

## Why DDC in Air Conditioning ?

*by R.V. Simha*

- .. DDC Beginnings - 1970's ( IN US)
- .. In & Around Bangalore - 1991
- .. What is DDC ?
- .. Earlier - and Elementary Controls
- .. Pneumatic Controls
- .. Electronic Controls
- .. ON / OFF Control is Crude
- .. Offset in P Control
- .. P + I Eliminates offset
- .. PID is Faster
- .. Adaptive Control

.. Limitations of

- Electro-mechanical Controls
- Pneumatic Controls
- Electronic Controls

.. How is DDC better ?

.. How DDC Works ?

.. AD Converter, Processor & DA Converters

.. Mathematical Calculations using Algorithms

.. Multitasking

.. Scanning times

.. PLC Functions + DDC Functions  
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Microprocessor Application Programme

## **DDC FUNCTIONS**

.. PID (Proportional + Integral + Differential)

Control Algorithm

.. Negate or Reversing Function

.. Sequencer or Split - Range Function

.. Ratio Function

.. Limit Switch Function

.. High and Low signals Selectors

.. Date and Time Function

.. Priority Handling

.. Event Programs

.. Alarm Suppression

.. Power Failure & Return After Power Failure

.. Data Logging, Data Storage & Report Generation :

- Inlet temperature to the chillers
- Outlet temperature of individual chiller
- Inlet temperature to the heat recovery condensers
- Dry bulb temperature in conditioned areas
- RH in conditioned area
- Dry Bulb Temperature and RH of air leaving Coils.
- Dry Bulb & RH temperature of Supply Air.
- Differential Pressure between designated zones.
- Pressure drop across (air) filters.

- Outside dry bulb temperature - deg C
- Outside relative humidity - %

.. Charts & Graphs

.. Run Hours

- Chillers
- Pumpsets
- Air Handling Units
- Ventilation Air Units
- Exhaust Air Units

.. Dynamic Graphic Display

**ENERGY MANAGEMENT  
FUNCTIONS**

- night cycle
- optimum start
- optimum stop
- time - and event programs
- night purge
- enthalpy control
- load reset control
- peak demand control or load shedding
- duty cycling
- presence detection

## **WHY DDC ?**

- Reduction in use of no. of sensors

- Reduction in use of no. of controllers ( thermostats, humidostats, etc., and other devices)
- Reduction of hard wiring
- Reduction of relays & reduction of hard wiring.
- Result - space saving
- Outputs calculated mathematically using digital values
- Inherently suited for PID Control
- More precise & accurate control of parameters
- Lends itself to application of Adaptive Control
- Data Acquisition
- Reports, Graphs, Trends, etc.,
- Centralizing operation of Plant
- Inherent flexibility in application.
- Great boon to maintenance.
- Performing Energy management and / or building management functions (in addition to HVAC Control)