Owner's Manual

NOVA COMBI 3000 / 4000

Seed and Fertilizer Sower

Starting from Production Number AB-50327

Right to make structural changes reserved

Read the manual before starting to work with the machine!

Original instructionst

EC declaration of conformity for the machine
(Machinery Directive 2006/42/EY, Appendix II A)

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Ensures, that

Sowing and planting machines TUME Nova Combi 3000 and 4000

- are in accordance of the relevant provisions of Machinery Directive (2006/42/EC)

and also declares that the

- the following European harmonized standards have been applied

  SFS-EN ISO 12100-1:2003

Time and place: Turenki 11.09.2012

Signed by:
Eero Tommila
President

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 sower. 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. Keep the manual in a safe place and easily accessible. A place to store the operating instructions is in the compartment at the right end of the machine. This place is marked with a sticker. 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.

Work 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 drive unit, 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 voltageis 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 lifted up with hydraulics.

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 maximum speed in good conditions is at 30 km/h. Extreme caution and reduced speed must used on uneven surfaces. Transfers should be preferably made when containers are empty. Load being transported on the machine is prohibited. In order to keep tires from breaking, avoid driving over rocks and other obstacles.

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.

The use of respiratory protective devices is recommended, especially when filling the optional seed dressing. Till 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.

3. MACHINE APPLICATION

General

Tume Nova Combi –Till 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 grooves 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, sow grass seeds, cover the sown seeds, as well as form tracks in the field.
The use of Nova Combi to other purposes than the sated 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 (see pg. 11, part 8) .
Passenger transport with the machine is completely prohibited!

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 filters may not pass through the seeds which will be sown. In this case, the screens 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. In the above special cases, it is worth remembering that the sowing tables shipped with the machine apply.

Using the machine only for fertilizing

Tume Nova Combia 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 and must comply with the maximum total weight stated in technical specifications.

4. GENERAL GUIDANCE FOR SOWING

Sowing depth selection

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 somewhat deeper groove for the fertilizers.
When selecting the sowing depth, cosideration must be given the requirements of seeds and ground moisture conditions. Find out in good time the suitable depth for sowing the seed and try to match the sowing date so that in the suitable sowing depth sufficient moisture exists. A suitable working depth for small seeds, normally alternates between 1-3 cm range and ordinary grains have a suitable sowing depth of 4-5 cm. Always be cautious not to sow too deeply. On the other hand, sowing low may end up with problems as seeds do not necessarily become covered. It is important, that the smaller disc of Nova Combi 2-disc coulter reaches a moist part of the soil. If the seeding depth is adjusted lower, there is a risk that the seeds fall on dry earth, and do not germinate.

Right time for sowing

The right time for sowing is based on observing the ground moisture, temperature and prevailing and predicted weather conditions. Soil type and sown crop type essentially affect the optimal sowing time, and there are no universal guidelines which could be given.
At the time of sowing, the seed depth should be malleable but still moist. The soil is too wet to be sown if the soil-texture can be hand-baked into "loafs".
Sowing dates of crops sensitive to frost or cold may have to be moved, regardless of soil moisture conditions, if the expected or prevailing temperature conditions so require.
If a direct sowing is applied, and the land is not tilled in the fall or spring, it is advisable to prepare for the spring sowing to start 7-10 days later after the tilled soil conditions. This is due to the insulating and light back-reflection properties of straws and and other waste materials.

Choosing the fertilizer

Tume Nova Combi places the fertilizers and seeds through the same coulter, in most cases slightly apart from each other. Fertilizers, when in immediate proximity with the seed, may in some conditions cause the seed to germinate slower or prevent it altogether. This burn break down risk is strongest with small seeds (eg, rape, turnip rape) and bark-free grains (e.g. wheat). The burn breaks down risks are being studied, but as the research is still in progress, it is safest to use the conventional granular compound fertilizers of well-known manufacturers, in which granules contain all the nutrients of the fertilizer. Fast soluble nitrogen fertilizers should be avoided (e.g. urea). Mechanical test results of the fertilizers are not yet available.
Fertilizer dosage must be reasonable. Very high fertilizer dosages should be avoided or alternatively must choose a divided method, in which part of the fertilizers are passed on the crop.

General guidelines for direct sowing

By using direct sowing and omitting all cultivation tasks, great cost-savings can be generated and large field areas maintained with only small machinery and people capacity. Especially in favorable conditions the crop level provided by a direct-sowing method does not usually differ from the normal. Using the direct sowing method in the spring sow an average crop level may become somewhat reduced compared to the traditional methods.
Moving over to the direct sowing should be already considered during the preceding year. Arable land drainage should be in good shape and on the surface there should not be concentrated tracks present left by the wheels or other irregularities. In the threshing, the stopping of the combine harvester should be avoided, thus avoiding the formation of straw heaps. The chopper of the combine should be effective and threshing waste should be spread on the ground as much into an even layer as possible.
Direct sowing is best suited for autumn sowing, because the autumn is usually high in moisture and seed germination takes place more easily. In general a dry period occurs during the spring sowing and also the start of summer is often dry. If the direct sowing taking place in spring time, the correct time of sowing, soil structure and soil type meanings become emphasized. It is also essential that the sowing depth is appropriate and that the seeds will be topped by dirt. Seeds must in no case remain on the surface! Tume Nova Combi may be provided with earthing disks, which ensure seed occultation.
In direct sowing special significance is given to the herbicide. Practice has shown that an annual glyphosate spraying with a reduced dose, either just before sowing or immediately after sowing before sprouting can keep the couch grass reasonably in check. Over the years, weeds may, however, become eutrophic, for example in hay growths. These should be fought with the available chemical products and, if necessary, using plant alternation or fallowing. The light soils with moisture conditions, which very suitable for direct sowing, are in terms of weeds, the worst.
When direct sowing is used, the crops should be monitored more carefully than usual, also in terms of diseases and pests. Control measures should be taken, if necessary when the thresholds are exceeded

Sowing into a minimally cultivated soil

Tume Nova Combi is also extremely suitable for sowing into a minimally cultivated soil. For minimal cultivation, machinery leaving an even, suitably fine and compressed track should be used and where working depth can be adjusted to an adequate accuracy.
Minimum tillage occurring just before sowing should at least be done in the soils with clay composition and to a somewhat shallower depth than the sowing. This will ensure that the moisture content at a depth of sowing can be retained.
Considering spring sowings the recommended minimum tillage method is to a tillage in the fall to a depth of 10-12 cm, and plant residues mix in the surface soil, and do not form an insulating layer on the surface. This method allows to start the normal sowing early in the spring, which is important especially in countries where the growth time is short. With Tume Nova Combi a spring sowing straight to the soil is possible, which has received a light tillage during the fall. If desired, during the time of planting a light tillage of the surface can be done by combining to the unit a Tume Cultipack-interim processing device.

Sowing in normally tilled soil

Seedbed preparation should be carried out at low depth, especially in clay soils lower than the sowing depth. This is to ensure a better conservation of moisture at a depth of sowing.
In the weighting of coulters a low weighting must be used, especially on light soils.
Equipping the Nova Combi till seed drill Tume cultipack with interim processing device the sowing can be done directly to a plowed field, and no other tillings are required.

5. TIRE EQUIPMENT OF MACHINERY MOVING ON THE FIELD

In fields where direct sowing is carried out, one should pay attention to the preservation and improvement of the soil structure, so that the water economy works. Additionally, the surface should be as smooth as possible.
Movement in the field should be done only with tires with a sufficiently low surface pressure and the axle loads should be as low as possible. Additionally, movement on fields should be avoided, if the weather conditions are wet.

6. COMMISSIONING THE MACHINE

Wheel base operational principle

Supporting 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 (fig. 1).

Geometry of supporting wheels has been planned in the way,that the machine working position (with the engine down), the pressure on all wheel pairs is nearly the same. On the other hand with the engine 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.

The front support wheels determine the depth the coulters can sow. The adjustment is coulter sled-specific, and therefore one wheel controls two coulters. Adjustment is done with quick-latches which are located in the front edge of the sledge (fig. 2). By adjusting the latch to the lowest nothces, 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.

When lifting the Tume Nova into a truck (e.g. the machine loading at the factory) a special lifting device for this express purpose will be deployed. Lifting is done by the driving direction oriented middle-wall located inside the machine tank. In it are provided 2 lengthy holes, into which the aforementioned lifting devices will be attached (2 pcs are needed), and to which the lifting chains will be connected. Ensure the equal length of the lifting chains: Nova needs to remain in direct upward position throughout the lift. Open the tarpaulin cover fully for the duration of lift, in order to protect it from becoming damaged!
Nova can also be loaded onto a truck using a loading bridge, or the use an adequate sloping ramp transport carriage, where the drive bridge is the width of the machine rear tire set. The intermediate wheel pairs must not be allowed to drop between the loading ramps. In the outermost wheel pairs it is enough that one wheel is on the stage if the machine is transported in the driving direction. NOTE: See the end of this manual APPENDIX 1: Loading and transport information.

