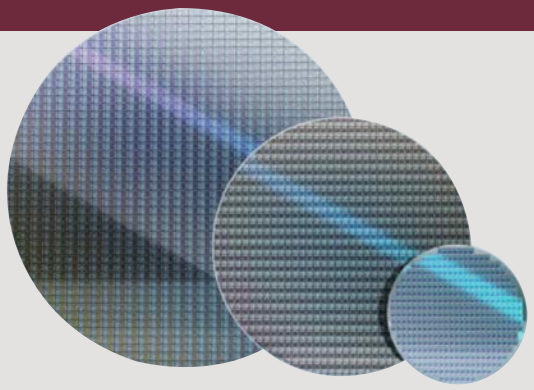
FRG-400/600 Series

Fully Automatic Rotary Surface Grinder

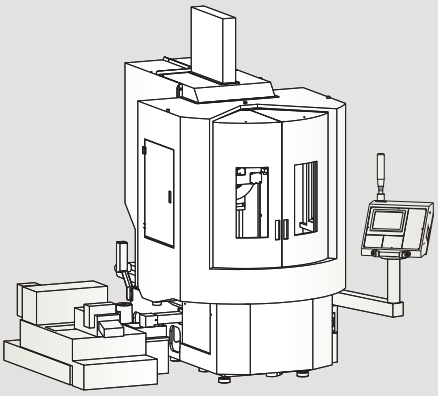
Hydrostatic table, intelligent, fully enclosed



CHEVALIER®
Grinding / Turning / Milling
We shape your ideas.™

Higher rigidity produces less vibration and smoother movement for years of consistent, reliable operation

Fully Automatic Rotary Surface Grinder



Chevalier adds the new FRG-400/600 Series of rotary surface grinders to our excellent family. The series has several design features that ensure smooth, stable grinding: a durable, ribbed machine column structure that can withstand heavy-load grinding with a fully enclosed hydrostatic rotary table.

The series grinders increase efficiency and productivity for such industries as aerospace, automotive, energy, medical and semiconductor in order to meet current and future market demands.

The spindle is supported by six Class 7 (P4), ultra-precision angular contact ball bearings that can withstand heavy-duty grinding. And the flexible coupling connecting the spindle and the motor incorporates a precise-balanced calibration process, which effectively reduces vibration and ensures grinding quality.

The elevating drive is driven by a C2-grade ballscrew with servo motor that provide high torque and speed. Linear guideways improves the elevating accuracy with a minimum increment of 0.001 mm (0.0001") and accurate positioning.

