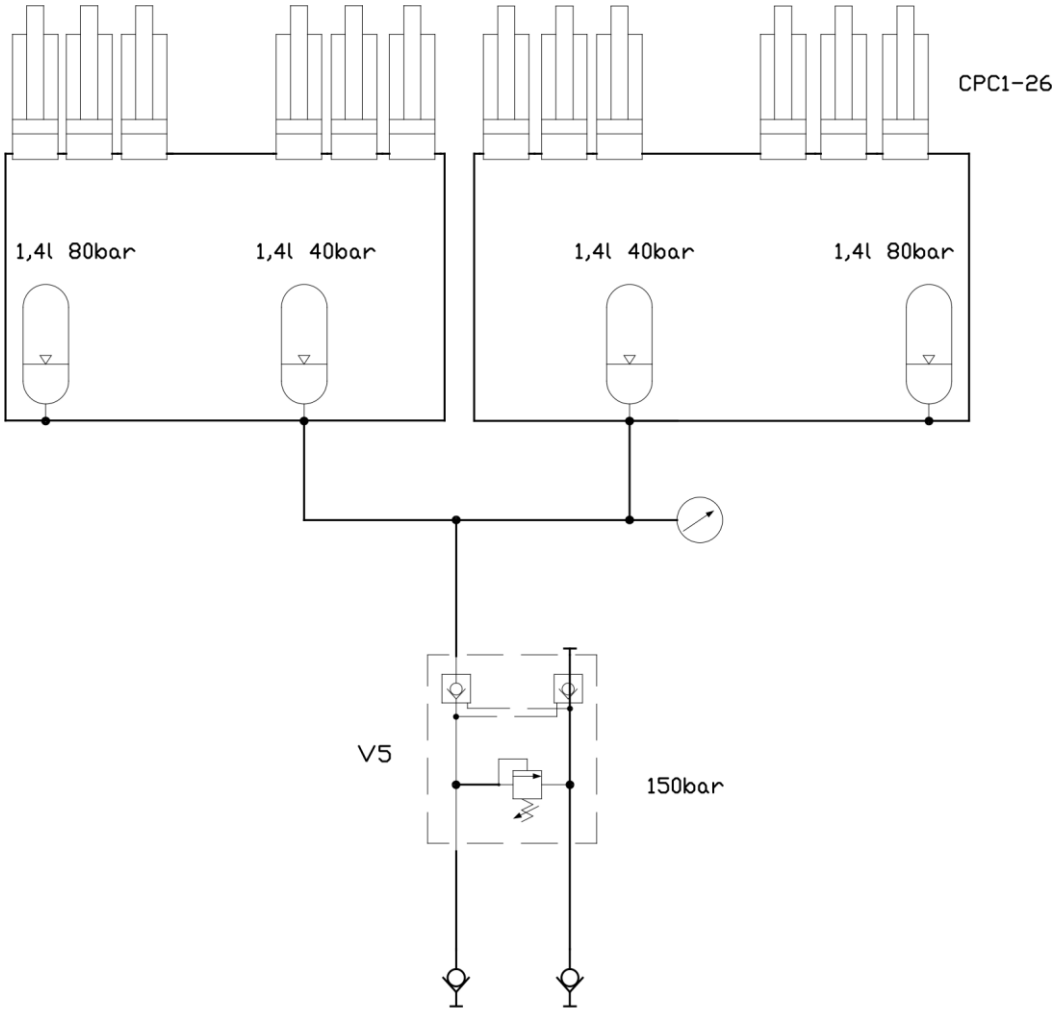


Drawbar cylinder

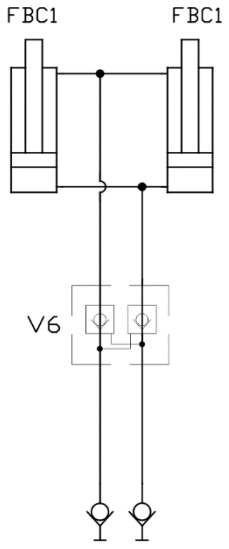
Hydraulic schematics FX400



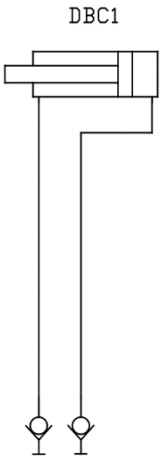
Lifting and lowering the machine (LC)
with middle markers (CMR/CML) and rear markers (RMR/RML)



