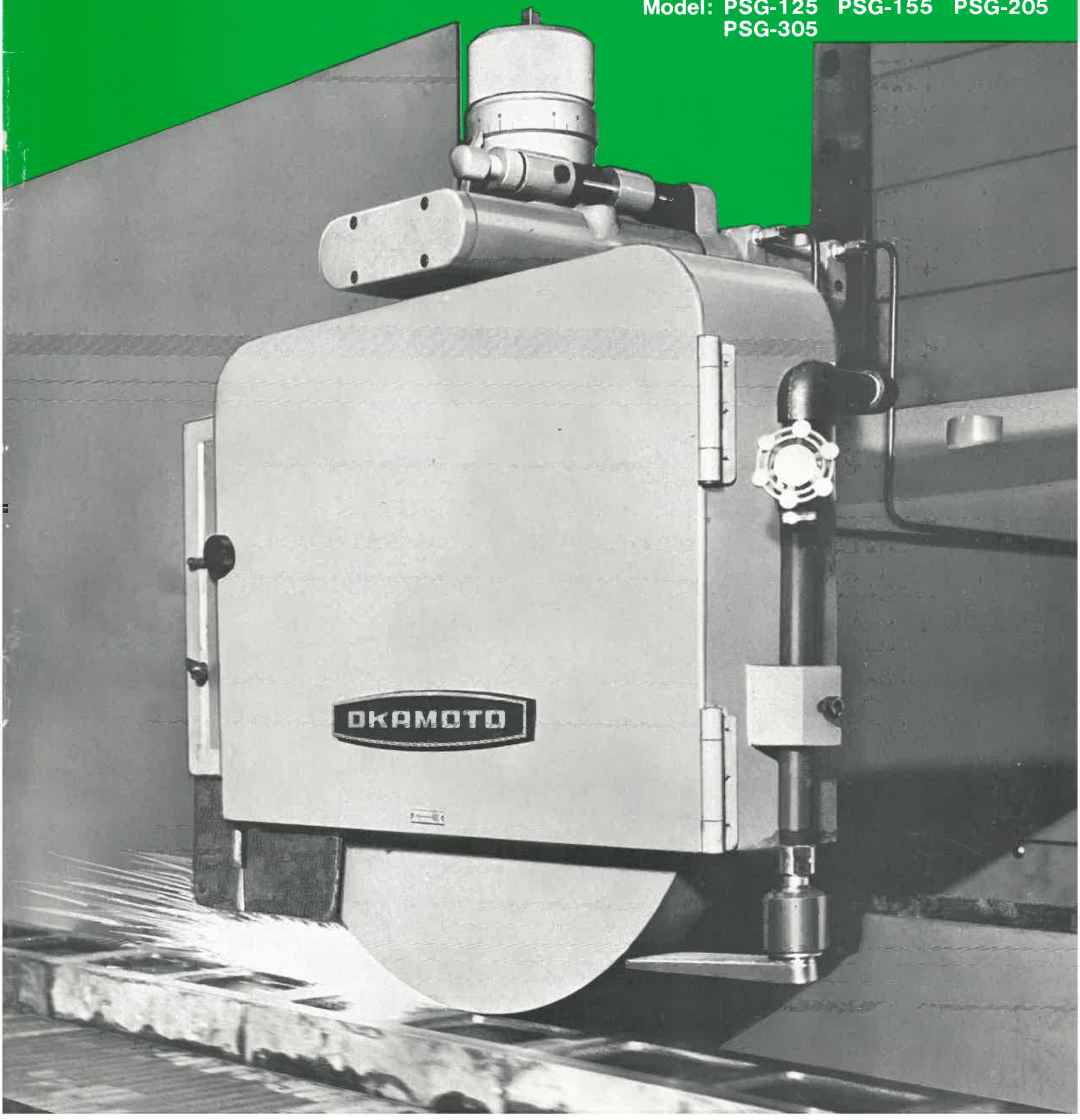
OKAMOTO

Precision Surface Grinding Machine

COLUMN TYPE SERIES

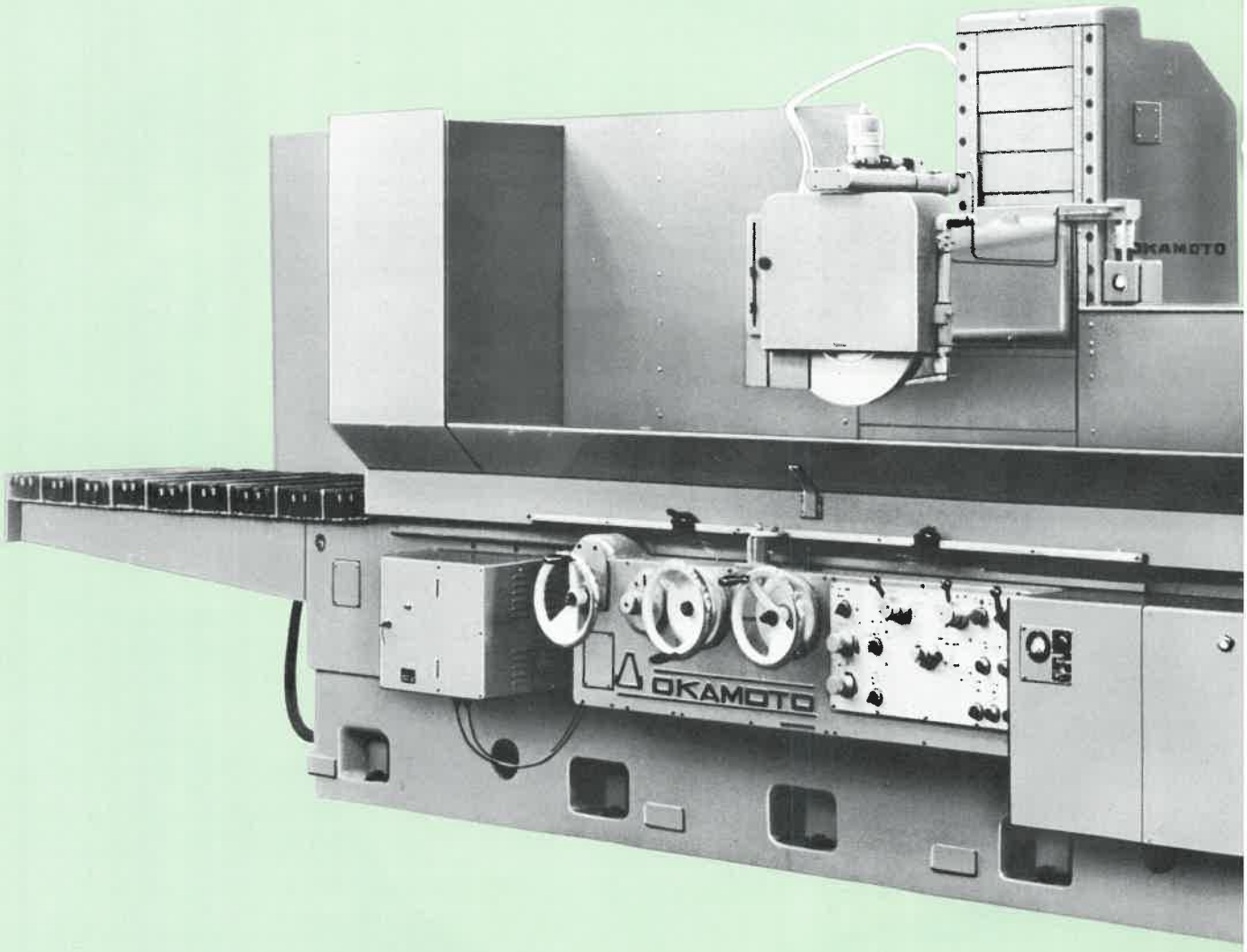
Model: PSG-125 PSG-155 PSG-205 PSG-305

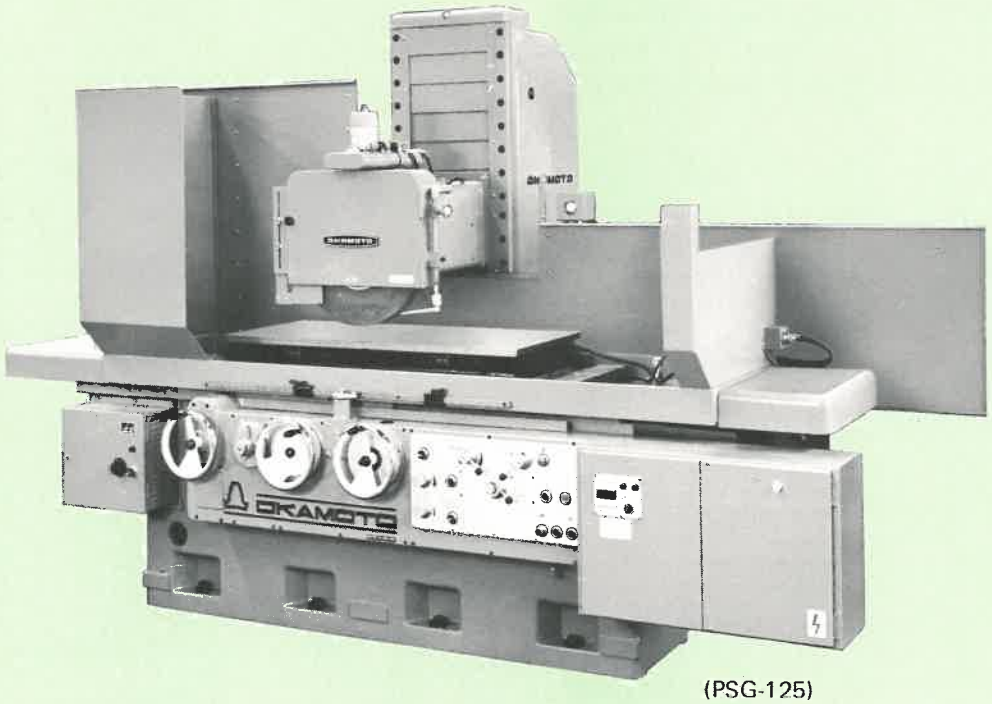


The Okamoto Machine Tool Works, Ltd. manufactures grinding machines of various sizes and types. Our experience in producing precision machine tools spans a period of 40 years. From a techcical stand point, we believe our grinders are second to none.

