ESM - Assembly and User Instructions

We cut it!

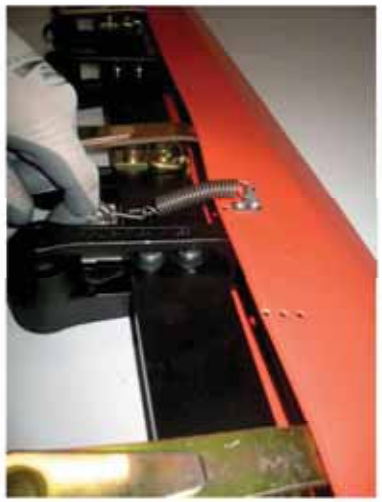
PARTSLIST: SHIPMENT CUTTERBAR

		120.5679 ESM Precission Cutting Dual Blade Cutterbar Set - 5 1/2 ft // 165cm	120.5659 ESM Precission Cutting Dual Blade Cutterbar Set - 7 ft // 210cm	120.5669 ESM Precission Cutting Dual Blade Cutterbar Set - 8 ft // 240cm	120.4499 ESM Precission Cutting Dual Blade Cutterbar Set - 9 ft // 275cm
120.5677	ESM Precission Cutting Dual Blade Cutterbar 5 1/2 ft // 165cm	1			
262.6120	Spare Knife (top) 5 1/2 ft // 165cm - smooth sections	1			
265.6155	Spare Knife (bottom) 5 1/2 ft // 165cm - serrated sections	1			
120.5657	ESM Precission Cutting Dual Blade Cutterbar 7 ft // 210cm		1		
262.6150	Spare Knife (top) 7 ft // 210cm - smooth sections		1		
265.6215	Spare Knife (bottom) 7 ft // 210cm - serrated sections		1		
120.5667	ESM Precission Cutting Dual Blade Cutterbar 8 ft // 240cm				
262.6160	Spare Knife (top) 8 ft // 240cm - smooth sections			1	
265.6225	Spare Knife (bottom) 8 ft // 240cm - serrated sections			1	
120.4497	ESM Precission Cutting Dual Blade Cutterbar 9 ft // 275cm				1
262.6090	Spare Knife (top) 9 ft // 275cm - smooth sections				1
265.6235	Spare Knife (bottom) 9 ft // 275cm - serrated sections				1
201.0567	Outer shoe with ball catch	1	1	1	1
238.1260	Gliding skid	1	1	1	1
240.0967	Cylinder screw + locknut for outer shoe protection	1	1	1	1
240.1187	Fasteners for outer shoe	1	1	1	1
240.2620	Set assortment of rivets	1	1	1	1
267.1177	ESM Knifesections smooth with carrier stud	5	5	5	5
344.1557	ESM Knifesections smooth	10	10	10	10
344.0987	ESM Knifesections serrated	10	10	10	10
344.0997	ESM Knifesections serrated with carrier stud	5	5	5	5
902.0615	ESM Sparepart List	1	1	1	1
902.0809	ESM Assembly and User Instruction	1	1	1	1

Assembly: Cutterbar to Drive/Machine

The assembly of the cutterbar is only permitted at points agreed between ESM and the respective device manufacturer. Should the installation respectively the drive deviate, then the manufacturer of the final machinery is responsible for the assembly and operational safety as well as for the provision of comprehensive assembly instructions in his operating manual! Assembly of the Cutterbar to the Open pivot Cutter drive is described in the following:

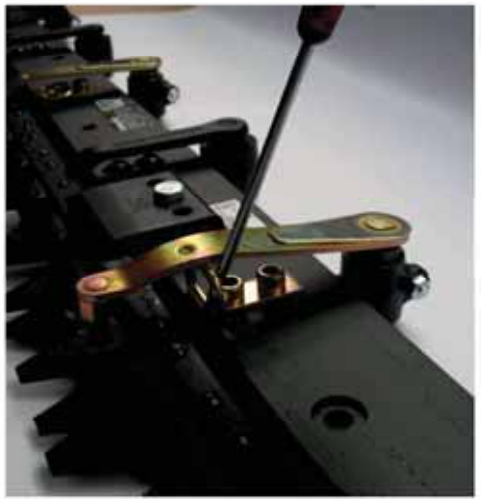
Step #1 - Remove Knives from Cutterbar



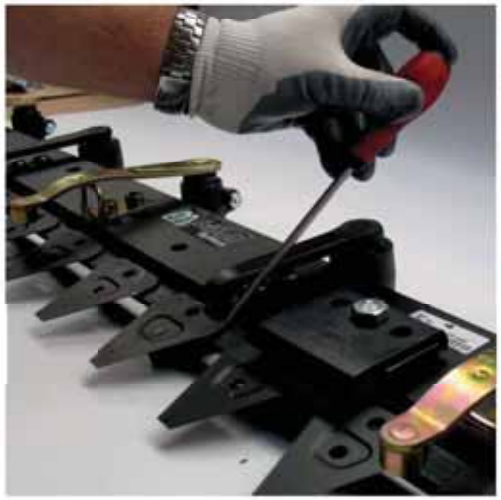
1. Pull springs back to unhook the safety cover

