

# Concrete Cylinder Grinder





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# **PLEASE READ MANUAL CAREFULLY PRIOR TO OPERATING GRINDER**

## **Introduction**

This grinder is designed to operate in accordance with the requirements of ASTM / ANSI C39 specifications. It will provide ease of use, superior grinding finish, durability, and plane accuracy. It is recommended for optimum safety and performance that you read and understand all safety and operating instructions prior to using the grinder. It is highly recommended that the sections on daily checkup and routine maintenance be paid particular attention. This will provide optimum performance and reliability.

## **Safe Operation of the Machine**

- Although grinding is performed in the enclosed chamber, you should take every precaution and be aware while operating this machine to avoid injury. The machine uses 110 VAC power and improper usage could result in injury.
- Never operate the grinder without having the disk cover and plastic splash guard in place.
- The grinder should not be operated with open access to the grinding disk. It is important that the number of samples in the V-type specimen receiver (part 5) match the splash guard. This will be either 2 or 3 depending on which guard you insert. This will prevent:
  - any opportunity to insert body parts into the rotating disk
  - undue grinding waste from splashing over the machine
- Always wear safety glasses when operating, maintaining or repairing the grinder.
- Always disconnect power prior to performing maintenance and repairs.
- Do not operate the grinder in an explosive or hazardous atmosphere, it is not explosion-proof.

- Do not wear loose clothing which might get caught in the moving parts of the machine.
- Operate only in a properly ventilated area.
- Regular checkups and maintenance are important for long term reliability and performance of this machine.
- The grinder must be connected to a properly wired 110 VAC grounded power source with appropriate current for its operation using its 3-pronged plug provided.
- Always check electrical connections for loose, frayed or pinched wiring at startup.
- Washing the grinder with running water (hosing it down!) is strictly forbidden. This machine is not designed to be waterproof. If water enters into the electrics, it may result in not only damage but electric shock.

### **Features of the Concrete Cylinder Grinder**

- The specimen end is finished without the need for capping.
- Grinding ensures a plane and parallel finish as fine as 0.002" (0.05mm).
- Grinding takes approximately 60 seconds per cylinder.
- Correct normal angle between upper and lower finishing plane, and the shaft is provided for with the V-type seat and pendulum type grinding. (Note, the cylinders themselves must be properly made for satisfactory operation.)
- End face is free from sags and chips.
- This machine can be used with high-strength concrete.
- Fragile materials or low-strength materials can be finished satisfactorily.
- There is no limitation for specimen diameter. Standard specification includes: Ø100, Ø125 and Ø150mm. Further, Ø50, Ø75mm and other sizes can be used for finishing if an optional jig is used.

- With this machine, efficiency should be greatly increased, and no abrasive material is used.
- The machine is designed with due considerations for safety and environment. Mechanical noise generated is low and the fixed casters make movement possible.
- Automatic specimen feed makes operation considerably easier than manual operation.
- The grinder conforms to ANSI / ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- Electrical approvals conforms to UL, NEC and CSA.

### **Uncrating and Inspection**

Please check the following on receipt of your new grinder:

The grinder, packed for shipment, weighs approx 815 lbs (370 kgs). Be sure to use equipment to handle this weight safely.

1. The grinder is shipped to you in a wooden crate. Before you accept the shipment inspect the crate for visible damage. Note any damages on the freight bill and proceed with inspection.
2. The crate has been shipped with a tilt sensor on the side, please note the condition of the sensor and report any abnormalities. It is important the crate was not tipped over as damage to the machine will most likely result.
3. Open the crate by removing the sides and top of the shipping crate. Check the machine for shipping damage. If you find concealed damage after you have signed for the grinder, call the delivering carrier **immediately** for an inspection. Save all packing materials, and leave the grinder as it is until this is accomplished.
4. The grinder is mounted on caster type wheels. It will need to be properly hoisted off the base transportation skid to the shop floor.
5. Check the Model number and other identification shown on the name plate mounted on the housing, they should agree with the specifications of the machine you ordered.

## **Installation Requirements**

### **Place of Installation**

Choose an operating site suitable for operation of a concrete cylinder grinder. This is normally in a typical concrete lab or prep room environment with appropriate power, sample handling logistics and drain facilities.