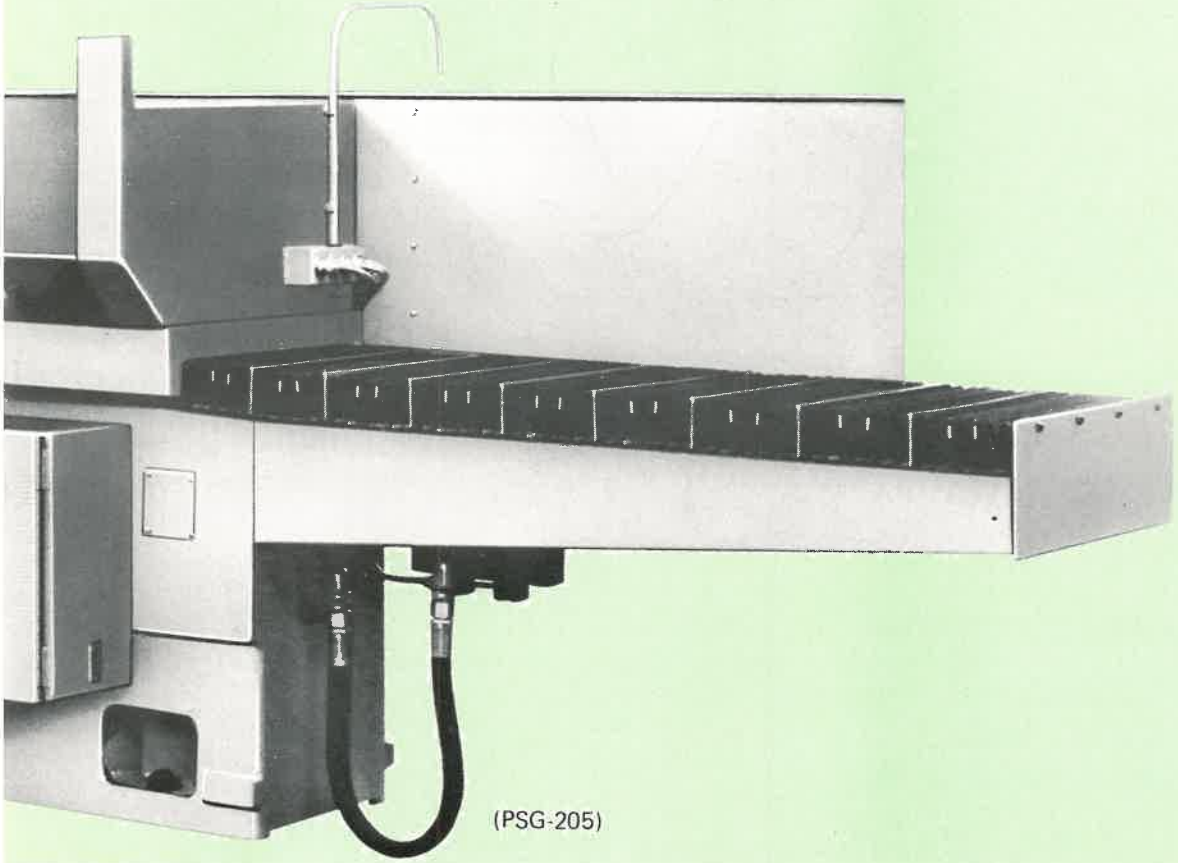
COLUMN TYPE SERIES

MODEL		
	PSG-125	1200 x 500
	PSG-155	1500 x 500
	PSG-205	2000 x 500
	PSG-305	3000 x 500





(PSG-125)

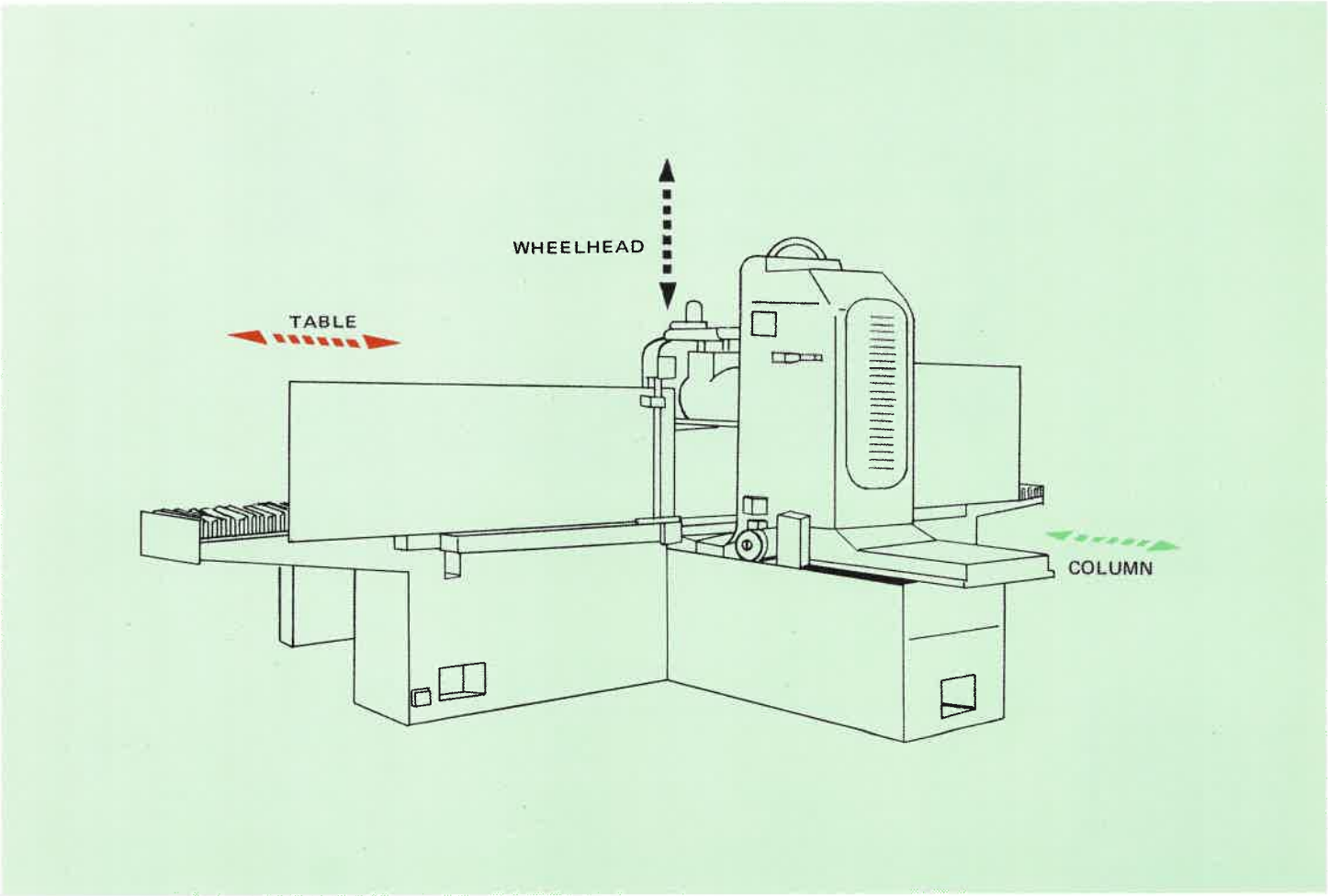


(PSG-205)

THIS IS THE COLUMN TYPE....

The Column Type series Precision Surface Grinding Machines are completely self-contained, hydraulic-type machines, designed and built for the efficient production of accurate flat surfaces and forms. They are particularly suited to production grinding where precision, fine finish and rapid removal of stock are often of equal importance.

Among many features of these Column Type constructions are :



CONSTANT ACCURACY

The table is mounted directly on the fixed bed in generous V and flat ways and the movable rugged column and massive wheelhead give exceptional rigid support to the spindle, affording maximum rigidity and constant accuracy.

OPERATABILITY

All operating controls are conveniently located at the front of the machine to reduce operator fatigue. The operator can easily view the grinding operation and have complete control of the machine at all times without any unnecessary movement.

Handwheels automatically disengaged during hydraulic operation for safer operation.

PRODUCTIVITY

Whole grinding operations from roughing, finishing and sizing can be done automatically. Okamoto precision, accuracy and quality of finish are assured by use of small increment down feed with wide increments of cross feed at 100 SFM (30 m/min.) table speed.

All the ways are automatically lubricated by the drip feed lubrication system and wheel spindle bearings are permanent-grease lubricated for life. These simplify the maintenance of the machine.

SPECIAL FEATURES

EIGHTY MILLIONTHS RUNOUT of dynamically balanced spindle is an Okamoto standard. Ultra-precision angular contact bearings are scientifically pre-loaded to reduce axial and radial deflections. Bearings are interchangeable with FAFNIR FS-130 ABEC-9 and duplex-fitted at both front and rear positions. They are grease-sealed for life with ESSO Andoc B.

HIGHLY RATED SPINDLE MOTOR 10 hp/1100 rpm (60 Hz) motor is connected by coupling to the spindle end. Full transmission is guaranteed. Motor is dynamically balanced TEFC-type, alkali-proofed and rated in Vibration Class-3. Motorized spindle is easily replaceable after years of usage. 15 hp motor is available as optional.

HYDRAULIC DRIVE AND LUBRICATION united in one system to simplify maintenance and to assure a fool-proof operation. 7-1/3* hp dual-purpose pump motor provides low pressure table feed through a cylinder and also serves to lubricate all slide ways, screws and gears. Like a continuous-flow oiling system, the pump goes into action as soon as the machine is started. Separate on-off valves, push button operated, may be started and stopped without interfering with the setting of table speed regurating valve. Table speed ranges from 1 to 100 SFM. Hydraulic power unit externally mounted. (*5 hp on PSG-125)

3 PSI TABLE PRESSURE As the pressure of the table is proportionate to the area of contact, less pressure is indicative of a great area of contact. Both V and flat ways are employed for smooth and accurate hydraulic feeding of the table. Straightness of table movement in its right and left stroke (indicator reading) deviates no more than 0.003/1000 mm (0.00012/40"), a guaranteed feature of Okamoto precision.

SIMPLIFIED CONTROLS Grouped at the operator area, complete hydraulic table speed and cross feed available with levers. With cross feed countrol, automatic feed up to 1-1/3" (35 mm) per table stroke is available or continuous variable rapid traverse up to 16 fpm (5 m/min.). The control panel allows dressing speed and direction control, magnetic chuck control ; rapid wheel elevation among other functions. The electrical box is easily accessible. Its door interlock prevents dangerous mishaps.

PRODUCTION CAPABILITY Okamoto precision, accuracy and quality of finish are assured by use of small increments of down feed with wide increments of cross feed at 100 SFM table speed.

MAXIMUM RIGIDITY Rugged cast iron units are used for table, cross-slide, bed and column. All ways are hand scraped to precision. The column is extra heavy to support the wheelhead with bearing surfaces in its 24-1/3" (620 mm) vertical stroke. Telescopic covers protect the column ways and the alloy steel elevation screw which is ground on a Reishauer Grinder after heat treated. Weight (net) of these type of machines are much heavier than most comparable machines on the market.

