

MMX Series Mixer Installation Operation & Maintenance Manual

This Installation and Operation Manual includes important warnings and information.

Be sure to keep this information with equipment and ensure all operators read this.

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Safety and Operational Warnings

Please read carefully before unpacking the mixer



The following safety instructions must be COMPLETELY REVIEWED AND FOLLOWED before operating Dynamix Mixers. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY:

- 1. Do not connect to air or electric motor to power source until this Installation operation manual is followed, the mixer is properly assembled and installed as per design
- 2. Each mixer is selected for a specific application. Do not use this mixer in applications other than it was designed and quoted for. Applying a mixer in applications outside of intended use may result in overload conditions which will damage the mixer. If you are unsure of the appropriate application please contact our staff with the relevant mixer serial number.
- 3. Your mixer has been tested and checked for shaft straightness before shipping. Care must be taken while handling the shaft to ensure proper operation.
- 4. It is the operators responsibility to ensure this equipment complies with all local, state / provincial and national fire electrical and safety regulations
- 5. Do not operate the mixer in a manner other than the mixers intended application
- 6. This mixer is intended for professional use only
- 7. Do not alter or modify this mixer
- 8. Follow ALL instructions and warnings set out in this manual
- 9. Ensure mixer is properly grounded
- 10. Ensure all equipment and personnel are clear of all rotating parts
- 11. Do not touch rotating mixer parts
- 12. Some electric motors will run excessively hot under continued load
- 13. Check equipment daily Repair and replace damaged parts immediately
- 14. Do not exceed the working air pressure of 100 psi for air motors



Fire and Explosion Hazard

Improper grounding, poor ventilation, open flames, or sparks can cause a hazardous condition and result in a fire or explosion and serious injury.





The following safety instructions must be COMPLETELY REVIEWED AND FOLLOWED before operating Dynamix Mixers. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY:

Inspection, Receiving and Storage

- 1. Check all crating and boxes for damage, which may have occurred during transit. Report any damage immediately to the carrier and to Dynamix Agitators Inc. Check all parts against packing list to verify that all parts have been received. Report any missing parts to Dynamix Agitators Inc.
- 2. The Dynamix Factory has tested and checked this mixer for operation and shaft straightness before shipping. Care must be taken when handling this mixer to ensure proper operation and longevity.
- 3. Store the mixer in a clean, dry environment, with a relatively constant temperature. Electric motors are easily damaged by moisture. Circulating air will help prevent moisture buildup in the mixer.
- 4. Store the mixer assembly off the floor, covered by plastic. Do not seal the plastic covering, as this will increase the chance of condensation. Use desiccants if possible.



The following safety instructions must be COMPLETELY REVIEWED AND FOLLOWED before operating Dynamix Mixers. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY:



Moving parts hazard: Always shut of the mixer power source (Unplug electric power and disconnect air power source) before performing any maintenance, repair or adjustments. Not doing so can result in serious injury.





The following safety instructions must be COMPLETELY REVIEWED AND FOLLOWED before operating Dynamix Mixers. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY:

Operation Instructions

Important: This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. If you have a question about a procedure or are uncertain about any detail, Do Not Proceed. Please contact Dynamix Agitators for more information or clarification.

Proper operation requires that the following criteria be met:

- 1. Do not uninstall or service this mixer until you have followed your "Control of Hazardous Energy Sources" procedure as per OSHA Guidelines, and the Canadian Occupational Health and Safety Regulations
- 2. Read and fully understand the operation manual before installation and startup
- 3. Avoid operating the mixer in air
- 4. Avoid extended operation when fluid level is at or near the bottom impeller
- 5. Fluid level must be at least one impeller diameter above the lower impeller.
- 6. Check the straightness of the shaft by slowly rotating by hand before operation in fluid
- 7. On start-up jog the mixer in order to ensure the mixer shaft and impeller is not obstructed from rotation
- 8. Check the quotation data sheet for operating speed requirements if a variable speed drive is used
- 9. Reversed rotation may cause overloading and inefficient mixing. Confirm rotation with sticker on side of mixer.
- 10. Fluidize settled solids before starting mixer. Impeller cannot be buried in solids at startup. For best performance axial flow impellers (Dynaflow and Pitch) should be position ½ of their diameter above the tank floor or settled solids.



