11/2026 F

USER MANUAL

NOVA COMBI 3000
NOVA COMBI 4000

SEED DRILL



Starting from serial number BB-54705

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Read the manual before operating the machine!

Translation

EY- vaatimustenmukaisuusvakuutus koneesta
(Konedirektiivi 2006/42/EY, Liite II A)

Valmistaja: Tume-Agri Oy
Osoite: Sudenkorventie 1, 14200 TURENKI

Henkilön nimi, joka osoite, joka on valtuutettu kokoamaan teknisen tiedoston:
Nimi: Heimo Valli Osoite: Sudenkorventie 1, FI-14200 TURENKI
Vakuuttaa, että

Kylvökone Nova Combi 3000 ja Nova Combi 4000
Sarjanumero _____

- ovat konedirektiivin (2006/42/EY) asiaankuuluvien säädösten mukaisia

ja lisäksi vakuuttaa, että

- seuraavia eurooppalaisia yhdenmukaistettuja standardeja on sovellettu

SFS-EN ISO 12100–1:2003

EG-försakran om maskinens överensstämmelse
(Maskindirektivet 2006/42/EG, Bilaga II A)

Tillverkare: Tume-Agri Oy
Adress: Sudenkorventie 1, FI-14200 TURENKI

Namn och adress till den person som är behörig att ställa samman den tekniska dokumentationen:
Namn: Heimo Valli Adress: Sudenkorventie 1, FI-14200 Turenki
Försäkrar härmed att

Såmaskin Nova Combi 3000 och Nova Combi 4000
Serienummer _____

- överensstämmer med tillämpliga bestämmelser i maskindirektivet (2006/42/EG)

Vi försäkrar dessutom att

- följande europeiska harmoniserade standarder har använts

SFS-EN ISO 12100-1:2003

EC Declaration of Confomity for the Machine
(Machine Directive 2006/42/EG, Annex II A)

Manufacturer: Tume-Agri Oy
Address: Sudenkorventie 1, FI-14200 TURENKI

Name and address of person authorized to compile a technical file:
Name: Heimo Valli Adress: Sudenkorventie 1, FI-14200 Turenki
Hereby declares that
Seed drill Nova Combi 3000 ja Nova Combi 4000 Serialnumber_____

- is in compliance with the applicable decrees of the Machine Directive (2006/42/EG)

and in addition, decleares, that

- the following standardized European directives and standards have been applied:

SFS-EN ISO 12100-1:2003

Paikka ja aika / Ort och datum / Place and Date: Turenki 24.01.2024

Allekirjoitus / underskriften / Signature :

Jorma Lähetkangas
Toimitusjohtaja / Verkställande direktör / Managing Director

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1. TO THE MACHINE OPERATOR AND THOSE IN CHARGE OF THE MACHINERY

We wish you the best of success with your TUME seed and fertilizer drill. Instruction in this manual gives the guidance for correct use, adjustments, maintenance and storage of the Tume Nova Combi. Following the guidance of this manual your machine will serve you impeccably and for a long time to come. It is very important to become acquainted with the machine operating instructions well before the operating season of the machine. Both the manufacturer, Tume-Agri Oy, as well as the authorized dealer, are happy to assist you with questions related to the machinery.

Remarks regarding the Operating Instructions

Because this publication is distributed in an international sales network, the machinery shown in the illustrations (as well as the standard equipment and accessories) can vary in different countries. In different countries the statutory and otherwise important covers have been opened or removed in some illustrations, in order to present a clearer view of the object. The equipment is not allowed to be used without the covers. For your own safety, make sure that all covers are in good condition or installed in place before commencing operations.

In this manual, the terms "left" and "right" in relation to the machine refer to the machine sides seen from behind towards the direction of travel.

Tume-Agri Oy continuously develops its products and reserves a right to make changes and improvements without commitment to carry out the said changes in machinery which is already sold.

2. GENERAL SAFETY PRECAUTIONS



Anyone using, maintaining or otherwise handling the TUME-seed and fertilizer sower, must become carefully acquainted with this manual before starting to work.

Working or staying under an unsupported raised machine is strictly prohibited. Make sure the machine stays up by closing the lift cylinder safety valves. Put the machine down if you have to leave it unattended.

Staying on the machine or on the step level when the machine is in motion is prohibited. The driver must ensure that nobody is near the machine when the machine is in motion.

Machine lubrication, adjustment or cleaning is not allowed when it is moving. Turn off the engine and turn on the hand brake during maintenance work.

All covers must be kept mounted in their respective locations.

Ensure the correct connection of drawbar, hydraulic lines and electrical wiring to the tractor and the work machine.

Damaged hydraulic hoses and connectors must be replaced without delay. Tractor hydraulic valves and connections must be leak-free and in good condition. Transportation position of the machine is dependent on these.

Due to the structure of the machine hydraulics, the hydraulics should be used only when a 12V supply voltage is connected to the machine. If the power supply is out of order, act with extreme caution in the use of hydraulics, because the movements taking place are unlimited!

Optional hydraulic row markers may move very quickly, especially if the hydraulic throttle valve is

open and the tractor hydraulic flow is high. Use extreme caution when trying out lift and a lowering of markers for the first time. Make sure that nobody is under a marker or trajectory.

Make sure that at least 20 per cent of the tractor's weight is left on the front axle of the tractor under all circumstances. If necessary, use additional weights. Be especially careful if the drill is connected to an interim processing device and you are raising it with the tractor's lifting gear i.e. in a case of reversal.

The machine is designed for a maximum transport speed of 40 km/h, both empty and fully loaded. When driving on public roads, always comply with applicable traffic regulations and restrictions concerning the tractor-machine combination. The permitted driving speed may be affected, for example, by the braking equipment of the machine and the mass of the towing tractor.

On rough or uneven roads, the driving speed must be reduced to a level appropriate for the road and driving conditions. Avoid driving over rocks and other obstacles to avoid flat tires.

Never select a driving lane, where the extreme wheels of the machine are "on empty". In such condition the machine can get too much swing. Choosing a wrong driving lane, can cause the machine to fall.

Always, use caution when moving on top of the machine for cleaning or maintenance work purposes, or filling the tanks.

When heated, machine painted surfaces can excrete gases harmful to health. Take care of efficient ventilation in your workspace for example during welding operations.

Use only manufacturer-approved accessories and equipment. The party carrying out alterations which does not follow manufacturer's instructions is responsible for the alterations and their consequences.

Seed Drill does not cause any substantial increase in the noise level at the driver's cabin. Possible hearing protection required depends on the tractor noise level. When handling heavy and sharp components (e.g. drawbar and coulter parts) the use of safety boots is recommended.

Keep your machine up to date also on the required road equipment, in case the machine has to be transported on public roads. Regulatory changes are often made.

Power should be taken directly from the tractor battery with its own power cable if tractor doesn’t have ISOBUS connector. Contact to your tractor dealer or manufacturer how to install power cable to your tractor and ask for an authorized mechanic to install the power cable with suitable and safe way. Tume-Agri Oy shall not be liable for any damage resulting from improperly connected or damaged cable.

Check power cable condition from time to time. A damaged cable may cause malfunction of the machine or tractor.

A damaged cable is a fire safety hazard. A damaged cable can cause electric shock.

It is forbidden to use the machine if the power cables are damaged. For example, if the insulation materials have rubbed.

Do not connect or operate the machine if the electrical connectors are wet.

3. MACHINE APPLICATION

Tume Nova Combi– Combi seed drill is intended for simultaneous seeding and fertilization. It is well suited for all sowing methods: direct sowing, sowing on minimally cultivated or on normal cultivated soil.

The machine can also be used only for seeding or fertilization, according to the boundary conditions stated below. Due to its structure, Nova Combi also intensifies the soil with its support wheels. Under most circumstances, the support wheels also close the furrows made by the coulters.

With the additional accessories, the number of features of Nova Combi may be increased, as the combination machine and accessory may do the drilling and fertilization and, during the same pass, among other things to modify or even out the arable land and sow grass seeds.

The use of Nova Combi to other purposes than the stated is prohibited. The machine is not meant for example to transport materials with great speed or storing material in the containers of the machine. The filling station of the machine should be located close to the field which will be sown and the transport speed, when machine has a load should be in a reasonable relationship to the container contents and road unevenness. Passenger transport with the machine is completely prohibited!

3.1 Using the machine exceptionally for sowing only

If fertilizers are not being used, it is reasonable to move the partitioning in machine container to its forward position and maximize the space for seed container.
If desired, for example due to the risk of soil drying out, to ensure that the seed is placed on the bottom of the deepest opened groove, the seeds can be sown through the fertilizer container. Calibration must also be done in this case by using the fertilizer side feeding device and calibration trough. It must also be taken into account that the fertilizer side sieves may not pass through the seeds which will be sown. In this case, the sieves must be removed.

In order to achieve the maximum drilling capacity, seeds may also be sown through both containers simultaneously (note: when sown through separate containers there is a 2 cm difference in resulting depth). Please note that the calibrations must be then carried out for both feeders and the sum of results forms a result describing the sowing rate.

3.2 Using the machine only for fertilizing.

Tume Nova Combi can also be used for fertilizer placement only. Fertilizer in this case will be filled into the fertilizer or seed container or to both. Special instructions related to the mere fertilizer placement are quite consistent with the instructions of the previous section.

On filling the entire machine with fertilizer, it should be noted that the fertilizer is usually heavier material than the seeds. Thus, the machine will not be filled completely.

4. GENERAL GUIDANCE FOR SOWING

4.1 Coulter features in sowing

Nova Combi is equipped with 2-disc coulters, where the right and left discs have different diameters. The first disc essentially determines the seed sowing depth and the larger disc creates a bit deeper groove for the fertilizers. Machine is also available with same size discs. With that option seeds and fertilizers goes to the same depth.

4.2 Driving instructions

Always when lowering the machine, it must be simultaneously moved forward. Otherwise the coulters may become blocked.

The machine is in the top position dependent on the tractor hydraulic valve. For this reason, in the transfer drive one must ensure that the tractor's hydraulic valve cannot accidentally open or leak.

NOTE! The end lift cylinder safety valves must always be kept open during the road transport!

The front end of the machine can be lifted with the tractor hydraulic system during sowing, for example in order to avoid clogging. This is done by the drive cylinder, which is managed by its own double-phased valve. The aforementioned cylinders should also be used on the road, as a higher ground clearance is then gained. Instead in sowing the front cylinder is used only when necessary.

The machine must function on level ground in a horizontal position. If the machine is tilted forward, the drawbar push rod needs to be adjusted longer. If the machine is tilted back, the push rod needs to be shortened. Check and if necessary adjust the sowing depths after driving for a while. Check the adjustment of markers by examining the sowing seam.

NOTE! Lift and lower the machine only when it moves forward. Never retreat the machine with coulters on the ground and the transmission connected. Machine sounds an alarm if reversing while its down or rear harrow is down.

Check from time to time, that there are no blockages in coulters. Also check all the seed and fertilizer pipe conditions and clean any blockages.

Do not store fertilizer or seeds for several days in the containers, especially in the damp weather. Damp fertilizer can cause feeding problems.

Driving speed:

- Good driving speed is normally 8-14 km/h.
- Driving speed while sowing bean and pea 6-10 km/h.
- Max. transport speed 40 km/h.

4.3 Notable tips to operate the machine

Some large and light seed types (i.e. some oats) may experience difficulty in flowing through the sieves. In such case remove the sieves from the seed tank. Use extreme caution when filling the tank, so that no large particles get mixed with the seeds and damage feeders.

The calibrations of the machine are done in seed and fertilizer sides to the trays below feeder

chambers. Exercise caution when pushing the troughs into place. Hold them in an absolutely straight line in terms of the machine. If a trough is pushed strongly so that its head is directed upwards, the trough can hit one of the feeder chambers and damage them.

Be careful while taking the sieves out from the hopper. Sieve hitting a level sensor may damage the sensor.

Most common error in the use of Nova Combi is that too much weight is placed on coulters. Weighing is sufficient when the working depth is achieved, that is that the coulter sledge moves on steadily relying on the front wheel, nothing more! Too much weight on the coulter increases the risk of machine becoming blocked and strains the machine structures unnecessarily.

5. COMMISSIONING THE MACHINE

5.1 Rear wheels

Rear wheels function in the way that the longer cylinders at the ends of the machine turn a tube frame with the width of the machine, in which are connected also the extreme wheel pairs. The intermediate wheel pairs in turn are mounted by means of joints to the tubular body and they operate with their own drive cylinders. All these cylinders have been connected to the same hydraulic circuit and thus they all share the same pressure. For this reason the wheel pairs can adjust to the ground irregularities but the rolling force is still standard throughout the working width (picture 1).

Geometry of rear wheels has been planned in the way, that in working position the pressure on all wheel pairs is nearly the same. On the other hand, with the machine lifted to its up position, the loose middle wheel pairs carry some more of the load. In this way the probability of peripheral wheel pairs becoming damaged is reduced, as those are the ones which most often are damaged in transit drive.

Also note when reversing the scrappers and the step of the back wheels, they are very close to the ground. Watch out for obstacles! When reversing over a high threshold etc. the above-mentioned scrapers rise higher if the machine is slightly lowered. Check that under the coulters will be enough room so that they will not hit obstacles.



Picture 1. Rear wheels.

5.2 Front wheels

The front support wheels determine the depth the coulters can sow (picture 2). While seeding the front wheels are on the ground and hold the coulter unit with two coulters. The adjustment is coulter sledge-specific, and therefore one-wheel controls two coulters. Adjustment is done with quick latches which are in the front edge of the sledge. By adjusting the latch to the lowest notches, the maximum sowing depth can be achieved. Respectively, by adjusting the latch i.e. to the upper notches sowing can be done to soil surface. Adjusting seeding depth is described completely in chapter 9.



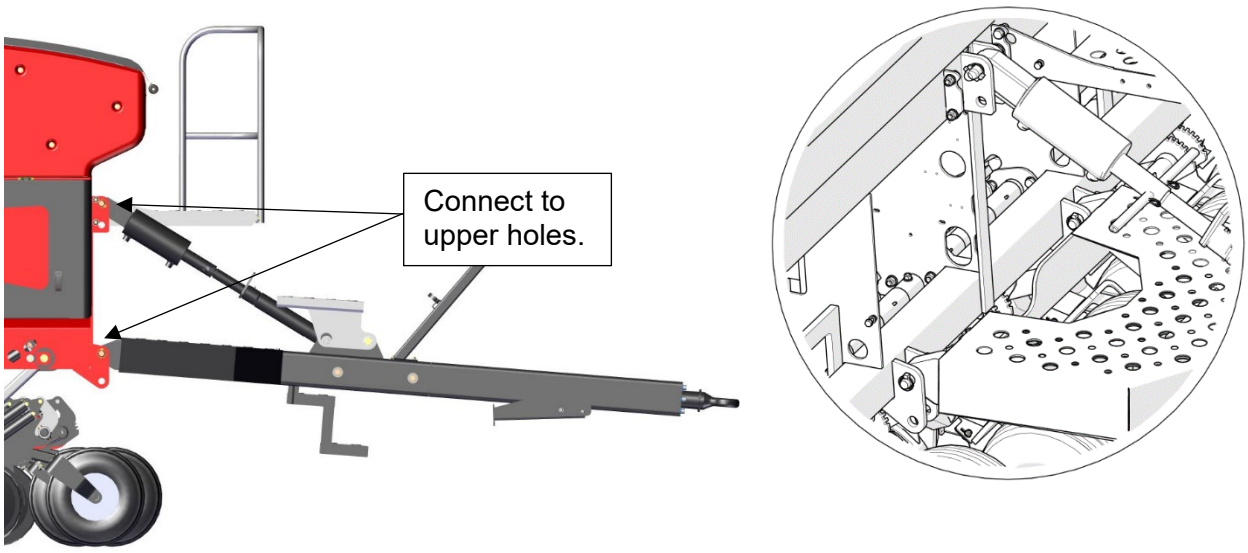
Picture 2. Front wheels.

Front wheels are pulled up by springs. Watch that front wheels do not hit to any obstacles while making steep turns. Wheels can move downwards if machine bounces and hit to an obstacle or ground causing damages to the wheel!

5.3 Drawbar installation

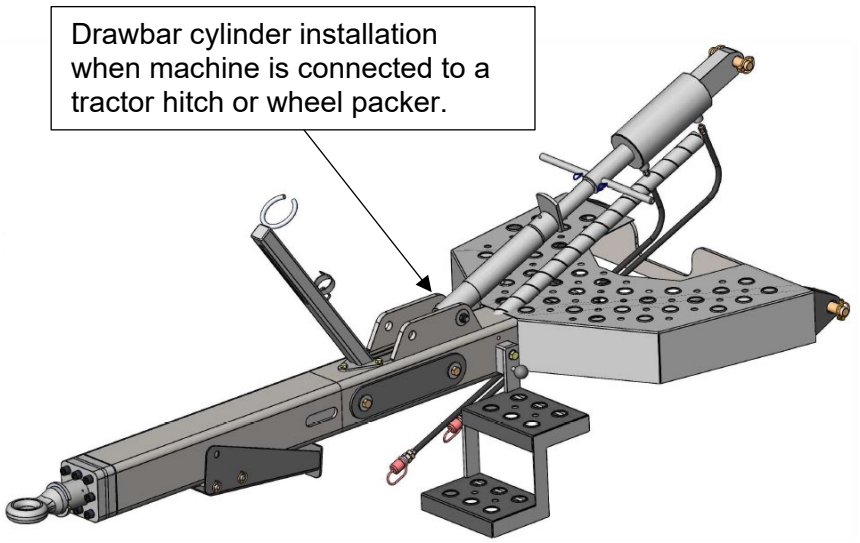
Drawbar is assembled according to picture 3 Note, that drawbar is always mounted to the upper holes of the machine's lower brackets. The hydraulic push rod is mounted also to its upper hole.

Hydraulic hoses and electricity wires are connected to the drawbar carefully so that they cannot be damaged in any driving situation. Pull hoses and wires through the drawbar.

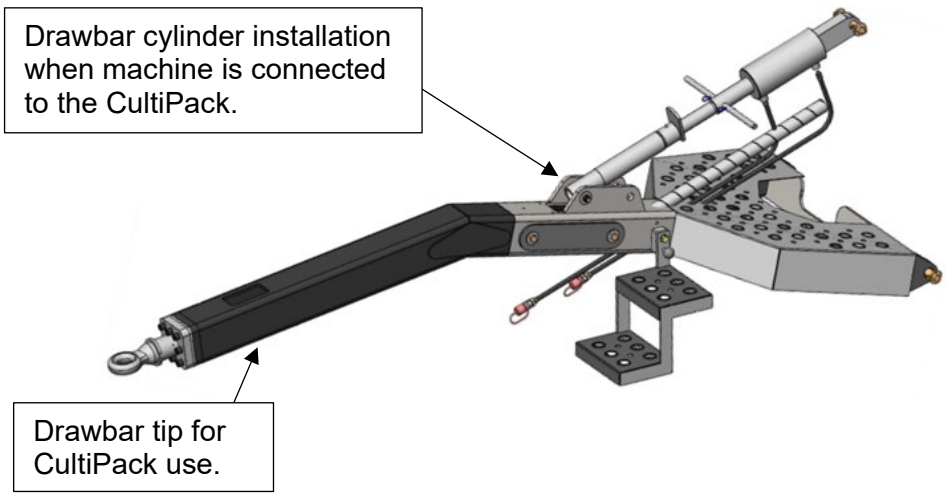


Picture 3. Drawbar installation.

Adjust the length of the push rod so that the machine is lowered and, in the tractor trailer hitch, the wheel packer or CultiPack are connected horizontally. Ensure, that the push rod cylinder is in its shortest position when adjustment is carried out. Fine adjustment of drawbar is done in the field in sowing conditions.



Picture 4. Drawbar cylinder is connected to the rear hole if machine is connected directly to the tractor trailer hitch or wheel packer.



Picture 5. Drawbar cylinder is connected to the front hole if machine is used together with CultiPack cultivator. This needs its own tip for to the drawbar.

5.4 Connecting the machine to tractor

Nova Combi is normally connected to the tractor trailer hitch, wheel packer or CultiPack cultivator. Connecting machine to a drawbar connected to three point linkage is not recommended. It reduces weight from the front and impairs handling.

5.5 Hydraulic connections

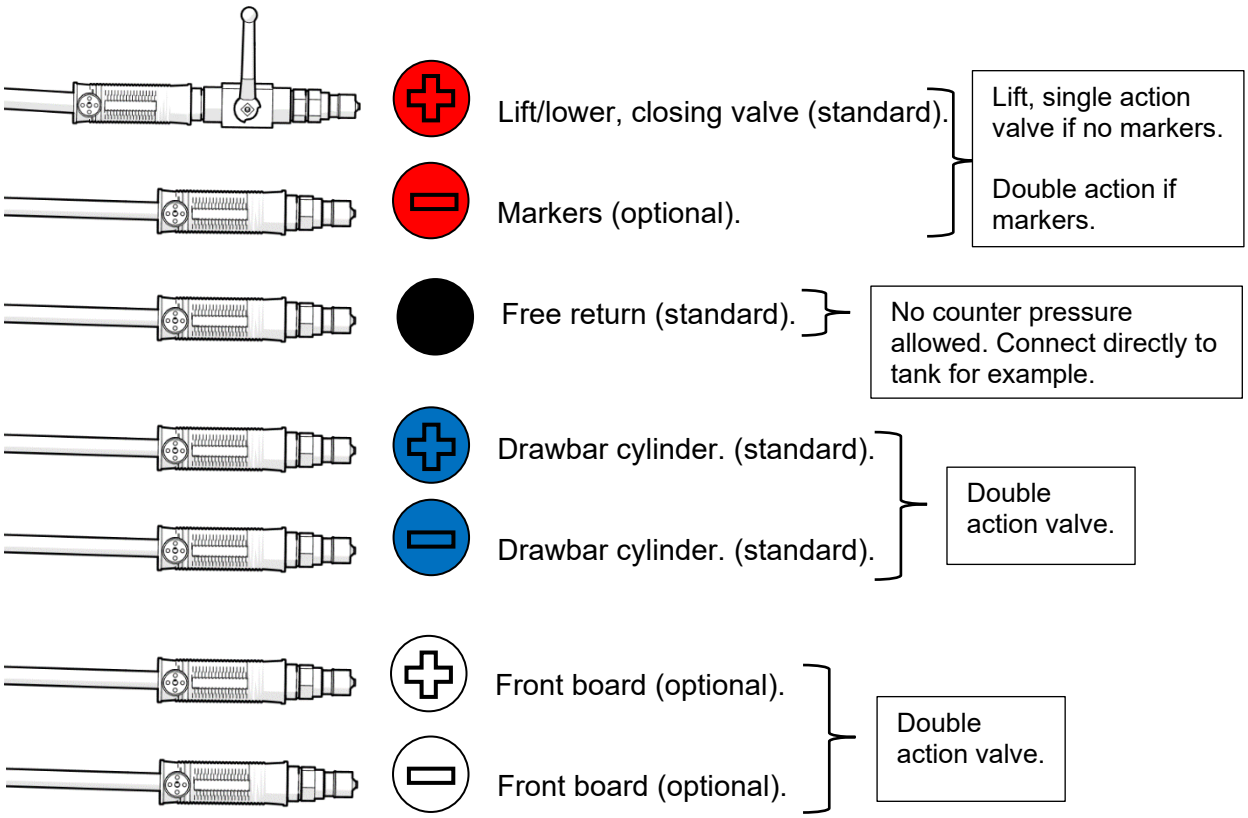
Standard Nova Combi lift/lower hydraulics are connected to single action valve. Drawbar cylinder needs its own double action valve. Free return must not have counter pressure and it is best to connect directly to tank.

NOTE! Too big counter pressure in free return slows down rear harrow's downwards movement or can prevent it completely from going down.

Close the valve in the lift hydraulic hose before disconnecting it from the tractor by turning the lever crosswise to hose. Open valve after connecting the hose to tractor.

If machine has markers, the work with the same valve as machine lifting and lowering. Then the hoses (lift and markers) must be connected to double action valve.

Hydraulic front board needs its own double action valve.



It should be noted that, in some tractor types must be used its own type of hydraulic quick connectors recommended by the manufacturer. If necessary, please change the tractor parts in question to the right type, to ensure the proper functioning of of hydraulic system.

Hydraulic hoses are pulled inside the drawbar.

5.6 Electric connections

5.6.1 ISOBUS -tractors

Nova Combi uses power from ISOBUS connector. Connect machine ISOBUS connector to tractor.



Picture 6. Machine's ISOBUS connector.

Machine has own plug for its rear lights. Connect it to tractors light socket.

5.6.2 External harness connection

In case there is no ISOBUS connector, the power is taken directly from tractor battery with power cable delivered with the Nova Combi . Power cable should be installed in a way that it is not necessary to remove the cable from the tractor even the seed drill is uncoupled.

Contact to your tractor dealer or manufacturer how to install power cable to your tractor and ask for an authorized mechanic to install the power cable with suitable and safe way.

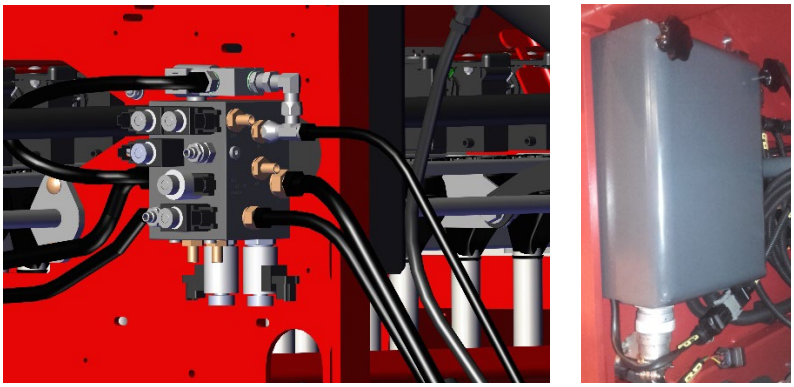
Ensure that the power cable cannot be harmed by any moving components, i.e. tractor's cabin suspension parts. Note also tractors own possible main power switch. Power cable has a fuse and main power switch for the seed drill. This cable is not needed to detach when seed drill is detached from the tractor. If you change tractor used for pulling the seed drill, move the cable to that other tractor or order and install another similar cable.

Check power cable condition from time to time. Damaged or broken cable should be replaced or fixed immediately. Damaged power cable can cause a safety hazard.

5.6.3 Electrically controlled up and down limits for lifting

NOTE! Machine's maximum lifting and lowering height is controlled by electrical valves (picture 9).

WARNING! Power should be connected always when machine is moved. If power is disconnected a serious coulter or tire/rim damage may occur!
If power is not connected, be careful when lifting and moving the machine!



Picture 7. Hydraulic valves and electric box.

Electric cables going from machine to tractor are put inside the drawbar.

5.6.4 Fuses

Fuses are located inside the electric box (picture 9).

A – F1 – 15 A – ECU/EPEC/Actuator motors
B – F2 – Empty
C – F3 – Empty
D – F4 – Empty
E – F5 – 5 A – Sensors and tramline servos
F – F6 – Empty

If the fuse burns, try to find out why. Do not replace any fuse with bigger one!

6. FILLLING THE HOPPERS

When starting the sowing, it is recommended that the machine is transferred to the field empty. Fertilizers and seed are brought to the field, for example, with a trailer, and the filling of the seed drill is done on the edge of a field. If the machine must be filled far away from the field to be sown, the transfer drive with full container loads should be done with caution. The greatest transfer speed of 40 km/h can be used on steady roads.

