Hart Engineering Corporation

SUBMITTAL:
11310-02

PROJECT: 9722. - Veolia/Taunton WWTP Solids Handling Improvements **DATE: 11/10/2021**

SUBMITTAL: 11310-02 - Thickened Sludge Grinder O&M Manual
REVISION: A
STATUS: Eng
SPEC #: 11310

TO:
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Item	Revision	Description	Status	Date Sent	Date Returned
11310-02	A	Thickened Sludge Grinder O&M Manual	Eng	11/10/2021	
Notes:					

Additional Notes:

Status Codes
1-APP – No Exceptions Taken
2-ANR – Make Corrections Noted
3-R&R – Revise and Resubmit
4-REJ – Rejected
5-IPO – For Information Purposes Only
6-NRR – Not Required for Review
ENG – Submitted to Engineer

Sincerely,
Hart Engineering Corporation

_____ DATE: 11/10/2021

OPERATION and MAINTENANCE MANUAL

Taunton, MA WWTF
Solids Handling Improvements

MUFFIN MONSTER GRINDER
Model 10000-0806
Serial Nos. 115242-1-1, 115242-1-2

MOTOR CONTROLLER
Model PC2220
Serial Nos. 115242-2-1, 115242-2-2

Contractor
Hart Engineering Corporation
800 Scenic View Drive
Cumberland, RI 02864-8706

Manufacturer/Service
JWC Environmental
2600 South Garnsey Street
Santa Ana, CA 92707
Ph: 800-331-2277

Local Representative
Aqua Solutions
154 West Grove Street Unit D
Middleboro, MA 02346
Ph: 508-947-5777

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Taunton, MA WWTF
Solids Handling Improvements

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- Reconditioning Service Policy

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- Operation and Maintenance Manual, Motor Controller PC2220
- Drawings

JWC Environmental®
2850 S. Red Hill Ave., STE 125
Santa Ana, CA 92705
(949) 833-3888

CUSTOMER ORDER

Order Number: **115242**
Date: **11/6/2021**
Page: **1**

Sold To	Ship To
Hart Engineering Corporation 800 Scenic View Dr Cumberland, RI 02864-8706 US - UNITED STATES	Hart Engineering 825 West Water Street Taunton, MA 02780 US - UNITED STATES

CUSTOMER ID	CUSTOMER P.O.	PAYMENT TERMS	FREIGHT TERMS
6002363	9722.102	90% Net 30 Days; 10% NTE 90 Day	Freight Prepaid

SALES REP ID	SHIPPING METHOD	F.O.B.	SHIP DATE
Aqua Solutions	Bestway	Origin	11/11/2021

QUANTITY						T
LI #	ORD	SHP	LOT	PART ID	DESCRIPTION	X

Name & number trucker can call 24 hours prior delivery:
Brian Little 401-302-0092

Days & hours of delivery: M_F 7-3
Is lift gate or forklift needed for truck: No will have a forklift/lull on site

LIQUIDATED DAMAGES apply – capped at 15%

1	2	0	**1**	10000-0806-DI	10000-0806-DI Ship Date 11/11/2021 Model 10000-0806-DI Muffin Monster grinder in a 6 inch dia. pipeline. 10000-0806-DI grinder with 8 inch cutter stack using 11 tooth .310 thick cam cutters in alloy steel tungsten carbide mechanical seals with Buna-N elastomers rated for 90 psi, Cork & Rubber gaskets. 30010-0144 - 3HP TEFC 208-230/460V 182TC 1.15SF Hunter Green Epoxy SN: 115242-1-1, 115242-1-2
10000-CD REV D A10000 REV D					
2	2	0	**2**	PC2200	PC2220-115242 Ship Date 11/11/2021 DWG. #PC2220-115242-A 3HP Grinder Motor 460V/ 3PH/ 60Hz Panasonic PLC Allen-Bradley pilot devices Remote mode status contact One Set of Spare Fuses NEMA 4X Fiberglass Enclosure (18x16x10) Program #PC2220-001-A SN: 115242-2-1, 115242-2-2

JWC Environmental®
2850 S. Red Hill Ave., STE 125
Santa Ana, CA 92705
(949) 833-3888

CUSTOMER ORDER

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SALES REP ID	SHIPPING METHOD	F.O.B.	SHIP DATE
Aqua Solutions	Bestway	Origin	11/11/2021

QUANTITY						T
LI #	ORD	SHP	LOT	PART ID	DESCRIPTION	X
3	3	0		SUBMITTALS	Standard Submittals Ship Date 11/11/2021 For approval: (1) PDF to George, Christiaan (CGeorge@hartcompanies.com (1) PDF Rep: Warren Brown <wbrown@aquasolutionsinc.net (1) PDF Rep: James Deluca <jdeluca@aquasolutionsinc.net	
4	8	0		MANUALS	O&M MANUALS HARD COPY Ship Date 11/11/2021 Standard manuals Ship separately: (1) PDF to George, Christiaan (CGeorge@hartcompanies.com (1) PDF Rep: Warren Brown <wbrown@aquasolutionsinc.net (1) PDF Rep: James Deluca <jdeluca@aquasolutionsinc.net (5) Final copies of complete manuals to customer 9attn: Jim Ramos)	
5	1	0		Shipping	Shipping & Handling Ship Date 11/11/2021	
6	1	0		SU	Start Up Ship Date 11/11/2021 One (1) day of start-up supervision by a factory-authorized representative.	
7	1	0		TARIFF	Tariff Surcharge Ship Date 11/11/2021	

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JWC Environmental
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Santa Ana, California 92707
Phone: 949-833-3888

Reconditioning Service

1. Free Labor

Under the Free Labor Reconditioning Policy, JWC Environmental provides free labor services on refurbishing all Muffin Monster® grinders. When the work is performed by factory personnel at the JWC Environmental service center, there is no labor charge for the reconditioning or replacement of any product component manufactured by JWC Manufacturing (excluding motor, reducer and controllers). The customer pays only for shipping and parts. Upon receipt, the unit will be disassembled and all parts will be factory inspected. After inspection but before commencing work, JWC Environmental® provides a quote on required replacement parts.

Advantages Under This Policy Include:

- New One Year Factory Warranty
- The Latest Design or Specification Change for Maximum Service Life
- Improved Reliability Avoid Uncertainties and Delays Often Associated with Self-Repair
- Reduce Your Maintenance Man-Hours
- Reduce Your Life Cycle Ownership Costs
- Reduce Your Parts Inventory

2. Cutter Cartridge Exchange

Another option is the Cutter Cartridge Exchange Program. Muffin Monster owners can order a factory reconditioned cutter cartridge in exchange for their unit requiring reconditioning. Subject to availability, the replacement cartridge will be shipped in response to a user's request. The factory exchange cutter cartridge is invoiced at a not to exceed price.

In addition to the advantages of the free labor services listed above, the exchange program results in significant reduction of machine down time.

3. Limited Warranty

Reconditioned units are backed by a limited one (1) year warranty for material and workmanship. This warranty covers the reconditioned cutter cartridge only (excludes motor, reducer, and controller).

JWC Environmental Sales /Service

2600 South Garnsey Street
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Fax (714) 549-4007

JWC ENVIRONMENTAL

CHANNEL MONSTER® / MACHO MONSTER / MUFFIN MONSTER® / MINI MONSTER®/ SLUDGE MONSTER®

OPERATION AND MAINTENANCE MANUAL

JWC Environmental®
A Sulzer Brand

OPERATION and MAINTENANCE MANUAL
Muffin Monster® 10000
In-Line Grinder

October 2019

JWC Environmental Inc.
2600 S. Garnsey
Santa Ana, CA 92707

www.jwce.com

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SECTION 1 GENERAL INFORMATION

1.1 PREFACE

This information is the property of JWC Environmental and contains proprietary data. It is not to be reproduced or copied in part, or in whole, without the written consent of JWC Environmental.

The specifications and information in this document are subject to change without notice. Actual equipment performance may vary based on individual configurations, conditions, or other factors.

1.2 INTRODUCTION

SECTION 1 describes and defines the specifications and support information related to the Muffin Monster 10000 grinder. Figures 1-1, 1-2, 1-3 and 1-4 show a standard 4" and 6" configuration grinder and corresponding dimensions.

1.3 DESCRIPTION

The grinder is a two shafted in-line grinding system designed for installation on the suction side of pumps that pulverizes influent solids into a particle size acceptable to sewage type pumps. Solids reduction facilitates free flow and easy disposal of sludge, eliminating the need for treatment plant bar screens, rakes, and other related equipment.

The other components of a typical grinding system are a motor drive mounted to the grinder that provides rotary power for the grinder shafts. Also, a separate motor controller provides operator and automatic controls for the grinder motor. Refer to the corresponding manual or instruction list for details on other components.

MUFFIN MONSTER 10000 technical information grinder:

- Motor options
  - 2 HP (1.5 kW) electric gearmotor
  - 3 HP (2.2 kW) electric gearmotor
  - 2 HP electric motor/speed reducer
  - 3 HP electric motor/speed reducer
- Max. flow: 555 GPM (35 L/S) - 6" flanges
- Maximum working pressure: 90 PSI (620 kPA)
- 6" flange application