Also note when reversing the pushers of the back wheels, they are very close to the ground. Watch out for obstacles! When reversing over a high thresholdetc. 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.

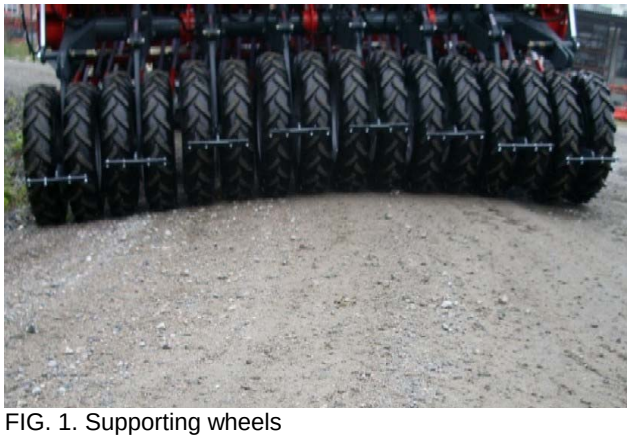


FIG. 1. Supporting wheels


FIG. 2. Adjusting the working depth

Drive unit installation

Drive unit is assembled according to fig. 3 where the mounting of the drive unit to the machine can also be seen. Note, that drive unit 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 drive unit carefully so that they cannot be damaged in any driving situation (i.e. driving the tractor into an obstacle). Thread the tubing through the inside of shaft housing.

FIG. 3. Drive unit

Adjust the length of the push rod so that the machine is lowered and, in the tractor trailor hitch, the wheel intermediate roller or intermediate processing device are connected horizontally. Ensure, that the push rod cylinder is in its lowest position when adjustment is carried out. Focus of drive unit is done in the field in sowing conditions.

Connecting the machine to tractor

Nova Combi is normally connected to the tractor drawbar. We do not recommend connecting the machine to the tractor drawbar attached to the arms, because it makes the tractor front end lighter and reduces manoeuvrability.

The hydraulics of Nova Combi are connected to single-phase external cylinders meant for the outlet of tractor hydraulics. If the machine is equipped with markers, they work with the same hydraulic valve lift of the machine as lifting and lowering, but in that case the machine must be connected to the double-phased hydraulics of tractor. 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. The hydraulic cylinder of the drive unit will also need a second 2-function interface.

Seed and fertilizer drill requires a 12 V electrical connection. The wiring diagram is shown on the next page.

The maximum lifting and lowering height is regulated with an electric valve (Fig. 5). The operation is controlled from the tractor cab from the board computer control unit. Refer to the board computer Agrocontin manual about raising / lowering!

NOTE: Always, when moved, the system computer Agrocont must be connected. If the power system is not connected, it may result in severe tire / coulter damage. This is due to the fact that, if the electric valves do not limit lifting, the machine can be lifted so that the rings collide with coulters and become damaged. **IF NO ELECTRICITY IS CONNECTED, CAUTION MUST BE PRACTICED IN ORDER TO AVOID THE AFOREMENTIONED FROM HAPPENING.**

FIG. 4. Control indicator element
NOTE: IF THE MACHINE IS LIFTED SO,
THAT ELECTRICITY IS NOT CONNECTED, THE YELLOW
POINTING ARROW MUST NOT RISE PAST THE LIMIT MARK

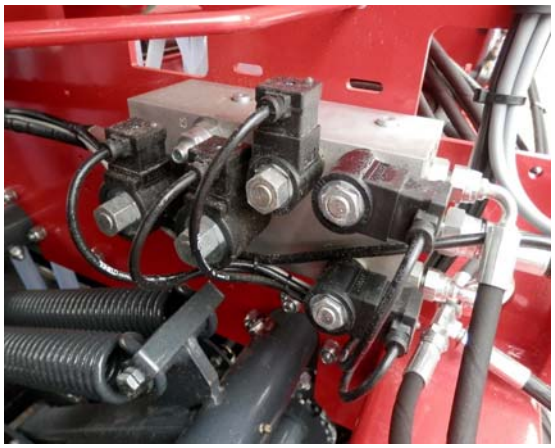


FIG. 5. Lifting and lowering valves

Driving instructions

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

Avoid unnecessary driving in the sown area. Select your driving technique so that there as few wheel tracks as possible will be left in the sown area.

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 can not accidentally open or leak. 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 drive unit 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.

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.

Keep enough seed and fertilizer in the container. Due to the design of the bottom, especially in the beginning special attention must be paid to this. Do not store fertilizer or seeds for several days in the containers, especially in the damp weather. Damp fertilizer can cause feeding problems.

Appropriate driving speed has more significance for the Nova Combi, than for the traditional sowing machines. A rule of thumb could be to say that in direct sowing a slightly higher sowing speed is usually recommended compared to the conventional tillage seeding. A suitable driving speed on modified land is normally about 7-12 km / h. Pea sowing maximum speed is 6-7 km/h. In transfer drive the maximum speed when empty is 30 km / h

7. SUPPLY EQUIPMENT LAND WHEEL

Input devices are driven by the ground wheel on the left side of the machine end. The ground wheel is attached to the container and hence it rises up when the machine is lifted. When the machine is lifted, the ground wheel is off the ground and the supply runs out. A separate transmission switch is not thus required in the machine.

NOTE: Do not rotate the ground wheel to reverse direction! Raise the machine fully up before reversing the tractor.

Feed disconnection and connection time can be adjusted by adjusting the ground wheel either higher or lower in terms of the container. This is done by adjusting the cable fixing points in the center of the tube frame of wheels.

It is also possible for the ground wheel to be pushed inwards during transport drive. This gives the machine the maximum total nominal transport width: 3 or 4 meters. Position options are shown in Figures 6 and 7.

Fig. 6: The ground wheel in working position

Fig. 7: The ground wheel in transport position

8. FILLING THE CONTAINERS

Timing of the filling

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 till seed grill is done on the edge of a field. If the machine has to be filled far away from the field block to be sown, the transfer drive with full container loads should be done with caution. The greatest transfer speed of 30 km/h can be used on steady roads with empty containers. The maximum speed is with full containers at 15 km / h

Emptying of the tanks can be monitored:

- By observing the area meter of the machine, it can be established n how large an area with a container can be sown. This is done using the on-board Agrocont computer; the previous meter reading of the filling is in the memory
- . An alarm will sound when the containers have a certain amount of fertilizer or seed

Adjustable tank volume

Fertilizer and seed containers 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 (Fig. 8). Remember to lock the support rods following the adjustment. Not that the partitioning wall height can also be adjusted.

Fig. 8. Container partitioning wall control rod.

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 jumbo bags (NOTE: sufficient lift equipment), or for example, the filling screw technology.

Jumbo Bags can be treated with a variety of loaders. Do not go under a hanging load. Jumbo 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 jumbo sack.

9. DRAINING OF CONTAINERS

Draining of fertilizer tank

Fertilizer tank is usually emptied through the culters. Adjust the output control to its maximum position; for example spread the load cover under the machine and lower the fertilizer side drawer bottom flaps lever all the way down. In this case, the tank empties almost completely. Guide the remaining fertilizer with a brush, or something similar, to the plenum. Rotate the feeder with a crank 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.

Draining the seedtank

Seedtank is drained the same way as fertilizer tank.

Do not mix seeds and fertilizers when draining the machine.

10. SEED FEEDING MECHANISM AND CONTROLS

Overview

Feeder is formed by helical rollers, bottom flaps with springs and adjustable shutters (Fig. 10). Feed chambers are located in the tank bottom. With this solution is it is possible that the sowing quantity canremain almost the same regardless of drill tilting side or direction of travel. Feeding equipment is made of corrodible materials. Bottom flaps below the feed rollers are adjustable, control lever is in the middle of the machine in the back (Fig. 10). For sowing of the small seeds the transmission gear ratio can be changed by turning the transmission cartridge.

