VERTICAL SURFACE GRINDERS

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Unipersonale

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HYDRAULIC VERTICAL SURFACE GRINDING MACHINES

V1 V2 V3

The CAMUT Technology has been specializing in the manufacture of two ranges of RECIPROCATING MOTION, RECTANGULAR TABLE, SURFACE GRINDING MACHINES:

- *Horizontal wheel-spindle surface grinding machines, MINI and MAXI models*
- *Vertical wheel-spindle surface grinding machines, V1 - V2 - V3 models.*

This publication covers only the surface grinding machines that are normally used for grinding workpieces covering a variety of materials which remove stock at high speed, achieving greater accuracy than is generally obtained by using cutting tools.
The complete range includes the V1 - V2 - V3 models, or the small, medium and large series. The wheel-motor power ranges from 15 kW to 370 kW (from 20 to 500 HP).

In most cases these machines do not require the use of special clamping fixtures, as the magnetic chuck is strong enough to clamp the workpieces. The machines can be equipped with measuring units for fully-automatic operations, loading and unloading excluded, but including finished dimension measuring. The cycle determines the roughing, finishing, spark-out and table-stop operations.

The «DUPLEX» version of this type of machine permits the use of two rotary tables (up to a 1400 mm diameter), alternately. The dead times relating to the loading and unloading of workpieces are thereby cancelled. When this kind of machine is provided with a fully-automatic working cycle, it is called «DUPLEX-MATIC».

MANUFACTURING FEATURES

All machines manufactured by CIMAT/CAMUT are based on experience gained in forty years of production, as well as utilizing new technogical developments in order to achieve excellent results.

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V1 - 16B

MODULAR COMPOSITION

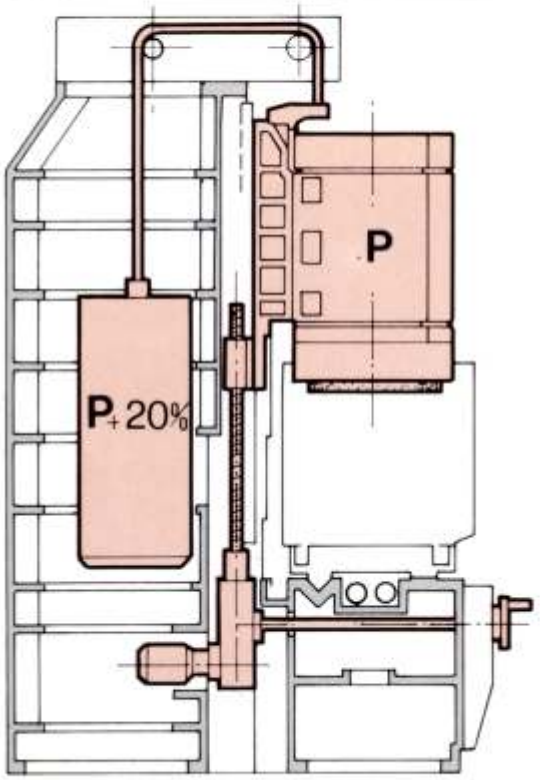
This concept allows a wide range of working capacities to be covered. Particular attention had to be paid to the design of the machine BED - TABLE - COLUMN.

STANDARDIZATION

In developing the design covering the new series of CIMAT/CAMUT grinders, particular care was paid to the expediency and necessity of standardizing several parts of different machines, in order to improve the workshop productivity level, and above all to make after-sale servicing easier.

RIGIDITY

The particularly strict working conditions under which surface grinders operate, together with the high accuracies required, have made it necessary to devote particular care to design, with a view to obtaining structural features which guarantee maximum rigidity.

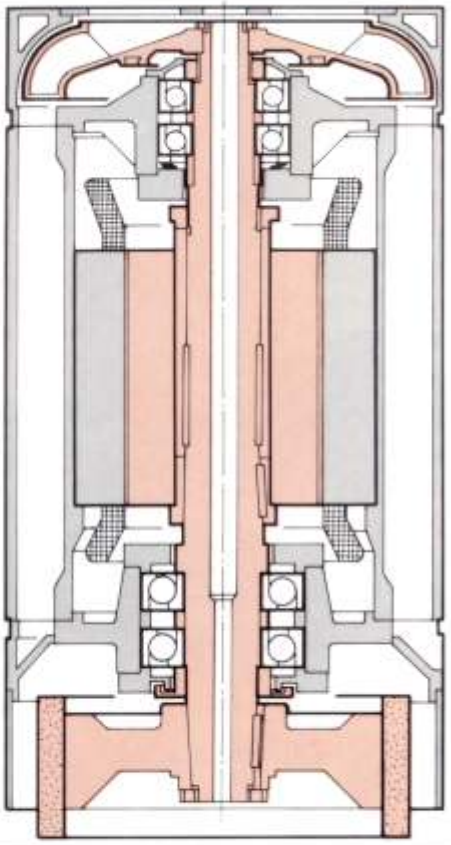


COUNTERWEIGHT

Inside the column there is a counterweight that exerts a force exceeding by 20% the weight of the unit formed by the wheelhead and motor. This feature guarantees a positive movement of the wheel downstroke and allows the grinding reaction to be absorbed, whilst the machine is operating.

VERTICAL FEED

The sensitivity of the wheelhead vertical feed is guaranteed by the counterweight and also by means of a large screw with a taking-up lead nut and locking lead nut, and by an accurate volumetric delivery lubrication on all sliding points.



SPINDLE

The wheelhead spindle, specially designed for high power, is mounted on two supports with large angular-contact ball bearings, allowing an automatic adjustment of the axial play.
The spindle is bored to allow the grinding wheel to be cooled at the centre of the segmental wheel-holder, in addition to the coolant delivered by the 4 nozzles located outside the wheel-holder itself.
The star-delta starting threephase electric motor is housed on the wheelhead spindle. This watertight motor is cooled by means of the stator's outside forced ventilation and is of a high-slip special type, with high insulating impregnation.
Compared with the table, the wheelhead/motor unit is easily inclined on the vertical plane to carry out either rough-grinding operations with a «parallel» pattern or finishing operations with a «cross hatch» pattern.
The standard equipment includes a wheel-dressing attachment, a rake change to be performed on segments. An ammeter, located in a clearly visible position, shows the power absorbed by the motor during the working sequences.