Emptying of the hoppers can be monitored by area meters after figuring out how many hectares you can seed with full hoppers. Terminal gives an alarm when there is a certain amount of seed or fertilizer in the hopper and the hopper level monitoring is turned on.

6.1 Adjustable hopper volume

Fertilizer and seed hoppers have an adjustable dividing wall, so the relationship between tanks, can be adjusted. Adjustment can be done by opening the locking screws of wall support rods and by turning the dividing partition to a desired position (picture 10). Remember to lock the support rods following the adjustment.



Picture 8. Container dividing wall control rod.

6.2 Filling method

The filling height of the machine is quite large and container volume is large. For this reason, we recommend that for the filling method is used big bags (**NOTE**: sufficient lift equipment), or for example, the filling screw technology.

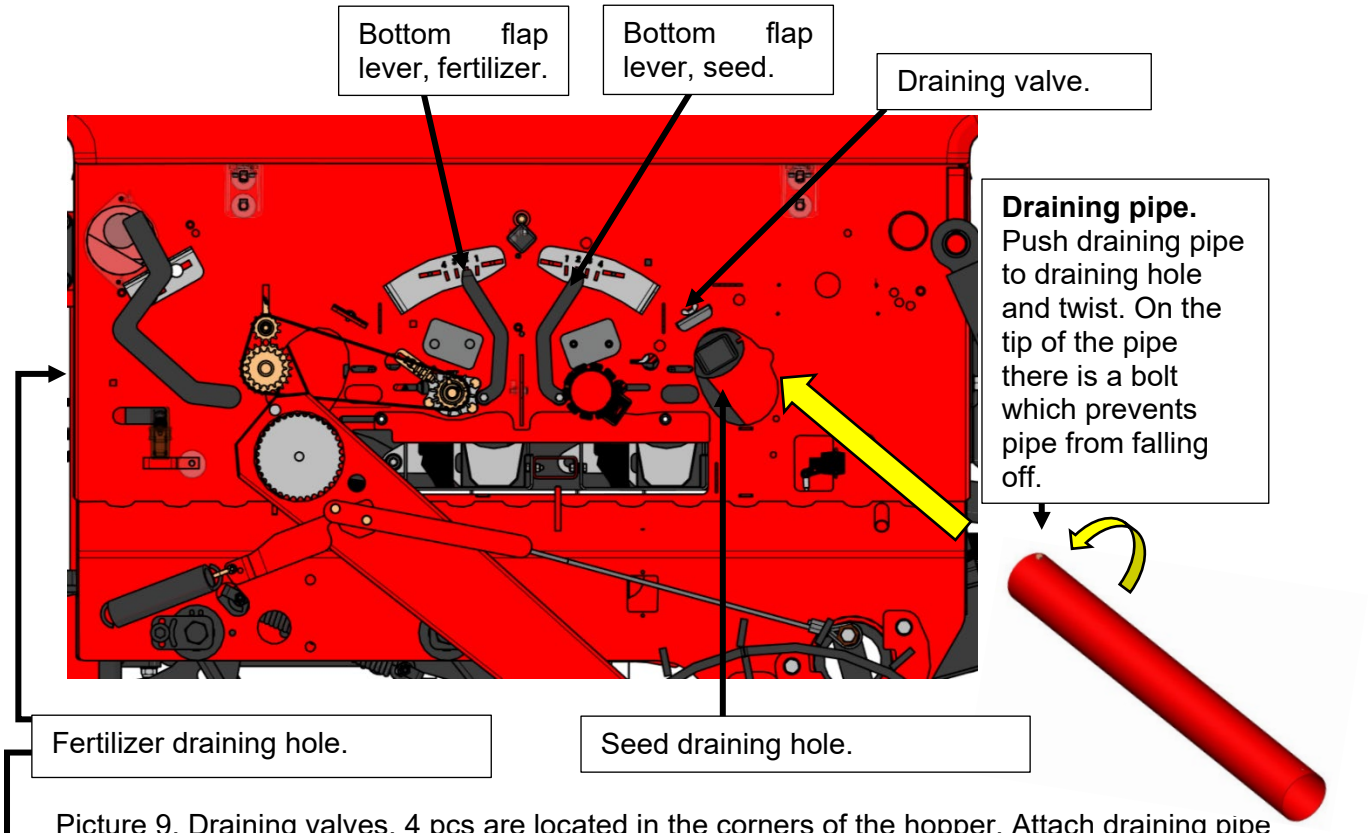
Big bags can be treated with a variety of loaders. Do not go under a hanging load. Big bag may not be put on the till seed drill structures. Do not overload the drill. Find out about the methods to partially drain a big bag.

7. DRAINING OF HOPPERS

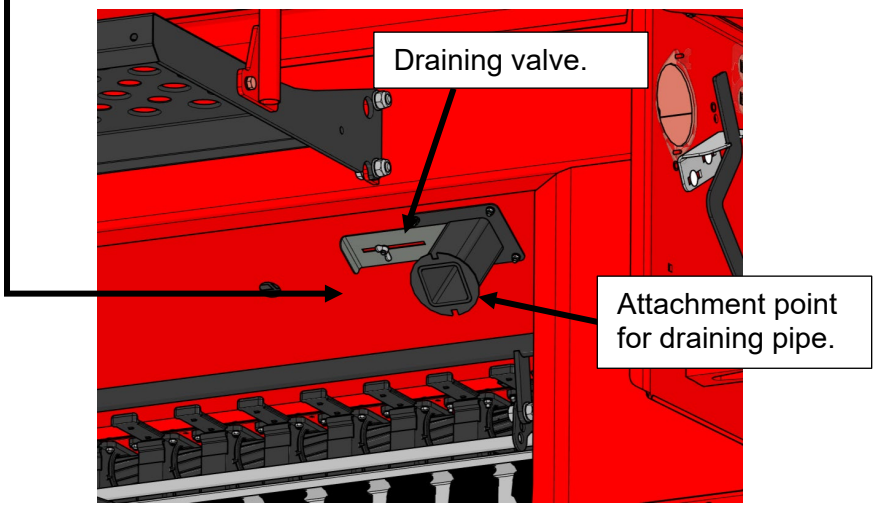
7.1 Draining of fertilizer hopper

Large amounts of fertilizer is recommended to remove from hopper through the draining holes (picture 11) using the draining pipe. After connecting the draining pipe to the draining hole, open the slide from the side. Draining can be done through the coulters as well. Spread the load cover under the machine and turn the fertilizer side bottom flaps lever over value 4. In this case, the tank empties almost completely. Guide the remaining fertilizer with a brush, or something similar,

to the plenum. Rotate the ground wheel for a few turns, so that the chambers empty out. Finally, swing the bottom flaps with the lever quickly a few times, so that no fertilizer is left on top of the flaps.



Picture 9. Draining valves, 4 pcs are located in the corners of the hopper. Attach draining pipe to the draining hole and open the draining valve to empty the hopper



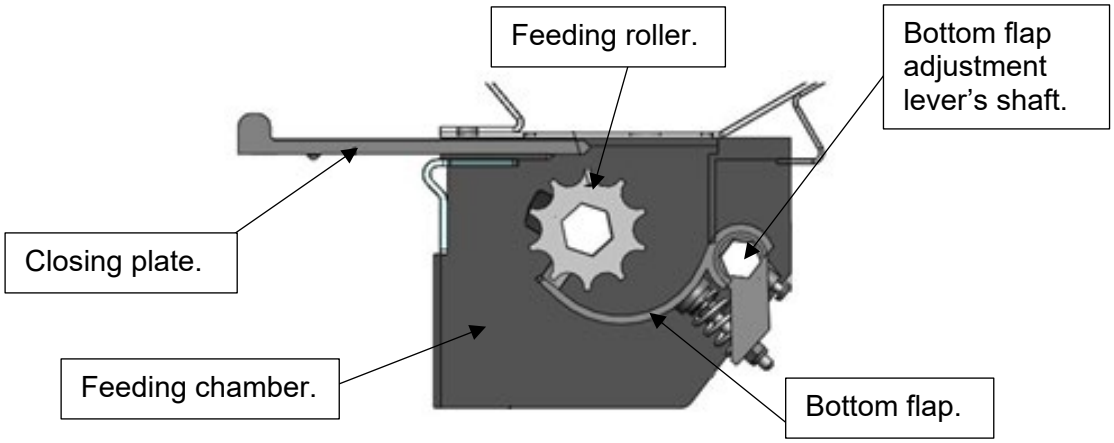
Picture 10. Fertiliser draining valve.

7.2 Draining the seed hopper

Seed tank is drained the same way as fertilizer tank.

7.3 FEEDING UNITS

The feeding devices are equipped with spiral rollers. Each unit has bottom flap and closing plate.



Picture 11. Feeding unit.

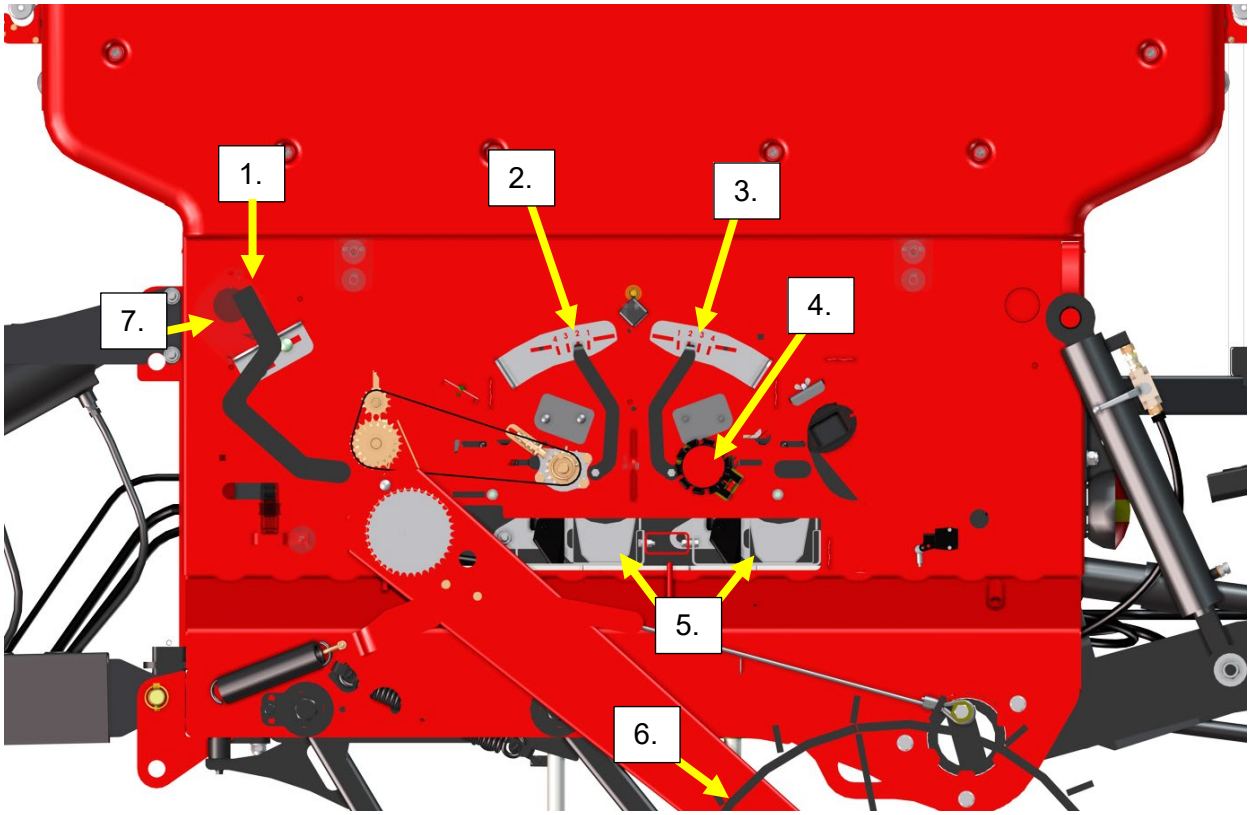
7.3.1 Bottom flaps

Feeding accuracy depends on the distance between the bottom flap and feeding roller (picture 13), for this reason it is important to have the bottom flaps in a right position, and that they will not be readjusted after the calibration test without repeating the test. The bottom flaps are flexible, in case some hard foreign item gets between the bottom flap and feeder roller. Bottom flaps are adjustable and there are four adjustment levers, two on both side of the hopper (picture 18).

7.3.2 Closing plates

Between each feeding unit and hopper bottom there is a closing plate (picture 13). Plates are usually kept completely open. Single feeding units can be disabled by pushing the closing plate completely inside the feeding chamber. Closing feeding units can be an option if for example every second coulter is wanted to use for seeding.

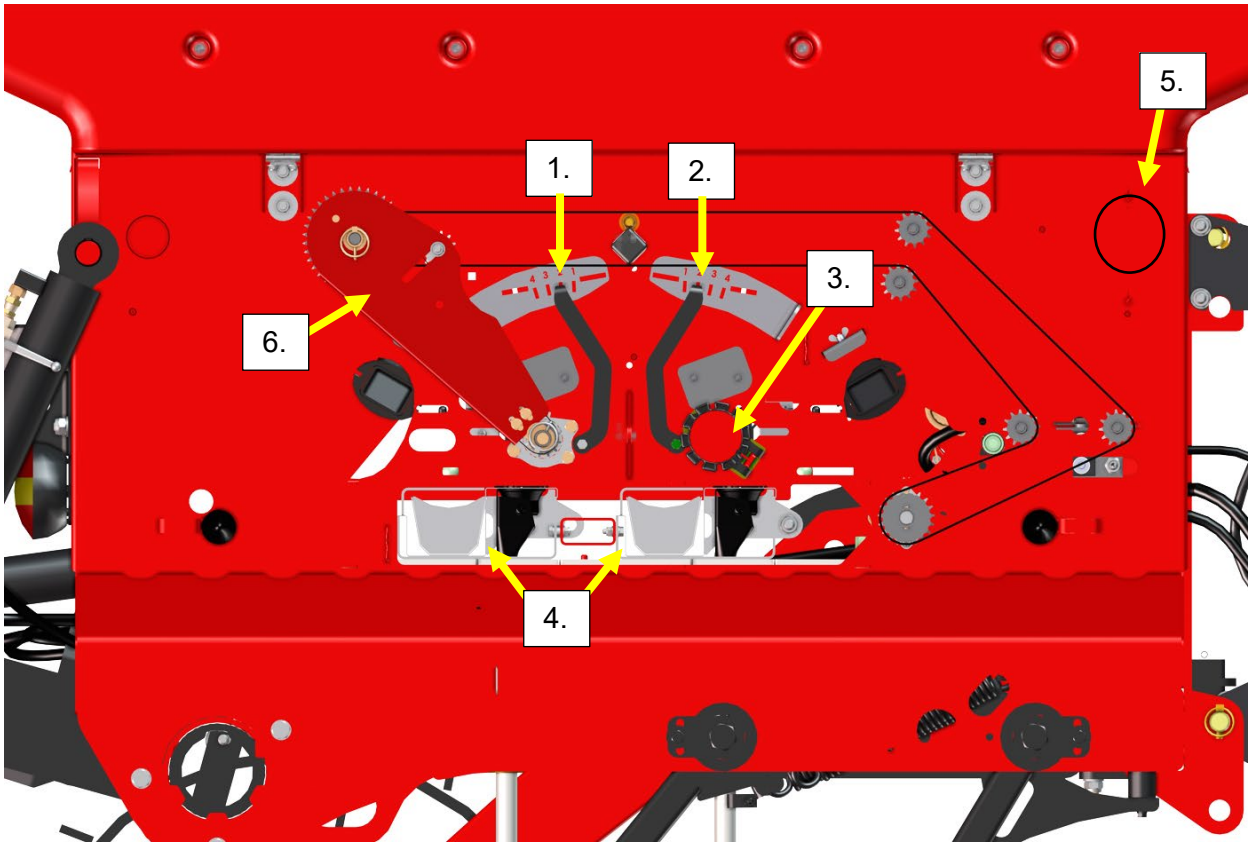
7.4 Adjustments on the sides of the machine



Picture 12. Adjustments on the left side of the machine

1. Lever to select calibration / seeding. In the picture the lever is in seedig position.
2. Bottom flap adjustment, fertilizer
3. Bottom flap adjustment, seed
4. Adjustment wheel for seed feeding (if electric adjustment is not equipped).
5. Calibration troughs
6. Ground wheel.
7. Storage box.

On the right side of the machine there are corresponding levers for bottom flaps.



Picture 13. Adjustments on the right side of the machine.

1. Bottom flap adjustment, seed
2. Bottom flap adjustment, fertilizer
3. Adjustment wheel for fertilizer feeding (if electric adjustment is not equipped).
4. Calibration troughs
5. Storage box.
6. Transmission cassette for seed feeding.

7.4.1 Lever for choosing calibration or seeding mode

Seeding mode is chosen when lever (1. picture 14) is in front and locked to the slot. By turning the lever completely to back, calibration troughs slide under the feeding units and calibration mode is chosen.

7.4.2 Bottom flap adjustment lever, fertilizer

Fertilizer bottom flap adjustment lever (picture 14 and 15) is used to adjust distance between feeding roller and bottom flap. Choose right position from the four-step scale while making calibration test according to the fertilizer to be sown.

NOTE! Adjustment lever must be set to the same setting on both sides of the machine!

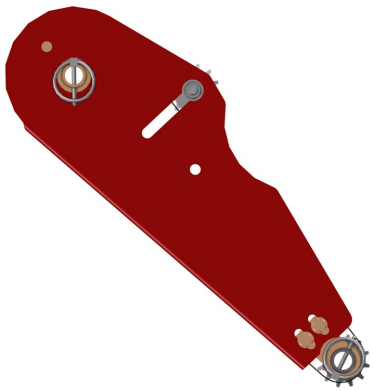
7.4.3 Bottom flap adjustment lever, seed

Seed bottom flap adjustment lever (picture 14 and 15) is used to adjust distance between feeding roller and bottom flap. Choose right position from the four-step scale while making calibration test according to the seeds to be sown.

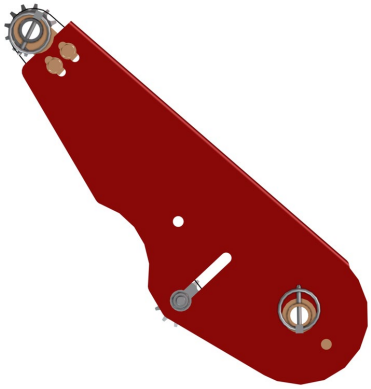
NOTE! Adjustment lever must be set to the same setting on both sides of the machine!

7.4.4 Transmission cassette, seed

Transmits power to the feeding shaft. Cassette can be turned.



Position for cereal seeding (big amounts).



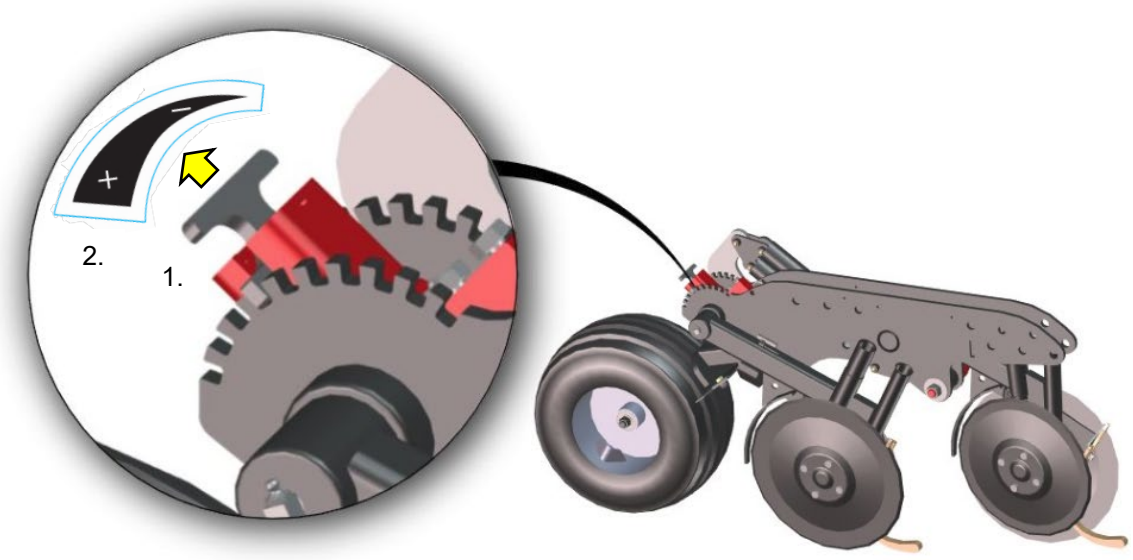
Position for small seed seeding (small amounts).

7.4.5 Calibration troughs

Calibration troughs (picture 14 and 15)) can only be emptied from the right side of the machine.

8. SEEDING DEPTH ADJUSTMENT

Coulters have been installed in sledges, where the adjusting wheels in the front measure the coulter working depth. Each wheel determines the working depth of the two coulters in the sledge. When installing the wheel adjustment hooks into the lowest notches, the maximum working depth is achieved. In the highest notches can be again sown almost to the field surface.

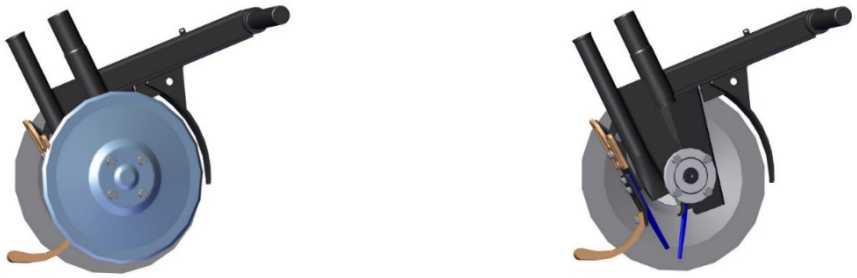


Picture 14. Seeding depth adjustment is done with quick latches which are in the front edge of each sledge. Remember to adjust each coulter sledge.

1. Pull from T-lever
2. Move lever to a slot you want. Make sure it locks to its place.

Seeding depth increases when lever is turned forward and decreases when lever is turned backwards. Adjustment can only be made when wheel is off from the ground. You can make turning the lever easier by pressing the wheel down at the same time.

Seeds and fertilizers are sown through the same coulters. Fertilizer is guided to the ground into the deeper groove, this is done by the bigger disc, and seed to the upper groove which is made by the smaller disc (picture 17). Distance between fertilizer and seed cannot be changed.



Picture 15. Coulter structure.

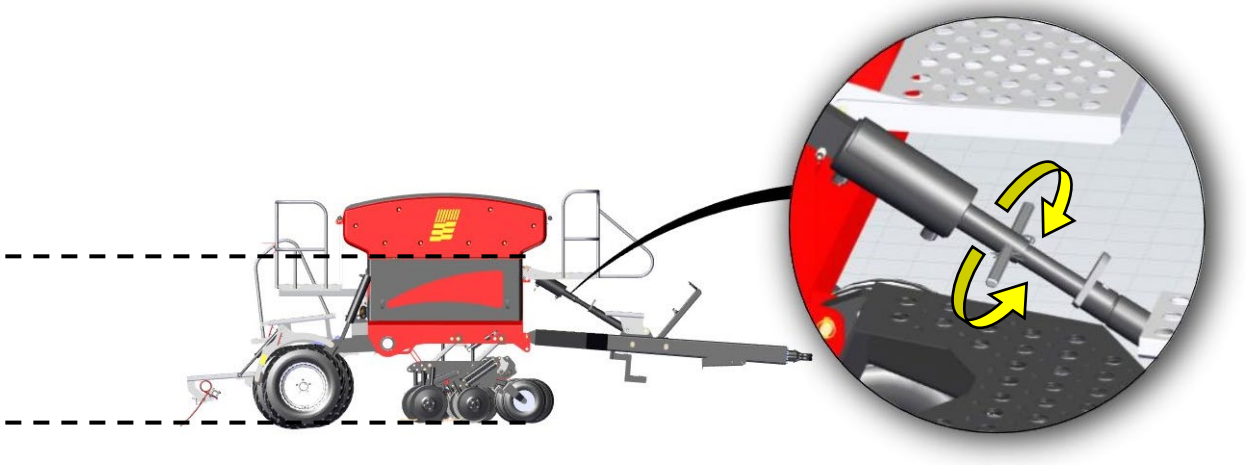
Seeding depth adjustment should be made on the field in sowing conditions.

1. Adjust seeding depth to a central position for example.

2. Put machine down while driving forwards at the same time. Stop tractor when machine is down. Don't let the tractor move any backwards so that coulters don't go stuck. Before leaving the tractor cabin, makes sure it cannot move.

3. Check machine's right position. It should be in level in driving direction. If needed, adjust drawbar's push rod length by turning. Level is easy to check by comparing the field surface and the edge of the grey side cover.

   NOTE! Drawbar cylinder stroke must be completely in, in seeding position!



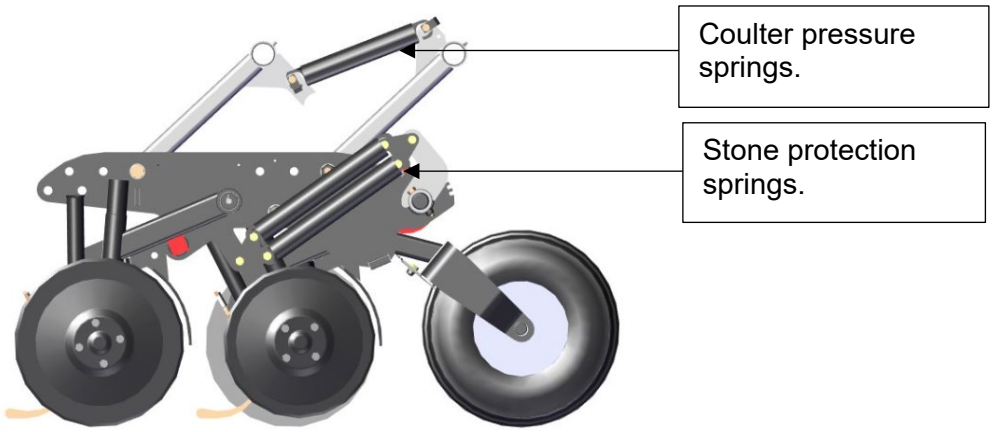
Picture 16. Adjusting machine to level.

4. If machine is on level and no adjustments to the drawbar pushrod is needed, seeding depth can be checked. Seeding depth is best to check behind the rear harrow.

If seeding depth is not correct, adjust T-lever to desired direction. Make new test and check result.

8.1 Coulter pressure's effect to the seeding depth

Coulter pressure affects if the set seeding depth is achieved or not. When the machine has been lowered almost to its lowest position, the tension springs creating the coulter pressure start to tighten. The lower the machine is adjusted; the greater will be the coulter pressure created by the tension spring pairs (picture 19). Coulter pressure is adjusted from the terminal by plus and minus buttons. Bigger value means bigger coulter pressure.



Picture 17. Coulter sledge.

Do not weight the machine more than necessary. Adjust the weighing, so that in the hardest part of the field block an adequate coulter weight is found in order to find the right sowing depth. When the land type changes to a lighter one, lift the machine slightly as required, that is to reduce the coulter weight adequately.