Coulter pressure



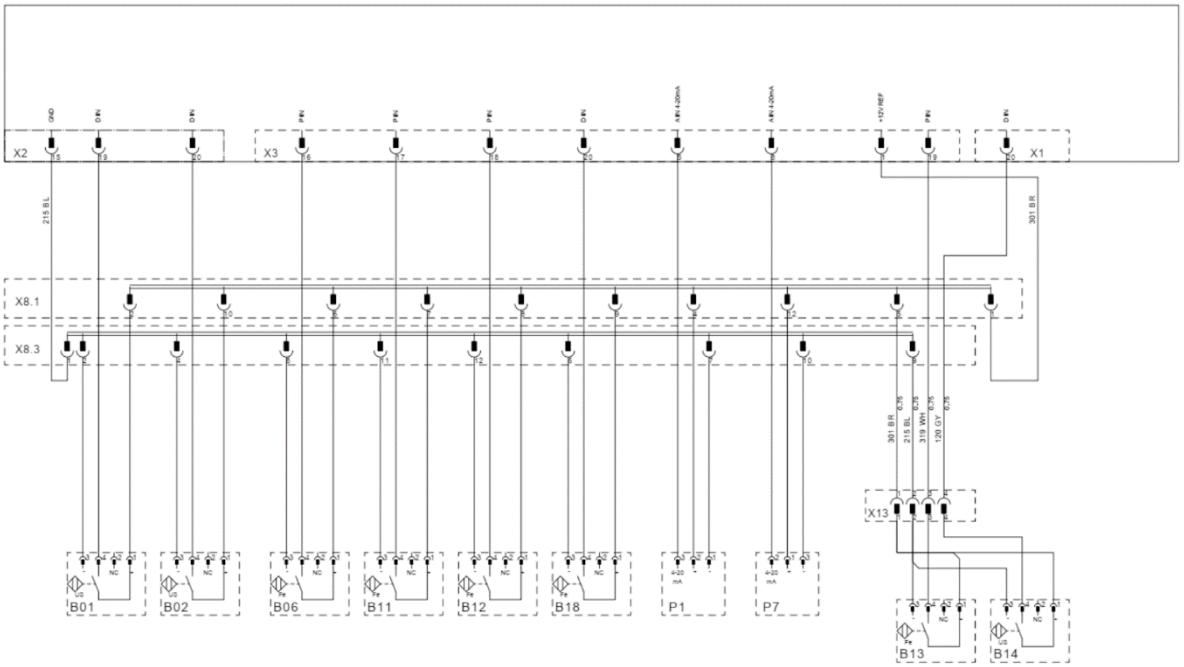
Front levelling board



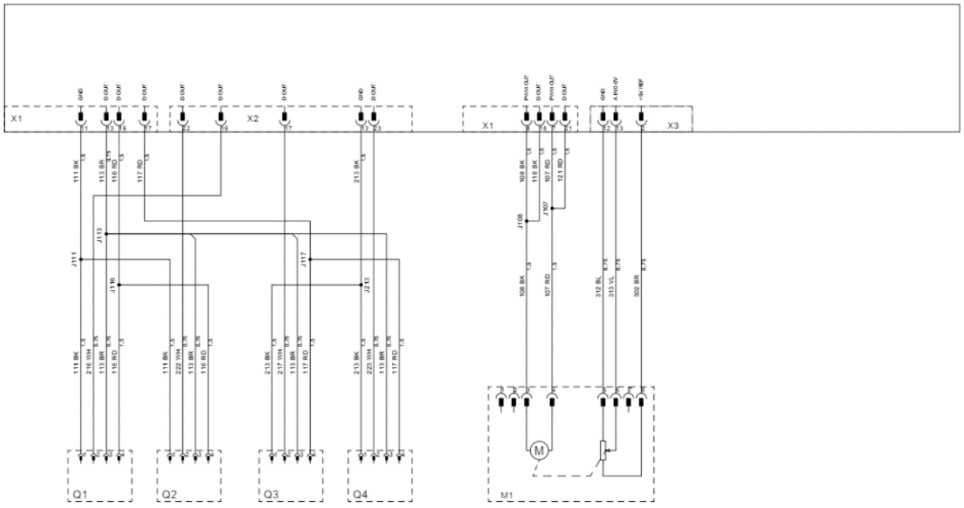
Drawbar cylinder

Electrical schematics

