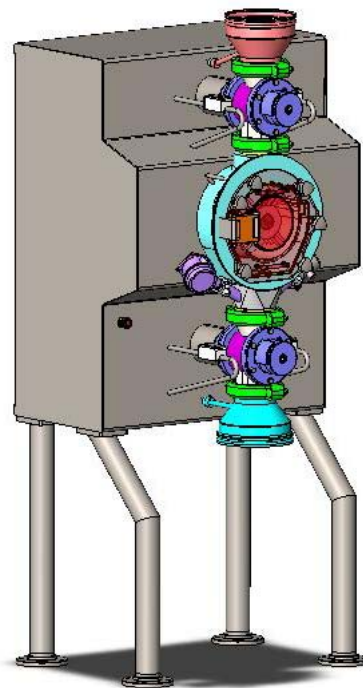


Operating Instruction Manual:



Model "D6B" Comminuting Machine



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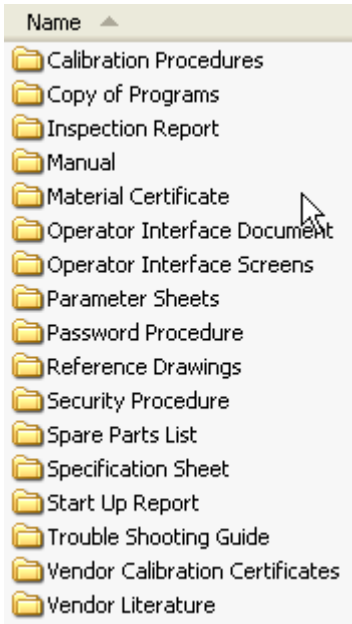
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PLEASE NOTE:

IT IS IMPORTANT THAT ALL PERSONNEL CONCERNED WITH THE INSTALLATION, OPERATION AND MAINTENANCE OF THIS EQUIPMENT HAVE AMPLE OPPORTUNITY TO STUDY THE CONTENTS OF THIS MANUAL. WE REQUEST THAT COPIES BE PROVIDED TO THE APPROPRIATE PEOPLE FOR THEIR INITIAL STUDY AND READY REFERENCE, IN ORDER THAT THE EQUIPMENT MAY BE INSTALLED, OPERATED AND MAINTAINED EFFECTIVELY AND SAFELY.

SECTION 2: Machine Systems Overview

2.1 How To Use Your Operating Manual



- Your Fitz®Mill Operating Manual has been provided to you on CD-ROM and includes a series of folders; each containing specific information relevant to your Comminuting machine.
- Below is a brief description of what is to be included in each folder. Depending on how your machine is configured and controlled, and whether or not specific quality documents were requested with your order, you may not receive all the folders shown below. Those supplied with all machines are designated as “**STANDARD**”.

- **Fitzpatrick Calibration Procedures:** **(Optional)**
Includes procedures for calibration of machine systems and instruments for machines so equipped.
- **Functional Description:** **(Optional)**
Written functional description of the machine / system and its controls. Supplied with the Advanced Documentation Package.
- **Inspection Report:** **(Standard)**
Signed final inspection report, as issued by Fitzpatrick QC department, prior to shipment of your machine.
- **Operating and Parts Manual** **(Standard)**
Includes the text file that forms the main body of your machine Operating Instruction Manual (includes this document).
- **Material Certification:** **(Optional)**
Includes certified material test certificates, when specified with your order.
- **Operator Interface Document:** **(Optional)**
Includes a written description and specification of your machine Operator Interface and Software, for machines so equipped.
- **Operator Interface Screens** **(Optional)**
Includes screen shots of all Operating Interface screens, for machines so equipped.

- **Parameter Sheets:** (Standard)
Includes Variable Frequency Drive (VFD) specifications and parameter settings for machines so equipped.
- **PLC & OIU Programs:** (Optional)
Includes software code for machines controlled via Fitzpatrick supplied PLC and Operator Interface.
- **Reference Drawings:** (Standard)
Includes specific drawings relevant to the design and construction of your machine. Typically includes General Arrangement / Layout, major assembly drawings, Electrical Layout and Wiring Diagrams, Process & Instrument Diagram (P&ID optional) and miscellaneous others.
- **Security & Password Procedures:** (Optional)
Includes procedures for software access and control, for machines supplied with security enabled software.
- **Spare Parts List:** (Standard)
Includes a Recommended Spare Parts List for your machine
- **Specification Sheet:** (Standard)
Includes a detailed specification sheet which references specific configuration details, assemblies and components of your machine
- **Start-up Report:** (Optional)
Includes the electrical controls set-up and check-out information, as documented during final testing of your machine. Only provided on machines with computer based control.
- **Trouble Shooting Guide:** (Standard)
Includes a trouble shooting guide (also in your manual) to aid the user in the resolution of common operating faults.
- **Vendor Calibration Certificates:** (Optional)
Includes calibration certificates for OEM supplied instruments & devices, when the machine is so equipped.
- **Vendor Literature:** (Standard)
Includes operating manuals, specification sheets and miscellaneous data for OEM supplied components of your machine.

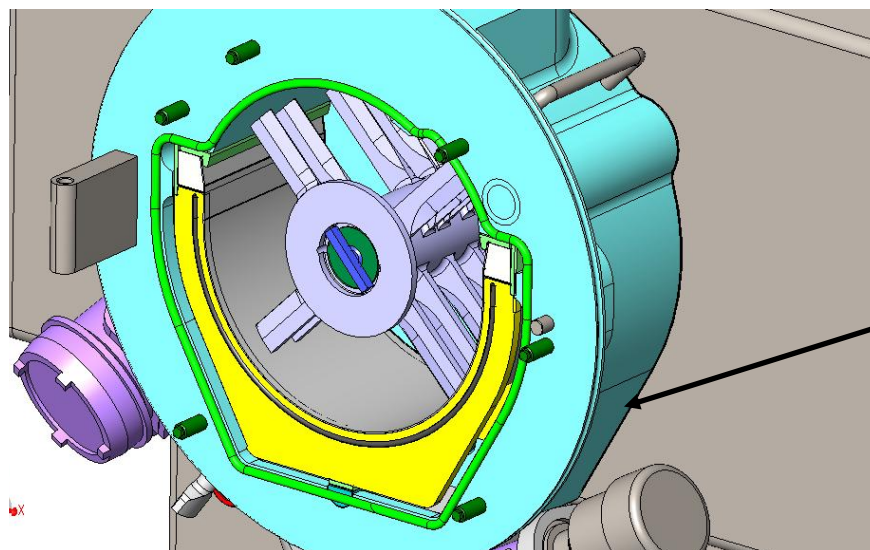
2.2 How to Identify Your Machine

A Model number and Serial number describe each Fitz®Mill Comminutor. These can be found on your Comminutor Specification Sheet, on the machine nameplate and stamped directly on the chamber side segment, near the packing gland (shown below). The serial number stamped on the chamber should be the same as indicated on the machine nameplate.

