Advance Cooling Technology for Server Room

Presented By: Ooi Joon Kit
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Challenge

Why We Need AC in Server Room?

Why We Need Precision Air Conditioning?
Why We Need AC in Server Room?

Important

Consequences
Important

It is important to maintain the server equipment in **Optimal Temperature**

- Too Hot
  - Shut Down
  - Signal Loss
- Too Cold
  - Waste Electricity
  - Waste Money
Consequences

- Lost Opportunity
- Waste Time
- Lost Customer Details

Trust
Why We Need Precision Air Conditioning?
What is PAC?

- Ambient Environment
- Constant Temperature and Humidity conditions
- To Electronic Equipment
- Normal Air Conditioning
- Provides Cooling comfort only
Concept

Precision Cooling

Racks
“A computer and data processing room, CDPR air conditioner are to provide

Air Filtration
Circulation
Cooling
Reheating
Humidity Control

American Society of Heating Refrigeration and Air Conditioning Engineer
Why Need Precision Cooling?

- RESEARCH
- ASHRAE Recommendation
- Comfort Air-Conditioner Risk in IT Room
RESEARCH

Electronic Equipment Failures

Temperature 55%
Humidity 19%
Vibration 20%
Dust 6%

“Report GB-185R”, BCC Inc.

Precision Cooling will solve **80% Problems**
## ASHRAE 90431 – Thermal Guide for Data Processing Environments

### Table 2.1 Equipment Environment Specifications

<table>
<thead>
<tr>
<th>Class</th>
<th>Dry-Bulb Temperature (°C)</th>
<th>Relative Humidity (%) Non-Condensing</th>
<th>Max. Dew Point (°C)</th>
<th>Max. Elevation (m)</th>
<th>Max. Rate of</th>
<th>Product Power Offb, c</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Allowable</td>
<td>Recommended</td>
<td>Allowable</td>
<td>Recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>15 to 32d</td>
<td>20 to 25</td>
<td>20 to 80</td>
<td>40 to 55</td>
<td>17</td>
<td>3050</td>
</tr>
<tr>
<td>2</td>
<td>10 to 35d</td>
<td>20 to 25</td>
<td>20 to 80</td>
<td>40 to 55</td>
<td>21</td>
<td>3050</td>
</tr>
</tbody>
</table>
## Comfort Cooling Air-Conditioner Risk in IT Room

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Risk Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td>Do not have capability to maintain the temperature specified for IT room, it’s easily to result in IT assets broken because of the temperature fluctuation.</td>
</tr>
<tr>
<td><strong>Airflow Volume</strong></td>
<td>The design of airflow volume is not sufficient enough so that the heating exchange of IT room can be handled in time.</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>Do not have capability to maintain the humidity specified for IT room, it’s easily to result in IT assets broken because of the PCB Short-circuit.</td>
</tr>
<tr>
<td><strong>Clean Class</strong></td>
<td>Because of the insufficient cleanliness, it’s easily to result in data exchange errors or overheating of some unit parts.</td>
</tr>
<tr>
<td><strong>Working Environment</strong></td>
<td>The cooling system can not work in the overheat (≥45°C) or freezing (≤5°C) environment application.</td>
</tr>
</tbody>
</table>
Comparison: Precision AC vs Comfort AC

- High Sensible Heat Ratio
- Wide Operation Temp. Range
- Precise Temp. Control
- Humidity Control
- MTBF
- Higher Filter Grade
- Reheater & Humidifier
- Group Monitoring
- Long Operation Hours
## Comparison: Precision AC vs Comfort AC

<table>
<thead>
<tr>
<th>Feature</th>
<th>Precision</th>
<th>Comfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Sensible Heat Ratio</td>
<td>&gt; 90%</td>
<td>65 - 70%</td>
</tr>
<tr>
<td>Wide Operation Temperature Range</td>
<td>-20°C – +45 °C</td>
<td>-5°C – +35 °C</td>
</tr>
<tr>
<td>Precise Temperature Control</td>
<td>±1°C</td>
<td>±2 to 3°C</td>
</tr>
<tr>
<td>Humidity Control</td>
<td>✔ (±5%)</td>
<td>✗</td>
</tr>
<tr>
<td>Mean Time Between Failure (MTBF) hr/year</td>
<td>8,760</td>
<td>1,200 to 2,500</td>
</tr>
<tr>
<td>Higher Filter Grade</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Reheater</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Humidifier</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Group Control</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Long Operation</td>
<td>✔</td>
<td>✗</td>
</tr>
</tbody>
</table>
Solution