FIGURE 1-1 MUFFIN MONSTER 10000 4" FLANGE DIMENSIONS

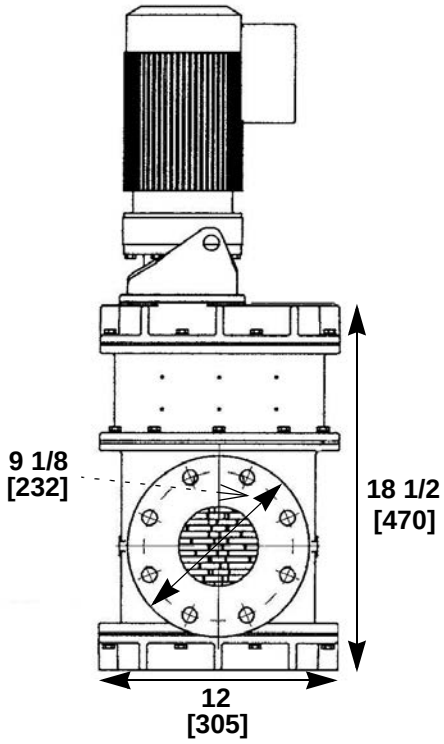

FIGURE 1-2 MUFFIN MONSTER 10000 6" FLANGE DIMENSIONS - B

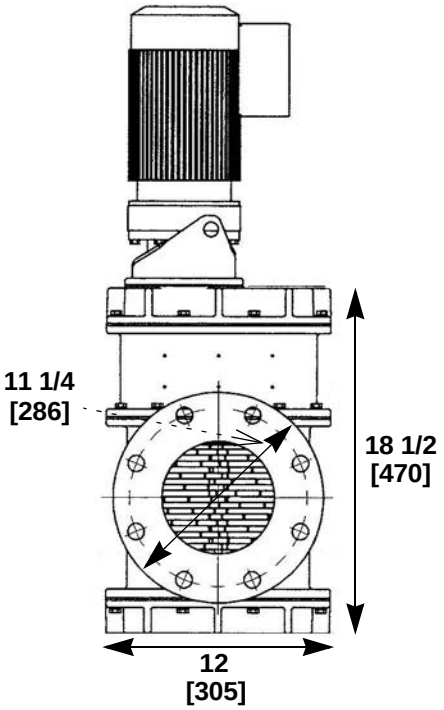

FIGURE 1-3 MUFFIN MONSTER 10000 4" SIDE DIMENSIONS - C

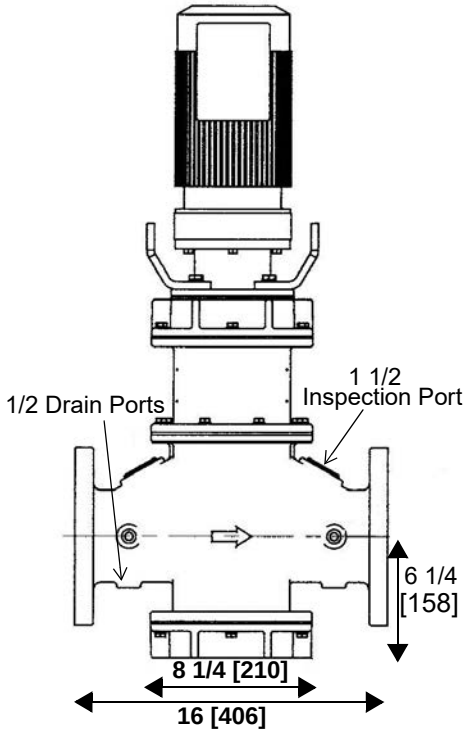

FIGURE 1-4 MUFFIN MONSTER 10000 6" SIDE DIMENSIONS

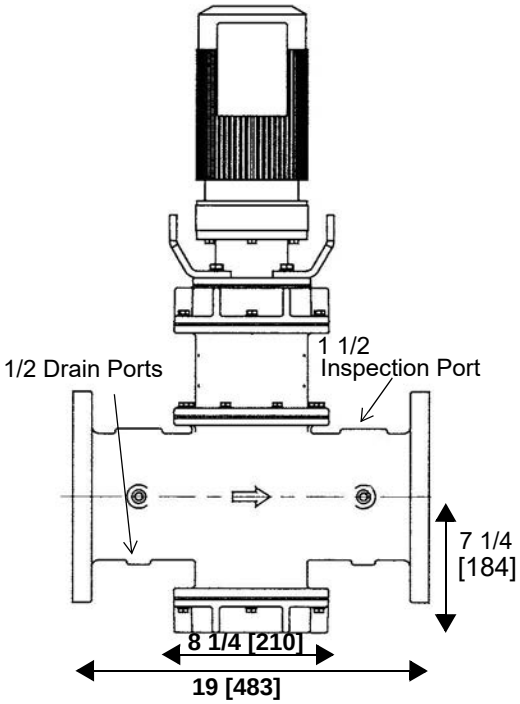

Table 1-1 shows standard grinder configuration specifications; Table 1-2 shows the grinder material.

1.4 LIMITATION OF USE

JWCE considers that the buyers and users of this equipment limit the use of the equipment to the purpose and intent defined at the time of sale. Applications of the equipment other than defined must be in compliance with all applicable local, federal, and area safety rules, regulations, and guidelines.

1.5 DESIGN COMPLIANCE

JWCE considers the equipment described in this manual as satisfying the design criteria for same and/or similar types of equipment. JWCE also considers that the buyers and users of this equipment comply and ensure compliance with the warnings, cautions and notes included in this manual to avoid the potential for injury and/or equipment damage.

1.6 REPAIRS AND RETURNS

Return Authorization must be obtained by calling JWCE if repairs are required. Be prepared to provide the model number and serial number which are located on the nameplate on the grinder top cover. Returned item(s) must be securely packaged and shipped to JWCE.

Contact JWCE Customer Service or a local sales/ service representative for international shipping or questions regarding service.

JWC Environmental
2600 S. Garnsey St.
Santa Ana, CA 92707

800-331-2277
949-833-3888
714-549-4007 (fax)

TABLE 1-1 GRINDER SPECIFICATIONS

Horsepower	3
Motor Type	Electric Motor / Speed Reducer
Motor Configuration	TEFC
Voltage	460 VAC
Frequency	60Hz
Duty	Continuous
Temperature Rating	Operating 23°F (-5°C) to 105°F (40°C) Storage 40°F (5°C) to 105°F (40°C)
Speed Reducer Ratio	29:1
Cutters	11 tooth, 4¾" (120 mm) diameter
Enclosure	Fiberglass

TABLE 1-2 GRINDER MATERIALS (Configuration Dependent)

GRINDER COMPONENT	MATERIAL USED
End Housings	ASTM A536 ductile iron
Top and Bottom Covers	ASTM A536 ductile iron
Cutters and Spacers	Alloy steel
Shafts	AISI 4140 alloy steel, 2" (50 mm) hex
Seal Faces	Tungsten Carbide with Buna-N elastomers

TABLE 1-3 GRINDER CHARACTERISTICS

MODEL	FLOW RATE	PIPELINE SIZE	PRESSURE DROP	APPROXIMATE WEIGHT
10000-0804	275 gpm	4 in	0.36 psi	303 lbs
10000-0806	550 gpm	6 in	1.33 psi	323 lbs

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SECTION 2 SAFETY INSTRUCTIONS

2.1 INTRODUCTION

Operations and maintenance personnel must read and understand the safety instructions listed in this section and throughout this manual before operating or maintaining the grinder. **WARNINGS** (double boxed, upper case), **Cautions** (single boxed, title case), and NOTES inform operations and maintenance personnel of safety concerns and important information crucial to the operation and maintenance of this equipment.

Safety instructions are based on properly trained personnel using good safety practices at all times. JWC Environmental shall not be held liable for any ignorance or disregard of applicable OSHA, federal, state, or local regulations. JWC Environmental shall not be held liable for any damages resulting from controller functions that are triggered as a result of wiring misconnections, wiring shielding errors, and/or other wiring errors not in compliance with OSHA, federal, state, or local regulations.

DO NOT WEAR LOOSE FITTING CLOTHING NEAR JWCE EQUIPMENT.

KEEP PERSONNEL AND UNAUTHORIZED MATERIAL CLEAR OF GRINDER CUTTING CHAMBER.

WEAR EYE AND EAR PROTECTION WHEN STEAM CLEANING ANY COMPONENTS.

DO NOT LIFT HEAVY EQUIPMENT OVERHEAD OF PERSONNEL. ENSURE THAT ADEQUATE ASSISTANCE IS AVAILABLE AND UTILIZED WHEN LIFTING AND TRANSPORTING EQUIPMENT, TOOLS, AND SUPPORT EQUIPMENT/ MATERIALS.

ELECTRICAL HAZARDS EXIST. DO NOT TAKE ELECTRICAL MEASUREMENTS ALONE. VERIFY AND ENSURE POWER TO THE MOTOR CONTROLLER IS REMOVED, LOCKED OUT, AND TAGGED BEFORE PERFORMING ANY INSTALLATION, SERVICE, OR MAINTENANCE TASK INCLUDING REMOVAL OR ATTEMPTING REMOVAL OF ANY OBSTRUCTION FROM THE GRINDER.

JWCE CONTROLLER PANEL CONTROLS DO NOT REMOVE POWER FROM THE CONTROLLER ENCLOSURE. DO NOT USE ANY START/STOP PUSHBUTTON AS A POWER DISCONNECT. SERVICE JWCE CONTROLLERS AND CONNECTED DEVICES ONLY WHEN POWER TO THE CONTROLLER HAS BEEN TURNED OFF, LOCKED OUT AND TAGGED.

DO NOT ATTEMPT ANY MAINTENANCE ON THE EQUIPMENT DURING A POWER LOSS. THE GRINDER MAY START, STOP, REVERSE, OR AUTOMATICALLY RESTART AFTER POWER LOSS AND RECOVERY. ELECTRICAL LOCKOUT PROCEDURES MUST BE PERFORMED PRIOR TO SERVICING ANY EQUIPMENT OR CONNECTED EQUIPMENT.

PERSONAL AND MECHANICAL HAZARDS EXIST DURING THE PERFORMANCE OF THE GRIND TEST.

PERFORM ALL SURFACE PREPARATION AND PAINTING IN A WELL VENTILATED NON-SMOKING AREA THAT IS IN COMPLIANCE WITH ALL APPLICABLE SAFETY REGULATIONS. AVOID PROLONGED EXPOSURE TO VAPORS. USE AN AIR RESPIRATOR/AIR MASK AND CHEMICAL SAFETY GOGGLES/FACE SHIELD.

CUTTERS AND SPACERS ARE SHARP. APPROPRIATE GLOVES MUST BE WORN WHEN INSTALLING OR HANDLING CUTTERS AND SPACERS TO PREVENT INJURY DURING HANDLING.

SECTION 3 INSTALLATION AND CHECKOUT

3.1 INTRODUCTION

SECTION 3 describes installation, checkout, and start-up procedures for the MUFFIN MONSTER 10000 grinder. Review all safety instructions before installing the grinder.

No special equipment is required for grinder installation, only ensure any lifting and handling device is rated for a load capacity greater than the weight of the grinder (approx. weight 200 lbs/90.7 kg).

3.2 UNPACKING AND STORAGE

The grinder is carefully packaged for shipment to the installation site. Do not remove any components from the shipping crate/carton until an inventory is taken.

1. Inspect the shipping container. Immediately report any shipping container damage to the carrier and send a copy to the company representative.

2. Inspect the grinder for missing, loose, or damaged components. The grinder is shipped completely assembled and ready to install. Contact JWCE or an authorized factory representative if parts are loose, missing, or damaged.

3. Inspect the grinder options included with the order. If parts are loose, missing, or damaged contact JWCE or an authorized factory representative.

4. After inspection for shortages and damage close all shipping containers. Store the equipment indoors in the shipping containers in an environment between 40° F (5° C) and 105° F (40° C) until time for installation. Do not re-open the storage container until installation.

The gear motor has been lubricated at the factory. Extended storage may cause grease to separate. A small amount of light oil may leak from greased areas. Unless leakage is excessive (i.e., more than one [1] tablespoon) it does not cause any problems. The grease homogenizes to its original consistency when the gears are run.

For equipment storage exceeding three (3) months prior to installation, contact JWCE Sales Support for storage instructions.

3.3 INSTALLATION

Perform the following procedure to install the grinder in line with the existing piping. A minimum amount of civil work is required during installation. Standard tools, a multimeter and lifting equipment with the proper load rating are all that is required - no special tools. All drive components are factory greased and ready for operation. Figures 3-1, 3-2, and 3-3 show the configurations, clearance, and grinder lift points. Use this information in your installation considerations. Remember, approximate grinder weight is 200 lbs/90.7 kgs.

A minimum of five pipe diameters should be allowed between the grinder discharge and the pump suction if the grinder is installed upstream of a pump.

Read and understand the appropriate motor controller manual before operating the grinder.

