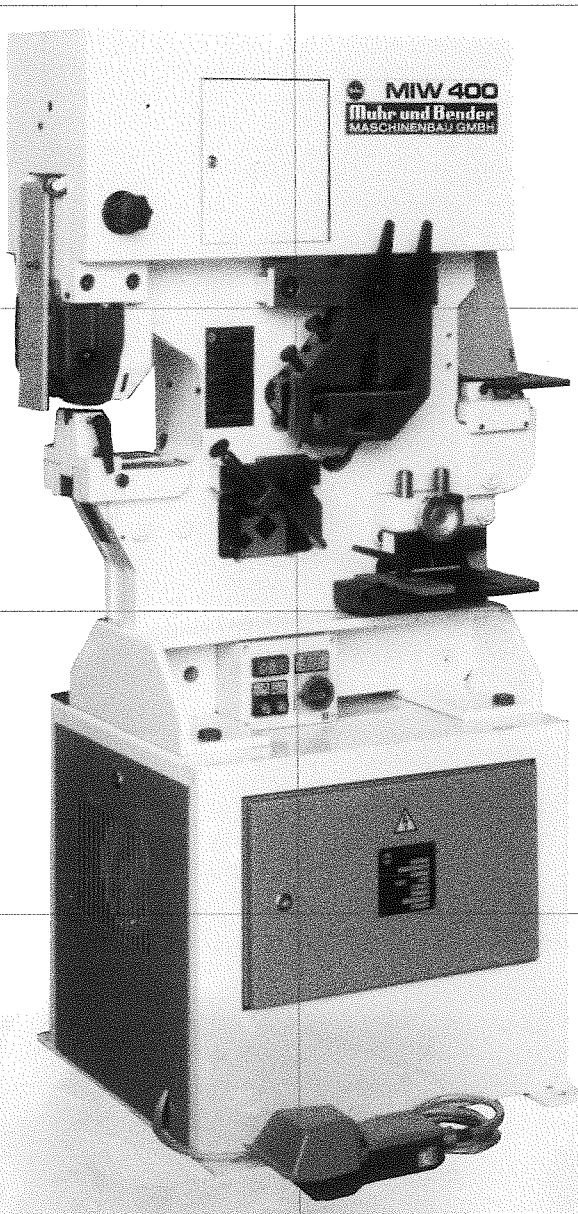
MUBEA
MIW 400



User Manual

Manufacturer: **Muhr und Bender**
Maschinenbau GmbH
Postfach 340
D-5952 Attendorn

Preface

In this User Manual you will find all the information necessary for operating and maintaining your **MUBEA MIW 400.**

Before you start working with the **MUBEA MIW 400**, please read this User Manual through thoroughly.

Wherever you see this symbol in this User Manual, it indicates safety regulations, safety instructions and important information **which absolutely must be heeded.**

Note: For representation purposes, some of the illustrations **do not** depict the prescribed safety fixtures. But for working with the **MIW 400**, these safety fixtures must absolutely be installed!

Performing maintenance regularly will ensure smooth operation of your machine.

Customer Service

For technical service call your local dealer or Muhr und Bender Maschinenbau GmbH. You can reach Muhr und Bender under the following number:

Germany: **(02722) 62-244**

Tools and Spare Parts

For all questions concerning spare parts or tools, please contact your local dealer or Muhr und Bender by dialing:

Germany: **(02722) 62-245** or

(02722) 62-421

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Contents

1

General Information

1 General Information

1.1 Technical Specifications

Machine type .....

Machine number .....

1.1.1 **Mechanical** (in standard version)

Weight	810 kg
Length	910 mm
Width	650 mm
Height	1730 mm

1.1.2 **Electrical** (in standard version)

Motor type	4 AP 112 M4, B3 / B5
Motor power	4 kW
Power consumption	15,9 / 9,14 A
Operating voltage	230 / 400 V
Control voltage	220 V ~

1.1.3 **Hydraulic** (in standard version)

Oil grade	See label on oil container
Oil amount (tank capacity)	35 l
Viscosity (at 40 °C)	46 mm^2 /s (ISO VG 46)
Operating pressure of hydraulic system	250 bar
Operating temperature	5°C to 70°C
Ambient temperature	5°C to 35°C

Always refill with the same grade of hydraulic oil; do not mix.

With extreme ambient temperatures, you must consult the manufacturer (see Customer Service).

1.2 General Description

The **MIW 400** Ironworker is a hydraulically driven flat-steel, section-steel and bar-steel shearing machine equipped with a notching fixture and a holepunch. It has a heavy-duty hydraulic cylinder, allowing work to be done simultaneously at all workstations. The slide performs a vertical movement, and the cutting direction of the mobile section knives is turned 45° on guideways in the machine frame. MIW ironworkers have a long life, are especially easy to service and require little maintenance.

Worn parts may be replaced with **genuine MUBEA spare parts** at any time.

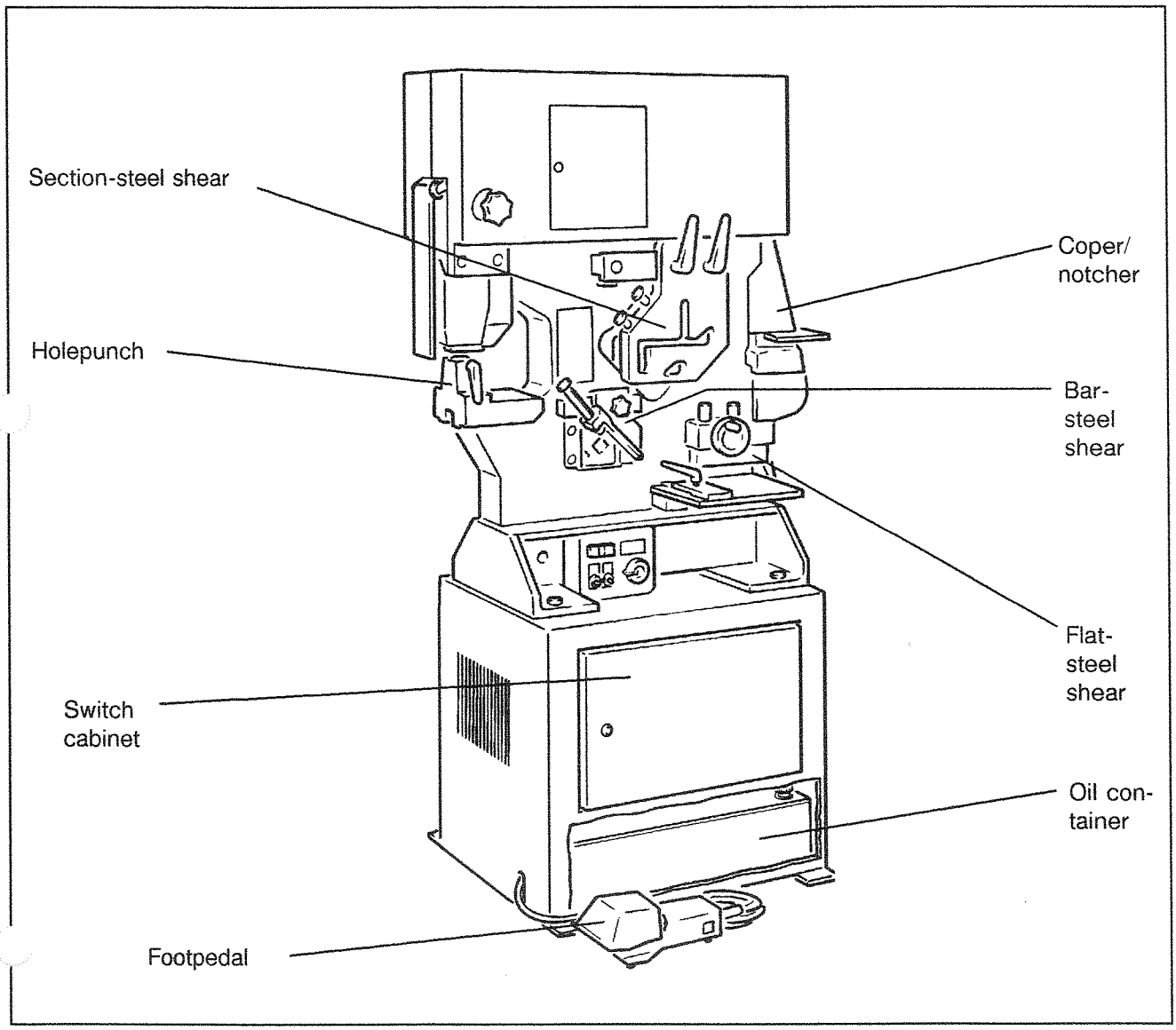
Please contact Muhr und Bender Maschinenbau GmbH (see chapter 12).

The standard version of the **MIW 400** is designed to permit the use of a variety of options to greatly expand the working range (for examples, see section 1.2.4).

For further information, please contact our Customer Service.

The machine comprises the mechanical, electrical and hydraulic subsystems.

The individual workstations are covered by safety fixtures.



1.2.1 Mechanical

The mechanical part essentially comprises the ironworker's design with the five work-stations:

- Holepunch
- Flat-steel shear
- Coper/notcher
- Bar-steel shear and
- Section-steel shear.

1.2.2 Elektrical

The electrical portion comprises the switch cabinet, the motor and all other electric parts such as controls, limit switches, contactors, cables, etc. (For circuit diagrams, see chapter 11).

1.2.3 Hydraulic System

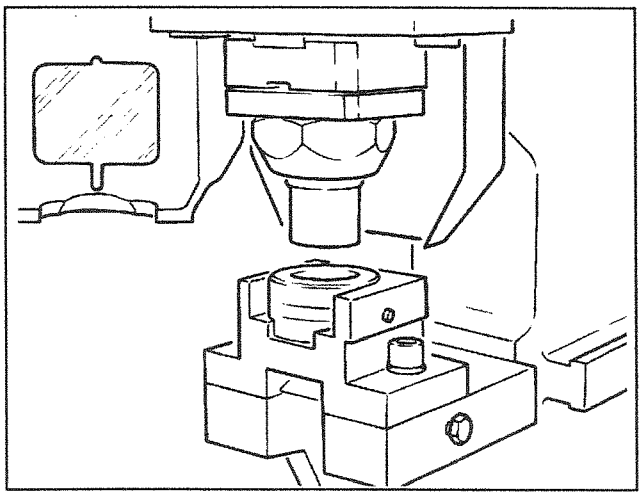
The hydraulic system comprises the pump, the oil container with oil filter, the working cylinder, the control block with pressure test connection and the various valves and lines (For the hydraulic system, see chapter 11).

1.2.4 Attachments

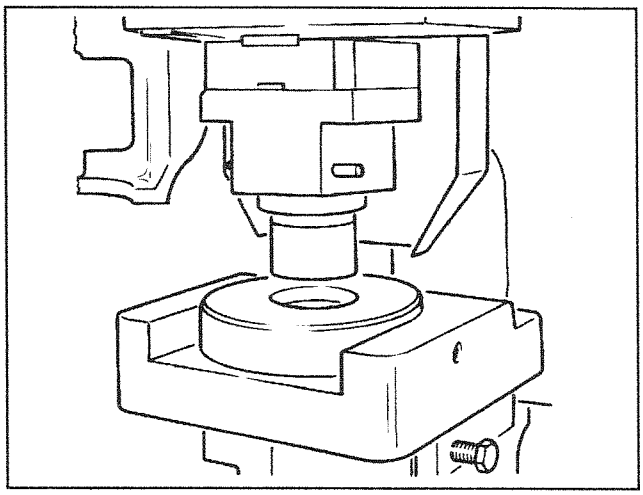
The examples given here are only a selection of the possible attachments. For detailed information, please refer to the **brochure MUBEA MIW**.

The attachments shown in this section **do not** belong to the standard version. Thus, with the exception of the length stop and the triangular notcher, they are not discussed in this User Manual.

Attachments for **holepunch** (examples)

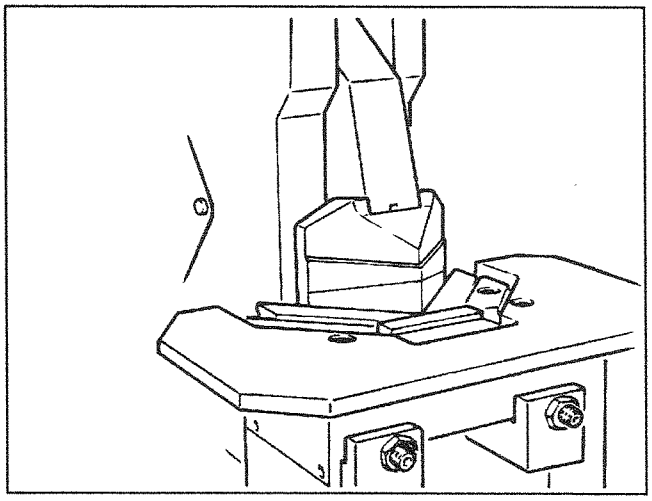


Special punching attachment for mounting punches and dies up to cutting diameter of 50 mm.



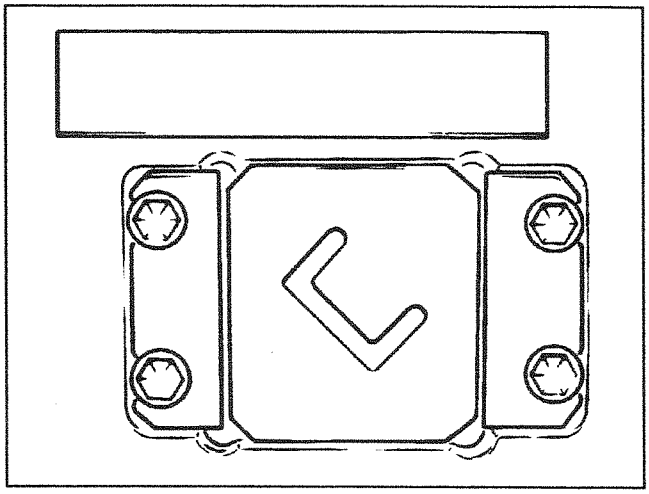
Special punching attachment for mounting punches and dies exceeding a cutting diameter of 50.5 mm.

Attachment for **coper/notcher** (example)

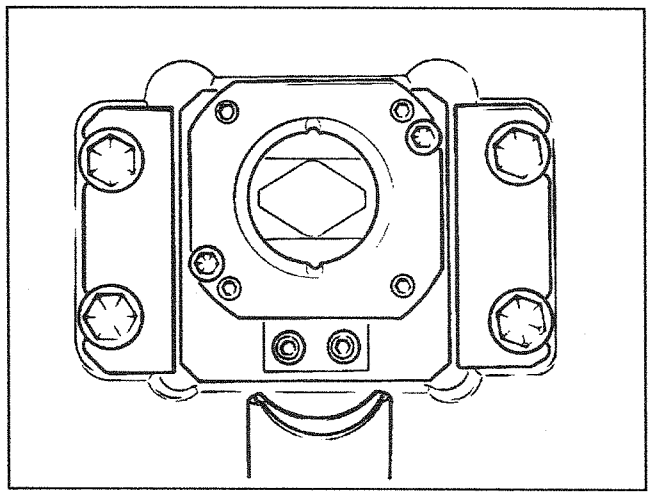


Triangular notching tool

Attachments for **bar-steel shear**
(examples)

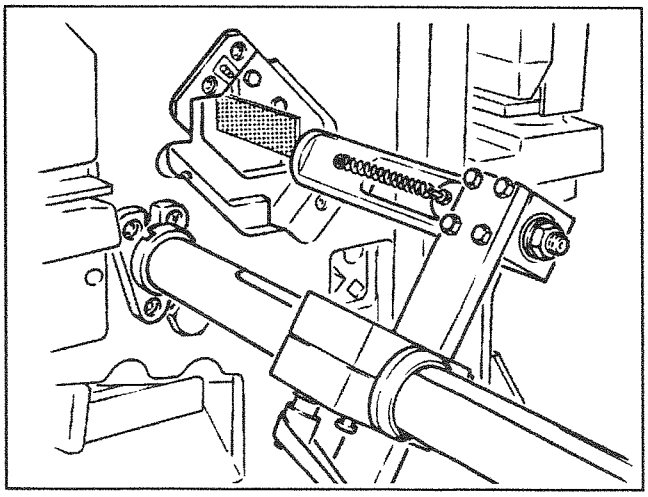


Knife for cutting
channel steel

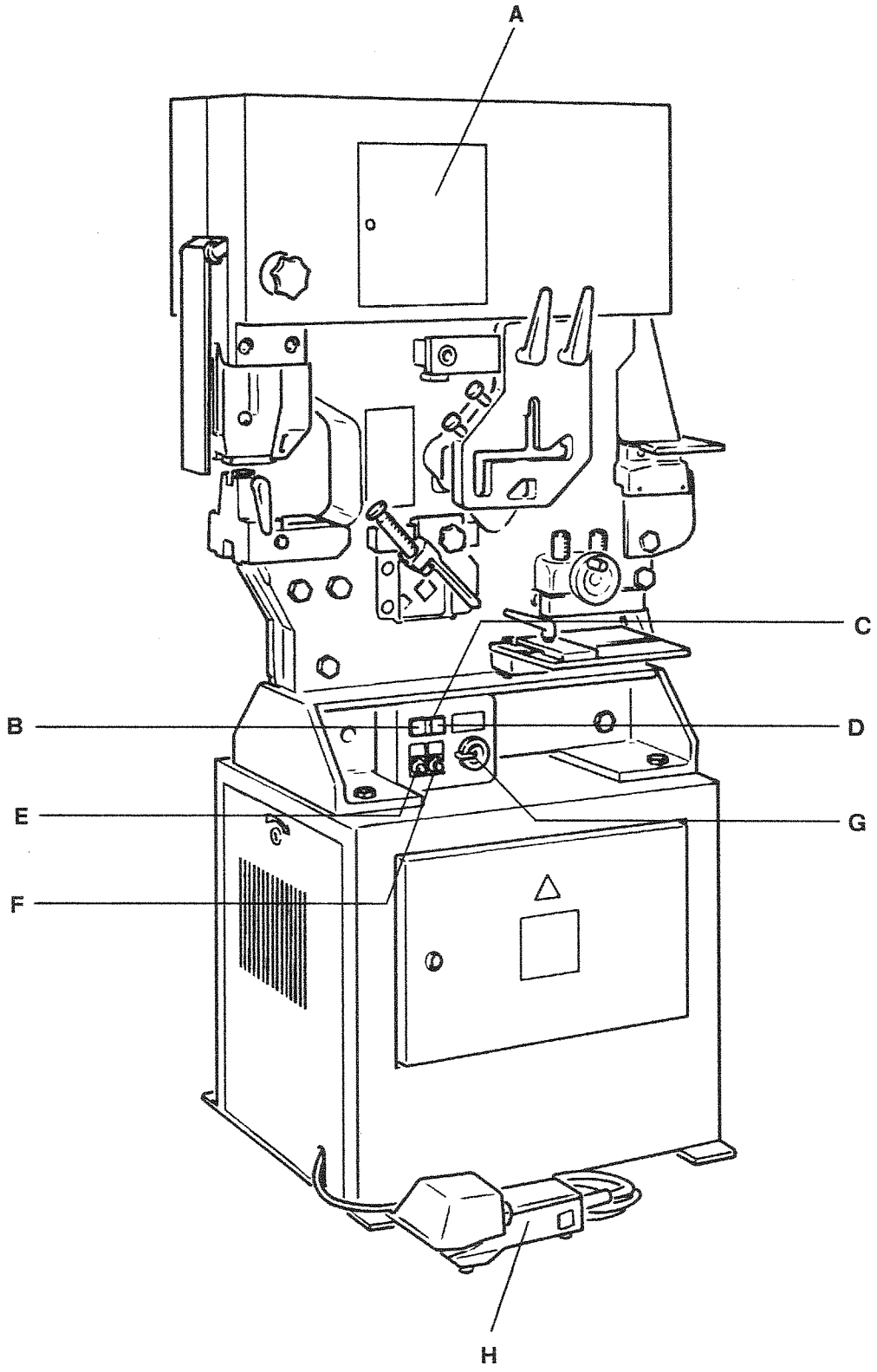


Pipe notching tool

Length stop
(for section-steel shear, bar-steel shear and
flat-steel shear)



Adjustable length stop


A
B
C
D
E
F
G
H

1.3 Controls

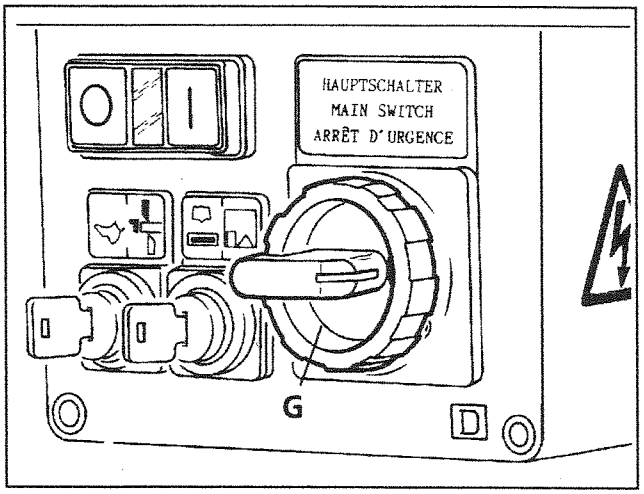
Main switch (G)

Positions:

I = On
O = Off

In the "Off" position the machine is separated from the power supply in all phases. The main switch can be secured with a padlock.

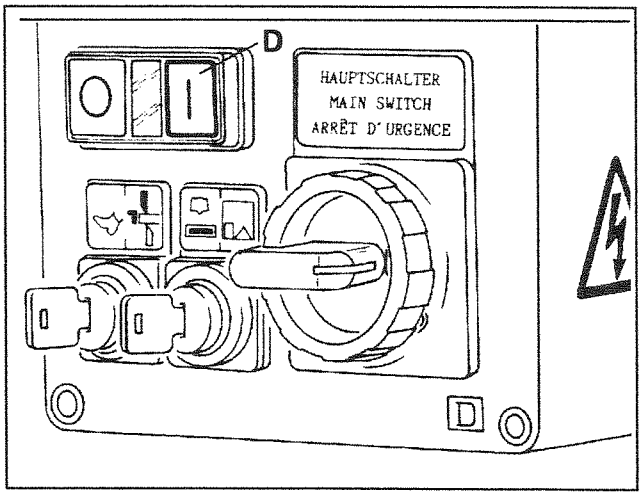
In the "Off" position the supply cables remain live. Therefore, whenever making repairs on the electrical components, make sure to separate the machine from the external power supply.



Start button (D)

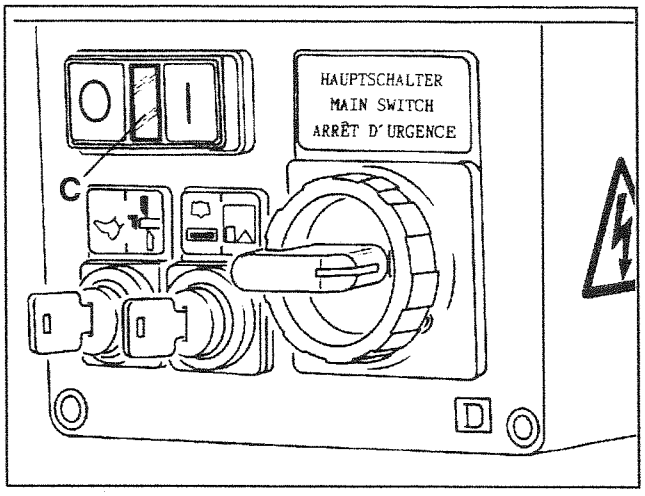
Positions: none

Pressing the Start button activates the motor of the hydraulic pump.



Pilot lamp (C)

The pilot lamp lights up as soon as the motor is ready.

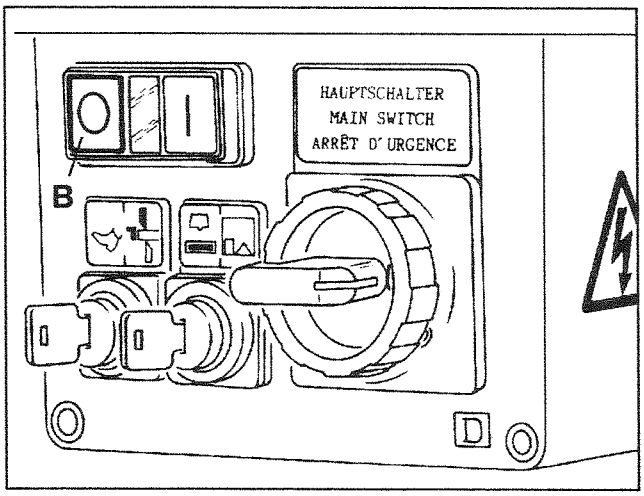


Stop button (B)

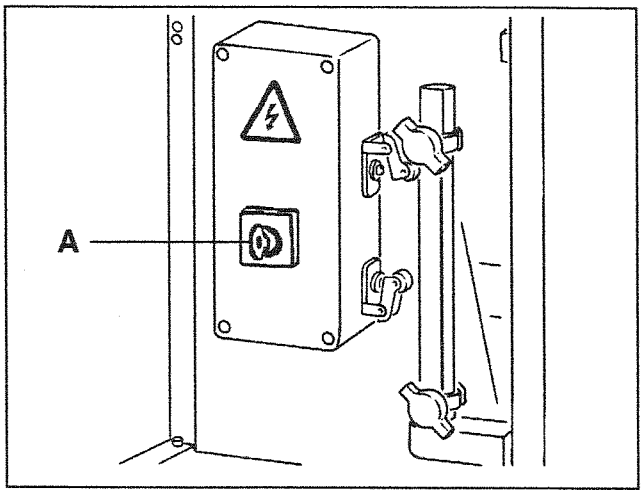
Positions: none

Pressing the Stop button stops the motor.

Electricity is still flowing through the machine.
Only perform maintenance and adjustment work when the main switch (G) is off and secured with the padlock.



Inching and Full Stroke switch (A)



Positions:

⌊● = Inching
O = Off
I = Full Stroke

With the switch in the "Inching" position the slide can be moved down to any desired position by pressing the footpedal (H) (e.g. to the punch toolsetting position).

The automatic return of the slide upon release of the footpedal does not function.

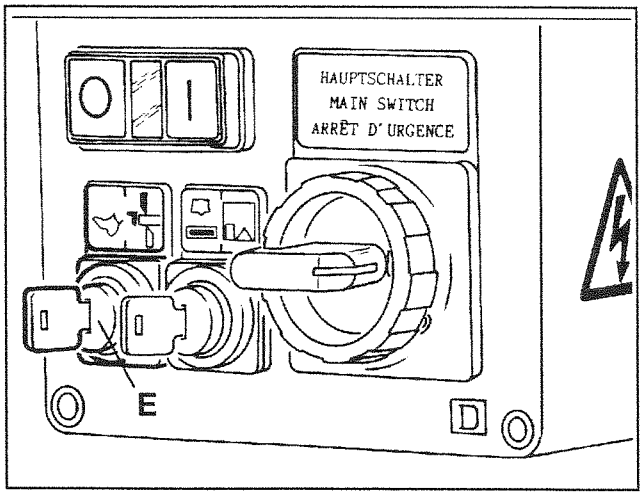
With the switch in the "Full Stroke" position, the slide moves down until the footpedal is released.

Upon release of the footpedal, the slide automatically returns to the upper limit switch position.

When you leave the ironworker, turn the keyswitch to "O" and remove the key.

Selector keyswitch for length stop/footpedal (E)

(for shears only, available also without length-stop attachment)



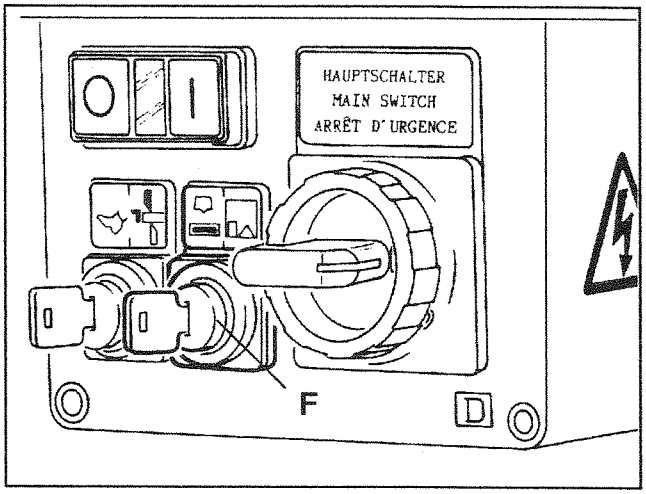
Positions:

Pulled = Footpedal (H) in operation
Length stop out of operation
Pushed = Length stop in operation
Footpedal (H) out of operation.

To push or pull the switch, you must turn the key.