The serial number shown on the **Comminutor Specification Sheet** should agree with the numbers found on the nameplate and the chamber. If they do not, please contact our Customer Service Department immediately (refer to contact info. in section 7) so that we can replace your **Comminutor Specification Sheet** with the correct one or otherwise resolve the difference. In case of any questions, please supply us with both the chamber and nameplate serial number(s).



Serial Number will be stamped on the rear-chamber segment, near the packing gland.



Serial Number
Stamped Here

2.3 How to Set Up a Fitz®Mill Comminutor

Most D6B machines are shipped completely assembled except for the machine legs, miscellaneous loose parts such as extra screens, dust retainers, accessories and spare parts, which are normally packed within a cardboard box, inside the machine packing crate.

For stability, most D6B machines are shipped on special shipping legs (short legs), which must be removed by the customer. The standard machine legs will be packed within the shipping crate and must be installed prior to placing the machine into service.

Consult the REFERENCE DRAWINGS folder on your Operating Manual CD-ROM or hard-copy book and review the layout, sub-assembly cross-sectional drawings and electrical drawings for your machine, prior to operation.

The electrical components have been wired in accordance with information on the **Comminutor Specification Sheet**. Refer to section 4 "Electrical / Controls" for electrical installation and checkout information.

CAUTION

Check the machine for shipment damage. Be sure the rotor moves freely, and that there is no apparent damage to controls, wiring or other devices.

Keep in mind that this a high speed device requiring caution in operation and maintenance. Do not operate your Comminutor until you and your machine operator(s) have read this manual and are thoroughly familiar with its operation and use.



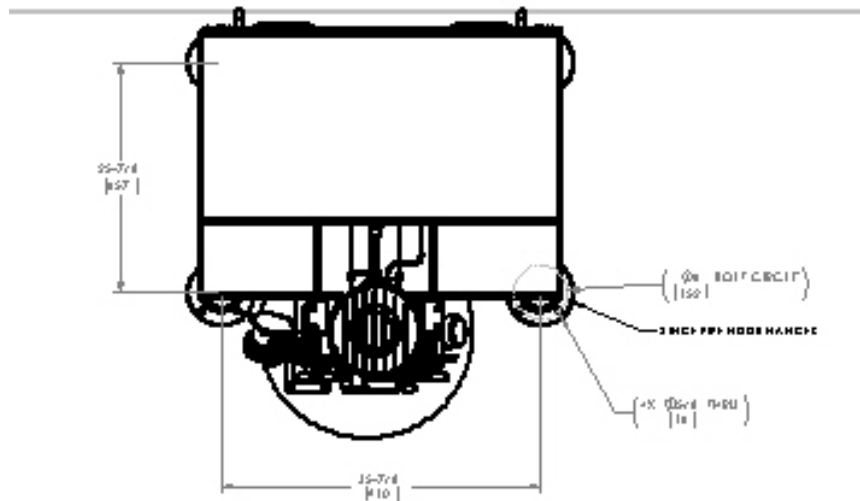


Figure 2.5.2: Typical Plan View for RV-D6B-RV

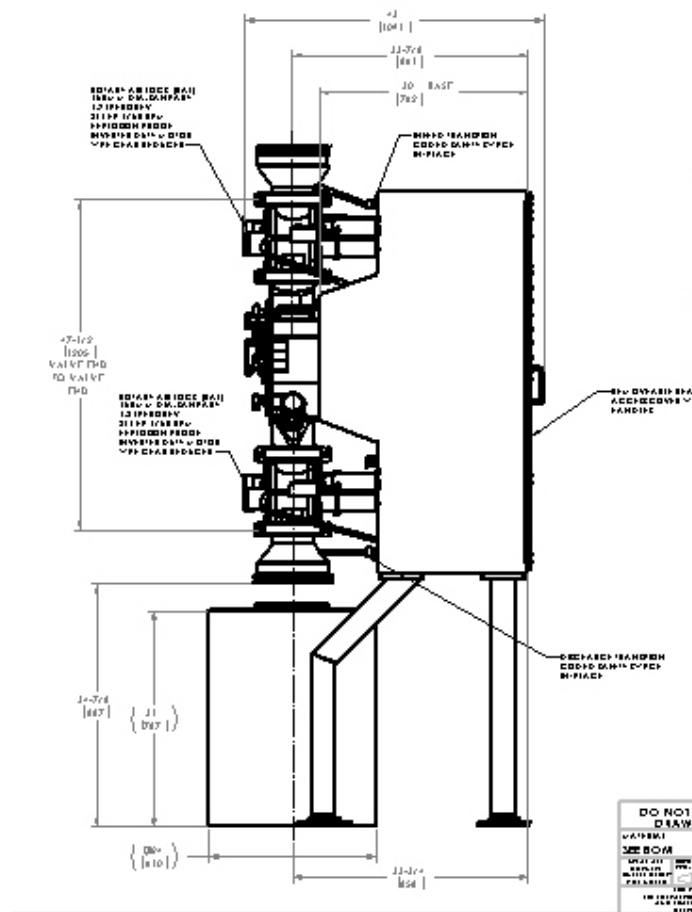


Figure 2.5.3: Side View for RV-D6B-RV

SECTION 3: Machine Set Up

3.1 Operating Speeds

Motors are typically supplied with base speeds of 1800 or 3600 rpm for 60 hertz duty (1500 or 3000 rpm for 50 hertz). Actual slip speed, as stamped on the motor nameplate, will be slightly less than these nominal ratings (e.g. 1750rpm, 3525 rpm, etc...). The Fitzpatrick Company has designed your machine to meet the rotor operating speed(s) as defined in your order documents and confirmed on the **Comminutor Specification Sheet**.

The typical operating range for the D6B Comminutor is:

- **1,000 – 4,600 RPM** when using the conventional rotor
- **100 – 1,000 RPM** maximum when using a bar rotor for gentle particle size reduction

With most model D6B machines, the mill rotor is directly coupled to the drive motor. Therefore, motor speed = rotor speed. The D6B can also be supplied with a belt driven for higher speed range when explosion proof or Atex motors are required. Normally these motors are not allowed to exceed 1.5 times base motor speed. Most D6B machines are equipped for operation over a working speed range (min-to-max) which is stated on your **Comminutor Specification Sheet**. Motor speed is controlled by use of a variable frequency drive (VFD). Depending upon the configuration of your specific D6B, speed control through the VFD may be accomplished by one of three control devices:

1. A manually operated speed control potentiometer, located on the base of the machine (older machines).
2. An electronic Human Interface Module (HIM) with digital readout.
3. Controlled by a PLC with touch screen. This option normally used for D6B machines with advanced features such as Product Containment systems, Nitrogen Inerting / Oxygen Sensing or where the D6B is integrated as part of a Chilsonator granulating system.