FIGURE 3-1 INSTALLATION CONFIGURATIONS

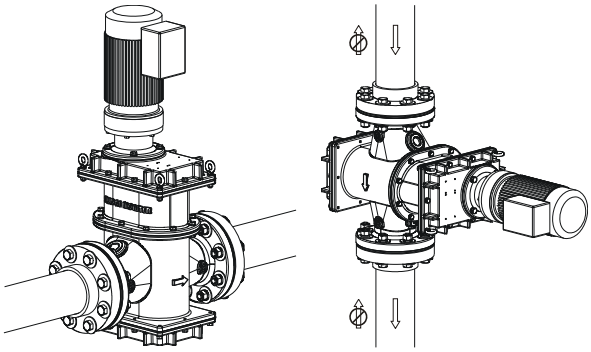


FIGURE 3-2 SUGGESTED CLEARANCE

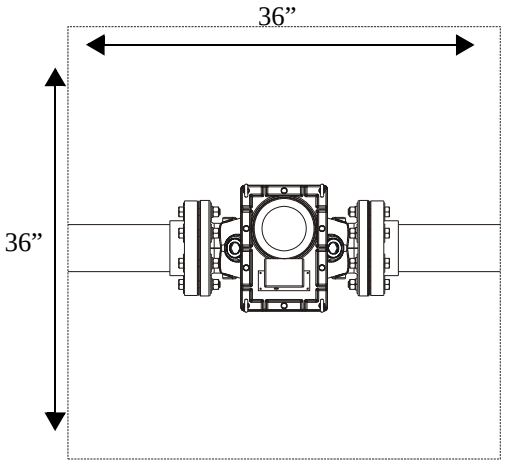
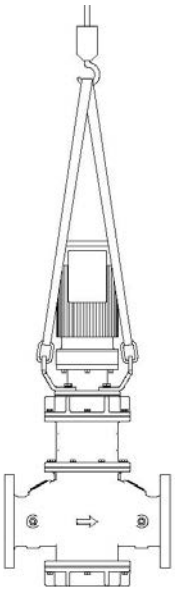


FIGURE 3-3 GRINDER LIFT POINTS



1. Verify that electrical power to the grinder is shut off and tagged out.

2. Locate the flow directional arrows on the main housing. Arrows point in the direction of flow.

3. Attach lifting cables to the lifting lugs as shown in Figure 3-3 to move the grinder into its installation position.

4. Install the flange gaskets and bolt the grinder flanges to their mating flanges in the pipe system. Bolts and gaskets are supplied by others.

5. Connect the electrical power from the grinder drive assembly to the motor controller panel. Refer to the motor controller schematic in the associated motor controller O&M manual and the site installation drawing during installation.

6. Verify that all electrical and mechanical connections are connected and secure. Complete any required customer/user inspection records and forms.

3.4 STARTUP

As has been stated, the motor controller controls grinder operation. Refer to the associated motor controller manual to perform grinder startup.

Verify correct rotation of the cutters by either of the two following methods:

Method 1 - Remove the upstream inspection port plug and visually verify that cutter rotation is converging into the center of the cutter stack. See Figure 6-4 for reference.

Method 2 - Inspect the rotation of the fan on the motor. The fan will be rotating in opposite direction - away from the center - of the cutter stack. This means the shafts (and therefore the cutters) will be converging toward the center of the stack as desired.

3.5 LONG TERM AND PERMANENT SHUTDOWNS

This section describes the steps to perform if the grinder is to be removed from service either permanently or for an extended time. For shutdowns longer than one (1) year, contact JWCE Customer Service for instructions.

3.5.1 Long Term Shutdown (but less than 1 year)

For a long term shutdown remove and lock out electrical power to the motor controller and isolate the grinder from both upstream and downstream flow.

For shutdowns from six (6) months up to one (1) year perform the following procedure.

1. Remove the grinder from its installation site if possible.

2. Steam clean all parts except the drive assemblies and clean the grinder using an appropriate solvent.

3. Rotate the grinder drive assembly for one (1) to five (5) minutes every three (3) months. If the grinder cannot be operated manually, temporarily apply the appropriate power to the grinder drive assembly for one (1) to five (5) minutes. Check for lubricant leakage.

3.5.2 Permanent Shutdown

The following guidelines should be followed when the grinder is being permanently taken out of service.

If returning to JWCE, clean and disinfect the grinder prior to crating for return.

For on-site disposal, clean and disinfect the grinder and components. Disassemble the grinder as described in SECTION 6. Dispose of the motor and components in accordance with local, federal, and national safety and disposal regulations and standards. Apply warning and safety labels to materials and containers where required.

SECTION 4 MAINTENANCE

4.1 INTRODUCTION

SECTION 4 defines maintenance guidelines and identifies the lubricants and procedures required to support the MUFFIN MONSTER 10000 grinder. Review all safety instructions before performing maintenance on the grinder. Refer to SECTION 5 for troubleshooting guidelines. Refer to SECTION 6 for removal and replacement instructions, the grinder exploded view, and the parts list. Refer to the appropriate manuals for motor controller and drive maintenance and troubleshooting information. Contact JWCE Customer Support or a local service representative for any maintenance information questions.

4.2 MAINTENANCE REQUIREMENTS

The following paragraphs describe the scheduled grinder maintenance activities. Recommended maintenance is required to ensure the grinder operates in optimal condition. Refer to Table 4-1 for a summary of maintenance tasks (including lubrication) and Table 4-2 for a list of recommended lubricants.

Contact JWCE Customer Support or a local service representative for questions on lubrication requirements, guidelines, or recommended lubricants. Avoid mixing brands and/or types of lubricants. Contact JWCE if the lubricant identified does not meet requirements.

Tasks are written for personnel experienced in same and/or similar equipment who are familiar with the basic operation, safety, emergency procedures, general plant safety, and use of plant tools/maintenance equipment. Time periods are based on normal operation usage and can be adjusted by the individual users depending on equipment usage and the operational environment. More frequent inspections may be required for grinders operating in a harsh environment or processing corrosive or abrasive material.

TABLE 4-1 INSPECTION AND LUBRICATION SCHEDULE

TASK	SCHEDULE	REFERENCE
Visual inspection	Monthly	Paragraph 4.3.1
Inspect/tighten external fasteners	At startup, then every year	Paragraph 4.3.2
Inspect drive assembly	At startup, then every year	Paragraph 4.3.3
Inspect cutter stack	At startup, then every year	Paragraph 4.3.4
Lubricate grinder drive couplings	Every 5 years	Paragraph 4.4.1
Lubricate drive gears	Every 5 years	Paragraph 4.4.2

TABLE 4-2 RECOMMENDED LUBRICANTS

TASK	TYPE	MANUFACTURER
Cutter stack lubrication	Zep 45 Aerosol Lubricant* WD-40 Aerosol Lubricant	Zep 45 Manufacturing WD-40 Corp.
O-ring and seal cartridge replacement	MPG All Purpose Super Grease*	Nichels Engineering
Greasing of couplings and drive gears	Mystic JT-6 Hi-Temp* Lubriplate 930-AA Mobiltemp 1, 2 or 78 Industrial Grease	Citgo Fiske Bros. Refining Mobil Oil Chevron Texaco
Grinder long term service removal	LPS 3® Rust Inhibitor*	LPS Laboratories
*OEM recommended		

4.3 INSPECTION/MAINTENANCE

The following paragraphs describe the inspection guidelines, preparation for inspection, and the inspection/maintenance defined for the grinder. Refer to the motor controller manual for inspection guidelines and procedures. Refer to SECTION 6 for removal/replacement instructions, grinder exploded view and grinder parts list.

Observe the following guidelines during maintenance:

OPEN, LOCK OUT, AND TAG OUT POWER TO THE CONTROLLER PER SAFETY PROCEDURES.

ISOLATE FLOW THROUGH THE PIPELINE AS REQUIRED TO AVOID INJURY AND/OR DAMAGE FROM FLOW PRESSURES AND/ OR INFLUENT. RELIEVE PRESSURE BY CRACKING OPEN ONE OF THE GRINDER FLANGES.

KEEP PERSONNEL AND UNAUTHORIZED MATERIAL CLEAR OF GRINDER CUTTING CHAMBER.

- Clean gasket surfaces of all gasket material before installing a new gasket.
- Thoroughly clean end housing bores with solvent (methyl ethyl ketone [MEK], acetone or equivalent). Replace housing if bores are scored, pitted, or other damage is identified.
- Replace cracked parts and any part that shows signs of excessive wear.
- Avoid mixing brands and/or types of lubricants. For questions regarding lubricants contact JWCE Customer Support.
- Rinse and steam sanitize the grinder parts except the drive assembly. Use solvent to clean the exterior of the drive assembly.
- Complete all required customer/user inspection records and forms.

4.3.1 Visual

Check the grinder for leakage, vibration, noise, or solids buildup on cutters and side rails, especially cloth or paper wrapping. Check grinder output for proper solids reduction.

4.3.2 External Fasteners

Check grinder external fasteners, especially gasket and flange fasteners, and tighten if loose.

4.3.3 Drive Assembly

Check that the grinder drive is free of contaminants and that there is no sign of damage, overheating or lubricant leakage. Check the hardware securing the drive to the grinder for tightness.

4.3.4 Cutter Stack

Isolate grinder from flow and remove the upstream inspection port to check the cutter stack. Check cutters for damage or wear. Damaged or worn cutters must be replaced if solids are not being properly reduced or if the grinder jams excessively.

Check cutter stack tightness by inserting a long screwdriver or similar tool in between adjacent cutters on each shaft and moving the tool up and down. Verify none of the cutters or spacers shift along the shaft when pressure is exerted. Cutters must be removed, cleaned, restacked and lubricated if any cutters or spacers shift along the shafts.

4.4 LUBRICATION

Observe the following when lubricating the grinder:

- Set the motor controller grinder switch to OFF and open any motor controller circuit breaker or disconnect switch. Remove, lock out and tag out supply power before lubricating any component.
- Avoid mixing brands and/or types of lubricants.
- Complete customer/user inspection records and forms if required.

4.4.1 Grinder Drive Couplings

Remove the drive per SECTION 6 instructions. Carefully remove old grease if required and

replace with new grease per Table 4-2 and Paragraph 6.2.7.

4.4.2 Drive Gears

Remove top cover per SECTION 6 instructions. Carefully remove old grease and replace with new grease per Table 4-2. Replace top cover.

4.5 PARTS INFORMATION

The parts list included in SECTION 6 identifies the parts for the standard configuration of the Muffin Monster 10000 grinder. JWCE does not recommend the stocking of replaceable parts as spares but rather recommends the user refer to the JWCE FREE LABOR POLICY for an alternative to stocking parts which may or may not be used.

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SECTION 5 TROUBLESHOOTING

5.1 INTRODUCTION

SECTION 5 describes MUFFIN MONSTER 10000 grinder troubleshooting. Review all safety instructions before troubleshooting the grinder. Table 5-1 is a troubleshooting guide for the grinder itself; Table 5-2 is a troubleshooting guide for the grinder motor. Refer to SECTION 6 for the appropriate removal and replacement instructions based on troubleshooting results. Refer to the motor controller and drive manuals for causes and possible solutions for problems not related to the grinder.