MAIN CONTROLS AND PARTS

❶ VERTICAL FEED HANDWHEEL

Graduated to 0.0002" (0.005 mm), one revolution of handwheel moves the wheelhead 0.04" (1 mm). Power increment downfeed is provided to operate at table stroke* or column reversal for automatic cycle. Automatic sizing on-off switch, rapid vertical feed actuating knob are included with this arrangement. (*Optional equipment)

❷ CROSS FEED HANDWHEEL

Handwheel dial graduated to 0.001" (0.02 mm), provides easy and accurate cross adjustment of wheelhead. Automatically disengaged when hydraulic cross travel is used.

❸ TABLE HANDWHEEL

Longitudinal table handwheel conveniently located. Gives smooth hand table drive. Automatically disengaged when hydraulic power is used ; automatically reengaged when hydraulic power is off.

❹ CONTROL PANEL

Table speed control lever, cross feed control lever, increment downfeed control knob, dressing speed control and direction lever, etc., are arranged properly under the consideration of maximum operating convenience.

❺ COLUMN

Rides on widely spaced and accurate cross-slide bed for rigidity. Wheelhead completely supported by bearing surfaces at all points for extremely accurate wheel alignment. Telescopic guards protects ways.

❻ HYDRAULIC WHEEL DRESSER

Wheelhead mounted wheel dresser (equipped as standard) avoids changing wheel position. One carat diamond tool hydraulically traversed across the wheel and fed automatically.

❼ WHEELHEAD

Removal unit type spindle, readily interchangeable. A 20" (500 mm) diameter, 2" (50 mm) width wheel is standard on these machines. Wheel guard takes 20" dia. (510 mm), 4" (100 mm) width wheels.

❽ WORKTABLE

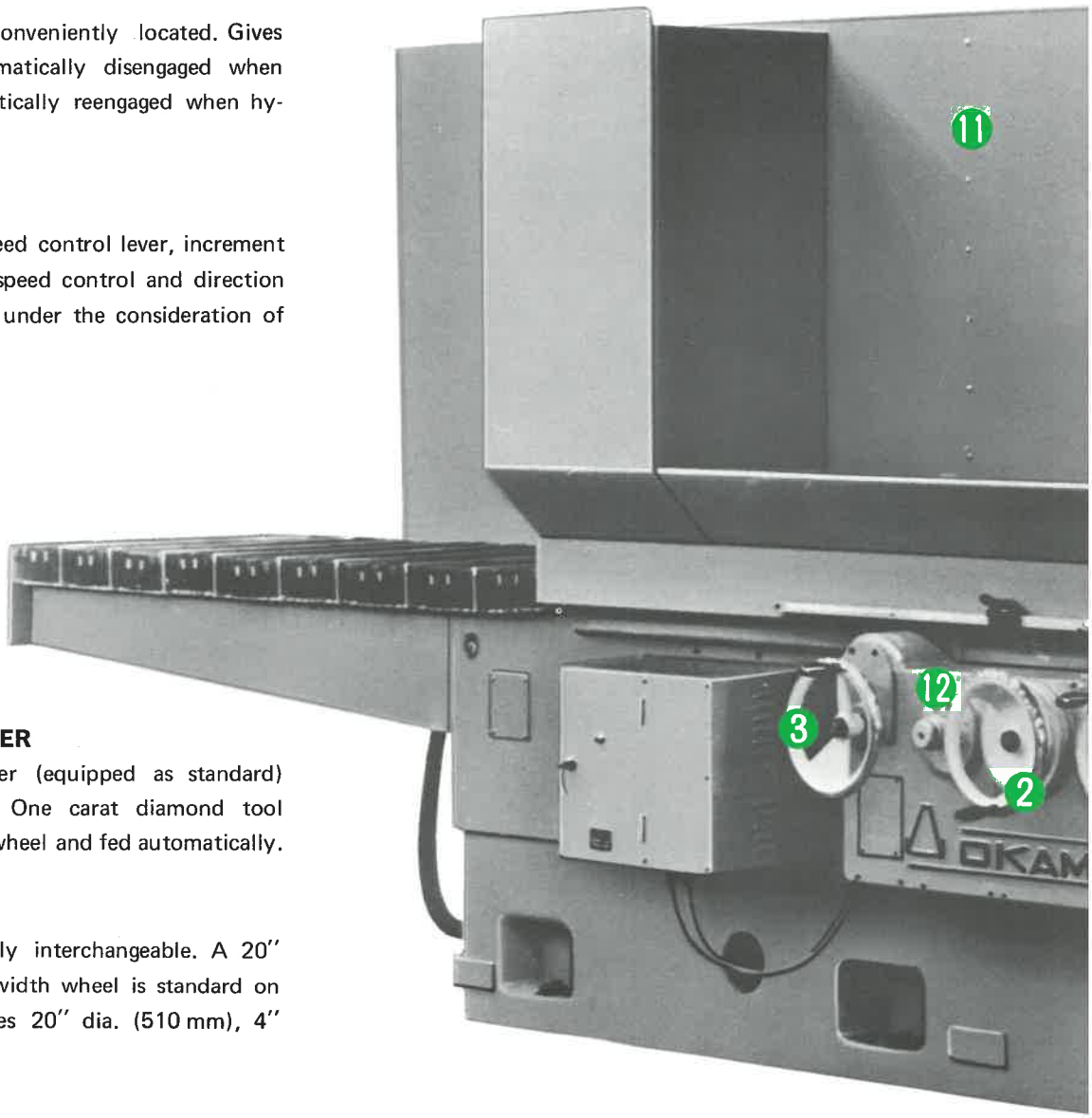
Provides ample work area at convenient height. Arranged with three T-slots for fixture, hydraulically-driven and running on V and flat ways. Ways completely guarded from dust and coolant by bellows.

❾ ELECTRICAL CONTROL BOX

All electrical controls are enclosed in the box ; well protected from dust and water. Easily accessible for checking.

❿ MACHINE BASE

Sturdy, well-proportioned base contributes substancially to general rigidity of machine. Hydraulic oil reservoir installed



separately from the machine base to eliminate vibrations and heat transmission of hydraulic oil.

⑪ TABLE SPLASH GUARD

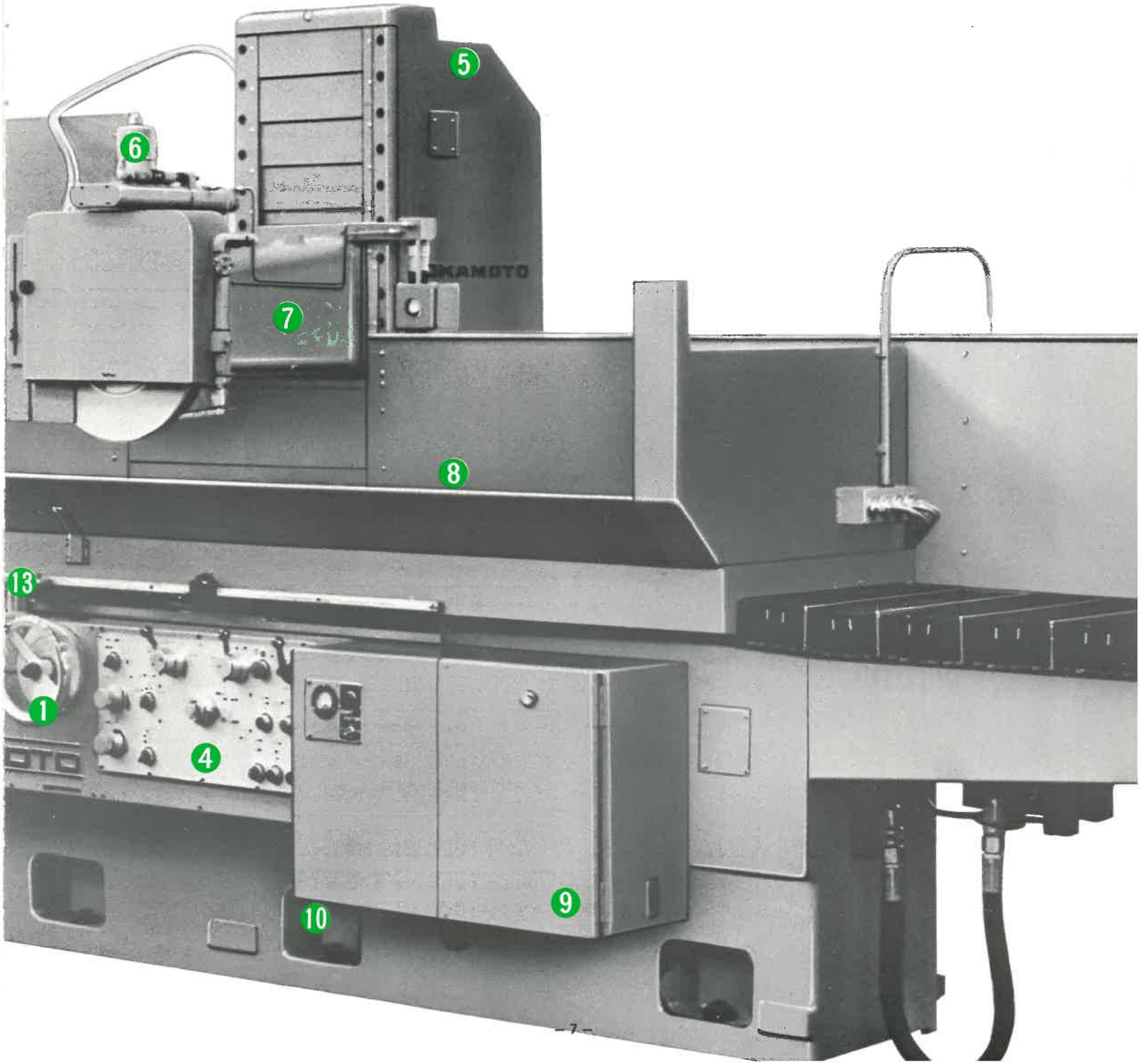
Wide, high guards ; built to accomodate coolant system. Has coolant nozzle on the wheel guard and coolant channel for wet grinding.

