

9/10 BLAST WHEEL MAINTENANCE & ASSEMBLY MANUAL



Parts & Machinery for the Abrasive Blast Industry

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INTRODUCTION

These instructions are intended for maintenance personnel for the maintenance and/or repair of the indicated blast wheel assembly. Disassembly and reassembly requires expertise and must be performed by personnel that are knowledgeable about the assembly. Please contact Coyote should you have any questions.

GENERAL DESCRIPTION

The Blast Wheel Assembly is the most vital part of any Airless Blast Cleaning System, thus the operating efficiency depends entirely upon the proper inspection, assembly, and adjustment of the Blast Wheel there will be constant war on internal parts making periodic inspection and replacement essential.

It is important to keep in mind that the very nature of this device requires that some of the parts be constructed using extremely hard and wear resistant materials. This hardness cannot be attained without making the wear parts brittle. When handling these parts (Blades, Impeller, Control Cage and Liners) they should be considered as cast glass. A sharp blow with a drift or pry bar can result in chips flying off with explosive force. Flying chips may also result from accidentally or carelessly knocking hardened parts together. When working with Blast Wheel components, always wear gloves and safety glasses. The efficiency of this equipment, the blast cycle time and the production requirements will all depend largely on the conditions under which the Blast Wheel is operated and maintained. Compliance with the instructions and suggestions given in this manual should result in a highly efficient and productive Blast Cleaning System. In brief, the Blast Wheel Assembly functions as follows: The Abrasive Valve feeds a controlled amount of Abrasive (Steel Shot or Grit) through the Feed Spout to the Impeller, revolving at a high speed, moves the Abrasive through the Control Cage opening into the path of the revolving Blades. The Blades, by means of centrifugal force, throw a controlled pattern of Abrasive at the work surface. The Blast Wheel by throwing millions of particles of Abrasive per minute at a tremendous velocity provides an economical and thorough method of cleaning.



INSPECTION OF THE WEARING PARTS

- Open the manually operated disconnect at the Control Panel and Tag Switch so that the machine cannot be energized.
- Remove Blast Housing Lid by loosening Nuts on each end of the Lid, rotating the Clevis Brackets outward and lifting the Lid upward.
- 3. Remove the Top Liners to give access to the Blast Wheel assembly.
- 4. Rotate Blades by hand and inspect them for wear. Vibration of the Blast Wheel when operating is usually an indication of an excessively worn or broken Blade. Whenever Blades are deeply grooved, worn to half their original thickness or broken they should be replaced with a new matching set. Never attempt to replace anything less than a full set of Blades. The Blades are carefully weighed and balanced in matched sets and should never be separated.
- 5. Make a visual inspection of the Control Cage opening. The sides of the opening should be straight. When grooves or notches develop around the Cage opening, it should be replaced.
- 6. While rotating the Blades by hand it is possible to see the leading edge of the Impeller fingers. When the fingers become grooved or worn to half their original size, the impeller should be replaced.
- 7. The Feed Spout wears very slowly so the inspection of this part usually involves checking for cracks or other physical damage.
- 8. Blast Wheel Liners should be replaced when they become worn to half their original thickness. Allowing the Blast Wheel Liners to wear through will result in damage to the Blast Wheel Housing.

NOTE: The wearable parts of the Blast Wheel should be inspected every 10-29 blast hours. Doing so will ensure that worn parts can be replaced as needed to keep the Blast Wheel running at peak efficiency while guarding against unnecessary damage.



BLAST WHEEL HOUSING LINERS

The Blast Housing Liners are identified as follows:

> Top Liner Part Number: C5000109

➤ End Liner Part Number: C5000110 (Short) or C5000122 (Long)

Side Liner Part Number: C5000111

These Liners are made of an extremely hard cast alloy. They are positioned around the Blast Wheel to protect the Blast Wheel Housing. Since these Liners are in the path of Abrasive, wear is to be expected. Thus, Liners should be inspected often to determine when replacement is necessary. If Liners are allowed to wear through, the Blast Wheel Housing will quickly develop wear holes causing Abrasive leakage on and around the machine. ALWAYS OPEN ELECTRICAL DISCONNECT PRIOR TO LINER INSPECTION.

