

# Submersible Wastewater, Sewage Pump

## Model DL3FU



Operating Instructions, Installation & Maintenance Manual

---



**EBARA**

EBARA Pumps Americas Corporation

---

TITLE

DOC. No.

REV.

---

CUSTOMER

COMPLETE IN  
WITH COVER

SHEETS

---

FINAL USER

---

PROJECT

SERVICE

---

JOB No.

EBARA SER. No.

---

ITEM No.

EQUIP.

SET

---



<b>1. Preface</b>	<b>P.4</b>
<b>2. Acceptance Inspection</b>	<b>P.4</b>
<b>3. Installaiton</b>	<b>P.4</b>
<b>3.1 Check the Following Points (1) Through (5)         Prior to Pump Installation</b>	<b>P.4</b>
<b>3.2 Pump Installation</b>	<b>P.9</b>
<b>4. Electric Wiring</b>	<b>P.13</b>
<b>4.1 Power Cable Connection</b>	<b>P.13</b>
<b>4.2 Grounding</b>	<b>P.16</b>
<b>4.3 Protective Device Leads Connection</b>	<b>P.17</b>
<b>5. Operation</b>	<b>P.18</b>
<b>5.1 Operational Limitations</b>	<b>P.18</b>
<b>5.2 Checking Rotation Direction</b>	<b>P.18</b>
<b>5.3 Cautions for Operation</b>	<b>P.20</b>
<b>5.4 Operation</b>	<b>P.20</b>
<b>5.5 Cautions during Operation</b>	<b>P.20</b>
<b>6. Maintenance and Overhaul</b>	<b>P.21</b>
<b>6.1 Daily Checks</b>	<b>P.21</b>
<b>6.2 Monthly Checks</b>	<b>P.21</b>
<b>6.3 Annual Checks</b>	<b>P.21</b>
<b>6.4 Parts that will be replaced</b>	<b>P.24</b>
<b>7. Troubleshooting</b>	<b>P.31</b>
<b>8. Startup Form</b>	<b>P.32</b>
<b>9. Limited Warranty</b>	<b>P.33</b>



## 1. Preface

Design of this EBARA pump is based on superior engineering and long experience. It is important to understand the EBARA pump thoroughly by careful study of this manual to prevent accidents and provide satisfactory operation and long life. If any questions arise regarding this manual, please direct them to EBARA. Your questions will be promptly answered, and your suggestion may be considered for incorporation into our future products.

**⚠ CAUTION** : THIS INSTRUCTION MANUAL INCLUDES NECESSARY ITEMS FOR INSTALLATION, OPERATION AND MAINTENANCE. READ THIS MANUAL CAREFULLY TO ENSURE CORRECT INSTALLATION, OPERATION AND MAINTENANCE. BE SURE TO KEEP THIS INSTRUCTION MANUAL ON HAND FOR FUTURE REFERENCE.

## Safety Labels

Four different types of safety labels are used in this manual. Please study the labels carefully so that the meaning of any safety warning you encounter is immediately clear.

**⚠ DANGER** : indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

**⚠ WARNING** : indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury

**⚠ CAUTION** : indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or possible damage to the equipment or machine.

**Note** : is used to call attention or to emphasize essential information.

## 2. Acceptance Inspection

Upon arrival of the pump –

- (1) Check the nameplate information for agreement with specifications in respect to model identification, head, pumping capacity, speed, power, voltage, and frequency.
- (2) Check the pump has not been damaged during shipment and all plugs and fastening bolts are properly tightened.
- (3) Check accessories and spare parts against the packing list.  
If any problem is found, contact your dealer.

## 3. Installation

### 3.1 Check the Followings Points (1) through (3) Prior to Pump Installation

- (1) Ensure that the internal liquid chamber is filled with specified amount and all plugs and fastening bolts are properly tightened.
- (2) Insulation resistance values are within limits. Check the pump is not damaged and the cable glands and cables are in satisfactory condition.
- (3) Other points that require particular attention.

**3.1.1 Internal Liquid Supply (Figs. 1, 2 and 3)**

2~5HP(1.5-3.7kW) models come standard without internal cooling system and are shipped with proper oil capacity per Table 2. 7.5~60HP(5.5~45kW) are standard with internally cooled system (no oil fill required) and are shipped with proper coolant capacity per Table 1.

COOLANT (Internal liquid)

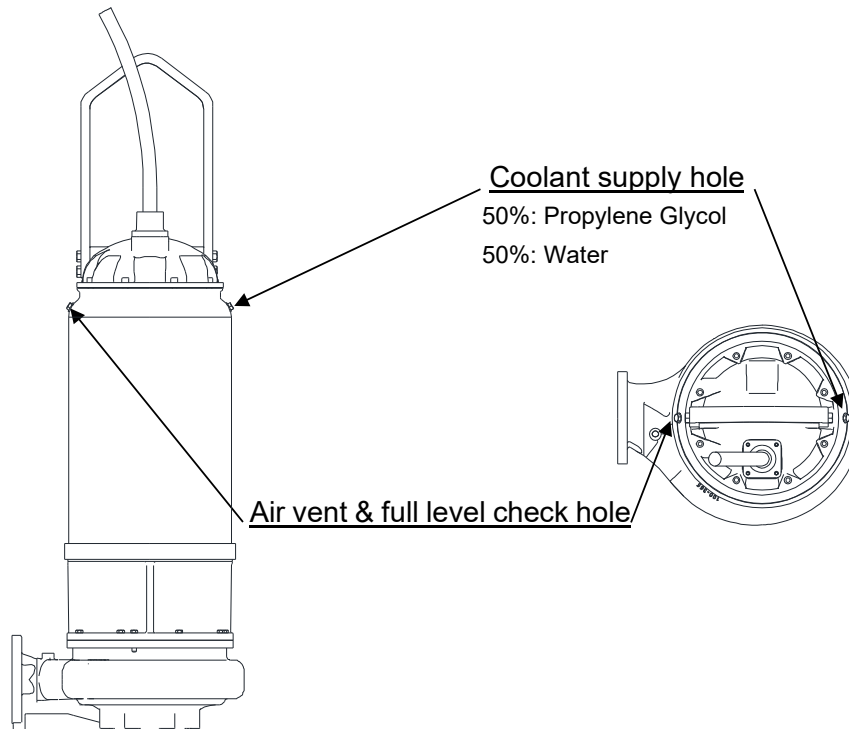


Fig. 1

Fig. 2

The motor shaft is sealed with a mechanical seal. The coolant chamber provided between the two sealing stages can be filled with coolant by standing the pump vertical on a level surface and remove plugs “Coolant supply hole” and “Air vent & full level check hole”.

**⚠ CAUTION: THE SEAL CHAMBER MAY BE UNDER PRESSURE. HOLD A RAG OVER THE PLUG TO PREVENT SPLATTER.**

Pour the specified coolant into the coolant chamber through “Coolant supply hole” until the coolant flows out of “Air vent & full level check hole”. (See Table 1)

After the coolant chamber is filled to the specified level, plug the two holes.

# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

Table 1

PUMP MODEL	APPROX. COOLANT CAPACITY [L]	PUMP MODEL	APPROX. COOLANT CAPACITY [L]
50 DL3FU 61.5	*OPT 9.5	100 DL3MFU 622	33.2
80 DL3FU 61.5	*OPT 9.5	100 DL3FU 630	38.8
80 DL3MFU 61.5	*OPT 9.5	100 DL3FU 637	38.8
80 DL3MU 61.5	*OPT 9.5	100 DL3FU 645	42
80 DL3FU 62.2	*OPT 11.6	150 DL3FU 67.5	23
80 DL3MFU 62.2	*OPT 11.1	150 DL3FU 611	19.1
80 DL3FU 63.7	*OPT 11.6	150 DL3FU 615	22.5
80 DL3MFU 63.7	*OPT 11.6	150 DL3FU 618	30.7
80 DL3FU 65.5	23.5	150 DL3FU 622	33.2
80 DL3MFU 65.5	23.5	150 DL3FU 630	35.8
80 DL3FU 67.5	23	150 DL3FU 637	35.8
80 DL3CMFU 67.5	23.8	150 DL3FU 645	39
80 DL3FU 611	19.3	200 DL3FU 67.5	23
80 DL3CMFU 611	19.7	200 DL3FU 611	19.1
80 DL3FU 615	22.5	200 DL3FU 615	22.5
80 DL3FU 618	31	200 DL3FU 618	30.7
80 DL3FU 622	33.2	200 DL3FU 622	33.2
100 DL3MFU 61.5	*OPT 9.5	200 DL3FU 630	35.8
100 DL3FU 61.5	*OPT 8.8	200 DL3FU 637	35.8
100 DL3MFU 62.2	*OPT 11.1	200 DL3FU 645	39
100 DL3FU 62.2	*OPT 11.3	250 DL3FU 611	19.1
100 DL3MFU 63.7	*OPT 11.5	250 DL3CFU 615	22.5
100 DL3FU 63.7	*OPT 11.3	250 DL3BFU 615	22.1
100 DL3FU 65.5	23	250 DL3FU 618	30.7
100 DL3MFU 65.5	23.5	250 DL3FU 622	32.6
100 DL3FU 67.5	23	250 DL3FU 630	35.8
100 DL3MFU 67.5	23	250 DL3FU 637	35.8
100 DL3MFU 611	19.3	250 DL3FU 645	39
100 DL3FU 611	19.1	300 DL3FU 618	30.1
100 DL3FU 615	22.5	300 DL3FU 622	32.1
100 DL3MFU 615	22.5	300 DL3FU 630	35.8
100 DL3FU 618	31	300 DL3FU 637	35.8
100 DL3MFU 618	31	300 DL3FU 645	40
100 DL3FU 622	33.2		

### OIL (Internal liquid)

Pump models 2~5HP(1.5~3.7kW) come standard with oil. Capacities are listed in Table 2. Models noted by an asterisk (\*) in Table 1, have an optional internal cooling system (for coolant capacities refer to Table 1).

Table 2

PUMP MODEL	APPROX. OIL CAPACITY [L]
50 DL3FU 61.5	*STD 1.1
80 DL3FU 61.5	*STD 1.1
80 DL3MFU 61.5	*STD 1.1
80 DL3MU 61.5	*STD 1.1
80 DL3FU 62.2	*STD 1.4
80 DL3MFU 62.2	*STD 1.3
80 DL3FU 63.7	*STD 1.4
80 DL3MFU 63.7	*STD 1.4
100 DL3MFU 61.5	*STD 1.1
100 DL3FU 61.5	*STD 1.0
100 DL3MFU 62.2	*STD 1.4
100 DL3FU 62.2	*STD 1.3
100 DL3MFU 63.7	*STD 1.4
100 DL3FU 63.7	*STD 1.3

Reinstall plug firmly after filling oil

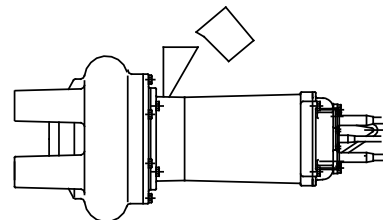


Fig. 3

### 3.1.2 Insulation Resistance Measurement

**⚠ WARNING:** ALL ELECTRIC WORK SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN AND ALL NATIONAL AND LOCAL ELECTRICAL CODES MUST BE OBSERVED.

Although insulation resistance of this pump was shop tested, it should be rechecked prior to installation, using the following procedure. Usually, insulation resistance of a minimum of  $1M\Omega$  is considered satisfactory (when measured with a DC 500V Megger).

Measurement procedure (Refer to Figs. 4 and 5)

Connect the minus (-) terminal of the DC 500V Megger to the G terminal of the cable, or a motor bolt.

