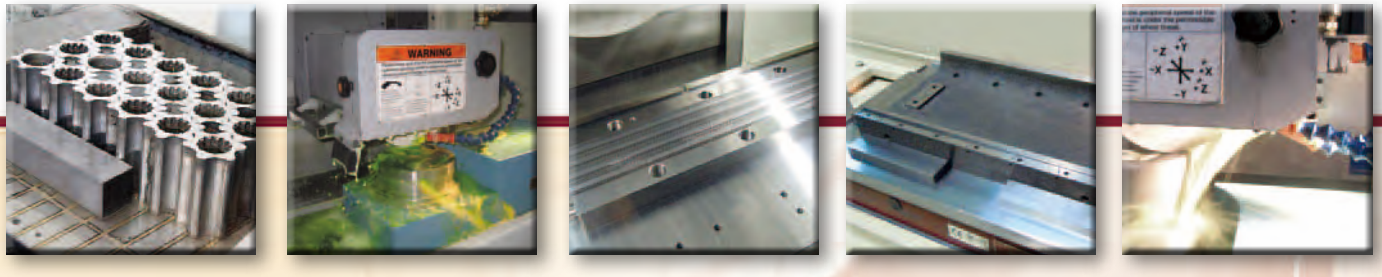
CHEVALIER®



FSG-ADIII Series

Automatic Precision Surface Grinding Machine

FSG-1224ADIII • 1632ADIII • 1640ADIII

MACHINE FEATURES

FSG-12/16A

AUTOMATIC PRECISION SU

FSG-1224ADIII • 1632ADIII • 1640ADIII

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 addtion 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 leadscrew and an AC servo motor providing high torque, speed and accurate positioning with a minimum increment of 0.001mm (0.00005"). A manual pulse generator(MPG) is standard for easy operation.

CROSSFEED SPEED CONTROL (OPTION)

Saddle continuous movement speed is controlled by a frequency converter 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.

RFACE GRINDING MACHINE

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.

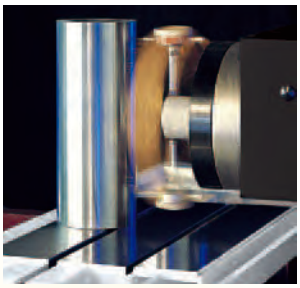
Runout of Wheel Spindle Conical Surface

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 0.0015mm (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 0.03mm/s (0.0012″/s).

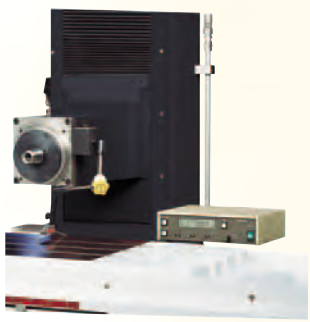
Parallelism and Squareness of Wheel Spindle Centerline to Table Surface



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 0.008mm (0.0003″) or less and the squareness is under 0.005mm (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 0.004mm (0.00016″).

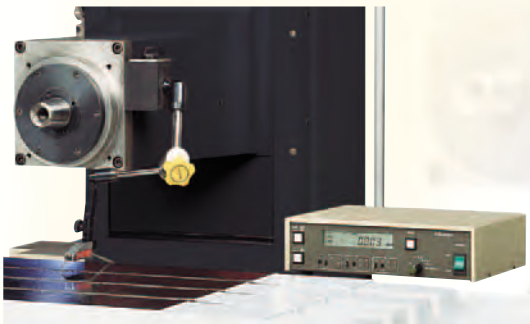


Sifting of Steel Roller Bearings

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

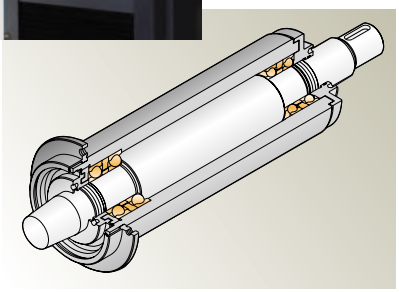
Parallelism of Table Surface to Table Longitudinal Movement

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 0.004mm (0.00016″).



