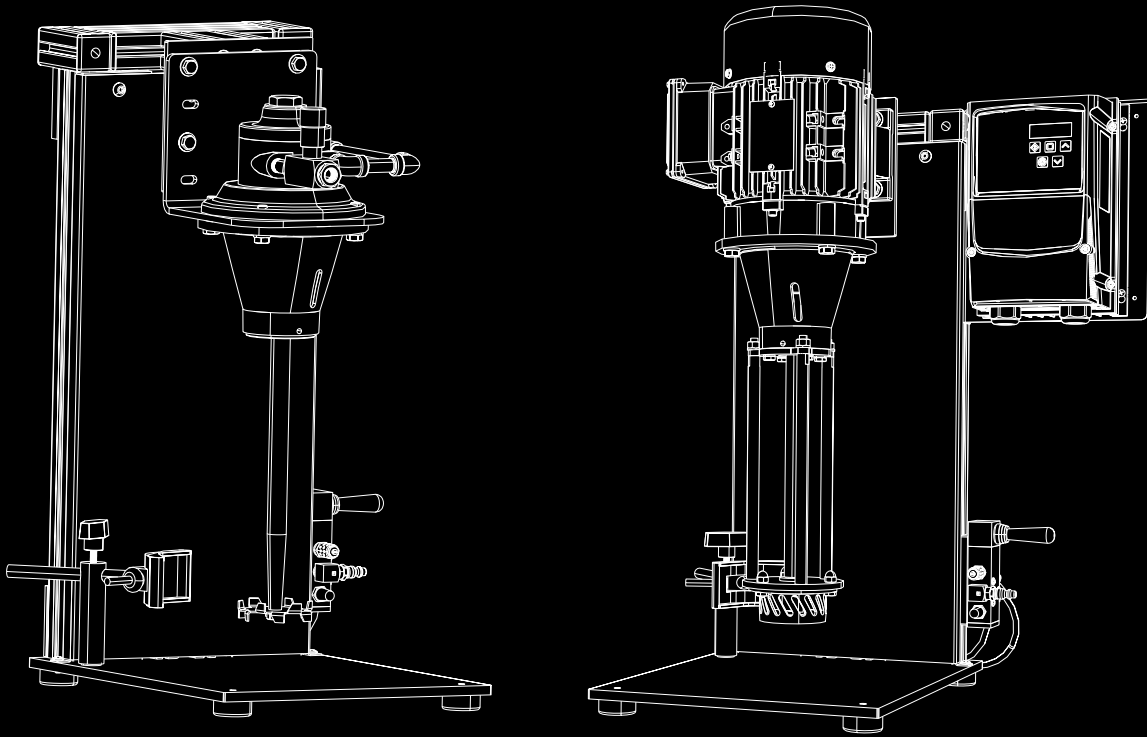


# Benchtop Dispenser and Rotor Stator Mixer Manual



## Installation, Operation, & Maintenance for Benchtop Dispenser and Rotor Stator Mixer Manual



**Every Process We Touch, We Improve**

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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 work-space 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, 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.

## Pneumatic Motor Safety

When utilizing pneumatic motors, it is imperative to exercise caution and implement necessary safety measures, despite their lower risk profile in comparison to electric motors in relation to overheating or explosion.

**⚠ DANGER**

**AVOID POSSIBLE EXPLOSION**

Never operate this unit with explosive gases or allow corrosive gases into the motor. The air motor is designed for air only. Filter out all water vapor, oil-based contaminants, or any other liquids before use. Failure to follow this instruction may result in serious injury or death.

**⚠ 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**

Use only the approved lubrication for your pneumatic motor to ensure optimal function. Failure to do so may result in malfunction or complete failure of the motor.



## Introduction

Congratulations on your purchase of the MXD Process Post Mount Disperser (DP1) or Post Mount Rotor Stator (RP1). This manual provides comprehensive guidance on the installation, set-up, operation, maintenance, and repair of your DP1 and RP1, 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.

## Configurations

The MXD Process Post Mount Disperser (DP1) and Post Mount Rotor Stator (RP1) can come with the following motor options.

### DP1

- Standard Totally Enclosed Fan Cooled (TEFC) Electric Motor
- Pneumatic Air Motor
- C1D1 Explosion Proof Inverter Duty Electric Motor

### RP1

- Standard Totally Enclosed Fan Cooled (TEFC) Electric Motor
- C1D1 Explosion Proof Inverter Duty Electric Motor

## READ BEFORE UNPACKING

### NOTICE

Please note that your MXD Process 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 gearbox, 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 10–20 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](mailto:support@mxdprocess.com)  
8am - 5pm EDT
- MXD Process Technical Sales  
(812) 202-4047 x1  
[sales@mxdprocess.com](mailto: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 standards of materials and workmanship, and we stand behind them with confidence. In the unlikely event that you encounter defects, we offer a one-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.



## 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

## Motor Installation

### Electrical Motor

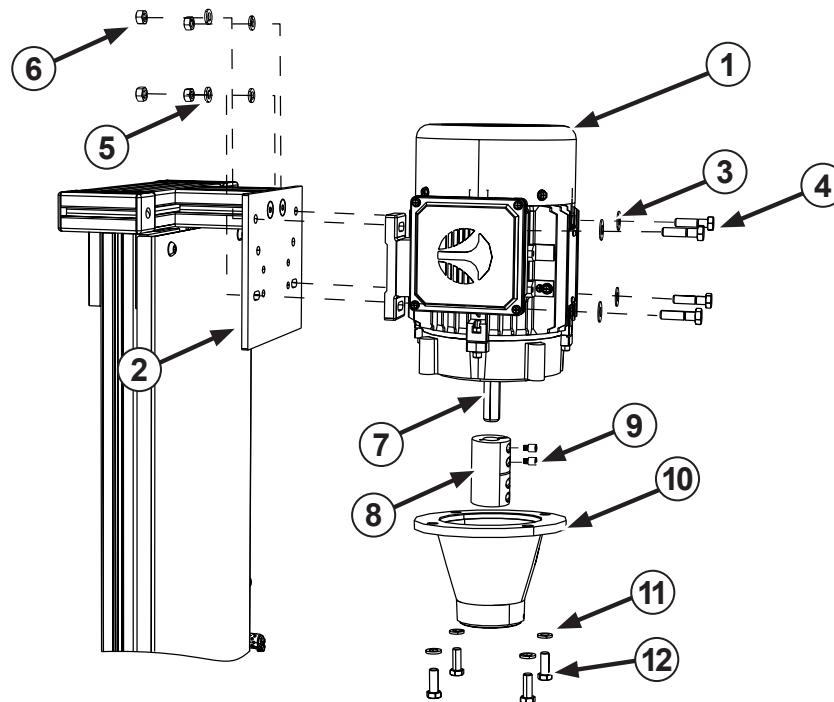


Figure 1. Electrical Motor Install

### **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. Lift the motor (1) into place on the frame assembly motor plate (2).
2. Install four cap screws (4), four flat washers (3), four lock washers (5) and four nuts (6) securing the motor to the frame assembly motor plate. Tighten to specification. See "Information Tables" on page 42.
3. Insert coupler (8) onto the motor shaft (7). Install two socket head cap screws (9) into the shaft coupler and tighten to specification. See "Information Tables" on page 42.
4. Ensure that the coupler access slot on the cone is oriented to the front of the motor. Proceed to install the cone (10) to the motor, securing it with four washers (11) and four cap screws (12), and tighten to specification. See "Information Tables" on page 42.

## Pneumatic Motor

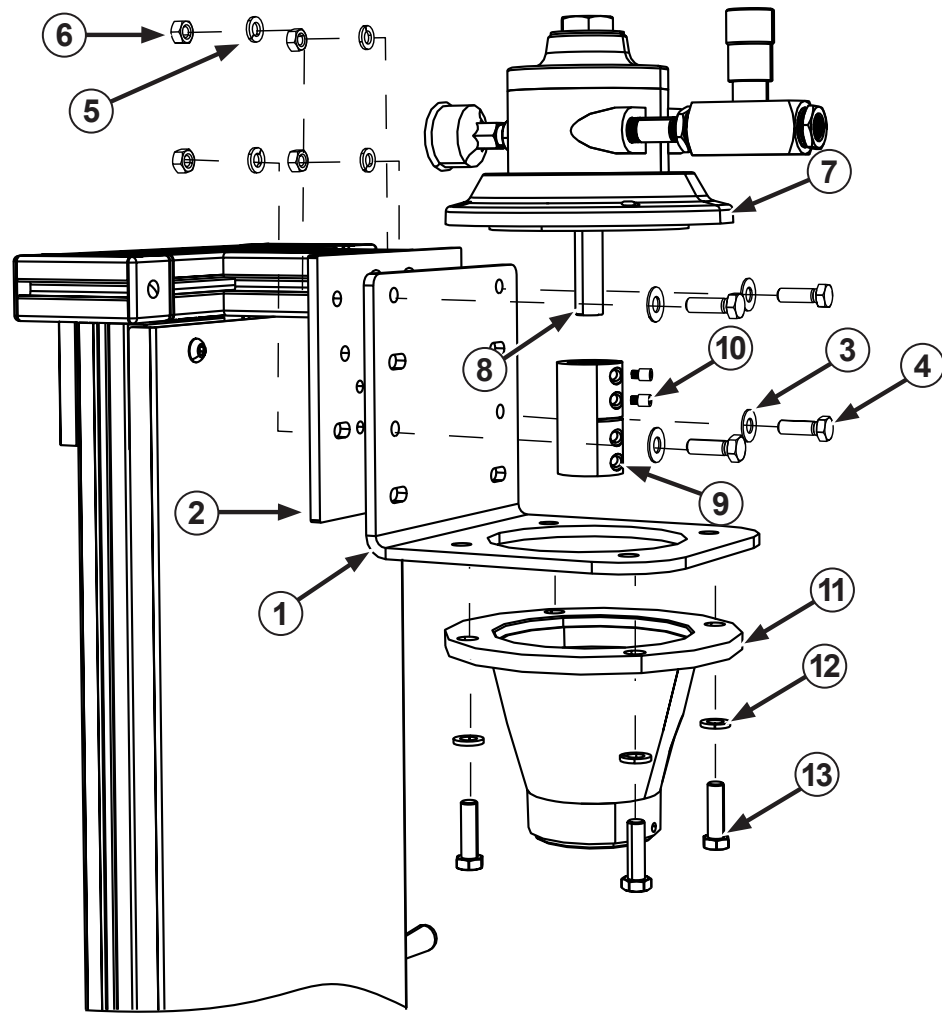


Figure 2. Pneumatic Motor Installation

1. Install the pneumatic motor adaptor plate (1) onto the frame assembly motor plate (2) using four cap screws (4), four flat washers (3), four lock washers (5), and four nuts (6). Tighten to specification. See "Information Tables" on page 42.
2. Insert coupler (9) onto the motor shaft (8). Install two socket head cap screws (10) into the shaft coupler and tighten to specification. See "Information Tables" on page 42.
3. Place the pneumatic motor onto the pneumatic motor adaptor plate, and align the holes.
4. Ensure that the coupler access slot on the cone is oriented to the front of the motor. Proceed to install the bearing cone shroud (11) securing it with four washers (12), and four cap screws (13), and tighten to specification. See "Information Tables" on page 42.



# Bearing Cone Shroud Installation

## Pneumatic Motor

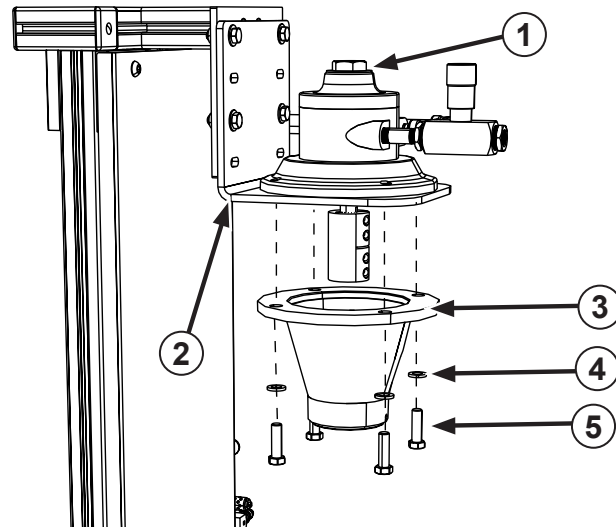


Figure 3. Pneumatic Motor Bearing Cone Shroud

1. Place the pneumatic motor (1) onto the pneumatic motor adaptor plate (2) and align the holes.
2. Make sure that the coupler access slot on the cone is oriented to the front of the motor.
3. Install the bearing cone shroud (3) using four washers (4) and four cap screws (5), but do not tighten them yet.
4. Align the bearing cone with the pneumatic motor by inserting the shaft through the bearing cone, bearing, and coupler.
5. Once everything is aligned, tighten to specifications. See "Information Tables" on page 42.