Touch the plus (+) terminal of the Megger to L1-phase (or L2-phase or L3-phase) of the cable and read the insulation resistance.

Also, touch the plus (+) terminal of the Megger to P1 (or P2) and P3 (or P4), with the minus (-) terminal G connected as above, and read the insulation resistance.

**⚠ CAUTION:** DO NOT CONNECT THE TWO MEGGER TERMINALS BETWEEN P1 AND P2, OR P3 AND P4, TO AVOID DAMAGE TO THE PROTECTIVE DEVICE. KEEP THE MOTOR CABLE OFF THE GROUND WHILE TAKING ALL MEASUREMENTS.

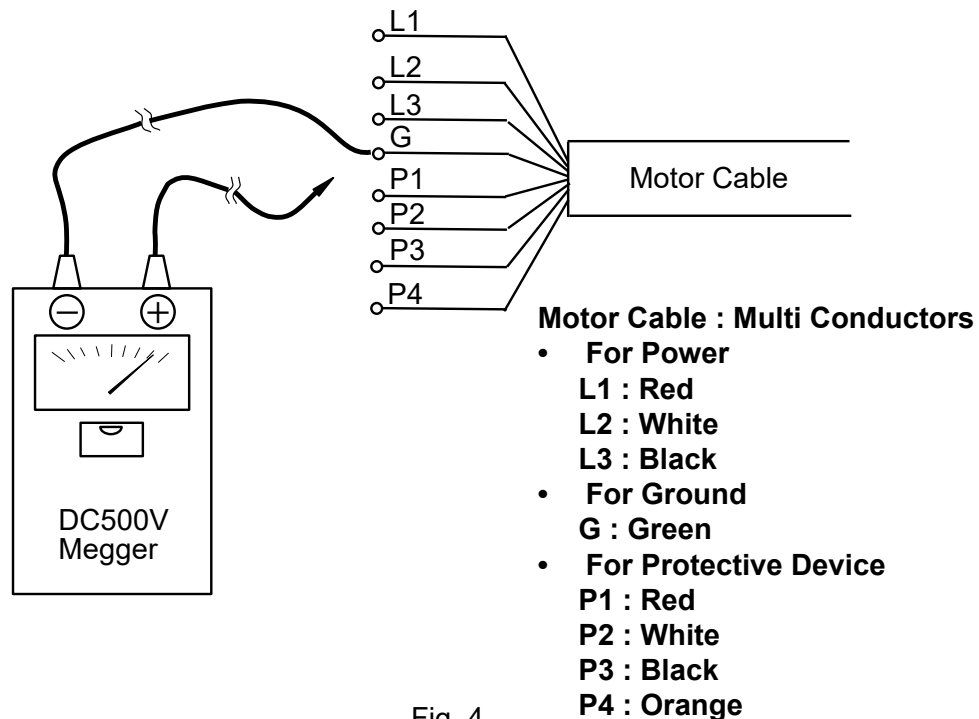


Fig. 4

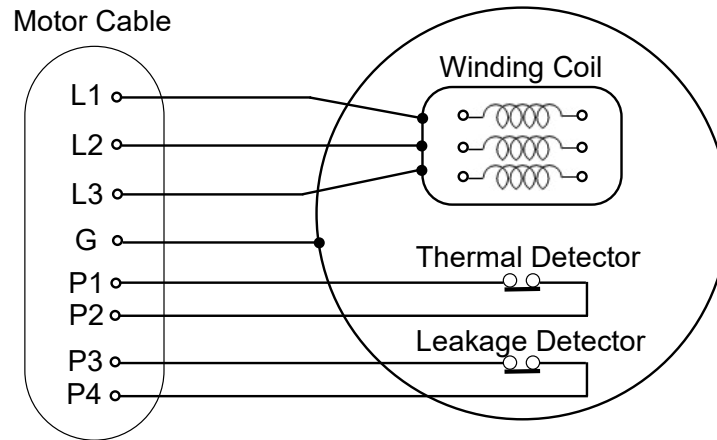


Fig. 5

### 3.1.3 Other Checks Requiring Particular Attention

(1) Minimum operating water level:

Be sure that the pump stop level is not lower than the minimum operating water level specified in the technical document found on the EBARA website. If the stop level is lower, a vortex flow can occur causing the pump to intake air, resulting in noise and vibration.

If there is possibility that the minimum water level may decrease to an excessive extent, it is necessary to use a minimum water level alarm. An alternative measure would be a water level-dependent control system that turns the motor off automatically. It will stop the pump when the water level is lowered than the critical level and is turned on again to resume automatic operation when water is restored to a safe level.

(2) Pump location relative to pump pit water inlet:

If the pump is installed near the pump pit water inlet, the incoming flow to the pump can be considerably turbulent; the influent liquid can shake the pump and cause the cable(s) to be whipped vigorously, resulting in damage. Therefore, the pump should be located as far from the water inlet as possible or an influent baffle should be installed.

(3) Size of debris:

Entry of large or long debris can result in a blocked impeller.

If such problem occurs, the pump can be readily lifted out and disassembled for servicing, which is however, time and labor consuming.

The primary consideration therefore should be to prevent the ingress of any oversized objects into the sump by use of a screen, etc. Another important consideration is to minimize presence of abrasive substances, such as sand, in the liquid.

If the contents of such substances become high, the impeller is increasingly worn, leading to the degradation of capacity.

**Note :** In case of any problems listed above actually occur, contact EBARA immediately.



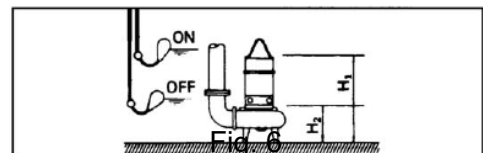
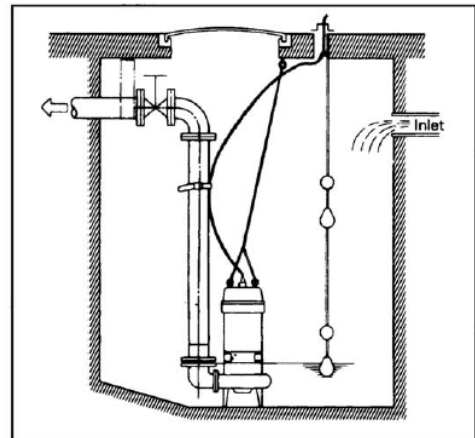
### 3.2 Pump Installation

**⚠ WARNING:** WHEN LIFTING THE PUMP, USE AN APPROPRIATE CRANE (OR A HOIST) AND LIFT SYSTEM. CHECK POSITION AND TIGHTNESS OF LIFT SYSTEM SO THAT WEIGHT OF THE PUMP IS NOT UNBALANCED. FAILURE TO OBSERVE THIS PRECAUTION CAN RESULT IN SERIOUS ACCIDENTS.

**⚠ CAUTION:** BEFORE INSTALLATION CHECK ROTATION. CORRECT ROTATION IS CLOCKWISE WHEN VIEWED FROM TOP OF MOTOR. READ ELECTRICAL WIRING.

(1) When installing directly on the floor.

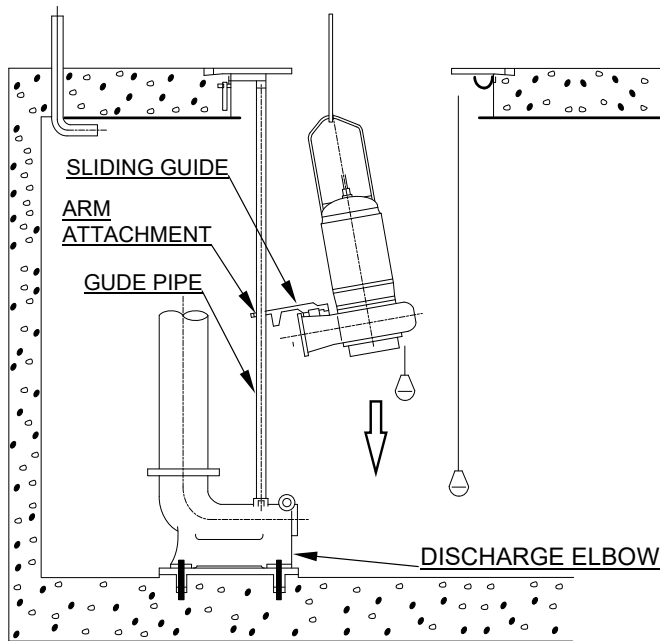
1. Clean the installation area.
2. Under no circumstances should the cable be pulled while the pump is being transported or installed. Attach a rated lifting chain or strap to the pump lifting bail and install the pump.
3. This pump must not be installed on its side. Ensure that it is installed upright on a secure base.
4. Install the pump at a location in the tank where there is the least turbulence.
5. If there is a flow of liquid inside the tank, support the cable where appropriate (See Fig. 6).
6. Install piping so that air will not be entrapped. If piping must be installed in such a way that air pockets are unavoidable, install an air release valve wherever air pockets are most likely to develop.
7. Do not permit the end of discharge piping to be submerged, as backflow will result when the pump is shut down.
8. Non-automatic pumps (model DLFU, DLMFU) do not have an automatic operating system using built-in floats. Do not operate the pump for a long time with the water level near the minimum operating level as the automatic cut-off switch incorporated inside the motor will be activated.



(2) When installing using QDC (Quick Discharge Connector).

1. After the pump is thoroughly checked, verifying it is in order, lift the pump body and fit the sliding guide of the pump body to the guide pipe.

**⚠ WARNING:** USE CAUTION DURING PUMP INSTALLATION AND REMOVAL TO MINIMIZE CONTACT BETWEEN PUMP AND ANY MATERIAL THAT CAN GENERATE AN IGNITION SOURCE SUCH AS A SPARK. HAVE FIRE SUPPRESSION EQUIPMENT ON HAND.



Guide pipe (304  
Stainless Steel) contacts  
arm attachment (Brass).  
Brass only used on non-  
sparking QDC

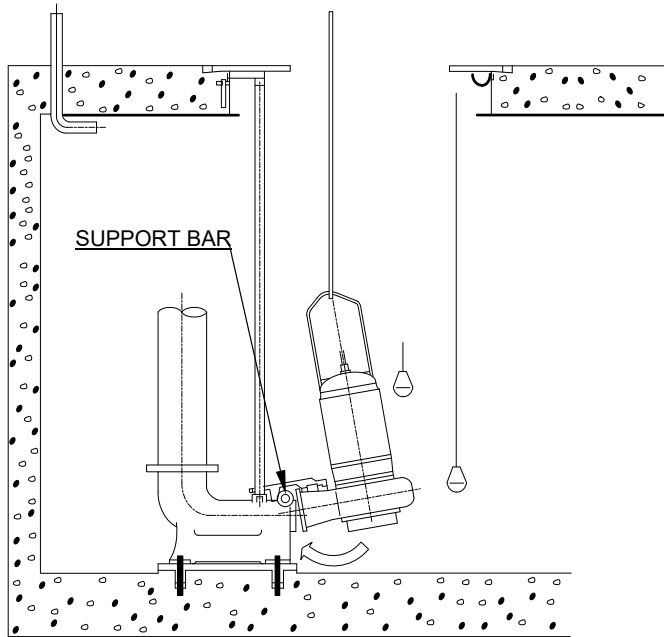
Fig. 7

# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

2. Then, lower the pump body slowly along the pump guide.

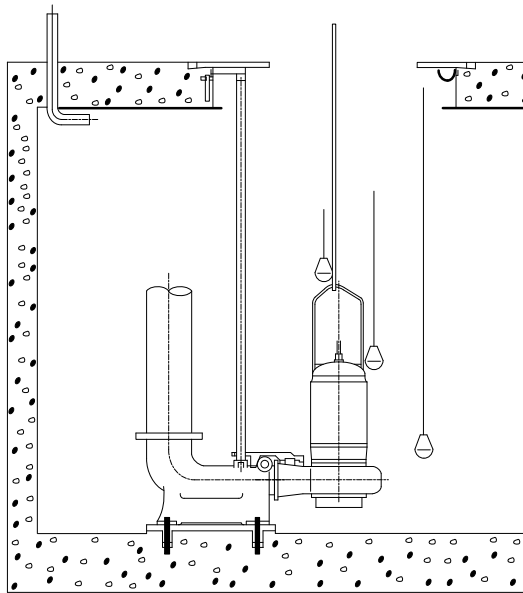
**⚠ WARNING:** CAUTION SHOULD BE TAKEN DURING PUMP INSTALLATION AND REMOVAL TO MINIMIZE CONTACT BETWEEN PUMP AND ANY MATERIAL THAT CAN GENERATE ANY IGNITION SOURCE SUCH AS A SPARK. HAVE FIRE SUPPRESSION EQUIPMENT ON HAND.



