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1. GENERAL DESCRIPTION

1-1 Construction (refer to the outline dimensions)
This machine is a small-sized horizontal precision surface grinding machine with a squareshaped table. This machine has a simple construction, each part of which has an enough rigidity to meet high accuracy requirements. By the use of this machine it is possible to perform precision grinding effectively with a stabilized accuracy through a light and simple operation.

The construction of the machine
- Coulume
- Wheel head
- Wheel spindle
- Machine body
- Worktable
- Saddle
- Base

Hydraulic power unit

Main functions:
- Vertical stepping motor feed and hand-wheel
- Wheel guard
- Motor, wheel flangs
- Guard, dogs
- Longitudinal feed hand-wheel, cross feed handwheel
- Electric cabinet, saddle clamping device
- Hydraulic table feed control lever pressure adjusting knob.

1-2 SPECIFICATIONS:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>INCH</th>
<th>METRIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>Maximum grinding length</td>
<td>18.5&quot;</td>
</tr>
<tr>
<td></td>
<td>Maximum grinding width</td>
<td>6.3&quot;</td>
</tr>
<tr>
<td></td>
<td>Maximum distance from spindle center to table surface</td>
<td>16&quot;</td>
</tr>
<tr>
<td>Table</td>
<td>Working surface area</td>
<td>18.3×6&quot;</td>
</tr>
<tr>
<td></td>
<td>Maximum longitudinal movement</td>
<td>18.9&quot;</td>
</tr>
<tr>
<td></td>
<td>T-slot width</td>
<td>0.669&quot;</td>
</tr>
<tr>
<td>Saddle</td>
<td>Maximum cross movement</td>
<td>7&quot;</td>
</tr>
<tr>
<td>Feeds</td>
<td>Longitudinal movement of Table</td>
<td>9.8-66fpm</td>
</tr>
<tr>
<td></td>
<td>Hydraulic feed</td>
<td>4.2&quot;</td>
</tr>
<tr>
<td></td>
<td>Hand feed per revolution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cross movement of saddle</td>
<td>0.2&quot;/rev</td>
</tr>
<tr>
<td></td>
<td>Hand feed per revolution</td>
<td>0.005&quot;</td>
</tr>
<tr>
<td></td>
<td>Graduation of handwheel</td>
<td>47&quot;/min</td>
</tr>
<tr>
<td></td>
<td>Rapid feed</td>
<td>0.006&quot;</td>
</tr>
<tr>
<td></td>
<td>Step feed</td>
<td>0.4&quot;/pass</td>
</tr>
<tr>
<td>ITEM</td>
<td>INCH</td>
<td>METRIC</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Vertical movement of wheel head feed per revolution</td>
<td>0.05&quot;/rev</td>
<td>1m/m/rev</td>
</tr>
<tr>
<td>Graduation of handwheel</td>
<td>0.0001&quot;</td>
<td>0.005mm</td>
</tr>
<tr>
<td>Rapid Movement</td>
<td>9&quot;/min</td>
<td>230mm/min</td>
</tr>
<tr>
<td>Semi - rapid movement</td>
<td>1.14&quot;/min</td>
<td>29mm/min</td>
</tr>
<tr>
<td>Default down feed</td>
<td>0.00005&quot; ~</td>
<td>0.001 ~ 0.099mm</td>
</tr>
<tr>
<td></td>
<td>0.00495&quot;</td>
<td>(set - up by F')</td>
</tr>
<tr>
<td>micro - downfeed</td>
<td>0.00005&quot;</td>
<td>0.001mm</td>
</tr>
<tr>
<td>Automatic down feed</td>
<td>0.00005 ~</td>
<td>0.001 ~ 0.099mm</td>
</tr>
<tr>
<td></td>
<td>0.00495&quot;</td>
<td></td>
</tr>
<tr>
<td>Feed rate (Coarse/Fine)</td>
<td>0.00005 ~</td>
<td>0.001 ~ 0.099mm</td>
</tr>
<tr>
<td>Total stock removal</td>
<td>49.99995</td>
<td>0.001 ~ 999.999mm</td>
</tr>
</tbody>
</table>

Grinding wheel
- Diameter, standard                          | 7.1"          | 180m/m                   |
- Optional accessories up to                  | 5"            | 205m/m                   |
- Width                                      | 0.25" - 0.63" | 6 - 16m/m                |
- Bore                                       | 1.25"         | 31.75m/m                 |
- Spindle revolution (50/60HZ)                | 2850/3420rpm   | 2850/3420rpm             |

Motors
- Grinding wheel spindle                     | 1.5HP         | 1.5HP                    |
- lubrication pump                           | 0.02HP        | 0.02HP                   |
- Hydraulic pump motor                       | 1HP           | 1HP                      |
- Cross feed motor                           | 25W           | 25W                      |

Floor
- L×W×H                                      | 83"×51.2"×70.9" | 2113×1300×1300          |

Weight (Approx)                              | 1980 Lbs      | 900kgs                   |

NOTE: The contents of this specifications are subject to change without notice.

