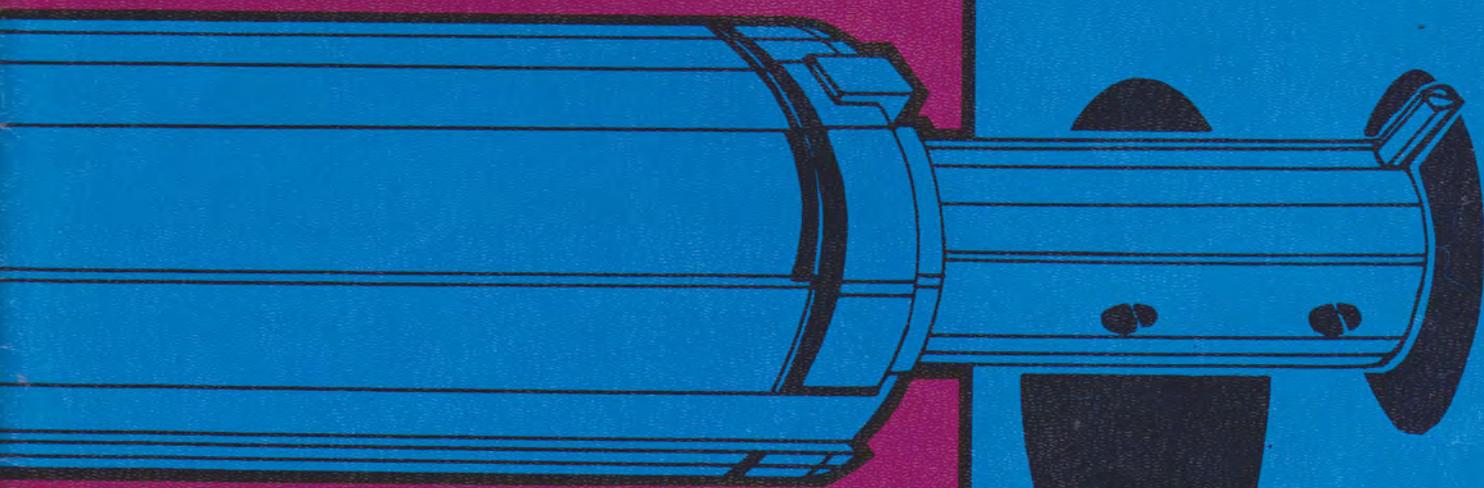




Made in Czechoslovakia

**Strojimport**

**W 100 A**



Horizontal boring and  
milling machine

**VARNSDORF  
TOOLS**

# W 100 A

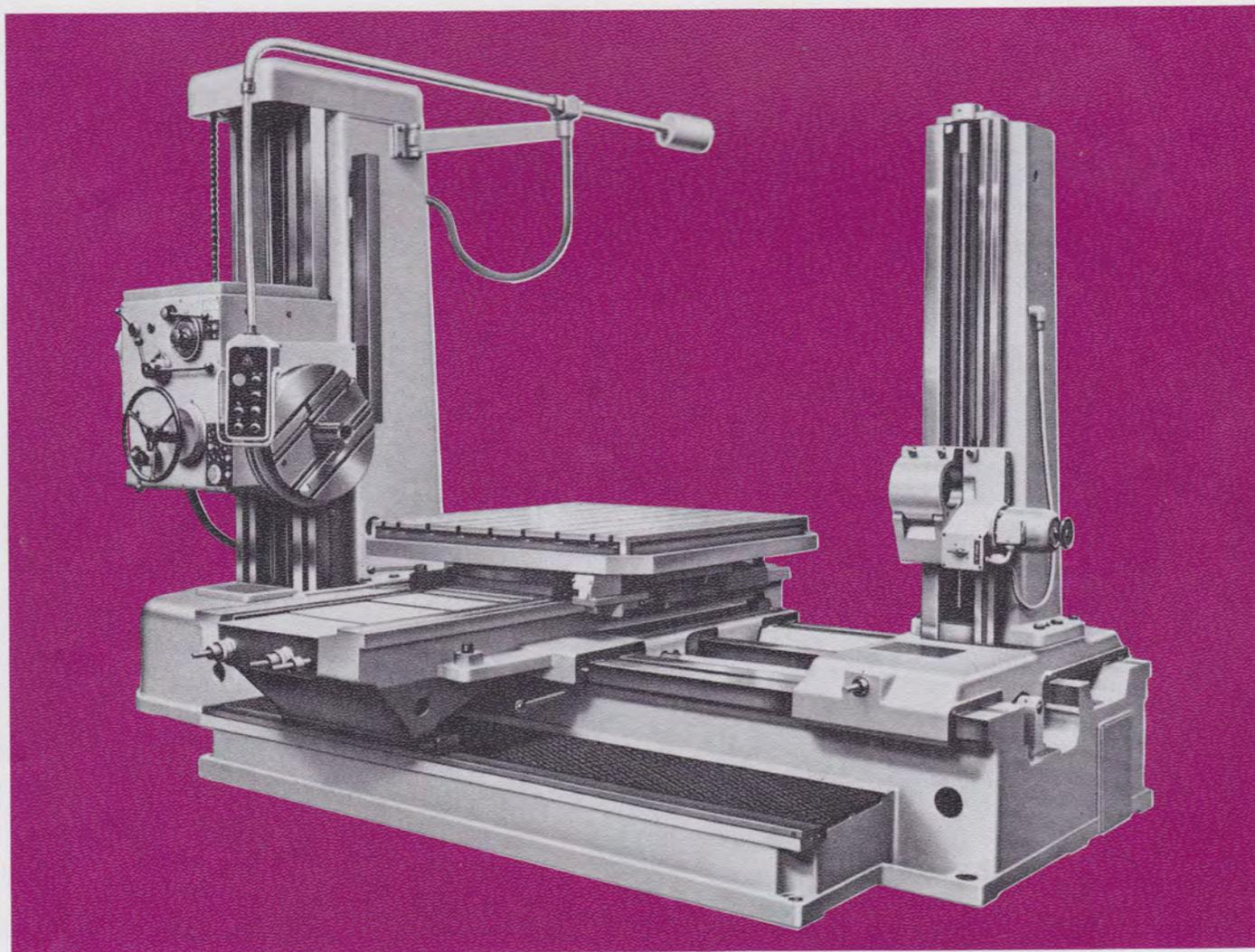
## Horizontal boring and milling machine

**Long tradition –  
high standard –  
outstanding quality**

TOS VARNSDORF is an important Czechoslovak machine tool works, highly specialized in the production of medium size

horizontal boring machines. An extensive capital construction, up-to-date machinery equipment alongside with many years of manufacturing tradition and high professional skill of the staff created optimum conditions for the works to rank among the most modern manufacturers of this kind in the world.

The high renown of the makes manufactured by the TOS VARNSDORF is best confirmed by an ever rising export of the horizontal boring machines to more than 40 countries of all continents. The export of these machines averages over many years more than 80% of the total production volume.



is a modernized version of the well-proved W 100 horizontal boring and milling machine which has been manufactured for more than 30 years and has always belonged to the most selling models of the classical horizontal boring machines. The universal applicability of the new type W 100 A machine is featured by the working possibilities which this new horizontal boring and milling machine offers:

- precision coordinate drilling and boring
- face turning by means of a face plate
- milling with simple and combined tools
- machining by means of long boring bars
- cutting of metric as well as inch threads
- efficient precision machining of cast as well as of welded steel workpieces up to the weight of 3000 kg.