OLEODYNAMIC GENERATOR

The oleodynamic generator unit is separate from the machine, to bring all sources of heat and vibration away from the machine, as well as to make maintenance operations easier. The oleodynamic generator includes:
- *A «Vickers» type vane pump.*
- *A «non-recovery» water operated counter-current heat-exchanger (supplied as a standard accessory), to keep the oil temperature low.*
- *A mechanical cartridge filter with a differential circuit and suction net-filter, to keep the oil free from impurities.*
- *Solenoid valves for the auxiliary circuit, pressure regulator by-pass, gauge, pipes and electric motor.*

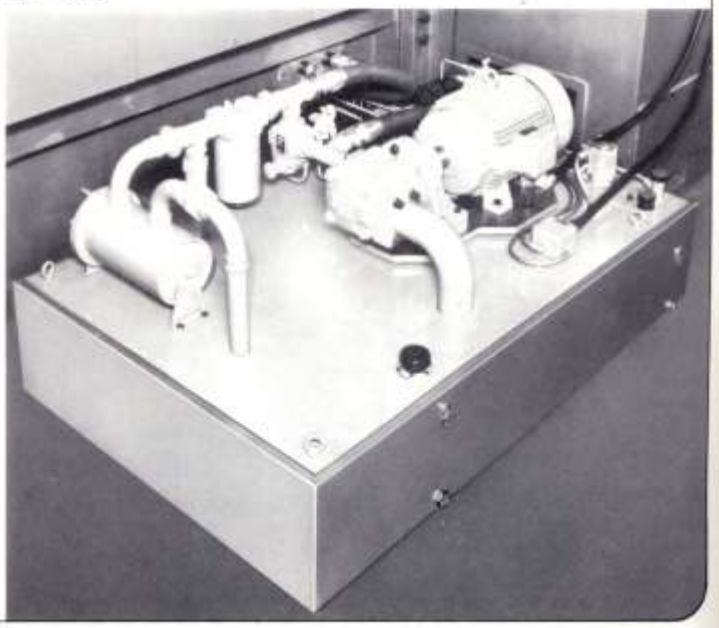
TABLE MOTION

The rectilinear reciprocating motion of the table is obtained by means of two ground and lapped steel cylinders, and by two shafts which provide constant traction running.
A thermal shield between the lower side of the table and the cylinders prevents any heat transfer to the table, thus avoiding distortion.

LUBRICATION

Particular attention has been paid to the lubrication system, as the accuracy, sensitivity of movement and life of the sliding parts depend greatly on an efficient, reliable and automatic lubrication system.
The lubrication system is separate from the oleodynamic generator, and every point to be lubricated is checked by means of a volumetric-delivery metering device.
A safety system stops the machine and an acoustic signal is automatically actuated in the event of any of the following situations arising:
- *the oil level falls below the minimum safety level;*
- *the pump does not work correctly;*
- *the minimum and maximum pressure values do not conform to those set;*
- *the filter needs attention;*
- *breakage or leakage occurs in the pipes.*

V2 - 23B *2*



V1

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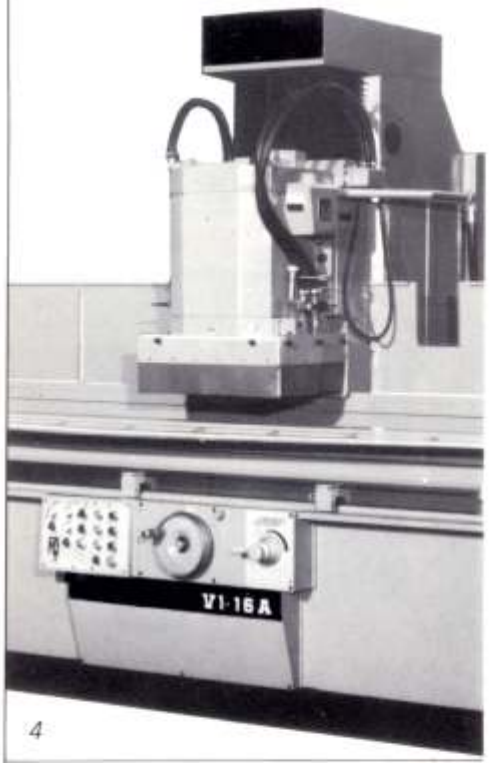
The model V1 surface grinder, with a power range of 15 to 30 kW (20 to 40 HP), is the latest of a matchless range of small and powerful machines manufactured since 1946.



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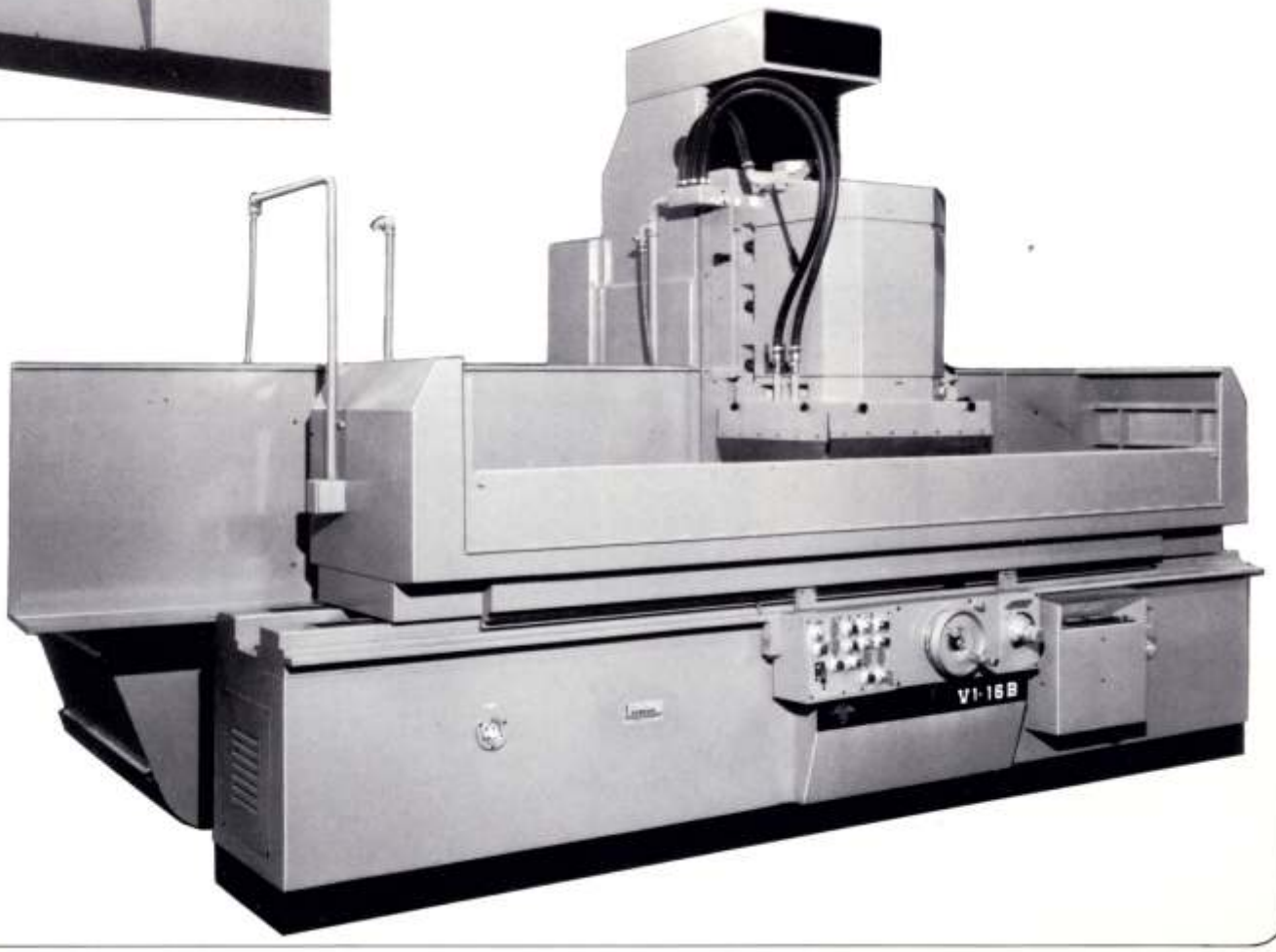

