



Circuit Setter® Plus Model "RF" Balance Valves (With Standard Sweat Connections)

Installation, Operation, & Service Instructions

INSTALLER: PLEASE LEAVE THIS MANUAL FOR THE OWNER'S USE.



SAFETY INSTRUCTIONS

This safety alert symbol will be used in this manual 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.**

OPERATIONAL LIMITS

(Solder Type Limits Per ASTM STD. B16.18-1978)

| CIRCUIT SETTER STYLE | TYPE OF SOLDER | MAXIMUM LIMITATIONS | |
|----------------------|----------------|---------------------|----------------|
| | | PRESSURE PSI | TEMPERATURE °F |
| SWEAT | 95-5 | 300 | 200 |
| | TIN- | 250 | 225 |
| | ANTIMONY | 200 | 250 |



WARNING: Damage to the Circuit Setter or failure of solder sealing joints may occur if these operational limits are exceeded. This can result in water leakage. Failure to follow this instruction could cause serious personal injury and/or property damage.

DESCRIPTION

Bell & Gossett Model "RF" Sweat Circuit Setter Balance Valves are precision engineered valves which function as precise system balancing valves and highly accurate variable orifice flow meters. The Circuit Setter Valves function as positive shutoff service valves. Bell & Gossett Model "RF" Sweat Circuit Setter Balance Valves are equipped with an easy to operate memory stop feature. They are also equipped with a drain port feature.

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INSTALLATION INSTRUCTIONS

1. To retain calibrated accuracy, a minimum length of unrestricted straight pipe equivalent to 3 pipe diameters upstream and 1 pipe diameters downstream must be maintained immediately adjacent to the Circuit Setter Balance Valves.
2. Circuit Setter Balance Valves are bi-directional and can be installed in most positions. However, they should be installed in a position to facilitate balancing of the system.

IMPORTANT:

Bell & Gossett Circuit Setter Balance Valves are not recommended for use with meter connections pointing down. Dirt can collect in the connections and foul up the readout valves and readout meters.

3. Circuit Setter Balance Valves are equipped with a 1/4" NPT plugged drain port. If the drain port is to be used to drain a riser on the downstream side of a terminal unit, the drain port should be situated on the terminal unit side of the riser when installing the Circuit Setter.
4. Use a torch with a sharp pointed flame.
5. Clean tube ends and Circuit Setter connections thoroughly.
6. Use 95-5 (Tin-Antimony) solder.



CAUTION: Heat associated with the use of silver solder may damage a Circuit Setter and void the warranty. Do not use silver solder. Failure to follow these instructions could result in property damage and/or moderate personal injury.



CAUTION: Excessive use of solder may result in damage to the valve seat and ball. Do not use excessive flux. Failure to follow these instructions could result in property damage and/or moderate personal injury.

7. When sweating the joints, first wrap the valve body with a cool wet rag, then direct the flame with care to avoid subjecting the Circuit Setter to excessive heat. Allow the valve body to cool below 200°F before installing the (2) Model RV-125A Readout Valves packaged with the Circuit Setter Balance Valve.
8. Check soldered connections for leaks. If resoldering is required, remove readout valves before applying the torch to the connection(s).

OPERATING INSTRUCTIONS

HOW TO USE BELL & GOSSETT CIRCUIT SETTER TO ESTABLISH REQUIRED SYSTEM FLOW

1. Turn the knob by hand to open the Circuit Setter to the "A" position. Circuit Setter position (amount the Circuit Setter is open and closed) can be read by the position of the knob slot/pointer on the nameplate.
2. Energize the Zone, Circuit and/or system pump(s) as applicable so that fluid is flowing through the Circuit Setter.
3. Using Bell & Gossett Model RP-250B readout probes, attach a Bell & Gossett differential pressure readout kit to the readout valves on the Circuit Setter Balance Valve.



WARNING: Hot water leakage can occur from readout valves during probe insertion and during hookup of readout kit. Follow the instruction manuals supplied with readout probes and readout kits for safe use. Failure to follow this instruction could result in serious personal injury and/or property damage.

