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OPERATING INSTRUCTIONS

for

„WOHLHAUPTER“ UNIVERSAL BORING AND FACING HEADS

Models UPA 1, UPA 2 and UPA 3

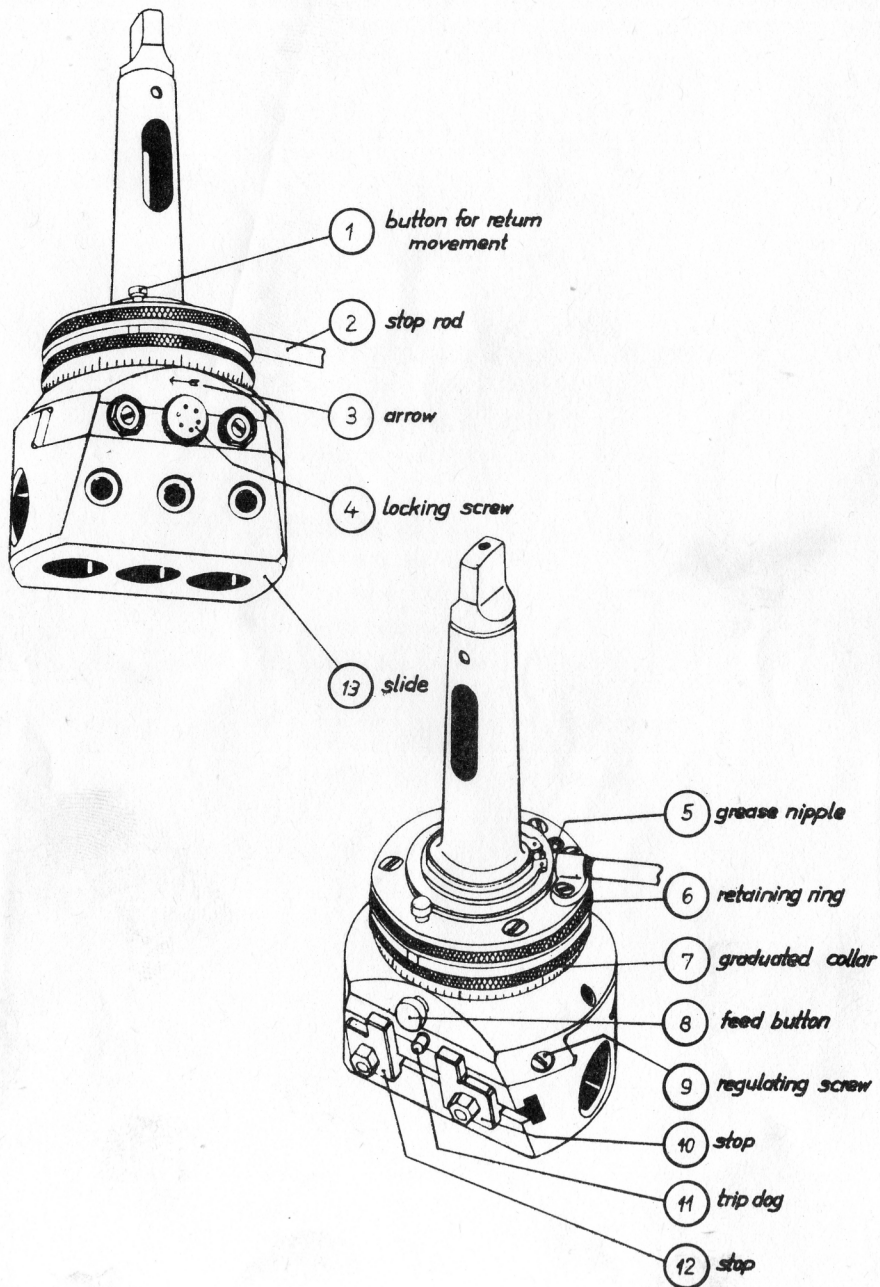


EMIL WOHLHAUPTER & CO.

WERKZEUGFABRIK 7443 FRICKENHAUSEN · WESTERN GERMANY

Illustration pertaining to Operating Instructions for

"WOHLHAUPTER" Universal Facing and Boring Heads UPA1, UPA2, and UPA3



C o n t e n t s

Operating Instructions for WOHLHAUPTER Universal Boring and Facing Heads UPA 1, UPA 2 and UPA 3

Max. admissible speed 1000 rpm

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Encl.:

Annexe 1: Control Elements of Heads UPA 1, UPA 2 and UPA 3

NOTE: Millimeter-values in brackets are not a conversion of the inch-values, but apply to heads with metric graduation.