## Electrical Motor

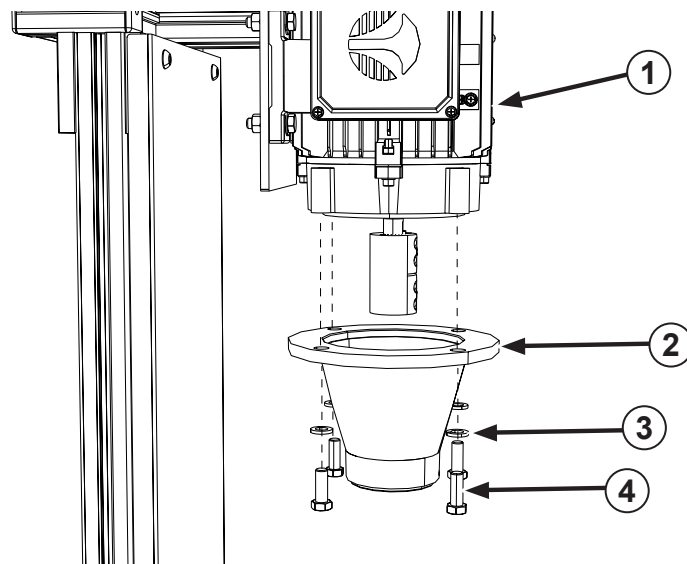


Figure 4.

1. Make sure that the coupler access slot on the cone is oriented to the front of the motor. Proceed to install the bearing cone shroud (2) to the electric motor,(1) and align the holes.
2. Install four washers (3), and four cap screws (4) tighten to specification. See "Information Tables" on page 42.

## Variable-Frequency Drive (VFD) Installation (if applicable)

The Variable Frequency Drive (VFD) Speed Controller for the electric motor DP1 and RP1 mixers enables the operator to adjust the RPM incrementally to match the specific mixing requirements and achieve the best impeller tip speed. In the case of hazardous area mixers, the VFD should be installed outside the hazardous area, with a hazardous area control panel mounted on the mixer.

### Variable Frequency Drive

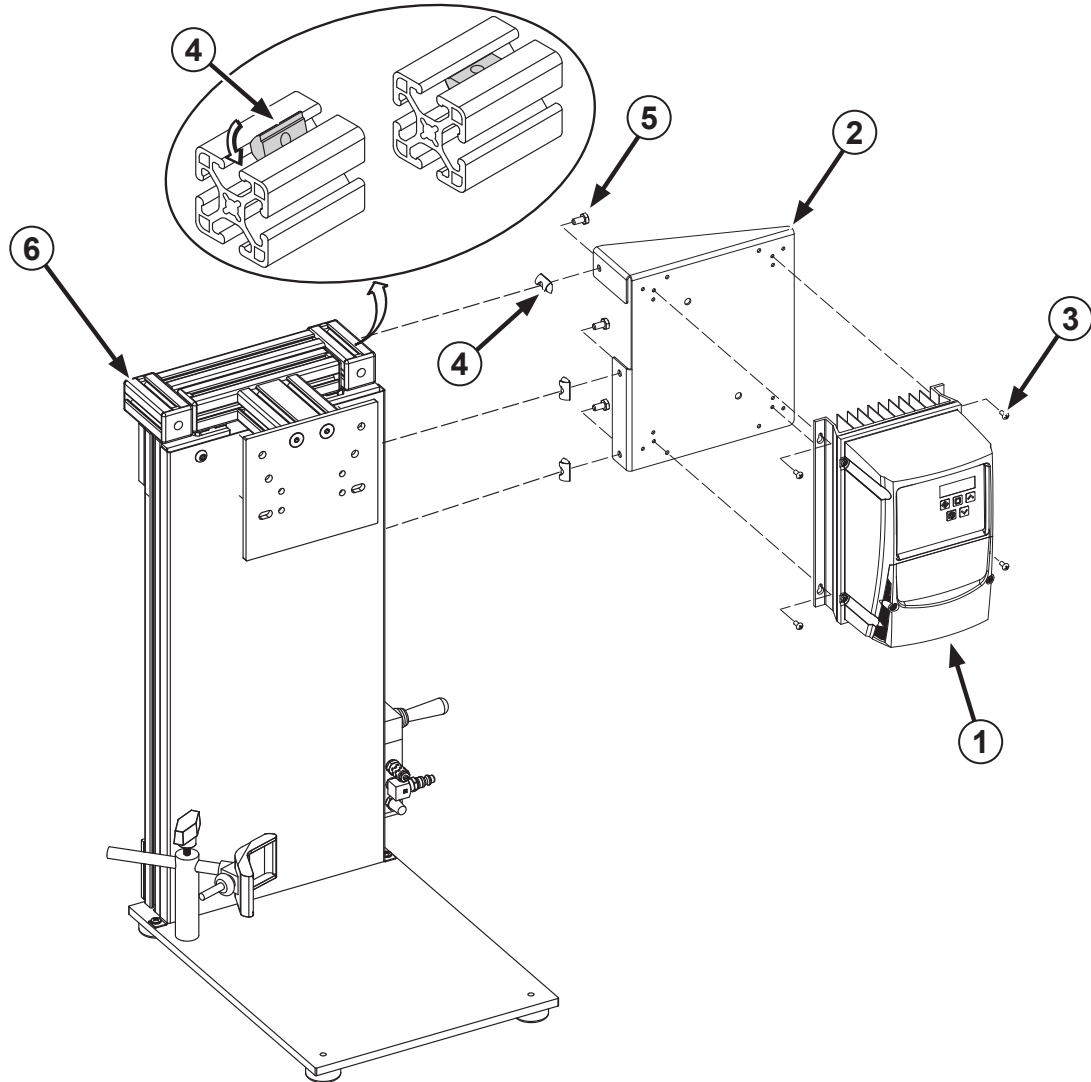


Figure 5. VFD

1. Install three Roll-in T-nuts (4) into the frame assembly (6).
2. Align the Variable Frequency Drive (VFD) mounting plate (2) with the corresponding Roll-in T-nuts in the frame assembly.
3. Secure the (VFD) mounting plate with three cap screws, (5) and tighten cap screws to specification. See "Information Tables" on page 42.
4. Install the VFD Speed Controller (1) to the VFD mounting plate, and secure with four screws (3).
5. For electrical connections see, "Wiring/Electrical" on page 18.

## Hazardous Area Control Panel

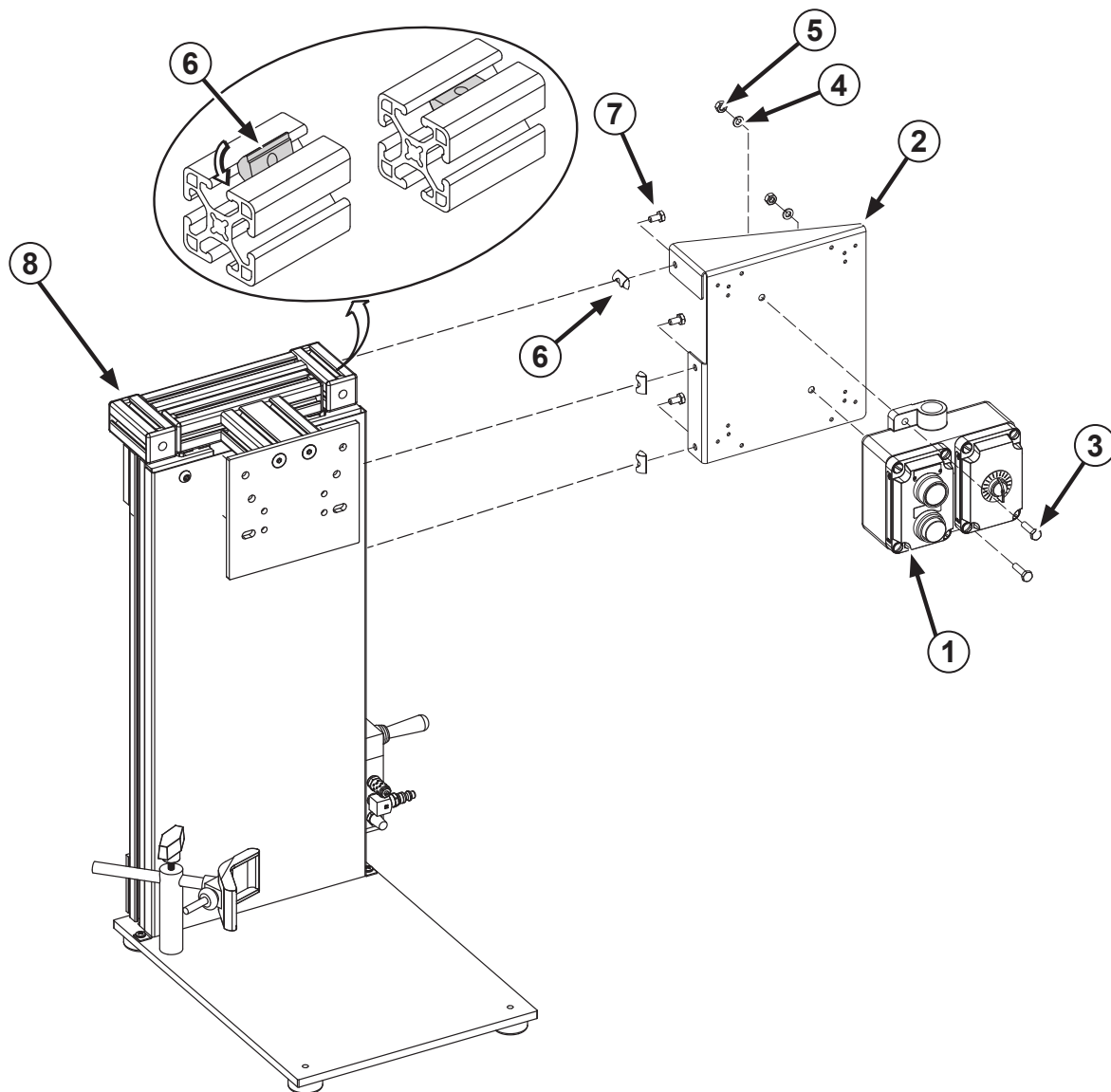


Figure 6. Hazardous Area Control Panel

1. Install three Roll-in T-nuts (6) into the frame assembly (8).
2. Align the Variable Frequency Drive (VFD) mounting plate (2) with the corresponding Roll-in T-nuts in the frame assembly.
3. Secure the (VFD) mounting plate with three cap screws, (7) and tighten cap screws to specification. See "Information Tables" on page 42.
4. Install the control panel (1) to the VFD mounting plate, and secure with two screws (3), two split washers (4) and two nuts (5).
5. For electrical connections see, "Wiring/Electrical" on page 18.

## Shaft Installation

**NOTE:** Shaft installation is the same for DP1 and RP1 configurations.

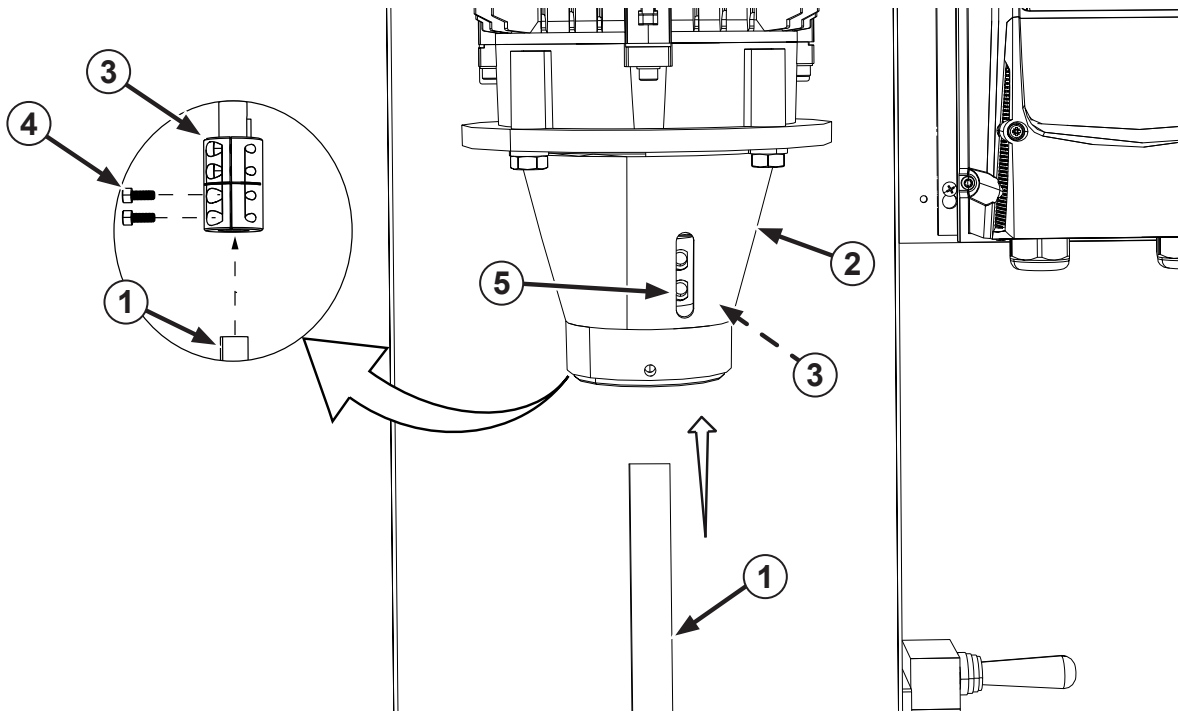


Figure 7. Shaft Installation.

