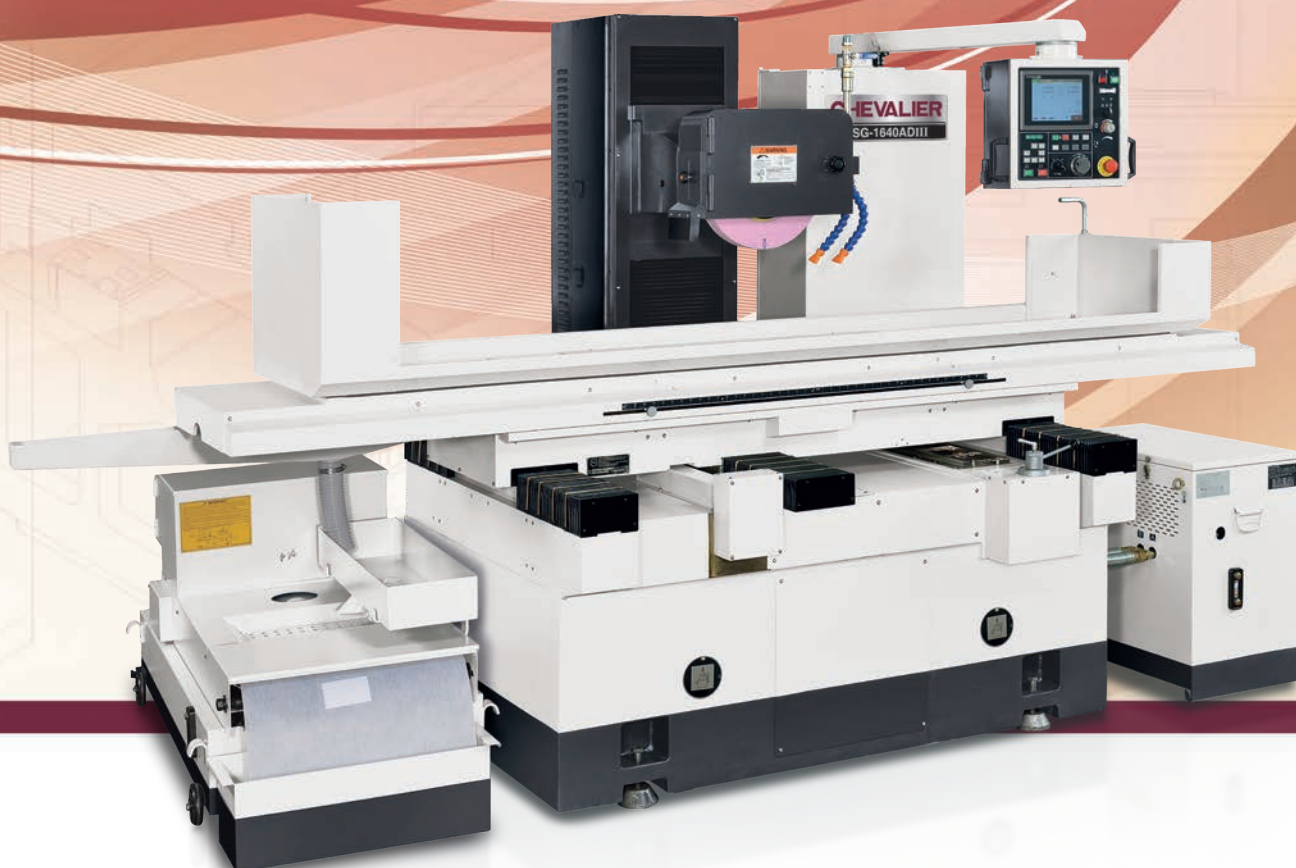


CHEVALIER®

Grinding / Turning / Milling



FSG-ADIII Series

Automatic Precision Surface
Grinding Machine

FSG-1224ADIII • 1632ADIII • 1640ADIII

FSG-1224ADIII • 1632ADIII • 1640ADIII

Machine Features

Automatic Precision Surface Grinding Machine

The highly advanced ADIII series of automatic precision surface grinding machines are a result of the ongoing and extensive research and development program at Chevalier. In addition to improved accuracy, quality, and machine life, the overall design of the machine incorporates ergonomics; all operating handwheels, levers, stroke setting devices and the pendant control panel are arranged to allow ease of operation, which increases working efficiency.