Operating Instructions

for

"WOHLHAUPTER" Universal Facing and Boring Heads UPA 1, UPA 2 and UPA 3 with self-acting slide feeds and automatic end release; rapid return movement without changing sense of rotation.

A. Purpose. The "WOHLHAUPTER" Facing and Boring Heads are suitable for facing, turning inside and outside diameters, fine boring, recessing and undercutting, as well as taper turning operations, all to be performed on one work setting.

Thanks to this versatility, the range of applications of boring mills, radial drills, lathes, milling machines, transfer units and other machine tools can be greatly increased by using our Universal Facing and Boring Heads.

B. The mounting of the head must be carried out very carefully. The shank of the head is inserted into the machine spindle and secured with a cotter pin, draw-in rod or cap nut against the possibility of falling out.

C. Lubrication For lubrication through grease nipple (5) we recommend a ball bearing grease of medium viscosity, dropping point at about 200°C, of a well-known brand like ESSO "Beacon M 200", SHELL "Alvania Grease 3" or others of corresponding specification. Use a high-quality oil lubricant for the dovetail joint. Please take care that the unit is at all times properly lubricated.

I. Turning Inside and Outside Diameters.

Before starting remove stop rod (2).

a) Quick Setting of Slide (13) and of toolbit respectively:

1. with Head at rest:

Push out feed button (8) by applying operating lever supplied as standard, to its shoulder; then turn graduated collar (7) to the left or to the right.

2. with Head rotating: (feed button (8) must be pushed out).

Stop graduated collar (7).

Sense: When turning collar (7) in the direction of arrow (3), slide (13) will move in the same direction.

1 rotation of graduated collar (7) corresponds to a slide movement of $.02" = .04"$ in dia ($0,5 \text{ mm} = 1,0 \text{ mm}$ in ϕ)

b) Fine Setting of slide (13) and tool bit respectively, with the head at rest:

1. Depress feed button (8) whilst turning graduated collar (7) to the right or to the left.

2. Feed the toolbit using retaining ring (6) whilst reading amount of slide adjustment and/or stock removal from graduated collar (7).

Direction of feed movement: When turning retaining ring (6) in the direction of arrow (3), collar (7) as well as slide (13) will move in the opposite direction to the arrows (3).

1 graduation of collar (7) corresponds to a slide travel of $.00025" = .0005"$ in dia ($0,005 \text{ mm} = 0,01 \text{ mm}$ in ϕ).

Stops (10) and (12) may be shifted and clamped alongside stop pin (11) so that a preset scale division can, at any time, be easily located.

c) Locking the Slide

Release setscrew (4) before adjusting slide (13) and tool respectively, and re-tighten it thereafter.

NOTE: Do not touch retaining ring (6) during operation when feed button (8) is pressed in, or the slide will be thrown out of adjustment.

C o n t e n t s

Operating Instructions for WOHLHAUPTER Universal Boring and Facing Heads UPA 1, UPA 2 and UPA 3

Max. admissible speed 1000 rpm

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5	III. <u>Taper Turning</u>

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Annexe 1: Control Elements of Heads UPA 1, UPA 2 and UPA 3

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Operating Instructions

for

"WOHLHAUPTER" Universal Facing and Boring Heads UPA 1, UPA 2 and UPA 3
with self-acting slide feeds and automatic end release; rapid return
movement without changing sense of rotation.

A. Purpose. The "WOHLHAUPTER" Facing and Boring Heads are suitable for facing, turning inside and outside diameters, fine boring, recessing and undercutting, as well as taper turning operations, all to be performed on one work setting.

Thanks to this versatility, the range of applications of boring mills, radial drills, lathes, milling machines, transfer units and other machine tools can be greatly increased by using our Universal Facing and Boring Heads.

B. The mounting of the head must be carried out very carefully. The shank of the head is inserted into the machine spindle and secured with a cotter pin, draw-in rod or cap nut against the possibility of falling out.

