



SAMI

DRUM GRADER



OPERATING INSTRUCTIONS LIST OF SPARE PARTS

Read these instructions carefully in conjunction with the illustrations before using your machine for the first time. Keep these instructions for future reference.



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ASSURANCE OF MEETING THE QUALITY REQUIREMENTS MADE OF THE MACHINE

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We assume full responsibility for assuring that our product SAMI drum grader (from serial number 168/1997) that has been brought into the market complies with European Economic Community Machine Directive including amendments relative to the directive, and all the national endowments carrying these into effect.

Directive

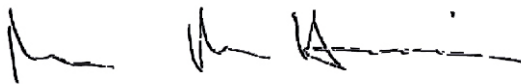
Standard

89/392/EEC

SFS-EN 292-1
SFS-EN 292-2
SFS-EN 60204-1

Ylihärmä

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Marko Mäki-Haapoja, Managing Director

LIST OF CONTENTS

1.	FOR THE OWNER	3
1.1.	SAFETY ALERT SYMBOL	3
2.	WARRANTY AND REGISTRATION	3
2.1.	WARRANTY AND REGISTRATION CARD	3
2.2.	TERMS OF WARRANTY	4
3.	SAFETY PRECAUTIONS	4
3.1.	GENERAL SAFETY PRECAUTIONS	4
3.2.	SERVICE AND REPAIR	4
3.3.	TRANSPORT	5
4.	TYPE PLATE	5
5.	PURPOSE OF THE MACHINE	5
6.	TECHNICAL DATA	6
6.1.	STANDARD EQUIPMENT	6
6.2.	EXTRA EQUIPMENT	6
6.3.	DIFFERENT SIEVES.....	6
6.3.1.	<i>Sieves with round holes.....</i>	6
6.3.2.	<i>Sieves with long holes</i>	6
6.3.3.	<i>Marking of sieves.....</i>	7
7.	BRINGING THE MACHINE INTO USE	7
7.1.	INSTALLATION	7
8.	STRUCTURE OF THE GRADER.....	8
8.1.	OPERATING PRINCIPLE.....	8
8.2.	ROTATING SIEVE BRUSH	9
8.3.	CONNECTIONS.....	10
9.	USE	10
9.1.	SORTING.....	10
9.1.1.	<i>Selecting appropriate sieve sizes</i>	10
9.1.2.	<i>Sieve size of secondary sieves.....</i>	11
9.1.3.	<i>Sieves recommended for different materials.....</i>	11
9.2.	ADJUSTMENTS	12
9.2.1.	<i>Adjusting the amount of material</i>	12
9.2.2.	<i>Adjusting the inclination of drum sieve.....</i>	12
9.2.3.	<i>Adjusting the Rotation speed of drum sieve</i>	13
9.2.4.	<i>Mixers attachable to the inner surface of the sieve</i>	13
9.2.5.	<i>Adjustments in general</i>	14
9.3.	SHIFTING OF SIEVES	15
9.3.1.	<i>Detachmen</i>	15
9.3.2.	<i>Attachment.....</i>	15
10.	SERVICE	16
11.	NOTES OF PERFORMED SERVICE MEASURES.....	17

1. For the Owner

Congratulations! You have just made a good choice in purchasing our product. Read this instruction manual carefully, because it is essential both for your personal safety and for the reliability of the drum grader to know the structure and function of the machine perfectly, to take care that it is correctly adjusted and well-maintained.

You should carefully read and understand every section of this manual. Following the instructions will ensure that your Sami drum grader will provide you with a long-lasting and faultless performance.

If you have problems, do not hesitate to consult the manufacturer or your local Sami products dealer. Keep this instructions manual in the near presence of the machine, in sight of the operator. After you have read the instructions, please return the warranty and registration card to the manufacturer and to your dealer.

BEST REGARDS,



Ylihärmä

1.1. Safety alert symbol



This safety alert symbol indicates that the current passage involves personal safety. This symbol also indicates that property and/or environmental damage may occur unless the instructions are followed carefully.

2. Warranty and Registration

2.1. Warranty and registration card

We consider you as an important customer and therefore we would appreciate it you could inform us, even after the one-year period of warranty has expired, if you have been satisfied with our products and services. This information helps us improve our products and services. Please complete and send us back the warranty and registration card enclosed.

