



**Manual Shredder
Type ZM 1**

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1.0 INTRODUCTION

These operating instructions are intended for **MERCODOR** shredder operator. They are intended to enable the shredder to be operated correctly and to enable personnel to correctly assess error messages and then remedy faults.

In addition, the manual is intended to help maintenance and repair work to be carried out correctly.

If faults occur which you yourself cannot remedy, please consult:

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2.0 Technical details of the shredder

Order:

Customer:

Delivery: 12/2021

Putting into operation: -

Shredder type: ZM1

No. of the shredder: ZM1

Motor: 7,5 kW

Cutting blades: 14,0 mm

Special voltage: 400 Volt 50 HZ

3.0 DESCRIPTION OF THE SHREDDER

3.1 Operating method of the shredder

The shredder is used to crush hospital waste. The machine has to be fed in a measured amount so that the machine will not be overloaded. Waste disposal.

Before putting waste into the machine, check that it does not contain any objects which cannot be shredded! ***For example iron, metal, soft materials etc.***

After filling the shredder manually or with loading units, you can start the shredding. The shredded waste falls out under the machine.

Items which cannot be shredded must be removed by hand. When removing parts from the cutting mechanism, disconnect the machine from the mains and make sure that it cannot be switched on accidentally!!!

Important:

The waste must be put into the machine in measured amounts in order to prevent the machine being overloaded.

Attention



Don't reach into the cutting knives, when the shredder is in operation!

When performing service, maintenance or repair work on the machine, disconnect it from the electricity mains and make sure that it cannot be

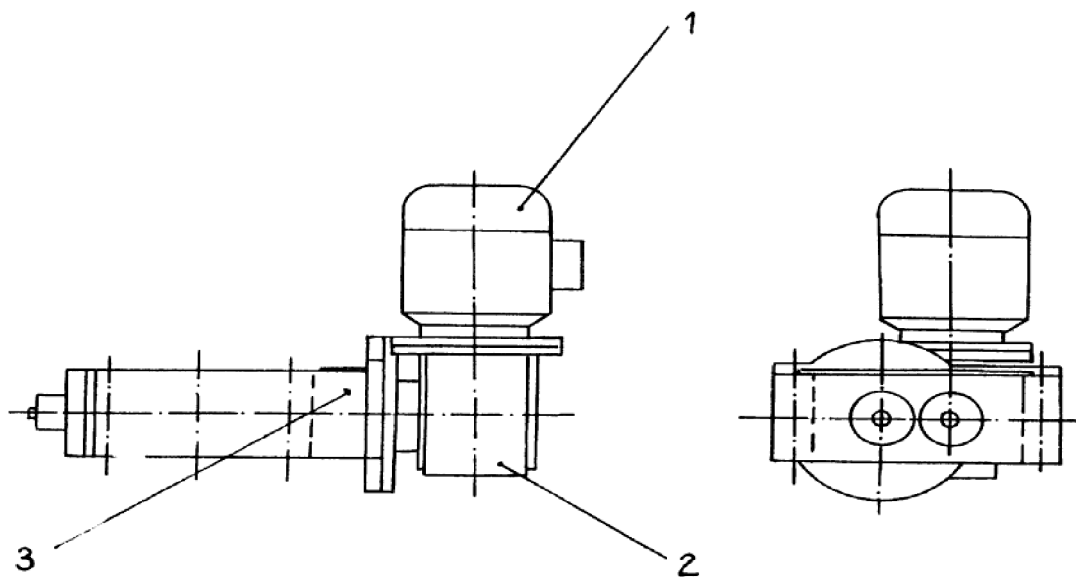
switched on by unauthorized persons, e.g. by removing the main fuse and locking the key switch.

