Sensormate Enterprise Co.,Ltd.

Air Speed Sensor

Date: 6-Sep-2019

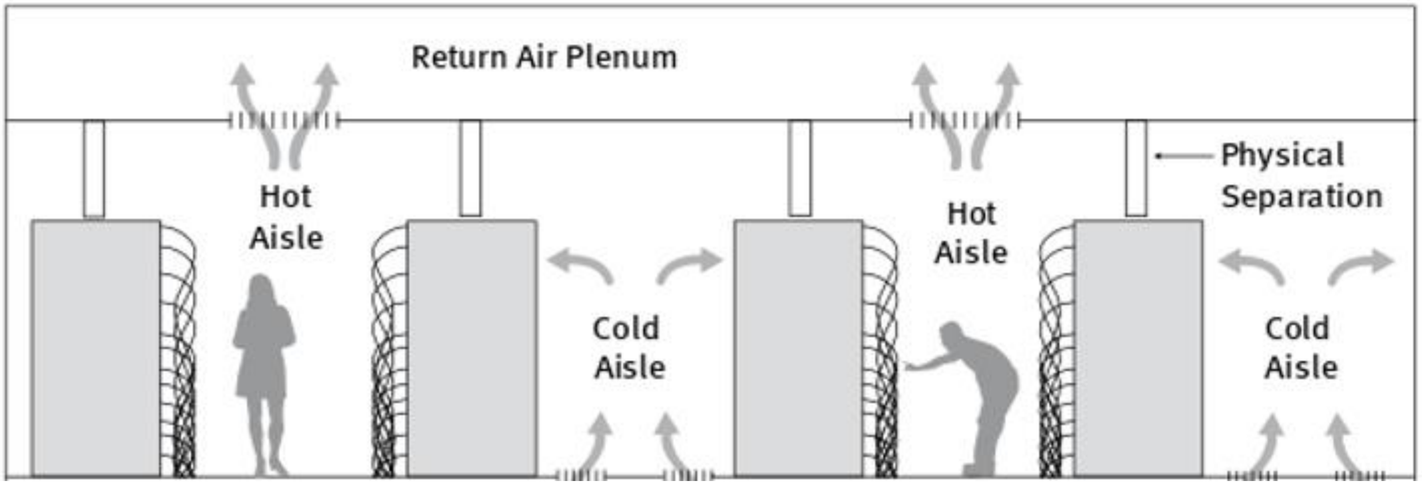
Ver.1.0

How to manage data center airflow

Large organizations are wasting money unnecessarily by literally blowing a lot of hot air because of inefficient data center airflow.
heating, ventilation, and air conditioning (HVAC)
Companies are getting more servers for less power these days, due to the rise of virtual machines (VMs), container technologies such as Docker, and the addition of low-power, low-heat ARM servers to the data center.

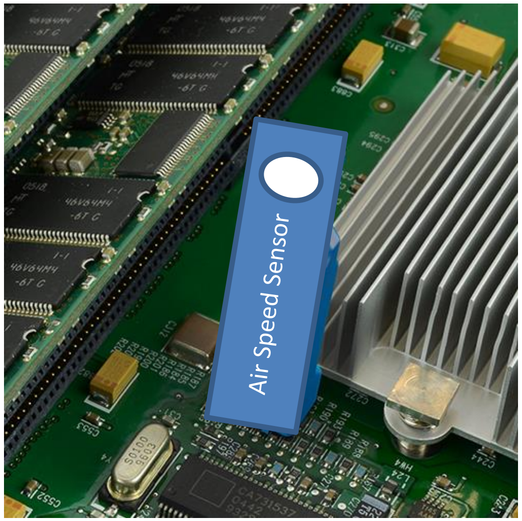
It's found that most data centers are not running anywhere close to peak cooling efficiency, as measured by **power usage effectiveness (PUE)**. PUE reflects the ratio of power coming into the data center to its distribution across the IT workload.
A PUE of 1.0 is considered very efficient, while anything between 2.0 and 3.0 is considered very inefficient
When you get to PUE ratios at 2 and above, you are looking at a massive amount of power going not just to the IT side of the house but also to the facilities side.