After your registration, we will be able to inform you about our future achievements. Registration also enables you to gain the best possible benefit of the product you have now purchased.

We advise you to send in the warranty and registration card as soon as possible. Use the envelope enclosed (postage free of charge).

Moreover, if we have your registration, you will find it easier to transact with us. For example, in case of non-durable parts, your registration ensures that you will certainly be delivered a spare part the model and version of which are exactly the same as the model and version of the present non-durable part in your machine.

2.2. Terms of warranty

1. This product is guaranteed for one year under normal agricultural use for which it is designed. Under communal, industrial and professional piecework use the warranty period is 6 months.
2. The warranty period begins from the day of delivery of a new machine.
3. If your product fails to perform satisfactorily because of defects in material or workmanship it will be repaired or replaced. If it is found that the warranty does not cover the defect in question you will be charged for the costs. For subcontracted parts, the warranty is valid only in accordance with the terms of warranty defined by the importer.
4. Repair under warranty does not extend the period of warranty.
5. The warranty does not cover damages caused by faulty installation, use or service, overloading or fair wear and tear of the machine.
6. The warranty does not cover secondary failures, freights, travel costs, demurrage days, or any amendments made to the original structure of the machine.

Before any actions are taken, it is essential for you to contact the manufacturer and discuss the possible measurements needed and the costs.

The warranty is valid only in case the warranty and registration card is appropriately completed and returned within 30 days from the day of delivery.

3. Safety Precautions



3.1. General safety precautions

- **USE:** Before using the machine for the first time, make sure you are familiar with the installation adjustments and the function of the machine.
- **SAFETY regulations:** Follow all the instructions and safety regulations in this operating instructions manual and the regulations attached to the machine itself.
- **SAFETY COVERINGS:** it is not allowed to use the machine unless the safety coverings are attached and are in proper condition.
- **CONNECTING TO TRACTOR:** Extreme caution is needed when connecting to and disconnecting from a tractor

3.2. Service and repair

- It is not allowed to service the machine while it is running.
- Before any service measures are performed, ensure that the machine is unplugged from mains supply and fuses are removed.
- This machine must be earthed.
- Electrical installations must not be performed by any other person than a qualified electrician.

3.3. Transport

- Local statutory regulations concerning road traffic must be observed when transporting the machine on public roads.
- All the essential equipment needed for transport on public roads, such as lights, luminous tags, and a triangle sign warning about a slow vehicle must be checked and attached.
- No passengers on the top of the machine are allowed.
- When lifting the machine: Lifting lines or chains must be attached using the three-point mooring on the sides of the machine. Alternatively, the machine can be lifted from the two lifting lugs, as illustrated.



Figure 1. Permitted lifting points

- Use only permitted lifting lines or chains and always ensure that they are in perfect condition.
- If the machine is transported on a platform or the like, it must be tied firmly in place using e.g. lines or chains.
- When moving the machine by the aid of an industrial truck or the like, make sure that the machine is perfectly in balance and there is no danger of falling.
- The lid must be shut during transport and lifting.

THIS MACHINE IS INTENDED FOR A QUALIFIED OPERATOR. THEREFORE IT IS ESSENTIAL FOR THE OPERATOR TO POSSESS SATISFACTORY KNOWLEDGE AND SKILL ON THE STRUCTURE AND FUNCTION OF THE MACHINE.

4. Type Plate

There is a type plate attached on your machine. It indicates the type, serial number and year of manufacture of your machine. Please make note here of the information on the type plate so as to ensure that it can be later referred to.

TYPE:

SERIAL NUMBER:

5. Purpose of the Machine

Sami drum grader is intended for the improvement of autarchic sowing seeds, small seeds and malted barley. The machine separates sowing seeds and small seeds from such refuse matter that could clog up the feeding apparatus of the seeding fertilizer machine. No other uses are allowed.