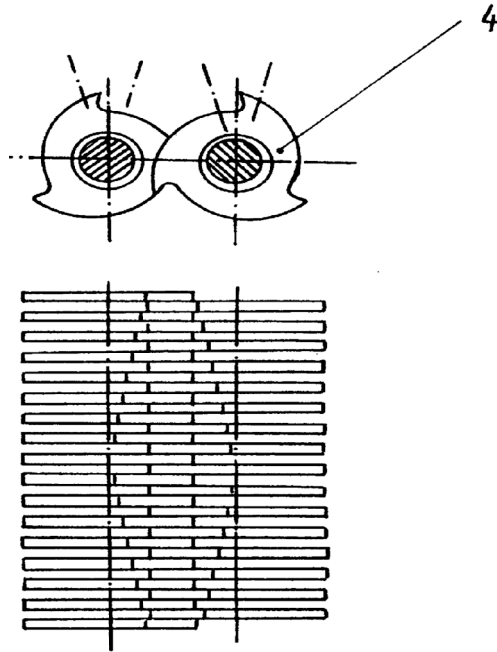
3.2 Description of the cutting device

The cutting mechanism consists of the following components:

- Worm gear (CARVEX) (2) with motor (1)
- Shredder gear unit (3)
- Blade assembly (4)

The actual cutting mechanism is made up of two cutting shafts working in opposite directions, 3 hooked blades, spacer rings and scrapers. The cutting blades and spacer rings engage alternately. A scraper is located above every spacer ring.





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4.0 SETTING UP

⇒ Keep a clearance of approx. 800 mm around the machine for maintenance work!

After taking delivery of your shredder, please first check whether any parts have become loose during transport. This could cause faults when the machine is started up.

Ensure that the mains voltage corresponds with the motor voltage.

Note:

It must be remembered that no PE conductor may be attached to the machine!!!

4.1 Putting into operation for the first time (checklist)

Checklist for putting the machine into operation

- ⇒ for the first time
- ⇒ putting into operation after servicing
- ⇒ after extended downtimes

⇒ Unscrew the fan impeller cover and turn the fan impeller. Turn the cutting mechanism through one complete revolution. This enables you to whether the blade shafts can be turned without any problem. Next screw the fan cover back on.

⇒ Visual check of the gear chamber and the worm gear. (**see section 6.3**)

Attention



Donöt reach into the cutting knives, when the shredder is in operation!

When performing service, maintenance or repair work on the machine, disconnect it from the electricity mains and make sure that it cannot be switched on by unauthorized persons, e.g. by removing the main fuse and locking the key switch.

5.0 SAFETY REGULATIONS

⇒ Crushing machines, as well as their protective devices or any other of their protective component parts, must be inspected and examined by expert technicians for their safe condition and operation:

- before the very first start-up of the machine
- at regular and reasonable intervals, and
- upon each alteration or subsequent start-up.

The term expert stands for a person that has sufficient technical training, experience and knowledge with regard to the working means concerned and that has furthermore ample knowledge of the applicable legal Workplace Protection Regulation, the Accident Prevention Regulations, Standards, Safety Rules, or other technical Rules and Standards (such as the VDE Rules or the DIN Standards) that are necessary to evaluate whether or not a machine or equipment is in a safe working condition.

⇒ The operation or the maintenance of refuse crushing machines must be in the exclusive hands of trained personnel. The training shall comprise sufficient instruction and information on the contents of the operator's manual.

⇒ Refuse crushing machine must be installed in such a place as to prevent any harm or danger to persons. In order to maintain the intended safety distances, the machine must in no case be located near ramps or other elevations; no ladders or footsteps are allowed to overcome these safety distances, e.g. to facilitate material feeding; this applied to machines equipped with funnel-shaped feeding devices in particular.

⇒ It must be absolutely sure that the safety appliances or any other protective component parts that enable a safe function of the refuse crushing machine be, at any time, in perfect order and function. The same applies to all and any electric component parts, the funnel, feeding tables, or similar super structural parts, that are intended, by their design and/or by their purposeful location on the machine, to provide optimum safety.

⇒ Refuse material, or component parts of these, that might form slings or loops, e.g. strips or cords, must be prepared before being introduced into machine for shredding, since they represent a major source of danger when being drawn in forcibly by the cutting tools.

⇒ Materials that are dangerous containers or recipients still closed (aerosol cans), as well as any other harmful substances or materials unfit for crushing, should be sorted out before processing.

⇒ The machine must be cut off of power supply during services maintenance or repair works.