Coulter weight that is too hard, increases the pull resistance, makes sowing deeper than desired and creates a stress on machine structures unnecessarily. At the same time the rear wheel set closing the groove will have less gravitational force

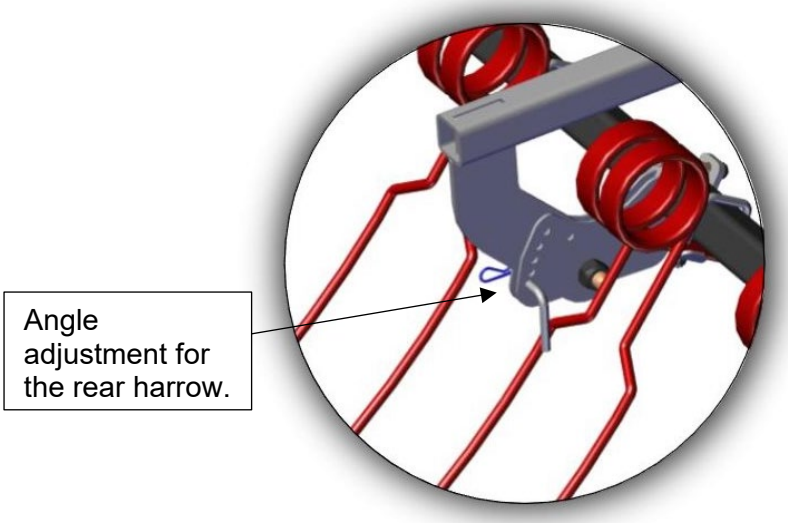
Coulter pressure adjustment is made from the terminal/user interface and it has been described in section 10.6.5. Coulter pressure adjustment etc.

9. REAR HARROW ADJUSTMENT



Picture 18. Rear harrow.

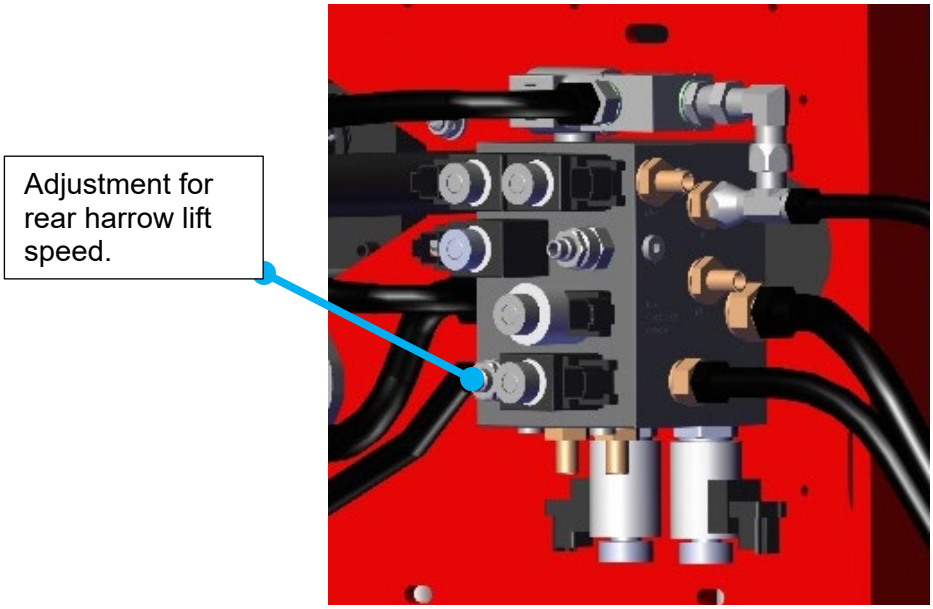
Harrow tines can be adjusted in sideways direction. In addition, the working angle can be adjusted. Sideways direction will be adjusted in such a way that the tines travel between the earth wall left between the supporting wheels and wheel track. Whenever the angle adjustment is changed afterwards, the working depth must also be checked.



Picture 19. Angle adjustment for the rear harrow.

Rear harrow can be controlled from terminal with a half lift function. Half lift function is explained in section 10.2.14 Half lift.

Rising speed of the rear harrow can be adjusted from a throttle valve, blue cap, located in front of the machine. For the adjustment, loosen the the hexagonal scew from side of the cap, rotate cap and lock it again with the screw. Adjustment is recommended to do with full hoppers and normal oil temperature.

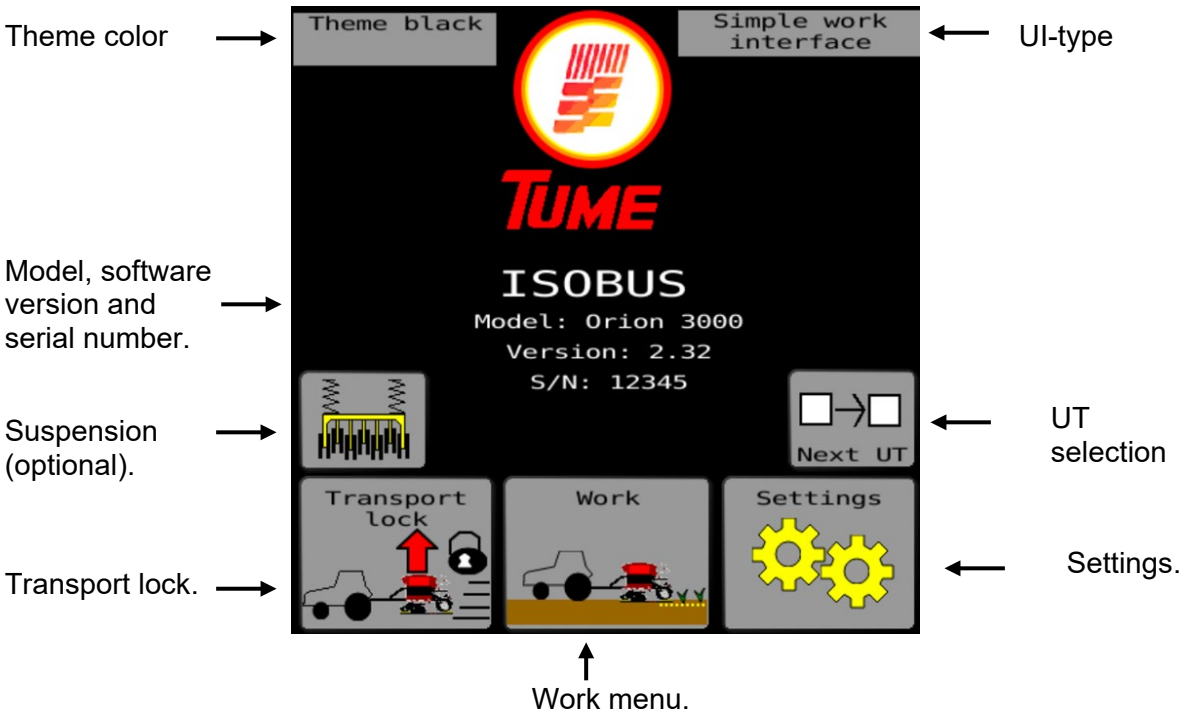


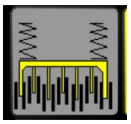
Picture 20. Rear harrow lift speed adjustment.

NOTE! Do not reverse when rear harrow is on ground!

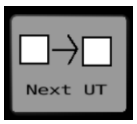
10. USER INTERFACE

Start menu

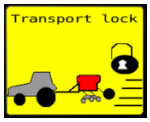




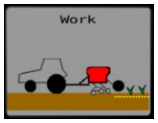
Rear wheel suspension on for road driving (yellow) or off (gray). Suspension is an optional equipment. Suspension works only when start menu is active.



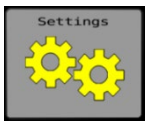
With **Next UT** button you can change the UT where seed drill user interface is shown, if you have more than one universal terminal.



Transport lock. Grey = off. Yellow = on. Can be activated only when machine is in up position. Ensure that the rear harrow is also up before activating this function. This prevents machine to go accidentally down, i.e. if hydraulics are used or tractors valve is leaking.

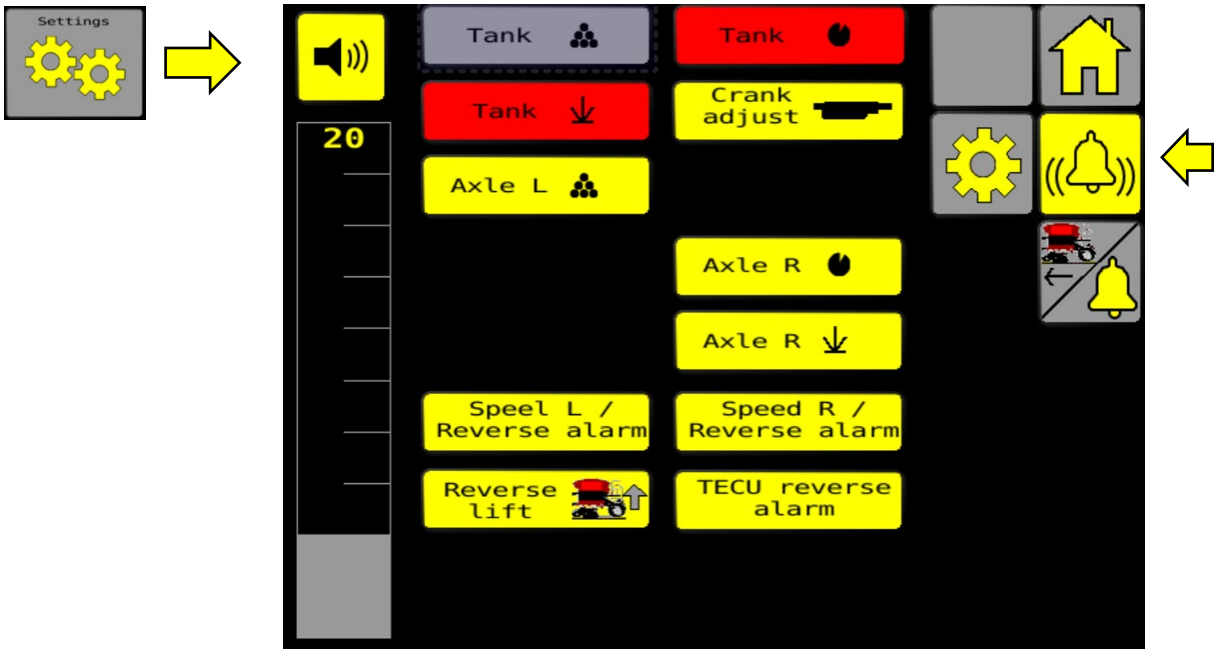


Work menu is selected when seeding.



Settings menu.

10.1 ALARM CONTROL



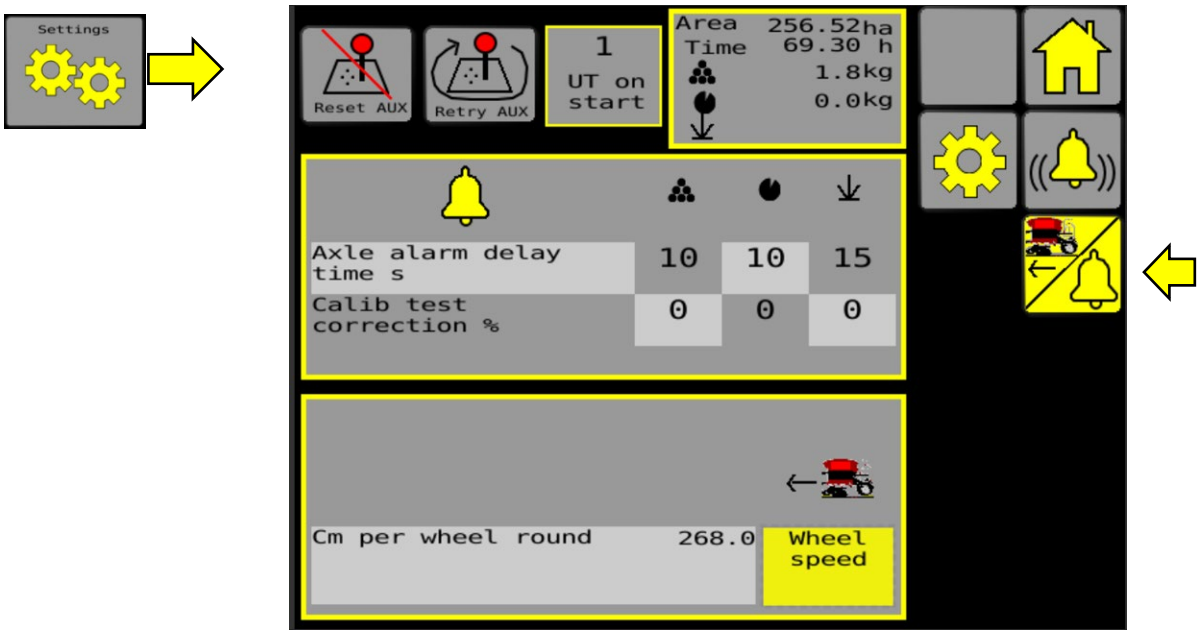
In the ALARM CONTROL menu you can activate/deactivate following functions.

- Tank = Fertilizer hopper level sensor.
- Tank = Seed hopper level sensor.
- Tank = Small seed/start fertilizer hopper level sensor.
- Axle L = Fertilizer feeding shaft rotation sensor.
- Axle R = Seed feeding shaft rotation sensor.
- Axle R = Small seed/start fertilizer feeding shaft rotation sensor.
- Speed L = Left side speed sensors. Reversing alarm.
- Speed R = Right side speed sensors. Reversing alarm.
- Reverse lift = Rear harrow reversing safety feature. Machine goes lower and harrow is lifted if reversed.
- Crank adjust = Actuator motor alarm.

Monitoring is in use when its icon is yellow. Make the selection by pressing the icon. Remove the selection by pressing the icon again when it turns to grey. Red icon means that the specific sensor is giving alarm. The alarm can be for example a nearly empty hopper.

Notice that if the selection is grey, you wont get any alarm from that function!

10.2 AUX, totals, alarm delays, speed settings





Reset AUX resets the auxiliary control device memory slots, which are stored in the seed drills ECU. When seed drill is restarted, these are not returned and AUX-N functions need to be set again.



Retry AUX tries to return auxiliary control devices memory slots, if the original automatic returning failed. Need in some tractors where UT is not accept programming before AUX-N functionality is activated.

AUX-N functionalities

AUX-N, Auxiliary control New, so new auxiliary control device. The machine can be controlled via ISOBUS using the tractor's own control devices or an additional controller provided by a third party. The AUX-N controller makes working easier because the buttons/lever are physical and their use is much easier compared to using the touch screen when the machine is moving and swinging. All functions of the seeder are accessible from the touch screen. The use of the AUX-N controller is not mandatory for sowing, but sowing is also possible without it. Controllable via AUX-N are:

1. Choosing seeding profile
2. Adjusting of seeding rates
3. Adjusting of coulter pressure
4. Tramline step + / -
5. Pole lift activating / deactivating
6. Markers

AUX-N programming

AUX-N functions are programmed via ISOBUS-UT whose number is 1. If there are several displays in the ISOBUS bus, each must have its own UT number. Even if the seeder's user interface is on screen 2, the functions of AUX-N must be programmed on screen 1. The screen's UT number can be found and can be changed in the screen's UT settings. Please note that the

existence of two screens with the same UT number on the bus will cause an error and the system will not work.

The programming protocol depends on UT's own practices. Familiarize yourself with UT's instructions on AUX-N programming and practices.

When the programming is done, the seeder links to the AUX-N controller via the UT and starts executing the commands given from the buttons. The seed drill stores the programmed functions in its memory, and remembers them after power outages.

AUX-N controller when restarted

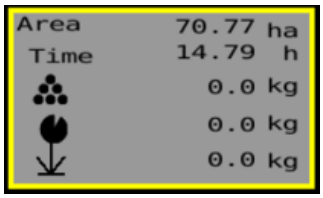
When the seeder is restarted or connected back to the same tractor after a break, the UT indicates that the programmed functions are trying to be restored. User must accept reset or AUX-N will not work. After this, AUX-N can be used if the tractor's or additional controller's own safety measures do not prevent it. Check that AUX-N is active on behalf of the controller before you start using it again.

In some terminals or tractors, automatic reset does not work until AUX-N is activated from the terminal. In this case, the Retry AUX button in the main view of the seed drill can be used to try to restore when AUX-N has been activated manually from the terminal first.

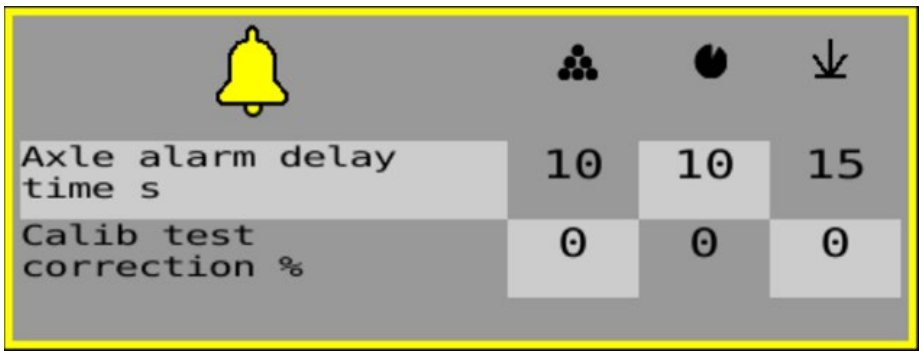


UT on start. With the number of the icon, you can choose which terminal (if you have more than one terminal) the user interface starts when you turn on the power.

NOTE: In some situations, the second terminal starts up so slowly compared to the other terminals that the seeder considers that it cannot be found on the bus. In this case, the seeder presents itself on the screen with the smallest UT number that it finds on the bus.

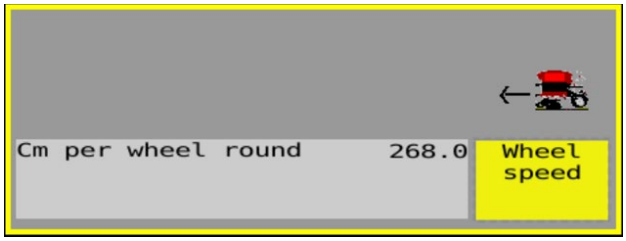


Total area, work time and sown amounts. Cannot be reseted.



Axle alarm delay time s
Time delay for shaft alarms. Note! too short time delay causes unnecessary shaft alarms.

Calib test correction %
Deviation of the seeding rate in relation to the calibration test. For example, if the sowing amount is systematically higher or lower with some fertilizer than the rotation test gives, the actual sowing amount can be corrected with this value.



Cm per wheel round
The advance of the machine in one revolution of the rear wheel. Affects area counter and speed measurement.

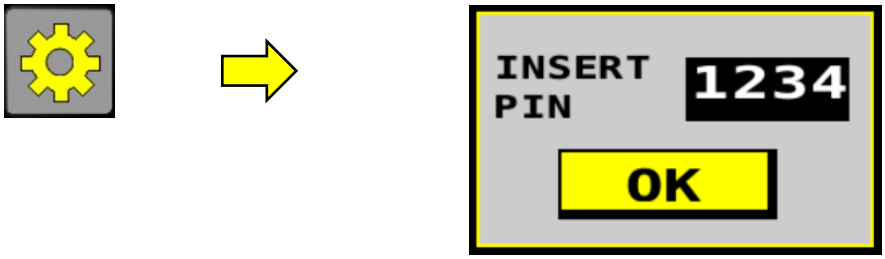
Factory settings:

Tire 7,5 – 16 = 240
Tire 7,5 - 20 = 268
Tire 280/70-18 = 262



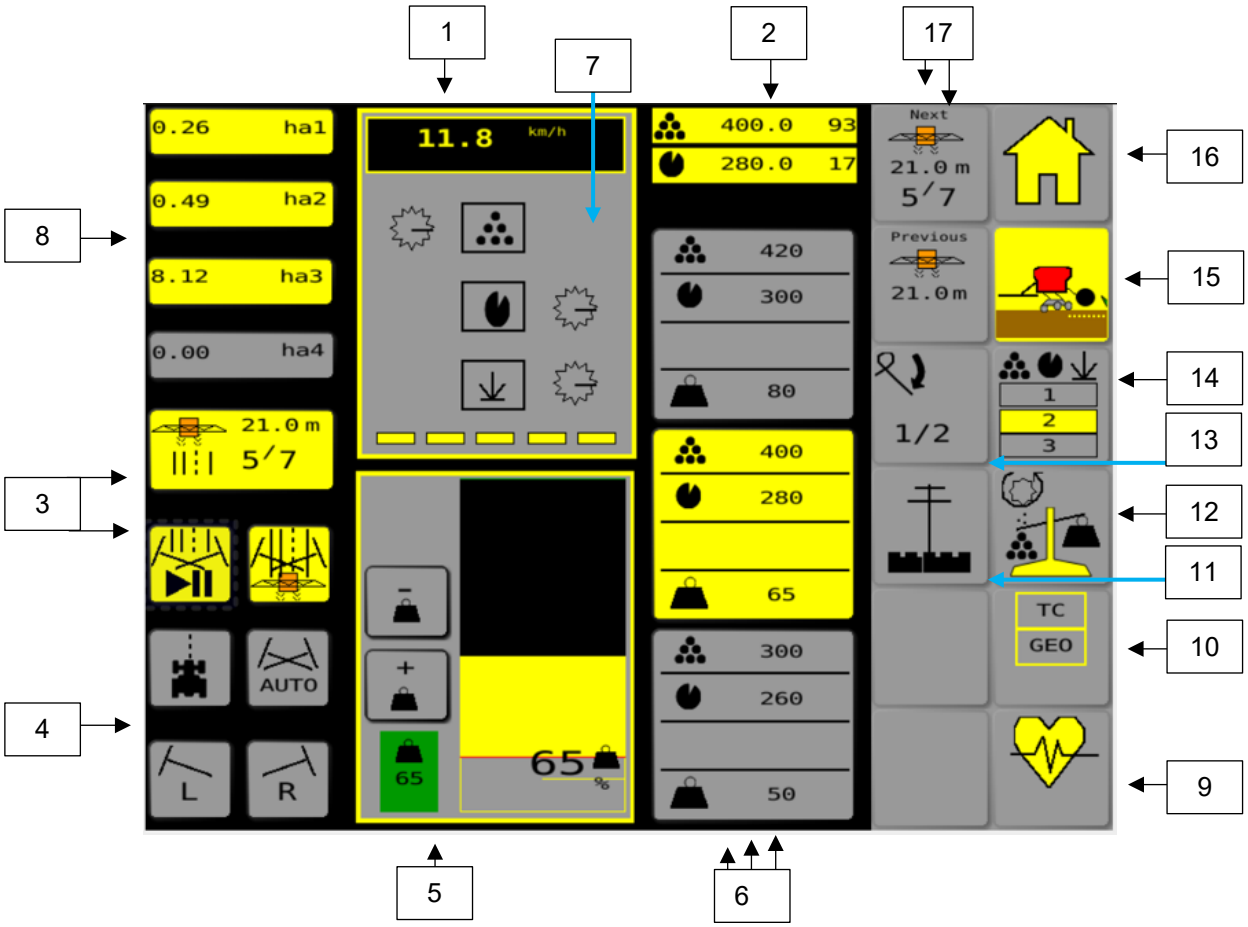
Selection of speed source. The factory setting is the speed coming from the seeder's wheels.

10.3 Equipment and features



Settings intended for use by the manufacturer.

10.4 Work menu (simple work interface)



Picture 23. Seeding menu.

User interface icons and buttons:

1. Speed display
2. Active feeding amounts
3. Tramlines
4. Markers
5. Coulter pressure / machine position
6. Seeding profiles 3 pcs.
7. Hopper and shaft rotation monitoring
8. Area counters
9. Diagnostics and alarm aknowledgement
10. ISOBUS-functionalities.
11. Pole-lift
12. Calibration settings
13. Half-lift
14. Seeding profile settings
15. Work menu.
16. Home menu
17. Next and previous wayline.

NOTE! Exit the seeding menu during transport by pressing button 16. (EXIT WORK).

Please note that depending on the equipment of the machine, not all of the icons mentioned above may be in use, in which case they will not appear on the screen. Missing icons can be the activity information of the ISOBUS task controller, the axle and tank monitors of the small seed device, the ritsi marking, left and right marker, the automatic function of the markers. Depending on the terminal used, the positions of the icons and the graphic representation may also differ from what is shown here.

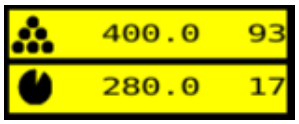
10.4.1 Speed display



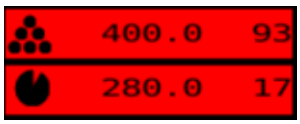
During seeding, the display shows the speed measured by the machine in km/h. The speed is normally measured from the support wheels, but another speed source can also be selected from the settings, if such are available (gps, tractor, radar). Speed data is needed for area measurement.

Note! The speed displayed by the monitor may differ from the speed of the tractor. This can be due to various reasons, such as slip, tire sinking, the tire size specified in the tractor settings in relation to the actual one, rounding of the speed value. A small speed difference does not cause any action.

10.4.2 Active seeding amounts



The icons show the amount to be sown in kg/ha at that moment and the percentage value of the maximum output amount when the electronic adjustment (accessory) is in use. A calibration test must be done so that the figure shows the real value.



If the icon is red, the target feeding amount has not been reached. The reason may be:
- too large or small amount kg/ha, which the feeder cannot feed.
- actuator motorl jamming, the feed shaft cannot move laterally
- damage to the actuator motor cable (the machine does not recognize the motor)

10.4.3 Tramlines



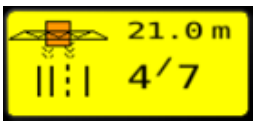
Pause/**play**. Tramline step is incremented and marker side is switched (if both markers are active) when machine is lifted.



Pause/play. Tramlines wont be incremented and markers wont go down.

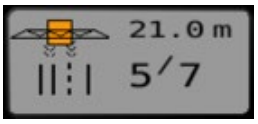


Tramlines activated. Set the function to active (yellow) when you want to make tramlines automatically. In this case, the tramline settings button also turns yellow.

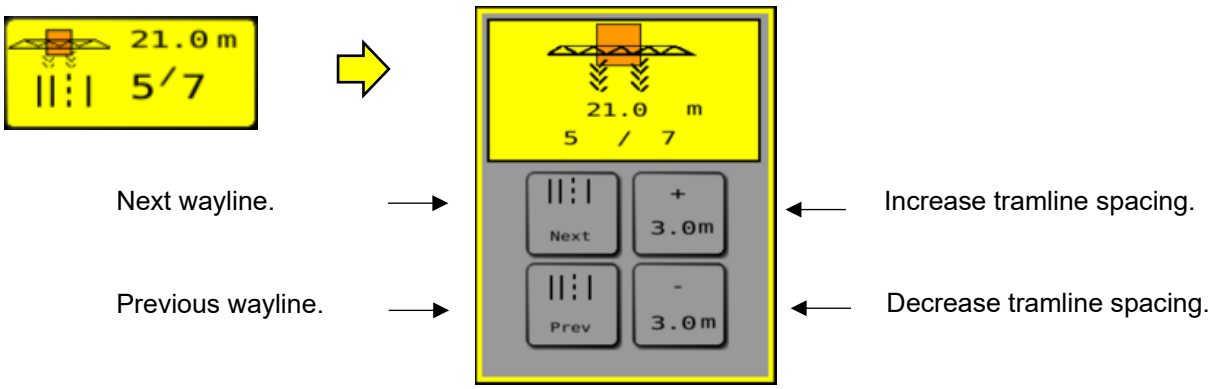




Tramlines off (grey). Set the function to off when you don't want to tramlines at all. In this case, the tramline settings button also turns gray.