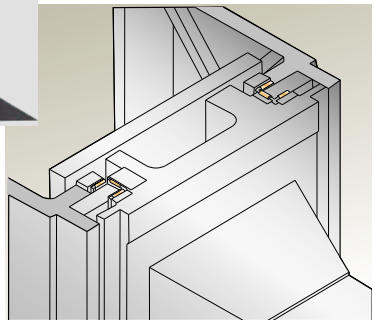
Spindle

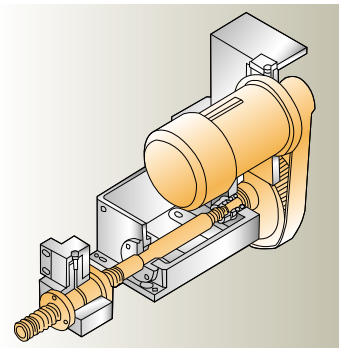
The spindle is supported by 4 Class 7(P4) super precision angular contact ball bearings which have been accurately measured, selected and preloaded, and then assembled in a temperature controlled clean room. The spindle is permanently lubricated and requires no maintenance. Spindle motor, spindle shaft, and couplings are precisely balanced to ensure accuracy and superb surface finish.



Elevating Guideway System

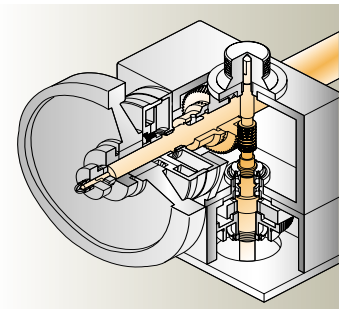
The wheelhead and column system is composed of hardened and ground inserted steel guideways and precision roller bearings. The wheelhead and column guideways are preloaded providing zero clearance for precise straight line movement. The low friction wheelhead guideway system enables accurate feeds even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





Crossfeed Transmission

The saddle incorporates a specially designed play-compensating feed nut and hardened and ground leadscrew, resulting in the elimination of backlash. Therefore, high accuracy results can be obtained during operations such as plunge grinding.



Micro Crossfeed Device

The micro crossfeed device consists of a worm and worm gear. Turn the lever clockwise to engage the worm and worm gear for fine adjustment at increments of 0.001mm (0.00005").

Once the worm and wormgear are engaged, the cross powerfeed motor and the cross handwheel are automatically.

FSG-1224ADIII

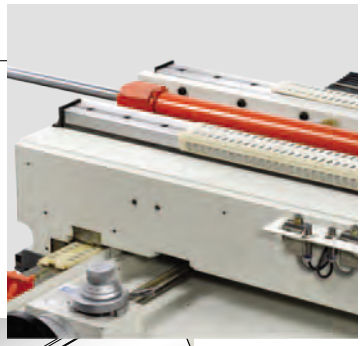
Note:Machine shown with optional accessories

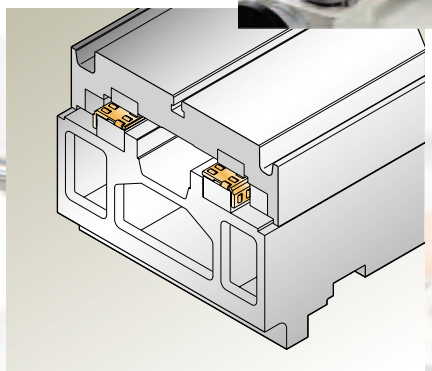
FSG-1632ADIII

Note:Machine shown with optional accessories

Table Guideway System

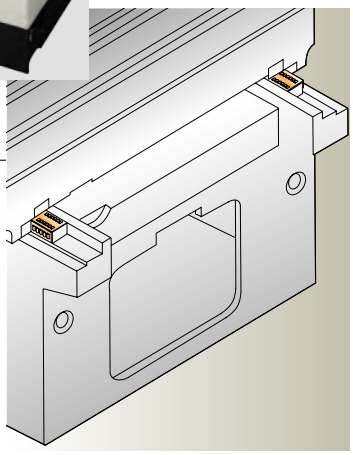
The table guideway system is composed of hardened and ground steel guideways with precision needle roller bearings to provide excellent longevity and low friction, and also to provide precise linear movement without deviation, even during rapid traverse movement.



