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1.0 INTRODUCTION

This booklet describes the regulations for use, maintenance for seeding machine. This manual is an integral part of the product, and must be kept in a safe place for consultation throughout the life of the machine.

ATTENTION

- The Manufacturer reserves the right to change the machine without having to promptly update this manual. In the event of disputes, the valid version is the Italian text.
- Some of the pictures in this manual show details or accessories which may be different from those fitted in your machine. Components or guards may have been removed to make images more useful.
- The machine was manufactured for dosing and distributing commercial seeds of standard quality.
- The machine was designed for professional skilled operators who are the only ones qualified for operating it.
- Minors, illiterates and persons under altered physical or psychological conditions must not be allowed to operate the machine.
- Operators who do not have a suitable driving license, or who are not properly informed and trained, must not be allowed to operate the machine.
- The operator must check that the machine operates correctly, and must replace and repair parts subject to wear that may cause damage.
- The customer should instruct personnel on accident risks, on the operator safety devices provided, on noise emission risks and on general accident prevention regulations provided for by the international directives and by the law in the country in which the machines are used.
- In any case, the machine should be used exclusively by skilled operators who will be held to follow scrupulously the technical and accident-prevention instructions in this manual.
- It is the user’s responsibility to check that the machine is operated only in optimum conditions of safety for people, animals and property.

1.1 GUARANTEE

The guarantee is valid for a year, against all defects of material, from the date of delivery of the equipment.

On delivery, check that the equipment has not been damaged during transport and that the accessories are integral and complete.

POSSIBLE CLAIMS MUST BE PRESENTED IN WRITING WITHIN EIGHT DAYS OF RECEIPT. The purchaser will enforce his rights on the guarantee only when he has respected the conditions concerning the benefit of the guarantee, set out in the supply contract.

1.1.1 EXPIRY OF GUARANTEE

Besides what has already been set out in the supply contract, the guarantee expires:

- If the limits set out in the technical data table are overshot.
- If the instructions set out in this booklet have not been carefully followed.
- If the equipment is used badly, defective maintenance or other errors by the client.
- If modifications have been carried out without written authorization of the manufacturer and if non original spare parts have been used.

1.2 DESCRIPTION OF THE SEEDER

The «ROMINA» precision planting unit is a machine that is particularly suitable for precision seed planting, for multiple uses and with any type of seed on soil that has been tilled and prepared by conventional methods or partially tilled with crop residues present. The planting unit is pneumatically operated and can also be used for soil fertilization.

This agricultural equipment, can only operate by means of a Cardan shaft applied to the power take-off of an agricultural tractor equipped with a lifting unit.

The «ROMINA» series planting unit is currently made in several versions, each with a basic frame onto which are attached the required seeding elements and equipped with fertilizer spreader units.

There are, more-over, various types of electronic instruments for seeding control and for the calculating the area seeded (Ha).

CAUTION

The seeder has been designed exclusively for seeding in the ground. The recommended working speed is 6÷8 km/h. The planting unit must only be transported by road with the tanks and hoppers empty and at max speed of 25 km/h. Any use other than that described in these instructions could damage the machine and be extremely dangerous for the user.

Good performance depends on the correct use and proper maintenance of the equipment. It is advisable there-fore scrupulously to observe the instructions provided in this manual in order to prevent the emergence of problems which could jeopardize the machine’s lifespan or its performance. All the information required for using the machine in the best way and instructions and advice for its correct maintenance are also supplied. It is also important to adhere to what is described in this manual since the Manufacturer declines all responsibility for consequences arising due to negligence and non-observance of these rules.

The Manufacturer is, of course, avail-able to assure immediate and thor-ough technical assistance and all that may be necessary to ensure that the equipment operates well, giving first class performance.
1.3 TECHNICAL DATA

<table>
<thead>
<tr>
<th>Max row number</th>
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<td>Fertilizer hopper capacity</td>
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<td>r.p.m.</td>
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<tr>
<td>Working speed (max)</td>
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<td>Oleodynamic Vacuum pump drive</td>
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<tr>
<td>No-load noise detection (**)</td>
<td>dB</td>
<td>(L&lt;sub&gt;10&lt;/sub&gt; = 112,7) - (L&lt;sub&gt;10&lt;/sub&gt; = 91,7)</td>
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<tr>
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<td>(Transport) 235/75 R17.5 142J (18PR)</td>
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<tr>
<td>Tyre inflation pressure</td>
<td>bar-(PSI)</td>
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</tr>
</tbody>
</table>

REQUIRED TRACTOR CHARACTERISTICS

| Power required           | HP-(KW) | 80+100 - (60+75) | 100+120 - (75+90) |
| Three- point universal joint category | Type | II CAT. |  |
| Battery voltage          | V      | 12      |  |
| Tractor hydraulic distributors (min.) | nr. | 2   |  |
| Tractor pump pressure (max) | bar | 180  |  |

(* With fertilizer.

(**) L<sub>10</sub> = Acoustic power level uttered by machine (Weighed A);

L<sub>10</sub> = Continuous equivalent acoustic radiation pressure level (Weighed A) in the "worker’s position".

The technical data and the models provided must be considered as non binding. We reserve the right to change them without notice.
1.4 IDENTIFICATION
Each individual machine has an identification plate (Fig. 1) indicating the following details:
1) Mark and address of the Manufacturer;
2) Type and model of machine;
3) Unloaded mass, in Kilograms;
4) Mass full load, in Kilograms;
5) Registration of the machine;
6) Year of manufacture;
7) CE mark.

You are advised to note down your data on the form below, along with the date of purchase (8) and the dealer’s name (9).

8) ____________________       9) ____________________
This information must always be quoted whenever assistance or spare parts are needed.

ATTENTION
Do not remove, tamper with or make the CE mark affixed on the machine illegible. Refer to the information provided on the CE mark for the manufacturer’s contact details (e.g. for requesting spare parts, etc.). When the machine is demolished, destroy the CE marking.

1.5 HANDLING (Fig. 2)
If the machine has to be handled, it should be lifted by hooking cloth ropes to the attachment points provided and using a suitable hoist or crane with sufficient capacity. Because of the danger involved, this operation should be carried out by trained and responsible personnel.

The parts with a weight exceeding 25 Kg (seeding element, drawbar etc.) must be moved by means of lifting equipment, using the hooking points indicated in Figure 2. Stretch the rope to keep the machine level.

ATTENTION
- Packaging materials (pallets, cartons, etc.) must be disposed of as prescribed by the existing regulations through authorised disposal companies.
- Parts making up the machine must not be lifted by hooking them up from moving or weak parts such as guards, electrical runways, pneumatic parts, etc.
- Standing under suspended loads is not allowed; unauthorised personnel are not allowed access to the work sites; it is mandatory to wear overalls, safety footwear, gloves and a hardhat.

fig. 1
fig. 2
1.6 ASSEMBLY (Fig. 3)
For transportation reasons, the following parts are supplied disassembled: seeding elements, drawbar, visual signalling system and row marker disc. Proceed to install them before using the planting unit.

IMPORTANT
During the first installation, bleed out all the air from the oleodynamic system.
1.7 ASSEMBLY DRAWING (fig. 4)
1) Load bearing structure;
2) Transport trolley
3) Drawbar;
4) Anti-tipping device of the two point linkage;
5) Parking foot;
6) Vacuum pump;
7) Gearbox;
8) Drive wheel for seed distributors and fertilizer spreader;
9) Seed hopper;
10) Seed distributors;
11) Universal joint for planting unit drive;
12) Disc-type planter shoe part of planting unit;
13) Depth wheels;
14) Seed-planting depth adjuster;
15) Press wheels;
16) Corrugated disc coulter;
17) Fertilizer distributor hopper;
18) Fertilizer distribution adjuster (Minimax);
19) Disc fertilizer furrower;
20) Spirit level;
21) Row marker;
22) Identification plate.
1.8 WARNING SIGNS
The signs described in Fig. 5 are reproduced on the machine. Keep them clean and replace them if they should come off or become illegible. Carefully read each description and learn their meanings by heart.

1.8.1 WARNING SIGNALS
1) Before operating, carefully read the instruction booklet.
2) Before carrying out maintenance, stop the machine and consult the instruction booklet.

1.8.2 DANGER SIGNALS
3) Danger of crushing of the upper limbs while handling mobile parts.
4) Danger of getting squashed during opening. Keep at a safe distance from the machine.
5) Danger of becoming entangled in the fan. Do not remove the guards and do not come close to the moving parts.
6) Danger of getting trapped. Keep away from moving parts.
7) Danger of getting squashed during closure. Keep at a safe distance from the machine.
8) When using anticryptogamic chemicals, use adequate protection.
9) High noise level. Use adequate acoustic protection.
10) Pipes with high pressure fluids. Take care if flexible pipes break as oil could spurt. Read the instruction manual.
11) Before engaging the pto, check that the rpm rate is that prescribed. Never exchange the 540 rpm rate for 1000 rpm.
12) Danger of envelopment. Do not remove the guards while the machine is running (parts in movement).
13) Danger of getting hooked by the Cardan shaft. Keep away from moving parts.
14) Risk of inhaling harmful substances. Wear a dust mask.

1.8.3 INDICATOR SIGNALS
15) Wear safety clothing.
16) Signs the hooking points for lifting (see cap. 1.5).
17) Greasing point (see cap. 5.1).
2.0 SAFETY REGULATIONS AND ACCIDENT PREVENTION

Pay attention to danger signs, where shown, in this booklet.

There are three levels of danger signs:

- **DANGER**: This sign warns that the operations described *cause* serious lesions, death or long term health risks, if they are not carried out correctly.

- **ATTENTION**: This sign warns that the operations described *could cause* serious lesions, death or long term health risks, if they are not carried out correctly.

- **CAUTION**: This sign warns that the operations described *could cause* serious damage to the machine, if they are not carried out correctly.

In order to complete the various levels of danger, the following describe situations and specific definitions that may directly involve the machine or persons.

- **DANGER ZONE**: any area inside a/o near a machine in which the presence of an exposed person constitutes a risk for the safety and health of that person.

- **EXPOSED PERSON**: Any person who happens to be completely or partially in a danger zone.

- **OPERATOR**: The person/s charged with installing, starting up, adjusting, carrying out maintenance, cleaning, repairing or transporting a machine.

- **USER**: The user is the person or the organization or the firm which has purchased or rented the machine and intends to use it for the purposes it was conceived for.

- **SPECIALIZED PERSONNEL**: Those persons who have been specially trained and qualified to carry out interventions of maintenance or repair requiring a particular knowledge of the machine, its functioning, safety measures, methods of intervention - and who are in a position to recognize the potential dangers when using the machine and are able to avoid them.

- **AUTHORIZED SERVICE CENTER**: The authorized Service Center is a structure legally authorized by the manufacturer which disposes of personnel specialized and qualified to carry out all the operations of assistance, maintenance and repair - even of a certain complexity - found necessary to keep the machine in perfect working order.

Carefully read all the instructions before using the machine; if in doubt, contact the technicians of the Manufacturer’s dealer. The manufacturer declines all responsibility for the non-observance of the safety and accident prevention regulations described below.