6. Technical Data

Sorting efficiency, depending on the size and purity of grain:	
Separation of straw + sorting into two size groups. (Secondary sieves of equal size, for example malted barley)	1000-3000 kg/h
Separation of straw + sorting into three size groups (secondary sieves of unequal size, for example seed grain)	500-1500 kg/h

Measurements and weight:	
Unloading height, at lowest	470 mm
Unloading height, at lowest (with elevation legs)	500 mm
Unloading height, at highest (with elevation legs)	800 mm
Length	1960 mm
Width	785 mm
Height, at lowest	1780 mm
Diameter of primary drum sieve	500 mm
Diameter of secondary drum sieve	650 mm
Size of primary sieve	1594 × 625 mm
Size of secondary sieve	2080 × 720 mm

6.1. Standard equipment

Pipe fitting	4 pieces, diameter 160 mm
Mixers attachable to the inner surface of sieve	4 pieces
Standard sieves	
- primary sieve with round holes	Ø 12 mm
- front secondary sieve	with long holes, 2,5 × 20 mm
- back secondary sieve	with long holes, 3,75 × 20 mm
Electric motor	
Motor starter	
Wire 5 m + 16 A connecting plug	
Rubber-topped legs	

6.2. Extra equipment

Primary sieves:	
- with round holes Ø 2-16 mm	
Secondary sieves:	
- with round holes	
- WITH LONG HOLES 1,0×20 – 5,0×20	
Adjustable elevating legs	
Vacuum cleaner for dedusting	
Pipe fitting for a grain pipe Ø 160	

6.3. Different sieves

6.3.1. Sieves with round holes

E.g the denotation P-SIEVE 120-51 means:

“P” stands for “primary sieve”

“S” stands for “secondary sieve”

Figure 120 stands for the diameter of the hole, which is as much as 12,0 mm

Figure 51 stands for the hole area of the sieve, which is as much as 51 %

6.3.2. Sieves with long holes

E.g. the denotation S-SIEVE 250-20-42 means:

“S” STANDS FOR “SECONDARY SIEVE”

“P” stands for “primary sieve”

Figure 250 stands for the diameter of the hole, which is as much as 2,5 mm

Figure 20 stands for the length of the hole, which is as much as 20 mm Figure 42 stands for the hole area of the sieve, which is as much as 42 %

SIEVES WITH ROUND HOLES			SIEVES WITH LONG HOLES		
PRODUCT NUMBER	SIEVE SIZE		PRODUCT NUMBER	SIEVE SIZE	
376011	P-sieve 020-40		376055	S-sieve 100-15-35	
376013	" 030-40		376056	" 110-15-35	
376015	" 040-30		376057	" 125-15-36	
376016	" 050-47		376058	" 150-15-40	
376017	" 060-33		376059	" 175-20-41	
376018	" 080-58		376060	" 200-20-34 *	
376019	" 100-56 *		376061	" 225-20-38 *	
376020	" 120-51 * +		376062	" 250-20-42 * +	
376021	" 160-58		376063	" 275-20-42 *	
376031	S-sieve 020-40 *		376064	" 300-20-41	
376033	" 030-40 *		376065	" 350-20-43 *	
376035	" 040-30		376066	" 375-20-42 * +	
376036	" 050-47		376067	" 400-20-42 *	
376037	" 060-33		376069	" 450-20-42	
376038	" 080-58 *		376068	" 500-20-48	
376039	" 100-56		376080	P-sieve 500-20-48	
376040	" 120-51				
376041	" 160-58				

* = this sieve is available from the manufacturer's depot (2-3 days of delivery time)
Sieves without a marking are custom-made (10 weeks of delivery time)

+ = this sieve is included in the standard delivery of a sorter. If the machine is delivered with other sieves, the difference of prices of the sieves must be noted.

6.3.3. Marking of sieves

The size of a hole has been marked on the sieves in the following manner:

E.g. the marking of a sieve of 3,75 mm:

mm ○ ○ ○
1/10 mm ○ ○ ○ ○ ○ ○ ○ ○
1/20 mm ○

7. Bringing the Machine into Use

The customer is responsible for bringing the machine into proper working order. Make sure that all parts are included and that no damage as a result of transport has occurred. If you find defects, do not hesitate to consult your local dealer.

7.1. Installation

The machine must be placed on a sturdy and even base. There are rubber-topped legs under the sorter, which are to keep the machine firmly in place when running, without any attachment to the base. However, if there is a possibility of falling of the machine caused by its moving on a non-sturdy location, the machine must be fastened on its base.