FIG. 9. Feeder adjustment with handwheel

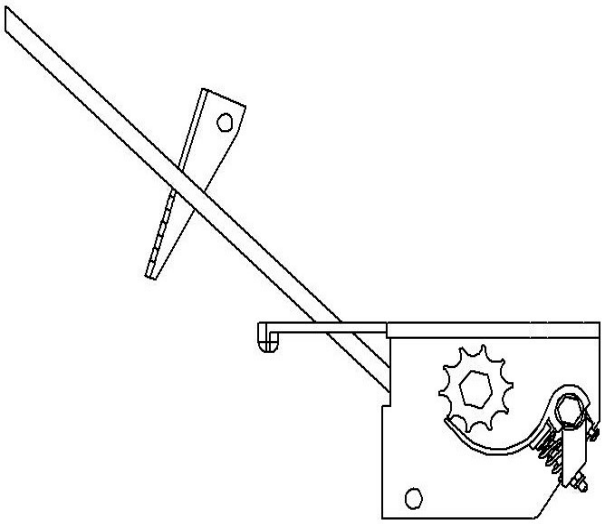


FIG.10. Feeder Diagram

The feed rate adjustment takes place by adjusting the feed roller laterally in relation to the plenum chamber. Adjustments are made by the hand wheel at the left end of the machine. The handwheel is locked with plastic lever, in which is disposed the feed main scale of 0-10, where the numbers correspond to one hand wheel turn. Adjustment is read from the inner surface of the handwheel. A handwheel has for each revolution 10 locking position, marked 0-9. This gives a total of 100 different control positions. With the small seed exchange (cassette position II) can be respectively gained 100 output control positions of a smaller field.

> **NOTE:** To adjust the feed, the plastic latch must be pressed towards the end wall of the machine to the arrow direction and at the same time rotated 90 degrees, resulting in the release of the handwheel

Rotating the handwheel counter-clockwise will increase the feed. When the desired amount of seed sown is known, inside the cover a Sowing Chart will give an indicative output position of the control.
Please notice the position of the cartridge. Adjustment should be made in such a way that the adjustable target position is always approached from the larger adjustment position. If the initial setting position is less than desired, the handwheel is turned anti-clockwise 1/2-1 turns over the intended adjustment, after which the wheel is rotated back toward the desired control position.

After the adjustment, the lock lever arm is turned into the gap, the wheel and the lever will lock into place. It should be noted that the adjusting position given by sowing table is indicative and the actual feed rate varies between different seed lots. It is recommended that the feed rate is verified by calibration test.

If the feeder accumulates dirt, the feed rollers may become clogged. This can contribute significantly to the feed rate. We recommend cleaning it from time to time. The rollers can be cleaned by adjusting the feed rate to zero and then back to the desired adjustment value. In this case must be kept in mind the above-mentioned adjustment instruction, first turn 1/2-1 above the desired adjustment value.

If the machine is equipped with seed dressing, the new calibration must be carried out approximately one acre after sowing. Coating can reduce the feeding amount by up to 20%!

NOTE: Handwheel must not be forced to zero-position. Simultaneous input shaft rotating eases the adjustment. The use of sowing table and instructions for performing the calibration test are discussed below.

NOTE: Maximum speed in sowing peas and beans is 6 – 7 km/h

Turning the transmission cassette

FIG. 11. Transmission cartridge. I = Grain, II = Small seed

When the bigger sprocket of the cartridge is up, it is in a grain position. When the smaller sprocket is up, it is in a small seed position. Position has been marked on the cartridge shell on the visible side. In Fig. 11 a grain position is shown. Turning is done as follows: Remove the ring pins and pull the cartridge out of its shafts. Turn the cartridge upside down. A sticker in the cartridge tells the setting.

Bottom flaps

Feeding accuracy depends on the distance between the bottom flap and feeding roller, for this reason it is important to have the bottom flaps in a right position, and that they will not be re-adjusted 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.

Below are indicative values for most seeds. If you are sowing varieties other than those recommended, compare the seeds based on their size and characteristics to the ones mentioned below and carry out the calibration test according to respective adjustments.

FIG. 12. Seed bottom flaps control

Bottom flap adjustment positions:

Grain seeds	slot2
Pea	slot 3
Small seeds	slot 1
Beans	slot 4

Other seeds: compare the seed size to previous

11. FERTILIZER FEEDING EQUIPMENT AND ADJUSTMENTS

Overview

The machine has as many chambers feeding fertilizers, as there are chambers sowing seeds. The feed rate adjustment takes place by adjusting the feed roller laterally in relation to the plenum chamber. Adjustments are made by the hand wheel at the right end of the machine.

Feed chambers are located in the tank bottom. With this solution it is possible that the sowing quantity can remain almost the same regardless of drill tilting side or direction of travel. The feeding rollers are plastic rollers equipped with a helical toothing. Bottom flaps below feeder rollers are adjustable. The control lever is in the front of the machine in the middle. The whole fertilizer supply system is made of corrodible material.
Fertilizer tanks can be used to sow all granular fertilizers. The feeder is not suitable for dispensing powdered fertilizers.

Fertiliser feed rate adjustment

The feed rate is adjusted with the handwheel on the right side of the machine. The handwheel is locked with a plastic lever, in which is visible the feed main scale.

NOTE: To adjust the feed, the plastic latch must be pressed towards the end wall of the machine to the arrow direction and at the same time must be turned 90 degrees, when the handwheel lock is released.

Rotating the handwheel counter-clockwise will increase the feed. When the desired amount of fertilizer sown is known, inside the cover a Sowing Chart will indicate the output position of the control.

Adjustment should be made in such a way that the adjustable target position is always approached from the larger adjustment position. If the initial setting position is less than desired, the handwheel is turned anti-clockwise 1/2-1 turns over the intended adjustment, after which the wheel is rotated back toward the desired control position.

After the adjustment, the lock lever arm is turned into the gap, the wheel and the lever will lock into place. It should be noted that the adjusting position given by sowing table is just an indication and the actual feed rate varies between different fertilizer lots. It is recommended that the feed rate is verified by calibration test.

In the machine an optional electric remote control fertilizer device AgrocontPlus can be fitted. Adjustment in question does not require another separate control unit, this feature will be added in Agrocont. Then in the fertilizer side there is no hand wheel at all, but the adjustment is carried out by levers used by the spindle motor.

The normal position of bottom flaps is the slot 2. If the feeder takes in wet fertilizer, the feeder rollers may become clogged. This may contribute decisively to the feed rate.

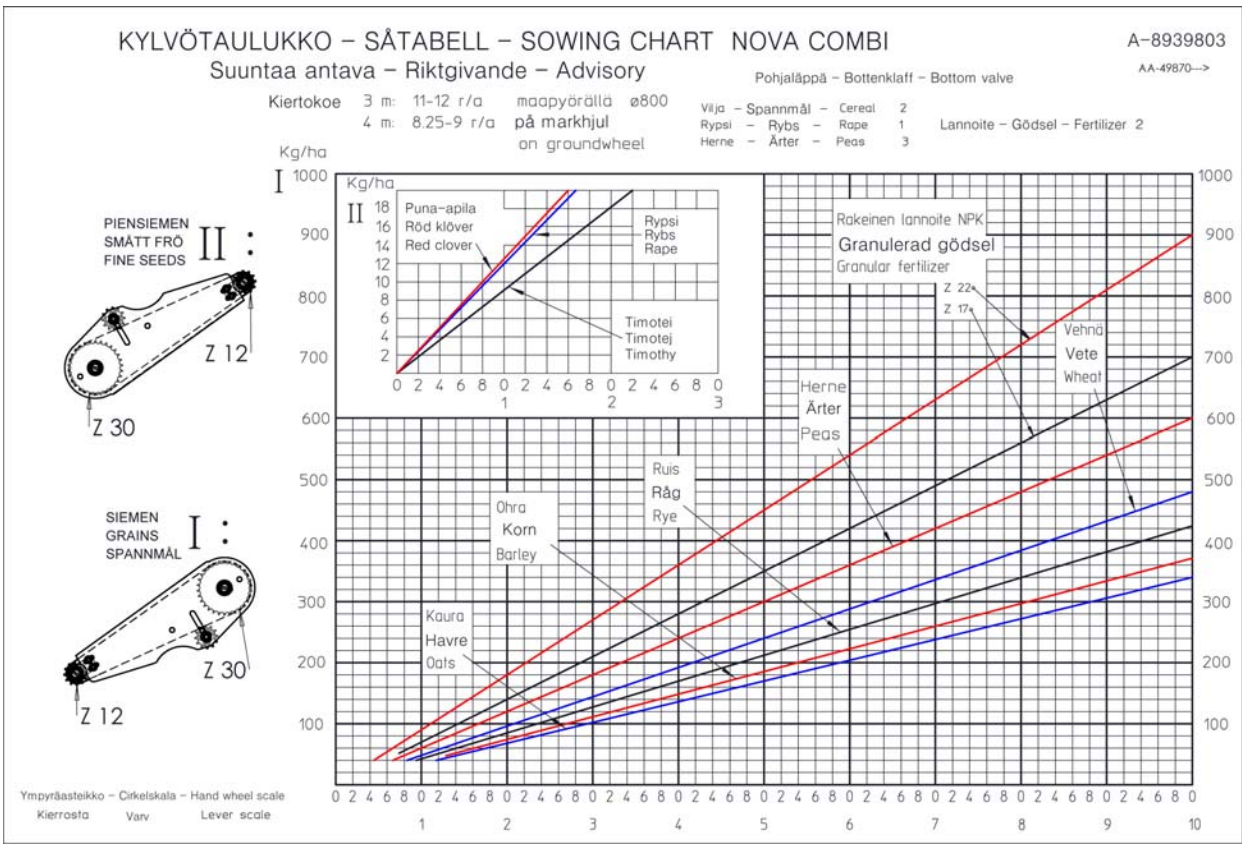
The rollers can be cleaned by adjusting the feed rate to zero and then back to the desired adjustment value. In this case the above-mentioned adjustment instruction must be kept in mind, first turn 1/2-1 above the desired value and then to the correct value (ie, from higher to a lower). The sowing table instructions and instructions for performing the calibration test are given below.

