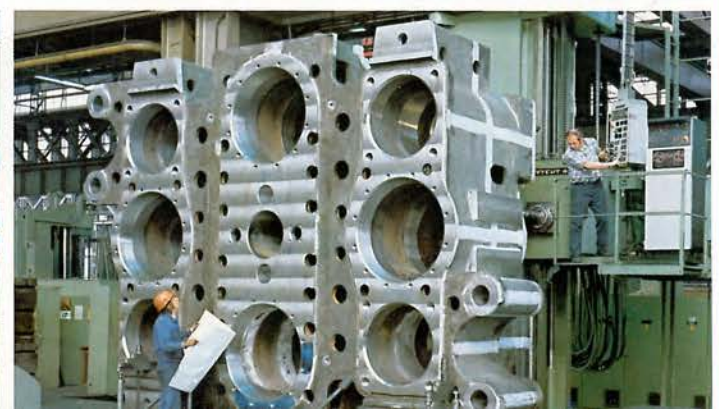
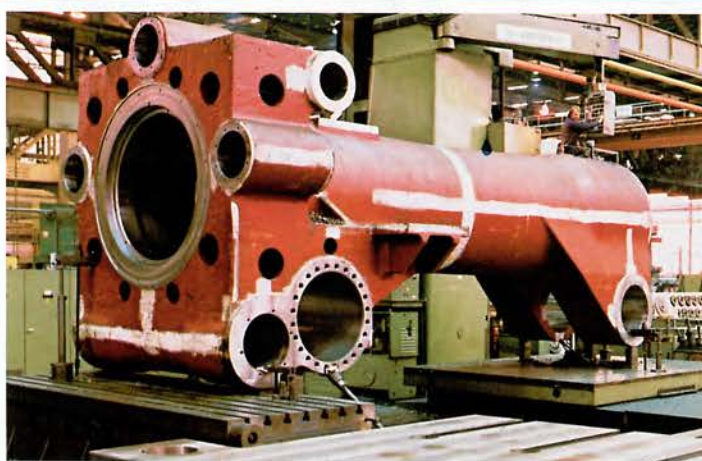




Machines and methods
which promote progress

SCHARMANN

Heavycut: manoeuvrable machining of massive components





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The Heavycut
modules

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The Heavycut
in practice

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design

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Technical data



The Heavycut-modules

The Heavycut modules consist of four basic machines, the coordinate fields of which can be extended in steps. All the machines can be delivered in three levels of automation. In connection with a comprehensive program of tables and an extensive list of auxiliary equipment, easy operation of the machines and the tools is achieved, and massive components can be manoeuvrably machined.

Machine size		Heavycut 1.	Heavycut 2.	Heavycut 3.	Heavycut 4.	
1. Machining unit						
	X = cross traverse	in	98% + lengths of 19%	98% + lengths of 19%	118% + lengths of 19%	157% + lengths of 19%
	Y = vertical traverse	in	78% + 118%	98% + 157%	118% + 197	157% + 236
	Z+W = ram and spindle traverse	in	31% + 27%	31% + 27%	39% + 39%	51 + 51
	max. main motor	hp	87	87	120	181
	ram cross section	in ²	12% x 12%	12% x 12%	15% x 15%	19 x 23%
	spindle diameter	in	5 7/8	6%	6% or 7	7% or 8 7/8
	max. spindle speed	rpm	1250	1250	1000	800
2. Automatic tool change						
	Number of tool pockets		40 or 60	40 or 60	40 or 60	40
	max. tool weight	lbs \triangle	\triangle 88	\triangle 88	\triangle 88	\triangle 132
	max. tool length	in	19%	19%	19%	23 1/2
	max. solid tool diameter	in	\varnothing 6%	\varnothing 6%	\varnothing 6%	\varnothing 8
3. Level of automation						
	MDI		1.1	2.1	3.1	4.1
	CNC		1.2	2.2	3.2	4.2
	MC		1.3	2.3	3.3	4.3



Heavycut boring and milling machine with floor plate and a rotary and traversable work-table, type TDV.

Heavycut boring and milling machine with floor plate and two rotary and traversable work tables, type TDV, for shuttle machining.

Twin-system – Heavycut boring and milling machines on a common bed with floor plates and clamping tables.

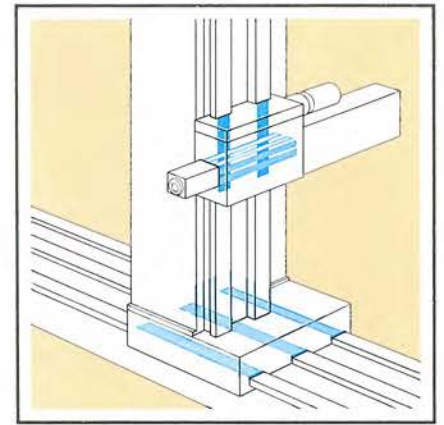
Special problems require special module-combinations.



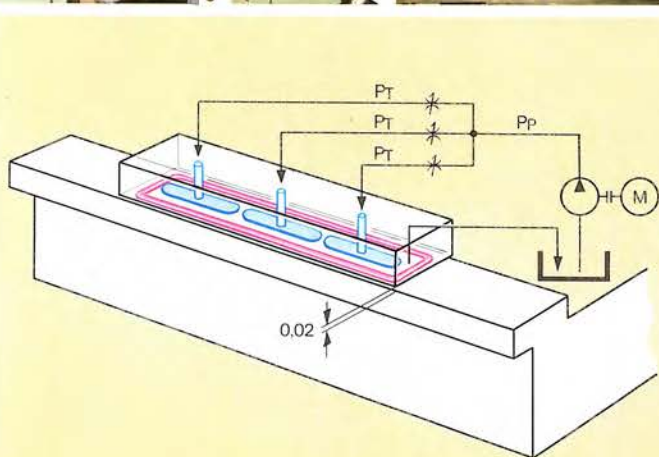
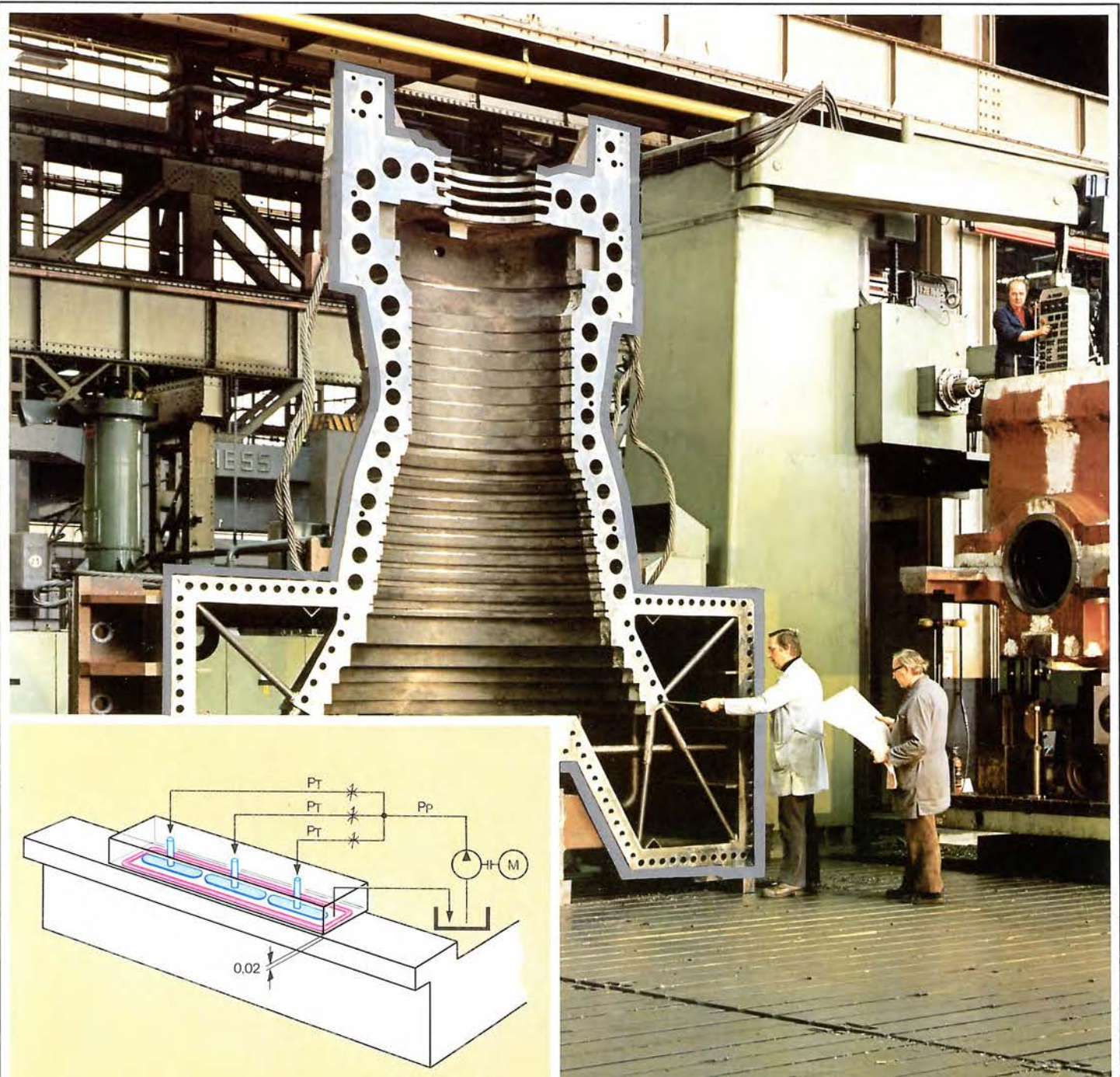


