Flat Lapping Machine

1) Introduction to Flat Lapping:

Flat lapping is a precision finishing process used to create flat, smooth surfaces on various materials. The process involves using a lapping plate and abrasive compounds to remove material from the surface of a workpiece, achieving a high degree of flatness and surface finish. It is commonly used in industries requiring tight tolerances and high-quality finishes.

2) Specifications:

Flat Lapping Surface: Diameter 500mm OD

Machine Overall Size: 400mm x 1350mm x1200mm (W x L x H)

Material: Special grade casting for lapping

Capacity: Can lap 3 jobs simultaneously

Bowl: 3 Nos

Weight Applied: Manually applied vertically using a circular plate

Motor Power: 1HP, 3 Phase

Speed Reduction: Worm gear box with a ratio of 1:15

Lapping Paste Application: Automatically applied using a pump

Pump Capacity: 10 Watts

Tanks: Two tanks available, one for fresh lapping water and the other for waste slurry

Tank Capacity: 15 Liters each

Control: Easy to handle and control via a machine panel

Speed Control: Adjustable from 0 RPM to 120 RPM using VFD (Variable Frequency Drive)

Display: Small display showing cycle status and control settings. RPM meter and VFD Display is also fix.

3) Process:

a) Clean the lapping plate with Kerosene.

b) Place the bowls in the correct position and place the job rings inside the bowls.

c) Add weight according to the lapping requirement.

d) Use the panel to set the Cycle time and applying lapping past mixture water with the help of pump.

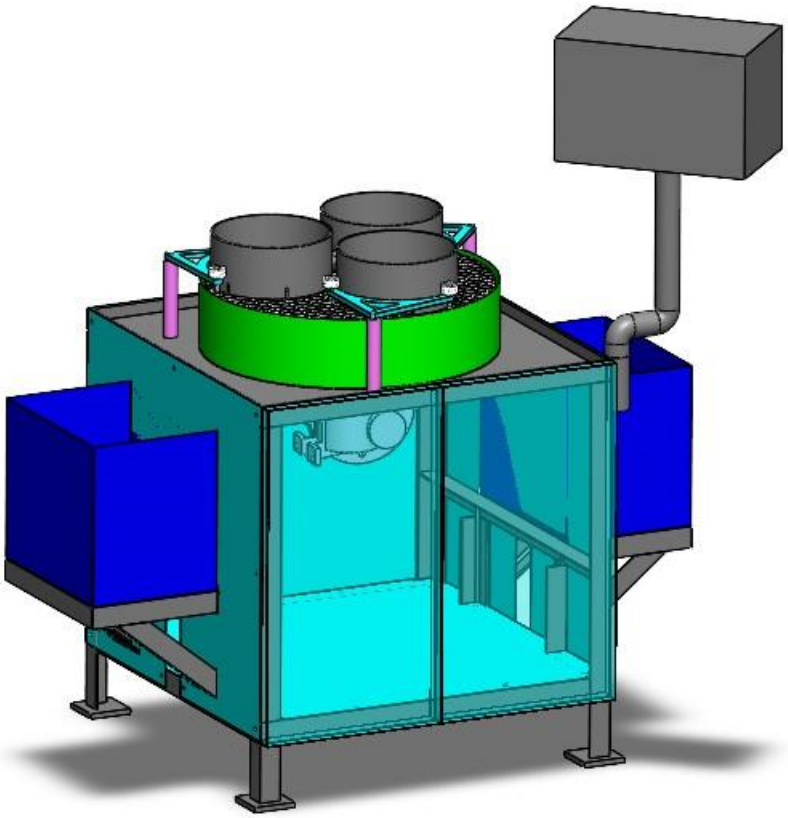
e) Start the cycle.

f) Lapping water pump inching manual in cycle as your requirement.

g) After the cycle is complete, check the job size and RA value. If the job is not finished, place it again in the bowl.

h) Set the values for the repeat cycle time.

i) Start the repeat cycle. After the cycle is complete, check the size and finish. If everything is correct, the process is complete. If not, adjust the cycle time in the panel and repeat the process.



Lapping Machine Control Instruction Manual

Lapping Machine Control panel is custom designed control panel, with embedded control. Lets have a general overview of it.

