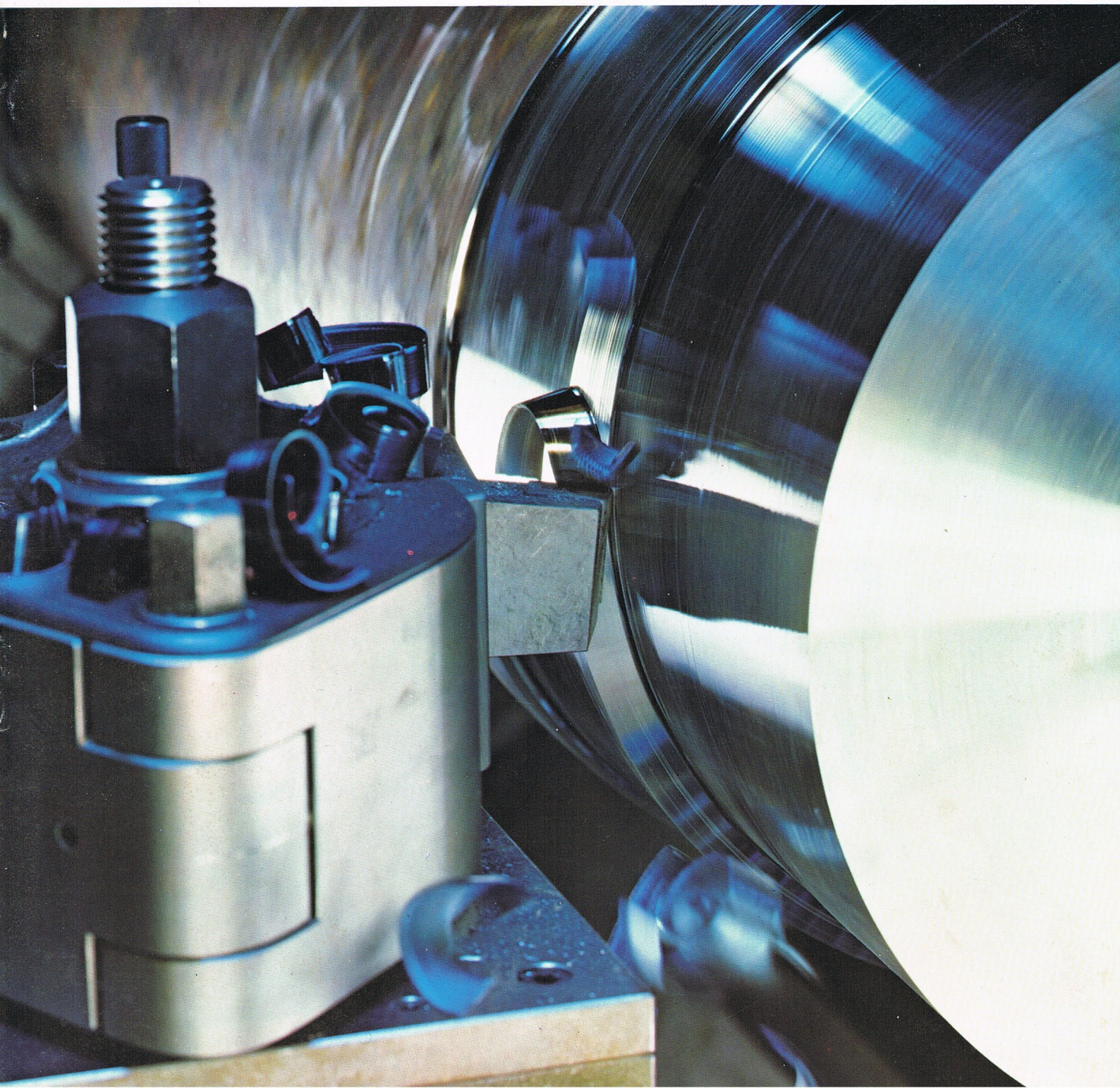


GILDEMEISTER

HEIDENREICH & HARBECK

**Universal turning machines
HAMBURG 840/HANSEAT 1020**



HAMBURG 840/HANSEAT 1020

The large heavy-performance turning machines of the model range HAMBURG/HANSEAT.

The high-performance turning machines HAMBURG 840 and HANSEAT 1020 complete the successful HAMBURG/HANSEAT model range at the top end. Machines within this capacity and performance range are frequently expected to provide a high degree of universality. For this reason, the models HAMBURG 840/HANSEAT 1020 are offered together with a wide range of extra attachments. In this way, these heavy machines can provide an exceptionally wide field of application which includes all the utilization potential of the successful M820/V1020 models.

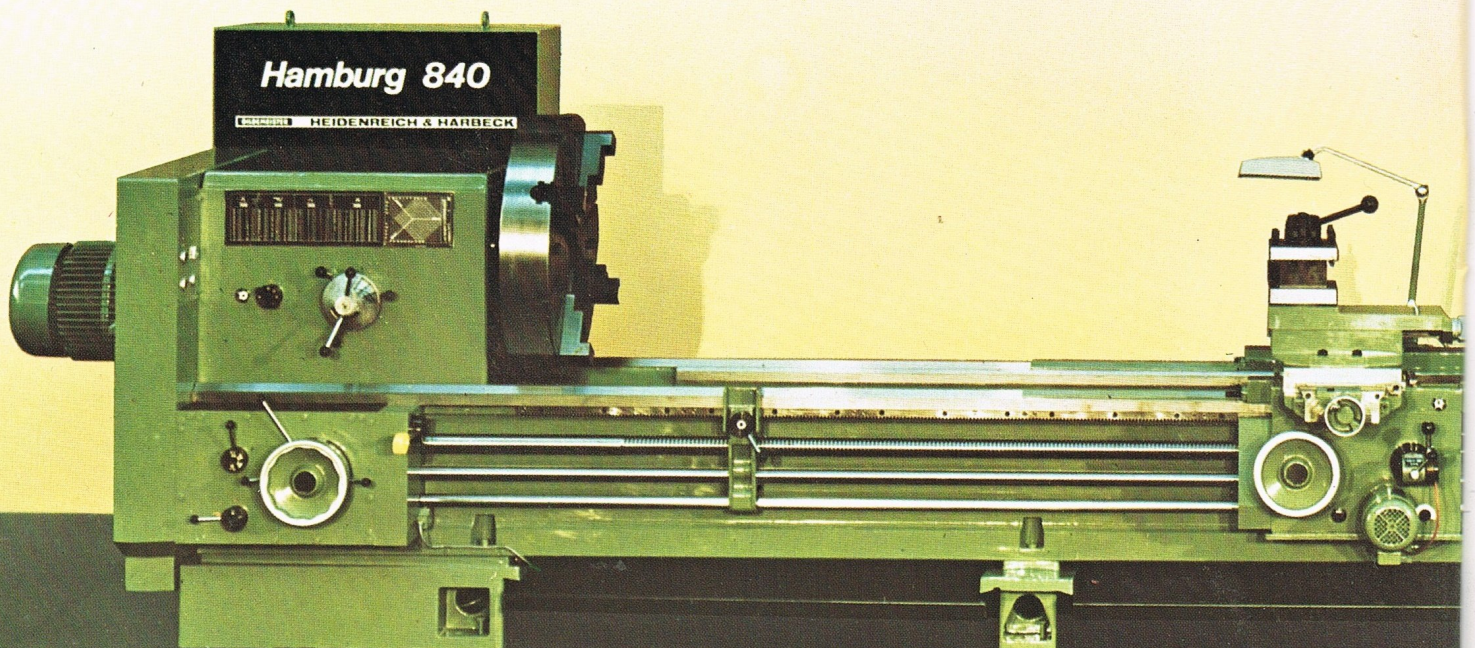
HAMBURG and HANSEAT turning machines are now available in three sizes and six models. For our customers this means:

Thoroughly tested and mature engineering offering identical operator convenience for the whole model range.

Service from a single source.

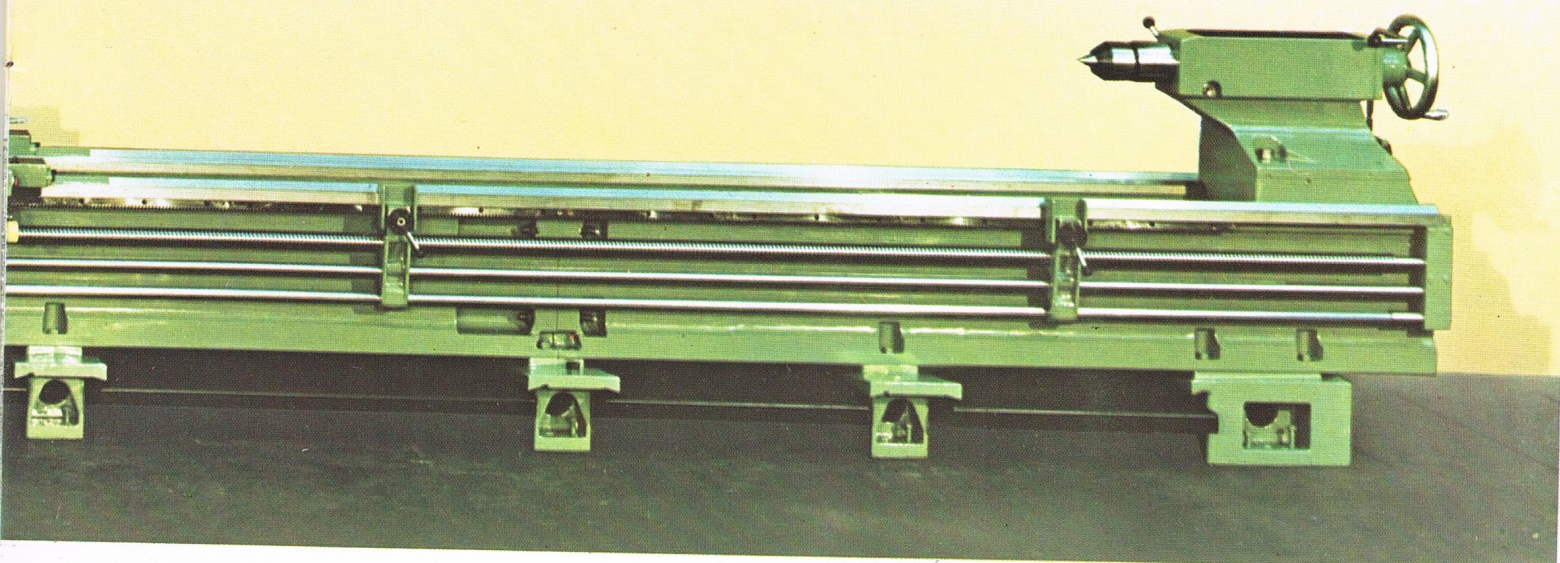
Rigidity and progressive engineering

- Unusually rigid bed through optimized bed cross-section design.
- Unusually high main spindle rigidity through optimized distance between bearings.
- One-hand quadrant selection for feed box allowing rapid feed changes with ratio 2. At low spindle speeds, feeds can also be changed while the machine is running.

