

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
FOR
THE SHEARPRO LINE OF
BATCH ROTOR STATOR MIXERS

Congratulations on your purchase of a ShearPro Batch Rotor Stator from MXD Process. This manual will help with installation, set-up, operation, maintenance, repair, and provide general information about your unit. Read this manual in its entirety before setup or use.

READ BEFORE UNPACKING

Your mixer has been tested for quality and functionality prior to shipment. Proper handling and care should be taken when the unit is moved, uncrated, and installed. Failure to abide by the following criteria may result in damage to the equipment or serious injury to those operating the product.

WARNINGS

- The equipment should only be used for the purposes and parameters discussed within this document. Any deviations above the design parameters are not recommended nor covered under factory warranty. Contact MXD Process prior to using the equipment for any applications outside of this scope.
- Improperly tightened hardware can damage components and/or system components and can result in reduced operational life. Check all hardware to ensure nothing loosened during shipping. Refer to Appendix 3 for fastener torque values.
- When working with equipment with high voltage or rotating components, the potential to inflict severe or even fatal injury is present. Only qualified personnel should attempt installation, operation, or maintenance on the equipment. Never service without first ensuring that all power to the equipment is de-energized and the equipment has been properly locked-out. Any installer should be aware of relevant electrical codes and safety standards. An electrical disconnect switch is recommended for each unit for ease of de-energizing electrical power during maintenance intervals.
- MXD Process is not responsible for damage or injury due to inadequate structure mounting or improper use of its equipment.
- Any modification or alteration done to the equipment that is not authorized by MXD Process may damage products, void product warranty, or cause serious injury.
- Overcurrent protection and safety disconnects are not provided and shall be incorporated by others during installation of equipment.

MXD Process
4650 New Middle Road
Jeffersonville, IN 47130 USA
Office: (812) 202-4047
Serial Number:



Contents

- 1.0 Initial Inspection, Receiving, and Storage.....3
 - 1.1 Inspection and Receiving.....3
 - 1.2 Storage.....3
- 2.0 Customer Support3
 - 2.1 Contact information3
 - 2.2 Warranty.....3
 - 2.3 Return Policy.....4
- 3.0 General Information4
 - 3.1 Process Parameters4
 - 3.2 Applications4
 - 3.3 Vessel Sizing.....4
 - 3.4 Stands4
- 4.0 Installation5
 - 4.1 Mounting5
 - 4.2 Electrical Supply Wiring.....5
 - 4.3 Shaft Installation and Removal.....5
 - 4.4 Rotor and Stator Attachment6
- 5.0 Startup and Operation.....6
 - 5.1 First Startup6
 - 5.2 General Operation.....6
 - 5.3 Startup and Operation Checklist7
- 6.0 Maintenance.....7
 - 6.1 Lubricating7
 - 6.2 Wear items7
 - 6.3 Seals.....7
 - 6.4 Bearings.....8
- 7.0 Troubleshooting Guide8
- 8.0 Batch Rotor Stator Mixer Diagrams.....9
- Appendix 1 –General Dimensions 12
- Appendix 2 – Batch Rotor Stator Part Number Breakdown..... 12
- Appendix 3 – Fastener Torque Values..... 13

1.0 Initial Inspection, Receiving, and Storage

1.1 Inspection and Receiving

Upon receiving the equipment, inspect for accuracy and possible shipping damage. Take note of any missing components. If damage is observed or items are missing, please report this error to the shipping carrier and MXD Process immediately. Do not discard provided packaging until all items are accounted for.

1.2 Storage

When storing the equipment, choose a location where the equipment is not subjected to elements of nature, moisture, and/or excessive mechanical vibrations. If the unit was in storage for greater than a year, a visual inspection shall be performed before placing the unit into service. Exposed carbon steel surfaces should be inspected for corrosion that may have occurred during storage. Refer to maintenance section (Section 6) for corrective actions or contact MXD Process if needed. Please follow these steps to help prepare the equipment for long term storage:

- Store at ambient temperature, approximately 32°F to 104°F (0°C to 40°C) and avoid relative humidity conditions in excess of 60%
- Cover unit to prevent excessive dust build-up
- Rotate the mixer once a month approximately 10-15 revolutions to distribute the bearing lubricants to internal surfaces and prevent brinelling of the bearing races

2.0 Customer Support

2.1 Contact information

Have an issue? Contact us.