**Main advantages of machine:**

- guideways of bed as well as of slide are lined with hardened steel gibs
- longitudinal and cross slides are covered with plastic
- power-operated shockless clamping of tools
- machine equipped with digital position readout for three coordinates
- wide range of spindle speeds and working feeds
- speeds of face plate and spindle may be either corresponding or independent of each other
- engagement of speeds and feeds by means of preselection lever
- reliable central lubrication of guideways
- covering of guideways in places of machining
- possibility of selecting power output of 4 or 11 kW saving power

### Bed, housing, end support

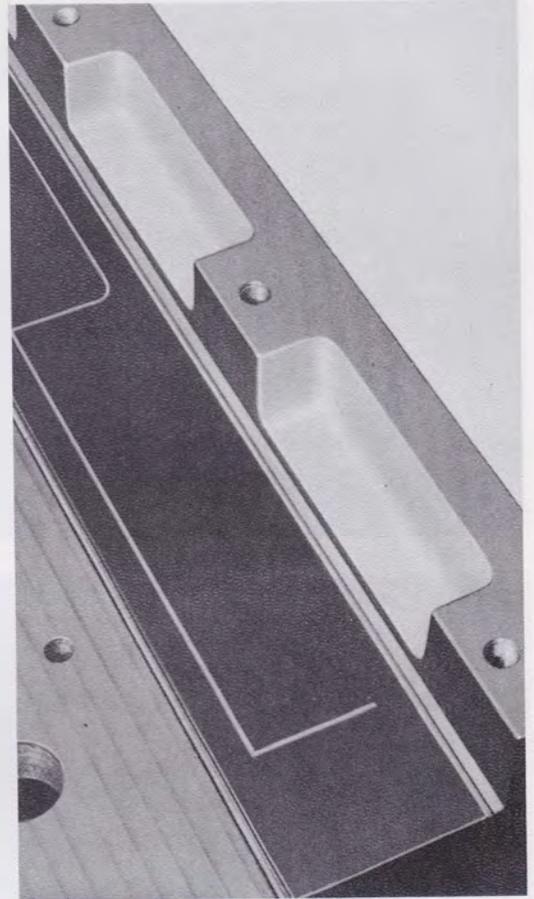
The bed with three flat guideways, one side and one supporting guideway, is purposefully stiffened with ribs inside. Its design ensures a high rigidity and an exact position of the table loaded with workpiece of maximum weight even in extreme positions.

The vertical guideways of the housing are precision ground. The right-hand guideway is particularly wide which ensures precision side guiding of the headstock. The end support is longitudinally adjustable by hand. The bearing of the support serving for bushes and long boring bars may be vertically moved by an electric motor. The fine final setting of the boring bar support is effected by means of a hand wheel on the electric motor shaft.

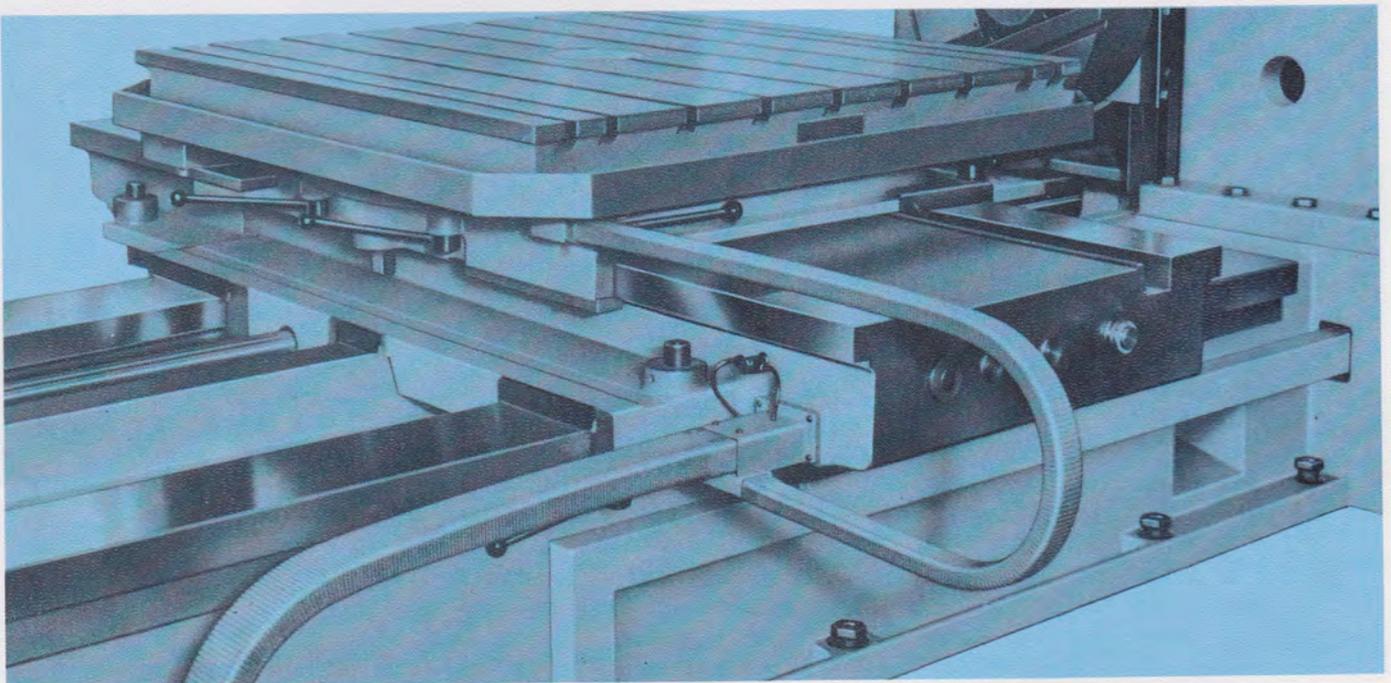
### Slide and table

The important novelty of this machine design are the slide surfaces covered with plastic. The application of plastic results in substantial decrease of friction and in reduction of power consumption for the power feeds. A high continuity even of the finest feeds is another important advantage of this design. The danger of any seizure is practically eliminated.

The thickness of the dark plastic layer is about 1.5 mm. In the plastic the lubrication channels are milled. The side assembled with the respective machine group is suffused with this plastic. The suffusion is done with precision and the surfaces thus obtained do not require scraping any more.



The electric wiring on the slide-table assembly is distributed by means of KONDUFLEX flexible steel protection hoses. The protection of the machine as well as its cleaning possibility are thus enhanced.

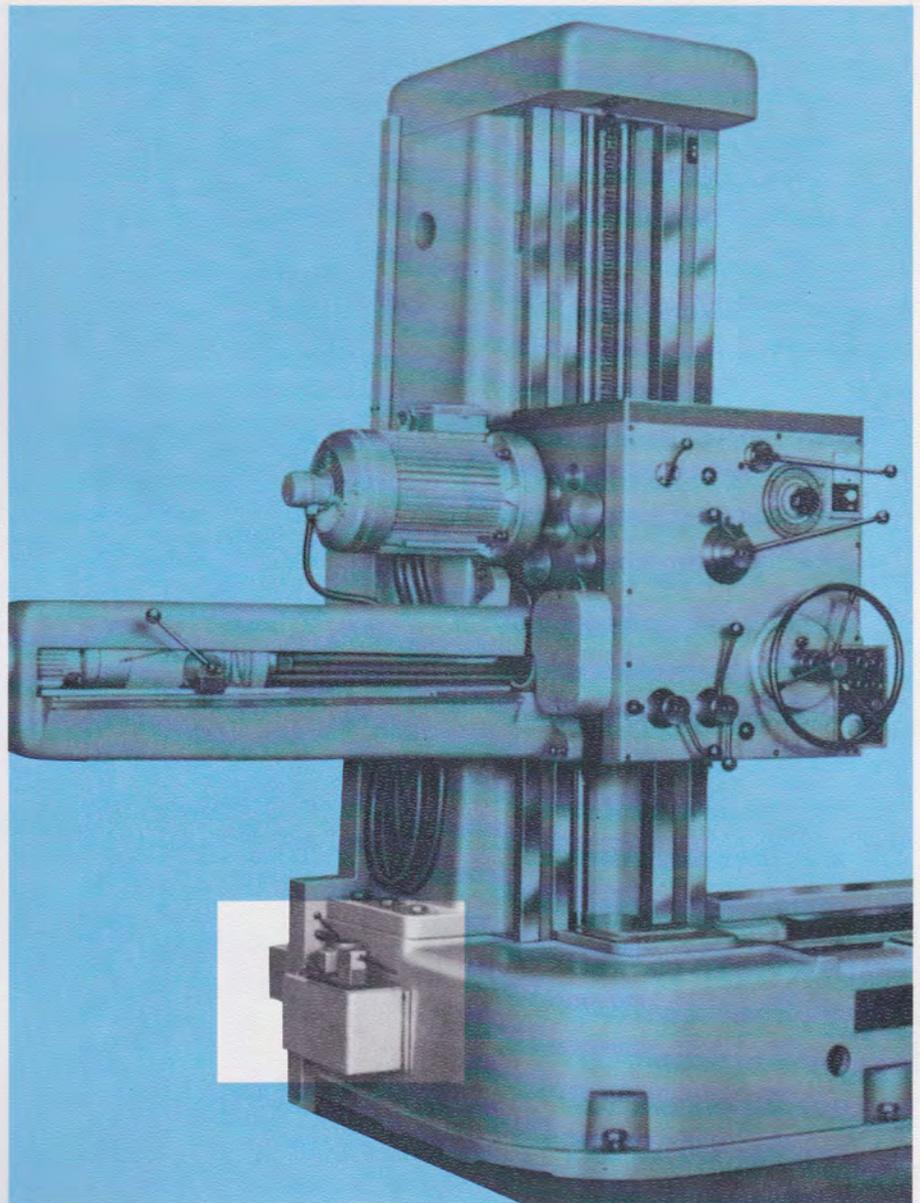


## Central lubrication

The machine assemblies subjected to extra high load — the longitudinal and cross slides with the rotary table bearing the workpiece — are lubricated with pressure oil from the central lubrication set. The headstock is lubricated in the same way. The possibility of adjusting and controlling the quantity of oil in both lubrication branches enables to carry out efficient and oil-saving lubrication. The running of the lubrication set, i.e. the starting of the oil pump motor, is performed by the machine operator by means of a pushbutton on the headstock.