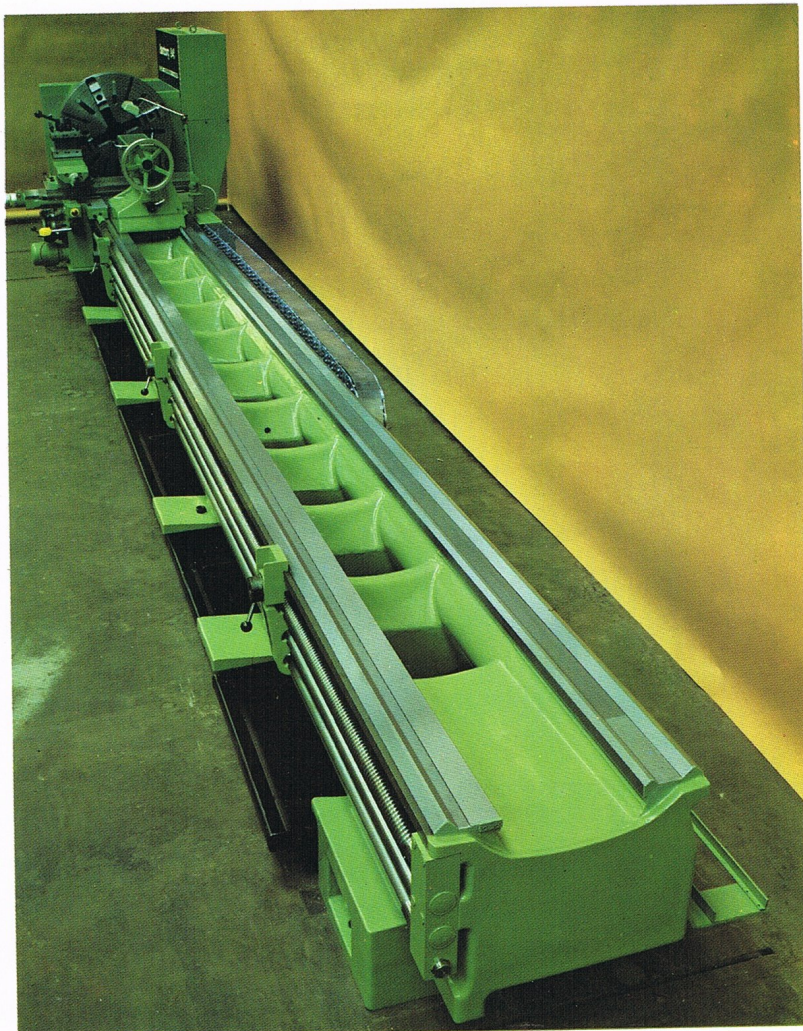


- High main spindle torque of 500 kpm permits heavy-duty turning even at low spindle speeds.
- Unusually rigid tailstock provides a counter-stay to suit the high-performance headstock.
- 24 spindle speeds with ratio $\phi = 1.25$; speed range 200 : 1; 12 reverse speeds with ratio $\phi = 1.6$.
- 3-lever visual coaxial selector control with direct indication on headstock.

- Compound apron control lever for the four feed directions. Safe handling, – control is fully directional.
- Rapid traverse actuation through pushbutton on compound control lever, thus safe slide direction.
- Feed cut-out with knee lever. Continuous force reduction ensures high accuracy when traversing against dead stop. No slide jump-back.
- Feed thrust can be changed in two stages – full feed thrust for roughing and drilling, reduced feed thrust for precision turning against dead stop.



High bed rigidity through optimum bed cross-section design



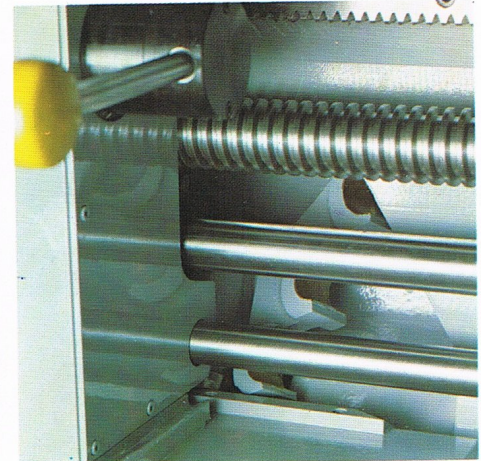
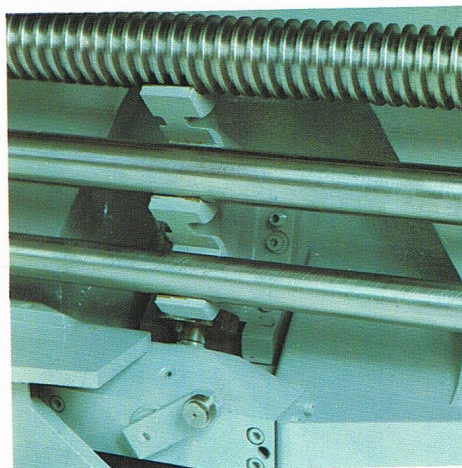
Bed cross-section design and casting quality result in high bending and torsional rigidity thereby providing the essential prerequisites for high stock removal rates and sustained accuracy even for long turning lengths. The totally enclosed box cross-section is extended at the front right down to the pedestal. This achieves optimum rigidity. The bed cross-section at the rear is curved inwards and this curve produces additional rigidity without restricting chip disposal. Bed width is 600 mm.

The high-grade bed together with all other cast assemblies is based on Meehanite quality castings. Core sand remaining in the hollow cavities provides for additional vibration damping.

The double vee slideways for the carriage ensure high guiding accuracy even under high load behind the turning centre line, as would be the case on a machine version equipped with copying unit. The bed slideways are induction-hardened (500 ± 50 HB) and ground.

Shaft carriers for long turning lengths

For machines with long turning lengths, leadscrew, feed shaft and control shaft are supported by shaft carriers. From 2500 mm turning length onwards the basic machine equipment therefore includes one or several detachable shaft carriers. Automatically engaging and disengaging carriers can be provided and relieve the operator. These are fitted into the front bed cheek and actuated by a cam rail on the apron.



Automatically actuated shaft carrier.

The heavy-duty headstock

Optimum distances between main spindle bearings are obtained by a second bearing point in the rigid central web. A support bearing is fitted at the end of the main spindle. This spindle bearing arrangement together with the double-row precision parallel roller bearings ensures high spindle rigidity. The high main spindle torque of 500 mkp allows appropriately high stock removal performance even in the lower speed range.

All headstock gears are hardened and ground to gear quality grade 3. The preassembled shafts are dynamically balanced.