Name	Number	Email	Business Hours
MXD Process Technical Support	(812) 202-4047 x2	support@mxdprocess.com	8am - 5:30pm EDT
MXD Process Technical Sales	(812) 202-4047 x1	sales@mxdprocess.com	8am - 5:30pm EDT

2.2 Warranty

MXD Process is not accountable for any alteration, customization, misuse, or improper assembly of its products or components. Warranties may also be voided by unauthorized disassembly of equipment. MXD Process shall not be liable for any other damages, whether consequential, indirect, or incidental, arising from the sale or use of its products.

Products are guaranteed against defective materials and workmanship. If such defects arise, MXD Process will repair or replace these items at the convenience of the customer. For items manufactured by MXD Process, the warranty period is one year. On items not manufactured by MXD Process, the manufacturer's warranty applies. All component parts are covered by these warranties, except for normal wear items such as belts, bearings, seals, set screws, etc.

For warranty repairs, equipment is to be returned to MXD Process at the customer's expense with an authorized RMA number issued from MXD Process. The product(s) will be evaluated, restored to original equipment

standards, then returned to the customer at the expense of MXD Process. This warranty is exclusive and is in lieu of all other warranties, whether expressed or implied.

2.3 Return Policy

All sales are final with Mixer Direct and MXD Process due to the level of complexity and customization of our industrial products.

All returns must be approved in advance by a Technical Support Lead, reference a valid Mixer Direct or MXD Process RMA number, and will be subject to a 50% restock fee.

Please contact Technical Support for all returns. When you call, please have the following available for reference:

- Unit Serial Number, Sales Order Number, or Purchase Order number
- Part number and description of the purchased product
- Reason for returning the product

3.0 General Information

3.1 Process Parameters

Process Maximum Viscosity: 10,000 cP

Process Temperature Range: -22 to 212°F

Rotor RPM: 3600*

*2.5" Rotor mixers with VFD's may be run up to 5000 RPM.

3.2 Applications

ShearPro Batch Rotor Stator mixers applications include, but are not limited to:

- Pre-dispersion process step for coatings
- Solids size reduction for food manufacturing
- Batch emulsion processes
- Rapid solid-liquid impartation

3.3 Vessel Sizing

For best results the mixing head diameter should be greater than 1/10 the diameter of the vessel. This will ensure there are no significant momentum losses resulting in "dead spots" or areas in the tank with significantly less shear exposure.

3.4 Stands

ShearPro Batch Rotor Stator Mixers are designed to be primarily mounted on portable mixer stands for ease of use. ShearPro EHS or HDLS stands are available as a convenient and portable mounting option. The EHS stand has a maximum capacity of 250lbs and a maximum lift height of 104.5". The HDLS stand has a capacity of

750Lbs and a maximum lift height of 127". Both stands are portable with locking casters, push handles and hydraulic lifts, and provide a convenient location for mounting the optional variable speed controller.

4.0 Installation

Pre-Installation Checklist:

- This manual has been read and understood in its entirety
- Unit removed from crating and inspected for damage or missing components
- Tools such as a calibrated torque wrench, sockets, ratchets, hex keys, are readily available
- Professionals, such as riggers, are on-site ready to move the equipment
- Qualified electricians are informed of the electrical requirements and prepared to wire the necessary equipment with recommended safety disconnects

4.1 Mounting

ShearPro Batch Rotor Stator Mixers are designed to be primarily mounted on portable mixer stands for ease of use. When using ShearPro EHS or HDLS portable mixer stand no other provisions are required for mounting. The provided hanger rod is passed through the hole on the arm of the stand and the mixer is hooked onto the rod via the (2) mounting rings. See the relevant stand manual for more information on assembly and ratings of the stands. Other stands or mounting methods may be used but MXD Process cannot guarantee the safety or suitability of any products not designed specifically for use with a ShearPro Batch Rotor Stator.

When using your mixer with variable frequency speed controller (VFD) provided by MXD Process, the speed controller should be mounted to the stand using the mounting plate and hardware provided in the speed controller kit. See the relevant stand manual for specific information regarding plate mounting locations.

4.2 Electrical Supply Wiring

All electrical wiring must comply with local codes and the National Electric Code. Electrical power requirements for the unit can be found on the motor nameplate, or for VFD controlled applications see the VFD nameplate.

All power connections to be made using flexible multi-conductor cord suitable for the environment and power requirements. A fused disconnect or other suitable branch circuit protection should be used and shall be sized and installed according to local electrical codes.

