



NRF/NBF/SSF Circulator

<https://qr.xylemsales.com/p58671>



Installer

NOTICE:

PLEASE LEAVE THIS MANUAL FOR OWNER'S USE



SAFETY INSTRUCTIONS


This safety alert symbol will be used in this manual and on the unit safety instruction decals to draw attention to safety related instructions. When used, the safety alert symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.

Introduction

Note: Bell & Gossett recommends Bronze or Stainless Steel Booster Pumps be used for pumping potable water.

This pump is for indoor use only.

Your NRF/NBF/SSF Booster Pump should have the warning/ caution label and non submersible warning label displayed to the right, See [Figure 1](#) on page 1 on the pump conduit box. If this warning and caution label is missing or illegible, contact your local B&G Representative for a replacement.

 WARNING
BEFORE INSTALLING, USING OR SERVICING THIS PRODUCT, READ THE INSTRUCTIONS. TO REDUCE RISK OF ELECTRICAL SHOCK SEE INSTRUCTIONS FOR PROPER INSTALLATION
 CAUTION
FOR SUPPLY CONNECTIONS USE WIRE SUITABLE FOR AT LEAST 90°C. USE COPPER CONDUCTORS ONLY. EMPLOYER DES FILS D'ALIMENTATION ADEQUATS POUR 90°C. FOR INDOOR USE ONLY. EMPLOYER UNIQUEMENT A L'INTERIEUR.


 WARNING
RISK OF ELECTRICAL SHOCK. THIS PUMP HAS NOT BEEN INVESTIGATED FOR USE IN SWIMMING POOL AND MARINE AREAS. -NONSUBMERSIBLE PUMP-

Figure 1: Warning label

Description

The Model NRF/NBF/SSF Circulator Pump features system liquid lubricated bearings, non-overloading permanent split capacitor motor with impedance protection and quiet operation.

Pump Application

The Model NRF/NBF/SSF Booster Pump may be used for water circulating applications in hydronic and solar systems. This pump is nonsubmersible, for indoor use only.

It has not been investigated, nor is it intended for use in swimming pool and marine areas.

Glycol mixture statement

- PL pumps can be used to circulate water and glycol mixtures up to a recommended 30% concentration and 40% for snow melt applications.
- Pump performance is based on 77°F (25°C). Therefore pumping of glycol mixtures will affect max performance, depending on mixture concentration and temperature.

Recommended accessories

- Pump is recommended to be used with clean water systems.
- Dirt or magnetic separators are recommended if the water is high in particulate matter such as iron oxide and/or mineral deposits. Clean water promotes long pump life.

Operational limits

These pumps are designed to pump liquids compatible with their iron, bronze or stainless steel body constructions.

Maximum Operating Pressure:	150 PSI (10 bars)
Operating temperature:	NRF-22 & NRF-9F/LW, -10°C to 115°C (50°F to 239°F)
	NBF Pumps (except NBF-33), -10°C to 110°C (50°F to 230°F)
	NRF-33 & NBF-33, -10°C to 107°C (50°F to 225°F)
	SSF Pumps, -10°C to 110°C (50°F to 230°F)
Electrical Rating:	115V, 60Hz, 1Ø; 220V, 60Hz, 1Ø;
	220V, 50Hz, 1Ø; 230V, 60Hz, 1Ø

If your NBF pump is equipped with a sweat connected pump body, the maximum operating pressure is limited to 150 PSI (10 bars) or a lower value determined by the type of solder used and pressure/temperature limitations listed below:

Do not exceed these values.

(Solder type limits per ASTM STD. B16.18-1978)

Pump body	Type of solder	Maximum limitations	
		Pressure PSI	Temperature °F
Sweat	95-5 TIN-Antimony	300	200
		250	225
		200	250

**WARNING:**

Failure to follow these instructions could result in serious personal injury or death.

Safety Requirements

Mechanical safety

**WARNING: Excessive system pressure hazard**

The maximum working pressure of the pump is listed on the nameplate. Do not exceed this pressure. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

**WARNING:**

The heating of water and other fluids causes volumetric expansion. The associated forces may cause failure of system components and release of high temperature fluids. This will be prevented by installing properly sized and located pressure relief valves and compression tanks. Failure to follow these instructions could result in serious personal injury, death, and/or property damage.

Thermal safety

**WARNING: Thermal Hazard**

The surfaces or parts of the unit may become hot during operation. Allow surfaces to cool before starting work, or wear heat-protective clothing.

Electrical safety

**WARNING: Electrical Hazard**

Risk of electrical shock or burn. A certified electrician must supervise all electrical work. Comply with all local codes and regulations.

