



INSTALLATION, OPERATION & MAINTENANCE MANUAL

PGV SERIES VERTICAL DISCHARGE Horizontal Electric Submersible Pumps

CAST IRON Three Phase 460V

PGV 55
PGV 75
PGV 110

Three Phase 460V PGV 220

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.

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INTRODUCTION

This Installation, Operation and Maintenance manual provides important information on safety and the proper inspection, disassembly, assembly and testing of the BJM Pumps® PGV Series horizontal submersible pump. This manual also contains information to optimize performance and longevity of your **BJM Pumps** submersible pump.

The submersible PGV Series pumps are designed to pump municipal; and industrial wastewater. The PGV Series pumps are not explosion-proof. They are not designed to pump volatile or flammable liquids.

Note: Consult chemical resistance chart for compatibility between pump materials and liquid before operating pump.

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

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Old Saybrook, CT 06475, USA

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Information, including pump data sheets and performance curves, is also available on our web site: 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.

NOTE: Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

⚠ DANGER 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.

⚠ DANGER Do not pump flammable, inflammable or volatile liquids. Death or serious injury will result.

⚠ WARNING Before attempting to open or service the pump:

- 1) Familiarize yourself with this manual.
- 2) Unplug or disconnect the pump power cable to ensure that the pump will remain inoperative.
- 3) Allow the pump to cool if overheated.

⚠ WARNING Do not operate the pump with a worn or damaged electric power cable. Death or serious injury could occur.

⚠ WARNING Never attempt to alter the length or repair any power cable with a splice. The pump motor and pump motor and cable must be completely waterproof. Damage to the pump or personal injury may result from alterations.

⚠ 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.

⚠ WARNING Obtain the services of a qualified electrician to troubleshoot, test and/or service the electrical components of this pump.

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

Make sure to ground the terminal (green) exclusive for grounding in accordance with local electrical codes and internal regulations.



Transportation, installation, wiring, operation, maintenance, and inspection should be performed only by authorized and qualified personnel.

INSPECTION

Review all safety information before servicing pump.

- Do not exceed rated specifications for use; a submersible pump should not be used on land. Failure to observe this caution may cause electric shock, injury to a person or damage to the product.
- Do not use pump if damaged in anyway.
- Any modifications of the product made by the user shall void guarantee.
- Do not remove the nameplate.

TRANSPORTATION

During transport, care must be taken to avoid dropping or overturning the pump. Failure to observe this caution may cause injury or damage to the product.

When lifting the pump, be sure to lift it using its lifting rings or handle.

- Do not lift a pump with machine connected, using only the lifting rings of the pump. Failure to observe this caution may cause injury or damage to the product.
- Do not lift by cables. Failure to observe this caution may cause injury or damage to the product.

RECEIVING

Open packing after confirming that pump is right side up. Failure to observe this caution may cause injury.

Verify that the received pump is the one you ordered. Installing the wrong product can cause unwanted results, and damage to the product.

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.

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 minder 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.

Warranty does not cover damage caused by connecting pumps and controls to an incorrect power source (voltage/phase 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.

INSTALLATION:

1. Inspect each part/component to verify that it is free of damage and imperfections.
2. Do not lift or move the pump by the power cable. Use the lifting handle or eye bolt attachment to support movement of the pump.
3. 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 suspended the pump with a lifting rope/chain. The pump can pass solids that are compatible with the suction/agitator opening size (see technical data sheet).
4. Running the pump dry for extended periods of time may damage the seals and over-heat the motor. Do not run the pump below the recommended operating level (see technical data sheet).
5. Pumping liquid should not exceed a maximum temperature of 104°F.

Remove foreign matter such as concrete clods or stones after installing the pump in the tank. Failure to observe this caution may cause damage to the impeller or casing, or block the intake port.



WIRING:

⚠ WARNING

Risk of electric shock. PGV Series pump models do not come with electric plug connectors. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle.

- Perform wiring conforming to National Electrical Code or to local electrical codes. Failure to observe this caution may cause fire or damage to the product.
- Make sure that the pump is rotating in the correct direction. Forward rotation creates more pressure and discharge power than reverse rotation.
- For built-in automatic level control pump never take the float bracket to lift the pump or pull the lead. Failure to observe this caution may cause injury or damage to the product.

⚠ WARNING

Do not alter the length or repair any power cable with a splice. The pump motor and cable must be completely waterproof. Damage to the pump or personal injury may result from alterations.