Connect the plug 16 A of the motor starter to an electrical plug (fuses 4 A). Check the correct running direction from the arrow on the sieve frame of the grader. In case of a faulty running direction due to the local electrical network, ask an authorised electrician to correct the running direction.

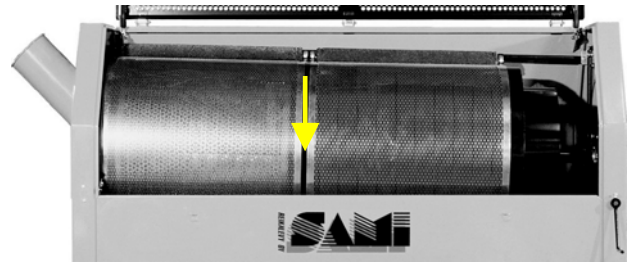


Figure 1. Running direction

8. Structure of the Grader

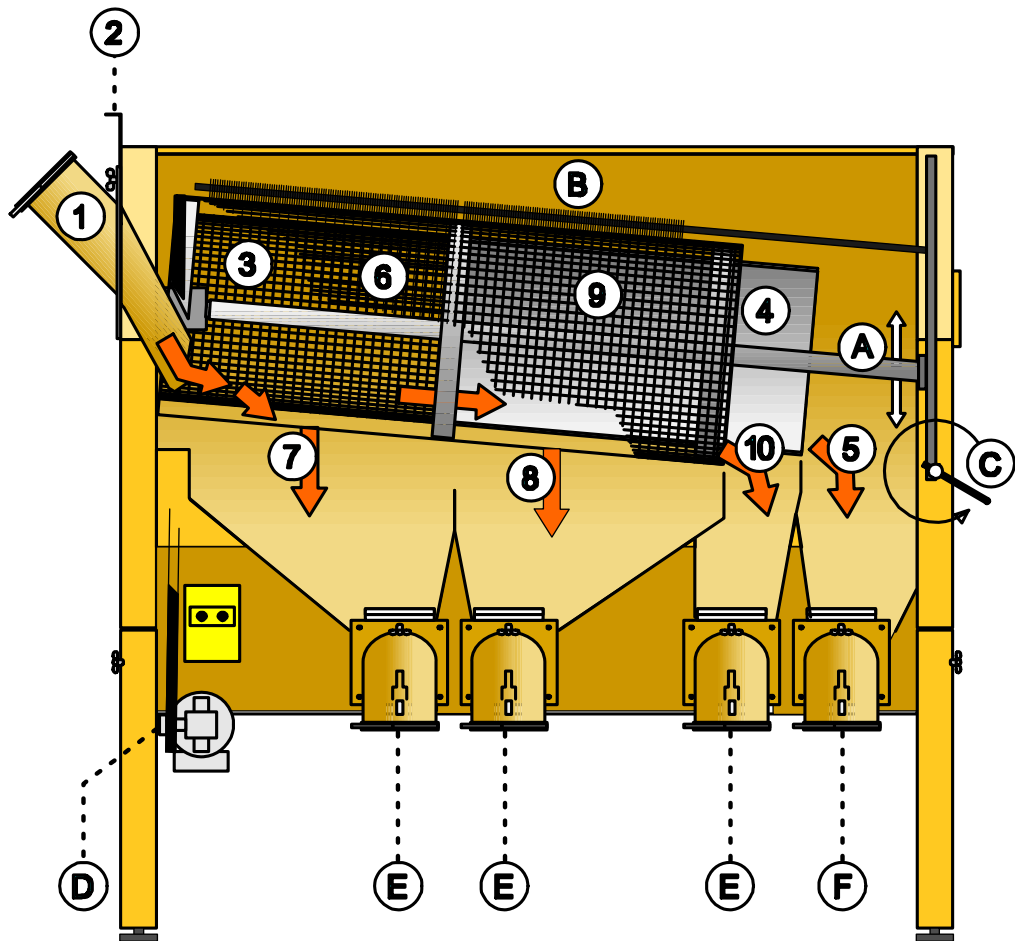


Figure 3. Operating principle pattern of the grader

8.1. Operating principle

Figures in brackets refer to the structural drawing of the grader.

The function of a Sami drum grader is based on a rotating sieve frame and sieves attached round the sieve frame.