4.3 Shaft Installation and Removal

ShearPro Batch Rotor Stator mixers use a pin and sleeve coupling to secure the shaft into the mixer. That shaft may be installed or removed without tools or disassembly of any other components for ease of service. The shaft is held in place with a simple cross pin installed in the coupling and through the hole in the top of the shaft. The pin is held in place with a sleeve that can be slid up or down to reveal the cross pin. To install the shaft:

- Slide the shaft up through the head bearing assembly (take care not to damage the seals if applicable)
- Pull the sleeve up or down to reveal the pin
- Push the pin out (a small rod or tip of a pen or screwdriver may be used if needed)
- Insert the shaft into the coupling and align the holes

- Re-install the cross pin, flush with the outsides of the coupling body
- Snap the sleeve back into place

See figure 8.0.3

Shaft removal and installation may be done with or without the rotor installed on the shaft and with or without the stator in-place on the mixer.

4.4 Rotor and Stator Attachment

Stator replacement, for service or changing mixing types, can be done by removing the three stator bolts and nuts. The stator should then remove freely, but a few light taps from a soft-face mallet may be used if required. See figure 8.0.0

The rotor is held onto the shaft via a single bolt, with lock washer and flat washer. Removal of the rotor is done by removing the bolt and washers and sliding the rotor off the bottom of the shaft. Take care not to lose the rotor key. See figure 8.0.0

5.0 Startup and Operation

5.1 First Startup

Check motor rotation direction. The motor should rotate clockwise when looking from the top/fan cover side down the shaft. Reverse operation will result in diminished performance and could potentially cause the rotor to come loose and cause damage.

ShearPro Batch Rotor Stator mixers are designed for use with the entire mixer head submerged in liquid. The standard ceramic bearing head may be ran dry without causing damage to the bearing, however, it is not recommended to do so for extended periods to avoid excessive seal wear.

5.2 General Operation

If working with a baffled or a rectangular tank, locate the mixing head in the center of the vessel. If working with an unbaffled tank locate the mixer head 1/4 to 1/6 of the vessel diameter away from the center of the vessel. 1/6 will provide a very intense vortex whereas 1/4 will provide a very mild vortex. Different solids will optimize their impartation with various vortex intensities.

The mixing head should be suspended one mixing head diameter from the bottom of the vessel for optimal performance. Coverage of the head should be at least 1.5 mixing head diameters before air impartation drives efficiencies to a suboptimal level.

After ensuring correct mixer placement, introduce the liquid phase of the product to the vessel. The Rotor Stator should be activated, vortex generation verified, and given time to stabilize. Contrary to conventional mixing, the solid phase needs to be added quickly to ensure a very quick wet out of the solid before the solid has a chance to build viscosity. Higher viscosity will result in lower pump rates through the impeller head, reducing wetting efficiency.

5.3 Startup and Operation Checklist

Check each of the following items for compliance prior to startup and operation:

- a. IOM Manual has been read and followed in its entirety
- b. Equipment is located in appropriate environment and mounted
- c. Wiring correctly installed, grounded, and insulated
- d. Rotation direction is verified
- e. The heat transfer fluid is in a closed loop and air purged from system
- f. Plumbed connections are tightened with no visible leaks
- g. Operators are aware how to start/stop and adjust the temperature

_____/_____/_____
Inspector Date

6.0 Maintenance

In order to ensure the life and longevity of the equipment, regular inspection and maintenance is suggested. The equipment should be inspected and lubricated at regular intervals as part of your standard maintenance program. How often various components should be inspected and serviced will depend on operating environment and process conditions. When performing maintenance on any moving or electrical equipment, de-energize all power and lock-out the equipment before beginning.

6.1 Lubricating

Most ShearPro Batch Rotor Stator mixers have no components that require regular lubrication. The stator head bearing is a lubrication free ceramic bearing and most of the motors have sealed for life bearings. Some motors may be ordered with re-greaseable bearings and grease fittings installed. On these applications the motor nameplate will provide grease type and quantity information.

6.2 Wear items

It is normal for a high or ultra-shear level mixer to have the mixing tools wear out with regular use. The Rotor and Stator may need to be replaced periodically and should be inspected regularly for wear on the working surfaces. The shaft may also be considered as wear item in some aggressive or abrasive applications. See section 4.3 and 4.4 for information on replacement of the Shaft, Rotor and Stator.

