

### INSTALLATION & SERVICE INFORMATION

#### MOUNTING

Flojet 4000 series is a self priming pump series. It may be located several feet from the tank, above or below the liquid level (it is not a submersible pump). For vertical pump mounting be sure that the motor is located on top. This will prevent water from entering the motor chamber in event of a leak.

#### PREVENTATIVE MAINTENANCE TIPS

##### Beverage Applications

Care should be used when applying sealers; the tape may enter the pump inhibiting valve action, causing no prime or no shut-off conditions. Failures due to foreign debris are not covered under warranty.

Protect pumps at all times from freezing conditions. Fluid freezing inside of pump head can cause severe damage. Flojet beverage pumps are intended for use with drinking water and various beverage fluids. Use with any other fluid products may cause damage to the pump. Consult factory for further details.

##### Industrial Applications

Care should be used when applying sealers; the tape may enter the pump inhibiting valve action, causing no prime or no shut-off conditions. Failures due to foreign debris are not covered under warranty.

Protect pumps at all times from freezing conditions. Fluid freezing inside of pump head can cause severe damage.

Do not assume chemical compatibility. If the fluid is improperly matched to the pump's elastomers, the pump may fail to prime, have low pressures or the pressure sensor may not shut off the pump.

Consult factory for questions about matching the elastomer compatibility with the chemicals used in the application.

#### PLUMBING

For best performance, flexible hose is recommended instead of rigid piping at the pump. Flojet 4000 Series ports are a push-in type retained by a “C” clip. To install the 4000 ports move “C” clips to rear of pump. Push the port until snug. Slide “C” clip forward to front of pump. Do not install pump in such a way that plumbing causes excessive stress on either port.

It is essential that a 20 mesh (min.) strainer or filter be installed in the tank or in the pump inlet line to keep large foreign particles out of the system. The Flojet 1600 Series 40 or 20 mesh strainer is available with various connections to fit most installations. For more information, request Form No. 81000-072. The use of check

valves in the plumbing system may interfere with the priming ability of the pump. Check valves, if used, must have cracking (opening) pressure of no more than 2 psi.

#### OPERATION

To start and prime the pump, the discharge line must be open allowing trapped air to escape, thus avoiding the potential of airlock. The pressure sensor will shut off the pump automatically when the discharge valve is closed and the pressure has risen to the sensor set point. The pressure sensor will restart the pump when a valve is opened and the discharge line pressure drops to the ON set point of the sensor.

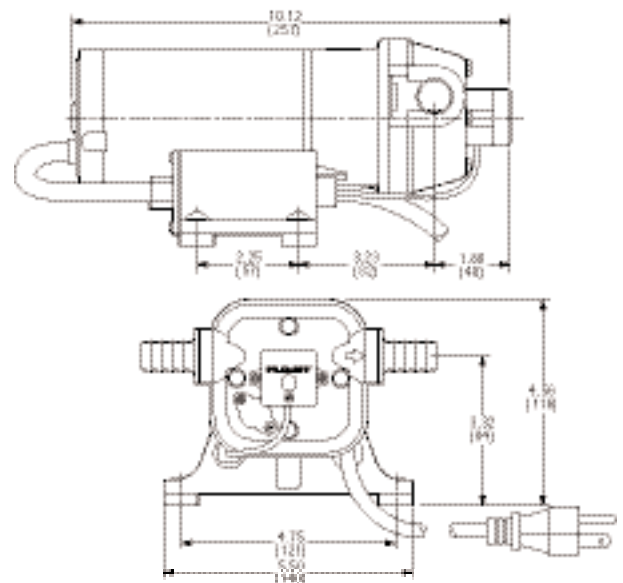
The sensor controlled motor will automatically adjust in real time to change in flow due to the number of nozzles in operation, filter back pressure, other system restrictions and working fluid viscosity. A constant pressure is maintained by the microcontroller adjusting to the system demand in flow. As more liquid is needed, the motor responds with higher motor speeds, and conversely, as the demand lessens, the motor will slow to meet the required flow at the system pressure.

Do not adjust the pressure calibration screw, as this voids the warranty. Adjusting the pressure calibration screw to cause an operating pressure higher than

Model 4000 “Quad” AC VSD

#### DIMENSIONAL DRAWING

Dimensions in inches (millimeters)



factory settings may damage the pump. No user-serviceable components inside the ACVSD control module. Opening the control module voids warranty.