1. Install the shaft (1) through the bottom of the bearing cone shroud (2).
2. Insert the shaft into the shaft coupler (3), and install two socket head cap screws (4).
3. Tighten socket head cap screws through the bearing cone shroud window (5) to specifications. For more information, please refer to the "Information Tables" on page 42.

## RP1 Head Installation

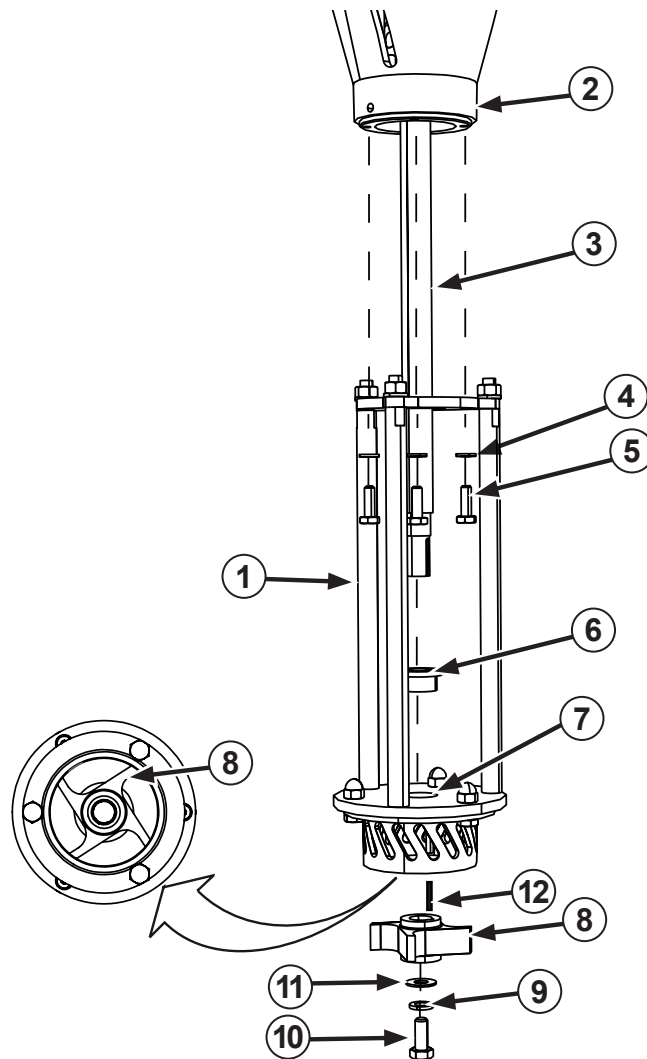


Figure 8.

1. Install the flange sleeve bearing (6) into the center of the bushing plate (7).
2. Insert the RP1 head assembly (1) onto the shaft (3), and slide it to the bottom of the bearing cone shroud (2).
3. Secure the RP1 head assembly to the bearing cone shroud with four split washers (4), and four cap screws (5). Tighten cap screws to specification. See "Information Tables" on page 42.

**NOTE:** Please note the impeller rotor orientation.

**Important:** It is essential to ensure there is sufficient clearance from the shaft shoulder to the top of the bearing (6) after assembly. Adjust the shaft position in the coupler as necessary to avoid binding.

4. Install the key (12) into the keyseat on the motor shaft (3).
5. Align the keyway on the impeller rotor (8) with the key on the shaft, and install the impeller rotor, securing with a flat washer (11), split washer (9) and cap screw (10). Tighten cap screw to specification. See "Information Tables" on page 42.

# Impeller Installation

## Dispersion Blade

**NOTE:** It is important to install the dispersion blade in a specific orientation, see rotation in Figure 9. Dispersion Blade Impeller below.

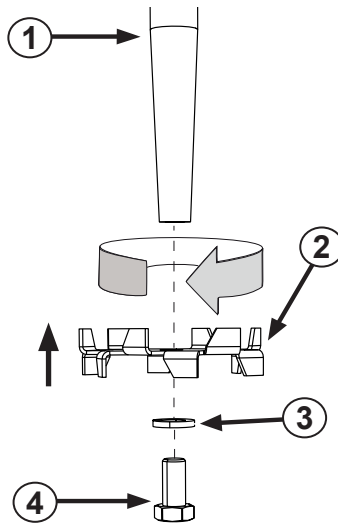


Figure 9. Dispersion Blade Impeller

1. Install the dispersion blade (2) onto the shaft (1).
2. Secure with a split washer (3), and cap screw (4), tighten to specification. See "Information Tables" on page 42.

## Impeller Rotor

**NOTE:** It is important to install the impeller rotor in a specific orientation, see rotation in Figure 10. Impeller Rotor below.

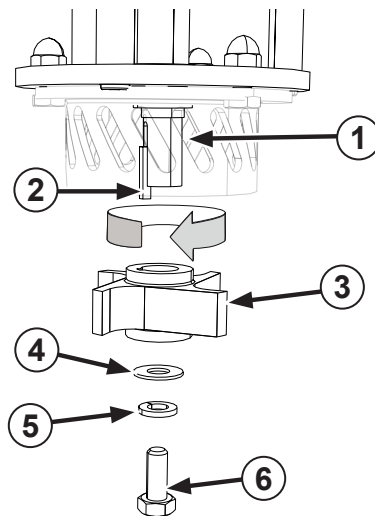


Figure 10. Impeller Rotor

1. Install the key (2) into the keyseat on the shaft (1)
2. Noting the specific orientation, see rotation in Figure 10. Impeller Rotor. Align the key to the keyway on the impeller rotor (3) and install to the shaft.
3. Secure with a flat washer (4), split washer (5), and cap screw (6) and tighten to specification. See "Information Tables" on page 42.

# Limit Switch Installation

## XP Lift Limit Switch

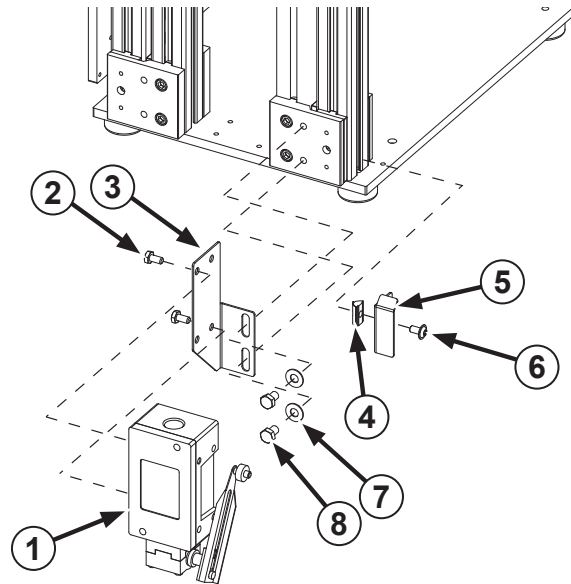


Figure 11.

1. Place the Roll-in T-nut (4) into the side of the frame, and install the lift limit contact bracket (5). Secure with a socket head cap screw (6) and tighten to specification. See "Information Tables" on page 42.
2. Install the lift limit mount bracket (3) to the rear of the frame and secure it with two split washers (7) and two cap screws (8). Tighten to specification see "Information Tables" on page 42.
3. Install the xp lift limit switch (1) to the lift limit mount bracket and secure with two cap screws (2). Tighten to specification see "Information Tables" on page 42.

### Standard Length Bracket Adjustment

Adjust the limit switch and bracket so that the switch actuates approximately 1 inch above the fully lowered position.

### Extended Contact Brackets Adjustment

Adjust the roller so that it stops approximately 1/2 inch from the bottom of the bracket.

## Standard Lift Limit Switch

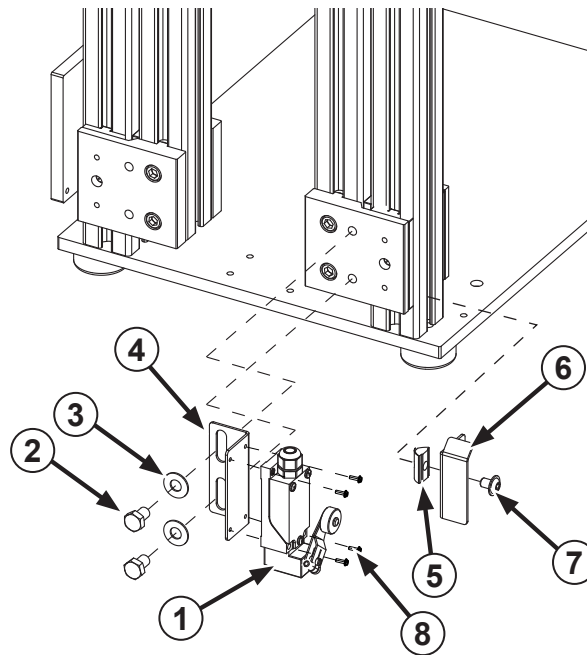


Figure 12.

1. Place the Roll-in T-nut (5) into the side of the frame, and install the lift limit contact bracket (6). Secure with a socket head cap screw (7) and tighten to specification. See "Information Tables" on page 42.
2. Install the lift limit mount bracket (4) to the rear of the frame and secure it with two split washers (3) and two cap screws (2). Tighten to specification see "Information Tables" on page 42.
3. Install the standard lift limit switch (1) to the lift limit mount bracket and secure with four cap screws (8). Tighten to specification see "Information Tables" on page 42.

### Standard Length Bracket Adjustment

Adjust the limit switch and bracket so that the switch actuates approximately 1 inch above the fully lowered position.

### Extended Contact Brackets Adjustment

Adjust the roller so that it stops approximately 1/2 inch from the bottom of the bracket.



## Container Limit Switch

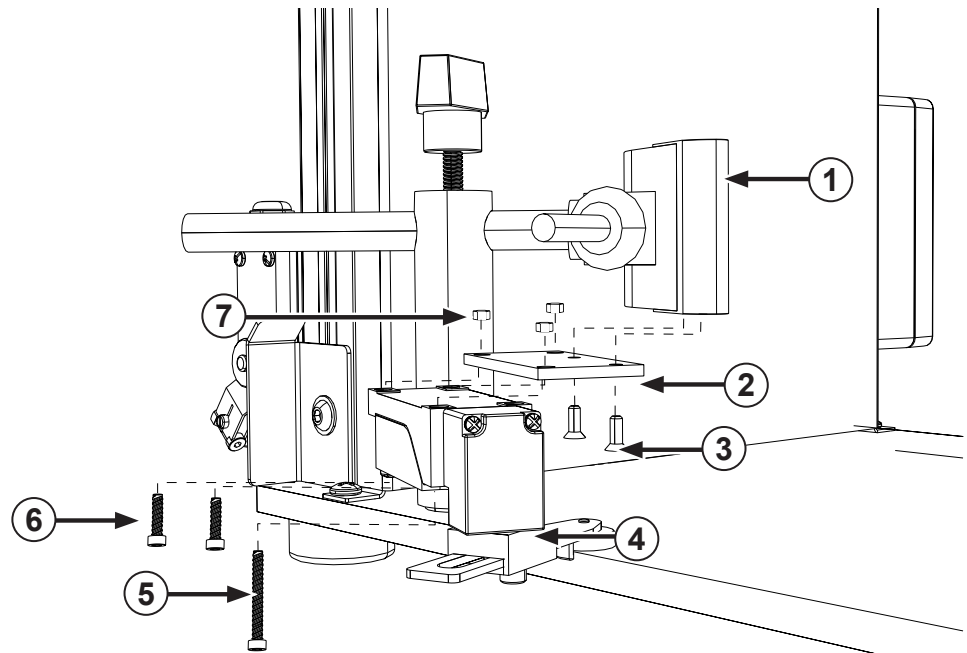


Figure 13.

