

## Modbus VAV Controller Configuration Properties

### Modbus Object Type: Holding Registers

Name	Default	Min	Max	Units	Modbus Reg #	Multiplier	Focus Screen	Modbus Notes
DeviceType	0	0	0	None	1	1	Device	(Not writable) 0=VavController
Soft Version	7.6	0	655.35	None	2	100	Device	(Not writable)
Hard Version	3.0	0	6553.5	None	3	10	Device	(Not writable) 1=VC1000 / 2.0=C1000 / 2.1=VC1000 Light / 2.5=C1050 / 2.6=C1050-PI / 3.0=VC2000 / 3.1=VC2000-PI
Proportional	3	0	50	deg C	4	100	Temperature	
Heat Integral	30	0	120	min	5	1	Temperature	
Cool Integral	30	0	120	min	6	1	Temperature	
Default Occupied Heat SP	21.5	-30	40	deg C	7	100	Temperature	Prolon Digital Sensors (T200, T500, T1000) will write to this register
Default Occupied Cool SP	22.5	-29.5	55	deg C	8	100	Temperature	Prolon Digital Sensors (T200, T500, T1000) will write to this register
Unoccupied Heat Setpoint	15	-30	40	deg C	9	100	Temperature	
Unoccupied Cool Setpoint	30	-29.5	55	deg C	10	100	Temperature	
MinHeatSPLimit	19	-30	40	deg C	11	100	Temperature	
MaxCoolSPLimit	26	-29.5	55	deg C	12	100	Temperature	
Low Scale Limit	15	-30	40	deg C	13	100	Temperature	
High Scale Limit	30	-30	40	deg C	14	100	Temperature	
Damper Control	1	0	2	None	15	1	Damper	0=Pressure / 1=Demand
Damper Opening Direction	0	0	1	None	16	1	Damper	0=CCW / 1=CW
Damper Opening Delay	95	15	300	sec	17	10	Damper	
Ventilation DB - Over	0.5	-15	15	deg C	18	100	Damper	
Damper Proportional Band	100	0	100	%	19	1	Damper	
Min Damper Opening (Vent)	10	0	100	%	20	1	Damper	
Min Damper Opening (Heat)	30	0	100	%	21	1	Damper	
Damper Differential (Demand)	10	1	100	%	22	1	Damper	
Min Ventilation Setpoint	90	0	7500	cfm	23	1	Pressure Indep	
Max Ventilation Setpoint	225	0	7500	cfm	24	1	Pressure Indep	
Damper Differential (Flow)	40	0	1000	cfm	25	1	Pressure Indep	
Duct Diameter	8	0	26	inches	26	1	Pressure Indep	