2. Remove the saftey cover

3. Fold up all top knife guide arms using a screwdriver as shown



4. Take hold of the top knife with both hands and pull out the knife in a slightly tilted frontward position.



5. Use a screw driver to lift the bottom knife, out of the bottom guide arms.

6. Pull out the knife in upward direction.

Important: Do not leave the top guide arms in the raised position for a prolonged period of time = relief for the rubber pivot bearing

Step #2 - Remove the Gliding Sole

1. For easier removal, lay down the cutter drive on its side as shown
2. Loosen and remove bolt on the rear of the drive

3. Push gliding sole down an forward to remove

Step #3 - Attach Drive to Cutterbar

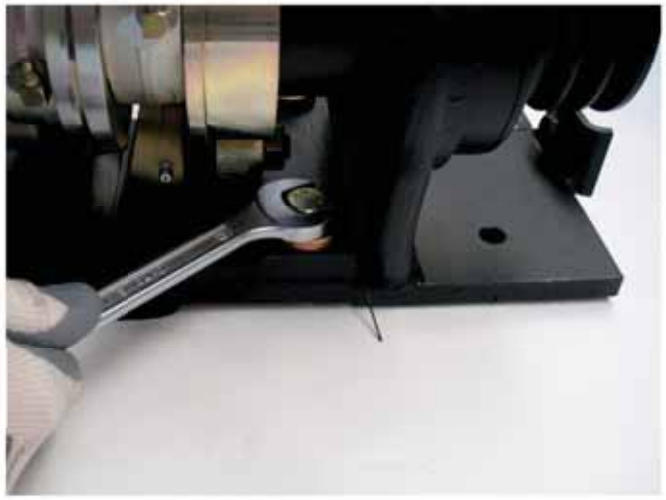
1. Position cutterbar and cutter drive as shown
2. Remove the three bolts from drive that will be used for connecting the cutterbar

3. Align the main holes of the bar back with the special nuts in the base plate of the drive

4. Position and slightly tighten the bolts with the washers as shown

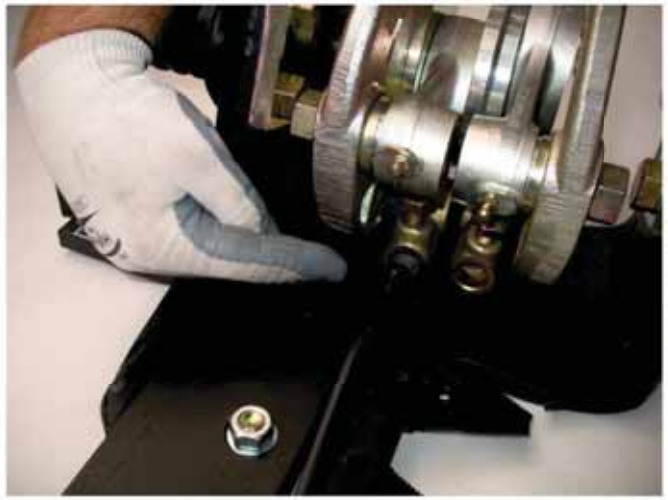
5. Elevate the drive as shown for easier positioning of the bolt

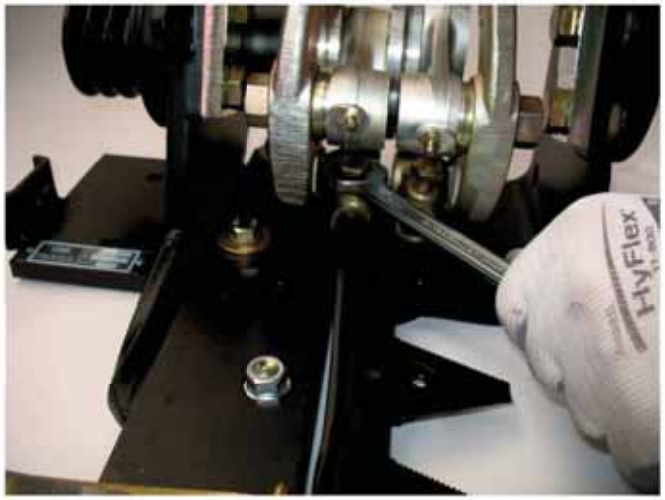
6. Tighten bolt with Allen key as shown



7. Finish up by tightening all the remaining connector bolts

Step #4 - Mounting the Bottom Knife



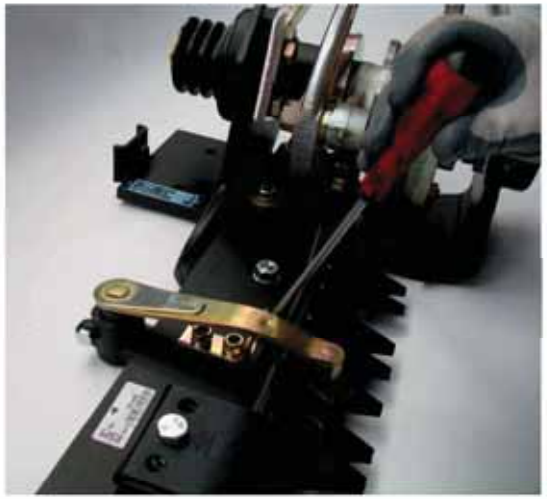


1. Bring the drive into a central position, in this position the connecting rods are in alignment.
2. Insert the knife head of the bottom knife into the ball joint as shown.
3. Ensure that the carrier studs are inserted into the guide bushings of the lower guide arms.
4. Mechanically secure the bottom knife to the drive by tightening the main clamp bolt on the ball joint.