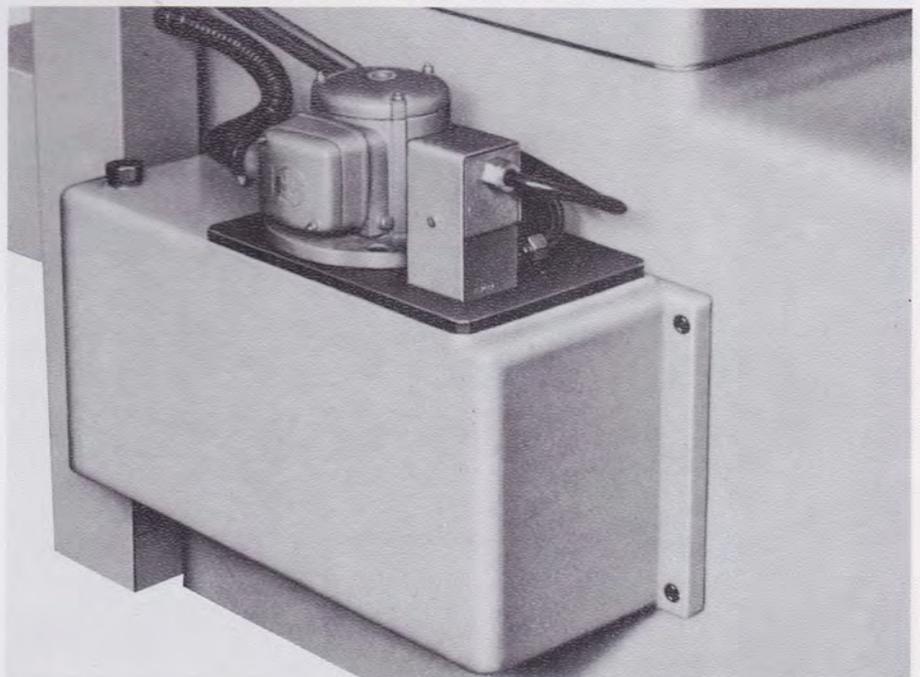
The independent oil tank for lubrication of guideways and the lubricating oil pump form a self-contained unit — the lubrication set. It is placed on the left-hand side of the machine bed and is easily accessible for oil refilling as well as for setting-up of the oilflow rate.

The lubrication oil pump is provided with a two-way valve enabling to set up the quantity of oil delivered to the one or to the other branch.



## Other methods of lubrication

The lubrication of the bearings, gears and other mechanisms of the headstock is automatic, circulating. The oil is drawn from the bottom part of the headstock by a piston pump and distributed to the required lubrication points. The operation of the pump can be checked through a sight glass. Oil level is checked by an oil indicator. The distribution box is automatically lubricated by wicks. The level of oil is checked by means of the oil level gauge. All other parts requiring lubrication are provided with conveniently laid out grease nipples. Lubrication is carried out by means of an oil gun in accordance with the lubrication chart.



## Headstock

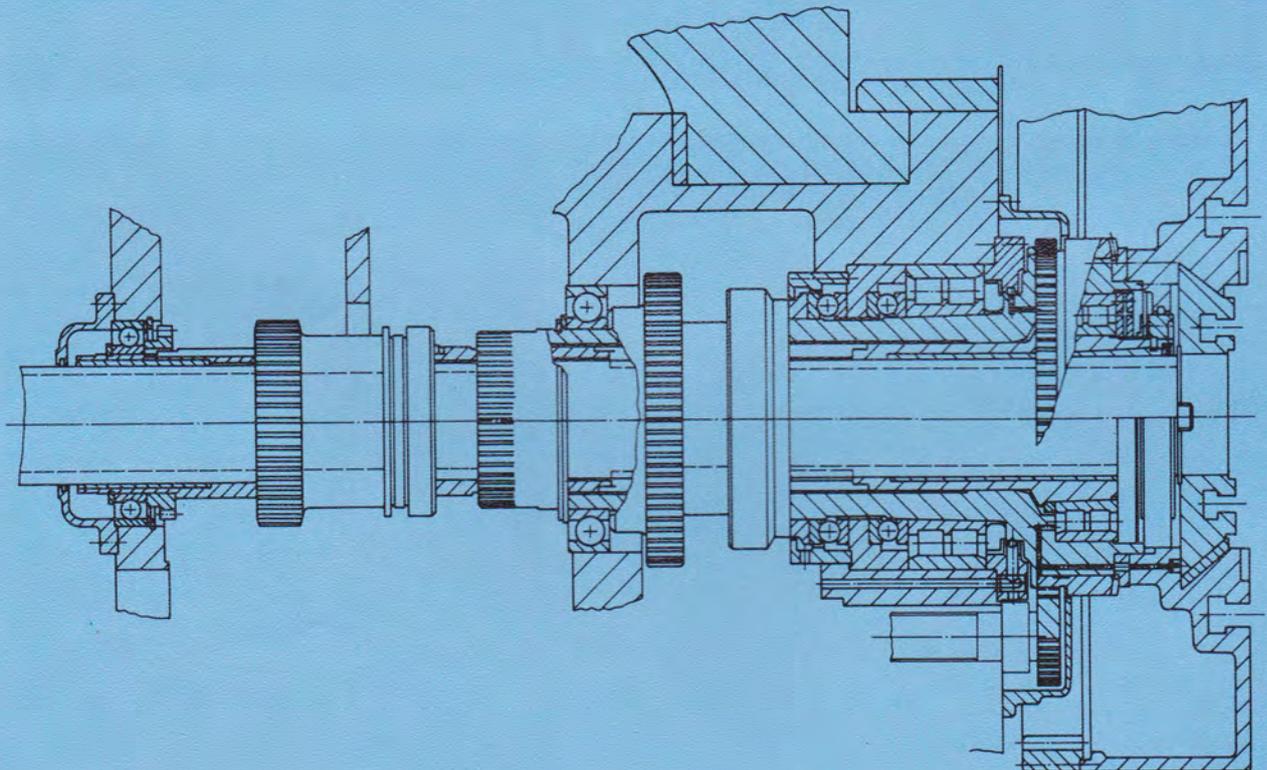
The headstock is a box-shaped casting stiffened with ribs. Inside the headstock are placed the mechanisms for engagement of the spindle speeds and power feeds of moving machine assemblies. Drive is derived from a three-phase asynchronous motor located on the left-hand side of the headstock. The sliding spindle is mounted in two hollow spindles. The face plate provided with tool slide is fastened to the external hollow spindle. The radial forces acting on the spindle mounting are taken up by two double-row roller bearings and two one-row ball bearings, while the axial forces are taken up by two one-way thrust bearings.

