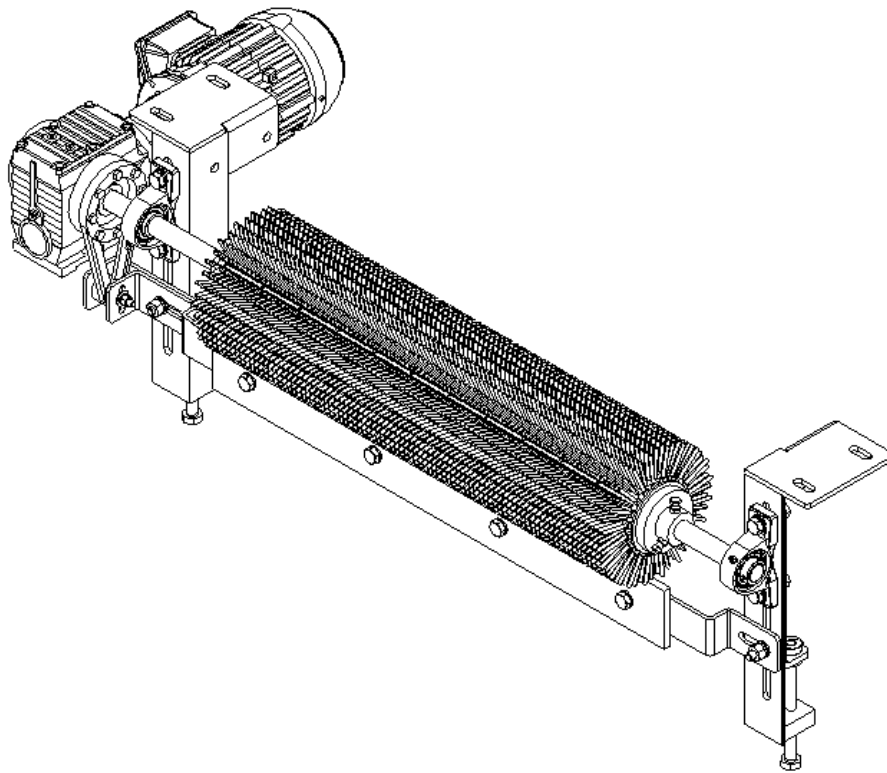


BENETECH **MaxClean™**

BMBC-XXX-X-XX-XHP

Motorized Brush Cleaner

Installation, Operation &
Maintenance Manual



! IMPORTANT !

BENETECH, INC. HEREBY DISCLAIMS ANY LIABILITY FOR, BUT NOT LIMITED TO:

- IMPROPER OR UNSAFE INSTALLATION OF EQUIPMENT
- IMPROPER SIZING OF EQUIPMENT
- DAMAGE DUE TO CONTAMINATION OF MATERIAL
- USER'S FAILURE TO INSPECT EQUIPMENT
- USER'S FAILURE TO MAINTAIN EQUIPMENT
- USER'S FAILURE TO TAKE REASONABLE CARE OF THE EQUIPMENT
- INJURIES OR DAMAGE RESULTING FROM USE OR APPLICATION OF THIS PRODUCT CONTRARY TO INSTRUCTIONS AND SPECIFICATIONS CONTAINED HEREIN.

BENETECH, INC.'S LIABILITY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF EQUIPMENT SHOWN TO BE DEFECTIVE.

! SAFETY !

Review and understand all safety rules given herein along with local and Governmental standards and regulations. Know and understand the American National Standards Institute (ANSI) z244.1-1982 lockout/tagout procedures, the American National Standard for Personal Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements and the Occupational Safety and Health Administration (OSHA) Federal Register, Part IV, 29 CFR Part 1910, Control of Hazardous Energy Source (Lockout/Tagout); Final Rule.

Also observe all local and Governmental regulations concerning entry into confined spaces, welding, cutting, grinding, wash-down procedures and all Personal Protective Equipment (PPE) regulations.

The following notations are used throughout in this manual.

! DANGER !

Danger: Denotes immediate hazards that will result in severe personal injury or death.

! WARNING !

Warning: Denotes hazards or unsafe practices that could result in personal injury.

! CAUTION !

Caution: Denotes hazards or unsafe practices that could result in product or property damages.

! IMPORTANT !

Important: Denotes instructions that must be followed for proper installation and/or operation of equipment.

! NOTE !

Note: Denotes general items to assist the reader/ installer/ operator.

Please pay close attention to all of these items and warnings.
They have been included here for your safety and for ease of installation.

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Introduction

Typical plain conveyor belt cleaning systems include a blade type belt cleaner. When a chevron conveyor belt is used, transient debris is trapped in the recessed areas and cannot be reached by a blade type cleaner. This debris, known as “carry-back” is then deposited in piles under the conveyor, sticks to return idlers, gravity take-up pulleys, bend pulleys and covers or, anything else it comes in contact with.

Problems arising from this carry-back range from mistracking of belts due to uneven build-up of material on idlers, premature belt wear from the belt being dragged through material piles and into conveyor structural members, belt fires from the belt being dragged through material piles, and even complete catastrophic belt failure from pulleys seizing.

The Benetech Motorized Brush Cleaner is one solution to the reduction of this transient debris. Rotary brush cleaners can be installed anywhere on the return side of the conveyor, but are typically installed immediately after the belt leaves contact with the drive pulley. This keeps the material removed by the rotary brush cleaner in the dribble chute area of the transfer point chute work where it can be reintroduced back into the main flow of material.

Once the brush cleaner is installed, the alignment and contact pressure of the brush against the conveyor belt should be adjusted so transient debris is being removed. With the rotary brush contact pressure against the belt as light as possible, brush wear is minimized thereby, achieving the longest brush life.

In some cases, materials used in the construction of the brush cleaner may not be compatible with the material being handled and contamination of the conveyed product can occur. If the conveyed material could be contaminated in any way through the use of this product it is the user's responsibility to take the necessary steps to prevent contamination.

Consult BENETECH, INC. if you suspect there may be material incompatibility issues or you have questions about product application and use, we can provide recommendations for your specific application.