3-Axes Needle Roller Slide Way

All three axes guideway rails are composed of (S55C) steel that is normalized and then hardened by high frequency induction. The guideways are HRC 60-64 after heat treatment. Precision roller bearings run through a sieve to select exactly matched sets which are then preloaded between the linear guideway to provide a guideway system that will ensure excellent accuracy and precise positioning with stick-slip free movement.

Vertical Drive By AC Servo Motor

The wheelhead travelling on a preloaded linear guideway system is driven by a hardened and ground ballscrew and an AC servo motor providing high torque, speed and accurate positioning with a minimum increment of 0.001 mm (0.00005"). A manual pulse generator (MPG) is standard for easy operation.

Crossfeed Speed Control

Saddle continuous movement speed is controlled by a AC servo motor for obtaining better grinding surface finish and dressing grinding wheel from table.

Inspection

Driving Force Test - After the guide ways are assembled, the resistance to movement on each axis is inspected to ensure that the proper preload is set and that friction is minimized, resulting in maximum life of the guide ways.



Driving force test on table



Driving force test on saddle



Driving force test on column

In Process Quality Control - To ensure the quality, accuracy, and longevity of our products, every technician follows step-by-step quality control procedures from casting to final product.



The column is placed on a granite surface plate and the perpendicularity of the guideways is inspected with a precision electro-indicator.



The parallelism of the wheelhead guideways is inspected with a precision electro-indicator.



Parallelism and flatness of the table guideways are checked by "In Process Quality Control". These and numerous other tests throughout production help to maintain and improve the quality of Chevalier grinders.

FSG-1224ADIII · 1632ADIII · 1640ADIII

Inspection

Spindle Temperature Rise Test

To assure spindle temperature rise below 10°C, the spindle is tested under a non-load condition for a minimum of 8 hours. The spindle is run throughout its entire speed range while being continuously monitored by a thermograph.



Runout of Wheel Spindle Conical Surface

Apply a test indicator to the rear, middle and front points of the conical surface of the wheel spindle, and rotate the wheel spindle, the variation shall be under 0.0015 mm (0.00006").



Spindle Dynamic Balancing Test

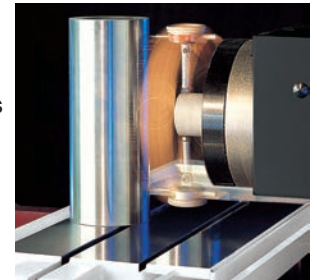
The spindle of each machine is calibrated by a portable precision dynamic vibration measuring device. The final amplitude of spindle vibration shall be under 0.03 mm/s (0.0012"/s).



Parallelism and Squareness of Wheel Spindle Centerline to Table Surface

Place a cylinder gauge on the table, swing the test indicator which is fixed on the wheel spindle, and obtain the readings of the indicator when table is at its right, middle and left positions.

The parallelism is 0.008 mm (0.0003") or less and the squareness is under 0.005 mm (0.0002").



Parallelism of Table Surface to Table Cross Transverse

Attach the base of a test indicator to the wheel head. Touch the stylus of the indicator to the table surface. Traverse the table in and out. The indicator variation shall be within 0.004 mm (0.00016").

Parallelism of Table Surface to Table Longitudinal Movement

Attach the base of a test indicator to the wheel head. Touch the stylus of the indicator to the table surface. Move the table left to right and reverse, the indicator variation shall be within 0.004 mm (0.00016").

Sifting of Steel Roller Bearings

The steel roller bearings used in all three axes guideways are sieved by an automatic machine which assures the tolerance of the bearings within 0.001 mm (0.00004").