The Top Liner is located on the uppermost section of the Blast Wheel Housing and is held in place by the (2) Bolts on the Housing Lid. The Side Liners are positioned on the front and backsides of the Housing and are attached using (4) Bolts, Lock Washers and Flat Washers. The End Liners are nest between both Side Liners under the Top Liner and are held in place by the (2) Bolts on the right and left ends of the Blast Housing.



CHECKING THE ROTATING ASSEMBLY FOR BALANCE & NOISE

The Blast Wheel Assembly should always run smoothly with very little vibration or noise. Excessive vibration of the Blast Wheel or unusual noise during operation should be investigated immediately. Vibration is an indication of an "out of balance" Blast Wheel. An "out of balance" Blast Wheel is caused by excessive wear or damage to internal rotating parts. When troubleshooting an "out of balance" Blast Wheel the Blades should be inspected first followed by the Impeller, and the Hub.

Damage to the internal rotating parts of the Blast Wheel usually occurs when Blades become worn through or broken and Abrasive enters the area behind the Blade. To inspect and replace the Blades and other parts of the rotating assembly, it will be necessary to partially or completely disassemble the Blast Wheel depending on the cause and remedy of the vibration or noise.

Motor failure or improper motor rotation could also cause excessive vibration or noise. A qualified electrical serviceman should do any motor repairs or replacements.



BLAST WHEEL DISASSEMBLY

Open the manually operated disconnect at the Control Panel and Tag Switch so that the machine cannot be energized

- 1. Remove Blast Housing Lib by loosening the Nuts on each end of the Lid, rotating the Clevis Brackets outward and lifting the Lid upward
- 2. Remove the Top Liner
- 3. Remove the Feed Spout by removing the two Feed Spout Clamps holding it in place.
- 4. If Blades are not badly worn they can be used again. To remove Blades, push the Blade toward the center of Wheel, rotate the bottom of Blade outward until it is free from the Blade Block and lift it out. Remove all Blades in this manner.
- 5. Unscrew and remove the Socket Head Cap Screw inside the Impeller and pull it out. If the Impeller does not remove easily, tap it lightly on alternate sides of the outside end with a soft drift or plastic mallet until it can be removed.
- 6. Remove the two (2) Nuts and Washers from the recessed slotted holes on the Cage Adapter to remove the Control Cage and Centering Plate
- 7. Inspect all parts, which have been removed to determine whether they are worn or damaged to the extent that replacement is necessary.
- 8. The Blast Wheel Hub has Blade Blocks mounted to it that hold the Blades in place. Blade Blocks do not wear very quickly if the Blades are maintained properly. The Blade Blocks are held on the Hub by a Roll Pin and a Cap Screw. To Remove the Blade Blocks, use a ½" Allen Wrench to remove the Cap Screw and pull it off the Hub. When inspecting these parts, look for unusual wear around the Centering Plate and on the face of the Blade Block where the Blade locks into place. It may be necessary to replace the Blade Blocks if there is excessive wear in these areas. Blade Blocks must be replaced in full sets to avoid Blast Wheel balancing issues.
- 9. Replace Top Liner and Housing Lid. Bolt cover in place and run Blast Wheel rim (no abrasive), if the Hub runs smoothly and there is no noticeable noise or excessive vibration, no further disassembly will be necessary. The worn parts can be replaced and the Blast Wheel reassembled.



However if vibration or noise is still present it will be necessary to complete the disassembly and remove the Hub and follow these steps:

- Loosen the Compression Cap Screws on the right and left side of the Blast Housing and remove End Liners from off the Blast Housing. Gently Tapping Liners with a rubber or plastic mallet will ease removal
- 2. Make sure Blade Blocks have been removed to allow the Wheel Hub to slide off the Motor Shaft
- 3. Remove the (2) Allen Head Screws in the Taper Lock Bushing.
- 4. Re-install one of them in the third hole of the Bushing. Be sure the hole is free of any Abrasive. This hole is threaded only on the Bushing side, the side nearest the Motor Shaft. Tighten this Screw until the Hub is released from the Taper Lock Bushing. If the Hub does not release, tap on the face of the rim using a bronze drift and tighten the Screw again. When the Wheel Hub is loose on the Bushing, slide it forward off the end of the Motor Shaft.

NOTE: See Attached Dodge Instructions as a reference for removal of Taper-Lock Bushing.