See section 4 of this manual for additional information regarding machine controls.

3.2 Rotor Rotation: Knife or Impact Milling

The D6B is equipped with a one-piece rotor assembly with both knife and impact edged blades. The impact or blunt edge is designed for fine size reduction, whereas the knife or sharp edge is utilized for producing a larger or granular end product with minimum fine powder.

The D6B is designed to allow operation in only one direction of rotation. To switch from Knife to Impact edge milling, it is necessary to remove the rotor and re-install it in the opposite orientation. The D6B rotor is designed to be reversible for this reason.

Figure 3.2.1 shows the D6B rotor with Knife blades configured for clockwise rotation.

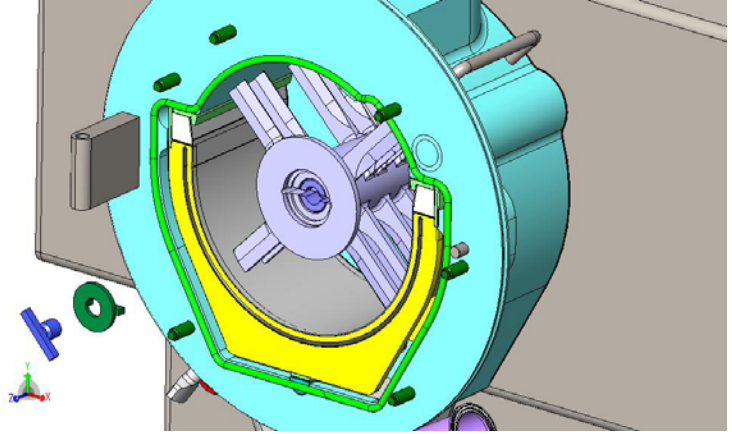


Fig. 3.2.1: D6B rotor with Knife / Impact Blades

The direction of motor rotation should always be counter-clockwise.

3.3 Rotor Lip Seal

Your machine has been shipped with a one piece double lip shaft seal installed. The lip seal is located on the inside rear chamber. The seal should be inspected regularly and replaced whenever excessive wear is evident. Refer to the **Comminutor Specification Sheet** to reference the Chamber assembly drawing number. The Chamber assembly drawing illustrates the detail of the lip seal and provides part numbers should you require replacement parts.

- A flanged lip seal, featuring two Fluoropolymer 72 lip seals with a built-in gas-purge ring between is installed as a standard feature of the D6B comminuter.

3.3.1 Installing Rotor Lip Seal:

- 1.) Before installing, visually check (2) o-rings for tears or slices. Make sure o-rings are firmly seated in their grooves. Replace o-rings if damaged. Check lip surfaces for cut or gouges. Replace entire seal if lips are damaged.
- 2.) Slide lip seal over rotor shaft and press in lip seal while holding parallel to rear chamber wall. Continue pressing in until completely seated against flanged underside

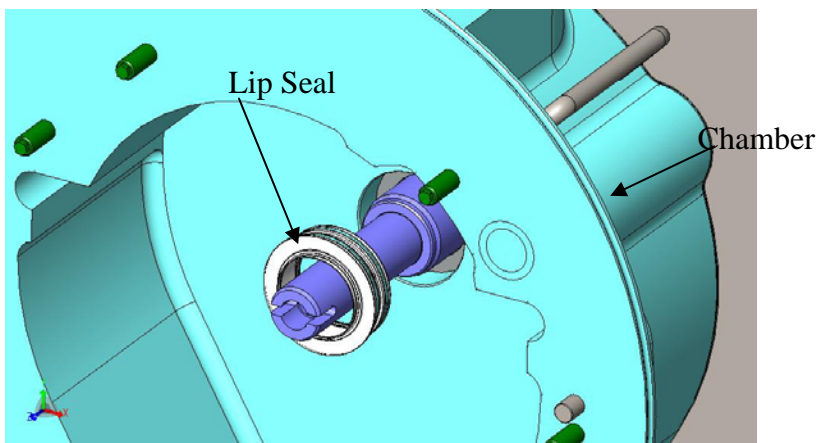


Fig.3.3.2: Installing Rotor Lip Seal

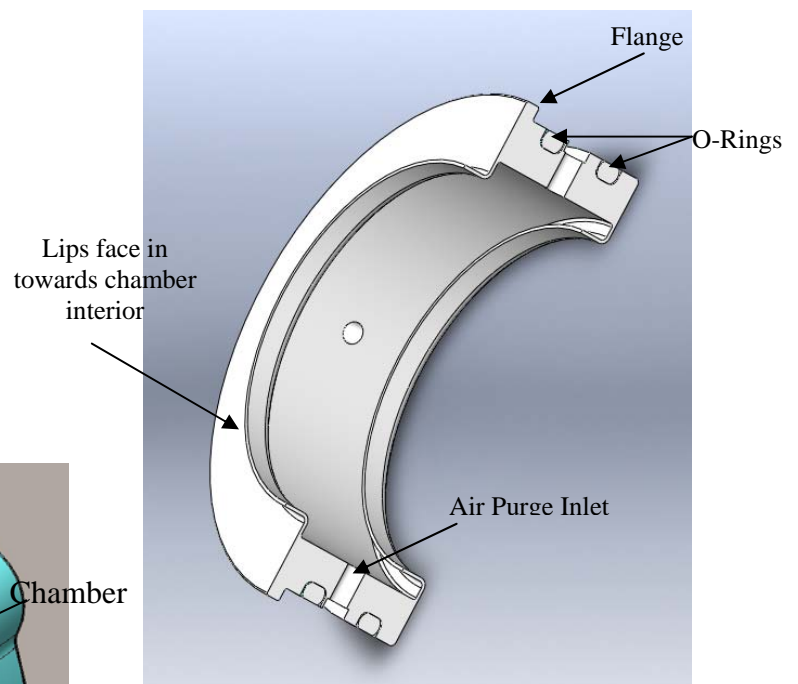
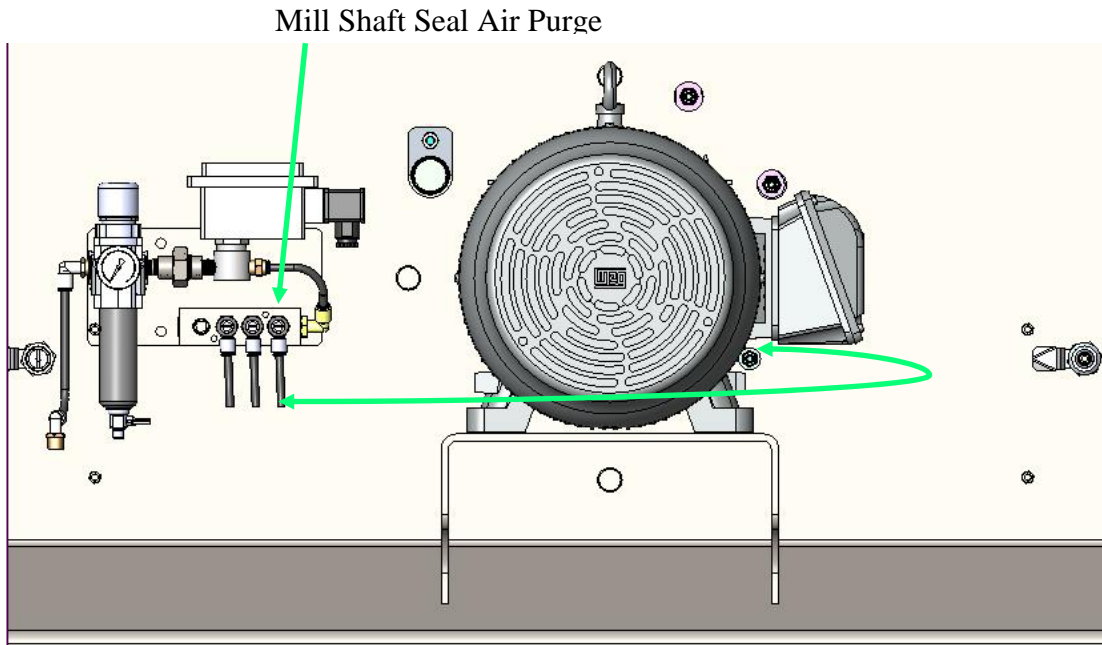