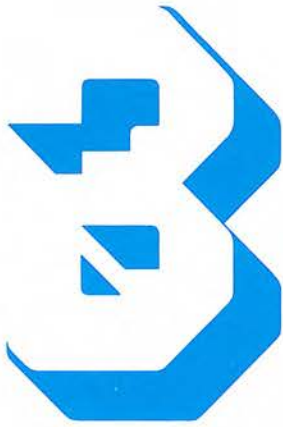
*Heavycut-
manoeuvrable machining
of massive components*

Quick positioning



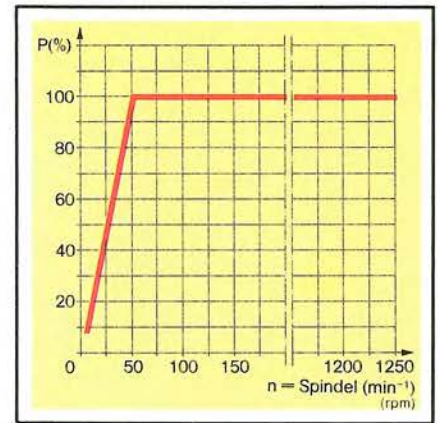
Reduction of idle times by quick positioning. High rates of acceleration and rapid traverse with low wear hydrostatic bearings in the X, Y and Z axes.



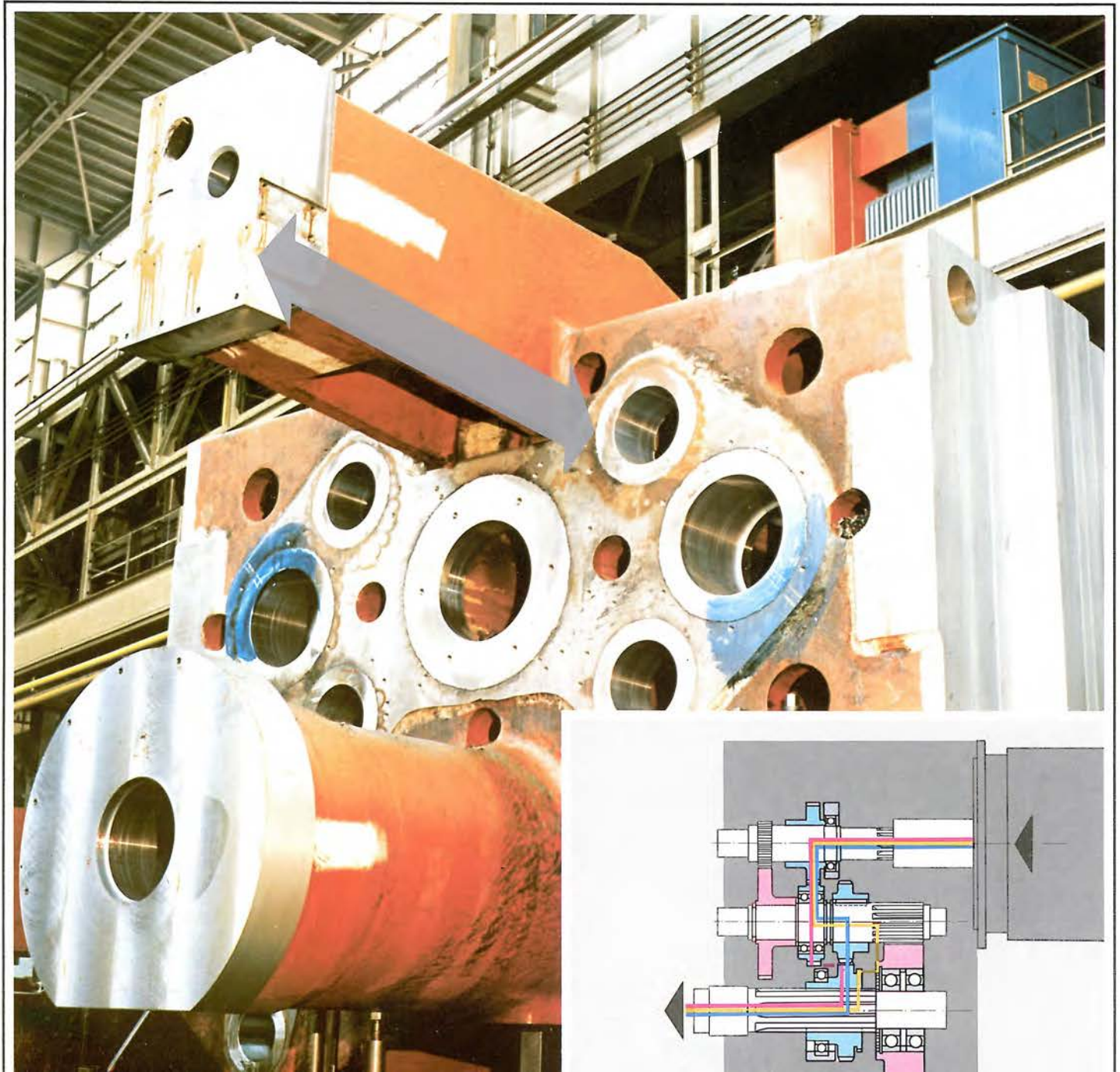


*Heavycut-
manoeuvrable machining
of massive components*

Power milling with large extensions



The available high power of the drive is transmitted through a three step motor, which is designed with a high torque rating, along the optimized ram to the cutting tool and is available for the whole length of the ram extension.



