



**MBO**  
Folding Technology

# Operating Manual

Buckle Folding Machines  
Models: B 26 S and B 30 S

Palletized Feeder

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## **Prologue**

With the MBO folding machine you have purchased a valuable product. However, it is absolutely imperative to comply with all Safety Regulations and Safety Instructions. This Operating Manual should also instruct you to correctly operate the MBO folding machine and to comply with the Safety Regulations and to maintain the machine properly.

## **1.0 Specifications**

### **1.1 Manufacturer**

**MBO Binder & Co., Maschinenbau Oppenweiler**  
Grabenstrasse 4, 71570 Oppenweiler  
P.O. Box 1169, 71567 Oppenweiler  
Tel.: 07191/46-0  
Fax.: 07191/4634

### **1.2 Type:**

**Buckle folding machines B 26 S and B 30 S with palletized feeder.**

### 1.3 Technical data

#### 1.3.1 Sizes

	<b>B 26 S</b>	<b>B 30 S</b>
Maximum sheet size:	68 x 120 cm (26½ x 48)	78 x 120 cm (30½ x 48) 88 x 120 cm (34½ x 48) *
Minimum sheet sizes:	17 x 25 cm (7 x 10")	17 x 25 cm (7 x 10")
- With small sheet-size device):	17 x 17 cm (7 x 7")	17 x 17 cm (7 x 7")
Pile height:	95 cm - Optional: 120 cm (48")	

#### 1.3.2 Electrical data

Feeder:	0,75 kW	0,75 kW
Pump:	3,60 - 4 kW	3,60 - 4 kW
Folding units each	0,75 kW	0,75 kW

#### 1.3.3 Speed:

10 - 205 mtrs./mte.

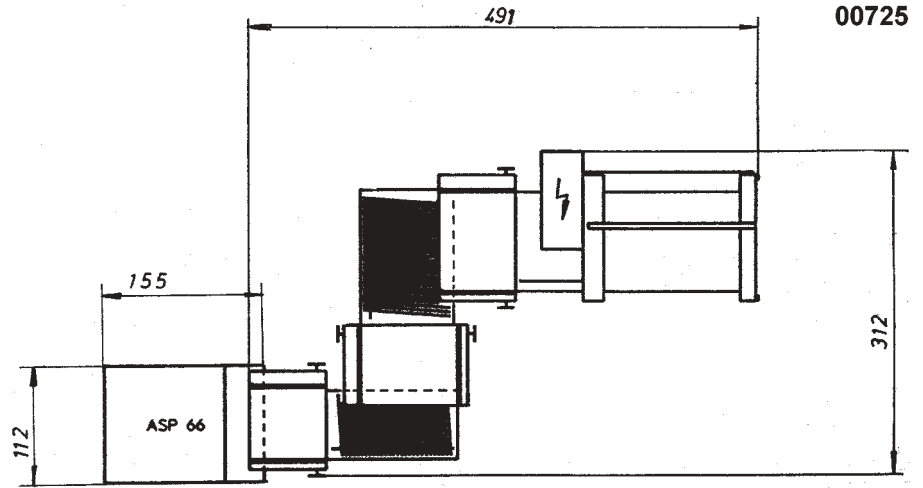
#### 1.3.4 Weights in kg:

	<b>Net</b>	<b>Gross</b>
Feeder B 26 S:	800	1.000
Feeder B 30 S:	800	1.000
Folding unit I 69 cm:	960	1.200
Folding unit I 78 cm:	1.000	1.290
Folding unit I 88 cm:	1.020	1.300
Folding unit II 69 cm:	680	850
Folding unit II 78 cm:	720	930
Folding unit II 88 cm: *	740	950
Folding unit III 56 cm:	480	600

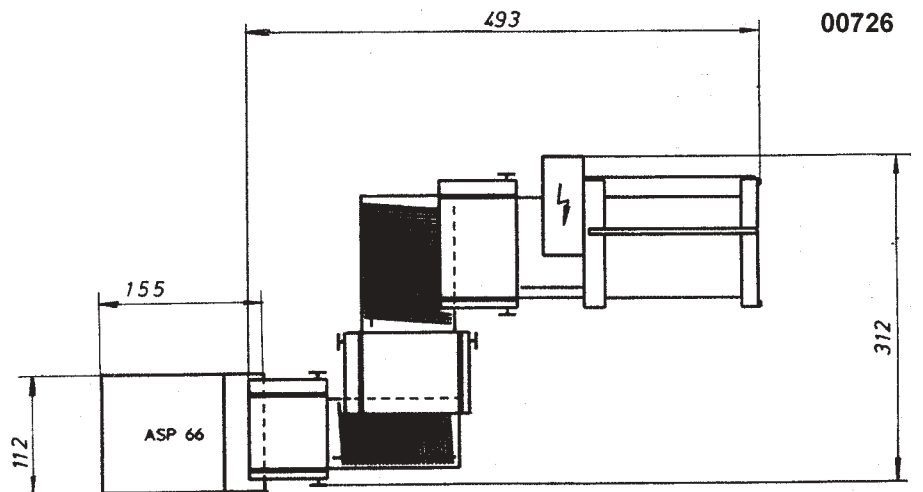
\* Upon request

1.3.5 Floor plan (measurements in cms):

B 26 S



B 30 S





**1.4 Documentation:**

Customer: \_\_\_\_\_

Machine configuration: \_\_\_\_\_

Machine-/Serial No.: \_\_\_\_\_

Type of feeder: Palletized feeder \_\_\_\_\_

Type of pump: \_\_\_\_\_

**Electrical data:** \_\_\_\_\_

Wiring diagram no.: \_\_\_\_\_

Folding unit: \_\_\_\_\_

Feeder: \_\_\_\_\_

Delivery: \_\_\_\_\_

Operating voltage (V/Hz): \_\_\_\_\_

Control voltage (V/A): \_\_\_\_\_

Control voltage (V/A): \_\_\_\_\_

Total rated current (A): \_\_\_\_\_

Fuse at power supply (A): \_\_\_\_\_

Conformity Certificate: \_\_\_\_\_

Noise level (dB/AI): \_\_\_\_\_

GS Certificate No.: \_\_\_\_\_

**1.5 Supplementary Documents:**

Operating Manual

batch counter: \_\_\_\_\_

air pump: \_\_\_\_\_

auxiliary units: \_\_\_\_\_

auxiliary units: \_\_\_\_\_

other manufacturers: \_\_\_\_\_

Spare parts lists \_\_\_\_\_

machine: \_\_\_\_\_

feeder: \_\_\_\_\_

pump: \_\_\_\_\_

peripheral units: \_\_\_\_\_

other manufacturers: \_\_\_\_\_

Knife list: **TM 32/2**

## 1.6 Information to user/Functioning description

### FOLDING MACHINE TO FOLD FLAT SHEETS

The folding machine is designed to fold flat sheets only. Folding of any other material should not be attempted. The manufacturer or supplier would not be liable for any damage caused as a result.

Furthermore, the manufacturer would also not be liable for any malfunctions or damages of additional installations or alterations which were not delivered or installed by him.

The construction of your machine may differ from the pictures in some details. However, this does not have any influence to its safe operation. Since we are continuously working on further developments, alterations are reserved.

The production speed can be varified between 10 and 205 mtrs./mte. However, the efficiency depends on the type of paper, size and type of fold as well as to the different circumstances of the user which cannot be influenced by the manufacturer.

In order to provide a general understanding of the machine function to the operator the following description has been carried out from the feeder to the machine.

**Please be advised that due to technical reasons and for better understanding certain options are already described in the standard machine description.**

The MBO Combination Folding Machine works exclusively in accordance with the principle of buckle folding. It may be coupled with mobile knife folding units which work in accordance with the principle of knife folding.

The basic machine consists of a combination of a parallel unit with palletized feeder, register table and stream delivery. Additional buckle plate units II, III, and IV, mobile knife folding units, such as Z 2, Z 5, and Z 6, special folding units or various other MBO deliveries may be attached, if necessary.

Standard buckle folding units consist of two, four or six buckle plates with swing deflectors, spiral foldrollers which can be adjusted through quick setting elements on the side frame of the machine, and quickly removeable slitter shafts with plug bearings.

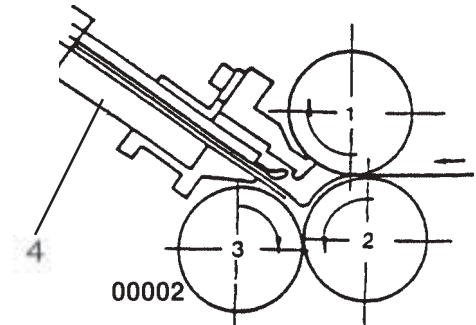
**Please bear in mind that a simultaneous folding with all buckle plates is not possible!**

### 1.7 Buckle fold:

The principle of buckle fold is that the sheet is always pushed into the buckle plate.

Three foldrollers and one buckle plate are necessary to prepare a buckle fold. Foldrollers 1 and 2 carry the sheet into the buckle plate 4 to the sheet stop.

A buckle occurs during transportation through these foldrollers to the direction of foldrollers 2 and 3 by which the sheet is folded through its passage.

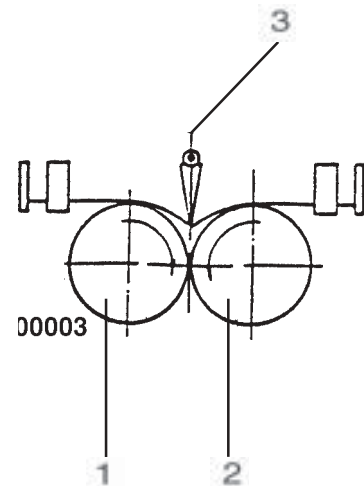


### 1.8 Knife fold:

Two foldrollers 1 and 2 as well as one knife 3 are necessary to prepare a knife fold.

The sheet is transported under the knife to a sheet stop and aligned.

After the knife has been released it moves the sheet between the foldrollers where it is folded during its passage.



## 2.0 BASIC SAFETY INSTRUCTIONS

### 2.1 Warnings and symbols

The following designations respectively signs are used for very special instructions



> **NOTICE** < Special instructions with respect to the economical use of the machine.



> **ATTENTION** < Special instructions respectively requirements and prohibitions to avoid injuries and damages.



> **DANGER** < Instructions respectively requirements and prohibitions to prevent personal injuries or extensive damages.

### 2.2 Safety at working place - destined use of the folding machine

2.2.1 MBO folding machines correspond to their stipulated Safety Technical Requirement at the time of their shipment. Therefore, any moveable and rotating parts are covered with protective hoods and are mechanically and electrically interlocked to such an extent as to not unreasonably detract from the operation.

Only one-man operation (unfavourable machine view at drive side)

2.2.2 At all safety technical preventions it is extremely important that the operating personnel achieves sufficient safety experience and is advised of all dangerous sources. The use of the delivery does not exclude danger to life and limb of the operator or third parties, respectively does not exclude the detraction of the machine and any other material assets.

2.2.3 The machine should only be operated when in good working order. Any malfunctions which may impair the safety must be removed immediately by trained personnel or the manufacturer/supplier.

2.2.4 The folding machine is designed to fold flat sheets only. Folding of any other material should not be attempted. The manufacturer or supplier would not be liable for any damage caused as a result.

2.2.5 Carefully read the complete Operating Manual before you operate the machine, including the Safety and Service Requirements.

2.2.6 The Operating Manual should be kept with the machine at all times.

2.2.7 Complete the Operating Manual, if necessary with internal Safety Instructions as well as with the legal Regulations for Prevention of Accidents.

2.2.8 If more than one operator, ensure that all operators are trained and informed.

2.2.9 Never remove guards or safety interlocks as the machine will no longer be protected.

2.2.10



>**DANGER**< Never use any tools which are not in a perfect condition and make sure that no tools are left on the machine after completion of settings and maintenance. Tools which fall into the machine may cause serious injuries and damages.

2.2.11

Note that all Safety Instructions are kept in a legible and visible condition.

2.2.12

Any audible and visible change on the machine in relation to the safety must be reported to the supervisor or manager of your company immediately.

2.2.13

The operating personnel should be aware that loose clothing, jewellery or hair can cause serious injuries if caught in the machine.

2.2.14



It is absolutely prohibited to clean rollers, eliminate malfunctions, or to undertake adjustments while the machine is on operation!

>**DANGER**< Always activate the **EMERGENCY-STOP** button.

2.2.15

Make sure that no other person starts the machine while you are working on it!

>**DANGER**< Always activate the **EMERGENCY-STOP** button or turn OFF the main switch, or pull OFF the power supply plug.

2.2.16

Check all the machine stoppages prior to starting the machine. You should never switch on the machine without first checking that the machine is in good working order and that no other person is making adjustments.

2.2.17

Turn off the main switch and secure it, if necessary, with a lock if you are required to undertake extensive mechanical or electrical maintenance and repair works.

2.2.18



Never open the main or sub-control panel! Only authorized personnel should gain access to the electronic control cabinets as there are no user serviceable parts.

>**DANGER**< if control cabinet is open! All main terminals could be alive even though the main switch has been turned off!

2.2.19

Any damaged cables or electrical connections must be reported to the competent authorities of your company immediately.

2.2.20



According to the latest Safety Regulations the machine must stop if the protective hood above the slitter shafts is opened. They are equipped with electrical switches. Any removal or bridging of these switches may cause >**DANGER**< to life and limb of the operating personnel!

>**DANGER**< Make sure that during the works with opened noise hoods it is completely opened to its limit to avoid any self-locking.

2.2.21

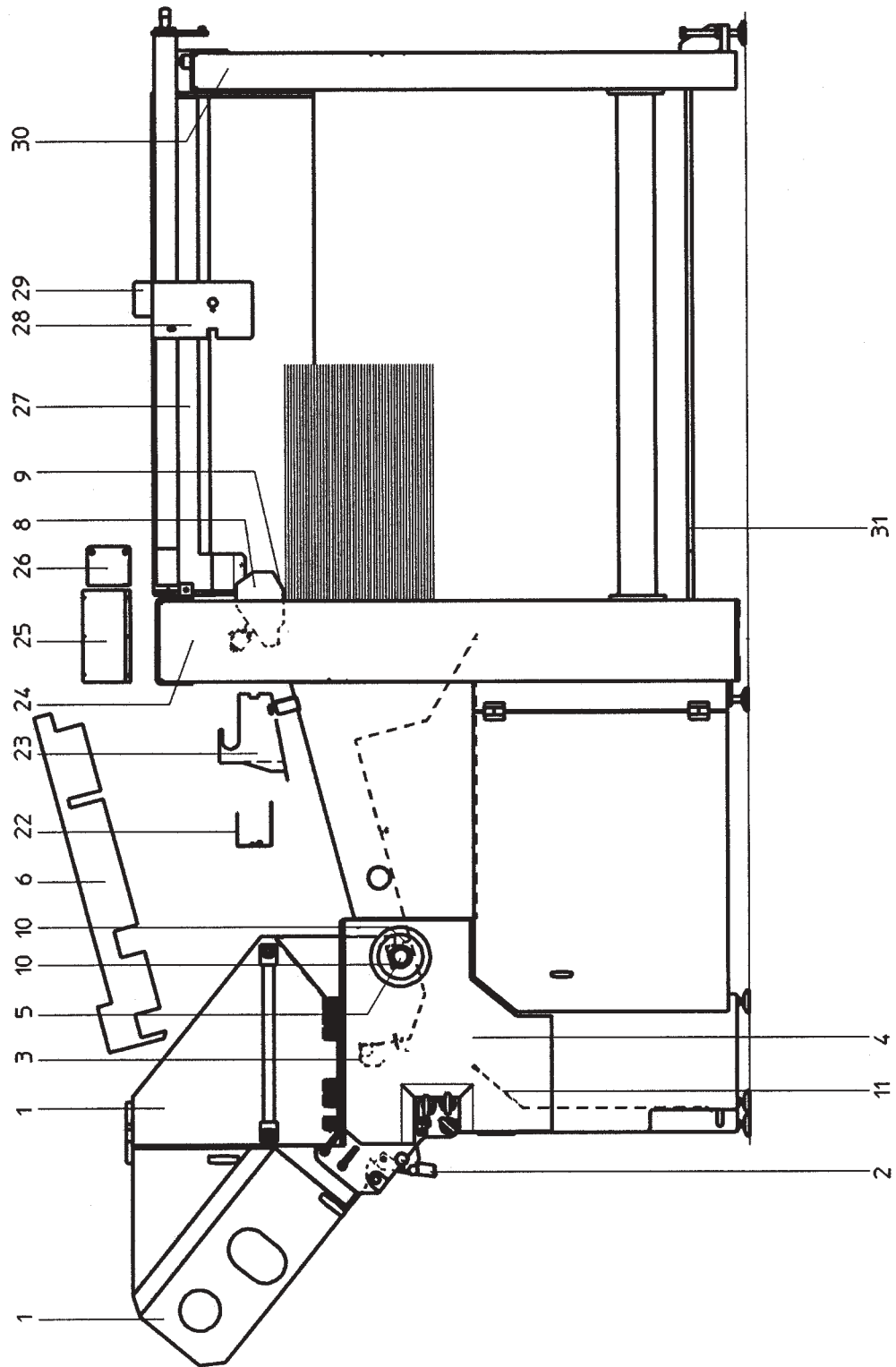
Machine connections must be installed in such a manner that no cables, tubes or hoses are left trailing.

**2.3 Safety devices - machine**

**2.3.1 Protective hoods - Checklist of parallel unit/feeder and mobile folding units**

Pos	Identification	Function control	Visible control	Result	Note
1	Two-pieced protective hood over parallel unit				
2	Protective hood over slitter shafts				Locked electron. if hood is open "V" = 70 mtrs/Mte. (tipping mode)
3	Guard over foldrollers				
4	Guard over parallel unit				at drive and operator side
5	Cover handwheel				at drive and operator side
6	Guard over drive of suction tape or suction wheel				at drive side
8	Guard over drive of suction tape or suction wheel				
9	Protective angle before suction tape or suction wheel				See page of Operating Manual for Setting Instructions
10	Guards over handwheel				
11	Guard plate below parallel unit				at exit of folding unit
12	Guards above drive belt cross carrier				At drive side
13	Guards before drive belt Cross carrier				At drive side
22	Guard over drive shaft of suction wheel				at suction wheel and suction tape
23	Guard over pulley for suction wheel				at suction wheel and suction tape
24	Guard over chain lead				
25	Guard over adjustment pulley				at drive side
26	Guard over drive chain				at drive side
27	Guard over drive shaft for feeder				at drive side
28	Guard over Vaculift				
29	Guard over motor for Vaculift				
30	Guard over chain lead				
31	Pile plate				automatical stoppage when plate is 120 mm above floor; remainder through tipping mode
	<b>Date</b>	<b>Name</b>			<b>Signature</b>

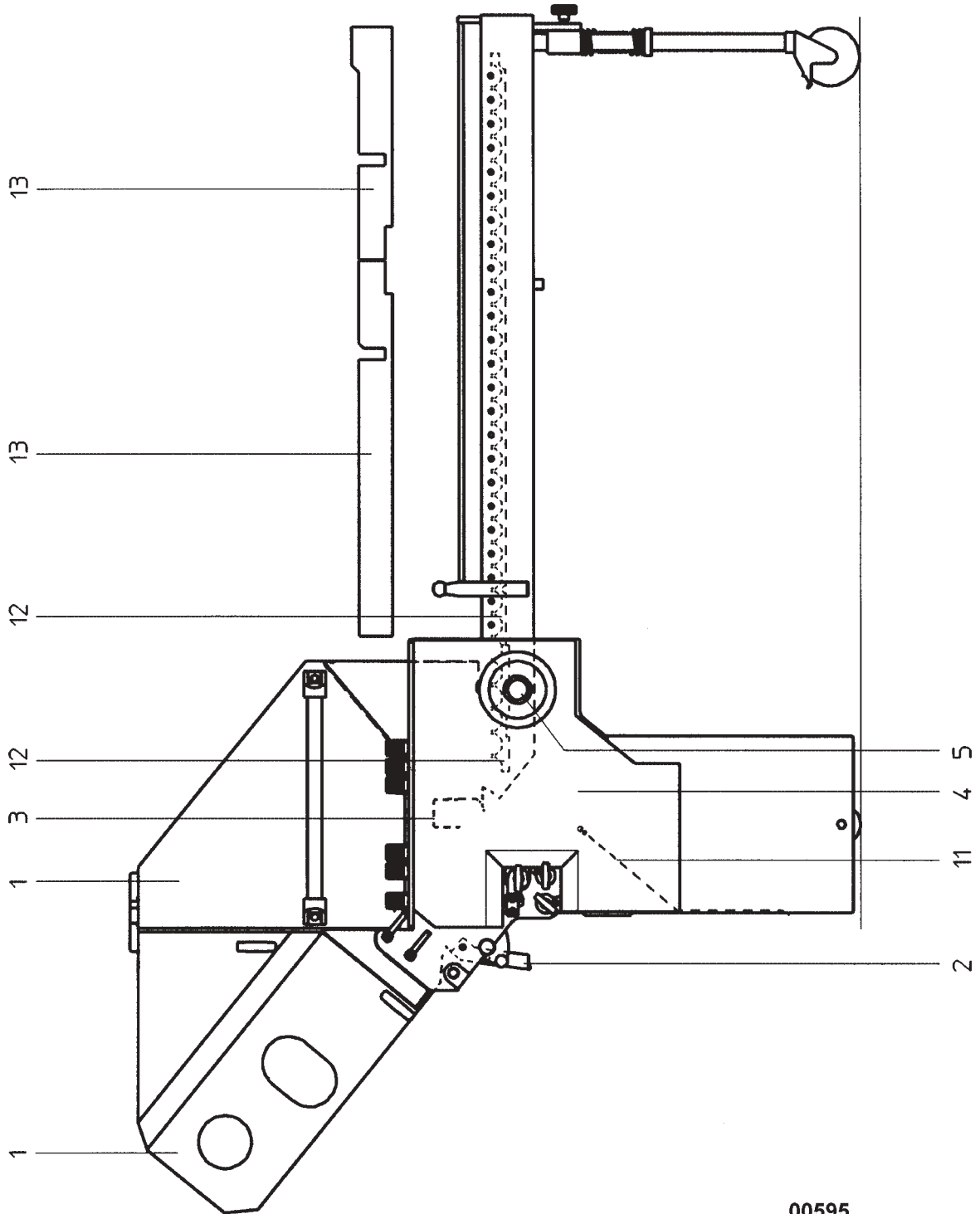
2.3.2 Protective hoods - Chart of parallel unit and feeder



00739



2.3.3 Protective hoods - Chart of mobile folding units



00595

### 3.0 Transportation/Erection/Installation

This part of the Operating Manual is directed to the competent service personnel and internal authorized personnel.

#### 3.1 Transportation

Folding units, feeder and delivery are delivered in separate crates. Move them to their final destination as close as possible.

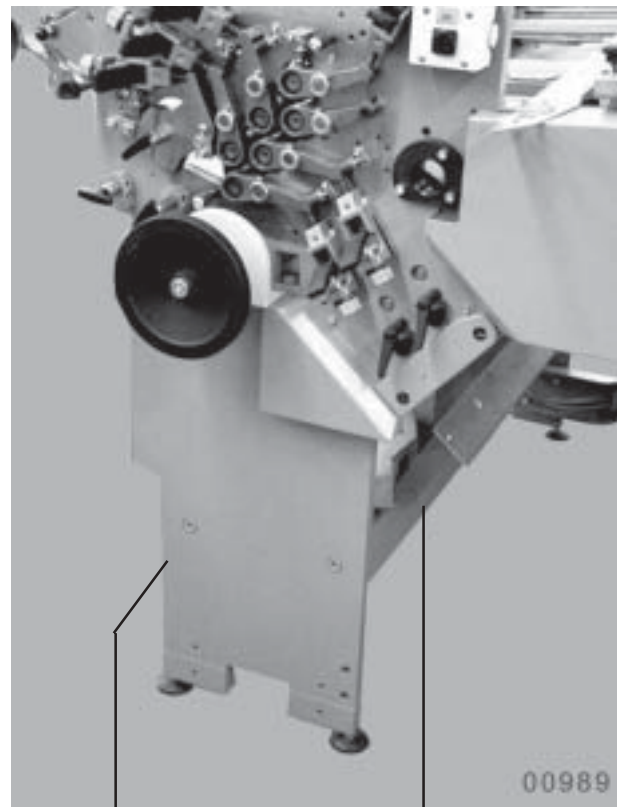
##### 3.1.1 Folding unit I

Unscrew the folding unit I off the pallet and move it with a fork lift.

Set the fork lift onto the cross bars **1** and **2** to the final position.



>**DANGER**< The unit may fall or slip off! Secure it, accordingly!



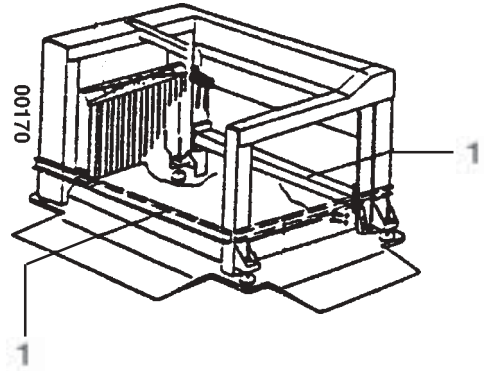
1

2

3.1.2 Feeder

Unscrew the feeder off the pallet and move it with a fork lift.

Set the fork lift onto the transport bars 1 to the final position.



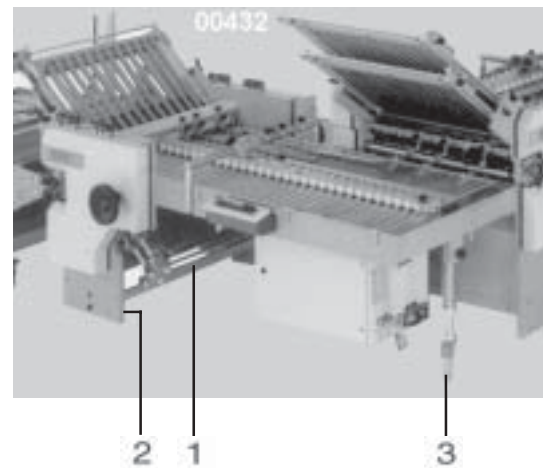
3.1.3 Folding units II and III

Unscrew the units II and III off the pallet and lift them with a forklift at cross bar 1.



**>ATTENTION<** The unit may fall (tip) over wherefore two additional persons are required to brace the unit.

Make sure that machine rollers 2 and castor wheel 3 will not be damaged when dropping the unit.