**General norms**

1. Pay close attention to the danger signs in this manual and on the seeder.
2. The labels with the instructions attached to the machine give abbreviated advice for avoiding accidents.
3. Scrupulously observe, with the help of the instructions, the safety and accident prevention regulations.
4. Avoid touching the moving parts in any way whatsoever.
5. Any work on and adjustment to the machine must always be done with the engine switched off and the tractor blocked.
6. People or animals must not, under any circumstances be transported on the equipment.
7. It is strictly prohibited to drive the tractor, or allow it to be driven, with the equipment attached by persons not in possession of a driver’s license, inexpert or in poor conditions of health.
8. Before starting the tractor and the equipment, check that all safety devices for transport and use are in perfect working order.
9. Before starting up the equipment, check the area surrounding the machine to ensure that there are no people, especially children or pets, nearby, and ensure that you have excellent visibility.
10. Use suitable clothing. Avoid loose clothing or garments with parts that could in any way get caught in the rotating or moving parts of the machine.
11. Before starting work, familiarize yourself with the control devices and their functions.
12. Only start working with the equipment if all the protective devices are in perfect condition, installed and in the safe position.
13. It is absolutely prohibited to stand within the machine’s radius of action where there are moving parts.
14. It is absolutely forbidden to use the equipment without the guards and container covers.
15. Before leaving the tractor, lower the equipment hooked to the lifting unit, stop the engine, pull the hand brake and remove the key from the dashboard, make sure that the chemical substances safely out of reach.
16. The driver’s seat must never be left when the tractor engine is running.
17. Before starting the equipment, check that the supporting feet have been removed from under the seeder; check that the seeder has been correctly assembled and regulated; check that the machine is in perfect working order, and that all the parts subject to wear and tear are in good condition.
18. Before releasing the equipment from the third point attachment, put the hoist command lever into the locked position and lower the support feet.
19. Only operate when visibility is good.
20. All operations must be carried out by expert personnel, equipped with protective gloves, in a clean and dust-free environment.
**Tractor hitch**

1) Hook the equipment to a suit-able, sufficiently-powered tractor by means of the appropriate device (lifter), in conformity with applicable standards.
2) The class of the equipment attachment pins must be the same as that of the lifter attach-ment.
3) Take care when working within the range of the lifting arms as this is a very dangerous area.
4) Be very careful when hooking and unhooking the equip-ment.
5) It is absolutely forbidden to stand between the tractor and linkage for manoeuvring the lifting con-trols from the outside (Fig. 6).
6) It is absolutely forbidden to stand in the space between the tractor and the equipment (Fig. 6) with the engine running and the uni-versal joint linked up and without the hand brake pulled and a block placed under the wheels to block them.
7) The attaching of additional equip-ment onto the tractor brings about a different distribution of weight on the axles. Check the compatibility of the tractor perfor-mance with the weight that the seeder transfers onto the three-point linkage. If in doubt consult the tractor Manufacturer.
8) Comply with the maximum ad-missible weight for the axle, the total mobile weight, transport regulations and the highway code.

**Transport on Road**

1) When driving on public roads, be sure to follow the highway code of the country involved.
2) Any transport accessories must be provided with suitable signs and guards.
3) It is very important to remember that road holding capacity as well as direction and braking capacity can be influenced, sometimes considerably, by equipment being either carried, semi-mounted or towed.
4) When taking a curve, calculate that the centrifugal force and the centre of gravity will shift depend- ing on whether equipment is being carried or not.
5) For transport, adjust and fasten the lateral lifting arm chains of the tractor; check that the seed and fertilizer hopper covers are closed properly; lock the hy-draulic lifting control lever.
6) Road movements must be per-formed with all tanks empty.
7) For displacements beyond the work area, the equipment must be placed in the transportation position. This also means that it is necessary to close all the oleodynamic circuits with the designated cocks.
8) Upon request the Manufacturer will supply supports and tables for signaling of dimensions.
9) When the dimensions of carried or partially-carried equipment conceal the tractor’s signalling and lighting devices, these must also be installed on the equip-ment itself, in conformity with regulations of the highway code of the country involved. When in operation make sure that the lighting system is in perfect work-ing order.

**Cardan shaft**

1) The equipment installed can only be controlled by means of the Cardan shaft complete with the necessary overload safety devi-ces and guards fastened with the appropriate chain.
2) Only the Cardan shaft supplied by the Manufacturer must be used.
3) The engine must not be running when installing and removing the Cardan shaft.
4) Care must be taken regarding the safety and correct assembly of the Cardan shaft.
5) Use the chain provided to stop the Cardan shaft from rotat-ing.
6) Always check carefully that the Cardan shaft guard is always in position, both during transporta-tion and operation.
7) Frequently and set intervals check the Cardan shaft guard, it must always be in excellent condition.
8) **Before engaging the power take-off, check that the set rpm corresponds to that indicated by the sticker on the equipment.**
9) Before inserting the power take-off, make sure that there are no people or animals nearby and that the rpm selected corre-sponds to that permitted. Never exceed the maximum admisible speed.
10) Watch out for the rotating univer-sal joint.
11) Do not insert the power take-off with the engine off or synchro-nized with the wheels.
12) Always disconnect the power take-off when the Cardan shaft is at too wide an angle (never more than 10° - Fig. 7) and when it is not being used.
13) Only clean and grease the Cardan shaft when the power take-off is disconnected, the engine is off, the hand brake pulled and the key removed.
14) When not in use, place the Cardan shaft on the support pro-vided for it.
15) After having dismantled the Cardan shaft, place the protec-tive cover on the power take-off shaft again.
Safety measures concerning the hydraulics

1) At the moment of connecting the hydraulic tubes to the hydraulic system of the tractor, make sure that the hydraulic systems of the operating machine and the tractor are not under pressure.

2) For the operative hydraulic connections between tractor and operating machine, the sockets and plugs should be marked with colours to distinguish them, to avoid them being used wrongly. There would be a danger of accident if the connections were to be swapped round.

3) The hydraulic system is under high pressure; because of the accident risk, when searching for leakage points special auxiliary instruments should be used.

4) Not to never carry out the search losses with the fingers or the hands. The liquids that exit from the holes can be nearly not visible.

5) During transport by road the hydraulic connections between tractor and operating machine should be disconnected and secured to the support provided.

6) Do not use vegetable oils under any circumstance. These could cause a risk of damage to the cylinder gaskets.

7) The operating pressures of the hydraulic system should be between 100 bars and 180 bars.

8) Never exceed the indicated hydraulic system pressure levels.

9) Check that the quick hook-ups are coupled correctly; parts of the system could get damaged if they are not.

10) Oil escaping at high pressure can cause skin injury with the risk of serious wounds and infection. Call a doctor immediately if such an incident occurs. If the oil with surgical means is not removed quickly, can take place serious allergies and/or infections. Therefore, the installation of hydraulic components in the tractor driver’s cab is strictly forbidden. All the components of the system should be positioned carefully to avoid parts being damage during use of the equipment.

11) In case of participation on the hydraulic system, to unload the hydraulic pressure carrying all the hydraulic commandos in all the positions some times after to have extinguished the motor.

Maintenance in safety

During work and maintenance operations, use suitable personal protection gear:

- Overalls
- Gloves
- Shoes
- Helmets

1) Do not proceed with maintenance and cleaning if the power take-off has not been disconnected first, the engine power off, the hand brake pulled and the tractor blocked with a wooden block or stone of the right size under the wheels.

2) Periodically check that the bolts and nuts are tight, and if necessary tighten them again. For this it would be advisable to use a torque wrench, respecting the values of 53 Nm for M10 bolts, resistance class 8.8, and 150 Nm for M14 bolts resistance class 8.8 (Table 1).

3) During assembling, maintenance, cleaning, fitting, etc., with the seeding machine raised, place adequate supports under the equipment as a precaution.

4) The spare parts must correspond to the manufacturer’s specifica-tions. **Use only original spares.**

---

**Table 1**

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<td>353</td>
<td>90</td>
<td>383</td>
<td>112</td>
<td>474</td>
</tr>
<tr>
<td>24 x 2</td>
<td>384</td>
<td>101</td>
<td>420</td>
<td>125</td>
<td>519</td>
</tr>
</tbody>
</table>

**Note:**

- Use only original spares.
3.0. INSTRUCTIONS FOR USE

To obtain the best performance from the equipment, carefully follow what is set up below.

**ATTENTION**

All maintenance work, adjustments and preparation for operation, must be carried out with the power take-off of the tractor disconnected, the seeder on the ground on its supporting feet, the tractor not running, the wheels blocked and the key turned off.

3.1 ATTACHMENT TO THE TRACTOR

The hooking the seeder from the tractor is a very dangerous phase. Be sure to follow the instructions carefully throughout the operation. The operation must be performed on a horizontal surface, with the equipment placed on it's parking feet, with the anti-tipping device in place (A1, Fig. 11) and with locking wedges placed under the transportation wheels (B, Fig. 11).

At this stage, proceed as follows:

1) Secure the equipment to the first and second coupling points of the tractor (C, Fig 11). Lock the pins into place with the snap pins.
2) Switch off the tractor, remove the ignition key and pull the parking brake.
3) The hydraulic pipes must be connected correctly to the tractor distributors following the instructions on each pipe (D, Fig. 8).
4) Connect the Cardan shaft and make sure that it is perfectly blocked on the power take-off (Fig. 10). Check that the guard turns freely and fix it with the chain provided.
5) Raise the parking wheels (E, Fig. 10-11).
6) Remove the anti-tipping device (A2, Fig. 11).
7) Remove the wheel chocks from under the wheels (B, Fig. 11).
8) Open the cock of the hydraulic system of the transport trolley (F, Fig. 8). Operate the system to check for proper movement of the trolley.
3.2 ADAPTING THE CARDAN SHAFT
The Cardan shaft, supplied with the machine, is of standard length. It might, therefore, be necessary to adapt the Cardan shaft. Should this be the case, before proceeding, consult the Manufacturer.

**IMPORTANT**

With the machine connected to the tractor and the feet raised, check the following:

- When the cardan drive line reaches maximum elongation (completely raise and lower all the tractor’s lower arms), the two tubes of the drive line must overlap by at least 15 cm (G, Fig. 12). When it is at maximum closing, gap must be at least 1 cm (H, Fig. 12).
- When using the equipment on another tractor, check that conditions are as stated above and check that the guards completely cover the rotating parts of the Cardan shaft.

**ATTENTION**

If the above inspections are not carried out, it can cause the vacuum fan and the drive line to break.

---

3.3 SEEDER OPERATIONAL LEVEL CONFIGURATION
To ensure proper penetration into the soil of the seeding units, it is important to configure the level of the seeder in the field, under normal working conditions.

At the beginning of the field, lower the seeder with the tractor moving in order to prevent clogging or damage to the shoe coulters. From the tractor, adjust the height of the lower arms to bring the frame-draw bar horizontal to the soil. Use the spirit level mounted forward of the rudder to perform a correct adjustment (L, Fig. 13).

When the adjustment is completed, the seeder’s frame must be located at a height above ground of approximately 48-49 cm (Fig. 13).

**IMPORTANT!** During operation, the equipment must always be perpendicular to the ground (90°, Fig. 13). This condition can be obtained with the help of a spirit level on the rudder.
3.4 UNHOOKING THE SEED DRILL FROM THE TRACTOR

**DANGER**

Unhooking the seed drill from the tractor is a very dangerous operation. Great caution must be used and the whole operation must be carried out following the instructions.

For a correct unhooking operation of the seed drill it is necessary to proceed on a horizontal level.

At this stage, proceed as follows:

1) Lower the parking foot (Fig. 14).
2) Lower the seed drill to the ground (Fig. 10).
3) Close the cock of the hydraulic system of the transport trolley (F, Fig. 15).
4) Switch off the tractor, remove the ignition key and pull the parking brake.
5) Insert the wheel chocks under the wheels (B, Fig. 11).
6) Disconnect the hydraulic pipes from the tractor distributors and protect the quick couplings with the caps.
7) Unhook the Cardan shaft from the tractor and put it on the special hook.
8) Attach the anti-tipping device (A1, Fig. 11-16).
9) Disconnect the snap pins and release the first and second coupling points (C, Fig. 11).

