



## **INSTALLATION, OPERATION & MAINTENANCE MANUAL**

### **XP-SK SERIES - (PUMP END ONLY) EXPLOSION PROOF SUBMERSIBLE SHREDDER PUMPS (CLASS 1, DIVISION 1, GROUPS C&D): FM APPROVED**

**Three Phase  
208V, 230V, 460V & 575V**

#### **CAST IRON THREE PHASE**

XP-SK15C	XP-SK55C
XP-SK22C	XP-SK75C
XP-SK37C	XP-SK110C
	XP-SK150C

This manual only covers the PUMP END (also called wet end).

**\*\*\* See the EIM ELECTRIC CO., LTD Instruction Manual for Installation, Operation & Maintenance on the EMQY Series submersible motors.**

Read this manual carefully before installing, operating or servicing these pump models. Observe all safety information. Failure to comply with instructions may result in personal injury and/or property damage. Please retain these instructions.



## TABLE OF CONTENTS

INTRODUCTION.....	4
SAFETY .....	5
INSPECTION .....	5
PRE-INSTALLATION INSPECTION .....	6
PUMP INSTALLATION .....	6
POSITIONING THE PUMP .....	6
PUMP ROTATION .....	7
PUMP OPERATION.....	8
WIRING INSTRUCTIONS .....	8
STOPPING .....	9
TROUBLE SHOOTING .....	9
PUMP WILL NOT RUN .....	9
PUMP RUNS BUT DOES NOT DELIVER RATED CAPACITY.....	9
SERVICING YOUR SUBMERSIBLE PUMP.....	9
MAINTAINING YOUR PUMP .....	9
CHANGING SEAL OIL .....	10
EXPLODED VIEW OF XP-SK15C (2HP).....	11
BJM WET END ASSEMBLY FOR EIM FM MOTOR.....	11
EXPLODED VIEW OF XP-SK22C, XP-SK37C (3 & 5HP) .....	12
BJM WET END ASSEMBLY FOR EIM FM MOTOR.....	12
EXPLODED VIEW OF XP-SK55C, XP-SK75C .....	13
BJM WET END ASSEMBLY FOR EIM FM MOTOR.....	13
EXPLODED VIEW OF XP-SK110C, XP-SK150C.....	14
BJM WET END ASSEMBLY FOR EIM FM MOTOR.....	14
XP-SK SERIES PARTS LIST.....	15
XP-SK DIMENSIONAL DRAWING .....	16
WARRANTY AND LIMITATION OF LIABILITY .....	17
START-UP REPORT FORM.....	18
NOTES:.....	21



## INTRODUCTION

This Installation, Operation and Maintenance manual only covers the pump end (wet end) of the XP-SK Series pumps.

Refer to EIM ELECTRIC CO., LTD Instruction Manual for Installation, Operation and Maintenance for the Explosion Proof Submersible Motors (EMQY Series; FM Approved for Class I, Division 1, Group C & D).

This manual provides important information on safety and the proper inspection; disassembly, assembly and testing of the BJM Pumps® SK Series Wet End attached to EIM Electric Co., LTD. EMQY Series Explosion Proof Submersible Motors. This manual also contains information to optimize performance and longevity of your **BJM Pumps** submersible pump end.

**The submersible XP-SK Series pumps are designed to pump water with some solids. The pump and motor housing are made of cast iron (the impeller and suction are made of chrome iron in pumps with 2, 3 & 5 HP motors). Consult chemical resistance chart for compatibility between pump materials and liquid before operating pump.**

If you have any questions regarding the inspection, disassembly, and assembly or testing please contact your **BJM Pumps** distributor, or BJM Pumps, LLC.

Note: All service work on the FM Approved motor by EIM Electric Co., needs to be done by an FM Approved repair facility.

BJM Pumps, LLC  
123 Spencer Plain Rd.  
Old Saybrook, CT 06475, USA

Phone: 877-256-7867  
Phone: 860-399-5937  
Fax: 860-399-7784

Information, including pump data sheets and performance curves, is also available on our web site: [www.bjmpumps.com](http://www.bjmpumps.com)

For assistance with your electric power source, please contact a certified electrician.

Please pay attention to the following alert notifications. They are used to notify operators and maintenance personnel to pay special attention to procedures, to avoid causing damage to the equipment, and to avoid situations that could be dangerous to personnel.



Immediate hazards that WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.



**⚠ WARNING**

Hazards or unsafe practices that COULD result in severe personal injury or death. These instructions describe the procedure required, and the injury which could result from failure to follow the procedure.

**⚠ CAUTION**

Hazards or unsafe practices which COULD result in personal injury or product or property damage. These instructions describe the procedure required and the possible damage which could result from failure to follow the procedure.

### **SAFETY**

Pump installations are seldom identical. Each installation and application can vary due to many different factors. It is the owner/service mechanics responsibility to repair, service, and test to ensure that the pump integrity is not compromised according to this manual.

**⚠ WARNING**

Risk of electric shock – this pump has not been investigated for use in swimming pool areas.

**⚠ WARNING**

Before attempting to open or service the pump:

- 1) Familiarize yourself with this manual & the EIM ELECTRIC CO., LTD Instruction Manual for Installation, Operation and Maintenance for the EMQY Series FM approved submersible pump motor.
- 2) Disconnect the pump power cable to ensure that the pump will remain inoperative.
- 3) Allow the pump to cool if overheated.

**⚠ WARNING**

After the pump has been installed, make sure that the pump and all piping are secure before operation.

**⚠ WARNING**

Do not lift the pump by the power cable piping or discharge hose. Attach proper lifting equipment to the lifting handle (or lifting rings) fitted to the pump. Do not suspend the pump by the power cable.

**⚠ CAUTION**

Pumps and related equipment must be installed and operated according to all national, local and industry standards.

### **INSPECTION**

**Review all safety information before servicing pump.**

The following are recommended installation practices/procedures for the pump. If there are questions in regards to your specific application, contact your local **BJM Pumps** distributor or BJM Pumps, LLC.



### **Lifting:**

Attach a rope or lifting chain (not included) to the handle (or lifting rings) on the top of the pump.

**⚠ CAUTION** Do not lift the pump by the power cable or discharge hose/piping. Proper lifting equipment (rope/chain) must be used.

## **PRE-INSTALLATION INSPECTION**

- 1) Check the pump for damage that may have occurred during shipment.
- 2) Inspect the pump for any cracks, dents, damaged threads, etc.
- 3) Check power cord (and Seal Leak Detector cord, if installed) for any cuts or damage.
- 4) Check for, and tighten any hardware that appears loose.
- 5) Carefully read all tags, decals and markings on the pump.
- 6) Important: Always verify that the pump nameplate amps, voltage, phase, and HP ratings match your control panel and power supply.

Record the model numbers and serial numbers from the pumps and control panel on the front of this instruction manual for future reference. Give it to the owner or affix it to the control panel when finished with the installation.

If anything appears to be abnormal, contact your **BJM Pumps** distributor or BJM Pumps, LLC. If damaged, the pump may need to be repaired before use. Do not install or use the pump until appropriate action has been taken.

## **PUMP INSTALLATION**

The Shredder pumps (2 HP) are not designed to pump unscreened solids which could contain matter such as bunched paper towels, feminine napkins, tampon applicators, etc. This type of debris can clog the pump & prevent it from operating properly. The **BJM Pumps** Shredder Pumps (3 HP and larger) are designed to handle unscreened sewage.

## **POSITIONING THE PUMP**

**BJM Pumps**, XP-SK Series pumps are designed to operate fully or partially submerged. Avoid running the pump dry for extended periods of time. Refer to data sheet for minimum submersion depth for your particular model. Data sheets can be obtained online at [www.bjimpumps.com](http://www.bjimpumps.com) or by calling BJM Pumps, LLC at 860-399-5937. For minimum submergence requirements, refer to EIM ELECTRIC CO., LTD Instruction Manual for Installation, Operation and Maintenance for the Explosion Proof Submersible Motors (EMQY Series; FM Approved for Class I, Division 1, Group C & D).



## **⚠ CAUTION**

- Do not run pump dry.
- Pump liquid should not exceed a maximum temperature of 104°F.
- Never place the pump on loose or soft ground. The pump may sink, preventing water from reaching the impeller. Place on a solid surface or suspend the pump with a lifting rope/chain.
- For maximum pumping capacity, use the proper size non-collapsible hose or rigid piping. A check valve may be installed after the discharge to prevent back flow when the pump is shut off (recommended if static head is 30' or greater).
- Take stand off of pump when using slide rail. Keep stand and reattach when transporting or handling the pump.

## **PUMP ROTATION**

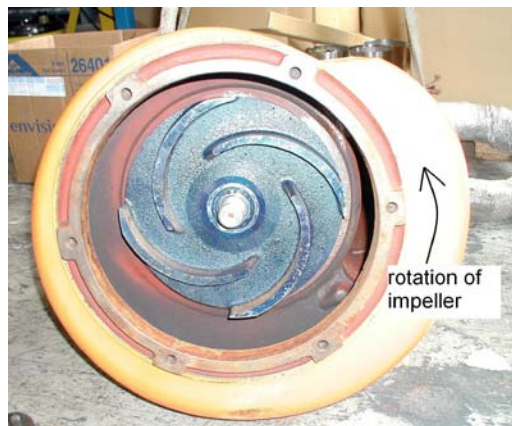
### **⚠ DANGER**

**DO NOT PLACE HANDS IN PUMP SUCTION WHILE CHECKING MOTOR ROTATION. TO DO SO WILL CAUSE SEVERE PERSONAL INJURY.**

Before installing a pump, check the pump rotation to insure that wiring has been connected properly to power source, and that the green lead of power cord (See wiring diagram), is connected to a valid ground, momentarily energize the pump, observing the directions of kick back due to starting torque. Rotation is correct if kick back is in the opposite direction of rotation arrow on the pump casing. If rotation is not correct, switching of any two power leads other than ground will provide the proper rotation.

Two ways to check the correct pump rotation:

1. By looking at the impeller; the rotation of the impeller should be counter clockwise as shown in the picture below.





2. By looking from the top of the pump. Since the impeller cannot be seen, the best way to check the rotation is to check the kick back motion of the pump when the pump just starts. The kick back motion of the pump should be counter clockwise as shown in the picture below.



### **PUMP OPERATION**

#### **⚠ WARNING**

This pump is designed to handle dirty water that contains some solids. Do not attempt to pump any liquids which may damage the pump or endanger personnel as a result of pump failure.

**Consult EIM ELECTRIC Co., LTD. Instruction Manual for Installation, Operation and Maintenance before connecting, operating or conducting maintenance on the Explosion Proof Submersible Motor.**

### **WIRING INSTRUCTIONS**

**Electrical wiring and protection must be in accordance with the National Electrical Code per NEC articles 500 through 503 for installation in Class I, Division 1, Group C & D Hazardous Locations, and any other applicable state and local electrical requirements.**

For motor specifications, motor technical data, design features, power supply, electrical wiring, operation, inspecting & maintenance, replacing shaft seals, replacing cables, replacing bearings and other parts, repairing, storing and troubleshooting the submersible electric motor, refer to EIM ELECTRIC CO., LTD Instruction Manual for Installation, Operation and Maintenance for the Explosion Proof Submersible Motors (EMQY Series; FM Approved for Class I, Division 1, Group C & D).

Note: All service work on the FM approved motor by EIM Electric Co., needs to be done by an FM Approved repair facility.





## **STOPPING**

To stop the pump (manual and automatic mode) turn off the breaker, or turn the electrical power source off (generator).

## **TROUBLE SHOOTING**



**Disconnect the electrical power source to the pump BEFORE attempting any type of trouble shooting, service or repair.**

## **PUMP WILL NOT RUN**

Refer to EIM ELECTRIC CO., LTD Instruction Manual for Installation, Operation and Maintenance for the Explosion Proof Submersible Motors (EMQY Series; FM Approved for Class I, Division 1, Group C & D).

### **PUMP RUNS BUT DOES NOT DELIVER RATED CAPACITY**

1. Discharge line clogged, restricted or hose kinked. Check discharge hose/pipe.
2. Worn impeller and/or suction cover. Inspect and replace as necessary.
3. Pump overloaded due to liquid pumped being too thick.
4. Pumping air. Check liquid level and position of pump.
5. Excessive voltage drops due to long cables.
6. Pump running backwards, check rotation.

## **SERVICING YOUR SUBMERSIBLE PUMP**

Pump should be disconnected from the electric power supply before proceeding to do any service or maintenance.

Service on submersible electric motor should only be performed by a qualified electrician. Refer to EIM ELECTRIC CO., LTD Instruction Manual for Installation, Operation and Maintenance for the Explosion Proof Submersible Motors (EMQY Series; FM Approved for Class I, Division 1, Group C & D).

## **MAINTAINING YOUR PUMP**

- Pump should be disconnected from the electric power supply before proceeding to do any service or maintenance.
- Pump should be inspected at regular intervals.
- More frequent inspections are required if the pump is used in a harsh environment.



