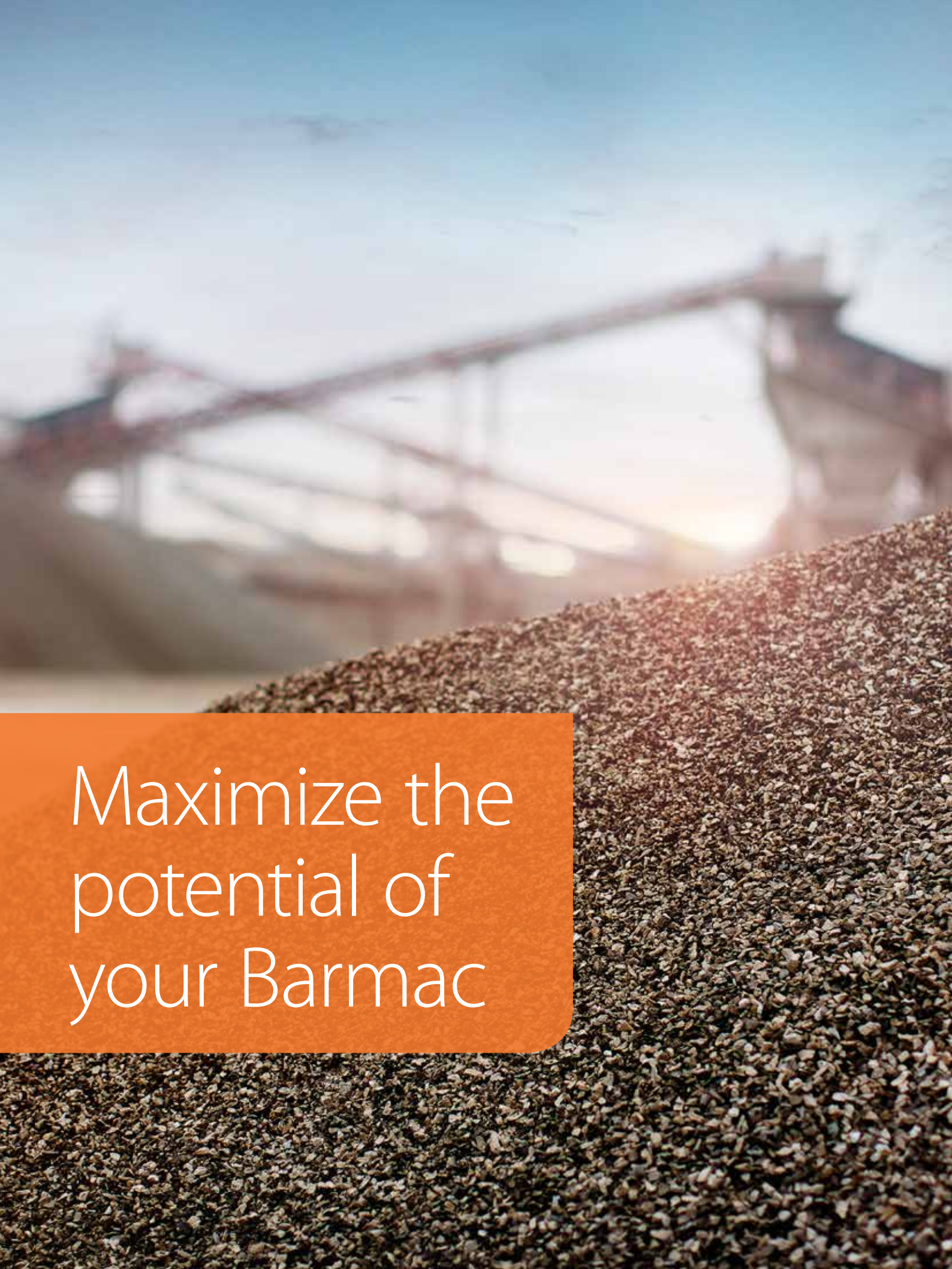


Metso
Orange
Series Rotors

Handbook





Maximize the
potential of
your Barmac



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Refresh your VSI operation



In an industry where reducing the cost per ton of an operation is paramount, the new Orange Series Rotor delivers results for Vertical Shaft Impactor (VSI) operators by adding operational uptime, securing faster service turnaround times and a longer wear life of parts.

The twin goals of availability and serviceability

Availability and serviceability of the Barmac VSI are greatly improved with Orange Series Rotors offering both longer wear life and easier servicing. Parts have been designed to more easily interchange and replace components to maximize wear life potential. This is achieved by reconfiguring components when and where needed.