The grinder normally operates smoothly and quietly. Verify main power is available before troubleshooting. Power off and tag out main power to the motor controller if any excessive noise or temperature rise is observed and, importantly, prior to any grinder inspection operation.

PERSONAL AND MECHANICAL HAZARDS EXIST WHEN THE GRINDER IS RUNNING. POWER OFF AND TAG OUT GRINDER PRIOR TO TROUBLESHOOTING.

ELECTRICAL HAZARDS EXIST WHEN TAKING VOLTAGE AND CURRENT MEASUREMENTS. DO NOT TAKE ELECTRICAL MEASUREMENTS ALONE.

TABLE 5-1 GRINDER TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Solution
Grinder making noise.	Cutter stack loose.	Check stack tightness. If loose, remove, inspect, clean, and tighten. Replace any damaged or worn cutters and spacers.
	Damaged cutter(s) or spacer(s).	Replace damaged cutter(s) or spacer(s).
	Seal or bearing failure.	Replace failed grinder seal cartridge.
	Drive gears not sufficiently greased.	Clean and re-grease gears (replace gears if damaged or excessive gear wear has occurred).
	Motor bearing or reducer may require grease.	Contact JWCE.
Cutter drive shaft not rotating.	Broken drive shaft below drive gear.	Replace drive shaft and check for ancillary damage. Return part to JWCE.
Cutter driven shaft not rotating.	Driven gear key failure.	Replace key if broken or missing. Contact factory if gear or shaft keyway is damaged.
	Broken driven shaft.	Replace driven shaft and check for ancillary damage (return to factory).

TABLE 5-1 GRINDER TROUBLESHOOTING GUIDE (Cont'd)

Both cutter drive and driven shafts not rotating.	Drive coupling failure; drive lugs worn.	Replace coupling assembly.
	Broken drive shaft.	Replace drive shaft and check for ancillary damage. Return part to JWCE.
	Grinder gearmotor failure.	Replace gearmotor.
	Grinder motor coupling key failure (applies only to drives with separate motor/reducer).	Replace coupling key(s) if broken or missing. Contact JWCE if shaft keyways are damaged.
	Grinder motor coupling failure (applies only to drives with separate motor/reducer).	Replace coupling assembly. Check coupling keys for damage or wear.
Head drop across grinder excessive.	Downstream water conditions different from what was originally provided at application stage.	Refer to performance flow curve to determine required flow conditions. Contact JWCE for assistance.
	Cutting stack clogged with debris.	Remove debris from cutters. Replace cutters if excessive wear is found.
	Solids content of sludge higher than expected.	Reduce solids loading or decrease duty cycle.
Grinder reverses excessively, but continues to run.	Cutters are worn and cannot effectively grind material.	Replace cutters and spacers.
	Excessive solids loading or duty cycle.	Reduce solids loading or decrease duty cycle.
	Grinder current sensor reverse threshold set too low.	Contact JWCE for assistance.
	Excessive friction on components.	Refer to Symptom - *Grinder making noise*.
Debris buildup on drive shaft spacers.	Cutters excessively worn.	Replace worn cutters.
Motor controller indicates Grinder Overload.	Unusually large or troublesome solids entered grinder chamber.	Locate and remove troublesome solids from waste stream. Reset controller and restart grinder per the controller O&M.
	Excessive solids loading or duty cycle.	Reduce solids loading or decrease duty cycle.
	Cutters excessively worn.	Replace worn cutters.
Motor controller indicates Grinder Motor Overload. The grinder motor current draw exceeds duration established by the controller.	Excessive solids loading or duty cycle.	Reduce solids loading or decrease duty cycle.
	Excessive friction on components.	Refer to Symptom - *Grinder making noise*.

TABLE 5-2 GRINDER MOTOR TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Solution
Motor does not start.	Line trouble such as single phasing at motor starter.	Check power source, overloads, fuses, controls, etc.
Excessive humming.	High voltage.	Check line connections.
	Eccentric air gap.	Contact factory to have motor serviced.
Motor overheating.	Overloading of motor due to excessive friction or duty cycle.	Remove unwanted friction in motor; reduce the duty cycle of equipment.
	Single phasing or unbalanced voltage.	Verify the current for each motor leg. The current for each leg should be approximately equal - if not, isolate and correct.
	Improper ventilation.	Verify cooling fan is operating correctly; increase ventilation of motor; reduce ambient heat on motor.
	Rotor rubbing on stator.	Contact JWCE to have motor serviced.
	Over or under voltage.	Check input voltage on each leg.
	Open stator winding.	Check voltage on all legs.
	Grounded winding.	Perform dielectric test and repair as required.
	Improper connections.	Inspect all electrical connections for proper termination, clearance, mechanical strength, and electrical continuity. Refer to motor lead connections.

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SECTION 6 ASSEMBLY, REMOVAL AND REPLACEMENT

6.1 INTRODUCTION

SECTION 6 describes the MUFFIN MONSTER 10000 grinder assembly and component removal and replacement. Review all safety instructions before removing and replacing grinder assembly or components. Grinder components can be reused unless broken or worn. Contact JWCE Sales Support for questions regarding grinder service.

The following guidelines must be observed when assembling and installing, or removing and reinstalling the grinder.

ISOLATE THE GRINDER FROM FLOW THROUGH THE PIPELINE AND RELIEVE ANY REMAINING PRESSURE.

OPEN, LOCKOUT, AND TAG POWER AT THE DISCONNECT (OR CIRCUIT BREAKER) TO THE CONTROLLER BEFORE ANY DISASSEMBLY OR REASSEMBLY PROCEDURES.

WEAR EYE AND EAR PROTECTION WHEN STEAM CLEANING ANY COMPONENTS. COMPLY WITH ALL OSHA AND OTHER REGULATORY AGENCY SAFETY REQUIREMENTS.

DO NOT WEAR LOOSE FITTING CLOTHING NEAR THE GRINDER.

USE EXTREME CARE WHEN USING ANY SOLVENT.

CUTTERS AND SPACERS ARE SHARP. APPROPRIATE GLOVES MUST BE WORN WHEN INSTALLING OR HANDLING CUTTERS AND SPACERS TO PREVENT INJURY DURING HANDLING.

6.2 MUFFIN MONSTER 10000 ASSEMBLY

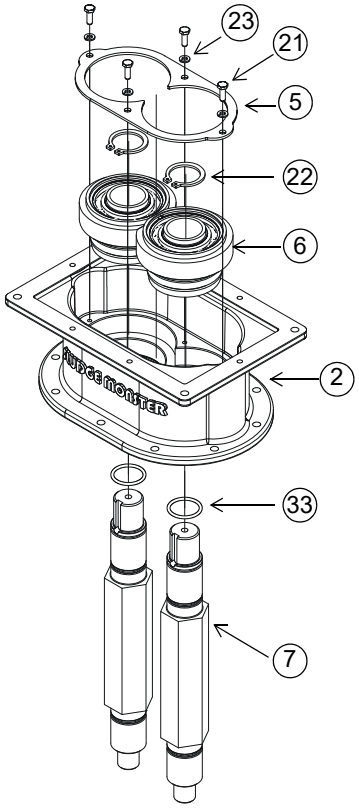
The following procedures describe how to assemble a Muffin Monster 10000. Before you begin be sure to read through these items to ensure a properly operating unit when installed.

- Clean housing bores thoroughly with solvent (Simple Green® or equivalent).
- Verify all parts/components being assembled (or reassembled) are clean and free of excess lubricant and gasket material.
- Inspect shaft top and bottom seal assemblies. Mating surfaces must be clean and polished.
- Inspect all parts for cracks, nicks, burrs, excessive wear, or obvious signs (or suspected areas) of damage. Replace all damaged/suspected parts. Sealed bearings cannot be re-greased - must be replaced.
- When a procedure specifies lubrication, refer to Table 4-2 for the recommended lubricant.
- Complete all required customer/user inspection records and forms if required.

6.2.1 Assembly Top End Housing

This section gives the steps for assembling the top end housing. Figure 6-1 is an illustration showing the parts the top end housing comprises.The circled numbers in this figure (and the following figures) correspond to the parts list shown in Table 6-2.

FIGURE 6-1 TOP END HOUSING



1. Lubricate the top end housing bores (2) and install the seal cartridges (6) into the top end housing.

2. Install the seal plates (5).

3. Apply three drops of Loctite Threadlocker Red 271 to the bolt fastener threads (21) and install.

4. Lubricate the O-rings (33) and install them into the grooves at the top of the shafts (7) near the hex.

5. Turn the end housing on its side.

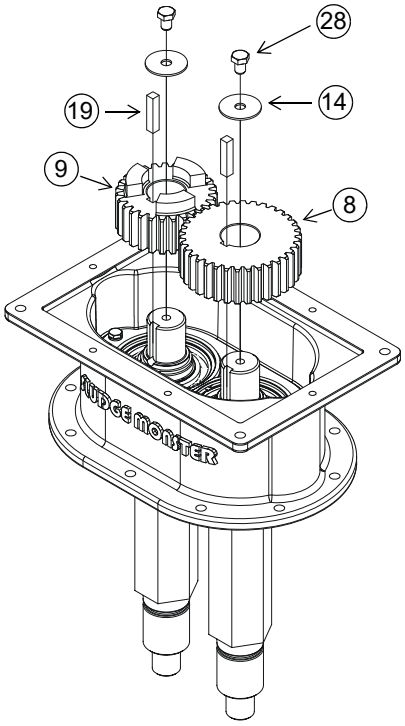
6. Insert one of the shafts into the seal cartridge (it doesn't matter which shaft).

7. Install the retaining ring (22) in the shaft groove, ensuring that the side with the sharper edge of the retaining ring faces away from the seal cartridge.

8. Repeat with the other shaft.

9. Install gears (8) and (9) on top of shafts (it doesn't matter which gear on which shaft at this point). See Figure 6-2.

FIGURE 6-2 GEAR INSTALLATION



10. Install keys (19).

11. Apply three drops of Loctite Threadlocker Red 271 to the bolt threads (28) and install the retaining hardware (14) and (28) to the top of the shafts.

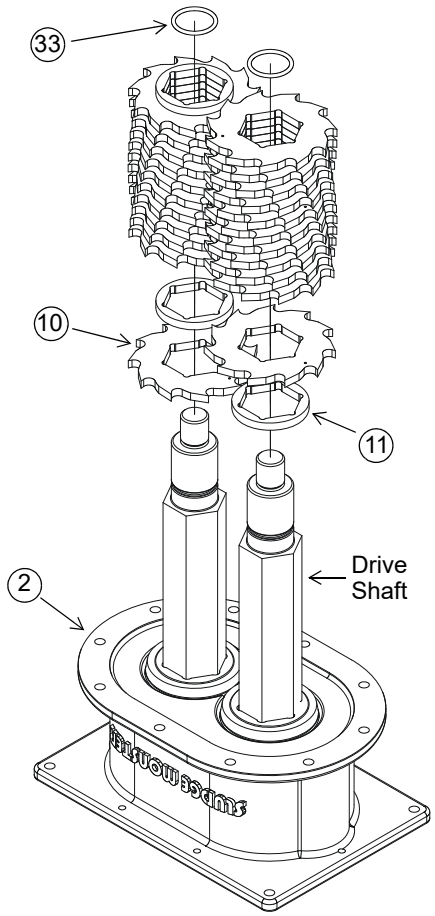
12. The shaft with the smaller gear with drive lobes (9) is now the **drive shaft**.