Fig.3.3.1: Lip Seal Gland with Gas Purge

3.3.2 Lip Seal Air Purge

The lip seal air purge is used on machines to keep product from migrating past the seal lips. It also aids in dissipating heat build up on the rotor shaft.

On inerting machines, nitrogen would be used as the process gas in place of air.



3.4 Water Jacketing

The D6B chamber is equipped with a water cooling jacket. The maximum recommended operating pressure in the Chamber is typically 1 bar (15 psi). Pressure control (supplied by customer) is to be located before the inlet to the water jacket. The outlet must not be restricted. The maximum recommended flowrate for cooling water is 12 LPM (~3 GPM). Inlet water temperature is typically 4-15° C (40-60° F) but may vary based on local conditions.

Check your Comminutor Specification Sheet and/or machine General Arrangement Drawing to confirm if your machine includes provision for water cooling controls. Inlet and outlet connection ports for water jackets will be indicated on your General Arrangement Drawing. Make sure your interconnecting water lines are adequately sized to provide the recommended flowrate.

Typical locations for water cooling jacket on D6B model Comminutors are:

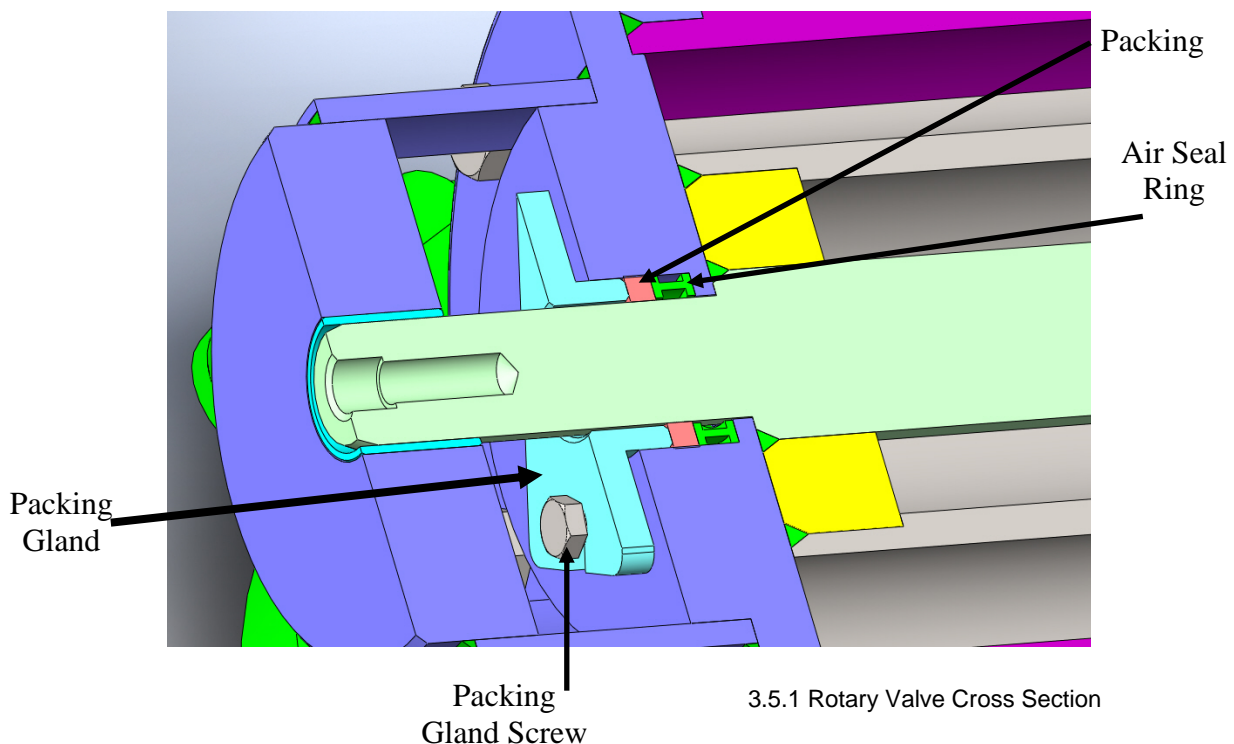
- ⇒ Near Chamber Feed Throat: Utilized to reduce the process temperature when handling heat sensitive products. In some highly heat-sensitive applications, connections are provided in the feed throat to inject a cryogen (e.g. liquid CO₂) directly into the product stream for cooling.