The fertilizer feeding device can be switched off by removing the ring pin from the end of fertilizer feeder shaft at the right end of the machine.

12. SOWING TABLE SAMPLE APPLICATIONS

General

In the seeding table below three different sowing table usage examples are drawn. It should be noted that the sowing amount shown in the table is only an indication. The actual sowing amount is dependent on the qualities of used seeds, varying significantly between each variety and yearly qualities.
Sowing amount must be verified with a calibration test, as described below.



Adjustment example when sowing grain

Case 1. To sow oats 200 kg/ha.

- The correct position of the bottom flaps is stated at the top right of the table, see "grain". Correct adjustment is position "2"
- Selected descriptor "oats"
- Check the transmission of the machine, which must be "1"
- Starting from the edge of the table in section 200 kg / ha
- Proceed along the horizontal line to the point where this line intersects the describer "oats"
- From the intersection point proceed directly down to the scale, where can be seen that the adjustment must be "5.9"

That is, the hand wheel must be open 5 full turns and 0.9 turns additional. Handwheel lock is locked to the notch marked with 9.

Adjustment example of sowing small seeds

Case 2. To sow rapeseed 12 kg/ha.

- The correct position of the bottom flaps is stated at the top right of the table as "1".
- Examine the small sowing table.
- Search for a starting point in the small sowing table left side 12 kg / ha.
- Proceed along the horizontal line in question of 12 kg / ha to the right. where this line intersects the describer "rapeseed".
- Go directly from the intersection to the lower scale, and we can see that the correct setting is "1.0".
- It is noted that in the upper left corner of small sowing table is a marking "transmission II". That is, in the transmission a small seed setting must be used meaning the cassette must be turned so that the cassette is as indicated in position "II".

Adjustment example, fertilizer side

Case 3. To sow NPK-fertilizer mix 500 kg/ha.

- It is noted in the sowing table upper right corner, that the correct adjustment of bottom flaps with correct granular fertilizer is "2", in the fertilizer side in the factory gear wheel Z 17 has been installed
- Starting from the edge of the big sowing table in part 500 kg / ha
- Proceed along the 500 kg/ha -line horizontally to the right into the intersection of this line and describer "granular fertilizer Z 17", if the chain wheel Z 17 in question (a black line in the table).
- From the intersection proceed directly down, where at the bottom scale it can be seen that the main scale figure placed on the wheel lock lever must be "7.2". After the adjustments the calibrations should be done in order to ensure a correct sowing amount.

NOTE! When attempting to get to an exceptionally large fertilizer level (over 700 kg/ha), the double-chain wheel in the left end of the machine must be turned so that Z 22 is in use. . Then
a maximum of appr. 900 kg/ha fertilizer can be sown . Then in the sowing table the red line will be followed!

13. CALIBRATION

General

Because the adjustment values in the sowing table are only indicative, before starting the sowing, a calibration must be carried out. Before starting a calibration the machine will be adjusted according to the sowing table.

Check:

- Transmission cassette setting I / II
- Bottom flaps position (seed and fertilizer)
- Seed feed rate from the handwheel
- That the optional drive groove device is not being used
- The amount of fertilizer feed from the handwheel
- The shutters are fully open
- That the tanks contain fertilizer and seeds

Machine is slightlylifted from the ground, so that the ground-wheel is loose and can be rotated. Rotating can be easily arrived at by inserting a rotation piece in its place as in Fig. 14. The rotation piece referred to is located in the left end of the machine under a cover.

Machine tubes (both seed and fertilizer) can be easily set to a calibration position at the same time. This takes place from the front of the machine (fig. 15).

- Lift the lock up
- Push the hose rack back
- Ensure that the hose rack moves evenly and i.e. not another edge first.

Calibration can be done in three ways:

- For the seeds and fertilizer simultaneously, when all of the transmission pins are in place.
- Separately for the seeds, when a spring ring pin is removed from the end of the fertilizer shaft. Remember to place the pin back in place after the calibration
- Separately for the fertilizer, when the seed side cassette pin is removed. Remember to place the pin back in place after the calibration

FIG. 14. Ground-wheel in calibration position

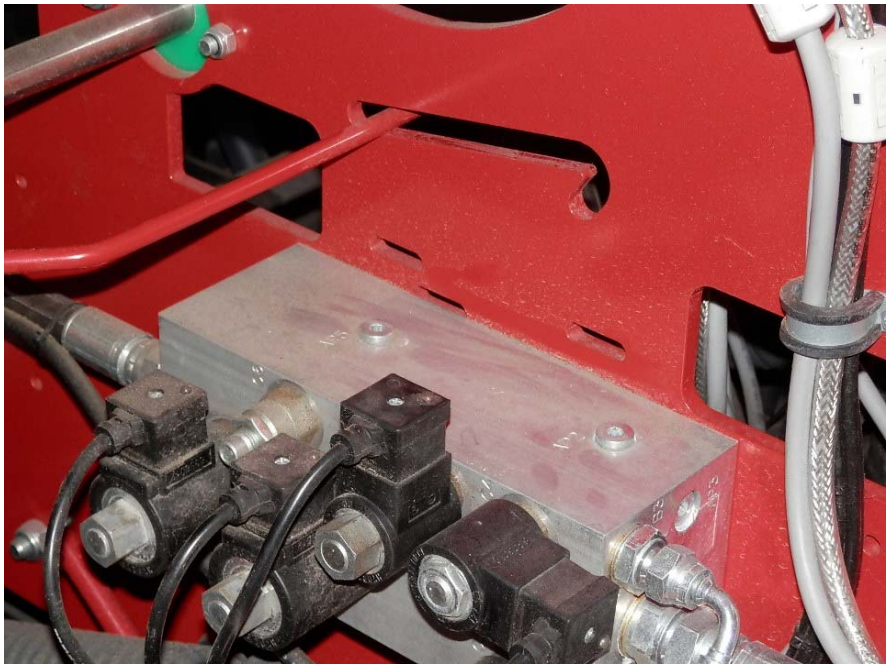


FIG. 15. Hose racks in calibration position

Tume Nova Combi has calibration trays as standard equipment both in seed and fertilizer sides. You can keep the aforementioned trays in place also during sowing operations. However, always remember to empty the trays of dust etc. before carrying out a calibration.

When the calibration has been done, pull out the calibration trays and weigh the seeds and fertilizers placed in them.

NOTE: When you have carried out the calibration tests, remember to pull the hose racks back to the front. After this the seeds and fertilizers go back in the coulters instead of calibration trays.

FIG. 16. Emptying of the calibration tray

Calibration for fertilizer and seeds simultaneously

Turn the crank few times, so that the feeding chambers become properly filled. After this empty the calibration trays carefully.

Rotate the landwheel the amount of rotations which is mentioned in the sowing table for the machinery type in question. The rotation speed must be equivalent to used driving speed.

Weigh the seeds and fertilizer entered in the sowing trays. If the calibration test was carried out with the rotation amount equivalent to acres, the sowing amount per hectacre can be arrived at by multiplying the weighing results by one hundred.

After completing the calibration test the hose rack will be pulled back in sowing position and handle lock will be locked back to its notch

Place the rotation piece of ground-wheel back in place and close the cover plates.

Fertilizer side calibration equipment use

The test is carried out as previously, with the exception that the seed-side transmission cassette pin is removed for the duration of calibration test. Place the drainage coil to the calibration trough under the fertilizer chambers.

