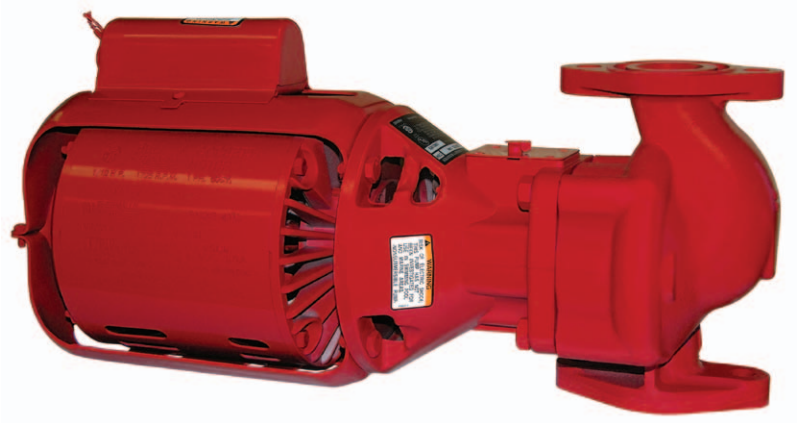
**TECHNICAL MANUAL**
HS-105-SM-R4



# Booster Pump

## Service Manual & Troubleshooting Guide

Bell & Gossett
a xylem brand

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# INTRODUCTION

This manual demonstrates the proper servicing techniques for Bell & Gossett Booster Pumps. B&G Boosters have been designed to give many years of trouble free operation with periodic maintenance limited to lubrication. However, should repair become necessary, service techniques illustrated and explained in this manual should be followed to provide safe and efficient methods of repair.

Repair procedures are outlined in a step-by-step fashion with pictures included to provide instructional clarity and accuracy. In the event that replacement parts are required, each item listed within this manual can be cross referenced to the B&G Booster Parts List.

**SAFETY INSTRUCTION**

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


Your Booster Pump should have this warning label affixed to the pump near the conduit box cover. If this warning is missing or illegible, contact your local Bell & Gossett Representative for a replacement.

### Pump Application

Bell & Gossett Booster Pumps may be used for water circulating applications in hydronic, solar and chilled water systems. If equipped with a bronze pump body, Bell & Gossett Booster Pumps may be used for water circulation in potable water systems. Note that some local codes require using a check valve in the supply line when recirculating potable water. If a supply line check valve is installed, a properly sized and located compression tank and pressure relief valve is required.

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

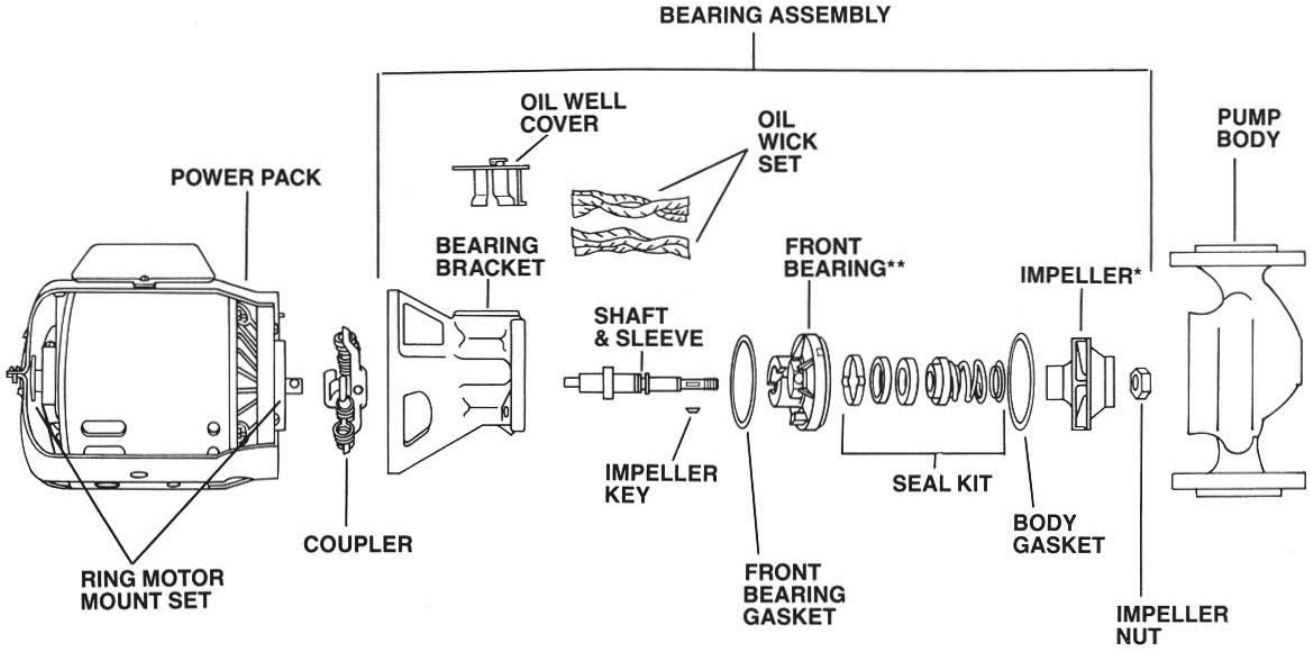
1. Electrical connections are to be made by qualified electricians in accordance with all national, state and local codes.

