

TRANSMITTAL OF SUBMITTAL

DATE: 8/16/23

TO: Scott Miller

CMG - City of Atlanta
2528 Chattahoochee Circle
Atlanta, GA 30318

New Submittal X Resubmittal

Project: East Area Water Quality Control Facility
Improvements

Specification Section No. : 11512

Supplier/Vendor/Subcontractor: HEWY Pumps

Manufacturer: TOYO Pumps

FROM: LAKESHORE ENGINEERING


_____ 1259 Ellsworth Drive _____
_____ Atlanta, GA 30318 _____

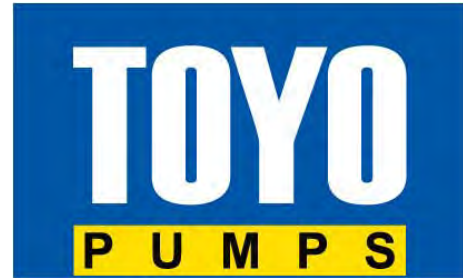
The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Submittal number	Submittal Type	Contains Variation to Contract	
				No	Yes
Email	Submersible pump - O&M Manual	11512-68.01	O&M Manual	X	

Comments/Variation:

CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By:  _____
Brandon Dow



DEM

Heavy Duty Submersible Pumps Installation, Operation & Maintenance Manual

Customer:	
Purchase Order:	
Pump Model:	
Pump Serial Number:	

TOYO PUMPS NORTH AMERICA CORPORATION

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GENERAL TERMS & CONDITIONS OF SALE

GENERAL TERMS & CONDITIONS OF SALE

The following terms and conditions shall apply to the purchase and sale of any products, materials, parts or other goods (collectively, "Goods") from Toyo Pumps North America Corp. ("TPNA"), Toyo Pumps North America, LLC. ("Toyo"), and Heavy Pumps Inc. ("Heavy" and, together with "Toyo" and "TPNA", the "Seller"), and the performance of any installation, repair, advisory, consulting or other services by Seller (collectively, the "Services"):

TERMS & CONDITIONS OF SALE

1. Acceptance of Purchase Order: Formal acknowledgment of the purchase order by Seller by return to the purchasing party (the "Buyer") of the executed copy or Seller's commencement of such performance or acceptance of any payment shall constitute acceptance by Seller subject to having the Goods in stock and/or being willing to manufacture the Goods and perform the Services and these terms and conditions. If the Buyer submitted a purchase order to any company, partnership or other entity that directly or indirectly through one or more intermediaries controls, is controlled by or is under common control with Seller (in each case, an "affiliate"), including Toyo Pumps North America, L.L.C. ("TPNA LLC"), or to any field or business consultant, salesman or other contractor of Seller or their respective affiliates, then the Buyer acknowledges that such affiliate (including TPNA LLC), consultant, salesman or other contractor, as the case may be, does not have the authority to bind Seller and the purchase order will not be accepted until the earlier of receipt by the Buyer of an executed copy of the purchase order signed by an officer of Seller, Seller's commencement of performance under the purchase order or acceptance by Seller of any payment under the purchase order. Seller's acceptance of the purchase order is conditional upon the Buyer's agreement that the terms and conditions set out in this Agreement govern the relationship between the parties.

In the event of any conflict or inconsistency between the terms and conditions of sale herein and the terms and conditions contained in the Buyer's order or in any other form issued by the Buyer, whether or not any such form has been acknowledged or accepted by Seller, Seller's terms and conditions herein shall prevail. No waiver, alteration or modification of these terms and conditions shall be binding upon Seller unless made in writing and signed by a duly authorized representative of Seller.

2. Materials and Compatibility with Buyer's System or Process: Quotations and recommendations including, but not limited to, materials of construction and compatibility of the Goods with the Buyer's system and process are based on information supplied by the Buyer. The Buyer is responsible for final confirmation of the metallurgical suitability of the construction materials and compatibility of the Goods with the Buyer's system or process. By placing an order further to a quotation, the Buyer acknowledges and agrees that it has confirmed the metallurgical suitability of the construction materials and the compatibility of the Buyer's system and process with the Goods.

Seller expressly disclaims any warranty that the Goods will be compatible with the Buyer's operating system or process, and that the construction materials are metallurgically suitable for the Buyer's purposes. In the event that the Goods are not compatible with the Buyer's operating system or process, and/or that the construction materials are not metallurgically suitable, the Buyer shall be responsible for the cost of all changes in the Goods, and if the Buyer's order is cancelled, Seller shall be reimbursed for all costs and expenses incurred and reasonable profit for performance executed prior to the date of such termination.

3. Taxes: Any taxes, excise duties, levies or other assessments under any existing or future laws which Seller may be required to pay or collect in connection with the order, under any existing or future laws, including any taxes, excise duties, levies or other assessments levied on the sale, purchase, delivery, storage, processing, use or consumption of any other materials necessary for the completion of this order are not included in the purchase price and shall be for the account of the Buyer. The Buyer shall promptly pay the amount thereof to Seller upon demand, or in lieu thereof, furnish Seller with a tax exemption certificate acceptable to the taxing authorities. Without restricting the generality of the foregoing, HST or GST, if applicable, shall be added to the purchase price.

4. Payments: For orders of Goods having an aggregate purchase price of less than \$100,000 and orders for Services, Seller's regular terms are net 30 days subject to credit approval and at Seller's discretion. For orders of Goods having an aggregate purchase price equal to or greater than \$100,000, progress payments in accordance with the following milestones shall apply:

Milestone

Acceptance of Purchase Order	15%
Submittal of Approval Drawings	20%
Purchase of Major Components	20%
Goods ready to ship	25%
30 days after Shipment*	20%

*(subject to credit approval and at Seller's discretion)

All milestone payments are due upon receipt of invoice, with the exception of the 30 days after Shipment milestone.

Interest will accrue at the annual rate of 24% per annum to be compounded monthly on the balance due and owing but will not exceed the maximum permitted by law.

Should the Buyer for any reason default in payments due under this Agreement, the Buyer agrees to pay all collection costs and indemnify Seller for all solicitors' fees arising from the default in payment.

5. Shipping: Unless shipping instructions accompany each order and are accepted by Seller, the manner of shipping is at the discretion of Seller. Seller's responsibility for the Goods ceases when they pass into the hands of the carrier at which time the Buyer assumes the risk for the Goods.

6. Damaged Goods: Seller's Goods are carefully inspected and checked for any damage prior to shipment. The Buyer assumes all responsibility for risk relating to loss or damage of Goods once the Goods pass into the hands of the carrier.

7. Delayed Performance: Seller shall not be responsible for delays in shipments or performance of the Services caused by (a) earthquake or explosion; (b) war, invasion, hostilities (whether war is declared or not), terrorist threats or acts, riot or other civil unrest; (c) requirements of law; (d) actions, embargoes, tariffs, or blockades in effect on or after the date of this Agreement; (e) action by any governmental authority; (f) national or regional emergency; and (g) strikes, labor stoppages or slowdowns or other industrial disturbances; (h) material shortages; (i) transportation delays; (j) accidents; (k) acts of God or other causes beyond Seller's reasonable control; or for delay caused by the acts or omissions of Seller, its servants, employees, contractors, subcontractors or agents. In any event, Seller shall not be responsible for the Buyer's lost profits or other consequential damages incurred by the Buyer for any delay or failure by Seller to make delivery of Goods or performance of Services under any order, it being agreed that Seller's sole liability shall be to refund any amounts prepaid by the Buyer to Seller on account of such delayed or non-delivered order.

8. Warranties: Seller makes no warranties expressed or implied, other than the following:

- (a) Seller warrants its Goods to be free from defects in material and workmanship until the earlier of one year from the date of start of operation or use of the Goods or 18 months from the date of shipment to the original retail customer, provided no alteration has been made thereto after delivery.
- (b) Any part or parts contained in the Goods which are proven defective after inspection by and to the satisfaction of Seller will be (at Seller's option) adjusted or repaired or replaced free of charge, on return of such defective part(s) by the Buyer. The Buyer shall assume all responsibility and expense for removal, reinstallation, freight and any related duties or taxes in connection with the foregoing.
- (c) Seller shall not be liable and shall not have any obligation for fair wear and tear, seal failures, damage caused by vibration, failure to properly maintain, damage caused by operating without flow or adequate submersion, damage caused by corrosives, abrasives or foreign objects and other damage caused by the improper storage, handling, operation, or maintenance contrary to good practice or instructions in any manuals, or due to the fault, negligence, want of skill or wrongful acts of the Buyer, its employees, agents, contractors or suppliers.
- (d) With respect to any equipment and materials which are included in the Goods furnished by Seller, but manufactured by others, the Buyer shall accept in lieu of any liability or guarantees on the part of Seller, the benefits of any guarantees (if any) that are obtained by Seller from such manufacturers or vendors.

- (e) Seller shall perform the Services in a workmanlike manner consistent with industry standards applicable at the time and place where such Services are performed.

The above warranties cease to be effective if the Goods are altered or repaired other than by persons authorized or approved by Seller to perform such work. Repairs or replacement deliveries do not interrupt or prolong the term of the warranty. The warranties above cease to be effective if the Buyer fails to operate and use the Goods sold hereunder in a safe and reasonable manner and in accordance with any written instructions from the manufacturer.

9. Exclusivity of Warranties: Seller expressly disclaims to the full extent permitted by law all express, implied, statutory and other warranties, guarantees or representations, including, without limitation, the warranties of merchantability, merchantable quality, durability or fitness for a particular purpose, and non-infringement of proprietary and intellectual property rights. For further clarity, the parties acknowledge and agree that, to the extent permitted by law, section 18 of the Sale of Goods Act, R.S.B.C. 1996, c. 410, and any similar legislation in other applicable jurisdictions, is excluded from and inapplicable to this Agreement.

10. Limitation of Liability: The liability of Seller and their respective affiliates, including but not limited to TPNA LLC, and their respective directors, officers, employees, contractors, subcontractors and agents ("Seller and Others") is limited to the repair, replacement or refund of the original purchase price actually paid by the Buyer for the particular Goods or Services which are the subject of the claim. Except as expressly provided in the foregoing, Seller and Others will not be liable for any loss, damage or expense including, but not limited to, the following: bodily harm to any individual, loss of profits, revenue, interest, loss by reason of shutdown or non-operation, increased expense of operation of the equipment, loss of power system, cost of purchase or replacement power, or claims of Buyer or customers of Buyer for service interruption, or any special, indirect, incidental or consequential damages arising out of this contract or any breach thereof, negligence of Seller and Others, the performance of the Services or defect in, failure of, or malfunction of the Goods furnished to the Buyer or the customers of the Buyer. Seller and Others will not be responsible for any special, indirect, consequential or incidental damages or expense of any kind or nature, regardless of the cause, even if Seller and Others have any knowledge regarding the probability of their occurrence.

11. Cancellation or Modification: The Buyer may cancel or modify a shipment of any part thereof only upon Seller receiving written notice seven (7) days prior to the cancellation or modification and upon payment to Seller of reasonable and proper cancellation or modification charges based upon expenses already incurred and commitments made by Seller, including, without limitation, any labour done, material purchased, Services performed and also including Seller's usual overhead and reasonable profit and cancellation charges from Seller's suppliers.

12. Cancellation or Modifications due to Unusual Market Conditions: The Seller will take all reasonable precautions to mitigate the risk related to Unusual Market and Supply Chain conditions related to commodities/ materials, economic tariffs, and sanctions. However, if, following the receipt and acceptance of a purchase order by Hevy, the cost to Hevy of the raw materials required to manufacture the Products ordered under such purchase order increases by a material amount, then notwithstanding Hevy's prior acceptance of such purchase order, Hevy may, in its sole discretion, either cancel such purchase order or increase the price for such Products by a corresponding amount by providing written notice to the Channel Partner, and upon receipt of such written notice the Channel Partner will have the option to either accept such increased price or cancel the purchase order; provided that if the Channel Partner fails to notify Hevy that it wishes to cancel the purchase order within 10 days of the date of receipt of Hevy's notice of the price increase, then the Channel Partner will be deemed to have accepted the price increase.

13. Return of Goods: No credit or refund will be permitted for Goods returned unless Seller's prior written permission has been obtained. If accepted, returned Goods may be subject to a handling or restocking charge.

14. Back Orders: The Buyer agrees that if it has ordered items which are unavailable at the time of the placement of the order, Seller will ship them as soon as they are available or at a later time.

15. Arbitration: If there is any disagreement, dispute or controversy (a "Dispute") between the parties with respect to any matter arising under this Agreement or the construction of this Agreement, then the Dispute shall be referred to and finally resolved by arbitration under the rules of the Arbitration Act, R.S.B.C. 1996, c. 55

by a sole arbitrator. The award of the arbitrator shall be final and binding upon each of the parties and shall not be subject to appeal or judicial review.

