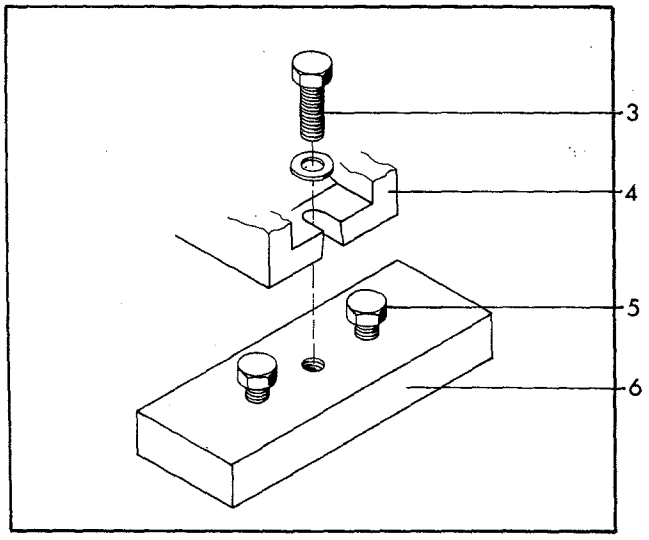


③ Tightening screw

④ Base of lathe bed

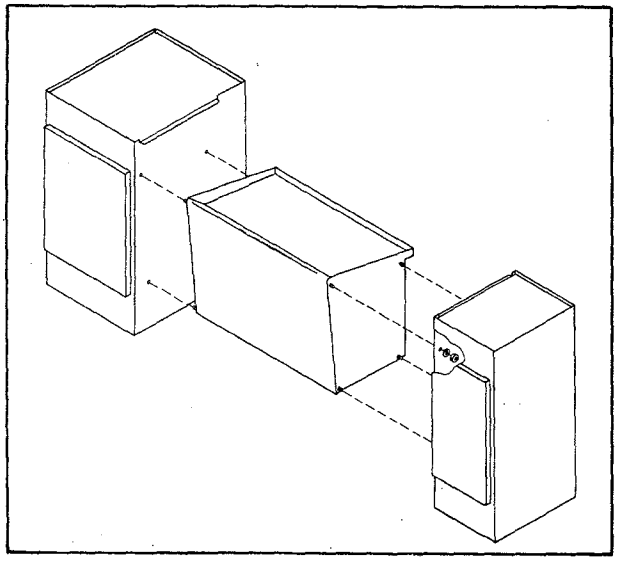
⑤ Setting screw

⑥ Steel plate
Recommended thickness of steel plate: approx. 2o mm (o,8"). These 2 steel plates must be fixed to the workbench.

Note: Before bolting down the machine, be sure that all 4 set screws rest against the lathe bed, otherwise the bed would be distorted or bent through the bolting down.

Mounting: Machine to Machine Stand, Vertical Milling and Drilling Unit and Splashguard

1. Assembly of the machine stand:



The sizes of the screws, nuts and washers as well as way of assembly are indicated in spare parts list.

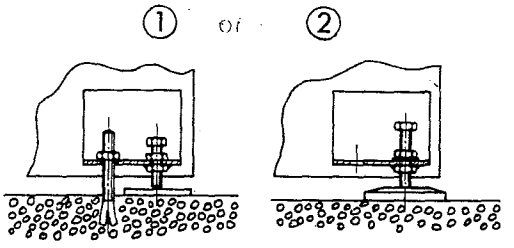
2. Aligning and fixing the machine stand

Method 1:

The machine stand is aligned by means of the hexagon screws under which steel plates must be placed. Then the machine stand is fixed with dowl bolts or similar.

