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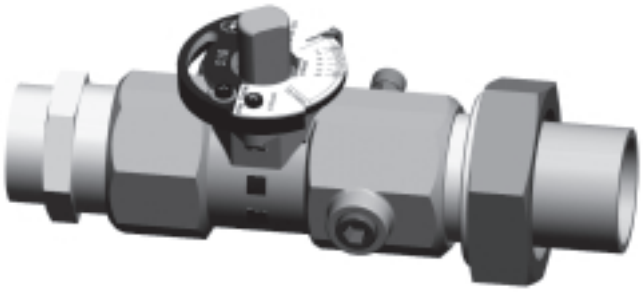
Bell & Gossett®
Instruction Manual V58045
REVISION A

1/2" TO 1" SWEAT & NPT SIZES



1 1/4" TO 2 1/2" SWEAT & NPT SIZES

Circuit Setter Plus® Model MC

Installation, Operation and Service Instructions

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

NOTE: Bell & Gossett does not recommend Circuit Setter Plus® components to be used for potable water.

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 THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.**

OPERATIONAL LIMITS

WORKING PRESSURE & TEMPERATURE LIMITS (SOLDER TYPE LIMITS FOR ANSI STD. B16.18)

Type Solder	Maximum Limitations 1/2" - 1"		Maximum Limitations 1 1/4" - 2 1/2"	
	Pressure psi (kPa)	Temp °F (°C)	Pressure psi (kPa)	Temp °F (°C)
95-5	300 (2069)	200 (93)	300 (2069)	175 (79)
TIN-	250 (1724)	225 (107)	250 (1724)	200 (93)
ANTIMONY	200 (1379)	250 (121)	175 (1207)	250 (121)

DESCRIPTION

Circuit Setter Balance Valves are precision engineered valves which function as precise system balance valves and highly accurate variable orifice flow meters. 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

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

FOR INSTALLING SWEAT CONNECTION:

a) Clean tube ends and valve connections thoroughly per good piping practices with a fine grade emery cloth or fine grit sandpaper.

b) For soldering, use 95-5 (Tin-Antimony) solder and a good grade of flux.

c) Use a torch with a sharp pointed flame.

d) When sweating the joints, first adjusting the valve in the full open position, then wrap the valve with a cool wet rag and then direct the flame with care to avoid subjecting the valve to excessive heat. Allow the valve to cool before touching or operating.

e) Check the soldered connection for leaks.

WARNING: Use of improper procedures to sweat valve model with union connection into system can damage valve. Before installing sweat union connection to valve, remove the union nut and O-ring from the valve body, then union tailpiece with union nut must be sweated (soldered) into place. Make sure the O-ring is reinstalled. Failure to follow this instruction could result in property damage and/or moderate personal injury.

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

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

FOR INSTALLING NPT CONNECTIONS:

Apply pipe compound conservatively to male connection fittings only.

CAUTION: The use of Teflon®* impregnated pipe compound and Teflon tape on pipe threads provides lubricity. Care should be taken to prevent overtightening which may damage the valve body. Failure to follow these instructions can result in moderate personal injury and/or property damage.

After installation check all joints for leakage and retighten where necessary.

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 Balancing 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 and 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 2 1/2" 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:

- Head loss in Steps “6” and “2” are a fixed head requirement the zone, circuit, or system pump, as required, must overcome.
- Refer to the G95872 pre-wired 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 valve during probe insertion and during hookup of readout kit. Follow the instruction manuals supplied with readout probes and readout kit 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, read the flow corresponding to the pressure drop read with the readout kit.

*Teflon is a registered trademark of E.I. DuPont de Nemours and Company

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 above 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 (5) above.
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.

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

3. Read the differential pressure across the orifice of the Circuit Setter Balance Valve.
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 the 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, 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

1. Make the final degree of closure setting.
2. Loosen the memory stop locking screw in the slot on the top of red knob.
3. Slide the memory stop screw in the slot (counter-clockwise for 1/2" - 1" sizes and clockwise for 1 1/4" thru 2 1/2" sizes) until the screw stops.
4. Tighten the memory stop screw.

SERVICING INSTRUCTIONS

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

WARNING: Corrosion or leakage is indication 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 G95872 tag (with properly filled in information) 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.

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

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

$$f = \frac{Ø}{\sqrt{S.G.}}$$

$$GPM_f = f \; GPM_s$$

GPM_f – FLUID FLOW

GPM_s – FLOW THRU SETTER (*a* MEASURED CONDITIONS)

Ø – VISCOSITY CORRECTION

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.	$\sqrt{S.G.}$	←				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

ITT BELL & GOSSETT
8200 N. Austin Avenue
Morton Grove, IL 60053
Phone: (847) 966-3700
Fax: (847) 966-9052
www.bellgossett.com

CANADA
ITT R&CW Canada
55 Royal Road
Guelph, Ontario,
N1H 1T1, Canada
Phone: (519) 821-1900
www.ittfpc.ca