1. Voltage and frequency check- check whether the supply voltage and frequency meet those indicated on the pump name plate.
2. Power connection- connect three wires U (red), V (white) and W (black) of the power cable of the pump to a power supply unit at site.
 - a. Terminal E9 (green) is for ground use. Connect a grounding wire to this terminal pursuant to the relevant law.
 - b. Also, provide electric leakage breaker.
3. Allowable cable length- keep voltage drop of the power cable with in 5% of the specified voltage. Table 1 shows the allowable cable length subject to 5% voltage down. (In case of 200V class)
 - a. The allowable cable length for the specified voltage 400V is four times the values shown in Table-1.

Nominal sectional area of cabtyre cable (mm)		3.5	5.5	8	14	22	30	38
Allowable current of cabtyre cable (Amps)		28	36	44	62	83	98	
Pump model and motor output	PGV55	50	75	105	185	290	410	
	PGV75		55	80	140	215	305	
	PGV110				95	155	210	240
	PGV220						110	130

Table 1 Allowable cable length (m)



INTENDED METHODS OF CONNECTION

BJM Pumps has been evaluated for use with water or water based solutions. Please contact the manufacturer for additional information.

THREE PHASE WIRING INSTRUCTION

⚠ WARNING FOR YOUR PROTECTION, ALWAYS DISCONNECT PUMP FROM ITS POWER SOURCE BEFORE HANDLING.

⚠ WARNING “Risk of electrical shock” Do not remove power supply cord and strain relief or connect conduit directly to the pump.

⚠ WARNING Installation and checking of electrical circuits and hardware should be performed by a qualified licensed electrician.

To automatically operate a non-automatic three phase pump, a control panel is required. ollow the instructions provided with the panel to wire the system for automatic three phase pumps see automatic three phase wiring diagram.

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.



BJM Pumps three phase pumps have integral motor overload protection. BJM recommends that all three phase pumps using a motor starting device also incorporate motor overload protection. Pumps **must** be installed in accordance with the National Electrical Code and all applicable local codes and ordinances. Pumps are not to be installed in locations classified as hazardous in accordance with National Electrical Code, ANSI/NFPA 70.

Connect pump to a junction box, outlet box, control box, enclosure with a wiring compartment that meets NEC and local codes in volume, and applicable fittings for supply connection. The provision for supply connection shall reduce the risk of water entry during temporary, limited submersion and shall comply with the applicable requirements of the Standard for Enclosures for Electrical Equipment, UL 50, or the standard for Metallic Outlet Boxes, UL 514A, and the standard for Motor-Operated Water Pumps. UL 778.

4. Pump revolution direction- the correct revolution direction of the impeller is counterclockwise viewing from the strainer side as shown in Fig. 1.

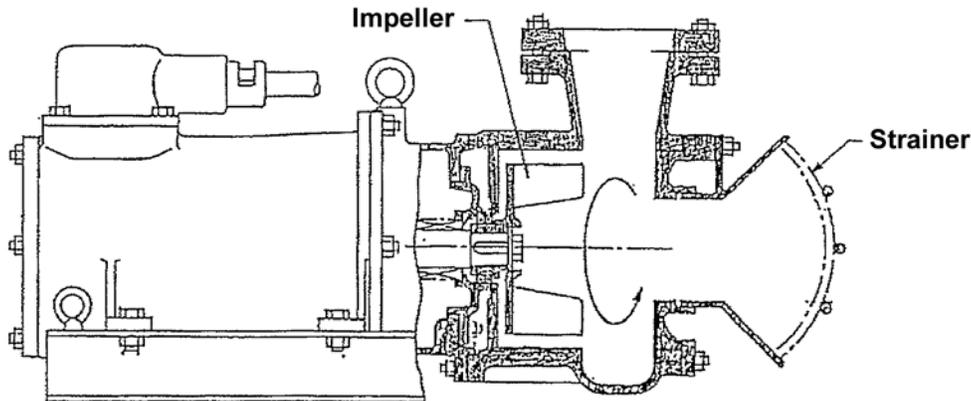


Figure 1

CAUTION Safety glasses must be worn when visually checking impeller rotation.

Switch ON the pump in inching mode and look into the impeller from the strainer side to check its normal rotational direction, just before complete stop of the impeller. Checking before piping connection can be made by looking into the impeller from the discharge pipe side. If the rotational direction of the impeller is reverse upon checking, interchange optional two wires of the power cable.



PUMP OPERATION

⚠ WARNING

Never get near or touch the suction port and discharge ports during operation. Failure to observe this warning may cause injury by being caught in a rotating part such as impeller. Do not put fingers in strainer or pump intake.