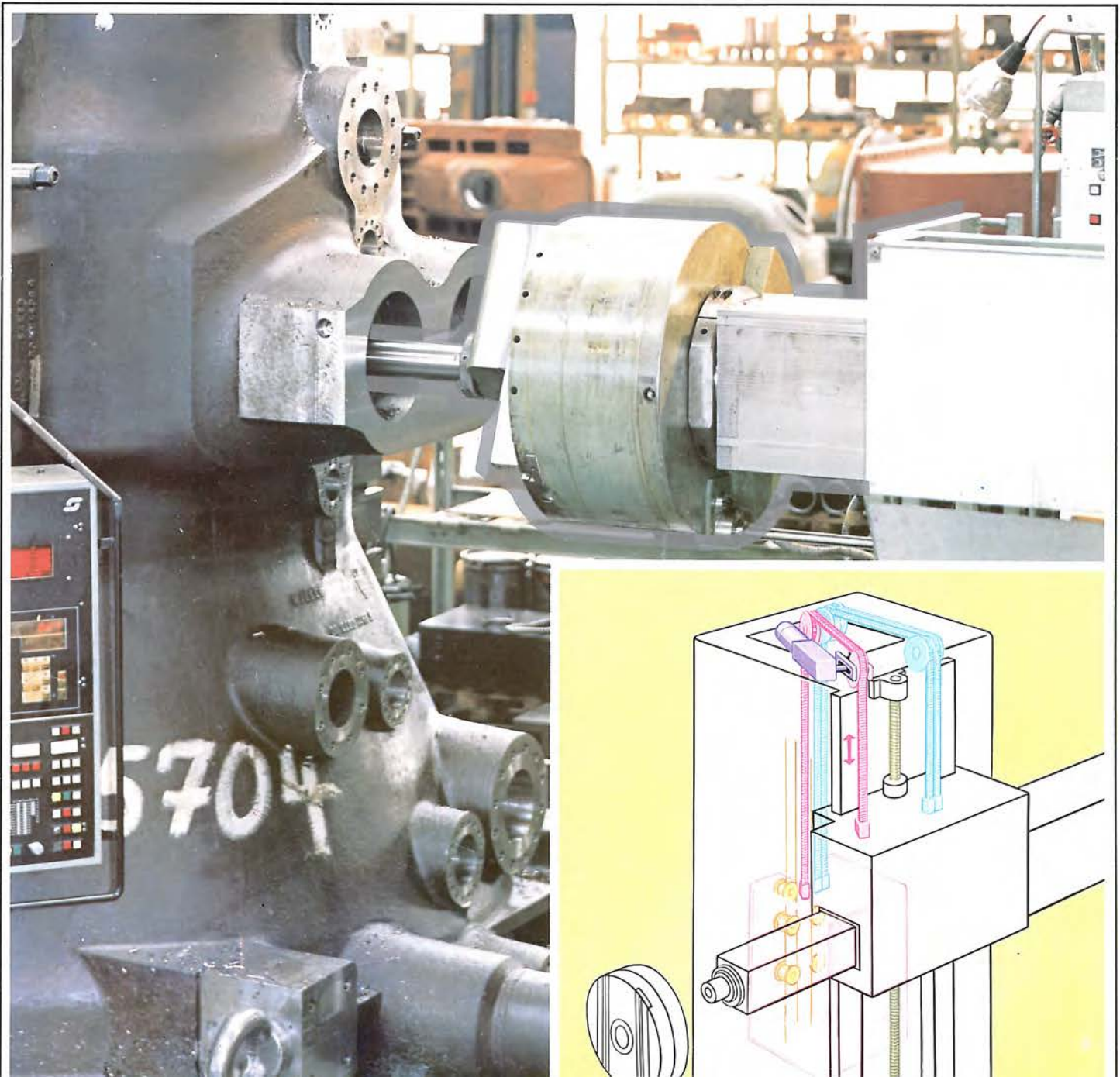


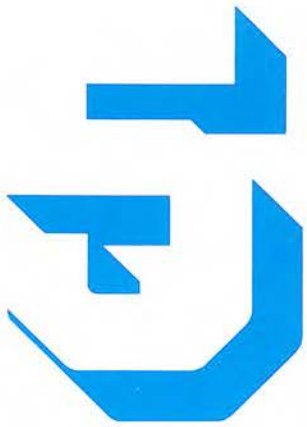
*Heavycut-
manoeuvrable machining
of massive components*

High accuracies with heavy machining units

Ram extensions (in)	Deviation without tools (μ in)	Deviation with facing head weighing 2646 lbs (μ in)	Deviation with angular milling head weighing 1323 lbs (μ in)
21"	197	472	236
27"	394	984	492
33"	590	1575	787
39"	108	2456	1260
45"	1673	3642	1890
51"	2756	5905	2953

An automatic center of gravity compensation unit keeps the ram in the horizontal plane at all ram extensions even with an auxiliary head mounted on it, e.g. detachable facing heads and angular milling heads, etc.



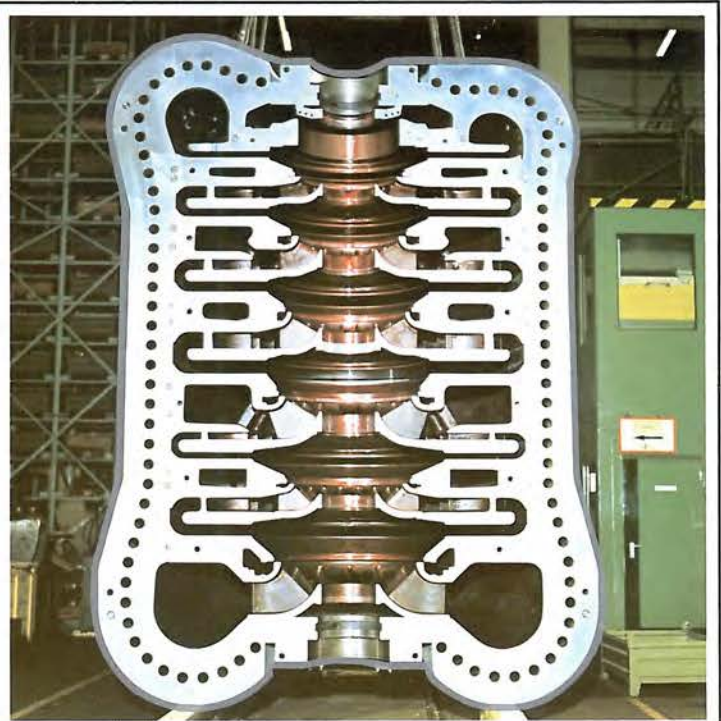


*Heavycut-
manoeuvrable machining
of massive components*

Manual operation with all the advantages of NC



All Heavycut boring and milling machines can be operated in a conventional manual mode. It is further possible to operate in NC-assisted manual mode at any time.



When manually machining large components with repeated tool paths, e.g. roughing, semi-finishing and finishing, it is possible to use the play-back method with NC advantages:

- The positions can be stored in a memory by pressing a button.
- The technological conditions shown on the display can be stored
- The geometrical points can be stored when repeating the part.

When machining operations are repeated, such as bolt holes or flange surfaces, the required information can be read in, in blocks, by means of the NC-pendant, stored and held in the memory for future use when required.

Components with machining paths such as joint surfaces on compressor housings, can be individually machined by guiding the tool using a direction switch (vector principle). The rotary direction switch can be used in all four quadrants in the chosen plane, e.g. x-y, y-z etc., with steps of 1 degree.