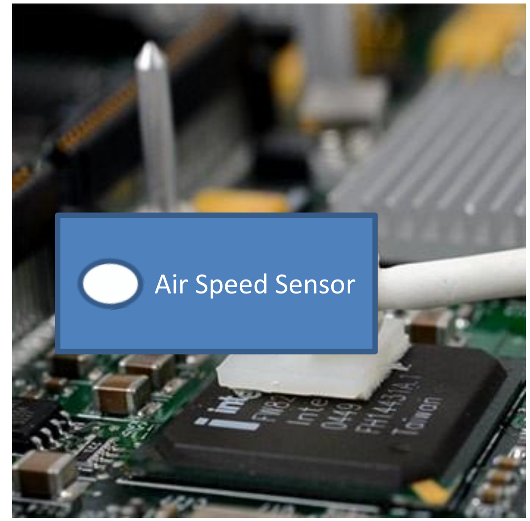
IBM's Robert Sullivan introduced the concept of hot aisle/cold aisle cabinets in 1992. In this configuration, cabinets are place



Containment: By closing off the hot and cold aisles (or ducting the hot return air out of the cabinets), the air flow dynamics within the data center" are greatly improved

http://www.cisco.com/c/en/us/solutions/collateral/data-center-virtualization/unified-computing/white_paper_c11-680202.pdf



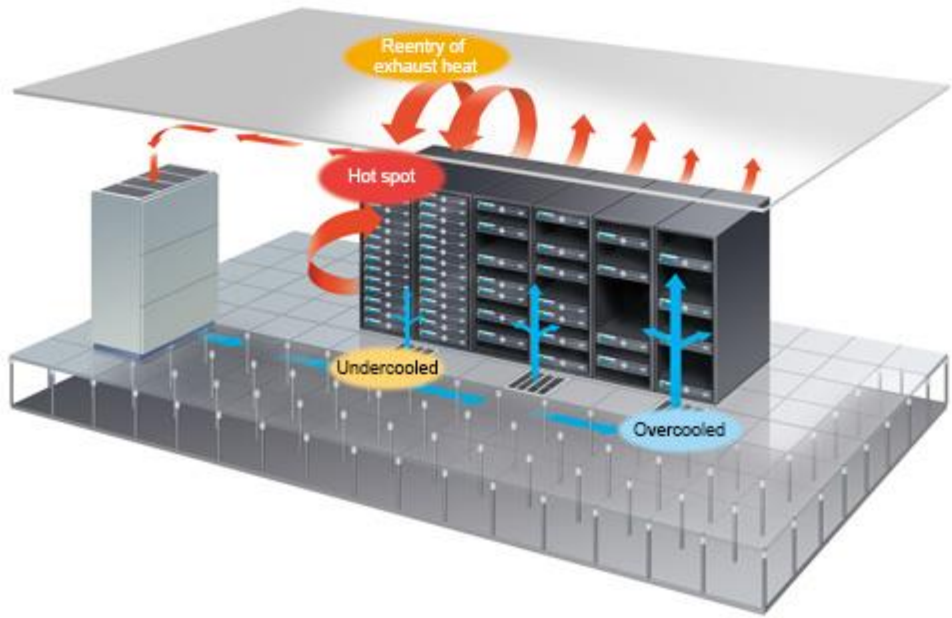


A novel air flow sensor for measuring flow velocities in heat ventilating and air conditioning systems in intense electonics The sensor relies on patent technology allowing the fabrication of robust, design flexible, and cost-effective solution. Due to the interaction with the streaming fluid, the air speed sensor generates an digital signal sent to host computer for determination of the total flow of air to gain energy saving.