- 11. If the impeller is buried, disperse any settled solids before starting the mixer,. This may be done using an air hose, re-circulating pump, or a large stick.
- 12. Do not handle the mixer by the shaft. Lifting and handling the mixer by the shaft will cause damage
- 13. Vortexing may occur if the fluid level is too close to the upper impeller. Aeration of the product and excess vibration may occur. When mixing materials of different viscosities or specific gravities, the lighter or less viscous material should be introduced first. Add heavier materials gradually in the center of the tank while the mixer is running. Do not dump large quantities of solids or powders into the tank. This will cause clogging of the impeller and may cause equipment damage.
- 14. Keep motors clean and dry. Air motor intakes and exhaust ports must be clear of foreign material. The electric motors supplied are designed for outdoor use, but may be damaged due to weather. A rain cover may be added to extend motor life.
- 15. Do not run air motors above 2000 RPM. See Pg.8 for proper air consumption and pressure. See the data sheet for the motor size.



General Information Regarding Electric Motors

Overview

Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements. A Warning statement indicates a possible unsafe condition that can cause harm to personnel. A Caution statement indicates a condition that can cause damage to equipment.

Before you operate or perform maintenance, become familiar with the following:

- NEMA Publication MG-2, Safety Standard for Construction and Use of Electric Motors
- 2. The National Electrical Code
- 3. Local codes and Practices
- 4. "Control of Hazardous Energy Sources" procedure as per OSHA Guidelines, and the Canadian Occupational Health and Safety Regulations

Safety Notice: This equipment contains high voltage! Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt installation, operation and maintenance of electrical equipment. Be sure that you are completely familiar with NEMA publication MG-2, safety standards for construction and guide for selection, installation and use of electric motors and the National Electrical Code and local codes and practices. Unsafe installation or use can cause conditions that lead to serious or fatal injury.

Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury. National Electrical Code and Local codes must be carefully followed.



WARNING: Use proper care and procedures that are safe during handling, lifting, installing, operating and maintaining operations. Improper methods may cause muscle strain or other harm.

WARNING: Disconnect all electrical power from the motor windings and accessory devices before disassembly of the motor. Electrical shock can cause serious or fatal injury.

WARNING: Do not use these motors in the presence of flammable or combustible vapors or dust. These motors are not designed for atmospheric conditions that require explosion proof operation.

WARNING: Motors that are to be used in flammable and/or explosive atmospheres must display the UL label on the nameplate. Specific service conditions for these motors are defined in NEC 70-599.

Caution: To prevent equipment damage, be sure that the electrical service is not capable of delivering more than the maximum motor rated amps listed on the rating plate.

Motor Connections

- 1. Wiring: Match the motor starter and overload protection to the motor rating. Follow the control manufacturer's instructions.
- 2. All electrical connections must conform to National Electrical Code and all local regulations. Match line voltage and wire capacity to motor rating found on the motor nameplate.
- 3. Single-phase electric motors may be pre-wired with a six (6) foot electrical cord. If not provided, follow the wiring diagram on the motor for proper connections. Ensure the switch is in the OFF position before connecting to a power supply. Switch the connections to achieve proper rotation.
- 4. Three phase electric motors must be wired according to the diagram on the motor.
- 5. Variable speed DC motors using an SCR controller must be wired following the controller instructions. Before applying power, read the instructions carefully, and make the required adjustments.



General Information Regarding Air Motors

Air motors operate best with lubricated, dry, clean air at air pressures below 100psi.

<u>Air Lubricator</u>: Lubricated air is typically available from the air system. If not, an automatic lubricator must be installed in the air- line ahead of the air motor. Use a pneumatic air lubricant e.g. ISO VG32 or detergent SAE #10 automotive oil. Lubricator should be adjusted to feed one drop of oil for every 50 to 75cfm.

<u>Moisture</u>: Excessive moisture in the air- line can cause rust formation in the motor and ice to form in the muffler. An in-line separator must be used on your pneumatic system to reduce this.

<u>Air Filter</u>; If the air is dirty this will cause the motor to run sluggishly and can break the motor vanes. An in-line filter must be used on your pneumatic system to reduce this.

