

Matrix iS21 Variable Pressure Regulator



UVP-LD

Matrix iS21 is a family of versatile hardware and software products developed and manufactured by Matrix Controls Pte Ltd for HVAC and lighting control of Intelligent Building Systems.

DESCRIPTION

Matrix UVP-LD Variable Pressure Regulator is the world's first Lon device designed to optimise air distribution in Variable Air Volume (VAV) AHU systems and has been proven to greatly reduce energy usage. This is achieved by **continually adjusting static air pressure set-points of an AHU** as opposed to conventional VAV AHU systems which rely on a fixed static air pressure set-point.

The conventional static pressure set-point can be set in various ways by the HVAC engineer - from the conservative higher static pressure set-point which ensures enough cooling/heating under all possible circumstances, to the energy conscious engineer who set a low static pressure point to realise some electrical savings from the AHU fan. The truth is neither set-point will perfectly – a constant set-point is not able to achieve both maximum energy efficiency and ensure sufficient airflow.

The main problem with a higher set-point for constant static pressure is that maintaining this pressure, when it is not needed, is a waste of electrical energy by the AHU fan.

Problems arise with a low pressure set-point when the VAV boxes near the AHU

fan are open wide. Boxes further away become starved of air and are not able to reach their required flow to bring the space temperature to the rooms' set-point; these boxes starved of air may take a very long time or perhaps never achieve the required space temperature.

The UVP-LD not only solves the above two problems through continually varying the static pressure, but it also brings the space temperature rapidly to its set-point by bringing up the fan speed when more cooling/heating is required. Thereafter, it maintains an optimum energy efficient pressure point to save energy.

The UVP-LD requires no hardware modifications (beyond installation of the UVP-LD) to an existing Lon HVAC system.



UVP-LD display shows current AHU status, static pressure, heating/cooling mode, fan speed control output and supply air temperature. It also displays the damper position, space and set-point temperature of every VAV.

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The following data was captured from a constant static pressure AHU system after it was installed with the UVP-LD.

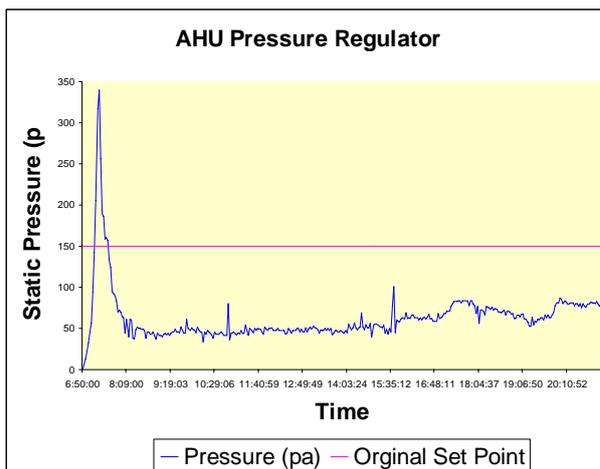
This particular AHU's static pressure was set to 150Pa (purple line) after looking for the lowest reasonable static pressure set-point to save energy. This was done by closing all VAV boxes fully except for the furthest box and finding a static pressure which is able to fulfil its designed maximum flow rate while all other boxes were closed.

As opposed to the convention of setting all boxes opened to maximum flow and finding a static pressure that will ensure the furthest box is still able to reach designed maximum flow, the abovementioned method resulted in a low constant static pressure set-point at this site to achieve energy savings.

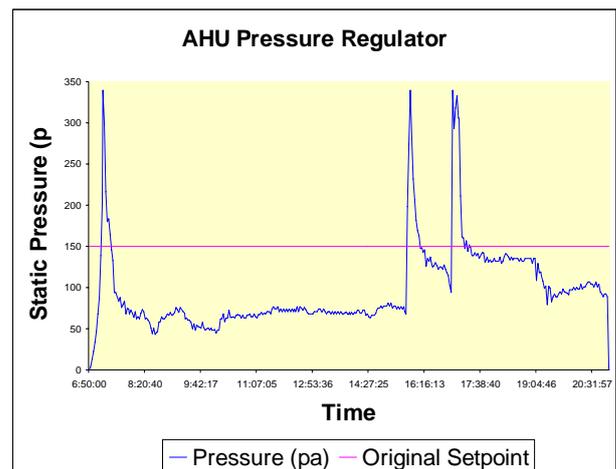
Regardless of the efforts to find an energy efficient low constant static pressure, the UVP-LD managed to maintain a lower pressure without compromising on space temperature. (Graph 1)

The initial spike shows how the UVP-LD allowed for higher static pressure to improve cooling/heating response, allowing the space temperature to reach desired set-points sooner than a constant static pressure system is able to achieve.

This speedy response in being able to achieve the cooling/heating space temperature set-point is further illustrated in Graph 2 where there were two periods of heightened human activity in the zone served by this VAV AHU in the afternoon.



Graph 1



Graph 2

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Key Advantages

- ✓ AHU fan runs at lower average speeds resulting in more energy savings
- ✓ Individual VAV boxes (up to 25 VAV boxes under one UVP-LD) receive “just enough” cooling air flow resulting in more effective cooling in individual rooms
- ✓ Cooling demand is met more quickly and efficiently
- ✓ Requires no modification of existing hardware beyond installation of the Matrix UVP-LD Variable Pressure Regulator
- ✓ Small dimensions – easy panel mount installation.
- ✓ Huge energy savings at low installation cost

SPECIFICATIONS

Supply

- ❑ FT/TP 78.6 kbps
- ❑ Power consumption: < 2.0 VA

Communication Channel

- ❑ FT/TP 78.6 kbps

Transceiver

- ❑ FTT-10A

LonMark® Version

- ❑ 3.2

Communication protocol

- ❑ LonTalk®

Conformance to standards

- ❑ Emission ----- EN50081-1
- ❑ Immunity ----- EN50082-1

Size & Weight

- ❑ Outer: - 124 x 148 x 2 mm
- ❑ Inner: - 108 x 105 x 32 mm
- ❑ LCD display: - 74mm x 24mm

Neuron Type

- ❑ 3150, 10MHz

Operating Environment

- ❑ 0 to 50 degrees Celsius
- ❑ 0 to 95% RH (non-condensing)

Interoperability conformance

- ❑ LonMark® Interoperability Guidelines
- ❑ 0 to 95% RH (non-condensing)

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