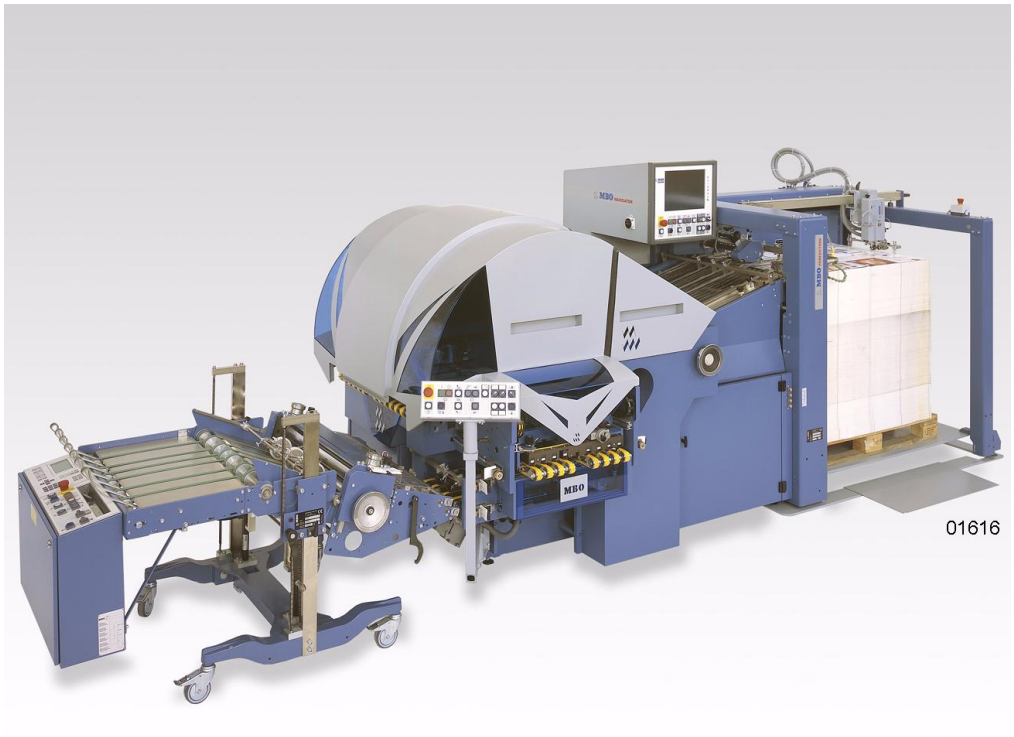
MBO
Folding Technology



Combi folding machine

K 800.2

Operating Manual

Preserve for future apply!

Machine type:	Combi folding machine K 800.2		
Configuration:	K 800.2		
Type of document:	Operating Manual		
Version:	1	**Official in charge:**	B. Noller
As at: (date)	06.06.2002	**Machine-no.:**	
Language:	English	**File name:**	
Manufacturer:	MBO Binder Co. KG Maschinenbau Oppenweiler Grabenstraße 4 71570 Oppenweiler Telefon: 07191 / 46-0 Fax: 07191 / 4634		

Preserve to alterations!

Prologue

With this MBO product you have acquired a valuable piece of equipment, which will give you the utmost reliability and efficiency if you operate it carefully and in accordance with instructions. This user information should ensure you correctly operate and maintain the machine and help you to observe the safety instructions.

Please keep this user information at or near the machine for further utilisation.

Copyright

Warranty

The contractually stipulated warranty shall be applicable for our products. The following violations exclude the claim of warranty:

- Arbitrary add-on's and modifications to the machine
- Damage which is the result of arbitrary, poor maintenance and repair work
- Installation of spare parts which have not been acquired directly from the manufacturer
- Non-approved utilisation
- Removal of protective and safety devices and damage resulting therefrom

Service information

You may purchase MBO machines and spare parts worldwide through our individual agencies near to your location.

Should you have any questions, service requirements or need any repair services you are kindly requested to contact your nearest MBO agency. In the event of enquiries and orders please keep the following details available:

- Production number
- Serial number
- Type of machine

This information may be taken from the type plate.
You are requested only to use spare parts that are delivered and recommended by the manufacturer!

Table of contents

7 Operation

8 Maintenance

1 General information

1.1 Structure and presentation conventions

The structure of this user information is divided as follows:
Chapter 1: General information
Chapter 2: Safety
Chapter 3: Transportation/Erection/Installation
Chapter 4: Structure and function
Chapter 5: Operating and display elements
Chapter 6: Adjustment/Fitting
Chapter 7: Operation
Chapter 8: Maintenance
Chapter 9: Putting out of service

The sequence of these chapters is designed to provide you with a constant progressive learning process for operating the machine. The individual chapters initially provide an overall view about the subject concerned and then gradually go into more detail.

Instructions of activities are

w marked with a W

Instructions of activities requiring a specific sequence are consecutively numbered. You are requested to ensure this sequence is always obeyed!

1.2 Important instructions about this Operating Manual

This user information is directed towards the operator of the machine. It should familiarise the machine operator with the operating process, actual operation, safety instructions, and with the maintenance of the machine.

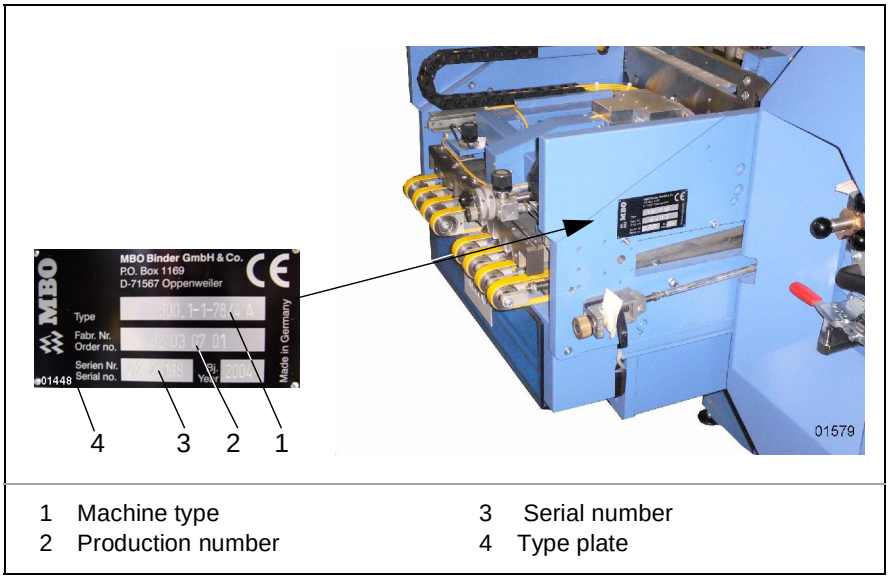
Ths user information should be considered part of the product. It should be kept with the machine during its operating life. You are kindly requested to pass this operating manual to each subsequent owner or user of the machine.

Please keep this user information up to date. You are also requested to enter each new amendment into this document.

Our machine represents the latest state-of-the-art technology at the time of delivery. As we are permanently working on further developments we reserve the right to make modifications.

User evaluation of the operating manual:
Our operating manuals are regularly updated.
You are kindly requested to recommend any improvements to make the instructions user friendly.

1.2.1 Designation of the machine



1	Machine type	3	Serial number
2	Production number	4	Type plate

Figure 1: Type plate

Please gather the significant machine data for identification of the machine from the type plate (4) on the machine.
Always provide this information for service requirements and procurement of spare parts:

- Machine type (1)
- Production number (2)
- Serial number (3)

1.2.2 Work area

The illustrated graphic indicates the individual work areas of the machine. The admitted work area during the operation has been shaded in grey.

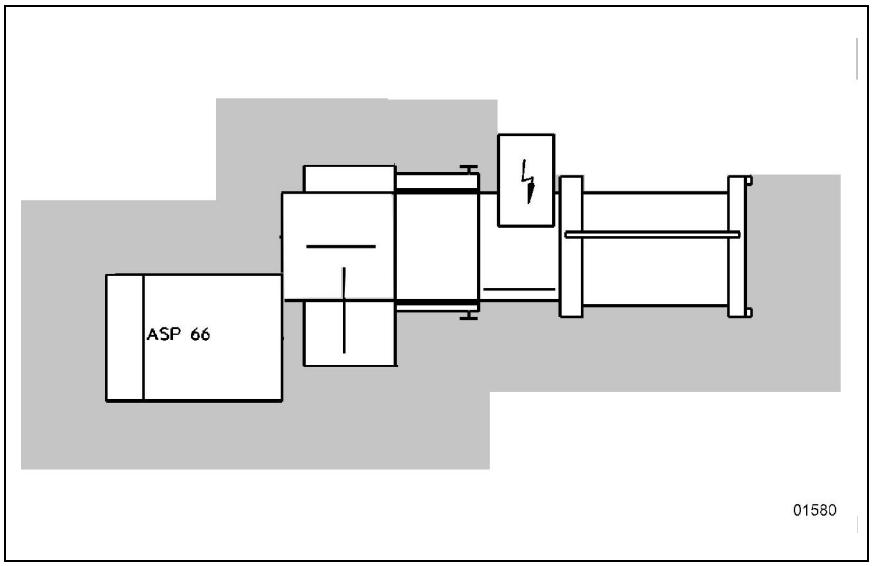


Figure 2: Work area

1.3 Product data

1.3.1 Figure

1.3.1.1 Floor plan K 800.2 - Continuous feeder

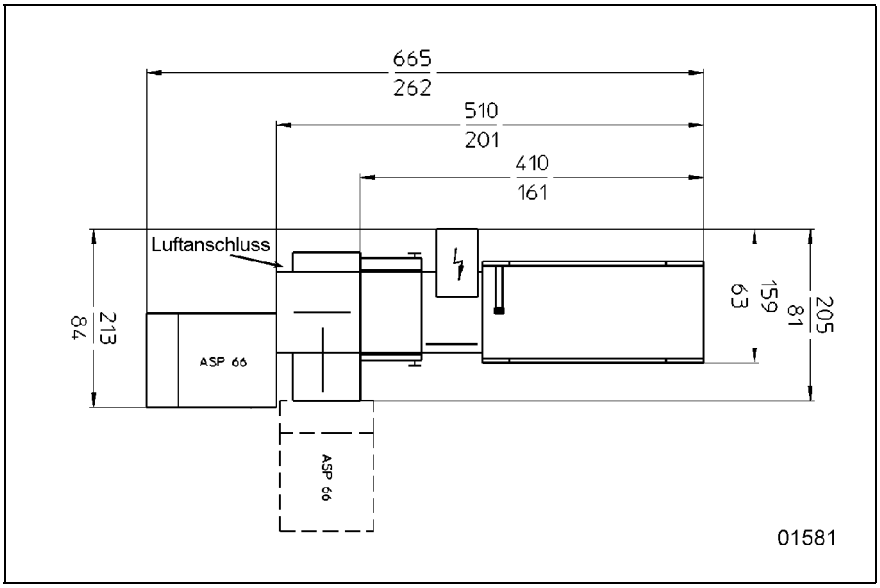


Figure 3: Floor plan K 800.2 - Continuous feeder (measure cm)

1.3.1.2 Floor plan K 800.2 - Pile feeder

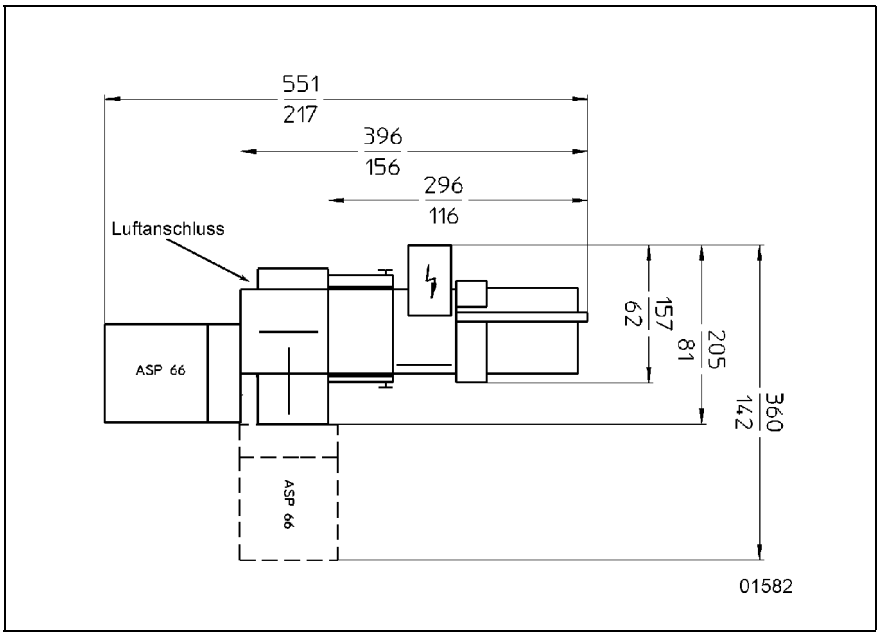


Figure 4: Floor plan K 800.2 - Pile feeder (measure cm)

1.3.1.3 Floor plan K 800.2 - Palletized feeder

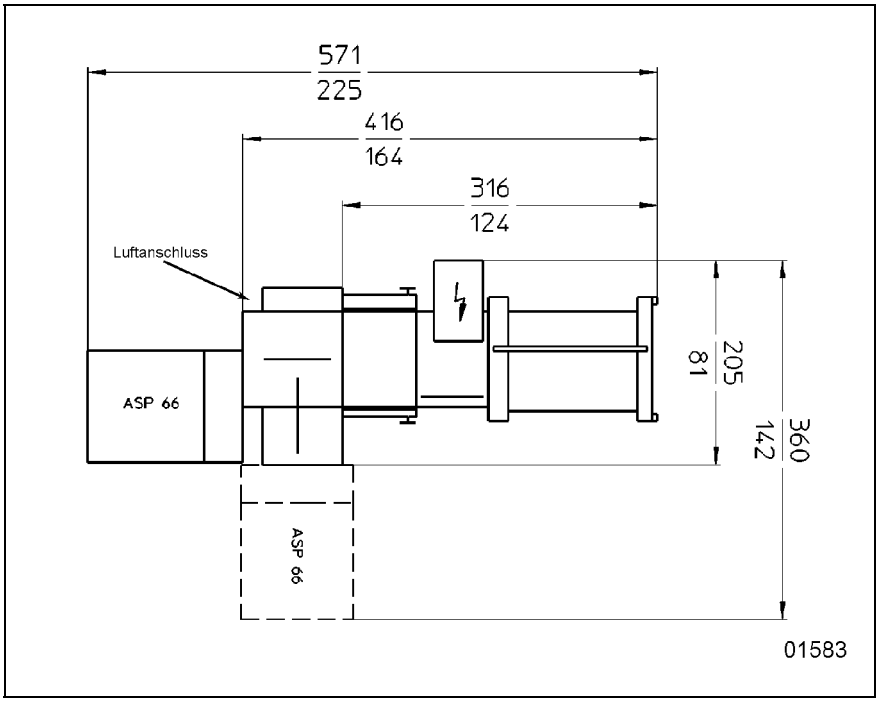


Figure 5: Floor plan K 800.2 - Palletized feeder (measure cm)

1.4 Technical data

Machine data	Machine and serial no.:		
	Machine configuration:		
	Type of feeder:		
	Type of pump:		
Certification	Conformity Certificate:		
	GS Certificate No.:		
Electrical data	Wiring diagram no.:		
	Folding unit:		
	Feeder:		
	Delivery:		
	Operating voltage (V/Hz):		
	Control voltage (V/A):		
	Total rated current (A):		
	Fuse at power supply (A):		
Noise emission	Noise level (AI):		
Sizes	**Maximum sheet size**		
	Continuous feeder:	78 cm x 120 cm (175 cm)	
	Pile feeder:	76 cm x 120 cm	
	Palettized feeder:	78 cm x 120 cm	
	Crossfold:	78 cm x 106 cm	
	Threefold:	78 cm x 106 cm	
	Minimum sheet size		
	Continuous feeder:	17 cm x 20 cm	
	Pile feeder:	17 cm x 25 cm	
	Palettized feeder:	17 cm x 25 cm	
	Palettized feeder-small size:	17 cm x 17 cm	
	Crossfold:	17 cm x 20 cm	
	Threefold:	20 cm x 40 cm	
Slitter shafts	Diametre:	35 mm	
Foldrollers	Diametre:	44 mm	
Electrical data folding unit (400V/50Hz)	with continuous feeder:	kW	4,5
	with pile feeder:	kW	6,0
	with palettized feeder:	kW	6,0

Table 1: Technical data

Air supply	Pneumatic knives and pneumatic crossfold stop	6 bar bei 25m³/h	
Speed	Min.	10 m/min	
	Max.	210 m/min	
Folding lengths	Maximum folding length Standard buckle plate	Buckle plates 1+2	70 cm
		Buckle plates3-6	49 cm
	Maximum folding length Combi buckle plate	Buckle plates 1+2	64 cm
		Buckle plates 3-6	43 cm
	Minimum folding length		6 cm
Weight		Net	Gros
		1800 kg	2000 kg

Table 1: Technical data

1.5 Accompanying documents

Operating manuals:	Feeder
	Air pump:
	Control cabinet:
	Supplementary unit:
	Supplementary unit:
	Other manufacturer:
	Other manufacturer:
Wiring diagram no.:	
Spare parts lists	Machine::
	Feeder:
	Delivery:
	Air pump:
	Peripheral units:
	Other manufacturer::
Knive list:	TM32/2

Table 2: Accompanying documents

1.6 Equipment

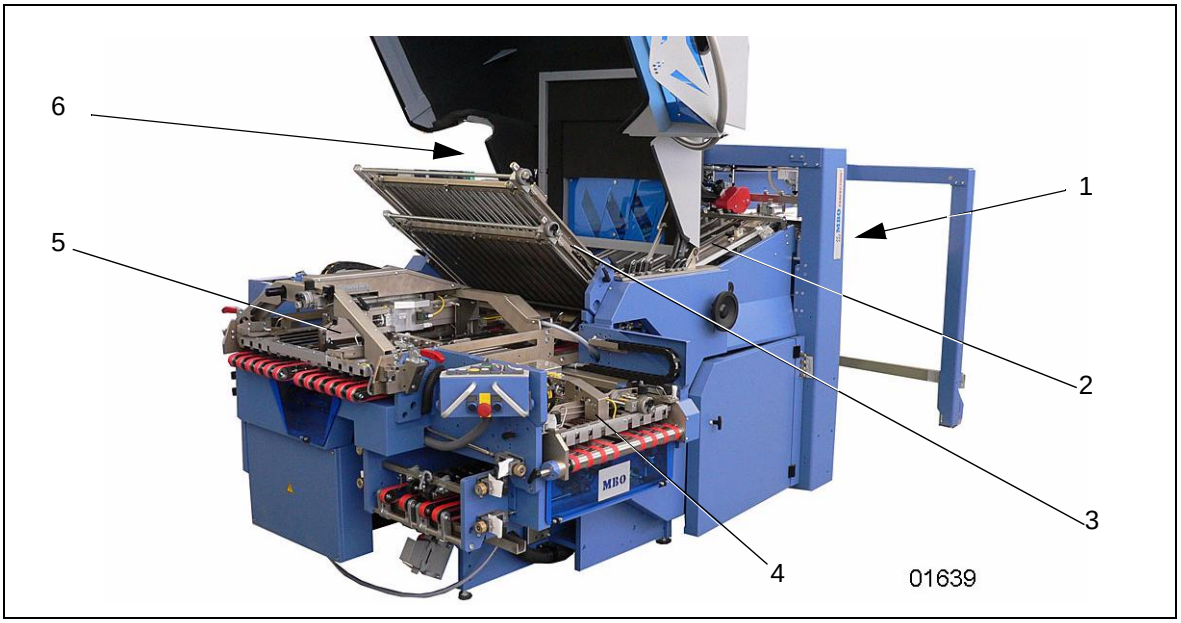


Figure 6: Equipment

Pos. 1	Feeder
Pos. 2	Register/alignment table
Pos. 3	Parallel fold
Pos. 4	Threefold
Pos. 5	Crossfold
Pos. 6	Machine control

The machine consists of a combination of:

- feeder with
- register/alignment table
- Parallel folding unit
- Crossfold folding unit
- Threefold folding unit
- Delivery

Additional mobile knife folding units (Z 2, Z5, Z6), special folding units and MBO deliveries can be made available on request.

Combi folding units in series are provided either with:

- Two, four or six buckle plates with swing deflectors,
- Spiral foldrollers,
- Slitter shafts.

The production speed varies between 10 and 210 metres/minute.
It depends on the type of paper, the size of paper, the type of fold and different user circumstances that
may not be influenced by the manufacturer.

2 Plotting of warnings

2.1 Plotting of warnings

2.1.1 Safety instructions and colours

Plotting	Significance
	**Prohibiting sign** Red border White background Black symbo
	**Warning** Yellow background Black symbol
	**Mandatory sign** Blue background White symbol

Table 3: Colours of safety instructions

2.1.2 General prohibition signs

Plotting	Significance
	Warning of hot surface
	Warning of objects falling down
	Warning - danger of dragging into rotating rollers
	Warning of injuries to the hand
	Warning of injuries to the hand by running rollers
	Warning of injuries from dangerous electric voltage
	Caution - danger of tripping
	Caution - danger of crushing injuries to parts of the body
	Warning of a general danger spot

Table 4: General prohibition signs

2.1.3 Levels of danger

The levels of danger draw your attention to the severity of the danger. They are structured in accordance with a classification system that differs by using various signalled words:

- Danger
- Warning
- Caution

Level of danger	Significance
 **DANGER!**	Meaning a direct imminent danger that leads to serious bodily injuries or even to death.
 **WARNING!**	Meaning a possibly dangerous situation that may lead to serious bodily injuries or even to death.
 **CAUTION!**	Meaning a possibly dangerous situation that may lead to slight bodily injuries or to property damage

Table 5: Significance of danger levels

2.1.4 General prohibition signs

DANGER!

Danger of electric voltage.

Non-compliance may cause serious injuries or even death.

It is absolutely imperative that you immediately report any exposed cables or electrical connections to the relevant responsible authorities in your company

DANGER!

Danger of residual voltage at the main terminals of the main switch at the open switch cabinet. Non-observance will cause serious bodily injuries or even death.

Electrical work should only be carried out by authorised and skilled personnel.

DANGER!

Danger of electric voltage.

Non-compliance may cause serious injuries or even death..

- Make sure the main control cabinet and the subsidiary distribution point are always kept locked to prevent unauthorised opening.
- Disconnect the control cabinet through the main switch if you undertake maintenance work: pull out the mains power plug.
- Protect the control cabinet during maintenance work with a safety lock against possible connection by third parties.

DANGER!

Danger may occur by alternations or removal of protective equipment at the machine.

Non-observance will cause serious bodily injuries or even death.

Report any audible/visible safety relevant alteration of the machine to the relevant responsible authorities in your company..

WARNING!

Danger of the opened protective hood falling down.

Non-observance may cause serious bodily injuries by jamming of parts of the body or even death

You can recognize a pressure loss as follows: hood is coming down on its own from the completely opened up position.

- Check the condition of the gas struts after every production run/daily and replace them, if necessary.
- Make sure that when working with an opened noise damping hood it is completely opened up to the stop.

CAUTION!

Danger from heavy machine elements.

Non-observance may possibly cause personal injuries and damage to property.

If the element weighs more than 25 kg it should only be lifted with the assistance of another person.

WARNING!

Danger of rotating machine element

Non-observance will cause serious injuries or even death.

- Make sure of always tying back your hair and keeping it protected.
- Take off any jewellery before you operate the machine or carry out any maintenance work.
- Make sure of wearing only close fitting clothes while you operate or maintain the machine..

WARNING!

Danger of rotating machine elements

Non-observance may possibly cause serious personal injuries and damage to property.

With sudden machine stops and before you re-connect the machine, make sure that:

- no other person is at the machine
- the machine is in perfect working condition

WARNING!

Danger from maintenance tools.

Non-observance may possibly cause serious personal injuries and damage to property.

- You should only use tools that are in perfect condition.
- Make sure that no tool has been left on/in the machine after completion of your adjustment or maintenance work.

WARNING!

Danger of rotating machine elements during assembly work.

Non-observance may possibly cause serious personal injuries and damage to property.

- Disconnect the machine for maintenance and repair work through the main switch.
- Secure the control cabinet against unintended re-connection.
- Make sure that no other person is at the machine before you re-connect it.

CAUTION!

Danger of tripping on cables lying about.

Non-observance will cause danger of personal injuries.

Make sure to lay machine connections (cables, hoses, tubes) so that no tripping points are formed.

WARNING!

Danger of rotating machine elements during the set-up process.

Non-observance may possibly cause serious personal injuries and damage to property.

Make sure that no other person is at the machine when setting up the machine.

CAUTION!

Danger from misuse of cleansing agents.

Non-observance may possibly cause adverse health effects.

- Avoid any skin contact.
- Protect your eyes against splashes.
- Wear safety gloves while you carry out any cleaning work.
- Check each manufacturer's information to ensure that you are totally informed about the residual dangers in respect to their non-irritant cleansing agents..

CAUTION!

Danger from used cleaning rags.

Non-observance may possibly cause personal injuries and damage to property.

- Observe fire hazards resulting from the inflammability of the cleansing agent.
- Dispose of the cleaning rag environmentally.
- Check each manufacturer's information to ensure that you are totally informed about the residual dangers and professional disposal of their cleansing agents.

2.2 Product safety

2.2.1 Obligation and liability

Please observe the instructions in the operating manual:

The absolute pre-requisite for the proper handling and trouble-free operation of this machine is knowledge of the elementary safety instructions and safety regulations.

This operating manual should be observed by all persons working at the machine. In addition, the rules and regulations applicable to the operating site for prevention of accidents should also be observed.

Dangers in dealing with the machine:

The “Combi folding machine K 800.2“ is built in accordance with the latest state-of-the-art technology and approved safety requirements. Nevertheless, danger to life and limb of the operator or third parties, or other infringements to the machine or other physical assets may occur.

Dangers in dealing with the machine:

- for the destined utilisation
- in a safe technologically perfect condition

Any interference that may have a negative effect on safety shall be eliminated immediately.

Warranty and liability:

Our “General Terms of Sale and Delivery“ are applicable. They are available to the operator following conclusion of the contract. Any claims based on warranty and liability for personal injuries and damage to property shall be excluded if they are attributable to one or several causes as follows:

- Non-destined application of the machine
- Improper assembly, commissioning, operating and maintaining of the machine
- Operating the machine with defective safety devices or non-properly affixed or non-functional safety and protection devices
- Non-observance of the instructions contained in the operating manual in respect of transportation, storage, installation, commissioning, operating, maintenance and retrofitting of the machine
- Arbitrary structural modifications on the machine
- Non-compliance of maintenance and cleaning intervals which exclude a machine down-time
- Insufficient observation of machine parts which are subject to wear
- Disastrous events caused by foreign influence and force majeure

2.2.2 Destined utilisation

- The machine is only destined for feeding, folding, and perforating of paper.
- The machine is only designed for one-man operation.
- The machine should only be operated in a perfect technical condition. Any failures that may endanger safety must be remedied immediately by skilled personnel, or a specialist from the manufacturer or supplier.
- The machine should only be operated by specially trained and instructed specialists

2.2.3 Inappropriate utilisation means:

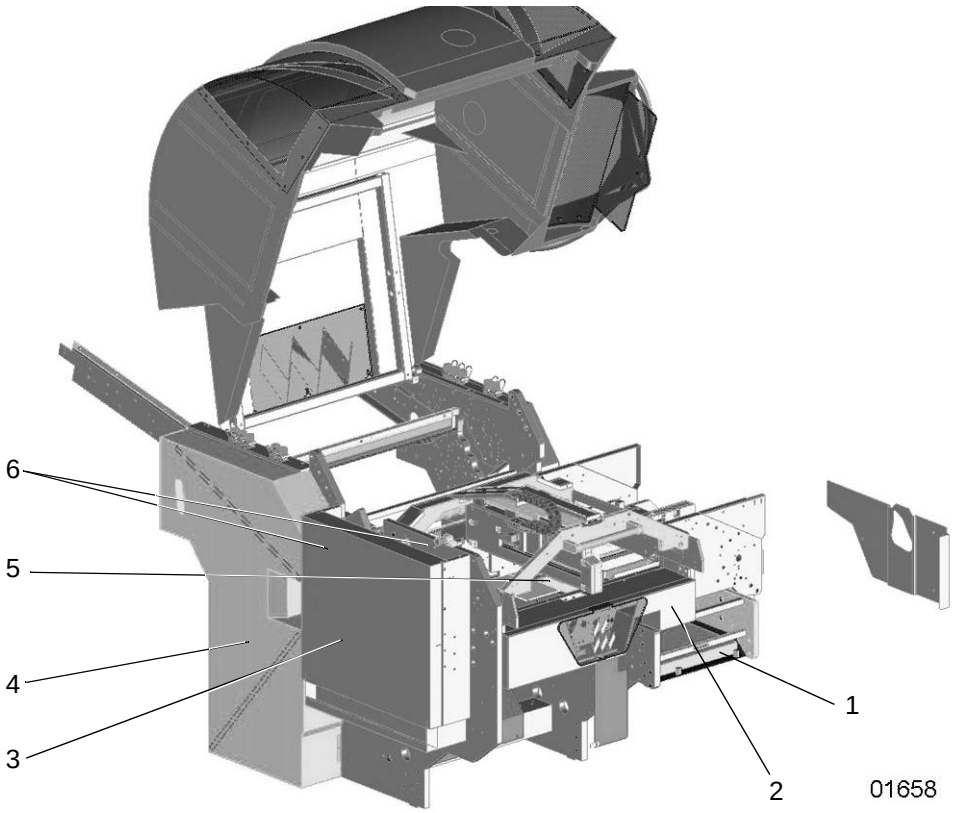
- any other use of the machine other than feeding, folding, and perforating of paper
- the processing of materials other than paper
- manipulation and arbitrary changing of the machine
- removal of protection and safety devices at the machine
- operation of the machine without instruction or training of the operating personnel

The manufacturer or supplier shall not be liable for any damages caused by improper utilisation.

2.3 Protective devices

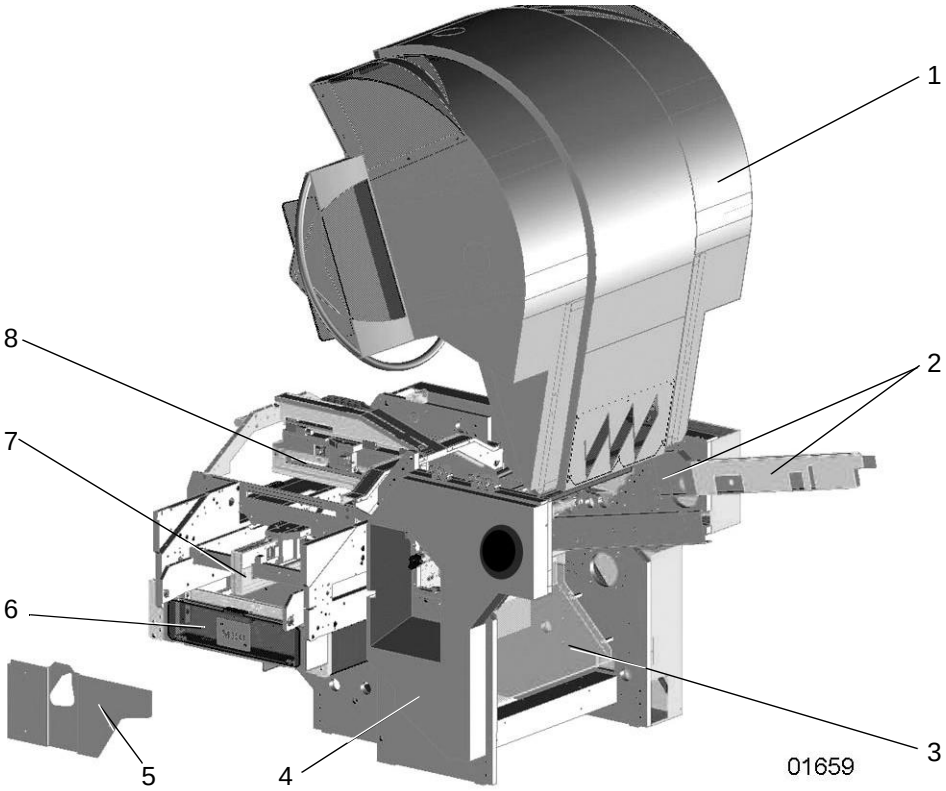
You are kindly requested to regularly check your machine with these check lists.

2.3.1 Check list for protective hoods - folding machine



Pos.	Description	Functioning control	Visual inspection	Result	Note
01	Guard under threefold				
02	Guard before foldrollers and slitter shafts Combi folding section				
03	Mobile guard before buckle plate KTL				
04	Guard of parallel fold				At drive side
05	Guard before threefold drive				
06	Guard before drive shaft of threefold				
Date::		Name:		Signature::	

Table 6: Checklist for protective hoods- folding machine



Pos.	Description	Functioning control	Visual inspection	Result	Note
01	Protective hood over parallel fold in Combi folding section				
02	Guard over drive before register table and suction tape				two-pieced
03	Guard before drive of Combi folding section				
04	Guard of parallel fold				At operator side
05	Guard KTLT foldrollers and slitter shafts at threefold				
06	Guard KTL foldrollers and slitter shafts at threefold				
07	Guard of threefold knife				
08	Guard of crossfold knife				
Date::		Name:		Signature::	

Table 7: Checklist for protective hoods- folding machine

2.4 Organisation and personnel

2.4.1 Safety at work

- Please keep this operating manual always with the machine.
- In respect to the operating manual please observe the generally applicable local regulations for the prevention of accidents and environmental protection.
- Keep all safety and danger instructions at the machine in a legible condition. Renew the safety and danger instructions occasionally.

2.4.2 Requirements for executive personnel

This table represents the areas of responsibility and the various functions of group of persons working at the machine.

	Instructed persons	Mechanic (company)	Service	Skilled electricians	Supervisor with appropriate responsibility
Transportation and packaging	X	X	X		X
Commissioning	X		X	X	
Operation	X		X		X
Mechanical trouble-shooting	X	X	X		X
Electrical trouble-shooting			X	X	
Set-up, retrofitting	X		X		X
Maintenance	X	X	X		X
Repair		X	X	X	
De-commissioning, storage			X	X	

Table 8: Personnel requirements

2.4.3 Qualification and training

- Ensure that only trained and instructed personnel work on the machine.
- It is essential that the operating and maintenance personnel of the user have read and understood the information.
- Ensure that the personnel operating, retrofitting and maintaining the machine are fully competent.
- Ensure that the personnel to be trained/instructed work only under the supervision of a skilled person.
- Have the instructions you have given signed by the individual person to signify they have understood them.

2.5 Personal protective kit

ATTENTION!

Danger of noise from the folding operation

Non-obeyance may cause hearing problems.

Use ear protection while you are working on the folding machine.

ATTENTION!

Danger from the slitter shaft

Non-obeyance may cause cuts.

Use safety gloves and safety shoes while you perform retrofitting and maintenance work at the slitter shaft.

2.6 Details in case of emergency

2.6.1 Rescue of persons

1 Emergency measures		• Rescue the injured person. • Restore vital functions and maintain them. • Avoid additional impairment.
2 Emergency call		Telephone number:.....(enter) • What happened? • How many persons are involved/injured? • Where did it happen? • Which type of injury? • Who reports? • Wait in case of any inquiries!
3 First aid		• Cordon off the scene of the accident. • Further medical care of the injured person by: • ensuring comfortable and correct position • soothing words • immobilisation of fractures, • putting on bandage if open wounds
4 Additional measures		• Direct ambulance to site of accident. • Keep accident scene clear from onlookers.

Table 9: Rescue of persons

2.6.2 Escaping substances

In the event of fire please observe the internal company directives and comply with the prescribed instructions. If those are not available proceed as follows:

2.6.2.1 Solvent-containing degreasers or hydrocarbons

- Inform your supervisor.
- Escape of material: in the event of extensive quantities, ensure a fresh air supply immediately, and leave the room.
- Absorb minor spilled quantities with available binding agents.
- In the event of fire extinguish only with proper extinguishing agents.
- Inform the first available person and supervisor on the scene and able to give assistance after an accident.
- In the event of skin contact wash off thoroughly with water and skin cleanser.
- In the event of eye contact irrigate thoroughly with water (eyebath/ irrigator).
- In the event of inhalation of vapours ensure immediate exposure to fresh air.
- Carry unconscious persons immediately into fresh air.

2.6.2.2 Combustible degreasers or water immiscible hydrocarbons (e.g. paraffin oil, solvent naphta, naphtene, hexamethylene)

- Ignition of material: disconnect the system, leave the danger area and inform the shift foreman.
- Extinguishing agents: carbon dioxide (CO2), foam, dry powder or water spray.
- Leakage: absorb small leaked quantities with binding agents.
- Collect recycled material and refuse in designated containers.
- Eyes: irrigate immediately and thoroughly with water for at least 10 minutes and seek medical attention.
- Skin: wash area of skin concerned thoroughly with water.
- Inhalation: ensure immediate exposure to fresh air. Keep the injured person calm and warm. Send for the doctor.
- Swallowing: consult a physician immediately

2.6.2.3 Cleaner with diluted alkaline solution

- Leakage: inform supervisor. Absorb minor spilled quantities of concentrate with available binding agents. Wash away minor quantities thoroughly with water.
- Accidents: inform the first available person and supervisor.
- In the event of swallowing the concentrate gargle with water, and continue to drink a lot of water.
- After swallowing of concentrate or continuous irritation seek assistance from a docto

2.6.2.4 Cleaner BG5-9, weak alkaline

- Leakage: neutralise small escaped quantities before any leakage into the sewerage system.
- Eyes: irrigate immediately and thoroughly with water for at least 10 minutes and seek medical attention!
- Skin: wash area of skin concerned thoroughly with water.
- Inhalation: ensure immediate exposure to fresh air. Keep the injured person calm and warm. Send for the doctor.
- Swallowing: consult a physician immediately and provide label/safety data sheet.

3 Transportation/Erection/Installation

Target group for work on transportation and commissioning:

	Instructed persons	Mechanic (name of company)	Service	Electrician	Supervisor with corresponding responsibility
Transportation	X	X	X		X
Erection	X	X	X		
Installation	X	X	X		
Electrical connections			X	X	

Table 10: Transportation/Erection/Installation

WARNING!

Danger of parts falling over during unloading and erecting.

Non-observance may cause serious personal injuries and damage to property.

- Please observe the weight indications for transportation under the chapter "Technical data".
- Please use a fork lift as conveyor.
- Make sure that additional personnel are available to assist if required during the unloading and erecting process. Certain parts of the machine must additionally be supported and secured.

3.1 Transportation

3.1.1 Feeder

Please observe the separate operating manual for the feeder.

3.1.2 Folding machine

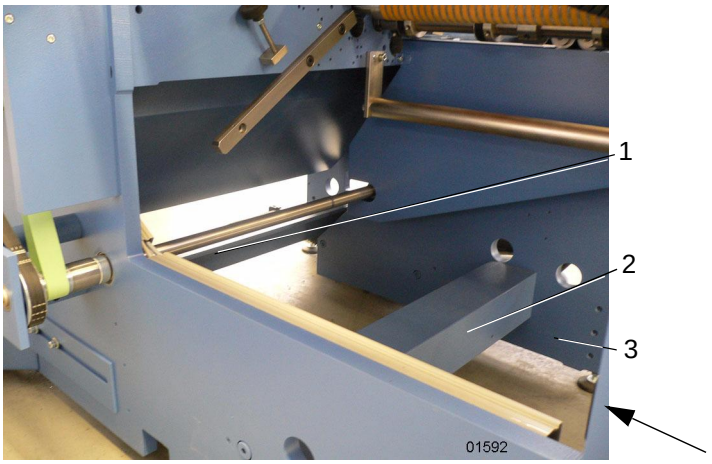
WARNING!

Danger of tipping and slipping of the folding machine.

Non-observance may cause serious personal injuries and damage to property.

The folding machine is braced on the right side in the threefold section.

- Set the forks of the fork lift at the right side wall (3) as close as possible.
- Make sure that the folding unit is sufficiently secured.