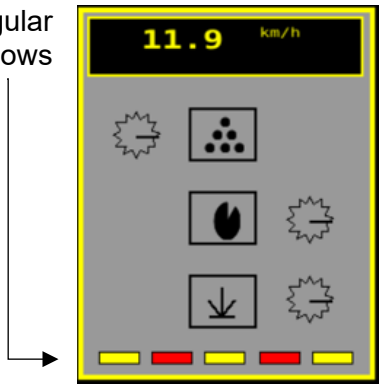


Tramline settings



The first number on the display indicates the current wayline. The second number indicates the tramline spacing. The second number is set according to the sprayer in use. In this example, it is a 3-meter seed drill and a 21-meter sprayer. The tramlines are formed in the middle of the tramline spacing. In this example in step 4/7.

When tramline is being made, the screen informs about it at regular intervals with a sound signal, in addition, the center of the screen shows the tramline devices in use in red.



10.4.4 Markers



Left marker not in use.



Left marker in use.



Right marker not in use.



Right marker in use.



Ritsi marking OFF.



Ritsi marking ON.

Ritsi marking means that the tramline locations are also marked mechanically to the field. This function is needed when sowing plants which need spraying before the plant has reached the surface. Actual tramlines are not yet visible then.

This is done using row markers. During the sowing next to the tramline both of the machine's row markers are lowered down. Then the other row marker draws a line to the centre of the previous tramline stage. So the mark works as a centre mark during spraying.

Ritsi marking is turned ON by pressing the icon shown above. Icon background color turns to yellow. Respectively it turns OFF by pressing the icon again, color changes to grey.



Be extra cautious when in Ritsi marking mode because both row markers are lowered down. This may cause a risk to the environment.



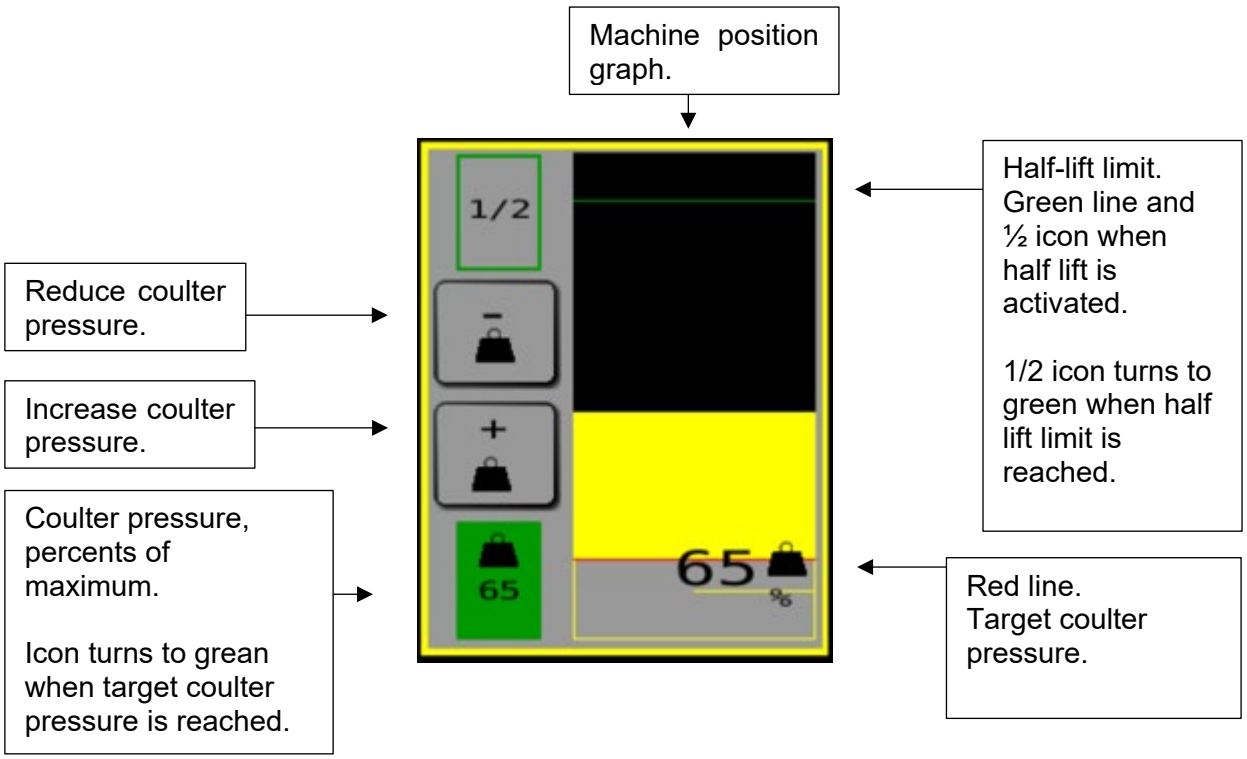
Left and right marker do not change turns automatically.



Left and right marker go down in turns.

When marker automatic function is on, the marker which goes down changes each time when machine is put down.

10.4.5 Coulter pressure adjustment, machine position



Coulter pressure depends on the height position of the machine. The lower the machine goes, the higher the coulter pressure rises. Machine's solenoid valves close lift/lowering hydraulics when the adjusted limit is reached. Proper coulter pressure can be monitored by looking the front wheels. Front wheels should touch the soil lightly and follow the soil surface.

Increasing coulter pressure

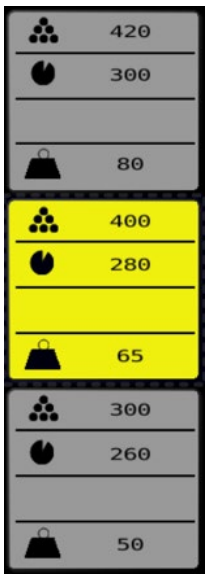
Increase coulter pressure with the + button on the print screen or by changing the seeding profile. Since the coulter pressure is determined by the height of the machine, increasing the pressure requires lowering the machine. Lower the machine using the tractor's hydraulics. If the machine descends too low, by pressing the pressure downwards, the machine will correct its height a little higher, correcting the error.

Decreasing coulter pressure

Reduce the value of the coulter pressure on the screen with the **-** button or by changing the seeding profile. Since the coulter pressure is determined by the height of the machine, reducing the pressure requires raising the machine when the machine is down. This can be done either by gently raising the machine and lowering it back down in the middle of sowing. It is easier to correct the pressure by pressing the machine down after the pressure has been reduced from monitor. In this case, the machine rises slowly upwards. When lifting the machine on the headland and lowering it back down, the machine automatically stops at the position determined by the weighting value by pressing down with pressure long enough.

After the coulter pressure setting has changed, return machine lifting/lowering hydraulic lever to central (closed) position from the tractor.

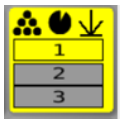
10.4.6 Seeding profiles 3 pcs



There are three seeding profiles in which you can save the fertilizer and seed seeding amounts and coulter pressure. You can change between the profiles e.g. between the fields or in the field between different soil types.

Setting on yellow background is in use. You can select the profile by pressing it. This can be done during the work.

Profile settings can be adjusted by pressing the profile setting button 123.



NOTE! The seeding rates cannot be changed in the settings, if the amount is adjusted with the handwheel.

NOTE! A calibration test must be done so that the fertilizer and seed quantities recorded in the sowing profiles are correct!

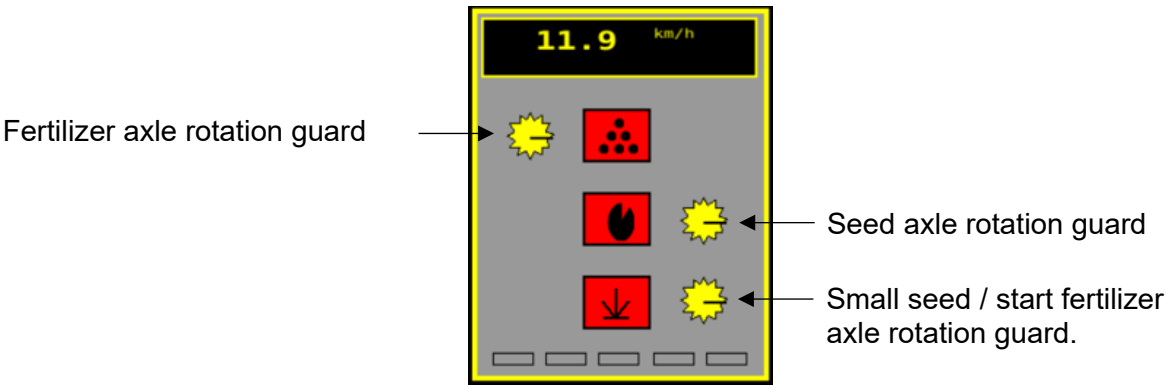
NOTE! Sowing profiles use the selected calibration test result!

Remember to select the rotation test results you want to use in order to achieve the correct seeding amount!

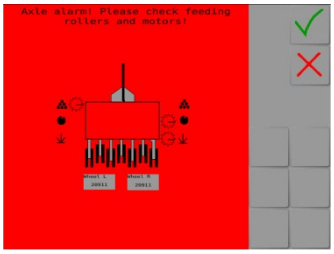
10.4.7 Axle and hopper level alarms

Axle alarms

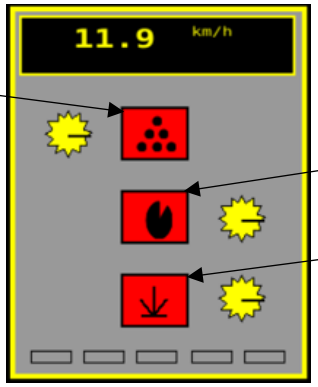
Axle alarm sensors are located at the end of each feeding shaft.



Yellow background color = axle guard in use, no alarm.
Gray background color = axle guard not in use.
Red background color = axle guard in use, axle does not rotate → Alarm!



Hopper level guards

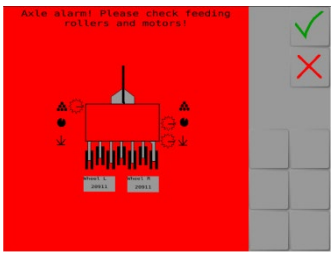


Ferilizer hopper level guard

Seed hopper guard

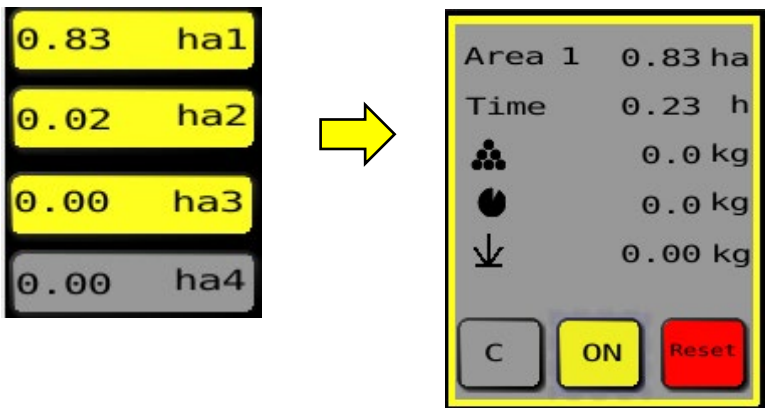
Small seed / start fertilizer hopper level guard.

Yellow background color = hopper level guard in use, no alarm.
Gray background color = hopper level guard not in use.
Red background color = hopper level guard in use, hopper empty → Alarm!



When the hopper is almost empty, the sensor gives an alarm, and the icon for that hopper turns red. At the same time, there will also be an audible alarm. The alarm can be turned off by pressing the alarm acknowledgment key. If the hopper monitor is off (switching on and off from the settings menu), the icon is gray.

10.4.8 Area-, work time and sowing rate meters 4 pcs



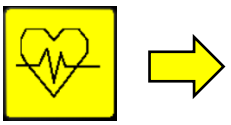
There are four area, working time and sowing rate meters. By pressing the area meter, the change menu for area meters opens. Area meters are selected for use by pressing the **ON** button of the respective meter to yellow. When the ON key is gray, the meter is not in use.

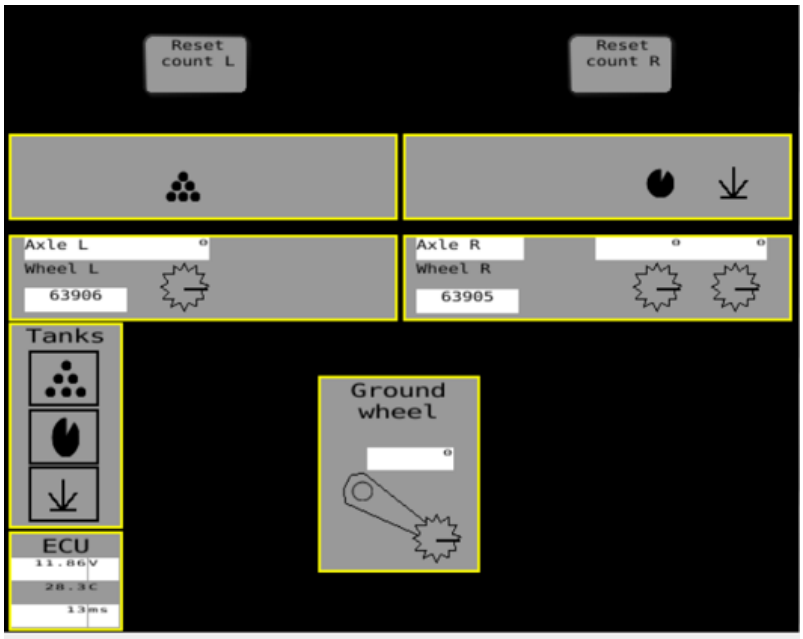
By pressing one of the **ha1**, **ha2**, etc. buttons, the stored data of that meter will open. These include worked area, working time, amount of fertilizer sown and amount of seed sown during the measurement period.

Note! Sown quantities are calculated, not weighed.
Note! Time is measured in hours, not hours and minutes. E.g. 0.5 h = 30 min.

The selected meter can be reset by pressing the **RESET** button. You can exit the menu without making any changes by pressing the **C** button.

10.4.9 Diagnostics and alarm acknowledgement





The diagnostics menu shows the pulses from the sensors. These values can be used for troubleshooting. The menu also shows active alarms. The counters can be reset with the Reset Count buttons. Below the ECU, its voltage, temperature and program cycle time ms.

10.4.10 ISOBUS functionalities



The ISOBUS task controller is managed from the settings of the tractor's ISOBUS terminal. The icons are for the user's information.

Using the different features of the task controller to control the seed drill requires their activation from the tractor terminal. Check the tractor manual for how to do it. These functions are only available if the tractor is equipped with these features.

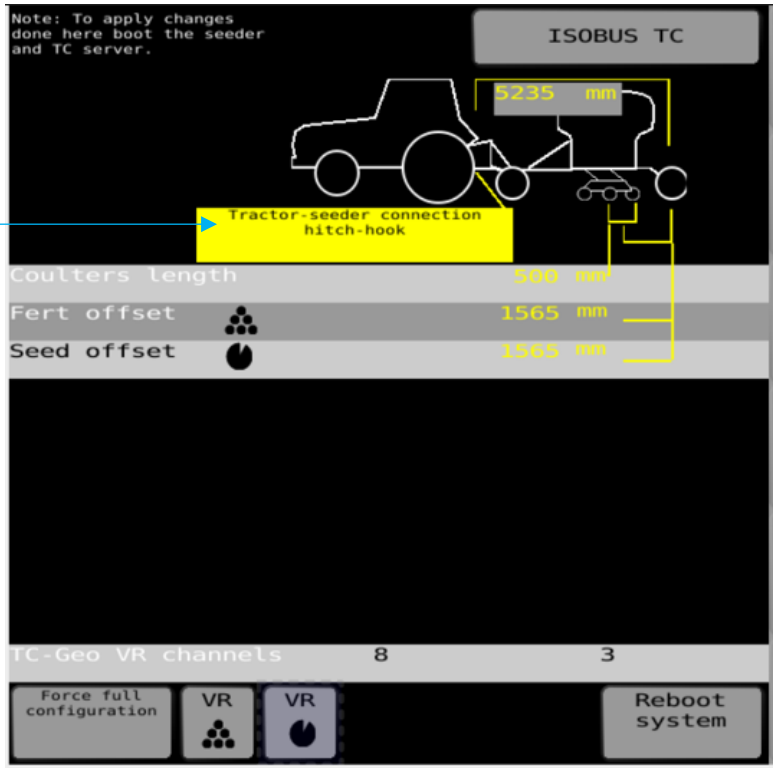
The ISOBUS task controller can be used:

- for recording accumulated area, working time and calculated seed and fertilizer rates (TC)
- for adjusting the sowing rates with the precision map (GEO)

The activity of the functions in use (TC, GEO) are shown in the user interface of the seed drill on a yellow background. The functionality of the icon on the gray background is not active.

The geometry to be notified to the task controller and the connection method of the machine can be changed from the menu. When the Isobus TC button in the upper right corner is blue, the task controller is in use from the seeder side. When the button is gray, the task controller cannot control the seeder.

Selection for connection type.

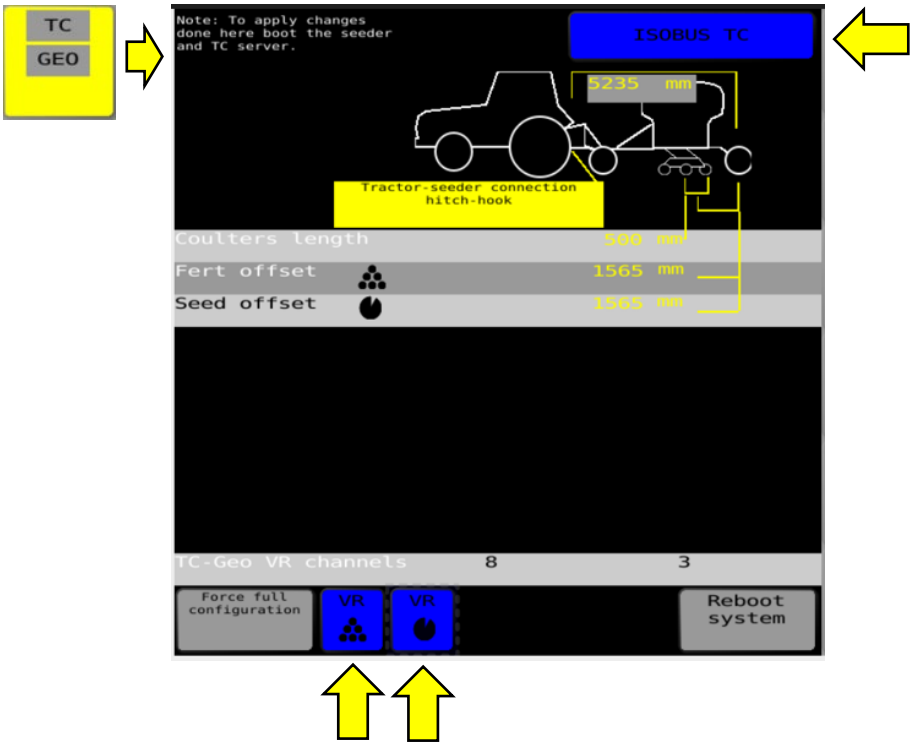


NOTE! Depending on the terminal, the position of the coulters can be interpreted either to the front or to the rear of the rear wheels, offset value + or -. With a ground wheel machine, this mainly affects the correctness of coverage map.

TC GEO functionality

With the TC-GEO functionality, the seed and/or fertilizer sowing quantities can be controlled according to the prescription map. Familiarize yourself with the instructions on the tractor terminal, how to activate the prescription map and how to use it.

Activate the TC-GEO functionality from the tractor terminal. After that, the button "ISOBUS TC" is selected from the user interface of the seeder and the fertilizer and/or seed that you want adjusted according to the map is selected from the bottom of the window.



When the task controller determines the amount of seed and fertilizer to be used, the sowing amounts shown in the sowing profiles are irrelevant.



+



The fertilizer feeding rate changes according to the command of the task controller (Variable Rate).



The sowing amount of the fertilizer is the sowing amount selected in the sowing profile.



+



The seed feeding rate changes according to the command of the task controller (Variable Rate).



The sowing amount of the seed is the sowing amount selected in the sowing profile.

10.4.11 Pole lift



Pole lift off. Marker rises when machine rises.



Pole lift on. Only marker rises when machine is lifted.

Pressing the pole lift on, the icon's background color turns to yellow. Then when lifting the machine, only marker rises, and the drill stays in seeding position. Function is used when you don't want to stop seeding but you need to rise the marker up because of some obstacle.

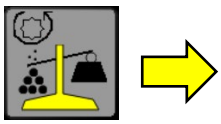
Pole lift goes off automatically after 20 seconds.

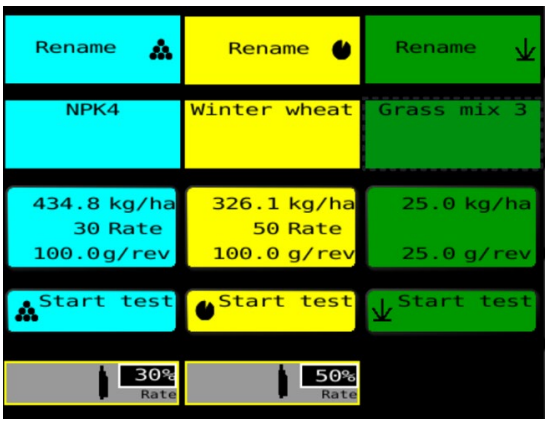
Do not reverse when pole lift is activated because the machine is in seeding position!

10.4.12 Calibration settings

The Calibration Settings menu stores the results of calibration tests. You can save up to eleven calibration tests for fertilizer, seed, and small-seed/start fertilizer, and name each product accordingly. The calibration test results are used as basic data for the feed quantity adjustment (electrical adjustment) and the counters, so it is important that they are correct and that the correct rotation test value is used at any given time.

More about the calibration test settings in the chapter **calibration test preparations** and **calibration test.**





10.4.13 Half lift



Half lift off. Rear harrow rises and lowers with the machine. Machine rises completely up.



Half lift on. Rear harrow stays in the position where it was when this function was activated, up or down. When liftin the machine, its stops to the set limit.

When half-lift is activated, the lifting height of the machine is limited. This can speed up headland work, for example.

With the half-lift function, the rear harrow can be locked in the upper or lower position. If you don't want to use the rear harrow and want it to stay up all the time, turn on the half lift when the rear harrow is up. If you want the rear harrow to stay on the ground even when the machine is raised, switch on the half-lift when the harrow is down.

The feature is good, e.g. in muddy conditions, when you want the rear harrow to break the tire tracks even on headland turns in the field.

You can change the height of the half lift in the profile settings with a value of 1/2. The higher the value, the lower the machine stays in half lift.

Half lifting does not affect the operation of markers or tramlines.



NOTE! Do not adjust the half-lift so low that the ground wheel or coulters do not rise sufficiently from the ground! When turning or reversing, the ground wheel and coulters can be damaged!

Half lifting does not affect the operation of markers or tramlines!

Note! Remember to switch off the half-lift when you reverse or go to road for transport. The structures of the rear harrow will be damaged if the rear harrow is left down!

The rear harrow has a protective function, where the rear harrow rises up using the oil pressure of the machine's lifting cylinders, if the machine is reversed and the rear harrow is not in the upper position. This can easily happen when using a half lift. In this case, the machine descends slightly and raises the rear harrow.

STILL DON'T REVERSE WHEN REAR HARROW IS DOWN! THE RISK OF DAMAGE EXISTS REGARDLESS OF THE PROTECTIVE FUNCTION!

10.4.14 Seeding profile settings



The values of the seeding profiles can be changed freely in each of the three profiles (Profile 1, Profile 2 and Profile 3). These include:

- Fertilizer feeding amount kg (kg/ha)
- Seed feeding amount kg (kg/ha)
- Small seed / start fertilizer feeding amount kg (optional, kg/ha)
- Coulter pressure, percentages of maximum %

Select the value to change by pressing the number field. Enter the desired value and accept it. Make the necessary changes to the fertilizer and seed amounts, as well as to the coulter pressure.

NOTE! The rotation test must be done carefully so that the fertilizer and seed amounts given in the sowing profiles are correct!

NOTE! The seeding rates cannot be changed in the settings, if the amount is adjusted with the handwheel.

10.4.15 Work menu



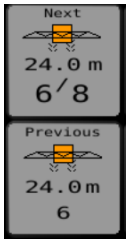
Opens work menu.
Closes all other open screens.

10.4.16 Home menu



Return to start menu. Exit work.

10.4.17 Next and previous wayline



The buttons can be used to change the wayline forward + or backward -.
You can, for example, quickly make a correction for an unintentional change of wayline.

11. CALIBRATION TEST

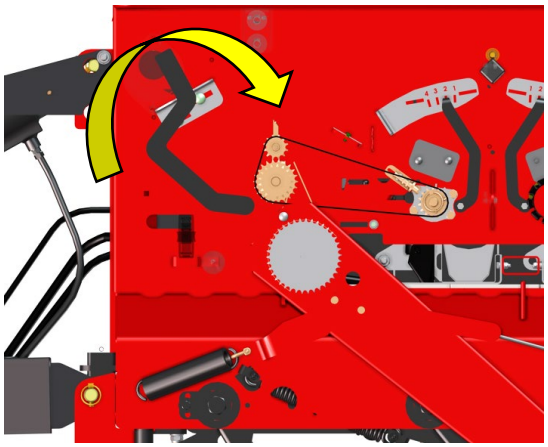
11.1 Preparations for calibration test

Before starting the calibration test, the machine is adjusted according to the seed and fertilizer to be sown.

1. Connect the seed drill to the tractor and turn on the power to the seed drill. Open the protective covers on the sides of the machine.

2. Move calibration troughs to calibration mode by turning the calibration lever from front to back. Calibration troughs slide under the feeding units.

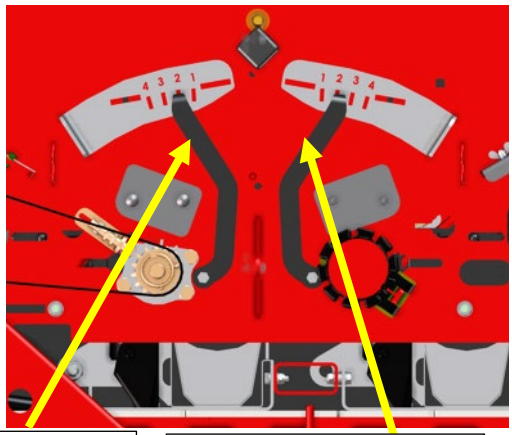
   If the machine is equipped with small seed / start fertilizer unit, it also adjusts to calibration mode. Hose rack moves away under the feeding units. Calibration troughs can be put to this free space. Take calibration troughs from the seed/fertilizer side.



3. Adjust bottom flap levers according to the seed / fertilizer to be sown.

SEED / FERTILIZER	BOTTOM FLAP POS.
Granular fertilizer	2
Grains	2
Small seeds	1
Pea	3
Large beans	4

NOTE! The bottom flaps must be adjusted to the same position on both sides of the machine.

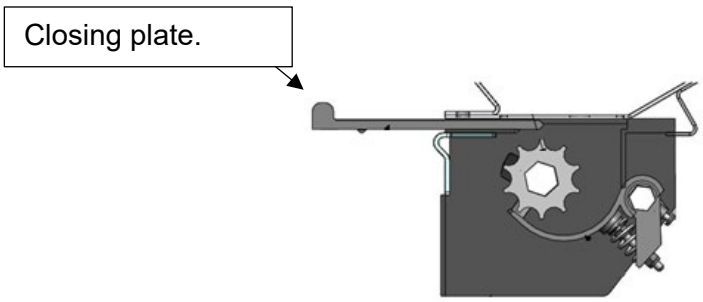


Fertilizer bottom flap adjustment. Left side.