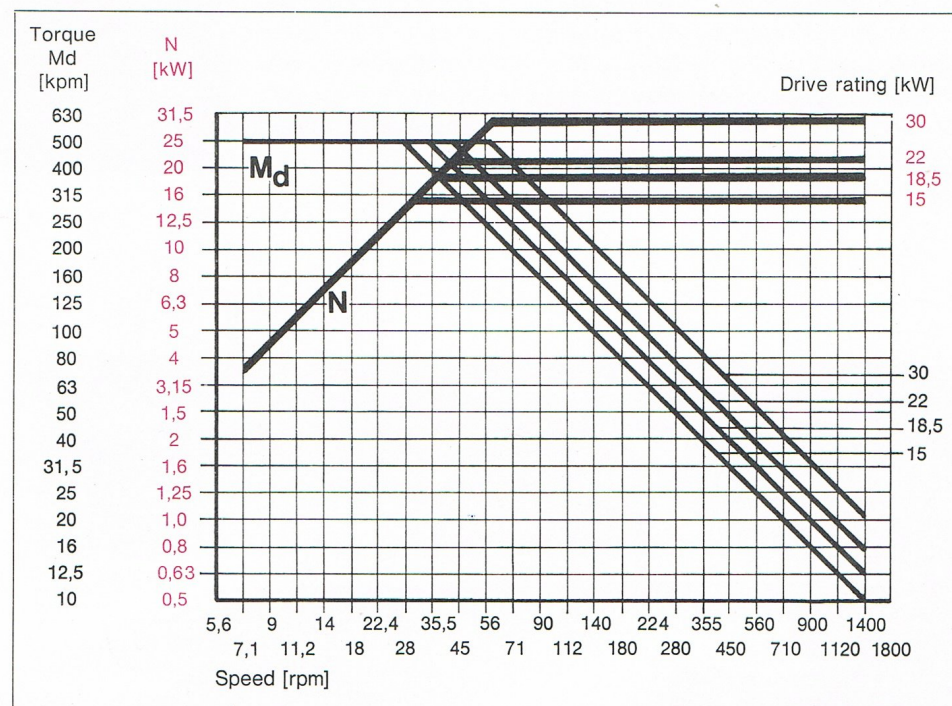
The wide speed range of 7.1 – 1400 rpm



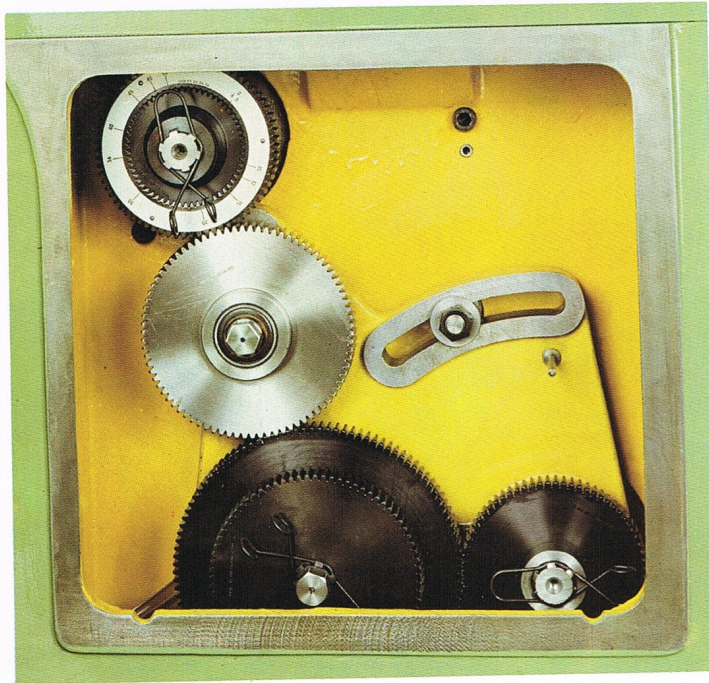
is selected with a 3-lever visual selector system. 24 forward speeds with ratio $\varphi = 1.25$ and 12 reverse speeds are available. The headstock clutches for forward and reverse are engaged easily by accident-proof control levers

and hydraulic amplification.

The design properties outlined above result in a smooth and low-vibration behaviour throughout the speed range even under extreme loads.



Speed/output diagram



Conveniently placed directional controls

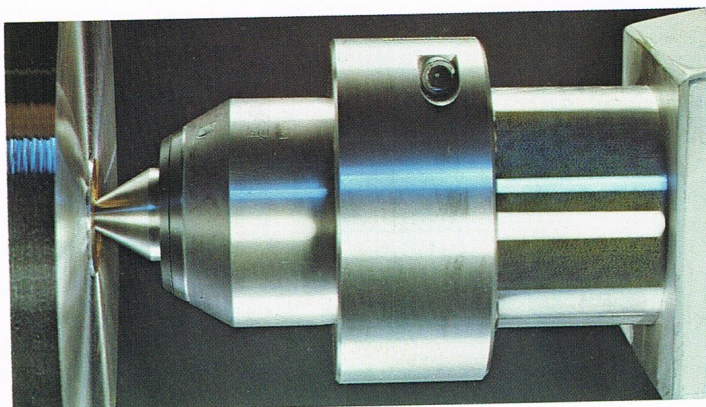
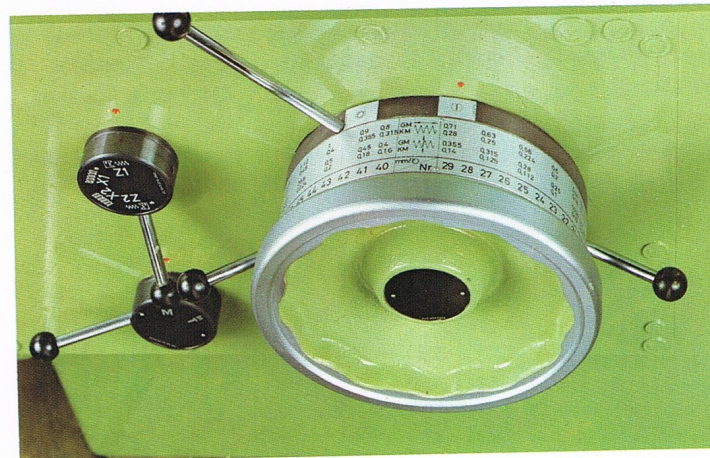
The feed box

The feed box contains the 10-stage basic transmission with ratio $\phi = 1.12$ and the multiplier transmission with ratios 1 : 1, 1 : 2, 1 : 4, 1 : 8.

The 32 standardized feed rates – longitudinal and transverse – can be directly read from the feed drum. Totally 68 feed rates each, up to 112 mm/rev. can be selected. With the main spindle stopped – for example when applying a milling attachment – feeds within a range of 22,4–2520 mm/min are available. The multiplier transmission can be actuated easily with one hand, – at slow speeds even when running. All this results in very low idle times for feed changes as required for roughing – finishing. All the more usual thread pitches are also set by the selector drum from a thread table.

The feed drive

The standard change gear set permits cutting all the more usual metric and Whitworth threads. Standard equipment also includes the internal dividing gear for multi-start threads. A single change gear only has to be repositioned for module and diametral pitch threads. The base of the change gear housing takes the form of an oil tank for the central lubrication of headstock, feedbox and change gears. Heat is taken away from the gearboxes by the oil and is then rapidly dissipated through the large area of the change gear housing. A magnetic rod filter unit in the oil tank is readily accessible from the change gear housing.