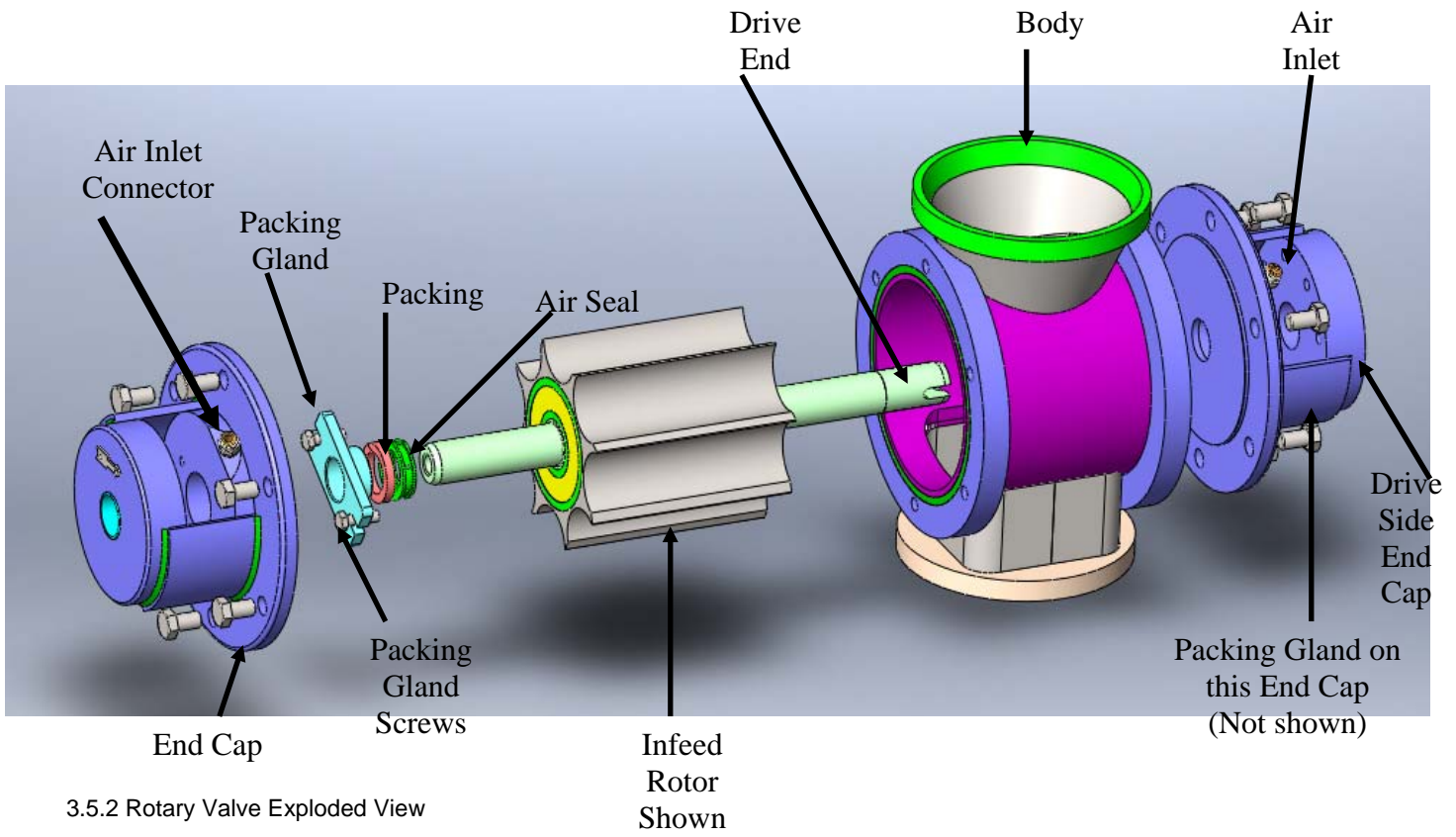
3.5 Procedure for Proper Rotary Valve Packing Adjustment

The infeed and discharge rotary valve are supplied with an air seal ring and a backup piece of packing on each rotor shaft end. The air seal helps keep product from leaking out of the rotary valve. The packing ensures powder no-leak integrity.

1. Install the air seal ring in each rotary valve endcap.
2. Place the packing behind the air seal ring.
3. Install the packing gland and secure loosely with (2) hex head screws.
DO NOT TIGHTEN AT THIS TIME.
4. Only after the rotor has been installed and the end caps have been bolted on the rotary valve body can the packing glands be tightened. Tighten the packing gland screws until hand tight, applying light pressure to the packing.
5. Using a wrench, tighten each bolt $\frac{1}{4}$ to $\frac{1}{2}$ turn (beyond hand tight) to apply additional compression to the packing.

Tighten the packing gland hex screws just enough to prevent product leakage. Over tightening the packing gland can cause excessive heat, premature wear and shorten packing life.





6.3 CHAMBER & ROTOR ASSEMBLY

Slide the flanged dual lip seal into the chamber bore (Fig. 6.3.1) until flange is seated completely against chamber wall. The lip seal can be removed for inspection using the (2) 1392-0337 removal brackets shown in section 7.2.

Slide the screen carrier assembly with screen into the chamber until seated against rear wall (Fig. 6.3.2).

Slide the rotor onto the shaft (knife forward shown) and rotate until slots on rotor are lined up with the slots on the shaft (Fig. 6.3.3).

Place the rotor key in the rotor slot and seat completely. Screw down the key tightener using the special wrench (see section 7.2) provided (Fig. 6.3.4)

The chamber door hinge is an articulating design which been designed to allow the door to first pull away from the chamber squarely before rotating out of the way. If the door has been removed for cleaning, simply re-bolt the hinge at the point it was removed from chamber or door.

Install the spliced o-ring rope in the mill door groove.

Close the mill chamber door taking care to align the door (2) dowel bores with the dowel pins protruding from the chamber. Once aligned, hold the door by its handles and press the door firmly closed.

Install the (5) similar handknobs and tighten hand tight (Fig. 6.3.5).

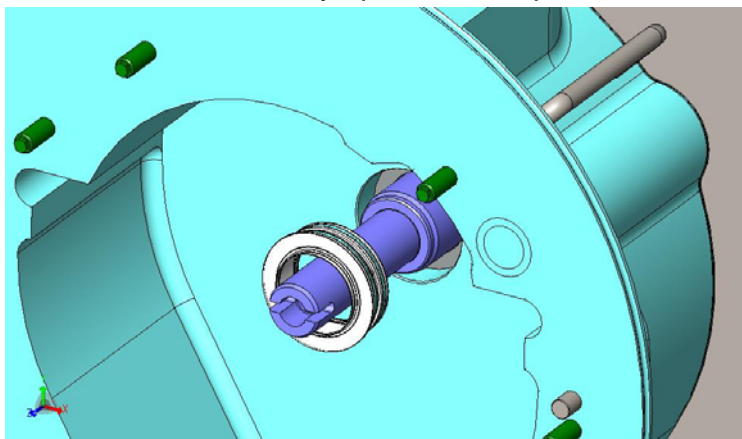
Install the knob with the stud protruding from its face handtight (Fig. 6.3.6).