The length-stop outlet on the back of the ironworker is live when the switch is in pushed position.

Selector keyswitch for punch and coper/notcher (F)



The punch and coper/notcher workstations are covered by a protective flap and a safety guard, respectively. If work is to be done at one of these workstations, use the selector keyswitch (F) to select the workstation you wish to work at and to open the corresponding safety cover.
If both safety covers are open, or if the safety cover of the unselected workstation is open, the MIW 400 **cannot** be put into operation.

Note
When working with the shears, keep **both** safety covers closed.

Positions:

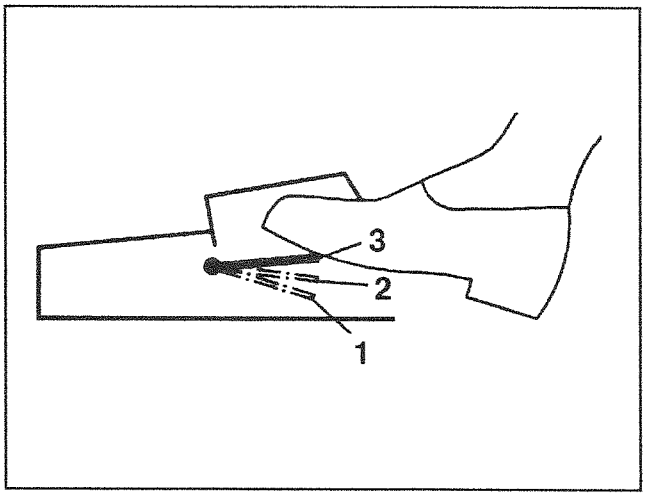
Pulled = Punch in operation.
Coper/notcher out of operation.
Pushed = Coper/notcher in operation.
Punch out of operation.

To push or pull the switch, you must turn the key.

Note on the keyswitches:
The three keyswitches (A, E and F) on the ironworker are different.

Footpedal (H)

Initial position: 3



The picture on the right shows the three positions of the footpedal. Between pos. 2 and pos. 1 there is a pressure point.

1 = Down
2 = Pause
3 = Up

With the Inching and Full Stroke switch (A) in the "Inching" position, the footpedal position 3 does not function, i.e. the slide does **not** move upward automatically upon release of the footpedal.

2

Safety Instructions

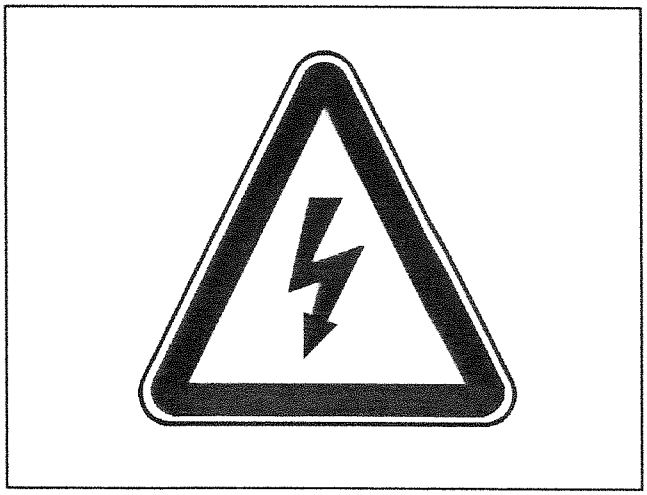
2 Safety Instructions

2.1 Warning Labels and Explanation of Warning Symbols

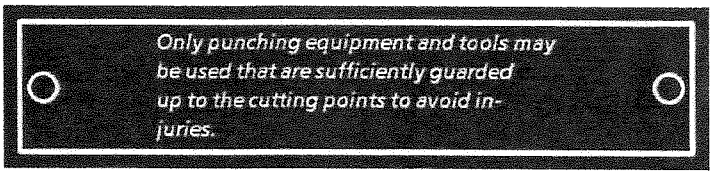
Warning labels are affixed to the machine at various places.

Do not remove the warning labels.
Replace damaged, scratched or illegible warning labels with new ones.
(article no. on the label).

Warning against hazardous electric voltage



Warning against unsafe tools



2.2 Instructions for Operator Safety

Basic instructions

Whenever performing work on the electrical system, always switch the ironworker off and disconnect it from the external power supply.

Whenever working near the cutting and punching tools, the ironworker must be deactivated by turning the main switch (G) off. Secure the main switch with a padlock.

When special tools are used, they must be designed as safe tools.

Instruction for safety fixtures

The safety fixtures must not be removed.

Whenever the ironworker is switched on, the safety fixtures must be checked beforehand to ensure they are all present, complete and securely fastened.

Damaged safety fixtures are to be exchanged for new ones.

Instruction for the warning labels

Do not remove the warning labels. Replace damaged, scratched or illegible warning labels with new ones.

Instruction for the main switch

In the "Off" position the supply cables remain live.
Therefore, whenever making repairs on the electrical components, make sure to separate the ironworker from the external power supply.

Instruction for the keyswitch

When you leave the ironworker, turn the keyswitch to "O" and remove the key.

Instruction for the "Off" button

Electricity is still flowing through the ironworker.
Only perform maintenance and adjustment work when the main switch (G) is off and secured with the padlock.

Instruction for the "length stop / footpedal" selector keyswitch (E)

The length-stop outlet on the back of the ironworker is live when the switch is in pushed position.

Instruction for adjustment work

The working cylinder moves up automatically.

After current is interrupted and the "Start" button (D) is pressed again, the slide moves to the starting position when the keyswitch is in the "Operation" position.
The same thing happens when you switch the toolsetting and operation switch (A) to the "Operation" position, if the slide is not in the starting position and the motor is running.

Instructions for all knives and tools

Unusable knives or tools should not be used.

Check knives and tools at regular intervals for dull or chipped blades.

Whenever knives are changed, the blade clearance must be checked.

Unclean cuts leave burrs and jagged spikes on the workpiece and increase the risk of injury.

Instructions for the holepunch

Only punching devices and tools that are equipped with sufficient means of protection against finger injuries up to the cutting point are permitted.

As a rule, check the alignment of punch and die after every tool change and from time to time while punching.

Use extreme caution when entering the punch into the die. Make sure that the punch does not touch the die.

The punch and die alignment must be checked whenever a tool change is made.

Should the view of the punch tool be obscured by a scratched or blind viewing window, it should be replaced with a genuine spare part (see spare parts).
Make absolutely sure that the safety device is securely fastened.

Punch and die must be properly aligned.

The clearance between the punch and the die must be carefully controlled.

Pay attention to the position of the cutting form of the punch relative to the die.

When using shaped dies, pay attention to the position of the cutting opening.

When the punch is not being operated, the cover flap must be closed.

Instructions for the coper/notcher

When the coper/notcher is not being operated, the safety guard must be closed.

Instruction for flat-steel shear, coper/notcher and section-steel shear

Proceed with extreme caution, so that the top knife does not touch the bottom knife.

Instruction for transport

When transporting, make sure that cables and supply lines are not creased or squeezed.

Instructions for crane transport

The crane, ropes or cables, chains and lifting equipment must have the required lifting capacity (machine weight, see technical specifications).
Do not stand under the hovering load.
Always screw the eyescrews tight.

When installing the ironworker, make sure that cables and supply lines are not squeezed or creased.

Instruction for connecting the ironworker

Connection of the ironworker to an electric power source must be done by a skilled electrician.

2.3 Instructions on Operation Safety

Instruction for all knives and tools

Knives and tools must be resharpened on time. Dull knives put a strain on the ironworker and result in poor cuts.

Instructions for the bar-steel shear

The clamps must not press the knives together.

If the knives are ground on the flat side, the clamps must also be reworked.

If resharpened knives are used, clamps must also be used.

When installing face-ground knives, particular attention must be paid to the blade clearance.

Instructions for the section-steel shear and the flat-steel shear

When installing flat-ground knives, particular attention must be paid to the blade clearance.

Hold onto to the knife firmly to prevent accidental dropping and possible damage.

Instruction for flat-steel shear

If you are cutting stock that is thinner than the stop rail, rotate the rail 180° so that it doesn't interfere with the adjustment of the hold-down.

Instruction for transporting with the forklift

When transporting the ironworker by forklift use only a screw-fastened plank platform to avoid damage.

General instruction for all work on the hydraulic system

Whenever working on the hydraulic system, make sure the equipment remains immaculately clean.

Instruction for operating pressure

Do not exceed the prescribed max. operating pressure.

Do not remove the built-in lead seal of the pressure-limiting valves; otherwise the guarantee will be void.

Bottoming of the cylinder on the limit switch for an extended time will cause the overload cut-out to activate and the machine will switch off. If this happens, inform the electrician.

Instruction for refilling with hydraulic oil

Always refill with the same hydraulic-oil grade; never mix. At extreme ambient temperatures you must consult the manufacturer (see Customer Service).

Instruction for cleaning the hydraulic system

Water, lyes or kerosene are unsuitable as cleaning agents.

Instructions for changing the oil

With every oil change, also change the oil filter.

Before draining the used oil, procure an appropriate collector vessel.

Avoid polluting the environment!

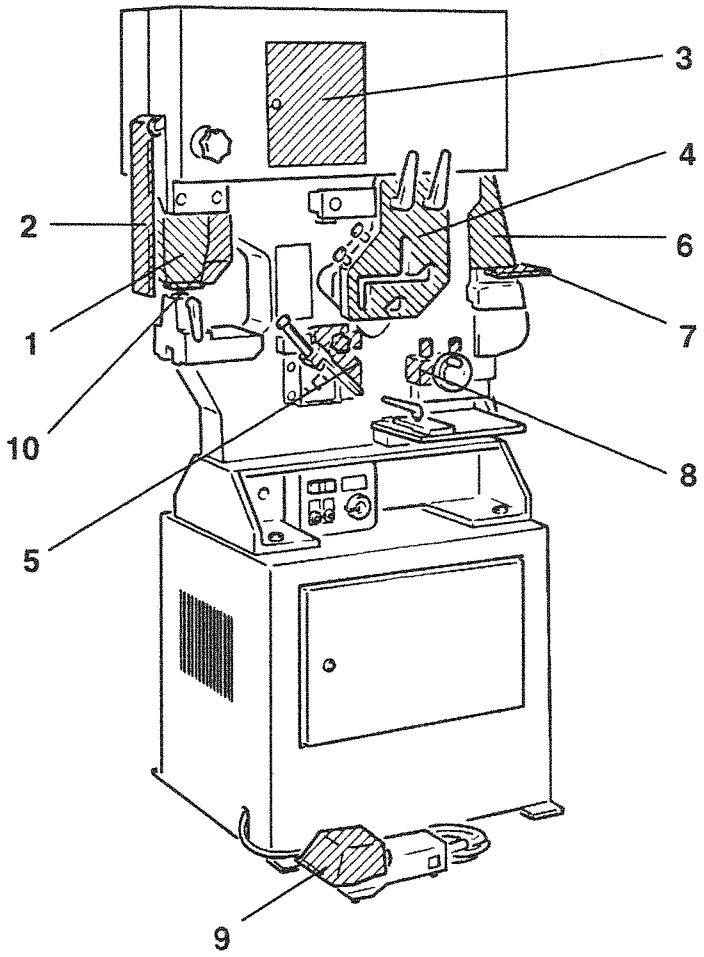
Take the used oil to a waste disposal facility.

2.4 Safety Fixtures

The safety fixtures must not be removed. Whenever the ironworker is switched on, the safety fixtures must be checked beforehand to ensure they are all present, complete and securely fastened. Damaged safety fixtures are to be exchanged for new ones.

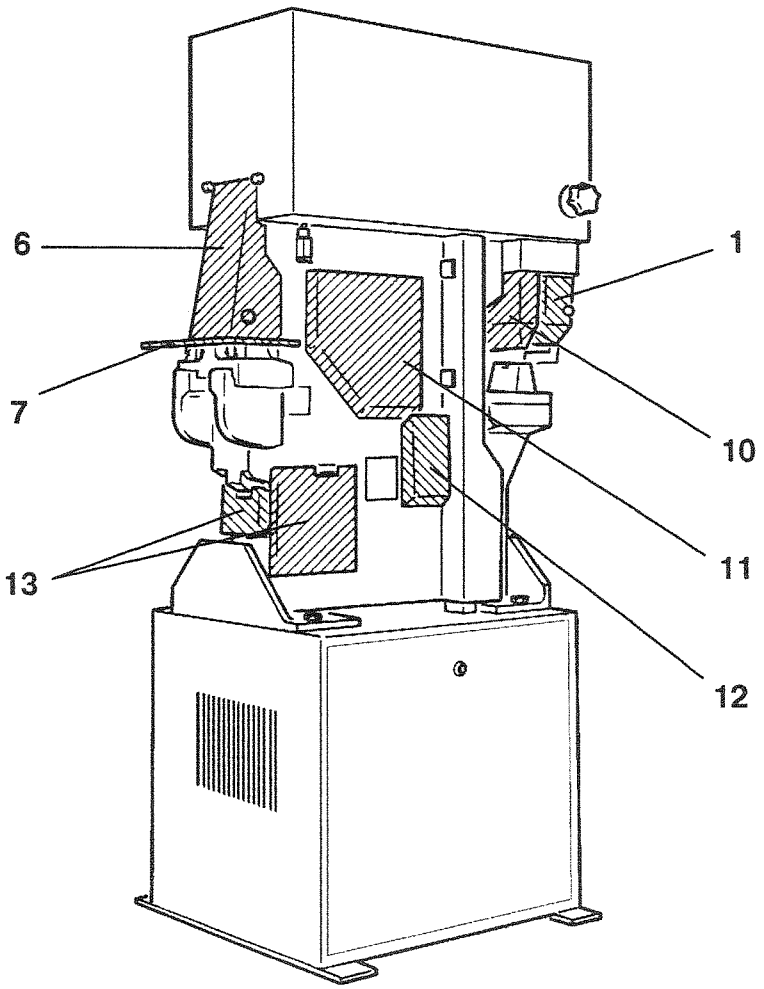
Note
Components 1, 4, 5, 7 and 8 fulfill dual functions. They are a safety fixture as well as a functional part of the machining process.

Safety fixtures on the front of the ironworker



1 Holepunch stripper
2 Holepunch cover flap
3 Door for the Inching and Full Stroke switch
4 Hold-down of section-steel shear
5 Hold-down of bar-steel shear
6 Coper/notcher safety guard
7 Safety fixture for coping saddle
8 Hold-down of flat-steel shear
9 Cover for footpedal
10 Safety cover for holepunch

Safety fixtures on the back of the ironworker



1 Holepunch stripper
6 Coper/notcher safety guard
7 Safety fixture for coping saddle
10 Safety cover for holepunch
11 Safety flap for section-steel shear
12 Safety flap for bar-steel shear
13 Safety flap for flat-steel shear

3

Putting into Operation

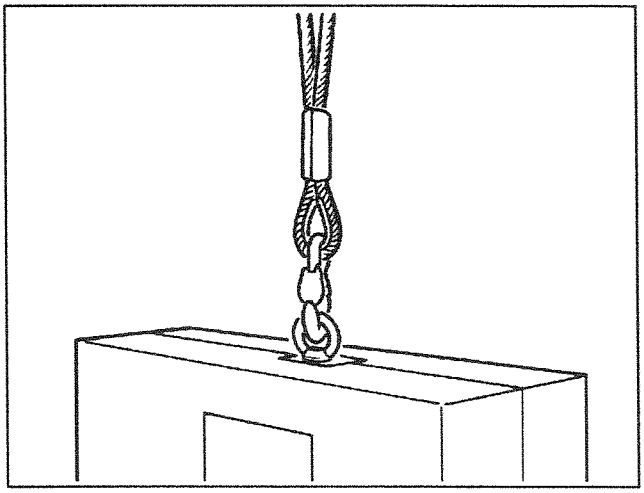
3 Putting into Operation

3.1 Transport

When transporting, make sure that cables and supply lines are not creased or squeezed.

3.1.1 Transporting by Crane

- Make sure the lifting eyescrew is fully tight.
- Transport the ironworker using only the eyescrew designed for that purpose.



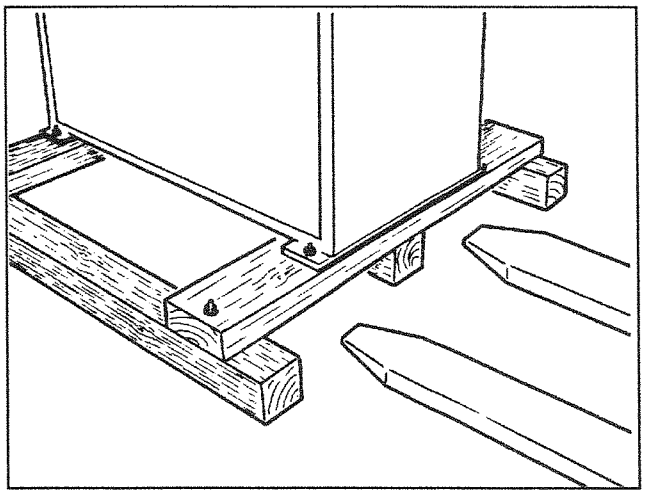
The crane, ropes or cables, chains and lifting equipment must have the required lifting capacity (machine weight, see technical specifications).

Do not stand under the hovering load.

Always screw the eyescrews tight.

3.1.2 Transporting by Forklift

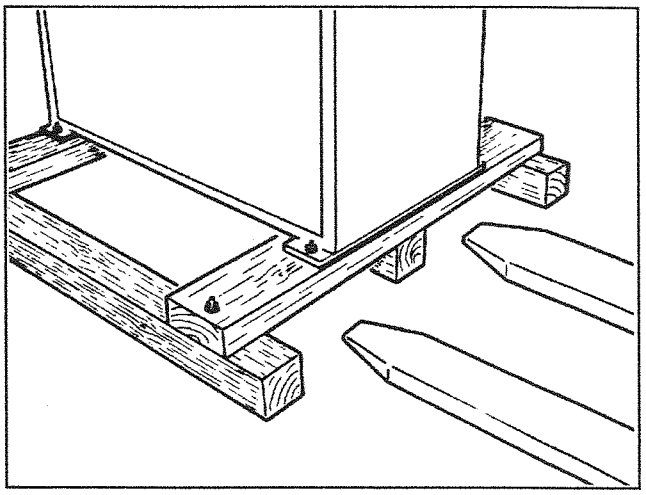
- Screw down the ironworker on a sturdy plank platform in such a way that it can be carried **lengthwise** by the forklift.
- Only carry the ironworker lengthwise, to prevent it from tilting.



When transporting the ironworker by forklift use only a screwfastened plank platform to avoid damage.

3.1.3 Transporting by Truck or Rail

- Screw down the ironworker on sturdy planks so that it rests securely (the shipping agent is responsible for anchoring the thus prepared ironworker on the rail car or truck).



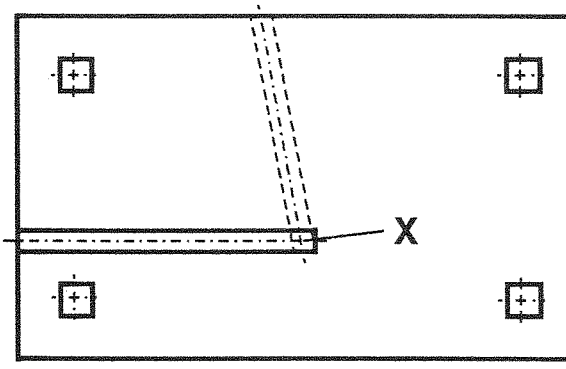
3.2 Installation

The ironworker's work sites have normal operating heights. Thus, it is not necessary to regulate the height using a baseplate or pedestal.

Before installation, check whether the floor is level and sufficiently strong.
If a foundation is required, refer to section 3.2.1.

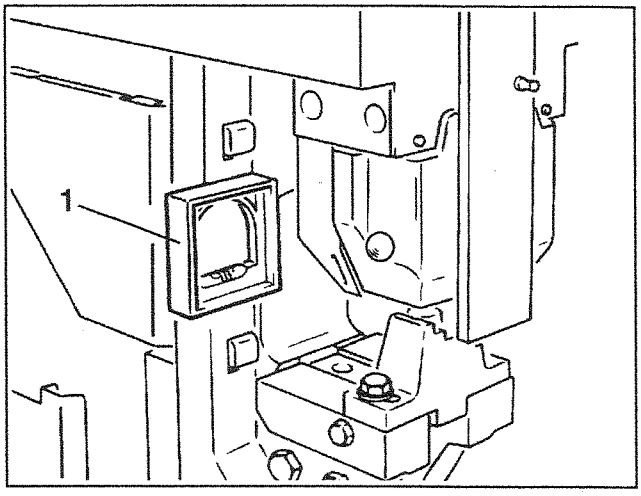
3.2.1 Preparing a Foundation
(if necessary)

- Prepare the foundation. (For foundation diagram, see chapter 11.)
- The depth of the foundation depends on the substructure.
- The cable duct from point "X" may run in any desired direction.



Foundation/machine front

3.2.2 Installing the Ironworker



When installing the ironworker, make sure that cables and supply lines are not squeezed or creased.

- Insert and run in anchor bolts according to foundation diagram, or bore holes according to foundation diagram (see chapter 11).
- Place ironworker at provided site and align it.
- Tighten fastening screws and nuts slightly, in crosswise fashion.
- Check upright alignment of ironworker by measuring with a level (1) frontally and laterally.
- If necessary, correct alignment.
- Tighten fastening screws and nuts all the way.

3.3 Power Connection

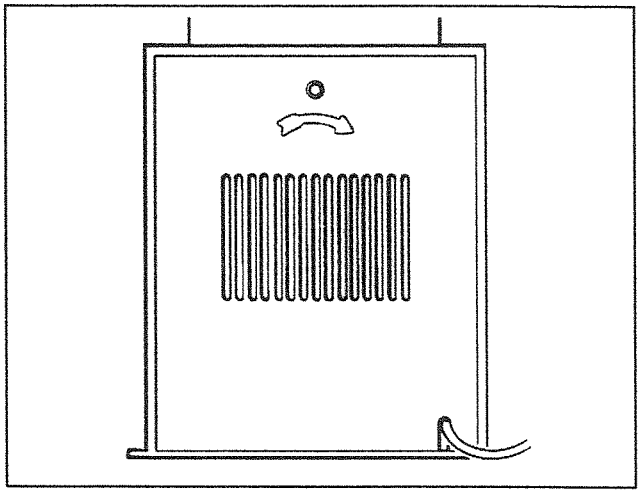
- Hook ironworker up to power source according to electrical connection diagram (see chapter 11).

Connection of the ironworker to an electric power source must be done by a skilled electrician.

3.4 Final Checks Following Installation and Hookup

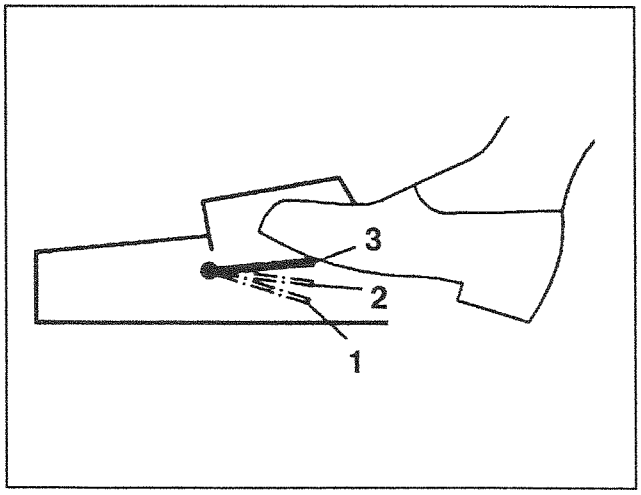
3.4.1 Electrical

- Check motor's direction of rotation.
- If direction of rotation is wrong, have it corrected by a skilled electrician.



3.4.2 Hydraulic

- Check oil level (see section 6.3.1).
- Ventilate system.
  Run the motor, letting it idle for approx. 4 min. Then use the footpedal (H) to move the working cylinder a number of times without any load.
- The max. operating pressure is factory-set, lead-sealed, and need not be tested. If so desired, it can be checked using the factory-installed test lead (see section 6.3.5).



Do not exceed the prescribed max. operating pressure.

Do not remove the built-in lead seal of the pressure-limiting valves; otherwise the guarantee will be void.

3.4.3 Mechanical

- Make sure the ironworker is seated firmly.
- Check whether all safety fixtures are present, securely fastened and operating properly.

The safety fixtures must not be removed.

Whenever the ironworker is switched on, the safety fixtures must be checked beforehand to ensure they are all present, complete and securely fastened. Damaged safety fixtures must be replaced.

- Lubricate the ironworker (see section 6.4).

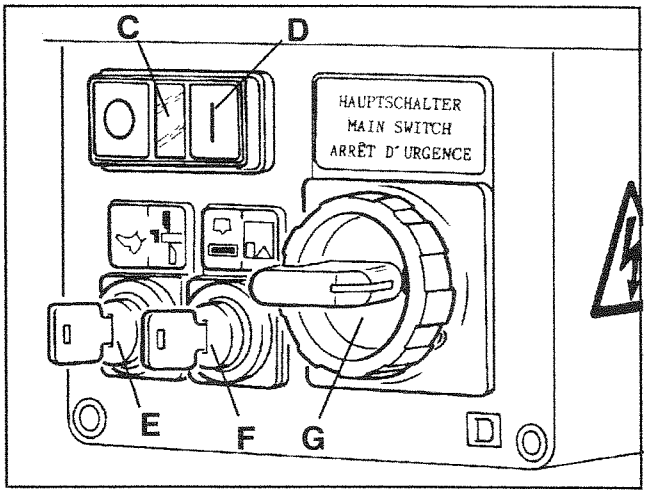
4

Operation

4 Operation

4.1 Preparations

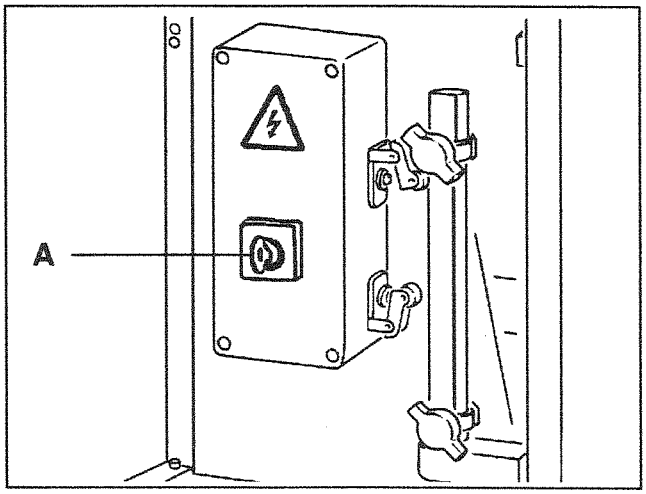
- Check safety fixtures for secure seating and proper operation.
- Test tools for damages, secure seating and sharp cutting edges.



4.2 Switching On the Ironworker

- Turn main switch (G) to "I".
- Press Start button (D).
  When the pilot lamp (C) lights up, the ironworker is ready.
- Turn the Inching and Full Stroke switch (A) to "Full Stroke".
- If necessary, turn the selector keyswitch (F) to the desired workstation. Open the appropriate safety cover and lock it in position.
- **Only when using the electric length stop:**
  Turn the selector keyswitch (E), bringing it into the pressed-in position (footpedal [H] out of operation, length stop in operation).

  Note
  If the length stop is not used, you do **not** have to move (press in) the selector keyswitch (E).



4.3 Operating the Holepunch

4.3.1 Safety Instructions

Only punching devices and tools that are equipped with sufficient means of protection against finger injuries up to the cutting point are permitted.

Should the view of the punch tool be obscured by a scratched or blind viewing window, it should be replaced with a genuine spare part (see spare parts). Make absolutely sure that the safety device is securely fastened.

When the punch is not being operated, the cover flap must be closed.

Punch and die must be properly aligned.

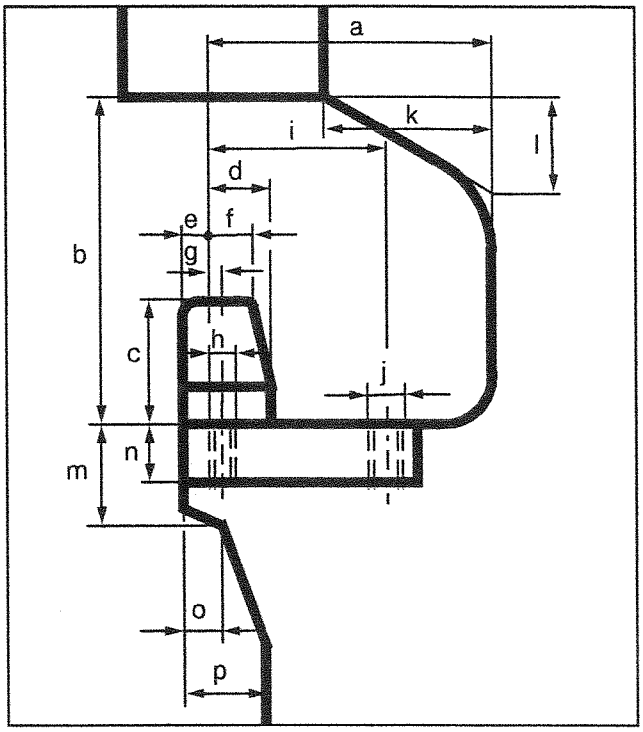
The clearance between the punch and the die must be carefully controlled.