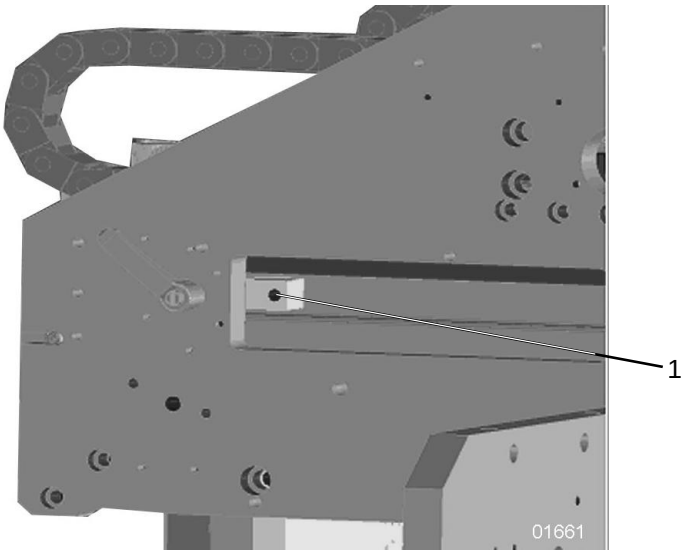
1 Cross bar
2 Cross bar
3 Side wall on the right

Figure 7: Transportation of folding machine

Follow these steps when lifting and setting up the folding machine:

w Remove the packing material from the machine
w Dispose of the packing material environmentally.
w Unscrew the folding machine from the pallet.
w With the fork lift, move in the direction of the arrow underneath both cross bars (1) and (2).
w Set the fork lift at the right side wall (3) as close as possible.
w Lift up the machine
w Move the machine to its destination.

3.1.2.1 Transportation lock threefold unit



1 Hexagon screw

Figure 8: Transportation lock threefold slide

The threefold unit is secured with a hexagon screw (1) for transportation.

w Remove the hexagon screw (1) from the threefold unit as soon as the machine has attained its final position.

w For each further transportation, it is necessary to secure the threefold unit with the hexagon screw. Keep therefore the hexagon screw in a safe place.

ATTENTION!

Danger of slipping out of the threefold unit during transportation.

Non-observance may possibly cause damage to property at the machine.

- Always secure the threefold unit with the hexagon screw (1) before transportation.
- Remove the transportation lock (1) from the machine after its erection.

3.1.3 Delivery

Please observe the separate operating manual for the delivery.

3.2 Cleaning of the machine

After erecting the machine, clean all machine parts carefully to prevent rust.Please observe the recommendation of cleaning agents in the subsequent table and the detailed description of the foldroller cleaner “Varn“ in the chapter “Maintenance“.

Part of machine	Cleansing agent
Lacquered surfaces	Solvent-free cleansing agent
Foldrollers	Foldroller cleaner “Varn“ bearing the no. “Varn-Wash VM 111 or VWM“
Plates	Degreaser of your choice

Table 11: Cleaning recommendation

3.3 Erection/Installation

3.3.1 Feeder

Please observe the separate operating manual for the feeder.

3.3.2 Folding machine

WARNING!

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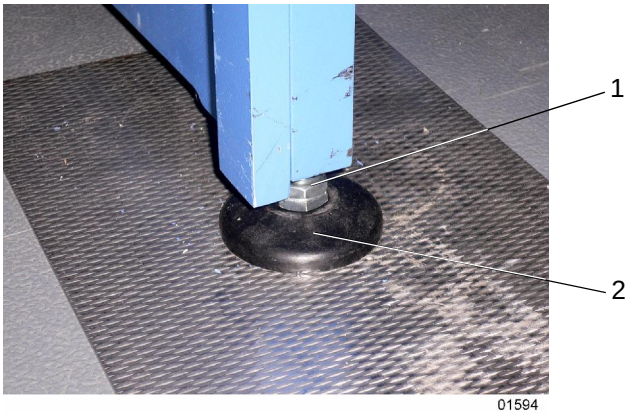
Non-observance may cause serious personal injuries and damage to property.

The folding machine is braced on the right side in the threefold section.

- Set the forks of the fork lift at the right side wall (3) as close as possible.
- Make sure that the folding unit is sufficiently secured.

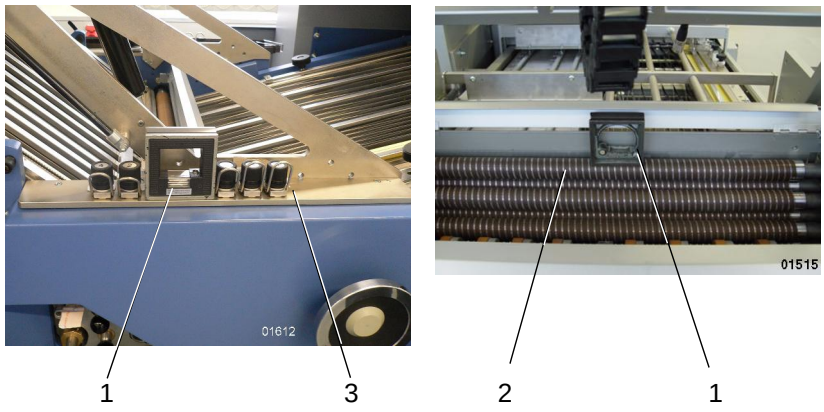


1 Adjusting screw 2 Plastic disk

Figure 9: Aligning of the folding machine

Erect the folding machine as follows:

w Move the folding unit to its final position.
w Place the plastic disks (2) underneath the adjusting screws (1) .
w Align the folding unit by means of the adjusting screws (1) and the spirit level.



1 Machine spirit level
2 Upper foldroller
3 Side part

Figure 10: Aligning of the folding machine

w Align to the exact height through the adjusting screws.
w Level the folding unit I by means of the spirit level (1).

Length-wise alignment:

w Place the machine spirit level (1) on the side part (3).

Cross-wise alignment:

w Place the machine spirit level (1) on top of the upper foldroller (2).

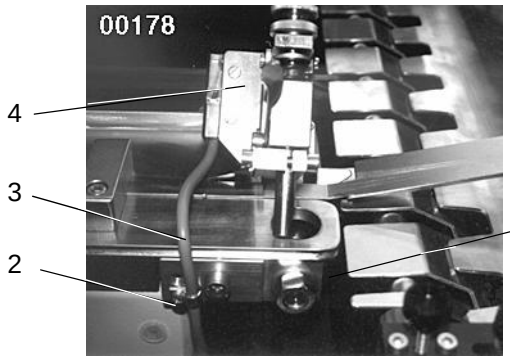
3.3.3 Feeder

Observe the separate operating manual for the feeder for transportation and installation.

3.3.3.1 Connection of the feeder with the folding unit

w Connect the feeder with the folding unit and screw together, but do not over-tighten. Please take the details for the connection of the folding unit and feeder from the separate operating manual for the feeder.

3.3.3.2 Connection of the double-sheet control



1	Screw	3	Cable
2	Screw	4	Double-sheet control

Figure 11: Connection of the double-sheet control

Connect the double-sheet control (4) as follows:

w Fasten the double-sheet control with the screw (1).
w Fasten the cable (3) for the double-sheet control with the screw (2).

3.3.3.3 Connection of air tubes for sheet infeed

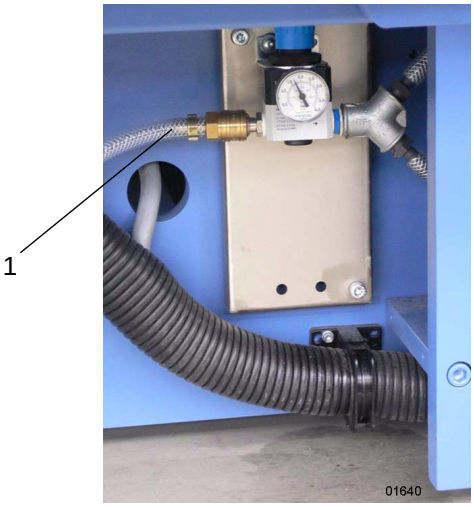


Figure 12: Connection of air tube sheet infeed

w Connect the air tube (1).

NOTE

The air tube is assembled by the manufacturer. Do not change these settings!

3.3.4 Safety and noise damping hood

WARNING!

Danger of the opened protective hood falling down.

Non-observance may cause serious bodily injuries by jamming of parts of the body or even death.

You can recognize a pressure loss as follows: hood is coming down on its own from the completely opened up position.

- Check the condition of the gas struts after every production run/daily and replace them, if necessary.
- Make sure that when working with an opened noise damping hood it is completely opened up to the stop.

Figure 13: Safety and noise damping hood

The safety and noise damping hood (1) is assembled by the manufacturer.

3.3.4.1 Safety switch

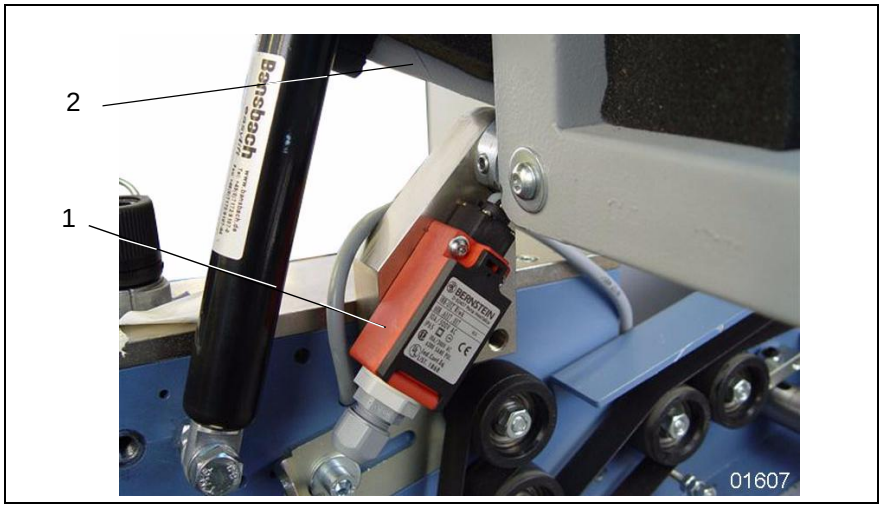
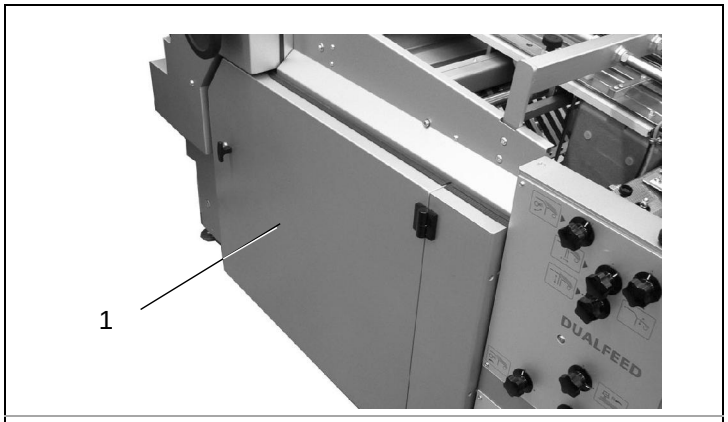


Figure 14: Safety switch

The safety and noise damping hood is electrically secured. That means that the safety switch (1) prevents illegal opening of the hood during the operation. Switch (1) stops the machine as soon as the safety hood (2) has opened.

3.3.5 Door with compartment for tools



1 Door

Figure 15: Door with compartment for tools

w Hang the compartment door (1) on the hinges

3.4 Electric connection

DANGER!

Danger of residual voltage at the main terminals of the main switch at the open switch cabinet.

Non-observance will cause serious bodily injuries or even death.

Electrical work should only be carried out by authorised and skilled personnel.

DANGER!

Danger of electric voltage.

Non-compliance may cause serious injuries or even death.

Follow the wiring diagram of the machine for all connecting work.

CAUTION!

Danger of non-concurrence of the feed direction/feeder table with the switching position/main control panel.

Non-observance may cause considerable material damage to the feeder as the final switch control is not functioning properly

If necessary, alter the terminal bar in the main control cabinet.

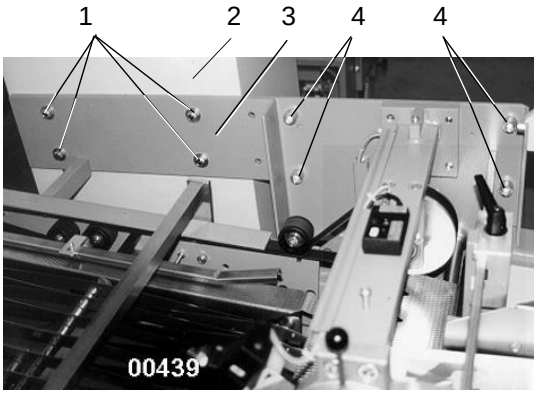
DANGER!

Danger of electric voltage.

Non-compliance may cause serious injuries or even death.

- Make sure to keep the main control cabinet and the subsidiary distribution point always locked to prevent unauthorised opening.
- Disconnect the control cabinet through the main switch if you undertake maintenance work; pull out the mains power plug.
- Protect the control cabinet during maintenance work with a safety lock against possible connection by third parties.
- Observe the wiring diagram for the machine.

3.4.1 Assembly of the main control panel



1	Screws	3	Support
2	Main control panel	4	Screws

Figure 16: Main control panel

Fasten the main control panel as follows:

w Attach the support (3) with the four screws (4).
w Fasten the main control panel (2) with the four screws (1) to the support (3).

3.4.2 Mains connection

DANGER!

Danger of electric voltage.

Non-compliance may cause serious injuries or even death.

- This work should only be carried out by skilled personnel.
- Ensure that the mains voltage and the frequency correspond to the data indicated on the type plate (1).
- Observe the right rotary field.
- Check the speed of rotation of the motors. If necessary, alter the terminal bar in the main control cabinet.

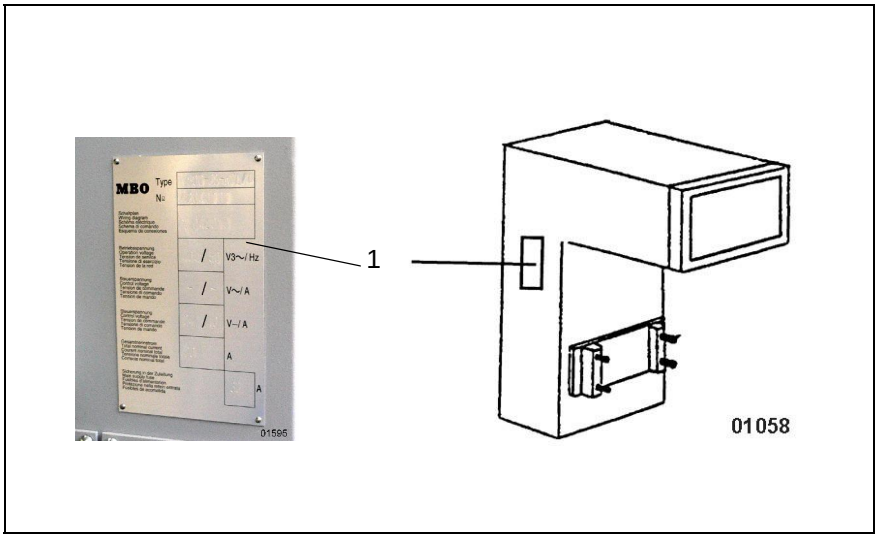
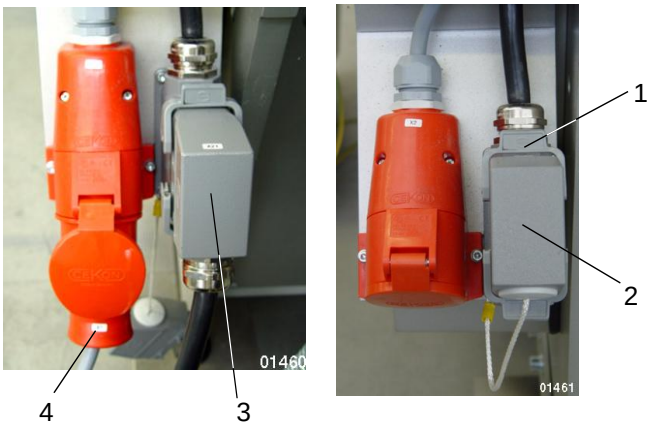


Figure 17: Control cabinet

3.4.3 Electrical connection



1	Socket of machine control	3	Control plug
2	Dummy plug	4	Mains plug

Figure 18: Electrical connection

Works with a delivery/supplementary unit:

Connect the electrical link:

w Connect the mains plug (4) of the delivery to the folding unit.
w Connect the control plug (3) of the delivery to the folding unit.

Works without a delivery/ supplementary unit:

w Pull out the mains plug (4) from its socket.
w Pull out the control plug (3) from the socket of the folding machine.
w Plug-in the dummy plig (2) into the socket (1) of the folding machine.

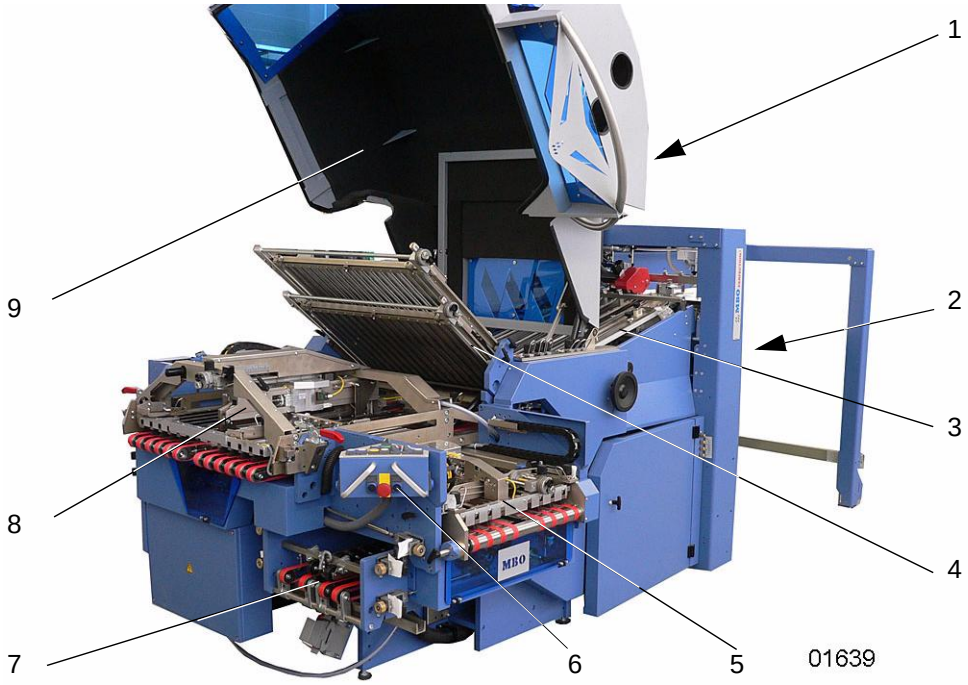
3.5 Inspection after first commission

After the first commission of the folding machine, it is necessary to make a visual inspection of belts and tapes **after 20 hours of operation**.

w Check the belts and tapes on correct centre running and on coorect tension. Readjust, if necessary!
w Please follow the indicated maintenance intervals in chapter "Maintenance"

4 Erection and functionning

4.1 Machine chart



1	Operator panel	6	Manual operator panel for cross- and threefold
2	Feeder	7	Exit of folding unit
3	Alignment table	8	Crossfold
4	Parallel fold	9	Protective hood
5	Threefold		

Figure 19: Machine chart

4.2 Procedure of paper folding

The MBO Combi folding machine works according to two different paper folding procedures:

- principle of buckle folding,
- principle of knife folding.

Principle of buckle folding:

The principle of "buckle fold" is that the sheet is always pushed into the buckle plate.
The foldrollers (1), (2) and (3) and one buckle plate (4) are necessary to prepare a buckle fold.

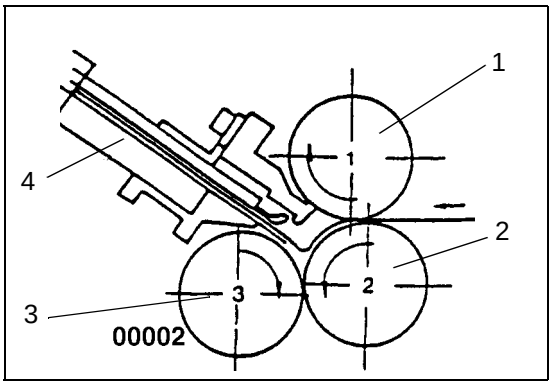


Figure 20: Principle of buckle fold

Foldrollers (1) and (2) carry the sheet into the buckle plate (4) (if this one is opened) to the sheet stop.up to the sheet stop.

A buckle occurs during transportation through these foldrollers (1) and (2) to the direction of foldrollers (2) and (3) by which the sheet is folded through its passage.

Principle of knife folding:

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

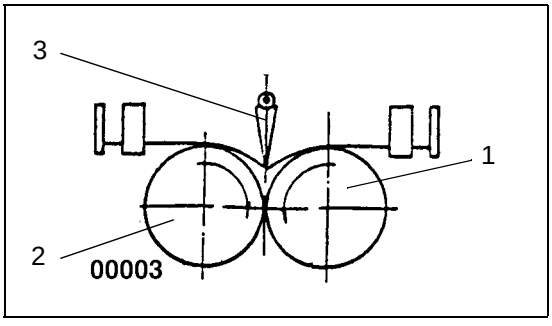


Figure 21: Principle of knife folding

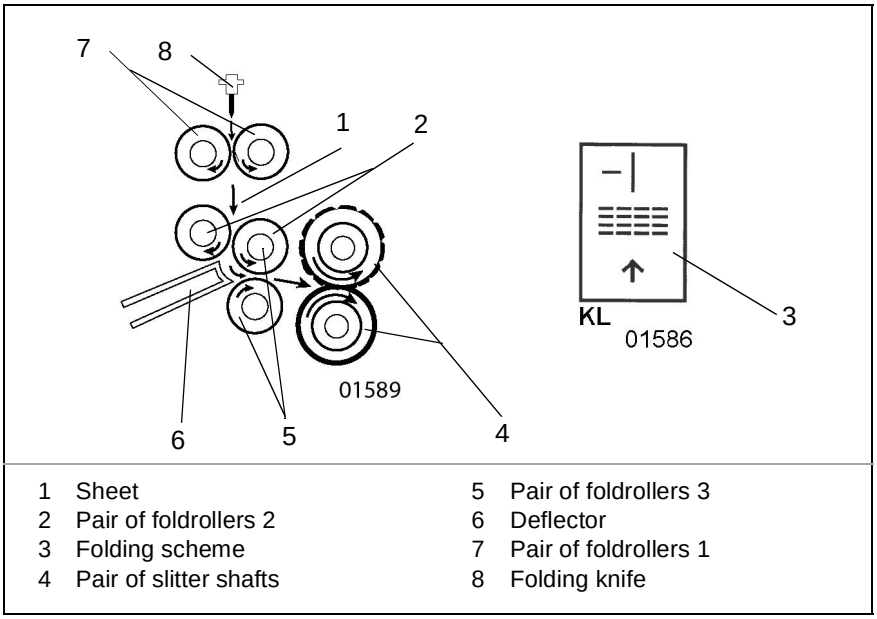
The sheet is transported under the knife (3) to a sheet stop and aligned. After the knife (3) has been released it moves the sheet between the foldrollers (1) and (2) where it is folded during its passage.

4.3 Configurations

The Combi folding machine K 800.2 folds, cuts, scores, punches and punches-perforates sheets and can be delivered in three configurations:

- version KL
- version S-KTL
- version S-KTLT

4.3.1 Version KL



1	Sheet	5	Pair of foldrollers 3
2	Pair of foldrollers 2	6	Deflector
3	Folding scheme	7	Pair of foldrollers 1
4	Pair of slitter shafts	8	Folding knife

Figure 22: Version KL

The designation "K 800.2 KL" means:

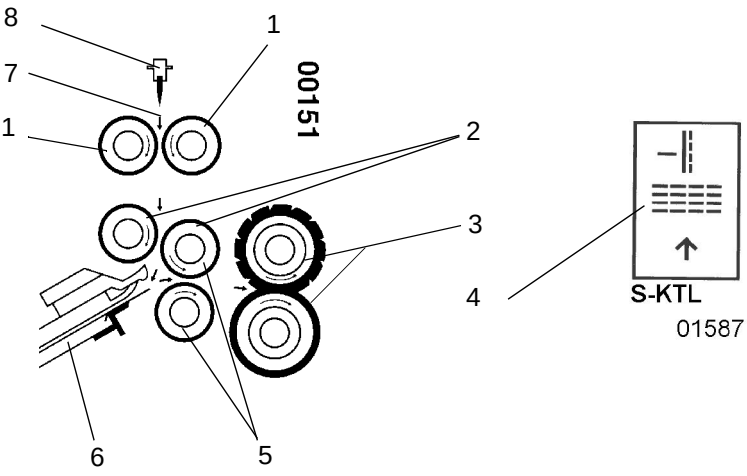
K	Combi folding machine
800.2	Designation of type
K	Crossfold
L	Threefold left of the sheet infeed direction

The cross- and threefold unit version KL consists of:

- transport tapes
- an electronically controlled folding knife
- foldrollers and an adjustable sheet stop,
- stabile, quickly removeable slitter shafts (standard at crossfold, optional at threefold).

Working method: The folding knife (8) carrys the sheet (1) into the first pair of foldrollers (7) and folds the sheet during its passage.The pair of foldrollers (2) carrys the sheet past of the sheet deflector (6) in direction of the foldroller pair (5). The subsequent pair of slitter shafts (4) cuts, punches or perforates the sheet (1).

4.3.2 Version S-KTL



1	Pair of foldrollers 1	5	Pair of foldrollers 3
2	Pair of foldrollers 2	6	Buckle plate
3	Pair of slitter shafts	7	Sheet
4	Folding scheme	8	Folding knife

Figure 23: Version S-KTL

The designation "K800.2 S-KTL" means:

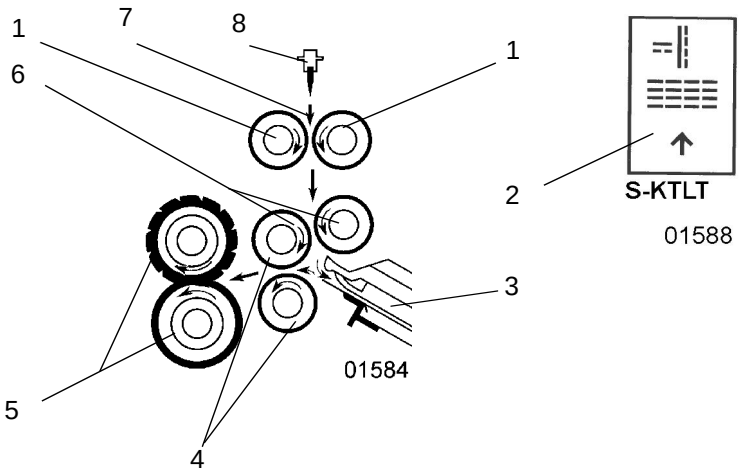
K	Combi folding machine
800.2	Designation of type
S	Super
K	Crossfold
T	Buckle plate after the 1. knife
L	Threefold left of the sheet infeed direction

Working method: The folding knife (8) carrys the sheet (7) into the first pair of foldrollers (1). The sheet is folded during its passage.

The second pair of foldrollers (2) carrys the sheet (7) into buckle plate (6) (if this one is opened) to the sheet stop.A buckle occurs during transportation through the second foldroller pair (2) in direction of the third foldroller pair (5) by which the sheet is folded during its passage.

The subsequent pair of slitter shafts (3) punches, perforates and cuts the sheet (7).

4.3.3 Version S-KTLT



1	Pair of foldrollers 1	5	Pair of slitter shafts
2	Folding scheme	6	Pair of foldrollers 2
3	Buckle plate	7	Sheet
4	Pair of foldrollers 3	8	Folding knife

Figure 24: Version S-KTLT

The designation "K800.2 S-KTLT" means:

K	Combi folding machine
800.2	Designation of type
S	Super
K	Crossfold
T	Buckle plate after the 1. knife
L	Threefold left of the sheet infeed direction
T	Buckle plate after the 2. knife

Working method:

The folding knife (8) carrys the sheet (7) into the first pair of foldrollers (1). The sheet is folded during its passage.

The second pair of foldrollers (6) carrys the sheet (7) into buckle plate (3) (if this one is opened) to the sheet stop.A buckle occurs during transportation through the second foldroller pair (6) in direction of the third foldroller pair (4) by which the sheet is folded during its passage.

The subsequent pair of slitter shafts (5) punches, perforates and cuts the sheet (7).

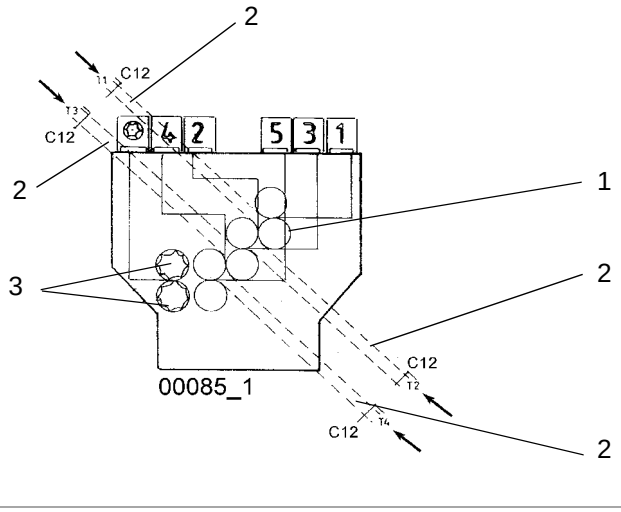
4.4 Folding units

The folding machine K 800.2 is equipped with the following units:

- parallel folding unit (Principle of buckle folding)
- Crossfold folding unit (Principle of knife folding)
- Threefold folding unit (Principle of knife folding)

4.4.1 Parallel folding unit

The parallel folding unit is always the first unit of the folding machine and works according to the principle of buckle folding.



1	Spiral foldrollers	3	Slitter shafts
2	Buckle plates		

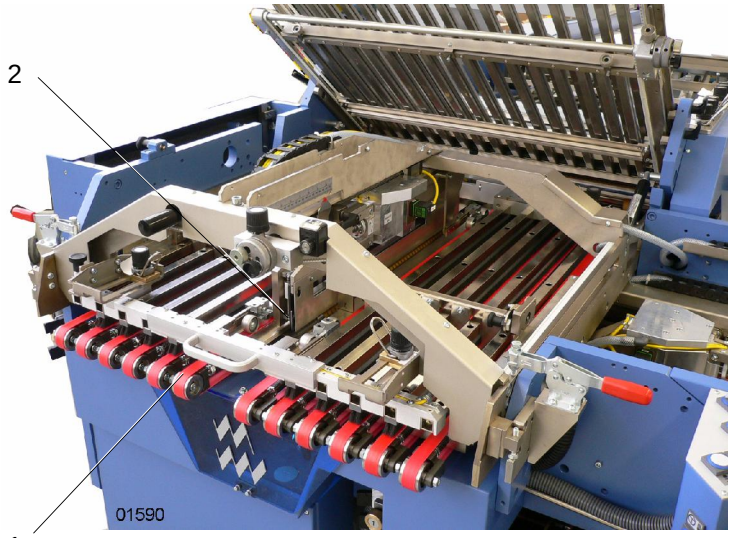
Figure 25: Outline parallel folding unit

The parallel folding unit alternatively has:

- 4 or 6 buckle plates with swing deflectors,
- spiral foldrollers, adjustable through quick setting elements
- quickly removeable slitter shafts.

4.4.1.1 Crossfold folding unit

The crossfold folding unit is the first knife folding unit of the machine. There, the sheet obtains a fold, in right angle to the parallel fold.
The subsequent slitter shaft (standard) cuts, scores, perforates or punch-perforates the sheet.



1	Transport tapes	2	Folding knife

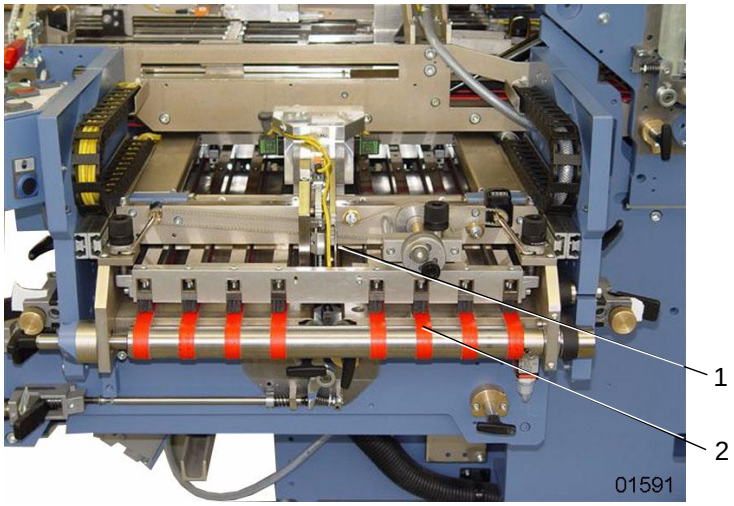
Figure 26: Crossfold folding unit

The crossfold folding unit consists of:

- transport tapes,
- an electronically controlled folding knife,
- 5 foldrollers,
- one buckle plate for various folding types parallel to the crossfold (optional).
- quickly removeable slitter shafts (standard).
- sheet stop, swiveable (pneumatic optional)

4.4.1.2 Threefold folding unit

The threefold folding unit is the second knife folding unit of the machine. There, the sheet obtains another fold, in right angle to the first knife fold The subsequent slitter shaft (optional) cuts, scores, perforates or punch-perforates the sheet.



1	Folding knife	2	Transport tapes

Figure 27: Threefold folding unit

The threefold folding unit consists of:

- transport tapes,
- an electronically controlled folding knife,
- two foldrollers,
- quickly removeable slitter shafts (optional),
- one buckle plate for various folding types parallel to the threefold (optional),
- sheet stop, swiveable

5 Operating and display elements

5.1 Main control panel "Navigator" (Standard display)

Please also observe the separate operating manual "Navigator".

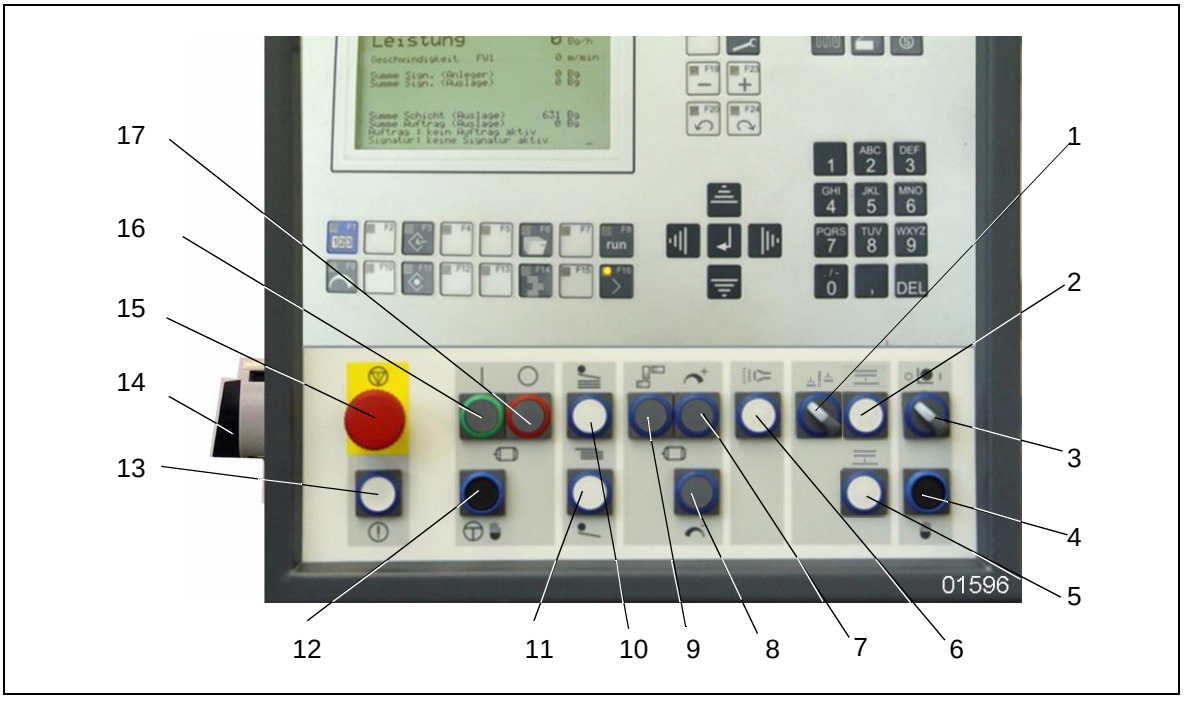


Figure 28: Main control panel "Navigator" with standard display

1 Selector switch palettized feeder; position left = palettized operation
Position right = FLS pile plate at loading height (manually).
2 Push button <Pile table UP>
3 Selector switch <set-up mode>
4 <Two-hand operation> for simultaneous pressing of button (12).
5 Push button <Pile table DOWN>
6 Push button <ON/OFF> for turbo-type air pump
7 Push button <speed increase> machine
8 Push button <speed reduction> machine
9 Push button for joint speed modification (simultaneous pressing of button (7) or (8))
10 Push button <sheet infeed> at production and feeder <start/stop>
11 Push button <sheet infeed single sheet>
12 Tipping and two-hand operation for simultaneous pressing of (4)
13 LED button <Delete errors> (flashes slowly) and <Quality control> (flashes quickly)
14 <Main switch>
15 Mushroom button <Emergency Off>
16 Push button <Machine start>
17 Push button <Machine stop>

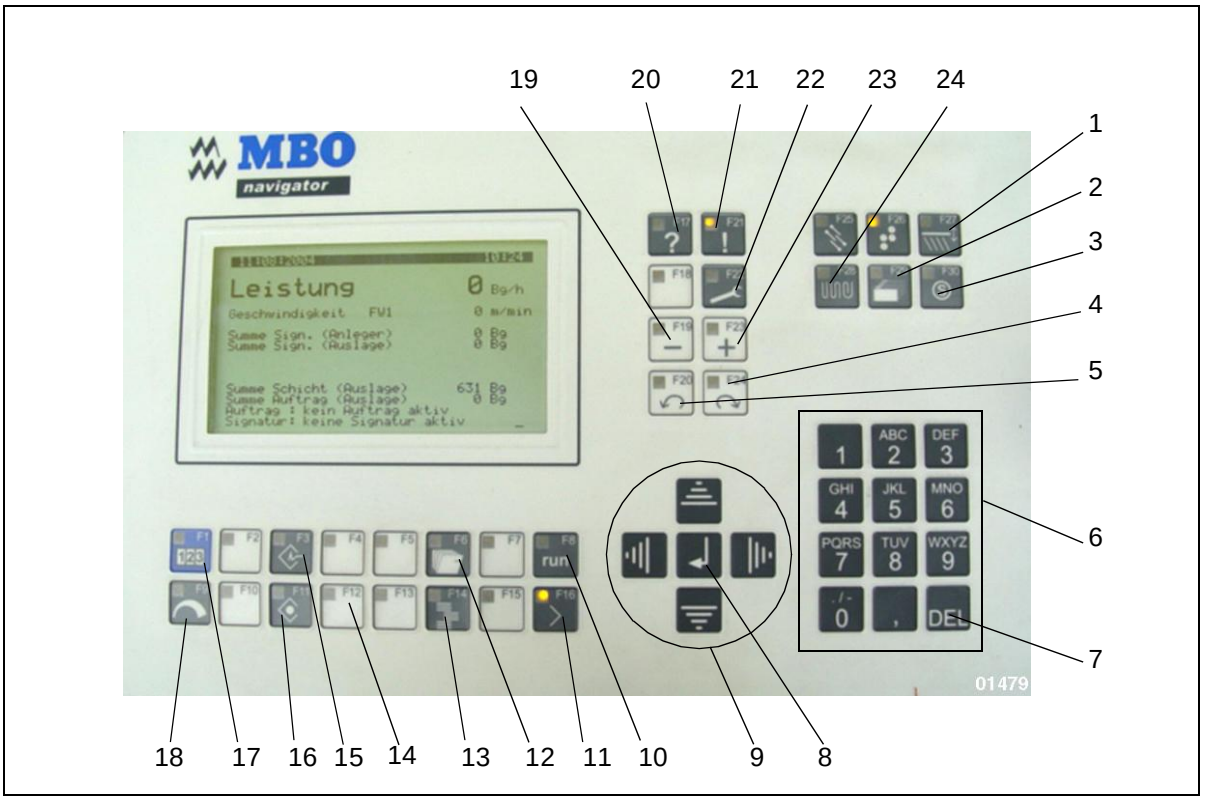


Figure 29: Display Navigator Standard

1 Current position of sidelay **F 27**
2 Folding sample memory **F 29**
3 Special function e.g. gatefold plate **F 30**
4 Switch over to next page **F 24**
5 Switch over to previous page **F 20**
6 Numbered keyboard
7 DELETE (delete)
8 Enter
9 Cursor field
10 Display of current counter data/efficiency **F 8**
11 Positioning **F 16**
12 ob management/Mini BDE **F 6**
13 Selection of marking type and batch counter **F 14**
14 Delay of sheets under the folding knives **F 12**
15 Re-calibration/new calibration **F 3**
16 Sheet gap/ cycle of suction **F 11**
17 Setting of counter **F 1**
18 Speed adjustment **F 9**
19 Minus button **F 19**
20 Help text **F 17**
21 List of errors **F 21**
22 Diagnosis/ service **F 22**
23 Plus button **F 23**
24 Preparation of folding sample **F 28**

5.2 Touch Display "Navigator" (optional)

Please note therefore the separate operting manual "Navigator".

