UNIVERSAL CYLINDRICAL GRINDER

Operation manual

AGS Series

Controller: PLC + Servo Motor + Human Machine Interface

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## 1. Specification

<table>
<thead>
<tr>
<th>STANDAR D SPECIFICATIONS</th>
<th>1022</th>
<th>1030</th>
<th>1140</th>
<th>1440</th>
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<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Swing over table</td>
<td>10”</td>
<td>10”</td>
<td>11”</td>
<td>14”</td>
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<tr>
<td>Distance between centers</td>
<td>21.6”</td>
<td>30”</td>
<td>40”</td>
<td>10”</td>
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<tr>
<td>Max. work-piece weight</td>
<td>Centers work 180Lbs</td>
<td>280 Lbs</td>
<td>330 Lbs</td>
<td>Workhead only 66</td>
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<tr>
<td>Swivel angle</td>
<td>± 15 degree</td>
<td>0.01” / Min</td>
<td>0.08”</td>
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<tr>
<td>Standard wheel dimensions</td>
<td>O.D.x Width x I.D. 16” x 1.5” x 5”</td>
<td>16” x 2” x 5”</td>
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<td>Optional wheel dimensions</td>
<td>O.D.x Width x I.D.</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Spindle speed</td>
<td>R.P.M. 1650rpm, 1850rpm (pulley change)</td>
<td>1650rpm, 1850rpm (pulley change)</td>
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<td></td>
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<tr>
<td>Traverse length</td>
<td>10”</td>
<td>10”</td>
<td>10”</td>
<td>10”</td>
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<tr>
<td>Rapid feed stroke</td>
<td>1.6”</td>
<td>1.6”</td>
<td>1.6”</td>
<td>1.6”</td>
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<tr>
<td>Auto infeed</td>
<td>Max. 3” / Min</td>
<td>3” / Min</td>
<td>3” / Min</td>
<td></td>
</tr>
<tr>
<td>Min.</td>
<td>0.01” / Min</td>
<td>0.01” / Min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handle feed</td>
<td>One revolution (Dia.) 0.08”</td>
<td>One revolution (Dia.) 0.08”</td>
<td></td>
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<tr>
<td></td>
<td>One division (Dia.) 0.0002”</td>
<td>One division (Dia.) 0.0002”</td>
<td></td>
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<tr>
<td><strong>Wheelhead and feed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spindle rotary</td>
<td>Live / Dead center</td>
<td>Live / Dead center</td>
<td></td>
<td></td>
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<tr>
<td>Swivel angle</td>
<td>Towards operator 30 degree</td>
<td>Towards operator 30 degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Away from operator 90 degree</td>
<td>Away from operator 90 degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spindle revolution</td>
<td>Variable speed 40<del>240 rpm 100</del>600 rpm</td>
<td>20<del>120 rpm 60</del>360 rpm</td>
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<td></td>
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<tr>
<td>Center taper</td>
<td>MT #4</td>
<td>MT #4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter of through hole</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
</tr>
<tr>
<td><strong>Workhead</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swivel angle</td>
<td>Towards operator</td>
<td>Towards operator</td>
<td>Towards operator</td>
<td>Towards operator</td>
</tr>
<tr>
<td></td>
<td>Away from operator</td>
<td>Away from operator</td>
<td>Away from operator</td>
<td>Away from operator</td>
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<tr>
<td>Spindle revolution</td>
<td>Variable speed</td>
<td>Variable speed</td>
<td>Variable speed</td>
<td>Variable speed</td>
</tr>
<tr>
<td>Motor</td>
<td>HP</td>
<td>HP</td>
<td>HP</td>
<td>HP</td>
</tr>
<tr>
<td>Wheel spindle</td>
<td>HP</td>
<td>HP</td>
<td>HP</td>
<td>HP</td>
</tr>
<tr>
<td>Workhead spindle</td>
<td>1/2 HP x 6 P</td>
<td>1 HP x 6 P</td>
<td>1 HP x 6 P</td>
<td></td>
</tr>
<tr>
<td>Hydraulic pump</td>
<td>HP</td>
<td>HP</td>
<td>HP</td>
<td>HP</td>
</tr>
<tr>
<td>Coolant pump</td>
<td>HP</td>
<td>HP</td>
<td>HP</td>
<td>HP</td>
</tr>
<tr>
<td>Tank capacity</td>
<td>Hydraulic tank 15 Gal</td>
<td>15 Gal</td>
<td>15 Gal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coolant tank 20 Gal</td>
<td>20 Gal</td>
<td>20 Gal</td>
<td></td>
</tr>
<tr>
<td>Floor space required</td>
<td>10”x6”</td>
<td>14”x6”</td>
<td>19”x6”</td>
<td>6.5”</td>
</tr>
<tr>
<td>Weight (Approximate)</td>
<td>Lbs 4500</td>
<td>5200</td>
<td>7500</td>
<td>8000</td>
</tr>
</tbody>
</table>

1. Human Machine Interface: FUJI / UG220H – LC4, Screen 5.7”
2. PLC: Mitsubishi FX1N
3. Servo Motor: Mitsubishi
4. Inverter: National (Matsushita) 1HP
2. Installation

2-1 Loading and unloading

(Reference: Figure 2-1(A) indicates the correct machine)