1-3 STANDARD ACCESSORIES:
(1) Grinding wheel(WA46:7.1" φ × 0.5" × 1.25" φ) ........................................ 1 pc
(2) Grinding wheel adaptor & Puller ......................... 1 set
(3) Arbor for wheel balancing .............................. 1 pc
(4) Diamond tool(1/4 carat) with a base ..................... 1 set
(5) Dust sweeping plate ................................... 1 pc
(6) Working lamp ........................................... 1 set
(7) Leveling plated ....................................... 3 pcs
(8) Leveling bolts with nuts ............................... 3 pcs
(9) Eyebolts ................................................ 4 pcs
(10) T-Nut .................................................. 2 pcs
(11) Necessary tools with a tool box .................... 1 set
(12) Lubrication oil (4 liter) ......................................................... 1 can
(13) Plug(5/8") ................................................................. 4 pcs
(14) Operation manual and inspection certificate ................................ 1 copy each
(15) Spare paint ................................................................. 1 can

*Details of tools

<table>
<thead>
<tr>
<th>NO.</th>
<th>Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pin face box wrench</td>
<td>27mm, 46mm</td>
</tr>
<tr>
<td>2</td>
<td>Hexagon – headed spanner</td>
<td>3, 4, 5, 6, 8</td>
</tr>
<tr>
<td>3</td>
<td>Adjustable wrench</td>
<td>200mm</td>
</tr>
<tr>
<td>4</td>
<td>Cross screw driver</td>
<td>NO:1</td>
</tr>
</tbody>
</table>
2-1 Transporting

2.1.1. Transportion of model 618

(1) When transporting the machine, care should be taken, so that any shock will not be given to the machine in the transportation.

(2) Lifting of the machine should be made by passing wire rope (more than \( \phi 8 \)) through the metal fittings (eyebolts) on the side of the base. In this case insert quilted cloth or damages will not be given to the machine. Weight of the machine is approximately 900 kg. (1980 lbs)

2-2 Cleaning

Use light-oil immersed soft cloth, in order to remove rust, preventive oil applied on the machine. Avoid a use of gasoline or thinner.

2-3 Installation

(1) Installation can be made on a floor in a usual machine shop (with concrete more than 150mm in thickness). However, avoid places where there is much vibration or the machine might be exposed directly to the sun.
Any special foundation work is not required except for a very poor ground condition. In case installation must inevitably be made around a place where there are shapers or presses which become the origin of vibration, vibration-proof foundation work must be done.

The surface grinding machine is one of the machine tools which have an aversion to vibration. Accuracy of the surface grinding machine is impeded to a great degree by the transmission of vibration coming from outside.

(2) First, put the five plates on a place to be mounted. Then, place the machine on them so that each of the five leveling bolts of the machine will be palced in conformity with each of those plates.

2-4 Adjusting

Horizontal adjustment is made by use of the five leveling bolts.

Place the precision level (sensitivity—one graduation 0.02m/m/M) on the surface of the table (or chuck). Make its adjustment within 0.04m/m/M for both the longitudinal and cross direction.

2-5 Power sources Wiring:

(1) Electrical equipment (refer to the wiring diagram).

The electrical equipment of the machine consists of the following items:

- Electric motor for grinding wheel: 1.13kw 2p
- Stepping motor for vertical feed: 21.6kg – cm
- Electric motor for dust suction system (OPT.): 0.4kw 2p
- Electric motor for cross movement: 25w
- Lubricating pump: 10w
- Hydraulic pump motor: 1.5kw 4p
- Working lamp: 60W

For 2 voltages compatibles motor, make sure that the motor wiring match with the source voltage. (refer to the wiring diagram). The motor was already wired for high voltage for safety.

(2) Connection of source

Connect the source (through your source switch) to the source cord on the rear part of the base.

Connect the working lamp to electric source or electric cabinet.

Connect the hydraulic pump motor to electric cabinet.

Caution: Never press push button switch power "ON" before oiling.

(3) Checking the direction of revolution.

Make an inching of the grinding wheel motor by pressing the push button switch and check to see the direction of its revolution. The direction of its
revolution must be clockwise, viewing from the front of the machine. If not, one phase of the power supply connection must be changed over.

(4) Connection of the dust suction motor to the magnetic switch inside the electric cabinet. (if you have this option)
3-1 Lubrication - System

This machine uses a fully automatic lubrication system. Oiling can be made into the oil tank on the lower part of the column. When connection the plug socket to the source, oiling to every part will be accomplished through the lubricating pump.

Oiling system

```
<table>
<thead>
<tr>
<th>Vertical column lead screw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil tank</td>
</tr>
<tr>
<td>Table saddle sliding</td>
</tr>
<tr>
<td>sliding surface</td>
</tr>
<tr>
<td>cross lead screw</td>
</tr>
</tbody>
</table>
```

3-2 Lubricating Oil

It is recommended that the equivalent oil can be used.

<table>
<thead>
<tr>
<th>service point</th>
<th>Amount</th>
<th>Oil specification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>lubricating oil tank</td>
<td>2 Liters</td>
<td>Mobil Vacuoline oil 1405 or slideway Lubricant ISO 32</td>
<td>Replenish in three to six months</td>
</tr>
</tbody>
</table>

3-3 Procedure of oiling

First, remove the cover on the lower part of the column and make an oiling into the oil tank. The capacity of the tank is approx. 4 liters. In a little while, oil will come to the inspection window on the upper part of the front of the column.
caution: The lubrication pump operates as soon as the source is put "ON". So never fail to cut "OFF" the source switch at the time of the completion of the operation.