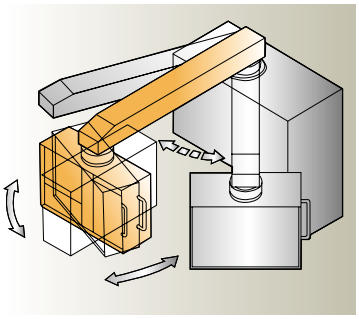


Saddle Guideway System

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.



CONTROL FEATURES

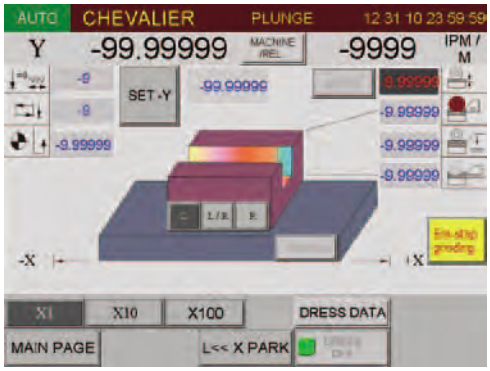


Control Station

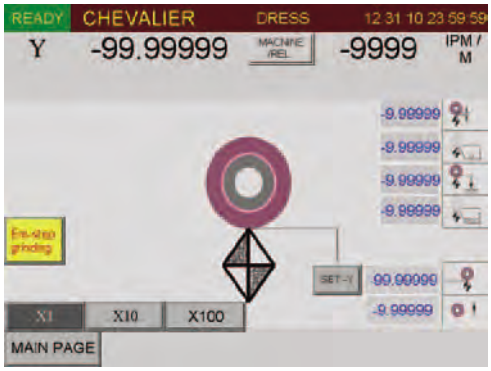
The control station can be adjusted to a comfortable position for the operator. All switches, buttons, LEDS, indicating lamps, and displays are ergonomically positioned providing user friendly operation.

The control features are:

1. High reliability NC control platfom.
2. 8"TFT high resolution 65536 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.

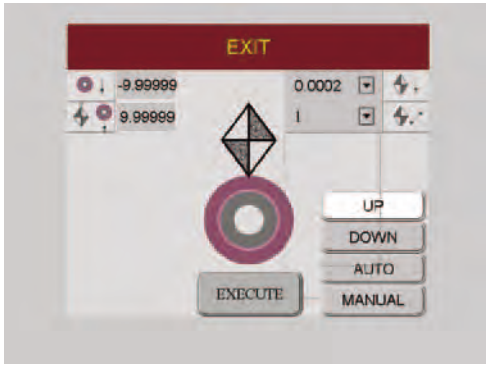


Plunge Grinding Mode



Dressing on Table (opt.B49-0407X)

Surface Grinding Mode



Automatic overhead dresser with compensation
(opt.B13-0415X, B13-0416X)

Crisscross Grinding (opt.B49-0407X)

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

MACHINE LAMP

B01-0903X (12V, 50W)

12/16 SERIES

AUTO WHEEL BALANCING SYSTEM(SBS)

• B44-0408X

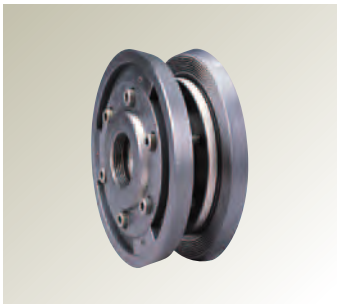
CHUCK CONTROLLER

• B23-0401X(12 SERIES)