- Never operate the pump under minimum water levels during continuous operation
- When changes in current and pressure occur during operation, check for abnormalities such as overload due to entrance of foreign matter.
- Immediately stop operation upon detection of any malfunction. Failure to observe this caution may cause electric shock, injury or fire.
- Make sure to turn OFF the power source at power failure. Failure to observe this caution may cause injury.
- Make sure to maintain the specified liquid temperature. For high-temperature liquid specification, refer to the catalogue. Failure to observe this caution may cause injury.
- For pumps with cutting mechanism, never rotate in reverse. Failure to observe this caution may cause burn-out of motor and injury.

⚠ WARNING

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

⚠ DANGER

Do not operate this pump where explosive vapors or flammable material exist. Death or Serious injury will result.

1. Change of running condition depending on water level. If the suction water level comes down near "LEVEL 1", air will be suctioned with generated vortex and consequently the pump is put in water-roaring run condition, which continues until the water level reaches next "LEVEL 2". (Refer to Fig. 2)

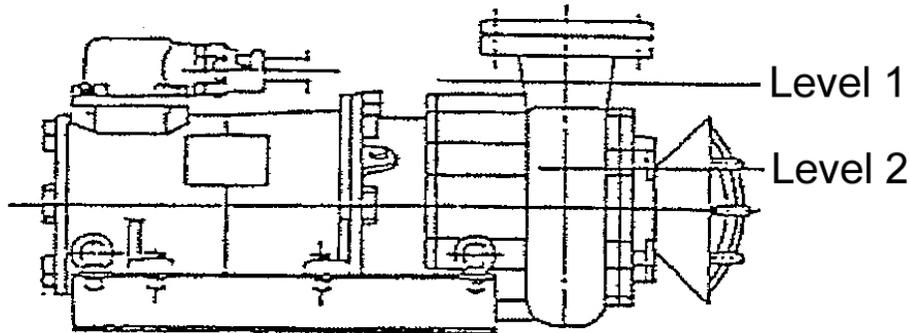


Figure 2

If the water level is below “LEVEL 2”, the suctioned air rate will increase; causing pumping failure of the pump and finally the pump is put in no-load running condition.

In case of this pump, however, unlike vertical submersible pumps the motor frame of this pump is submerged in the range from “LEVEL 1” to “LEVEL 2” so that the motor is effectively cooled. When the water level is below “LEVEL 2”, the motor frame exposes to the atmosphere and consequently the cooling effect comes down, but it is safety with low temperature because of its non-load run condition.

2. Voltage check - during pump running; sometimes measure the power voltage to check that it is within the range of 95% - 105% of the specified voltage.
 3. Attention to pumping up of high density water where sand, slurry and other solids are much contained in the pumping of water, the shaft power increases with increasing mixture density of solids and the motor is eventually overloaded. (Special technical instructions on this matter are available. It will be furnished upon request).
- In such case, read the ammeter to monitor the electric current of the motor and adjust the pump location.

MAINTENANCE AND INSPECTION

To service or repair your pump, please contact your local **BJM Pumps** distributor. Service should only be performed by a qualified electrician.

Insulation resistance of $1M\Omega$ or greater, or unstable values with sudden drops indicates potential malfunction and should be investigated.

Never touch terminals when measuring insulation resistance. Failure to observe this caution may cause electric shock.

- 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.)**
- Seal oil should be checked once per year.
- Maintenance should always be done when taking a pump out of service before storage.

DISPOSAL OF PUMP

When disposing a pump, treat it as a general industrial waste, abiding by federal, state and local regulations.

TROUBLE SHOOTING



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

Warning: Pump will restart automatically when motor over-heat protection switch cools.

Repair and assembly should be performed by qualified personnel only. Failure to observe this caution may cause electric shock, injury or fire.

1) Pump fails to run (no running noise)

No electric current in power distribution line →

No electric current in pump cable →

Power switch in OFF. Or 2 phase or more in open condition due to fault of the switch

Operation switch in OFF. Or 2 phase or more in open condition due to fault of the switch. Possible causes: Contact failure of switch, fuse disconnection, reset-missing of over current relay
Inspect and repair.



2) Pump fails to run, or runs but fails to reach full speed.

Voltage drop in power line	→	Check whether or not the power voltage is normal Power switch, operation switch or pump cable with either one wire opened or disconnected. Inspect and repair or replace.
Single-phase run	→	
Stuck impeller	→	Repair
Motor trouble	→	Causes: Insulation fault, interlayer and interphase short-circuit, single-phase disconnection Inspect and repair.