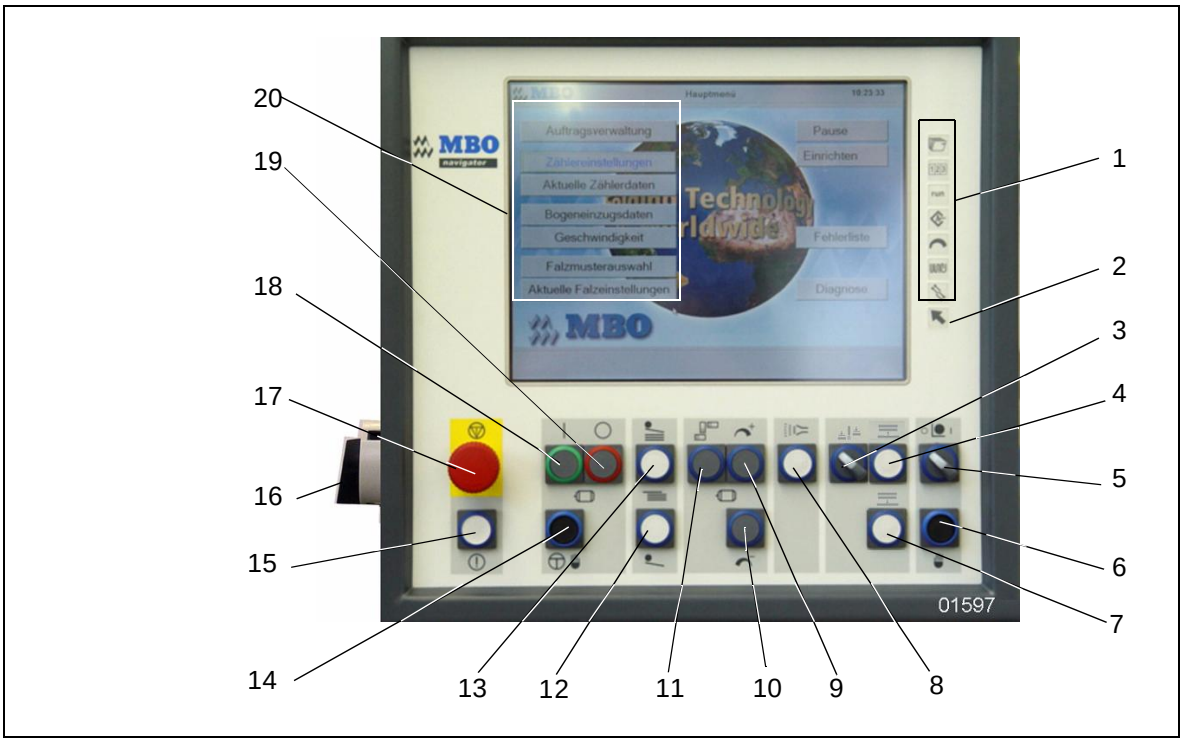


Figure 30: Main control panel "Navigator" with Touch display (optional)

1 Menu <Touch-up pads> (identical to(20))
2 <Home> button, return to the main menu
3 Selector switch palettized feeder; position left = palettized operation, position right = FLS pile plate at loading height (manually)
4 Push button <Pile table UP>
5 Selector switch <Set-up mode>
6 <Two-hand operation> for simultaneous pressing of button (14).
7 Push button <Pile table DOWN>
8 Push button <ON/OFF> for turbo-type air pump
9 PUsh button <speed increase> machine
10 Push button <speed reduction> machine
11 Push button for joint speed modification (simultaneous pressing of button (9) or (10))
12 Push button <sheet infeed single sheet>
13 Push button <sheet infeed> at production and feeder <start/stop>
14 Tipping and two-hand operation for simultaneous pressing of button (6)
15 LED button <Delete errors> (flashes slowly) and <Quality control> (flashes quickly)
16 Main switch
17 Mushroom button <Emergency Off>
18 Push button <Machine start>
19 Push button <Machine stop>
20 Menu <Touch-up pads>

5.3 Operator panel at crossfold and threefold

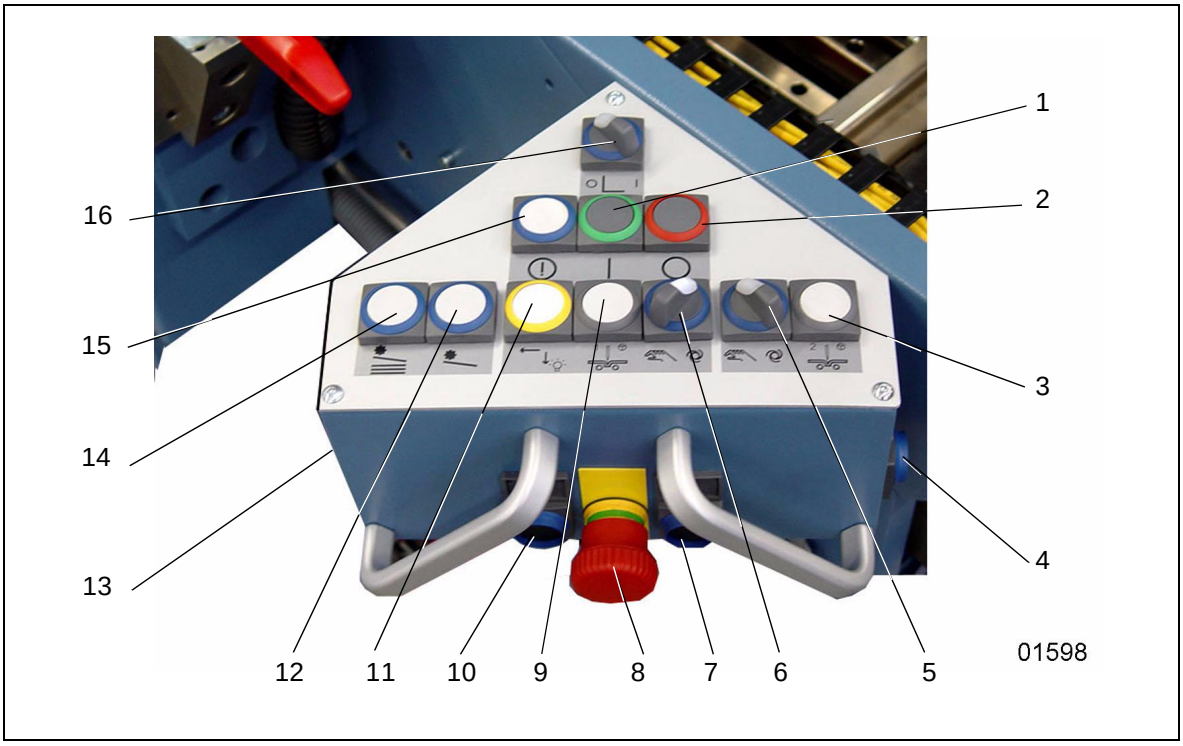


Figure 31: Operator panel at crossfold and threefold

1 Push button <Machine start>
2 Push button <Machine stop>
3 Push button <single stroke release folding knife 2>
4 Push button for <Two-hand operation>
5 Turn-switch <folding knife 2>

Continuous production
Single stroke in connection with button (3)

6 Turn-switch <folding knife 1>

Continous production
Single stroke in connection with button (9)

7 Optional
8 Mushroom button <Emergency off>
9 Push button <single stroke release folding knife 1>
10 Optional
11 Push putton crossfold stop <OPEN/CLOSE> (Optional)
12 Push button <single sheet>
13 Switch <Tipping mode> in connection with push button (4)
14 Push button <sheet during production>
15 LED button <Delete errors> (flashes slowly) and <Quality control> (flashes quickly)
16 Turn-switch <Set-up mode>
Position 0 = Set-up mode OFF
POsition 1 = Set-up mode ON.

5.3.1 Operating modes at operator panel

Two operating modes are possible for the operator panel:

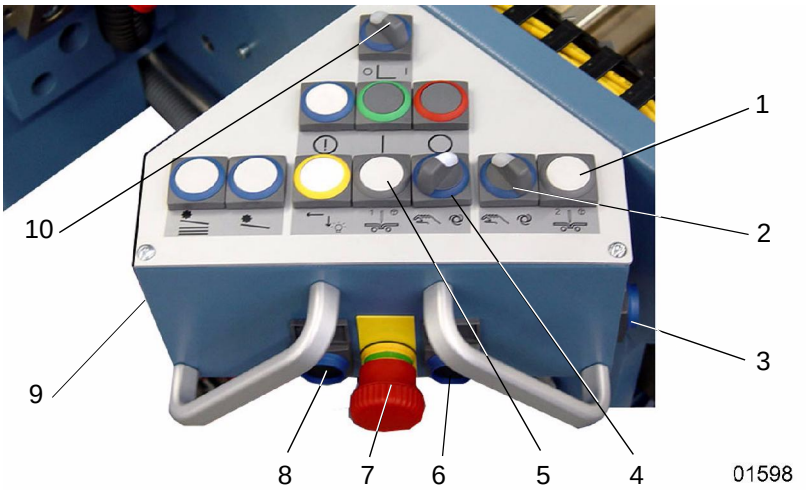
- set-up mode
- production mode

WARNING!

Danger of rotating machine elements during the set-up mode.

Non-observance may possibly cause personal injuries and damage to property.

Make sure that no other person is at the machine!



1	Push button <single stroke release folding knife 2>	6	Optional
2	Turn-switch folding knife 2	7	Emergency off switch
3	Push button for two-hand operation "set-up mode"	8	Optional
4	Turn-switch folding knife 1	9	Push button for "set-up mode"
5	Push button <single stroke release folding knife 1>	10	Push button for "set-up mode"

Figure 32: Betriebsarten am Bedienterminal

5.3.1.1 Set-up mode of folding knives

Folding knife 1 Release of knife stroke (folding unit 1):

w Turn switch (4) to position  .

w Push button (5).

Folding knife 2 Release of knife stroke (folding unit 2):

w Turn switch (4) to position  .

w Push button (1).

5.3.1.2 Set-up mode

In the set-up mode, it is possible to run the machine with an opened hood at three different speeds:

- production speed
- set-up mode of 70 m/min
- set-up mode of 15 m/min

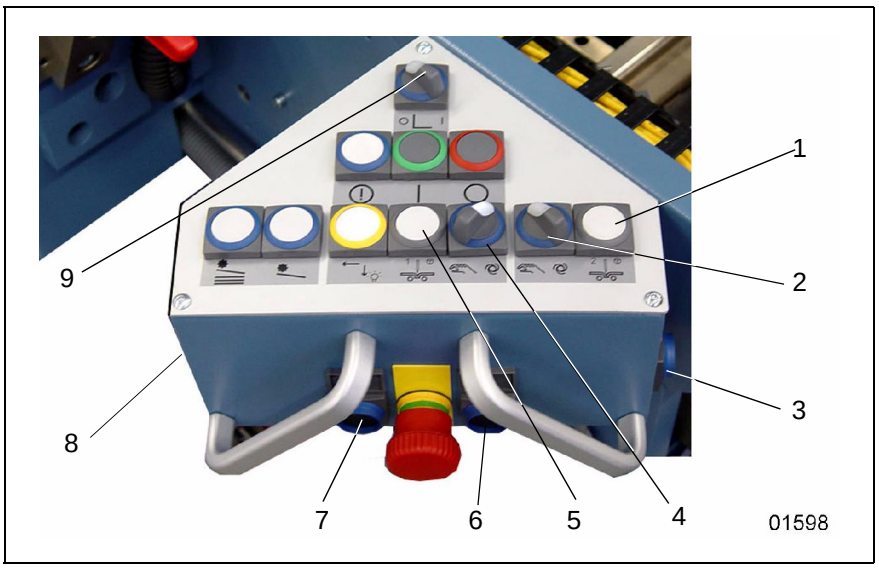


Figure 33: Operating modes operator panel

Set-up mode at production:

w Set turn-switch (9) to position 1.
w Press push buttons (3) and (8) simultaneously.

The machine runs with production speed now

Set-up mode with 70 m/min:

w Set turn-switch (9) to position 1.
w Press push button (8).

The machines runs with 70m/min now.

Set-up mode with 15 m/min:

w Set turn-switch (9) to position 0.
w Press push button (8).

The machine runs with 15 m/min now.

5.3.1.3 Production mode

The machine shall work in the production mode:

w Turn switch (9) to position  .
w Turn switch (4) and (2) to position  .

6 Setting/fitting

Take the target groups for "setting/fitting" from the table:

	Instructed person	Mechanics of company	Service	Electrician	Supervisor with corresponding responsibility
Setting, fitting	X		X		X

Table 12: Setting/fitting - Requirements to personnel

WARNING!

Danger of rotating machine elements during the set-up mode.

Non-observance may possibly cause personal injuries and damage to property.

Make sure that no other person is at the machine!

WARNING!

Danger of rotating machine elements.

Non-observance will cause serious injuries or even death.

- Make sure of always tying back your hair and keeping it protected.
- Take off any jewellery before you operate the machine or carry out any maintenance work.
- Make sure of wearing only close fitting clothes while you operate or maintain the machine..

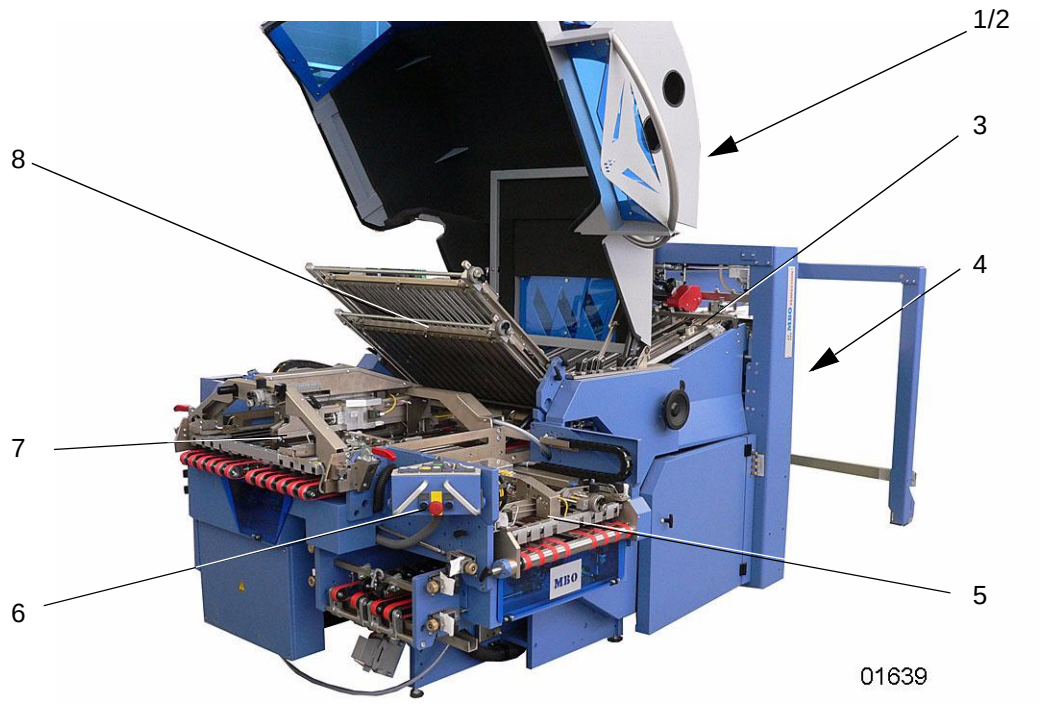
WARNING!

Danger of the openedd protective hood falling down.

Non-observance may cause serious bodily injuries by jamming of parts of the body or even death.

Make sure that when working with an opened noise damping hood it is completely opened up to the stop.

6.1 Outline representation



1 Machine control "standard" (see chapter "6.2" on page 55).
2 Machine control "Touch Display" (see chapter "6.3" on page 62).
3 Alignment table (see chapter "6.4" on page 74).
4 Palettized feeder (see separate operating manual).
5 Threefold folding unit (see chapter "6.7" on page 107).
6 Operator panel for crossfold-threefold section
7 Crossfold folding unit (see chapter "6.6" on page 98).
8 Parallel folding unit (see chapter "6.5" on page 79).

Figure 34: Outline of the subsequent chapters

6.2 Setting of the machine control (standard)

This chapter contains instruction for the most important settings of the machine control:

- Start display
- New job/signature/shift
- Sheet infeed data
- Calibration of machine
- Speed
- Selection of folding samples
- Photocells
- Touch Screen error messages

For further indications, please look at the separate operating manual "Navigator" (standard).

6.2.1 Start display

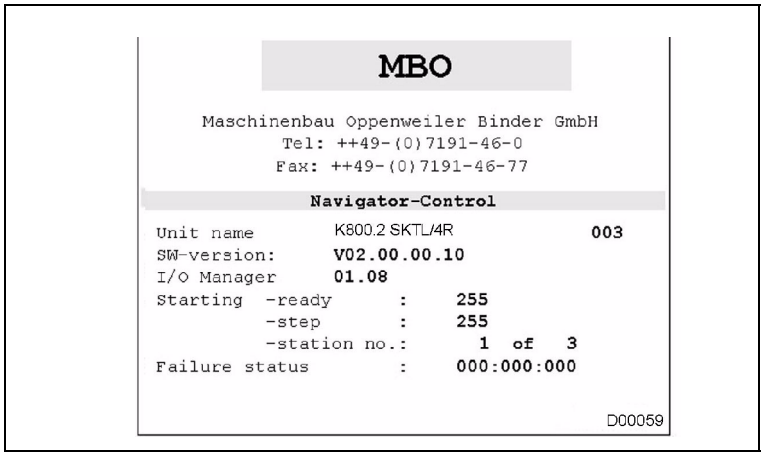


Figure 35: Start display

w Turn on control at the main switch.

The start display appears. There, you will find these indications:

Name of unit	Name of the unit
SW-version	Current version no. of the software

Operational readiness

Start ready	255
Step	255

If this data appears on the display, the control will be ready for production.

At <Error status> the error numbers are indicated in case of a start problem. Please name these error numbers

when you call MBO.

After 10-20 seconds, the program switches over to menu <efficiency>.

6.2.2 New job/signature/shift (F1)

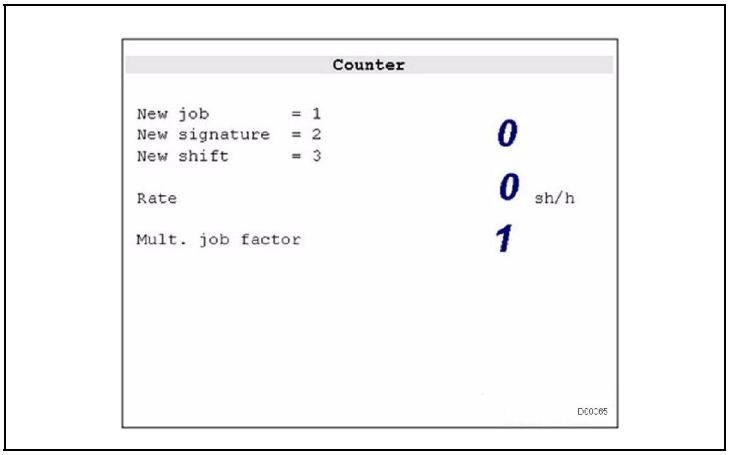


Figure 36: New job/signature/shift

If the machine runs a new job, then proceed as follows:

- w Push the counter button <F1>.
- w Use cursor <UP/DOWN> for to navigate
- w Confirm with <ENTER>.

New job:

w Select <1>.

<New calibration> is activated now. All job and signature related counter data is deleted.

New signature:

w Select <2>.

The signature data is deleted. All job and signature related counter data will continue.

New shift:

w Select <3>.

The shift data is deleted. All job and signature related counter data will continue.

Preformance set-point value:

w Enter a new figure or scroll with <+/-> (250 sheets/h each, more or less)

Number of X-up production:

w Enter a new figure or scroll with <+/-> (1 x-up production each, more or less)

Sheets per batch:

w Enter a new figure or scroll with <+/-> (5 sheets each, more or less)

Batches per box:

w Enter a new figure or scroll with <+/-> (1 batch each, more or less).

After entering the desired number of batches, a double marking is released.

6.2.3 Sheet infeed data (F11)

6.2.3.1 Basic settings of the folding machine

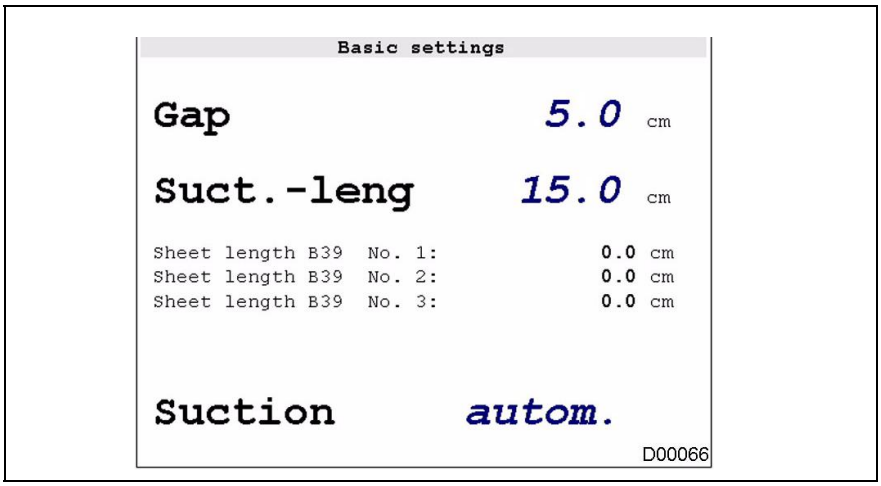


Figure 37: Basic settings

Go therefore in menu <basic settings>.

w Push button <F11>.
w Select the desired function with cursor <UP/DOWN>.

Increasing the sheet gap:

w Push button <+/-> (every step +1 cm) or enter the figures.
w Confirm the entry with <ENTER>.

Reducing the sheet gap:

At certain types of fold it is possible that a too large fixed minimum sheet gap may arise.

In this case, you are able to reduce the determined minimum sheet gap manually (complies with the lower limit for the sheet gap).

w Push button <-> (every step <+/-> 1 cm) or enter the figures.
w Confirm the entry with <ENTER>

Suction length:

You are able to increase or reduce ths suction length:

w Push button <+/-> (every step <+/-> 1 cm) or enter the figures.
w Confirm the entry with <ENTER>

Suction cycle:

Switch suction cycle from <Automatic> to <Cycle>.

(Use this function for the processing of punched or transparent materials).

w Push therefore <+/-> cycles.

NOTICE

In the suction cycle mode "**Cycle**" it is impossible to determine the sheet lengths of the folding units automatically.
Therefore it is necessary to enter all infeed lengths (sheet lengths before infeeding into the folding unit) manually.

6.2.4 Calibration of the machine (F3)

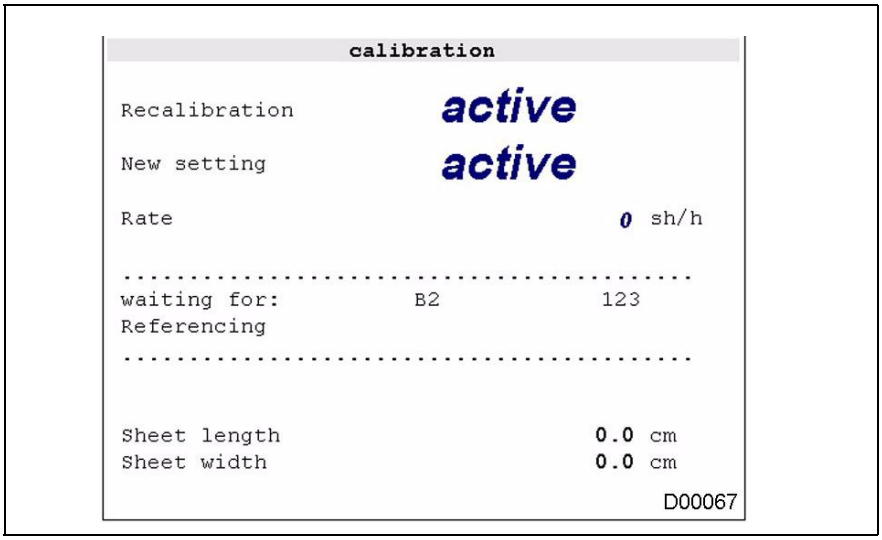


Figure 38: Calibration of the machine

"Calibration of the machine" is divided into:

- New calibration and
- Re-calibration

"New calibration"

New calibration> (F3) means that all speeds, sheet gaps and sheet monitoring are newly calibrated and optimized. The counter settings are maintained.

w Use buttons <+/-> for increasing or reducing the efficiency or the numbered keyboard.

Call up a single sheet afterwards. This one is automatically measured and the values are stored.

"Re-calibration"

"Re-calibration" is necessary for a speed modification of 20 %. With the re-calibration, only the sheet monitoring is newly calculated, manually modified parametres are adopted.

w Use buttons <+/-> for increasing or reducing the efficiency or the numbered keyboard.
w Call up a single sheet afterwards. This one is automatically measured and the values are stored.

Efficiency (setpoint value)

It is possible to modifie the current efficiency (setpoint value) with buttons <+/-> or through entering a new figure.

Wait for

<wait for> is only activated when calibrating and indicates the next LED button to be calibrated.

Sheet length

Measured sheet length at B 39.

Sheet width

Measured sheet width at B 13 after the crossfold

6.2.4.1 Emergency service at failure of a photocell

w Stop "New calibration".

Menu <Emergency service> opens.

w Make a selection of the photocell to be bridged (B12 is taken over from B39; B 13 is taken over from B12).
w Enter the corresponding values.
w Increase the sheet gap. A trouble-free emergency service is thus guaranteed.

6.2.5 Speed (F9)

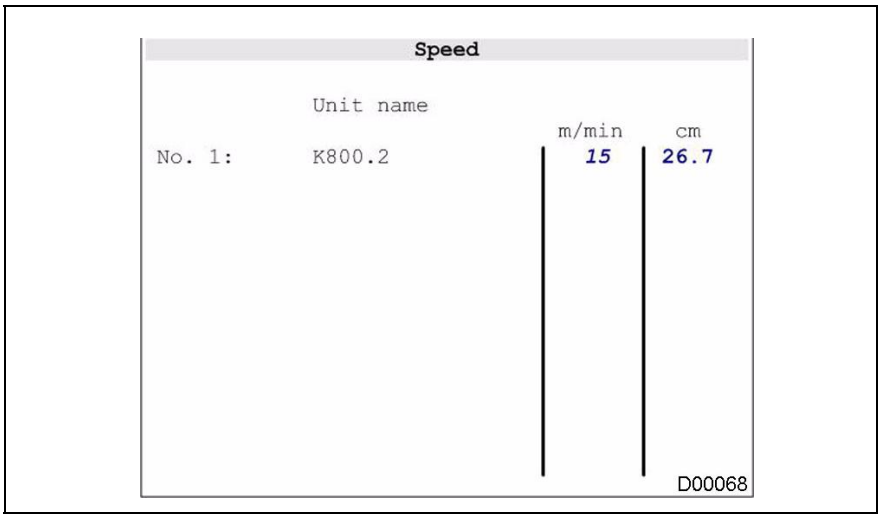


Figure 39: Speed

You can proceed different settings in the <speed> menu.

w Select menu <speed>.
w Select with cursor <UP/DOWN> the desired unit.
w Push button <+> (every step +/- 10 cm) or enter the figures.
w Confirm the respective entry with <ENTER>

Machine is not calibrated:

w Make an entry between 30 m/min - 210 m/min.

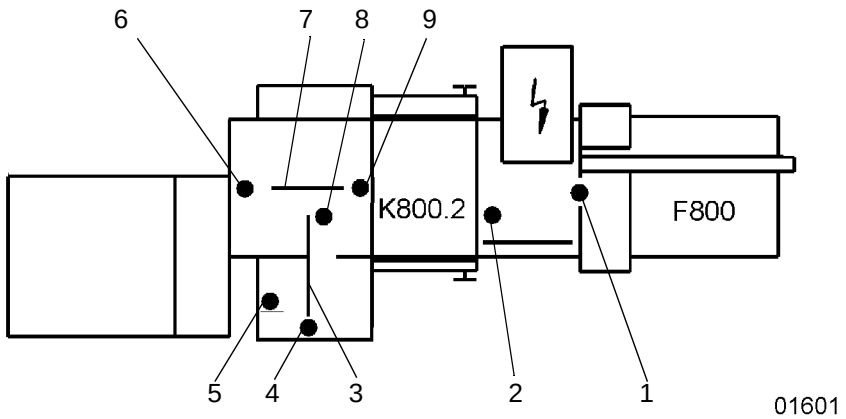
Machine is calibrated:

w You are only able to proceed a bigger entry than calculated.

Consequence: The sheet gap at this unit becomes bigger.

w ou are unable to proceed a smaller entry than calculated.

6.2.6 Photocells in main machine



1 The sensor monitors the sheet infeed at the suction wheel/vacubelt and counts the entering sheets.
2 The sensor monitors the infeed of the parallel fold and calculates the sheet and suction length.
3 Folding knife threefold
4 The sensor monitors the sheet running between (8) and (4). It will be automatically activated if (3) is not used.
5 The sensor monitors the sheet running between (8) and (5). It will be automatically activated if (3) is used.
6 The sensor monitors the sheet running between (9) and (6). It will be automatically activated if (7) is not used.
7 Folding knife crossfold
8 The sensor monitors the sheet running between (9) and (8). It will be automatically activated if (7) is used.
9 The sensor monitors the exit of the parallel fold

Figure 40: Photocells in main machine

Sensor/Photocell	Designation
Pos 1	B 2
Pos. 2	B 39
Pos. 4	B11.2
Pos. 5	B11.3
Pos. 6	B11.1
Pos. 8	B13
Pos. 9	B12

Table 13: Designation of sensors

In the event that a sheet does not pass one of these photocells at the calculated time then the machine will stop with an error message.

6.2.7 Touch screen error message

1	Touch Screen	2	Error message

Figure 41: Error message at standard display

Error message: An error message (2) becomes visible at the Touch Screen (1).
This error message indicates the type of error and the position of the malfunction. Please take note of the separately attached operating manual for the machine control.

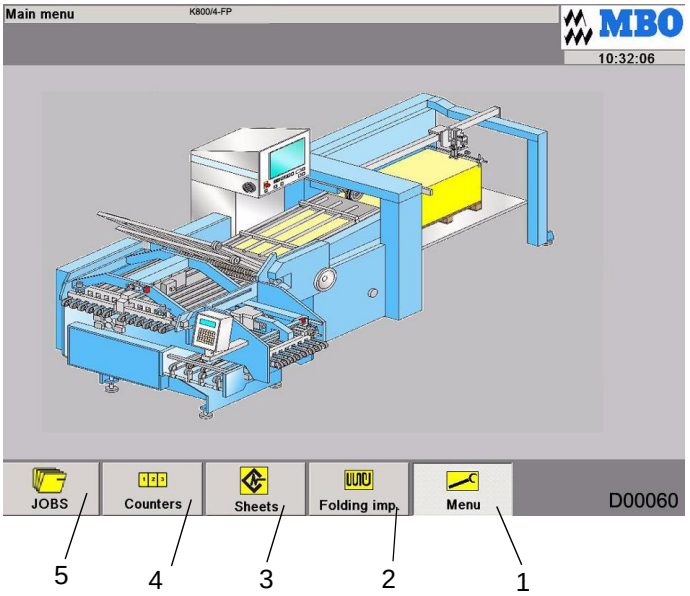
6.3 Setting of the machine control (Touch)

In this chapter you will find instructions for the most important settings of the machine control:

- Main menu
- New job
- New signature
- New shift
- Sheet infeed data
- New calibration (sheet monitoring)
- Speed
- Selection of folding samples
- Photocells

Please also observe the separate operating manual of the machine control "Navigator".

6.3.1 Main menu



1 Diagnosis and service menu
2 Preparation and storage of folding samples
3 Sheet infeed data and "calibration"
4 Delete counter and call up counter setting
5 Job management and signatures

Figure 42: Main menu

6.3.2 New job

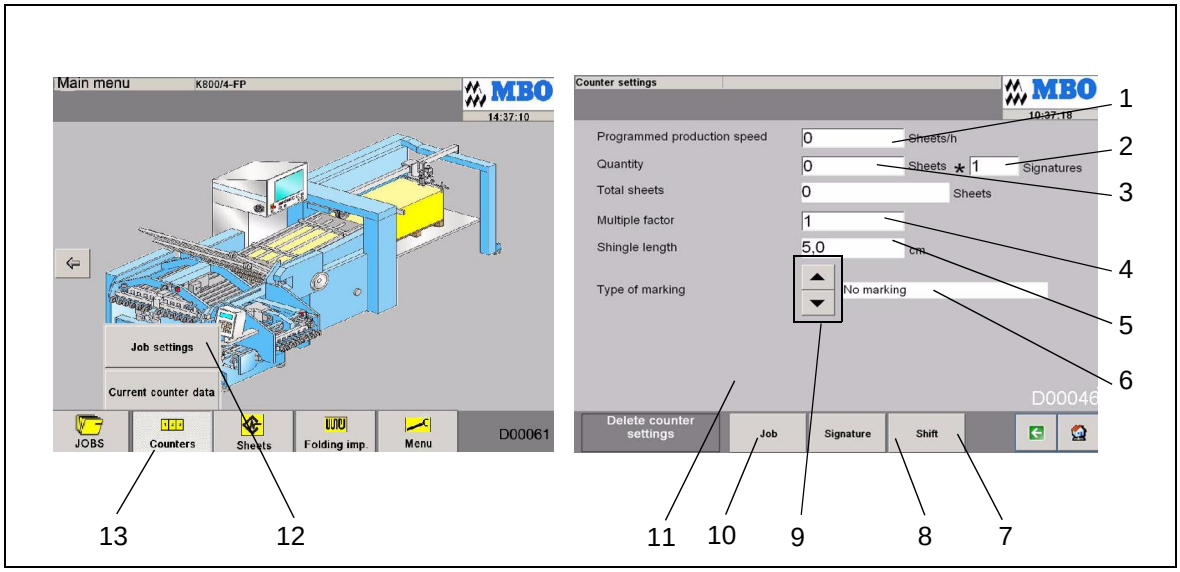


Figure 43: New job

If the machine is to run a new job, it is necessary to proceed as follows:

w Push counter button (13).
w Push button <counter settings> (12) in the sub-menu.

Menu (11) appears now.

w Push button <Job> (10).
w Confirm check back with "Yes".

The job- and signature counters are deleted. The counter setting for the shift will be maintained.

The machine is now in "new calibration" condition (see chapter "6.3.5" on page 65).

w Pre-select the folding efficiency of the machine (sheets per hour) in the field <Efficiency> (1).Do not make any entries in field (1), so the mechanical speed of the folding unit will be maintained.
w If desired, enter in field (3) the number of sheets (quantity)
w If desired, enter in field (2) the number of signatures.

Field (3) x field (2) makes the total number of sheets.

w Enter the number of signatures on one single sheet in field (4), e.g. at multiple-up production.
w Pre-select the shingle length (speed of delivery) in field (5).
w Set the type of marking with button (9).

The set marking will be displayed in field (6).

If a delivery with Navigator Control is connected to the folding unit, the type of marking will automatically be selected.

6.3.3 New signature

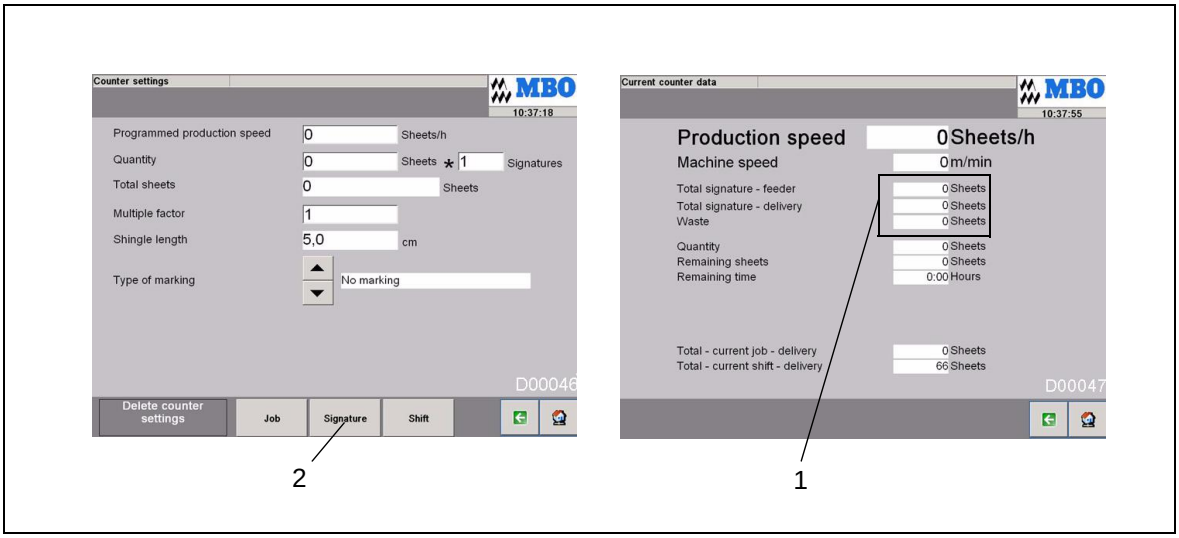


Figure 44: New signature

w Use the button (2) to delete the counter settings (1) of the signature. This task does not release the function of calibration.

6.3.4 New shift

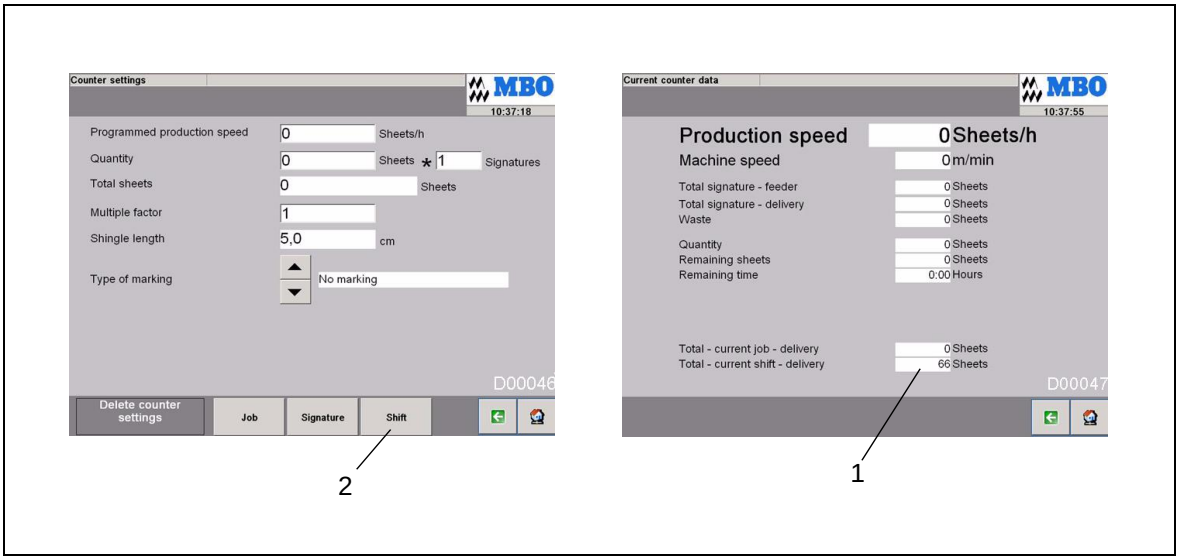


Figure 45: New shift

w Use the button (2) to delete the counter settings (1) of the shift. This task does not release the function of calibration

6.3.5 Sheet infeed data

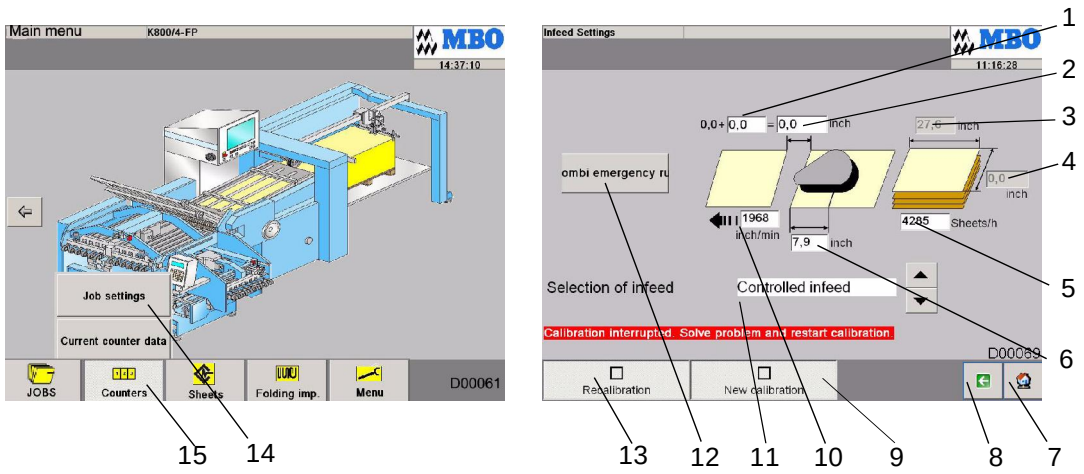
6.3.5.1 Calibration of the machine

"Calibration of the machine" is divided into

- New calibration and
- Re-calibration

"New calibration" New calibration means that all speeds, sheet gaps and sheet monitoring are newly calibrated and optimised. All values will calculate automatically and can be modified manually, if desired.