## Controls on the headstock

### Mechanical:

1. Lever for engagement of spindle speeds and feeds
2. Check of oil pump function
3. Lever for safety clutch of feeds
4. Disc of circular scales for spindle speeds and feeds
5. Lever for engagement of feed or rapid traverse
6. Lever for selection of machine assemblies
7. Disengagement of spindle feed
8. Engagement of feed ranges
9. Hand wheel
10. Engagement of spindle speed ranges
11. Disconnecting of feed of face plate slide
12. Oil gauge for measuring oil level in headstock
13. Disc with scale for longitudinal sliding movement of spindle

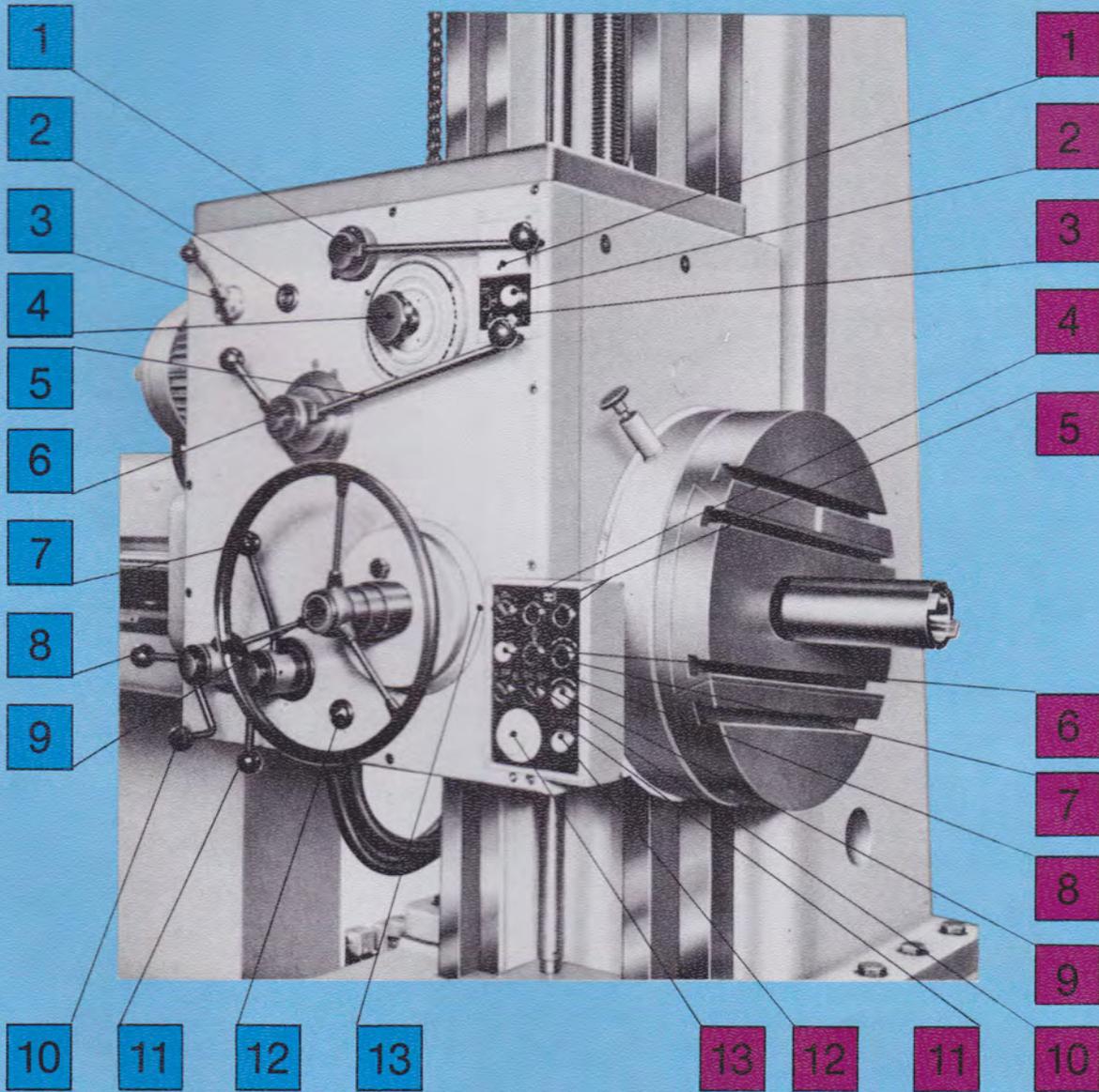
Section through main mounting of the spindles

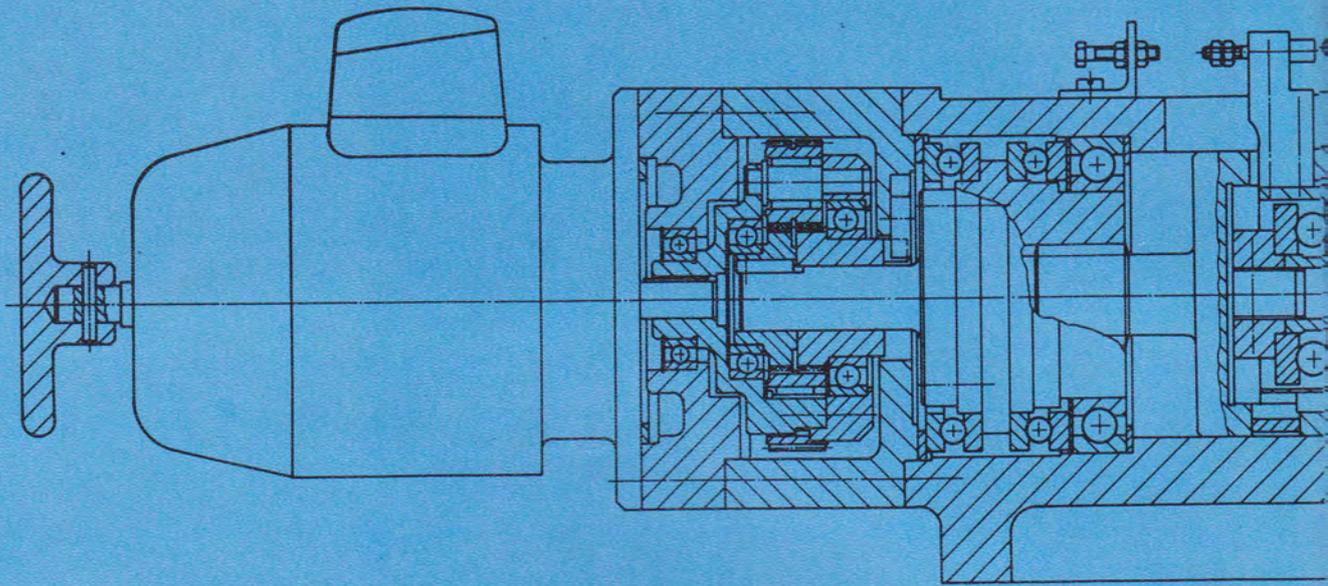


## Electrical

1. Ammeter of motor load
2. Signal light for motor start readiness
3. Lighting of machine
4. Coolant pump switch
5. Power-operated tool clamping
6. Central lubrication of guideways
7. Lighting of optical readers
8. Pushbutton for spindle indexing

9. Pushbutton for continuous spindle operation
10. Preselection of spindle speed sense of rotation
11. Preselection of motor output
12. STOP pushbutton of motor, counter-current braking
13. Central STOP, remote switching-off of main circuit breaker