⑫ CROSS TRAVERSE RANGE DIAL

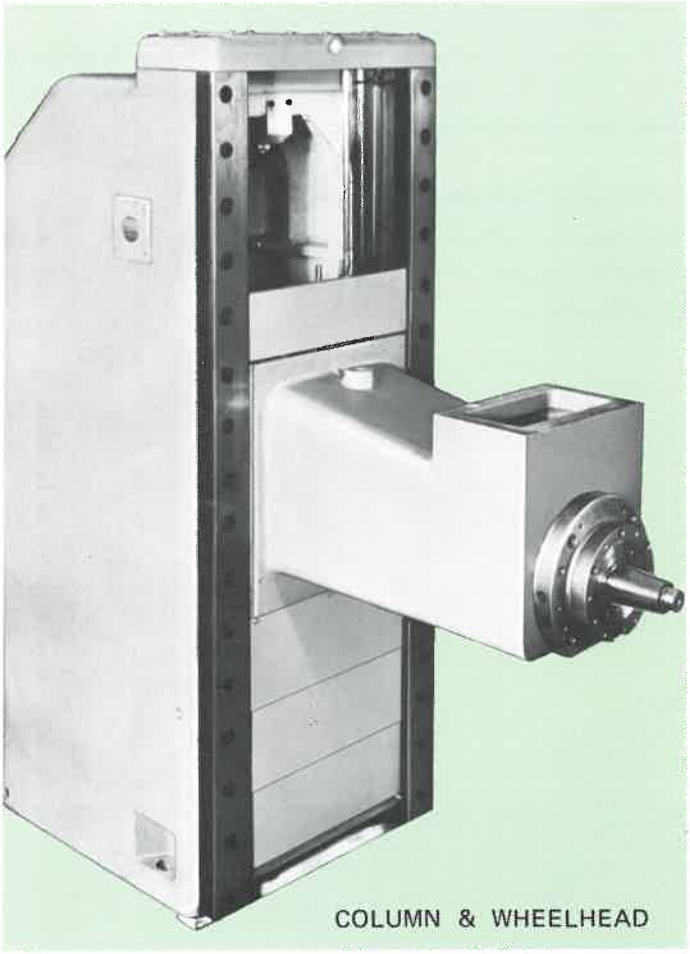
Sets automatic cross feed traverse range for desired stroke up to 21″ (530 mm). Two pointers indicate automatic reversal positions column at front and rear.

⑬ TABLE REVERSING LEVER

Operated by adjustable dogs or manually, table reverses without shockes at all speeds of 1-100 feet per minute (0.3-30 m/min.)



STRUCTURES



COLUMN & WHEELHEAD

COLUMN AND WHEEL HEAD

The column and wheelhead are made from high grade cast iron and internally ribbed for maximum support and rigidity.

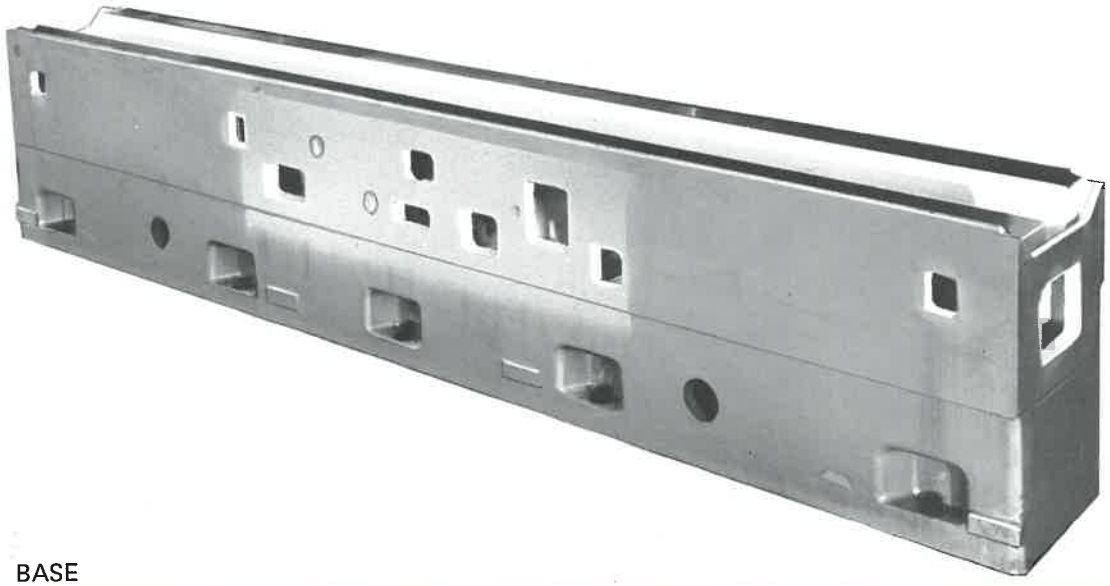
The wheelhead is fully supported with 6 bearing surfaces in the rigid column ways. Large vertical capacity of 23.4" (595 mm) from table top to bottom of the new grinding wheel gives wide job range use. The entire column assembly is protected by telescopic dust guards. Screw and slides are automatically lubricated.

WORKTABLE

The worktable is mounted directly on the fixed bed for longtudinal travel. The combination Vee and flat ways increase table bearing surface area and precise alignment of work. Three T-slots run through the entire length of the working surface of the table for securing fixtures, chucks and worktable accessories.

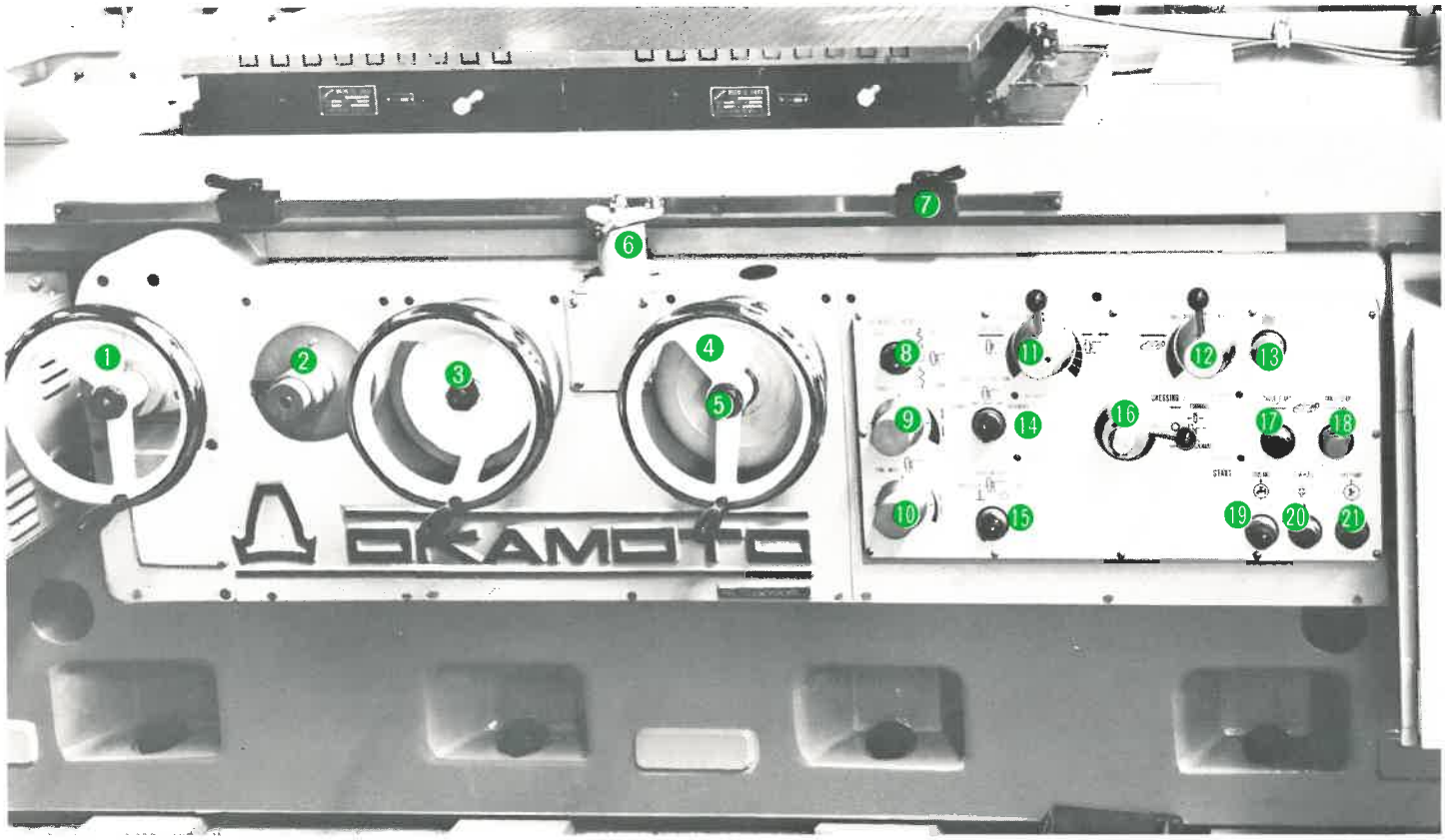
RUGGED CAST IRON BASE

The strong, cast iron base is proportioned to completely absorb grinding stresses. This rigidity is acquired not only by heavier weight, but by a scientifically engineered special and ribbed construction. Both ways are accurately hand scraped and automatically lubricated, thus assuring smooth table movement.



MACHINE BASE

CENTRALISED FRONT CONTROLS



1. TABLE HAND WHEEL
2. CROSS FEED RANGE CONTROL
3. CROSS FEED HANDWHEEL
4. VERTICAL FEED HANDWHEEL
5. VERTICAL RAPID FEED ON-OFF KNOB
6. TABLE REVERSING LEVER
7. TABLE DOG
8. VERTICAL RAPID FEED DIRECTION SELECTOR
9. INCREMENT DOWNFEED CONTROL KNOB (ROUGH)
10. INCREMENT DOWNFEED CONTROL KNOB (FINE)
11. CROSS FEED SPEED CONTROL LEVER (CONTINUOUS-INTERMITTENT)
12. TABLE SPEED CONTROL LEVER
13. MASTER STOP BUTTON
14. CROSS FEED DIRECTION SELECTOR
15. DOWNFEED SELECTOR (MANUAL-AUTO. SIZING-CONTINUOUS)
16. DRESSING SPEED & DIRECTION CONTROL
17. HYDRAULIC TABLE ON BUTTON
18. HYDRAULIC TABLE OFF BUTTON
19. COOLANT PUMP ON BUTTON
20. GRINDING WHEEL ON BUTTON
21. HYDRAULIC PUMP ON BUTTON

HANDWHEEL DISENGAGEMENT

Longitudinal and corss feed handwheels (1) (2) are positively disengaged when respective hydraulic drives are in use.

AUTOMATIC TABLE STOP

Table always stops at extreme right for fast and easy set-up. When operator stops the table (19) or automatic cycle is over, the table automatically stops at right end.