V1 - 16B

V2

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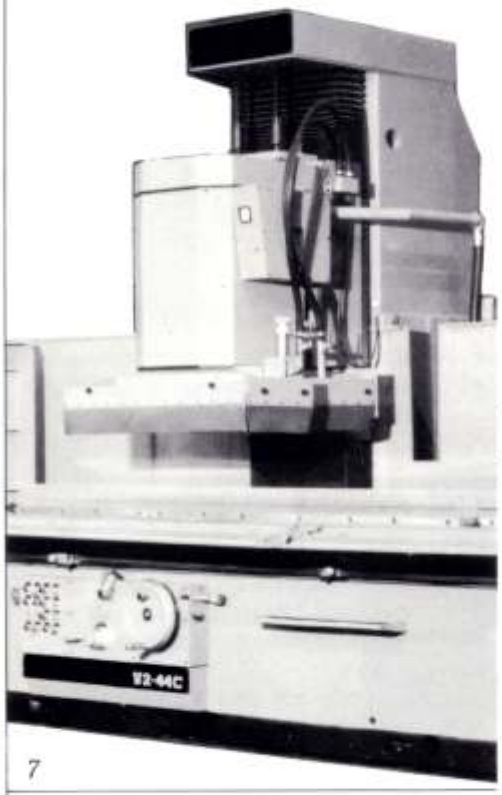

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The model V2 surface grinder, with a power range of 45 to 90 kW (60 to 120 HP) represents a key point in as regards these types of machines

- *— the sizes of the component to be ground*
- *— the installed horsepower*
- *— the greater removal capacity which, on steel, is higher than 1 cm^3/HP x min.*

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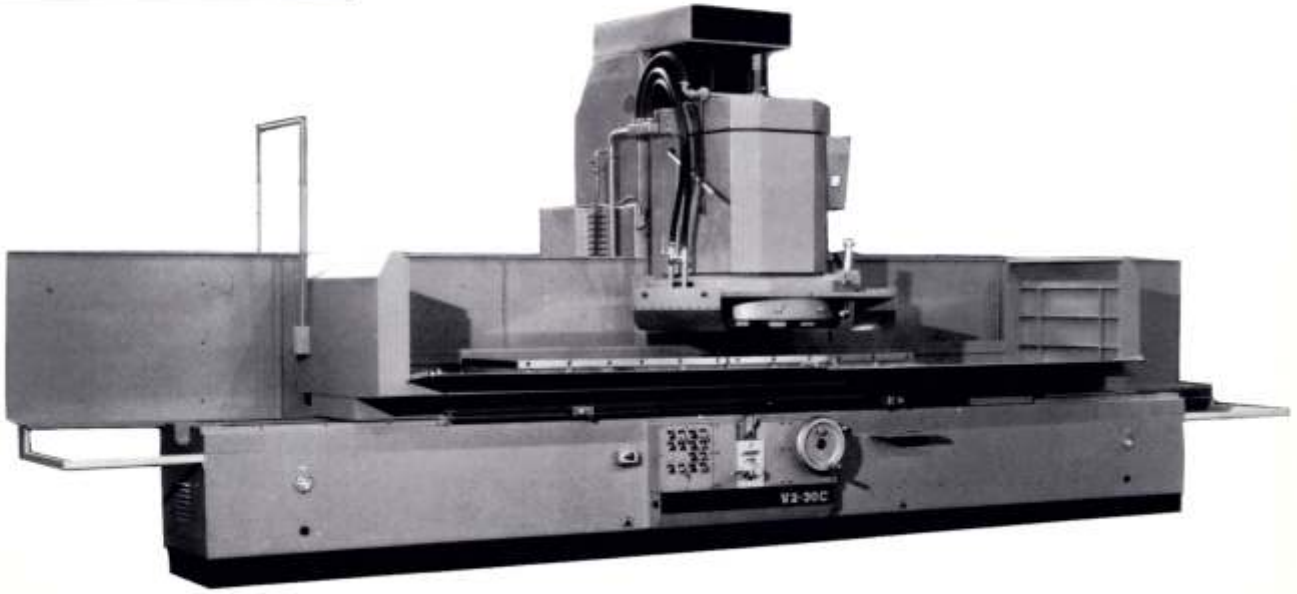

V2 - 30C

V3

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10

The model V3 surface grinder, with a power range of 110 to 370 kW (150 to 500 HP), is the most powerful vertical wheel-spindle surface grinding machine manufactured in the world.
It can grind extremely wide surfaces, which until now have been machined by means of cutting tools, and surpasses the finish and accuracy achieved by those tools.

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V3 - 44D

SPECIFICATION		V1-16A	V1-21A	V1-26A	V1-31A	V1-36A	V1-41A	V1-16B	V1-21B	V1-26B	V1-31B	V1-36B
		V1 - A						**V1 - B**				
Max. working stroke of table	mm	1600	2100	2600	3100	3600	4100	1600	2100	2600	3100	3600
Working surface of table: width	mm	310						410				
length	mm	1500	2000	2500	3000	3500	4000	1500	2000	2500	3000	3500
Max. height ground on table	mm	500						500				
Segment-wheel diameter	mm	360						460				
Size of segments	mm	N. 10 - 64/70 x 25 x 150 (SO 31)						N. 12 - 64/70 x 25 x 150 (SO 3				
Automatic vertical feeds of wheel	mm	0,005 ÷ 0,1						0,005 ÷ 0,1				
Table speed	m/min	1 ÷ 35						1 ÷ 35				
Rotation speed of wheel motor (50 cy.)	rpm	1450 (4 poli)						960 (6 poli)				
Wheel motor	HP	15 (HP 20)		[22 (HP 30)]***				22 (HP 30)		[30 (HP 40)]***		
Oil pump motor	HP	5,5			7,5			5,5			7,5	
Motor for rapid vertical movements	HP	0,55						0,55				
Motor for electric pump	HP	0,55						0,55				
Hydraulic oil tank	litres	240						240				
Coolant tank	litres	500						500				
Size of electromagnetic chuck: width	mm	300						400				
length	mm	1500	2000	2500	3000	3500	4000	1500	2000	2500	3000	3500
Net weight	approx. Kg	5800	6800	7800	8800	9800	10800	6800	7800	8800	9800	10800

* The real table stroke is given by max. working stroke plus 100 mm, which are required for obtaining the amortized stroke reverse.
( )** Segment-weel diameter which can be supplied on request.
( )*** Wheel motor which can be supplied on request.