13. Install the cutters and the spacers according to the procedure shown in Paragraph 6.2.2.

6.2.2 Install Cutters and Spacers

Install the cutters and spacers as follows, using Figures 6-3 and 6-4 as a reference.

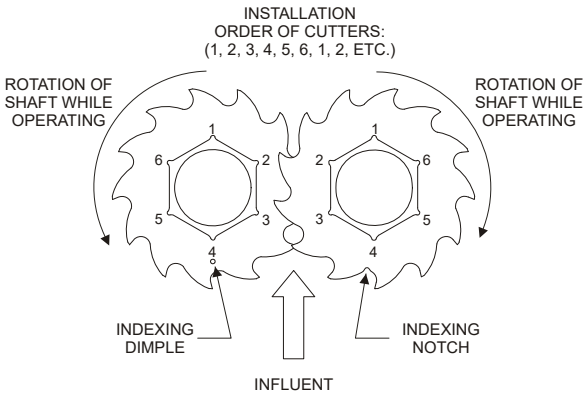
FIGURE 6-3 CUTTER/SPACER STACKING



1. Position the top end housing/shaft assembly (2) as shown (upside down) so that the shafts are vertical and the threads are at the top. The drive shaft should be to your right as you face the **influent** side of the grinder.

2. Install the first spacer on the drive shaft as shown in Figure 6-3 and the first cutter on the driven shaft, orienting the cutters as shown in Figure 6-4.

FIGURE 6-4 CUTTER ORIENTATION



3. Install a spacer on the driven shaft and a cutter on the drive shaft, rotating the indexing dimple or notch by one position (Figure 6-4).

4. Continue until all cutters and spacers are installed - a spiral pattern results.

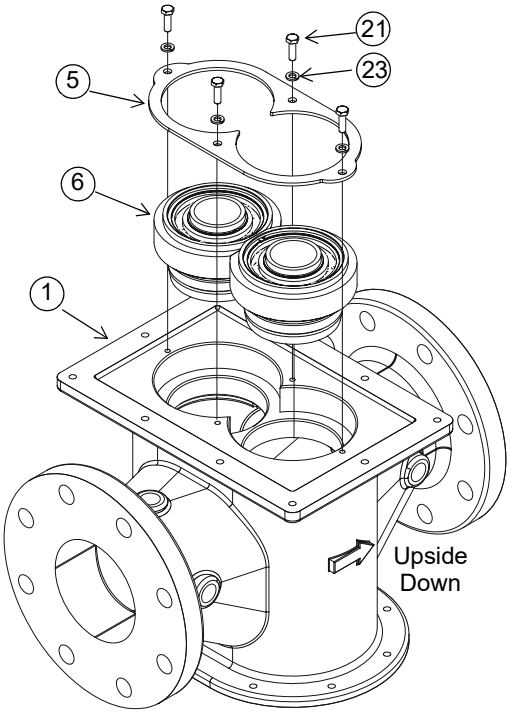
5. Lubricate the O-rings (33) and then install one each in the grooves at the top of the shaft near the threads (as was done at the other end of the shafts in Paragraph 6.2.1).

6. Set the assembly aside for now and prepare the main housing.

6.2.3 Prepare Main Housing

Follow these steps to prepare the main housing (see Figure 6-5 for reference).

FIGURE 6-5 MAIN HOUSING



1. Place the main housing (1) on its top so that the bottom of the housing faces up. Lubricate the bores and install the seal cartridges (6) into the bottom of the main housing.

2. Install the seal plate (5).

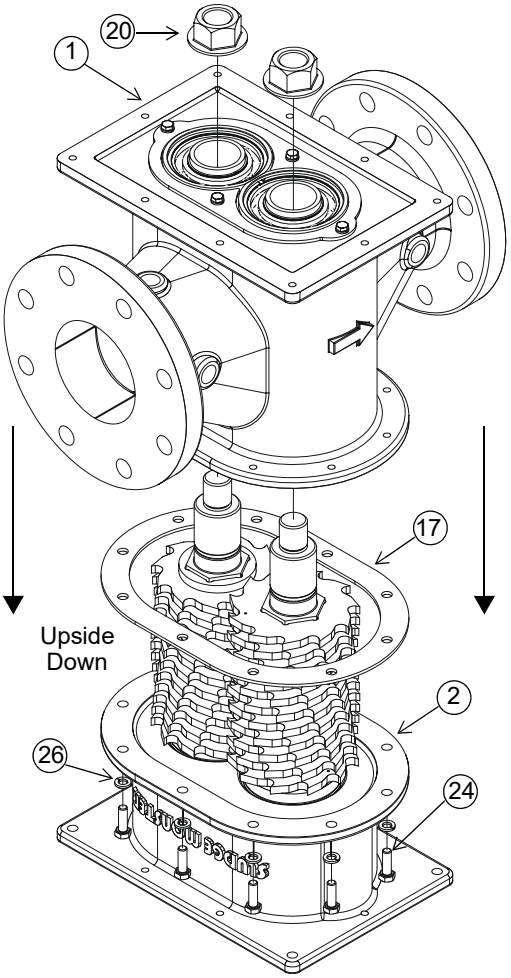
3. Apply three drops of Loctite Threadlocker Red 271 to the bolt fastener threads (21) and install with the lock washer (23).

4. Go to the next procedure to attach the main housing to the earlier assembled top housing with cutter stack.

6.2.4 Attach Main Housing to Top Housing

The following steps show the procedure for attaching the main housing (1) to the top end housing (2) (use Figure 6-6 for reference).

FIGURE 6-6 MAIN HOUSING TO TOP HOUSING ATTACHMENT



1. Place the main body gasket (17) on the main housing (1).

2. Using a lifting device, carefully lower the main housing over the stack of exposed shaft ends, taking care to align the shaft hex with the hex socket in the seal cartridges. **THIS IS VERY IMPORTANT - USE CARE**.

3. Apply three drops of Loctite Threadlocker Red 271 to shaft threads and with finger-tight pressure install a flanged hex nut (20) on each shaft.

4. Fasten the top housing to the main housing using the provided appropriate fasteners (24) and (26).

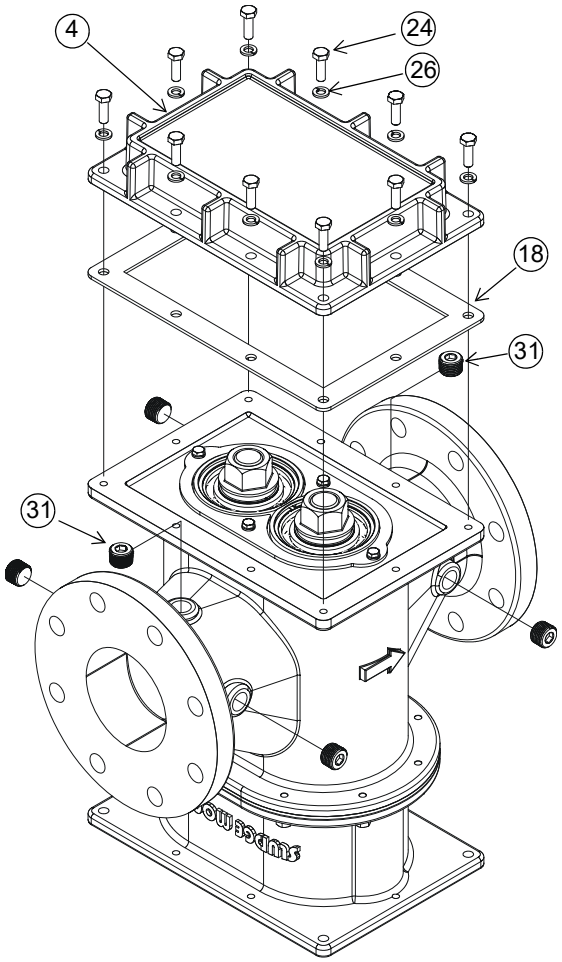
5. Torque each shaft hex nut (20) to 135 ft. lb.

6. Install the bottom cover as explained in the next section.

6.2.5 Install Bottom Cover

This section gives the steps to install the bottom cover. Follow the steps and use Figure 6-7 for reference.

FIGURE 6-7 BOTTOM COVER INSTALLATION



1. Place the bottom cover gasket (18) on the bottom cover (4).

2. Install the bottom cover and fasten with the provided appropriate fasteners (24) and (26).

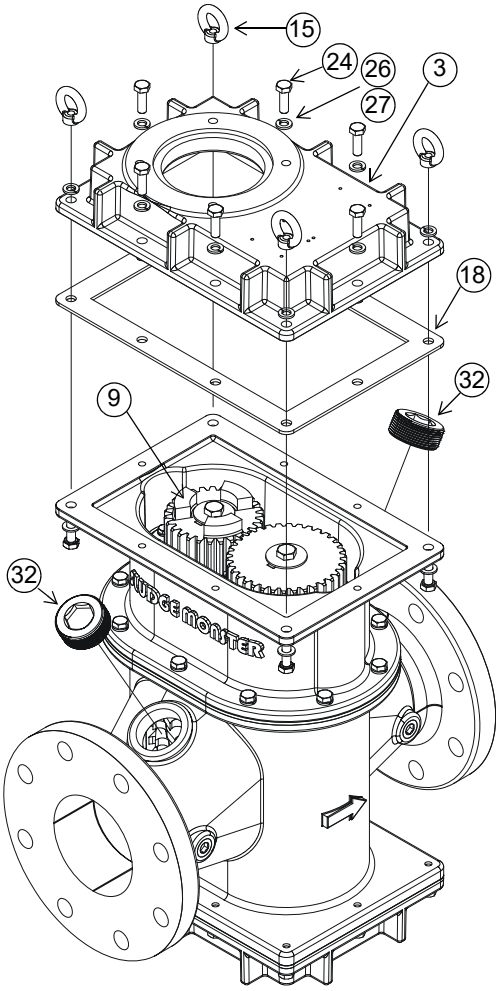
3. Install the pipe plugs (31) in the main body (use teflon pipe thread).

4. Install the top cover. See the next section for top cover installation steps.

6.2.6 Top Cover Installation

The procedure below gives the steps for installing the top cover. Use Figure 6-8 for reference.