Method 2:

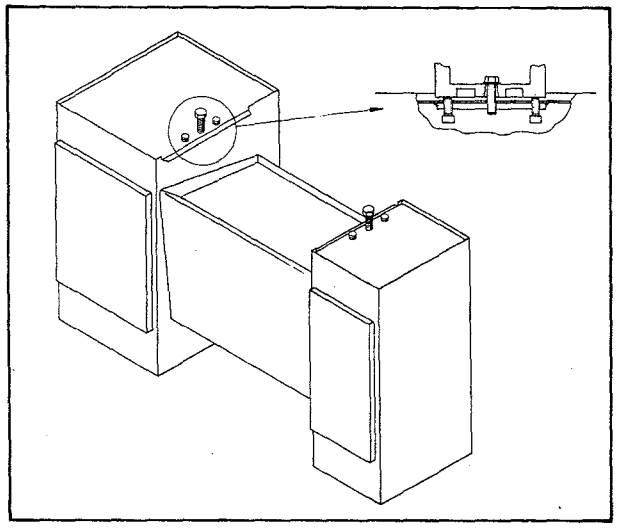
The machine stand is aligned with levelling elements. The levelling elements replace bolting to the floor.



The machine is placed onto the machine stand and is levelled in longitudinal and cross directions by means of the 4 levelling bolts at exact horizontal position. Then the machine is fixed to the stand with the 2 hexagon bolts.

Note:

Before bolting down the machine, all 4 levelling bolts must rest against the casting extensions, otherwise the bed would be distorted or bent.

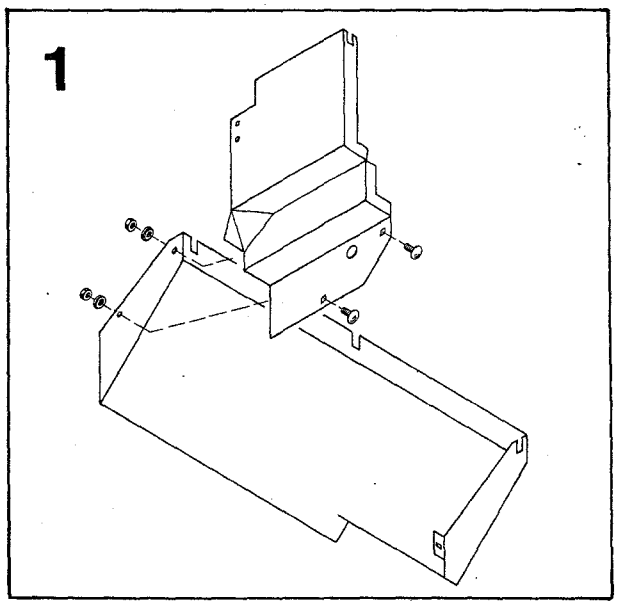


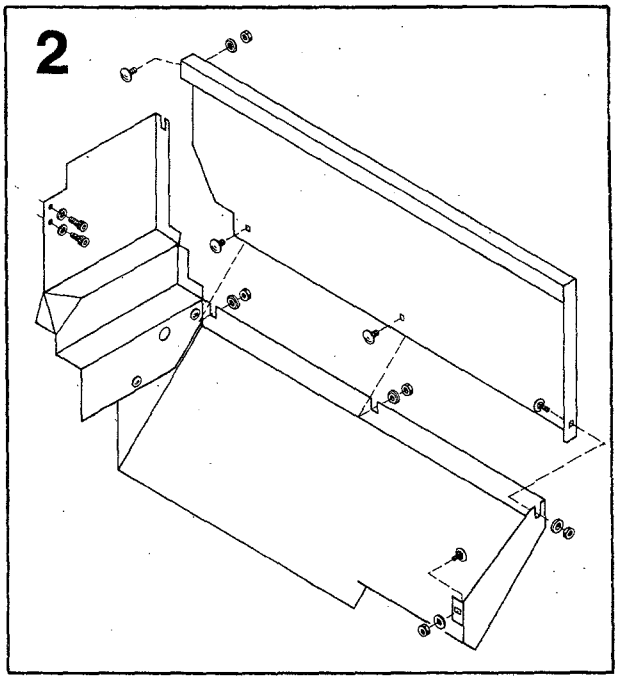
4. Mounting the Vertical Milling and Drilling Unit

The vertical milling and drilling unit is delivered with its own instruction manual and spare parts list. In this instruction manual the mounting, service, tools and accessories are described in detail.

For the electrical connection of the vertical unit, see page 13-15

5. Mounting the Splashguard





The sizes of screws, nuts and washers are indicated in the spare parts list.