Adjust valve for column slide way
Adjust valve for lead screw
Adjust valve for longitudinal and cross slide way.
<table>
<thead>
<tr>
<th>NO</th>
<th>Symbol</th>
<th>Code No.</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main Power</td>
<td>PB2</td>
<td>MAIN POWER ON</td>
</tr>
<tr>
<td>2</td>
<td>Emergency stop</td>
<td>PB1</td>
<td>When press this button, all the switches will be cut off except the magnetic chuck.</td>
</tr>
<tr>
<td>3</td>
<td>End Mode</td>
<td>SW1</td>
<td>Left: (POWER OFF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Table stop to right and cut off main power when work is finished.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Right: (Buzzer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Buzzer is actuated when work is finished.</td>
</tr>
<tr>
<td>4</td>
<td>Feed Mode</td>
<td>SW5</td>
<td>Left 1: Traverse automatic grinding cycle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Left 2: Traverse grinding cycle with manual down feed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Middle: manual control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Right 1: Plunge automatic grinding cycle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Right 2: Plunge grinding cycle with manual down feed.</td>
</tr>
<tr>
<td>5</td>
<td>Cross feed</td>
<td>VR3</td>
<td>Control the cross feed rate when traverse automatic grinding cycles is working. Turn C.W. to increase the speed rate.</td>
</tr>
<tr>
<td>6</td>
<td>Rising mode</td>
<td>SW2</td>
<td>Left: No rising of grind wheel when work is finished.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Middle: Grind wheel return to zero point.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Right: Grind wheel rise to a distance ( a ) beyond zero point.</td>
</tr>
<tr>
<td>7</td>
<td>Cycle start</td>
<td>PB3</td>
<td>Automatic cycle start</td>
</tr>
<tr>
<td>8</td>
<td>Cycle stop</td>
<td>PB4</td>
<td>Automatic cycle stop</td>
</tr>
<tr>
<td>9</td>
<td>Plunge Mode</td>
<td>SW3</td>
<td>Left: Down feed at both side of table reverse.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Right: Down feed at left side only.</td>
</tr>
<tr>
<td>10</td>
<td>Magnetic chuck</td>
<td>SW4</td>
<td>Left: Magnetic clamping force is provided.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Center: Stops magnetic clamping force</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Right: Demagnetization is provided.</td>
</tr>
<tr>
<td>11</td>
<td>Demagnetizing Time adjustment</td>
<td>VR1</td>
<td>CW:TO increase the demagnetizing time. C.C.W.:To increase the clamping force</td>
</tr>
<tr>
<td>12</td>
<td>Magnetic chuck Clamping Force Adjustment</td>
<td>VR2</td>
<td>CW:To increase the clamping force</td>
</tr>
<tr>
<td>13</td>
<td>Spindle Motor</td>
<td>Left: ON Right: OFF</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Hydraulic Motor</td>
<td>Left: ON Right: OFF</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Coolant and Dust Suction Motor</td>
<td>Left: ON Right: OFF</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Stepping Motor Holding Torque Release</td>
<td>Left: Holding torque release Right: Holding torque not release.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>ZERO SET</td>
<td>Push this button to reset screen to be zero.</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>ZERO RETURN</td>
<td>Push this button to have grind wheel go to zero point.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>FINE FEED RATE SET</td>
<td>Push this button to have screen sparkling and set a new fine feed value</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>EDIT</td>
<td>Push this button to have screen sparkling one by one and set down feed value.</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>NUMBER KEY</td>
<td>For setting the feed value.</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>ERASE KEY</td>
<td>Erase the wrong value during editing.</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>ENTER TOTAL FEED AMOUNT SCREEN &quot;T&quot;</td>
<td>Confirm the editing value.</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Rough feed rate screen &quot;R&quot;</td>
<td>For indicate and input the total stock removal.</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Fine feed stock removal screen &quot;f&quot;</td>
<td>For indicate and input the fine feed stock removal</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Fine feed ratee screen &quot;F&quot;</td>
<td>For indicate and input the fine feed rate</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Spark out screen</td>
<td>For indicate and input the spark out times</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Position/Auto – return value &quot;a&quot; screen</td>
<td>Shows the present position of vertical axis/Indicate and input the auto – return value &quot;a&quot;</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Rapid cross feed button</td>
<td>Left: Saddle moves inward. Right: Saddle moves outward.</td>
<td></td>
</tr>
</tbody>
</table>
|   | Rapid vertical feed button | Left: moves down  
Right: moves up  
Push button continuously: 230mm/min  
one touch of button: 0.001mm/touch |
|---|-----------------------------|------------------------------------------------------------------|
| 32 | Semi-rapid vertical feed button | Left: moves down  
Right: moves up  
Feed rate is about 29 mm/min |
| 33 | Default vertical feed | Left: moves down  
Right: moves up  
Set-up by ② value, and push button once it gives one “F” feed. |

4-2 Function of Table Speed Control Lever on the Front of Base

![Table Speed Control Diagram]

Turn C.W.: Increase table speed
Turn C.C.W.: Decrease table speed & stop.

4-3 Table Longitudinal Movement

Hydraulic table travel

To engage the hydraulic table travel, turn the table speed control lever C.W. until desired speed is obtained.

Hydraulic pressure is unloaded when the lever is in the tables stop position.

(C.C.W., dead point) Table stroke length is set by two table dogs and two proximity switches located inside of saddle which provides easy setting and safe handling of the machine.

Be sure the table hand wheel is in pull-out position before starting the hydraulic table travel.
Table hand feed

The table hand wheel is located on the left side of the front controls and moves the table by rack with a pinion at the end of hand wheel shaft. In case of hand feed; the safety hook must be unlocked then push hand wheel in where pinion rad the rack are engaged.