6.3 Seals

Standard ShearPro Batch Rotor Stator mixers use a ball bearing in the stator head flange. This bearing is protected from the mixing process via (2) lip seals. Regular inspection for process material bypassing the seals can increase the service life of the equipment. If process material is found in the bearing area due to worn seals the seals should be replaced. To replace the seals:

- Remove rotor and stator, Shaft may be removed as well for ease of access. See section 4.3 and 4.4

- Remove the bolts securing the head flange to the support shafts and remove the head flange.
- Remove the bolts securing the retainer to the flange. Remove the flange. See Figure 8.0.1
- The components in the head are pressed in from the bottom, with the retainer removed, the components may be pressed out and replaced. Take care not to damage any components that are to be re-used such as the spacers or retainer. See figure 8.0.1

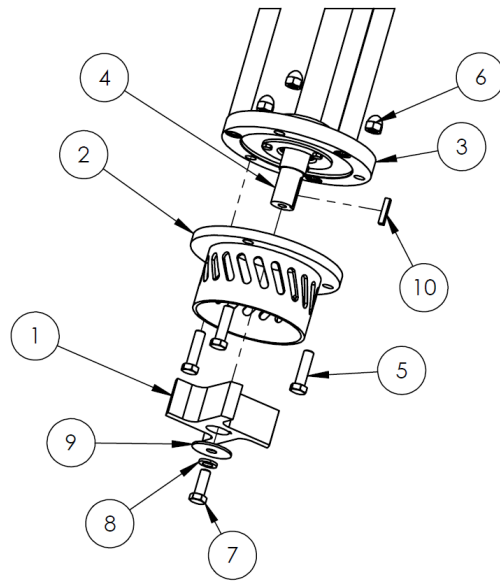
6.4 Bearings

Standard ShearPro Batch Rotor Stator mixers use a ceramic ball bearing in the stator head flange. The bearing is a long life bearing that requires no lubrication and, in many circumstances, should not require maintenance or replacement. If during inspection it does not spin freely or otherwise shows signs of wear, follow the instructions in section 6.3. If the bearing is to be removed or replaced it is recommended the seals be replaced as well.

7.0 Troubleshooting Guide

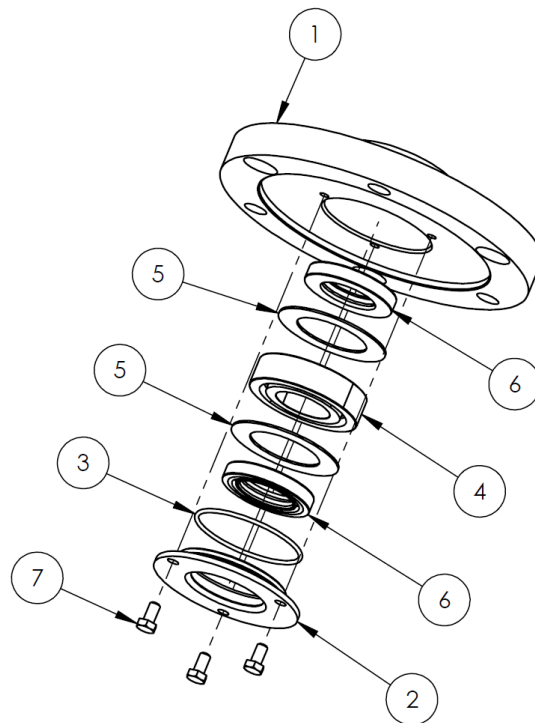
PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
Unit will not start or turn on	Blown fuse or tripped circuit breaker	Replace fuse or reset circuit breaker
	Incorrect wiring	Check actual wiring
	Loose wiring connections	Tighten loose connections
	Impeller interference	Free all debris from rotor
	Damage to motor	Service or replace motor (consult factory)
	VFD is faulted	Resolve fault
Noisy	Worn or faulty bearing(s)	Inspect/replace bearing(s)
	Loose hardware	Check all hardware for proper torque
	Incorrect mixer head alignment	Adjust/align head and supports Replace bent/damaged support shafts
Bearing Failure	Worn head seals	Replace head seals and bearing
	Bearing has worn beyond useful life	Replace bearing (check all other parts)
	See all items under "Noisy"	
Inadequate Mixing Performance	Improper mixer placement/process	Adjust mixer position and/or process
	Worn tooling	Inspect and replace Rotor and/or Stator
	Incorrect mixer for application	Consult factory with application details
Excessive vibrations	Bent mixer shaft	Replace shaft
	Loose mixer head components	Inspect hardware and alignment of head
	Damaged or worn bearings	See "Bearing Failure"
	Damaged rotor or stator	Inspect and replace rotor
	Debris on/in rotor or stator	Check and clean rotor and stator