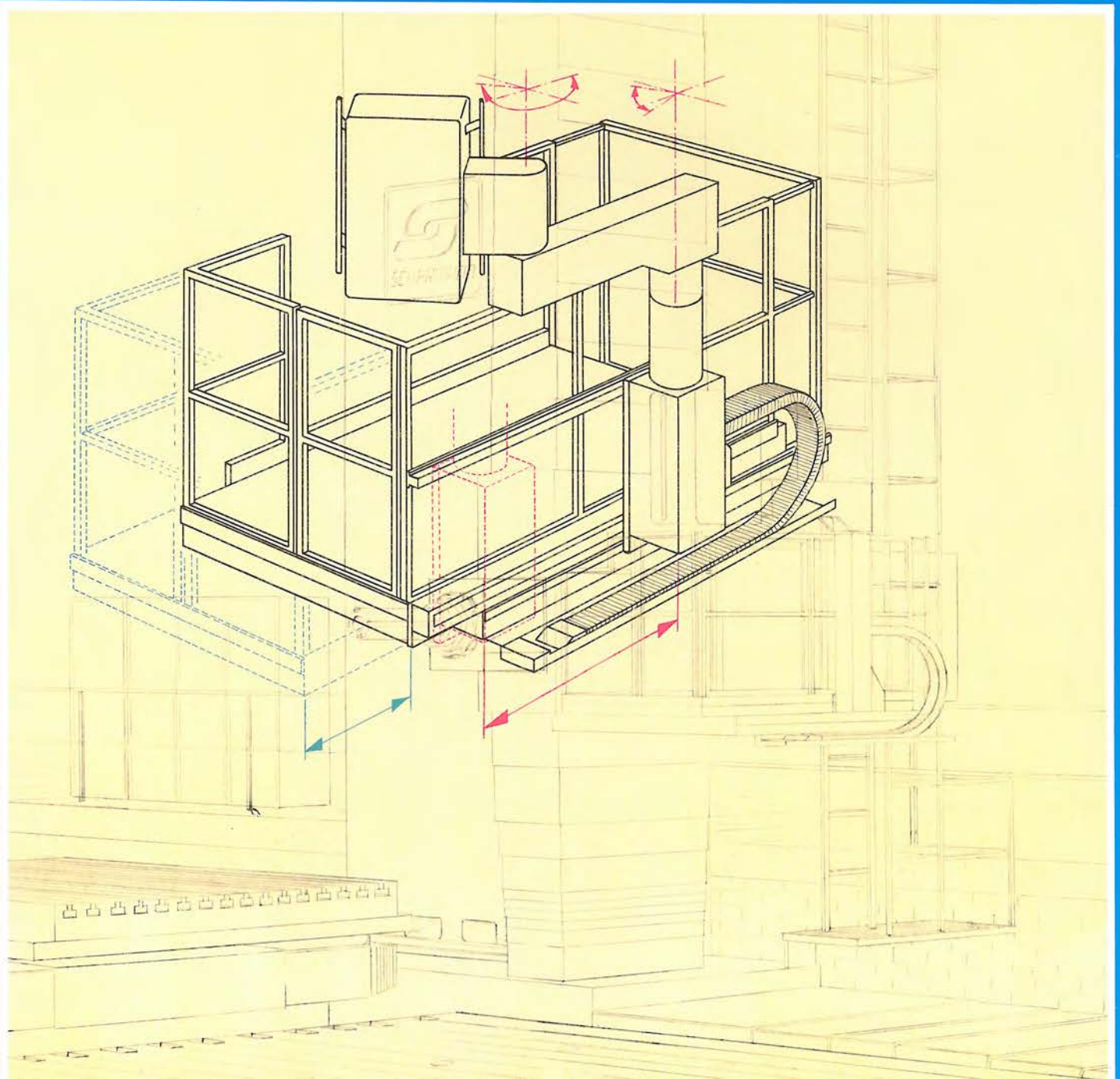


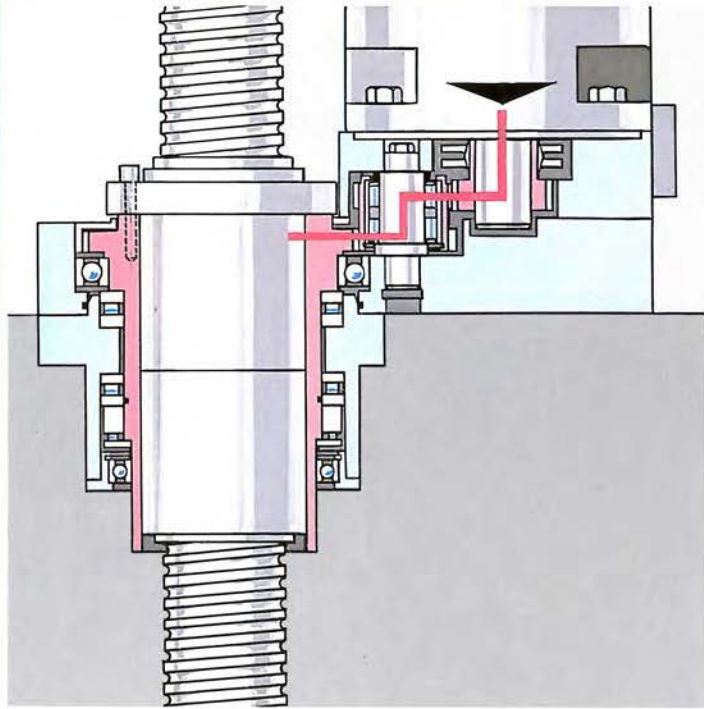
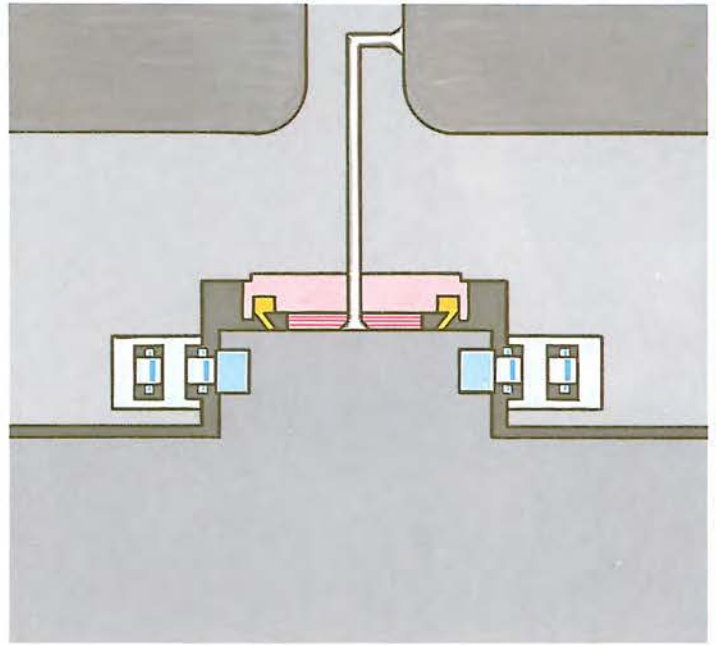
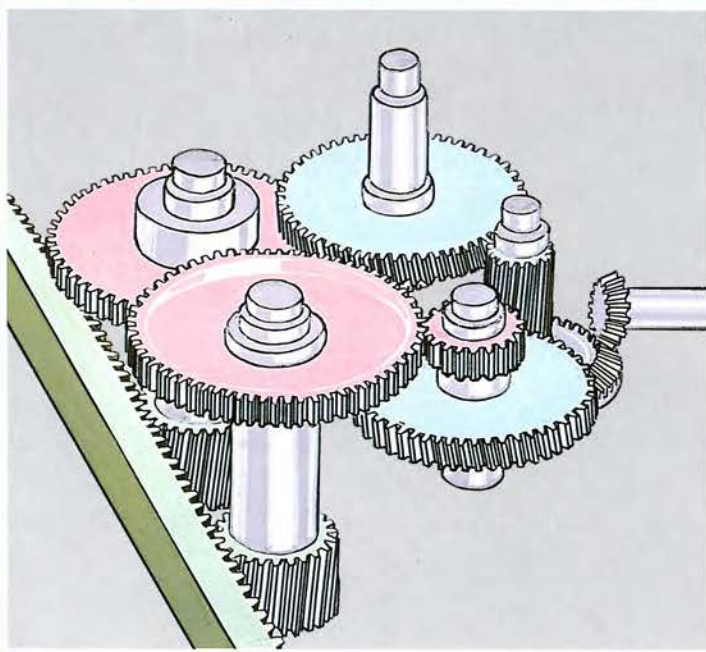
The Heavycut design

Basic machine

Manoeuvrable machining of massive components requires precise design:

- centralized control
- easy supervision of the cutting operations
- easy access to the working spindle
- simplicity of measurement in the working area.



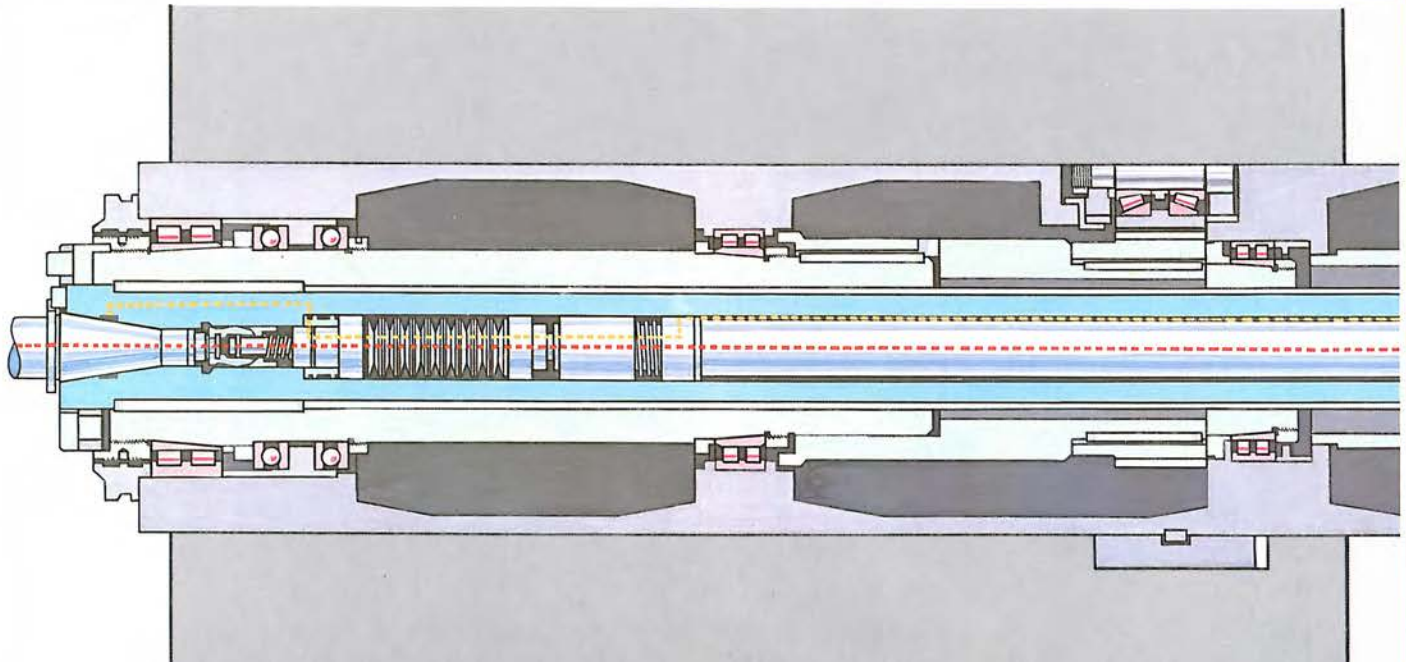


Rigid power transmission in the X-axis by means of a double pinion gear with back lash compensation. The helical rack assures high power transmission. (top left)

With the hydrostatic bearings, the positioning accuracy in the X- and Y-axes is maintained by rigid preloaded roller bearings. (top right)

Dynamic stability of the feed drive for the headstock traverse is achieved by means of a stationary spindle and rotating nut.

