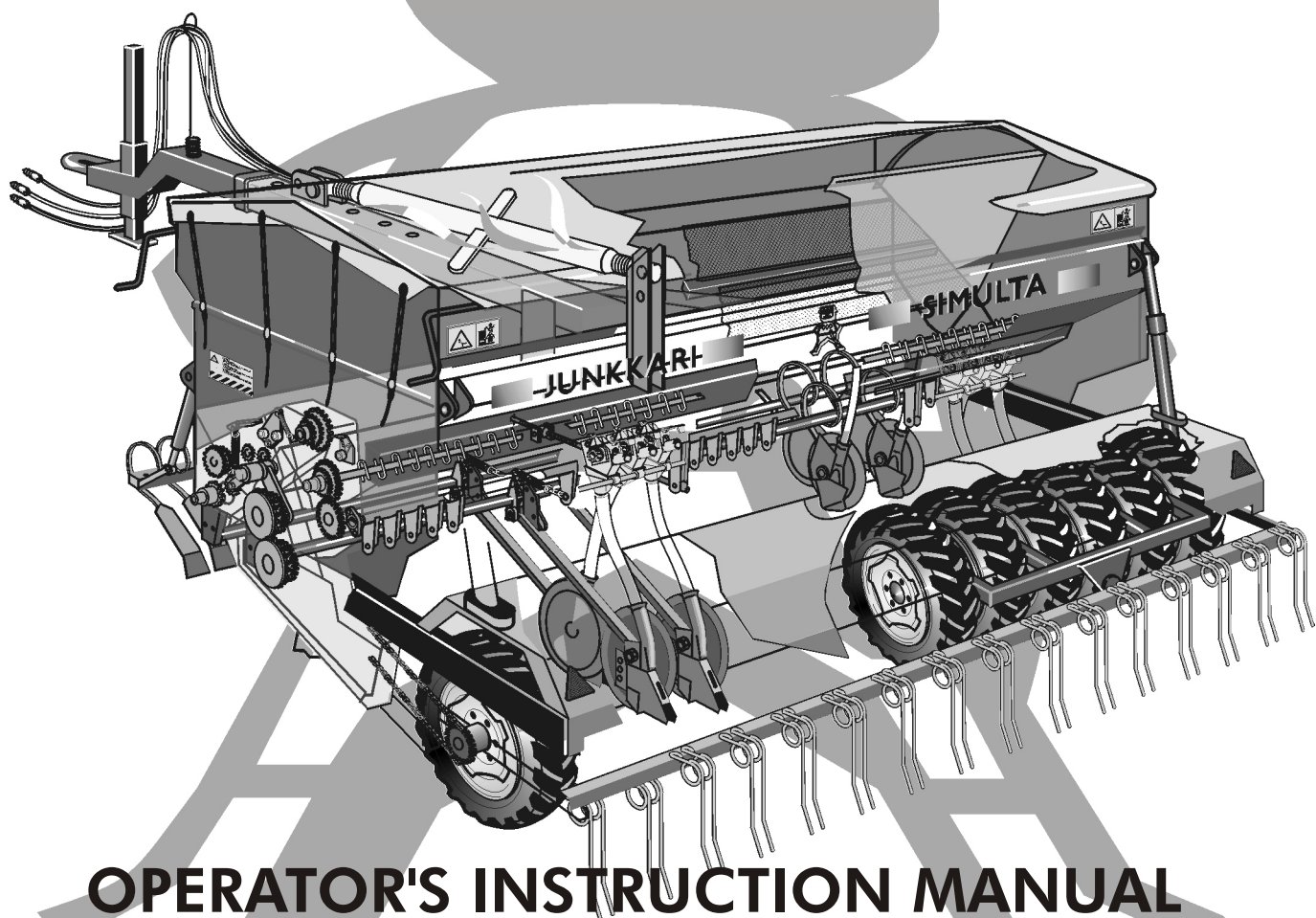


# JUNKKARI SIMULTA

**2500 T**  
**3000 T/ST**  
**4000 T/ST**



**OPERATOR'S INSTRUCTION MANUAL**  
**SPARE PARTS CATALOGUE**

**STOOENG**



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**2000 ENGLISH € €**

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## 2. FOR THE READER

We wish you every success in your profession.

We would ask you to read through the instructions contained in this book and acquaint yourself with your machine, its principles of operation and the maintenance schedules, points, which will all affect the operational safety and uninterrupted operation during the busy sowing seasons.

It is imperative that each and every specific point raised in this manual be fully understood and that the instructions regarding the machine's operation are complied with. Should any doubts arise, please contact your Dealer.

We also hope that you will kindly return the Certificate of Warranty after having acquainted yourself with the instructions of this manual.



### 2.1 Warning sign

This sign will be used throughout the manual to mark any operation, which might cause a danger of injury to the operator or any person close to the machine.

The sign is also used to indicate any danger to environment or property whilst carrying out any specific operation with the machine.

## 3. TECHNICAL SPECIFICATIONS

	S2500T	S3000T	S3000ST	S4000ST
Working width, cm	250	300	300	400
Row spacing, cm				
- seed	12.5	12.5	12.5	12.5
- fertilizer	25	25	25	25
Hopper capacity, l				
- seed maximum	1320	1584	3390	4528
- fertilizer minimum	920	1104	0	0
- seed min.	890	1068	1093	2124
- fertilizer max.	1360	1640	2580	3440
Filling height, cm	150	150	175	175
Tyres	7.00-12"	7.00-12"	7.00-12"	7.00-12"
Weight, unladen, kg	1300	1700	2350	3100
Overall width, cm	284	334	334	434

### STD. EQUIPMENT

- areal meter electr.	*	*	*	*
- fertilizer sieve	*	*	*	*
- access step	*	*	*	*
- rear harrow, automatic	*	*	*	*
- lighting equipment	*	*	*	*
- front harrow attachment			*	*

### OPTIONAL EQUIPMENT (OPTIONS)

- small seed box/start-up fertilizer rationing unit	*	*	*	*
- row markers	*	*	*	*
- disinfectant treatment kit	*	*	*	*
- remote control kit (mech.)	*	*	*	*
- tramline marker kit (manual/computer operated)	*	*	*	*
- Artemis operating computer	*	*	*	*
- power harrow drawbar version	*	*	*	
- wheel track eradicators	*	*		
- front harrowing attachment	*	*	*	*
- front leveller attachment	*	*		
- front crusher attachment	*	*	*	*
- packer attachment	*	*	*	*
- Front lift cylinder	*	*	*	*



## 4. SAFETY INSTRUCTIONS



### 4.1 GENERAL SAFETY INSTRUCTIONS

- **CLOTHING:** Always use well-fitting clothing for the sake of safety during operation of the machine.
  - **OPERATION:** Acquaint yourself fully with the attachment, controls and operational principles of the machine before starting to operate it.
  - **WARNING LABELS:** Always comply with all warning labels attached to the machine at various points.
  - **SHIELDS:** The machine must have all its shields and covers in place before attempting to operate it.
  - **ATTACHMENT TO TRACTOR:** Exercise special caution when attaching the implement to or when detaching it from the tractor.
  - **HITCH LOAD:** Always note the maximum load limits on the drawbar or on the tractor hitch.
  - **SUPPORT LEG:** A danger of compression exists when extending the support leg out into position.
  - **PARKING:** Ensure that the machine cannot move while staying parked.
  - **SAFETY DISTANCE:** The machine employs certain components which, due to the nature of the machine's operation, cannot be fully shielded. A safe distance to these working parts must always be maintained. The operator must also take care that no outside person(s) can approach these components during the machine's operation.
  - **OPERATION:** No outsiders must be allowed to stay near the machine while it is being operated.
1. Never enter the space between the machine and the tractor when the machine is either being lifted up, lowered down or being transported around.
  2. Never bend underneath or on top of a machine which is being supported above the ground on tractor hydraulics only.
  3. Take care each time before taking the machine into use that it has been correctly attached to the tractor and that all its protective shields are in place.
  4. Always check before starting to move the machine, that no outside persons are within a safe distance from it.
  5. Check the condition of the machine after each operating run, especially its hitching and other connection points.
  6. If the machine is fitted with a disinfectant treatment applicator, ensure that the proper handling of the disinfectant is maintained throughout the operation as per the instructions given by the manufacturer of the disinfectant.
  7. Extra seed or fertilizer must not be carried on top of the machine covers or on the access step.
  8. Never overload the drill. Familiarize yourself with the partial emptying techniques of large bulk seed or fertilizer sacks.
  9. Avoid damaging the machine covers with freely swinging large bulk sacks while lifting them.

### 4.2 TRANSPORTING AND MOVING THE MACHINE

***The maximum towing speed of the drill is 30 k.p.h. (18.7 m.p.h.).***

1. Always comply with the highway code while transporting a trailed machine on public roads.
2. Check and/or fit all accessories required for transporting the machine on public roads, such as reflectors and a warning triangle (Slow Vehicle).
3. Take into consideration the allowed axle weights, total weights and the overall transport dimensions.
4. All accessories, such as chains drawbars etc., used in the transportation of the machine must be installed in such a manner that any unintentional movements of the machine in its operating or transport position cannot interfere with these accessories in any way.
5. The behavior of the tractor under transport conditions, its steering and braking characteristics can be affected by any trailed or hitch-mounted equipment and extra weights applied. It is therefore important to ensure that the proper steering and braking ability is maintained under all circumstances.
6. No outsiders must be allowed to ride on the machine.
7. The machine must be lifted only from the lifting points marked by labels on the machine.

8. Use only approved lifting lines or chains and check their condition before attempting to lift the machine.
9. If the machine is transported e.g. on a lorry platform, make sure that the machine is securely tied down using chains or lines.
10. If a forklift truck is used to lift or lower the machine, care must be taken to ensure a proper balance and that there is no danger of the machine tipping over.
11. When lifting the machine e.g. with a forklift truck, make sure that the transport pins are fitted in place.

## 4.4 HYDRAULIC SYSTEM

***The maximum pressure in the hydraulic system is 210 bar.***

1. A high pressure is induced into the machine's hydraulic system after coupling it into the tractor system. A jet of high-pressure hydraulic oil will penetrate skin and can cause grave injury. A danger of injury exists even when seeking out for possible oil leaks.
2. Handle all hydraulic components and parts with extreme care. The nature of the equipment will always present dangers of cuts or compressive action.
3. Never disconnect any hydraulic system connectors while the machine is being supported by the hydraulic system alone as the system will retain its pressure.
4. When connecting up the machine's hydraulic system to the tractor system, both systems must be unpressurized.

### PROTECTIVE MEASURES AGAINST OILS AND GREASES

1. Always use suitable protective clothing and oil-proof gloves when handling oil or grease.
2. Avoid direct skin contact with oil or grease as these may cause skin injury.
3. Never use oil or grease to clean off dirt from skin. These substances may contain tiny metal particles which can cause cuts in the skin, further aggravated by the action of the oil.
4. Follow the handling and safety instructions given by the manufacturers of the lubricants.
5. Synthetic oils are in many cases corrosive and cause a severe irritation of the skin.

### WASTE OIL

1. Waste oil must be collected into a suitable container and taken to a collection point for proper disposal according to national regulations.

### ACCIDENTS

1. If oil is spilled on the ground, its spreading must be restricted and the oil must be collected by absorbing it e.g. into peat.
2. Should oil or grease cause a skin injury contact the nearest physician at once.

## 4.5 CLEANING THE MACHINE

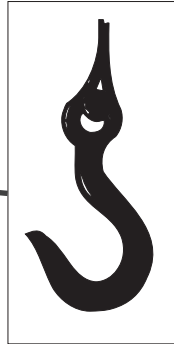
1. The drill must always be cleaned before replacing the seed or the fertilizer used is replaced with a different type.
2. The hopper must always be emptied and the feed grooves cleaned from any residual material by moving the feed rate adjustment from one extreme position to the other, if the machine is left standing overnight or for the duration of a long rainy period.
3. A water jet used for cleaning must not be directed at electrical equipment.
4. When using detergents, always check out their compatibility with the task at hand and follow the detergent manufacturer's safety instructions.

