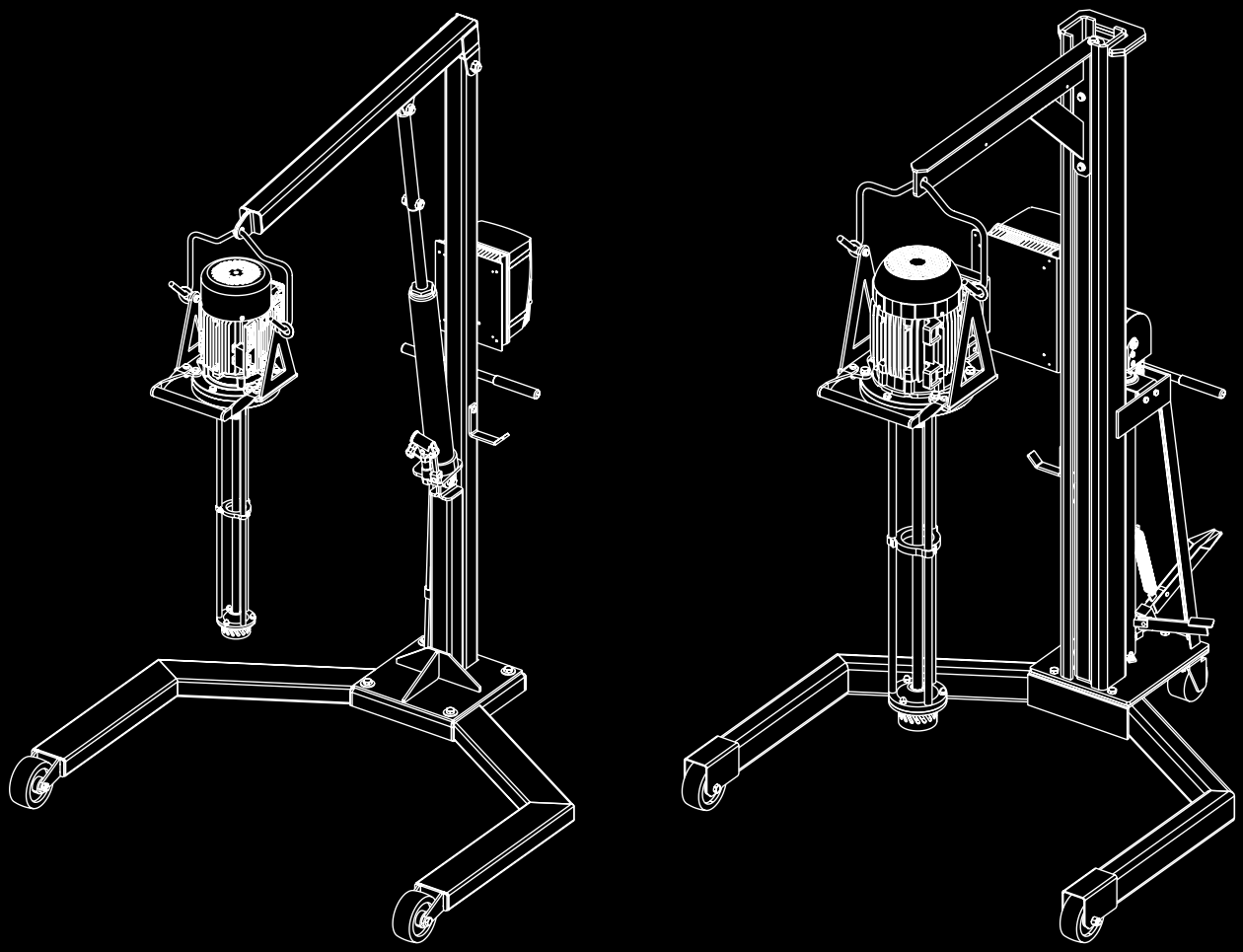
Batch Rotor Stator Mixer



Installation, Operation, & Maintenance for Batch Rotor Stator Mixers and Lift Stands

MXD PROCESS™

Every Process We Touch, We Improve

MXD-MAN-003-R1 10-28-2025

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General Safety

Safety is the most important element of the operation and maintenance of your new equipment. Knowledge of the procedure to be performed and safe work habits are essential to preventing death, personal injury, or property damage. Use the following statements as a common-sense guide to proper work and tool-use habits.

Prepare for the Job

Preparation is essential to complete a procedure in a safe and efficient manner.

- Wear proper clothing. Loose or baggy clothing could become tangled in moving parts.
- Use eye/face protection. Always use proper eye/face protection to protect your eyes from flying debris or chemical splatters.
- Wear protective footwear. Wear safety shoes (steel-toe) to protect your feet from falling objects.
- Use gloves when handling parts. Parts may have sharp edges or may be hot.
- Remove jewelry prior to servicing electrical systems.
- Prepare proper tools and equipment. Always use the correct tool for the job. Improper or homemade tools can cause injury or machine damage.
- Prepare needed parts and materials. Gather the needed parts and materials before beginning the procedure.
- Many components can get hot during operation. Be sure to allow enough time for components to cool before beginning service.
- Prepare proper workspace lighting. A well-lit work area can make the job easier.
- Follow procedures and safety warnings. Service procedures are written to be as safe and efficient as possible. Never take shortcuts.
- Be prepared for emergencies. Accidents can happen, even under the best conditions. Fire extinguishers and first aid kits should be well maintained and easily accessible.

Safety Notices

Please read this entire manual before attempting to operate or service equipment. Failure to follow these instructions could result in serious bodily injury or death.

Throughout this manual, the following key safety words will be used to alert the reader of potential hazards. Become familiar with these words and their meaning. Take all precautions to avoid the hazards described.

⚠ DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious bodily injury.

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, may result in serious or moderate bodily injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate bodily injury.

NOTICE

Indicates a situation which, if not followed, may involve deterioration or damage to equipment.

Maintenance Safety

⚠ WARNING

Before doing any service or maintenance on this machine, follow all safety procedures. This should include:

- **Disconnect the electrical power supply.**
- **Relieve any pressure from the pneumatic system.**
- **Mechanically secure any part of the machine that may shift while doing maintenance.**

Electric Motor Safety

⚠ WARNING

ELECTRICAL SHOCK!
De-energize unit before servicing. Failure to follow this instruction may result in serious injury.

⚠ WARNING

AVOID POSSIBLE INJURY, ROTATING PARTS!
Please make sure to keep your hands, hair, and loose clothing away from rotating parts to avoid any injuries. Failure to do so, may result in serious injury.

⚠ CAUTION

HOT PARTS DO NOT TOUCH!
During and after operation, motor and auxiliary components can become hot. To avoid severe burns, do not touch motor and component parts while in use or immediately after stopping.

NOTICE

All electric motors should be in accordance with National Electrical Code (NEC) NEMA along with local codes. All grounding should be in accordance with National Electrical Code (NEC) Article 430.

ATTENTION: *Under no circumstances should anyone other than qualified professionals be responsible for electrical connections and repairs. The potential dangers of electricity are far too great to be taken lightly. Therefore, it is imperative that safety is prioritized above all else and that only individuals with the necessary qualifications and expertise are entrusted with electrical work.*

Variable-Frequency Drive (VFD) Safety

⚠ WARNING

ELECTRICAL SHOCK!
This device will store a charge for up to 3 minutes after removing the main voltage from the unit. Always discharge or allow ample time before servicing. Failure to follow this instruction may result in serious injury.

Introduction

Congratulations on your purchase of the MXD Process Batch Rotor Stator Mixer! This manual provides comprehensive guidance on the installation, set-up, operation, maintenance, and repair of your mixer, as well as general information. We recommend reading this Operation and Maintenance Manual in its entirety before setting up or using the mixer to ensure safe and efficient operation. We thank you for choosing our product and look forward to providing you with any assistance you may need.

READ BEFORE UNPACKING

NOTICE

Please note that your MXD Process Batch Rotor Stator Mixer has undergone rigorous quality testing before shipment. It is important to exercise proper care and handling when moving, uncrating, and securing the mixer components to their mounting surface. Failure to adhere to the guidelines below may result in damage to the equipment or serious injury to those operating the products.

Inspection and Receiving

Upon receipt of the equipment, it is imperative to conduct a thorough inspection to ensure accuracy and identify possible shipping damage. It is highly recommended to take note of any missing components and promptly report any observed damage or missing items to both the shipping carrier and MXD Process. It is advisable to refrain from discarding the packaging provided until all components have been accounted for, and product has been confirmed to be free from transit damage. For a detailed list of components, please refer to the Spare Parts section of the manual.

Storage

When it comes to storing mixing equipment, it is important to select a location that is free from exposure to elements of nature, moisture, and excessive mechanical vibrations. This is especially important as electrical components are not designed to withstand moisture. In the event that the mixer has been in storage for more than a year, it is recommended that the gear lubricant be checked prior to the mixer being put into service. Additionally, exposed carbon steel surfaces such as the gearbox's hollow bore, should be inspected for any corrosion that may have occurred during storage. For corrective actions, please refer to the Maintenance section or contact MXD Process if further assistance is required. To prepare the equipment for long-term storage, please follow these steps:

- Check mixer functionality before storing.
- For optimal storage of the mixing equipment, keep it at an ambient temperature between 32°—104°F (0°—40°C) and avoid relative humidity over 60%.
- To ensure proper storage of the mixer, it is recommended that it be kept in its actual mounting position, with a horizontal orientation and the mount parts facing downward.
- It is recommended to cover the unit to prevent excessive dust buildup, which can have a detrimental effect on the equipment's overall performance.
- To prevent corrosion and ensure optimal performance, it is recommended to apply a protective lubricant coating to all unpainted carbon steel surfaces, including the gearbox hollow shafts. This step is crucial in maintaining the integrity of the equipment and extending its lifespan. Additionally, regular inspections should be carried out to check for any signs of corrosion.
- To prevent any potential corrosion inside the unit, it is recommended to overfill the gearbox with oil. By taking this step, it is possible to ensure that the equipment is properly lubricated and protected against potential damage.
- To ensure that the oil is properly distributed to internal surfaces and to prevent brinelling of the bearing races, it is recommended to rotate the gearbox once a month, approximately 10—15 revolutions in both directions. By following this approach, it is possible to maintain optimal equipment functionality and extend its lifespan.

Customer Support

If you encounter any problems or have any questions, feel free to contact us. We are here to help in any way we can.

Contact information

- MXD Process Technical Support
  (812) 202-4047 x2
  support@mxdprocess.com
  8am - 5pm EDT

- MXD Process Technical Sales
  (812) 202-4047 x1
  sales@mxdprocess.com
  8am - 5pm EDT

Warranty

MXD Process prides itself on providing high-quality products to our customers. To ensure you get the most out of our equipment, we kindly remind you that any alteration, customization, misuse, or improper assembly of our mixer or mixer components is not our responsibility. Such actions may void your warranty and can result in serious harm or damage. We encourage you to carefully follow the instructions provided to ensure safe and proper use of our equipment.

Our products are crafted with the highest standard of materials and workmanship, and we stand behind them with confidence. In the unlikely event that you encounter defects, we offer a 1 year warranty on items we manufacture and the manufacturer's warranty on other items we do not manufacture. All component parts are covered by these warranties, except for normal wear items like belts, bearings, set screws, etc.

To initiate a warranty repair, please contact us for a Return Material Authorization (RMA) number. Returns must be made within the specified window and packaged comparably to their initial shipment. We recommend using the original packaging, if reusable.

At MXD Process, we value your business and are committed to providing only the best products and services. Our warranty is the only one we offer and supersedes all other warranties, whether expressed or implied, so you can have peace of mind knowing that you are covered.

Return Policy

All returns require approval from our Technical Support Team and are subject to a re-stocking fee. In order to return a product, you need to obtain a Return Material Authorization (RMA) number. We will not process any return or credit without an authorized RMA number. Please make sure to package your return in a comparable manner to how it was initially shipped. If the original packaging is reusable, we recommend using it for the return. Please note that products must be returned within 10 business days from the date of issuance of the RMA.

If you need to return any of our products, please do not hesitate to reach out to our Technical Support team at (812) 202-4047 x2. Our team is available to assist you and make the process as easy as possible. To help us expedite your request, kindly have the following information ready when you call:

- Mixer Serial Number (located near the motor tag), Sales Order Number, or Purchase Order Number
- Part number and description of the product you purchased
- Reason for returning the product

We appreciate your business and are committed to ensuring your satisfaction.

Product Details

Batch Rotor Stator Mixers

Batch Rotor Stator (BRS) Mixers are designed to hang from a stationary or portable point/stand, inserted into an open-top tank, and are often manipulated by hand while hanging.