- Less Space for IDU
- Group Monitoring
- Precise Temp. & RH Control
- Link to BMS
- Fire Alarm & Water Detection System
- ODU Discharge Direction
- Long Piping Application
- Flexible Placement
- Data Centre Containment
- Link to BMS
- Precise Temp. & RH Control
- Group Monitoring
- Less Space for IDU
- Fire Alarm & Water Detection System
- ODU Discharge Direction
- Long Piping Application
- Flexible Placement
- Data Centre Containment
Air Conditioning able to control & monitor using Building Management System (BMS) through communication Protocol (Modbus)
Precise Control Temp. & Humidity

- %RH
- Static Electricity
- %RH
- Corrosion

- Electronic Burn
- %RH
- Electricity bill
Group Monitoring

Duty - Standby

Master Slave

Automatic Switch Over
Limited IDU Space

Dual Cool

Limited Spacing
Fire Alarm & Water Detection System

- Link to Fire Alarm System
- Water Detection Kits
ODU Discharge Direction

High Rise Building
No Space

Vertical Outdoor Unit (ODU) Discharge Direction

Vertical Discharge Blockage

Horizontal Outdoor Unit (ODU) Discharge Direction
Long Piping Application

- Chilled Water Cooled

High Elevation
Flexible Placement

- PAC can move here and there
- Server Room is not required
Polar Containment

- In-Row Precision Air Conditioner can be used
Fitting Cold Aisle Acrylic Roof
Fitting Cold Aisle Roof Supports
Connect the Frame
Install First Automatic Sliding Door
Installation of Data Centre Containment
Placement of Side & Privacy Panels
Installing Doors on Frames
Fitting Rails & Automatic Mechanism
Installing Second Sliding Door
Installation of Cover & Sensor
Testing Automation
Placement and Alignment of Frames
Major Component

- **Ventilation**
  - Fan
  - Filter

- **Monitoring**
  - Controller
  - HMI

- **Heating**
  - Reheater
  - Controller Parts

- **Humidifying**
  - Humidifier
  - Electrode
  - Infrared

- **Cooling**
  - Compressor
  - Evaporator
  - Condenser
  - TXV/EEV
  - Parts
Major Cooling Type

- Air Cooled DX
- Water Cooled DX
- Chilled Water-CW
- Glycol-GW
- Air & Chilled water-ACW
- Water & Chiller water-WCW
- Chilled Water & Chilled Water-CW2
Major Cooling Air Discharging

- Up Flow
- Down Flow
- Up-Front Flow
- Down-Front Flow
- Front Flow
- Under Floor Flow
Product Series

iClimate Series
Cooling Solution

Cool Smart

Cool Row

Cool Master

BR-iBlock Rack All
in One Data Centre
Cool Smart Precision Air Conditioner

- Cool Smart
- A5PCS 007 – 020
- Air Cooled & Water Cooled

Features:
- Link to Fire alarm system
- EC Centrifugal Fan
- Build-in Modbus Protocol
- Recorded History Data
- Link to BMS system
- Group Control & Master-Slave
- Water Detection Kits
- SMS Alarm Function

Types:
- Up-Front Flow
- Down-Front Flow
- Down Flow
Cool Row Precision Air Conditioner

A5PCR 012 – 060
Air Cooled & Water Cooled

- Cold Aisle Containment
- Hot Aisle Containment

A5PCR 025 – 060C
Chilled Water Cooled

- Link to Fire alarm system
- EC Centrifugal Fan
- Build-in Modbus Protocol
- Recorded History Data
- Link to BMS system
- Group Control & Master-Slave
- Water Detection Kits
- SMS Alarm Function

Cool Row

Cold Aisle Containment

Hot Aisle Containment

EC Centrifugal Fan

Recorded History Data

Group Control & Master-Slave

SMS Alarm Function
Cool Master Precision Air Conditioner

Cool Master

A5PCM 025 – 120
Air Cooled, Water Cooled & Glycol Cooled

APCM 031 – 200C
Chilled Water Cooled

A5PCM 030 -100D
Dual Cooled

Link to Fire alarm system
Build-in Modbus Protocol
Link to BMS system
Water Detection Kits
Pressure Transducer
Recorded History Data
Group Control & Master-Slave
Modular Frame Structure
SMS Alarm Function
BR-iBlock Rack All in One Data Centre

BR-iBlock
ABRIM 03 – 06
Air Cooled

ABRIM 03C -IT
Air Cooled
(Compact Series)

- Fire alarm system
- Flexible Move
- Link to BMS system
- Build-in UPS & Battery Pack
- Build-in Modbus Protocol
- Recorded History Data
- Water Detection Kits
- SMS Alarm Function
Summary

Cool Master

Cool Row

Cool Smart

BR-iBlock
Our Service Team & Network

Service

Training

Support

ACSON MALAYSIA SALES & SERVICE SDN BHD