**NOTE THAT THE MACHINE IS INTENDED TO BE OPERATED BY A SKILLED FARMER. THEREFORE ITS USE REQUIRES ADEQUATE GENERAL KNOWLEDGE AND SKILLS OF AGRICULTURAL PRACTICES. USE THE LARGE HOPPER VOLUMES SENSIBLY. IN EXTREMELY DAMP CONDITIONS IT IS ADVISABLE TO OPERATE WITH ONLY PARTLY-FILLED HOPPERS.**





# 5. WARNING LABELS SAFETY COMPONENTS AND SERIAL NUMBER PLATE



Lifting point

### TYPE PLATE

1. CE plate attachment year
2. Machine model
3. Serial No. and year model
4. Machine weight w/o accessories
5. Manufacturer



Transport of persons forbidden



Danger of compression



**HUOM. OBS.**  
 Kiristä pultit 3 tunnin ajon jälkeen.  
 Spänn bultarna efter 3 timmar körning.  
**NOTE!**  
 Tighten the bolts after first 3 hours of running



Danger of compression between the machine and traktor



Forbidden to go below the machine



**Lue käyttö- ja turvallisuusohjeet aina ennen käyttöönottoa.**  
**Läs bruksanvisning och säkerhetsföreskrifter innan den nya maskinen tas i bruk.**  
**Become familiar with the owners manual and safety instructions before starting to operate this machine.**

4-32173

# REFLECTORS AND LIGHTNING EQUIPMENT

## -REFLECTORS AND WARNING STRIPES

Implements must have at the rear triangular, E-approved reflectors, which reflect red light (see Fig. 3). The front-mounted reflectors must reflect white light and their shape must be other than triangular. The machine sides must be fitted with yellow, E-approved reflectors. The number of reflectors depends on the length of the machine sides (see Fig. 4). Trailed machines must always be fitted with a Slow Moving Vehicle warning triangle (see Fig. 2). The machine sides must be fitted with red/yellow warning stripes which are visible both from the front and the rear of the machine (see Fig. 1). These accessories are standard fittings, either mounted on the machine frame or alternatively at the rear of the optional small seed box (see Fig. 5).

## LIGHTNING EQUIPMENT

The Simulta-drills are equipped with standard lighting equipment and accessories required by the road safety regulations. In basic Simulta 'T' and 'ST' versions, the lighting equipment is mounted on the machine frame (see Fig. 3). Should the machine be fitted with the optional small seed box, the lighting equipment must be attached to the box (see Fig. 5). The wiring connectors can only be connected in one way so that no problems can arise e.g. when connecting up blinkers. Plastic tie-straps are provided in the package for attaching the wires to the machine frame. The drill lighting equipment is connected to the tractor electrical outlet by a standard 7-pin socket connector.



Fig. 1



Fig. 2

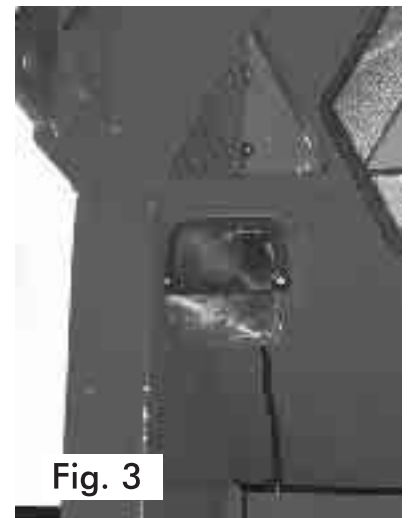


Fig. 3



Fig. 4



# 6 OPERATING ENVIRONMENT

## 6.1 THE OBJECTIVE OF THE DESIGN

The Simulta seed and fertilizer drill has been designed for the simultaneous drilling of both seeds and fertilizer. The Simulta prepares the seed bed, places the fertilizer in a beneficial position in regard to the seeds, drills the seeds with 12.5 cm (4") row spacing and levels or compacts the top soil above the seed rows.

The many accessories and optional equipment available enable the machine to be equipped to deal with every specific need.

## 6.2 APPLICATIONS

The basic Simulta drill design can be used as such for drilling cultivated soils. The characteristics of the machine can be altered to suit different operational conditions or operating practices by using the various optional attachments available. The function and operating characteristics of each attachment has been described separately for each item later in the manual.



## 6.3 OPERATIONAL LIMITATIONS AND FORBIDDEN MODES OF OPERATION



### OPERATIONAL LIMITATIONS

#### **Limitations regarding the operator**

The operator of the drill must not be under the influence of intoxicating substances, alcohol or strong medication.

In case of severe illness or disability the physician in charge must be consulted for a permission to operate the machine.

The use and operation of the Simulta drill is forbidden to persons lacking in appropriate knowledge or skills in agriculture and to persons under the age of 15 years.

#### **Environmental limitations**

The operation of the drill should be avoided in extremely wet or dry conditions, where one cannot make guarantee a proper moisture level for the seeds.

#### **Forbidden modes of operation**

The machine must not be operated within any protective zones along or around waterways nor on any areas reserved for nature preservation.

The machine must not be used for spreading liquids, inflammable substances, sand nor pulverized or fibrous substances.

# 7 PRINCIPLE OF OPERATION

The Simulta seed and fertilizer drill features an accurate grooved feed mechanism, where the feed rate is adjusted by altering the efficient length of the feeder grooves; either by operating the adjusting wheels on the R.H. side of the machine or by means of an optional remote control. The feed mechanism is driven from the R.H. side support wheels. The power is transmitted to the feed mechanism by a chain drive arrangement. The seeds and the fertilizer flow down into the coulters through feed pipes and are placed on the chosen level in the seed bed. In 'ST' model, a standard feature front levelling bar levels out the seedbed and reducing the topsoil crumbs into optimum size for ideal drilling conditions. For the 'T' model, the front leveller is optional. The seed coulters can be adjusted both individually and centrally for the required drilling depth. The fertilizer coulters working depth is adjusted by altering the operating height of the machine. Both in 'T' and 'ST' models the support wheels act also as compacting rollers. Their spiky tread pattern stops crusting of the topsoil. Both 'T' and 'ST' models feature a rear harrow attachment which spreads a layer of loose soil on top of the sown seed bed thus preventing moisture from rising to the top where it would be evaporated by the sun's rays.



# 8 MACHINE TRANSPORTATION, HANDLING AND STORAGE

(IMPORTER, DISTRIBUTOR, DEALER)

## 8.1 TRANSPORTATION

1. The delivery terms of the product are free ex works, unless specified otherwise.
2. The buyer (importer) and the factory agree upon a date of the delivery when the product is ready for shipment.
3. The factory will arrange the loading of the product on a transport vehicle at the factory premises.
4. The transport agency shall be responsible for the product for the period of transportation from the factory to the buyer.

## 8.2 HANDLING

1. The product must be handled in the careful manner which is customary in handling all agricultural machinery, without causing any damage to the product.
2. No other products must be loaded on top of the machine package.
3. The factory will package the product carefully for shipment.
4. The transportation attachments must remain attached at all times during the handling of the product.

## 8.3 STORAGE

1. The machine must be shielded from direct sunlight and rain and stored on its support wheels with the coulters clear of the ground.
2. When stored outdoors, check from time to time that no water is collected on top of the machine.
3. Long-term storage must always take place indoors.



## 8.4 SPECIAL SAFETY NOTES FOR MACHINE TRANSPORTATION



1. Never attempt to lift the machine from any other point than those clearly marked for lifting.
2. Check before lifting that the transport securing pins are attached.
3. Ensure that the lifting device is adequately efficient and safe and that no there exists no danger of overturning or falling down.
4. The machine must not be lifted by a forklift truck, always use lifting lines or chains.
5. Always use only approved lines or chains for lifting.
6. Check the condition of the lines or chains always before lifting.
7. 'T' and 'ST' model drills must never be tipped over to rest on 'their noses'.
8. Always check the lifting reach when using cranes for the lift.
9. The machine must always be kept securely tied down on the platform during transportation.
10. When lifting the machine take care of the danger of swaying. Avoid all sudden movements.
11. It is imperative to remove the transport securing pins before connecting the machine's hydraulic system to that of a tractor.

# 9. TAKING THE MACHINE INTO OPERATION

## 9.1 PREPARATIONS PRIOR TO OPERATION

All preparations connected with the bringing the machine up to operational condition shall be left for the customer, unless otherwise specified. If the product is to be transported in a container, then the importer or its representative is responsible to bring the machine up to standard condition before its delivery to the customer.

The customer shall also attend to the attaching of any optional equipment unless otherwise specified.

The optional equipment can be factory-mounted with the assembly costs added to the price of the option in question.

## 9.2 DELIVERY PACKAGE

### 'T' MODELS

The machine with all its equipment is packed in a single package for a standard delivery. The machine is packed inside protective plastic sheeting and the following parts are included in the package:

- Operator's manual.
- Fertilizer sieves (4 off) inside the fertilizer hopper.
- Lighting equipment ready-mounted on the machine.
- Calibration test handle inside the fertilizer hopper.
- Slow Moving Vehicle warning triangle inside the fertilizer hopper.
- Drawbar ass'y attached to the access step.
- Top link inside the fertilizer hopper.
- Top link attaching and linch pins used as transport pins in the levelling box.
- Areal meter display unit inside the fertilizer hopper.
- Rear harrow frame attached to access step cover, harrow lift springs tied down in their positions, harrow arms complete with adjusting screws inside the fertilizer hopper and mounting bolts screwed down into the machine's arm.
- Front hand-grips attached on the inside of the fertilizer hopper.
- Hitch and its attaching linch pin on top of the access step.
- Hopper canvas cover in package on top of the access step.
- Support for the hydraulic hoses inside the fertilizer hopper.
- Support leg ready-mounted on the machine.

### 'ST' MODELS

The machine with all its equipment is packed in a single package for a standard delivery. The machine is packed inside protective plastic sheeting and the following parts are included in the package:

- Operator's manual.
- Fertilizer sieves (4 off) inside the fertilizer hopper.
- Lighting equipment ready-mounted on the machine.
- Calibration test handle inside the fertilizer hopper.
- Slow Moving Vehicle warning triangle inside the fertilizer hopper.
- Drawbar ass'y attached to the access step.
- Top link inside the fertilizer hopper.
- Top link attaching and linch pins used as transport pins in the levelling box.
- Areal meter display unit inside the fertilizer hopper.
- Rear harrow frame attached to access step cover, harrow lift springs tied down in their positions, harrow arms complete with adjusting screws inside the fertilizer hopper and mounting bolts screwed down into the machine's arm.
- Hopper canvas cover in package on top of the access step.
- Support for the hydraulic hoses inside the fertilizer hopper.
- Support leg inside the fertilizer hopper.
- Front leveller ass'y with its mounting accessories tied down on the access step, hydraulic equipment ready-mounted on the machine.

## 9.3 ATTACHMENT TO A TRACTOR



### READ THE SAFETY NOTES FIRST



The tractor HITCH MOUNTED `T` model `A` frame is attached to the tractor lower links (ISO Standard 730, Category 2). If the lowering rate of the tractor lift linkage is adjustable, the speed rate control lever should be moved to position `SLOW`.



If the tractor is equipped with a weight-transfer system, IT MUST BE KEPT IN OFF-POSITION THROUGHOUT ANY SOWING OPERATION.

**`ST` models** models are coupled into the tractor's rear towing hook (ISO 6489/1) or to an optional roller attachment, which in turn is attached to the tractor lower links.

**2500T-, 3000T-, 3000ST-** models can also be attached to a power harrow attachment by means of an optional power harrow hitch. In this case the 'T' models must be equipped with a drawbar arrangement similar to that used in the 'ST' model. The **4000ST** drill, however, is not recommended to be used with a power harrow, due to the sheer size of this model.

### HYDRAULICS

The Simulta 'T' and 'ST' drills require one external, single-acting hydraulic control valve for lifting the machine. An additional double-acting valve section is required if a front leveller is used. The drill can also be equipped with an optional hydraulic row marker attachment. This can be used in an automatic mode, which requires it to be coupled to the hydraulic system of the drill. For use in the manual mode, the row marker requires one single-acting control valve section for operation. The quick-release couplings conform to ISO 7241-1 Standard.

### ELECTRICAL CONNECTIONS

The models employing an electrical areal meter and lighting equipment are connected to the tractor's 7-pin rear electrical socket. The socket must conform to SFS 2472 DIN ISO 3732 standards. The nominal voltage used is 12V DC. The connecting procedures are dealt with in later chapters of this manual related to each separate piece of equipment. Other electrical optional equipment for the machine is also available and these use the DIN ISO 4165 or ISO/TR 12369 Standard connectors for their connection to the machine's electrical system.

## CABLE CONNECTION

If the machine is equipped with a cable-operated remote control, the cable is attached to a suitable location in the tractor by means of a mounting support, delivered within the package. The location of the remote control should preferably be in the vicinity of other tractor controls so as to provide for best ergonomic conditions.

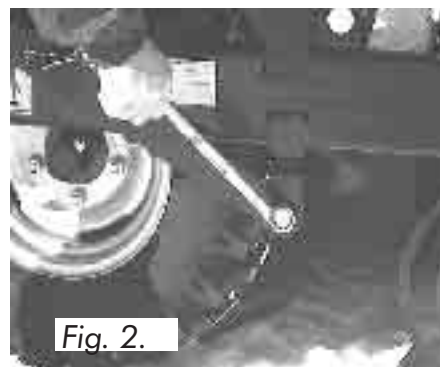
### 9.4 Assembly and mounting instructions

1. Remove the protective plastic sheeting and the metallic and plastic tie-taps .
2. Remove the transportation securing pins (see Fig. 1).
3. Inspect the contents of the delivery package.