C. Lubrication For lubrication through grease nipple (5) we recommend a ball bearing grease of medium viscosity, dropping point at about 200°C, of a well-known brand like ESSO "Beacon M 200", SHELL "Alvania Grease 3" or others of corresponding specification. Use a high-quality oil lubricant for the dovetail joint. Please take care that the unit is at all times properly lubricated.

I. Turning Inside and Outside Diameters.

Before starting remove stop rod (2).

a) Quick Setting of Slide (13) and of toolbit respectively:

1. with Head at rest:

Push out feed button (8) by applying operating lever supplied as standard, to its shoulder; then turn graduated collar (7) to the left or to the right.

2. with Head rotating: (feed button (8) must be pushed out).
Stop graduated collar (7).

Sense: When turning collar (7) in the direction of arrow (3), slide (13) will move in the same direction.

1 rotation of graduated collar (7) corresponds to a slide movement of $.02" = .04"$ in dia ($0,5 \text{ mm} = 1,0 \text{ mm}$ in ϕ)

b) Fine Setting of slide (13) and tool bit respectively, with the head at rest:

1. Depress feed button (8) whilst turning graduated collar (7) to the right or to the left.
2. Feed the toolbit using retaining ring (6) whilst reading amount of slide adjustment and/or stock removal from graduated collar (7).

Direction of feed movement: When turning retaining ring (6) in the direction of arrow (3), collar (7) as well as slide (13) will move in the opposite direction to the arrows (3).

1 graduation of collar (7) corresponds to a slide travel of $.00025" = .0005"$ in dia ($0,005 \text{ mm} = 0,01 \text{ mm}$ in ϕ).

Stops (10) and (12) may be shifted and clamped alongside stop pin (11) so that a preset scale division can, at any time, be easily located.

c) Locking the Slide

Release setscrew (4) before adjusting slide (13) and tool respectively, and re-tighten it thereafter.

NOTE: Do not touch retaining ring (6) during operation when feed button (8) is pressed in, or the slide will be thrown out of adjustment.

II. Facing, Recessing, Undercutting

a) Self-acting Slide Feed.

1. Loosen setscrew (4): slide (13) must not be clamped.
2. Depress feed button (8), simultaneously turning graduated collar (7) slightly in the desired sense.
3. Place stop rod (2) in retaining ring (6) holding it by hand or using machine for support.
4. Rotate the head (by starting the machine).

As the head rotates with ring (6) retained, the slide will feed at a constant rate of .002" (0,05 mm) per rev.

b) Automatic End Release of Cross Feed

As a rule, the automatic end release becomes operative by stop (12) hitting stop pin (11) or else in case of excessive cutting pressure due to damaged tools, blunt, broken, or otherwise.

If anything of that nature happens, feed button (8) will jump out immediately thereby disrupting the feed movement. When holding retaining ring (6) with stop rod (2) by hand, the end release can be felt.

The sensitivity of the feed button (8) can be adjusted to the specific cutting pressure (determined by tensile strength, cross section of chip and cutting speed) by regulating screw (9).

Should the stop device be used for automatic end release true to diameter, subsequent to the facing operations, follow instructions on page 4, sect.f.

c) Rapid Return without changing sense of rotation or stopping the work-spindle, is initiated as follows, after disengagement of the cross feed:

Depress button for rapid return (1) using the lever supplied, and hold retaining ring (6) with stop rod.

Slide (13) will immediately withdraw at a rate of .02"=.04" in dia (0,5 mm = 1,0 mm in ϕ). Return button (1) may also be depressed before the automatic end release has become operative; the advance movement will then be arrested immediately and the slide withdraw.

If depressing return button (1) with the work spindle at rest: Has stop pin (11) been hit either by slide (13) at the end of the advance movement, or by stop (12), unclamp the slide by turning collar (7) contrary to the direction of arrow.

Thereupon depress return button (1) as follows:

Turn retaining ring (6) until return button (1) comes to stay between two divisions of scale (7); press button (1), stop retaining ring (6) using the stop rod, and engage clockwise rotation of the head.

d) Arresting the Rapid Return:

Either remove stop rod (2) thereby releasing retaining ring (6) or, with the return button (1) depressed, wait until preset stop (10) will hit stop pin (11). Return button (1) will then spring back, thereby immediately arresting the return movement. In order to retract the slide thus returned from stop (10), turn graduated collar (7) rapidly in direction of arrow. Feed button (8) may then be depressed whilst going on turning collar (7).

