

**Technical data**

---

**Turning machines**

**HEIDENREICH & HARBECK**  
**Werkzeugmaschinenfabrik**  
A member of the GILDEMEISTER group

# Hamburg - Hanseat

Universal turning machines for one-off and small batch production in 8 sizes from 250 to 1020 mm diameter and from 500 to 10000 mm turning length

## Technical data

Model HAMBURG - HANSEAT		250	350	430	480	540	640	840	1020
Dia. above bed	mm	250	350	430	480	540	640	840	1020
Dia. above facing slide	mm	140	200	235	295	280	380	515	715
Cent. height above flat slideway	mm	130	180	210	240	265	315	400	500
Width of bed	mm	255	255	333	333	403	403	600	600
Spindle nose to DIN 55022 - size		5	5	6	6	8/11	8/11	11	11
Spindle bore dia.	mm	30	36	56	56	65/103	65/103	128	128
Tailstock quill dia.	mm	60	60	65	65	80/100	80/100	125	125
quill stroke	mm	100	100	155	155	225	225	300	300
quill nose	MT	4	4	4	4	5	5	6	6
Speed range	rpm	35,5-3150	28-2500	19-2000	19-2000	9-1800	9-1800	7,1-1400	7,1-1400
Number of speeds	i	14	14	24	24	24	24	24	24
Drive rating	kW	3	3	11	11	18,5	18,5	22	22
Tool cross-section to DIN (hxb)		16 x 16	20 x 20	25 x 25	25 x 25	32 x 25	32 x 25	40 x 25	40 x 25
Feed range - longitudinal	mm/rev.	0,04-0,4	0,04-0,4	0,04-2,32	0,04-2,32	0,063-2,24	0,063-2,24	0,08-2,8	0,08-2,8
Number of thread pitches	i	129	129	210	210	226	226	226	226
Metric pitch in mm	mm	0,2-18	0,2-18	0,25-112	0,25-112	0,25-560	0,25-560	0,25-560	0,25-560
Whitworth pitches in TPI		76-2	76-2	108/1/4	108-1/4	80-1/16	80-1/16	80-1/16	80-1/16
Module thread - pitch in module		0,4-13,5	0,4-13,5	0,125-28	0,125-28	0,1-50	0,1-50	0,1-50	0,1-50
Diametral pitch threads per π"		36-2,6	36-2,6	224-1	224-1	160-0,5	160-0,5	160-0,5	160-0,5
Capacity of travelling steadies		10-90	10-90	10-72	10-72	25-160 100-250	25-160 100-250	25-160 100-250 200-350	125-60 100-250 200-350
Capacity of fixed steadies		10-90	10-90	10-140 75-205 120-250	10-140 75-205 120-250	10-200 40-315	10-200 40-315 180-400	40-315 180-400 340-600	40-315 180-400 340-600
Chuck diameter		160 200*	160 200*	200 250*	200 250*	250 315 400*	250 315 400*	315 400 500*	315 400 500*
* n <sub>max.</sub> limited									
Faceplate diameter		250	250	400	450	450 500	560 630	800	900 1000
Tool carrier "Multifix,, size		B	B	B	B	C	C	D1	D1
<b>Turning length mm</b>		<b>Weight kg</b>							
500		1100							
750				1850	1950				
800		1200							
1000			1300	1950	2050	3000	3100	5700	6100
1500				2200	2300	3200	3300	6000	6400
2000				2400	2500	3600	3700	6400	6800
3000						4000	4100	7300	7700
4000						4600	4700	8000	8400
5000						5200	5300	8800	9200
6000								9600	10000
8000								11200	11600
10000								12800	13200

# Hamburg 250 Hanseat 350

- For production, training and education.
- Modern engineering and high operating convenience.
- Universal utilization in one-off, small and medium batch production.
- Numerical position display for higher positioning accuracy and more reliable production, for shorter idle times and reduced rejects.

## Headstock

The headstock drive is by Vee-belt, basic transmission and flange-mounted motor. A 1 : 8 back-gear provides 14 spindle speeds covering a range of 35.5 to 3150 rpm (28 to 2500 rpm).

