

Operating & Maintenance Manual

JEC JCP Series

Centrifugal Pumps



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* *Operating Principle*

A. Safety



This symbol indicates those safety instructions contained in this manual which when not followed could jeopardize your safety



This symbol indicates potential problems with electrical safety.



This symbol indicates a compulsory measure to be taken by the user in compliance with specific instructions which serve to guarantee operating safety and/or protection of the pump.

SAFETY

Symbols

It is absolutely necessary to place symbols on the pump, e.g., arrows which indicate the direction of rotation or other symbols indicating connections to fluids. All of these symbols should be clearly visible and legible.

Training and experience

The personnel who are responsible for the operation, maintenance, inspection and assembly of the equipment should have the proper experience and training. The scope of their responsibilities and the supervision of the operators should be specifically defined by the plant foreman.

If the operators did not have the required knowledge, they should be trained, which could be done by the manufacturer of the machine or by the supplier on behalf of the shop foreman.

Furthermore, the shop foreman should make sure that the contents of the instruction manual are fully understood by the operators.

In accordance with the instructions

Any failure to comply with the instructions could lead to a hazard for the operators, the atmospheric conditions of the room, and the machine, and it could lead to a loss to any right to make a claim for damages.

Such non-compliance could bring with it the following risks:

- Important operating failures of the machine / plant.
- Failure to comply with specific maintenance and repair procedures.
- Potential electrical, mechanical and chemical hazards.
- Atmospheric conditions in the room could be hazardous due to the release of chemical substances.

In accordance with the regulations governing safety at work

The instructions contained in this manual should be followed for operating the pump, along with national regulations and any other service and safety instructions made available by the shop foreman, so as to avoid accidents.

Safety instructions for handling

If the machine's components, whether in a cold or warm state, constitute some hazard, then accidental contact with the same should be avoided.

When the machine is operating, be sure that the rotating parts are protected by a shield.

In the event of a fire (e.g., mechanical seal) or hazardous fluids (e.g., explosives, toxic agents, hot products), the machine should be emptied to prevent any risk to persons or to the ambient conditions. Existing regulations should be strictly adhered to. Avoid any hazard which could be produced by the electrical circuits (e.g.: VDE specifications and regulations on the supply of local energy services).

Safety instructions for maintenance, inspection and assembly

It is the shop foreman's responsibility to see to it that maintenance, inspection and assembly work is performed by qualified personnel once they have become familiar with the subject; they should read this manual very carefully.

Work should only be done on this machine when it is stopped; it is extremely important that the procedure for stopping the machine be followed as set forth in this manual. Those pumps should be de-contaminated which may contain hazardous agents. Upon completion of the work, re-install the safety and protection devices. Prior to re-initiating the operation of the machine, the instructions given in the chapter on "Operating Principles" should be read.

Changes without prior authorization and production of spare parts

No modification can be made to the machine without the prior consent of the manufacturer. For your safety, use spare parts and accessories authorized by the manufacturer.

The use of other parts exempts the manufacturer from any and all responsibility.

Unauthorized operations

The machine's safety is only ensured if it is used properly in accordance with the instructions given in this manual.



The limits for values specified in the data sheet cannot be exceeded under any circumstances.

Any change in operating conditions can only be done with the prior written consent of JEC.

WARRANTY

We wish to point out that any warranty issued will be null and void and that we are entitled to an indemnity for any civil liability claim for products which might be filed by third parties if:

- operation and maintenance work has not been done following the corresponding instructions; the repairs have not been made by our personnel or have been made without our written authorization;
- modifications are made to our material without prior written authorization;
- the parts or lubricants used are not original JEC parts/lubricants;
- the material has been improperly used due to error or negligence or have not been used according to the indications and the intended purpose.

The General Delivery Terms which you have already received are also applicable.

Think Safety

1. Do not operate the pump with safety devices (if fitted) or guards removed.
2. Only qualified personnel should operate this pump.
3. Do not start the pump until all personnel are clear.
4. Never attempt to carry out service or maintenance procedures whilst the pump is in motion.
5. Do not run the pump with the Front Cover removed.
6. Before any work is carried out on the pump, the power to the prime mover must be isolated and suitable precautions taken to ensure the power is not restored until it is safe to do so.
7. Ensure that no internal pressure exists within the pumping chamber or inter-connecting pipe-work before carrying out any maintenance work.