4. Read the differential pressure across the Circuit Setter.
5. Refer to the "A" position pressure drop curve in this manual for the model Circuit Setter installed and read the flow corresponding to the measured pressure drop. The Cv shown on the curve may also be used to calculate the flow or to read the flow from scale 5 on the Bell & Gossett System Syzer.

IMPORTANT:

If the system contains a liquid with a specific gravity and/or viscosity higher or lower than that of water, apply the appropriate correction factor noted in the Corrective Factors for Viscosity and Specific Gravity Table to obtain the actual GPM for the system liquid.

6. If the GPM does not agree with the specified (required) GPM, close the Circuit Setter accordingly. Repeat steps 5 and 6 until the required results have been achieved.

HOW TO USE BELL & GOSSETT CIRCUIT SETTER BALANCE VALVES AS AN ISOLATION VALVE

1. Move the adjustment knob until the position indicator aligns with the closed position on the calibration plate.
2. Close the isolation valve on the other side of the equipment to be serviced.
3. Open a drain valve to drain the system between the Circuit Setter and second isolation valve.



WARNING: Check for proper sealing when using as an isolation valve. If the seat is not sealing properly liquid will continue to flow from the drain valves. In this case, the Circuit Setter must be isolated from the system and replaced. Failure to do so could result in serious personal injury and/or property damage.

HOW TO USE THE MEMORY STOP FEATURE

1. Make the final degree of closure setting.
2. Loosen the memory stop locking screw in the slot on the top of the adjustment knob.
3. Rotate the plastic ring under the adjustment knob counter-clockwise until the tab on the plastic ring stops against the nameplate.
4. Tighten the memory stop screw.

SERVICE INSTRUCTIONS

Periodically inspect the Circuit Setter for signs of leakage or corrosion.



WARNING: Corrosion or leakage are indications that the Circuit Setter may be damaged and must be replaced. Failure to follow this instruction could result in serious personal injury and/or property damage.

INSULATION

If an optional insulation set is used, then Bell & Gossett recommends that the insulation be attached to the Circuit Setter after the system has been balanced. Tape or other acceptable means should be used to secure the insulation to the Circuit Setter Balance Valve.

HOW TO USE THE BELL & GOSSETT CIRCUIT SETTERS TO PROPORTIONATELY BALANCE A SYSTEM

1. Open to "A" position all "RF" Circuit Setters and all standard Circuit Setters to the fully open position for single pump systems.
2. If more than one branch circuit is used, start the balance procedure by reading all of the flows to the units in a branch. Each unit (coil) should have its own Circuit Setter for flow balancing. Using Bell & Gossett RP-250B readout probes, sequentially attach a Bell & Gossett differential pressure Readout Kit to the Readout Valves on each Circuit Setter Balance Valve.



WARNING: Hot water leakage can occur from readout valves during probe insertion and during hookup of readout kit. Follow the instruction manuals supplied with readout probes and readout kits for safe use. Failure to follow this instruction could result in serious personal injury and/or property damage.

3. Using side 2 of the Bell & Gossett Circuit Setter Balance Valve Calculator, with the top hairline set on zero for the size Circuit Setter being read, or the pressure drop curves supplied in this manual for the "RF" models read the flow corresponding to the pressure drop read with the readout kit.
4. Calculate the ratio of the actual flow to the design flow for each unit in the branch. This is the proportional flow rate. (Actual flow divided by design flow.)
5. Select the Circuit Setter with the lowest proportional flow. This Circuit Setter is left in the "A" position if "RF" model or the full open position for standard Circuit Setters. Every other Circuit Setter in the branch is then reset to the same proportional flow.

6. If there are additional branches, repeat the steps in 3 and 4 for each branch.
7. After all branches have been proportionately balanced, measure the full open flows on the Circuit Setter Balance Valves installed on the risers. Calculate the proportional ratio of each riser Circuit Setter and select the one with the lowest proportional ratio. This Circuit Setter is left fully open and the other riser Circuit Setters are adjusted to the same ratio.
8. Adjust pump flow so that circuits are receiving their design flow. This can be accomplished by adjusting a Circuit Setter Balance Valve installed on the pump discharge or by changing the pump impeller size.