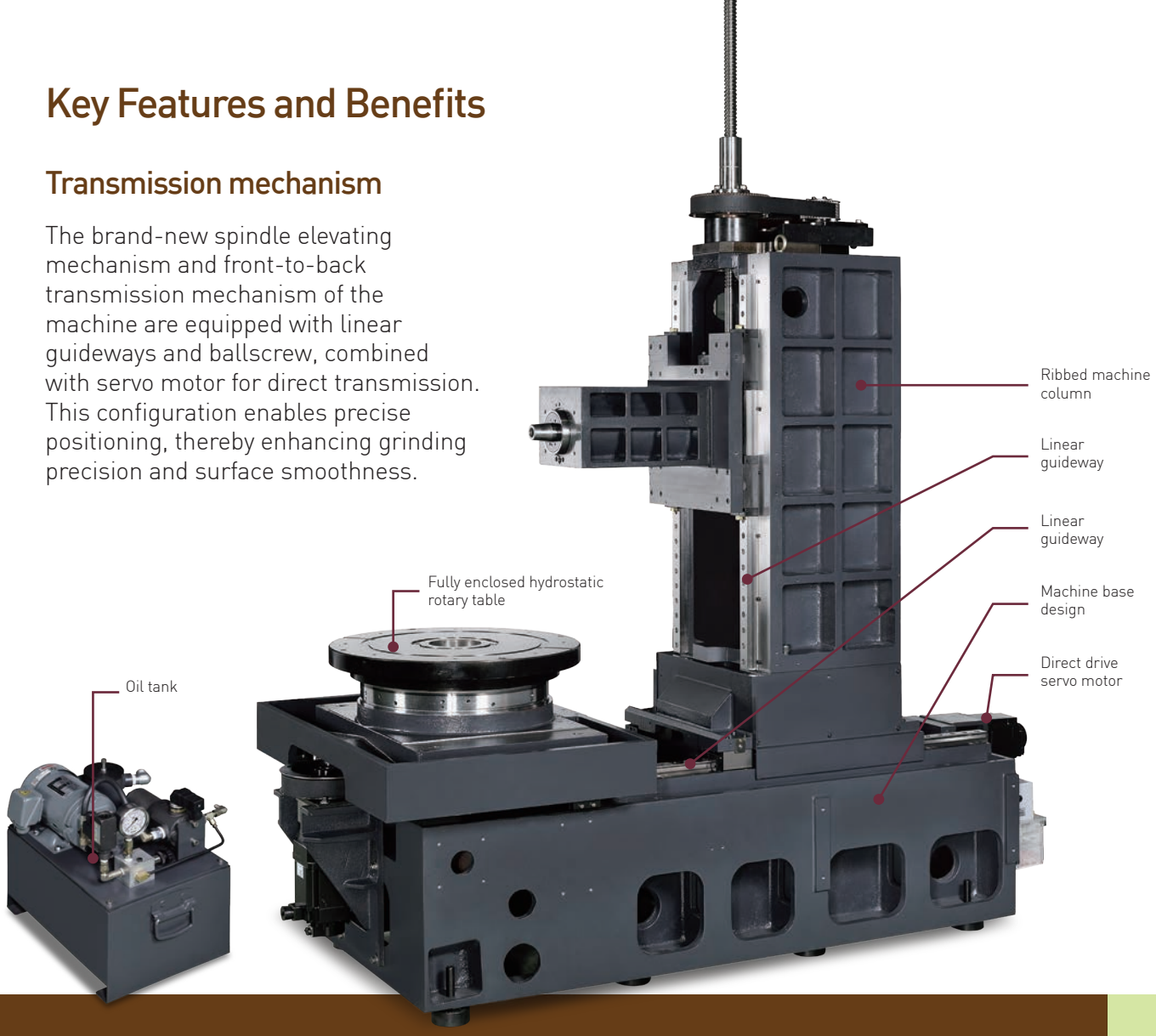
This fully automatic grinding machine is designed to be user friendly. Our exclusive iSurface control incorporates production efficiency, which simplifies operation procedures and greatly enhances the performance of Chevalier grinders.

The FRG-600 is shown with optional accessories.

Key Features and Benefits

Transmission mechanism

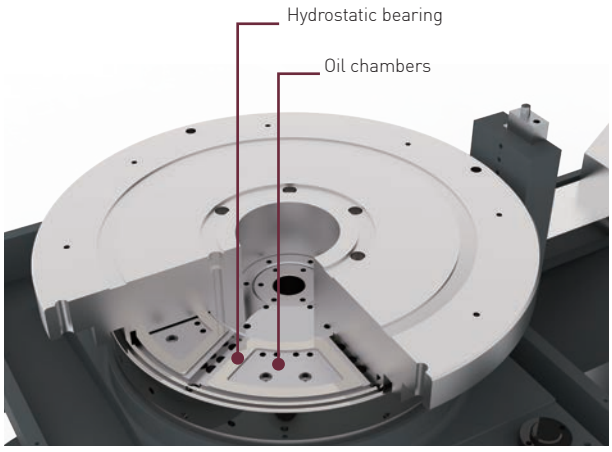
The brand-new spindle elevating mechanism and front-to-back transmission mechanism of the machine are equipped with linear guideways and ballscrew, combined with servo motor for direct transmission. This configuration enables precise positioning, thereby enhancing grinding precision and surface smoothness.



Hydrostatic rotary table design ensures smooth surface roughness and precision stability

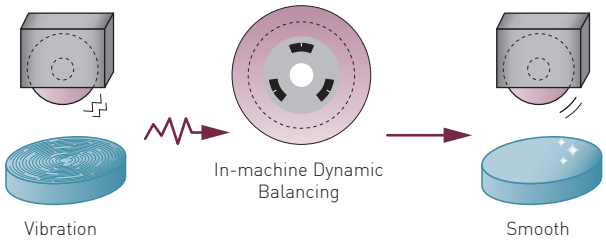
Rotary table

The rotary table is designed with hydrostatic bearings, which support the worktable through a uniform oil film, providing the mechanism with high vibration resistance and higher rotational precision than conventional bearings. This design ensures long-term operation capability.