• B23-0703X(16 SERIES)

Input Voltage: 140VAC

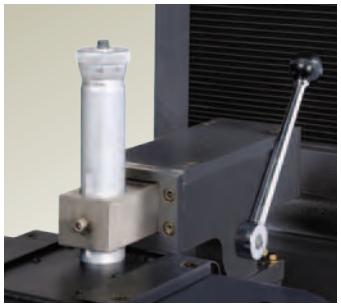
Output Voltage: 110VDC



WHEEL FLANGE

B05-0401X (12/16 SERIES)

Suitable for 355 x 50 x 127mm (14″ x 2″ x 5″) grinding wheel



PARALLEL DRESSING ATTACHMENT (MANUAL TYPE)

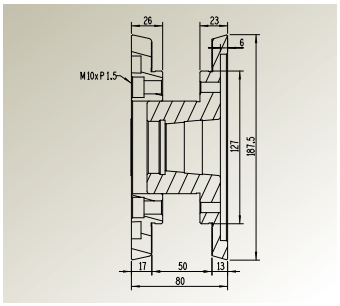
• B13-0902X (12 SERIES)

• B13-0504X (16 SERIES)

Suitable for 356mm (14″) grinding wheel

UNIVERSAL WHEEL GUARD AND NOZZLE

B41-0410X (12/16 SERIES)



Max. Clamping : 65mm (2.56″)

Min. Clamping : 35mm(1.38″)

BALANCING STAND WITH LEVELLING BUBBLE

B15-0301X

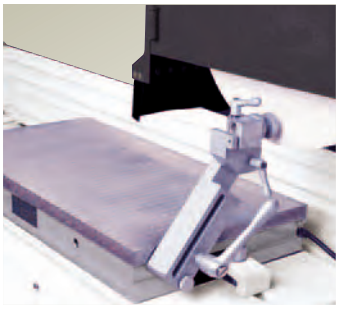
Max. Dia. : 355mm (14″)

Max. Width : 50mm (2″)

BALANCING STAND (ROLLER TYPE)

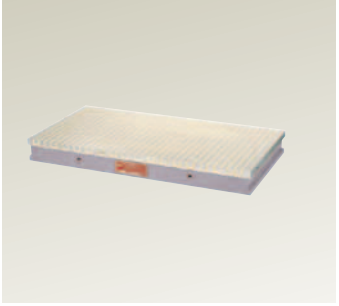
B15-0601X

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



SINGLE FACE DRESSER

• B13-0301X



ELECTROMAGNETIC CHUCK

B09-04011 (1224)

300 x 600mm

(11 3/4″ x 23 5/8″)

B09-04051 (1632)

400 x 800mm

(15 3/4″ x 31 1/2″)

B09-04061 (1640)

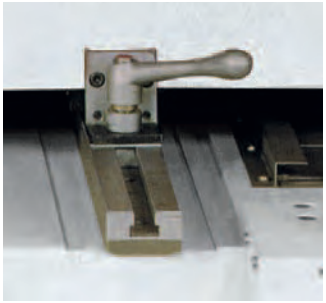
400 x 1,000mm

(15 3/4″ x 39 3/8″)

Voltage : 110VDC

*Chuck Control is required for all of the above.