Brush Cleaner Safety

All safety rules defined in this document and all owner/employer as well as State and Federal safety rules must be strictly adhered to when working on/with this, or any, belt cleaner.

! DANGER !

Do not touch or go near the conveyor belt or conveyor accessories when the belt is running. Your body or clothing can get caught and you can be pulled into the conveyor, resulting in severe injury or death.



! DANGER !

Before installing, servicing, or adjusting the brush cleaner, turn off AND lockout/tagout all energy sources to the conveyor and conveyor accessories according to ANSI standards. Failure to do so could result in serious injury or death.

! DANGER !

If this equipment is to be installed in an enclosed area, observe all confined space entry regulations and test the atmosphere for gas levels and dust content levels before using a cutting torch, welding equipment or electric hand tools. Using a torch, welding, grinding or drilling in an area with gas or dust may cause an explosion and/or fire resulting in serious injury or death.

! WARNING !

Before using a cutting torch, welders, or grinding equipment, cover the conveyor belt with a fire retardant/resistant cover. Make sure a water source/fire hose is readily available AND OPERATIONAL. Failure to do so can allow the belt to catch fire.

! WARNING !

Motorized Brush cleaners are heavy and require two people to lift. Attempting to lift the brush cleaner without assistance could result in injuries or damage to the equipment.



! WARNING !

Remove all tools, parts, trash, and foreign objects from the installation area and conveyor belt before turning on the conveyor. Failure to do so can result in serious injury to personnel or damage the belt and conveyor.

! NOTE !

All Dimensions in this manual are inches (mm)

Before Installing Brush Cleaner

1. Inspect ALL shipping containers for damage and correct number of items (skids, pallets, cartons, boxes, etc.) being delivered. Report damage and/or shortages to delivery service immediately and fill out delivery service's claim form. Keep ALL damaged goods for examination. Benetech Inc is NOT responsible for damage occurring during transit.
2. All Benetech Inc. Motorized Brush Cleaners are shipped from our facilities fully assembled. Care should be taken while disassembling the units to ensure no parts are lost or damaged as the equipment is moved to its desired location. Dispose of shipping containers in approved manner.
3. If any items are missing, IMMEDIATELY contact BENETECH, INC. or an authorized representative.
4. Gather tools. Minimum tools required for installation are:
 - Tape measure/ String
 - Torch/Hole Saw
 - Level/Straight Edge
 - Angle Finder
 - Welder/Drill
 - Open/Box End Wrenches
 - Socket Set
 - Marker/Soapstone (Welders chalk)
5. Turn off and lock out/tag out energy source according to ANSI standards (see "References") and local plant regulations.

! WARNING !

Before installing equipment, turn off AND lockout/tagout all energy sources to the conveyor and conveyor accessories according to ANSI standards. Failure to do so could result in serious injury or death.



6. If using a cutting torch or welding:
 - Obtain a weld or burn permit as required.
 - Test atmosphere for gas level or dust content. Cover conveyor belt with fire retardant cover. Verify locations of fire extinguishers and operational water hoses prior to beginning cutting / welding operations.

! WARNING !

If equipment will be installed in an enclosed area, the atmosphere in the structure/area must be tested for gas levels and dust content levels before using a cutting torch, welding equipment, grinding equipment or electric powered tools. Using a cutting torch, welding, drilling or grinding in an area with gas or dust may cause an explosion.