1. Use the right crane and/or chain block to lift up this machine.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Capacity</th>
</tr>
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<tbody>
<tr>
<td>1022</td>
<td>2 tons (4400 pounds)</td>
</tr>
<tr>
<td>1030</td>
<td>3 tons (6600 pounds)</td>
</tr>
<tr>
<td>1140 / 1440</td>
<td>4 tons (8800 pounds)</td>
</tr>
</tbody>
</table>

2. Use a wire rope of more than 157”. The diameter is about 0.6” or can lift up 4400 pounds. (3 ropes)

3. Check the wheelhead, workhead and tailstock to maintain the balance of this machine.

4. Insert a piece of wood block between wire rope and machine body to protect this machine and avoid the rope breaking. (Or use rubber block)

5. Machine layout relevant situation. (Reference: Figure 2-1 (B))
Figure 2-1 (B)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>1022</th>
<th>1030</th>
<th>1140 / 1440</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>106.3”</td>
<td>137.8”</td>
<td>157.5”</td>
</tr>
<tr>
<td>B</td>
<td>67.0”</td>
<td>67.0”</td>
<td>69.3”</td>
</tr>
<tr>
<td>C</td>
<td>59.0”</td>
<td>71.0”</td>
<td>86.0”</td>
</tr>
<tr>
<td>D</td>
<td>13.8”</td>
<td>18.9”</td>
<td>35.4”</td>
</tr>
<tr>
<td>E</td>
<td>9.8”</td>
<td>13.8”</td>
<td>19.7”</td>
</tr>
<tr>
<td>F</td>
<td>23.6”</td>
<td>23.6”</td>
<td>23.6”</td>
</tr>
<tr>
<td>G</td>
<td>15.7”</td>
<td>15.7”</td>
<td>19.7”</td>
</tr>
<tr>
<td>I</td>
<td>27.6”</td>
<td>27.6”</td>
<td>35.4”</td>
</tr>
<tr>
<td>J</td>
<td>19.7”</td>
<td>19.7”</td>
<td>23.6”</td>
</tr>
</tbody>
</table>

Floor conditions: The structure of the floor condition must be strong enough and be able to support the machine weight.

Please use the leveling plate (standard accessory)
I. Connection of cable
1-2 Wheel spindle motor
2-2 ID grinding spindle motor
3-3 Coolant pump
5-5 Hydraulic pump
6 Solenoid valve cover

II Connection of oil pipe

A-A Coolant recovery pipe
B-B Coolant supply pipe
E-E Leak-proof recovery pipe of solenoid oil valve
F Waste oil escape
P1-P1 Hydraulic oil pressure side pipe
P2-P2 Ditto
T1-T1 Hydraulic oil suction side pipe
T2-T2 Ditto

You can remove the equipment, after take away the above cables and pipes.
2-2 Leveling of this machine

1. Please clean the table before leveling.
2. Use the level having the sensitivity of 0.0002"/ft.
3. Adjust the level as Figure 2-2 indicates to place level.
4. After checking the table, check torsion by traversing the table to left and right to check if the table is distorted.

Figure 2-2
3. Machine Diagram

The basic structure of this machine (Reference Figure 3-1)

Figure 3-1

(1) Workhead
(2) Front Splash Guard
(3) Coolant Nozzle
(4) Internal Grinding Attachment
(5) Wheelhead
(6) Tailstock
(7) Swiveling Table
(8) Traversing Table
(9) Hydraulic Tank
(10) Leveling Plate

(11) Control Panel
(12) Wheelhead Feed Handwheel
(13) Sizing Stopper
(14) Table Traverse Controls
(15) Body
(16) Coolant Tank
(17) Table Traverse Handwheel
(18) Rear Splash Guard
3-2 The Structure of Wheelhead

1. The structure of wheelhead

   A. Basically, the wheelhead is composed of 7 parts. (Reference: Figure 3-2 indicates (1), (2), (3), (4), (5), (6), (7))

   B. The rotation is determined by spindle pulley. (Reference: Figure 3-2 indicates (7))

2. The swiveling angle of wheelhead is ±15°

![Figure 3-2](image)

(1) Wheelhead Body
(2) Bearing spindle
(3) Flange
(4) Grinding Wheel
(5) Clamping Side of Flange
(6) Clamping Nut
(7) Spindle Pulley
3-3 The Wheelhead Cross Feed Structures

1. It is traversed by cross feed handwheel (Reference: Figure 3-3(A) to (1) which is the spur gear ordered by (1)\rightarrow(2)\rightarrow(3)\rightarrow(4)\rightarrow(5) moving process.

2. The wheelhead feed travel is 10 inches.

3. The rapid approach and retraction travel is 1.6 inch.

4. One revolution of cross feed handwheel is 0.08 inch by diameter.

5. One division of cross feed handwheel is 0.0002 inch by diameter.

6. Clockwise rotation of the handwheel causes the wheelhead to move forward. Counterclockwise rotation of the handwheel causes the wheelhead to move backward.