Rigid, compact, preloaded, precision radial and axial bearings. For tooling with coolant through the shafts, coolant can be pumped through the spindle itself. The tool shafts are cleaned when tool changing occurs by means of compressed air.

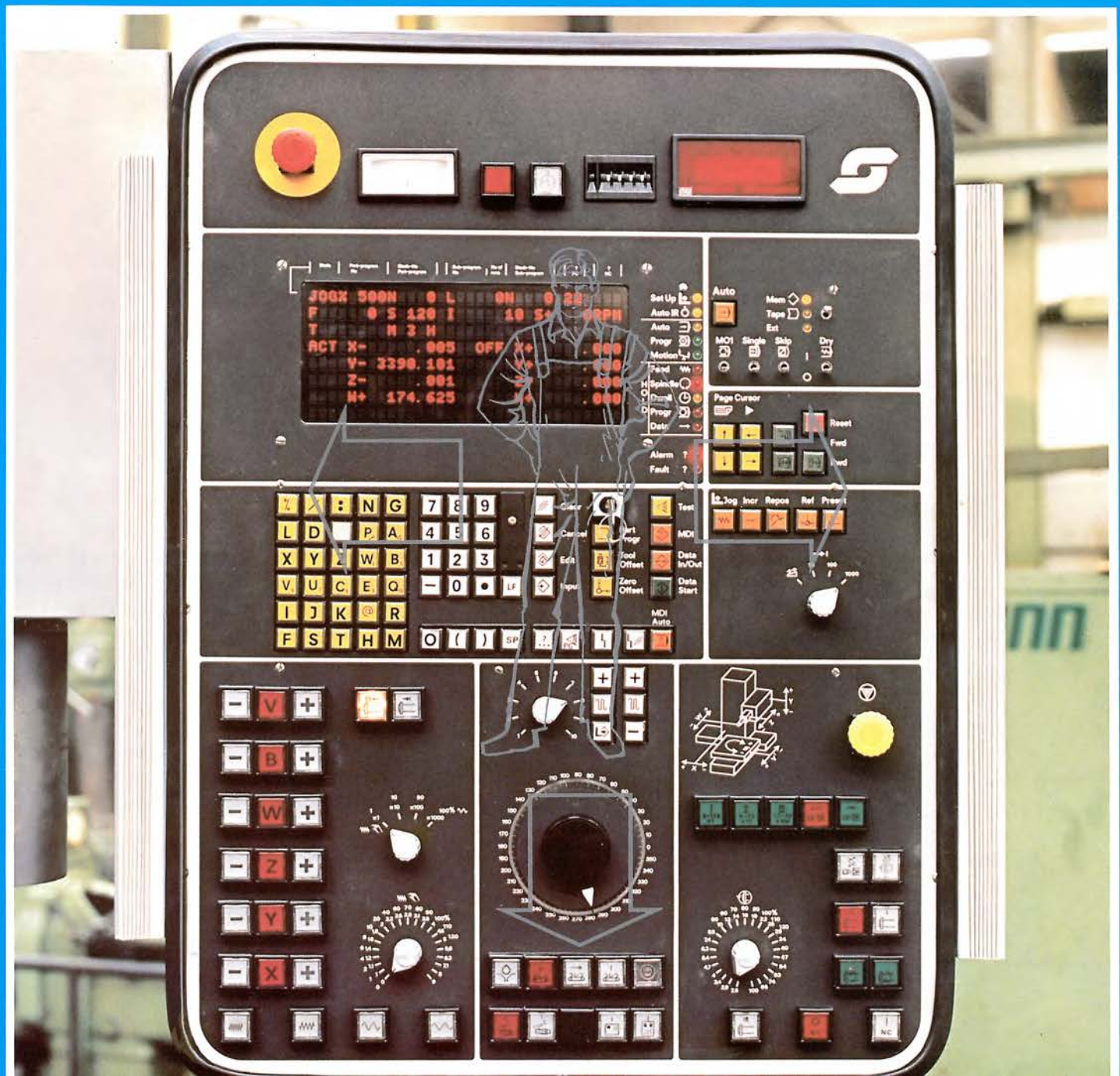


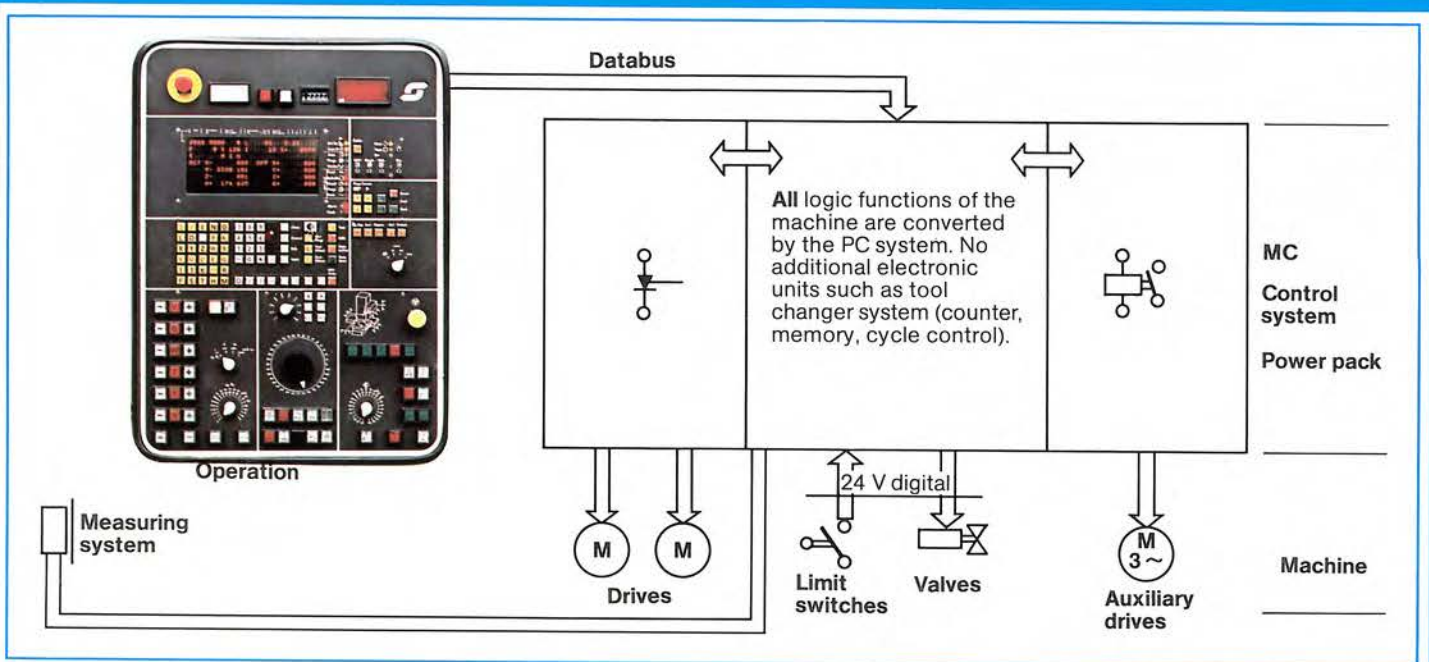


The Heavycut design

Electrics and electronics

The Heavycut electrical package is one unit for all machine types and levels of automation. The electrical panel is in a closed form, installed to IP 54. The machine and control diagnostics operate with plain language read-out. The control and power units are discrete units as are the PC and functions on the control panel.





The electrical package

Standard units for all types of machine and levels of automation coming from one supplier.