Seed bottom flap adjustment. Left side.

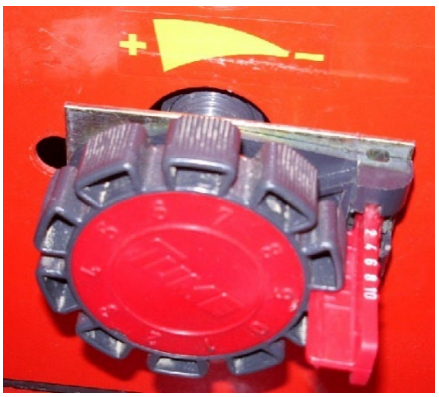
Seeds other than those mentioned above: Compare the seed size with the seeds mentioned above and their corresponding settings.

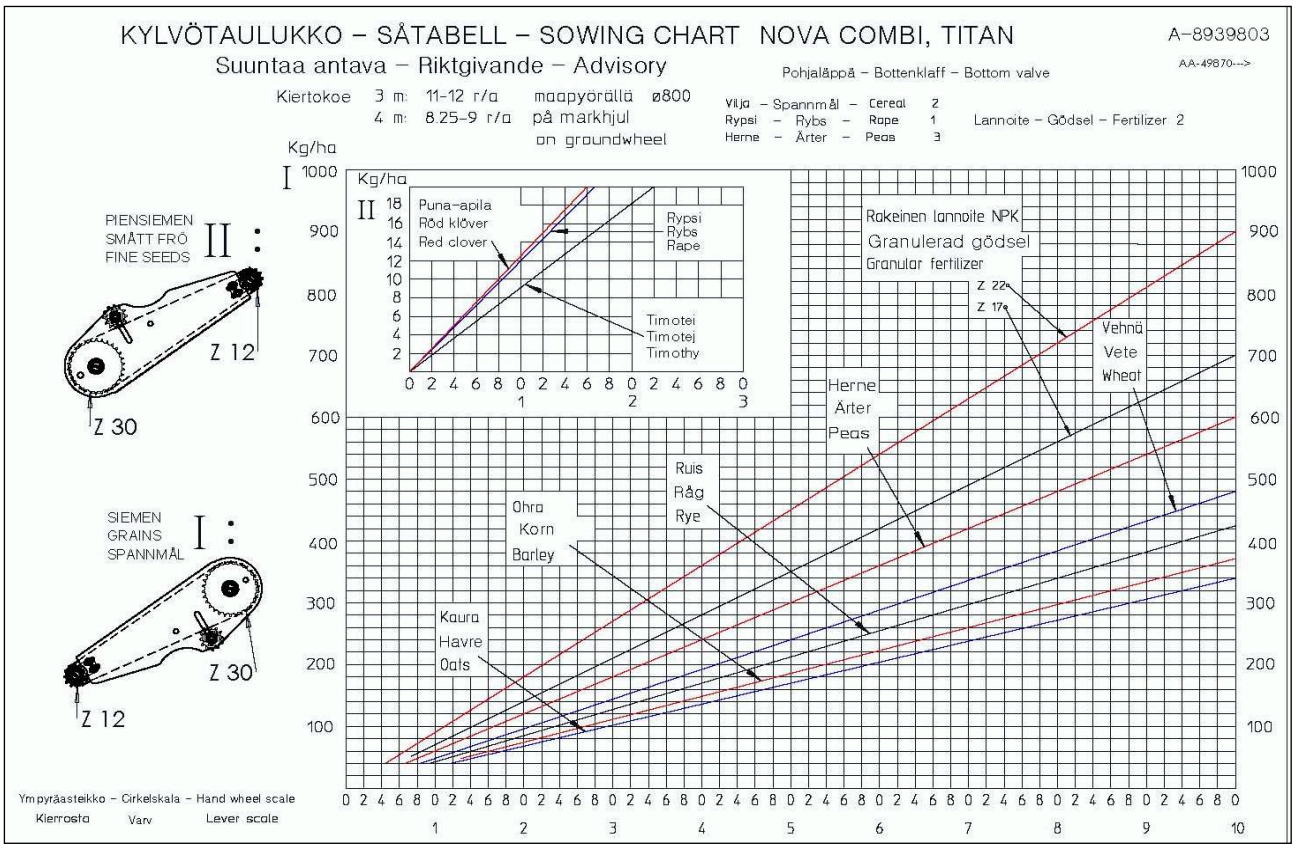
4. Make sure that closing plates are completely open and tramline device is turned off..



5. If the machine has a manual feed control (hand wheel) See the seeding chart for the setting value and adjust the hand wheel accordingly. The sowing table can also be found on the side of the machine.

   The handwheel has 10 complete turns and 10 partial turns. Unlocking is done by first pressing the handwheel locking lever towards the machine, and then by turning it. The locking lever also has a main feed scale of 0-10, where the number interval corresponds to one turn of the handwheel. The adjustment is read from the inner surface of the handwheel.





Seeding chart.

– – – –

11.2 Calibration test for fertilizer, hand wheel adjustment

After you have made the preparations for the calibration test you can perform the calibration test.

1. Turn the calibration test lever to the rot calibration test position and make sure that the calibration test trays are empty.

2. Rotate the ground wheel. The wheel does not necessarily have to be rotated the number of are, as the pulse sensor in the ground wheel automatically calculates the area that is rotated in the test. However, the calculation is easiest to visualize using the one are.

   The number of revolutions per are of the ground wheel of different machine widths are below:

   - o Nova Combi 3000 = 11-12 revolutions /are
   - o Nova Combi 4000 = 8.25-9 revolutions /are

3. Weigh the amount of fertilizer fed into the test trays. This, multiplied by a hundred, is kg/ha, if an area equivalent to an are was rotated.

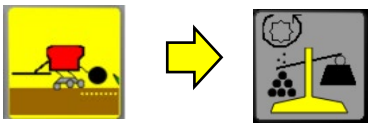
   - **NOTE!** Remember to remove the weight of the container/bag from the weighing result.

4. Adjust the handwheel smaller or larger as needed and repeat the calibration test until you are satisfied with the feed amount.

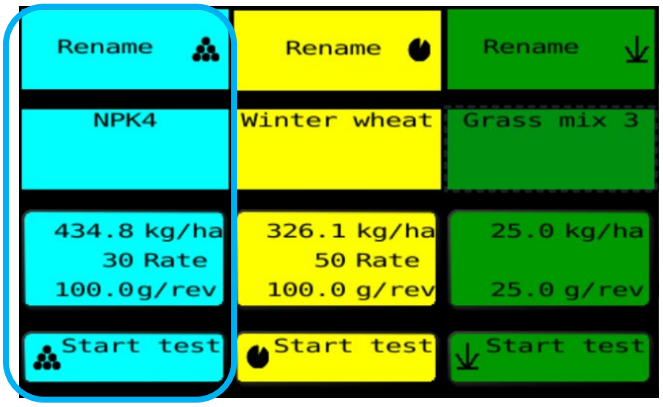
   - **NOTE!** when increasing the amount of feed, first turn the handwheel half a turn above the target value and then back down.

   - **NOTE!** If dirt accumulates in the feeder, the feed rollers may become blocked. This can have a decisive effect on the feed rate. We recommend cleaning from time to time. The rollers can be cleaned by adjusting the feed amount to zero and back again to the desired adjustment value. In this case, you must remember the aforementioned adjustment instruction, first turn 1/2-1 turn above the desired adjustment value.

5. To use the machine's counters, save the result of the calibration test.
   Select the calibration test menu from the seeding menu.



Select first the fertilizer for which you want to save the result.
You can also name the product.



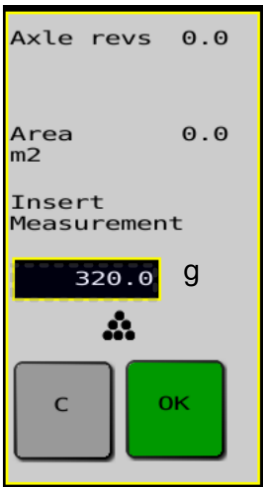
Press ⁂ **Start test**, grey window will open.

NOTE! The handwheel adjustment does not restore the correct setting by changing the selection, the adjustment must always be done by hand and confirmed by a calibration test!

Go through the calibration test one more time. The display shows the rotations of the axle and the area measured from the ground wheel. Enter the result of the rotation test in grams on the screen.

After that, press OK, and the machine calculates the result in kg/ha and g/shaft revolution.

Based on these results, the machine calculates the accumulated amount.

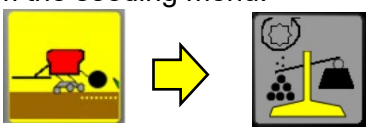


Tip: *you can also set the seed side to rotation test readiness at the same time in a similar way. This way you can take the results for fertilizer and seed with one rotation time of the ground wheel.*

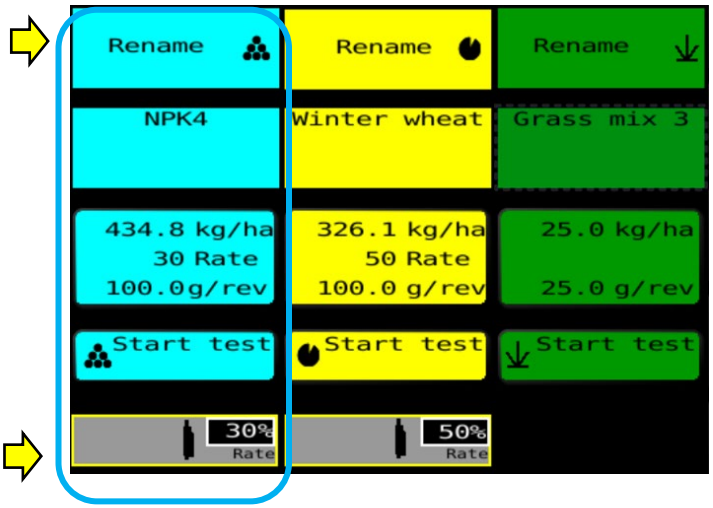
11.3 Calibration test for fertilizer / electric adjustment (optional)

After you have made the preparations for the calibration test you can perform the calibration test.

1. Turn the calibration test lever to the calibration test position and make sure that the test trays are empty. Select the calibration test menu from the seeding menu.

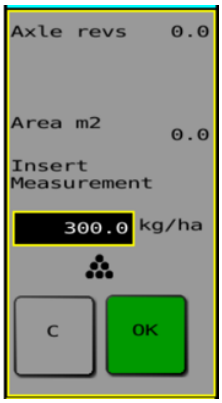


2. Select first the fertilizer for which you want to save the result. You can also name the product.



Adjust the **Rate** value to estimated value, and the actuator motor will drive itself to the corresponding position.

Press ⁂ **Start test**, grey window will open.



Tip: *you can also set the seed side to rotation test readiness at the same time in a similar way. This way you can take the results for fertilizer and seed with one rotation time of the ground wheel.*

3. Rotate the ground wheel until there is enough fertilizer in the test tray for weighing. (in the gray window, the unit kg/ha changes to g).

You can freely choose the number of revolutions, because the machine calculates the area with the pulse sensor of the ground wheel. If you want to do a calibration test for one are, the number of revolutions of the ground wheel is the following:

- Nova Combi 3000 = 11-12 revolutions /are
- Nova Combi 4000 = 8.25-9 revolutions /are

4. Carefully pull out the test trays and weigh the amount of fertilizer.

5. Check from the screen that "Axle revs" is more than 0.0 and "Area m2" is the area corresponding to the revolutions of the ground wheel.

6. In the "**Insert measurement"** field, enter the weighing result in **grams (g)** and press OK. The controller calculates the result in grams per rev and kg/ha from the entered amount and they remain valid in the selected memory location.

   The calibration test memory location of the fertilizer you have now selected is calibrated for that fertilizer.

   (C = exit without making changes).

7. When you want to sow the fertilizer in question, select the memory spot for the fertilizer in question to the use for which you took the calibration test.

Note! Remember that the calibration test must be done again when you change the fertilizer quality, if you use the same memory location.

Note! If you use different fertilizers, save the calibration test results of different fertilizers in your own fertilizer calibration test memory locations.

NOTE! After you have done the calibration tests, remember to turn the calibration test lever back to the front. After this, the seeds and fertilizers again go into the coulters instead of the test trays.

11.4 Calibration test for seed / hand wheel adjustment

After you have made the preparations for the calibration test you can perform the calibration test.

1. Turn the calibration test lever to the rot calibration test position and make sure that the calibration test trays are empty.

2. Rotate the ground wheel. The wheel does not necessarily have to be rotated the number of are, as the pulse sensor in the ground wheel automatically calculates the area that is rotated in the test. However, the calculation is easiest to visualize using the one are.

   The number of revolutions per are of the ground wheel of different machine widths are below:

   - o Nova Combi 3000 = 11-12 revolutions /are
   - o Nova Combi 4000 = 8.25-9 revolutions /are

3. Weigh the amount of seed fed into the test trays. This, multiplied by a hundred, is kg/ha, if an area equivalent to an are was rotated.

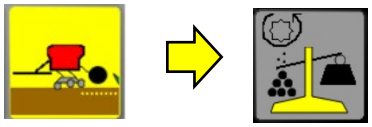
   - **NOTE!** Remember to remove the weight of the container/bag from the weighing result.

4. Adjust the handwheel smaller or larger as needed and repeat the calibration test until you are satisfied with the feed amount.

   - **NOTE!** when increasing the amount of feed, first turn the handwheel half a turn above the target value and then back down.

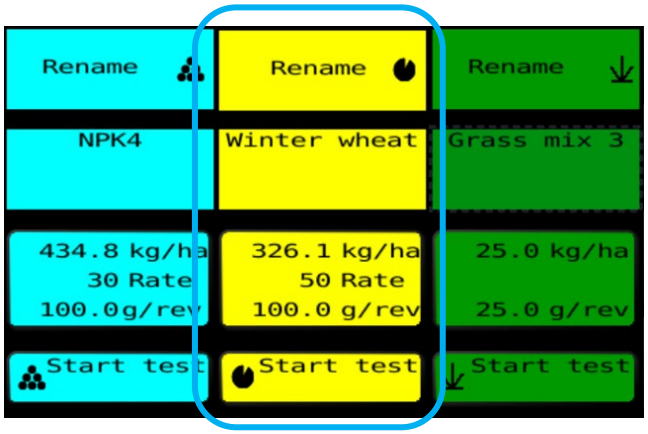
   - **NOTE!** If dirt accumulates in the feeder, the feed rollers may become blocked. This can have a decisive effect on the feed rate. We recommend cleaning from time to time. The rollers can be cleaned by adjusting the feed amount to zero and back again to the desired adjustment value. In this case, you must remember the aforementioned adjustment instruction, first turn 1/2-1 turn above the desired adjustment value.

5. To use the machine's counters, save the result of the calibration test.
   Select the calibration test menu from the seeding menu.



Select first the seed for which you want to save the result.
You can also name the product.

Press **Start test**, grey window will open.

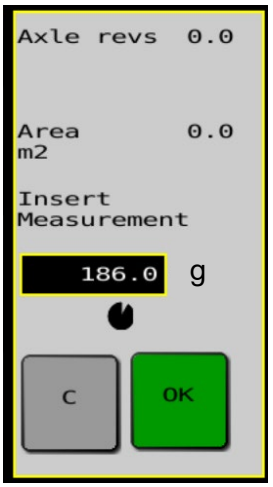


NOTE! The handwheel adjustment does not restore the correct setting by changing the selection, the adjustment must always be done by hand and confirmed by a calibration test!

Go through the calibration test one more time. The display shows the rotations of the axle and the area measured from the ground wheel. Enter the result of the rotation test in grams on the screen.

After that, press OK, and the machine calculates the result in kg/ha and g/shaft revolution.

Based on these results, the machine calculates the accumulated amount.

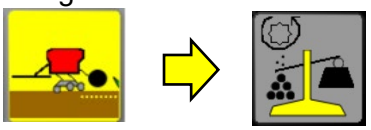


Tip: *you can also set the seed side to rotation test readiness at the same time in a similar way. This way you can take the results for fertilizer and seed with one rotation time of the ground wheel.*

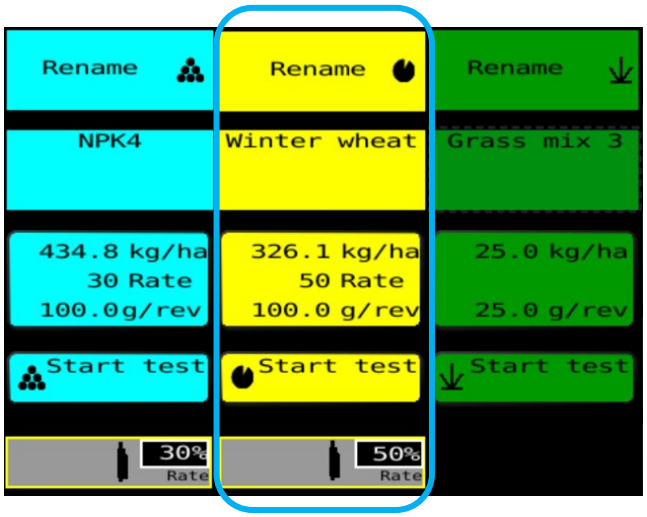
11.5 Calibration test for seed / electric adjustment (optional)

After you have made the preparations for the calibration test you can perform the calibration test.

1. Turn the calibration test lever to the calibration test position and make sure that the test trays are empty. Select the calibration test menu from the seeding menu.

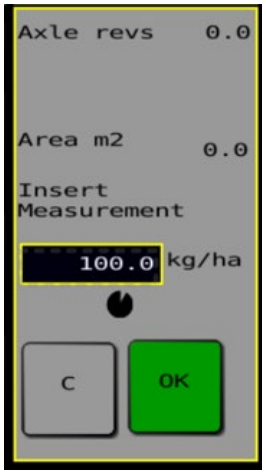


2. Select first the seed for which you want to save the result. You can also name the product.



Adjust the **Rate** value to estimated value, and the actuator motor will drive itself to the corresponding position.

Press **Start test**, grey window will open.



3. Rotate the ground wheel until there is enough seed in the test tray for weighing. (in the gray window, the unit kg/ha changes to g).

You can freely choose the number of revolutions, because the machine calculates the area with the pulse sensor of the ground wheel. If you want to do a calibration test for one are, the number of revolutions of the ground wheel is the following:

- Nova Combi 3000 = 11-12 revolutions /are
- Nova Combi 4000 = 8.25-9 revolutions /are

_ _

4. Carefully pull out the test trays and weigh the amount of seed.

_ _

5. Check from the screen that "Axle revs" is more than 0.0 and "Area m2" is the area corresponding to the revolutions of the ground wheel.

6. In the **"Insert measurement"** field, enter the weighing result in **grams (g)** and press OK. The controller calculates the result in grams per rev and kg/ha from the entered amount and they remain valid in the selected memory location.

   The calibration test memory location of the seed you have now selected is calibrated for that seed.

   (C = exit without making changes).

_ _

7. When you want to sow the seed in question, select the memory spot for the seed in question to the use for which you took the calibration test.

_ _

Note! Remember that the calibration test must be done again when you change the seed quality, if you use the same memory location.

Note! If you use different seeds, save the calibration test results of different seeds in your own seed calibration test memory locations.

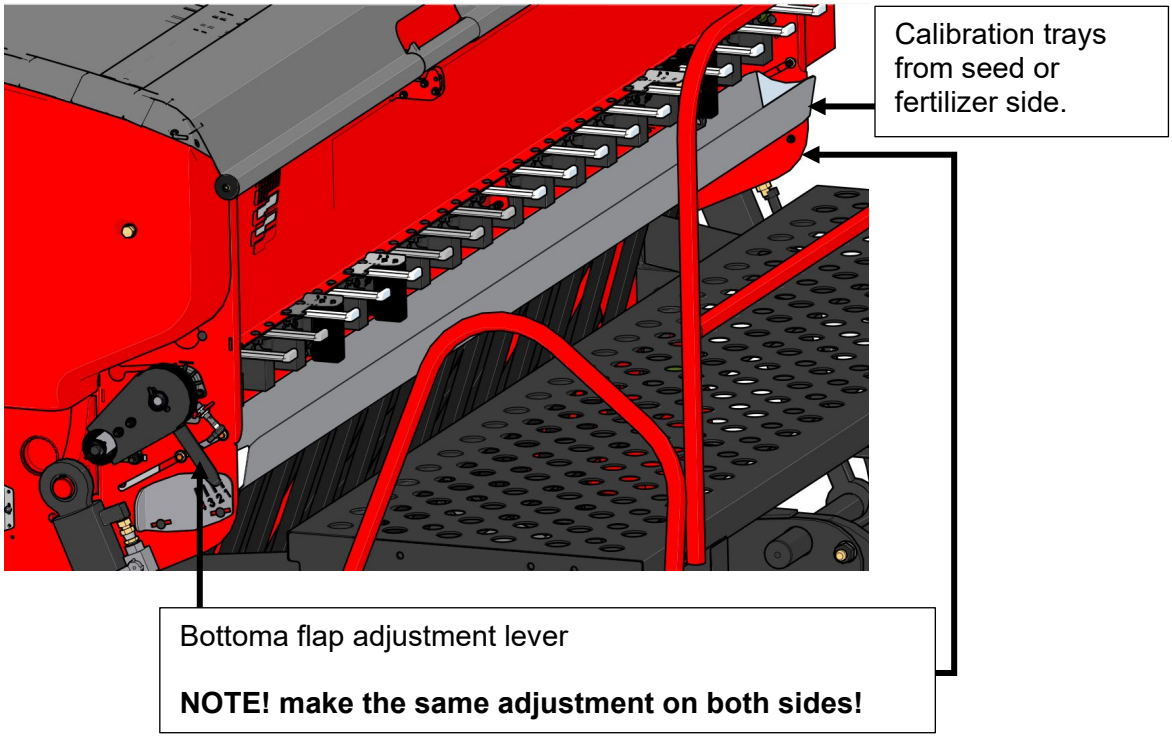
NOTE! After you have done the calibration tests, remember to turn the calibration test lever back to the front. After this, the seeds and fertilizers again go into the coulters instead of the test trays.

11.6 Calibration test for small seed and start fertilizer device (optional)

Make the preparations of chapter 11.1 with the following exceptions.

- The bottom flaps are adjusted from the edges of the small seed device. Remember to make the adjustment on both sides of the machine. The setting is 1 for small seeds and 2 for granular fertilizers.

- Use rotation test trays on the seed or fertilizer side.



_ _

1. Ensure calibration trays are empty and clean.

_ _

2. Rotate ground wheel corresponfing of one are.
   - Nova Combi 3000 = 11-12 revolutions / are
   - Nova Combi 4000 = 8,25-9 revolutions / are

_ _

3. Weigh the amount of seed/fertilizer fed into the test trays. Multiply the result by one hundred to get the sowing rate in kilograms per hectare, kg/ha.

   - NOTE! Remember to remove the weight of the container/bag from the weighing result.

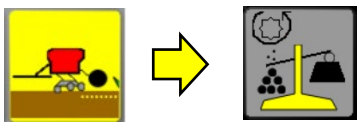
_ _

4. Adjust the handwheel smaller or larger as needed and repeat the rotation test until you are satisfied with the feed amount.

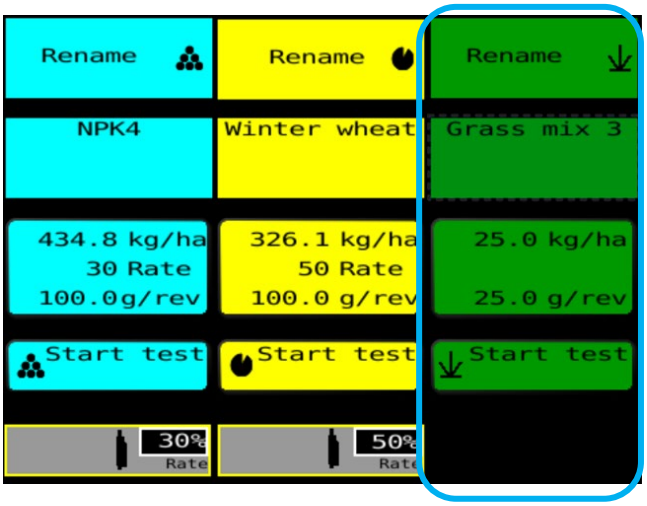
   - NOTE! when increasing the amount of feed, first turn the handwheel half a turn above the target value and then back down.

   - NOTE! If dirt accumulates in the feeder, the feed rollers may become blocked. This can have a decisive effect on the feed rate. We recommend cleaning from time to time. The rollers can be cleaned by adjusting the feed amount to zero and back again to the desired adjustment value. In this case, you must remember the aforementioned adjustment instruction, first turn 1/2-1 turn above the desired adjustment value.

5. To use the machine's counters, save the result of the rotation test.
   Select the rotation test menu from the seeding menu.

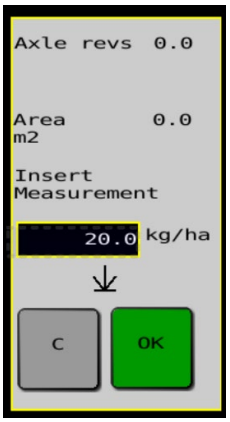


6. Select first the fertilizer / seed for which you want to save the result. You can also name the product



   Press **Start test**, grey window will open.

7. Rotate the calibration test one more time and enter the result of the rotation test in grams on the screen. The machine automatically calculates kilograms per hectare from the accumulated area and the weighing result.



NOTE! The handwheel adjustment does not restore the correct setting by changing the selection, but the adjustment must always be done by hand and confirmed by a calibration test!

12. FIELD TEST

A field test is absolutely the most accurate testing format of feeding amount. If the field test is carried out on the field which is to be sown and on a prepared seedbed, conditions equivalent to sowing are accurately established. A field test can be done both to seed and fertilizer.

Carrying out the field test:

- Adjust the equipment according to the calibration guidelines. Leave calibration lever on calibration position (= calibration troughs are under the feeding units).
- Measure a drive corresponding to one are sown area, which based on machine type is:

Nova combi 3000 → 33,3 m
Nova combi 4000 → 25 m

- Drive outside the test area, about 10 meters, with the machine in working position so that each sowing chamber is feeding out the seeds.
- Empty calibration troughs.
- Drive a distance in accordance with the table above; the machine lowered to the sowing position with a normal sowing speed.
- Weigh the seeds in test sowing trays and/or the fertilizers and multiply the weighing results with 100 to get the resulting seed amount in kg/ha.

13. OPTIONAL EQUIPMENT

TUME develops its machines and accessories constantly. If accessories are wanted for the older machines, it is useful to ensure the compatibility by contacting the manufacturer representatives.

In TUME-seed and fertilizer drills only the following original TUME-accessories are allowed to be used. In the installation of accessories, the factory instructions must be followed without fail. Faulty installation or use of other than original TUME-accessories may endanger the user safety or damage the machine. The manufacturer is not responsible for the damages which occur from the changes that are against the factory instructions.

Optional equipment for Nova Combi :

- Row markers.
- Small seed / start fertilizer unit.
- Hydraulic front board.
- Agitator shafts.
- Wheel packer.
- CultiPack disc cultivator.