3.1.4 Cleaning



**>ATTENTION<** Clean the machine, feeder, and delivery of rust preventing agents.

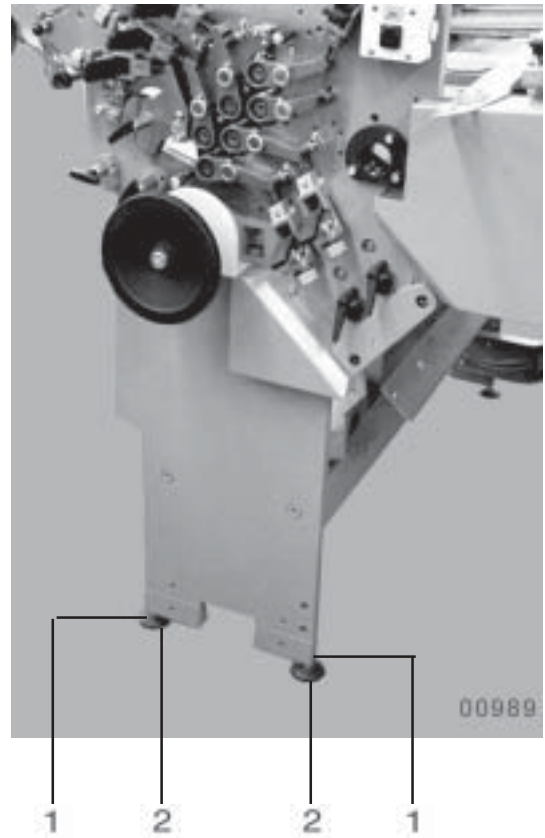
### 3.2 Erection/Installation of machine

#### 3.2.1 Folding unit I



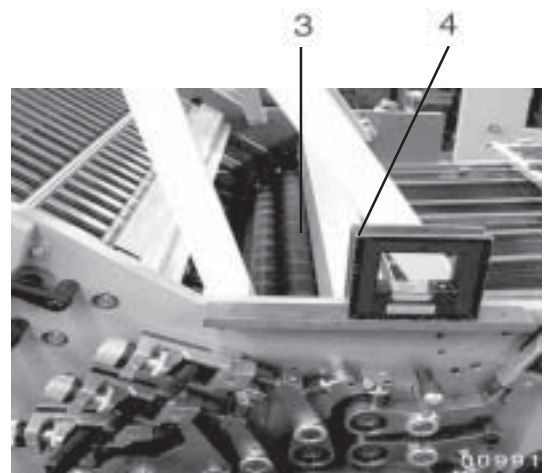
**>DANGER<** The unit may fall or slip off! Therefore, brace the unit, accordingly! Carry the folding unit to its final position.

Place plastic feet **2** underneath the setting screws **1**. Align the unit with setting screws and spirit level.



Horizontal alignment:  
Upper foldroller **3**

Vertical alignment:  
Place spirit level onto the side panel **4**.



**3.2.2 Feeder**

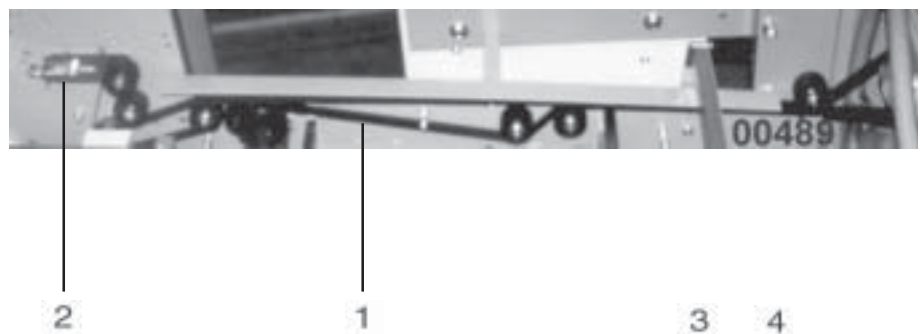
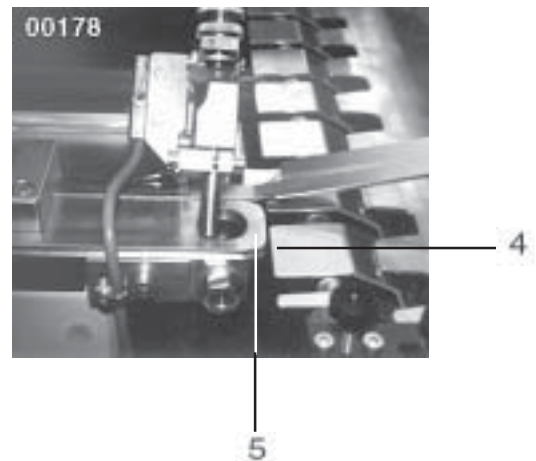
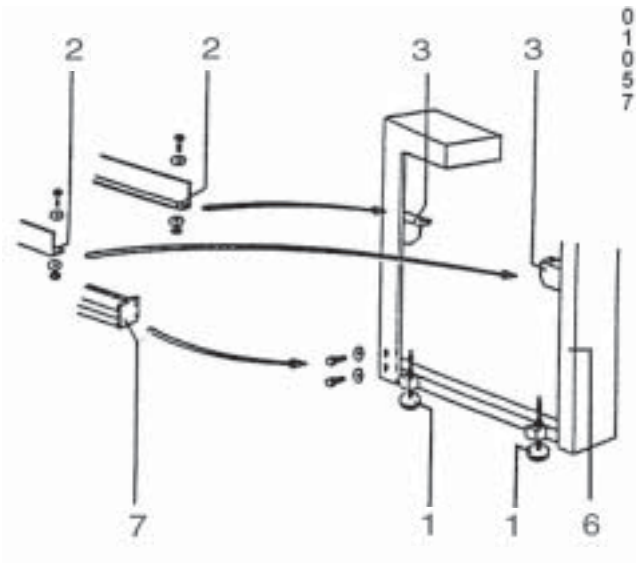
Place the feeder onto the levelling screws and plastic feet 1 and move it to the folding unit. Alignment holes of register table 2 and feeder 3 must correspond with each other.

Exact position has been marked by the factory.

A distance of 1-2 mm must be between the conveyor plate 4 and the register bar 5.

Set the exact height through the setting screws, adjust it with the spirit level 6 and screw them up without stress.

Thereafter, screw the feeder and folding unit with the connecting piece 7 up without stress.



Place the flat belt 1 for the drive of suction wheel onto the drive rollers and tension it from the bottom with the tensioning roller 2.

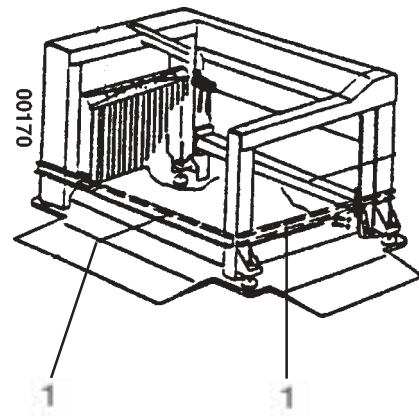
Hinge-up the lattice-type alignment table 3 into all positions 4.



**Continuation**

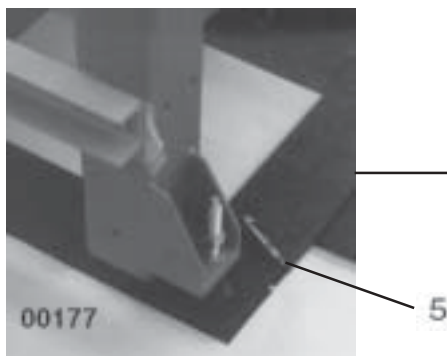
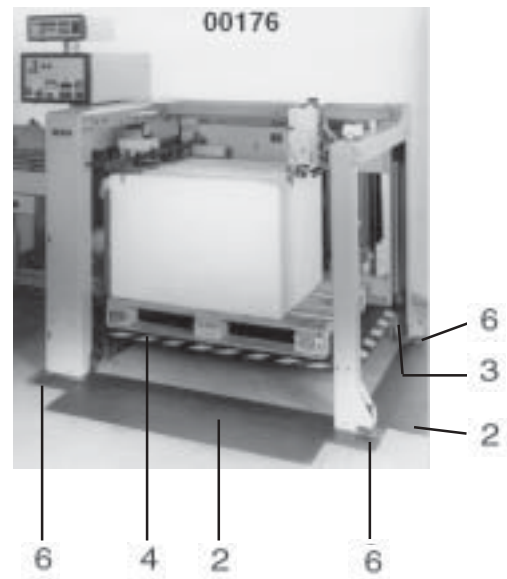
Continuation

Remove the transport bars 1.



Affix wedge 2 and place the centering wedge 3 beyond the floor. The pile plate 4 should be in its lowest position in the centre of the machine.

Fix the feeder with screwed inserts 5 at positions 6.

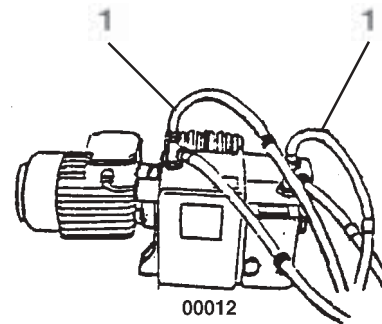


### 3.2.3 Pressure / Vacuum pump

Put the vacuum and air tubes onto the matching connection pieces 1 which are marked in colour.

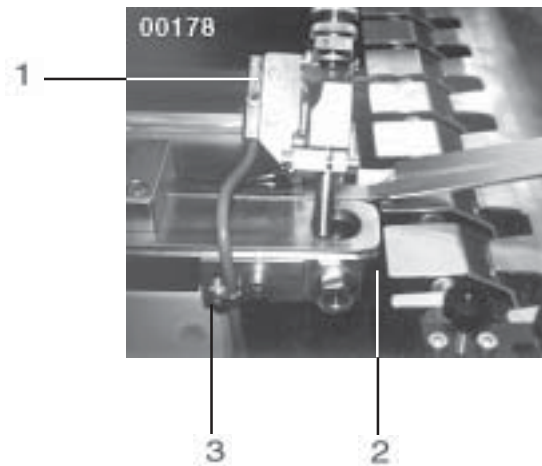


**>ATTENTION<** Check before the rotating field. If this is not correct, it may cause essential damages to the pump or to the feeder - head.



### 3.2.4 Double sheet control

Attach the double sheet control 1 with screw 2 and the cable with screw 3.

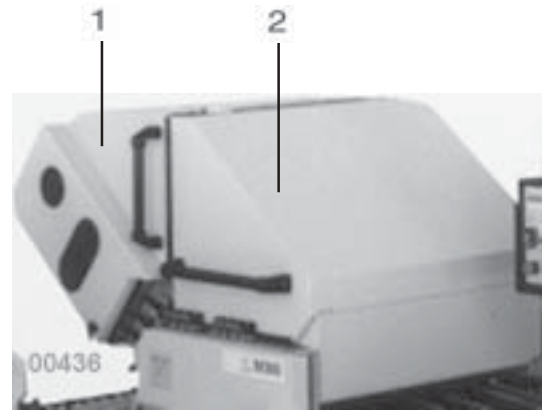


**Attach all protective hoods !**

Insert the buckle plates, place the guide rails on, place the slitters onto the slitter shafts, tension the transport tapes etc. All these works are described under the following paragraph „Operation of the Machine“.

3.2.5 Noise damping hoods (optional)

Noise hoods 1 and 2 are installed by the manufacturer.

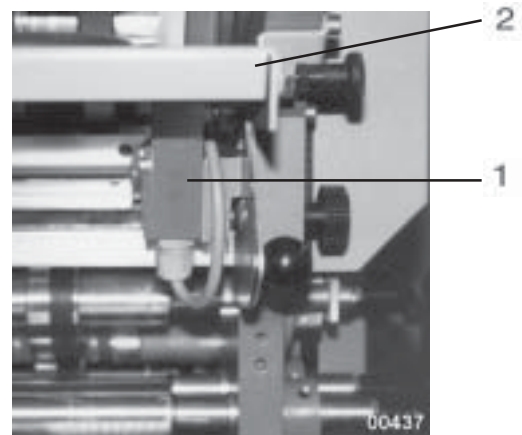


3.2.6 Guard above the slitter shafts

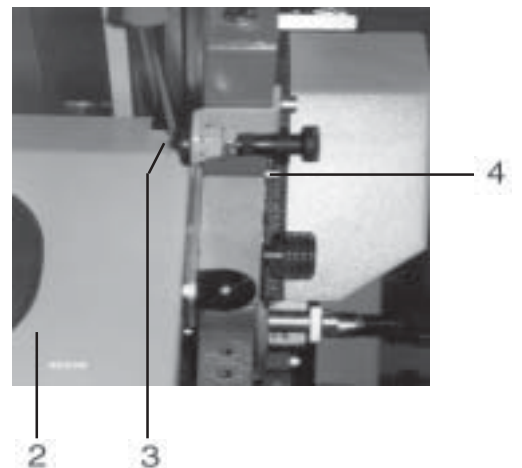


>**DANGER**< Check of the safety switch 1:

If the guard 2 is lifted the safety switch 1 must activate.



If setting becomes necessary, loosen the screw 3 through hexagon key SW 1.5 mm and turn the axe 4 into the required position.



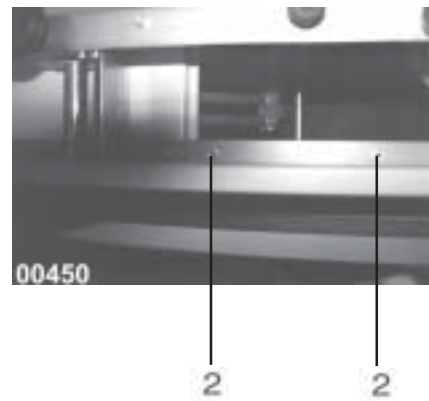
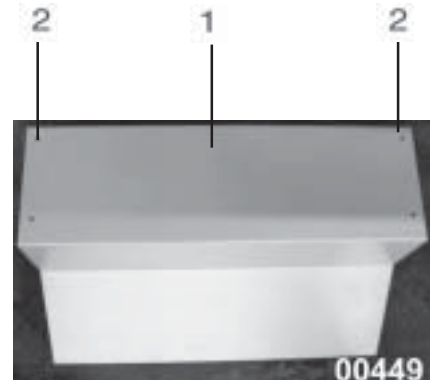


3.2.7 Guards

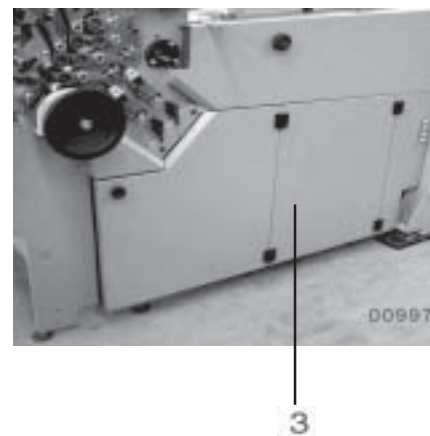


**>DANGER< Use and affix all protective hoods which have been delivered with!**

Fasten the noise hood **1** under the register table with four screws **2**.



Hook-in the door **3** with the tool drawer.



Insert the buckle plates, place the guide rails on, place the slitters onto the slitter shafts, tension the transport tapes etc. All these works are described under the following paragraph „Operation of the Machine“.

### 3.3 Electrical connection

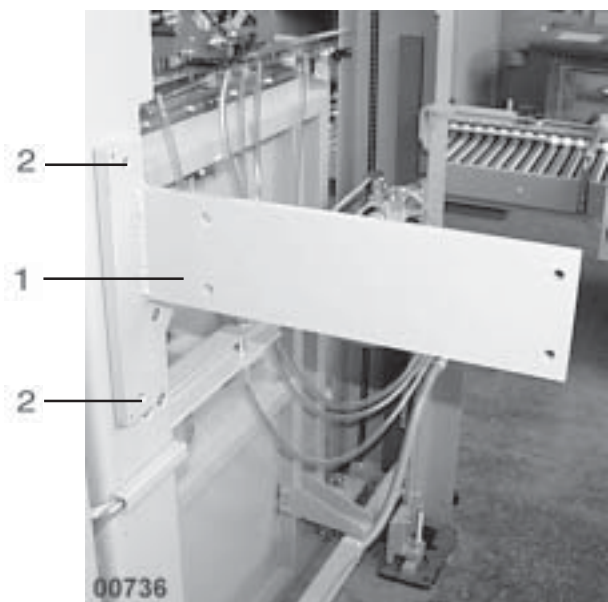
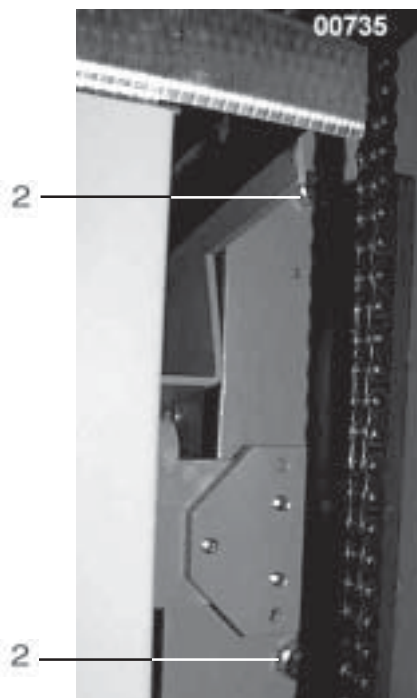
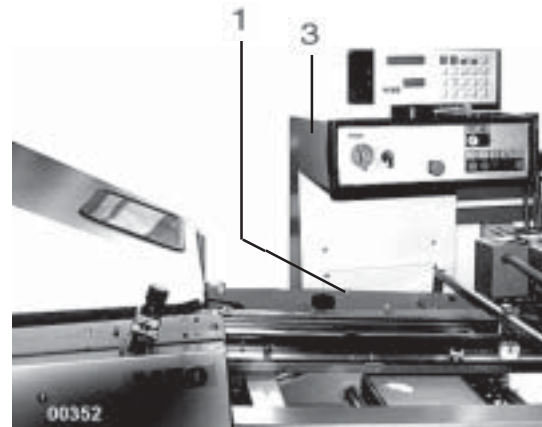


>DANGER - MAY BE HAZARDOUS TO YOUR LIFE< These works are only to be carried out by authorized or skilled personnel!

#### 3.3.1 Installation of main control panel

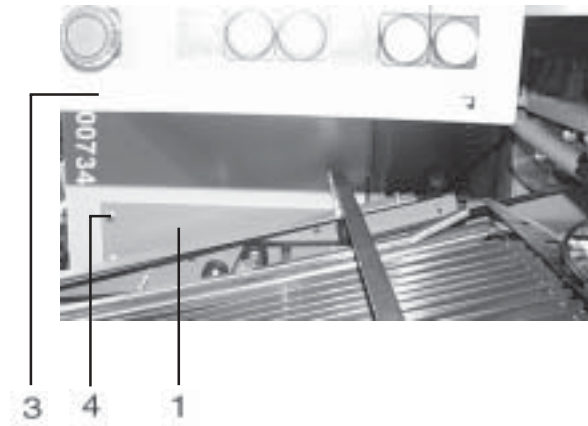
Fasten the holder 1 with five screws 2 at first, from the inside.

Continuation



**Continuation**

Then affix 4 the main control panel 3 onto holder 1.



3 to be affixed 6 at bar 5,  
distance piece 7 between 3 and 5.

Insert the plugs of machine  
and feeder into the corresponding  
sockets at the control panel.

Matching plugs and sockets  
bear the same marking.

Connect the cables of motors directly  
with the motor protective switches  
at main control panel.

Connect the pressure-/vacuum pump -  
cables are numbered.

**Please note wiring diagram!**



3.3.2 MCC Counter

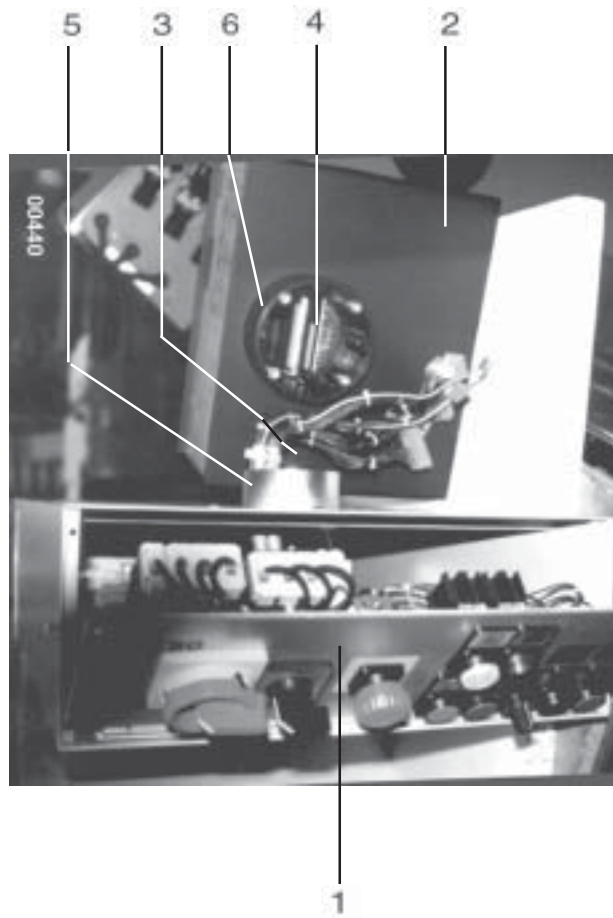
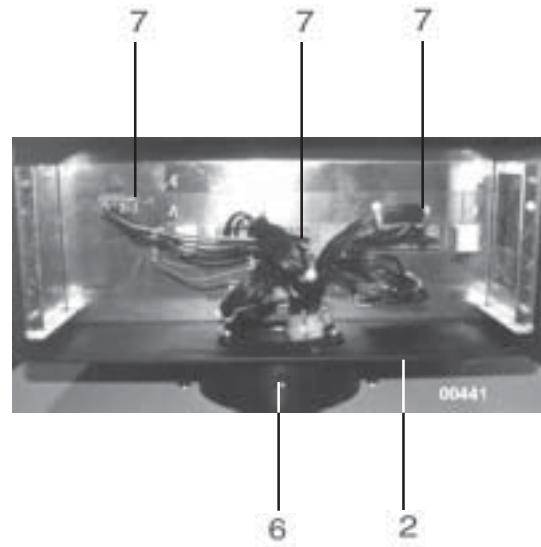
Open the front plate 1 and remove cover plate at rear side of counter 2.

Pull the cable out of opening 3 and push it through the opening 4 into 2. Place 2 onto the adapter 5.

Fasten the screw 6 to such an extent so that counter 2 still can be turned.

Insert numbered cable connectors 7.

Close the front plate 1 and replace cover plate 2.



3.3.3 Main Power Connection



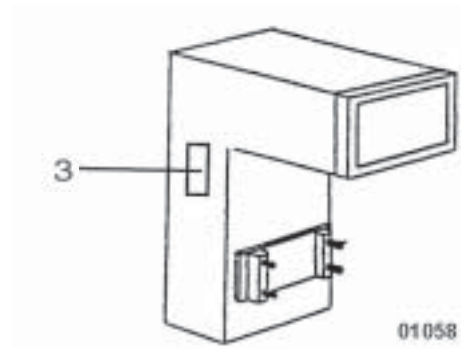
**>DANGER - MAY BE HAZARDOUS TO YOUR LIFE<** These works are only to be carried out by authorized or skilled personnel!



**>ATTENTION<** Check whether the supply voltage and frequency correspond to the data indicated on the machine label **3**.

Enter the connecting cable from the base of the control panel, connect the wires to the main terminals provided and secure it with protective plates.

**Please note wiring diagram!**



**>ATTENTION<**  
**Consider clockwise rotating field!**



**>ATTENTION<** Check the rotating field of the motors! If necessary, alter the terminal strip in the main control panel.

## 4.0 Maintenance

This part is directed to the competent service personnel or internal authorized personnel.



**>DANGER<** No cleanings nor maintenance works should be carried out unless the electrical supply is isolated. Always turn OFF the isolator on the control cabinet and secure it with a safety lock!



**>NOTICE<** The tensioning of the tapes for the foldrollers and drive of slitler shafts as well as for the crossfold drive occurs through self-tensioning elements. Since October 1st, 1996, the rollers to centre the taperunning are marked red. Other drive belts or tapes should be checked monthly. If you manually turn the handwheel the foldrollers cannot be stopped by hand.



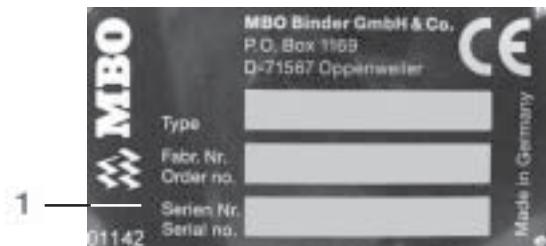
**>DANGER<** These as well as the following described works should be carried out by one person only! Danger of squeezing!

### Procurement of spare parts



**>ATTENTION<** Only use the spare parts which are supplied or recommended by the manufacturer.

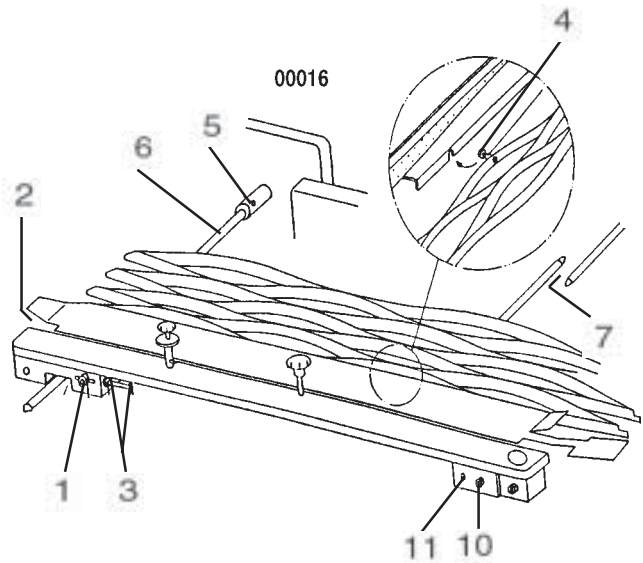
For inquiries and spare parts orders it is necessary to provide the machine and serial number, which may be read-off from the label 1.



**4.1 Exchange and/or tensioning of belts/tapes**

**4.1.1 Register belt at register table**

Loosen the screw **1** and release tension of register belt **2** through screws **3**. Unhinge the lattice-type alignment table at **4**. Loosen the screw **5** and remove rod **6**. Take the register belt off the rollers and thread out at **7**. Insert the new register belt in the opposite sequence.

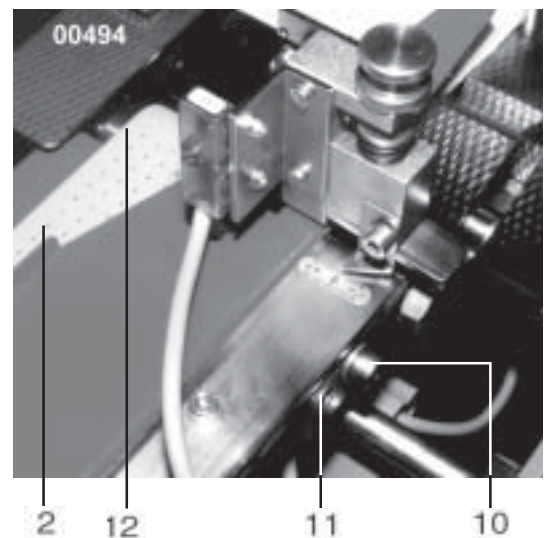
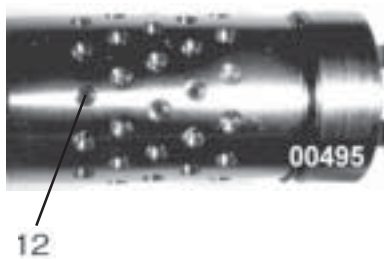
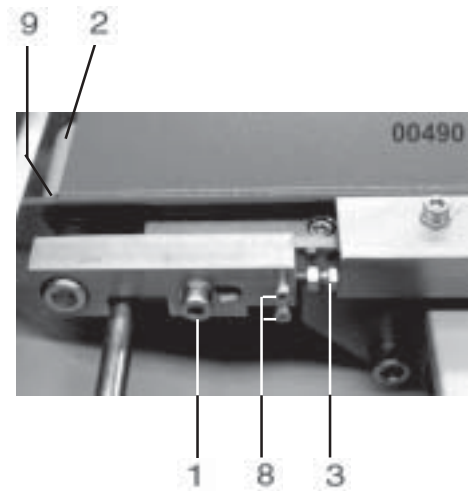


**>ATTENTION<** Adjust new tape:

Loosen the screw **1** and adjust the new tape **2** flush left onto roller **9** through screws **8**. Refasten screw **1**.