Instruction to improve sowing accuracy

Calibration value stated in the sowing table is indicative. Its reliability is affected by, among other things, ground quality and working depth,.

Therefore, in the sowing table an indicative range for calibration results has been given:

Nova Combi 3000: 11 – 12 r/a
Nova Combi 4000: 8.25 – 9 r/a

The accuracy of sowing amount can be increased by carrying out a tensile test in sowing conditions. Tensile test is carried out by pulling the machine a distance required for on acre's sowing in the sowing conditions and at the same time counting the ground-wheel rotations. Write the calibration test value down and use it when carrying out calibrations.

If the value youhave measured differs greatly from the value stated in the sowing table value, repeat thetest. In the table below are the distances L for different working widths.

L = 33,3 m, when the working width is 3,0 m
L = 25 m, when the working width is 4,0 m

Also, check the accuracy of area-meter at the time of measurement.

14. 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 equipvalent 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
- Measure a drive corresponding to one acre sown area, which based on machine type is:

NOVA COMBI 3000	33,3 m
NOVA COMBI 4000	25 m

- Drive outside the test distance, about 10 meters, with the machine in working position so that each sowing chamber is feeding out the seeds
- Empty the contents of test sowing trays
- 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.
- If verifications are needed, carry these out according to the calibration instructions

15. WORKING DEPTH ADJUSTMENT/ COULTER WEIGHING

Overview

In Tume Nova Combi the seeds and fertilizers are sown through the same coulters. Fertilizer is guided to the ground into the larger groove, this is done by the bigger disc, and feed to the upper groove is done by the smaller disc.

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

The desired coulter emphasis is adjusted by changing the machine container height: When the machine has been lowered almost to its lowest position, the tension springs creating the coulter pressure start to tighten. The lower the lowering of the machine is adjusted, the greater will be the coulter pressure created by the tension spring pairs. Maximum lower position (that is coulter pressure) from the Agrocont board computer. Check the adjustment instruction from the Agrocontin manual.

FIG. 17. Coulter pressure

FIG. 18. Coulter structure

Adjustments

Adjustment must be carried out in the field, in sowing conditions.

Adjust the coulter wheel, e.g. to the middle adjustment notches.

Lower the machine down simultaneously driving forward. Stop the tractor when the machine is lowered. Do not allow the tractor to jolt backwards, in order to keep the coulters from becoming blocked.

Check the accurate position of the machine. Machine must be in driving direction and horizontally aligned. Adjust the drive unit push rod set screw as needed. NOTE: Shaft cylinder must be in its minimum length when in working position.

If the machine is aligned with the surface of the field and the machine push rod needs no adjustments, the sowing depth can be verified.

If the sowing depth is not correct, carry out the new adjustments and a new test. Sowing depths vary somewhat depending on machine filling level, used tractor and soil type.

NOTE: COULTER WEIGHT ADJUSTMENT ALSO EFFECTSTHE SOWING DEPTH

Do not weigh the machine more than necessary. Adjust the maximum weighing with Agrocont ,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 backwheel set closing the groove will have less gravitational force.

16. HARROW CONTROL

FIG. 19. Harrow.

Harrow spikes 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 spikes travel between the earth wall left between the supporting wheels and wheel track.

Vertical adjustment will be carried out with side chains. This adjustment, in addition to affecting the working depth, also affects the moment of escalation; that is in what part of the escalation the harrow will be off the ground. The lower parts of the chains have been provided with protective tubes, which at the same time prevent the harrow chains from being adjusted too high up**. If the harrow is adjusted too high, when the machine is lifted in vertical position, the rear foot step will become damaged.**

Whenever the angle adjustment is changed afterwards, the working depth must also be checked.

NOTE After the adjustments, check that when the machine is lifted fully, the harrow will also lift enough for reversal and transport driving.

17. SEED AND FERTILIZER DRILL SERVICE

In the more demanding cases we request a return to 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 TUME-Till 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.

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!

FIG. 20. Lifting cylinder safety valve closed

NOTE: Transport drive is not allowed with closed safety valves.

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.

Seed and fertilizer drill lubrication

Transmission roller chains can be lubricated approx. every 50 hours of use or when needed. I.e.. SAE 10 or SAE 20 lubricant can be used for lubrication.

Drive unit push rod set screw must be lubricated with a lubrican and vaseline on a yearly basis.

Coulter disc bearings have been lubricated for life and are thus in no need of maintenance.

Nipples requiring lubrication by a lubricant press every 100 hours are located in the following places:

Coulter:	-coulter arm upper ends -supporting front wheel arm closing pin -working depth notch adjuster -coulter sledge parallelogram upper ends
Running gear:	-frame tube -cylinder joints -intermediate wheel joints
Ground-wheel:	-reservoir sleeve
Power transmission:	-fertilizer shaft drive gear
Lifting cylinder joints	
Marker joints	

NOTE: See the end of this manual APPENDIX 2: Lubrication chart.

Please check the intervals 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 hours.

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

If it is noticed in the sowing that some coulter hose does not stay in coulter tube, there is often a fault in the hose upper part and/or orientation of the curvature. Turn the hose and/or funnel from the top to different position and check the situation.

Notable tips to operate the machine

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

Always lift up the back-level stairs when driving the machine: Both in sowing operations and transport drive

Note, that when the machine is moving forward, two separate issues exist: Forward movement, which defines the accuracy of sowing amounts means the forward movement of ground-wheel rotating the feeders of the machine: How many rotations does the ground-wheel in question rotate in one acre (compare part 13, Instruction to improve sowing accuracy) . Instead the forward movement affecting the accuracy of surface area measurement is defined by the forward movement of supporting wheels. Determine with a tensile test how much the machine proceeds in your sowing conditions, when the feeler wheel rotates one turn.

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 ispushed strongly so that its head is directed upwards, the trough can hit one of the feeder chambers and damage them.

The air-pressure of feeler wheels (front wheels) is easy to check asunder every second wheel a relatively sturdy support is placed, when lowering the machine which however is not too wide (for example log etc.). This lifts up the whole coulter sledge with the tires, and a hand can fit the tire vent. **NOTE: BE CAREFUL WHEN INSTALLING SUPPORT THAT IT IS WELL SET AND SECURE UNDER THE TIRE. IF THE SUPPORT FALLS, HAND MAY BECOME JAMMED.**

Your seed and fertilizer drill is equipped with an electronic monitoring device, with surface sensors for seeds and fertilizer. Use caution when taking screens from the tanks. A screen hitting a sensor can damage it.
Similarly, the installation of the seed dressing tanks and decoupling should be carried out with caution.

DO NOT SOW IN CONDITIONS WHICH ARE TOO WET THE SOIL CONDENSES TOO MUCH, AND THE AIRINESS / WATER PERMEABILITY DETERIORATES

WATCH THE SOWING DEPTH. E.G. IF THE FIELD HAS BEEN MODIFIED THE SEED MUST BE LAID ON UNMODIFIED SOIL. WATCH OUT WHEN MODIFYING DURING SPRING TIME, THAT MODIFICATIONS DO NOT GO IN TOO DEEP.

MOST COMMON ERROR IN THE USE OF NOVA COMBI IS THAT COULTERS TOO MUCH WEIGHT IS PLACED ON COULTERSBECOME TOO MUCH WEIGHED ON. WEIGHING IS SUFFICIENT WHEN THE WORKING DEPTH IS ACHIEVED, THAT IS THAT THE COULTER SLEDGE MOVES ON STEADILY RELYING ON THE FRONT FEELER WHEEL, NOTHING MORE! TOO MUCH WEIGHT ON THE COULTER INCREASES THE RISK OF MACHINE BECOMING BLOCKED AND STRAINS THE MACHINE STRUCTURES UNNECESSARILY

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. Parts where the paint has become worn out can be protected with anti-rust oil.

The faults noted during cleaning will be recorded. Spare parts should be ordered in good time, well before season, in order to have the repairs done in time.

18. TECHNICAL SPECIFICATIONS

Type	**NOVA COMBI 3000**	**NOVA COMBI 4000**
Working width (m)	3.0	4.0
Tank capacity (l) -Full -Seed, min -Seed, max -Fertilizer, max	 3250 1330 2280 1920	 4500 1840 3160 2660
Base machine weight (kg) -Empty -Tanks filled with wheat and fertilizer	 3750 6050	 5475 8590
Base machine dimensions (cm) -Height to the tank edge -Width -Length without the drive unit	 215 300 290	 215 400 290
Feeler wheels -Size -amount -Pressure (bar)	 7,50 – 16 12 1,5 – 2.0	 7,50 – 16 16 1,5 – 2.0
Coulter weighing -Coulter pressure / coulter (N) -Weighing adjustment during driving	 400 - 2200 standard	 400 - 2200 standard
Number of coulters (units)	24	32
Work depth adjustment wheel -Size -amount -Pressure (bar)	 18,5 x 8,50 – 8 12 1,5 – 2.0	 18,5 x 8,50 – 8 16 1,5 – 2.0
Hydraulics -Pressure (bar) -Connection, without markers -Connection, with row markers	 150 1-phased 2-phased	 170 1-phased 2-phased
Shaft cylinder	2-phased	2-phased

19. ACCESSORIES

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 sowers 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.