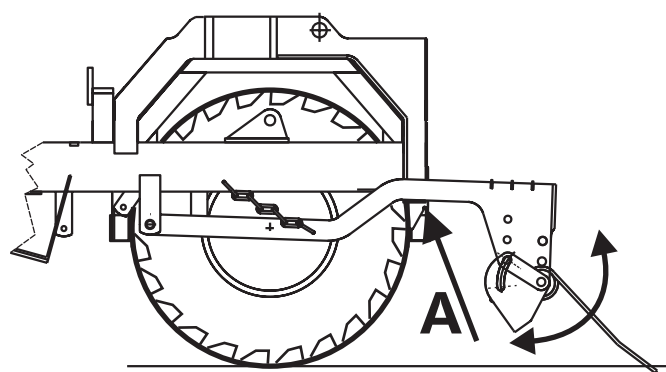
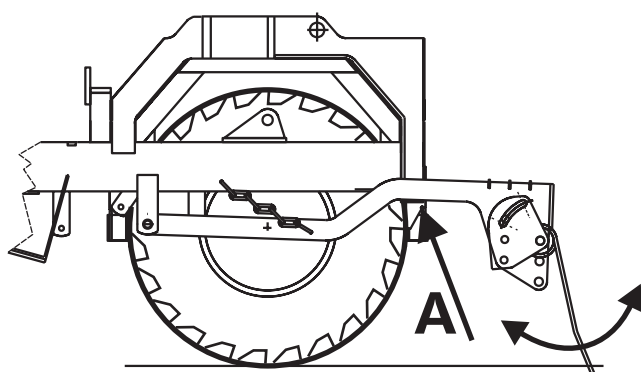
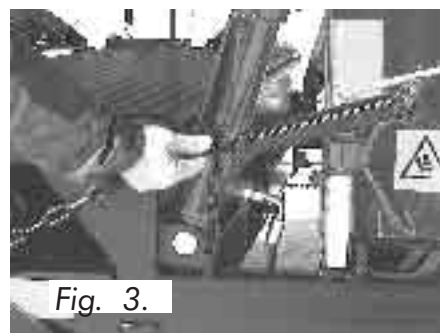


#### Attaching the rear-mounted harrow attachment

The rear harrow attachment is mounted on the supports provided on either side of the bogie frame with M16 bolts and self-locking nuts. Tighten the nuts loosely to enable the harrow attachment to freely. The harrow lift springs are attached to the lift chains in the manner that an equal no. of free links are left on each chain (refer to Figs. 2 and 3). The harrow operating angle can be adjusted to suit prevailing conditions. The harrow support arms have a set of 3 mounting holes each to provide for three operating heights for the harrow frame. This is necessary to limit the height of the lowermost operating position. It is also needed to enable the harrow arm to make contact with a stopper in the machine's frame, when stepping on the access step on the harrow frame. The adjusting screws for altering the harrow's angle of advance must be tightened down properly ('A' in Figs. 4 and 5).



The adjustments to the harrow are best done on the field, right after the sowing adjustments. The principle used is that the harrow follows the machine smoothly spreading the loose soil left between the tyres over the hard-packed tread marks. The loose soil layer will prevent the humidity in the soil from rising to the top through the action of capillary flow and evaporating away. The optimum working depth for the harrow is approx. 2 cm (3/4") below the mean ground level of the field but always, however, kept above the seed bed level.



## Attaching the lighting accessories

The lighting equipment has been ready-mounted on the machine at the factory. Should, however, a 'T' model drill be fitted with a small seed box attachment, the lighting accessories and reflectors must be relocated in the mounting points provided at the rear of the box attachment (refer to Figs. 6 and 7).

Fig. 6



Fig. 7



## Hopper canvas cover

The shape of the hopper canvas cover is designed to cover the optional small seed box, if fitted. If the small seed box is not fitted, the extra portion of the covering canvas is kept rolled around one of the carrier rollers so that the canvas is kept symmetrical in relation to the centre roller. The canvas can thus be attached to the hopper in either way.

If the small seed box is attached, the canvas must be attached on top of the hopper with its longer end pointing rearwards to enable the canvas to cover the box as well.

Mounting on a basic model:

- The canvas cover is attached to the mounting holes at each end of the hopper by the centre canvas roll with the screws provided in the roll (refer to the illustrations below).
- The canvas is then ready to be spread over the hopper.



*Mounting on a basic model with small seed box:*

-A portion of the canvas, wrapped for one round only around one of the carrier rolls, is freed by removing its plastic tie-strap and adhesive strip. The rubber fastener is refitted to the outermost reinforcing ring in the canvas.

-Attach the canvas with the longer canvas half facing rearwards.

(Refer to the illustration on the right.)



*Using the canvas hopper cover:*

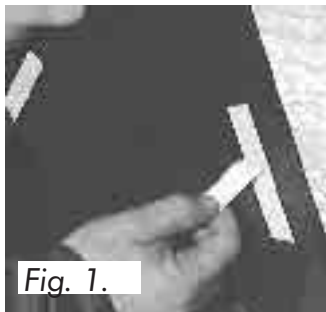
In normal use, with the center roller attached to the machine with screws, the canvas is rolled back to the hopper centre to uncover both hopper sections.

The whole canvas cover may also be rolled back to rest at the front of the hopper. In this usage, the centre roller screws must be removed to free the centre roller and the front rubber fasteners must be attached to the attaching mountings provided at



**Attaching the Slow Moving Vehicle warning triangle**

The SMV warning triangle supplied with the machine package is mounted at the rear of the machine by means of the adhesive strips on the rear face of the triangle. The mounting surface must be clean to enable a lasting bond. Remove the protective covering from the adhesive strips and press the triangle against the hopper rear side plating. Do not touch the adhesive strips in order to keep the adhesive clean and to retain its adhesive properties. The triangle must be mounted at the far left of the rear end of the machine. It must be remembered that if the machine is equipped with a small seed box, the triangle must be mounted at the rear end of the box (refer to Figs. 1 and 2).



## **ELECTRICAL AREAL METER**

1. The areal meter is mounted inside the cab by means of a piece of sticker tape. (Fig. 3)
2. The electrical cord is connected to the tractor rear lightning socket by means of a standard 7-pin connector. The meter is operational when the tractor's parking lights are switched on
3. When the drill is detached from the tractor, the areal meter is disconnected at its own wiring connector. (fig. 4).

In 'ST' models and when using a rotary tiller drawbar an extension cord is required for the areal meter.

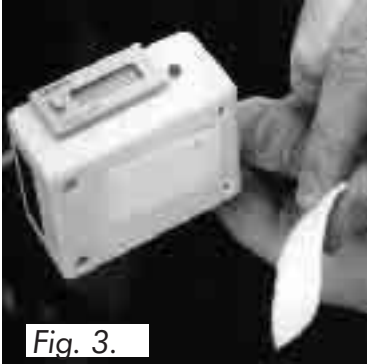


Fig. 3.

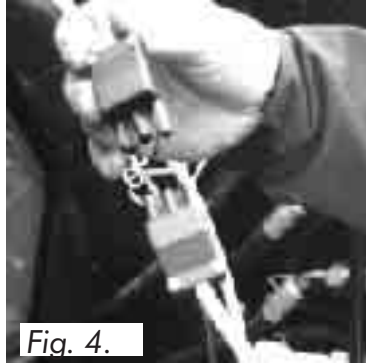


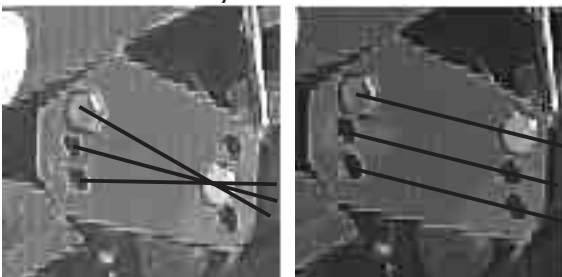
Fig. 4.

## **Support leg and hitch attachment**

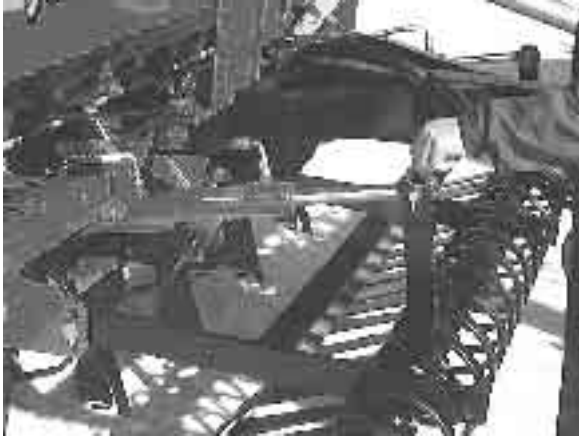
The drawbar ass'y consists of a drawbar frame, drawbar, hydraulic hose support and top link ass'y. The drawbar frame is attached to the machine with the attaching pins supplied. Top link is attached with pins, which are mounted for the duration of transport to the boggie frame to act as securing pins for transport position. The drawbar is inserted into the frame and is attached with a pin securing the drawbar and its frame to each other. 'T' models are supplied with a standard a three-point lateral drawbar, which is attached to the tractor links in the normal manner. It is recommended to use the shortest possible drawbar adjustment in this connection. 'ST' models cannot be coupled to a 3-point drawbar due to their standard front leveller - therefore these models are supplied without the 3-point drawbar. The hydraulic hose support is screwed into the threaded pin in the drawbar frame. The support leg is attached to the drawbar in 'ST' models. In 'T' models, the support leg is mounted on the machine frame front beam. It is advisable to use e.g. an adequately powerful lifting device when attaching the 'ST' model support leg to the machine.

## **Mounting the front leveller**

The front leveller is attached with screws to mounting brackets at the front of the machine. The leveller can be adjusted in five different positions by means of alternative mounting holes (see illustrations below). Adjustment of the leveller does not affect its ground clearance to any notable extent.



After having mounted the front leveller, attach the hydraulic cylinders as shown in the illustration below. The hydraulic hoses are supplied as complete assemblies. The hoses must, however, be routed and attached as shown in the illustration.



## Hydraulics

The hydraulic hoses are supplied complete with ball valves, which are used to stop oil flow through the lines. When the valve handle is turned into the direction of the hose, the valve is open. When the handle is turned crosswise to the hose, the valve is closed.



## 9.5 DISPOSAL OF THE PACKAGING MATERIALS

The wooden and cardboard packaging materials can be discarded by burning them or by taking them to a refuse dump. The PVC packaging materials (bags and plastic strings) must be discarded in the manner according to national law either by recycling or by taking them to a refuse dump.

## 9.6 BALANCING WEIGHTS

In order to make use of the full potential that the Simulta can offer you in the form of ease of operation and saving of time, it is imperative that it can be operated with full hopper loads. Always check before a sowing season that the tractor lift linkage is in good working order. Sometimes, particularly with smaller tractors, the tractor front end may prove too light, especially when operating with full hopper loads. In this case it is advisable to fit the tractor with front weights to ensure that approximately 20% of the tractor weight is maintained on its front axle.

# 10 ACCESSORIES

## 10.1 SEED COULTERS

The seed coulters consist of two main component parts: The arm and the coulter tip. The weighing of the coulter for proper penetration depends partly on the characteristics of its tip and also on the spring tension, which is centrally adjustable between 0-20 kilograms (0-44 lbs). Each coulter is also individually adjustable and is equipped with an adjustable low-position limit stop.

Different soils require a choice of different coulters to carry out the job. The single-disc wedged coulter is applicable for general use and the Suffolk-type coulter for hard soils.



### **SINGLE-DISC WEDGED COULTER**

The single-disc wedged coulters are an excellent choice for general use. It adapts itself both to soft and even hard soil conditions equally. Its characteristics come best into their own when used in fields where the soil composition varies greatly. The design of the coulters maintains a uniform drilling depth even in rapidly changing ground conditions. The rotating disc is extremely useful to prevent clogging, and thus, under very favourable conditions, it may even be used for direct sowing without prior tilling of the soil.

### **SUFFOLK COULTER**

The Suffolk coulters have been designed to operate in hard soil conditions. The angle of penetration of the coulters tip can be adjusted into three different positions. This will enable the coulters to perform well also on soft, even soils.

## **10.2 FERTILIZER COULTERS**

### **NARROW-POINTED COULTERS**

This is the most widely used general purpose fertilizer coulters. Its most common application is drilling in tilled soils. It will perform equally well both in soft, organic soils as in hard, mineral-rich soils. The coulters features an adjustable tip, the purpose of which is to protect the coulters against wear. The tips are available in three hardness categories: The standard tip, the hardened spring steel tip with a hard weld and the third type, which has an added wearing surface of special sintered steel. The coulters feed tube is equipped with a spur to prevent the clogging of the fertilizer tubes when lowered down on soft ground e.g. for the duration of time for filling up the hoppers.

### **DISC FERTILIZER COULTER**

The disc fertilizer coulters has a wider application range than the narrow-pointed coulters as it can be successfully operated in only lightly-tilled soil due to the rotation of its disc, which prevents clogging-up of straw or top-soil. The disc is manufactured of special high-quality steel to give it excellent wearing properties. Its hard spring suspension enables it to be used also for direct sowing.