7. Feed amount of wheelhead can be fixed by the sizing-stopper. (Reference: Figure 3-3(B) indicates (1)) Switch downwards and loosen the set screw (2), and rotate the graduated ring (3), and you can choose any fixed point.
Figure 3-3 (A)

(1) Spur Gear
(2) Lead Screw (H Type)
    Ball Screw (AGS Type)
(3) Driving Sleeve
(4) Sliding Base
(5) Wheelhead
Figure 3-3 (B)

(1) Sizing – Stopper
(2) Clamping Screw
(3) Slip Ring
3-4 Workhead

1. The structure of workhead

   (1) It has 2-step speeds. If equipped with infinite variable driving motor, it has the ability to operate up to about 600 RPM. (Option)

   (2) The workhead can be separated into two styles. The dead spindle style and the live spindle style. Their adjustment method can be followed by two points:

       a. Dead spindle style
          Before using, please open the cover (Reference: Figure 3-4 (A) (e) indicates.), then take off the drive key (d), swivel the center of the workhead by hand, and insert the pin (b) into the slot of the spindle (a) causing it not to rotate.

       b. Live spindle style
          Please check that the pin (b) is removed before using. If it is pulled out, then fasten the drive key (d) and confirm that it is tightened.

2. The Adjustment of The Workhead Speed

   First of all, loosen the set screw (Reference: Figure 3-4(B) (3) indicates.) then, open the workhead cover (1), and adjust the V belt to the needed speed position, then fasten the motor base.

3. Infinite variable driving motor must be rotating to adjust the workhead rotation speed. (Option)
Figure 3-4 (A)

(a) Spindle
(b) Pin
(c) Gear Pulley
(d) Key
(e) Cover
4. The Adjustment of Angle of The Workhead:

Please first loosen the cap nut (4). (Notice: They are opposite to each other.) Then, swivel to the needed angle and fasten the cap nut (4) (Reference: Figure 3-4 (B)).

Figure 3-4 (B)

(1) Cover
(2) Motor
(3) Set Screw
(4) Cap Nut
3-5 Tailstock

1. Tailstock is fixed on the swiveling table by way of the clamping block. (Reference: Figure 3-5 (1) indicates)

2. We can adjust the pressure of center spring by way of spring adjusting handwheel (3). Clockwise rotation increases the pressure.

3. If you want to take off the MT4 center, please insert ø 0.5 inch cylindrical rod into (A) position and hit it sharply.

4. If work piece is too heavy you can use the set screw (2) to fix the center.

5. When there is a work piece between two centers, you can use the wheel dresser (5) on the tailstock to dress grinding wheel.

Figure 3-5

(1) Clamping Block
(2) Set Screw
(3) Spring Adjusting Handwheel
(4) Handle
(5) Diamond Dresser Holder
(6) Oil Injection Orifice
3-6 The adjustment and structure of the table

1. The swiveling operation of the table is by way of Figure 3-6 (A) indicates to adjust. Its traversing relation is stepped by $1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5$.

![Diagram](image)

Figure 3-6 (A)

(1) Adjusting Nut
(2) Lead Screw
(3) Square Nut
(4) Connecting Bolt
(5) Swiveling Table
(6) Traversing Table

- 15 -
2. The Adjustment Steps of table swiveling

A. First, loosen the four set screws of both sides of the table (Reference: Figure 3-6(B) (2) indicates)

B. Place the set handle on the adjustment handle (4). Rotate clockwise, the swiveling table (1) will swivel counterclockwise. (Reference: Dial indicator indicates.)

Figure 3-6 (B)

(1) Swiveling Table
(2) Hexagonal Socket Head Bolt
(3) Indicator
(4) Adjusting Nut
(5) Graduated Plate
3-7 Table Traverse Driving

1. Drive By Manual Driving

(1) First, please swivel the manual/automatic turning lever to the left side manual-driven position. (Reference: Figure 3-7 (7) indicates.)

(2) It's necessary to press handwheel clutch (2) to engage with the rack, and swivel the handwheel (1) clockwise or counterclockwise, then, the table will slide to left / right.

(3) Swivel the table traverse handwheel (1) one revolution and table sliding is 0.5 inch.

2. Hydraulic Automatic Driving

(1) If necessary to drive hydraulically, please completely abide by 4-2 (Operation of the machine).

(2) Before operating the hydraulic driving, please familiarize with 4-1 (Remarks Before Operating).

(3) The operation methods of tarry time left/right control knob of the table traverse: If swiveling counterclockwise set the tarry time much longer, and vice versa. (Reference: Figure 3-7 (3), (5) indicates.)

(4) The operation methods of table Traverse Speed Control Knob: If swiveling counterclockwise, the speed of the table sliding is much slower, and vice versa. (Reference: Figure 3-7 (4) indicates.)
Figure 3-7

(1) Table Traverse Handwheel
(2) Handwheel Clutch
(3) Left Tarry Time Control Knob
(4) Table Traverse Speed Control Knob
(5) Right Tarry Time Control Knob
(6) Table Reversing Dog
(7) Manual/Auto Table Engagement Lever
(8) Table Reversing Valve
(9) Chain Switch
(10) Wheelhead Feed Handwheel
(11) Workhead Jog Switch
(12) Graduation Zero Switch
(13) AGS Setting Switch
(14) Control Panel
4. Machine Operation Process

4-1 Special Precautions Before Operating

1. Oil

A. Before operating, please check if the capacity tank is full of oil.

B. Choosing oil must correspond with Figure 4-1(A) and Figure 4-1(B).

<table>
<thead>
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<th>Oil Putting Position</th>
<th>Q’ty</th>
<th>Suggestive Oil</th>
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<tbody>
<tr>
<td>Hydraulic Tank</td>
<td>60 L (15 gal)</td>
<td>Castrol Hyspin AWS68 Mobil Vacuoline 1405 Renew/half a year</td>
</tr>
<tr>
<td>Table Sliding Face</td>
<td>4 L (1 gal)</td>
<td>Castrol Magna DB68 Mobil Vactra No. 2 Supply when it is necessary</td>
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Figure 4-1 (A)