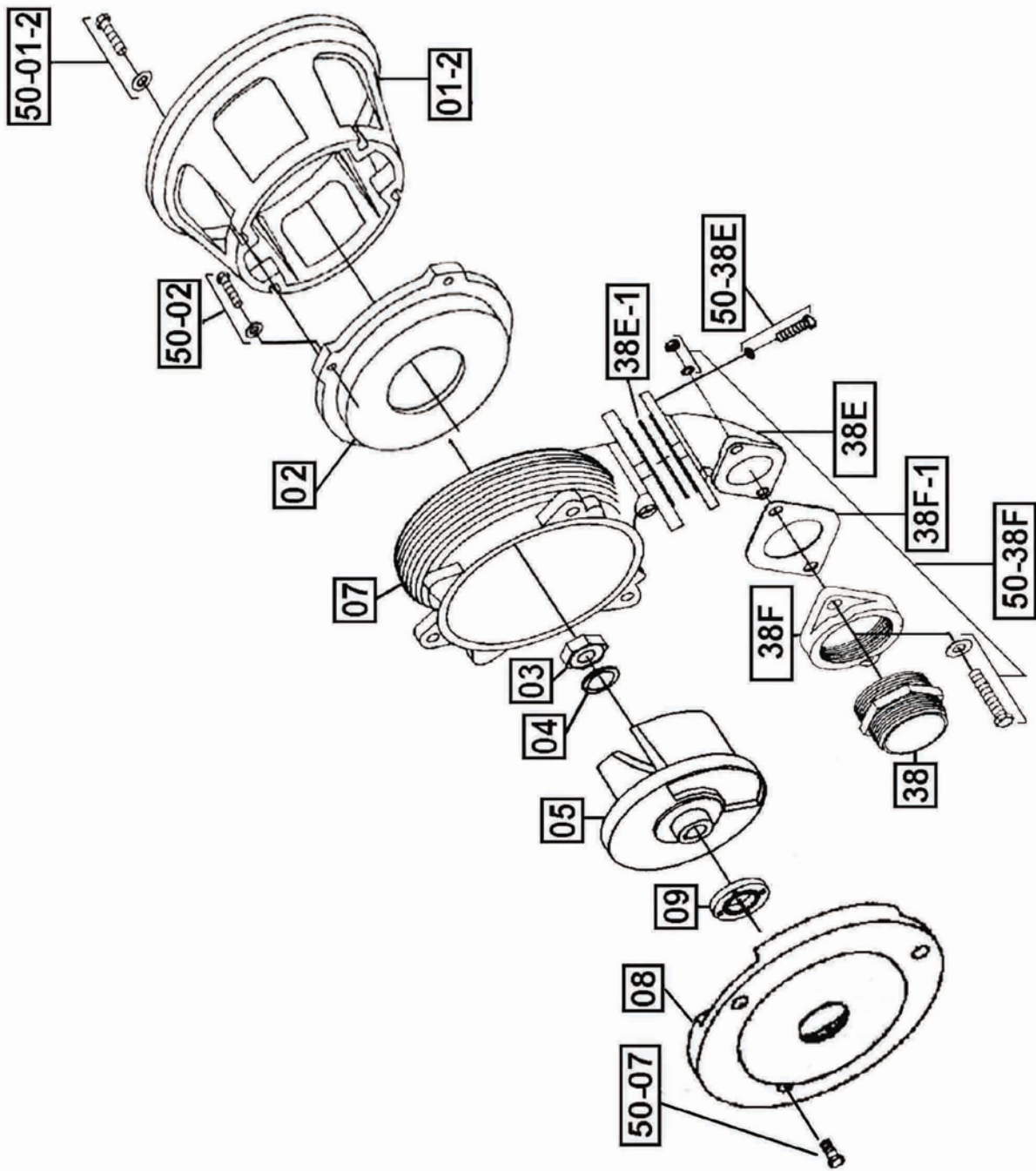
- Preventative maintenance should be performed to reduce the chance of premature failure.
- Worn impellers and lip seals should be replaced.
- Cut or cracked power cords must be replaced. **(Never operate a pump with a cut, cracked or damaged power cord.)**
- Maintenance should always be done when taking a pump out of service before storage.
- The impeller to suction cover clearance should be adjusted to between 0.01” to 0.02” for optimal cutting of the shredder. Shim kits are available if adjustment is required.
  - 1) Clean pump of dirt and other build up.
  - 2) Check condition of oil around the shaft seals.
  - 3) Check hydraulic parts: check for wear.
  - 4) Inspect power cable. Make sure that it is free of nicks or cuts.

#### **CHANGING SEAL OIL**

Refer to EIM ELECTRIC CO., LTD Instruction Manual for Installation, Operation and Maintenance for the Explosion Proof Submersible Motors (EMQY Series; FM Approved for Class I, Division 1, Group C & D).



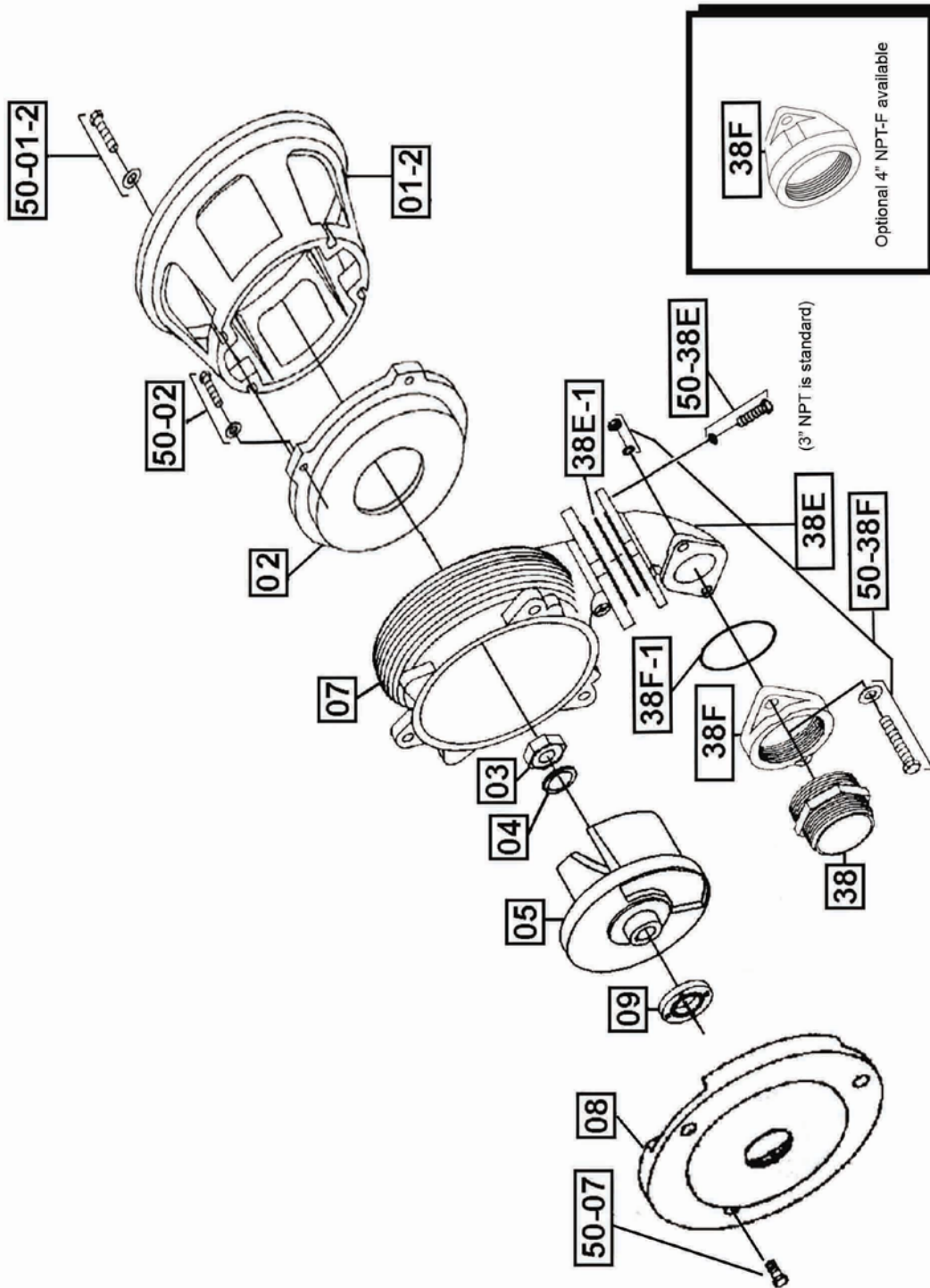
EXPLODED VIEW OF XP-SK15C (2HP)  
BJM WET END ASSEMBLY FOR EIM FM MOTOR





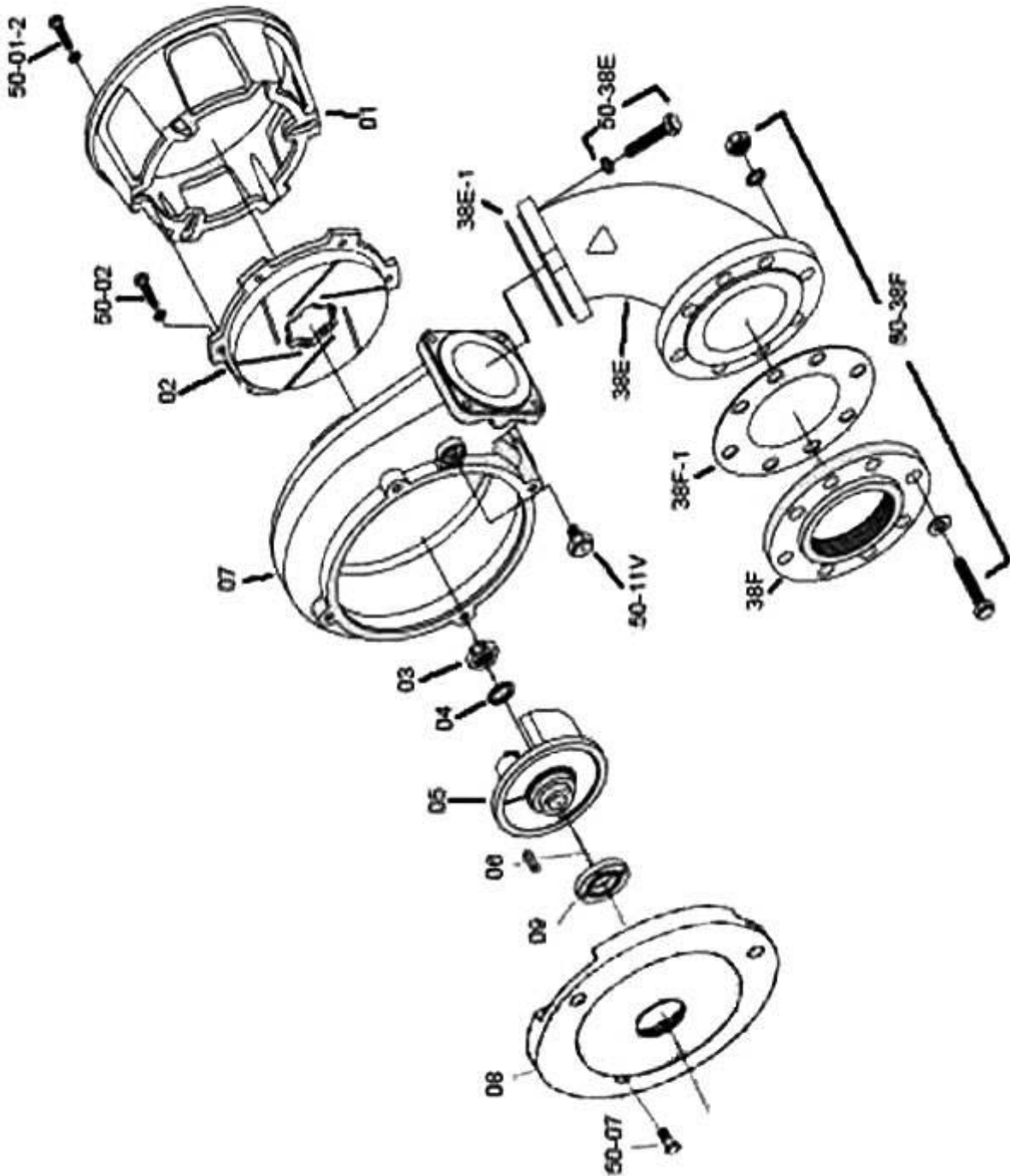
# EXPLODED VIEW OF XP-SK22C, XP-SK37C (3 & 5HP)