CNC-control

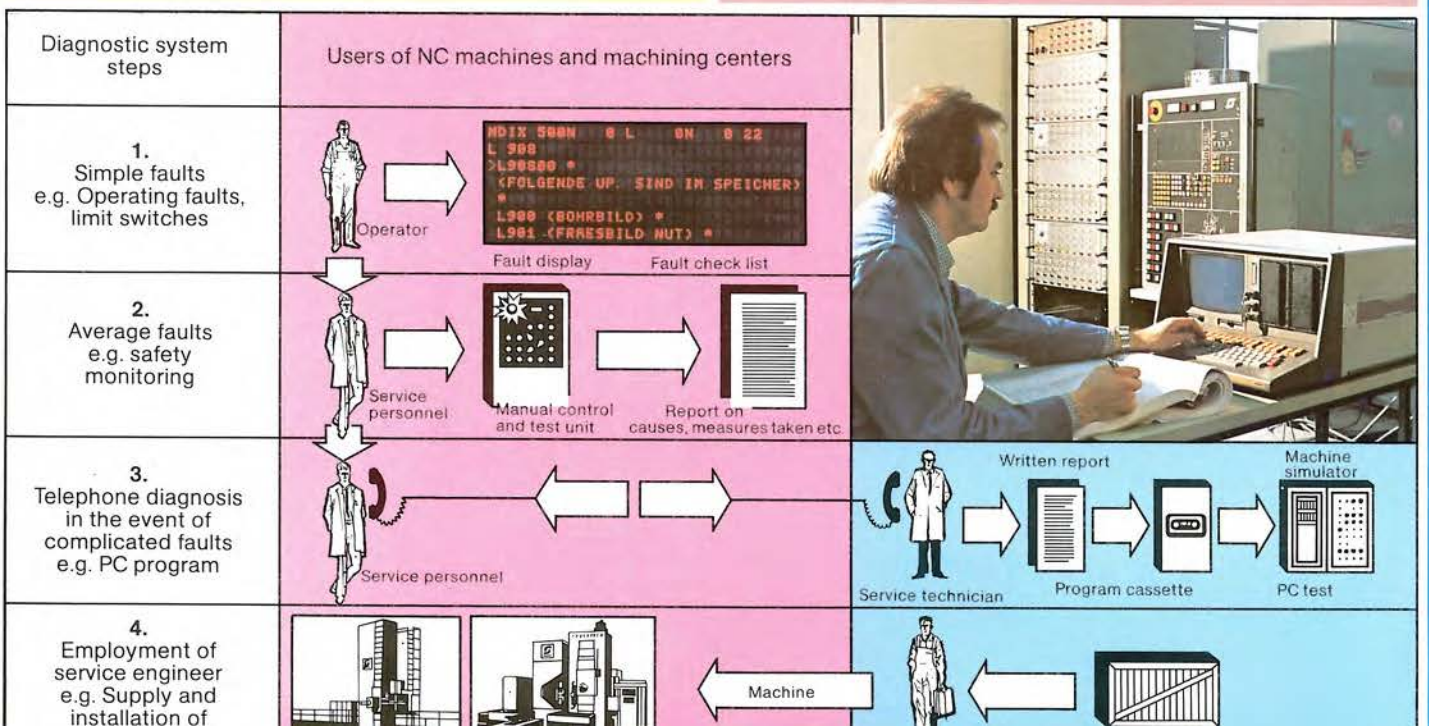
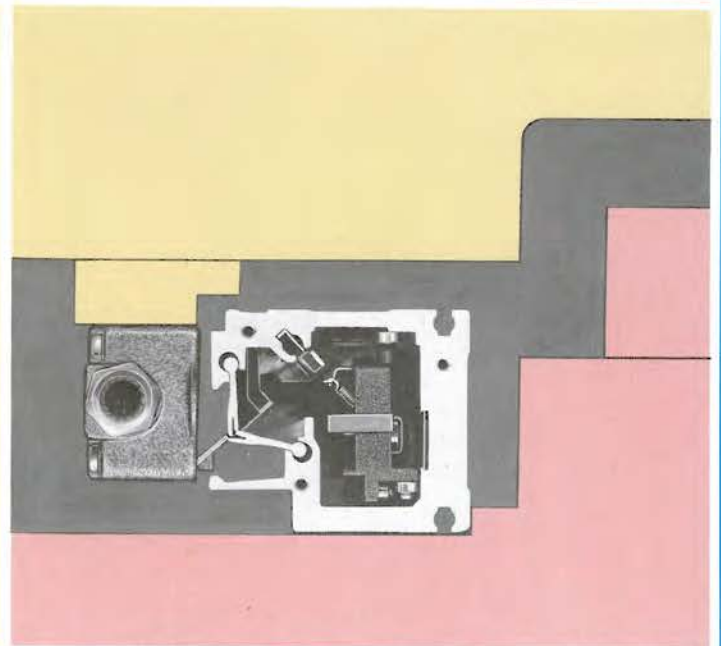
Standard control concept for all machine types and levels of automation (MDI, CNC, MC).

The Heavycut-systems diagnostics

The electrical concept enables machine faults to be kept under control at all times and is tailored for each machine by the machine tool manufacturer.

The Lida-measuring system

The incapsulated measuring system with its simple, uncomplicated design is suitable for long traverses and has a calibrated prestressed steel tape as the scale and a photoelectric scanning head for non-contact gauging. The resolution is 39 µm and the system has integrated fault correction.

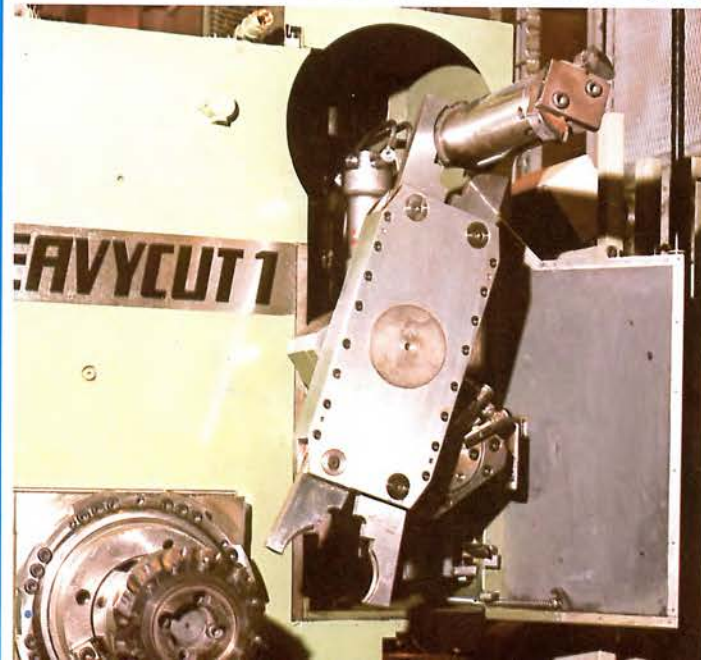




The Heavycut design



Automated tool changing

Manoeuvrable machining of components requires that the tool changes can be made easily and quickly in any working position. After loading a tool into a loading pocket on the operator's platform, the tool can be automatically swung over using a double arm and changed into the working spindle. The next grade of automation is complete automatic tool changing from a tool magazine.