OPTIONAL ACCESSORIES



SADDLE LOCKING DEVICE
B40-0404X (12 SERIES)
B40-0405X (16 SERIES)

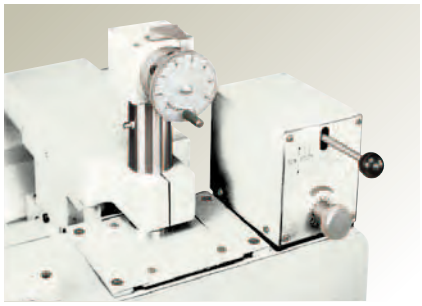
FREQUENCY CONVERTER FOR SPINDLE
B48-0402X (12,16 SERIES)
5HP(Voltage : 400V)
B48-0403X (12,16 SERIES)
5HP(Voltage : 200V)

SINGLE SIDE WATER BAFFLE
- B19-0401X (1224)
- B19-0405X (1632)
- B19-0406X (1640)

Double side water baffle
- B19-0409X (1224)
- B19-0412X (1632)
- B19-0413X (1640)

Z axis travel is reduced by 20mm (4/5″) and max. manual travel is reduced by 35mm (1 3/8″)

OVER-THE-WHEEL AUTO. STRAIGHT LINE DRESSING & COMPENSATION DEVICE
B13-0415X (12 SERIES)
B13-0416X (16 SERIES)
dressing width:70mm(2.75″)



PARALLEL DRESSING ATTACHMENT (HYDRAULIC)
- B13-0401X (12 SERIES)
- B13-0405X (16 SERIES)

Suitable for :355mm (14″) grinding wheel
dressing width:70mm(2.75″)

Other Optional Accessories

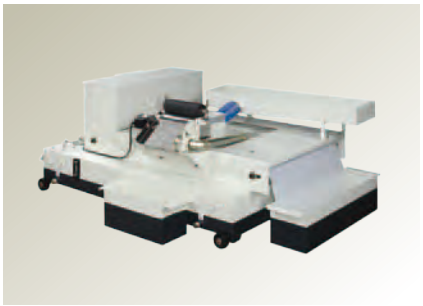
1.Ballscrew instead of leadscrew on crossfeed transmission
- B37-0401X 12 (metric)
- B37-0402X 12 (inch)
- B37-0403X 16 (metric)
- B37-0404X 16 (inch)

2.CBN mode (Variable continuous saddle movement speed) and crisscross mode with frequency converter.
- B49-0407X

DUST COLLECTOR
- B17-0102X

Suction Motor : 1/2HP,2P
Space : 470 x 500mm
(18 1/2″ x 19 11/16″)
Height : 585mm(23″)

COOLANT SYSTEM WITH DOUBLE FILTER
B17-0901X
Volume : 95L
Pump : 1/8HP
Coolant Capacity : 20L/min.
Space : 660 x 480mm (26″ x 19″)
Height : 610mm (24″)