Available Mixer Sizes

- 2.5 in. 56C/140TC
- 2.5 in. 180TC
- 3.5 in. 180TC
- 4 in. 210TC

Process Parameters

- Process Maximum Viscosity: 10,000 cP
- Process Temperature Range: -22°–212°F (-30°–100°C)
- Rotor RPM: 3600*

**A 2.5 in. rotor mixer equipped with a variable-frequency drive (VFD) may be run up to 5000 RPM.*

Applications

Batch Rotor Stator Mixer 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

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.

Stands

Batch Rotor Stator Mixers are designed to be primarily mounted on a portable mixer stand for ease of use. The stand can be moved and adjusted as necessary.

Available Stands

Economy Hoist Stand (EHS)

- Portable, medium duty. Supports up to a 250 lb BRS Mixer.
- Two locking swivel casters in back, two fixed wheels in front.
- Utilizes a 59 in. advertised lift stroke with a maximum usable lift height of 104.5 in. Usable stroke depends on the height of the mixer being used.
- Equipped with a manual hydraulic lift with the option of an air and manual ram for easier operation.
- Includes a cord hanger and provisions for mounting an optional variable speed controller.

Heavy-Duty Lift Stand (HDLS)

- Portable, heavy-duty. Supports up to a 750 lb BRS Mixer.
- Two locking swivel casters in back, two fixed wheels in front.
- Utilizes a 50 in. advertised lift stroke with a maximum usable lift height of 127 in.
- Includes a cord hanger and provisions for mounting an optional variable speed controller.
- A 9 in. drop arm is available for use with shorter OAH mixers or smaller containers. Additional drop amounts may be requested.

Assembly

Pre-Assembly Checklist

- Manual has been read in its entirety.
- Mixer removed from packaging and inspected for damage or missing components.
- Mounting hardware is prepared, if applicable.
- Gasketing is prepared, if applicable.
- Tools such as a calibrated torque wrench, sockets, ratchets, Allen keys (hex keys), and anti-seize 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.
- Installation site is prepped, cleaned, and all relevant personnel are informed.

Stand Assembly

Economy Hoist Stand

For ease of shipping, the Economy Hoist Stand ships partially disassembled. It may be necessary to assemble the tower to the portable base and install the hoist cylinder to the stand.

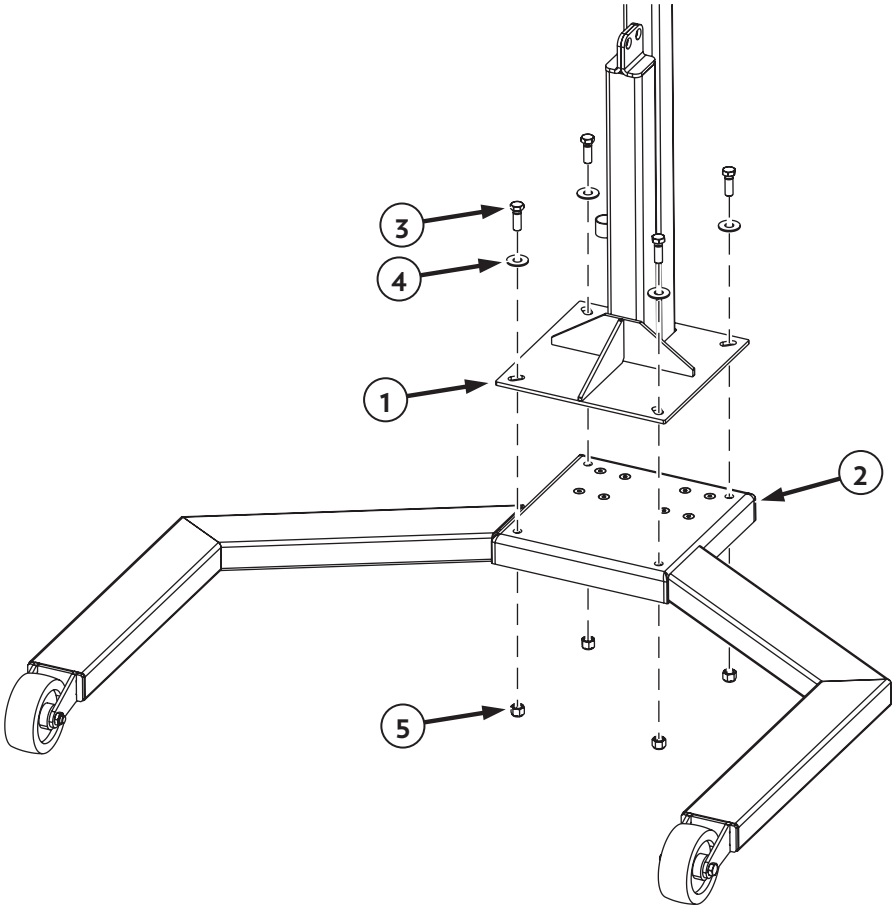


Figure 1. Tower to Base

⚠ WARNING

AVOID INJURY, HEAVY COMPONENT!
It is important to utilize appropriate lifting equipment or have additional personnel present to aid in lifting heavy objects into place. Noncompliance with this directive may result in physical harm.

1. Assemble the tower (1) to the base (2) using the provided four 1/2 in. bolts (3), flat washers (4), and lock nuts (5). Tighten to specification. See "Torque Specifications" on page 36.

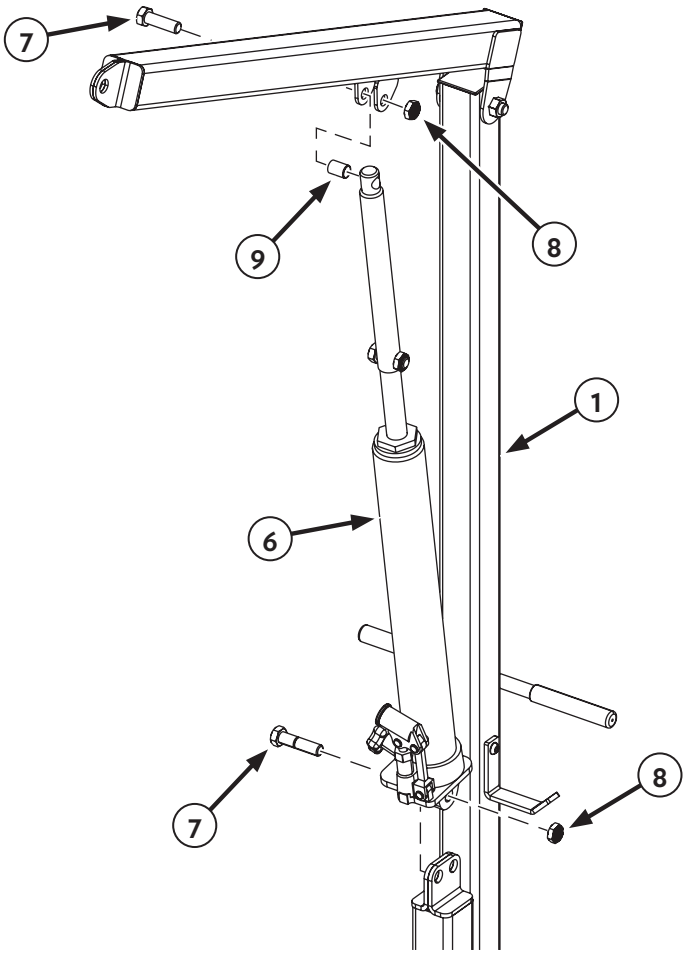


Figure 2. Cylinder to Tower

2. Install the cylinder (with the pump side forward) (6) to the tower (1) using the provided 1/2 in. bolts (7), nylon lock nuts (8), and sleeve bearing (9) as shown. Tighten the bolts so they are fully engaged with the nylon, but still loose enough to allow rotational movement.

Heavy-Duty Lift Stand

For ease of shipping, the Heavy-Duty Lift Stand will ship partially disassembled. It may be necessary to assemble the tower to the portable base and the arm to the shuttle.

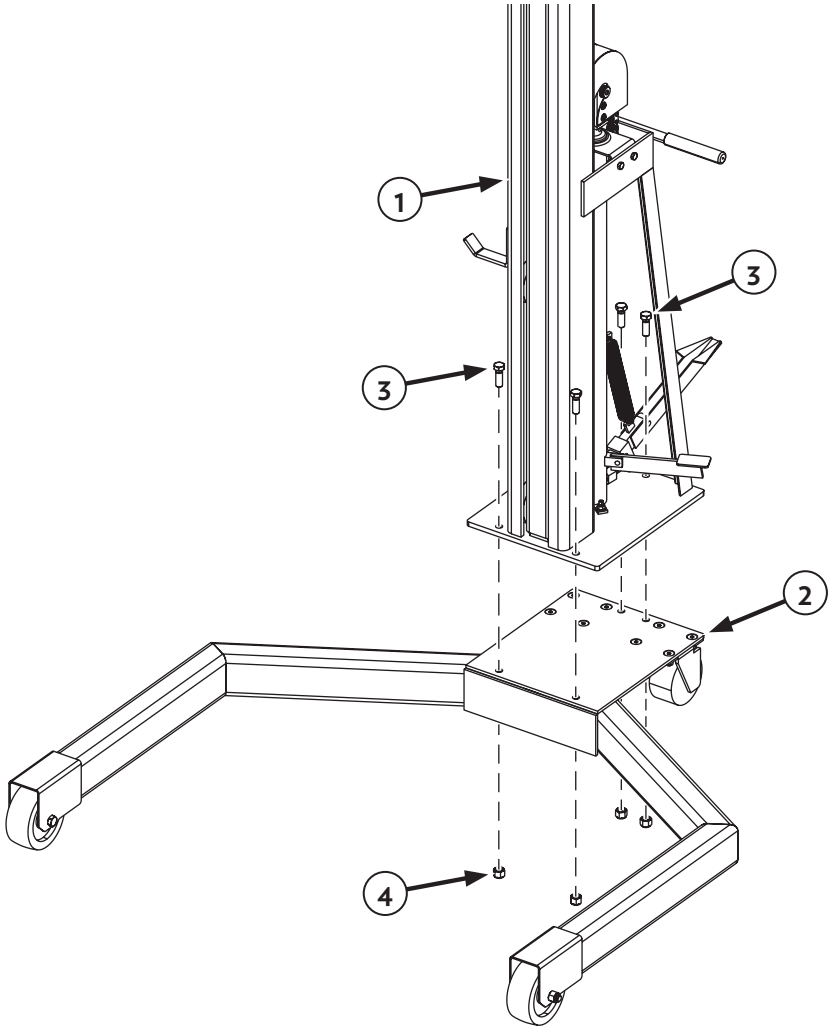


Figure 3. Tower to Base

⚠ WARNING

AVOID INJURY, HEAVY COMPONENT!
It is important to utilize appropriate lifting equipment or have additional personnel present to aid in lifting heavy objects into place. Noncompliance with this directive may result in physical harm.

1. Assemble the tower (1) to the base (2) using the provided four 1/2 in. bolts (3) and lock nuts (4). Tighten to specification. See "Torque Specifications" on page 36.

