

HVAC Economizers 101

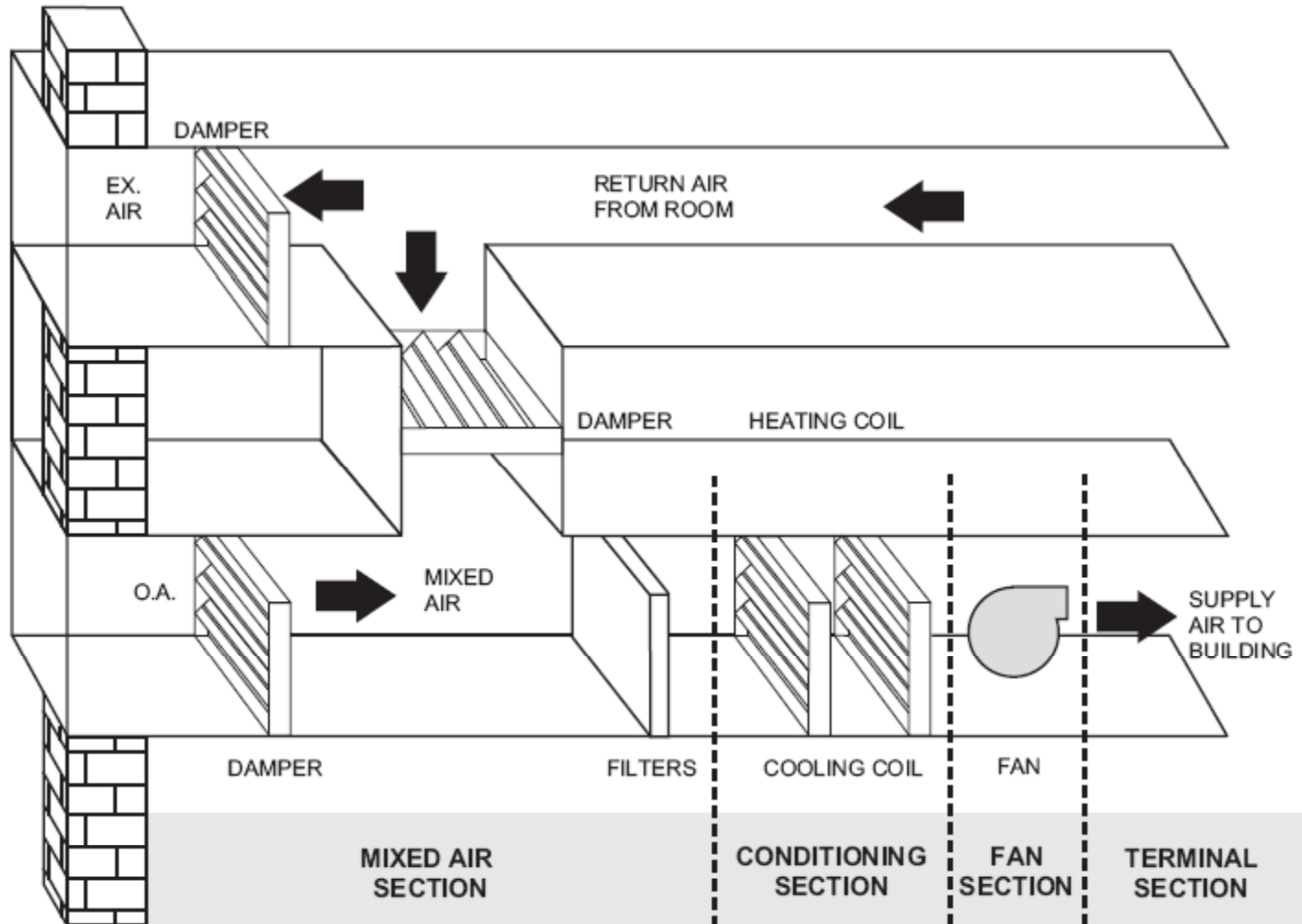
Section #7

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

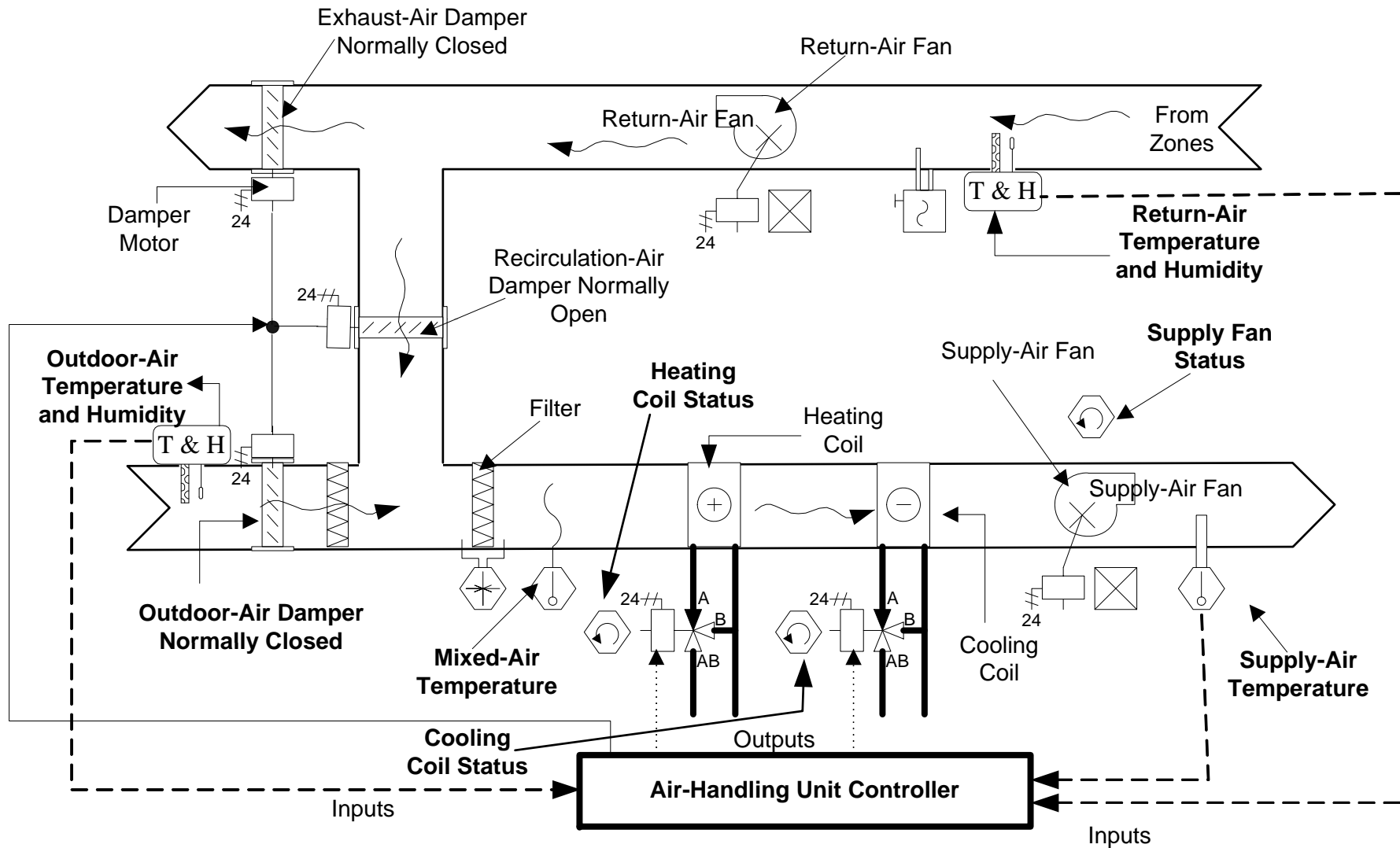


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Many Central AHU Are Standard Units, with Customized Site Specific Designed DDC Controls