Sliding guide attaches to support bar (420 Stainless Steel). Pump rotates around point of support bar.

Fig. 8

3. The pump is automatically connected to the discharge elbow.



Each flange contacts face to face.

Fig. 9

If the pump cannot slide down smoothly, the guide pipe may not be vertical, or the lifting method may be wrong. Check these points to determine the cause for correction.

After the pump is installed attach the chain to the hook of the floor frame.

When the pump is installed indoors, it is a good idea for convenience sake that a hoist, for example, be provide on the ceiling or surface platform so that it can be moved to the pump lifting center when necessary.

**4. Electric Wiring**

**4.1 Power Leads Connection**

**⚠ WARNING:** CHECK THAT THE POWER IS LOCKED OUT AND TAGGED OUT AND DISCONNECTED BEFORE WORKING ON PUMP. ALL ELECTRICAL WORK SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN AND ALL NATIONAL AND LOCAL ELECTRICAL CODES MUST BE OBSERVED.

**⚠ WARNING:** IF THE PURCHASED PUMP IS AN FM EXPLOSION-PROOF PRODUCT, CHANGING OF THE INTERNAL MOTOR WIRING I.E. CHANGING 208/230V ⇄ 460V) MUST BE PERFORMED AT EBARA'S FM APPROVED SERVICE SHOP. UNAUTHORIZED WORK MAY IMPAIR EXPLOSION-PROOF PERFORMANCE. THIS IS DANGEROUS AND MUST BE AVOIDED!

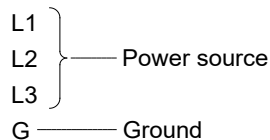
Wiring

- a) Wire as indicated for the appropriate start system as shown in Fig. 10.
- b) Loose connections will stop the pump. Make sure all electrical connections are secure to prevent short circuit.

The electric wiring for a submersible motor is no different from an ordinary motor, except the direction of rotation cannot be easily verified.

Wiring to wrong terminals results in reverse rotation. To prevent this and to achieve best results, the following wiring procedure is recommended.

Connect terminals L1, L2 and L3 to the secondary terminals L1, L2 and L3 of the electromagnetic switch or breaker respectively. Connect the remaining terminal G to ground.

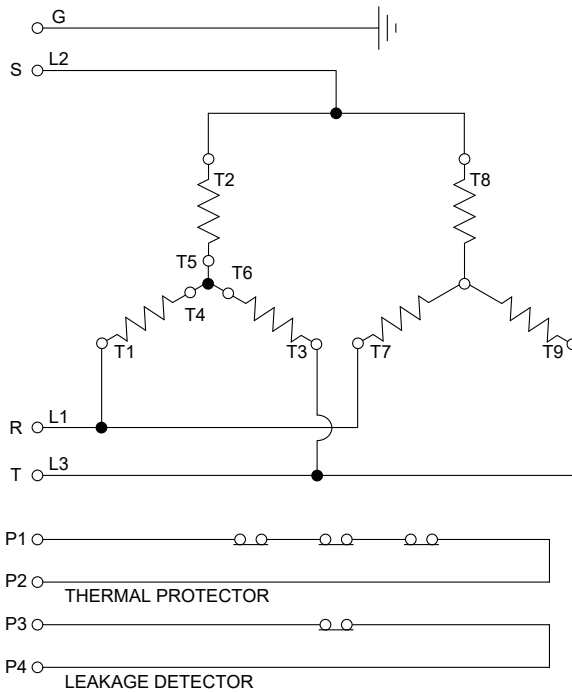


**⚠ WARNING:** WHEN PREPARING POWER CABLE LEADS FOR CONNECTION TO CONTROL, IT IS ESSENTIAL THAT THE GROUND LEAD BE LONGER THAN THE POWER LEADS. THE GROUND LEAD MUST HAVE AT LEAST 2" (50 MM) SLACK REMAINING AFTER CONNECTION, CUSTOMER TO ENSURE SUFFICIENT SPACE. THIS IS DONE FOR ELECTRICAL SAFETY. IF THE CABLE IS MISTAKENLY PULLED OUT, THE GROUND LEAD WILL BE THE LAST WIRE BROKEN.

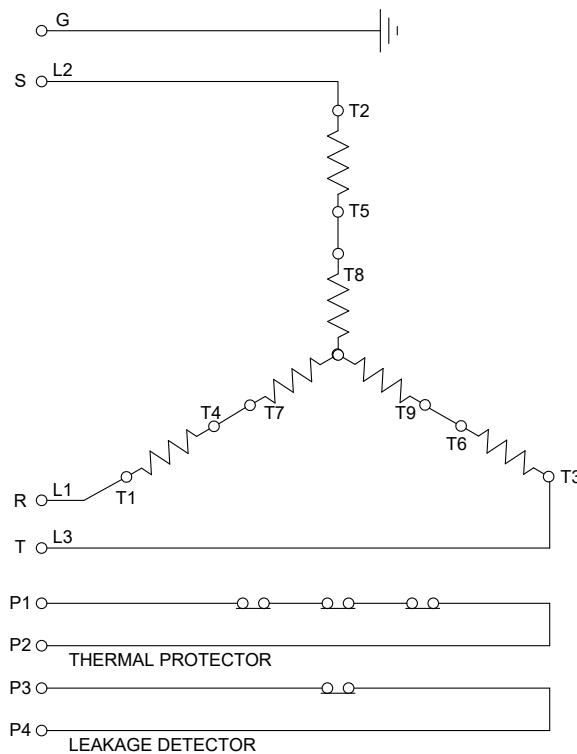
# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

### Output 2 to 10HP 208/230V



### 460V

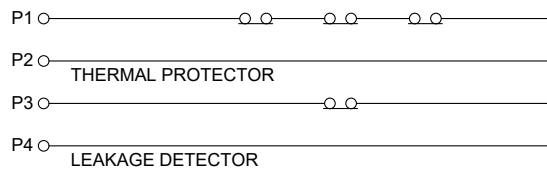
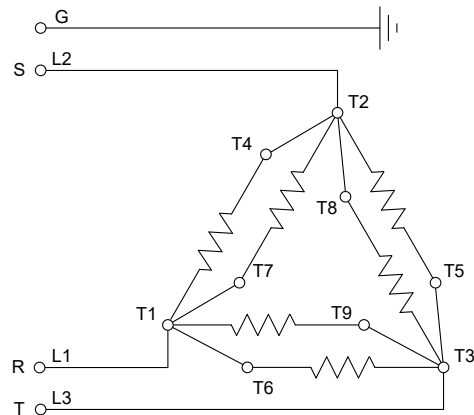


# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

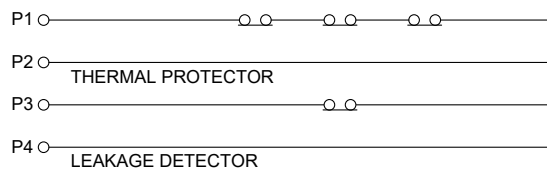
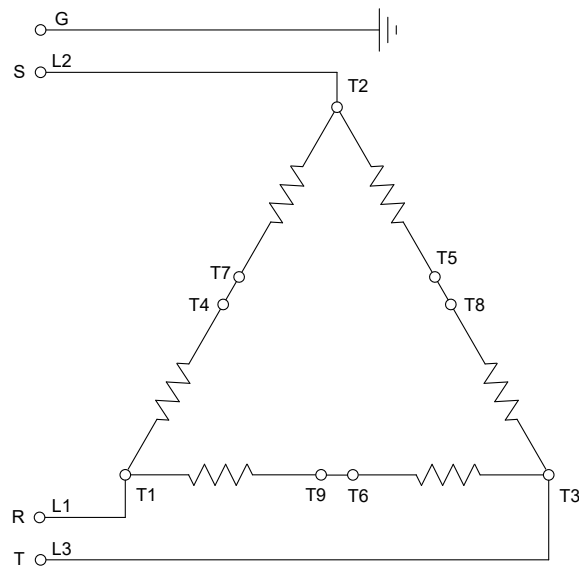
### Output 15 to 30HP

#### 208/230V



- G - GRN
- L1 - RED - T1 - T7 - T6
- L2 - WHT - T2 - T8 - T4
- L3 - BLK - T3 - T9 - T5
- P1 - RED
- P2 - WHT
- P3 - BLK
- P4 - ORG

#### 460V



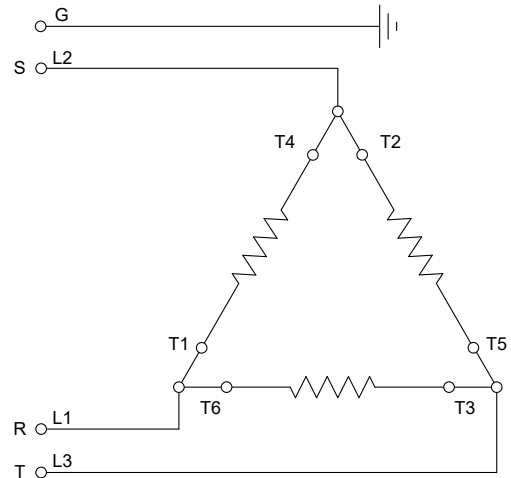
- G - GRN
- L1 - RED - T1
- L2 - WHT - T2
- L3 - BLK - T3
- T4 - T7
- T5 - T8
- T6 - T9
- P1 - RED
- P2 - WHT
- P3 - BLK
- P4 - ORG



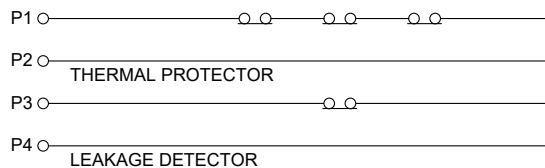
# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

**Output 40 to 60HP**  
**460V(208/230V not available)**



- G - GRN
- L1 - RED - T1- T6
- L2 - WHT - T2 - T4
- L3 - BLK - T3 - T5
- P1 - RED
- P2 - WHT
- P3 - BLK
- P4 - ORG



### 4.2 Grounding (Fig. 11 and Table 3)

Be sure to connect the ground line (labeled “G”) to ground. Prior to grounding, ensure that the wire is the proper one (labeled “G”).

Also, verify that grounding continuity has been established inside the motor by checking that ground wire (labeled “G”) is electrically conductive with the bolt on the top of the motor (to be stripped of paint to bare metal surface).

Ground the motor according to local codes.