<table>
<thead>
<tr>
<th>Distinguish</th>
<th>Description</th>
<th>Brand</th>
<th>Viscosity</th>
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<tbody>
<tr>
<td>Suggestive oil</td>
<td>Vacuoline 1405</td>
<td>Mobil</td>
<td>100° F SSU 295-310</td>
</tr>
<tr>
<td>Adaptable Oil</td>
<td>Mechanic 52</td>
<td>Idemitsu</td>
<td>100 ° F SSU 59.15</td>
</tr>
<tr>
<td></td>
<td>Swalub 300</td>
<td>Maruzen</td>
<td>100° F SSU 305</td>
</tr>
<tr>
<td></td>
<td>Tellvsoil 33</td>
<td>Shell</td>
<td>100° F SSU 310</td>
</tr>
<tr>
<td></td>
<td>Lubway 300</td>
<td>Sun Oil</td>
<td>100° F SSU 310-350</td>
</tr>
<tr>
<td></td>
<td>Power Lex</td>
<td>Esso</td>
<td>100° F SSU 315</td>
</tr>
</tbody>
</table>

Figure 4-1(B)
2. Coolant: Pouring the coolant into coolant tank with 80 liters. Please choose the appropriate coolant to mix with water. (Reference: Coolant supplier and its figures and ratios.)

3. Check all the optional switches to see if they are in the original (OFF) position. (Reference: Figure 4-3 direction indicates)

4. Check wheelhead and table's clamping plate to see if it had been taken off. (The plate can prevent sliding and colliding in lifting.)

5. Check if table and wheelhead are fully moving and to see if there are any obstacles.

6. Check the wheelhead and workhead's V-belt tension to be appropriate. (Press downwards about 0.6 inch)

7. Check wheelhead position to prevent collision and crash resulting from workhead, tailstock and workpiece when wheelhead approaches.

8. Check the manual/auto table engagement lever if it is placed in manual position. (Reference: Figure 3-7 indicates.)

9. Check the table reversing dog (Reference: Figure 3-7 indicates.) to see if it is on the right position and tightened to prevent the collision between grinding wheel and workhead or tailstock.

10. Under operation, if there is any emergency, please push emergency button.
4-2 Operation of H Type

1. Please read in detail all the functions and remarks of the machine parts, then start to operate.

2. Electrify. (The light will be on.)

3. Originate all the optional switches (swivel OFF position).

4. Press the start button: The wheelhead spindle lubricant pump will start. (If installed with manual operated oil pump, please pull it for 3-5 times.)

5. Start the hydraulic pump switch. (Please notice the following three points.)

   (1) The handwheel clutch of the table traverse handwheel should be separately with rack.

   (2) Table control valves manual/automatic engagement lever should be swiveled to the manual position. (Otherwise, the hydraulic pump once starts, the table will slide immediately and cause danger easily.)

   (3) Check if the slowest position of the table traverse speed control knob is correct or not.

6. Start the switch of workhead spindle to the right auto moving position.

7. Start coolant pump switch to the right auto moving position.

8. Table control valves manual / automatic engagement lever to right automatic position. (Before doing this, notice the following two points.)

   (1) Confirm the separation for 1.6 inch between wheelhead and workpiece to prevent wheelhead rapid approach colliding with workpiece.

   (2) Confirm the adjustment of the table reversing dog being tightened.

9. Confirm the table traverse speed control knob, and be sure to make the convenient tarry time

10. Swivel table control manual / automatic engagement lever to the left manual position.

11. Start spindle motor switch. (Warm up for 3 minutes)
12. Press the wheelhead rapid approach button. (1-1 type)

13. Put the workpiece between two centers.

14. Swivel wheelhead feed handwheel to the proper position to prepare grinding.

15. Start auto moving switch. (Meanwhile, coolant pump being to rotate. Please adjust the coolant amount control valves to be proper flowing.)

16. Swivel wheelhead feed handwheel to touch the workpiece.

17. Swivel table manual / automatic engagement lever to the right automatic position. (The table can operate to and for begins to grind.)

18. When the workpiece reaches the desired diameter, counter-clockwise swivel the wheelhead feed handwheel to move back to proper position. (Back about one revolution.)

19. Turn off the auto switch. (Meanwhile, workhead spindle stops rotating and the coolant stops supplying.)

20. Press wheelhead rapid retraction button. (Wheelhead rapidly separates back with the distance 1.6 inch away from the workpiece to facilitate installing and unloading the workpiece.)

21. Change the workpiece.

22. Press wheelhead rapid approach button, and the wheelhead rapidly forwards for 1.6 inch and begins to grind. (The process of grinding follows above-saidly: 15 → 16 → 17 → 18 → 19 → 20 → 21 → 22)
4-3 Operation of AGS Type

1. Explanation of control panel:

![Control Panel Diagram]

Figure 4-3
1. CS14 : Control switch
   Manual for H type, auto for AGS type.

2. LS : Power on/off switch
   Supply the electric, the light will be on

3. CS1 : Spindle motor switch
   Swivel to right, the spindle motor will rotate.

4. CS5 : Work head motor switch
   Swivel to left, the workhead begins to rotate. Swivel to right, it will be in auto position.

