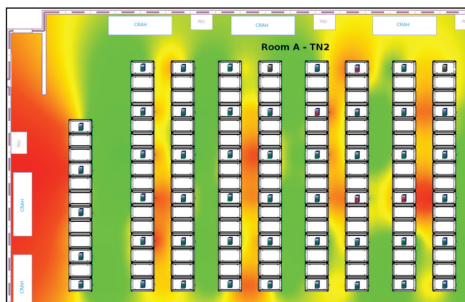


Cooling Optimization – with SynapSoft® Software

As organizations are challenged with supporting growing data center needs with limited budgets, data center operators are seeking ways to optimize power and increase cooling capacity. SynapSoft® Software, part of the Panduit® SmartZone™ Solutions Software Suite, works with SynapSense® Wireless Mesh Sensors and Gateways to monitor, manage, and control the optimization of cooling, enabling customers to reclaim stranded capacity and avoid the capital expenditures associated with purchasing new equipment. As result, customers typically experience up to a 50% reduction in cooling energy and ROI payback timeframes within two years.

Dynamic Visualization of the Data Center Environment

The Livelmaging™ feature provides real-time two-dimensional imaging of the sensor-monitored environment through use of a 'thermal map' style color gradient overlaid onto the data center layout image. This information can then be displayed via maps or animated movies of temperature, pressure differentials, and humidity levels at multiple levels to identify developing hot spots or anomalies in the data center, track an issue, and play back the sequence of events leading up to the occurrence.



Automation of CRAH Temperatures and Set-Points

The Active Control™ feature provides energy savings and increased efficiency by continuously aligning cooling capacity with changes in IT load. Using server inlet temperatures and subfloor pressure differentials, the software can manage CRAH temperature set points and variable fan speeds. This unique approach optimizes cooling capacity and saves up to 50% in cooling costs by minimizing the fan energy needed to meet server CFM and ASHRAE requirements.

The Active Control™ feature has built-in redundancy and failover safety mechanisms to mitigate temperature control risks associated with fan motor failures, maintenance windows, perforated floor relocations, changes to IT load, and software patches and failures. It also includes alerts and alarms providing notifications to data center operators on a wide variety of operational issues.

Real-time		History	
Temperature			
Mode:	Engaged, Manual		
	Unit	Env	
Setpoint:	20.00 °C		
Return temperature:	36.67 °C	36.11 °C	
Supply temperature:	20.00 °C	20.00 °C	
Valve position:	42.00 %		
Valve control:	Return Air		
Control strategy: Proportional			
Output temperature:	15.56 °C		
Last Adjustment:	± °C		
Uncontrollable inputs:	0% (0/43)		
Worst Uncontrollable:			
Controlling input:	P.06.04 - Inake	28.33 °C	
Most Overcooled Input:	P.06.04 - Inake	22.22 °C	
Pressure			
Mode:	Engaged, Manual		
Fan speed:	100.00 %		
Fan power:	5.76 kW		
Control strategy: Proportional			
Output fan speed:	100.00 %		
Last Adjustment:	± %		
Uncontrollable inputs:	0% (0/6)		
Worst Uncontrollable:			
Controlling input:	P.06.04 - Differenc	15.45 Pa	
Most Overcooled Input:	P.06.13 - Differenc	21.67 Pa	

SynapSoft® Software helps you...

- **Reduce cooling energy utilization up to 50%**
- **Reclaim stranded power and cooling capacity**
- **Avoid capital expenditures** associated with purchasing new equipment
- **Achieve tangible ROI**, with typical payback timeframes of less than two years
- **Automate management** of CRAH temperature set points and variable fan speeds to maintain energy savings
- **Meet server CFM requirements** while maintaining acceptable server inlet temperature within ASHRAE range
- **Identify hot spots and direct airflow** to avoid overheating or air mixing
- **Create trending views** of recent or historical temperatures, pressure differentials, dew points, or humidity levels
- **Optimize and ensure PUE accuracy** through evaluation of system performance identification of changes in electrical infrastructure
- **Improve capacity planning and management** with an in-depth understanding of total and detailed resource utilization
- **Increase resiliency** and reduce risk of overloading by providing alarms for phase or load balancing violations
- **Gain remote access** to cooling optimization data via mobile platform

A Complete Data Center Metrics Dashboard

The software dashboards provide a comprehensive overview of conditions of the entire data center using calculated metrics including

- Real-time PUE
- Rack Cooling Index (RCI)
- TM/SM RCIHI
- TM/SM and RCILO
- TM/SM, Rack
- Moisture Index Hi/Lo, Recirculation Air
- Ratio (RA), Bypass Air Ratio (BPA) and
- Air Loss Ratio (ALR)



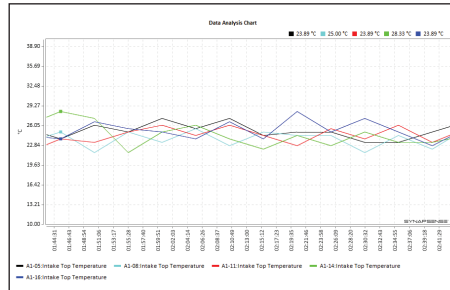
Preferred Views of Sensors

Sensor views allow sorting by data type. This enables users to quickly create a preferred view with the most recent data or use historical data to view past trends such as high and low temperatures, pressure differential, dew point, and humidity.