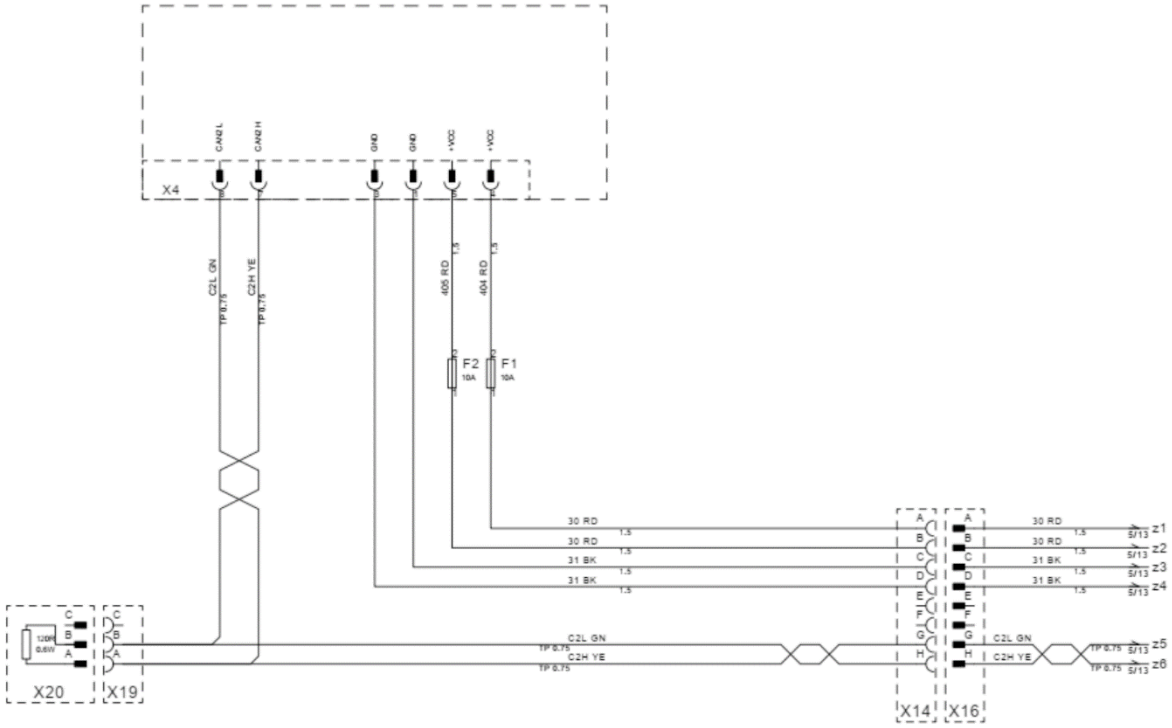
SeedPilot sensors



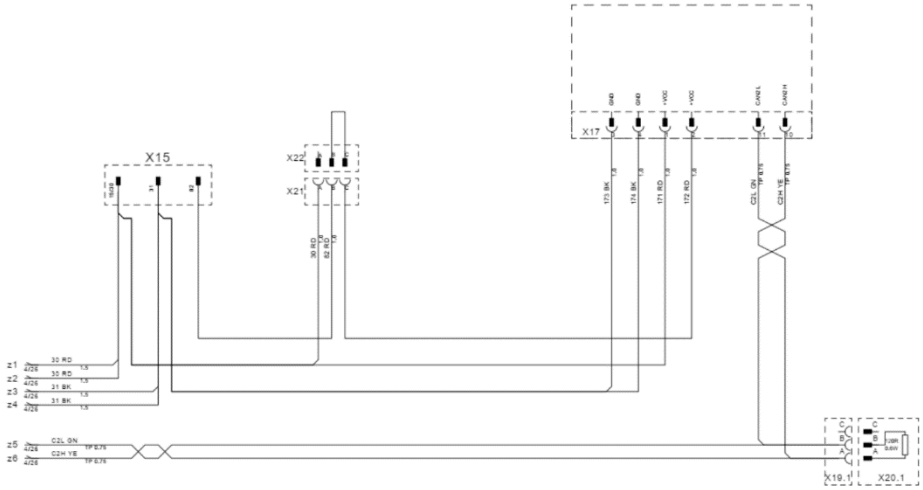
SeedPilot linear actuator and tramline clutches



