

## GBV-T

### Five Turn Circuit Balancing Valves

NPT Threaded

The Series GBV is a multi-turn, Y-style globe valve designed for accurate determination and control of fluid flow to circuits requiring precise balancing.

#### FEATURES & BENEFITS

- Multi-turn adjustment
- Pressure differential ports on both sides of the valve
- Positive shutoff for equipment servicing
- Micrometer type handwheel adjustment
- Tamper-proof memory stop
- Precision instrument function and performance
- Easiest and fastest field balancing

#### THROTTLING PERFORMANCE

- Ball valves adapted for balancing have only a 90° range from open to closed. A small adjustment in the ball opening can mean a huge change in flow. GBV sweat and threaded balancing valves in Cast Bronze from 1/2" to 2" have four full turns, providing 16 times finer adjustment than a ball valve.

See pages 178-180 for installation instructions.



GBV-T

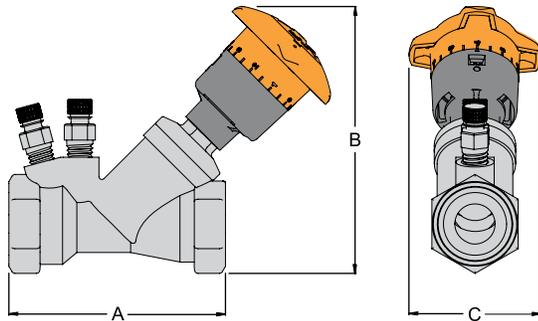
#### BALANCED CIRCUITS

Many systems tend to be oversized, causing some circuits to have too much flow, or insufficient flow, depending on their proximity to the source of the flow. The benefits of a balanced circuit:

- Save energy
- Make occupied spaces more comfortable
- Ensure that pumps operate against the lowest possible pressure
- Reduce capital and maintenance costs
- Ensure that the system operates according to the intent of the design

#### 1/2" - 2" CAST BRONZE, SOLDER & THREADED GBV'S

- Sweat and Threaded 1/2" to 2"
- Unique flow control plug
  - Precision contoured channels
  - High strength accurately molded resin
- Ergonomically designed handwheel
- Micrometer type adjustment scale
- Tamper-proof hidden memory stop



#### MODEL: GBV-T 1/2" - 2"

Model	Nominal Size	A	B	C	Approx. Wt. Ea.
	In./DN(mm)	In./mm	In./mm	In./mm	Lbs./Kg
GBV050VT	1/2" 15	3 80	4 5/8 117	2 3/4 70	1.1 0.5
GBV075VT	3/4" 20	3 1/4 83	4 7/8 125	2 3/4 70	1.2 0.6
GBV100VT	1" 25	3 13/16 97	5 1/4 135	2 3/4 70	1.9 0.8
GBV125VT	1 1/4" 32	4 9/16 110	5 5/8 143	2 3/4 70	2.3 1.1
GBV150VT	1 1/2" 40	5 1/16 129	5 7/8 150	2 3/4 70	3.5 1.6
GBV200VT	2" 50	6 153	6 11/16 170	2 3/4 70	6.0 2.5

#### PROJECT INFORMATION

#### APPROVAL STAMP

<b>Project:</b>	<input type="checkbox"/> Approved
<b>Address:</b>	<input type="checkbox"/> Approved as noted
<b>Contractor:</b>	<input type="checkbox"/> Not approved
<b>Engineer:</b>	<b>Remarks:</b>
<b>Submittal Date:</b>	
<b>Notes 1:</b>	
<b>Notes 2:</b>	

## FIG. GBV-S & GBV-T

### Five Turn Circuit Balancing Valves

#### INSTALLATION:

**1** Clean the system piping of debris (pipe scale, rust, welding slag) and other contaminants. As with any water system it is important to make provisions to keep the system clean. For optimum operation, air entrapment in the fluid must be removed.

**2** The operation of the valve is dependent on the fluid characteristics such as specific gravity and viscosity, which vary with the fluid temperature. For installations using fluids other than 100% water, flow rates must be corrected for the changes created by the fluid medium. See [www.anvilintl.com](http://www.anvilintl.com) for appropriate correction factors, or call your local Anvil representative.

