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Commissioning systems with variable-speed pumps

With the growing use of variable-speed pumps comes the demise of proportional balancing.

DUNCAN SELBY discusses this new world of commissioning.

As Part L of Building Regulations takes hold within the HVAC industry, we are seeing a concentrated effort to show savings in pumping energy. One key method being exploited is the use of variable speed pumps to modulate the flow in the system.

The days of simple proportionally balanced constant flow systems are slowly coming to an end in favour of variable volume circuits controlled by differential pressure control valves (DPCV's). Typically, the control valves are two-port types that control the flow on the basis of not pumping water if you do not need to. This philosophy is fine if the system includes DPCV's that control the pressure across all circuits. Circuits not fitted with DPCV's are difficult to set-up and control and are unlikely to generate the expected savings.

The use of variable speed pumps combined with DPCV's offers considerable benefits - lower overall energy use, less complex control valve arrangements and simpler installation. The time taken to commission should also be reduced, as the need for proportional balancing reduces.

Smoother commissioning

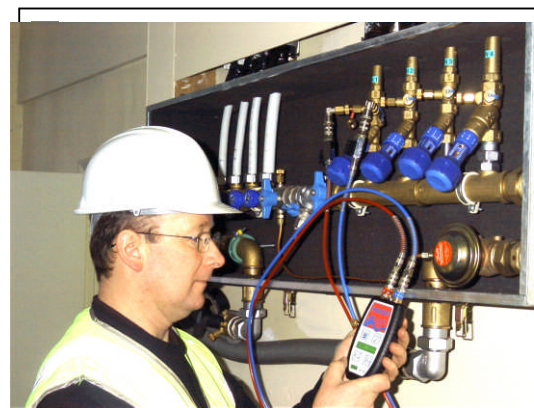
The process of proportioning flow to the multitude of terminals (fan coils), now becomes a flow setting operation by simply setting each balancing valve to the desired flow then moving to the next valve without the need to keep monitoring the index circuit. Circuits controlled using DPCV's also allow buildings to be completed in stages without fear of changes in one circuit altering the flow in another.

Perhaps the most elegant solution to the variable speed issue is the development of prefabricated modularised systems such as SAV's Commissioning Module which enables one compact assembly of valves complete with a DPCV to serve up to six terminal (fan coil) units.

Commissioning modules offer many benefits. However, Commissioning Engineers must be aware that consulting engineers are demanding more data than just flow rates to each terminal unit. Fortunately, this is only a small part of what can be achieved. Commissioning modules also enable all hydraulic parameters to be measured, such as flow to each terminal, loss across each terminal, differential pressure controlled by DPCV, differential across flow and return and differential across strainer.

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The benefit of this set of measurements is to provide full confidence that each circuit is functioning correctly and the final value for the differential across the flow and return on the index circuit will allow the pump speed to be established for optimum energy saving.



Electronic manometers overcome the limitations of mercury manometers. When integrated into a computerised commissioning device the entire task of commissioning is much simplified. This is Comdronic's AC5.

Perfect commissioning solution

All of the above results are simple to achieve with commissioning modules arranged with all the necessary testpoints. From some readings across the flow and return will now be 65kPa. No longer will it be acceptable for Commissioning Engineers to simply record 'Greater than 65kPa', due to the limitations of traditional mercury manometers.

The perfect solution is to combine commissioning modules with more sophisticated and reliable electronic manometers. This avoids all the issues associated with mercury, allows accurate readings up to 250 kPa and provide a host of advantages.

One of the latest of the computerised commissioning modules available, the Comdronic AC5, is ideally suited to commissioning of these highly innovative modules, from the signals on flow valves to the differential across the DPCVs.

This instrument gives accurate readings from 0 to 1000 kPa. This, capability, combined with the onboard database of 1000 valves and flow measurement devices, allows commissioning engineers direct reading of flow across the distribution system.

All in all there are considerable opportunities for energy saving within the HVAC industry primarily made possible through the use of more technologically advanced products and systems now available.

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