FIGURE 6-8 TOP COVER INSTALLATION



1. Position the assembly right side up so that the gears are now facing upward.

2. Apply grease to the gear housing and gears.

3. Apply a light coating of grease to the drive lobes of the drive gear (item 9 in Figure 6-8).

4. Place the top cover gasket (18) on the top cover (3).

5. Install and fasten the top cover (3) using the provided appropriate fasteners (24), (26), (27).

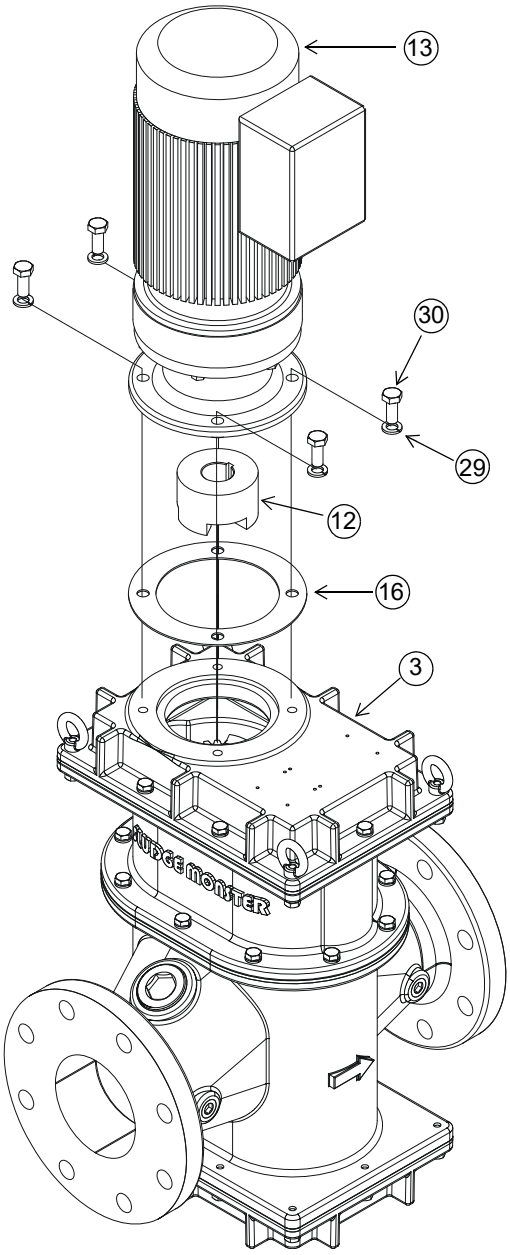
6. Install all four lifting eyes (15).

7. Install the drive motor according to the steps shown in the next section.

6.2.7 Drive Motor Installation

These steps give the procedure for installing the drive motor on the Muffin Monster 10000. Use Figure 6-9 for reference.

FIGURE 6-9 DRIVE MOTOR INSTALLATION



1. Place the drive gasket (16) on the top cover (3).

2. Install the interlocking coupling half (12) on the motor drive shaft.

3. Apply a light coating of gear grease to the lobes of the coupling half (12).

4. Install the drive motor (13) to the grinder top cover (3), orienting the motor as shown in Figure 6-9.

5. Fasten the drive motor using the provided appropriate fasteners.

6.3 GRINDER REMOVAL

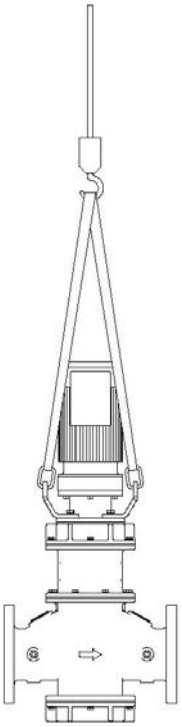
The grinder can be removed from the installation without any disassembly and/or component removal. The following procedure describes the removal of the grinder from installation.

DO NOT LIFT HEAVY EQUIPMENT OVERHEAD OF PERSONNEL. ENSURE THAT ADEQUATE ASSISTANCE IS AVAILABLE AND UTILIZED WHEN LIFTING AND TRANSPORTING ANY EQUIPMENT.

1. Verify that the main power is disconnected from the motor controller.

2. Attach the lifting cables to all hoisting rings on the top cover as shown in Figure 6-10.

FIGURE 6-10 LIFTING WITH HOIST



3. Disconnect the grinder at the inlet and outlet flanges.

4. Lift the grinder and set the grinder on the bottom cover on a level surface.

Replacing the grinder in the installation after assembly or maintenance is the same as the installation instructions in SECTION 3.

6.4 GRINDER COMPONENT REPLACEMENT

The following paragraphs contain procedures to replace grinder components. Place removed components on a clean, flat, work surface to avoid damage and facilitate inspection.

Refer to Figure 6-11 and Table 6-1 for grinder part location and parts list. Ensure that all mating surfaces are clean during grinder component replacement. Clean any gasket residue and replace gasket if required. It is always a good idea to have spare gaskets on hand in the event of damage when performing maintenance tasks.

6.4.1 Main Body Removal and Replacement

Remove the main body of the Muffin Monster 10000 by following these steps:

1. Isolate the grinder from flow and remove from pipeline.

2. Remove the drive (in order to turn the unit upside down).

3. Cover the exposed gear opening to prevent grease contamination.

4. Turn the unit upside down.

5. Remove the bottom cover.

6. Remove the stack nuts from the shafts.

7. Remove the main body.

6.4.2 Cutter and Spacer Removal

Perform the following procedure to remove and replace the grinder cutters and spacers. Refer to Paragraph 6.4.3 for cutter and spacer stacking.

CUTTERS AND SPACERS ARE SHARP. APPROPRIATE GLOVES MUST BE WORN WHEN INSTALLING OR HANDLING CUTTERS AND SPACERS TO PREVENT INJURY DURING HANDLING.

1. Isolate the grinder from flow and remove from pipeline.
2. Remove the drive (in order to turn the unit upside down).
3. Cover the exposed gear opening to prevent grease contamination.
4. Turn the unit upside down.
5. Remove the bottom cover.
6. Remove the stack nuts from the shafts.
7. Remove the main body.
8. Remove cutters and spacers.

6.4.3 Stacking Cutters and Spacers

Verify that the correct quantity of cutters and spacers for the grinder are on hand. Refer to Table 6-2.

Verify all cutters and spacers are clean, free of cracks, signs of excessive wear, and/or other obvious signs of damage.

Verify the cutter drive and driven shafts are free of any burrs. File and clean off any burrs.

Follow the procedure given in Paragraph 6.2.2 for correct cutter and spacer stacking.

Verify That Foreign Material Does Not Become Trapped Between the Stack Components. Trapped Material Can Affect Stack Height and Cutter Meshing Tolerance.

6.4.4 Gear and Shaft Removal and Replacement

Follow these steps for gear and shaft replacement.

1. Remove the main body and cutters/spacers as described in previous procedures.
2. Remove the retaining fasteners from the top of the shafts.
3. Remove the gears and keys.
4. Remove grease.
5. Remove the retaining ring from each shaft.
6. Remove the shafts.
7. Remove the shaft O-rings.
8. Reinstall the gears and shafts beginning with the Assembly - Top End Housing, Paragraph 6.2.1, and proceeding through the necessary steps.

6.4.5 Top End Housing Removal

1. Remove the main body and cutters/spacers as described in previous procedures.
2. Remove the retaining fasteners from the top of the shafts.
3. Remove the gears and keys.
4. Remove grease.
5. Remove the retaining ring from each shaft.
6. Remove the shafts.
7. Remove the seal plate.
8. Remove the seal cartridges (a hydraulic press may be necessary to **remove** the seal cartridges - not for installation).

The top end housing is now isolated and is subject to maintenance or replacement.

6.4.6 Seal Cartridge - Top, Inspection and Removal

Do Not Attempt To Repair Or Grease The Seal Cartridge Assembly. Replace If Damaged Or If Wear Is Observed.

Handle End Housing With Care. Polished Seal Surfaces Can Be Damaged If The Housing Is Dropped Or Mishandled.

1. Remove the top end housing as described in a previous procedure.
2. Remove the seal cartridge (a hydraulic press may be necessary to **remove** the seal cartridges - not for installation).
3. Inspect the cartridge and replace if necessary.

6.4.7 Seal Cartridge - Bottom, Inspection and Removal

1. Remove the main body as described in a previous procedure.
2. Remove the seal plate.
3. Remove the seal cartridge (hydraulic press may be necessary to **remove** the seal cartridges, not for installation).
4. Inspect the cartridge and replace if necessary.

6.5 GRIND TEST

Perform a grind test per the following procedure before installing the grinder if the cutter assembly or cutters have been removed and replaced.

PERSONAL AND MECHANICAL HAZARDS EXIST DURING THE PERFORMANCE OF THE GRIND TEST.

1. Temporarily connect the appropriate wiring to supply power to the grinder motor.
2. Apply power to the grinder. Verify the grinder is running with no excessive noise or vibration and cutters are rotating correctly.
3. Carefully insert a piece of wood into the grinder cutting chamber. Verify the wood is reduced by the cutters. Remove power.
4. Clean any debris left over from the grind test prior to installing the grinder as described in SECTION 3.

6.6 OPTIONAL MOTOR/REDUCER ASSEMBLY

One of the options JWC provides is an electric motor with reducer. The motor/reducer combination can be TEFC, SUPER-E,WASHDOWN, XPFC or immersible type. Figures 6-11 through 6-13 show the motor/reducer dimensions. Part numbers and part locations for the reducer and connecting hardware can be found on the drive assembly drawing in the drawings section of this document. Following is an exploded view of the grinder with part number callouts. The part numbers are shown in Table 6-1. There are different cutter options offered which allow for customization of the grinder for specific purposes. The cutter/spacer combination, type and quantity is shown in the cutter drawing in the drawings section of this document.

FIGURE 6-11 OPTIONAL MOTOR/REDUCER DIMENSIONS

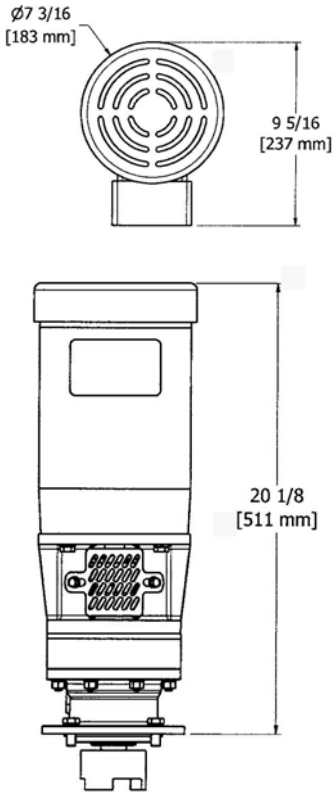


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FIGURE 6-12 OPTIONAL TEFC, SUPER-E, WASHDOWN, XPFC MOTOR/REDUCER - EXTENDED SHAFT