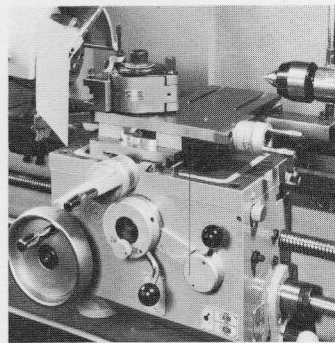
The main spindle is dynamically balanced and runs in 3 bearings ensuring exceptionally smooth operation.

A remote control lever directly starts the main motor for both forward and reverse. The centre position of this lever actuates the electro-magnetic brake.

## Carriage

The facing slide is of the extended type as standard and incorporates T-slots accepting a copying attachment or tool carrier. The top-slide swivels in an annular T-slot.

A Multifix quick-change toolholder size B is supplied as standard.



## Apron

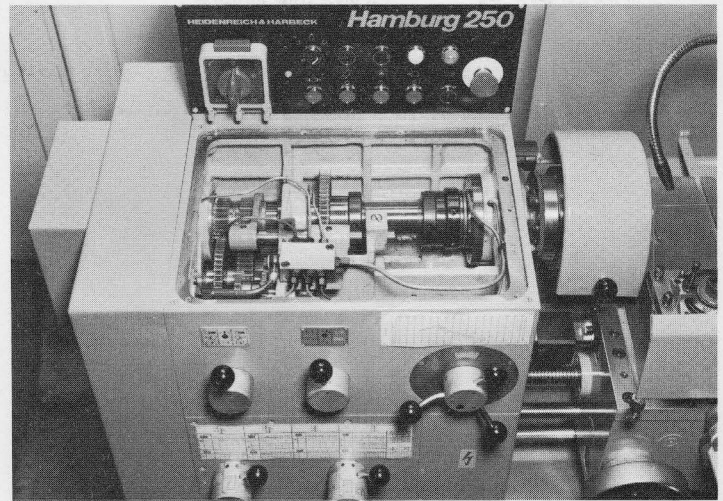
Longitudinal and facing feeds are controlled by a central lever. Feed action is automatically interrupted when traversing against a dead or drum stop. A safety device prevents simultaneous engagement of half-nut and feed. Maximum feed thrust is limited by an overload clutch.

## Lube oil supply

Headstock and feed box are supplied with lubricant by a central lube system with gear pump and slot filter. An eccentric pump in the apron lubricates the carriage and facing slide ways.

## Machine pedestal and bed

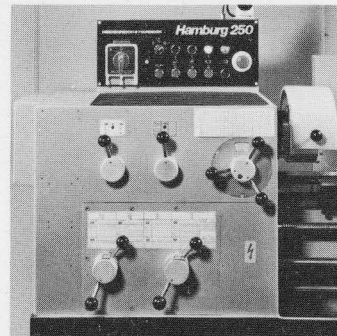
The amply ribbed machine bed is rigidly connected to the machine pedestal thus forming a single unit. The slideways are induction-hardened and ground, hardness approx.: 500 Brinell. The right-hand



machine pedestal takes the form of a coolant tank including pump. The machine bed is rigid and can be placed on antivibration mounts if required.

## Screwcutting gears and feed box.

Standard metric and inch threads can be selected directly without the need for changing gears. A set of change gears for module and diametral pitch threads are part of standard equipment supplied. The longitudinal feeds are

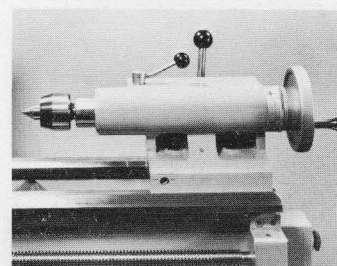


selected by a double lever and the facing feed rates are half the longitudinal rates.

The reversing transmission is actuated by a lever on the headstock.

## Tailstock

Tailstock with amply dimensioned housing and quill slides on separate Vee ways. The tailstock is clamped to the bed by an eccentric lever.