Next install the proximity switch safety bracket with the Elobau magnetic target bolted to it. The Elobau target inserts in the mill door bore.

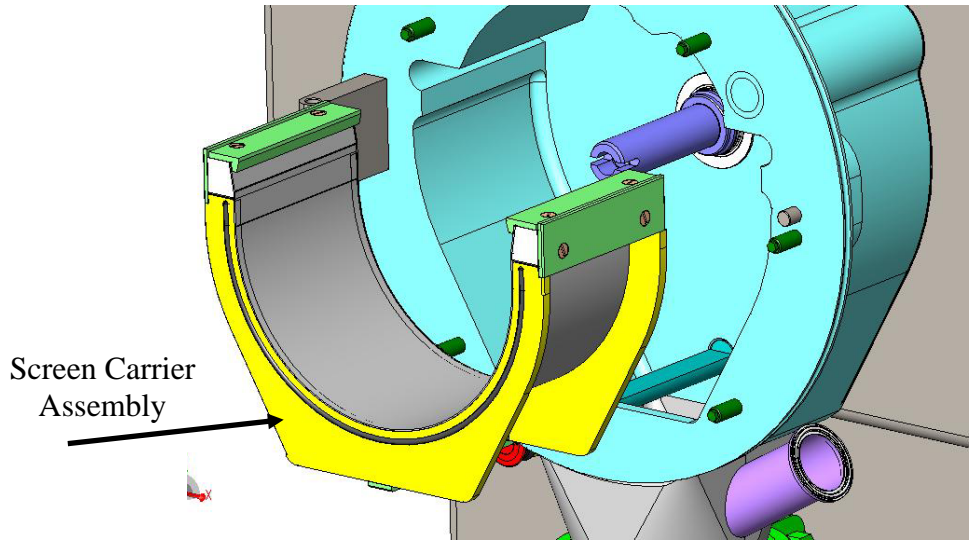
Install the final handknob to secure the elobau target bracket.

Safety Note:

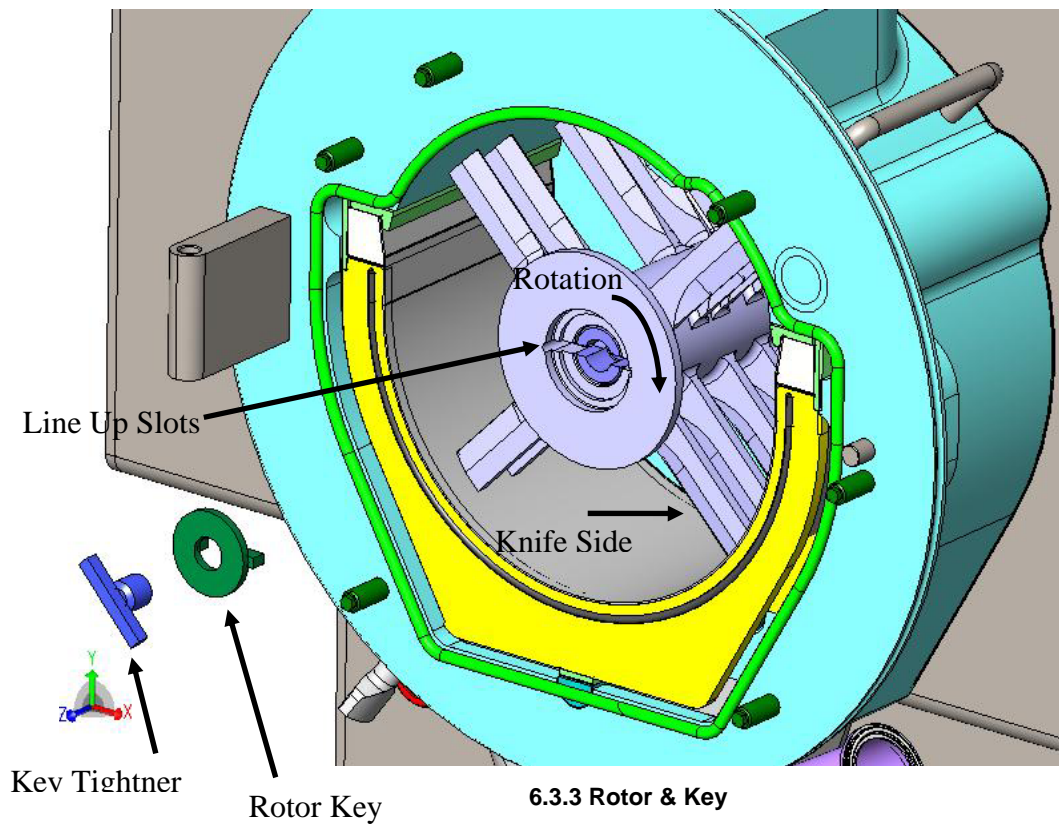
The purpose of the safety bracket is to increase the time it takes to open the mill door. The removal of the bracket with target engages the emergency stop system, thus killing power to the rotor motor. The motor freely spins to a stop.



