HVAC Economizers 101
Section #7

Central Air Handling Units
Economizer Controls
Section #7-Central Air Handling Units (AHU) Economizer Controls
Central AHU Are Custom Ordered and Built to Fit Inside the Building with Controls

[Diagram showing the flow of air through an AHU system]
Many Central AHU Are Standard Units, with Customized Site Specific Designed DDC Controls
Typical Controls on Central AHU

- Return-Air Fan
- Exhaust-Air Damper Normally Closed
- Recirculation-Air Damper Normally Open
- Damper Motor
- Outdoor-Air Temperature and Humidity
- Filter
- Cooling Coil Status
- Mixed-Air Temperature
- Heating Coil Status
- Outdoor-Air Damper Normally Closed
- Heating Coil
- Outputs
- Cooling Coil
- Supply-Air Fan
- Supply-Fan Status
- Supply-Air Temperature
- Return-Air Temperature and Humidity
- Air-Handling Unit Controller

Outputs
Inputs
Inputs
Economizer Inspections of Actual AHU Equipment

- Typical AHU controls
- DDC controls
- Alerton controls
- Siemens controls
Many Factory Built-Up AHU Are VAV with DDC Controls

http://www.mmtmagazine.org/page/indexa916.html?id=44
Typical Controls on Factory AHU
Example of Schematic for Alerton Controls
Typical Controls on Factory AHU
Example of Economizer Program for Alerton Controls
Typical Controls on Factory AHU
Example of Economizer Program Components for Alerton Controls
Typical Controls on Factory AHU
Example of Program for Johnson Controls

```
PROCESS 'Market\100Bid' "VAV Control" '\NCM-22'
PERIOD 00:02:30
Exempt All
PRIORITY 4
Shared MeanPrice!,Deviation!,MarketPrice!

Rem inputs
UnOccBias100! = 'Rm-100\CS-Obj\SP_28' :Rem Unocc Bias
K100! = 'Rm100\Comfort'

Auto? = 'Rm-100\TranCntl' :Rem Auto Man Input

if Auto? = False then
  First Pass
  Tell 'Rm-100\CS-Obj\SP_12' to "REL_CS" 3 :Rem Rel Bias
  End First Pass
  STOP
End if

MTmpBias100! = (MarketPrice! - MeanPrice!) * ((UnOccBias100! - 1.0)/(K100! * Deviation!)) + 1.0
SetpointBias! = Ramp(SetpointBias!,MTmpBias100!,0.25)
If SetPointBias! < 1 then SetPointBias! = 1
Tell 'Rm-100\CS-Obj\SP_12' to "STCSAN" SetpointBias!, 3

end process

PROCESS 'Market\109Bid' "VAV Control" '\NCM-22'
PERIOD 00:02:30
Exempt All
PRIORITY 4
Shared MeanPrice!,Deviation!,MarketPrice!

Rem inputs
UnOccBias109! = 'Rm-109\CS-Obj\SP_28' :Rem Unocc Bias
K109! = 'Rm109\Comfort'

Auto? = 'Rm-109\TranCntl' :Rem Auto Man Input
```
Typical Controls AHU - Example of AutomatedLogic© Basic Graphics Display for Central AHU Controls
What’s Wrong with the Economizer in this DDC AHU Graphics Display?
1. The previous slide shows that a typical AHU has a problem in the program code. What is it?

2. The Automatic Logic Graphic display shows the % of OSA, what is it?

3. How does Alerton programming compare to Siemens programming? Explain.

4. Some central AHU will have two OSA dampers. Why is this designed this way?

5. The controls on a central AHU typically shows all of the dampers being tied together from one control signal. Why?