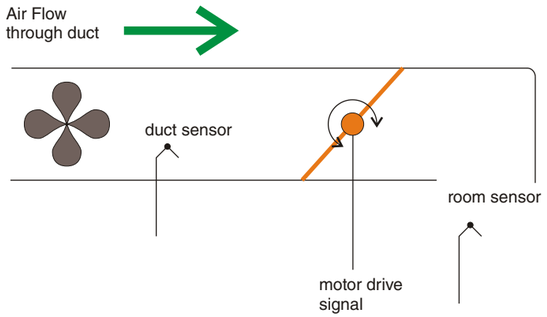
HVAC room control diagram

Example 45 - Using function blocks to switch one output between heat and cool power.

Real world example is where a customer wants to control room temperature with one output where the duct temperature is warm in winter and cool in summer.

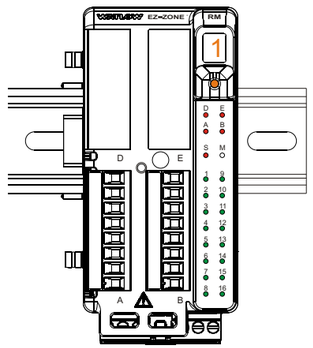
Demonstrates use of Analog Input, Control, Compare, Math and Output Analog Function blocks.

Theory of operation - When room temperature is greater than or equal to duct temperature, use cool control output and disable heat control output. When room temperature is less than duct temperature, use heat control output and disable cool control output.



RMC1N1AAAAAAAAA

Control Module



EZKB-LAAA-AAAA

Heat Algorithm = PID
Cool Algorithm = PID
TRU-TUNE+ Enable = No
Remote Set Point Enable = No
Ramp Action = Off
Closed Loop Low Set Point = 65 F
Closed Loop High Set Point = 85 F
Set Point Open Limit Low = -100 %
Set Point Open Limit High = 100 %

Instance ID
Custom Setup

Custom Function Block
Custom Setup 1 = Active Process
Instance ID = 1

Displays room sensor in upper display

Instance ID
Custom Setup

Custom Function Block
Custom Setup 2 = Active Set Point
Instance ID = 1

Displays room set point in lower display

Instance ID
Custom Setup

Custom Function Block
Custom Setup 3 = Process
Instance ID = 2

Displays duct sensor with press of advance key

R1, S1, T1

Clear Latch Request
Calibration Offset
Display Precision
Input Error Latching
Filter
Units
RTD Leads
Sensor Type

Analog Input
Analog Input Function Block 1
Zone 1
Sensor Type = RTD
Analog Input Value

Sensor in room

Heat Algorithm
Cool Algorithm
Cool Output Curve
TRU-TUNE+ Enable
TRU-TUNE+ Band
TRU-TUNE+ Gain
Autotune Aggressiveness
Remote Set Point Enable
Remote Set Point Type
User Failure Action
Input Error Failure
Open Loop Detect Enable
Fixed Power
Open Loop Detect Time
Open Loop Detect Deviation
Ramp Action
Ramp Scale
Ramp Rate
Profiling Enable
Closed Loop High Set Point
Closed Loop Low Set Point
Set Point Open Limit High
Set Point Open Limit Low
Remote Set Point Enable
Control Mode
Autotune Set Point
Closed Loop Set Point
Idle Set Point
Heat Proportional Band
Cool Proportional Band
Heat Hysteresis
Cool Hysteresis
Time Integral
Time Derivative
Deadband
Open Loop Set Point
Loop Error Clear Request

Source Function A = Analog Input
Source Instance A = 1
Source Zone A = 1

Source Function B = None
Source Instance B = 1
Source Zone B = 1

Control Function Block 1
Zone 1
Control Mode = Closed Loop (Auto)

Heat Power
Cool Power
Closed Loop Set Point
Open Loop Set Point
Power

Note:
Control Loop 1 must use PV 1 or Analog Input 1
Control Loop 2 must use PV 2 or Analog Input 2
Control Loop 3 must use PV 3 or Analog Input 3
Control Loop 4 must use PV 4 or Analog Input 4

R2, S2, T2

Clear Latch Request
Calibration Offset
Display Precision
Input Error Latching
Filter
Units
RTD Leads
Sensor Type

Analog Input
Analog Input Function Block 2
Zone 1
Sensor Type = RTD
Analog Input Value

Sensor in duct

Error Handling
Tolerance
Function

Source Function A = Analog Input
Source Instance A = 1
Source Zone A = 1

Compare Function Block 1
Zone 1
Function = Greater Than or Equal

Source Function B = Analog Input
Source Instance B = 2
Source Zone B = 1

Output Value

Scale Low = 0.0
Scale High = 100.0
Range Low = 0.0
Range High = 100.0

Function
Scale Low
Scale High
Range Low
Range High
Filter
Offset

Source Function A = Heat Power
Source Instance A = 1
Source Zone A = 1

Source Function B = Cool Power
Source Instance B = 1
Source Zone B = 1

Source Function E = Compare
Source Instance E = 1
Source Zone E = 1

Output Value

Math Function Block 1
Zone 1
Function = Process Scale

Output Type
Scale Low
Scale High
Range Low
Range High
Calibration Offset

Output Type = Volts
Scale Low = 0.00
Scale High = 10.00
Range Low = 0.00
Range High = 100.00

Output Function = Math
Output Function Instance = 1
Source Zone A = 1

Output Analog Function Block 1
Zone 1

Output

-F1, +G1, +H1

connect to
damper motor

Information Flow

EZ-ZONE RM Application Example - using function blocks
Print on 11” x 17” landscape paper for best viewing

User parameter settings in RED

Revision C