



SINCE 1872

351 Bench Top Pulverizer

Machine Manual

Installation, Operation, Maintenance

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NOTICE OF SUITABILITY

Holmes Bros. Technologies, LLC strives to build the most robust equipment to suit our customers. Our goal is to be a partner with our customers and understand their processes and environments. We welcome your input regarding your needs.

In today's global marketplace, there are many standards and acceptable practices. Our machines will operate in a variety of them. We can recommend a machine that will work in many specified applications; however, we cannot guarantee the suitability of our machines beyond their designed function.

During the purchase of your machine from one of our distributors, you should have been asked to supply your input power and application. At this time, take special consideration to make sure the equipment you received is suitable for your application before use. Verify that the machine is configured for your power supply and has the correct screen plates. Please inform us of any discrepancy so that we may discuss it with our distributor.

WELCOME TO THE HBLLC FAMILY

Thank you for choosing Holmes Bros. Technologies, LLC. If this is your first piece of Holmes equipment, we are pleased to be chosen as a supplier that can meet your needs. We know that in today's market the choices seem endless and it is hard to tell the difference between the real thing and the imitators. Since 1872, Holmes has survived the test of time by producing quality equipment for the mining and laboratory industry to be used in the harshest environments. The equipment has changed over time to stay competitive, but is built as durable today as ever. You will know our machines are the real thing when they are put to the test.

At Holmes Brothers Technologies, LLC, we're committed to working with you to understand your goals and how we can best assist you to meet them. In this packet is a Product Registration Card. Please take the time to fill out this card and return it to the address printed on the back. We enter this information and any other comments you may have into our database. This way, we can always know what equipment you have and maintain the history on it as time goes by. Many of our machines run for decades and we are happy to record the details so we can be ready to assist you. Please retain the information provided for replacement parts, maintenance, and troubleshooting your equipment. In the event that you need us, our customer service group will be happy to answer any questions about our products.

Thank you again for choosing Holmes Brothers Technologies, LLC. Please contact your distributor for pricing and availability on any of our products or parts. If you have any requests or suggestions regarding our products, please send them to the address listed on the last page of this manual. We will give your opinions our sincere consideration. We realize that our continued success depends largely on your success. Thank you and best of luck.

MACHINE INSTALLATION

The 351 has been designed to meet your needs with minimal installation work. However, due to the wide range of environments that our machines go into, here are a few tasks before turning on the machine.

1. Inspect the packaging and/or skid the machine arrived on for damage during transit. Photograph any signs of damage and notify your distributor.
2. Remove the packaging and discard. The machine is held to the skid via screws. These can be removed easily with a wrench.
3. Place the machine on the bench where it will operate. Open the pulverizer door and turn the rotor by hand to make sure it spins. Remove the yellow hopper cover and visually inspect the auger to make sure there are no particles or debris that could jam the auger.
4. The machine is now ready to be wired.

Note: A qualified electrician should wire the machine to meet the electrical codes that govern your site. Holmes Bros. Technologies, LLC will not be responsible for problems associated with errors made during this step. A wiring diagram has been supplied as a guide only. Be sure that the machine wiring is consistent with the input power that you specified at the time of order.

5. Due to the wide range of international, regional, local, and intercompany wiring practices, the machine is supplied with only the power cord. Please refer to your specific regulations to safely wire the machine for your site.

Other considerations regarding this machine include the health, safety, and ergonomic requirements of the operator.

1. The machine should be placed in a well ventilated environment.
2. The machine should be placed in an environment that is free of trip/fall hazards or wet conditions.
3. The machine should be placed in an open area and situated so that the operator can work the machine without excessive bending or reaching.
4. All regulations regarding appropriate PPE should be strictly adhered to.
5. Operators should be well trained on the proper use of the machine and the hazards present. This training should be documented and periodically updated.
6. The machine should be set and operated on a surface that is suitable to hold the weight and vibration of the machine.
7. The machine should be kept dry and not exposed to ambient temperatures above 100 °F.
8. The machine must be dusted off to prevent combustible layers from building that could potentially create a fire hazard.

MACHINE OPERATION

The 351 is a simple machine to operate. It has a simple ON/OFF operation and reset feature in the event that the door is opened while running or thermal overloads trip. However, as with all machines there are other things to consider before operating.

1. The inside of the machine is free of paint in order to prevent ongoing contamination of samples. However, there is a light coating of rust preventative present. Initial samples will wear this coating off and leave a bare metal surface that will not affect your sample.
2. Refer to your lab policies on the number of discard samples that should be run before using the machine for test readings.

During operation:

1. Ensure that the pulverizer door is shut and latched.
2. Remove the hopper cover and pour the sample into the hopper.
3. Replace the hopper cover.
4. Start the machine by pressing the START button.
5. If the machine needs to be reset, manually open the starter box with a screwdriver. If the 1MCP and/or 2MCP knobs are in the horizontal position, turn them to the right until they are in the vertical position. You should feel the knob(s) click into place.
6. The machine will move the sample into the pulverizer chamber.
7. Once the sample sounds as though it is done, press the STOP button.
8. Remove the hopper cover and inspect to see if the sample has been moved into the pulverizer.
9. Open the pulverizer door to ensure that the sample has been pulverized.
10. If so, clean the pulverizer for the next sample run.