When you have placed the grinder in its operating location, it will require;

1. Properly wired 3 pronged grounded receptacles with appropriate electrical current for the machine.
2. Well ventilated site.
3. Install the machine on a level concrete floor and secure casters with the brake that is provided. Ensure that the casters are on a flat area, free from any grooves or uneven floor.

NOTES: Extremely humid and high temperature areas are not recommended for the grinder location. The cooling water from the grinder contains the debris and dust paste from the grinding process. Consider how you will dispose of this material. If you plan to settle and reuse the water a pump should be used instead of running water. A filter for removal of foreign matters should be provided. This helps to prevent clogging of solenoid valves and others. Maintain the filter regularly.

### **Connection of Power Supply**

The grinder has been inspected in accordance with UL, CSA and NEC standards. It requires a properly grounded 110 vac 3 prong outlet for connection to the supplied electrical cable. It should have its own dedicated electrical breaker.

### **Grounding**

The grinder must be connected to a properly wired 110 VAC grounded power source with appropriate current for its operation using its 3 pronged plug.

### **Protection Devices**

This machine is equipped with an electro-magnetic built-in contactor with overload protection thermal relay. When a current beyond the setting point flows, the switch will be turned OFF automatically.

A stroke limit switch for electric feeding is provided at the side of the geared motor. The machine will stop at 50mm stroke. When this stop occurs, restore the stroke by the specimen feeding handle.

**NOTE:** An excessive current will flow when foreign matters are caught by the grinding disc or motor if the feeding speed is too fast or insulation becomes poor due to water filling. When the motor is stopped after protection device actuation it will be reset automatically. Ensure that the foreign matter is removed fully and back the cylinders away from the grinding disc before starting the machine again.

### **Initial Startup and Operation of the Grinder;**

**Confirm that the power is disconnected  
prior to performing these steps!**

Be sure to check disk and external parts for loosened nuts and screws before the trial run. Tighten fixing bolts (M8 x 25) provided in the yellow colored portion of the grinding disc using L-type wrench that comes with the machine. Fasten them by hand using a wrench at three locations. Tightening should be done clockwise.

**NOTE:** Do not over tighten the disk mounting bolts.

Check to ensure that packing materials are not left between the grinding disc and cover.

Conduct the following check using the specimen feeding handle that is used for movement of the specimen V-type receiver. Movement as much as about 40mm is possible using the feed handle. You may feel the handle gradually tightening. This is because the base is being fastened. Check if it moves evenly without any difficulty.

### **Installation and usage of Feed Water Device**

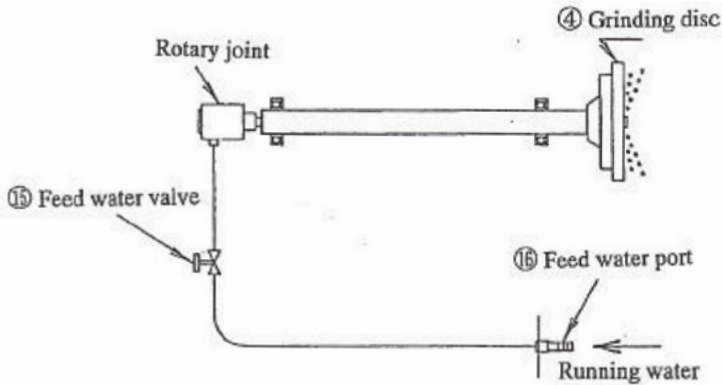
The machine includes a feed water system to prevent clogging or loading up of the grinding disc. The feed water system also serves to provide cooling and efficiency improvement.

With this system, water is injected to the grinding plane.

To use this system;

1. Connect a water supply hose to the hose barb on the side of the machine.
2. The water flow is regulated by the brass colored feed water valve located on the side of the machine





### Tips for proper usage of water injection

- Adjust the supply water to the extent that grinding dust is not generated.
- Note that if the water supply is adjusted to high a volume grinding dust and debris may scatter.
- As required for proper grinding (volume and type of cylinder dependant) it will be necessary to rinse out the grinding disk and chamber. At a minimum, rinsing the disk once per day is normal.