<u>Pressure Regulator</u>: Air motors are designed to operate with a maximum air pressure of 100 psi. If higher air pressure is supplied, an in-line air pressure regulator should be used to reduce the pressure. This can also be used to vary the speed of the air motor

<u>Flushing</u>: Should excessive dirt, foreign particles, moisture, or excess oil be permitted to enter the air motor, the unit will act sluggish. Flushing the air motor should remove this.



Use only non-combustible solvents. Do not use kerosene or other flammable solvents to flush the air motor. Flushing with Flammable solvents could cause fire or explosion and result in serious injury or property damage. Locktite Safety Solvent or Inhibisol Safety Solvent will reduce this concern. Wear eye protection and flush in a well-ventilated area.

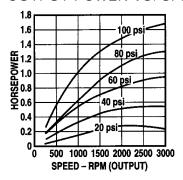
- Disconnect air line and muffler
 Pour several tablespoons of solvent directly into intake port
- 2. Rotate shaft by hand in both directions for 3 to 4 minutes
- 3. Reconnect air line and slowly apply pressure until there is no trace of solvent in the exhaust air
- 4. Re-lubricate motor with a squirt of oil in chamber



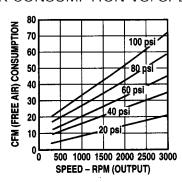
Air Motor Horsepower Rating & Air Consumption

For Air Motors rated at 1.5HP

OUTPUT POWER VS. SPEED

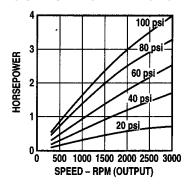


AIR CONSUMPTION VS. SPEED



For Air Motors rated at 3HP

OUTPUT POWER VS. SPEED



AIR CONSUMPTION VS. SPEED

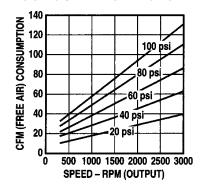


Figure 1

Note:

Output rpm refers to motor output only. Refer to gear ratio on gear reduced units.



Air Motor Rebuilds

Note: Air motor rebuilds are often not worth the parts and labor costs considering with the resulting performance vs. purchasing a new air motor.

Please email or call to request current procedure from Dynamix Agitators Inc. info@dynamixinc.com (604) 244 3771

Air Motors 1.5HP Rating

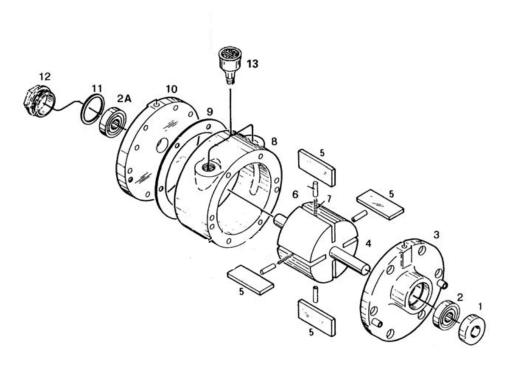


Figure 2

Exploded views are shown for reference only. Units may vary depending upon specific model. Please refer to factory if you are unsure of your model.

 Δ Denotes parts included in the Service Kit.

REF#	DESCRIPTION	QTY
1 Δ	SHAFT SEAL	1
2 Δ	DRIVE END BEARI	NG 2
3	DRIVE END PLATE	1
4	ROTOR ASSY.	1
5 Δ	VANE	4
6 Δ	PUSH PINS	4
7 Δ	VANE SPRINGS	2

8	BODY	1
REF#	DESCRIPTION	QTY
9 Δ	SHIMS	2
10	DEAD END PLATE	1
11 Δ	END CAP GASKET	1
12	DEAD END CAP	1
13	MUFFLER ASSY.	1



Air Motors; 3HP Rating

Please email or call to request current procedure from Dynamix Agitators Inc. info@dynamixinc.com (604) 244 3771

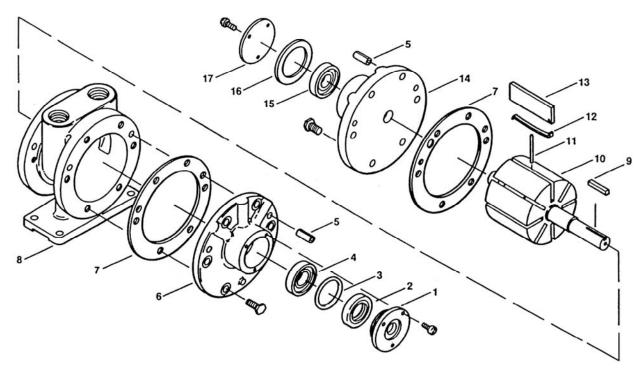


Figure 3

Exploded views are shown for reference only. Units may vary depending upon specific model. Please refer to factory if you are unsure of your model.