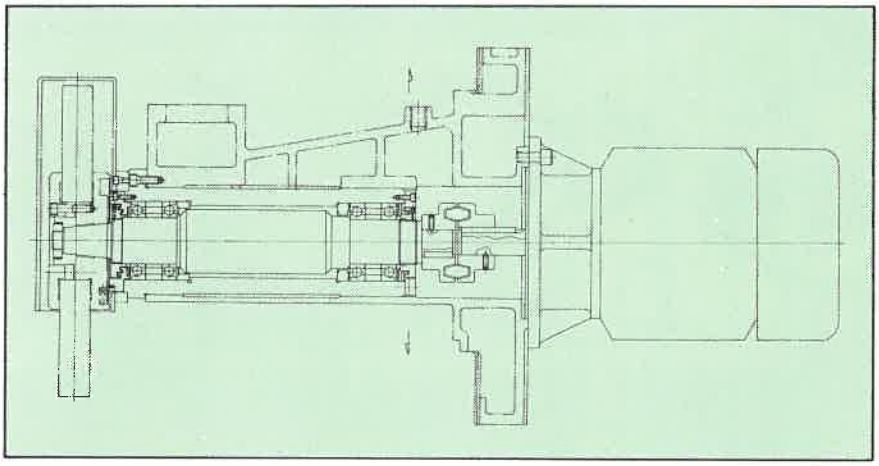
POWER ELEVATION OF WHEEL HEAD

Selector (8) controls the vertical rapid feed direction of the wheel head.

Safety stop disengages the feed at extreme upper limit of the travel. Vertical feed hand wheel will not turn during power elevation for safety.

GRINDING WHEEL SPINDLE

75 mm diameter at bearing locations offers more rigidity than those bored for coolant passage. Large, bulky bearings are liable to short life, chatter and displacement at high speed. Further, Okamoto does not rely on outside sources for the manufacture of its spindles as precision is too often sacrificed in favor of other motives.



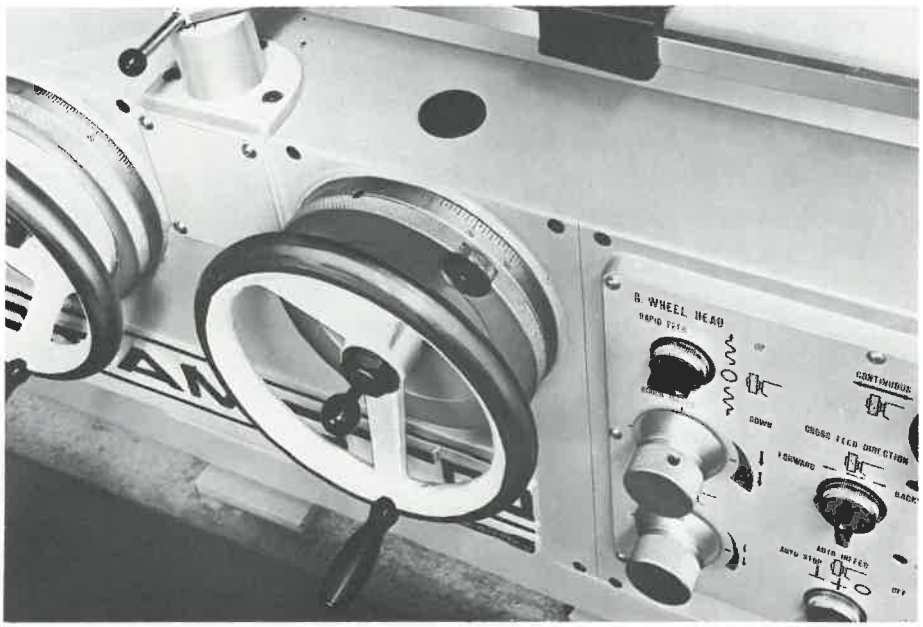
Super-precision (class ABEC 9) ball bearings are scientifically preloaded and mounted at front and rear positions and well suited to spindle speed of 1,100 rpm. Motor is connected by a coupling to the spindle to eliminate thrust deflection and vibration, suitable for precision grinding jobs. The spindle is cartridge type, sealed and lubricated for life.

AUTOMATIC POWER DOWNFEED

Automatic wheel infeed is actuated at each reversal of the column (surface grinding) or at each other reversal of the table (plunge grinding)* by a selector switch. (*Optional equipment)

When grinding wheel reaches 0.002" (0.05 mm) before size, increment downfeed rate will change from rough grinding to finish grinding.

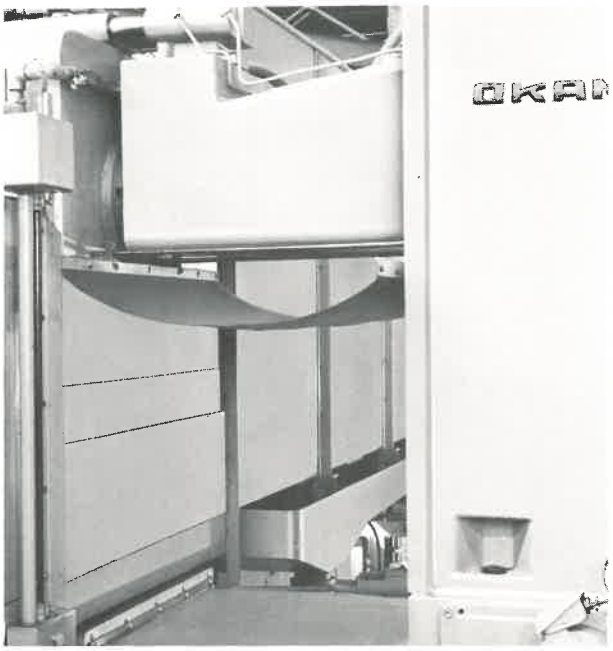
When preset depth is reached, the wheel head will stop the infeed and the table will stop at the extreme right. Fine feed is adjustable 0.0002 ~ 0.02" (0.005 ~ 0.05 mm) per actuation.



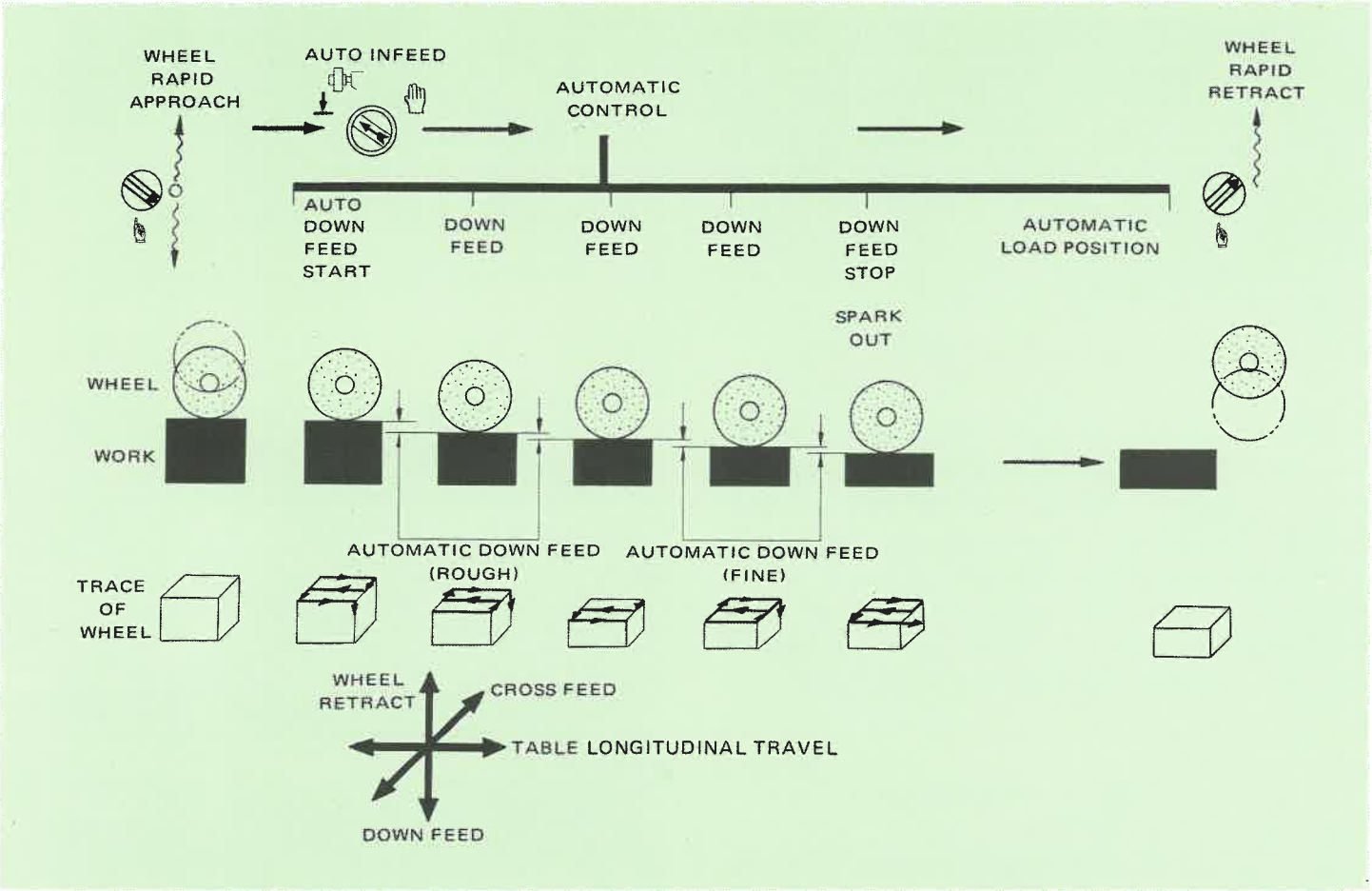
COMPLETE SPLASH GUARD

Tall enough splash guard and Okamoto's unique design of slidable cover under wheel head protect slide ways and screws from foreign materials such as coolant, grits and chips allowing productive grinding and maintaining accuracy of the machine for long time.