### Selection of Manual/Electric Feeding Device

Pulling out the specimen feed handle disengages the electric feed motor and allows for manual grinding. Pushing in the specimen feed handle engages the gears allowing the electric motor to automatically grind the cylinders. Once again by pulling the handle the gear is disengaged (manual feed). By pushing the handle, the gear is engaged (automatic feed). When it becomes hard to operate, lightly turn it to the right or left and press it in again.

**NOTE:** It is designed that one turn of the specimen feeding handle generates 1.5mm of movement.

Place  $\text{Ø}150 \times 300\text{mm}$  specimen with a normal angle onto the specimen V-type receiver and check if the seat is free from any play. In this case, seat B that is attached to it is not used.

Insert a prescribed cover made of polycarbonate from the top side to cover the grinding disc.

Before turning switch ON:

Prepare a cylinder to be used for trial. Note, do not use a previously failed cylinder, it will fracture and fail during the grinding process. Be sure to use a new one.

Set the cylinder on the seat and move the feeding handle until the cylinder makes contact with the grinding disc (clockwise turning provides forward movement). After contact, turn the handle one turn (counterclockwise). This ensures the specimens have no contact with the grinding disc during start up and prevents the motor from overloading. Set the height adjusting screw for the specimen fixture and secure the specimen holder against the specimens so that they do not move.

This is accomplished by rotating the top handle to the left. Ensure the specimens are firmly in place and can no longer move. If the specimens can still move readjust the specimen holder as previously mentioned. The scale of the specimen V-type receiver should be at 0 (Zero).

### **Adjustment of Specimen Feeding Speed**

A black dial for feeding speed regulation is provided to the left of the start switch. Feeding speed adjusting range is 0.1-1.2mm/min. By adjusting the scale from 1-10, it is possible to change the speed. Please use the following graph (Page 20) which correlates the dial number to the feed speed.

**NOTE:** Feeding speed should be changed depending on the hardness of specimen. With ordinary concrete, feeding speed of 1 mm/min may be appropriate. If this is the case, the feeding speed dial should be adjusted to about 6. The machine is now ready to grind your trial run specimens. Confirm you are achieving smooth operation and grinding of your trial run specimens.

### **Starting Grinding Finish (Manual Feeding)**

Switch ON.

Become familiar with the sound of the grinding disc rotating at about 1800 rpm.

To move the specimen forward turn feeding handle by 1/3 (0.5mm). Then turn the handle another 1/3 (0.5mm) to move it forward again. When the concrete grinding disc makes contact with it, you can hear a specific grinding noise. Move it another 1/3 (0.5mm). Move it further 1/3 turning and holding it as it is for more than 20 seconds.

After the sound of the grinding process is reduced, turn OFF the switch and manually move it backward to remove the specimen.

**NOTE:** Feeding should be made lightly and every 1/3 turning (0.5mm)

When fast feeding speed is used, a strong frictional force and load are applied to the grinding disc. If this is the case, the grinding disc will deform resulting in vibration occurrence. In addition the motor can be damaged due to overloading.

An important tip to obtain a good grind level is to carry out the feed extremely slowly. Feeding speed of more than 1/3 turning per 20 seconds should normally be used and adjusted according to current conditions. Good grinding effect is not obtained with a high feeding speed. Going too fast will cause problems in performance and surface finish.

### **Electric Feeding**

1. Check that the specimen receiver electric feeding switch 11 is at the ON position.
2. Set Manual/Electric selection clutch 1 to PULL (MANUAL) and bring it close to the blade using the manual handle. Do not make contact with the disc at start up.
3. Set time using the setting timer 8. If you need to grind it by 1mm with 1mm/min speed, it should be set to 1 min.
4. Set feeding speed dial 7 to arbitrary scale. (0.1 – 1.2mm/min)
5. Press the start switch 10. Then the grinding disc turns and oscillation starts.
6. Open feed water valve 15.
7. Set specimen feeding handle 1 to electric feeding PUSH (ELECTRIC). Then specimen feeding starts and grinding starts.
8. The buzzer sounds after the set time is reached by step 3 shown above and specimen feeding stops.
9. Finishing grinding is done for about 20 seconds. The grinding noise is reduced and rotation of the grinding disc will stop automatically. The water supply will stop in conjunction with the ending of the grinding cycle.