3) Pump runs at full speed, but produces abnormal noise mechanically.

Broken impeller	→	Replace
Worn or damage bearing	→	Replace
Low level running	→	Not harmful, but less pumping rate and low efficiency, caused by low suction level. Raise suction level or stop the pump

4) Small pumping rate (capacity)

Reverse rotation of pump	→	Interchange two wires of the cable for correct rotational direction
Impeller clogged with foreign matter	→	Remove foreign matter
Clogged pipe	→	Repair
Small size pipe	→	Replace
Water leakage from pipeline and channel	→	Inspect and repair

5) Motor overheated

Overload	→	Large mixture percentage of solids to pumping water or use of liquids with high viscosity or high specific gravity.
Motor exposed to atmosphere	→	Consider of the pump location and adjust or relocate.
Motor abnormal	→	Inspect insulation fault, interlayer short-circuit and interphase short- circuit. In this event, the over current relay of the operation switch might work. If failed to work, check whether the relay is properly set. In many cases, motor abnormal is primarily caused by its insulation down by leaked water in section 7.



6) Water leakage into oil chamber

Worn or abnormal shaft seal →

Considerably worn or vital abnormality.

Replace the shaft seal.

7) Water leakage into motor chamber

Worn or abnormal shaft seal →

Loosened cable packing gland →

Tear cable →

Refer to (6)

Re tighten

Repair or replace a torn portion. Where water has leaked into the motor chamber, stator and rotor must be inspected to check for their abnormality and, in many cases, re-dried. Checking by electric technician is preferred.

Inspection immediate after operation-start- This inspection is performed to judge the sealing performance of the shaft seal. Carry out this inspection about one week after startup of the operation.

1. Oil chamber check- The sealing performance can be judged by contamination degree of the sealing oil depending on the quantity of water leakage into the oil chamber.

- The upper oil box located at the center part of the pump is provided with two oil plugs spaced at 180° from each other (one is located upside from the shaft center and other located downside from the shaft center) as illustrated in Fig. 3.
- As illustrated in Fig. 3, locate a proper chute and a proper oil pan just under the downside plug to discharge the oil from the oil chamber.
- After that, unscrew off the plug to discharge and take the oil into the oil pan.
- When oil flow from the chamber is not smooth, unscrew off the upside plug to intake the air into the chamber.
- Use a transparent oil pan.
- Take (sample) a small quantity of oil into the pan. (Small quantity is sufficient for oil analysis).
- The sampled oil looks like cloudy emulsion when the mixture ration with leaked water is small and is separated from the water when it is 5% and over.
- Inspect the sampled oil based on the above criterion and determine further periodic oil inspection interval according to the obtained result.

2. Recommended oil brand-When the oil must be replaced with fresh one upon above inspection or further periodic inspection, use the oil recommended below.

ISO 32 NSF Food Grade Mineral Oil



3. Required oil volume: As Table-2

Pump Model	PGV55, 75	PGV110	PGV220
Required oil volume (L)	1.3	1.6	5.8

Table 2 – Required Oil Volume in submersible pumps

4. Motor chamber check-When much water leakage is detected upon oil chamber check, inspect further the motor chamber.
- Should any leakage into the motor chamber be detected, the shaft seal must be checked for abnormal wear and other fault. In this case, the pump shall be overhauled. Follow Section 8 for the detailed overhauling procedure.
 - If its measured insulation resistance is $20M\Omega$ and over after adequately dried, the stator is available for further continued use.

Periodic Inspection:

Periodically inspect the mechanical seal (most important check item), impeller, bottom plate, dust seal, strainer, etc. to check that they are abnormal-free.

In addition, inspect the insulation resistance.

- 1) Oil chamber and shaft seal (mechanical seal) in case of continuous running; inspect them at least once every 6 months.
- 2) Insulation resistance- check once per year. The pump motor may be further used provided that the measured value is $1M\Omega$ and over.
- 3) Impeller- in addition to periodic inspection, carefully inspect it when the suction (pumping) capacity decreases, too. Refer to section 6.
- 4) Other Inspection- check the bolts and nuts for loose, damaged and deformation.
- 5) Overhauling- overhaul the pump at least once a year, though depending on the service conditions, to inspect each component/part and replace any abnormally-abraded part or faulty part with new one and clean adequately other parts available for further use in thinner or washing oil. In addition, refill fresh oil in the oil chamber.
 - Each seal packing may be possibly damaged by over-hauling work. It is therefore recommendable to stock and provide the spare parts recommended in Section-7.
- 6) Inspection of Pumping Capacity- various causes for the decreased pumping capacity are as described in section 12 “troubleshooting”. The causes by the impeller, bottom plate, etc. are described hereunder.
 1. Impeller- check whether or not the water passage is narrowed and the pump function is disturbed by solids adhered to the central boss of the impeller and between vanes.
 2. Passage in bottom plate and casing- check whether or not the passage is narrowed by solids adhered to the bottom plate and the casing.
- 7) Recommended Spare Parts- it is recommendable to stock the following parts which may require replacement within 1 to 2 years from startup of the initial running.



