



**OPTimum** SERIES  
CNC CYLINDRICAL GRINDER

S & P

The image shows a close-up of an industrial machine, specifically a CNC cylindrical grinder. The machine has a white and grey color scheme. A semi-transparent circular overlay is placed in the center, containing the company name and a promotional message. The background shows the internal components of the machine, including a grinding wheel and a workpiece mounted on a rotating table. A blue flexible hose is visible on the right side of the machine.

# S & P

*Designed and researched  
through years of efforts, the  
S & P new generation of  
CNC Cylindrical Grinder will  
give you competitive edge in  
today's competitive  
environment.*





## Advanced Design Concepts Peak Performance CNC Cylindrical Grinder

The **OPTIMUM** series CNC cylindrical grinder from S & P is designed with high efficiency, high accuracy and maximum operational convenience in mind. The machine structure design fully meets ergonomic theorem for user-friendly operations. Rigid and stable construction, as well as a special wheel spindle design are combined with advanced CNC control to make cylindrical grinding easier and more accurate than ever before.

*Committed to Excellence*

“0.1  $\mu\text{m}$  Grinding Accuracy  
**OPTIMUM** Series Is Your  
Guarantee of Accuracy”

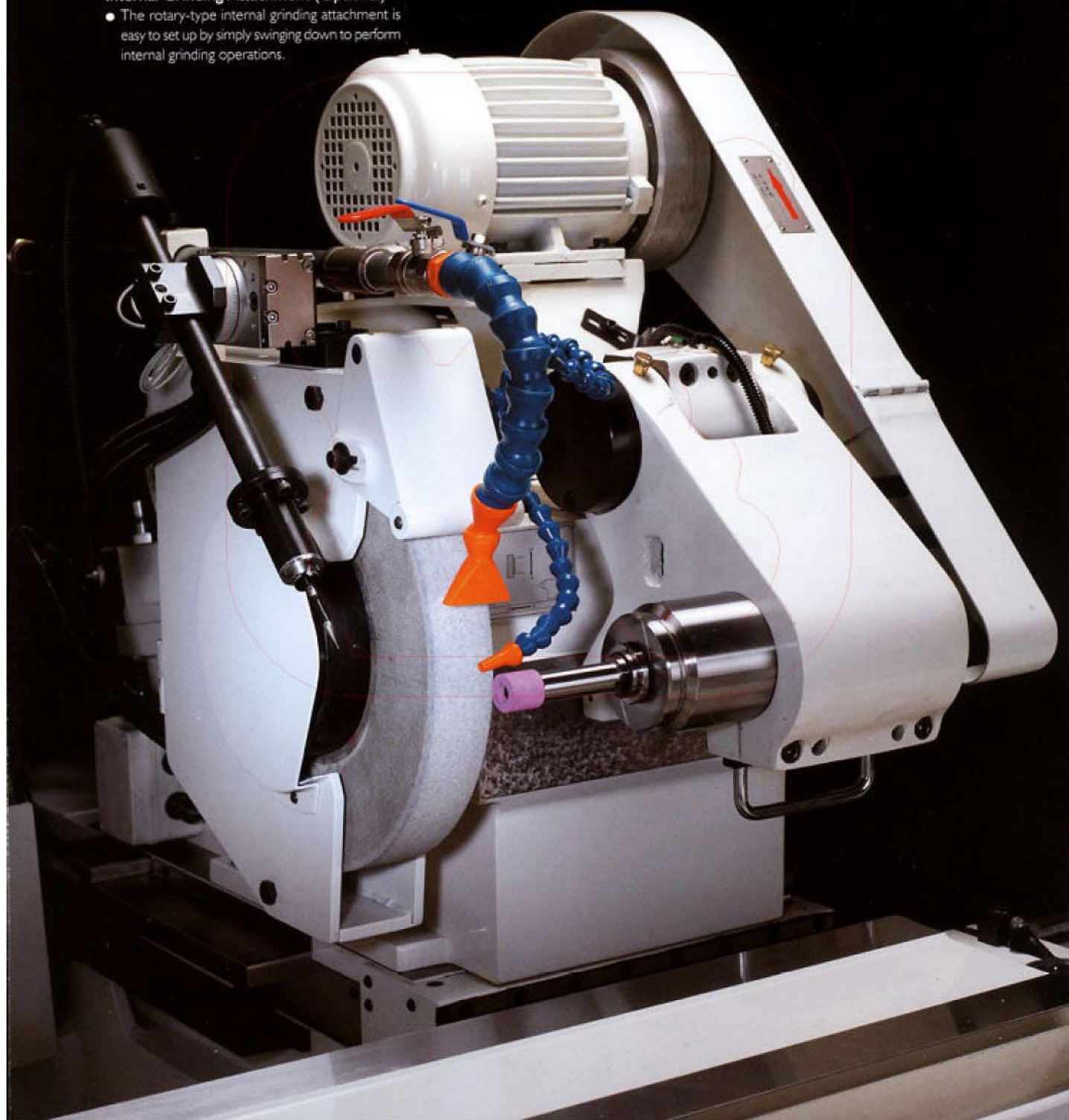


# Fine Craftsmanship and Outstanding Performance

S & P **OPTIMUM** Series Sets a New Standard in Cylindrical Grinders

## Internal Grinding Attachment (Optional)

- The rotary-type internal grinding attachment is easy to set up by simply swinging down to perform internal grinding operations.