10. Disengage clutch 1 from the electric motor. Restore it to PULL (MANUAL) position, turn manual handle counterclockwise to move the specimen receiver 5 backward. Release specimen holder by rotating the handle to right and remove the specimens.
11. Shut feed water valve 15.

### Preparations for changing the specimen size

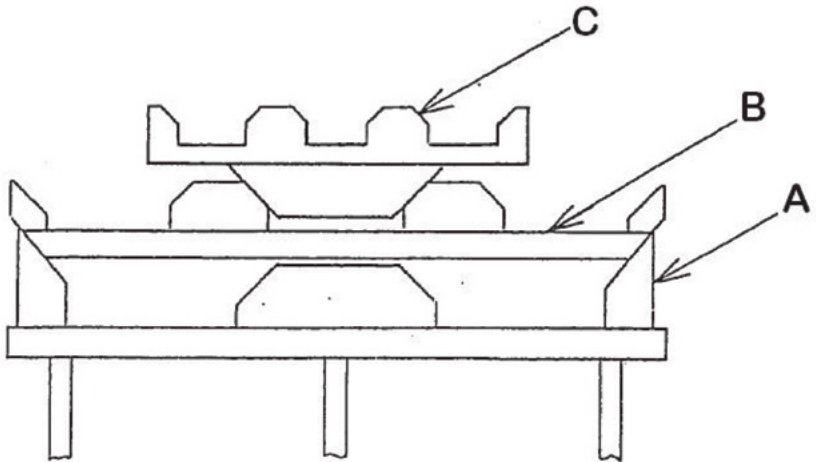
**NOTE:** Following instructions apply to Ø50, Ø100, Ø125 and Ø150mm specimens.

Seat A (V-seat already provided) is for Ø150 and Ø125mm specimens.

Seat B (accessory V-seat) is for Ø100mm specimens only.

Seat C (optional accessory) is for Ø50mm and Ø75mm diameter specimens.

Seat B and C are placed on V-seat A.



Clean dust and debris adhered to the rear of A, B and C seat thoroughly. This should be done carefully since these materials may cause a significant play.

Set the specimen holder appropriately by changing set position depending on specimen diameter. (Ø50 to Ø150mm)

Polycarbonate cover should be adjusted to the specimen diameter. Be sure to use the specimen holder correctly during grinding. This is to ensure safety and improve efficiency.

**NOTE:** If a fragile cylinder specimen is fastened too tightly it may be damaged and result in excessive debris when you attempt to grind it.

## Grinder Check Lists

### A. Check up BEFORE operation of machinery

1. Stable Installation of Grinder.
  - Ensure casters are placed in a stable position
  - Ensure that machine body is level
2. Check Grinder surroundings.
  - Ensure the work area is clear and suitable for the operation of the grinder
3. Power Supply and Water Supply
  - Check the 3 prong power cable is properly plugged into the AC receptacle.
  - Check that the water supply hose is connected to the water supply and fittings are secured
  - Check that the drain hose is secure
4. Before starting machine, be sure to check:

**Specimen Table:** Ease of movement should be checked manually

**Switches:** ON/OFF

**Timers:** Actuation check

**Feed speed change:** Confirmation of speed change

**Specimen Cover:** Concrete adhesion degree

**Grinding Blade:** Confirmation of condition (blades are there)

**Grinding Disc:** Check to ensure mounting is secure

**Stop Buzzer:** Confirmation of buzzer actuation

**Water Feeding:** Confirmation of water flow

**Specimen Fixing:** Stable fixing

**Automatic Stop:** Automatic stop should be checked beforehand

## **B. Check up DURING operation of machinery**

**Specimen holder:** Check before start switch is turned ON/OFF

**Specimen feed speed:** Speed should be set according to its expected strength. Grinding a hard material on high speed is not advised and may lead to specimen fracture in addition to improper wear of the blade, failure of the controller, wear or danger of the gear head damage.

**During grinding:** Keep all body parts and loose clothing a safe distance away from the machine during grinding.

**Re-starting after stopped once:** Whenever the machine is stopped during grinding for any reason back away the specimen from the grinding disc and start the machine again.