IMPORTANT:

If a high degree of throttling of flow at pump discharge is required, Bell & Gossett recommends that the impeller be sized to produce design flow. This will reduce electrical energy consumption.

B&G CIRCUIT SETTER CORRECTION FACTORS FOR VISCOSITY AND SPECIFIC GRAVITY

$$GPM_f = \frac{\emptyset}{\sqrt{S.G.}} GPM_s$$

$$f = \frac{\emptyset}{\sqrt{S.G.}}$$

$$GPM_f = f GPM_s$$

GPM_f – FLUID FLOW

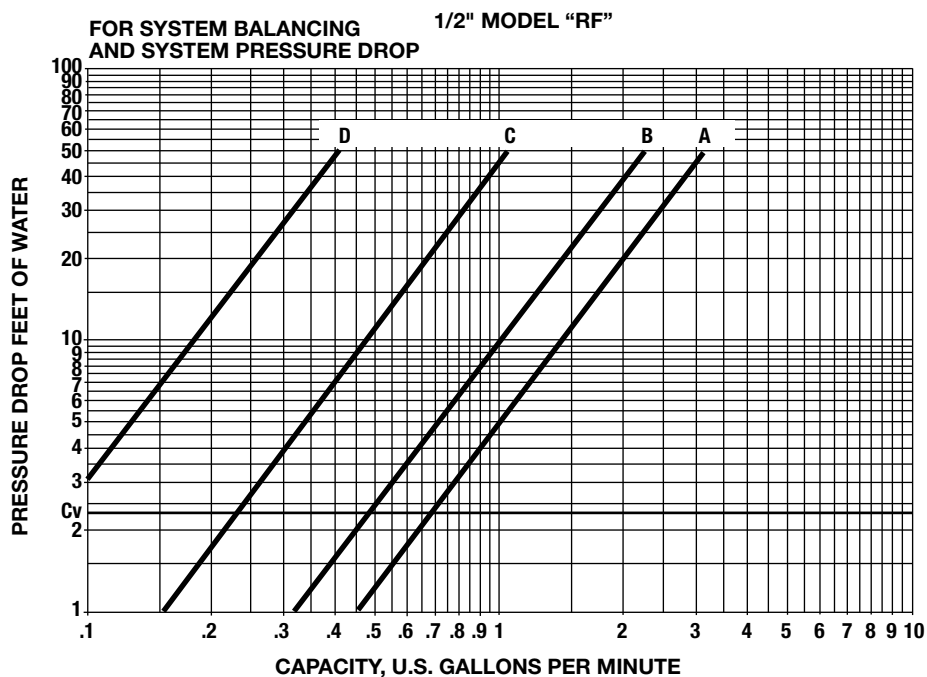
GPM_s – FLOW THRU SETTER
(a MEASURED CONDITIONS)

∅ – VISCOSITY CORRECTION

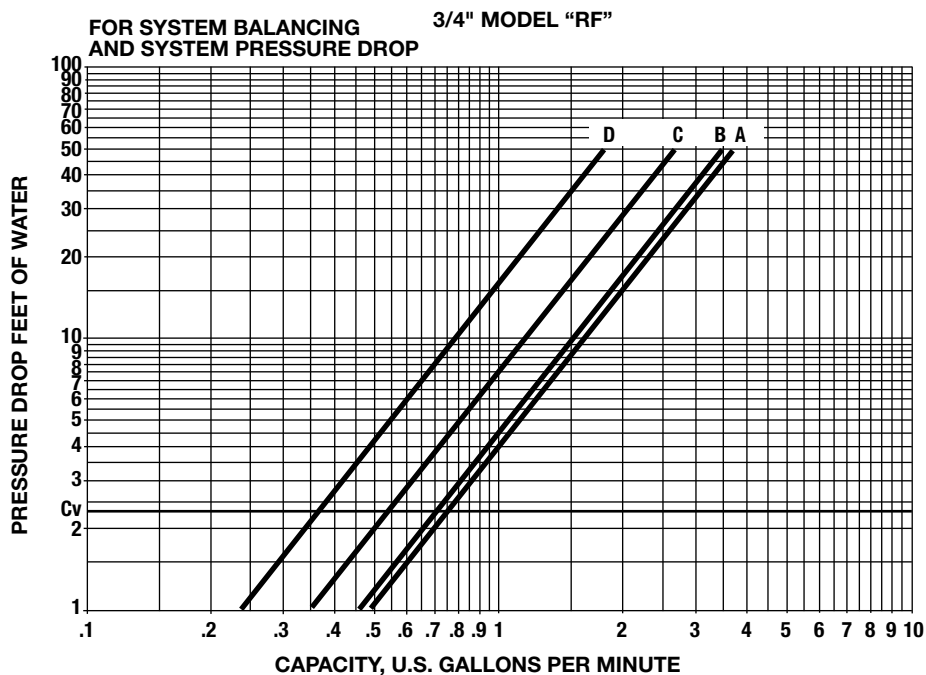
S.G. – SPECIFIC GRAVITY (TO WATER)