SeedPilot cab



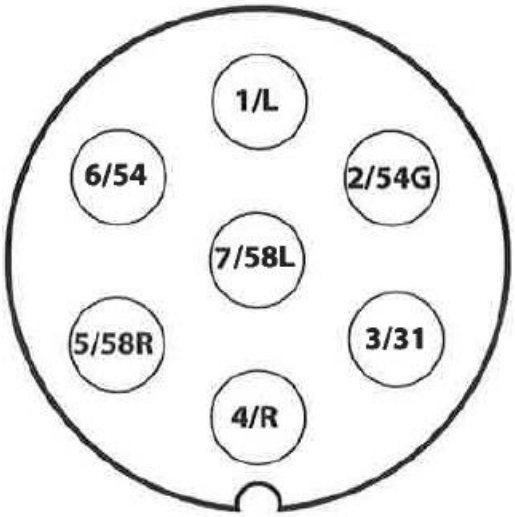
SeedPilot tractor



SeedPilot component and connector list

X1	CONTROL UNIT AMP23 CONNECTOR
X2	CONTROL UNIT AMP23 CONNECTOR
X3	CONTROL UNIT AMP23 CONNECTOR
X4	CONTROL UNIT AMP8 CONNECTOR
X8.1	SENSOR POWER MODULE
X8.3	SENSOR GROUNDING MODULE
X13	SMALL SEED HOPPER CONNECTOR
X14	TRACTOR CABLE CONNECTOR
X15	POWER SUPPLY CONNECTOR (3-POLE)
X16	CAB CABLE CONNECOR
B01	LEVEL SENSOR FERTILISER
B02	LEVEL SENSOR SEED
B06	AREA SENSORR
B11	FERTILISER SHAFT ROTATION MONITOR
B12	SEED SHAFT ROTATION MONITOR
B13	SMALL SEED LEVEL SENSOR
B14	SMALL SEED SHAFT ROTATION MONITOR
B18	OPTIONAL
K01	MIDDLE MARKER LEFT
K02	MIDDLE MARKER RIGHT
K03	LIFT INHIBIT
K10	REAR MARKERS
K11	OPTIONAL
Q1	TRAMLINE CLUTCH FERTILISER LEFT
Q2	TRAMLINE CLUTCH SEED LEFT
Q3	TRAMLINE CLUTCH FERTILISER RIGHT
Q4	TRAMLINE CLUTCH SEED RIGHT
P1	MACHINE POSITION SENSOR
P7	COULTER PRESSURE SENSOR
M1	LINAK FERTILISER

Connection socket according to SFS 2473



1/L	Left turn signal
2/54G	Free
3/31	Ground
4/R	Right turn signal
5/58R	Right rear light + lic. plate light
6/54	Brake light
7/58L	Left rear light

Calculating the stability of the tractor - seed drill combination

The load may impact the steerability of the tractor. The dead weight of the machine and the materials in the hoppers may result in the loss of the stability of the tractor - seed drill combination.

This Appendix provides a recommendation on how to ensure the stability of the tractor - seed drill combination by means of calculation.

The following formula can be used to calculate the tractor's minimum weight $I_{F,min}$, which will allow the load on the front axle to be 20% of the weight of an empty tractor:

$$I_{F,min} = \frac{\left(I_R \times (c+d)\right) - (T_F \times b) + (0{,}2 \times T_E \times b)}{a+b}$$, in which

T_E	[kg]	Tractor's dead weight [1)]
T_F	[kg]	Front axle load of an empty tractor [1)]
T_R	[kg]	Rear axle load of an empty tractor [1)]
I_R	[kg]	Total weight of the implement or rear ballast installed in the rear [2)]
I_F	[kg]	Total weight of the implement or front installed in the front[2)]
a	[m]	Distance between the centre of mass of the implement or front ballast installed in the front and the centre of the front axle [2) 3)]
b	[m]	Tractor's wheelbase [1)]
c	[m]	Distance between the centre of the rear axle and the centre of the connecting point of the link arm [1) 3)]
d	[m]	Distance between the centre of the connecting point of the link arm and the centre of mass of the implement or rear ballast installed in the rear [2)]

1) See the tractor manual
2) See the implement manual
3) To be measured

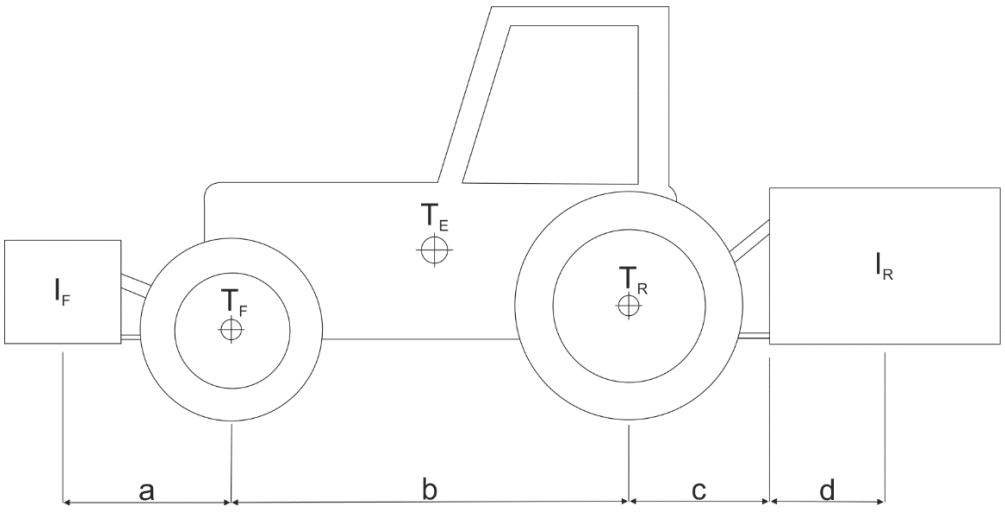


Figure 1. *Calculating the stability of the tractor - seed drill combination*