## **C. Check up and maintenance after grinding sessions;**

1. Disconnect the power supply and water supply.
2. Using a separate hose, flush the disk system thoroughly with water, cleaning inside the grinding cover and wash out grinding sludge thoroughly. If a hose for running water is not available, slightly back off the grinding disc from the specimen, set feed water pressure to a slightly higher level and carry out idle operation for a while to allow removal of these materials.
3. Wipe down the machine removing all material from the specimen feed stand.
4. If it is necessary to move the machine in the work area, disconnect power, drain hose and water supply prior to moving the machine.

## Parts Diagram

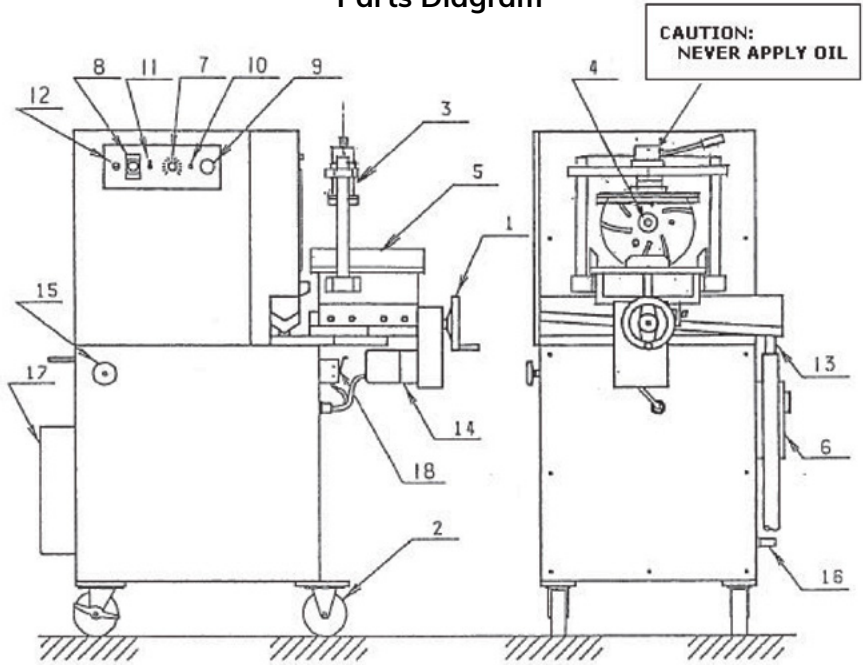


Diagram Number	Part Name	Diagram Number	Part Name
1	Specimen feeding handle (Manual/electric motor selection clutch)	10	Start Switch (Small Green Button)
2	Movement caster	11	Specimen receiver electric motor feeding switch (FEED)
3	Specimen Holder	12	Feeding completion Timer/Buzzer
4	Grinding Disc	13	Drain port
5	V-type specimen receiver	14	Geared motor for electric motor feeding
6	Main Power Switch	15	Feed water valve Flow rate regulating valve
7	Feeding Speed Dial	16	Feed water port
8	Timer for specimen receiver movement	17	Tool Box
9	Stop switch Red Button for Emergency Stop	18	Stroke limit switch

## Tips for Better Grinding

The following instructions are precautions and tips for maintaining grinding disc performance, prevention of grinding disc deformation, and prevention of one-sided wear.

### At the Start:

1. The specimen receiver is fed forward by the handle. Better grinding capability is associated with appropriate feeding speed resulting in even level grinding. Try to understand this simple principle. It is recommended that 30 seconds 1/3 turning = 0.5 mm be used.
2. On the other hand, if the receiver is fed quickly, an excessive load will be exerted to the grinding disc causing distortion. Note that if this is the case, level grinding becomes one-sided.

### At Completion

1. When grinding is finished, return the handle slowly in backward direction with a similar manner for receiver forward feeding. This is necessary to obtain improved level.
2. Even if one-sided grinding is done by quick grinding, it may be corrected with a backward movement if it is manipulated slowly.

**NOTE:** Don't take out the specimen before grinding noise is eliminated and the grinding disc comes to a complete stop, after the switch is turned OFF. This precaution should be observed from a safety point of view.

## Maintenance

### When grinding disc performance is reduced

There will be no problem as long as ordinary concrete materials are processed. Mortars will fill the grinding disc more quickly than concrete materials. In order to remove the clogged embedded paste materials try grinding a concrete test piece. This will help restore the original grinding capability. Do not grind samples containing metals or steel, if this does happen it will likely damage the grinding disc. If you must do, or inadvertently did, please contact your dealer for advice on replacement or an appropriate disc.