“Advanced concepts, state-of-the-art techniques and innovative design-all this can be found on the S & P **OPTIMUM** Series CNC Cylindrical Grinder. It's a competitive edge for today's precision grinding. The **OPTIMUM** series features unmatched accuracy, grinding quality and control performance. Specially designed fine feed allows mirror-effect grinding and end face grinding easily - achieving the accuracy of  $0.1\ \mu\text{m}$ . A wide range of optional equipment is available to meet customer's requirement, and effectively upgrades the machine performance.”



**OCD-3240**

Fully Enclosed Splash Guard (Optional)



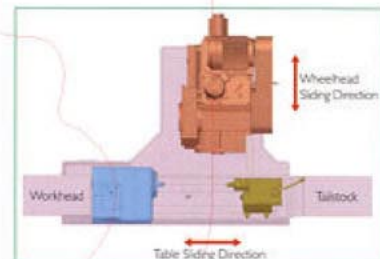
**Plunge Cylindrical Grinding**

- Two axes control combined with one auxiliary axis for workhead spindle running.
- Least input increment:  $0.001\ \text{mm}$ .



**Hydraulic Tailstock (Optional)**

- The rigid tailstock is locked on the slide firmly. The tailstock quill movement is driven by hydraulic power for convenient and fast workpiece clamping and unclamping.



**Easy to Check the Table Position**

- As the wheelhead advances/retracts in a straight line, even with the angular type, the wheel and workpiece longitudinal positions can be checked easily.



**Linear Scale For Z Axis (Optional)**

- The linear scale provides closed-loop control, assuring extremely high positioning accuracy and stability.



**Automatic Grinding Wheel Balancers (Optional)**

- The automatic grinding wheel balancer allows for automatically balancing the grinding wheel at all times. A clearance eliminator is also suggested to order for use together with the automatic grinding wheel balancer.



**Touch Probe Gauge (Optional)**

- Provides fast measurement for reference point on end face.

### Sophisticated Inspection Instruments and Rigorous Quality Control

S & P is committed to providing customers the best possible machinery. Rigorous quality control is conducted at each step throughout the entire manufacturing process. Each machine is tested and retested prior to shipping.

S & P QC department is fully equipped with a wide range of sophisticated inspection instruments. Our well-trained QC staff thoroughly conducts parts and machinery inspections to assure the dependability of each machine form S & P.

# Precision Inspection Pay Attention to Every Detail

“The Quality-proven **OPTIMUM** Series from S & P”







### OCD-4260

- CNC control.
- Fully enclosed splash guard ( optional accessory)
- Swing over table  $\varnothing 420$  mm.
- Distance between centers 600 mm.



### OCD-32100

- CNC control.
- Fully enclosed splash guard (optional).
- Swing over table  $\varnothing 320$  mm.
- Distance between centers 1,000 mm.