## **10.3 AREAL METER**

### **ELECTRICAL AREAL METER**

The electric areal meter is connected to the tractor electrical system by means of the connecting cable supplied with the meter. The cable is equipped with a separate connector at the display unit sensor to enable disconnection of the cable line and to leave the display unit inside the tractor, when detaching the drill from the tractor.

An extension cord is a standard accessory with the 'ST' models, but can also be obtained separately as an optional accessory. The extension cord will be supplied as standard accessory with any model equipped with a rotary tiller drawbar. The meter requires a 12V supply of DC, obtained from the tractor rear lighting socket when the tractor parking lights or main beams are switched on.

The display unit is fed from a sensor on the L.H. side of the machine. When the machine is moving, a permanent magnet encircles around the sensor and generates the impulses. The sensor works in the way that the magnet induces a charge into the sensor when it passes one end of the sensor and causes a discharge from the sensor when passing its other end.

The display is read as follows: The 4th digit from right to left in the display indicates hectares; thus a reading 31281 is interpreted as 31 ha (hectares) 28.1 a (ares). Depending on the prevailing wheel slip conditions and irregularities of the field patterns the decimal digits for ares can be overlooked, as they serve no practical purpose.

The meter employs a built-in accumulator, which will stay operational for approximately 5 years without re-charging. The accumulator is, however, re-charged each time the meter receives an impulse from its sensor.

A push-button is provided in the display unit for resetting the reading back to zero.

The electric areal meter can be supplemented with a separate total areal meter unit, which enables the standard meter to be used in the fashion of a trip counter in a car.

The availability of the total areal meter should be checked with your local Simulta dealer.

## 10.4 FEED MECHANISM

The feed mechanism is of groove feed type, which enables the feed rate to be adjusted by altering the effective lengths of the feeder grooves.

The feeder mechanism is chain driven from the machine's L.H. side chain drive unit.

A stopper plate, located between the feed chamber and the hopper, enables the feed to be stopped at the chamber. By closing a part of the feeder mechanism with stopper plates, the machine can be used for sowing in narrow strips.

A curved bottom flap is located at the bottom of the feed chamber. The flaps will give in if a foreign object or a hard lump of fertilizer should enter the feed chamber.

The position of the bottom flaps can be adjusted by means of a lever at the centre of the machine. The movement of the lever acts simultaneously on all flaps. For normal purposes the lever should remain in the second notch from the top (Position 1) but when sowing peas the bottom flaps must be opened by moving the lever into the third notch (Position 2). On the fertilizer side the normal operating position of the adjusting lever is in the second notch from the top (Position 1). If moved into the third notch position (Position 2), the feed rate will be increased by approximately 15%. The machine is emptied by pushing the lever completely down and by turning the feed mechanism manually with the handle provided.

## 10.5 REAR HARROWING ATTACHMENT

The purpose of the rear harrowing attachment is to loosen and to level the top soil above the seed row level. Additionally, the harrowing unit will spread loose soil on top of the hard-packed wheel tracks to prevent the moisture from reaching the top of the soil and thus minimizing the detrimental moisture evaporation. The rear harrowing attachment is not designed to be used as a tilling implement and therefore its position must be adjusted so that it cannot interfere with the seed rows in the soil.

## 10.6 FRONT LEVELLER

The hydraulically operated front leveller of the 'ST' models levels and smoothes out the topsoil and crushes it into ideally sized crumbs for drilling.

# 11 ACCESSORIES

Each separate accessory item is supplied with its own printed assembling and attaching instructions. The instructions also cover a spare parts list for each accessory in case it is not included in the main parts catalogue supplied with this manual. It is advisable to attach any separate accessory parts list to the main parts catalogue for safe keeping.

## 11.1 PARKER ATTACHMENT

The packer attachment compression wheels packs the soil left between the tractor tyres to achieve a uniform degree of compression over the whole drilling width of the machine. It will also ease operations on a field as a part of the weight, which otherwise would be fully borne by the tractor, can be transferred to the packer wheels.

## 11.2 SMALL SEED BOX

The small seed box is attached to the rear of the machine and the unit takes its drive from the chain drive unit by a roller chain. The unit can be used for sowing e.g. grass seed when the other sowing work permits. The small seed box can be calibrated in the same manner as for the main feed mechanism i.e. straight into calibration test troughs. The small seed box can also be equipped with a rationing unit for start-up additives and nutrients in order to drill in fertilizer in the same row as the seeds.

### **11.3 ROW MARKERS**

Row markers are used when it is important to leave a clearly marked trail in the field for the adjacent run. The row marker attachment is connected to the tractor hydraulic pressure take-off connection (for manual operation) or, in the case of trailed implements, to the implement pressure line via a quick-release coupling (automatic operation). The system utilizes one single-acting hydraulic cylinder for operation. The attachment works on the principle that when the machine is raised off the ground, the cylinder places the marker discs attached to each side of the machine into the ground one by one in turn. In the manual version of the system this is done by hand.

### **11.4 DISINFECTANT TREATING UNIT**

The unit treats the seeds while in the process of being sown. This completely eliminates one stage in the seed handling process. The resulting treatment is very accurate and it leaves no treated seeds in the hoppers after stopping the drilling run. The unit can use all kinds of pulverized disinfectants.

### **11.5 REMOTE CONTROL UNIT**

The Simulta drills can be equipped with a mechanical remote control for fertilizer feed enabling the operator to adjust the feed rate from the tractor cab during a sowing run. The remote feed control is very useful on fields with variations in the soil composition.

### **11.6 TRAMLIN MARKERS**

The tramline markers are used to stop the feed along the tractor wheel tracks leaving a trail in the field for later spraying runs.

The marker is operated by a set of electrical switches, controlled either manually or by a drive computer from the tractor cab. The computer version further employs sensors which monitor the operation and send a warning message to the display unit inside the cab when an error possibly occurs. The system will calculate the tramline marking sequence automatically on the basis of a set of values fed into the computer prior to the operating run.

### **11.7 DRIVE COMPUTER JUNKKARI ARTEMIS**

The drive computer can be used, in addition to the symmetrical and asymmetrical marking of the tramlines, to adjust the fertilizer feed rate electrically. The computer can be programmed to handle nine different kinds of fertilizer based on the separate calibration test results obtained from the use of these fertilizers. The computer will oversee the fertilizer feed rate and the increase in the sown area and will also print the results. The computer will also oversee the principal functions of the machine and report of any possible malfunctions.

A GPS unit can be added to the computer system to enable the Artemis computer to act as control unit for the drill. The computer receives its guidance information from a Hermes computer, which utilizes satellite locating techniques, and which has been pre-programmed with the fertilizer feed rates required on the areas to be sown on basis of yield maps.

### **11.8 POWER HARROW DRAWBAR**

The drill may be equipped with a special drawbar to enable the use of a power harrow with the drill. The drawbar couples the drill directly into the power harrow. Soil preparation and seed drilling can thus be accomplished in a single working run.

The power harrow drawbar may be obtained either as a complete assembly or as a replacement extension boom. Both variants are supplied with an hydraulic extension hose, an extension cord for the areal meter, a shorter top link and an appropriate drawbar. The complete set includes in addition to the above mentioned items an 'A' frame, which is standard equipment for trailed Simulta drills. The power harrow drawbar is not recommended for use with the Simulta 4000 ST model due to its large size.

### **11.9 OTHER ACCESSORIES**

A range of other accessories, not specified here, is available for Simulta drills to enable its operation in specific conditions.

Your Simulta Dealer will provide the information on the items in this range of accessories.

# 12 OPERATION AND CONTROL OF THE SEED AND FERTILIZER DRILL



## READ THE SAFETY INSTRUCTIONS BEFORE OPERATING THE DRILL



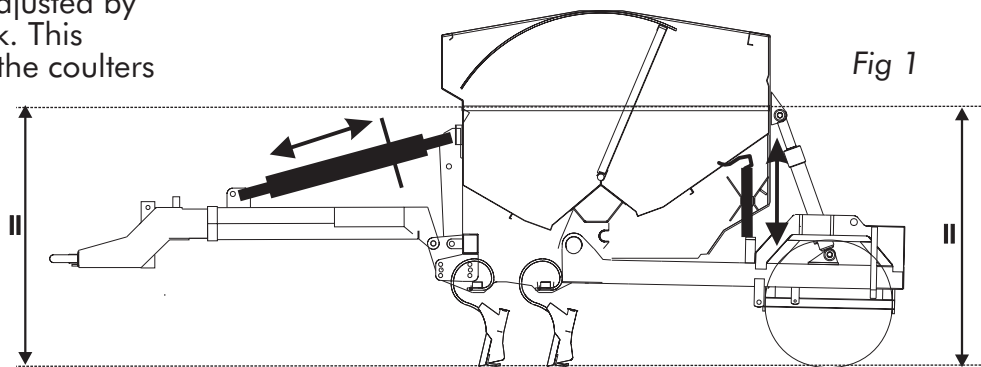
## 12.1 BEFORE A SOWING RUN

### 12.1.1 WORKING POSITION

Before starting a sowing run adjust the top link so that the machine will maintain the normal working depth while the machine travels in a horizontal position.

The horizontal position is adjusted by turning the drawbar top link. This position is important as all the coulters have the same working depth (see Fig. 1).

The machine's horizontal position affects primarily the sowing depth of the fertilizer coulters.



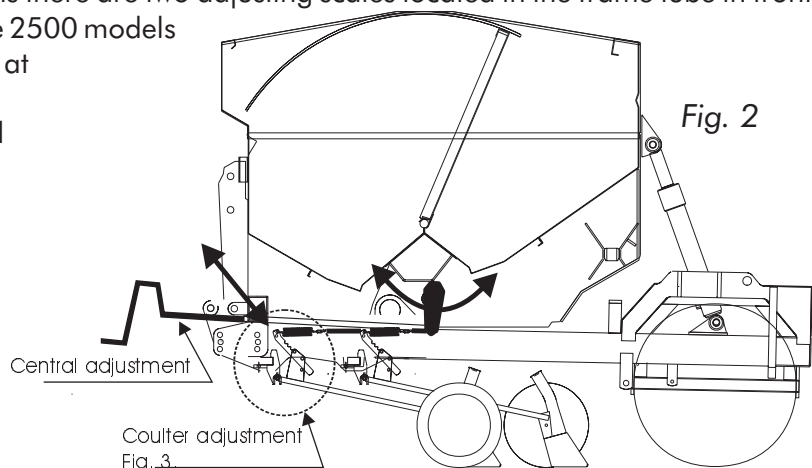
### 12.1.2 FERTILIZER COULTER ADJUSTMENT

Fertilizer sowing depth is determined by the positioning of the ground support wheels. An adjustment screw is provided on both sides of the machine for raising or lowering of the support wheels. Individual adjustment of the support wheels becomes necessary when a wheel travels along a water furrow or alongside an open ditch. A scale is provided on the lower end of each side of the machine showing the related positions of the support wheels. The actual sowing depth must be ascertained from the field itself after a trial sowing run. The most advantageous fertilizer drilling depth is 2-4 cm (1"-1½") below the level of the seed row depth. The coulter design includes a spur, which helps to prevent the clogging of the fertilizer feed tubes even when the machine is lowered fully on soft soil (see Fig. 1).

### 12.1.3. SEED COULTER ADJUSTMENT

The seed coulter sowing depth can be adjusted steplessly by increasing the spring pressure acting on the coulter arm. In 2500 series models an adjustment scale is provided on the R.H. side of the machine for the seed coulters. In the 3000 and 4000 series models there are two adjusting scales located in the frame tube in front of the machine. The central adjustment in the 2500 models

is carried out by turning an adjustment screw at the rear centre of the machine with the handle provided. In the case of the 3000 and 4000 models the adjustment is done by turning the adjusting screws on the front side of the machine. The sowing depth is increased with the increase in spring pressure (see Fig. 2).



Individual coulter adjustment is carried out by altering the length of the notched spring anchor arm. Individual adjustment is called for e.g. for a coulter following in the line of a tractor wheel, where the soil is compacted and the penetration of the coulter is hindered. The coulter travel lower limit can be adjusted by turning the adjusting nut on the low position limiter. The lower position limits are factory-set (see Fig. 3).

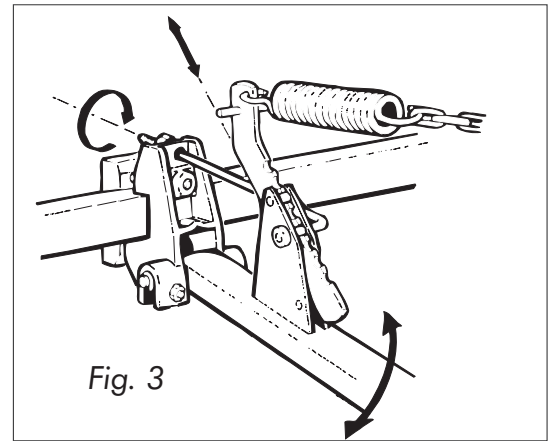


Fig. 3

## 12.1.4 CHOOSING THE FEED RATES AND CALIBRATION TESTING

The feed rates are adjusted by turning the adjusting knobs located on the R.H. side panel of the machine. The scales, which provide the values to choose from, are the main scale on the adjusting knob locking latch and the circular scale on the outer face of each adjusting knob. A circular groove cut into the knob outer circumference determines the position of the knob in relation to the main scale. The sowing chart gives guide values for adjusting the feed rates. The vertical scales in the chart indicate the feed volume per hectare and the horizontal scales the related settings of the two adjustment scales. The lower, larger digits are the values on the main scale and the upper, smaller digits are the values on the circular scales on each adjusting knob (see Fig. 4).