Thereafter, loosen screw **10** and adjust new tape **2** through screw **11**. Make sure that track of punched holes in the register belt **2** are coincidentally to the bore holes of the vacuum roller **12**. Refasten the screw **10**.

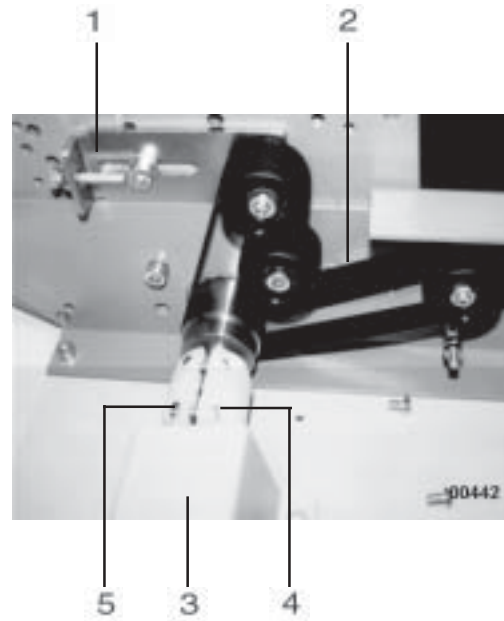
Check:  
Check with paper strip in the area of **12** whether vacuum is still provided - activate pressure-/vacuum pump!



**4.1.2 Drive belt for suction wheel/Vacu-Infeed**

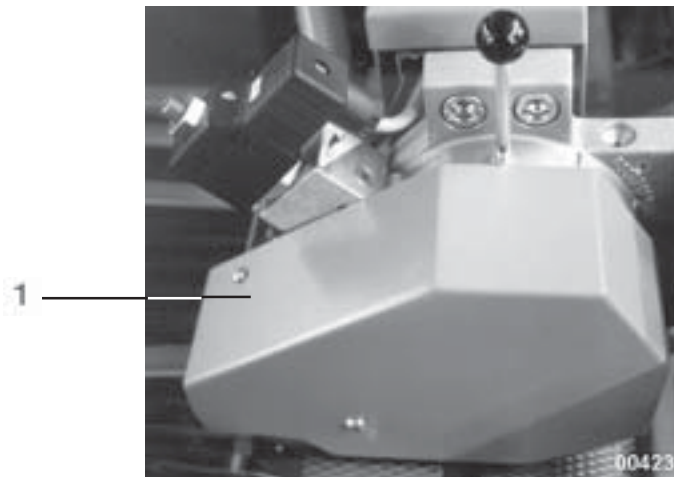
Tension the drive belt **1** through tensioning lever **2**.

Exchange:  
Remove guard **3**,  
open **5** the coupling **4**  
and re-thread the tape.  
The installation occurs  
in the opposite sequence.



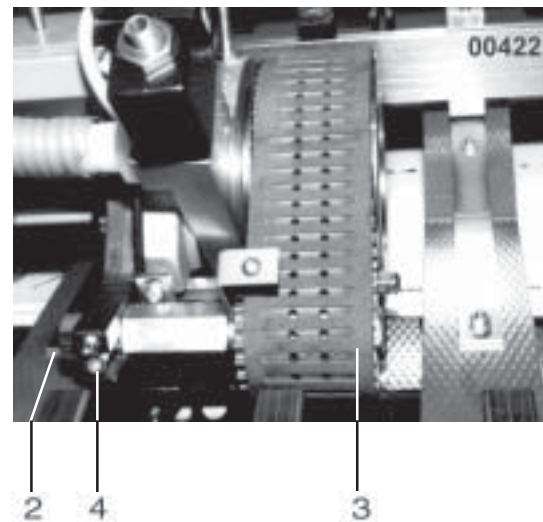
**4.1.3 Vacu-Infeed-Tape (Option)**

Remove protective hood **1**,



loosen the nut **2**  
and tension the tape **3**.  
Insert the screw **4**  
(but not too tight).

Exchange:  
Loosen the screw **4**.



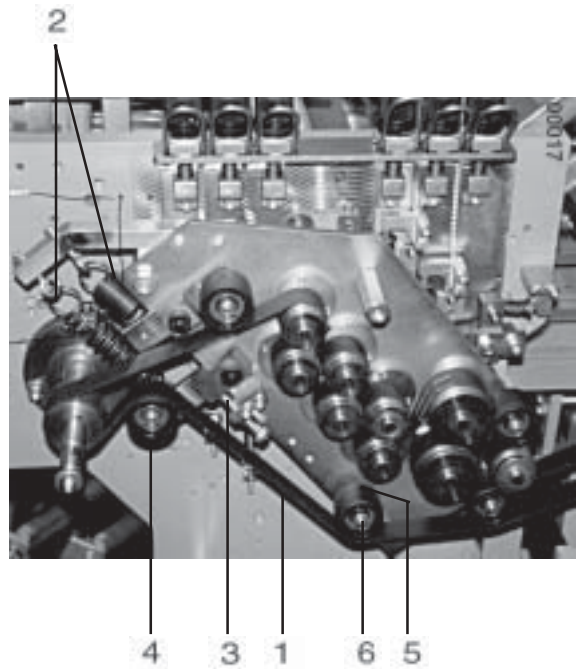


**4.1.4 Drive tape for foldrollers and slitter shafts (Standard)**

The drive belt 1 is automatically tensioned by draw spring 2.

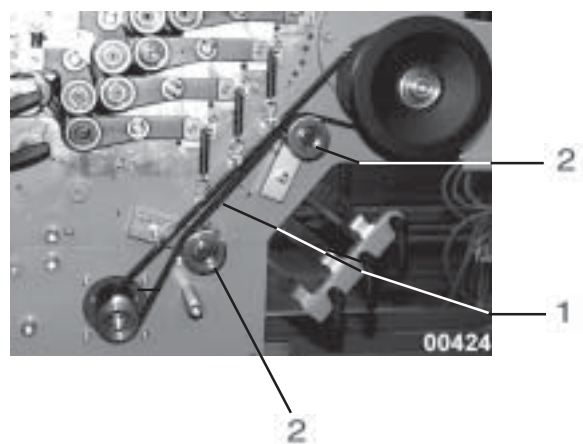
Do not use the adjustment screw 3 for belt tensioning.

It should be approximately 1 mm underneath the tensioning lever 4 if machine is stopped. After loosening the red nut 6 adjust the centric running of the drive belt through the excentric bolt behind the roller 5.



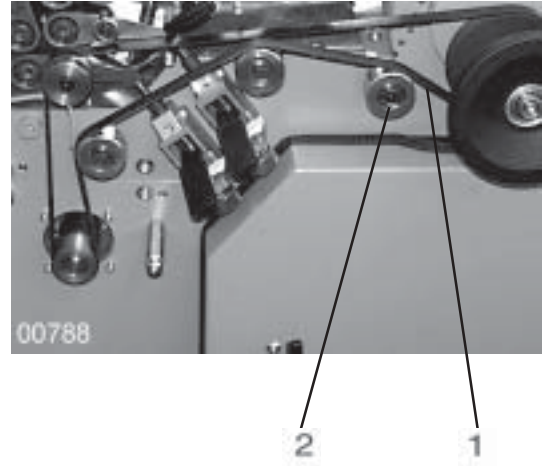
**4.1.5 Main drive of the folding units (Standard)**

Tension the Poly-V-Belt 1 through tensioning rollers 2 (see photograph).



4.1.6 Main drive of the folding units with pre-perforating shafts (option)

Tension the Poly-V-Belt 1 through tensioning roller 2.



4.1.7 Drive tape for foldrollers and slitter shafts – units with pre-perforating shafts (option)

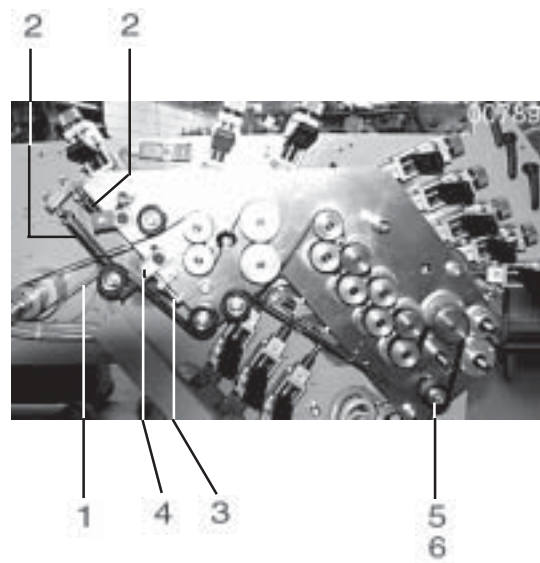
The drive belt 1 is automatically tensioned by draw spring 2.

Do not use the adjustment screw 3 for belt tensioning.

It should be approximately 1 mm underneath the tensioning lever 4 if machine is stopped.

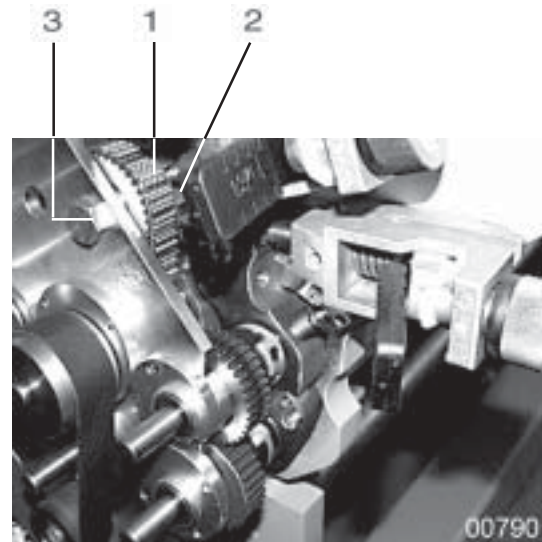


>ATTENTION< Centre a new tape 1 for its centric running: after loosening the nut 6 (marked red) adjust through the excentric bolt behind the roller 5.



4.1.8 Toothed belt for rear twin-perforator shafts (option)

Tensioning of toothed belt 1:  
Loosen nut 2 and turn eccentric 3.  
  
Refasten 2 again.

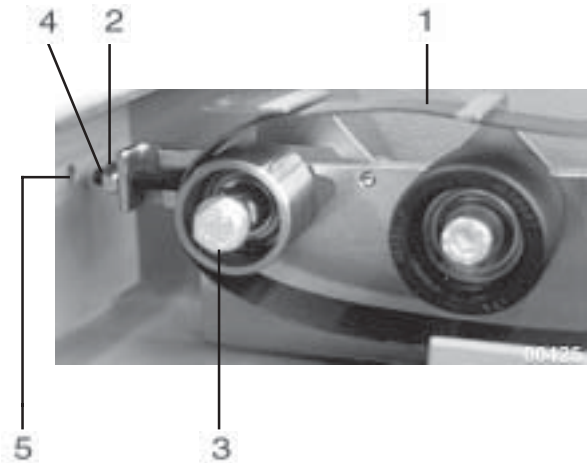


4.1.9 Drive belt for register table on mobile folding units

Strain tightening of the drive belt **1** at bottom side of register table:  
Loosen the screws **2** and **3**,  
insert screw **4** from the external  
side through the opening **5**.

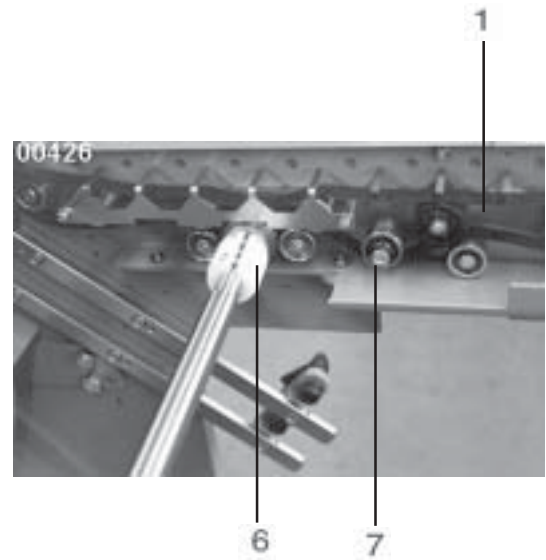
Retighten the screws **2** and **3**

Exchange: Relieve the screw **4**  
and displace the coupling **6**,  
re-thread drive belt **1**.  
The installation occurs  
in the opposite sequence.



**>ATTENTION<** Centre the  
tape for its centric running:  
turn the red marked screw **7**.  
Fasten the external cap nut.

Refasten screw **6** and nut **7**.



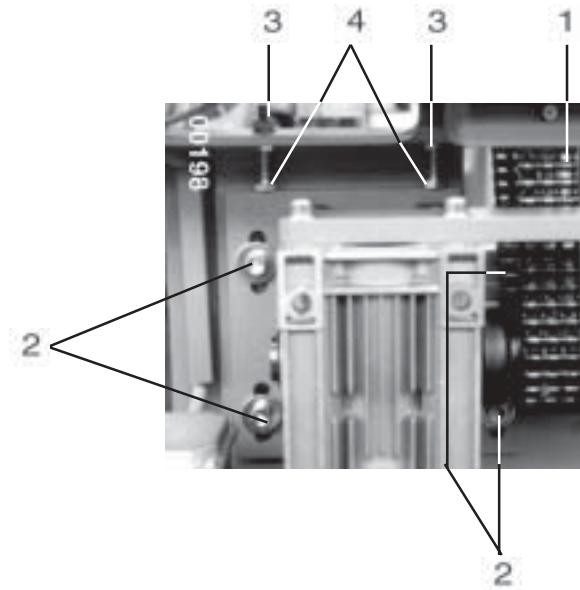
4.1.10 Feeder - tensioning of drive chain



Tensioning of drive chain 1:  
Loosen the four screws 2  
as well as counter nut 3.  
Turn both screws 4 together.

>ATTENTION< Do not overtighten.

Refasten screws 2 and counter nuts 3.



4.1.11 Feeder - final switch (top)

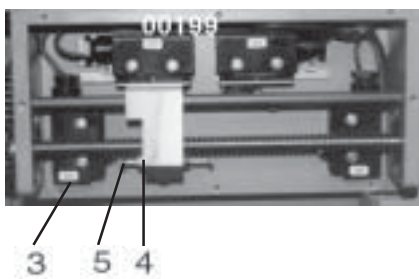
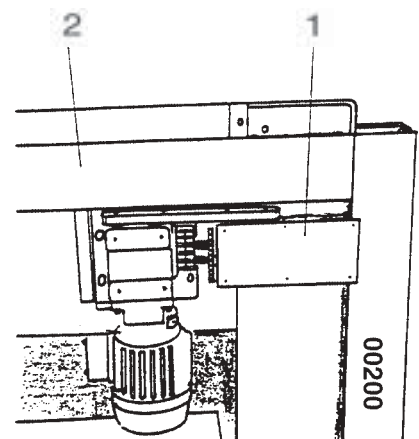
The minimum distance from the pile plate to the suction wheel/Vacubelt has been set by the manufacturer to 155 mm.

Reason: When using EURO pallets, which have the most height (150 mm) of the pallets normally used, it will never occur that the Vacubelt/suction wheel will be damaged by the pallet which is damaged or incomplete in the area of the capacitive switch. If mostly low throw-away pallets are used the pile is not completely processed. In this case you may move the top final position of the pile plate closer to the Vacubelt/suction wheel. However, the manufacturer will not be liable for any damages caused.

Remove the cover 1 at drive side of the feeder 2. The limit switch S 25 3 activates the top final position. Loosen the counter nut 4. When you clockwise turn the screw 5 it will cause a higher final position of the pile plate.



>ATTENTION< Adjust sensitively!  
One rotary movement of the screw 5 will amount to 10 mm height difference.  
Refasten counter-nut 4.



## 4.2 Lubrication / Cleaning

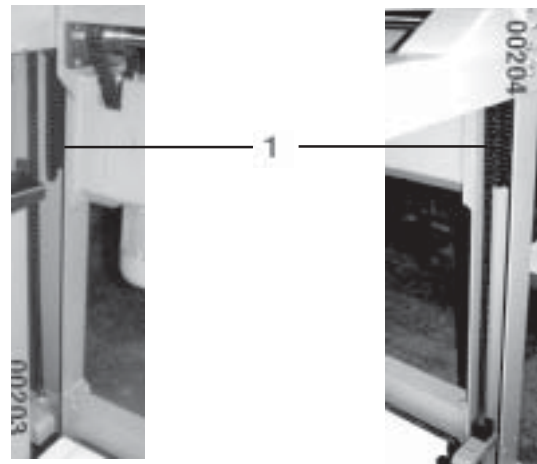


>NOTICE< Generally, the machine should be cleaned after each job, particularly moveable parts which have been changed due to change of sheet size, because heavy dust may cause reduction of function.

### 4.2.1 Feeder

Check the loose ends 1 of the pile plate chains, clean it off from dust and provide it with a slight touch of oil.

**Move the pile table up in its top position for these works !**

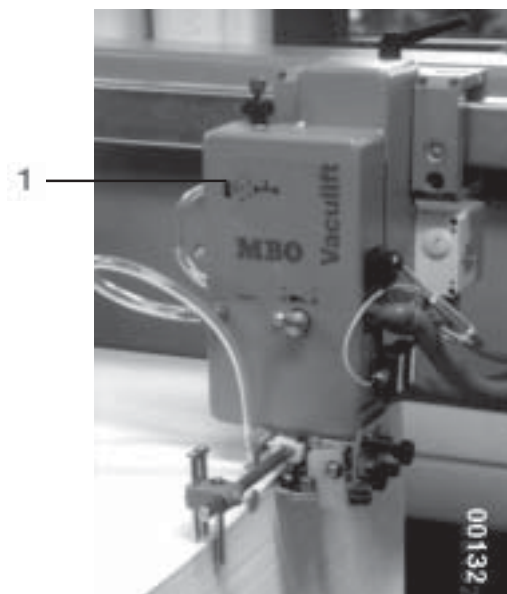


### 4.2.2 Vaculift

Remove protective hood 1 and put a slight touch of spray-oil onto all guiding elements and moving parts, monthly.

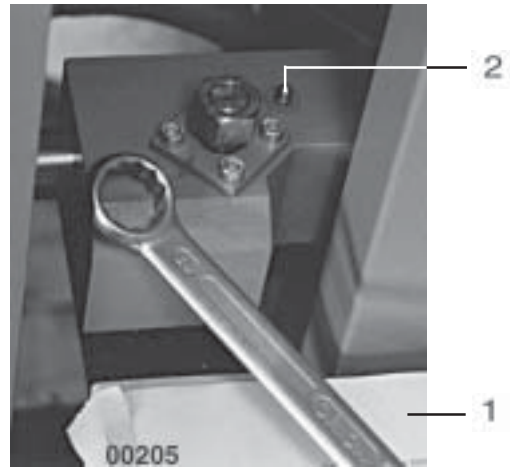


>NOTICE< If you add too much spray-oil lubricant may drop onto the sheets through the knife guide.



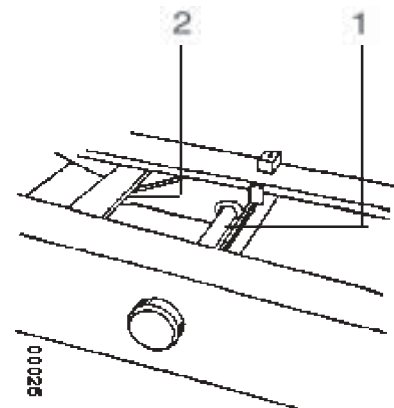
**4.2.3**      **Axe of pile plate**

Lubricate the axe for lateral setting of the pile plate **1** at the two lubrication nipples **2** left and right once a month.



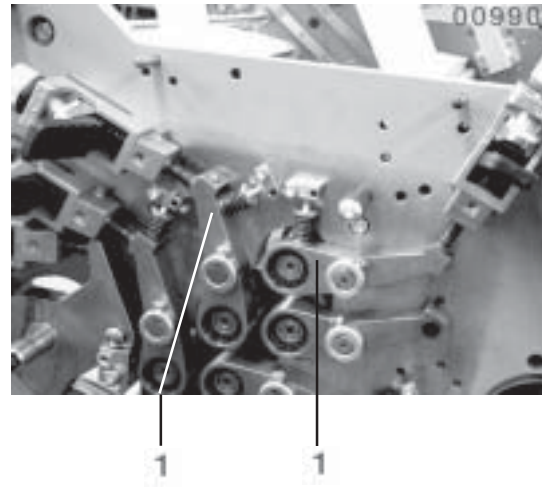
**4.2.4**      **Register table**

Clean the guide shaft for sheet size adjustment **1** as well as drive shaft **2** off from dust and provide them with a slight touch of oil.



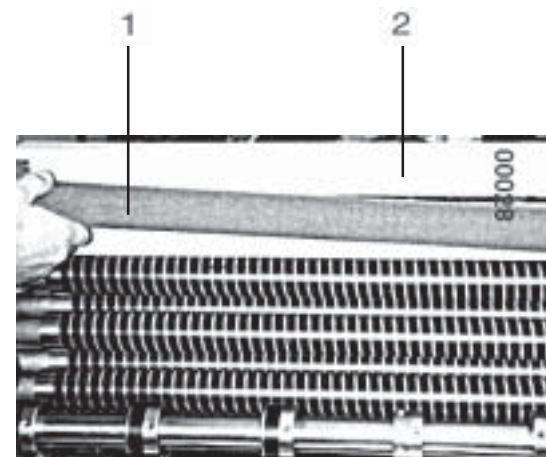
4.2.5 Folding units

Provide a slight touch of oil between the machine frame and bearing lever 1 at both sides of the machine monthly.



4.2.6 Cleaning roller

The cleaning roller 1 under the flap 2 is stripping off the powder of the upper foldroller. Depending on the level of pollution you should take-off this cleaning roller and clean it. Make sure that powder deposits under the flap 2 are being extracted!



>**DANGER**< It may cause you bodily harm! Turn OFF the machine!



>**ATTENTION**<  
Do not use the cleaning roller for HIGH -GRIP fold rollers.



## 4.2.7 Cleaning of foldrollers



>**DANGER**< Foldrollers should be cleaned only if the machine is not in motion! Push the EMERGENCY STOP button and/or turn OFF the main switch. Ensure that the machine cannot be restarted!



>**NOTICE**< Depending on the extent of ink build-up, the foldrollers must be cleaned from time to time. The affect of printing powder or ink build-up on the foldrollers may decrease the quality of the folding. The foldrollers must be cleaned with a cleansing agent suitable for synthetic material. Please contact your machine supplier. Improper cleaner may cause decomposure or swelling of the foldroller coating.

**MBO the manufacturer of this folding machine recommends a cleaning material for the foldrollers made by VARN, bearing the no. VARN-Wash VM 111 or VWM. Our recommendation is on a label near the foldrollers. The VARN company is a worldwide supplier for the printing industry. Therefore, it cannot be excluded that in certain other countries different indications are used. Please take the individual order no. from the technical data sheets of VARN.**



>**DANGER**< No chemical aggressive cleaner must be used. Protective gloves should be worn while you are cleaning. Protect yourself against splashes or contact with the cleaning material with uncovered parts of your body. Dispose of the soiled cleaning material in the correct manner (environmentally friendly). Consider the flammability of the cleansing agent. Make sure if any residual danger could eventually exist. Check the technical data sheet from the cleansing agent manufacturer.



>**DANGER**< It is absolutely imperative to clean the HIGH-GRIP fold rollers only with linens by using the washing agent **VARN-WASH VM 111** or **VWM** by VARN. Make sure to apply only a slight pressure onto the fold rollers

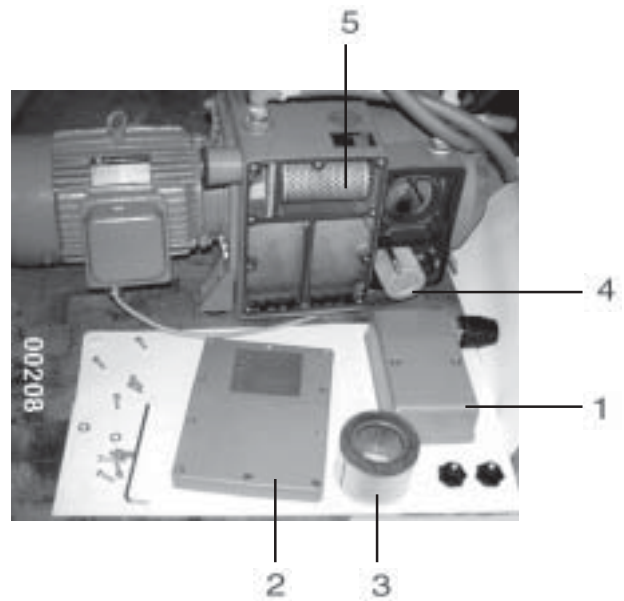
4.2.8 Pressure/Vacuum Pump



The cleaning of the pump depends on the use of the folding machine. It may become necessary weekly or at infrequent intervals. Please check separate Operating Manual of manufacturer. >NOTICE< To ensure full efficiency, however, the cartridge at suction side should be checked and cleaned occasionally. The filtre cartridge must be cleaned every 50 hours of operation and be exchanged every 6 months. Dirty or damaged cartridges must be replaced immediately. Do not remove the filtre cartridge in any case, otherwise penetration of foreign substances will damage the pump. Make sure that pump is turned OFF during maintenance works.

Remove cap 1 and 2,  
as well as filtre cartridges 3, 4 and 5.  
Clean these cartridges  
by blowing through from  
the internal to the external side.

Exchange cartridges every six months.



4.2.9 Maintenance Report

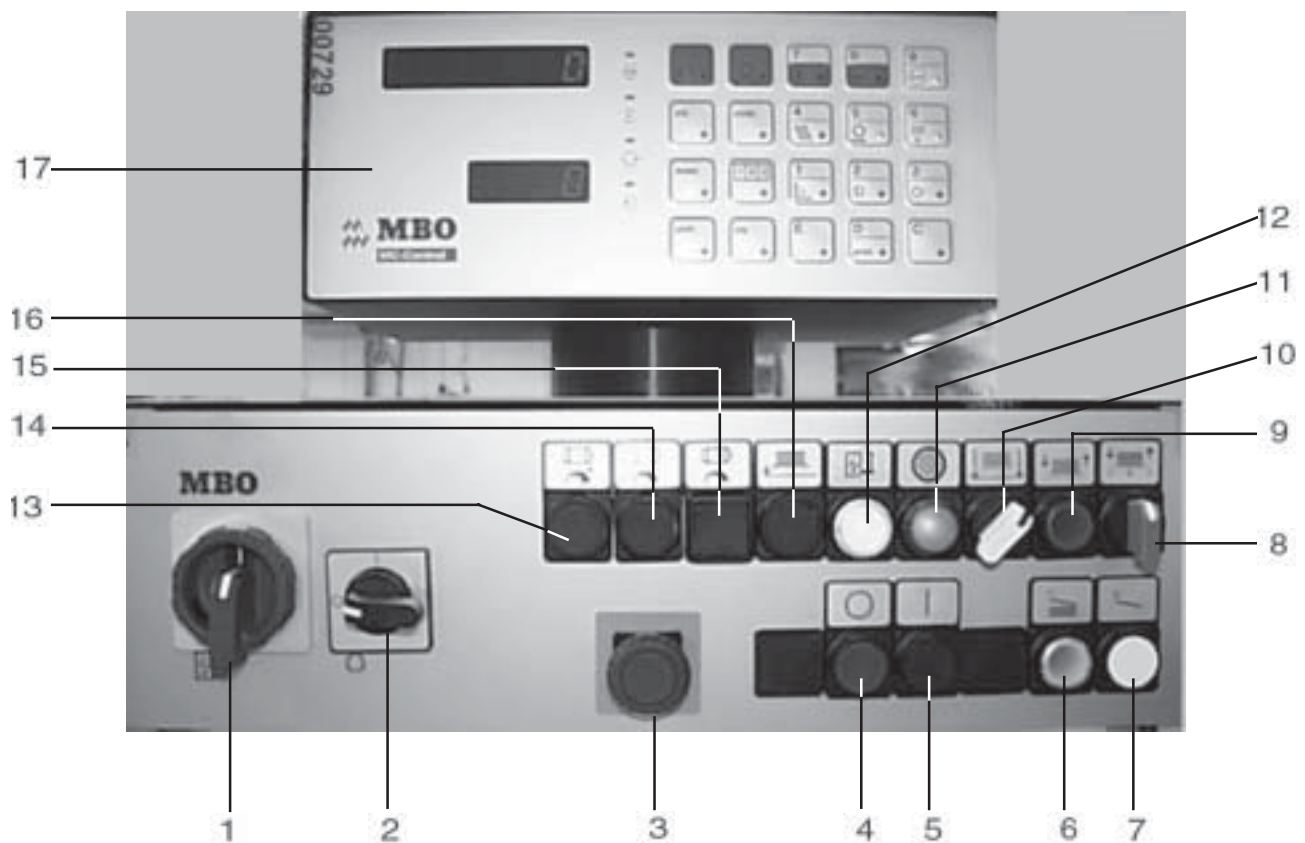
This page may be attached to the Maintenance and Check List with the machine, whereby all items described under para. 4.2 should be considered!