Tailstock

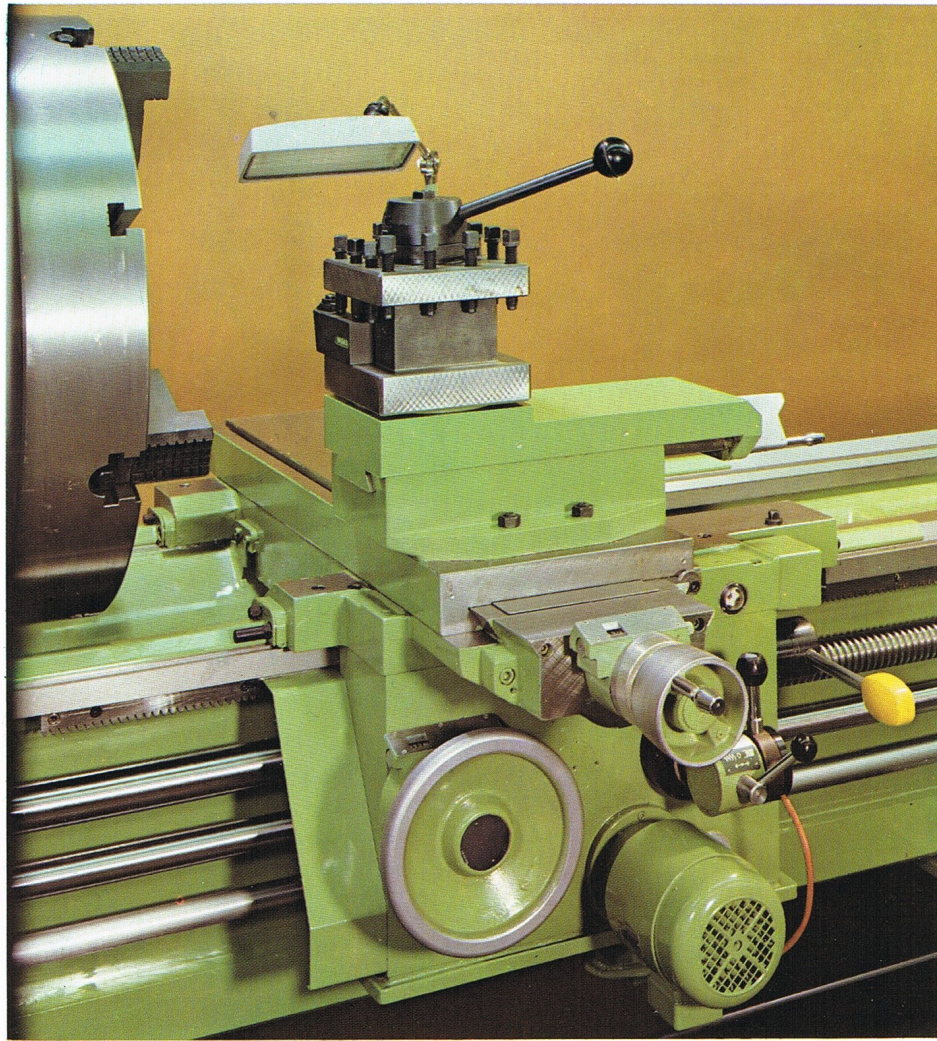
The tailstock features unusually ample dimensions and rigidity and is thus a fully compatible counter-stay for the heavy-duty headstock.

Rapid clamping to the bed is effected by actuating a lever which produces a clamping force of 6 tons. When particularly heavy workpieces are being turned, additional clamping effect is provided by tightening a hex. bolt. When clamping is released and the tailstock moved, a weight relieving system employing spring-loaded rollers in the tailstock base becomes effective.

Increased productivity through ergonomic design

Saddle

The sturdy carriage is guided by two strong Vees. Surface pressure remains low even when extreme cutting forces are applied. Wear is thus also limited, further assisted by the favourable material pairing: quality Meehanite casting on induction-hardened quality Meehanite casting. The facing screw is nitrided. The facing slide (cross slide) is extended to the rear and has T-slots in the facing direction for mounting auxiliary equipment and attachments.



Apron

In common with the smaller models of the HAMBURG/HANSEAT range, the compound control lever is the salient operating control on the apron. This compound lever engages and disengages feed action. Control movements are completely directional, i.e. they correspond with the appropriate feed direction. The ball of the compound lever incorporates a pushbutton for rapid

traverse actuation. Rapid traverse acts as an „overtaking” movement. As soon as the rapid traverse button is released feed becomes active once more.

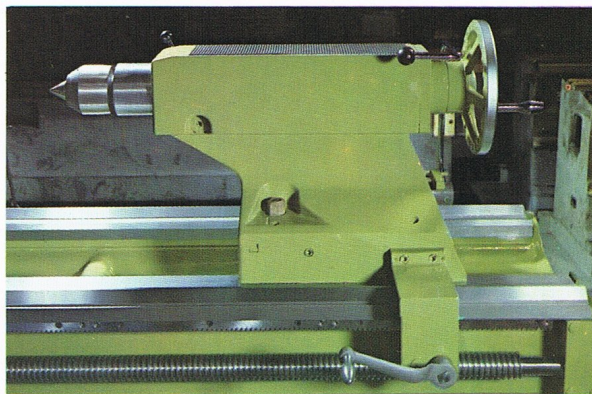
The second lever on the same shaft as the compound lever serves for engaging and disengaging the overload clutch and for opening and closing the half-nut. Half-nut actuation is additionally interlocked.

