



www.orioncontrols.com

WattMaster Controls, Inc.
8500 NW River Park Drive
Parkville, MO 64152

Phone: 816-505-1100
Fax: 816-505-1101
Toll Free: 866-918-1100

VAV Box Controller - Configuration & Setpoints Worksheet

Filled Out By: _____ Date: _____

Job Name: _____

Job Location:

Multiple horizontal lines for job location details.

Engineer: _____ Contractor: _____

Service Contact: _____ Controls Contact : _____

Enter The Unit Tag Numbers For The VAV Units
To Be Configured Per This Setpoint Worksheet:

Multiple horizontal lines for entering unit tag numbers.

VAV BOX Setup Sheet

Configuration Screen #1

XX Box Cnfg IDXXXX
Box Configuration
COOLING ONLY BOX
Use < Or > To Change

- COOLING ONLY BOX
- H/C CHANGEOVER BOX
- SERIES FAN BOX
- PARALLEL FAN BOX

Check one of the boxes above. Default is "COOLING ONLY BOX".

Configuration Screen #2

XX Box Cnfg IDXXXX
Damper Operating
Mode: DIRECT ACTING
Use < Or > To Change

- DIRECT ACTING
- REVERSE ACTING

Check one of the boxes above. If the damper opens in a *clockwise* direction, it is DIRECT ACTING. If the damper opens in a *counter-clockwise* direction, it is REVERSE ACTING. Default is "DIRECT ACTING".

Configuration Screen #3

XX Box Cnfg IDXXXX
Is This Box a
Voting Zone: YES
Use < Or > To Change

- YES
- NO

Check one of the boxes above. Default is "YES".

Configuration Screen #4

XX Box Cnfg IDXXXX
Pr. Independent Boxes
Airflow @ 1" WG
Constant: 1200 CFM

If this is a Pressure Independent Box, you must enter this airflow constant so that the CFM readings can be correctly calculated. This airflow constant is provided by the box manufacturer and depends on the diameter of the duct. Default is "1200 CFM".

Configuration Screen #5

XX Box Cnfg IDXXXX
Expansion Relays
(Optional)
Steps of Reheat: 2

If you require the VAV/Zone Controller to control reheat for the zone it is installed in, you must include a relay expansion board and then configure the number of heating stages (1, 2, or 3) that it will be controlling whenever there is a heating demand in the space. Enter 0 if you don't require this option. Default is "2".

Configuration Screen #6

XX Box Cnfg IDXXXX
Proportional Heating
Signal: 0-10 VDC
Use < Or > To Change

- 0-10 VDC
- 2-10 VDC

Check one of the boxes above. Default is "0-10 VDC".

Configuration Screen #7

XX Box Cnfg IDXXXX
Allow Box Heat With
HVAC Heat: NO
Use < Or > To Change

- YES
- NO

Select YES to allow the Heating Relay's Controlling Box Heat to remain on even when the HVAC unit is in Supply Air Heating Mode. This is used as a method to provide supplemental heat if for some reason the HVAC heat cannot satisfy the heating demand. Default is "NO".

Configuration Screen #8

XX Box Cnfg IDXXXX
This Unit Needs Main
Fan Status: NO
Use < Or > To Change

- YES
- NO

This setting only applies to the unoccupied mode of operation. Select YES to activate the heating stages only when the main fan is operating on non-fan terminal units. For series fan terminal units, if this setting is set to YES, the series box fan will only run when the main HVAC unit fan is running or when a space heating demand is made. For series fan terminal units, if this setting is set to NO, the series box fan will only run when a space heating demand is made. This setting has no effect on the parallel flow fan terminal unit. Default is "NO".

Configuration Screen #9

XX Box Cnfg IDXXXX
Push-Button Override
Group Id #: 1

During Unoccupied Mode, all zones with a corresponding Group ID # will resume Occupied operation whenever any of the zones in that group has its push-button depressed to initiate an override condition. This allows you to group zones in various areas of the building. For example, individual tenants with several offices could restore occupied mode for just their zones and not affect other zones in the building.

The default group ID number for all VAV/Zone Controllers is set at the factory to 1. If you don't want a specific zone(s) to be part of that group, you must give each one a distinct Group ID number between 2 and 16. Setting a zone's Group ID number to 0 will disable the Space Sensor Override Button function.

If you don't want a specific zone to be a part of any group, enter 0 for its Group ID #. Default is "1".

Setpoint Screen #1

**XX Box Spts IDXXXX
Occupied Setpoints
Cooling.....: 74°F
Heating.....: 70°F**

In the first box above enter a value from 50 to 90. The default value is "74". In the second box above enter a value from 50 to 90. The default value is "70".

The Occupied Cooling Setpoint is the maximum temperature you would like the zone to reach before modulating the damper open to bring in more cold air to cool the space. The Occupied Heating Setpoint is the minimum temperature you would like the zone to reach before activating the Reheat Stages on the optional Expansion Relay board. If this is a Cooling Only box that doesn't contain reheat, this setpoint will be ignored.