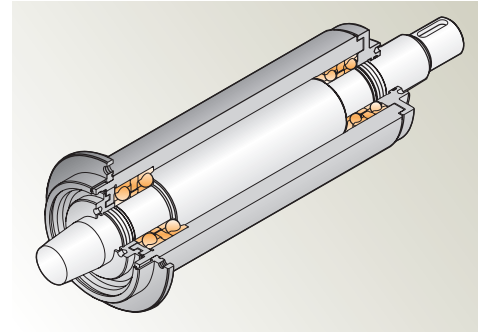
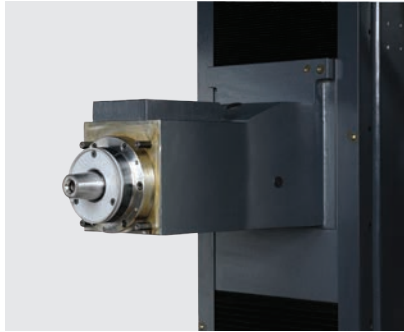


FSG-1224ADIII • 1632ADIII • 1640ADIII

Machine Construction

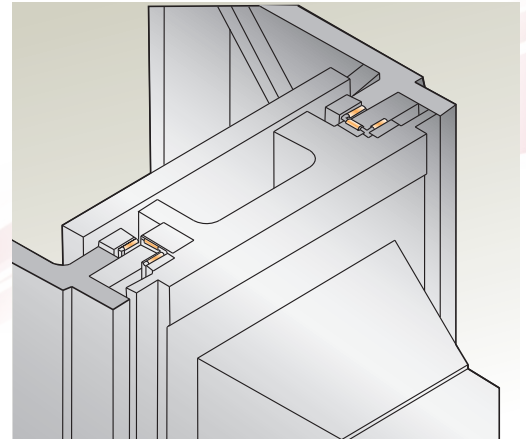
Spindle

The spindle is supported by four pieces of Class 7 (P4) super precision angular contact ball bearings which have been accurately measured, selected and preloaded, and then assembled in a temperature controlled clean room. The spindle is permanently lubricated and requires no maintenance. Spindle motor, spindle shaft, and couplings are precisely balanced to ensure accuracy and superb surface finish.



Elevating Guideway System

The wheelhead and column system is composed of hardened and ground inserted steel guideways and precision roller bearings. The wheelhead and column guideways are preloaded providing zero clearance for precise straight line movement. The low friction wheelhead guideway system enables accurate feeds even at 0.001 mm (0.00005") increments.



FSG-1224ADIII

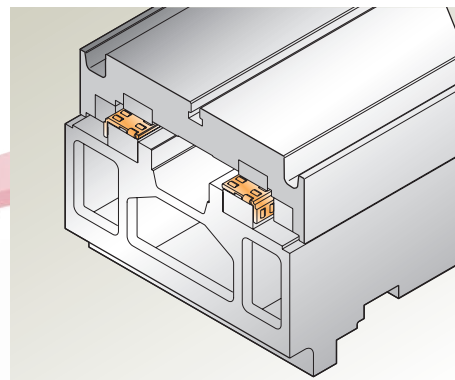
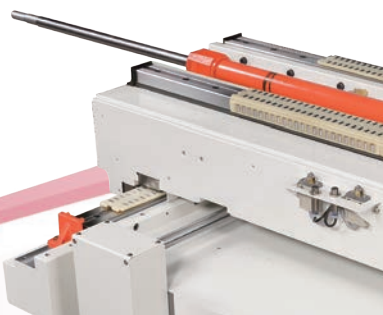
Note: Machine shown with optional accessories

FSG-1224ADIII • 1632ADIII • 1640ADIII

Machine Construction

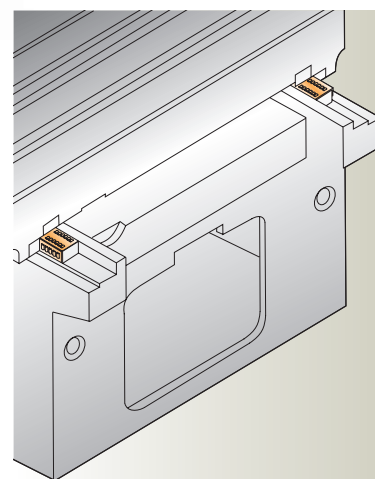
Table Guideway System

The table guideway system is composed of hardened and ground steel guideways with precision needle roller bearings to provide excellent longevity and low friction, and also to provide precise linear movement without deviation, even during rapid traverse movement.