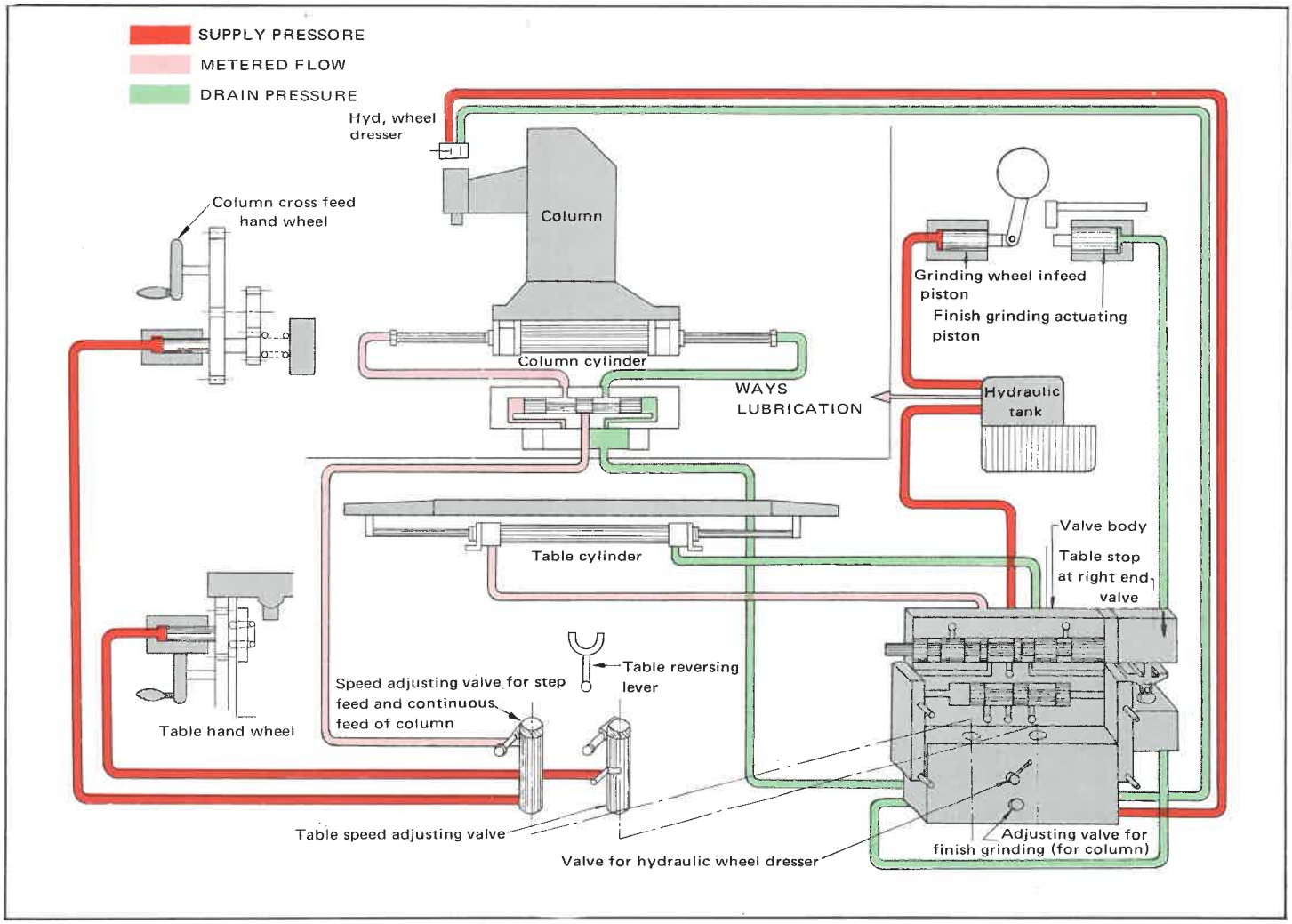
Golumn cross ways are also strictly shieleded with slidable cover from dusts.



AUTOMATIC GRINDING CYCLE



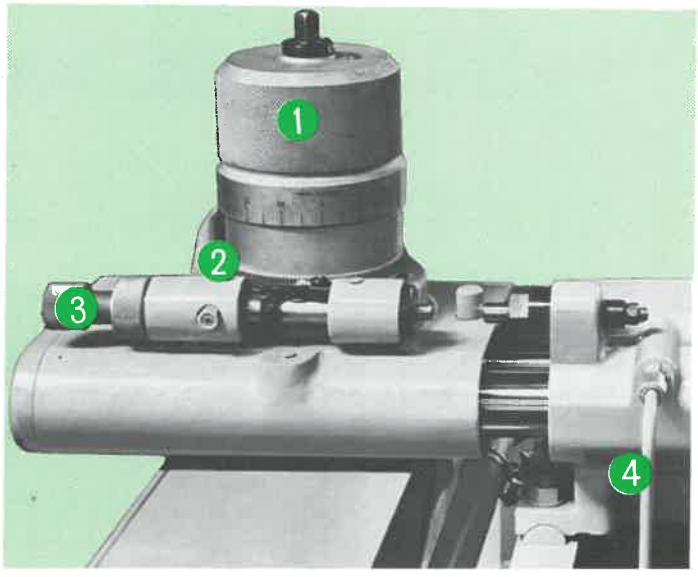
HYDRAULIC CIRCUIT DIAGRAM



HYDRAULIC WHEEL DRESSER

Hydraulic wheel dresser with 1 carat diamond tool is equipped as standard. Wheel head mounted unit avoids changing wheel position as would be the case for table mounted units. Hydraulic actuation of the diamond dresser is smooth and provides highest accuracy and finish from the wheel.

Diamond tool infeed is actuated automatically by preset amount with every reciprocation of the dresser head across the wheel. One graduation of the infeed dial is 0.002" (0.05 mm).

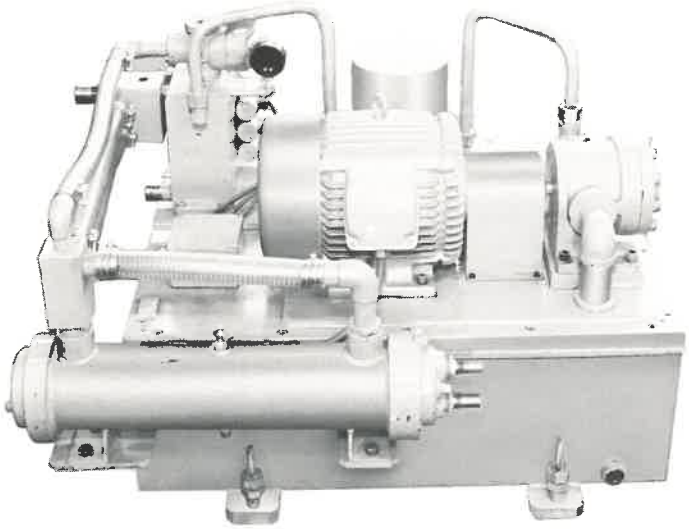


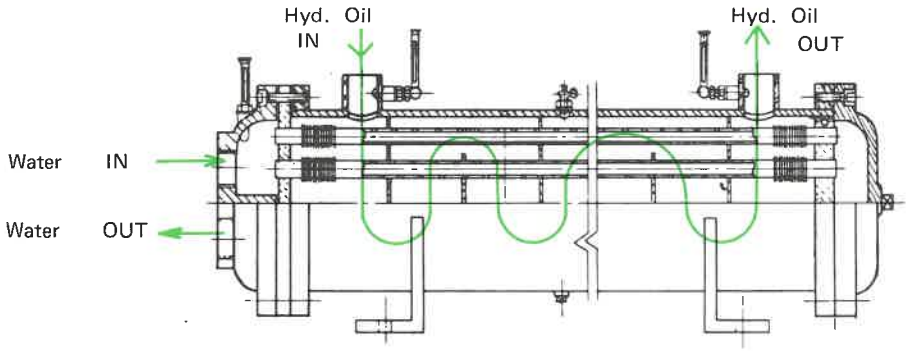
1. Diamond tool infeed dial
2. Pointer
3. Automatic dressing feed amount setting knob
4. Hyd. pipes for dressing feed

HYDRAULIC TANK UNIT

The hydraulic unit consists of dual purpose precision pump, incorporating 7-1/3 HP (5.5 KW) driving motor, releif valve, strainer, oil cooler, oil chamber, etc. The tank unit is installed apart from the machine proper, eliminating unfavorable effects of vibrations hydraulic oil temperature rise, etc., transmitted to the machine.

Oil cooling is also equipped on the unit to prevent temperature rise of oil during operation. Tap water circulated for this purpose.

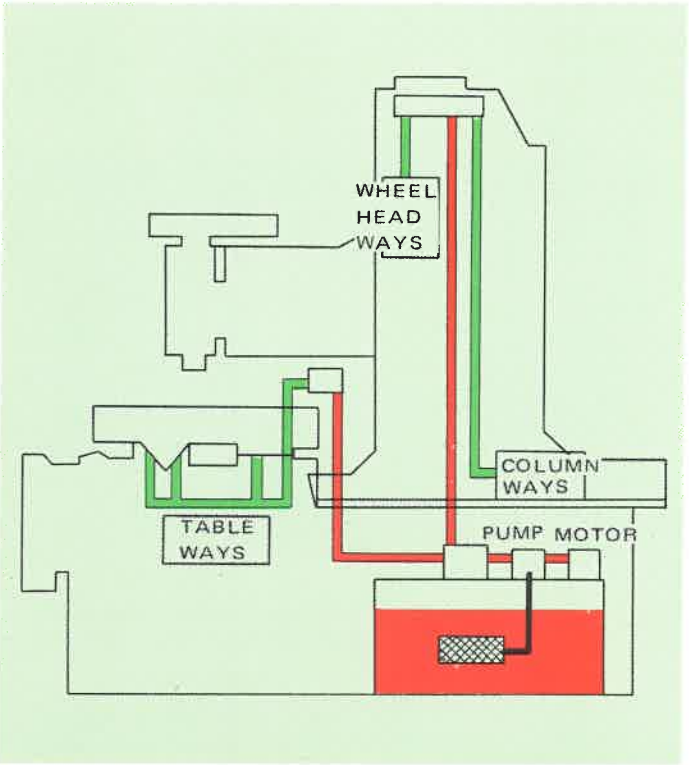




AUTOMATIC LUBRICATION

Lubricating oil flows onto all slide ways and screws as soon as pump is started.

Lubricating pressure is maintained at a constant value in all times with a gravity head of oil without any adjustment. The pressure for table slide way is so arranged to maintain specially low for higher grinding accuracy.



STANDARD EQUIPMENTS

* Machine complete with electric motors for wheel spindle, hydraulic pump, vertical rapid feeder and electric controls.
* Hydraulic longitudinal and cross feed
* Automatic downfeed with auto-sizing device
* Power rapid feed for grinding wheel elevation
* Hydraulic wheel dresser mounted on wheel head
* Push button table start and stop
* Cartridge grinding wheel spindle
* 20" grinding wheel, wheel adaptor, adaptor puller
* Table splash guards
* Foundation screws, necessary tools with box
* Complete operator's manual, and test report

OPTIONAL EQUIPMENTS

C101 Coolant system with a magnetic dust separator Type CT-300M pump motor : 1/3 Hp, 0.25 Kw separator motor : 0.13 Hp, 0.1 Kw tank capacity : 80 gals, 300 lit.