16. Governing Law: This Agreement shall be governed by and interpreted in accordance with the laws in effect in the Province of British Columbia, and, subject to Article 14, the parties attorn to the courts of the Province of British Columbia for the resolution of any disputes arising out of this Agreement. The United Nations Convention on Contracts for the International Sale of Goods will not apply to the supply of Goods or Services.

17. Exclusion of Liability for Oral Representations: The Buyer acknowledges that none of Seller, their respective affiliates or agents has made any oral or written representations, inducements, or promises that are not expressly contained in this Agreement. The Buyer acknowledges and agrees that ANY ORAL OR WRITTEN REPRESENTATIONS, INDUCEMENTS OR PROMISES MADE BY ANY FIELD OR BUSINESS CONSULTANT, SALESMAN OR OTHER CONTRACTOR OF SELLER OR THEIR RESPECTIVE AFFILIATES ARE EXPRESSION OF OPINION ONLY AND ARE NOT BINDING ON SELLER OR THEIR RESPECTIVE AFFILIATES UNLESS EXPRESSLY CONTAINED HEREIN. NEITHER SELLER NOR ANY OF THEIR RESPECTIVE AFFILIATES IS LIABLE FOR ANY ORAL OR WRITTEN REPRESENTATIONS, INDUCEMENTS OR PROMISES MADE BY ANY FIELD OR BUSINESS CONSULTANT, SALESMAN OR OTHER CONTRACTOR OF SELLER OR THEIR RESPECTIVE AFFILIATES UNLESS EXPRESSLY CONTAINED IN THIS AGREEMENT. This Agreement may be modified only in writing signed by the Buyer and an officer of either Seller. The Buyer acknowledges that any field or business consultant, salesman or other contractor of Seller or its affiliates is not authorized to modify or change any term of this Agreement.

18. Intellectual Property: Title to, ownership of and all intellectual property rights in, any facilities, designs, equipment, specifications, drawings, formulas, engineering notices, technical data, software, processes, documentation and information used in connection with Seller's supply of the Goods or Services (the "Goods Components") shall be and remain with Seller, or their suppliers or licensors. This Agreement does not grant to the Buyer any intellectual property or other rights or licenses in or to any Goods Components. Buyer shall not, and shall not knowingly permit a third party to, whether directly or indirectly, modify, reverse engineer or disassemble any Goods without the prior written consent of Seller.

19. Severability: If any provision of this Agreement is determined to be invalid, void or unenforceable, in whole or in part, such invalidity, voidance or unenforceability shall attach only to such provision or part thereof, and the remaining part of such provision and all other provisions thereof shall continue in full force and effect.

20. Applicability: This Agreement applies only to this order. Prospective orders may be subject to revised terms and conditions. It is the Buyer's responsibility to request and review Seller's current terms and conditions in respect of prospective orders.

21. Entire Agreement Clause: This Agreement constitutes the entire agreement between the parties, and is subject to no other oral or written proposals, agreements, implied terms, agreements through course of conduct, conditions precedent or understandings whatsoever.

End of General Terms & Conditions of Sale

TABLE OF CONTENTS

TABLE OF CONTENTS 1

SECTION I - INTRODUCTION 5

I-A General 5

I-B Safety 5

I-C Upon Arrival 6

I-D Storage 6

SECTION II – INSTALLATION 7

II-A Pre-start Preparations 7

II-B Installing the Pump 7

II-C Electrical Wiring 8

II-D Internal Sensor Systems 9

SECTION III – OPERATION 10

III-A Pre-start Checks 10

III-B Test Operation 10

III-C Operation 11

SECTION IV – MAINTENANCE 12

IV-A Regular Inspections 12

IV-B Lubrication and additional Maintenance 12

IV-C Recommended Spare Parts 13

IV-D Electrical Check (Megger Test) 14

SECTION V – TROUBLESHOOTING 15

SECTION VI – APPENDIX 17

A Model Identification

B Pump Specifications

C Performance Curves

D Motor Protection

E Pump Lubrication and Additional maintenance

F Disassembly and Assembly Procedures

G Optional equipment (if applicable)

H Drawings & Parts Lists

SECTION I - INTRODUCTION

I-A General

Thank you for selecting a Toyo submersible pump.

In order to ensure that you receive the maximum benefit of this equipment, it is required that this **INSTRUCTION & SERVICE MANUAL** be thoroughly read prior to use, and that all instruction be carefully followed.

The descriptions and instructions in this manual cover the standard design of the equipment and the variations for the range of models. This manual does not cover all the design details (see specific pump model drawings) nor does it provide for every contingency which may be encountered. If information cannot be found in this manual, contact the nearest Toyo branch office.

This pump has been designed to provide safe and reliable service. It is, however, both a pressure vessel and a piece of rotating machinery. The operator must exercise good judgment and proper safety practices to avoid damage to the equipment and surroundings to prevent personal injury. The instructions in this manual are intended for personnel with a general training in operation and maintenance of centrifugal pumps.

Toyo Pumps reserves the right to change the design, construction material of any part without incurring the obligation of installing such changes on pumps already delivered.

I-B Safety

It is assumed that your safety department has established a safety program based upon a thorough analysis of industrial hazards. Before installing, operating or performing maintenance on the pump and associated components described in this manual, it is suggested that the safety program be reviewed to ensure that it covers the hazards arising from high speed rotating machinery.

WARNING!!

Standard pumps are not explosion-proof or spark-proof. Pumps should not be operated in any area where flammable or explosive gases, vapors, liquids or particles are or may be present or where a spark could cause a
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In general, all personnel should be guided by all the basic rules of safety associated with the equipment and the process.

It should be understood that the information contained in this manual does not relieve operating and maintenance personnel of the responsibility of exercising normal good judgment in operation and care of the pump and its components.

Toyo cannot be held responsible for accidents or damage incurred to equipment or personnel due to any use of the equipment not described in this manual.

I-C Upon Arrival

The unit should be inspected upon arrival. If there are any product irregularities, contact Toyo immediately. Damage due to shipment should be reported to the carrier.

Care should be taken when unpacking and moving pumps. Rough handling of the pump can cause breakage. Make sure that any equipment used to lift the pump or any of its components is capable of supporting the weights encountered. Make sure that all parts are properly rigged before attempting to lift.

Take note of the pump model (with correct frequency and voltage) as per your order. Pump parts and accessories may be packed inside the shipping container or attached to skids in individual packages. Inspect all containers, crates and skids before discarding.

A copy of this instruction book as well as instruction sheets for other various components may be included in the shipment. Put these papers in a safe, accessible place for ready reference when required. It is important that the entire contents of this booklet be studied before installation.

I-D Storage

The pump is protected against corrosion for the period of shipment and installation only.

If the pump is not to be installed at once, find a clean, dry location for storage indoors. The unit should be stored in an approximately level position with no strains applied. Protective coverings should be left in place. The pump can be left in its shipping container or skid for storage. The unit is shipped oil and grease filled.

Rotate the pump once per month by hand to re-lubricate the bearing surfaces.

If the pump has been in use before, make sure the unit is cleaned and dried completely prior to putting in storage.

For extended storage suitable covers out of plywood or plastic must be installed on the suction and discharge flanges and any other openings on auxiliary equipment to provide adequate protection against dirt, dust and nesting animals.

SECTION II – INSTALLATION

II-A Pre-start Preparations

1. Installation will require the following tools: AC voltmeter and ammeter (clamp type), meg-ohm meter, wrenches, and screwdriver.
2. If the pump is not in its fully assembled state or has parts missing, do not install the pump and contact Toyo for replacement parts.
3. Choose a location for the pump that is away from flammable or explosive materials. The pump should be located in an area where water levels will be sufficient at all times (see appendix drawings for minimum water level).

WARNING: Allowing the pump to operate with insufficient discharge head or a clogged strainer stand can result in excessive vibration, current draw and/or noise, which could cause electrical hazards and damage to the pump.

4. Using a meg-ohm meter check the motor's insulation resistance by taking a measurement between each power conductor of the cabtyre cable and the ground conductor. Insulation resistance should be 1 MΩ or greater for new or newly repaired pumps with cable attached.
5. Ensure your power supply is within ±5% of its rated voltage.
6. Do not pump fluids other than recommended without contacting Toyo first.

WARNING: Using the pump outside its temperature range could lead to electrical hazards or pump failure.

II-B Installing the Pump

1. Lifting the pump can be done by securing a rope/chain to the eye bolts, ensuring not to drop or heavily impact the unit on contact.

CAUTION: During placement, be aware of the weight and movement of the centre of gravity of the pump as it can easily fall or cause damage.

WARNING: Never hold or suspend the pump by its cabtyre cable. This could lead to electrical shorts, shock to personnel or fire if damaged.

2. Place the pump on a flat, clear surface for use in the upright position. A mounting block may be used if necessary to prevent the suction strainer from being submerged in mud.
3. Using suitable piping materials, arrange pump piping as directly as possible while preventing any load on the pump itself.
4. Any recoil from the pump starting up should be able to be taken by the piping.
5. Avoid getting welding sparks and paint on the pump when making connections.
6. Avoid submerging the discharge piping to prevent backflow when the pump stops.

II-C Electrical Wiring

1. Choose qualified personnel to perform all electrical wiring according to local rules and regulations.

WARNING: Failure to abide by standard practices by qualified electricians may risk safety and lead to breaking regulations.

2. The pump must be outfitted with appropriate breakers and overload protectors per local rules and regulations to prevent electrical shock and/or pump damage.
 - a. Starting protection: Typical time limit type breaker setting is maximum 2.5 x FLA.
 - b. Operating protection: Typical overload protection is 1.25 x FLA. Where local rules allow use 1.35 x FLA for 1.35 service factor motors. See nameplate for FLA and SF.

3. Properly ground the pump prior to usage, making certain not to attach the grounding wire to gas/water pipes, telephone ground wires, or lightning arrestors.

WARNING: Improper grounding could result in electrical shock.

4. Disconnect all power supplies to the pump before any wiring or maintenance activities. Source of power should be from a non-shared, dedicated power source rated for the pump current.

CAUTION: If power is not disconnected prior to electrical setup or the source power is shared with other equipment, this may lead to unforeseen accidents and hazards such as shock and fire.

5. To connect the cabtyre cable, connect all the leads to the terminals of the control panel. See diagram below. Avoid excessive twisting, bending or impact of the cable and the individual wires to prevent damage.

WARNING: If the cabtyre cable becomes damaged or cut it may cause electrical hazards or fire.

6. If the cabtyre cable requires extending, use a conductor size equal to or greater than the previous cable to maintain performance and prevent overheating. For length longer than a total cable length of 100 feet consult your cable supplier or Toyo to confirm line voltage drop is less than 5% total.

WARNING: If the cabtyre cable overheats it may lead to electrical hazards or fire.

7. Keep the power supply and cabtyre cable away from water. If the cabtyre cable needs to be submerged in water, make certain there is no damage to the insulation and any splices are completely sealed and protected from water damage.

WARNING: Stop using the pump if there is wear/handling damage or water damage to the cabtyre cable. This may lead to hazards such as shock and fire.

II-D Internal Sensor Systems

Each pump is equipped with internal sensor systems as detailed in the appendix. Some of these systems can be wired to halt operation of the pump as soon as a problem has been indicated.

CAUTION: Avoid switching the pump on and off repeatedly once a problem has been established to prevent further damage of the motor and pump.

WARNING: These options do not replace the need for correctly sized starter and overloads.

CAUTION: Sensors wired for auto shut-down must be connected to a trip relay to prevent the pump restarting without warning. Always lock out pump before service.

CAUTION: Auto shut-down of the pump while pumping slurry through the lines risks the lines getting plugged and the pump being buried.

SECTION III – OPERATION

III-A Pre-start Checks

1. Double check the frequency and voltage rating are correct for the pump model.

CAUTION: Using incorrect power ratings may lead to damage of the pump as well as lower performance and efficiency.

2. Double check the rating for the breaker and overload protection (in accordance with rated current of pump) and verify insulation resistance (should be greater than or equal to 1 M Ω for a pump with cable attached).
3. When powering the pump with a generator, do not share the generator with other equipment.

III-B Test Operation

WARNING: If testing while suspended in mid air, special attention should be paid to stay clear of the discharge piping. Extreme caution should be exercised. The recoil that occurs on startup can result in accidents or damage to unit or nearby objects.

1. Bump start the pump. Check the direction of rotation is counterclockwise when viewed from the suction end (ie. correct recoil on starting is counterclockwise when viewed from the top).

WARNING: For a pump with mechanical seals Bump starting must be limited to one or two seconds or expensive seal failure will occur.

WARNING: These pumps will pump a significant fraction of rated performance running backwards. The fact that the pump is pumping does not verify correct rotation.

WARNING: The pump rotation check should never be done while submerged. If the impeller is rotating in the reverse direction while in water it could damage the pump.

2. If the direction of rotation is incorrect interchange connections between any two leads U, V, or W.

WARNING: Remember to turn off power supply circuit breaker and ensure the pump has completely stopped prior to performing any rewiring.