Setpoint Screen #2

**XX Box Spts IDXXXX
Unoccupied Setbacks
Cooling SetUp: +10°F
Heating SetBk: -10°F**

In the first box above enter a value from 0 to +30. The default value is "+10". In the second box above enter a value from 0 to -30. The default value is "-10".

During unoccupied hours, the Occupied Cooling Setpoint is adjusted up by the amount entered for the Cooling SetUp. The Occupied Heating Setpoint is adjusted down by the amount entered for the Heating SetBk.

Setpoint Screen #3

**XX Box Spts IDXXXX
AHU Heat Call
Space Temp.: 70°F**

In the box above enter a value from 50 to 90. The default value is "70".

This setpoint allows you to set a Space Temperature that will cause the VAV/Zone Controller to send a call for heat to the HVAC unit. This only occurs in the Unoccupied Mode.

Setpoint Screen #4

**XX Box Spts IDXXXX
Auxiliary Heat
Setpoint: 70°F**

In the box above enter a value from 50 to 90. The default value is "70".

This setpoint allows you to set a Space Temperature that will enable the Auxiliary Heat Relay (Relay 4) on the VAV/Zone Controller Reheat Expansion Board for heating options other than box heat, such as baseboard heat or an external duct heater. This could control a stage of electric heat or an on/off hot water valve. The Auxiliary Heat Relay will energize at .5°F below this setpoint and will de-energize at .5°F above this setpoint. The Auxiliary Heat will continue to function regardless of the HVAC Mode the unit is in and at any airflow condition.

Setpoint Screen #5

**XX Box Spts IDXXXX
Damper / Airflow Spt
Integral [Ki]:: 0**

In the box above enter a value from 0 to 100. The default value is "0".

The VAV/Zone Controller normally opens its damper based on a Proportional Error from Setpoint. That means if the zone temperature is 4°F from setpoint, the damper would be 100% open, or it would be modulating to provide the Maximum CFM on Pressure Independent boxes. If the error is less than 4°F, the damper may stagnate at that position and never satisfy the zone. If you add Integral into the damper calculation process, this will cause the damper or airflow calculations to continue to increase as long as the zone temperature is still above the setpoint. That means it can provide 100% or Maximum CFM before the 4°F error is achieved, bringing the zone under control faster than it normally would. Start with a small (5 or 10) value, if you use this, and monitor the effect it has. If you enter too large a value, you can create "hunting" situations that can cause the damper actuator to prematurely wear out.

Setpoint Screen #6

**XX Box Spts IDXXXX
Damper / Airflow Spt
Maximum: 100%
Vent Min: 25%**

In the first box above enter a value from 0% or 0 CFM to 100% or 30000 CFM. The default value is "100% or 1000 CFM". In the second box above enter a value from 0% or 0 CFM to 100% or 30000 CFM. The default value is "25% or 250 CFM". Pressure Dependent = %. Pressure Independent = CFM.

The VAV/Zone Controller will not allow the damper or airflow calculation to exceed the Maximum setpoint while it is allowing the damper to modulate. During Vent mode when there is no heating or cooling demand, the damper or airflow will maintain at least the Vent Min amount of airflow into the zone for ventilation.

Setpoint Screen #7

**XX Box Spts IDXXXX
Damper / Airflow Spt
Cool Min: 10%
Heat Min: 10%**

In the first box above enter a value from 0% or 0 CFM to 100% or 30000 CFM. The default value is "10% or 1000 CFM". In the second box above enter a value from 0% or 0 CFM to 100% or 30000 CFM. The default value is "10% or 100 CFM". Pressure Dependent = %. Pressure Independent = CFM.

During Supply Air Cooling Mode, if the space being served by this damper is satisfied and has no cooling demand, the damper will close to this Cool Min setting. This provides a minimum amount of airflow into the space for ventilation, even if the space does not require additional cooling. During Supply Air Heating Mode, if the space being served by this damper is satisfied and has no heating demand, the damper will close to this Heat Min setting. This provides a minimum amount of airflow into the space for ventilation, even if the space does not require additional heating.

Setpoint Screen #8

**XX Box Spts IDXXXX
Damper / Airflow Spt
Night Min: 0%
Fan On Min: 25%**

In the first box above enter a value from 0% or 0 CFM to 100% or 9999 CFM. The default value is "0% or 0 CFM". In the second box above enter a value from 0% or 0 CFM to 100% or 9999 CFM. The default value is "25% or 250 CFM". Pressure Dependent = %. Pressure Independent = CFM.

The Night Min is the position the damper will move to when the system is in Override Mode and this particular damper is not part of the override group. This Night Min position only affects non-fan powered boxes. The Fan On Min is the minimum damper or airflow setting used to activate the parallel fan if installed.