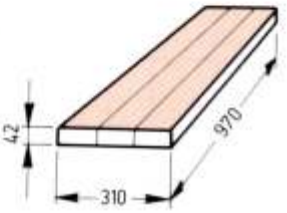
SERIE	A	B	C	D	E	F	G	H	I	L	m	n	o	p	q	r
V1-16A	3800	5200	2100	500 (750)	2450	2700	—	30	310	125	360	1700	1500	1300	550	850
V1-21A	4800	6200										2200	2000	1800		
V1-26A	5800	7200										2700	2500	2300		
V1-31A	6800	8200										3200	3000	2800		
V1-36A	7800	9200										3700	3500	3300		
V1-41A	8800	10200										4200	4000	3800		
V1-16B	3800	5200	2200	500 (750)	2700	2950	—	30	410	175	460	1700	1500	1200	550	850
V1-21B	4800	6200										2200	2000	1700		
V1-26B	5800	7200										2700	2500	2200		
V1-31B	6800	8200										3200	3000	2700		
V1-36B	7800	9200										3700	3500	3200		
V1-41B	8800	10200										4200	4000	3700		
V2-16B	3900	5300	2500	600 (850) (1100)	2920	3170	3420	35	460	195	510	1700	1400	1120	550	850
V2-23B	5300	6700										2400	2100	1820		
V2-30B	6700	8100										3100	2800	2520		
V2-37B	8100	9500										3800	3500	3220		
V2-44B	9500	10900										4500	4200	3920		
V2-51B	10900	12300										5200	4900	4620		
V2-58B	12300	13700										5900	5600	5320		
V2-16C	3900	5300	2500	500 (750)	3170	3420	—	40	550	235	660	1700	1400	1000	550	850
V2-23C	5300	6700										2400	2100	1700		
V2-30C	6700	8100										3100	2800	2400		
V2-37C	8100	9500										3800	3500	3100		
V2-44C	9500	10900										4500	4200	3800		
V2-51C	10900	12300										5200	4900	4500		
V2-58C	12300	13700										5900	5600	5200		
V3-30C	6700	9000	3000	500 (750) (1000)	3800	4050	4300	60	750.	315	1000	3100	2700	2000	950	1350
V3-37C	8100	10400										3800	3400	2700		
V3-44C	9500	11800										4500	4100	3400		
V3-51C	10900	13200										5200	4800	4100		
V3-58C	12300	14600										5900	5500	4800		
V3-30D	6900	9200	3700	750 (1000) (1250)	4450	4700	4950	55	1050	235	1250	3100	2500	1775	950	1350
V3-37D	8300	10600										3800	3200	2475		
V3-44D	9700	12000										4500	3900	3175		
V3-51D	11100	13400										5200	4600	3875		
V3-58D	12500	14800										5900	5300	4575		

V2-B

1-41B	V2-16B	V2-23B	V2-30B	V2-37B	V2-44B	V2-51B	V2-58B	V2-16C
1100	1600	2300	3000	3700	4400	5100	5800	1600
	460							
1000	1400	2100	2800	3500	4200	4900	5600	1400
	600							
	510 (550)**							
	N. 10 - 94/103 x 38 x 180 (SO 32)							
	0,005 ÷ 0,1							
	1 ÷ 35							
	960 (6 poli)							
	45 (HP 60) [60 (HP 80)]***							60
	7,5		11		15			1
	0,55							
	0,55							
	400							
	750			1000				7
	450							
1000	1400	2100	2800	3500	4200	4900	5600	1400
1800	12250	13750	15250	16750	18250	19750	21250	15550

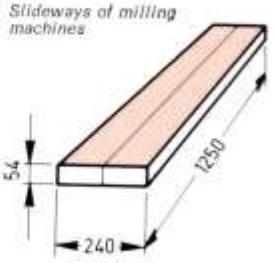
EXAMPLES OF GRINDING OPERATIONS

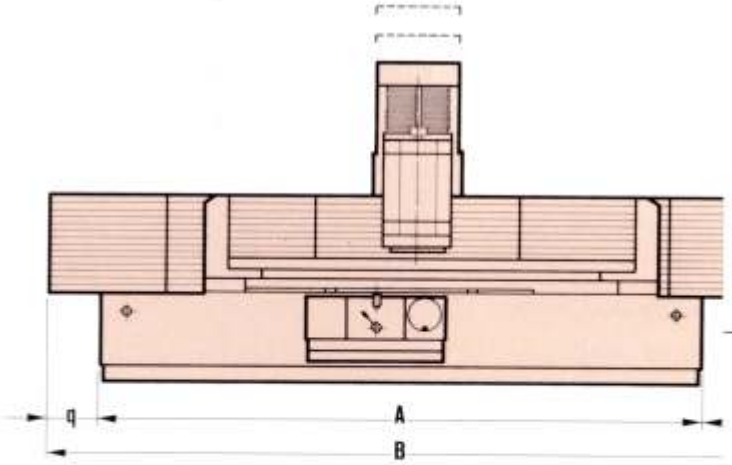
Machine model	V1 - 16 B
Wheel motor	kW 30
Wheel diameter	mm 460
Material	Z 200 C 13
Material resistance	kg/mm² 120
Time	min 5
Removed stock	mm 1
Removed stock	cm³/HP x min 1.5



Machine model	V2 - 23 B
Wheel motor	kW 45
Wheel diameter	mm 510
Material	C 50
HRC	58 ÷ 60
Time	min 5
Removed stock	mm 0.32
Removed stock	cm³/HP x min 0.32

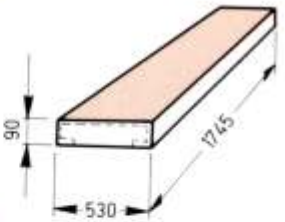
Slideways of milling machines

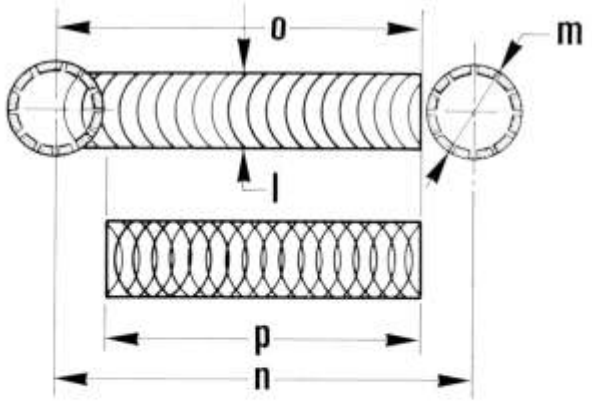




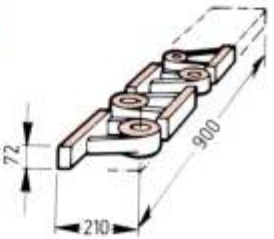
Machine model	V2 - 30 C
Wheel motor	kW 60
Wheel diameter	mm 730
Material	Cast iron G22
Time	min 5
Removed stock	mm 0.6
Removed stock	cm³/HP x min 1.9
Flatness	mm 0.020
Parallelism	mm 0.010

Thicknessing-machine table for wood working





Machine model	V2 - 23 B
Wheel motor	kW 45
Wheel diameter	mm 510
Material	Cast iron G25
Number of components	6
Time	min 3
Removed stock	mm 4
Removed stock	cm³/HP x min 1.3



Machine model	V2 - 58 C
Wheel motor	kW 90
Wheel diameter	mm 730
Material	Z 200 C 12
Time	min 5
Removed stock	mm 0.5
Removed stock	cm³/HP x min 1.16

STANDARD EQUIPMENT SUPPLIED TOGETHER WITH THE MACHINE

— *Rapid vertical feeds of the wheelhead for V2 and V3 models (on request for V1 models).*
— *Automatic vertical feeds of the wheel, synchronized with the table reversals.*
— *Micrometric vertical-feed stop-device with automatic release when reaching a pre-established position.*
— *Ammeter for wheel-motor control.*
— *Wheel-dressing unit, oscillating type (diamond or dressing roller not included) (photo 14 pag. 11).*
— *No. 1 Segment wheel holder complete with no. 1 series of segments.*
— *No. 1 Steel wheel-guard, complete with an additional antisplash rubber guard.*
— *Segment wheel extractor complete with wheel balancing arbor (photo 15-A pag. 11).*
— *High-precision support for machine levelling.*
— *Cooling system complete with pipes, pump, guards and electric controls.*