- Rowmarkers.
- Mixing shafts
- Coulter earthing up set
- Hay seed sowing machine
- Seed dressing
- Front foot step
- Rear-level additional railing
- Ritzi-marker
- Self-retracting tarpaulin
- Hydraulic front harrow
- Packer
- CultiPack intermediate processing device

Row markers

If the machine is equipped with row markers, the seed and fertilizer sower must be connected to the tractor dual-purpose hydraulic vent. Markers have been connected parallel with the machine lifting and lowering circuit. The seed and fertilizer sower itself works with single-acting hydraulics, but the marker requires dual-purpose: Arm will not start lowering, unless hydraulically pushed downwards.

Marker control has been carried out in such a way, that the machine must first be in upward position before the marker arm raises. **NOTE: Your machine is provided with board computer Agrocont, markers are controlled with that (see the use instructions in the related manuals).**

The speed of marker movement can be adjusted from the hydraulic unit (Fig. 5). 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.

Marker use and electric connection is presented in the Agrocont manual.

NOTE: If you use markers (= with at least one of the control unit switches on), remember to always remove the marker arm lockpins. In road driving, a recommendation is made to place the lockpins back in their places.

Fig. 5.

Hay seed sowing machine (HS-machine)

Hay seed sowing machine is meant for the sowing of different hay 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 slightlyearths the seeds. I.e. sowing speed affects to how strongly the hay seeds are earthed.

The hay seed sowing machine has been mounted in an integrated way to the seed and fertilizer sower back wall. The base machine tarpaulin cover thus also covers the hay seed sowing machine. HS-sowing machine attaches itself partly inside the base machine, and reduces the seed volume appr. 200 l / Nova Combi 3000 and appr. 300 l / Nova Combi 4000.

HS-machine feeding equipment consists of helical rollers. The feed rate adjustement takes place by moving the helical rollers sideways. Adjustment is made with a wheel on the left side of the sowing machine, which becomes locked in the desired position with a plastic locking device. When opening the lock button, it must be pressed in the direction of the arrow, it istowards the end of the machine, when the lock can be turned away from the adjustment wheel.

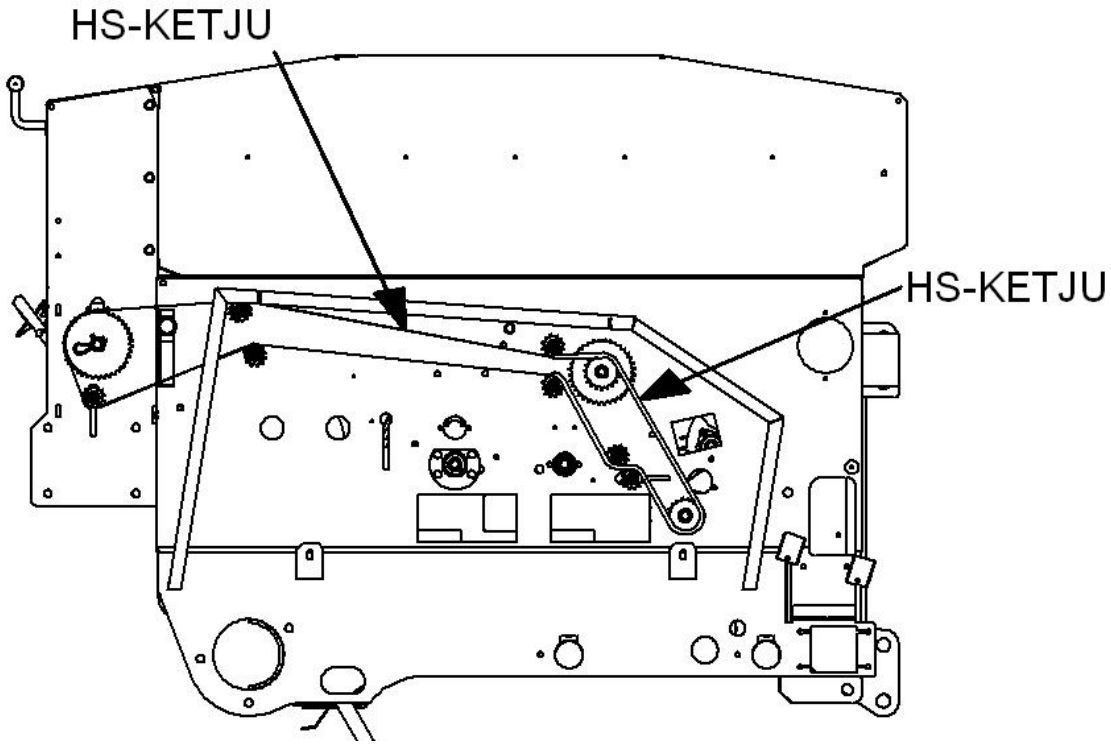
Do not force the lock!

Main scale on the locking device is divided into notches of 0 - 10, with one interval corresponding to one of the adjustment wheel turns. An adjustment wheel has 10 locking positions for each revolution, marked 09. This gives a total of 100 different control positions. Full revolutions are read from the lock scale in the inner surface of the wheel.

The feeder has adjustable bottom flaps. The control lever is in the middle of the machine. For small seeds the adjustment notch 1 is normally used.

The closing doors 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,withlightweight, easily arching grass seeds (e.g. fescue), the closing doors must be fully opened.

Indicative feeding adjustment is done by sowing table. Select from the table vertical axis the desired feed rate (kg / ha) and follow it on the horizontal line to the right until the line intersects with the corresponding curve for sowing material. In the corresponding horizontal axis of intersection in Table the requested adjustment value can be read, the numbers on the axis correspond with the main scale on the adjustment wheel (i.e, on the hand wheel turns). Sowing table values are only indicative, check the correct feeding amount always with calibration!)



Calibration

The calibration of an HS-machine is carried out with the **seed calibration tray** provided with the base machine.

From the HS-machine funnel shelf the locking pins are removed and the funnel shelf is moved forward. The seed calibration tray is placed in this freed space.

Remove the basic machine's seed and fertilizer feed (remove the pins from feeder shafts).

Adjust the handwheel to the desired sowing setting in accordance with the sowing table. Check the correct position of bottom flaps (notch).

Pour the seeds into the tank.

Rotate the ground-wheel a few times. This ensures the filling of HS-chambers.

Empty the accumulated seeds on calibration trays back to the HS-machine tank.

Place the calibration tray back under the feeder chambers and rotate the ground-wheel an amount of turns equivalent to an acre. (Nova Combi 3000: 11 – 12 rounds , Nova Combi 4000: 8,25 – 9 rounds in ground-wheel).

Weigh the seed amount, and multiply it with a multiplier: **Nova Combi 3000: 100, Nova Combi 4000: 100**. The sum received gives the amount of sowing per hectare. For example, if there was 250 grams of seed in the calibration tray, Per hectacre is then 100 x 0,25 kg = 25 kg. NOTE: The vibration of the machine while driving can slightly inrease the actual and practical sowing amount compared to the calibration, especially when compared with small amounts of seed. Monitor the consumption of seeds as the sowing progresses.

Note! Always remember to return the pins back to the feeder shafts before sowing.

HS-machine can be disabled by by removing the ring-pin in the end of the feeder shaft and by moving it to the free hole in the end of the shaft. In this case the chain-wheel rotates freeliy on the feeder shaft. HS-machine mixer shaft (accessory) can be disabled as needed by removing the pin in the end of the mixer shaft use end inside the tank.

Make sure, that when filling the tanks, no hard objects fertilizer dumplings etc. enter the tank and could potentially damage the feeder equipment.

Very small grains of sowing material can fit the adjustor sleeve between the sowing chamber and top of the feed roller. This can lead to tension adjusting the sowing amount with the handwheel. In this case the device must always be rotated some turns whenever the adjustment control starts to feel stiff.