Part description

Impeller
 Shaft Seal
 Bottom Plate
 Packing

Quantity per pump

1 piece
 1 set
 1 piece
 Full set

8) Overhauling procedure (refer to section 11 “Sectional Drawing”).

- Perform the overhauling work with the pump kept in horizontal position.
- Unscrew off the bolts (B1 in Sectional DWG) to separate the pump from the pump base (170). Then, lift up the pump using the lifting eye-bolt (58).
- Provided two wooden blocks of about 100mm square onto clean floor and put the pump thereon horizontally.
- By this, the pump is ready for overhaul. Overhaul the pump in the procedure given below.

<u>Step</u>	<u>Part Name</u> () : part No. in sectional DWG	<u>Overhauling Procedure</u> () : Part No. in sectional DWG.	<u>Note</u>
1	Strainer (16)	Unscrew off stud nut (SN1)	
2	Bottom Plate (15)	Unscrew off stud-nut (SN2)	
3	Impeller nut (B2)	Unscrew off the nut	
4	Impeller (14)	Draw off the shaft from shaft (8).	Be careful not to damage the vanes
5	Casing (13)	Unscrew off stud nut (SN3)	
6	Drain-out of oil	Remove oil plug (28)	Follow 5.1 (1)
7	Lower oil box (12L)	Unscrew off stud nut (SN4)	
8	Shaft seal (10)	After removal of the lower oil box (12L) in step 7, mechanical seal parts appear. Pull them out one by one from the shaft using a hooked-shaped puller.	
9	Upper oil box (12U) and rotor (7)	Unscrew off stud nut (SN5)	In this case, be careful not to damage stator coil, shaft and bearing.



ASSEMBLING:

Assemble the pump in the reverse sequence of the overhauling with good care for the following points.

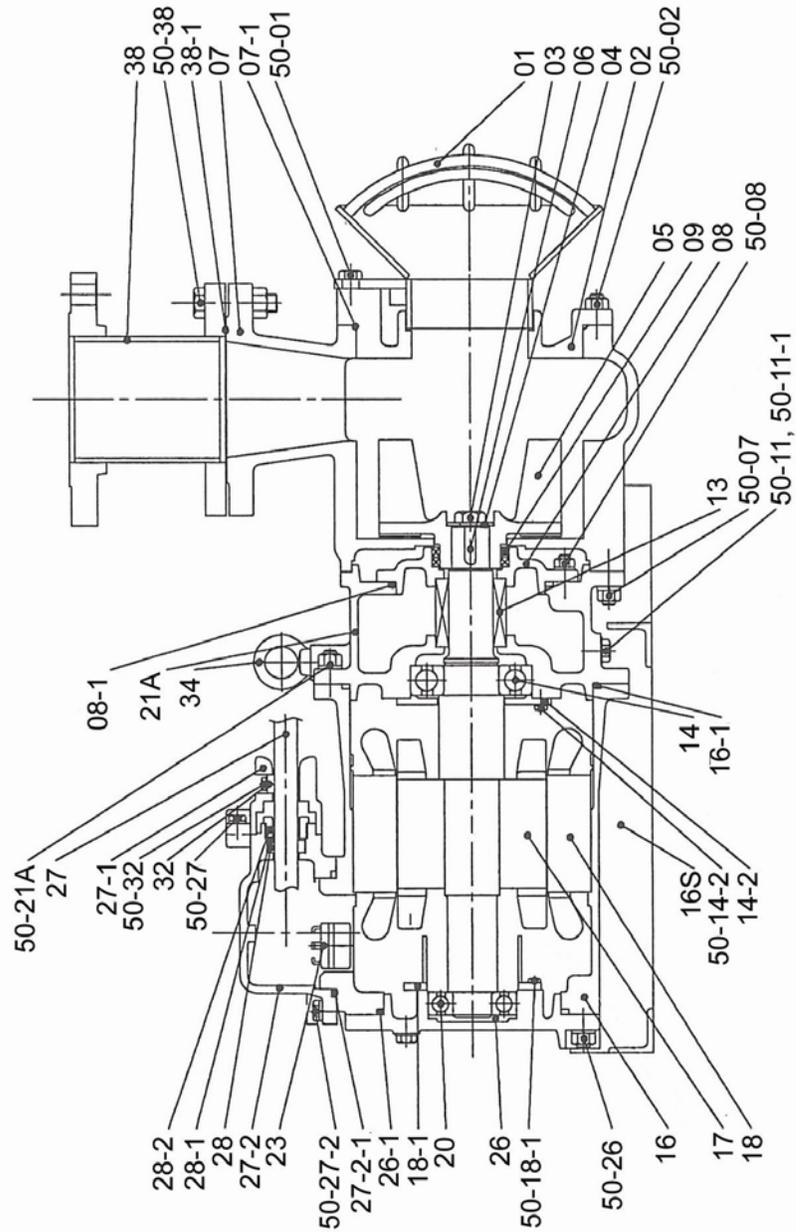
- 1) Shaft seal (Mechanical Seal)
 - The contact surface of each seal ring shall keep right vertical to the shaft axis.
 - The contact surfaces shall be free from dust and foreign matter.
- 2) Cautions in assembling
 - Handle each part/component with good care not to damage it.
 - Securely restore o-rings and seal packing's in their original positions.
 - Replace worn or damaged o-ring and seal packing with new ones.
 - Tighten securely bolts and screws with specific tightening torque.
 - After assembled, turn the impeller by hand to check its smooth rotation.