"Re-calibration" "Re-calibration" is necessary for a speed modification of 20 %. With the re-calibration, only the sheet monitoring is newly calculated, manually modified parametres are adopted.



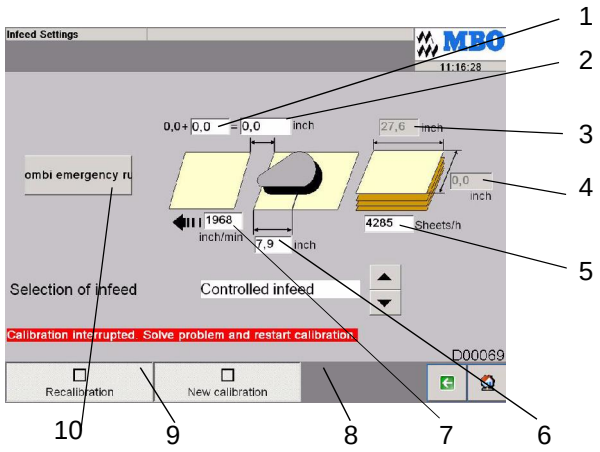
1 Increase value sheet gap
2 Actual sheet gap
3 Sheet length
4 Sheet width
5 Production of sheets of the folding machine/h
6 Suction length of the folding machine
7 Return to main menu
8 Return to previous page
9 New calibration
10 Speed of the folding unit
11 Scroll field <Selection sheet infeed>
12 Delay of sheets under the knife
13 Re-calibration
14 Sub-menu <sheet infeed data>
15 Button <sheet>

Figure 46: Sheet infeed data

After <New job>, <new calibration> or <new folding sample>, the calibration is activated.

w Push button (15) in the main menu.
w PUsh button <sheet infeed data> (14) in the sub-menu.

The menu display <sheet infeed data> appears.



1 ncrease value sheet gap
2 Actual sheet gap
3 Sheet length
4 Sheet width
5 Production of sheets of the folding machine/h
6 Suction length of the folding machine
7 Speed of the folding machine
8 Button <New calibration>
9 Button <Re-calibration>
10 Delay of sheets under the knife

Figure 47: Sheet infeed data

After <New job>, <new calibration> or <new folding sample>, the "calibration" is activated.

The current speed, the minimum suction length and the sheet gap are displayed. If a setpoint value of the efficiency has been determined, it will be indicated now. After the first sheet has been passed all photocells in the unit, the sheet length, sheet width and speed (depending on the manually entered setpoint value of the efficiency) will taken over from the control.The minimum possible sheet gap and the optimal suction length are adjusted. If no setpoint value of the efficiency is pre-selected, the current speed in m/min will be used as basis.

Modification of sheet infeed data

Pos. (1) It is possible to increase the sheet gap through an entry in field (1).

Pos. (2) Field (2) indicates the current sheet gap. This sheet gap (2) calculates independently. It resultes from the basis sheet gap of 3 cm and pos. (1). This position depends on sheet size and type of fold. If this value is increased, it is automatically added to the calculation for the delay of sheets under the knives.

Pos. (5) Pos. (5) displays the calculated production of sheets per hour. It is possible to increase or to reduce the production of sheets.

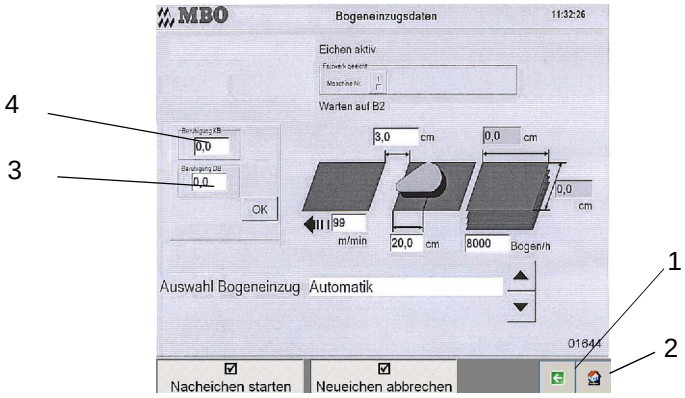
Pos. (6) The suction length of the folding machine will be calculated independently and can be modified with Pos. (6). Approx. 1/3 of the sheet length

Pos. (7) This position indicates the current mechanical speed of the machine and can be modified, too. It is only possible to increase the current mechanical speed when the machine is calibrated; a reduction is impossible. Through increasing the current mechanical speed, only the mechanical speed will increase, but not the production of sheets per hour. The machine incerases the sheet gap

Pos. (8) "New calibration" means that all speeds, sheet gaps and sheet monitoring are newly calculated (example: new job).
w Activate position (8) therefore.

Pos. (9) The re-calibration is necessary for a speed modification of 20 %. With the re-calibration, only the sheet monitoring is newly calculated, manually modified paramteres are adopted.
w Activate position (9) therefore.

Pos. (10) Delay of sheets under the knife. With this button, you will arrive at the following sub-menu:



1	Return to previous page	3	Delay threefold
2	Return to main menu	4	Beruhigung Kreuzbruch

Figure 48: Delay of sheets under the knife

The maximum possible delay of knives is automatically calculated up to a value of 10 cm. Thereby the sheet gap is not increased.
Every entry of an additional delay increases the sheet gap in normal case:

- Entry in field (4): Additional delay for the crossfold.
- Entry in field (3): Additinal delay for the threefold.

NOTICE

If the machine is calibrated, it is only possible to increase the value, not to reduce it.
w Enter therefore a value in pos. (3) and (4)

?

The sheet remains lying under the folding knife. The calibration process is not carried out.

The sheet remains lying under the folding knife. The calibration process is not carried out.

The automatically determined pre-switch-off time is too small.

w Take out the sheet which is lying under the folding knife.
w emand one further sheet.
w With the demanding of a new sheet, the machine determines the pre-switch-off time in the superior level (power of folding knife).
w If the sheet remains lying again, you will be able to repeat this procedure up to three times,
w until the control will find the most ideal value (dependent on paper and type of fold).

6.3.6 Speed

All folding units and deliveries connected are displayed in the menu "speed"

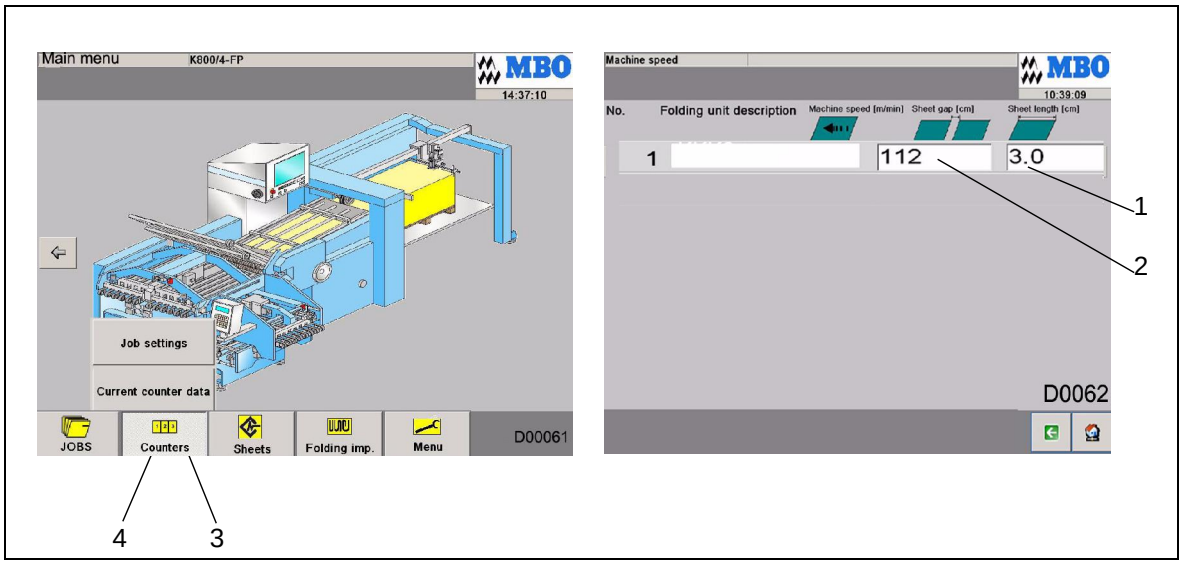


Figure 49: Speed

Modification of speed of the folding machine:

- w Push button <sheet> (3) in main menu.
- w Push button <speed> (4) in sub-menu.

The menu display <speed> appears

- w select field (2) and enter the new speed through the numbered key-board.
- w Confirm with <ENTER>.

NOTICE

The sheet gap will increase through a speed increase.
Please note that after a calibration speeds can be increased but not reduced.

6.3.7 Selection of folding sample

6.3.7.1 Preparation of a new folding sample

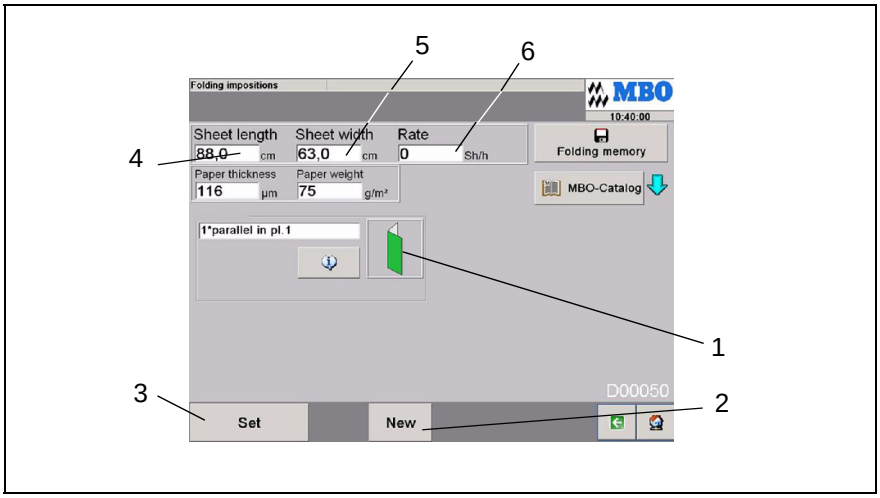


Figure 50: New folding sample

NOTICE

Through pushing button <Execute> (3) the entered values are newly calculated, the current values will get lost. If necessary, store the current data before

Store folding sample:

w Push button folding sample memory (7). Menu "Folding sample memory" appears.
w Give the folding sample an identification (designation).
w Store the folding sample.

The folding sample is stored in the folding sample memory.

Preparation of a new folding sample:

Enter at first the sheet length, sheet width and the setpoint value of the efficiency:

w Push button <NEW> (2).
w Enter the sheet length in field (4).
w Enter the sheet width in field (5).
w Indicate the setpoint value of the efficiency in field (6).

Select now the type of fold for the parallel fold.

w Push button (1).

You will arrive at menu <selection of folding sample>

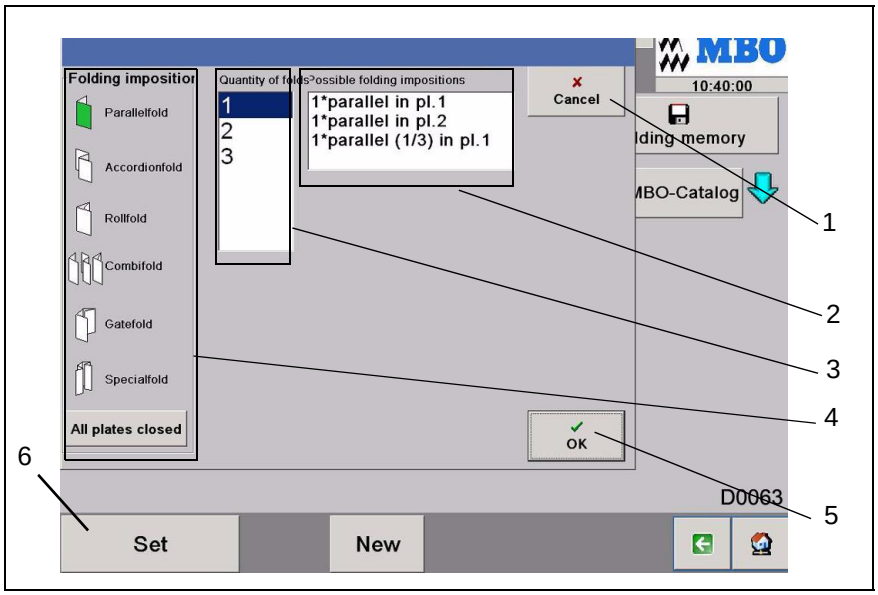


Figure 51: Selection of folding sample

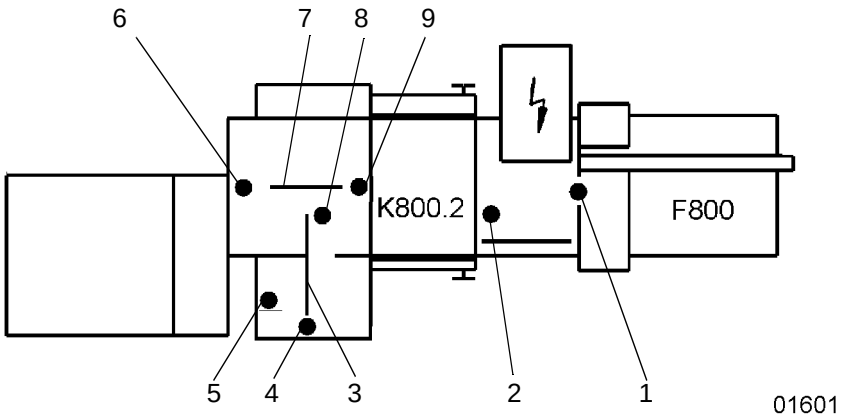
w Indicate the type of fold (marked in green) in field (4).
w Determine the number of folds in field (3).
w If several folding samples are possible, make a choice through field (2).
w Confirm with button <OK> (5) or return to the selection of folding samples with field <Abort> (1).
w Enter the settings for the crossfold and threefold section likewise.
w Push button <Execute> (6) and confirm the check back with <Yes>.

The new data is calculated and the so far current data will get lost.

NOTICE

- The parallel fold is always activated, it is only possible to deactivate the crossfold and threefold section.
- Activate a new folding sample, so the current folding sample is deleted. The machine automatically sets in condition "new calibration".

6.3.8 Photocells in main machine



1 The sensor monitors the sheet infeed at the suction wheel/vacubelt and counts the entering sheets.
2 The sensor monitors the infeed of the parallel fold and calculates the sheet and suction length.
3 Folding knife threefold
4 The sensor monitors the sheet running between (8) and (4). It will be automatically activated if (3) is not used.
5 The sensor monitors the sheet running between (8) and (5). It will be automatically activated if (3) is used.
6 The sensor monitors the sheet running between (9) and (6). It will be automatically activated if (7) is not used.
7 Folding knife crossfold
8 The sensor monitors the sheet running between (9) and (8). It will be activated if (7) is used.
9 The sensor monitors the exit of the parallel fold.

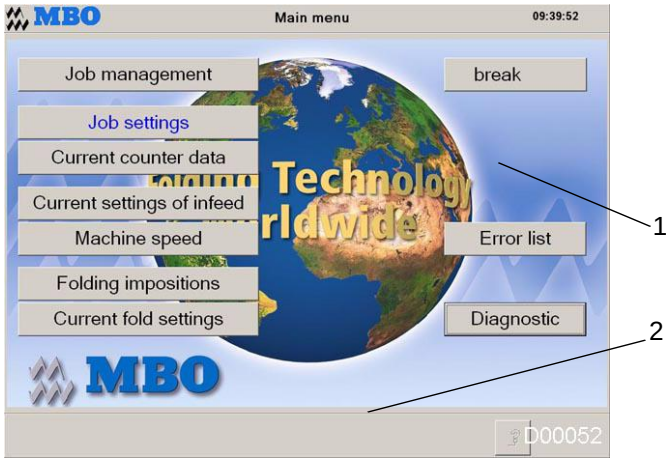
Figure 52: Photocells in main machine

Sensor/Photocell	Designation
Pos 1	B 2
Pos. 2	B 39
Pos. 4	B 11.2
Pos. 5	B 11.3
Pos. 6	B 11.1
Pos. 8	B 13
Pos. 9	B 12

Table 14: Designation of sensors

A "learning sheet"passes through the machine. The photocells detect the length and flow times. This will automatically program the sheet control and sheet monitoring. In the event that a sheet does not pass one of these photocells at the calculated time then the machine will stop with an error message.

6.3.9 Touch Screen error message



1	Touch Screen	2	Error message

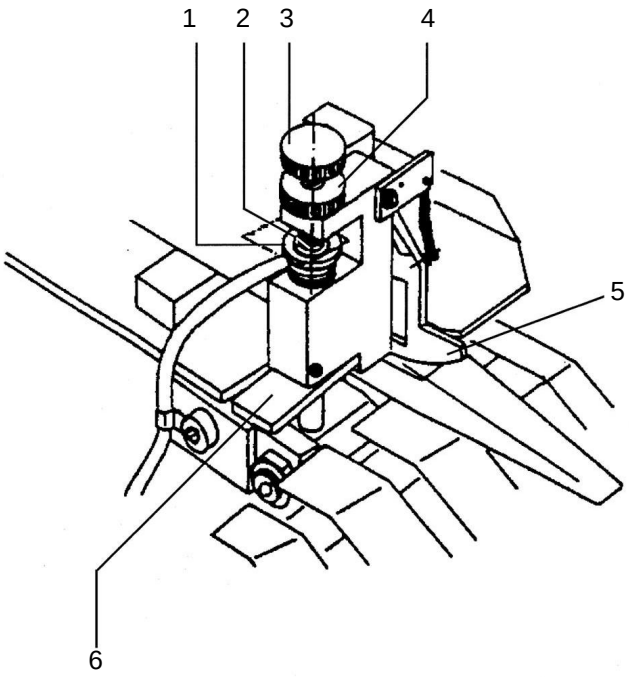
Figure 53: Touch Screen error message

An error message (2) becomes visible at the Touch Screen (1).
It appears on the entire display and machine readings as a red bar.

6.4 Setting of the register table

6.4.1 Setting of double-sheet control (manually)

The double-sheet control detects sheets sticking together and emits an electric signal through a sensor. This signal stops the sheet infeed. All sheets still left in the machine are folded; then the machine stops.



1	Bolt	4	Knurled nut
2	Gap	5	Switching segment
3	Knurled screw	6	Lever

Figure 54: Double-sheet control

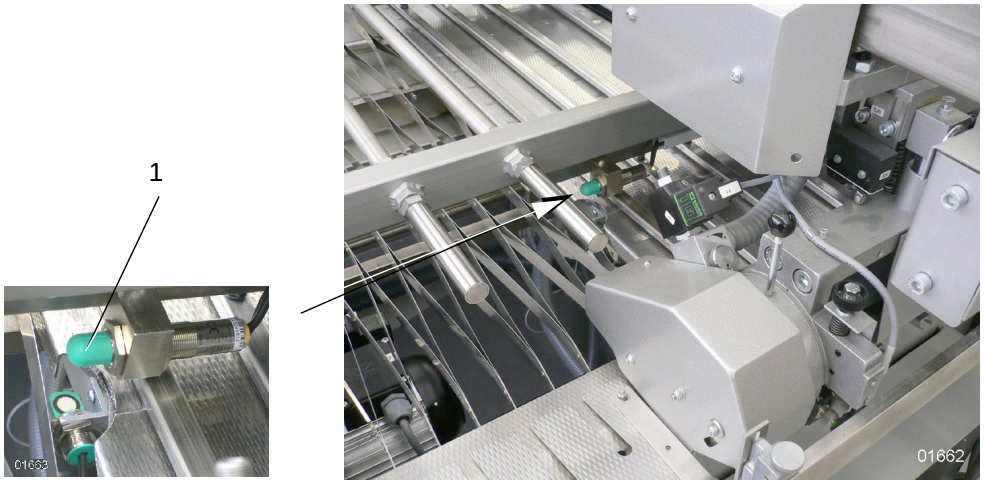
Setting of double-sheet control:

- w Press the lever (6) down.
- w Insert a paper strip (single paper thickness) of the sheets to be processed into the gap (2) between the bolt (1) and the knurled screw (3).
- w Insert a paper strip of double paper thickness beneath the switching segment (5) while the machine is running.

Check: The paper strip of single paper thickness shall not switch.

Readjust, if necessary.

6.4.2 Turn ON/OFF ultra-sound double sheet control (optional)



1 Ultra-sound double sheet control

Figure 55: Ultra-sound double sheet control (optional)

The machine alternatively can be equipped with an ultra-sound double sheet control. The ultra-sound double sheet control recognizes an air gap between two sheets.
It is used for conventional paper types and recognizes:

- no sheet
- one sheet
- double sheet

Double sheets are recognized by the control and ejected.
If no sheet is coming out, an error message will appear.

NOTICE

At different types of paper, error messages may arise through an air gap within the material. Deactivate the ultra-sound double sheet control and activate the manual double sheet control, for example at:

- pre-folded products,
- coated products,
- laminated products and
- concealed products.

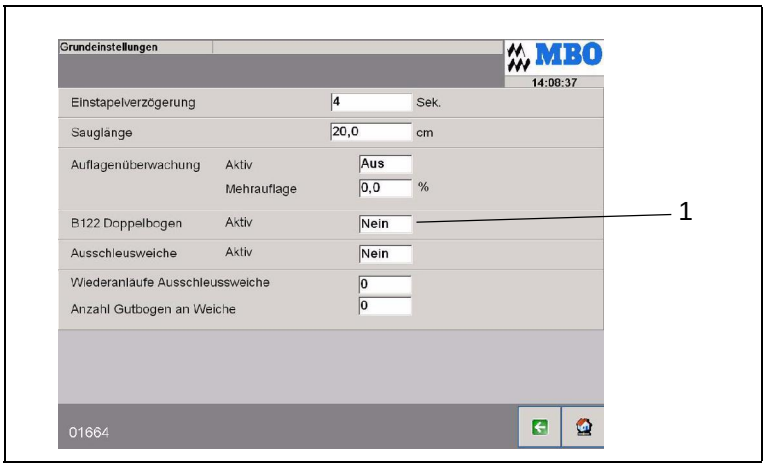


Figure 56: Ultra-sound double sheet control (optional)

Turn ON ultra-sound double sheet control:

In order to turn on the ultra-sound double sheet control, proceed as follows:

- w Turn off the manual double sheet control. Insert therefore several strips of the paper to be processed into the gap of the manual double sheet control
- w Pre-select the basic settings in the control and activate the ultra-sound double sheet control at pos. (1).

Turn OFF ultra-sound double sheet control:

- w Adjust the setting of the manual double sheet control again (see "Setting of double sheet control (manually) on page 74).
- w Pre-select the basic settings in the control and deactivate the ultra-sound double sheet control at pos. (1).

6.4.3 Setting of Vacu-Alignment

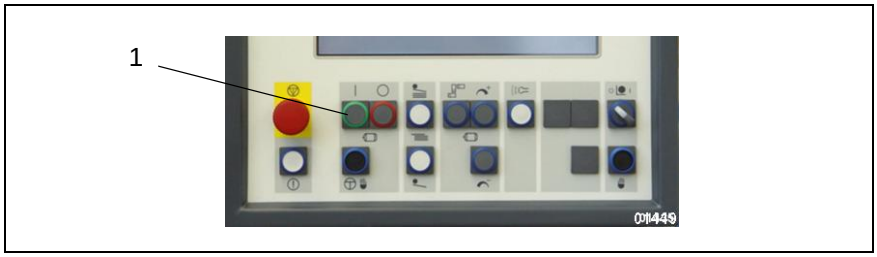
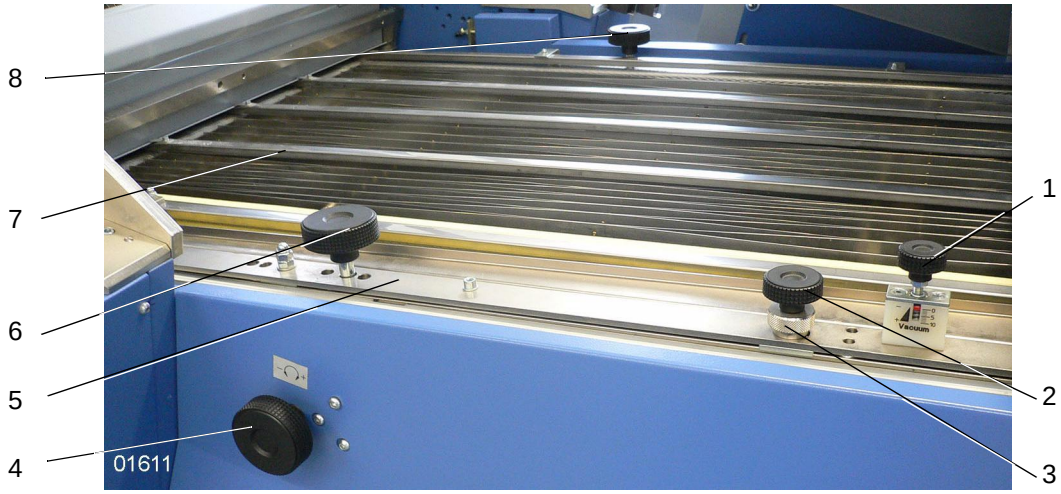


Abbildung 57: Start of vacu-alignment

Start vacu-alignment:
The Vacu-Alignment has a separate vacuum pump.
This one starts automatically after pushing button <start> (1).



1	Turning handle vacuum	5	Sidelay for Vacu-Alignment
2	Knurled screw	6	Knurled screw
3	Excentric	7	Smoother bars
4	Turning handle for fine adjustment	8	Knurled screw

Figure 58: Setting of Vacu-Alignment - outline

The following pages contain descriptions of these adjustments:

- Adjust the sidelay for the vacu-alignment pos. (4-8)
- Ajust the angle to the foldrollers pos. (2,3)
- Regulate the vacuum pos. (1).

Sidelay for the Vacu-Alignment:

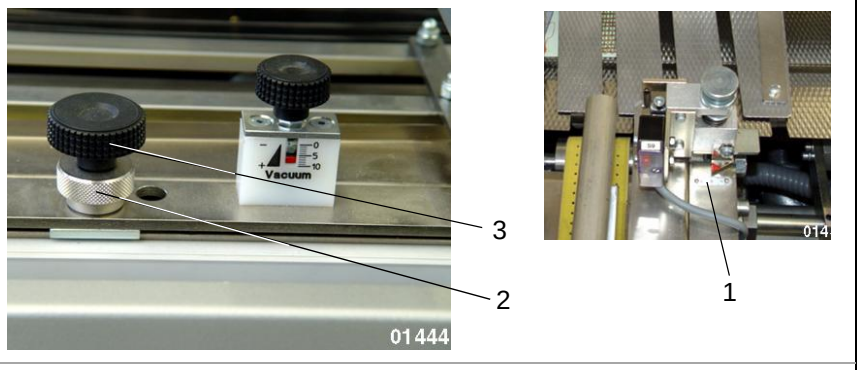
Adjúst the sidelay manually:

w Open knurled screw (6) or (8) for the opposite side and adjust the sidelay (5).
w Close the knurled screw (6) or (8).
w Proceed any fine adjustments with turning handle (4). Keep therefore the knurled screw (6) closed.

Turning to <->: smaller size

Turning to <+>: bigger size

6.4.3.1 Angle to the fold rollers



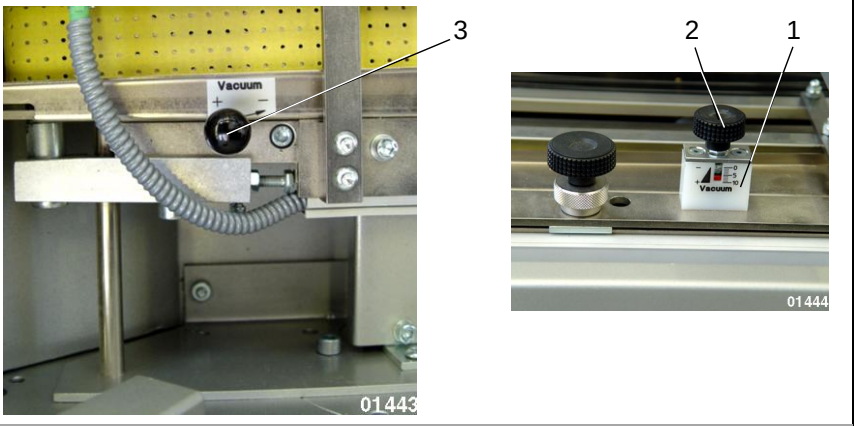
1	Scale	3	Knurled screw
2	Eccentric		

Figure 59: Angle to the fold rollers

Adjust the angle to the fold rollers as follows:

w Loosen the knurled screw (3).
w Adjust the angle to the fold rollers through the eccentric (2). The adjusted value may be read-off at the scale (1).
w Re-fasten the knurled screw (3).

6.4.3.2 Regulation of the vacuum



1	Skala	3	Lever
2	Turning handle		

Figure 60: Regulation of vacuum

Heavy/thick paper requires more vacuum than light/thin paper.

w Adjust the vacuum with the turn handle (2) at the scale +/- (1).

Heavy sheets and landscape (oblong) sizes require an extensive vacuum for a safe take-over at the entry area to the fold rollers.

w Adjust the vacuum with the lever (3).

6.5 Setting of the parallel folding unit

The parallel folding unit takes over the aligned sheet from the register table and carries out the first fold. The subsequent slitter shaft processes the sheet going through the unit, in addition.

6.5.1 Setting of foldrollers and slitter shafts

WARNING!

Danger of hand injuries from the rotating handwheel.

Non-observance may cause crush injuries to hands.

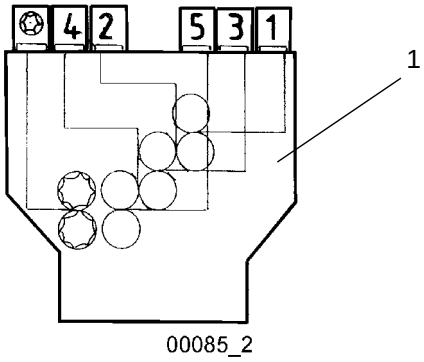
In the event of manual moving of the handwheel, position hands carefully and comfortably on the handwheel before turning.

WARNING!

Danger of rotating machine elements.

Non-observance may possibly cause serious injuries and damage to property.

Carry out foldroller settings only when machine is not running.

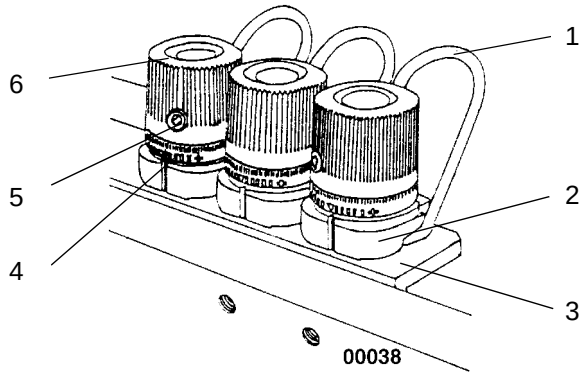


1 Foldroller scheme parallel fold

Figure 61: Foldroller scheme parallel fold

The foldroller scheme (1) is located at the side wall of the machine and supports the setting. On this scheme, you can recognize the sets of foldrollers with the corresponding setting elements

6.5.1.1 Setting elements



1	Lever Adjustment ring	4	Adjustment ring
2	Pressure plate Screw	5	Screw
3	Side part Adjustment head	6	Adjustment head

Figure 62: Setting of foldrollers and slitter shafts

NOTICE

The number of paper strips to be clamped between (2) and (3) depends on the type of folding.

Consider therefore the setting information for the parallel folding.

Adjust the foldrollers and slitter shafts as follows:

- Press the lever (1) down.
- Insert the required number of paper strips to be processed between pressure plate (2) and side part (3).
- Insert the required number of paper strips to be processed between the foldrollers to be adjusted.
- Set the pressure of foldrollers on both sides with the adjustment head (6):

  Turning clockwise (+):

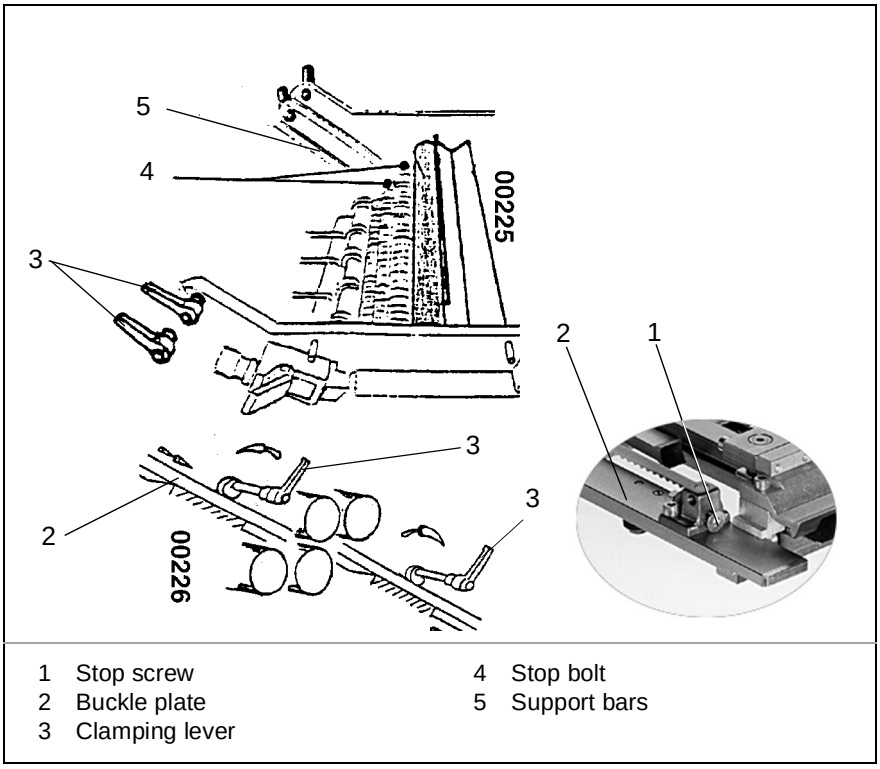
  The foldroller gap becomes bigger (pressure of foldrollers is getting lower).

  Turning counter-clockwise (-):

  The foldroller gap becomes smaller (pressure of foldrollers is getting stronger).

- Set the adjustment ring (4) in the "O" position. So you are able to arrive faster at the inital position after the adjustment.
- Secure adjustment head (6) with screw (5) to prevent distortion, do not tighten too strong!

6.5.2 Use of buckle plates



1	Stop screw	4	Stop bolt
2	Buckle plate	5	Support bars
3	Clamping lever		

Figure 63: Buckle plates

Insert the buckle plate as follows:

w Push the buckle plates (2) into the support bars (5) until the buckle plates hit the stop bolts (4) with the stop screws (1).

w Wedge the buckle plates (2) by means of the clamping levers (3).

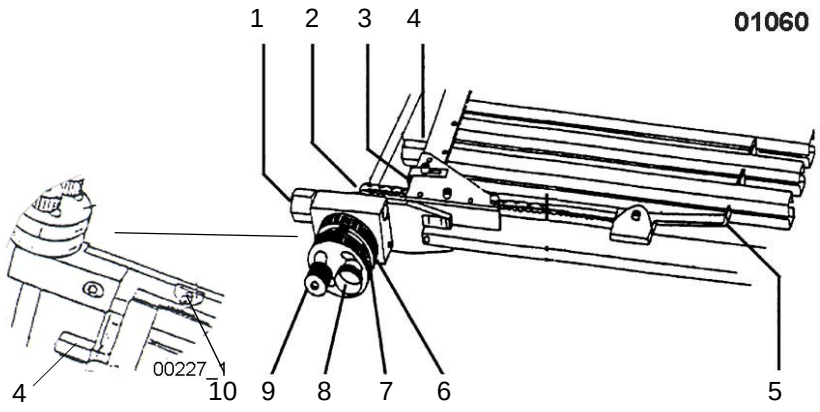
ATTENTION!

Danger of re-locating the stop screw (1).

Non-observance may cause serious property damage to the buckle plates and folding units. Do not change the position of the stop screws!

6.5.3 Manual buckle plates

6.5.3.1 Modification of folding length



1	Screw	6	Rear adjustment wheel
2	mm-scale	7	Front adjustment wheel
3	Indicator	8	Knurled screw (plastic)
4	Hexagon	9	Knurled screw (metal)
5	Angle sheet stop	10	"0"-marking

Figure 64: Modication of the folding length (manual buckle plates)

- w Loosen the knurled screw (9).
- w Adjust the folding length by means of the rear adjustment wheel (6).
- w Read-off the adjusted value at the mm-scale (2) and check the result.
- w Proceed the fine adjustment of the folding length with screw (1).

6.5.3.2 Modification of the sheet stop angle

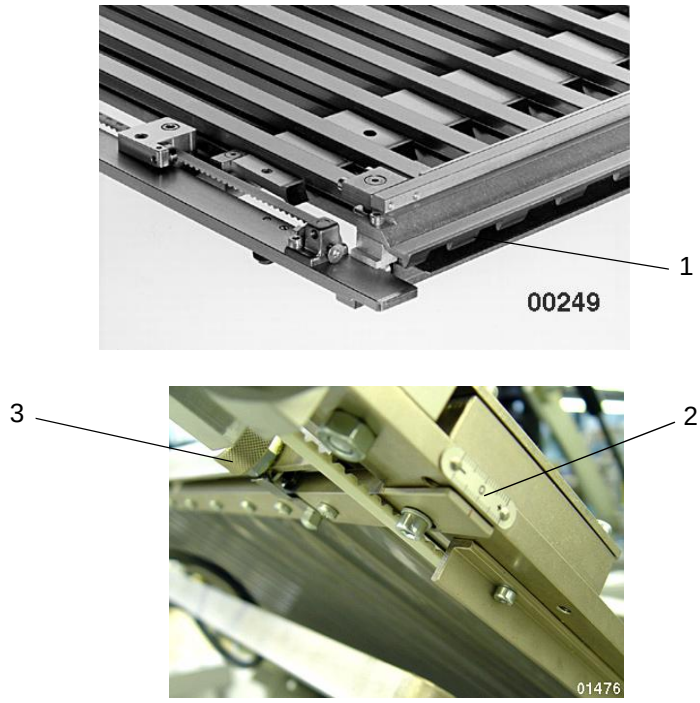
Adjust the angle of the sheet stop when processing non-right-angled sheets:

- w Loosen the plastic knurled screw (8).
- w Turn at the front adjustment wheel (7). The "0"-position is displayed by two markings at the adjustment wheel.

Fine adjustment

- w Turn at the screw (1) for the fine adjustment.

6.5.3.3 Modification of the bottom plate lip



1 Bottom plate lip
2 Zero marking
3 Knurled screw

Figure 65: Bottom plate lip

Alteration of the bottom plate lip:

w Twist the knurled screw (3). The setting must be even at both sides.