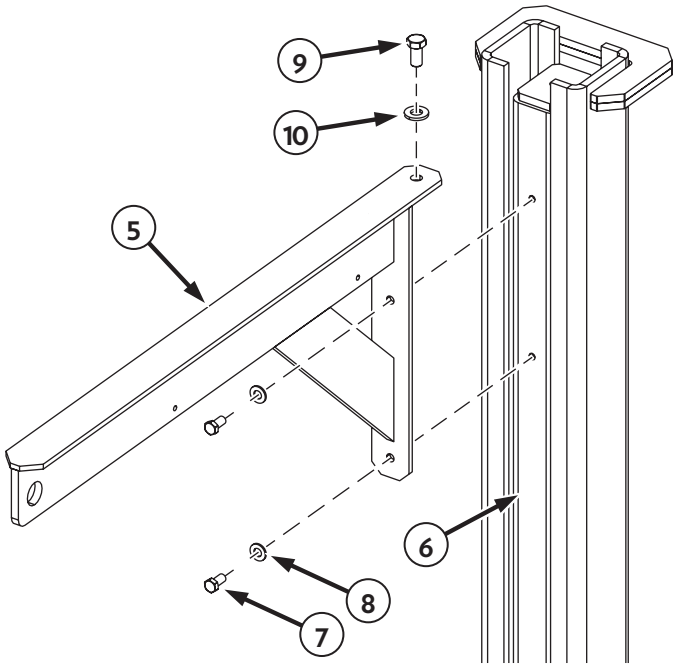
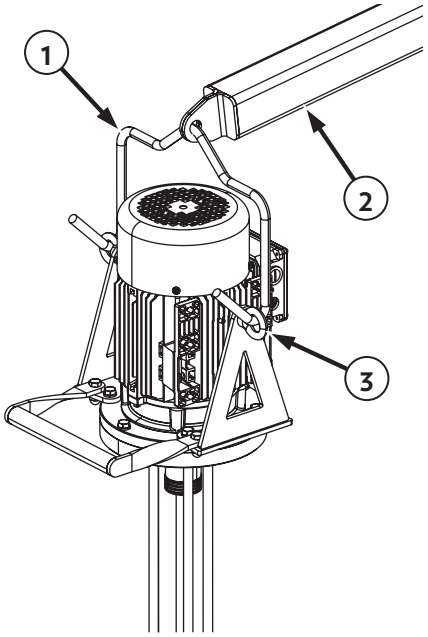


Figure 4. Arm to Shuttle

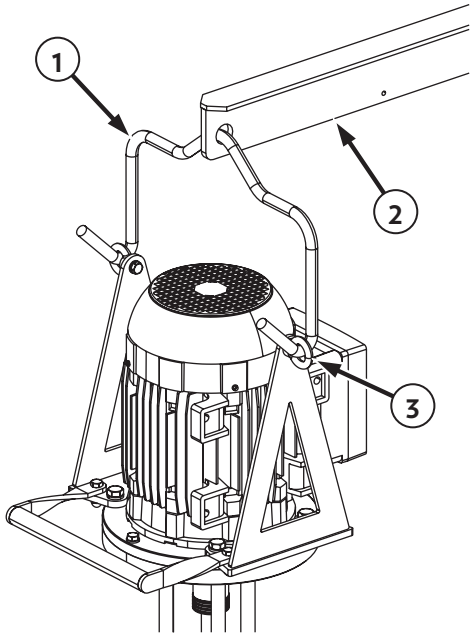
2. Install the arm (5) to the shuttle (6) using the provided two 3/8 in. bolts (7) and flat washers (8), and the 1/2 in. bolt (9) and flat washer (10). Tighten to specification. See "Torque Specifications" on page 36.

Mixer Mounting

Batch Rotor Stator Mixers are designed to be primarily mounted on portable mixer stands for ease of use. When using an EHS or HDLS portable mixer stand, no other provisions are required for mounting. Other stands or mounting methods may be used; however, MXD Process cannot guarantee the safety or suitability of any products not designed specifically for use with a MXD Process Batch Rotor Stator Mixer.



EHS Mixer Mount



HDLS Mixer Mount

Figure 5. Mixer Hanger Rod

⚠ WARNING

AVOID INJURY, HEAVY COMPONENT!
It is important to utilize appropriate lifting equipment or have additional personnel present to aid in lifting heavy objects into place. Noncompliance with this directive may result in physical harm.

1. Pass the provided hanger rod (1) through the hole at the end of the mixer stand arm (2).
2. Hang the mixer by sliding the mixer mounting rings (3) over the hanger rod ends.

Shaft Installation

Batch Rotor Stator Mixers use a cross-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 cross-pin is held in place with a sleeve that can be slid up or down to reveal the cross-pin.

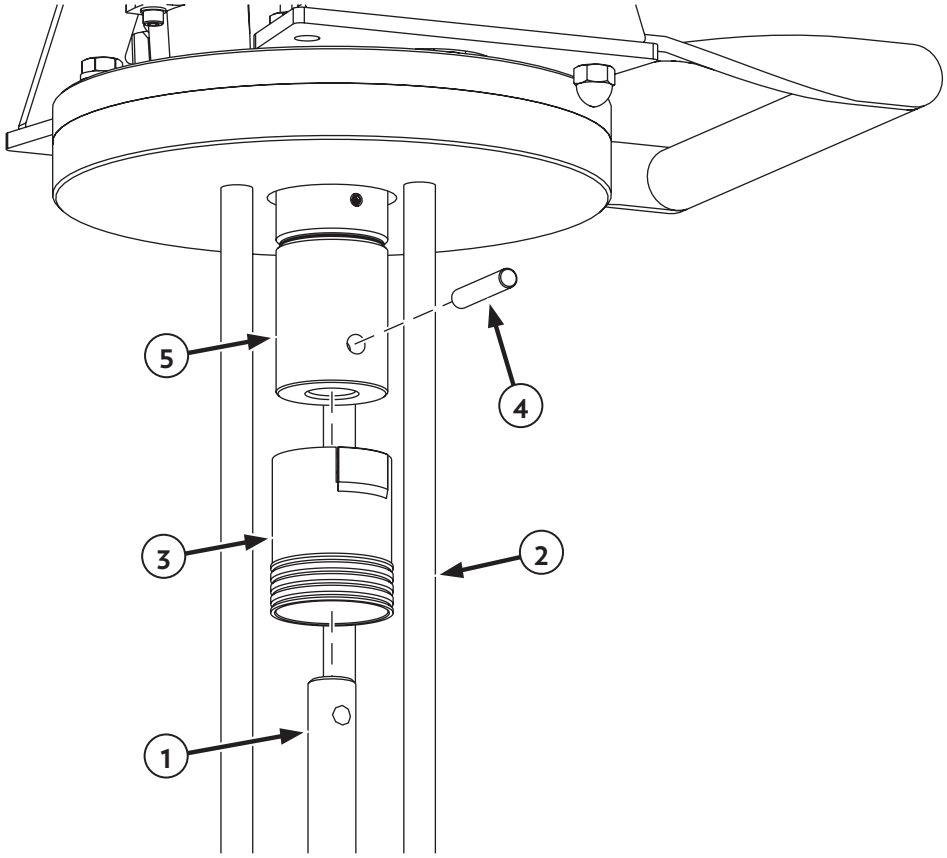


Figure 6. Shaft Coupler

NOTE: *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.*

NOTICE

Take care not to damage the seals when inserting the shaft into the head bearing assembly.

1. Slide the shaft (1) up through the head bearing assembly at the end of the support shafts (2).
2. Pull the sleeve (3) down to reveal the cross-pin (4).
3. Push the cross-pin out.

   NOTE: *A small rod, pen tip, or screwdriver may be used if necessary.*
4. Insert the shaft in to the coupling (5) and align the holes.
5. Install the cross-pin so that it is flush with the outside of the coupling body to secure the shaft.
6. Snap the sleeve back into place.

Rotor and Stator Installation

Rotor

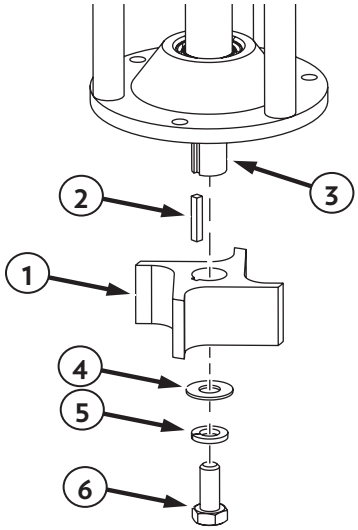


Figure 7. Rotor Installation

1. Align the rotor (1) keyway with the key (2) and shaft (3) keyseat, and slide the rotor onto the shaft.
2. Install the flat washer (4), lock washer (5), and bolt (6). Tighten to specification. See "Torque Specifications" on page 36.

NOTE: *Take care not to lose the rotor key (2) during removal.*

Stator

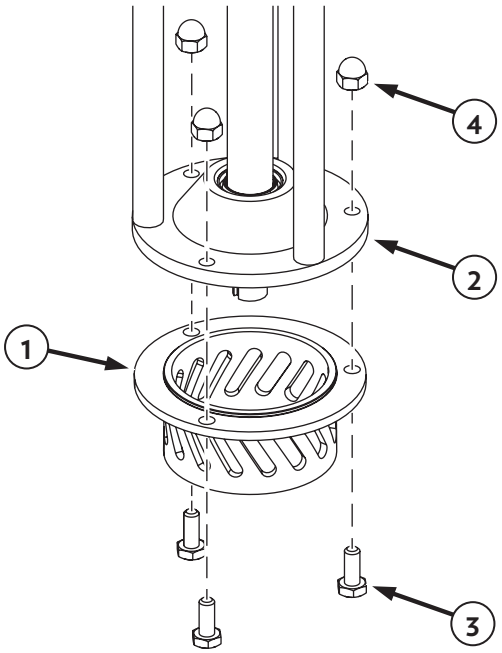


Figure 8. Stator Installation

1. Align the stator (1) bolt holes with the bearing flange (2) bolt holes and install the bolts (3) and acorn nuts (4). Tighten to specification. See "Torque Specifications" on page 36.

NOTE: *The stator may require a few light taps with a soft-faced mallet during removal.*

Variable-Frequency Drive (VFD) Installation (If Equipped)

When using your mixer with a VFD speed controller 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. The optional VFD speed controller for Batch Rotor Stator Mixers allows the operator to adjust the RPM incrementally to suit the mixing application.

Economy Hoist Stand (EHS) VFD Mounting

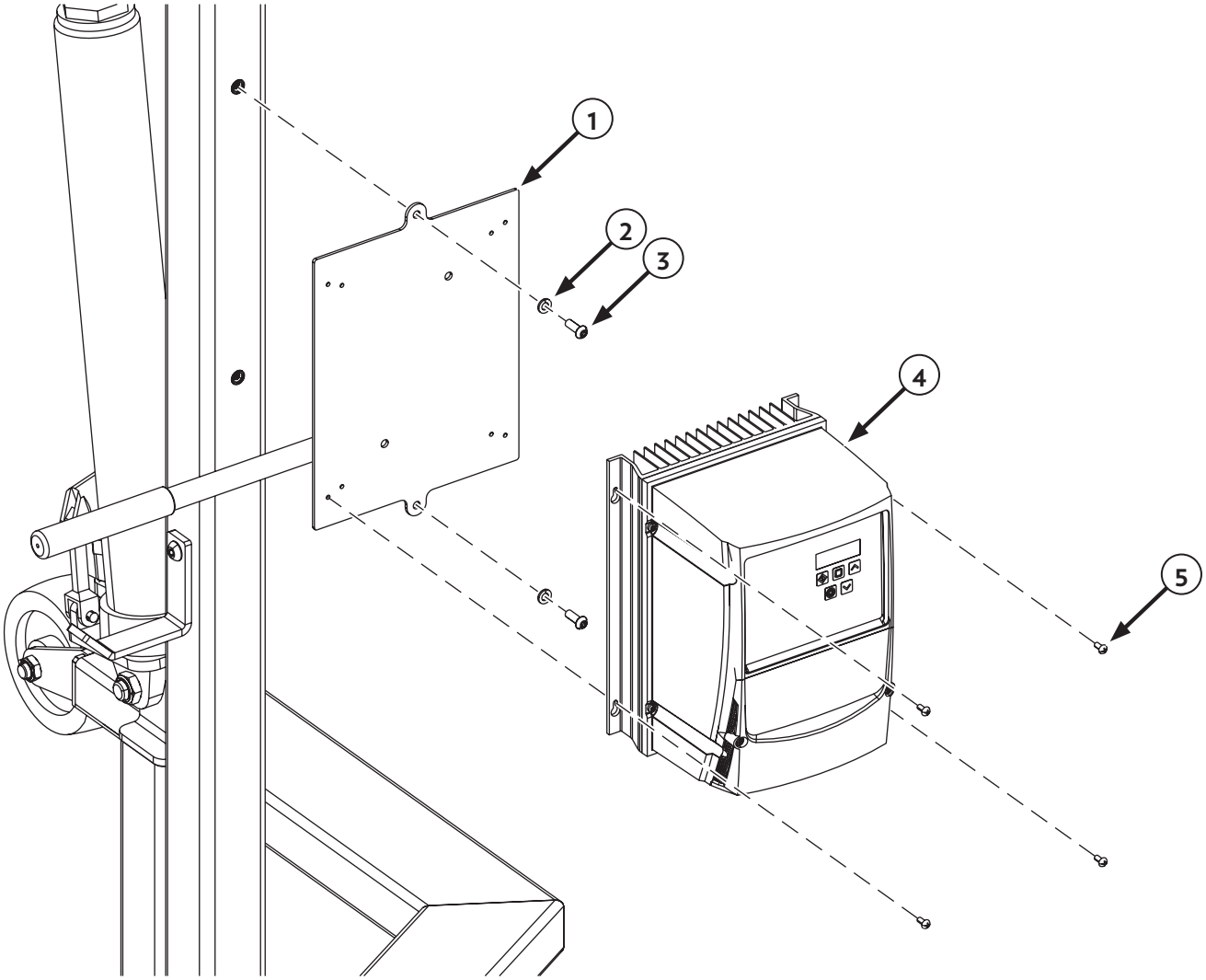


Figure 9. VFD to Economy Hoist Stand

1. Install the VFD mounting plate (1) to the back of the EHS tower using two lock washers (2) and two cap screws (3). Tighten the cap screws to specification. See "Torque Specifications" on page 36.
2. Secure the VFD speed controller (4) to the VFD mounting plate with four screws (5).
3. Any wiring secured to the mixer stand should use a suitable locking connector to allow removal of the mixer for service or if multiple mixers are used with one stand. Mixer wiring should be done in a manner to allow the full stroke of the lift without putting unnecessary tension on the wire/cord. For additional information on electrical connections, see "Wiring/Electrical" on page 17.