SPECIAL FEATURES AND APPLICATIONS

V1		V2		V3		
V1-A	V1-B	V2-B	V2-C	V3-C	V3-D	
11-01	11-02	21-01	21-02			— Maximum height which can be ground on the table: 750 mm
		21-03		31-01	31-02	— Maximum height which can be ground on the table: 1000 mm
12-01						— Wheel motor 22 kW (30 HP)
	12-02					— Wheel motor 30 kW (40 HP)
		22-01				— Wheel motor 60 kW (80 HP)
			22-02			— Wheel motor 75 kW (100 HP) - 730 rpm - wheel-holder diameter 660 or 730 mm
			22-03			— Wheel motor 90 kW (120 HP) - 730 rpm - wheel-holder diameter 660 or 730 mm
			22-04			— Wheel motor 75 kW (100 HP) - 570 rpm - wheel-holder diameter 850 mm
			22-05			— Wheel motor 90 kW (120 HP) - 570 rpm - wheel-holder diameter 850 mm
				32-01		— Wheel motor 147 kW (200 HP)
				32-02		— Wheel motor 185 kW (250 HP)
					32-03	— Wheel motor 300 kW (400 HP)
					32-04	— Wheel motor 375 kW (500 HP)
			22-06			— Surcharge for providing for the use of a 730 mm. dia. segmental-wheel holder onto the standard machine, inclusive of special oversize guards and of a 730 mm. dia. segmental-wheel holder (60 kW, 730 rpm).
			22-07			— SAME as above, with a 850 mm. dia. segmental-wheel holder, inclusive of changes in the column and the saddle and of a 850 mm. dia. segmental-wheel holder (60 kW, 570 rpm) (photo 9).
12-03	12-04	22-08	22-09	standard	standard	— Device for automatic change from parallel to cross hatch grinding.
						— Coolant cleaner, with paper roll, with automatic cleaning and exhaust of mud, complete with mud box.
13-01	13-01	23-01				Tank cap. 750 litres - pump 150 litres/min
		23-02	23-02			Tank cap. 1000 litres - pump 220 litres/min
		23-03	23-03			Tank cap. 1500 litres - pump 300 litres/min
			23-04	33-01	33-01	Tank cap. 2000 litres - pump 500 litres/min
				33-02	33-02	Tank cap. 3000 litres - pump 750 litres/min
					33-03	Tank cap. 4000 litres - pump 1000 litres/min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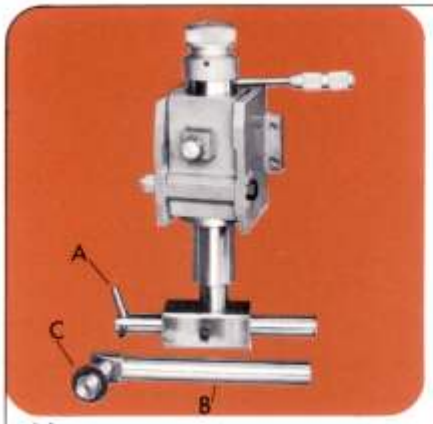

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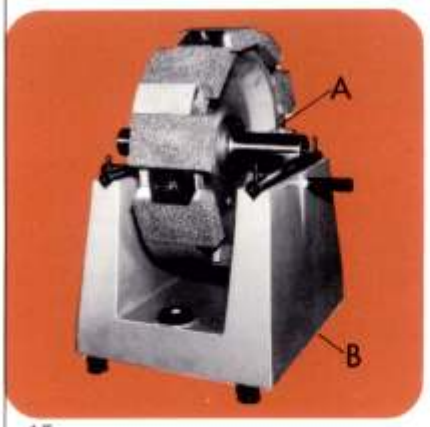
44.01 *Thermostatic valve for checking and maintaining the hydraulic oil temperature.*
44.02 *Industrial diamond, 1.5 carat (photo 14-A).*
44.03 *Roller-type wheel dresser, PERISTAT OK 57 (photo 14-B).*
44.04 *Roller for PERISTAT OK 57 (photo 14-C).*
44.05 *Unit for static balancing of wheel, for a max. 600 mm. dia. wheel-holder (photo 15-B).*



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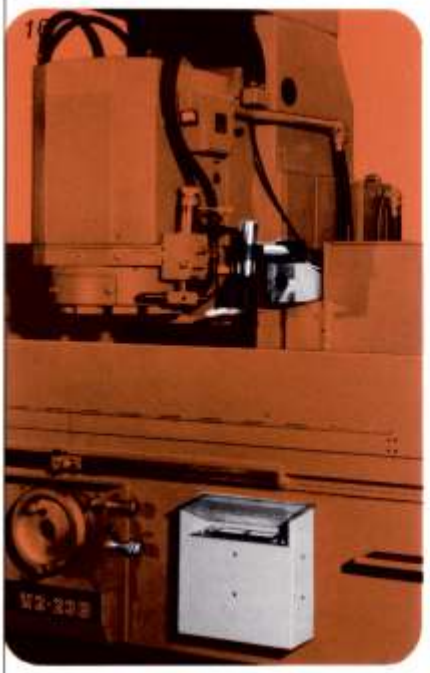
45.01 *Mains voltage different from 380 V.*
45.02 *Frequency different from 50 cy.*
45.03 *Electric equipment to special specifications.*
45.04 *24 V., 50 cy., 100 W. shunted lighting from the machine, with separate-winding transformer or, as an alternative, 220., 50 cy., 20 W. lighting with separate feed by means of a fluorescent lamp - watertight glass ceiling bowl.*
45.05 *Hour-meter electric device for checking the «on»-current time to the machine.*
45.06 *Operator's handbook, additional copies.*
45.07 *Two-composant painting in different colour from GREEN RAL 6011, embossed.*
45.08 *Rapid vertical feeds of the wheelhead (for V1 only).*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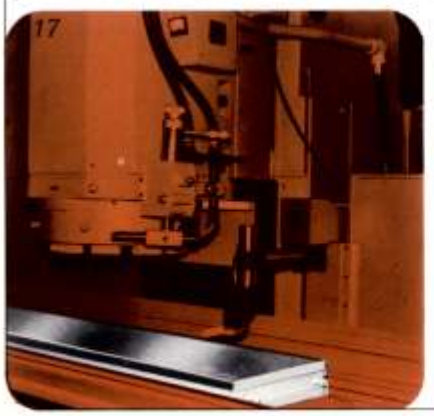
«MARPOSS» automatic-cycle measuring device.
Cycle sequence:
— Roughing,
— Finishing,
— Spark-out,
— Head lifting and stop of coolant delivery,
— Table stop in loading and unloading position.
The device consists of:
46.01 *— Prearrangement of the machine.*
46.02 *— MARPOSS electronic unit — 3 signals — for removable stocks up to 3 mm. - complete with measuring head, amplifier unit and connection cables.*
Or, as an alternative to **46.02:**
46.03 *— MARPOSS electronic unit — 3 signals — for removable stocks up to 18 mm. - complete with special measuring head, Honeywell 6 FS 1 probe, special amplifier unit and connection cables.*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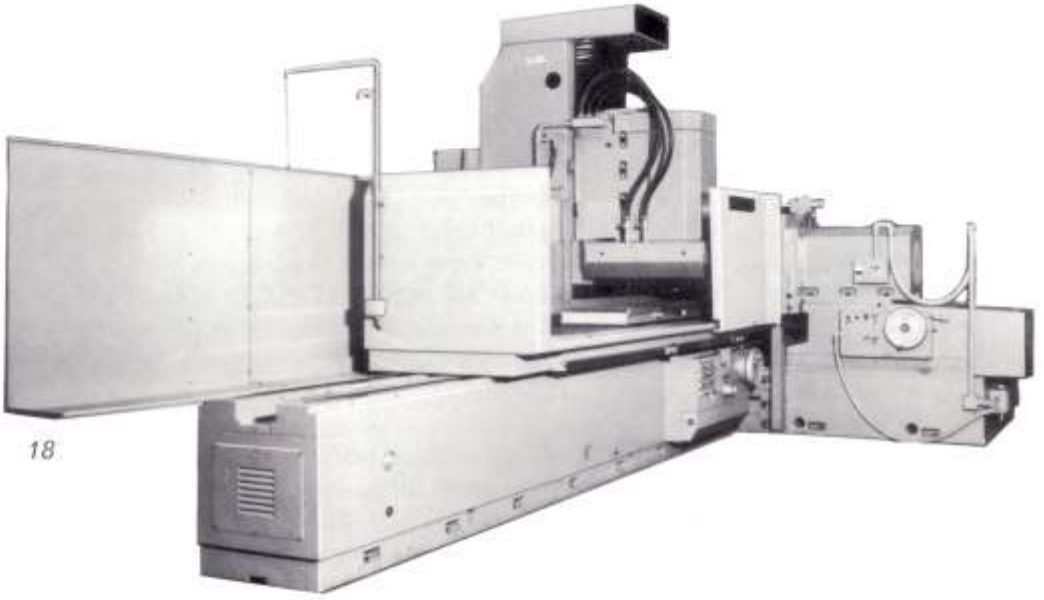
47.01 *Electromagnetic chuck, 5 mm pole pitch.*
47.02 *Electromagnetic chuck, 25 mm pole pitch.*
47.03 *Device for constant-power feed of magnetic chuck.*
47.04 *Device for 20% to 100% variable-attraction power feed of magnetic chuck.*