Attention



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When performing service, maintenance or repair work on the machine, disconnect it from the electricity mains and make sure that it cannot be switched on by unauthorized persons, e.g. by removing the main fuse and locking the key switch.

6.0 MAINTENANCE AND CARE INSTRUCTIONS:

6.1 Lubrication list

The lubricants listed below are applied to the machine at the factory.

Bearings/Cutting shaft		
Producer	Description	Equipped with
FINA	Marson L/2	
MOBIL	Mobilgrease MP 2	
ARAL	Aralub HL 2	X
SHELL	Alvania R 2	

BP

Energrease LS
2

Motor gear see the enclosed description Flender Himmel

Important:

Top up only with lubricants which are already in the machine. Do not mix different makes of lubricant!

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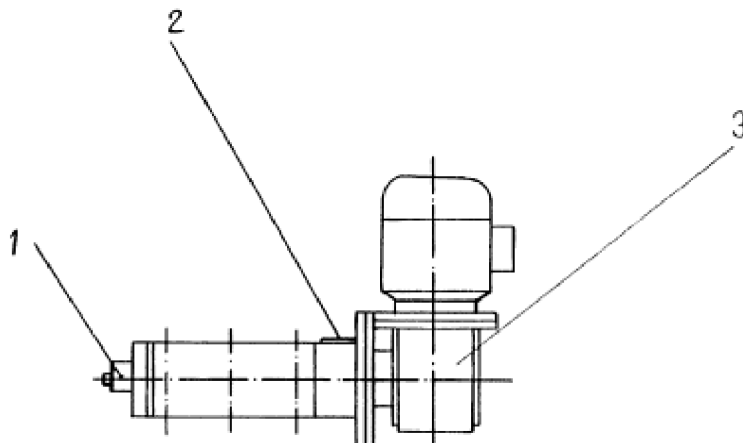
6.2 Lubrication plan

Note:

Re. 1.: Fill the grease bushings with a hand press. Lubricate once each day in the case of moist material or if liquid cleaning agents are used.

Re. 2.: Monitoring the toothed gear drive: Unscrew the gear cover (4) and check whether there is still sufficient grease present. **Important: The gear chamber must be filled to the top with grease.**

Re.3.: See the enclosed description of Flender Himmel



Attention



Don't reach into the cutting knives, when the shredder is in operation!

When performing service, maintenance or repair work on the machine, disconnect it from the electricity mains and make sure that it cannot be switched on by unauthorized persons, e.g. by removing the main fuse and locking the key switch.

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6.3 Maintenance work composition

What	Where	With what	When	Remark
1. Bearings/Cutting shaft lubricate	Grease housing (41)	Hand press	Every other day	After every washing operation. By damp shredding material, lubricate several times each day
2. Gear/machine	Behind gear cover (4)	Visible check, Inspection glass	1x per week	The gear unit is filled with gear oil up to the center of the inspection glass
3. Castle nuts, tighten	Cross arm (2)	Torque spanner 350 Nm	Every 50 operation hours	The investigation is very important
4. Check the cutting blades for damage	Cutting mechanism	Visible check Measuring instrument	Every 50 operation hours	Remove and rework defective blades and blades with an edge radius of 0,5 - 1,0 mm
5. Gear motor	close to the cutting mechanism	Refer to the enclosed information of the manufacturer of the gear motor		

" All part numbers correspond to the position numbers of the exploded drawing "

Attention



Donöt reach into the cutting knives, when the shredder is in operation!

When performing service, maintenance or repair work on the machine, disconnect it from the electricity mains and make sure that it cannot be switched on by unauthorized persons, e.g. by removing the main fuse and locking the key switch.

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6.4 Maintenance instruction

6.4.1 Gears/Machine: On the Type ZM 1 shredder, the toothed gear drive is directly behind the cutting chamber. After unscrewing the gear cover (4), you can check whether there is still enough gear grease in the gear chamber. The gear cover must then be carefully scaled again and screwed on. The inspection must be made **once per week**. The gear chamber is filled with multi-purpose grease, type **ARAL Aralub HL 2 to approx. 90 % and 10 % with ARAL FDP 00 on the top**.