Heavy-Duty Lift Stand (HDLS) VFD Mounting

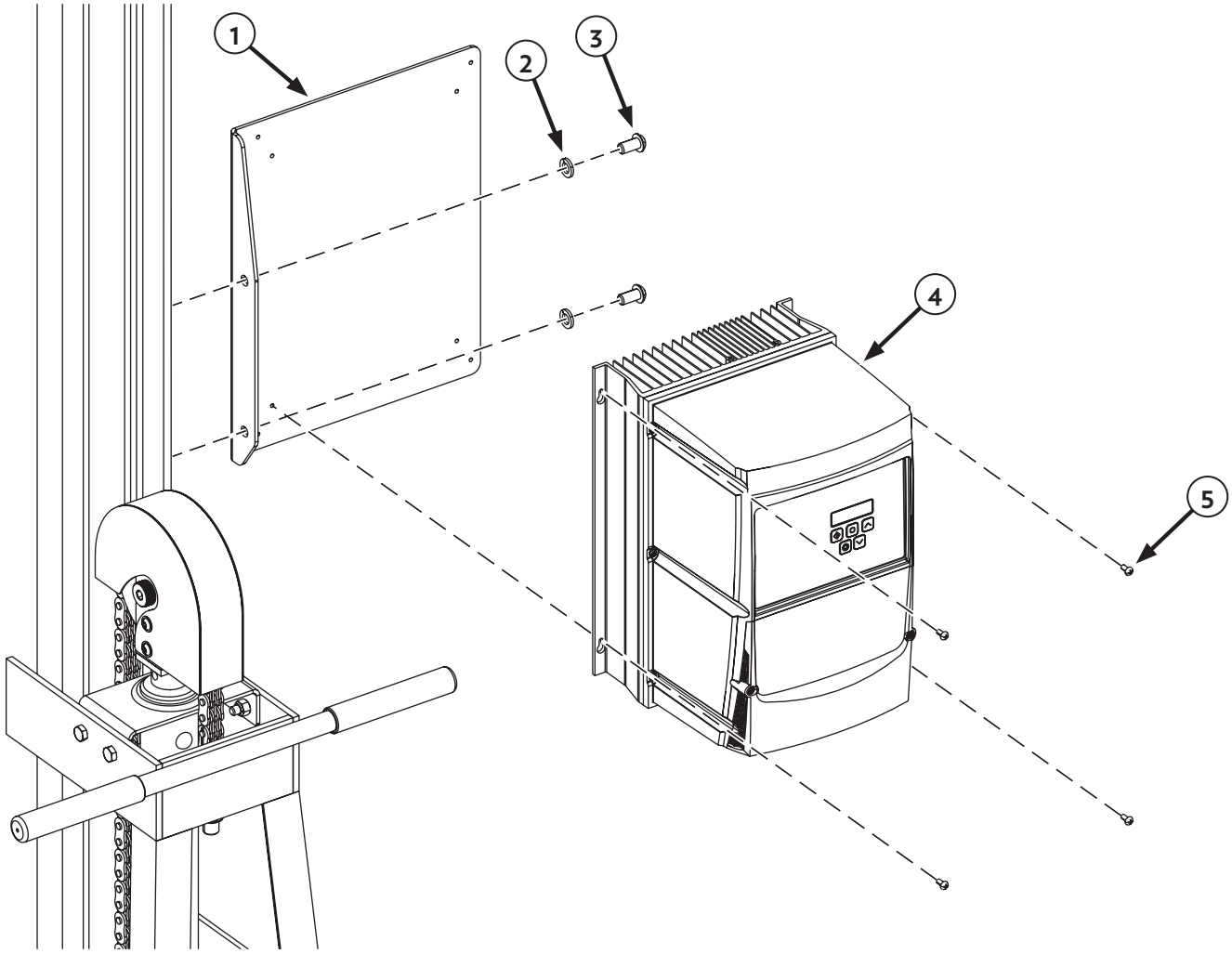


Figure 10. VFD to Heavy-Duty Lift Stand

NOTICE

Prevent damage to components and ensure that proper hardware is being used. Incorrect hardware could cause contact with the lift shuttle and inhibit operation. Verify that the bolts do not cause interference before operation.

1. Install the VFD mounting plate (1) to the side of the HDLS tower using two lock washers (2) and two cap screws (3). Tighten the cap screws to specification. See "Torque Specifications" on page 36.
2. Secure the VFD speed controller (4) to the VFD mounting plate with four screws (5).
3. Any wiring secured to the mixer stand should use a suitable locking connector to allow removal of the mixer for service or if multiple mixers are used with one stand. Mixer wiring should be done in a manner to allow the full stroke of the lift without putting unnecessary tension on the wire/cord. For additional information on electrical connections, see "Wiring/Electrical" on page 17.

Wiring/Electrical

⚠ WARNING

ELECTRICAL SHOCK HAZARD!
When working with high-voltage equipment, always de-energize unit before servicing. Failure to follow this instruction may result in serious injury.

⚠ WARNING

AVOID POSSIBLE INJURY, ROTATING PARTS!
Please make sure to keep your hands, hair, jewelry, and loose clothing away from rotating parts to avoid any injuries. Disconnect the motor from the air line before any adjustment operation. If you fail to do so, it may result in serious injury.

NOTICE

It is important to note that all electrical work must be completed by a licensed electrician. We strongly advise against performing such work without the appropriate qualifications and training, as it can pose a serious risk to both the individuals involved and the property being serviced. Therefore, it is recommended that qualified electricians be contacted and utilized for any electrical work required.

NOTICE

All electric motors should be in accordance with National Electrical Code (NEC) NEMA along with local codes.
All grounding should be in accordance with National Electrical Code (NEC) Article 430.

It is important for installers to be aware of all the electrical codes and safety standards. To make maintenance and servicing easier, MXD Process suggests having an electrical disconnect switch or circuit breaker for each mixer unit to de-energize the power. All motors and VFDs must be wired according to the provided wiring diagrams for ease of de-energizing electrical power during maintenance and servicing.

It is imperative to verify the appropriate shaft rotation after wiring. When viewed from above, the impeller's rotation direction should be clockwise. Should a counterclockwise rotation be observed, it is critical to adhere to all relevant electrical codes and safety standards, as well as to de-energize power and secure the unit before adjusting the wiring. To reverse the unit's operation for 3-phase motors, including all mixers with VFDs, swap any two line wires (L1, L2, or L3) according to the wiring diagram on the motor. For 1-phase motors, refer to the motor nameplate wiring diagram to determine which wires should be swapped (usually T5 and T8).

NOTE: *Please refer to the wiring diagram attached to the motor for proper connection and reversing instructions.*

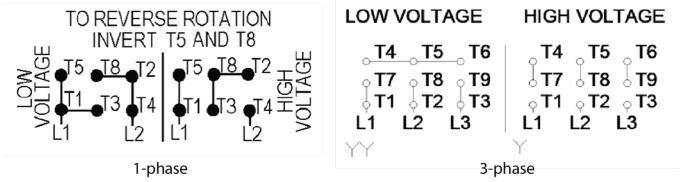


Figure 11. Typical NEMA Wiring Diagrams

(Optional) Variable-Frequency Drive (VFD) Wiring

VFDs are usually shipped without wiring. When wiring, it is important to follow the VFD speed controller manual included in the package. For your convenience, the speed controllers are unboxed and pre-programmed by MXD Process. Please contact MXD Process if you need a digital copy of the VFD Manual or refer to the Invertek website (www.invertekdrives.com).

Startup and Operation

NOTICE

Please be advised that damages incurred to the mixer or vessel due to improper mounting practices are not covered by the warranty. Kindly ensure that appropriate measures are taken to avoid any such instances.

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, overloading, ineffective mixing of contents, and could potentially cause the rotor to come loose and cause damage. The rotor and stator used on the mixer are selected according to the horsepower of the mixer. To avoid damage to the rotor and stator, it is recommended to operate the mixer in the reverse direction only intermittently.

General Operation Principles

Mixer Operation

NOTICE

It is important to remember that a mixer should never be operated without an impeller. Similarly, an impeller should never be operated outside of a container. Following these guidelines will help ensure safe and proper use of the equipment.

It is crucial to ensure that the mixer is securely fastened to a suitable mounting location (mixer stand) before attempting to operate it. It is recommended to only operate the mixer at speeds outlined in the document or pre-programmed in the optional Variable-Frequency Drive (VFD).

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.

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 1/6–1/4 of the vessel diameter away from the center of the vessel. A 1/6 distance will provide a very intense vortex, whereas a 1/4 distance 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 then given time to stabilize. Contrary to conventual 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.

These mixers are also not designed for outdoor use and are not rated for extreme temperatures, whether hot or cold. It is recommended to maintain normal operating temperatures between 14°—104°F (-10°—40°C) to ensure optimal performance.

To ensure the mixer's longevity and efficiency, it is essential to keep the motor free of foreign debris, including but not limited to oil, dust, dirt, water, or chemicals. Protect the air intakes and outputs from any foreign material that may cause blockages or damage the equipment.

Furthermore, it is important to follow the manufacturer's recommendations for maintenance and cleaning to ensure that the equipment is in good working condition. Regular inspections and maintenance will help prevent equipment failure, reduce downtime, and extend the life of the equipment.

Economy Hoist Stand (EHS) Operation

Raising the Lift

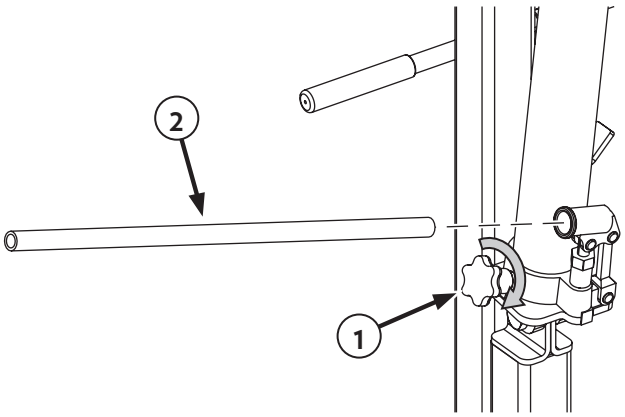


Figure 12. EHS Cylinder and Release Knob

1. Turn the release knob (1) clockwise until it is firmly closed.
2. Insert the handle (2) into the pump and pump the handle up and down to raise the lift.

   NOTE: *For the optional air powered ram, an air line may be connected to the valve and the lever depressed to raise the lift instead of using the pump handle.*
3. Remove the handle from the pump and store when not in use.

Lowering the Lift

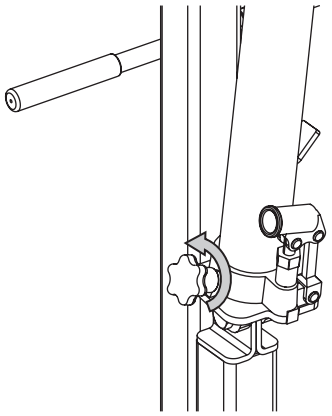


Figure 13. EHS Release Knob

1. Turn the release knob counterclockwise slowly to lower the lift. Lowering speed is determined by how much the knob is rotated.
2. Once the lift is in the desired position, turn the release knob clockwise again until it is firmly closed.

Heavy-Duty Lift Stand (HDLS) Operation

Raising the Lift

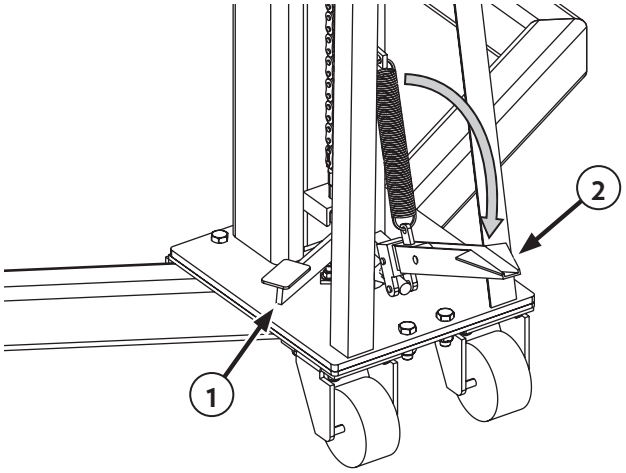


Figure 14. HDLS Pedals

1. Ensure that the release pedal (1) is not depressed.
2. Unfold the lift pedal (2).
3. Pump the lift pedal to raise the lift. One full pump should raise the lift approximately 1 in.
4. Fold the lift pedal to prevent accidental actuation once the lift is in the desired position.