Unusable knives or tools should not be used.

Check knives and tools at regular intervals for dull or chipped blades.

4.3.2 General

MIW 400	mm	MIW 400	mm
a	175	j	M 24
b	195	k	100
c	84	l	58
d	35.5	m	52
e	22.5	n	45
f	25	o	27
g	8	p	70
h	M 16		
i	118		



- For continuous production or large piece numbers, the coupling nut should be used instead of the quick-change fixture (see section 9.1.1).
- When punching with large punches, the stripper plate can be detached (see section 9.1.2).

4.3.3 Working With the Holepunch

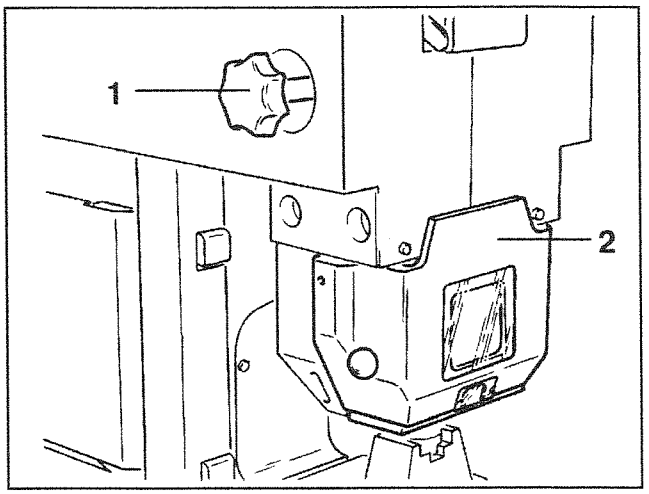
- Observe safety regulations.
- Switch on the ironworker (see section 4.2).

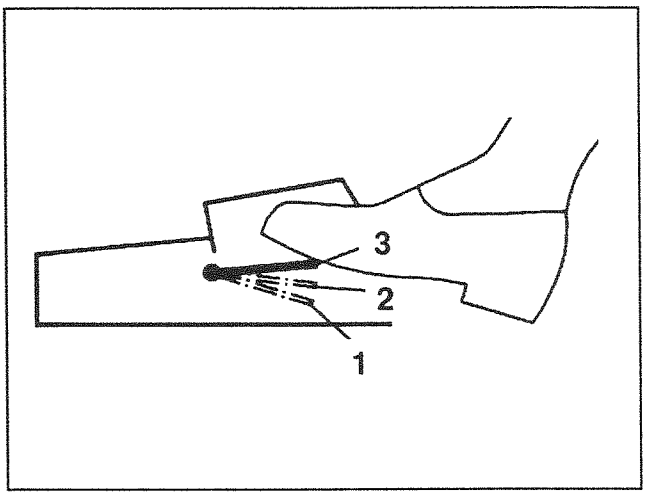
  Notes
  When working with the punch, the selector keyswitch (F) must be in pulled position.

  The safety guard of the coper/notcher must be closed.
- Open the cover flap of the punch and lock in position.
- Check whether the punch and die have the required dimensions, and determine the clearance according to section 5.2.1. If necessary, change punch and die as describe in sections 7.1.1 and 7.1.2.
- Check whether the stroke of the punch suits the thickness of the stock to be processed. If necessary, optimize the punch stroke according to section 5.1.

- Insert and position the stock.
- Using the star handle (1), adjust the height of the stripper (2) according to the stock thickness.
- Press the footpedal (H).

  For precise punching (e.g. premarked stock), first bring the punch down slowly in inching mode (i.e., by pressing the footpedal a number of times to position 1 and raising it to position 2) and, after positioning the stock, press it down all the way.
- After punching, release the footpedal. The holepunch will automatically return to its original position at the top.
- From time to time check the cutting play and/or the centering of the tools (see section 5.2.2).
- On completion of work, close the cover flap on the holepunch.





4.4 Operating the Flat-Steel Shear

4.4.1 Safety Instructions

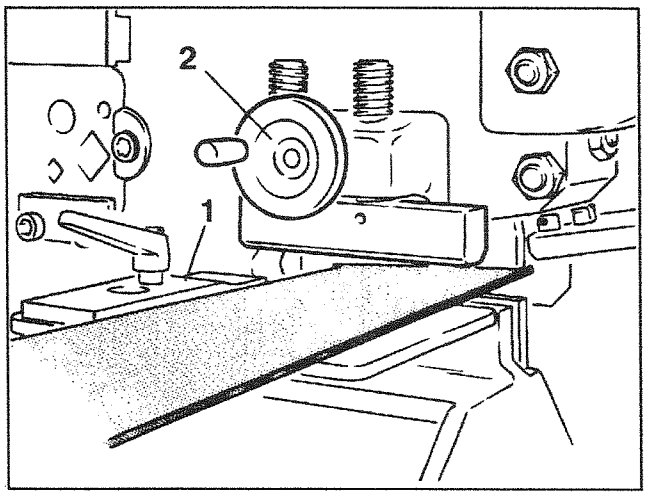
Unusable knives and tools should not be used.

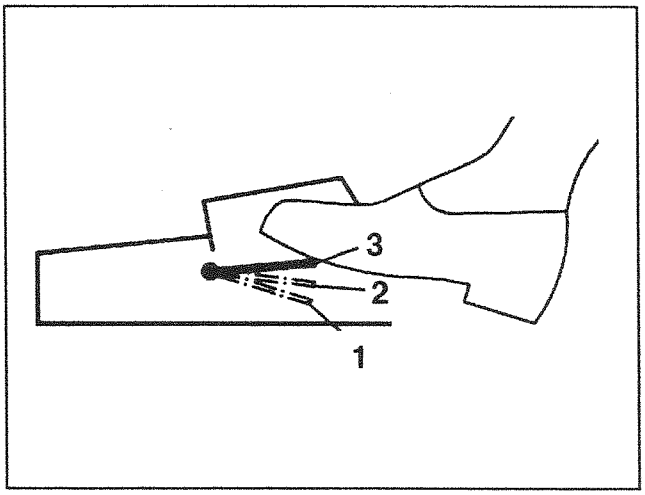
Check knives and tools at regular intervals for dull or chipped blades.

4.4.2 Working With the Flat-Steel Shear

- Observe safety regulations.
- Switch on ironworker (see section 4.2).

  Note
  Keep the safety covers of the punch and the coper/notcher closed while working with the flat-steel shear.
- Check the stroke of the flat-steel shear, and make sure it suits the thickness of the stock to be processed. If necessary, optimize the stroke according to section 5.1.
- If necessary, adjust the stop rail (1) (see section 4.4.3).
- Insert and position the stock.
- Using the handwheel (2), set the hold-down onto the stock.
- Press the footpedal (H).
- After cutting, release the footpedal. The slide will automatically return to its original position at the top.
- From time to time check the clearance of the flat-steel shear (see section 5.3.1).



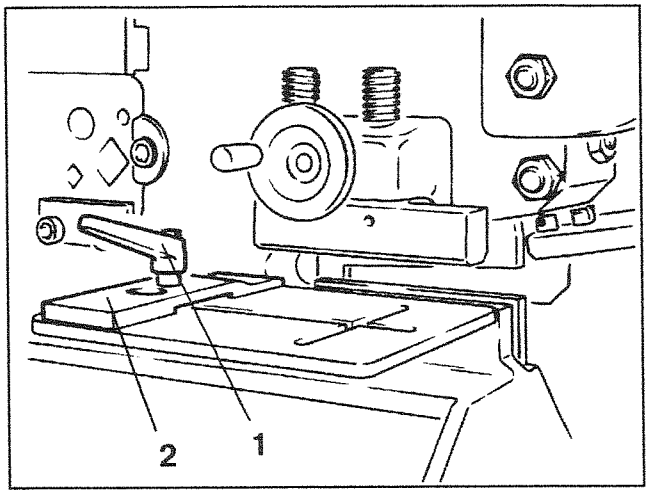


4.4.3 Adjusting the Stop Rail on the Supporting Table

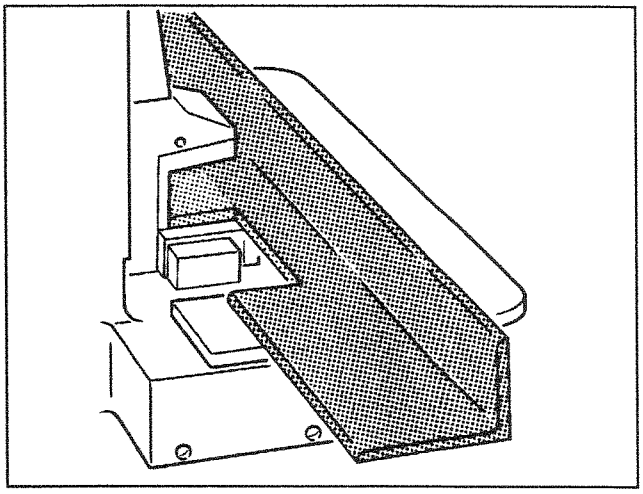
The stop rail on the supporting table can be adjusted to meet the requirements of the cut.

- Switch off the machine.
- Loosen the locking lever (1).
- Move the stop rail (2) to desired position.
- Tighten the locking lever (1).

If you are cutting stock that is thinner than the stop rail, rotate the rail 180° so that it doesn't interfere with the adjustment of the hold-down.



4.5 Operating the Coper/Notcher

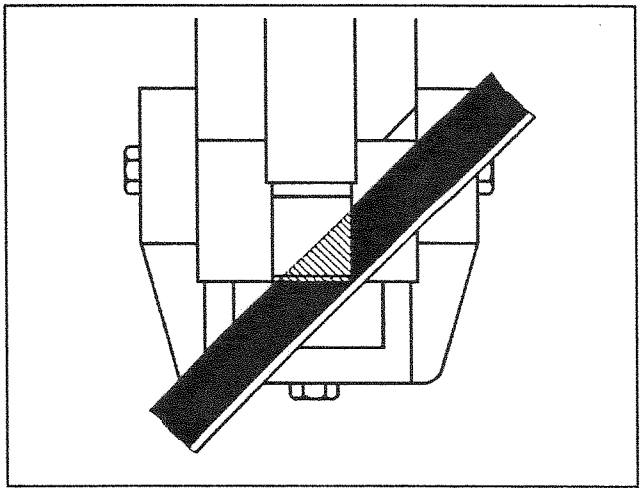


4.5.1 Safety Instructions

When the coper/notcher is not being operated, the safety guard must be closed.

Unusable knives and tools should not be used.

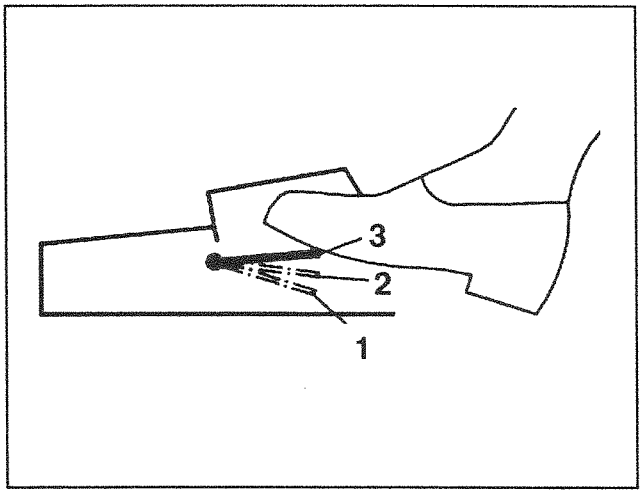
Check knives and tools at regular intervals for dull or chipped blades.



4.5.2 General

- Make wider copes by repositioning the stock.
- Make triangular notches by placing the stock at a 45° angle.

  Note
  Due to the sharp tips in the notched triangle, these notches are not suitable for making frames.



4.5.3 Working With the Coper/Notcher

Notes
When working with the coper/notcher, the selector keyswitch (F) must be in the pushed position.

Die Abdeckklappe der Lochstanze muß geschlossen sein.

- Observe safety regulations.
- Switch on machine (see section 4.2).
- Open the coper/notcher safety guard and secure it in position.

- Insert and position the stock.
- Press the footpedal (H).
- After coping, release the footpedal. The coper will return to its initial position at the top.
- From time to time check the blade clearance of the coper/notcher (see section 5.4.1).
- After finishing the work, close the safety guard.

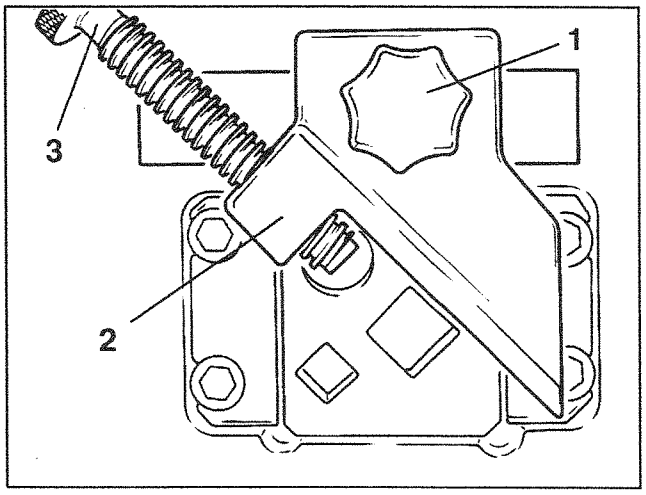
4.6 Operating the Bar-Steel Shear

4.6.1 Safety Instructions

Unusable knives and tools should not be used.

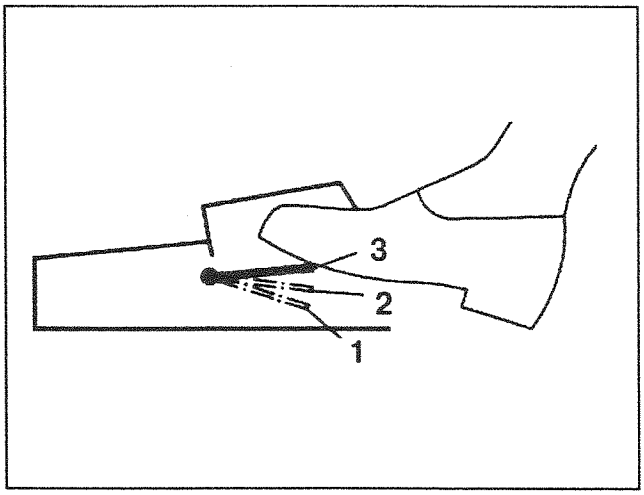
Check knives and tools at regular intervals for dull or chipped blades.

4.6.2 Working With the Bar-Steel Shear



- Observe safety regulations.
- Switch on ironworker (see section 4.2).

  Note
  Keep the safety cover of the punch and the coper/notcher closed while working with the bar-steel shear.
- Check the stroke of the bar-steel shear, and make sure it suits the thickness of the stock to be processed. If necessary, optimize the stroke according to section 5.1.
- Insert and position the stock.
- After loosening the star handle (1), adjust the complete hold-down (2) and spindle (3) so that the stock is lying horizontal when it is cut.
- Tighten the star handle (1).
- Press the footpedal (H).
- After cutting, release the footpedal. The carriage will automatically return to its original position at the top.
- From time to time check the blade clearance of the bar-steel shear (see section 5.5.1).



4.7 Operating the Section-Steel Shear

4.7.1 Safety Instructions

Unusable knives and tools should not be used.

4.7.2 Working With the Section-Steel Shear

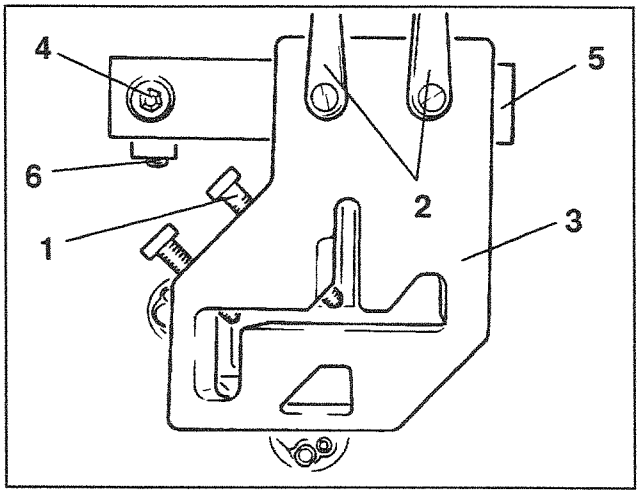
a) Rectangular Cut

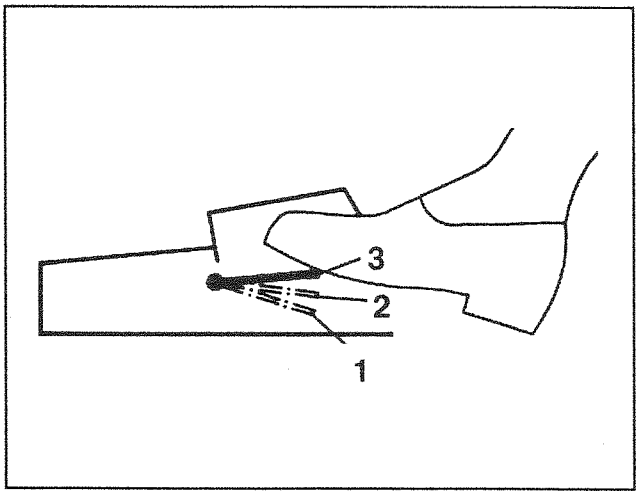
Note
Heed figures 1 and 2 in section 4.7.3 "Cutting Instructions".

- Observe safety regulations.
- Switch on ironworker (see section 4.2).

Note
Keep the safety cover of the punch and the coper/notcher closed while working with the section-steel shear.

- Check the stroke of the section-steel shear, and make sure it suits the thickness of the stock to be processed. If necessary, optimize the stroke according to section 5.1.
- Insert and position the stock.
- Screw the hold-down spindle (1) tight.
- Press the footpedal (H).
- After cutting, release the footpedal. The carriage will return to its original position at the top.
- If the horizontal leg is not square enough, loosen the locking lever (2) and adjust the hold-down plate (3) to attain the required angle on the workpiece.
- If the vertical leg is not square, loosen the hex socket screw (4) and readjust the stop rail (5) with the setting screw (6).
- After setting the stop rail, tighten the screws (4) again.
- From time to time check the blade clearance of the section-steel shear blades (see section 5.6.1).





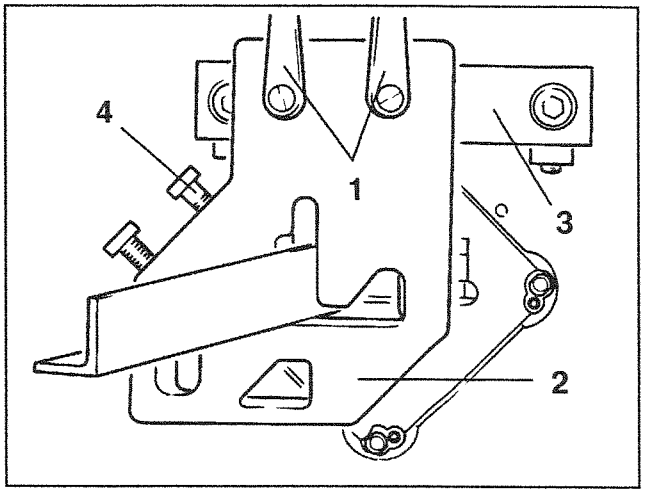
b) Bevel (Miter) Cut

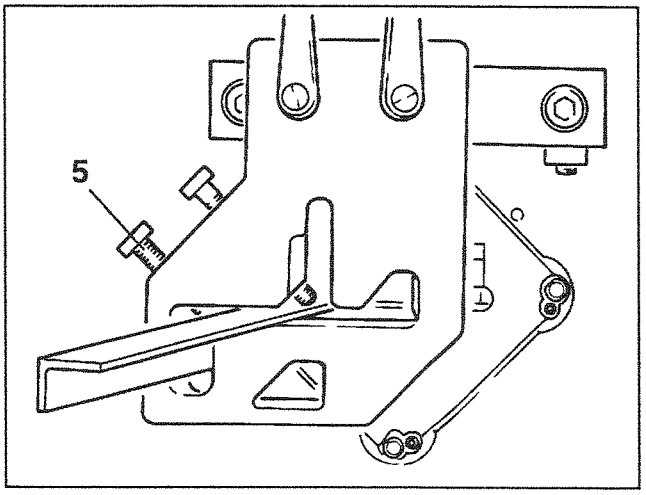
Note
Heed figures 3 and 4 in section 4.7.3 "Cutting Instructions".

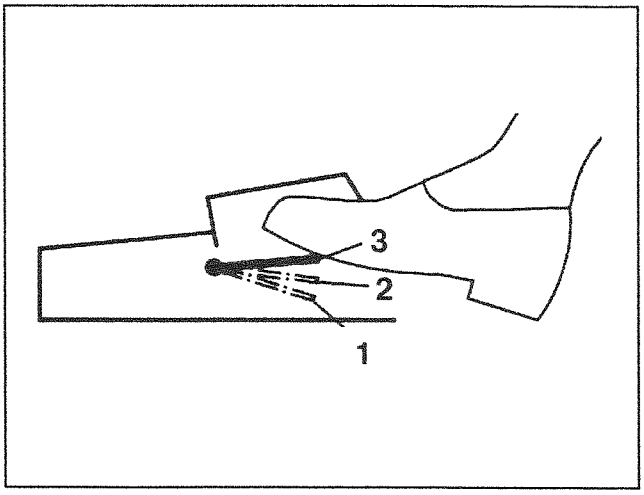
- Observe safety regulations.
- Switch on ironworker (see section 4.2).

Note
Keep the safety cover of the punch and the coper/notcher closed while working with the section-steel shear.

- Loosen the locking lever (1) and slide the hold-down plate (2) along the stop rail (3) to the 45° bevel mark.
- Tighten the locking lever (1).
- Insert and position the stock (see section 4.7.3).
- Tighten the hold-down spindle (4).
- Press the footpedal (H).
- After cutting, release the footpedal. The shear carriage will return to its original position at the top.
- To cut the opposite bevel, insert the stock as required and tighten the hold-down spindle (5).
- From time to time check the blade clearance of the section-steel shear (see section 5.6.1).

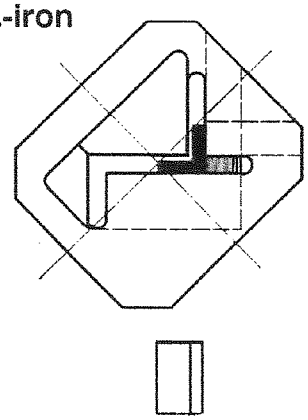




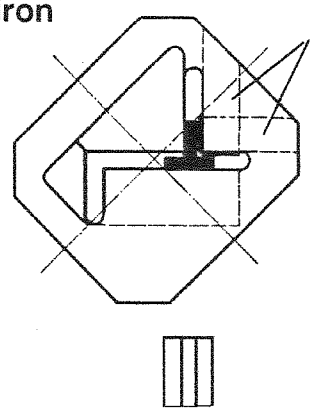


4.7.3 Cutting Instructions

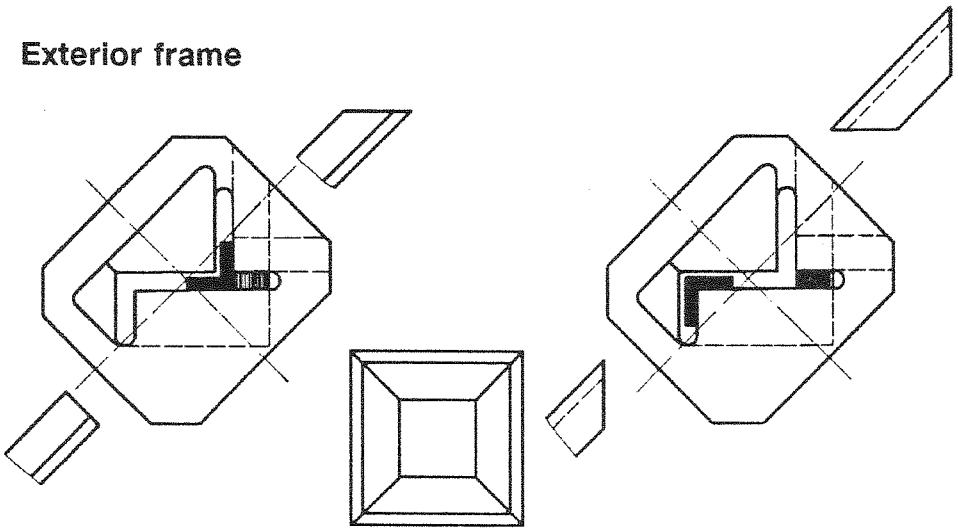
1 L-iron



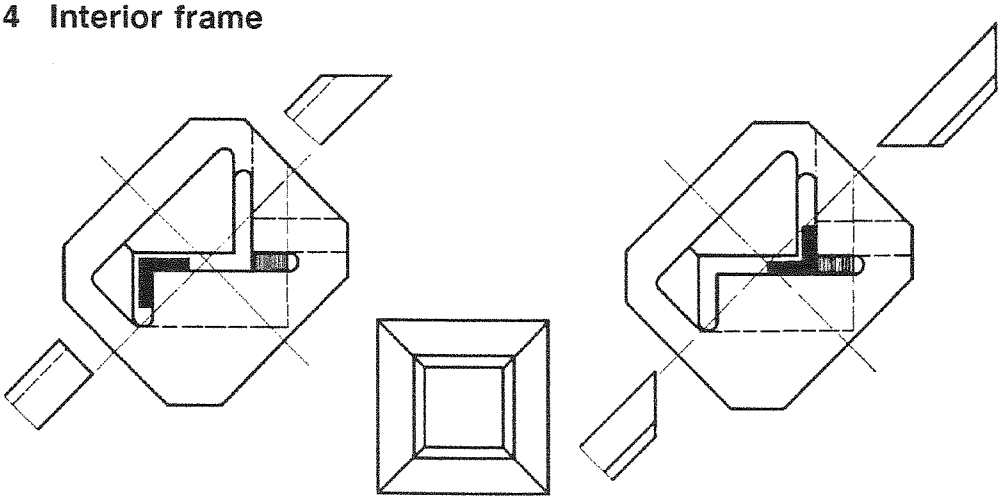
2 T-iron



3 Exterior frame



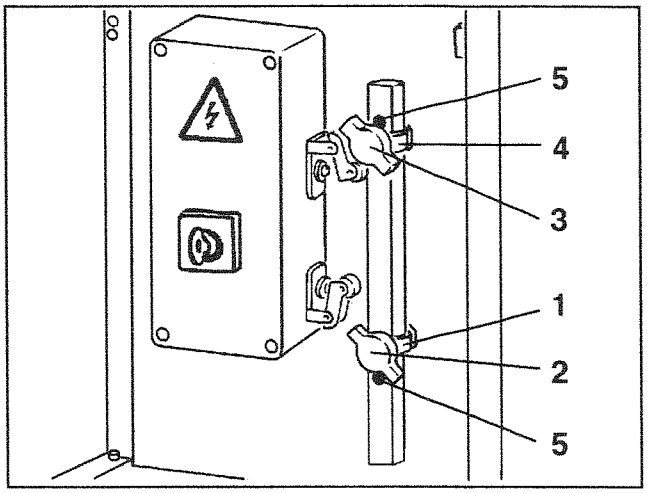
4 Interior frame



5

Toolsetting

5 Toolsetting



5.1 Setting the Stroke Length

The stroke length for the respective workstation is controlled by the two trip cams (1) and (4).

The upper trip cam (1) limits the downward stroke, the lower trip cam (4) limits the upward stroke.

The stroke length should be set so that you are always working with shortest possible stroke.