### ■ OCD-2040

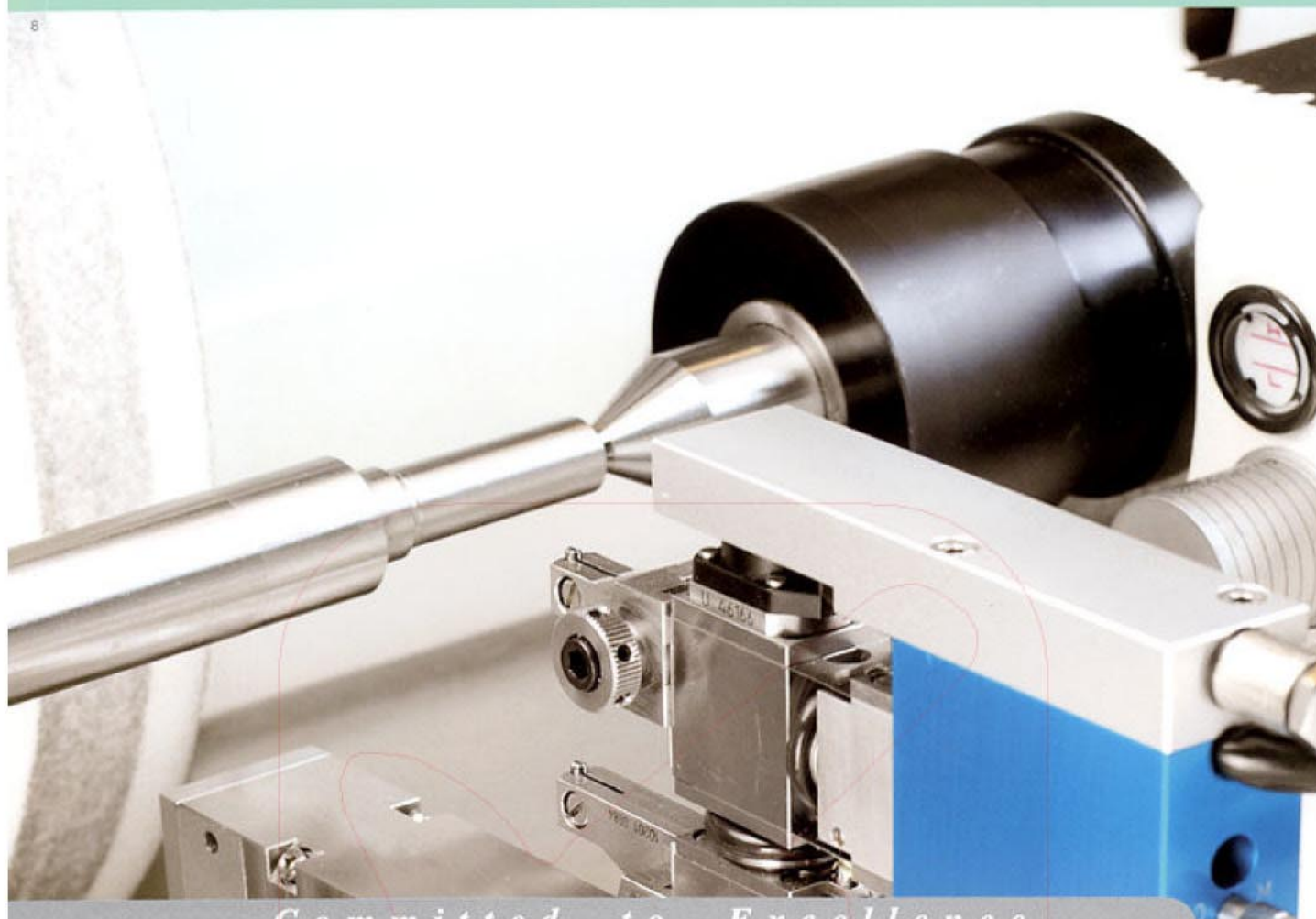
- CNC control.
- Semi-enclosed splash guard.
- Swing over table  $\varnothing 200$  mm.
- Distance between centers 400 mm.



### ■ OCD-3240

- CNC control.
- Fully enclosed splash guard (optional).
- Swing over table  $\varnothing 320$  mm.
- Distance between centers 400 mm.





*Committed to Excellence*



Massive machine construction combined with through treatment on structural parts is a critical factor to assure lifetime accuracy of a grinder. The **OPIMUM** series CNC cylindrical grinder is manufactured by an advanced structure design concept and subject to a comprehensive heat treatment. This guarantees consistent accuracy year after year.

- The machine structure is manufactured from high-quality Meehanite cast iron, heat treated and stress relieved for outstanding stability without deformation.
- The lower center of gravity of the bed enormously upgrades machine stability.
- The bed is scientifically rib reinforced for outstanding stability.
- The entire machine structure is ergonomically designed for added operational convenience.
- Slideways are precision ground and scraped.

#### Rigid Spindle Head

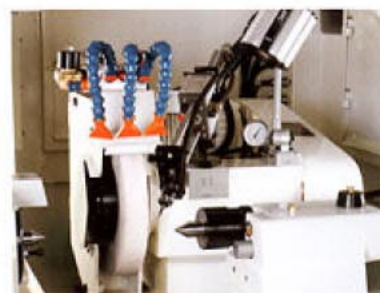
The rigid constructed spindle head employs high precision bearings assuring maximum spindle stability. It guarantees outstanding accuracy for external and internal diameter grinding and face grinding.

- The spindle head on the **OPIMUM** series cylindrical grinder is driven by servomotor, providing variable speed change.
- The spindle head allows for swiveling positive 90° and negative 30°.

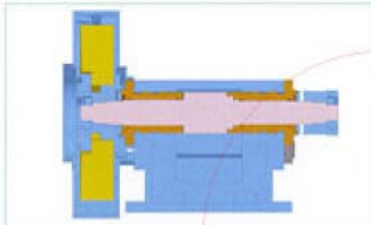


#### Precision Wheel Spindle

- The grinding wheel spindle is precisely machined from high quality alloy steel (SNCM-220), normalized, tempered, carburized and sub-zero treated, precisely ground and mirror-effect treated. Hardness reaches to over HRC 62°. Non-deformation, maximum wear resistance and lifetime accuracy are assured.



“ Based on the company's concept of constant pursuance of "New Lever Performance," S & P pioneers competitors in developing the new generation of CNC cylindrical grinder. No matter what in machine appearance or performance, the S & P **OPTIMUM** series will let you enjoy its extraordinary value. ”

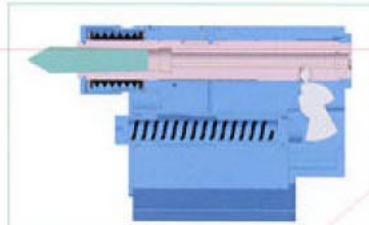


#### Hydro-static Bearing wheel spindle with Absolutely No Metal-to-Metal Contact

- Hybrid Palmary hydro-static Bearings are used for the wheel spindle bearings. Metal-to-metal contact will never occur with these highly rigid bearings which have a damping effect and make 0.5μm the new definition of wheel spindle rotational accuracy.