Step #5 - Mounting the Top Knife

1. Insert the knife head of the top knife into the ball joint as shown.

2. Mechanically secure the top knife to the drive by tightening the main clamp bolt on the ball joint.



3. Release all the top guide arms using a screwdriver as shown

Step #6 - Remounting the Gliding Sole

1. Elevate the drive as shown.
2. Insert the front studs of the gliding sole into the designated holes as shown.
3. Position and tighten the bolt on the rear of the drive

Step #7 - Setting of Bottom Knife Elevation

1. Bring the drive into a central position, in this position the ball joints are in alignment.
2. Check clearance between the bottom knife and the base plate of the drive. It should be approx. 1/10 inch, to ensure that the knife remain straight (no vertical distortion).

3. Slightly loosen the self-locking nut of the drive arm pivot bearing as shown

4. Rotate the eccentric bushing (bottom knife only) with a punch, until the required clearance between the bottom knife and the base plate of the drive is reached.

Step #8 - Setting Top Knife Clearance

1. The top and bottom knife must glide upon another without any free play between them.

2. In order to set the correct clearance, slide a piece of paper between the top and the bottom knife and rotate the eccentric bushing (top knife only) with a punch, until a first clamping of the paper is reached.

3. Next, tighten the self-locking nut on the drive arm pivot bearing to 110 lbf•ft (150 Nm). In this procedure make sure the eccentric bushings are not rotated. The self-locking nut securing the drive arm pivot bearing is to be replaced after a number of openings (to avoid self loosening of the nut).

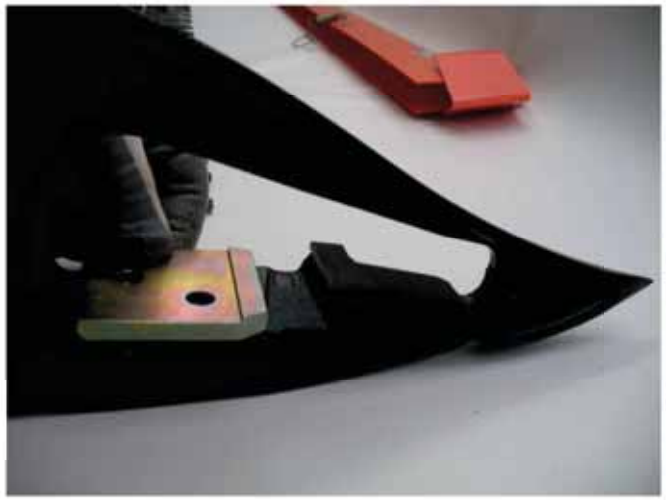
Step #9 - Mounting the Outer Shoe

1. Remove temporary knife rest

2. Parts needed for mounting the outer shoe

3. Insert front hook of the gliding sole into the hole on the outer shoe as shown

4. Secure gliding sole to outer shoe by tightening the bolt, at the desired cutting height, as shown.



4. Position cross connection plate as shown

5. Position outer shoe as shown below the bar back
6. Position the knife guide plate on top of bar back as shown

7. Slightly tighten bolts that hold on the outer shoe and set the required clearance of approx. 0.04 - 0.08 inch between the knife guide plate and knife back.

8. To finish, completely tighten bolts

Step #10 - Adapting Knife Safety Cover to fit the Outer Shoe

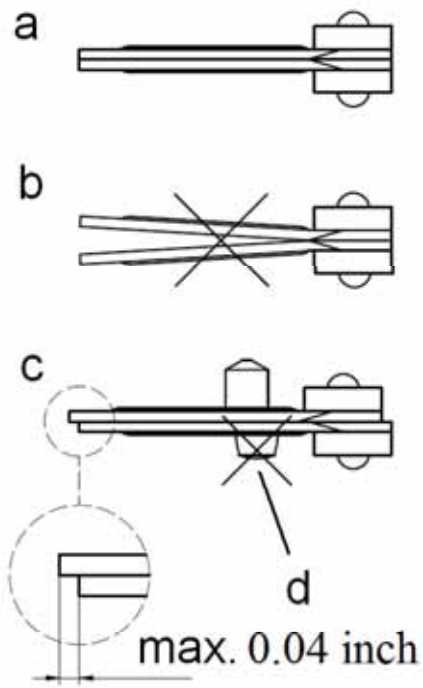
1. Outer shoe protection in its shipping position