After-operation Maintenance

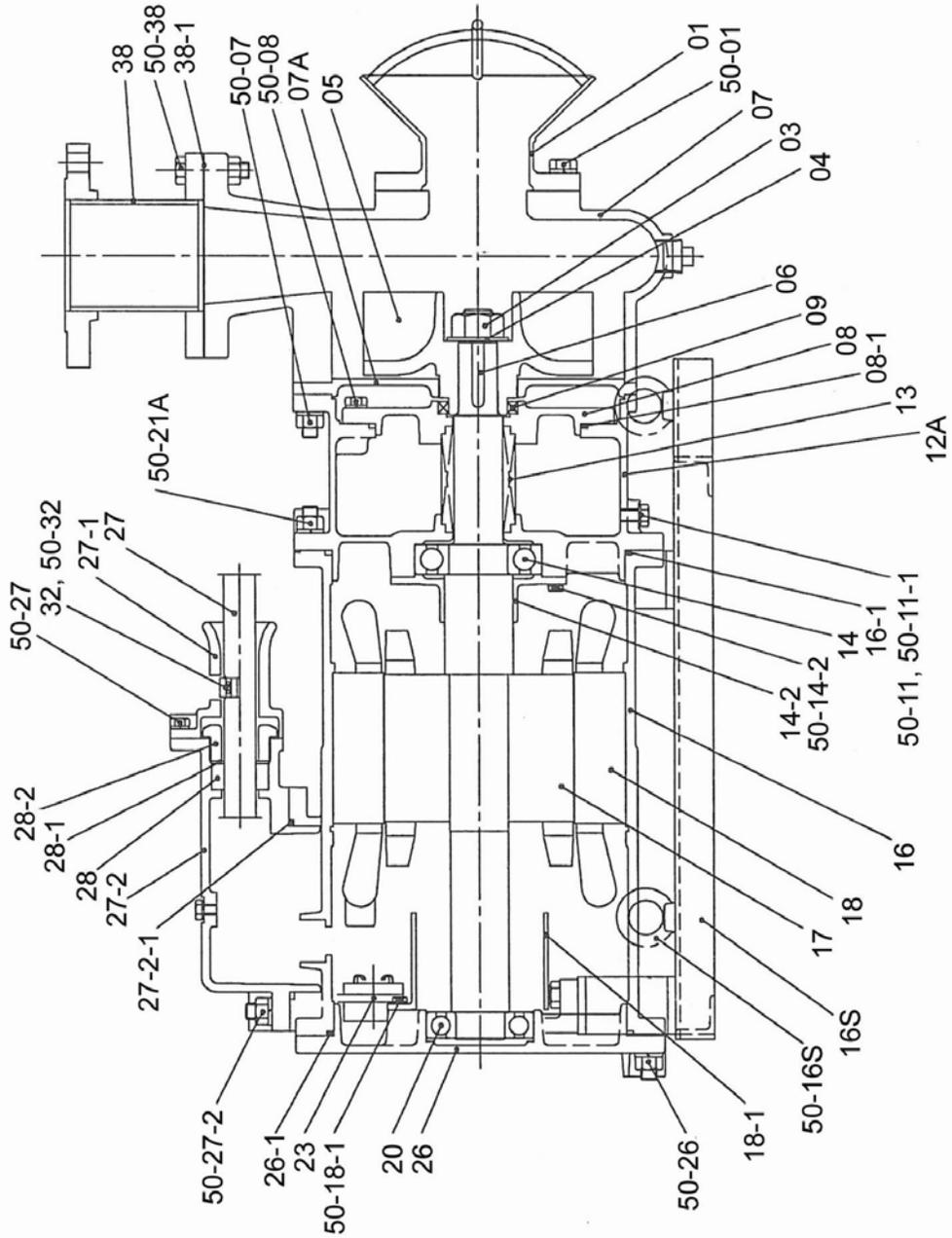
- When the pump is put in long term rest, operate it under clean water for a while for internal cleaning. Leaving the pump as is without cleaning would cause early corrosion of the pump components and finally pump trouble.
- When the pump handled liquid containing solids such as cement slurry, limestone slurry, etc., adequately clean each component, especially impeller and shaft seal for complete removal of such adhered solids. Otherwise, adhesion of solids will interfere with the normal running.



