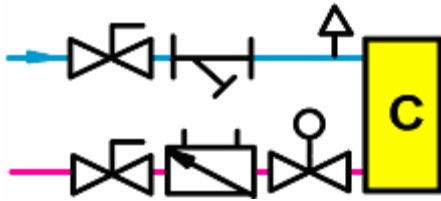
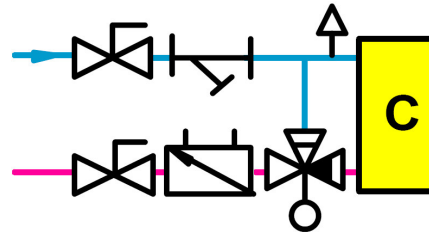


## System Design

### Recommended coil design for automatic balancing



Automatic balancing in series with a 2-way on/off control valve



Automatic balancing in series with a 3-way control valve

The preferred location for automatic balancing valves is the return side of the coil, as shown in the valve diagrams above. The return side is recommended by AIRAH and is preferred by many engineers because it will:

- Minimize air entrapment
- Reduce noise problems
- Decrease the possibility of valve cavitation in the automatic temperature controller (ATC).

The following steps are required to set up the TA AutoFlow circuit:

1. The proper TA AutoFlow valve, factory-labelled for the specific terminal unit and L/s, must be installed as shown without the cartridge inserted.
2. Run the system at full capacity to remove any unwanted debris from the system caused by the construction process. This will reduce the risk of damage occurring to the coils and valves.
3. Insert the cartridges and design flow is achieved as soon as the pump is turned on.
4. Verification of the design flow can be achieved by reading the differential pressure across the TA AutoFlow valve. E.g. for the 14 – 220 kPa range, a reading above 14 kPa and below 220 kPa indicates that the design L/s is flowing.

### Automatic balancing combined with manual balancing valves

The TA AutoFlow automatic balancing valves can often be complemented in the system design by the use of the range of TA manual balancing valves and TA differential pressure controllers. In a correctly designed automatically balanced system, automatic regulators are placed only at the terminal equipment such as fan coils and air handlers. They are not required, nor are they recommended, for branches, risers, mains or at the pump discharge.

Although automatic balancing valves can be used to check flow via pressure differential, they do not have a flow measurement function. Therefore it can be useful to design manual balancing valves into the branches and have automatic balancing valves on the many hundreds of coils.

The manual valves can then:

- Measure the flow rate to the entire branch as a secondary check that the automatic valves are delivering the correct total flow rate or where the automatic balancing valves on the individual coils are inaccessible for flow checking.
- Provide a degree of adjustability in the system for pressure differential at maximum flow conditions (*note however in variable flow systems, the pressure differential on the manual balancing valves will diminish as flow reduces*)



In an attempt to improve the modulating 2-way control valve authority it is deceptive to simply throttle down on the manual branch balancing valve to transfer excess pressure differential from the automatic balancing valve. Whilst this would cause an improvement at the maximum flow condition during commissioning when every coil on the branch is at full load and calling for 100% flow, when the system begins operating at a typical flow of about 50%, the pressure differential that was created by the manual balancing valve on the branch will have dropped to 25% and the other 75% of its pressure will again have transferred back onto the terminal circuits and control valves. This can be corrected by installing differential pressure controllers across the branches as described in the following section.

TA retains the right to make changes to its products and specifications without prior notice  
For further technical information please visit our website [www.touranderson.com.au](http://www.touranderson.com.au)

**TOUR & ANDERSSON** Moorabbin Business Park Unit 25 / 148 Chesterville Road MOORABBIN VIC. 3189, PO Box 154 Highett Victoria 3190  
Telephone (03) 9553 3366 Facsimile (03) 9553 3733 email [info@touranderson.com.au](mailto:info@touranderson.com.au)