### **DEMAND OPERATION (intermittent duty)**

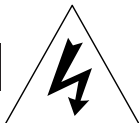
Demand Operation is considered an “intermittent duty” application. The maximum intermittent duty cycle is that which will cause the motor to reach its maximum thermal limits. Once the maximum thermal limit is reached, the motor must be allowed to settle to a lower temperature ideally being ambient before resuming operation. Running the pump at or near the maximum thermal limit for an extended period of time will shorten the life of the pump and may result in immediate pump failure.

The Flojet Quad ACVSD pump has a maximum load duty cycle of 10 minutes on / 90 minutes off. The cycle period increases when the pump is used at less than maximum flow and pressure.

### **ELECTRICAL**



**WARNING**



#### **Risk of an electrical shock!**

When wiring electrically driven pumps, follow all electrical and safety codes, as well as the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

Make certain the power source conforms to the pump voltage. Be sure all power is disconnected before installation. The pump should be wired into an individual (dedicated) circuit.

Standard 115-volt AC pump comes with 6-foot cord with molded-in plug.

On 115-volt AC pumps, the black wire lead is “hot” (live), the white lead wire is neutral and the green/yellow is ground. On 230-volt AC pumps the brown wire lead is “hot” (live), the blue wire is neutral and the green/yellow is ground.

Under most conditions, the unit can produce stable pressures for spray nozzle applications as low as 0.1GPM or lower. Flexible tubing between the pump and spray nozzle can stabilize systems that exhibit pulsation with very low flow demands.



**WARNING**



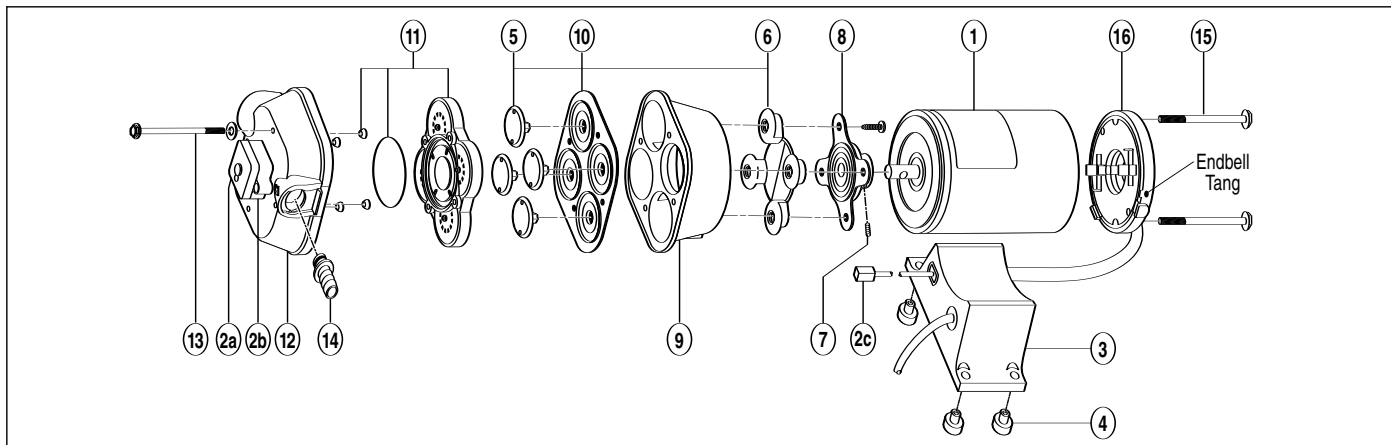
**THIS PUMP HAS BEEN EVALUATED FOR USE WITH WATER ONLY. DO NOT USE TO PUMP FLAMMABLE FLUIDS, GASOLINE, KEROSENE FUEL OIL, ETC. DO NOT USE PUMP IN A EXPLOSIVE ENVIRONMENT.**

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**PRODUCT WARRANTY IS VOID  
IF INSTALLATION INSTRUCTIONS  
ARE NOT FOLLOWED**

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## PARTS LIST MODEL 4000 SERIES