The field of application for each type of pump is limited. The pump was selected for certain pumping conditions at the time that the order was passed. JEC assumes no responsibility for damages that may arise in the event that the information made available by the purchaser is incomplete (nature of the liquid, viscosity, r.p.m. ...).

Do not use the pump for applications other than those for which it has been specified on purchase and installation. No modifications can be made without previously consulting with JEC and without the latter's written consent. A correct application shall take into account the following: the viscosity of the product, its properties, purity, temperature, suction and discharge pressure, r.p.m. ...

When the pump is used in a pumping unit or in an environment for which the pump has not been designed, the operator and the material may be exposed to hazard. Consult JEC in case of doubt prior to use.

WARNING The following limits ought to be considered for the:

- **Flushing:** flow 2,5 - 5 l/min.
pressure max. 0,5 bar
- **Elastomers**
 - EPDM: temperature max. 130 °C
 - VITON: temperature max. 180 °C
 - NBR: temperature max. 100 °C
 - PTFE: temperature max. 180 °C

- Place the pump so that the motor is properly ventilated. Prepare the motor to be started according to the instructions provided by its manufacturer.



A suitable connection should be used when inflammable or explosive liquids are pumped. Connect the components of the unit with grounding jumpers in order to reduce the danger from static electricity.

Use explosion-proof motors in accordance with local regulations. Provide suitable coupling guards and suitable couplings.

- Depending on the fluid to be pumped, high temperatures can be reached inside and around

the pump.



Over 70°C, the operator should take protective measures and place warning notices advising of the danger which exists if the pump is touched.

The type of protection selected should not isolate the pump entirely. It should allow for the bearings to be cooled more efficiently and for the bearings to be lubricated.

- Prior to connecting an electric motor to the power supply, check local regulations on electrical safety and also refer to the EN 60204-1 standard.



Let qualified personnel perform the connection of electrical motors. Take the necessary steps to prevent faults in the connections and wiring.

- In order to work on the pump without hazards, an automatic breaker should be installed as close as possible to the pump. The use of a grounding switch is also recommended.



The pumps switchgear should comply with current regulations, as set forth in the EN 60204-1 standard on electrical safety.

- In order to protect the motor from overloads and short circuits, the use of thermal or magnetic relays is recommended. Adjust these relays to maximum rated current values as indicated on the data plate of the motor.
- Consult the supplier's instructions prior to connecting the motor to the power supply. For single-phase motors, use motors with an increased starting torque. Ensure a starting torque which is sufficiently high for motors controlled by a frequency converter, and provide for adequate cooling at low speeds. If necessary, install an independent fan.



The electrical equipment, the terminals and the control system components can continue to carry current when disconnected. Any contact with them can endanger the safety of the operators or cause irreparable damage to the material.

Start-up Check List



If the pump is supplied without a drive, the purchaser/user is responsible for the pump's start-up and assembly.

1. Check that piping and pump are clean and free of foreign material, such as welding slag, gaskets, etc. Do not use pump to flush system.
2. Check to see that pump and drive are tight and leak-free. Where possible, check system with "non-hazardous" fluid.
3. Check that all guards are in place and secure.
4. Check direction of pump and drive rotation (jogging is recommended).
5. Start pump drive. Where possible, start at slow speed, or jog.
6. Check the electrical supply to see that it matches the motor nameplate rating.
7. In case of a seal flush: start the flush media flowing and adjust pressure and flow.

8. If the liquid does not flow into the pump, fill it with the liquid to be pumped.



The pump should never rotate when empty. Provide flushing if necessary.



“Do not rotate the shafts with the cover removed. Impeller and housing could be damaged.”