Grain is feeded in the feeding tube (1). The efficiency of feeding is adjusted by the shutter (2). There are two sieve drums, one within the other. There is a central shaft (A) with ball bearing in the grader. The shaft has a solid body for sieve plates. Sieve plates are attached round the sieve frame with springs. Thus, there are two sieve drums, one upon another.

The inner sieve plate (3) with bigger holes makes the inner sieve drum, that is, the primary sieve which separates coarse refuse matter and straw. Straw is conveyed along the sparsely perforated conveyor pipe (4) to the end of the drum (5) and then out.

The round plate in an upright position which is attached to the central shaft and which is located in between the primary sieve and the conveyor pipe prevents the grain bouncing from the primary sieve from dropping on the conveyor pipe. Those few grains that pass through the primary sieve (3) and thus find their way to the conveyor pipe, are dropped down through the small and more sparse holes in the conveyor pipe (4) to the back secondary sieve.

There are two successive secondary sieves that are all of different size during sorting into three size groups (sorting of seed grain). Refuse seeds, other fine refuse matter, and undersize grains are dropped off through the front secondary sieve (6,7). The grain belonging to the main size group (8) is dropped down through the back sieve (9), and coarse grain/refuse matter is dropped out from the end of the set of sieves (10).

During sorting into two size groups (e.g. sorting of malted barley) the secondary sieves are of equal size. Undersize grains are dropped through both of the sieves and the grains belonging to the main size group are dropped out through the end of the set of sieves. The sieve plates, even detached, do not require much space because of the fact that they can be stored in a plate shape.

The rotating, spring-loaded sieve brush (B) prevents the grains from being stuck in the set of sieves. The inclination is adjusted by the aid of the arm bar (C) when running the machine. The rotation speed of the drum sieve can be adjusted by the aid of a steplessly adjustable band pulley (D).

There is a pipe fitting (E) for each size group, and an additional pipe fitting (F) for refuse matter. All pipe fittings are equipped with shutters. If needed, pipe fittings can be connected/joined with a branch tubing or, during sacking, a sack can be placed round both of the pipe fittings.

8.2. Rotating sieve brush



Figure 4. Rotating sieve brushes

Impurities that are caught by the holes of the sieve during use are separated by a two-piece brush the rotation area of which covers the whole length of the drum sieve. Due to the rotating movement and the fact that the brushes are pressed by springback factor against the sieves, the bristles penetrate the holes of the sieve and keep them clean. The brushes incline along with the drum sieve.

8.3. Connections

The end of the feeding tube is designed for an instantaneous bandage the diameter of which is 160 mm. A grain pipe, screw conveyor, feeding funnel or a separate precleaner, e.g. Skandia can be attached to the feeding tube. The plexi-window on the back plate of the machine can be replaced by a vacuum-cleaner for dedusting. There are four pipe fittings (\varnothing 160 mm) in the grader for different size groups.



Figure 5. Screw conveyor and precleaner connected to the feeding tube



Figure 4. The plexi-window on the back plate of the machine

9. Use

Please read the safety regulations before you use the machine!



9.1. Sorting

9.1.1. Selecting appropriate sieve sizes

The size of the holes in the sieve affects the separation of different size groups. Selection of appropriate sieve sizes is the prerequisite for proper function of the machine. Moreover, the adjustments of the grader affect the sorting process. (See section 10.2. "Adjustments").

9.1.1.1. Sieve size of the primary sieve

The standard sieve is a 12-millimetre sieve with round holes. It is suitable for the most general purposes.

Switching the primary sieve to a smaller one is necessary mainly if fine grain is sorted at low sorting capacity, which results in a slight improvement in the straw-separating efficiency of the primary sieve (10 mm or, in special occasions 8 mm)

Switching the primary sieve to a larger one (16mm) is necessary mainly if coarse material is sorted (maize, peas, etc.) at high sorting capacity (a capacity which would be too high for a standard 12-millimetre sieve).

In special cases, another primary sieve of the designed size can be attached to the sieve frame after the front sieve, by cutting off (using e.g. a grinding wheel) the perforated area on the conveyor pipe of the sieve frame. For this purpose, there are ready-made attachment holes for the spring fasteners of a sieve plate.