5. Key : Key switch
   For O.D. or I.D. grinding setting (CW for I.D. grinding the wheelhead will rapid approach automatically, CCW for O.D. grinding and both wheelhead rapid approach and retraction can be actuated as desired)

6. PBL1 : Safety key
   Before pressing this button, please make sure if all the optional buttons/switches are in OFF position, if not, the switch won’t be ON.

7. CS2 : Hydraulic pump switch
   Swivel right, the hydraulic pump starts to rotate

8. CS4 : Coolant pump switch
   Swivel to left, the coolant pump starts to rotate, and will correspond with the coolant control valve, swivel to right, it will be in auto position.

9. CS3 : ID motor switch
   Swivel right, the internal grinding wheel starts to rotate (Notice: Before starting, please first abide by 4-4 which indicates the internal grinding operation specification and finish the preparing steps before starting.)

10. PBL3 : Infeed button
    Press this button, wheelhead will move forward swiftly by 1.6 inch. (Before pressing this button, please first check grinding wheel front place of 1.6” away to see if there is any obstacles. (Such as workpiece, diamond dresser holder, workhead and tailstock …etc.)

11. PB5 : Retract switch
    Press this button, the wheelhead will move backward swiftly by 1.6 inch.
12. CS13 : Retract switch
Swivel to ON position, the wheelhead will retract 1.6 inch, swivel to
OFF position won’t retract 1.6 inch. It is for OD grinding mode only, it
won’t retract when machine is in ID grinding mode.

13. PB0 : Emergency button
Under operation, if there is an emergency, please push emergency
button

14. PB4 : Workhead jog switch
Press the switch, the workhead will start to rotate, and release for the
workhead stop to rotate.

Note:

1. Control switch CS14 in manual position and retract switch CS13 in ON position :
   Press in-feed button PBL3, the wheelhead will rapid approach 1.6 inch.
   Press retract button PBL5, the wheelhead will rapid retract 1.6 inch.

2. Control switch CS14 in manual position and retract switch CS13 in OFF position :
   Press in-feed button PBL3, the wheelhead will rapid approach 1.6 inch.
   Press retract button PBL5, the wheelhead won’t retract 1.6 inch.

3. Control switch CS14 in auto position and retract switch CS13 in ON position :
   Press in-feed button PBL3, the wheelhead will rapid approach 1.6 inch +
   grinding start point (rapid in-feed + rough feed + Fine feed).
   Press retract button PBL5, the wheelhead will rapid retract 1.6 inch +
   grinding start point (rapid in-feed + rough feed + Fine feed).

4. Control switch CS14 in auto position and retract switch CS13 in OFF position :
   Press in-feed button PBL3, the wheelhead will rapid approach 1.6 inch +
   grinding start point (rapid in-feed + rough feed + Fine feed).
   Press retract button PBL5, the wheelhead won’t rapid retract 1.6 inch, but will
   retract grinding start point (rapid in-feed + rough feed + Fine feed).
2. Operation of AGS type

CYLINDRICAL GRINDER

SHARP INDUSTRIES, INC.
3501 CHALLENGER STREET
TORRANCE, CA 90503
TEL (310) 370-5990
FAX (310) 542-6162

Website: www.sharp-industries.com
E-mail: info@sharp-industries.com

Select grinding mode

Plunge steps | Message | **
---|---|---
Rapid Feed | Rapid Travel (Amount) |
Rough Feed | .000" |
Fine Feed | In-feed Speed |
Spark Out | inch/min |

Plunge steps | Message | **
---|---|---
Rapid Feed | Total Rough Feed |
Rough Feed | Rough Feed Amount Per Step |
Fine Feed | Rough Feed Dwell |
Spark Out | Rough Feed Speed |
 | inch/min |

Plunge steps | Message | **
---|---|---
Rapid Feed | Dwell |
Rough Feed | Sec |
Fine Feed | Auto Retract Rate |
Spark Out | inch/min |

Steps | Data | **
---|---|---
Rapid Feed | Real Position |
Preparatory Speed | Total Stock Removal |
Rough Feed | Speed |
Fine Feed | Speed |
Spark Out | Stay Time |

H type

Grinding wheel position

1. It can be operated by manual mode when servo motor is in trouble.
2. The function of H type is table traverse by hydraulic driving, wheelhead rapid approach and retraction.

To start the machine by AGS type, please mark sure the grinding wheel position is in rapid IN-FEED
1. It can be operated by manual mode when servo motor is in trouble.
2. The function of H type is table traverse by hydraulic driving, wheelhead rapid approach and retraction.

To "start" the machine by AGS type, please make sure the grinding wheel position is in rapid IN-FEED.
(1) Power On:

1. Power light "LS" will be on.
2. Reset emergency stop button "PB0".
3. Swivel control switch “CS14” to MANUAL position.
4. Swivel wheel motor switch “CS1” to OFF position.
5. Swivel hydraulic pump switch “CS2” to OFF position.
6. Swivel work-head motor switch “CS5” to OFF position.
7. Swivel coolant pump switch “CS4” to OFF position.
8. Swivel retract switch “CS13” to OFF position.
9. Swivel ID wheel switch “KEY” to OD position.
10. Swivel ID attachment switch “CS3” to OFF position.
11. Press safety key "PBL1", after the light on, the screen will appear ...