Recommended Preventive Maintenance

Note) Inspection and maintenance

1. Our JCP series we supply is provided with a seal which has been validated to demonstrate that there is no migration past the seal under the intended conditions of use and The European Hygienic Engineering and Design Group (EHEDG) test for bacterial tightness approves the determining migration past the seal.
2. The seal for JCP series is designed so it is capable of being maintained bacterially tight. Also, enclosed threads are cleanable and drainable.
3. We recommend inspect and maintenance periodically (at least once in a month) seal and the enclosed threads. If dust or particle is founded, clean them thoroughly by brushing or water or replace the seal or the enclosed thread if impossible to be cleanable.

Contents

Thank you for purchasing a JEC Product!

This manual contains disassembly and assembly instructions, maintenance procedures, troubleshooting and a complete parts list for all JCP series Centrifugal Pumps designed and manufactured by JEC Ltd. South Korea.

READ THIS MANUAL carefully to learn how to service these pumps. Failure to do so could result in person injury or equipment damage.

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SAFETY

DO'S & DON'TS

- DO** read and understand these instructions before installing or using the pump.
- DO** use JES spare parts when replacing a component of the pump.
- DO NOT** services the pump while it is running.
- DO NOT** place the pump in an application where the service ratings are exceed.
- DO NOT** modifies the pump. Modifying the pump creates unsafe conditions and voids all warranties.

SAFETY PRECAUTIONS WHEN INSTALLING PUMP

- DO** use an authorized electrician when connecting the pump.
- DO** observe the mechanical limits of the pump (refer to the pump performance sheet).
- DO** install a throttling valve in the discharge line.
- DO NOT** installs a throttling valve in the suction line.

SAFETY PRECAUTIONS WHEN OPERATING PUMP

- DO NOT** touches the pump or the lines when pumping hot fluids or when performing Clean In Place (CIP) procedures.
- DO NOT** run the pump with BOTH the suction inlet and discharge outlet blocked. Running the pump with the inlet the blocked will cause serious damage to the pump.
- DO NOT** checks pump rotation with liquid in the pump.
- DO NOT** runs the pump with the impeller rotating in the wrong direction. Rotating the impeller in the wrong direction may cause damage to the pump.
- DO NOT** operates the pump without the motor shroud.

SAFETY PRECAUTIONS WHEN SERVICING PUMP

- DO** ensure the pump is cool to touch before performing service.
- DO** relieve all pressure and drain all fluids from pump and connected piping before performing service.
- DO ENSURE POWER TO THE UNIT HAS BEEN UNPLUGGED PRIOR TO PERFORMING ANY PUMP MAINTENANCE OR CLEANING.**
- DO** exercise caution and wear protective clothing when using lye or acid for cleaning.

TECHNICAL INFORMATION

TECHNICAL DATA

SPECIFICATIONS

Maximum Inlet Pressure -----	10 bar (1,000 kpa, 145 PSI)
Maximum Discharge Pressure -----	10 bar (1,000 kpa, 145 PSI)
Maximum Flow rate -----	100 m3/hr (440 US GPM)
Temperature Range -----	-10 C to 150 C (14 F to 302 F)
Noise Level -----	60 ~ 80 db

MATERIALS

Product Wetted Steel Parts -----	AISI 316 (standard)
Product Wetted Seals -----	EPDM (standard)
Alternative Seals -----	NBR, VITON, PTFE Encapsulated, Perfluoroelastomer

SHAFT SEALS

Seal type -----	Single and Double Flushed
Maximum Flushing Water Pressure -----	Maximum 1 bar (14 PSI)
Flushing Water Consumption -----	0.25~0.5 liter/min (30~60 cubic inches/min)
Stationary Seal ring Material -----	Silicone Carbide
Rotating Seal Ring Material -----	Carbon (standard) or Silicone Carbide
O-ring material -----	EPDM (standard)

MOTOR INFORMATION

Uses standard IEC B5 flange motors up to 7.5Kw and over uses B3 B5 flange motors.
Options include drip proof, explosion proof motors.