## BJM WET END ASSEMBLY FOR EIM FM MOTOR



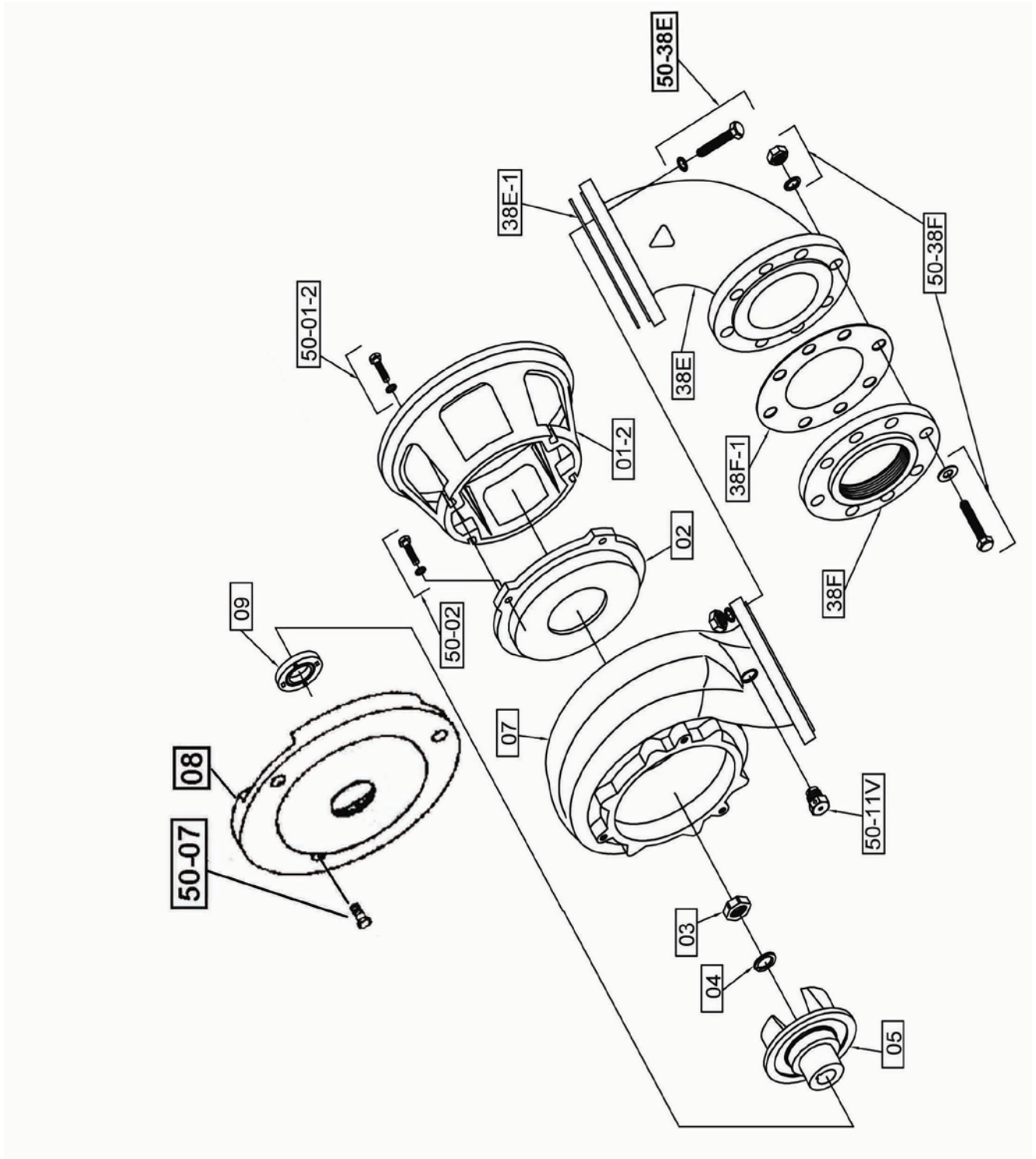


EXPLODED VIEW OF XP-SK55C, XP-SK75C  
BJM WET END ASSEMBLY FOR EIM FM MOTOR





EXPLODED VIEW OF XP-SK110C, XP-SK150C  
BJM WET END ASSEMBLY FOR EIM FM MOTOR



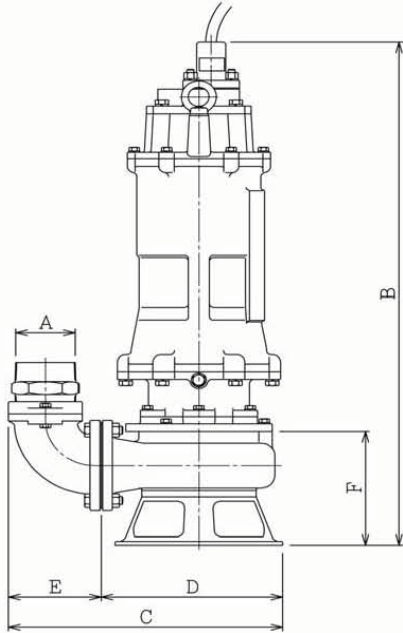
## XP-SK SERIES PARTS LIST

	<b>Pump Model</b>	<b>XP-SK15C</b>	<b>XP-SK22C</b>	<b>XP-SK37C</b>	<b>XP-SK55C</b>	<b>XP-SK75C</b>	<b>XP-SK110C</b>	<b>XP-SK150C</b>
<b>Pos. No.</b>	<b>Part Description</b>	<b>Part #</b>	<b>Part #</b>	<b>Part #</b>	<b>Part #</b>	<b>Part #</b>	<b>Part #</b>	<b>Part #</b>
01-2	Stand Only	120B	116B	119B	124C	124C	125C	125C
02	Suction Cover, Cast Iron	-	-	-	220	220	221	221
02	Suction Cover, Hi-Chrome	227A	228A	229A	-	-	-	-
03	Impeller Nut	305	305	305	308C	308C	308C	308C
04	Impeller Washer	405C	405C	405C	420	420	420	420
05	Impeller, Cast Iron	577C	578C	579C	587C	588C	562C	563C
05	Impeller, Hi-Chrome	577A	578A	579A	-	-	-	-
06	Impeller Key	602	602	602	610	610	610	613
07	Pump Housing	718C	721C	723C	744C	744C	747C	747C
08	Mating Plate / Oil Chamber Cover	See the EIM ELECTRIC CO., LTD I O & M manual.						
09	Lip Seal Buna-N	902C	904C	904C	909C	909C	909C	909C
09	Lip Seal FKM (Optional)	903CV	905CV	905CV	914CV	914CV	914CV	914CV
38	Discharge Nipple 3"	3804	3804	3804	-	-	-	-
38E	Discharge Elbow	3820C	3820C	3820C	3833	3833	3834C	3834C
38E-1	Gasket, Discharge Elbow Buna-N	4072	4072	4072	4073	4073	4076	4076
38E-1	Gasket, Disch. Elbow Viton (Optional)	4072V	4072V	4072V	4073V	4073V	4076V	4076V
38F	Discharge Flange 3"	3810	3810	3810	-	-	-	-
38F	Discharge Flange 4"	-	3816C	3816C	3835	3835	-	-
38F	Discharge Flange 6"	-	-	-	-	-	3812C	3812C
38F-1	Gasket, Discharge Flange Buna-N	4071	4071	4071	4074	4074	4076	4076
38F-1	Gasket, Disch. Flange Viton (Optional)	4071V	4071V	4071V	4074V	4074V	4076V	4076V
50-01-2	Bolt for Strainer/Stand	5013	5013	5013	5022	5022	5069	5069
50-02	Bolt for Suction Cover	5013	5013	5013	5022	5022	5069	5069
50-07	Bolt for Mating Plate to Volute	5013	5013	5013	5061	5061	5061	5070
50-11V	Air Release Valve	-	-	-	5080	5080	5080	5080
50-38E	Bolt for Discharge Elbow	5043	5043	5043	5066	5066	5068	5068
50-38F	Bolt for Discharge Flange	5083	5083	5041	5067	5067	5068	5068

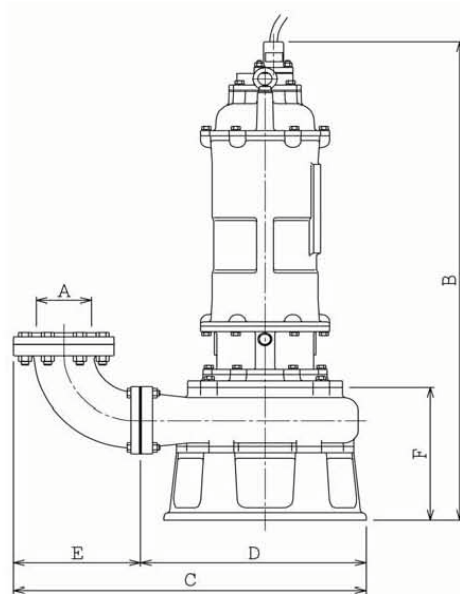
## XP-SK DIMENSIONAL DRAWING



### XP-SK SERIES



MODEL	A	B	C	D	E	F
XP-SK15C	3.0"	29.5"	14.75"	9.5"	5.25"	5.75"
XP-SK22C	3.0"	29.75"	15.25"	10.0"	5.25"	6.0"
XP-SK37C	3.0"	31.0"	15.25"	10.0"	5.25"	7.3"



MODEL	A	B	C	D	E	F
XP-SK55C	4.0"	43.5"	29.5"	18.5"	11.0"	12.5"
XP-SK75C	4.0"	43.5"	29.5"	18.5"	11.0"	12.5"
XP-SK110C	6.0"	48.5"	35.15"	22.5"	13.0"	17.5"
XP-SK150C	6.0"	57.0"	35.15"	22.5"	13.0"	17.5"



BJM PUMPS, LLC  
123 Spencer Plain Road  
Old Saybrook, CT 06475, U.S.A.

## **WARRANTY AND LIMITATION OF LIABILITY**

Unless otherwise expressly authorized in writing, specifying a longer or shorter period, BJM Pumps,LLC warrants for a period of eighteen (18) months from the date of shipment from the Point of Shipment, or one (1) year from the date of installation, whichever occurs first, that all products or parts thereof furnished by BJM Pumps,LLC under the brand name BJM Pumps, hereinafter referred to as the "Product" are free from defects in materials and workmanship and conform to the applicable specification.

BJM Pumps,LLC's liability for any breach of this warranty shall be limited solely to replacement or repair, at the sole option of BJM Pumps,LLC, of any part or parts of the Product found to be defective during the warranty period, provided the Product is properly installed and is being used as originally intended. Any breach of this warranty must be reported to BJM Pumps,LLC or BJM Pumps,LLC's authorized service representative within the aforementioned warranty period, and defective Product or parts thereof must be shipped to BJM Pumps,LLC or BJM Pumps,LLC's authorized representative, transportation charges prepaid. Any cost associated with removal or installation of a defective Product or part is excluded.

IT IS EXPRESSLY AGREED THAT THIS SHALL BE THE SOLE AND EXCLUSIVE REMEDY OF BJM PUMPS, LLC'S DISTRIBUTORS AND CUSTOMERS. UNDER NO CIRCUMSTANCES SHALL BJM PUMPS, LLC BE LIABLE FOR ANY COSTS, LOSS, EXPENSE, DAMAGES, SPECIAL DAMAGES, INCIDENTAL DAMAGES OR CONSEQUENTIAL DAMAGES ARISING DIRECTLY OR INDIRECTLY FROM THE DESIGN, MANUFACTURE, SALE, USE OR REPAIR OF THE PRODUCT, WHETHER BASED ON WARRANTY, CONTRACT, NEGLIGENCE, OR STRICT LIABILITY. IN NO EVENT WILL LIABILITY EXCEED THE PURCHASE PRICE OF THE PRODUCT.

THE WARRANTY AND LIMITS OF LIABILITY CONTAINED HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES, EXPRESSED OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY BJM PUMPS, LLC AND EXCLUDED FROM THIS WARRANTY.

BJM Pumps,LLC neither assumes, nor authorizes any person to assume for it, any other warranty obligation in connection with the sale of the Product. This warranty shall not apply to any Product or parts of Product which have (a) been repaired or altered outside of BJM Pumps,LLC's facilities unless such repair was authorized in advance by BJM Pumps,LLC or by its authorized representative; or (b) have been subject to misuse, negligence or accident; or (c) have been used in a manner contrary to BJM Pumps,LLC's instruction.

In any case of products not manufactured and sold under the BJM Pumps,LLC brand name, there is no warranty from BJM Pumps,LLC; however BJM Pumps,LLC will extend any warranty received from BJM Pumps,LLC's supplier of such products.

**START-UP REPORT FORM**

**START-UP REPORT FORM**

This form is designed to record the initial installation, and to serve as a guide for troubleshooting at a later date (if needed).

BJM Pumps, LLC  
123 Spencer Plain Road  
Old Saybrook, CT. 06475

Pump Owner's Name			
Location of Installation		Date of Installation:	
Dealer		Dealer Phone ( )	
Date of Purchase			
Model		Serial No	
Voltage	Phase	Hertz	HP
Does impeller turn freely by hand?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Condition of Equipment		<input type="checkbox"/> New	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor
Condition of Cable Jacket		<input type="checkbox"/> New	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor
Rotation: Direction of Impeller Rotation (viewed from bottom) (Use C/W for clockwise, CC/W for counterclockwise): _____			
Resistance of cable and Pump Motor (measured at pump control)			
Red-Black_____ohms		Red-White_____ohms	
White-Black_____ohms			
Resistance of ground circuit between control panel and outside of pumps _____ Ohms			
<b>MEG OHM CHECK OF INSULATION</b>			
Red to ground_____ White to ground_____ Black to ground_____			
Condition of location at start-up		<input type="checkbox"/> Dry	<input type="checkbox"/> Wet <input type="checkbox"/> Muddy
Was equipment stored		<input type="checkbox"/> Yes	<input type="checkbox"/> No.
If YES, length of storage:			
Liquid being pump			
Debris in bottom of station?		<input type="checkbox"/> Yes	<input type="checkbox"/> No

**START-UP REPORT FORM**

Are guide rails vertical?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is base elbow installed level?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Liquid level controls: Model _____		
Is control installed away from turbulence?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<b>Float Operation Check</b>		
Tip lowest float (stop float), all pumps should remain off. Tip second float (and stop float), one pump comes on. Tip third float (and stop float), both pumps on (alarm on simplex). Tip fourth float (and stop float), high level alarm on (omit on simplex).		
<input type="checkbox"/> Check here if using manual on/off only.		
Does liquid level ever drop below volute top?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Control Panel MFG & model no.		
Number of pumps operated by control panel		
<b>NOTE: At no time should hole be made in top of control panel, unless proper sealing devices are utilized.</b>		
Short Circuit protection:	Type:	
Number and size of short circuit device(s)	Amp rating:	
Overload type:	Size:	Amp rating:
Do protective devices comply with pump motor amp rating?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are all pump connections tight?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is the interior of the panel dry?	<input type="checkbox"/> Yes	<input type="checkbox"/> No If No, correct moisture problem.
Electrical readings		
<b>SINGLE PHASE</b>		
Voltage supply at panel line connection, pump off	L1	L2
Voltage supply at panel line connection, pump on	L1	L2
Amperage load connection, pump on	L1	L2
<b>THREE PHASE</b>		
Voltage supply at panel line connection, pump off		
L1-L2	L2-L3	L3-L1
Voltage supply at panel line connection, pump on		

START-UP REPORT FORM

L1-L2	L2-L3	L3-L1
Amperage load connection, pump on		
L1	L2	L3
<b>FINAL CHECK</b>		
Is pump secured properly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Was pump checked for leaks?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Do check valves operate properly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Flow: Do pumps appear to operate at proper rate?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Noise level:	Acceptable <input type="checkbox"/>	Unacceptable <input type="checkbox"/>
Comments:		
Installed by:		
Company:		
Person:		
Date:		



123 Spencer Plain Road • PO Box 1138 • Old Saybrook, CT 06475, USA  
• Phone: (860) 399-5937 • Fax: (860) 399-7784  
Email: [sales@bjmcorp.com](mailto:sales@bjmcorp.com) • Web Site: [www.bjmpumps.com](http://www.bjmpumps.com)

BJM Pumps is a registered trademark of BJM Pumps, LLC.  
Copyright © 2009-2011 BJM Pumps, LLC. All rights reserved.



# INSTRUCTION MANUAL

for Installation, Operation and Maintenance

## Explosionproof Submersible Motors MODEL EMQY

Class I , Division 1  
Groups C & D



### TABLE OF CONTENTS

	Page
GENERAL INFORMATION .....	1
TRANSPORTATION .....	1
RECEIVING THE MOTOR AND INSPECTION.....	1
SPECIFICATIONS .....	1
GENERAL TECHNICAL DATA.....	1
DESIGN FEATURES .....	2
ASSEMBLING ONTO WET END.....	2
POWER SUPPLY .....	2
ELECTRICAL WIRING .....	2
OPERATION .....	3
INSPECTION AND MAINTENANCE .....	3
DISASSEMBLY AND REASSEMBLY PROCEDURES ...	4
REPLACING CABLES .....	6
REPLACING BEARINGS AND OTHER PARTS ...	6
REPAIR .....	6
STORAGE .....	6
TROUBLESHOOTING .....	7
[ ANNEX ] ELECTRICAL WIRING	
SECTIONAL DRAWING AND PARTS LIST	
SECTIONAL DRAWING OF MECHANICAL SEAL	

**EIM ELECTRIC CO., LTD. JAPAN**

FMI-0705

## GENERAL INFORMATION

Thank you for purchasing EIM EMQY Series Explosionproof Submersible Motor. This motor has been constructed in compliance with FM testing and is suitable for use in Class I, Division 1, Group C & D Hazardous (Classified) Locations. To help ensure years of trouble-free and safe operation, please read the following manual carefully, before installation, operation, maintenance or inspection of this motor. After thoroughly reading this manual, keep it in a safe place for future reference.