Lowering the Lift

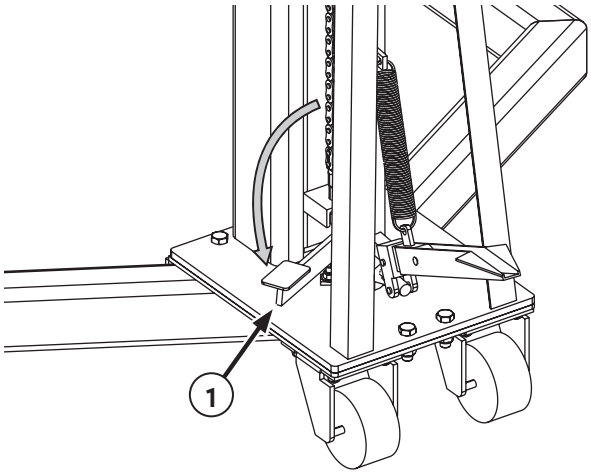


Figure 15. HDLS Pedals

1. Unfold the release pedal (1).
2. Depress the release pedal slowly to lower the lift.
3. Once the lift is in the desired position, lift and fold up the release pedal to prevent accidental actuation.

Startup and Operation Checklist

- Ensure that the manual has been read and the instructions have been followed.
- The shaft rotation must be clockwise when looking down at the mixer.
- Do not handle the mixer by the shaft. Lifting and handling the mixer by the shaft will cause damage.
- The equipment should be kept in an appropriate environment.
- The rotor and stator should be installed correctly.
- Make sure that the mounting rotor and stator bolts are tightened to the proper torque.
- Check the straightness of the shaft by slowly rotating by hand before operating in fluid.
- The mixer support should be sufficient for the mixer application.
- Check if the wiring is correctly installed, grounded, and insulated.
- Fluid level must be a minimum of the equivalent to 1.5 diameter of the mixing head above the mixing head for proper mixing.

Maintenance

It is highly recommended to perform regular maintenance on industrial equipment to ensure its longevity and optimal functionality. In order to achieve this, it is essential to inspect and lubricate the equipment at regular intervals. How often various components should be inspected and serviced will depend on operating environment and process conditions. Prior to conducting any maintenance or wiring procedures on electrical equipment, it is imperative to de-energize all power and lock it out to prevent any potential hazards.

To maintain your mixer, follow these guidelines:

- Maintain a clean mixer to prevent the accumulation of debris or residue.
- Regularly inspect all wiring and repair any issues promptly to avoid further damage or hazards.
- Check all fasteners and set screws periodically to ensure their tightness to prevent loosening during operation.

Cleaning

To ensure a long service life, it is important to keep the equipment clean. Use a mild cleaning solution to wipe down the mixer, stand, and cylinder to keep dirt, grime, and contaminates out of the motor, cylinder, pivot points, and off of moving surfaces. If equipped with a HDLS, grease that becomes dirty on the leaf chain, pulley, and rollers should be cleaned off and re-greased.

Lubrication

Mixer

Most 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.

Economy Hoist Stand (EHS)

All pivot points on your Economy Hoist Stand use lubrication free bearings designed for a long worry-free service life without additional lubrication.

Heavy-Duty Lift Stand (HDLS)

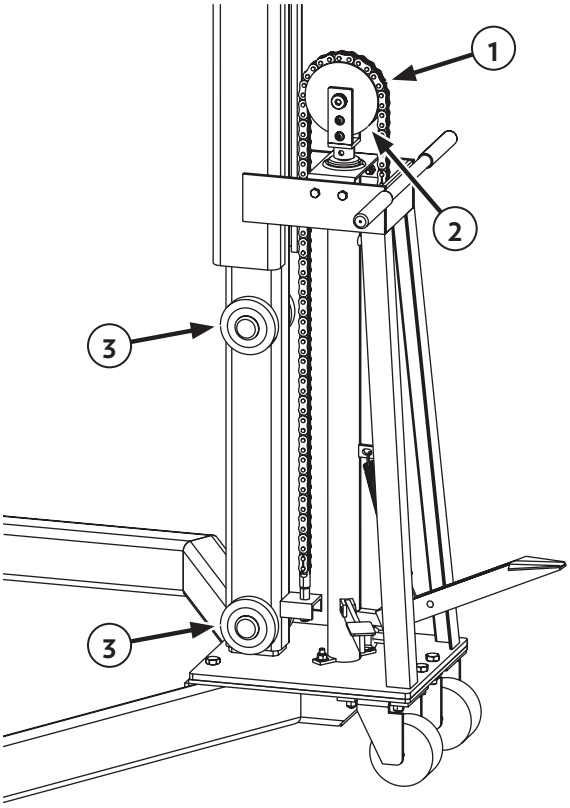


Figure 16. HDLS Grease Points

The leaf chain (1), pulley (2), and shuttle rollers (3) should be kept coated in a quality grease to ensure a long service life and prevent rust. Lightly coat all the running surfaces and cycle the lift through its full operating range a few times to ensure that the grease is well distributed. Remove any excess grease. If the grease becomes contaminated, performance of the unit will degrade and it could become damaged. Dirty grease should be cleaned off and replaced.

Mixer 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 a wear item in some aggressive or abrasive applications. For removal and installation information, see "Shaft Installation" on page 13 and "Rotor and Stator Installation" on page 14.

Seal Replacement

Batch Rotor Stator Mixers use a ball bearing in the stator head flange. This bearing is protected from the mixing process via two 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:

1. Remove the rotor, stator, and shaft. See "Rotor and Stator Installation" on page 14 and "Shaft Installation" on page 13.

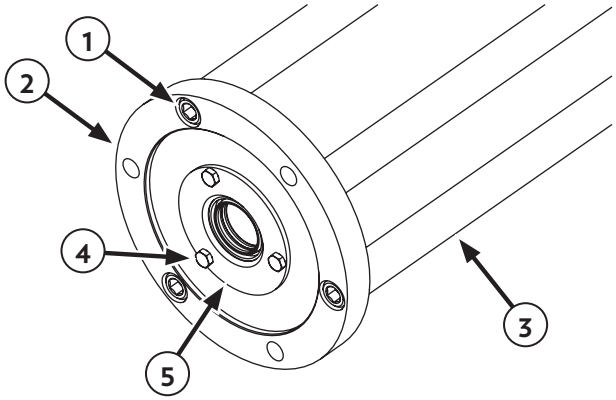


Figure 17. Head Bearing Assembly

2. Remove the three socket head bolts (1) and the head bearing assembly (2) from the support shafts (3).
3. Remove the three hex head bolts (4) and the retainer (5) from the head flange.

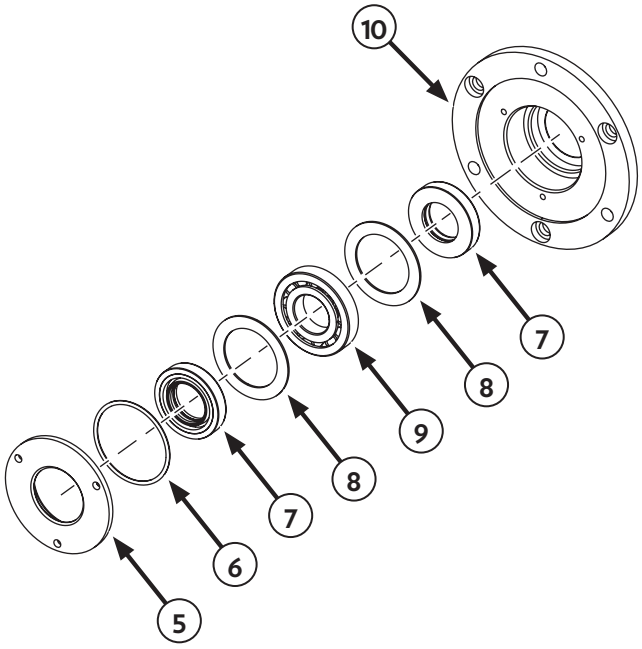


Figure 18. Head Bearing Assembly (exploded view)

(5) Retainer
(6) O-Ring
(7) Seal (2 used)
(8) Spacer (2 used)
(9) Bearing
(10) Head Flange

NOTICE

Take care not to damage any components that are to be re-used such as spacers or the retainer.

4. The components in the head bearing assembly are pressed into the head flange (10) from the bottom. With the retainer removed, press the components out from the head flange.
5. Replace the O-ring (6) and seals (7).
6. Press the head bearing assembly components (6–9) into the head flange as shown.
7. Install the retainer to the head flange and the head bearing assembly to the support shafts. Tighten fasteners to specification. See "Torque Specifications" on page 36.

Bearing Replacement

Batch Rotor Stator Mixers use a ceramic ball bearing in the head bearing assembly. 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 "Seal Replacement" instructions and replace the bearing. It is recommended to replace the seals as well when a bearing is being removed or replaced.

Purge Air From the EHS Cylinder

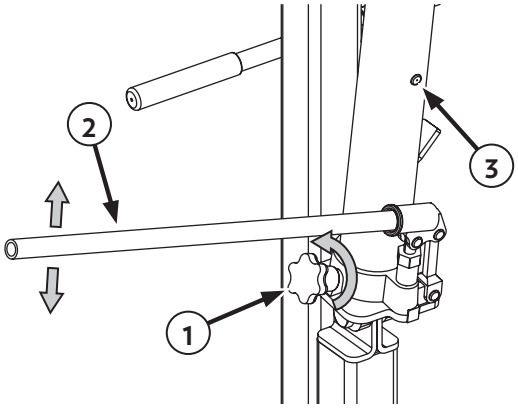


Figure 19. EHS Cylinder

1. Turn the release knob (1) counterclockwise one full turn.
2. Rapidly pump the handle (2) 6–8 times and leave the handle in the down position.

NOTICE

Take care not to damage the oil fill plug (3) when purging trapped air.

3. With a flat blade screwdriver, push the oil fill plug (3) slightly to the side to purge any trapped air.
4. Turn the release knob clockwise to the closed position.

Add Oil to the EHS Cylinder

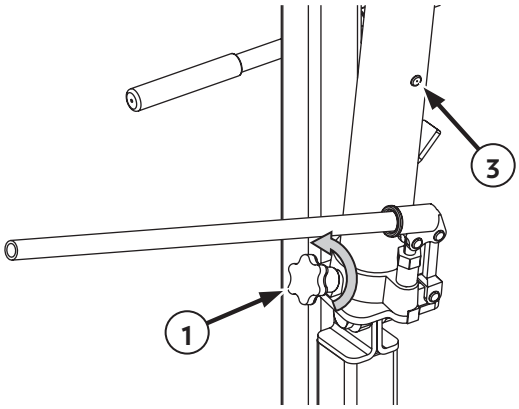


Figure 20. EHS Cylinder

NOTICE

Only use anti-foaming hydraulic jack oil to prevent damage to the cylinder.

1. Turn the release knob (1) counterclockwise to lower the lift to the lowest position.
2. Remove the oil plug (3) and fill the oil case until the level is just below the lower rim of the oil fill hole.
3. Replace the oil plug and perform the purge air procedure.

Purge Air From the HDLS Cylinder

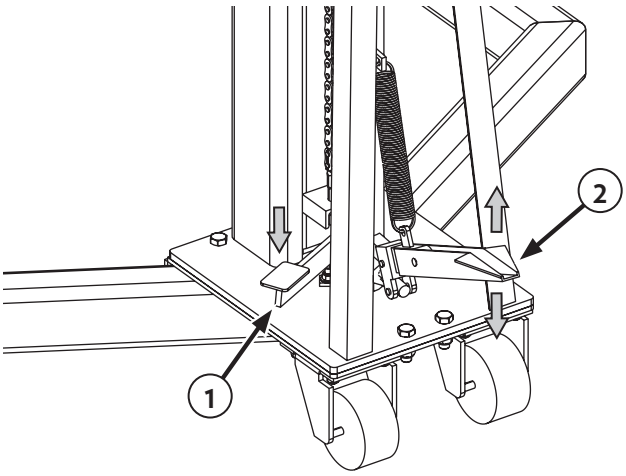


Figure 21. HDLS Pedals

1. Depress and hold the release pedal (1) in the down position.
2. While holding the release pedal down, cycle the lift pedal (2) 8–12 times at a moderate cycle speed.
3. Allow the release pedal to return to its normal position.

Shaft Runout Check

⚠ CAUTION

AVOID DAMAGE!
It is strongly advised to abstain from utilizing heat or an open flame for the purpose of straightening the shaft. Such an approach is likely to result in irreparable distortions that may render the shaft unusable.