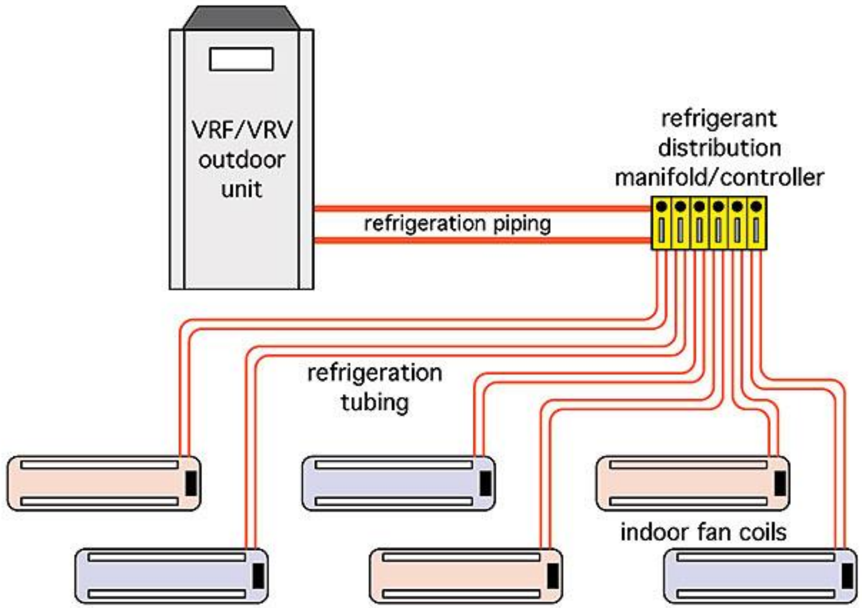
Airflow management solution for data center environments

For both redundancy and energy conservation

The temperature should be well maintained, with computer room air conditioners (CRACs) and airflow comprehensively and continuously managed so that cold air is reliably supplied to the IT equipment.



Airflow can be disturbed by pillars, beams, racks, and other obstructions, causing hot spots and excessive cooling.



There is a change taking place in the HVAC market, driven by the availability of Variable Refrigerant Flow (VRF). This is reducing the number of dampers used. Replacing them with Refrigerant Fan Coils. With a Pressure Independent Damper with feedback by air speed sensor, we can regain a considerable amount of the VRF market.

Air Fluid

Air Speed Sensor
w/Wireless
Connectivity

iOS Display & DAQ

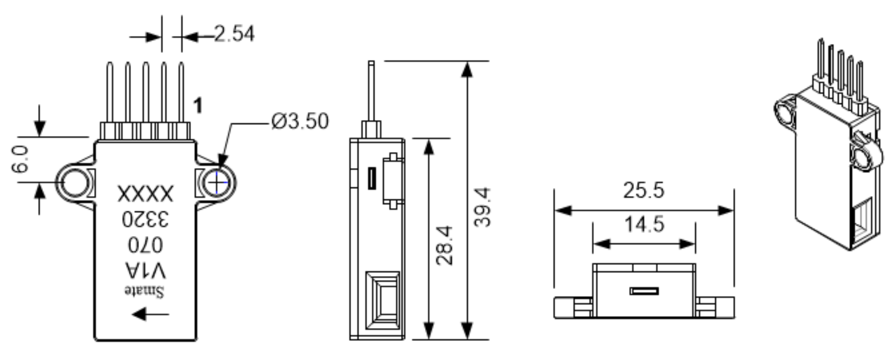
PRELIMINARY

Test Conditions: 5V (analog), Ta=25°C. Relative Humidity: 40%<RH<60%

Parameters	Min	Typ	Max	Unit
Supply Voltage [1]	2.75	5	5.5	V
Supply Current		17	21	mA
Range of Flow Rate [2]	0		7	m/s
Output - Analog	0.5 to 4.5 @5V			V
Accuracy	5%FS A(analog) or 5% of reading + 0.1 m/s (digital)			
Relative Humidity [3]	5		95	%
Response Time		5	15	ms
Temperature – Reference [4]		25		˚C
Temperature – Operating [4]	- 5		+85	˚C
Temperature - Storage	-40		105	˚C
Wetted Materials	Silicon carbide, epoxy, PPE+PS, FR4			
Weight	4			g

Notes:

1. Other supply is also available upon request.
2. 30 sccm to 4000 sccm; Mass flow emulation.
3. Non-condensing
4. Lower operating temperature is possible with individual evaluation. Thermal error is 0.2%FS/100 ˚C which is design parameter.