47.05 *«COLD» electropermanent magnetic chuck.*
47.06 *Device for constant-power feed of the «COLD» magnetic chuck.*
47.07 *Device for 20% to 100% variable-attraction power feed of the «COLD» magnetic chuck.*

VO2-44 C



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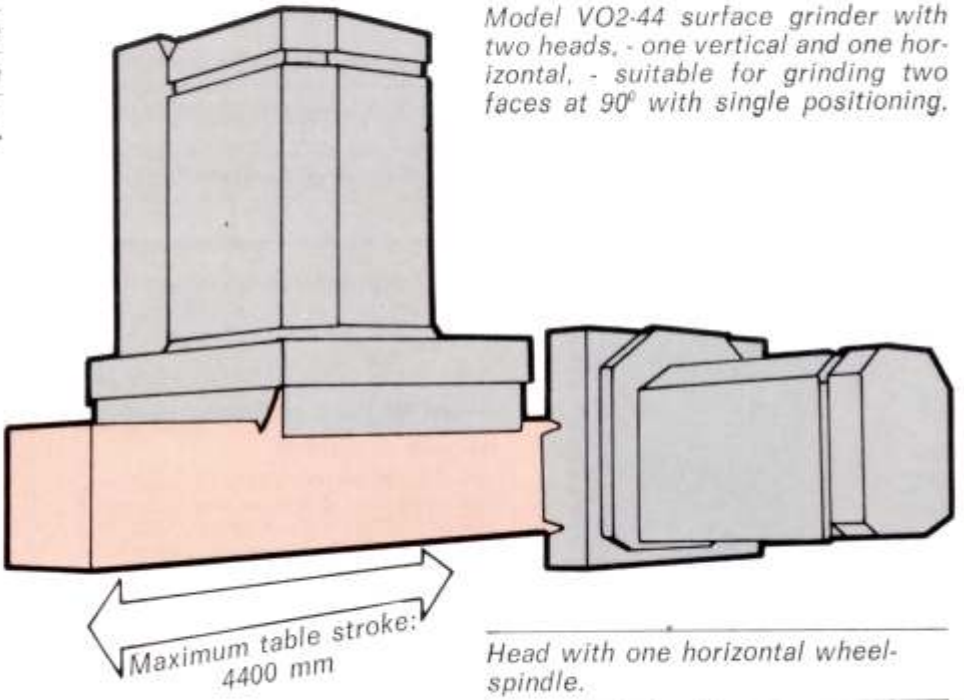
Head with one vertical wheelspindle	
Segmental-wheel diameter	850 mm
Wheelhead motor	90 kW (120 HP)



Model VO2-44 surface grinder with two heads, - one vertical and one horizontal, - suitable for grinding two faces at 90° with single positioning.

Head with one horizontal wheelspindle.	
Segmental-wheel diameter	730 mm
Wheelhead motor	60 kW (80 HP)

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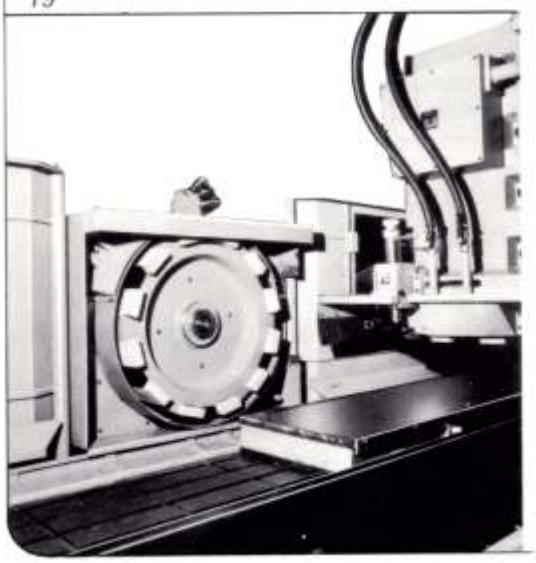
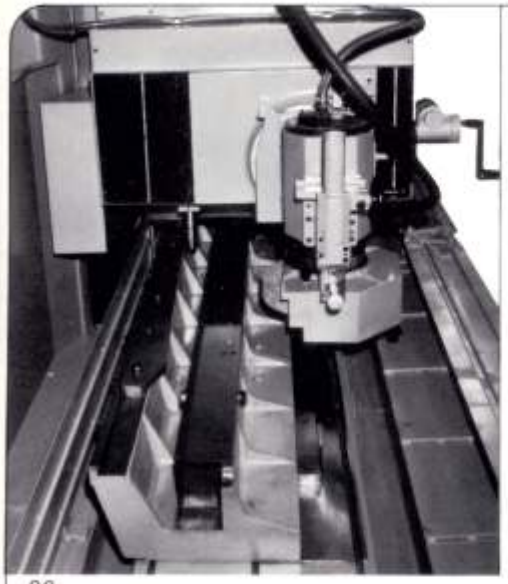