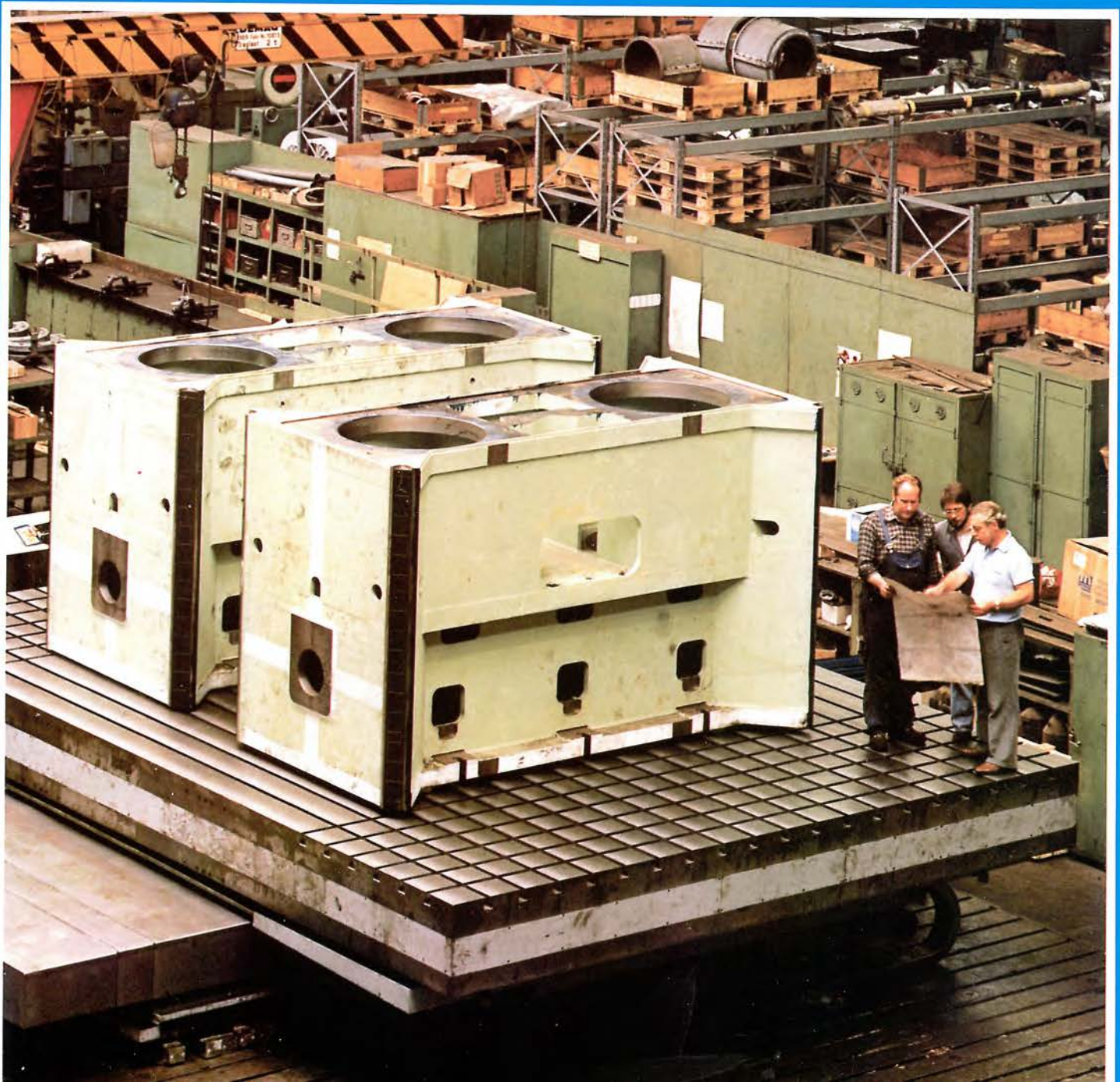


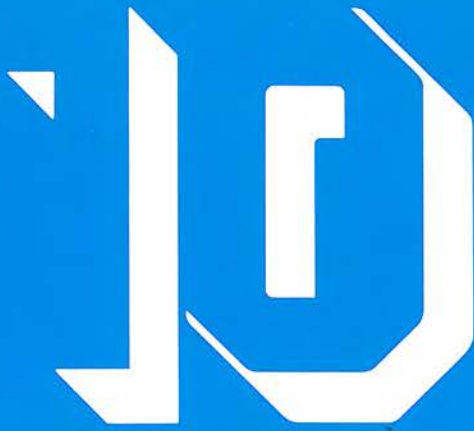
The Heavycut design Tables

					
size	ton.	load kg	size	ton.	load kg
TD 1	2	2.000	TDV 1	2	2.000
TD 2	6	6.000	TDV 2	6	6.000
TD 3	12	12.000	TDV 3	12	12.000
TD 4	25	25.000	TDV 4	25	25.000
TD 5	40	40.000	TDV 5	40	40.000
TD 6	60	60.000	TDV 6	60	60.000
TD 7	100	100.000	TDV 7	100	100.000

Further details refer to technical data.

Manoeuvrable machining of massive components requires that the machines of the Heavycut-range can be equipped with various types of tables and tables sizes, various pallet changing systems and pallet sizes, or combinations of tables and/or floor plates. An extensive program of tables, from the smallest to the largest table is available. (Special purpose tables upon request.)