**WARNING: Electrical grounding hazard**

Adequate electrical grounding is required for the safe operation. The use of grounded metal conduit assures this requirement. If the means of connection to the supply-connection box (wiring compartment) is other than grounded metal conduit, ground the pump back to the service by connecting a copper conductor at least the size of the circuit conductors supplying the pump to the green grounding screw provided within the wiring compartment. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

**WARNING: Electrical Hazard**

Risk of electrical shock or burn. The equipment manufacturer has not evaluated this unit for use in swimming pools. If used in connection with swimming pools then special safety regulations apply.

**WARNING: Chemical Hazard**

This product can expose you to Mercury. Mercury is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to: www.P65Warnings.ca.gov.

Removal of the Pump from Existing System for Replacement

**WARNING: Electrical Hazard**

Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized. This applies to the control circuit as well.

1. Close the valves on the suction and discharge sides of the pump. (If no valves have been installed, it may be necessary to drain the system.)

**WARNING: Hot water hazard**

Before draining the system, allow water to cool to a maximum of 100°F (38°C). Open the drain valve (take precautions against water damage) and leave the drain valve open until servicing is complete. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

**WARNING: Electrical shock hazard**

Be certain the electrical power is not present at the motor leads before continuing. Failure to follow these instructions could result in serious personal injury or death.

2. Loosen the conduit box cover screw and remove the cover.
3. Disconnect the electrical supply lines to the pump.

**WARNING: High pressure hazard**

Pressure may be present in the pump body. This pressure can be relieved by loosening the flange bolts and shifting the pump assembly slightly to allow the pressurized water to escape. Failure to follow these instructions could result in serious personal injury or death.

4. Remove the flange nuts and bolts or loosen the union ring nuts. Then remove the pump from the piping.

Pump Installation

**CAUTION: PROPERTY DAMAGE HAZARD**

It is not advisable to install circulators in an attic or upper floor over finished living space. If the circulator must be installed over head, or over expensive equipment, provide adequate drainage in the event of leakage. Failure to follow these instructions could result in property damage.

Locate the pump so there is sufficient room for inspection, maintenance and service. Bell & Gossett recommends the installation of service valves on the suction and discharge of all circulators to facilitate servicing or replacement of the circulator without draining the system.

**CAUTION:**

The use of PTFE tape impregnated pipe compound and PTFE tape on pipe threads provides lubricity which can lead to overtightening and breakage. Do not overtighten. Failure to follow this instruction can result in moderate personal injury from hot water and/or property damage.

Install suction and discharge flanges or union connectors on the pipe ends. The use of PTFE tape sealer or a high quality thread sealant is recommended.

Be sure to minimize any pipe strain on the pump. Support the suction and discharge piping by the use of pipe hangers near the pump. Line up the vertical and horizontal piping so that the bolt-holes in the pump flanges match the bolt-holes in the pipe flanges. If union connections are used, line up the pump threads with union tail pieces. Do not attempt to spring the suction or discharge lines in position. This may result in unwanted stress in the pump body, flange connections and piping. The code for Pressure Piping (ANSI B31.1) lists many types of supports available for various applications.

Bell & Gossett flange/union gaskets must be installed between the NRF/NBF/SSF pump body flanges and the suction and discharge pipe flanges/union tail pieces. Use 7/16" diameter x 1 1/2" long cap screw and matching nut to connect the pump to the flanges.



WARNING: Hot water hazard

When disassembling a gasketed joint, always use a new gasket upon reassembly. Never re-use old gaskets. Failure to follow these instructions could result in serious personal injury, death and/or property damage.



WARNING: Hot water hazard

Make sure that each flange gasket remains seated in the flange groove during and after installation. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

Apply torque in even increments to both flange bolts until a value of 115 in-lbs. is reached. Both the suction and discharge flange bolts must be torqued in this manner.

If your NBF pump is equipped with a sweat connected pump body, see the following instructions:

1. Use a torch with a sharp pointed flame.
2. Clean tube ends and pump connections thoroughly.
3. Use 95-5 (Tin-Antimony); and a good grade of flux.



CAUTION: Thermal Hazard

The surfaces or parts of the unit may become hot during operation. Allow surfaces to cool before starting work, or wear heat-protective clothing.



CAUTION:

Read this manual carefully before installing and using the product. Improper use of the product can cause personal injury and damage to property, and may void the warranty.

4. When sweating the joints, first wrap the pump body with a cool wet rag, then direct the flame with care to avoid subjecting the pump to excessive heat.
5. Check soldered connections for leaks. If resoldering is required, take care to avoid subjecting the pump to excessive heat.



WARNING: Water leakage hazard

To prevent leakage, make certain that the flange bolts have been adequately torqued. Failure to follow these instructions could result in serious personal injury and/or property damage.