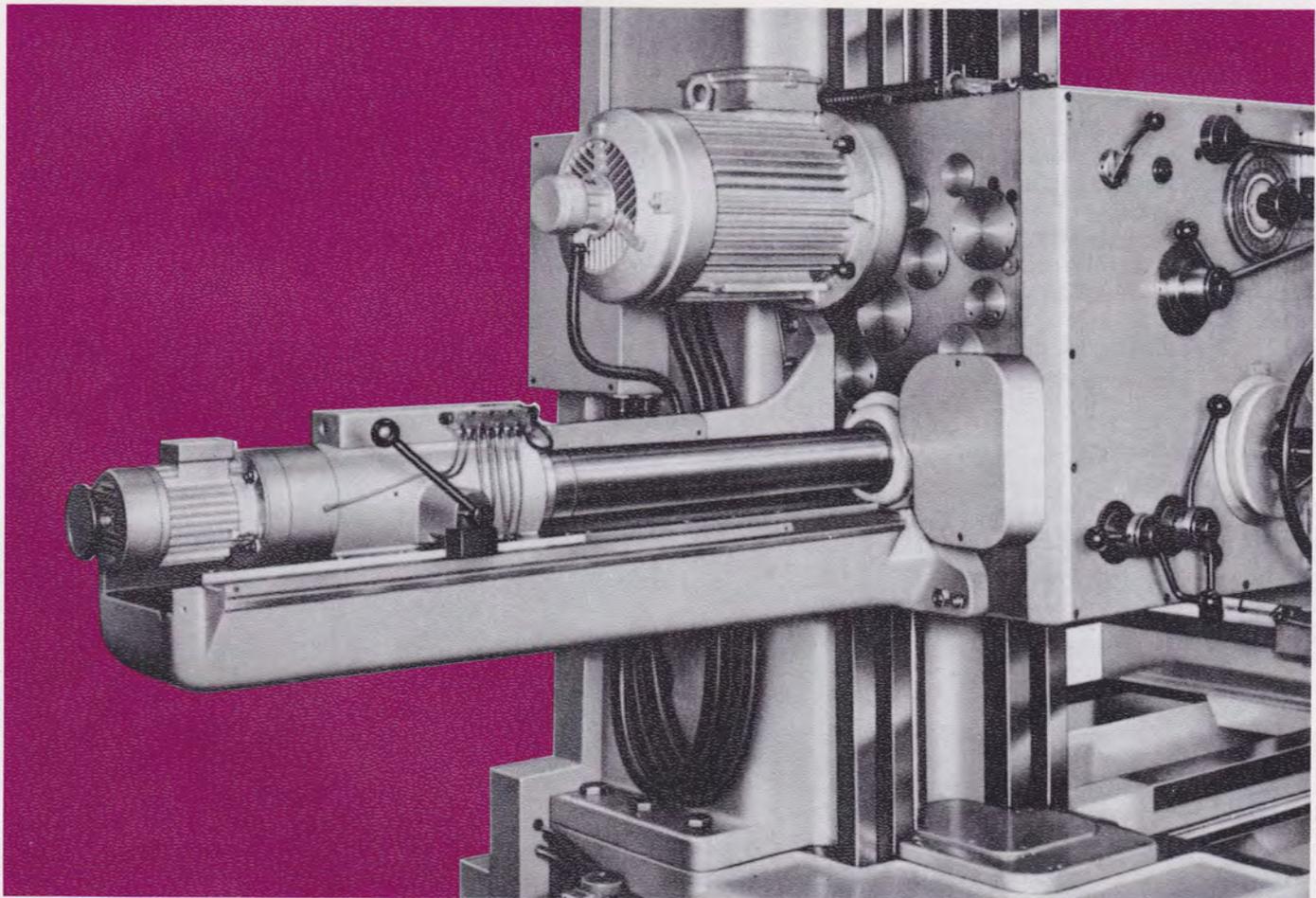
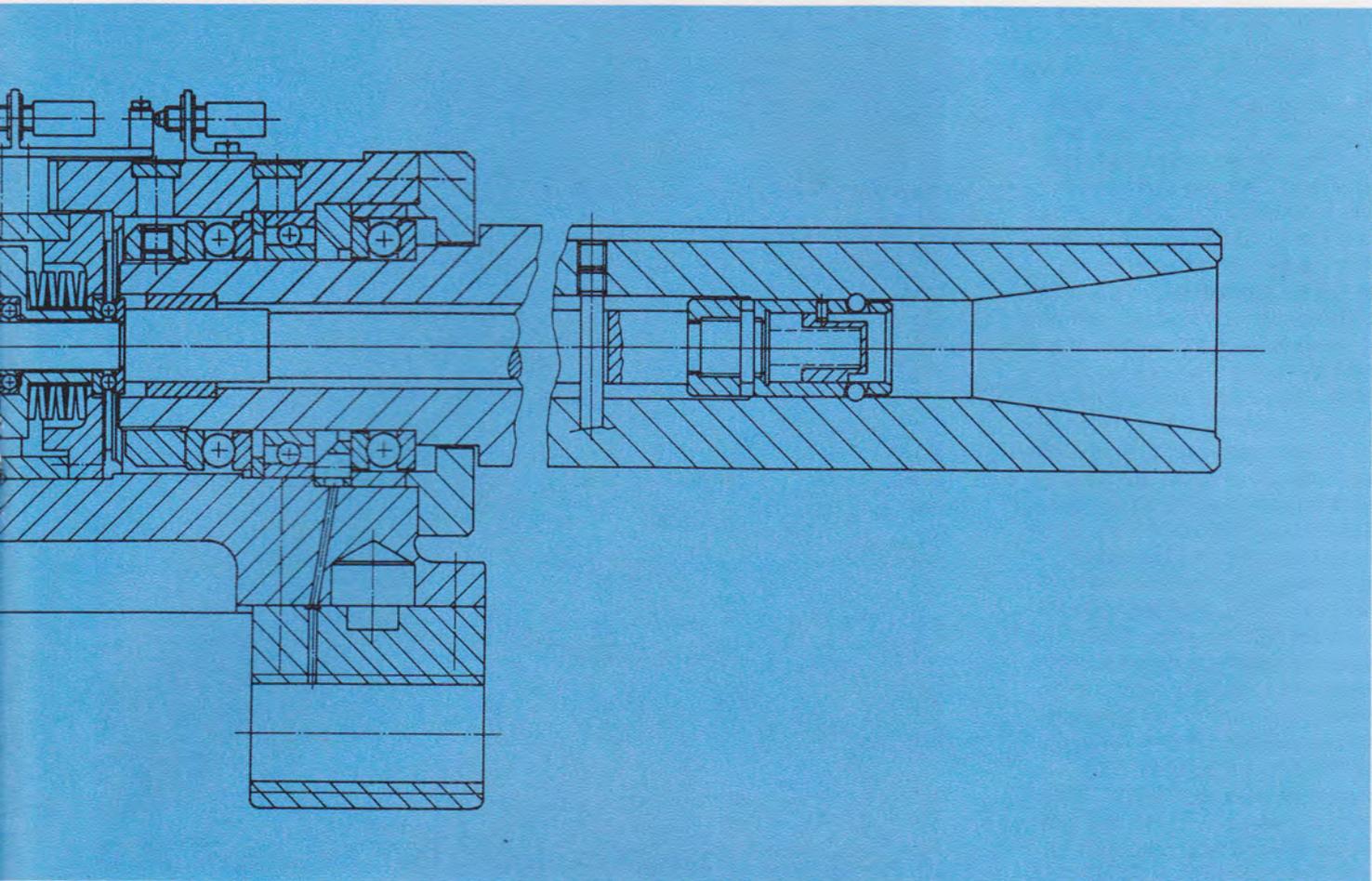


Section through general assembly drawing of power-operated tool clamping attachment (MUN). To important elements of this attachment belong the Belleville springs ensuring the necessary flexibility in tensile force of the attachment.

### Power-operated shockless tool clamping attachment

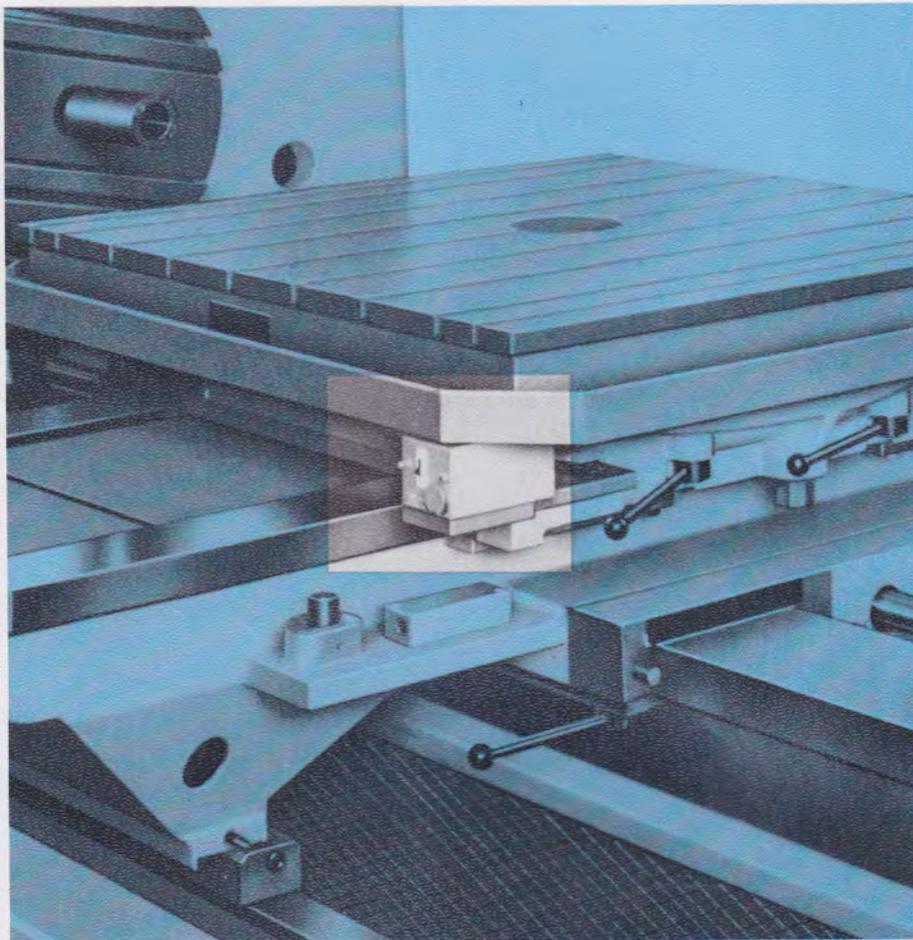
The machine spindle in standard version is provided with taper bore ISO 50 (ČSN 22 0430). The clamping of tools in this spindle is performed by means of an electric motor, drawing attachment and a bar passing through the whole spindle. The tools are fitted with clamping adapters. The clamping adapter being shifted into the spindle bore and being clamped, its cylindrical end is drawn in and gripped by steel balls along its entire periphery. The angular position of tool is given by position of the drivers on the spindle nose.