Locating and Installing Motorized Brush Cleaner

Figure 1

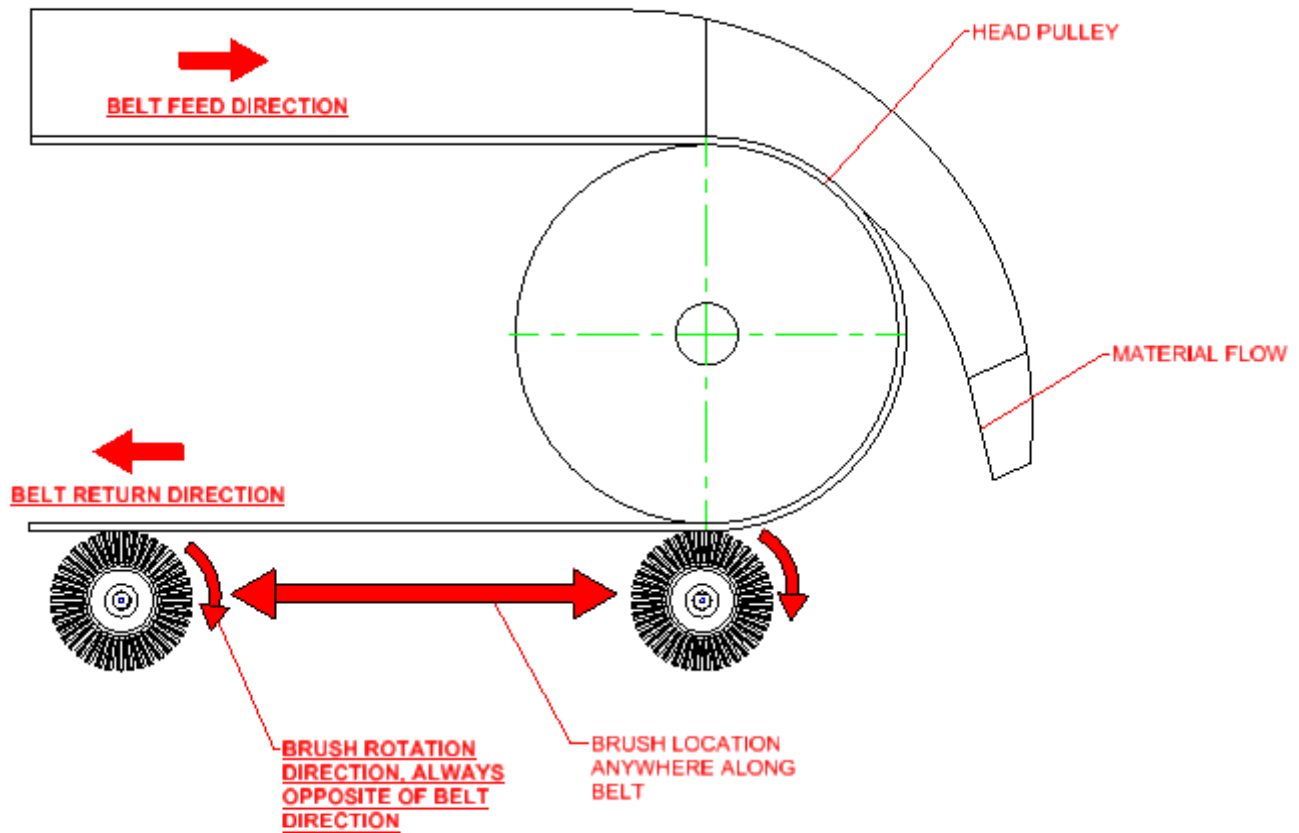


Figure 1 illustrates proper installation options for locating the Benetech Motorized Brush Cleaner. Other positions may be available based on specific customer conditions.

Key items to consider are as follows:

- 1) Suitable structure to mount brush cleaner too.
- 2) Ability of brush cleaner to direct debris from belt into dribble chute or merge into material flow.
- 3) Access to brush cleaner to allow periodic maintenance such as brush or motor replacement.
- 4) Ability to seal around the brush cleaner to limit escapement of dust.
- 5) Access to suitable electrical connection with ability to lockout / tagout for periodic maintenance.
- 6) Brush rotation direction must be opposite of belt direction.

! IMPORTANT !

If the brush cleaner is installed on enclosed pulley chutework, inspection access must be created to allow for inspection of the equipment during operation. Access panels or doors can be added for servicing as required. Contact BENETECH, INC. or a representative for a list of inspection doors and part numbers. **Unless specifically ordered, inspection doors are not included with the brush cleaner.**

Read entire section before beginning work.

Mounting options

To install the brush cleaner, follow the steps detailed in this section
The BMBC Brush Cleaner can be installed in two ways.

Figure 2

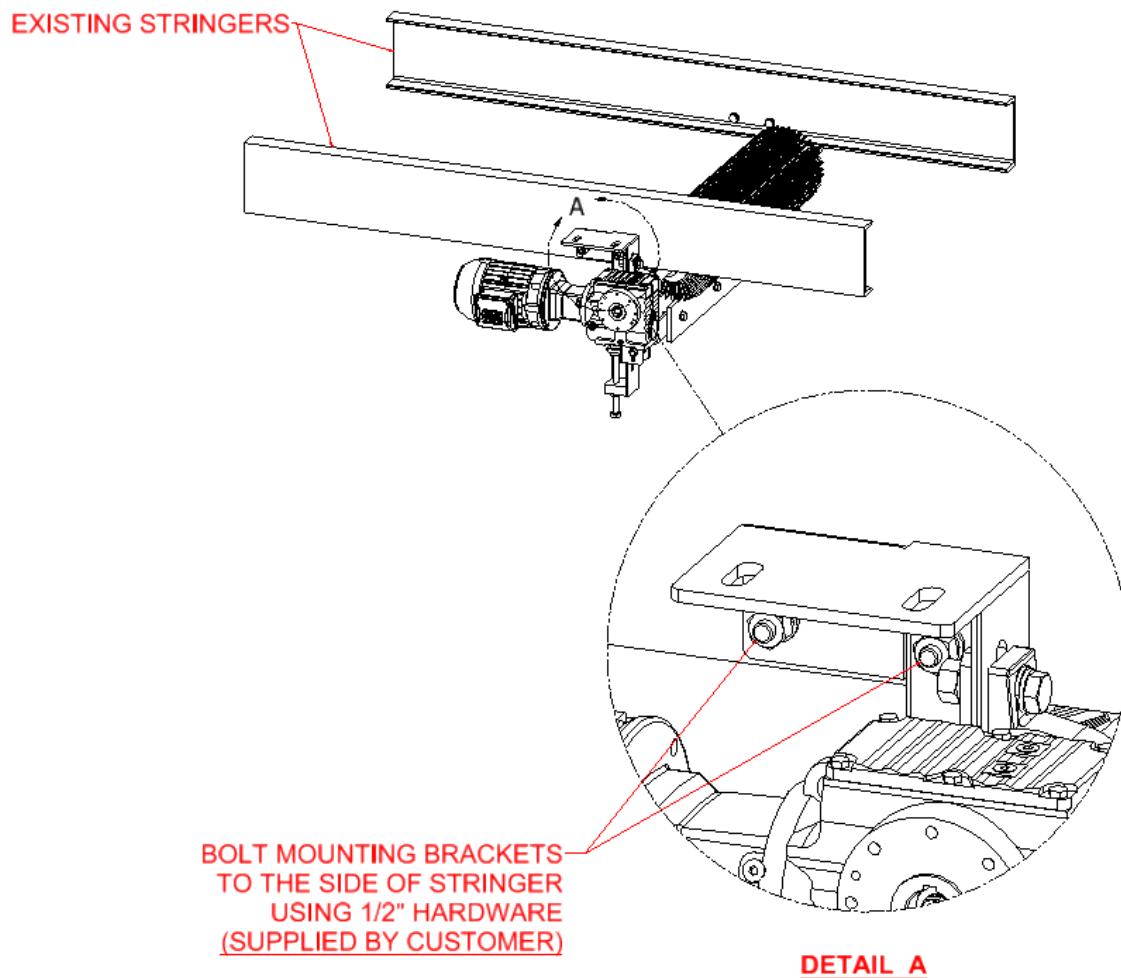


Figure 2 illustrates mounting the brush cleaner to existing stringers using customer supplied 1/2" hardware. This mounting option is most commonly used when mounting the brush cleaner along the length of the conveyor away from the head pulley.