8.0 Bach Rotor Stator Mixer Diagrams



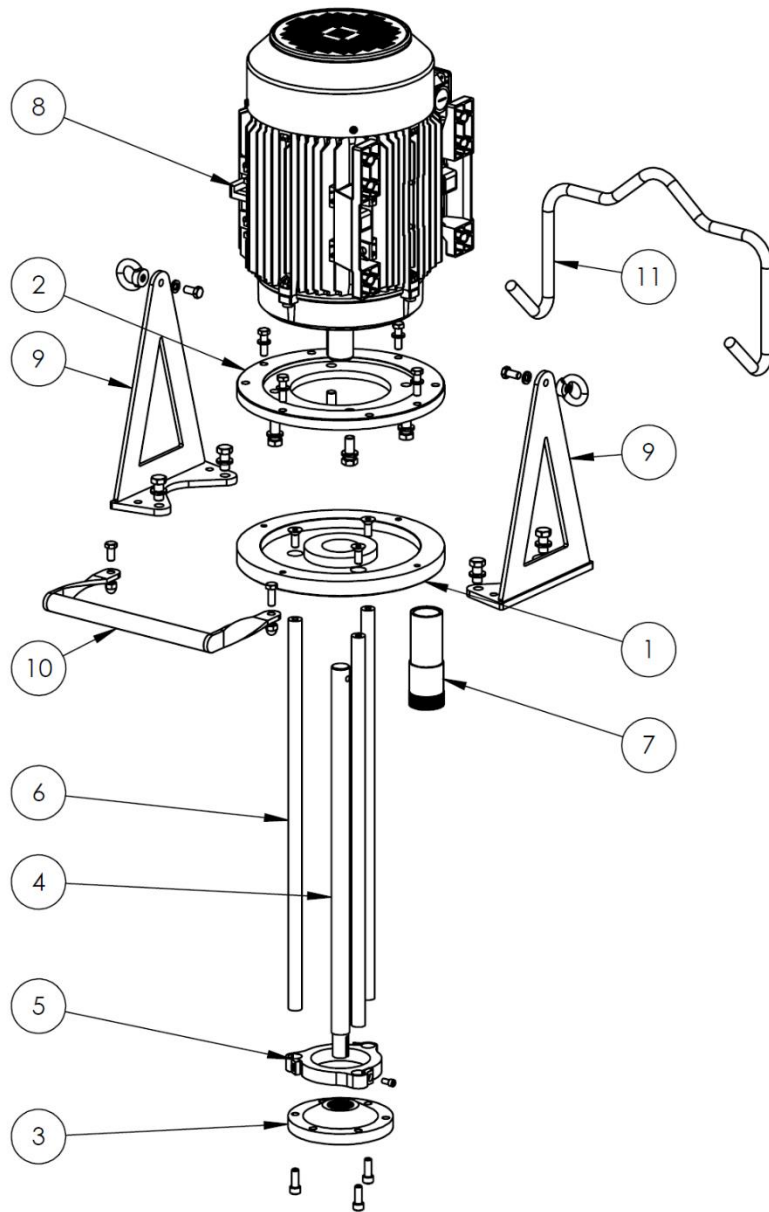
1 – Rotor; 2 – Stator; 3 – Head Flange; 4 – Shaft; 5 – Stator Bolt; 6 – Stator Nut; 7 – Rotor Bolt; 8 – Rotor Lock washer; 9 – Rotor Washer; 10 – Rotor Key

Figure 8.0.0 – Rotor and Stator



1 – Head Flange; 2 – Retainer; 3 – O-Ring; 4 – Bearing; 5 – Spacer; 6 – Seal; 7 – Retainer Bolt

Figure 8.0.1 – Ball Bearing Head Assembly



1 – Body Flange; 2 – Motor Flange; 3 – Head Flange; 4 – Shaft; 5 – Mid Support; 6 – Support Shaft; 7 – Coupling;
8 – Motor; 9 – Hanging Bracket; 10 – Handle; 11 – Hanger Rod