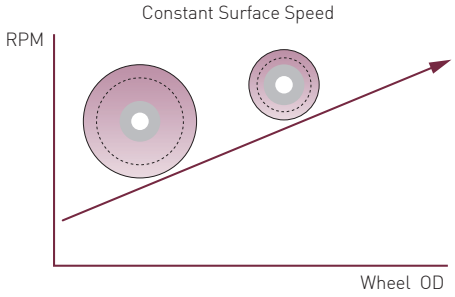
In-machine dynamic balancing

The control's data helps to set adjustments for the in-machine dynamic balancing in order to reduce grinding wheel vibration and eliminate the workpiece surface ripple to improve grinding quality.



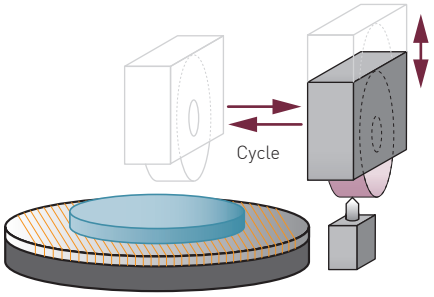
Variable speed spindle

The built-in driver controls spindle speed. Combined with the automatic dressing function, the driver provides constant surface speed regardless of the grinding wheel's changing diameter.



Automatic wheel dressing with compensation

An automatic wheel dressing with compensation feature dresses the wheel automatically during rough and/or fine grinding and again at the end of rough grinding. This enables the machine to run unattended for hours, making it ideal for high-volume production runs, while reducing machining costs and increasing line productivity.



A higher level of precision, flexibility and functionality with in-machine manual dynamic balancing

Control Features and Benefits

All new iSurface control

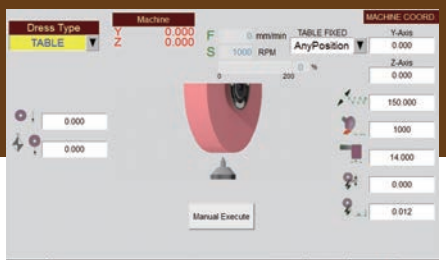
FRG-400/600 Series controls are PC-based (NC control), high-specification industrial units. The high-response AC servo motors on the Y- and Z-axes are designed to improve accuracy.

The control is equipped with a variable frequency drive system that automatically adjusts the grinding wheel's linear speed. A magnetic encoder accurately detects spindle load and correctly grasps the spindle cutting load.

A built-in acceleration gauge monitors the grinding wheel's balance at all times. If the wheel becomes unbalanced, the operator will be notified to rebalance the wheel.

Perfect HMI control

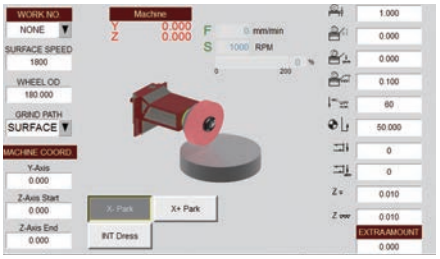
The control's standard equipment includes a 10.4" high-color touchscreen with HMI.



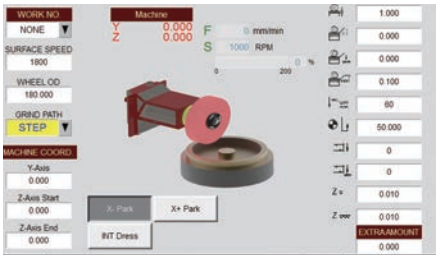
Automatic Dressing on Table

Enhanced control system

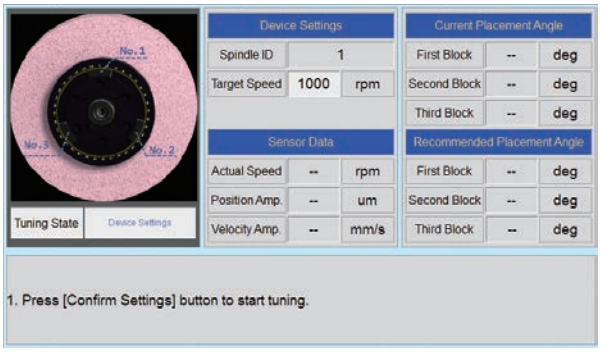
Enhanced control system Unlike PLC control boards, the PC-based control's powerful computing power enhances the HMI for more precise control. Combined with data analysis from network connectivity, it permits managers to improve production output.