**NOTE:** The container brace is different on mixers ordered with a container limit switch, if a switch is to be added to a mixer that wasn't originally ordered with one it will need to be modified.

1. Install the limit switch mounting plate (2) to the container brace (1) and secure with two cap screws (3) and tighten to specification. See "Information Tables" on page 42.
2. Install the container limit switch (4) to the limit switch mounting plate using one M4 x 35mm socket head cap screw (5), two M4 x 20 mm socket head cap screws (6) and three hex nuts (7). Tighten to specification see "Information Tables" on page 42.

# 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.

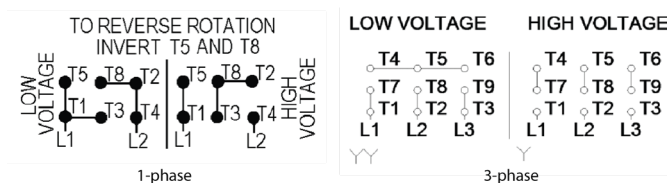


Figure 14. Typical NEMA Wiring Diagrams

## (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 or refer to the wiring instructions provided below. 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](http://www.invertekdrives.com))



## (Optional) Limit Switch Wiring

The following wiring instructions are crucial for the optional limit switches on all DP/RP mixers and with the XP local control panel. These instructions ensure proper installation and functionality, contributing to operational efficiency and reliability.

The limit switches have their normally open (N.O.) contacts wired in series and connected to terminals 1 and 2 on the VFD terminal strip, replacing any existing jumper. Refer to the following wiring diagram example for more clarity.

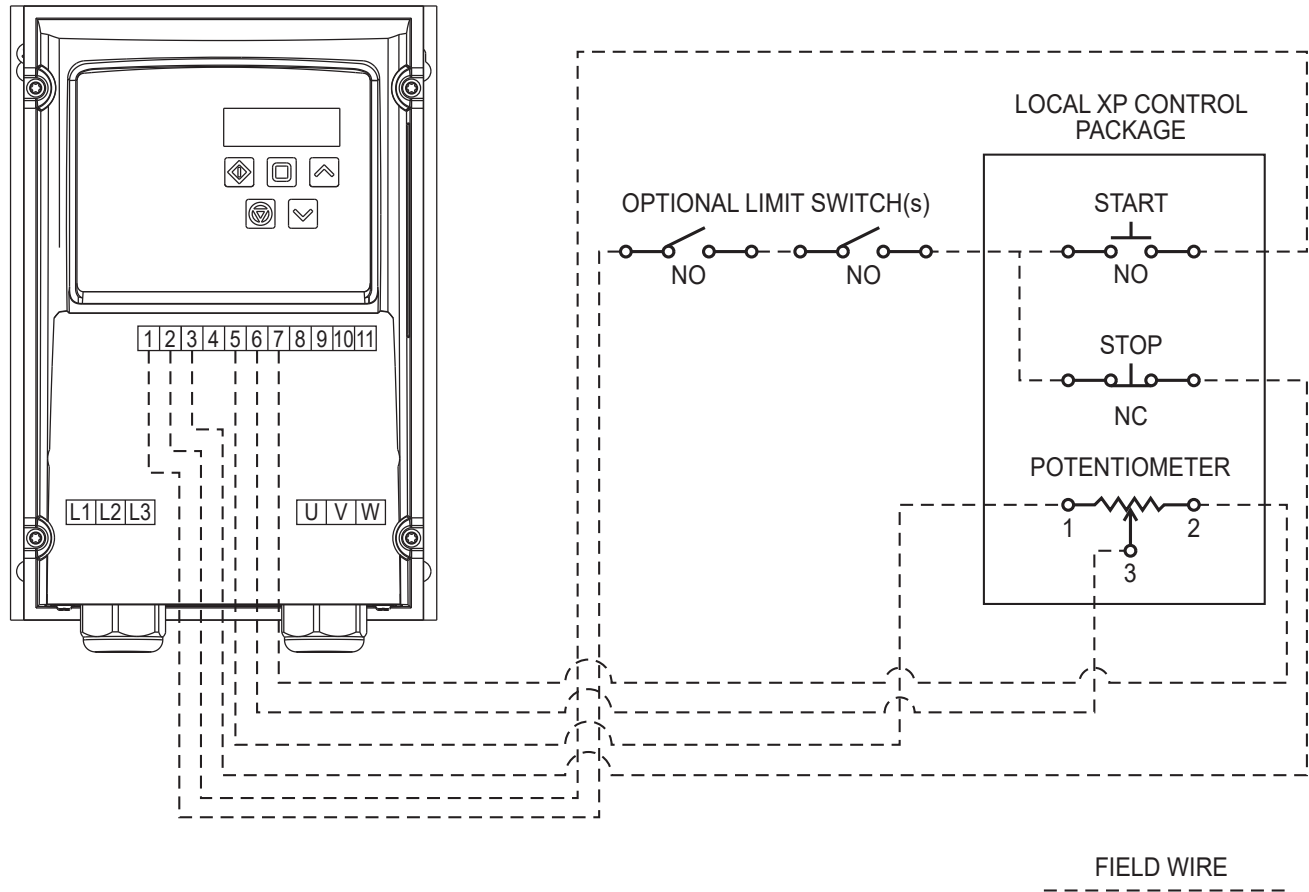


Figure 15.

# Startup and Operation

## Rotation Direction

When looking down into the container, the mixer rotates in a clockwise direction. If the rotation is reversed or impeller installed upside down, it may result in overloading and ineffective mixing of the contents. The impellers used in the mixer are selected according to the horsepower of the mixer.

**NOTE:** Operation of a DP1 in reverse for any period of time can cause the impeller to become detached, damage the equipment or cause serious injury. It is important to check the mixer operation direction before installing the blade.

## General Operation Principles

It is important to note that the mixer should not be operated for an extended period of time when the tank is empty, when the liquid level is at or near the bottom of an impeller, or when impellers are splashing. For proper mixing and stabilizing of the mixing shaft, MXD recommends maintaining at least one impeller diameter of liquid level above the impeller. Additionally, it is crucial to ensure that the mixer is secure and level on a flat surface before attempting to operate it. Finally, it is recommended to only operate the mixer at speeds outlined in the document or pre-programmed in the optional Variable Frequency Drive (VFD).

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 motors 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.

## Startup and Operation Checklist

- Please 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 impeller(s) should be installed correctly.
- Make sure that the mounting/impeller bolts are tightened to the proper torque.
- Check the straightness of the shaft by slowly rotating by hand before operation in fluid.
- The mixer support should be sufficient for the mixer application.
- Use the proper type and amount of lubricant.

- Check if the wiring is correctly installed, grounded, and insulated.
- Fluid level must be a minimum of the equivalent to one diameter above the impeller for proper mixing.

## 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.**

## Electric Motor Operation

After successfully wiring the electric motor, it is imperative to check the rotation to ensure that the mixer shaft is moving in a clockwise direction. To do this, you can simply look down into the container and observe the direction of the mixer shaft. If it is moving in a counterclockwise direction, you may need to adjust the wiring to rectify the issue. Checking the rotation of the mixer shaft is a crucial step to ensure that the mixer operates efficiently and effectively.

## Pneumatic Air Motor Operation

Before connecting the air supply to the mixer, it is crucial to ensure that the air valve is closed. Next, take a moment to check the rotation of the mixer shaft. This can be done by looking down into the container and observing whether the shaft is rotating clockwise. By following these steps, you can ensure that the mixer is operating safely and effectively.

It is important to start and stop the mixer at the slowest speed to prevent any potential hazards or accidents. By doing so, you can ensure a smooth and efficient mixing process without any unwanted mishaps.

## Lift

### Electric

Post-mount mixers with an electric lift are operated using a directional control box that is powered by a provided 12V AC/DC power supply. A 120V North American standard cord is included, and any cord with an IEC C7 connector may be utilized, provided it has a power rating of 100-240Vac and operates at a frequency of 50-60Hz.

### Pneumatic

Post-mount mixers with an air lift are controlled by a 3-position lift directional control valve. The valves come with a standard 1/4" male quick-connect air supply fitting and are configured to operate with an 80-100 psi air supply. It is important to ensure that the air supply is free from moisture and lightly lubricated. The lift will maintain its position even when the air supply is disconnected. However, moving the lift control valve up or down with the air supply disconnected will cause the mixer to lower.



Air Motors

**⚠ WARNING**

The air stream from an air motor may contain solid or liquid material that can result in eye or skin damage. DO NOT USE combustible gases to drive your air motor. Wear hearing protection. Sound levels may exceed 85db.

Air motors should be installed with air lines equal to or greater than the diameter of the inlet port. In order to provide proper lubrication and air dehydration you should have an in-line moisture trap and filter/lubricator (not included) installed ahead of the motor (see photos below). To reverse shaft rotation of air motors, swap air inlet valve and muffler fittings.

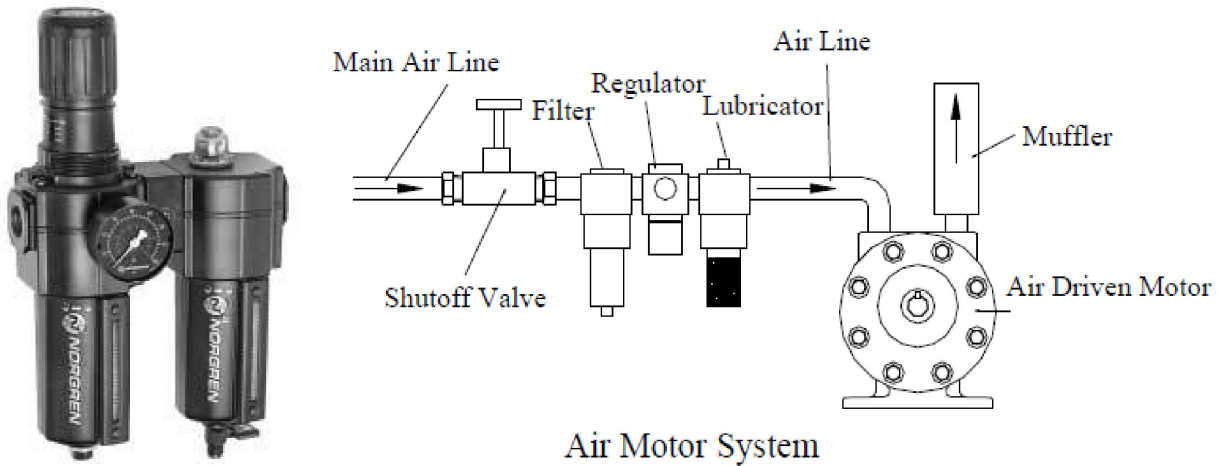


Figure 16. In-line moisture trap and filter/lubricator

Excessive moisture can cause rust to appear inside the motor and possibly cause the muffler to ice up. The lubricator should be adjusted to feed one drop of oil per minute for every 25 CFM of air flow through the motor. Use an SAE #10 air tool oil for optimal performance.

**⚠ CAUTION**

Allowing excessive moisture and/or foreign particles into the air motor will void the warranty.

All air motor-powered mixers manufactured by MXD Process are equipped with a needle valve at the inlet port. By adjusting that valve you can control the speed of the mixer. The maximum rpm, torque and air flow requirements for each of the air motors offered by Mixer Direct are given in the table below.

Table 1. Maximum Rpm, Torque and Air Flow

Nominal Horsepower	Max RPM	Torque (in-lb)	Max Air Flow (cfm)
1/2	10,000	2.8	20.5
3/4	3,000	19.5	30.0
1 1/2	3,000	36.0	78.0
4	3,000	84.0	128.0

## Variable Speed Drive (VFD) Operation

MXD Process mixers are outfitted with Variable Speed Drives (VFDs) that feature Optidrive E3 drives from Invertek. Below is a summary of the essential mixer VFD operation. For comprehensive documentation on wiring, programming, and drive operation, please refer to the following link: <https://www.invertekdrives.com/variable-frequency-drives/optidrive-e3/documentation>.

**NOTE:** The drives are pre-programmed for use with the specific mixer. Modifying the programming may lead to performance issues and equipment damage. If there is a need for any programming or operation changes, please feel free to contact MXD support for assistance

VFDs provided with MXD Process mixers are operated using the integrated digital keypad. Mixers provided with a local control panel for utilization in hazardous areas are to be exclusively controlled via the local control panel. In this case, the built-in keypad on the drive will not be responsive to start/stop and speed control commands.