Electrical Connection

Safety tip

Mounting the plugs as well as the connection of the vertical drilling and milling unit, the coolant pump, the machine lamp must be carried out professionally.

A grounding receptacle must be available. Should an electrical failure occur in the motors, the grounding receptacle and plug will protect the user from electrical shock. - If a grounding receptacle is not available, use a grounding adaptor to adapt to properly grounded receptacle.
Never use the machine if it is not properly grounded!

Mounting the plug

Single-phase:

Clamp blue and brown wires to contact L_1 (R) and N and the yellow-green wire to the grounding contact.

Three-phase:

Clamp brown/black/black wires to contacts L_1(R), L_2(S), L_3(T) and the blue wire (neutral wire) to contact N (Mp). The yellow-green wire must be clamped to the grounding contact.

Note:

If the motor runs in wrong direction, interchange two phases, for ex. L_1(R) and L_2(S).

Attention:

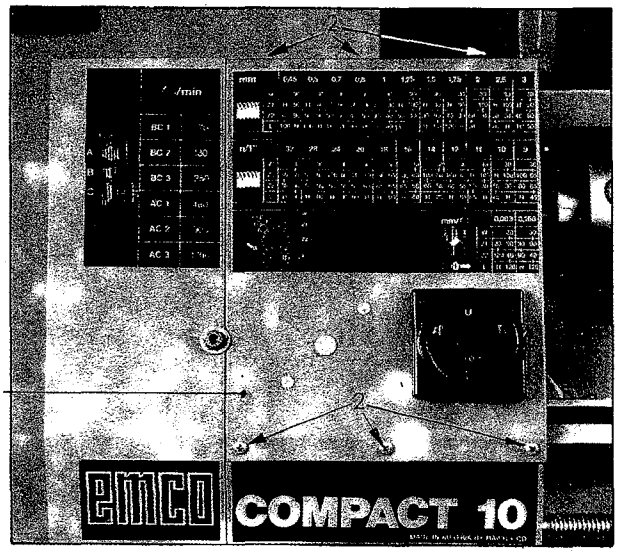
If the neutral wire N (blue) is wrongly clamped to a phase (R,S or T), the motor will run for a short time and then burn. No waranty! The reason for this burning of the motor can easily be found out afterwards.

Connecting the accessories

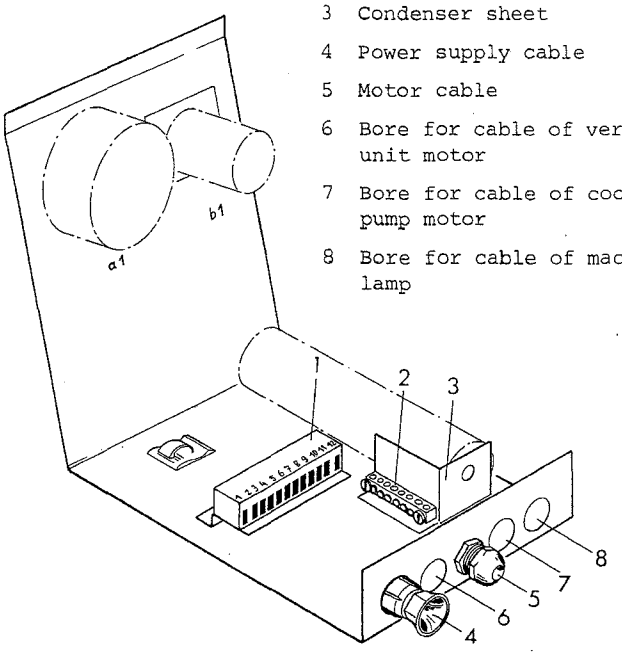
Inside of the headstock cover (1) you find the clamping strip and the grounding strip for the electrical connection of the accessories.

Connection:

1. Remove power supply plug
2. Remove the sheet screws (2) at the front and rear side. The headstock cover can be put back.