### WARNING:

- Transportation, installation, wiring, operation, maintenance, inspection, and repair should be performed only by authorized and qualified persons.
- To prevent ignition of flammable gases or vapors, do not remove any cover mounted on the motor while circuits are live.
- Our guarantee will become void when any modification of the motor being made by other parties.

## TRANSPORTATION

### WARNING:

- Full attention should be paid to avoid dropping or overturning the package during transportation.
- Always use the handle or the eye bolts provided on the top of this motor or use adequate lifting lugs, when lifting and/or lowering the motor.
- Do not use cables to handle this motors.

## RECEIVING THE MOTOR AND INSPECTION

It is recommended to take the motor out of the package immediately after receiving and check for damages that might have been caused during transportation. If damages have occurred, please inform and send report of damages to

EIM ELECTRIC CO., LTD.  
10-2-16 Inokuma, Mizumaki, Onga  
Fukuoka 807-0001, Japan

Furthermore it is necessary to compare the data of the nameplate with those of the test report enclosed. The data of both nameplate and test report must be identical.

## SPECIFICATIONS

Please see the informations in the general nameplate provided on this motor, the test report and the sectional drawing with parts list attached hereto.

### [ Informations in General Nameplate ]

		EIM ELECTRIC CO. ONGA, FUKUOKA 807-0001 JAPAN				EXPLOSIONPROOF CL. I DIV. 1 GR. C&D	
<b>SUBMERSIBLE MOTOR</b>							
MODEL	(1)			SN	(2)		
3 PHASE	(3)	POLES	INS	(4)	WT	(5)	LB
HP	VOLTS	Hz	AMPS	RPM	NEMA CODE	▽ MAX	
(6)	(7)	(8)	(9)	(10)	(11)	(12) 65FT	
THERMALLY PROTECTED		T-CODE: T4		AMB. TEMP: 104 F			
⚠ DO NOT REMOVE COVER WHILE CIRCUITS ARE LIVE ⚠							

- (1) MODEL: Motor Model Number
- (2) SN : Serial Number
- (3) POLES : Number of Poles
- (4) INS : Insulation Class
- (5) WT : Total Mass of Motor (LB)
- (6) HP : Rated Horsepower Output (HP)
- (7) VOLTS: Rated Voltage (V)
- (8) Hz : Rated Frequency (Hz)
- (9) AMPS : Full Load Rated Current (A)
- (10) RPM : Rated Speed (MIN-1)
- (11) NEMA CODE: NEMA Code Letter
- (12) ▽ MAX: Max. Submersible Depth (FT)

## 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. 20 m (65 ft)

The motor can be operated at rated output if at least the whole of motor housing is submerged.

Starting method : Direct on line start

Number of admissible starts :

Frame <sup>(*)</sup> Size	Starts in series		Starting <sup>(**)</sup> Frequency/H
	Cold	Hot	
140T, 180T	10	5	10
250T, 320T	10	5	10
360T	8	4	8

Note: (1) (\*) Frame Size: Refer to the sectional drawing with parts list attached hereto.

(2) (\*\*) 50% running time



## DESIGN FEATURES

This motor is a explosionproof submersible three phase squirrel cage induction motor.

- Winding Insulation : Specially treated class F (155°C, 310°F) nonhygroscopic insulation system
- Motor Housing : Rugged Cast iron ASTM type A48, Class 35
- Rotor : Cast aluminum, dynamically balanced
- Shaft : AISI-420 stainless steel, oversized for maximum strength and life
- Shaft Seal : Double mechanical seals prevent the water from penetrating into the oil chamber and the motor housing. The inner seal uses carbon against ceramic faces (Frame size: 140T, 180T and 250T) or dual silicon carbide faces (Frame size: 320T and 360T). The outer seal uses dual silicon carbide faces for all frame sizes.
- Bearings : The support (upper) bearing consists of a single row ball bearing (Frame size : 140T, 180T and 250T) or a roller bearing (Frame size: 320T and 360T). The main (lower) bearing consists of a single row ball bearing (Frame size: 140T) or a two-row angular contact ball bearing (Frame size: 180T, 250T, 320T, 360T). Both upper and lower bearing are packed with lithium grease for high temperature usage. Minimum bearing life L10 30,000 hours
- Oil Chamber : The oil in the oil chamber lubricates and cools the shaft seals and functions as a buffer to prevent water penetration into the motor.
- Cable Entry : The cable sealing between the cable and the gland body is ensured by a rubber bushing. The power cable and control cable are potted into the junction chamber cover with cable sealing cement, forming the cable and cover assembly.
- Hardware : All external hardware are made of AISI-304 stainless steel.
- Lifting Device : Oversized lifting eyebolts of AISI-304 are provided for the safe handling.

### [ Monitoring Equipment ]

- Leakage Detector

This motor is provided with a single-electrode or dual-electrode leakage detector in the oil chamber for sensing water penetration into there.

For a single-electrode leakage detector, its control circuit must be as follows;

Open circuit voltage : 30 Vrms, 60Vpeak, 60Vdc, or less

Circuit current : 0.5 mA, or less

**CAUTION :** The electrode leakage detection circuit is supplied by an isolating transformer.

- Thermal Protection Device

Two automatic-resetting bimetallic thermostats connected in series for limiting motor external surface temperature are embedded in the motor windings.

Rating of the thermostat is as follows;

Contact : Normally closed

Max. contact rating : 230 VAC 13A

Nominal opening temperature : 140°C +- 5°C

Nominal closing temperature : 90°C +- 15°C (REF)

### [ Reference Standards ]

- FM Approval Standard 3600 : 1998 "Electric Equipment for use in Hazardous (Classified) Locations, General Requirements"
- FM Approval Standard 3615 : 2006 "Explosionproof Electrical Equipment, General Requirements"
- FM Approval Standard Supplement 3615.80 : 1999 "Electrical Submersible Pump Motors" ( Motor Performance and Test )
- NEMA MG1-1993 Part 12 "TESTS AND PERFORMANCE - AC MOTORS"
- IEC 60034-1 : 2004 "Rating and performance"
- JEC-2137-2000 "Induction Machines" ( JEC : Japanese Electrotechnical Committee )

## ASSEMBLING ONTO WET END

### WARNING:

- If services are required to ensure proper installation for the motor, please contact the factory or an authorized EIM service shop.
- Do not lean on or hang on the motor.

- To ensure proper assembling, please see the dimensions in the dimensional drawing attached hereto.
- Do not pull the motor cables. Use the eyebolts provided on the top of the motor for handling and assembling.
- Ensure that the motor cables are following with the motor during assembling to avoid inadmissible tensile stress.
- It is recommended to measure the insulation of motor winding and the motor cables prior to assembling and when the assembling completed.

## POWER SUPPLY

- Check that the supply voltage and frequency agree with the specifications in the nameplate or the motor test report attached to the motor.
- Check the phase sequence with the phase sequence indicator.

## ELECTRICAL WIRING

### WARNING:

- Electrical wiring and protection must be in accordance with the National Electrical Code per NEC articles 500 through 503 for installation in Class I, Division 1, Group C & D Hazardous Locations, and any other applicable state and local electrical requirements.
- Electrical wirings on this motor must be made only by qualified persons.

**WARNING:**

- Before wiring, make sure that the motor is disconnected from all power supply and cannot be energized.
- Make sure that the grounding wire is grounded correctly.
- The cable should be replaced if the outer sheath is damaged. Contact a EIM service shop.

**CAUTION:**

- Make sure to connect the power cable to power supply terminals in control panel.
- The leakage detection circuit is supplied by an isolating transformer; and for a single-electrode leakage detector, its leakage detection open-circuit voltage is 30Vrms, 60Vpeak, 60Vdc, or less; and the circuit current is 0.5mA or less.
- Do not forcibly bend, pull, or pinch the cables
- Do not submerge the cable terminals into water.

- The motor may be used only in accordance with the approved motor data shown in the nameplate.
- Connect power cable and control cable to the control panel as illustrated in the wiring diagram attached hereto.

## Direct on line start

	L1	L2	L3
Start & Run	(T1,T6)	(T2,T4)	(T3,T5)

## Y-Start Delta run

	L1	L2	L3	Join
Start	T1	T2	T3	(T4,T5,T6)
Run	(T1,T6)	(T2,T4)	(T3,T5)	—

**IMPORTANT** : All wires should be checked for shorts to ground with an ohmmeter or megger after the wirings are completed. This is important, as one grounded wire can cause considerable trouble.

- Make sure that the direction of rotation is correct. If the direction of rotary field of the power supply is unknown, a short time start of the motor is possible.

NOTE : The direction of rotation is CCW (counter clockwise) when viewed from the shaft end. If CW (clockwise), two phases at power supply are to be exchanged in the control panel.

**OPERATION****WARNING:**

- Do not get near or touch the rotating parts such as pump impeller.
- Make sure to shut off the power supply at power failure.

**CAUTION:**

- When irregular changes in motor current being observed, carefully check the abnormalities such as over load.
- Immediately stop operation when any malfunction being detected.

- Check the direction of rotation before start of operation. The impeller shall rotate counter clockwise when viewed from the suction. When started, the pump will kick back to the opposite direction of the motor rotating direction. If rotation is wrong, two phases at power supply are to be exchanged in the control panel to correct rotation.
- Check the supplied voltage and frequency agree with specific informations shown in the nameplate or the test report.
- Check the motor current is not more than full load rated current shown in the nameplate or the test report.
- Voltage Inspection during Operation : Measure the voltage of power supply occasionally and make sure the measured value is within the allowed variation of plus or minus 10% of the rated voltage.
- This motor is provided with Leakage Detector and Thermal Protector. Connect the control cable of the motor to the control circuit inside of the control panel to make an alarm or to stop the motor operation, when they work.

Leakage Detector : When the Leakage Detector works, water entrance into oil chamber and/or motor housing through shaft seals might be happened. If the motor would be forced to continue operation, it might cause serious damages on bearings and/or motor windings. Then stop the operation and lift up the motor from sump for a full inspection on the causes of alarm and remove them.

Thermal Protector : The Thermal Protector provided for this motor will work when inferior cooling effect by lower water level, over load, excessive current with too low supply voltage, single-phase operation, etc. being happened. This Thermal Protector is an automatic resetting type, which will need several minutes to be reset once it has tripped. Do not restart the motor until cooled down for a while. Never forget to trace the causes of tripping and to remove

**INSPECTION AND MAINTENANCE**

- Motor should be checked per the following table.

Item	Interval
Water Level Vibration and Noise Supply Voltage Current	Daily
Insulation Resistance Lubricating Oil Appearance(Corrosion and Wear) Hardware Cables	6 Months
Overhaul	12 Months

- Inspection of Lubricating Oil : Change the lubricating oil every six months, when the motor is operated continuously. The sealing capability of the shaft seal may be estimated by the condition of the lubricating oil.

Remove the oil plug provided on the side of oil chamber housing and take sample oil from the oil chamber. If the heavy emulsification of the sample oil or the separation of oil and water being observed, change the oil and thereafter shorten the interval of oil change.

**CAUTION:** The oil chamber may be pressurized. Hold a rag over the oil plug to prevent oil splash.

[ Recommended lubricating oil ] Turbine Oil (ISO VG32) - SHELL : Shell Turbo Oil T32 or Shell Vitrea Oil 32  
CALTEX : Canopus 32, or equivalent

[ Volume of new lubricating oil ] Refer to the sectional drawing with parts list attached hereto.

Take care not to fill with oil completely. Keep the volume within 100 to 105% of the recommended oil volume, i.e., approx. 80 to 85% of the capacity of the oil chamber. Excess oil will increase the pressure inside of the oil chamber and might cause damage of shaft seal.

- Inspection of Shaft Seal : If oil must be changed frequently, or if the leakage detector worked, return the motor to the factory or an authorized EIM service shop to perform the overhauling work of the motor and check the shaft seal.
- Inspection of Insulation Resistance :  
Measure the insulation resistance to ground every six months and confirm it being not less than 0.5 mega-ohms.
- Other Inspection :  
Check the hardwares such as bolts, nuts, studs etc. are tightened enough. If not, tighten it enough. Check there are no damages or deformations on components

**WARNING:**

- If services are required to ensure proper inspection or maintenance for the motor, it must be returned to the factory or an authorized EIM service shop.

## DISASSEMBLY AND REASSEMBLY PROCEDURES

**WARNING:**

- Before disassembling the pump, make sure that the pump motor is isolated from power supply and cannot be energized.
- Disassembling and reassembling should be performed only by authorized and qualified personnel.

NOTE: Refer to the "Sectional Drawing with Parts List" attached hereto. Part numbers enclosed in parentheses ( ) shown below are identical with those on the sectional drawing.

### 1. Disassembly

1. Dismantle wet end completely.
2. Lay the motor in horizontal position and locate the oil plug (28) downward.
3. Place a container beneath the oil plug (28). Remove the oil plug from the oil chamber housing (12U) and drain out all oil.

**CAUTION:** The oil chamber may be pressurized. Hold a rag over the oil plug to prevent oil splash.

4. Check for water in the oil drained from the oil chamber. If there is some water in this oil, measure the insulation resistance of motor windings to ground.

**CAUTION:** 1. If some water in the oil is observed and the measured resistance is less than 0.5 mega-ohms, please inform the factory or an authorized EIM service shop of inspection results.  
2. Oil turns milky white if it contains water.

5. Place the motor unit in vertical position with the shaft end downward, using a suitable support.
6. Remove the bolts (76-B) securing the junction chamber cover (76) to the junction chamber housing (2).
7. Lifting up the junction chamber cover (76) adequately, disconnect the electric cables (54) from the motor leads.