When the desired position is obtained, pull-out the hand wheel and lock the safety hook for preventing the turning of hand wheel in case of hydraulic feed.

4-3-1 Saddle cross movement

Saddle is driven by a set of electric motor system which provides continuous rapid feed and auto step feed.

Rapid feed

Turn mode selection switch ④ on control panel to middle, then press button switch ⑩ left to get inward movement or ⑪ right to have outward movement. It gives a fix speed about 1200mm/min.

Saddle stops immediately when the button is released.

Auto. step feed

There is a set of electronic driving system which provides automatical cross step movement on presetting feed rate.

Select the step feed mode by turning switch ⑥ to left-1 then adjust feed rate by turning switch ⑤ (c.w. to increase).

Adjust the dogs at left side of saddle to have suitable stroke in accordance with the width of work piece.

Actuate the table longitudinal feed, then press either push button switch ⑪ to get desired direction of step feed.

The saddle will give an auto. cross movement at each reversing of tables, and reverse by the pre-setting stroke of left side dogs.

4-4 Hand-wheel Operation

Vertical feed hand-wheel
Revolve clockwise       Rising
Revolve counter-clockwise  Descending
Cross feed hand-wheel
Revolve clockwise       Retreating
Revolve counter-clockwise  Advancing
Longitudinal feed hand wheel
Revolve clockwise       Rightward
Revolve counter-clockwise  Leftward

4-5 Grind wheel vertical movement

Grind head unit is driven by a set of stepping motor system which provides rapid and semi-rapid movement and automatic down feed.

Rapid movement:
Push key ⑩ ⑪ to have rapid and semi-rapid movement of grind head unit.
Automatic down feed:
The auto down feed is set – up by key ②.

4–5–1 Edit Procedure: (Refer to the printed diagram on left side of control panel)
1. Push key 20
2. ② screen "T" will start to sparkling.
3. Key – in desired value by number keys ③. Then confirm by enter key ③.
4. ③ screen "R" will start to sparkling, do as process 3. does.
5. Follow the same sequence to key – in and confirm ③ ③ ③ ③ values.

4–5–2 Traverse automatic downfeed:
1. Select traverse mode by turning switch ④ to left. ( 
2. Adjust the longitudinal movement of table by proximity switch and dogs.
3. Adjust the cross movement stroke of saddle by limit switch and dogs.
4. Adjust the cross feed rate by turning switch ⑤.
5. Select rising mode of grind head by switch ⑥.
6. Select ending mode of grind head by switch ③.
7. Make a light touch of work piece with grind wheel then stop the table, but remain the vertical position of grind wheel not move.
8. Push zero set key ⑦ to have screen ③ clear to zero.
9. Measure thickness of work piece and determine the removing amount.
10. Push key ⑧ for editing. (See detail A for EDIT process)
11. Start the table
12. Push key ⑨ to start the cycle.
13. Push key ⑩ to stop the cycle.

4–5–3 Plunge automatic downfeed:
1. Select plunge mode by turning switch ④ to 13:00 o’clock position. ( 
2. Select both side or left side feed by switch ⑨.
3. Do as B–5–13 does.

4–6 Mounting and Dismounting of Grinding wheel
It is recommended to select a grinding wheel with abrasive grain, grain size, hardness (degree to be bound) and binding material suitable for the material, shape and accuracy of the work–piece. And make sure that there exist no cracks as a result of a sound test (by lightly tapping the wheel with a wooden hammer).

(1) When mounting a new wheel to the machine, first, mount it to the grinding wheel flange and balance it roughly by use of the wheel balancing device.

Note: Refer to the Paragraph 4.7 "Balancing of Grinding Wheel."

(2) Wipe lightly a tapered end part of the wheel spindle and the tapered hole of the flange, and check to see that there are no dusts on them. Then, insert the wheel flange into the tapered part and clamp a hexagon–headed nut with the attached wrench.

At this time, hold down the wheel by left hand.
(3) Close the wheel cover.

(4) Start the wheel spindle by pushing the push button switch on the electric cabinet and make a racing of the wheel in a few minutes. At this time, do not allow your face to come near the wheel, because an accident may occur.

(5) Make a rough dressing with the diamond dresser mounted on the chuck until swing of the outer periphery of the wheel disappears. Place the diamond in a position where its tip comes somewhat leftward away from just under the center of the wheel.

(6) Stop the revolution of the wheel and turn reversely the hexagon-headed nut, pressing down the wheel by left hand. Then, remove the wheel flange and make balance of the wheel precisely again.

Note: It is recommended that balancing will be made timely at the time of operating, because the wheel becomes out of balance due to its wear.

4-7 Balancing of Grinding Wheel

Explanation is made on how balancing of the wheel is done by the use of the...
wheel balancing device (special accessories).

(1) Place the device on a sturdy base and make out a level of the knife edge with the three adjusting bolts, looking at the attached level.

(2) Insert the grinding wheel flange with a mounted wheel into the arbor for an exclusive use, and fix it, clamping the nut.

(3) Put the above onto the device and allow it to run lightly.

(4) When the wheel is out of balance, it comes back a little to the opposite direction to that of revolution, and in a little while, the wheel makes a movement just like a pendulum and stops.

(5) In the item (4) the heaviest part comes underneath, so, make a mark of that point with chalk.

(6) Put on balance piece on a place on the opposite side to the position marked with chalk and fix it with a screw.