C102 Coolant system with a magnetic dust separator and paper filter attachment Type CT-400PM pump motor : 1/2 Hp, 0.4 Kw separator motor : 0.27 Hp, 0.2 Kw paper filter motor : 0.27 Hp, 0.2 Kw tank capacity : 100 gals, 400 lit.

C103 Electro-magnetic chuck (for PSG-125) 1200 x 500 mm, 47" x 19.7"

C104 Electro-magnetic chuck (for PSG-155) 1500 x 500 mm, 59.1 x 19.7"

C105 Electro-magnetic chuck (for PSG-205) 2000 x 500 mm, 78.8 x 19.7 :

C106 Electro magnetic chuck (for PSG-305) 3000 x 500 mm, 118.2 x 19.7"

C107 Grinding wheel balancing apparatus with a test arbor, Type BW-5 Max. diameter balanced: 20", 500 mm Max. width balanced: 4", 100 mm

*C108 Automatic demagnetizing controller Type NS1-5 100/200 V AC. 5A (for PSG-125, PSG-155 & PSG-205)

*C109 Automatic demagnetizing controller Type NS1-10 100/200 V AC. 10 A (for PSG-305)

*C110 Plunge grinding attachment 0.0002"—0.002" (0.005—0.05mm)/table stroke

*C111 Micro feeder for vertical movement one grad. : 0.00008", 0.002 mm

*C112 Micro feeder for cross movement one grad. : 0.00008" 0.002 mm

C113 Side and angle dressing device Type DRA-5 angle dressed : 0—±45° dresser stroke : 2-1/3", 60 mm

C114 Vertical spindle Attachment, spindle motor 1 Hp, 0.75 Kw, with angle and relief dressers.

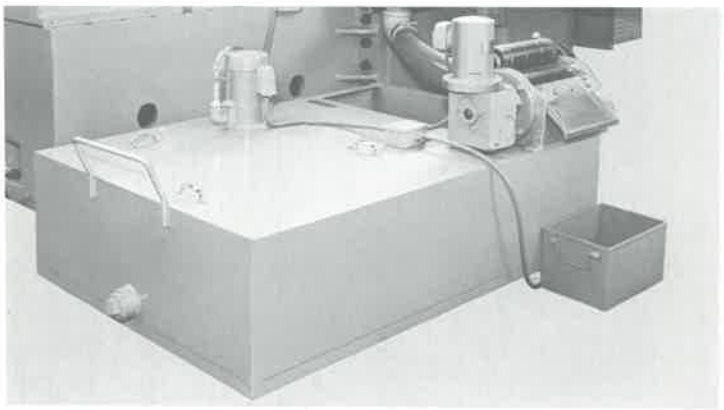
C115 Spare grinding wheel spindle unit

C116 Spare grinding wheels adaptor

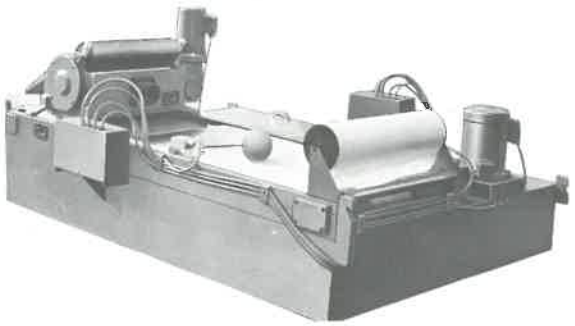
C117 Demagnetizer, demag. surface: 14 x 9", 360 x 230 mm AC. 100/200 V, 10/5 A, 1 KVA

*C118 Hydraulic wheel dresser mounted on wheelhead and coolant nozzle for 100mm (4") grinding wheel

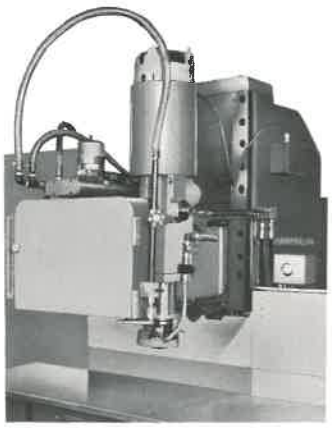
Note (1) *mark to be installed at factory before shipment
(2) C108 or C109 is indispensable with the use of electro-magnetic chuck



C101 Coolant system with a magnetic dust separator Type CT-300M Tank capacity : 80 gals, 300 liters.

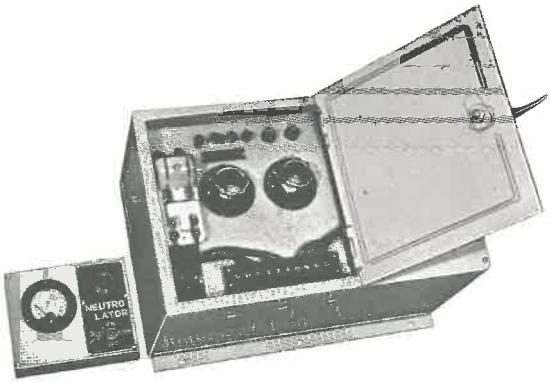


C102 Coolant system with a magnetic dust separator and paper filter attachment Type CT-400PM Tank capacity : 100 gals, 400 liters

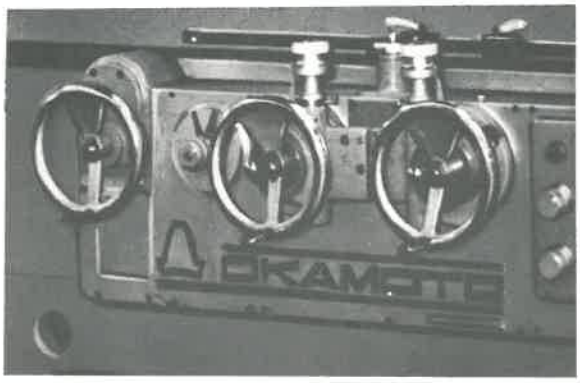


C114 Vertical spindle attachment

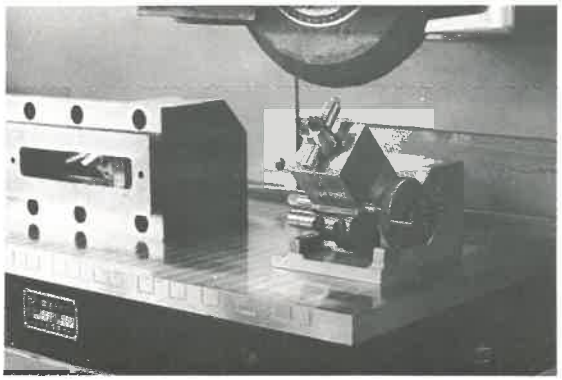
C107 Grinding wheel balancing apparatus
Max. dia. x width balanced : 20" x 4", 510 x 100 mm



C108 Automatic demagnetizing controller
Type NS1-5 (for PSG-155 & 205)



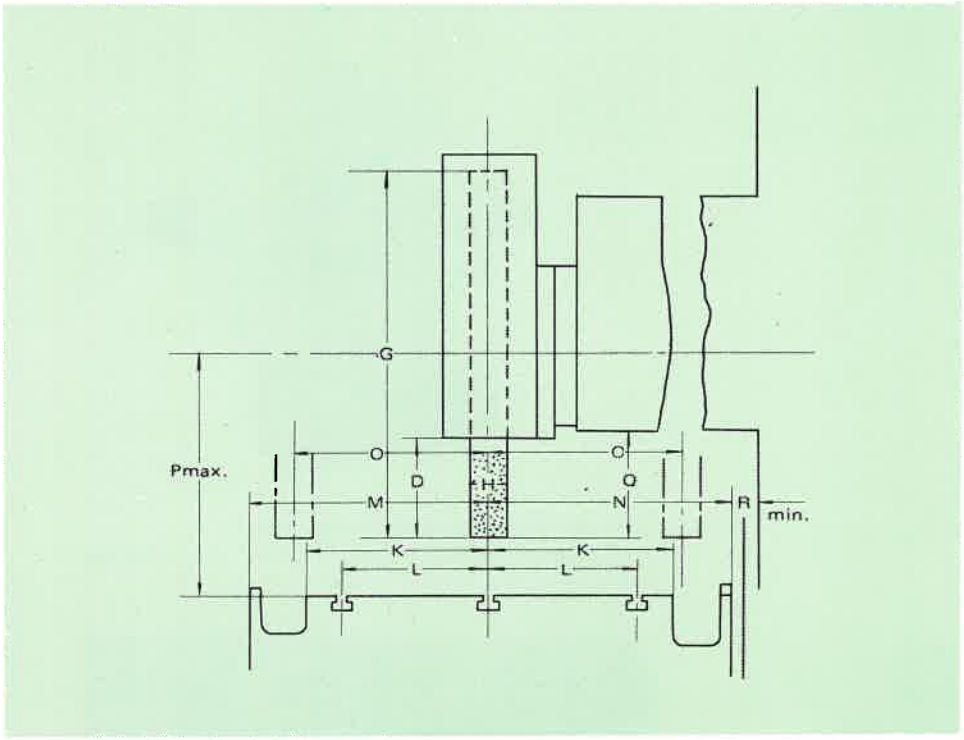
C112 Micro feeder for cross movement
One grad.: .00008", 0.002 mm



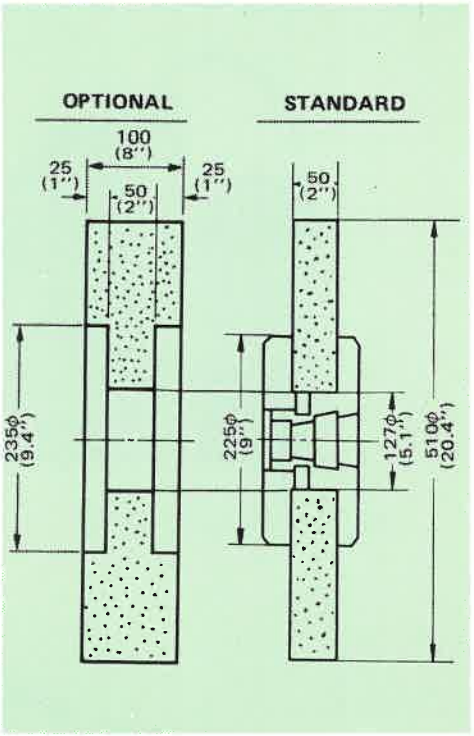
C113 Side and angle dressing device
Type DRA-5 Dresser stroke : 2-1/3", 60 mm