Saddle Guideway System

The guideway system of the saddle is composed of specially designed preloaded needle roller bearings and hardened and ground slide rails. The roller bearings consist of independent loading and leading bearings. Loading bearings are to support the vertical load and preloaded leading bearings are to assure accuracy of the cross movement of saddle. The combination of these two features provide excellent longevity and low friction, stick-slip free accurate movement.



FSG-1632ADIII

Note: Machine shown with optional accessories

FSG-1224ADIII • 1632ADIII • 1640ADIII

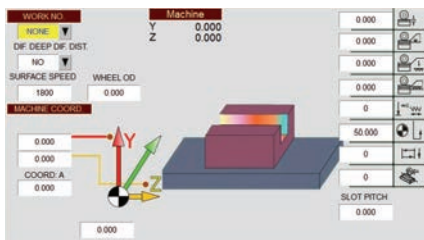
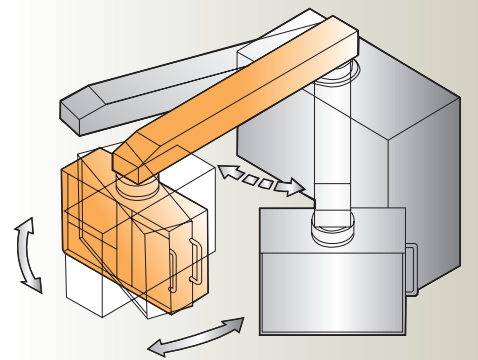
Control Features

Control Station

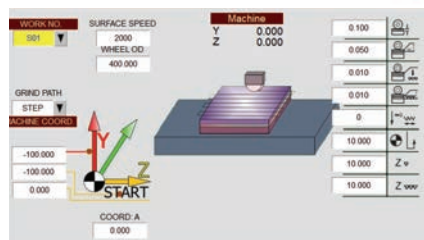
The control station can be adjusted to a comfortable position for the operator. All switches, buttons, LEDs, indicating lamps, and displays are ergonomically positioned providing user friendly operation.

The Control Features

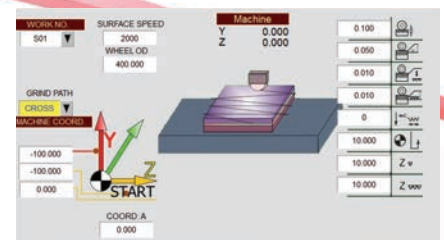
1. High reliability NC control platform.
2. 8" TFT high resolution 65,536 pixel color touch panel control interface.
3. Powerful graphic conversational function with surface/plunge standard built-in grinding program.
4. Brief and clear operation panel.
5. Machine abnormal alarm message display and alarm history record.
6. Y axis home positioning function.
7. Multi-language support available.
8. Mechanical coordinates and relative coordinates display.
9. Digital I/O check mode makes service system more efficient.
10. Operation friendly, grinding, wheel dressing and automatic compensation can be accomplished easily without making CNC program.



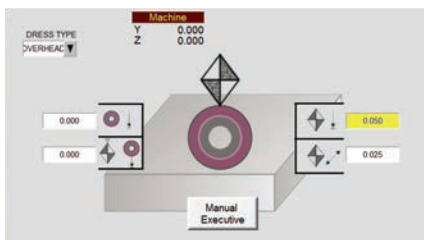
Plunge Grinding Mode



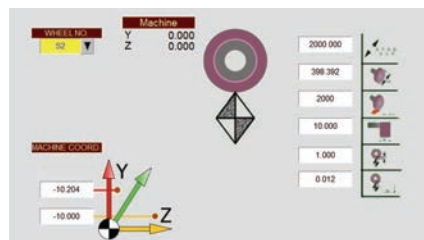
Surface Grinding Mode



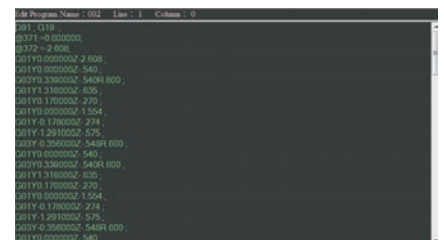
Crisscross Grinding (optional)