The limit stops (5) must not be removed.

a) Setting the Upper Dead Center (Stroke Limit)

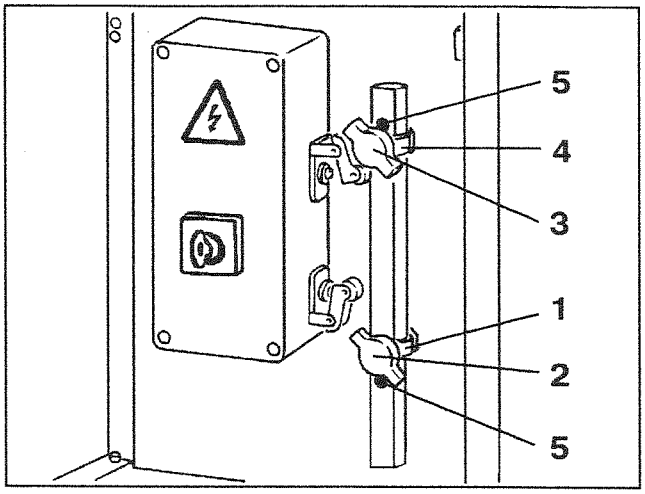
- Switch on the ironworker (see section 4.2).
- Turn the Inching and Full Stroke switch (A) to "Inching".
- Using the footpedal (H), carefully inch the punch down to the point where you can still easily insert the workpiece to be processed.
- Loosen the lower T-screw (2) and slide the trip cam up to the roller of the limit switch.
- Retighten the lower T-screw (2).
- Turn the Inching and Full Stroke switch (A) to "Full Stroke".
- Perform a test stroke and, if necessary, correct the setting.
- Switch off the ironworker.

b) Setting the Lower Dead Center
(normally not necessary if a standard tool is used)

- Switch on the ironworker (see section 4.2).
- Turn the Inching and Full Stroke switch (A) to "Inching".
- Using the footpedal (H), carefully move the tool to the desired lower position.
- Undo the upper T-screw (3) and slide the trip cam down to the roller of the limit switch.
- Tighten the upper T-screw (3).
- Turn the Inching and Full Stroke switch (A) to "Full Stroke".

The working cylinder moves up automatically.

- Perform a test stroke and, if necessary, correct the setting.
- Switch off the ironworker.



5.2 Holepunch

The safety fixtures must not be removed.

Whenever the ironworker is switched on, the safety fixtures must be checked beforehand to ensure they are all present, complete and securely fastened.

Damaged safety fixtures are to be exchanged for new ones.

When special tools are used, they must be designed as safe tools.

When you leave the ironworker, turn the selector keyswitch to "O" and remove the key.

Electricity is still flowing through the ironworker. Only perform maintenance and adjustment work when the main switch (G) is off and secured with the padlock.

Unusable knives and tools should not be used.

5.2.1 Determining the Punch and Die Clearance

The cutting tolerance (= twice the cutting gap) of the tools for the holepunch is a fixed value resulting from the punch diameter and the diameter of the die bore; for this reason, it cannot be set.

The cutting tolerance should be approx. 10% of the material thickness (see example at right).

Detailed information can be found in the introductory notes of the **MUBEA catalog "Punches and Dies"** (which can be ordered from MUBEA).

Example:	*The material thickness is 12 mm, the punches should have a diameter of 20 mm.*
This yields:	
Punch Ø	= *20 mm*
Blade clearance	= *10% of the material thickness* = *Material thickness x 0.1* = *12 mm x 0.1* = *1.2 mm*
Result:	*The diameter of the die bore should measure 21.2 mm across.*

5.2.2 Centering the Tools

Punch and die must be properly aligned.

As a rule, check the alignment of punch and die after every tool change and from time to time while punching.

The punch and die have been centered at the factory. If for any reason whatsoever the centering is out of place, correct it by doing as follows:

- Switch on the ironworker (see section 4.2).

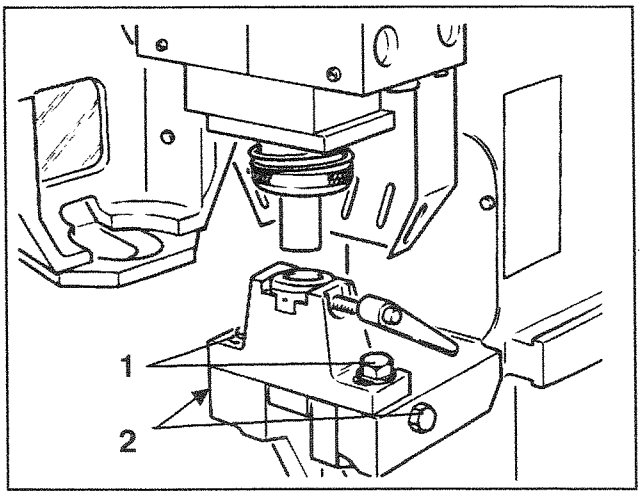
  Notes
  When working with the punch, the selector keyswitch (F) must be in pulled position.

  The coper/notcher safety guard must be closed.

- Open and arrest the cover of the holepunch.
- Turn the Inching and Full Stroke switch for the punch (A) to "Inching".
- Open the stripper by pushing it down and swinging it forward.
- Using the footpedal (H), carefully inch the punch down into the die.

Use extreme caution when entering the punch into the die. Make certain that the punch does not touch down upon the die.

- Switch off the ironworker.
- Loosen the fastening screws (1).
- Shift the punch saddle forward or backward.
- Using the adjustment screws (2), laterally center the punch saddle.
- Tighten the fastening screws (1).
- Tighten the adjustment screws (2).



- Switch on the ironworker (see section 4.2).

The working cylinder moves up automatically.

- Close the stripper and the cover flap.
- Switch off the ironworker.

5.3 Flat-Steel Shear

Safety fixtures must not be removed.

Whenever the ironworker is switched on, the safety fixtures must be checked beforehand to ensure they are all present, complete and securely fastened.

Damaged safety fixtures are to be replaced with new ones.

When you leave the ironworker, turn the keyswitch to "O", and remove the key.

Electricity is still flowing through the ironworker. Only perform maintenance and adjustment work when the main switch (G) is off and secured with the padlock.

Unusable knives and tools should not be used.

5.3.1 Checking and Setting the Blade Clearance

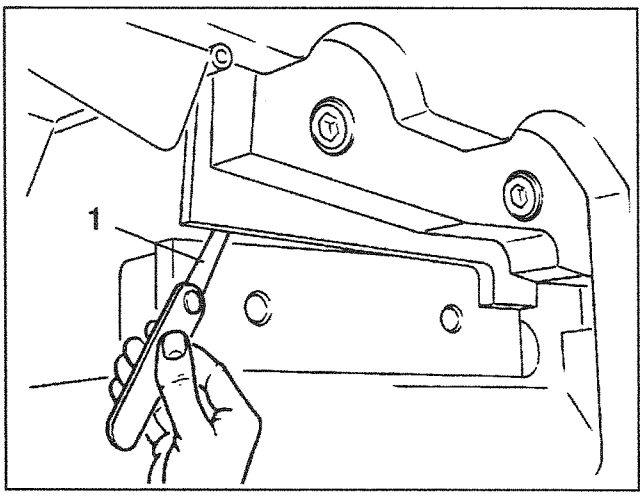
Whenever knives are changed, the blade clearance must be checked.

When installing face-ground knives, particular attention must be paid to the blade clearance.

- Switch on the ironworker (see section 4.2).
- Turn the Inching and Full Stroke switch (A) to "Inching".
- Using the footpedal (H), carefully move the slide to the lowermost position.

Proceed with extreme caution, so that the top knife does not touch the bottom knife.

- Switch off the ironworker.
- Using a feeler gauge (1), check the blade clearance from the back of the ironworker over the entire knife length.
- The blade clearance should be 5-10% of the material thickness to be cut. The blade clearance at the front should be approx. 0.2 mm narrower than at the rear.
- If the blade clearance is too big, reduce the clearance by backing the lower knife with foils (for removing knives, see section 7.2.2).
- **Too small a blade clearance** is only possible if there are no genuine knives installed, the slide guideway was adjusted or the knife was already backed with foils. To remedy this, remove the inserted foils, install genuine knives, or refinish the lower knive's standard foil.



- Switch on the ironworker (see section 4.2).
- Turn the Inching and Full Stroke switch (A) to "Full Stroke".

The working cylinder moves up automatically.

- Switch off the ironworker.

Note
The blade clearance for very thin stock is permitted to be smaller than 0.2 mm.

5.4 Coper/Notcher

Unusable knives and tools should not be used.

The safety fixtures must not be removed.

Whenever the ironworker is switched on, the safety fixtures must be checked beforehand to ensure they are all present, complete and securely fastened.

Damaged safety fixtures are to be replaced with new ones.

When you leave the ironworker, turn the keyswitch to "O", and remove the key.

Electricity is still flowing through the ironworker. Only perform maintenance and adjustment work when the main switch (G) is off and secured with the padlock.

5.4.1 Checking and Setting the Blade Clearance

Whenever knives are changed, the blade clearance must be checked.

The blade clearance between the upper knife and the lower knives must be equal.

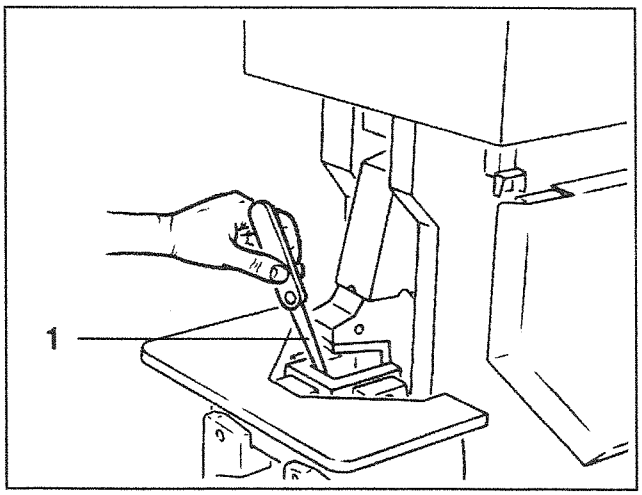
- Switch on the ironworker (see section 4.2).

  Notes
  When working with the coper/notcher, the selector keyswitch (F) must be in pushed position.

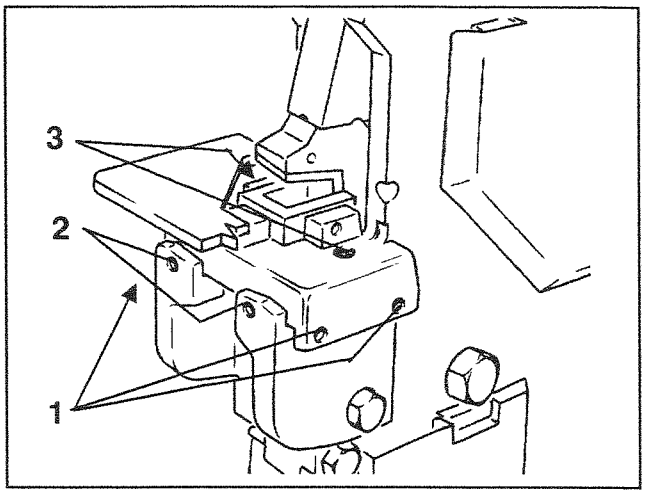
  The cover flap of the punch must be closed.

- Turn the Inching and Full Stroke switch (A) to "Full Stroke".
- Open the safety guard and arrest it.
- Using the footpedal (H), carefully move the slide down until the cutting edges of the upper knife enter the lower knives.

Proceed with extreme caution, so that the top knife does not touch the bottom knives.



- Switch off the ironworker.
- Using a feeler gauge (1), check the blade clearance on all sides.
- The blade clearance should be between 0.2 mm and 0.4 mm.
- If the ironworker is equipped with **genuine MUBEA knives and spare parts**, the lateral blade clearance cannot be too small.
- Nor can the lateral blade clearance be too big, if **genuine MUBEA knives and spare parts** are used. But if the clearance is too big, it can be decreased by backing the lower knives with a shim (may be necessary if, by way of exception, the knives were ground on the flat side - see section 8.3.2).
  For removing the knives, see section 7.3.3.



- Unequal lateral blade clearances are corrected by adjusting the coping saddle.
- Too big or too small a lengthwise blade clearance is rectified by shifting the coping saddle.
- To adjust the coping saddle, loosen the fastening screws (3).
- Use the adjustment screws (1) to move the coping saddle sideways.
- Move the coping saddle forward or back by turning the adjustment screws (2).
- Tighten the fastening screws (3).
- Retighten the adjustment screws (1).
- Check the blade clearance once again.
- Switch on the ironworker (see section 4.2).
- Turn the Inching and Full Stroke switch (A) to "Full Stroke".

The working cylinder moves up automatically.

- Close the safety guard.
- Switch off the ironworker.

When the coper/notcher is not being operated, the safety guard must be closed.

5.5 Bar-Steel Shear

The safety fixtures must not be removed.

Whenever the ironworker is switched on, the safety fixtures must be checked beforehand to ensure they are all present, complete and securely fastened.

Damaged safety fixtures are to be replaced with new ones.

When you leave the ironworker, turn the keyswitch to "O", and remove the key.

Electricity is still flowing through the ironworker. Only perform maintenance and adjustment work when the main switch (G) is off and secured with the padlock.

Unusable knives and tools should not be used.

5.5.1 Checking and Setting the Blade Clearance

The clamps must not press the knives together.

If the knives are ground on the flat side, the clamps must also be reworked.

If resharpened knives are used, then resharpened clamps must also be used.

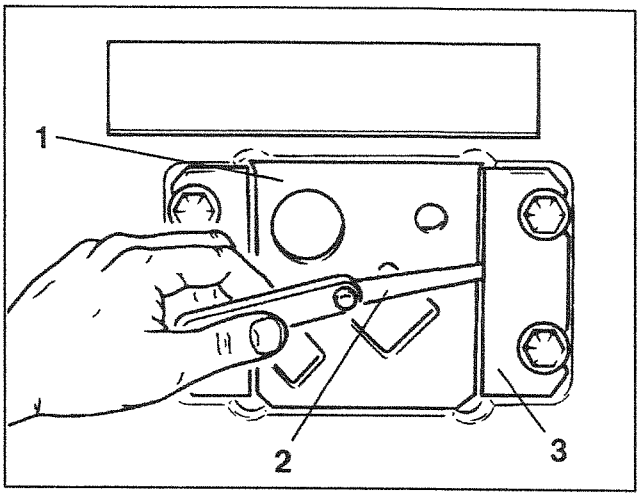
Whenever knives are changed, the blade clearance must be checked.

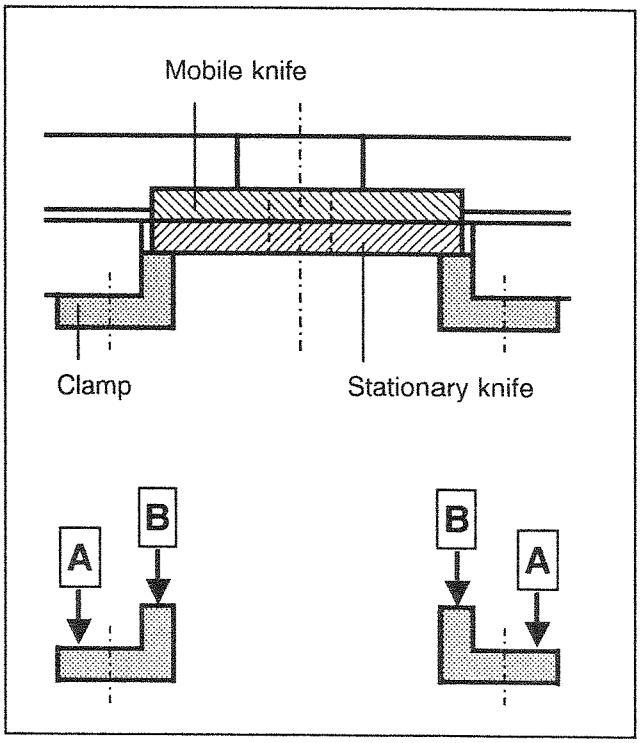
- Switch off the ironworker
- Remove the hold-down (see section 7.4.1).

- Push the stationary knife (1) back against the mobile knife.
- Using a feeler gauge (2), check the blade clearance between the clamps (3) and the knife on all surfaces.
- The blade clearance should be between 0.3 mm and 0.5 mm.

  If the **blade clearance is too big**, it can be decreased by reworking the clamps (3) on surface **A** (see also section 7.4.2 Changing the Knives).

  Too small a blade clearance is only possible if there are no genuine knives installed, the slide guideway was readjusted or the **A** surfaces of the clamps were already reworked once previously. The fault can be rectified by resharpening the clamps on the **B** surfaces.
- Reattach the hold-down (see section 7.4.4).





5.6 Section-Steel Shear

The safety fixtures must not be removed.

Whenever the ironworker is switched on, the safety fixtures must be checked beforehand to ensure they are all present, complete and securely fastened.

Damaged safety fixtures are to be replaced with new ones.

When you leave the ironworker, turn the keyswitch to "O", and remove the key.

Electricity is still flowing through the ironworker. Only perform maintenance and adjustment work when the main switch (G) is off and secured with the padlock.

Unusable knives and tools should not be used.

5.6.1 Checking and Setting the Blade Clearance

Whenever knives are changed, the blade clearance must be checked.

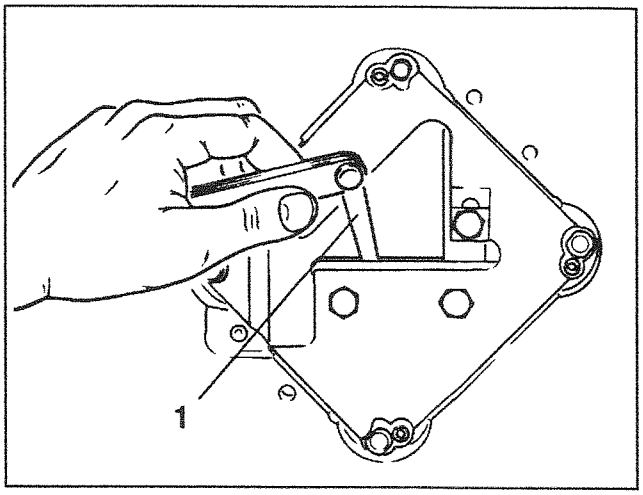
When installing knives ground on the flat side, pay special attention to the blade clearance.

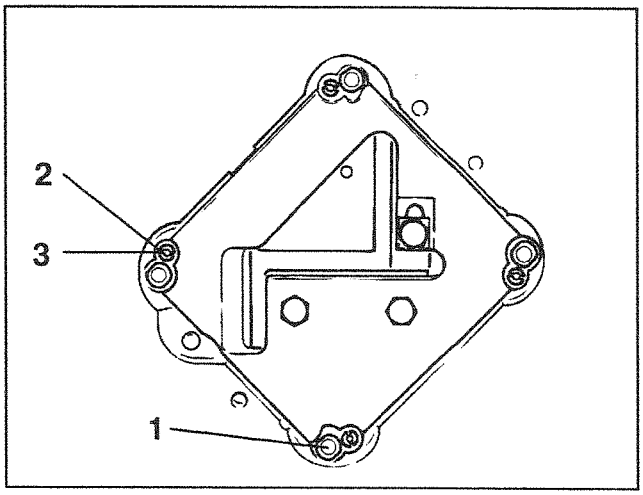
- Switch on the ironworker (see section 4.2).
- Turn the Inching and Full Stroke switch (A) to "Inching".

- Using the footpedal (H), carefully move the slide to the lowermost position.

Proceed with extreme caution, so that the top knife does not touch the bottom knife.

- Switch off the ironworker.
- Remove the hold-down (see section 7.5.1).
- Using a feeler gauge (1), check the blade clearance along the entire cutting edge.
- The blade clearance should be between 0.2 mm and 0.3 mm.
- To set the blade clearance, bend up the tab washers of the four cheesehead screws (1).
- Loosen the cheesehead screws (1).
- Loosen the locking caps (2).
- Turn the four threaded pins (3) to set the blade clearance.
- Tighten the locking caps (2).
- Screw the cheesehead screws (1) and secure them with the tab washers (do not use them more than 3 to 5 times).
- Switch on the ironworker.
- Turn the Inching and Full Stroke switch (A) to "Full Stroke".





The working cylinder moves up automatically.

- Switch off the ironworker.
- Reattach the hold-down (see section 7.5.5).

6

Maintenance

6 Maintenance

6.1 Knives and Tools

Check knives and tools at regular intervals for dull or chipped blades.

Knives and tools must be resharpened on time. Dull knives put a strain on the ironworker and result in poor cuts.

Unclean cuts leave burrs and jagged spikes on the workpiece and increase the risk of injury.

When you leave the ironworker, turn the keyswitch to "O" and remove the key.

Whenever working near the cutting and punching tools, the ironworker must be deactivated by turning off the main switch (G). Secure the mainswitch with a padlock.

Do not remove the warning labels.
Replace damaged, scratched or illegible warning labels.

The safety fixtures must not be removed.

Whenever the ironworker is switched on, the sufety fixtures must be checked before hand to ensure they are all present, complete and securely fastened.

Damaged safety fixtures must be replaced.

Electricity is still flowing through the ironworker.
Only perform maintenance and adjustment work when the main switch (G) is off and secured with the padlock.

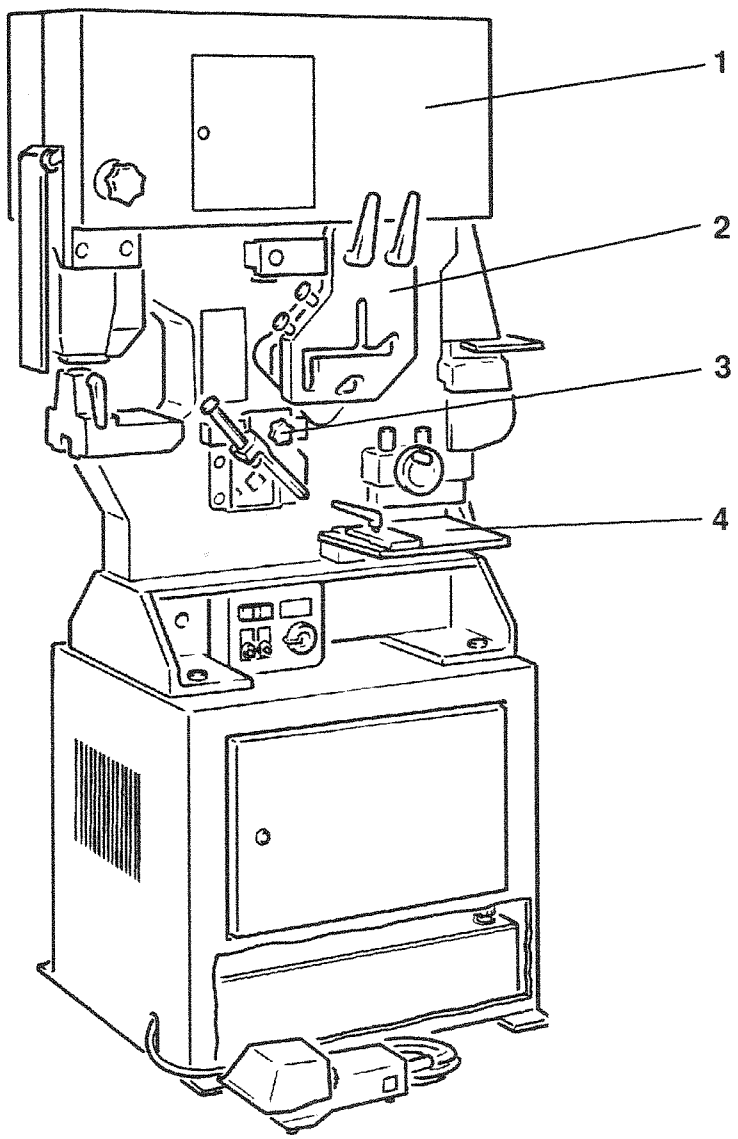
6.2 Readjusting the Slide Guideway

Like all of the ironworker's parts, the lengthwise and crosswise guideways for the slide are also subject to a certain amount of wear.

To reset the slide guideway, the section-, bar- and flat-steel knives, the punch tools and the coper/notcher tools have to be removed.

6.2.1 Preparations

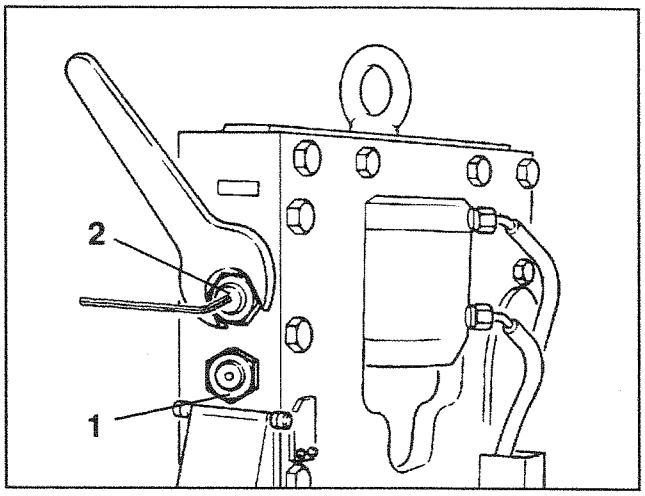
- Switch off the ironworker.
- Remove the machine's safety cover (1).
- Remove the hold-downs (2, 3) according to section 7.4.1 and 7.5.1.
- Remove the supporting and guide table (4) (see section 7.2.1).
- Dismantle the section-steel knives, flat-steel knives, bar-steel knives, punch tools and coper/notcher tools (see chapter 7 Exchanging Knives and Tools).



6.2.2 Setting the Slide Guideway

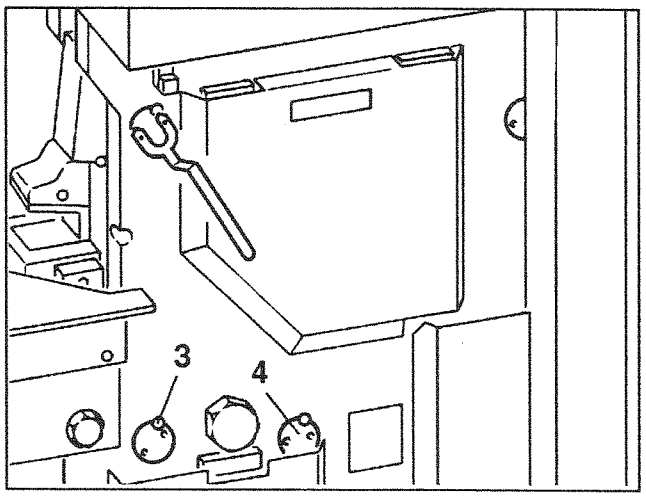
a) Lengthwise guideway

- Loosen the five lock nuts (1) on the front (coper side) of the machine.
- Tighten the pressure screws (2) all the way.
- Loosen the pressure screws (2) slightly; this will give the slide its proper running fit.
- Tighten the lock nuts (1) all the way.



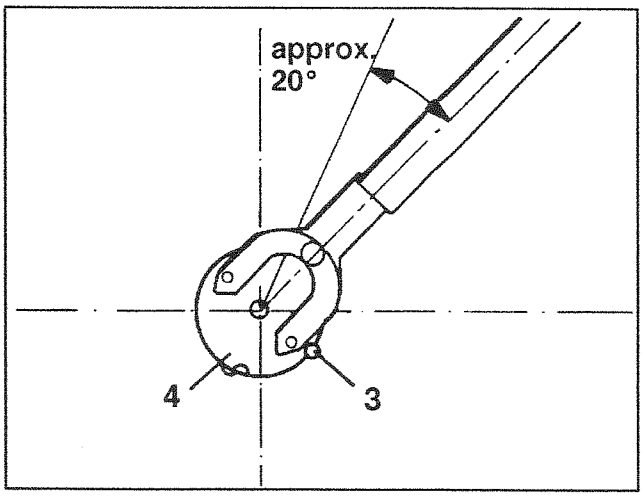
b) Crosswise guideway

- To adjust the lateral slide guideway, loosen the locking screws (3).
- Tighten the guide rollers (4) all the way.
- Then loosen the guide rollers (4) 1/16 of a turn (about 20 degrees); this will give the slide its proper running fit.
- Drill the guide rollers (4) in this position (drill diameter 4.5 mm).
- Tighten the locking screws (3) all the way.



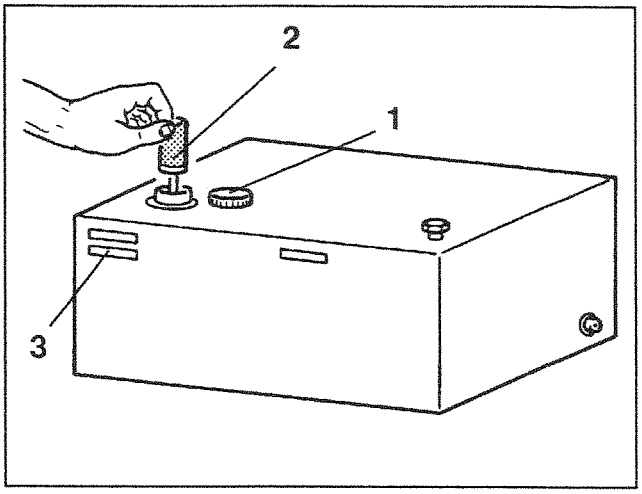
6.2.3 Final Tasks

- Mount the punch tools and check alignment (see section 7.1).
- Mount flat-steel knives and check blade clearance (see section 7.2).
- Mount coping tools, bar- and section-steel knives and check blade clearances (see sections 7.3, 7.4, 7.5).
- Attach hold-downs for bar-steel and section-steel shears (see sections 7.4.4 and 7.5.5).
- Attach supporting and guide table (see section 7.2.5).
- Mount the machine's safety cover.