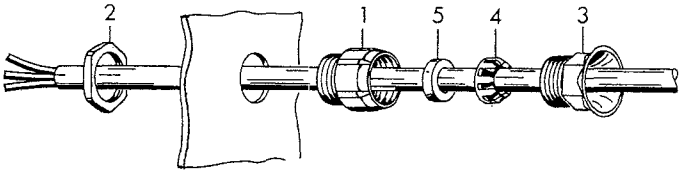
1 Clamping strip with numbers
2 Grounding strip
3 Condenser sheet
4 Power supply cable
5 Motor cable
6 Bore for cable of vertical unit motor
7 Bore for cable of coolant pump motor
8 Bore for cable of machine lamp



Mounting the screw-type conduit fitting

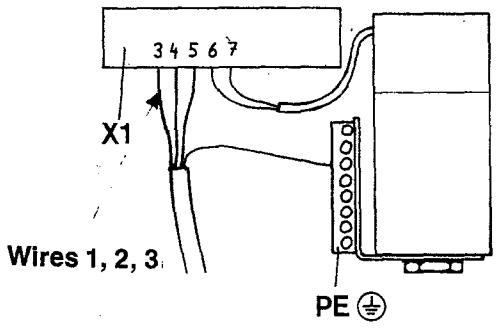
The fittings are delivered with the respective accessories.

- Mount basic element (1) with nut (2) onto the metal sheet.
- Thread the lock nut (3), cone element (4), rubber ring (5) onto the cable.
- Clamp wires to the strips.
- Tighten the lock nut (3) with basic element.



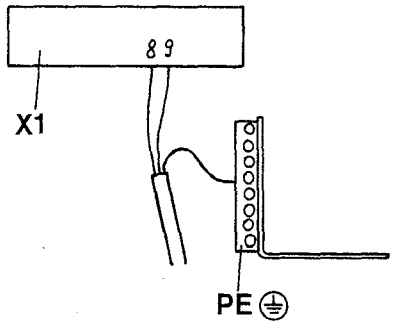
Single-phase

1. Vertical milling and drilling unit



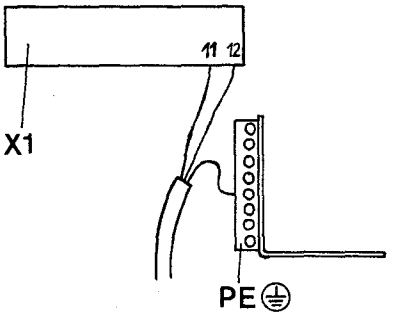
- Clamp grounding wire (yellow-green) to the grounding strip.(PE)
- The three black wires (1,2,3) are clamped to contacts 3,4,5.
- The condenser is mounted to the condenser sheet. The two wires are clamped to contacts 6 and 7.

2. Coolant pump



- Clamp grounding wire (yellow-green) to grounding strip.
- The two other wires R and N are clamped to the contacts 8 and 9.

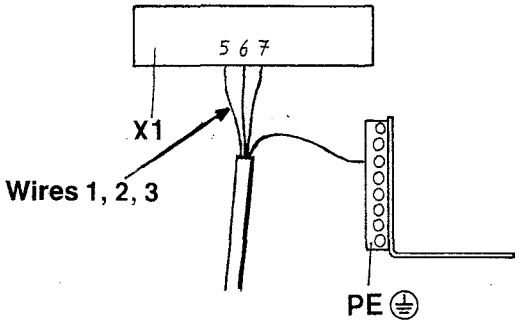
3. Machine lamp



- Clamp grounding wire (yellow-green) to grounding strip.(PE)
- The two other wires R and N are clamped to the contacts 11 and 12.

Three-phase

1. Vertical milling and drilling unit

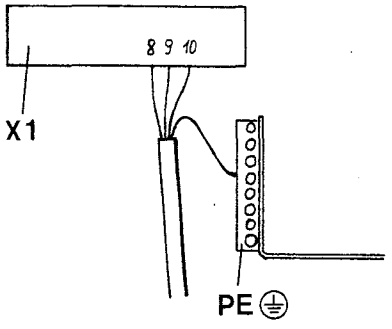


- Clamp grounding wire (yellow-green) to the grounding strip.
- The three black wires (1,2,3) are clamped to the contacts 5,6,7.