**NOTE:** Whenever power is supplied to the drive, it becomes active and ready for operation.

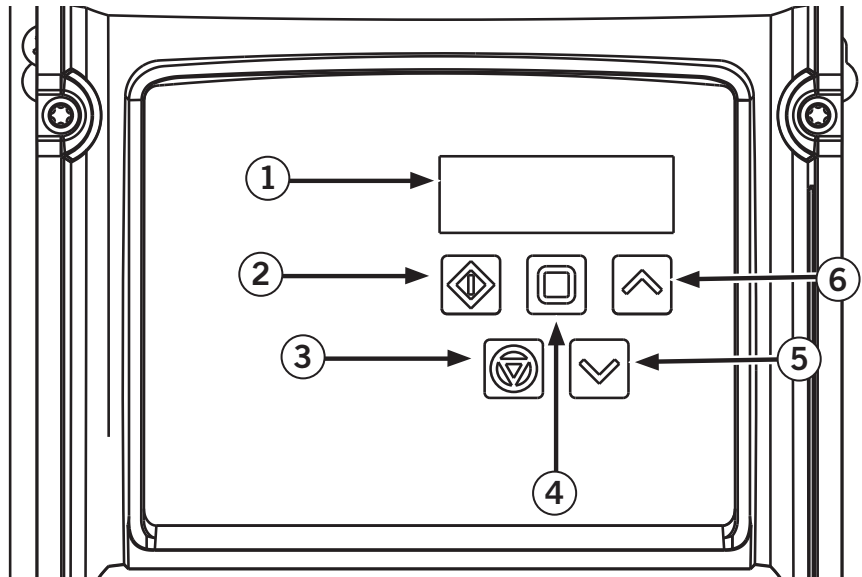


Figure 17.

(1) Display	(2) Start (green diamond with line)
(3) Stop (red circle with inverted triangle)	(4) Navigate (white rectangle)
(5) Down (white down arrow)	(6) Up (white up arrow),

1. Press the start button to start/run. The VFD will ramp up to the previously used speed.
2. Press or hold the up or down buttons to increase or decrease the speed. The drive will only operate within the programmed minimum and maximum speeds.
3. Press the stop button to stop the drive; the VFD will ramp down and display “STOP.”

While running, pressing the navigation button will cycle through the available displays. On the left side of the display, a letter indicates what is being shown. “H” for the output frequency in hertz, “A” for the motor current draw in amps, “P” for the motor power in kilowatts, and no letter for the motor RPM display. On mixers that are not direct drive an additional operating display is typically programmed, indicated with a small “c” (for custom display), this display shows the shaft speed of the mixer, which is based on a ratio of the motor RPM related to the gearbox or belt reduction.

While stopped, pressing the stop button will bring up the current speed setpoint, allowing the speed to be changed before pressing start.

Most mixers come with the VFD enabled for forward operation only; some mixers that can be run in reverse will be set up to allow it. To change the operating direction while running forward, press the start button again. The VFD will ramp down to 0 and then ramp up in reverse. The speed display is negative for reverse.

## 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

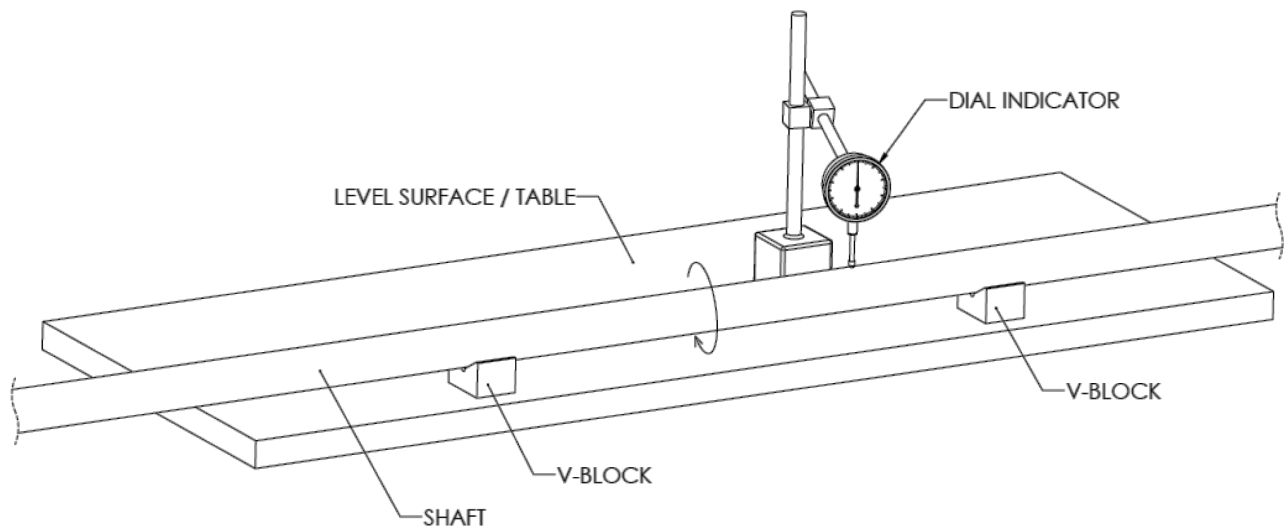


Figure 18.

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

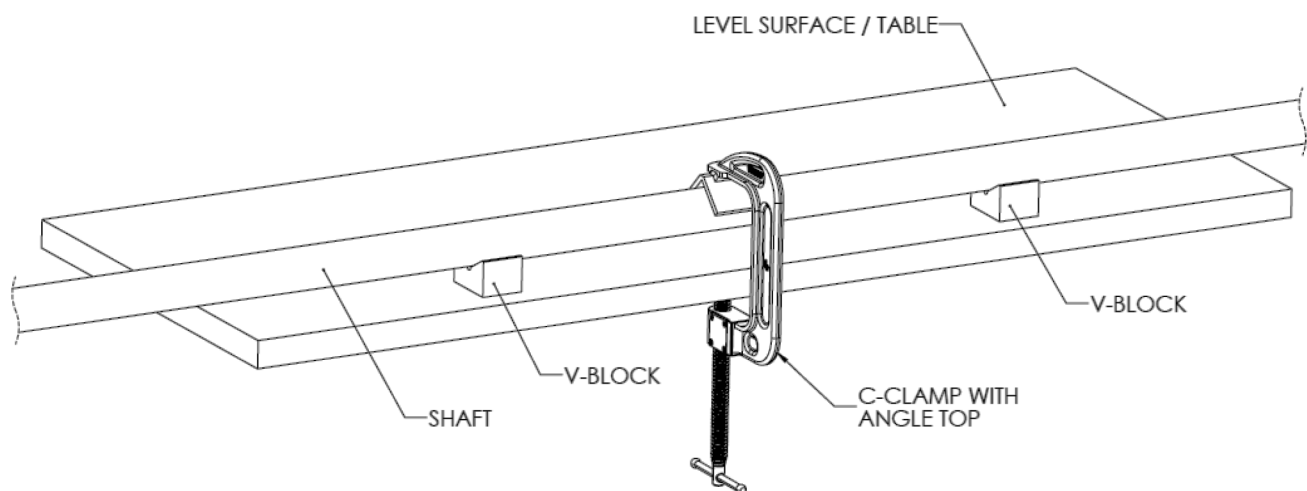


Figure 19.

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

## Shaft Bearing Replacement

The Bearing in the cone may wear out over time and should be replaced to reduce vibrations and extend the mixer's lifespan.

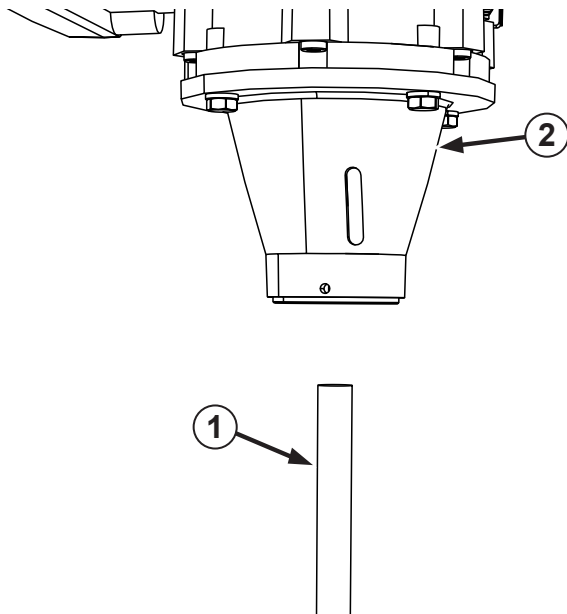


Figure 20.

1. Remove the shaft (1) from the bearing cone shroud assembly (2).

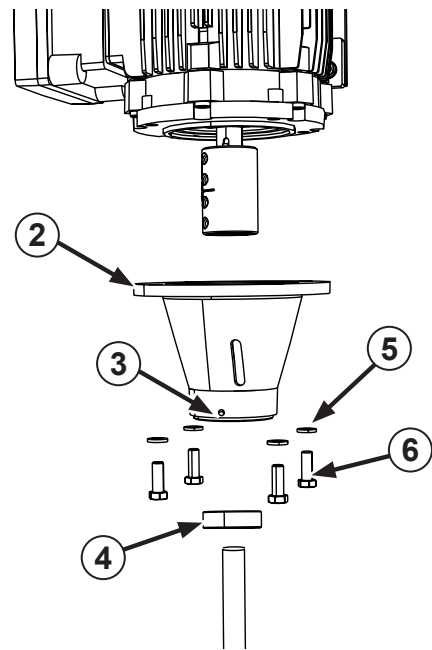


Figure 21.

2. Remove the four split washers (5) and four cap screws (6). Then, remove the bearing cone shroud assembly (2) from the motor.
3. Loosen set-screw (3) from the bearing cone shroud.
4. Press out the bearing (4) from the bearing cone shroud assembly (2).
5. Inspect parts for burrs or damage .
6. Press in the bearing into the bearing cone shroud assembly, and tighten the set-screw at the bottom of the bearing cone shroud.
7. Install the shaft, and reassemble the bearing cone shroud assembly onto the motor.
8. Assembly is the reverse from disassembly.
9. Tighten all hardware to specification see "Information Tables" on page 42.



## Stator Bearing Replacement (RP1)

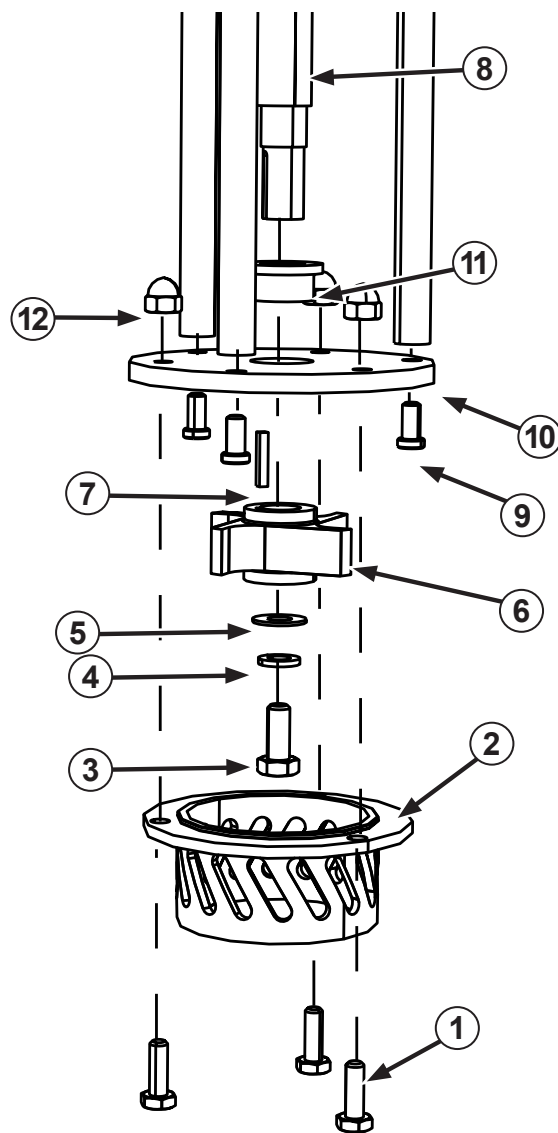


Figure 22.

1. Remove the three cap screws (1), three acorn nuts (12) and then remove the stator (2).
2. Remove the cap screw (3), split washer (4), and flat washer (5).
3. Remove the impeller rotor (6) and key (7) from the shaft (8).
4. Remove the three cap screws (9) lower the bushing plate (10).
5. Remove the flange sleeve bearing (11).
6. Inspect parts for burrs or damage.
7. Replace flange sleeve bearing.

**NOTE:** Bearing is press-fit to bushing plate and depending on the tolerance may require reaming after install to fit the shaft.