- 5. Remove the Taper Lock Bushing and Key from the Motor Shaft
- 6. Clean the Motor Shaft and all Blast Wheel components.
- 7. Inspect the Keyway on the Motor Shaft and the Key for wear.
- 8. Inspect Front and Rear Side Liners for wear. If any of the Liners have worn to one half their original thicknesses they should be replaced. Remove the retaining bolts holding the Front Side Liner and remove. Repeat this step on the Rear Side Liner. The Side Liners must be removed through the bottom of the Blast Housing
- 9. If the Blast Wheel Motor runs smoothly, the Blast Wheel can be reassembled. All badly worn parts should be replaced to assure a smooth running final assembly. If vibration still exists, the Motor may need to be repaired or replaced. Be sure all motor or electrical repairs or replacements are done by a qualified electrician or serviceman.



WHEEL ASSEMBLY INSTRUCTIONS

- 1. Place the Rear Side Liner in position, and bolt in place
- 2. Make sure that the Roll Pins for the Blade Blocks are positioned in the holes to achieve the desired Blast Wheel rotation.
- 3. Place the Taper Lock Bushing into the Wheel Hub.
- 4. Align the half holes on the outer perimeter of the Taper Lock Bushing with the half holes on the inner perimeter of the Wheel Hub.
- 5. Thread the (2) Set Screws into the holes that are diametrically opposite each other and screw them in just enough to hold them in place.
 - a. NOTE: Only Dodge Bearings are recommended. See attached instructions for Taper Lock Bushing installation and torque recommendations.
- 6. Place Key in the Keyway on the Motor Shaft. Key should fit snuggly
- 7. Slide the Wheel Hub Assembly over the end of the Motor Shaft with the Key aligned with the Bushing Keyway.
- 8. Position the face of the Taper Lock Bushing flush against the end of the Motor shaft. If needed, use a round tube with an inner diameter large enough to go over the Motor Shaft to tap Bushing into place
- 9. Install the Blade Blocks.
 - 1) Place the Sheer Ring into the counter bored hole on the flat end of the Blade Block
 - 2) Place the Blade Block onto the Hub aligning the Blade Block roll pin hole with the Roll Pin in the Hub and the Sheer Ring in the Blade Block with the matching Wheel Hub counter bore.
 - 3) Last, install and tighten the Cap Screw to hold the Blade Block in place.
- 10. Block the rotation of the Blast Wheel Hub with a wooden block and tighten the Taper Lock Bushing Set Screws evenly until the face of the Taper Lock Bushing is flush with the inner face of the Wheel Hub. Make sure the assembly does not slide out of position. **Final tightening** should be done according to attached Dodge recommendations
- 11. Install the Front Side Liner making sure it is in perfect alignment with the Rear Side Liner. This alignment is essential for the Top Liner and the End Liners to fit correctly.
- 12. Directions for Installation of Blades (matched sets only) are as follows:
 - 1. Place Blade Spring into the outer hole of the Blade Block
 - 2. Slide the Blade Spring hole on the Blade over the Spring and push down and toward the Blade Block until the notch on the bottom of the Blade locks into the bottom of the Blade Block
 - 3. Repeat the above steps until all the Blades are installed
 - 4. Last, spin the Wheel Hub by hand and inspect to ensure that all Blades are securely in place.
- 13. Slide the Centering Plate over the end of the Motor Shaft and into bore of the Wheel Hub aligning notch on the outer rim with the Roll Pin
- 14. Place the Cage Retainer inside the Housing against the Housing Front.