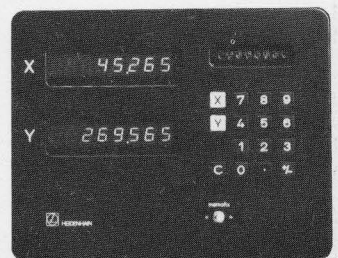
## Steadies

These can either be travelling steadies carried on the carriage cheeks or fixed steadies clamped to the machine bed. The quills are equipped with jaws. The fixed steady is opened and closed by a quick-action mechanism.

## Numerical position display

for transverse and longitudinal axis. Two-axis forward and backward counter in sturdy cast housing with waterproof front panel suitable for workshop use.

7 easily read decimal places. 12 mm lettering. Reference datum point input through keyboard. Chip and splash protection by guards over scales and total enclosure of scanner probes. Accuracy grade  $\pm 0.01$  mm.



# Hamburg 430 Hanseat 480

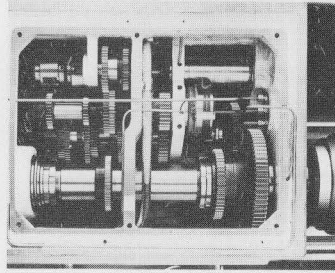
- Universal turning machines and range of usual equipment.
- 24 spindle speeds with close ratio  $\phi = 1.18$  main machining range.
- two spindle speeds with ratio 1:2.36 can be power-shifted.
- Feed actuation with knee lever. Linear thrust reduction provides for high cut-out accuracy when traversing against dead stop.
- Coaxial triple lever visual selection within convenient reach at right-hand end of headstock.
- Compound selector lever on apron for the 4 feed directions, safe handling, directional control.
- Numerical position display for higher positioning accuracy and more reliable production, for shorter idle times and reduced rejects.

## Headstock

with 24 speeds from 19 to 2000 rpm in forward. Additional speed change in forward with ratio 2.36 or reverse speed by accident-proof remote control lever actuating multi-plate clutches.

Close ratio of  $\phi = 1.18$  in main working range. 3-lever visual speed selection to right of headstock within convenient reach of operator. High-precision headstock gearbox with hardened

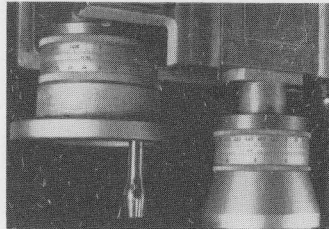
and ground gears made from alloyed case-hardening steel. Adjustable multi-plate clutch for main spindle forward and reverse. Electro-magnetic headstock brake acts in centre position of remote control lever. Central lubrication with magnetic filter and oil tank under change gear cover.



## Carriage

with long saddle beams (guiding length 500 mm) and appropriately low unit surface pressure. Thus extremely low wear and high sustained accuracy. Precision facing leadscrew with coarse and fine division collar for mechanical diameter indication. One facing screw revolution is equivalent to a change of 10 mm in diameter. Minimum in-feed increment 0.01 mm on diameter with Vernier reading. Facing slide has T-slots at front and rear and annular T-slot for top slide which swivels through 360°.

"EMERGENCY STOP" button travels with carriage.



## Apron

with compound control lever for directional feed control. Lever for half-nut actuation and overload protection on same axis as compound control lever. Faulty half-nut engagement is made impossible by an additional interlock. Longitudinal and transverse dead-stop cut-out with max. 0.01 mm error by knee lever with precision disengagement. Overload protection adjustable in two stages for longitudinal feed thrust of 4900 N or 8900 N. Apron handwheel with coarse and fine division collar for mechanical length indication. One handwheel revolution is equivalent to 25 mm travel, minimum in-feed amount 0.1 mm.

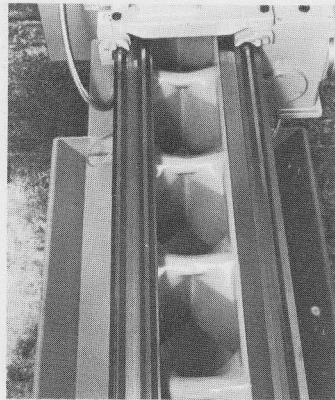
## Leadscrew

with overload protection and cut-out – if required with increased accuracy of 0.01 or 0.02 mm per 300 mm thread length.