3. Submerge the pump to the recommended minimum submergence (see outline drawing in appendix) and allow it to run for 2 to 5 minutes. Measure the voltage (within $\pm 5\%$ rated voltage) and the operating current for leads U, V and W.
 - Refer to nameplate data. If voltage exceeds tolerance levels re-check power supply.
 - Refer to nameplate data. If current exceeds the rated value overloading the motor is the likely reason, check pump specifications.
4. Stop the test operation of the pump if abnormal sounds, vibration or smells result and contact Toyo immediately. If no problems arise, allow the pump to continue under operation.

CAUTION: Allowing the pump to operate under such non-desirable conditions may result in electrical hazard or damage.

III-C Operation

1. If no abnormal occurrences happen during the test, continue as fully operational.

CAUTION: With continued use, the pump may become hot, avoid contact.

2. For operation in air follow these guidelines:
 - a. DL Pumps: Although not recommended these can run dry continuously.
 - b. DXL Pumps: Bump only, for operation the wet end must be submerged to the recommended level.
 - c. DP-xx-2 & DPF Pumps:
 - i. Lip seal: 10 minutes maximum run time in air
 - ii. Mechanical seal: Bump only, running dry will damage seal. During operation the motor must be completely submerged or cooled with a water jacket.
 - d. DEM/DBS Pumps: Bump only, running dry will damage seal. During operation the motor must be completely submerged or cooled with a water jacket.
3. Start the pump in clear fluid to prime the discharge hoses/piping. Ensure that no hoses are kinked as the pump may not be able to force them open to start flow. Where flexible hose is required use non-collapsible hose.
4. Lower the pump slowly into the material being pumped.
5. Slurry density can be observed by watching an ammeter for current loading. Higher current means higher specific gravity and thus higher density.
6. Slurry density can often be controlled by raising and lowering the pump into the material.
7. The hose must be sized carefully to ensure suitable carrying velocities in the line. Typically, velocities of 8 to 10 ft/sec (2.4 to 3 m/sec) in the hose are suitable for normal slurries. Using larger or smaller hose could result in plugging the line. Make sure that the discharge hose is not bent or folded as this will cause a decrease in pump output. Always use the shortest possible length of hose.
8. Prior to pump shutdown lift the pump into clear fluid for several minutes to completely flush the system of any slurry.

CAUTION: Never stop the pump while pumping slurry through the lines as there is a risk the lines will plug and the pump will be buried.

9. After shutdown, to keep the pump in good condition and maintain high pumping efficiency, clean out any solids (i.e. sand, mud, etc.) which may have been collected in the pump casing or around the strainer stand.
10. For storage after use, the pump should be stored in a dry warehouse after cleaning both the inside and outside of the pump thoroughly.

SECTION IV – MAINTENANCE

In order for the pump to continue running efficiently and provide a long service life, regular inspections and maintenance should be done in addition to monitoring the pump's internal sensors.

IV-A Regular Inspections

1. Turn off the power and disconnect the pump's cabtyre cable from the power source.

WARNING: All electrical work must be performed by qualified personnel.

2. Clean the pump with water, removing any dirt or fragments that may have collected within the impeller or other crevices.
3. A general inspection should be done to make sure there are no cracks, no loose bolts any other obvious abnormalities.
4. The following is an inspection schedule listing items to check on a regular basis. See the section on Spare Parts for spares/replacements.

Regular Inspection and Maintenance Schedule:

Schedule	Maintenance to be performed
Daily	-Remove excessive accumulations of dirt on the motor -Check for abnormal noise or vibration
Weekly	-Check clarity of oil and oil level (see Lubrication Section) -Check values for voltage, current and insulation resistance with rated values. -Supply voltage • $\pm 5\%$ rated value -Operating current • compare with rated value -Insulation resistance • Must be $1M\Omega$ or greater for pump with cable attached, record value, any change from previously recorded value should be minimal otherwise inspection of the motor may be required
Monthly	-General inspection of pump efficiency and check for plugging or wear of the impeller which may reduce performance significantly.
Every 3 Months or 1500 Hrs (earlier of two)	-Re-grease top and bottom bearings if applicable
Every Year or 4000 Hrs (earlier of two)	-Change oil and re-grease bearings if applicable (see Pump Lubrication in appendix).
Every 1-2 Years depending on severity of service	-Complete servicing (regardless of pump's condition) -Replace all seals
Out of Use	-Clean and dry the pump for indoor storage -Rotate once a month by hand

IV-B Lubrication and additional Maintenance

1. For lubrication and additional maintenance details see appendix.
2. **Always tailor lubrication intervals to your application specific requirements.** If pump is run intermittently, the oil reservoir should be examined more often.
3. If the pump has not been operated for a long period of time, the oil reservoir should be examined shortly after startup to ensure there has been no deterioration of seals.

IV-C Recommended Spare Parts

To ensure against possible long and costly downtime periods, especially on critical services, it is advisable to have spare parts on hand. A list of spare parts is found in the parts list. Repair orders will be handled with minimal delays if the following directions are followed:

1. Give model number and serial number. These can be obtained from the nameplate on the pump.
2. Write plainly the name and part number of each part required. These names and numbers should agree with those on the sectional drawings.
3. Give the number of parts required.
4. Give complete shipping instructions.

Some parts have long lives and therefore do not have to be carried in stock. These items should be checked at regular intervals, and when replacement is indicated, the parts should be ordered.

IV-D Electrical Check (Megger Test)

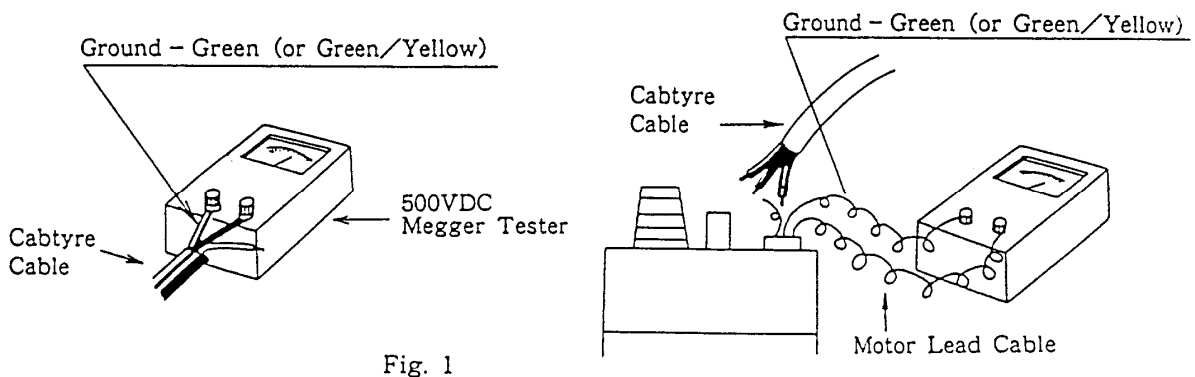
Whenever the pump is serviced the following test should be performed to check the insulation resistance of the motor and cable.

- a) Disconnect the cabtyre cable from the power source.
- b) Verify continuity between the cable ground conductor and the motor frame.
- c) Test the motor and cable assembly. Using the 500 VDC Megger Tester, check the electrical insulation resistance between the cable ground conductor (green) and each power conductor in turn (See Fig.1).
- d) Any reading less than 1 meg-ohms ($M\Omega$) indicates damage to the cabtyre cable and/or the motor.
- e) If any reading is less than 1 meg-ohms ($M\Omega$), disconnect the cabtyre cable from the motor and Megger Test the insulation resistance of the motor itself in the same manner as above.
- f) If all motor readings are more than ten (10) meg-ohms ($M\Omega$) it indicates the problem is in the cable and requires immediate replacement of the Cabtyre Cable.
- g) Any motor reading less than ten (10) meg-ohms ($M\Omega$) indicates damage in the motor in which case the motor must be checked by a qualified repair facility.

CAUTION: It is absolutely imperative that appropriate corrective action/repair be performed before the pump is returned to service if it does not pass the Megger Test.

Serious personal injury can result from electrical shock.

The above maintenance inspection, if it is performed regularly, will result in greatly improved pumping efficiency and pump life.



SECTION V – TROUBLESHOOTING

Problem	Possible Causes & Solutions
Pump won't start.	The power has not been turned on
	Fuse or circuit breaker blown
	The power supply is inadequate
	The motor is burned out or is burning out
	The cabtyre cable has been incorrectly connected. See section on <i>Electrical Wiring</i> .
	The cabtyre cable has been damaged and needs to be replaced or repaired.
Pump's motor overload protection system stops the pump right after startup.	Debris between the rotating and stationary elements requires cleaning
	The voltage may be too low and not in accordance to the rated voltage. (Or the cabtyre cable has been extended with an improper gauge cable).
	The power supply/frequency does not match the pump nameplate. Replace the power supply
	The motor may be faulty and need replacing, see section on Electrical Check
	Too much solid material is being sucked into the pump. Raise the pump into clear liquid and lower slowly into the solids
Pump requires excessive power.	Specific gravity of liquid higher than design.
	Viscosity of liquid differs from that for which designed.
	Total system head lower than pump design head resulting in too much flow
	For pumps without water jackets, there is insufficient submergence for motor cooling.
	Where applicable, impeller front or back axial running clearance set too tight.
	Excessive bearing lubricant or lack of cooling causing excessive bearing temperatures.
Lift or discharging capacity is low.	The impeller is excessively worn and needs replacement.
	The discharge piping is partially clogged. Raise the pump into relatively clear water and flush the piping. (Avoid stopping the pump without flushing the piping with relatively clear water)
	The discharge valve closed or incorrectly set.
	The discharge hose is kinked.
	The suction strainer is clogged and requires cleaning of debris. The pump may be placed on a mounting block to reduce clogging.
	The motor direction is reversed. See sections on <i>Electrical Wiring</i> and <i>Test Operation</i> for interchanging leads.
	The pump is not completely filled with liquid or there is an excessive amount of gas entrained in the liquid

Problem (continued)	Possible Causes & Solutions
Excessive noise and vibration.	The motor shaft or bearings are worn or damaged and need replacement.
	Resonance of piping system.
	Operation at low capacity.
	Rust on bearings due to water getting into housing.
	Brinelling of bearing races due to high ambient vibration produced by nearby equipment or long storage.
	Insufficient grease in seal housings.
	Incorrect bearing lubricant used.
	Contaminated lubricant.
	Impeller loose on shaft due to improper assembly.
	Impeller or rotor damaged and out of balance.
Lip Seals have short life.	One or more impeller vanes clogged
	Shaft sleeve worn or scored at the seals.
	Incorrect type of seals for operating conditions.

SECTION VI – APPENDIX

- A Model Identification**
- B Pump Specifications**
- C Performance Curves**
- D Motor Protection**
- E Pump Lubrication and Additional Maintenance**
- F Disassembly and Assembly Procedures**
- G Optional Equipment (if applicable)**
- H Drawings & Parts Lists**



DEM MODEL IDENTIFICATION

TED-141 Rev 2

Basic designation

DEM WW - DDD – YYXX/N – ZZZZ

WW = Wet end series (61, 81, 82, etc)

DDD = Discharge Diameter (mm) (2"=50, 3"=80, 4"=100, 6"=150, 8"=200)

YY = Motor speed 2 = 3600 rpm and motor frame size (C, D, E, F, G)

3 = 3000 rpm

4 = 1800 rpm

5 = 1500 rpm

6 = 1200 rpm

7 = 1000 rpm

8 = 900 rpm

XX = Motor Horsepower (1.35 service factor)

/N = Non-Agitator, leave blank if agitator

Options

- Z** = C High temperature option (upgraded seals, bearings & class H insulation)
J Jet ring
K Float switch for oil level
L Float switch in motor housing
M Moisture sensor in oil - standard above 15hp, not available 15hp & below
Q Stainless steel motor
R RTD Top and bottom bearing temperature sensors
T Thermostat motor winding protection - standard
W Water Jacket
2 Two power cables (allows star-delta starting) - standard above 15hp
Note: pumps with sensors have an additional cable for sensors
eX Explosion proof motor – Check area classification

Voltage/Frequency

460 VAC 60 Hz standard - see nameplate

Standard Features

Double SiC mechanical seal

Model number example

DEM 81-150-4E150/N-LMT2

APPENDIX B – Pump Specification

Explosion Proof, Submersible, Totally enclosed, Water cooled, Squirrel cage, Induction motor, Dry type. FM approved, Class I, Division 1, Group C & D, T4 Temperature Code.