<table>
<thead>
<tr>
<th>H type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinding wheel position</td>
</tr>
</tbody>
</table>

1. It can be operated by manual mode when servo motor is in trouble.
2. The function of H type is table traverse by hydraulic driving, wheelhead rapid approach and retraction.

To "start" the machine by AGS type, please make sure the grinding wheel position is in rapid IN-FEED.

- 28 -
(2) Setting in-feed data:

1. Please turn hydraulic pump switch “CS2” to ON position, control switch “CS14” to MANUAL position.

2. Press in-feed switch “PBL3”, the wheel-head will rapid approach 1.6” (in the meantime the servo will be in OFF status), swivel the hand-wheel until the grinding wheel touch to the work-piece, that is Zero position.

3. Turn control switch “CS14” to AUTO position, the screen will appear ...

![Diagram](image)

### Plunge grinding

<table>
<thead>
<tr>
<th>Plunge Steps</th>
<th>Message</th>
<th>**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Feed</td>
<td>Rapid Travel (Amount)</td>
<td></td>
</tr>
<tr>
<td>Rough Feed</td>
<td>.000&quot;</td>
<td></td>
</tr>
<tr>
<td>Fine Feed</td>
<td>In-feed Speed</td>
<td>inch/min</td>
</tr>
<tr>
<td>Spark Out</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Setting data**

### Traverse grinding

**Setting data**

A. After setting in-feed data, press retract switch PBS5, wheel-head will retract to the grinding start point (Rapid in-feed + rough feed + Fine Feed)

B. Proceed to grind ...
(3) Start to grind

After setting, if the retract switch CS13 is in ON position, please press retract switch PB5, the wheel-head will retract 1.6" + grinding start point (Rapid in-feed + rough feed + Fine feed.)
(4) Function key

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Website: www.sharp-industries.com
E-mail: info@sharp-industries.com

Select grinding mode

- Plunge Grinding
- Traverse Grinding

<table>
<thead>
<tr>
<th>Plunge Steps</th>
<th>Message</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Feed</td>
<td>Rapid Travel (Amount)</td>
<td>inch/min</td>
</tr>
<tr>
<td>Rough Feed</td>
<td>.000&quot;</td>
<td></td>
</tr>
<tr>
<td>Fine Feed</td>
<td>In-feed Speed</td>
<td></td>
</tr>
<tr>
<td>Spark Out</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Traverse Steps</th>
<th>Message</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Feed</td>
<td>Rapid Travel (Amount)</td>
<td>inch/min</td>
</tr>
<tr>
<td>Rough Feed</td>
<td>.000&quot;</td>
<td></td>
</tr>
<tr>
<td>Fine Feed</td>
<td>In-feed Speed</td>
<td></td>
</tr>
<tr>
<td>Spark Out</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Both traverse grinding and plunge grinding do have the same function key.
(5) Abnormal

DISPLAY1
1. Motor overload
2. Plunge setting data error
3. Traverse setting data error
4. Traverse has not to select direction
5. Servo system abnormal

DISPLAY2
1. Motor overload
   1-1 Wheel head motor overload
   1-2 Hydraulic motor overload
   1-3 I.D. motor overload
   1-4 Coolant pump overload
   1-5 Inverter abnormal
2. Plunge setting data error
   2-1 Amount per step > rough feed amount
   2-2 Amount per step > fine feed amount
3. Traverse setting data error
   3-1 Amount per step > rough feed amount
   3-2 Amount per step > fine feed amount
4. Traverse has not to select direction
   4-1 It has not to select direction of retract.
   4-2 It has not to select rough feed direction.
   4-3 It has not to select fine feed direction.
5. Servo system abnormal
   5-1 FX2N-10GM alarm
   5-2 Servo driver alarm
4-4 Operation of Internal Grinding Attachment

Figure 4-4

(1) Pin
(2) Slowly put down meeting wheelhead
(3) Hexagonal bolt
(4) Push
(5) Set Bolt
(6) Flat Belt
1. Internal Grinding Installing Solid Steps

(1) Take away the tailstock from table and place it on the clean position. (To prevent the collision between table traversing and internal hole wheel spindle when grinding.)

(2) Pull out the pin. (Reference: Figure 4-4 (1) indicates.)

(3) Slowly put down the bracket and lean against to meet the wheelhead.

(4) Tighten the hexagonal bolt (3). (Two screws)

(5) Tighten the set screw (5). (Two screws)

(6) Loosen the set screw of the motor base and install the flat belt (6) through indicating direction. Push tightly and fasten the motor base.

(7) Tighten the spindle cover.

2. Operation of Internal Grinding Attachment

(1) First of all, please read thoroughly every part of the machine functions and be sure to read all the remarks, then start grinding process.

(2) Before grinding, please obey the above said (1) to prepare the processes of internal grinding.

(3) Obey Figure 3-4 indications and adjust the workhead to live spindle style. The workhead spindle should be fixed with 3-jaw chuck or optional accessories, etc.

(4) Electrify. (Meanwhile, the light will be on.)

(5) Fix the work piece.

(6) The steps to begin are much the same as above said 4-2 in machine operation (3)～(10).

(7) Switch the key switch (Figure 4-3 ) CW for selecting I.D. grinding and start the internal grinding switch (warm up for 3 minutes.)

(8) Swivel the wheelhead feed handwheel and table traverse handwheel to the proper positions and prepare to grind.
(9) Swivel wheelhead cross feed handwheel to touch the work piece.