**WARNING: Electrical Shock Hazard** Electrical Connections must be made by a qualified electrician in accordance with all applicable codes, ordinances and good practices. Failure to follow these instructions could result in serious personal injury or death and property damage.

2. B&G Booster Pumps are designed to pump liquids compatible with their iron or bronze body construction at working pressures up to 125 psi at a maximum temperature of 225°F. Do not exceed these values.

**WARNING: Excessive 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 or death and property damage.

3. This pump is for indoor use only.




## Booster Pump

**Exploded View**

**NOTE:** Pump shown is Series 100. Replacement parts for all boosters are similar.

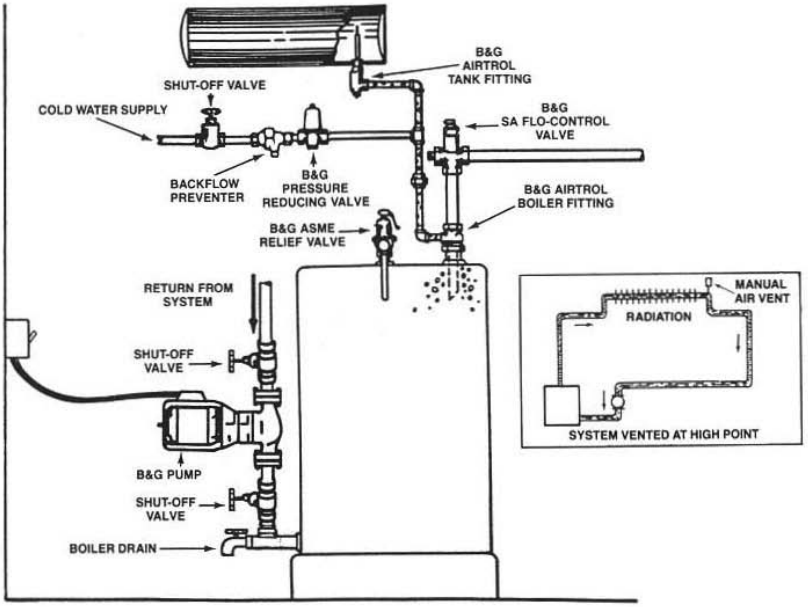
*– Impeller not always included in Bearing Assembly.

**–Shown rotated 90°

# 1.0 GENERAL FIELD SERVICE

Instructions for service procedures to be carried out in the field are demonstrated in this section. Steps of assembly and disassembly are in the order in which they will be encountered by servicepersons. The names of the parts listed within this manual are the same as those listed on the B&G Parts Lists. All service operations can be completed with common hand tools. These instructions have been written to specifically reflect the Series 100, HV, PR and 2" booster pumps. References to certain features such as over/under motor brackets and plastic impellers do not apply to all booster pumps.

**Note:** Removal of the pump body from the system is not necessary unless the flange gaskets are leaking or the pump body itself is damaged. In either case, it will not be necessary to remove the flanges.




## 1.1 System Preparation

The electrical supply must be turned off and the pump service valves must be closed before servicing procedures begin. If no service valves are installed, the city water supply valve should be closed.

> **WARNING: Hot Water Hazard**
> Before draining the system, allow water to cool to at least 100°F, open the drain valve (take precautions against water damage) and leave the drain valve open until servicing is completed. Failure to follow these instructions could result in serious personal injury and/or property damage.