A. The front panel includes following control/indicator elements.

1. Rotary Table drive motor On/Off/Speed through VFD Control.

2. Lapping Compound feeder pump ON/OFF/Inching Control.

3. Lapping Compound Mixer ON/OFF/Inching Control.

4. Rotary Table RPM Indicator.

5. Control Status/configuration 16x2 LCD display.

6. Table Drive Motor ON LED indicator.

7. Lapping Compound feeder ON LED indicator.

8. Auto Cycle On LED Indicator.

9. Alarm Status LED Indicator.

10. Mains Power LED Indicator.

11. Emergency Off.

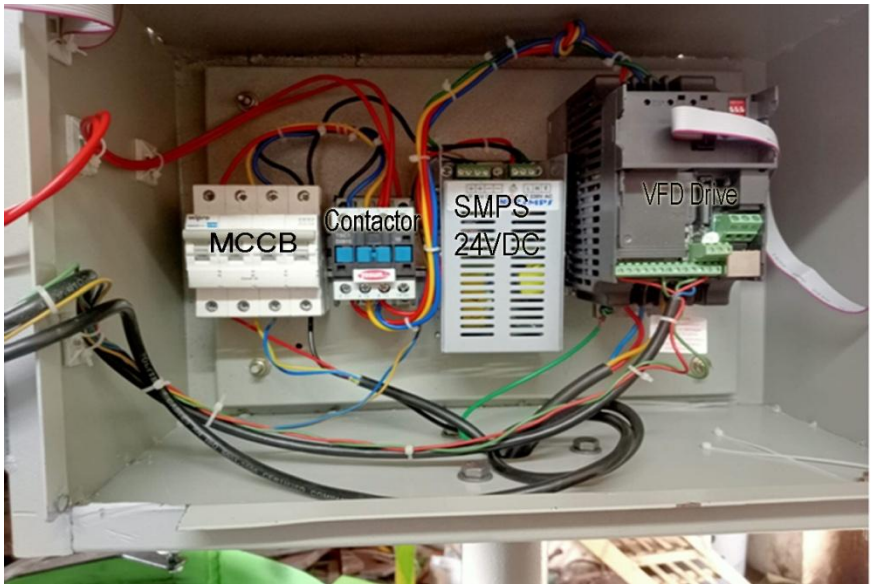
12. Main Power On/Off switch.

13. Set/Run Toggle Switch.

14. VFD Frequency Control (Rotary POT).

15. VFD Frequency display.

B. <u>The Inside panel overview includes following control/indicator elements.</u>



1. Main Power 4-pole MCCB.

2. Power Contactor 4-pole.

3. SMPS Power supply 24VDC

4. VFD Control.

5. Embedded Controller PCB.

C. External Actuators/Control Elements.

1. Rotary Table Driver 1HP/3Ph. Motor

2. Lapping Compound Feeder 24VDC/Peristaltic Tube Pump.

3. Lapping Compound Mixture/Agitator 1Ph./AC.

4. RPM Sensor/Inductive Proximity/PNP/NO/M12.

D. Commissioning/installation.

Installation at production shop floor is quite easy task. To ensure quick and error free connections, we have provided polarized, no interchangeable I/O connectors. Just take care of input side, 3 phase, Neutral and earth connections. Lets see summery of I/O connectrers.

1. Mains Input, 3 Pin/3Phase/16A, Male female, Connector.

2. Mains Input, 2 Pin/6A/Neutral-Earth/Flat/Male female, Connector.

3. Rotary Table drive Motor Power 3pin/3Phase/10A, Male female, Connector.

4. Agitator/Mixer, 2Pin/6A/Flat/male female, Connector.

5. Lapping Compound Peristatic Pump Motor, 24VDC/2Pin/6A/G16/Round shell/male female, Connector.

6. RPM Input Inductive Proximity Sensor/3wire/4-pin/Plastic/Square header/Connector.

All these connecters are marked for identification. Just ensure correctness of mains power input side carefully. Once confirmed, you can apply power. Then Initially check inbuilt MCCB st to <On> Position. Then close and lock the panel door. Now check if Emergency Switch released. Also set the <SET/RUN> Toggle switch to <RUN> position.

Then switch the <Main On> Switch Knob to On position. It have center off position and both left right are power on positions. You shall observe <Power On> indicator glow. At the same time, power contactor on sound shall be heard. Same way you shall see <LCD Display> on. You will see some initializing messages.

Shree Tech SPM

SC/STSI/LAP1/092

First line indicate original manufacturer name. Second Line indicate Software Version code. Then the display flashes following messages.

Iitializing ...

Please wait..

Then the display changes to

Manual Mode Run

This is the default menu, that loads. Now you have three options.