SECTIONAL VIEW OF PGV55, 75 & 110



SECTIONAL VIEW OF PGV220



PGV SERIES PARTS LIST

	Pump Model	PGV55	PGV75	PGV110	QTY.
Pos. No.	Part Description	Part #	Part #	Part #	NEEDED
01	Strainer	E00101	E00101	E00101	1
02	Suction Cover	E00201	E00202	E00202	1
03	Impeller Bolt	E05016	E05016	E05016	1
04	Impeller Washer	E00401	E00401	E00401	1
05	Impeller	E00501	E00502	E00503	1
06	Impeller Key	E00601	E00601	E00601	1
07	Pump Casing	E00701	E00702	E00702	1
07-1	O-ring, BUNA-N	E04003	E04003	E04009	1
08	Lower Oil Box	E00801	E00801	E00801	1
08-1	O-ring, BUNA-N	E04002	E04002	E04002	1
09	Lipseal, BUNA-N	E00901	E00901	E00901	2
13	Mechanical Seal	E01301	E01301	E01301	1
14	Lower Ball Bearing	E01401	E01402	E01402	1
14-2	Bearing cover	E01411	E01412	E01412	1
16	Motor Housing	E01601	E01602	E01603	1
16-1	O-ring, BUNA-N	E04001	E04001	E04008	1
16S	Pump Support	E01611	E01611	E01611	1
17	Rotor w/ shaft	E01701	E01702	E01703	1
18	Stator, 460V, 3PH 60Hz	E01801	E01802	E01803	1
18-1	Lead Wire Support	E01811	E01811	E01811	1
20	Upper Ball Bearing	E02001	E02001	E02002	1
21A	Upper Oil Box	E02101	E02102	E02103	1
23	Motor Protector, 460V, 3PH 60Hz	E02301	E02302	E02303	1
26	Bearing Housing	E02601	E02601	E02602	1
26-1	O-ring, BUNA-N	E04005	E04005	E04011	1
27	Power cord	E02701	E02702	E02703	1
27-1	Bell Mouth	E02711	E02711	E02712	1
27-2	Terminal Box	E02721	E02721	E02721	1
27-2-1	O-ring, BUNA-N	E04004	E04004	E04010	1
28	Cable Packing	E02801	E02802	E02803	1
28-1	Cable Washer	E02811	E02811	E02812	1pc- model 55,75 2pcs-model 110
28-2	Screw Gland	E02821	E02821	E02822	1
32	Cable Clamp	E03201	E03201	E03201	1
34A	Eyebolt (pump support)	E03401	E03401	E03401	4
34B	Eyebolt (Top of motor side oil box)	E03401	E03401	E03402	1
38	Discharge Adapter 4"	E03801	E03801	E03801	1
38-1	Gasket, discharge - F.R.R.	E04006	E04006	E04006	1
50-01	Bolt (Strainer)	E05012	E05012	E05012	4
50-02	Stud & nut (suction cover)	E05006	E05006	E05006	6
50-07	Stud, nut & s-washer (pump casing)	E05004	E05004	E05004	6
50-08	Stud, nut & s-washer (lower oil box)	E05005	E05005	E05005	4
50-11	Oil Plug	E05001	E05001	E05001	2
50-11-1	Seal washer, BUNA-N	E04007	E04007	E04007	2
50-14-2	Bolt & s-washer (bearing cover)	E05010	E05011	E05011	4
50-18-1	Bolt (lead wire support)	E05013	E05013	E05002	3
50-21A	Stud, nut & s-washer (upper oil box)	E05004	E05004	E05004	6
50-26	Stud, nut & s-washer (bearing housing)	E05004	E05004	E05004	6
50-27	Bolt & s-washer (bell mouth)	E05008	E05008	E05008	2
50-27-2	Bolt & s-washer (terminal box)-model 55, 75 Stud, nut & S-washer (terminal box)-model 110	E05007	E05007	E05004	4
50-32	Bolt & s-washer (cable clamp)	E05009	E05009	E05009	2
50-38	Bolt & Nut (discharge flange)	E05015	E05015	E05015	8