**CAUTION:** Don't pull the cables (54) forcibly before disconnection.

8. Remove the eye bolts (58) from the junction chamber housing (2).
9. Place the motor unit in vertical position with the shaft end upward, using suitable lifting tools and support.
10. Remove bolts (12U-B2) securing the oil chamber cover (12L) to the oil chamber housing (12U), and remove the oil chamber cover (12L).  
Note: 1. Outer stationary part of the shaft seal (10) and the dust seal (25) are removed together with the oil chamber cover (12L).  
2. Sealing O-ring (12U-R) and the dust seal (25) should be discarded.
11. Remove the rotating part of the shaft seal (10) from the shaft (8).  
Note: The rotating part of the shaft seal (10) should be discarded.
12. Remove the bolts (12U-B1) securing the oil chamber housing (12U) to the motor housing (5).
13. Lift slowly the oil chamber housing (12U) together with the rotor assembly consisting of the rotor (7), shaft (8), both non-drive and drive end bearings (3) (9), bearing cover (30) and leakage detector (107), using a suitable lifting device.

**CAUTION:** Take care so as not to damage the stator windings and the lead wire connected to the leakage detector (107).

14. Place carefully the rotor assembly onto a suitable support in vertical position with the shaft end downward.
15. Remove the bolt (2-B) securing the junction chamber housing (2) to the motor housing (5).
16. ( For frame size 140T - Both the drive end bearing (9) and the non-drive end bearing (3) consist of ball bearings.)  
Remove the wave washer (36) attached to the junction chamber housing (2).

- Note: Keep the wave washer (36) for reuse.
17. ( For frame size 320T and 360T - The non-drive end bearing consists of roller bearing.)  
Remove the bolt (30U-B) securing the upper bearing cover (30U) to the junction chamber housing (2). Remove the upper bearing cover (30U). Then, using a bearing puller located behind the outer race of the non-drive end bearing (3) attached to the junction chamber housing (2), withdraw the outer race of the non-drive end bearing (3) together with rollers.  
Note: The outer race of non-drive end bearing (3) and rollers should be discarded.
  18. Remove the bolts (30-B or 30L-B) securing the bearing cover (30 or 30L) to the oil chamber housing (12U) and withdraw the rotor assembly from the oil chamber housing (12U) with the leakage detector (107).
  19. Remove the inner stationary part of the shaft seal (10) attached to the oil chamber housing (12U).  
Note: 1. The inner stationary part of the shaft seal (10) should be discarded.  
2. The sealing O-ring (5-R2) should be discarded.
  20. ( For frame size 180T thru 360T - The drive end bearing consist of double row angular ball bearing.)  
Unlocking the toothed washer attached to the bearing nut (146) securing the drive end bearing (9), remove the bearing nut (146).
  21. Place the rotor assembly onto a suitable support in vertical position with the shaft end upward.
  22. Using a bearing puller located behind the inner race of the drive end bearing (9), withdraw the drive end bearing (9).  
Note : The drive end bearing (9) should be discarded.
  23. Remove the bearing cover (30 or 30L) from the shaft (8).
  24. Place the rotor assembly onto a suitable support in vertical position with the shaft end upward.
  25. ( For frame size 140T thru 250T - The non-drive end bearing consists of ball bearing.)  
Using a bearing puller located behind the inner race of the non-drive end bearing (3), withdraw the non-drive end bearing (3).  
Note: The non-drive end bearing (3) should be discarded.
  26. ( For frame size 320T and 360T - The non-drive end bearing consists of roller bearing.)  
Remove the retainer ring attached to the non- drive shaft end. Using a bearing puller, withdraw the inner race of the non-drive end bearing (3).  
Note: The inner race of the non-drive end bearing (3) should be discarded.
  27. Clean the dismantled parts using solvent, paying particular attention to the O-ring locations.  
Note: Refer to the sectional drawing of shaft seal (mechanical seal) attached hereto.
  28. Examine the bearing locations on the shaft for defects, and remove any burrs found using fine emery cloth.

CAUTION: Do not use any old seal parts. Replace all parts with new ones.

## 2. Reassembly

CAUTION: Carefully clean all parts. Exchange the shaft seal, bearings, O-rings and dust seal for new ones.

1. Preheat the bearings to a temperature of 100°C (212°F) in oven.

CAUTION: For frame size 320T and 360T - the non-drive end bearing consists of roller bearing, don't preheat its outer race with rollers, but preheat its inner race and the junction chamber housing (2).

2. Place the shaft (8) in vertical position with the shaft end downward, using a suitable support.
3. ( For frame size 140T thru 250T - The non-drive end bearing consists of ball bearing.)  
Mount the non-drive end bearing (3) into its location on the shaft (8).
4. ( For frame size 320T and 360T - The non-drive end bearing consists of roller bearing.)  
Mount the inner race of the non-drive end bearing (3) into its location on the shaft (8) and the retainer ring into its location on the shaft end.  
Mount the outer race with rollers of the non-drive end bearing (3) into its location on the junction chamber housing (2).

CAUTION: Handle the heated bearings with gloves or mittens so as not to be burnt.

5. Turn the shaft (8) in vertical position with the shaft end upward, using a suitable support.
6. Mount the drive end bearing (9) into its location on the shaft (8).  
Note: Insert the bearing cover (30 or 30L) into the shaft (8) before mounting the drive end bearing.
7. ( For frame size 180T thru 360T - The drive end bearing consist of double row angular ball bearing.)  
Mount the bearing nut (146) and lock it with the toothed washer.

CAUTION: Handle the heated bearings with gloves or mittens so as not to be burnt.

8. When the bearings have been satisfactorily mounted, install the oil chamber housing (12U) onto the shaft (8).
9. Install the bearing cover (30 or 30L) onto the oil chamber housing (12U).
10. Place the motor housing (5) subassembled with the junction chamber housing (2) in vertical position with the motor housing (5) upward.

CAUTION: For frame size 140T - both the drive end bearing (9) and the non-drive end bearing (3) consist of ball bearings, subassemble the wave washer (36) into the junction chamber housing (2).

11. Using a new O-ring (5-R2), install the shaft (8) subassembled with the oil chamber housing (12U) onto the motor housing (5), positioning it vertically.

CAUTION: 1. Run the lead wire connected to the leakage detector (107) through the hole on the outside of stator core (6) until it reaches to the junction chamber housing, connecting an additional cord to its end.  
2. Pay attention so as not to damage the motor winding, when installing the shaft (8).  
3. Make sure that the O-ring (5-R2) is in its correct position.

12. Fasten the oil chamber housing (12U) to the motor housing (5) with bolts (12U-B1) using a torque wrench.

**CAUTION:** Pay attention to the tightening torque described in Table 4.

13. Install the inner stationary part of the shaft seal (10) through the shaft end until it locates in the oil chamber housing (12U).

14. Mount the rotating part of shaft seal (10) onto the shaft (8) until the seal faces make contact.

**CAUTION:** Make sure that the inner stationary part and the rotating part of shaft seal (10) are in their correct position.

15. Pre-install the new dust seal (25) into the oil chamber cover (12L).

16. Pre-install the outer stationary part of the shaft seal (10) into the oil chamber cover (12L), confirming its correct position.

17. Using the new O-ring (12U-R), install the oil chamber cover (12L) into the oil chamber housing (12U) with bolts (12U-B2) using a torque wrench.

**CAUTION:** 1. Make sure that the O-ring (12U-R) is in its correct position.  
2. Pay attention to the tightening torque described in Table 4.

18. Place the motor unit in vertical position with the shaft end downward, using a suitable support.

19. Position the junction chamber cover (76) with cables (54) onto the junction chamber housing (2).

20. Connect correctly the cables (54) to the motor leads and the lead wire of the leakage detector and insulate connected parts as old ones were removed, referring to the wire marks attached to each cable terminal and ELECTRICAL WIRING attached hereto.

**CAUTION:** Take care not to pinch the cables and the leads.

21. Fasten the junction chamber cover (76) to the junction chamber housing (2) with the bolts (76-B).

22. Lay the motor in horizontal position of the oil plug (28) locates upside..

23. Pour new oil into the oil chamber through the drain hole, and fasten the oil plug (28).

24. Reconnect the pump cable to the power supply.

25. Start the motor, and immediately switch off after observing the direction of rotation.

26. Confirm that the direction of rotation is the same as that indicated by the arrow on the nameplate attached to the motor housing (5).

Note: The direction of rotation is to be counter-clockwise when observed from the shaft end.

Improper direction of rotation is to be corrected by isolating the power supply and exchanging any two phase wires at the supply point.

27. Assemble wet end completely.

Table 4

Size	Tightening Torque (N·m)
B6	4.9
B8	12
B10	24
B12 SN12	42
B16 SN16	106

## REPLACING CABLES

The power cable and control cable are potted into the junction chamber cover (76), forming the cable and cover assembly. If it is necessary to replace the cables due to damage etc., cable and cover assembly must be replaced as a complete assembly available from factory.

1. Remove cable and cover assembly from the junction chamber housing (2).
2. Disconnect wires taking note of wire color and marking of cables and motor leads.
3. Connect wires of new cable and cover assembly in same manner as old one was removed.
4. Reinstall cable and cover assembly taking care not to pinch wires.
5. Check for shorts to ground after the wirings are completed.
6. Make sure that the direction of rotation is correct.

## REPLACING BEARINGS AND OTHER PARTS

### WARNING:

- This motor is the Explosionproof Electrical Equipment tested by FM. Therefore, if it is required to dismantle the Explosionproof Enclosure, it must be returned to the factory or an authorized EIM service shop.

## REPAIR

### WARNING:

- If it is required to repair the motor, it must be returned to the factory or an authorized EIM service shop.

## STORAGE

For a long period of storage or setting non-operational for 3 months or longer, the pump must be protected against moisture and heat. After the storage or non-operation set forth above, the pump should be rotated manually to prevent the sticking of shaft seal faces.

Before electrical startup, the pump should be inspected. Check especially the insulation resistance, the condition of shaft seal and cable entry, and oil volume.

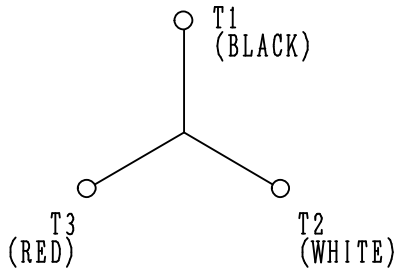
## TROUBLESHOOTING

Condition	Common Cause	Countermeasure
Motor does not start or run	<ul style="list-style-type: none"> <li>• Power not supplied</li> <li>• Trouble of distribution line</li> <li>• Failure of power switch</li>   <li>• Voltage drop too big</li> <li>• Breakage of cablearting</li> <li>• Single phase st</li>   <li>• Motor protector tripping</li> </ul>	<ul style="list-style-type: none"> <li>• Connect and/or switch on power supply.</li> <li>• Have distribution line repaired by specialist.</li> <li>• Replace fuse, or repaire poor contactor or incorrect connection.</li> <li>• Adjust supply voltage, check cabling.</li> <li>• Replace cable.</li> <li>• Check power switch, control switch, cable system etc., because circuit lose one line in a three phase unit.</li> <li>• Investigate and solve the cause of tripping. ( Do not forget to keep power off)</li> </ul>
Motor overheats and thermal relay trips	<ul style="list-style-type: none"> <li>• Incorrect Voltage</li> <li>• Unbalanced power supply</li> <li>• Incorrect rotation</li> <li>• Single phase operation</li> <li>• Insufficient water level</li> <li>• Excessive liquid temperature</li> <li>• Specific gravity or viscosity of liquid too high</li> <li>• Pump clogged</li> <li>• Defective impeller</li>   <li>• Defective bearings</li> <li>• Incorrect setting of thermal relay</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust supply voltage, check cabling.</li> <li>• Check power source.</li> <li>• Exchange two phases at power supply.</li> <li>• Lost one line in a three phase unit</li> <li>• Submerge motor below specified liquid depth.</li> <li>• Decrease liquid temperature.</li> <li>• Adjust head or flow rate.</li>   <li>• Inspect wet end.</li> <li>• Inspect impeller and replace impeller, if necessary.</li> <li>• Replace bearings.</li> <li>• Adjust thermal relay setting.</li> </ul>
Abnormal noise	<ul style="list-style-type: none"> <li>• Defective bearings</li> <li>• No axial clearance between impeller and volute</li> </ul>	<ul style="list-style-type: none"> <li>• Replace bearings.</li> <li>• Adjust the axial clearance.</li> </ul>
Water penetration into junction chamber	<ul style="list-style-type: none"> <li>• Strain relief bushing not tightened enough</li> <li>• Defective O-ring/packing</li>   <li>• Leak test plug loosened</li> <li>• Damage to cable insulation or cable entry poured seal</li> </ul>	<ul style="list-style-type: none"> <li>• Retighten</li>   <li>• Investigate damage of O-ring or O-ring groove, or check if packing is properly positioned and/or tightened. Replace O-ring/packing Clean and dry out motor, and check insulation resistance</li> <li>• Retighten</li> <li>• Replace cable and cable entry assembly.</li> </ul>
Water penetration into motor housing	<ul style="list-style-type: none"> <li>• Defective shaft seal</li>   <li>• Defective O-ring/packing</li> </ul>	<ul style="list-style-type: none"> <li>• Replace shaft seal. If solid matter adhering, or chemically corroded or damaged, replace and/or contact manufacturer.</li> <li>• Investigate damage of O-ring or O-ring groove, or check if packing is properly positioned and/or tightened. Replace O-ring/packing Clean and dry out motor, and check insulation resistance</li> </ul>
Water penetration into oil chamber	<ul style="list-style-type: none"> <li>• Defective shaft seal</li>   <li>• Defective O-ring/packing</li> <li>• Oil plug loosened</li> </ul>	<ul style="list-style-type: none"> <li>• Replace shaft seal. If solid matter adhering, or chemically corroded or damaged, replace and/or contact manufacturer.</li> <li>• Replace O-ring/packing</li> <li>• Retighten and change oil.</li> </ul>