2. Turn protection into forward position until holes are aligned

3. Position the small bolt as shown and secure the protection with lock nut from the inside

MAINTENANCE: INSPECTION, ADJUSTMENT AND CLEANING

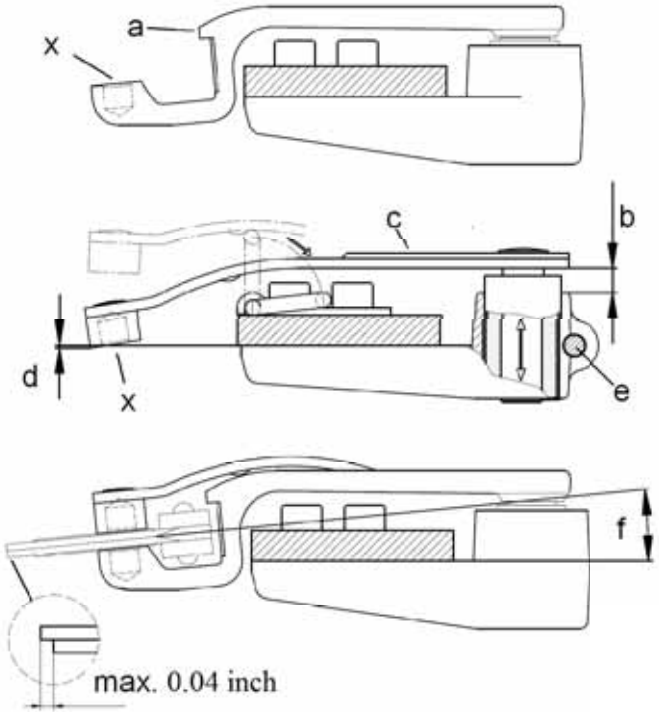
Operational breakdowns caused by inadequate or improper maintenance may lead to high repair costs and long downtimes of the cutterbar. Regular inspections and maintenance to assure operational reliability is therefore essential!!



- Only sharp, well adjusted and ground knives work trouble free
- The knives must always be straight, bent knife sections and knife backs must be straightened
- If there is heavy wear-off or damage to the knives, we recommend replacing the knives
- Damaged, loose or worn out knife sections need to be replaced
- Knife sections must lie on top of one another without any free-play between them (a). Should this not be the case, the knife guides must be straightened or need to be replaced due to heavy wear down.
- Guiding sections with worn carrier studs (d) must be replaced on time, since the knife guide arms can no longer function properly with worn carrier studs.
- If the knife protrusion is greater than 0,04 inch, the guide arms must be straightened accordingly

Knife guide:

The pressure of the guide arms to the knives is factory set to 130-160N (29 -35 lbf) and is checked with a spring scale with the knives assembled, directly behind the guide bushing of the guide arms. An adjustment of the pressure is possible, as described below, but seldom necessary. Only after the first 50 hours of operation, or hitting solid obstacles and after repairs does this pressure setting need to be checked.



The bottom guide arms (a), which form a unit with its holder and its pivot bearing, determine the correct position of the knife to the bar back respectively the end knife plates.

The top guide arms (c), are built as leaf springs and are mounted in maintenance-free and height-adjustable rubber pivot bearings, which through their position, determine the pressure on the knives.

Adjustments are to be carried out as follows:

Remove the knives and close the guide arms (c). To attain the proper pressure setting 130-160N (29 -35 lbf) the bottom edge of each individual top guide arm/bushing must stand about 0.04 inch lower than the bottom edge of the bar back (d).

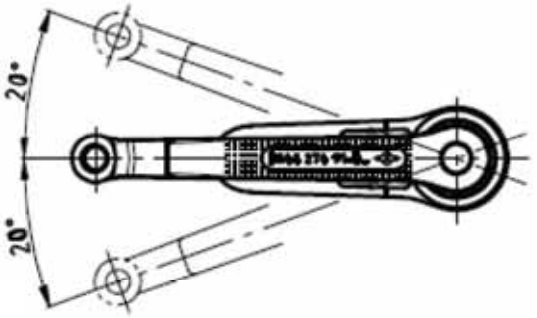
Should a pressure correction be necessary, loosen the clamp bolts (e) and, using a hammer, bring the guide arm (c) respectively its pivot bearing into the correct higher or lower position. Attention! Retighten the clamp bolts (e).

INSPECTION:

With a regular check (knives being in central position), the clearance (b = min 0.29 inch, max 0.43 inch), the angular measure (f = 5.5°) and the maximal knife protrusion of 0.04 inch should be verified. If this is not the case, it indicates a deformation/damage to the guide arms (a, c) and/or the guide arm pivot bearings. For easy inspection and straightening of the guide arms refer to the following scaled (1:1) illustration.