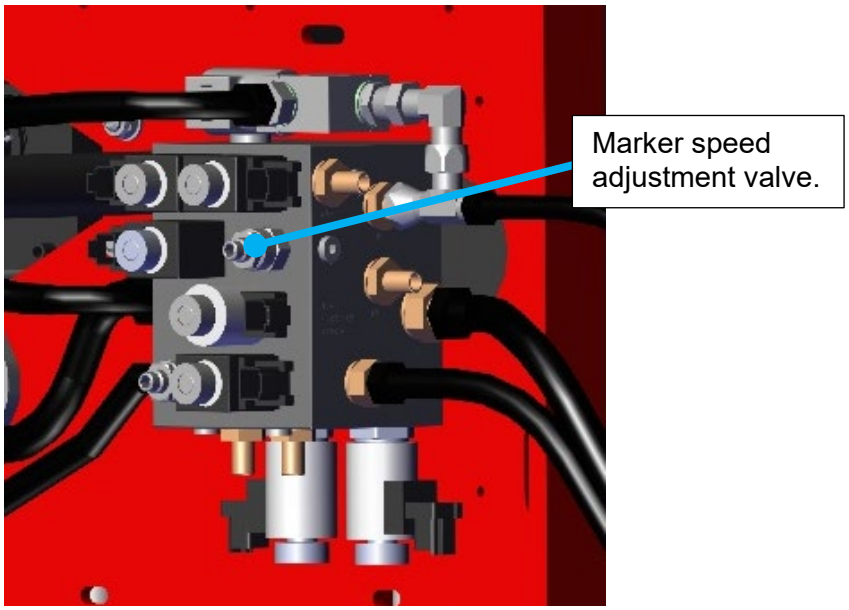
13.1 Row markers

If the machine is equipped with row markers, the machine must be connected to the tractor double-acting hydraulic valve. Markers have been connected parallel with the machine lifting and lowering circuit. The drill itself works with single-acting hydraulics, but the marker requires dual-acting valve. Marker will not start lowering, unless hydraulically pushed downwards.

Markers are controller by the buttons shown in the picture 21. Activating only left marker means that only the left marker is used. Right marker works similar way. If both markers are activated, both will go down when machine is lowered. Activating **Auto** -function, markers will go down in turns. If **Ritsi** -function is activated, both markers will go down on the next way line after the tramlines were made. Other marker marks the place of the tramlines to the field and other marks the guiding line for the next drive line.

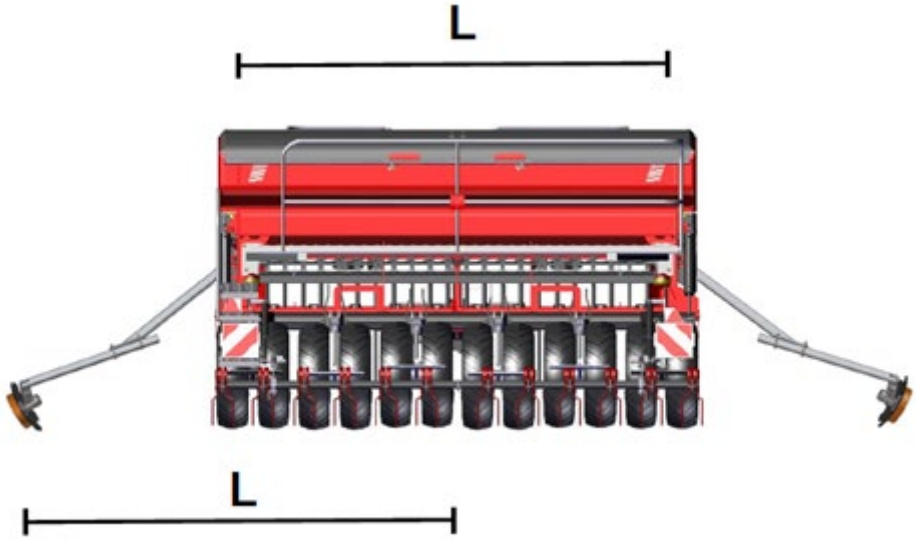
The speed of marker movement can be adjusted from the hydraulic unit (picture. 24). Adjust the speed to begin with a small flow. This is because the movement of marker arms is calm and does not cause damages or hazards. Adjust the screws for right speed for the actual drilling work at a time when, for example ,the tractor oil has reached a normal operating temperature.

NOTE! If you use markers, remember to always remove the marker arm lock pins. In road driving, a recommendation is made to place the lock pins back in their places.



Picture 21. Marker speed adjustment.

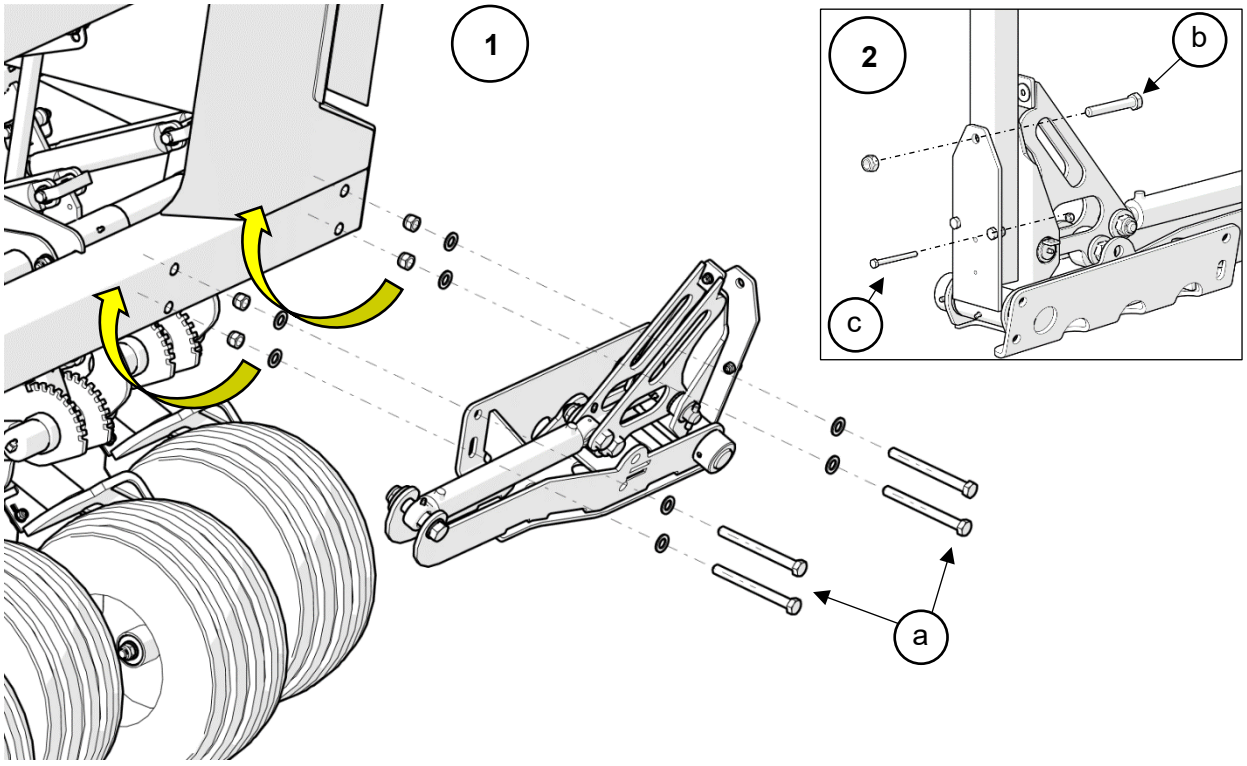
Marker disc angle and distance cab be adjusted. Adjust the length of the marker arm so that the distance from the bottom of the furrow made by the disc to the center of the machine is the same as the working width (picture 25). The disc angle should be so that it throws soil towards the machine. Disc angle affects to the visibility of the furrow. Use as low disc angle as possible to avoid unnecessary deep furrow. Length and angle adjustment is in chapter 13.1.1 Row marker installation, section 3.



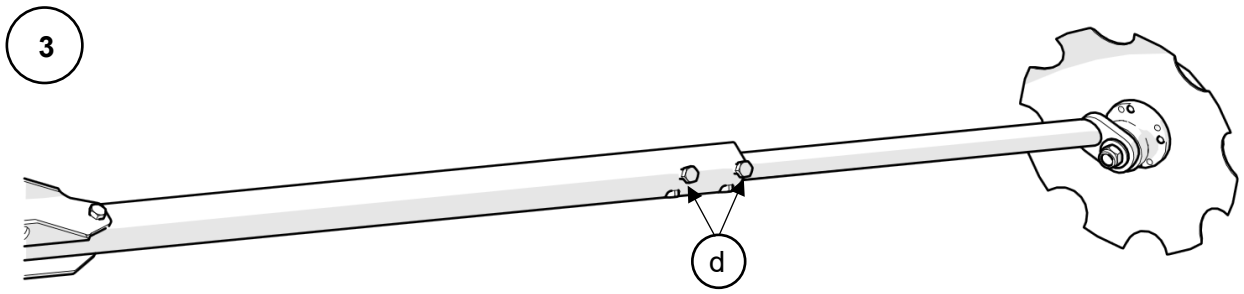
Picture 22. Marker length adjustment.

Making sharp turns while markers are down can damage markers!

13.1.1 Row marker installation

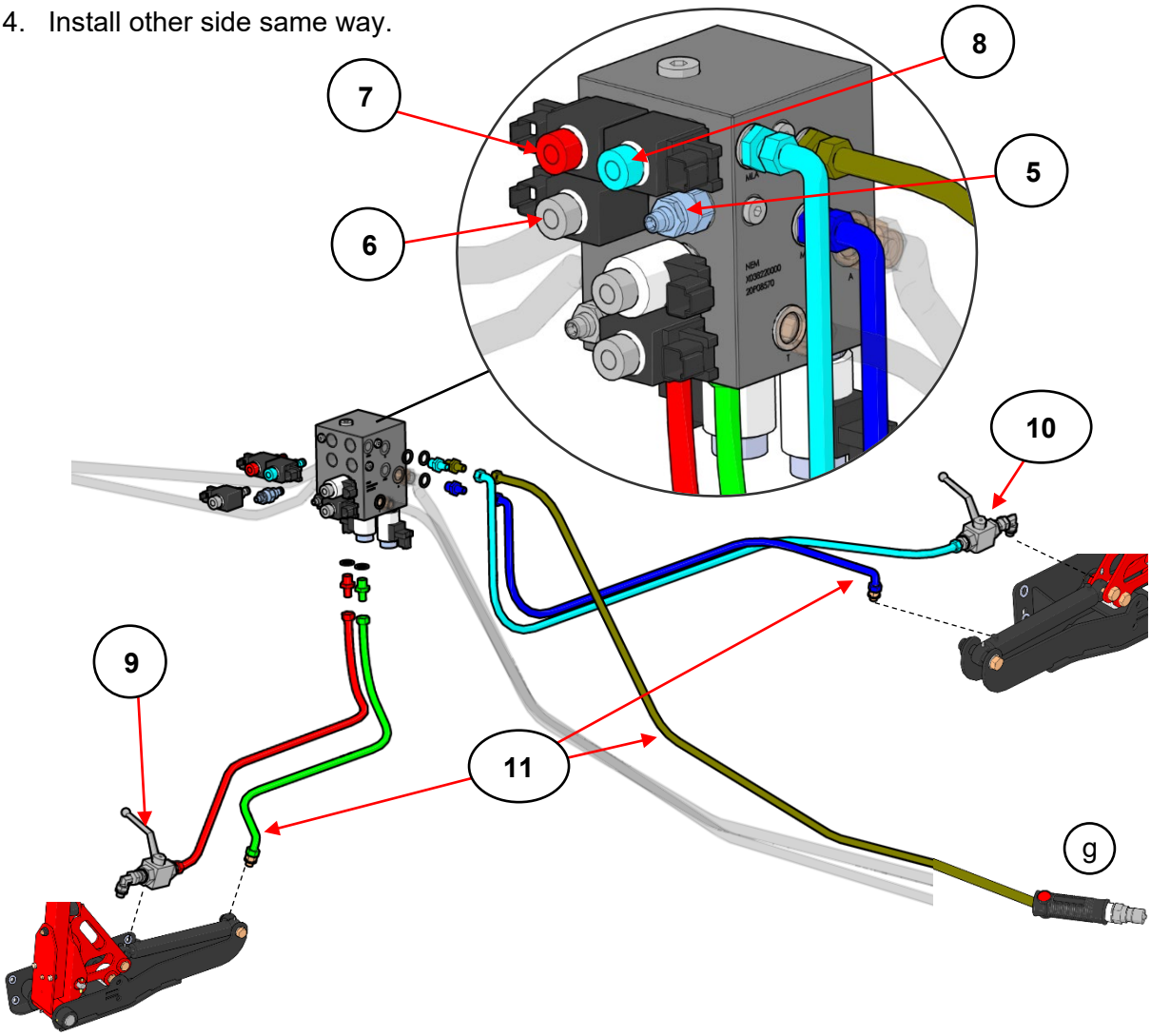


1. Install marker frame to drill frame with four M16x160 screws (a).
2. Install marker arm to the frame. M16x100 screw (b) works as a joint and M8x90 as a share bolt (c).



3. Install disc arm to marker arm. Length and angle can be adjusted after loosing the screws (d). Adjust and tighten the screws. Then angle of the disc should be so that it throws soil towards the machine.

4. Install other side same way.

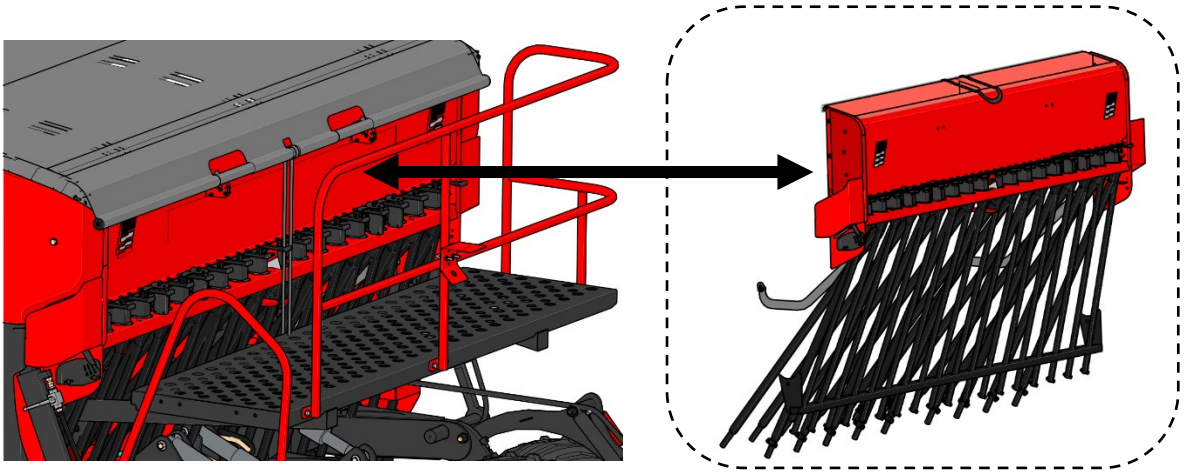


5. Install counter valve 01451327
6. Install marker cancel valve 01454250 and connect plug **CM**
7. Install right marker valve 01454248 and connect plug **R**
8. Install left marker valve 01454248 and connect plug **L**
9. Install right marker's cylinder rod side hose with tap.
10. Install left marker's cylinder rod side hose with tap.
11. Install cylinder piston side hoses. The longest hose to a quick coupler (g).
12. Finally select markers in use from the settings. See chapter 11.1.3 Features.

13.2 Small seed / start fertilizer unit

The unit is the same in both cases. As small seed unit seeds are guided and spread through the hoses in front of the rear wheels. If used as start fertilizer unit, fertilizer is through the hoses to the seed coulters. Fertilizer goes to the same furrow with the seeds.

Unit is integrated to the seed drill's rear wall. The tarpaulin also covers the small seed unit. The unit is installed partly inside the seed hopper, so it reduces the seed hopper volume.



Picture 23. Small seed / start fertilizer unit.

13.2.1 Using for seeding small seeds

Grass seed sowing unit is meant for the sowing of different grass seed varieties and their mixtures. Seeds are led to the field through hoses. Hoses have been installed in such a way, that the sowing coulter slightly earths the seeds. Sowing speed affects to how strongly the grass seeds are covered by the soil.

The closing flaps between the bottom of the tank and the feed chamber should be adjusted in a semi-closed position, if small and easily flowing materials (such as clover) are sown with the device. On the other hand, with lightweight, easily arching grass seeds (e.g. fescue), the closing doors must be fully opened.

13.2.2 Using for seeding start fertilizer

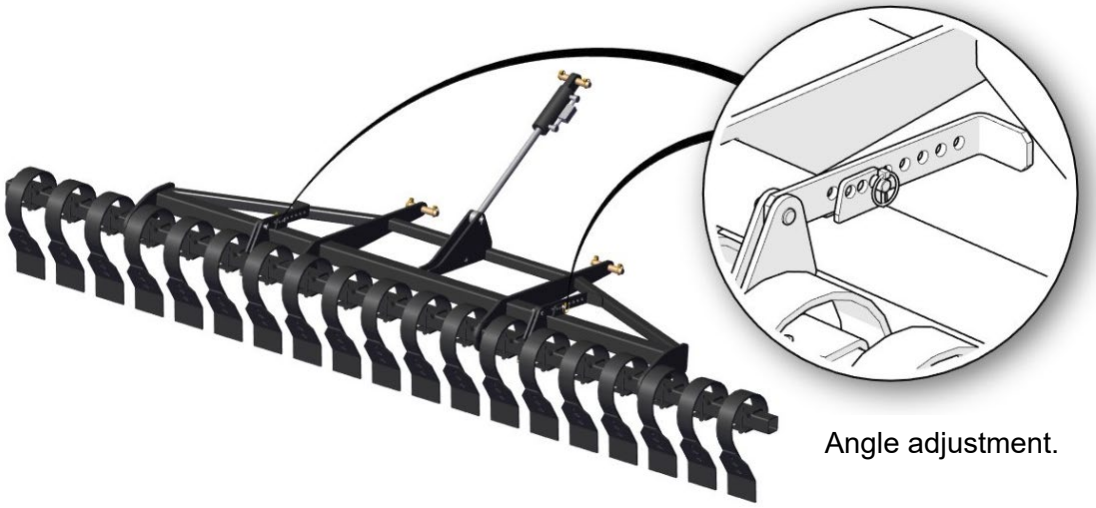
Start fertilizer unit is meant to sow fertilizer to the same furrow as seeds. Fertilizer flows through hoses to the upper part of the seed coulters.

The closing flaps between the bottom of the tank and the feed chamber should be adjusted fully open.

NOTE! Only granulated fertilizers can be used in this machine. Powder fertilizers can block the system!

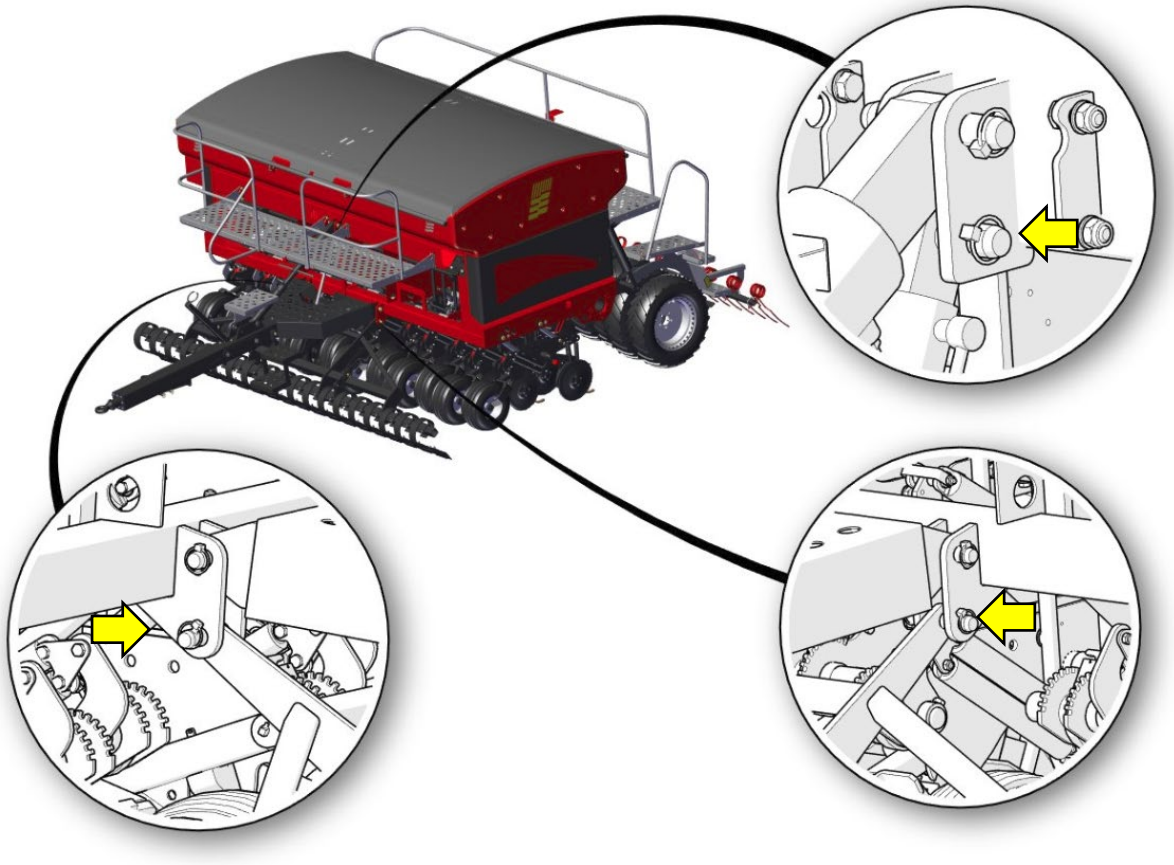
13.3 Hydraulic front board

Hydraulic front board can be used to even the soil during sowing. In good conditions seeding directly to a ploughed soil is possible. Hydraulic front board needs one two phased hydraulic output. This way the board can be adjusted during work without affecting to seed drill's other functionalities. Working depth is recommended to keep as low as possible. This reduces the need of pulling power. The angle of the board is changed by moving the perforated plate and locking it with a pin. The same adjustment must be carried out on both sides (picture 31).



Picture 24. Nova Combi hydraulic front board.

Front board's arms are installed with pins under the drawbar's attachment holes. Front board's cylinder is installed with a pin to the holes under the drawbar's cylinder. Hydraulic hoses are pulled inside the drawbar as other hoses and cables.



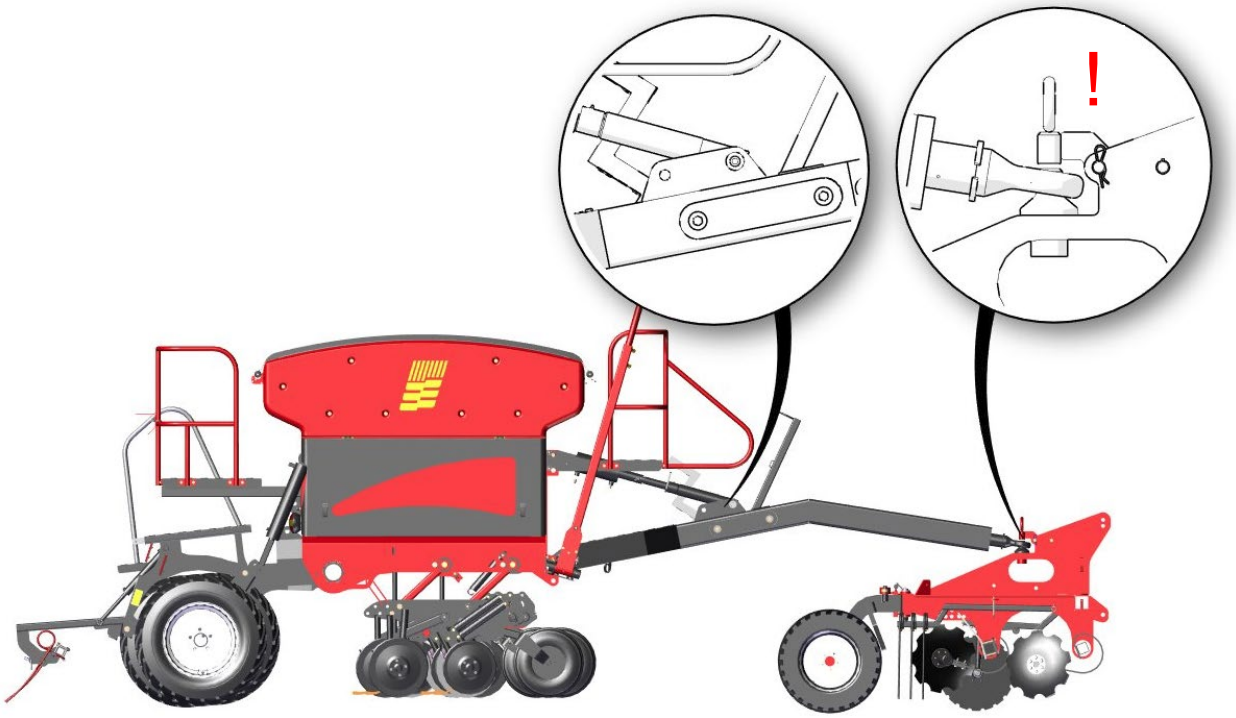
Picture 25. Hydraulic front board installation.

13.4 CultiPack disc cultivator

Nova Combi is connected to CultiPack with a special drawbar (see section 5.3 drawbar installation). Drawbar cylinder's lower end is connected to front hole of the drawbar. Seed drill's drawbar is connected to a CultiPack towing point (picture 29). Remember to lock the latch with a pin.

During transport drive the CultiPack can be on the ground, when cultivator discs are turned up with hydraulics. CultiPack rear wheel turning must be locked. CultiPack must be lifted up from the ground when reversing.

NOTE! CultiPack has its own user manual. Read the manual before using the CultiPack.



Picture 26. Nova Combi and CultiPack combination. Make sure the drawbar is locked to the CultiPack towing hitch with a latch and pin.

13.5 Wheel packer



For wheel packer operation, the lower end of the hitch cylinder is connected to the rear hole of the towing device (figure 30). It is recommended to keep the wheel packer raised during road transport. When reversing, the wheel packer must be lifted off the ground.



Figure 270. Wheel packer connection.

The wheel packer is attached to the end of the drawbar by first removing the towing eye. The flange of the packer fits into the same bolt holes at the end of the drawbar.

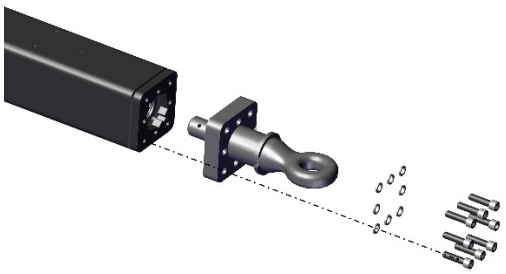


Figure 31. The wheel packer is connected to the end of the drawbar by first removing the towing eye. The flange of the packer fits into the same bolt holes at the end of the drawbar. It is absolutely essential to ensure that the bolts do not loosen and that they are sufficiently strong. Hardness 12.9, tightening torque 375 Nm, use a Nord-Lock washer.

NOTE! Check the tightness of the fastening screws at least once per season!

14. SERVICE

In the more demanding cases we recommend contacting the dealer. In the following some measures are presented which in most cases can be carried out on a farm. Please read the service instructions carefully. According to the guidelines the seed drill works flawlessly year after year. In the instructions it is stated that a service failure will void the warranty.

Always turn off the tractor engine before starting the service and turn on the hand break. Make sure no one can use the machine during service.