## ELECTRICAL WIRING

## 1. TERMINAL MARKING AND CONNECTION

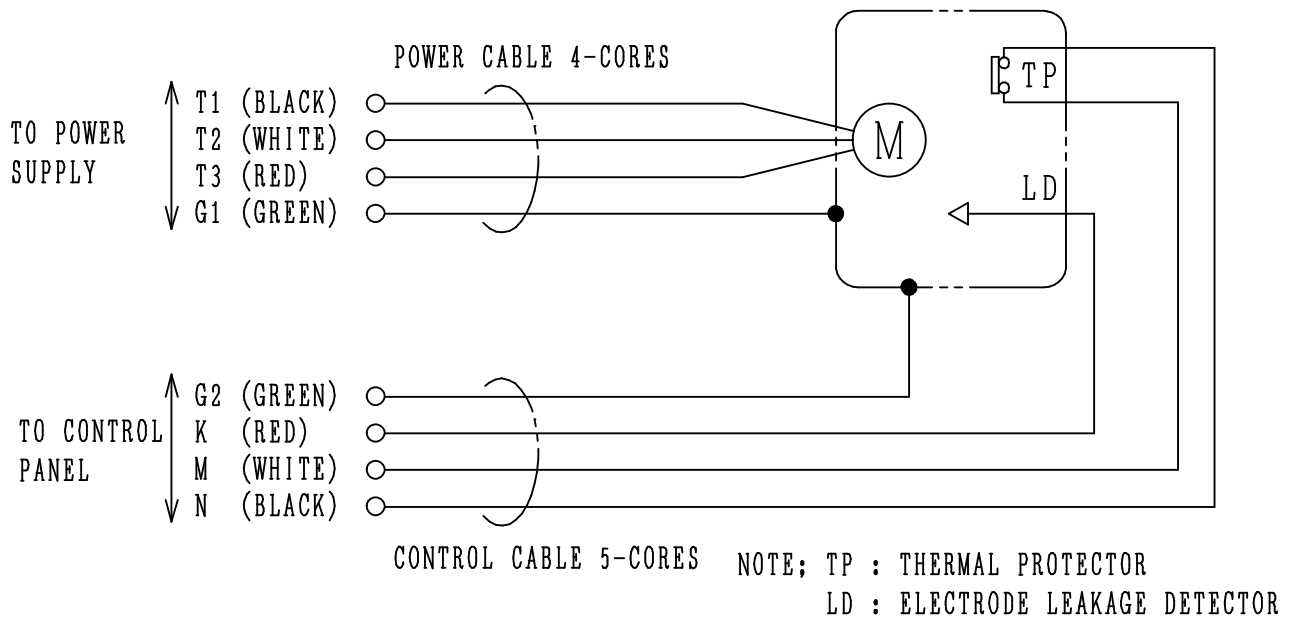
## MOTOR WINDINGS



## DIRECT ON LINE STARTING

	L1	L2	L3
START & RUN	T1	T2	T3

NOTE; L1, L2, L3 : POWER SUPPLY



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



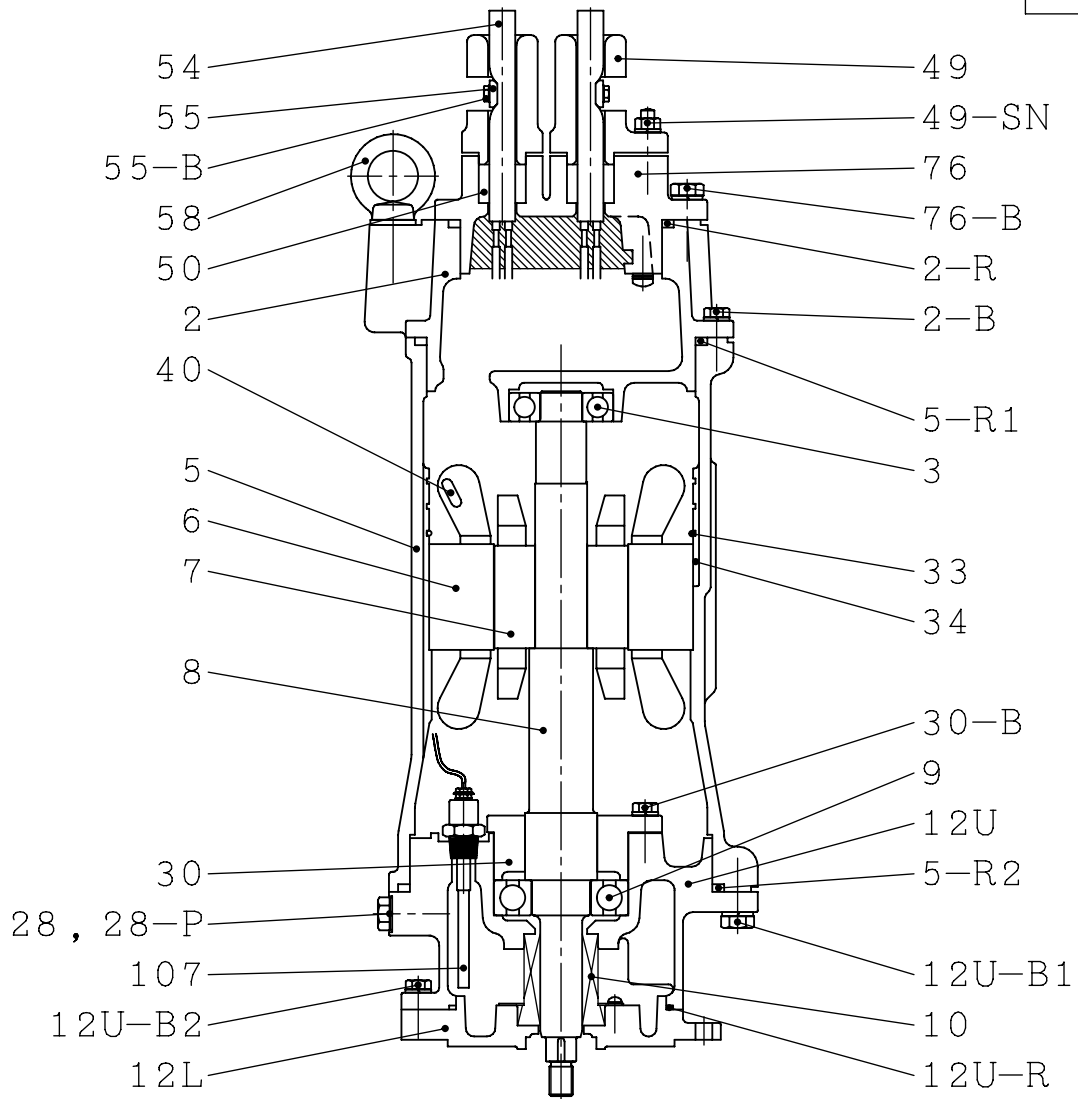
WARNING THE LEAKAGE DETECTION CIRCUIT MUST BE AN ISOLATED SECONDARY CIRCUIT.  
OPEN CIRCUIT VOLTAGE : MAX. 30VAC  
RATED CURRENT : MAX. 0.5mA

DWN	DATE	MODEL NUMBER	EMQY-Series	THIRD ANGLE PROJECTION
Y.TANAKA	18/12/08	PRODUCT		ELECTRICAL WIRING
CHKD	DATE	DWG. NO.	EP411989	REV. 0
APPR	DATE	<b>EIM ELECTRIC CO., LTD.</b>		
H.NAKAMURA	18/12/08			

SECTIONAL DRAWING

MODEL: EMQY-22ST6A

F/# 140T



Required Oil Quantity : 0.6 liter

No.	Description	Material (ASTM)
2	Junction Chamber Housing	A48-No.35
3	Ball Bearing	6305ZZC3
5	Motor Housing	A48-No.35
6	Stator	—
7	Rotor	—
8	Shaft	AISI-420
9	Ball Bearing	6307ZZC3
10	Shaft Seal	Mechanical Seal
12U	Oil Chamber Housing	A48-No.35
12L	Oil Chamber Cover	A48-No.35
28	Oil Plug	AISI-403
30	Bearing Cover	A48-No.35
33	Stator Retainer Ring	1078
34	Stator Key	A688
40	Thermal Detector	—
49	Bell Mouth	A48-No.35
50	Cable Bushing	NBR
54	Flexible Cable	—
55	Cable Clamp	AISI-304

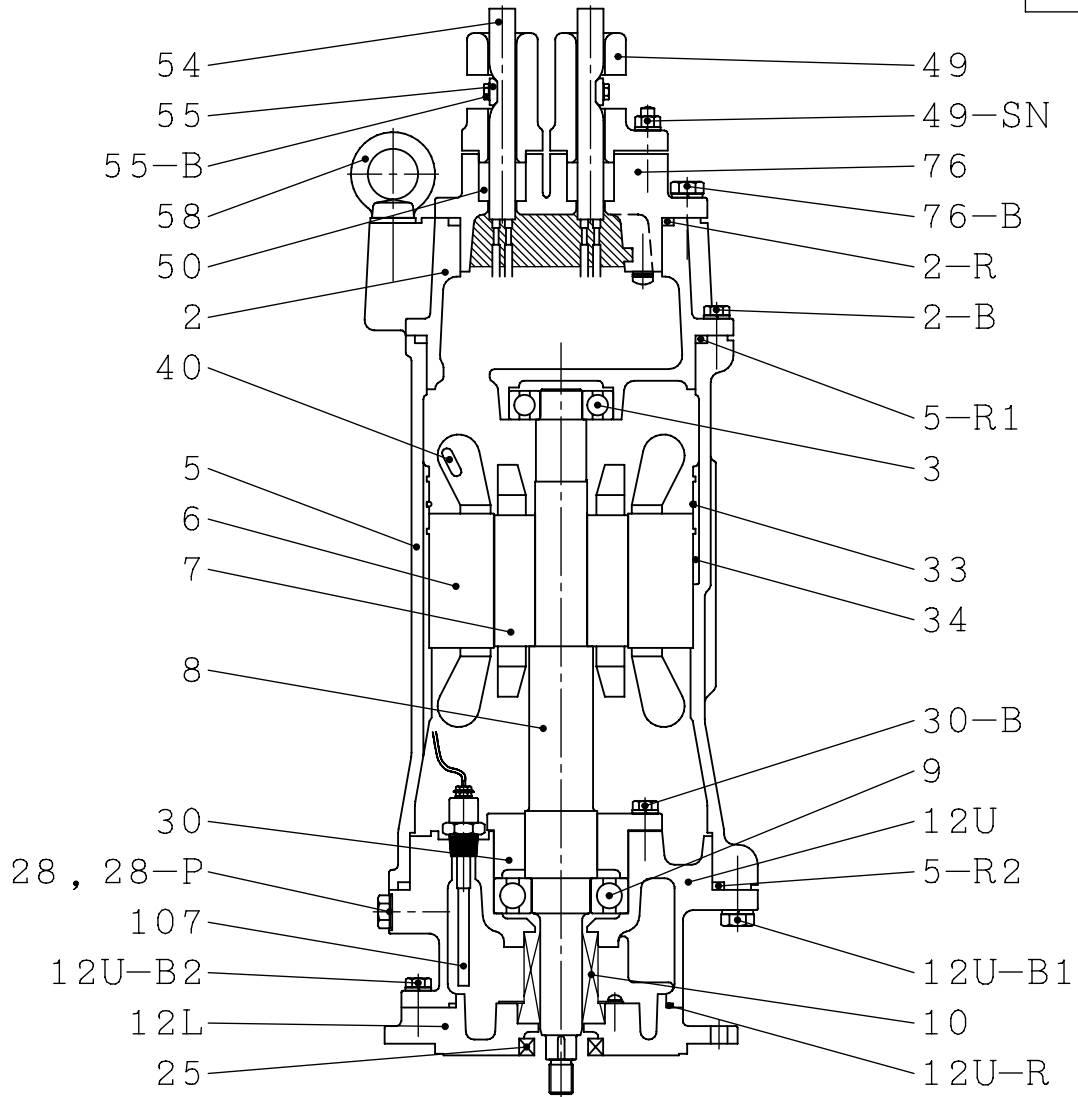
No.	Description	Material (ASTM)
58	Eye Bolt	AISI-304
76	Junction Chamber Cover	A48-No.35
107	Electrode Leakage Detector	—
28-P	Packing	NBR/AISI-304
2-R	O-Ring	NBR
5-R1	O-Ring	NBR
5-R2	O-Ring	NBR
12U-R	O-Ring	NBR
49-SN	Stud & Nut	AISI-304
2-B	Bolt	AISI-304
12U-B1	Bolt	AISI-304
12U-B2	Bolt	AISI-304
30-B	Bolt	AISI-304
55-B	Bolt	AISI-304
76-B	Bolt	AISI-304