Fig. 4

The Sowing Chart is provided both on the machine's top cover and in this manual. The grain variety is first chosen from the lines in the diagram. The intersection of the required sowing rate from the vertical scale and the variety line determines the relative positions of the main and adjusting knob scales directly below the intersection point.

As an example, suppose that barley is being sown at a required feed rate of 200 kg per hectare. The corresponding adjustment setting on the scales is then 4.7, i.e. 4 on the main and 7 on the knob scale. The adjusting knob is now turned so that the groove on the knob circumference is moved to position 4 on the main scale. The knob is then turned further until the position 7 on the knob scale is brought in line with the locking latch of the main scale.

A calibration test should always be run before the final decision on the required feed rate is done. The degree of cleanliness, the specific gravity value and even specific seed treatments affect the flow characteristics of the seeds within the feeding mechanism.

When compiling the Sowing Chart, a 5% allowance has been made for wheel slip due to the sinking of the tyres. The slippage value may in practice vary between 5-10% depending on the prevailing soil conditions. The calibration test must never be carried out on the basis of the reading given by the areal meter alone. The calibration test can be run separately for the seeds and for the fertilizer if so required. In this case, the drive chain sprocket securing cotter pin must be moved to the outer, alternate hole. When running the calibration test for small seeds, the chain drive arrangement must be adjusted into the small seed sowing position before the test.

When testing the fertilizer side calibration, the calibration troughs are used in the same manner as when testing the seeds. The required feed rate is chosen from the Sowing Chart and the corresponding scale readings noted. Set the feed rate adjusting knob to the reading values thus obtained. The test is carried out in the following manner: Using the handle provided with the machine turn the feed shaft end at a rate of 1 turn in 2 seconds for the accumulated values given in the tables below:

- Fertilizer side test (turning the fert. feed shaft by handle). (as in Fig. 5)  
turns./are

S-2500 T	30.4
S-3000 T/ST	25.4
S-4000 T/ST	18.9

1 are	= 100 sq.m	= 0,0247 acres
1 hectare	= 10000sq.m	= 2,471 acres



Fig. 5

- Seed side test (turning agitator shaft end by handle as in Fig. 6)

	Turns./are
S-2500 T	5.3
S-3000 T/ST	4.4
S-4000 T/ST	3.3 (Fig. 6)

The amount of seed and fertilizer collected in the test troughs is weighed and the resulting weights multiplied by one hundred. The resulting figure represents the amount of material the machine will sow on one hectare for that particular adjustment. The figure thus obtained is compared with the feed rate in the Sowing Chart and a possible corrective action is then taken by turning the adjusting knob. Always adjust from smaller value settings upwards to higher values. This method will counteract any possible backlash in the adjusting knob threads. An alternative method to the calibration test on the seed side is to make a trial run with the calibration troughs in place. A trial run will eliminate also any slippage occurring due to soil conditions or tyre pressures. The resulting figure is the exact feed rate value corresponding with the prevailing conditions.

Fig. 6



**Example:**

210 kg barley and 500 kg of fertilizer to be sown over 1 hectare

SEED:

1. Fill up the seed hopper with at least 100 kg (220 lbs) of seed.
2. Lift up the machine.
3. Remove the drive chain cover.
4. Remove the sprocket retaining cotter pin and insert it in the outer cotter pin hole of the same shaft.
5. Check the Sowing Chart to ascertain the adjustment scale readings for a feed rate of 210 kg/ha for barley. The main scale reading will be 6 and the knob scale reading 3.
6. Adjust the feed rate by turning the adjusting knob on the L.H. side of the machine. Bring the circumferential groove to setting 6 on the main scale and after this, Turn the knob further for 3 more notches to obtain the reading 3 on the knob scale. Always adjust from zero value upwards.
7. Remove the retaining pins from the calibration testtrough support arms to let the troughs fall down below the feed chambers into the test position. Check that no seeds can bypass the test troughs.
8. Attach the calibration test handle into the end of the seed agitator shaft and turn the handle for a few turns. Check that the seeds pass through all of the feed chambers. Empty the troughs by tipping the collected seeds back into the hopper. Replace the troughs in their test position.
9. Rotate the handle at a speed of 2 turns/sec., the speed rate required for the test (check tables for no. of turns required for each machine model).
10. Weigh the seeds collected in the troughs after the completion of turns.
11. If there should be a marked difference between the value given in the Sowing Chart and the value obtained from the test, re-adjust the settings and re-run the test.

**PLEASE NOTE THAT THE VALUES GIVEN IN THE SOWING CHART ARE FOR GUIDANCE ONLY, DUE TO VARIATIONS IN THE COMPOSITION OF THE SOWED MATERIALS, THEIR TREATMENTS ETC.**

**continued...**

**FERTILIZER:**

1. Fill up the fertilizer hopper with at least 100 kg (220 lbs) of fertilizer.
2. Lift up the machine.
3. Remove the drive chain cover.
4. Remove the sprocket retaining cotter pin and insert it in the outer cotter pin hole of the same shaft.
5. Check the Sowing Chart to ascertain the adjustment scale readings for a feed rate of 500 kg/ha for fertilizer. The main scale reading will be 5 and the knob scale reading 6.
6. Adjust the feed rate by turning the adjusting knob on the L.H. side of the machine. Bring the circumferential groove to setting 5 on the main scale and after this, turn the knob further for 6 more notches to obtain the reading 6 on the knob scale. Always adjust from zero value upwards.
7. Move the test troughs over to the fertilizer feed side, release the funnel shaft retaining rubber straps and move the shaft to the rear to make room for the insertion of the test troughs below the feed chambers. Check that no fertilizer can bypass the troughs.
8. Attach the test handle to the end of the fertilizer hopper feed shaft and rotate the handle for a few turns to check that fertilizer passes through all feed chambers. Tip the collected fertilizer from the troughs back into the hopper and refit the troughs back in place.
9. Rotate the handle at a speed of 2 turns/sec., the speed rate required for the test (check tables for number of turns required for each model).
10. Weigh the fertilizer collected in the troughs after the completion of turns.
11. If there should be a marked difference between the value given in the Sowing Chart and the value obtained from the test, re-adjust the settings and re-run the test.

**PLEASE NOTE THAT THE VALUES GIVEN IN THE SOWING CHART ARE FOR GUIDANCE ONLY, DUE TO VARIATIONS IN THE COMPOSITION OF THE SOWED MATERIALS, THEIR HUMIDITY LEVELS ETC.**

**SMALL SEED SOWING AND DRIVE CHAIN REVERSAL**

The Simulta drills are also suited for sowing small seeds, when the feed shaft speed is reduced. This is accomplished by reversal of the chain drive sprocket arrangement.

The drive sprockets are in their normal positions when the smaller sprocket is attached to the feed shaft (see Fig. 7a). The drive is reversed by first removing the retaining pins from each shaft and, in case of 'T' and 'ST' models, the outer sprocket from the intermediate shaft, which drives the optional small seed box. It is advisable to remove the two sprockets and the drive chain as a complete assembly keeping the chain taut so that the sprocket teeth do not change their positions in relation to the drive chain. This also helps to line up the retaining pin holes automatically (see Fig. 7b).

The calibration test for 'T' and 'ST' model drills is made by turning the end of the intermediate shaft and thus the reversal of the chain drive sprockets has no effect on the number of turns required for the test.



Fig. 7a



Fig. 7b

## TRIAL RUN FOR CALIBRATION

To obtain a more accurate result than the manual calibration test can produce is to make a trial run. The run will also take into account the actual wheel slip and any changes in the feed rates due to the machine vibrations occurring during running.

Carry out the trial run as follows:

1. Open up the fertilizer feed flow.
2. Adjust the machine as per instructions for the calibration test.
3. Measure the machine's travelling distance required for completing the sowing of an area of 100 sq.m (1 are) - i.e. the travel distance for the particular drill model.

Travel distances for different working widths per 1 are:

S-2500 T40 m

S-3000 T/ST33.3 m

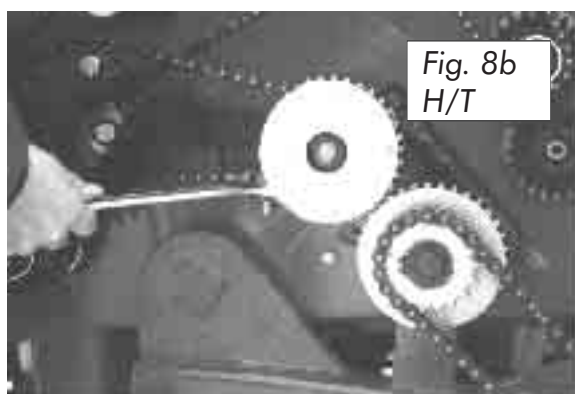
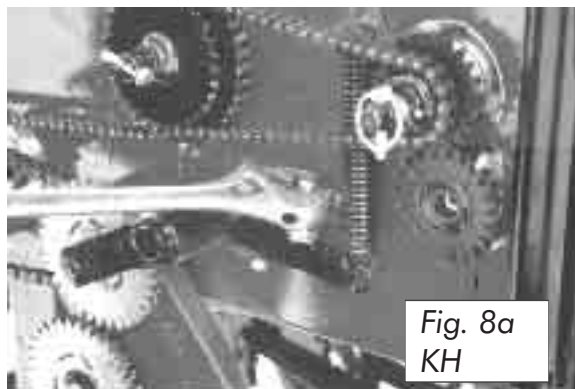
S-4000 T/ST25 m

(the travel distances will stay the same irrespective of the position of the feed chain drive sprockets)

4. Check first that the seeds are passing out unobstructed through each feed chamber by driving outside the test for about 10 meters (33 ft) with the drill in its proper working position.
5. Empty the trough back into the hopper.
6. Lower the machine into working position and carry out the test run over the measured distance.
7. Measure the amount fed into the trough multiplying the resulting value by 100 to obtain the weight of seeds required in kilograms per hectare.
8. Should any checking be called for, refer to the Chapter 'Calibration Test'.
9. Do not forget to reopen the fertilizer feed mechanism and remove the test trough after the field test.