## Adjustment and replacement of motor V-belt

Remove the lower rear cover and upper rear side cover. The motor mounting plate is used for adjustment. Adjust belt tension. Belt size B-51 should be used for replacement.

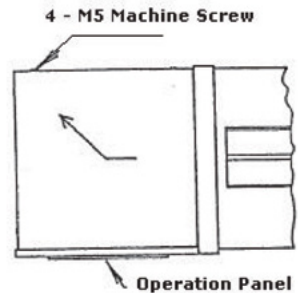
## Replacement of grinding disc

When length from the grinding disc is reduced to about 2mm, it should be replaced. This is required from a safety and performance point of view. The blades on the grinding disc are arranged to provide wheel balance. If a blade is damaged or lost, the disc may not provide good surface finish and should be replaced. Please send it to your local agent for repair.

As for replacement, remove the cover and unscrew cap bolts at the three locations using a hexagon wrench to replace the grinding disc.

Removal of the cover is necessary when the belt tension is tightened, distribution box inside is checked or water filling rotary joint is checked.

To remove the large cover of the upper portion, remove the four machine screws and pull it diagonally upward. This will allow access to the inside of the machine. The distribution box is also secured by two machine screws from the inside.



## To prevent corrosion and eventual damage to disc mounting bolts

When bolts are used frequently for the grinding disc, replace them every 6 months. Cap screw bolt M8mm x 25mm x 3 pieces.

## Greasing and Oiling

**Daily:** After usage, lightly oil the moving parts of the specimen receiver with machine oil. Use Hub City Worm Gear Lubricant GL-460 or equivalent.

**Monthly:** Remove the cover, check inside for loosened screws and remove built up dust, sand and debris.

**Every 6 months:** Remove the body cover and supply grease to grinding disc main bearing and pendulum driving bearing. (Four locations) Use Lucas X-Tra Heavy Duty Grease NLGI or equivalent.

## Removal of Powder Dusts

Dust powder and grit are generated from grinding process. Wipe down the machine daily.

## Replacement of Spindle/Bearings

Depending on the frequency of applications, replacement of the spindle and bearings, and replacement or repair of the parts become necessary due to wear or play caused by long time operation. If this is the case, please contact your local agent for consultation.

**NOTE:** Wear and damage are dependant on the volume of work you do. Become familiar with the machine and check it carefully prior to use.