While stopped it is possible to reduce the size of the seeder, folding the rudder as shown in Figure 17 (T):

1) Remove the linchpin (P), turn the front hitch (Q) to the the side opposite the side the rudder will be turned to. Lock it with the linchpin.
2) Remove the linchpin and pull out the pin (R).
3) Fold the entire rudder locking it with the pin and inserting the linchpin.
3.5 TRANSPORT ON ROAD

If it becomes necessary to transport the machine for a long distance, it can be loaded onto a railway wagon or a truck. For this purpose, consult «Technical Data» for weight and specific dimensions. The latter are very useful to check the possibility of driving along all types of roads. The machine is generally supplied in a horizontal position with no packing material. It is therefore necessary to use a system of hoisting with a crane and cables, or chains of adequate capacity, hooking onto the machine at the hoisting points marked with the «hook» symbol (16, Fig. 5).

![CAUTION]

Before proceeding to the hoisting operations, make sure that any any mobile elements of the machine are blocked. Make sure to use a crane with an adequate hoisting capacity to lift the machine. Hoist the machine with extreme caution and transfer it slowly, without jerks or abrupt movements.

![DANGER]

The operations of hoisting and transport can be very dangerous if not carried out with the maximum caution; persons not directly involved should be moved away. Clean, evacuate the area and delimit the transfer zone. Check the state, condition and suit-ability of the means at disposition. Do not touch suspended loads, keeping them at a safe distance. It must be further ascertained that the operational area is free of obstacles and that there is sufficient «escape space», meaning an area which is free and secure into which one could move rapidly in case a load should fall. The surface on which the machine is to be loaded must be horizontal in order to prevent possible shifting.

Once the machine is positioned on the vehicle, make sure that it remains blocked in its position. Fasten the machine on the platform of the vehicle by means of cables suitable for the mass which must be blocked (see «Technical Data» for the weight). The cables must be firmly fastened to the machine and pulled taut to the anchorage point on the platform. Once transport has been carried out and before freeing the machine from all its fastenings, make sure that its state and position are such as not to constitute danger. Remove the cables and proceed to unloading with the same means and methods used for loading.

Transit and transporting on the public highways

**When driving on public roads, be sure to follow the highway code of the country involved.**

The tractor used for transporting the equipment must have the powers shown in the Technical Data table; if necessary, redistribute the total weights with the addition of ballasts to return balance and stability to the whole assembly.

For displacements beyond the work area, the equipment must be placed in the transportation position:

- Rudder pins (R, Fig. 18) inserted and secured with the specific plugs. Remove the anti-tipping device (A2, Fig. 18).
- The cock of the hydraulic circuit of the transport trolley is correctly closed (F, Fig. 15).
- Where provided for, make all the moving parts come within the transport width, locking them with the safety devices (toolbars, row marker arms, row marker discs, etc.).
- The (front, rear, side) clearance tables must be positioned correctly and the lights must be in good working order.
- Road movements must be performed with all tanks empty.
- Any transport accessories must be provided with suitable signs and guards.

When driving on the public roads, fit on the rear reflector triangles, side lights and flashing beacon and always make sure that you comply with the Highway Code and any other applicable regulations. Make sure that the machine dimensions during transfer phases allow for safe transport when travelling in subways, along narrow roads, near electrical lines, etc.

**ATTENTION**

The seed-drill must only be transported by road with the tanks and hoppers empty and at max speed of 25 km/h. Before driving on to the public roads with the machine hitched to the tractor, make sure that the devices listed above and/or the slow vehicle signal and/or the projecting load signal operate correctly. These indicators must be affixed to the rear of the implement in a position where they can be clearly seen by any other vehicle that drives up behind.

The hydraulic delivery hose that controls movement of the carriage is provided with a valve (Fig. 15) which prevents accidental carriage engagement. After preparing the road transport equipment, close all the oleodynamic circuits of the frames, central trolleys and row markers by rotating the handles of the cocks in the indicated position (F, Fig. 15).
3.6 SEED SELECTION

3.6.1 SEED DISTRIBUTOR
A plate (1, Fig. 19), chosen according to the size of the seed, is installed inside the distributors (Fig. 19) (the seed should not be able to enter the hole). Should suction cause some seeds to clog the holes of the plate, these will be left on the ground. The seeder is delivered to the customer with a single set of plates already installed on the distributors. The Manufacturer can supply the client with further sets of plates. (see Table 3, page 57).

REPLACEMENT OF SEED DISC AND ADJUSTMENTS

![fig. 19](image)

![fig. 20](image)

![fig. 21](image)

CAUTION

All operations described in this paragraph must be carried out by expert personnel, equipped with protective gloves, in a clean and dust-free environment.

- The seeder must be clean and dry and stably positioned.
- If the power take-off is hooked to the tractor it must be disconnected, the engine turned off, the key removed and the hand brake pulled.
- Only clean parts in good condition must be installed.
- The plate must be assembled with the pegs (2, Fig. 19) pointing towards the inside of the distributor.
- If some of the pegs are bent or missing from the plate, this means that foreign bodies have entered the distributor, in which case the plate must be replaced.
- If there are circular scratches, they must not exceed 1/3 of the plate thickness.
- Hand-tighten only the winged nut that closes the cover (Fig. 20).

N.B. When replacing worn plates, the cover gasket should also be replaced.

These are the operations to be carried out:
1) Unscrew and remove the wing nut (Fig. 20);
2) Open the distributor cover;
3) Insert or replace the disc;
4) If necessary, adjust the seed-spill prevention plate as described further on;
5) Adjust the selector, as described further on;
6) Close the cover and screw the wing nut back on (Fig. 20).
7) Adjust the selector as described further on.

REPLACING THE COVER SEAL

Check the whole of the seed distributor cover seal surface regularly (A, Fig. 21) for signs of wear.

The seal must be replaced before the surface «A» (Fig. 21), being worn down by the disc movement, reaches surface «B». Also check that no grooves have been made by the disk along surface «A».
EXPELLER SEEDS
Use the light grey coloured seed expeller (C, Fig. 22) for small size seeds with an average diameter less than 3.5 mm (e.g. pelleted sugar beet seed).
Use the black coloured seed expeller (D, Fig. 22) for medium size seeds with an average diameter from 3.5 to 7 mm (e.g. corn).
Remove the seed expellers when using seed with an average diameter greater than 7 mm.

ASSEMBLY
Position the expeller (2) as shown in Figure 22. keeping the expeller pressed against the edge, obtained in the relative seat (3, Fig. 22), block it by the screw (1) kit. The screw is to be mounted only as shown in the picture. Do not interpose any thickness between the expeller and its seat.
Make sure the expeller is flat against the seed disk but that it does not come in contact with the disk. Replace the expeller when worn.

SELECTOR ADJUSTMENT
When the indicator (1, Fig. 23) is moved, it commands a cursor (2, Fig. 23), which slightly touches the plate near the holes, causing the excess seeds to fall. The selector is adjusted at each seed and plate change, towards the lower numbers for small seeds (A, Fig. 23) and viceversa for big seeds (B, Fig. 23).
Adjust the selector and control through the transparent grate (Fig. 24) that the plate is only holding one seed per hole;
IMPORTANT: The selector does not adjust the air flow in the distributor.

ANTI-OVERFLOW PLATE ADJUSTMENT
The anti-overflow plate (1, Fig. 25) can be adjusted to 3 positions and defines the width of the seed inlet gap (2, Fig. 25), so that these cannot flow out of the distributor due to excessive feeding. Adjustment is particularly needed when the ground slopes steeply or when working with small seeds.
In this case, it might be necessary to replace the standard plate with a special one to be used exclusively with small seeds.
Spare part order code: G22270133.
4.0 SOWING

The MTR planting unit is the evolution of the MT model, which for years has represented the reference for precision planting. MTR is now the new reference. In fact, it maintains the same philosophy with greater operational capacities thanks to the largest opening discs in the category and the new multiple adjustment system of the furrow coverer device that guarantees suitable covering also in the most demanding applications. Moreover, the connection parallelogram has been enlarged to guarantee greater stability, fundamental when the working speed is high. It however maintains the flexibility and adaptability of MT to different applications; land prepared traditionally, minimally and with surface residues always guaranteeing constant seeding depth.

PLANTING UNIT (Fig. 401)

1) Seed distributors;
2) Seed hopper (60 liters);
3) Disc-type planter shoe part of planting unit (Ø 420 mm)
4) Depth wheels;
5) Seed-planting depth adjuster;
6) Rear press wheels;
7) Rear closing wheels adjustment;
8) Seed selector;
9) Universal joint for planting unit drive;
10) «ARM STRONG» reinforced parallelogram;
11) Disc coulter;
12) «AIR SPRING»

fig. 401
4.1 SEED SELECTION

4.1.1 SEED DISTRIBUTOR
A plate (1, Fig. 402), chosen according to the size of the seed, is installed inside the distributors (Fig. 402) (the seed should not be able to enter the hole). Should suction cause some seeds to clog the holes of the plate, these will be left on the ground. The planter is delivered to the customer with a single set of plates already installed on the distributors. The Manufacturer can supply the client with further sets of plates. (see Table 4, page 30).

REPLACEMENT OF SEED DISC AND ADJUSTMENTS

**CAUTION**
All operations described in this paragraph must be carried out by expert personnel, equipped with protective gloves, in a clean and dust-free environment.

- The planter must be clean and dry and stably positioned.
- If the power take-off is hooked to the tractor it must be disconnected, the engine turned off, the key removed and the hand brake pulled.
- Only clean parts in good condition must be installed.
- The plate must be assembled with the pegs (2, Fig. 402) pointing towards the inside of the distributor.
- If some of the pegs are bent or missing from the plate, this means that foreign bodies have entered the distributor, in which case the plate must be replaced.
- If there are circular scratches, they must not exceed 1/3 of the plate thickness.
- Hand-tighten only the winged nut that closes the cover (Fig. 403).

N.B. When replacing worn plates, the cover gasket should also be replaced.

These are the operations to be carried out:
1) Unscrew and remove the wing nut (Fig. 403);
2) Open the distributor cover;
3) Insert or replace the disc;
4) If necessary, adjust the seed-spill prevention plate as described further on;
5) Adjust the selector, as described further on;
6) Close the cover and screw the wing nut back on (Fig. 403).
7) Adjust the selector as described further on

REPLACING THE COVER SEAL
Check the whole of the seed distributor cover seal surface regularly (A, Fig. 404) for signs of wear.
The seal must be replaced before the surface «A» (Fig. 404), being worn down by the disc movement, reaches surface «B». Also check that no grooves have been made by the disk along surface «A».
EXPELLER SEEDS
Use the light grey coloured seed expeller (C, Fig. 405) for small size seeds with an average diameter less than 3.5 mm (e.g. pelleted sugar beet seed).
Use the black coloured seed expeller (D, Fig. 405) for medium size seeds with an average diameter from 3.5 to 7 mm (e.g. corn).
Remove the seed expellers when using seed with an average diameter greater than 7 mm.
Loosen the screws (1, Fig. 405) and remove the expeller (2).

ASSEMBLY
Position the expeller (2) as shown in Figure 405, keeping the expeller pressed against the edge, obtained in the relative seat (3, Fig. 405), block it by the screw (1) kit. The screw is to be mounted only as shown in the picture. Do not interpose any thickness between the expeller and its seat.
Make sure the expeller is flat against the seed disk but that it does not come in contact with the disk. Replace the expeller when worn.

SELECTOR ADJUSTMENT
When the indicator (1, Fig. 406) is moved, it commands a cursor (2, Fig. 406), which slightly touches the plate near the holes, causing the excess seeds to fall. The selector is adjusted at each seed and plate change, towards the lower numbers for small seeds (A, Fig. 406) and vice versa for big seeds (B, Fig. 406).
Adjust the selector and control through the transparent grate (Fig. 407) that the plate is only holding one seed per hole.
IMPORTANT: The selector does not adjust the air flow in the distributor.