Please note:

If vertical motor is running in wrong direction (see marking on vertical unit) interchange two contacts (for example 1 and 2) and clamp them.

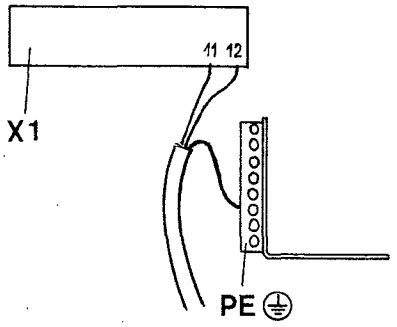
2. Coolant pump



- Clamp grounding wire (yellow-green) to the grounding strip.
- The three other wires R,S,T are clamped to the contacts 8,9,1o.

The coolant pump transports in both directions.

3. Machine lamp



- Clamp grounding wire (yellow-green) to the grounding strip (PE)
- The two other wires R and N are clamped to the contacts 11 and 12.

Controls

Lathe Bed

The lathe bed is made of high-grade cast iron. The combination of high cheeks with stron diagonal ribs gives a bed, which has low vibration and rigid qualities.
Two high-precision ground Vee-guideways, one for the carriage and one for the tailstock assure accurate travel.

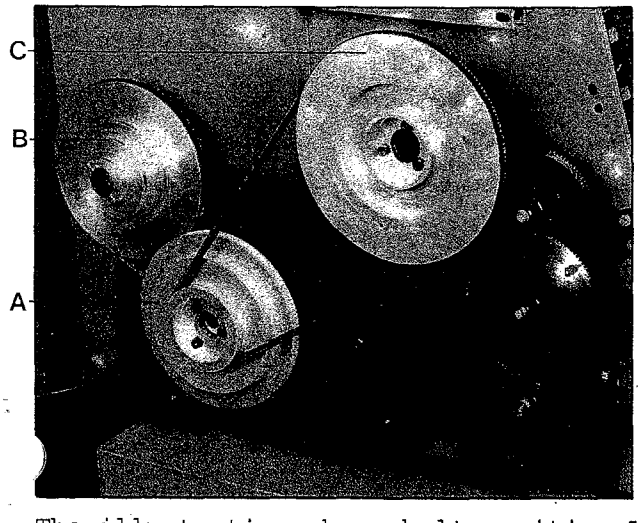
Four bores are provided at the back of the lathe bed for mounting the vertical milling and drilling unit.

The Main Spindle Drive

The motor is reversible (this is necessary for thread-cutting).
The main spindle is driven by a V-belt either directly from

+ Motor pulley belt A to the pulley of main spindle C (spindle speeds 7o/13o/25o rev/min with 5o cycles resp. 85/155/3oo rev/min with 6o cycles) or from
+ Motor pulley A to the idler pulley B, from the idler pulley B to the pulley of the main spindle C (speeds 48o/9oo/17oo rev/min with 5o cycles or 58o/11oo/2ooo rev/min with 6o cycles).

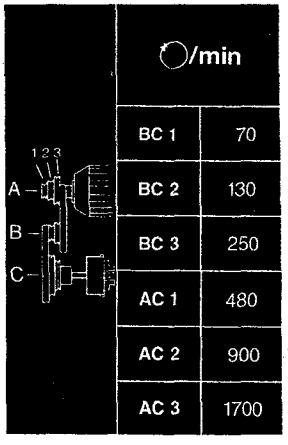
The belt from the motor pulley to the idler pulley is never changed and remains.



The illustration shows belt position AC1 (48o resp. 58o rev/min).

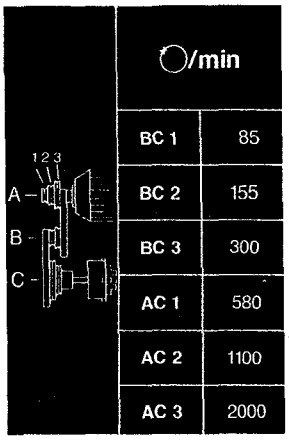
Spindle speed chart

The spindle speed chart on the front of the headstock shows the main spindle speeds and the respective pulley positions.