The power-operated shockless tool clamping attachment is accessible with ease on putting down the cover of the jib. In case a checking and setting of functions is required, an easy approach to conductors and terminal connectors can be obtained by dismounting the cover from the microswitch box and from the box of motor terminal board.



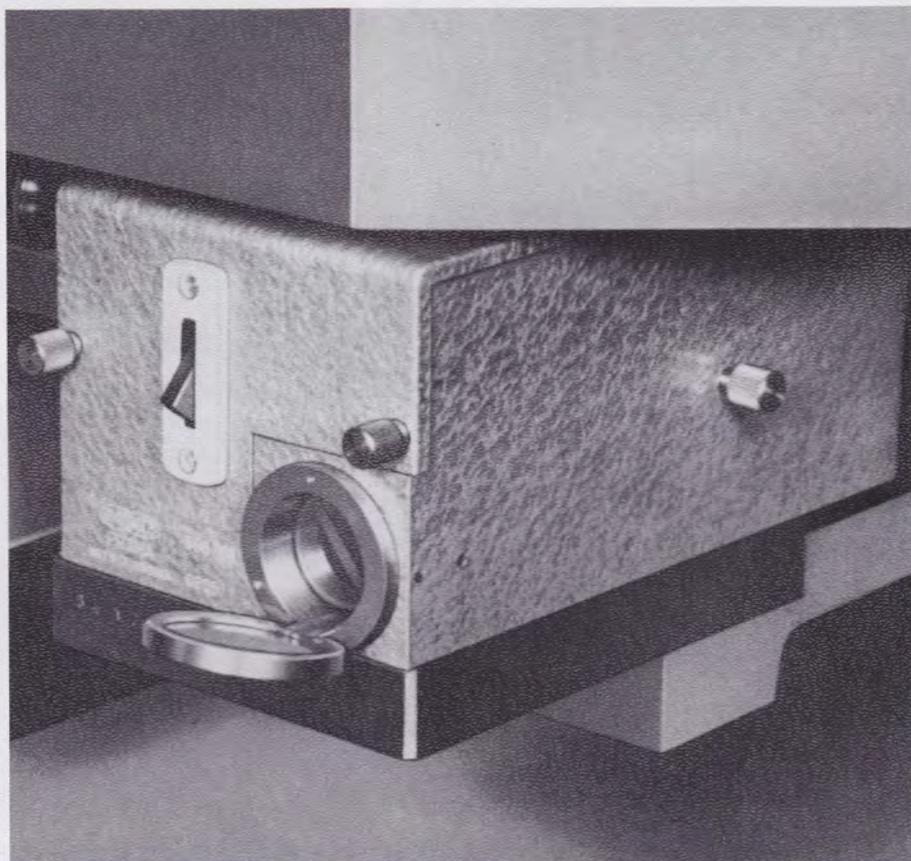
## Precision positioning of rotary table to $4 \times 90^\circ$

The exact setting of the table to positions of  $4 \times 90^\circ$  can be checked by an optical projection-type reading equipment. The tilting mirror, serving also as a cover of the ground glass, may be swivelled to any position. The motion of division line to the sight marks can be easily observed by the operator from the post from where the table rotation is controlled by the hand crank, i. e. in front of the longitudinal slide. The optical projection-type reading equipment enables to set the table to position of  $4 \times 90^\circ$  with an accuracy of  $8''$  (angular seconds). The four corners of the table are provided with adjustable sight marks. When the machine is properly anchored on the specified type of foundation, the maximum final accuracy of table positioning at  $4 \times 90^\circ$  can be obtained by means of measuring the table positions again, using the precision bridge and the tipping arm. The sight marks being adjusted, they can be secured so as to avoid unprompted loss of their positions. In addition to this, the table periphery is provided with scales from 0 to  $360^\circ$ . The above described optical projection-type reading equipment for the table positioning of  $4 \times 90^\circ$  forms a part of the standard accessories delivered with each machine.



The optical projection-type reading equipment for positioning of the table to  $4 \times 90^\circ$  is located under the table edge on the bracket fastened to the cross slide. The ground glass can be observed easily from the operator's post serving for the control of the table by the hand crank. The table may be locked in any position by means of the levers placed on the slide.

On swivelling the table through  $45^\circ$ , the optical reading equipment for table positioning is easily accessible. The cleaning as well as the replacement of the lighting lamp can be carried out with ease. The equipment disposes of independent low voltage lighting.



## Position Readout

The W 100 A horizontal boring machine is supplied with position measuring system of machine assemblies moving in three axes:

- X — cross direction (saddle and table)
- Y — vertical direction (spindle head)
- Z — longitudinal direction (saddle and table)

The machine is available in the following variants:

1. With length gaging by means of scales and verniers.
2. Equipped with racks, IRC member and TESLA NS 115 digital position readout.
3. Equipped with opto-electronic linear encoders Heidenhain LS 603 C and Heidenhain three-axis position readout VRZ 750.
4. Without digital readout system, however with faces suited for the retrofitting of Heidenhain position measuring system.



## Electrical equipment

The machine is driven by a three-phase induction motor. Starting, stopping and reversing is controlled by means of pushbuttons on the front panel of the headstock. The motor is started as well as braked by counter-current in the start connection. The full output of the motor is made use of in the delta connection. During the start the switching-over up to 11 kW of output is done automatically and is controlled by a time relay. The load of the motor can be observed on an ammeter. The motor is protected against overload by thermal overload relays and fuses. Only the three-phase power may be used for the drive of the machine. The machine must be connected to ground and/or to neutral conductor in accordance with the regulations in force.

The auxiliary pendant control panel provides for the following controls:

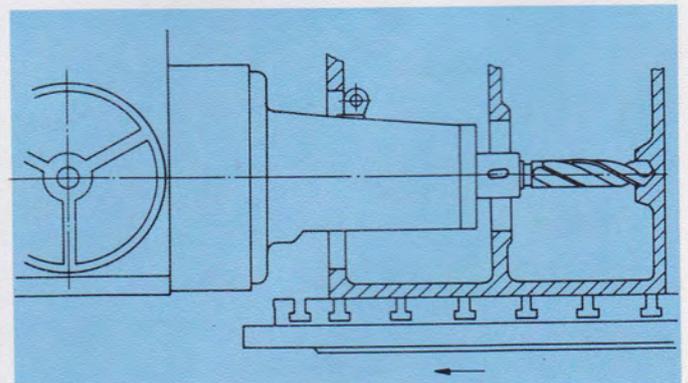
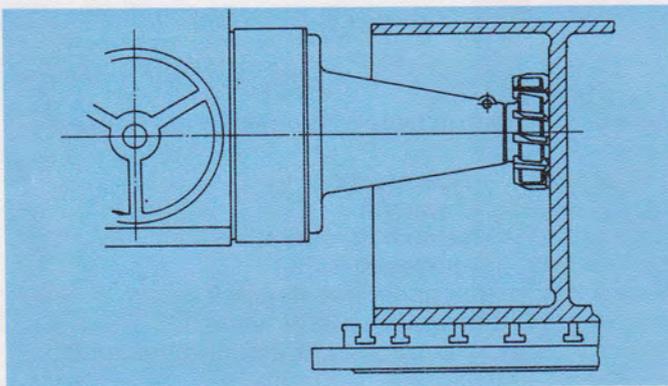
1. selection of sense of spindle rotation
2. pushbutton for inching of spindle
3. pushbutton for continuous spindle operation
4. STOP of motor, counter-current braking
5. pushbutton for putting the panel into function
6. signal lamp for putting the panel into function
7. CENTRAL STOP, remote controlled switching-off of main circuit breaker