ANTI-OVERFLOW PLATE ADJUSTMENT
The anti-overflow plate (1, Fig. 408) can be adjusted to 3 positions and defines the width of the seed inlet gap (2, Fig. 408), so that these cannot flow out of the distributor due to excessive feeding.
Adjustment is particularly needed when the ground slopes steeply or when working with small seeds.
In this case, it might be necessary to replace the standard plate with a special one to be used exclusively with small seeds.
Spare part order code: G22270133.
### 4.1.2 DISTRIBUTION ADJUSTMENT

#### SEED CHART (Seeds per hectare)

<table>
<thead>
<tr>
<th>Density (cm²)</th>
<th>45</th>
<th>50</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<td>150</td>
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<td>150</td>
<td>150</td>
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<td>150</td>
<td>150</td>
<td>150</td>
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<tr>
<td>200</td>
<td>200</td>
<td>200</td>
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<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
</tbody>
</table>

**Legend:**
- Density (cm²) refers to the area covered by seeds per hectare.
- The table shows the number of seeds per hectare for different densities.
### Interfila (Inches) - Row spacing (Inches)

<table>
<thead>
<tr>
<th>Interfila (Inches)</th>
<th>Cod.</th>
<th>Row spacing (Inches)</th>
<th>Cod.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,60</td>
<td>36,450</td>
<td>226.800</td>
<td>369.100</td>
</tr>
<tr>
<td>7,00</td>
<td>36,450</td>
<td>239.100</td>
<td>369.100</td>
</tr>
<tr>
<td>7,40</td>
<td>36,450</td>
<td>251.400</td>
<td>369.100</td>
</tr>
<tr>
<td>7,80</td>
<td>36,450</td>
<td>263.700</td>
<td>369.100</td>
</tr>
<tr>
<td>8,20</td>
<td>36,450</td>
<td>276.000</td>
<td>369.100</td>
</tr>
<tr>
<td>8,60</td>
<td>36,450</td>
<td>288.300</td>
<td>369.100</td>
</tr>
<tr>
<td>9,00</td>
<td>36,450</td>
<td>300.600</td>
<td>369.100</td>
</tr>
<tr>
<td>9,40</td>
<td>36,450</td>
<td>312.900</td>
<td>369.100</td>
</tr>
</tbody>
</table>

### USE AND MAINTENANCE

- **Cod. 36,450**
  - 6,60: 226.800
  - 7,00: 239.100
  - 7,40: 251.400
  - 7,80: 263.700
  - 8,20: 276.000
  - 8,60: 288.300
  - 9,00: 300.600
  - 9,40: 312.900
DISTRIBUTION ADJUSTMENT
Distribution adjustment must be done in compliance with:
- the kind of seed that has to be distributed;
- the longitudinal distance between one seed and another.

Kind of seed to be distributed:
Identify the diameter of the holes of the seed disk in Table 4, according to the type of seed to distribute.

### SEED DISK TABLE

<table>
<thead>
<tr>
<th>Holes</th>
<th>SEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nr.</td>
<td>Ø (mm)</td>
</tr>
<tr>
<td>26</td>
<td>5,0 / 5,5 Corn (big sizes), Beans</td>
</tr>
<tr>
<td>26</td>
<td>4,5 Corn</td>
</tr>
<tr>
<td>26</td>
<td>2,5 Sunflower</td>
</tr>
<tr>
<td>36</td>
<td>2,1 Beets, Sorghum, Melon, Squash</td>
</tr>
<tr>
<td>36 (*)</td>
<td>5,5 Beans</td>
</tr>
<tr>
<td>52</td>
<td>4,25 Soyabeans</td>
</tr>
<tr>
<td>72</td>
<td>3,5 Beans, Peas</td>
</tr>
<tr>
<td>72</td>
<td>1,5 Tomato (pied), Spinach, Radish</td>
</tr>
<tr>
<td>72 (**)</td>
<td>1,1 Tomato</td>
</tr>
<tr>
<td>6</td>
<td>2,5 / 3,0 Pumpkin</td>
</tr>
</tbody>
</table>

Table 4

(*) Special for beans.
(**) The seed distributor cover should be replaced by a special one suitable for small seeds.
For special requirements make a specific order.

The values shown on the table are approximate. The definite choice of seed plates is completely up to the user. Complaints for imprecise sowing due to utilization of improper seed plates will not be accepted.

Longitudinal distance between one seed and another:
The longitudinal seeding distance is determined by the number of holes on the seed plate, by the number of teeth and position of the gears on the wheel which transmits the motion to the gearbox, and by how the gears are combined in the gearbox.
On the cover of the gearbox there is a table for adjusting the seeding distance and a table that shows the drive fitted on the gear drive wheel.

1) From the Seed Investment Table 2-3:
Depending on both the row distance of the planter and the selected seed investment per hectare, calculate the longitudinal seed planting distance by using Table 2-3 (Seed Investment chart).

Example:
- Seeding row distance 75 cm;
- number of seeds to be distributed per hectare: 72.000.
According to the “Seed investment Table”, the longitudinal distance between one seed and another is 18,50 cm.

For row distances differing from those listed in the table, apply the following directions:

Longitudinal seeding distance = \( \frac{\text{Ha}}{\text{No. of seeds/ha}} \times 100 \)

Example:
- Ha = 10000 m²;
- Row distance = 0,90 m;
- No. of seeds to be distributed for hectare = 70.000

Longitudinal seeding distance = \( \frac{10000m^2}{0.90} \times \frac{1}{70000} \times 100 = 15.87 \text{ cm} \)

2) About the Seed Planter:
Verify which couple of pinions (Wheel) is to be found (C-D ill. no. 409-410) in the seed planter;

3) From the Table of Longitudinal Seed Planting Distances (Table 5):
- Look for the table that lists the couple of pinions equal to the seed planter’s one;
- Seek the value of the longitudinal seed planting distance previously calculated. Should there be two or more types of disks that assure the same longitudinal seed planting distance, prefer the disk with the largest number of holes.
- Move left and see on which pair of gears (A-B, Fig. 409-410) to place the gear chain;

4) About the Seed Planter:
- Set the gearbox with the identified ratio (A-B);
- If with the pinions (wheel C-D) fitted on the planting unit (Fig. 409-410) it is still not possible to obtain the required seeding distance, use the alternative table, taking care to set the relative pinions (wheel C-D= Z10-Z23.. or Z16-Z23).

To move the chain, open the gearbox cover and loosen the two chain tensioners (2, Fig. 410):
Place the chain (3) on the desired gears and align them.
Retighten the chain by means of the two chain tensioners (2) and close the cover (1).

- The gearbox transmission must be checked every time the longitudinal seed planting distance is changed (see following section).
4.1.3 CHECKING THE GEARBOX TRANSMISSION

To check the correct coupling between the gears inside the gearbox, proceed as follows:
- lift the machine off the ground, switch off the tractor engine, remove the ignition key and engage the parking brake;
- at the same time, with your other hand, grip the drive axle coming out of the gearbox (V, Fig. 411) to exert a slight resistance to the movement; make sure the axle is rotating together with the transmission wheel;
- if the axle (V) does not turn in these conditions, the gearbox is not set correctly; move levers A and B to engage the combination chosen with the seed chart and repeat the check.

Periodically check that, in working position, the pressure on the drive wheels on the transport wheels is sufficient to avoid any slippage, ensuring proper distribution of seeds. If necessary increase the pressure of the spring by turning the nut (R, Fig. 411). The ‘factory’ load is set by setting the corresponding screw protrusion to 20 mm (0.8 inch).

The planting distances reporting in the table are only meant as a guide, as they depend on the different operating conditions of the soil. Therefore, we recommend checking directly the actual distance between the seeds. It is recommended to do trial planting for a few metres to check that seed deposition is taking place as desired, and especially check that the amount of seeds per linear meter corresponds to that intended. The Manufacturer is not responsible for any inconsistencies between the values in the table and the actual values detected.

**LONGITUDINAL SEEDING DISTANCE (Table 5)**

<table>
<thead>
<tr>
<th>Ingran. Gears</th>
<th>Cambio Gearbox</th>
<th>IMPERIAL</th>
<th>CM</th>
<th>CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>C - D</td>
<td>A - B</td>
<td>Inch</td>
<td>Inch</td>
<td>Inch</td>
</tr>
<tr>
<td>4 - 4</td>
<td>6.7</td>
<td>5.2</td>
<td>3.7</td>
<td>2.6</td>
</tr>
<tr>
<td>4 - 3</td>
<td>7.1</td>
<td>5.4</td>
<td>3.9</td>
<td>2.7</td>
</tr>
<tr>
<td>4 - 2</td>
<td>7.5</td>
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**METRIC**

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<td>29.3</td>
<td>21.2</td>
<td>14.7</td>
<td>10.6</td>
</tr>
</tbody>
</table>

The planting distances reporting in the table are only meant as a guide, as they depend on the different operating conditions of the soil. Therefore, we recommend checking directly the actual distance between the seeds. It is recommended to do trial planting for a few metres to check that seed deposition is taking place as desired, and especially check that the amount of seeds per linear meter corresponds to that intended. The Manufacturer is not responsible for any inconsistencies between the values in the table and the actual values detected.

**NOTICE**

Wheel coefficient 10.25 inch/pls
4.2 DEPOSITION OF THE SEED

4.2.1 PLANTING UNIT

In order to ensure that the seeds are all planted at a uniform depth, a few simple adjustments should be made to the planting unit. Adjust the seeding depth by changing the height of the side wheels (1, Fig. 412) using the crank (2, Fig. 412). A numbered scale (3, Fig. 412) enables all of the parts to be adjusted to the same degree.

N.B.: the pointer of the adjustment scale is purely progressive; it does not show a variation in cm on the height of the side wheels.

Depending on the type of soil to be sown, adjust the compression of the springs (E, Fig. 413) to either increase or decrease the seeding element’s power of penetration:

Min. 110 Kg  >>>  Max. 140 Kg

Moving from a notch and the other of the adjustment scale corresponds to a variation of the load of approximately 2.5 kg.

N.B.: the adjustment scale index (F, Fig. 413) is purely progressive and does not, under any circumstances, indicate a variation in kilograms.

4.2.2 REAR COVERING WHEELS

The rear set-up of the seeding elements is of considerable importance in quality sowing (Fig. 414):

A) Rubber «V» shaped (1 inch) press wheels (Ø 300 x 25 mm);
B) Rubber «V» shaped (2 inch) press wheels (Ø 320 x 50 mm);
C) Iron «V» shaped press wheels.

These elements are crucial to the covering of the seeds after they have been sown. They should therefore be suitably adjusted according to the type of seed and type of ground:

- change the position of the rear wheels on their support as shown in the diagram in Figure 415 (D-E);
- using the handle (4, Fig. 412), adjust the pressure of the rear inclined wheels for closing and packing the seed furrow (5, Fig. 412).

If the covering wheels («NO», Fig. 415) are not aligned with the seed furrow, proceed as follows:

- Raise the planting unit.
- Loosen the clamping screw (6, Fig. 415).
- Rotate the cam (7, Fig. 415) by 180° in a clockwise direction to move the covering wheels to the right, and in an anticlockwise direction to move them to the left.
- Visually centre the wheels with the furrow opening disc of the seeding element.

**NOTE:** After centring the covering wheels, ensure that the wheels are all resting on the ground at the same time («SI», Fig. 415) and with the same pressure.

- After completing the adjustments, tighten the clamping screw.
4.2.3 «AIR SPRING»

The compressor air system (Fig. 418) needs for the down force of the row units. It has been powered from 12Volts source on the tractor. Depending on the type of soil to be planted, adjust the compression of the «AIR SPRING» (Q, Fig. 416) to increase or decrease the force of penetration of the planting element:

<table>
<thead>
<tr>
<th>PRESSURE (bar)</th>
<th>LOAD (kg)</th>
<th>PRESSURE (psi)</th>
<th>LOAD (lb)</th>
</tr>
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<tr>
<td>1</td>
<td>9</td>
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</tr>
<tr>
<td>6</td>
<td>145</td>
<td>87</td>
<td>319</td>
</tr>
</tbody>
</table>

The installed sensors allow checking the system pressure, as it can be read on the supplied «SEEDING CONTROL» monitor.