## Bed

made from Meehanite casting and featuring transverse ribbing to ensure efficient chip disposal combined with high rigidity. Slideways are induction-hardened (approx. 500 Brinell) and ground. Double Vees provide exceptional guiding properties even when forces apply behind turning centre line. Centre slideways for tailstock. Retractable chip pan avoids heat transfer to bed and incorporates easily cleaned coolant tank.

Detachable chip protection panel with chip deflectors and integrated machine lamp.

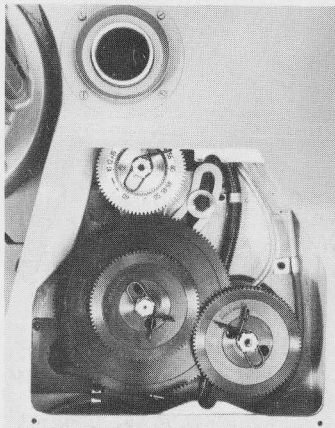


## Feed box

with 10-speed basic gearbox and 6-speed multiplication gearbox providing 60 feed rates of 0.04 – 2.32 mm/rev. with a ratio of  $\phi = 1.12$ . All gears hardened and ground. Direct indication of 36 feed rates on setting drum of feed box. One-hand quick-action feed changeover 1 : 2 oder 2 : 1 by conveniently placed lever on multiplication gearbox.

## Feed drive

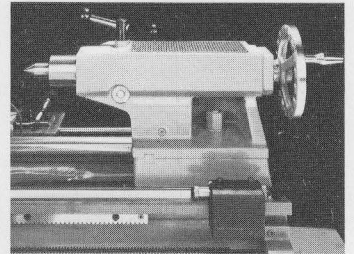
with easily accessible change gears and dividing



facility for multi-start threads. 48 metric threads and 54 Whitworth threads available with identical set of change gears.

## Tailstock

with quick-action clamping lever and additional clamping dog for heavy-duty turning operations. Tailstock quill with scale for longitudinal adjustment in quill guide projecting far over the front. Quill bore honed to a tolerance of 0.003 mm. Compensation of thermal workpiece expansion by Belleville washer spring stack in quill.



## Steadies

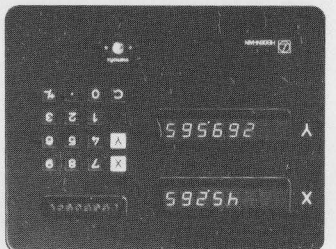
These can either be travelling steadies carried on the carriage cheeks or fixed steadies clamped to the machine bed. The quills are equipped with jaws or rollers. Opening and closing of the fixed steadies by a quick-action mechanism.

## Electric equipment

with switchgear in sealed control cabinet after IEC recommendations and taking the latest VDE regulations into consideration.

## Numerical position display

for transverse and longitudinal axis. Two-axis forward and backward counter in sturdy cast housing with waterproof front panel suitable for workshop use. 7 easily read decimal places. 12 mm lettering. Reference datum point input through keyboard. Chip and splash protection by guards over scales and total enclosure of scanner probes. Accuracy grade  $\pm 0.01$  mm.



# Hamburg 540

# Hanseat 640

# Hamburg 840

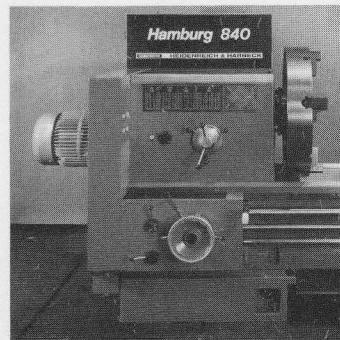
# Hanseat 1020

- The large, high-performance machines in the HAMBURG-HANSEAT range.
- 24 forward and reverse speeds with ratio  $\phi = 1.25$ , speeds range 200:1.
- Triple lever visual selection and direct indication coaxially and conveniently mounted on headstock.
- Unusually rigid tailstock provides adequate support bearing to suit high-performance headstock.
- Compound control lever on apron for the four feed directions. Safe and reliable, directional handling.
- Rapid traverse actuation by pushbutton in compound lever, thus safe direction control of carriage.
- Feed control with knee lever. Linear thrust reduction provides for high accuracy when traversing against dead stop. No carriage rebound.
- Feed thrust can be in two stages – full feed thrust for roughing and drilling, reduced feed thrust for precision dead-stop turning.
- Numerical position display for higher positioning accuracy and more reliable production, for shorter idle times and reduced rejects.

