AUTOMATIC PRECISION SURFACE GRINDING MACHINE
The highly advanced ADII 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 accuracies, 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, therefore, working efficiency is increased.

**3AXES NEEDLE ROLLER SLIDE WAY**

All three axes guideway rails are composed of (S55C) steel that is normalized then hardened by high frequency induction. The guideways are HRC 60-64 after heat treating. 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.

**Grinding flow chart**

**AC SERVO VERTICAL DRIVE**

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 0.0001” (0.001 mm). 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.

**Additional Features:**
- Cycle interrupt - Table park at left or right for part inspection
- CBN mode for wheel dressing from table (Option)
**FACE GRINDING MACHINE**

**Spindle Temperature Rise Test**

To assure spindle temperature rise below 10°C, the spindle is tested under a no load condition for a minimum of 8 hours. The spindle is run throughout its entire speed range while being continuously monitored by a thermograph.

**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 0.0012”/s (0.03mm/s).

**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 0.00006” (0.0015mm).

**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 0.0003” (0.008mm) or less and the squareness is under 0.0002” (0.005mm).

**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 0.00016” (0.004mm).

**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 0.00004” (0.001mm).

**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 0.00016” (0.004mm).
Driving Force Test

After the guide ways assembled, resistance to movement on each axis is inspected to ensure that the proper preload is set and that friction is minimized, resulting in maximum way life.

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.

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 finishes.

Elevating Guideway System

The wheelhead and column way 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 0.000050"(0.001mm) increments while providing extended way life.

ASSEMBLY

Driving Force Test

Driving force test on table

Driving force test on saddle

Driving force test on column

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

Crossfeed Transmission

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

Micro Crossfeed Device

The micro crossfeed device consists of a worm and wormgear. Turn the lever clockwise to engage the worm and wormgear for fine adjustment at increments of 0.00005" (0.001mm). Once the worm and wormgear are engaged, the cross powerfeed motor and the cross handwheel are automatically
ACCESSORIES

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

MACHINE LAMP
B01-0903 (12V, 50W)
12/16 SERIES

GRINDING WHEEL
DYNAMIC BALANCING SYSTEM
• B44-0401

CHUCK CONTROLLER
• B23-0701
• B23-0703
Input Voltage: 140VAC
Output Voltage: 110VDC

PARALLEL DRESSING ATTACHMENT (MANUAL TYPE)
• B13-0902 (12 SERIES)
• B13-0504 (16 SERIES)
Suitable for 14" (356mm) grinding wheel

DUAL FACE DRESSER
• B13-0302 (12, 16 SERIES)
Max Angle: 90°
Min Angle: 90°
Max Length: 4.3" (110mm)

ADAPTER FOR MOUNTING DIACOMP DRESSER
B41-0401 (12 SERIES)
B41-0402 (16 SERIES)

ELECTROMAGNETIC CHUCK
B09-04011 (1224)
11 3/4"x23 5/8" (300x600mm)
B09-04051 (1632)
15 3/4"x31 1/2" (400x800mm)
B09-04061 (1640)
15 3/4"x39 3/8" (400x1000mm)
Voltage: 110VDC
*Chuck Control is required for all of the above.

OVER-THE-WHEEL AUTO. STRAIGHT LINE DRESSING & COMPENSATION
DEVICE
B13-0406 (12 SERIES)
B13-0409 (16 SERIES)

ROTARY DIAMOND DRESSER
• B13-0306 (12 SERIES)
• B13-0307 (16 SERIES)
Rapid Elevating Power: 40W
Dressing Power: 100W
Auto Infeed: 0.00005" (0.001mm)
Roller (optional): Ø4"x2"xØ1"
(Ø100x50xØ25mm)

WHEEL FLANGE
B05-0401
(12/16 SERIES) Suitable for 14"x2"x5" (355x50x127mm) grinding wheel

BALANCING STAND
WITH LEVELLING BUBBLE
B15-0301
Max. Dia: 14" (355mm)
Max. Width: 2" (50mm)

DUAL FACE DRESSER
B13-0601
Suitable for 8"~14" (203~355mm) grinding wheel

SINGLE FACE DRESSER
• B13-0301

UNIVERSAL WHEEL GUARD & NOZZLE
B41-0409 (12 SERIES)
B41-0410 (16 SERIES)

PARALLEL DRESSING ATTACHMENT
(ROLLED TYPE)
B15-0601
Suitable for 8"~14" (203~355mm) grinding wheel

NOTE: ADAPTERS FOR MOUNTING DRESSER
B41-0401 (12 SERIES)
B41-0402 (16 SERIES)
ACCESSORIES

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

DUST COLLECTOR
- B17-0102
  Suction Motor: 1/2HP, 2P
  Space: 18 1/2"x19 11/16" (470x500mm)
  Height: 23" (585mm)

COOLANT SYSTEM WITH DOUBLE FILTER
B17-0901
Volume: 95L
Pump: 1/8HP
Coolant Capacity: 20L/min
Space: 26"x19" (660x480mm)
Height: 24" (610mm)