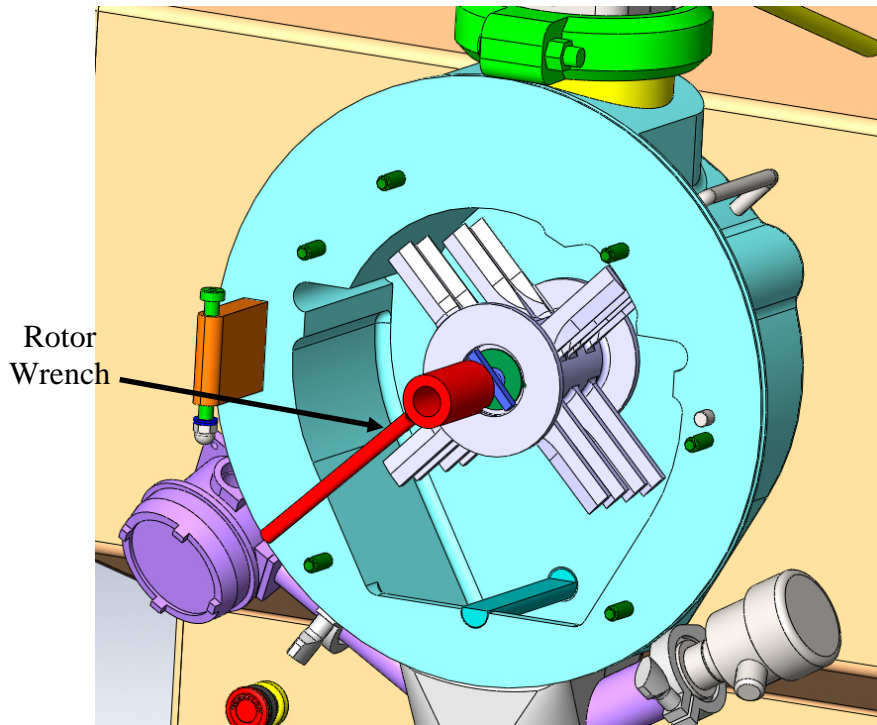
6.3.1 Chamber & Lip Seal



6.3.2 Chamber & Lip Seal

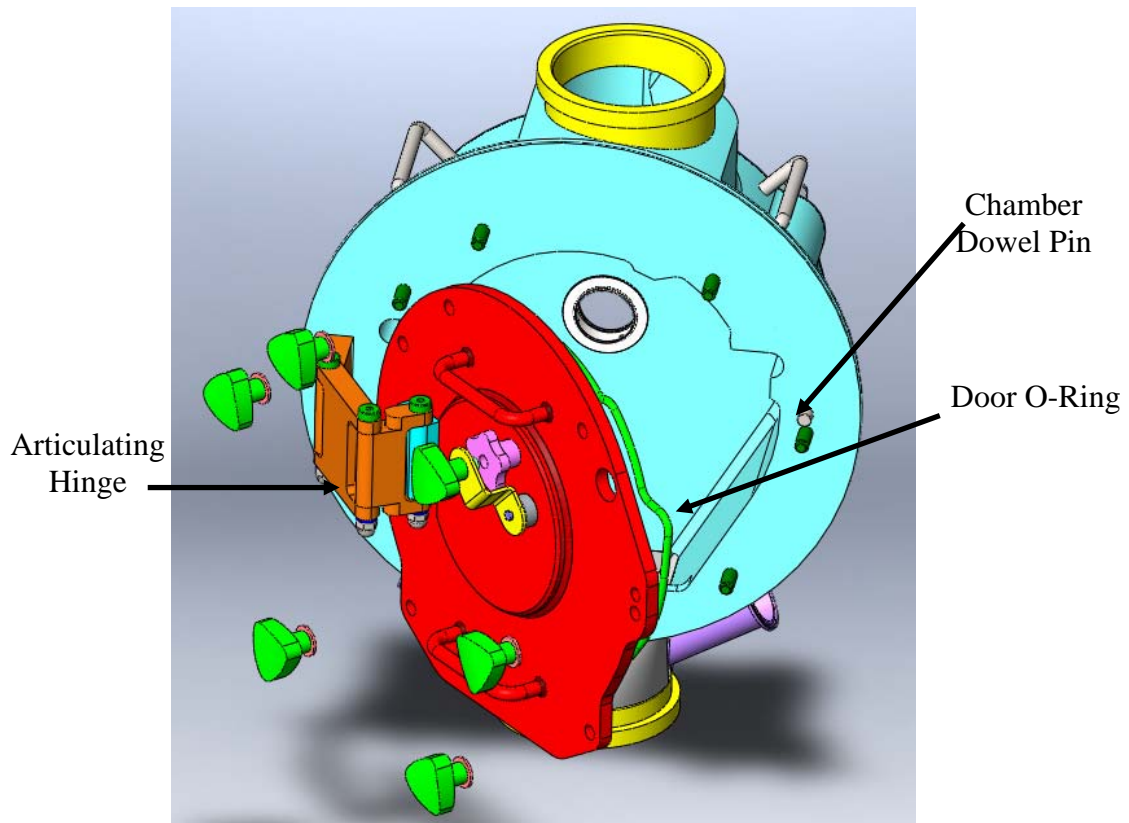


6.3.3 Rotor & Key



Rotor
Wrench

6.3.4 Rotor Tightening

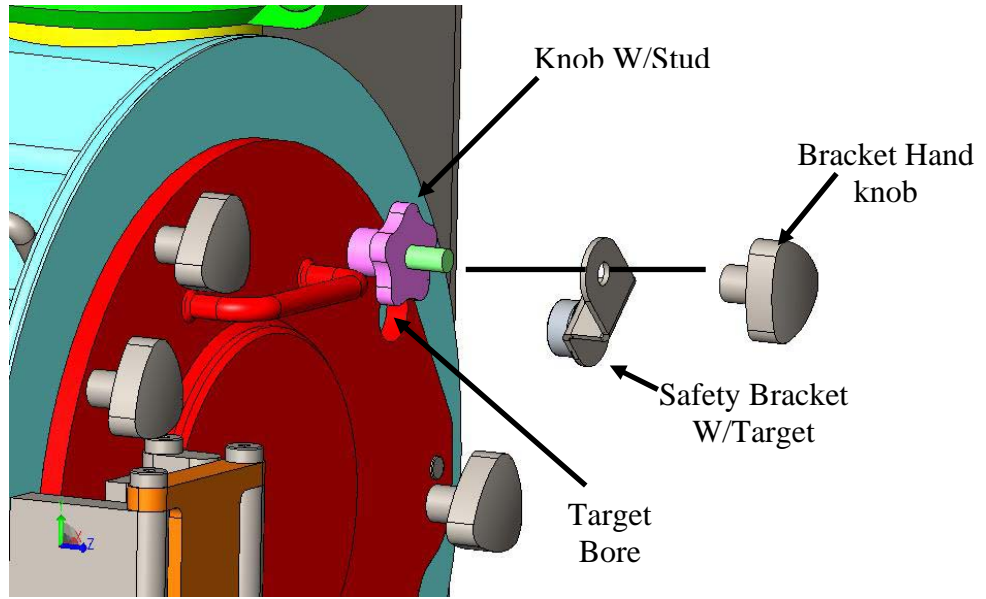


Articulating
Hinge

Chamber
Dowel Pin

Door O-Ring

6.3.5 Chamber Door/Handknobs



6.3.6 Safety Bracket with Target

6.4 Cleaning your machine

The design and construction of your machine allows for disassembly without the need for specialized tools.

Complete disassembly of all parts is required for thorough cleaning or washing. All metal parts which contact products being processed are constructed of stainless steel and may be cleaned with hot water or steam. When materials processed are not water soluble, solvents or steam may be used for cleaning under proper safety conditions. Care should be taken that bearings are kept dry and lubricated. Care should also be taken that cleaning agents or solvents used are chemically compatible with elastomers and metals used in the construction of your machine (refer to your BOM and assembly drawings for parts details). Highly chlorinated cleaning solutions (e.g. bleach) are to be avoided as these can be harmful to stainless steel.

