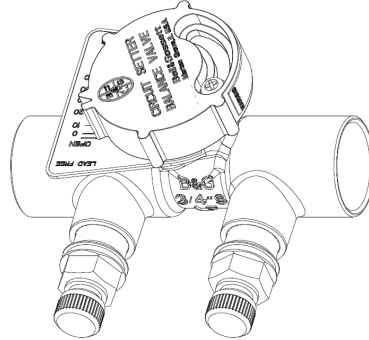
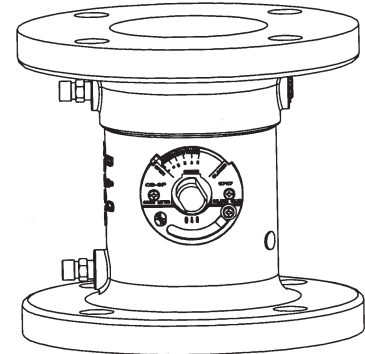


1/2" to 3" NPT size



1/2" to 2" Sweat size



2 1/2", 3", 4" FLANGED

# Circuit Setter® Plus Balance Valves

## With NPT, Flanged and Solder Connections

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

**NOTE:** This product is not intended for use in potable water applications.



**WARNING: California Proposition 65 Warning!** This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.



### SAFETY INSTRUCTION

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 THE 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
NPT	—	300	250
SWEAT	95-5 TIN-ANTIMONY	300	200
		250	225
		200	250
2 1/2", 3", 4" FLANGED	—	175	250

### DESCRIPTION

Bell & Gossett Circuit Setter Balance Valves are precision engineered valves which function as precise system balancing valves and highly accurate variable orifice flow meters. NPT, Sweat and 2 1/2", 3" and 4" flanged models also function as positive shut-off service valves. Bell & Gossett NPT, Sweat and 2 1/2", 3" and 4" flanged Circuit Setter Balance Valves are equipped with an easy to operate memory stop feature. NPT and Sweat models are also equipped with a drain port feature.



**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 can cause serious personal injury and/or property damage.

## INSTALLATION INSTRUCTIONS

To retain calibrated accuracy, a minimum length of unrestricted straight pipe equivalent to 3-pipe diameters upstream and 1-pipe diameter downstream must be maintained immediately adjacent to Circuit Setter Balance Valves.

Circuit Setter Balance Valves are bi-directional valves and can be installed in most altitudes, however, they should be installed in a position to facilitate the ease of balancing the system.

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

NPT and sweat style Circuit Setter Balance Valves are equipped with 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, it should be situated on the terminal unit side of the riser when installing the Circuit Setter.

### CIRCUIT SETTER BALANCE VALVES WITH SWEAT CONNECTIONS

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

**CAUTION:** Heat associated with the use of silver solder may damage a Circuit Setter voiding 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 in a vertical installation 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.

4. 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.

**CAUTION:** The use of PTFE impregnated pipe compound and PTFE tape on threads provides lubricity. Care should be taken to prevent overtightening of the readout valves which may damage the Circuit Setter.

5. Check soldered connections for leaks. If resoldering is required, remove the readout valves before applying the torch to the connection(s).

### CIRCUIT SETTER BALANCE VALVES WITH NPT CONNECTIONS

1. Apply pipe compound conservatively to male connecting fittings only.

**CAUTION:** The use of PTFE impregnated pipe compound and PTFE tape on threads provides lubricity. Care should be taken to prevent overtightening of the readout valves which may damage the Circuit Setter.

2. Check connections for leaks.

## CIRCUIT SETTER BALANCE VALVES WITH 125 PSI ANSI FLANGED CONNECTIONS

Flanged Circuit Setter Balance Valves are not furnished with companion flanges, gaskets, nuts and bolts.

1. When installing Circuit Setter Balance Valves with flanged connections, care should be taken to prevent the gaskets from extending into the inside diameter of the pipe which will cause a blockage that will affect the accuracy of the Circuit Setter.
2. Check connections for leaks.

## OPERATION INSTRUCTIONS

### HOW TO USE BELL & GOSSETT CIRCUIT SETTER BALANCE VALVES FOR PRE-SET FLOW BALANCING

All Circuit Setter Balance Valves within a common zone, circuit, or system, with a common pump, are brought into balance with each other by establishing a common BALANCE GOVERNING HEAD LOSS as noted.