Orange Series Rotor can be applied without any modifications to the VSI models accepting the following rotors:

	RC690DTR (27")	RC840DTR (33")	RC990DTR (39")
B6000	■		
B6100	■		
B6150SE	■		
B6900	■		
LT7150		■	
B7150SE		■	
B8000		■	
B8100		■	
B9000		■	■
B9100		■	■
B9100SE		■	■
B9600		■	■

Competitive advantage offered

Wear part lifetimes drastically increased

Primary components in the Orange Series Rotor will, in most cases, result in longer service intervals caused by an increase in wear life. As a result, you will benefit from increased uptimes and lower costs per crushed ton, reducing your total cost.

Wear life increase

Tip	30 - 50%
Cavity wear plate	20 - 30%
Upper and lower wear plates	30 - 40%

Multiple rapid change wear parts

The main wear parts are quick and easy to change. The new and unique design of the retaining bar structure further enhances the ease in wear parts replacement. Consequently this makes your work safer while reducing downtime and service costs.

Reduction in replacement time (indicative)

Tip	80%	from 90 to 20 min.
Cavity wear plate	85%	from 90 to 15 min.
Upper and lower wear plates	66%	from 180 to 60 min.

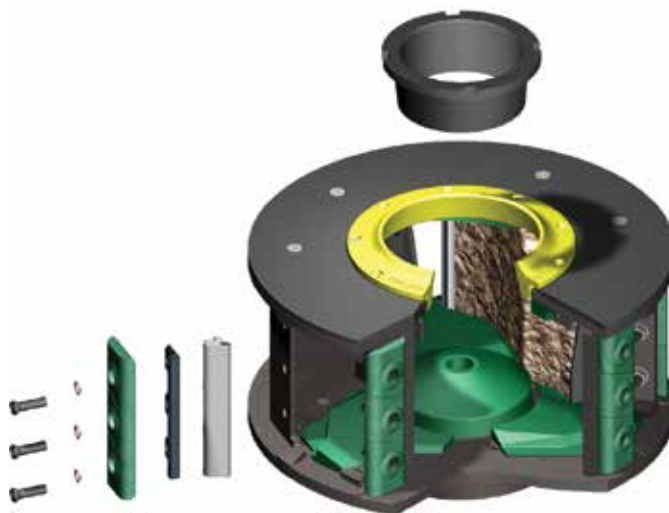
Reduction in number of parts

Several components are now integrated reducing the number of fixing points making the Orange Series Rotors easier to maintain. The total number of wear parts and components are reduced by 25%-30%. For example, the 840DTR contains 48 wear parts, while the RC840 consists of only 34 wear parts. Thanks to the reduction in the number of components the need for inventory is also reduced.

Simple to maintain

- Fewer components
- Hard facing repairs not required

Deep Rotor



Orange Series Rotor



Components have been integrated when possible and the number of fixing points have been reduced to make the Orange Series Rotors easier to maintain.



Orange Series Rotor components



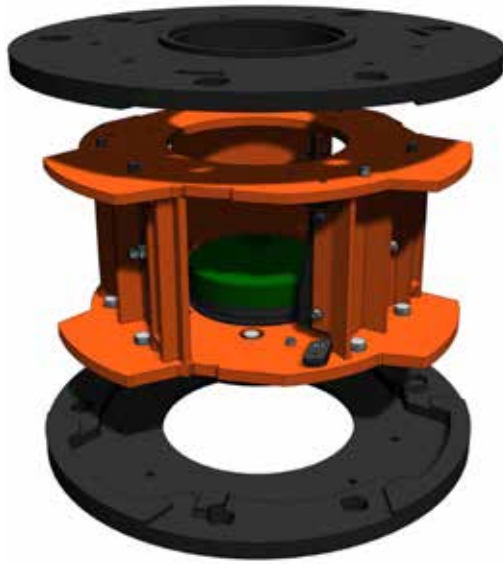
Multiple wear part replacement

If multiple wear parts need to be replaced, you may consider removing the rotor and replacing it with a new assembly to keep downtime and service costs to a minimum. The removed rotor can be cleaned, rebalanced and wear parts replaced while the new assembly is in operation.