KEY	DESCRIPTION
1	Motor Assembly
2a	Sensor Housing Cover
2b	Sensor Housing
2c	Sensor
3	Motor Controller/Base (provided w/Brush/Endbell/Rectifier Assembly)
4	Grommet (4)
5	Piston, Inner
6	Piston, Outer
7	Cam/Bearing Set Screw
8	Cam/Bearing w/Set Screw
9	Bearing Cover
10	Diaphragm w/Pistons & Screws

KEY	DESCRIPTION
11	Check Valve, Ferrules & O-Ring
12	Upper Housing Assy
13	Pump Screw
14	1/2" Port Kit EPDM, (Set of 2) Part No. 20381-002 1/2" Port Kit Viton®, (Set of 2) Part No. 20381-015 3/4" Port Kit EPDM, (Set of 2) Part No. 20381-006 3/4" Port Kit Viton®, (Set of 2) Part No. 20381-014
15	Motor Bolts (2)
16	Brush/Endbell/Rectifier Assembly (provided w/Motor Controller/Base)

NOTE: Consult the 4000 service parts kits list (F100-024) for specific part numbers.

## SERVICE TIPS

### DISASSEMBLY

1. Disconnect power to the unit.
2. Remove the cover (2a) from the sensor housing (2b).
3. Remove sensor (2c) from the sensor housing (2b) by lifting the retaining tang slightly and pulling the sensor wire.
4. Remove four pump head screws (13).
5. Rotate bearing cover (9) so drain notch is aligned with cam/bearing assembly set screw (7).
6. Loosen set screw with 1/8" allen wrench and slide pump head off shaft. *Always* use complete FLOJET repair kits upon reassembly.

### REASSEMBLY

1. Install new single-piece outer piston (6) into bearing cover (9) with piston tops pointing away from motor.
2. Slightly bend outer piston (6) along premolded crease to aid assembly.
3. Place diaphragm in bearing cover (9) with the molded O-ring seals facing away from motor.
4. Insert each inner piston (5) through diaphragm into outer piston.
5. Turn each piston until fully seated.
6. Align cam/bearing assembly (8) with outer piston (6).
7. Secure with cam/piston screws using 18 inch-pounds of torque.

8. Reassemble lower housing (6, 8, 9) to motor.
9. Set screw **MUST** be positioned over shaft indentation and secured tightly.
10. Reassemble pump upper housing (11,12).
11. Check that ferrules are installed in upper housing and O-ring is properly seated before inserting check valve assembly (11) into upper housing (12).
12. Align pump assembly to motor and tighten pump head screws evenly with 25 inch-pounds of torque.

### VSD Drive/Rear Endbell Replacement

1. Disconnect power to the pump motor controller.
  2. Remove the sensor lead wire by lifting the connector-retaining tang slightly and pulling out the sensor lead connector.
  3. Remove the two hex-head machine screws located under the drive module/base plate.
  4. Remove the endbell: Remove the two motor bolts (15) that secure the endbell (16).
  5. Pull the endbell from the motor. It may be necessary to gently pry the endbell before pulling. Break the endbell loose by inserting a tool at the endbell tang.
- To install a new drive module/base plate, reverse the disassembly procedure.

## TROUBLESHOOTING

**NOTE: Observe all proper safety precautions. Remove power from the unit prior to servicing. Only qualified personnel should attempt to service the unit.**

### Motor Operates, but No Pump Discharge (Failure to Prime)

- Restricted intake or discharge line. Open all line valves.
- Check for debris in check valves.
- Check for clogged inlet filter.
- Air leak in intake line.
- Punctured pump diaphragm.
- Defective pump check valve.
- Crack in pump housing.

### Motor Fails to Turn On

- Pump or equipment not plugged in electrically.
- Loose wiring connection.
- Defective motor.
- No flow – system is pressurized.

### Pump Fails to Turn Off after Discharge Valves are Closed

- Depletion of available liquid supply.
- Punctured pump diaphragm.
- Discharge line leak.
- Accumulation of debris inside pump and plumbing.
- Defective sensor switch.
- Insufficient voltage to pump.

### Low Flow and Pressure

- Air leak at pump intake.
- Accumulation of debris inside pump and plumbing.
- Worn pump bearing (excessive noise).
- Punctured pump diaphragm.
- Defective rectifier or motor.

### Pulsating Flow – Pump Cycles On and Off

- Restricted pump delivery. Check discharge lines, fittings, valves and spray nozzles for clogging.