6.5 Screen Carrier Assembly Installation

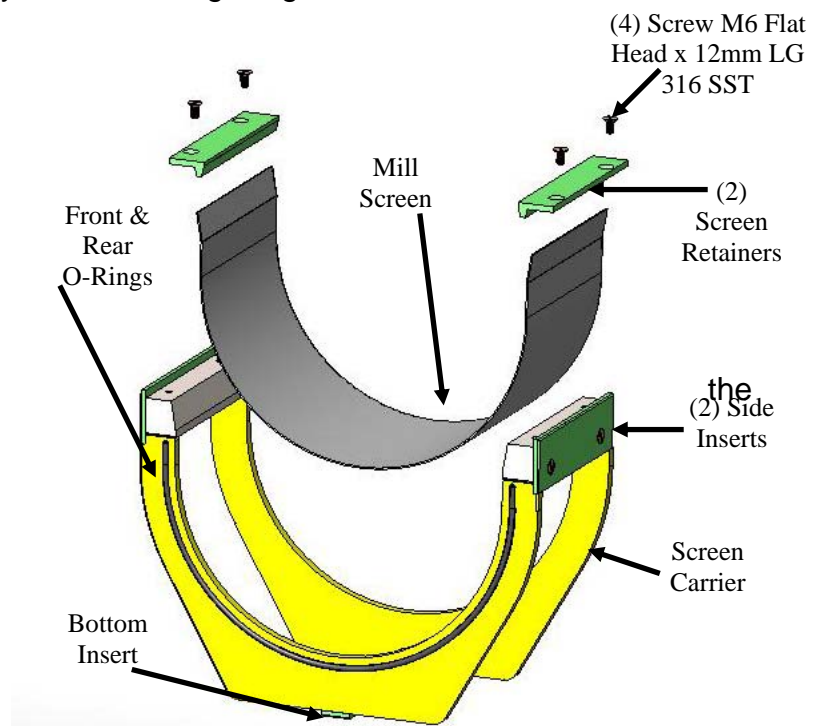
The Mill Screen Carrier Assembly is symmetrically designed to clamp a milling screen securely and slide in the chamber easily with the anti-galling retainers and inserts.

Use the screen carrier pry bar (see section 7.2 tools) to aid in removal from the chamber. The carrier assembly has anti-galling side and bottom bolted inserts which do not require any normal attention.

Installing mill screen: seat the screen in the carrier and while holding down screen firmly, check that the screen profile matches the carrier profile closely.

Re-bend the screen if large gaps are observed. Again while holding down the screen firmly, screw down one screen retainer securely using a flat tipped screwdriver.

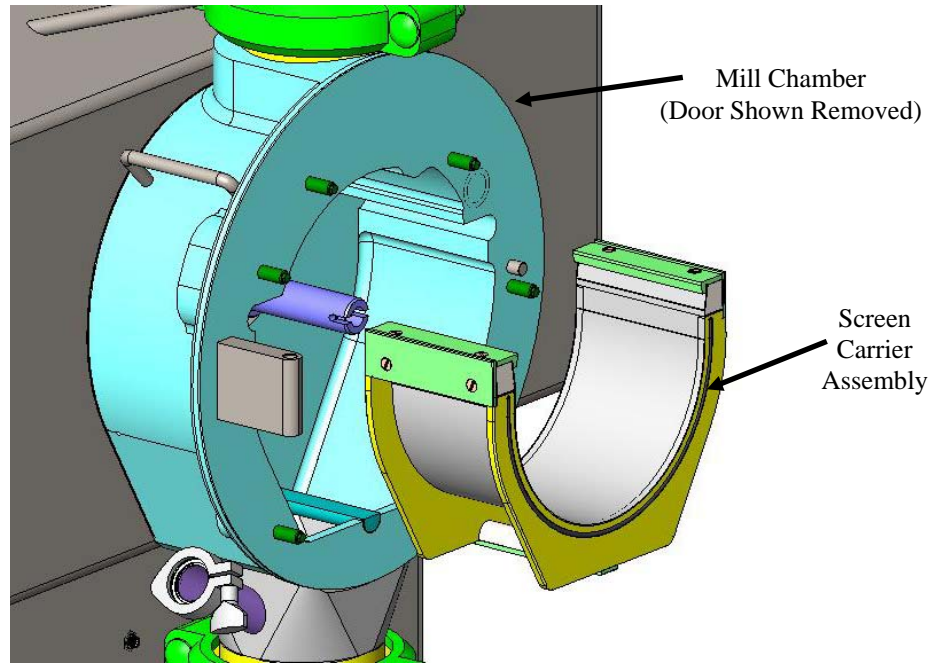
Screw down the second (2nd) screen retainer to lock the screen in place



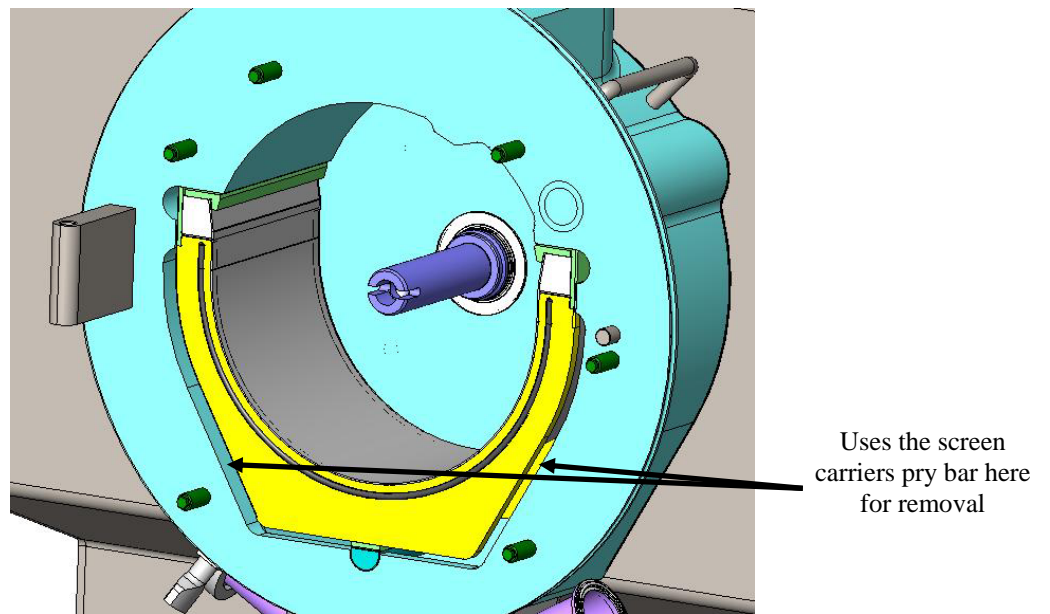
6.5.1 Screen Carrier Assembly

Check that the (2) side o-rings are in good condition and slide the screen carrier assembly into the mill chamber.

Refer to the “Comminuter Spec Sheet” to reference the screen carrier assembly drawing.



6.5.2 Screen Carrier Installation



6.5.3 Screen Carrier Removal