Figure 3

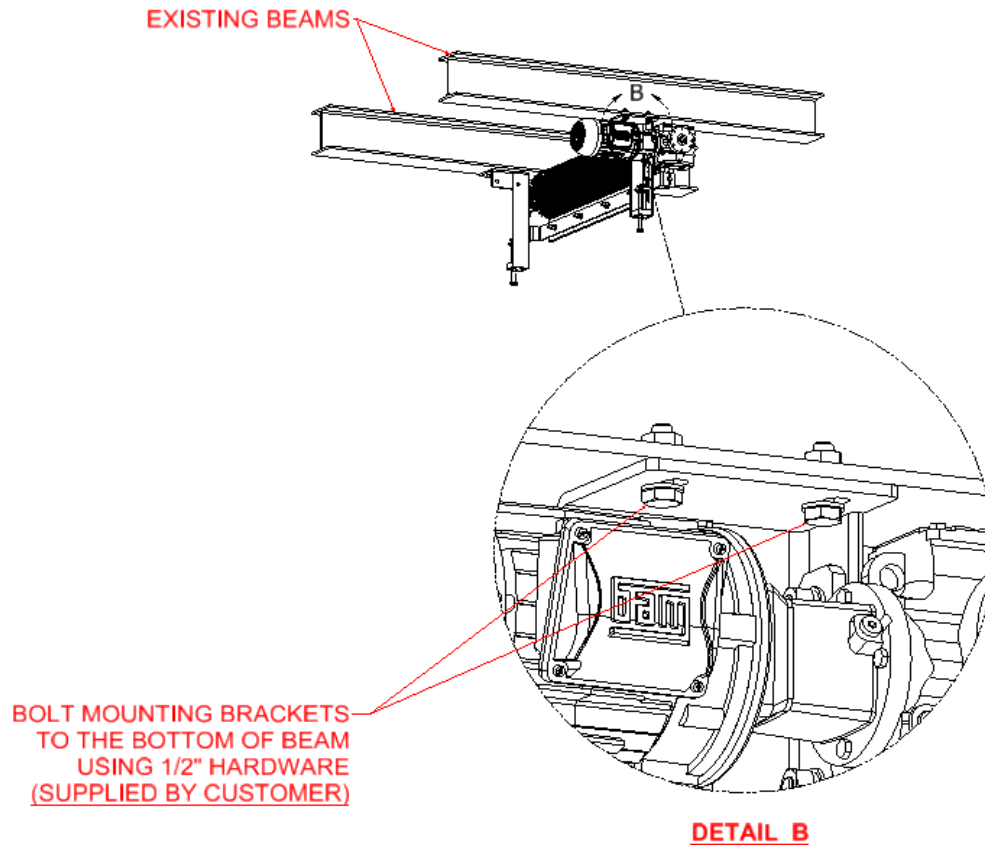


Figure 3 illustrates mounting the brush cleaner to existing beams using customer supplied 1/2" hardware. This mounting option is most commonly used when mounting the brush cleaner near the conveyor head pulley.

Note: For best performance results, either mounting method requires the brush assembly to be mounted square to the conveyor belt. To easily achieve this, secure the motor mounting bracket of the brush cleaner assembly first. Once secured align the opposite end and inspect for square prior to securing to the existing structure.

Motor Wiring

Wiring should be done by a qualified electrician. Note: It is recommended that the brush rotates only when the conveyor belt is operating, install proper controls to achieve this.

To allow for proper brush adjustment, use flexible conduit for the motor junction box connection.

Motor should be wired according to the motor nameplate and the rotation direction should be set so the brush rotates opposite of the belt direction.

! IMPORTANT !

Important: The brush rotation direction must be opposite of the conveyor belt.

! NOTE !

Note: In some circumstances brushes can be wider than the belt width, this "overlap" poses no threat of damage to the conveyor.