Automatic Overhead Dresser with Compensation (optional)



Semi Automatic Dressing on Table



Program Edit Screen (optional)

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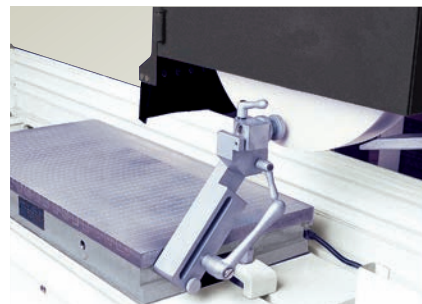
Optional Accessories



Machine Lamp
(12V, 50W)



• **Auto Wheel Balancing System (SBS)**



• **Single Face Dresser**

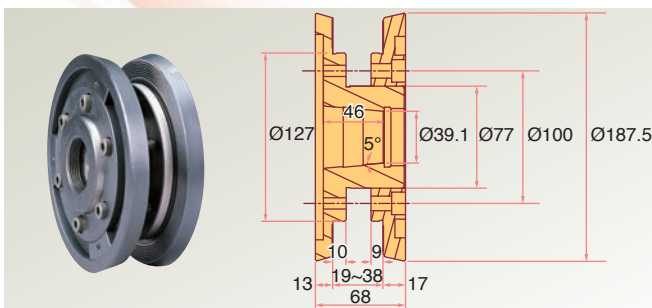


• **Parallel Dressing Attachment (manual type)**



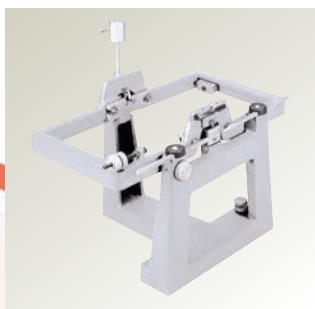
Universal Wheel Guard and Nozzle

Suitable for: 356 mm (14") grinding wheel



Wheel Flange

Clamping Width: 19~38 mm (0.75"~1.5")



Balancing Stand with Levelling Bubble

Max. Dia.: 355 mm (14")
Max. Width: 50 mm (2")



Balancing Stand (roller type)

Suitable for:
203~355 mm (8"~14") grinding wheel



Electromagnetic Chuck

1224
300 x 600 mm (11.8" x 23.6")
1632
400 x 800 mm (15.7" x 31.5")
1640
400 x 1,000 mm (15.7" x 39.4")
Voltage: 110V DC

• **Chuck Controller**

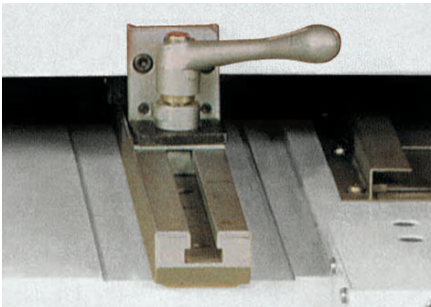
Input Voltage: 140V AC
Output Voltage: 110V DC

*Chuck Control is required for all of the above.

Note: Items marked with • are recommended to be factory installed.

FSG-1224ADIII • 1632ADIII • 1640ADIII

Optional Accessories



Saddle Locking Device



Frequency Converter for Spindle

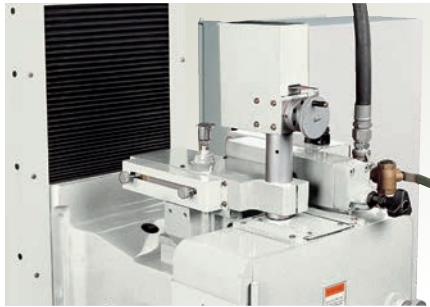
5 HP (Voltage: 400V)
5 HP (Voltage: 200V)