6.3 Hydraulic System

Whenever working on the hydraulic system, make sure the equipment remains immaculately clean.



6.3.1 Checking the Oil Level

- Open the cover panel at the base.
- Remove the cap (1).
- Regularly check the oil level with the measuring gauge (2). The oil container should be filled to about 2 cm below the cap.
- Replace the cap (1), closing it tightly.
- Close the cover panel.

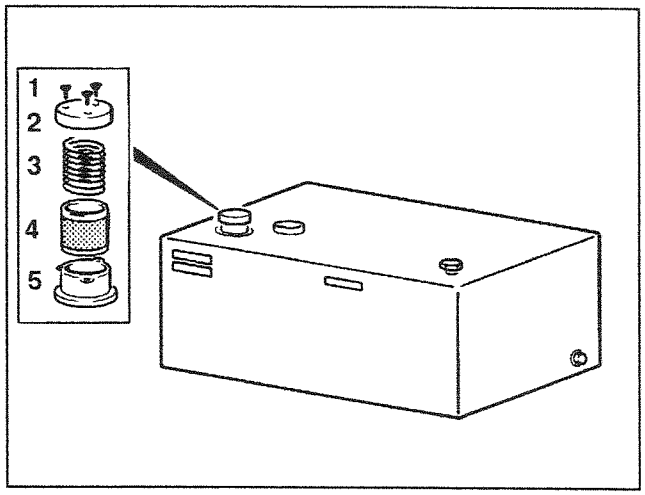
6.3.2 Refilling the Oil

- Open the cover panel at the base.
- Read the oil grade off of the instruction label (3) on the hydraulic container.

Always refill with the same hydraulic-oil grade; never mix. At extreme ambient temperatures you must consult the manufacturer (see Customer Service).

- Remove the cap (1).
- Refill with oil until the oil level is about 2 cm below the container cap.
- Replace the cap (1), closing it tightly.
- Close the cover panel.

6.3.3 Cleaning the Reflux Filter



The first cleaning is to be done after 10 hours of operation.
Routine cleaning of the filter should be done every 600 operating hours.
The same intervals apply to changing disposable filters.

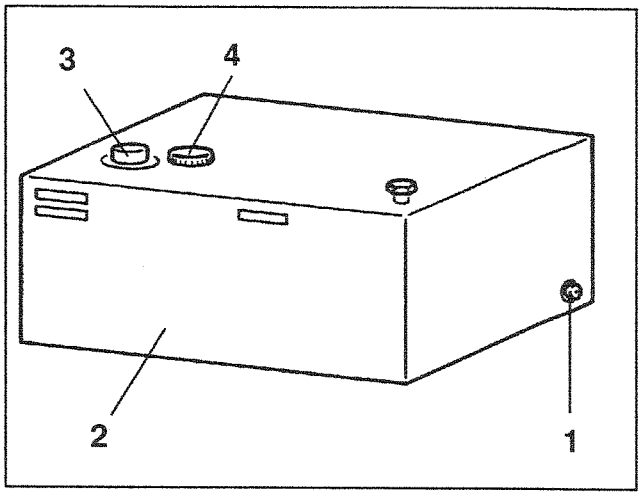
- Open the cover panel at the base.
- Unfasten screws (1) and take off filter cover (2).
- Remove spring (3).
- Pull out filter element (4).
- Clean filter element in scavenging oil or, even better, use new filter element.

Water, lyes or kerosene are unsuitable as cleaning agents.

- Clean the sealing surfaces of the cover (2) and connection piece (5).
- Put in a cleaned or new filter element (4).
- Insert spring (3).
- Replace cap (2) and fasten with the screws (1).
- Close cover panel.

6.3.4 Changing the Oil

The first oil change should be made after 600 operating hours.
After that, the oil must be changed every 1,200 to 1,500 operating hours.



With every oil change, also change the oil filter.

If the grade of oil is changed, the new oil grade should be indicated on the cover cap of the hydraulic container.

- Open the cover panel on the base.
- Unscrew the oil drain plug (1).
- Drain the used oil.

Before draining the used oil, procure an appropriate collector vessel.
Avoid polluting the environment!
Take the used oil to a waste disposal facility!

- Clean the oil container (2) and the hydraulic system with scavenging oil.
- Clean sealing surfaces of filler neck (3) and cap (4).
- Check seal of oil drain plug (1) and, if necessary, change.
- Insert oil drain plug (1) and screw tight.
- Pour in new, unused oil. The oil container should be filled up to 2 cm below the cap.
- Close filler neck (3) and cap (4) and screw tight.
- Ventilate system.
  Switch motor on, letting it idle for about 4 min. Then use the footpedal (H) to move the working cylinder a number of times without any load.
- Recheck the oil level.
- Close the cover panel.

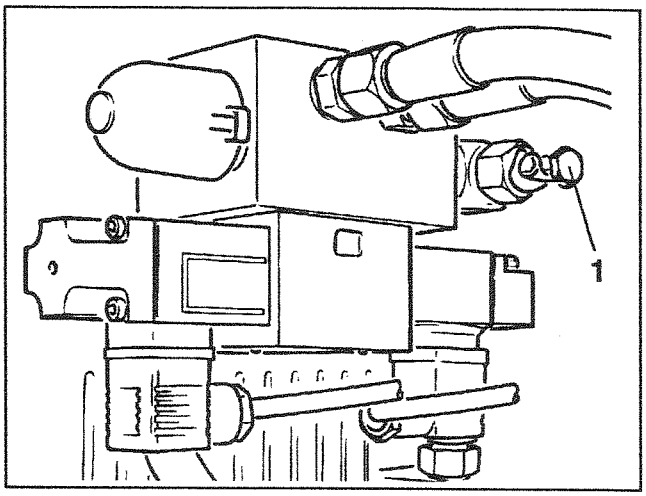
6.3.5 Checking the Max. Operating Pressure

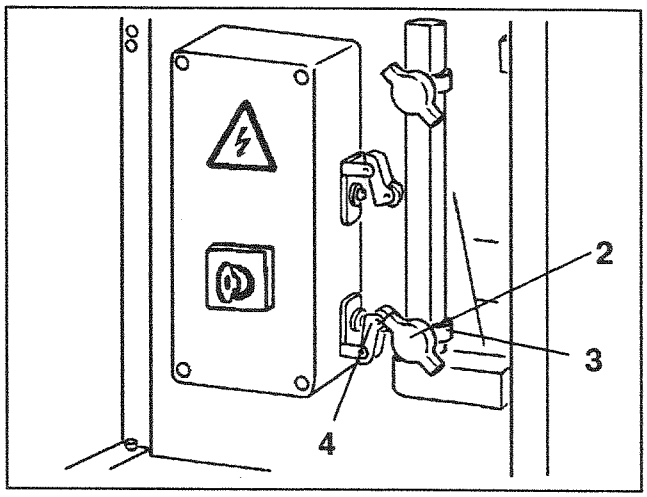
- Switch off the motor.
- Open the cover panel at the base.
- Connect and secure the pressure gauge to the test connection.
  (Special accessory "pressure gauge" can be ordered from **Muhr und Bender**, or is available on the market.)
- Switch on the motor (see section 4.2).
- Loosen the T-screw (2).
- Slide the trip cam (3) up past the limit switch (4) **for a short time**. Upon contact release, pump begins running under pressure.
- Read pressure off the gauge.
- Reset the trip cam (3) and tighten the T-screw (2).
- Switch off the motor.

Bottoming of the cylinder on the limit switch for an extended time will cause the overload cut-out to activate and the machine will switch off. If this happens, inform the electrician.

- Remove the pressure gauge.
- Close and lock the test connection (1).
- Close the cover panel.

Do not remove the built-in lead seal of the pressure-limiting valves; otherwise the guarantee will be void.





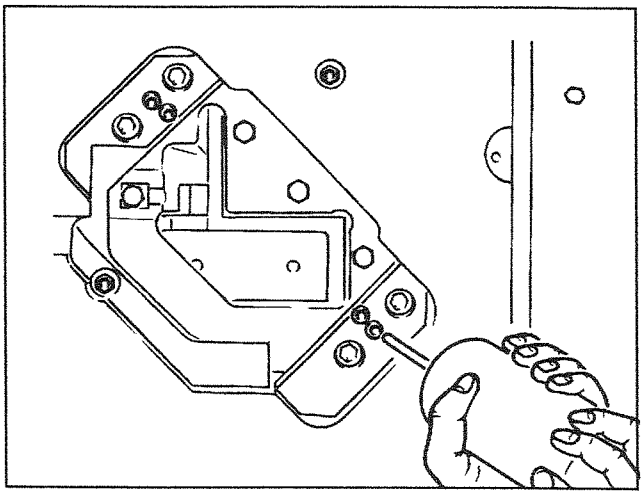
6.4 Lubricating the Ironworker

The ironworker must be thoroughly lubricated with a force-feed lubrication pump.

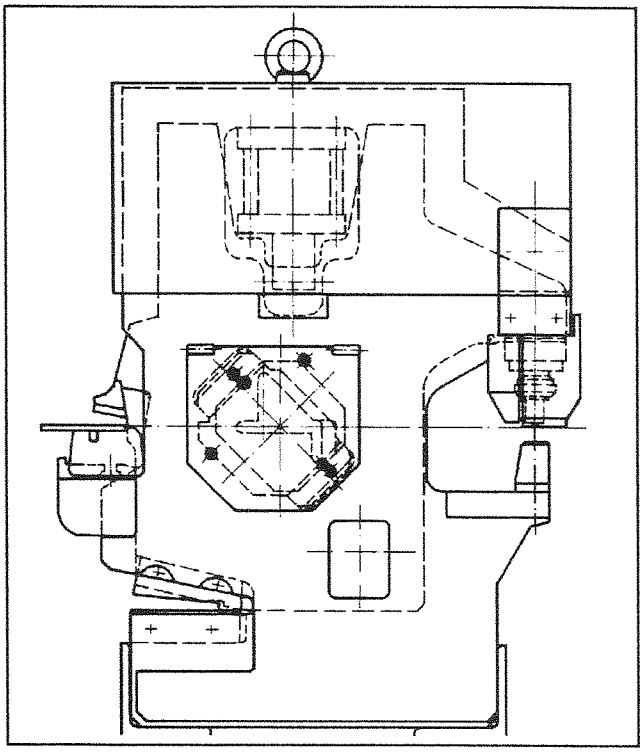
The six lubrication points are marked in yellow and are located at the positions indicated in the picture.

Lubrication intervals:
One pump stroke prior to start of work and then every five operating hours.

The same type of oil can be used at all the lubrication points.
You may use any of the following lubricants:



Oil brand	Viscosity at 40 °C
ARAL Deganit B 220	220 mm²/s
SHELL Tonna Oil T 220	220 mm²/s
MOBIL OIL AG Vactra Oil No. 4	212 mm²/s
ESSO AG Millicot K 220	230 mm²/s
BP Energol HP - C 220	220 mm²/s



7

Exchanging Knives and Tools

7 Exchanging Knives and Tools

Knives and tools should be checked regularly for the condition of their cutting edges and for the formation of burrs or cracks. Dull or damaged knives have to be resharpened or exchanged for new ones. The possibility for resharpening the knives and tools is limited in each case by the cutting stroke of the ironworker.

Unusable knives and tools should not be used.

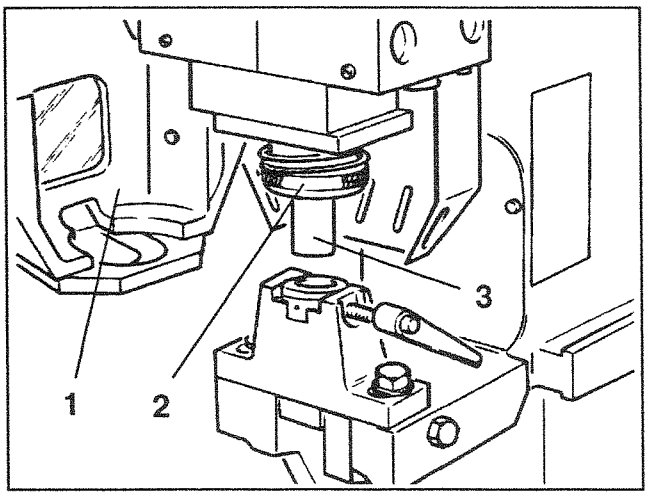
Whenever working near the cutting and punching tools, the ironworker must be deactivated by turning the main switch (G) off. Secure the main switch with a padlock.

7.1 Holepunch

7.1.1 Changing the Punch

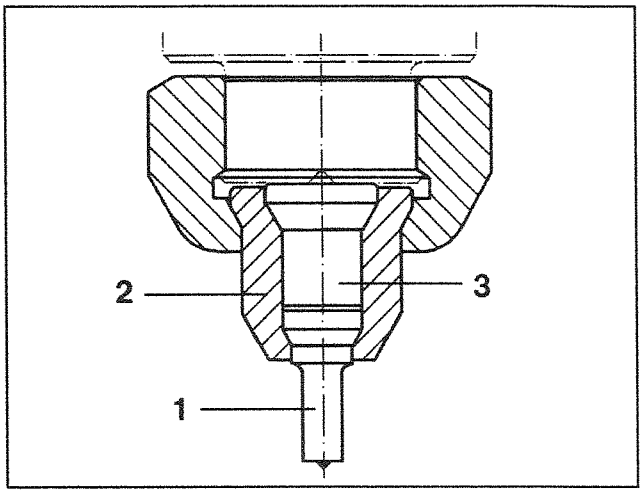
The clearance between the punch and the die must be carefully controlled.

- Switch off the ironworker.
- Open the cover flap at the punch and secure it in position.
- Open the stripper (1) by pressing it down and swinging it out to the front.
- Undo the quick-change attachment (2) by turning it counterclockwise, or: Unscrew the coupling nut.
- Take out the punch (3).



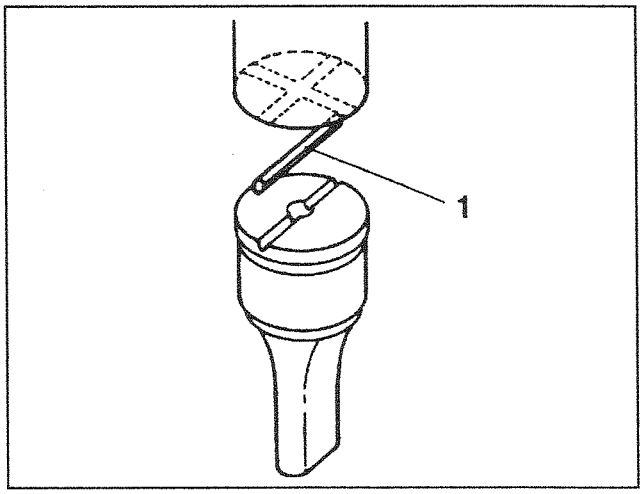
- Insert new or resharpened punch.

  Note
  When inserting small punches up to a cutting range of 15 mm (1), use a reducing sleeve (2) and a punch attachment (3) (see figure at right or the MUBEA catalog).
  The sleeve and the attachment are part of the standard delivery of the ironworker.



- For embossing, the anti-torsion pin (1), which is included in the delivery, must also be inserted.
  Make sure the pin is seated properly in the adapter.

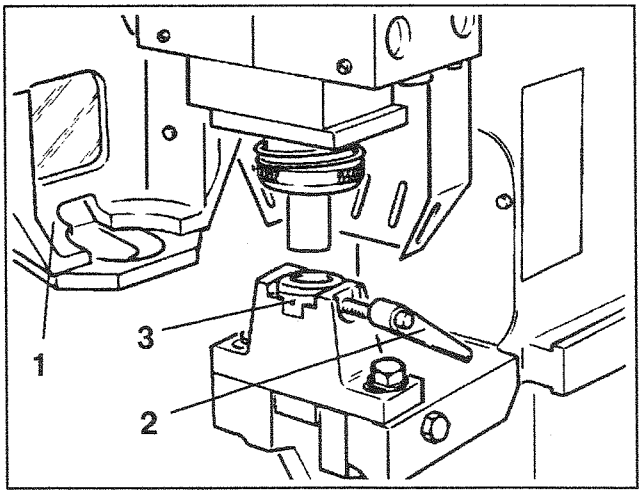
Pay attention to the position of the cutting form of the punch relative to the die.



- Close the quick-change attachment, or: Screw on the coupling nut and tighten it.
- Close the stripper.
- Check alignment according to section 7.1.3.

7.1.2 Changing the Die

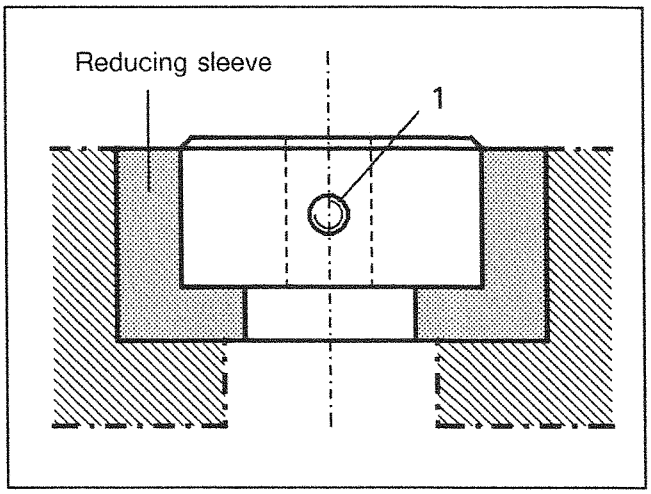
The clearance between the punch and the die must be carefully controlled.



- Switch off the ironworker.
- Open the cover flap at the punch and secure it in position.
- Open the stripper (1) by pressing it down and swinging it out to the front.
- Loosen the clamping lever (2).
- Take out the die (3).

- Insert new or resharpened die (cutting edge at top).

  Note
  Insert small dies using the reducing sleeve delivered with the ironworker (see figure at right or the MUBEA catalog).



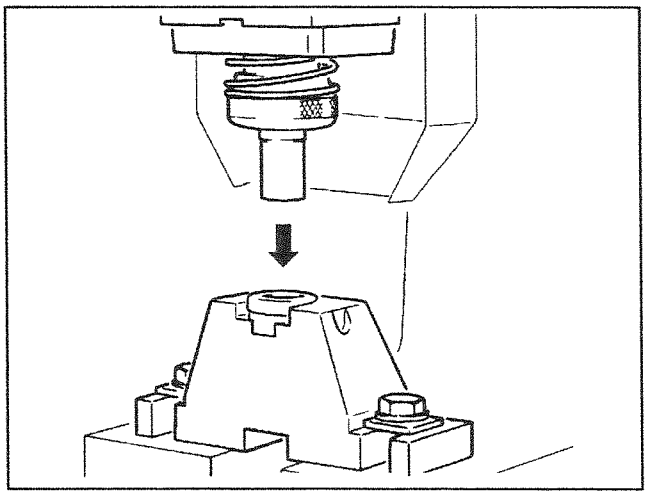
When using shaped dies, pay attention to the position of the cutting opening.

- Tighten the clamping lever; when using the reducing sleeve also tighten the threaded pin (1).
- Close the stripper.
- Check alignment according to section 7.1.3.

When special tools are used, they must be designed as safe tools.

7.1.3 Check Alignment

Punch and die must be properly aligned.



As a rule, check the alignment of punch and die after every tool change and from time to time while punching.

- Switch on the ironworker (see section 4.2).
- Turn the Inching and Full Stroke switch (A) to "Inching".
- Open the cover flap at the punch and secure it in position.
- Open the stripper by pressing it down and swinging it out to the front.

- Using the footpedal (H) in inching mode, carefully lower the punch into the die.

Use extreme caution when entering the punch into the die. Make sure the punch does not touch the die.

- Switch off the ironworker.
- Adjust incorrect centering according to section 5.2.2.
- Switch on the ironworker.
- Turn the Inching and Full Stroke switch (A) to "Inching".

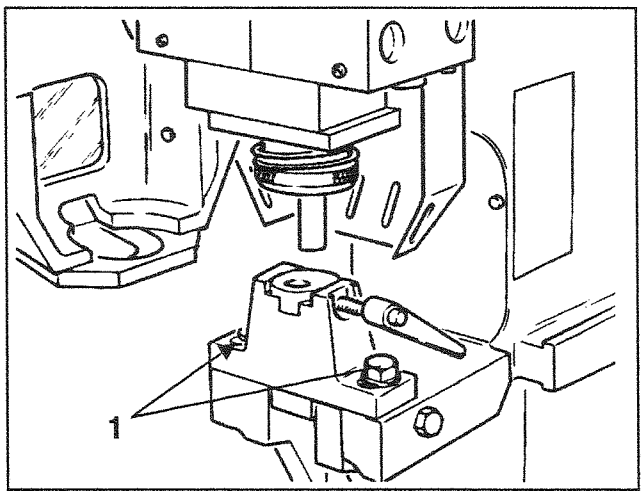
The working cylinder moves up automatically.

- Close the stripper.
- Close the cover flap of the punch.
- Switch off the ironworker.

7.1.4 Using Eccentric Dies

Note
The hole in the die must be aligned with the punch.

- Switch off the ironworker.
- Change the die (see section 7.1.2)
- Loosen screws (1).
- Adjust the punch saddle to match the die (see section 5.2.2)
- Tighten screws (1).
- Check alignment according to section 7.1.3.



The punch and die alignment must be checked whenever a tool change is made.

7.2 Flat-Steel Shear

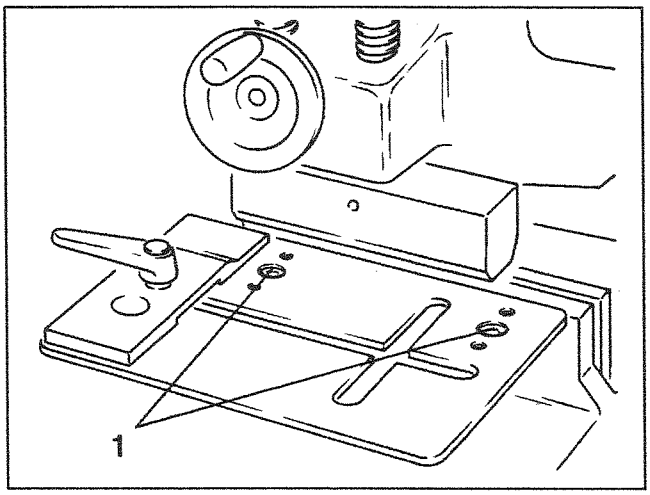
The bottom knife can be used on four sides. Changing each knife individually is also possible.

Whenever knives are changed, the blade clearance must be checked.

When installing flat-ground knives, special attention must be paid to the blade clearance.

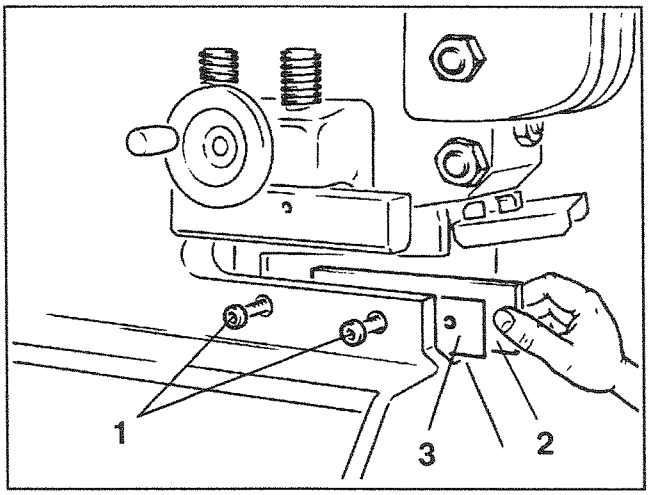
7.2.1 Removing the Supporting and Guide Table

- Switch off the ironworker.
- Unscrew and remove the hex socket screws (1).
- Lift off the supporting and guide table.



7.2.2 Changing the Bottom Knife

- Switch off the ironworker.
- Unmount supporting and guide table according to section 7.2.1.
- Remove the fastening screws (1).
- Take out the knife (2) and knife shim (3).
- Turn the knife around, or mount new/resharpened knife together with the shim.
- Insert and tighten the fastening screws (1).
- Check blade clearance according to section 7.2.4.
- Mount the supporting and guide table according to section 7.2.5.

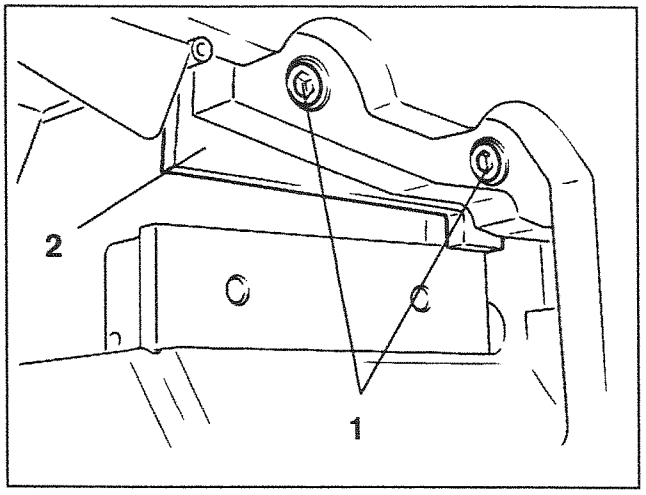


7.2.3 Changing the Top Knife

- Switch off the ironworker.
- Remove the fastening screws (1) from the back of the ironworker.

Hold onto to the knife firmly to prevent accidental dropping and possible damage.

- Remove the knife (2) from the back of the ironworker.
- Turn the knife around, or mount new/resharpened knife.
- Insert and tighten fastening screws (1).
- Check blade clearance according to section 7.2.4.

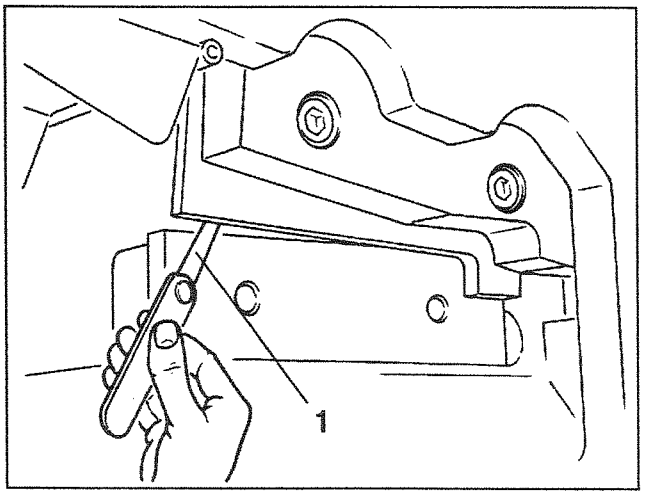


7.2.4 Checking the Blade Clearance

- Switch on the ironworker (see section 4.2).
- Turn Inching and Full Stroke switch (A) to "Inching".
- Using the footpedal (H), carefully move the slide to the lowermost position.

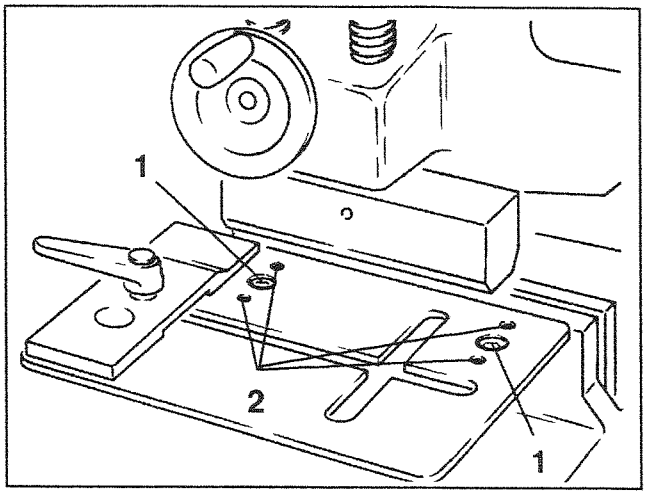
Proceed with extreme caution, so that the top knife does not touch down upon the bottom knife.