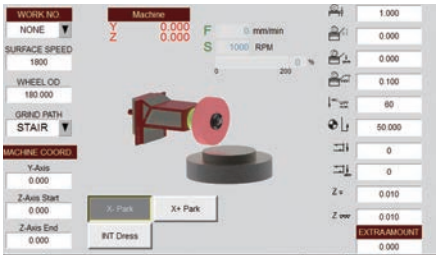
Surface Grinding Mode



Step Grinding Mode



In-Machine Dynamic Balancing



Stair Grinding Mode

FRG-400 / 600
iSurface control features

- 10.4" touch-screen monitor
- Compact control panel
- Alarm list and historical record
- Y-, Z-axis, high-precision servo control
- Multi-coordinate system display
- Clear I/O status display
- MPG simulation function
- Retract function
- Graphic conversation operation
- Surface grinding, Step grinding, Stair grinding
- Dressing with auto compensation
- Ethernet (iMCS)
- Multi-languages display
- In-machine dynamic balancing

iMachine Communications System™ (iMCS)

iMCS is a comprehensive remote monitoring software that integrates with IoT functions on Chevalier's CNC machines to perform 24/7 data collection, utilization monitoring, data analysis, alarm history, maintenance and overall equipment effectiveness (OEE), all which help to avoid downtime and increase productivity. Additional PC and software are required.

Wheel Dressing

The conventional dressing mode of grinder takes too much time. iSurface's exclusive conversational graphic function enables automatic grinding wheel dressing and automatic compensation.

Auto dressing modes

Conversational graphic, automatic-wheel dressing modes can be linked with all—grinding modes.

The FRG-600 is shown with optional accessories.

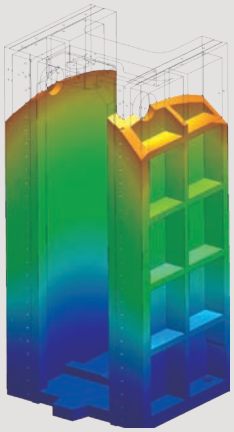
The wheel dressing mode ensures the grinding wheel remains true for consistent grinding accuracy

On Table Dressing

Machine Construction

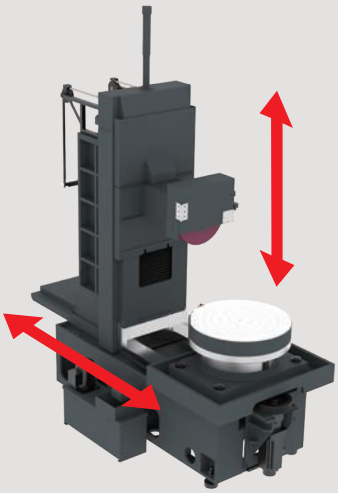
Column structure

The FRG-400/600 Series are designed with precise calculation and FEM structure analysis to achieve a lightweight and high structural rigidity that provides better grinding efficiency and precision.



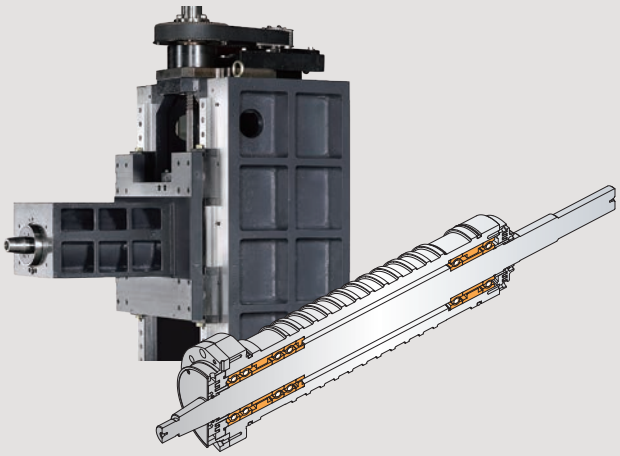
Column and elevating transmission

The moving column moves back and forth to ensure balanced linear motion. The accuracy will not change due to the change of workpiece weight. The crossfeed and elevating adopts precision linear guideways and cooperates with precision ballscrews for precise positioning and linear movement.