Working cycle	Interval	Date	Signature
Feeder - chains (4.2.1)	monthly		
Vaculift (4.2.2)	monthly		
Register table (4.2.4)	monthly		
Axe of pile plate (4.2.3)	monthly		
Bearing lever (4.2.5)	monthly		
Cleaning roller (4.2.6)	daily		
Cleaning roller (4.2.6)	daily		
Cleaning roller (4.2.6)	daily		
Feeder - chains (4.2.1)	monthly		
Vaculift (4.2.2)	monthly		
Register table (4.2.4)	monthly		
Axe of pile plate (4.2.3)	monthly		
Bearing lever (4.2.5)	monthly		
Cleaning roller (4.2.6)	daily		
Cleaning roller (4.2.6)	daily		
Cleaning roller (4.2.6)	daily		
Feeder - chains (4.2.1)	monthly		
Vaculift (4.2.2)	monthly		
Register table (4.2.4)	monthly		
Axe of pile plate (4.2.3)	monthly		
Bearing lever (4.2.5)	monthly		
Cleaning roller (4.2.8)	daily		
Cleaning roller (4.2.8)	daily		
Cleaning roller (4.2.8)	daily		
Filtre cartridge (4.2.8)	after 50 hrs. of operation		
Filtre cartridge (4.2.8)	after 50 hrs. of operation		
Filtre cartridge (4.2.8)	after 50 hrs. of operation		
Filtre cartridge (4.2.8)	after 50 hrs. of operation		
Filtre cartridge (4.2.8)	after 50 hrs. of operation		
Filtre cartridge (4.28.)	after 50 hrs. of operation		
Filtre cartridge (4.2.8)	after 50 hrs. of operation		

## 5.0 Operation of the machine

### 5.1 Main control panel

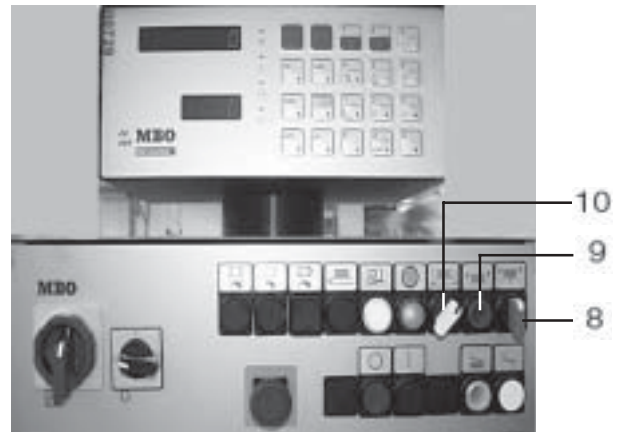
- 1 MAIN SWITCH
- 2 ON/OFF switch for AIR PUMP
- 3 Red mushroom button with locking for EMERGENCY STOP
- 4 Button to STOP the machine
- 5 Button to START the machine
- 6 Button for SHEET INFEED during PRODUCTION and feeder START/STOP
- 7 Button for SINGLE SHEET INFEED
- 8 Switch to release PILE PLATE UP/DOWN
- 9 Button to RELEASE PILE TRANSPORTATION
- 10 Selector switch for pallet operation/manual piling
- 11 INDICATOR LIGHT for main drive
- 12 INDICATOR LIGHT for main switch
- 13 Push button to increase the speed of folding unit I
- 14 Push button to decrease the speed of folding unit I
- 15 Push button for joint speed alteration of all folding units (activate simultaneously with buttons 13 or 14).
- 16 Push button PILE PLATE down: For safety reasons the pile plate will stop approx. 15 cm above the floor. The pile plate will move down to the floor if you push the button 16 permanently.
- 17 MC-Control with integrated sheet infeed control and preselection counter. See separate Operating Manual „MC-Control“ for detailed description.



## 5.2 Feeder

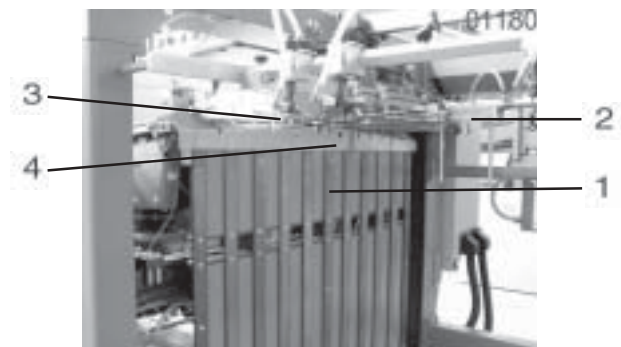
### 5.2.1 Manual piling

Switch **8** must show the position "DOWN"; push button **9** must be lightening, selector switch **10** must indicate to broken line !



Pile table is moving down until the photocell **1** is uncovered; it remains automatically in an ergonomically favourable position.

Set the pile stop **2** to appropriate size ( $\frac{1}{2}$  of sheet width) prior loading the table (scale). Load pile table. Table moves automatically down until photocell **1** is released again. Should, however, the loading is impeded by the position of the „Vaculift“, lift up support bar.

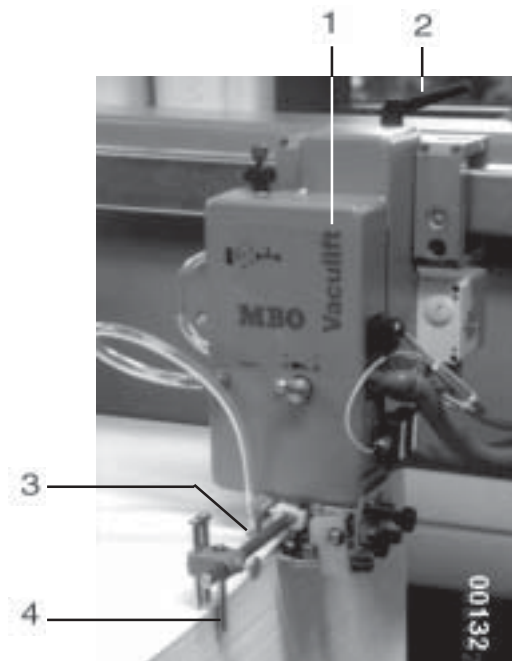


**>NOTICE<** Sheets which cling or stick together should be aerated sufficiently prior loading!

Place pin **3** to the pile edge. A height adjustable retaining plate **4** avoids an eventual forwarding of the aerated sheets.

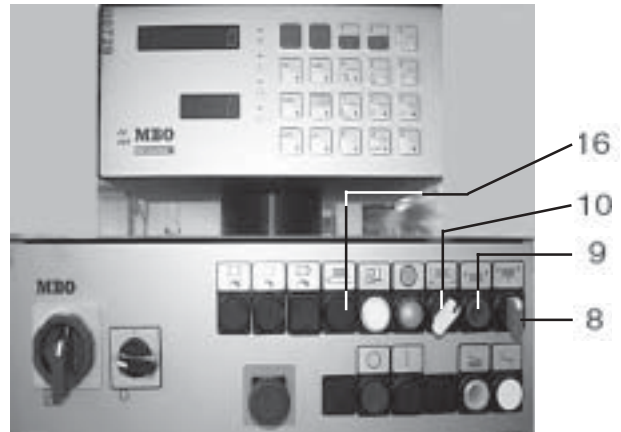
#### Prior you move UP the pile table:

Place the feeder head „Vaculift“ **1** above the pile, position with clamping lever **2**. Rear edge of suckers **3** approximately 2 mm inside, and stop pins **4** at the rear edge of pile.



5.3.2 Pallet operation

Switch **8** must show the position "DOWN"; push button **9** must be lightening, selector switch **10** must indicate to continuous line !



The pile plate **1** moves down and stops at a safety margin of approximately 15 cm above the floor. Push the button **16** continuously for further down movement.



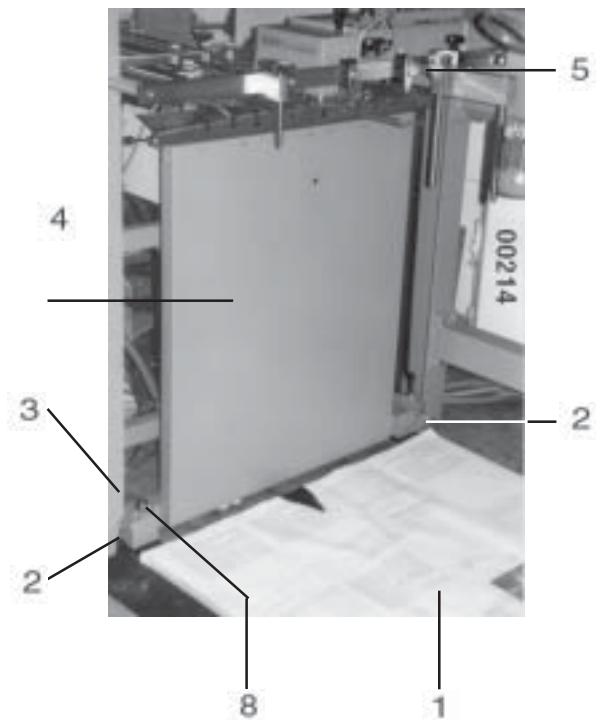
**>ATTENTION<** Feet of other persons being in the immediate vicinity of the pile plate may be injured!

Enter the pallet from the rear or operators side.

In its lowest position, the pile plate **1** aligns itself by the wedge-shaped angles **2** laterally into the centre position.

In the guide rail, these angles **3** push the pile plate **1** approximately 2 cm to the rear, i.e. when the plate moves up the pile is sitting close on the front panel **4**.

Prior you enter the pallet:  
Set the pile stop **5** to appropriate size (½ of sheet width).

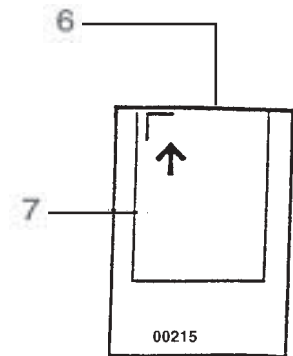


Continuation

Continuation

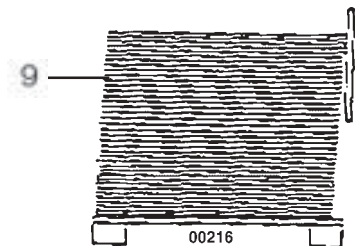
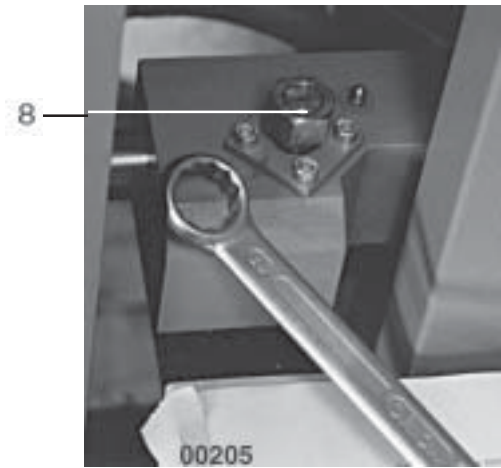
The front edge of pile **6** must align with the front edge of the pallet **7**!

Should the paper size be smaller than the pallet, the pile must be in centre of the pallet.



The nut **8** is required for the lateral pile alignment of  $\pm 20$  mm for non-vertical pile **9**.

The centre position is marked red.

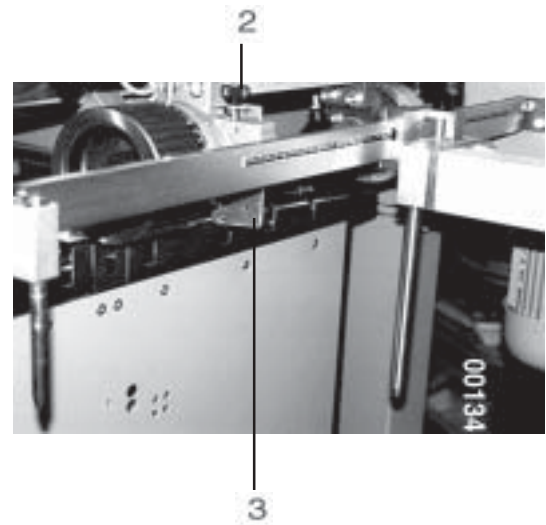


### 5.2.3 Height control of pile and „Vaculift“

The pile UP movement is stopped by the proximity switch 1.  
The distance between the suction wheel and the pile is approximately 7-8 mm; this basic setting has been made by the manufacturer.  
Alterations, depending on the sheet pile, through knurled screw 2.



**>ATTENTION <** Make sure that proximity switch 1 is not covered!

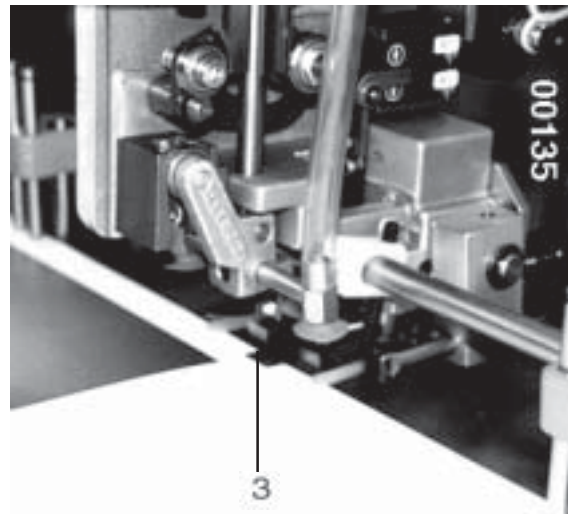


#### After the pile STOP:

The „Vaculift“ is automatically moving onto the rear edge of pile. The pressure foot 3 stops the down movement shortly after reaching the top edge of pile.

#### Pile DOWN:

The „Vaculift“ always moves time-delayed into its top position.



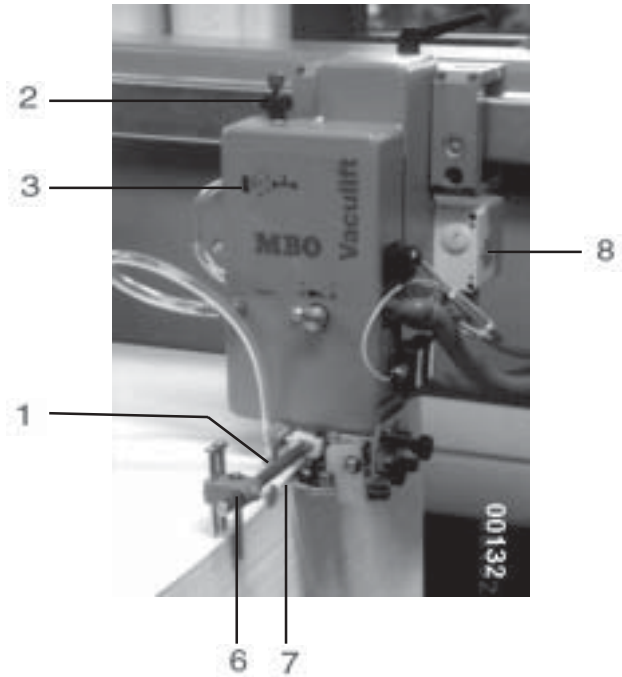


5.2.4 Feeder head „Vaculift“

Basic position of „Vaculift“:  
The sucker **1** approximately 2-5 mm distance from the rear edge of pile and 2 mm above the pile.  
Adjustments through knurled screw **2**; measurements can be read-off at scale **3**.  
In case you process voluminous papers: Cant **4** the sucker **1** slightly (through screw **5**). This will not suck-on the sheet entirely on its surface.

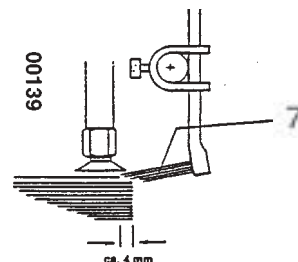
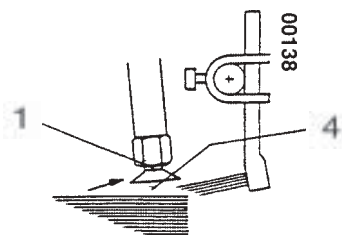
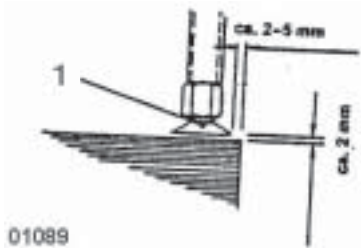
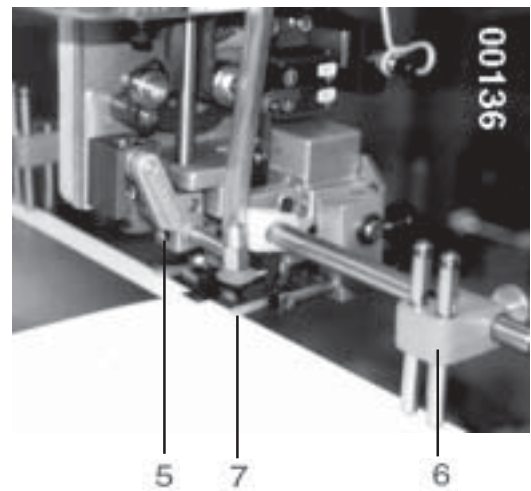
Stop holders **6** should fix small sheets sizes laterally and to the rear.  
Large sheet sizes:  
Move the stop holders **6** as far as possible off the „Vaculift“.

Double sheets are stripped off by the brushes **7**; they should reach approx. 4 mm into the pile, distance approx. 1 mm.



**>NOTICE<** Depending on the type of paper and power of air blast it may become necessary to slightly push the brushes **7** onto the pile.

Selector switch **8** for **ON/OFF**.

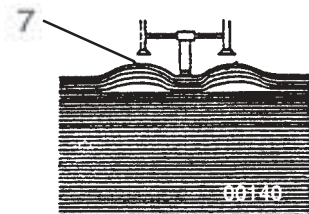
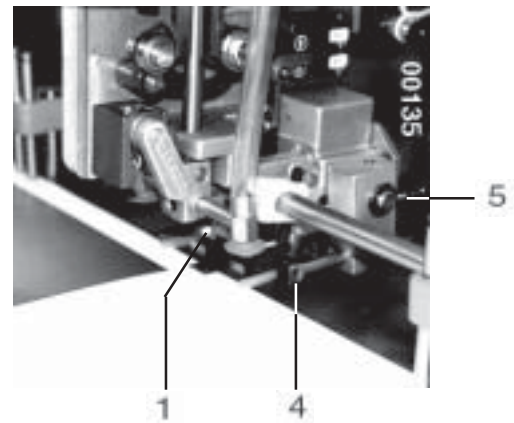


**5.2.5 Air support**

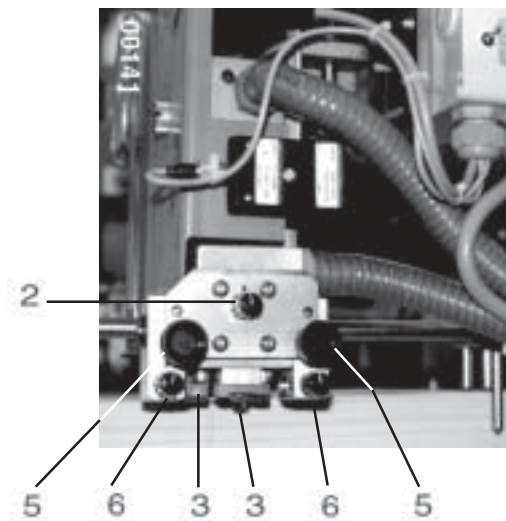
Air blast and suction air of the feeder is provided by a pressure/vacuum pump. ON/OFF position occurs through switch **2** at main control panel. Button **6** SHEET INFEED: suckers move down and lift the first sheet of pile.

How to regulate the air blast of the nozzles **1** through the adjustment knob **2**: Increase the power of air blast slowly until the sheet is slightly fluttering and touching at the suction wheel. Change the air blast direction at large or oblong sizes: loosen the screw **3**.

Pre-blowers **4**: height adjustment through knurled screws **5**. Regulate the air blast through the adjustment knobs **6** so that the top sheets of the pile are ventilated in a „mushroom-“ shape.



For various types of papers adjust the power of suction of both suckers through the knurled screw **8**.



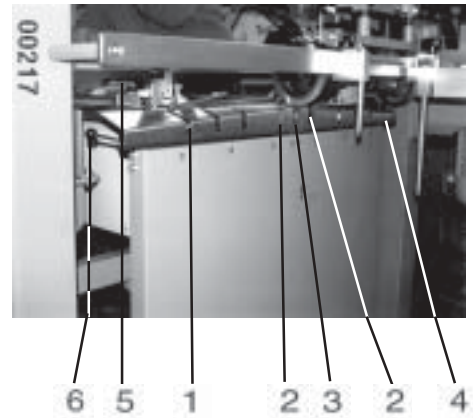
**5.2.6 Front air nozzles**

These nozzles enable you to separate difficult papers much better.

The positions of the centre nozzles **2** and **3** are fixed. For various paper sizes you can shift the left **1** and the right **4** nozzle on the rod **5**.

Make sure that only the upper 10-15 sheets are ventilated.

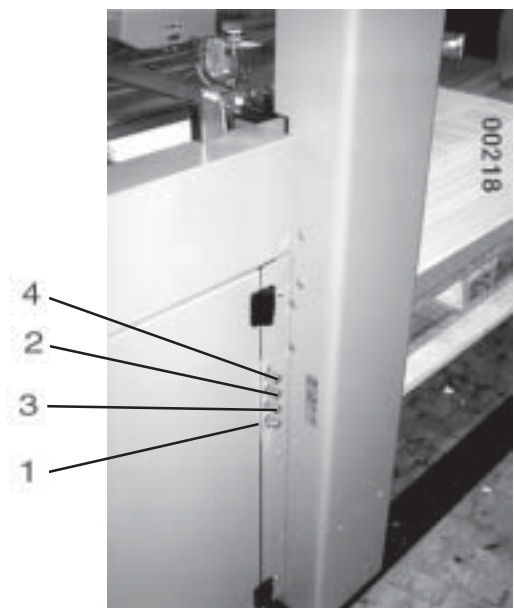
How to change the blowing direction:  
Swivel rod **5** through lever **6**.  
If necessary, the nozzles may also be swivelled individually.



**Valves:**

Regulate the quantity of air through valves **1** thru **4**.

Nozzles and valves belong to each other are marked with the same numbers.



5.2.7 Small sheet-size device

This device is only used for sheets of less than 17 cm of length:  
Turn off „Vaculift“ through toggle switch **1**, move it to the rear or lift the support bar **2**.

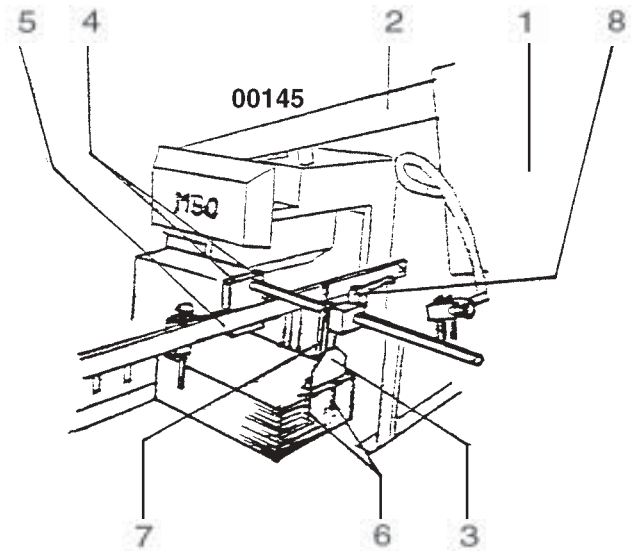
Affix the small sheet-size device **3** with two screws **4** onto the tie-bar **5**.  
The pins **6** must touch the end of pile.  
The holding pin **7** must rest on the end of pile thereby slightly holding the sheets.  
Lock through knurled grip **8**.

Ventilation only through frontal air support (see item 5.2.6).



**>NOTICE<** The nozzles should only ventilate the upper sheets (approximately 10-15).

The faster the production the more sheets must be ventilated. Loading and height control is described under items 5.3.1 and 5.3.2,



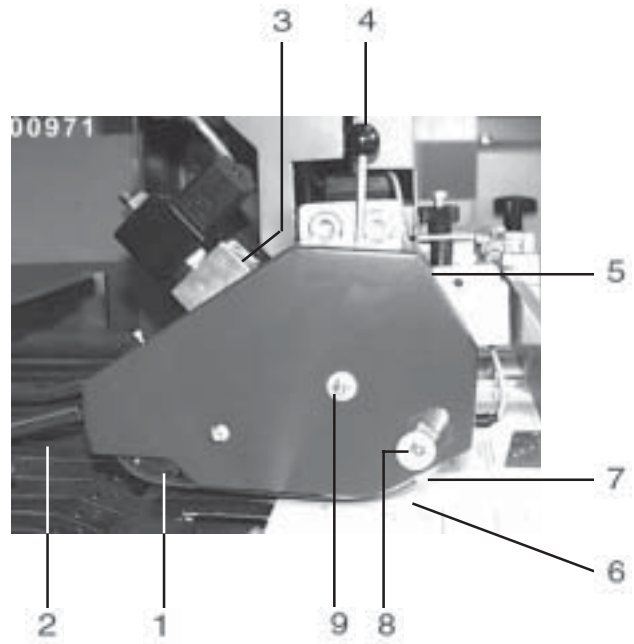
5.2.8 Vacu-Infeed (standard)

The Vacu-Infeed 1 transports the sheets onto the register table 2.

The power of vacuum for various paper weights can be adjusted through the red screw 3 (use the scale +/-).

Corresponding on the tendency of rolling of the sheets you can move the Vacu-Infeed forwards or backwards through the lever 4.

Red markings 5 show you the current position.



>**DANGER**< The gap 6 between the pile's surface and the protective angle 7 must be set as small as possible - only 8 mm are permitted!

Make sure that the nuts 8 and 9 are re-fastened after the settings.

### 5.3 Register table

#### 5.3.1 Vacu-Alignment (standard)

The Vacu-Alignment 1 has a separate vacuum pump 3.

ON/OFF position also occurs through switch 2.