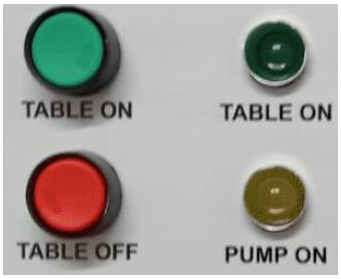
1. Checking Main Table rotation and direction by pressing table On Touch switch. However check motor speed setting POT Knob to left most position(Anticlockwise). The VFD display

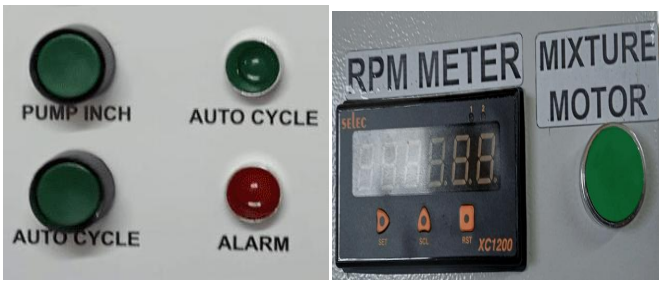
shall show <0>. Now slowly rotate the knob anticlockwise and observe VFD frequency display shows <5>. Now you are ready to go for manual operation check.

By momentary pushing <TABLE ON> the rotory table shall <Start> rotating at set speed. It hase smooth acceleration/deceleration. To it will take set speed gradually and smoothly.

By momentary pushing <TABLE OFF> the rotory table shall <Stop> gradually. It will not stop suddenly, but decelerate slowly.

If you observe reversed direction, please interchange any two phase wires at Mains input side only. Then check <On/Off> and <Direction>.





Similarly you can check Lapping Compound Dispenser pump <On/Off>. For that purpose, there is <PUMP INCH> push to on switch. The Pump will run till the switch is hold pressed. The pump will stop immediately on releasing the push Button.

Similarly You can check Agitater/Mixure <On/Off> by pressing switch located at right of RPM Indicator. This is also push to on switch. The mixure will <RUN> until the switch is pressed and <STOP> on release.

At the same time, oserve <RPM Indicator> display some reading. If yoy see <0> while table is rorating. Check if proximity sensor LED indicator blinks on every rotation. If not then you may need to adjust sensor probe within 3mm of sense pin. If not, then see if sensor connector male female are inserted and mating properly.

Once all things are set right. You may want to run the machine in <Auto Cycle>, so you can. But before proceeding, just check what cycle time is set, by putting <SET/RUN> toggle switch

to <SET> position. As soon as you select <SET> position, The LCD Display menu will change to set mode. Alarm indicator will glow. It indicate that your system is entered in set mode, and normal button operations are disabled. Now on <LCD Display>you can see set time in minutes. If you desire to change it, you can change it. Here <TABLE ON> Green button serves its alternate function as <Increment (++)> the set value. Just keep pressed, the set value will increment in steps of of <1>, and automatically get <Saved> as soon as you release. Same way, <TABLE OFF> Red button, will serve the <Decrement(--)> function, in steps of <1>. Keep the button pressed until you see desired value and release to save. That's all.

Now you shall set the <SET/RUN> switch to <RUN> mode. The LCD display will again change to manual mode. Now if you desire to run <AUTO>, just press <AUTO CYCLE> button. The <AUTO CYCLE> Green LED will glow. The auto timer will be displayed. It indicates set time verses actual run time. And rotary table will start. It will continue to run until, the given time is completed. The timer run value is <auto saved> in memory and will not clear on sudden power loss. So whenever power get restored, by pushing <AUTO CYCLE>, the internal timer will show previous run time and will continue till run time equals the set value. One cycle is complete, the system will automatically go tho <Manual Mode> and you have options to change set time or to continue same cycle, you may just press <AUTO CYCLE> button once again.

So this is normal operation of control panel. Table Motor speed can be varied any time regardless of Manual or Auto mode. Just rotate the know to increase/decrease the motor speed. Auto Cycle don't check or monitor the<TABLE MOTOR> speed. Similarly Pump and agitator are to be operated manually and there is no auto control for it.

Important Warning

Never experiment on control panel. Use exactly as per instructions manual. Don't touch any key without knowledge. VFD display is only used for observing set frequency. Don't touch its <UP>,<DOWN>,<SET>,MODE> keys, nor the <POT> knob. Otherwise set parameters may get disturbed and your machine may get damaged. If found tampered, the warrantee will be void and repairs will be charged, irrespective of warrantee period.