(7) Check to see which is heavier, the side with the fixed balance piece or the opposite side (on the side marked with chalk), by use of the device.

(8) On the opposite side to the heavier side, mount two balance pieces in symmetry with the line of gravity (angle is optional).

(9) Check to see a balance of the wheel again. When the wheel is out of balance, repeat its balance until a complete balance is obtained, adjusting opened angle of the two balance pieces (make sure of moving in symmetry with the line of gravity)

Note: Moment decreases as the balance pieces come near the center.

(10) When balance is attained, the wheel dose not swing any longer like the pendulum.
4-8 Operator's Checking before Operation

Prior to the grinding operation, once again check the following items to insure successful operation.

2. Fill the hydraulic tank with approximately 16 gallons (60 liters) hydraulic oil.
   Check the quantity of oil by observing an oil gauge attached at the side of the tank.
3. Make certain the machine voltage before connecting it to your power supply. The
   name plate of the machine voltage is attached on the electrical power box.
4. Check the rotation of the wheel with the arrow on the wheel guard. If incorrect, one
   phase of the power supply line must be changed over.
5. Check the oil gauge at the top of column to see if there is oil running when press
   the main power bottom (1) after 1 or 2 minutes.
6. Check the wheel specifications and safety speed. Consult your wheel supplier for
   recommended grades of wheel for various materials to be ground.
7. Confirm the wheel had been trued properly.
8. Care should be taken for the mounting and handling of the wheel to wheel adaptor
   and also their unit to spindle nose.
9. The table of this machine has been ground and does not require further regrinding.
A light cut of the mounting surface of magnetic chuck, if necessary, must be taken to prevent the bending of table after clamped.

10. Table speed control lever must be at stop (9:00 o'clock) where no table feed is provided.

11. On the control panel for the selection of dust suction & coolant pump motor must be at the OFF position.

12. Legal running of the dust suction motor and coolant pump motor.

13. Legal running of the hydraulic pump motor.

14. All the preset value for automatic downfeed are correct and all the function keys are on the proper position.

4–9 Trial Running of the Machine
(Prior to entering into this operation, make sure to confirm OPERATOR'S CHECKING BEFORE GRINDING OPERATION shown on the former pages item 4.8)

1. Press main power button ①

2. Confirm lubrication oil appear in the oil gauge on the column top.


4. Check the direction of wheel spindle revolution (Clockwise).

5. Press hydraulic pump motor ④ on.

6. Move the table few times by table hand wheel and then stop it at the position where saddle proximity switches are in between two table dogs.

7. Turn table speed control lever slowly until its speed reaches to 5–6 m/min (20 ft/min).

8. Confirm table moves smoothly.

8–1. Turn switch ④ to left

8–2. Adjust switch ⑤ to middle

8–3. Press push button switch ⑦

8–4. Confirm saddle moves smoothly

9. Return the lever to table stop position.

10. Press dust suction ⑫–L coolant pump to confirm their function.


12. Re-press ⑬–L, ⑭–L, ⑮L button, then press Emergency stop button ② for confirming stop of hydraulic pump, spindle motor, dust suction motor at the same time.

If there is no abnormal operation by above, trial running of the machine is completed.
5. GRINDING OPERATION

5-1 Basic Grinding Operation

(1) Mount the wheel, the balance of which has been attained.

A wheel out of balance worsens accuracy of the workpiece and shortens a service life of the wheel spindle.

(2) Wipe well the surface of the chuck with a sweeping plate, wiper of wastes, and put quietly the workpiece onto the check for fixing the workpiece on it.

(3) Clamp the workpiece on the chuck.

(4) Adjust the clamping force by actuating knob ③ if you have this option.

(5) Adjust the position of the table dogs on the right and left side in accordance with the length of the workpiece.

(6) Press the main power button ①

(7) Press the spindle motor button ③-L

(8) Press the hydraulic pump motor ④-L

(9) Turn table speed control lever slowly to get a smooth table speed about 6M/min.

After a reverse or two then up to your desired speed.

(10) Re—adjust the dogs to get suitable travel length to meet the workpiece.

(10-1) For plunge grinding (or shoulder grinding) keep mode selection switch ④ on left (9 o’clock) position.

(10-2-1) For traverse grinding keep mode selection switch ④ on left (9 o’clock) position.

(10-2-2) Re—adjust the feed rate by turning switch ⑤

(10-2-3) Re—adjust the reversing stroke of saddle in accordance with the width of workpiece by adjusting the dogs on the left side of it.
(11) When the vertical feed hand-wheel is revolved, the wheel is allowed to cut in the work. In this case, great care should be taken so that the wheel will not encroach upon the workpiece on account of overfeeding on occasion when it approaches the workpiece. It is also recommended that infeed will be made, allowing the longitudinal hand-wheel to operate slowly.

(12) After the wheel had come in contact with the workpiece, proceed to the grinding operation, giving a suitable amount of infeed to the wheel.