**3** To ensure accuracy of measurement Circuit Balancing Valves (GBV's) should be located at least five pipe diameters downstream from any fitting and at least ten pipe diameters downstream from a pump (as illustrated in Fig. 1).

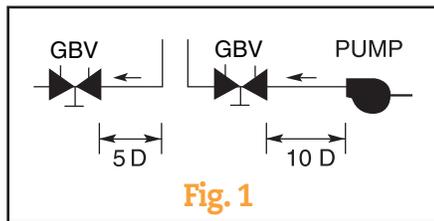


Fig. 1

**4** All GBV's are marked with an arrow on the valve body to indicate direction of flow. The arrow must point in the direction of flow for proper operation.

**5** GBV's may be installed in horizontal or vertical piping (as illustrated in Fig. 2). Provisions must be made for easy access to the probe metering ports (P.M.P.'s), reading scale, and memory stop.

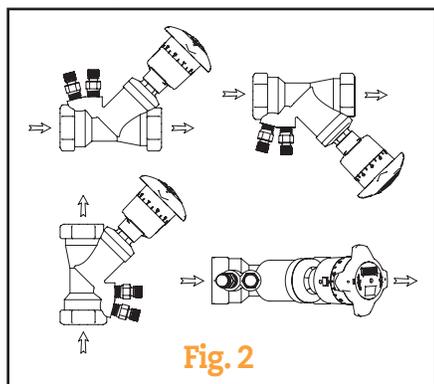


Fig. 2

#### GBV-S - SWEAT (SOLDER)

##### CONNECTIONS:

**6** GBV-S models are supplied with sweat style connections. Caution should be used when sweat style connection valves are installed to prevent overheating the valve.

**7** Solder the valve body in line using 95/5 (95% tin, 5% antimony) type solder or equal. Always follow local plumbing codes for installation best practices.

##### CAUTION:

Before soldering, ensure the valve is opened at least one full turn to avoid damage to the sealing O-ring due to overheating. Anvil recommends that the GBV be protected during installation by wrapping a damp rag around the handle / bonnet assembly prior to soldering the valve into the line.

#### GBV-T - NPT THREADED

##### CONNECTIONS

**6** GBV-T models are tapped with NPT threaded connections. All threaded connections should be sealed using an approved pipe sealant per industry standards. Once the GBV installation has been completed and the system has been filled and purged, each valve loop must be adjusted to the correct flow setting. Employ piping best practice when engaging pipe to threaded valves. Overtightening when installing valves may result in fracturing of the valve body at the threads. (Go to Step 8)

##### WARNING:

Anvil does NOT recommend leak testing an HVAC system with air due to safety concerns. Testing HVAC systems with pressurized air can be dangerous due to the high compressibility of air, as compared to water.

#### OPERATION:

**8** Valves are circuit balancing valves that are selected to deliver the correct flow in a piping circuit based on line size and design flow rate.

**9** To set the system flow, adjust the handwheel position until the differential pressure reading across the venturi corresponds to the required GPM.

**10** The valve operates from fully open to closed by a clockwise rotation of the orange handwheel using five 360° turns. Two indicators describe the position of the valve: the handwheel turns dial and the micrometer scale.

- **“Handwheel Turns” Dial:** This dial is printed on the outer surface of a gearing mechanism located inside the lower half of the handle assembly (Fig. 6). Each complete 360° revolution of the handwheel is visible through a display window and is scaled 0 - 5 to indicate the valve position in terms of the number of full turns. (Fig. 3)
- **Micrometer Scale:** This scale is marked 0 - 9 and is located on the upper half of the handle assembly. Each mark represents 1/10<sup>th</sup> of a full, 360° turn of opening when lined up with an arrowhead symbol, located above the handwheel turns display window. (Fig. 3)

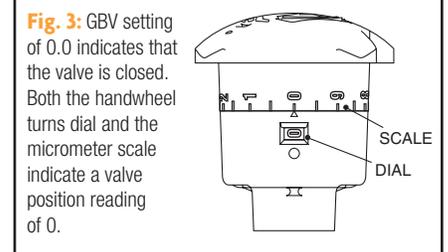


Fig. 3: GBV setting of 0.0 indicates that the valve is closed. Both the handwheel turns dial and the micrometer scale indicate a valve position reading of 0.