Figure 8.0.2 – Batch Rotor Stator Exploded View

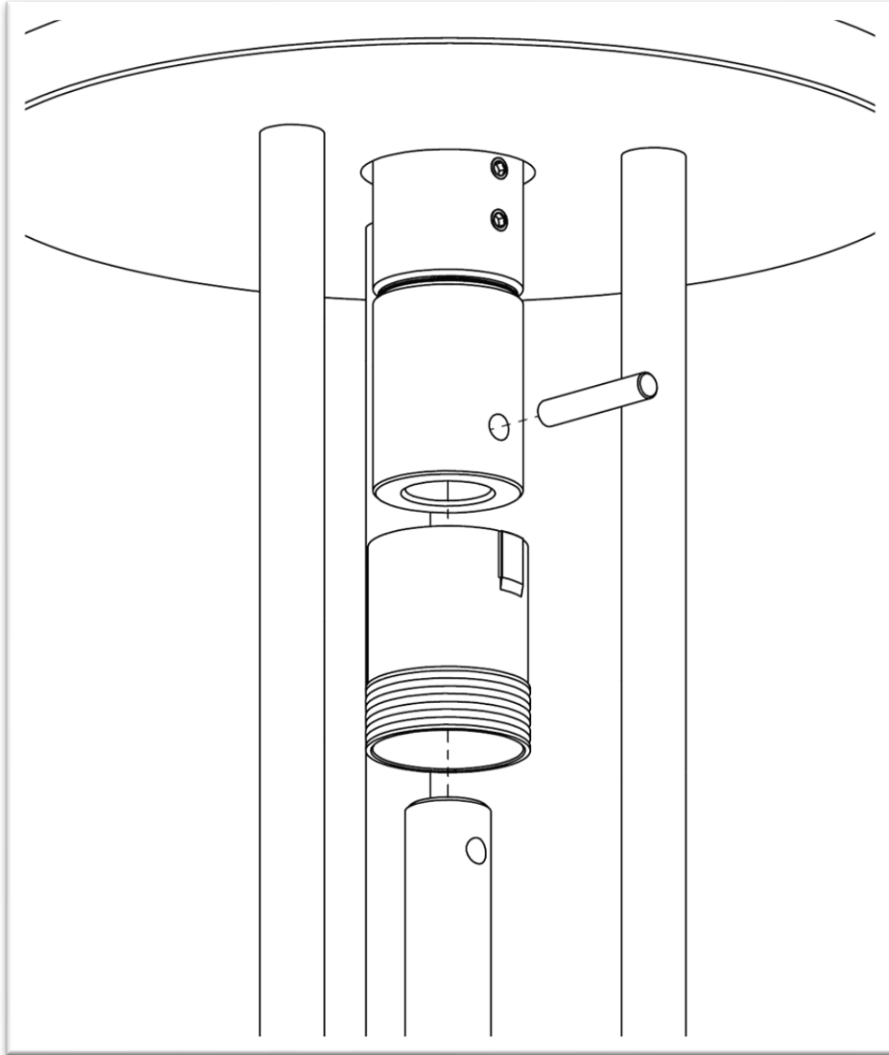
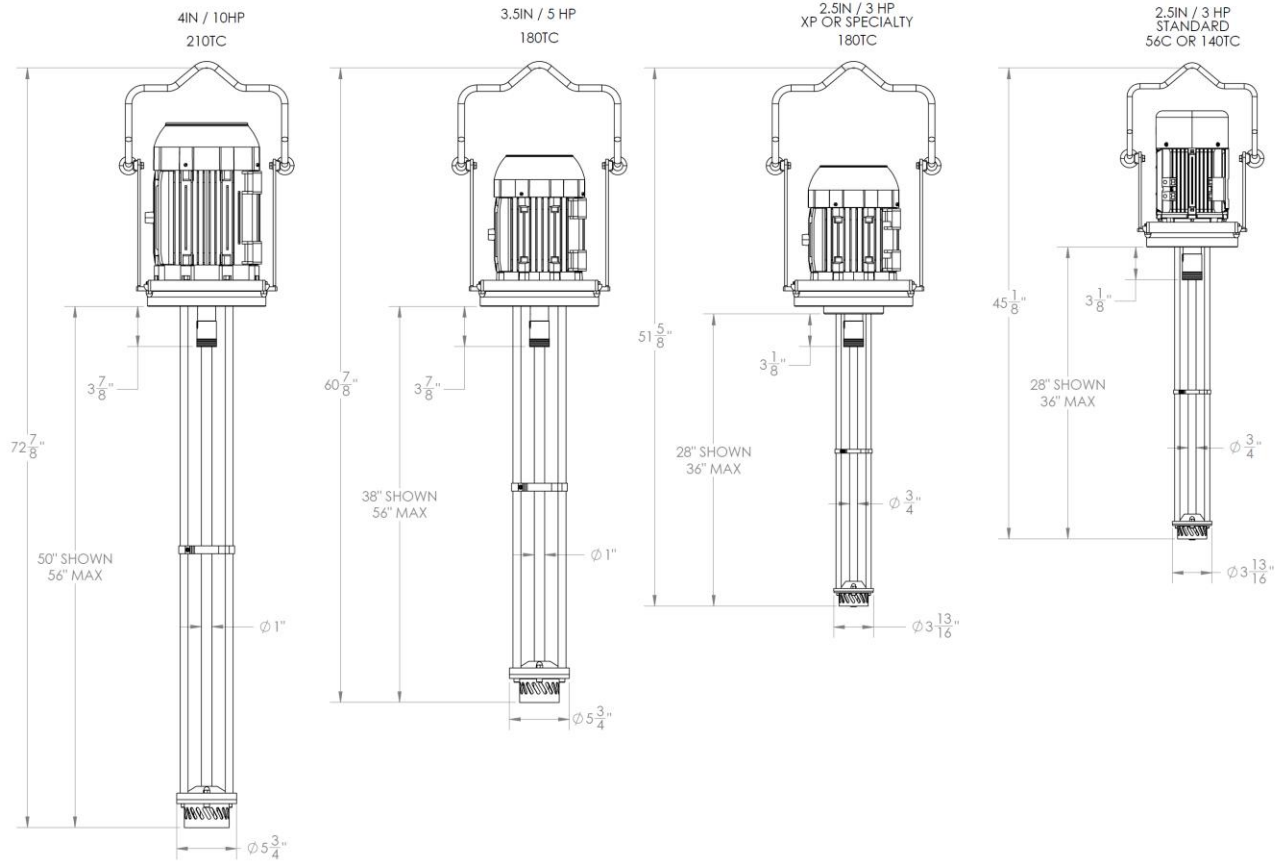