BASIC MACHINE MAINTENANCE

Maintenance Frequency Chart

Part	Description	Frequency (hrs of use)
30-3	Door Seal	2000
500-12	Auger Bushing	2000
300-4	Sample Container Gasket	2000
3A30	Motor Shaft Seal	2000
500D7A	Motor Bearing	2000
501-18	Rotor	4000
500-9	Auger	6000

Congratulations on your purchase. The 351 is a relatively maintenance free machine. All bearings are sealed for life and require no periodic lubrication. Perishable and wear parts are made from quality certified steels and coatings to provide long life. OEM parts are available through your distributor and are easy to replace using the correct tools. Below are some common tasks that can be performed by a novice mechanic using relatively few tools.

Note: **All hazards and sources of energy must be neutralized before maintenance steps are performed.**

Rotor Removal and Replacement

1. Open the pulverizer door.
2. Remove the rotor retaining screw in the center of the rotor.
3. Loosen the set screw located on the side of the hub.
4. Fit the rotor puller inside the rotor and turn the jack screw into the center of the shaft to pull the rotor off the shaft.

Note: A liquid penetrant may be required if the rotor is seized onto the shaft. Removal should not require an excess of 10 in-lb on the screw.

5. Once the rotor is removed, check the shaft for marring and damage.
Replace if necessary.
6. The new rotor should slip on the shaft against the shoulder in the rear.
7. Orientate the set screw to the flat on the side of the shaft and tighten.
8. Replace the rotor retaining screw and tighten.

Screen Plate Replacement

1. Remove the rotor as per the instructions above.
2. Using a screwdriver if necessary, work the old screen plate out of the machine.
3. The new screen plate may require some trimming on the ends to get a perfect fit. This can be done with hand shears.
4. Fit the new screen to the inside of the pulverizer.
5. Ensure that there are no gaps around the drop-through opening at the bottom of the pulverizer.
6. Ensure that the screen is securely held by the two pins at the top of the pulverizer and that no edges of the screen are hanging down.
7. Replace the rotor as per the instructions above.

The 351 is designed to operate for many years. The bulk of the castings and structure of the machine allow for several rebuilds and updates. Over time there are more detailed maintenance tasks that can be performed in order to keep your machine operating at optimal efficiency. The following are some of the more detailed items.

Note: These tasks are for skilled mechanics and will require a larger number of tools.

Seal Replacement

1. Remove old seals and scrape old glue from surfaces. Sand the area to remove small pieces and debris.
2. Clean the surfaces with an evaporating cleaner such as window cleaner.
3. Apply the new glue to the seal and also to the surface.
4. Mate the seal to the surface and press firmly to squeeze glue across the entire surface. This will create a better bond.
5. For the sample container seal, put the sample container in upside down to maintain pressure against the seal.
6. For the door gasket, shut the door and latch it.
7. Allow the seal to sit undisturbed for 3-4 hours.

Rotor Shaft Seal Replacement

1. Remove the rotor housing.
2. Drive out the two seals.
3. Clean any debris or contamination from the bore.
4. Drive the new seals in using a seal driver and mallet.
5. Lube with all-purpose grease.
6. The inner seal should sit flush with the inside of the pulverizer.

Motor Bearing or Armature Replacement (an arbor press and bearing puller are recommended)

1. Remove the motor.
2. Unscrew the four nuts on the end and remove the end cap.
3. Pull the mounting flange off the armature.
4. Pull the armature out of the body.
5. Pull the bearings off the armature.
6. Assemble in reverse order.

Note: Apply grease to the motor shaft before assembly.

Motor Brush Replacement

1. Unscrew the brush caps on the back side of the motor.
2. Remove the brushes.
3. Install the new brushes.
4. Install the caps.

Auger and Auger Bushing Removal

1. Remove the auger guard.
2. Unclip the auger chain and loosen the set screw on the driven auger sprocket to remove it.
3. Loosen the set screw on the side of the hopper and remove the auger and bushing.
4. Assemble in reverse order.

TROUBLESHOOTING

1. Machine does not run.

- a. Verify that incoming power is on and correct.
- b. Verify that door is closed and latched.
- c. Verify that thermal overloads are not tripped.
- d. Verify that the door proximity switch is working.
- e. Replace the motor rectifier.

2. Machine will not reset.

- a. Verify that incoming power is on and correct.
- b. Verify that door is closed and latched.
- c. Verify that thermal overloads are not tripped.
- d. Verify that the door proximity switch is working.

3. Machine is louder than when new.

- a. Guards may have come loose and may be shaking.
- b. The rotor bearings may need replaced.
- c. The belt may need replaced.

4. The motor is hot when machine is running.

- a. Verify that incoming power is correct.
- b. Replace the starter.

5. The rotor does not turn when the machine is on.

- a. The rotor motor thermal overload may be tripped.
- b. The rectifier is not working.
- c. The rotor motor brushes may be bad.
- d. The rotor motor may be bad.

6. The machine doesn't move the product into the pulverizer.

- a. The auger may be jammed.
- b. The auger handle is slipping on the auger.



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