| VISCOSITY CENTIPOISE | 1 | 10 | 15 | 25 | 35 | 60 | 100 | 200 | 500 |
|-------------------------|--------|------|------|------|------|------|------|------|------|
| ∅ | 1 | .95 | .90 | .85 | .80 | .75 | .70 | .65 | .60 |
| S.G. | √ S.G. | f | | | | | | | |
| .60 | .775 | 1.29 | 1.23 | 1.16 | 1.10 | 1.03 | 0.97 | 0.90 | 0.84 |
| .65 | .806 | 1.24 | 1.18 | 1.12 | 1.05 | 0.99 | 0.93 | 0.87 | 0.81 |
| .70 | .837 | 1.20 | 1.14 | 1.08 | 1.02 | 0.96 | 0.90 | 0.84 | 0.78 |
| .75 | .866 | 1.16 | 1.10 | 1.04 | 0.98 | 0.92 | 0.87 | 0.81 | 0.75 |
| .80 | .894 | 1.12 | 1.06 | 1.01 | 0.95 | 0.89 | 0.84 | 0.78 | 0.73 |
| .85 | .922 | 1.08 | 1.03 | 0.98 | 0.92 | 0.87 | 0.81 | 0.76 | 0.71 |
| .90 | .949 | 1.05 | 1.00 | 0.95 | 0.90 | 0.84 | 0.79 | 0.74 | 0.69 |
| .95 | .975 | 1.03 | 0.97 | 0.92 | 0.87 | 0.82 | 0.77 | 0.72 | 0.67 |
| 1.00 | 1.00 | 1.00 | 0.95 | 0.90 | 0.85 | 0.80 | 0.75 | 0.70 | 0.65 |
| 1.05 | 1.025 | 0.98 | 0.93 | 0.88 | 0.83 | 0.78 | 0.73 | 0.68 | 0.63 |
| 1.10 | 1.049 | 0.95 | 0.91 | 0.86 | 0.81 | 0.76 | 0.72 | 0.67 | 0.62 |
| 1.15 | 1.072 | 0.93 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.65 | 0.61 |
| 1.20 | 1.096 | 0.91 | 0.87 | 0.82 | 0.78 | 0.73 | 0.68 | 0.64 | 0.59 |
| 1.25 | 1.118 | 0.89 | 0.85 | 0.81 | 0.76 | 0.72 | 0.67 | 0.63 | 0.58 |
| 1.30 | 1.140 | 0.88 | 0.84 | 0.79 | 0.75 | 0.70 | 0.66 | 0.62 | 0.57 |
| 1.35 | 1.162 | 0.86 | 0.82 | 0.78 | 0.73 | 0.69 | 0.65 | 0.60 | 0.56 |
| 1.40 | 1.183 | 0.85 | 0.80 | 0.76 | 0.72 | 0.68 | 0.63 | 0.59 | 0.55 |

PERFORMANCE CHARACTERISTIC CURVE



PERFORMANCE CHARACTERISTIC CURVE



ISO 9001
Certified

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