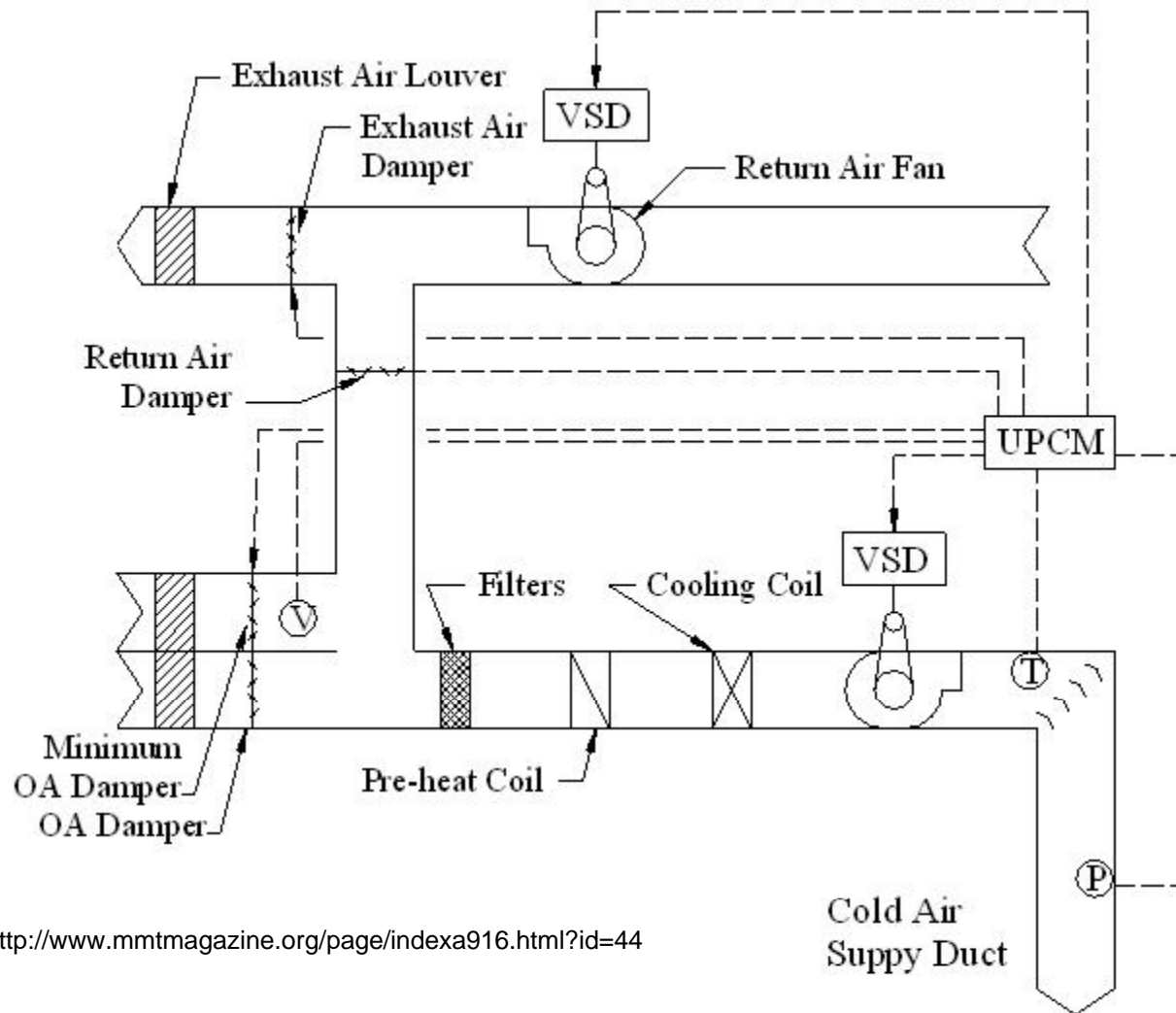
Typical Controls on Central AHU



Economizer Inspections of Actual AHU Equipment

- Typical AHU controls