DANGER! ALWAYS CLOSE THE SAFETY VALVES OF BOTH CYLINDERS, IF THE MACHINE NEEDS LIFTING UP DURING MAINTENANCE. DO NOT GO UNDER A MACHINE WHICH IS ONLY SUPPORTED BY HYDRAULICS!

Please check the tightness of all screw connections every 100 hours of use. On a new machine the aforementioned check must be carried out twice every 25 hours of use and after this every 100 hour.



Picture 282. Lifting cylinder safety valve closed.

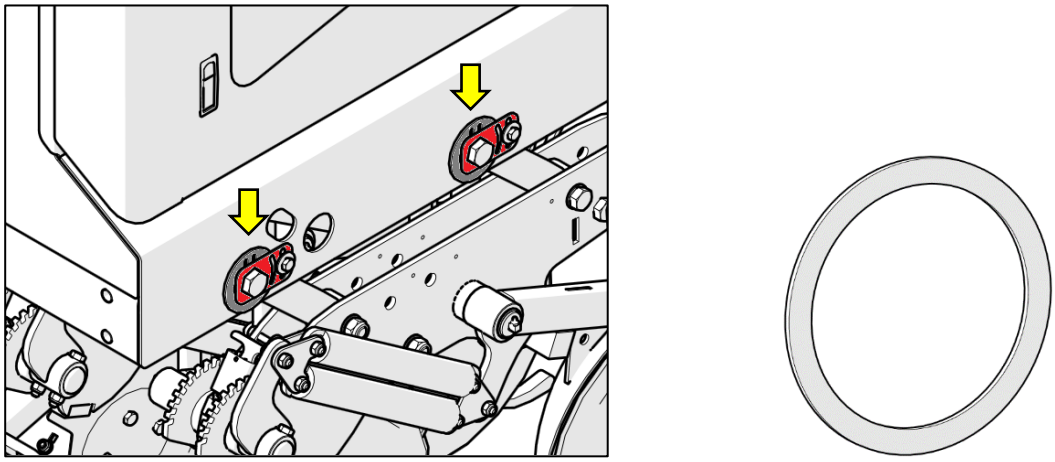
NOTE! Transport drive is not allowed with closed safety valves (picture 32).

In the machine hydraulic circuit there is also pressure when it has been removed from the tractor.

DANGER! WHEN HEATED, PAINTED SURFACES OF THE MACHINE CAN EXCRETE GASES HARMFUL TO HEALTH. PROVIDE ADEQUATE VENTILATION IN THE WORKSPACE, FOR EXAMPLE DURING THE WELDING WORKS.

14.1 Removing coulter sledge axial endplay

In each end of the machine there are two screws M24 (key 36), with which the coulter sledge endplay is axially tightened with clamping pieces. These screws have been equipped with separate rotation-prevention parts, which need to be removed for the duration of tightening. In addition, the machine is supplied with pass plates (inner diam. 50 mm) which, if the endplay is big, such that the inner surface of a clamping piece touches the end plate of the machine (=backlash used up), then these can be installed behind the clamping pieces as needed.



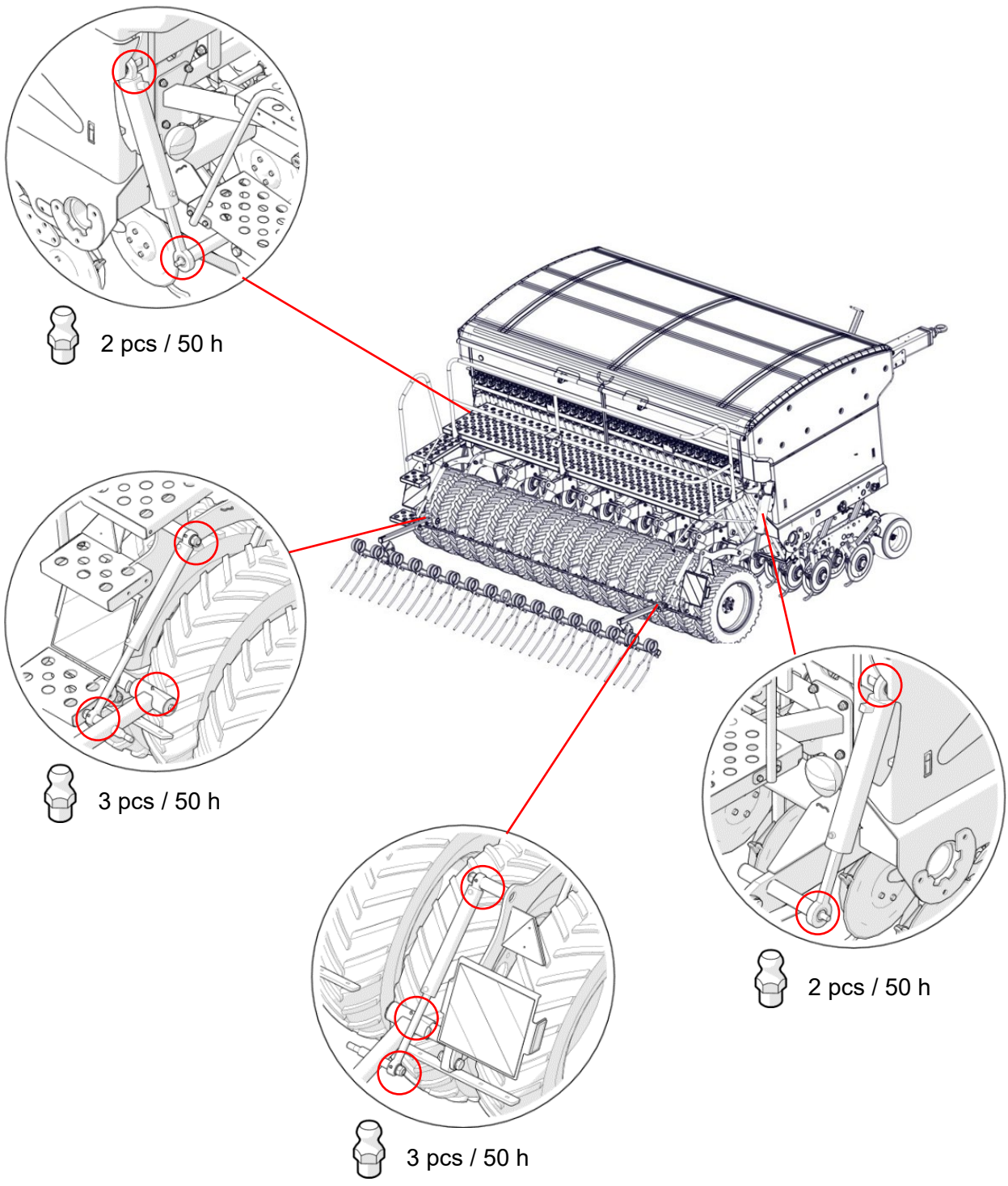
Picture 33. Tightening screws and pass plate.

14.2 Lubrication

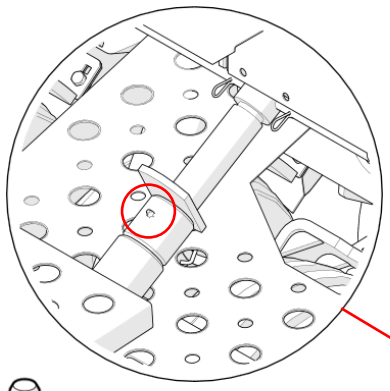
Machine must be lubricated at least once in the season and always after washing. Machine must be lubricated before storage.

Coulter disc bearings do not need greasing.

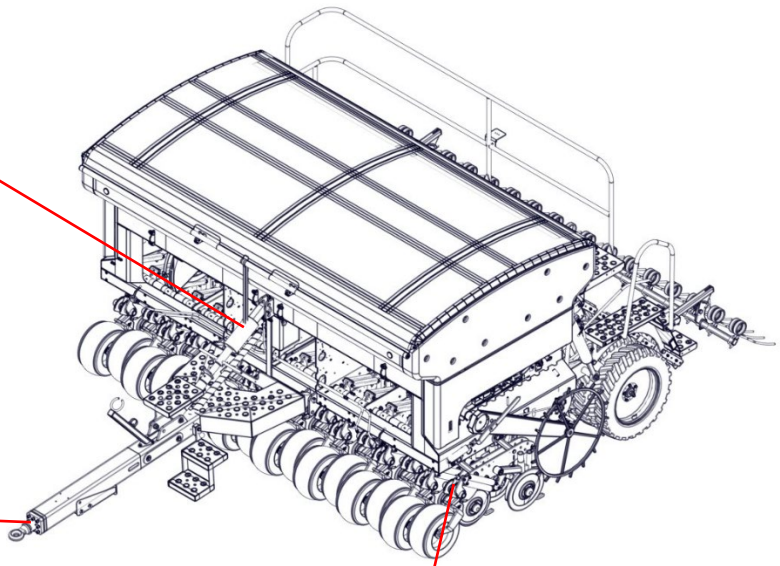
SIDES AND BACK

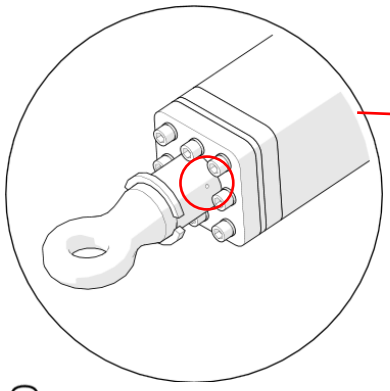


FRONT AND COULTERS

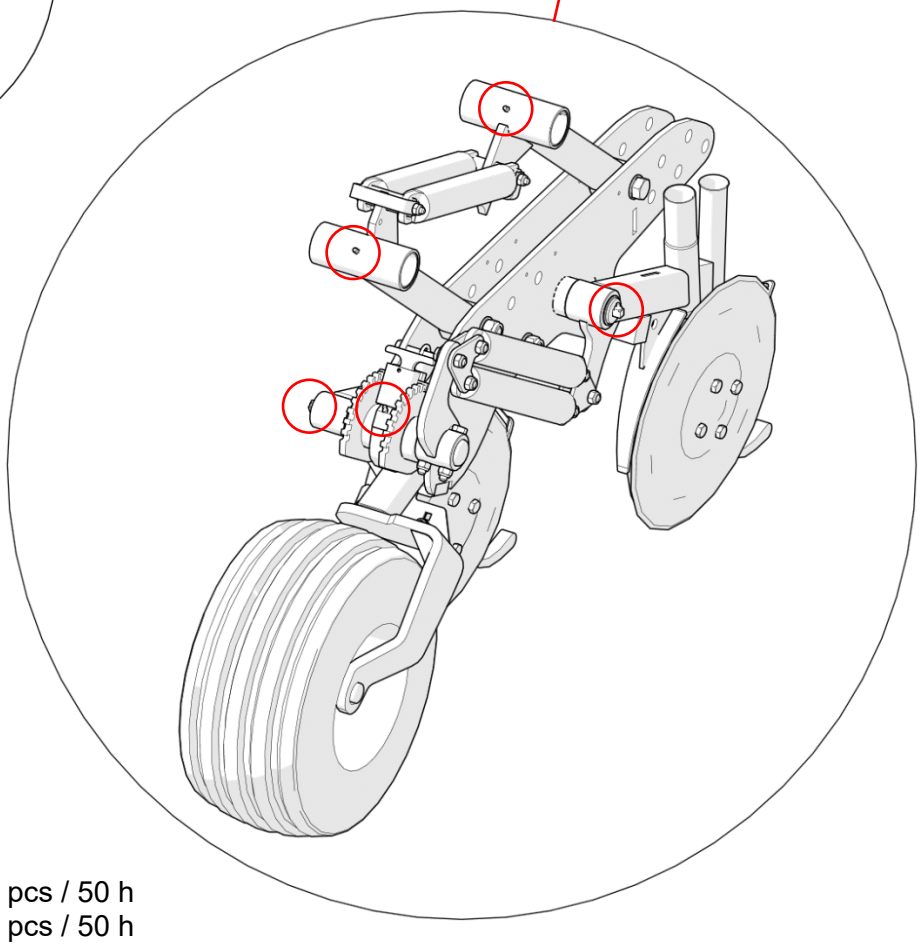


1 pcs / 100 h.
Lubricate
thread also.



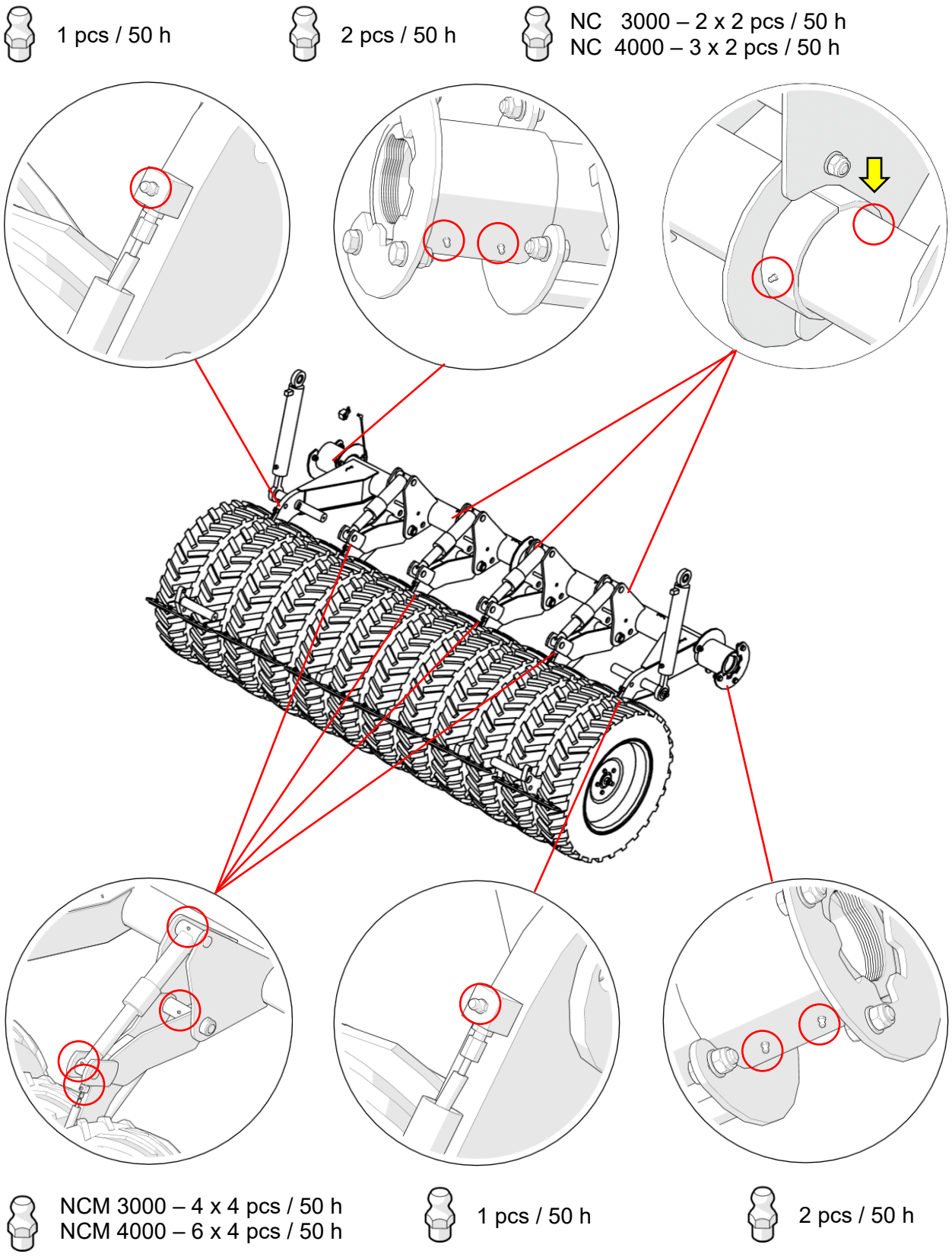


1 pcs / 50 h



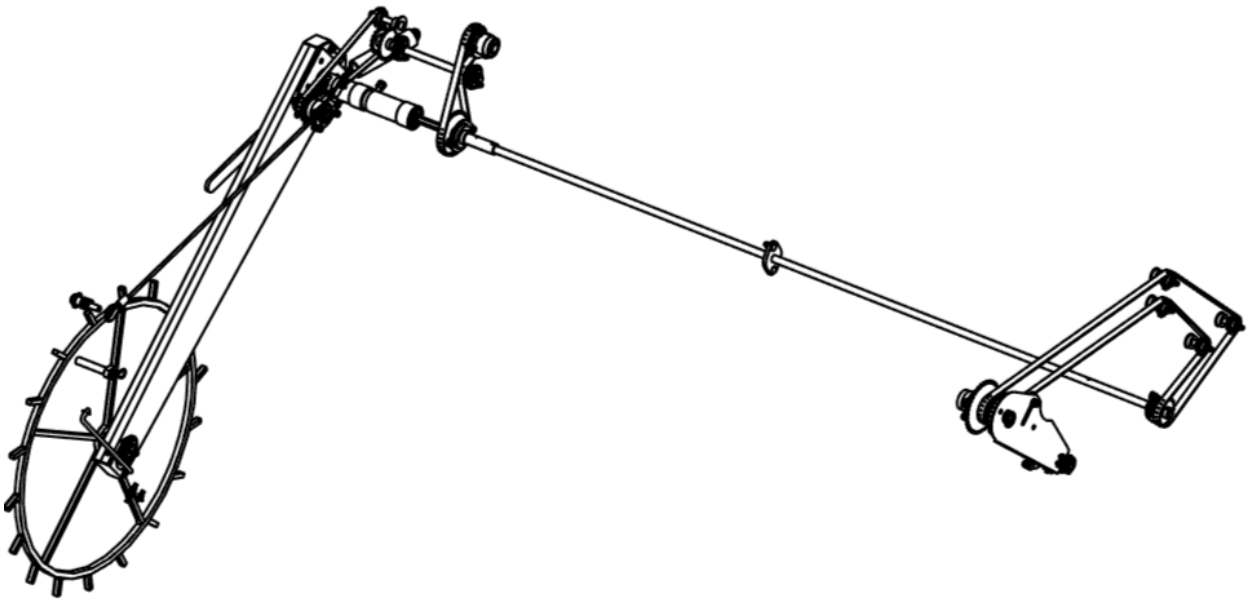
NC 3000 – 12 x 5 pcs / 50 h
NC 4000 – 16 x 5 pcs / 50 h

REAR WHEELS

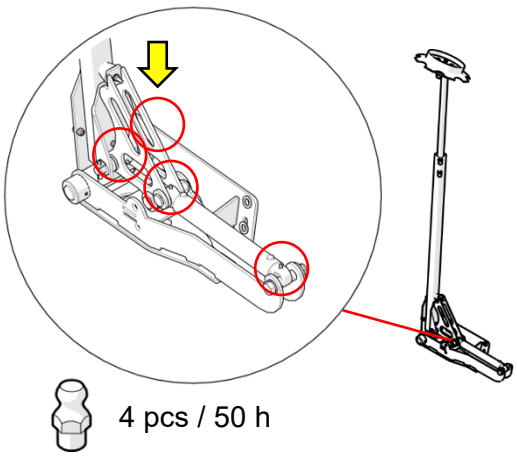

1 pcs / 50 h
2 pcs / 50 h
NC 3000 – 2 x 2 pcs / 50 h
NC 4000 – 3 x 2 pcs / 50 h
NCM 3000 – 4 x 4 pcs / 50 h
NCM 4000 – 6 x 4 pcs / 50 h
1 pcs / 50 h
2 pcs / 50 h

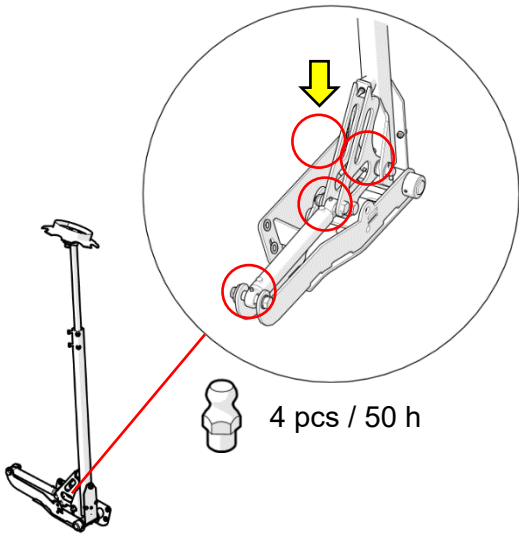
TRANSMISSION

Chainspray every 50 h.

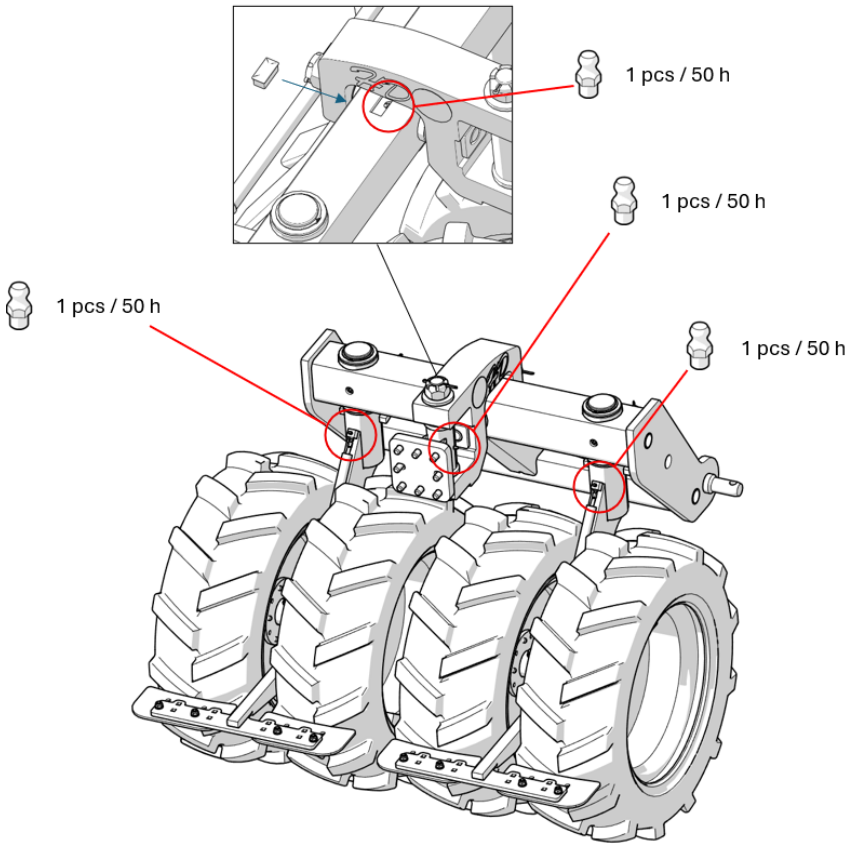


MARKERS (OPTIONAL)





WHEEL PACKER (OPTIONAL)



14.3 Tire pressures

Front tires 18x8,5-8	1,5 – 2.0 bar.
Rear tires 280/70 R18	1,5 – 2.0 bar.

Tire pressures are easiest to check with a tool provided with the machine. Tires have automatic valves, so no separate valve caps need to be removed. First clean the valve with air pressure and put the tool after that to the valve. Measure and adjust tire pressure.

NOTE! If dirt goes into the automatic valve, it can leak. Cleaning is usually accomplished by blowing and venting air back and forth a few times.

14.4 Replacing tires

Empty machine and drive it on solid and even surface before replacing the tire.

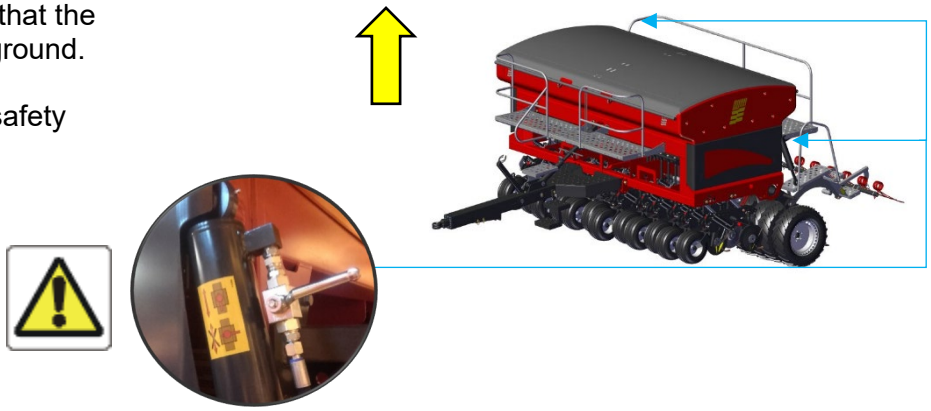
When changing tires, always make sure that the machine cannot move or be moved by outsiders.

The tires and the structures that support them are heavy and can cause damage if dropped!

14.4.1 Front tire replacing

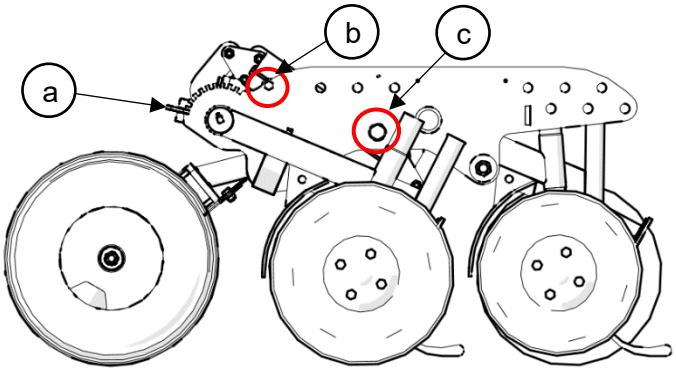
1. Lift the machine so that the front tires rise off the ground.

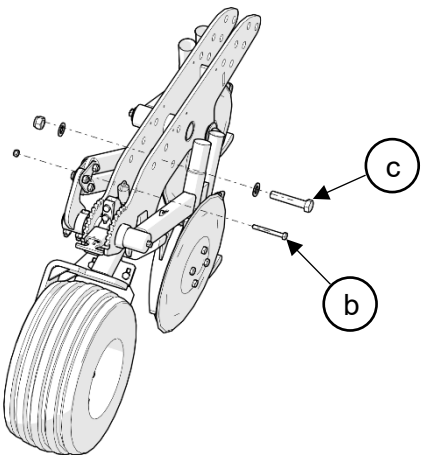
2. Close lift cylinders safety valves!



3. Turn seeding depth adjustment T-lever (a) completely front.

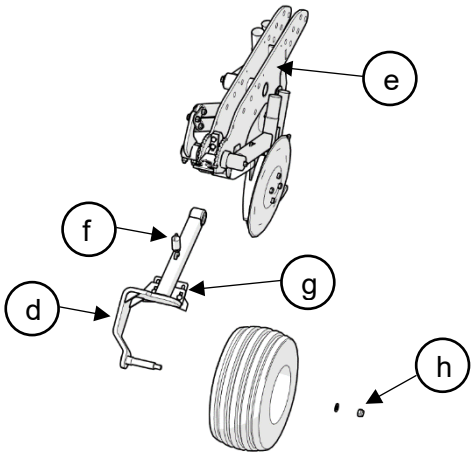
4. Removable screws (b) and (c).