VOLTAGE AND FREQUENCY

3 phase, 50Hz, 220/415 VAC -----	1,500/3,000 RPM
3 phase, 60Hz, 220/440 VAC -----	1,800/3,600 RPM

INSTALLATION

INSTALLATION

1. Mounting surface should be flat and level.
2. The suction line should be kept as short as possible and present minimum friction loss.
3. Suction and discharge lines must be fully supported and installed so that no expansion or shock forces act on the pump which could lead to distortion.
4. Ensure sufficient clearance around the motor and pump.

START UP

1. Before connecting the suction and discharge pipe work the entire system must be thoroughly cleaned to prevent damage from welding, grinding and other residues.
2. Before starting, bump the motor to check if the motor fan is rotating clockwise when seen from the motor back. If the motor fan cannot be seen, look through the pump case adaptor after take off motor shroud. (Bump means to momentarily apply power to the motor and then immediately remove power).
3. Direction of rotation must only be checked with a completely filled system. Where double mechanical shaft seals are installed the flush supply must be operational. Any dry running will result in seal damage.
4. The motor rating plate should be checked to ensure that it is in accordance with the available electrical supply. It is essential that the full load current is not exceeded to prevent motor overload.
5. Before start up any safety guards required by local statutory regulations should be fitted.

Pay attention to circumstances that could indicate pump cavitations:

1. Low pressure in the suction line due to line restrictions.
2. Air in the suction inlet line.
3. Pumping temperature is too high.
4. Pump is over sized.

MAINTENANCE

DISASSEMBLY

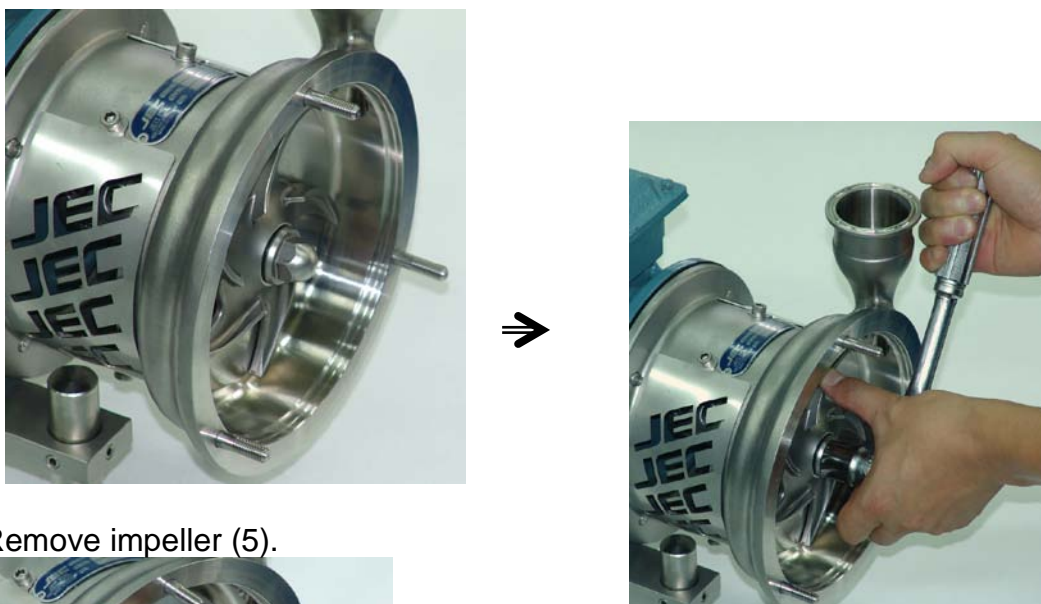
REMOVING PUMP PARTS

Prior to removal of pump, the shut-off valves in the suction and discharge pipe work must be closed. If there is any risk that product may harden, crystallize or freeze in the pump it should be thoroughly drained and cleaned immediately after use. Similar attention must apply to the seal flush system. Remove power before servicing to prevent unintended start of the pump by an authorized electrician.

1. Remove front cover (2) after remove case handle (7).



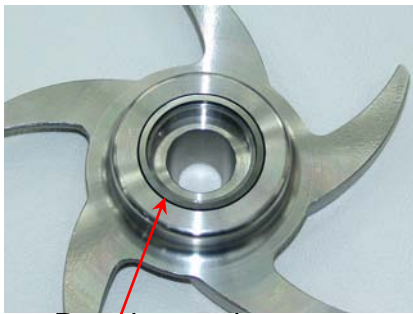
2. Remove impeller cap nut (4) from stub shaft by wrench.
Wrench size is 22mm.



