WHY FMS BE USED?

1. 

Variable Air Volume (VAV) is used because it allows for better control of HVAC systems. In VAV systems, air volume is adjusted based on the space load, which results in energy savings. For example, 90% of the time, VAV systems can reduce energy consumption by 60%. Constant Volume Reheat Systems are also used, but they are less efficient. About 70% of the time, VAV systems are preferred over Constant Volume Systems.

2. 

VAV System (Variable Air Volume) is used over Pneumatic Control, Electronic Control, Direct Digital Control, and Pressure Independent Control. Remote Setpoint Adjust and Warming Up are also considered.

These factors make VAV systems a more efficient and cost-effective choice for HVAC systems.
2.1. ½Ç³» ¿Âµµ Á¶ÀýÀÌ ¾ÊµÇ´Â ¿äÀÎ
- °¡º¯ dz·® À¯´ÏÆ® Àü Á¤¾ÐÀÌ ÀÏÁ¤ÇÏÁö ¾Ê´Ù
- °¡º¯ dz·® À¯´ÏÆ® dz·® »óÇÏÇÑ (Minimum/Maximum) Á¶Á¤ÀÌ À߸ø µÇ¾ú´Ù
- ÀÚµ¿ Á¦¾î ¿ÀÀÛµ¿

2.2. °¡º¯ dz·® À¯´ÏÆ® ¼ÒÀ½ ¿äÀÎ
- Á¦ÀÛ ¼³°è»óÀÇ °áÇÔ
- ¼Ûdz±â Á¤¾ÐÁ¦¾î ºÒ·®
- ¾Ð·Â Á¾¼Ó½Ä Á¦¾î
- ªÀº °¡º¯ dz·® ÀÛµ¿Ã¼ ¿îÀü ½Ã°£
- ÇåÆÃ ¿îÀü

2.3. °ø±Þ ´ÚÆ®³» Á¤¾Ð º¯È­°¡ ¸¹Àº ¿äÀÎ
- ºÎÀûÇÕÇÑ Á¤¾Ð °¨Áö±â ¼³Ä¡ À§Ä¡
- ºÎÀû´çÇÑ Á¤¾Ð °¨Áö±â ¼±Á¤ (Static Pressure Wide Range™)
- ³·Àº Á¤¾Ð °¨Áö±âÀÇ Á¤¹Ðµµ
- ¼Ûdz±â Á¦¾î ±â±â ¿ÀÀÛµ¿

2.4. °¡¾Ð ¹× ÃÖ¼Ò ¿Ü±â·® µµÀÔÀÌ ¾ÊµÇ´Â ¿äÀÎ
- dz·® ÃøÁ¤ ÀåÄ¡ (FMS)¸¦ Ȱ¿ëÇÏÁö ¾Ê°í ´Ü¼ø °¨½Ã (Monitoring) ±â´ÉÀ¸·Î¸¸ »ç¿ëÇÒ ¶§
- ¼Ûdz±â¿Í ȯdz±â¸¦ µ¿ÀÏ Á¦¾î ½ÅÈ£·Î Á¦¾î Çϸ鼭 º¸Á¶ ½Ã¼³ÀÌ ¾ø´Â ´Ü¼ø Á¦¾î ½Ã½ºÅÛÀ»

däÅÃÇÑ °æ¿ì

3. °¡º¯ dz·® ½Ã½ºÅÛ¿¡ Á¤¾Ð ¼¾¼­ ¹× dz·® ÃøÁ¤ ÀåÄ¡ (FMS)ÀÇ Àû¿ë

3.1. Á¤¾Ð ¼¾¼­ÀÇ Àû¿ë

ºø±Þ VAV ½Ã½ºÅÛÀÇ ¿î¿ë¿¡ ÀÖ¾î, ¹æ, °ø°£, Ãþ ¶Ç´Â ºôµù¿¡¼­ °ø±ÞµÇ´Â °ø±âÀÇ ¾çº¸´Ù ¸¹°Å³ª Àû°Ô ¶Ç´Â µ¿ÀÏÇÏ°Ô ¹è±âÇϰԵǸé ÀÌµé ³»¿¡ ¾ç¾Ð (Positive Pressure)À̳ª À½¾Ð (Negative Pressure) À̳ª ÀÌ´Â °ø°£ÀÇ ºÎÇÏ ¼ö¿ä¸¦ ÃæÁ·½Ã۱â À§ÇØ ±Þ±â dz·® (Supply Air Volume) ÀÌ ¸»¹Ì¾Ï¾Æ ±Þ ±â¿Í ¹è±â dz·®°£ÀÇ ºñµ¿±â¼º (Nonsynchronization)¿¡ ±âÀÎÇÑ´Ù. ±Þ±â dz·®ÀÌ º¯È­ÇÔ¿¡ µû¶ó ÀÌ¿¡ ¸ÂÃß¾î °ø°£ÀÇ ºÎÇÏ ¼ö¿ä¿¡ ¾Ë¸Â´Â ÀûÁ¤ ½Ç³»¾Ð À¯Áö¸¦ À§Çؼ­´Â Duct System®
Constant Volume System (Return fan Control)

Variable Air Volume System (Variable Air Volume System)

Air Terminal Unit (Air Terminal Unit)

Air Terminal Unit (Air Terminal Unit)

Fan (Duct)

Air Terminal Unit (Air Terminal Unit)

Duct Static Pressure Sensor (Sensing Devices)

Duct Static Pressure Sensor (Sensing Devices)