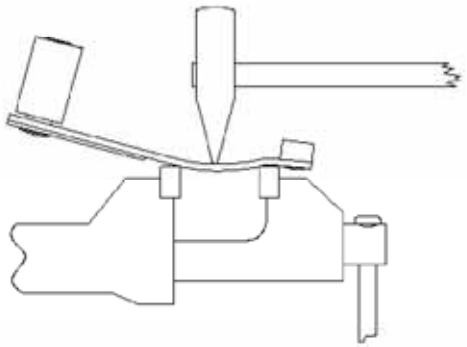
NOTICE:

- The knife guide should be cleaned regularly and all friction points (x) should be regularly lubricated.
- Pay attention to wear in the guide bushings of the guide arms.
- Attention – do not over turn the bottom guide arm "bidux"! To avoid damage to the built-in pivot bearing/gasket the guide arm may be turned to each side by a max. of 20°.

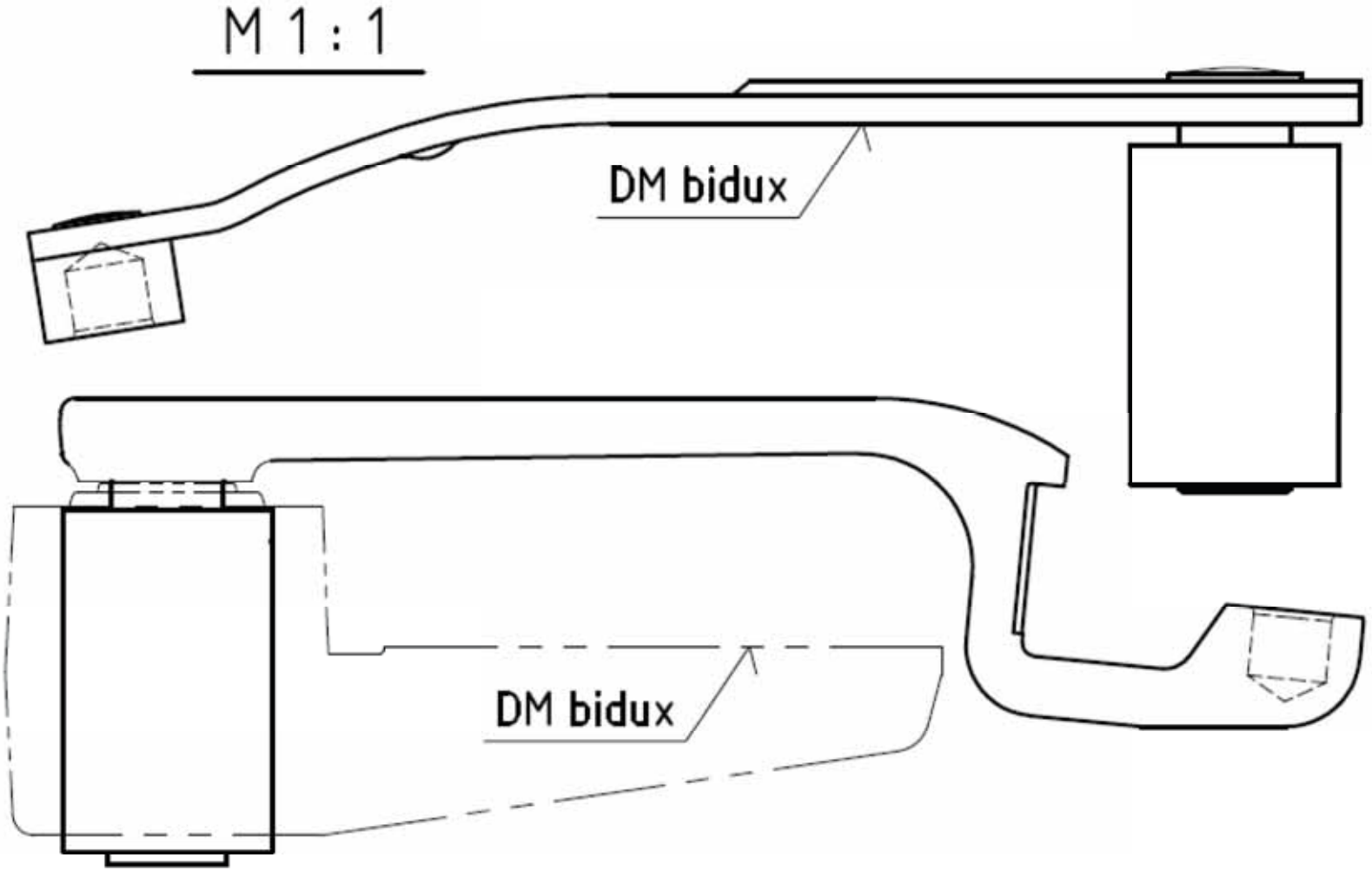


Straightening the Guide Arms:

If, after the proper adjustment of the knife guides, deviations to the given control measurements are found, than possible the guide arms are bent and need to be straightened. For easy inspection and straightening of the guide arms, follow the scaled illustrations provided in this manual and the method illustrated below.