5. Remove the screw (b) M10x90, key 17 mm, holding the wheel arm spring.

6. Remove wheel arm screw (c) M20x140. Key 30 mm.



7. Pull wheel arm (d) out from the coulter sledge (e). Do not lose the spring (f).

8. Loosen the scrapper (g). Key 17 mm.

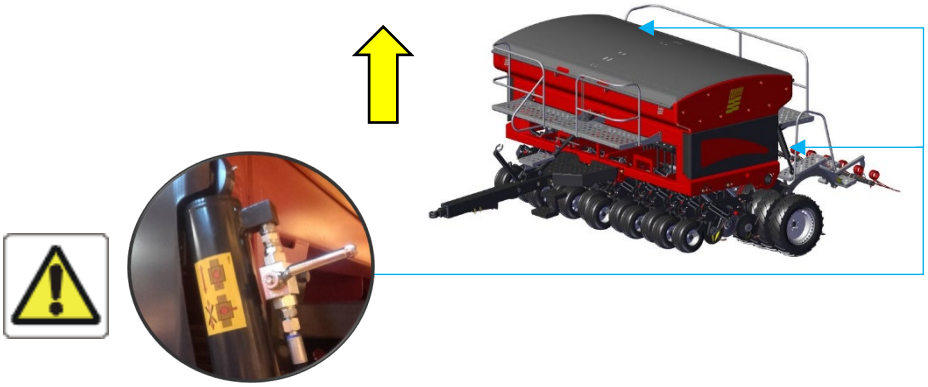
9. Remove nut (h) M16, key 24 mm. You can now remove the tire.

Assembly is done in reverse order. Be sure to attach the spring (f) holding the wheel arm and check the position of the scraper (g).

14.4.2 Rear tire replacing

1. Power on. Lift machine up.

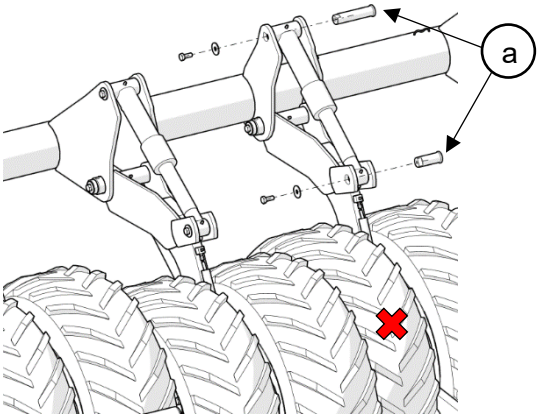
2. Close lift cylinders safety valves!



3. Set lifting hydraulics from tractor to float.

Machine stays up, but the pressure from the middle cylinders removes.

4. Remove cylinder pins (a) from that wheel arm in which the replaceable tire (x) is.



Be careful not to damage the hydraulic hoses of the removed cylinder! The risk of the hose connection breaking is high when lifting the wheel arm!

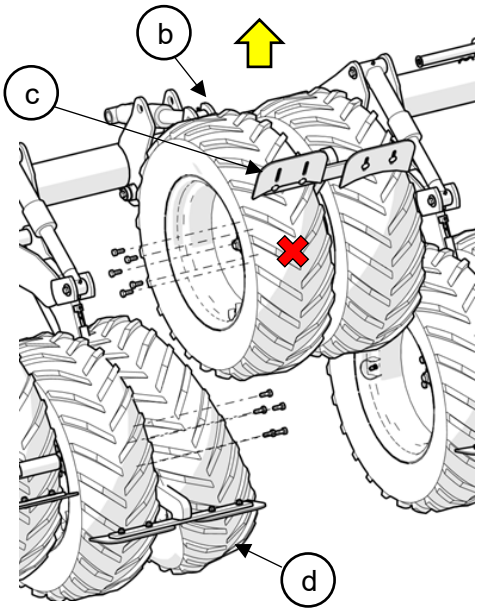
5. Lift pair of wheels up (b).

You can use a cargo strap attached to the scraper and rear platform for example.

6. Loosen the scraper (c).

7. Lighten the tire next to it (d) and remove its bolts to get more space.

8. Remove the tire to be replaced (x).



Assembly is done in reverse order.

14.5 Replacing the coulter pressure springs

The machine must be lifted and lowered during replacement. Always lock the safety valves on the lifting cylinders on both sides of the machine between lifting and lowering.

DANGER! When the machine is down, the coulter pressure springs are under high tension. Do not attempt to remove any spring while it is under tension. The releasing spring can cause serious damage.

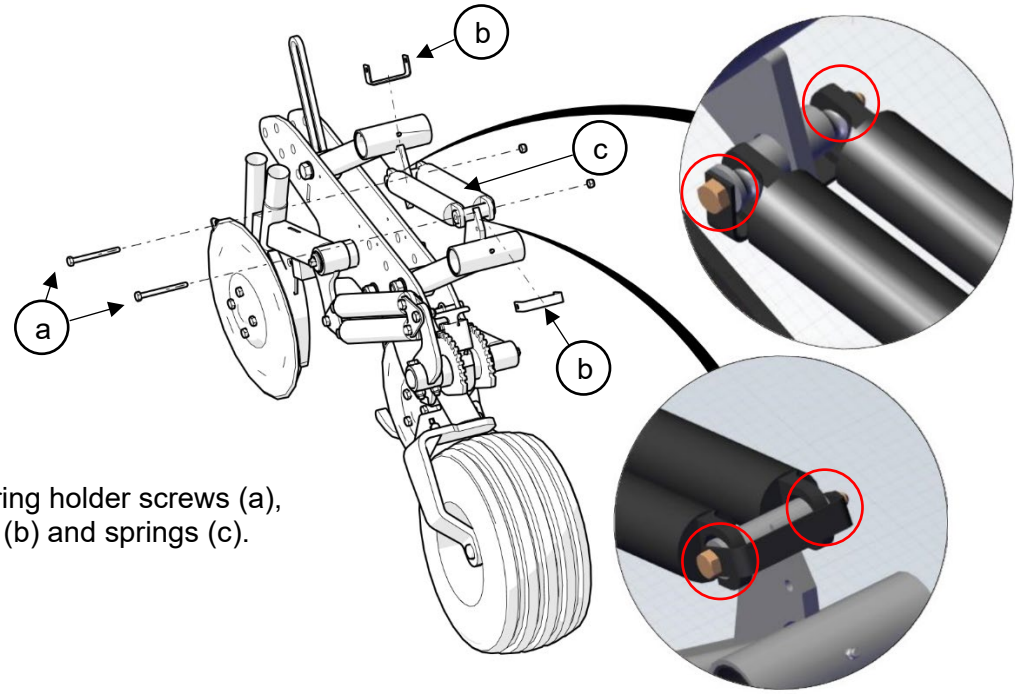
1. Lower machine so that the coulters touch lightly to ground. Coulter pressure springs go loose.

The right place must be found very carefully.

Close safety valves.







2. Remove spring holder screws (a), spring holders (b) and springs (c).

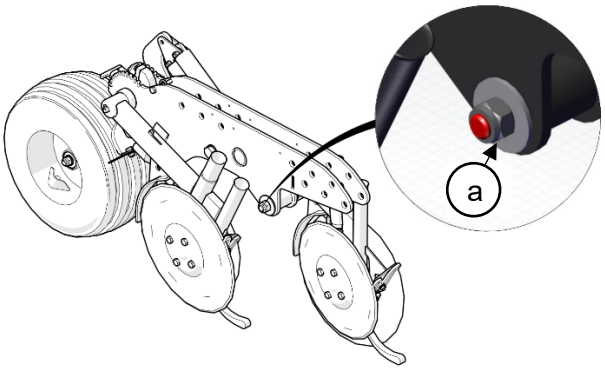
Assembly is done in reverse order.

14.5.1 Replacing the rear coulter arm

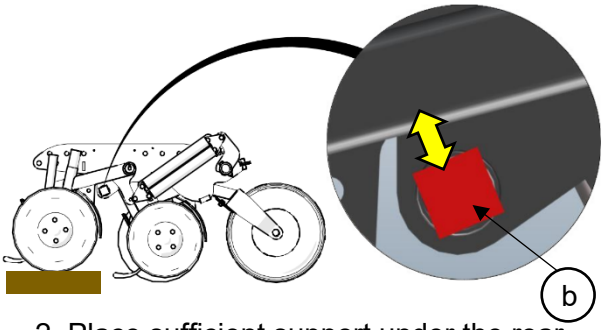
WARNING! The coulter arms are tensioned with springs against the limiters. To replace the coulter arm, the spring tension must be loosened. Uncontrolled release of spring tension can cause serious damage!

The machine must be lifted and lowered during replacement. Always lock the safety valves between lifting and lowering.

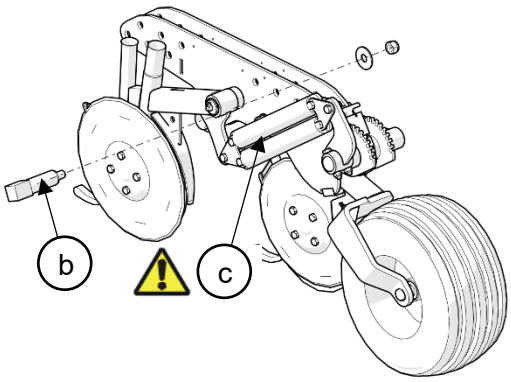




1. Loosen the limiter's nut (a) M20. Key 30 mm.



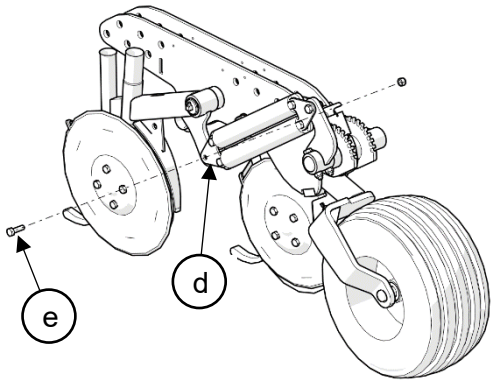
2. Place sufficient support under the rear coulter, e.g. a metal beam, and lower the machine. The coulter arm disengages from the limiter (b).



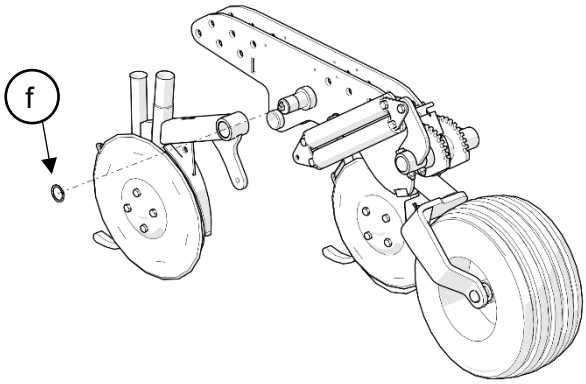
3. Remove limiter (b). **NOTE! springs (c) have tension!**



4. Lift machine to lose the spring tension. Close safety valves.



5. Remove spring holder's (d) screw (e) from the coulter arm. Screw M12x40. Key 19 mm.



6. Remove circlip (f) from coulter arm's shaft. You can now remove the coulter arm.

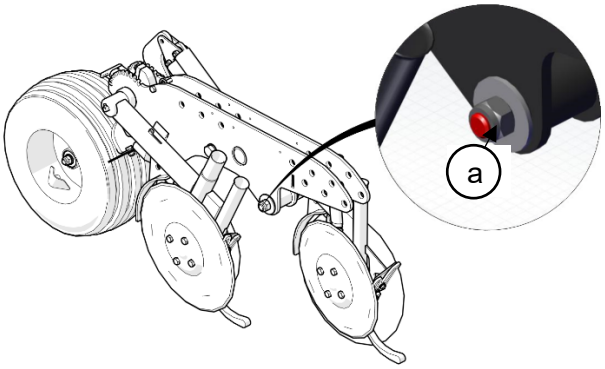
Assembly is done in reverse order.

14.5.2 Replacing the front coulter arm / removing coulter sledge

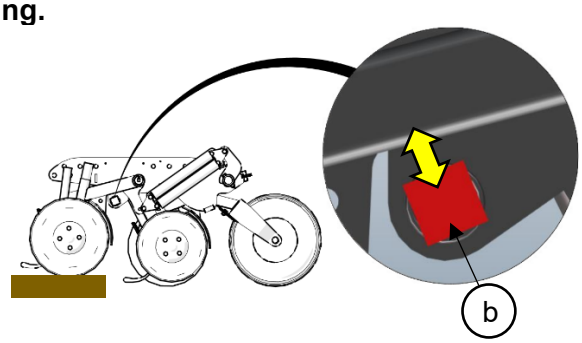
Replacing the front coulter arm is easiest when the whole coulter sledge is detached.

WARNING! The coulter arms are tensioned with springs against the limiters. To replace the coulter arm, the spring tension must be loosened. Uncontrolled release of spring tension can cause serious damage!

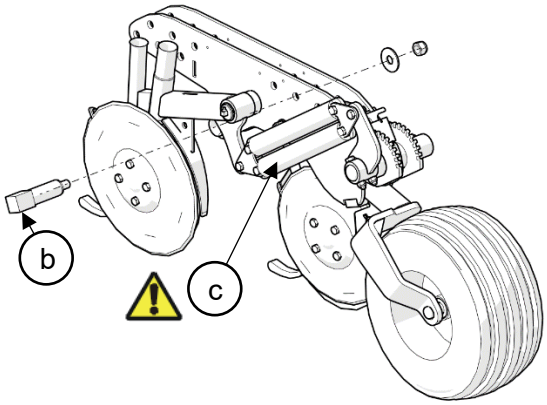
The machine must be lifted and lowered during replacement. Always lock the safety valves between lifting and lowering.



1. Loosen the limiter's nut (a) M20. Key 30 mm.



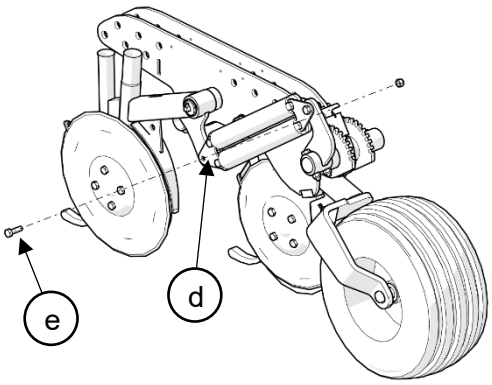
2. Place sufficient support under the rear coulter, e.g. a metal beam, and lower the machine. The coulter arm disengages from the limiter (b).



3. Remove limiter (b). **NOTE! springs (c) have tension!**



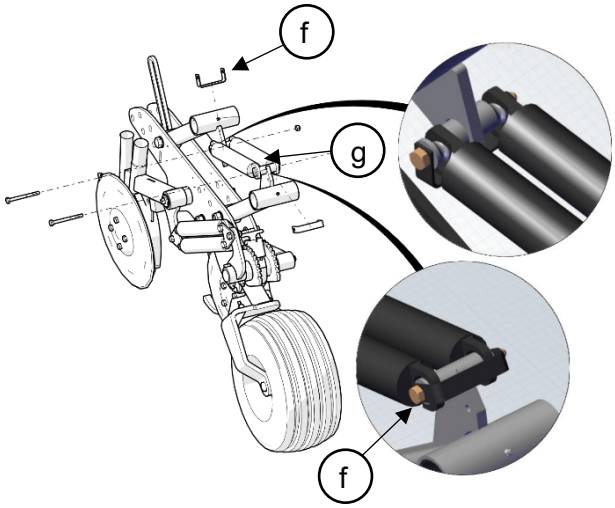
4. Lift machine to lose the spring tension. Close safety valves.



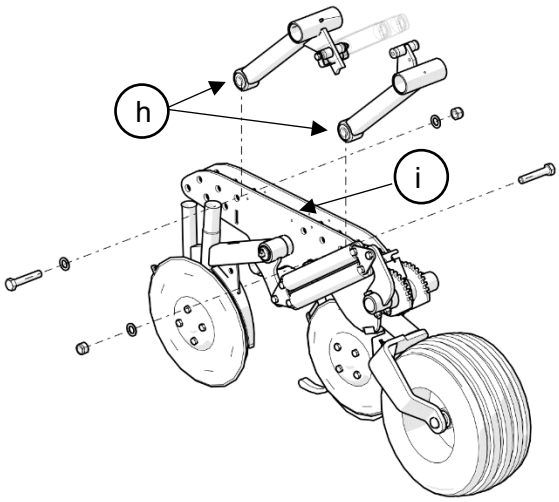
5. Remove spring holder's (d) screw (e) from the coulter arm. Screw M12x40. Key 19 mm.



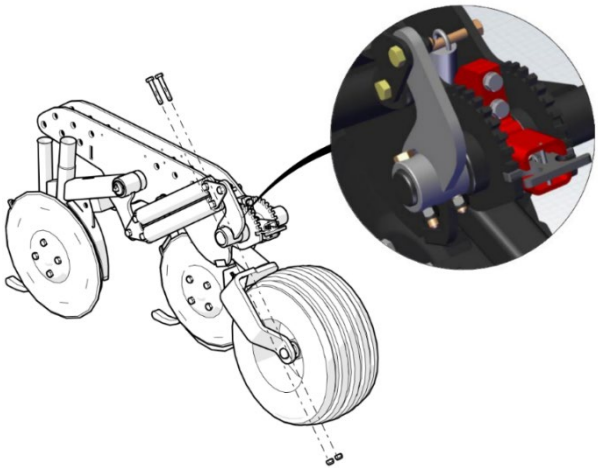
6. Lower machine so that the coulters touch lightly to ground. Coulter pressure springs go loose. **Close safety valves!**



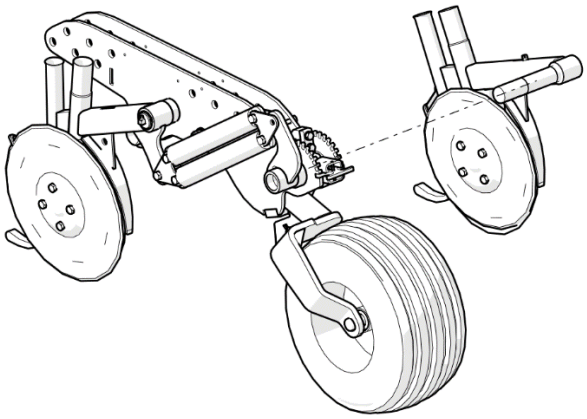
7. Remove spring holders (f) and springs (g).



8. Adjust seeding dept to minimum (front wheel completely down). This helps the sledge to stay upright. Remove parallel arms (h) from coulter sledge (i). You can now pull the coulter sledge off.



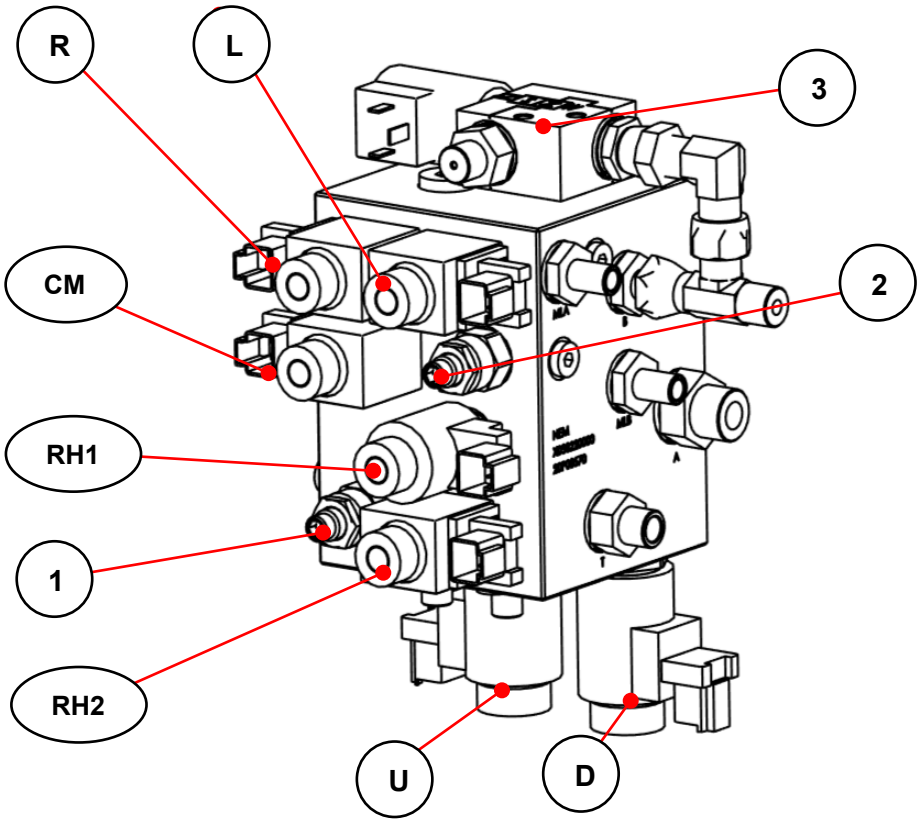
9. Remove the screws from the crank, 2 pcs. M12x75. Key 19 mm.



10. You can now remove the front coulter arm.

Assembly is done in reverse order.

14.6 Hydraulic valves



RH1	–	Rear harrow operation valve.
RH2	–	Rear harrow free return valve. Allows harrow to float.
1	–	Rear harrow lift speed adjustment valve.
2	–	Marker lift speed adjustment valve.
CM	–	Cancel marker valve. Makes delay for the marker rising.
R	–	Right marker valve. Allows right marker to go down.
L	–	Left marker valve. Allows left marker to go down
U	–	Up limit. Stops machine's upwards movement.
D	–	Down limit. Stops machine's downwards movement.
3	-	Coulter pressure adjustment valve.

15. STORAGE

When the machine is not being used, it must be stored in sheltered place, cleaned up and maintained. Put the machine down. Do not leave the machine with the tractor hydraulics. Tanks are emptied of fertilizer and seeds.

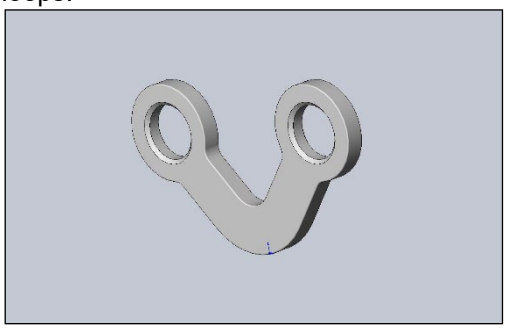
The machine is washed inside out with water. Use a pressure washer carefully, (Max. water temperature is 60 degrees, pressure 100 bars), do not point the pressure directly on the bearings. Lubricate the machine according to instructions after washing. Parts where the paint has become worn out can be protected with anti-rust oil. Let the machine dry before storage.

16. TECHNICAL DATA

	Nova Combi 3000	Nova Combi 4000
Working width cm	300	400
Hopper capacity, l		
– Total	4020	5570
– Seed, min	1545	2140
– Seed, max	2475	3430
– Fertilizer, max	2475	3430
– Fertilizer, min	1545	2140
Basic machine weight, kg		
– Empty	4300	5600
– With full hoppers	about 7300	about 10650
Basic machine dimensions, cm		
– Height to hopper edge	240	240
– Width	298	398
Depth adjustment wheels	12 pcs	16 pcs
– Tire size	18,5 x 8,50 – 8	18,5 x 8,50 – 8
– Tire pressure, bar	1,5 – 2,0	1,5 – 2,0
Rear wheels	12 pcs	16 pcs
– Tire size	7,50–16	7,50–16
– Tire pressure, bar	1,5-2,0	1,5-2,0
Coulter pressure		
– Pressure/coulter, N	400–2200	400–2200
– Adjustment during drive	Standard	Standard
Coulters, pcs	24	32
Hydraulics		
– Pressure, bar	150	170
– Connections	2-act. + free return	2-act. + free return
Drawbar cylinder	2-act.	2-act
Noise level	less than 70 dB (A)	less than 70 dB (A)

Appendix 1. Loading and transport guide

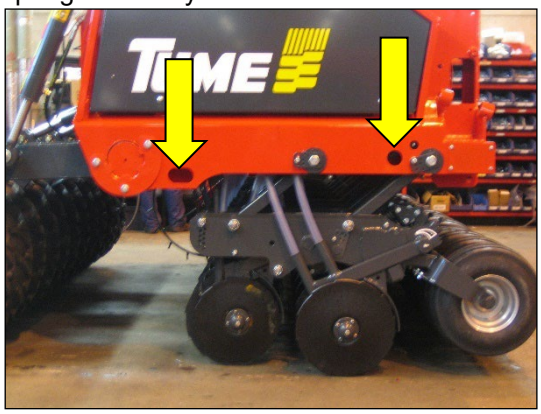
If the loading takes place by lifting the machine, then the lift takes place by the holes in the middle wall inside the machine tank with respective loops.



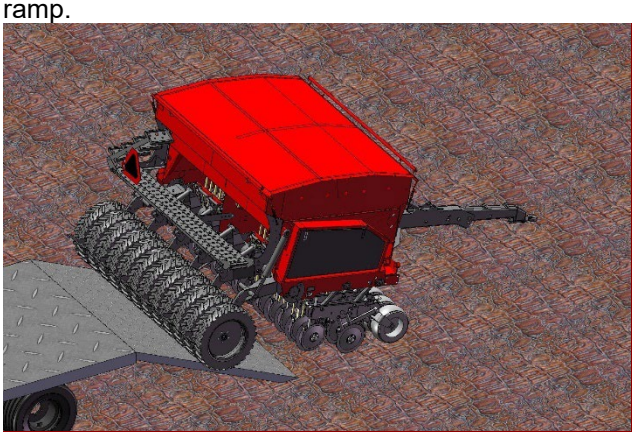
Or chains.



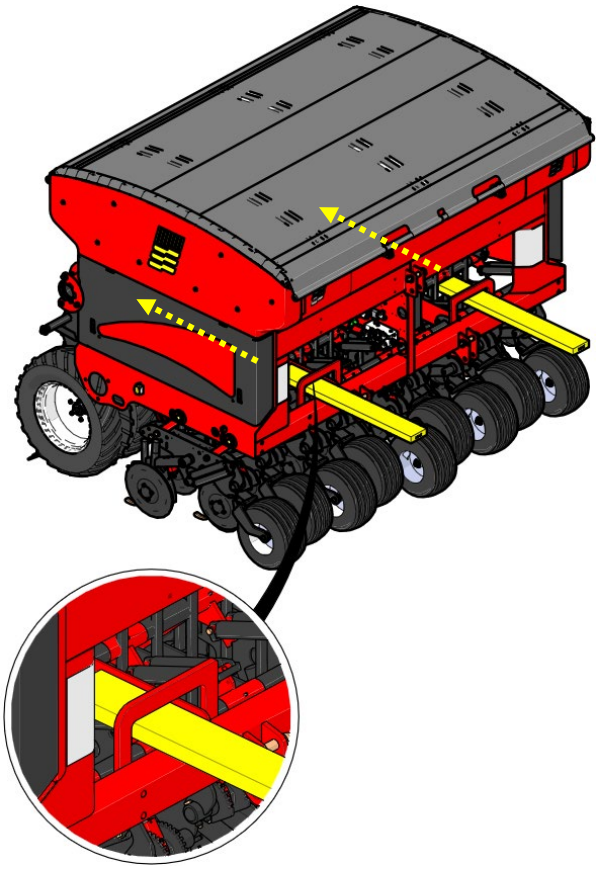
For the transport there are holes made to the ends of the machine. Note that coulters have springs and they can move.



Loading of the machine with either tractor or a truck must be done in such a way that under each pair of back tires there must be a support or a ramp.



Machine in transport package can be lifted using a heavy forklift. Forks are pushed inside the loops under the hopper. Forks must be long enough to reach also to the rear loops. Move seed and fertilizer hoses away from the forks.



17. NOTES



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