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

COOLANT SYSTEM WITH MANUAL PAPER FEEDING DEVICE (WITH 1 ROLL OF PAPER)
B17-0107
Volume: 85L
Pump: 1/8HP
Coolant Capacity: 20L/min
Space: 21 21/32"x39 3/8" (550x1000mm)
Height: 30 1/2" (775mm)

COOLANT SYSTEM WITH AUTO. PAPER FEEDING DEVICE & MAGNETIC SEPARATOR (WITH 1 ROLL OF PAPER)
B17-0302
Volume: 120L
Paper feeding motor: 25W
Pump: 1/8HP
Coolant Capacity: 20L/min
Space: 57"x24 3/8" (1450x620mm)
Height: 30" (760mm)

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

Other Optional Accessories
1. Ball screw instead of lead screw on crossfeed transmission
   - B37-0401 12 (metric)
   - B37-0402 12 (inch)
   - B37-0403 16 (metric)
   - B37-0404 16 (inch)
2. Creepfeed mechanism on table (table speed 0.032 fpm or 10mm/min, with hydraulic oil cooling system).
   - B40-0409 (12 SERIES)
   - B40-0414 (1632)
   - B40-0429 (1640)
3. CBN mode (Variable continuous saddle movement speed) and criscross mode with frequency converter
   - B49-0402

STD. ACCESSORIES

1. Tool box
2. Touch-up paint
3. Balancing arbor
4. Wrench
5. Hex. wrench
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.
## SPECIFICATION

### Description

<table>
<thead>
<tr>
<th>Description</th>
<th>FSG-1224ADII</th>
<th>FSG-1632ADII</th>
<th>FSG-1640ADII</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table Size</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. grinding length</td>
<td>Longitudinal</td>
<td>Longitudinal</td>
<td>Longitudinal</td>
</tr>
<tr>
<td>Max. grinding width</td>
<td>Crosswise</td>
<td>Crosswise</td>
<td>Crosswise</td>
</tr>
<tr>
<td>Max. distance from table surface to spindle centerline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard magnetic chuck size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Longitudinal movement of table</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid travel, approx.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic transverse increment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum automatic travel</td>
<td>12&quot; (305mm)</td>
<td>16&quot; (405mm)</td>
<td>18&quot; (460mm)</td>
</tr>
<tr>
<td>Maximum manual travel</td>
<td>13 3/4&quot; (350mm)</td>
<td>12&quot; (305mm)</td>
<td></td>
</tr>
<tr>
<td>Handwheel per revolution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handwheel per graduation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micro Feed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micro Feed per graduation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wheelhead vertical infeed</strong></td>
<td>Automatic infeed</td>
<td>0.00005<del>0.002 (0.001</del>0.04mm)</td>
<td>25ipm (500mm/min)</td>
</tr>
<tr>
<td><strong>Cross movement of table</strong></td>
<td>Rapid travel, approx.</td>
<td>60Hz/12rpm (3.5m/min), 50Hz/10rpm (2.9m/min)</td>
<td>60Hz/175rpm, 50Hz/1450rpm</td>
</tr>
<tr>
<td><strong>Grinding Spindle drive</strong></td>
<td>Speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td></td>
<td>60Hz/1750rpm, 50Hz/1450rpm</td>
<td>5HP/4P</td>
</tr>
<tr>
<td><strong>Standard grinding wheel</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>14&quot; (355mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>2&quot; (50mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bore</td>
<td>5&quot; (127mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hydraulic system</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Crossfeed drive</strong></td>
<td>Power rating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rating</td>
<td>1HP/6P</td>
<td>1/6HP/4P</td>
<td>2HP/6P</td>
</tr>
<tr>
<td><strong>Elevating drive</strong></td>
<td>Power rating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rating</td>
<td></td>
<td>AC servo 1kw</td>
<td></td>
</tr>
<tr>
<td><strong>Floor Space</strong></td>
<td>Total space required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>116&quot; x 91 7/8&quot; (2950x1490x2080mm)</td>
<td>139 3/8&quot; x 81 7/8&quot; (3340x1730x2080mm)</td>
<td>168 1/2&quot; x 86&quot; (4280x1730x2080mm)</td>
</tr>
<tr>
<td><strong>Weights</strong></td>
<td>Net weight approx.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4849 lbs (2200kgs)</td>
<td>6394 lbs (2900kgs)</td>
<td>7710 lbs (3500kgs)</td>
</tr>
<tr>
<td></td>
<td>Gross weight approx.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5951 lbs (2700kgs)</td>
<td>7862 lbs (3550kgs)</td>
<td>9240 lbs (4200kgs)</td>
</tr>
<tr>
<td><strong>Rated power, approx.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.6kw (7.5HP)</td>
<td></td>
<td>6.3kw (8.5HP)</td>
</tr>
<tr>
<td><strong>Packing dimensions (LxWxH)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>107&quot; x 69.5&quot; x 88&quot; (2720x1760x2235mm)</td>
<td>112&quot; x 79.5&quot; x 88&quot; (2840x2020x2235mm)</td>
<td>126&quot; x 80.5&quot; x 88&quot; (3200x2040x2235mm)</td>
</tr>
</tbody>
</table>