6.4.2 Bearings/cutting shaft: The bearings are lubricated with a multi-purpose grease from **ARAL, type ARAL ARALUB HL 2** by a hand press. If you are shredding damp material, lubricate the bearings **several times each day**. When shredding normal dry materials, it is necessary to lubricate the reverse bearings **every other day!** Lubricate until the old, used grease leaves the bearing. The surplus grease is carried off the shredded material.

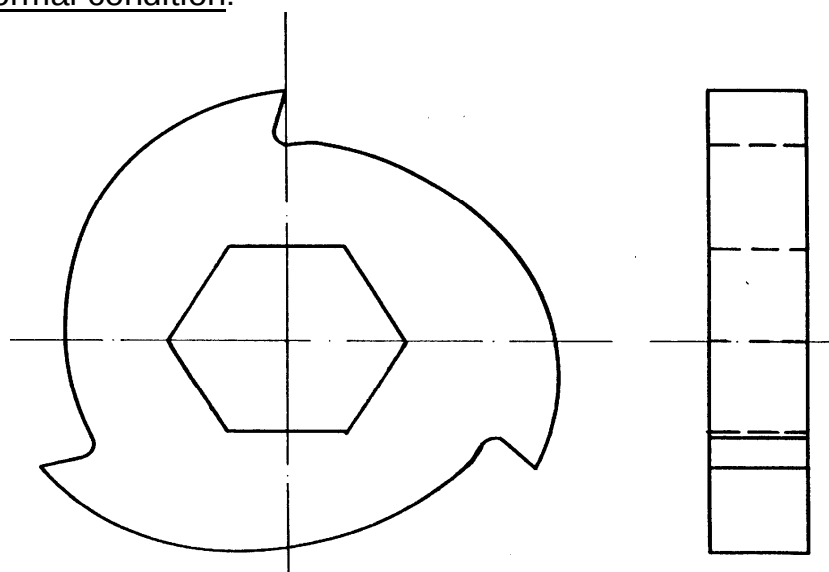
In general, the user should determine the actual extent to which the grease filling is contaminated by removing the grease bushings and, if necessary, shortening our lubrication intervals, since we cannot always anticipate the composition of all materials to be shredded.

6.4.3 Worm gear (CAVEX): See the enclosed description from Flender Himmel!

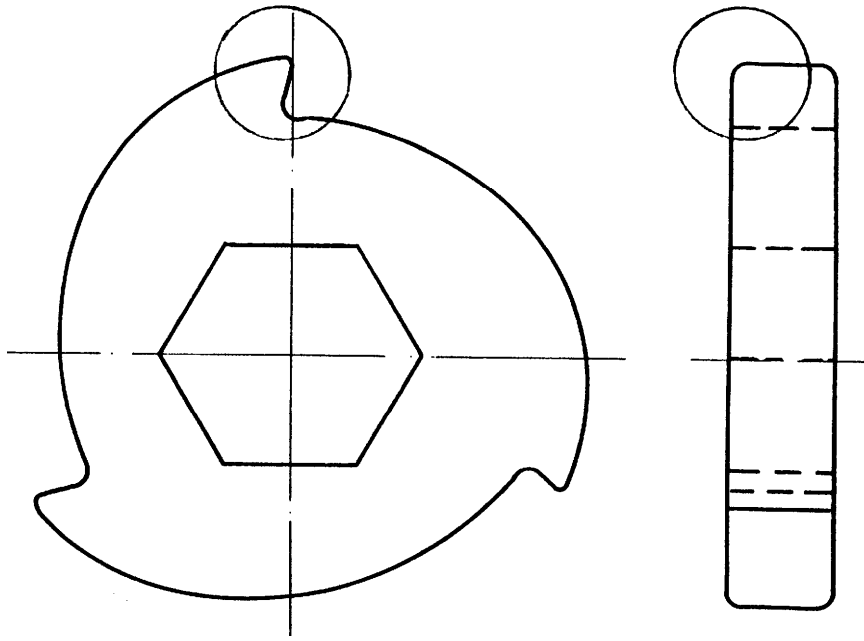
6.4.4 Cutting blades:

Check the cutting blades for damage after every 50 operating hours and tighten them with a 350 Nm torque spanner. Remove and rework defective blades and blades with an edge radius of 0,5 - 1 mm.