VO2 - 44C



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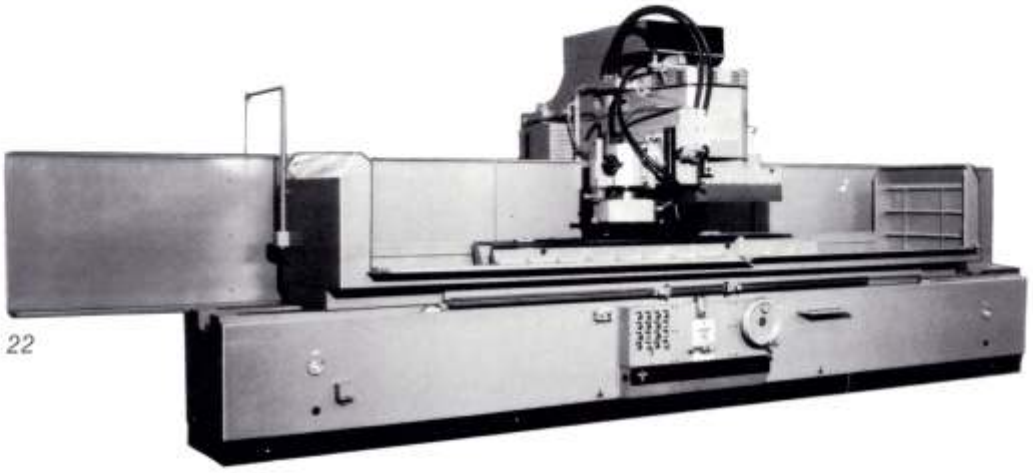

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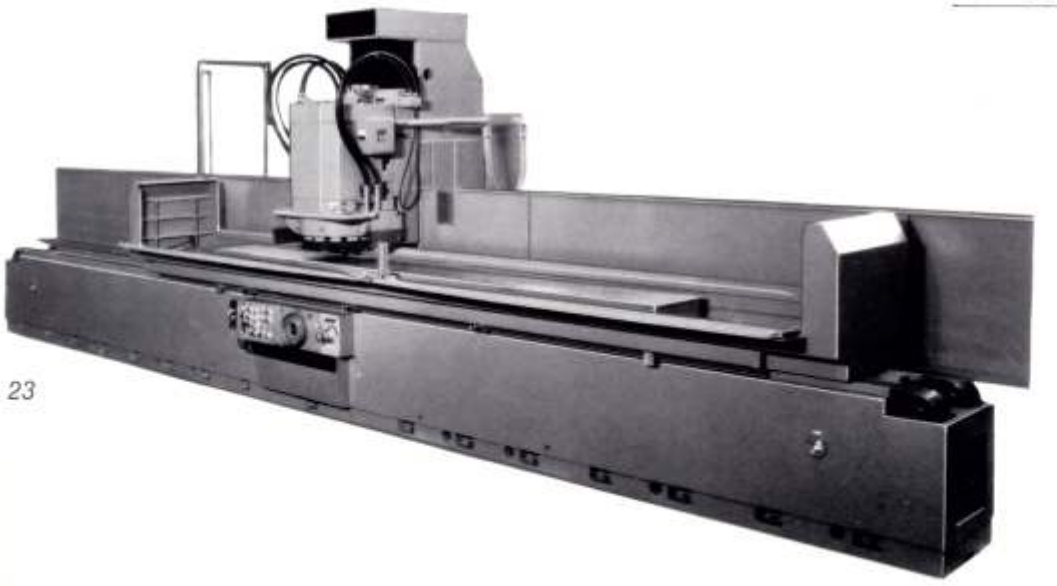
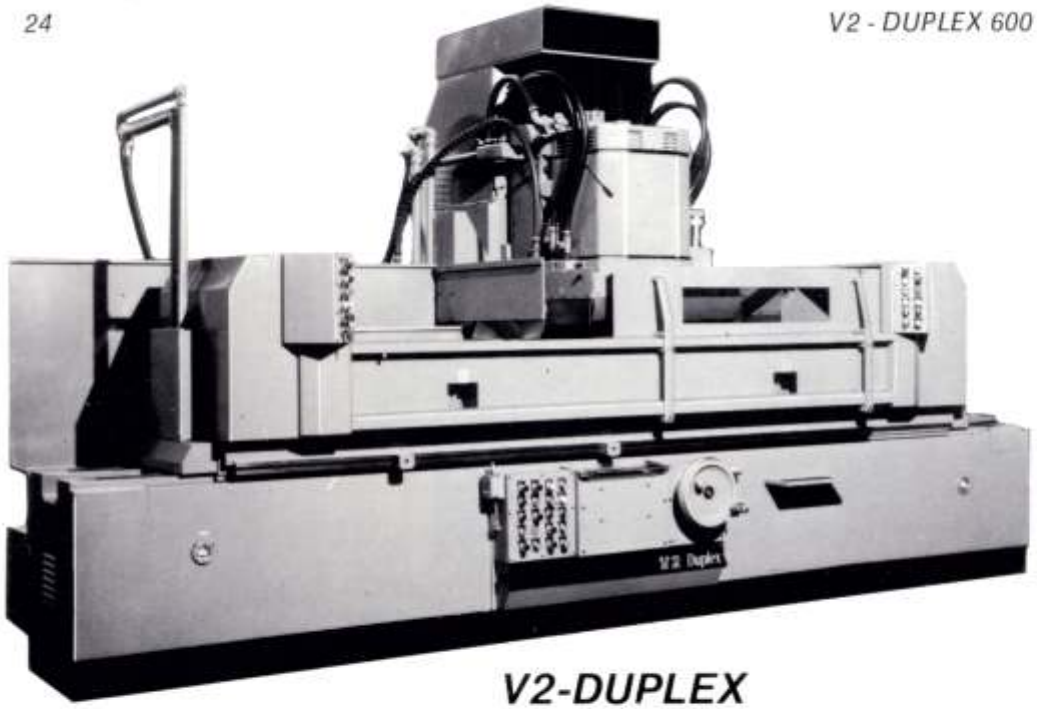
Model V1-31B surface grinding machine suitably equipped for grinding curved, concave or convex blades.

IN ADDITION TO THE SURFACE GRINDING MACHINES ILLUSTRATED ON PAGES 8 AND 9, VERSIONS WITH GREATER WORKING CAPACITIES CAN BE MANUFACTURED.

V1-51 B	
Working surface of table:	
— width	*310 mm*
— length	*5000 mm*



23



AUTOMATIC VERTICAL GRINDING MACHINES WITH TWO ROTARY CIRCULAR TABLES

V2-DUPLEX

Photograph 1 shows the model V2-DUPLEX 600 vertical surface grinding machine designed for grinding medium-sized, and large, batches of components, with the loading and unloading operations included in the cycle time.
Two motor-driven rotary circular tables are arranged on the rectangular table of the machine.
The working cycle is such that whilst one table is in the working position, the operator is unloading the machined components and loading other parts onto the other table. An electro-hydraulic control enables the operator to position first one table and than the other under the wheel.
This work cycle can be automated by using a MARPOSS electronic unit to make the following operations automatic: the roughing feed of the wheel to the components, the finishing feed, the wheel spark-out phase, the sizing of the components and the lifting of the wheel from the components when they have been machined to size.