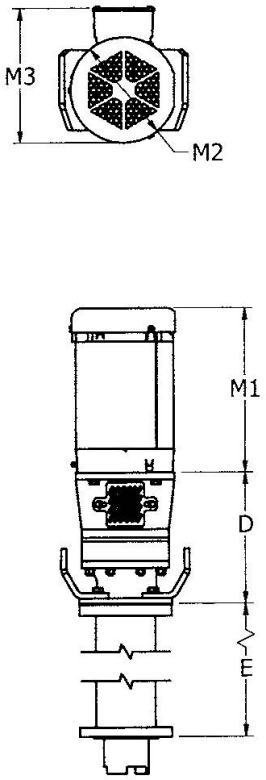

FIGURE 6-13 IMMERSIBLE MOTOR

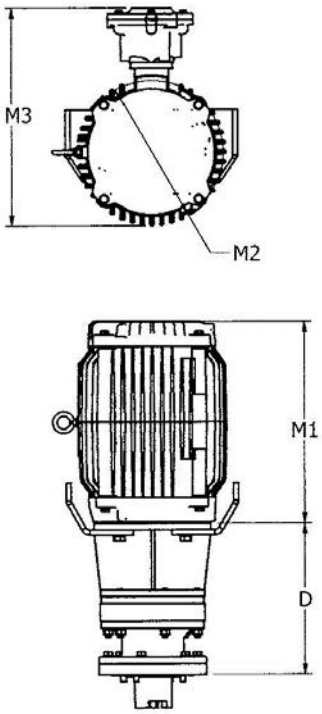

TABLE 6-1 ELECTRIC MOTOR DIMENSIONS

Motor Type	HP	M1	M2	M3	WEIGHT
TEFC	2	11 3/16 (284	7 3/16 (183)	9 3/8 (238)	41 (18.6)
	3	13 7/16 (341)	7 3/16 (183)	9 5/16 (237)	60 (27.2)
SUPER-E	2	10 7/8 (276)	8 (203)	10 3/8 (264)	59 (26.8)
	3	13 1/8 (333)	8 1/2 (216)	11 15/16 (303)	98 (44.5)
WASHDOWN	2	13 3/8 (340)	7 3/16 (183)	9 5/16 (237)	41 (18.6)
	3	13 7/16 (341)	7 (178)	9 5/16 (237)	62 (28.1)
XPFC	2	13 1/8 (333)	7 1/8 (181)	10 3/16 (259)	60 (27.2)
	3	16 1/4 (413)	8 5/8 (219)	11 13/16 (300)	91 (41.3)
IMMERSIBLE	2	15 3/4 (400)	11 7/16 (291)	17 (432)	205 (92.9)
	3	15 3/4 (400)	11 7/16 (291)	17 (432)	212 (96.2)
REDUCER SPOOL DIMENSION INCLUDING ADAPER (D)					
	2	9 (229)			
	3	11 15/16 (303)			

FIGURE 6-14 MUFFIN MONSTER 10000-0004/0006 EXPLODED VIEW

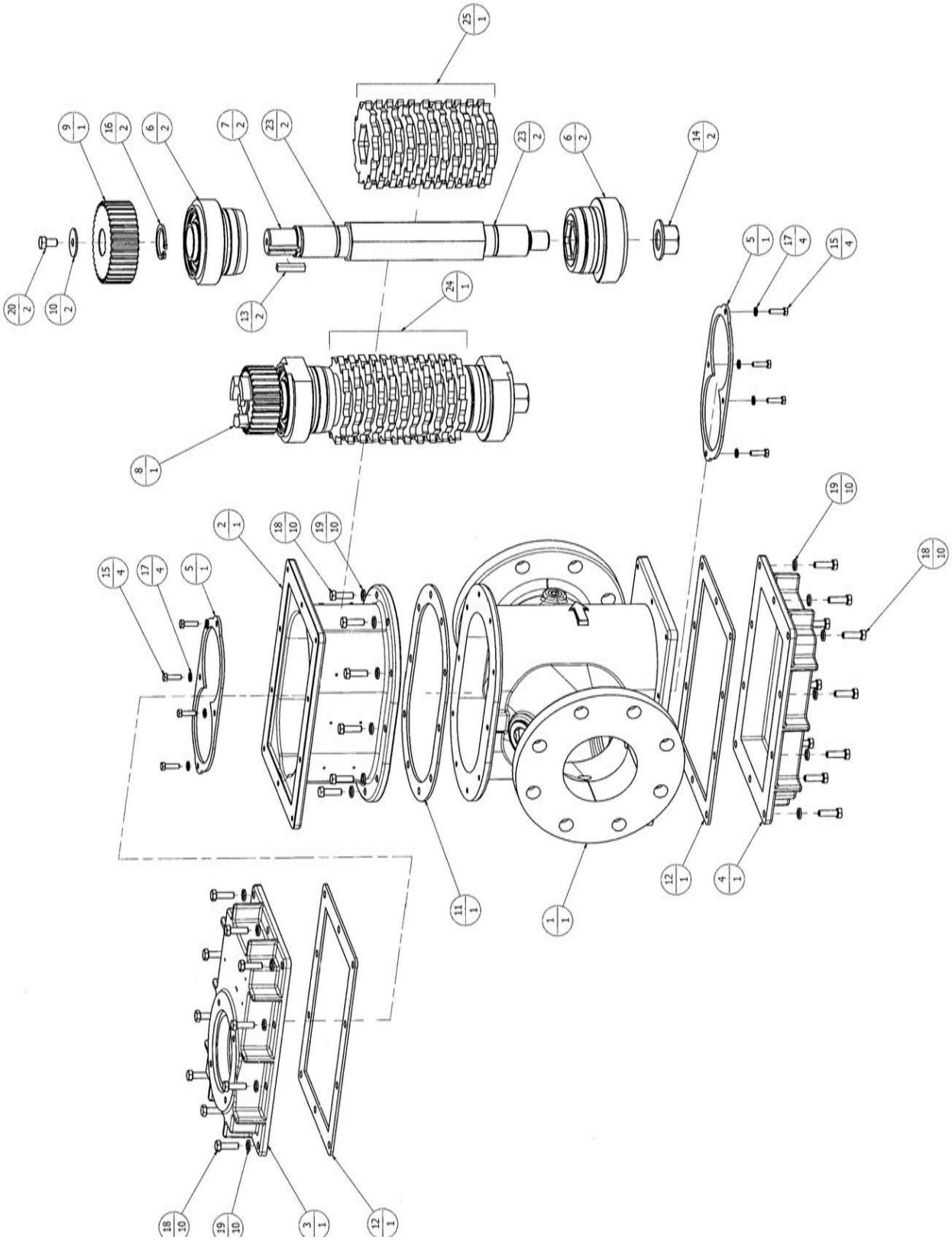

TABLE 6-2 MUFFIN MONSTER 10000 PARTS LIST

Item	Description	Part No.	Qty	Material
1	Main Housing - 4” Pipe / 6” Pipe	10036-0004/6-DI	1	Ductile Iron
2	Top End Housing	10077-DI	1	Ductile Iron
3	Top Cover	10005-DI	1	Ductile Iron
4	Bottom Cover	10027-DI	1	Ductile Iron
5	Seal Plate	10015	2	304 SST
6	Assembly - Seal Cartridge	A35620- SS	4	Tungsten Carbide
7	Drive Shaft	10018-0008	2	Alloy Steel
8	Gear/Coupling - 27 Teeth, High Strength	10019-0001	1	Alloy Steel
9	Gear - Driven - 34 Teeth, High Strength	10021-0001	1	Alloy Steel
10	Washer, Flat 3/8 ID x 1-1/2 OD	30184	2	Steel
11	Gasket - Main Body	10014-0036	2	C/R or Viton
12	Gasket - Top & Bottom Covers	10014-0005	2	C/R or Viton
13	Key, 5/16 SQ x 1-1/2	10045-0001	2	Steel
14	Hex Nut, Flanged, 1-14	30210	2	Steel
15	HHCS M6 x 1 x 20 mm, Full Thread	30693	8	18-8 SST
16	Retaining Ring, 5160-156	30287	2	Steel
17	Washer, Lock M6	30697	8	18-8 SST
18	HHCS M8 x 1.25 x 25 mm, Full Thread	30694	30	18-8 SST
19	Washer, Lock M8	21008-SS	30	18-8 SST
20	HHCS M10 x 1.5 x 16 mm, Full Thread	30695	2	18-8 SST
21	Plug, Pipe 1/2 NPT	31087-0016	6	Steel
22	Plug, Pipe, 1-1/2 NPT	31087-0015	2	Steel
23	O-Ring, #220	34046	4	Buna-N or Viton
24	Cutter Stack Assembly, Drive Shaft	See Drawing	1	
25	Cutter Stack Assembly, Driven Shaft	See Drawing	1	

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APPENDIX A

ELECTRIC DRIVE ASSEMBLY MAINTENANCE INSTRUCTIONS

A. 1 GENERAL INFORMATION

This maintenance instruction describes the standard and immersible electric motor drive assembly that provides rotary power for JWC Environmental (JWCE) high flow waste management devices such as grinders and augers. The electric drive assembly consists of an electric motor, reducer, an optional extended shaft and adapter spool. Refer to the electric drive assembly drawing for parts location and parts list.

The following paragraphs define the specifications, support guidelines, and safety concerns for the drive assembly. Details for the controller and the applicable JWCE equipment are located in the corresponding operation and maintenance manuals. Dimensional information for the drive may be found on the associated equipment configuration drawing.

Electric Drive - The following specifications apply to the electric drive.

- NEMA Frame, TEFC/TEXP / Chemical Duty / Super-E for standard motors or TENV XP for immersible motors.
- Speed: 1725 rpm for 60Hz (typical); 1440 for 50 Hz.
- Horsepower Rating: 1 to 10 horsepower.
- Power Requirements: 208/230/380/460 volts AC ± 10%, three phase, 50/60 Hertz.
- Duty: Continuous, grounding is required.
- Temperature: Operating 23° F (-5° C) to 105° F (40° C). Motor winding heater required below 32° F (0° C).
- Storage 40° F (5° C) to 105° F (40° C).
- Optional extended shaft available in six inch increments from 12” up to 120”.

Speed Reducer - The speed reducer assembly consists of a motor adapter and a reducer. The following general specifications apply to the speed reducer.

- Input: 10 HP (maximum), 1450 to 1800 RPM.
- Reduction Factor: 377:1 (1 HP), 29:1 (3-5 HP), 43:1 (5 to 10 HP).
- Service Factor: 1.15.
- C-Face Adapter: NEMA 56C or 143TC (1 HP), 145TC or 182TC (3-5 HP), 213 or 215TC (5-10 HP).
- International Electro-technical Commission (IEC) 112M (Standard).

The spool is a one piece assembly that provides adaptability from the motor to the cutter assembly end housing and houses the coupling which transitions the motor output to the equipment input drive shaft.

The drive assembly is designed to operate smoothly and quietly. If any excessive noise or temperature rise is noted, stop operation and inspect the drive.

A. 2 TROUBLESHOOTING

Motor does not start:

- Main power supply trouble - Check the main power and motor controller settings.
- Motor failure - Contact JWCE.

Motor hums excessively:

- Supply voltage exceeds motor rating - Check supply voltage and line connections.
- Motor failure - Contact JWCE.

Motor overheating:

- Improper ventilation - Standard motors: Verify air intake is not blocked and motor cooling fan is rotating. Increase ambient air flow and reduce ambient heat if possible. Immersible motors: Verify motor body heat fins are free of dirt, sludge or other contaminants.
- Main power line problems or bad connection - Check supply voltage and line connections.
- Motor failure - Contact JWCE Customer Support.