- e) Advance and return movements without applying the stop rod can only be recommended when operating at low speeds and without using the stops for end release.

The self-acting feed of the slide is produced by holding retaining ring (6) during rotation of the head with feed button (8) being depressed (cf. Section IIa/2).

Rapid return without reversing the sense of rotation is produced by arresting graduated collar (7) during rotation of the head after feed button (8) was pushed out by means of the operating lever. Do not depress return button (1)!

- f) Stop Adjustment to assure automatic end release true to diameter.

The stop must be set and bolted to the slide in such a way as to cause Cross Feed to disengage instantaneously upon the predetermined diameter having been produced by the cutting tool.

Thigten Regulating Screw as little as possible so as to keep release pressure between stop and stop pin at the lowest possible level.

To produce an exact ratio between cutting tool and end release it is recommended to ascertain the amount of deviation to be eliminated by a test release.

For this reason, after coarse setting of the stop, which must be tightly secured in position, a test release of the Cross Feed is made. This permits ascertaining of the actual turning diameter produced by the tool with the present setting of the cross feed. The stop must then be adjusted by half the difference between the desired and the actual diameter obtained by the first trial release.

Proceed as follows:

1. Stop nuts should not yet be removed, but slide should be moved back until a sliding fit of a gage block to be determined e.g. 1/8", between stop and stop pin has been secured.
2. With the aid of the slide locking screw, secure slide in this position, thus preventing it from changing position on adjustment of the stop.
3. Calculate new gage block, proceeding as follows:
 - a) Should the diameter obtained be smaller than the diameter required, the new gage block would have to be 1/8" plus 1/2 of the difference ascertained.
 - b) Should the diameter obtained be larger than the required diameter, the new gage block would have to correspond to 1/8" less 1/2 the amount of the difference.
4. Now Loosen stop nuts, adjust stop and secure again in position when sliding fit for new gage block has been obtained.
5. Remove gage block, loosen slide locking screw.

At this point, the end release is set on the value desired and, provided no further re-adjustment of the stop is carried out, end releases will take place at a tolerance of .002" on the diameter (0.05 mm ϕ).

III. Taper Turning

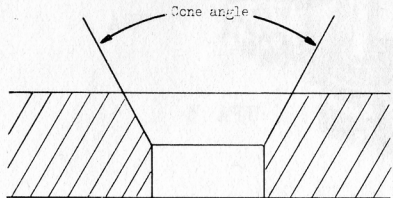
Engage transverse feed as described in Sect. IIa, in addition to axial feed motion of the machine spindle or the machine table as per table below:

Slide feed with UPA 1 and UPA 2 = .00222" per rev.		Slide feed with UPA 3 = .00203" per rev.			
Cone angle	required axial machine feed per rev.		Cone angle	required axial machine feed per rev.	
	with UPA 1 and UPA 2	with UPA 3		with UPA 1 and UPA 2	with UPA 3
10°	.02540	.02318	80°	.00265	.00242
15°	.01688	.01540	85°	.00242	.00221
20°	.01260	.01150	90°	.00222	.00203
25°	.01002	.00915	95°	.00204	.00185
30°	.00829	.00757	100°	.00186	.00170
35°	.00705	.00643	105°	.00170	.00155
40°	.00610	.00557	110°	.00155	.00142
45°	.00536	.00490	115°	.00142	.00129
50°	.00476	.00435	120°	.00128	.00117
55°	.00427	.00389	125°	.00115	.00105
60°	.00385	.00351	130°	.00103	.00094
65°	.00349	.00318	135°	.00092	.00084
70°	.00317	.00290	140°	.00081	.00074
75°	.00290	.00264	145°	.00070	.00064
			150°	.00059	.00054

Table values represent the axial feeds of machine spindle and/or table per revolution required so as to produce, in conjunction with the cross feed of the head, the selected Taper.

Example:

A taper of 60° as per sketch is produced by a machine feed of .00385" and, with UPA 3, .00351" respectively, according to the table. The calculated feed rates will, however, not always be available so that the nearest value within the range of the machine will have to be applied. This will, of course, result in a correspondingly small deviation of the cone angle.