A Criterion of the amount of infeed

<table>
<thead>
<tr>
<th></th>
<th>Coarse</th>
<th>Vertical feed</th>
<th>0.01 – 0.03mm&lt;br&gt;(0.0004 – 0.0012&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cross feed</td>
<td>2.5 – 5 mm&lt;br&gt;(0.1 – 0.2&quot;)</td>
</tr>
<tr>
<td>Dry traverse grinding</td>
<td>Fine</td>
<td>Vertical feed</td>
<td>0.0025 – 0.005 mm&lt;br&gt;(0.0001 – 0.0002&quot;)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cross feed</td>
<td>1 – 3 mm&lt;br&gt;(0.04” – 0.12&quot;)</td>
</tr>
<tr>
<td>Dry plunge grinding</td>
<td>Coarse &amp; fine</td>
<td>Vertical feed</td>
<td>0.0025 – 0.015 mm&lt;br&gt;(0.0001 – 0.0006&quot;)</td>
</tr>
</tbody>
</table>

Note: (1) The feed amount of wet grinding (pouring water) should be 50 – 100% more than that of dry grinding.

(2) Select the amount of feed properly in accordance with grain size, hardness of the wheel and material or hardness of the workpiece.
5–2 Saddle Clamping Device

This device is applied for a plunge grinding which is done without giving any cross feed, especially for form grinding.

5–3 Dust Suction System

Be sure to use the dust suction system in the case of dry grinding.

Grinding dusts pollute the air in the shop and are harmful to the security of the machine and the health. The height of the mouth of the dust suction is adjustable. Accordingly, efficiency of dust suctioning can be enhanced, when the mouth is lowered enough within the limits of that it does not impede with the workpiece.

Note: Never use the dust suction system in the case of wet grinding (pouring water).
6-1 General Maintenance

It is essential that the following periodical maintenance will be kept, in order

(1) Wipe every part of the machine, in particular, its polished part with Oil-immersed cloth after wiping it with dry cloth at the time of completion of the operation.

(2) Remove grinding chips in the inner part of the wheel guard or on the surface of the table.

6-2 Chuck

The surface of the chuck is an important surface which becomes a standard of accuracy, but it has a tendency to be scratched, because it is made of soft steel material. Is is, therefore, necessary to treat it with consideration as much as possible. It becomes necessary to grind the surface of the chuck over again, if its accuracy gets out of order or there come out some scratches on it.

Note: For the grinding of the surface of the chuck it is recommended that grinding wheel to the grade WA46H will be used and its rough dressing performed with a small amount of infeed. Be sure that grinding will be done after excitation. Also, clean the surface of the chuck well and oil it thinly.

6-3 Grinding Wheel Spindle

As grease lubrication is given for the grinding wheel spindle bearings, oiling is not required for it. In case its accuracy will be reduced after a few years usage of it (its service life is dependent upon the condition of usage), return it to our company for its repair or replace it with a new spindle. Procedure for the replacement of the wheel spindle:

(1) Remove the wheel.
(2) Loosen the clamp bolt and remove the guard.
(3) Loosen the set screws positioning at the five points on the upper and lower part of the wheel head.
(4) Remove the connections of the motor.
(5) Pull out the motor backwards, keeping it by both hands.
(6) Mounting of the wheel spindle should be made according to the reverse methods to the above procedure.

In this case, never clamp the screw of the wheel head too strong.
6-4 Lubricating Oil

Change lubricating oil after first month operation and six to twelve months after for the next, respectively.
There is an exhaust port (threaded plug) on the lower part of the oil tank.
At the same time, clean the inner part of the oil tank the filter of the pump.

6-5 Hydraulic Oil

Change yearly, 60 liters each time (Esso R68 is suggested)
There is an exhaust port (threaded plug) on the lower part of the oil tank.
At the same time, clean the inner part of the oil tank and the filter of the pump.
ESSO R68
1. Change Yearly
2. 60 Liters Each Time

Increase Table Speed C.W.

Speed Control Unit
(LOCates in Front of the Base)
<table>
<thead>
<tr>
<th>No.</th>
<th>PART NAME</th>
<th>SPEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RELIEF VALVE</td>
<td>JUNHER SHING BG-04</td>
</tr>
<tr>
<td>B</td>
<td>MOTOR</td>
<td>JUN CHUNG 220/60.4P2HP</td>
</tr>
<tr>
<td>C</td>
<td>SOLENOID VALVE</td>
<td>VICKERS DG4V-3S-6C-MUB</td>
</tr>
<tr>
<td>D</td>
<td>THROTTLE &amp; CHECK VALVE</td>
<td>JUNHER SHING MTC 02W</td>
</tr>
<tr>
<td>E</td>
<td>OIL TANK</td>
<td>VOL.75 liters</td>
</tr>
</tbody>
</table>

6.6 HYDRAULIC PRESSURE ADJUSTMENT

The working pressure of the hydraulic pump is set to 12kg/cm² (168 lbs/in²) and this had been adjusted at factory before shipment.

However, when the setting is disturbed by unforeseen accidents, this setting must be readjusted.

To check the pressure of hydraulic system: (See fig. 1)

1. Start the table hydraulically with a slow speed of less than 1 m/min. As hydraulic pressure is unloaded when the table is stopped correct pressure can not be observed.
2. Open the gauge cock ⑧ located just under the pressure gauge and observe the hydraulic pressure.
3. Loose nut ⑥ C.C.W.
4. Turn screw ⑦
   1) C.W. to increase pressure.
   2) C.C.W. to decrease pressure.
5. Fasten nut ⑥, after the adjustment is done, s done.
6. Close gauge cock ⑧ to maintain the life of the pressure gauge.
Outline dimensions for model 618.