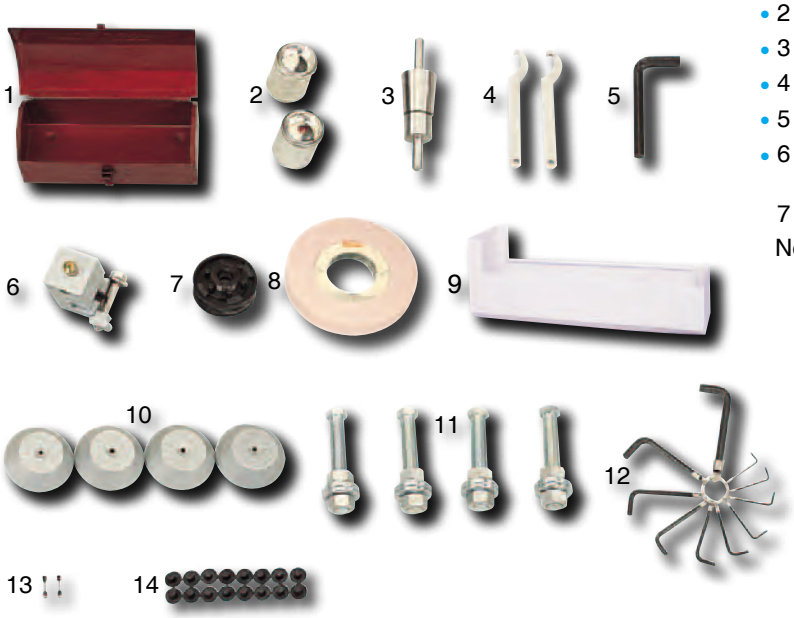


COOLANT SYSTEM WITH AUTO. PAPER FEEDING DEVICE AND MAGNETIC SEPARATOR (WITH 1 ROLL OF PAPER)
B17-0302X
Volume : 120L
Paper feeding motor : 25W
Pump : 1/8HP
Coolant Capacity : 20L/min.
Space :1,450 x 620mm
(57″ x 24 3/8″)
Height : 760mm (30″)

COOLANT SYSTEM WITH AUTO. PAPER FEEDING DEVICE (WITH 1 ROLL OF PAPER)
B17-0301X
Volume : 120L
Paper feeding motor : 25W
Pump : 1/8HP
Coolant Capacity : 20L/min.
Space :1,450 x 620mm
(57″ x 24 3/8″)
Height :760mm(30″)

COOLANT SYSTEM WITH MANUAL PAPER FEEDING DEVICE
B17-0107X
Volume : 85L
Pump : 1/8HP
Coolant Capacity : 20L/min.
Space : 550 x 1,000mm
(21 21/32″ x 39 3/8″)
Height : 775mm(30 1/2″)

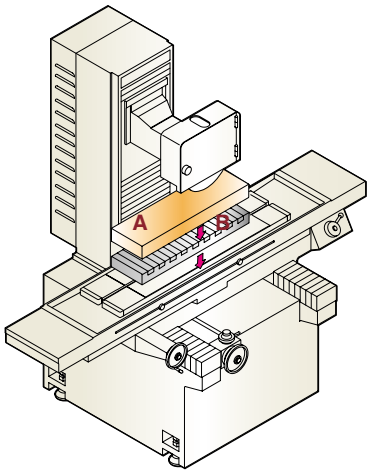
STANDARD ACCESSORIES



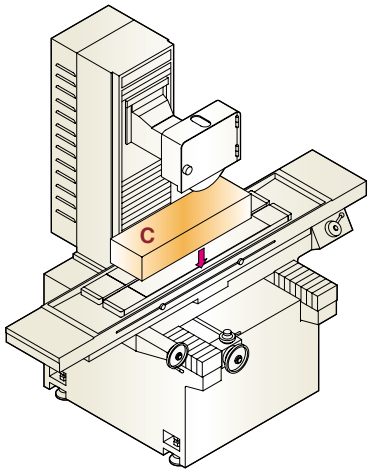
1 . Tool box
• 2 . Splash guard
• 3 . Balancing arbor
• 4 . Wrench
• 5 . Hex. wrench(14mm)
• 6 . Diamond dresser with diamond(B03-0401)
7 . Wheel flange
8 . Grinding wheel
9 . Splash guard
10 . Levelling pads
11 . Levelling screws & nuts
12 . Hex. wrench
13 . Fuse
• 14 . Hole plugs

Note: The items marked with • are stored in tool box.