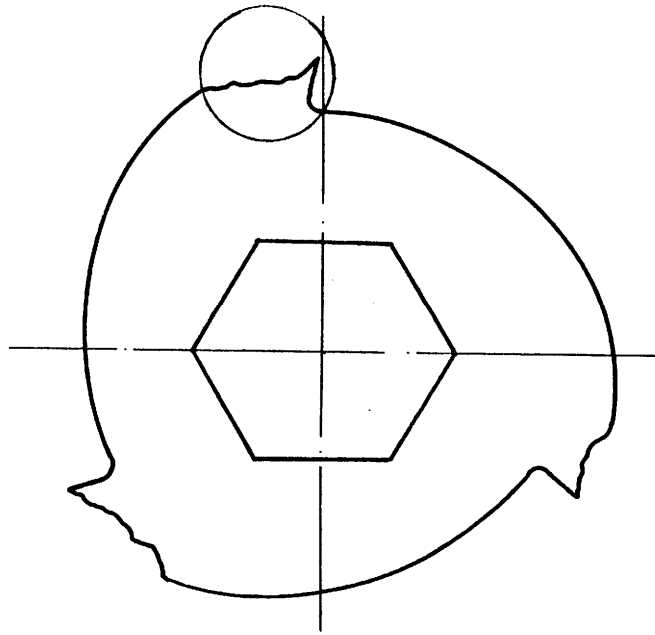
Blades in normal condition:



Blades with an edge radius of 0,5 - 1 mm



Damaged knife:



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When reworking, always rework the entire assembly, in other words the blades, spacer bushings and scrapers. In the meantime, the machine can continue to be operated with a replacement assembly (if available).

Tighten the blade assembly with the torque spanner as follows:

- ⇒ Unscrew the grease bushings
- ⇒ Force out the hollow splint with splint driver
- ⇒ Tighten the castle nuts with the torque spanner

Assemble in reverse order!

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6.5 Cleaning instructions

The machine can be cleaned with both water and cardboard or loose paper.

Important:

When cleaning the machine with water, use only fresh water in such a way that flowing water (not pressurized water) is put into the machine. After the machine has been cleaned with water, it is essential to blow it dry and then to spray it with a rust protection agent!

Caution:

If the machine is incorporated in an overall system, ensure that downstream machines are not damaged by water and that water does not impair their function!

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7.0 MAINTENANCE (ASSEMBLY AND DISASSEMBLY)

" All part numbers correspond to the position numbers of the exploded drawingô

7.1 Removing the cutting blades:

1. Undo the 6 screws in the grease bushing in order to remove the latter.
2. Knock the 2 clamping sleeves out of the castle nuts (39).
3. Undo and unscrew the castle nuts (39).
4. Next, undo the 4 screws (46) of the cross arm (2) and remove it with two mounting levers.

The cutting blades, spacer bushings and scrapers can be pulled off on alternate sides without any problems after the thrust collars (38), the dirt collars (35) and the radial sealing rings (36) have been pulled off.

Important:

For safety reasons, use original spare parts made by the manufacturer. If damage arises due to the use of parts which have not been supplied by the machine manufacturer, all warranty claims are void. Please contact MERCODOR, if you require spare parts.

7.2 Fitting the cutting blades:

" All part numbers correspond to the numbers of the exploded drawing ".

⇒ Before fitting the cutting blades, always clean all individual parts so as to guarantee a perfect fit later.

⇒ Push a spacer bushing onto one cutting shaft and a cutting blade onto the other cutting shaft. When doing so, ensure that the first cutting blade is against the plane surface of the shoulder and not against the radius of the undercut.

⇒ Next, push on another cutting blade. Now press on the two cutting blades and measure the gap "X". It must be half the difference between the cutting blade width and bushing width.

Example:

Cutting blade width:	14,0 mm
Gap "X":	0,5 mm
Bushing width:	15,0 mm

This is the most important point concerning fitting the cutting blades and must be performed carefully so as to guarantee problem-free operation later. If the measured dimension "X" does not correspond to the calculated dimension "X" this must be corrected by turning the 1st bushing or 1st dirt blade.