9.1.2. Sieve size of secondary sieves

9.1.2.1. Sorting into two size groups (malted barley)

Both of the sieves of equal size and with small holes:

Fine refuse matter, weed seeds, split and undersize grains are dropped down through the sieves. The sorted matter belonging to the main size group is dropped out through the set of sieves, together with large refuse items and all coarse matter that has possibly passed through the primary sieve. During high-efficiency sorting of malted barley 2,5 × 20-millimetre sieves are used as both of the secondary sieves.

9.1.2.2. Sorting into three size groups (purification sorting of planting seeds)

Front sieve with small holes and back sieve with larger holes:

The front sieve functions as described above. The sorted matter belonging to the main size group is dropped down through the back sieve. Too large refuse items and coarse matter is dropped down through the set of sieves.

The more size groups/sieves of different sizes, the more slowly the sorting process. The speed of the sorting process is at its highest when the secondary set of sieves is of equal size. The material to be sorted has its effect on the speed of the sorting process as well. The size of the grains of a particular subspecies can vary annually. Therefore, the desirable size of the set of sieves can vary as well even if the same subspecies of grain is in question.

It is also possible to run the machine two successive times in a row, e.g. by using secondary sieves with small holes during the first run, then using sieves with larger holes during the second run.

9.1.3. Sieves recommended for different materials

When selecting the size of sieves, you should note that due to annual and geographical variation in the size of grains, it can be possible that the recommended sieve size must be switched to a smaller or a larger one.

Purpose	Front secondary sieve	Back secondary sieve
Normal sorting of grain into three size groups	2,5 x 20 mm	3,75 x 20 mm
High-efficiency sorting of malted barley	2,5 x 20 mm	2,5 x 20 mm
Wheat, rye or subspecies of oat and barley with smaller size of grains	2,0 x 20 mm tai 2,25 x 20 mm	3,75 x 20 mm or 3,5 x 20 mm
Purification sorting of small seeds (separation of coarse refuse matter)	∅ 2 or 3 mm round	no sieve
Peas (separation of split peas)	5 x 20 mm	8 mm round

9.2. Adjustments

The stepless adjustments that can be used during running the machine help the operator to make correct adjustments to the sorter.

9.2.1. Adjusting the amount of material

The amount of material to be sorted is adjusted by the feeding shutter located in the feeding tube. Another possibility is the using of adjustable-efficiency elevator, screw conveyor or spiral conveyor for the feeding of grain. There is a numbered scale beside the feeding shutter. The scale indicates the approximate units of capacity/kg per each figure on the scale.

The inner end of the feeding tube is designed for leading the straw diagonally to the front end of the primary sieve. This means that the straw does not go straight through the primary sieve, but is led over the primary sieve and then out through the end of the conveyor pipe.

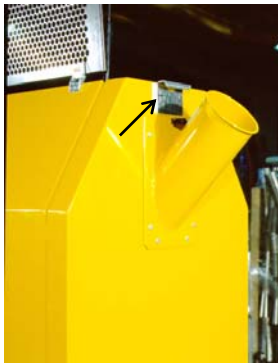


Figure 8. Adjusting the amount of feeding

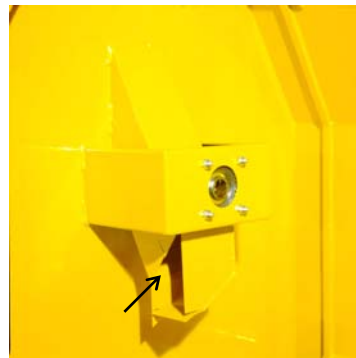


Figure 7. Design of the inner end of the feeding pipe.

9.2.2. Adjusting the inclination of drum sieve

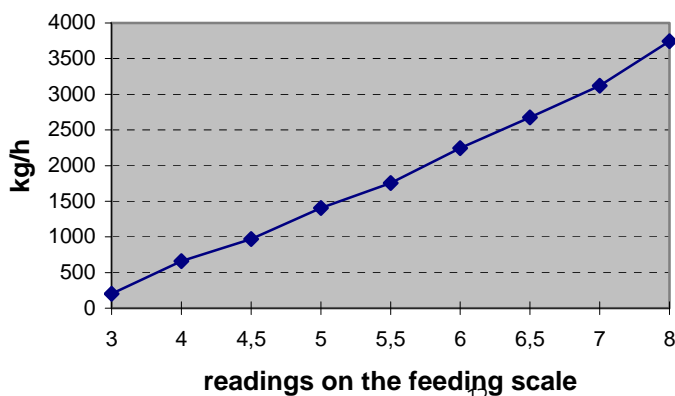


Figure 9. Adjusting the inclination of drum sieve

The inclination of the drum sieve is adjusted by the arm bar at the back of the machine. The adjustment can be performed when running the machine.