Figure 4

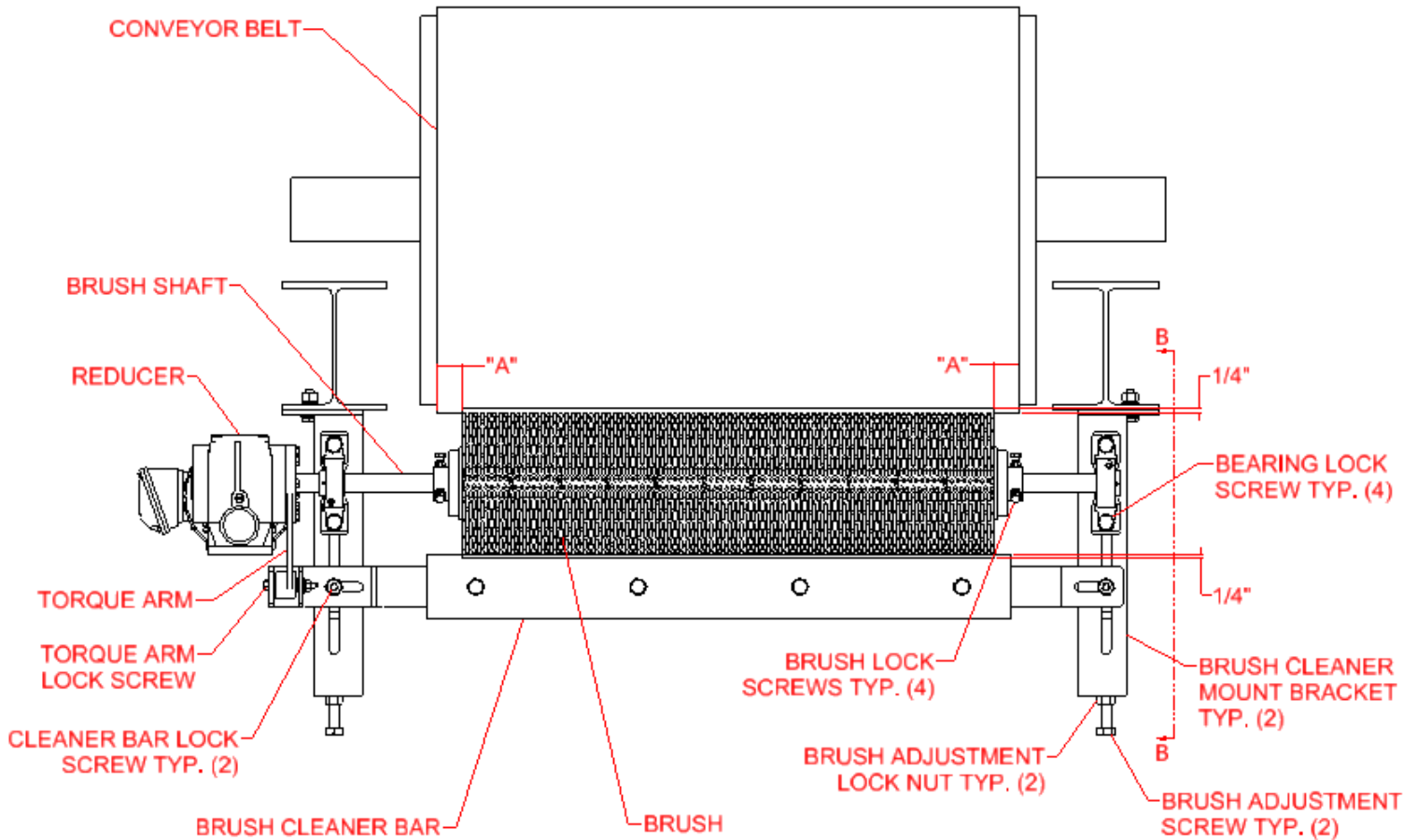


Figure 4 illustrates the brush position relative to the center of the conveyor belt. For best performance the brush should be centered on the conveyor belt.

To adjust the brush assembly loosen all four brush lock screws and slide the brush along the brush shaft until dimension "A" matches on both sides of conveyor belt.

Due to available brush length vs. conveyor belt width combinations the brush length may be wider or narrower than the conveyor belt. In either case position the brush ends equidistant from the conveyor belt width. Once the brush is properly positioned tighten all four brush lock screws to secure the brush in position.

Figure 5

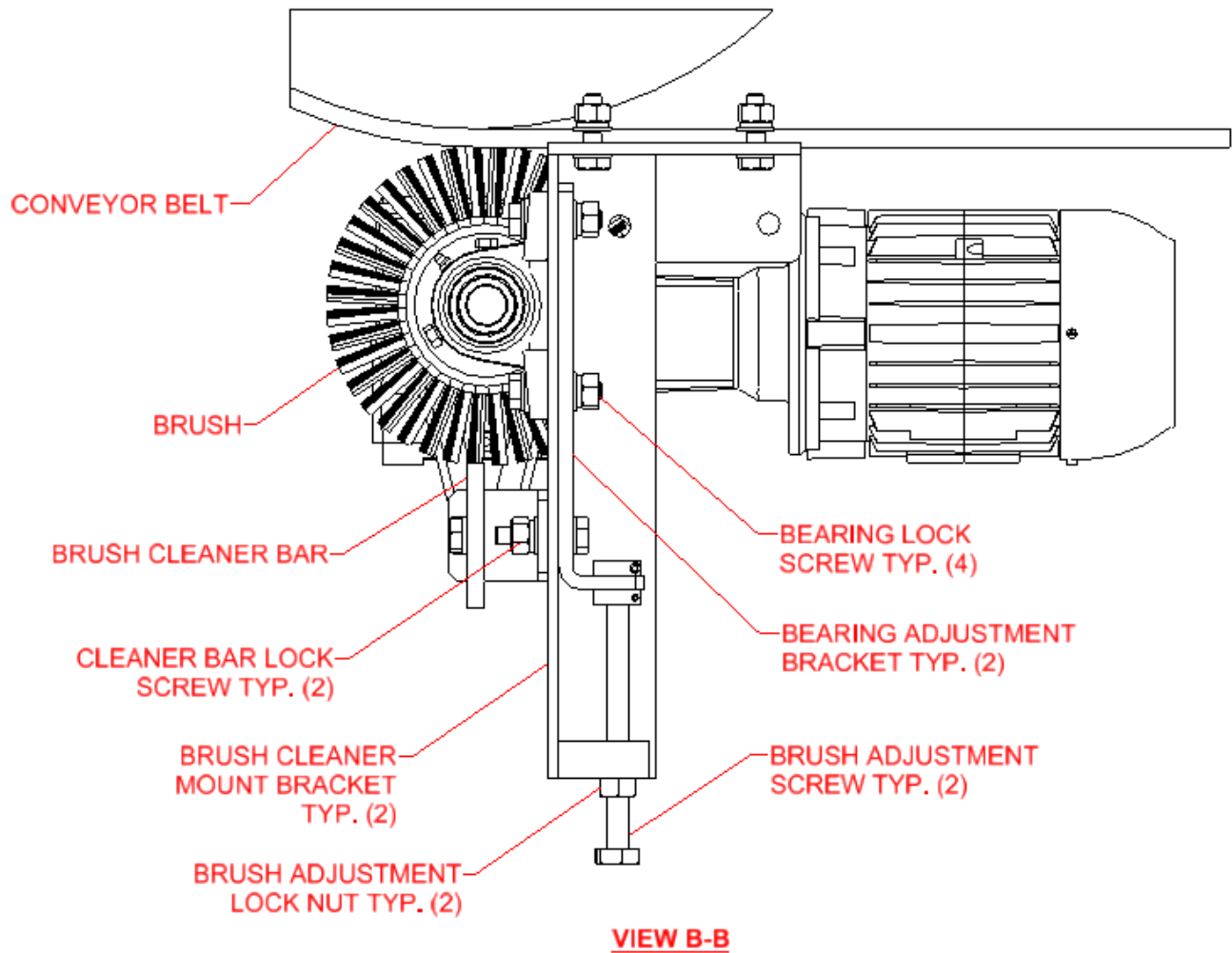


Figure 5 illustrates the brush position relative to the conveyor belt return surface and brush cleaner bar. For best performance and minimum brush and conveyor belt wear, the brush should be adjusted to the lightest pressure possible while still removing transient debris from the belt.