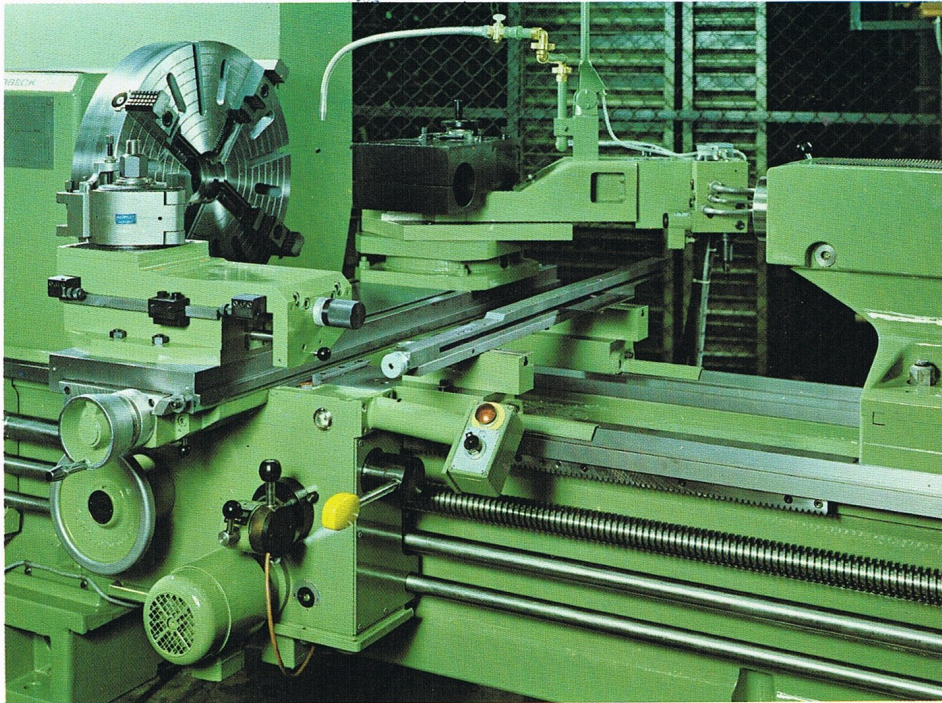
The feed thrust required for disengaging the overload clutch can be set to two levels. Position 1 = normal cut, position 2 = heavy cut. Due to continuous force reduction when actuating the overload clutch (toggle lever principle) position 1 ensures accurate location when traversing against dead stop.

The tailstock is easily adjustable by crank handle and pinion.

The rotating precision centre – MT6 – which is part of the standard equipment is supplied with a strengthened ring clamping housing. Expansion compensation in the quill additionally protects the centre against overloading.

Tailstock for model 820
(without ring clamping housing
for centre)





Extra equipment and attachments
 Selected for your specific requirements
 Can be extended to provide a complete
 solution of specific problems

MODEL HAMBURG 840 with SAUTER copy-turning attachment KMC 1004 for face copying, 360° tracer, electro-magnetic control for approach – return, boring bar holder 100 mm dia., power-operated top slide.

Copy-turning – increased productivity even when turning smallest batches

In practice, heavy workpieces generally arise in small batches. However, even with batches of 2 – 3 off or even in the case of recurring "one offs" it frequently pays to rationalize production by employing a hydraulic copy-turning attachment. Reductions in cutting- and idle time in comparison with conventional

turning depend on the degree of workpiece difficulty. Time reductions of up to 40% are no exceptions.

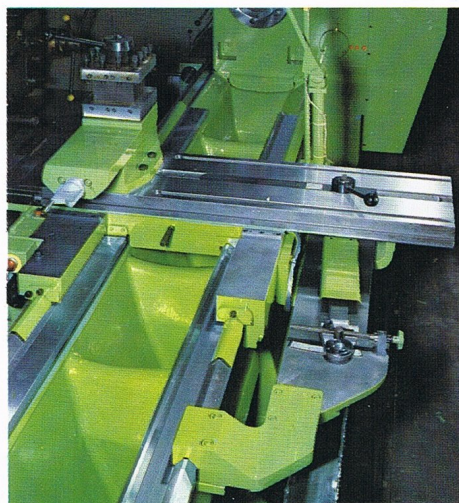
On account of the size of HAMBURG 840/ HANSEAT 1020 machines, the SAUTER hydraulic copy-turning attachments fitted by us generally incorporate electro-magnetic control for rapid approach and return traverse of the copying slide. Basic equipment also includes an electrically controlled finishing cut facility. In addition, the copy-turning attachment can also be supplied with an electrically controlled multipass facility for a maximum of 10 passes. The operating controls for the copy-turning attach-

ment and an electronic cut indication are fitted into the control panel at the front of the carriage. This arrangement ensures high operational reliability combined with very low idle times.

For the multi-pass automation the rapid traverse will be employed and supplementary equipment will be provided such as interruption clutch in the apron, four-row program channel rail at the front of the bed and suitable electrical auxiliaries. A four-row program channel rail is sufficient because the length of the individual preliminary passes is controlled by the contact tracer of the copy-turning unit.

Taper turning attachment for 600 mm taper length

Slender tapers with up to 20° taper angle can be turned economically by employing the taper turning attachment which has a capacity of 600 mm taper length (see illustration). We supply a special cross slide for the taper turning attachment and have paid special attention to solid construction of all component parts of this attachment. Even heavy duty taper turning work will thus cause no problems.



Power-operated top slide

For turning short tapers and steep taper angles we can supply a power-operated top slide. Naturally, the 360° top slide swivel facility remains in full. Maximum traverse of power-operated top slide is normally 260 mm but can be extended in special cases to 350 mm.

ments
machining problems –
the complete

**Internal machining with
rigid boring bar carriers**

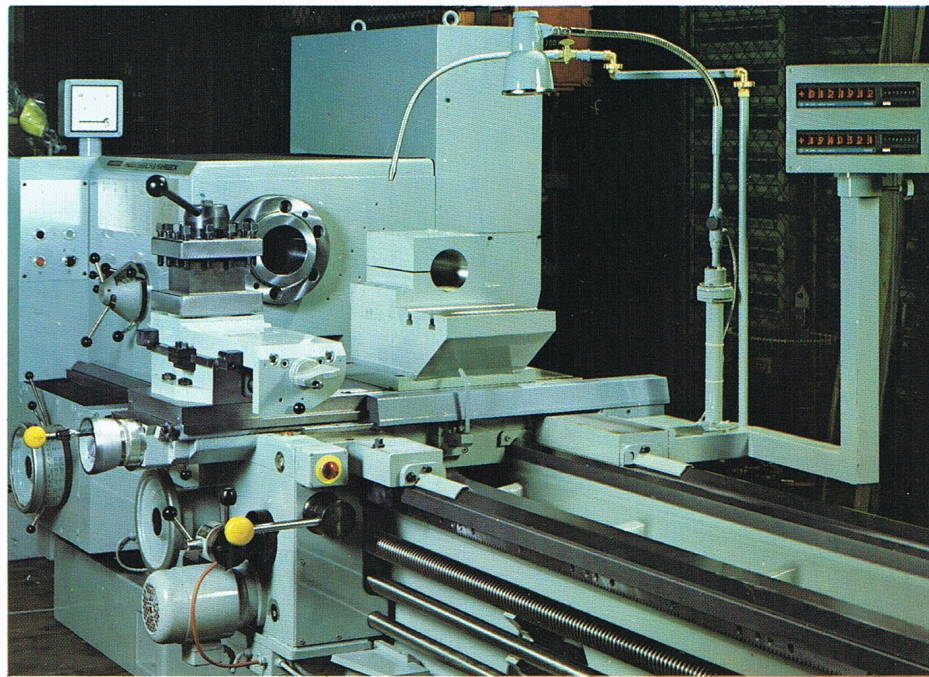
To permit economical boring, rigid boring bar carriers can be fitted to the facing slide.