Setpoint Screen #9

**XX Box Spts IDXXXX
Damper / Airflow Spt
Reheat Min: 0%**

In the box above, enter a value from 0% or 0 CFM to 100% or 30000 CFM. The default value is "0% or 0 CFM". The default value is "25% or 250 CFM". Pressure Dependent = %. Pressure Independent = CFM.

The Reheat Min is the damper or airflow setting used during the Space Reheat Mode of operation.

Setpoint Screen #10

**XX Box Spts IDXXXX
Damper / Airflow Spt
Fixed Pos: 0%**

In the box above, enter a value from 0% or 0 CFM to 100% or 9999 CFM. The default value is "0% or 0 CFM". Pressure Dependent = %. Pressure Independent = CFM.

Many times while troubleshooting a system, it is useful to have the zone damper set to a specific damper position or airflow setting. This setpoint can be used to determine where the damper/airflow will remain when the VAV/Zone Controller receives a Force to Fixed Position command.

Setpoint Screen #11

**XX Box Spts IDXXXX
SAT HVAC Mode
Deadband: 10°F**

In the box above enter a value from 0 to 20. The default value is "10".

If the supply air temperature is above the space temperature by this amount, the VAV/Zone controller enters the Supply Air Heating Mode. It will remain in the Supply Air Heating Mode until the supply air drops to 2°F above the space temperature. At that point the unit enters the Supply Air Vent Mode and remains there until the supply air drops this deadband below the space temperature. At that point the VAV/Zone Controller enters the Supply Air Cooling Mode and will remain there until the supply air temperature rises to 2°F below the space temperature.

Setpoint Screen #12

**XX Box Spts IDXXXX
Zone Alarm Offsets
Hi Zone: +30°F
Lo Zone: -30°F**

In the first box above enter a value from +1 to +50. The default value is "+30". In the second box above enter a value from -1 to -50. The default value is "-30".

The VAV/Zone Controller can be setup to generate an alarm anytime the box goes into the Occupied Mode and the Zone Temperature exceeds the user-defined alarm limits for a user-defined period of time. A High Temperature Alarm Setpoint is created by adding the Hi Zone Alarm offset to the current Cooling Setpoint. The Low Temperature Alarm Setpoint is created by adding the Lo Zone Alarm offset to the current Heating Setpoint. If the zone temperature exceeds either of these limits for a period defined by the Alarm Delay setpoint, the controller can generate an alarm callout if all the optional hardware components required for this to occur are installed.

Setpoint Screen #13

**XX Box Spts IDXXXX
Zone Alarm Delay
Must Be Out Of
Limits For: 30 Min**

In the box above enter a value from 1 to 300. The default value is "30".

As mentioned in the previous screen, if you configure the controller to generate zone temperature alarms, this is the amount of time after the box goes into the Occupied Mode that the temperature must be outside the alarm limits before an alarm is generated.

Setpoint Screen #14

**XX Box Spts IDXXXX
Day / Night Schedule
Control #: 0
0=AHU 1-5=Scheduler**

In box above enter 0 to operate on the AHU schedule. Enter 1 to 5 to use an external schedule. A GPC Plus is required for schedules 1-5. The default value is "0".

This screen allows you to set the VAV/Zone controller to operate on a remote schedule instead of the schedule that is contained in the unit controller.

Setpoint Screen #15

**XX Box Spts IDXXXX
Maximum Slide Offset
Effect on Spt: 0°F**

In the box above enter a value from 0 to 6. The default value is "0".

If the Flush Mount Wall Sensor has the optional Setpoint Slide Adjust, this is the maximum amount you can adjust the heating and cooling setpoints up or down as the slide is moved from the center position to its full up or down position.

Setpoint Screen #16

**XX Box Spts IDXXXX
Push-Button Override
Duration: 0.0 Hr**

In the box above enter a value from 0.0 to 8.0. The default value is "0.0".

If the Flush Mount Wall Sensor has the optional Push-Button Override, this is the amount of the VAV/Zone Controller will resume using its Occupied Setpoints during unoccupied mode. This will generate a call for the Air Handler to start its fan and provide heating or cooling, depending on how you configure the Air Handler.

Setpoint Screen #17

**XX Box Spts IDXXXX
Maximum EMS Setpoint
Offset: 0°F**

In the box above enter a value from 0 to 30. The default value is "0".

If the Energy Management System (EMS) is activated, the heat and cool setpoints can be spread apart by this amount.

Setpoint Screen #18

**Sensor Calibration
SPC: 0°F 0°F
SPC: 0°F 0°F
[SAT Only if Sensor**

The Thermistor Type III sensor readings can be calibrated. Enter a Positive value to increase a reading and a Negative value to decrease a reading. Values are from -100 to +100. Default is "0".

NOTE: The Supply Air Temperature calibration offset only operates on the reading when the VAV/Zone Controller has its own Supply Air Temperature sensor installed on the AUX2 input. If the supply temperature is received from a global broadcast, you will need to go to the air handler to calibrate the temperature reading.