Pump Model Number		DEME-71-80-6C10X/C-HC-460#
Pump Serial Number		D-32221 to D-32229
Metallurgy		High Chrome
Impeller Dia.	in.	8.86
Assembly Weight	kg [lbs]	
Frame Size		180T3
Rated Output	HP	10 S.F. = 1.15
No. of Phases		3
No. of Poles		6
Rated Voltage	V	460
Frequency	Hz	60
Rated Current	A	15
Starting Current	A	76
Starting Method		Direct on Line
Speed	RPM	1140
Insulation Class		F
NEMA Code		G
Efficiency (100%)	%	82.1
Power Factor (100%)	%	78.5
Rated Torque	lb-ft	46
Breakdown Torque	%	207
Starting Torque	%	272
Painting		Zinc Rich Primer / Epoxy
Water Penetration Detector		Electrode Leakage Detector
Motor Thermal Protector		MTP in each Stator Winding
Power Cable(s)		SOOWxAWG10x4corex20m -
Control Cable		SOOWxAWG18x5corex20m

Operating Conditions

Flow	USGPM	135
TDH	Feet	38.5
Slurry S.G.		1.02
Max. Particle Size	in.	1.18
Temperature	°F	82.4
pH		7

OPERATOR TO FILL IN ACTUAL STARTUP OPERATING DATA

Installation Date:

		At Installation	6-Month Check	1-Year Check
Flow (USGPM)	Normal			
	Max.			
Discharge Pressure	PSI			
Discharge Line Size	in.			
Temperature	°F			
Voltage	V			
Current	A			

General Technical Data

Maximum operating temperature range (T-Code): T4 [135°C (275°F)]

Ambient temperature: Max. 40°C (104°F)

Liquid temperature: Max. 40°C (104°F)

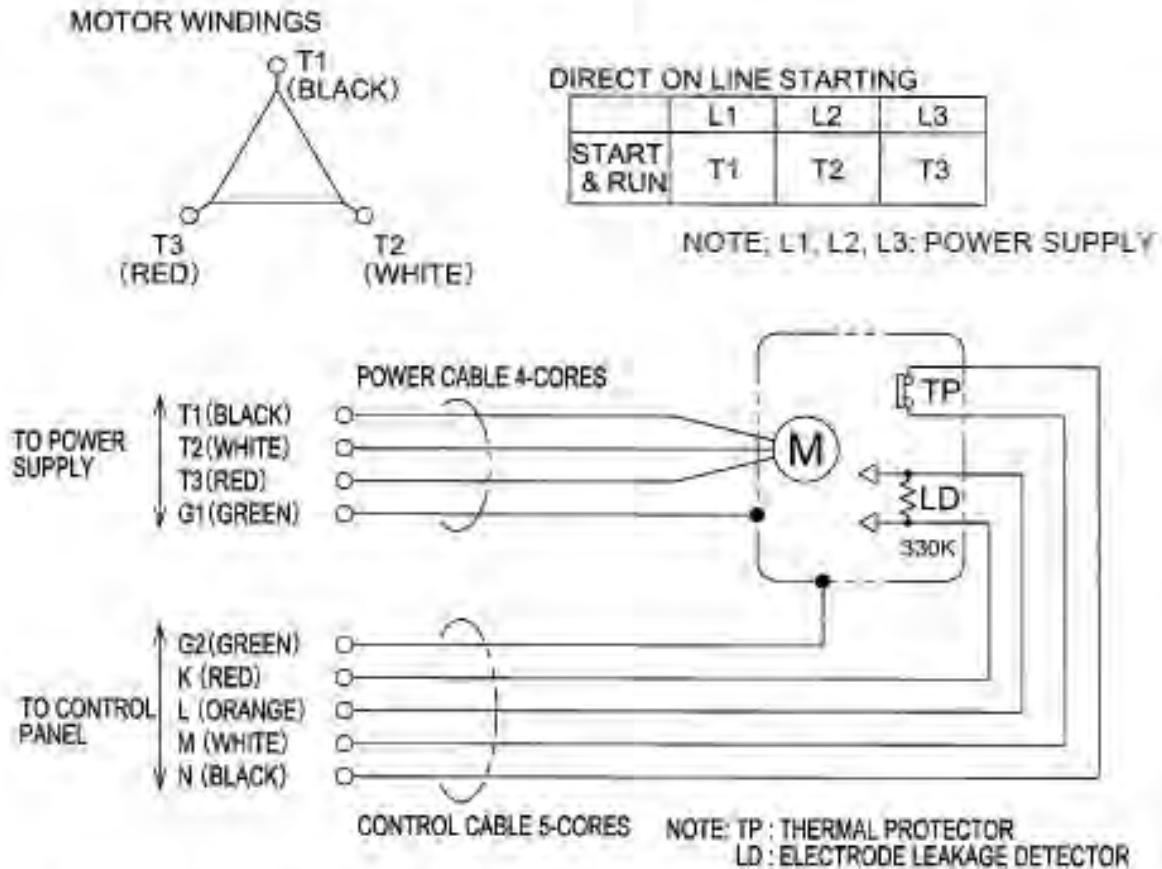
Submersible Depth: Max. 20m (65 ft)

The motor can be operated at rated output if the complete motor housing is submerged.

Number of allowable starts: For frame size 180T and 250T, 10 starts per hour when cold and 5 starts per hour when hot

ELECTRICAL WIRING

1. TERMINAL MARKING AND CONNECTION



WARNING ⚠ THE GROUNDING CONDUCTOR G1 AND G2 MUST BE CONNECTED SURELY TO THE GROUNDING TERMINAL OF POWER SUPPLY

2. THERMAL PROTECTOR : TP

AUTOMATIC-RESETTING BIMETALLIC THERMOSTAT
 NORMALLY CLOSED, MAX. CONTACT RATING : 230VAC, 13A
 NOMINAL OPENING TEMP. : $140 \pm 5^{\circ}\text{C}$
 NOMINAL CLOSING TEMP. : $90 \pm 15^{\circ}\text{C}$ (REF)

3. ELECTRODE LEAKAGE DETECTOR : LD

DUAL-ELECTRODE LEAKAGE DETECTOR

WARNING ⚠ THE LEAKAGE DETECTION CIRCUIT MUST BE AN ISOLATED SECONDARY CIRCUIT.
 OPEN CIRCUIT VOLTAGE : MAX. 30VAC
 RATED CURRENT : MAX. 0.5mA



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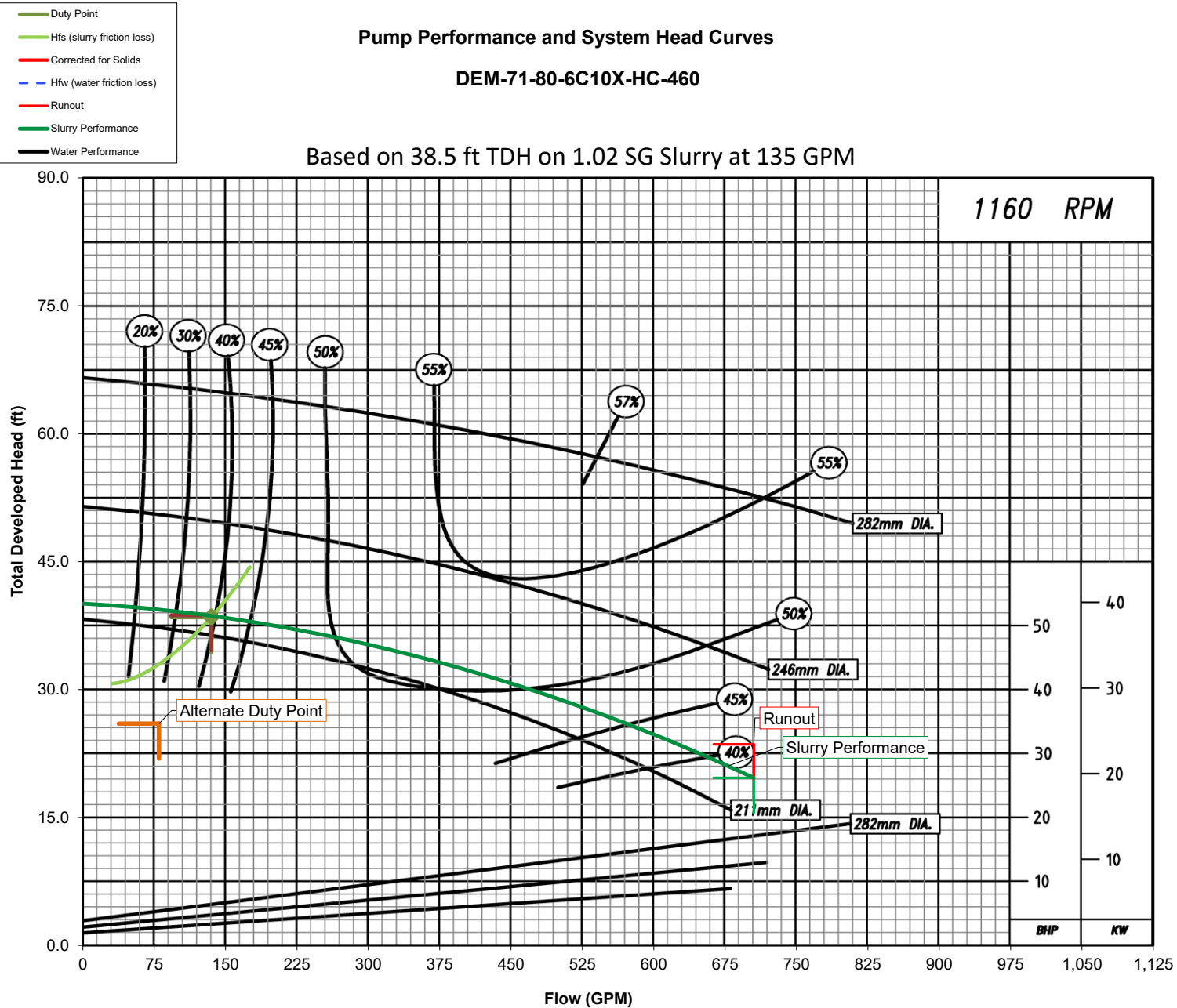
Toyo Pumps North America Corporation
 Coquitlam, British Columbia
 Canada V3K 7C1
 Tel : (604) 298-1213 Fax: (604) 297-7773

Pump Model	DEM-71-80-6C10X-HC-460	
Curve Number	A3752	Rev. 3
Performance at Pump Casing		
Head @ Shutoff	40.1 ft	4% Rise
% of BEP Flow	33%	
DISCHARGE	3.0"	75 mm
SUCTION	4.0"	100 mm
IMPELLER TYPE	Recessed, 8 Vane	
IMPELLER DIAMETER (FULL)	11.1"	282 mm
IMPELLER DIAMETER (SELECTED)	8.7"	220 mm
MAX. PARTICLE	1.18"	30 mm
DRIVE	Direct Drive	
POWER FRAME		
MOTOR	10 HP	7.5 kW
De-Rated to	10 HP	7.5 kW
BHP @ Duty	4.2 HP	3.1 kW
PUMP SPEED	1160 RPM	
MAX FOR FRAME	1154 RPM	
MOTOR SPEED	1154 RPM	
2103SH08A0		

Pump Performance and System Head Curves

DEM-71-80-6C10X-HC-460

Based on 38.5 ft TDH on 1.02 SG Slurry at 135 GPM

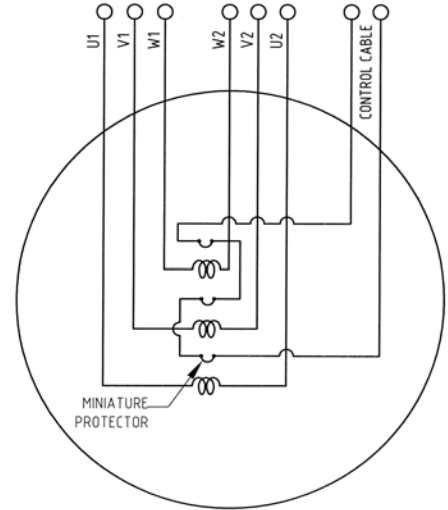


APPENDIX D – Motor Protection

T - Miniature Thermal Protector (MTP)

A bi-metallic contact imbedded in each winding of the stator wired independently from the power conductors. If the motor's coil begins to overheat, the sensor will trigger and open the control circuit. The signal from this sensor is conveyed to the control panel via the cabtyre or control cable. At the panel wiring can be connected to warning lights or alarms or may be connected to the starter to auto shut down the pump (requires contact protection relay, not supplied.) Once temperature returns to normal, the sensor automatically resets. Restarting is done manually.

RECOMMENDATION: Use a holding circuit to avoid damage which could occur when the pump restarts after the sensor resets.



Contacts Normally Closed

Insulation class	F	H
Nominal Opening Temp	140°C ± 5°C	-
Nominal Closing Temp	90°C ± 15°C	-
Max. Contact Rating	230 VAC 13A	-

R - Optional RTD Bearing Temperature Sensor (Resistance Temperature Detector)

Pumps with bearing RTD's: Thermal Sensors (Platinum RTD) are mounted on the upper and lower bearings. Electrical resistance of the RTD varies linearly with temperature.