Ensuring that the mixing shaft is straight is crucial to prevent excessive vibrations and extend lifespan of the mixer. The runout of the mixing shaft should not exceed 0.002 in. Total Indicated Runout (TIR) per foot. Refer to the diagrams provided to straighten the shaft as necessary.

ATTENTION: *TOLERANCE = 0.002 in. RUNOUT PER FT*

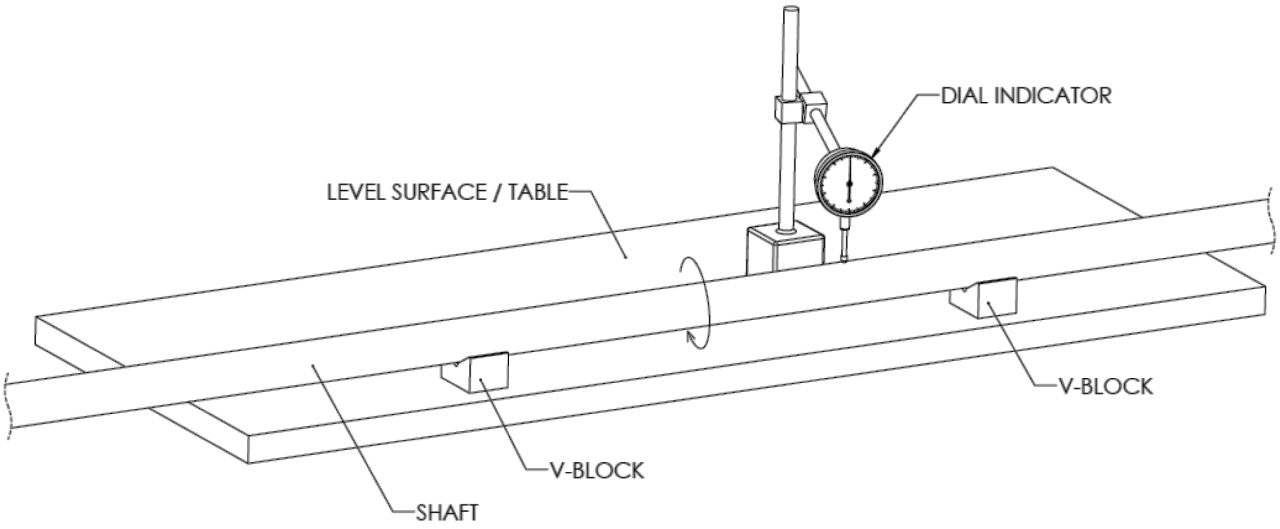


Figure 22.

1. Verify runout does not exceed 0.002 in. by rotating the shaft and observing the dial indicator.

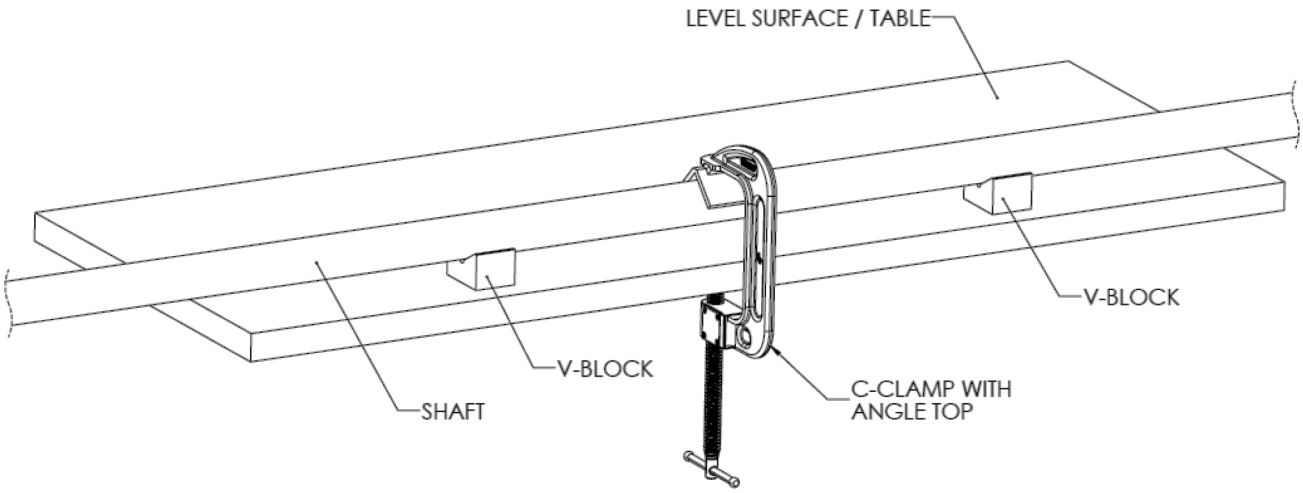


Figure 23.

2. If the shaft runout exceeds specifications, gently apply force to high spots using a C-clamp to bring the shaft within tolerance.

Troubleshooting Guide

Table 1.

PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
Mixer Troubleshooting		
Incorrect mixer rotation	Incorrect wiring to motor	Swap any two line wires to reverse rotation. Refer to Motor Wiring section for help.
Shaft will not seat fully	Damaged shaft	Repair or replace shaft.
Mixer will not start	Blown fuse or tripped circuit breaker	Replace fuse or reset circuit breaker.
	Loose connections	Tighten connections.
	Incorrect wiring	Check wiring diagram and wire correctly.
	Impeller interference	Free all debris from the rotor.
	Damage to motor	Service or replace motor (consult factory).
	VFD malfunction	Refer to VFD Manual.
Mixer will not reach correct speed	Overload of motor	Check amperage against nameplate data.
	VFD malfunction	Refer to VFD Manual.
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	Impeller not immersed in liquid	Fill tank.
	Bent mixer shaft	Replace shaft. Consult factory.
	Loose mixer head components	Inspect hardware and alignment of head.
	Damaged or worn bearings	See "Bearing Replacement" on page 21.
	Damaged rotor or stator	Inspect and replace rotor or stator. See "Rotor and Stator Installation" on page 14.
	Debris on/in rotor or stator	Check and clean rotor and stator.
	Operating at critical speed	Decrease or increase speed until vibration is reduced.
EHS Troubleshooting		
Stand will not raise	Release knob is not completely closed	Tun the knob clockwise until closed.
	Air is trapped in the cylinder	Perform the purge air procedure. See "Purge Air From the EHS Cylinder" on page 22.
	Low oil level	Add oil. See "Add Oil to the EHS Cylinder" on page 22.
	Pump is damaged	Replace cylinder.
Stand will not stay in position	Release knob is not completely closed	Tun the knob clockwise until closed.
	Low oil level	Add oil. See "Add Oil to the EHS Cylinder" on page 22.
	Leaking cylinder seals	Replace cylinder.
Stand will not lower	Overfull oil reservoir	Drain the extra oil.
	Stand is bound	Inspect for damage.
	Foreign object obstruction	Clear the lowering path.
Stand will not fully raise	Low oil level	Add oil. See "Add Oil to the EHS Cylinder" on page 22.

PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
Stand is hard to move	Flat spots on caster(s)	Inspect and replace caster(s).
	Worn bearing(s) on caster(s)	
	Damaged casters(s)	
	Foreign object obstruction	Clear the pathway.
HDLS Troubleshooting		
Stand will not raise	Release pedal is depressed	Raise the release pedal.
	Air is trapped in cylinder	Perform the purge air procedure. See "Purge Air From the HDLS Cylinder" on page 22.
	Foreign object obstruction	Clear obstructions.
	Low oil level	Add oil.
	Pump is damaged	Replace cylinder.
Stand will not stay in position	Release pedal is depressed	Raise the release pedal.
	Low oil level	Add oil.
	Leaking cylinder seals	Replace cylinder.
Stand will not lower	Overfull oil reservoir	Drain the extra oil.
	Lift is bound	Inspect for damage.
	Foreign object obstruction	Clear the lowering path.
Stand will not raise fully	Low oil level	Add oil.
Stand is hard to move	Flat spots on caster(s)	Inspect and replace caster(s).
	Worn bearing(s) on caster(s)	
	Damaged casters(s)	
	Foreign object obstruction	Clear the pathway.

Diagrams and Spare Parts

Batch Rotor Stator Mixer

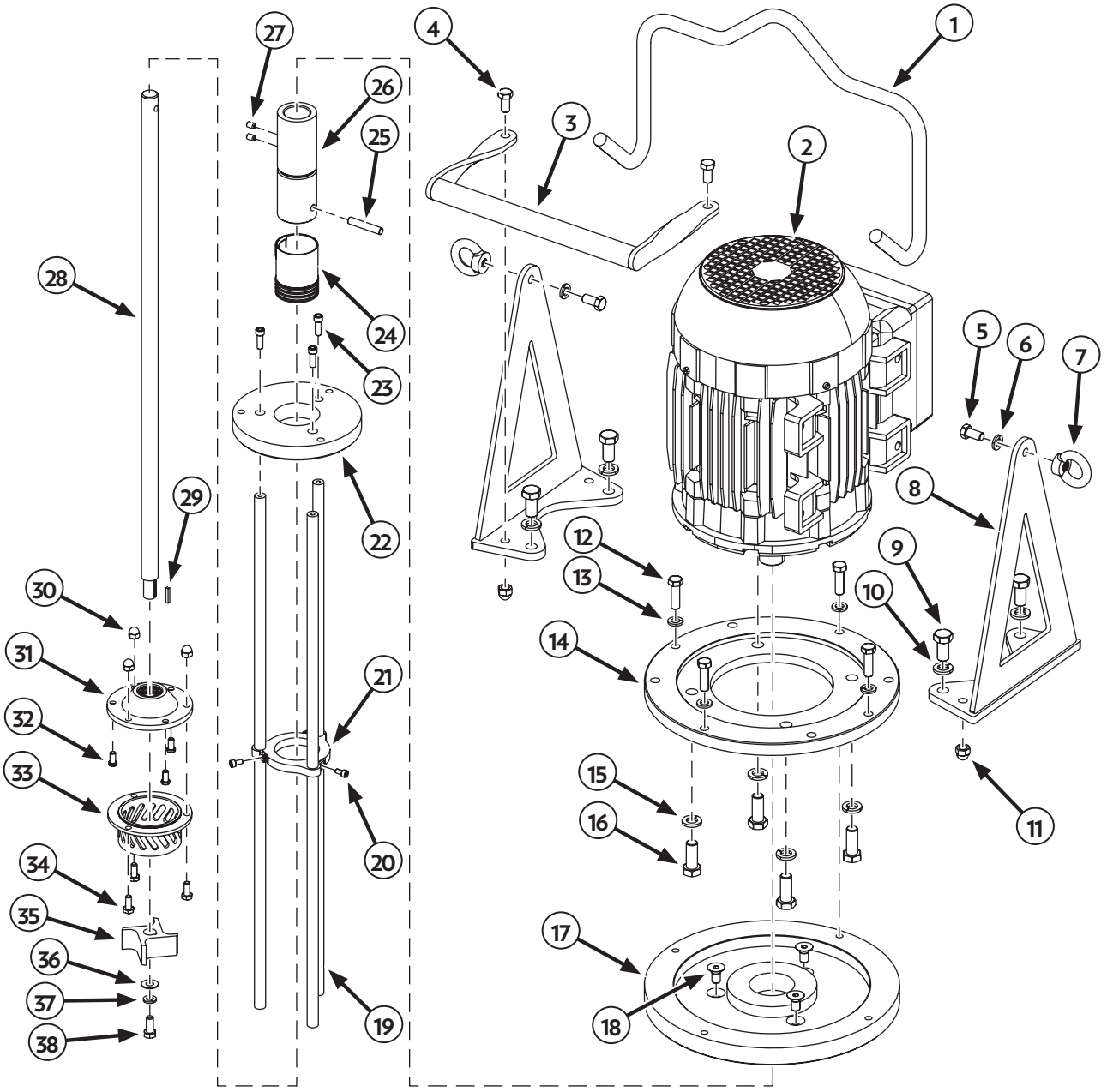


Figure 24. Batch Rotor Stator Mixer

Table 2. Batch Rotor Stator Mixer Parts

ITEM	QTY	DESCRIPTION
1.	1	Hanger Rod
2.	1	Motor
3.	1	Handle
4.	2	Hex Bolt
5.	2	Hex Bolt
6.	2	Lock Washer
7.	2	Mounting Rings
8.	2	Hanging Bracket

ITEM	QTY	DESCRIPTION
9.	4	Hex Bolt
10.	4	Lock Washer
11.	2	Acorn Nut
12.	4	Hex Bolt
13.	4	Lock Washer
14.	1	Motor Flange
15.	4	Lock Washer
16.	4	Hex Bolt