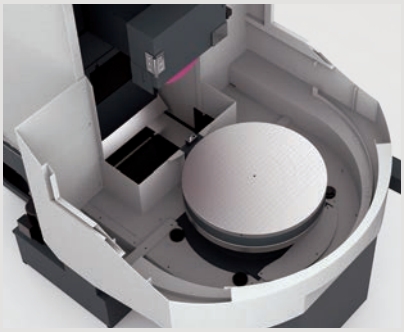
Spindle design

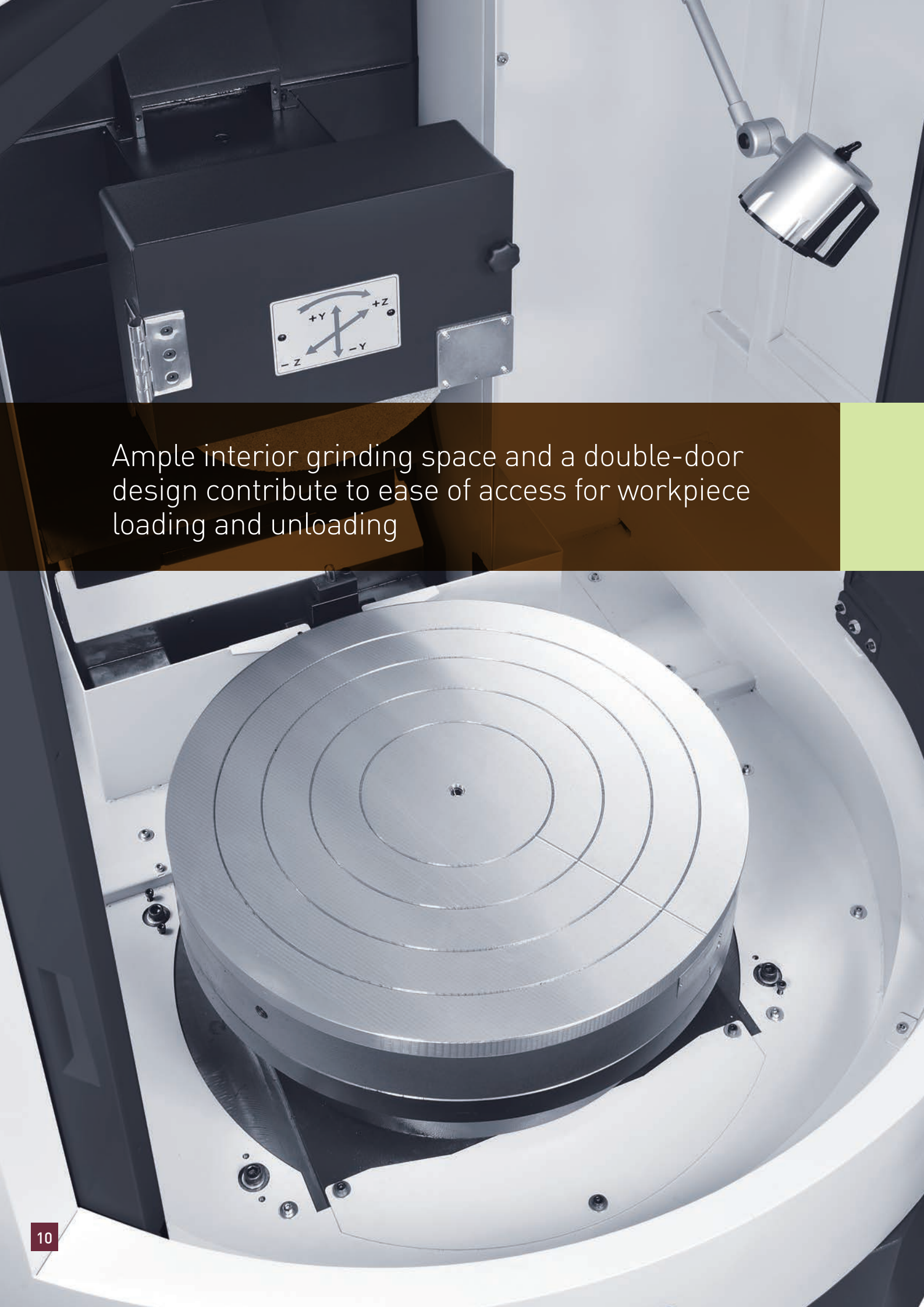
The newly designed spindle is supported by six Class 7 (P4), ultra-precision angular contact ball bearings (four in front, two in rear). The spindle structure is rigid and withstands heavy load grinding. The flexible coupling connecting the spindle and the motor incorporates a precise-balanced calibration process, which effectively reduces vibration and ensures grinding quality.