PERMISSIBLE LOAD OF MACHINE



Grinding with Magnetic Chuck



Grinding without Magnetic Chuck

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

A=Workpiece **B=Magnetic Chuck** **C=A+B**

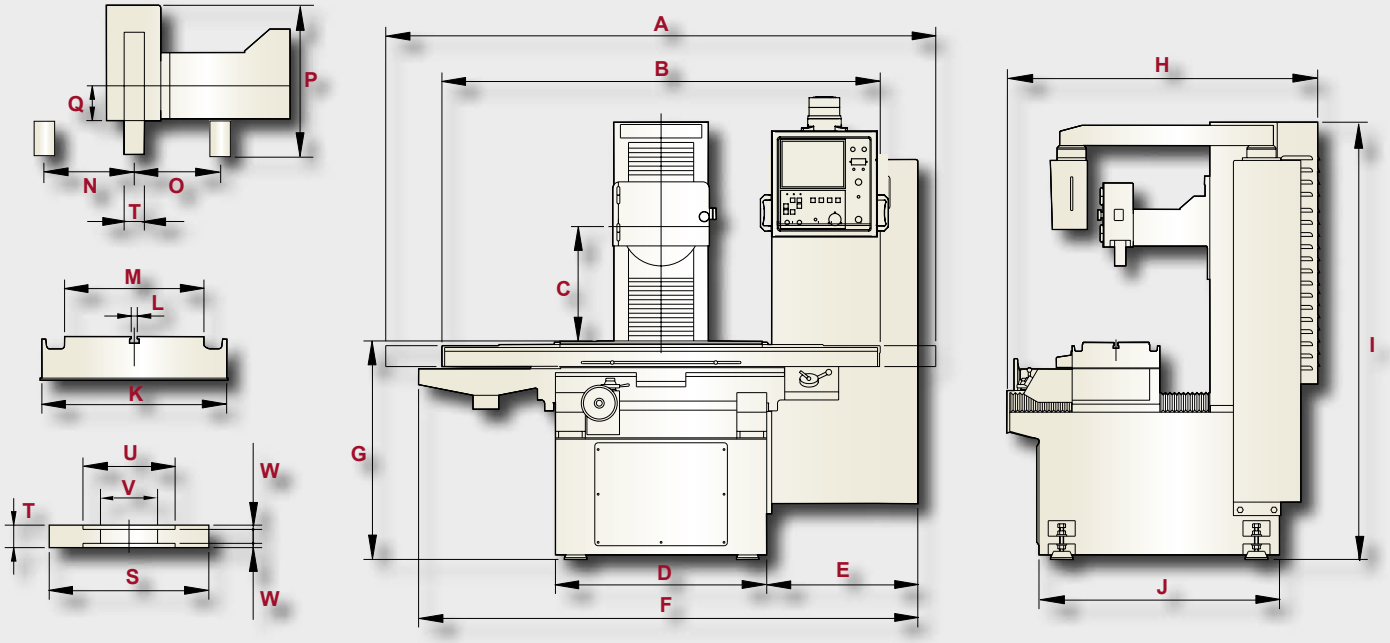
Umit : mm(")

MODEL	FSG-1224ADIII	FSG-1632ADIII	FSG-1640ADIII
A Kg(lbs.)	314 (690)	403 (886)	423 (930)
B Kg(lbs.)	106 (233)	197 (433)	247 (543)
C Kg(lbs.)	420 (923)	600 (1,319)	670 (1,473)

