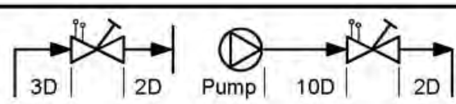
## VALVE INSTALLATION GUIDE

Accurate flow measurement re quires that the velo city distribution ne ar t he bal ancing valve stays constant, regardle ss of the total flow through the pipe. Fi ttings, such as elbows and tees, disturb the nor mal flow profile which is es tablished through straight pipe; pumps create even great er disturbances. Failure to a llow water flows aroun d fittings and pumps to normali ze can affect measuring a ccuracy by as much as 20% when the valve is in th e worst, fully open, position. Mi nimum lengths (diameters, D) of straight pipe before and afte r the balancing valve prevent t hese errors. Follow the flow direction arrow on the valve body for best accuracy. Valves are designed for vertical, horizontal or inclined installation.

**MINIMUM PIPE DIAMETERS FROM FITTINGS**



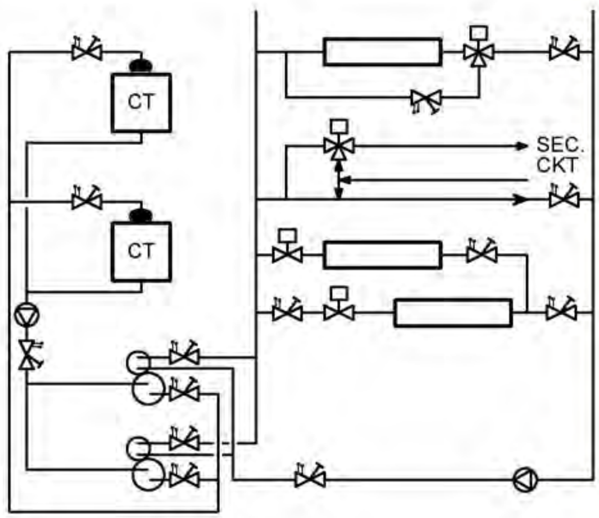

1. Typical locations and piping arrangements for manual balancing valves.

2. Flo Fab balancing valves can be installed on the supply piping to vertical coils to allow complete draining us ing the optional hose connection while still maintaining correct flow through the balancing valve.

3. Flanged valve wit h handwheel lock installed. Handw heel lock prevents handwheel rotation and operates independently of the hidden memory stop standard feature.

4. Accessories are avail able for all valves and include hose conne ction kit, probe extenders abd extra valve identification tags.

5. Rimmed handwheel used for 8" (DN 200) and larger valves.



## Balancing Procedures for Series LGS

### Balancing The System

#### 1) Read Pumps

With all valves open read system flow at pump(s) and compare to the total design flow of all connected devices. If the flow is less verify that it is within the range of the intended diversity. If flow is more than 20% above design, adjust discharge of pump to + 20% maximum.

#### 2) Read Risers

Read the flow of all risers and/or secondary pump loops to identify the riser/loop having the highest proportion of actual to design flow. This is the riser with the lowest installed pressure drop and will be the first balanced. Any risers or secondary pump loops that are more than 20% above design flow should be adjusted to + 20% maximum.

#### 3) Read branches on selected riser

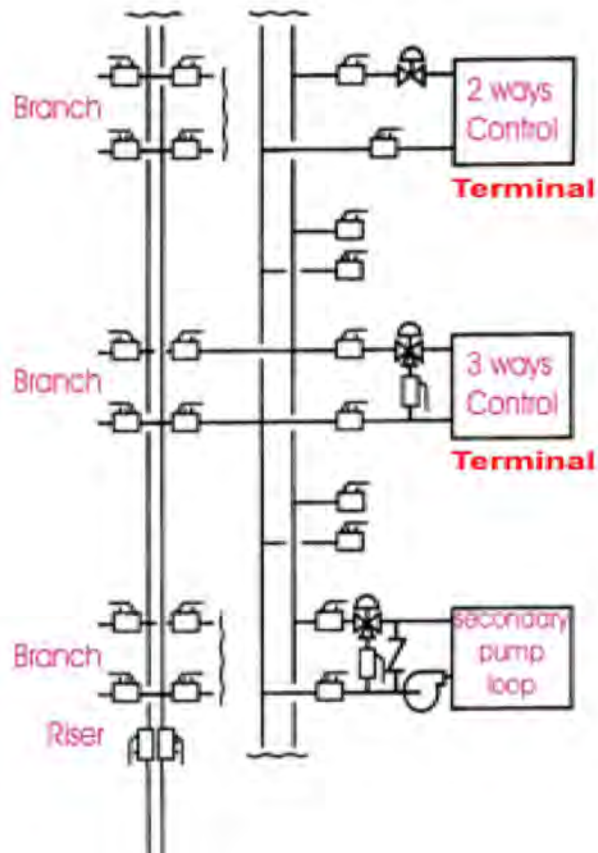
Read the flow of all branches on the selected riser to identify the branch having the highest proportion of flow. This is the branch with the lowest installed pressure drop and will be the first balanced. Any branches that are more than 20% above the design flow should be adjusted to + 20% maximum.