K Factor	2.39	1	300	None	27	100	Pressure Indep	
Min Ventilation Heat Setpoint	120	0	7500	cfm	28	1	Pressure Indep	
Flow Sensor Type	0	0	1	None	29	1	Pressure Indep	0=LowVelocity / 1=HighVelocity
Zone Temperature Offset	0	-15	15	deg C	30	100	Calib Temp	
Supply Temperature Offset	0	-15	15	deg C	31	100	Calib Temp	
Airflow Offset	0	-1000	1000	cfm	32	1	Calib Vent	
Correction Factor	1	0	10	None	33	100	Calib Vent	
Output 1 Control	9	0	255	None	34	1	Output1	0=Damper / 1=Demand / 2=Occ / 3=OccNightHeat / 4-8=Math1-5 / 9=OFF / 10=OccNightHeatCool / 11=FanStatus
Output 1 Setpoint	50	-95	95	%	35	1	Output1	If using diff, invalid between -5 and 5
Output 1 Proportional Band	0	0	99	%	36	1	Output1	
Output 1 Differential Band	40	0	99	%	37	1	Output1	PropBand must be first set to zero to use Differential
Output 2 Control	9	0	255	None	38	1	Output2	0=Damper / 1=Demand / 2=Occ / 3=OccNightHeat / 4-8=Math1-5 / 9=OFF / 10=OccNightHeatCool / 11=FanStatus
Output 2 Setpoint	50	-95	95	%	39	1	Output2	If using diff, invalid between -5 and 5
Output 2 Proportional Band	0	0	99	%	40	1	Output2	
Output 2 Differential Band	40	0	99	%	41	1	Output2	PropBand must be first set to zero to use Differential
Output 3 Control	9	0	255	None	42	1	Output3	0=Damper / 1=Demand / 2=Occ / 3=OccNightHeat / 4-8=Math1-5 / 9=OFF / 10=OccNightHeatCool / 11=FanStatus
Output 3 Setpoint	50	-95	95	%	43	1	Output3	If using diff, invalid between -5 and 5
Output 3 Proportional Band	0	0	99	%	44	1	Output3	
Output 3 Differential Band	40	0	99	%	45	1	Output3	PropBand must be first set to zero to use Differential
Output 4 Control	1	0	255	None	46	1	Output4	0=Damper / 1=Demand / 2=Occ / 3=OccNightHeat / 4-8=Math1-5 / 9=OFF / 10=OccNightHeatCool / 11=FanStatus
Output 4 Setpoint	50	-95	95	%	47	1	Output4	If using diff, invalid between -5 and 5
Output 4 Proportional Band	0	0	99	%	48	1	Output4	
Output 4 Differential Band	40	0	99	%	49	1	Output4	PropBand must be first set to zero to use Differential
Output 5 Control	1	0	255	None	50	1	Output5	0=Damper / 1=Demand / 2=Occ / 3=OccNightHeat / 4-8=Math1-5 / 9=OFF / 10=OccNightHeatCool / 11=FanStatus
Output 5 Setpoint	25	-95	95	%	51	1	Output5	If using diff, invalid between -5 and 5
Output 5 Proportional Band	75	0	99	%	52	1	Output5	
Output 5 Differential Band	8	0	99	%	53	1	Output5	PropBand must be first set to zero to use Differential
Output 5 Reverse Acting	0	0	1	None	54	1	Output5	0=Normal / 1=ReverseActing
Duct Heater ID	0	0	5	None	55	1	Output5	0=No Duct Heater Output / 1-5=Output1-Output5
Group Code 1	0	0	250	None	56	1	Group Codes	
Group Code 2	0	0	250	None	57	1	Group Codes	
Group Code 3	0	0	250	None	58	1	Group Codes	
Group Weight 1	0	0	15	None	59	1	Group Codes	
Group Weight 2	0	0	15	None	60	1	Group Codes	

Group Weight 3	0	0	15	None	61	1	Group Codes	
Global Weight	1	0	60	None	62	1	Group Codes	
Math Source 1	0	0	255	None	63	1	Math Functions	0=WeightedAverage / 1=MaxHeating / 2=MaxCooling / 3=WeightedAverage (HeatOnly) / 4=WeightedAverage(CoolOnly) / 5=MathOccupancy / 6=MathOverride / 7=RadiantReq / Else=OFF
Math Source 2	0	0	255	None	64	1	Math Functions	0=WeightedAverage / 1=MaxHeating / 2=MaxCooling / 3=WeightedAverage (HeatOnly) / 4=WeightedAverage(CoolOnly) / 5=MathOccupancy / 6=MathOverride / 7=RadiantReq / Else=OFF
Math Source 3	0	0	255	None	65	1	Math Functions	0=WeightedAverage / 1=MaxHeating / 2=MaxCooling / 3=WeightedAverage (HeatOnly) / 4=WeightedAverage(CoolOnly) / 5=MathOccupancy / 6=MathOverride / 7=RadiantReq / Else=OFF
Math Source 4	0	0	255	None	66	1	Math Functions	0=WeightedAverage / 1=MaxHeating / 2=MaxCooling / 3=WeightedAverage (HeatOnly) / 4=WeightedAverage(CoolOnly) / 5=MathOccupancy / 6=MathOverride / 7=RadiantReq / Else=OFF
Math Source 5	0	0	255	None	67	1	Math Functions	0=WeightedAverage / 1=MaxHeating / 2=MaxCooling / 3=WeightedAverage (HeatOnly) / 4=WeightedAverage(CoolOnly) / 5=MathOccupancy / 6=MathOverride / 7=RadiantReq / Else=OFF
Math Group 1	0	0	250	None	68	1	Math Functions	Group 0 = Global
Math Group 2	0	0	250	None	69	1	Math Functions	Group 0 = Global
Math Group 3	0	0	250	None	70	1	Math Functions	Group 0 = Global
Math Group 4	0	0	250	None	71	1	Math Functions	Group 0 = Global
Math Group 5	0	0	250	None	72	1	Math Functions	Group 0 = Global
Max Master	127	0	127	None	73	1	BACnet	Can be written to from device Object, property #64
Device Instance	0	0	4194303	None	74	1	BACnet	Modbus--> 74=Lo 75=Hi / BACnet--> Can be written to from device Object, property #75. Write address 4194303 to use dipswitch address.
Max Receive Time	720	0	6553	sec	76	1	Timing	Deactivated when set to zero
Max Send Time	40	5	6553	sec	77	1	Lon	
Min Send Time	3	0	6553	sec	78	1	Lon	
Override Time IO	120	0	720	min	79	1	Timing	
Morning Warm Up Time	0	0	300	min	80	1	Timing	
Net Port Baud Rate	3	0	5	None	81	1	Comm	0=9600 / 1=19200 / 2=38400 / 3=57600 / 4=76800 / 5=115200
Net Port Parity	0	0	2	None	82	1	Comm	0=NONE / 1=ODD / 2=EVEN
Net Port Stop Bits	0	0	1	None	83	1	Comm	0=1 Stop Bit / 1=2 Stop Bits