## Headstock

with optimum bearing centre distance in main spindle. On HAMBURG 840/HANSEAT 1020, the second bearing point is situated in the projected rigid centre web.

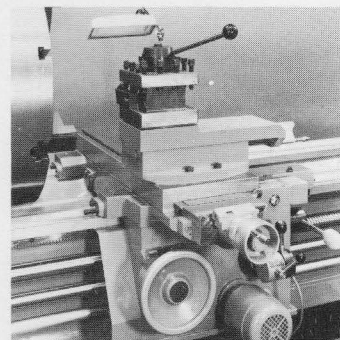
A support bearing is situated at the end of the main spindle. The spindle bearing arrangement employs high-precision double-row parallel roller bearings ensuring high spindle rigidity. High main spindle torque provides for appropriate levels of stock removal capacity even in lower speed range.



## Carriage

The rigid carriage is guided on two Vees. Unit surface pressure remains low even when high cutting forces are applied. Wear is similarly minimal. The pairing: Meehanite casting on induction hardened Meehanite casting is particularly favourable from a wear point of view. The facing screw is nitrided. Precision facing leadscrew with coarse and fine division collar for mechanical diameter indication. One facing screw revolution is equivalent to a change of 10 mm in diameter.

The facing slide is generally of the extended type and incorporates T-slots in the facing direction for mounting attachments.



Rigid carriage construction allows heavy chip cross-sections when roughing while at the same time providing high accu-

racies and surface finishes when finishing. The carriage runs on two strong Vees so that low unit surface pressure ensures high resistance to wear.

"EMERGENCY STOP" button travels with carriage.

## Apron with compound control lever

The compound control lever provides directional carriage traverse control. A second lever on the same shaft actuates the overload protection and the half-nut. The overload protection system disengages the feed with high accuracy even when fast feed rates are employed and strong thrust is applied when contacting a dead stop.

Apron handwheel with coarse and fine division collar for mechanical length indication. One handwheel revolution is equivalent to 25 mm travel, minimum in-feed amount 0.1 mm.

## Visual spindle speed selection

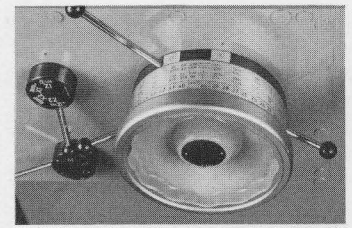
A triple lever visual spindle speed selector is fitted to the headstock within easy reach of the operator. The selected speed can be read at a glance. (Direct visual indication).

## Bed

Bed cross-section and casting quality result in high deflection and torsional rigidity thereby providing the essential prerequisites for heavy-duty stock removal and sustained accuracy even when handling long turning lengths. The totally enclosed box-type cross-section is projected down to the bed pedestal. This arrangement achieves highest possible rigidity. The bed cross-section is internally arced at the rear and this arc creates additional rigidity without restricting chip disposal.

## Feed box

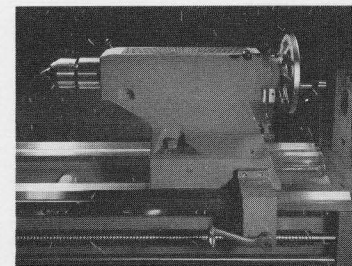
A 10-speed basic box and the 4-speed multiplication box provide a wide range of feeds and screwcutting pitches. In addition, the feedbox incorporates the changeover transmission for metric and inch pitches as well as the combined reversing and changeover transmission for deed shaft and leadscrew.