### 12.1.5 CLUTCH ADJUSTMENT

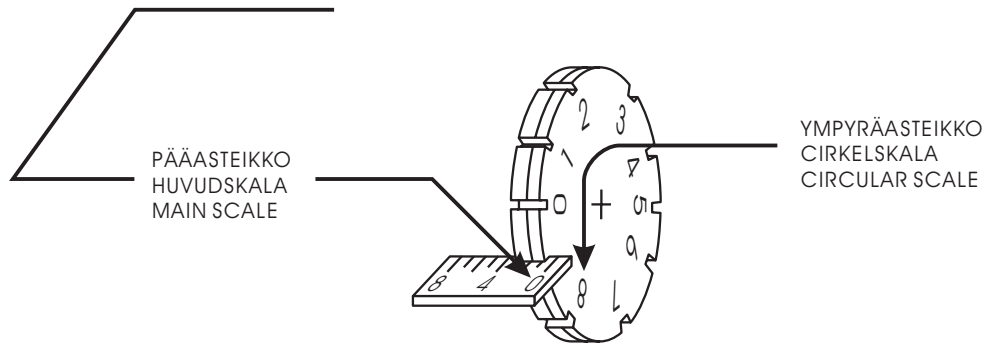
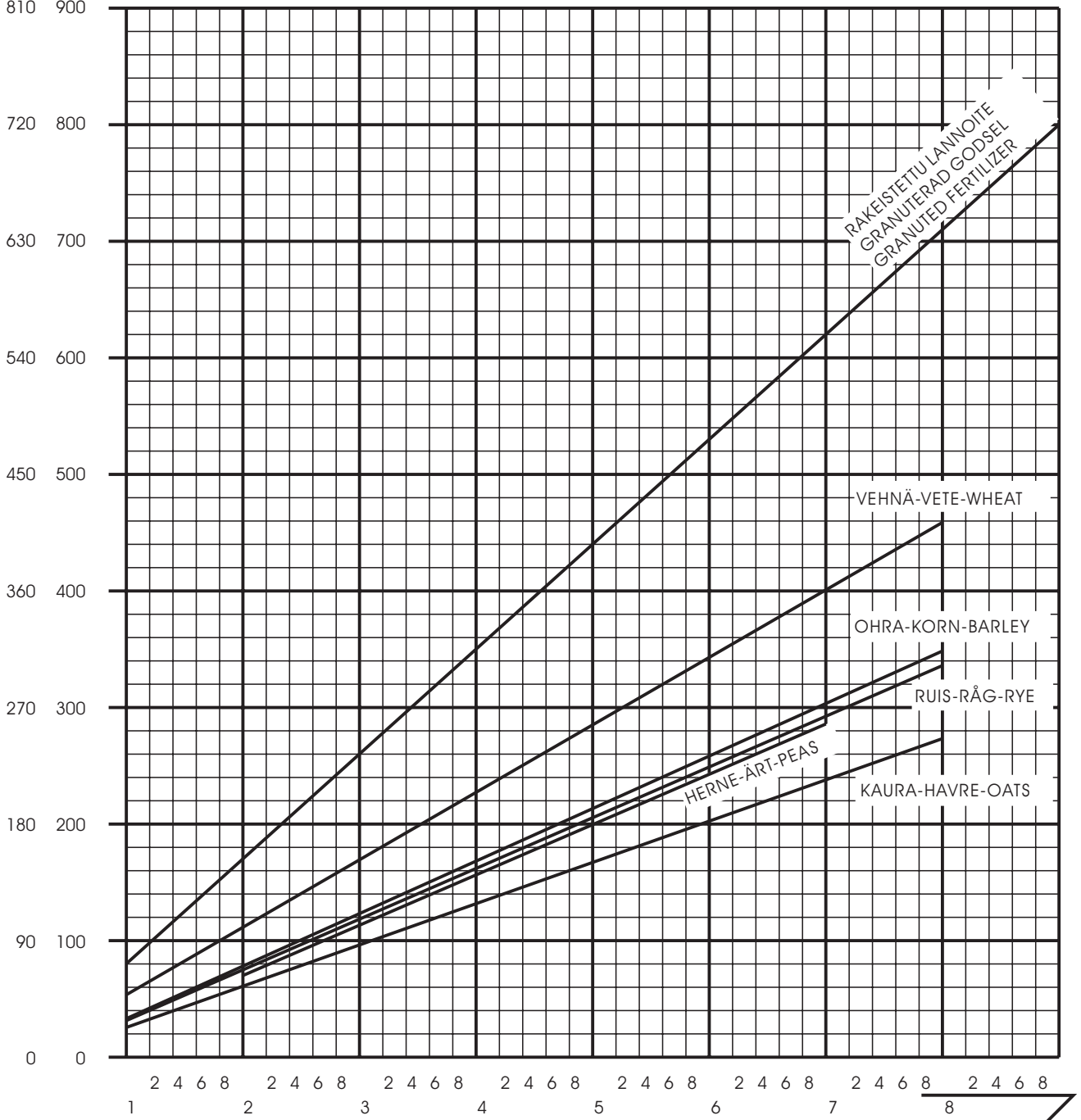
It is possible to adjust the clutching/de-clutching point of the feed when raising or lowering the trailed drill by adjusting the limit screw of the coupling sprocket. Tighten the locking nut after the adjustment. The basic adjustment has been set at the factory (see Figs. 8a and 8b).





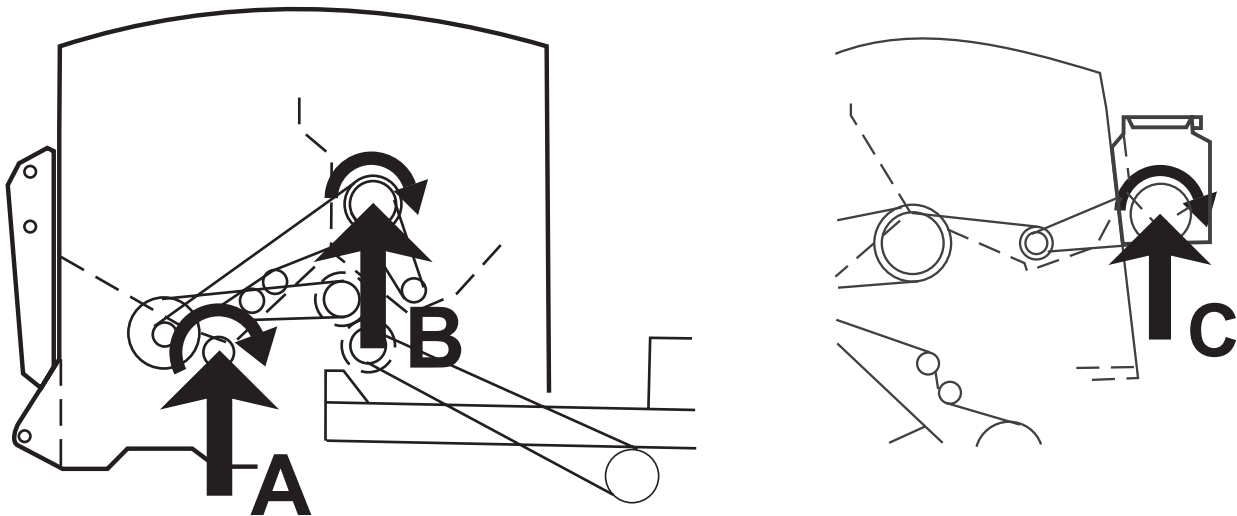
lbs/ acre    kg/ ha  
 810    900

# SOWING CHART



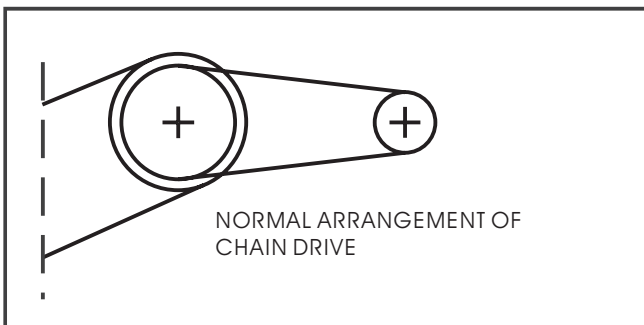
THE VALUES SHOWN IN THE SOWING CHART ARE FOR GUIDANCE ONLY DUE TO THE VARIATIONS IN THE SEED AND FERTILIZER QUALITIES. THE SOWING RATES CAN BE ASCERTAINED BY CARRYING OUT A CALIBRATION TEST. WHEN COMPILING THE SOWING CHART, A 5% ALLOWANCE HAS BEEN MADE FOR WHEEL SLIP. THE SLIPPAGE MAY IN PRACTICE VARY BETWEEN 5-10% DEPENDING ON THE PREVAILING SOIL CONDITIONS.

## 12.2 CALIBRATION TEST



- A = On the fertilizer side by turning the feed shaft.  
 B = On the seed side by turning the agitator shaft.  
 B = On the seed side by turning the intermediate shaft.  
 C = On the small seed box drive.

### NORMAL SOWING



#### POSITION OF THE BOTTOM FLAP

Fertilizer	1 - ( 2 )
Grain seeds	1
Peas	2

### Calibration test turns

# A

	Turns/100 sq.m
S-2500 T	30,4
S-3000 T/ST	25,4
S-4000 T/ST	18,9

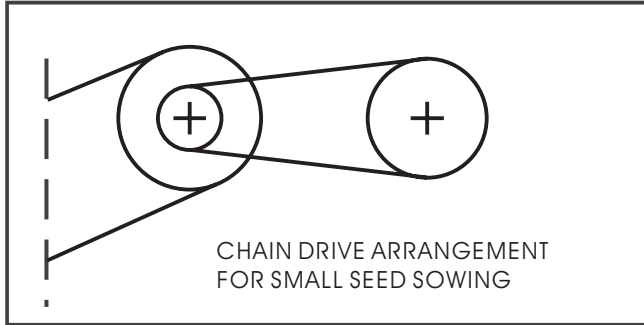
# B

	Turns/100 sq.m
S-2500 T	5,3
S-3000 T/ST	4,4
S-4000 T/ST	3,3

1 are (a)  
 = 100 sq.m  
 = 0.0247 acres

1 hectare (ha)  
 = 10.000 sq.m  
 = 2,471 acres

## SMALL SEED SOWING FROM THE MAIN HOPPER



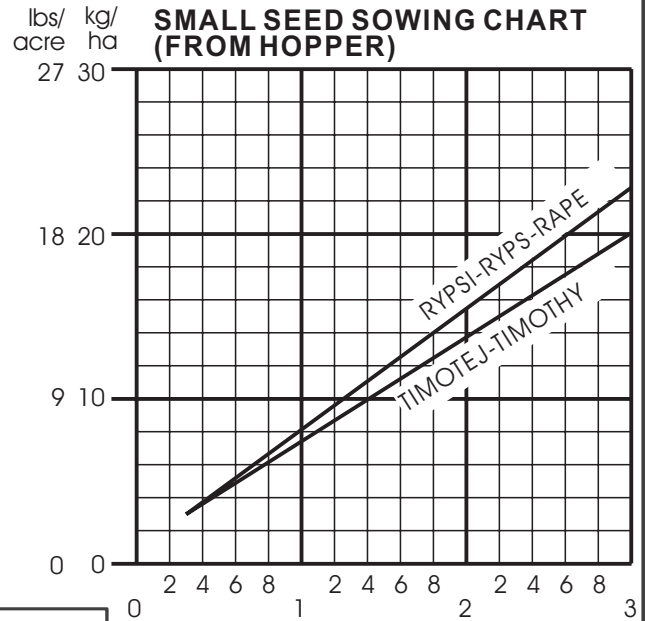
Bottom flap position **0**

Calibration test turns:

<b>A</b>	Turns/100 sq.m
S-2500 T	30,4
S-3000 T/ST	25,4
S-4000 T/ST	18,9

<b>B</b>	Turns/100 sq.m
S-2500 T	5,3
S-3000 T/ST	4,4
S-4000 T/ST	3,3

### SMALL SEED SOWING CHART (FROM HOPPER)



1 are (a)  
= 100 sq.m  
= 0.0247 acres

1 hectare (ha)  
= 10 000 sq.m  
= 2.471 acres

## SMALL SEED SOWING FROM THE SMALL SEED BOX (optional)

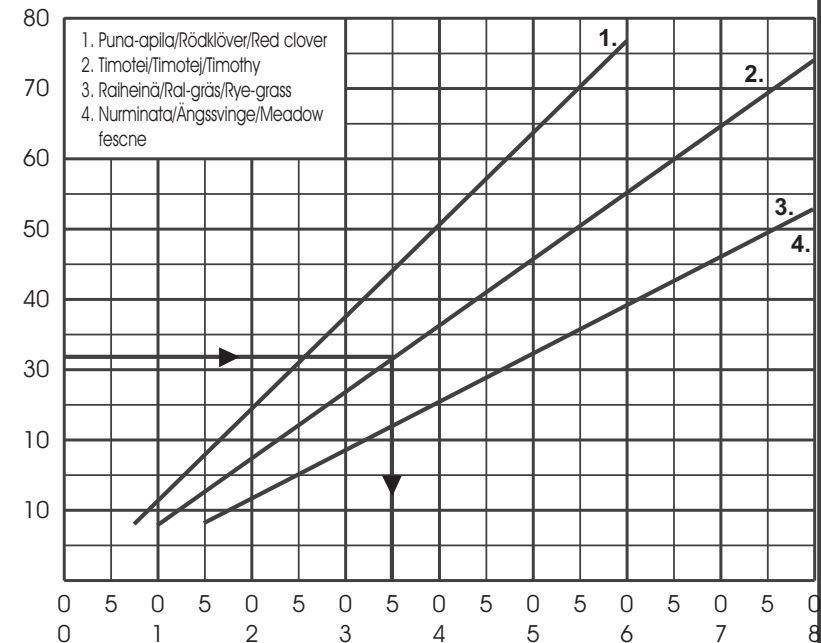
Bottom flap position **0**.  
Sprocket **37T**

Calibration test turns

<b>B</b>	Turns/100 sq.m
S-2500 T	5,3
S-3000 T/ST	4,4
S-4000 T/ST	3,3

<b>C</b>	Turns/100 sq.m
S-2500	3,1
S-3000	2,6
S-4000	2,0

### kg/ha SOWING CHART FOR SMALL SEED BOX



The values given in the chart are for guidance only, due to variations in the quality of seeds. Run calibration test to ascertain values. E.g. required sowing rate 32 kg/ha timothy, use adjustment settings 3.5.

## 12.3 SOWING TECHNIQUES

It is always recommendable to get acquainted with a new machine or machine model by taking the time to operate the machine in trial run with the hoppers empty. This is especially beneficial if done well in advance of the busy sowing season, so that the operator gets accustomed to the necessary adjustments and the general structural details of the machine.

### SOWING SEASON

The correct timing of the start of the sowing is of fundamental significance to the resulting growth. The starting point is determined mainly by the soil humidity value, which again depends largely on the properties of the soil.

The seeds should be placed into the soil in such a manner that their access to the moisture contained in the soil is preserved, even though the amount of moisture should not be excessive. A rule-of-thumb is that if the soil clings to the tyres, then the timing of the starting point of the sowing season should be reconsidered.