RJ45 Port Baud Rate	3	0	5 None	84	1	Comm	0=9600 / 1=19200 / 2=38400 / 3=57600 / 4=76800 / 5=115200
RJ45 Port Parity	0	0	2 None	85	1	Comm	0=NONE / 1=ODD / 2=EVEN
RJ45 Port Stop Bits	0	0	1 None	86	1	Comm	0=1 Stop Bit / 1=2 Stop Bits
Math Enable	0	0	1 None	87	1	Math Functions	Activates Math functions - Can also be activated by setting outputs to Math
Output 5 Range	0	0	2 None	88	1	Output5	0 = 0-10V 1=2-10V 2=0-5V
Output 5 Pulsed	0	0	1 None	89	1	Output5	0=Modulating / 1=Pulsed
Math Refresh Rate	3	1	250 sec	90	1	Math Functions	
List Refresh Rate	30	0	250 min	91	1	Math Functions	
Location	0	0	0 None	92	1	Device	Each reg holds 2 chars -- 16 chars max -- 8 regs --regs 92-99 / BACnet--> Can be written to from device Object, property #58
UseHalomo	1	0	1 None	100	1	Output1	When out1+2 or out5 are set to damper, setting this to TRUE means they will be driven by Halomo choices, otherwise use DampDelay
UsedLang	0	0	3 None	101	1		(Not writable) 0=Unknown, 1=Modbus, 2=BACnet, 3=Lon
DamperSpeed	2	0	4 None	102	1	Pressure Indep	Sets the speed at which the damper will chase the flow setpoint (used only in pressure independent mode). 0=fastest / 4=slowest (In Focus, this is reversed)
MinCoolSPLim	20	-29.5	54 deg C	103	100	Temperature	
MaxHeatSPLim	25	-30	54.5 deg C	104	100	Temperature	
Unoc Heat Offset	3	-20	20 deg C	105	100	Temperature	
Unoc Cool Offset	5	-20	20 deg C	106	100	Temperature	
Duct Heater SP	25	5	100 %	107	1	Damper	Minimum Damper/Flow Heat SPs only activate when the duct heater output reaches this value (for proportnl outputs, deactivates when goes below SP-5%)
Damper Max Position	100	0	100 %	108	1	Damper	
DampUnocMode	0	0	3 None	109	1	Damper	0=Open / 1=Demand / 2=Closed / 3=Normal
RadiantFloorID	0	0	5 None	110	1	Radiant Floor	0=No Radiant Output / 1-5=Output1-Output5
MinSlabTemp	21	5	30 deg C	111	100	Radiant Floor	
MaxSlabTemp	27	5	30 deg C	112	100	Radiant Floor	
MinSlabTempUnoc	19	5	30 deg C	113	100	Radiant Floor	
Outside Cutoff Temp	15	5	30 deg C	114	100	Radiant Floor	
Radiant Proportionnal	1	0	10 deg C	115	100	Radiant Floor	
Radiant Integral	60	0	1000 min	116	1	Radiant Floor	
Calib Slab Temp	0	-15	15 deg C	117	100	Radiant Floor	
Radiant Floor Cycle Time	10	1	255 min	118	1	Radiant Floor	