SECTIONAL DRAWING

MODEL: EMQY-32ST6A

F/# 140T



Required Oil Quantity : 0.6 liter

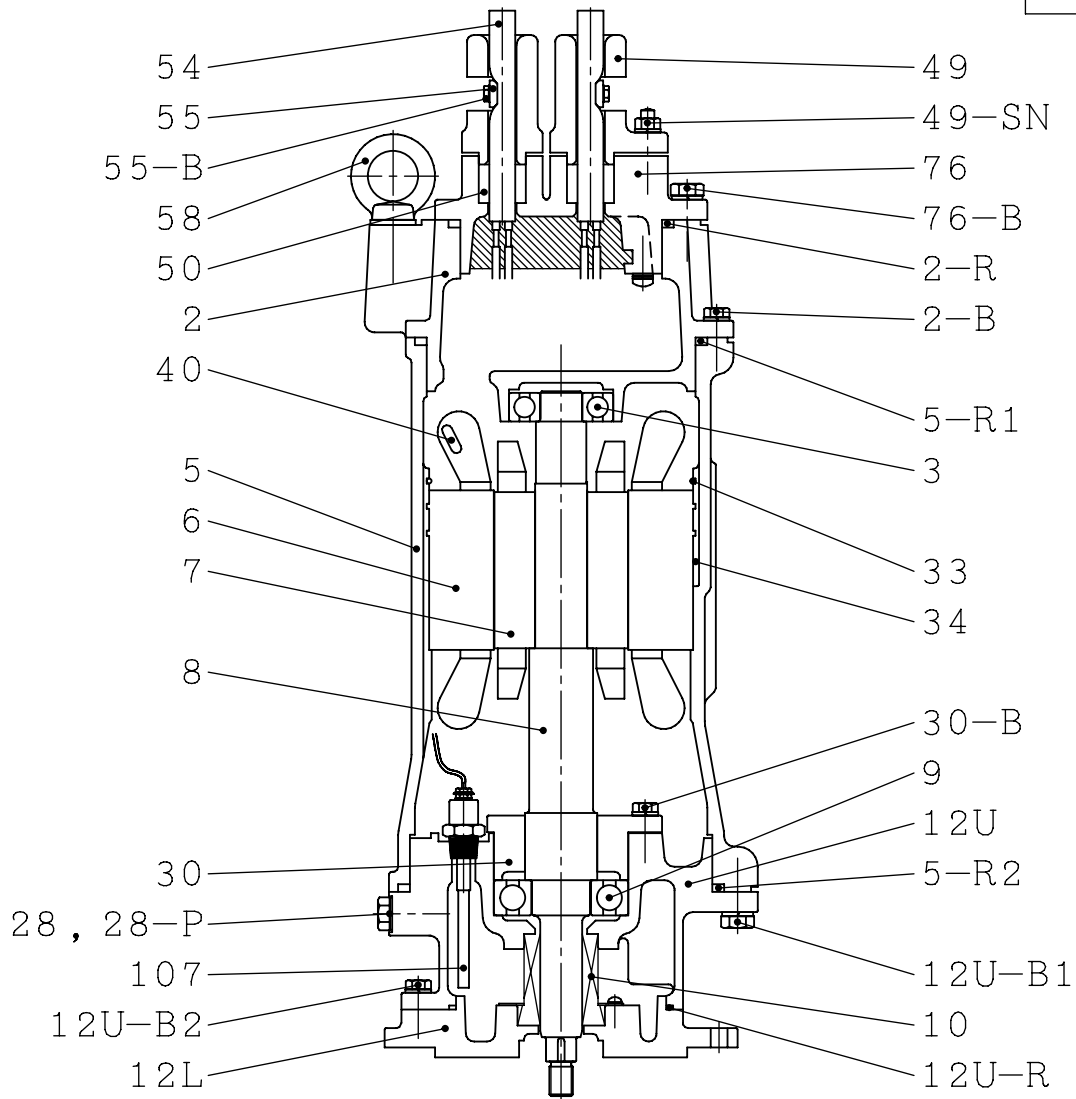
No.	Description	Material (ASTM)
2	Junction Chamber Housing	A48-No.35
3	Ball Bearing	6305ZZC3
5	Motor Housing	A48-No.35
6	Stator	—
7	Rotor	—
8	Shaft	AISI-420
9	Ball Bearing	6307ZZC3
10	Shaft Seal	Mechanical Seal
12U	Oil Chamber Housing	A48-No.35
12L	Oil Chamber Cover	A48-No.35
25	Oil Chamber Cover	NBR
28	Dust Seal	AISI-403
30	Bearing Cover	A48-No.35
33	Stator Retainer Ring	1078
34	Stator Key	A688
40	Thermal Detector	—
49	Bell Mouth	A48-No.35
50	Cable Bushing	NBR
54	Flexible Cable	—

No.	Description	Material (ASTM)
55	Cable Clamp	AISI-304
58	Eye Bolt	AISI-304
76	Junction Chamber Cover	A48-No.35
107	Electrode Leakage Detector	—
28-P	Packing	NBR/AISI-304
2-R	O-Ring	NBR
5-R1	O-Ring	NBR
5-R2	O-Ring	NBR
12U-R	O-Ring	NBR
49-SN	Stud & Nut	AISI-304
2-B	Bolt	AISI-304
12U-B1	Bolt	AISI-304
12U-B2	Bolt	AISI-304
30-B	Bolt	AISI-304
55-B	Bolt	AISI-304
76-B	Bolt	AISI-304

SECTIONAL DRAWING

MODEL: EMQY-52ST6A

F/# 140T



Required Oil Quantity : 0.6 liter

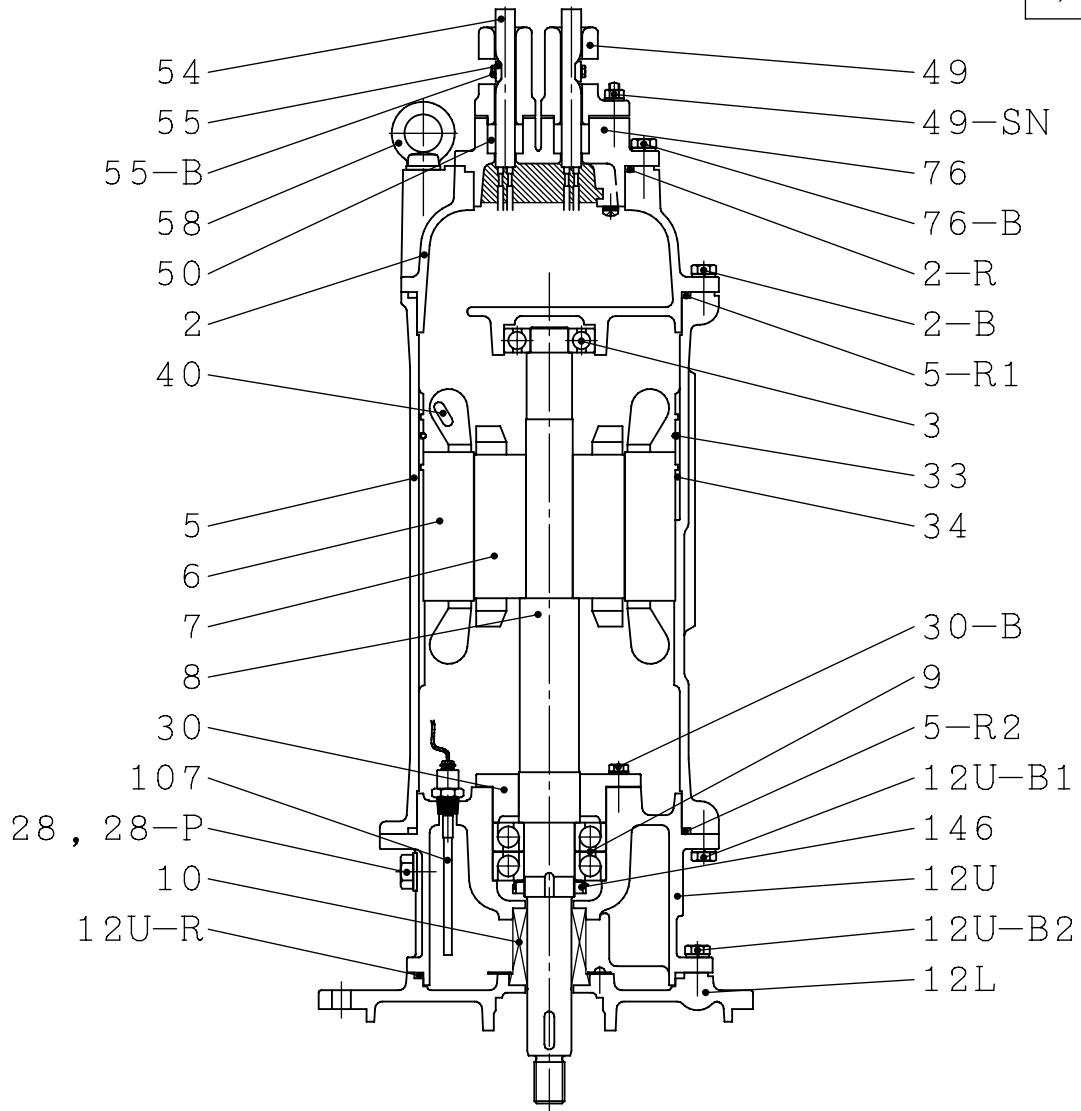
No.	Description	Material (ASTM)
2	Junction Chamber Housing	A48-No.35
3	Ball Bearing	6305ZZC3
5	Motor Housing	A48-No.35
6	Stator	—
7	Rotor	—
8	Shaft	AISI-420
9	Angular Contact Ball Bearing	6307ZZC3
10	Shaft Seal	Mechanical Seal
12U	Oil Chamber Housing	A48-No.35
12L	Oil Chamber Cover	A48-No.35
28	Oil Plug	AISI-403
30	Bearing Cover	A48-No.35
33	Stator Retainer Ring	1078
34	Stator Key	A688
40	Thermal Detector	—
49	Bell Mouth	A48-No.35
50	Cable Bushing	NBR
54	Flexible Cable	—
55	Cable Clamp	AISI-304

No.	Description	Material (ASTM)
58	Eye Bolt	AISI-304
76	Junction Chamber Cover	A48-No.35
107	Electrode Leakage Detector	—
28-P	Packing	NBR/AISI-304
2-R	O-Ring	NBR
5-R1	O-Ring	NBR
5-R2	O-Ring	NBR
12U-R	O-Ring	NBR
49-SN	Stud & Nut	AISI-304
2-B	Bolt	AISI-304
12U-B1	Bolt	AISI-304
12U-B2	Bolt	AISI-304
30-B	Bolt	AISI-304
55-B	Bolt	AISI-304
76-B	Bolt	AISI-304

SECTIONAL DRAWING

MODEL: EMQY-84ST6A

F/# 180T



Required Oil Quantity : 2.0 liter

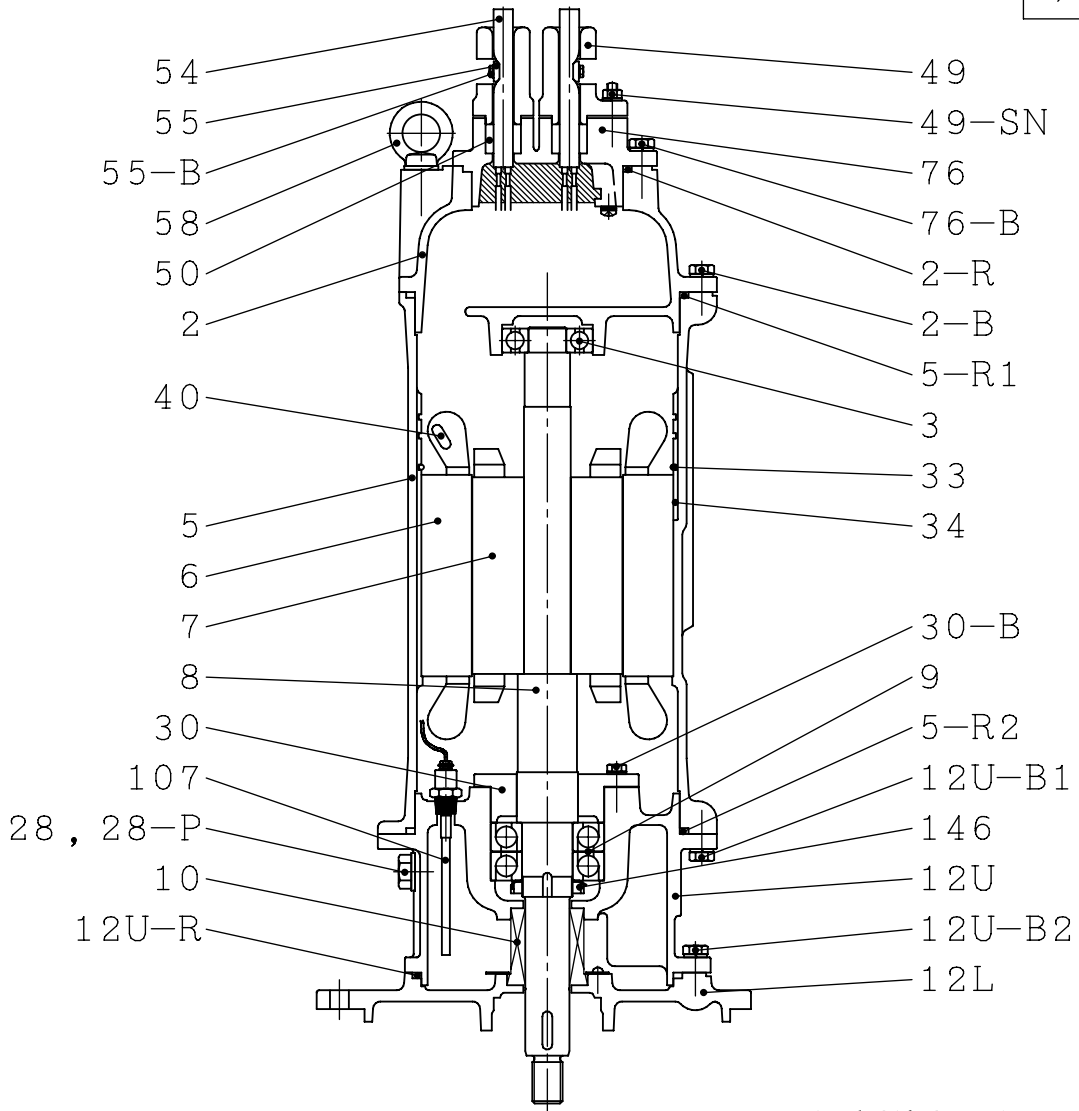
No.	Description	Material (ASTM)
2	Junction Chamber Housing	A48-No.35
3	Ball Bearing	6306ZZC3
5	Motor Housing	A48-No.35
6	Stator	—
7	Rotor	—
8	Shaft	AISI-420
9	Angular Contact Ball Bearing	7308BDB
10	Shaft Seal	Mechanical Seal
12U	Oil Chamber Housing	A48-No.35
12L	Oil Chamber Cover	A48-No.35
28	Oil Plug	AISI-403
30	Bearing Cover	A48-No.35
33	Stator Retainer Ring	1078
34	Stator Key	A688
40	Thermal Detector	—
49	Bell Mouth	A48-No.35
50	Cable Bushing	NBR
54	Flexble Cable	—
55	Cable Clamp	AISI-304

No.	Description	Material (ASTM)
58	Eye Bolt	AISI-304
76	Junction Chamber Cover	A48-No.35
107	Electrode Leakage Detector	—
28-P	Packing	NBR/AISI-304
2-R	O-Ring	NBR
5-R1	O-Ring	NBR
5-R2	O-Ring	NBR
12U-R	O-Ring	NBR
49-SN	Stud & Nut	AISI-304
2-B	Bolt	AISI-304
12U-B1	Bolt	AISI-304
12U-B2	Bolt	AISI-304
30-B	Bolt	AISI-304
55-B	Bolt	AISI-304
76-B	Bolt	AISI-304