### PERMISSIBLE LOAD OF MACHINE

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

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

<table>
<thead>
<tr>
<th>MODEL</th>
<th>FSG-1224ADII</th>
<th>FSG-1632ADII</th>
<th>FSG-1640ADII</th>
</tr>
</thead>
<tbody>
<tr>
<td>A lbs(kg)</td>
<td>690 (314)</td>
<td>946 (403)</td>
<td>930 (423)</td>
</tr>
<tr>
<td>B lbs(kg)</td>
<td>230 (106)</td>
<td>433 (197)</td>
<td>543 (247)</td>
</tr>
<tr>
<td>C lbs(kg)</td>
<td>924 (420)</td>
<td>1320 (600)</td>
<td>1474 (670)</td>
</tr>
</tbody>
</table>

※ Note: The manufacturer reserves the right to modify the design, specifications, mechanisms... etc. of the machine without notice.  
All the specifications shown above are just for reference.
## DIMENSIONAL DRAWINGS

<table>
<thead>
<tr>
<th>Description</th>
<th>FSG-1224ADII</th>
<th>FSG-1632ADII</th>
<th>FSG-1640ADII</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>116”(2950mm)</td>
<td>139 3/8”(3540mm)</td>
<td>168 1/2”(4280mm)</td>
</tr>
<tr>
<td>B</td>
<td>84 21/32”(2150mm)</td>
<td>100 3/4”(2560mm)</td>
<td>118”(3000mm)</td>
</tr>
<tr>
<td>C</td>
<td>37”(940mm)</td>
<td>63”(1600mm)</td>
<td>63”(1600mm)</td>
</tr>
<tr>
<td>D</td>
<td>84 21/32”(2150mm)</td>
<td>100 3/4”(2560mm)</td>
<td>118”(3000mm)</td>
</tr>
<tr>
<td>E</td>
<td>24 7/16”(620mm)</td>
<td>30”(760mm)</td>
<td>30”(760mm)</td>
</tr>
<tr>
<td>F</td>
<td>95 7/8”(2430mm)</td>
<td>111 3/4”(2840mm)</td>
<td>137 1/8”(3480mm)</td>
</tr>
<tr>
<td>G</td>
<td>38 3/16”(970mm)</td>
<td>38 19/32”(980mm)</td>
<td>68 7/32”(1733mm)</td>
</tr>
<tr>
<td>H</td>
<td>58 3/32”(1490mm)</td>
<td>38 19/32”(980mm)</td>
<td>68 7/32”(1733mm)</td>
</tr>
<tr>
<td>I</td>
<td>42”(1070mm)</td>
<td>81 7/8”(2080mm)</td>
<td>117 1/2”(2970mm)</td>
</tr>
<tr>
<td>J</td>
<td>15 11/31”(390mm)</td>
<td>51 5/8”(1311mm)</td>
<td>91 11/16”(2330mm)</td>
</tr>
<tr>
<td>K</td>
<td>11 3/4”(305mm)</td>
<td>15 3/4”(405mm)</td>
<td>15 3/4”(405mm)</td>
</tr>
<tr>
<td>L</td>
<td>7”(180mm)</td>
<td>9 1/2”(240mm)</td>
<td>9 1/2”(240mm)</td>
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<tr>
<td>M</td>
<td>7 7/16”(190mm)</td>
<td>3 3/8”(86mm)</td>
<td>14”(355mm)</td>
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<tr>
<td>N</td>
<td>15 3/16”(386mm)</td>
<td>2”(50mm)</td>
<td>8”(205mm)</td>
</tr>
<tr>
<td>O</td>
<td>3 3/8”(86mm)</td>
<td>2”(50mm)</td>
<td>5”(127mm)</td>
</tr>
<tr>
<td>P</td>
<td>14”(355mm)</td>
<td>8”(205mm)</td>
<td>3/8”(9.5mm)</td>
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<tr>
<td>Q</td>
<td>2”(50mm)</td>
<td>5”(127mm)</td>
<td>3/8”(9.5mm)</td>
</tr>
<tr>
<td>S</td>
<td>8”(205mm)</td>
<td>5”(127mm)</td>
<td>3/8”(9.5mm)</td>
</tr>
<tr>
<td>T</td>
<td>5”(127mm)</td>
<td>3/8”(9.5mm)</td>
<td>3/8”(9.5mm)</td>
</tr>
<tr>
<td>U</td>
<td>3/8”(9.5mm)</td>
<td>3/8”(9.5mm)</td>
<td>3/8”(9.5mm)</td>
</tr>
<tr>
<td>V</td>
<td>3/8”(9.5mm)</td>
<td>3/8”(9.5mm)</td>
<td>3/8”(9.5mm)</td>
</tr>
<tr>
<td>W</td>
<td>3/8”(9.5mm)</td>
<td>3/8”(9.5mm)</td>
<td>3/8”(9.5mm)</td>
</tr>
</tbody>
</table>