Math Unoc Mode	0	0	1 None	119	1	Math Functions	0=Averaging math functions are replaced with Max Demand during unoccupied mode / 1=No change to math functions during unoccupied mode
Reverse Acting Output 1	0	0	1 None	120	1	Output1	0=Normal / 1=ReverseActing
Reverse Acting Output 2	0	0	1 None	121	1	Output2	0=Normal / 1=ReverseActing
Reverse Acting Output 3	0	0	1 None	122	1	Output3	0=Normal / 1=ReverseActing
Reverse Acting Output 4	0	0	1 None	123	1	Output3	0=Normal / 1=ReverseActing
Input Profile (C1050 Only)	0	0	255 None	124	1	Other	4LSB=AI3 Mode (0=Supply or Radiant Temp (selected based on config) / 1=Discharge Temp / 2=CO2), 4MSB=DI Mode (0=Occupancy / 1=Conference Occup / 2=Damper Override)
Analog Input Mode (VC2000 Only)	0	0	6 None	124	1	Other	0=Supply or Radiant Temp (selected based on config) / 1=Zone Temp / 2=Occupancy / 3=Discharge Temp / 4=Conference Occup / 5=CO2 / 6=Damper Override
Min Damper Pos - Standby	50	0	100 %	125	1	Damper	Min Damper position when in standby mode
Ventilation DB - Under	0.5	-15	15 deg C	126	100	Damper	
Setpoint Offset	0	-15	15 deg C	127	100	Calib Temp	This offset is applied to the Default Heating Setpoint or to the setpoint provided by an attached potentiometer.
Fan Powered Box Output ID	0	0	5 None	128	1	Output5	0=No Fan Powered Box / 1-5=Output1-5
Fan Powered Mode	0	0	2 None	129	1	Output5	0=Parallel / 1=Series / 2=Series with fan protection
CO2 High Limit	1000	0	5000 PPM	130	1	Other	
CO2 Min Damper Pos	30	0	100 %	131	1	Damper	
CO2 Min Flow	150	0	5000 cfm	132	1	Pressure Indep	
CO2 Calibration	0	-3000	3000 PPM	133	1	Other	
Locked Address	0	0	127 None	140	1	Device	Saved address (overrides physical dipswitch address). Set to 0 to return to physical address.
Output 1 Override Enable	0	0	1 None	150	1	Visualisation	0=No Override / 1=Use override (see override values)
Output 1 Override Value	0	0	100 %	151	1	Visualisation	
Output 2 Override Enable	0	0	1 None	152	1	Visualisation	0=No Override / 1=Use override (see override values)
Output 2 Override Value	0	0	100 %	153	1	Visualisation	
Output 3 Override Enable	0	0	1 None	154	1	Visualisation	0=No Override / 1=Use override (see override values)
Output 3 Override Value	0	0	100 %	155	1	Visualisation	
Output 4 Override Enable	0	0	1 None	156	1	Visualisation	0=No Override / 1=Use override (see override values)
Output 4 Override Value	0	0	100 %	157	1	Visualisation	
Output 5 Override Enable	0	0	1 None	158	1	Visualisation	0=No Override / 1=Use override (see override values)
Output 5 Override Value	0	0	100 %	159	1	Visualisation	
Damper Override Enable	0	0	1 None	160	1	Visualisation	0=No Override / 1=Use override (see override values)
Damper Override Value	0	0	100 %	161	1	Visualisation	
Schedule Override Enable	0	0	1 None	162	1	Visualisation	0=No Override / 1=Use override (see override values)
Schedule Override Value	1	0	1 None	163	1	Visualisation	0=Unoccupied / 1=Occupied

Reset	0	0	1 None	164	1	Device	Modbus only, write a "1" to cause the device to reset.
Reprogram	0	0	255 None	165	1	Device	Writing 255 to this address causes the device to enter bootloader mode (warning: cannot be returned from without Focus)
Tstat Override	0	0	1 None	166	1		Modbus only, write a "1" to override the schedule from unoccupied to occupied for the amount of time specified in "Override Time IO"
Wink command (VC2000)	0	0	1 None	167	1		Send a '1' to make the VC2000 blink it's status LED for 2 minutes
Display Only Registers	0	0	0 None	250	1	Visualisation	Registers 250 to 291. Must access using Multiple Read/Write. [2 first regs are visual display choices: SupplyTemp, BaseboardID ][Then 8 regs for each output name (x5)]
Center SP	22	-29.5	44.5 deg C	300	100		Heat and Cool SP are centered around this value
Center Deadband	1	0.5	7.5 deg C	301	100		Alternate method for setting occupied heat and cool setpoints, in conjunction with Reg 301. Heat and cool setpoints are centered on this value, separated by deadband
Use Ext Ventilation Mode	0	0	1 None	302	1	Damper	
Ventilation Mode Target	100	0	100 %	303	1	Damper	
Ventilation Mode Delay	5	0	100 min	304	1	Damper	
Analog Input Damper Target	100	0	100 %	305	1	Other	
Duct Heater Supply Interlock	50	20	54 deg C	306	100	Output5	
Multizone Reset Position	50	0	100 %	307	1	Damper	
Integral Dropoff Rate	3	0	4 None	308	1	Temperature	0=Slow Dropoff Rate / 4=Fast Dropoff Rate
Chip Type	0	0	1 None	309	1	Device	0=PIC18F6722 / 1=PIC18F67K40