Clearance chart & Floor Plan:

-1880 x 74""
-260 x 10.24"
-1350 x 53.14"
-270 x 10.63"

-630 x 24.8"

-1180 x 48.6"

-1520 x 59.84"

-210 (8.26"

-150 (5.92"

-875 (34.4"

-44 (1.73"

-Ø 1887.07"

-Ø 623.52"

-Ø 150 (5.92"

-210 (8.26"

-150 (5.92"

-875 (34.4"

-44 (1.73"

-Ø 1887.07"

-Ø 623.52"
TABLE OF CONTENT

1. CONNECTION DIAGRAM  PAGE 1
2. CONTROL HARDWARE DESCRIPTION  PAGE 2
3. TROUBLESHOOTING  PAGE 6
2. Control hardware description:

A. PCB DRAWING

There are 3 PCBs in the control system.
The part number and function description are as follows:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Figure No.</th>
<th>Function Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0110</td>
<td>Fig. I-2-1</td>
<td>Display and keyboard</td>
</tr>
<tr>
<td>A0109</td>
<td>Fig. I-2-3</td>
<td>Main control and driver board</td>
</tr>
<tr>
<td>A0100</td>
<td>Fig. I-2-2</td>
<td>Switching mode power supply</td>
</tr>
</tbody>
</table>

**Fig. I-2-1  Display & Keyboard (MT 0110)**

**Fig. I-2-3 Switching power supply (MT 0100)**
B. DIP SWITCH SETTING

The DIP switches (SW1) on the main control board set the stepping motor current. These switches were set to a default value before shipping. Please do not change the setting.

C. OUTPUT SIGNALS

The output signals are connected to the terminal strip (CN6) on the main control board. The LED 23 to LED 33 are used for output signal on/off indication. Signals description as follows.

<table>
<thead>
<tr>
<th>SSR NO.</th>
<th>PIN NO.</th>
<th>LED NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSR 1</td>
<td>2</td>
<td>LED 23</td>
<td>Compressor on/off control</td>
</tr>
<tr>
<td>SSR 3</td>
<td>4</td>
<td>LED 25</td>
<td>Cooling water on/off control</td>
</tr>
<tr>
<td>SSR 4</td>
<td>5</td>
<td>LED 26</td>
<td>Start lamp on/off control</td>
</tr>
<tr>
<td>SSR 5</td>
<td>7</td>
<td>LED 27</td>
<td>Go left control</td>
</tr>
<tr>
<td>SSR 6</td>
<td>8</td>
<td>LED 28</td>
<td>Go right control</td>
</tr>
<tr>
<td>SSR 7</td>
<td>9</td>
<td>LED 29</td>
<td>Spindle on/off control</td>
</tr>
<tr>
<td>SSR 8</td>
<td>11</td>
<td>LED 30</td>
<td>Go backward control</td>
</tr>
<tr>
<td>SSR 9</td>
<td>12</td>
<td>LED 31</td>
<td>Go forward control</td>
</tr>
<tr>
<td>SSR 10</td>
<td>13</td>
<td>LED 32</td>
<td>Buzzer on/off control</td>
</tr>
<tr>
<td>SSR 11</td>
<td>14</td>
<td>LED 33</td>
<td>Cut power control</td>
</tr>
</tbody>
</table>
D. INPUT SIGNALS DESCRIPTION

There are 20 input signals connected to the CN8 on the main control board. The correspondent LED is used for input switch contact close indication.

<table>
<thead>
<tr>
<th>NO.</th>
<th>PIN NO.</th>
<th>LED NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN 1</td>
<td>3</td>
<td>LED 3</td>
<td>Left proximity switch</td>
</tr>
<tr>
<td>IN 2</td>
<td>4</td>
<td>LED 4</td>
<td>Right proximity switch</td>
</tr>
<tr>
<td>IN 3</td>
<td>5</td>
<td>LED 5</td>
<td>Front proximity switch</td>
</tr>
<tr>
<td>IN 4</td>
<td>6</td>
<td>LED 6</td>
<td>Rear proximity switch</td>
</tr>
<tr>
<td>IN 5</td>
<td>7</td>
<td>LED 7</td>
<td>Upper limit switch</td>
</tr>
<tr>
<td>IN 6</td>
<td>8</td>
<td>LED 8</td>
<td>Compressor auto/manu switch</td>
</tr>
<tr>
<td>IN 7</td>
<td>10</td>
<td>LED 9</td>
<td>Start input signal</td>
</tr>
<tr>
<td>IN 8</td>
<td>11</td>
<td>LED 10</td>
<td>Stop input signal</td>
</tr>
<tr>
<td>IN 9</td>
<td>12</td>
<td>LED 11</td>
<td>Cut power / alarm selection when one piece girding finished</td>
</tr>
<tr>
<td>IN 10</td>
<td>13</td>
<td>LED 12</td>
<td>Auto surface girding selected ( *1 )</td>
</tr>
<tr>
<td>IN 11</td>
<td>14</td>
<td>LED 13</td>
<td>Semi-auto surface girding selected ( *1 )</td>
</tr>
<tr>
<td>IN 12</td>
<td>15</td>
<td>LED 14</td>
<td>Auto cutting selected ( *1 )</td>
</tr>
<tr>
<td>IN 13</td>
<td>16</td>
<td>LED 15</td>
<td>Semi-auto cutting selected ( *1 )</td>
</tr>
<tr>
<td>IN 14</td>
<td>17</td>
<td>LED 16</td>
<td>Left feed Selected ( *2 )</td>
</tr>
<tr>
<td>IN 15</td>
<td>18</td>
<td>LED 17</td>
<td>Spindle goes up mode 1 ( *3 )</td>
</tr>
<tr>
<td>IN 16</td>
<td>19</td>
<td>LED 18</td>
<td>Spindle goes up mode 2 ( *3 )</td>
</tr>
<tr>
<td>IN 17</td>
<td>20</td>
<td>LED 19</td>
<td>Forward/backward feed control signal ( *4 )</td>
</tr>
<tr>
<td>IN 18</td>
<td>21</td>
<td>LED 20</td>
<td>Forward/backward feed control signal ( *4 )</td>
</tr>
<tr>
<td>IN 19</td>
<td>22</td>
<td>LED 21</td>
<td>Forward/backward feed control signal ( *4 )</td>
</tr>
<tr>
<td>IN 20</td>
<td>23</td>
<td>LED 22</td>
<td>Forward/backward feed control signal ( *4 )</td>
</tr>
</tbody>
</table>