All subsequent cutting blades and spacer bushings have the same dimension, which means that the blade assembly continues parallel up to the end of the cutting blade. The scrapers are each attached with a spacer bushing. They are guided by the subsequent insertion of the scraper shafts or on 2 trapezoid strips.

⇒ There are 4 types of blades. This means that each in case the cutting hook is arranged offset by 15 degrees to the hexagon socket. In order to achieve optimum shredding, it is recommended to set the cutting blades spirally with their blade hooks.

This is done as follows: Push 2 cutting blades of one type with one already measured 1 st bushing or the 1 st dirt blade onto the cutting shaft, followed by 2 spacer bushings and 2 scrapers. The cutting hooks of the two following cutting blades should be arranged 15 degrees to the rear.

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This continues as far as the center of the cutting chamber. The hooks should then each be arranged offset 15 degrees to the front as far as the end of the cutting chamber. This arrangement prevents the shredded material being concentrated on one side of the cutting chamber.

When the last cutting blade has been set with respect to the last spacer bushing, fit the cross arm (2) and push on the dirt rings (35) with the radial sealing rings (36), the two deep-groove bearings (37) and the thrust collars (38).

When doing so, ensure that the pressure applied by the tightened castle nuts (39) is transferred from the inner ring of the bearing onto the blade assembly by the dirt rings.

This means the concentricity hole of the dirt ring must be large enough so that the dirt ring applies pressure to the blade assembly and is not on the shaft hexagon.

⇒ The castle nuts (39) can now be tightened with 350 Nm and the clamping sleeves can be knocked in to provide stability.

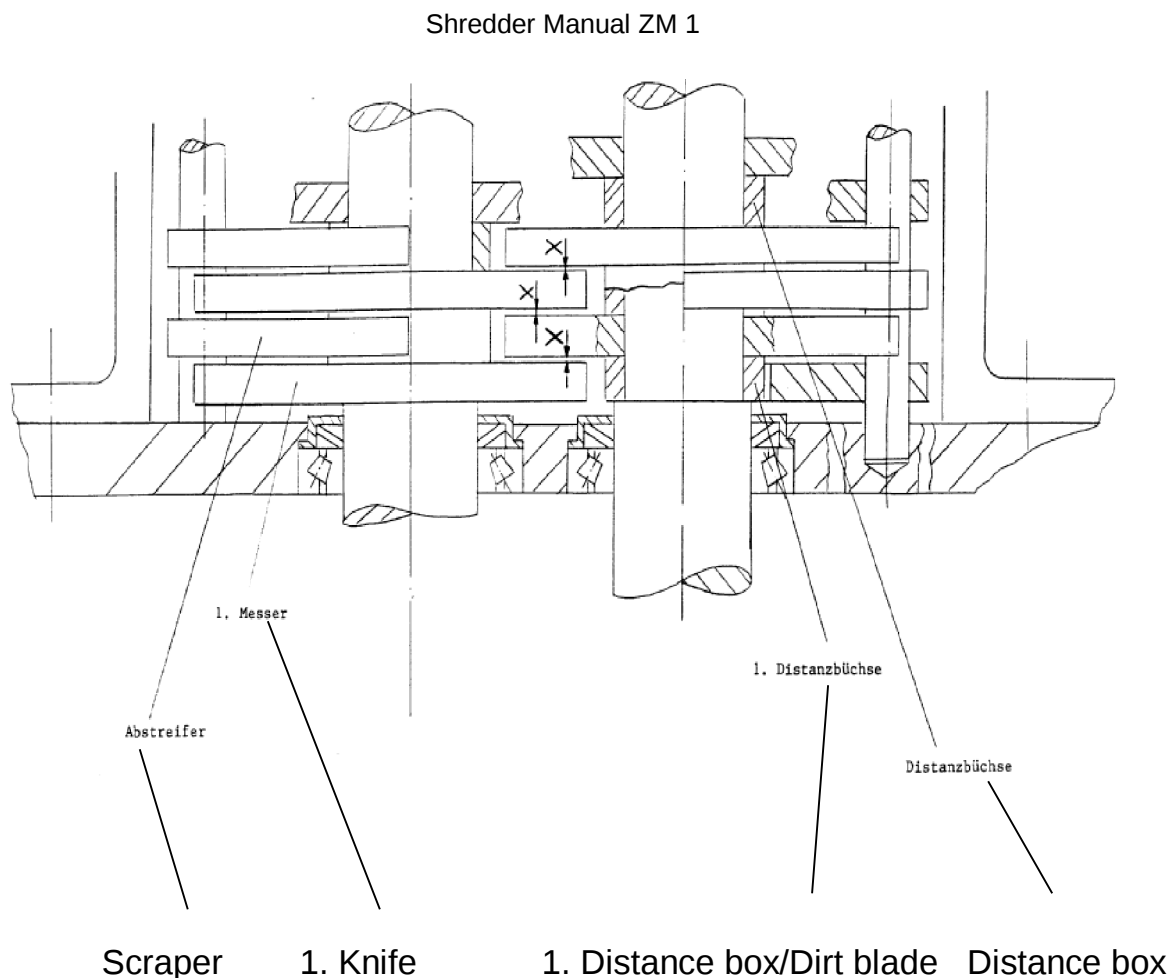
⇒ Screw on the 3/4 filled grease containers and then lubricate the deep-groove bearings.