The adjustment affects the flow of material. The wider the inclination of the drum sieve, the higher the speed of the flow of material through the drum sieve.

readings on the feeding scale/kg (barley)



9.2.3. Adjusting the Rotation speed of drum sieve

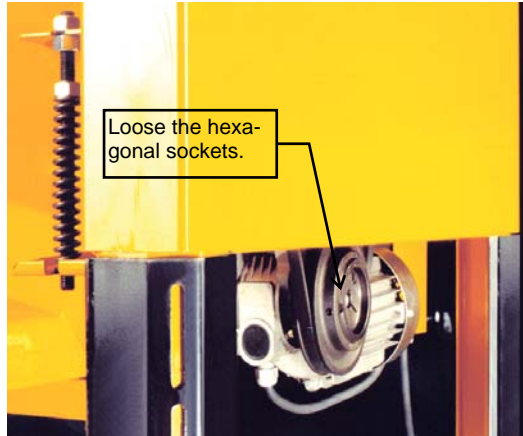


Figure 8. Adjusting the rotation speed of drum sieve

The drum sieve is rotated by a belt in an electric motor. The rotation speed is adjustable from 14 to 19 r/min by the rotation of the other half of the band pulley in a worm gear. The screen capacity of sieves is affected by the rotation speed. In general, the lower the rotation speed, the better the screen capacity – however, this is clearly affected by the material to be sorted as well. In order to achieve the best possible result you should try with different rotation speeds.

Adjusting:

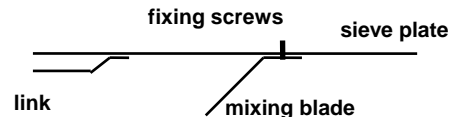
Detach the belt shield. The rotation speed is adjusted by loosening the hexagonal sockets (2 pieces) on the other side of the band pulley. The rotation speed can be raised by screwing the half of the band pulley clockwise and, correspondingly slowed down by screwing counterclockwise.

9.2.4. Mixers attachable to the inner surface of the sieve



Figure 11. Attachment of mixing blades to the inner surface of a sieve

Mixers (4 pieces) that improve the separation of small grains can be attached to the inner surface of the sieve. During sorting into two size groups (with secondary sieves of equal size) the mixers are attached to both of the secondary sieves. The standard delivery includes 4 pieces of mixers.



Note: the mixers must be attached the right side up.

9.2.5. Adjustments in general

In order to achieve good sorting result, the sieve size, the adjustment of the amount of the feeding of material, the inclination of the drum sieve, and the adjustment of the rotation speed of the drum must all be correctly selected.

9.2.5.1. Purification sorting of seed grain

1. Adjust the flow of material to app. 1000 kg/h (see p. 10: "Readings on the feeding scale")
2. Adjust the inclination of the drum so as to ensure that there will be enough material up to the point just before the end of the secondary sieve. However, ensure that no excessive seeds come out from the end of the conveyor drum along with refuse material.
3. In case the purification result is not satisfactory, reduce the amount of feeding and readjust the inclination of the drum to fit the current amount of feeding.
4. If the secondary sieves let through material too rapidly, increase the amount of feeding (or remove some of the mixers from the inner surface of the sieve). The change in the rotation speed also affects the screen capacity of the sieve. (see p. 11 "Adjusting the rotation speed of drum sieve")
5. If the screen capacity of the sieve is too low, reduce the amount of feeding/add some mixers.
6. If these adjustments do not give a satisfactory result, switch to another sieve size.