- DDC controls
- Alerton controls
- Siemens controls

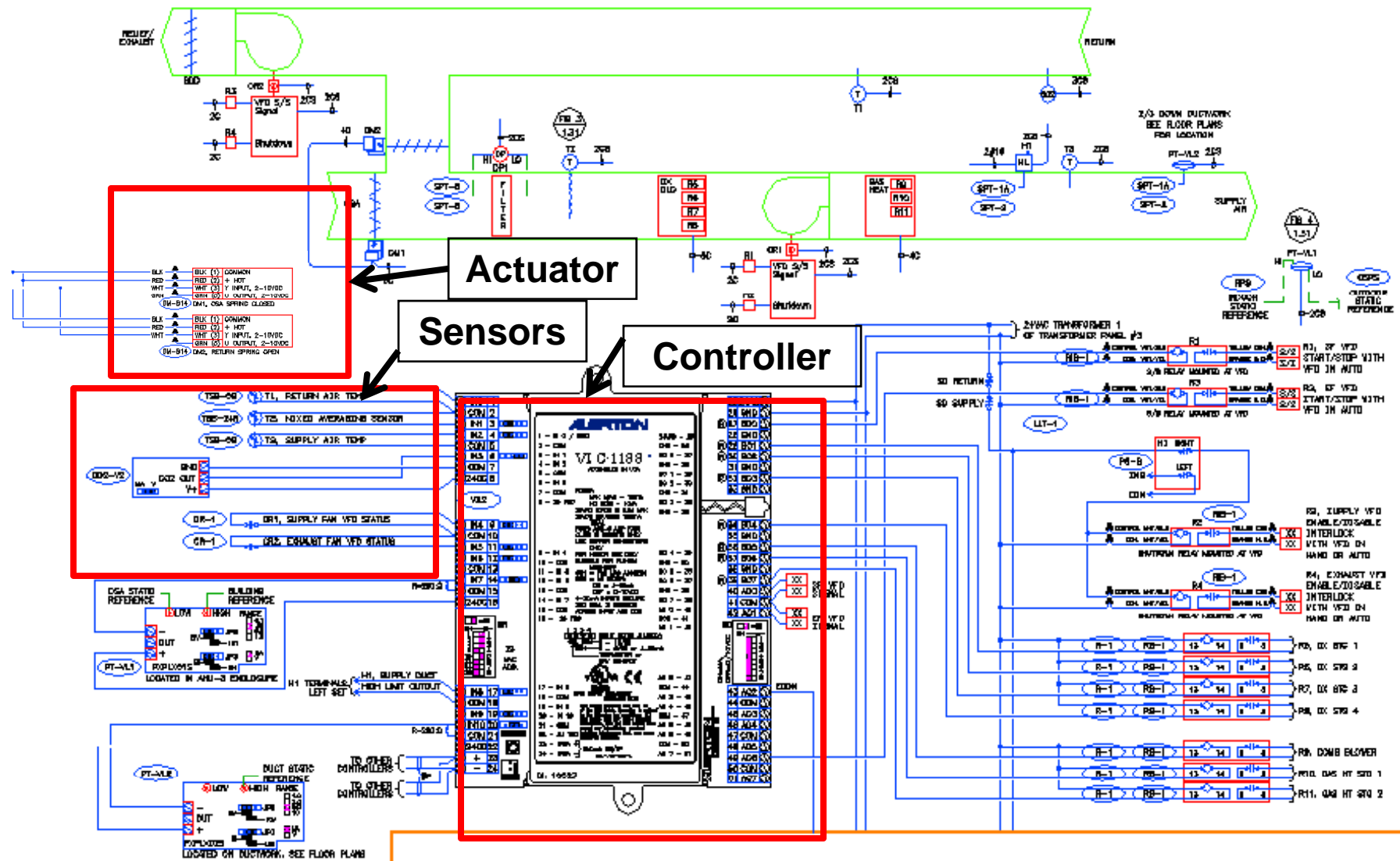
Many Factory Built-Up AHU Are VAV with DDC Controls