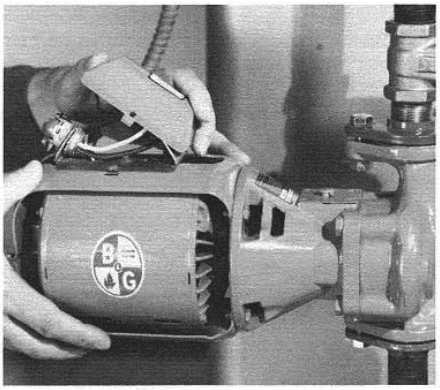
The system should then be drained by opening the boiler drain valve and the vent near the top of the system. If a Flo-Control valve is installed and there are balance valves on the returns, then the balance valves may be closed to isolate the boiler from the system. The Flo-Control valve will act as a check valve on the supply and only the boiler will need to be drained. Open a vent between the boiler and the system.

## 1.2 Removing the Conduit Box Cover

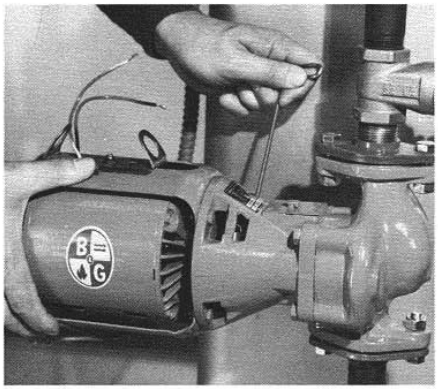
**WARNING: Electrical Shock Hazard** Disconnect and lockout the power before servicing. Failure to follow these instructions could result in serious personal injury or death.

**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.

**WARNING: Unexpected Start-Up Hazard** Single phase motors are equipped with automatic reset overload protectors. The pump can restart without warning. Disconnect and lockout power before servicing. Failure to follow these instructions could result in serious personal injury or death.



The conduit box cover must be removed and all electrical wires must be disconnected prior to separating the motor from the bearing assembly. The photograph illustrates the removal of the conduit box cover. This procedure is followed by the removal of the wire nuts and the flexible conduit connector.



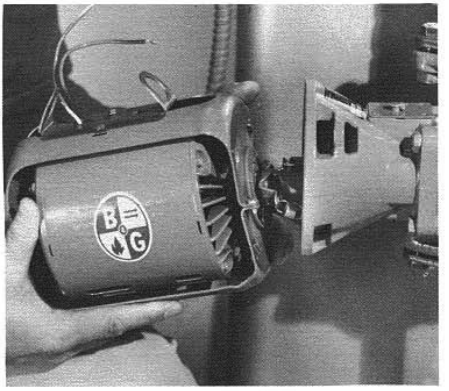
## 1.3 Disconnect the Coupler from the Pump Shaft

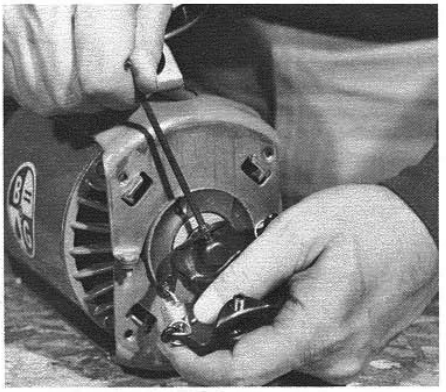
The coupler is released from the pump shaft by loosening the set screw with an Allen wrench. The set screw rests in a blind hole along the shaft; the set screw must therefore be backed off at least ⅛" before attempting to remove the coupler. If stuck, a screwdriver may be used to gently pry the coupler from the shaft (before prying, be certain that the set screw has cleared the depth of the blind hole — usually about three full turns of the wrench will clear the hole).

### 1.4 Separate the Motor from the Bearing Assembly

Support the motor assembly before beginning this procedure. Use a box wrench to loosen and remove the four motor cap screws connecting the motor to the bearing assembly.

With the cap screws removed, the motor can be separated from the bearing assembly. Provided that the coupler set screws were backed off sufficiently, the coupler should slide free of the pump shaft. If tight, a screwdriver may be used to gently pry the coupler loose.





**Note:** Noisy coupler operation or coupler failure are generally strong indicators of the need to replace the motor mounts. Refer to Section 2.0 for motor mount servicing instructions.