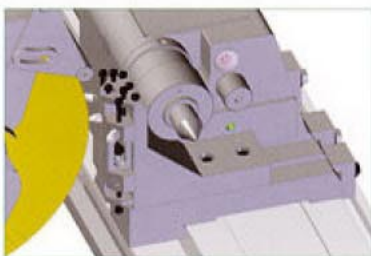
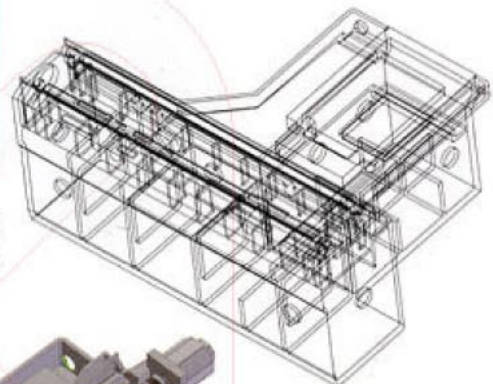
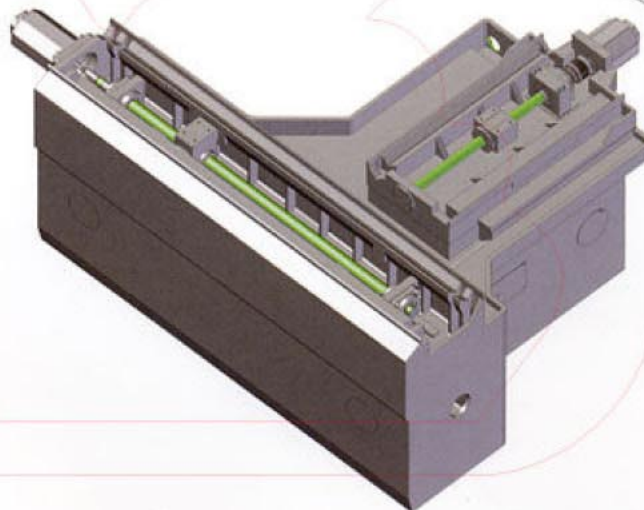
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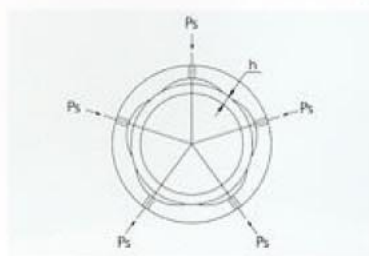
#### Tailstock Lubrication System Simplifies Maintenance

- An automatic oil bath lubrication system has been provided for the tailstock to maintain high-level accuracy. An oil level gauge enables quick and sure oil level checks.



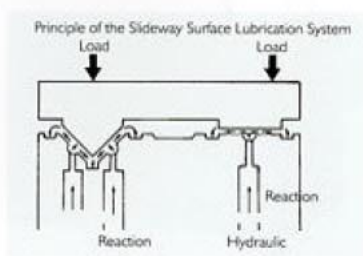
#### Convenient Wheel Dressing

- The diamond dresser holder is mounted on the traverse table. No diamond dresser position compensation is required after the table has been swiveled.



#### Special hydro-static Bearing

- The wheel spindle runs by using a special hydro-static bearing and is especially ideal for precision grinding work. It features high speed, no friction between metals, no heat generation, deformation-free, extra high accuracy and continual use.



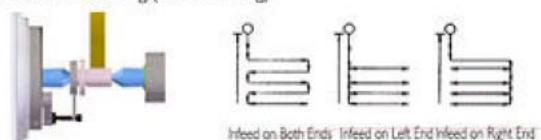
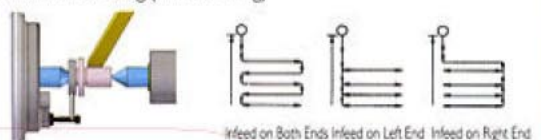
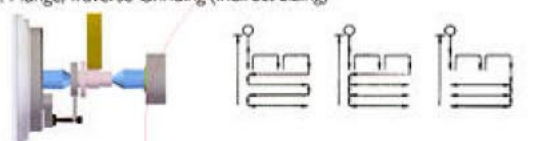
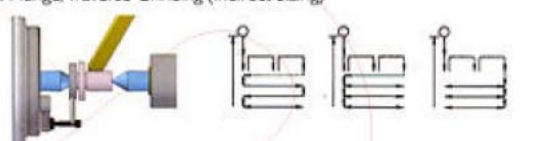





#### Advanced Hydro-static Lubrication System

- The sideways of the table and of the wheel head are lubricated by an advanced automatic hydro-statical lubrication system. This provides various features such as extremely smooth movement, added feeding accuracy and superior grinding accuracy.