⇒ When you have followed all of these points and carefully carried out of work, the machine is fully operational and will shred your material without any problems.

However, if you do encounter problems, please consult us. We will provide you with help and advice and will try to solve your problems immediately.

Note

Drawing for the example last side!



Note

In case of included dirt blades, it will be not the first bushing, but also the first dirt blade! In the end of the cutting chamber you have also to blades to protect the bearings and seals.

Attention

Please you make sure that the cutting knives may not heat up!

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7.3 Disassembling the cutting unit:

" All part numbers correspond the numbers of the exploded drawing ".

⇒ Undo the fastening screws of the worm gear from the shredder's gear casing (1). The worm gear can then be pulled down from the long drive shaft.

⇒ Undo the 6 screws of the grease container in order to remove the latter.

⇒ Knock the clamping sleeves (40) out of the castle nuts.

⇒ Undo and unscrew the castle nuts (39)

⇒ Next, undo the 4 screws (46) of the cross arm (2) and remove the latter with the aid of two mounting levers. The cutting blades, spacer bushings and scrapers can be pulled off on alternate sides without any problems after the thrust collars (38) and dirt collars (35) have been pulled off. The scraper shafts (18) are merely pushed through the scrapers or been mounted on the 2 trapezoid strips.

⇒ After removing the cutting blades, the long cutting shaft can be pulled out towards the worm gear.

To remove the short cutting shaft in the same way, you must first unscrew the bearing flange (29).

After removing the gear cover (4) and the lubricating grease, both toothed gears (23 + 24) can be pulled out upwards.

⇒ Next, carefully use a rubber hammer to knock out the deep-groove bearings (25) and the shaft seal casing (27) containing the shaft seals (26) towards the worm gear.

7.4 Mounting the cutting shafts and the chain drive

All part numbers correspond to the numbers of the exploded drawing ".

⇒ Before assembly, clean all individual parts so as to guarantee a perfect fit later.

⇒ Press the radial sealing rings (26) into the shaft seal housing (27). A suitable ring is required here.

⇒ Fit the shaft seal housing (27) and the deep-groove bearing (24) into the machine casing (1). It is essential to use Loctite adhesive for this purpose..

⇒ The feather key provides a positive connection. When it is pushed in, ensure that the radial sealing ring is not damaged, so as to guarantee that the shredding machine is free of leaks later.

Next, fit the bearing flange after coating it with a sealing compound. When doing so, ensure that the bearing flange is of the correct length so that the cutting shaft is free of axial play between the two deep-groove bearings and can be turned easily. If necessary, the bearing flange must be adjusted (by truing) after its length is measured.