• **Single Side Water Baffle**

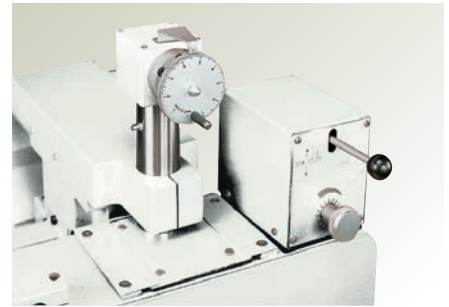


• **Double Side Water Baffle**
The max. movement decreases 35 mm (1.4")



• **Over-The-Wheel Auto. Straight Line Dressing and Compensation Device**

Suitable for: 355 mm (14") grinding wheel
Dressing width: 70 mm (2.8")



• **Parallel Dressing Attachment (hydraulic)**

Suitable for: 355 mm (14") grinding wheel
Dressing width: 70 mm (2.8")

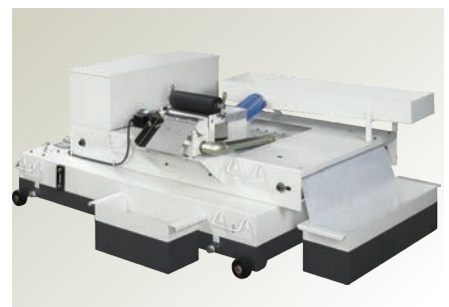


• **Dust Collector**
Suction Motor: 1/2 HP, 2 P
Space: 470 x 500 mm (18.5" x 19.7")
Height: 585 mm (23")



• **Coolant System with Double Filter**

Volume: 95 L
Pump: 1/8 HP
Coolant capacity: 20 L/min.
Space: 660 x 480 mm (26" x 19")
Height: 610 mm (24")



• **Coolant System with Auto. Paper Feeding Device and Magnetic Separator**

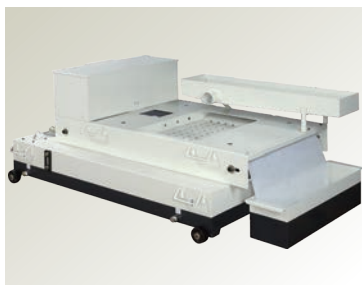
(with 1 roll of paper)
Volume: 120 L
Paper feeding motor: 25 W
Pump: 1/8 HP
Coolant capacity: 20 L/min.
Space: 1,450 x 620 mm (57" x 24.4")
Height: 760 mm (30")

FSG-1224ADIII • 1632ADIII • 1640ADIII

Optional Accessories

Coolant System with Auto. Paper Feeding Device (with 1 roll of paper)

Volume: 120 L
 Paper feeding motor: 25 W
 Pump: 1/8 HP
 Coolant Capacity: 20 L/min.
 Space: 1,450 x 620 mm
 (57" x 24.4")
 Height: 760 mm (30")



Coolant System with Manual Paper Feeding Device

Volume: 85 L
 Pump: 1/8 HP
 Coolant Capacity: 20 L/min.
 Space: 550 x 1,000 mm
 (21.7" x 39.4")
 Height: 775 mm (30.5")



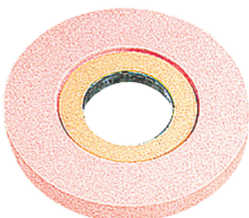
Standard Accessories



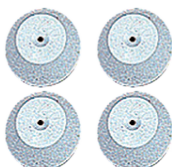
- Tool box**
- Touch-up paint
 - Balancing arbor
 - Wrench
 - Hex. wrench (14mm)
 - Diamond dresser with diamond
 - Hex. wrench
 - Hole plugs