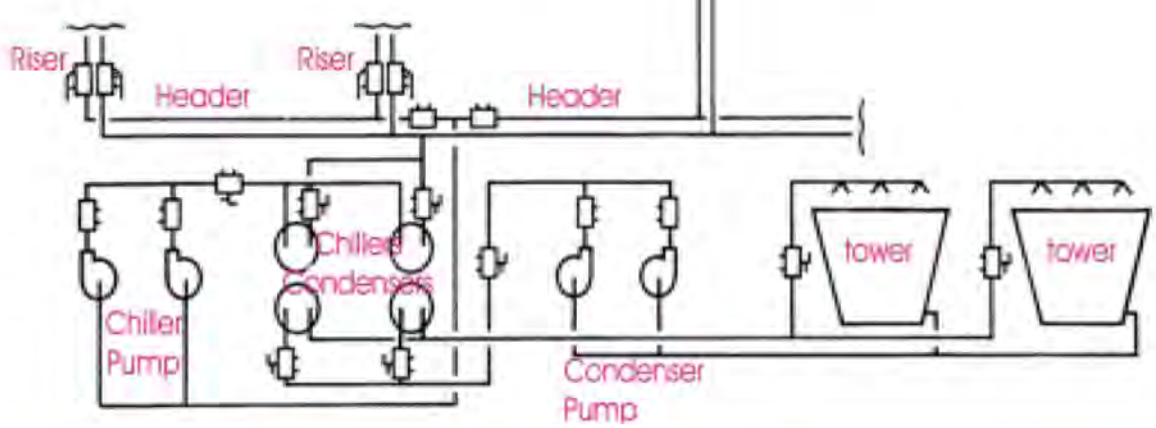
#### 4) Read the units on selected branch

Read the flow of all the units on the selected branch and select the unit having the lowest proportion of actual to design. This is the unit with the highest installed pressure drop and will remain open.

#### 5) Adjust units to proportion of lowest

Adjust the unit with the next lowest proportion of actual to design to match the proportion of the lowest unit. You should check back on the lowest unit (which becomes the reference unit), as it will increase when the next unit is adjusted. Adjust all other units on this branch to the same proportion as the reference unit with appropriate check-backs as required. Balance from the lowest proportion to the highest proportion until all units on branch are proportionally balanced. Readout all units to verify they are set at the same proportion.



**6) Adjust units on all branches from lowest to highest**

The next set of units balanced will be on the branch with the next lowest proportion of flow. Continue from lowest to highest, balancing all units on each branch of selected riser using procedure in step 5.

**7) Adjust branches to proportion of lowest riser now proportionally balanced**
(Repeat step 4 thru 7 for all risers)

Find the branch with the lowest proportion (this branch will remain open), and then balance all the other branches to the reference branch. The riser is now proportionally balanced. Repeat step 4 thru 7 for all risers until the units and branches on each are proportionally balanced.

**8) Adjust risers to proportion of lowest**

Select the riser with the lowest proportion (this riser will remain open). Set the next lowest riser to the same proportion as the reference riser and proceed until all risers are proportionally balanced.

**9) Adjust headers to proportion of lowest**

If system has multiple headers, identify the one having the lowest proportion (leave open) and set the next lowest proportional header to match. Adjust each header accordingly. System is now proportionally balanced and contains one open flow path from headers to risers to branches to terminals having the lowest pressure drop possible. Readout all terminals and fine tune any out range devices, set memory stops, and record final readings. The final flow adjustment takes place at the pump and the method of achieving design flow is the subject of the section titled "Energy Efficiency In Balancing".

**10) Adjust chillers to proportion of lowest**

**11) Adjust condensers to proportion of lowest**

**12) Adjust towers to proportion of lowest**

**13) Adjust flow at pump**
(Method described in " Energy Efficiency In Balancing")

**Energy Efficiency In Balancing**

The design flow rate may be obtained by throttling the pump, trimming the impeller, changing the pump or reducing the pump speed. The simplest and lest costly of these options is to throttle the pump, producing balanced design condition and saving a few horsepower. It is also possible to operate the system at design flow rate with actual system pressure drop. This operation can be obtained by trimming the pump impeller to approximately 10.5" or reducing the pump speed using a variable speed device. Trimming the pump impeller is the lowest cost method of obtaining this operating point, but once trimmed, the impeller offers no capability of producing additional flow should condition warrant. A variable speed pump can match future load conditions, but imposes an additional penalty of the inefficiency of the drive on the system, thus making it a poor choice if this is all the drive is designed to accomplish. Systems having variable flow characteristics (modulating valves) can utilize variable speed drives to a substantial cost advantage taking into account the building diversity, etc.