<http://www.mmtmagazine.org/page/indexa916.html?id=44>

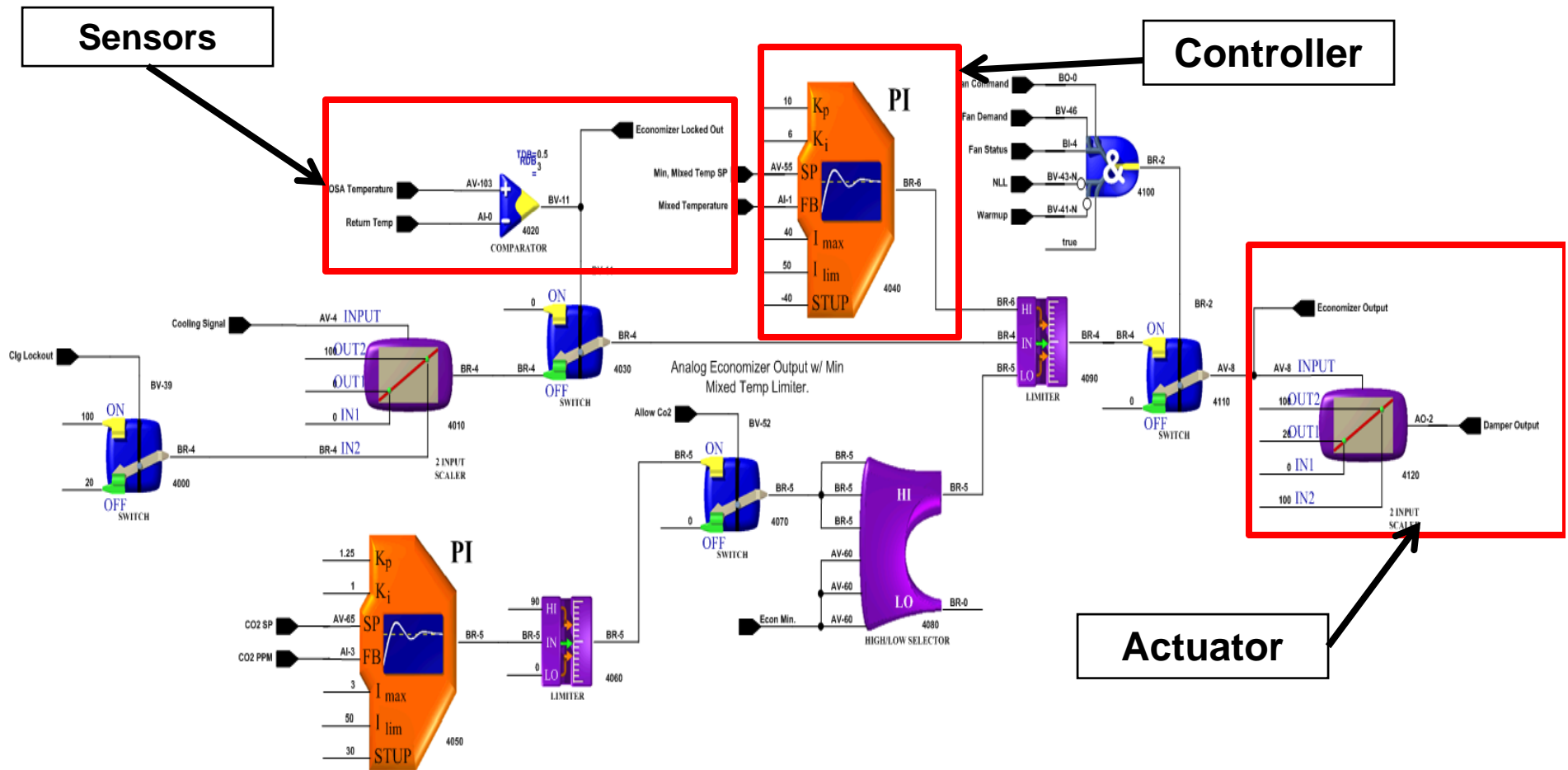
Typical Controls on Factory AHU

Example of Schematic for Alerton Controls



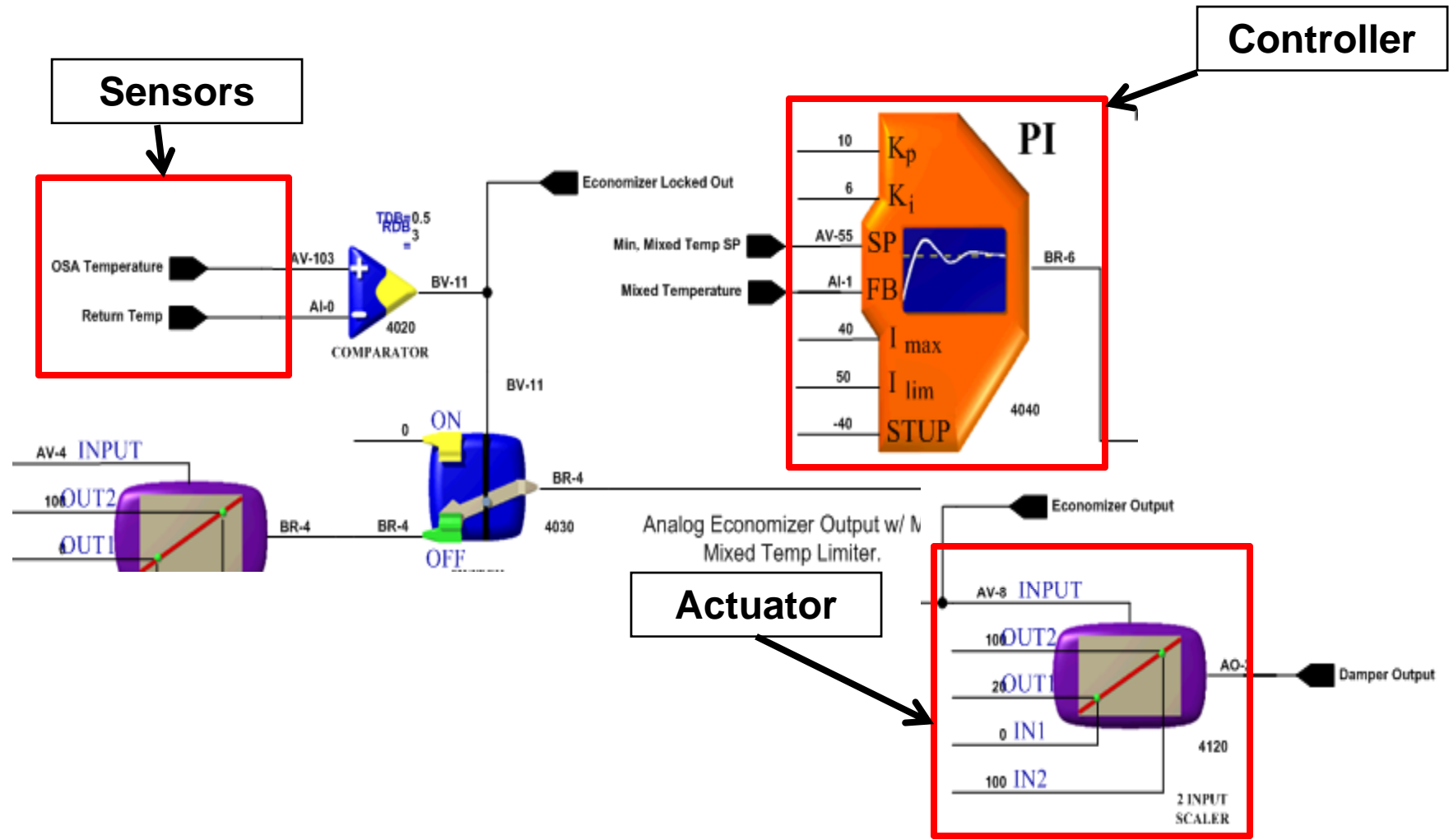
Typical Controls on Factory AHU

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

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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