Figure 8.0.3 – Shaft Coupler

Appendix 1 – General Dimensions



All dimensions are in inches unless specified otherwise

Appendix 2 – Batch Rotor Stator Part Number Breakdown

BRS[SIZE][HP][MOTOR]-[NON-WETTED][HEAD LENGTH]

[SIZE]	[HP]	[MOTOR]	[NON-WETTED]	[HEAD LENGTH]
025=2.5"	030=3 HP	Blank=TEFC	A=ALUMINUM	28=28"
035=3.5"	050=5 HP	X=XP C1 D1	S=304SS	38=38"
040=4"	075=7.5 HP	S=STAINLESS		50=50"
	100=10 HP			
	150=15 HP			

EXAMPLE: BRS025030-A28
BRS035050S-S38

Appendix 3 – Fastener Torque Values

Table A4.1 – Screw & Bolt Torque Values					
		SAE J429	SAE J429	ASTM A574	ASTM F593
	Nominal Size	Grade 5	Grade 8	SHCS	304/316 SS
INCH LBS	#10	31	44	50	20
	#12	49	70	79	29
	1/4	76	107	120	62
	5/16	156	221	249	128
	3/8	23	32	36	19
FOOT LBS	7/16	36	52	58	30
	1/2	57	80	90	46
	5/8	113	159	179	92
	3/4	200	283	318	113
	7/8	322	455	512	182
	1	483	682	767	273
	1-1/8	684	966	1086	346
	1-1/4	965	1363	1533	545

All values are for coarse thread lubricated fasteners

Table A4.2 - Set Screw Torque Values				
	Nominal Size	Alloy Steel	Stainless	Hex Size
INCH LBS	#8	20	13	5/64
	#10	36	23	3/32
	1/4	87	57	1/8
	5/16	165	107	5/32
FOOT LBS	3/8	24	16	3/16
	7/16	35	23	7/32
	1/2	52	34	1/4
	9/16	52	34	1/4
	5/8	110	72	5/16
	3/4	200	130	3/8
	7/8	300	195	1/2
	1	417	271	9/16

All values are for coarse thread lubricated fasteners