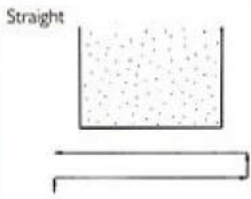
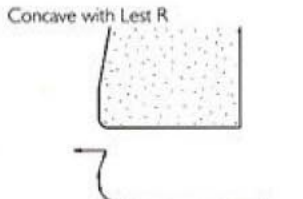
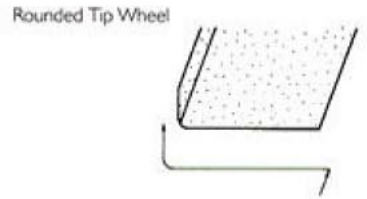
## ■ Cycle Patterns Grinding Cycles

Straight Type	Angular Type
1. Plunge Grinding (Indirect Sizing) 	1. Plunge Grinding (Indirect Sizing) 
2. Traverse Grinding (Indirect Sizing) 	2. Traverse Grinding (Indirect Sizing) 
3. Plunge/Traverse Grinding (Indirect Sizing) 	3. Plunge/Traverse Grinding (Indirect Sizing) 
● Internal Grinding Cycle (OD Grinding Cycle is Used) 1. Plunge Grinding  (Item 1 Above is Used) 2. Traverse Grinding  (Item 2 Above is Used)	4. Shoulder Grinding 

### Notes:

1. The above grinding cycles can be divided into rough and finish grinding cycles using the cycle dividing function.
2. Face grinding can be performed by manual interrupting operations and manual table axis compensation.
3. Direct sizing plunge, direct sizing traverse or direct sizing plunge/traverse grinding cycles is available as an option.  
(It is suggested to order for use together with the optional auto outside diameter measuring device.)
4. Only indirect sizing cycle is available (direct sizing cycle is not available) for the internal grinding cycle.
5. Internal multi-step grinding can be performed manually.

## ■ Wheel Dressing Cycles

Straight Type	Angular Type
Straight  Concave with Least R 	Rounded Tip Wheel 

### Notes:

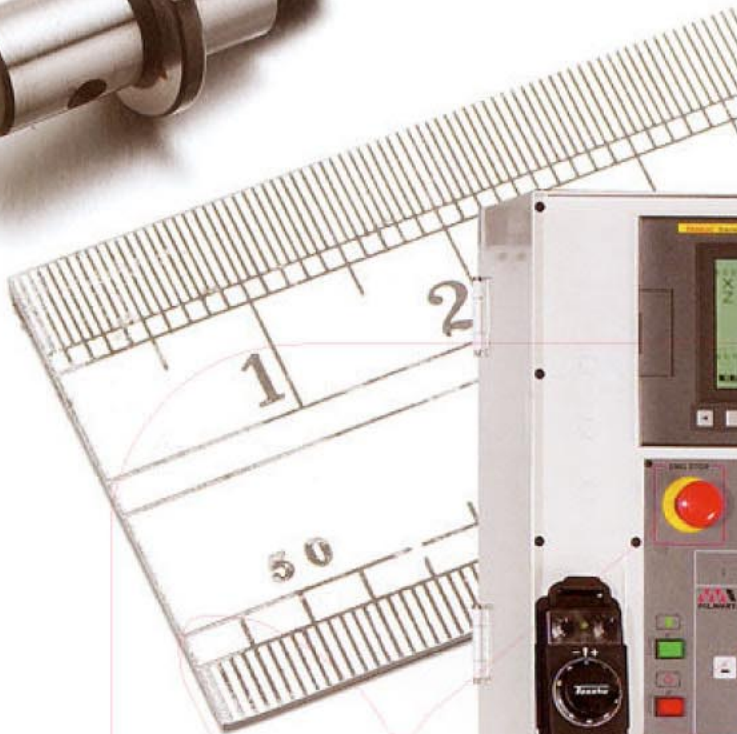
1. Up to five patterns of wheel shape can be registered.
2. Three wheel dressing conditions: rough, semi-finish and finish can be set.
3. The automatic dressing function for internal grinding wheels is not provided. Dress them manually using an internal/external diamond tool holder to be mounted on the table.



## CNC Control System

- \* Program Storage 160 M.
- \* Registered Program
- \* Program Number Search
- \* Program Protection
- \* Background Editing
- \* Bilingual Display: English / Chinese
- \* Display of Spindle Speed, T Code, Workpiece Quantity and Processing Time on Screen.
- \* Actual Speed Display
- \* External Key Input
- \* External Message
- \* I/O Device Control
- \* MDI Operation
- \* Reset
- \* Dry Run
- \* Single Block
- \* Program Protection
- \* Emergency Stop
- \* Status Display
- \* Incremental Pulse Coder Interface
- \* Automatic Coordinates Setting
- \* Workpiece Coordinates Setting
- \* Z-axis Simultaneous Controlability
- \* Least Input Increment - 0.001 mm.
- \* Least Command Increment - 0.001 mm.
- \* Rapid Traverse Override - 0, 25, 50, 100
- \* Automatic Acceleration / Deceleration
- \* Linear Acceleration / Deceleration After Cutting
- \* Feed Interpolation
- \* Feedrate Override 0 to 150%
- \* Positioning
- \* Linear Interpolation
- \* Circular Interpolation
- \* Reference Position Return
- \* Reference Position Return Check
- \* Program Combine
- \* Special G Code Input
- \* Programming Input of Offset Data
- \* Custom Macro B
- \* Inch / Metric Conversion
- \* Tool Nose Radius Compensation
- \* Canned Cycles for Grinding
- \* X-axis Diameter / Radius Command
- \* Counter Input of Offset Value
- \* Radius Designation on Arc
- \* External Data Input / Output
- \* Manual Handle Feed - 1 unit
- \* Manual Handle Feed Rate Adjustable
- \* Dwell (per sec.)
- \* High-speed Skip Function
- \* External Deceleration
- \* Position Signal Output
- \* Battery Alarm Output
- \* Backlash Compensation
- \* Stored Pitch Error Compensation
- \* Clock Function
- \* EIA / ISO Automatic Recognition
- \* Multi-step Skip
- \* Miscellaneous Function
- \* 9" CRT / MDI High-resolution
- \* Monochrome Screen
- \* Program Erase Function
- \* Program Copy Function
- \* Self-diagnosis Function
- \* 32 Pairs Tool Offset Memory
- \* Dressing Compensation
- \* Tool Geometry/Wear Offset
- \* Simple Tool Life Management
- \* Custom Macro