## Review of Maintenance Notes;

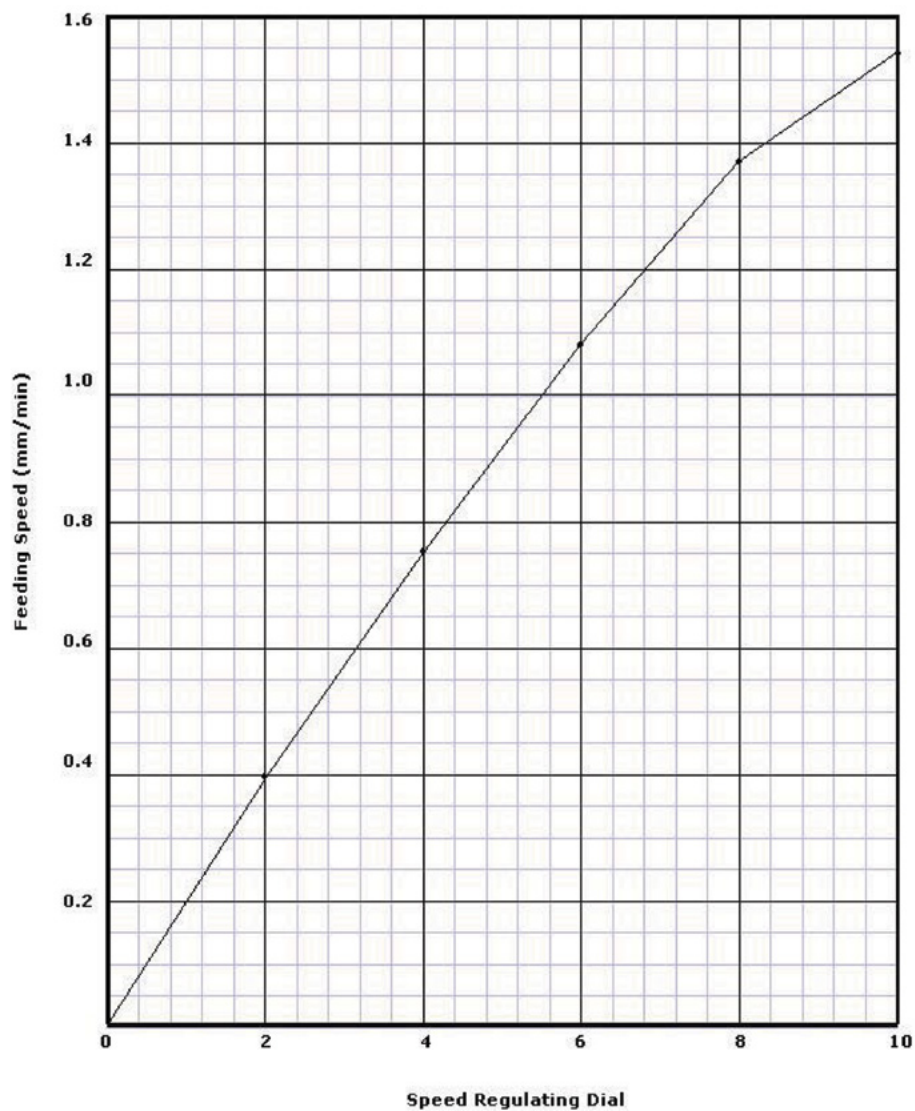
1. Ensure that the mounted portion of the grinding disc is secure. If any part is loosened, be sure to tighten it using the L-type wrench (cap screw bolt M8mm x 25mm) that comes together with the machine.
2. Check the blade of the grinding disc for breakage. Any breakage may result in vibration of the machine and poor finish of the specimen end.
3. The fixing screws of the specimen receiver need to be secure. (Root of V-type receiver)
4. Ensure that there is no sand or debris from concrete adhered on the V-type block. Remove them by brushing or wiping them off thoroughly using wash cloth.
5. The stroke of the specimen receiver feeding device is designed to be about 40mm. Two oiling ports are provided so replenish the lubricants after usage. (Specified oil should be used.)
6. Remove residue from mud and sludge thoroughly using a wire brush after usage. If these materials are left, they may become solid and that will hinder the next grinding set.

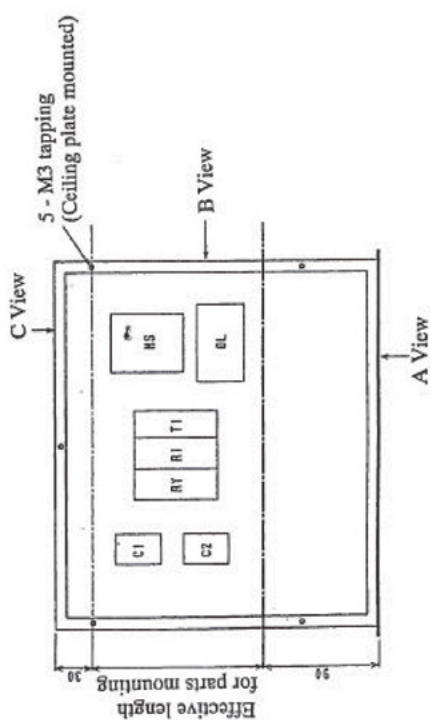
**NOTE:** Washing with running water is strictly prohibited. This machine is not designed to be waterproof. If water enters into the electric driving unit, it may result in leakage and/or electric shock.

## Specifications

<b>Size:</b>	1350mm (53 inches) H x 850mm (33.5 inches)D x 600mm (24 inches) W
<b>Weight:</b>	180 Kgs (400 lbs.)
<b>Electrical:</b>	110 vac 60 Hz 1 ph
<b>Electrical Approvals:</b>	UL, NEC, CSA (equivalent)
<b>Application:</b>	ASTM / ANSI C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
<b>Capacity:</b>	2 x 150mm (6") diameter specimens 3 x 100mm (4") diameter specimens 3 x 50mm (2") diameter specimens (with optional jig)
<b>Approximate grinding time:</b>	60 secs per set
<b>Approximate disc life:</b>	3000 to 5000 cylinders