C117 Demagnetizer
Demag. surface : 14 x 9", 360 x 230 mm

WORKING RANGE DIAGRAM



GRINDING WHEEL

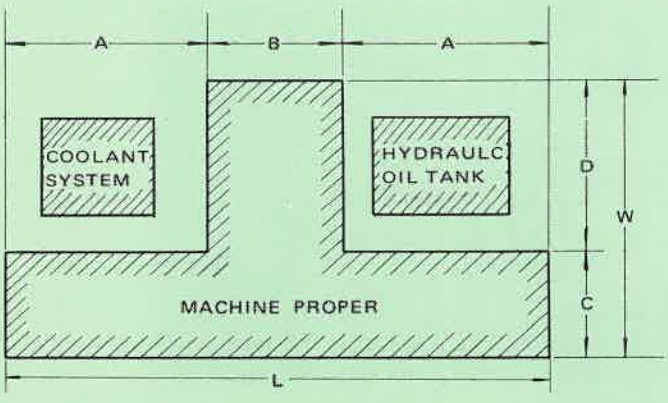


Model	Dimensions	D	G	H	K	L	M	N	O	P	Q	R
PSG–125 PSG–155	mm	139	510	50 (100)	250	200	325	330	265	850	154	26
PSG–205 PSG–305	inch	5.47	20.00	2 (4)	9.85	7.87	12.77	13	10.41	32.4	6.05	1.2

( ) optional

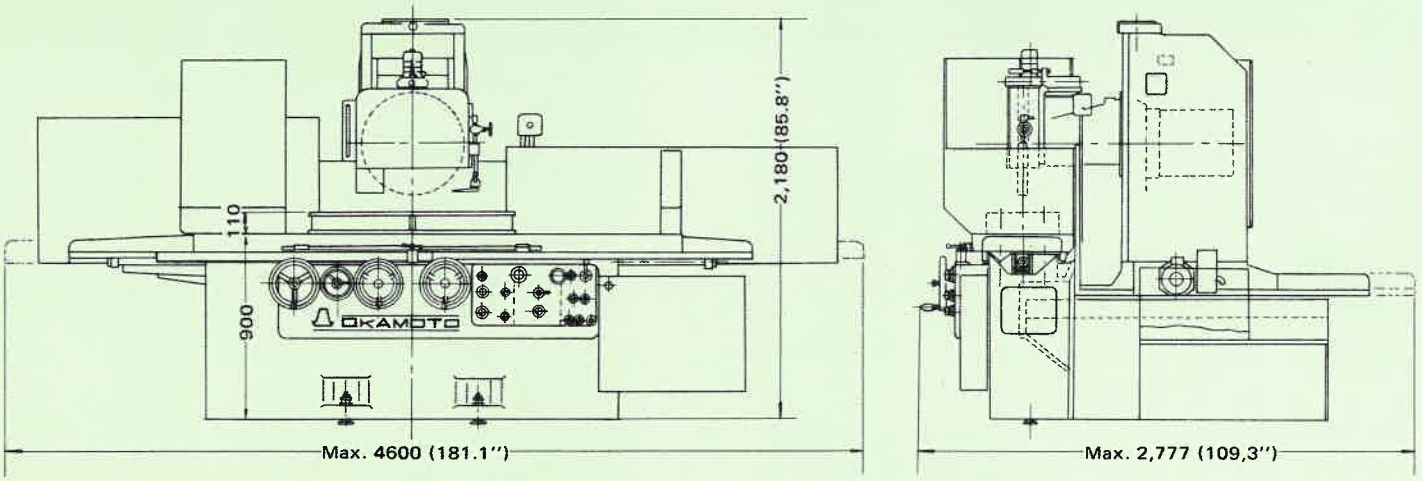
FLOOR PLAN

Model	PSG–125	PSG–155	PSG–205	PSG–305
A	1,950 76.7"	2,310 90.7"	3,135 123.4"	4,155 163.6"
B	700 27.5"	700 27.5"	700 27.5"	700 27.5"
C	925 36.4"	925 36.4"	925 36.4"	925 36.4"
D	1,850 72.8"	1,850 72.8"	1,850 72.8"	1,850 72.8"
L	4,600 181.1"	5,310 209"	6,970 274.4"	9,010 354.7"
W	2,777 109.2"	2,777 109.2"	2,777 109.2"	2,777 109.2"

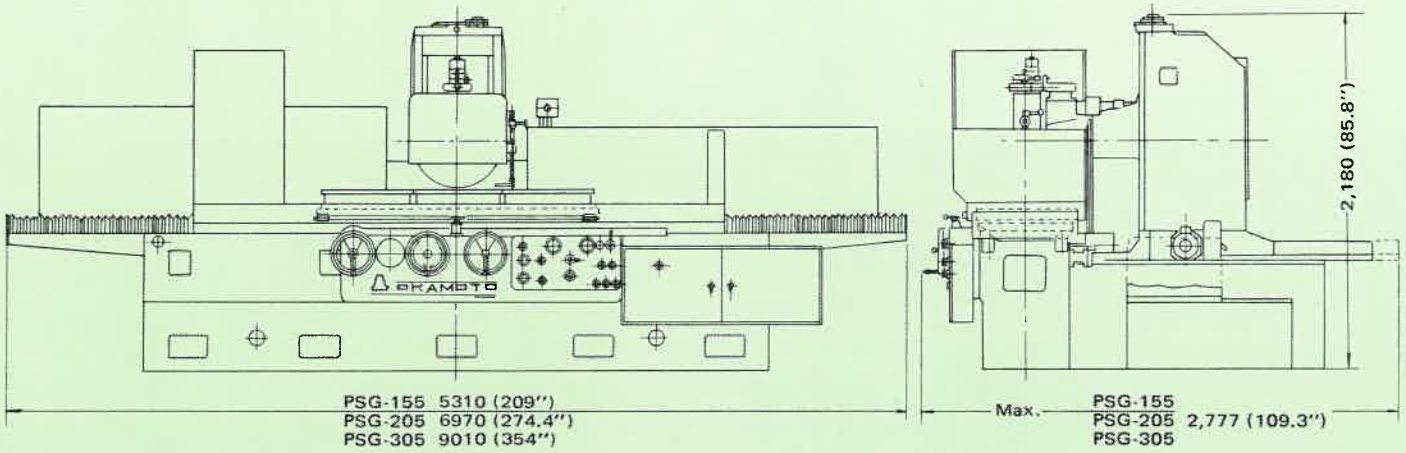


OUTLINE DIMENSIONS

PSG-125



PSG-155, PSG-205 & PSG-305



SPECIFICATIONS

	ITEMS	DIMENSIONS	PSG-125	
			METRIC	INCH
Capacity	Maximum grinding length	mm in	1,200	47.24"
	Maximum grinding width	mm in	500	20"
	Maximum distance under 510 mm (20") wheel to table top	mm in	595	23.4"
	Maximum longitudinal travel of table	mm in	1,300	51.22"
	Maximum cross travel of column	mm in	530	20.86"
Table	Surface length	mm in	1,200	47.24"
	Surface width	mm in	500	19.7"
	T-Slot (No. x Width)	mm in	3 x 17	3 x 669"
Feeds	Longitudinal movement of table			
	Hydraulic feed per minute	m/min ft/min	0.3–30	1–100'
	Hand feed per revolution	mm in	25	.984
	Cross movement of column			
	Hydraulic intermittent feed	mm in	5–35	.20–13.7"
	Hydraulic continuous feed per minute	m/min ft/min	0.3–5	1–16.4'
	Hand feed per revolution	mm in	5	0.2
	Granduation of handwheel	mm in	0.02	0.001"
	Vertical movement of wheel head			
	Automatic feed per table stroke (optional)	mm in	0.005–0.05	0.0002–0.002"
	Automatic feed per column reversal	mm in	0.005–0.05	0.0002–0.002"
	Graduation of handwheel	mm in	0.005	0.0002"
	Hand feed per revolution	mm in	1	0.04"
	Vertical rapid feed	mm/min in/min	300	12"
Grinding wheel	O.D. x width x I.D.	mm in	510 x 50 x 127	20 x 2 x 5"
	Spindle revolution (50 Hz)	rpm	980	980
	Spindle revolution (60 Hz)	rpm	1,100	1,100
Motors	Grinding wheel spindle, standard	KW HP	7.5	10
	Grinding wheel spindle, Optional up to	KW HP	11	15
	Hydraulic pump	KW HP	3.7	5
	Vertical rapid feeder	KW HP	0.4	1/2
Floor space	Length x width	m ft	4.6 x 2.8	150 x 109
Weight	Approx. Machine net	Kg Lbs	6,000	13,200

PSG-155		PSG-205		PSG-305	
METRIC	INCH	METRIC	INCH	METRIC	INCH
1,550 500 595 1,650 530	61′ 20″ 23.4″ 65.01″ 20.86″	2,050 500 595 2,150 530	80.70″ 20″ 23.4″ 84.64″ 20.86″	3,050 500 595 3,150 530	120.08″ 20″ 23.4″ 124.02″ 20.86″
1,550 500 3 x 17	61.07 19.7″ 3 x .669″	2,050 500 3 x 17	80.71″ 19.7″ 3 x .669″	3,050 500 3 x 17	120.08″ 19.7″ 3 x .669″
0.3–30 25	1–100′ .984″	0.3–30 25	1–100′ .984″	0.3–30 25	1–100′ .984″
5–35 0.3–5 5 0.02	.20–1.37″ 1–16.4′ 0.2 0.001″	5–35 0.3–5 5 0.02	.20–1.37″ 1–16.4′ 0.2 0.001″	5–35 0.3–5 5 0.02	.20–1.37″ 1–16.4′ 0.2 0.001″
0.005–0.05 0.005–0.05 0.005 1 300	0.0002–0.002″ 0.0002–0.002″ 0.0002″ 0.04″ 12″	0.005–0.05 0.005–0.05 0.005 1 300	0.0002–0.002″ 0.0002–0.002″ 0.0002″ 0.04″ 12″	0.005–0.05 0.005–0.05 0.005 1 300	0.0002–0.002″ 0.0002–0.002″ 0.0002″ 0.04″ 12″
510 x 50 x 127 980 1,100	20 x 2 x 5″ 980 1,100	510 x 50 x 127 980 1,100	20 x 2 x 5″ 980 1,100	510 x 50 x 127 980 1,100	20 x 2 x 5″ 980 1,100
7.5 11 5.5 0.4	10 15 7-1/3 1/2	7.5 11 5.5 0.4	10 15 7-1/3 1/2	7.5 11 5.5 0.4	10 15 7-1/3 1/2
5.3 x 2.8	210 x 109	7.0 x 2.8	275 x 109	8.7 x 2.8	342 x 109
7 000	15,400	8,800	19,300	13,000	28,600

Note: The contents of this catalogue are subject to change without notice due to improvements, etc.
Please make sure when placing your order.

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