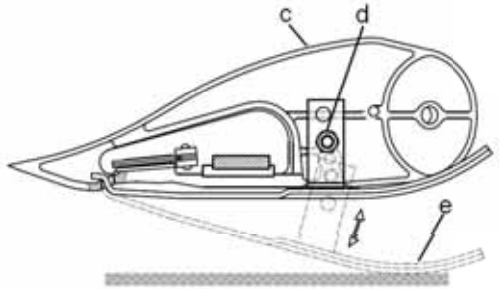


Caution! DO NOT hit the hardened frontal parts of the guide arms ..... Risk of breakage!

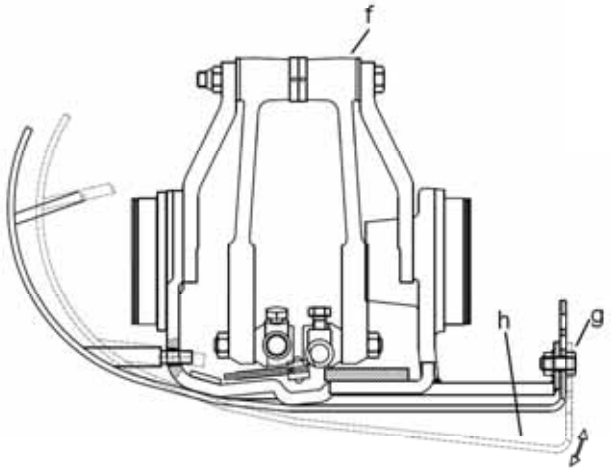


Adjusting the cutting height

The cutting height of the cutterbar is set through the gliding skids (b) attached to the cutterbar, or the gliding soles (e, h) attached to the outer shoe (c) respectively the cutter drive (f). An adjustment to the cutting height is carried out as follows:



The outer shoe (c) provides a clean cutting edge, divides the crop, guides the cutterbar in the desired cutting height and serves as a basis for the mounting of the optional swath plate. To set the cutting height, loosen the clamping screw (d) and refasten the gliding sole (e) into the desired position.



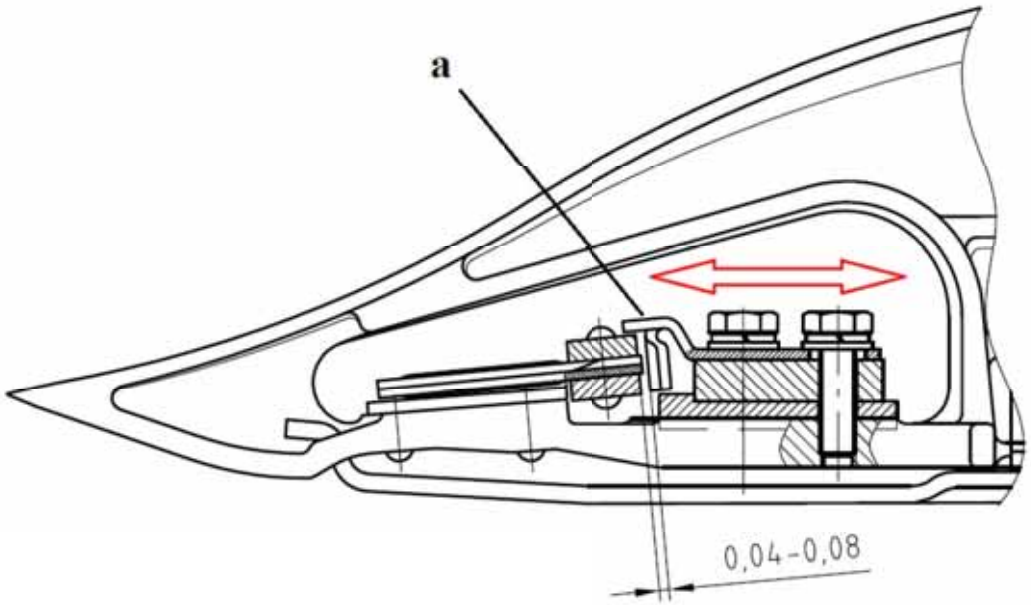
Cutter drive (f); for adjustment: remove the mounting screw (g) and then refasten the gliding sole (h) into the desired position.

CUTTERBAR:

After every cutting operation, the top knife has to be removed to assure proper cleaning of the cutterbar and all the relevant guiding and friction surfaces. Before the reassembly of the knife, check and repair damaged parts, straighten bent knife sections, sharpen blunt sections and apply lubrication to all relevant guide and frictions surfaces. If no cutting work is to be done for an extended period, remove knife and make sure to store it safely in a dry location.

Knife guide plates:

These plates (a) have the task of preventing a jumping and bending of the knives when stones or other foreign objects come into the knife.