ITEM	QTY	DESCRIPTION
17.	1	Lower Body Flange
18.	3	Flat Socket Head Bolt
19.	3	Support Shaft
20.	3	Socket Head Bolt
21.	1	Mid Support Clamp
22.	1	Support Shaft Adapter Plate (2.5 in. 180TC assembly only)
23.	3	Socket Head Bolt (2.5 in. 180TC assembly only)
24.	1	Coupling Sleeve
25.	1	Coupling Pin
26.	1	Coupling
27.	2	Set Screw

ITEM	QTY	DESCRIPTION
28.	1	Shaft
29.	1	Key
30.	3	Acorn Nut
31.	1	Head Bearing Assembly
32.	3	Socket Head Bolt
33.	1	Stator
34.	3	Hex Bolt
35.	1	Rotor
36.	1	Flat Washer
37.	1	Lock Washer
38	1	Hex Bolt

Economy Hoist Stand

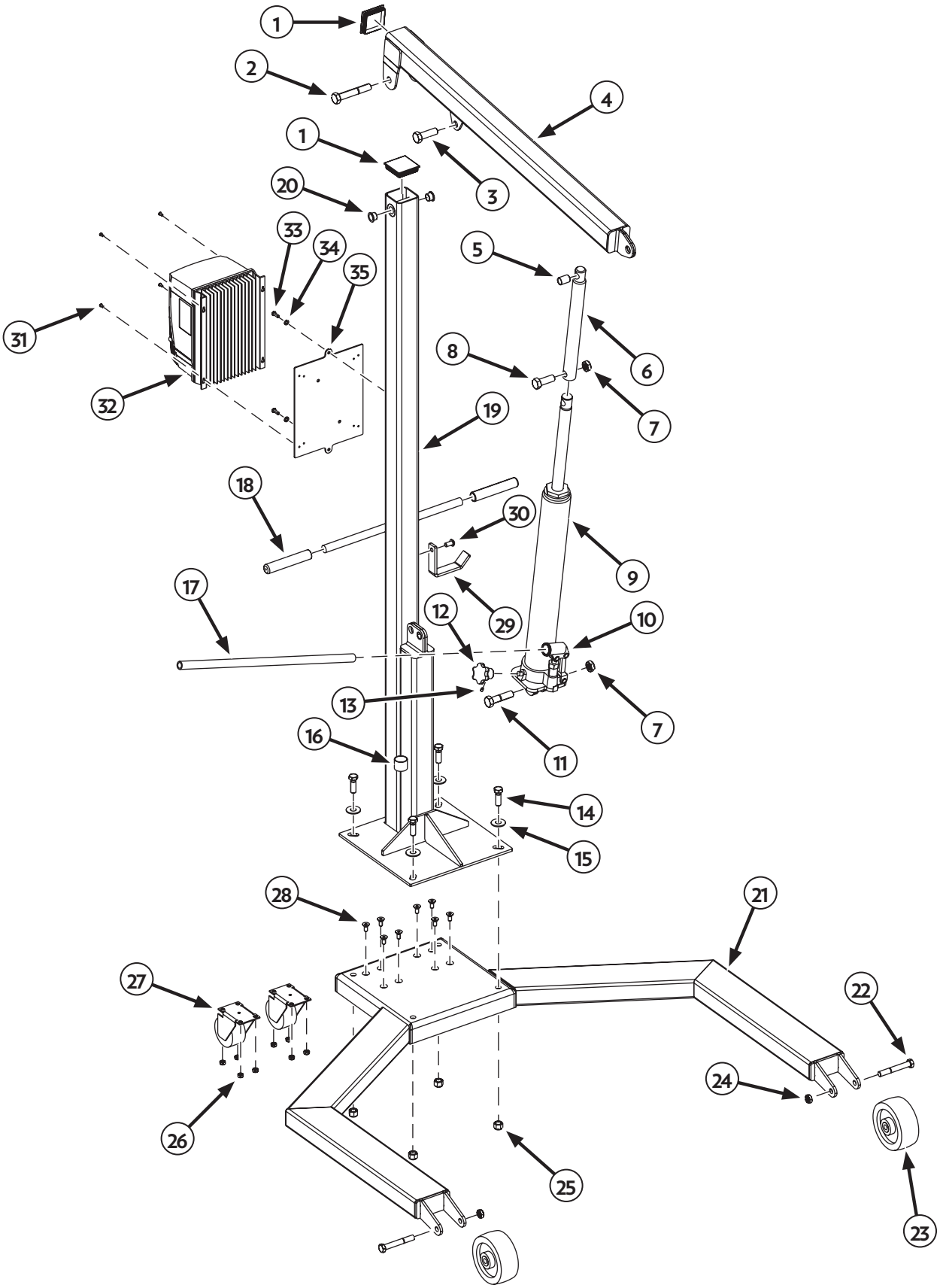


Figure 25. Economy Hoist Stand

Table 3. EHS Parts

ITEM	QTY	DESCRIPTION
1.	2	Square Tube Plug
2.	1	Hex Bolt
3.	1	Hex Bolt
4.	1	Hoist Arm
5.	1	Sleeve Bearing
6.	1	Ram Extension
7.	2	Nylon Lock Nut
8.	1	Hex Bolt
9.	1	Lift Cylinder
10.	1	Cylinder Pump
11.	1	Hex Bolt
12.	1	Release Knob
13.	1	Set Screw
14.	4	Hex Bolt
15.	4	Flat Washer
16.	1	Cylinder Pump Handle Storage
17.	1	Pump Handle
18.	2	Maneuvering Handle Grip
19.	1	Hoist Tower
20.	2	Sleeve Bearing
21.	1	Hoist Base
22.	2	Hex Bolt
23.	2	Caster Wheel
24.	2	Nylon Lock Nut
25.	4	Nylon Lock Nut
26.	8	Nylon Lock Nut
27.	2	Locking Swivel Caster Wheel
28.	8	Flat Socket Head Bolt
29.	1	Cord Hanger
30.	1	Socket Head Screw
31.	4	Screw
32.	1	Variable-Frequency Drive (VFD)
33.	2	Socket Head Screw
34.	2	Lock Washer
35.	1	VFD Mount Plate
36.	1	Optional Variable Frequency Assembly (31–35)

Heavy-Duty Lift Stand

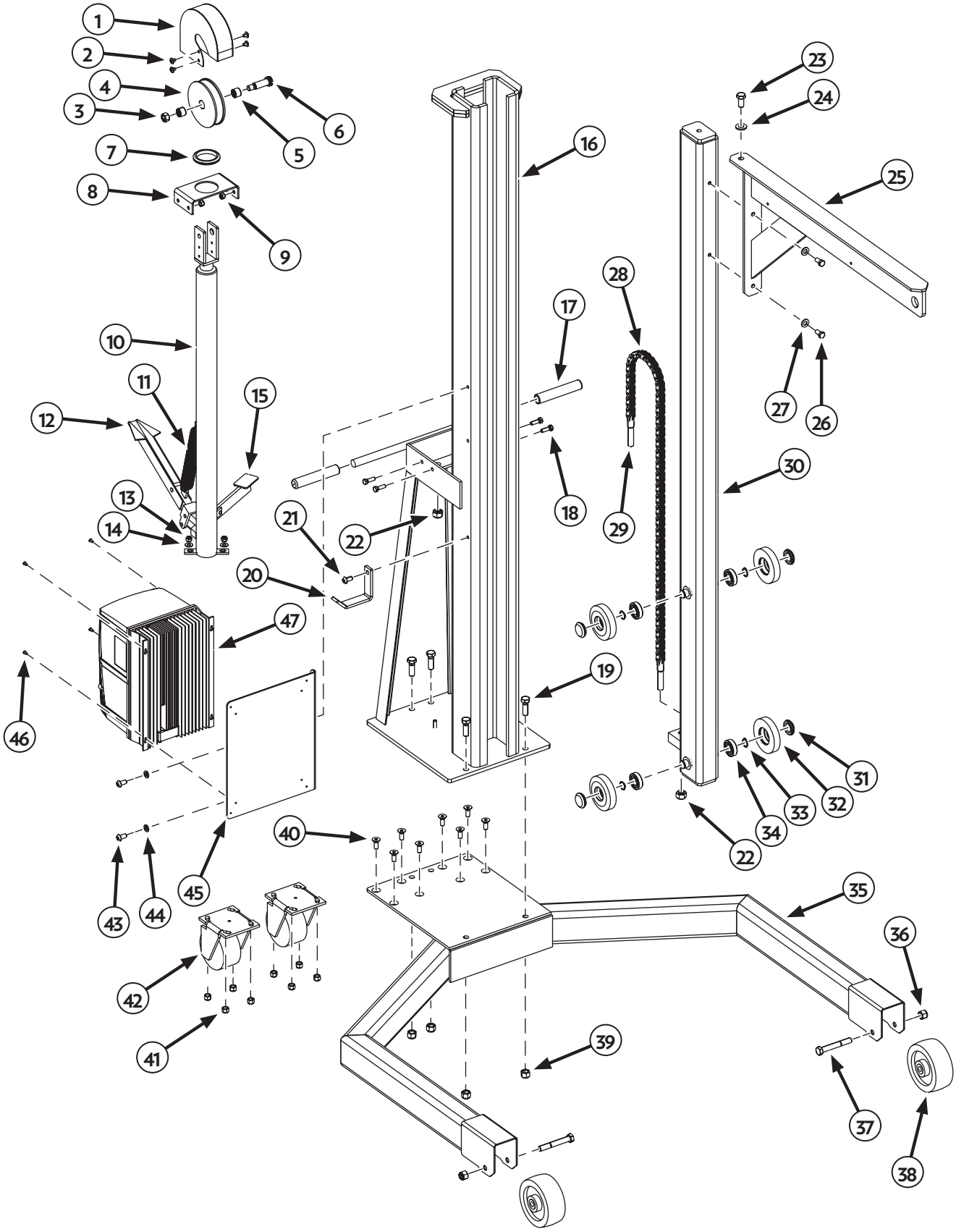


Figure 26. Heavy-Duty Lift Stand

Table 4. HDLS Parts

ITEM	QTY	DESCRIPTION
1.	1	Pulley Cover
2.	4	Socket Head Screw
3.	1	Hex Nut
4.	1	Lift Pulley
5.	2	Needle Roller Bearing
6.	1	Shoulder Bolt
7.	1	Grommet
8.	1	Cylinder Upper Support Plate
9.	4	Nylon Lock Nut
10.	1	Lift Cylinder
11.	1	Spring
12.	1	Folding Lift Pedal
13.	2	Nylon Lock Nut
14.	2	Flat Washer
15.	1	Folding Release Pedal
16.	1	Lift Tower
17.	2	Maneuvering Handle Grip
18.	4	Hex Bolt
19.	4	Hex Bolt
20.	1	Cord Hanger
21.	1	Socket Head Screw
22.	2	Nylon Lock Nut
23.	1	Hex Bolt
24.	1	Flat Washer
25.	1	Lift Arm
26.	2	Hex Bolt
27.	2	Flat Washer
28.	1	Leaf Chain
29.	2	Leaf Chain Anchor Bolt
30.	1	Shuttle Weldment
31.	4	Roller Slider Cap
32.	4	Roller Wheel
33.	4	Retaining Ring
34.	4	Roller Bearing
35.	1	Lift Base
36.	2	Nylon Lock Nut
37.	2	Hex Bolt
38.	2	Caster Wheel
39.	4	Nylon Lock Nut
40.	8	Flat Socket Head Bolt
41.	8	Nylon Lock Nut
42.	2	Locking Swivel Caster Wheel
43.	2	Socket Head Screw
44.	2	Lock Washer
45.	1	VFD Mount Plate
46.	4	Screw
47.	1	Variable-Frequency Drive (VFD)
48.	1	Optional Variable Frequency Assembly (43–47)