3. Remove impeller (5).



4. Remove rotating seal part from the impeller backside



Rotating seal



If sing seal is used,

5. Remove stationary seal and O-ring from the shaft.

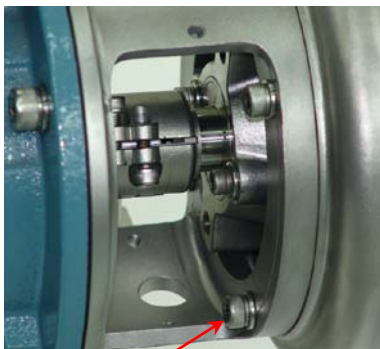


Stationary seal



If double seal with flushing is used,

6. Remove case (1) from frame (6) by removing four wrench bolts (14) securing case to frame.



Remove these screws.

*** Note) Do carefully remove case from frame so that do not have double seal damage from stub shaft.**

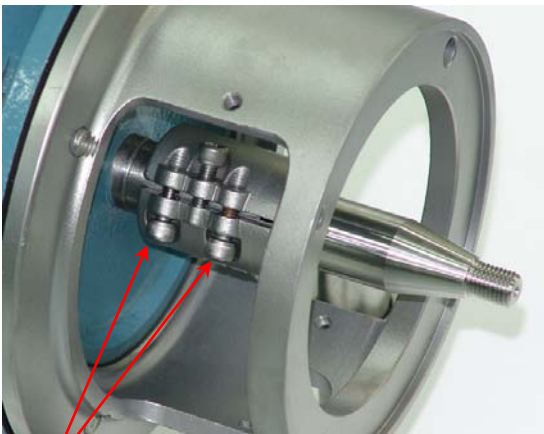
7. Remove seal gland on back of casing by removing four screws (34).



8. Remove double seal and O-ring (26, 28).



9. If disassembling stub shaft from motor: loosen screws (15) by 5mm Allen wrench (6mm from 5.5kw motor) remove it from motor shaft after tightened a center screw oppositely.



Loosen the screws to disassemble stub shaft.

10. If disassembling motor frame from motor: loosen screws(13) by 5mm Allen wrench(6mm from 5.5kW motor) remove it from the motor.



INSPECTION & Replacement

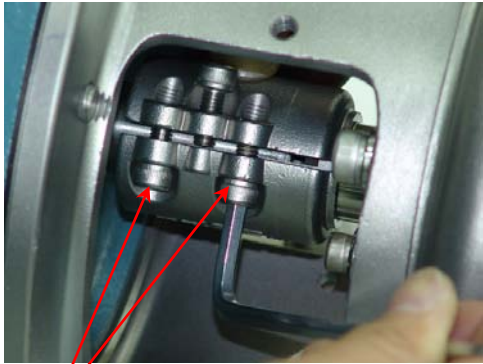
1. Inspect O-rings and seals for reuse. Worn O-rings and seals should be replaced.
2. Inspect seal faces for scoring or cracks. Replace any seal faces that are damaged.
3. Inspect stub shaft and other metal parts for wear or damage.
4. Inspect impeller for damage from cavitations. Cavitations damage appears as pitting on the impeller surfaces.

ASSEMBLY

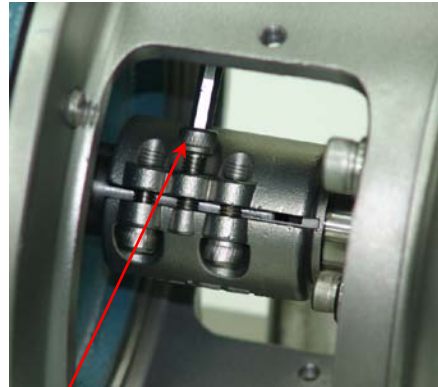
PUMP PARTS ASSEMBLY

“JEC pumps must only be operated with genuine JEC spares”.