The initial brush position should be set to compress against the belt face approximately 1/4" (see figure 4). Test the effectiveness of the brush in this position. If the brush is removing the desired amount of debris, it can be left as is or, for less brush and belt wear reduce the pressure against the conveyor belt as long as all debris is still being removed.

If the brush is leaving an undesired amount of debris, increase the brush pressure until the desired amount of debris is being removed.

To adjust the brush belt pressure, loosen all four bearing lock screws, both cleaner bar lock screws and both brush adjustment lock nuts. Adjust both brush adjustment screws toward the conveyor belt to increase belt pressure or away from the belt to decrease pressure. After adjusting, inspect the brush for even contact across the belt width to ensure even brush wear. At this point secure all four bearing lock screws only.

With the brush belt pressure correctly set, loosen the torque arm lock screw and adjust the brush cleaner bar to engage the brush by approximately 1/4" (see figure 4). Inspect bar for even contact with the brush. Once in position, tighten both cleaner bar lock screws, torque arm lock screw and both brush adjustment lock nuts to secure entire assembly in place.

! NOTE !

Note: If the belt is severely cupped or uneven please contact Benetech Inc or a representative.

Figure 6

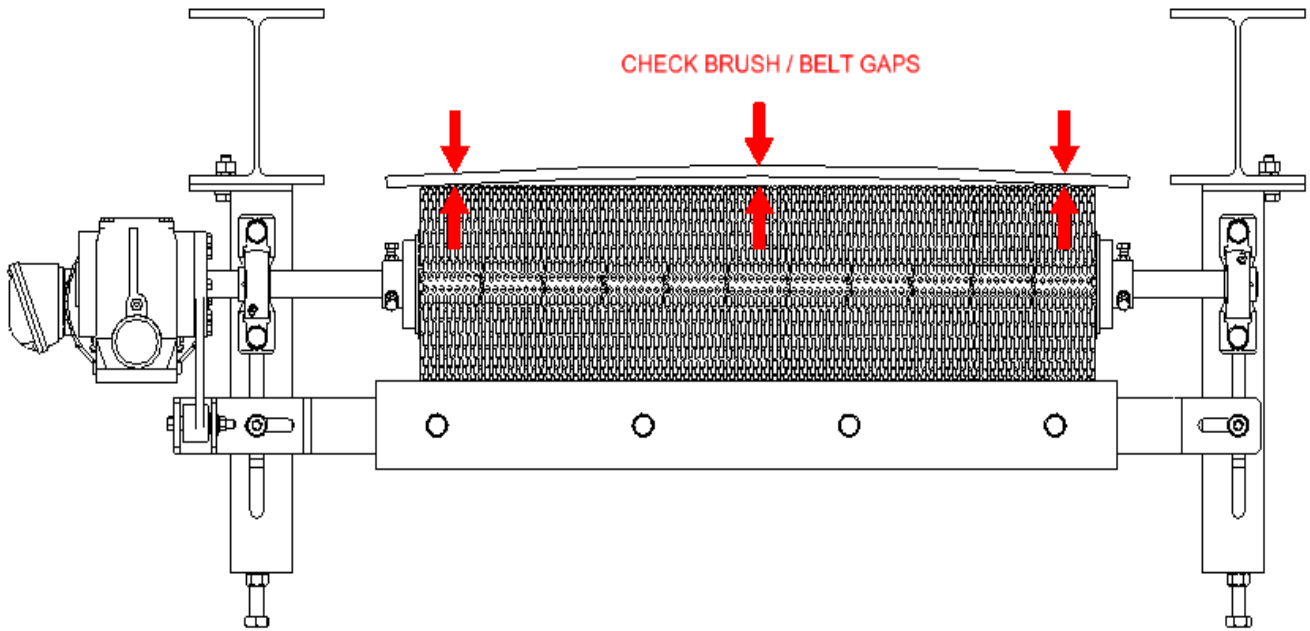


Figure 6 illustrates the brush position relative to the belt face. For best performance the brush should contact the entire face of belt.

! WARNING !

Excessive tensioning of the belt cleaner can create premature wear of cleaner blades, damage to belt cover and excessive heat.

! WARNING !

Failure to remove tools from installation area and conveyor belt before turning on energy source can cause serious injury to personnel and damage to belt.

! WARNING !

Do not touch or go near conveyor belt or conveyor accessories when conveyor belt is running. Body or clothing can get caught and pull body into conveyor belt, causing severe injury or death.

Once installation is complete and all conditions for a safe startup have been confirmed, turn on conveyor belt for 1/2 hour, then turn off. Tighten all mounting nuts bolts etc. Check for belt condition and proper tensioner settings. Readjust if necessary.

Brush Cleaner Operation and Maintenance



! DANGER !

Before installing, servicing, or adjusting the brush cleaner, turn off and lock out/tag out all energy sources to the conveyor and conveyor accessories according to ANSI standards. Failure to do so could result in serious injury or death.



