

# SYSTEM CONTROLS

## GLOSSARY

### **B.A.S. (Building Automation System)**

The Building Automation System can be used in place of a thermostat signal. It is an input signal that is relayed to the controllers and instructs them to control to a certain temperature.

### **Bypass Pressure Control**

Control main distribution duct/plenum static pressure by relieving (bypassing) supply air from the distribution duct/plenum back to the rooftop unit to maintain system pressure in a set range through the use of a control valve or damper.

### **Control Point**

The actual value of the controlled variable (for example, the room temperature).

### **Cooling Mode**

A mode of operation for the rooftop controller, during which one or two stages of cooling are in operation (i.e. the compressors are energized and the rooftop is supplying cool conditioned air).

A mode of operation for the zone controllers, during which the zone controller is calling for a percentage of cooling based on the difference between the room temperature set-point and the actual room temperature air between min and max cooling.

The demand for cooling is created when the room temperature is higher than the room temperature set-point.

### **Dead Band**

A range of values typically surrounding the set-point in which no controller actions are taken.

### **Demand**

Demand is the call for one of the three types of operation: Cooling, Heating or Neutral Mode.

### **Direct Acting**

A device is said to be Direct Acting when an increase in input signal results in an increase in output signal.

### **Direct Digital Controls**

Complex micro-processor based controls that are capable of being networked and offer Proportional Integral Control of the air flow.

### **Economizer**

Fresh air damper that works in conjunction with the cooling signal and the outside air temperature sensor to provide cool outdoor air as a source of cooling when the outdoor air temperature is in the allowable range.

### **Electronic Controls**

Very simple devices that use Proportional Control to control air flow.

### **EMC (Electronic Modulating Control)**

This type of heater control is similar to the SCR, except it has an additional air flow sensor which can override the temperature signal to limit the amount of heat the heater will create (allows heat to be supplied at very low flows).

### **Error Signal**

The differential between the set-point and the actual point of control.

### **Heating Mode**

A mode of operation for the rooftop controller, during which one or two stages of heating are in operation (i.e. the heating coil is energized and the rooftop unit is supplying warm conditioned air).

A mode of operation for the zone controller, during which a demand for heat is made.

Often the demand for heat is used to energize reheat coils, and is created when the room temperature is less than the room temperature set-point.

### **Network**

A network in the controlling sense is a connection of all the controls for mechanical equipment (in this case, the HVAC equipment) which allows for the transfer of data.

### **Neutral Mode**

A mode of operation for the rooftop controller, during which no actions (heating or cooling) are taken (i.e. the majority of the space is satisfied - fan is typically still in operation for ventilation purposes).

A mode of operation for the zone controller, during which it is completely satisfied (i.e. the room temperature is equal to the room temperature set-point or is in the dead band).

### **Night Setback**

The reduction of room set-points overnight when the space becomes unoccupied.

Typically there is no air (i.e. the rooftop fan has shut down) since there are no people that require ventilation.

### **Normally Open/Normally Closed**

Refers to the fail safe position of the VAV units damper.

## Output Signal

A signal that the controller uses to change the current situation; for example, if the controller is reading a temperature that is three degrees higher than the set-point, it will send out an OUTPUT signal to the damper to try to change the current room temperature (by opening the damper and allowing for more cooling).

## PRTU

The Price Digital Rooftop Unit controller, which includes a fully programmable wall-mounted controlling thermostat and input/output module for rooftop control.

## Pneumatic Controls

VAV controls that are typically powered using 15-25 psi compressed air.

Very simple device that uses proportional control to control air flow.

## Pressure Dependent

An air regulating device is considered pressure dependent if its ability to regulate air flow is dependent on the system static pressure. For example, a cooling damper with no air flow sensor will open on an increase in space temperature; however, the air flow that is allowed to pass through the damper will change if the static changes (increase in static equals increase in flow).

## Pressure Independent

An air regulating device is considered pressure independent if it can control to a specific air volume regardless of fluctuations in system static pressure.

## Primary Control Strategies

The first line of control strategies (usually polling strategies) that are used in conjunction with secondary strategies such as indoor air quality control or supply air temperature limiting to control the rooftops behavior.

## Proportional Band

The range through which the output of the controller spans from minimum to maximum.

Often known as the Reset Range for pneumatics.

## Proportional Control

A type of control in which the Output Signal is proportional to the Error Signal.

## Proportional Integral Control

A combination of both Proportional Control and Time Dependent Integral Control.

## Protocol Converter

A device which converts different network languages so that equipment with different network languages can communicate on the same network.

## Reverse Acting

A device is said to be reverse acting when an increase in input signal results in a decrease in output signal.

## Schedule

A time dependent way of automating a controller's functions, such as night setback, morning warm-up, etc.

## SCR (Silicon Control Rectifier)

SCR control is a type of modulating control device that is used with electric heaters to modulate the amount of heat by switching solid state relays on and off very rapidly.

The frequency and time delay of switching determine how much heat is provided.

## Secondary Control Strategies

A means of control that works in conjunction with the primary method.

A more advanced system of control which offers more flexibility to the user.

## Set-Point

The desired value to which the controller is trying to control to.

## System Demand Total

The sum of each zone demand percentage.

Represents the total demand of the space, regardless of what type of demand it is.

## System Demand Percentage

A numerical representation of the demand per type of demand of the entire space.

## Zone Demand

The demand in an individual zone.

If the room temperature is below the set-point, the Zone Demand is Heating.

If the room temperature is above the set-point, the Zone Demand is Cooling.

If the room temperature is equal to the set-point, the Zone Demand is Neutral.

## Zone Demand Percentage

The amount of demand based on a percentage scale. 100% is considered full or max demand and 0% is considered min demand.

## Zone Reheat

One of many possible types of reheat, could include:

- + Duct heaters (Electric or Hot Water)
- + Perimeter reheat
- + Radiant Panel