°C	0	10	20	30	40	50	60	70
ohms	100.00	103.90	107.79	111.67	115.54	119.40	123.24	127.07

°C	80	90	100	110	120	130	140	150
ohms	130.89	134.70	138.50	142.29	146.06	149.82	153.58	157.31

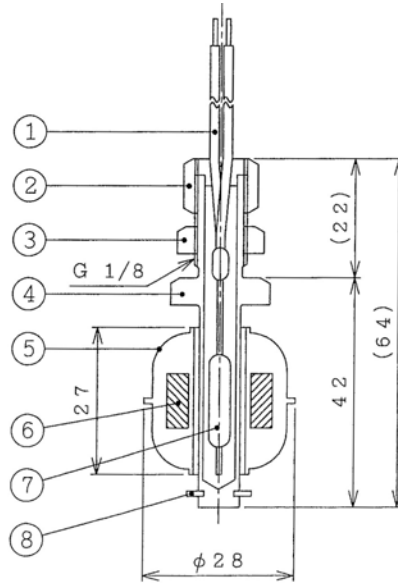
Signal from the RTD can be used to monitor the temperature of the motor. If the bearing temperature exceeds the allowable temperature the RTD can trigger control circuitry (not supplied) for an alarm or to de-energize the magnetic contactor in the control panel to shut-down the motor.

RTD Current Rating: 1mA

L - Optional Water Penetration Detector (Float Switch)

Pumps with float switches: A normally closed float switch is mounted in the motor chamber of the pump. If water leaks into the motor chamber the switch contacts open. The contacts can be wired to trip an alarm, lights or a shut down circuit (not supplied). Once this sensor is tripped, internal repairs will be required prior to putting the pump back into service.

Maximum Contact Capacity: 50VA AC, 50W DC
 Maximum Operating Current: 0.5A AC, 0.5A DC
 Maximum Operating Voltage: 300V AC, 300V DC
 Contact: Normally Closed



No.	NAME	QTY
1	LEAD WIRE	2
2	UNION NUT	1
3	FITTING NUT	1
4	HOUSING	1
5	FLOAT	1
6	MAGNET	1
7	LEAD SWITH	1
8	STOPPER	1

M - Optional Moisture Sensor (Conductivity type)

Pumps with moisture sensors: A conductivity sensor is mounted in the oil chamber of the pump. If water leaks into the oil chamber the sensor signal can be sensed with an external relay.

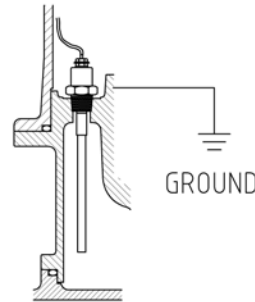
Recommendation: The relay contacts should be wired to trip an alarm or light rather than a motor shut down. This is because shutdown of the pump during heavy slurry operation can plug the pipeline.

Once this sensor is tripped, maintenance should be scheduled within 1 or 2 days to replace the lower seals, shaft sleeve and possibly the lower bearing. *Note: An induced current can also set off the sensor, so it is necessary to configure the control panel to only halt operation only after the sensor has been signaled for several seconds.*

For single-electrode leakage detector

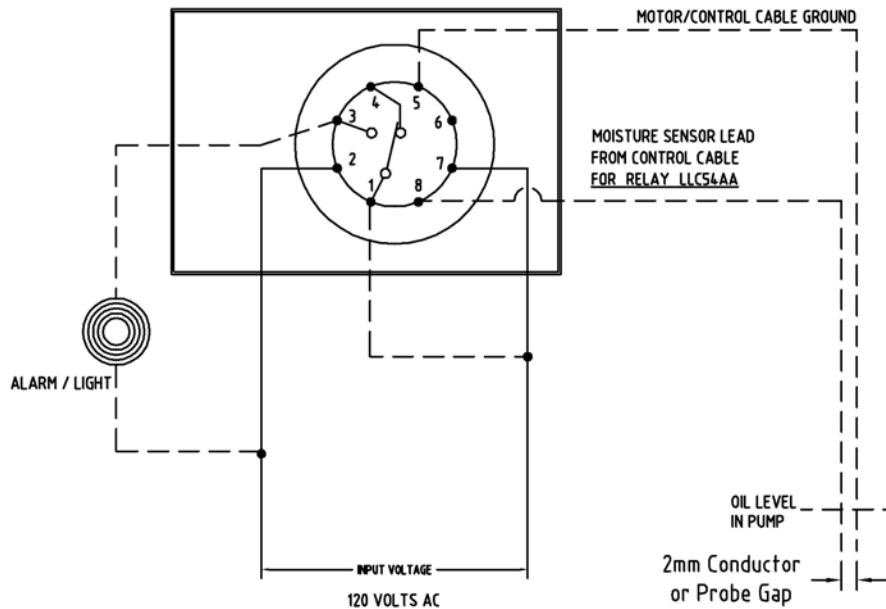
Sensor Parameters:

No moisture present: Open Circuit
 Open circuit voltage: max. 30VAC
 Circuit current: max. 0.5mA



Relay Contact rating: 5A resistive at 240VAC

Moisture Sensor Relay Wiring (ABB LLC5AA):

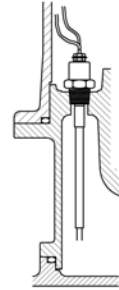


- NOTES:
1. ALARM WIRING DASHED LINES ARE FOR EXAMPLE ONLY. RELAY CONTACTS ARE ISOLATED AND CAN BE CONNECTED TO A DCS.
 2. CONTACT RATING IS 5A @ 240VAC
 3. INITIAL SET-UP OF RELAY: TURN SENSITIVITY KNOB TO 5 OR HIGHER
 SENSITIVITY OF 10 WILL WORK BUT WILL BE MORE LIKELY TO FALSE TRIP

For dual-electrode leakage detector

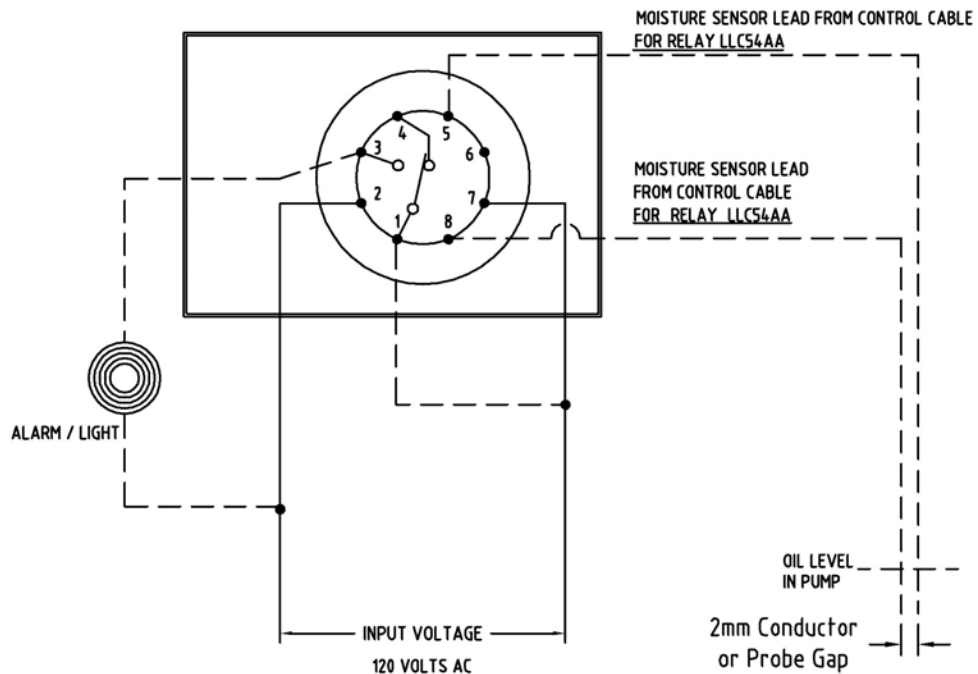
Sensor Parameters:

No moisture present: Open Circuit
 Open circuit voltage: max. 30VAC
 Circuit current: max. 0.5mA



Relay Contact rating: 5A resistive at 240VAC

Moisture Sensor Relay Wiring (ABB LLC5AA):



NOTES:

1. ALARM WIRING DASHED LINES ARE FOR EXAMPLE ONLY. RELAY CONTACTS ARE ISOLATED AND CAN BE CONNECTED TO A DCS.
2. CONTACT RATING IS 5A @ 240VAC
3. INITIAL SET-UP OF RELAY: TURN SENSITIVITY KNOB TO 5 OR HIGHER
 SENSITIVITY OF 10 WILL WORK BUT WILL BE MORE LIKELY TO FALSE TRIP

APPENDIX E – DEM Lubrication & additional Maintenance

MOISTURE SENSOR (IF APPLICABLE)

If moisture sensor is tripped, go through normal shutdown procedure and immediately check the oil reservoir per instructions below. Replace the shaft seals as necessary.

LUBRICANT CHECK

Check lubrication oil level in oil reservoir at least every 500 operating hours or monthly. Set the pump horizontally on appropriate wooden blocks with one of the oil covers facing up. Remove the oil cover and angle the pump allowing some oil to drain slightly to check for its consistency.

CAUTION: Be aware of the pump's weight and centre of gravity when moving to prevent serious accidents or damage.

If the oil is milky white or has water mixed in with it replace the oil with type and quantity as follows. Check oil within a few days to confirm oil is still clear. If the oil is cloudy, the pump may require disassembly for replacement of the shaft seal. Contact Toyo for technical assistance.

Inspect seal on oil cover and replace if damaged.

If the oil level is low top up the oil with type per table. Check oil within a few days to confirm oil level, if level is again low the pump may have to be disassembled to replace seals. Contact Toyo for technical assistance.

OIL REPLACEMENT

Change the oil every year or when the accumulated operating time reaches 4000 hours.

1. Set the pump horizontally on appropriate wooden blocks with one of the oil covers facing up. Remove both oil covers and drain oil.

Note: Used oil should be appropriately disposed of by waste disposal contractors in compliance with local regulations.

2. If water and sludge have contaminated the oil reservoir (oil is milky white) check the shaft seals and lower bearing and replace as necessary.
3. Replace the seal on the oil covers and install the lower cover

4. Re-fill the oil to the quantity in the table based on your motor horsepower and speed.

Motor HP@rpm	5@1160 7.5@1160&1760 10@1160&1760 15@1760	15@1160 20@1160&1760 25@1160&1760 30@1760 40@1760	30@1165 40@1165
Frame Size	180T	250T	320T
Mechanical seal oil quantity	1.6 liters (0.42 US Gal)	3.5 liters (0.92 US Gal)	6.8 liters (1.80 US Gal)

5. Use the following oils:

ISO Grade #32 turbine oil (or non-detergent
SAE 10 if turbine oil unavailable)

6. If pump is run intermittently, the oil reservoir should be examined more often.
7. If the pump has not been operated for a long period of time, the oil reservoir should be examined shortly after startup to ensure there has been no deterioration of seals.

BEARING GREASE LUBRICATION

DEM pumps are greased during assembly and do not require re-greasing between major overhauls.

Refill the grease every year or when the accumulated operating time reaches 8000 hours.

The upper bearing consists of a single row ball bearing. The lower bearing consists of a two-row angular contact ball bearing. Both upper and lower bearings are packed with lithium grease for high temperature usage. The table below lists acceptable grease.

Acceptable Grease	Manufacturer
Stamina grease RL 2	Shell

APPENDIX F – DEM/DBS Disassembly & Assembly Procedures

Use a location that is dry and dust free for disassembly/reassembly of the wet end. Prepare a chain block or crane, rags, solvent, tools and several small boxes for disassembled small parts. If repairs are required to the motor and seals, contact a qualified Toyo repair facility.

WARNING: Proper disassembly/reassembly of parts other than the wet end should only be done by a knowledgeable Toyo representative.

DIS-ASSEMBLY

1. Turn off the power, lock out pump and disconnect the cabtyre cable.

WARNING: Electrical hazards may occur if this is not properly done. Never restore power in the middle of disassembly/reassembly which may lead to serious accidents or damage.

2. The agitator or cutter is threaded to the shaft. Remove it by hitting it counterclockwise with a soft metal mallet, use caution when hitting the vanes as they are hard and brittle (always wear safety glasses).
3. Remove bolts and washers at the bottom of the pump to release the Strainer Stand.
4. Next remove the necessary bolts and washers to release the Pump Casing and remove the casing.
5. Remove the impeller and delivery cover.

CAUTION: Be aware of the impeller's sharp edges that may cause serious injury.