	○/min
BC 1	70
BC 2	130
BC 3	250
AC 1	480
AC 2	900
AC 3	1700

Spindle speed chart 5o cy.

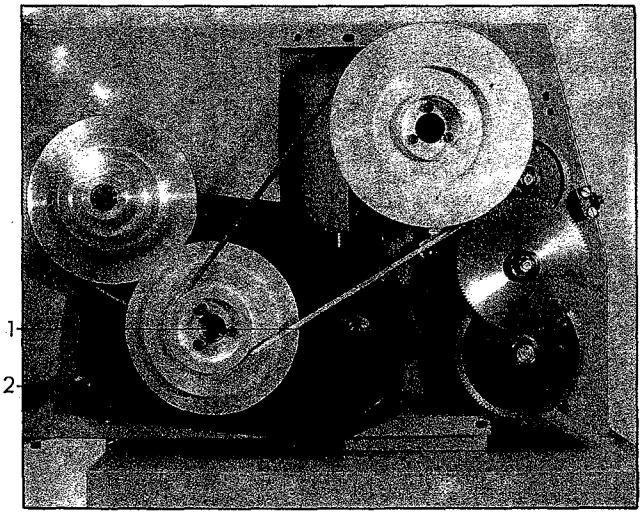


	○/min
BC 1	85
BC 2	155
BC 3	300
AC 1	580
AC 2	1100
AC 3	2000

Spindle speed chart 6o cy.

Setting the required spindle speed

- Loosen hexagon nut (1),
- lift motor plate with handle (2),
- place belt on the required pulley combination,
- tension V-belt and tighten the hexagon nut.



Note

If the V-belt slips at lower speed, tension the belt or reduce the cutting depth.

The Headstock/The Main Spindle

The headstock is made of vibration-free strongly ribbed cast-iron and bolted to the lathe bed. It is covered with a steel sheet. On the front side you find a chart for feeds and thread-pitches and the respective change gear combination.

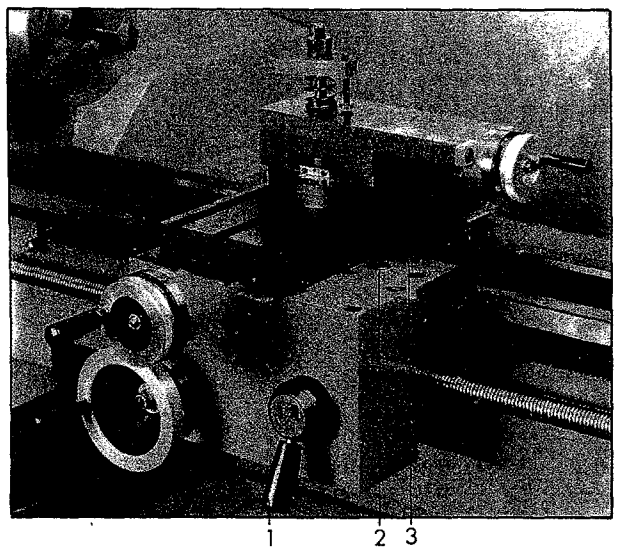
The high-precisely grounded rigid main spindle is supported by two taper roller bearings which are adjustable. The taper roller bearings are protected and greased for life time.

The Slides

1. Longitudinal slide with apron

The longitudinal slide runs on the ground Vee of the bed without play. The optimal ratio of guidance guarantees extreme accuracy and smooth movement.

Operating elements:



- The half nut lever (1): by swinging the half nut lever clockwise, the half nut engages with the leadscrew.

- Clamping screw for longitudinal slide (2): with the hexagon screw the longitudinal slide is clamped to the lathe bed (this is done when facing or parting-off).

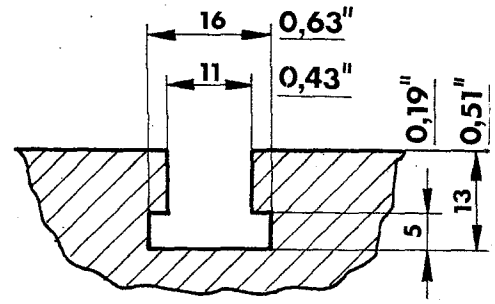
- Handwheel for longitudinal slide, graduation metric machine: 0,2 mm
  Graduation on inch-type machine: 0,01 inch
  The large dimension of the handwheel enables exact positioning and turning with manual feed.