Back to the basic setting

w Please observe the zero marking (2).

NOTICE

Adjustments for thick paper:

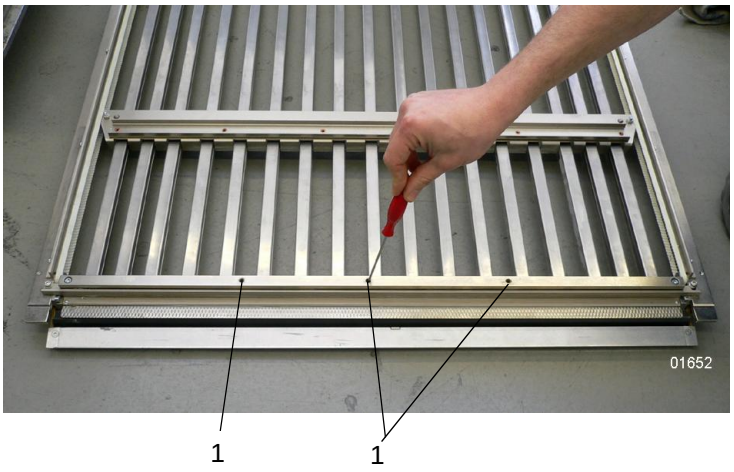
w Reset the lower plate lip (1) away from the foldrollers.

Adjustments for thin paper:

w Move the lower plate lip (1) towards the foldrollers.

Pre-stressing the bottom plate lip

The pre-stress is set in the event of rolling perforation, dog ears at the folded edge or round folding edges (paper tension).



1 Screws

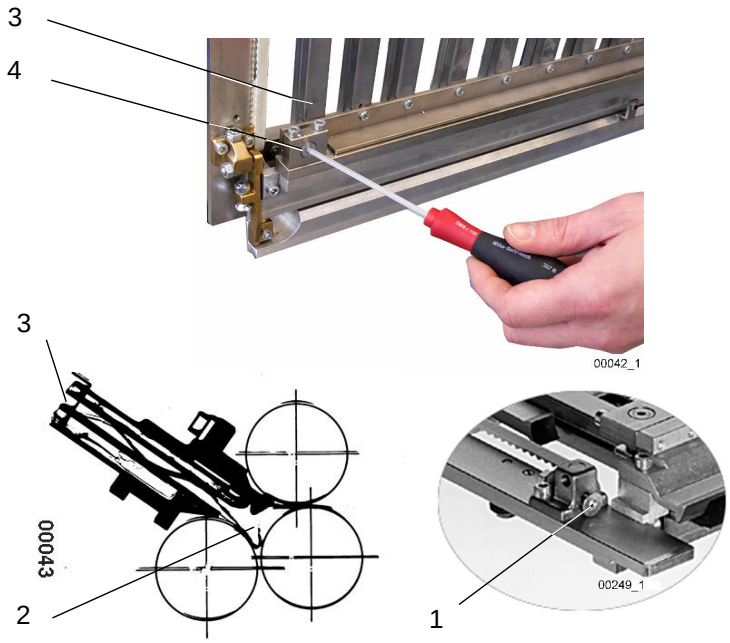
Figure 66: Pre-tensioning of the bottom plate lip

This setting improves the folding result.

w Screw in both screws (1) evenly.

If necessary, increase the inner width.

6.5.3.4 Setting of the inner width



1	Screws	3	Folding space
2	Stop screw	4	Buckle rails

Figure 67: Setting of the inner width.

ATTENTION!

Danger of re-locating the stop screw (2).

Non-observance may cause serious property damage to the buckle plates and folding units.

Do not change the position of the stop screws!

Different product thickness may require the re-setting of the inner width of the buckle plates. The inner width is the distance between the upper and lower buckle rails (4)

Setting of the inner width:

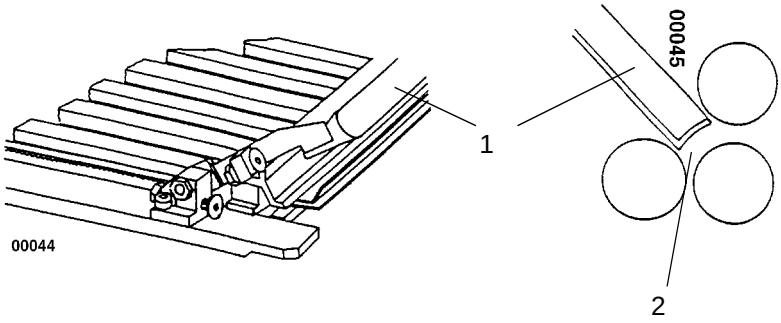
- w Twist the screw (1). Clockwise rotation increases the inner width, counter-clockwise rotation decreases the inner width.
- w Check whether the setting at the screw (1) has been adjusted evenly on both sides..

Alteration of the folding space (3)

How to adjust the folding space (3):

- w For very thick products insert carton strips or several paper strips between the stop bolt and the stop screw (2)).

6.5.4 Set-up of sheet deflectors



1 Sheet deflector
2 Folding space

Figure 68: Setting of sheet deflector

Non-required buckle plates:

w Loosen the clamping levers for the buckle plates.
w Withdraw the non-required buckle plates.
w Set there assembled sheet deflectors (1) before running into the buckle plate.
w Move buckle plates to stop bolts again.
w Re-wedge the buckle plate by means of the clamping levers.

Heavy paper

w Heavy paper partly requires an increase in the folding space (2): Withdraw the sheet deflector (1) slightly.

Correction of diagonal perforations

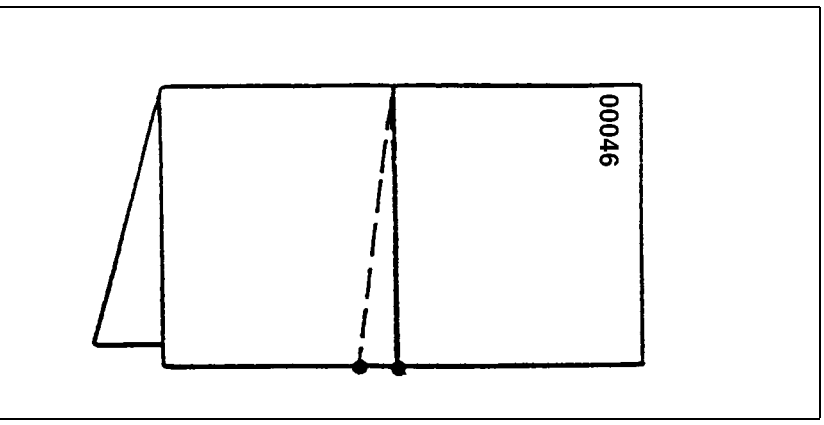


Figure 69: correction of diagonal perforations

w For diagonal perforations withdraw the last closed buckle plate slightly at one side.

6.5.5 Messerwellen

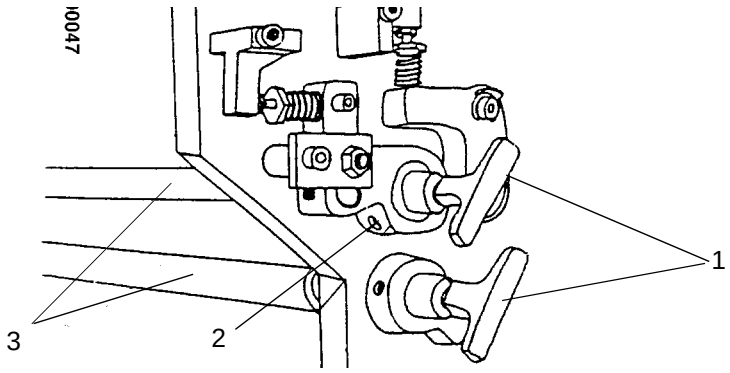
CAUTION!

Danger from slitter shaft.

Non-observance may cause serious bruisings and cuts.

- Dismount the slitter shafts only when machine is not running and secure it against unintended turning-on.
- wear safety gloves and safety shoes while you are carrying out retrofitting and maintenance work on the slitter shafts.
- Always hold the slitter shafts at the shaft and not at the tool.

6.5.5.1 Slitter shafts (standard)



1 Plug bearing
2 Screw
3 Slitter shaft

Figure 70: Set of slitter shafts

Each folding unit can be equipped with slitter shafts (3) by the manufacturer.These slitter shafts serve to retain tools for perforating, scoring or cutting.For mounting and dismounting the slitter shaft, proceed as follows:

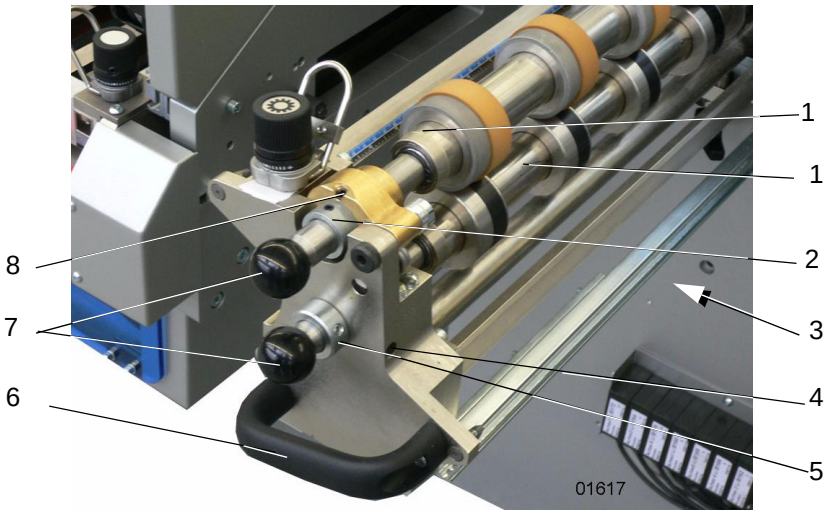
Dismounting Slitter shaft:

w Loosen the screw (2)
w Unlock the plug bearing (1).
w Keep holding the slitter shaft (3). If necessary, a second person should assist you.
w Withdraw the plug bearing (1).
w Remove the slitter shaft (3).

Mounting Slitter shaft

w Place the slitter shaft (3) into its original position.
w Have the plug bearing (1) engage the bore of the slitter shaft stub.
w Lock the slitter shaft (3) by a turn to the right.
w Fasten the screw (2) by pressing the plug bearing (1) towards the slitter shaft. This avoids an axial backlash.

6.5.5.2 Slitter shaft cassette (optional)



1	Slitter shaft	5	Adjustment ring
2	Adjustment ring	6	Handle
3	Lever	7	Plug bearing
4	Grub screw	8	Grub screw

Figure 71: Slitter shaft cassette

The slitter shafts (1) located in the slitter shaft cassette serve to retain tools for perforating, scoring or cutting.In this option, the slitter shafts are placed in a retractable cassette. The cassette simplifies the removal of slitter shafts and the re-mounting.

For mounting and dismounting the slitter shaft, proceed as follows:

Dismounting of slitter shaft:

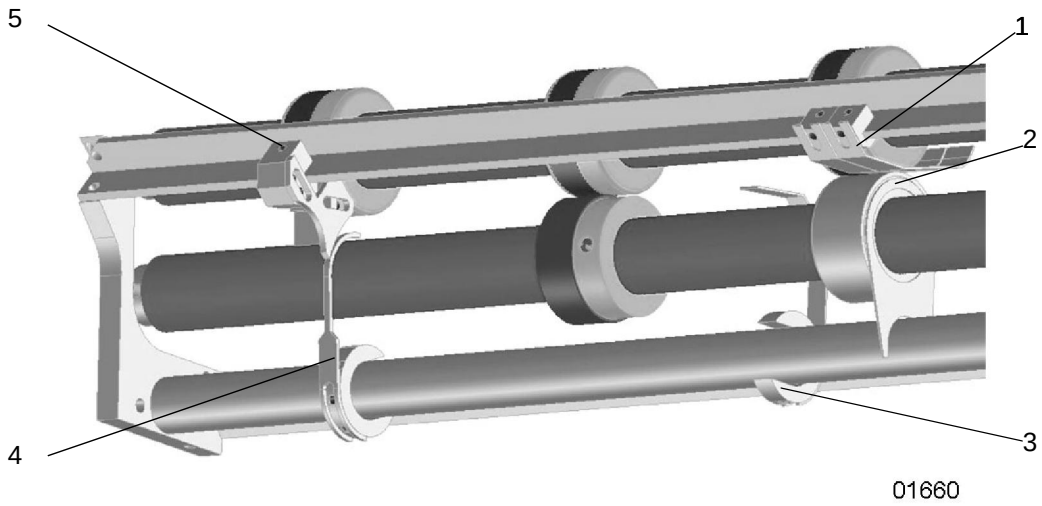
- w Unlock the slitter shaft cassette by means of lever (3).
- w withdraw the slitter shaft cassette at the handle (6).
- w Loosen the grub screws (4) and (8) by means of MBO wrench SW 4.
- w Withdraw the plug bearings (7).
- w Take-out the slitter shafts (1).

Mounting of slitter shaft:

- w Place the slitter shafts (1) into their original position.
- w Move the plug bearing (7) into the slitter shafts (1).
- w Make sure that the plug bearings (7) are really completely introduced into the slitter shaft.
- w The adjustment rings (5) and (2) must cling.
- w Attach the slitter shafts (1) with the grub screws (4) and (8). For this, use only the MBO wrench SW 4.
- w MOve the slitter shaft cassette at the handle (6) into the unit, until it has been snapped in.

The lever (3) must completely be snapped in.

6.5.5.3 Single rear stripper - sltter shaft cassette (optional)



1 Upper stripper
2 Punch perforating device (optional)
3 Lower stripper
4 Gully-cut device (optional)
5 Edge trim device (optional)

Figure 72: Stripper of slitter shaft cassette (optional)

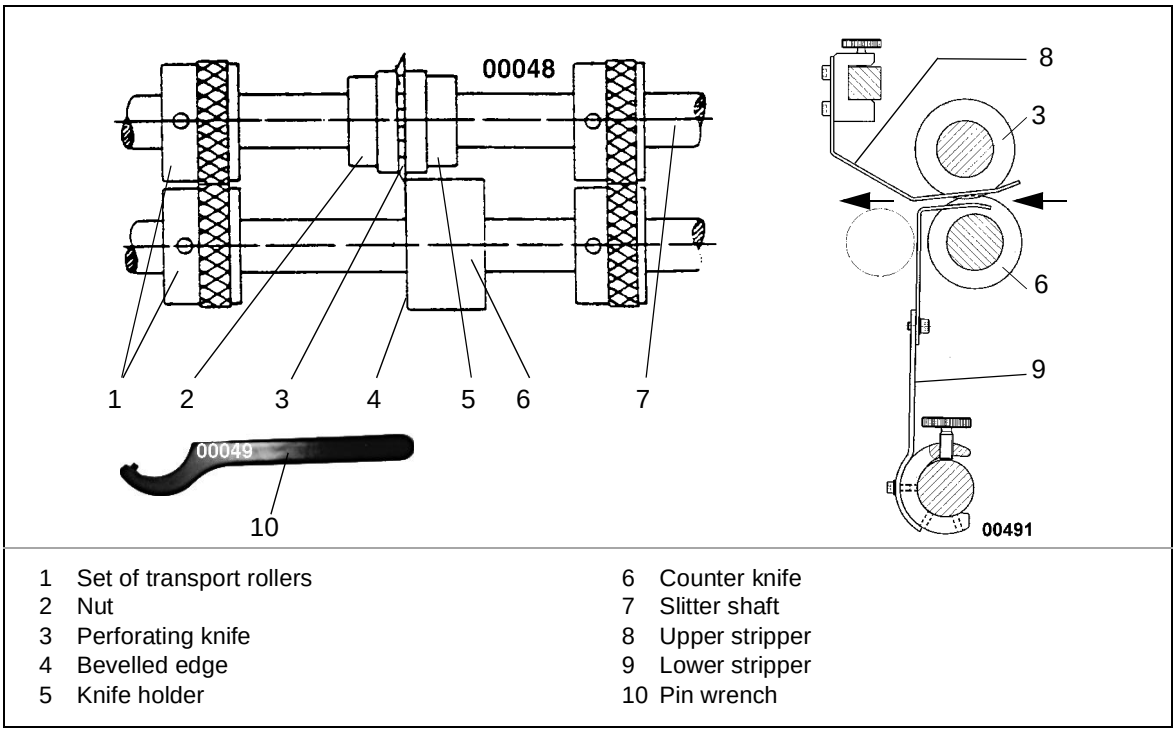
For mounting the individual strippers and special devices for the slitter shaft cassette (single rear), please follow the illustration above.

NOTICE

The machine is electrically secured and cannot be operated when the slitter shaft cassette is pulled-out.

6.5.5.4 Set-up of the perforation function

The perforation is used for cross-folds to avoid wrinkles on the head.
“Back spine“ perforations are only applied for perfect binding.
The slitter shaft must be equipped with the necessary tools for perforating.



1	Set of transport rollers	6	Counter knife
2	Nut	7	Slitter shaft
3	Perforating knife	8	Upper stripper
4	Bevelled edge	9	Lower stripper
5	Knife holder	10	Pin wrench

Figure 73: Application of perforating knife

How to set up the perforating function:

- w Loosen the nut (2) with the pin wrench (10).
- w Place the perforating knives (3) into the knife holder (5). The slotted knives need not be taken off the slitter shaft. When mounting the perforating knives (3) the smooth side of the knife must be directed towards the bevelled edges (4). The blunted angle of the tooth must get into the paper first.
- w In addition, also use the upper stripper (8).

ATTENTION!

Danger from wrongful mounting of the knife holder (5).

Non-observance may cause the knife holders to come open while the machine is running. Danger of material damage.

Make sure that the nut (2) is turned towards the running direction of the machine.

- w Make sure that sufficient sets of transport rollers (1) are applied for the perforation. This ensures perfect sheet transportation.
- w In the event that the perforating knife is located on the lower slitter shaft you should also apply the lower stripper (9).

REMARK!

Different types of perforating knives are required for certain types of paper and folding impositions.

w Please take note of the attached knife list TM 32/2.

Tooth forms

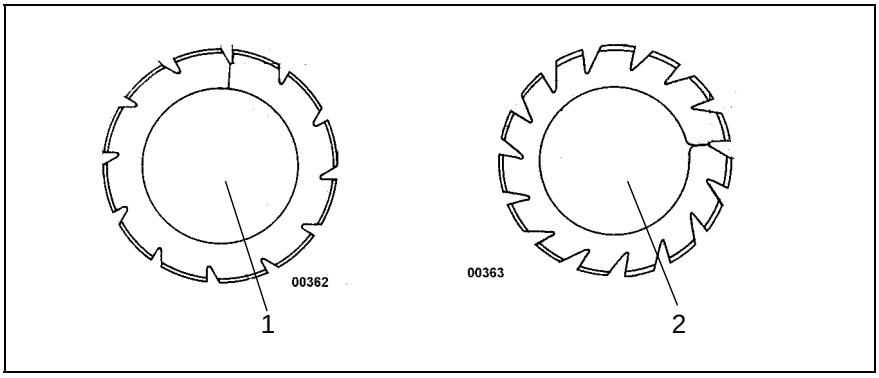
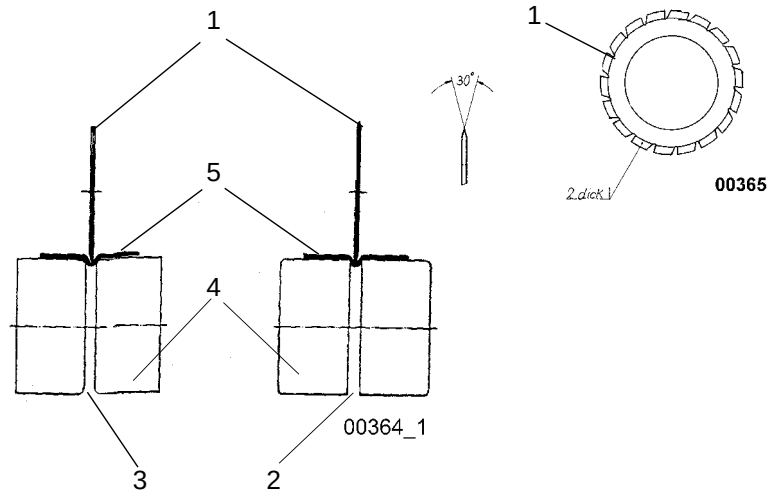


Figure 74: Tooth forms

w Use the tooth form (1) for the 1st and 3rd folding units.
w Use the tooth form (2) for the 2nd folding unit.

6.5.5.5 V-shaped special perforating knives (optional)



1	Perforating knife	4	Slitting wheel
2	Variety 1: between the cutting edge	5	Paper
3	Variety 2: between the scoring edge		

Figure 75: V-shaped special perforating knives

V-shaped special perforating knives are used for buckle folding machines on the slitter shafts in folding unit I.
The perforating knife (1) is 1.6 mm thick, non-slotted and uniformly ground on both sides.The sheet is simultaneously pre-scored during perforating. This avoids dog-ears on the edges of the head side in the crossfold (2nd folding unit). However, the perforation cut will not be as sharp as a normal perforation.

1st mounting variant: (2) between the cutting edges

2nd mounting variant: (3) between the scoring edges.

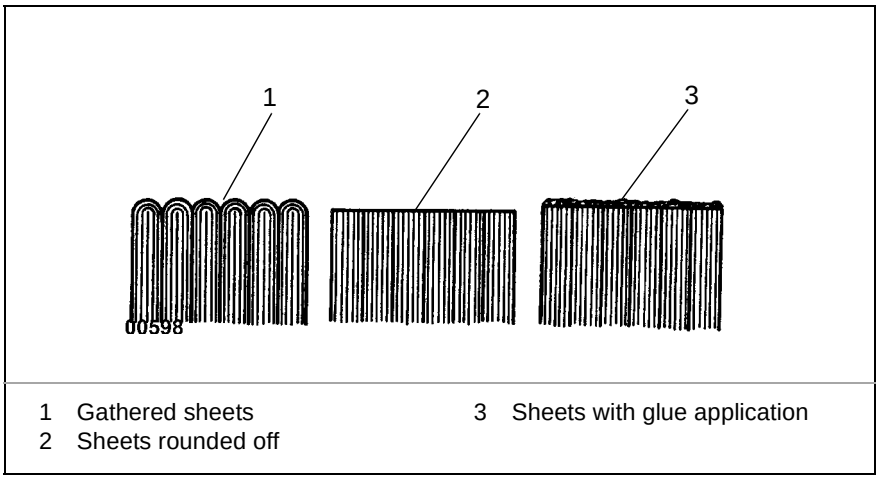
NOTICE!

- w co-ordinate the gap and the mounting method to the product to be processed.
- w The cutting and perforating rollers shall, under no circumstances, touch the perforating knife.

The cut of these perforating knives is not as sharp as a “normal“ perforation.

6.5.6 Punch perforation

6.5.6.1 Former types of perfect binding

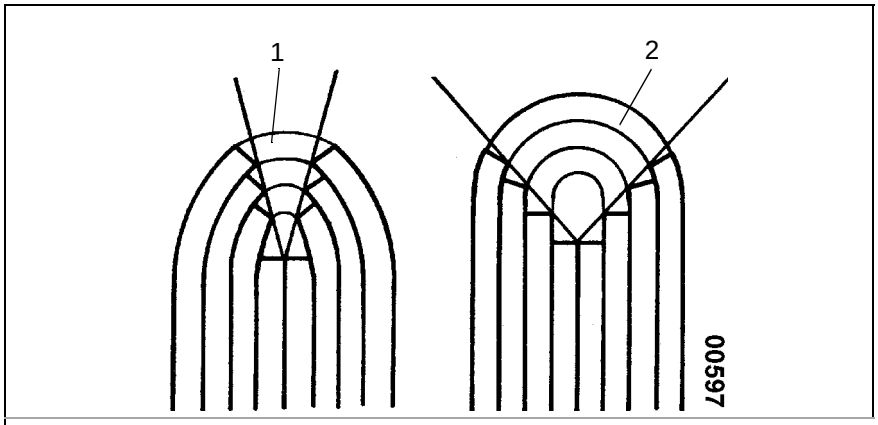


1 Gathered sheets
2 Sheets rounded off
3 Sheets with glue application

Figure 76: Former types of perfect binding

The previously common perf-binding method provides a cut perforation to the sheet in the back margin. The pages are too close to each other, i.e. the glue cannot reach the inner pages. This type of perfect binding does not wear well.

6.5.6.2 MBO punch perforation



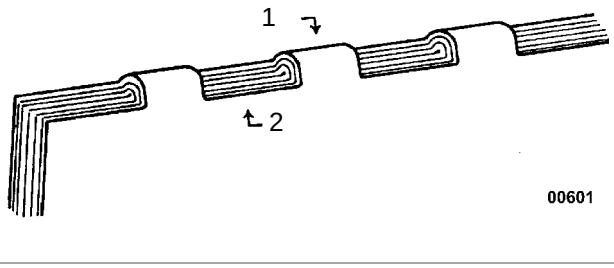
1 Cross-section of the previous perf-binding method
2 MBO punch perforation

Figure 77: Cross-section of punch perforation and MBO punch perforation

Previous punch perforations (1) show an angle that is too tapered.

MBO's punch perforating device (2) punches out slots. The punched slots establish a greater opening in the back margin of the folded sheet, i.e. the glue may reach each single page.

The sheets are gathered; the back margin is no longer in the perfect binder but still glued.

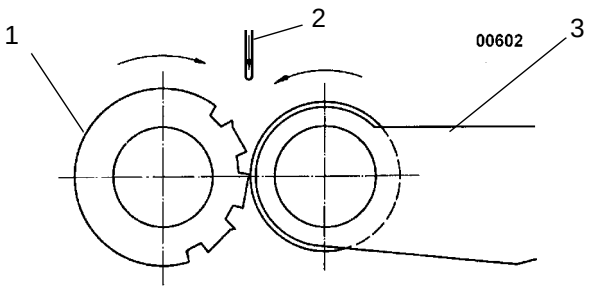


1 Connecting points 2 Punch perforation

Figure 78: MBO punch perforation

The new punch perforation and perf-binding method ensures that the glue reaches the paper sheets both on top as well as laterally, and connects them firmly. This method achieves optimum retention of the single pages.

6.5.6.3 Punch perforation knife



1 Punch perforation knife 3 Stripper
2 Paper sheet

Figure 79: Knife with slitter shaft

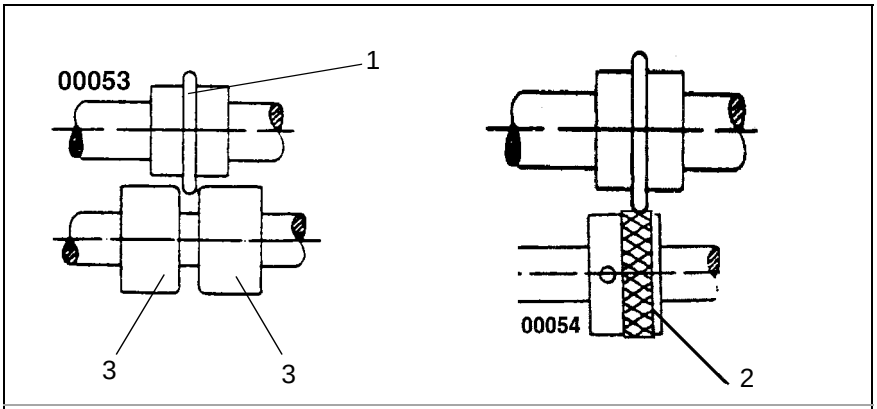
The slitter shafts allow the use of variable special devices such as e.g.gully cut, edge trim and perforation devices.

It is very important that when punch perforating the punched out paper trimmings are safely separated and stripped away from the sheet. For this purpose the perforating knife separates the trimmings safely from the sheet, and a special stripper removes the trimmings away from the tool.

The new punch perforation device is available for all machines that are equipped with 30 mm and 35 mm slitter shafts.

6.5.7 Set-up of scoring function

Pre-scoring will be applied at cross-folding with buckle plates if no perforating is required. Such scoring ensures that the fold is established exactly in its pre-determined folding point. Special scoring devices may also be applied on request.



1 Scoring knife
2 Transport roller with rubber inset
3 Counter knife

Figure 80: Set-up of scoring function

w Set up your scoring knives (1) on the slitter shaft so that they are positioned between the two transport rollers or between the two rounded-off counter knives (3).

Scoring of brittle paper

w With a brittle paper surface you should score on the rubber inset of the transport roller (2). In this case use scoring knives with a smaller diameter.

6.5.8 Set-up of cutting function

After folding, flat sheets are cut with the cutting function.

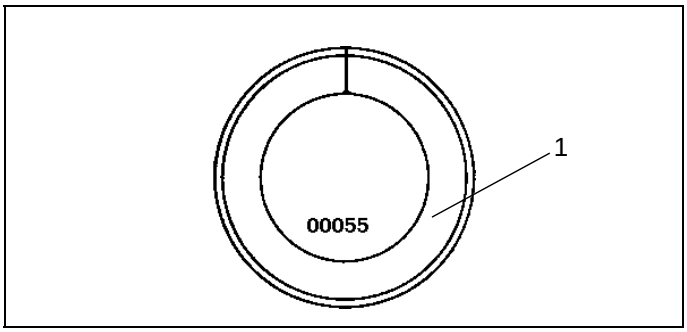
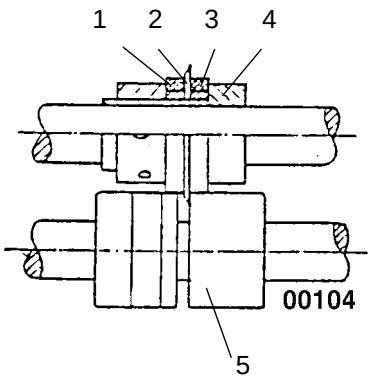


Figure 81: Cutting knives

w Apply one or several cutting knives (1) to separate paper sheets.
w Install the cutting knives in accordance with the principle of perforating knives.

Edge trim

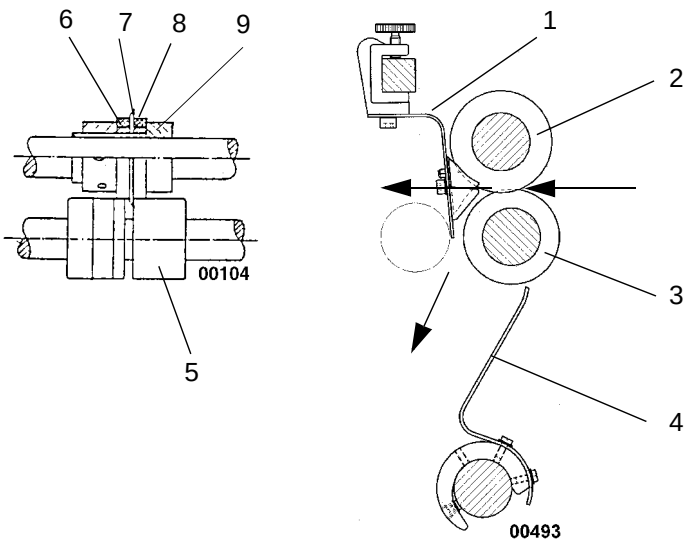


1	Rubber ring	4	Knife holder
2	Cutting knife	5	Counter knife
3	Rubber ring		

Figure 82: Edge trim

How to set up the slitter shaft for edge trimming:

- Move the knife holder (4) with the rubber rings (1, 3) and the cutting knives (2) onto the upper slitter shaft.
- Make sure that a distance washer (0.5 mm) is placed between the rubber ring (3) and the cutting knife (2).
- Adjust the counter knives (6) on the lower slitter shaft. Please follow the illustration for the proper position.



1	Stripper	6	Rubber ring
2	Cutting knife	7	Cutting knife
3	Lower slitter shaft	8	Rubber rings
4	Stripper	9	Knife holder
5	Counter knife		

Figure 83: Strippers for edge trimming

w Guide the paper trimmings away between the stripper (1) and the rubber rings (6).
w Apply the stripper (4).

Slanted cut or slight paper trim::

In the event of a slanted cut or slight paper trim proceed as follows:

w Affix the knife holder (9) onto the lower slitter shaft; ensure that the cutting knife (2) is positioned with its cut surface to the inside (directed to the folding product). The precise mounting position of (5-8) depends on the paper thickness and paper grain.

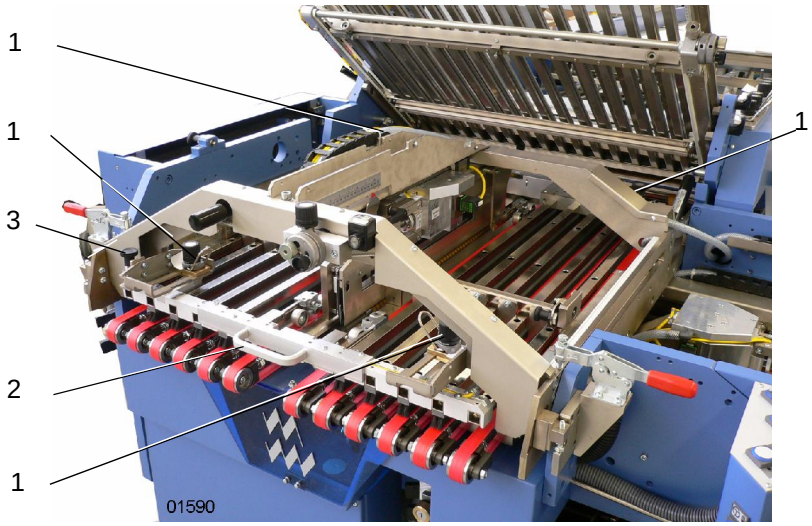
NOTICE!

The best result is achieved with this mounting variant:

- Position (2) on the top, position (3) at the bottom.
- Knife cutting edge (2) towards the paper trim guided by the rubber ring (6).

6.6 Set-up of crossfold folding unit

6.6.1 Transport brushes



1 Setting element
2 Grip with cross bar
3 Locking bolt

Figure 84: Set-up of transport brushes

The transport tapes carry the sheet in the crossfold section through the pressure of brushes. The brushes hold the sheet down and avoid the returning of the sheet to the stop. The lower the brushes are on the sheet, the more power of feed is carried out.

Adjust the transport brushes as follows:

w Set the number of paper thickness of the sheet to be transported underneath the setting elements (1).

NOTICE

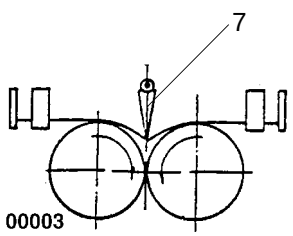
If tensions or waves may arise at the stop, you are able to set several paper strips underneath the setting elements (1)
and thus reduce the contact pressure. The sheet shall be placed in a proper and planned condition at the stop
(depending on paper and type of fold)..

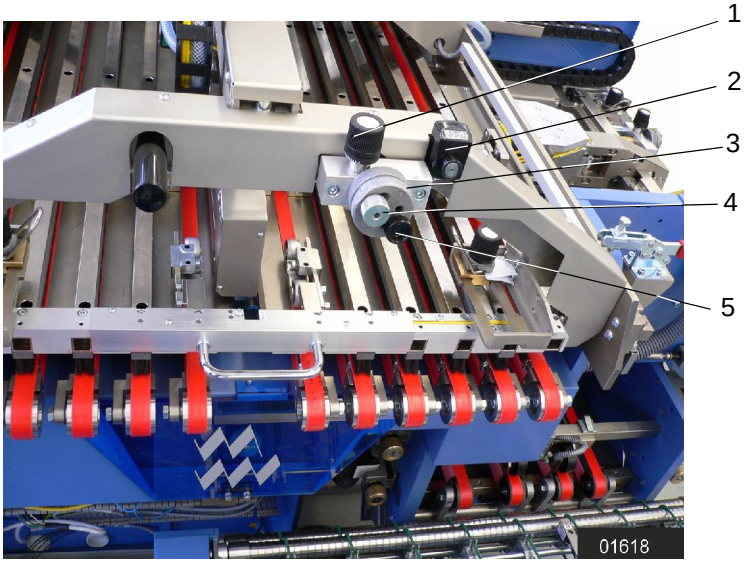
Withdraw the brush unit:

w withdraw therefore the locking bolt (3).
w Withdraw the entire frame at grip (2) of the cross bar.

Now you are able to remove the wrong-folded sheets more easily

6.6.2 Crossfold stop





1	Fine adjustment	5	Plastic knurled screw
2	Display	6	Crossfold stop
3	Central adjustment	7	Crossfold knife
4	Metal knurled screw		

Figure 85: Illustration 85: Crossfold stop

- w Loosen the knurled screw (4).
- w Adjust the crossfold stop (6) with the central adjustment (3) to half of the arriving sheet length.
- w Re-fasten the knurled screw (4).
- w Proceed the fine adjustments by means of (1).

You can read off the set value at the display (2).

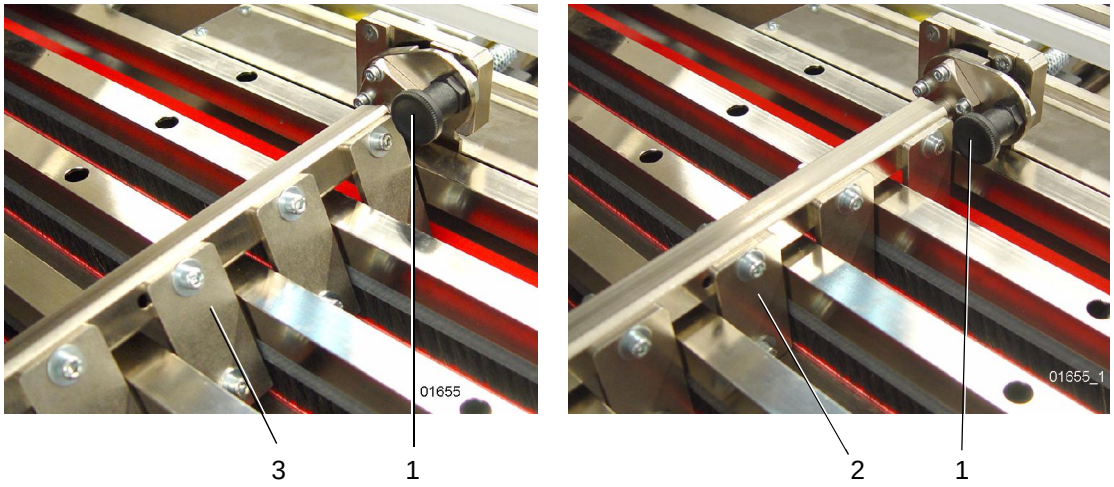
- w If necessary, adjust the angle to the crossfold stop (6) by opening the knurled screw (5). Close the knurled screw (5) after setting the angle (6).

If a folding sample has been calculated through the Navigator Control, you will be able to read off the values in menu "Current settings-crossfold".

NOTICE

Through opening the crossfold stop (6), the crossfold knife (7) and the threefold knife are deactivated automatically.

6.6.2.1 Open/close crossfold stop

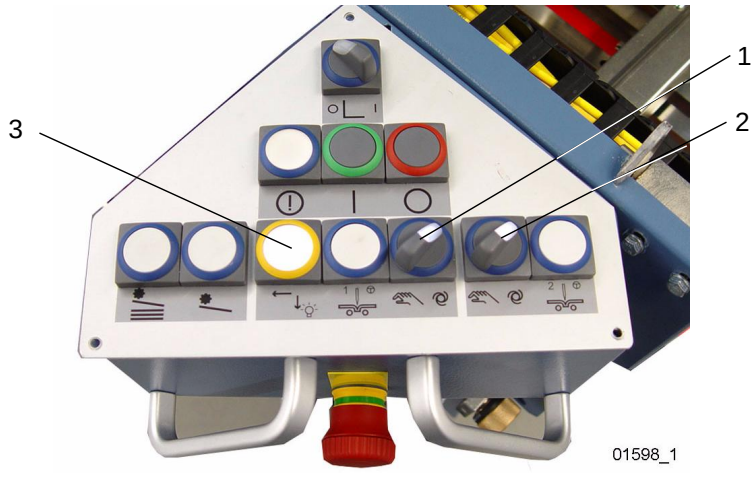


1 Pin
2 Open crossfold stop
3 Closed crossfold stop

Figure 86: Open/close crossfold stop

Open the crossfold stop as follows:

w Unlock the crossfold stop. Withdraw pin (1) therefore.
w Lift-up the crossfold stop (2) at pin (1) and lock it. Have pin (1) snapped-in therefore.