VAV Terminal Units

Static Pressure Transmitter

Receiving Controller

JSP Static Pressure Sensor

Supply System

Supply Fan

3.1.1. A

A. Direct Building Static Pressure Control

Outdoor Static

| Return Fan |

Space

Space Static

Static

Control
B. °³¹æ ȸ·Î Á¤¾Ð Á¦¾î (Open Loop Control)

Return Fan

Supply Fan

Duct Static

C. Æó¼â ȸ·Î Á¤¾Ð Á¦¾î (Close Loop Control)

Return Fan

Supply Fan

Flow Measuring Station

Duct Static

Reference Static

Control

Flow Measuring Station

Reference Static

Control
3.1.2. (Static Pressure Sensor Location)

Supply Fan

Air Terminals

Duct Static

Reference Static Control

Supply Fan

Air Terminals

Duct Static

Reference Static Control

Selector
3.2. Śąś ¿øÁ¤ ÀåÄ¡ (FMS)ÀÇ Àû¿ë

3.2.1. Supply Air Duct[]

Supply Duct[] ³×°¾ ÀÇÇØ µ¿½Ã¿¡ ¶È°°Àº Á¦¾î ½ÅÈ£·Î Á¦¾îÇÏ°Ô µÇ¸é ½Ç³» °¡¾Ð (Positive Pressure) ³×°¾ ÀÇÇØ µ¿½Ã¿¡ ¶È°°Àº Á¦¾î ½ÅÈ£·Î Á¦¾îÇÏ°Ô µÇ¸é ½Ç³» °¡¾Ð.

- Supply Air Static Pressure[] Supply/Return Fan µ¿½Ã Á¦¾î½Ã Air Unbalance []:

* AHU Supply Air 30,000 CMH, Return Air 27,000 CMH[] []

<table>
<thead>
<tr>
<th></th>
<th>100%</th>
<th>80%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Fan</td>
<td>30,000 CMH</td>
<td>24,000 CMH</td>
<td>15,000 CMH</td>
</tr>
<tr>
<td>Return Fan</td>
<td>27,000 CMH</td>
<td>21,600 CMH</td>
<td>13,500 CMH</td>
</tr>
<tr>
<td>Exhaust</td>
<td>3,000 CMH</td>
<td>2,400 CMH</td>
<td>1,500 CMH</td>
</tr>
</tbody>
</table>

System Static Pressure Controller[] ³×°¾ ÀÇÇØ µ¿½Ã¿¡ ¶È°°Àº Á¦¾î ÀûÀýÇÏ°Ô ÂàÁ¢ Á®Á¥À® (terminal unit []), Supply Fan µ¿½Ã Á¦¾î½Ã Air Unbalance [] Sensing Devices(JFM-P Series [] JFM-S Series)[] ³×°¾ ÀÇÇØ µ¿½Ã¿¡ ¶È°°Àº Á¦¾î ÇÊ¿äÇÔÀ».
3.2.2. Supply Air Ducts

VAV Supply Fan Return Fan Building Static Control Open Loop System (ASHRAE Systems Guide)

Supply Fan Supply Duct 2/3
Return Fan Supply Duct FMS
Return Duct FMS Return Fan

Supply Fan Return Fan Supply Duct 2/3
Return Fan Supply Duct FMS Return Duct FMS

Supply Fan Return Fan Supply Duct 2/3
Return Fan Supply Duct FMS

* Supply Air 30,000 CMH Return Air 27,000 CMH

Supply Air FMS 27,000 CMH : 27,000 - 3,000 = 24,000 CMH (Return Fan Setpoint)
Supply Air FMS 15,000 CMH : 15,000 - 3,000 = 12,000 CMH (Return Fan Setpoint)
Supply Air FMS 12,000 CMH : 12,000 - 3,000 = 9,000 CMH (Return Fan Setpoint)
3. 2. 3. Outside Air Duct

Outside Air Ducts, Air Flow Measuring Probes (JFM-P Series), Supply Fan, and Return Fan are used to measure the minimum outside air volume. Outside Air Quantities are determined by the supply fan and return fan. Outside Air Intake is measured by Air Flow Measuring Probes (JFM-P Series) and Stations (JFM-S Series). Economy Cycle is performed to ensure adequate supply air.

4. Delivery

VAV System

Pressurization

Air Terminal Units

Supply

Return Fan

Sensors

Controls

* JFM-P Series

* Direct Digital Controls

* Inverter

* FMS

* Controls

* Actuators

Automatic Air Flow Control

* Fan Constant (system) Static Control

* Constant (system) Static Controller Setting Fan

* Safety Pressure Override

* Minimum Outside Air Control

* Building Pressurization Supply Return Fan Synchronization

* Floor Space Pressurization Supply Return Air Duct Volumes Synchronization

* Branch Duct Constant Static Control VAV Terminal Boxes Air Noise

* VAV System Constant Volume Control

Airflow Control Flow Measuring Probes Stations Single Station Station

VAV System Air Flow Measuring Sensing Devices JFM-P Series JFM-S Series JSP

VAV System Control
1. Return Air Duct

   - Return Air System Flow Adjusting Balancing

2. Supply Air Duct

   - Branch Ducts Constant Static Control Air Noise levels
   - Supply Duct Air Flow Constant Volume Control

3. Supply Return Air Duct

   - Floor Space Pressurization Control Supply Return Air Flow
   - Branch Ducts Return Supply Fans Duct Leakage
   - Supply Return Air Flows

4. Supply Return Outside Air Duct

   - Supply Return Fan Balance Supply Return Fan

Jin Sung Air Flow Measuring Probes (JFM-P Series) Stations (JFM-S Series) Static Pressure Sensor (JSP) VAV System