The temperature of the soil may be taken as one of the consideration points for the timing of the sowing. The sprouting will take long when the soil temperature remains low and part of the seeds may not sprout at all. Never attempt to sow above a frozen ground layer.

Should the timing of sowing present problems due to lack of personal experience, it is advisable to turn to expert advice from e.g. agricultural organisations.

### FERTILIZING

Fertilizing means supplying the plants with nutrients and the requirements can be best determined by a growth potential test. The amount of fertilizer required by the growth is usually calculated on the basis of the fertilizer's nitrogen content. The most suitable of the different fertilizer types, which all have the same nitrogen content, is the one providing also other nutrients, such as trace elements, required by the growing plants. If the chosen fertilizer is lacking in a specific nutrient or if it contains an excess of the same for the plant requirement, the situation may be balanced the following year by choosing a fertilizer with the opposite values for this nutrient. The representatives of the fertilizer manufacturers will help out when determining the requirements of fertilizer based on conditions of the area and the varieties grown on the farm.

The fertilizer should be placed just below the seed row level so that the plants receive the maximum benefits from the fertilizer.

The most beneficial drilling depth for fertilizer is 2-4 cm below the depth of the seeds.

### SEEDS

Each plant variety has its own specific growth density for producing the best yield. A too small quantity of seeds does not give the best yield and may produce late re-sprouting. Too large amount of seeds is again wasteful, does not produce the ideal yield and also one of the causes for easily laid crops.

The required quantity of seeds for sowing a given area must be determined by taking into account the quality of the seed, its germinative capacity, its size, the object of the sowing and the prevailing conditions for growing the crop.

It is usual in grasslands to grow a protective cereal crop over the grass. The best varieties for this purpose are the early, short and stout-stalked grains, e.g. barley. To prevent any hindrance to the sprouting of the grass seeds from the protective plant growth, it is advisable to reduce the sowing rate for the latter by 20-40%.

The required quantities of seeds should always be checked and confirmed by the supplier of the seeds or by other, independent experts.

The sowing depth of seeds should always be chosen as shallow as possible for rapid sprouting. The important point to note is that the seeds are provided with moisture in all possible conditions. Therefore avoid too shallow drilling depths in a soil that is prone to dry up quickly, otherwise the moisture in the top soil evaporates away and the seeds are left in a dry ground. On lands, which are lacking in moisture in the springtime, it is advisable to drill the seeds adequately deep, even in despite of a lengthened sprouting period, to ensure a successful crop growth.

The actual drilling depth should always be ascertained from the soil as the sinking of the wheels into the soil, the varying soil conditions and tilling techniques make it impossible to produce generally acceptable tables and charts or measuring methods for the determination of the correct drilling depth to cover all possible variations.

## 13. MAINTENANCE



**READ THE SAFETY INSTRUCTIONS  
FIRST**



### 13.1. LUBRICATION

Correct lubrication prevents wear and breakdowns during the busy sowing season. The lubricant used must be a good quality multi-purpose grease. Check always when lubricating that the lubrication nipples are unblocked and that the grease gun nozzle is in good condition.

The lubricating points are shown in the diagram on page 32 of this manual.

### 13.2. CLEANING AND STORAGE DURING OPERATING SEASONS

The machine should be shielded during the operating season from rain and the coulters should be kept above ground when the machine is stored outdoors. If left on ground, moisture is condensed inside the coulters and plastic tubing causing obstructions particularly to the fertilizer flow through the feed mechanism and the coulters. It is a recommended practice that the fertilizer hopper is emptied after each sowing run and that the machine is lifted onto e.g. forklift pallets to rest above ground. The trailed models can be left up supported by the hydraulics providing that the pressure line ball valve is closed and the support leg is used.

The fertilizer feed grooves should be turned fully open before commencing a sowing run and from time to time during the actual sowing run. This procedure will loosen any fertilizer stuck in the groove and results in maintaining the correct feed rate. It also prevents any damage to the feed mechanism caused by hard lumps of fertilizer.

### 13.3 DO-IT-YOURSELF REPAIRS

#### DAMAGED FERTILIZER COULTERS

The fertilizer coulters tip or disc, coulters arm or the springing can often be replaced separately. After replacing a coulters or its spring the attaching screws must be checked for tightness after having operated the machine over a few hectares. Check the coulters tips for wear from time to time. If the coulters tip should prove worn, its adjustment should be altered so that the lower surface of the coulters tip remains at least 5 mm below the spur (see Fig. 1).

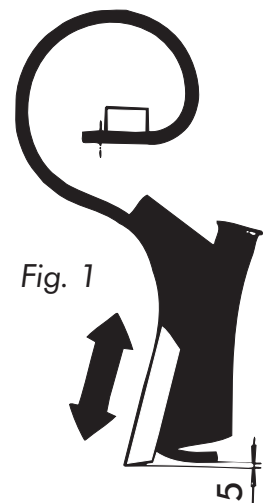


Fig. 1

#### DAMAGED SEED COULTERS

The replaceable parts of a seed coulters are the disc, the wearing bit and the coulters arm. If the coulters pivot bearings have got worn, the bearings can either be replaced or tightened down (see 'A' in Fig. 2).

#### FEED ROLLER SEALING RING REPLACEMENT

Remove the threaded mounting flange of the feed mechanism adjusting knob from the side panel and all cotter pins from the shaft. Pull the shaft out through the hole in the side panel. The sealing ring is located in a groove on the side of the feed chamber. Insert a thin knife blade or corresponding between the sealing ring and its locking ring forcing the locking ring out of place to enable replacement of the sealing ring.

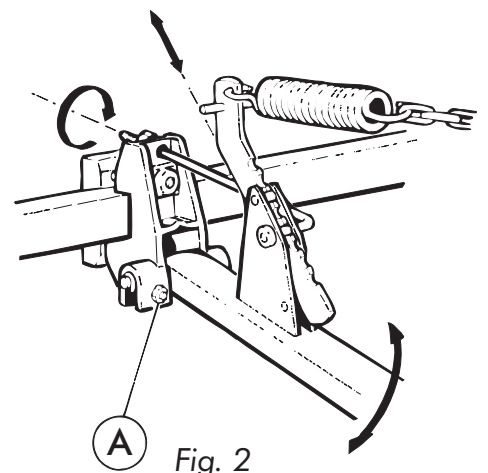


Fig. 2

## REPLACEMENT AND ADJUSTMENT OF BOTTOM FLAPS

The feed rate is affected in a decisive manner by the condition and the correct adjustment of the bottom flaps. The flap adjustment has been carried out at the factory, but it is always possible that clumped fertilizer, foreign objects etc. may damage a bottom flap despite of its safety release spring. A damaged bottom flap should be replaced by a new one or, if the damage is only slight, it is sufficient to correct the condition by re-adjustment.

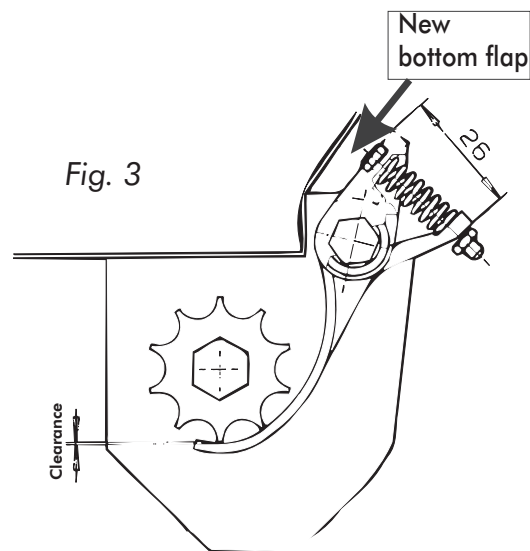
### BOTTOM FLAP REPLACEMENT

Remove all the hairpin fasteners from the bottom flap operating shaft and mark out the locations of the other parts on the shaft to help in the correct assembly later. Remove the seed side adjustment screw locking to enable the withdrawal of the shaft. The bottom flap can be removed and replaced after having turned the feed rate adjustment to zero reading. The assembled bottom flap is then placed inside the feed chamber and the operating shaft refitted. Check that all flaps stay in the same position in relation to the hexagonal shaft. Re-attach all the parts removed in the process of repair (see Fig. 3).

### INDIVIDUAL ADJUSTMENT OF BOTTOM FLAPS

The basic adjustment of the bottom flap spring is correct when the marked distance in the drawing on right is 26 mm. The bottom flap position can be adjusted into both directions within the normal range of adjustment.

Tightening of the adjusting screw by one turn increases the feed rate by 7%. Conversely, loosening the screw decreases the feed rate. All bottom flaps in each feed chamber must be similarly adjusted. Move the central adjustment lever into position 1, to enable the checking of the clearance between each flap and its feed roller by your fingertip. The correct clearance is approx. 0.5 mm. The clearance adjustment has been carried out at the factory for all new machines (see Fig. 3).



### CENTRAL ADJUSTMENT OF THE BOTTOM FLAPS

Should the calibration test results differ markedly from the values given in the Sowing Chart, the machine may be trimmed towards the chart values within certain limits. It is only natural that there should occur even quite significant differences in the flow characteristics of both seeds and fertilizer. It is therefore not recommendable to commence a major adjusting procedure to correct only slight deviations. The adjustment is carried out by altering the position of the adjusting lever locking latch. The effect of the adjustment is about 1.5% for each 1 mm movement so that tightening of the latch reduces the sowing rate and vice versa. The limiting value for the tightening is that a clearance should remain between the flap and the feed roller when the central adjusting lever is moved to its position 1 (see Fig. 3).

### TYRE REPLACEMENT

Tyre replacement in Simulta 3000/4000 'S' and 'ST' models is best carried out by first detaching the boggie shaft and removing the whole boggie ass'y from the machine. In the case of the L.H. boggie, the drive chain from the wheel must also be removed. In practice, this is done by supporting the whole boggie by means of e.g. a floor jack and removing the boggie centre shaft having first removed its locking ring. Jack up the boggie frame to enable the oscillating boggie carrier ass'y to be freed from the frame by pulling the carrier ass'y backwards.

Having done this, remove the wheel axle shaft bearings and the gang wheel assembly from its carrier. The individual wheels can now be removed from the axle shaft. The removal of the centremost wheel requires the removal of the outermost wheel hub.

The quickest way to remove a wheel from the 2500 T model is to remove first the wheel shaft bearings. After this lift up the boggie frame and support the wheels in this position in such a way that the bearing capscrews can be removed while leaving the bearings still in their places. Remove the support blocks and let the wheels down, so that they can be withdrawn from below the boggie frame.

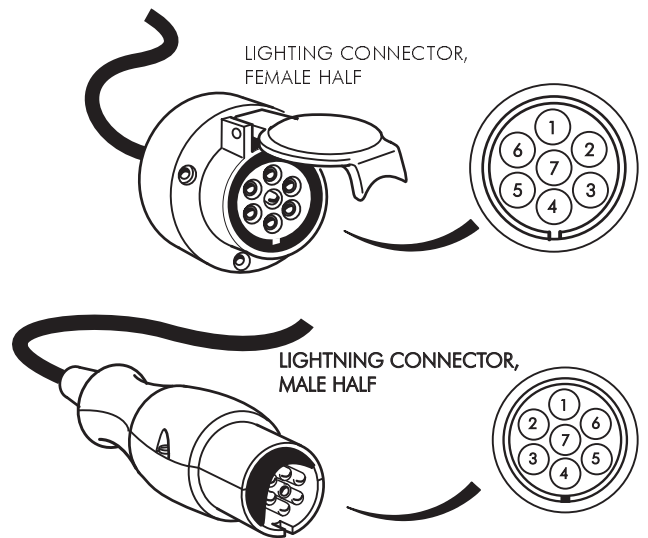
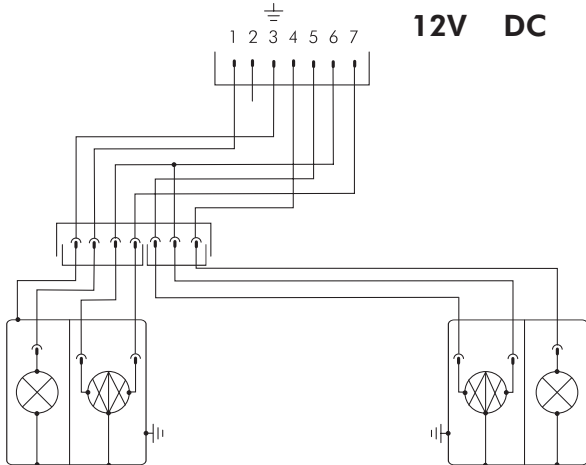
## TYRE PRESSURES

The tyre pressures used affect the total ground pressure exerted by the machine. This in turn affects the compactness of the soil. It is worth noting that by using a smaller ground pressure also means having a lower carrying capacity. The carrying capacity is directly related to the machine's transport speed, so that when using tyre pressures, which are lower than the maximum allowed, the transport speed of the machine must also be lowered. The tyre pressure values given in the tables below have been determined on the basis of the machine weight and the travel speed of 30 k.p.h. (18.7 m.p.h.), which is the structural top speed value for the tyres. When sowing, the function of the tyres is to act as packing rollers over each sown row. Thus it is advisable to use tyre pressures as near the max. values as possible to improve the compression effect on soil especially on soils lacking in spring moisture.