Wheel flange



Grinding wheel



Levelling pads



Levelling screws & nuts



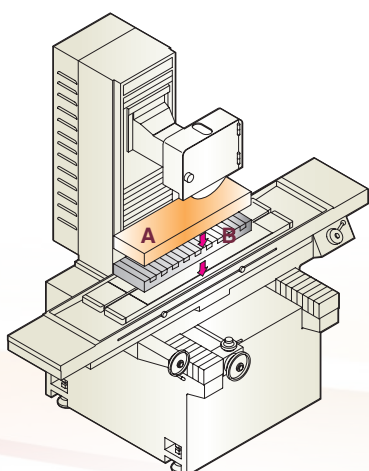
Splash guard

Permissible Load of Machine

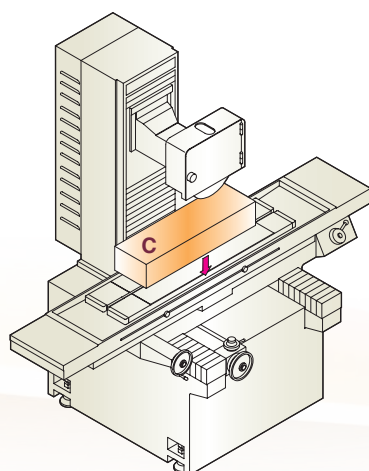
Unit : Kg (lb)

The total suggested maximum workloads of table are shown as follows:

	A= Workpiece	B=Magnetic Chuck	C=A+B
Model	FSG-1224ADIII	FSG-1632ADIII	FSG-1640ADIII
A	314 (690)	403 (886)	423 (930)
B	106 (233)	197 (433)	247 (543)
C	420 (923)	600 (1,319)	670 (1,473)