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- 15. Install the (2) Support Studs into the (2) inner bolt holes of the Cage Retainer making sure they do not extend past the Cage Retainer into the blast area.
- 16. Slide the (2) bolt holes in the Cage Adapter onto the Support Studs.
- 17. Put a Lock Washer and a Nut on each of the Support Studs and hand tighten the Nuts.
- 18. Place the Control Cage inside the Cage Adapter. The opening of the Control Cage should be facing 180 degrees away from the shot pattern.
- 19. Install Bolts, Flat Washers and Lock Washers into the bolt holes behind the recessed slotted holes in the Cage Adapter and hand tighten Bolts.
- 20. Install the Impeller inside the Control Cage matching the bottom of the Impeller with the cut out in Centering Plate.
- 21. Insert the Impeller Bolt with the Lock Washer into the threaded hole in the Motor Shaft.
- 22. Block the rotation of the Blast Wheel Hub with a wooden block and tighten the Impeller Bolt until the Lock Washer is flattened.
- 23. With the Impeller in place, adjust Control Cage Assembly until the spacing between the Impeller and the Control Cage is equal all the way around.
- 24. Rotate Wheel Hub to check Control Cage clearance.
- 25. Reposition the Control Cage Assembly as needed. Once proper alignment has been achieved, tighten the Nuts and Bolts to lock the assembly in place.
- 26. Place the Top Liner on top of the Front and Rear Side Liners making sure that the flat hold down surfaces are an equal distance from the Top of the Housing.
- 27. Place the Housing Lid on top of the Housing and tighten it down using the (2) Clevis Bolts, Flat Washers and Nylock Nuts.
- 28. Tighten the Cap Screws on the Housing Lid to hold the Top Liner in place.
- 29. Slide the End Liners between the Front and the Rear Side Liners and tap lightly with a Plastic Mallet to insure proper fit against the Top Liner in place.
- 30. Insert the Spout Seal into the Control Cage opening.
- 31. Attach the Spout Clamps to the Support Studs and hold in place with Flat Washers, Lock Washers and Nuts but **DO NOT** tighten the Nuts.
- 32. Place the Feed Spout on top of the Spout Seal in the Control Cage opening.
- 33. Finally, position the Spout Clamps so that the long leg is on the Feed Spout Flange and the Short Leg is on the Housing Front and tighten the Nuts.
- 34. Install the Rear Seal on the back of the Housing. The (2) pieces of the Rear Seal mount one on top of the other with the Flat Washers, Lock Washers and Bolts to hold them in place.
- 35. Rotate the Wheel Hub by hand to ensure that it spins freely with no noise.
- 36. Check the Wheel rotation by jogging (momentarily start and stop) the Motor.
- 37. Run a Blast Wheel NO LOAD TEST (no abrasive), check for any noise or vibration
- 38. Check and adjust the Blast Pattern

The Blast Wheel is now ready for operation



ADJUSTING AND CHECKING THE BLAST PATTERN

The adjustment of the Blast Pattern is of the utmost importance. A poor adjustment will not only reduce cleaning efficiency but also increase maintenance and replacement costs. A Blast Pattern Test should be completed when the equipment is first put in operation, when any decrease in blast efficiency is noted, after any maintenance has taken place or if a change is made to the type (or size) of Abrasive material being used.

The Hot Spot is that area of the work surface receiving the greatest portion of the abrasive blast. It is visible by the discoloration caused by frictional heat. The Hot Spot should be directed toward the area of work to be blasted to give the most effective cleaning pattern. If not properly directed, abnormal wear of the equipment and parts may occur.

To check the location of the Hot Spot place a metal plate in the direct path of the Blast pattern at the average work height position. Blast the plate for 30 seconds and then immediately feel to locate the hottest spot. The plate is very hot after being blasted, it's important to be careful when feeling for the Hot Spot.

The Control Cage, located at the center of the Blast Wheel, receives the Abrasive from the Impeller through the static opening. The Control Cage, through the location of its opening, controls the point of delivery of the Abrasive to the Blast Wheel Blades. If the smaller line on the Control Cage rim face is set in a 12 o'clock position then each Blade will pick up Abrasive at this point and deliver it in a downward thrust at a point below the Blast Wheel (approximately 6 o'clock). The point of delivery may vary with different types and sizes of Abrasive.

To adjust the blast stream Hot Spot, the Control Cage must be rotated clockwise or counter-clockwise. The line on the Cage should always be facing approximately 180 degrees away from the blast pattern. Rotating the Control Cage in a clockwise direction will move the Hot Spot clockwise; moving the Control Cage in a counter-clockwise direction moves the Hot Spot counter-clockwise. Initial adjustment should begin with the line in the 12 o'clock position. Final adjustment will usually be less than 1" from this point.

The pattern must always be checked at initial set-up under the condition the equipment will be operating.



ABRASIVE CONTROL VALVE

Correct adjustment of the Abrasive Control Valve is essential for maximum cleaning efficiency and maximum Blast Motor Life.