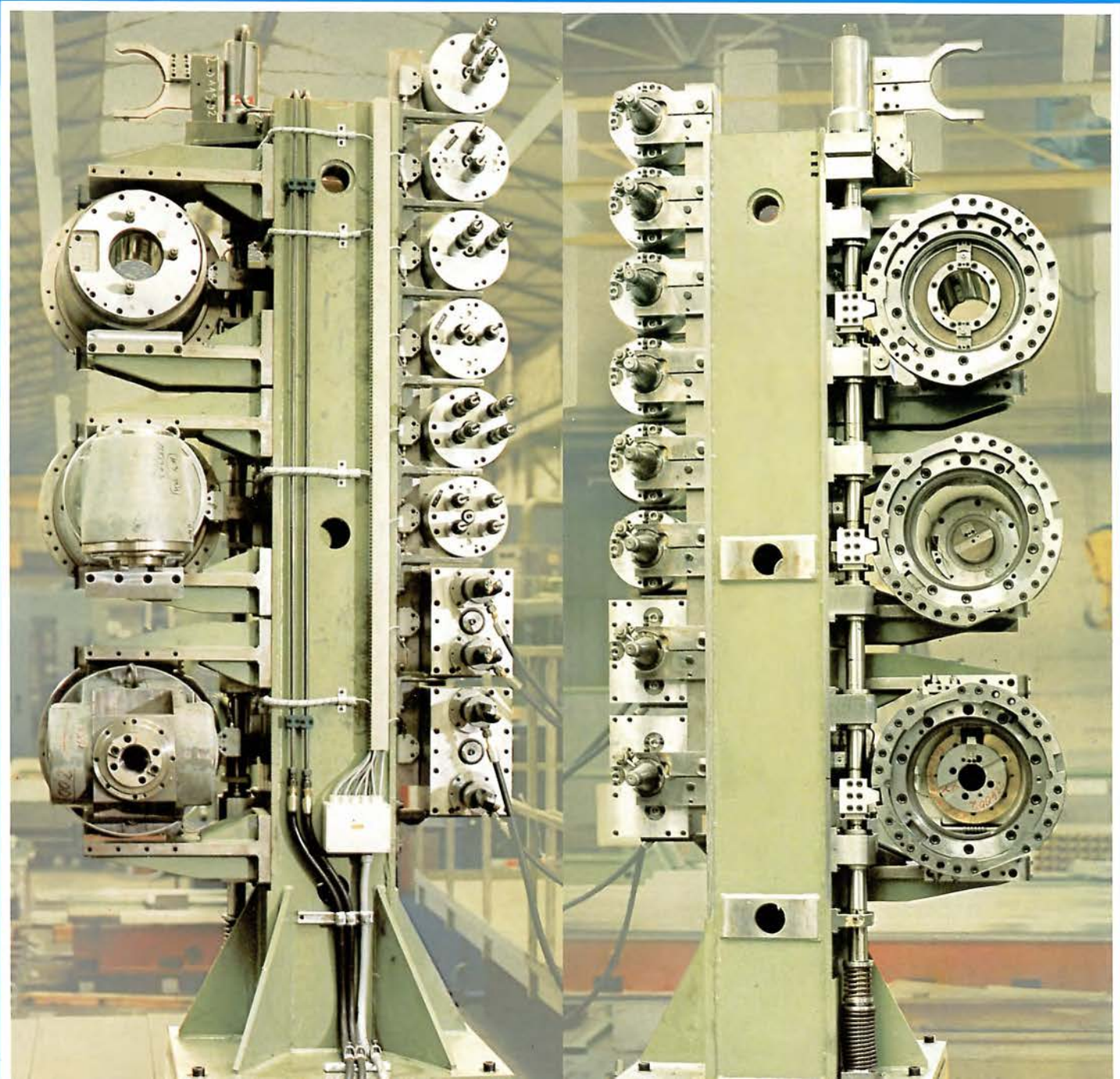


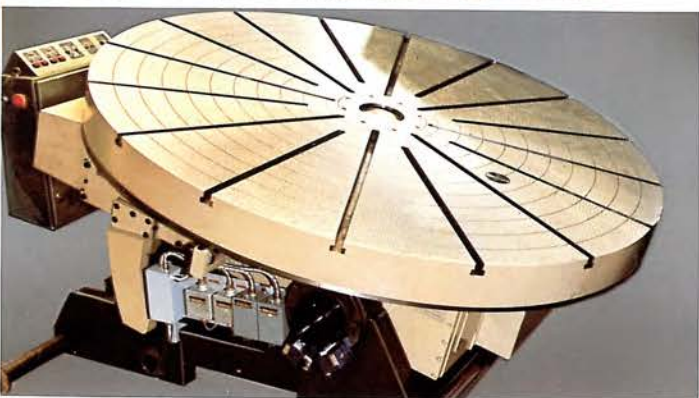
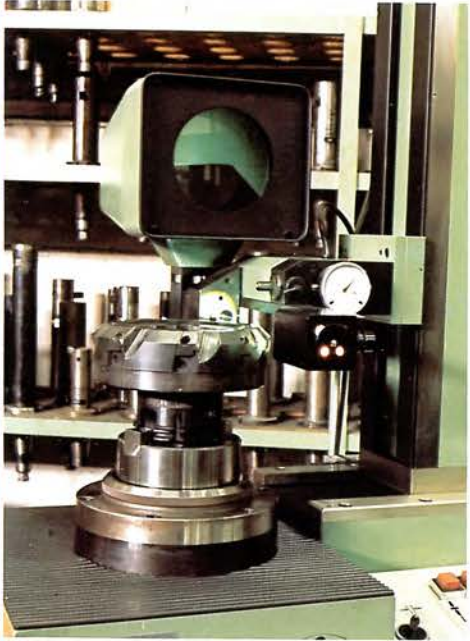


The Heavycut design

Technical details

Manoeuvrable machining of massive components requires optimized tooling and individualized auxiliary equipment.





The pick-up-magazine is designed for the automatic changing of angular milling heads, multispindle heads and special purpose tool units.

Tool presetter unit for setting tool lengths and diameters.

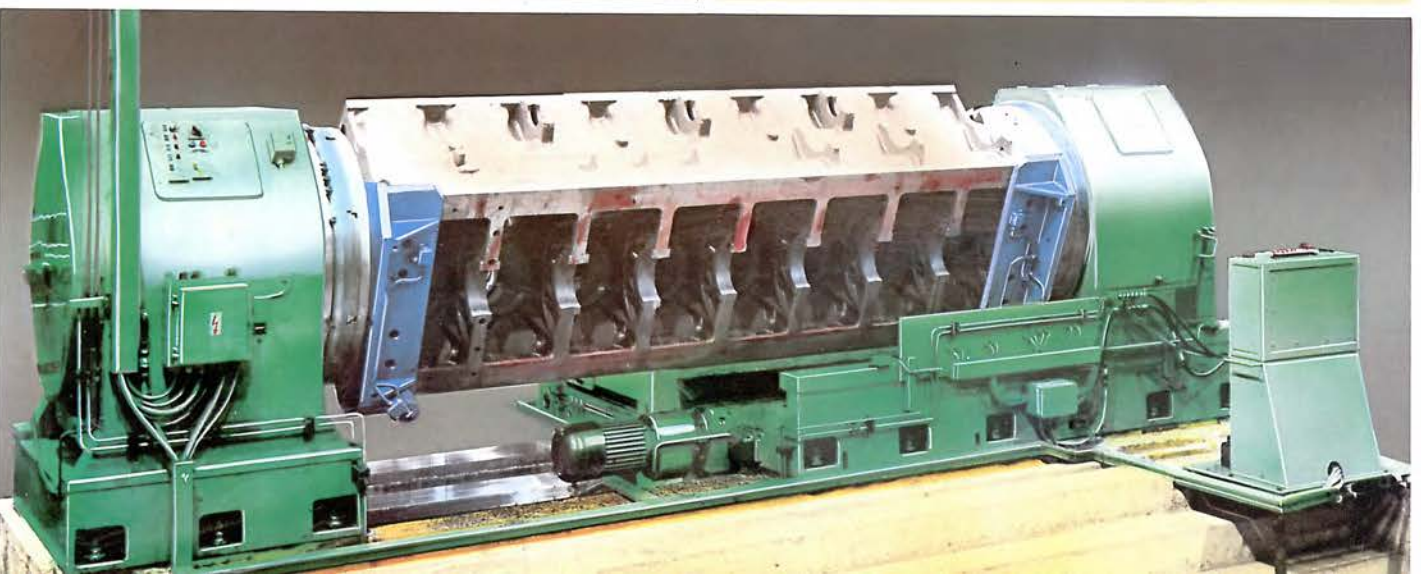
Detachable facing heads with either manual or NC-controls for accurate boring and contouring and acceptance of multi tool holders.

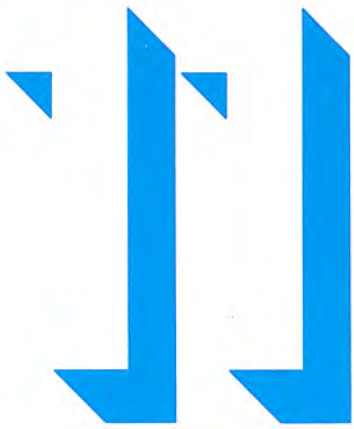
Universal angular milling head for the machining of any inclined surface.

Electronic probe for tolerance control (Renishaw).

The uniqueness of components requires individual selection of the auxiliary equipment. Tilting and indexing tables allow machining operations to be performed in the fifth plane.



Trunnions for the complete machining of components in five planes.





Technical data

Heavycut machine size		Heavycut 1.		
Level of automation**		MDI	CNC	MC
Machine designation		1.1	1.2	1.3
1. Machining unit Coordinate area X = cross traverse Y = vertical traverse longitudinal traverse of table		98½ + lengths of 19¾ 78¾ - 118¼ see worktables		
Work spindle max. main motor max. spindle speed spindle diameter spindle traverse (W) spindle taper		hp rpm in in size no.	87 1250 5⅞ 27½ 50	
Ram ram cross section Z = ram traverse		in in	12¾ x 12¾ 31½	
Feeds feed range max. rapid traverse		ft/min ft/min	0,003 - 20 33	
Facing head (detachable) facing head diameter max. facing head speed max. turning diameter max. facing head slide stroke		in rpm in in	P 650 26½ 200 53 8	
Automatic tool changer number of tool pockets max. tool weight max. tool length max. tool solid diameter (without adjacent pockets being empty) max. solid tool diameter (with adjacent pockets being empty)		lbs in in in	40 or 60 88 19¾ 6¾ 13½	

2. Table units* 2.1 Rotary worktables  clamping area max. payload		in lbs	TD1 29½ x 33½ 33½ x 39½ 4400	TD2 39½ x 49¼ 39½ x 57 13200
2.2 Rotary and traversing worktables  clamping area max. payload table traverse		in lbs in	TDV1 29½ x 33½ 33½ x 39½ 4400 47½ - 226½	TDV2 39½ x 49¼ 39½ x 57 13200 47½ - 226½

Heavycut 2.			Heavycut 3.			Heavycut 4.		
MDI	ENG	MG	MDI	ENG	MG	MDI	ENG	MG
2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3
98½ + lengths of 19¾ 98½ - 157½ see worktables			118¼ + lengths of 19¾ 118¼ - 197 see worktables			157½ + lengths of 19¾ 157½ - 236 see worktables		
87 1250 6¼ 27½ 50			120 1000 6¼ or 7 39½ 50/60			181 800 7¾ or 8⅞ 51 60		
12¾ x 12¾" 31½			15¾ x 15¾ 39½			19 x 23½ 51		
0,003 - 20 33			0,003 - 20 33			0,003 - 20 33		
P 650 26½ 200 53 8			P 800 31½ 100 78¾ 10			P 900 35½ 100 98½ 10		
40 or 60 88 19¾ 6¾ 13½			40 or 60 88 19¾ 6¾ 13½			40 132 23½ 8 17¾		

TD3 49¼ x 63 49¼ x 71 26500	TD4 63 x 78¾ 63 x 90½ 55100	TD5 78¾ x 98½ 98½ x 118¼ 88200	TD6 98½ x 118¼ 118¼ x 137¾ 143300	TD7 118¼ x 137¾ 130 x 157½ 220000
TDV3 49¼ x 63 49¼ x 71 26500 78¾ - 236¼	TDV4 63 x 78¾ 63 x 90½ 55100 78¾ - 236¼	TDV5 78¾ x 98½ 98½ x 118¼ 88200 98½ - 236¼	TDV 6 98½ x 118¼ 118¼ x 137¾ 143300 98½ - 236¼	TDV7 118¼ x 137¾ 130 x 157½ 220000 98½ - 236¼