### 1.5 Removing and Replacing the Coupler

Similar to its removal from the pump shaft, the coupler is separated from the motor shaft by loosening the set screw with an Allen wrench. If the coupler is found to be broken completely or if excessive wear is observed, replace the entire coupler — never replace individual components of the coupler assembly. Neither the springs nor the coupler arms should ever be replaced. Replacing individual springs will only result in repeated breakage due to spring imbalance caused by the greater stiffness of the new springs compared to the old ones.

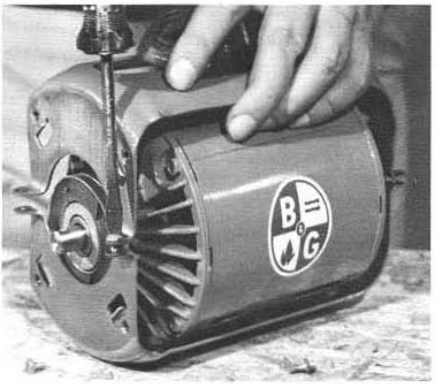
New couplers can be installed by reversing the removal operation. The set screw must be seated in the shaft recess to prevent slipping.

# 2.0 MOTOR MOUNT SERVICE

The following procedures illustrate and explain the operations that can be performed in the field. These operations are limited to the exterior of the motor. All repair work to the motor's interior should be performed by an authorized Bell & Gossett Motor Repair Station. Information regarding the nearest B&G repair station can be obtained from your local B&G Representative.

## 2.1 Motor Mount Replacement

The over/under brackets must be removed prior to servicing the motor mounts. These brackets can be separated by first removing the four clamp screws (there are two screws at each end of the motor) and then lifting one half from the other. This operation will leave the free standing motor.



## 2.2 Inspect Motor Mount Wear and Damage

Always visually inspect the motor mounts before removing them from the end plates. An inspection in-place may give some indication to the cause of an operational problem or failure.

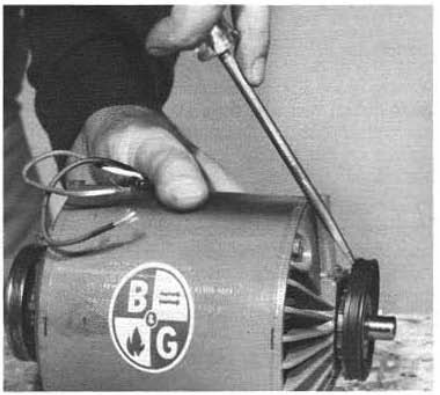
The motor mount in the photograph displays the effects of over-oiling. Though B&G motor mounts are made of neoprene, an oil resistant compound, constant oil soaking will eventually produce material damage. This mount has been damaged and has begun to sag as a result.

Always replace both motor mounts when either one shows signs of sagging. Never replace one mount at a time. Single replacements will only result in misalignment of pump and motor shafts.

### 2.3 Removing the Motor Mount – Outer Ring

The motor mount's outer ring can be removed by using a hammer and screwdriver. As shown, place the screwdriver between the front mounting and the end plate of the motor; the head should be angled inward toward the mount's rubber section. Tap the screwdriver to force it through the rubber.

The screwdriver can now be used to pry against the inner ring of the mount to remove the outer ring. Care should be taken during this operation to prevent damage to the motor shaft or end plates.



### 2.4 Removing the Motor Mount – Inner Ring

The inner ring of the motor mount, which should not come off with the outer ring, will require an additional effort for its removal. B&G suggests the use of either a cold chisel to cut through the inner ring or a means of prying the ring from the end plate. In both cases, however, care must be taken to prevent damage to the motor itself and/or the motor end plates.

## 2.5 Replacing the Motor Mount

Remember to always replace both mounts whenever one of the mounts begins to sag — never replace one mount and not the other. Replace the front mount first and then the rear mount. To correctly position a replacement mount, set it square on the boss of the motor end plate as shown.

Orient the mount so that the split along its outer diameter is aligned to the bottom of the motor (direction opposite the oil tube). With the mount positioned and aligned properly, use a hammer to tap around the mount until it sits flush against the end plate. Repeat the procedure for the rear mount.

## 2.6 Completing Motor Mount Service

Wipe any debris or oil that may have settled on the over/under brackets. Set the motor into the under bracket so that the two threaded holes in the bracket's end face the same direction as the motor shaft. Pull the ground wire over the top of the rear mount as shown and place the over bracket with its tabs also facing the front of the motor. The ground wire should now extend out from between the over bracket and the motor mount.

Place and tighten the four bracket screws so the motor fits securely between them. It should not be possible to rotate the motor once it is mounted in the brackets.