Batch Rotor Stator Mixer General Dimensions

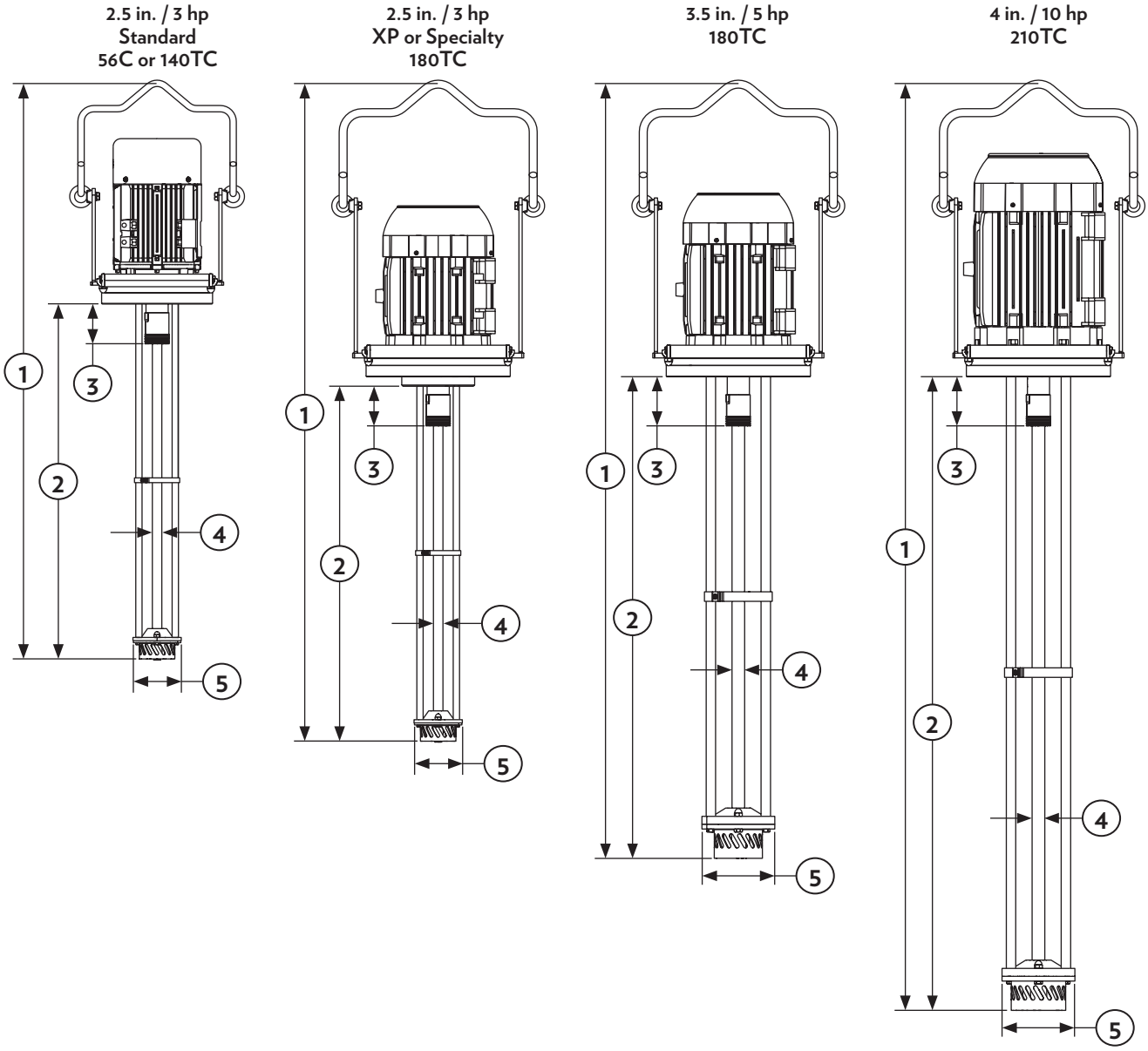


Figure 27. Batch Rotor Stator Mixer Dimensions

Table 5. Mixer Dimensions

	2.5 in. / 3 hp Standard 56C or 140TC	2.5 in. / 3 hp XP or Specialty 180TC	3.5 in. / 5 hp 180TC	4 in. / 10 hp 210TC
1.	45 1/8 in.	51 5/8 in.	60 7/8 in.	72 7/8 in.
2.	28 in. shown 36 in. max	28 in. shown 36 in. max	38 in. shown 56 in. max	50 in. shown 56 in. max
3.	3 1/8 in.	3 1/8 in.	3 7/8 in.	3 7/8 in.
4.	Ø 3/4 in.	Ø 3/4 in.	Ø 1 in.	Ø 1 in.
5.	Ø 3 13/16 in.	Ø 3 13/16 in.	Ø 5 3/4 in.	Ø 5 3/4 in.

**All dimensions are in inches unless specified otherwise.*

Economy Hoist Stand General Dimensions

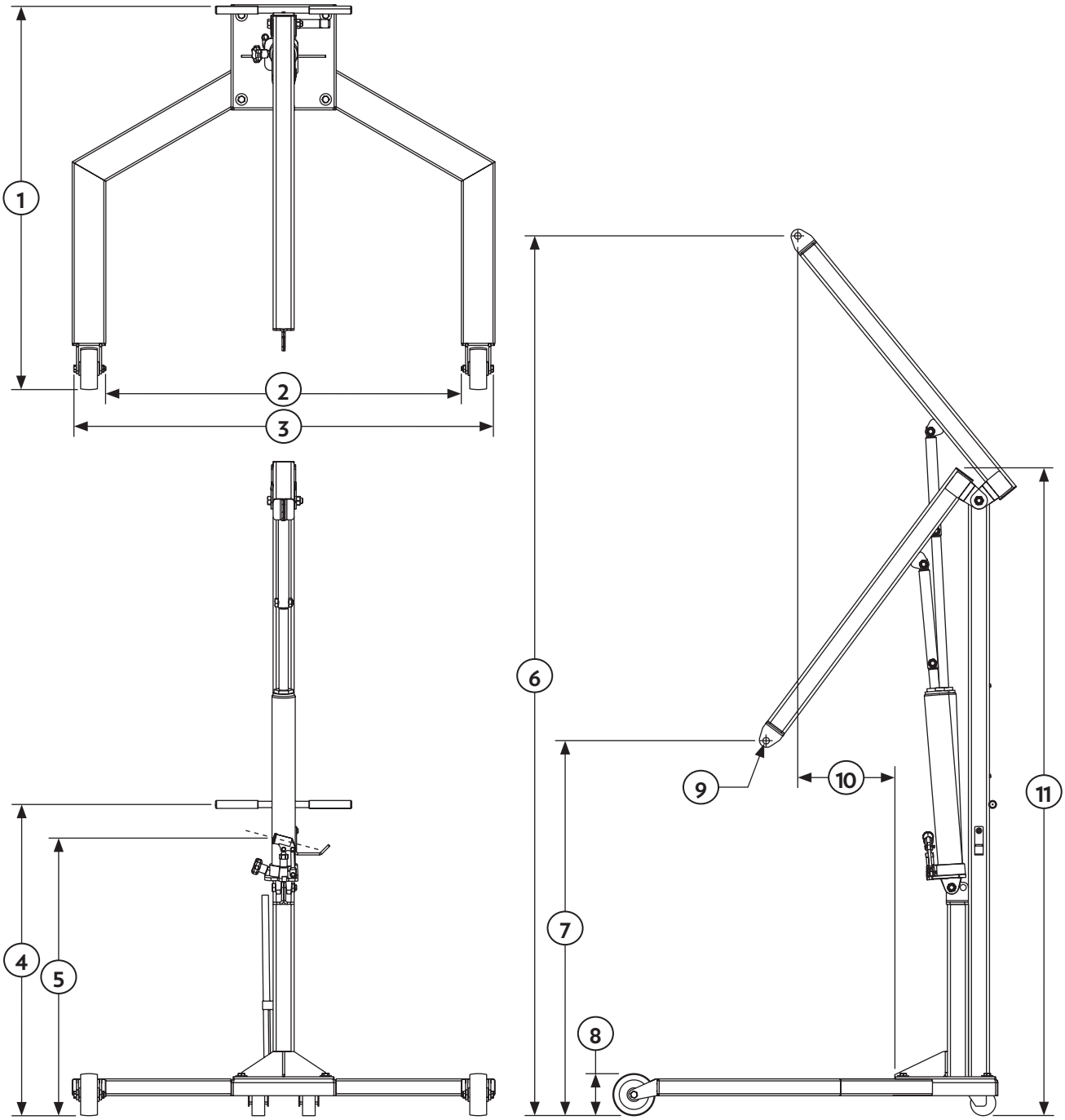


Figure 28. EHS Dimensions

Table 6. EHS Dimensions

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
45 5/8 in.	42 1/4 in.	50 1/4 in.	37 in.	33 in.	104 1/2 in.	45 1/2 in.	Ø 5 in.	Ø 3/4 in.	11 in.	77 in.

Heavy-Duty Lift Stand General Dimensions

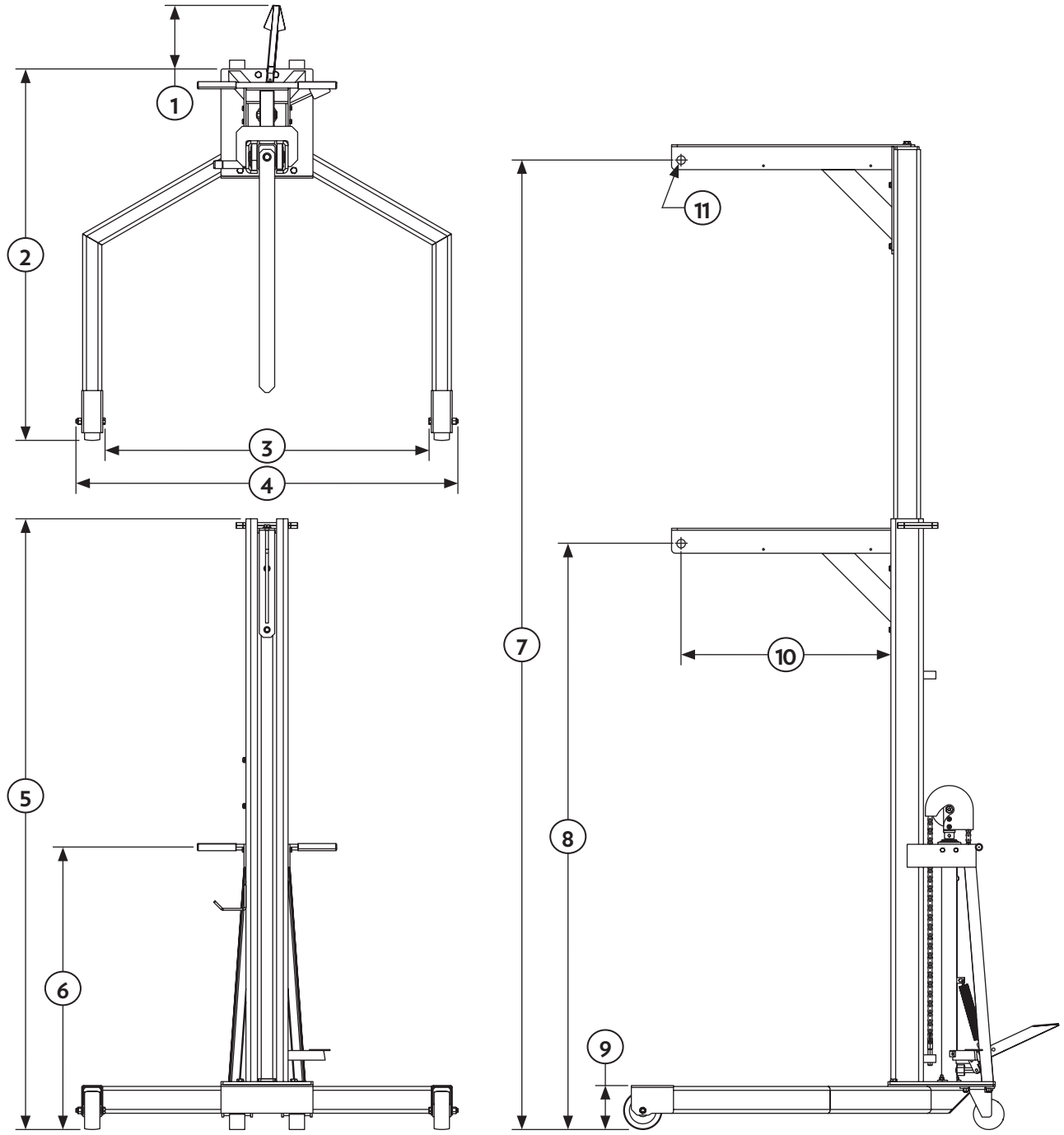


Figure 29. HDLS Dimensions with Standard Arm

Table 7. HDLS Dimensions

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
8 3/8 in. Folding	48 1/2 in.	42 1/4 in.	49 7/8 in.	79 3/4 in.	37 in.	127 in.	77 in.	5 3/4 in.	27 in.	Ø 1 1/8 in.

Batch Rotor Stator Mixer Part Number Breakdown

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

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

Example: BRS025030-A28
BRS035050S-S38

Torque Specifications

NOTE: *All values are for coarse thread lubricated fasteners.*

Table 8. Cap Screw and Screw Torque Values

	Nominal Size	SAE J429 Grade 5	SAE J429 Grade 8	ASTM A574 SHCS	ASTM F593 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
FOOT LBS	3/8	23	32	36	19
	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	1,086	346
	1-1/4	965	1,363	1,533	545

Table 9. 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

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