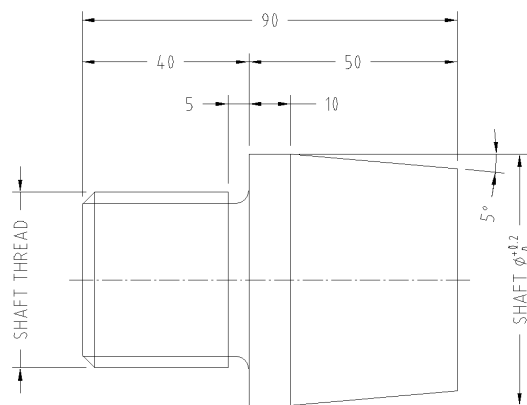
The following steps are only required for Mechanical Seal replacement:

6. Remove the oil plug and angle the pump such that oil can be drained completely. Be aware of the pump's weight and centre of gravity while moving/tilting to avoid accidents.
7. Remove bolts and washers necessary to release the lower part of the Oil Casing, see cross sectional drawing. Use caution to avoid damage to the surface of the seal.
8. Release the set screw from the shaft and slide the Mechanical Seal from the shaft.

ASSEMBLY

Mechanical Seal replacement:

1. The sliding surface of the Mechanical Seal should be wiped clean with a non-oily cloth.
2. Screw a jig similar to this sketch into the shaft.
3. Apply o-ring lubricant to the elastomer surfaces and slide the seal onto the shaft ensuring it remains perpendicular to the shaft.
4. Tighten the set screw onto the shaft following the instructions provided with the seal.
5. Once reassembly is finished, ensure the rotation of the shaft is smooth and unobstructed.



Wet end replacement:

6. After repairs and/or replacement of any necessary parts, reassemble pump in reverse order of disassembly.
7. Ensure rotation of the shaft is smooth and unobstructed.
8. Refill oil (see lubrication section for type and quantity) and replace Oil plug and seal.



TOYO PUMPS NORTH AMERICA CORPORATION

1550 Brigantine Drive

Coquitlam, V3K 7C1

Tel: (604) 298-1213 Fax: (604) 298-1224

PARTS LIST - DEME-71-80-6C10X/C-HC-460#

Ref. Dwg. No. DN14961 Rev.0, DN15786 Rev.0, DN13760 Rev.0, DN15707 Rev.0 (S01-020043-01 to -08)

Serial - D-32221 to 32228

Please use the part number when ordering.

Effective: Mar 16, 2023

REF #	PART #	DESCRIPTION	QTY	
999		Assembly, Pump Complete	1	
012	08229	Relay, Moisture Sensor	1	
030.1	34618	Kit, Guide Rail 3"	1	
1		Elbow Assembly	1	
2		Discharge Connection	1	
3	Customer supplied	Guide Pipe	-	
4		Guide Holder	1	
5		Coupling and Uncoupling Flange	1	
6		Shaft Holder	1	
**	34737	Gasket (Elbow Assy. & Disch. Connection)	1	
030.2	34738	Joint Holder Set	1	
030.3	34791	Assy, Lifting Chain	1	
030.4	35167	Holder, Cable (Power Cable)	1	
030.5	35168	Holder, Cable (Control Cable)	1	
030.6	35169	Bracket, Hook Type Style	1	
040.1	01651	Screw, Hex Head, PT, Cap	4	
040.2	02041	Washer, Lock	4	
040.3	01401	Washer, Flat	4	
497	34795	Sub-Base, Pump DEME	1	
100		Kit, Wet End	1	
020	03621	Key	1	
040.1	01858	Stud	20	
040.2	02039	Washer, Lock	20	
040.3	01407	Nut, Hexagon	20	
040.4	01863	Stud	4	
040.5	03583	Stud	4	
040.6	02041	Washer, Lock	8	
040.7	01798	Nut, Hexagon	8	
**	060.1	25539	Gasket	1
**	060.2	09089	Gasket	2
**	060.3	14870	Gasket	1
**	062.1	02397	O-Ring	1
**	062.2	02420	O-Ring	1
**	062.3	02428	O-Ring	1
091	23578	Kit, Shim	1	
*	101	37108	Casing, Pump	1
*	104	03791	Cover, Delivery	1
*	202	22841	Impeller	1
204.2	25552	Sleeve, Distance	1	
206	37358	Nut, Impeller	1	
**	219	09847	Cutter, Rotating	1
**	220	14626	Cutter, Stationary	1

** CRITICAL SPARES

* RECOMMENDED SPARES



TOYO PUMPS NORTH AMERICA CORPORATION

1550 Brigantine Drive

Coquitlam, V3K 7C1

Tel: (604) 298-1213 Fax: (604) 298-1224

PARTS LIST - DEME-71-80-6C10X/C-HC-460#

Ref. Dwg. No. DN14961 Rev.0, DN15786 Rev.0, DN13760 Rev.0, DN15707 Rev.0 (S01-020043-01 to -08)

Serial - D-32221 to 32228

Please use the part number when ordering.

Effective: Mar 16, 2023

REF #	PART #	DESCRIPTION	QTY
260	37107	Shaft, Stub	1
306	25551	Flinger	1
369	25550	Stool, Pump	1
805	14631	Stand, Pump	1
400		Assy, Motor Module	1
2		Junction Chamber Housing	1
** 3	19308	Upper Roller Bearing	1
5		Motor Housing	1
6, 7		Motor (Stator & Rotor)	1
8		Shaft	1
** 9	22316	Angular Contact Ball Bearing	1
** 10	34736	Shaft Seal (with No. 24, 24-SW)	1
12L		Oil Chamber Cover	1
12U		Oil Chamber Housing	1
** 25	34735	Dust Seal	1
28		Oil Plug	2
30		Bearing Cover	3
33		Stator Retainer Ring	1
34		Stator Key	1
49		Bell Mouth for Control Cable	1
49		Bell Mouth for Power Cable	1
** 50	34734	Cable Bushing for Control Cable	1
** 50	34733	Cable Bushing for Power Cable	1
54		Control Cable	20 m
54		Power Cable	20 m
55		Cable Clamp (Bell Mouth Clamp)	2
58		Eye Bolt	2
76		Junction Chamber Cover	1
107		Electrical Leakage Detector	1
** 146	20179	Bearing Nut	1
** 28-P	19344	Packing	2
** 2-R	20860	O-Ring	1
** 5-R1	20859	O-Ring	1
** 5-R2	20859	O-Ring	1
** 12U-R	22131	O-Ring	1
831	34531	Jet Ring, DEME-71-80, SS	1

** CRITICAL SPARES
 * RECOMMENDED SPARES



TOYO PUMPS NORTH AMERICA CORPORATION

1550 Brigantine Drive

Coquitlam, V3K 7C1

Tel: (604) 298-1213 Fax: (604) 298-1224

PARTS LIST - DEME-71-80-6C10X/C-HC-460#

Ref. Dwg. No. DN15786 Rev.0, DN13760 Rev.0, DN15707 Rev.0 (S01-020043-33)

Serial - D-32229

Please use the part number when ordering.

Effective: Mar 16, 2023

REF #	PART #	DESCRIPTION	QTY
999		Assembly, Pump Complete	1
012	08229	Relay, Moisture Sensor	1
100		Kit, Wet End	1
020	03621	Key	1
040.1	01858	Stud	20
040.2	02039	Washer, Lock	20
040.3	01407	Nut, Hexagon	20
040.4	01863	Stud	4
040.5	03583	Stud	4
040.6	02041	Washer, Lock	8
040.7	01798	Nut, Hexagon	8
** 060.1	25539	Gasket	1
** 060.2	09089	Gasket	2
** 060.3	14870	Gasket	1
** 062.1	02397	O-Ring	1
** 062.2	02420	O-Ring	1
** 062.3	02428	O-Ring	1
091	23578	Kit, Shim	1
* 101	37108	Casing, Pump	1
* 104	03791	Cover, Delivery	1
* 202	22841	Impeller	1
204.2	25552	Sleeve, Distance	1
206	37358	Nut, Impeller	1
** 219	09847	Cutter, Rotating	1
** 220	14626	Cutter, Stationary	1
260	37107	Shaft, Stub	1
306	25551	Flinger	1
369	25550	Stool, Pump	1
805	14631	Stand, Pump	1
400		Assy, Motor Module	1
2		Junction Chamber Housing	1
** 3	19308	Upper Roller Bearing	1
5		Motor Housing	1
6, 7		Motor (Stator & Rotor)	1
8		Shaft	1
** 9	22316	Angular Contact Ball Bearing	1
** 10	34736	Shaft Seal (with No. 24, 24-SW)	1
12L		Oil Chamber Cover	1
12U		Oil Chamber Housing	1
** 25	34735	Dust Seal	1
28		Oil Plug	2
30		Bearing Cover	3
33		Stator Retainer Ring	1
34		Stator Key	1
49		Bell Mouth for Control Cable	1

** CRITICAL SPARES
* RECOMMENDED SPARES



TOYO PUMPS NORTH AMERICA CORPORATION

1550 Brigantine Drive

Coquitlam, V3K 7C1

Tel: (604) 298-1213 Fax: (604) 298-1224

PARTS LIST - DEME-71-80-6C10X/C-HC-460#

Ref. Dwg. No. DN15786 Rev.0, DN13760 Rev.0, DN15707 Rev.0 (S01-020043-33)

Serial - D-32229

Please use the part number when ordering.

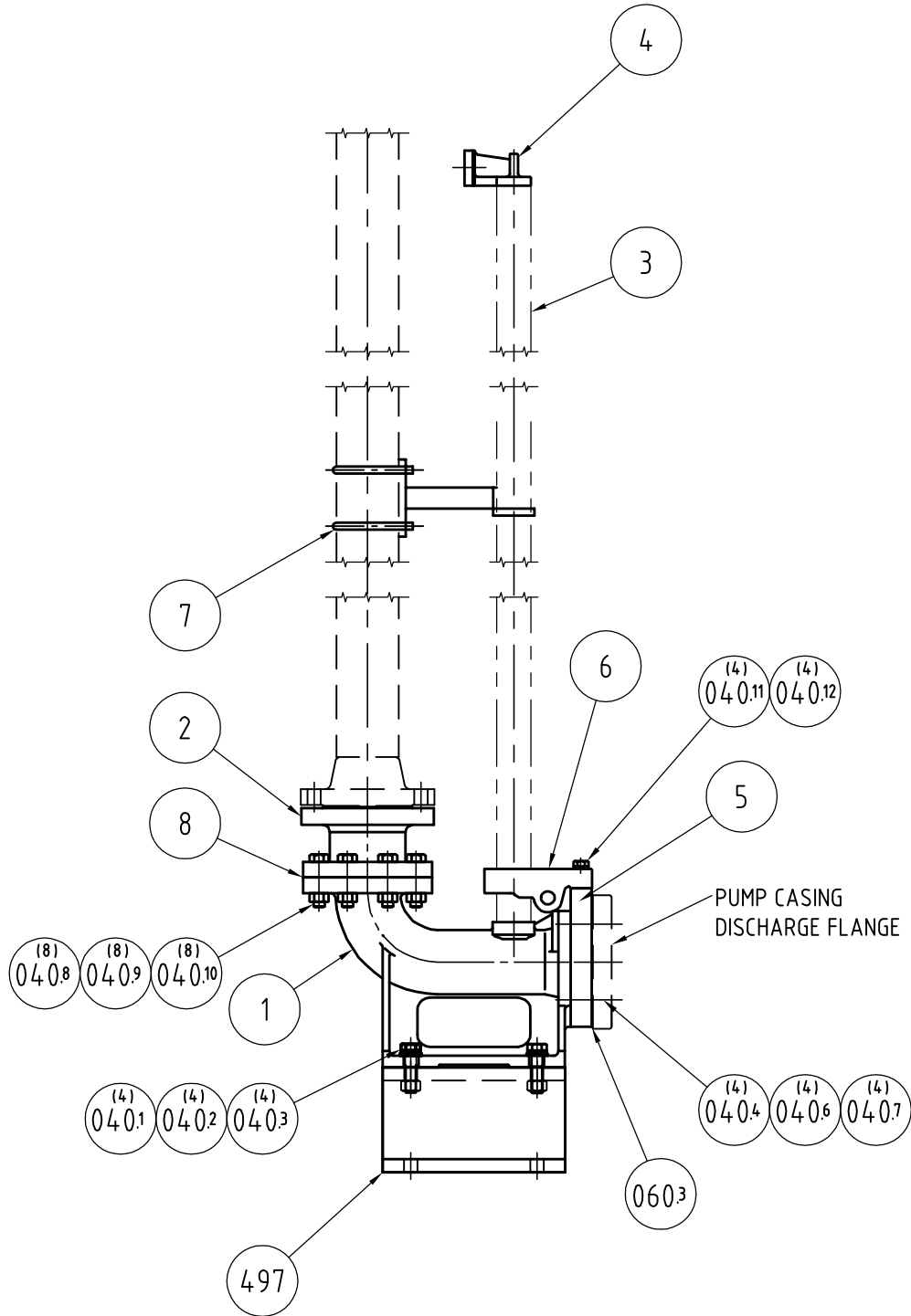
Effective: Mar 16, 2023

	REF #	PART #	DESCRIPTION	QTY
	49		Bell Mouth for Power Cable	1
**	50	34734	Cable Bushing for Control Cable	1
**	50	34733	Cable Bushing for Power Cable	1
	54		Control Cable	20 m
	54		Power Cable	20 m
	55		Cable Clamp (Bell Mouth Clamp)	2
	58		Eye Bolt	2
	76		Junction Chamber Cover	1
	107		Electrical Leakage Detector	1
**	146	20179	Bearing Nut	1
**	28-P	19344	Packing	2
**	2-R	20860	O-Ring	1
**	5-R1	20859	O-Ring	1
**	5-R2	20859	O-Ring	1
**	12U-R	22131	O-Ring	1