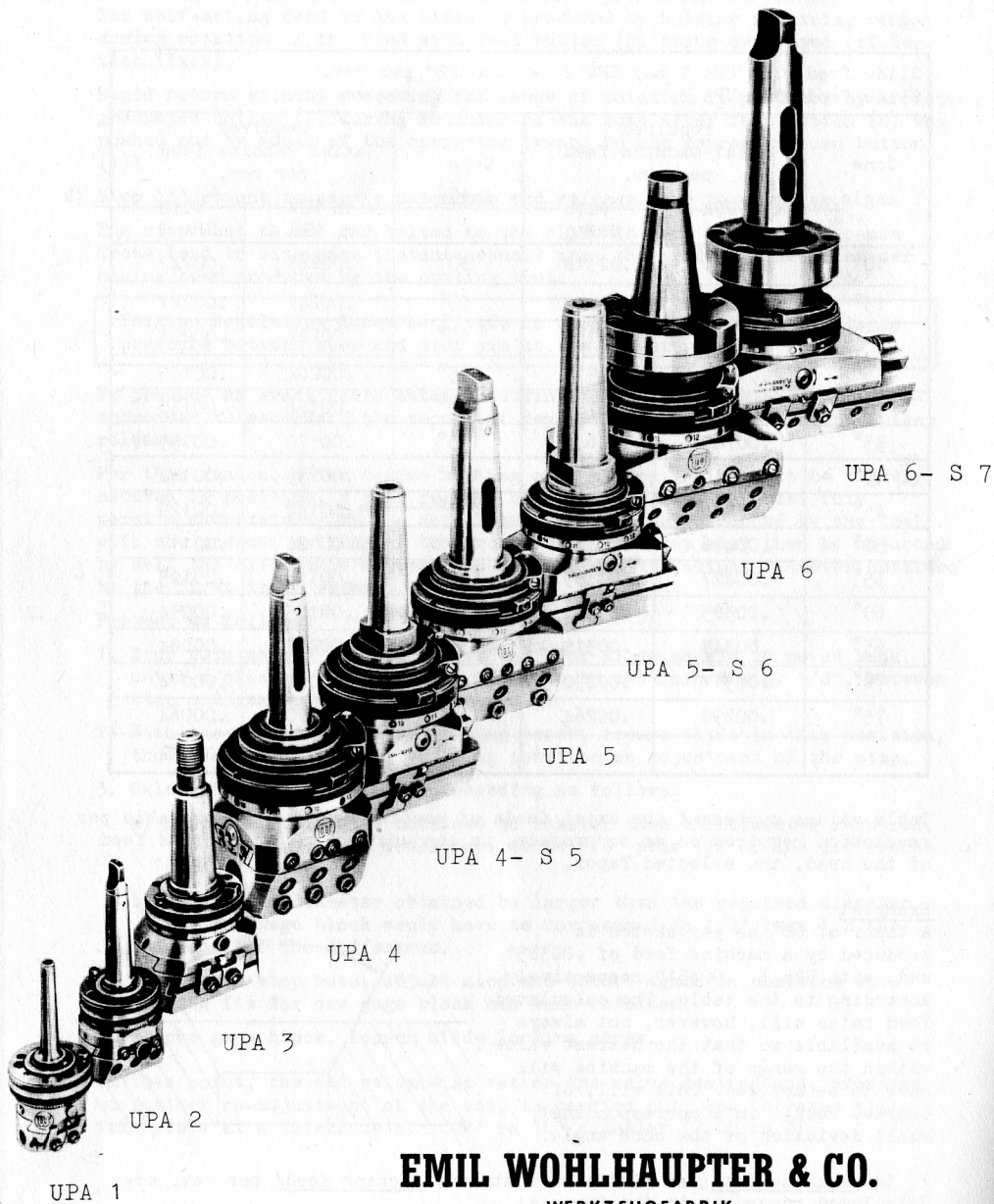


If the machine feed per minute were stated, machine feeds per rev. are calculated according to the formula:

$$\frac{\text{machine feeds per min.}}{\text{No. of rev.}} = \text{machine feeds per rev.}$$

"WOHLHAUPTER" Universal Facing and Boring Heads

UPA 1 - UPA 6s7



EMIL WOHLHAUPTER & CO.

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