Interior space

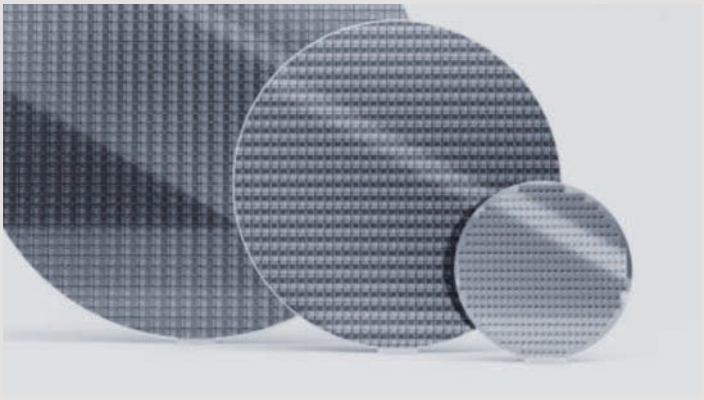
Ample interior grinding space and a double-door design contribute to ease of access for workpiece loading and unloading. The drainage system easily removes swarf for cleaning. The machine is fully enclosed with a sealed, waterproof metal guard.

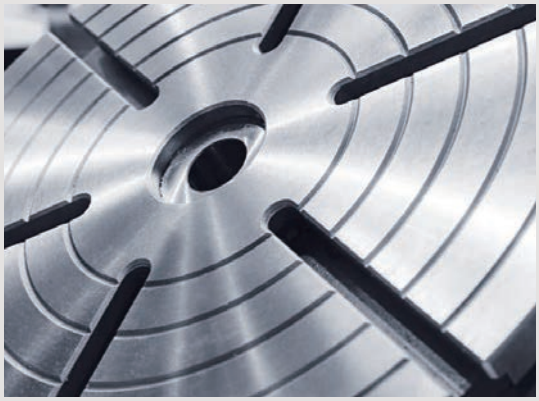




Ample interior grinding space and a double-door design contribute to ease of access for workpiece loading and unloading

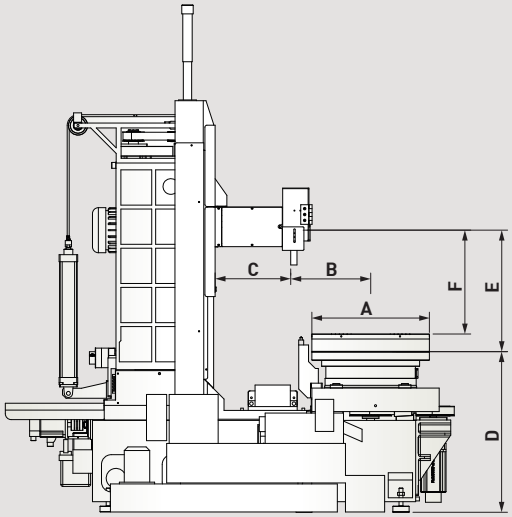
Applications





Easily adapts to future needs for semiconductor, precision chuck, saw blade and spindle transmission components

Maximum Working Space

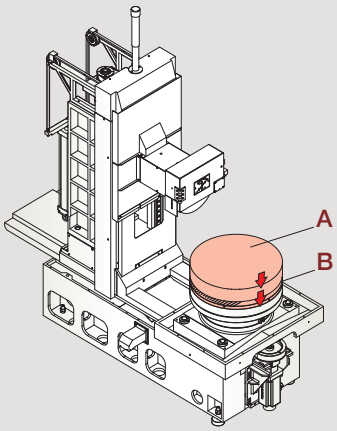


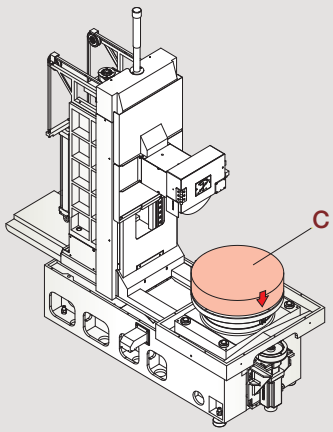
Units: mm (")

Item	FRG-400	FRG-600
A	Ø400 (Ø15.7)	Ø600 (Ø23.6)
B	395 (15.6)	
C	386 (15.2)	
D	820 (32.3)	
E	600 (23.6)	
F	500 (19.7)	