SPECIFICATION

Description		FSG-1224ADIII	FSG-1632ADIII	FSG-1640ADIII
Table Size		300 x 600mm (11 3/4″ x 23 5/8″)	400 x 800mm (15 3/4″ x 31 1/2″)	400 x 1,000mm (15 3/4″ x 39 3/8″)
Max. grinding length	Longitudinal	610mm (24″)	810mm (32″)	1,015mm (40″)
Max. grinding width	Crosswise	305mm (12″)	405mm (16″)	
Max.distance from table surface to spindle centerline		610mm (24″)		
Standard magnetic chuck size		300 x 600mm (11 3/4″ x 23 5/8″)	400 x 800mm (15 3/4″ x 31 1/2″)	400 x 1,000mm (15 3/4″ x 39 3/8″)
Longitudinal movement of table	Longitudinal travel, hydraulic	650mm (25 5/8″)	850mm (33 7/16″)	1,050mm (41 5/16″)
	Maximum travel, manual	700mm (27 1/2″)	900mm (35 3/8″)	1,100mm (43 1/4″)
	Table speed (stepless)	5~25m/min. (16~82fpm)		
Cross movement of table	Rapid travel, approx.	3.5m/min. (60Hz /12 fpm), 2.9m/min. (50Hz/10 fpm)		
	Automatic transverse increment	3~32mm (1/8″ ~1 1/4″)		
	Maximum automatic travel	305mm (12″)	405mm (16″)	
	Maximum manual travel	Opt.285mm (11 1/5″) (with double side water baffle)	Opt.385mm (15 1/5″) (with double side water baffle)	
		350mm (13 3/4″)	460mm (18″)	
		Opt.315mm (12 2/5″) (with double side water baffle)	Opt.425mm (16 4/5″) (with double side water baffle)	
	Handwheel per revolution	6mm (0.25″)		
	Handwheel per graduation	0.1mm (0.0025″)		
	Micro Feed per revolution	0.1mm (0.005″)		
	Micro Feed per graduation	0.001mm (0.00005″)		
Wheelhead vertical infeed	Automatic infeed	0.001~0.04mm (0.00005” ~0.002″)		
	Rapid travel, approx.	500mm/min. (25ipm)		
Grinding Spindle drive	Speed	60Hz/1,750rpm, 50Hz/1,450rpm		
	Power rating	5HP/4P		
Standard grinding wheel	Diameter	355mm (14″)		
	Width	50mm (2″) Double Recess		
	Bore	127mm (5″)		
Hydraulic system	Power rating	1HP/6P	2HP/6P	
Crossfeed drive	Power rating	1/6HP/4P		
Elevating drive	Power rating	AC servo 1Kw		
Floor Space	Total space required	2,950 x 1,490 x 2,080mm (116″ x 59″ x 81 7/8″)	3,540 x 1,730 x 2,080mm (139 3/8″ x 68″ x 81 7/8″)	4,280 x 1,730 x 2,080mm (168 1/2″ x 68″ x 81 7/8″)
Weights	Net weight approx.	2,200Kgs (4,840 lbs.)	2,900Kgs (6,380 lbs.)	3,500Kgs (7,700 lbs.)
	Gross weight approx.	2,700Kgs (5,940 lbs.)	3,550Kgs (7,810 lbs.)	4,200kgs (9,240 lbs.)
Rated power, approx.		5.6Kw (7.5HP)	6.3Kw (8.5HP)	
Packing dimensions (LxWxH)		2,720 x 1,760 x 2,235mm (107″ x 69.5″ x 88″)	2,840 x 2,020 x 2,235mm (112″ x 79.5″ x 88″)	3,200 x 2,040 x 2,235mm (126″ x 80.5″ x 88″)

※ Note: The manufacturer reserves the right to modify the design, specifications, mechanisms... etc. of the machine without prior notice.
All content is for reference only and may be subject to change without notice or obligation.



Description	FSG-1224ADIII	FSG-1632ADIII	FSG-1640ADIII
A	2,950mm (116″)	3,540mm (139 3/8″)	4,280mm (168 1/2″)
B	2,150mm (84 21/32″)	2,560mm (100 3/4″)	3,000mm (118″)
C	610mm (24 7/16”)		
D	940mm (37″)	1,600mm (63″)	1,600mm (63″)
E	600mm (23 3/5″)		300mm (11 4/5″)
F	2,430mm (95 7/8″)	2,840mm (111 3/4″)	3,480mm (137 1/8″)
G	970mm (38 3/16”)	980mm (38 19/32″)	
H	1,490mm (58 3/32″)	1,733mm (68 7/32″)	
I	2,080mm (81 7/8″)		
J	1,070mm (42″)	1,311mm (51 5/8″)	
K	390mm (15 11/31″)	500mm (19 11/16″)	
L	14mm (9/16″)		
M	305mm (12″)	405mm (15 3/4″)	
N	180mm (7″)	240mm (9 1/2″)	
O	190mm (7 7/16″)	240mm (9 1/2″)	
P	386mm (15 3/16″)		
Q	86mm (3 3/8″)		
S	355mm (14″)		
T	50mm (2″)		
U	205mm (8″)		
V	127mm (5″)		
W	9.5mm (3/8″)		