Dressing the rotor

Wear parts for the rotor are supplied either in sets or as individual components. All sets are weight matched to ensure the rotor is not subjected to an imbalance because of the addition of wear parts. The bare rotor is supplied pre balanced. To ensure the rotor remains in a balanced condition, the procedures (as highlighted right) should be followed.

Tips, back-up tips, cavity wear plates, upper/lower wear plates and trail plates are all supplied as weight matched sets. When these wear parts are being fitted, it is important to correctly position them onto the rotor to distribute the weight evenly. The correct position is one at each port.



Top and bottom wear plates

Long lasting top and bottom wear plates provide maximum protection for the rotor body. The rotor is no longer hard faced - no more costly weld repairs are required.

Removal/installation

Access: Through the roof and spider.

It is not recommended to remove and install the top wear plate with the rotor still in the crusher due to the requirement of rebalancing the rotor after installation.

Removal

1. Remove the rotor from the crusher.
2. Remove the six retaining bolts from the underside of the rotor weldment top plate.
3. Shock the top wear plate loose with a hammer and lift free with suitable lifting equipment.
4. Thoroughly scrub top plate of the rotor weldment.

Installation

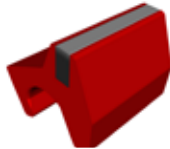

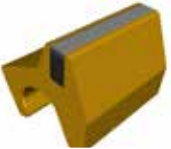
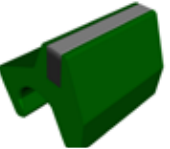

1. Ensure mating surfaces are clean and free of snags.
2. Lower top wear plate onto rotor weldment.
3. Replace all six retaining bolts (apply an anti-seize compound to the thread) and tighten. Torque bolts to 372Nm (274ft lbs).
4. Balance rotor as described in the rotor balancing section of this handbook (page 15).
5. Reinstall the rotor to the crusher.

Retaining bars

Our retaining bars are designed to provide faster and timely maintenance. Access tips and cavity wear plates by simply lifting up and swinging out each of the six retaining bars.

The innovative design provides access to wear parts without bolts, washers and nuts.

SIMPLE TIP SELECTION GUIDE - ORANGE SERIES ROTORS

	Red	Black	Yellow	Green	Orange
					
	The best first selection for all applications	Larger tungsten carbide gives more life compared to red	For faster tip speeds when more reduction is required	For abrasive materials with larger tungsten than yellow	Maximized lifetime with very abrasive material
Features	Hard tungsten (red/black) Largest feed size (0-50 mm) Lowest abrasion resistance Highest impact resistance		Extra hard (yellow/green) Medium feed size (0-40 mm) Medium abrasion resistance Medium impact resistance		Extra X hard (orange) Smallest feed size (0-25 mm) Highest abrasion resistance Lowest impact resistance
Application	Shaping, general crushing		Fine crushing, manufactured sand		Industrial minerals, mining

Rotor tips

Our wear plate tips - made of high quality tungsten carbide - have optimized profiles for extended wear life.

The retaining bar holds wear plate tips in place without the use of nuts and bolts, making them simple to change. All tips are accessible through the service door decreasing your service time by up to 80%.

Removal/installation

Access: Through service door.

Disassembly

1. Loosen all the tips and the retaining bar in a port. This is best achieved by shocking the tip hangers and the retaining bar with a large hammer. In some cases it may require breaking away any excessive internal stone build up still in contact with the tips.
2. Once the tips and retaining bar have been loosened, the bar can be lifted vertically until it disengages with the bottom wear plate. Pulling the bottom of the retaining bar away from the tips will result in the bar disengaging from the top wear plate.
3. With the retaining bar removed, the tips are free to be replaced or repositioned as their wear condition requires.

Assembly

1. Ensure all mating surfaces on rotor tips, back up tips and retaining bars are free of any high spots (dirt, weld spatter, burrs) and retaining bar locations are cleaned out.
2. Place the tips into the desired position, ensuring the requirements of even weight distribution for all new parts fitted are followed.
3. Engage the retaining bar into the top wear plate and while lifting, move the bottom of the bar in towards the tips until it engages with the bottom wear plate. Lower retaining bar to engage the bottom wear plate.
4. Tapping the tip assembly with a hammer will assist in the seating of the retaining bar.

Tips must be changed in sets and distributed evenly around the rotor; otherwise an imbalanced condition will occur.



Back-up tips

For maximum protection against rotor body wear, our back-up tips are made of tungsten carbide.

Back-up tips are secured in slots in the rotor top and bottom wear plates. Tips, retaining bar and upper and lower wear plates must be removed when replacing these parts. Service door access makes back-up tips easy to replace.