## Standard equipment of machine

- set of attendance tools
- hand grease gun — 140 — ČSN 23 1454.1
- hand crank — 250 — PN 60 2501
- suspension screw — M 36 x 3 — ČSN 02 1369
- technical documents
- cleaner for tool taper ISO 50

## Optional equipment of machine

- telescopic holder TD 50/4
- guiding support of spindle VP 100
- clamping support of spindle SP 100
- tool cooling equipment CHZ 100
- vertical milling attachment FP 40 — 100
- set of change gears for cutting of inch threads RZ 100
- boring bars, long plain 50 x 80 x 2500  
50 x 100 x 2500
- plain bearing bushes for boring bar support  
for bars of 80 mm dia. LLK 150/ 80  
for bars of 100 mm dia. LLK 150/100
- set of boring heads for boring bar  $\varnothing$  80 and 100 mm, for boring  
range of 180 to 425 mm
- universal boring head Vhu 125 — ISO 50
- tool adapter
- clamping block UK 500
- clamping angle plates UU 800, UU 950, UU 1120
- auxiliary pendant control panel
- anchoring material KM 100



## Extra machine versions

- machine with the electrical equipment wired for different voltage and cycles
  - machine adapted in accordance with the requirements based on the standards which are different from the ČSN (Czechoslovak standards)
  - machine painted in different colour
- The extra versions of the horizontal boring and milling machine are to be agreed upon in advance on the basis of individual specifications of the customer.

## Main technical data of W 100 A machine

### Headstock

– diameter of spindle	100 mm
– taper in spindle – ČSN 22 0431	50 (ISO 50)
– axial movement of spindle	900 mm
– maximum distance – spindle axis to table surface, „Y“	1120 mm
– maximum distance – face plate to boring bar support	2800 mm
– maximum diameter of face turning	900 mm
– number of spindle speeds	23
– range of spindle speeds	7.1 to 1120 r.p.m.
– number of face plate speeds	16
– range of face plate speeds	7.1 to 224 r.p.m.

### Table

– cross travel of table „X“	1600 mm
– longitudinal travel of table „Z“ (W)	1250 mm
– clamping surface of table	1250 x 1250 mm
– number of T-slots of table	9
– width of T-slots of table (ČSN 02 1030)	22 mm
– pitch of T-slots	160/80 mm
– diameter of centering hole of table	180 H6 mm
– boring feeds (per one spindle revolution)	
number	32
range	0.02 to 12 mm/rev.
– milling feeds	18
number	
range	18 to 900 mm/rev.
– feeds of face plate slide	32
number	
range	0.02 to 12 mm/rev.
– circular feeds of table referred to 1000 mm dia.	18
number	
range	25 to 1400 mm/rev.
– rapid traverse: spindle, headstock, slide and table	2800 mm/min
table rotation	1 r.p.m.
bearing of boring bar support	696 mm/min
– maximum weight of workpiece	3000 kg

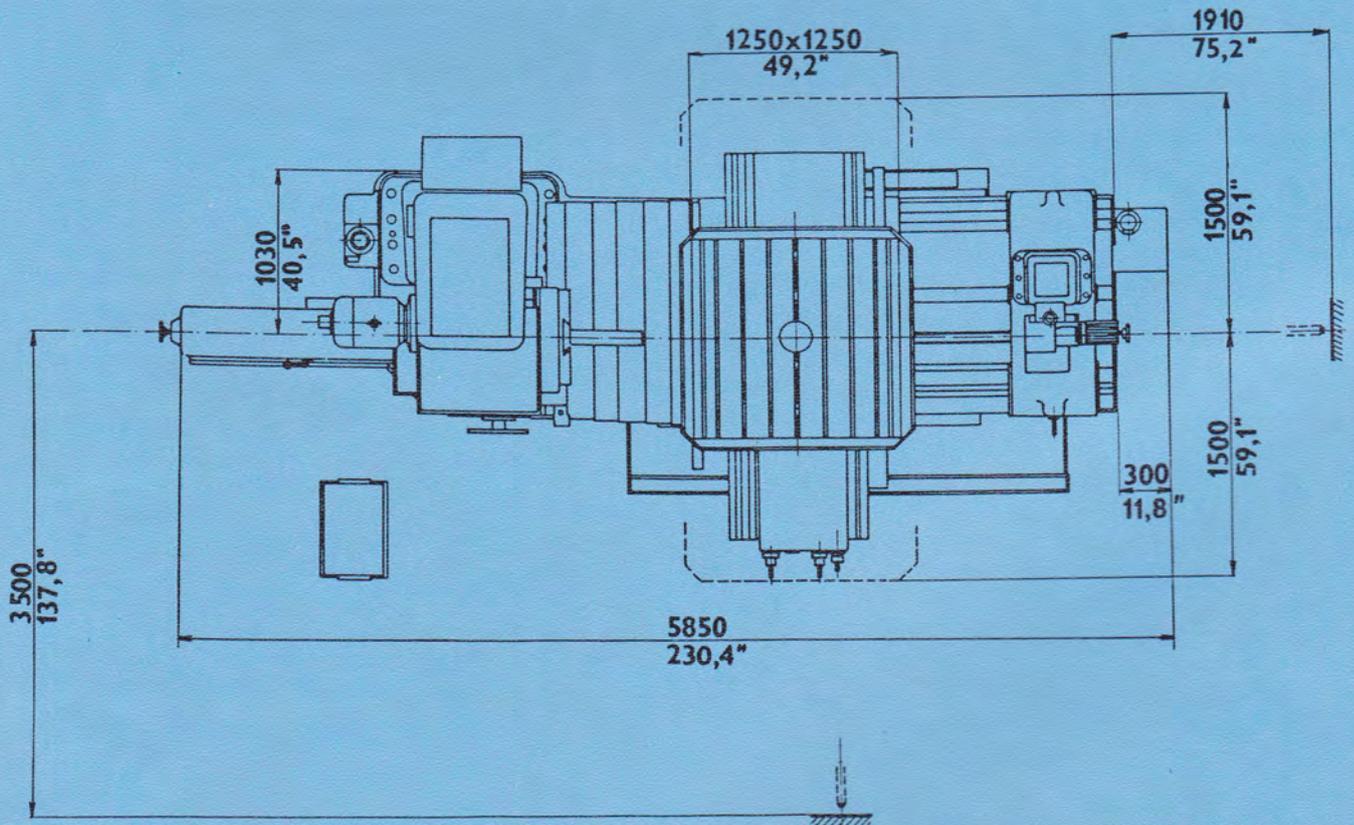
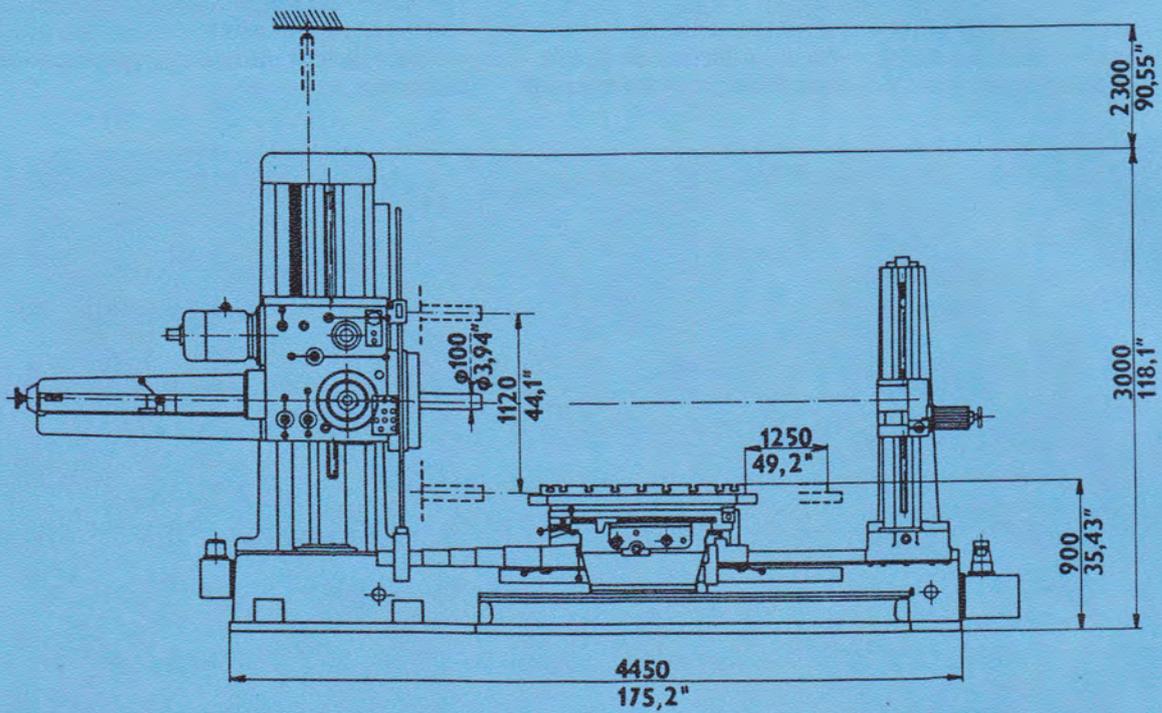
### Threads

– 18 metric threads, lead	0.25 to 12 mm/rev.
– 18 inch threads	120 to 2.5 t.p.i.