SECTIONAL DRAWING

MODEL: EMQY-104ST6A

F/# 180T



Required Oil Quantity : 2.0 liter

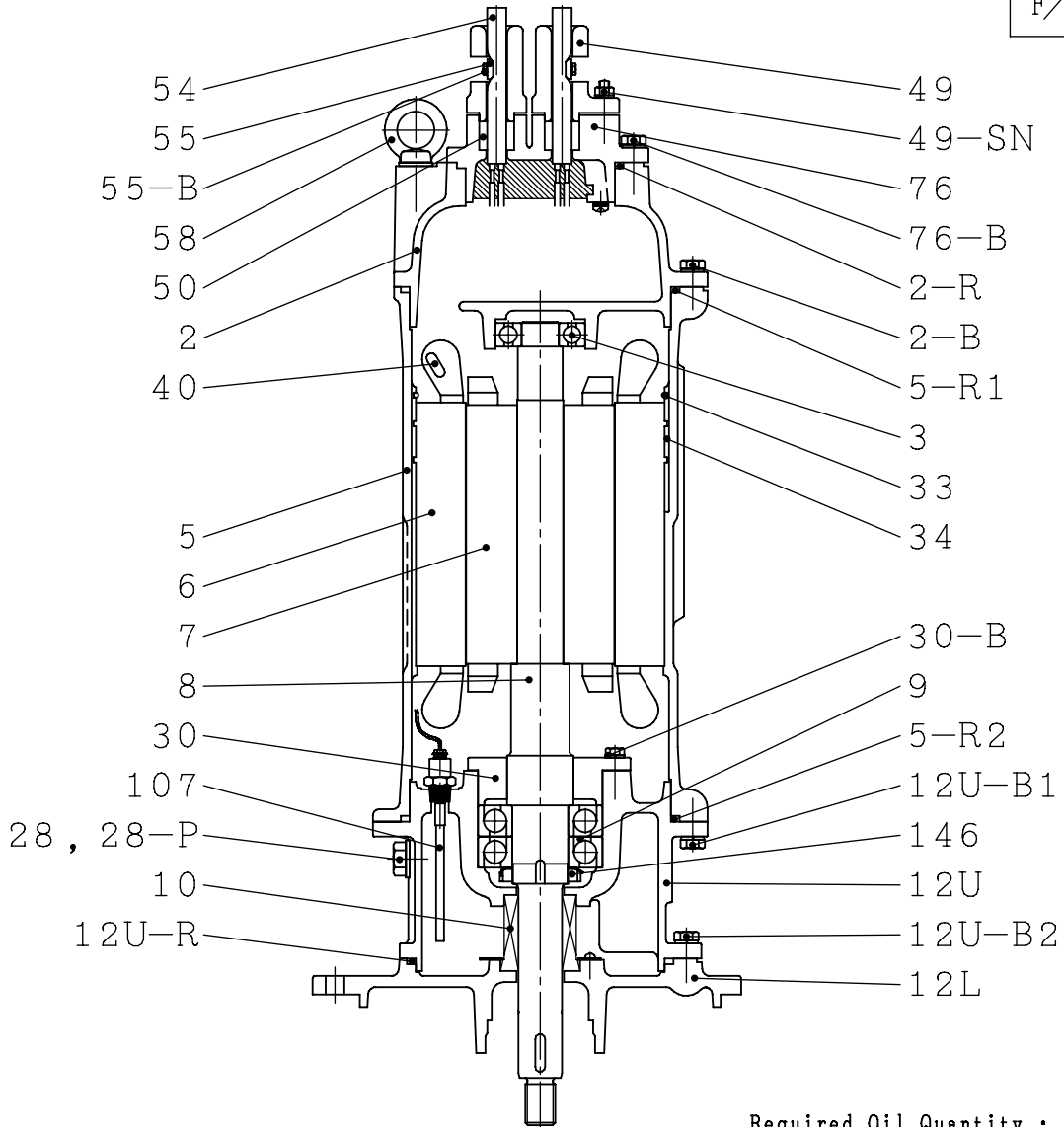
No.	Description	Material (ASTM)
2	Junction Chamber Housing	A48-No.35
3	Ball Bearing	6306ZZC3
5	Motor Housing	A48-No.35
6	Stator	—
7	Rotor	—
8	Shaft	AISI-420
9	Angular Contact Ball Bearing	7308BDB
10	Shaft Seal	Mechanical Seal
12U	Oil Chamber Housing	A48-No.35
12L	Oil Chamber Cover	A48-No.35
28	Oil Plug	AISI-403
30	Bearing Cover	A48-No.35
33	Stator Retainer Ring	1078
34	Stator Key	A688
40	Thermal Detector	—
49	Bell Mouth	A48-No.35
50	Cable Bushing	NBR
54	Flexible Cable	—
55	Cable Clamp	AISI-304

No.	Description	Material (ASTM)
58	Eye Bolt	AISI-304
76	Junction Chamber Cover	A48-No.35
107	Electrode Leakage Detector	—
28-P	Packing	NBR/AISI-304
2-R	O-Ring	NBR
5-R1	O-Ring	NBR
5-R2	O-Ring	NBR
12U-R	O-Ring	NBR
49-SN	Stud & Nut	AISI-304
2-B	Bolt	AISI-304
12U-B1	Bolt	AISI-304
12U-B2	Bolt	AISI-304
30-B	Bolt	AISI-304
55-B	Bolt	AISI-304
76-B	Bolt	AISI-304

SECTIONAL DRAWING

MODEL: EMQY-154ST6A

F/# 180T



Required Oil Quantity : 2.0 liter

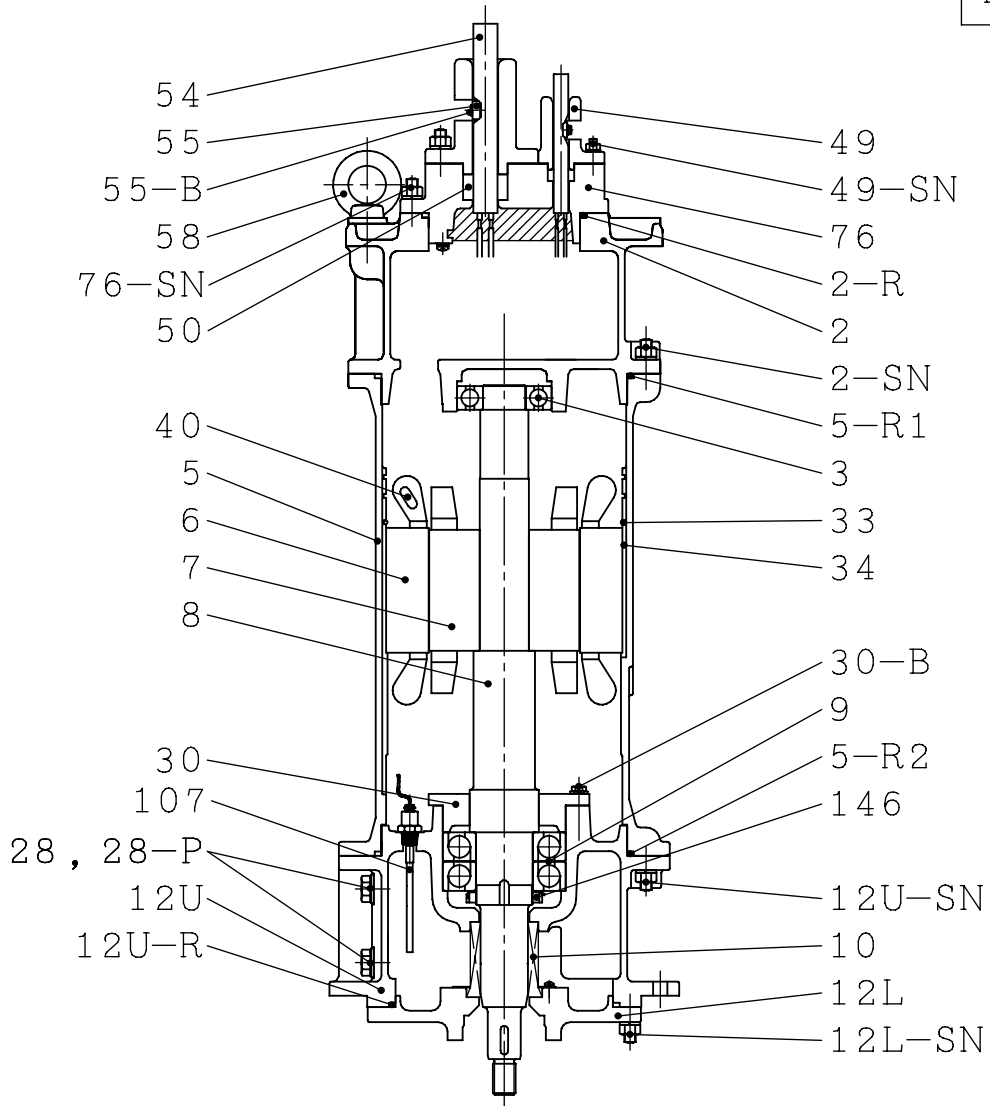
No.	Description	Material (ASTM)
2	Junction Chamber Housing	A48-No.35
3	Ball Bearing	6306ZZC3
5	Motor Housing	A48-No.35
6	Stator	—
7	Rotor	—
8	Shaft	AISI-420
9	Angular Contact Ball Bearing	7309BDB
10	Shaft Seal	Mechanical Seal
12U	Oil Chamber Housing	A48-No.35
12L	Oil Chamber Cover	A48-No.35
28	Oil Plug	AISI-403
30	Bearing Cover	A48-No.35
33	Stator Retainer Ring	1078
34	Stator Key	A688
40	Thermal Detector	—
49	Bell Mouth	A48-No.35
50	Cable Bushing	NBR
54	Flexible Cable	—
55	Cable Clamp	AISI-304

No.	Description	Material (ASTM)
58	Eye Bolt	AISI-304
76	Junction Chamber Cover	A48-No.35
107	Electrode Leakage Detector	—
28-P	Packing	NBR/AISI-304
2-R	O-Ring	NBR
5-R1	O-Ring	NBR
5-R2	O-Ring	NBR
12U-R	O-Ring	NBR
49-SN	Stud & Nut	AISI-304
2-B	Bolt	AISI-304
12U-B1	Bolt	AISI-304
12U-B2	Bolt	AISI-304
30-B	Bolt	AISI-304
55-B	Bolt	AISI-304
76-B	Bolt	AISI-304

SECTIONAL DRAWING

MODEL: EMQY-204ST6A

F/# 250T



Required Oil Quantity : 4.3 liter

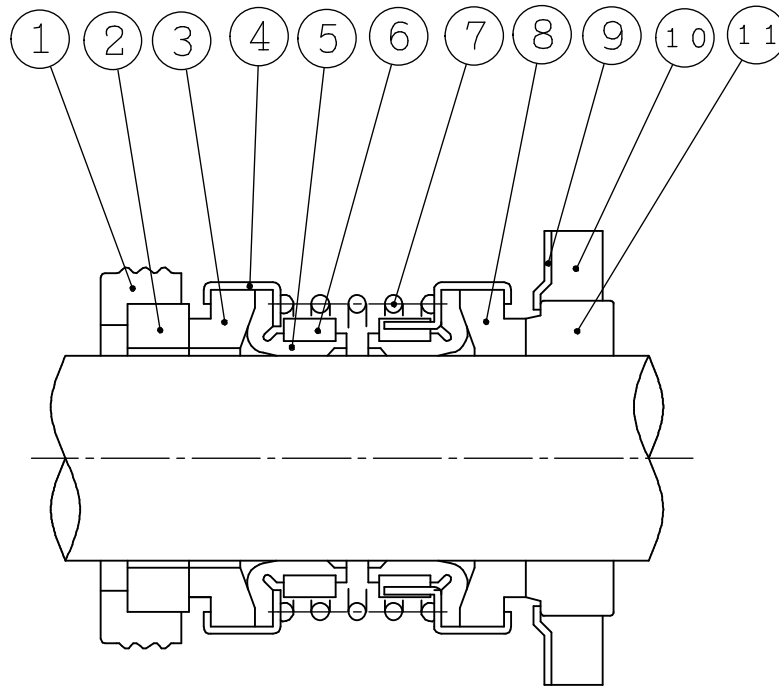
No.	Description	Material (ASTM)
2	Junction Chamber Housing	A48-No.35
3	Ball Bearing	6309ZZC3
5	Motor Housing	A48-No.35
6	Stator	—
7	Rotor	—
8	Shaft	AISI-420
9	Angular Contact Ball Bearing	7312BDB
10	Shaft Seal	Mechanical Seal
12U	Oil Chamber Housing	A48-No.35
12L	Oil Chamber Cover	A48-No.35
28	Oil Plug	AISI-403
30	Bearing Cover	A48-No.35
33	Stator Retainer Ring	1078
34	Stator Key	A688
40	Thermal Detector	—
49	Bell Mouth	A48-No.35
50	Cable Bushing	NBR
54	Flexible Cable	—
55	Cable Clamp	AISI-304

No.	Description	Material (ASTM)
58	Eye Bolt	AISI-304
76	Junction Chamber Cover	A48-No.35
107	Electrode Leakage Detector	—
28-P	Packing	NBR/AISI-304
2-R	O-Ring	NBR
5-R1	O-Ring	NBR
5-R2	O-Ring	NBR
12U-R	O-Ring	NBR
2-SN	Stud & Nut	AISI-304
12U-SN	Stud & Nut	AISI-304
12L-SN	Stud & Nut	AISI-304
49-SN	Stud & Nut	AISI-304
76-SN	Stud & Nut	AISI-304
30-B	Bolt	AISI-304
55-B	Bolt	AISI-304

## MECHANICAL SEAL

Motor Side

Impeller Side



No.	DISCRIPTION	Q'TY	MATERIAL
1	CUP GASKET	1	N.B.R.
2	MATING RING	1	CERAMIC
3	SEAL RING	1	CARBON
4	CASE	2	AISI-304
5	BELLOWS	2	N.B.R.
6	DRIVE RING	2	AISI-304
7	COIL SPRING	1	AISI-304
8	SEAL RING	1	SILICON CARBIDE
9	CASE	1	Carbon Steel Sheet
10	CUP GASKET	1	N.B.R.
11	MATING RING	1	SILICON CARBIDE

MECHANICAL SEAL TYPE : A TYPE  
 FRAME SIZE : 140T , 180T

DWN Y.TANAKA	DATE 13/11/08	MODEL NUMBER EMQY-Series	THIRD ANGLE PROJECTION
CHKD T.MASAGO	DATE 13/11/08	PRODUCT MECHANICAL SEAL	SCALE 1/1
APPR H.NAKAMURA	DATE 13/11/08	DWG. NO. EP411945	REV. 0
<b>EIM ELECTRIC CO., LTD.</b>			