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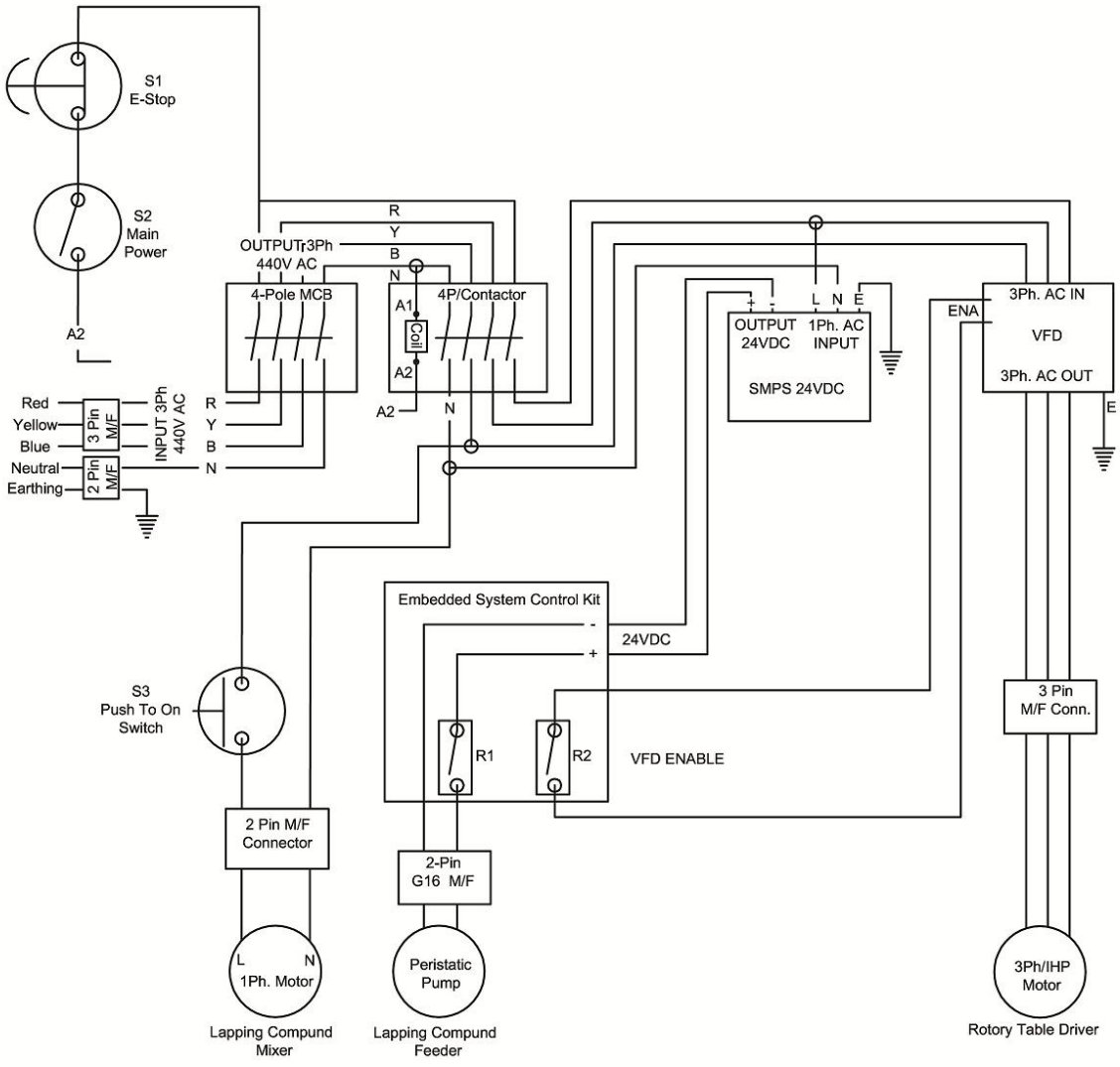
Please refer enclosed Connections diagram and keep in safe custody for your records.

Lapping Machine Control Wiring Schematic



Note 1 : Strictly Follow The Input Wire Colour Code R,Y,B,N,E for Red(Phase1),Yellow(Phase2),Blue(Phase3),Black(Neutral) & Green(Earthing respectively).
Note 2 : To change table motor direction, interchange any two phase wires at Mains Input.
Note 3 : S1,S2,S3 are mains power control switches.