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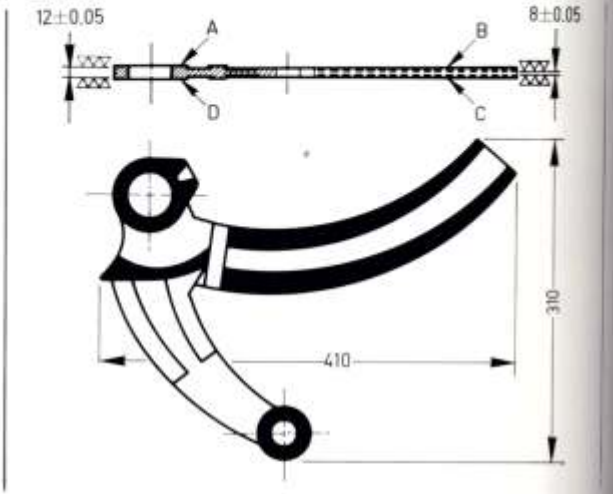
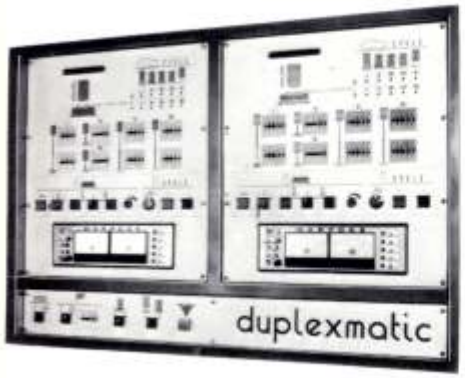
Components ground on V2 DUPLEX and V2 DUPLEXMATIC grinders



Lever for textile-machine dobby

Machine used	*V2-duplexmatic 1000*
Material	*G25 UNI 5007*
Breaking load	*R = 31 kg/mm²*
Stock removal	*1 mm per face*
Components placed on table	*No. 7*
Grinding time for faces A-B-C-D	*7 min.*
Unit time	*1 min.*



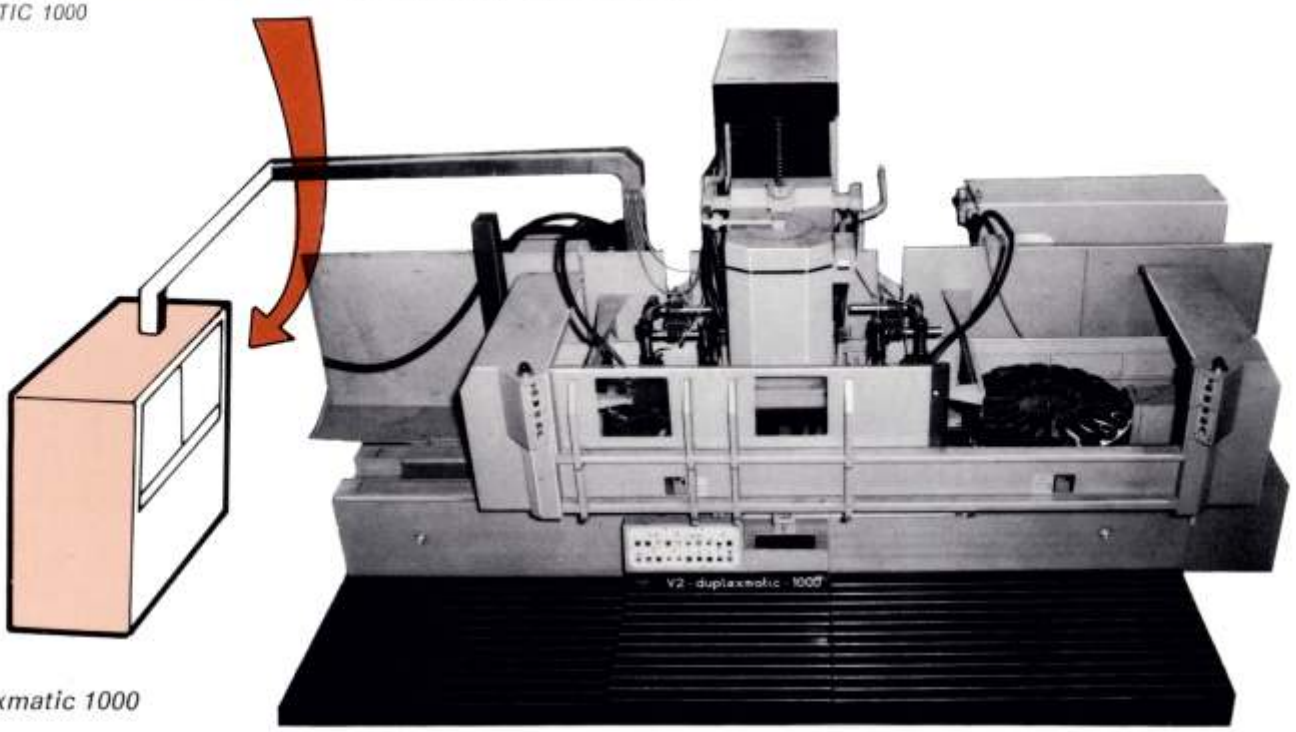
V2-DUPLEXMATIC 1000
control panel

V2-DUPLEXMATIC

The V2-DUPLEXMATIC surface grinding machine has an extended version of the automatic features provided for on the DUPLEX machine, and still further reduces the cycle times. This machine is equipped with:

— *four MARPOSS measuring units;*
— *«NICOLA» electronic equipment for the automation of all cycle functions;*
— *an AVAL-GRIND device allowing «stepless» access to the component, stopping the stepless downfeed and starting the adjustable work feed.*

Its field of operation permits the grinding of TWO DIFFERENT THICKNESSES ON THE SAME COMPONENT and it machines to size by means of a completely automatic cycle.



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V2 - duplexmatic 1000

TECHNICAL FEATURES		V2 - DUPLEX ..... V2 - duplexmatic 600	800	1000	1400
Diameter of the two circular tables	mm	600	800	1000	1400
Diameter of the segment wheel	mm	460	510	550	730
Maximum height ground on table	mm	155	250	250	250
Maximum height ground on table (on request)	mm	405	500	500	500
Automatic vertical feed of the wheel	mm/rev.	0.005 ÷ 0.100			
Wheelhead-motor rotation speed, 50 cy.	rpm	960	960	960	720
Number of revolutions of the two circular tables	rpm	30	20	20	15
Number of revolutions of the two circular tables (on request)	rpm	10÷30	10÷30	10÷30	10÷25
Wheel motor	kW	30	45	60	60 (75-90)*
Motor for circular tables	kW	2.5	2.5	2.5	6
Motor for rapid vertical feeds	kW	0.5	0.5	0.5	0.75
Motor for driving electric pump	kW	0.5	0.5	0.5	0.75
Net weight	approx. kgs	15500	16000	17500	30000
Overall dimensions, including table movements:					
Length	mm	6200	6200	6300	9200
Width	mm	3750	3750	3800	3800
Height	mm	3400	3400	3500	3200

Dimensions, weights and design not binding, subject to alteration.

* *Wheel motor to be supplied on request.*