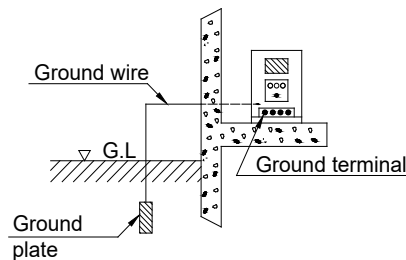


Fig. 11

Table 3 (Example)

Motor classification	Grounding resistance	Minimum Ground line diameter per
AC 600V below	10Ω	NEC 70





**4.3 Protective Device Leads Connection (Table 4)**

This pump has a leakage detector at the motor bottom, and a thermal detector in the stator coil to protect the motor. Connect terminals P1 and P2 for the thermal detector to P1 and P2 of the same control connector. Also, connect terminals P3 and P4 for the leakage detector to P3 and P4 of the same control connector. Table 4 shows detailed specifications regarding protective devices.

Table 4

	Thermal detector	Leakage detector
Type	9700K 66-215	<b>Float Type Reed Switch</b>
Acting Temperature	140 +/- 5°C	N/A
Reset Temperature	85 +/- 10°C	
Contact rating	AC 115V/230V×18A/12A (max)	AC 300V×0.5A (max)
Contact type	normally closed (b-contact)	normally closed (b-contact)
Cable terminal identification	P1 P2	P3 P4

**⚠ WARNING:** AN EARTH LEAKAGE BREAKER MUST BE USED ACCORDING TO LAW TO PREVENT ELECTRICAL ACCIDENTS.

**⚠ CAUTION:** A MOTOR PROTECTIVE DEVICE SHOULD BE INSTALLED ON CONTROL PANEL TO PROTECT THE SUBMERSIBLE MOTOR AGAINST OVERCURRENT, OPEN PHASE, REVERSE PHASE.

## 5. Operation

### 5.1 Operational Limitations

This pump is designed to operate under the following conditions:

- (1) Liquid temperature: max. 40°C (105°F)
- (2) Liquid: This pump must not be used with sea water and corrosive chemicals or combustible liquids.
- (3) Lowest liquid level: Refer to lowest liquid level shown in the technical document.
- (4) Voltage variations: The motor is designed to supply its rated output at variations of up to  $\pm 10\%$  of the rated voltage at the rated frequency.
- (5) Frequency variations: The motor is designed to supply its rated output at variations of up to  $\pm 5\%$  of the rated frequency at the rated voltage.
- (6) Combined variations: When the variation of voltage and frequency are combined, the total variation is limited to a maximum of 10 percent (sum of absolute values) of the rated values, provided the frequency variation does not exceed  $\pm 5\%$  of rated frequency.

### 5.2 Checking Rotation Direction (Figs. 12 and 13)

Check the motor for rotation direction by the following procedure after the pump has been installed in the pump pit.

A reversing pump is no problem if operation is not prolonged.

- (1) If the pump performance curve is available.

Open the sluice valve on the discharge side approximately half a turn (so that air is released, and a small quantity of liquid is discharged), and turn the main switch ON. With all air released from the discharge pipe, fully close the sluice valve.

At this time, if the value of shut-off Total Discharge Head meter (m) where;

Total Discharge head =  $H_1 + H_2$  (m)

$H_1$  (m) Compound pressure gauge reading

$H_2$  (m) Vertical distance from gauge to liquid surface

is generally in agreement with the pump performance at hand, the pump is operating normally.

If the pump is reversed, a performance curve as denoted by dashed lines in Fig. 12 is usually obtained, where the pump's discharge pressure is lower than normal or specified, and a sudden rise in electric current occurs with gradual opening of sluice valve.

In this event, change connections as shown in Fig. 13.

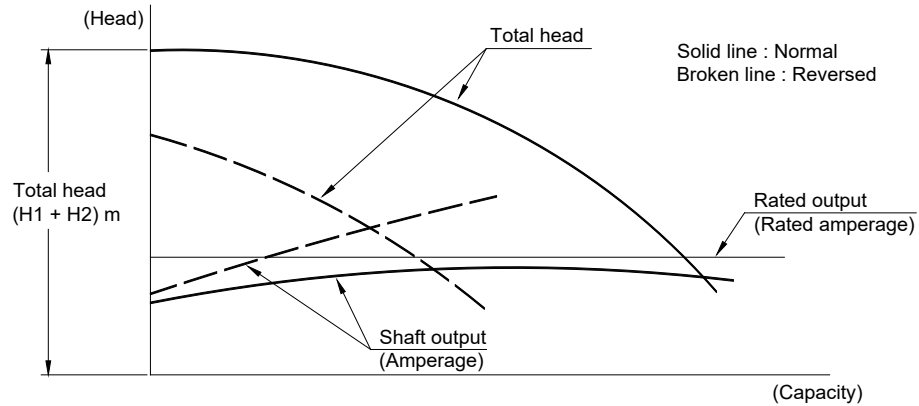


Fig. 12 Pump performance of Normal Rotation VS reverse rotation

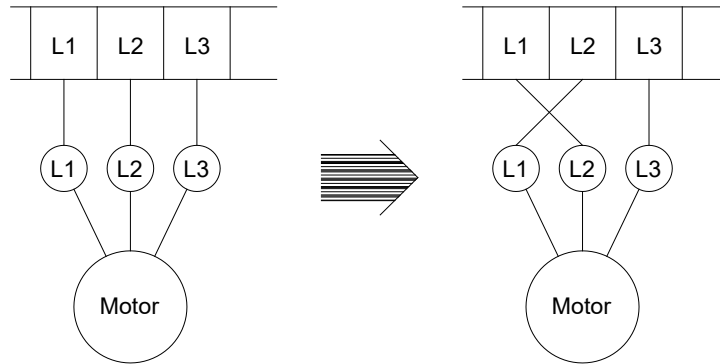


Fig. 13 Change two of Connections for proper rotation and Normal Pump Performance

(2) If the pressure gauge or compound pressure gauge is not installed on the discharge pipe, if checks of the rotating direction of the pump in the water as described above cannot be performed, proceed as follows.

Lay the pump on the ground. Turn switch on and off instantaneously and check visually the rotation direction through the discharge bore of the pump. The rotating direction of the pump should be clockwise when viewed from top of motor.

**⚠ CAUTION:** SINCE THE STARTING TORQUE ON LARGE PUMPS CAN BE POWERFUL, THE PUMP MUST BE PROPERLY SUPPORTED.

**⚠ DANGER:** DURING CHECKING THE DIRECTION OF ROTATION, DO NOT TOUCH ROTATING PARTS OF THE PUMP. KEEP HANDS, FEET, LIMBS, HAIR AND TOOLS AWAY FROM ROTATING PARTS TO PREVENT SERIOUS ACCIDENTS.

### 5.3 Cautions for Operation

Closed valve operation is not problematic to the pump if it is not operated for a prolonged period of time. Otherwise, the pump will overheat, or rattle, or vibrate. This can result from backward flow at the suction port.

Avoid closed valve operation as much as circumstances allow.

### 5.4 Operation

#### (1) Starting

- Open the valve if provided.
- Start motor

**Note:** A pump of lower shut off power than rated horsepower may be started with the valve closed.

In such case, open the valve within 1 minute after motor start.

 **CAUTION:** DO NOT RUN THE MOTOR IF REVERSE FLOW OCCURS.

#### (2) Stopping

- Stop motor (Turn off power)

**Note:** A pump of lower shut off power than rated horsepower may be stopped after the valve is closed.

### 5.5 Cautions During Operation

Pay attention to abnormal noise and vibration. If air or foreign matter enters the pump or if there is a change in the operating point, mis-operation or valve defect in the discharge lines, abnormal noise and vibration can occur. Pump discharge pressure can also vary greatly, or the current meter of the motor can vary suddenly during operation.

In such cases, immediately check to find the cause of these problems.

## 6. Maintenance & Service

While the life of the pump depends largely on the ambient conditions, daily servicing and inspection helps extend service life considerably. To achieve that, carry out the maintenance as follows:

### 6.1 Daily Checks

Check the following items at least once a week.

(4) Current

If the ammeter reading exceeds the motor rating listed on the data plate or is abnormally lower than usual, it is an indication of a problem.

(5) Voltage

Voltage should be within  $\pm 10\%$  of the rated value throughout operation.

(6) Vibration

Check for the abnormal vibrations and noise.

(7) Protective devices

Check protective devices by reading the panel indicator.

### 6.2 Monthly Checks

Check the following items at least once a month.

(1) Discharge pressure

Check pump discharge pressure and discharge flow rate (if flow meter is provided).

(2) Insulation resistance

Operation is safe as long as insulation resistance is more than  $1M\Omega$ . If the insulation resistance is still higher than  $1M\Omega$  but there is a sharp decline from a certain value, check the cables and/or overhaul is required.

### 6.3 Annual Checks

Even if there is nothing wrong with the pump under normal service condition, it should be lifted out and inspected at least once a year.

Particularly, when the pump is in use under severe conditions, such as where the liquid being handled contains sand or is corrosive, or oversized debris is pumped, inspect it as often as circumstances allow.

A recommended procedure for the inspection is outlined below. If the mechanical seal must be replaced or an overhaul is necessary as a result of the inspection, contact the nearest dealer, or EBARA directly.

**⚠ WARNING: BEFORE PULLING THE PUMP, DISCONNECT MOTOR CABLE AND ENSURE THAT THE PUMP IS ISOLATED FROM THE POWER SUPPLY.**

**⚠ WARNING: ALWAYS LIFT THE PUMP BY THE LIFTING LUGS, NEVER BY THE MOTOR CABLE.**

**⚠ WARNING:** WHEN LIFTING THE PUMP, USE AN APPROPRIATE CRANE (OR A HOIST) AND LIFT SYSTEM.  
CHECK POSITION AND TIGHTNESS OF LIFT SYSTEM SO THAT WEIGHT OF THE PUMP IS NOT UNBALANCED.  
FAILURE TO OBSERVE THIS PRECAUTION CAN RESULT IN SERIOUS ACCIDENTS.

### 6.3.1 Inspection Procedure

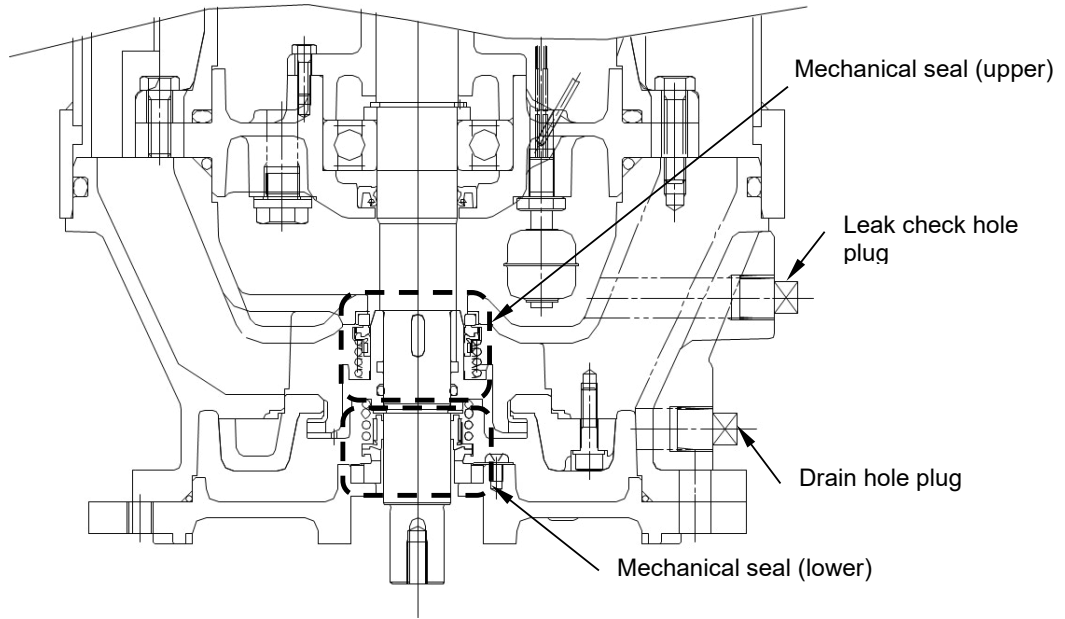
(1) Appearance check

Check the impeller, motor cable, bolts and nuts, external surface conditions for abnormal conditions.