Seed dressing

SAFETY PRECAUTIONS WHEN USING THE SEED DRESSING

- All handlers of seed dressing and mordants must read this manual and the manual of the mordant used. Mordants are toxic.
- In the mordant handling it is mandatory to use personal protective equipment such as gloves, face protection, respiratory protection and protective clothing. More detailed instructions are found in the mordant manual i.e. on required respirators.
- Make sure that children or animals do have access to mordant soiled parts.
- If you must wash the seed dressing (i.e. when changing mordant), make sure the water used is handled appropriately (drained, absorbed etc).
- If such seeds are sown, where no seed dressing is desired (e.g. rapeseed) the seed dressing feed troughs must be removed. Even a small amount of mordant may damage the type of seeds for which the mordant is not meant (i.e. germination).
- The unused treated seeds are hazardous waste which must be disposed in an appropriate recycling point.

Action

Seed dressing is driven with a roller chain from the seed and fertilizer sower seed side (right side) from the upper intermediate shaft (shaft, with the seed transmission cassette top) Transmission power is led to the seed dressing with a mixing shaft through the left end. an eccentric / free switch combination is in the left , with which the sowing amount adjustment takes place.

If you take the Seed dressing feeding troughs (tanks) out of the machine, pay attention to unload the parts in right order and right place. This will ensure the correctness of re-installation.

When filling the mordant the seed and fertilizer sower screen must be set aside in order for you to get the feed trough open lids. It is not necessary to remove the screens out of the machine completely.

Operating Instructions

When using the seed dressing there must always be so much mordant in the containers that its surface is not above the mixer shaft center line. If there is less mordant in the container, thefeeding amount becomes smaller than the value in the table.

Mordant feed control is done by moving the conrod upper end in the left side of the feed control lever groove.

The eccentric drive has three M8 threaded holes. The basic supply setting is set with these holes. Compare the required position from the table supplied with the mordant. When you put the screw to the hole in the center of the axis, seed dressing does not rotate and no mordant is supplied, but the mixer shaft rotates. If you want also the mixer shaft to stop, remove the pin from the mixer shaft use in the right end of the machine. Place the pin in the empty hole for storage found in the end of the shaft.

NOTE: Seed amounts to sow must be checked with calibration after about half-hectare test run. Mordant has been found to reduce the seed feeding, barley and oats in particular, because the flow through the feed apparatus will slow down due to mordant.

After the season it is best to keep the seed dressing unwashed in a warm and dry place. However, if the device is washed, it must also be carefully dried. Following this the device can be handled with a thin layer of anti-rust oil. Check that no garbage has been collecting between the feeder chamber pusher and feeder roller.

Check the transmission bearing and chain tightnesses on a yearly basis. For lubrication, thin machine oil can be used.

Earthing discs

The function of earthing discs, which can be acquired as accessories, is to improve the earthing of seeds. Earthing disc is located in terms of coulters slightly on the side, behind the coulter, and it guides the soil to the groove left by the sowing coulter.

The earthing disc unit is coulter sledge specific. Behind each coulter sledge a leaf spring will be attached, which, in its lower end, has attached two discs, one for each seed coulter.

The earthing unit is attached to the coulter sledge from the loop in front of the leaf spring. The lower position limit is placed on the underside of the coulter sledge with an installed screw. Raising the seed and fertilizer sower up, the earhing discs can fall downward until the leaf springs coincide with the earthing discs and hit the surface of stop screws.

In the rear end of coulter sledge are 9 holes. These holes are for the adjustment of earthing unit. By placing a control pin above the leaf spring of the earthing disc, it is possible to adjust the weighing force which makes the earthing disc to function. The lower the pin is located, the greater the force by which the earthing disc operates. If the earthing disc is below the leaf spring, it will the function as a lower position limit. Earthing will then function only by its own force. When needed the earthings can be lifted fully up, removed from functioning with this control pin.

The angle of earthing discs is also adjustable. By loosening the nut on the side of axis, the axis of the disc can be turned and the working angle changes. The nut must be carefully tightened after the adjustment.

NOTE! EXERCISE CAUTION WHEN LIFTING A MACHINE WITH EARTHING DISCS!

- If the electric control of the lifting and lowering circuit power is not connected, the machine can in principle, be lifted as far up as the lifting cylinders permit. In this case, the seed and fertilizer sower rear wheels touch the earthing discs and as a result there will be damage to the tires and to the earthing disc units. If you must lift the equipment so, that the electric power is not connected, stop the lifting movement well before the tires start to touch the earthing discs.
- Also, when the electric control of lifting is connected, check the upper limit of lifting. Lifting must finish well before the wheels are close to the earthing discs. Adjust the lifting upper limit magnet so that the space between the wheels and earthing discs is at least 10 cm.

Also note that when the machine coulter weighing or sowing depth is changed the settings of earthing discs also change.

WARRANTY

One (1) year warranty will be granted to all the products of Tume Agri Oy.

Warranty becomes effective from the date when the machine is delivered to the end-user. The warranty covers only the damage that is reclaimed to the factory within three (3) years after the product was delivered to the factory dealers.

The warranty applies to manufacturing and material defects addressed.
Warranty does not cover normal wear and tear, neglect or misuse, improper installation or defects due to lack of maintenance. Warranty does not cover defects caused by use of the machine in unusually difficult or abrasive conditions. Consumable parts which consist of the coulters, hoses, tires, fittings, seals, etc. are not covered by the warranty.

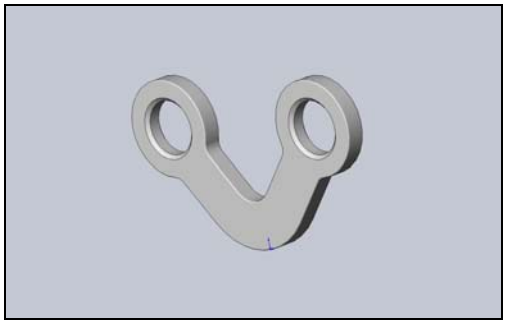
The damage which has occurred must be reported immediately to the manufacturer, in which case a determination will be made whether the warranty will cover the case. If we consider it appropriate, the machine / part must be returned to the factory for warranty processing and must be accompanied by the following information: Machine type, the completion number, date of delivery, the owner's name and address.

Warranty services will be carried out in part or at valid net price of the part when the incident occurs. Warranty compensation supplicant is liable to pay for the freight and installation costs of warranty. Warranty does not cover damage which would justify less than twenty (20) euro in warranty compensation. The guarantee is not valid if the machine has been modified so that it differs from the original form, for example, modifications, adjustments, or additional structures, exchanges to other than the manufacturer's original spare parts or accessories.

ANNEX 1 LOADING AND TRANSPORT GUIDE

ANNEX 2 LUBRICATION CHART

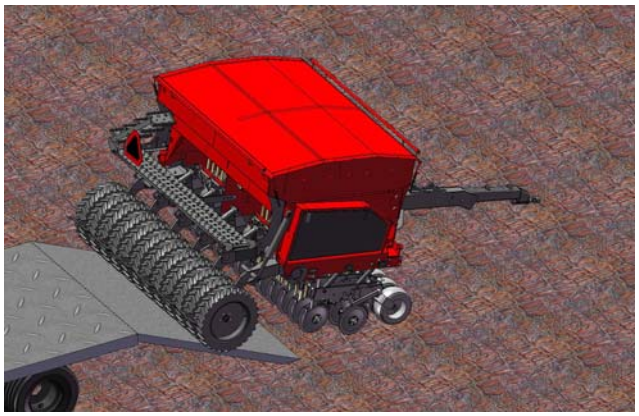
IF THE LOADING TAKES PLACE BY LIFTING THE MACHINE, THEN THE LIFT TAKES PLACE BY THE HOLES IN THE MIDDLE WALL INSIDE THE MACHINE TANK WITH RESPECTIVE LOOPS



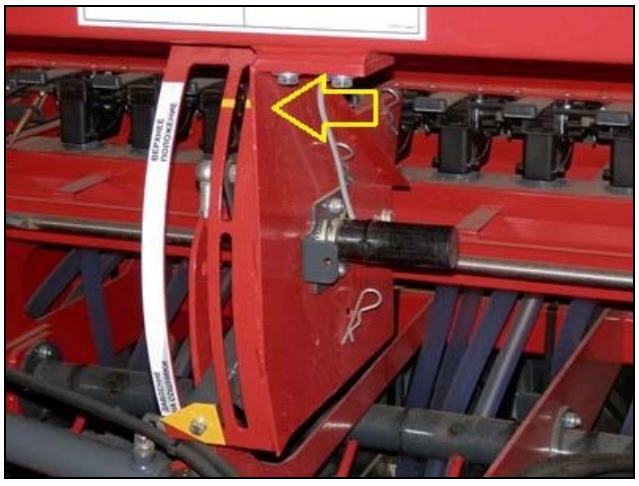
OR CHAINS.