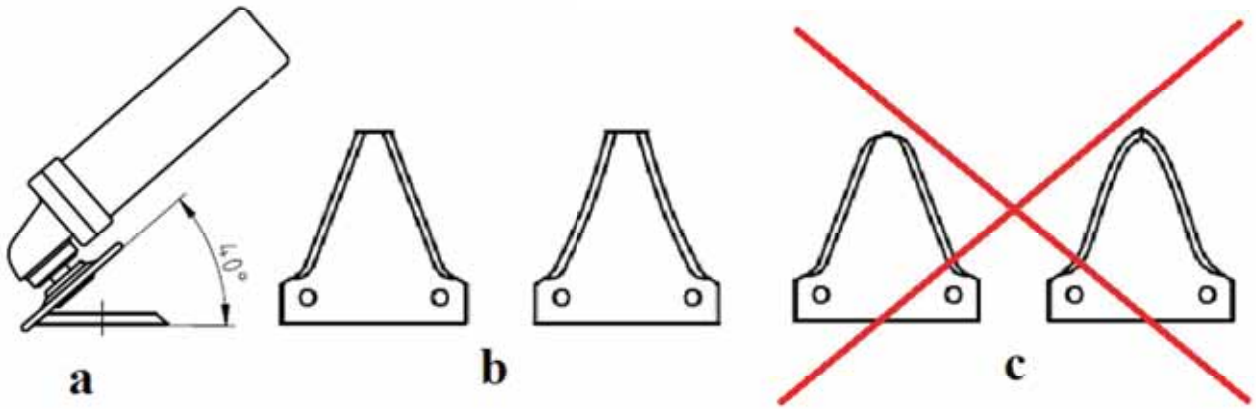


For the adjustment of knife guide plates the knife has to be in end of stroke position. The slotted holes on these plates permit an exact adjustment. With correct adjustment of the plates, a gap x of approx. 0.04 - 0.08 inch should be given between knife guide plate (a) and knife back.

Sharpening of Knives:

The proper sharpening of the knives is of great importance for a clean, trouble-free and efficient mowing operation. Depending on the cutting condition, knives should be sharpened on approx. 5-20 hour intervals. For the proper sharpening procedure follow the instructions below:

- Remove the knives prior sharpening!
- Sharpen the knives only when wearing safety glasses and protective gloves!
- Sharpen the blades of your double-knife cutterbar, with a grinder, at an angle of 40 degrees (a)!
- Do not round the tip, or grind curves into the blades (c)!
- Sharpen the blades as shown in figure (b)!
- After sharpening, make sure to remove any grinding burr!



Attention: Do not let the cutting edges overheat, or they will loose their temper and therefore blunt much quicker!

REPLACEMENT OF SINGLE KNIFE SECTIONS:

Although all types of ESM cutterbars are quite resistent against the access of stones or other obstacles, it might happen that fingers , respectively bar sections and knife sections will get damaged or bent. If single knife sections do get damaged or worn there is an option to replace them. For the proper replacement of worn sections, remove knifes from cutterbar and follow the procedure described below.

UNRIVETING OF WORN KNIFE SECTIONS (E.G APPLIED TO SECTIONS WITHOUT OVERLAP TOWARDS KNIFE BACK)

Place a strong sleeve onto a solid surface e.g. an anvil. Center the rivet of the knife section over the sleeve and with a pin driver (ESM#599.0880) and a hammer drive out the rivet.

Unriveting of worn sections (e.g. applied to knife sections with overlap towards knife back)

Fix the knife in a vice by clamping the section that needs replacement (knifeback should be resting on top of the chaw) and shear of the rivets by hitting the backside of the section with a hammer. Remove rivet remains from the knifeback with a pin driver.

Riveting on new knife sections

Place the required countersunk rivet into the countersunk of the knife section and through the bore of the knife back and , if applicable, through the bore of the knife drive plate. In this order, with the rivet head facing down, position all the parts onto a solid surface (e.g anvil)

1. Now drive the rivet with a hammer until a first clamping is reached.
2. In order to attain a strong and durable rivet joint it is necessary to remove any play that might be left in the joint. To do so, center a sleeve over the joint and drive the parts firmly together.
3. Next, using a rivet head molder (e.g ESM# 599.0850), mold rivet head until proper shape is reached.

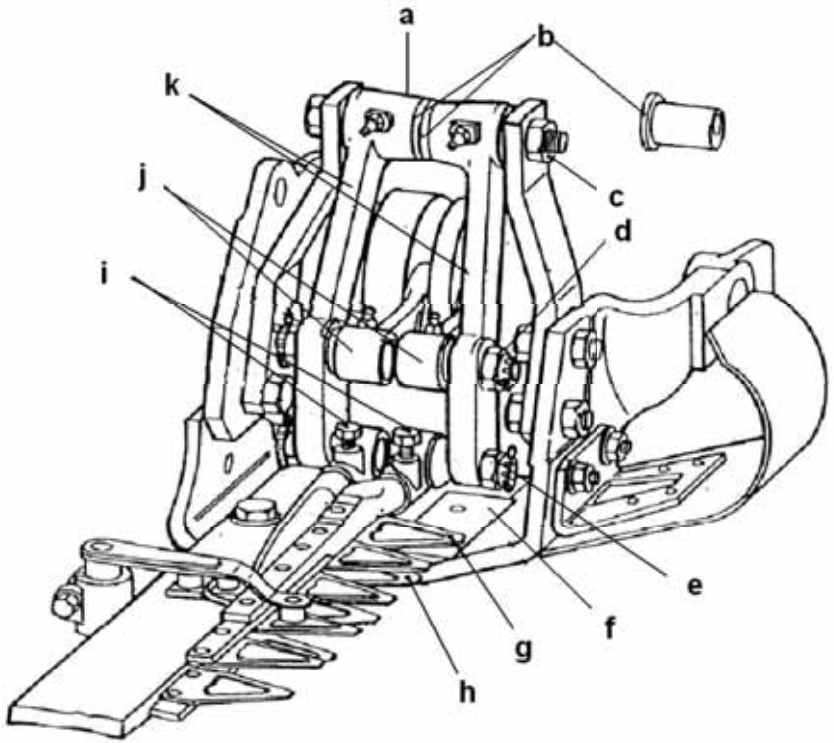
Attention! In the section of the knife head, make sure to fit rivet head to shape of knife head.