Summary	Temperature	Pressure	Humidity	Power	Energy	Flow	Volume	Time
Dashboard 12 out of 12 Rows								
Index	Value	Unit	Value	Unit	Value	Unit	Value	Unit
A0-01	41.86	0.00	23.33	5.00	23.33	21.11	80.00	20.00
A0-02	20.00	0.00	23.89	4.75	23.33	21.11	28.89	22.22
A0-03	21.43	0.00	22.78	4.24	22.22	22.78	27.78	21.11
A0-04	21.58	0.00	22.78	3.87	24.44	22.22	29.44	20.56
A0-05	21.68	0.00	24.44	3.97	23.33	23.33	31.67	21.67
A0-06	31.91	0.00	22.78	3.87	23.33	22.78	35.56	21.67
A0-07	34.00	0.00	23.33	3.87	24.44	23.33	38.56	20.56
A0-08	31.03	0.00	22.78	3.70	23.33	20.56	26.67	20.56
A0-09	30.00	0.00	21.67	3.70	22.78	21.67	31.11	20.56
A0-10	34.00	0.00	23.89	3.43	23.89	21.67	31.11	20.00
A0-11	17.85	0.00	22.22	3.43	23.33	20.56	28.89	20.56
A0-12	42.86	0.00	21.56	3.43	25.00	24.44	29.44	21.67
A0-13	47.06	0.00	26.11	3.43	26.11	22.78	35.00	20.56
A0-14	18.75	0.00	22.22	3.15	23.33	21.11	28.33	21.11
A0-15	32.61	0.00	22.78	3.15	24.44	21.67	30.56	21.11
A0-16	19.35	0.00	25.00	3.15	24.44	21.11	31.67	21.11
A0-17	40.00	0.00	26.11	3.15	22.22	21.67	31.11	20.00
A0-18	19.35	0.00	23.33	3.15	22.22	21.67	29.44	21.11
A0-19	30.00	0.00	24.44	3.15	24.44	22.22	30.56	21.11
A0-20	32.71	0.00	25.56	2.87	24.44	20.89	32.22	22.22
A0-21	48.57	0.00	21.11	2.87	22.78	21.67	30.56	20.56
A0-22	20.69	0.00	21.89	2.87	23.33	22.78	27.78	22.22
A0-23	53.85	0.00	24.44	2.58	25.56	21.67	31.11	20.00

Environmental Data Analysis Reports

Any number of sensors can be graphed through the "Data Analysis" functionality. The software console enables a group of sensors to be named and saved for future reporting with a single click.



Data Access on the Go

Access data anytime, anywhere with the SynapSoft® Software mobile app.

- Built for iPhone and Android
- Provides direct access to all data centers on a server
- View geographic locations
- Gain access to key metrics at the data center or rack level
- View Livemaging™ feature
- View and manage critical alert traffic
- Get instant access to contact information



SynapSoft® Software is part of the SmartZone™ Solutions Software Suite.

Panduit® SmartZone™ Solutions enable comprehensive energy and physical infrastructure efficiency in data centers, facility domains, and enterprise estates through intelligent software, hardware, and services that provide granular visibility of power, space, environmental, asset, and connectivity information that is accurate and actionable for operational optimization.

Features of SynapSoft® Software:

- Control of CRAH temperature set points and variable fan speeds to continuously align cooling capacity with changes in IT loads
- Imaging of real-time environmental conditions, displayed in thermal, humidity, and pressure maps and movies to identify developing hot spots or anomalies in the data center, track an issue, and play back the sequence of events leading up to the occurrence
- Mobile app views of data that is compatible with iPhone and Android platforms
- Consolidated display of branch circuit monitoring and rack level monitoring on one screen
- Quick identification of cooling phase imbalance or threshold violations to support resiliency and enable load and phase balancing
- Intuitive visualization of rack-level power data with cooling capacity for optimal server placement

Solve real-world data center and enterprise challenges with Panduit® SmartZone™ Solutions.

We can show you how - call us, e-mail us, or visit us online!
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