Grinding with Magnetic Chuck



Grinding without Magnetic Chuck

FSG-1224ADIII • 1632ADIII • 1640ADIII

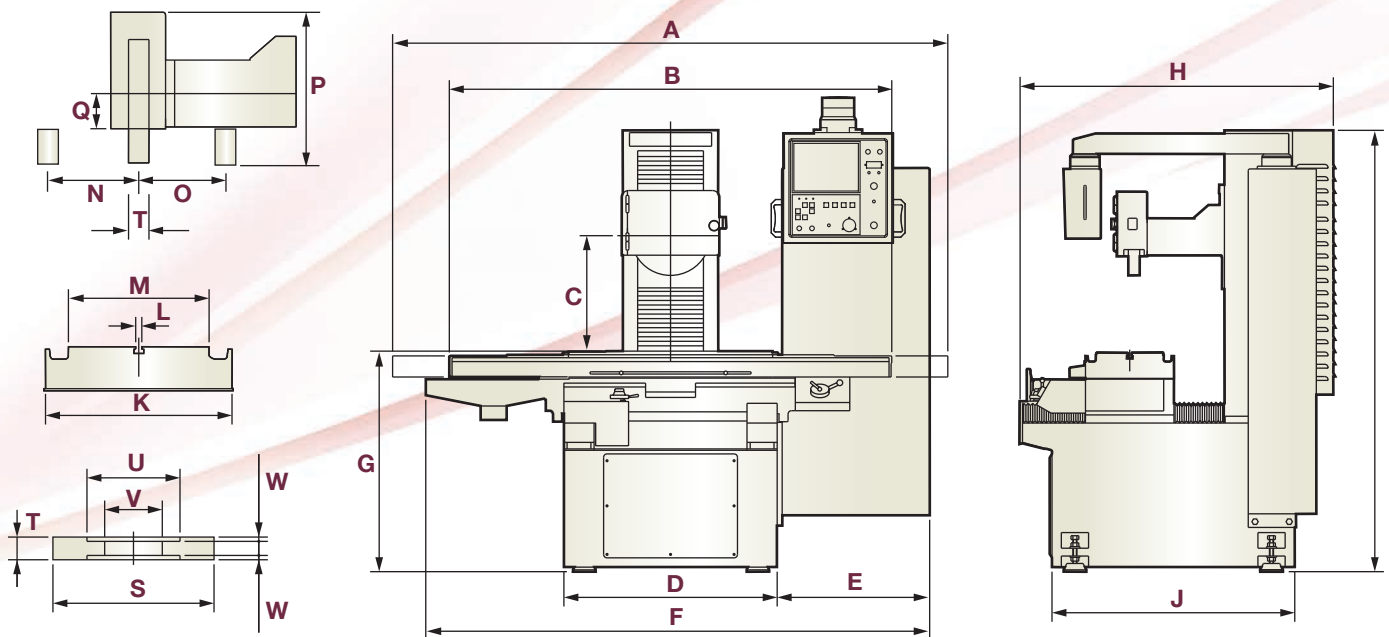
Specification

Description		FSG-1224ADIII	FSG-1632ADIII	FSG-1640ADIII
Table Size		300 x 600 mm (11.8" x 23.6")	400 x 800 mm (15.7" x 31.5")	400 x 1,000 mm (15.7 x 39.4")
Max. Grinding Length	Longitudinal	610 mm (24")	810 mm (32")	1,015 mm (40")
Max. Grinding Width	Crosswise	305 mm (12")	405 mm (16")	
Max. Distance from Table Surface to Spindle Centerline		610 mm (24")		
Standard Magnetic Chuck Size		300 x 600 mm (11.8" x 23.6")	400 x 800 mm (15.7" x 31.5")	400 x 1,000 mm (15.7 x 39.4")
Longitudinal Movement of Table	Longitudinal travel, hydraulic	650 mm (25.6")	850 mm (33.5")	1,050 mm (41.3")
	Maximum travel, manual	700 mm (27.6")	900 mm (35.4")	1,100 mm (43.3")
	Table speed (stepless)	5~25 m/min (16~82 fpm)		
Cross Movement of Table	Rapid travel (approx.)	0~2,250 mm/min (0~99 ipm)		
	Automatic transverse increment	3~32 mm (0.1"~1.3")		
	Maximum travel	320 mm (12.6")	420 mm (16.5")	
		Opt. 285 mm (11.2") (with double side water baffle)	Opt. 385 mm (15.1") (with double side water baffle)	
Mini input	0.001 mm (0.0001")			
Wheelhead Vertical Infeed	Automatic infeed	0.001~0.04 mm (0.00005"~0.002")		
	Rapid travel (approx.)	675 mm/min. (45 ipm)		
	Mini input	0.001 mm (0.0001")		
Grinding Spindle Drive	Speed	60 Hz / 1,750 rpm, 50 Hz / 1,450 rpm		
	Power rating	5 HP / 4 P		
Grinding Wheel	OD x Width x Bore	Ø355 x 50 x Ø127 mm (Ø14" x 2" x Ø5") Double Recess		
Hydraulic System	Power rating	1 HP / 6 P	2 HP / 6 P	
Crossfeed Drive	Power rating	AC servo 1 kW		
Elevating Drive	Power rating	AC servo 1 kW		
Floor Space	Total space required	2,950 x 1,490 x 1,940 mm (116" x 59" x 76.37")	3,540 x 1,730 x 1,940 mm (139.4" x 68" x 76.37")	4,280 x 1,730 x 1,940 mm (168.5" x 68" x 76.37")
Weights	Net weight approx.	2,200 kg (4,840 lb)	2,900 kg (6,380 lb)	3,500 kg (7,700 lb)
	Gross weight approx.	2,700 kg (5,940 lb)	3,550 kg (7,810 lb)	4,200 kg (9,240 lb)
Rated Power, Approx.		5.6 kW (7.5 HP)	6.3 kW (8.5 HP)	

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

FSG-1224ADIII • 1632ADIII • 1640ADIII

Dimensional Drawings



Unit : mm (")

Description	FSG-1224ADIII	FSG-1632ADIII	FSG-1640ADIII
A	2,950 (116.1)	3,540 (139.4)	4,280 (168.5)
B	2,150 (84.6)	2,560 (100.8)	3,000 (118.1)
C		610 (24)	
D	940 (37)	1,090 (42.9)	1,600 (63)
E		600 (23.6)	300 (11.8)
F	2,430 (95.7)	2,840 (111.8)	3,480 (137)
G	970 (38.2)		980 (38.6)
H	1,490 (58.7)		1,733 (68.2)
I		2,080 (81.9)	
J	1,070 (42.1)		1,311 (51.6)
K	390 (15.2)		500 (19.7)
L		14 (0.6)	
M	305 (12)		405 (15.9)
N	160 (6.3)		205.5 (8.1)
O	160 (6.3)		214.5 (8.4)
P		386 (15.2)	
Q		86 (3.4)	
S		355 (14)	
T		50 (2)	
U		205 (8.1)	
V		127 (5)	
W		9.5 (0.4)	



Grinding Machine



Grinding Machine



Turning Machine



Milling Machine

Headquarters

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