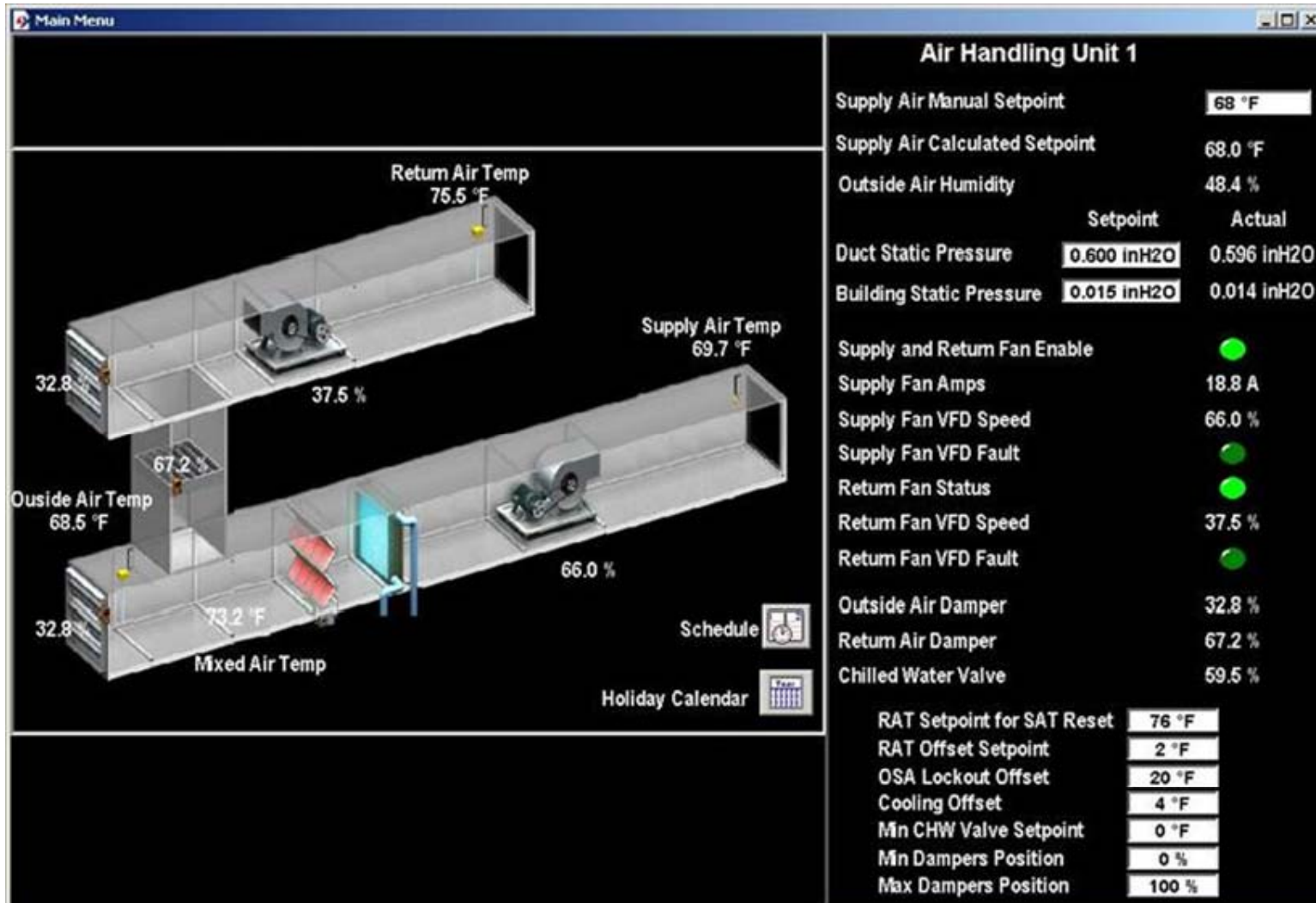
Process 'Market\109Bid' "VAV Control" '\NCM-22'
PERIOD 00:02:30
Exempt All
PRIORITY 4
Shared MeanPrice!,Deviation!,MarketPrice!

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?

Device 9002 Data

File Select Options Edit Help

Supply Temperature Setpoint

Current Setpoint 64.0 °F

Setpoint Control Mode

Manual/Startup Setpoint 64.0

Auto-Reset Stpt Hi Limit 60.0

Auto-Reset Stpt Lo Limit 50.0

Warmup Supply Temp. Stpt 97.0

Low Supply Temp. Limit 38.0

Unit Enable

Building Status

System Mode

Supply Fan Alarm

Fan Alarm Reset

Air Filter Alm Status : Filter Clean

Supply Fan Speed 0 %

Supply Duct Pressure 0.00 "

Supply Pressure Setpoint

Current Setpoint (waiting) "

Setpoint Control Mode

Manual/Startup Setpoint (waiting)

Auto-Reset Stpt Hi Limit (waiting)

Auto-Reset Stpt Lo Limit (waiting)

Warmup Pressure Stpt (waiting)

OSA Temp 47.2 °F

Econ. Position 80 %

Econ. Minimum 10

Econ Lockout Status
Allowed

Return Air Temp. 73 °F

Cooling Valve 0 %

CHW Temp 44 °F

CHW Request

CHW Flow

Heating Valve 0 %

HWS Temp 130 °F

HWS Request

HWS Flow

Supply Air Temp. 62 °F

Exercise #7

(Provide Answers below on notes page)

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?