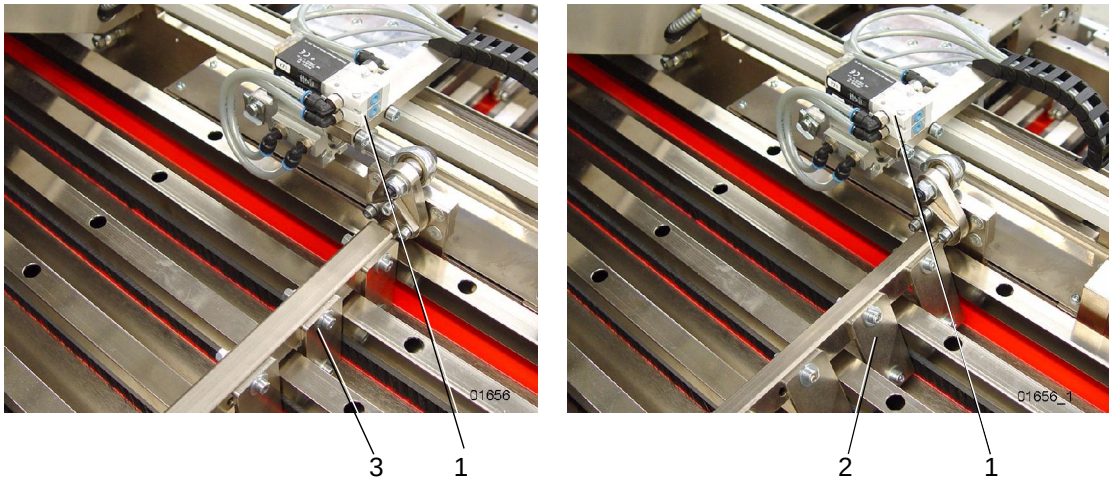


1 LED turn switch
2 LED turn switch
3 LED button

Figure 87: LED button at operator panel crossfold-threefold

The LED buttons (1)-(3) do not flash when the stop is opened.
Crossfold and threefold are inactive.

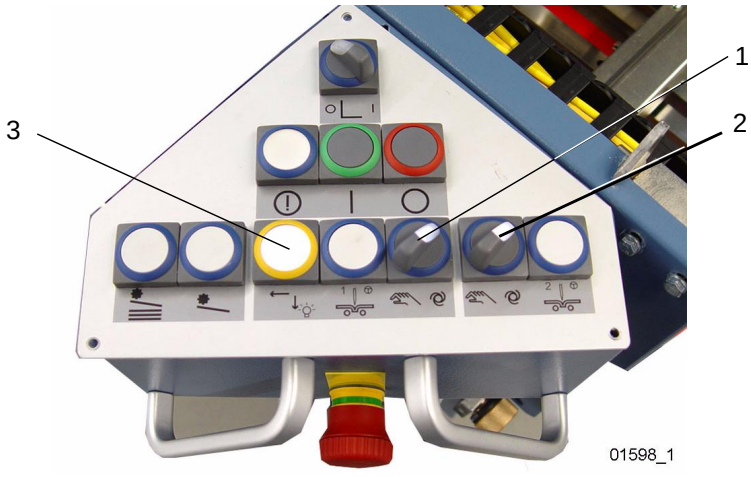
6.6.2.2 Open/close pneumatic crossfold stop (optional)



1 Pneumatic unit
2 Open crossfold stop
3 Closed crossfold stop

Figure 88: Open/close crossfold stop

Open the crossfold stop (2) as follows:



1 LED turn switch
2 LED turn switch
3 LED button

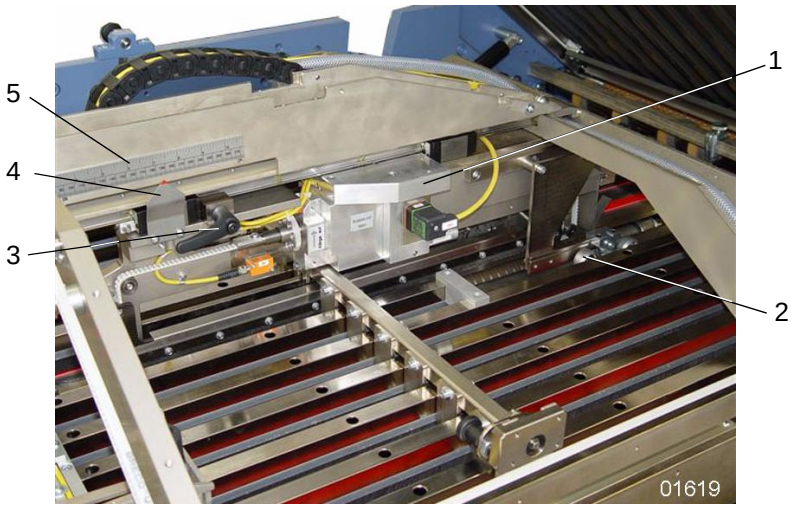
Figure 89: LED button at operator panel crossfold-threefold

w Push LED button (3).
The LED buttons (1)-(3) do not flash when the stop is opened.

w Close crossfold stop by repeated pushing of the LED button (3).
The LED buttons (1)-(3) are flashing.

The knives are active if they are set to production mode.

6.6.2.3 Set-up of crossfold knife in vertical direction



1	Crossfold section	4	Indicator
2	Transport rollers	5	Scale
3	Clamping lever		

Figure 90: Set-up crossfold knife in longitudinal direction

Adjust the crossfold knife in its longitudinal direction:

w Open the clamping lever (3).

w Move the complete knife holder (1) to half of the arriving sheet length.

The transport rollers (2) steadily aligned to the knife are automatically adjusted with the knife holder (1). The transport rollers are manufactured for a strong position and should not be adjusted separately.

w Check the set value at scale (5) with indicator (4).

If a folding sample has been calculated through the Navigator Control, you will be able to read off the values

in menu "Current settings-crossfold".

w Re-fasten the clamping lever (3).

NOTICE

Change with the position of the crossfold stop also the position of the knife. Thus the transport rollers remain in the right position. The transport rollers (2) must stand approx. 1 mm behind the
rear edge of the sheet, do not wedge the rear edge of the sheet thereby!

6.6.3 Lift-up crossfold section

1	Crossfold section	4	Locking bolt
2	Knee lever	5	Handle
3	Foldrollers		

Figure 91: Lift-up crossfold section

The crossfold section can be lifted up for setting and cleaning works.

WARNING!

Danger of the opened crossfold protective section falling down.

Non-observance may cause serious injuries by jamming of parts of the body or even death.

- Make sure that the locking bolt (4) completely snaps-in when lifting the crossfold section to the top.
- Check the condition of the gas struts after every production/daily and replace them, if necessary.

You can recognize a pressure loss at the gas struts as follows:

Hood is coming down on its own from the completely opened up position.

w Open the knee lever (2).
w Lift the table by means of handle (5) to the top and have the locking bolt (4) snapped in.

Now you have a free access to the foldrollers (3) and the slitter shafts.

Lowering of the crossfold section

w withdraw the locking bolt (4) and press down the table at handle (5).
w close the knee lever (2).

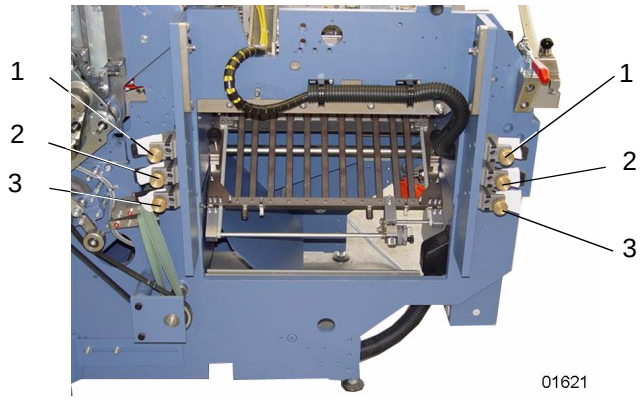
The table is pushed in its original position.

6.6.4 Crossfold foldrollers

6.6.4.1 Set-up setting elements

Adjust the foldrollers and slitter shafts at crossfold to the number of sheets going through the unit:

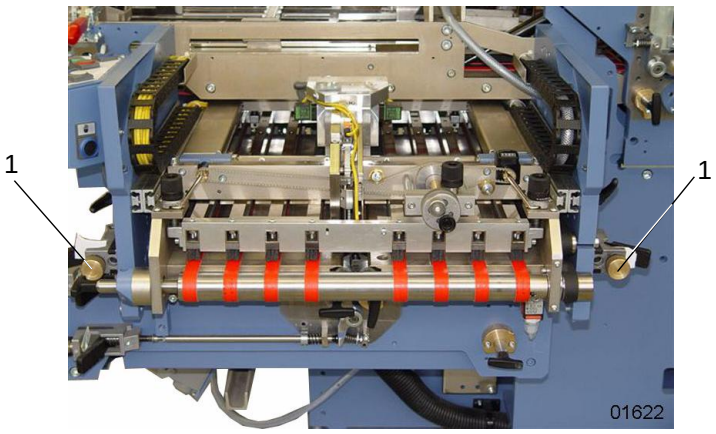
Setting elements for foldrollers



1 Setting elements foldroller at crossfold
2 Setting elements at exit of crossfold buckle plate
3 Setting elements infeeding foldroller of crossfold buckle plate

Figure 92: Setting elements foldrollers

Setting elements for slitter shafts



1 Setting elements for slitter shafts at crossfold

Figure 93: Setting elements slitter shafts

You will find further indications for the set-up of setting elements in chapter "setting elements" on page 80.

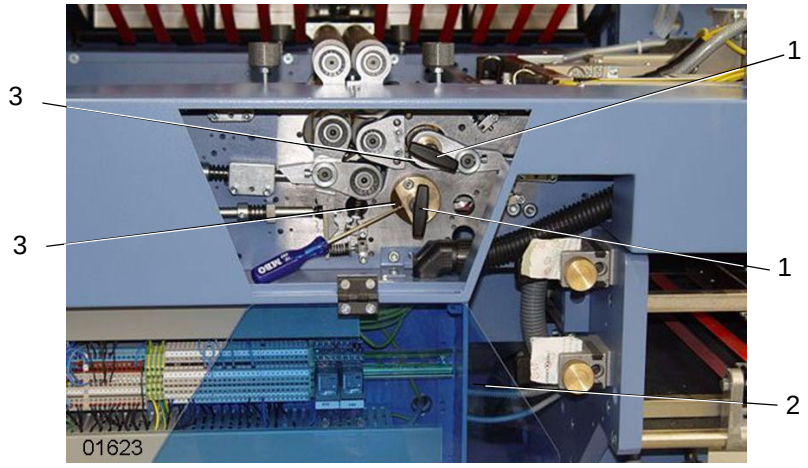
6.6.5 Slitter sahfts in the crossfold folding unit

CAUTION!

Danger from slitter shaft.

Non-observance may cause serious bruisings and cuts.

- Dismount the slitter shafts only when machine is not running and secure it against unintended turning-on.
- wear safety gloves and safety shoes while you are carrying out retrofitting and maintenance work on the slitter shafts.
- Always hold the slitter shafts at the shaft and not at the tool.



1 Plug bearings
2 Flap
3 Screws

Figure 94: Dismount slitter shaft

For mounting and dismounting the slitter shafts proceed as follows

Dismounting of slitter shafts:

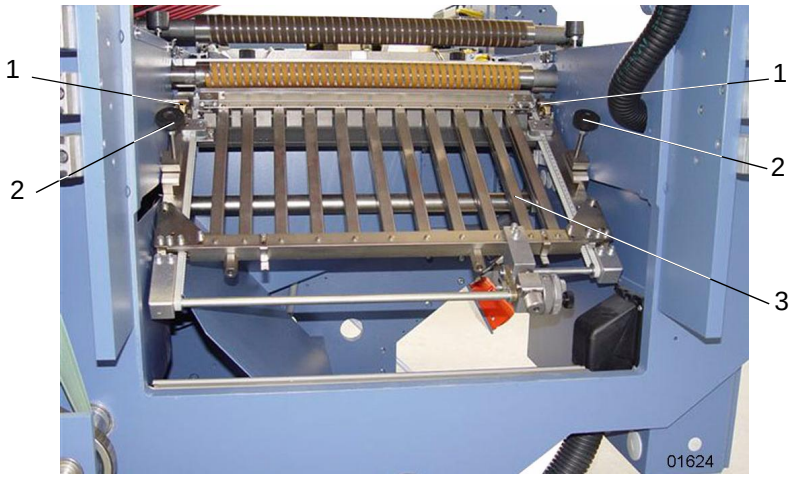
w Open the flap (2).
w Make the section of slitter shafts accessible (See "Lift-up of crossfold section" on page 103).
w Loosen the screws (2) by means of MBO allen wrench SW 4.
w Withdraw the plug bearings (1), keep holding the slitter shaft.

Mounting of slitter shaft:

w Place the slitter shaft into its original position.
w Move the plug bearing (1) into the bore of the slitter shaft stub.
w Fasten the screw (2) by means of the MBO allen wrench SW 4, press the plug bearing (1) towards the slitter shaft. This avoids an axial backlash.
w Close the section of slitter shafts and the flap (2).

6.6.6 Buckle plate at crossfold (version S-KTL)

6.6.6.1 Operating change "buckle plate" to "sheet deflector"



1	Stop	3	Buckle plate
2	Screws		

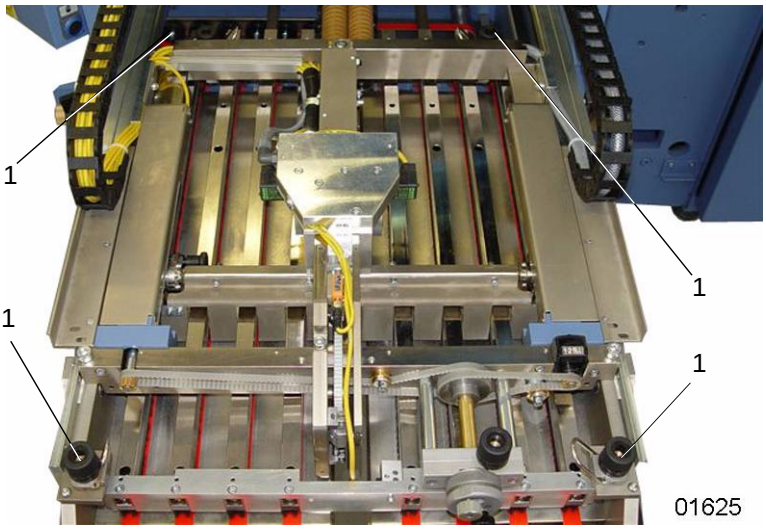
Figure 95: Buckle plate to sheet deflector

Change from function "buckle plate" to "sheet deflector" or reversely:

- w Loosen both screws (2).
- w Withdraw buckle plate (3) a little and open or close the retrofit sheet deflector.
- w Move the buckle plate (3) to the stop into the unit.
- w Refasten the screws (2).

6.7 Set-up of threefold folding unit

6.7.1 Transport brushes



1 Einstellelement

Figure 96: Setting element

The transport tapes carry the sheet in the crossfold section through the pressure of brushes. The brushes hold the sheet down and avoid the returning of the sheet to the stop. The lower the brushes are on the sheet, the more power of feed is carried out.

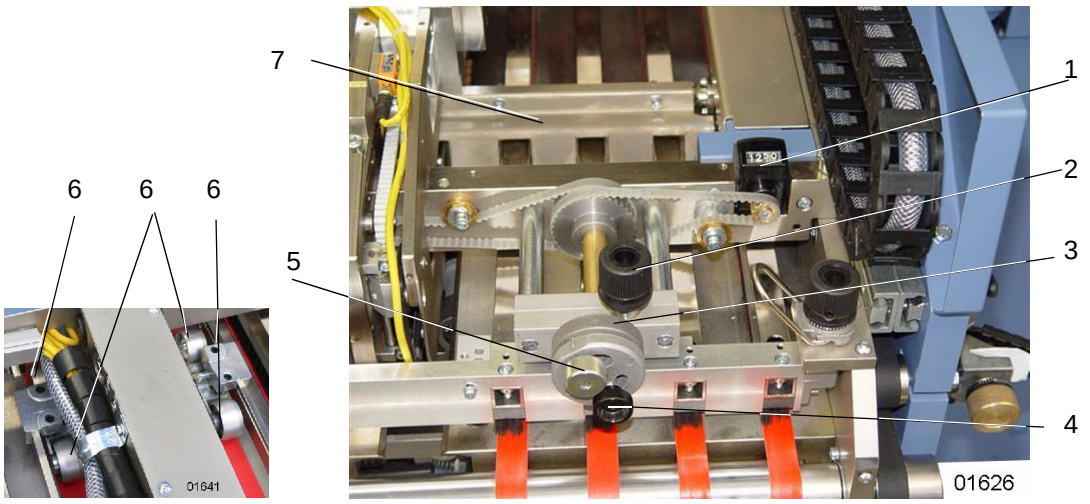
NOTICE

If tensions or waves may arise at the stop, you are able to set several paper strips underneath the setting elements (1) and thus reduce the contact pressure. The sheet shall be placed in a proper and planned condition at the stop (depending on paper and type of fold).

Adjust the transport brushes as follows:

w Set the number of paper thickness of the sheet to be transported underneath the setting elements (1).

6.7.2 Set-up of threefold stop



1 Display
2 Fine adjustment
3 Central adjustment
4 Plastic knurled screw
5 Metal knurled screw
6 Transport rollers
7 Threefold stop

Figure 97: Threefold stop

- Loosen the knurled screw (5).
- Adjust the threefold stop (6) with the central adjustment (3) to the arriving sheet length.
- Re-fasten the knurled screw (5).
- Proceed the fine adjustments by means of position (2).
- The transport rollers must stand approx. 1 mm behind the rear edge of the sheet, do not wedge the rear edge of the sheet thereby!

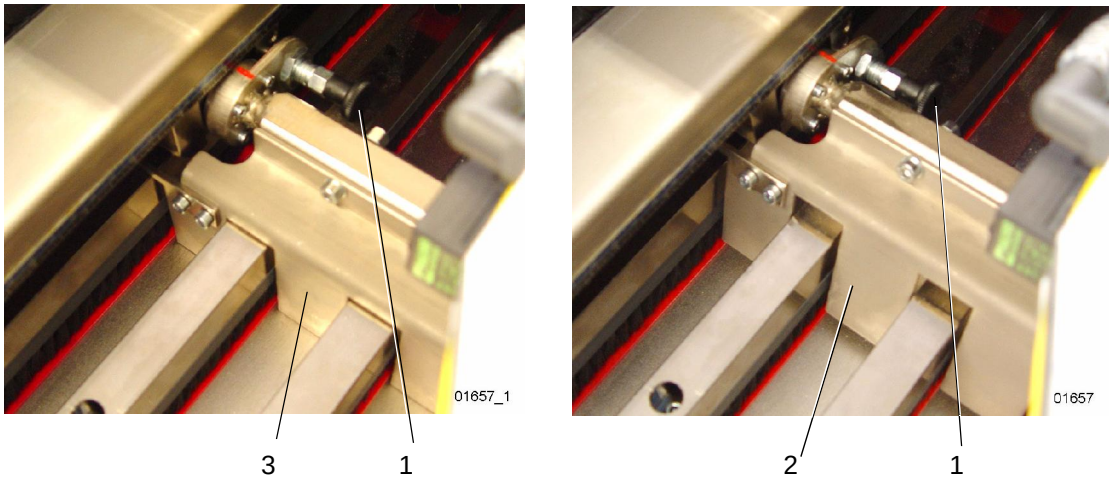
You can read off the set value at the display (1).

If a folding sample has been calculated through the Navigator Control, you will be able to read off the values in menu "Current settings-threefold".

NOTICE

Through opening the threefold stop (7), the threefold knife is deactivated automatically.

6.7.2.1 Open/ close threefold stop



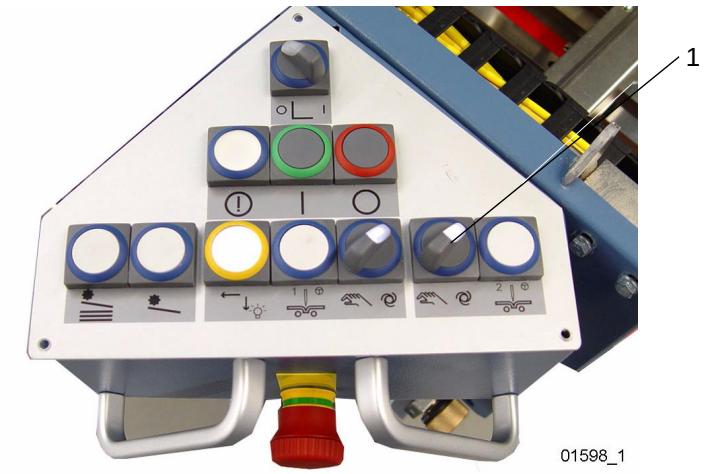
1 Pin
2 Open threefold stop
3 Closed threefold stop

Figure 98: Open/close threefold stop

Open the threefold stop as follows:

w Unlock the threefold stop. Withdraw pin (1) therefore.
w Lift-up the threefold stop (2) at pin (1) and lock it. Have pin (1) snapped-in therefore.

The threefold is inactive.

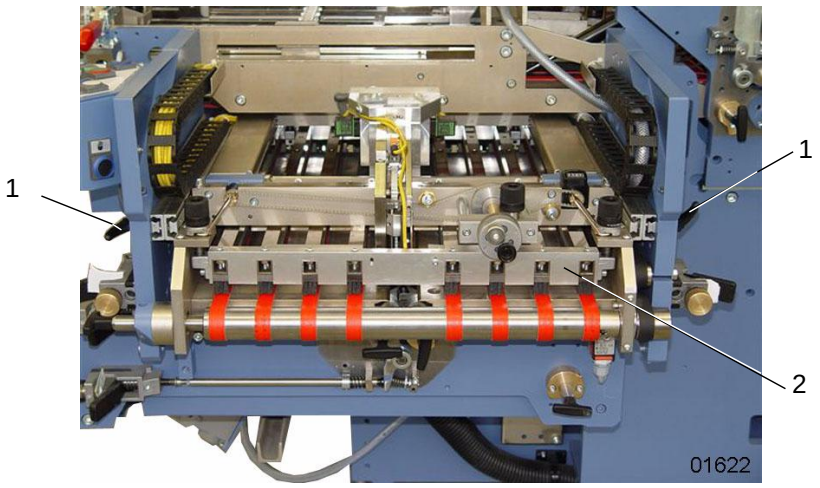


1 LED turn switch

Figure 99: LED turn switch at operator panel crossfold-threefold

The LED turn switch (1) does not flash when the threefold stop is opened.

6.7.3 PUll-out the threefold section



1 Clamping lever 2 Threefold

Figure 100: Pull-out the threefold section

The threefold section (2) can be pulled out for setting and cleaning works.

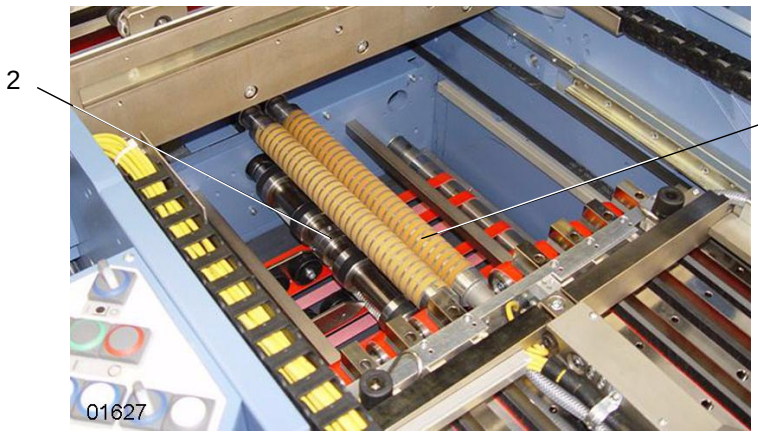
w Open the clamping levers (1) and pull-them out laterally.
w Pull out the threefold. Have the clamping lever (1) pulled-out.

ATTENTION!

Danger of edges in the threefold carriage.

Non-observance may cause material damage!

Make sure that the clamping lever (1) remains pulled-out as long as the threefold (2) will be in its original position again.

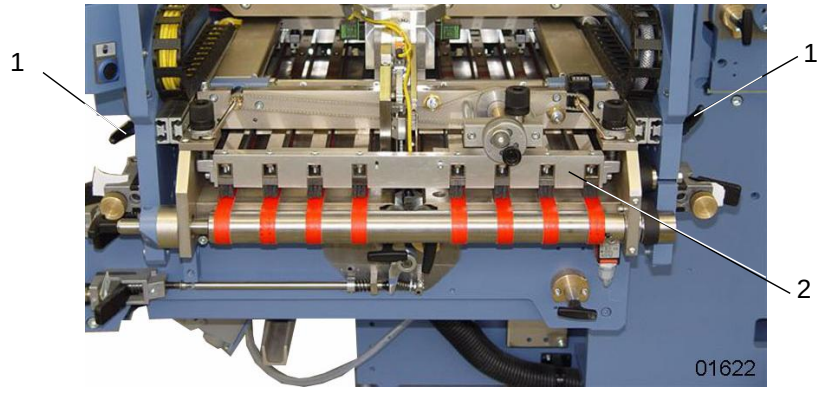


1	Foldrollers	2	Slitter shafts

Figure 101: Foldrollers/slitter shafts at threefold

You have now free access to the foldrollers (1) and slitter shafts (2).

Moving the threefold section into the folding unit:

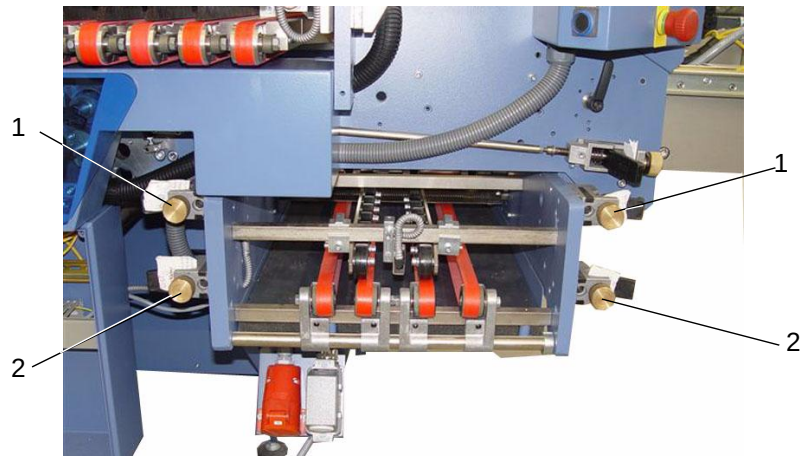


1	Clamping lever	2	Threefold

Figure 102: Moving the threefold secting into the folding unit

w Move the threefold section (2) with the clamping lever (1) laterally pulled-out into the folding unit.
w Push the clamping levers (1) in their original positions. Wedge the clamping levers counter-clockwise.

6.7.4 Threefold foldrollers (version S-KTL)



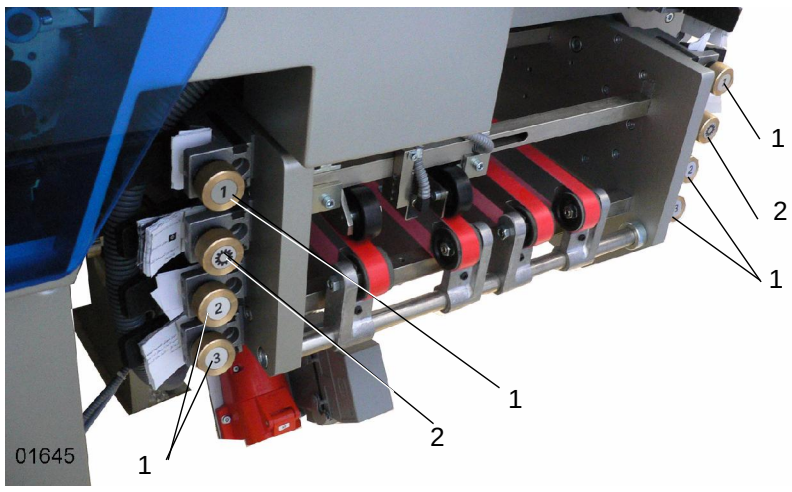
1	Setting element for foldrollers	2	Setting element for slitter shafts (optional)

Figure 103: Setting element for slitter shafts (optional)

Adjust the foldrollers and slitter shafts with the setting elements (1) and (2) to the number of sheets going through the unit.

Note therefore chapter "setting elements" on page 80.

6.7.5 Threefold foldrollers (version S-KTL)



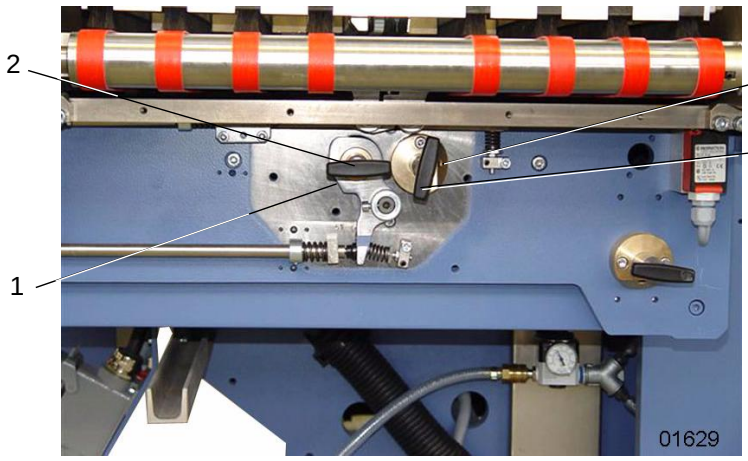
1	Setting elements for foldrollers	2	Setting elements for slitter shafts

Figure 104: Foldrollers at threefold (S-KTLT)

Adjust the foldrollers and slitter shafts with the setting elements (1) and (2) to the number of sheets going through the unit.

Note therefore chapter "setting elements" on page 80.

6.7.6 Slitter shafts in threefold folding unit



1	Screw	2	Plug bearing

Figure 105: Slitter shafts in threefold folding unit

For mounting and dismounting the slitter shafts proceed as follows:

Dismounting of slitter shafts:

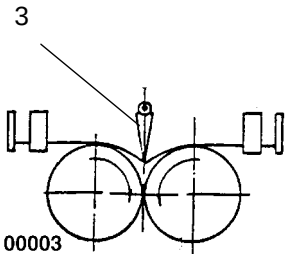
- w Make the section of slitter shafts accessible (See "Pull-out threefold section" on page 110).
- w Loosen the screws (1) by means of MBO allen wrench SW 4.
- w Withdraw the plug bearings (2), keep holding the slitter shaft.

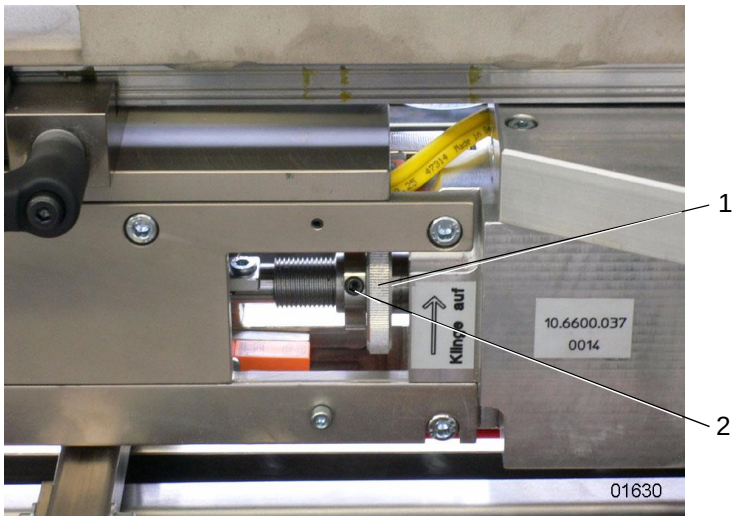
Mounting of slitter shaft:

- w Place the slitter shaft into its original position.
- w Move the plug bearing (2) into the bore of the slitter shaft stub.
- w Lock the slitter shaft by a turn to the right.
- w Fasten the screw (1) by means of the MBO allen wrench SW 4, press the plug bearing (1) towards the slitter shaft. This avoids an axial backlash.
- w Move the threefold section into the folding unit again.

6.8 Folding knife at crossfold and threefold

6.8.1 Height adjustment folding knife





1 Setting wheel
2 Adjustment ring with grub screw
3 Folding knife

Figure 106: Height adjustment folding knife

Regulate the height of the folding knife as follows:

w Set the folding knife in its upper position.
w Loosen the adjustment ring (2) by means of grub screw SW 3.

Increasing the knife:

w Turn the setting wheel (1) counter-clockwise.
w Retighten the adjustment ring (2) by means of grub screw SW 3, but not too strong.

Lowering the knife:

w Turn the setting wheel (1) clockwise.
w Retighten the adjustment ring (2) by means of grub screw SW 3, but not too strong.

?

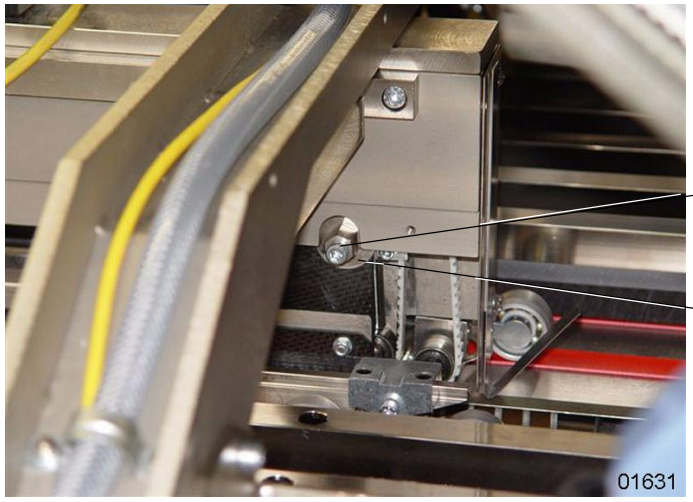
The sheet is not recognized from the knife?

The folding knife is placed too high. The sheet is not transported between the foldrollers from the folding knife.

w Set the folding knife (2) in its upper position.
w Transport a sheet under the folding knife (2) and release a single stroke.
w Set the knife half a turn lower at the setting wheel (1) and release a new single stroke. Repeat this procedure as long as the sheet is transported.
w Set the folding knife (2) quarter a turn lower afterwards, until the folding sheet is transferred safely into the foldrollers

6.8.2 Vertical adjustment

The vertical adjustment influences the exact infeeding of sheets as well as the subsequent perforating, scoring or cutting..



1 Screw 2 Excentric

Figure 107: Vertical adjustment of the folding unit

Adjust the folding knife in the crossfold section in its vertical position::

Adjustment of the inclination:

w Open the screw (1)
w Adjust the excentric (2) by means of wrench SW 13.

The sheet moves forward at the stop side:

w Lower the infeed point of the knife.

The sheet is pushed less strong against the stop.

The sheet overruns at the stop side:

w Increase the infeed point of the knife.

The sheet is pushed stronger against the stop.

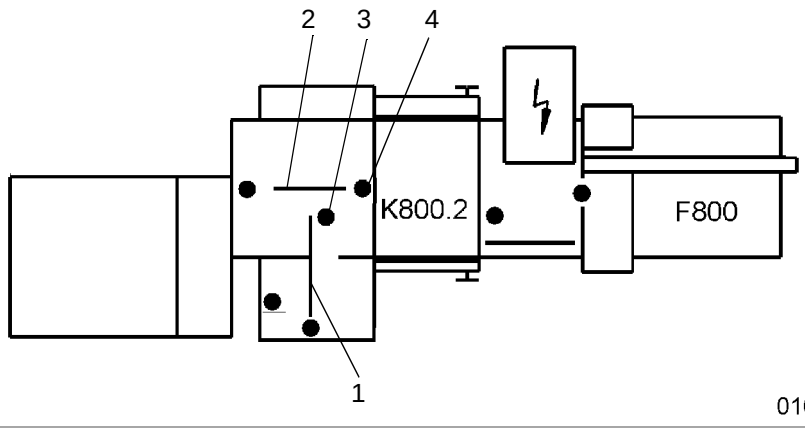
w Refasten the screw (1) after the adjustment. Keep holding the excentric (2) by means of a wrench.

In the event ofan extremely vertical adjustment, the folding knife has to be set higher (increased), if necessary.

NOTICE

You are able to influence an evenly slanted perforation as quickly as possible by pulling out the buckle plate KTL on one side.

6.9 Folding knife control at crossfold and threefold



1 Folding knife threefold
2 Folding knife crossfold
3 Sensor (activates folding knife threefold)
4 Sensor (activates folding knife crossfold)

Figure 108: Photocells folding knife

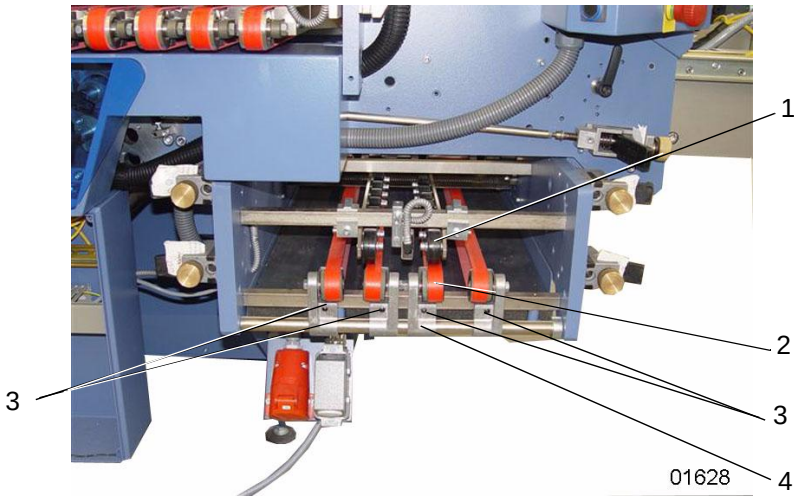
The folding knife (1,2) works independently. The movement of the folding knife is released by a photocell (3,4) through arriving sheets.
The time of release is automatically calculated through the calibrated sheet.

It is possible to modifie the delay by means of the control "Navigator".

If necessary, the control increases the sheet gap to avoid malfunctions.

- Machine control Navigator Standard: (See chapter "6.2.3" on page 57).
- Machine control Navigator Touch: (see chapter "6.3.5" on page 65).

6.10 Transportation at exit



1	Transport rollers	3	Grub screws
2	Transport tapes	4	Supports

Figure 109: Adjust transportation at exit

Setting of transport tapes

How to set the transport tapes (2) at the exit:

w Loosen the grub screws (3) by means of the MBO wrench SW 4.

w Move the supports (4) of the individual transport tapes into the adequate position

w Retighten the grub screws (3) by means of the MBO wrench SW 4.

Setting of transport rollers/smoother bars:

w Adapt the individual transport rollers (1) to the inferior tapes (2).

6.11 Adjusting data of standard folding impositions

This chapter includes the most common folding impositions, which are sub-divided into::

- Parallel fold
- Cross-fold
- Three-fold.