(10) Swivel table manual / automatic turning lever to the right automatic position. (The table will slide to and fro and begin to grind.)

(11) When the work piece reaches the needed size, first, swivel the manual / automatic turning lever to manual position. Rotate counterclockwise wheelhead feed handwheel back to the proper position, and rotate counterclockwise the table traverse handwheel to make the internal grinding wheelhead retract from the work piece hole.

(12) Turn off internal grinding wheelhead switch.

(13) Change the work piece.
5. The Installing and Removing of Grinding Wheel from Flange

5-1 Installing Process

1. As Figure 5-1 (A) indicates 1 → 2 → 3 → 4 → 5.

2. When installing, notice that the grinding wheel and flange should have paper placed between them. If the label paper on the wheel is big enough, additional paper can be omitted.

3. When installing, please obey Figure 5-1(B) indications as 1 → 2 → 3 → 4 → 5 → 6 positions. Use torsion handle to fix the flange screw equally tight.

4. Revise the wheel balance. Please obey Figure 5-1 (C) indications. Place an adjustable balancing weight block.

5. After revising wheelhead balance, please obey Figure 5-1(A) indicating to install spindle as 6 → 7 → 8

6. About the selection of the product:
   Refer to the technical data of the abrasive product by manufacturer. The operating speed of the abrasive product must over 40m/s. the material of the abrasive product can not cause danger for health. Recommend the operator to the low noise abrasive product.

   The section of the blotter
   The blotters are supplied with abrasive by the manufacturer, supplier or importer on delivery. The blotter shall be made of a soft or flexible material e.g. plastic, soft cordboard or rubber.

   Blotters have an annular shape, the outside diameter of the blotter of the blotter shall be at 0.8 inch greater the outside diameter of the flange, The thickness of the blotters shall at least 0.008 inch maximum 0.04 inch. The inside diameter of the blotter shall at least cover the annular flange contact area.
Figure 5-1 (A)

(1) Flange
(2) Grinding wheel
(3) Clamping ring
(4) Balancing weight block
(5) Hexagonal socket head cap screw
(6) Spindle
(7) Clamping nut
(8) Set screw

- 38 -
Figure 5-1 (B)

Figure 5-1 (C)

(1) Bearing
(2) Balancing arbor
(3) Wheel balancing stand
(4) Clamping Nut
5-2 Removal of grinding wheel and flange from machine

1. First, loosen the set screw (8) which is indicated by Figure 5-1(A), then rotate clockwise the flange clamping nut (7) to off the spindle.

2. Obey the Figure 5-2 indications. Tighten the flange unloading screw nut, then, tighten screw bolt to take off the flange.

(1) Flange unloading nut  
(2) Hexagonal socket head cap screw bolt

Figure 5-2
6. Standard Accessories and Optional Accessories

**Standard Accessories**

<table>
<thead>
<tr>
<th>No.</th>
<th>Contents</th>
<th>Q’ty</th>
<th>No.</th>
<th>Contents</th>
<th>Q’ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Wheel flange and extractor</td>
<td>1 Set</td>
<td>16.</td>
<td>Tool box</td>
<td>1 Set</td>
</tr>
<tr>
<td>2.</td>
<td>Wheel balancing arbor</td>
<td>1 Set</td>
<td>17.</td>
<td>Dial indicator</td>
<td>1 Pc</td>
</tr>
<tr>
<td>3.</td>
<td>Lubricant supply unit</td>
<td>1 Set</td>
<td>18.</td>
<td>Screw driver</td>
<td>1 Pc</td>
</tr>
<tr>
<td>4.</td>
<td>Diamond dresser holder</td>
<td>1 Set</td>
<td>19.</td>
<td>Cross driver</td>
<td>1 Pc</td>
</tr>
<tr>
<td>5.</td>
<td>Table swiveling angle measuring device</td>
<td>1 Set</td>
<td>20.</td>
<td>Zigzag-open wrench #19</td>
<td>1 Pc</td>
</tr>
<tr>
<td>6.</td>
<td>Standard grinding wheel (405 x 32-50 x 127mm)</td>
<td>1 Pc</td>
<td>21.</td>
<td>Open wrench</td>
<td>6 Pcs</td>
</tr>
<tr>
<td>7.</td>
<td>Standard coolant supply unit</td>
<td>1 Set</td>
<td>22.</td>
<td>Hex. Key switch</td>
<td>10 Pcs</td>
</tr>
<tr>
<td>8.</td>
<td>Coolant splash guard</td>
<td>1 Set</td>
<td>23.</td>
<td>Diamond dresser #10</td>
<td>2 Pcs</td>
</tr>
<tr>
<td>10.</td>
<td>Hydraulic soft tube</td>
<td>1 Set</td>
<td>25.</td>
<td>Spare clamping handle</td>
<td>1 Pc</td>
</tr>
<tr>
<td>11.</td>
<td>Leveling plate</td>
<td>1 Set</td>
<td>26.</td>
<td>Oil can</td>
<td>1 Pcs</td>
</tr>
<tr>
<td>12.</td>
<td>Leveling bolt</td>
<td>1 Set</td>
<td>27.</td>
<td>Hydraulic system</td>
<td>1 Set</td>
</tr>
<tr>
<td>13.</td>
<td>Taper rod</td>
<td>1 Pcs</td>
<td>28.</td>
<td>Coolant system</td>
<td>1 Set</td>
</tr>
<tr>
<td>14.</td>
<td>Zigzag open wrench #30</td>
<td>1 Pc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Extension cover</td>
<td>2 Pcs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Optional Accessories**