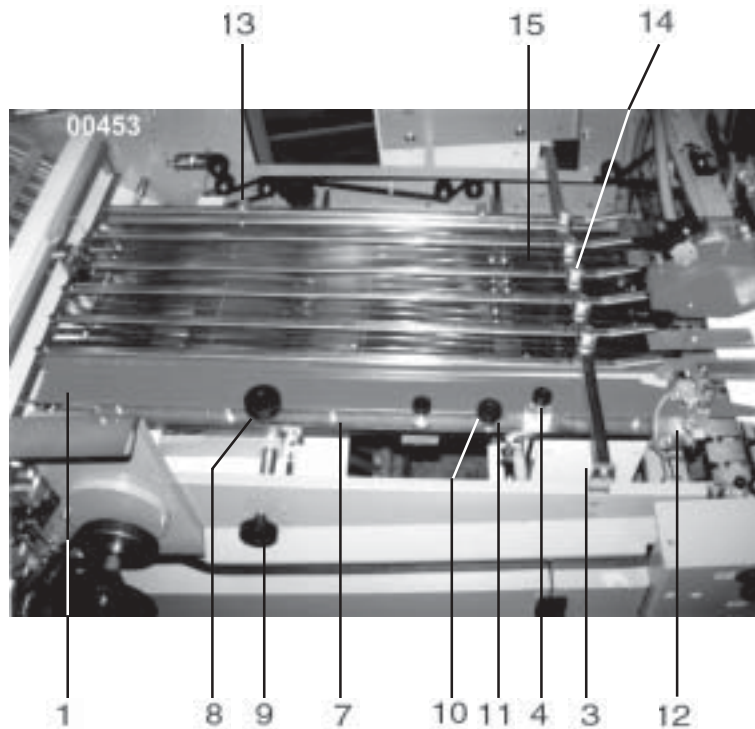
Heavy or thick paper require more vacuum than light or thin paper. The setting occurs at twist-grip 4, scale +/-

Set the sidelay 7 through knurled grip 8 to 1/2 of sheet width at mm-scale. The fine adjustment occurs through knurled grip 9.

Angle to the foldrollers: loosen knurled screw 10. Settings to be made at excenter 11, reading-off at scale 12, +/-.

Set the guide plate with the rail 13 above it to such an extend that the paper edge runs between it.

The quantity of smoother bars 14 above the lattice fence 15 depend on the sheet width.



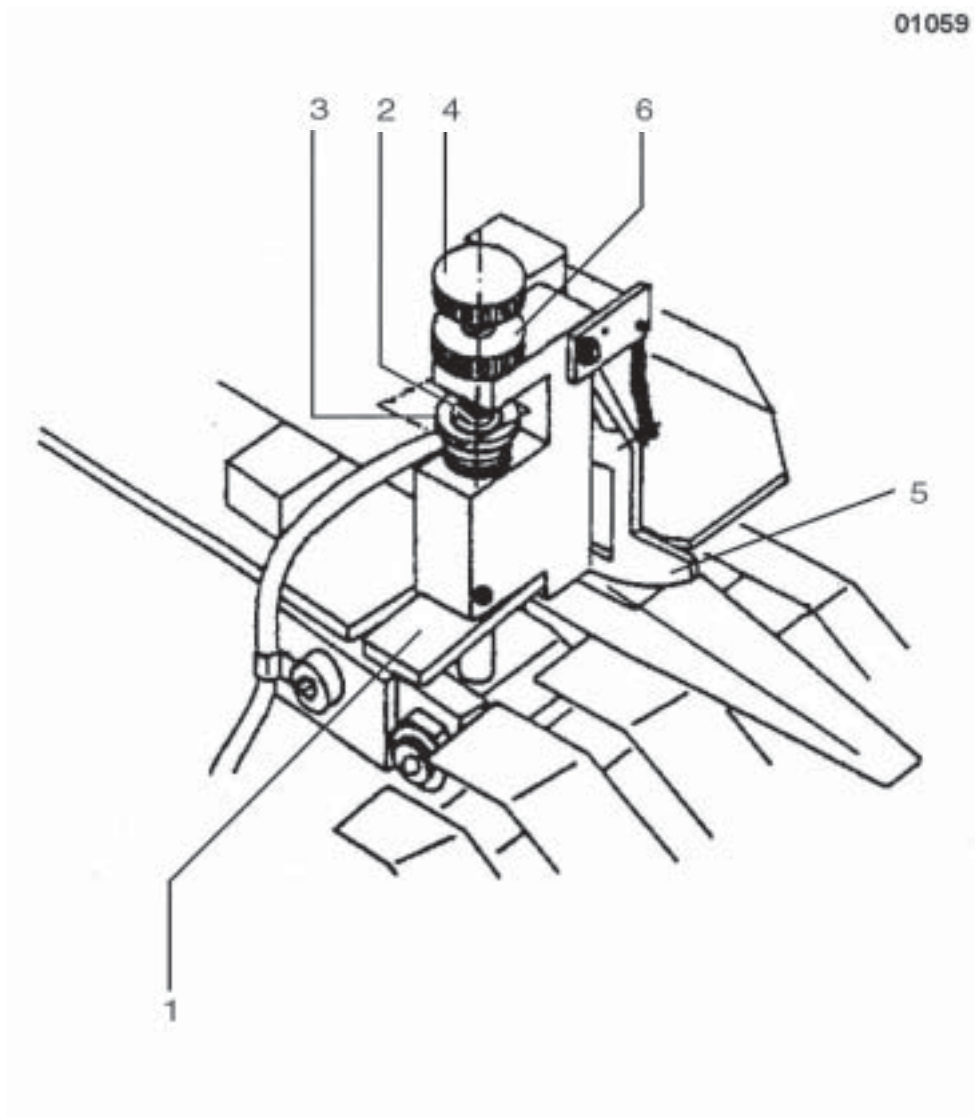
5.3.2 Double sheet control

Press the lever **1** and insert a paper strip (which you are running) into the gap **2** between the bolt **3** and the knurled screw **4**.

Insert a double paper strip under the segment **5**. Turn the knurled screw **4** until the segment **5** has switched and tighten the knurled nut **6** after the adjustment of the double sheet control has been completed.

If you check with a single paper strip the machine must continue to run. Re-adjust, if necessary!

**Please note that the double sheet control stops the sheet infeed at first. The machine will stop if no sheets are in the machine!**



## 5.4 Sheet infeed control

### 5.4.1 Automatic learning of suction length and sheet gap

START the machine **5**  
and turn ON the pump **2**.

Keep the button SUCTION LENGTH **17**  
pushed and activate the SINGLE  
SHEET **7** button.

A „learning“ sheet is entered  
with a basic suction length.  
It is measured by a photocell in front of  
first foldroller whereby required suction  
length is automatically determined.  
If necessary, you may increase  
or decrease the suction length  
by pushing the buttons **17** and **18 (+)**  
or **17** and **19 (-)** simultaneously.

Adjust the machine.  
Set photocell **8** above the sheet exit.

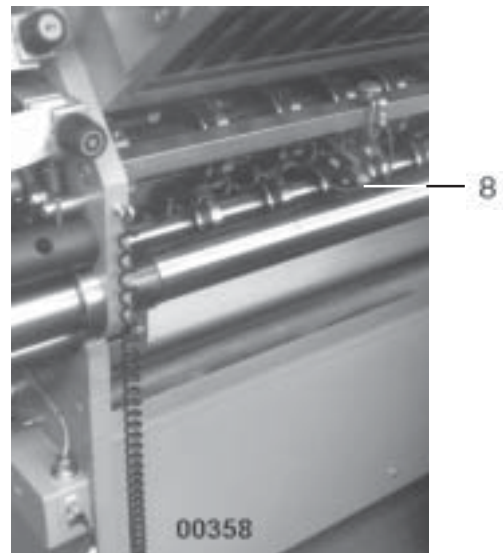
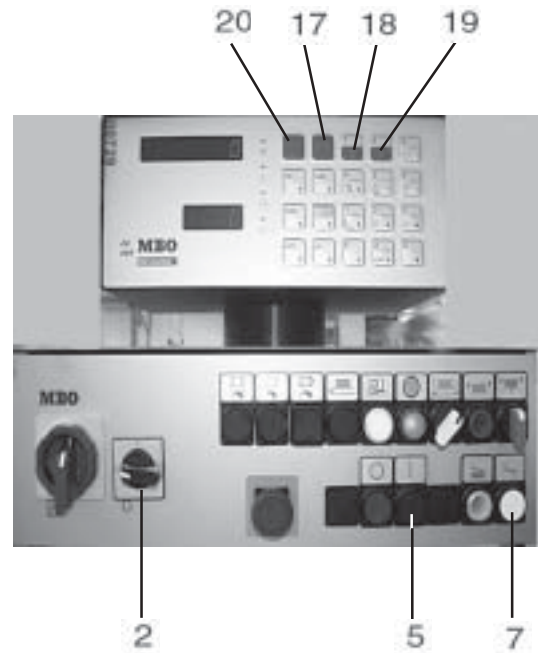
Calibrate sheet monitoring:  
Keep the button SHEET GAP **20**  
pushed and activate  
the SINGLE SHEET **7** button.

All photocells are calibrated by  
one „learning“ sheet. The (minimum)  
sheet gap is determined for 2 cm.

If necessary, increase as follows: Push  
buttons SHEET GAP **20** and **18 (+)**.

Sheet gaps of more than 2 cm may  
be reduced with buttons **20** and **19 (-)**.

**Please also consider the attached  
Operating Manual „MC“.**





5.4.2 Photocells (Standard)

Photocell 1 controls the sheet infeed at suction wheel / the Vacubelt and is counting the infeeded sheets.

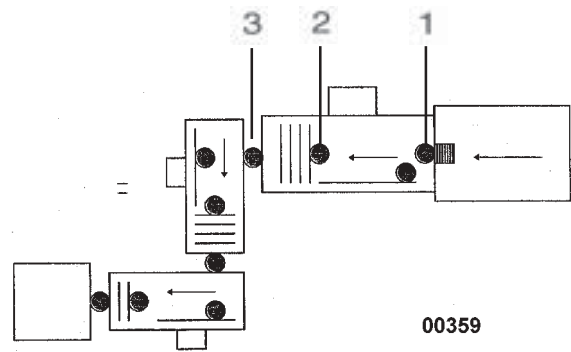
Photocell 2 controls the infeed of parallel unit and calculates the sheet or suction length.

Photocell 3 controls the exit of parallel unit and counts the sheets at exit.



**>NOTICE<** The machine will stop if one sheet fails to pass one of these photocells at the exact calculated time or is passing this photocell longer than calculated.

The MC-Control will display an ERROR REPORT 21. It will show the position of the error - see also Operating Manual attached separately.



**Calibration of photocells:**

Adjust the machine completely (folding length, foldrollers, etc.) and push buttons 7 and 20 simultaneously.



A "learning sheet" is passing the machine. The photocells detect lengths and times of passage. This will automatically program sheet control and sheet monitoring.

5.4.3 Photocells in folding units II and III (option)

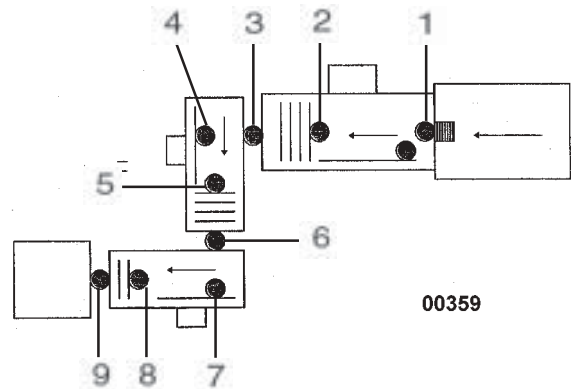
In addition to the standard design (5.4.2) the following items are available:

- Photocell 4 controls the infeed at sidelay of folding unit II
- Photocell 5 controls the infeed at folding unit II
- Photocell 6 controls the exit at folding unit II
- Photocell 7 controls the infeed at sidelay of folding unit III
- Photocell 8 controls the infeed at folding unit III
- Photocell 9 controls the exit of folding unit III and the transition to a subsequent unit



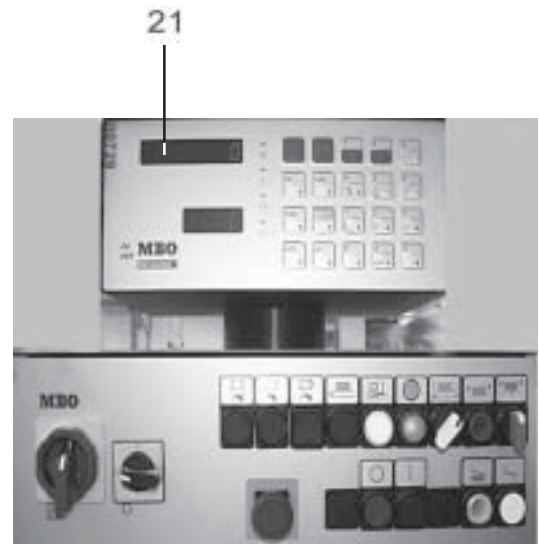
**>NOTICE<** The machine will stop if one sheet fails to pass one of these photocells at the exact calculated time or is passing this photocell longer than calculated.

The MC-Control will display an **ERROR REPORT 21**. It will show the position of the error - see also Operating Manual attached separately.



**Calibration of photocells:**

See the attached special Operating Manual



## 5.5 Parallel folding unit

### 5.5.1 Setting of foldrollers and slitter shafts



**>DANGER<** Never carry out foldroller settings while machine is still running! Machine must be turned OFF! Use EMERGENCY-STOP switch! Even manual foldroller settings by the handwheel may cause injuries by the foldrollers.

Press the lever **1** and insert a paper strip (of the running paper) between the pressure plate **2** and the counter pressure plate **3**. Check with a paper strip whether it goes through the foldrollers.

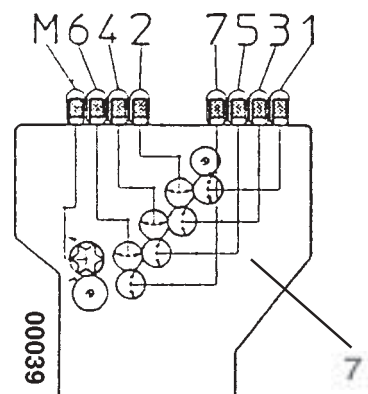
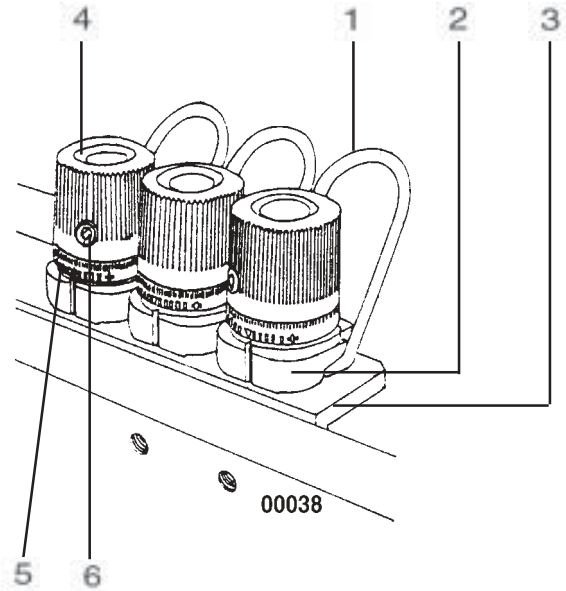
Turn the handwheel and adjust the pressure at both sides of the foldroller through the adjustment knob **4**, i.e.  
if you turn clockwise (+)  
 = pressure on foldrollers becomes less  
if you turn counter-clockwise (-)  
 = pressure on foldrollers has increased

Set the adjusting ring **5** into 0-position in order to enable a quick readjustment of the foldrollers into their original position. Secure with screw **6** to prevent dislocation; do not over-tighten the nut!

Depending on the type of fold, thickness and quantity of sheets, insert paper strip between pressure plate **2** and angle **3**.

Read para. 6.0 for setting instructions of the most important parallel folds.

**The scheme of foldrollers at machines side panel shows you foldrollers with the setting elements pertaining thereto.**

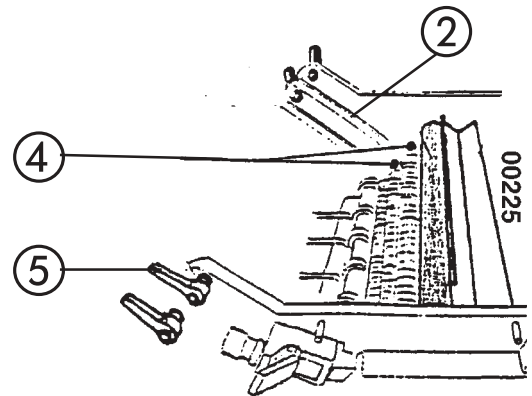


5.5.2 Buckle plates

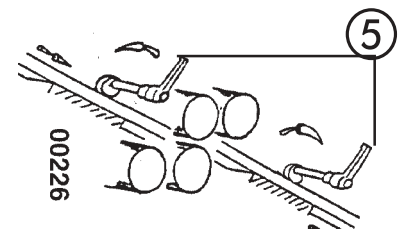
Insert the buckle plates 1 into the lateral support rails 2. The buckle plate (or deflector) will bump with their stop screw 3 against the stop bolt 4 in its deepest (basic) position. Lock buckle plates on both sides with clamping lever 5.



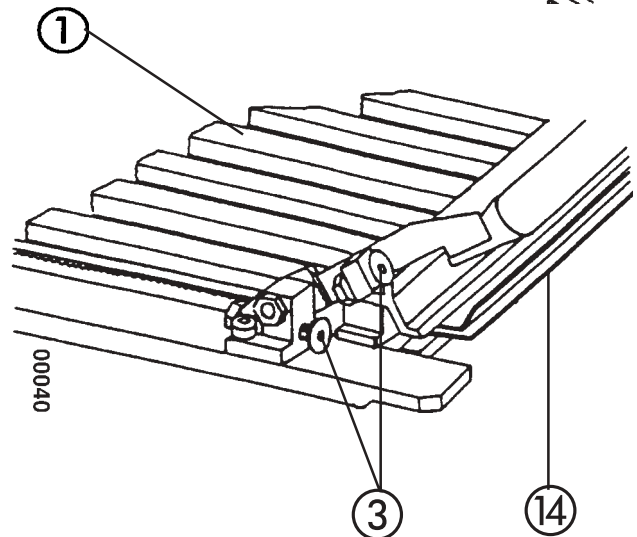
>NOTICE< Make sure that the buckle plates are pushed against the foldrollers 4 and rest on it.



Setting of folding length: Loosen metal knurled screw 6 and adjust with adjustment ring 7. The necessary size can be read-off at toothed belt with mm-indicator 8 and red indicator 9.



Change of stop angle 10: When folding out-of-square sheets loosen plastic knurled screw 11 and turn the frontal adjustment ring 12. The O-position is shown by two marks on the adjustment rings.



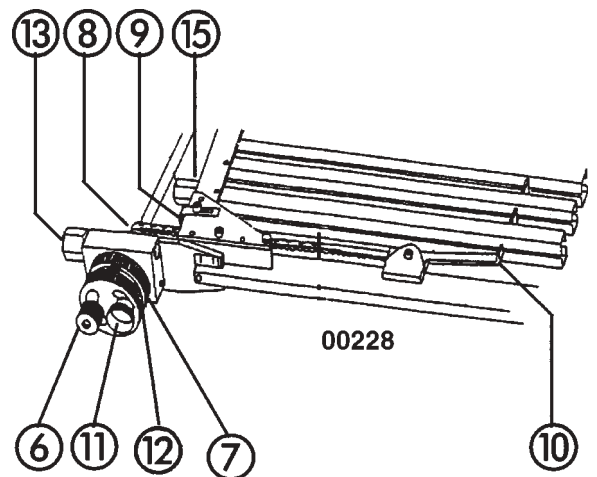
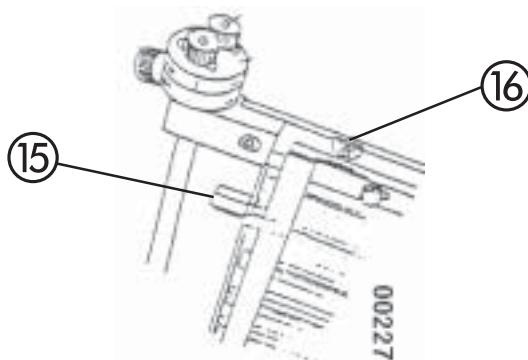
Twists screw 13 for fine adjustments.

How to change the lower plate lip 14 : Turn hexagon nuts 15 **simultaneously** at both sides: Basic adjustment = consider 0-markings 16.

Heavy papers: remove the lower plate lip 14 off the foldrollers.

Thin papers: move the lower plate lip 14 to the foldrollers.

**Continuation**

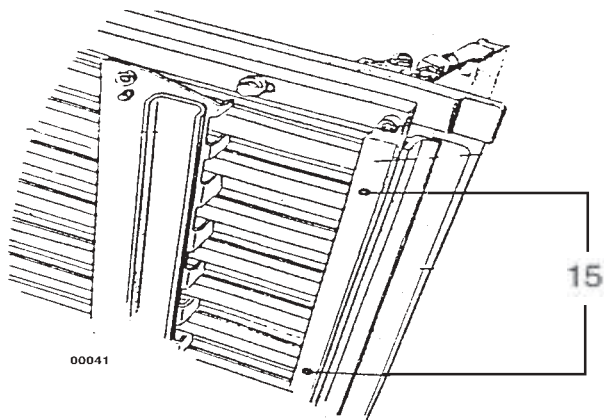
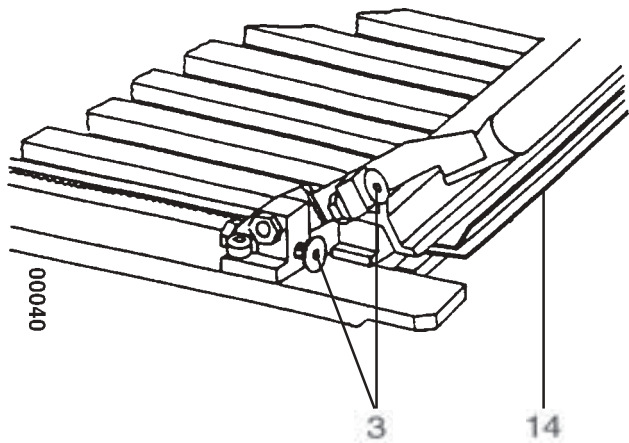


**Continuation**

Pretensioning of lower plate lip 14:

In case you have unsteady perforations, dog-ears or slightly bowed folding lines (paper tensionings) you should proceed as follows:

Insert both screws **15** simultaneously.  
Eventually extend the inner width.



Inner width:

The inner width of the buckle plate must eventually be changed for certain thicknesses of the product. (Distance between the upper and lower buckle rails **1**):  
Clockwise turning of the screws **2** = increase of inner width.  
Counter-clockwise turning of the screws **2** = decrease of inner width.

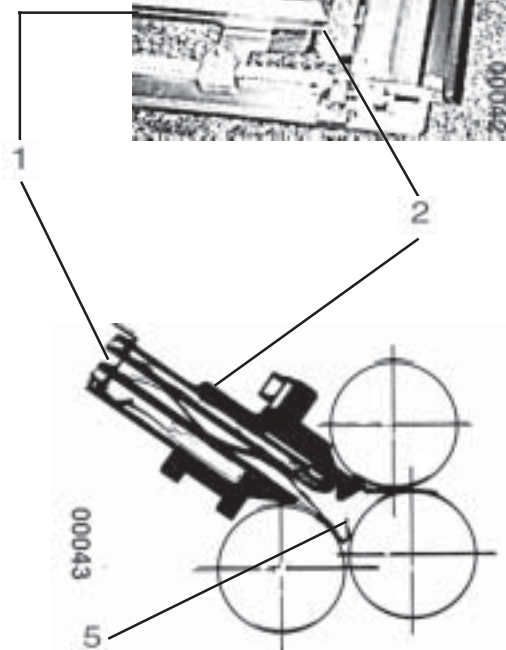
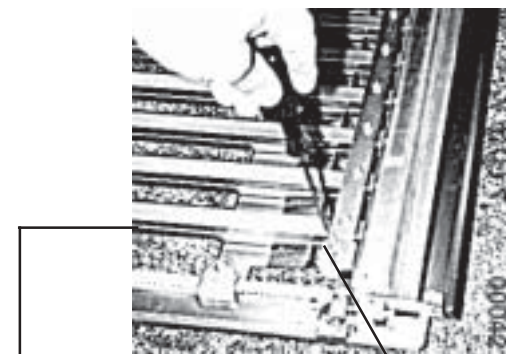
**Make sure that screws 2 are turned simultaneously**

Change of folding space 5:  
Insert strips of cartons or multiple paper strips between **3** and **4**.



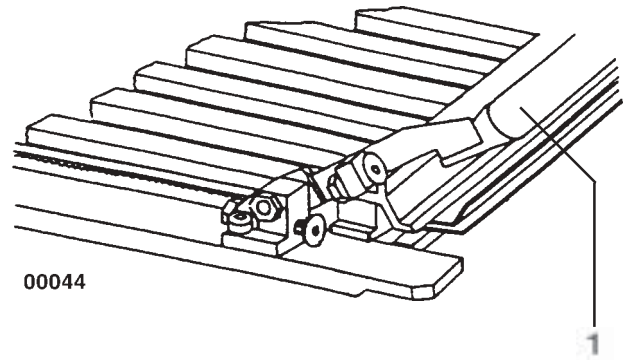
**>ATTENTION<** Never alter or displace stop screws **3**!

It may cause damages to the buckle plates or foldrollers

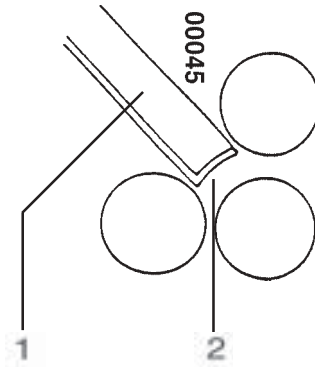


5.5.3 Sheet deflectors

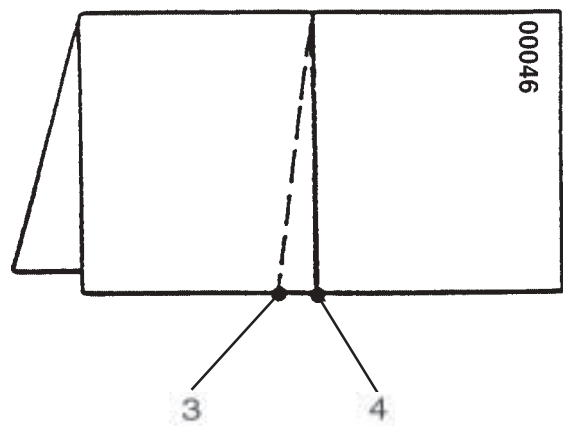
Buckle plates which are not used should be pulled out and the deflector be shifted 1.  
Replace the buckle plates and tighten them with the clamping levers.



Heavy or multiple folded sheets may require an increase of the folding space 2, for this purpose remove the deflector a little bit.



If you pull out the deflector at one side only it may influence the perforating 3, scoring or cutting line which deviates from the desired direction 4.