8. Assembly is the reverse from disassembly.

**Important:** It is essential to ensure there is sufficient clearance from the shaft shoulder to the top of the flange sleeve bearing (11) after assembly. Adjust the shaft position in the coupler as necessary to avoid binding.

9. Tighten all hardware to specification see "Information Tables" on page 42.

## Lift Maintenance

 **WARNING**

**AVOID POSSIBLE INJURY!**

Air and electric lifts are designed to maintain their position when stopped. However, when working underneath a raised mixer, it is advisable to provide additional support to the mixer to mitigate the risk of injury or damage in the event of unexpected movement of the lift.

DP1/RP1 frames use UHMW-PE linear bearings that don't require lubrication, the sliding surfaces of the lift should be kept clean to ensure smooth operation and long service life.

An air lift in satisfactory condition should be capable of maintaining its position for a significant and undetermined period. Nevertheless, the incidence of damage and wear may lead to internal or external air leaks, resulting in the gradual drift or descent of the lift over time. Therefore, prudent reliance on the lift to sustain its position over protracted periods is ill-advised. In the event of excessive movement, a thorough examination of the air system for leaks is warranted, followed by the appropriate servicing or replacement of the valve and/or cylinder.

Air lift direction control valves are equipped with three flow controls to precisely modulate the lifting speed, ensuring both safety and smooth operation. Each direction (up and down) is managed by a dedicated valve, with an additional flow control exhaust to effectively regulate the downward speed of the mixer. The air lift systems are meticulously tuned at the factory to accommodate the specific weight of the mixer in use, minimizing the need for further adjustments. However, should any components be replaced, the valves may require readjustment to ensure optimal performance. In such instances, we recommend reaching out to MXD Process for professional assistance.

# Troubleshooting Guide

Table 2.

PROBLEM	POSSIBLE CAUSE	SUGGESTED SOLUTION
Incorrect mixer rotation	Incorrect wiring to motor	Swap any two line-wires to reverse rotation. Refer to Motor Wiring Section for help.
	Incorrect plumbing to motor	Reverse the inlet and exhaust plumbing.
Shaft will not seat fully	Coupler screws too tight	Loosen coupler screws
	Damaged shaft	Repair or replace shaft
Mixer will not start	Incorrect wiring	Check wiring diagram and wire correctly
	Loose connections	Tighten connections
	Blown fuse	Replace fuse
	Impeller interference	Free all debris for rotation
	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
	Damage to gear reducer	Repair/replace reducer
	VFD Malfunction	Refer to VFD Manual
	Insufficient air pressure and flow	Remove supply air line restrictions,
		Adjust regulator
	Clogged exhaust	Clean/clear exhaust muffler
Worn out air motor	Replace or rebuild motor	
	Check oil supply	
Noisy	Insufficient lubricant	Fill proper amount of lubricant
	Foreign material in lubricant	Change lubricant
	Incorrect lubricant	Change to correct lubricant
	Worn or faulty bearings or gears	Replace bearings and/or gearbox
	Incorrect gearbox and bearing alignment	Adjust/align bearings and gearbox
	Bent/broken guards	Straighten/replace guards
Bearing failure	Bearing has worn beyond useful life See all items under "Noisy"	Replace bearing (check all other parts)
Shaft vibration	Impeller not immersed in liquid	Fill tank
	Bent mixer shaft	Consult factory
	Loose or improperly assembled	Assemble shaft securely
	Damaged bearings	Check and replace bearings if necessary
	Debris on impeller	Clean impeller
	Loose or bent impeller blades	Tighten or straighten blades (consult factory)
	Operating at critical speed	Decrease or increase speed until vibration is reduced
Seal leakage	Worn seal	Replace seal
	Scored shaft	Replace shaft
	Incorrect seal position	Consult factory
Lift function	Not enough air pressure	Increase Air pressure
	Air leaks	Find and repair leak
	Incorrect flow adjustment	Correct the flow
	Bad power supply	Replace power supply



# Diagrams and Spare Parts

## Air Lift Frame

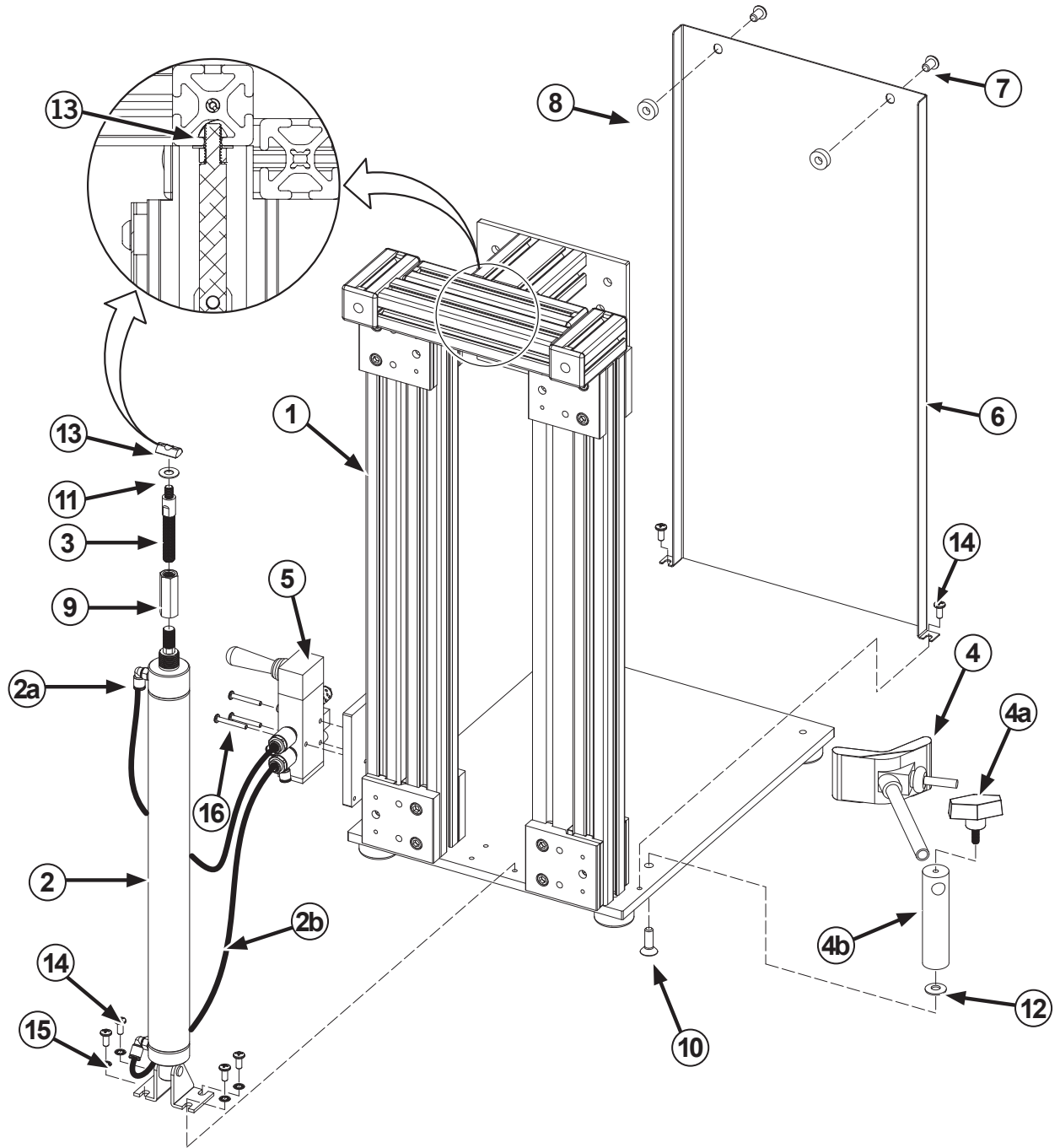


Figure 23. Frame Assembly Air Lift



Table 3.

ITEM	QTY	DESCRIPTION
1.	1	DP1 Frame Assembly Gen 3
2.	1	1.5" Air Cylinder, 14" Stroke, Pivot Mount
2a	2	1/4" PTC x 1/8" MNPT Elbow
2b	2	1/4" Tube
3.	1	DP1 Air Cylinder Upper Mount, For Gen 3
4.	1	DP1 Container Brace, Lab
4a	1	Container Brace Knob
4b	1	Container Brace Mount Post
5.	1	Directional Control Valve with DP1 Air Package
6.	1	Splash Guard For DP1 Gen 3
7.	2	5/16"-18 X 1/2" Button Head Cap Screw
8.	2	5/16" X 3/4" X 1/4" Spacer
9.	1	7/16"-20 Coupling Nut
10.	1	5/16"-18 X 1" Flat Head Socket Bolt
11.	1	5/16" Flat Washer
12.	1	5/16" Belleville Spring Lock Washer
13.	1	5/16"-18 Roll-In T-Nut, With Spring Leaf, Tall
14.	6	#12-24 X 0.5" Pan Head Screw
15.	4	#12 Tooth Lock Washer
16.	3	#8-32 X 1.25" Pan Head Screw

# Electric Lift Frame

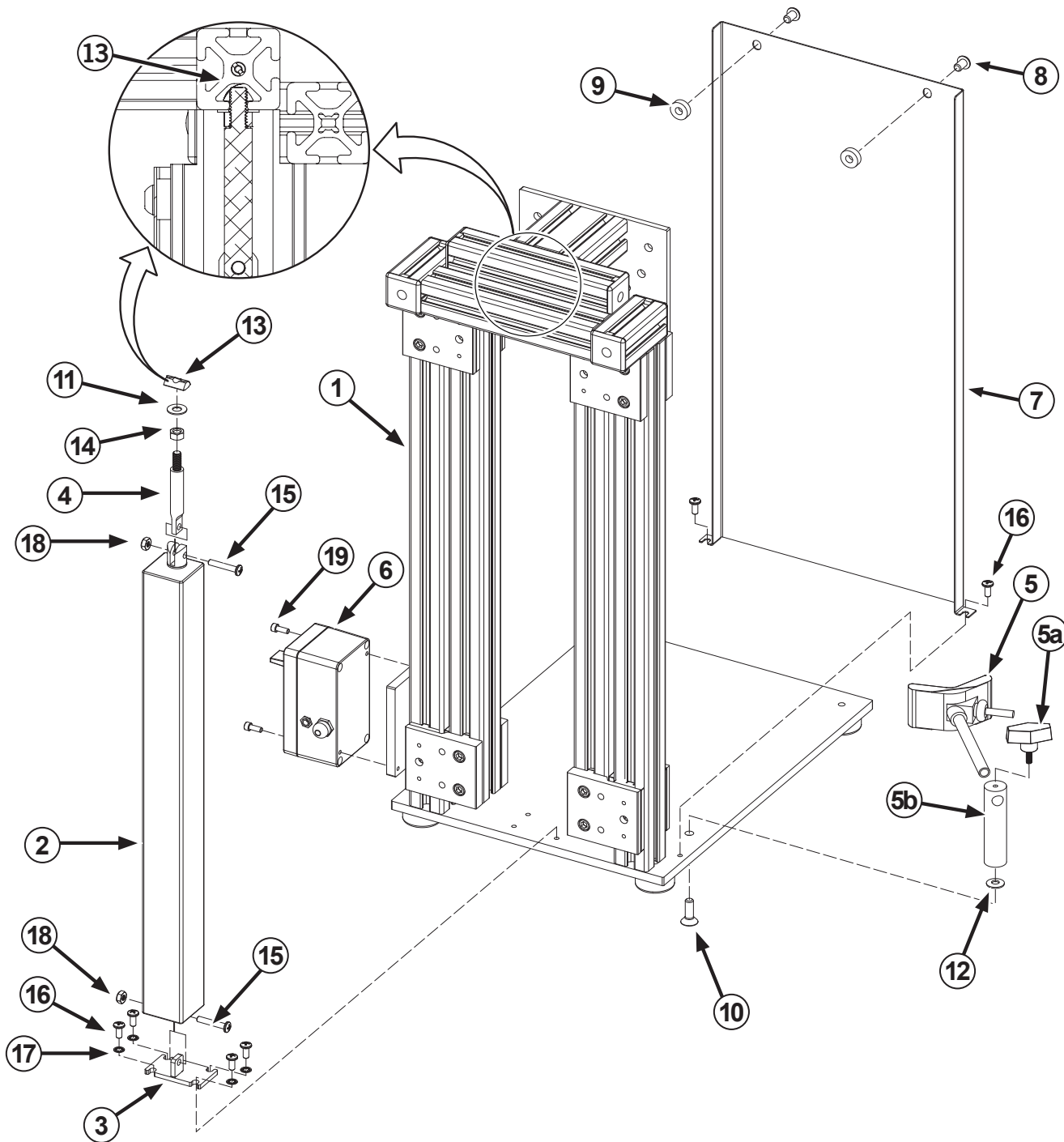


Figure 24. Frame Assembly Electric Lift



Table 4.