2. Cross slide

The cross slide runs playfree in a dovetail guide. It can be clamped with a socket head screw (3).

The T-nuts on the cross slide are for clamping the top slide and other clamping devices (milling table, toolpost grinder, angleplate, dividing head etc.)

Dimensions of T-nut:

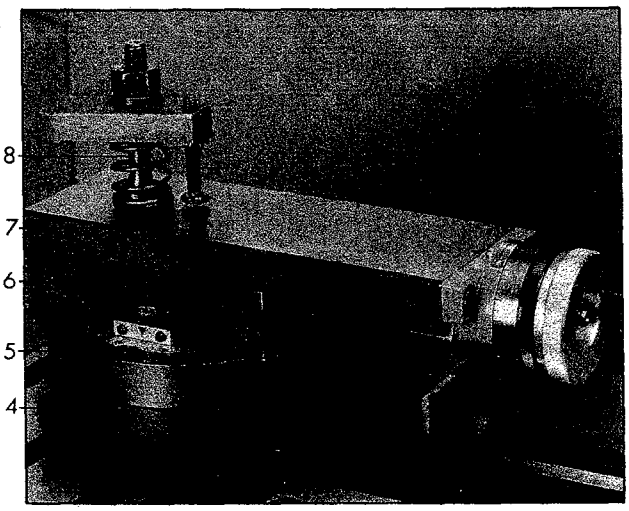


Operating elements:

- Clamping screw for cross slide (3)

- Cross slide handwheel with scale.
  Note: The graduation on the cross slide refers to the diameter of the workpiece.
  Graduation on metric machines: 0,05 mm
  Graduation on inch-type machines: 0,002"

3. The Top Slide

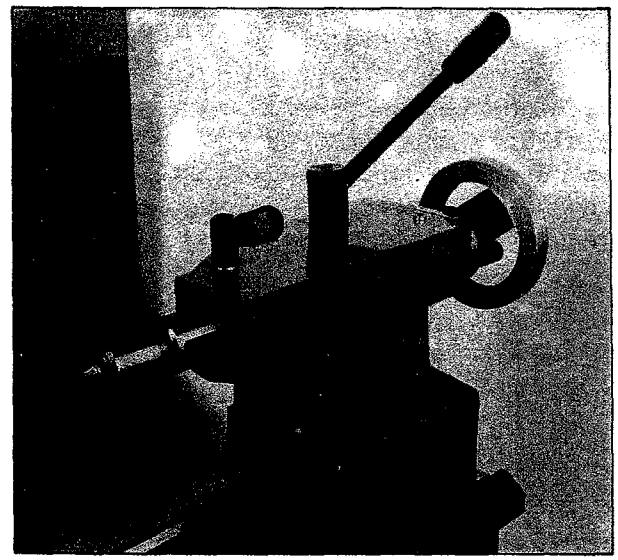


The top slide is bolted with 3 T-nuts (4) and socket head screws (5) to the cross slide.
After loosening the two socket head screws (6) it can be positioned in the desired angle position. The graduated scale enables exact angle-positioning. Graduations on the top slide handwheel metric machine: o,o25 mm; Inch-type machine: o,oo1 inch.

Clamping the turning tools

- Clamping with the clamp:
  the distance of top slide surface to center height is 23 mm. Steel spacers of corresponding size must be placed under the turning tool set it to exact center height. The position of the hexagon screw (7) should be so that the clamp is parallel to the top slide. (23 mm = o,9")
- Clamping with the fourway-toolpost and the quick-change toolpost:
  they are centered by the centering bolt of the top slide (8) and fixed with a hexagon nut and a special washer.

The Tailstock



The tailstock is set on the rear Vee of the lathe bed and is made of high-grade vibration-free cast-iron.