5.5.4 Combination buckle plate FTK (optional)

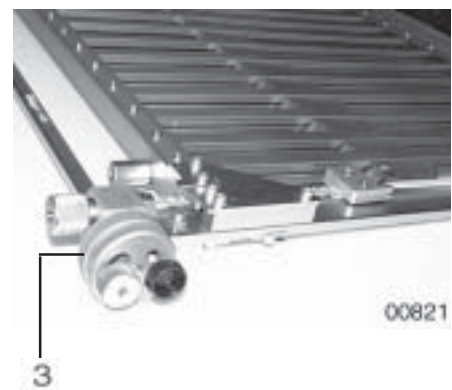
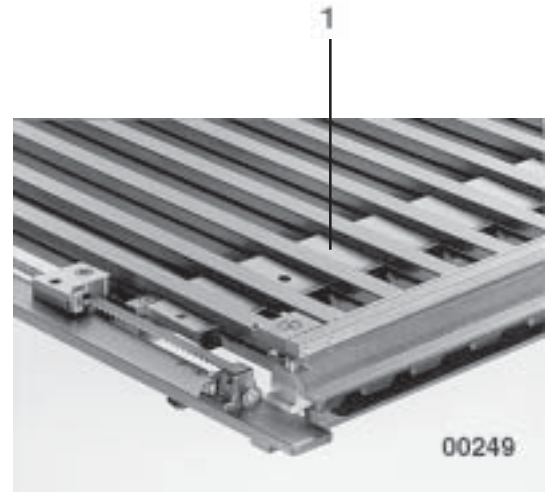
This type of buckle plate does not require the separate or swiveable sheet deflector. The buckle plate / deflector does not require to be pulled-off or swivelled for retrofitting.

The sheet stop 1 also serves as sheet deflector 2.

**Function of „Buckle plate“:**  
See item 5.5.2

**Function „Sheet deflector“:**  
Turn (clockwise) the sheet stop 1 through the adjustment ring 3 into its deepest position 4.

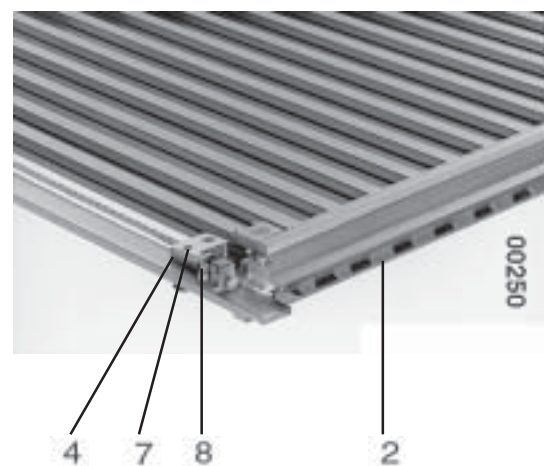
**One-sided pull of the sheet deflector** to influence out-of square perforations, scorings and cuttings  
- see also item 5.5.3:



**>ATTENTION<** The deflector 2 shall not touch the foldrollers!



**>ATTENTION<** Do not change the position of screws 7 and 8!



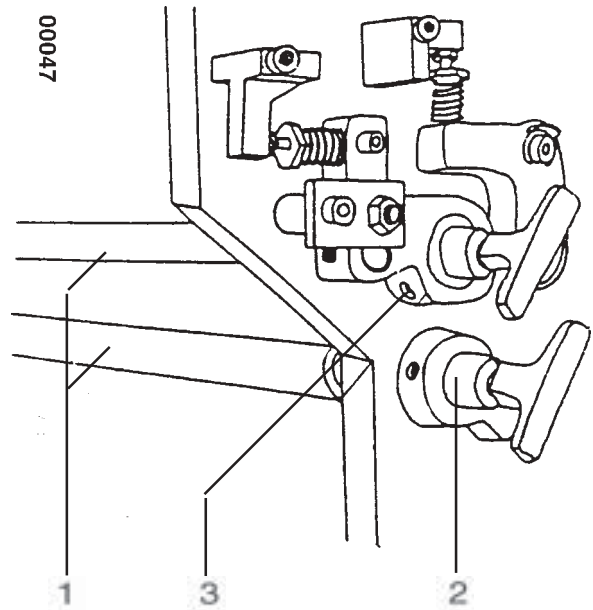
**5.5.5 Slitter shafts (Standard)**

Each folding unit is equipped with two slitter shafts **1** to enable the insertion of tools for perforation, scoring or cutting.

They can easily be mounted and removed by plug bearings **2**. For that purpose loosen the screw **3** and pull out the plug bearing **2**. Keep the slitter shafts!

When installing them, proceed in the opposite sequence.

When locking the screw **3** make sure that plug bearing **2** is pushed against the slitter shaft **1**. Avoid any end play!

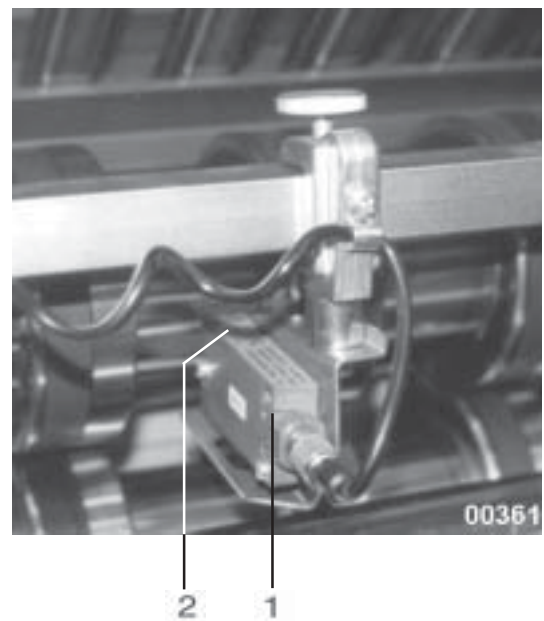


**5.5.6 Photocell at exit of folding unit**

If any interferences occur during sheet running the photocell **1** at the folding unit will stop the machine.

When you install or displace the photocell make sure that the green diode **2** is neither covered nor lightening!

Otherwise you will not be able to turn ON your machine.

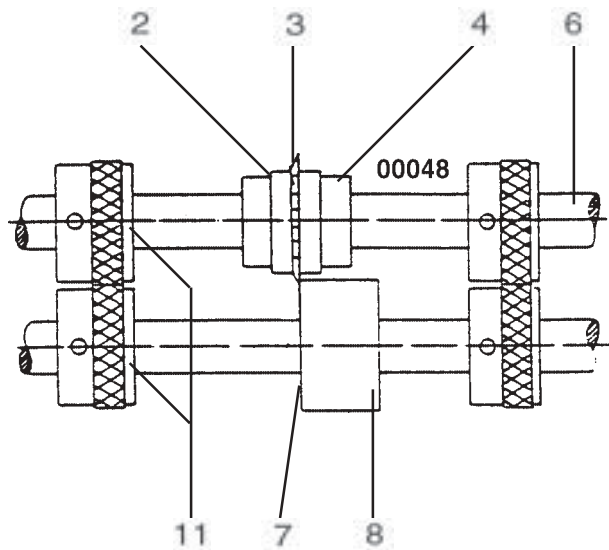




5.5.7 Perforating

To avoid creasing you perforate crossfolds at "head". However, perforating at „spine“ should only be made when perfect binding !

Loosen with hooked wrench 1 nut 2.  
Insert perforating knife 3 into knife holder 4; some knives are slotted 5.  
The slitter shaft 6 does not have to be removed.  
Installation of perforating knife 3:  
The straight side of the knife must be adjacent to the grinded side 7 of the counter knife 8. It must enter with the obtuse angle 9 first into the sheet.  
You avoid jam-up of sheets.  
In addition thereto, use stripper 10.



**>ATTENTION<** When you install the knife holder 4 make sure that you turn the nut 2 counter-clockwise. Wrong installation will cause opening while the machine is running!

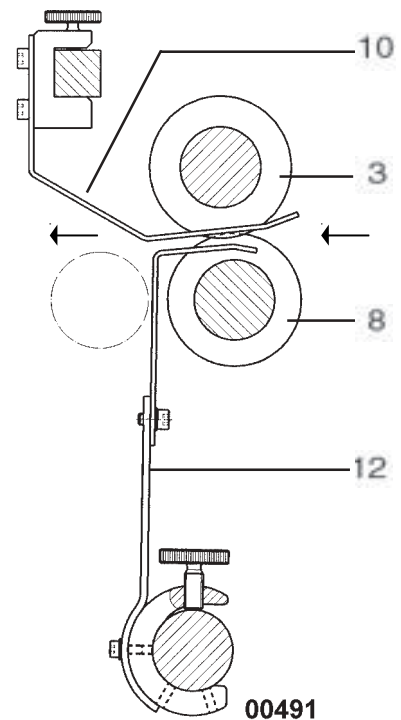
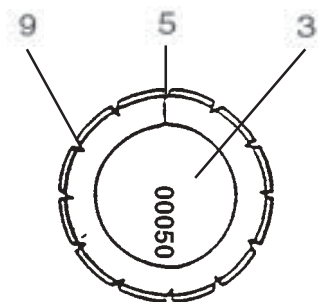
Use sufficient transport rollers 11 for exact sheet transportation.

Use strippers 12 if lower slitter shaft has been equipped with perforating knife 3.



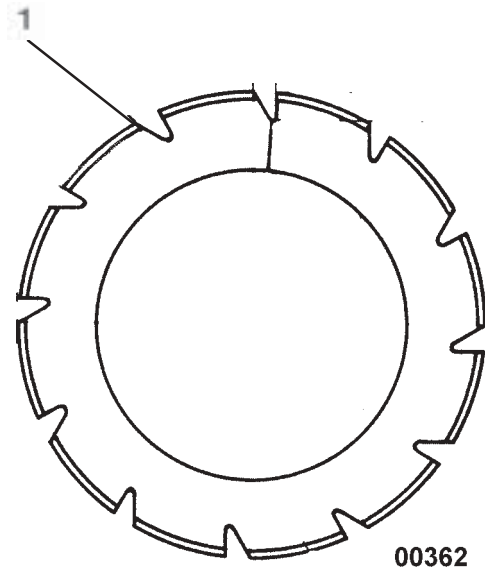
**>NOTICE<** Please bear in mind that you require different perforating knives for certain types of papers. It is absolutely imperative that you follow the attached List of Knives<sup>TM</sup> 32/2.

Continuation

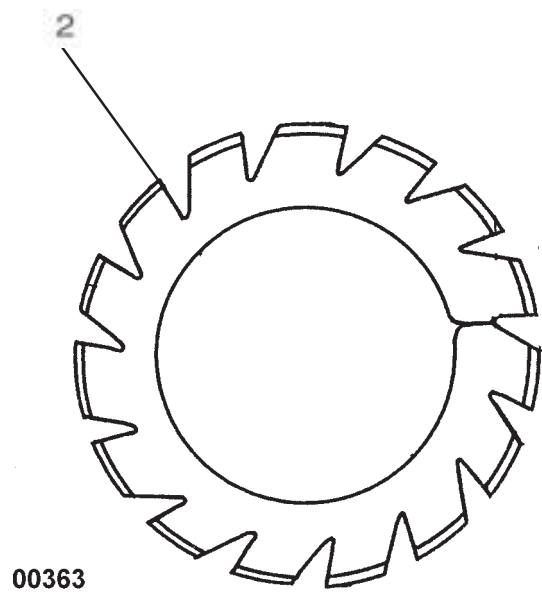


Continuation

Use this type of blade 1  
in the first and third folding unit.



This type of blade 2 to be used  
in the second folding unit.

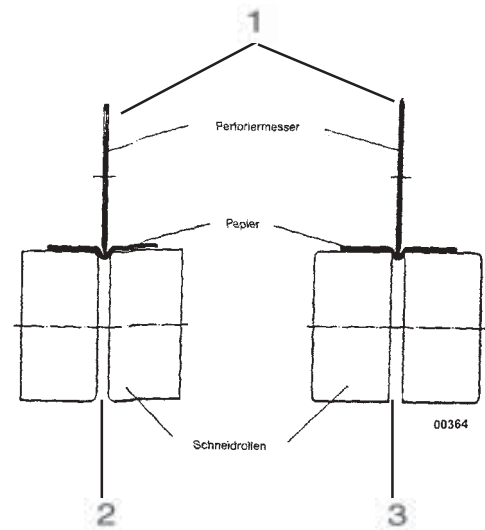


5.5.8 V-shaped special perforating knife (optional)

These knives may be used on the slitter shafts at folding unit I of buckle folding machines.

The non-slotted perforating knife 1 is 1.6 mm thick and twoside grounded in a V-shape.

The sheet is prescored during perforation. This will avoid the dog-ears at head side of crossfold section (2nd folding unit).



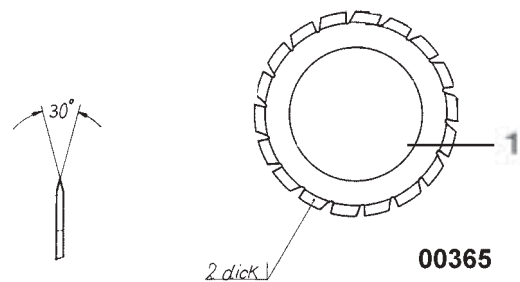
Two alternatives for installation:

Position 2 between scoring edges.

Position 3 between cutting edges.

In any case, the cutting or scoring rollers shall not touch the perforating knife.

Coordinate the distance and method of installation with the product to be processed.



**Please be advised that the perforation cut will not become sharp to such and extend as you may expect it at “normal” perforation.**

5.5.9 Scoring

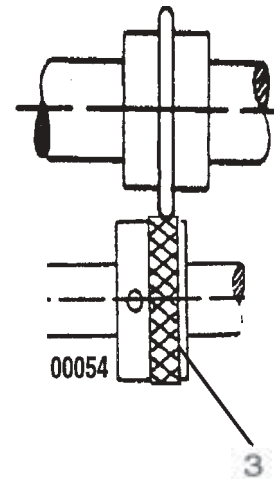
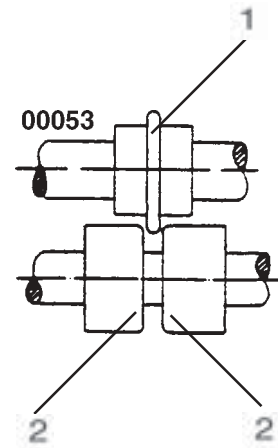


>NOTICE< Basically, crossfolds with buckle plates should be pre-scored if you do not perforate! Without scoring it is not ensured that the fold will always be exactly in the desired position.

The scoring knife 1 must be placed between two transport rollers 2 (or counter knives) at the round side.

When running pulp board sheets you should score on the rubber part of the transport roller 3. For this purpose use a scoring knife with a smaller outer diameter!

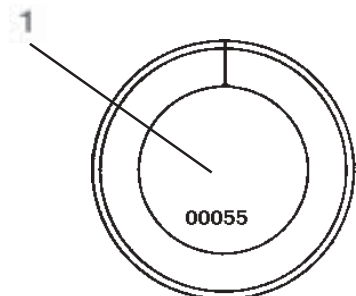
Special scoring devices may also be used upon request.



5.5.10 Cutting

For separation of multiple-up production you should use one (or multiple) knives 1.

The installation occurs in the same way as perforating knife.



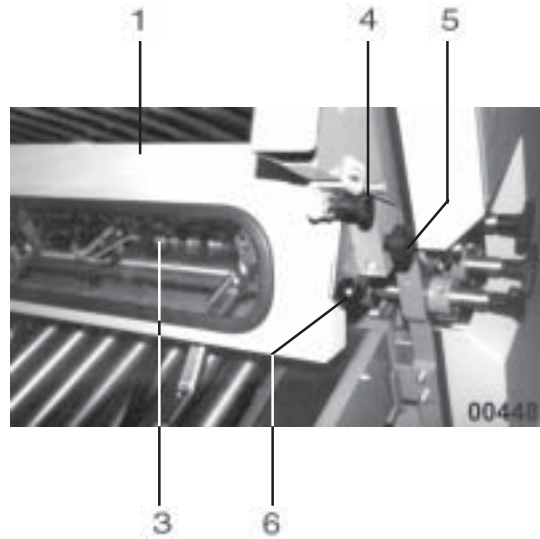
5.5.11 Guard above rear perforator shaft (Standard)

The guard 1 locked electronically.



>**DANGER**< Never remove or overbridge the switch 2! Danger of personal injuries!

Works at slitter shaft 3:  
Lift the guard 1, lock bolt 4.  
Switch 2 stops the machine.

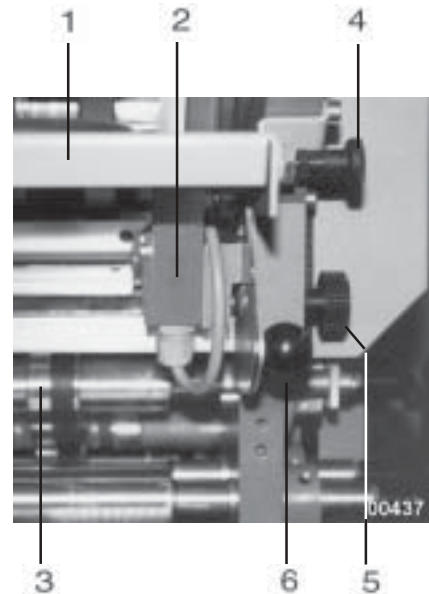


Adjust guard 1 if various subsequent units are used:

Loosen the knurled screw 5, use ball grip 6 to pull-up and refasten knurled screw 5.



>**DANGER**< Never reach into the machine during machine running, extensive danger of personal injuries!



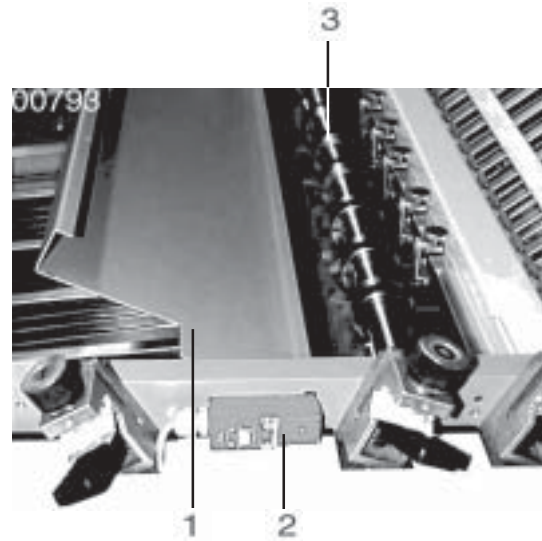
5.5.12 Guard above pre-perforator shaft

The guard **1** is locked electronically.



>**DANGER**< Never remove or overbridge the switch **2**!  
Danger of personal injuries!

Works at slit shaft **3**:  
Lift the guard **1**, s  
witch **2** stops the machine.



5.5.13 Pre-perforator shaft and rear twin-perforator shafts (option)  
- setting of foldrollers and slitter shafts



>**DANGER**< Never carry out foldroller settings while machine is still running!

Machine must be turned OFF!  
Use EMERGENCY-STOP switch!  
Even manual foldroller settings by the handwheel may cause injuries by the foldrollers.

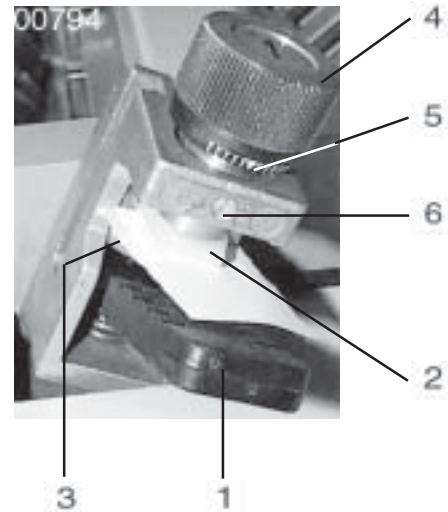
Press the lever **1** and insert a paper strip (of the running paper) between the pressure plate **2** and the counter pressure plate **3**. Check with a paper strip whether it goes through the foldrollers.

Turn the handwheel and adjust the pressure at both sides of the foldroller through the adjustment knob **4**, i.e.

if you turn clockwise (+)  
= pressure on foldrollers becomes less  
if you turn counter-clockwise (-)  
= pressure on foldrollers has increased

Set the adjusting ring **5** into 0-position in order to enable a quick readjustment of the foldrollers into their original position. Secure with screw **6** to prevent disortion; do not over-tighten the nut!

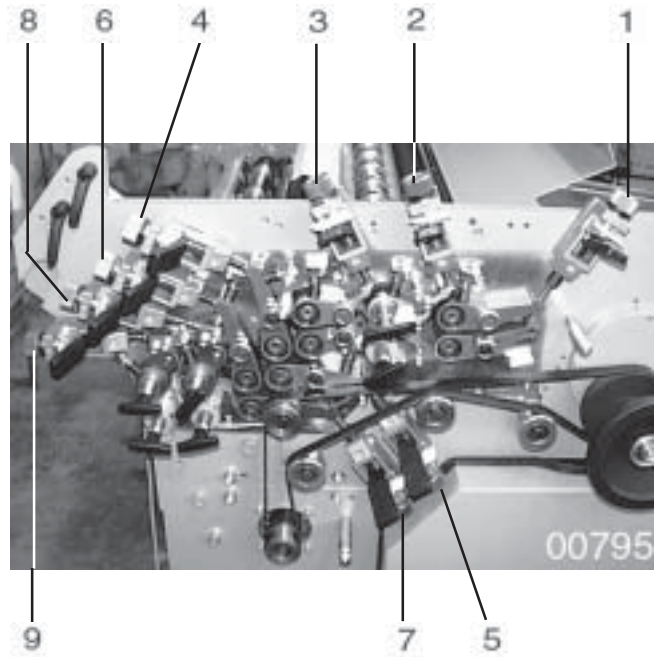
Depending on the type of fold, thickness and quantity of sheets, insert paper strip between pressure plate **2** and angle **3**.



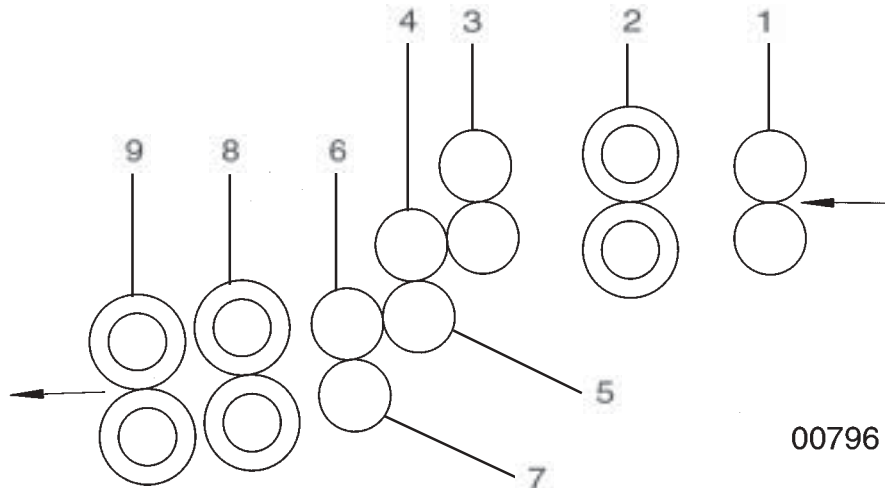
**Continuation**

Continuation

- 1 guide rollers
- 2 pre-perforator shaft
- 3 foldroller 1
- 4 foldroller 2
- 5 foldroller 3
- 6 foldroller 4
- 7 foldroller 5
- 8 first rear perforator shaft
- 9 second rear perforator shaft



The scheme of foldrollers at machines side panel shows you foldrollers with the setting elements pertaining thereto.





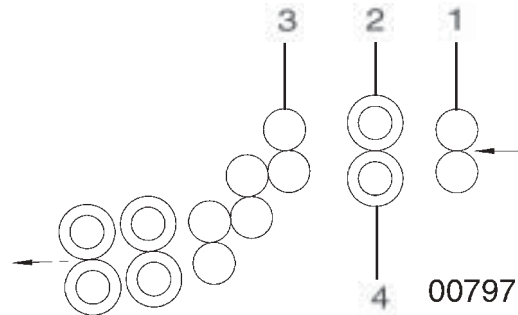
5.5.14 Pre-slitter shafts (option) - Applications

**Tear-off perforations:**

Tear-off perforations (very small teeth) are carried out more precisely with pre-slitter shafts, i.e. only one product thickness is perforated.



**>NOTICE<** Set the guide roller 1 and the first foldroller 3 according to the thickness of the product being fed. Please bear in mind that the pre-slitter shaft 2 must always be set to double-thickness of product.



**Interrupted perforations:**

Remove upper slitter shafts 2 and place plastic counter rollers 5 onto the lower slitter shafts 4.

Affix perforating heads 6 and place them above pos. 5. Use sufficient smoothers 4.

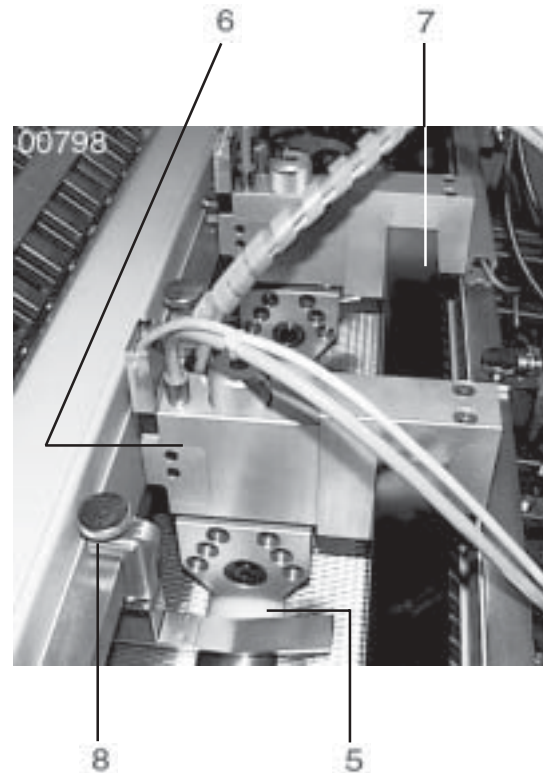
Please follow the enclosed individual Operating Manuals for operating and connecting the individual perforating heads.

**Remoistable glue:**

Remove the upper 2 and lower 4 slitter shafts. The lower slitter shaft 4 is replaced by a another shaft delivered with.

Gluing devices of different manufacturers can be affixed onto the cross bar 7 which has to be installed.

Please follow the enclosed individual Operating Manuals for operating and connecting the individual gluing devices.



5.5.15 Twin-rear slitter shafts (Option) - Applications

Extremely flexible, many cutting, scoring and perforating knives can be used while increasing the accuracy of processing at the same time.



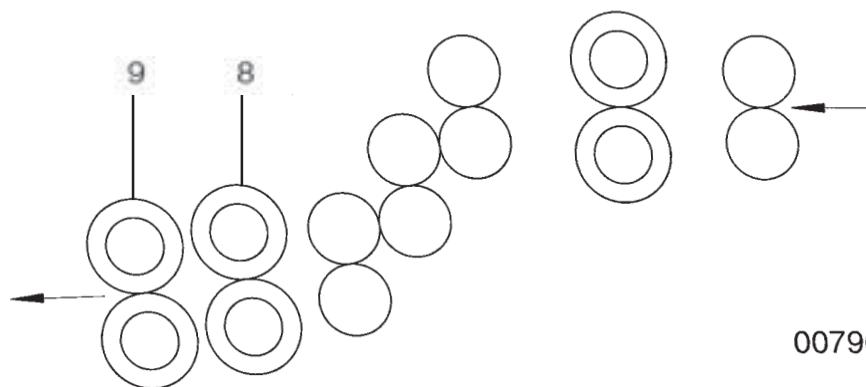
>NOTICE< Place the cutting, scoring and perforating knives on the first set of rear slitter shafts **8**. The second set **9** serves as additional sheet guidance.