9.2.5.2. High-efficiency sorting of malted barley

1. Take a comprehensive sample from unsorted grain.
2. Attach mixers to both of the sieves of equal size (2,5 × 20 mm).
3. Select a sorting efficiency (kg/h) suitable for separating a satisfactory percentage of small grains. *Depending on the subspecies of grain, some of the material belonging to the desired size group inavoidably escapes along with small grains. For this reason, the difference between the raw specimen and the desired purity must always be smaller than the amount of separated small grains. If, for example, the share of material belonging to the desired size group in the raw specimen is 75% while the aim is 90%, 15% of separated small grain is not enough. If large amounts of material are to be separated it is worthwhile taking first a small amount for sorting and then taking a sample.*
4. The inclination and rotation speed are correct if the amount of separated small grains is large. The appropriate adjustments depend on the subspecies/the size of grains, and must therefore be separately tested in every individual sorting process.

9.3. Shifting of sieves

9.3.1. Detachment



Figure 12. Detachment of sieve



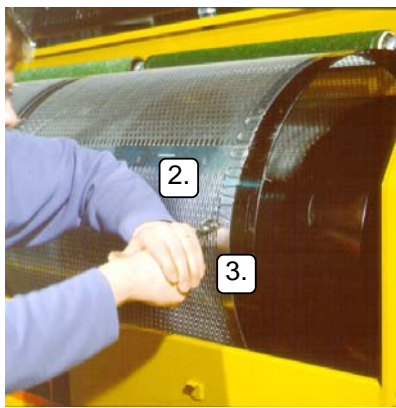
1. Stop the machine.
2. Disconnect the machine from the mains lead.
3. Open the safety covering.
4. Turn the drum sieve round until the attachment springs of the sieve are at a working height.
5. Detach the attachment springs using grippers from their lower end (1). Beware of a possible hurtling spring – use eye protectors!
6. Draw off the detached sieve surrounding the drum.



9.3.2. Attachment



Figure 13. Attachment of sieve



1. Push the sieve via the upper side of the drum and attach the sieve from its upper end by a spring (1). Set the springs cross-wise, in order to ensure their keeping in place.
2. Draw the lower end of the sieve in its place and place it in the link, as deep as possible (2).
3. By the aid of grippers, draw the lower end of the spring in its place to the central hole (3).

10. Service

The construction of your Sami drum grader is simple and therefore few service measures are necessary. By taking regular notice of the following points you can be sure that your grader will provide you with a faultless performance.

1. Clean your grader at regular intervals. The importance of a proper, regular cleaning can not be overemphasised. For example, it prevents wild oat and plant diseases from spreading. The cleaning can be easily performed using compressed air, but also ordinary brush can be used. Before cleaning, detach the sieves and open the bottom gates completely. Clean the cooling fins of the motor as well.
2. Broken parts must be repaired or immediately switched to new ones.
3. Loosened screws must be tightened.
4. Check the condition of electric wiring and electrical equipment, or have them checked by a qualified electrician.
5. Check the condition of the cog belt of the motor and the function of the automatic tightener. It is worthwhile keeping a spare tightener at hand.

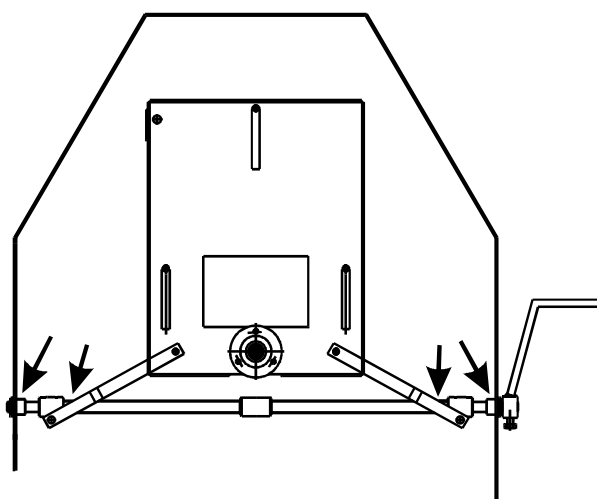


Figure 14. Lubrication of the inclination controller of drum sieve

6. Lubricate the trapezoid screw of the inclination controller of the drum sieve at intervals of every 15 using hours by dropping a few oil drops on the screw and by screwing it from one extreme position to another. Drop a few additional oil drops in the marked holes in the ends of the screws.
7. Before prolonged period of storage, lift the rotating sieve brushes off from the surface of sieves, so as to prevent brushes from bending. Suspension of brushes can be performed by e.g. a few pieces of boards placed at the ends of the axes.