## Modbus VAV Controller Network Variable Outputs

### Modbus Object Type: Input Registers

Name	Units	Modbus Reg #	Multiplier	Modbus Notes
Active Zone Temp	deg C	1	100	
Active Heat Setpoint	deg C	2	100	
Active Cool Setpoint	deg C	3	100	
Demand	%	4	1	
Damper State	None	5	1	0=OK / 1=STALLED / 2=REINITIALIZING
Damper Position	%	6	1	111% when performing damper reinitilisation
Air Flow	cfm	7	1	
Supply Temp	deg C	8	100	
Output1	%	9	1	
Output2	%	10	1	
Output3	%	11	1	
Output4	%	12	1	
Output5	%	13	1	
Occupancy Status	None	14	1	0=Unoccupied / 1=Occupied (AUTO)
Slab Temp	deg C	15	100	
Unoc Override Status	None	16	1	0=AUTO / 1=Activate override from unoccupied mode
Radiant Cycle Used	%	17	1	
Discharge Temp	deg C	18	100	
Standby Mode Active	None	19	1	When in standby mode, uses Standby Min position, declares demand and weight 0 to master
Flow Setpoint	cfm	20	1	
CO2 Reading	PPM	21	1	

## Modbus VAV Controller Network Variable Inputs

### Modbus Object Type: Holding Registers

Name	Units	Modbus Reg #	Multiplier	Modbus Notes
Occupancy NVI	None	136	1	0=Unoccupied / 1=Occupied
Outside Temp Net Input	deg C	139	100	Allows the outside temp to be set by another network device. Set to 0x7FFF to invalidate. Will always read 0x7FFF.
Zone Temp Sensor	deg C	200	100	Prolon Digital Sensors (T200, T500, T1000) will write to this register
Heat Setpoint Input	deg C	201	100	Takes priority over Default Occupied Heat Setpoint (Write >300degC to clear)
Cool Setpoint Input	deg C	202	100	Takes priority over Default Occupied Cool Setpoint (Write >300degC to clear)
Air Flow Input	cfm	203	1	
Override Input	None	204	1	0=No schedule override / 1= Schedule override in effect
Supply Temp Input	deg C	205	100	
Out 3 Enable Morning Warm-Up	None	206	1	Output 3 disabled when this value is TRUE. Remains disabled until indicated otherwise, or until the morning warmup period expires
Out 4 Enable Morning Warm-Up	None	207	1	Output 4 disabled when this value is TRUE. Remains disabled until indicated otherwise, or until the morning warmup period expires
Out 5 Enable Morning Warm-Up	None	208	1	Output 5 disabled when this value is TRUE. Remains disabled until indicated otherwise, or until the morning warmup period expires
Out 3 Override Val	%	209	1	Modbus: To remove override, set to 255.
Out 4 Override Val	%	210	1	Modbus: To remove override, set to 255.
Out 5 Override Val	%	211	1	Modbus: To remove override, set to 255.
Damper Override Val	%	212	1	Modbus: To remove override, set to 255.
Outside Temp Input	deg C	213	100	Allows the outside temp to be set by another network device. Set to 0x7FFF to invalidate.
Slab Temp Input	deg C	214	100	



CO2 Input	PPM	215	1	
Fan Status Input	None	216	1	
Zone Temp NVI	deg C	217	100	Takes priority over Zone Sensor Temp Input (HR#200)

## Modbus Document Notes

### Output Identification

By default, this document identifies outputs using indexes 1 through 5, referring to the five outputs on a C1050 hardware platform. These indexes can be applied to other hardware platforms using the following table:

Output Identification (in this document)	C1050 C1000 VC1000F	VC2000 VC1000LT
Output 1	DO1	N/A
Output 2	DO2	N/A
Output 3	DO3	N/A
Output 4	DO4	DO
Output 5	AO	AO