Cavity wear plates

Thanks to a retaining bar fixing method that does not require nuts and bolts, replacement takes less than half the time compared to the previous Barmac rotor design.

The cross section is increased providing extended wear life. Additionally, further wear life can be achieved by reversing the cross section.

Removal/installation

Access: Through service door.

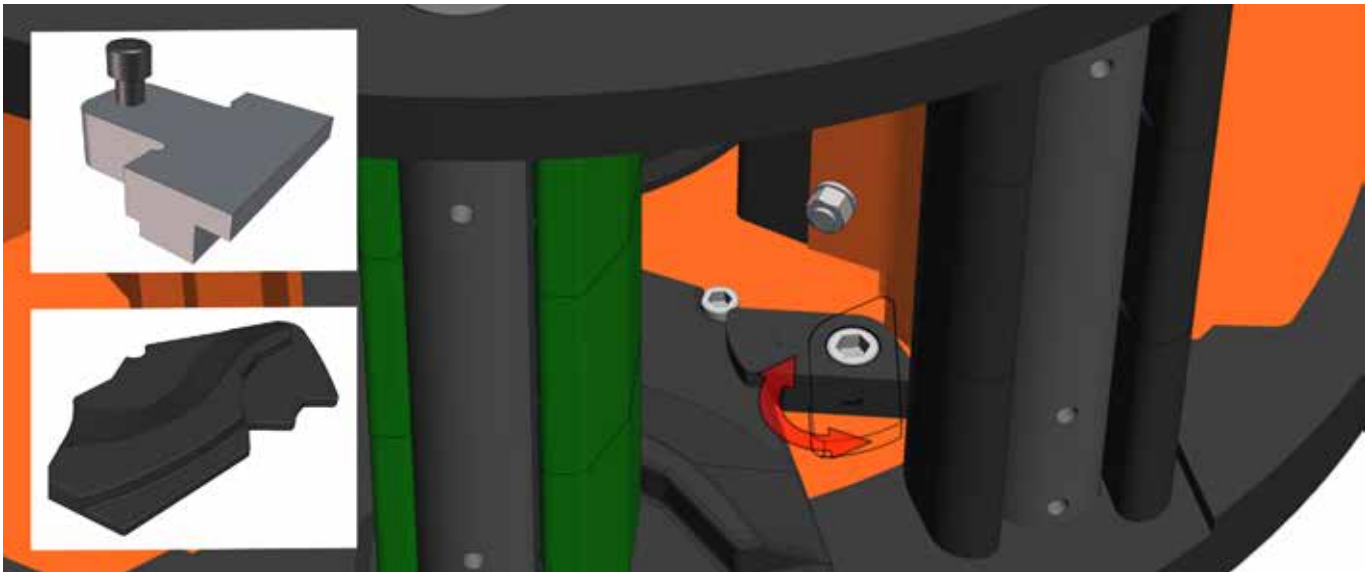
Disassembly

1. Loosen all the cavity wear plates and the retaining bar. This is best achieved by shocking the castings and the retaining bar with a large dead blow hammer. Care should be taken not to break reusable castings.
2. Once the cavity wear plates and retaining bar are loosened, the bar can be lifted vertically until it disengages from the bottom wear plate. Pulling the bottom of the retaining bar away from the cavity wear plates will result in the bar disengaging from the top wear plate.
3. With the retaining bar removed, the cavity wear plates are free to be replaced or repositioned as their wear condition requires.

Assembly

1. Ensure all mating surfaces on cavity wear plates and retaining bars are free of any high spots (dirt, weld spatter, burrs) and retaining bar locations are cleaned out.
2. Place the cavity wear plates into the desired position, ensuring the requirements of even weight distribution for all new parts fitted are followed.
3. Engage the retaining bar into the top wear plate and while lifting, move the bottom of the bar in towards the cavity wear plates until it engages with the bottom wear plate. Lower retaining bar to engage the bottom wear plate.
4. Tapping the cavity wear plate assembly with a hammer will assist in the seating of the retaining bar.

Cavity wear plates must be changed in sets and distributed evenly around the rotor; otherwise an imbalanced condition will occur.



Cavity upper and lower wear plates

Our wear plates have bolted keepers and rotating cam-locks for ease of replacement, dramatically reducing service time. Our rotating cam-locks are also bolted in place for effortless change out.

Removal/installation

Access: Through service door.