**PRESSURE ADJUSTMENT AIR SPRING**

**ATTENTION**

All operations related to maintenance, adjustments and work preparation must be carried out necessarily with the tractor PTO disconnected, equipment resting on the ground on the supporting feet, clamping wedges placed under the wheels, with the tractor turned off, fully stationary and with the keys removed.

1) On the compressor (Fig. 417), pull the button (T, Fig. 418) into the «ON» position to start the compressor and load the tank with air. Pressure in the circuit. Upon reaching a pressure of 8 bar (116 psi) (+/- 2 %) the compressor switches off automatically (V, Fig. 418).

2) To adjust the pressure on the «AIR SPRING» springs, act on the pressure reducer (U, Fig. 418), pulling the knob upwards and rotating it clockwise to increase it and anticlockwise to decrease it.

**ATTENTION: DO NOT EXCEED 6 bar (87 psi) pressure.**

Recommended pressure 2 bar (29 psi) (Z, Fig. 418). Increase or decrease pressure depending on the type and conformation of the ground.

3) To prevent corrosion, at the end of the job empty the tank and drain the condensation, which forms inside due to air humidity, via the tap (W) located under the tank itself.

**ATTENTION!** Before carrying out maintenance on the compressor, disconnect the battery power cables.

The compressor inflates the air spring on the eight rows for corn (8 row at 30 inch spacing). By the cock (X, Fig. 419) the air spring on the staggered units can be inflated (15 row at 15 inch spacing).
4.2.4 SOIL SCRAPER DISC FURROWS

Planting units are supplied with soil scrapers in production configuration (F, Fig. 420) which adhere to the disc furrows. The soil scrapers are enabled or disabled by turning the supplied screw (8) as follows:
- F) soil scrapers enabled;
- G) soil scrapers disabled.

4.2.5 DISC COULTER

The purpose of this disc is to help the furrow opening discs to penetrate into the seedbed and cut or move the crop residue in minimum tillage conditions. Disc penetration depth is controlled by the force exerted on the seeding element. In normal tillage conditions, the disc should work at a height that is approx. 10 mm (0.4 inch) higher to that of the furrow opening disc (Fig. 421).

The planting unit may also be equipped with a rotating residue spreader that can be coupled to the disc coulter, in order to ensure efficient clearing of the seedbed (Fig. 422).
4.2.6 PLANTING UNIT EXCLUSION
Switch off the tractor and remove the ignition key.
Raise the single planter from the ground as follows:
- Fit the spring as shown in position «9a» (Fig. 424).
- Lift the planting unit using the lever (10, Fig. 424).
- Press and hold down the sleeve (11, Fig. 425) in the direction indicated by the arrow, push forward while turning the ring nut (12, Fig. 425) until the iron pin comes free.
- Pull the sleeve back as far as it will go (11, Fig. 425).
- To render the drive operative again, push the sleeve forward and lock the ring nut again against the iron pin.
- Fit the spring as shown in position «9b» (Fig. 424) to lower the planting unit to the production position. Then, lift the planting unit to disable the block by means of the supplied lever (10 in Fig. 424).

IMPORTANT!
Pay the greatest attention to the couplings of the cardan shafts (A, Fig. 425) and follow the position of the crosses.

4.2.7 PLANTING UNIT TRANSMISSION
Each case is equipped with a safety pin which breaks (13, Fig. 425) when the rotating of the seed plate is forced or jams as a result of foreign bodies entering the distributor (paper, string etc.) Should this occur, pour the seeds out of the container, check and clean the distributor, check the plate pegs and replace the safety pin.

WARNING! Do not over-tighten the screws holding the case (14 Fig. 425). It should be able to oscillate.

4.3 VACUUM BLOWER
The vacuum blower (Fig. 426) creates a vacuum inside the distributors, so that the seeds are aspirated onto the holes in the plate. The tensioning and good condition of the belt are therefore of vital importance to ensure the good for the good operation of the vacuum blower and, hence, the success of the sowing. The belt is correctly tensioned when it does not yield under the pressure of a hand.

Belt checking procedure:

WARNING
Before conducting the operations reported below make sure the tractor’s motor is off:
- Remove the protective housing.
- Loosen the 4 screws (1, Fig. 426).
- Loosen the nut (2, Fig. 426).
- If worn, replace the belt (4, Fig. 426).
- Tension the belt by tightening the screws (3, Fig. 426).
- Tighten the bolts loosened before and close the casing.

Vacuometer
The instrument (5, Fig. 426) is the vacuum measuring device. The average approximate aspiration values are:
for large seeds (corn, soybean): \(-60 \div -70\) mbar;
for small seeds (sugarbeat): \(-40 \div -50\) mbar.

The recommended RPM value for the PTO must be reach for the right vacuum value.

For the vacuum on the staggered units(15 row at 15 inch spacing) the cock must be open (A, Fig. 427). For corn on 8 row at 30 inch spacing the cock must be close (B, Fig. 427).
4.4 ROW MARKER

The row marker is a machine that traces a reference line parallel to the tracks of the tractor on the ground.

Once the tractor has completed its run and it has turned around, follow the reference row with one of the front wheels (L1, Fig. 428) or with the centre of the tractor (L2, Fig. 428) according to the row marker employed, where:

\[ L = \text{the distance between the outer most unit and the row marker;} \]
\[ D = \text{the distance between the rows;} \]
\[ N = \text{the number of units operating;} \]
\[ C = \text{the tractor’s front wheelbase.} \]

Each time it passes, the planter will mark a reference line on the side opposite to the previous passage.

Row-marker arm inversion is activated by the tractor’s hydraulic distributor control.

The plungers should be connected by their hydraulic pipes to the ancillary hydraulic distributors of the tractor.

The hydraulic row marker device has a valve that alternately operates the two arms, so that just one hydraulic tractor distributor is present.

When the system is not in use protect the quick couplings with the hoods provided (Fig. 429) and house the hydraulic pipes in the support provided for the purpose.

**ROW MARKER DISK ADJUSTMENT**

Rotate the row marker arm from the transport position to the operating position (W, Fig. 431).

Row marker with trace on the tractor wheel (L1)

Using the Table 7 shown, read the distance (L1, Fig. 428) at which the disc is to draw the reference line.

Regulate the disc at the correct distance, tilt it slightly and firmly tighten the nuts (A, Fig. 430).

For distances not covered by the table, use the following rule:

\[ L = \frac{D(N + 1) - C}{2} \]

Row marker with trace in the centre of the tractor (L2)

Using the Table 7 shown, read the distance (L2, Fig. 428) at which the disc is to draw the reference line.

Regulate the disc at the correct distance, tilt it slightly and firmly tighten the nuts (A, Fig. 430).

For distances not covered by the table, use the following rule:

\[ L = \frac{D(N + 1)}{2} \]

---

**Table 7**

<table>
<thead>
<tr>
<th>METRIC</th>
<th>L1 (WRM)</th>
<th>L2 (CRM)</th>
<th>IMPERIAL</th>
</tr>
</thead>
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<td>600</td>
</tr>
<tr>
<td>6</td>
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<tr>
<td>240</td>
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<td>200</td>
<td>250</td>
</tr>
</tbody>
</table>

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WARNING

During travel by road, lock the row marker arms in a vertical position with the safety bolts (C, Fig. 432) and turn the discs to come within the machine’s overall dimensions (T, Fig. 431) locking them with the bolts supplied.

4.4.1 ADJUSTING THE HYDRAULIC SYSTEM

System regulation
The hydraulic systems provided come equipped with one-way flow regulators (1-2, Fig. 433) which allow for the regulation of the quantity of oil during opening (1) or closing (2), depending on how the regulators have been installed:

Flow from A to B, free;
Flow from B to A, choked (regulated).

To regulate, loosen the lock nut (3, Fig. 433) and turn the knob (4). Once this adjustment has been made, re-tighten the lock nut.

WARNING

Make sure that the result of this adjustment does not cause the rising or descent speed, of the lateral frame and the arms rows marker, to damage the structure itself.
4.5 DISTRIBUTION OF CHEMICAL PRODUCTS

Fertilising products are distributed via special dosers (Fig. 434) mounted under the respective tanks.

4.5.1 FERTISYSTEM DISTRIBUTOR (Fig. 434)

1) Fertilizer transport conveyor: driven by the axle, it feeds the fertilizer. Simple and quick maintenance and replacement.
2) Rubber ring: keeps the fertilizer feed auger in place.
3) Auger drive axle: covered with injected plastic coated with non-stick coating, it has great durability and a low friction coefficient.
4) Fertilizer discharge chute: removable for easy cleaning and maintenance of the auger.
5) Level bulkhead: achieves an even and consistent fertilizer overflow. Periodically check the correct fitting on the lid. NEVER use the FERTISYSTEM distributor without the level bulkhead.
6) Discharge chute cover with rubber bulkhead: prevents entry of water and enables release of fertilizer in the event of delivery tube clogging.
7) Quick coupling spring of the fertilizer discharge chute.
8) Main body: made of plastic, corrosion-resistant and durable.
9) Distribution chamber lining: component designed with non-stick and abrasion resistant material.
10) Self cleaning fill hole: allows discharge of any fertilizer accumulations to avoid damage to the bearings.
11) Dual ball bearings: lubricated and protected by seal rings.
12) Drive axle support: support the drive axle that connects the FERTISYSTEM distributors to the transmission of the planter with double ball bearings, lubricated and protected by seals.

Keep all parts and components that are direct and indirect contact with fertilizers clean, since fertilizer is highly corrosive and abrasive, and can generate oxidation and chemical reactions.

DISASSEMBLY AND ASSEMBLY OF THE AUGER

Periodicamente è necessario effettuare interventi di pulizia e di manutenzione del distributore rendendo indispensabile la rimozione della coclea. Semplici operazioni consentono di smontarla e rimontarla:

1) remove the discharge chute unlatching both quick release springs (1, Fig. 435);
2) using the supplied assembly tube, pull out the fertilizer auger and the rubber ring (2, Fig. 435).

Before assembling the auger, make sure that the bottom of the distributor is completely clean and free from fertilizer or other debris. Perform the required operations and subsequently reassemble the auger:

3) Insert the auger (A) and the rubber ring (B) on the drive axle (3, Fig. 436);
4) using the supplied assembly tube, push the rubber ring (4, Fig. 436) up to the inner edge of the distribution chamber.

The auger must be well seated into the bottom of the distributor. If the auger is not correctly positioned, changes in the distribution of fertilizer or damage to the distributor can occur.

**IMPORTANTE**
The auger is held in place by the rubber ring. Immediately replace the rubber ring as soon as signs of wear or lack of tightness (pressure) occur.
At the end of each use, it is important to remove the augers to avoid corrosion, then they must be washed, brushed and placed in containers with lubricating oil.
ASSEMBLY OF THE DISCHARGE CHUTE (Fig. 437)
Position and slightly tilt the discharge chute (C) to the main body (D), making sure that the rubber bulkhead (E) fits correctly in the area (F) of the main body.
Then fully insert the discharge chute (C) in the main body (D). Use the guides (G) to properly perform the operation.
Block the discharge chute to the main body with the quick release springs (H) on both sides, making sure they are correctly latched.

ATTENTION
When pulling out the discharge chute, be careful to not injure your hands because of the return effect of the springs.

At the end of the assembly check that the rubber bulkhead is correctly seated in zone (F, Fig. 437).

ASSEMBLY OF THE COVER IN THE DISCHARGE CHUTE (Fig. 438)
Tilt the cover (C) to align the flat face of the rectangular channel (I) with seat (L) located on the discharge chute. Slide in the cover in the rectangular seats (on both sides) and rotate it to seat it fully on the discharge chute (Fig. 438).