An Indoor Climate business of IMI plc

# System Design

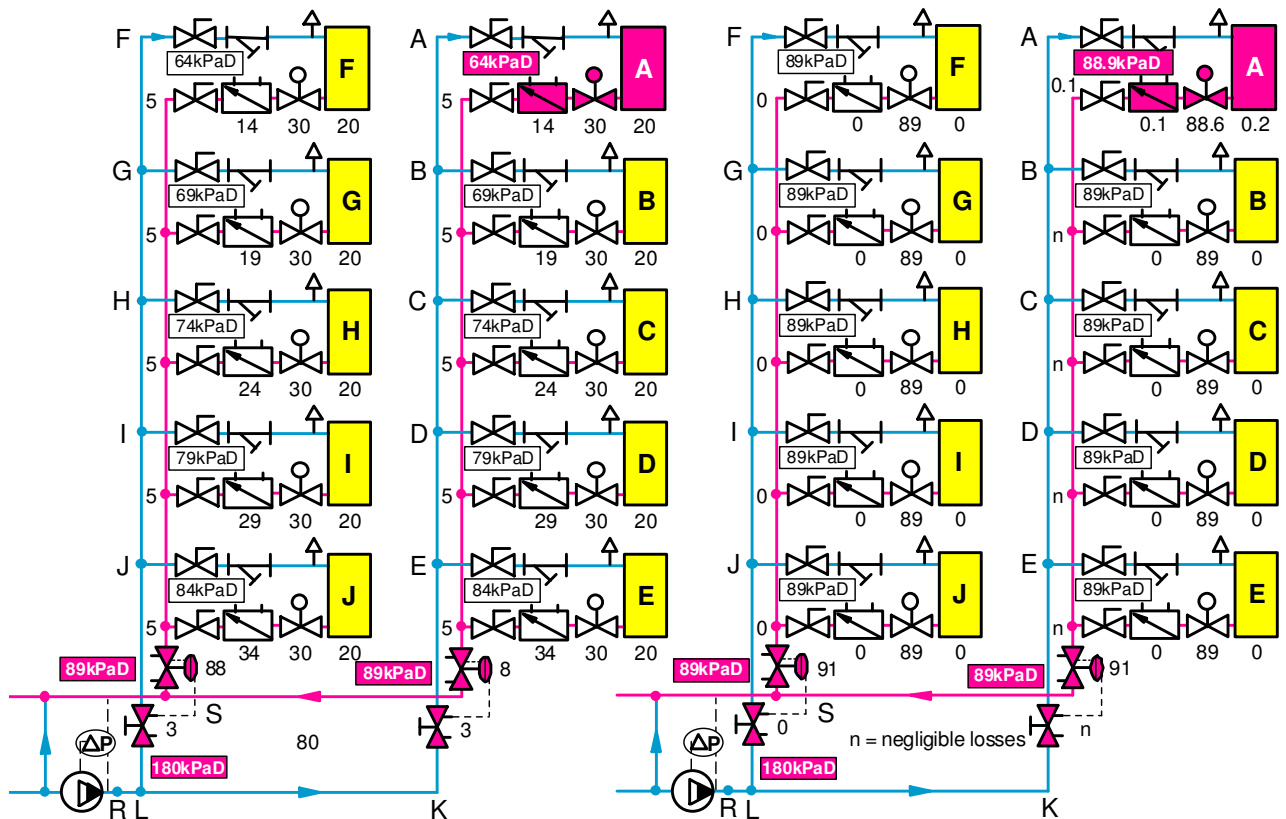
## Automatic balancing with differential pressure control valves

The design of differential pressure control valves applied across branches with automatic balancing valves on the individual coils can be a good compromise solution. This can still provide the main benefit of eliminating the need for commissioning adjustments of hundreds of valves for all coils in large systems whilst providing improved control valve authority if designed correctly.

The pressure differential controller would be selected and adjusted so that under all flow conditions, it would maintain a stable pressure differential across the branch. A manual balancing / flow measuring valve should also be designed into the supply line to make adjustment of the differential pressure controller easier on site as actual onsite pipe frictions can vary considerably from design calculations. Please refer to Tour & Andersson STAP differential pressure controller technical sheets for more details.



### Pressure differential stabilisation across the branches



Operating at design maximum system flow

Operating at minimum system flow

The above diagram represents an arrangement for optimum balancing. Here, automatic balancing valves TA AutoFlow regulate the flow to each of the units and a combination of manual balancing STAD valves and STAP differential pressure controllers balance the branch lines. With this arrangement, even as the flow goes below the design conditions, the system remains perfectly balanced.

TA retains the right to make changes to its products and specifications without prior notice  
For further technical information please visit our website [www.tourandersson.com.au](http://www.tourandersson.com.au)