## “ State-of-the-art Technology - Your Right Choice! Advanced CNC Control for User-friendly Operation ”

### CENTRALIZED CONTROL PANEL

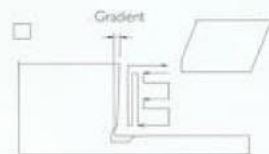
#### Major Functions:

- Increased operational convenience.
- Three-color alarm light.
- MPG handwheel for easy adjustment.
- Emergency stop button for retracting wheel instantly.
- Colorful graphic display.
- Easy to integrate with other optional functions.



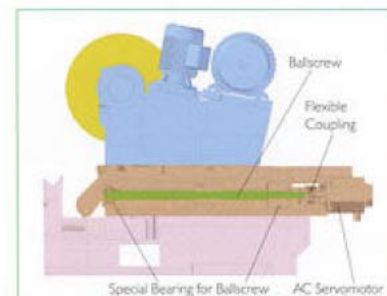
### Control Circuit Meets European Standards

- The control circuit consists of high quality electronic components, featuring dependable control performance and long service life.
- The electric cabinet is equipped with a heat exchanger, providing a constant temperature for the control circuit and maximum stability of control performance.
- The electrical cabinet is dust-proof.



### High-accuracy Face Grinding Realized by an Angular Wheel

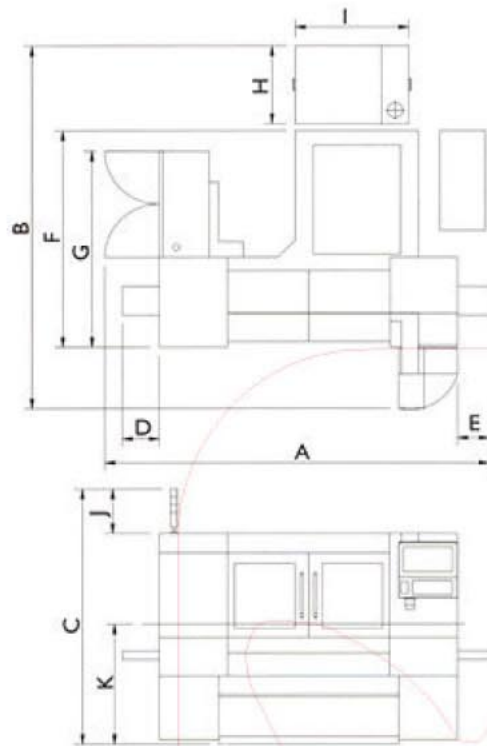
- Less wheel wear on the end face facilitates longitudinal sizing.
- The wheel can be angled and adjusted for contact with the end face. (The table swiveling function is used.)



### 0.1 $\mu\text{m}$ Grinding Accuracy

- Specially-designed fine feed allows mirror-effect grinding and end face grinding easily - achieving the accuracy of 0.1  $\mu\text{m}$ .

## ■ Floor Space Occupied and Machine Dimensions:



	OCD-2040	OCD-3240	OCD-3260	OCD-32100
A	2,480mm	3,385mm	3,500mm	3,765mm
B	2,680mm	3,260mm	3,260mm	3,430mm
C	1,880mm	2,300mm	2,300mm	2,300mm
D	220mm	130mm	250mm	620mm
E	210mm	280mm	300mm	570mm
F	1,580mm	1,960mm	1,960mm	1,960mm
G	1,450mm	1,765mm	1,765mm	1,650mm
H	425mm	700mm	700mm	700mm
I	735mm	1,000mm	1,000mm	1,000mm
J	400mm	400mm	400mm	400mm
K	1,050mm	1,080mm	1,080mm	1,080mm

Remark: OCD-42 series, K value: 1130 mm.