	Pump Model	PGV220	QTY.
Pos. No.	Part Description	Part #	Needed
01	Strainer	E00102	1
03	Impeller Nut	E00301	1
04	Impeller Washer	E00402	1
05	Impeller	E00504	1
06	Impeller Key	E00602	1
07	Pump Casing	E00703	1
07A	Guard Plate	E00704	1
08	Lower Oil Box	E00802	1
08-1	O-ring, BUNA-N	E04013	1
09	Lip Seal, BUNA-N	E00902	1
13	Mechanical Seal	E01302	1
14	Lower Ball Bearing	E01403	1
14-2	Bearing cover	E01413	1
16	Motor Housing	E01604	1
16-1	O-ring, BUNA-N	E04012	1
16S	Pump Support	E01612	1
17	Rotor w/ shaft	E01704	1
18	Stator, 460V, 3PH, 60Hz	E01804	1
18-1	Lead Wire Support	E01812	1
20	Upper Ball Bearing	E02003	1
21A	Upper Oil Box	E02104	1
23	Motor Protector 460V, 3PH, 60Hz	E02304	1
26	Bearing Housing	E02603	1
26-1	O-ring, BUNA-N	E04012	1
27	Power cord	E02704	1
27-1	Bell Mouth	E02713	1
27-2	Terminal Box	E02722	1
27-2-1	O-ring, BUNA-N	E04014	1
28	Cable Packing	E02804	1
28-1	Cable Washer	E02813	1
28-2	Screw Gland	E02823	1
32	Cable Clamp	E03202	1
34A	Eyebolt (pump support)	E03402	4
38	Discharge Adapter 4"	E03801	1
38-1	Gasket, discharge-F.R.R	E04006	1
50-01	Bolt (Strainer)	E05020	8
50-07	Stud, Nut & S-washer (pump casing)	E05019	8
50-08	Bolt & S-washer (lower oil box)	E05022	6
50-11	Oil Plug	E05001	2
50-11-1	Seal washer, BUNA-N	E04007	2
50-14-2	Bolt & S-washer (bearing cover)	E05011	4
50-18-1	Bolt & S-washer (Lead wire support)	E05011	3
50-21A	Stud, Nut & S-washer (upper oil box)	E05018	8
50-26	Stud, Nut & S-washer (bearing housing)	E05018	8
50-27	Bolt & S-washer (Bell mouth)	E05021	2
50-27-2	Stud, Nut & S-washer (terminal box)	E05018	5
50-32	Bolt (cable clamp)	E05003	2
50-38	Bolt & Nut (discharge flange)	E05017	8

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			
Person in Charge		Phone()	
Purchased From			
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 (Use C/W for clockwise, CC/W for counterclockwise): _____			
Method used to check rotation (viewed from bottom) _____			
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			
MEG OHM CHECK OF INSULATION			
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		
Was debris removed in your	<input type="checkbox"/> Yes <input type="checkbox"/> No		

START-UP REPORT FORM

presence?		
Are guide rails exactly 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
Operation Check		
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).		
If not on levels controls, describe type of controls		
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		
NOTE: At no time should hole be made in top of control panel, unless proper sealing devices are utilized.		
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		
SINGLE PHASE		
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
THREE PHASE		
Voltage supply at panel line connection, pump off		
L1-L2	L2-L3	L3-L1

START-UP REPORT FORM

Voltage supply at panel line connection, pump on		
L1-L2	L2-L3	L3-L1
Amperage load connection, pump on		
L1	L2	L3
FINAL CHECK		
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: Does station 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:		
Describe and equipment difficulties during start-up		
Installed by: Company: _____ Person: _____ Date: _____		
Maintained by: Company: _____ Person: _____		
Date and time of start-up _____ Present at start-up: () Engineer's name _____ () Contractor's name _____ () Operator's name _____ () others _____		

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