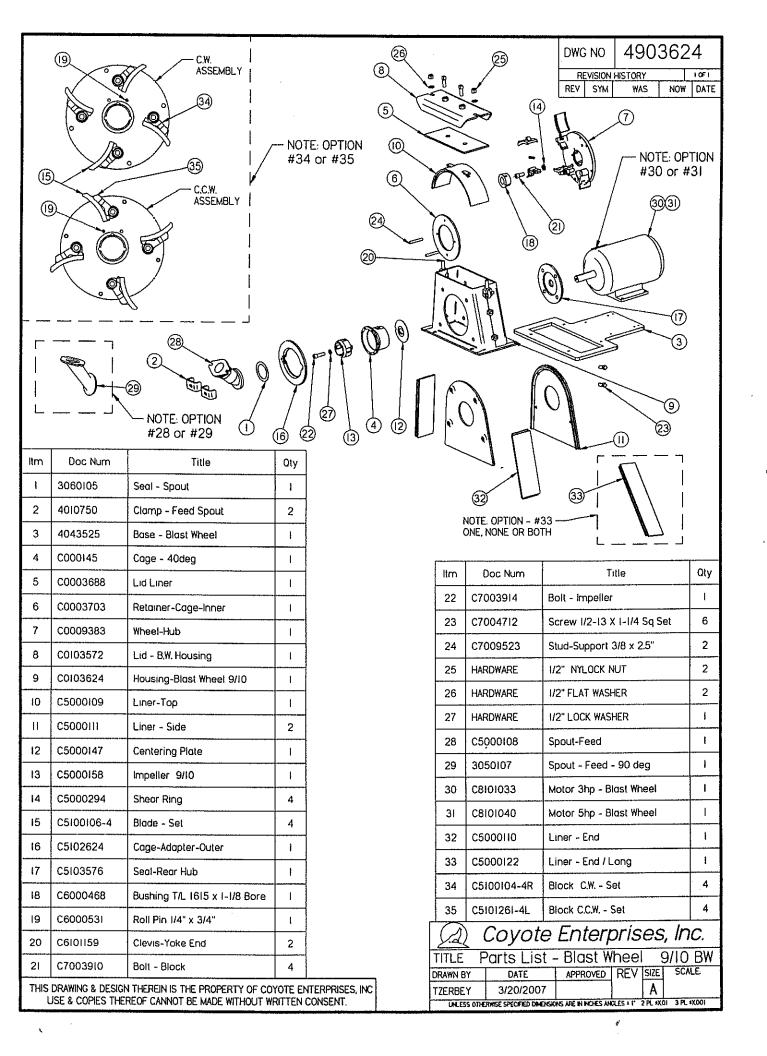
The Motor Load Amp Meter determines the abrasive flow adjustment. The Amp Meter registers the amperage load on the Blast Wheel Motor (see Motor Manufacturer's Nameplate for full load rating information). To obtain full Blast Wheel efficiency from an Amp Meter, the Amp Meter should always show a full load reading during the blast cycle. This reading can vary from one type of Abrasive to another.

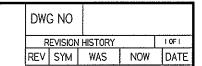
When the Blast Wheel is running the Amp Meter reading should be constant and steady. Any severe fluctuations can be interpreted as an indication of bearing trouble, "drag" from moving parts of the Blast Wheel, Motor malfunction or electrical supply variances.

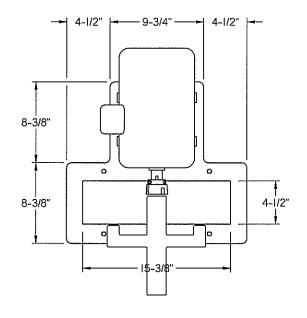
While the machine is in operation, any Amp Meter reading fluctuations should be investigated. Changes could indicate shortage of the Abrasive, stalled Elevator, clogged Screen or foreign objects in the Impeller. The Amp Meter serves as a prime indicator of proper or improper operation.

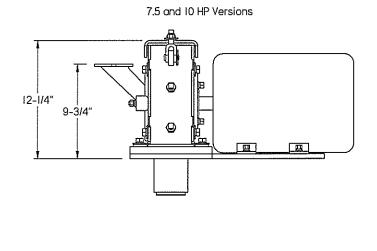
As the Abrasive Control Valve is opened, the amperage load will increase. The valve should be set so that the Motor will draw maximum rated amperage or run at 100 percent efficiency. Always run the Blast Motor at maximum efficiency (never overload). Monitor and adjust amperage as necessary.