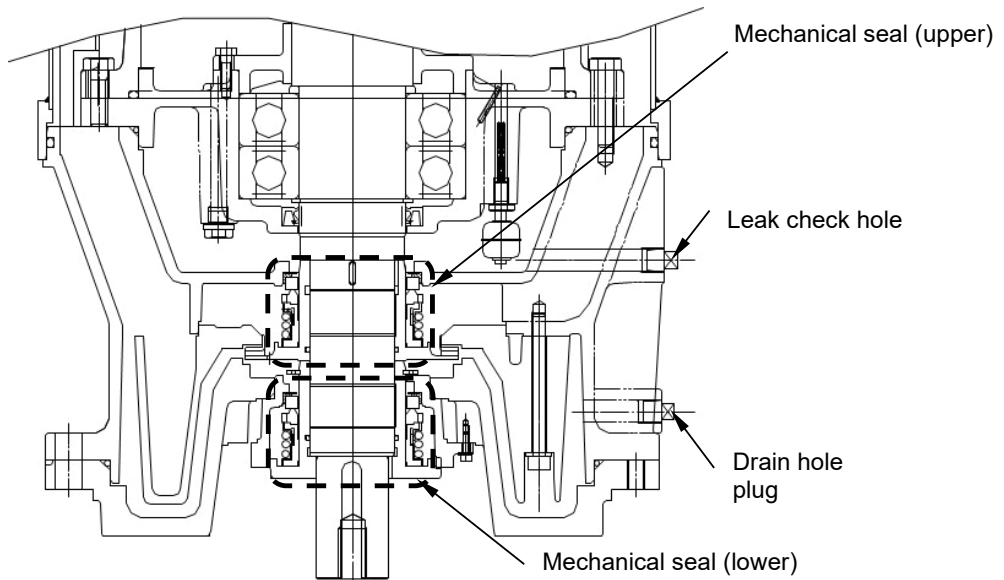
**⚠ CAUTION:** THE SEAL CHAMBER MAY BE UNDER PRESSURE. HOLD A RAG OVER THE PLUG TO PREVENT SPLATTER.

(2) Mechanical seal (upper)

- (a) Lift the pump out of the pump pit and stand it on the floor in a vertical position. Unplug “Leak check hole” in the intermediate casing of the pump.
- (b) If no liquid leaks from “Leak check hole”, the mechanical seal (upper) in Fig. 14 is in satisfactory condition.
- (c) If a very small quantity of any liquid leaks out, there is no concern. If any liquid, more than 1 liter (after one year or less of use) leaks out, the mechanical seal must be replaced.
- (d) If much liquid is emitted, the mechanical seal or other components may be damaged, and an overhaul is necessary.
- (e) When inspection is completed, wind seal tape to the plug, and tighten the plug.



2~5HP(1.5~3.7kW)



7.5~60HP(5.5~45kW)

Fig. 14

(3) Mechanical Seal (lower)

- (a) Unplug “Drain hole” (shown in Fig. 14) and drain all internal liquid (coolant or oil).  
When draining coolant, open “Air vent” (shown in Figs. 1 and 2)
- (b) If the drained liquid is muddy, it contains pumped liquid.  
The mechanical seal (lower) is in satisfactory condition as long as the internal liquid does not contain much pumped liquid. Otherwise, it must be replaced.
- (c) After the internal liquid has been inspected, pour fresh internal liquid (coolant or oil) based on paragraph 3.1.1. The amount is shown in Table 1 or 2.
- (d) Replug “Supply hole” as carefully as the other ports.
- (e) Replacing the upper and lower mechanical seal, the pump must be disassembled.  
After the mechanical seal has been replaced with a new one, reassemble the pump and supply the specified internal liquid as well. At this point, turn the rotating body by hand to ensure that it turns smoothly. Also, check for coolant leaks.

**⚠ WARNING:** USE CAUTION WHEN TURNING THE IMPELLER TO AVOID INJURY.

(4) Rotor

- (a) After checking the coolant, put your hand through the pump discharge and turn the impeller. Use caution when turning the impeller to avoid injury. If it turns smoothly, the rotating components should be in satisfactory condition.
- (b) If the impeller resists or feels locked, the pump requires an overhaul.

**6.4 Parts that will need to be replaced:**

Flamepath are not intended to be repaired, contact manufacture.

Replace the appropriate part when the following conditions are apparent.

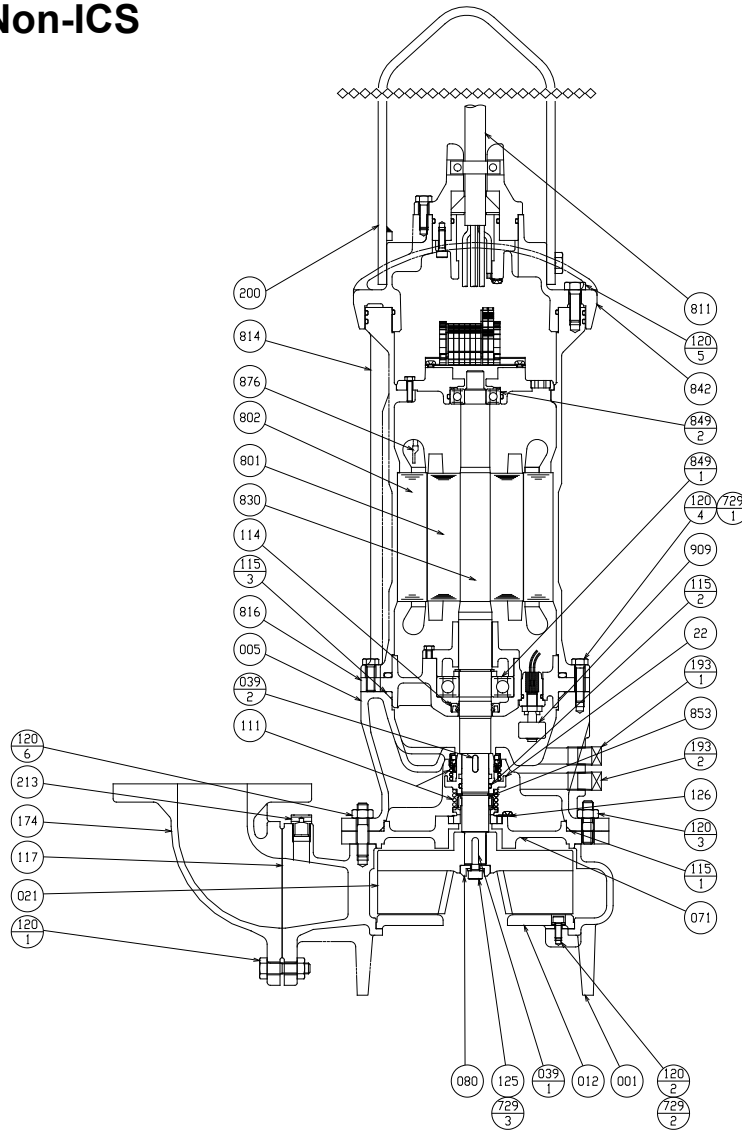
Replaceable Part	Mechanical Seal	Seal Washer	Internal Liquid (Coolant/Oil)	O-ring
Replacement guide	Whenever internal liquid is clouded	Whenever coolant is replaced or inspected	Whenever clouded or dirty	Whenever pump is overhauled
Frequency	Annually	Annually	Annually	Annually

Above replacement schedule is based on normal operating conditions.



**EBARA Submersible Sewage Pumps**  
**Operating, Installation, and Maintenance**

**2-5 HP Std. - Non-ICS**  
**(1.5-3.7 kW)**



Item Number	Part Name	Material		Qty per unit
001	Pump Casing	ASTM A48 CL 30	Cast Iron	1
005	Intermediate Casing	ASTM A48 CL 30	Cast Iron	1
012	Suction Cover	ASTM A48 CL 30	Cast Iron	1
021	Impeller	ASTM A48 CL 30	Cast Iron	1
022	ICS sleeve	CF-8	Stainless Steel	1
039-1	Key	AISI 420	Stainless Steel	1
039-2	Key	AISI 316	Stainless Steel	1
071	Side Plate	ASTM A48 CL 30	Cast Iron	1
080	Bushing	Steel	Steel	1
111	Mechanical Seal			1 set
114	Oil Seal			1
115-1	O-ring	NBR		1
115-2	O-ring	NBR		1
115-3	O-ring	NBR		1
117	Gasket			1
120-1	Bolt	AISI 304	Stainless Steel	4
120-2	Bolt	AISI 304	Stainless Steel	3
120-3	Bolt	AISI 304	Stainless Steel	4
120-4	Bolt	AISI 304	Stainless Steel	4
120-5	Bolt	AISI 304	Stainless Steel	4
120-6	Bolt	AISI 304	Stainless Steel	4
125	Bolt	AISI 304	Stainless Steel	1

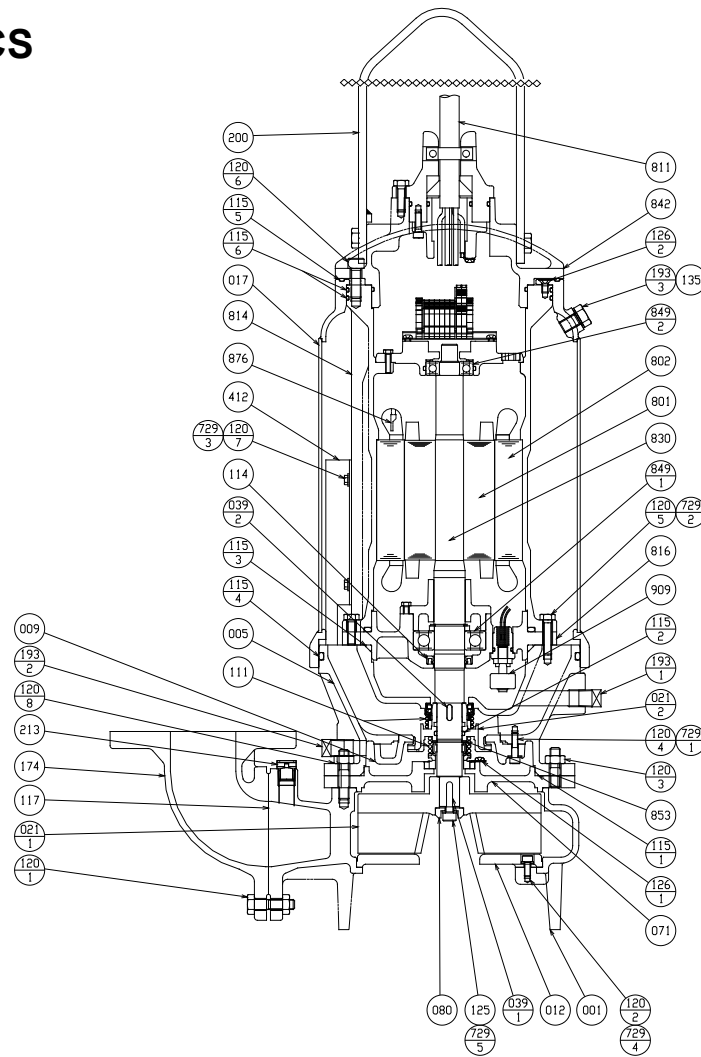
Item Number	Part Name	Material		Qty per unit
126	Screw	AISI 304	Stainless Steel	3
174	Discharge Elbow	ASTM A48 CL 30	Cast Iron	1
193-1	Plug	AISI 304	Stainless Steel	1
193-2	Plug	AISI 304	Stainless Steel	1
200	Lifting Hanger	AISI 304	Stainless Steel	1
213	Air Vent Valve	B36 No. 272	Brass	1
729-1	Spring Washer	AISI 304	Stainless Steel	4
729-2	Spring Washer	AISI 304	Stainless Steel	3
729-3	Spring Washer	AISI 304	Stainless Steel	1
801	Rotor			1
802	Stator			1
811	Submersible Cable			1
814	Motor Frame	ASTM A48 CL 30	Cast Iron	1
816	Power Side Bracket	ASTM A48 CL 30	Cast Iron	1
830	Shaft	AISI 403	Stainless Steel	1
842	Head Cover	ASTM A48 CL 30	Cast Iron	1
849-1	Ball Bearing			1
849-2	Ball Bearing			1
853	C-Type Snapp Ring			1
876	Thermal Protector			3
909	Leakage Detector			1



# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

### 2-5 HP Opt. - ICS (1.5-3.7 kW)



Item Number	Part Name	Material	Qty per unit
001	Pump Casing	ASTM A48 CL 30 Cast Iron	1
005	Intermediate Casing	ASTM A48 CL 30 Cast Iron	1
009	Inner Casing	ASTM A48 CL 30 Cast Iron	1
012	Suction Cover	ASTM A48 CL 30 Cast Iron	1
017	Cooling Jacket	CF-8 / AISI 304 Stainless Steel	1
021-1	Impeller	ASTM A48 CL 30 Cast Iron	1
021-2	Impeller	CF-8 Stainless Steel	1
039-1	Key	AISI 420 Stainless Steel	1
039-2	Key	AISI 316 Stainless Steel	1
071	Side Plate	ASTM A48 CL 30 Cast Iron	1
080	Bushing	Steel Steel	1
111	Mechanical Seal		1 set
114	Oil seal		1
115-1	O-ring	NBR	1
115-2	O-ring	NBR	1
115-3	O-ring	NBR	1
115-4	O-ring	NBR	1
115-5	O-ring	NBR	1
115-6	O-ring	NBR	2
117	Gasket		1
120-1	Bolt	AISI 304 Stainless Steel	4
120-2	Bolt	AISI 304 Stainless Steel	3
120-3	Bolt	AISI 304 Stainless Steel	4
120-4	Bolt	AISI 304 Stainless Steel	4
120-5	Bolt	AISI 304 Stainless Steel	4
120-6	Bolt	AISI 304 Stainless Steel	4
120-7	Bolt	AISI 304 Stainless Steel	8
120-8	Bolt	AISI 304 Stainless Steel	4

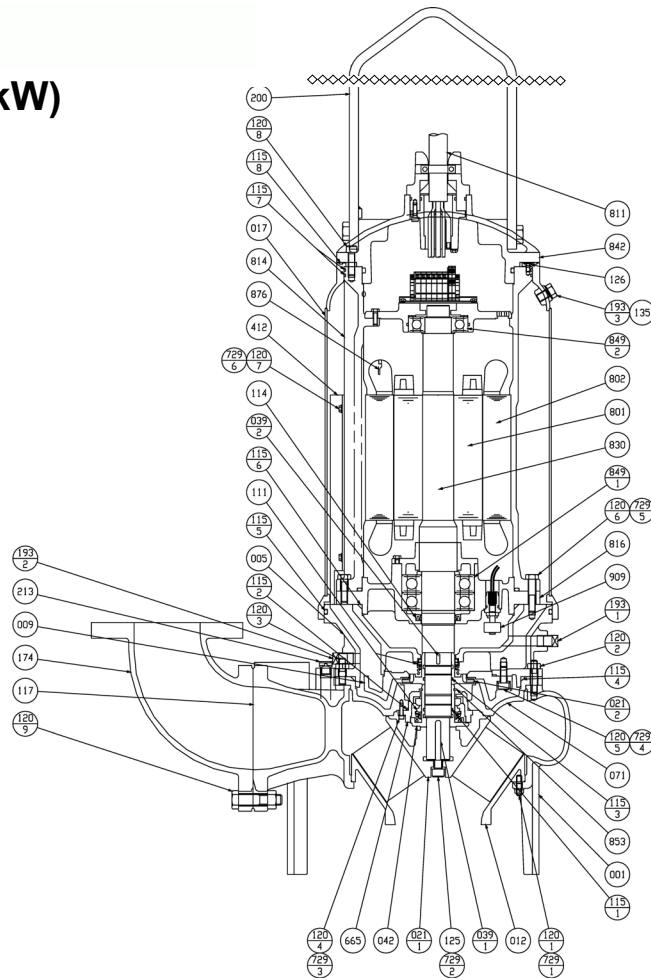
Item Number	Part Name	Material	Qty per unit
125	Bolt	AISI 304 Stainless Steel	1
126-1	Screw	AISI 304 Stainless Steel	3
126-2	Screw	AISI 304 Stainless Steel	4
135	Seal Washer		2
174	Discharge Elbow	ASTM A48 CL 30 Cast Iron	1
193-1	Plug	AISI 304 Stainless Steel	1
193-2	Plug	AISI 304 Stainless Steel	1
193-3	Plug	AISI 304 Stainless Steel	2
200	Lifting Hanger	AISI 304 Stainless Steel	1
213	Air Vent Valve	B36 No. 272 Brass	1
412	Guide Plate	AISI 304 Stainless Steel	4
729-1	Spring Washer	AISI 304 Stainless Steel	4
729-2	Spring Washer	AISI 304 Stainless Steel	4
729-3	Spring Washer	AISI 304 Stainless Steel	8
729-4	Spring Washer	AISI 304 Stainless Steel	3
729-5	Spring Washer	AISI 304 Stainless Steel	1
801	Rotor		1
802	Stator		1
811	Submersible Cable		1
814	Motor Frame	ASTM A48 CL 30 Cast Iron	1
816	Power Side Bracket	ASTM A48 CL 30 Cast Iron	1
830	Shaft	AISI 403 Stainless Steel	1
842	Head Cover	ASTM A48 CL 30 Cast Iron	1
849-1	Ball Bearing		1
849-2	Ball Bearing		1
853	C-Type Snapp Ring		1
876	Thermal Protector		3
909	Leakage Detector		1



# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

### 7.5-15, 25-30 HP (5.5-11, 18.5-22 kW)



Item Number	Part Name	Material		Qty per unit
001	Pump Casing	ASTM A48 CL 30	Cast Iron	1
005	Intermediate Casing	ASTM A48 CL 30	Cast Iron	1
009	Inner Casing	ASTM A48 CL 30	Cast Iron	1
012	Suction Cover	ASTM A48 CL 30	Cast Iron	1
017	Cooling Jacket	CF-8 / AISI 304	Stainless Steel	1
021-1	Impeller	ASTM A48 CL30*	Cast Iron or Ductile	1
021-2	Impeller	CF-8	Stainless Steel	1
039-1	Key	AISI 420	Stainless Steel	1
039-2	Key	AISI 316	Stainless Steel	1
042	ICS Sleeve	CF-8	Stainless Steel	1
071	Side Plate	ASTM A48 CL 30	Cast Iron	1
111	Mechanical Seal			1 set
114	Oil seal			1
115-1	O-ring	NBR		1
115-2	O-ring	NBR		1
115-3	O-ring	NBR		1
115-4	O-ring	NBR		1
115-5	O-ring	NBR		1
115-6	O-ring	NBR		1
115-7	O-ring	NBR		2
115-8	O-ring	NBR		1
117	Gasket			1
120-1	Bolt	AISI 304	Stainless Steel	4
120-2	Bolt	AISI 304	Stainless Steel	8
120-3	Bolt	AISI 304	Stainless Steel	4
120-4	Bolt	AISI 304	Stainless Steel	4
120-5	Bolt	AISI 304	Stainless Steel	4
120-6	Bolt	AISI 304	Stainless Steel	4
120-7	Bolt	AISI 304	Stainless Steel	8
120-8	Bolt	AISI 304	Stainless Steel	4

Item Number	Part Name	Material		Qty per unit
120-9	Bolt	AISI 304	Stainless Steel	4 or 6
125	Bolt	AISI 304	Stainless Steel	1
126	Screw	AISI 304	Stainless Steel	4
135	Seal Washer			2
174	Discharge Elbow	ASTM A48 CL 30	Cast Iron	1
193-1	Plug	AISI 304	Stainless Steel	1
193-2	Plug	AISI 304	Stainless Steel	1
193-3	Plug	AISI 304	Stainless Steel	2
200	Lifting Hanger	AISI 304	Stainless Steel	1
213	Air Vent Valve	B36 No. 272	Brass	1
412	Guide Plate	AISI 304	Stainless Steel	4
665	ICS Housing	ASTM A48 CL 30	Cast Iron	1
729-1	Spring Washer	AISI 304	Stainless Steel	4
729-2	Spring Washer	AISI 304	Stainless Steel	1
729-3	Spring Washer	AISI 304	Stainless Steel	4
729-4	Spring Washer	AISI 304	Stainless Steel	4
729-5	Spring Washer	AISI 304	Stainless Steel	4
729-6	Spring Washer	AISI 304	Stainless Steel	8
801	Rotor			1
802	Stator			1
811	Submersible Cable			1
814	Motor Frame	ASTM A48 CL 30	Cast Iron	1
816	Power Side Bracket	ASTM A48 CL 30	Cast Iron	1
830	Shaft	AISI 403	Stainless Steel	1
842	Head Cover	ASTM A48 CL 30	Cast Iron	1
849-1	Ball Bearing			1
849-2	Ball Bearing			1
853	C-Type Snapp Ring			1
876	Thermal Protector			3
909	Leakage Detector			1

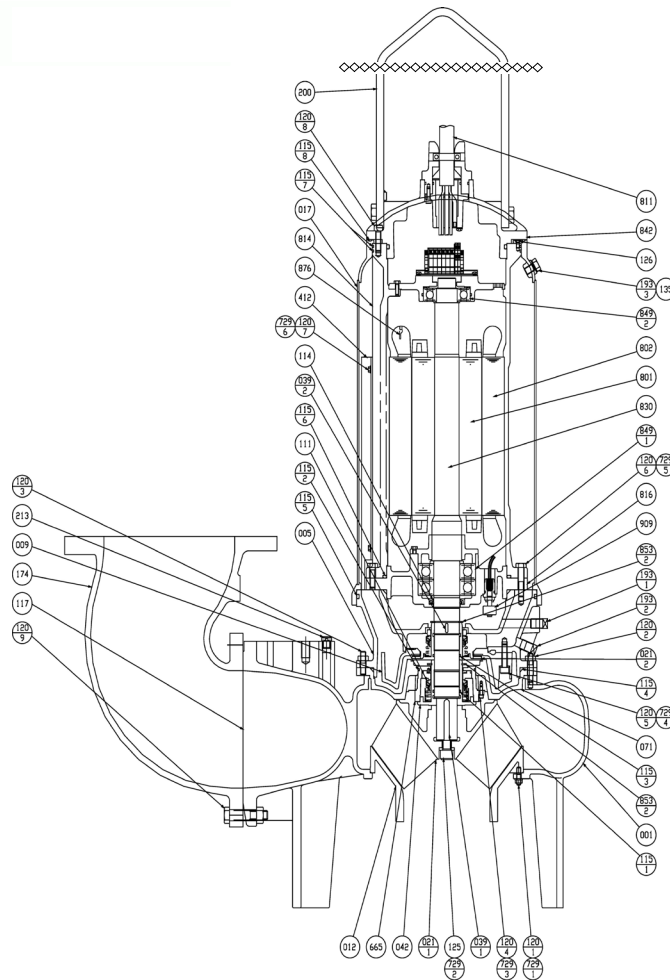
\*Some models are constructed from: ASTM A48 CL 35 or ASTM A536 (Ductile)



# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

### 20HP (15 kW)



Item Number	Part Name	Material	Qty per unit
001	Pump Casing	ASTM A48 CL 30 Cast Iron	1
005	Intermediate Casing	ASTM A48 CL 30 Cast Iron	1
009	Inner Casing	ASTM A48 CL 30 Cast Iron	1
012	Suction Cover	ASTM A48 CL 30 Cast Iron	1
017	Cooling Jacket	CF-8 / AISI 304 Stainless Steel	1
021-1	Impeller	ASTM A536 60-40-15* Cast Iron or Ductile	1
021-2	Impeller	CF-8 Stainless Steel	1
039-1	Key	AISI 420 Stainless Steel	1
039-2	Key	AISI 316 Stainless Steel	1
042	ICS Sleeve	CF-8 Stainless Steel	1
071	Side Plate	ASTM A48 CL 30 Cast Iron	1
111	Mechanical Seal		1 set
114	Oil seal		1
115-1	O-ring	NBR	1
115-2	O-ring	NBR	1
115-3	O-ring	NBR	1
115-4	O-ring	NBR	1
115-5	O-ring	NBR	1
115-6	O-ring	NBR	1
115-7	O-ring	NBR	2
115-8	O-ring	NBR	1
117	Gasket		1
120-1	Bolt	AISI 304 Stainless Steel	4
120-2	Bolt	AISI 304 Stainless Steel	8
120-3	Bolt	AISI 304 Stainless Steel	4
120-4	Bolt	AISI 304 Stainless Steel	4
120-5	Bolt	AISI 304 Stainless Steel	4
120-6	Bolt	AISI 304 Stainless Steel	4
120-7	Bolt	AISI 304 Stainless Steel	8
120-8	Bolt	AISI 304 Stainless Steel	4
120-9	Bolt	AISI 304 Stainless Steel	4 or 6

Item Number	Part Name	Material	Qty per unit
125	Bolt	AISI 304 Stainless Steel	1
126	Screw	AISI 304 Stainless Steel	4
135	Seal Washer		2
174	Discharge Elbow	ASTM A48 CL 30 Cast Iron	1
193-1	Plug	AISI 304 Stainless Steel	1
193-2	Plug	AISI 304 Stainless Steel	1
193-3	Plug	AISI 304 Stainless Steel	2
200	Lifting Hanger	AISI 304 Stainless Steel	1
213	Air Vent Valve	B36 No. 272 Brass	1
412	Guide Plate	AISI 304 Stainless Steel	4
665	ICS Housing	ASTM A48 CL 30 Cast Iron	1
729-1	Spring Washer	AISI 304 Stainless Steel	4
729-2	Spring Washer	AISI 304 Stainless Steel	1
729-3	Spring Washer	AISI 304 Stainless Steel	4
729-4	Spring Washer	AISI 304 Stainless Steel	4
729-5	Spring Washer	AISI 304 Stainless Steel	4
729-6	Spring Washer	AISI 304 Stainless Steel	8
801	Rotor		1
802	Stator		1
811	Submersible Cable		1
814	Motor Frame	ASTM A48 CL 30 Cast Iron	1
816	Power Side Bracket	ASTM A48 CL 30 Cast Iron	1
830	Shaft	AISI 403 Stainless Steel	1
842	Head Cover	ASTM A48 CL 30 Cast Iron	1
849-1	Ball Bearing		1
849-2	Ball Bearing		1
853-1	C-Type Snapp Ring		1
853-2	C-Type Snapp Ring		1
876	Thermal Protector		3
910	Leakage Detector		2

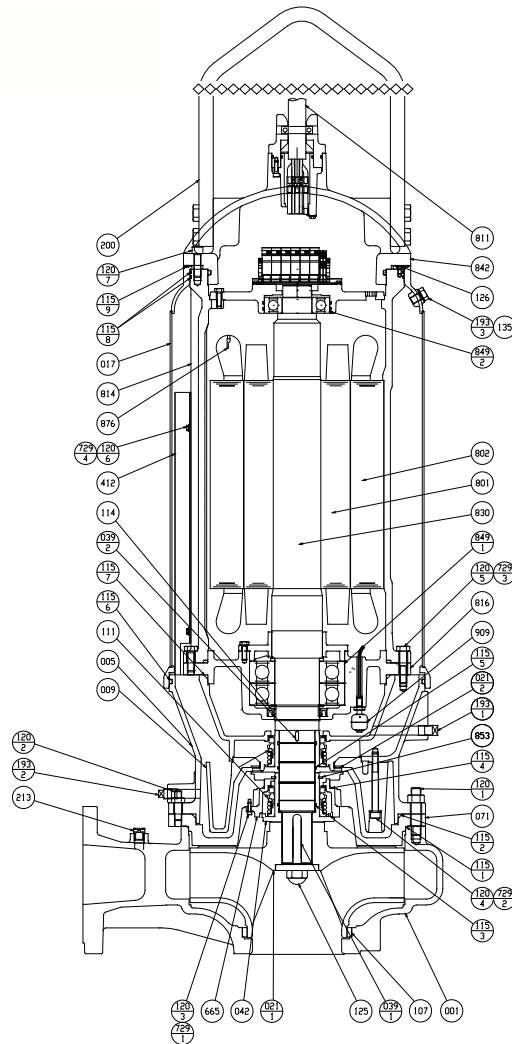
\*Model 250DL3BFU615: ASTM A48 CL 35



# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

**40-60 HP (30-45 kW)**  
**100DL3FU ONLY**



Item Number	Part Name	Material	Qty per unit
001	Pump Casing	ASTM A48 CL 30 Cast Iron	1
005	Intermediate Casing	ASTM A48 CL 30 Cast Iron	1
009	Inner Casing	ASTM A48 CL 30 Cast Iron	1
017	Cooling Jacket	CF-8 / AISI 304 Stainless Steel	1
021-1	Impeller	ASTM A536 70-50-05 Ductile Cast Iron	1
021-2	Impeller	CF-8 Stainless Steel	1
039-1	Key	AISI 420 Stainless Steel	1
039-2	Key	AISI 316 Stainless Steel	1
042	ICS Sleeve	CF-8 Stainless Steel	1
071	Side Plate	ASTM A48 CL 30 Cast Iron	1
107	Wearing Ring	CAC406 Bronze	1
111	Mechanical Seal		1 set
114	Oil seal		1
115-1	O-ring	NBR	1
115-2	O-ring	NBR	1
115-3	O-ring	NBR	1
115-4	O-ring	NBR	1
115-5	O-ring	NBR	1
115-6	O-ring	NBR	1
115-7	O-ring	NBR	1
115-8	O-ring	NBR	2
115-9	O-ring	NBR	1
120-1	Bolt	AISI 304 Stainless Steel	8
120-2	Bolt	AISI 304 Stainless Steel	4
120-3	Bolt	AISI 304 Stainless Steel	4
120-4	Bolt	AISI 304 Stainless Steel	4
120-5	Bolt	AISI 304 Stainless Steel	4
120-6	Bolt	AISI 304 Stainless Steel	8

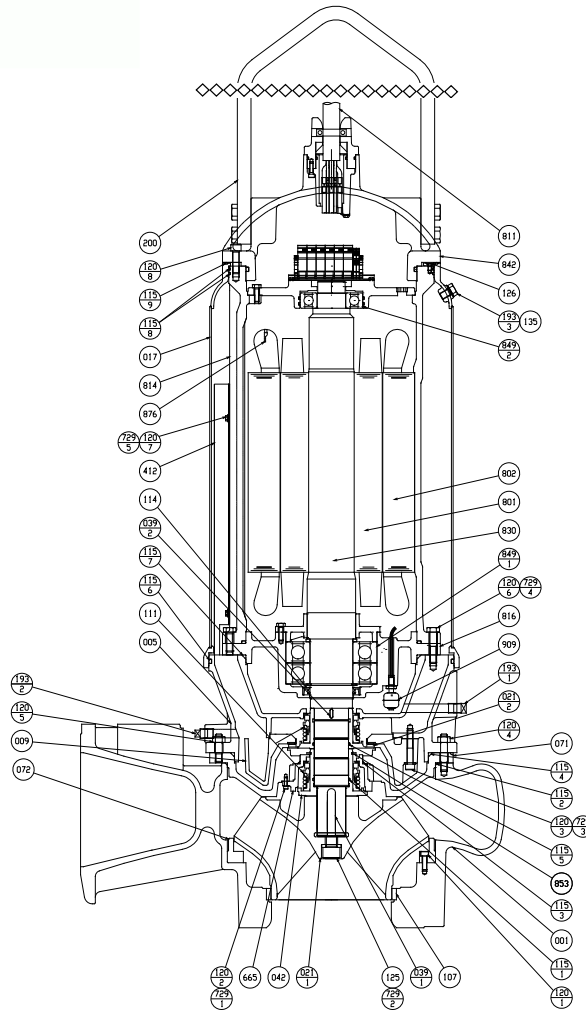
Item Number	Part Name	Material	Qty per unit
120-7	Bolt	AISI 304 Stainless Steel	4
125	Bolt	AISI 304 Stainless Steel	1
126	Screw	AISI 304 Stainless Steel	4
135	Seal Washer		2
193-1	Plug	AISI 304 Stainless Steel	1
193-2	Plug	AISI 304 Stainless Steel	1
193-3	Plug	AISI 304 Stainless Steel	2
200	Lifting Hanger	AISI 304 Stainless Steel	1
213	Air Vent Valve	B36 No. 272 Brass	1
412	Guide Plate	AISI 304 Stainless Steel	4
665	ICS Housing	ASTM A48 CL 30 Cast Iron	1
729-1	Spring Washer	AISI 304 Stainless Steel	4
729-2	Spring Washer	AISI 304 Stainless Steel	4
729-3	Spring Washer	AISI 304 Stainless Steel	4
729-4	Spring Washer	AISI 304 Stainless Steel	8
801	Rotor		1
802	Stator		1
811	Submersible Cable		1
814	Motor Frame	ASTM A48 CL 30 Cast Iron	1
816	Power Side Bracket	ASTM A48 CL 30 Cast Iron	1
830	Shaft	AISI 403 Stainless Steel	1
842	Head Cover	ASTM A48 CL 30 Cast Iron	1
849-1	Ball Bearing		1
849-2	Ball Bearing		1
853	C-Type Snapp Ring		1
876	Thermal Protector		3
909	Leakage Detector		1



# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

**40-60 HP (30-45 kW)**  
**150-300DL3FU**



Item Number	Part Name	Material		Qty per unit
001	Pump Casing	ASTM A48 CL 30	Cast Iron	1
005	Intermediate Casing	ASTM A48 CL 30	Cast Iron	1
009	Inner Casing	ASTM A48 CL 30	Cast Iron	1
017	Cooling Jacket	CF-8 / AISI 304	Stainless Steel	1
021-1	Impeller	ASTM A536 70-50-05	Ductile Cast Iron	1
021-2	Impeller	CF-8	Stainless Steel	1
039-1	Key	AISI 420	Stainless Steel	1
039-2	Key	AISI 316	Stainless Steel	1
042	ICS Sleeve	CF-8	Stainless Steel	1
071	Side Plate	ASTM A48 CL 30	Cast Iron	1
072	Side Ring	ASTM A48 CL 25	Cast Iron	1
107	Wearing Ring	CAC406	Bronze	1
111	Mechanical Seal			1 set
114	Oil seal			1
115-1	O-ring	NBR		1
115-2	O-ring	NBR		1
115-3	O-ring	NBR		1
115-4	O-ring	NBR		1
115-5	O-ring	NBR		1
115-6	O-ring	NBR		1
115-7	O-ring	NBR		1
115-8	O-ring	NBR		2
115-9	O-ring	NBR		1
120-1	Bolt	AISI 304	Stainless Steel	4
120-2	Bolt	AISI 304	Stainless Steel	4
120-3	Bolt	AISI 304	Stainless Steel	4
120-4	Bolt	AISI 304	Stainless Steel	8
120-5	Bolt	AISI 304	Stainless Steel	4
120-6	Bolt	AISI 304	Stainless Steel	4