FOR THE TRANSPORT THERE ARE **HOLES MADE TO THE ENDS OF THE MACHINE.**FOR THE LOAD SUSPENSION**.**

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 STRUCTURAL SUPPORT OR A RAMP.

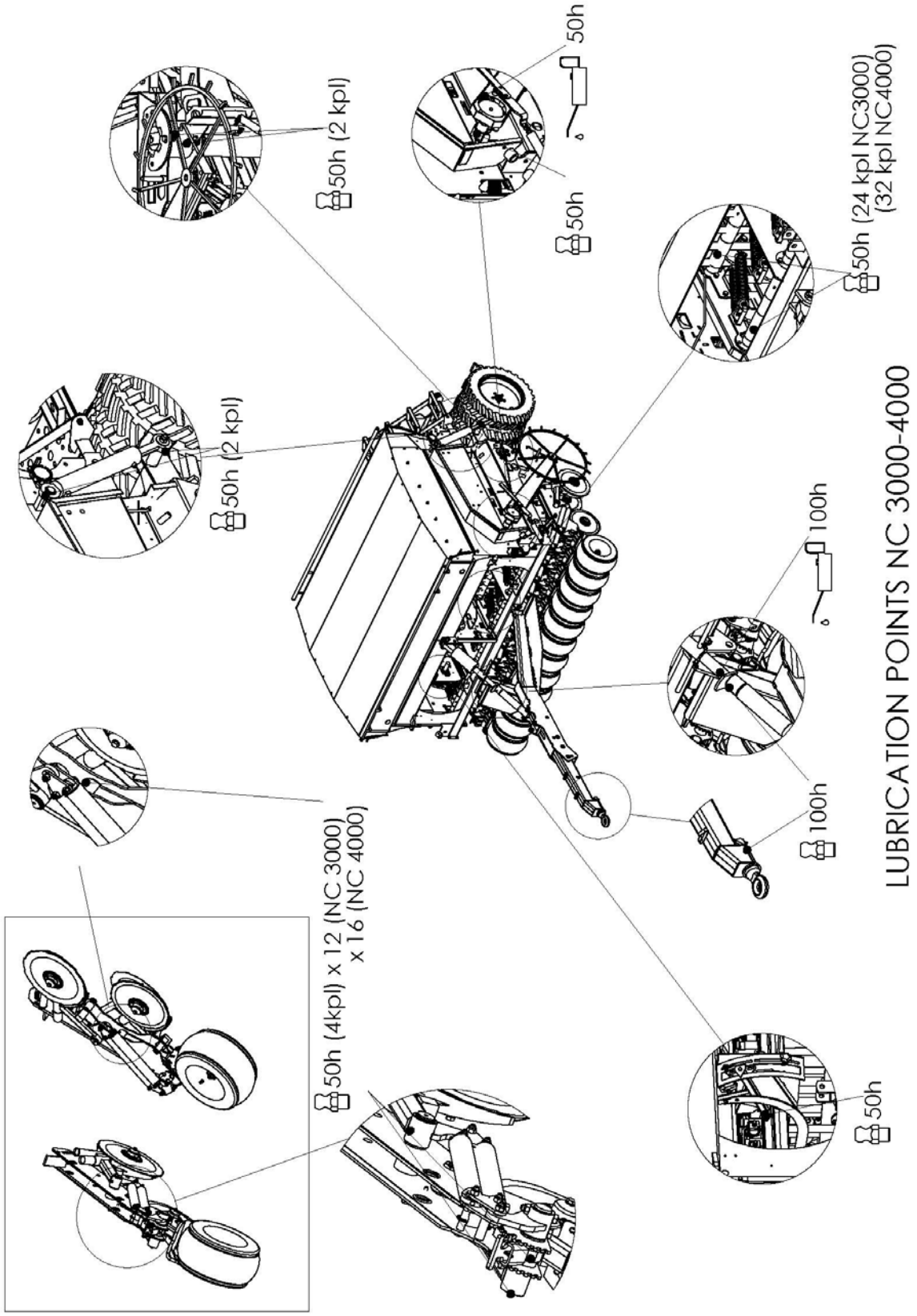


WHEN CARRYING OUT A TEMPORARY TRANSFER / LOADING IT IS SUFFICIENT THAT ONLY **THE THICKEST OF THE HYDRAULIC TUBES IS CONNECTED** (RED COLOR CODE).

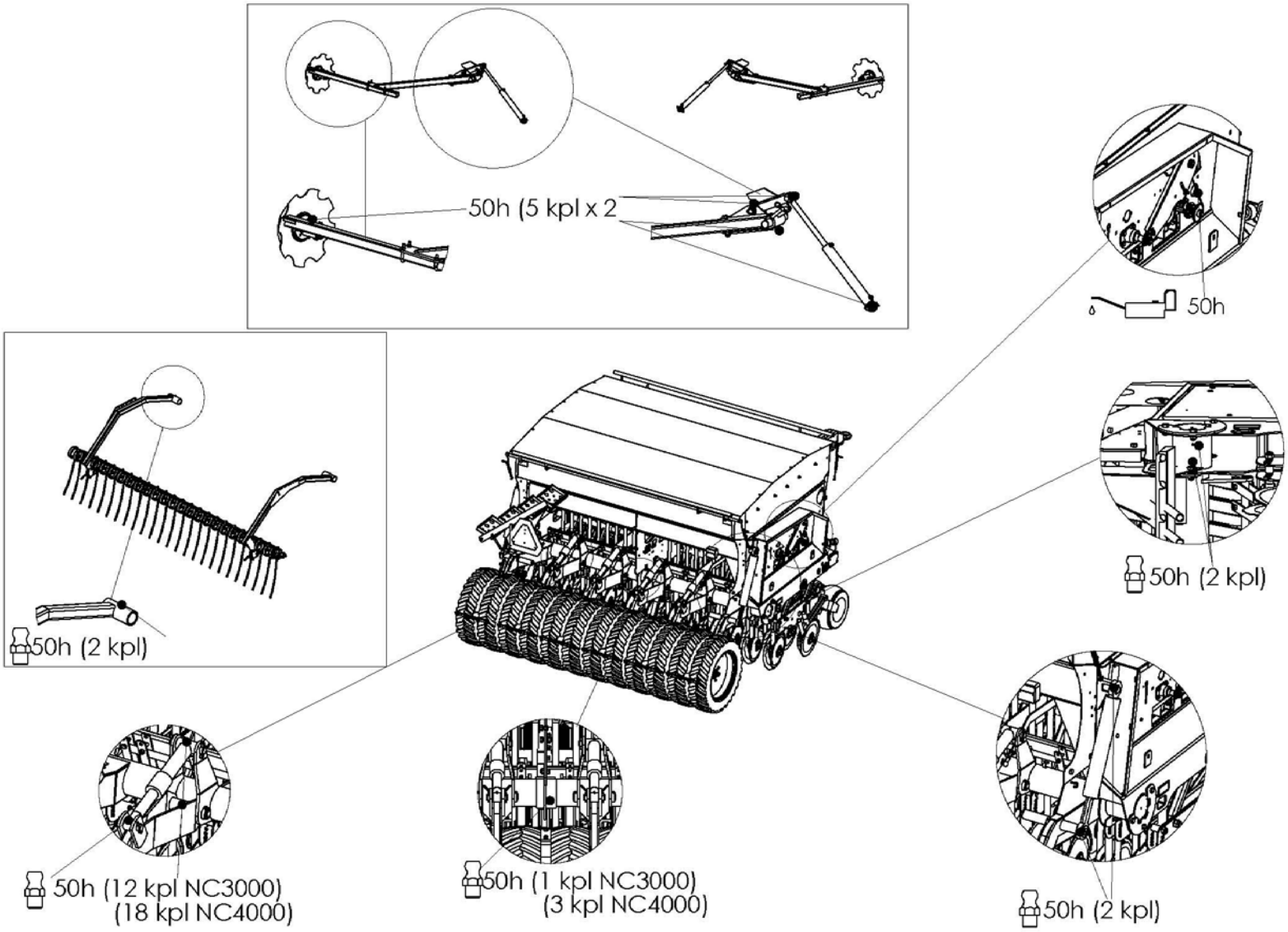


WHEN LIFTING THE MACHINE WITH TRACTOR HYDRAULICS WITHOUT CONNECTING THE ELECTRICAL SYSTEM, NOTE, THAT **YELLOW POINTER ARROW WILL NOT RISE PAST THE LIMIT SIGN**

Annex 2/1



Annex 2/2



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