<table>
<thead>
<tr>
<th>No.</th>
<th>Contents</th>
<th></th>
<th>No.</th>
<th>Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A101</td>
<td>Internal grinding attachment</td>
<td></td>
<td>A110</td>
<td>Wheel balancing stand</td>
<td></td>
</tr>
<tr>
<td>A102</td>
<td>Double shoe steady rest</td>
<td></td>
<td>A111</td>
<td>Spare wheel flange</td>
<td></td>
</tr>
<tr>
<td>A103</td>
<td>Triple-shoe steady rest</td>
<td></td>
<td>A112</td>
<td>Tungsten carbide half center</td>
<td></td>
</tr>
<tr>
<td>A104</td>
<td>Scroll chuck and plate (5” or 6”)</td>
<td></td>
<td>A113</td>
<td>Automatic dog set (6 pcs / set)</td>
<td></td>
</tr>
<tr>
<td>A105</td>
<td>Magnetic chuck and plate (5” or 6”)</td>
<td></td>
<td>A114</td>
<td>Grinding gauge for manual sizing</td>
<td></td>
</tr>
<tr>
<td>A106</td>
<td>Magnetic coolant separator</td>
<td></td>
<td>A115</td>
<td>Microfeeder for wheelhead</td>
<td></td>
</tr>
<tr>
<td>A107</td>
<td>Paper filter</td>
<td></td>
<td>A116</td>
<td>Work rest (2 pcs / set)</td>
<td></td>
</tr>
<tr>
<td>A108</td>
<td>Angle dresser</td>
<td></td>
<td>A117</td>
<td>Tailstock with hydraulic operation</td>
<td></td>
</tr>
<tr>
<td>A109</td>
<td>Radius dresser</td>
<td></td>
<td>A118</td>
<td>Collet chuck mounted on workhead</td>
<td></td>
</tr>
</tbody>
</table>
7. Oil Diagram

Figure 7-1
8. Remarks and Points of Maintenance

(1) Hydraulic oil should be used by specification of the brand to follow. Please don’t mix with others.

(2) Under operating, be sure to check the smell of the oil if it has the bad smell or disgusting odor. Please change the oil by new one for one time every 6 months.

(3) When adding the lubricating oil, please remember to take out the bad oil to prevent out flowing of left piled oil water. Please check Figure 8-1.

(4) Be sure to exchange the coolant one time every 3 months.

(5) Under operating, strictly prohibit putting the tools or appliances or accessories on the table in order to prevent collision or crash.

(6) Under operating, strictly prohibit standing by both sides of the table to prevent accident or damage when the table is sliding.

(7) When exchanging V-belt speed, strictly prohibit the help of any irrelevant persons to prevent misoperating the spindle which might cause danger.

(8) Be sure to avoid the collision and knocking to confirm the extractness and precision and also the life of this machine.

(9) When discovering something wrong, please don’t fix it yourself, but contact our company to fix it.

(10) Be sure to clean the table after operating everyday and spread the oil on in order to prevent rust which might cause bad grinding conditions.

(11) While operating the machine, if you find an electrical overload has occurred, please open the electrical cabinet, check that the machine power is off, and then push in the reset button of overloaded magnetic contactor. This rest button will pop out farther than the others if that circuit has overloaded.
Figure 8-1

(1) Automatic lubricant installation
(2) Waste oil outflowing valve
9. Safety Indication of Cylindrical Grinding Machine

1. Under operating, strictly prohibit stand by both sides of the table to prevent accident or damage when the table is sliding.

2. When exchanging V-belt speed, strictly prohibit the help of any irrelevant persons to prevent misoperating the spindle switch which might cause danger.

3. Before starting the hydraulic pump switch, please notice the following three points:

   (1) The handwheel clutch of the table traverse handwheel should be separately with rack.

   (2) Table control valves manual / automatic engagement lever should be swiveled to the manual position. Otherwise, the hydraulic pump once starts, the table will slide immediately and cause danger easily.

   (3) Check if the slowest position of the table traverse speed control knob is correct or not.

4. Be sure to press the wheelhead rapid approach button (That is, the wheelhead will be in rapid approach position.) before external grinding and internal grinding.

5. Before mounting the quill and internal grinding wheel, first check the rotation direction of internal spindle to see if it is correct (as the arrow label indicates.)

6. While operating the machine, if you find an electrical overload has occurred, please open the electrical cabinet, check that the machine power is off, and then push in the rest button of overloaded magnetic contactor. This rest button will pop out farther that the others if that circuit has overloaded.

7. When discovering something wrong, please don’t fix it yourself, but contact our company or agent to fix it.
Safety Rule of Grinding Wheels

1. Carefully store grinding wheels in proper condition, i.e. away from heat and humidity sources.

2. Select correct wheel in accordance with grinding requirements. “Ring” wheel and inspect for cracks. Never use cracked wheel.

3. Strictly prohibit exceeding maximum safe operating speed established for wheel.

4. Use clean recessed matching flanges at least 1/3 wheel diameter.

5. Never alter hole in wheel or force wheel on spindle.

6. Wheel newly mounted or rarely used must run idle for at least 3 minutes before starting to grind.

7. Under grinding, carefully protect eyes and organ of breath.