>NOTICE< If you place the cutting, scoring and perforating knives in very small distances to each other: Use both sets of slitter shafts **8** and **9** to ensure that you have enough space for the rubber transporting rollers between the knives



>NOTICE< For installation of various tools onto the set of slitter shaft **8**, it is advisable to remove the set of slitter shafts **9**.



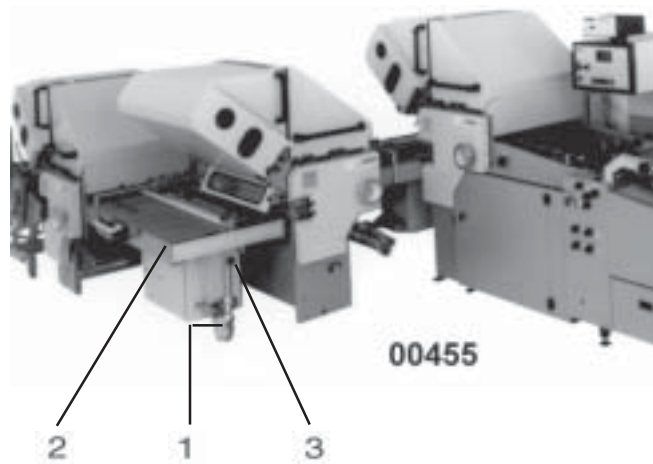
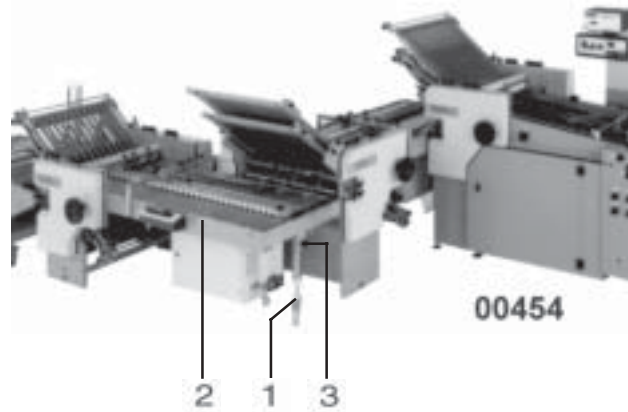
## 5.6 Mobile buckle folding units

### 5.6.1 Installation

Folding units are normally positioned in a right angle to each other.

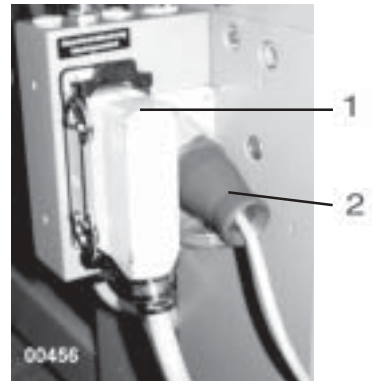
Lock the brakes **1**.

Height of infeed and inclination of register table **2** may be adjusted after loosening the knurled screw **3**.



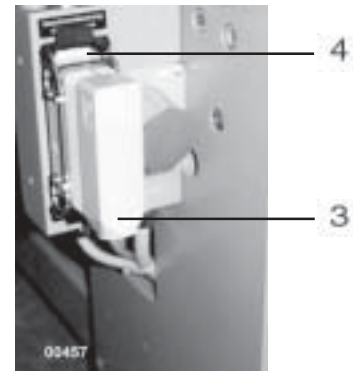
5.6.2 Electrical connection

Electrical connection occurs through power plug 1 and control plug 2 at control cabinet of the previous folding unit.



Works without sub-folding unit or delivery:

Insert dummy plug 3 into socket "machine control" 4.



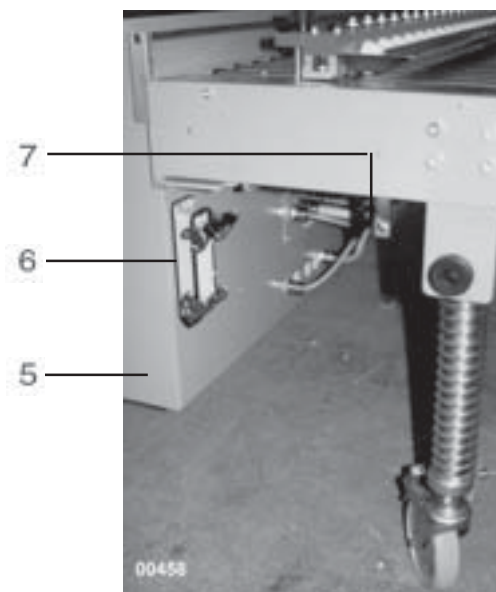
Due to their self control mobile folding units may also be connected to machines of other manufacturers or operated separately.

For this purpose, insert power plug 1 to power supply and control plug 2 into socket "self-control" 6 at control cabinet 5. Both units must be turned ON and OFF separately.



**>DANGER<** Please bear in mind that there is no joint disconnection of MBO folding units and machines of other manufacturers!

Manufacturer will not be liable for any damages caused by the missing of safety disconnections!



5.6.3 Control panel

- 1 Red mushroom button with locking for EMERGENCY STOP
- 2 Button to STOP the machine
- 3 Button to START the machine
- 4 Sheet infeed button for PRODUCTION
- 5 Button for SINGLE SHEET INFEEED
- 6 Selector switch for set-up mode (see para. 5.6.4).

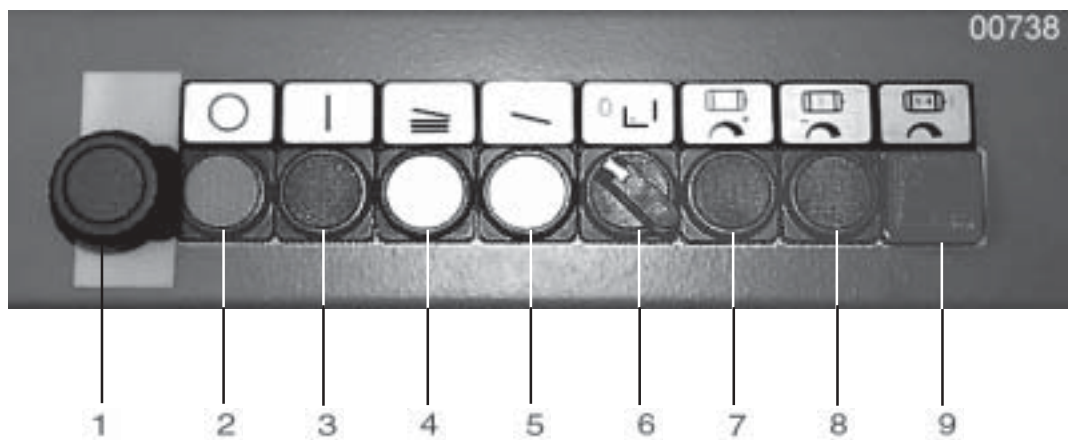
**Position I:** Set-up mode.

**Position 0:** Position of switch during production

- 7 Push button to increase speed of folding unit
- 8 Push button to reduce the speed of folding unit
- 9 Push button for joint speed alteration of all folding units (push simultaneously with buttons 7 or 8).



>**NOTICE**< If the guard above the slitter shaft is opened the machine will stop immediately. ERROR 22 will appear on the MC counter.



5.6.4 Set-up mode of buckle folding machines

The function " set-up mode " simplifies the set-up of individual buckle folding units. In addition thereto, it improves the safety. For this function all folding units used must be connected with eachother through power and control cables.

**Main control panel of folding unit I:** No switch for SET-UP MODE available.

**Control cabinet at mobile buckle folding units**

Selector switch 6 for set-up mode:

**Position I:** Set-up mode

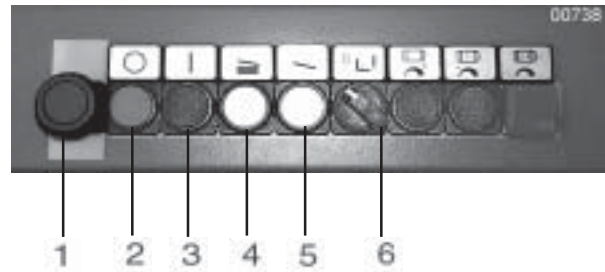
**Position 0:** Position of switch during production

**Production:**

At production mode turn all selector switches 6 to 0. If guard above the slitler shaft is open: machine will stop immediately.

**Set-up mode:**

Only 8- thru 32-page units are equipped with switch 6.



Switch position I at 8-page unit: parallel unit is running, but not 8- thru 32-page units.

Switch position I at 16-page unit: parallel- and 8-page units are running, but not 16- and 32-page units.

Switch position I at 32-page unit: parallel- thru 16-page units are running, but not 32-page unit.

Folding units with switch position I cannot be started through push button 3.



**>NOTICE<** For safety reasons you cannot start the folding units by turning off the set-up mode 0 after set-up. Switch over from I to 0 during set-up: All folding units are turned off. To start them push button 2 and then 3.

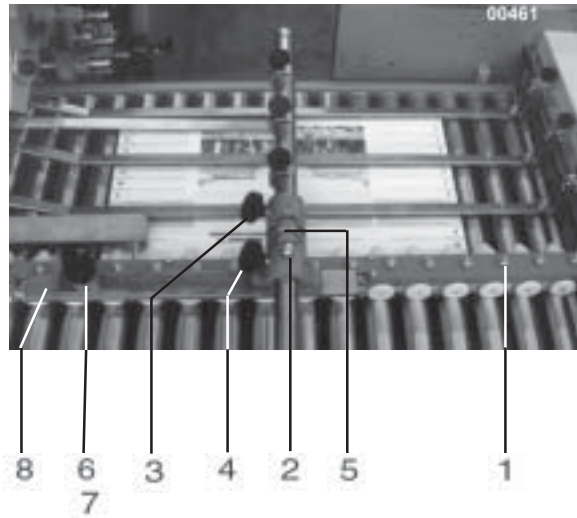
All EMERGENCY 1 and STOP switches 2 are in working order during set-up. All buttons 4 and 5 for SHEET INFEED are in working order during set-up.

5.6.5 Sheet transportation

Loosen grip **9**.  
Set the sidelay **1** with setting element **2**  
into appropriate position.

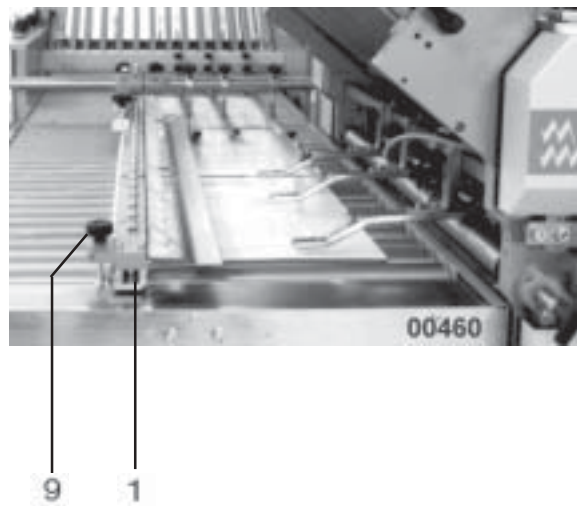
Fine adjustment: fasten grip **3**,  
open grip **4** and adjust with grip **5**.

Set the angularity of the sidelay **1**  
to the foldrollers through grip **6**  
and excenter **7**; read-off values  
at mm-scale **8 +/-**.



>**NOTICE**< After completion  
of all settings at sidelay **1**:  
Fasten the grip **9**.

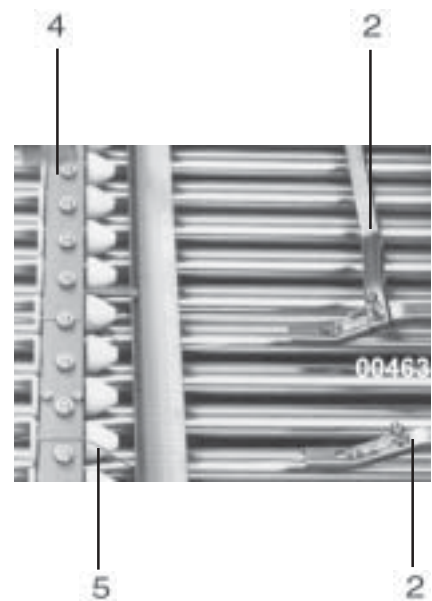
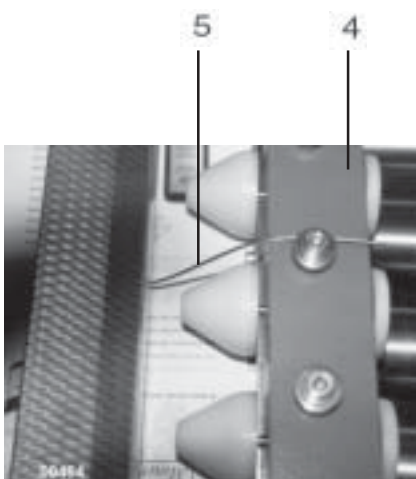
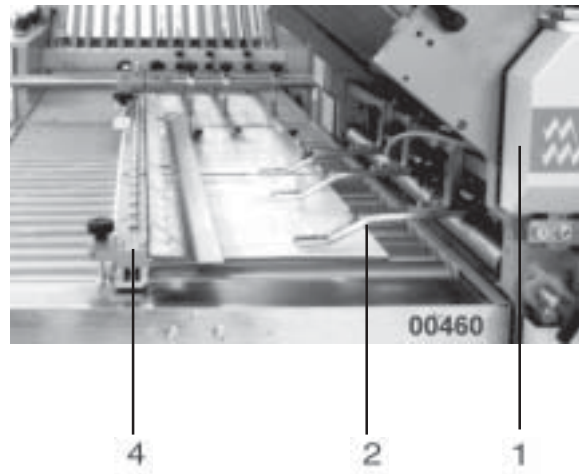
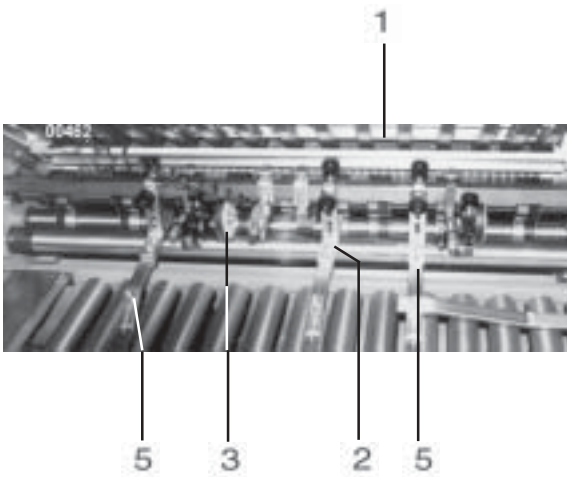
**Continuation**



**Continuation**

To avoid fluttering of the sheets at exit of the previous folding unit 1:  
Use height adjustable smoothers 2 and adjustable exit rollers 3.  
For safe sheet running into the sidelay 4 it is absolutely necessary to affix steel string 5.

**Continuation**





**Continuation**

For safe sheet transportation on the cross carrier:  
Height adjustable smoothers 1 and 2 avoid rising of the sheets during running on the cross-carrier - safe entering into the foldrollers.

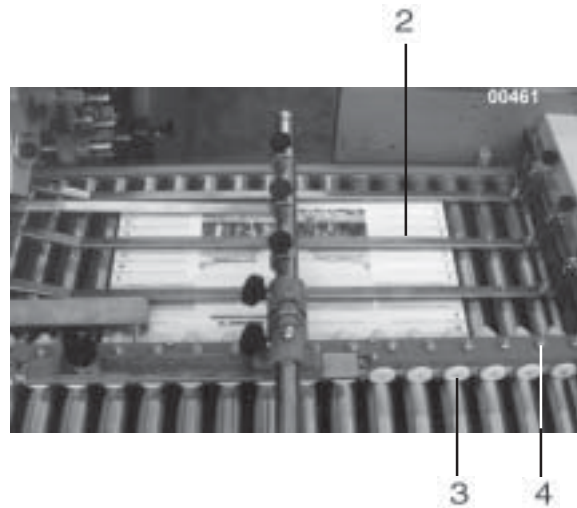
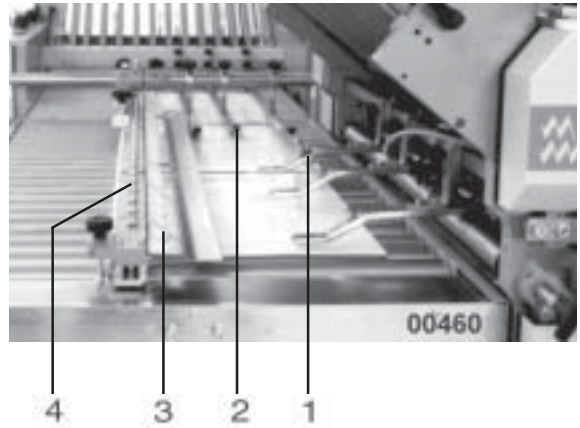
Setting of coned rollers 3 for sheet transportation of various products:

Light paper: Less pressure - unscrew the screws 4.

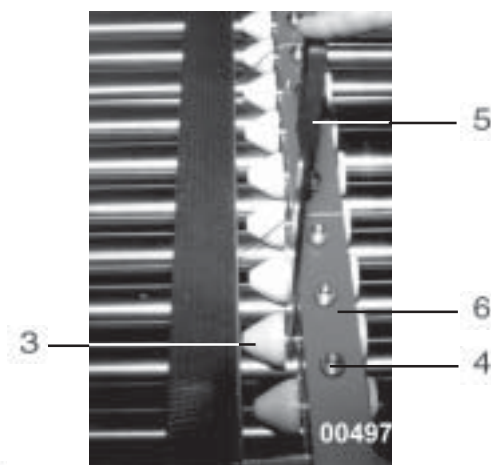
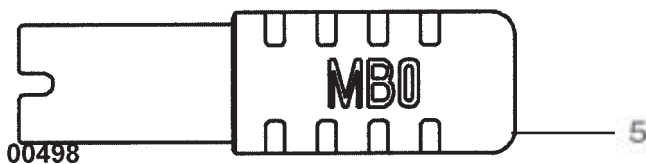
Heavy paper: More pressure - screw in the screws 4.

Fast production:

Insert screws 4 at the transition area of the previous folding unit; it will result in a precise and fast aligning of the sheets. Move the coned rollers 3 forward to the first latch by means of the tool 5 delivered with - also on smooth sheets and two-up production on one sidelay (see also item 5.6.10). The sheets are overtaken earlier and their speed is reduced, i.e. the bouncing speed at sidelay 6 is diminished.



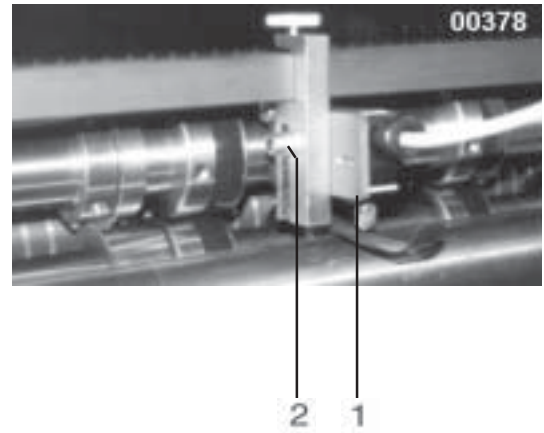
Foldrollers, buckle plates, sheet deflectors, slitter shafts, perforating, scoring, cutting etc. - see paras. 5.5.1 through 5.5.10.



5.6.6 Exit of folding unit

**Standard model:**

Jam detector switch **1** at exit of folding units will stop the machine in case of jam-ups. They are height adjustable, if necessary **2**.

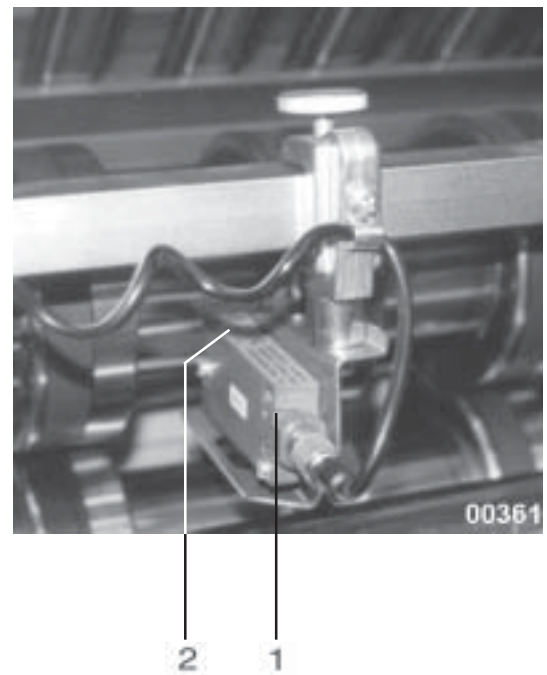


**Option:**

Photocell **1** will stop the machine in case of jam-ups.



>**NOTICE**< When you install or displace it make sure that green diode **2** is not covered (should not be lightening)! Otherwise you would not be able to turn ON your machine!



**5.6.7 Guard above the slitter shaft**

See para. 5.5.11

**5.6.8 Miscellaneous**

For certain kind of folds at which the quantity of buckle plates of folding unit I are not enough, you may also place the folding units in line behind eachother.



>**NOTICE**< In folding unit I you should process folds as less as possible in this configuration, but as much as possible in folding unit II.



>**NOTICE**< The speeds of all folding units should correspond with eachother. Normally, a gap of 1-2 cm on the cross carriers is sufficient.

5.6.9 Double Stream Device (Optional)

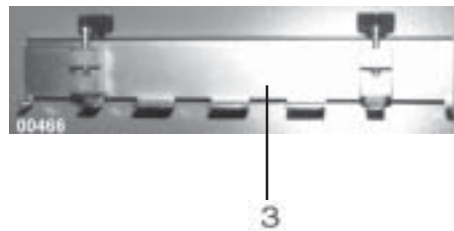
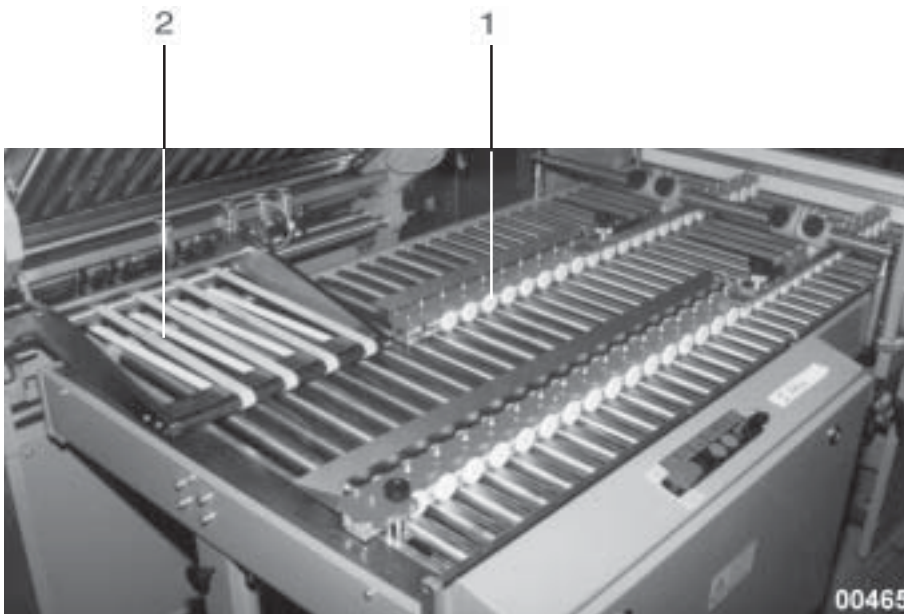
To process from 2 x 8 thru 2 x 32 pp.

Double stream devices installed in buckle folding machines provide more productivity. Use only when you process large quantities due to extensive set-up time. Make arrangements for corresponding imposition layouts between printer and finisher!

Normally, the sheets run into the 1st folding unit with their wide side. They are cut on the slitter shafts after the parallel fold. The double-stream device is to be installed onto the subsequent folding units. Both parts of the sheet run parallel side by side into the next individual folding unit.

This device consists of a short sidelay 1, one conveyor table 2 and two additional sheet stops 3 for the buckle plates.

Continuation



**Continuation**

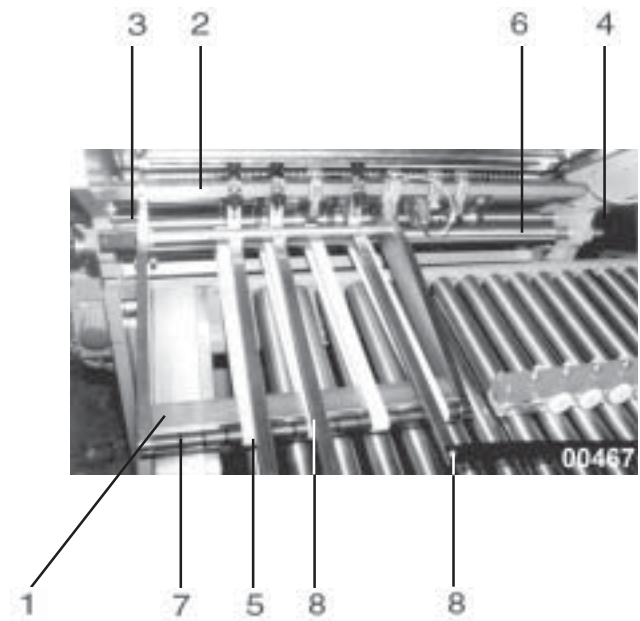
**Installation of the conveyor table:**

Hook the conveyor table **1** onto the cross-bar **2**, and fasten it with screws. Screw **3** serves as a sidelay (is being set by the manufacturer).

Pull off the plug bearing **4** and thread the tapes **5** into the tape roller **6**. Loosen the screw prior thereto.

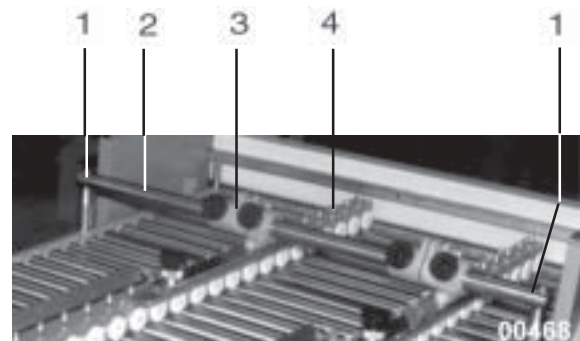
Centering of the tape running:  
Place the tapes **5** above the rubber rings **7**.

Use smoothers **8**.



**Installation of the additional sidelay:**

Remove both screws **1** at sidelay support **2**. Push the sidelay support **2** through the holder **3** of the additional sidelay **4**. Refasten the sidelay support **2**.

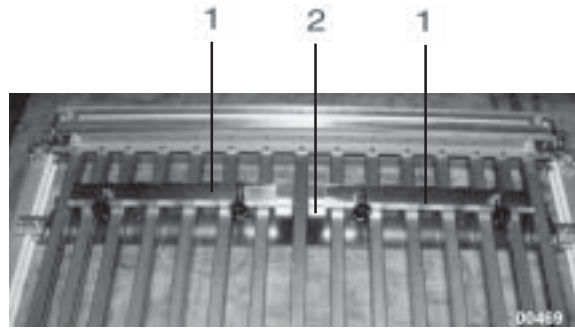


**Continuation**

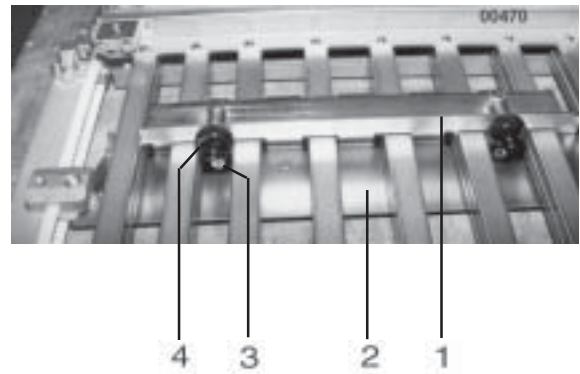
Continuation

**Installation of the additional sheet stops:**

Affix **3** the two additional sheet stops **1** from the bottom at the sheet stop **2** of the buckle plate and fasten them with screws.