The following are available: 32 standardized feed rates for longitudinal and transverse traverses with ratio  $\phi = 1.12$  from 0.063 to 2.24 mm/rev. (0.008 to 2.8 mm/rev.) (half feed rates apply to facing traverse). In the lower speed range from 7.1 to 22.4 rpm a 1 : 40 coarse pitch feed selection is available for feed rates up to 90 mm/rev. This range can also be covered with the main spindle at a standstill, a facility which has been found very advantageous when using, for example, a milling unit.

## Tailstock, Hamburg 840

with quick-action clamping lever and additional clamping dog for heavy-duty turning operations. Tailstock quill with scale for accurate longitudinal adjustment.



## Steadies

These can either be travelling steadies carried on the carriage cheeks or fixed steadies clamped to the machine bed. The quills are equipped with jaws or rollers. Opening and closing of the fixed steadies by a quick-action mechanism.

## Numerical position display

for transverse and longitudinal axis. Two-axis forward and backward counter in sturdy cast housing with waterproof front panel suitable for workshop use. 7 easily read decimal places. 12 mm lettering. Reference datum point input through keyboard. Cip and splash protection by guards over scales and total enclosure of scanner probes. Accuracy grade  $\pm 0.01$  mm.

(See left-hand page for illustration).

# Hamburg 840 electronic Hanseat 1020 electronic

## Production turning machines with manual input CNC systems

- For the economical production of large turned parts even on one-off basis.
- These machine are supplied with the successful CNC manual input controls FANUC MATE TS, Gildemeister EPM or SINUMERIK SPRINT 8T. These control systems provide for direct programming and thus readily adapt themselves to any plant structure.

### Headstock

The wide speed range offers fine speed stages and thus good adaptation to the particular machining problem in hand. Operator-orientated control provides for manual speed range preselection.

Spindle speeds are called up over the entire preselected range by the program. Any whole-number spindle speed can be called up or, alternatively, the machine can be run at constant cutting speed. The latter method offers special advantages where large diameter changes occur. The headstock is designed sustain high cutting forces. High torque and high-power low-speed characteristics permit large chip cross-sections over the full working capacity.

### Carriage

The carriage has double Vee-guides coated with Turcite B. Ample dimensioned facing slide with hardened slideways. Wide, long guide surfaces and automatic pressure lubrication result in best possible anti-friction properties for high cutting forces and low feed rates at low spindle speeds. Feed drives by thyristor-controlled DC motors. Recirculating ball screw diameter: X axis 50 mm - Z axis 63 mm.

### Machine bed

with double V-guide designed for high anti-deflection characteristics and torsional rigidity. Optimum cross-section utilization for long turning lengths. Wide chip chutes for unrestricted chip disposal.

### Tooling systems

Quick-change holders or automatic tool turret designed for cutting forces up to 30000 N.

Boring bar carriers for internal machining with tools requiring long overhang.

### Chip guard

covers the entire working area and is mobile.

Roller-mounted protective panels at rear for emptying the chip pan.

### Tailstock

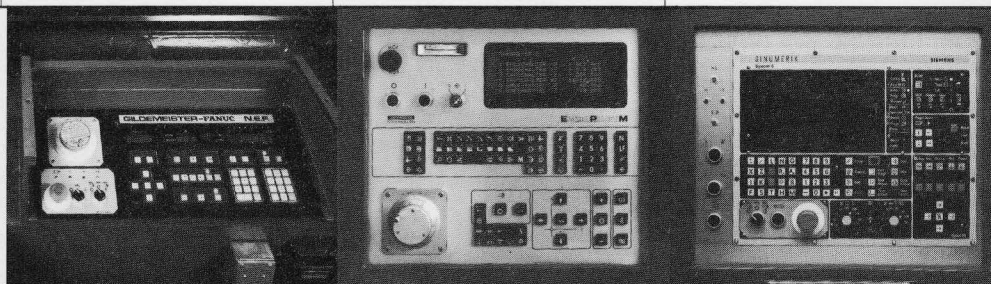
with trailing facility and coupling mechanism on carriage.