It is possible to remove and install the upper wear plates through the service door, however it may be necessary to remove the tip assembly first to provide a larger working environment.

Removal

1. Gain access to the rotor through the service door as described in the Introduction.
2. Open locking cams (replace as a set if worn).
3. Removing rotor tips and retaining bar assists upper wear plate removal.
4. Using a copper or rubber mallet, tap the wear plate to break free any material build up.
5. Using a pry bar, lever the wear plate free of the rotor.
6. Withdraw the plate through the discharge port.
7. Thoroughly scrub out the remaining build-up with a wire brush or water hose.

Installation

1. Ensure mating surfaces are clean and free of dirt.
2. Insert new wear plate through the discharge port and slide into place.
3. Ensure the new plates are wedged under the keepers (highlighted on upper left corner of illustration above).
4. Close locking cams.
5. Check tips for wear.



Distributor plates

Removal/installation

Access: Through the roof and spider.

Removal

1. Gain access to the rotor through the roof as described in the Introduction.
2. Remove stones and protective cloth from distributor bolt hole.
3. Remove distributor plate bolt.
4. Lift out distributor plate.

Warning: There are safety risks due to the heavy load of distributor plates. A two person lift is recommended.

Installation

1. To protect the distributor plate from breakage, ensure the top plate surface is clear of obstructions before fitting.
2. Place distributor plate in center of rotor. Insert distributor plate bolt (apply an anti-seize compound to the thread) and tighten. Torque bolt to 200Nm (150ft lbs).

The use of large impact wrenches should be avoided when tightening bolts.

Insert a piece of cloth into the distributor plate bolt hole and tamp firmly around bolt head. This will keep dirt from getting around the bolt head and will make later removal much easier.

Trail plates

Removal/installation

Access: Through service door.

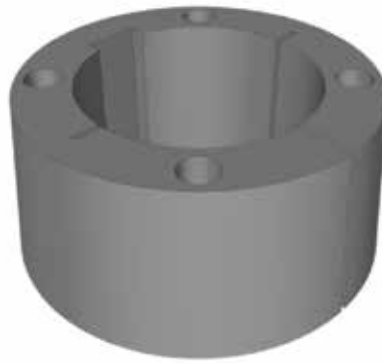
Disassembly

1. Remove trail plate retaining bolts. Bolts will be covered with build-up and will have to be knocked out with a hammer and punch.
2. If the trail plate is held in by the build-up, a sharp blow with a hammer and bar will break away the buildup and allow the trail plate to fall free.

Assembly

1. Clean out any remaining build-up.
2. Position trail plate and insert bolts (apply an anti-seize compound to the threads).
3. Insert bolt from the inside of the rotor.
4. Tighten bolt with appropriate wrench, Torque bolts to 77Nm (57 ft lbs).

Trail plates must be changed in sets; otherwise an imbalanced condition will occur.



Feed tube

Removal/installation

Access: Through the roof and spider.

Disassembly

1. Open the roof with a lifter if available. If the crusher does not have a lifter, raise the hopper and crusher roof together.
2. Remove spring handle and feed clamp plate from spider assembly (build-up needs to be removed).
3. Lift out feed tube.

Assembly

1. Lower feed tube into feed tube location plate.
2. Refit feed tube clamp plate.
3. Lock feed tube clamp plate into position with spring handle.

Refer to VSI maintenance manual for method to adjust the feed tube position.

Tapered sleeves

Tapered sleeves (Taperlock) are used for MKI, MII, MKIII and 8000 shafts. A new taper lock should be installed with every rotor change. Alternatively the fit between the taper lock and rotor boss should be checked.

This is a quick reference list that does not apply to every case. Check the old taper lock for the exact taper lock option.

MK II to models:

- B7150SE
- B8000
- B8100
- B9600

MK III to models:

- B7160SE
- B8000
- B9600
- B9000
- B9100
- B9100SE

Rotor taper check

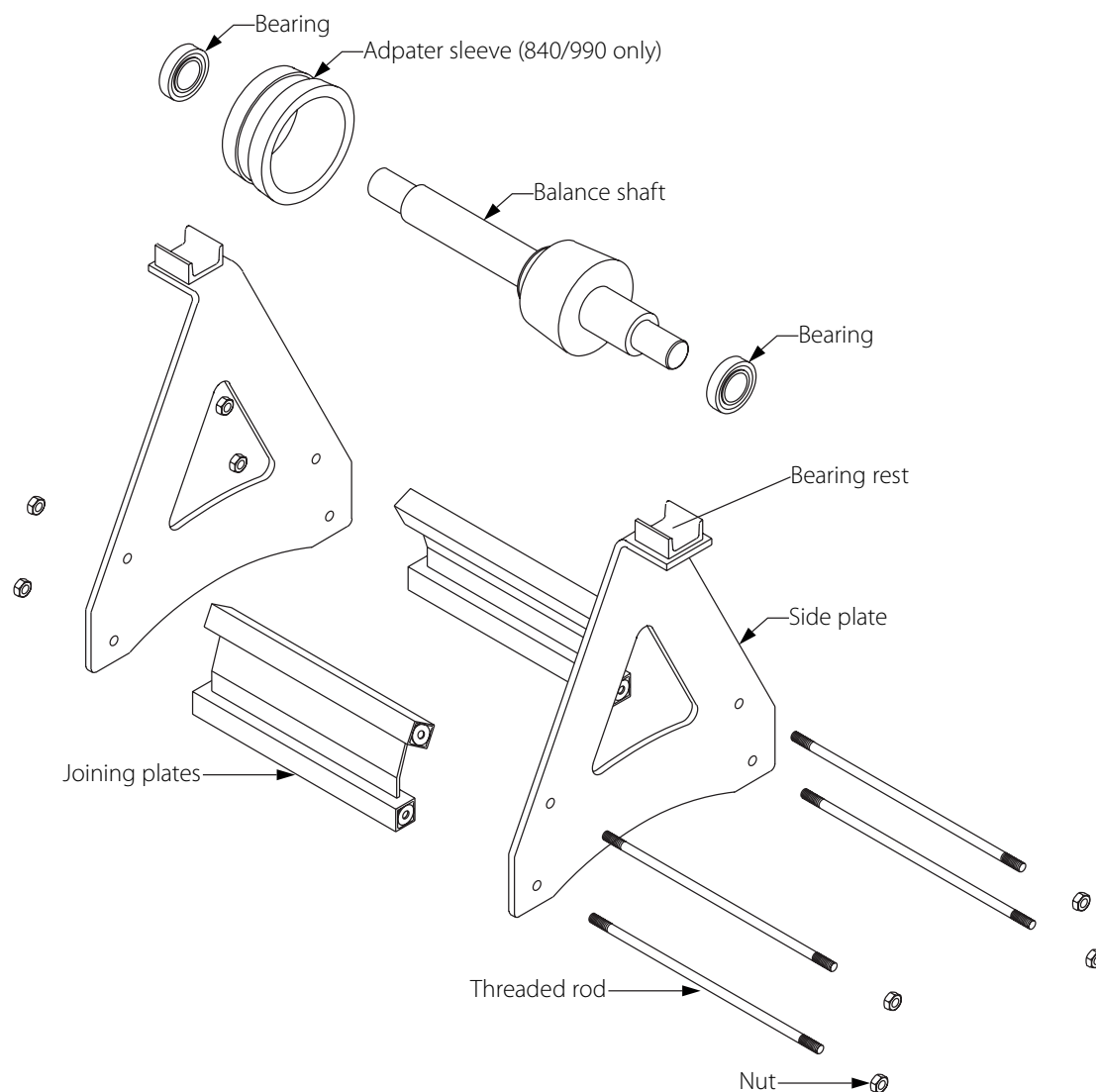
First, add marking blue liquid to the bore of the rotor boss and lower onto the taper lock on the shaft (use the rotor lifting plate). Ensure the taper is properly seated under the weight of the rotor and then remove.

A blue mark should be visible on the taper lock indicating contact with the rotor boss. This mark should cover at least 90% of the circumference and 90% of the length of the taper.

Any less contact requires replacement of the rotor boss.



Rotor balancing



First assemble the rotor balancing machine. Ensure the bearings are not damaged or dirty. Clean off any dirt or old oil, and if they sound or feel too worn, we recommend the bearings be changed.

After they are clean, add a little oil. Use a spirit level to be sure the rotor balance machine is level. Make sure there is no loose material or wear parts in the rotor that could move as it is turned.

Stage 1

Balance the rotor weldment.

Stage 2

Balance the rotor with top and bottom wear plates.

The balance of the rotor changes when wear parts are fitted. Genuine Barmac VSI wear parts are weight matched to maintain balance within acceptable limits. Exact guidelines for balancing can be found in the Orange series rotor manual.



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