Figure 7

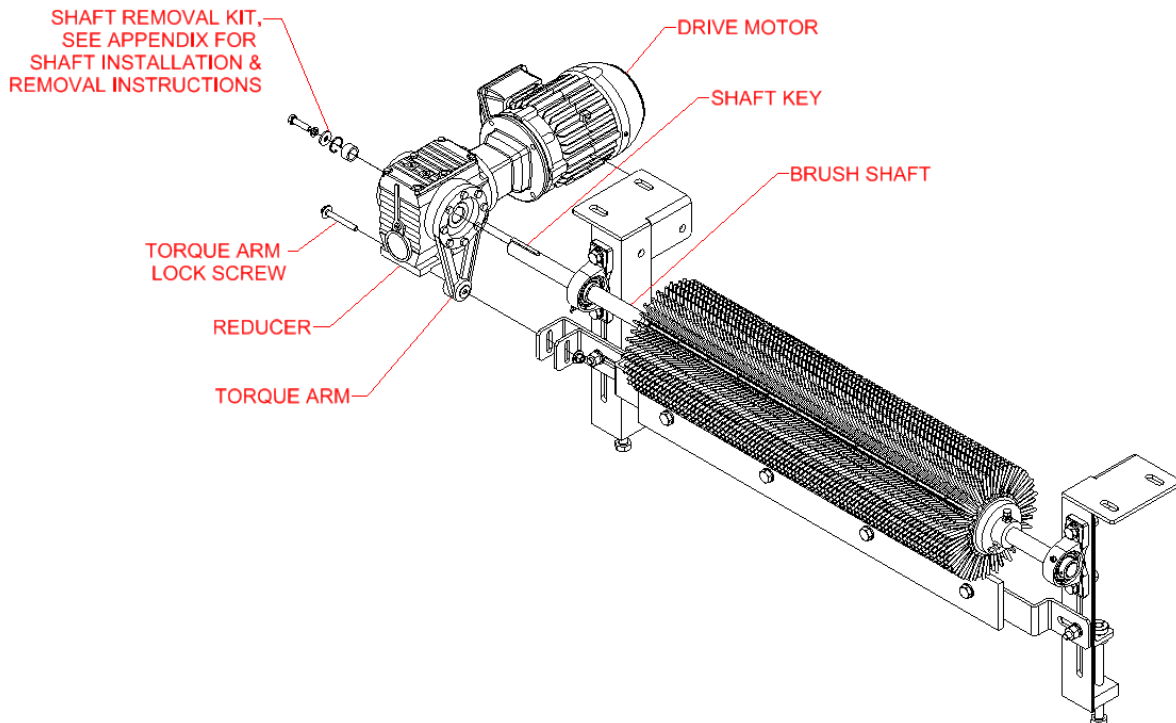


Figure 7 illustrates the disassembly procedure of the reducer to the mounting frame and the shaft from the reducer. Please refer to the appendix for specific instructions on the shaft installation and removal from the hollow shaft reducer.

- 1) Periodic inspection and maintenance **MUST** be performed on a regular basis to ensure the equipment is functioning properly.
 - a. Inspect brush cleaner for proper wear pattern. A small amount of "run-in" wear is normal. This will stop once brush tines wear to conveyor belt contour. The brush should wear evenly during operation - if it doesn't adjust the position on one or both sides. If this does not correct the problem contact Benetech Inc.
 - b. If excess or uneven wear patterns appear, material builds up badly on brush, or some other problem exists, consult a specialist or contact Benetech Inc for support.
 - c. During inspection remove any material build-up from BMBC brush cleaner.
 - d. Make sure all hardware and fasteners for the mounting equipment are tight.
 - e. Check belt /brush face pressure and debris removal. Adjust as required. Note that as the brush wears the assembly will need to be adjusted
 - f. Check brush for excessive wear. Replace brush when necessary.
 - g. Remove equipment from service if there is any indication it is not functioning properly. Call BENETECH, INC. or a representative for assistance.

! NOTE !

Maintenance inspection should be performed no less than weekly. Some applications may require more frequent maintenance inspections.

! DANGER !

Before installing, servicing, or adjusting the belt cleaner/ tensioner, turn off and lock out/tag out all energy sources to the conveyor and conveyor accessories according to ANSI standards. Failure to do so could result in serious injury or death.

! WARNING !

Do not touch or go near conveyor belt or conveyor accessories when conveyor belt is running. Body or clothing can get caught and pull body into conveyor belt, causing severe injury or death.

! WARNING !

Failure to remove tools from installation area and conveyor belt before turning on energy source can cause serious injury to personnel and damage to belt.



Troubleshooting

! NOTE !

Conveyor equipment is subject to a wide variety of bulk materials characteristics and performs under extreme operating conditions. It is not possible to predict all circumstances that may require troubleshooting. Contact BENETECH, INC. or a representative if you are experiencing problems other than those listed in the "Troubleshooting" section below. **Do not return the equipment to operation until the problem has been identified and corrected.**

Symptom Corrective **Action**

Insufficient cleaning and excessive carry back.

Brush / belt face pressure is set too low. Increase pressure to recommended settings or higher if necessary as bulk material conditions may have changed (monitor closely and return to original/recommended settings when possible).

Brush is worn.

Brush is designed to wear during operation. Remove an excessively worn brush from service and replace.

Noise or vibration.

Brush / belt face pressure is set too high or un-even between the two mount brackets. Correct or equalize pressure at both mount brackets as necessary by adjusting the vertical position of the brush assembly.

If this does not correct the problem, brush type or material type may not match application. Cleaner may also be incorrectly mounted or other damage to the cleaning system may have occurred. Contact Benetech, Inc. or a representative.

High brush wear rate requiring frequent brush replacement or change out.

Brush / belt face pressure is set too high. Reduce brush / belt face pressure setting. If problem persists contact Benetech Inc. or a representative.

Unusual wear or damage to brush.

Check belt splice(s) and repair as necessary. Observe belt operation and check for irregularities. If the cleaning system is damaged replace it. If brush is worn out replace it. If brush is not worn, check mainframe location.

Brush or System Corrosion/Chemical Degradation.

Brush material may not match application. Contact BENETECH, INC. or a representative.

Other problems.

Contact BENETECH, INC. or a representative.

Part Numbers

This section provides product names and corresponding part numbers for the Benetech BMBC-XXX-X-XX-XHP Motorized Brush Cleaner System. For a more detailed parts list please contact Benetech Inc.