1. Identify the zone within a given circuit or circuit within a given system with the highest head loss.
2. Establish the value of the head loss in feet of water.
3. Establish the corresponding required GPM.
4. Select the appropriate size Circuit Setter Balance Valve (normally line size) for the required GPM.
5. Using Side #1 of the V91483 Circuit Setter Balance Valve Calculator, set the degree of closure hairline in the red section of the Calculator over the 0° setting for the appropriate size Circuit Setter and read the head loss opposite the required GPM. The setting for this Circuit Setter will remain 0°.
6. Add the head loss in Step "5" to the head loss in Step "2" to establish the Balance Governing Head Loss for the zone or circuit.
7. Subtract the required head loss for each zone circuit from the Balance Governing Head Loss in Step "6" to establish the head loss difference for each zone or circuit which is to be brought into balance with Step "6".
8. The head loss difference in Step "7" and the required GPM in Step "3" are lined up in the white section of Side #1 of the Calculator. The degree of closure for the specific Circuit Setter Balance Valve is shown under the degree of closure hairline in the red section of the Calculator for the appropriate size Circuit Setter.
9. Adjust the Circuit Setter by turning the red knob by hand on sizes 1/2" thru 1", or by placing a wrench on the wrench flats provided on sizes 1 1/4" thru 4" to the set position determined by the preceding procedure.

**WARNING:** It is possible, depending on the age or condition of the stem seal, for some liquid to escape during Circuit Setter adjustment. Do not have eyes or face on a level with the sides of the Circuit Setter. Failure to follow this warning could result in serious personal injury.

### NOTES:

1. Head losses in Steps "6" and "2" are a fixed head requirement the zone, circuit, or system pump, as required, must overcome.
2. Refer to the G95872 prewired tag packaged with the Circuit Setter Balance Valve and fill in the appropriate information. Attach the tag to the Circuit Setter for future reference.

## HOW TO USE BELL & GOSSETT CIRCUIT SETTERS TO PROPORTIONAL BALANCE A SYSTEM

1. Open fully all Circuit Setters on a single pump system.
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 these instructions could result in serious personal injury or death and 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, 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 divide by design flow.)
5. Select the Circuit Setter with the lowest proportional flow rate. This Circuit Setter is left in the full open position. Every other Circuit Setter in the branch is then reset to the same proportional flow rate.
6. If there are additional branches, repeat the steps in 3, 4 and 5 for each branch.
7. After all branches have been proportionately balanced, measure the full open flows on the Circuit Setters 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 this same ratio as described in Step "5".
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 pump impeller be sized to produce design flow. This will reduce electrical energy consumption.

## HOW TO USE BELL & GOSSETT CIRCUIT SETTER BALANCE VALVES AS FLOW METERS

1. Energize the zone, circuit and/or system pump(s) as applicable.
2. Using Bell & Gossett Model RP-250B Readout Probes, sequentially attach a Bell & Gossett differential pressure readout kit to the readout valves on each Circuit Setter Balance Valve.
3. Read the differential pressure across the orifice of 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 these instructions could result in serious personal injury or death and property damage.

4. Using Side #2 of the Circuit Setter Balance Valve Calculator, set the hairline over the degree of closure as indicated by the part of the red plastic knob or indicator plate parallel to the degree of closure noted on the calibration plate, and read actual GPM flowing through the Circuit Setter opposite the gauge reading head loss noted in the white section of Side #2.

### NOTE:

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 these instructions to obtain the actual GPM for the system liquid.

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

1. Move the adjustment knob or stem 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 the 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 follow these instructions could result in serious personal injury or death and property damage.

## HOW TO USE THE MEMORY STOP FEATURE

For sizes 1/2" thru 4":

1. Make the final degree of closure setting.
2. Loosen the memory stop locking screw in the slot on the top of the red knob.
3. Slide the memory stop screw in the slot (counter-clockwise for 1/2" thru 1" sizes and clockwise for 1 1/4" thru 4" sizes) until the screw stops.
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 must be replaced. Failure to follow these instructions could result in serious personal injury or death and property damage.

## INSULATION

Bell & Gossett recommends that insulation be attached to the Circuit Setter after the system has been balanced and the completed G95872 tag has been wired to the Circuit Setter.

### NOTE:

Tape or other acceptable means should be used to secure the insulation to the Circuit Setter Balance Valve.

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

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

GPM<sub>f</sub> – FLUID FLOW

GPM<sub>s</sub> – FLOW THRU SETTER  
(a MEASURED CONDITIONS)

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

∅ – VISCOSITY CORRECTION

$$GPM_f = f \quad GPM_s$$

S.G. – SPECIFIC GRAVITY (TO WATER)