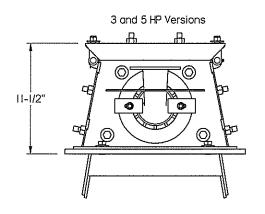
An adjustable Stroke Air Cylinder operates the Valve Slide Plate. An Adjustment is made by loosening the jam nut and turning the Adjustment Bolt on the back of the cylinder. Turning the Bolt out allows more stroke by opening the Slide Plate which increases the abrasive flow and raises the amperage.

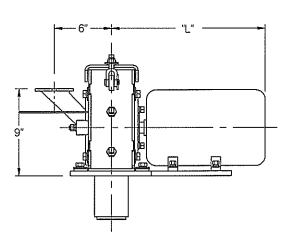












MOTOR	LBS OF SHOT	B.W. SIZE	MOTOR	111 11
HP	PER MINUTE		TYPE	
3		10 INCH	182T	18"
5	160	10 INCH	184T	18"
7.5		10 INCH	213T	20"
10		10 INCH	215T	21"

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Coyote Enterprise	s, Inc.
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TITLE 9/I	0 Blast Whee	9			
DRAWN BY	DATE	APPROVED	REV	SIZE	SCALE:
QSummers	ŧ i			Α	N/A

MATERIAL :

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES ANGLES ± 1° 2 PL ±X01 3 PL ±X001

TAPER-LOCK® Bushings

These instructions must be read thoroughly before installation or operation.

WARNING: To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

INSTALLATION:









1006 to 3030

3535 to 6050

3535 to 6050

- Insert Screws to Install
- Insert Screws to Remove
- Clean shaft, bore of bushing, outside of bushing and hub bore of all oil, paint and dirt. File away burrs.
- 2. Insert bushing into hub. Match the hole pattern, not threaded holes (each complete hole will be threaded on one side only).
- "LIGHTLY" oil setscrews and thread into those half-threaded holes indicated by O on above diagram.

CAUTION: Do not lubricate the bushing taper, bushing bore, hub taper or the shaft. Doing so could result in breakage of the product.

- Position assembly onto shaft allowing for the small axial movement which will occur during lightening procedure.
- 5. Alternately torque setscrews to recommended torque setting in chart below.

CAUTION: Do not use worn hex key wrenches. Doing so may result in a loose assembly or may damage screws.

- To increase gripping force, lightly hammer face of bushing using drift or sleeve. (Do not hit bushing directly with hammer.)
- Re-torque screws after hammering. 7.

CAUTION: Where bushing is used with lubricated products such as chain, gear or grid couplings be sure to seal all pathways (where lubrication could leak) with RTV or similar material.

Recheck screw torques after initial run-in, and periodically thereafter. Repeat steps 5, 6 and 7 if loose.

WARNING: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper quards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Baldor Electric nor are the responsibility of Baldor Electric. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

TO REMOVE:

- 1. Remove all screws.
- Insert screws in holes indicated by on drawing. Loosen bushing by alternately tightening screws.

NOTE: If two bushings are used on the same component and shaft, fully tighten one bushing before working on another. When installing bushing in sintered steel product (sheave,coupling, etc.) follow torque recommendation shown on product hub if present.

Recommended Installation Wrench Torque					
Bushing No.	Lbin.	Nm			
1008 1108 1210 1215 1310 1610	55 55 175 175 175 175 175	6,2 6,2 19,9 19,9 19,9 19,9			
2012	280	31,8			
2517	430	48,8			
2525	430	48,8			
3020	800	90,8			
3030	800	90,8			
3525	1000	114			
3535	1000	114			
4030	1700	193			
4040	1700	193			
4535	2450	278			
4545	2450	278			
5040	3100	352			
5050	3100	352			
6050	7820	888			
7060	7820	888			
8065	7820	888			
10085	13700	1556			
12010	13700	1556			

NOTE: When using TAPER-LOCK bushings with conveyor pulleys, refer to the DODGE Instruction Manual for TAPER-LOCK, H.E., and QD Conveyor Pulley Bushings.



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