TUBE FOR DISTRIBUTOR MAINTENANCE
To perform maintenance and cleaning, or to replacing the fertilizer transport auger without needing to unload the hopper completely, use the supplied maintenance tube (M), Fig. 439.
Remove the discharge chute unlatching both springs and insert the tube, rotating it to move the fertilizer present distribution chamber, until it reaches the seat on the bottom of the distributor. The maintenance tube has a bevel at the end to facilitate insertion.

EXCLUSION OF THE FERTISYSTEM DISTRIBUTOR (Fig. 440)
Use the exclusion tube if necessary, to exclude a distributor from the fertilizer distribution. To perform this operation, follow the following instructions:
1) remove the discharge chute unlatching both springs;
2) using the supplied assembly tube, pull out the fertilizer transport auger and the rubber ring;
3) insert the exclusion tube into distribution chamber;
4) reassemble the discharge chute latching both quick release springs.
4.5.2 DISTRIBUTION CONTROLLER (GEARBOX)

The amounts to be distributed are determined by a cam adjustment device (gearbox), friction-driven by the drive wheels. The adjustment gearbox can be used to adjust the speed of rotation of the fertilizer distributors using the adjustment lever that is calibrated on a continuous 1 to 50 scale (Fig. 442).

Each adjustment must be performed as follows: loosen the knob, move the lever to full scale “50”, then back to “0” (zero), then position it at the desired amount. Lock it by tightening the knob.

In the table below, based on the seed row spacing, the density (specific weight), identify the amount per hectare of fertiliser to be distributed, to determine the approximate gearbox opening setting.

Example (1):

<table>
<thead>
<tr>
<th>Row spacing (cm)</th>
<th>Density (kg/m³)</th>
<th>Posizione del cai</th>
<th>Quantità · Quantità · Menge</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>0.8</td>
<td>2 4 6 8 10 12 14 16 18 20</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20</td>
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<tr>
<td>70</td>
<td>0.8</td>
<td>120</td>
<td>75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96</td>
</tr>
</tbody>
</table>

ATTENTION! The values in this Table 8 are only approximate values, because the specific weight and size of the seeds are often different. In any case always refer to the specific weight printed on the product packaging, or failing that, contact the manufacturer.

NOTE:

In the case of the use of level bulkhead supplied is necessary to increase the distribution values, reported in the Table 8, the percentage indicated below (Fig. 441):

- The initial setting should never be considered final.
- Always check the specific weight of the fertiliser used to adjust the setting of the gearbox.
- Normal working conditions may change when the activity is paused due to rain, overhauls, maintenance, etc., events that may determine humidity inside the hopper and dosing units. High humidity fertilizers cause uneven distribution. Therefore, after a pause, resume operation only after checking for proper distribution.
- Always use the same parameters and measuring conditions (type of fertilizer, grain size, moisture, tank level, etc...) to obtain comparable results.
- Adjustments performed at the beginning of the day are not affected by situations that may occur during operation: formation of fertilizer lumps, scale along the walls of hoppers, voids created by the fertilizer lumps, deposits or other impurities inside the doser.

Repeat the adjustment at least after emptying of the hopper.

- When filling the hopper, fertilizer must be distributed evenly, not separating grains and powder.
- The use of the grids (Fig. 443) retains lumps of fertilizer and other foreign matter that can accidentally enter the hopper during loading.
- Periodically check that the auger is not compromised by excessive corrosion or foreign objects such as stones, tools, twine, paper of the bag or other material, that accidentally could be put in the hopper during loading.
- Uneven wear of the augers in use may cause an uneven distribution of manure along the rows.
## Table of Distribution Quantity (Table 8)

**Metri**

|       | 2   | 4   | 6   | 8   | 10  | 12  | 14  | 16  | 18  | 20  | 22  | 24  | 26  | 28  | 30  | 32  | 34  | 36  | 38  | 40  | 42  | 44  | 46  | 48  | 50  |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cod.  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| **4.5.3** TABLE OF DISTRIBUTION QUANTITY |

**American**

|       | 2   | 4   | 6   | 8   | 10  | 12  | 14  | 16  | 18  | 20  | 22  | 24  | 26  | 28  | 30  | 32  | 34  | 36  | 38  | 40  | 42  | 44  | 46  | 48  | 50  |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **4.5.3** TABLE OF DISTRIBUTION QUANTITY |

**Use and Maintenance**

**Table 8:**

**Cod. GI9708291**

**Tableau distribuzione concime - Table of fertilizer distribution**

**Table de la Dungemittelverteilung - Tableau de distribution fertilisant**

**Table Distribuzione fertilizzante - Tabelle der Verteilung der Düngemittel**

**Quantità - Menge - Quantité - Cantidad - Количество (Kg/ha)**

**Row spacing (cm) | Density (quart) | Quantity | Menge | Quantité | Cantidad | Количество**
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**ATTENTION!** The values in this table are only approximate values, because the specific weight and size of the seeds are often different. In any case always refer to the specific weight printed on the product packaging, or failing that, contact the manufacturer.
4.5.4 REGULATING THE FERTILIZER INTERRING HOE

The depth and distance of the seeding line fertiliser is defined by the supplier of the product: factory setting is at 7 cm (2.75 inch). For large quantities, it is recommended that the distance be increased to avoid “burning” the seed.

Before using the planter, make sure that all of its seeding components have the same adjustments, as well as being suitable to the quantity per hectare and the type of fertiliser that is to be distributed, so that no damage is done to the crop.

Change the distance if required. Also regulate the depth at which the fertilizer is interred, by changing the height of the spring (N, Fig. 444).

After completing this operation, cut any extra off the length of the tube so as to prevent the creation of folds which could obstruct the flow of the fertilizer (O, Fig. 444).

4.5.5 HOPPER AND TANK FILLING

Hoppers and tanks can be filled by hand or using a lifter with a capacity of at least 200 kg (440 lb), which must be regularly approved by the relative authorities. Remember that weights of more than 25 kg (55 lb) must either be lifted by more than one operator or the above-mentioned lifter must be used following the instructions included in the relative use and maintenance manual.

WARNING

- All fertilizer spreader tank loading and unloading operations must be carried out with the planting unit at a standstill, on the ground, with the frame open, with the hand brake on, with the motor switched off and the starter key removed from the control panel. Make sure that chemicals are kept out of harm’s way.
- All operations must be carried out by trained staff wearing suitable protection (overalls, gloves, boots, masks etc) in a clean, dust-free environment.
- Do not place any bags of fertilizer or any other object on the fertilizer distributor container covers to avoid breaking them or endangering property or persons.
- When filling the seed, fertilizer and insecticide hoppers, ensure that no foreign bodies (string, paper, etc.) enter them.
- The seeding machine can transport chemical substances. Do not allow children, people, pets to come near the seeding machine.
5.0 OPERATIONS FOR PUTTING THE MACHINE INTO SERVICE

5.1 WHEN THE MACHINE IS NEW
- Assemble onto the equipment any parts that may have been delivered disassembled for transport purposes (follow the instructions given in the assembly diagrams attached to these parts).

5.2 CHECKS AND PREVENTATIVE MAINTENANCE
- Check that the safety bolts are present on the pins:
  a) 3-point linkage connecting pins;
  b) pins for locking the row marker arms for road transport.
- Check that the pipes of the hydraulic system are undamaged.
- Check that all the screws are tight.
- Grease the row-marker disc pin.
- Grease the pin of the seeding depth control wheels.
- Check that all the suction tubes are well connected.
- Check that all the drive shafts are properly engaged.
- Carefully check moving parts, driving parts and seed distribution.

5.3 ATTACHMENT THE TRACTOR
- Attach the equipment to the tractor’s towing device, using the safety devices provided.
- Connect the hydraulic pipes to the distributors of the tractor.
- Plug the visual signalling units into the socket of the tractor’s electrical system.
- Remove the safety bolts of the row marker arms and the toolbar, and operate the hydraulic systems to check they are working correctly. If necessary, adjust the flow regulators where present.
- Lift the equipment off the ground and remove the support legs (Fig. 501).
- When travelling by road, lock the row marker arms and the toolbar in transport position with the safety bolts.

5.4 PREPARING FOR SEEDING
- From the seed chart, according to the row spacing, obtain the distance between one seed and the next along the row.
- From the longitudinal sowing distance adjustment table, obtain the combinations of gears on the gearbox and on the drive wheel that will produce this distance.
- Insert the right seed discs in the distributors.
- If beet seed is to be distributed, use the seed ejector. In other cases, remove the ejector.
- Put a small quantity of seed in the hoppers.
- From the driver’s seat of the tractor, raise the planter;
- Operate the vacuum blower.
- Using the gear lever, put the tractor engine into neutral;
- Brake the tractor and, if necessary, block it by wheel chocks of adequate dimensions under the wheels.
- Manually turn the planter gear drive wheel in the direction in which the machine is moving;
- Open the grate and adjust the selector and control that just one seed per hole is on the seed plate (Fig. 502);
- Adjust the planting depth by turning the side wheels by means of the handle.
- According to the type of ground, adjust the distance of the rear wheels and their pressure on the ground for closing the seed furrow.
- Check the degree of preparation of the seedbed and adjust the height of the front clod clearer.
- Move along the seedbed for a few metres with the equipment in working position, and adjust the third point tie rod to obtain true perpendicularity between machine and ground.
- Proceed with the planting process: after a few metres check whether the distributors are placing one seed at a time and at the right distance.

5.4.1 CONVERSION FROM 8 ROWS TO 15 ROWS
1) Open the cock for the vacuum on the staggered units (15 row at 15 inch spacing) (A, Fig. 427);
2) Open the cock of the air spring on the staggered units (15 row at 15 inch spacing) (X, Fig. 419).
3) Fit the spring as shown in position «9b» (Fig. 424) and lift the row units to disable the block by means of the supplied lever (10 in Fig. 424).
4) To render again the drive operative, push the sleeve forward and lock the ring nut again against the iron pin (Fig. 425).
5) Change the seed plate according to the seed to be distributed and set the right combination of the gearbox transmission;
6) Open the grate and adjust the selector and control that just one seed per hole is on the seed plate (Fig. 502);

5.4.2 CONVERSION FROM 15 ROWS TO 8 ROWS
1) Close the cock for the vacuum on the staggered units (B, Fig. 427);
2) Close the cock of the air spring on the staggered units (X, Fig. 419).
3) Fit the spring as shown in position «9a» (Fig. 424) and lift the row units to disable the block by means of the supplied lever (10 in Fig. 424).
4) Press and hold down the sleeve (11, Fig. 425) in the direction indicated by the arrow, push forward while turning the ring nut (12, Fig. 425) until the iron pin comes free. Pull the sleeve back as far as it will go (11, Fig. 425).
5) Change the seed plate according to the seed to be distributed and set the right combination of the gearbox transmission;
6) Open the grate and adjust the selector and control that just one seed per hole is on the seed plate (Fig. 502);
5.5 DISTRIBUTION OF CHEMICAL PRODUCTS

- Hoppers and tanks can be filled by hand or using a lifter with a capacity of at least 200 kg (440 lb), which must be regularly approved by the relative authorities.
- When filling the fertilizer and insecticide hoppers, be careful that foreign bodies do not enter (string, bag paper, etc.).
- Set the quantity to distribute following the information given in the table (the values given in the table are a rough guide only).
- Adjust the working depth and the distance of the fertilizer placement units from the sowing row, carefully following the specific agronomic instructions of each crop.

5.6 DURING SEEDING

- After having performed all the operations above, the planter is ready to work. However, it is recommended to do trial planting for a few metres to check that seed deposition is taking place as desired, namely check that the amount of seeds per linear meter corresponds to that intended. Example: if the longitudinal planting distance set is «d = 16 cm (6.3 inch)», this means that in 160 cm (63 inch) (L) there must be 11 seeds (10 spaces) as shown in the figure below.