ITEM	QTY	DESCRIPTION
1.	1	DP1 Frame Assembly Gen 3
2.	1	12" Lift DC Electric Cylinder, 150lb
3.	1	DP1 Electric Lift Cylinder Bracket
4.	1	DP1 Ele Cylinder Upper Mount, For Gen 3
5.	1	DP1 Container Brace, Lab
5a	1	Container Brace Knob
5b	1	Container Brace Mount Post
6.	1	Electric Direction Control
7.	1	Splash Guard For DP1 Gen 3
8.	2	5/16"-18 X 1/2" Button Head Cap Screw
9.	2	5/16" X 3/4" X 1/4" Spacer
10.	1	5/16"-18 X 1" Flat Head Socket Bolt
11.	1	5/16" Flat Washer
12.	1	5/16" Belleville Spring Lock Washer
13.	1	5/16"-18 Roll-In T-Nut, With Spring Leaf, Tall
14.	1	5/16"-18 Hex Nut
15.	2	#12-24 X 1.25" Pan Head Screw
16.	6	#12-24 X 0.5" Pan Head Screw
17.	4	#12 Tooth Lock Washer
18.	2	#12-24 Thin Nylon Lock Nut
19.	2	#10-24 X 1/2" Socket Head Cap Screw

# RP1 Head

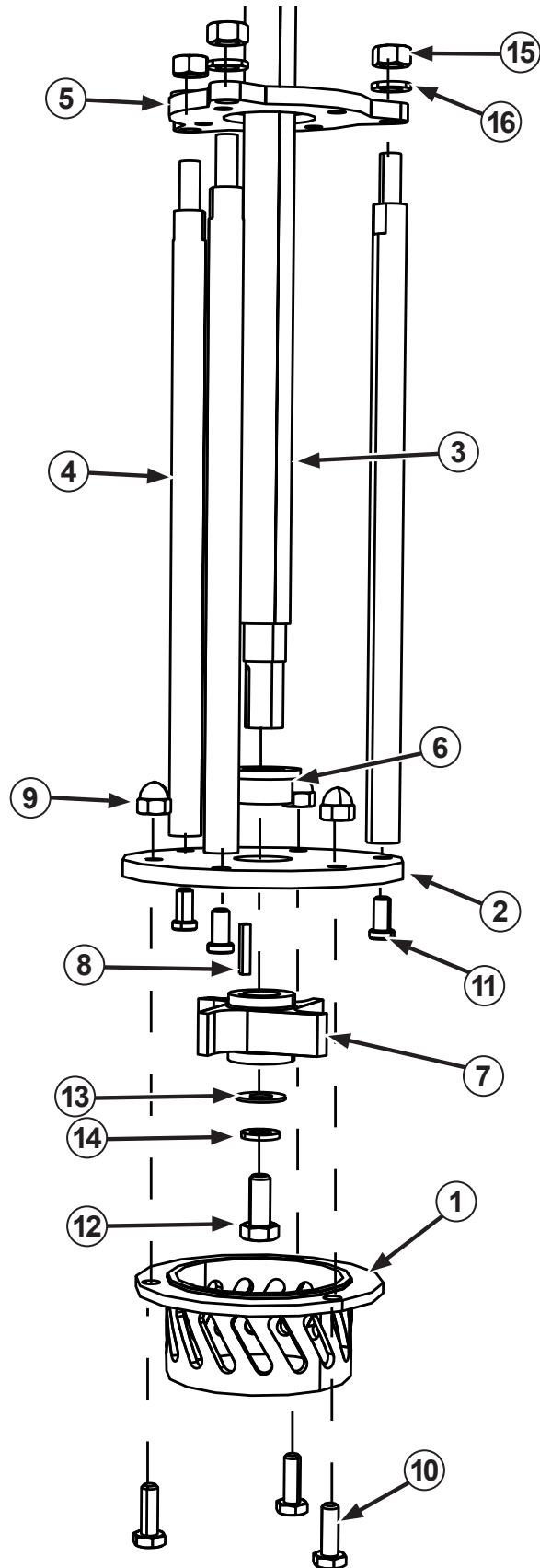


Figure 25. RP1 Head





Table 5.

ITEM	QTY	DESCRIPTION
1.	1	2.5" Stator
2.	1	RP1 Bushing Flange
3.	1	RP1 Rotor Stator Shaft
4.	3	RP1 Rotor Stator Support Shaft
5.	1	RP1 Upper Mounting Plate
6.	1	Flanged Sleeve Bearing - 5/8" Shaft Diameter, 7/8" OD, 1/2" Length
7.	1	2.5" Rotor, Low Power Profile
8.	1	1/8" X 3/4" Key
9.	3	1/4"-20 Acorn Nut
10.	3	1/4"-20 X .75" Hex Bolt
11.	3	1/4"-20 X 1/2" Low-Profile Socket Head Cap Screw
12.	1	5/16"-18 X .75" Hex Bolt
13.	1	5/16" Flat Washer
14.	1	5/16" Split Lock Washer
15.	3	5/16"-18 Hex Nut
16.	3	5/16" Split Lock Washer

# RP1 Electric Air

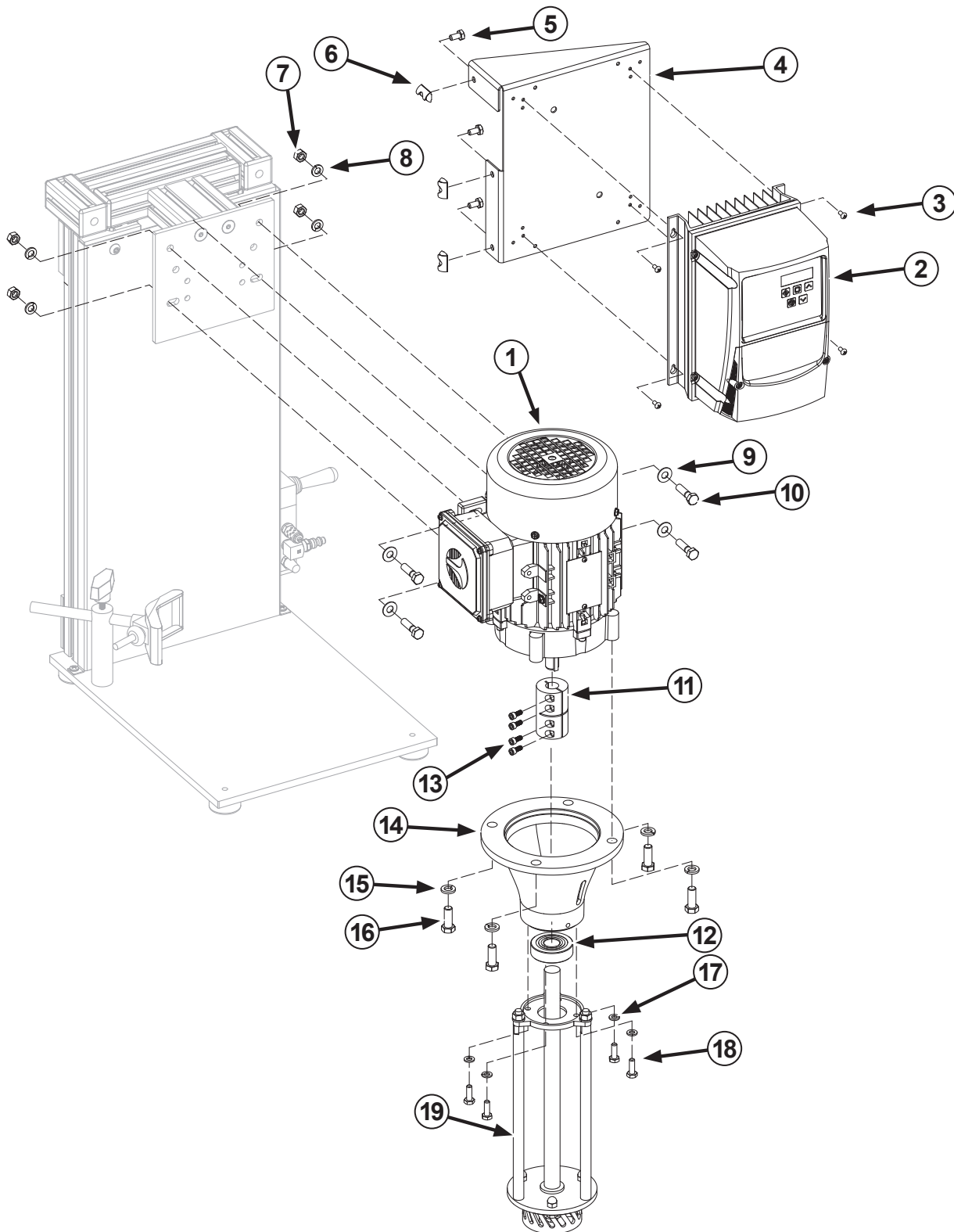


Figure 26. RP1 Electric Air



Table 6.

ITEM	QTY	DESCRIPTION
1.	1	Standard Electric Motor
2.	1	Variable Frequency Drive (VFD)
3.	4	#8-32 x 3/8" Round Head Screw
4.	1	VFD Mount Plate
5.	3	1/4"-20 x 1/2" Cap Screw
6.	3	1/4"-20 Roll-In T-Nut, With Spring Leaf, Tall
7.	4	5/16"-18 Nut
8.	4	Split Washer
9.	4	Flat Washer
10.	4	5/16"-18 x 1.25" Cap Screw
11.	4	Shaft Coupler
12.	1	Ball Bearing
13.	4	Socket Head Cap Screw
14.	1	Bearing Cone Shroud
15.	4	Split Washer
16.	4	3/8"-16 x 1" HHCS
17.	4	Split Washer
18.	4	1/4"-20 x 3/4" Cap Screw
19.	1	RP1 Head

# DP1, Electric Motor

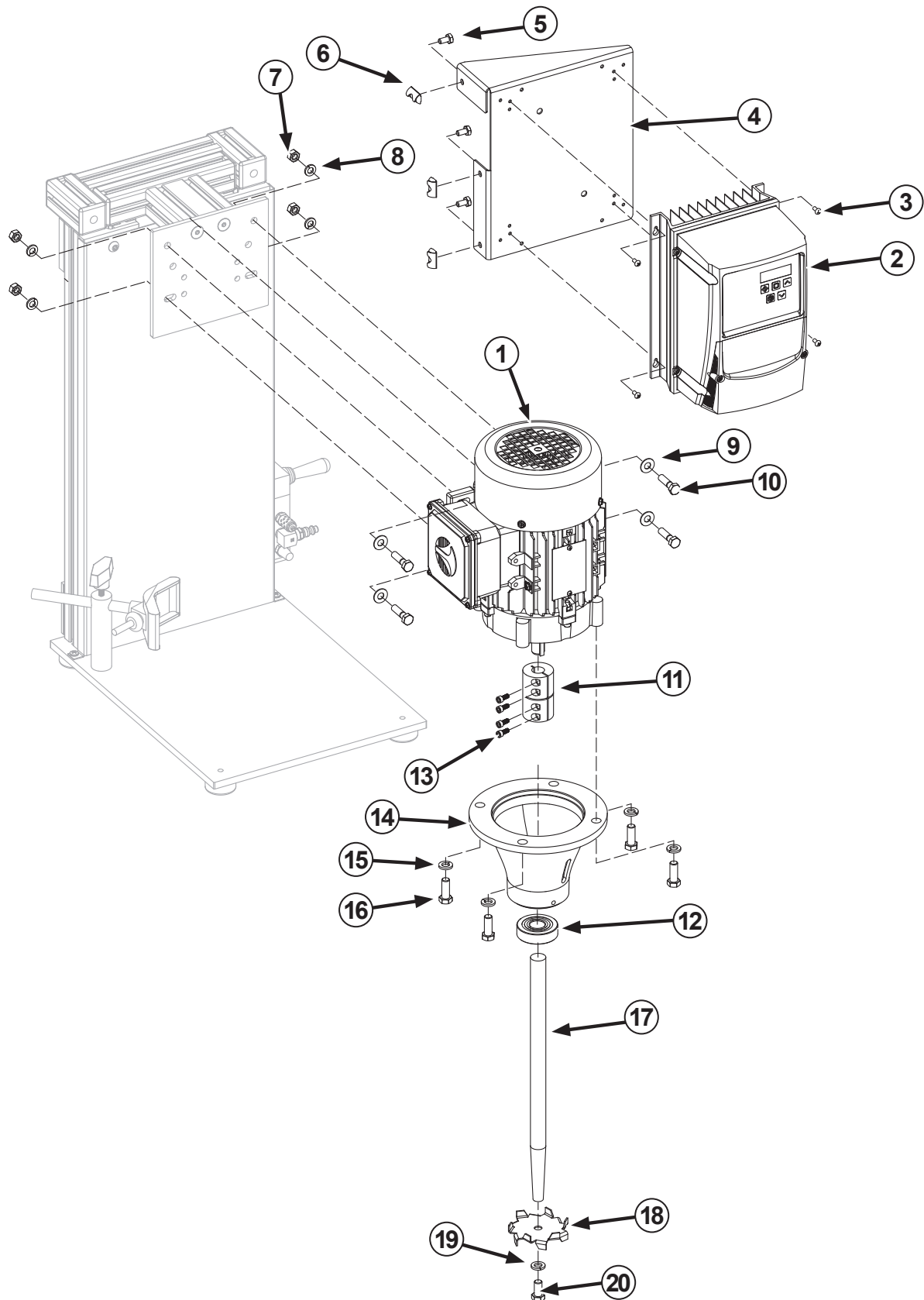


Figure 27. DP1, Electric Motor



Table 7.