** CRITICAL SPARES

* RECOMMENDED SPARES

DEME SERIES SUBMERSIBLE PUMP

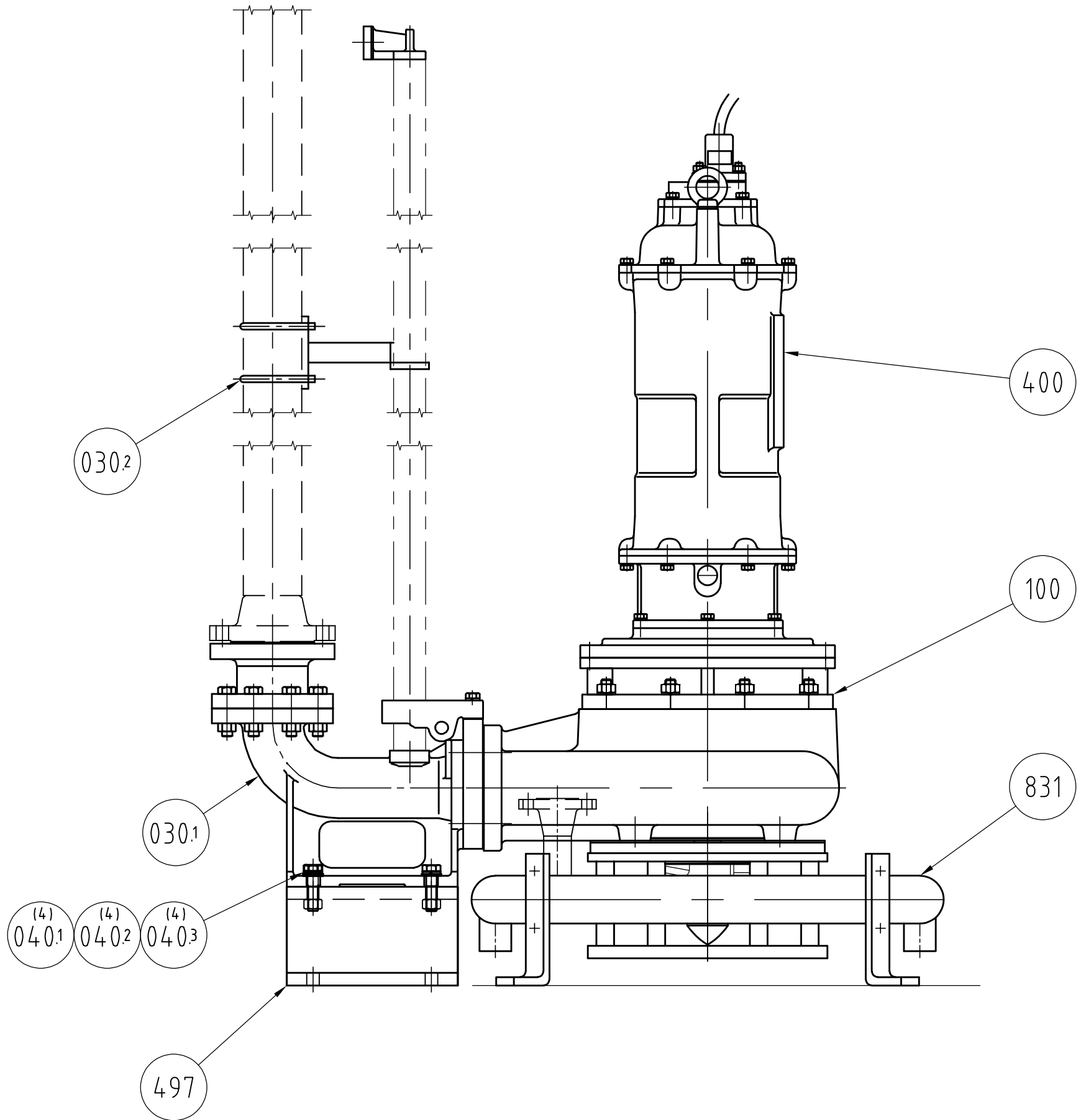


ASSEMBLY, GUIDE RAIL
DEME-71-80-6C10X-HC-460#

DRAWING NO.
DN14961

REV.
0

DEME SERIES SUBMERSIBLE PUMP

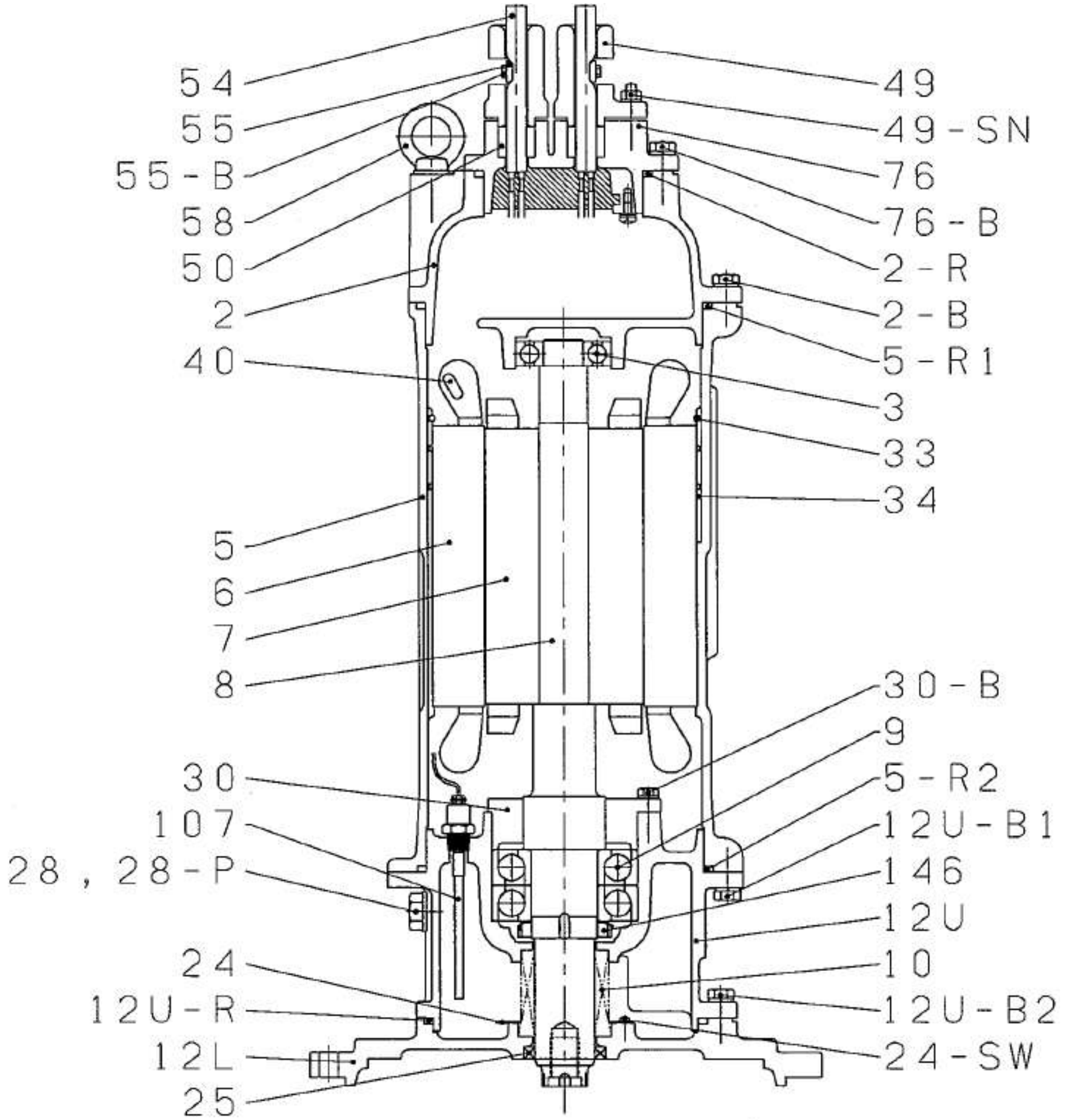


ASSEMBLY, PUMP COMPLETE
DEME-71-80-6C10X/C-HC-460#

DRAWING NO.
DN15786

REV.
0

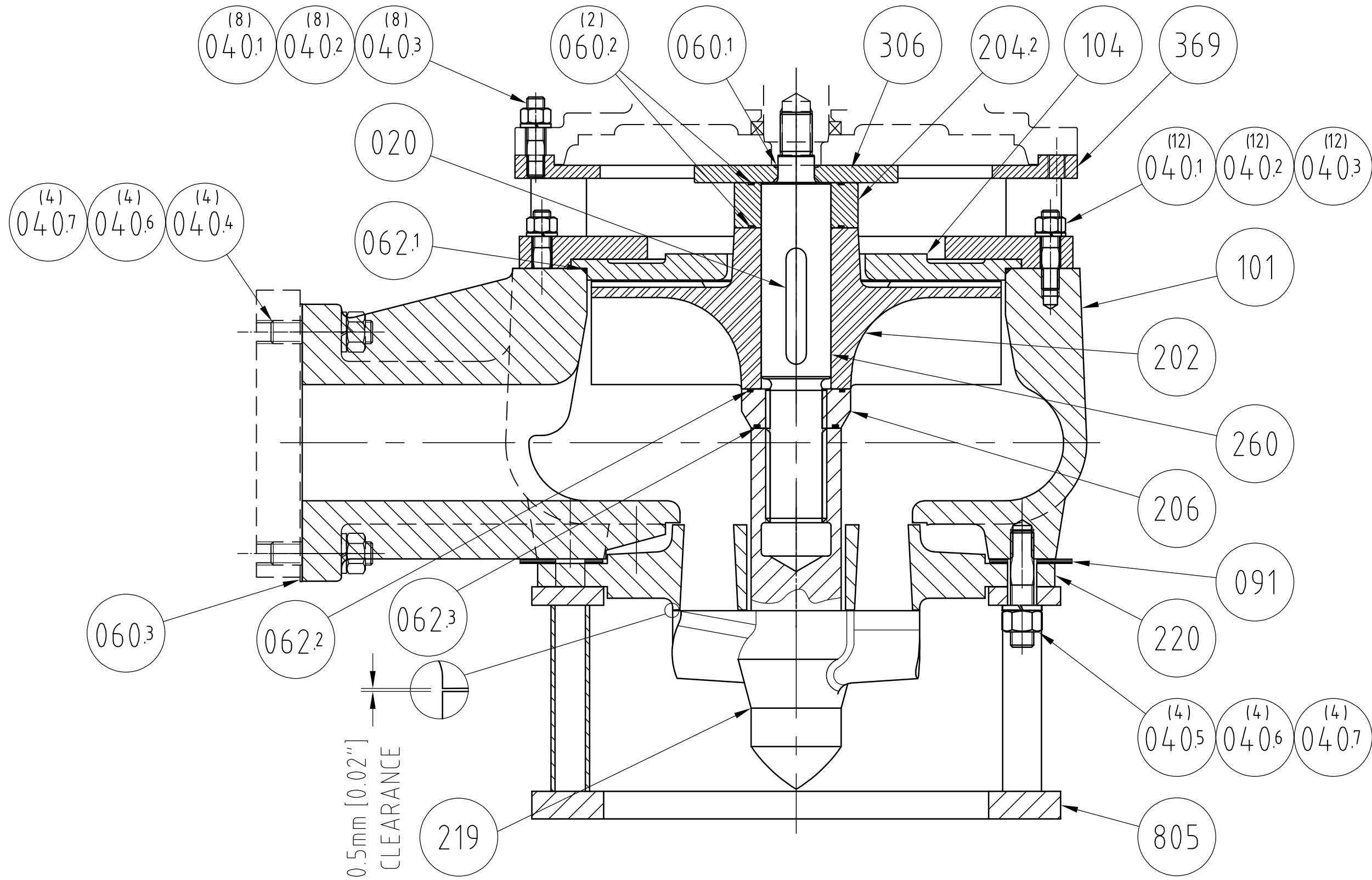
DEM SERIES SUBMERSIBLE PUMP



TOYO PUMPS	TOYO PUMPS NORTH AMERICA CORPORATION	ASSEMBLY, MOTOR MODULE DEM 'C' FRAME, EXPLOSION PROOF	DRAWING NO. DN13760	REV. 0
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DEM SERIES SUBMERSIBLE PUMP