- During the planting process, check the distribution of the seeds often. If this is not accurate, check the selector and the transmission ratios.
- At the end of each run, during the direction change manoeuvre, the vacuum blower must always stay on to keep the seeds attached to the distributor discs.
- If there is a loss or decrease of suction, check that the pipes are not damaged or clogged; if so, replace or clean them, checking the aspirator belt also.
- During seed drilling, periodically check the pressure of the tyres in accordance with the values shown in the "TECHNICAL DATA" table. Flat tyres cause irregular seed planting.
- If the fertilizer is very wet, due to rain or other factors, remove the level bulkhead (A, Fig. 503) and drive the distributors to expel the completely slurried fertilizer. Then reassemble the level bulkhead.

⚠️ CAUTION

- The shape, dimensions and material of the drive shaft elastic pins have been selected for reasons of safety. The use of non-original or more resistant pins could cause serious damage to the seeding machine.
- Start the vacuum blower gradually, sudden jerks cause damage to the belt.
- Avoid curves with the machine grounded, and do not work in reverse. Always lift it when changing direction or reversing.
- Do not work with the power take-off synchronized with the wheels.
- Do not exceed the number of revolutions per minute indicated on the power take-off.
- Never push the tractor to maximum revs.
- Maintain a seed planting speed that is compatible with the type and preparation of the soil in order to avoid breakages or damage.
- Low the seeding machine while the tractor is moving so as not to clog or damage the coulter parts. For the same reason it is unadvisable to manoeuvre in reverse with the planter lowered.
- When filling the seed, fertilizer and insecticide hoppers, ensure that no foreign bodies (string, paper, etc.) enter them.

⚠️ DANGER

The seeding machine can transport chemical substances. Do not allow children, people, pets to come near the seeding machine.

⚠️ WARNING

Do not place any bags of fertilizer or any other object on the fertilizer distributor container covers to avoid breaking them or endangering property or persons. Load from the outer sides of the machine. It is forbidden to come near the containers of the chemical substances or to open them when the seeding machine is operating or about to operate.
5.7 THE END OF OPERATION
- Disconnect the power take-off.
- Lock the row marker arms and the toolbar in transport position with the safety bolts.
- At the end of seeding, discharge the remaining seeds through the distributor door (Fig. 504).
- Carry out road transfers with the hoppers empty.
- During road transport, observe the Highway Code in force in your country.

5.8 DAILY REST PERIOD
- Put the support legs in the parking position (Fig. 505).
- Disconnect the cardan shaft.
- Unhook the equipment from the tractor.
- Wash the equipment with abundant water, giving special attention to the hoppers that contained chemical substances, and then dry it.
- On completion of the work, the hopper should be carefully cleaned. This particularly applies to the fertilizer hoppers. Adhere to the ecological standards applicable for the disposal of polluting liquids.
- Put it in a place where it will be out of the reach of unauthorized persons.
6.0 MAINTENANCE

Here follows a list of various maintenance operations to be carried out periodically. Lowered operating costs and a longer lasting seeding machine depend, among others, on the methodical and constant observation of these rules.

- Before to carry out any operation of maintenance by machine raised, to make sure to have inserted the two correctly it block mechanical of safety on the two central carts, wheels which blocked with wedges, to assure the car with of the supports (supports) so as to avoid of any accidental handling, tractor extinguished, set in action brake of parking and which switched off key.

- The maintenance periods listed in this manual are only intended as a general indication and apply to normal operating conditions. They may, therefore, vary depending on service conditions, dust factors, seasonal factors, etc. For heavier conditions of service, maintenance will, of course, have to be carried out more frequently.

- All operations must be carried out by expert personnel, equipped with protective gloves, in a clean and dust-free environment.

- All maintenance operations must be carried out with the machine hooked up to the tractor, the parking brake engaged, the engine off, the ignition key removed and the equipment sitting on suitable supports on the ground.

ATTENTION

USING OILS AND GREASES

- Before injecting grease, the nipples must be cleaned to avoid mud, dust and foreign bodies from mixing with the grease, otherwise they will reduce or even annul the effect of the lubrication.

- Always keep oils and grease out of reach of children.

- Always read warnings and precautions indicated on the containers carefully.

- Avoid skin-contact.

- After use wash the equipment thoroughly.

- Treat the used oils and polluting liquids in conformity with the laws in force.

RECOMMENDED LUBRICANTS

- For lubrication in general, we advise use a OIL SAE 80W/90.

- For all greasing points we advise use a lithium saponified multipurpose grease with EP additives.

CLEANING

- The products used for cleaning must be disposed of according to the laws in force.

- Clean and maintain the machine after putting any removed guards back in position. Replace them with new ones, if they are damaged.

- Clean the electrical components only with a dry cloth.

USING PRESSURISED CLEANING SYSTEMS (Air/Water)

- Do not pressure clean electrical components.

- Do not pressure clean chromium-plated components.

- Do not place the nozzle in contact with the parts of the equipment, especially the bearings. Keep it at a min. distance of 30 cm from the surface to be cleaned.

- Always keep in mind the rules that regulate use of these systems.

- Thoroughly lubricate the equipment, especially after cleaning it with pressurised systems.

ELECTRIC SYSTEMS

- Cut out power to the electric system before performing any operation.

HYDRAULIC SYSTEMS

- Hydraulic systems must be maintained exclusively by skilled operators.

- The hydraulic system is under high pressure; because of the accident risk, when searching for leakage points special auxiliary instruments should be used.

- In case of participation on the hydraulic system, to unload the hydraulic pressure carrying all the hydraulic commandos in all the positions some times after to have extinguished the motor.

- Oil escaping at high pressure can cause skin injury with the risk of serious wounds and infection. Call a doctor immediately if such an incident occurs. If the oil with surgical means is not removed quickly, can take place serious allergies and/or infections. Therefore, the installation of hydraulic components in the tractor driver’s cab is strictly forbidden. All the components of the system should be positioned carefully to avoid parts being damage during use of the equipment. At least once a year have the hydraulic pipes checked for wear by an expert.

- Replace the hydraulic pipes if they are damaged or worn by aging.

- Replace the hydraulic pipes every 5 years even if they have not been used (natural aging).

Figure 601 (A) shows hydraulic pipes bearing the year of manufacture as an example.

After the first 10 hours of operation and then after every 50 hours, check that:

- all the elements of the hydraulic system are water-tight;

- all the joints are tight;

Before starting the machine up, check that:

- the hydraulic pipes are connected correctly;

- the pipes are positioned correctly, and they are free to move during standard manoeuvres;

- any damaged or worn part is replaced, if necessary.

Replace the hydraulic pipes in the following cases:

- when external damage is identified such as cutting, tearing and wear due to friction, etc.;

- when they are deteriorated on the outer surface;

- when they are deformed beyond their natural shape due to crushing, formation of bubbles, etc.;

- when leaks are identified near the pipe sheath (B, Fig. 601);

- when the sheath is corroded (B, Fig. 601);

- 5 years after their manufacture (A, Fig. 601).
6.1 TORQUE VALUES CHART

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</table>

Torque tolerance ± 0%, -15% of torquing values. Unless otherwise specified use torque values listed above.

### TORQUE – HYDRAULIC TUBES AND FITTINGS

<table>
<thead>
<tr>
<th>Tube Nuts for 37 ° Flared Fittings</th>
<th>O-Ring Boss Plugs, Adjustable Fitting Lock Nuts, Swivel JIC - 37 ° Seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Tubing OD</td>
</tr>
<tr>
<td>4</td>
<td>1/4</td>
</tr>
<tr>
<td>5</td>
<td>5/16</td>
</tr>
<tr>
<td>6</td>
<td>3/8</td>
</tr>
<tr>
<td>8</td>
<td>1/2</td>
</tr>
<tr>
<td>10</td>
<td>5/8</td>
</tr>
<tr>
<td>12</td>
<td>3/4</td>
</tr>
<tr>
<td>14</td>
<td>7/8</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>1-1/4</td>
</tr>
<tr>
<td>24</td>
<td>1-1/2</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
</tr>
</tbody>
</table>

### USE AND MAINTENANCE

| Size | Tubing OD | Thread Size | Min | Max | LB FT | Min | Max | LB FT |
| 2 | 1/4 | 6.4 | 9/16-20 | 10 | 12 | 12 | 16 | 11/16-20 | 18 | 20 | 20 | 24 |
| 8 | 1/2 | 12.7 | 13/16-16 | 32 | 35 | 43 | 47 | 1-14 | 46 | 50 | 60 | 68 |
| 10 | 5/8 | 15.9 | 1-3/16-12 | 65 | 70 | 90 | 95 | 1-3/16-12 | 65 | 70 | 90 | 95 |
| 12 | 3/4 | 19.1 | 1-3/16-12 | 65 | 70 | 90 | 95 | 1-3/16-12 | 65 | 70 | 90 | 95 |
| 14 | 7/8 | 22.2 | 1-11/16-12 | 92 | 100 | 125 | 135 | 1-11/16-12 | 125 | 140 | 170 | 190 |
| 16 | 1 | 25.4 | 2-1/2-12 | 150 | 165 | 200 | 225 | 2-1/2-12 | 150 | 165 | 200 | 225 |

Above torque figures are recommended for plain, cadmium, or zinc plated fittings; dry or wet installations, and swivel nuts, either swaged or brazed. These torques are not recommended for tubes 12.7 mm (0.5 in) OD and thicker with wall thickness of 0.889 mm (0.035 in) or less. The torque is specified for 0.889 mm (0.035 in) wall tubes on each application individually.

cod. G19504050
### 6.2 MAINTENANCE PLAN - Summary table (Table 12)