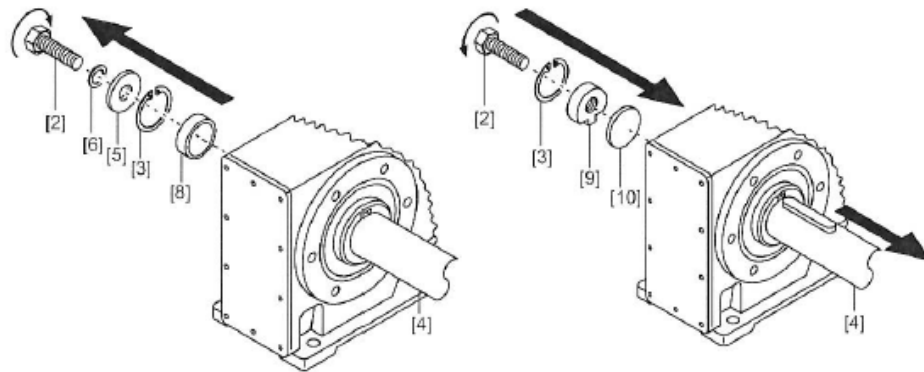
References

The following documents are referenced in this manual:

- American National Standards Institute (ANSI) z244.1-1982, American National Standard for Personal Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements, American National Standards Institute Inc., 1430 Broadway, New York, NY 10018.
- Federal Register, Volume 54, Number 169, Part IV, 29 CFR Part 1910, Control of Hazardous Energy Source (Lockout/Tagout); Final Rule, Department of Labor, Occupational Safety and Health Administration (OSHA), 32nd Floor, Room 3244, 230 South Dearborn Street, Chicago, IL 60604.

Appendix

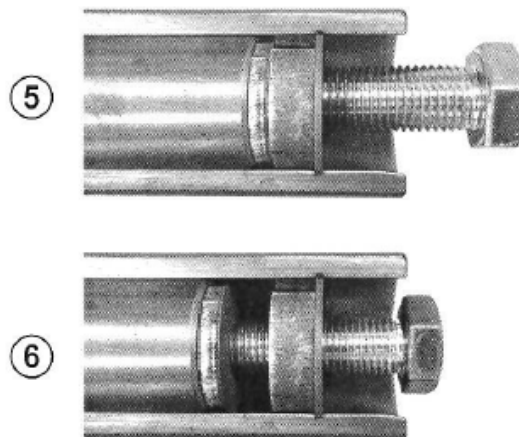
Removal procedure:



211527051US

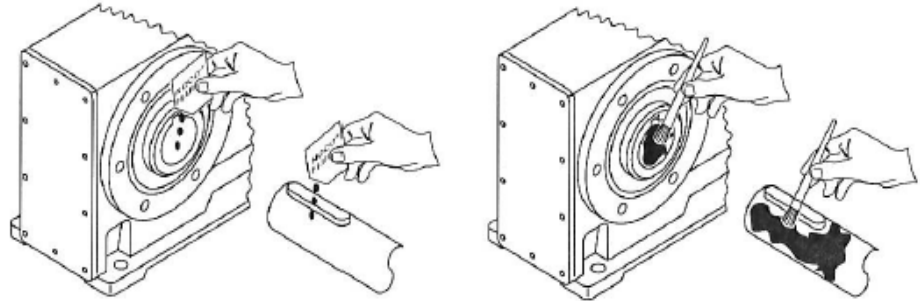
- | | |
|----------------------------|---------------------|
| [2] Longer retaining screw | [6] Lock washer |
| [3] Snapping | [8] Spacer tube |
| [4] Customer shaft | [9] Locking nut |
| [5] Flat washer | [10] Forcing washer |

1. Loosen the retaining screw [2].
2. Remove parts [3], [5], and [6]. Also, remove the spacer tube, [8], if applicable.
3. Using the parts [9] and [10] from the removal kit, insert the forcing washer and the locking nut until they rest against the customer shaft [4].
4. Re-install the snapping [3].
5. Thread the retaining screw [2] into the locking nut, as shown in cutaway below.
6. Turn the screw with wrench to force the shaft out of the gear unit.



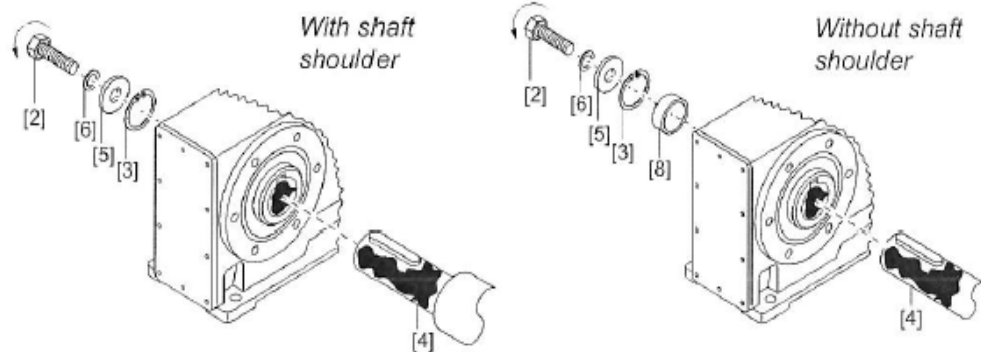
Installation procedure:

1. Apply and thoroughly spread NOCO fluid (normally supplied with unit).



211516171

2. Install the shaft and secure it axially with the hardware supplied.



211520523US

[2] Longer retaining screw

[3] Snapring

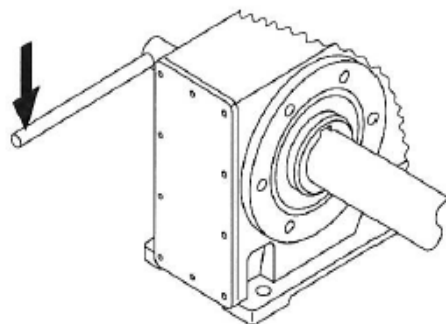
[4] Customer shaft

[5] Flat washer

[6] Lock washer

[8] Spacer tube

3. Tighten the retaining screw to the appropriate torque shown in table below.



Screw		Tightening torque Nm / lb-in
Metric	SAE	
M5		5 / 44
M6	1/4-20	8 / 71
M10	7/16-14	20 / 177
M12	1/2-13	
M16	5/8-11	40 / 355
M20	3/4-10	80 / 710
M24	1-8	200 / 1770

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Benetech, Inc
2245 Sequoia Drive
Suite 300
Aurora, IL 60506

P: 630-844-1300
F: 630-844-8690
www.benetechusa.com