However, we always attempt (by way of our computerised spare parts department) to make the spare parts we supply in such a way that they are relatively easy to replace. However, remember that certain dimensions of individual components are subject to wear and must be readjusted during an inspection.

⇒ Push in the long cutting shaft (11) with the previously fitted small toothed gear (24). Here too, you must ensure that the radial sealing ring (26) is not damaged. An assembly aid is recommended. Press in the radial sealing ring (30) to seal the machine on the worm gear side. The long cutting shaft (11) has only one deep-groove bearing in the casing. Its counter-bearing is the worm gear.

⇒ Push the worm gear onto the long cutting shaft. A feather key (13) guarantees a positive connection here. The worm gear is secured to the machine casing (1) with 4 screws.

8.0 Parts list:

Pos.	Qty.	Designation	Material Name	Order No.
1	1	Gear-housing	GG 25	44-001
2	1	Cross arm	GG 25	44-002
3	2	Side arms	GG 25	44-003
4	1	Cover	St37k	44-004
5	2	Plate	St37k	44-005
6				
7				
8				
9				
10				
11	1	Cutting shaft		44-011
12	1	Cutting shaft		44-012
13	1	Feather key	C 60	44-013
14	2	Feather key	C 60	44-014
15	25	Spacer rings		44-015
16	25	Knives		44-016
17	25	Scrapers		44-017
18	2	Trapezoid strips		44-018
19				
20				
21				
22				
23	1	Toothed wheel	16 MnCr 5	44-023
24	1	Toothed wheel	16 MnCr 5	44-024
25	2	Deep groove bearing		44-025
26	2	Radial sealing ring		44-026
27	2	Seal housing	C 45	44-027
28	1	Deep groove bearing		44-028
29	1	Flange		44-029
30	1	Radial sealing ring		44-030

31
32
33
34

Pos.	Qty.	Designation	Material Name	Order No.
35	2	Dirt ring	42 CrMo 4	44-035
36	2	Radial sealing ring		44-036
37	2	Deep groove bearing		44-037
38	2	Thrust collars		44-038
39	2	Castle nut		44-039
40	2	Splint	d = 5	44-040
41	2	Grease housing	GG 25	44-041
42	2	Grease nippel		44-042
43				
44				
45	2	Splint	d = 6	44-045
46	16	Screws	M 12 x 60	44-046
47	4	Screws	M 10 x 25	44-047
48				
49				
50				
51				
52				
53				
54				
55	2	Dirt ring	42 CrMo 4	44-055
56	12	Screws	M 8 x 20 IS	44-056
57	6	Screws	M 8 x 20 IS	44-057
58	2	Radial sealing ring		44-058

Remark

*" All part numbers correspond to the position numbers of the Exploded-
and Assembly drawing "*

Note: Proportioned task necessary and requested!

It is to be made certain for your part that the UVV regulations are considered with the installation of the cutting platform. If the electrical control should not be supplied of [MERCODOR](#), it must be paid attention to the fact that the used control is equipped with a reversing control, which protects the machine from overload. I.e. it must switch itself off with the 1,1-times of the rated current admission of the engine and reverse 3-times (backwards-run). After 3-times reversion within an adjusted time scolded the control on disturbance. The length of the reversing time must be adjustable, so that the filter can clean itself. No rough parts may arrive into the machine. If necessary a connection diagram can be made available.

Notes to Spare parts

When ordering spare parts, always quote the machine number, the machine type and the year in which the machine was built. These details simplify correct and rapid delivery of your order.

If you order cutting blades, we recommend that you order a complete assembly in each case (25 blades, 25 scrapers and 25 spacer rings, depending on the cutting chamber length) or at least 4 blades and 4 spacer rings.

As the manufacturer, we recommend that you always have in stock at least one set of ball bearings, as well as 4 blades, 4 spacer rings and 4 scrapers and one spare screen.

Final observation

Liability for faults:

If any alterations or repairs to the shredding equipment are done by anyone else within the time of warranty, we do not take any further liability for faults. In all questions or spare part orders the number of the shredder has to be given!

Technical data given in this instruction are subject to modifications due to technical improvements !

Best regards,

MERCODOR GMBH SONDERMASCHINENBAU KG