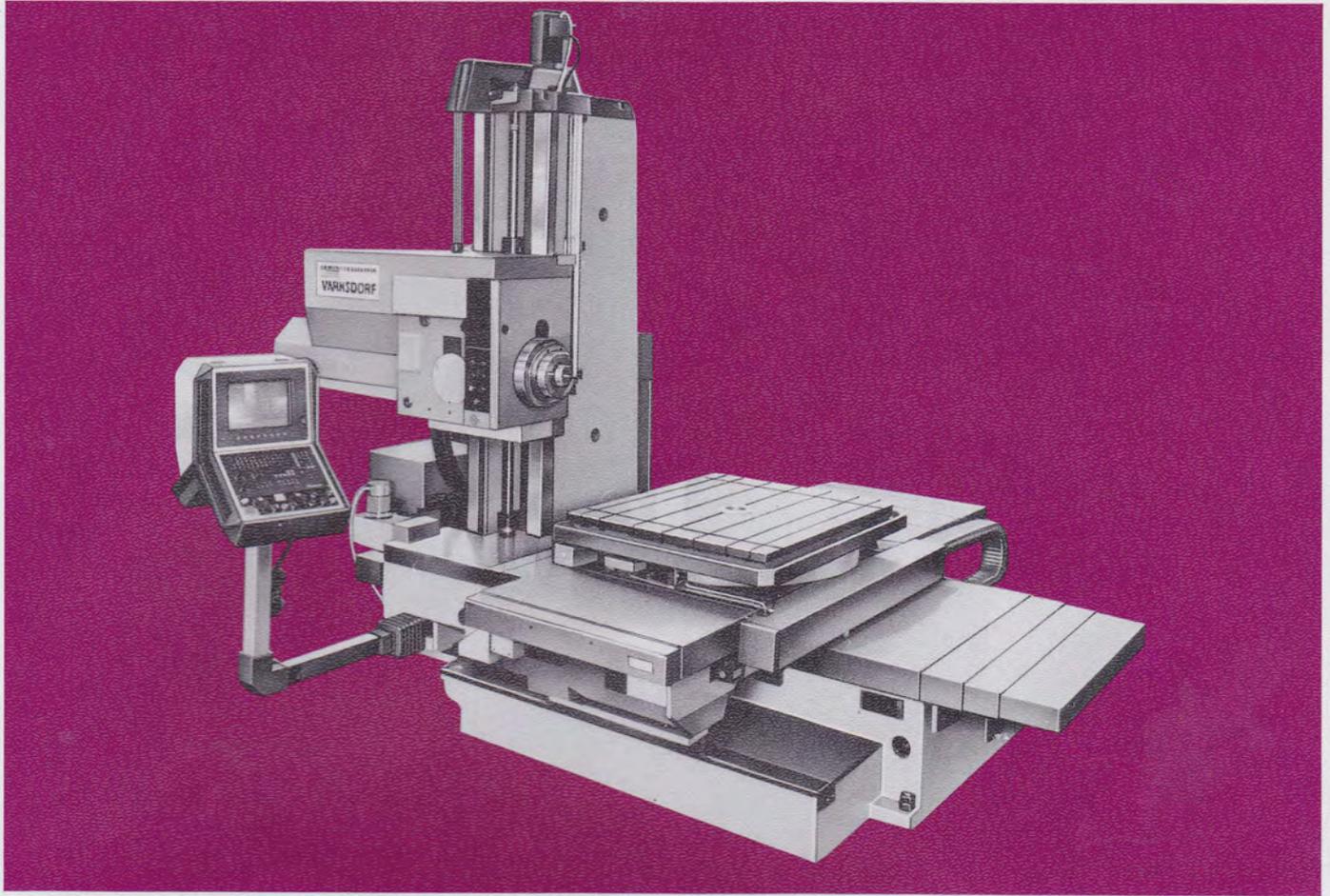
### Drive

– main motor output (for speeds and feeds)	11 kW
– main motor speed	1400 r.p.m.
– output of end support motor	0.55 kW
– speed of end support motor	2780 r.p.m.
– total input of machine	15 kVA
– weight of machine (without packing)	14 000 kg

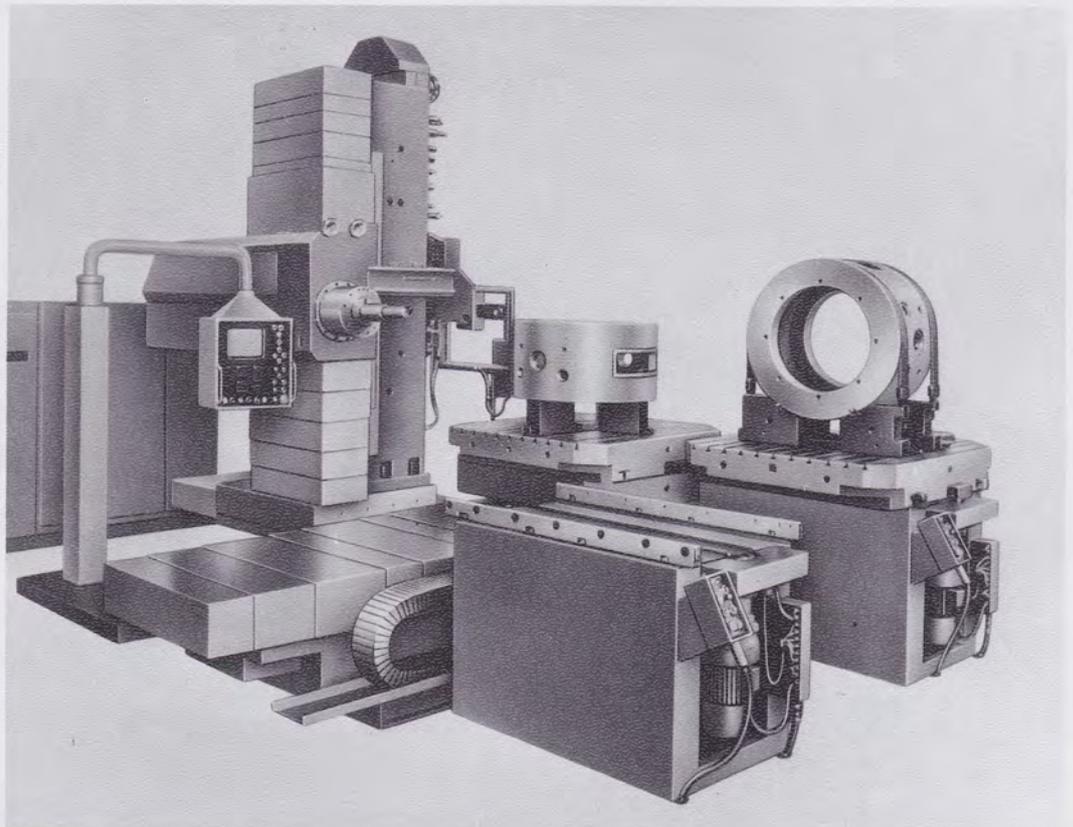
### Dimensions of W 100 A horizontal boring and milling machine



In view of the continuous development and technical improvement of the machines the particulars and illustrations are not binding in detail.



▲  
WH 10 CNC



Selected items in the  
production program of

**VARNSDORF**  
**TOS**

WHN 110 MC ▶

Made in Czechoslovakia



Manufactured by:

**VARNSDORF**  
**TOLS**

**Exporter: Strojimport Ltd.**

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