<table>
<thead>
<tr>
<th>INTERVAL</th>
<th>TYPE OF WORK</th>
</tr>
</thead>
</table>
| **WHEN THE MACHINE IS NEW** | - Grease all parts indicated by transfer nr. 18 ('GRASE') at page 9 of this leaflet.  
- Lubricate all the transmission chains with mineral oil (SAE 85W-90).  
- After the first hours of work check that all the bolts are still tight.  
**WARNING!** Do not over-tighten the screws holding the case (C, Fig. 602). It should be able to oscillate. |
| **AT THE BEGINNING OF THE SEEDING SEASON** | - Check the pressure of the tyres (see technical data table).  
- Lubricate all the transmission chains with mineral oil (SAE 85W-90).  
- Check the fixing and the state of wear of all the suction tubes and the delivery tubes for fertilizer and other chemical products.  
- Run the seeding machine loadless, the airflow clears the pipes of condensation and removes any impurities.  
- Check the tensioning of the vacuum blower belt (Fig. 426). |
| **EVERY 8 WORKING HOURS** | - Lubricate all the transmission chains with mineral oil (SAE 85W-90).  
- Grease the universal joint spiders.  
- Grease the bevel gear pair of the cardan shaft of the planting units (1, Fig. 602).  
- Grease the pin of the seeding depth control wheels (2, Fig. 602).  
- Carry out a complete and thorough cleaning of the body of the FERTISYSTEM distributor (Fig. 605): remove all discharge chutes, augers (as shown in chapter 4.5) and carry out a complete and thorough cleaning of it all. |
| **EVERY 50 WORKING HOURS** | - Inspect the condition of the seed plates; if any of the pegs are missing or bent, replace the plate with an original spare; if there are circular scratches on the plates they must not exceed 1/3 of the disc thickness.  
- Clean the seed distributor carefully and thoroughly; replace the cover seal if necessary.  
- Check the tensioning of the vacuum blower belt (Fig. 426).  
- Make sure the toothed wheels are properly aligned and the transmission chains are tensioned to prevent them from wearing out in little time or a failure affecting the transmission parts.  
- Check that all the bolts are still tight.  
- Grease all the joints of the row marker shown in Figure 603.  
- Grease all frame joints indicated in Figure 604-607.  
- Grease all the wheel joints shown in Figure 608.  
- Check the oil level in the gearbox and top up to level (H, Fig. 609) whenever necessary using the same type of oil whenever possible. |
| **EVERY 100 WORKING HOURS** | - Clean or replace the compressor suction filter (B, Fig. 606).  
**ATTENTION!** Before carrying out maintenance on the compressor, disconnect the battery power cables. |
| **EVERY SIX MONTHS** | - Oil the height adjuster screw the depth wheels (3, Fig. 602). |
| **EVERY 400 WORKING HOURS** | - Completely change the oil of the seed and fertilizer distribution controller gears (Fig. 609-610) according to the following specifications. |
| **PERIODICALLY** | - Check the pressure of the planter tyres (see «3.2 Technical Data»).  
- Check that fertilizer sediments and deposits do not form in the FERTISYSTEM distributors in the area indicated in Figure 611 (X). |
| **EVERY FIVE YEARS** | - To replace all the tubes of the hydraulic systems. |
| **REST PERIODS** | At the end of the season, or if a long period of rest is foreseen it is advisable to:  
1) Wash the equipment thoroughly with water, especially the chemical substance hoppers, then dry them. Clean the electrical components only with a dry cloth.  
2) At the end of operations, conduct a comprehensive and thorough cleaning of the body of the FERTISYSTEM distributor body:  
   a) Remove all discharge chutes, augers (as shown in Chapter 4.5) and carry out a complete and thorough cleaning of it all, in order to maintain the distribution system in perfect condition for use.  
   b) Check the condition of the distribution chamber coating (A, Fig. 612). When there are obvious signs of wear it must be replaced by removing the screws (B).  
   c) At the same time, check the wear of the felt (C), of the washer (D) and of the cleaning washer (E). Excessive wear of parts (C, D and E) can be detected by excessive flow of fertilizer from the self-cleaning discharge hole. (F, Fig. 612). **The parts mentioned must be replaced with original spare parts to avoid damage to the bearings and therefore to the functionality of the distribution unit.**  
3) Carefully check for worn or damaged parts and replace then where required.  
4) Check the state of wear of the transmission chains and toothed wheels. Replace damaged or worn out parts, if required. Use solvent to clean the transmission chains, the toothed wheels and the chain stretchers. Lubricate with mineral oil (SAE 85W-90) when dry.  
5) Adjust the belt of the vacuum blower and replace it if necessary.  
6) Before to use the compressor air system it is necessary to check the following items:  
   - Empty the air tank by the tap (W, Fig. 606).  
   - Clean the filter (B, Fig. 606).  
7) Firmly tighten all screws and bolts.  
8) Apply protecting oil to all unpainted parts.  
9) Protect the equipment with a (nylon) cover.  
10) Then position it stably in a dry place out of the reach of unauthorized people. |

It is in the interests of the user to follow these instructions carefully, as when work recommences, he will find the equipment in perfect condition.
Oil Type: SAE 10W
Quantity: Kg. 2,0 (4.4 lb)

Oil Type: SAE 90
Quantity: Kg. 2,5 (5.5 lb)
### 6.3 PROBLEMS, CAUSES AND SOLUTIONS (Table 13)

<table>
<thead>
<tr>
<th>PROBLEMS</th>
<th>CAUSES</th>
<th>SOLUTIONS</th>
</tr>
</thead>
</table>
| Irregular seed drilling (inaccurate distance between seeds). | 1) Wear of furrow-opening coulter.  
2) Over-tensioned tensioning spring of V seed-covering wheels.  
3) Unsuitable rear seed-covering wheels.  
4) Deformed or worn seed disc (over 1/3 of its original thickness).  
5) Deformed or missing seed disc pins.  
6) Worn or broken seed disc gasket.  
7) Badly adjusted moving selector. WARNING! The selector does not regulate the amount of air coming into the seed distributor.  
8) Flat tyres: gear ratio is altered.  
9) Forward speed is too fast.  
10) Incorrect WHEEL-GEARBOX AXLE ratio and/or gearbox adjustment.  
11) Drop in seed aspirator revs.  
12) Wear of distributor drive shaft joints.  
13) Use of small seeds or seeds with electrostatic charge (rape, beet).  
14) The planter is not perpendicular to the ground and is pointing forwards.  
15) The furrow opener discs fill up with earth because they are sloping backwards.  
16) The furrow opener discs are not turning.  
17) The drive wheel is not in contact with the driving wheel.  
18) The shifter levers are not properly engaged. | 1) Replace  
2) Slacken  
3) Replace  
4) Replace the seed disc. We advise replacing the gasket when replacing the seed disc.  
5) Replace the seed disc.  
6) Replace the gasket.  
7) Adjust the selector:  
   a) Small seeds (small numbers of selector).  
   b) Large seeds (large numbers of selector).  
8) Pump up according to technical data table.  
9) Reduce the drilling speed.  
10) Consult the WHEEL-GEARBOX table and change the ratios as necessary.  
11) Check:  
   a) belt tension  
   b) tractor’s power take-off revs  
   c) breakage of air tubes to the seeding elements.  
12) Replace  
13) Use the ejector for coated seeds.  
14) Use the ejector for coated seeds.  
15) The drive wheel is not in contact with the driving wheel.  
16) The shifter levers are not properly engaged.  
17) Lower the machine.  
18) Check for proper gear transmission coupling. |

Seeds spill over from the distributor.

<table>
<thead>
<tr>
<th>CAUSES</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-spill-over plate too open.</td>
<td>Close or replace with G22270133.</td>
</tr>
</tbody>
</table>

Few seeds reach the distributor.

<table>
<thead>
<tr>
<th>CAUSES</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-spill-over plate too closed.</td>
<td>Open</td>
</tr>
</tbody>
</table>

Seed disc does not rotate or does not work correctly.

<table>
<thead>
<tr>
<th>CAUSES</th>
<th>SOLUTIONS</th>
</tr>
</thead>
</table>
| 1) Seed distributor bevel gear is stuck.  
2) Seed distributor bevel gear is worn or broken.  
3) Disc feed hub has oxidized.  
4) Seeds dressed with sticky products that increase the friction between disc and gasket.  
5) Broken plastic safety bolt.  
6) Moving selector is too closed.  
7) Use of fixed selector with large seeds (beans, chickpeas, etc).  
8) Fixed selector is bent and knocks against the disc.  
9) Worn or broken transfer case.  
10) Distributor transmission universal joint not hooked up. | 1) Free it with anti-seize products.  
2) Replace (replace bushings and gear axle).  
3) Free it with anti-seize products.  
4) Clean disc and gasket often. If possible, use other dressed products.  
5) Replace  
6) Open  
7) Remove the fixed selector.  
8) Replace  
9) Replace  
10) Hook up |

The seeds fall off the seed disc.

<table>
<thead>
<tr>
<th>CAUSES</th>
<th>SOLUTIONS</th>
</tr>
</thead>
</table>
| 1) Insufficient suction  
   a) Slack belt  
   b) Broken belt  
   c) Holes in air tubes  
   d) Blocked air tubes  
2) Rev speed not constant or not sufficient.  
3) Seed disc holes of insufficient diameter. | 1)  
   a) Tension the belt  
   b) Replace  
   c) Replace  
   d) Cleaning (check the suction in the tube with your palm at the seed distributor end).  
2) Use the tractor’s hand accelerator.  
3) Replace the seed discs. |

The seed furrow remains open and the seeds uncovered.

<table>
<thead>
<tr>
<th>CAUSES</th>
<th>SOLUTIONS</th>
</tr>
</thead>
</table>
| 1) Rear seed-covering wheels a long way from the seed furrow.  
2) Insufficient pressure of the rear seed-covering wheels.  
3) Rear seed-covering wheels not suitable for the ground. | 1) Adjust the distance between wheels.  
2) Increase the pressure of the rear wheels on the ground.  
3) Replace |

Irregular seed drilling depth.

<table>
<thead>
<tr>
<th>CAUSES</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clod clearer set too low.</td>
<td>Raise the clod clearer: it must be set as shown in the instruction booklet.</td>
</tr>
<tr>
<td>PROBLEMS</td>
<td>CAUSES</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Seeds on surface.</td>
<td>1) Wrong seeding depth setting.</td>
</tr>
<tr>
<td></td>
<td>2) Obstructed seed delivery tube.</td>
</tr>
<tr>
<td></td>
<td>3) Insufficient pressure of the rear seed-covering wheels.</td>
</tr>
<tr>
<td></td>
<td>4) Rear seed-covering wheels not suitable for the ground</td>
</tr>
<tr>
<td></td>
<td>5) Use of stainless steel seed-covering wheel on damp soil.</td>
</tr>
<tr>
<td></td>
<td>6) Ground not suitably prepared.</td>
</tr>
<tr>
<td></td>
<td>7) Bent planting unit frame (example: caused by knocks from stones on</td>
</tr>
<tr>
<td></td>
<td>the ground)</td>
</tr>
<tr>
<td></td>
<td>8) Seed drilling on steeply sloping ground.</td>
</tr>
<tr>
<td>Seeds too deep.</td>
<td>1) Wrong seeding depth setting.</td>
</tr>
<tr>
<td></td>
<td>2) Excessive pressure of the rear seed-covering wheels.</td>
</tr>
<tr>
<td></td>
<td>3) Unsuitable rear seed-covering wheels.</td>
</tr>
<tr>
<td>The gearbox chain jumps off the</td>
<td>The two pinion axles are not parallel to each other.</td>
</tr>
<tr>
<td>gears.</td>
<td></td>
</tr>
<tr>
<td>Irregular distribution of</td>
<td>1) Incorrect adjustment of the fertilizer distribution controller.</td>
</tr>
<tr>
<td>chemical products</td>
<td>2) Product with specific gravity different to those indicated in the</td>
</tr>
<tr>
<td>(Fertilizers and Microgranules)</td>
<td>3) Use of non-granulated product (dusty).</td>
</tr>
<tr>
<td></td>
<td>4) Delivery tube bent sharply and/or blocked by deposits.</td>
</tr>
<tr>
<td></td>
<td>5) Obstructed furrower element.</td>
</tr>
<tr>
<td></td>
<td>6) Distributor dirty with deposits.</td>
</tr>
<tr>
<td></td>
<td>7) Protective grille fitted the wrong way round (after maintenance).</td>
</tr>
<tr>
<td></td>
<td>8) Fertilizer on surface.</td>
</tr>
<tr>
<td></td>
<td>9) The distributor does not turn properly.</td>
</tr>
<tr>
<td></td>
<td>10) Worn bevel gears.</td>
</tr>
<tr>
<td>Row marker does not work</td>
<td>1) Impurities present in the hydraulic system.</td>
</tr>
<tr>
<td>or works irregularly.</td>
<td>2) The row marker arms rise too quickly (damage to the structure).</td>
</tr>
</tbody>
</table>
7.0 DEMOLITION AND DISPOSAL

This operation is to be carried out by the customer.
Before demolishing the machine, you are advised to carefully check its physical condition and ascertain whether there are any parts of the structure that may be susceptible to structural collapse or breakage during demolition.
The customer should operate in compliance with the environment protection laws in force in his/her country.

⚠️ CAUTION

The machine demolition operations should be carried out by skilled personnel only, equipped with suitable protective clothing (safety footwear and gloves) and auxiliary tools and equipment.

All the disassembly operations for demolition should be carried out with the machine stopped and detached from the tractor.

Before demolishing the machine, you are advised to render harmless all the parts that may be a source of danger and therefore:
- scrap the structure using specialized firms,
- remove any electrical apparatus according to the laws in force,
- collect oils and greases separately, to be disposed of through specialized firms, in accordance with the regulations of the country in which the machine was used.

When the machine is demolished the CE mark should be destroyed together with this manual.

Last but not least, we remind you that the Manufacturer is always available for any and all necessary assistance and spares.