VISCOSITY CENTIPOISE		1	10	15	25	35	60	100	200	500
Ø		1	.95	.90	.85	.80	.75	.70	.65	.60
S.G.	√S.G.	f								
.60	.775	1.29	.123	1.16	1.10	1.03	0.97	0.90	0.84	0.78
.65	.806	1.24	1.18	1.12	1.05	0.99	0.93	0.87	0.81	0.75
.70	.837	1.20	1.14	1.08	1.02	0.96	0.90	0.84	0.78	0.72
.75	.866	1.16	1.10	1.04	0.98	0.92	0.87	0.81	0.75	0.69
.80	.894	1.12	1.06	1.01	0.95	0.89	0.84	0.78	0.73	0.67
.85	.922	1.08	1.03	0.98	0.92	0.87	0.81	0.76	0.71	0.65
.90	.949	1.05	1.00	0.95	0.90	0.84	0.79	0.74	0.69	0.63
.95	.975	1.03	0.97	0.92	0.87	0.82	0.77	0.72	0.67	0.62
1.00	1.00	1.00	0.95	0.90	0.85	0.80	0.75	0.70	0.65	0.60
1.05	1.025	0.98	0.93	0.88	0.83	0.78	0.73	0.68	0.63	0.59
1.10	1.049	0.95	0.91	0.86	0.81	0.76	0.72	0.67	0.62	0.57
1.15	1.072	0.93	0.89	0.84	0.79	0.75	0.70	0.65	0.61	0.56
1.20	1.096	0.91	0.87	0.82	0.78	0.73	0.68	0.64	0.59	0.54
1.25	1.118	0.89	0.85	0.81	0.76	0.72	0.67	0.63	0.58	0.54
1.30	1.140	0.88	0.84	0.79	0.75	0.70	0.66	0.62	0.57	0.53
1.35	1.162	0.86	0.82	0.78	0.73	0.69	0.65	0.60	0.56	0.52
1.40	1.183	0.85	0.80	0.76	0.72	0.68	0.63	0.59	0.55	0.51

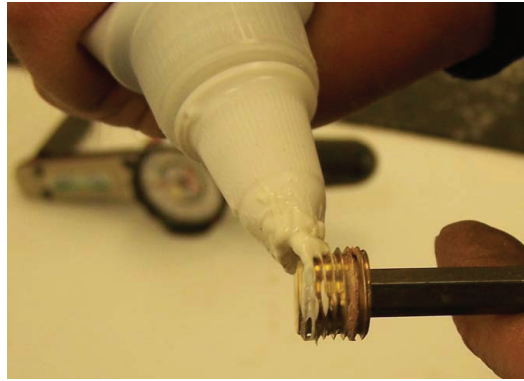
The P/T readout ports and drain plugs found on Bell & Gossett Circuit Setter Plus calibrated balance valves come pre-assembled with a leading industrial thread sealant, Loctite 567, and are tightened to appropriate levels. P/T readout ports on Sweat model Circuit Setters are shipped loose and will need to be installed as per the instructions below. With that in mind, the following information should help to clarify questions regarding the adjustment or servicing of those components when required.

**WARNING:** Installation and maintenance must be performed by a qualified professional. Service should not be performed on any valve in an active Hydronic loop. Before attempting to make any required adjustments, properly isolate and drain the branch loops that require service and allow the valves to reach a safe handling temperature and zero pressure condition. Use proper safety equipment including gloves, goggles, or similar tools to avoid contact with system fluids and common hazards. Failure to follow these instructions could result in personal injury and property damage.

Any field adjustment of factory installed components will break the original thread seal and could cause leakage. This will necessitate the removal, cleaning and resealing of those parts per the instructions below.

Should any adjustment or servicing of P/T readout ports or drain plugs be required, please take the following steps:

1. Completely remove the desired component from the valve.
2. Taking care not to damage any threads on the components or the valve, clean off all of the old thread sealant. Use a wire brush and gentle abrasion if necessary. Allow the valve and the component to dry. Note: if the component or valve appears to have been damaged, replace it.
3. Starting with the second thread of the NPT male valve component, apply a 360° bead of Loctite 567 thread sealant/lubricant as shown below. Follow Loctite handling precautions as noted on the product labeling.



4. If Loctite 567 is unavailable, we recommend Rector Seal No. 5 pipe thread sealant for all non-glycol based applications, or any PTFE thread sealing tape. Be sure to follow the manufacturer specific handling precautions and application instructions as noted on the product labeling.
5. Thread component into valve until it is finger tight.
6. Apply torque to the following specifications:

Component		Torque
Size	Type	
1/4" NPT	P/T Readout Port, Drain Plug	9.0 ft.-lbs + 3.0 ft.-lbs. / -0

**NOTICE:** The use of thread sealants/lubricants on threads also provides lubricity. Over application of torque may cause damage to the valve port or component.

7. Properly assembled valve components will immediately seal to moderate pressure (100 PSI or less). For maximum pressure resistance, allow the Loctite 567 or Rector Seal No. 5 thread sealant to cure for 24 hours. PTFE tape typically does not require curing to achieve maximum pressure resistance.

Loctite and Loctite 567 are registered trademarks of Henkel AG & Co. Rector Seal No. 5 is a registered trademark of RectorSeal Corporation.



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