### Failure to Turn Off

- Pump continues to run at a low speed even after flow has ceased. Air may be trapped in pump. This is likely to occur after installing or re-installing a VSD pump or pulling air into the inlet, then running the unit only at low flows. Purge air from the pump by running the pump at open flow with a fully flooded inlet for 1 minute or more.

## FAILURE MODES FOR AC VSD

### Failure to Turn Off, High Speed

**Symptom:** The pump continues to run at a high speed even after flow has ceased.

**Possible Causes:** Sensor is not properly seated in housing, such as after replacement of a motor pump unit. Also, the sensor or sensor wiring may be damaged.

**Solution:** Ensure the sensor is fully seated under the retaining clip (located beneath the cap on the pressure sensor housing). Inspect sensor and wiring for damage.

### Failure to Turn On; Pump Stops

**Symptom:** The pump does not turn on or quits after extended operation.

**Possible Causes:** Power is not applied to the unit. The fuse is blown. The motor or the control module overheated.

**Solution:** If the motor is hot, allow it to cool for 1/2 hour or more. Verify power is available at the unit. Check the fuse. The fuse should not blow unless there is a cause. See below for blown fuses.

### Fuse is Blown

**Symptom:** The fuse is blown.

**Warning:** NEVER defeat a fuse, or replace with a higher rated fuse, or use a fuse with a time delay greater than the specified fuse. If a fuse repeatedly blows, take the unit out of service immediately. Do not attempt to inspect or repair the interior of the VSD module. Only qualified personnel should evaluate a possibly defective motor.

**Possible Causes:** Defective condition in the equipment. The fuse should not blow under normal conditions. If the fuse is blown, an abnormal condition may exist in the equipment. Possible causes of a blown fuse include: locked rotor, internal motor short, shorted wiring between the VSD and the motor, or failure within the VSD module. A locked rotor could be caused by frozen fluid, or mechanical seizure.

**Solution:** Inspect exposed wiring. If unit or fluid is frozen, allow it to thaw. If no external or environmental cause is identifiable, remove unit from service.

## SERVICE KITS

Kits are readily available to repair standard 4000 series pumps. To insure that the correct kits are received the model number and all name plate data must be included with the order. Contact a FLOJET distributor to order the necessary repair kits.

## PRODUCT WARRANTY

Flojet warrants this product to be free of defects in material and/or workmanship for a period of one year after purchase by the customer from Flojet. During this one year warranty period, Flojet will at its option, at no charge to the customer, repair or replace this product if found defective, with a new or reconditioned product, but not to include costs of removal or installation. No product will be accepted

for return without a return material authorization number. All return goods must be shipped with transportation charges prepaid. This is only a summary of our Limited Warranty. For a copy of our complete warranty, please request Form No. 100-101.

## RETURN PROCEDURE

Prior to returning any product to Flojet, call customer service for an authorization number. This number must be written on the outside of the shipping package. Place a note inside the package with an explanation regarding the reason for return as well as the authorization number. Include your name, address and phone number.

# Flojet



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[www.flojet.com](http://www.flojet.com)

U.S.A.  
Jabsco  
Cape Ann Industrial Park  
Gloucester, MA 01930  
Tel: 978.281.0440  
Fax: 978.283.2619

UNITED KINGDOM  
Jabsco  
Bingley Road, Hoddesdon  
Hertfordshire EN11 OBU  
Tel: +44 (0) 1992 450145  
Fax: +44 (0) 1992 467132

CANADA  
Fluid Products Canada  
55 Royal Road  
Guelph, Ontario N1H 1T1  
Tel: 519 821.1900  
Fax: 519 821.2569

JAPAN  
NHK Jabsco Company Ltd.  
3-21-10, Shin-Yokohama  
Kohoku-Ku, Yokohama, 222  
Tel: 045.475.8906  
Fax: 045.475.8908

GERMANY  
Jabsco GmbH  
Oststrasse 28  
22840 Norderstedt  
Tel: +49-40-53 53 73 -0  
Fax: +49-40-53 53 73 -11

ITALY  
Jabsco Marine Italia  
Via Tommaseo, 6  
20059 Vimercate, Milano  
Tel: +39 039 685 2323  
Fax: +39 039 666 307