General requirement: Rivet protrusion towards support, guiding or sliding surfaces are not acceptable. Make sure to remove any rivet protrusion with a grinder.

After the riveting procedure make sure to check the quality of the joint. Quality and durabillity are always result of the procedure and the expertise applied.

Open pivot Cutter drive:

Operational breakdowns caused by inadequate or improper maintenance may lead to high repair costs and long downtimes of the cutter drive. Regular inspections and maintenance to assure operational reliability is therefore essential!! The following is to be observed:



- Lubricate only with clean greases, depending on the operating time and temperature, at least every 4-8 operating hours and after each cutting operation or high pressure cleaning. To be lubricated are the following points (1x crankshaft bearing, 2x per bearing housing; 1x per oscillating drive arm; 1 x per ball joint).
- All bearings are to be regularly checked for wear
- Always ensure the mechanical secure connection of all fasteners (in particular, the oscillating drive arm bearing (a), the connecting rod bearing (j), the ball joint clamp bolts (e), the knife head clamp bolts (i) and the safety equipment).
- Strictly observe the following torque guideline, failure to follow, may lead to breakage of the oscillating drive arms; the nut (c) = 110 lbf•ft (150 Nm), nut (d) = 73 – 103 lbf•ft (100-140 Nm), nut (e) = 59 – 73 lbf•ft (80 – 100 Nm).
- The self-locking nuts (c) securing the drive arm pivot bearing (a) are to be replaced after a number of openings (to avoid self loosening of the nut).
- We recommend that all repairs are to be carried out by a professional.

Attention: For your own safety, never operate this cutter drive with a rotational speed higher than 1200 rpm!

Maintenance and Lubrication Instructions:

Lubrication should be done with compression-proof grease only: If the implement is being used for cutting eatables, all lubricated parts coming in contact with the material to be cut, must be lubricated with food grade lubricants only!

Maintenance Instructions	Operating hours / Periods		
	Every 4 h	Every 8 h	Every 5-25 h
Checking of the knife guides:		X	
Checking of the knives and the knife head		X	
Check the entire cutterbar for loose and damaged parts, especially components relevant to safety.		X	
Grease knife head bearing	X		
Grease carrier bolt and guide bushings		X	
Sharpen Knives			X
Cleaning of the Cutterbar and Cutter Drive	daily		
Grease Cutter Drive (1x crankshaft bearing, 2x per bearing housing; 1x per oscillating drive arm; 1 x per ball joint)		X	

Trouble-shooting and Remedy:

For quick and easy problem identification, the following table provides a list of the most common problems, its related cause and the remedy needed.

Problem	Cause	Remedy
Cut material becomes stuck between the top and bottom knife	Knives are blunt Knives are not straight Knife Sections are not aligned Bottom guide arms deformed	Replace or sharpen knives Remove and straighten knives Straighten knife sections Straighten guide arms
Section tips of the bottom knife work themselves into the sections of the top knife.	Top knife protrudes to far over the bottom knife	Straighten top knife guides
Rattling along whole length of the cutterbar	Guide bushing not sitting on carrier studs	Reposition guide arms/bushings onto carrier studs
Knife sections are not sitting flat on top of each other	Knife sections or knife buckled, Knife back distorted	Check the straightness of the knives, if necessary, straighten the knife sections until the are all aligned
Guide arms/bushings jump off the carrier studs	Guide arms twisted Carrier bushings/studs worn out	Straighten the guide arms Replace bushings /studs
Knife backs break	Excessive rotational speed Excessive play in the knife head Improperly attached knife head Improper adjustment of the knife guides	Reduce rotational speed Check and remove excessive free-play in all the relevant parts Readjust the knife guides

Spare Parts:

We would like to bring to your attention that only ESM original spare parts and accessories should be used, as only these have been tested and approved by us. The fitting and/or use of other products may compromise the function and the safety of the machine. We accept no warranty and liability for damages resulting from the use of other than original spare parts and accessories.

Additional Technical Information

Further technical information, such as spare parts lists and user manuals, are to be found on our Website: www.esm-ept.de. For specific questions please make contact directly with your dealer or the manufacturer.

Your closest dealer / service center

Dealers STAMP