REF#	DESCRIPTION	QTY
1	DRIVE END CAP	1
2 Δ	SHAFT SEAL	1
3 Δ	O-RING	1
4 Δ	DRIVE END BEARIN	G 1
5	DOWEL PIN	4
6	DRIVE END PLATE	1
7 Δ	BODY GASKET	2
8	BODY	1
9	KEY	1

REF#	DESCRIPTION	QTY
10	ROTOR ASSEMBLY	1
11 Δ	PUSH PIN	2
12 Δ	VANE SPRING	4
13 Δ	VANE	4
14	DEAD END PLATE	1
15 ∆	DEAD END BEARING	1
16 Δ	END CAP GASKET	1
17	DEAD END CAP	1



Lubrication

Air Motor Connection

Air Motors must always have a filter, lubricator and moisture trap installed on the air supply line. Supply pipe should one size larger than the intake port on the motor. A regulator may be installed to control motor speed. Install the airline on the correct port on reversible motors for proper rotation direction.

Gear Driven mixers are lubricated at the factory using the proper type and amount of lubricant for normal service. For additional information contact Dynamix Agitators. **Air motor** lubricator should be adjusted to feed one drop of oil every 50-75 CFM. Use a SAE #10automotive detergent engine oil.

Mixer shaft bearings are pre-lubed and sealed and do not require re-lubrication.



Trouble Shooting Guide

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Mixer will not start	 Loose connections Incorrect wiring Incorrect voltage Blown fuse Mechanical jamming Water damage to motor 	 Check and tighten connections Check wiring diagram and wire correctly Wire for correct voltage Replace fuse Free all debris for rotation Service or replace motor
Motor runs hot	 Restricted ventilation Amperage overload Low or high voltage Unbalanced voltage between phases Frequent starting and stopping Product too viscous Air motor not lubricated properly Impeller(s) upside down Incorrect rotation 	 Clear vents Contact factory Wire for correct voltage Consult electrician Check with factory. A special motor may be required Check viscosity and specific gravity of product (consult factory) Lubricate (See Lubrication section) Reinstall in correct position Change motor leads per nameplate instructions
Mixer will not reach correct speed	 Air motor vanes / ports dirty Overload of motor Insufficient pressure for air motor Loose drive coupling bolts 	 Flush air motor with non-combustible solvent then relubricate Check amperage against nameplate data Increase air line, compressor size, decrease air compressor distance from air motor Check coupling bolt tension (coupling and/or shaft may be damaged if mixer has been run with slipping coupling



Trouble Shooting Guide

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Excessive Vibration	 Incorrect Mounting Loose locking nut Bent mixer shaft Bent or uneven impeller blades Impeller not immersed in liquid Impeller too close to surface 	 Consult factory Consult factory Consult factory Fill tank Fill tank or lower impeller Restart mixer Clean impeded blade



Terms and Conditions

These Delivered Terms and Conditions (the "Delivered Terms") apply to the purchase of Dynamix Agitators Inc. ("Dynamix", "We" or "Our") products ("Products") by a customer (the "Customer"). Unless otherwise indicated, these terms and conditions will apply to all purchases of Products from Dynamix.

PURCHASE TERMS

The Customer's purchase of Products is governed by: (1) the quotation sent to the Customer for the Products, which sets out the Customer's name and address, the Products covered, price and payment terms (the "Quotation"); (2) the terms and conditions attached to the Quotation; (3) these Delivered Terms; and (4) any additional terms referenced in the Quotation (collectively, the "Agreement").