1. Loosen screws (15) and slightly tighten jack center screw in stub shaft.
2. Place stub shaft with parts assembled on the shaft.
3. Tighten screws (15) evenly after loosen jack center screw but not more than to allow the stub shaft to be moved by gently tapping with a rubber or plastic tipped mallet. This will allow for possible adjustment during setting of impeller clearance.

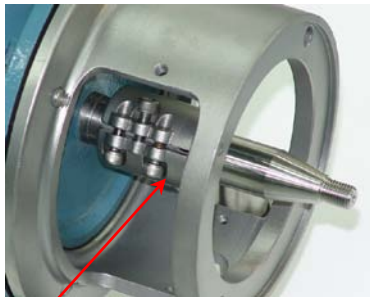


Tighten screws



Loosen jack screws

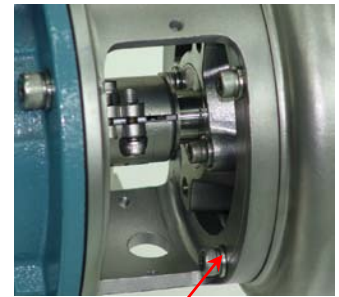
4. Assemble case (1) to frame with four screws (14). **Do not assemble stationary seal components into back plate. These parts should be assembled after the impeller clearance has been adjusted. Perform impeller clearance adjustment without seals to prevent any damage to the stationary seals.**



Assemble shaft.
assembled.



Assemble back plate **without** stationary seal.



Back plate

5. Place impeller (5) and screw cap nut (4) without shaft O-ring (24).



SETTING IMPELLER CLEARANCES WITHOUT SEALS

- Using a feeler gauge set the clearance between impeller back and back plate (1) to 0.7mm for JCP500 , 0.8mm for JCP 800 and 1.2mm for JCP2200. .



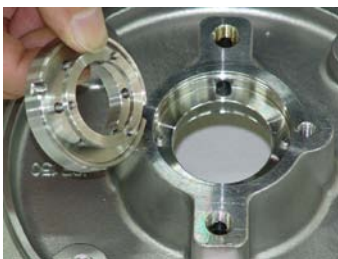
- Remove impeller after tighten screws (15) securing the stub shaft to 15Nm.



- Remove back plate (1).

- Place front cover of motor shroud and screws (19).

- Install O-ring (24), stationary seal (29) and seal gland (27) into back plate using four Allen screws (34) and washers.



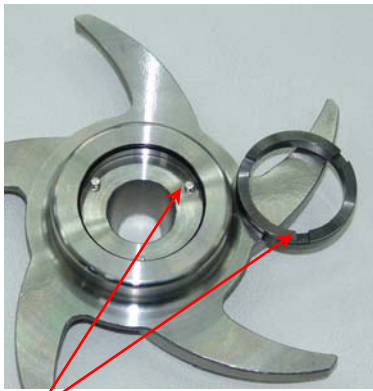
- Install back plate (1) to shaft and pump adaptor carefully and tighten screws (14) securing to pump adaptor. If flushed seal should be place flush seal to stub shaft before place back plate.

Before assembly, lubricate O-rings and gaskets with a food grade silicone spray or equivalent. And it is important that the surface of the rotating seal be wiped clean of any foreign matter (dirt, dust, oil from fingers, etc.) prior to assembly. Clean surface in accordance with good shop practice.



Assemble back plate

13. Install rotating seal parts inside back of impeller. Ensure the pin of the rotating seal ring shall be complied to



Pin for seal shall be complied to notch of seal ring.

14. Install impeller cap nut (4) on stub shaft after place spring washer (36) and O-ring (22). Note that impeller cap nut is metric. Wrench size is 22mm and torque need to 21Nm.



15. Install case O-ring (24) in back plate.

16. Install front cover (2) on back plate and handle (7) tighten.



Note) Inspection and maintenance

1. Our JCP series we supply is provided with a seal which has been validated to demonstrate that there is no migration past the seal under the intended conditions of use and The European Hygienic Engineering and Design Group(EHEDG) test for bacterial tightness approves the determining migration past the seal.
2. The seal for JCP series is designed so it is capable of being maintained bacterially tight. Also, enclosed threads are cleanable and drainable.
3. We recommend inspect and maintenance periodically(at least once in a month) seal and the enclosed threads. If dust or particle is founded, clean them thoroughly by brushing or water or replace the seal or the enclosed thread if impossible to be cleanable.