Tyre size		`T` model	`ST` models	max. press
7.00-12	4ply	175kPa	210kPa	210kPa
7.00-12	6ply	165kPa	210kPa	250kPa

### Electrical System Diagram:

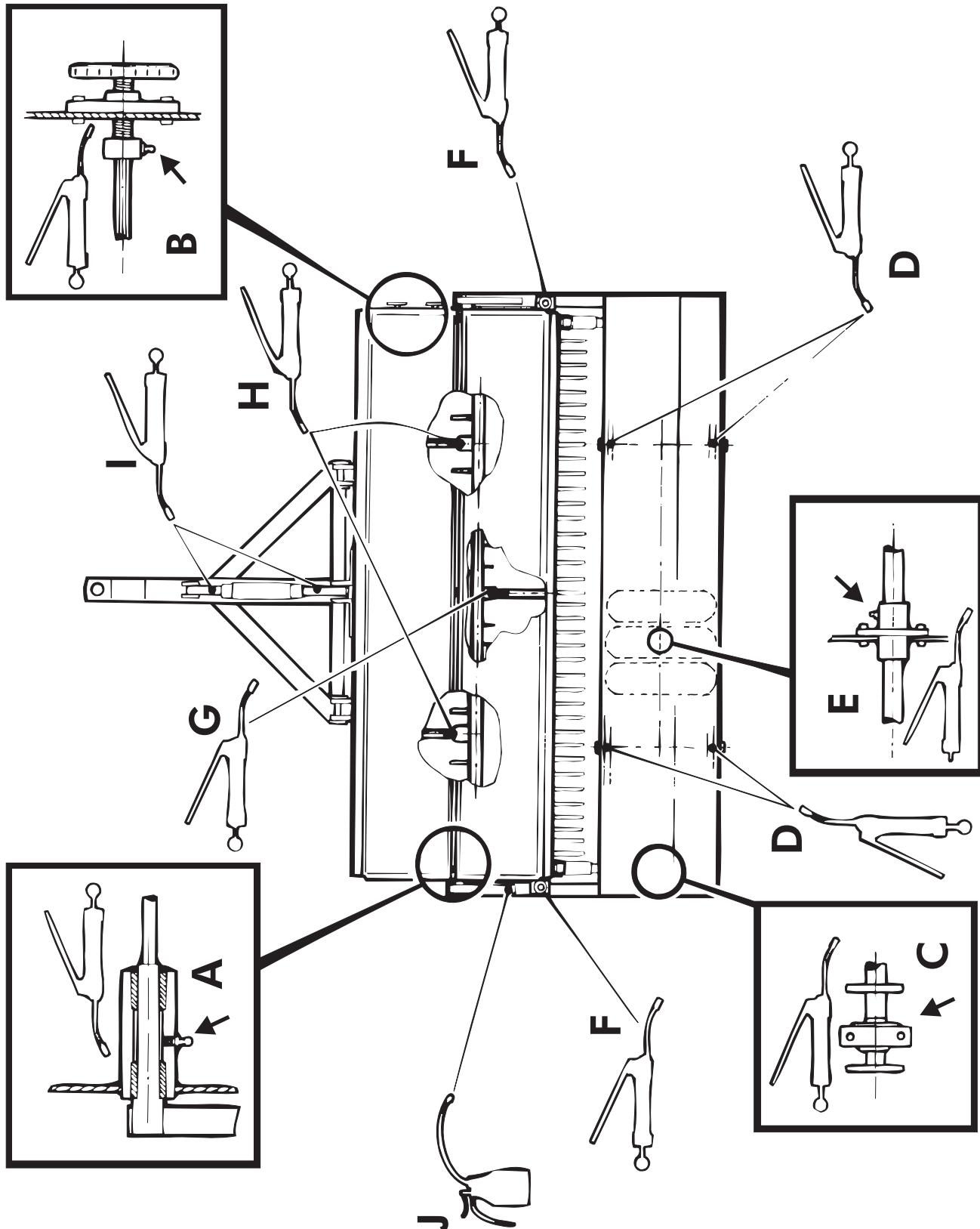
1. L.H. DIRECTIONAL LIGHT
2. UNUSED
3. GROUNDED TO FRAME
4. R.H. DIRECTIONAL LIGHT
5. R.H. REAR LIGHT AND LICENCE PLATE LIGHT
6. BRAKE LIGHT
7. L.H. REAR LIGHT



# 14. SPARE PARTS

When ordering spare parts always specify the machine model and the year of manufacture and also both the description and the part no. of each part required.

# 15 LUBRICATION CHART





		\$2500	\$3000 \$4000
A.	Arm bushings 2ea	200hours or twice in a season	200hours or twice in a season
B.	Feed adjustment 2ea	As above	As above
C.	Wheel bearings 4ea	Only at renewal	
	8ea		Only at renewal
D.	Boggie bearings 4ea	Twice in a season	
	8ea		Twice in a season
E.	Freewheel bearings 4ea	Twice in a season	
F.	Height adjustment 2ea	As above	Twice in a season
G.	Central adjustment 1ea	As above	
H.	Central adjustment 2ea		Twice in a season
I.	Top link threads 2ea	Twice in a season	As above
J.	Drive chains	Daily	Daily

The screw threads are to be lubricated with a good quality vaseline or appropriate general lubricating grease. Turn each threaded portion once fully in and fully out after applying the lubricant to spread the lubricant evenly over the whole length of the thread. It is recommended to lubricate the drive chains with biological oil.

## 16. OUT-OF-SEASON STORAGE

### 16.1 CLEANING FOR STORAGE

The drill is emptied of all seeds and fertilizer. Wash the machine thoroughly both inside and out with clean water. Clean all electrical system components with a clean, damp cloth.



**NOTE! Do not use a pressure washer for cleaning!  
Do not spray the electrical system components with water or any cleaning liquids!**

### 16.2. WINTER STORAGE

When the machine is left unused after an operating season, it should be stored in a covered space after having been cleaned and lubricated. The machine should be cleaned carefully and its paintwork checked after the cleaning. Any scratches or other damage to the paintwork should be repaired by painting over the damaged spots. Carry out a full lubrication routine on the machine. The drive chains should be removed and cleaned in petrol or kerosene and oil-bathed after cleaning.

The machine will survive the winter period without rusting, if it is wiped over with a rag dipped in mineral oil.



**Never use other than new, clean oil for rust prevention during winter storage as old, used oils contain sulphur and other combustion residues. These will increase the risk of corrosion in areas not protected by paint. It is also forbidden to use synthetic oils for corrosion prevention.**

The hydraulic cylinders should also be fully retracted to prevent rusting of the piston rods. Loosen the screws of the central adjusting mechanism in order to relieve the spring pressures in the coulters. All removable electronic display units and encased control units should be stored separately in a dry and warm environment.

It is also advisable to check the tyre pressures before leaving the machine into storage.

***As the storage period of a seed/fertilizer drill tends to be lengthy, careful attention to preparation procedures is especially important with regard to the durability of the machine.***

## 17. FAULT FINDING CHART

FAULT	CAUSE	REPAIR
Calibration test does not comply with chart values	Faulty adjustment	Check adjustment
	Faulty direction or rotation	Check d.o.r.
	Faulty No. of turns in test	Check
	Faulty bottom flap position	Check
	Note the guidance aspect of chart	Carry out a trial run as necessary
Feed rate lower than calibration test indicates	Calibration test not properly done	Re-test
	Clutch engagement improper	Re-adjust clutch
Feed rate higher than calibration test indicates	Calibration test not properly done	Re-test
	Machine vibration may sometimes increase the flow of seed	Carry out a trial run as necessary

FAULT	CAUSE	REPAIR
Feed rate varies between individ. feed chambers	Bottom flaps in different positions	Adjust
	Feed groove positions in relation to feed chambers vary	Adjust
Electric areal meter does not operate and indicator light is off	Lights no switched on	Switch parking lights on
	Connector corroded	Clean connector
	Broken wiring	Repair
Electric areal meter does not operate even when indicator lights in on	Connector corroded	Clean connector
	Broken wiring	Repair
	Damaged sensor	Replace
Excessive wear in fertilizer coulter tubes	Coulter tip runs too high	Adjust position
Excessive wear in fertilizer coulter tips	Soil conditions hard and wear-inducing	Replace tips with hard-faced or hard alloy tips
Seed coulter bent upwards	Coulter struck stone in field	Replace coulter arm
Seed coulter bent downwards	Coulter struck obstacle when reversing the machine	Replace coulter arm

### 17.1 NORMAL WEAR AND TEAR

The normal operational wear that takes place in the seed and fertilizer drill processes safely and causes no dangerous situations.



*It should be noted that if the machine is operated in any manner contrary to the highway code or the given safety instructions or if it is overloaded or left without proper maintenance the danger of unusual wear or failure of a component part always exists. This might present a risk of personal injury or environmental damage.*



# 18 WITHDRAWAL OF THE PRODUCT FROM ACTIVE USE



**READ THE SAFETY INSTRUCTIONS**



When the product is withdrawn from active service the responsibility of handling the matter rests solely on the product's end-user or the person or enterprise, in whose ownership the product is at that date.

The disposal of the machine and the various resulting waste materials is governed by national laws, instructions and regulations, which are to be complied with. This applies to all countries, where the product is marketed.

Most of the component parts of a seed drill are of materials, which do not disintegrate in nature. This makes it necessary to disassemble the machine and to dispose of the various materials according to national regulations.

- Steel and other metallic parts are recycled through scrapyards or stripping yards for re-use.
- Waste oil, plastic parts and rubber components, other than tyres, are disposed of as hazardous waste by recycling, taking them to a refuse dump or disposed of by other means according to national regulations.
- Tyres must be disposed of in accordance with the directives 83/189 EY, 182/88/EY, 94/10/EY by returning the used tyres to recycling points or to a recycling operator, who will forward the tyres for re-processing.

Environmental authorities will supply further information on handling the scrapping and the resulting waste materials.

# 19 TERMS OF WARRANTY

## TERMS OF WARRANTY:

1. The warranty period is 12 (twelve) months when used for agricultural purposes within the scope of operation to which the machine has been intended for.
2. In communal, industrial or commercial contract work the warranty period is 6 (six) months.
3. The warranty period shall begin from the date of the machine's delivery to the customer by the authorized Distributor/Dealer.
4. The warranty is limited to manufacturing and material defects in the product. The failed part(s) will be repaired or exchanged for reconditioned part(s) either by the factory or an authorized repair workshop. The subcontracted machine components are covered by the respective warranty policies of their manufacturers.
5. A repair carried out and covered by the warranty does not constitute any elongation of the warranty period.
6. The warranty does not cover faults or damages caused by operating practices which are incorrect or contrary to the practices outlined in this manual, by incorrect maintenance, excessive loading or normal wear. The warranty shall neither extend to cover any subsequent damages, down-time, travelling expenses, freight charges, daily allowances, overtime work nor any modification work on the machine's original design.

In matters related to the warranty, please contact your local Dealer, who will prepare a warranty claim on the subject matter. Before any action is taken to correct the fault or defect, the proposed procedure and possible expenses thereof must be agreed with by the manufacturer.

The warranty shall apply only if the warranty registration form is returned duly filled to the manufacturer

## 20 SCOPE OF LIABILITY

The manufacturer of the product shall not be held liable for the consequences if the said product is used in a way contrary to common law, safety instructions or the instructions contained in this manual. When operating the machine, situations may arise, which are unforeseen and therefore not covered by any specific instructions. The operators are therefore advised in such cases to act according to general, machinery-related safety regulations and directives.

Please note that the incorrect application of fertilizer or seed dressing may prove damaging to people, animals, waterways or soil. Always comply with the instructions given by the manufacturer of the materials or by other experts on the matter to ensure correct handling and application of these substances.

The manufacturer shall not be responsible for any damages caused by incorrectly chosen seed, pesticide or fertilizer for any application. Experts should be consulted for advice if personal knowledge and experience is not sufficient for correct decision-making.

The manufacturer shall neither be held responsible for a poor growth resulting from the use of the product. The operator must keep an eye at all times on the sowing rates for both seeds and fertilizer thus to ensure that the quantity of sown material remains at a level, deemed suitable, in all feed chambers. The operator must also continually observe that the proper sowing depths are maintained.

The manufacturer of the product shall not be responsible for damages caused by the use of subcontracted components.

The manufacturer shall not be responsible for any damages to other machinery and equipment which may be caused by the use of the seed and fertilizer drill.

The manufacturer reserves the right to further develop or alter the construction of the product.

The owner of the seed and fertilizer drill shall be held responsible to oversee that each and every person operating the machine has acquainted himself/herself with the operating and safety instructions outlined in this manual and fully understood all such instructions.