Item Number	Part Name	Material		Qty per unit
120-7	Bolt	AISI 304	Stainless Steel	8
120-8	Bolt	AISI 304	Stainless Steel	4
125	Bolt	AISI 304	Stainless Steel	1
126	Screw	AISI 304	Stainless Steel	4
135	Seal Washer			2
193-1	Plug	AISI 304	Stainless Steel	1
193-2	Plug	AISI 304	Stainless Steel	1
193-3	Plug	AISI 304	Stainless Steel	2
200	Lifting Hanger	AISI 304	Stainless Steel	1
412	Guide Plate	AISI 304	Stainless Steel	4
665	ICS Housing	ASTM A48 CL 30	Cast Iron	1
729-1	Spring Washer	AISI 304	Stainless Steel	4
729-2	Spring Washer	AISI 304	Stainless Steel	1
729-3	Spring Washer	AISI 304	Stainless Steel	4
729-4	Spring Washer	AISI 304	Stainless Steel	4
729-5	Spring Washer	AISI 304	Stainless Steel	8
801	Rotor			1
802	Stator			1
811	Submersible Cable			1
814	Motor Frame	ASTM A48 CL 30	Cast Iron	1
816	Power Side Bracket	ASTM A48 CL 30	Cast Iron	1
830	Shaft	AISI 403	Stainless Steel	1
842	Head Cover	ASTM A48 CL 30	Cast Iron	1
849-1	Ball Bearing			1
849-2	Ball Bearing			1
853	C-Type Snapp Ring			1
876	Thermal Protector			3
909	Leakage Detector			1



# EBARA Submersible Sewage Pumps

## Operating, Installation, and Maintenance

### 7. Troubleshooting

Symptoms	Probable Causes	Remedies
Pump fails to start	<ul style="list-style-type: none"> <li>○ Defective cable or motor.</li> <li>○ Malfunction inside control panel.</li> <li>○ Power source trouble.</li> <li>○ Pump is mechanically locked.</li> <li>○ Defective motor protector.</li> </ul>	<ul style="list-style-type: none"> <li>○ Lift pump and replace cable or motor.</li> <li>○ Inspection made by competent electrician.</li> <li>○ Inspection made by competent electrician.</li> <li>○ Lift pump and inspect and/or overhaul.</li> <li>○ Replace protector.</li> </ul>
Pump fails to function despite motor operation	<ul style="list-style-type: none"> <li>○ System head too high.</li> <li>○ Clogged discharge pipe (Pressure too high).</li> <li>○ Clogged pump or strainer (Pressure too low).</li> <li>○ Wrong direction rotation.</li> <li>○ Internal pump wear.</li> <li>○ Discharge valve is closed.</li> </ul>	<ul style="list-style-type: none"> <li>○ Recheck requirements.</li> <li>○ Clean discharge pipe.</li> <li>○ Clean strainer or impeller and casing.</li> <li>○ Check and change rotation. Transpose two of three phase leads at panel.</li> <li>○ Repair and/or replace.</li> <li>○ Check valve operation.</li> </ul>
Insufficient capacity	<ul style="list-style-type: none"> <li>○ Air suction.</li> <li>○ System head too high.</li> <li>○ Clogged discharge pipe. (Pressure too high)</li> <li>○ Clogged pump or strainer. (Pressure too low)</li> <li>○ Air accumulation in pipe.</li> <li>○ Internal pump wear.</li> <li>○ Wrong direction rotation.</li> <li>○ Liquid viscosity different from design value.</li> <li>○ Damaged impeller.</li> </ul>	<ul style="list-style-type: none"> <li>○ Raise water level in pump pit.</li> <li>○ Recheck requirements.</li> <li>○ Clean discharge pipe.</li> <li>○ Clean strainer, impeller and casing.</li> <li>○ Install air vent valve.</li> <li>○ Repair and/or replace.</li> <li>○ Check and change rotation. Transpose two of three phase leads at panel.</li> <li>○ Recheck requirements.</li> <li>○ Repair and/or replace.</li> </ul>
Excessive current	<ul style="list-style-type: none"> <li>○ Gravity of pumped liquid greater than that specified.</li> <li>○ Sand mixed with water.</li> <li>○ Foreign matter clogging the pump</li> <li>○ Refer to “Pump fails to start”</li> </ul>	<ul style="list-style-type: none"> <li>○ Change pump unit.</li> <li>○ Lift pump and overhaul. Remove sand in tank.</li> <li>○ Remove foreign matter.</li> </ul>
Vibration and/or noise	<ul style="list-style-type: none"> <li>○ Internal pump wear.</li> <li>○ Clogged pump.</li> <li>○ Cavitation or vortex.</li> <li>○ Resonance in pipeline or foundation.</li> <li>○ Rotating component in contact with fixed component.</li> <li>○ Damaged impeller.</li> </ul>	<ul style="list-style-type: none"> <li>○ Repair and/or replace.</li> <li>○ Clean pump.</li> <li>○ Raise suction water level. Operate at proper flow rate.</li> <li>○ Repair to change characteristic vibration.</li> <li>○ Internal pump check. Repair and/or replace.</li> <li>○ Repair and/or replace.</li> </ul>

NPCOL1:8326703.2-KEY-(MAM) 029827-00000





## PUMP START-UP REPORT

**WARRANTY VOID IF NOT COMPLETED AND MAILED TO  
EBARA INTERNATIONAL CORPORATION WITHIN 30 DAYS OF START-UP**

Date: \_\_\_\_\_ Job Name: \_\_\_\_\_

Contractor: \_\_\_\_\_ Signature: \_\_\_\_\_

Design Conditions: \_\_\_\_\_ GPM @: \_\_\_\_\_ TDH

Pump Model: \_\_\_\_\_ HP: \_\_\_\_\_ Voltage:  208/230  460 please select voltage below: AB AC BC

Pump Serial No.: #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3 \_\_\_\_\_

Control Manufacture: \_\_\_\_\_ Heater Size: \_\_\_\_\_

GRD Connected: \_\_\_\_\_ Alternator Tested \_\_\_\_\_

Megger Check: #1 \_\_\_\_\_ Red \_\_\_\_\_ White \_\_\_\_\_ Black \_\_\_\_\_  
 #2 \_\_\_\_\_ Red \_\_\_\_\_ White \_\_\_\_\_ Black \_\_\_\_\_ { To Ground  
 #3 \_\_\_\_\_ Red \_\_\_\_\_ White \_\_\_\_\_ Black \_\_\_\_\_

Resistance Check: #1 \_\_\_\_\_ RW \_\_\_\_\_ RB \_\_\_\_\_ WB \_\_\_\_\_  
 #2 \_\_\_\_\_ RW \_\_\_\_\_ RB \_\_\_\_\_ WB \_\_\_\_\_ { Rated \_\_\_\_\_  
 #3 \_\_\_\_\_ RW \_\_\_\_\_ RB \_\_\_\_\_ WB \_\_\_\_\_

Amperage Check: #1 \_\_\_\_\_ A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_  
 #2 \_\_\_\_\_ A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ {FL Amps \_\_\_\_\_  
 #3 \_\_\_\_\_ A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_

Performance Test: #1 \_\_\_\_\_ GPM@ \_\_\_\_\_ TDH \_\_\_\_\_  
 #2 \_\_\_\_\_ GPM@ \_\_\_\_\_ TDH \_\_\_\_\_ Water Level \_\_\_\_\_  
 #3 \_\_\_\_\_ GPM@ \_\_\_\_\_ TDH \_\_\_\_\_

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Check oil <input type="checkbox"/></li> <li>2. Sensor cable connected <input type="radio"/> yes <input type="radio"/> no</li> <li>3. Check moisture sensor <input type="radio"/> closed <input type="radio"/> open</li> <li>4. Check thermal sensor <input type="radio"/> closed <input type="radio"/> open</li> <li>5. Check rotation <input type="checkbox"/></li> <li>6. Guide Rails <input type="radio"/> Plumb <input type="radio"/> Secured</li> <li>7. Station clean of debris <input type="checkbox"/></li> </ol> | <ol style="list-style-type: none"> <li>8. Check valves for proper operation <input type="checkbox"/></li> <li>9. Pump seated properly <input type="checkbox"/></li> <li>10. Check for leaks in piping <input type="checkbox"/></li> <li>11. Flow meter <input type="checkbox"/></li> <li>12. Pressure gauge <input type="checkbox"/></li> <li>13. Ebara Capacitor pack or equivalent (1ø only) <input type="checkbox"/></li> </ol> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
- Relay # \_\_\_\_\_  
Start Cap MFD \_\_\_\_\_  
Run Cap MFD \_\_\_\_\_

Comments \_\_\_\_\_

I certify this report to be accurate (please sign): \_\_\_\_\_

Official Start Date: \_\_\_\_\_ Report Date: \_\_\_\_\_





EBARA Pumps Americas Corporation  
Corporate Headquarters

1651 Cedar Line Drive, Rock Hill, South Carolina 29730 USA  
P: (803) 327-5005 F: (803) 327-5097 www.pumpsebara.com

**Industrial/Standard Warranty**

**Industrial/Standard warranty is 12 months from startup or 18 months from purchase, which ever shall occur first.**

**All pumps returned for evaluation found to be NON-Warranty will be assessed a labor charge of \$55.00.**

**\*NOTICE- REQUIREMENTS HAVE CHANGED\***

- This form must be filled out in detail and returned to EBARA Pumps Americas Corporation before an RMA can be issued.
- All Industrial Service Pump Evaluation Forms must have an MSDS Sheet provided with this completed form before an RMA can be issued.
- All pumps used in **“Industrial Service Applications”** that are returned for evaluation must have an M.S.D.S Sheet securely attached to the exterior of the package, **NO EXCEPTIONS.**
- All pumps used in “Sewage Applications” are excluded from the above requirement regarding MSDS sheets.
- **\*\*\*\*\* NOTE \*\*\*\*\*** When returning product(s) to EBARA that have been used in **sewage applications**, be sure to clean and disinfect pumps or parts thoroughly with a solution of 25% Bleach and repackage securely so no further damage will occur.
- **On the exterior of packaging, please note: “Pump Has Been Disinfected”.**
- All returns shall have an RMA number clearly written on exterior of packaging with a copy of the RMA paperwork inside the package.
- **Failure to follow the above instructions will result in your shipment being refused and returned to Distributor, at the Distributor’s expense.**

Today’s Date: \_\_\_\_\_  
 Date of Start Up: \_\_\_\_\_  
 Date of Failure: \_\_\_\_\_  
 Pump Model: \_\_\_\_\_  
 Serial No. \_\_\_\_\_  
 HP: \_\_\_\_\_ Voltage: \_\_\_\_\_ Operating Conditions: Head \_\_\_\_\_  
 Flow \_\_\_\_\_  
 Application: \_\_\_\_\_  
 Distributor Name (who was the pump purchased from?): \_\_\_\_\_  
 Dist. original P.O.# \_\_\_\_\_  
 Distributor Contact Name: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Email: \_\_\_\_\_

Detailed Description of Failure:

---



---



---



---