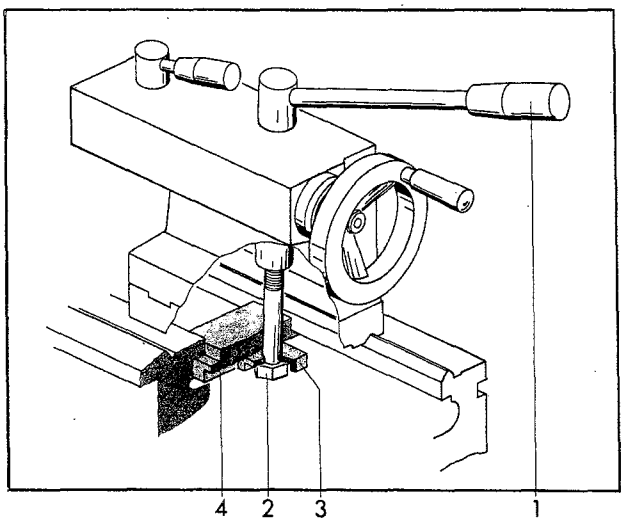
The tailstock ram is moved via the handwheel (travel of tailstock ram is 8o mm). A graduated scale is engraved into the tailstock ram. Accurate feed is guaranteed by a scale ring on the tailstock handwheel.

Scale graduations on metric machines: o,o5 mm; on inch-type machines o,oo1".

Note:

Tailstock ram should always be clamped - exept during drilling work.

The inside taper of the tailstock ram (MT2) serves for receiving centers and drill chuck. By turning back the ram, the center or drill chuck is automatically ejected.



Resetting the clamping lever

The clamping lever can be reset from 60° to 60°, in order to place the lever in the most convenient position for working.

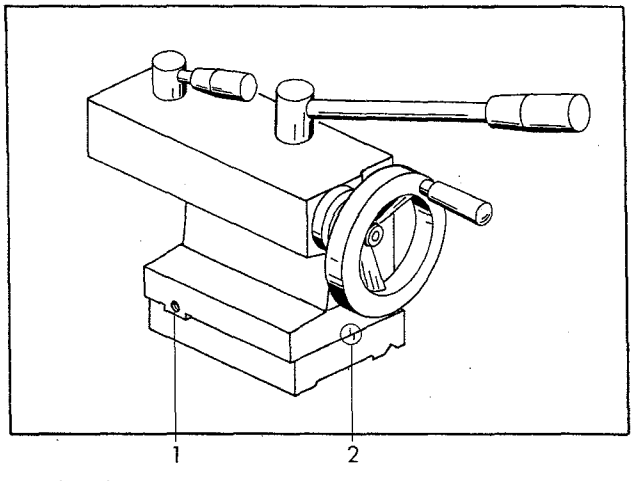
Resetting:

The clamping lever (1) is turned out so far, until the hexagon screw (2) can be turned in the slot of the wedge (3). The wedge is pressed against the clamping plate (4).

Setting-over the tailstock

Example: Setting-over the tailstock to the front

The rear screw is loosened. By turning the front screw (1) clockwise, the tailstock is moved to the front. When the required set-over position is achieved, the rear screw is tightened again.

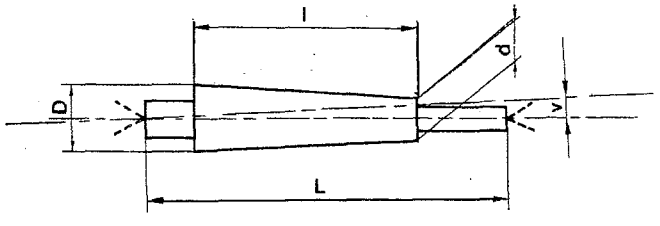


With the aid of the line marks (2), the tailstock can again be brought to the required position.

Note: Front and rear screw must be tightened against each other.

Taper turning using the tailstock set-over

Long and narrow tapers can be machined also with automatic feed, by setting-over the tailstock. The workpiece must be clamped between centers.



Tailstock set-over: $v = \frac{D-d}{2} \times \frac{L}{l}$

Example: D = 70 mm; d = 65 mm;
L = 400 mm; l = 200 mm;

results:

$$v = \frac{70-65}{2} \times \frac{400}{200} = \frac{5}{2} \times 2 = 5 \text{ mm}$$