CONFIDENTIAL INFORMATION

The Product pricing, terms and conditions of sale, the Quotation, and other information contained in or disclosed by Dynamix pursuant to the Agreement is confidential. Customer may not disclose such pricing, terms and conditions, Quotation and other information to any other party without Dynamix's prior written approval, except for any legally required disclosures. Dynamix reserves the right to enforce these confidentiality restrictions against any party who wrongfully discloses, receives or further disseminates Dynamix's confidential information.

WARRANTY

Dynamix warrants to the Customer that the Product will perform substantially in accordance with the features and Solution Assurance as set out in the Quotation and be free from defects in materials and workmanship under normal use.

We warrant that we will modify, repair or replace the Product provided to the Customer, at Our sole discretion and at no charge, Ex Works (Incoterms 2000) Dynamix plant, if the Product is defective in materials or workmanship under normal use. WE DO NOT GUARANTEE THE PRODUCTS AGAINST CHEMICAL OR ABRASIVE ATTACK OR OTHER DETERIORATION DUE TO EXPOSURE.

THE FOREGOING WARRANTIES EXTEND ONLY FOR 12 MONTHS AFTER FIRST INSTALLATION OF THE PRODUCT AT CUSTOMER'S FACILITY OR FOR 18 MONTHS AFTER ITS SHIPMENT FROM DYNAMIX'S PLANT, WHICHEVER PERIOD IS SHORTER, OR AS OTHERWISE STATED IN WRITING BY DYNAMIX.

EXCEPT AS EXPRESSLY PROVIDED IN THE AGREEMENT, WE EXPRESSLY DISCLAIM AND MAKE NO EXPRESS OR IMPLIED REPRESENTATIONS, CONDITIONS, GUARANTEES OR WARRANTIES OF ANY KIND, ORAL OR WRITTEN, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A



PARTICULAR PURPOSE, NON-INFRINGEMENT, INTER-OPERABILITY OF PRODUCTS, USAGE, CUSTOM OR TRADE, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF DYNAMIX. THE ABOVE WARRANTIES SHALL NOT APPLY TO FAILURES RESULTING FROM (A) NORMAL WEAR AND TEAR, (B) ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, MISUSE OR USE INCONSISTENT WITH ANY INSTRUCTIONS PROVIDED AS TO STORAGE, HANDLING, MAINTENANCE, LUBRICATION, INSTALLATION, STARTUP, OPERATION AND SAFETY, (C) IMPROPER INSTALLATION AND/OR (D) INACCURATE AND/OR INCOMPLETE SPECIFICATIONS, DESIGN CONDITIONS OR OTHER DATA FURNISHED BY OR ON BEHALF OF CUSTOMER. WE MAKE NO WARRANTY WHATSOEVER WITH RESPECT TO ACCESSORIES OR PARTS NOT SUPPLIED BY DYNAMIX.

LIMITATION OF REMEDIES

Customer's remedy for breach of any of the foregoing warranties shall be limited to those set forth in Section 0 above; provided, however, that We will not be responsible for removal, loading, installation, freight or similar related expenses in connection with any modification, replacement or repair. The determination of which such remedy shall be applicable shall be determined by Dynamix, in its sole discretion.

DYNAMIX AND ITS AFFILIATES AND REPRESENTATIVES HAVE NO LIABILITY TO CUSTOMER FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR DELAY WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOST OR INTERRUPTED BUSINESS, LOSS OF USE, LOST PROFITS OR LOST REVENUES, HOWEVER CAUSED AND UNDER ANY THEORY OF LIABILITY (INCLUDING, BUT NOT LIMITED TO, CONTRACT, TORT, WARRANTY OR NEGLIGENCE), EVEN IF WE HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE TOTAL LIABILITY OF DYNAMIX AND ITS AFFILIATES AND REPRESENTATIVES TO CUSTOMER AND CUSTOMER'S EXCLUSIVE REMEDY FOR ANY AND ALL CLAIMS ARISING OUT OF OR RELATING TO THIS CONTRACT, INCLUDING, BUT NOT LIMITED TO, THE PRODUCTS PROVIDED HEREUNDER, IS LIMITED TO THE PURCHASE PRICE OF THE PRODUCT THAT IS THE BASIS FOR THE CLAIM.

Customer will be barred from any remedy unless Customer gives Dynamix prompt written notice of the problem. Further, any returns of Products for modification, repair or replacement must be authorized by Dynamix in writing prior to return of the Products by the Customer.