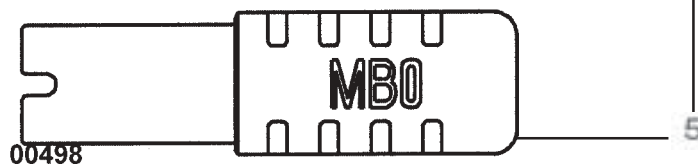
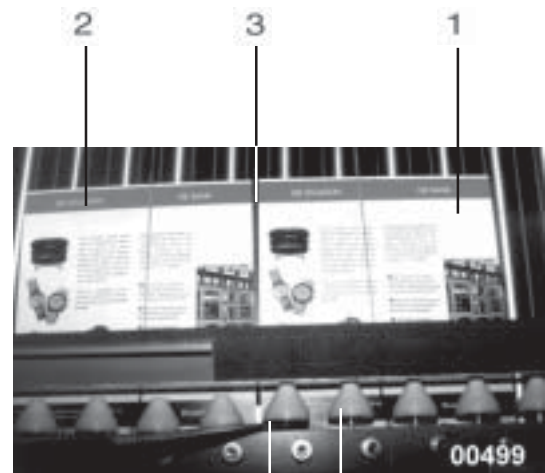


Use knurled screw **4** to set the folding length and folding angularity for both sheet parts individually.



**5.6.10 Two-up production at one sidelay**

The first (right) signature **1** must be overtaken earlier than the second (left) signature **2**, which will automatically creates a gap **3**. Move the coned roller **4** forward up to the first latch by means of tool **5**.



## 5.7 Noise damping device (option)

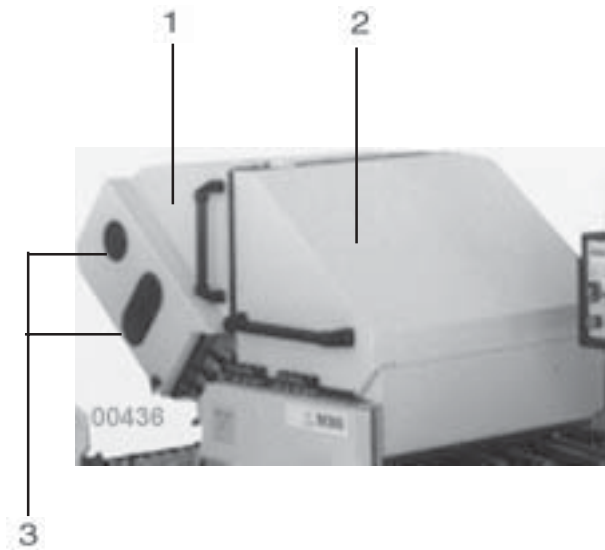
The noise damping device corresponds to the requirements of the legislator and has been approved by the Professional Trade Association. This device is not stipulated in certain countries, i.e. in such cases it may be delivered upon request.

For insertion of the upper buckle plates lift the noise hoods **1** and **2** to their limit stops to avoid any self-locking!



**>DANGER<** In order to avoid self-locking always open the hood to its limit stop!

The upper buckle plates may be adjusted through the openings **3**.



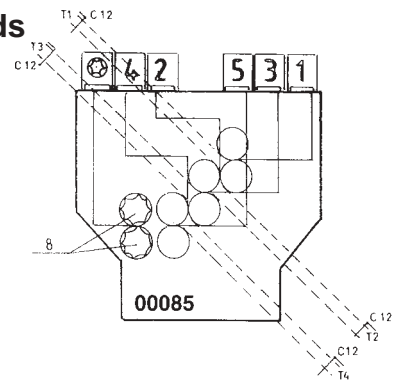
**>DANGER<** Never reach into the machine during machine run, extensive danger of personal injuries.

**6.0 Instructions to the user**

**6.1 Setting instruction for the most commonly folds**

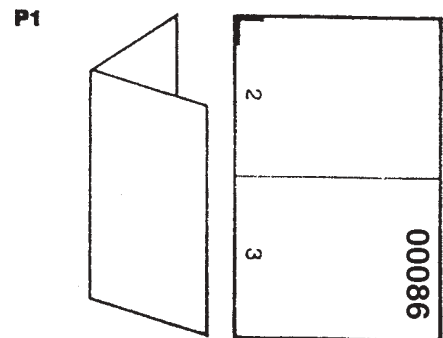
**6.1.1 Parallelfold**

- 1-5 = 1st - 5th set of foldrollers
- 8 = set of slitter shafts



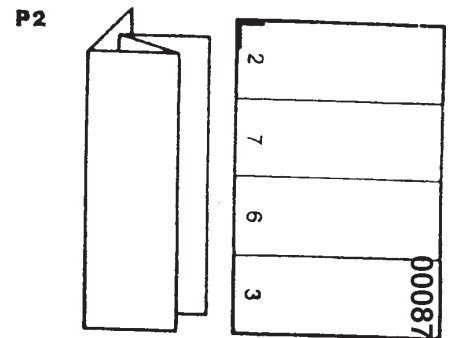
**P 1 1 x parallel fold, i.e. 4 pages**

At 1, set for single paper thickness, and from 2 thru 8 set to double paper thickness. Set sheet stop C 12 at 1st buckle plate to 1/2 of sheet length. The buckle plates 2- 4 are replaced by **sheet deflectors**.



**P 2 2 x parallel fold, i.e. 8 pages**

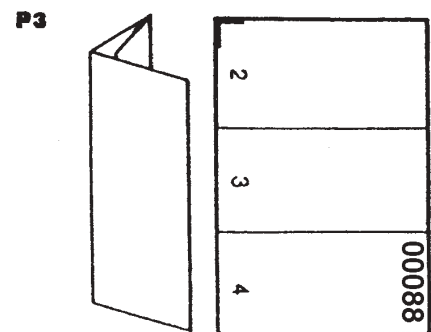
At 1 set for single, and at 2 set for double paper thickness, and at 3 to 8 set to quadruple paper thickness. Set sheet stop C 12 to 1/2 of sheet length at 1st buckle plate and 1/4 of sheet length at 2nd buckle plate. Buckle plates 3 and 4 are replaced by **sheet deflectors**.



**P 3 2 x parallel fold (letter fold), i.e. 6 pages**

I. With two top buckle plates (T1 and T3), set foldrollers 1-3 to single and foldrollers 4-8 to triple thickness of paper. Set sheet stop C 12 at 1st and 3rd buckle plate to 1/3 of sheet length. Buckle plates 2 and 4 are replaced by **sheet deflectors**.

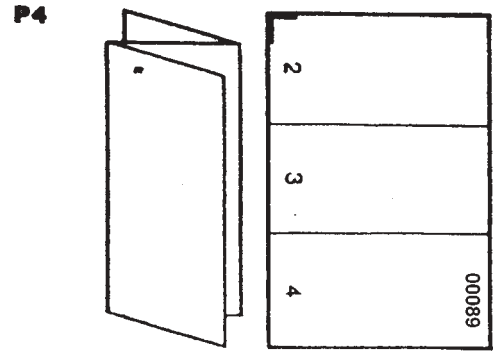
II. With one top (T1) and one bottom (T2) buckle plate set the foldrollers 1 and 2 for single and foldrollers 3-8 for triple thickness of paper. Set sheet stop C 12 at 1st buckle plate to 2/3 of sheet length, at 2nd plate to 1/3 of sheet length. Buckle plates 3 and 4 are replaced by **sheet deflectors**.





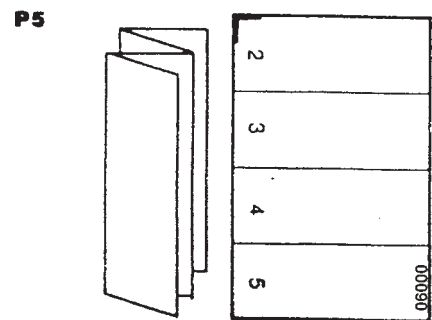
**P 4** 2 x parallel fold (accordian fold), i.e. 6 pages

Set of foldrollers 1 and 2 to single thickness of paper, and foldrollers 3-8 to triple thickness of paper.  
Set sheet stop C 12 at 1st and 2nd buckle plate to 1/3 of sheet length.  
Buckle plates 3 and 4 are replaced by **sheet deflectors**.



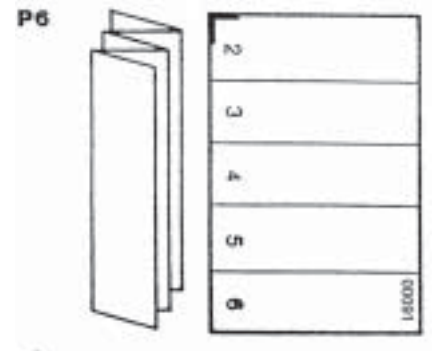
**P 5** 3 x parallel fold (accordian fold), i.e. 8 pages

Set foldrollers 1-3 for single thickness and foldrollers 4-8 to quadruple thickness of paper. Sheet stop C 12 should be set to 1/4 of sheet length at 1st, 2nd and 3rd buckle plate.  
The 4th buckle plate is replaced by a **sheet deflector**.



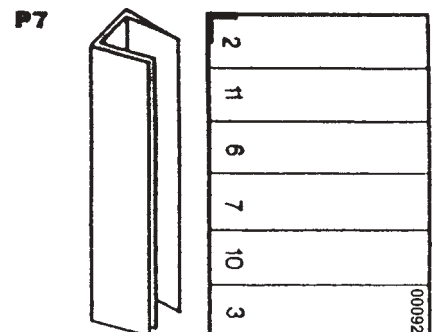
**P 6** 4 x parallel fold (accordian fold), i.e. 10 pages

Set foldrollers 1-4 to single paper thickness, foldrollers 5-8 to fivefold thickness of paper.  
Set sheet stop C 12 to 1/5 of sheet length at all 4 buckle plates.



**P 7** 3 x parallel fold (1 parallel + 2 letter folds), i.e. 12 pages

Set foldroller 1 to single paper thickness, foldrollers 2-4 to double thickness of paper, and foldrollers 5-8 to sixfold thickness of paper. Sheet stop C 12 should be set to 1/2 of sheet length at 1st buckle plate, and to 1/6 of sheet length at 2nd and 4th buckle plate.  
The 3rd buckle plate is replaced by a **sheet deflector**.



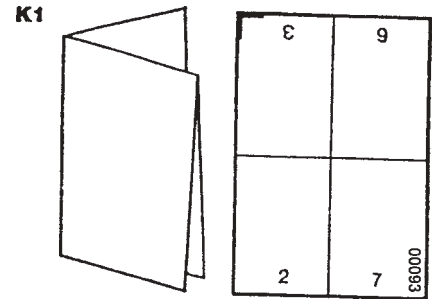
6.1.2 Crossfold

**K 1** 1 x parallel and 1 x crossfold (double folding), i.e. 8 pages

See item **P 1** for set of parallel fold.

Set of crossfold:

Adjust the foldroller 1 to double, and the remaining foldrollers and slitter shafts to quadruple thickness of paper. Set the sheet stop of buckle plate at crossfold unit to  $\frac{1}{2}$  of the sheet width. The remaining buckle plates are replaced by **sheet deflectors**.

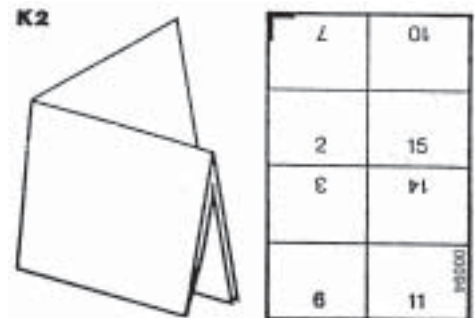


**K 2** 2 x parallel and 1 x crossfold, i.e. 16 pages

See item **P 2** for set of parallel fold.

Set of crossfold:

Adjust the foldroller 1 to quadruple, and the remaining foldrollers and slitter shafts to octuple thickness of paper. Set the sheet stop of buckle plate at crossfold unit to  $\frac{1}{2}$  of the sheet width. The remaining buckle plates are replaced by **sheet deflectors**.

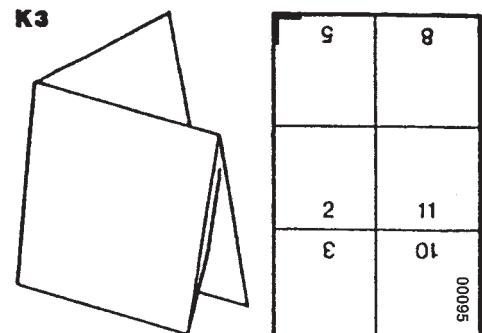


**K 3** 2 x parallel (letter fold) and 1 x crossfold, i.e. 12 pages

See item **P 3** for setting of parallel fold.

Setting of crossfold:

Adjust foldroller 1 to triple thickness of paper and the remaining foldrollers and slitter shafts to sextuple thickness of paper. Set the sheet stop of buckle plate at crossfold unit to  $\frac{1}{2}$  of the sheet width. The remaining buckle plates are replaced by **sheet deflectors**.



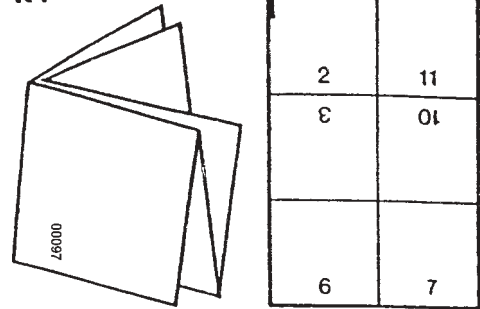
**K 4** 2 x parallel fold (accordion) and 1 x crossfold, i.e. 12 pages

See item **P 4** for setting of parallel fold.

Setting of crossfold:

Adjust foldroller 1 to triple thickness of paper and the remaining foldrollers and slitter shafts to sextuple thickness of paper. Set the sheet stop of buckle plate at crossfold unit to ½ of the sheet width. The remaining buckle plates are replaced by **sheet deflectors**.

**K4**



**6.1.3** **Threefold**

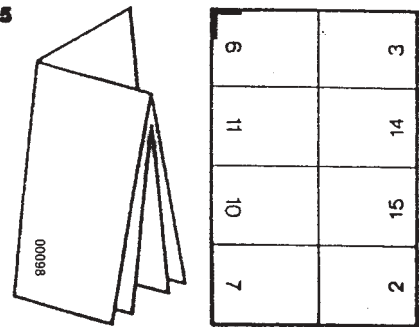
**K 5** 1 x parallel, 1 x cross and 1 x threefold, i.e. 16 pages

See item **K 1** for setting of parallel and crossfold.

Setting of threefold:

Adjust foldroller 1 to quadruple thickness of paper and the remaining foldrollers and slitter shafts to octuple thickness of paper. Set the sheet stop of buckle plate at threefold unit to ¼ of the sheet length. The remaining buckle plates are replaced by **sheet deflectors**.

**K5**

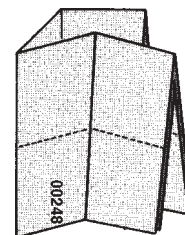


**K 6** 1 x parallel, 1 x cross and 2 x threefold (2 x 32 pp two-up production)

See item **K 1** for setting of parallel and crossfold.

Setting of threefold:

Adjust foldroller 1 to quadruple, foldroller 2 to octuple and the remaining foldrollers and slitter shafts to sixteenfold thickness of paper. Sheet stops at threefold unit: buckle plate 1 to ¼ and buckle plate 2 to 1/8 of sheet length. The remaining buckle plates are replaced by **sheet deflectors**.



7.0 Options

7.1 Batch counter

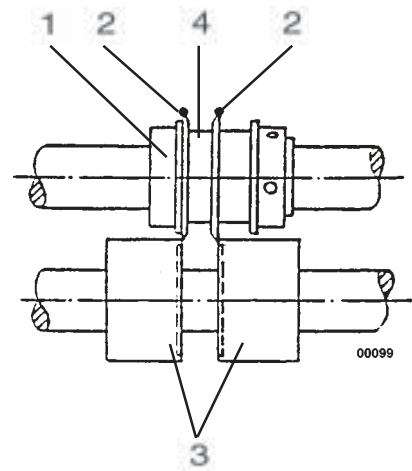
The counting functions of the standard batch counter MCC 3 are integrated into the "MC Control" and are described as "MC Control" in the attached Operating Manual. Should, however, another counter have been installed by the manufacturer, its Operating Manual is also attached separately.

7.2 Gully cut

Place the knife holder 1 onto the upper slitter shaft. Insert two knives 2 with their cutting edge to the outside and place two counter knives 3 against them on the lower slitter shaft.

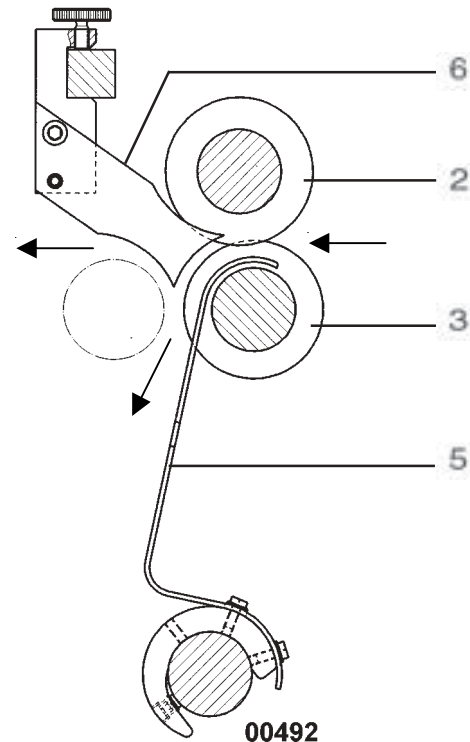
**Width of cut:**  
Minimum = 4 mm, maximum = 15 mm

The thicker the product the wider the cut! Combine distance washers 4 of 0.3 - 5 mm.



Always insert a stripper 5 between the counter knives 3.

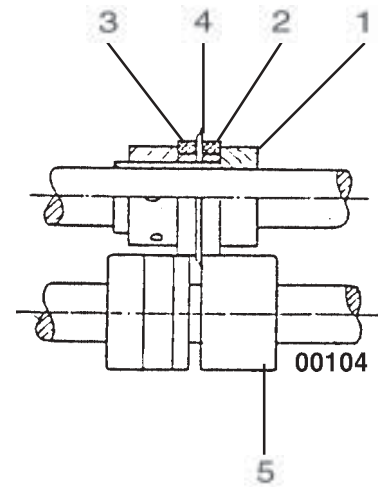
Use a stripper 6 between the cutting knives only when you process bulky products.



### 7.3 Edge trim

Install the knife holder 1 with rubber rings 2 and 3 and cutting knife 4 onto the upper slitter shaft.

Place a distance washer (0.5 mm) between rubber rings 2 and cutting knife 4. Place the counter knife 5 at bottom against it.



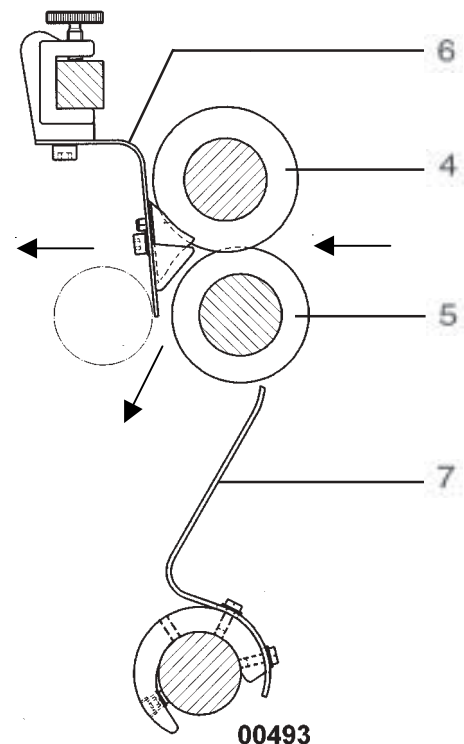
Paper cut-off is guided between 2 and stripper 6; use also stripper 7.



**>NOTICE<** If you obtain an angled cut or badly guided paper trim-off you may also install the knife holder 1 onto the lower slitter shaft; the cutting knife 4 into the direction of the folding product. It mostly depends on the paper thickness and paper fibre.

Experiences shows that the following alternative of installation reveals in the best result:

knife top 4, counter knife bottom 5, cut edge of top knife 4 into direction of paper cutoff. Paper cutoff is guided by rubber ring.

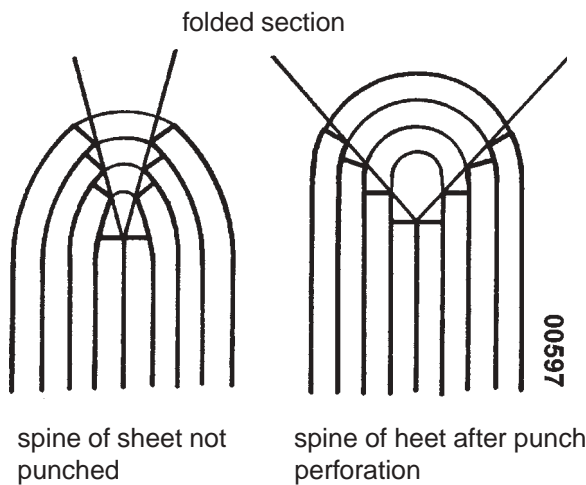


### 7.4 Punch Perforation

The trend to produce more and more books by the perfect-binding method at lower cost places an ever increasing demand on manufacturers to develop machinery and ancillary equipment to make further progress towards this end.

The new MBO-punch perforating device fulfils the requirement by providing a considerably improved adhesive surface for perfect-bining.

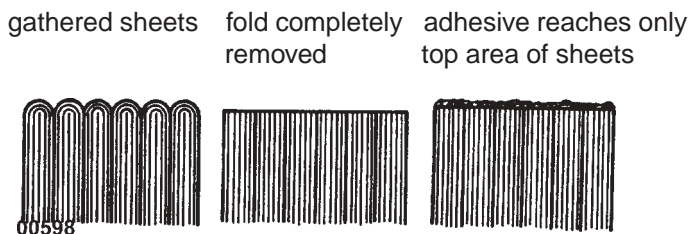
Instead of the commonly used type of perforation, i.e. - - - - - , slots are punched into the folded sheets, i. e. just before the last fold.



These slots provide a larger opening in the spine of the collated sections and allow the glue to penetrate easily and reach every single sheet.

The folded sheets are gathered and fed into hte perfect binder in the usual manner. The spine will not be roughened and grooved, however, only the adhesive will be applied.

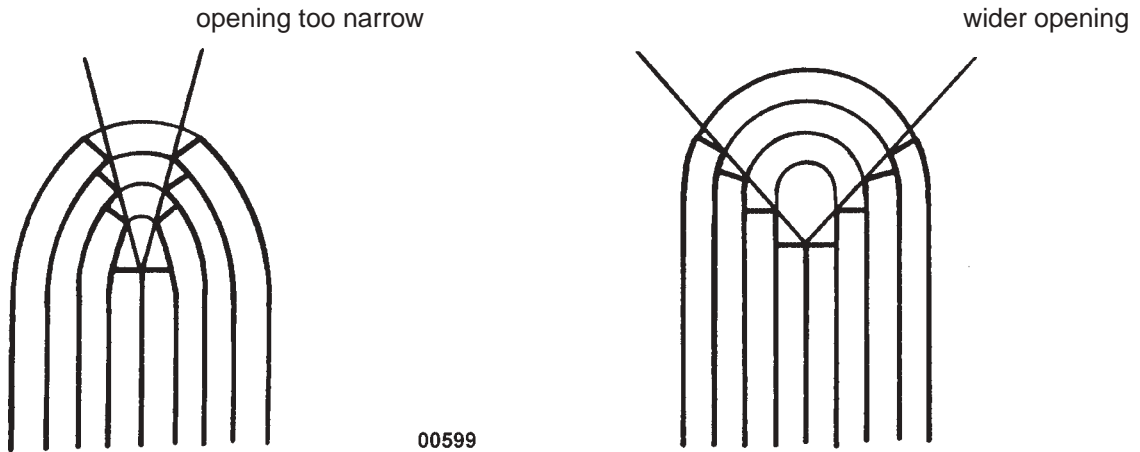
Present perfect binding methods, where the spine is completely removed, have the disadvantage that the adhesive reaches only the very top area of the sheet edge and, therefore, has only a limited strength.



In the perfo-binding process, where folded sheets have standard perforations in the spine, the openings are too small to allow the glue to penetrate thoroughly, and it does not always reach the inner sheets.

**Continuation**

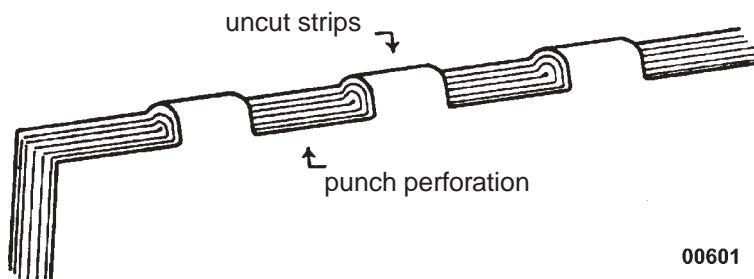
Continuation



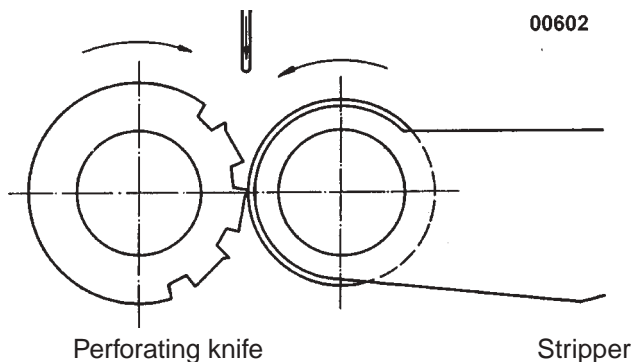
With punch-perforation the opening is larger and the angle wider, therefore the glue can definitely reach all sheets.

Contrary to the existing perfect binding methods, where the glue reaches the top edge of the sheet only, the punch-perforation method enables the glue to bind the sheets not only on the edge but also at the sides, resulting in far stronger perfect binding than has been possible in the past.

Furthermore, the sheets are still attached to each other between the slots by the uncut strips which guarantees a more secure binding.



When using the new punch-perforation device, it is of the utmost importance that the punched out pieces are separated and stripped from the folded sheets. A new design of perforating knife ensures this in conjunction with a specially manufactured stripping unit.



## **7.5 Gatefold devices**

See separately attached Operating Manual.

## **7.6 Other options**

In case this machine includes options which are not described, separate Operating Manuals are attached herewith.

## **8.0 Peripheral units**

Operating Manuals pertaining to mobile peripheral units are attached separately, if these units are part of the order at the time of shipment.

## **9.0 Final remarks**

**You have now reached the end of this Operating Manual. We hope that you understood everything, if so, then our efforts to prepare this Manual have been worthwhile. Of course, we accept comments and wish to thank you for any suggestions to improve it. Even we are not perfect! We wish you much pleasure and success with this machine. Should you, however, still have problems with it, please do not hesitate to contact our technicians or supervisors who will be able to assist you.**





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