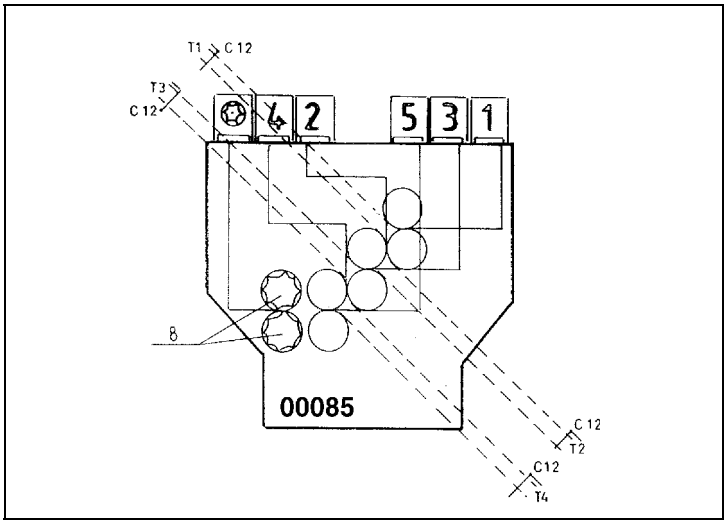
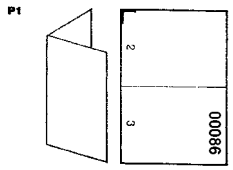
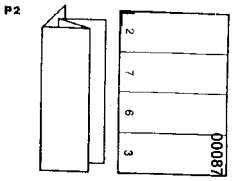
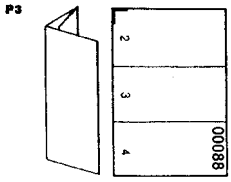
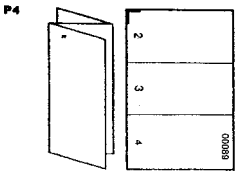


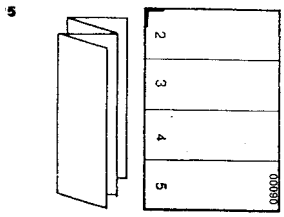
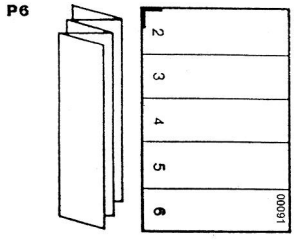
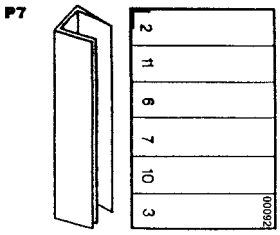
Figure 110: Adjusting data of standard folding impositions

1	Set of fold rollers 1
2	Set of fold rollers 2
3	Set of fold rollers 3
4	Set of fold rollers 4
5	Set of fold rollers 5
8	Set of slitter shafts

Table 15: Adjusting data of standard folding impositions

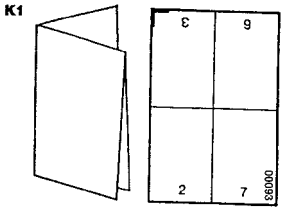
6.11.1 Parallel fold

P1	**1 x parallel fold = 4 pages**
	 w Set fold roller 1 to single paper thickness. w Set fold rollers 2 to 8 to two-fold paper thickness. w Set the sheet stop C 12 to 1/2 of the sheet length at the 1st buckle plate. w The buckle plates 2 to 4 are replaced by sheet deflectors (buckle plates are closed).
P2	**2 x parallel fold = 8 pages**
	 w Set fold roller 1 to single paper thickness. w Set fold roller 2 to two-fold paper thickness. w Set the fold rollers 3 to 8 set to four-fold paper thickness. w Set the sheet stop C 12 to 1/2 of the sheet length at the 1st buckle plate. w Set the sheet stop at the 2nd buckle plate to 1/4 of the sheet length. w The buckle plates 3 and 4 are replaced by sheet deflectors (buckle plates are closed)..
P3	**2 x parallel fold (letter fold) = 6 pages**
	 **1) With two top buckle plates (T1 and T3)** w Set fold rollers 1 to 3 to single paper thickness. w Set fold rollers 4 to 8 to three-fold thickness of paper. w Set the sheet stop C 12 to 1/3 of the sheet length at the 1st and 3rd buckle plates. w The buckle plates 2 and 4 are replaced by sheet deflectors (buckle plates are closed). **2) With one top (T1) and one bottom (T2) buckle plate:** w Set fold rollers 1 and 2 to single paper thickness. w Set fold rollers 3 to 8 to three-fold thickness of paper. w Set the sheet stop C 12 to 1/3 of the sheet length at the 1st and 3rd buckle plates. w Set the sheet stop of the 2nd buckle plate to 1/3 of the sheet length. w The buckle plates 2 and 4 are replaced by sheet deflectors (buckle plates are closed).
P4	**2 x parallel fold (accordion fold) = 6 pages**
	 w Set fold rollers 1 and 2 to single paper thickness. w Set fold rollers 3 to 8 to three-fold thickness of paper. w Set the sheet stop C 12 to 1/3 of the sheet length at the 1st and 2nd buckle plates. w The buckle plates 3 and 4 are replaced by sheet deflectors (buckle plates are closed).

P5	**3 x parallel fold (accordian fold) = 8 pages**
	 w Set fold rollers 1 to 3 to single paper thickness. w Set fold rollers 4 to 8 to four-fold thickness of paper. w Set the sheet stop C 12 to 1/4 of the sheet length at the 1st and 3rd buckle plates. w The buckle plate 4 is replaced by the sheet deflector (buckle plates are closed).
P6	**4 x parallel fold (accordion fold) = 10 pages**
	 w Set fold rollers 1 to 4 to single paper thickness. w Set fold rollers 5 to 8 to five-fold thickness of paper. w Set the sheet stop C 12 to 1/5 of the sheet length from the 1st to the 4th buckle plates.
P7	**3 x parallel fold (1 x parallel fold + 2 x letter folds) = 12 pages**
	 w Set fold roller 1 to single paper thickness. w Set fold rollers 2 to 4 to two-fold paper thickness. w Set fold rollers 5 to 8 to six-fold thickness of paper. w Set the sheet stop C 12 to 1/2 of the sheet length at the 1st buckle plate. w Set the sheet stop of the 2nd and 4th buckle plates to 1/6 of the sheet length. w The 3rd buckle plate is replaced by the sheet deflector (buckle plates are closed).

6.11.2 Crossfold

K1	1 x parallel and 1 x crossfold (double folding) = 8 pages



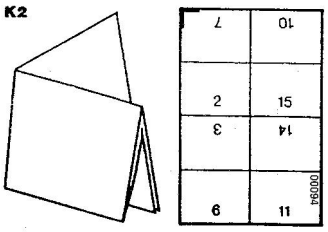
Settings of parallel fold:

- w Set foldroller 1 to single paper thickness.
- w Set foldrollers 2 to 5 to two-fold paper thickness.
- w Set the sheet stop C 12 to 1/2 of the sheet length at the 1st buckle plate.
- w The buckle plates 2 to 4 are replaced by sheet deflectors (buckle plates are closed).

Settings of crossfold:

- w Set crossfold foldrollers 1-3 to four-fold paper thickness.
- w Set the sheet stop of the buckle plate at crossfold to 1/2 of the sheet length.
- w Adjust the knife with transport rollers in vertical position at the rear edge of the sheet.

K2	2 x Parallel fold and 1 x crossfold = 16 pages



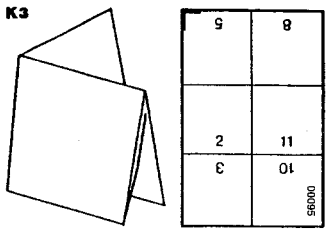
Settings of parallel fold:

- w Set foldroller 1 to single paper thickness.
- w Set foldroller 2 to two-fold paper thickness.
- w Set foldrollers 3 to 5 to four-fold paper thickness.
- w Set the sheet stop C 12 to 1/2 of the sheet length at the 1st buckle plate.
- w Set the sheet stop of the 2nd buckle plate to 1/4 of the sheet length.
- w The buckle plates 3 and 4 are replaced by sheet deflectors (buckle plates are closed).

Settings of crossfold:

- w Set foldrollers 1 to 3 and the slitter shaft to eight-fold paper thickness.
- w Set the sheet stop of the buckle plate in the crossfold unit to 1/2 of the sheet length.
- w Adjust the knife with transport rollers in vertical position at the rear edge of the sheet.

K3	**2 x parallel (letter fold) and 1 x crossfold = 12 pages**



1) Setting of parallel fold with two buckle plates on the top (T1 and T3)

w Set foldrollers 1 to 3 to single paper thickness.
w Set foldrollers 4 to 5 to three-fold paper thickness.
w Set the sheet stop C 12 to 1/3 of the sheet length at the 1st and 3rd buckle plates.
w The buckle plates 2 and 4 are replaced by sheet deflectors (buckle plates are closed).

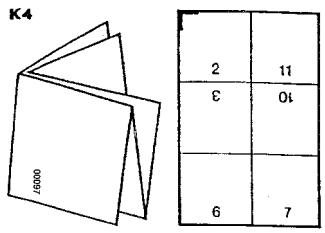
2) Setting of parallel fold with one buckle plate on the top (T1) and one buckle plate at the bottom (T2):

w Set foldrollers 1 and 2 to single paper thickness.
w Set foldrollers 3 to 5 to three-fold paper thickness.
w Set the sheet stop C 12 to 2/3 of the sheet length at the 1st buckle plate.
w Set the sheet stop C 12 to 1/3 of the sheet length at the 2nd buckle plate.
w The buckle plates 3 and 4 are replaced by sheet deflectors (buckle plates are closed).

Settings of crossfold:

w Set foldrollers 1-3 at crossfold to six-fold paper thickness.
w Set the sheet stop at crossfold to 1/2 of the sheet length.
w Adjust the knife with transport rollers in vertical position at the rear edge of the sheet.

K4	**2 x parallel fold (accordion fold) and 1 x crossfold = 12 pages**



Settings of parallel fold:

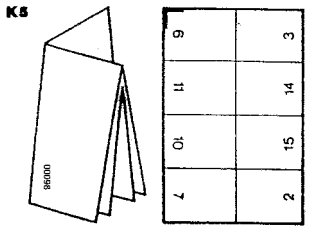
w Set foldrollers 1 and 2 to single paper thickness.
w Set foldrollers 3 to 5 to three-fold paper thickness.
w Set the sheet stop C 12 to 1/3 of the sheet length at the 1st and 2nd buckle plates.
w The buckle plates 3 and 4 are replaced by sheet deflectors (buckle plates are closed).

Settings of crossfold:

w Set foldrollers 1 to 3 to six-fold paper thickness.
w Set the sheet stop at crossfold to 1/2 of the sheet length.
w Adjust the knife with transport rollers in vertical position at the rear edge of the sheet.

6.11.3 Threefold

K5	1 x parallel, 1 x crossfold and 1 x threefold = 16 pages (threefold folding unit)

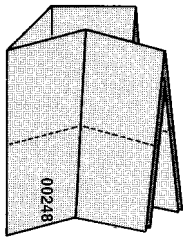


Settings of parallel fold:
- w Set foldroller 1 to single paper thickness.
- w Set foldrollers 2 to 5 to two-fold paper thickness.
- w Set the sheet stop C 12 to 1/2 of the sheet length at the 1st buckle plate.
- w The buckle plates 2 to 4 are replaced by sheet deflectors (buckle plates are closed).

Settings of crossfold:
- w Set foldrollers 1 to 3 to four-fold paper thickness.
- w Set the sheet stop at crossfold to 1/2 of the sheet length.
- w Adjust the knife with transport rollers in vertical position at the rear edge of the sheet..

Settings of threefold:
- w Set foldrollers 1 to 2 to eight-fold paper thickness.
- w Set the sheet stop at threefold to the sheet length.
- w The transport rollers shall be placed at the rear edge of the sheet..

K6	1 x parallel fold, 1 x crossfold, and 2 x threefold = 2 x 32 pages (two-up production) version S-KTLT

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Settings of parallel fold:
- w Set foldroller 1 to single paper thickness.
- w Set foldrollers 2 to 5 to two-fold paper thickness.
- w Set the sheet stop C 12 to 1/2 of the sheet length at the 1st buckle plate.
- w Replace the buckle plates 2 to 4 by sheet deflectors (buckle plates are closed).

Settings of crossfold:
- w Set foldrollers 1 to 3 to four-fold paper thickness.
- w Set the sheet stop at crossfold to 1/2 of the sheet length.
- w Adjust the knife with transport rollers in vertical position at the rear edge of the sheet.

Settings of threefold:
- w Set foldrollers 1 and 2 to eight-fold paper thickness.
- w Set foldroller 3 and the slitter shaft to sixteen-fold paper thickness.
- w Set the sheet stop at threefold to the sheet length.
- w Set buckle plate S-KTLT to 1/8 of the sheet length.

7 Operation

This table represents the areas of responsibility and the different activities of group of persons working on the machine.

	Instructed persons	Mechanics of company	Service	Electrician	Supervisor with corresponding responsibility
Operation	X		X		X
Mechanical trouble-shooting	X	X	X		X
Electrical trouble-shooting			X	X	
Repair		X	X	X	

Table 16: Operational requirements to the personnell

7.1 Safety and noise-damping hood

WARNING!

Danger of the opened protective hood falling down.

Non-observance may cause serious injuries by jamming of parts of the body or even death.

You can recognize a pressure loss as follows: Hood is coming down on its own from the completely opened up position.

- Check the condition of the gas struts after every production/daily and replace them, if necessary.
- Make sure that when working with an opened noise damping hood it is completely opened up to the stop.

WARNING!

Danger of rotating machine elements.

Non-observance may possibly cause personal injuries and damage to property.

Reach only into the machine when it is not running!

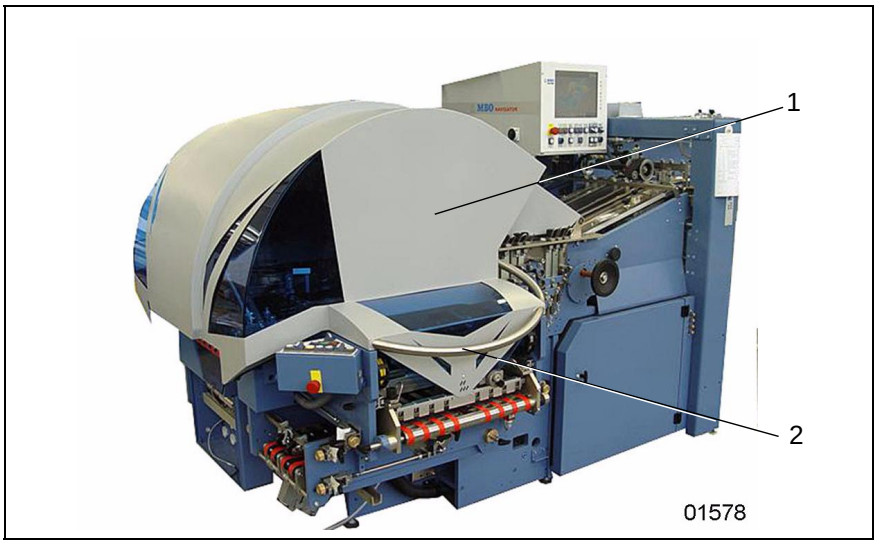


Figure 111: Safety/ noise damping hood

The safety and noise damping hood (1) covers the entire parallel-crossfold and threefold section.

w If required, lift-up the hood at the grip (2).

w Make sure that the hood is opened up to the stop.

7.1.1 Safety switch

DANGER!

Danger may occur through alterations or removal of protective equipment at the machine.

Non-observance may cause serious bodily injuries or even death.

Report any audible/visible saftey relevant alteration of the machine to the responsible authorities in your company.

Safety switches prevent an unpermitted opening of the safety and noise damping hood during operation.

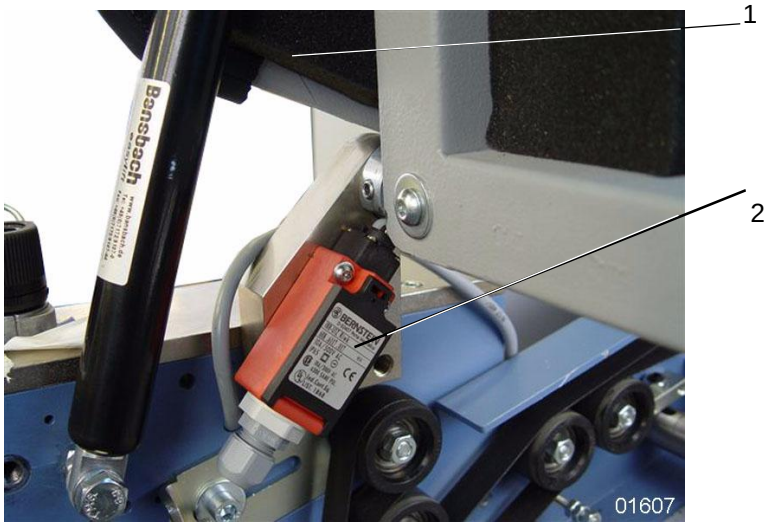


Figure 112: Safety switch

Switch (2) stops the machine, as soon as hood (1) is opening.

7.2 Start of the machine

Before you start the production it is imperative that you prepare the machine ready to run.

1 Main switch at Touch display (optional)
2 Main switch at standard display

Figure 113: Start of the machine

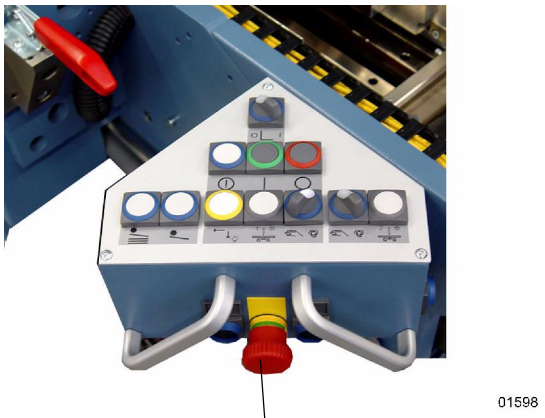
w Start the machine at main switch (2) or optional at main switch (1).

The machine is now ready for operation.

7.3 Production stop

The machine is in operation. In the event of an emergency situation, you have to put the machine out of operation.
For these situations, there is an emergency stop switch at each control panel.

1



2

1 Emergency stop switch at main control panel	2 Emergency stop switch at crossfold and threefold

Figure 114: Emergency stop switch

- Activate the emergency stop switch (1) or (2).
- Eliminate the failure. Make sure that the machine cannot be re-started unintentionally during this situation.
- Unlock the emergency stop function. Turn therefore the emergency stop switch (1) or (2) clockwise.

The machine is ready for operation.

7.4 Turn-off the machine

After finishing the production run, the machine has to be turned off.

1 Main switch at Touch (optional)
2 Main switch at standard display

Figure 115: Turn-off the machine

w Turn-off the machine at the main switch.

The machine is switched off now.

7.5 Setting/ fitting of the machine

See "setting/fitting" on page 53.

7.6 Identification and handling of malfunctions

7.6.1 Continuous feeder

Failure	Cause	Elimination
Double sheet at continous feeder	Too much air in pile, i.e. sheets orm a wave and are thus with-drawn too far under the suction wheel. The suction wheel can pull two sheets.	• Reduce vacuum • Install finger at buffer plate. • Reduce vacuum at VIVAS
	Porous sheets or vacuum too deep in the pile (thus the upper sheets are pressed together again.)	• Aerate less sheets • Install finger at buffer plate • Increase power of frontal blowers • Reduce vacuum at VIVAS
	Sheets overrun the sensor finger.	• Increase the sensor finger • Lower the transfer plate • Reduce vacuum at VIVAS
	Support rollers and brushes wrongly positioned..	Position properly. The middle of the roller is the rear edge of the sheet.
Break in shingle	Too much air in the pile at inserting.	Press out air.
	The middle transport tape is too tight..	Relieve tension of tape by means of the knurled screw..
	Springs are too tight at the con-veyor table..	Relieve tension by varying the springs, maybe unhing a spring..
	The infeed angle in front of the drum is too narrow.	Increase infeed angle by means of the adjusting screw..
Over shingling	White transport tape is too loose.	Tension the tape by means of knurled screw..
	Lower table does not transport.	Re-tension the tapes by means of allen wrench 6 (possibility to tension under the machine, above the compressors).
Formation of waves on lower table	Lower table does not transport.	Re-tension the tapes by means of allen wrench 6 (possibility to tension under the machine, above the compressors)
	Conveyor table too loose..	Tension the springs by varying..
Dog ears	Missing or wrong positionned teflon tapes..	Apply teflon tapes at the conveyor table (at sheet edges).

7.6.2 Pile feeder/palletized feeder

Failure	Cause	Elimination
Double sheet at pile feeder/palet-tized feeder	Pile stands too high.	Lower capacitive head by means of knurled screw laterally at VIVAS.
	Frontal air is activated (makes the sheet plunging).	Switch off frontal air.
	Suckers are set too low (suck through)	Increase suckers (approx. 2 mm above pile).
	Vaccum at VIVAS too strong.	Reduce vacuum (red screw, under-neath of valve to the left)..
	Pre-blower is set too low (air cushion breaks down)	Aerate stronger.
	Vaculift is in the wrong position (too far backwards).	Set vaculift properly (pressure foot must stand approx. 8-9 mm on the sheet).
	Brushes are in the wrong position	Place brushes appro. 2-3 mm above the pile and 5-6 mm in the pile.
	Sheets are clinging or sticking together.	Aerate the pile (roll...)
	Sheet is aerated too strong from backside and is broken away from the sucker, plunges ahead.	Reduce air at seperation blower.
Bad, stagnant feeding	Too less air at seperation blow-ers at heavy, big sheets	Increase the aeration (possibly retrofit lateral aeration).
	Smoother bar too deep, sheet is clamped.	Set smoother bars higher.
	Pile stands too deep.	Set capacitive switch higher by means of knurled screw (pile approx. 3-4 mm under VIVAS).
	Edges hang down, sheet is edged.	Straighten pile by means of wedges, or blow-up edges by means of lateral frontal aeration.
	Vacuum too low at VIVAS.	Increase vacuum (turn red screw to the right below valve)..

Failure	Cause	Elimination
Bad, stagnant feeding	Vaculift is placed too far into the pile, the pressure foot pushes down the lifted sheet.	Adjust pressure foot properly (pressure foot must stand approx. 8-9 mm on the sheet).
	Brushes stand too high or not far enough into the pile,.sheets can plunge away.	Brushes shall stand approx. 2-3 mm above the pile and 5-6 mm in the pile.
	Vaculift runs steadily up and down during machine running	Defective height control? Have origina settings checked.

7.6.3 Alignment VIVAS

Failure	Cause	Elimination
First fold is crooked	Sheet forms a wave on the left or drifts with its rear edge from sidelay, sidelay is not angled	Set sidelay to right angle
	Sheet is pulled too strong into the sidelay, forms a wave,.too much vacuum.	Reduce vacuum generally, knurled screw to the left.
	Sheet is pulled too strong into the sidelay, forms a wave,.too much vacuum.	Reduce vacuum by means of sliding bar at infeed
	Sheet tips over to the right, too less vacuum at infeed..	Increase vacuum by means of sliding bar.
	Sheet stutters on sidelay at the transfer and tips over to the right, generally too less vacuum.	Increase vacuum, turn knurled screw to the right.

7.6.4 Parallel fold

Failure	Cause	Elimination
First fold is crooked.	Sheet forms a wave at the feeder side, sheet is pulled to the sidelay too strong	Set sidelay to right angle. Reduce vacuum at the infeed
	Sheet is tipping off with its front edge from sidelay,vacuum is too weak at infeed.	Increase vacuum, turn control lever to + (plus).
	Sheet is drifting with its rear edge from sidelay.	Set sidelay to right angle
	Foldrollers have not a parallel tension.	Adjust foldrollers evenly. Heavy products: strong tension Thin products: weak tension
	Sheet stop is not angled	Set sheet stop to the right angle Attention: Check zero-position of setting wheel by completely moving down the sheet stop and, adjust it, if necessary.
	The lower plate lip is crooked or too deep. The sheet is thus stopped..	Set in parallel position, useful: start from the zero-.position
	Inner width is too narrow on one side, sheet is stopped	Enlarge evenly..
	Sheet edge runs within the u-shaped buckle rail and gets caught on it..	Move the buckle plates laterally until edge of sheet is recognizable.
Perforation/score/ cut is too crooked or fluctuates	Too much vacuum or too many heavy balls/conical rollers on the sidelay.	Use less vacuum or lighter balls Adjust conical rollers looser.
	Infeed sidelay is not angled.	Set infeed sidelay to the right angle.
	Too less vacuum or too light-weight balls/ conical rollers sheet is drifting from sidelay	Increase the vacuum or use heavier balls/conical rollers.
	A lower buckle plate/ or sheet deflector is not properly positioned in the folding space.	Position and clamp the buckle plate/ sheet deflector properly.

7.6.5 Double fold in the first fold

Failure	Cause	Elimination
Double fold in the first fold	first fold Round, cockling fold	Pre-tension lower plate lip in the previous unit by means of pre-tension rail at bottom side
	After the letter fold	• Open foldroller at exit • Use hold-down springs in buckle plate 3
		• Lower plate lip deeper in folding space, (functioning only at a gap of approx. 3-max. 8 mm from fold). • Use hold-down springs in buckle plate 3
		• Fold downwards, e.g. in buckle plate 2 + 4. Open foldroller at exit. • Use hold-down springs in buckle plate 4
	At open gatefold	• open foldrollers at exit, set more underneath • Use hold-down springs in buckle plate 3.
		Fold downwards, e.g. in buckle plate 2 + 4.Open foldroller at exit.
	At closed gatefold (optional)	Do not use gatefold plate yet.Let the sheet fallen to the floor. If double fold appears, set foldroller 4 or 6 looser. Use hold-down springs in buckle plate 3or 5
		Use now gatefold plate. If double fold appears again, open foldroller at exit up to 12 paper thicknesses.

7.6.6 Edges/dog ears at letter-gatefold

Failure	Cause	Elimination
Edges/dog ears at letter fold, gatefold	Letter fold: Edges of the infeeding sheet are hanging down	• Pre-bend sheet to the top, • Use hold-down springs in buckle plate 3 • Turn sheet and fold downwards, e.g. in buckle plates 2 + 4 • Open foldroller at exit, up to 6 paper thicknesses • Use hold-down springs in buckle plate 3
	Inner width in buckle plate 3 is too big	• Reduce the inner width, • Use hold-down springs in buckle plate 3
		• Pre-bend sheet to the top, turn sheet and fold downwards, e.g. in buckle plates 2 + 4. • Open foldroller at exit, up to 6 paper thicknesses use hold-down springs in buckle plate 3. •

8 Maintenance

	Instructed person	Mechanics of ompany	Service	Electrician	Supervisor with corresponding responsibility
Maintenance	X	X	X		X
Repair		X	X	X	

DANGER!

Danger of wrong maintenance, greasing and cleaning intervalls at multishift operation.

Non-observance may possibly cause servious damages to the machine

All indicated maintenance, greasing and cleaning intervalls are designed for a one-shift operation. Convert the indicated intervalls at multishift operation accordingly.

DANGER!

Danger of electric voltage.

Non-observance may cause serious injuries or even death.

- Make sure to keep the main control cabinet and the subsidiary distribution point always locked against unauthorised opening.
- Disconnect the control cabinet through the main switch before you undertake any maintenance work;pull out the mains power plug.
- During any maintenance work protect the control cabinet with a safety lock against possible connection by third parties

DANGER!

Danger of residual voltage at the main terminals of the main switch at the open switch cabinet. Non-observance will cause serious injuries or even death.

Electrical work should only be carried out by authorised and skilled personnel..

ATTENTION!

Danger from maintenance tools.

Non-observance may possibly cause serious personal injuries and damage to property.

- You should only use tools that are in perfect condition.
- Make sure that no tool has been left on/in the machine after completion of your adjustment or maintenance work

CAUTION!

Danger from misuse of cleansing agents.

Non-observance may possibly cause adverse health effects.

- Avoid any skin contact.
- Protect your eyes against splashes.
- Wear safety gloves while you carry out any cleaning work.
- Check each manufacturer’s information to ensure that you are totally informed about the residual dangers in respect to their non-irritant cleansing agents.

WARNING!

Danger of the opened protective hood falling down.

Non-observance may cause serious injuries by jamming of parts of the body or even death.

You can recognize a pressure loss as follows: hood is coming on its own from the completely opened up position.

- Check the condition of the gas struts after every production/daily and replace them, if necessary.
- Make sure that when working with an opened noise damping hood it is completely opened up to the stop.

WARNING!

Danger from rotating machine parts during assembly work.

Non-observance may possibly cause serious personal injuries and damage to property.

- Maintenance and cleaning work should be carried out by one person only.
- Make sure to disconnect the machine through the main switch while you are carrying out cleaning,
- maintenance and repair work.
- Secure the control cabinet against unintended re-connection.
- Make sure that no other person is at the machine before you re-connect it.

CAUTION!

Danger from used cleaning rags.

Non-observance may possibly cause personal injuries and damage to property.

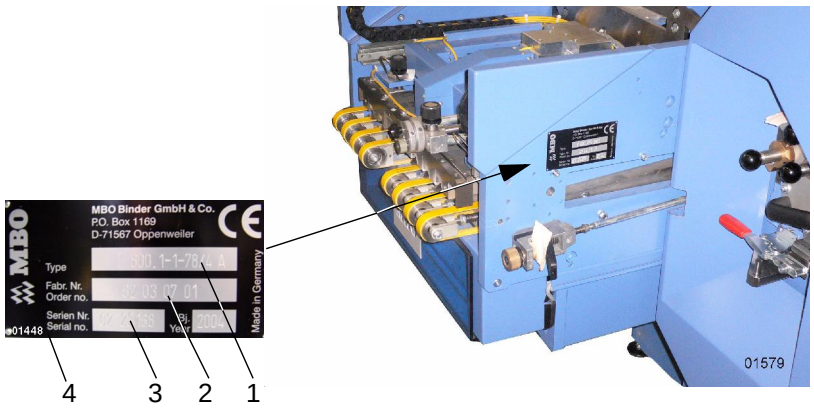
- Observe fire hazards resulting from the inflammability of the cleansing agent.
- Dispose of the cleaning rag environmentally.
- Check each manufacturer’s information to ensure that you are totally informed about the residual dangers and professional disposal of their cleansing agents.

8.1 Maintenance

NOTICE!

- Check the tension of the belts monthly. Turn the machine manually by means of the hand wheel therefore.It should be impossible to stop the foldrollers with the other hand.
- The centre rollers on the drive belt are red-marked.

8.1.1 Procurement of spare parts



1	Machine type	3	Serial number
2	Production number	4	Type plate

Figure 116: Type plate

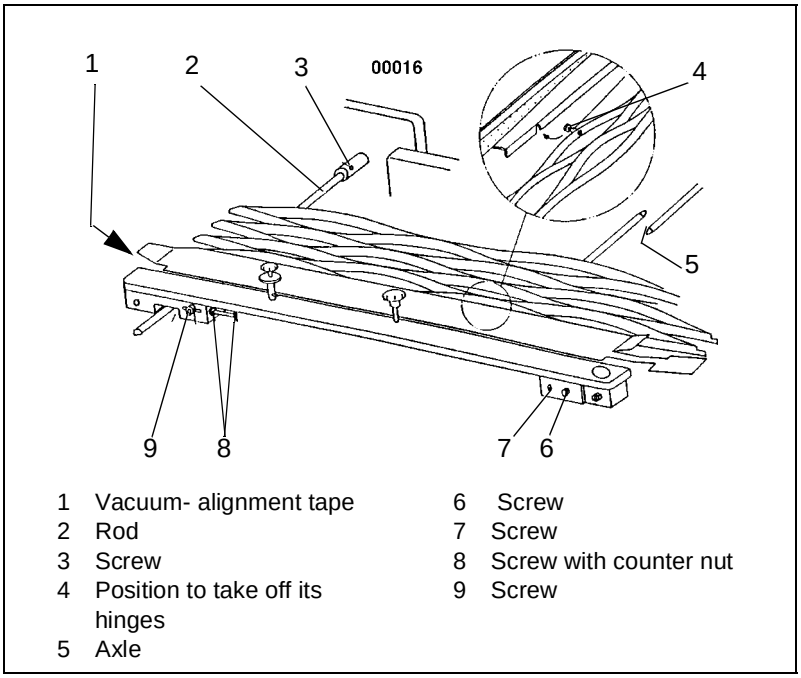
Please gather the significant data for identification of the machine from the type plate (4) at the machine.
Always provide this information for service requirements and procurement of spare parts:

- Machine type (1)
- Production number (2)
- Serial number (3)

REMARK!

Please use only spare parts that are delivered and recommend by the manufacturer!

8.1.2 Check/exchange vacuum-alignment tape at the register table



1	Vacuum- alignment tape	6	Screw
2	Rod	7	Screw
3	Screw	8	Screw with counter nut
4	Position to take off its hinges	9	Screw
5	Axle		

Figure 117: Exchange of vaccum-alignment tape

The vacuum-alignment tape at the register table must be checked every 500 hours of operation and exchanged, if necessary.

Please proceed as follows:

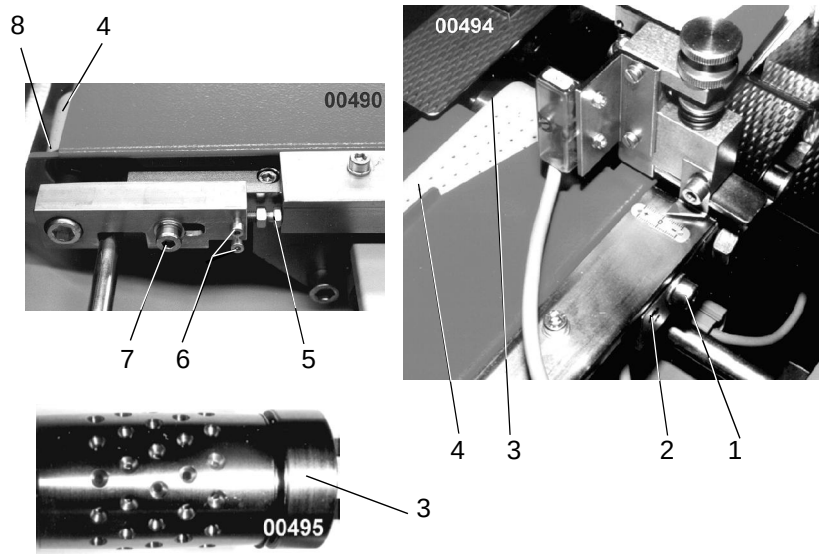
Dismounting

- w Re-tension the vacuum- alignment tape (1). Loosen the counter nut at screw (8) as well as the screws (8) and (9).
- w Take the lattice grate off its hinges at position (4).
- w Loosen the screw (3).
- w Take out the rod (2).
- w Remove the vacuum-alignment tape from the roller and thread it out at the axle (5).

Mounting

- w Insert the new vacuum-alignment tape and thread it again at axle (5).
- w Push in the rod (2).
- w Fasten the screw (3).
- w Hang the lattice grate at its hinges at position (4).
- w Tension the vacuum- alignment tape (1) by fastening the screws (8) and (9). Secure the screw (8) with the counter nut.

8.1.2.1 Setting of vacuum-alignment tape



1	Screw	5	Screw with counter nut
2	Screw	6	Screws
3	Suction roller	7	Screw
4	Vacuum-alignment tape	8	Roller

Figure 118: Setting of vacuum-alignment tape

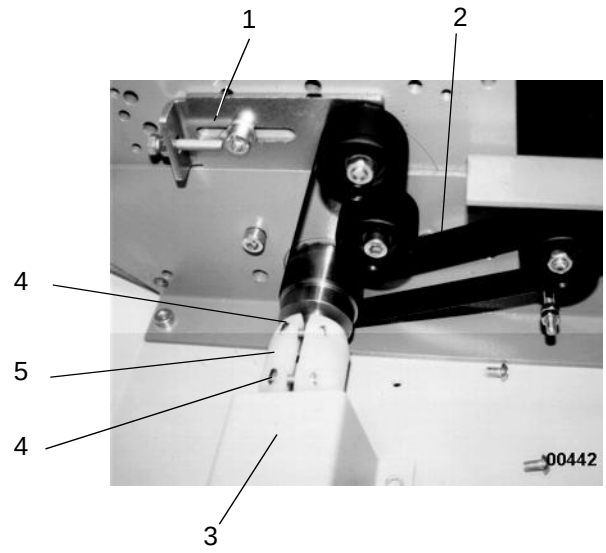
How to set the vacuum-alignment tape (4) properly:

- w Loosen the screw (7).
- w Align the new vacuum-alignment tape (4) on the roller (8) to the left. Use the screws (6) for this purpose.
- w Re-fasten the screws (7).

Fine adjustment of vacuum-alignment tape:

- w Loosen the screw (1).
- w Set the new tape with the screw (2). Make sure that the bore holes for the track of holes/vacuum-alignment tape
- w are exactly over the bore holes of the suction roller (3).
- w Re-fasten the screw (1).
- w Start the turbo-type air pump.
- w Use a paper strip to check whether vacuum is provided in the area (3) and make corrections, if necessary.

8.1.3 Check/exchange drive belt for Vacu-Infeed



1	Tension lever	4	Screws
2	Drive tape	5	Coupling
3	Guard		

Figure 119: Drive belt of suction wheel

Check the condition of the drive belt after 500 hours of operation. Re-tension the tape or exchange it, if necessary.

How to tension the drive tape (2):

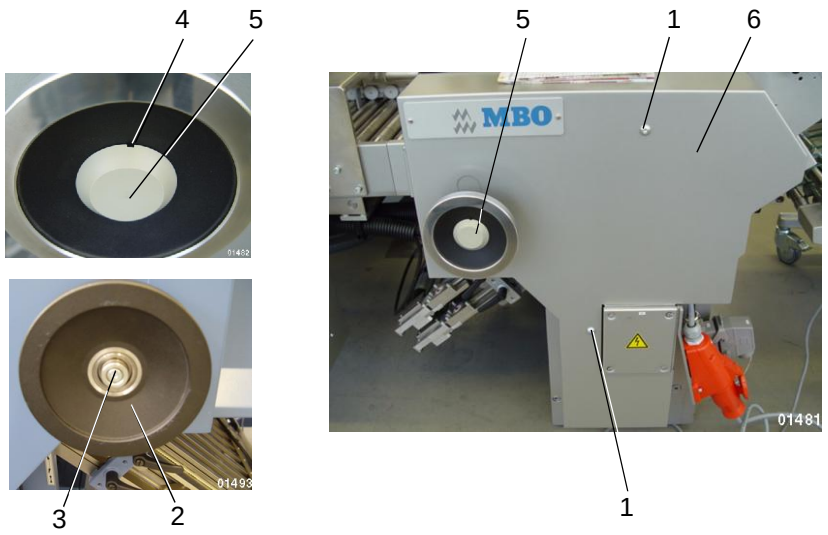
w Tension the drive belt (2) by means of the tension lever (1).

How to exchange the drive belt (2):

w Remove the guard (3).
w Open the coupling (5) with the screws (4).
w Relieve the tension of the drive belt (2) by means of the tension lever (1).
w Thread out the drive belt (2).
w Thread in the new drive belt
w Tension the drive belt (2) by means of the tension lever (1).
w Cover the coupling (5) by means of the screws (4).
w Put the guard (3) back on.

8.1.4 Removal and replacement of the guard for the drive

8.1.4.1 Removal of guard



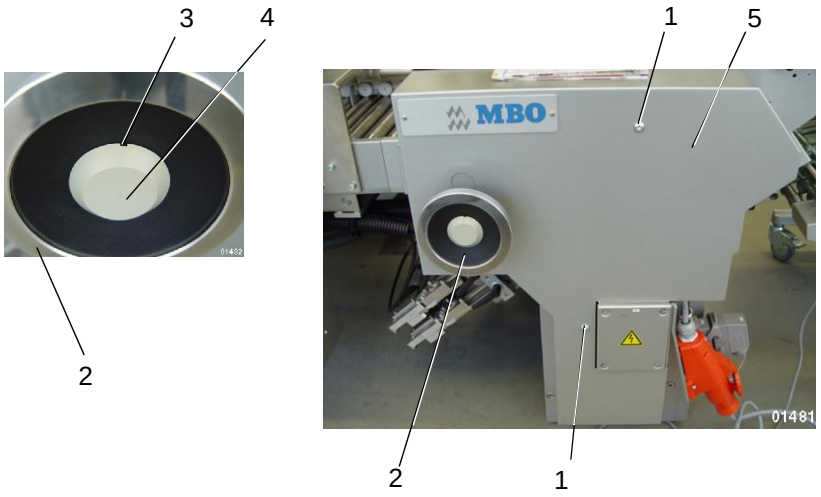
1	Screws	4	Gap
2	Hand wheel	5	Covering cap
3	Screw	6	Guard

Figure 120: Drive belt for fold rollers and slitter shafts

Firstly, remove the guard (6):

- w Remove the covering cap (5) at the hand wheel (2) by means of a cross-head screwdriver by placing it into the gap (4).
- w Loosen the screw (3) by means of a hexagon key (SW 6 mm).
- w Pull the hand wheel (2) away from the shaft.
- w Remove the screws (1) and the guard (6).

8.1.4.2 Replacement of guard



1	Screws	4	Covering cap
2	Hand wheel	5	Guard
3	Gap		

Figure 121: Drive belt for foldrollers and slitter shafts

How to replace the guard:

w Put the guard (5) back on and fasten with the screws (1).
w Place the hand wheel on the hand wheel shaft.
w Fasten the screw at the hand wheel (2) by means of a hexagon key (SW 6 mm).
w Place the covering cap (4) on the hand wheel (2).