*1. IN10, IN11, IN12 and IN13 are signals for girding mode selection. The selection table is as follows.

<table>
<thead>
<tr>
<th>Girding mode</th>
<th>IN10</th>
<th>IN11</th>
<th>IN12</th>
<th>IN13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual girding mode</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Auto surface girding</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Semi-auto surface girding</td>
<td>Off</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Auto cutting</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
<td>Off</td>
</tr>
<tr>
<td>Semi-auto cutting</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
</tr>
</tbody>
</table>

*2. IN 14 controls the feed mode.

| IN 14 off | The spindle feeds at both left and right side. |
| IN 14 on  | The spindle feeds at only left side           |

*3. IN15 and IN16 determines the “spindle go up mode”.

| IN15 off / IN16 off | The spindle goes up to the original position when girding is finished. |
| IN15 on / IN16 off  | The spindle goes up to the “origin + a” position when finished.       |
| IN15 off / IN16 on  | The spindle does not go up but set alarm when girding is finished.    |
4. IN17, IN18, IN19 and IN20 set the forward/backward jog length. The higher setting value results in longer each jog distance.

<table>
<thead>
<tr>
<th>Length</th>
<th>IN20</th>
<th>IN19</th>
<th>IN18</th>
<th>IN17</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>3</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>4</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>5</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>6</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>7</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>8</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>9</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>10</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>11</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>12</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>
3. Troubleshooting:

1. Panel display shows “all zero” and no action when key pressed (only beep).
   The display shows last setting value when power turns on. When “edit” key is pressed the corresponding setting window flashes. If display shows “all zero” and no other response besides “beep” when press “edit” key.
   **Possible cause and solution:**
   
   - *Bad connection between PCB MT-0109 and MT-0110.*
     
     Please check the connection of 9 pin D-type connector from MT-0110 CN2 to MT-0109 CN4. (See section I - 1 connection diagram).

2. Position display shows “blank” and stepping motor unlocked.
   **Possible cause and solution:**
   
   - *Y’ axis motion has switched to manual operation.*
     
     Please press “auto/manu” key to toggle the motion control to auto mode. In auto mode, the position display will show a value no matter where it is.
   
   - *Over temperature*
     
     Please check if “LED2” is lit. “LED2 lit” indicates that the stepping driver heat sink is over temperature. It may be caused by damage of the cooling fan that is located beside the main PCB.
   
   - *Over current*
     
     Please check if “LED1” is lit. “LED1 lit” indicates that the stepping driver over current. Please turn off and re-turn on the power to see if this over current happens again. If over current happens every time when motor move, please replace the main control board. If over current happen occasionally please set DIP switch (SW1-4) from on to off and check again.

3. Stepping motor miss positioning when moving.
   **Possible cause and solution:**
   
   - *Motor over loaded*
     
     If the miss positioning occurs only in motor fast moving and slow motion is ok, it is possible that motor is overloaded. Please check the mechanism.
   
   - *Bad motor connection*
     
     Please check and fix the motor wire connection.
   
   - *Motor demagnetized*
     
     Replace the motor.
   
   - *Driver damaged*
     
     Replace the main control board.
4. The “cradle” goes to left then stop at left end without back to right.

Possible cause and solution:

- The cradle was in the left side before start.
  Push the cradle to right or middle position before the compressor was turned on.
- Faulty or bad connection of left proximity switch.
  Check “LED3” to verify if the left proximity switch is ok.
INPUT & OUTPUT SIGNALS CONNECTION DIAGRAM

INPUT SIGNALS CONNECTION

+13V

13V
13V
IN1
IN2
IN3
IN4
IN5
IN6
IN7
IN8
IN9
IN10
IN11
IN12
IN13
IN14
IN15
IN16
IN17
IN18
IN19
IN20
GND
GND

Pin No.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Left px. sw
Right px. sw
Front px. sw
Rear px. sw
Upper limit sw
Compressor sw
Start push bottom
Stop push bottom
Cut power/Alarm select
Auto surface
Semi auto surface
Auto cutting
Semi auto cutting
Left feed
Spindle rising mode 1
Spindle rising mode 2
Forward/backward feed control (12 grades)

Output terminal

COM
SSR 1
SSR 2
SSR 3
SSR 4
COM
SSR 5
SSR 6
SSR 7
COM
SSR 8
SSR 9
SSR 10
SSR 11

1
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14

AC 110V
Compressor
Water
Start lamp
Go left
Go right
Spindle
Backward
Forward
Buzzer
Cut power

DIP Switch

A (1)
F (2)
B (4)
E (3)
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