## Technical data

HAMBURG 840/HANSEAT 1020 electronic		HAMBURG 840 electronic	HANSEAT 1020 electronic
Diameter above bed	mm	840	1020
Diameter above facing slide	mm	400	600
Diameter in normal gap (max. 410 mm in front of spindle nose)	mm	900	1070
Width of bed (double Vees)	mm		600
Facing traverse	mm		600
Spindle nose DIN 55022	size		11
Spindle bore diameter	mm		128
Spindle diameter	mm		170
Main drive: DC motor	kW		30
Main spindle torque	Nm		6000
Speed range	rpm		5 to 1120
Number of speeds manually controlled			4
Speed range	1		5 to 140 rpm
Speed range	2		9 to 280 rpm
Speed range	3		18 to 560 rpm
Speed range	4		36 to 1120 rpm
Speeds programmable in each main speed range			Any whole-number spindle speed
Tailstock, quill diameter/stroke	mm		125/300
Quill register	MZ		6
Turning tool cross-section b x h	mm		32 x 40

## HAMBURG 840/HANSEAT 1020 electronic

Control data	FANUC Mate TS	Gildemeister EPM	SINUMERIK SPRINT 8T
Controlled axes	2, X and Z	2, X and Z	2, X and Z
Interpolation	Linear and circular	Linear and circular	Linear and circular
Min. input increment, dia. - length	0.01 mm	0.001 mm	0.001 mm
Dimens. input, absolute - incremental	Function key	Function key	G 90/91
Max. programmable traverse/radius	± 9999.99 mm	± 9999.99 mm	± 99999.999 mm
Feed mm/rev.	0.01-20.47	0.001-39.999	0.001-50.000
Thread pitch mm/rev.	0.01-40.95	0.001-39.999	0.001-2000
Thread - tapered, mm/rev.	-	0.001-39.999	0.001-2000
Feed override	Direct keyboard	Keyboard 0-120%	Stepping switch 0-120%
Rapid traverse mm/min. X/Z (param.)	5000/8000 (max.)	5000/8000 (max.)	5000/8000 (max.)
Dwell (s)	0.1-99.9	0.1-99.9	0.001-99999.999
T	via G 92 - automatic calculation	20 each offsets for X and Z ± 9.999 mm	32 each offsets for X, Z and R ± 9999.999 mm
Program input	Keyboard or RAM cassette	Keyboard or punched tape	Keyboard or punched tape
Program memory	217 words	(6 k-Byte ≈ 250 NC blocks)	15 m-80 m punched tape
Program output	Digital display or RAM cassette	Tape punch FACIT 4070, GNT 3406	Tape punch with in-series interface
Spindle speed selection	Direct or constant cutting speed	Direct or constant cutting speed	Direct or constant cutting speed
Manual inching in increments along X, Z	Handwheel pulse emitter 0.01 mm	Handwheel pulse emitter 0.001-0.01-0.1	Keyboard input 0.001-0.01-0.1-1.0-10.0 mm
Display unit	1 Command at a time	Complete blocks, 32 symbol display	Complete blocks, 8 lines of 32 characters each
Work cycles	Roughing cycle, longitudinal - transverse  Screwcutting cycle;  sub-program facilities	Roughing cycle, longitudinal - transverse parallel to contour; screwcutting cycle; undercut cycles, recesses, radii, chamfers;  sub-program facilities tool radius compensation possible	Roughing cycle longitudinal - transverse parallel to contour; screwcutting cycle;  Deep-hole drilling cycle; Retraction cycle for tool changing without intermediate position; sub-program facilities; tool radius compensation possible



Turning length mm	Machine weight (kg)	
	HAMBURG 840 electronic	HANSEAT 1020 electronic
1000	6000	6400
1500	6350	6750
2000	6700	7100
3000	7600	7800
4000	8300	8700

**HEIDENREICH & HARBECK · Werkzeugmaschinenfabrik GmbH**

A member of the GILDEMEISTER group

Wiesendamm 30, 2000 Hamburg 60, Telephone (040) 29 89 1, Telex 211 174 (huh d)