Mode of discharge

The Model NRF/NBF/SSF Circulator can be installed to discharge up or down, horizontally, left or right, but the motor shaft must remain in the horizontal position, the arrow on the body must point in the direction of the flow, the conduit box must be positioned on the top or to the side of the motor housing see [Figure 2](#) on page 3. If the conduit box position must be changed, it is best to do so before installation. However, if the pump is already installed, see the section titled [Removal of the Pump from Existing System for Replacement](#) on page 2 before proceeding.



CAUTION:

To change the conduit position

1. Remove the four (4) ¼ -20 Allen screws (³/₁₆ wrench) while supporting the motor assembly.
2. Remove the motor assembly from the pump body and rotate it to the desired position see [Figure 2](#) on page 3.
3. Replace the Allen screws and tighten evenly in a diagonal method to 60 in-lbs.
4. Check to see that the impeller turns freely. Insert your finger in the discharge port of the pump body (the arrow on the pump body points in the direction of the discharge) until you can feel the impeller and rotate it with your fingertip. If the impeller does not turn easily, repeat the disassembly/ reassembly process.

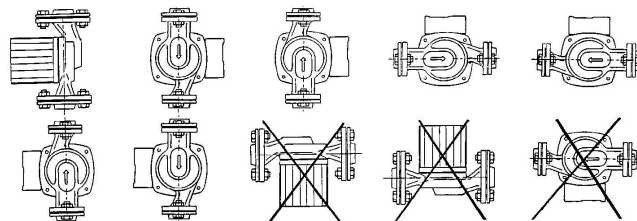


Figure 2: Conduit position



WARNING: Electrical Hazard

Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized. This applies to the control circuit as well.

Wiring Instructions

1. Loosen the screw securing the conduit box cover (wiring compartment), and remove the screw & cover.
2. Attach the appropriate size connector to the hole in the side of the conduit box.
3. Using a minimum size 14 AWG copper electrical wire (refer to your local code for wiring restrictions), wire the motor to a single phase power source that matches the electrical rating on the pump nameplate. See [Figure 3](#) on page 3. Use the size of electrical wire as dictated by local code.
4. Connect the ground wire to the inside of the conduit box with one of the green screws provided inside the box. See [Figure 4](#) on page 4.

Note: Electrical supply and grounding wires must be suitable for at least 90°C (194°F).

Note: Model NRF/NBF/SSF Circulators are impedance protected and do not require external overload protection.



WARNING: Electrical shock hazard

Be certain that all connections are secure and the conduit box is closed before electrical power is connected. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

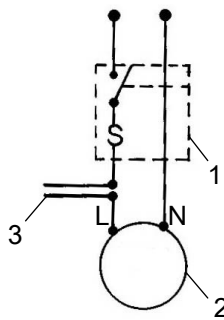


Figure 3: Typical wiring installation schematic 1Ø power source

1. Fusible disconnect or circuit breaker by others.
2. Pump motor (Impedance protected)
3. To remove control if required.

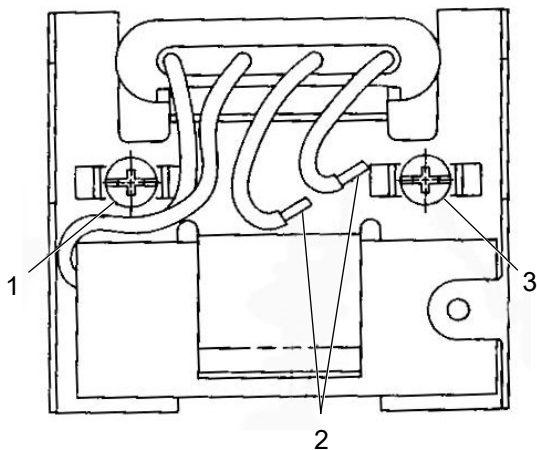


Figure 4: Conduit box wiring detail

1. Alternate ground screw
2. Line leads
3. Green ground screw

System Preparation

Prior to pump start up, closed heating and cooling systems should be cleaned, drained and refilled with clean water. System ph must be maintained between 7 and 9.

Startup

Do not start pump until the system has been filled and vented. Air should be vented from the system by means of an air vent located at a high point in the system, or by an alternate method. The system must be completely vented prior to pump operation. Do not run NRF/ NBF/SSF circulators dry. Pump operation without water circulation could result in pump and motor damage.



WARNING: Hot water leakage hazard

Pressurize the body slowly while checking for leaks at all joints with gaskets. Failure to follow these instructions could result in serious personal injury and/or property damage.

Periodic Inspection

Bell & Gossett NRF/NBF/SSF Circulators are designed to provide years of trouble free service. It is recommended that periodic inspections be made to check for potential problems with the pump. If any leakage or evidence of leakage is present, repair or replace the unit.

Storage guidelines

- Protect the product against humidity, dirt, heat sources, and mechanical damage.
- The product must be stored at an ambient temperature from -13°F to +131°F (-25°C to +55°C) and humidity < 95% (non-condensing).