The illustrations show two variants of available boring bar carriers. The boring bar carrier with T-slots in the facing direction is made to special order. This carrier also includes a mount for square bars which is not illustrated.

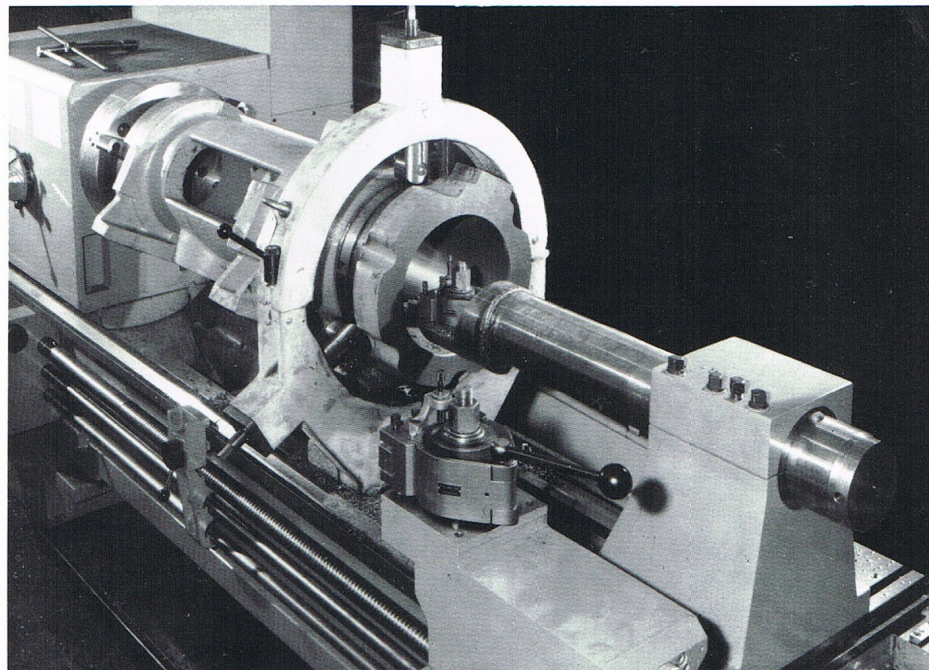
The 150 mm dia. boring bar carrier is a more frequently required attachment because the top slide tool holders will not accept as large boring bar cross sections.

The illustration shows internal machining of a cylinder. Since several tool holders are required for this work, the boring bar carrier incorporates a quick-change tool holder.

Model HAMBURG 840 with boring bar carrier having interchangeable boring bar mount 100 mm dia., power-operated top slide, measuring equipment with digital read-outs for longitudinal and transverse, minimum read-out increment longitudinal 0.01 mm, transverse 0.01 mm on diameter. Ammeter fitted to change gear cover.



Model HANSEAT 1020 with boring bar carrier for boring bars 150 mm dia., boring tube 800 mm long with quick-change toolholder MULTIFIX B, roller steady with capacity of 340 – 600 mm.





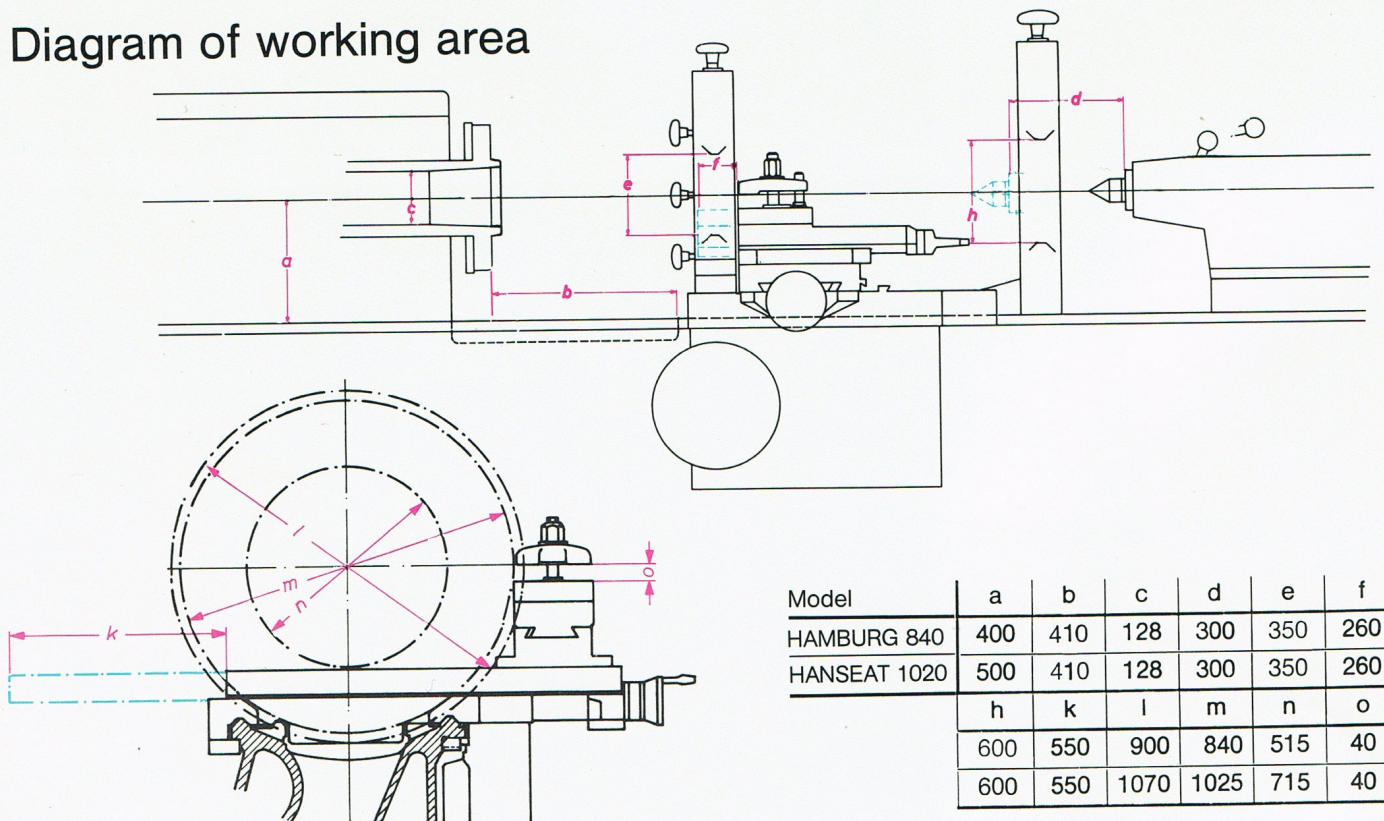
Available capacity and extra attachments ensure universality