## Feeding Speed Conversion Table

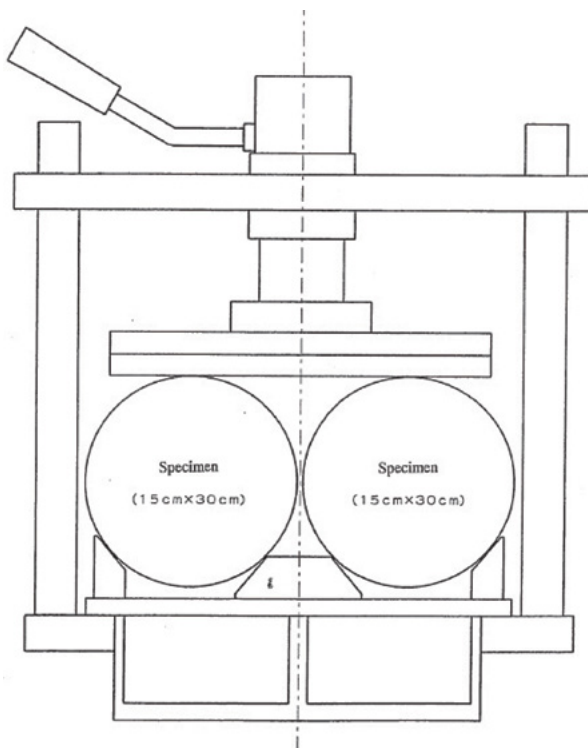
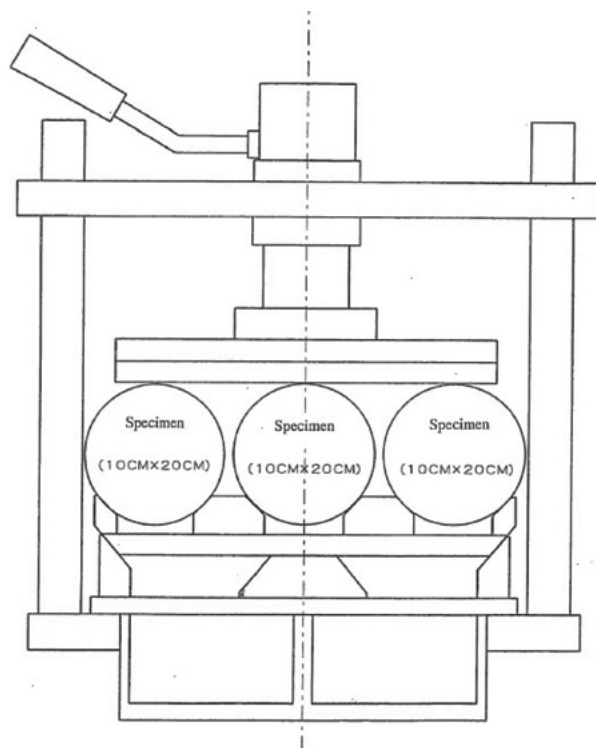




TB\_HL5051AMF-20P

19	Regular position detection
18	Feeding forward limit
17	Feeding forward limit
16	Feeding forward limit
T	Cutting water
21	Cutting water
8	Cutting water
7	Cutting water
6	Feeding motor
5	Feeding motor
4	Feeding motor
T	Pendulum motor
3	Pendulum motor
1	Pendulum motor
VI	Spindle motor
UI	Spindle motor
1	Spindle motor
5	Main power supply
8	Main power supply

Parts arrangement (Ceiling view)



Warranty

Humboldt Mfg. Co. warrants its products to be free from defects in material or workmanship. The exclusive remedy for this warranty is Humboldt Mfg. Co., factory replacement of any part or parts of such product, for the warranty of this product please refer to Humboldt Mfg. Co. catalog on Terms and Conditions of Sale. The purchaser is responsible for the transportation charges. Humboldt Mfg. Co. shall not be responsible under this warranty if the goods have been improperly maintained, installed, operated or the goods have been altered or modified so as to adversely affect the operation, use performance or durability or so as to change their intended use. The Humboldt Mfg. Co. liability under the warranty contained in this clause is limited to the repair or replacement of defective goods and making good, defective workmanship.

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