Machine's reliability provides high-performance surface and accuracy

Loading Capacity



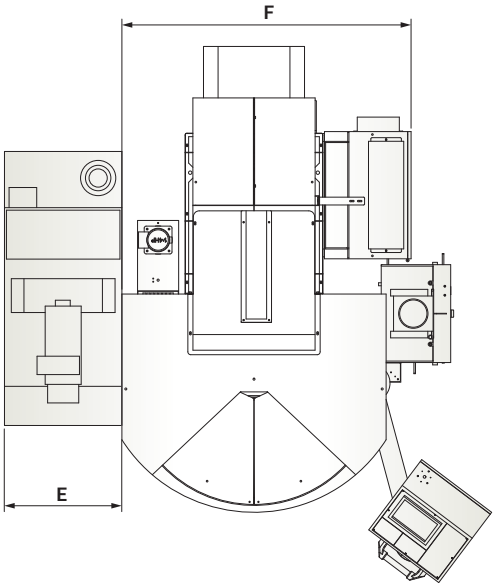


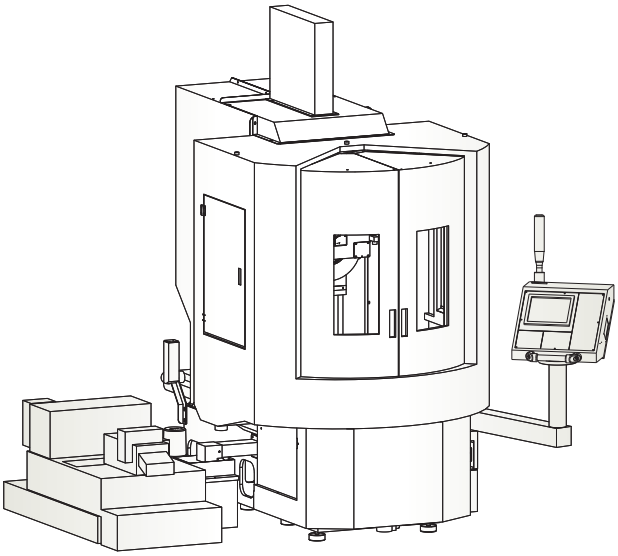
Item	A	B	C
FRG-400	50 kg (110 lbs.)	100 kg (220 lbs.)	150 kg (330 lbs.)
FRG-600	205 kg (452 lbs.)	195 kg (430 lbs.)	400 kg (882 lbs.)

Suggested maximum table loads
A = Workpiece, B = Chuck, C = A+B

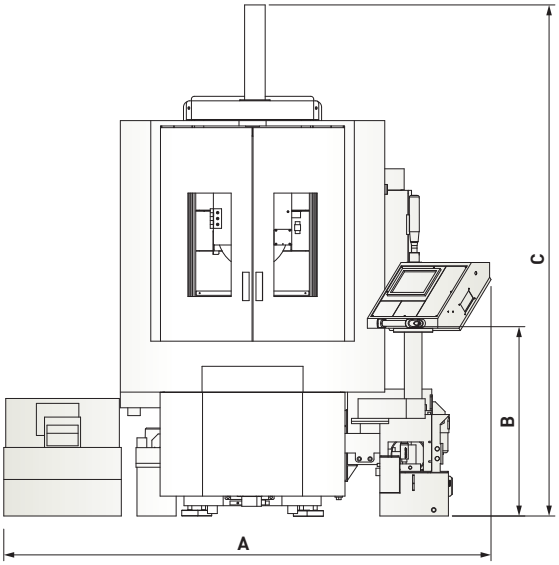
Machine Dimensions

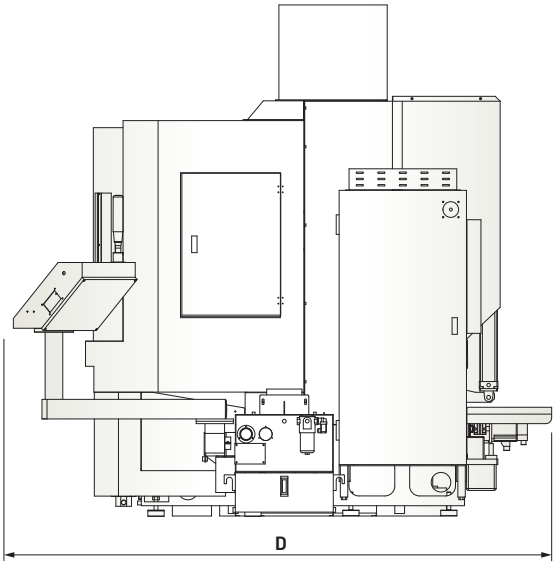
Units: mm (")





Note: Machine shown with optional accessories.