- Switch off the ironworker.
- Using a feeler gauge (1) from the back of the ironworker, check the blade clearance along the entire length of the knives.
- The blade clearance should be 5-10% of the material thickness to be cut. The blade clearance at the front should be approx. 0.2 mm narrower than at the rear.
- If necessary, adjust the blade clearance according to section 5.3.1.



7.2.5 Mounting the Supporting and Guide Table

- Switch off the ironworker.
- Place the supporting and guide table in position and fasten with the hex socket screws (1).
- If necessary, use the adjustment screws (2) to align the table with the upper edge of the bottom knife.



7.3 Coper/Notcher

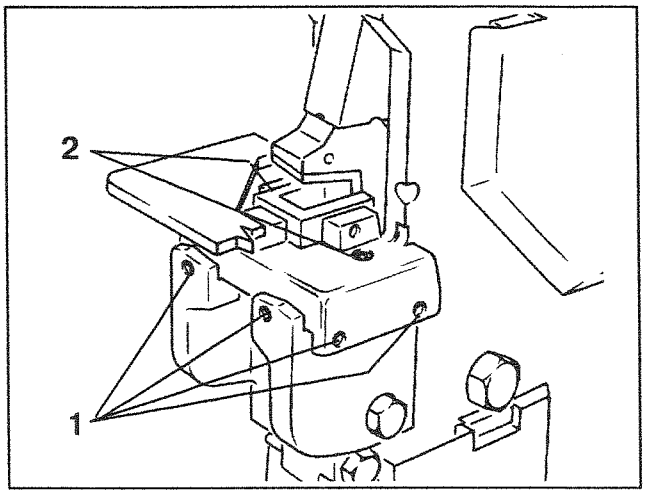
The bottom knives of the rectangular notching tool each have two cutting edges and can be rotated.

Whenever knives are changed, the blade clearance must be checked.

7.3.1 Removing the Coping Saddle

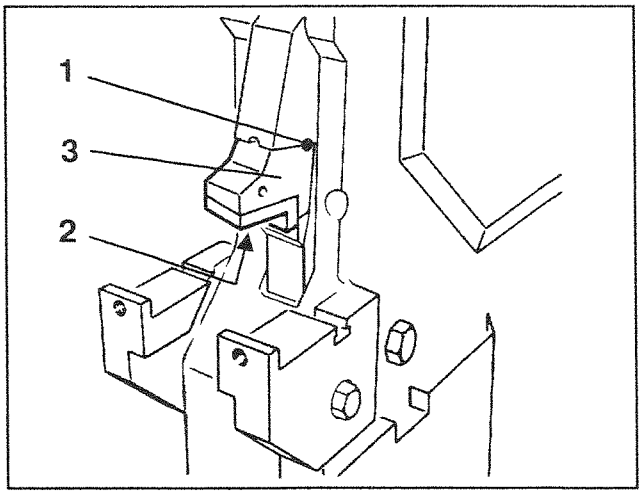
(only necessary when changing the top knife)

- Switch off the ironworker.
- Open the safety guard and arrest it.
- Loosen the adjustment screws (1).
- Loosen and remove the adjustment screws (2).
- Remove the coping saddle.
- Close the safety guard.

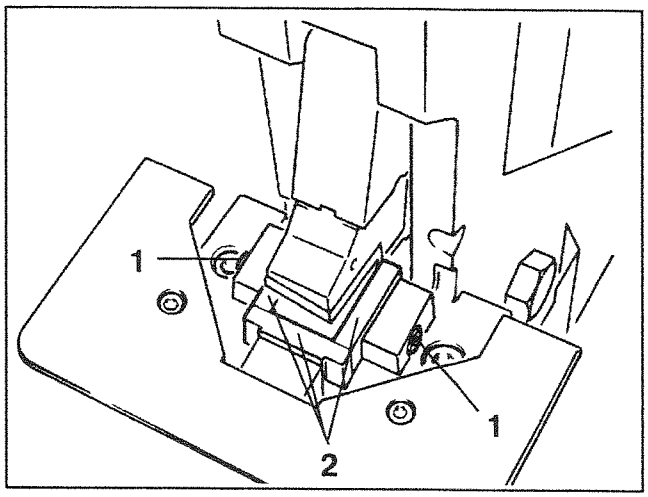


7.3.2 Changing the Top Knife

- Switch off the ironworker.
- Detach the coping saddle (see section 7.3.1).
- Open the safety guard and secure it.
- Using a suitable drive-out punch, knock out the two dowel pins (1).
- Unscrew and remove the fastening screw (2).
- Detach the top knife (3) from its mounting, removing it to the front.
- Insert a new or resharpened top knife in its mounting.
- Hammer in both dowel pins (1).
- Insert and tighten the fastening screw (2).
- Mount the coping saddle (see section 7.3.4).

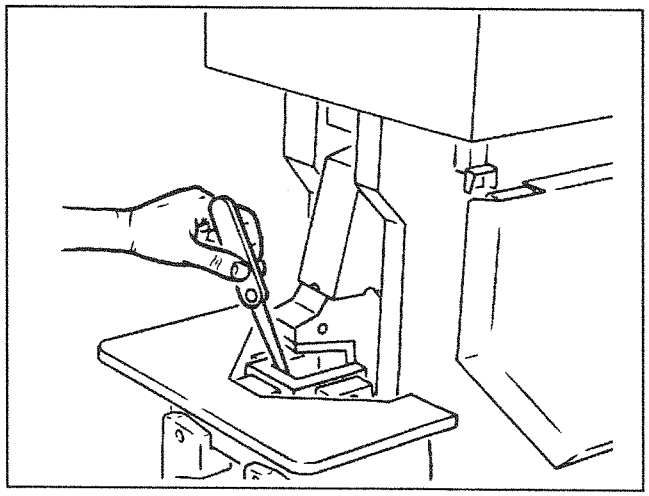


7.3.3 Changing the Bottom Knives



- Switch off the ironworker.
- Open and secure the coper safety guard.
- Unscrew and remove the fastening screws (1).
- Take knives (2) out of saddle.
- Turn knives around, or insert new/resharpened knives.
- Insert and tighten fastening screws.
- Check blade clearance (see section 5.4.1).

7.3.4 Mounting the Coping Saddle



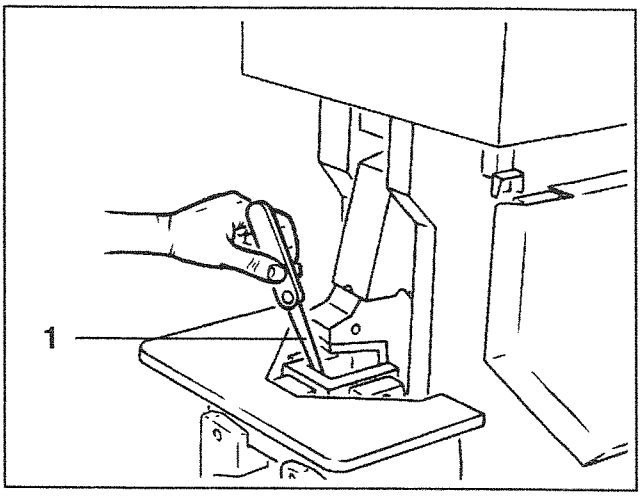
- Switch on the ironworker (see section 4.2).
- Turn toolsetting and operation switch (A) to "Inching".
- Using the footpedal (H), move the slide to the lowermost position.
- Switch off the ironworker.
- Open and secure the coper safety guard.
- Clean the bearing surface for the coping saddle on the ironworker and on the coping saddle.
- Mount and fasten the coping saddle.
- Set and check the blade clearance according to section 5.4.1.

7.3.5 Checking the Blade Clearance

- Switch on the ironworker (see section 4.2).
- Turn Inching and Full Stroke switch (A) to "Inching".
- Using the footpedal (H), carefully move the slide down until the cutting edges of the upper knife enter the lower knives.

Proceed with extreme caution, so that the top knife does not touch the bottom knives.

- Switch off the ironworker.
- Using a feeler gauge (1), check the blade clearance on all sides.
- The blade clearance should be between 0.2 mm and 0.4 mm.
- If necessary, adjust the blade clearance according to section 5.4.1.

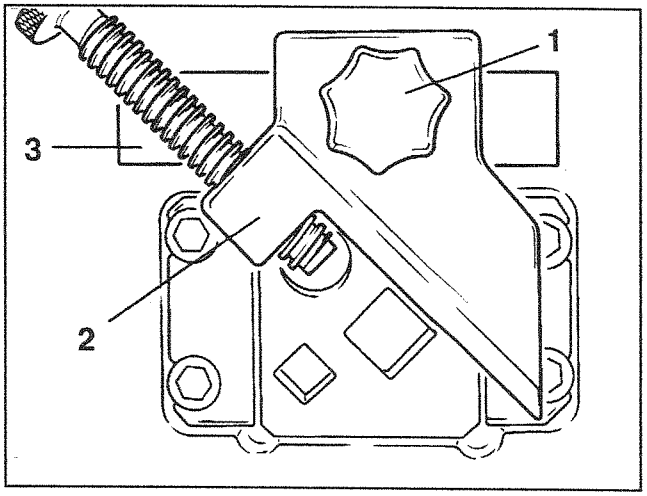


7.4 Bar-Steel Shear

The knives are square-shaped and have cutting edges on both sides.
By rotating and tilting the knives, eight cutting edges can be used.

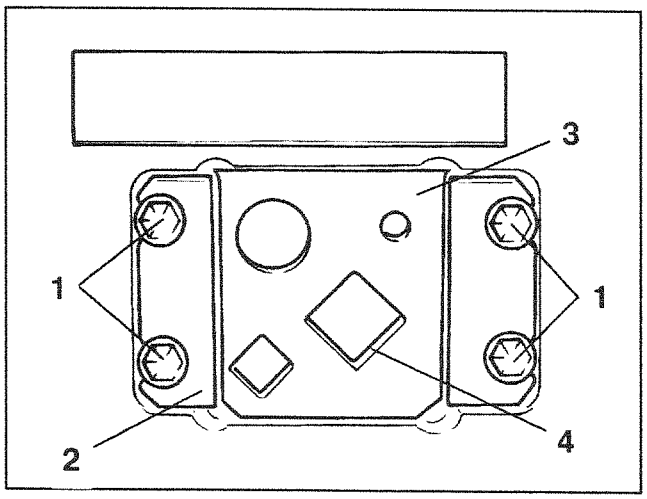
Whenever knives are changed, the blade clearance must be checked.

7.4.1 Removing the Hold-Down



- Switch off the ironworker.
- Loosen the star handle (1).
- Slide the hold-down plate (2) off the stop rail (3).

7.4.2 Changing the Knives



- The slide must be at the topmost position. If necessary, adjust stroke accordingly (see section 5.1).
- Switch off the ironworker.
- Take off the hold-down as described in section 7.4.1.
- Loosen the fastening screws (1).
- Remove the clamps (2).
- Take out the stationary knife (3).
- Take out the mobile knife (4).
- Turn knives around, or insert new/resharpened knives.

- Reattach clamps.
- Tighten fastening screws.
- Check blade clearance (see section 7.4.3).

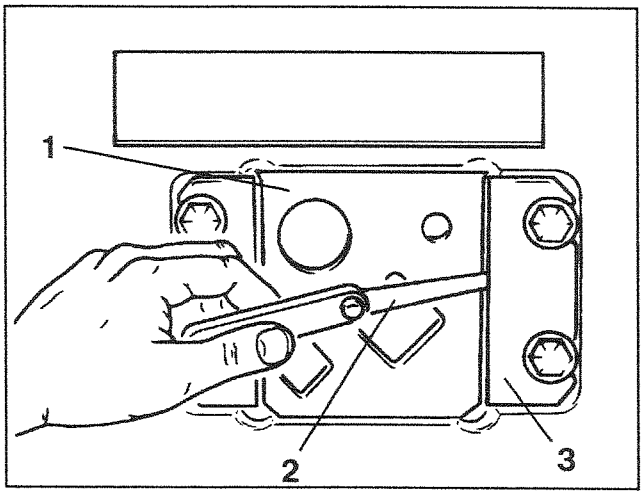
The clamps must not press the knives together.

If resharpened knives are used, reworked clamps must also be used.

- Mount the hold-down according to section 7.4.4.

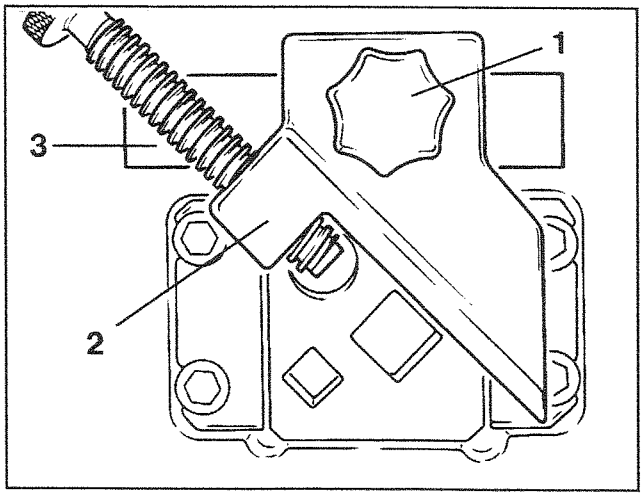
7.4.3 Checking the Blade Clearance

- Switch off the ironworker.
- Take off the hold-down according to section 7.4.1.
- Press the stationary knife (1) back against the mobile knife.
- Using a feeler gauge (2), check the blade clearance between the clamps (3) and the knife on all surfaces.
- The blade clearance should be between 0.3 mm and 0.5 mm.
- If necessary, adjust blade clearance according to section 5.4.1.
- Mount the hold-down according to section 7.4.4.



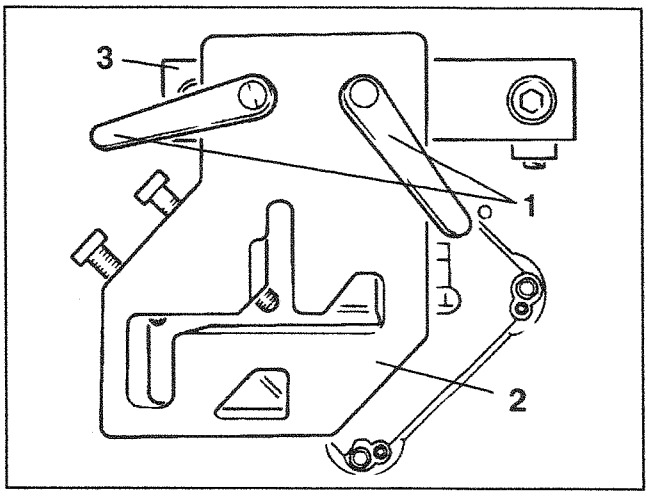
7.4.4 Mounting the Hold-Down

- Switch off the ironworker.
- Slide the hold-down (2) onto the stop rail (3).
- Tighten the star handle (1).



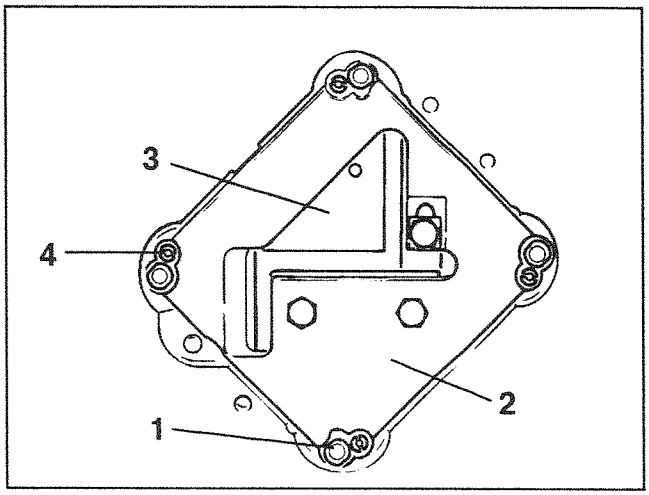
7.5 Section-Steel Shear

7.5.1 Removing the Hold-Down Plate



- Switch off the ironworker.
- Release the locking lever (1).
- Slide the hold-down plate (2) off the stop rail (3).

7.5.2 Removing the Section-Steel Knives



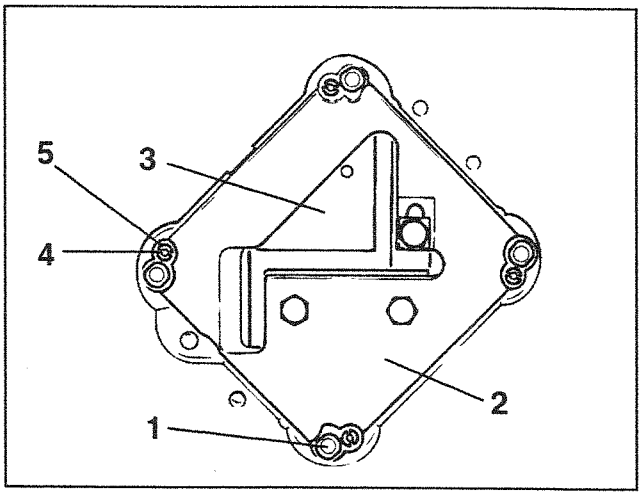
Whenever knives are changed the blade clearance must be checked.

Note
The slide must be at the topmost position. If necessary, adjust stroke length according to section 5.1.

- Switch off the ironworker.
- Remove the hold-down plate (see section 7.5.1).
- Bend up the tab washers of the cheesehead screws (1).
- Screw out the four cheesehead screws (1).
- Take the stationary section-steel knife (2) out of the profile window, removing it to the front.
- Take the mobile section-steel knife (3) out of the profile window, removing it to the front.
- Replace dull or damaged cutting inserts with new/resharpened ones.
  When mounting resharpened section-steel knives, follow instructions in section 8.5.
- Clean the guideways in the body, in the slide and on the knife.

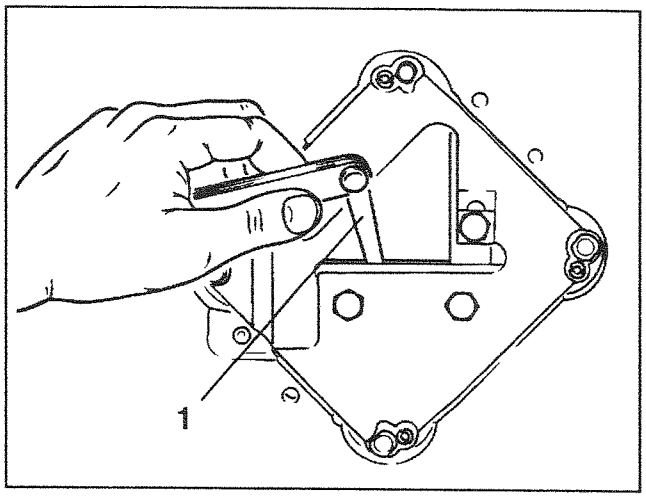
7.5.3 Mounting the Section-Steel Knives

Note
The slide must be at the topmost position.
If necessary, adjust stroke length according to section 5.1.



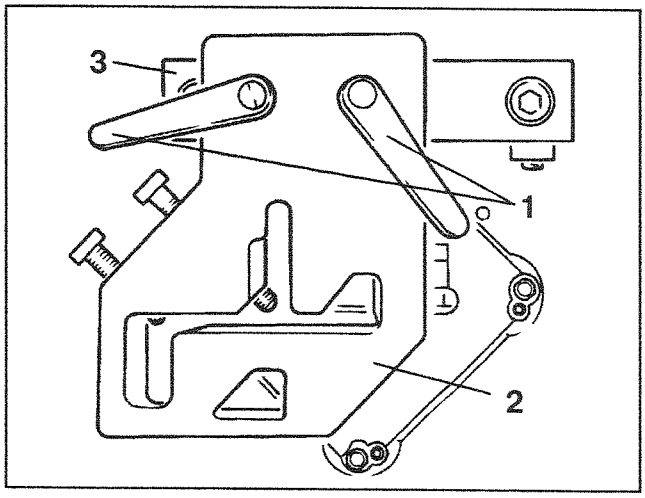
- Switch off the ironworker.
- Before mounting the section-steel knives, oil the outer guide surfaces of the mobile section-steel knife (3).
- Insert mobile section-steel knife (3) into the slide and push it into the knife guideways all the way back.
- Insert stationary knife (2) and loosen the locking caps (5) and the threaded pins (4).
- Insert the four cheesehead screws (1) with the tab washers (use washers no more than 3 to 5 times) and screw tight.
- Screw threaded pins (4) tight.
- Loosen the cheesehead screws (1) one turn and tighten the threaded pins (4) about 1/8 of a turn.
  This is necessary, to prevent the two section-steel knives from being pulled toward each other and to maintain a blade clearance.
- Screw the cheesehead screws (1) tight.
- Screw the locking caps (5) tight.
- Secure the cheesehead screws (1) with tab washers.
- Check blade clearance (see section 7.5.4).
- Mount hold-down plate according to section 7.5.5.

7.5.4 Checking the Blade Clearance



- Switch on the ironworker.
- Turn toolsetting and operation switch (A) to "Inching".
- Using the footpedal (H), move the slide to the lowermost position.
- Switch off the ironworker.
- Detach the hold-down according to section 7.5.1.
- Using a feeler gauge (1), check the blade clearance along the entire cutting edge.
- The blade clearance should be between 0.2 mm and 0.3 mm.
- If necessary, adjust the blade clearance according to section 5.6.1.
- Mount the hold-down plate according to section 7.5.5.

7.5.5 Mounting the Hold-Down Plate



- Slide the hold-down plate (2) onto the stop rail (3).
- Pull the locking lever (1) tight.

8

Resharpening the Knives and the Tools

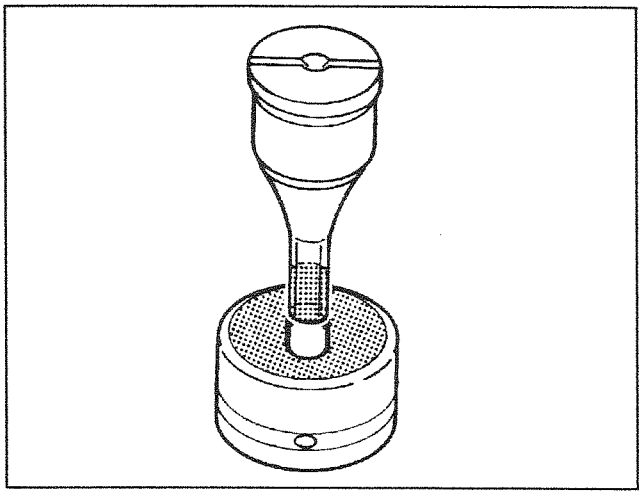
8 Resharpening the Knives and the Tools

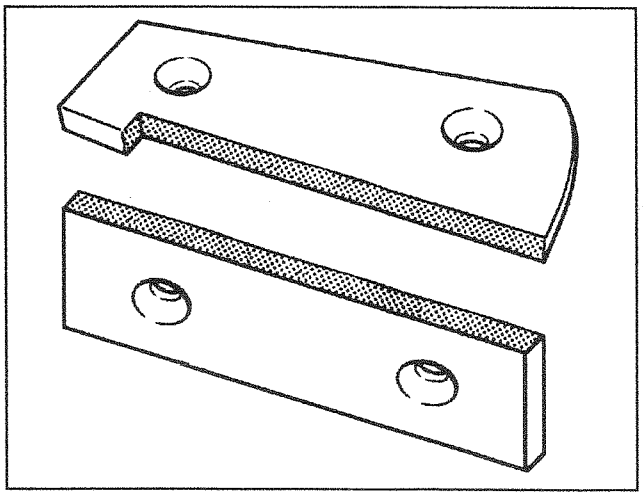
Knives and tools must be resharpened on time. Dull Knives put a strain on the ironworker and cause unclean cuts.

Unclean cuts leave burrs and jagged spikes on the workpiece and increase the risk of injury.

All knives and tools should be sharpened with a fine-grained grinding wheel.
Make sure there is sufficient cooling!
Excessive local heating will lead to the development of chinks and subsequent fracturing of the tools. Use oil stone to remove grinding fins or flashes.

Instead of regrinding, it may be better to use new tools.
The order number can be found in the spare parts list or in the catalog "**MUBEA Punches and Dies**".





8.1 Resharpening the Punching Tools

8.1.1 Punch

- Grind the punch only on the face.

8.1.2 Die

- Grind the die only on the cutting surface.

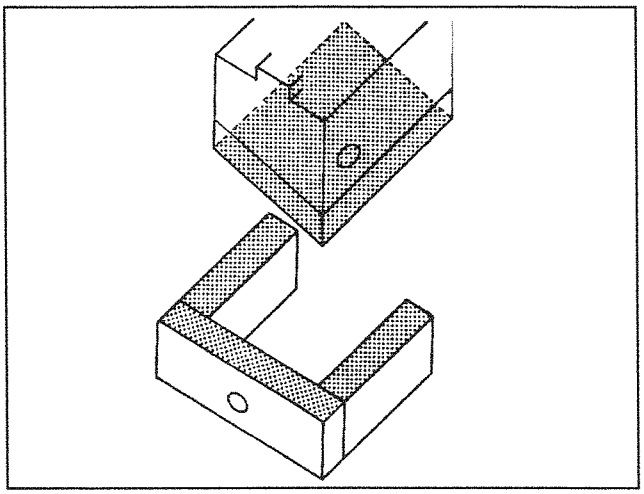
8.2 Resharpening the Flat-Steel Knives

- Grind the flat-steel knives only on the face and at a right angle.
- Grind off uniformly, in order that the pitch between the knives remains unchanged.

- In exceptional cases, it may be necessary to grind on the flat side.

When installing the flat-ground knife, particular attention must be paid to the blade clearance (see section 5.3.1).

8.3 Resharpening the Coping Tools



8.3.1 Top Knife

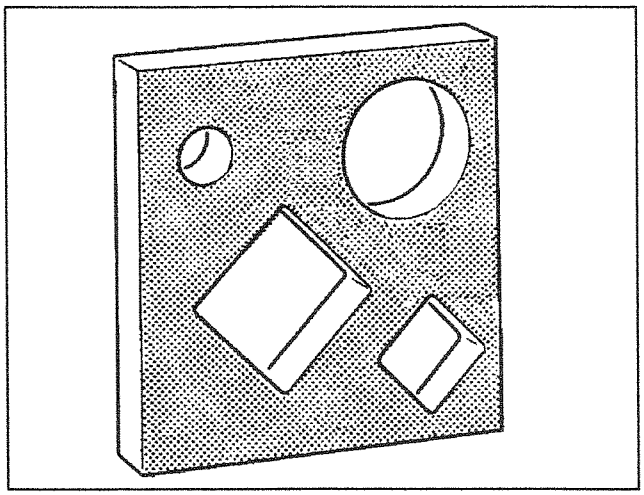
- Grind the top knife only on the lower surface.

8.3.2 Bottom Knife

- Grind the bottom knife only on the upper surfaces.
- In exceptional cases, it may be necessary to grind on the flat side.

When installing a flat-ground bottom knife, particular attention must be paid to the blade clearance (see section 5.4.1).

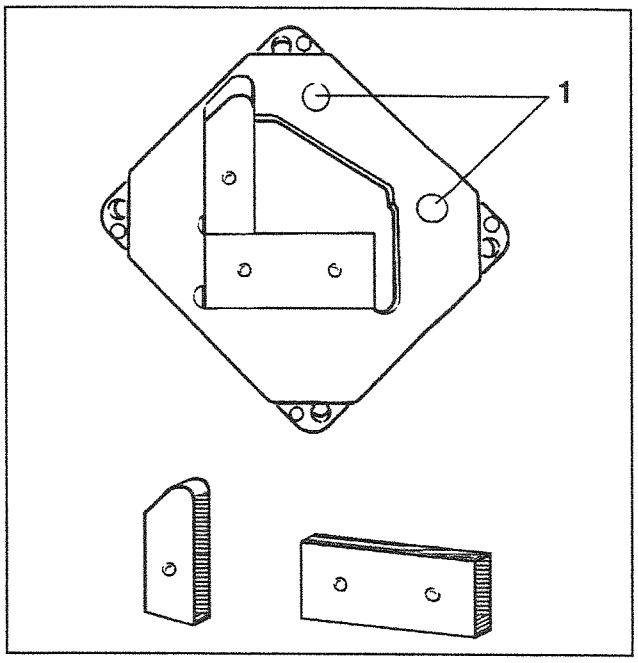
.4 Resharpening the Bar-Steel Knives



- Grind the knife on its planar side.
- Depending on the amount of wear, it may also be necessary to grind the profile.

When installing a surface-ground knife, particular attention must be paid to the blade clearance (see section 5.5.1).