**11** The valve is considered “zeroed” when fully closed hand tight. The “0” on the micrometer scale should be within one half of 1/10<sup>th</sup> of a turn of the arrowhead symbol when the valve is closed hand tight. **DO NOT USE A WRENCH ON THESE VALVES – THEY SHOULD BE OPENED AND CLOSED HAND-TIGHT ONLY!**

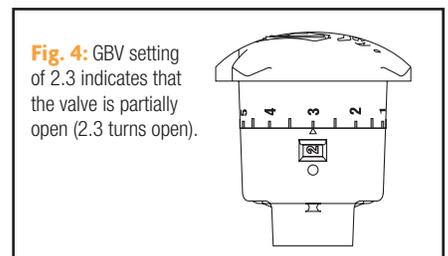
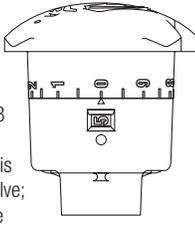


Fig. 4: GBV setting of 2.3 indicates that the valve is partially open (2.3 turns open).

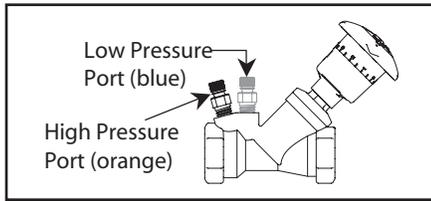
# FIG. GBV-S & GBV-T

## Five Turn Circuit Balancing Valves

**Fig. 5:** GBV setting of 5.0 indicates that the valve is fully opened. In some cases, the valve may open as much as 5.3 turns, due to the depth of the stem threads. This is not a problem with the valve; however, the performance curves for these GBVs are calibrated only to 5.0 turns.



**CAUTION:** Hot water leakage can occur from metering ports (P.M.P.'s) during probe insertion and hookup of metering device. Wear protective eyewear and clothing to prevent personal injury when measuring pressure.



**12** Connect pressure measuring device to the GBV metering ports as follows:

- Remove protective cap from metering ports (1/4" NPT connection).
- Insert the meter probe into the metering ports. The hose with orange fitting, up stream; the hose with blue fitting downstream.

**CAUTION:** When inserting probe, do not bend, as this will cause permanent damage to the probe, adversely affecting the pressure measurement. Do not use any lubrication on the probes when inserting them. If necessary, simply wet the probes with clean water.

The probe should not be left inserted into the fitting for prolonged periods of time, overnight, etc., as leakage of the P.M.P. may occur when the probe is removed.

The locking nut on the probe is designed to hold it in the P.M.P. when taking readings. As sealing is accomplished internally on the probe stem, it is only necessary to tighten the locking nut FINGER-TIGHT. Over-tightening may cause damage to the P.M.P. or locking nut threads.

**13** Before taking a measurement reading, set the valve to its fully open position (5.0) or at a preset position. Read the pressure drop across the venturi with a digital meter. Determine flow rate by use of venturi Cv performance curves on page 4 or the Anvil Balancing Slide Rule.

**14** The handle of the GBV is not designed to be removable. Do not try to take it off the valve, or it may become damaged. If for any reason, the handle is damaged, replace the entire handle assembly with the appropriate replacement part indicated in the table below.

PART NUMBER	SIZE
571155-022	1/2"
571155-022	3/4"
571155-022	1"
571155-022	1 1/4"
571155-022	1 1/2"
571155-022	2"