## Standard Accessories:



1. Linear Scale (For X Axis)



2. Grinding Wheel and Grinding Wheel Flange x 1 set



3. Diamond Tool Holder (Table Mounted Type) x 1 pc



4. Tools and Kits x 1 set



5. Carbide Tipped Work Centers x 2 pcs



6. Coolant Equipment x 1 set



7. Hydraulic Tank With Oil Cooler x 1 set



8. Work Lamp x 1 set



## Optional Accessories:



1. Internal Grinding Attachment



2. Cam Locked Driving Dogs (6 pcs/set)



3. Work Holder (2 pcs/set)



4. 2-point Steady Rest



5. Adjustable 3-point Steady Rest



6. Adjustable 3-jaw Scroll Chuck



7. Adjustable 4-jaw Chuck



8. Magnetic Coolant Separator



9. Magnetic and Paper Filter



10. Automatic Grinding Wheel Balancer



11. Wheel Balancing Stand and Arbor



12. Touch Probe Gauge



13. Auto In-process Gauge



14. Oil Mist Collector



15. Fully Enclosed Splash Guard



16. Spare Grinding Wheel and Grinding Wheel Flange



17. Hydraulic Tailstock



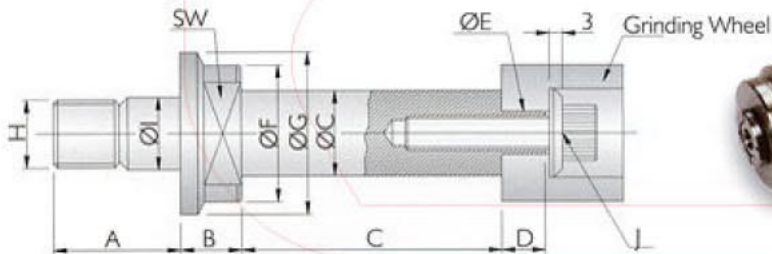
18. Ø80 Spindle Hole

## Rotary-type Internal Grinding Attachment (Optional Accessory)

- Easy to change over from O.D. grinding to I.D. grinding. The attachment is fixed by the rotary support for convenient workpiece loading.
- To position the internal grinding attachment, simply turn it downward and fix it in the grinding position.
- Allows for external and internal grinding operations in one process.
- Tapered workpieces can be ground by swiveling on the workhead and table.
- The internal grinding spindle head on the OCD-20 series is driven by a 1/2 HP motor.
- The internal grinding spindle head on the OCD-32 series is driven by a 1 HP motor.



## Internal Grinding Spindle



- The ratio of grinding hole diameter to length is 1 : 3.
- Maximum length is 150 mm.

HOLE DIA.	GREASE TYPE	A	B	C	D	E	F	G	H	I	J	SW	OIL MIST TYPE	HOLE DIA.
Ø65 ~ Ø150	8,000 rpm	42	16	Ø40 x 100 Ø40 x 85 Ø40 x 55	12	Ø12	Ø50	Ø58	M26 x 2P	Ø28	M8 x 1.25P	41		
Ø40 ~ Ø80	10,000 rpm	29	14	Ø30 x 90 Ø25 x 70 Ø20 x 60	10	Ø10	Ø32	Ø38	M16 x 1.5P	Ø17	M8 x 1.25P	24		
Ø35 ~ Ø70	15,000 rpm	29	14	Ø30 x 90 Ø25 x 70 Ø20 x 60	10	Ø10	Ø32	Ø38	M16 x 1.5P	Ø17	M8 x 1.25P	24	20,000 rpm	Ø24 ~ Ø40
Ø24 ~ Ø40	20,000 rpm	28	11	Ø24 x 80 Ø20 x 60 Ø16 x 40	8	Ø8	Ø26	Ø32	M14 x 1.5P	Ø15	M6 x 1.0P	19	30,000 rpm	Ø15 ~ Ø25
Ø15 ~ Ø25	30,000 rpm	21	9	Ø13 x 30 Ø10 x 25 Ø12 x 35	6	Ø6	Ø21	Ø26	M10 x 1.5P	Ø10.5	M4 x 0.7P	17	40,000 rpm	Ø12 ~ Ø16
Ø12 ~ Ø16	40,000 rpm	20	8	Ø10 x 30 Ø8 x 25 Ø8 x 30	x	x	Ø18	Ø23	M8 x 1.25P	Ø8.5	M4 x 0.7P	14	50,000 rpm	Ø9 ~ Ø13
Ø9 ~ Ø13	50,000 rpm	18	7	Ø7 x 25 Ø6 x 20 Ø6.7 x 25	x	x	Ø15	Ø20	M7 x 1P	Ø7.5	M4 x 0.7P	11	60,000 rpm	Ø7 ~ Ø10
		13	6	Ø5.7 x 15 Ø5.7 x 15	x	x	Ø11	Ø14	M5 x 0.8P	Ø5.5	M4 x 0.7P M3 x 0.5P	8	80,000 rpm	Ø6 ~ Ø8