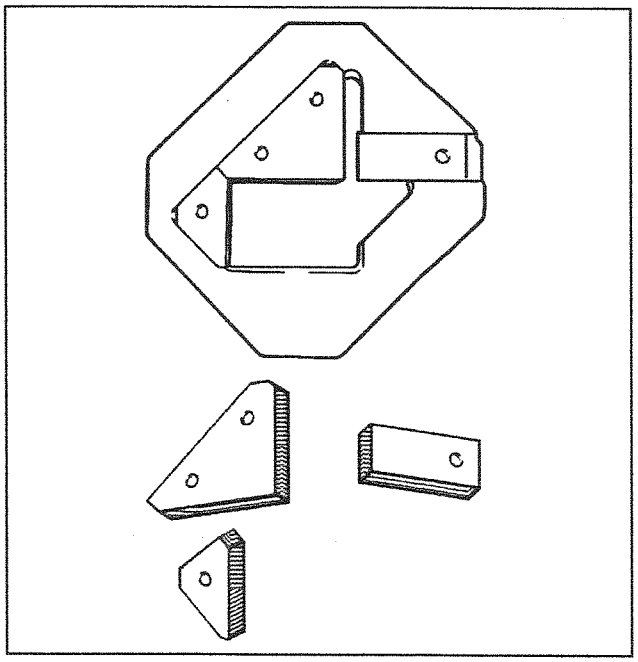
8.5 Resharpening the Section-Steel Knives



- Remove the cutting inserts from the knife mounting.
- Grind the knife only on its faces, uniformly, and at a right angle.
- In exceptional cases, it may be necessary to grind on the flat side.

Note
Grinding on the flat side is only possible if this is allowed by the projecting length of the knives and the guides (1).

When installing a flat-ground knife, special attention must be paid to the blade clearance (see section 5.6.1).



9

Retooling

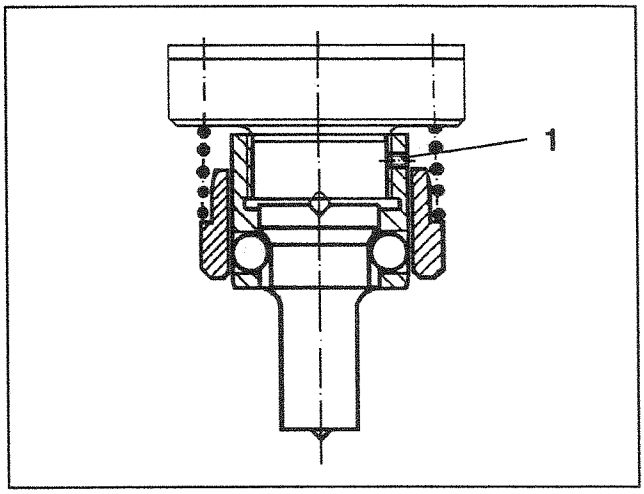
9 Retooling

9.1 Retooling – Standard Accessories

9.1.1 Changing Over the Punch Attachment to Attachment With Coupling Nut

For large series production the quick-change fixture should always be replaced by the sturdier punch attachment with coupling nut. The coupling nut is part of the standard delivery.

- Switch off the ironworker.
- Open the stripper.
- Loosen the threaded pin (1).
- Unscrew the quick-change fixture.
- Insert the punch in the coupling nut and screw on the coupling nut.
- Close the stripper.

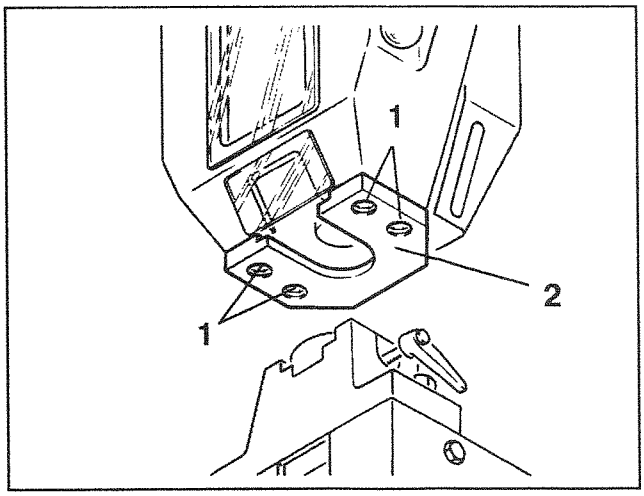


The clearance between the punch and the die must be carefully controlled.

9.1.2 Detaching the Stripper Plate from the Holepunch

The stripper plate, which is part of standard equipment, can be detached if necessary.

- Switch off the ironworker.
- Screw out the hex socket screw (1) and remove the stripper plate (2).

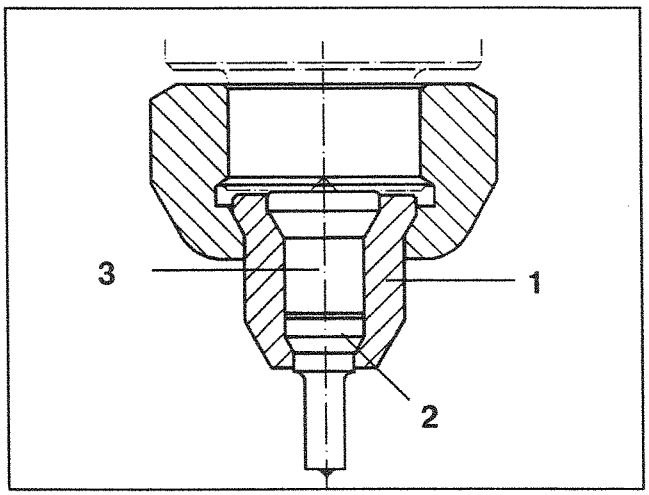


9.1.3 Attaching the Punch and Die Reducing Sleeves

Note
When working with small punches and dies (up to cutting range of 15 mm) the punch and die reducing sleeves, included in the standard delivery, must be installed.

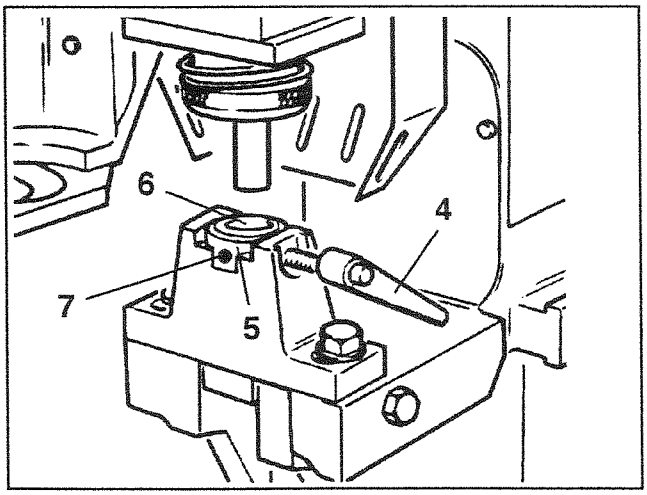
Punch

- Switch off the ironworker.
- Swing open the stripper.
- Open the quick-change fixture, or unscrew the coupling nut.
- Remove the punch.
- Attach the reducing sleeve (1) and the punch (2).
- Insert the punch shim (3).
- Close the quick-change fixture, or screw on the coupling nut.



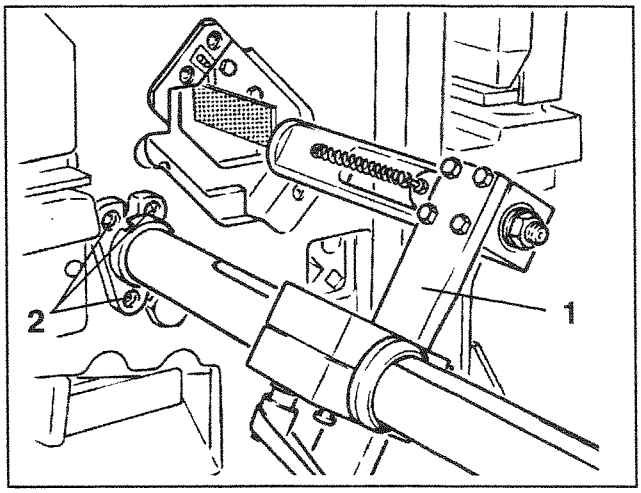
Die

- Loosen the clamping lever (4).
- Take out the die.
- Insert the reducing sleeve (5).
- Tighten the clamping lever.
- Insert the die (6) in the reducing sleeve and fix in place with threaded pin (7).
- Swing the stripper closed.



9.2 Retooling - Special Accessories (Not Standard)

9.2.1 Length Stop



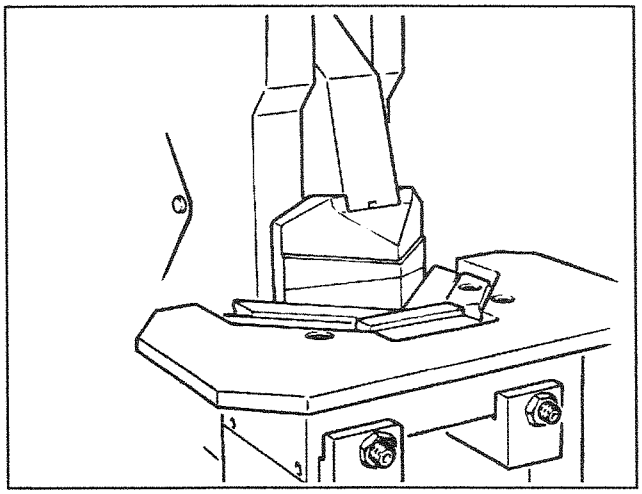
- Attach the length stop (1) with three fastening screws (2) in the boreholes provided on the back of the ironworker.
- Insert the plug into the socket.

Note
When switching on the ironworker, press the selector keyswitch for length stop/footpedal (E) (see section 4.2).

For operation of length stop, refer to the separate user manual.

The safety flap of the section-steel shear has only been removed for the purpose of representation.

9.2.2 Triangular Notching Tool



Converting to the triangular notching tool follows the same procedure as exchanging the top and bottom knives of the rectangular coping tool.

- Remove the coping saddle (see section 7.3.1).
- Exchange the top knife (see section 7.3.2).
- Exchange the bottom knife (see section 7.3.3).
- Attach the coping saddle (see section 7.3.4).

10

Malfunctions and Their Remedy

10 Malfunctions and Their Remedy

10.1 Machining Errors

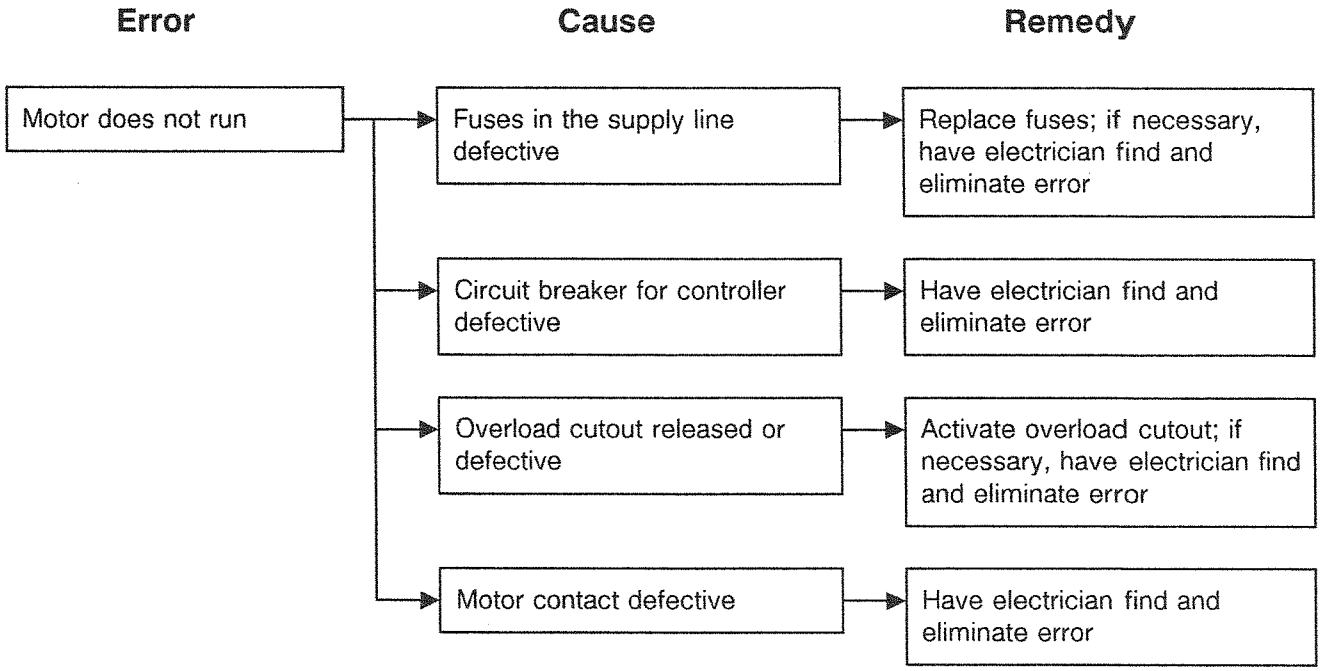
Error	Cause	Remedy
Slide does not move down when footpedal is pressed	Inching and Full Stroke switch at position "0"	Switch setting
	"Holepunch/coper" switch at "holepunch" position, "coper" safety guard is open	Close "coper" safety guard
	"Holepunch/coper" switch at "coper" position, "holepunch" cover flap is open	Close "holepunch" cover flap
	"Length stop" / footpedal" switch at "length stop" position	Switch to "Footpedal" position
	Directional control valve dirty or defective	Repair or replace directional control valve
	Directional control valve does not switch	Have electrician find and eliminate error
	Footpedal does not function properly	Have electrician find and eliminate error

Error	Cause	Remedy
Slide remains in lowermost position and does not move up	Inching and Full Stroke switch in "Inching" or "0" position	Switch to "Full Stroke" position
	Limit switch for the lower stroke limit does not function properly	Check limit-switch setting, or have limit switch replaced by electrician
	Directional control valve dirty or defective	Repair or replace directional control valve
	Directional control valve does not switch	Have electrician find and eliminate error
	Footpedal does not operate properly	Have electrician test and repair footpedal
Slide moves down, but workpiece is only partially cut or not cut at all	Ironworker's working capacity limit exceeded	Use stock with less tensile strength or decrease workpiece cross-section
	Cutting edges of knives extremely worn or damaged	Grind or replace knife
	Blade clearance of knives much too big	Adjust blade clearance to correct width
	Hydraulic pressure in system too low	Check pressure and, if necessary, adjust (see p. 10 - 9)

Error	Cause	Remedy
Slide moves down, but workpiece is only partially punched or not punched at all	Ironworker's working capacity limit exceeded	Use stock with less tensile strength or decrease punching cross-section
	Tool extremely worn or damaged	Grind or replace tool
	Hydraulic pressure in system too low	Check pressure and, if necessary, adjust (see p. 10 - 9)
	Footpedal does not function properly	Have electrician find and eliminate error
Angle steel is cut, but the cut sections are out of shape or not square	Blade clearance between the knives too big	Adjust blade clearance (see user instructions)
	Root radius on workpiece and on mobile knife are different	Adjust radius on mobile knife to the root radius
	Knife geometries changed due to improper grinding of knives	Grind knives according to rules (see user instructions)
	Incorrect setting of hold-down	Set according to user instructions

10.2 Electrical Errors

Error	Cause	Remedy
Motor is deactivated by overload cutout after a short time	Overload cutout incorrectly set or defective	Have electrician test and, if necessary, replace overload cutout
	Directional control valve does not switch off or over at upper or lower stroke point	Repair or replace directional control valve
	Directional control valve receives no switch instruction at upper or lower stroke point	Have electrician find and eliminate error
	Stroke setting for upper or lower stroke point incorrectly set	Correct the stroke setting
	Ironworker's power-range limit exceeded	Use stock with low tensile strength or small shear/punch cross-section
	Hydraulic pump defective	Replace hydraulic pump
	Motor damaged	Have motor repaired or replaced (have it connected only by an electrician)


Error
Cause
Remedy
Motor does not run
Fuses in the supply line defective
Replace fuses; if necessary, have electrician find and eliminate error
Circuit breaker for controller defective
Have electrician find and eliminate error
Overload cutout released or defective
Activate overload cutout; if necessary, have electrician find and eliminate error
Motor contact defective
Have electrician find and eliminate error

10.3 Hydraulic Error

Error	Cause	Remedy
Excessive noise in the hydraulic system	Too little hydraulic oil in container	Raise amount of oil to prescribed level
	Hydraulic oil too cold (below +5 °C)	Heat hydraulic oil to temperature of +5 °C
	Oil temperature too high (above +70 °C)	Raise amount of oil to prescribed level
		Use prescribed oil grade
	Oil-return filter dirty	Clean or replace filter
	Oil-container ventilation clogged	Clean ventilation filter in lid of oil container
	Viscosity of hydraulic oil too high	Use appropriate oil
	Hose or pipe lines vibrating	Check/tighten fastenings
	Pressure-limiting valve damaged or incorrectly set	Set pressure-limiting valve correctly or replace it (removing the lead seal voids the guarantee); if necessary, call for factory Customer Service
	Air in suction line	Tighten or replace screw-type fitting of suction line
	Motor defective	Have motor repaired or replaced (have it connected only by an electrician)
	Pump defective	Replace pump

Error	Cause	Remedy
Insufficient pressure or none at all	Air in suction line	Tighten or replace screw-type fitting of suction line
	Oil viscosity too low	Use appropriate hydraulic oil
	Directional control valve damaged or dirty	Repair or replace directional control valve
	Motor defective	Have motor repaired or replaced (have it connected only by an electrician)
	Pressure-limiting valve damaged or dirty	Repair or replace pressure-limiting valve (removing the lead seal voids the guarantee); if necessary, call for factory Customer Service
	Hydraulic-cylinder bore damaged	Exchange hydraulic cylinder
	Coupling between motor and hydraulic pump defective	Replace coupling
	Plunger seals in hydraulic cylinder damaged or worn	Replace plunger seals
	Pump defective	Replace pump

Error	Cause	Remedy
Irregular or fluctuating feed output	System not completely ventilated	Ventilate system
	Hydraulic oil too cold (below +5 °C)	Heat hydraulic oil to temperature of +5 °C
	Viscosity of hydraulic oil too high	Use appropriate hydraulic oil
	Oil temperature too high (above +70 °C)	Raise amount of oil to prescribed level
		Use prescribed oil grade
	Directional control valve damaged or dirty	Repair or replace directional control valve
	Oil-container ventilation clogged	Clean ventilation filter in lid of oil container
	Too little hydraulic oil in container	Raise amount of oil to prescribed level
	Motor defective	Have motor repaired or replaced (have it connected only by electrician)
	Pressure-limiting valve damaged or incorrectly set	Set pressure-limiting valve correctly or replace it (removing the lead seal voids the guarantee); if necessary, call for factory Customer Service
	Air in suction line	Tighten or exchange screw-type fitting of suction line
	Oil viscosity too low	Use appropriate hydraulic oil
	Pump defective	Replace pump

Error	Cause	Remedy
Too low a feed output or none at all	Motor rotating in wrong direction	Have electrician change motor's electric connection
	Hydraulic oil too cold (below +5 °C)	Heat hydraulic oil to temperature of +5 °C
	Viscosity of hydraulic oil too high	Use appropriate hydraulic oil
	Oil temperature too high (above +70 °C)	Raise amount of oil to prescribed level
		Use prescribed oil grade
	Oil viscosity too low	Use appropriate hydraulic oil
	Oil-container ventilation clogged	Clean ventilation filter in lid of oil container
	Too little oil in container	Raise amount of oil to prescribed level
	Air in suction line	Tighten or exchange screw-type fitting of suction line
	Pressure-limiting valve damaged or incorrectly set	Set pressure-limiting valve correctly or replace it (removing the lead seal voids the guarantee); if necessary, call for factory Customer Service
	Motor defective	Have motor repaired or replaced (have it connected only by electrician)
	Pump defective	Replace pump

Error	Cause	Remedy
	Coupling between motor and hydraulic pump defective	Exchange coupling
	Directional control valve damaged or dirty	Repair or replace directional control valve
	Plunger seals in hydraulic cylinder damaged or worn	Replace plunger seals
	Hydraulic-cylinder bore damaged	Exchange hydraulic cylinder
Temperature of hydraulic oil too high	Oil-return filter dirty	Clean or replace oil filter
	Too little hydraulic oil in container	Raise amount of oil to prescribed level
	Wrong viscosity of hydraulic oil (too high or too low)	Use prescribed oil grade
	Directional control valve damaged or dirty	Repair or replace directional control valve
	Pressure-limiting valve damaged or dirty	Repair or replace pressure-limiting valve (removing the lead seal voids the guarantee); if necessary, call for factory Customer Service
	Directional control valve does not switch off	Check stroke setting and set correctly
	Directional control valve receives no switch instruction	Have electrician find and eliminate error
	Pump worn	Exchange pump

Error	Cause	Remedy
Leaks in hydraulic system	Screw fittings loose	Tighten screw fittings
	Hydraulic hose defective	Replace hose
	Hydraulic valve worn	Exchange hydraulic valve
	Hydraulic pump worn	Change hydraulic pump
	Hydraulic-cylinder seals worn	Replace hydraulic cylinder or exchange seals

11

Circuit Diagrams and Drawings

*** S T Ü C K L I S T E ***

Angebots-Nr.: Auftrags-Nr.: 52/1598 01 Auftrag

Kunde : Muhr + Bender
Maschinenbau GmbH
Auf der Schlachtwiese
5952 /Attendorn
Attendorn

Bespr.-Datum :
Eing.-Datum : 19.06.8
Bearb.-Datum : 19.06.8
Liefertermin : 4.07.8
Anzahl Anlagen : 01

Verhandlungspartner :
Telefon :
Projektbezeichnung : MIW 400 NACH VDE 0164 810301 40294
Bestell-Nr. :
Sachbearbeiter :
Versandart :
Zeichnungs-Nr. : SB 043/52-0688.1