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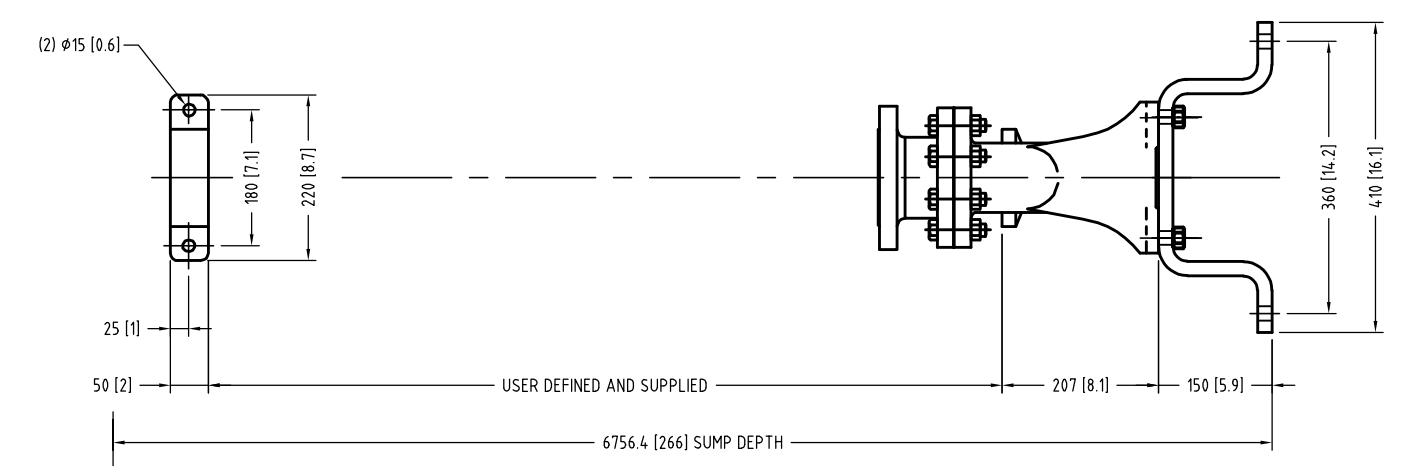
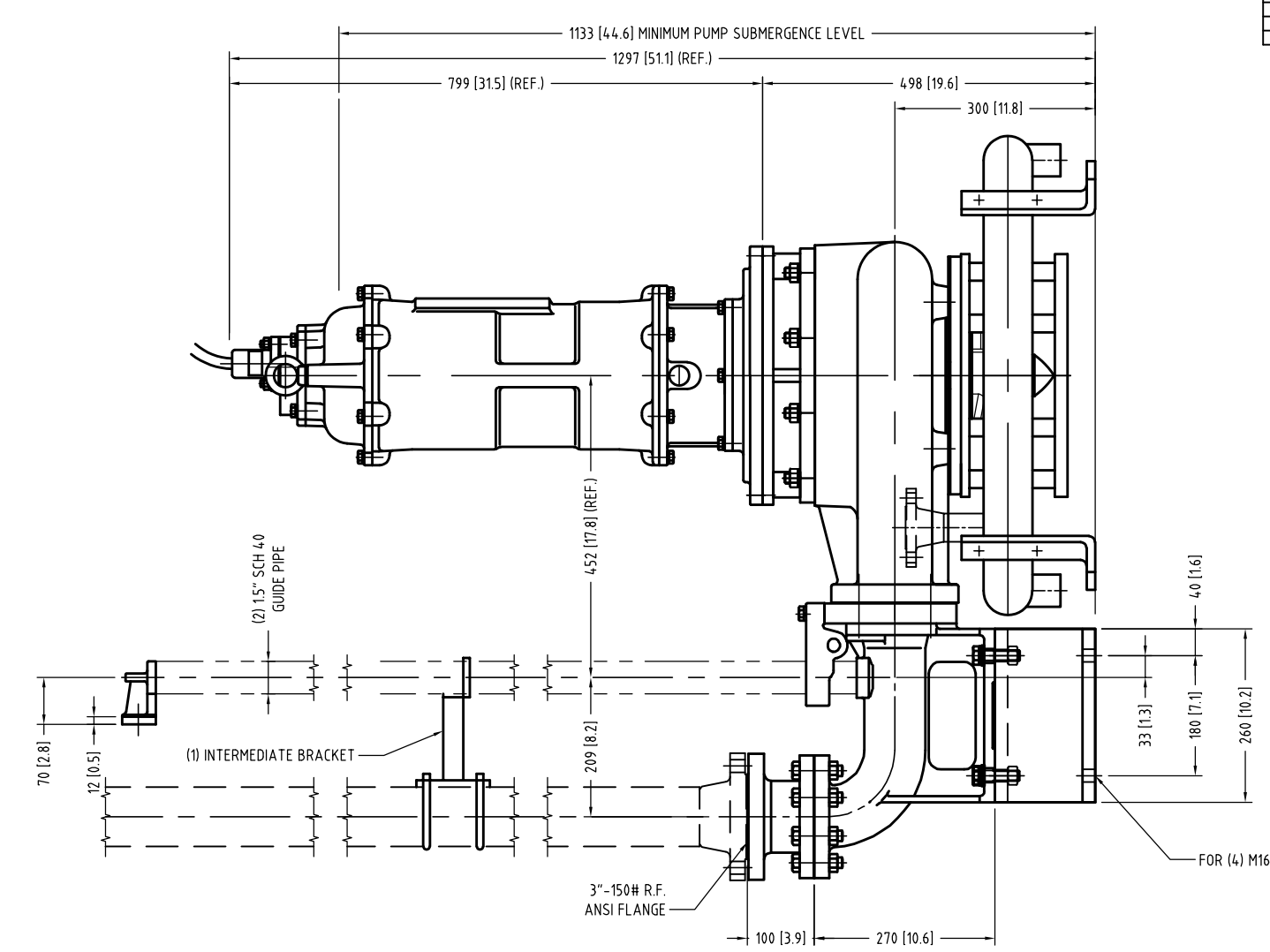
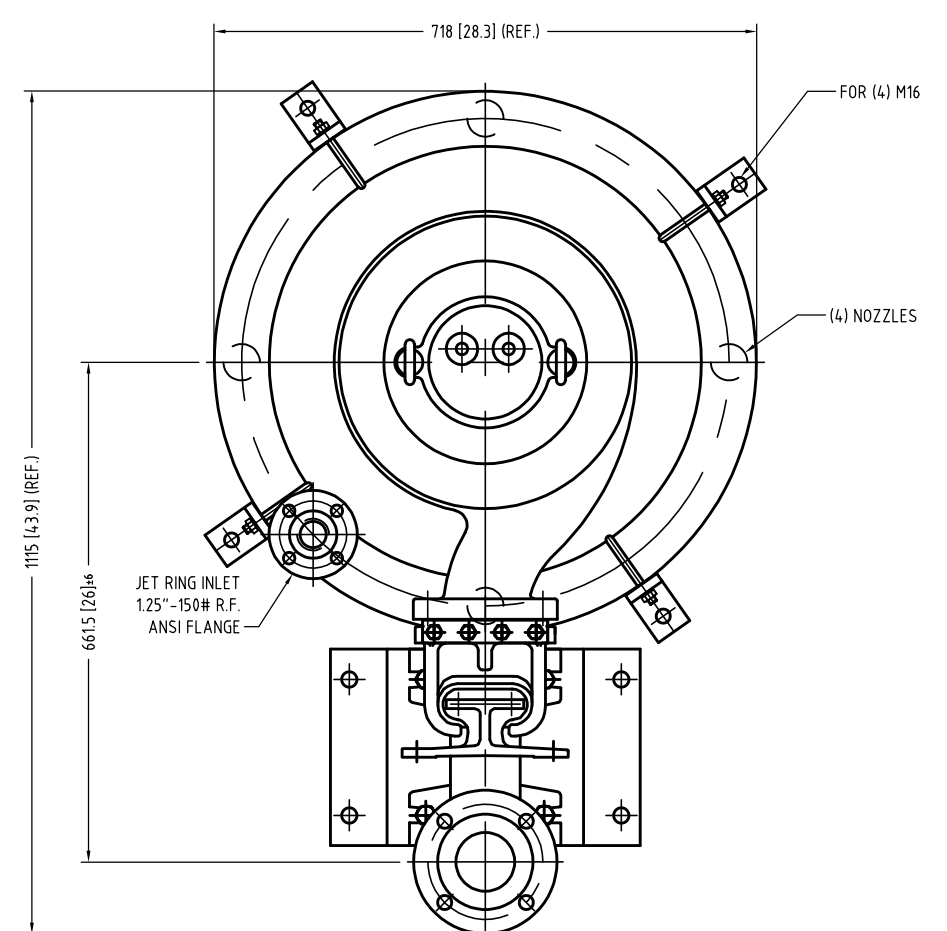
KIT, WET END
 DEME-71-80/C 180T3 EXP. PROOF MOTOR

DRAWING NO.
 DN15707

REV.
 0

TOYO PUMPS RESERVES THE RIGHT TO CHANGE ANY OR ALL COMPONENTS WITHOUT NOTICE

REV.	ECH	ZONE	CHANGE DESCRIPTION	BY	APPROVED	DATE
0	-	-	REDRAWN FROM DN14650 REV2	A.P.	CDM	8 FEB 22
1	12493	-	REVISED PUMP FROM AGITATOR TO CUTTER	A.P.	CDM	1 DEC 22



NOTE: 1. SIDE VIEW OF MOTOR IS A GENERAL REPRESENTATION AND NOT A PROPER PROJECTION OF THE TOP VIEW OF THE MOTOR
 2. PRIMARY DIMENSIONS SHOWN ARE IN mm; DIMENSIONS IN SQUARE BRACKET ARE IN INCHES

APPLICATION DATA	
CAPACITY:	135 USgpm
TDH:	38.5 feet
FLUID:	WASTEWATER
TEMPERATURE:	82.4 °F
PH:	7
SLURRY SG:	1.02
NPSHa:	34.7 feet
APPROXIMATE WEIGHTS	
PUMP ASSEMBLY	265 KG
JET RING	20 KG
GUIDE RAIL	60 KG
TOTAL	345 KG

MATERIALS OF CONSTRUCTION	
PUMP CASING	ASTM A532 CL III TYPE A (HI CHROME)
PUMP DELIVER COVER	ASTM A532 CL III TYPE A (HI CHROME)
IMPELLER	ASTM A532 CL III TYPE A (HI CHROME)
ROTATING CUTTER	ASTM A532 CL III TYPE A (HI CHROME)
STATIONARY CUTTER	ASTM A532 CL III TYPE A (HI CHROME)
MOTOR SHAFT	428SS
PUMP SHAFT	17-4PH
DISCHARGE ELBOW	ASTM A48 CL 35
PUMP STAND	ASTM A36 & A53
MOTOR HOUSING	ASTM A48 CL 35
MOTOR MOUNTING STOOL	ASTM A36
JET RING	316SS
FASTENERS	316SS

PUMP/ELECTRICAL DATA	
MODEL:	DEME-71-80-6C10X/C
SERIAL NUMBER:	D-32221 TO D-32229
DISCHARGE:	3 IN.
OUTPUT:	10 hp
SPEED (AT 60Hz):	1160 RPM
SERVICE FACTOR:	1.15
PHASE:	3
FREQUENCY:	460 Hz
VOLTAGE:	60 V
CURRENT:	15 amps
INSULATION CLASS:	F
ROTATION (MOVED FROM SECTION END):	CCW

CUSTOMER/VENDOR INFORMATION		
CLIENT NAME:	LAKESHORE ENGINEERING, LLC	
PROJECT NAME:	IFB-C 1210217 EAST AREA WQCF IMPROVEMENTS	
PROJECT NUMBER:	---	
PURCHASE ORDER NO.:	21091-11100	
CUSTOMER TAG NUMBERS		
TOYO S/O	CUSTOMER TAG NO.	EQUIPMENT NAME
591-82043	P3422, P3423, P3424, P3425, P3432, P3433, P3434, P3435, AND 1 SPARE	-
THIS PRINT AND ALL INFORMATION HEREON IS THE PROPERTY OF TOYO PUMPS, NORTH AMERICA CORP. AND MUST NOT BE MADE PUBLIC, COPIED OR USED IN ANY WAY DETRIMENTAL TO OUR INTEREST. IT IS LOANED SUBJECT TO RETURN ON DEMAND UNLESS FURNISHED UNDER CONTRACT PROVISIONS.		
PRODUCT LINE	DEME	
TYPE / FRAME	71-80-6C10X/C	
B.O.M.	-	
ORIG. JOB NO.	-	
ORIG. ORDER NO.	-	
SCALE	1:5	
DRAWN	A.P.	DATE 8 FEB 22
CHKD.	DATE	DATE 8 FEB 22
APPRD.	CDM	DATE 8 FEB 22
REPLACES	-	REPLACED BY -
TITLE GENERAL ARRANGEMENT		DRAWING NO. DN15331
REV. 1		SHEET 1 OF 1