Dynamix will not be responsible for any repairs performed by third parties unless the extent, terms and costs of such repairs are authorized by Dynamix in writing in advance.

PATENTS

Dynamix represents and warrants that, to its knowledge, the Products do not infringe upon any patents granted to others. We do not assume any responsibility or liability for any claim of infringement brought against the Customer, its successors, assigns, customers or users of the Products.



UNAUTHORIZED MODIFICATIONS

Modifications to the Products ordered by Customer, or any of their components, could significantly affect their performance or conformance to Dynamix's features. Any modification of the Products, or any of their components, other than as performed or authorized in writing by Dynamix, is prohibited and will invalidate and terminate Dynamix's warranty for the Products, effective on the date of any such modification.

LEGAL FEES

If a suit or action is brought by any party under this Contract to enforce or interpret any of its terms, or in any appeal therefrom, it is agreed that the prevailing party shall be entitled to reasonable legal fees to be fixed by the trial court and/or appellate court. Customer shall be responsible for any and all costs of collection incurred by Dynamix in connection herewith, including legal fees and costs.

JURISDICTION/VENUE

These Delivered Terms will be governed by and construed in accordance with the laws in force in the Province of British Columbia and the federal laws of Canada, as applicable therein, without regard to its conflict of laws principles. The Parties agree to attorn to the exclusive jurisdiction of the courts of British Columbia.

GENERAL MATTERS

Any assignment of these Delivered Terms will be void without the other party's prior written consent, which will not be unreasonably withheld. Dynamix may hire subcontractors or use its affiliates to perform the obligations under this Agreement. If any part of these Delivered Terms are found invalid, the remaining part will be effective. No waiver, alteration or modification of any of the provisions of these Delivered Terms will be binding on Dynamix, unless made in writing and signed by a duly authorized officer of Dynamix. These Delivered Terms, the Quotation and its attached terms and conditions, and any other terms referenced in the Quotation contain the entire agreement of the parties.





The following safety instructions must be COMPLETELY REVIEWED AND FOLLOWED before operating Dynamix Mixers. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY:

Start-up Checklist

Prior to and during start-up, plea	ase check that the following	g things have been do	ne:
1. Manual has been read a	and followed.		
2. Sufficient protection for motor (if outdoors).			
3. Wiring correctly installed, grounded, and insulated.			
4. All mounting bolts are tigl	4. All mounting bolts are tight		
5. Impeller(s) installed corre	ectly.		
6. Impeller immersed in liqu	6. Impeller immersed in liquid and no equipment		
or obstructions can impac	ct the impeller.		
7. Correct voltage / amperage upon starting			
(Check against motor nar	meplate data).Record:	Volts Amp	os _
8. Excessive noise after sta	rt-up? Record:	db @ 3ft	
*If required			
Inspector		Date	

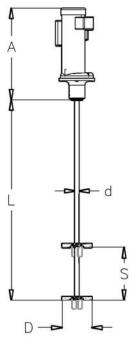


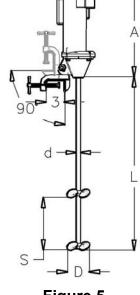
MMX Mixer Mounting Types

2" NPT "Bung" Mount



Drum Lid Mount





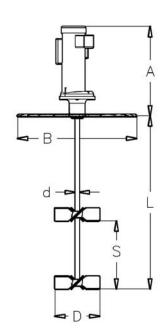


Figure 4

Figure 5

Figure 6

Universal Drum Mount

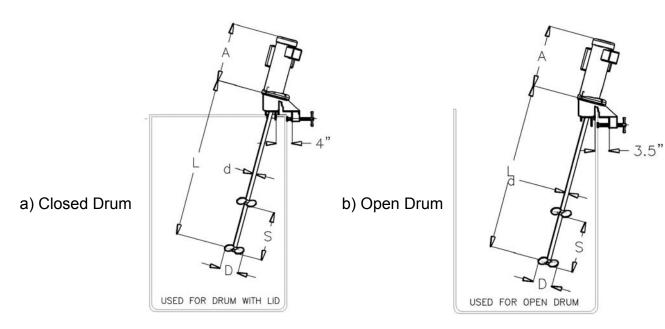


Figure 7 Figure 8