Some of the more usual extra attachments:

- Top slide with Multifix quick-change toolholder, size D2
- Top slide with four-station toolpost
- Power operated top slide, 260 mm traverse
- Boring bar carrier 150 mm dia.
- Double saddle with separate facing slides, (also power operation in both top slides)
- Taper turning attachment for 600 mm taper length, adjustment range $\pm 10^\circ$
- Length measuring equipment with coarse and fine indication
- Diameter read-out for facing screw with coarse and fine indication
- Shaft supports, engaging and disengaging automatically
- Coolant equipment with electric coolant pump, hose guided in cable chain
- Main spindle with Camlock nose 11" D1 ASA B.5.9
- Extended taper sleeve for main spindle, MT 6
- Leadscrew with $\frac{1}{2}$ " pitch
- Thread dial indicator for metric or inch leadscrew
- Facing stop with dial indicator
- Six-station longitudinal stop
- Steadies with jaws and/or roller quills, fixed with capacity up to 600 mm dia. travelling with capacity up to 350 mm dia.
- Two-speed driving motors

A wide range of workpiece-clamping equipment is naturally also available.

Diagram of working area



Technical data

Models	HAMBURG 840	HANSEAT 1020
Working capacity		
Swing diameter above bed	840	1025
Swing diameter above extended facing slide	515	715
24 main spindle speeds	7.1 . . . 1400	
Ratio	1.25	
Feed rates, read from selector drum		
32 longitudinal feeds	0.08 . . . 2.8	
32 facing feeds	0.04 . . . 1.4	
Thread pitches		
66 metric threads	0.25 . . . 560	
60 Whitworth threads	80 . . . 1/16	
60 module threads	0.1 . . . 50	
40 diametral pitch threads	160 . . . 0.5	
Dimensions		
Centre height above flat slideway	400	500
Width of bed		
Spindle nose to DIN 55022	600	
Spindle bore diameter	11	
Spindle dia. in front bearing	128	
Leadscrew pitch	170	
Facing slide	12	
Length	1010 (1420*)	
Width	340	
Traverse	550	
Carriage		
Guide length on bed	815	
Guide length transverse	963 (1333*)	
Top slide		
Length	505	
Width	200	
Traverse	260	
Tool cross-section to DIN (h × w)	40 x 25	
Tailstock		
Quill diameter / reception	125/MT6	
Quill stroke	300	
Electric drive		
Drive rating	18.5 – 22 – 30	
Net weight including electric drive		
Turning length 1000 mm	5700	6100
1500 mm	6000	6400
2000 mm	6400	6800
2500 mm	6800	7200
3000 mm	7300	7700
4000 mm	8000	8400
5000 mm	8700	9100
6000 mm	9400	9800
8000 mm	10700	11100
10000 mm	11800	12300
Turning lengths exceeding 10 m on request *) at extra charge		
All data subject to amendment without notice		

Standard equipment for HAMBURG 840 / HANSEAT 1020

- 1 longitudinal stop
- 1 facing stop
- 1 rotating centre, MT 6, with ring clamping housing
- 2 dead centres MT 6
- Detachable shaft support(s) (from 2500 mm turning length) and other standard equipment

Standard version of Models

HAMBURG 840 / HANSEAT 1020 (included in price)

- 18.5 kW main drive and ammeter
- Top slide with
- MULTIFIX quick-change toolholder, size D1,
- with 1 interchangeable sub-holder D1D 40 180
- Rapid traverse for longitudinal and transverse movement including trailing cable chain
- Machine lamp with neon tube 220 Volt

Economy through quality

A typical example for comparison (machining of a compressor housing)

Amortisation	HANSEAT 1020	Compared machine
① Machine, completely equipped, new value	DM 124 900.--	103 700.--
② Annual machine costs (including depreciation)	DM 24 880.--	21 060.--
③ Annual labour costs (single-shift work)	DM 48 000.--	48 000.--
④ Annual working space costs (including tool costs)	DM 76 400.--	72 580.--
⑤ Working space cost per hour	DM 47.75	45.36
⑥ Machining time for compressor housing	Hrs. 2.48	2.97
⑦ Piece costs for compressor housing ③ × ⑥	DM 118.40	134.70
⑧ Cost savings per piece	DM 16.30	--
⑨ Cost savings per hour ⑧ : ⑤	DM 6.57	--
⑩ Annual savings	DM 10 510.--	--
⑪ Annual depreciation	DM 12 490.--	10 370.--
⑫ Annual return on capital	DM 23 000.--	10 370.--
⑬ Amortization ① : ⑫	Years 5.43	10

In the above comparison, the purchase price of the machine compared is 17% lower than that of our quality machine HANSEAT 1020. As far as the working space costs are concerned, the difference is however only 5% because labour costs have a much more severe effect than machine costs. This difference is more than compensated on our machine by better quality features such as sustained accuracy, operator convenience, exemplary service and high resale value.

However, the quality features of our machines also lead to a reduction in piece costs. It will be obvious that, say, the particularly well grouped arrangement of operating controls reduces idle times. Again, the high repeat accuracy of the machine – even after many years of use – reduces piece times.

In the above example of machining a compressor housing, the comparison shows that the HANSEAT 1020 quality machine achieves a time saving of approx. 17%. In comparing the two

machines, the annual capital return is influenced far more by the cost savings in machining the workpiece than the time savings would at first suggest. Our quality machine will amortize almost twice as fast as the compared machine. This is of course only a single example but the salient facts are clearly apparent. Our catalogue HH 547 covering the models HAMBURG 540/HANSEAT 640 deals in more detail with the subject "economy". Please do not hesitate to make use of this available information.

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*A subsidiary of GILDEMEISTER Aktiengesellschaft, Bielefeld