8.1.5 Cleaning of folding units

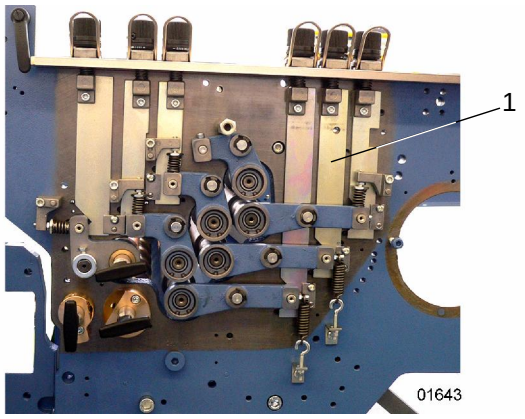


Figure 122: Foldroller bearings

w Clean paper dust and printing powder from the foldroller bearings (1) after every 500 hours of operation by using a brush or vacuum cleaner.

ATTENTION!

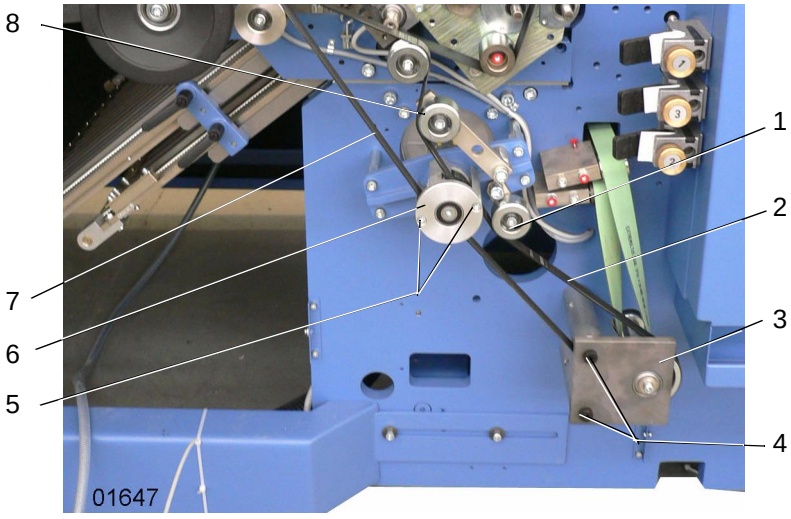
Danger before using compressed air.

Non-observance may possibly cause property damage.

Use only a brush or vacuum cleaner for cleaning the foldroller bearings (1).

8.1.6 Check/exchange main drive belt

Check the condition of the main drive belt after 500 hours of operation. Re-tension the tapes or exchange them, if necessary.



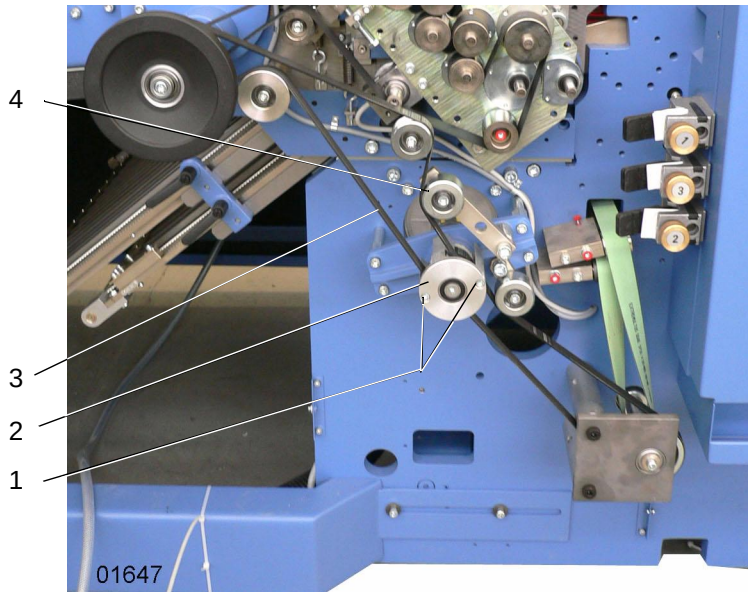
1	Tension roller	5	Screws
2	Poly-V belt	6	Flange
3	Flange	7	Poly-V belt
4	Screws	8	Tension roller

Figure 123: Exchange of main drive belt

Exchange of belt (2)

THow to exchange the main drive belt (2):

- w Remove the guard for the main drive (see chapter “Removal and replacement of guard for the drive” on page 144).
- w Relieve the tension of the poly-V belt (7) by means of the tension roller (8).
- w Relieve the tension of the poly-V belt (2) by means of the tension roller (1).
- w Loosen the screws (4) and swivel down the flange (3).
- w Loosen the screws (5) and remove the flange (6).
- w Take belt (7) from pulley which is positionned before belt (2).
- w Remove the belt (2) and renew it, if necessary.
- w Set the belt (7) on the pulley in front of it.
- w Place on the flange (6) and attach it with screws (5).
- w Swivel the flange (3) to the top and attach it with screws (4).
- w Tension belt (2) by means of the tension roller (1).
- w Tension belt (7) by means of the tension roller (8).
- w Put on the guard again and attach it with the screws.
- w Place the hand wheel back on the hand wheel shaft and secure it with the screw (see chapter "Removal and replacement
- w of guard for the drive" on page 144).



1	Screws	3	Poly-V belt
2	Flange	4	Tension roller

Figure 124: Exchange of belts (8)

Exchange of belt (3):

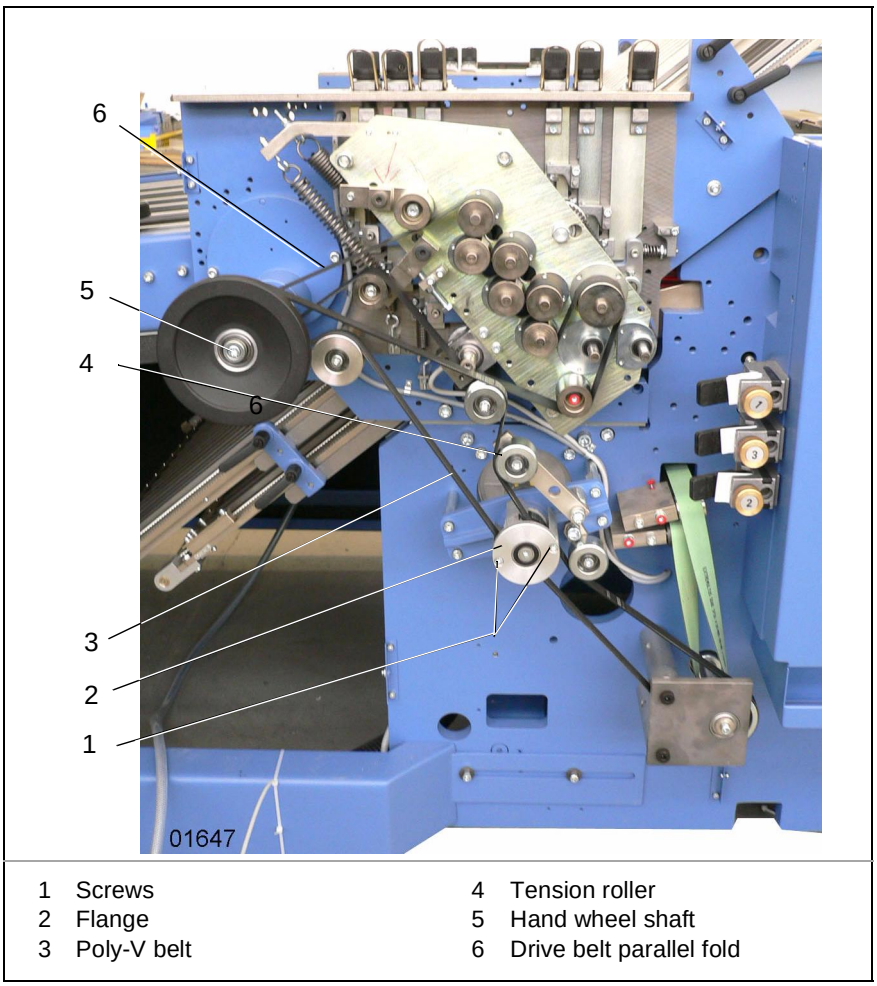
- w Remove the guard and the hand wheel (see chapter "Removal and replacement of guard for the drive" on page 144).
- w Relieve the tension of the poly-V belt (3) by means of the tension roller (4).
- w Loosen the screws (1) and remove the flange (2).
- w Remove the belt (3) and renew it, if necessary.
- w Place on the flange (2) and attach it with screws (1).
- w Tension belt (3) by means of the tension roller (4).
- w Put on the guard again and attach it with the screws.
- w Place the hand wheel back on the hand wheel shaft and secure it with the screw (see chapter "Removal and replacement
- w of guard for the drive" on page 144).

8.1.7 Check/exchange drive belt for the parallel fold

Check the condition of the drive belt after very 500 hours of operation and exchange it, if necessary.

The following working steps are necessary in order to exchange the drive belt for the parallel fold:

- Remove the guard and the hand wheel.
- Relieve the tension of belt of the main drive.
- Remove and exchange the drive belt for the parallel fold.
- Tension the belts of the main drive.
- Place on the guard and the hand wheel.



1	Screws	4	Tension roller
2	Flange	5	Hand wheel shaft
3	Poly-V belt	6	Drive belt parallel fold

Figure 125: Exchange of drive belt

Belt (3) of main drive:

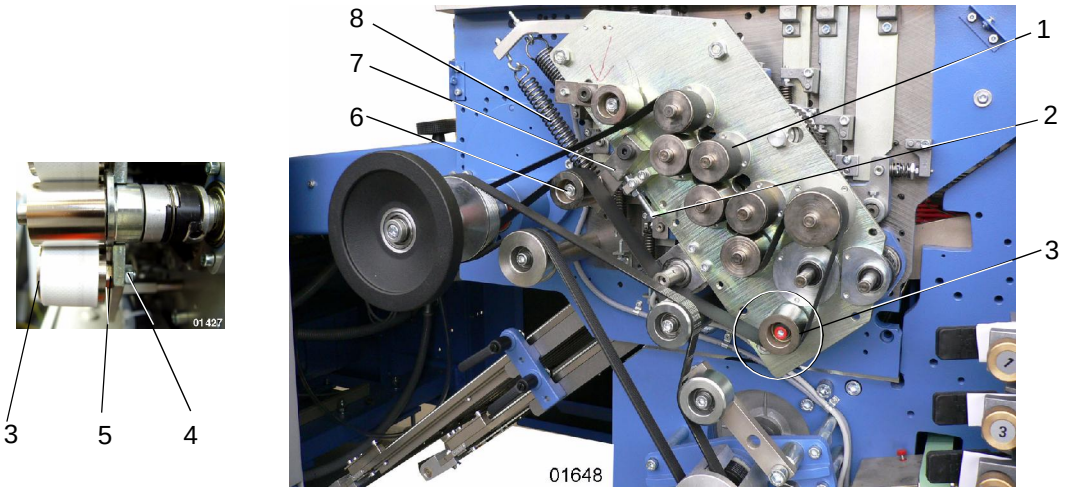
Firstly relieve tension of the Poly-V belt (3) of the main drive:

w Remove the guard and the hand wheel (see chapter "Removal and replacement of guard for the drive" on page 144).

w Relieve the tension of the drive belt (3) by means of the tension roller (4).

w Take the belt (3) from the pulley in front of the hand wheel shaft.

You have now free access to the drive belt for the parallel fold.



1	Drive belt	5	Excentric bolt
2	Adjusting screw	6	Tension roller
3	Roller	7	Tension lever
4	Nut	8	Tension springs

Figure 126: Drive belt parallel fold

ATTENTION!

Danger of material break.

Non-observance may possibly cause damage at the drive belt and downtimes of the folding machine.

Do not pull the drive belt over the edges in case of re-mounting.

Exchange drive belt of parallel fold

Re-new the drive belt for the parallel fold as follows:

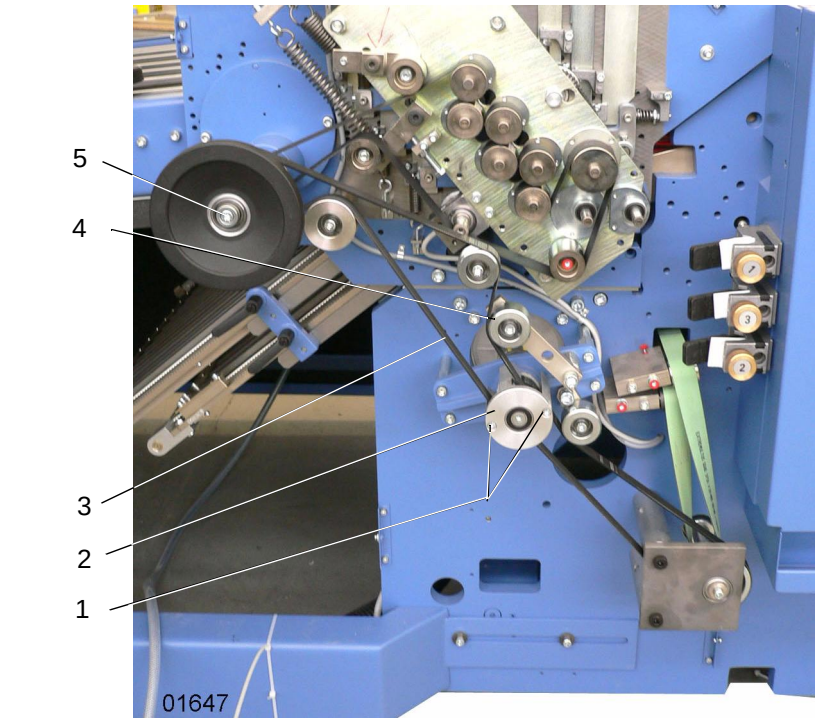
- w Loosen the counter-nut at the adjusting screw (2).
- w Loosen the adjusting screw (2).
- w Place the hexagon key (SW 13) at the tension roller (6). Swivel the tension roller (6) downwards by turning the hexagon key
- w counter-clockwise.
- w Remove the drive belt (1).
- w Remove dust and dirt from the folding unit (see chapter "Cleaning of folding units" on page 146).
- w Replace the drive belt against a new one.
- w Thread in the new drive belt as you can see it in the illustration.
- w Relieve the tension roller (6) with the hexagon key SW 13.
- w Tension the tape by turning the hexagon key SW 13 slowly and clockwise.

The drive belt for the parallel fold is inserted again.

- w Place the adjusting screw (2) with a slight pressure at the tension lever (7) when the machine is not running. Attach the adjusting screw (2) with the counter-nut.

Setting of centre running:

- w Loosen the nut (4).
- w Adjust the centre running of the drive belt through the excentric bolt (5) behind roller (3). The setting roller (3) is red-marked.



1 Screws
2 Flange
3 Poly-V belt
4 Tension roller
5 Hand wheel shaft

Figure 127: Exchange of drive belt

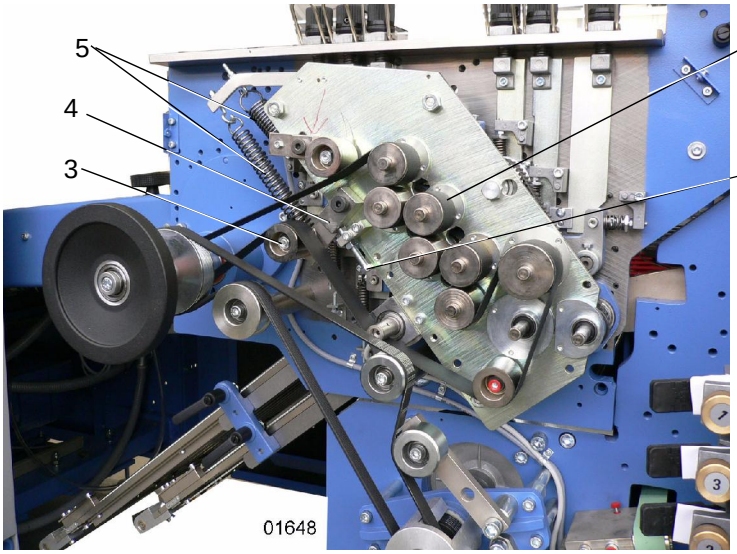
Tensioning of belt (3)

Tension the Poly-V belt (3) as follows:

w Tension the Poly-V belt (3) as follows:
w Put belt (3) back in its original position.
w Tension belt (3) by means of tension roller (4).
w Place on the guard again and attach it with screws.
w Place the hand wheel back on the hand wheel shaft and secure it with the corresponding screw (see chapter "Removal and replacement of guard for the drive" on page 144).

8.1.7.1 Tension drive belt for the parallel fold

Check the condition of the drive belt after every 500 hours of operation. The tensioning of belts effects automatically.



1	Drive belt	4	Tension lever
2	Adjusting screw	5	Tension springs
3	Tension roller		

Figure 128: Drive belt parallel fold

NOTICE

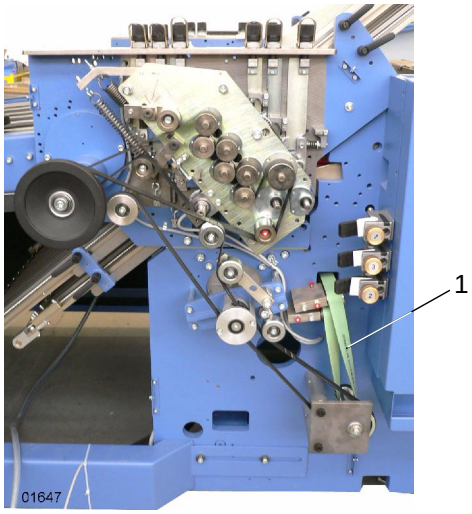
Do not use the adjusting screw (2) for tensioning the belt!

The drive belt (1) is automatically tensioned with the tension springs (5). Thereby the adjusting screw (2) should be placed with a slight pressure at the tension lever (5) when the machine is not running.

w Check the tapes and belts on correct centre running and on correct tension. Re-adjust, if necessary.

8.1.8 Check/exchange the drive belt for foldrollers at crossfold and threefold

Check the condition of the drive belt after every 500 hours of operation and renew it, if necessary.



1 Drive belt foldrollers at crossfold

Figure 129: Drive belt for foldrollers at crossfold

NOTICE

Have the drive belt for foldrollers exchanged by skilled personnel only

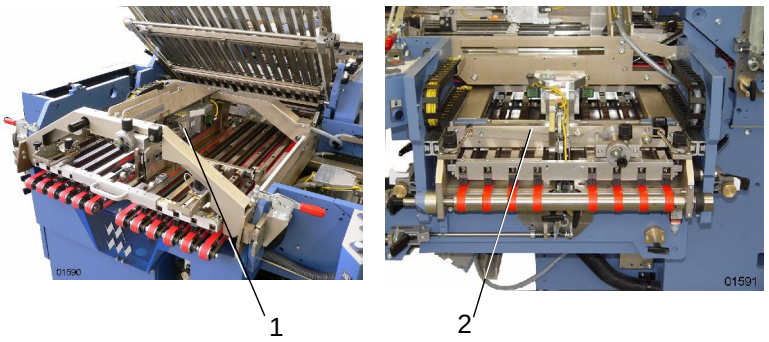
8.1.9 Check/exchange the transport tapes at crossfold and threefold

Check the condition of the transport tapes after every 500 hours of operation and renew them, if necessary.

NOTICE

Have the transport tapes exchanged by skilled personnel only.

8.1.10 Maintenance of folding knives



1 Folding knife at crossfold

2 Folding knife at threefold

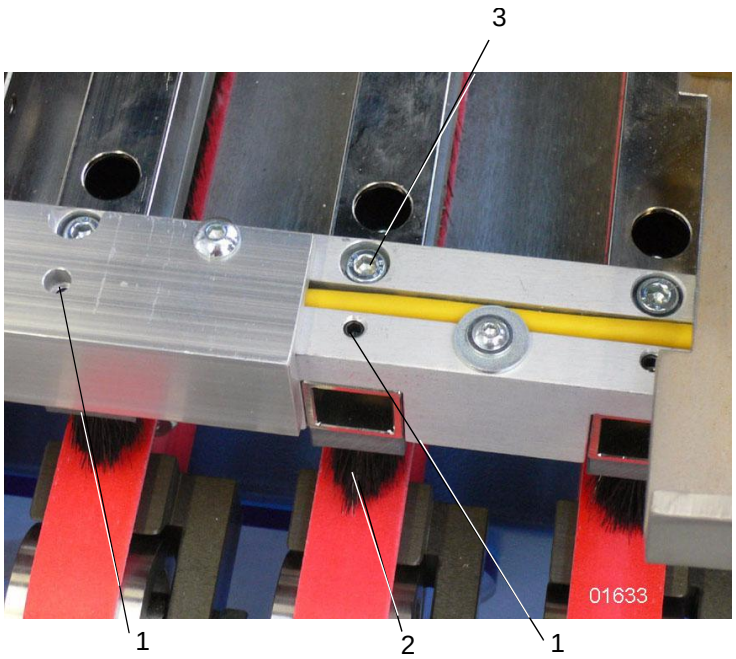
Figure 130: Cleaning of folding knives

w Clean paper dust and printing powder from the folding knife units after every production (weekly at the latest). For this purpose use a brush or a vacuum cleaner.

8.1.11 Check/exchange brushes at crossfold and threefold

Check the brushes after every production on wear and tear. Re-adjust the brushes, if necessary, or exchange them.

8.1.11.1 Re-adjustment of brushes



1	Adjusting screw	3	Hexagon mounting
2	Brush		

Figure 131: Brushes at parallel fold

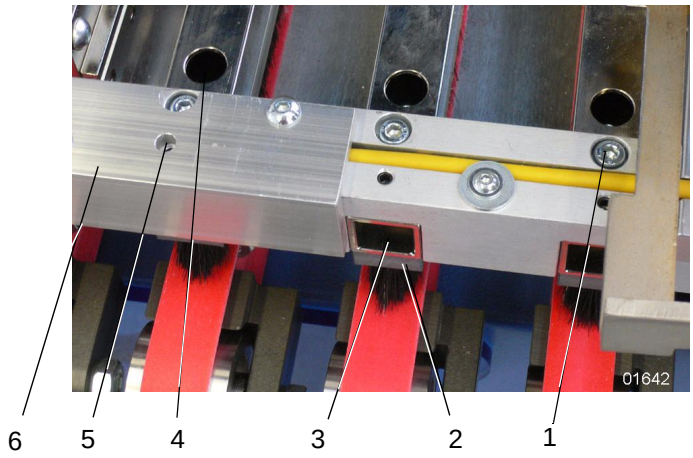
How to re-adjust the brushes (2):

- w Loosen the hexagon-mounting (3) of the brush (2).
- w Turn in the adjusting screws (1) with an allen key.
- w Re-fasten the hexagon-mounting (3) of the brush (2).

NOTICE

Please see to an uniform height adjustment of all brushes (2) to the register table. The bottom edge of the brush holder
to the surface of the belts amounts 30 mm.

8.1.11.2 Exchange of brushes



1	Hexagon-mounting	4	Screw
2	Brush	5	Adjusting screw
3	Brush holder	6	Cross bar

Figure 132: Brushes at parallel fold

Exchange the brushes as follows (2):

- Remove the hexagon-mounting (1) at the edges of the brushes.
- Pull-out the brushes (2) together with the brush holder (3).
- Loosen the screws (4) at every brush holder (3) and remove the brush.
- Insert a new brush and attach it with the screws (4).
- Place the brush holder (3) at cross bar (6).
- Attach the brush holder (3) with the hexagon-mounting (1).
- Align the brushes (2) with the adjusting screws (5) evenly.

NOTICE

Please see to an uniform height adjustment of all brushes (2) to the register table. The bottom edge of the brush holder
to the surface of the belts amounts 30 mm.

8.1.12 Turbo-type air pump

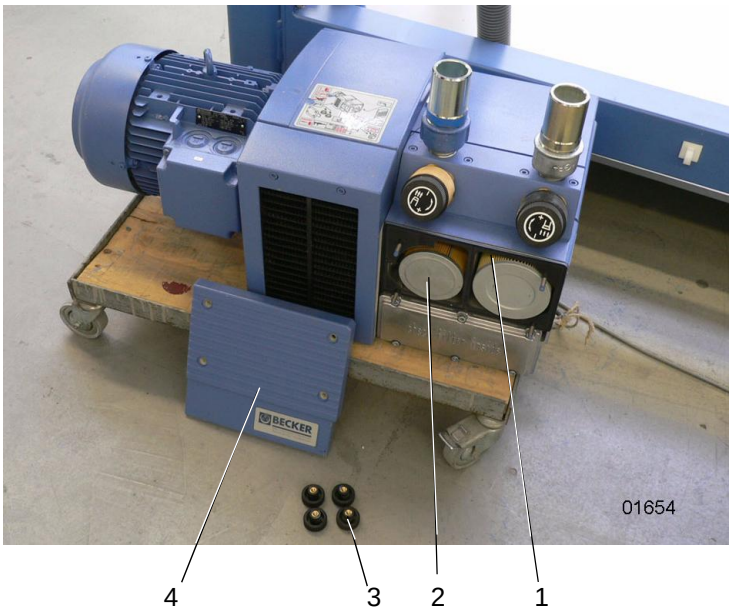
The maintenance intervals are detailed in separate operating manuals produced by Becker. To guarantee full output capacity the filter cartridges must be cleaned after every 50 hours of operation, and replaced annually. The notice <Maintenance pump> will appear on the Touch Screen.

ATTENTION!

Danger from penetration of foreign substances.

Non-observance will cause property damage.

- Turn off the turbo-type air pump during any maintenance work.
- Do not operate the turbo-type air pump without the filter cartridges.
- Replace any blocked or damaged cartridges.



1	Filter suction air	3	Knurled nuts
2	Filter compressed air	4	Cover

Figure 133: Turbo-type air pump; filter for suction- and compressed air-pump

How to clean the air filters (1) or (2):

w Loosen the knurled nuts (3) and remove the cover (4).

Filter suction air

w Take out the filter cartridge (1) and clean it. For this purpose, blow from the internal to the external side.

Filter compressed air:

w Take out the filter cartridge (2) and clean it. For this purpose, blow from the internal to the external side.

w Insert filter cartridge (1) or (2) again.

w Place on the cover (4) again and attach it with knurled nuts (3).

8.1.12.1 Confirm the cleaning of the filter/maintenance at the display

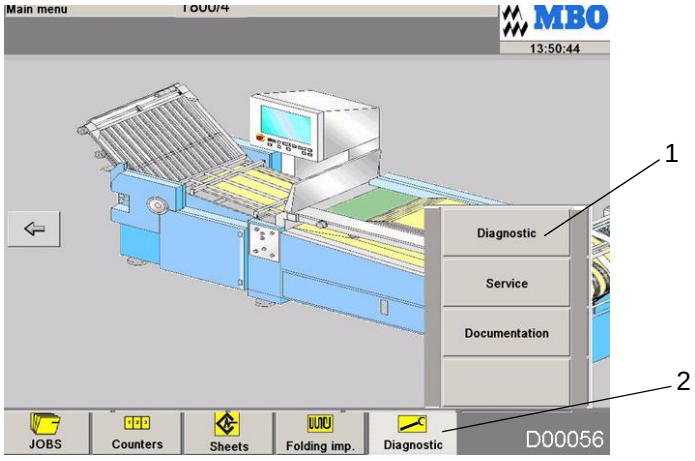
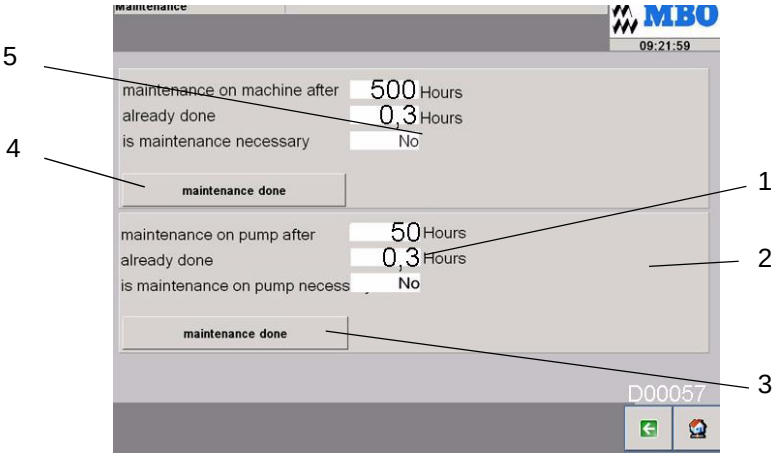


Figure 134: Confirm the maintenance - main menu

How to confirm the maintenance of the machine/pump:

w Press button (2) in the main menu.
w Activate the field (1).
w Press button <Maintenance>.



1 Run hours of operation of the pump
2 Main menu <Maintenance>
3 Field <Confirm maintenance> for the pump
4 Field <Confirm maintenance> for the machine
5 Run hours of operation of the machine

Figure 135: Confirm the maintenance at the display

How to confirm the maintenance of the pump:

w Confirm in main menu <Maintenance> (2) with field (3).
0.0 hours will appear in field (1).

How to confirm the maintenance of the machine:

w Confirm in main menu <Maintenance> (2) with field (4).
0.0 hours will appear in field (5).

8.1.13 Check the gas struts

WARNING!

Danger of the opened protective hood falling down.

Non-observance may cause serious injuries by jamming of parts of the body or even death.

- Make sure that when working with an opened noise damping hood it is completely opened up to the stop..

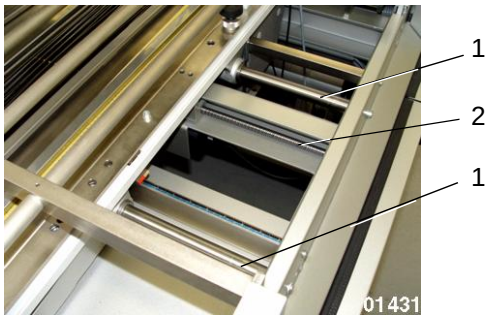
Check the condition of the gas struts after every production (daily).You can recognize a pressure loss as follows: hood is coming down on its own from the completely opened up position. Replace the gas struts, if necessary:

- Gas struts at the safety and noise-damping hood

8.2 Lubrication

8.2.1 Guide shafts at the register table

Clean and lubricate monthly:



1 Guide shafts
2 Drive spindle

Figure 136: Guide shafts at the register table

w Clean paper dust and printing powder from the drive spindle (2) and the guide shafts (1) monthly by using a brush.
w If necessary, apply silicone spray to the drive spindle (2) and guides (1). Do not use oil or grease!

8.2.2 Lubrication of folding units

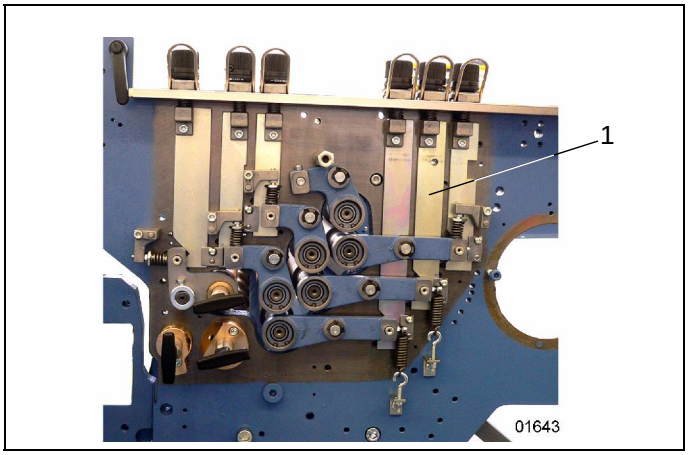


Figure 137: Roller bearing levers

The roller bearing levers (1) are durably lubricated. There is no need to apply additional grease or oil

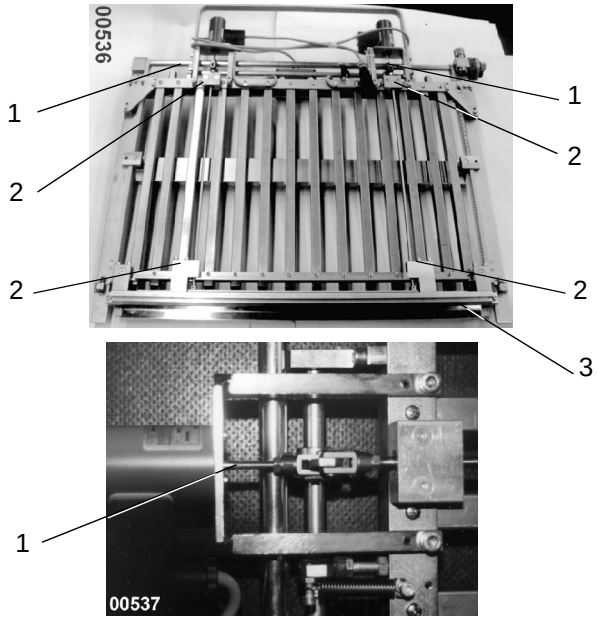
ATTENTION!

Danger from using compressed air.

Non-observance may possibly cause property damage.

For cleaning the roller bearing levers use only a brush or a vacuum cleaner.

8.2.3 Gatefold plate (optional)



1 Tappet
2 Guide
3 Top lip

Figure 138: Gatefold plate

- Clean paper dust and printing powder from the guides (2) of the movable top lip (3) and the tappet (1) at the magnet prior to each new application (not to exceed 250 hours of operation).
- Provide the guides (2) and the tappet (1) of the top lip (3) with a slight touch of spray oil. Do not apply any grease!
- Make sure that the tappet (1) is not spoiled by bending.

8.3 Cleaning

NOTICE

Clean the machine after each application. Take special care on the cleaning of all movable parts.
Too much dirt will considerably reduce the function of your machine!

WARNING!

Danger from rotating machine parts during assembly and cleaning.

Non-observance may possibly cause serious personal injuries or even death.

- Assembly and cleaning should be carried out by one person only.
- Make sure to disconnect the machine through the main switch while you are carrying out any cleaning and maintenance work.
- Secure the control cabinet against unintended re-connection

ATTENTION!

Danger from removing heavy machine elements (slitter shaft, folding unit).

Non-observance may possibly cause personal strain injuries and damage to property.

If the element weighs more than 25 kg it should only be lifted with the assistance of another person.

WARNING!

Danger from rotating machine parts during assembly and cleaning.

Non-observance may possibly cause serious personal injuries or even death

- Make sure that third parties are not endangered during any maintenance and cleaning work.
- Make sure that all persons are in a safe area prior to re-connection of the machine.

CAUTION!

Danger from misuse of cleansing agents.

Non-observance may possibly cause adverse health effects.

- Avoid any skin contact.
- Protect your eyes against splashes.
- Wear safety gloves while you carry out any cleaning work.
- Check each manufacturer's information to ensure that you are totally informed about the residual dangers in respect to their non-irritant cleansing agents

CAUTION!

Danger from used cleaning rags.

Non-observance may possibly cause personal injuries and damage to property.

- Observe fire hazards resulting from the inflammability of the cleansing agent.
- Dispose of the cleaning rag environmentally.
- Check each manufacturer's information to ensure that you are totally informed about the residual dangers and professional disposal of their cleansing agents.

8.3.1 Recommendation of cleansing agents

MBO, the manufacturer of this machine, recommends either

"VARN-Wash VM 111" or "VWM“ cleaning material for the fold rollers.

You will find a label near the fold rollers with a recommendation in this respect. The “Varn“ company is a worldwide supplier for the printing industry. Therefore, it cannot be excluded that in certain other countries different designations are used. Please take the respective order number from the "VARN“ technical data sheets. Cleaning of the machine

- Clean the machine after each use. Rotating parts in particular must be cleaned to remove dirt and dust. Too much dirt will considerably reduce the function of your machine!
- Do not use any chemically aggressive washing and cleansing agents!!

8.3.2 Cleaning the fold rollers

- Depending on the degree of contamination, clean the fold rollers occasionally. Too much printing powder or depositing of printing colour on the fold rollers may considerably reduce the quality of the folded products.
- The High Grip fold rollers should only be cleaned with linen and “Varn-Wash VM 11“ or “VWM“. Do not apply too much pressure on the fold rollers when cleaning.

If you have any questions in this respect, please contact your machine supplier. Improper washing agents may swell up the coating on the fold roller.

8.3.3 Cleaning of machine sensors

Machine sensors can become dirty with paper dust during production and must, therefore, be cleaned after each job:

- Clean dust and any other contaminants from the sensors. Use a dry and fluff-free cloth.

8.4 Lubrication and maintenance plan

DANGER!

Danger of wrong maintenance, greasing and cleaning intervalls at multishift operation.

Non-observance may possibly cause serious damages to the machine

All indicated maintenace, greasing and cleaning intervalls are designed for a one-shift operation. Convert the indicated intervalls at multishift operation accordingly

	Chapter No.:	Working process	Interval	Date	Signature
Maintenance	3.5	• Inspection after start-up	after 20 hours of operation		
	8.1.2	• check vacuum-alignment tape • Exchange vacuum-align-ment tape	every 500 hours of operation if required		
	8.1.3	• Check drive belt for Vacu-Infeed • Exchange drive belt for Vacu-Infeed	every 500 hours of operation if required		
	8.1.5	Clean the folding units	every 500 hours of operation		
	8.1.6	• Check/exchange main drive belt • Exchange main drive belt	every 500 hours of operation if required		
	8.1.7	• Tension drive belt for the parallel fold • Exchange drive belt for parallel fold	every 500 hours of operation if required		
	8.1.8	• Check drive belt for fol-drollers at cross- and threefold • Exchange drive belt for foldrollers at cross- and threefold	every 500 hours of operation if required		

Table 17: Lubrication and maintenance plan

	Chapter No.:	Working process	Interval	Date	Signature
Maintenance	8.1.9	Check transport tapes at cross- and threefold Exchange transport tapes at cross- and threefold	every 500 hours of operation if required		
	8.1.10	Maintenance of folding knives	after every production, weekly at the latest		
	8.1.11	Check brushes at cross- and threefold Exchange brushes at cross- and threefold	every 500 hours of operation if required		
	8.1.12	Maintenance of filter turbo-type air pump Exchange filter turbo-type air pump	after 50 hours of operation annually		
	8.1.13	Check gas struts	daily		
Lubrication	8.2.1	Guide shafts at register table	weekly		
	8.2.3	Gatefold plate (optional)	after each production run, after 250 hours of operation at the latest.		
Cleaning	8.3.2	Foldrollers	if required		
	8.3.3	Sensors	after each production run		

Table 17: Lubrication and maintenance plan

9 Putting out of service

9.1 Details of storage

- w Check the premises in respect of temperature and humidity. The ideal storing temperature rests between +15°C and +28°C. The higher the humidity the greater the danger of corrosion.
- w It is essential that you take the weight details of the machine into consideration in respect of the maximum load capacities.
- w It is essential that you take the size details of the machine into consideration in respect of the maximum load capacities.
- w Prepare the gears/transmission for storage. You should also take into consideration that the pre-requisites vary from case to case. Therefore, please contact the supplier of the gears/transmission and motor and follow the respective manual.
- w Clean dirt and dust carefully from the machine; do not use water - danger of corrosion.
- w Ensure that only an electrician disconnects the machine from the power supply.
- w Use a fork lift to transport the machine.
- w Cover the machine with foil.

9.2 Environmental waste disposal

Dispose of single machine parts and all occurring waste materials from the K 800.2 Combi folding machine environmentally according to:

For European Community member countries:	• 75/442 EEC • 91/156 EEC • 91/692 EEC in connection with the country and district specific Waste Disposal Acts..
For non-EC member countries:	Compatible with the country and district specific Waste Disposal Acts .

Ask about the possibility of municipal disposal or waste disposal by private waste disposal companies.

On this occasion you should differ between:

- Destruction (destruction of records)
- Recycling (plastic packaging materials)
- Disposal (disposal of harmful substances)

9.2.1 Disposal of the waste machine

You may dispose of the waste machine:
w Through the supplier
w Through a disposal and demolition company, or
w Through your own company

9.2.1.1 Disposal by instructing the supplier

Instruct your supplier to dispose of the machine. The waste machine will be either part-exchanged or professionally disassembled and environmentally disposed of. As a result you are spared any further trouble.

9.2.1.2 Disposal by a disposal and demolition company

You may also instruct one of the nearby disposal and demolition companies who are also familiar with this special field.

9.2.1.3 Disposal by your own company

You also have the alternative of demolishing the waste machine by your own expert personnel on your own premises.

However, you should bear in mind that in some places you may require a separate official permit for transportation and disposal. Make sure to obtain written confirmation of your professional disposal.

9.2.2 Ground water preservation

Please comply with the applicable provisions and acts to avoid ground water pollution:

For European Community member countries:	• 80/68 EEC • 90/656 EEC • 91/692 EEC • 96/350 EC • 96/59 EC in connection with the country and district specific Waste Disposal Acts for the ground water protection.
For non-EC member countries:	compatible with the country and district specific Waste Disposal Acts for the ground water protection.

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