A. 3 REMOVAL AND REPLACEMENT GUIDELINES

Observe the following guidelines during removal and replacement of the motor, reducer, and spool. Review the safety requirements in the JWCE equipment manual. Removed parts can be used during replacement unless damaged, worn or otherwise noted. Contact JWCE if any of the parts inspected in the following paragraphs appear damaged or worn.

Opening The J-Box On Immersible-type Motors Will Void The Warranty. Change Motor Rotation Via The Controller. Refer To The Motor & Cable Wiring Diagram For Connection Definition.

VERIFY SUPPLY POWER HAS BEEN REMOVED AND TAGGED OUT BEFORE REMOVING MOTOR

DO NOT LIFT HEAVY EQUIPMENT OVERHEAD OF PERSONNEL.

- Replacement of the motor or speed reducer does not require removal of the JWCE equipment from the installation.
- Store removed parts in a safe location.
- Install the JWCE equipment and electrical hookup following good practices and in compliance with all OSHA, local, state, and federal codes and requirements.
- Do not steam clean and disinfect the motor. Clean outside surfaces of the motor with suitable solvent.
- Remove all gasket material from all mating surfaces.
- Inspect outside of each unit/component removed for signs of cracks, damage, or excessive wear. Replace if necessary.
- Complete all required customer/user inspection records and forms.

A. 4 DRIVE ASSEMBLY REMOVAL/ REPLACEMENT

Perform the following to remove the drive assembly as a complete unit from the JWCE equipment.

1. Attach lifting cables/sling lift to the drive assembly. Maintain tension on the lifting cables/sling.
2. Remove hardware securing drive assembly to the JWCE equipment.
3. Remove wiring from motor or at motor controller for immersible motors.
4. Lift up the drive assembly with slow and steady pull. Place removed assembly on a clean level surface and remove lifting cables/sling.
5. Inspect top cover gasket; replace if required.

Perform the startup and grinder cutter rotation verification as defined in the motor controller manual after motor replacement.

A. 5 MOTOR REMOVAL / REPLACEMENT

Each motor is maintenance-free type and is covered by the motor manufacturer's service policy and limited warranty. JWCE advises do not disassemble motor. If service is required, JWCE recommends removal of the motor from the affected unit and returning the motor to an authorized repair center. Contact JWCE Customer Support for more information.

Perform motor removal per the following steps. Replace the motor in the reverse order of the removal steps.

1. Prepare JWCE equipment for motor removal as described in SECTION 6.
2. Disconnect power leads to the motor and any heater or thermostat wiring (if required).
3. Remove hardware securing the motor to the spool.
4. Attach lifting cables/sling lift to the motor.
5. Remove the coupling guards from the speed reducer assembly.
6. Remove hardware securing the motor to the speed reducer assembly.
7. Slowly lift the motor from the speed reducer assembly and place the motor on a clean, flat work surface.

8. Remove motor flexible coupling half and key from the motor output shaft. The coupling half should be easily removable from the motor output drive shaft. If the coupling cannot be removed by hand, a gear puller will be required.

9. Inspect coupling motor half and motor output shaft key for damage. Discard and replace damaged components as necessary. **Store motor shaft half of coupling and motor output shaft key in a safe location to prevent loss until the motor is replaced on the motor/reducer adapter spool.**

Perform startup and grinder cutter rotation verification after motor replacement.

A. 6 SPEED REDUCER AND SPOOL REMOVAL / REPLACEMENT

The reducer assembly consists of a motor adapter spool and a reducer. The reducer assembly and spool are considered a complete assembly. Component removal and/or replacement is not recommended. Replace the speed reducer and spool in the reverse order of the removal steps. Contact JWCE if a speed reducer or spool problem is detected or suspected.

Remove the speed reducer and spool per the following procedure. Replace discarded gasket when replacing the speed reducer.

1. Remove the electric motor.

2. Attach lifting cables/sling, lift from the speed reducer assembly if necessary.

3. Remove hardware securing the speed reducer assembly to the speed reducer/equipment adapter spool.

4. Slowly lift the speed reducer assembly from the adapter spool and place it on a clean, flat work surface.

5. Remove the lifting cables/sling lift from the speed reducer assembly.

6. Remove and discard the speed reducer assembly-to-spool gasket.

7. Remove speed reducer assembly half of interlock coupling and key from the speed reducer assembly output shaft. Each coupling half should be easily removable from the shafts. A gear puller may be required if the couplings cannot be removed by hand.

8. **Store interlocking coupling and key in a safe location until the speed reducer assembly is installed.** Proceed to the next step if removing the spool.

9. Remove hardware securing the equipment adapter spool to the equipment top cover.

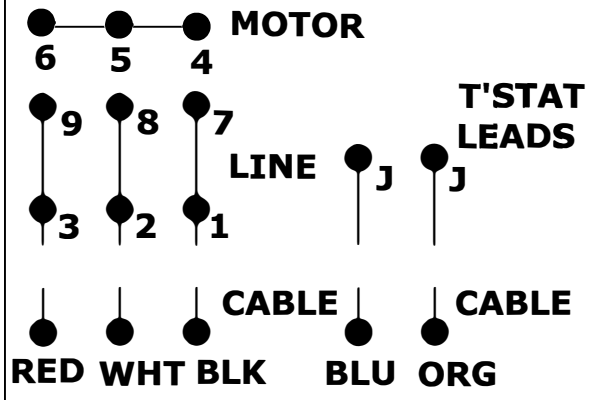
10. Slowly lift the equipment adapter spool from the unit top cover and place it on a clean, flat work surface.

11. Remove and discard the spool-to-top cover gasket.

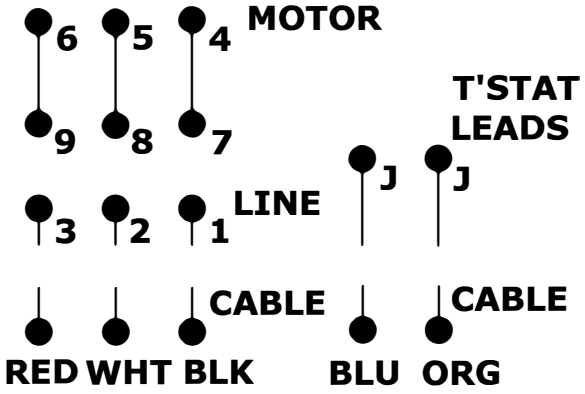
Perform startup and grinder cutter rotation verification after spool replacement.

IMMERSIBLE MOTOR & CABLE WIRING

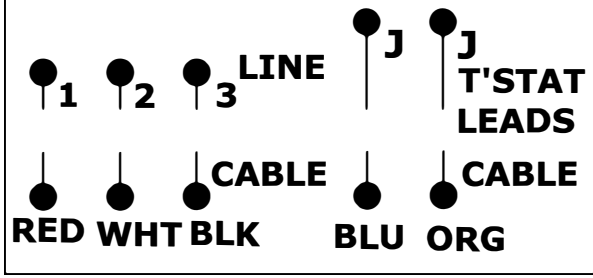
LOW VOLTAGE



HIGH VOLTAGE



SINGLE VOLTAGE MOTORS



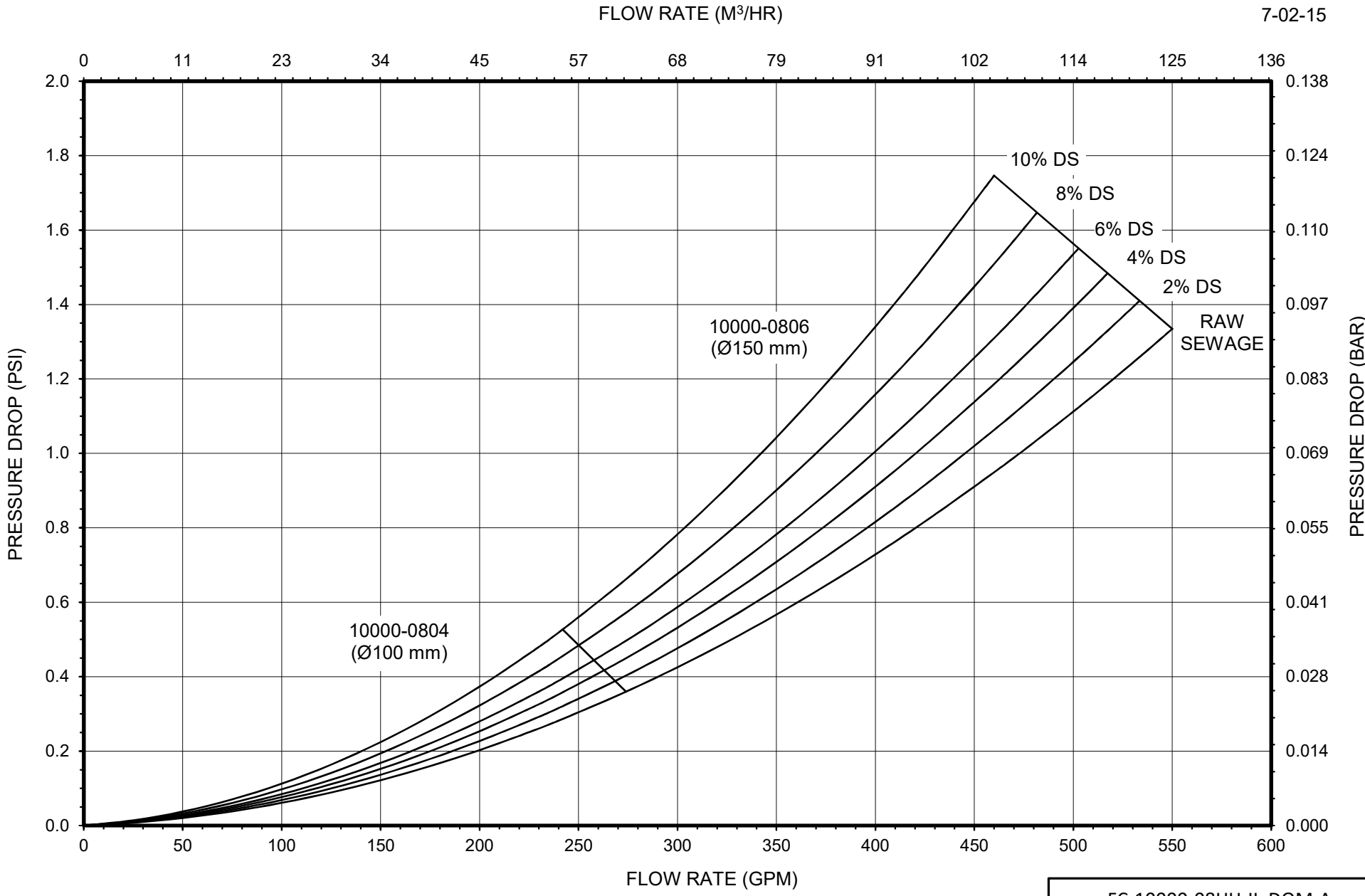
THERMOSTAT RATING

AMPS	VOLTAGE
6.0	115
3.0	230
1.5	460
1.2	575

JWC Environmental®
A Sulzer Brand

REV A, ECN000026, 03/02/21, CG

MODEL 10000-08



FC-10000-08HH-IL-DOM-A