Item	A	B	C	D	E	F
FRG-400	2,800 (110.2)	960 (37.8)	2,610 (102.8)	2,800 (110.2)	600 (23.6)	1,500 (59.1)
FRG-600	2,800 (110.2)	960 (37.8)	2,610 (102.8)	2,800 (110.2)	600 (23.6)	1,500 (59.1)

A full line of standard and optional accessories adds flexibility to FRG-400/600 Series grinders

Accessories

Standard accessories

- Wheel flange (clamping width): 19~38 mm (0.7"~1.5")
- Grinding wheel (OD x Width x Bore): Ø355 x 38 x Ø127 mm (Ø14" x 1.5" x Ø5")
- Diamond dresser stand with diamond rod
- Fully enclosed splash guard
- Y-axis linear scale
- Round electromagnetic chuck (fine pole) with chuck control and rotary Joint
- Work lamp
- Warning lamp
- Leveling screws, nuts and pads: 8 sets
- Toolbox (includes balancing arbor, spanner, hex wrench, locking nut and wheel flange extractor)
- Ball point hex wrench set

Optional accessories

- Coolant system with auto paper feeding device
- Coolant system with auto paper feeding device and magnetic separator
- Filtering device- Centrifugation system
- Z-axis linear scale
- Oil mist collectors
- Spindle motor: 7.5 kW (10 HP)
- Rotary joint for vacuum chuck (for electromagnetic chuck)
- SMART iControl control system

Specifications

Item	Description	FRG-400	FRG-600
Control system		iSurface	
Capacity	Max. grinding radius	R225 mm (R8.9")	R325 mm (R12.8")
	Max. grinding height (elevating)	350 mm (13. 8")	
	Distance between table to spindle centerline	600 mm (23.6")	
	Height from table to ground	820 mm (32.3")	
	Max. table load	150 kg (330 lbs.)	400 kg (882 lbs.)
Rotary table	Table size	Ø400 mm (Ø15.7")	Ø600 mm (Ø23.6")
	Table speed	10 ~ 150 rpm	
Transverse movement (Z)	Max. travel	380 mm (15.0")	
	Feed speed	0 ~ 3,000 mm/min (0 ~ 9.75 fpm)	
	Min. input	0.001 mm (0.0001")	
Wheelhead elevation (Y)	Max. travel	450 mm (17.7")	
	Feed speed	0 ~ 2,000 mm/min (0 ~ 6.56 fpm)	
	Min. input	0.001 mm (0.0001")	
Spindle	Spindle speed	500 ~ 2,200 rpm	
	Spindle motor	5.5 kW (7.5 HP), optional 7.5 kW (10 HP)	
Motors	Rotary table motor	2.4 kW (3 HP)	
	Axis motors (Y/Z)	Y/Z: 1.7 kW	
Wheel dimension	OD x Width x Bore	Ø355 x 38 x Ø127 mm (Ø14" x 1.5" x Ø5")	
Power and air requirement	Power required	19 kVA	
	Total air consumption — Pressure	6 kg/cm^2 (86 psi)	
	Total air consumption — Flow	200 NL/min (7 cfm)	
Tank capacitiy	Oil tank capacity for rotary table	18 L (5 gals.)	
Machine dimensions	Floor space (W x D x H)	2,800 x 2,800 x 2,610 mm (110.2" x 110.2" x 102.8")	
	Net weight	3,400 kg (7,500 lbs.)	3,500 kg (7,700 lbs.)
Accuracy	Positioning accuracy	0.005 mm (0.00020)	
	Repeatability accuracy	0.003 mm (0.00012)	
	Accuracy standard	ISO 1986-1	

All content is for reference only and may be subject to change without prior notice or obligation.

Grinding Machines

SMART Grinding Machines

Turning Machines

Milling Machines

CHEVALIER®
Grinding Turning / Milling
We shape your ideas.™

Headquarters
FALCON MACHINE TOOLS CO., LTD.
No. 34, Hsing Kong Road, Shang Kang,
Chang Hua 509004, TAIWAN
Tel: +886 4 799 1126 Fax: +886 4 798 0011
www.chevalier.com.tw
overseas@chevalier.com.tw

U.S.A. Headquarters
CHEVALIER MACHINERY INC.
9925 Tabor Place, Santa Fe Springs, CA 90670 U.S.A.
Tel: (562) 903 1929 Fax: (562) 903 3959
www.chevalierusa.com
info@chevalierusa.com

FRG-400/600_EN_202308/1000P1/@RW

TAF Quality Management QC021 · QMS 010 · MIRDC ISO 9001 · CE