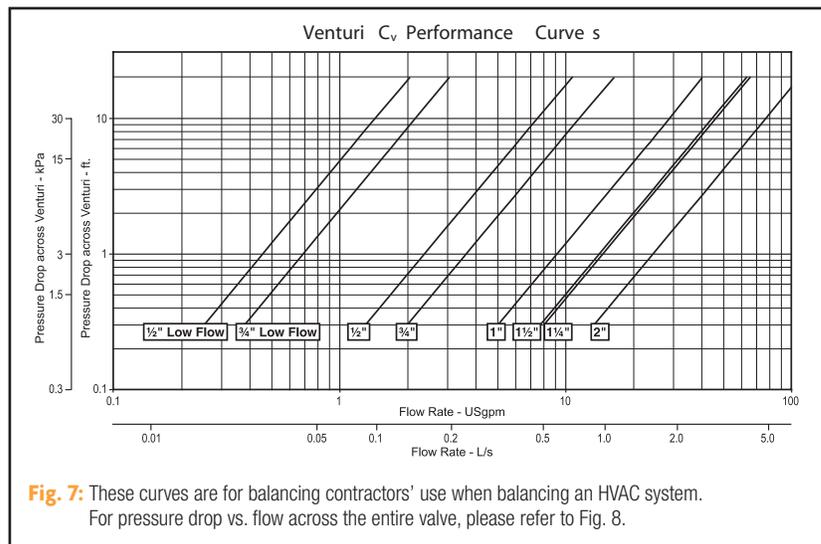
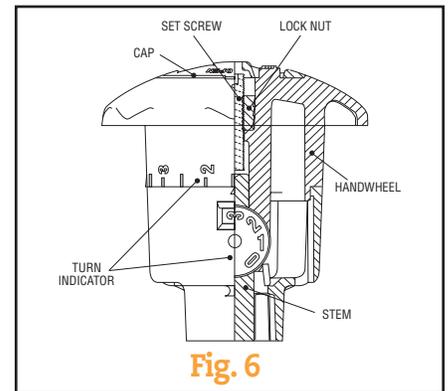
**MEMORY SETTING:**

**15** After valve has been properly adjusted and without moving the handwheel, the locking memory stop should be set. The memory stop will allow the valve to be fully closed for isolation and then reopened to the preset flow position.

**16** Insert a 2.5 mm (or 3/32") Allen key through the hole provided in the valve's handle cap. (Fig. 6)

**17** Turn the setscrew in a clockwise direction until it stops. It is not necessary to tighten. The memory has now been set. This establishes the maximum opening position for this particular valve.

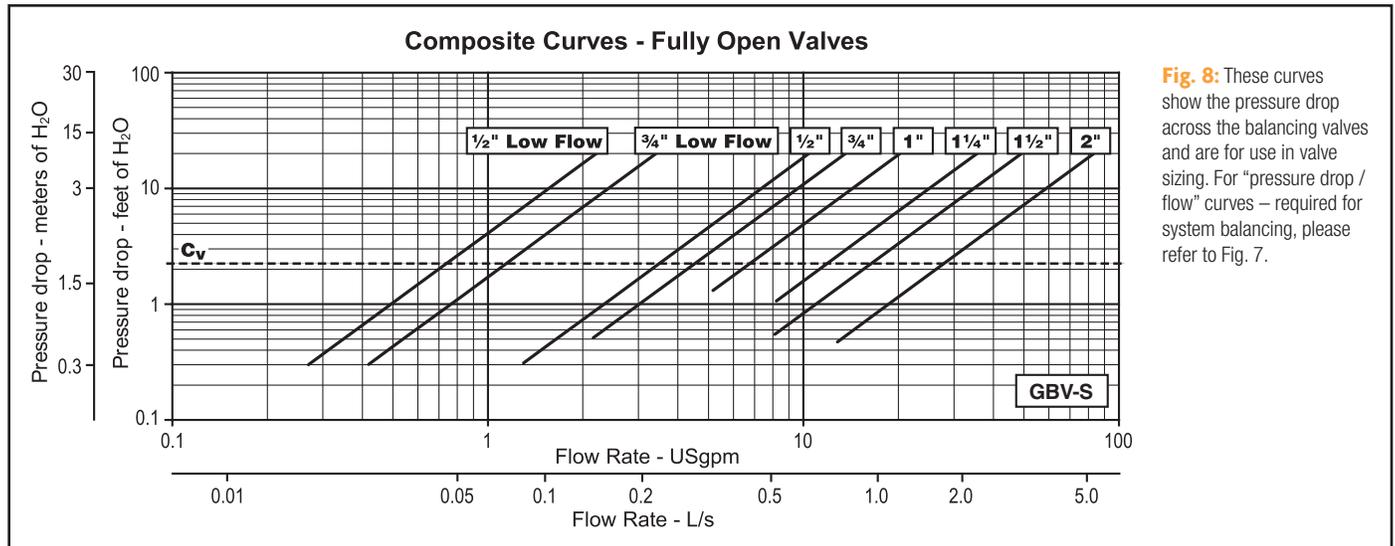
**18** The valve may now be closed tightly, as needed, for isolating the piping during system maintenance. To return the valve to its preset "balanced" position, simply open the valve by turning the handwheel counter-clockwise until the handle stops turning (the valve stem inside the handle has hit the memory setscrew). **DO NOT APPLY EXCESSIVE FORCE WHEN REOPENING THE VALVE – OPEN ONLY UNTIL THE VALVE STOPS TURNING UNDER "HAND TIGHT" CONDITIONS. DO NOT USE A WRENCH TO OPEN, CLOSE, OR TIGHTEN VALVES.**