### Example of Grinding Workpieces

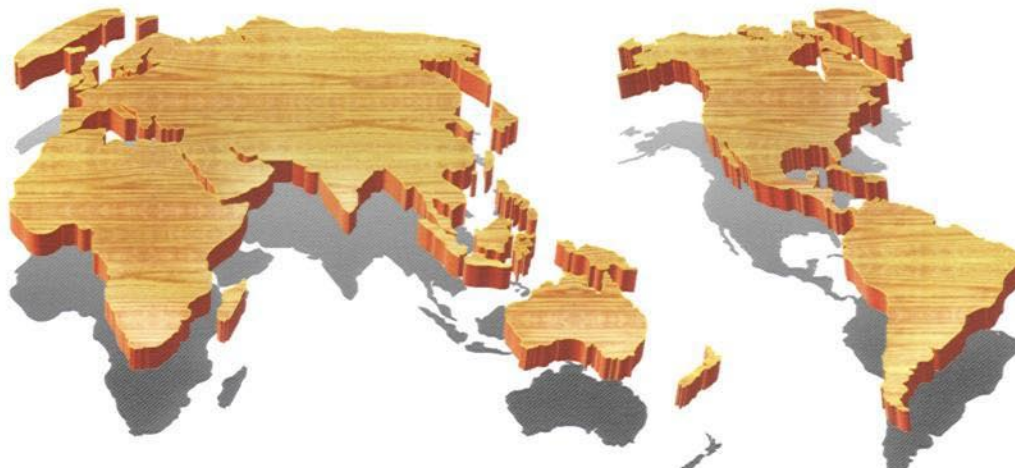


### \* Machine Specifications and Layout

Specification		Model	OCD-2040	OCD-32(42)40	OCD-32(42)60	OCD-32(42)100
Swing Over Table			Ø200 mm		Ø320 mm (Ø420 mm)	
Distance Between Centers			400 mm	400 mm	600 mm	1000 mm
Max. Grinding Diameter			Ø180 mm		Ø300 mm (Ø400 mm)	
Max. Load Held Between Centers			60 kg		150 kg	
Wheel	OD x Width x ID		Ø305 x 38 x Ø127 mm		Ø355 x 50 x Ø127 (Ø152.4) mm	
	Linear Velocity		30 m/s		30 m/s	
	Speed		2085 / 2495 RPM		1783 / 1940 RPM	
Wheelhead	Rapid Feedrate		6 m/min		6 m/min	
	Min. Input Increment		0.001 mm (0.0001 mm)		0.001 mm (0.0001 mm)	
	Internal Grinding		Manual Elevation		Manual Elevation	
Table	Rapid Feedrate		6 m/min		6 m/min	
	Min. Input Increment		0.001 mm (0.0001 mm)		0.001 mm (0.0001 mm)	
	Swiveling Angle		-3°~10°	0°~12°	0°~12°	0~10°
Workhead	Swiveling Angle		-30° ~ +90° deg		-30° ~ +90° deg	
	Center		MT. No. 3		MT. No. 4	
	Speed		10-500 rpm		10-500 rpm	
	Max. Load of Spindle (tool holder included)		15 kg (Max length: 100 mm)		35 kg (Max length: 150 mm)	
Tailstock	Center		MT. No.3		MT. No.4	
	Tailstock Stroke		20 mm		25 mm	
Power Source			Power: 220 V Cont. Cir: 24 VDC		Power: 220 V Cont. Cir: 24 VDC	
Drive Motors	Wheel Spindle		2.3 (4P) kw		3.7 (4P) kw	
	Work Spindle		0.75 (4P) kw Freq. Invt.	0.8 kw AC Servo motor		1.3 kw AC Servo motor
	Wheelhead Feed		1.2 kw (AC Servomotor)		1.2 kw (AC Servomotor)	
	Table Feed		1.2 kw (AC Servomotor)		1.8 kw (AC Servomotor)	
	Hydraulic Pump		0.75 (6P) kw		0.75 (6P) kw	
	Wheel Spindle Lubricant		0.18 (2P) kw		0.18 (2P) kw	
	Coolant Pump		0.18 (4P) kw		0.18 (4P) kw	
	Internal Grinding Wheel Spindle		0.37 (2P) kw		0.75 (2P) kw	
Tank Capacities	Wheel Spindle Bearing Lubricant		12 L		12 L	
	Lubrication Oil Tank		60 L		60 L	
	Machine Weight		2250 kg	3400 kg (3600 kg)	4250 kg (4450 kg)	5300 kg (5500 kg)

1. The above specifications are subject to change without prior notice.

## Sales Network All Over the World



Germany  
Italy  
Switzerland  
India  
Russia  
Poland  
France  
Bulgaria  
Hungary  
Portugal  
South Africa  
Australia  
Israel  
Jordan

Thailand  
Malaysia  
Singapore  
Philippines  
Vietnam  
Indonesia  
Sri Lanka  
Turkey  
Pakistan  
Belgium  
Slovenia

China  
Hong Kong

South Korea  
Japan  
Taiwan  
Egypt

USA  
Mexico  
Costa Rica  
Brazil  
Argentina

### Product Range

- Centerless Grinder
- NC Centerless Grinder
- CNC Centerless Grinder
- High Speed Centerless Grinder
- Precision Universal Cylindrical Grinder
- NC Universal Cylindrical Grinder
- CNC Universal Cylindrical Grinder
- NC Internal Grinder
- CNC Internal Grinder
- Surface Grinder

# S & P



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