Nennbetriebs-Strom	: 8,5 A		Steuerspannung	: 220	V
Sicherung in Zuleitung	: 20 A		Frequenz-Steuerspannung	: 50	Hz
Betriebsspannung	: 380 V		System-Steuerspannung	:	
Frequenz-Betriebsspannung	: 50 Hz		Hilfsspannung	:	V
System-Betriebsspannung	:		Frequenz Hilfsspannung	:	Hz
Netzform	:				

```
**********************************************************
* Schutzmaßnahmen im Lieferumfang dieses Auftrags:       *
* ------------------------------------------------------ *
* Sie erhalten eine geprüfte Schaltgeräte-Kombination    *
* nach VDE 0660 Teil 500.                                *
* Nicht zum Betriebsstromkreis gehörende Teile,die im    *
* Fehlerfall Spannung annehmen können, sind mit dem      *
* gekennzeichneten Schutzleiteranschluß verbunden.       *
* ------------------------------------------------------ *
* Weitere Maßnahmen zur Erfüllung der Schutzmaßnahmen    *
* am Aufstellungsort nach VDE 0100 ( z.B. Verbindung     *
* N mit PE ) sind bauseitig durchzuführen.               *
*                                                        *
**********************************************************
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Ausführungsangaben

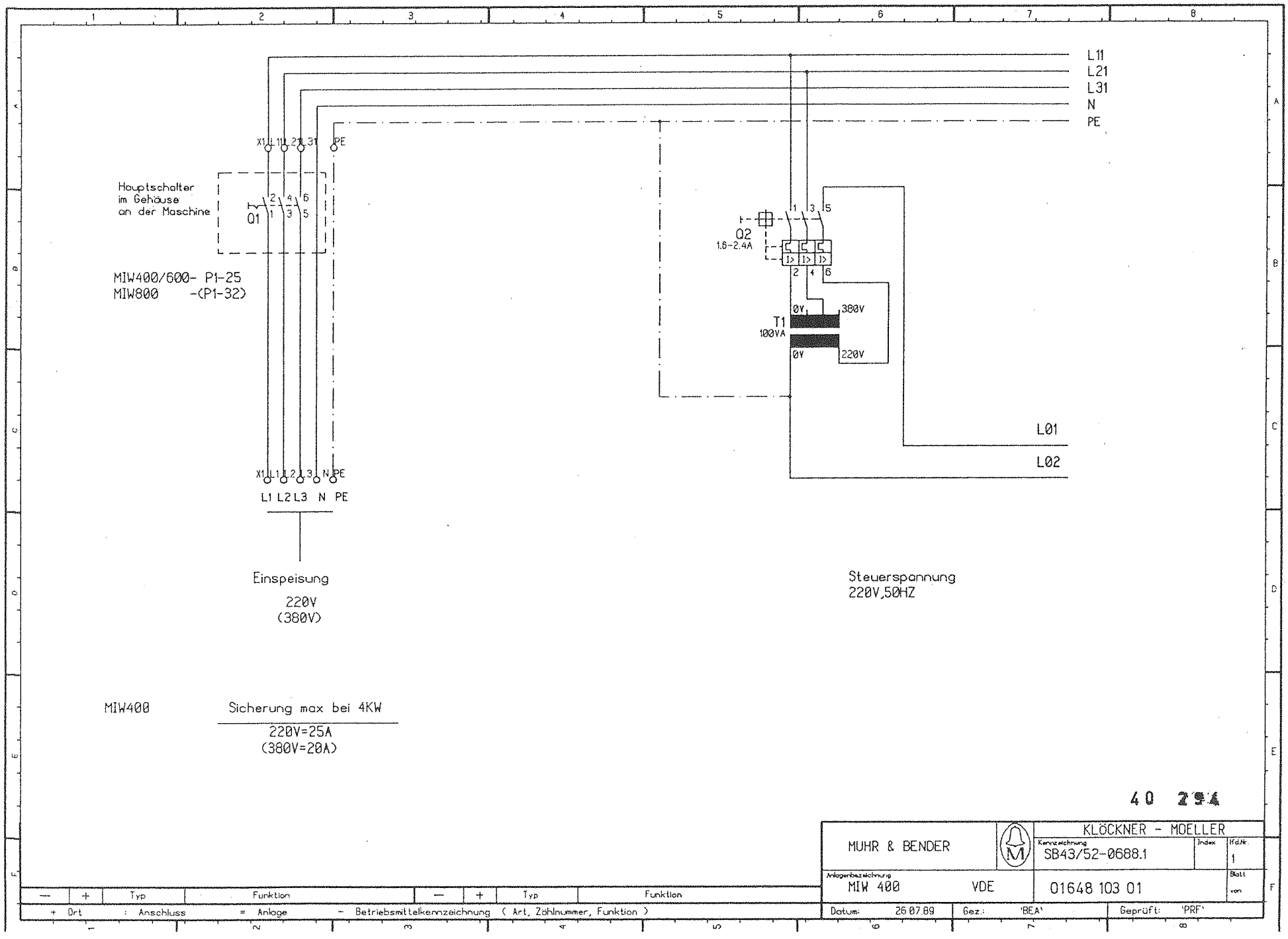
Muhr und Bender
Attendorn

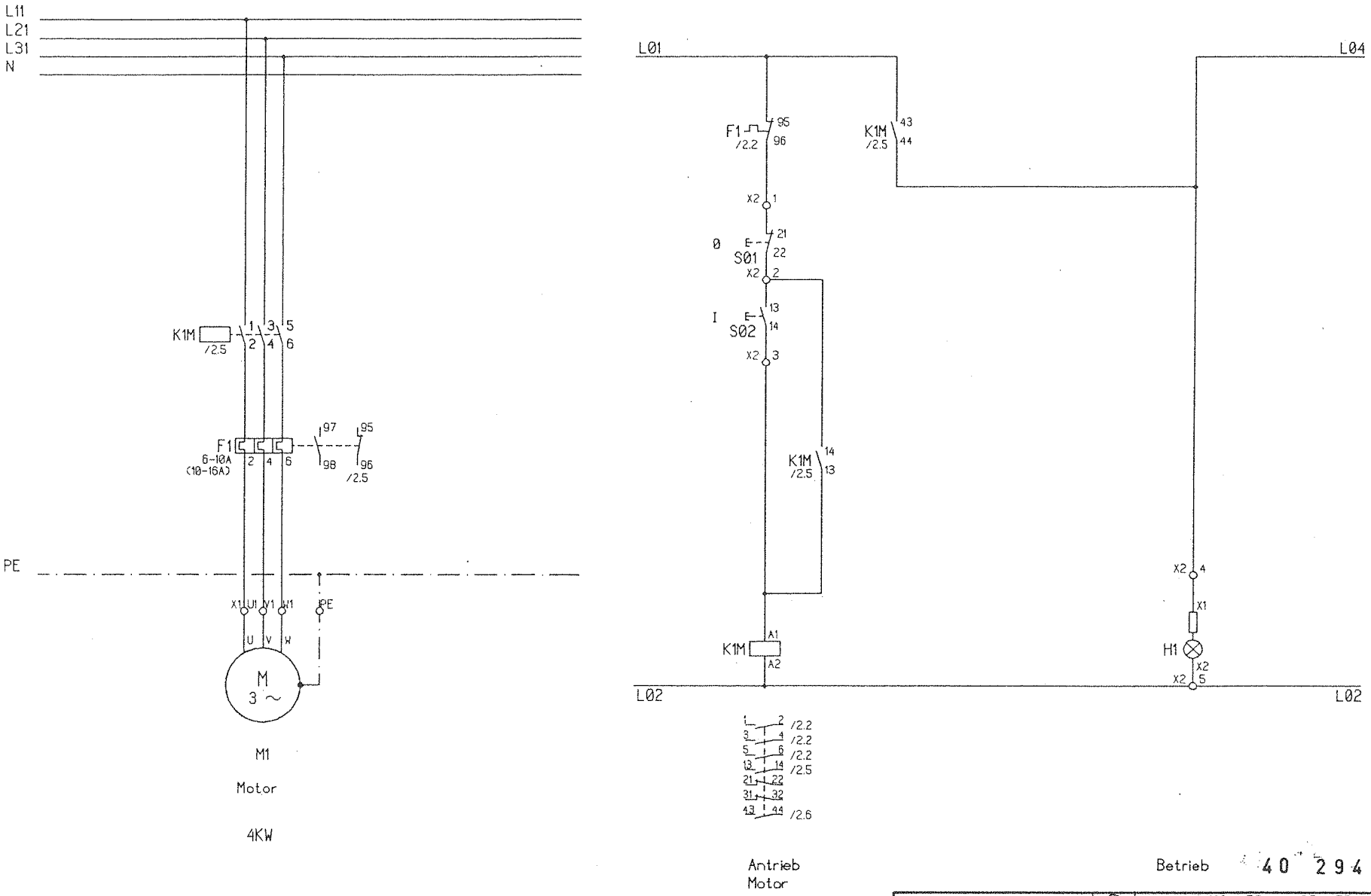
0164810301
40 294

**** Stueckliste MIW 400 VDE ****

Kloeckner Moeller Schaltplan Nr.: SB43/52-0688.1 Blatt 2

Nr.	G.K.Z.	T.Bezeichn.	T.Gruppe	St.	Ident Nr.
10	F	500x300x175mm(Westfa)	Gehaeuse	1	8510021340
20		KT16F	Kabeltuelle	2	8520150900
30	Q2	PKZM1-2,4	Motorschutzschalter	1	8540050070
40	T1	STKO,1(380-220)	Steuertransformator	1	8101000060
50	K1M	DILOM/22	Universalschuetz	1	8540011440
60	F1	ZOO-10	Motorschutzrelais	1	8540030500
70	K2	DILO8/31	Hilfsschuetz	1	8540010160
80		UK10	Reihenklemme	7	8550010630
90		USLKG10-1	Reihenklemme	2	8550010600
100		UK5	Reihenklemme	3	8550010610
110F		UKK5(Phoenix)	Doppelklemme	17	8550010700
120		USLKG4-1	Reihenklemme	7	8550010650
140	M1	4AP112M-4	Motor	1	8530030400
150	Q1/SO1 SO2/H1 S6/S9	DS1X-2027	Hauptscha.kpl.	1	8540080200
160	S3/S5/S4	Art.Nr.1180171	Endschalterkpl	1	8540311910
170	S7/S8	GC-U1HTW	Endschalter	2	8540310690
180	S1	F1-U2DUK	Fusschalter	1	8540311670
190		HAN 3	Steckvorrichtung kpl	1	8550060610
		Pos.150 besteht aus:			
250		PC-Gehaeuse Nr.356			
260		D1M2Z	Zweifachdrucktaste mit Meldeleuchte	1	8540200755
280		DFGN11 + Z32	Kontaktboeckchen mit Kontrolleuchte	1	8540200855
290		D1LAO	Schluesselschalter	2	8540200425
300		DG11 +	Kontaktboeckchen	2	8540200945
310		Z15 +	Schildtraeger	2	8540300490
320		VC1 +	Hauptschalter	1	8540070050
330		KZ16	Schildtraeger	1	8540300480
340		Glimmlampe	BA9S 130V	1	8540200470
		Position 160 besteht aus:			
350	S4	TM-2-15432/EZ/ S-H+F*D-076389	Nockenschalter	1	8540200470
360	S3	U16	Endschaltereinsatz	1	8540311770
370	S5	U1	Endschaltereinsatz	1	8540311800
380		Schluessel Nr.601		1	8540200470

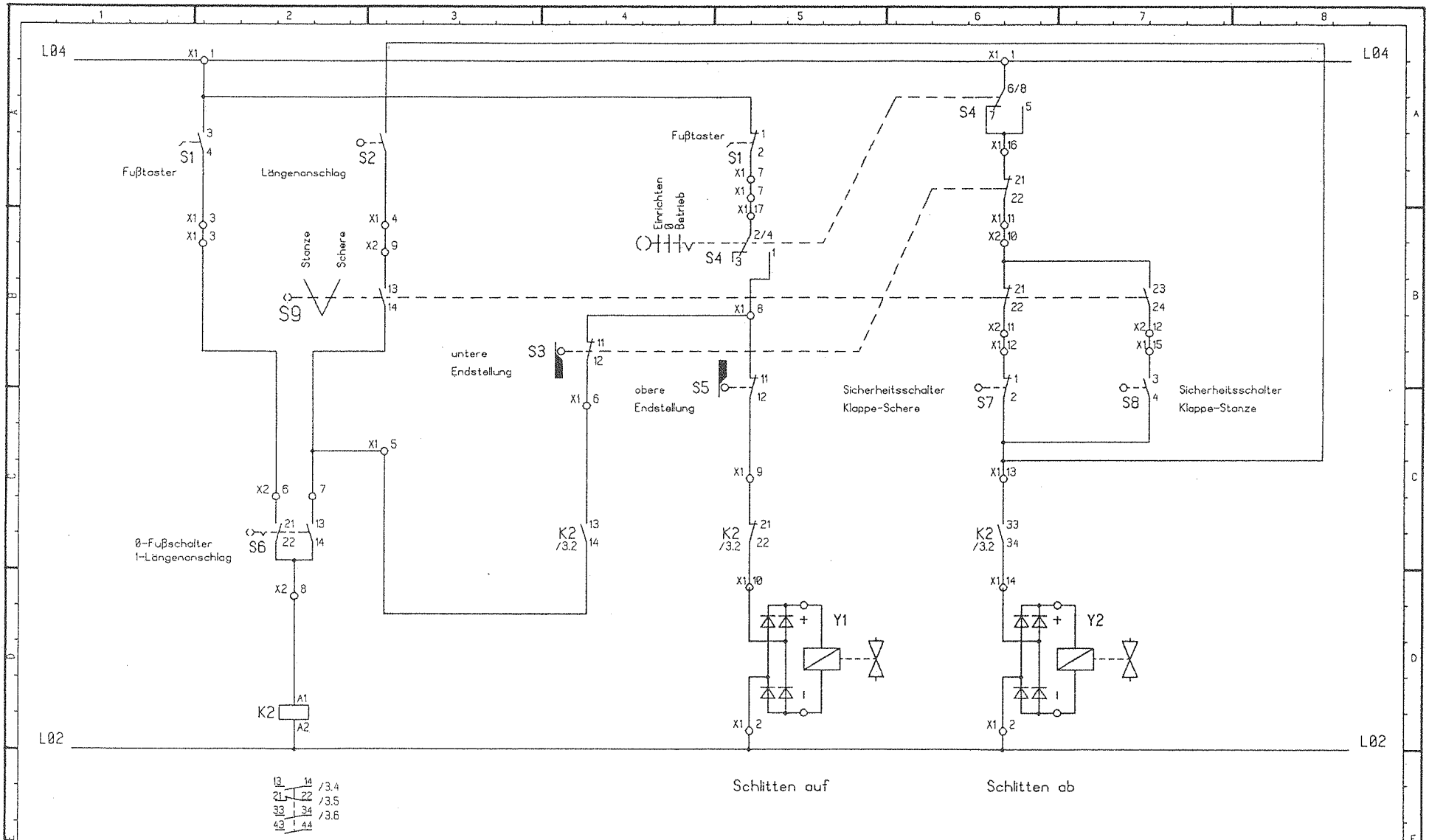

L11
L21
L31
N
PE
X1 L11 L21 L31 PE
Hauptschalter
im Gehäuse
an der Maschine
Q1
MIW400/600- P1-25
MIW800 -(P1-32)
Q2
1.6-2.4A
T1
100VA
0V
380V
0V
220V
L01
L02
X1 L1 L2 L3 N PE
L1 L2 L3 N PE
Einspeisung
220V
(380V)
Steuerspannung
220V,50HZ
MIW400
Sicherung max bei 4KW
220V=25A
(380V=20A)
40 294
MUHR & BENDER
KLÖCKNER - MOELLER
Kennzeichnung
SB43/52-0688.1
Index
lfd.Nr.
1
Anlagenbezeichnung
MIW 400
VDE
01648 103 01
Blatt
von
Datum: 26.07.89
Gez.: 'BEA'
Geprüft: 'PRF'
— + Typ Funktion — + Typ Funktion
+ Ort : Anschluss = Anlage - Betriebsmittelkennzeichnung (Art, Zählnummer, Funktion)



—	+	Typ	Funktion	—	+	Typ	Funktion

+ Ort : Anschluss = Anlage - Betriebsmittelkennzeichnung (Art, Zählnummer, Funktion)

MUHR & BENDER		KLÖCKNER - MOELLER	
		Kennzeichnung SB43/52-0688.1	Index / lfd.Nr. 2
Anlagenbezeichnung M1W 400	VDE	01648 103 01	Blatt von
Datum: 26 07 89	Gez.: 'BEA'	Geprüft: 'PRF'	

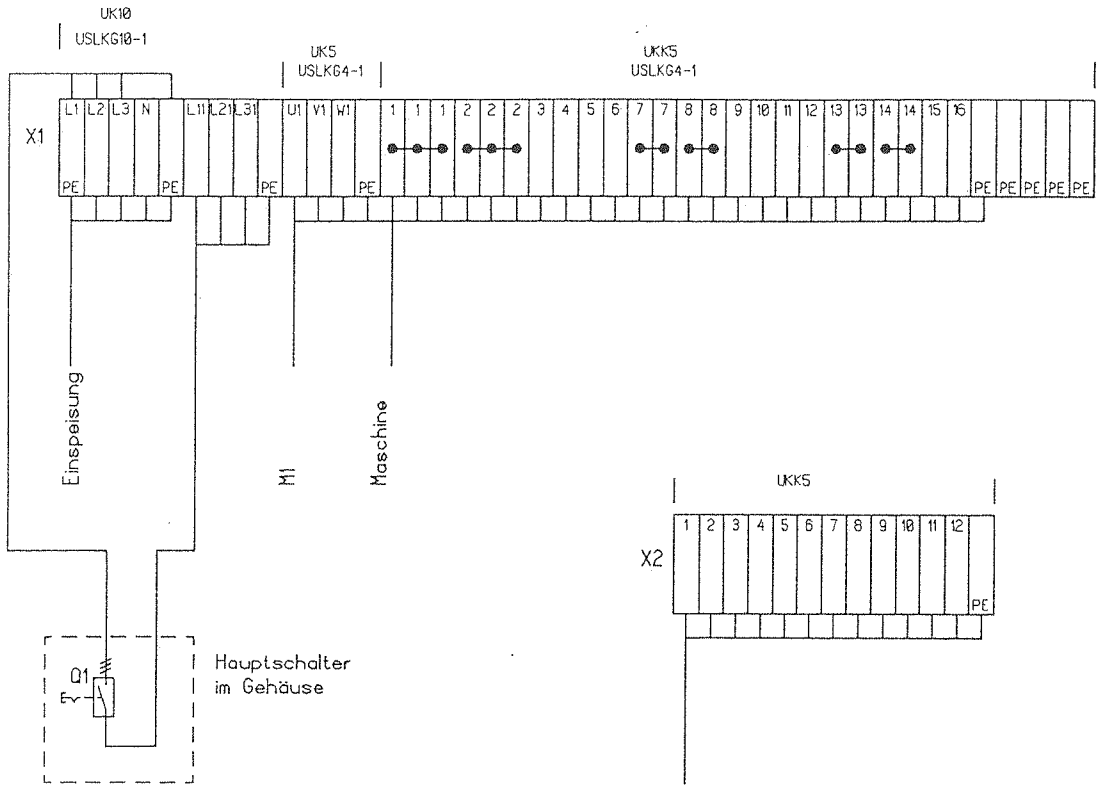


—	+	Typ	Funktion	—	+	Typ	Funktion

+ Ort : Anschluss = Anlage - Betriebsmittelkennzeichnung (Art, Zählnummer, Funktion)

40 294

MUHR & BENDER	KLÖCKNER - MOELLER		
	Kennzeichnung: SB43/52-0688.1	Index:	lfd.Nr.: 3
Anlagenbezeichnung: MIW 400-VDE	M+B Nr. 0168410301		Blatt von
Datum: 14.02.90	Gez.: 'BEA'	Geprüft: 'PRF'	



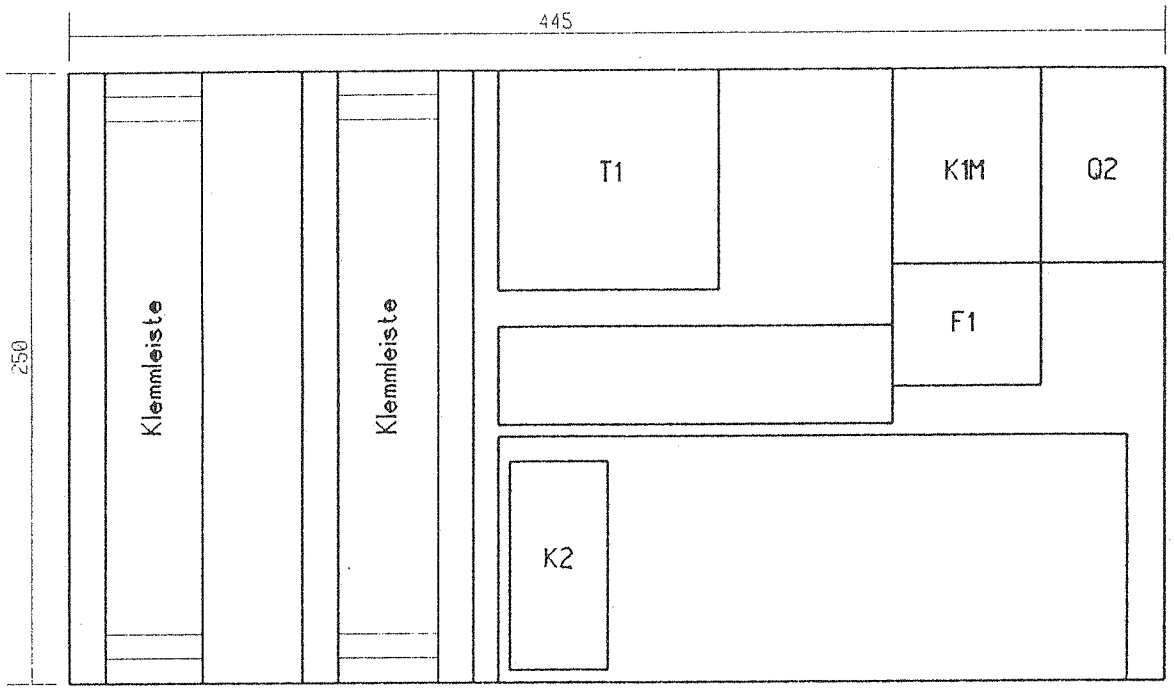
40 294

—	+	Typ	Funktion	—	+	Typ	Funktion

+ Ort : Anschluss = Anlage - Betriebsmittelkennzeichnung (Art, Zählnummer, Funktion)

MUHR & BENDER	KLÖCKNER - MOELLER		
	Kennzeichnung SB43/52-8688.1	Index	Kd.Nr. 4
Anlagenbezeichnung MIW 400 -VDE	M+B Nr. 0164810301		Blatt von
Datum: 21.11.89	Gez.: 'BEA'	Geprüft: 'PRF'	

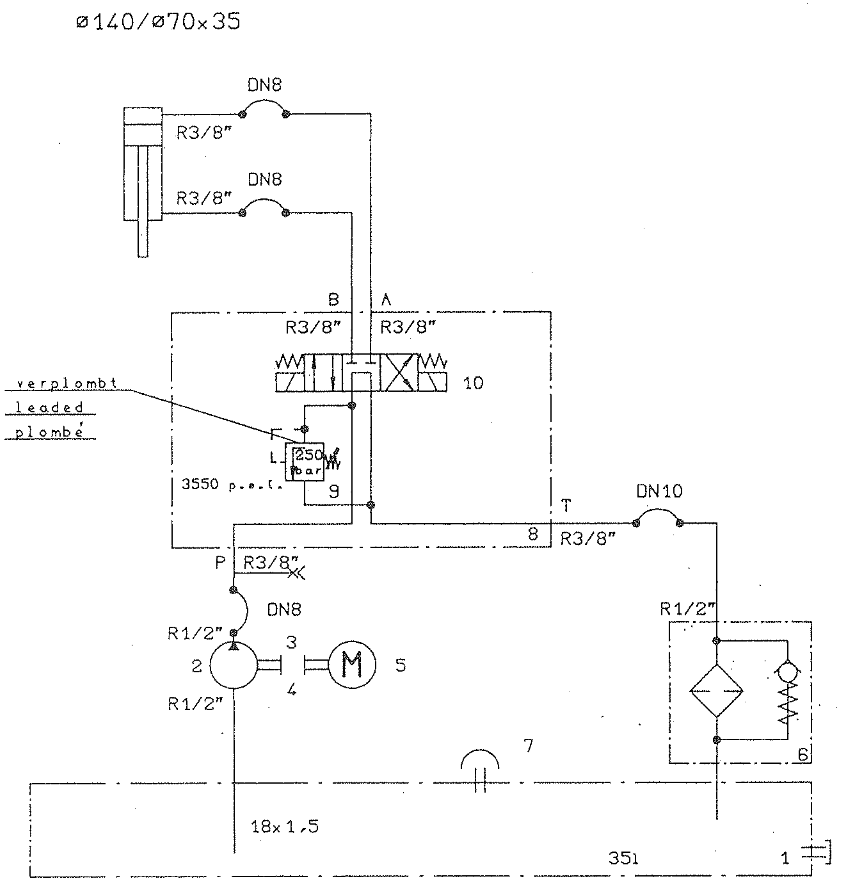
Montageplattenaufbau MIW - 400/600/800 - VDE



Maßstab 1:2

40 294

MUHR & BENDER	KLOCKNER - MOELLER	
	SB43/52-0688.1	5
MIW 400 /DE	01648 103 01	



Pos.	Menge	Benennung	Denomination	Désignation	Typ	Fabrikat
10	1	Magnetventil,kpl.	Solenoid valve	Electrovanne complète	WEE4/3-06-207/190V=	HEYPFA
9	1	Druckbegrenzungsventilpatrone	Pressure relief valve	Cartouche de limiteur de pression	HV 03134.1	HEYPFA
8	1	Montageplatte	Mounting plate	Plaque de montage	HM 03011	HEYPFA
7	1	Einfuell- u.Belueftungsfilter	Filter cap assembly	Filtre de remplissage et d'aération	TF/1	HEYPFA
6	1	Ruecklauffilter	Return pass filter	Filtre sur retour	MPF 3/20	HEYPFA
5	1	DN - Motor	DN - Motor	Monteur DN	AP112 M4 B3/B5 4kW 1400min-1 220/380V,50Hz	Birkenbeul
4	1	Kupplung	coupling assembly	Embrayage	ND 13	HEYPFA
3	1	Pumpentraeger	pump support	Support de pompe	LS 252	HEYPFA
2	1	HD - Pumpe	HD - pump	Pompe HP	CPL 11 D/S	HEYPFA
1	1	Oelbehaelter	oiltank	Réservoir à huile	351	

Freimasstoleranz nach DIN 7168 mittel

	Datum	Name
1987		
Bearb.	12.11.	Tauchert
Gepr.		
Freig.		

Masstab | Gewicht

Werkstoff / Rohteil-Nr. / Modell-Nr.: MIW 400 Ausf.50Hz

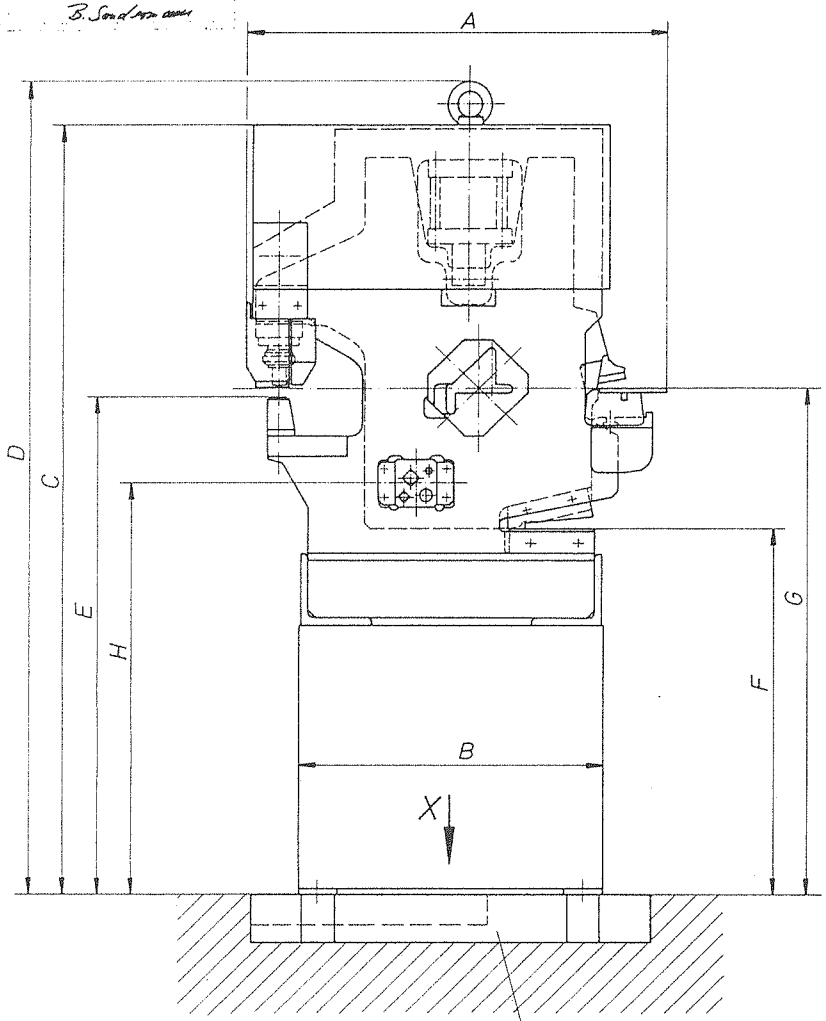
Benennung: Hydraulikplan
Hydraulic system
Schéma hydraulique

Muhr und Bender MASCHINENBAU GMBH

Zeichnungs-Nr. 01600 103 06 — 3 Bl.

A.B. | Zahl | Mitteilg. | Name | Dat. | Urspr. | Ers.f. | Ers.d.

07. 11. 90
B. Sondern

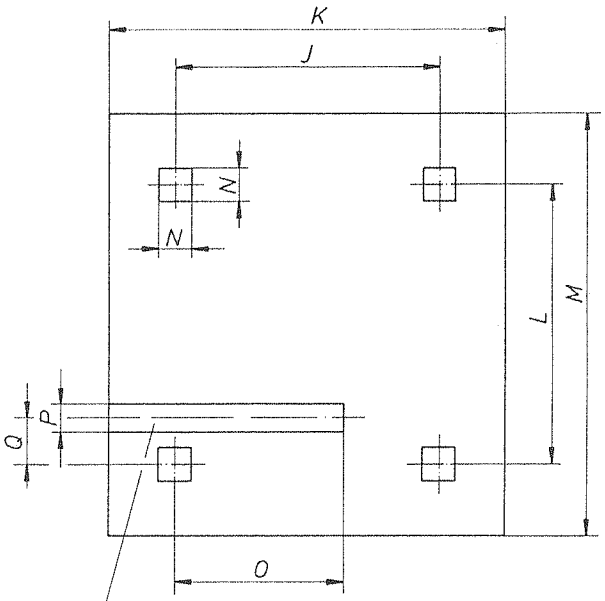


Tiefe je nach Bodenbeschaffenheit

Depth according to the condition of the ground.

Profondeur de la fondation d'après l'état du sol.

Ansicht X



Kanal für Kabeleinführung Richtung beliebig

Channel for feeding cable direction to your choise

Canal pour câbles d'alimentation

MIW 400

	01600	01601
	mm	inch
A	900	35 7/16
B	640	25 3/16
C	1630	64 3/16
D	1720	67 11/16
E	1054	41 1/2
F	770	30 5/16
G	1075	42 5/16
H	870	34 1/4
J	560	22 1/16
K	840	33 1/16
L	600	23 5/8
M	900	35 7/16
N	70	2 3/4
O	360	14 3/16
P	60	2 3/8
Q	100	3 15/16

Pos.	Menge	Einheit	Benennung	Sachnummer	Bt.-Gr.	Bemerkung

Freimaßtoleranz nach DIN 7168 mittel

~ glatt, roh — glatt
▽ geschruppt — Rz 100
▽▽ geschlichtet — Rz 25
▽▽▽ feingeschlichtet — Rz 6.3

Maßstab | Gewicht

Werkstoff
Rohteil-Nr.
Modell-Nr.

	Datum	Name
1987		
Bearb.	26. 08.	
Geprüft		
Freigabe		

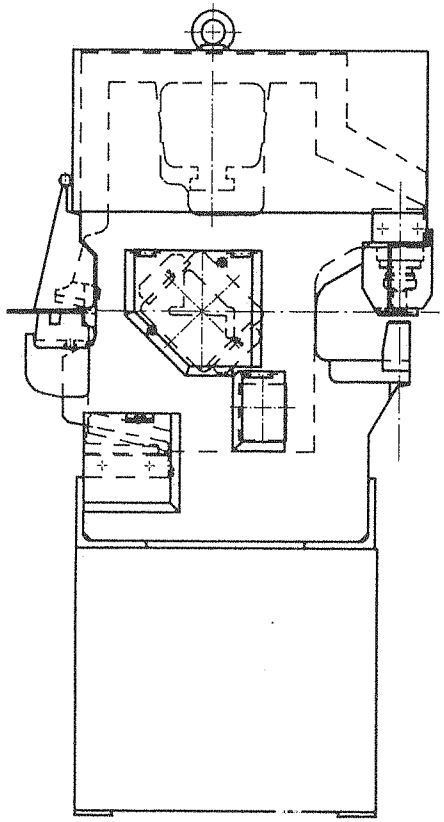
Benennung: Fundamentplan
Foundation drawing
Plan de fondation

Ruhr und Rendon
Altendorn

Zeichnungs-Nr. 01600 103 04

Blatt / Blätter

A.B. | Zahl | Mittlg. | Name | Datum | Urspr. | Ers. f. | Ers. d.



Vor Schichtbeginn und nachfolgend im Abstand von 5 Stunden je Schmierstelle 1 Pumpenhub mittels mitgelieferter Handstosspresse!

Prior to starting the work shift and following in intervalls off five hours lubricate each oiling point applying one pump stroke with the oil gun supplied with the machine

Lubrification exigée au début des travaux et aprés en intervalles de 5 heures chaque point de graissage par un coup de pompe de graissage manuelle livrée avec la machine

Schmierstoffe/Lubrikant/Lubrifiant

MOBIL OIL AG VACTRA Oil Nr.4
Viskositaet 212 mm^2/s bei 40°C

ESSO AG MILLCOT K 220
Viskositaet 230 mm^2/s bei 40°C

BP Energol HP C 220
Viskositaet 220 mm^2/s bei 40°C

ARAL Deganit B 220
Viskositaet 220 mm^2/s bei 40°C

SHELL Tonna Oil T 220
Viskositaet 220 mm^2/s bei 40°C

For machines supplied to the USA

Lubrikant

CHEVRON VISTAC OIL 150X

Alle Schmierstellen sind an der Maschine gelb gekennzeichnet

All oiling points are yellow marked

Tous les points de graissage sur la machine sont marqués en jaune

Pos.	Menge	Einheit	Benennung	Sachnummer	Bl. Gr.	Bemerkung
			Freimasstoleranz nach DIN 7168 mittel			Massstab Werkstoff Rohteil-Nr. Modell-Nr.

	Datum	Name
1990		
Bearb	08.11.	Sondermann
Gepr		
Freig		

Benennung: Schmierplan / Lubrication chart / Plan de Lubrification

Muhr und Bender MASCHINENBAU GMBH

Zeichnungs-Nr. 0160010303 — 3 Bl.

A.B. | Zahl | Mittlg | Name | Dat. | Urspr. 27.08.1987 Tauchert | Ers.f. | Ers.d.