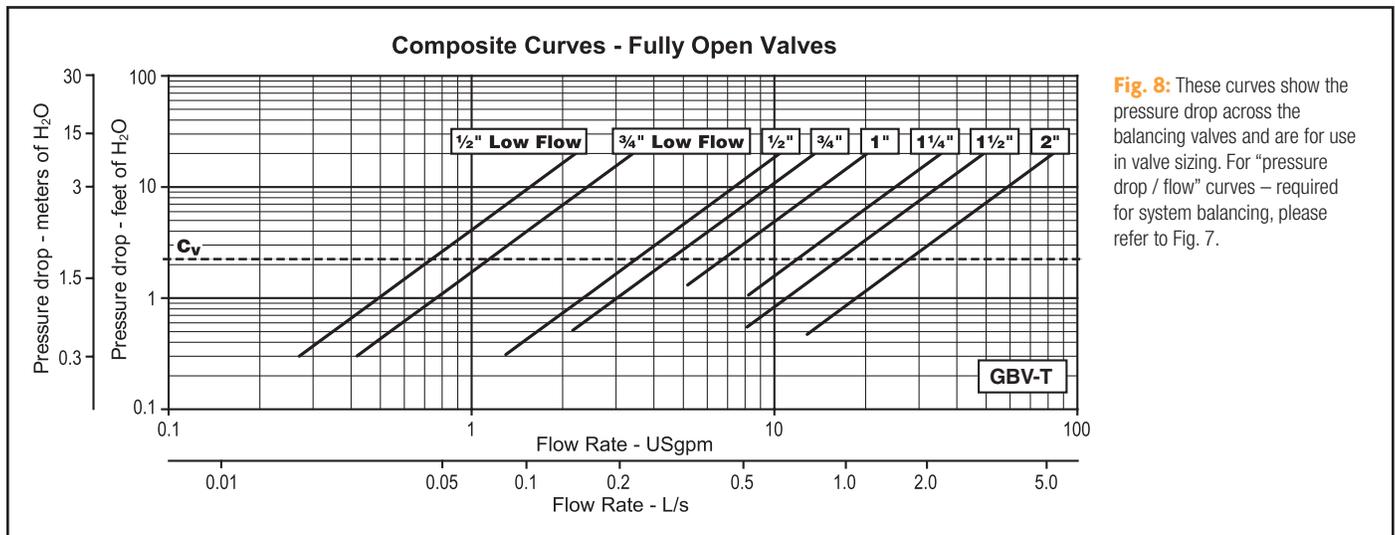
See next page for Fig. 8 for both the GBV-S & GBV-T and a troubleshooting chart

## FIG. GBV-S & GBV-T

### Five Turn Circuit Balancing Valves



**Fig. 8:** These curves show the pressure drop across the balancing valves and are for use in valve sizing. For "pressure drop / flow" curves – required for system balancing, please refer to Fig. 7.



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#### TROUBLESHOOTING:

Symptom	Likely Cause	Solution
<b>1. Valve is leaking:</b>		
• At the bonnet / body joint	Bonnet o-ring has been damaged.	Remove the handle / stem assembly and replace with the appropriate replacement part indicated in Table 1.
• At the pipe connection	If solder joint - the joint has failed, or was not soldered properly.	Re-solder the connection and recheck for leakage.
	If threaded - the connection is not sufficiently tight, or	Tighten and re-check for leakage.
	the valve was over-tightened during installation and the valve body has cracked (fractured).	Remove and reinstall a new valve, being careful not to over-tighten.
<b>2. Valve does not shut off completely when closed (hand tight).</b>	The seat o-ring has been deformed due to overheating during soldering.	Remove the handle / stem assembly and replace with the appropriate replacement part indicated in Table 1.