TROUBLESHOOTING

JEC pumps are high-quality products designed for trouble-free operation and long operating life. However, occasional problems can arise. The troubleshooting chart, figure 4, provides a means of determining and correcting most of your pump problems. Should problem arise where the remedies listed in the troubleshooting chart do not cure the situation, pump cavitations, such as noisy operation, insufficient discharge and vibration, can result when a pump is not properly applied. If these conditions are present, check the system and re-evaluate the application.

Trouble	Problem Cause	Remedy
1. No or insufficient discharge	a. Pump speed too slow.	a. Correct wrong or poor electrical connections.
	b. Wrong direction of rotation.	b. Reverse a three-phase motor by switching any two of the three power leads at the motor or controller.
	c. Closed valve, obstruction in discharge piping.	c. Open valve and clear obstruction.
	d. Impeller diameter too small.	d. Replace impeller.
2. Excessive power consumption	a. Products viscosity too high.	a. Check the application.
	b. Impeller contact to case.	b. Re-set clearance according to the in these instructions.
	c. High pump capacity.	c. Check the application.
	d. Bearings are damage.	d. Replace bearing.
3. Pump is noisy	a. Impeller contact to case.	b. Re-set clearance according to the in these instructions
	b. Bearings are damage.	b. Replace bearing.
	c. NPSHa is too low.	c. Check the system and re-evaluate the application.
	d. Pressure loss in suction line too high.	d. Check the system and re-evaluate the application.
	e. Pump cavitation.	e. See cavitation clause in the start-up section.
	f. Solid particles in pump.	f. Remove case and check for particles in the pump.
4. Pump leaks	a. O-ring seal is worn or defective.	a. Replace O-ring seal.
	b. Mechanical seal is worn or defective.	b. Replace mechanical seal.

If assistance is required, please contact your local sales office with the following information:

1. Operating conditions.
2. Accurate description of default.
3. Model of pump and serial number.
4. If possible installations sketch of pump system.