ITEM	QTY	DESCRIPTION
1.	1	Standard Electric Motor
2.	1	Variable Frequency Drive (VFD)
3.	4	#8-32 x 3/8" Round Head Screw
4.	1	VFD Mount Plate
5.	3	1/4"-20 x 1/2" Cap Screw
6.	3	1/4"-20 Roll-In T-Nut, With Spring Leaf, Tall
7.	4	5/16"-18 Nut
8.	4	Split Washer
9.	4	Flat Washer
10.	4	5/16"-18 x 1.25" Cap Screw
11.	1	Shaft Coupler
12.	1	Ball Bearing
13.	4	Socket Head Cap Screw
14.	1	Bearing Cone Shroud
15.	4	Split Washer
16.	4	3/8"-16 x 1" HHCS
17.	1	Shaft
18.	1	Dispersion Blade
19.	1	Split Washer
20.	1	3/8"-16 x .75" Cap Screw

# DP1, XP Electric Motor

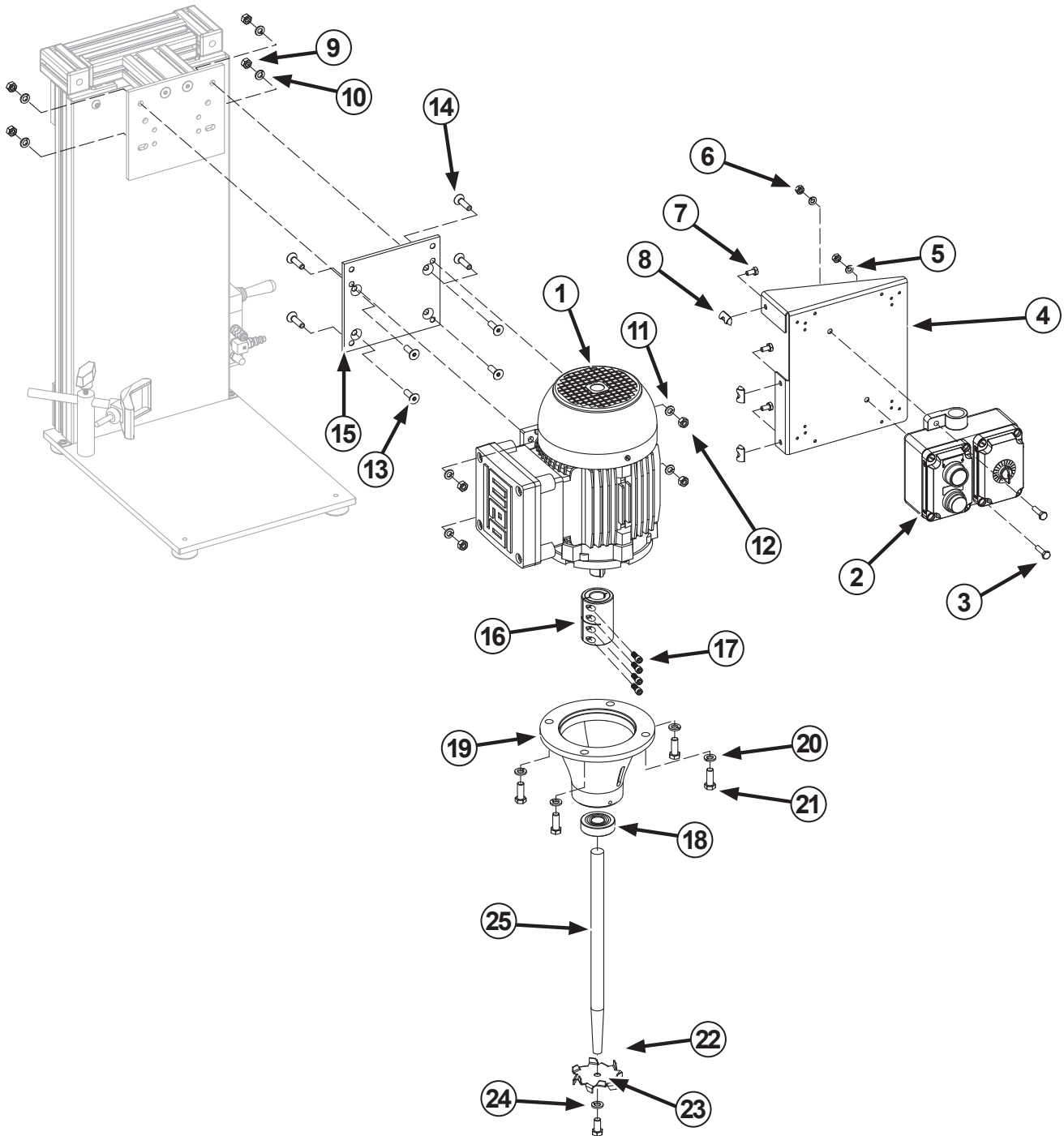


Figure 28. DP1, XP Electric Motor



Table 8.

ITEM	QTY	DESCRIPTION
1.	1	Explosion Proof Motor
2.	1	Control Panel
3.	2	1/4"-20 x 1/2 Cap Screw
4.	1	VFD Mount Plate
5.	2	Split Washer
6.	2	1/4"-20 Nut
7.	3	1/4"-20 x 1/2" Cap Screw
8.	3	1/4"-20 Roll-In T-Nut, With Spring Leaf, Tall
9.	4	5/16"-18 Nut
10.	4	Split Washer
11.	4	Split Washer
12.	4	5/16"-18 Nut
13.	4	5/16"-18 x 1" Socket Flat Head Screw
14.	4	5/16"-18 x 1.25" Socket Flat Head Screw
15.	4	Motor Adaptor Plate
16.	1	Shaft Coupler
17.	4	Socket Head Cap Screw
18.	1	Ball Bearing
19.	1	Bearing Cone Shroud
20.	4	Split Washer
21.	4	3/8"-16 x 1" HHCS
22.	1	Dispersion Blade
23.	1	Split Washer
24.	1	3/8" - 16 x 1" Cap Screw

# DP1, Air Motor

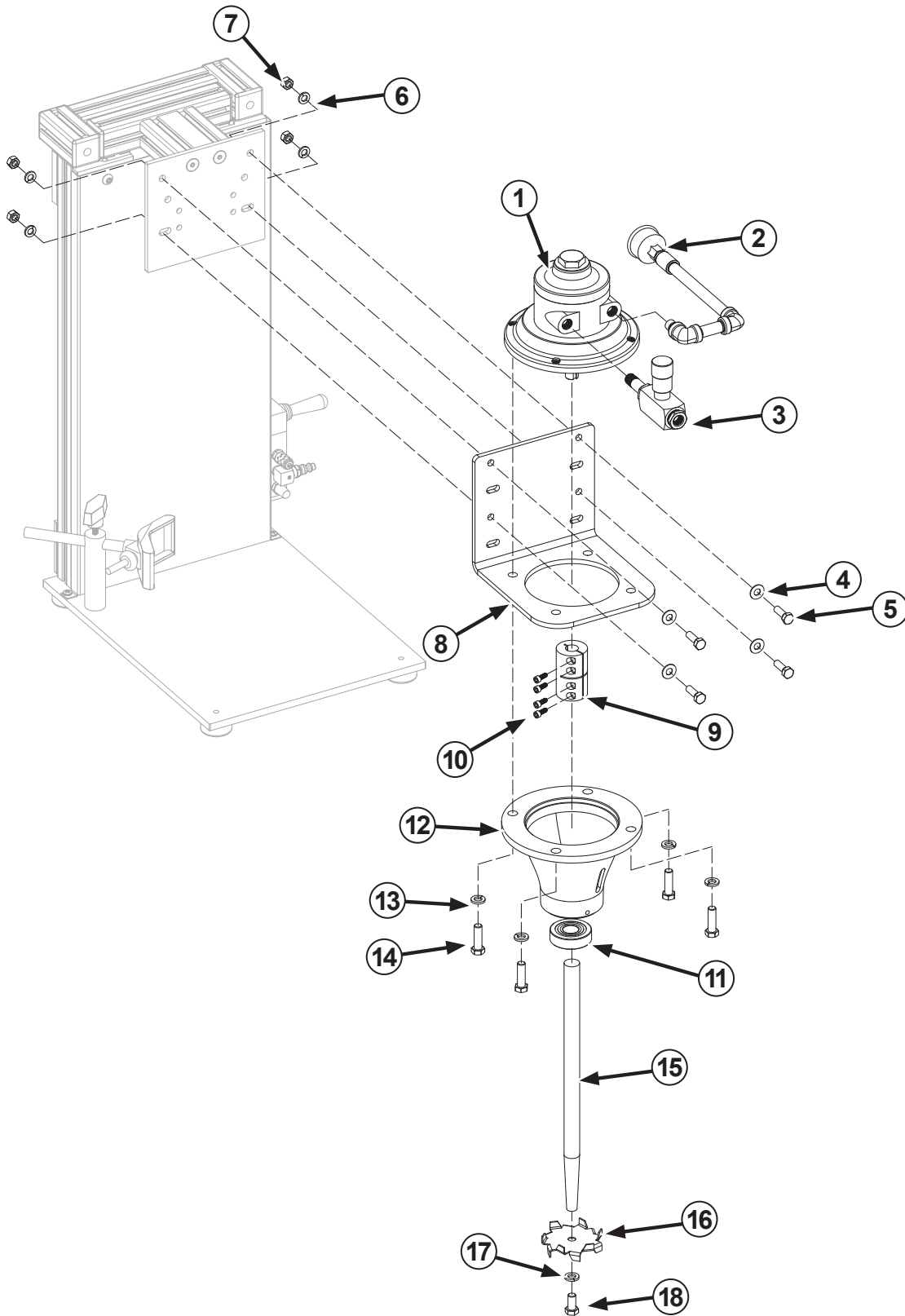


Figure 29. DP1, Air Motor





Table 9.

ITEM	QTY	DESCRIPTION
1.	1	Air Motor
2.	1	Exhaust Assembly with Muffler
3.	1	Air Valve Assembly
4.	4	Flat Washer
5.	4	5/16"-18 x 1" Cap Screw
6.	4	Split Washer
7.	4	5/16"-18 Nut
8.	1	Pneumatic Motor Adaptor Plate
9.	1	Shaft Coupler
10.	4	Socket Head Cap Screw
11.	1	Ball Bearing
12.	1	Bearing Cone Shroud
13.	4	Split Washer
14.	4	3/8"-16 x 1" HHCS
15.	1	Shaft
16.	1	Dispersion Blade
17.	1	Split Washer
18.	1	3/8" - 16 x .75" Cap Screw

# Information Tables

## Torque Specifications

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

Table 10. Cap Screw and Screw Torque Values

	Nominal Size	SAE J429	SAE J429	ASTM A574	ASTM F593
		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
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	1086	346
1-1/4	965	1363	1533	545	

Table 11. Clamp Coupling and Coupler Torque Values

	Largest Bore	Screw	Alloy Steel	Stainless	Hex Size
INCH LBS	3/8	#6-32	28	15	7/64
	1/2	#8-32	49	28	9/64
	5/8	#10-32	76	45	5/32
	3/4	1/4-28	170	110	3/16
	7/8	1/4-28	170	110	3/16
	1	1/4-28	170	110	3/16
	1-1/4	1/4-28	170	110	3/16
	1-1/2	1/4-28	170	110	3/16
FT LBS		5/16-24	27	15	1/4
		3/8-24	47	28	5/16

Table 12. 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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