Unit: mm

Pin #	Description
1	V_{DD}
2	V_{SS}
3	Output
4	N.C.
5	N.C.

Characteristics

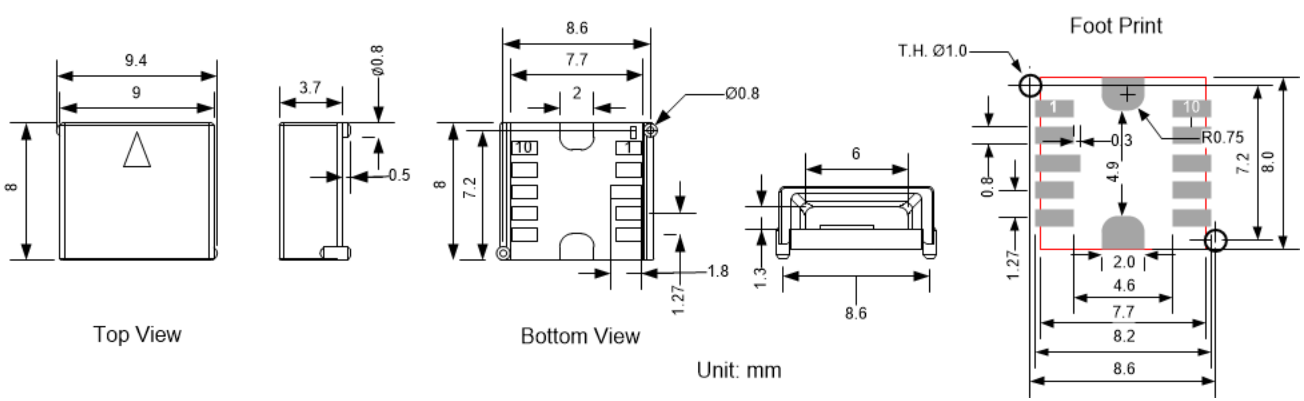
PRELIMINARY

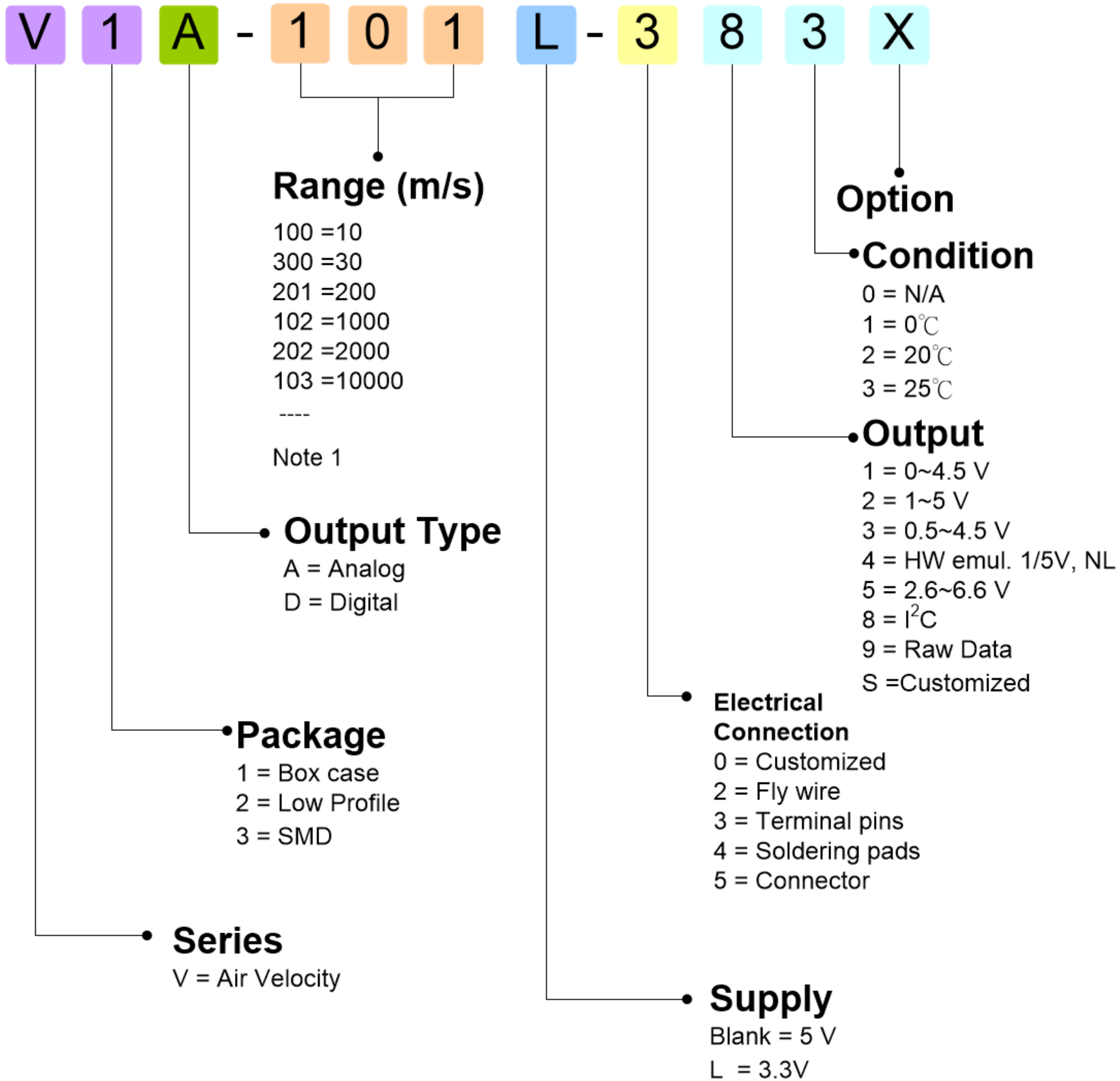
Test Conditions: 5V (analog), Ta=25°C. Relative Humidity: 40%<RH<60%

Parameters	Min	Typ	Max	Unit
Supply Voltage [1]	2.75	5	5.5	V
Supply Current		17	21	mA
Range of Flow Rate [2]	0		7	m/s
Output - Digital		12		Bit
Accuracy	5%FS A(analog) or 5% of reading + 0.1 m/s (digital)			
Relative Humidity [3]	5		95	%
Response Time		5	15	ms
Temperature – Reference [4]		25		°C
Temperature – Operating [4]	- 5		+85	°C
Temperature - Storage	-40		105	°C
Wetted Materials	Silicon carbide, epoxy, PPE+PS, FR4			
Weight		4		g

Notes:

1. Other supply is also available upon request.
2. 30 sccm to 4000 sccm; Mass flow emulation.
3. Non-condensing
4. Lower operating temperature is possible with individual evaluation. Thermal error is 0.2%FS/100 °C which is design parameter.




V 1 A - 1 0 1 L - 3 8 3 X
Range (m/s)
100 =10
300 =30
201 =200
102 =1000
202 =2000
103 =10000

Note 1
Output Type
A = Analog
D = Digital
Package
1 = Box case
2 = Low Profile
3 = SMD
Series
V = Air Velocity
Option
Condition
0 = N/A
1 = 0℃
2 = 20℃
3 = 25℃
Output
1 = 0~4.5 V
2 = 1~5 V
3 = 0.5~4.5 V
4 = HW emul. 1/5V, NL
5 = 2.6~6.6 V
8 = I2C
9 = Raw Data
S =Customized
Electrical Connection
0 = Customized
2 = Fly wire
3 = Terminal pins
4 = Soldering pads
5 = Connector
Supply
Blank = 5 V
L = 3.3V