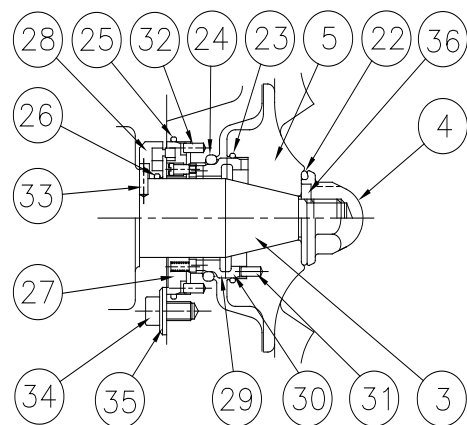
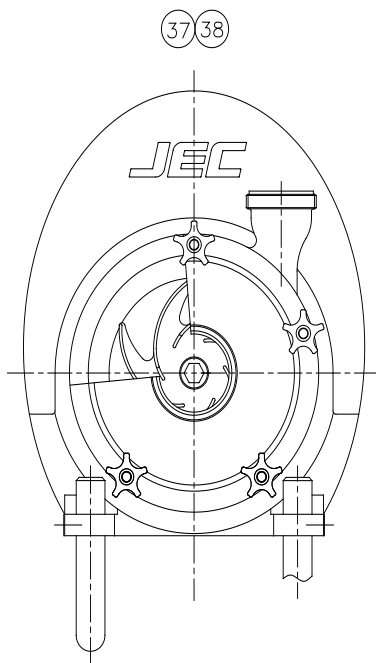
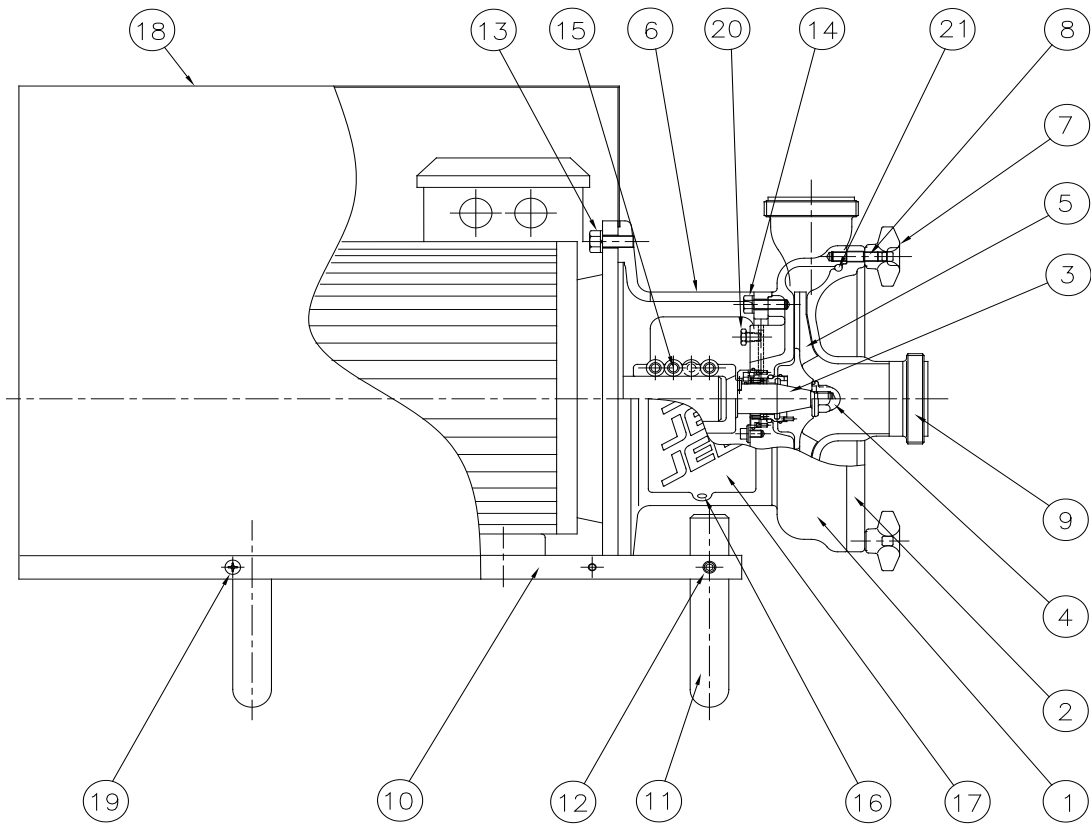
PARTS LIST

All orders for repair parts must contain the following.

1. Complete model number (located on nameplate).
2. Pump serial number (located on nameplate).
3. Description and part number from the parts list.

No.	Description	Q'ty	No.	Description	Q'ty
1	Case	1	20	Flush Port	2
2	Front Cover	1	21	Cover O-ring	1
3	Shaft	1	22	Cap Nut O-ring	1
4	Cap nut	1	23	Impeller O-ring	1
5	Impeller	1	24	Casing O-ring	1
6	Frame	1	25	O-ring for Flushing	1
7	Handle	1	26	O-ring for D.Seal	4
8	Stud Bolt	1	27	Single Mech. Seal	1
9	Nozzle	1	28	Double Mech.Seal	1
10	Leg Bracket	1	29	Case Seal Ring	1
11	Leg Screw	4	30	Impeller Seal Ring	1
12	Leg Feet	4	31	Seal Pin	1
13	Hex Bolt	4	32	Seal Pin	1
14	Wrench Bolt	4	33	Seal Pin	1
15	Wrench Bolt	2	34	Wrench Bolt	2
16	Wrench Bolt	1	35	Flat Washer	2
17	Guard	2	36	Spring Washer	1
18	Motor Cover	1	37	Name Plate	1
19	Cover Screw	4	38	Rivet	2

CROSS SECTIONAL VIEW



Seal Drawing

