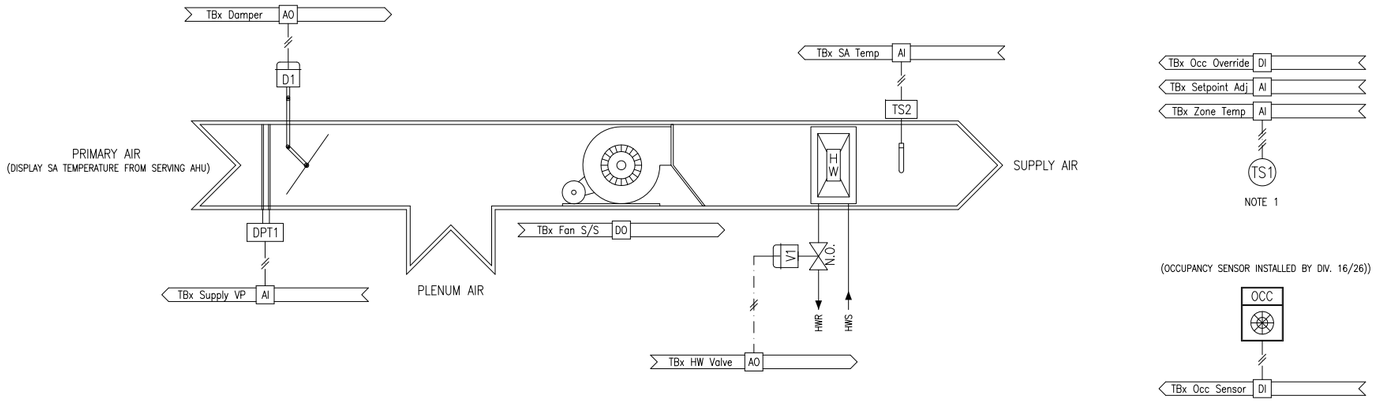


NOTES

1. Provide with temperature display and communications port.

BILL OF MATERIAL

DESIG	QTY	MODEL NO.	DESCRIPTION
TS 1	1		Temp Sensor, Zone
TS 2	1		Temp Sensor, Duct
V1	1		Valve Actuator
D1	1		Damper Actuator
OCC	1		Occupancy Sensor

POINTS LIST

POINT NAME	POINT DESCRIPTOR	POINT TYPE DI	AI	DO	AO	REMARKS
TBxx.SA-F	TBx SA Flow		1			
TBxx.PRIM-D-C	TBx Primary Dmper				1	
TBxx.OCC-OVRD	TBx Occ Override	1				
TBxx.SA-T	TBx SA Temperature		1			
TBxx.OCC-OVRD-S	TBx Occ Sensor	1				
TBxx.ZN-xx-T-SP	TBx Zone x SP Adj		1			
TBxx.ZN-xx-T	TBx Zone x Temp		1			
TBxx.HTG-V-C	TBx HW Valve				1	
TBxx.S-FN-C	TBx Fan S/S			1		
	TOTALS	3	4	1	2	

SEQUENCE OF OPERATION

General: The variable air volume terminal shall be fully controlled by the BAS. Control shall be pressure independent with minimum and maximum flow setpoints, scheduled occupancy with optimimum preoccupancy and occupancy override. Schedule shall be the same as the parent AHU.

Space Temperature Control: During periods of occupied operation (space is occupied, scheduled to be occupied or occupancy is detected) the operator may adjust the Normal (72°F adj.) setpoint. Occupants may further adjust the Normal setpoint via the local sensor setpoint adjustment (the range of adjustment shall be configurable via the BAS, initially +/-2°F). The BAS shall automatically apply an offset for cooling and heating set points during occupied periods as follows:

1. Space cooling setpoint shall be the Normal space temperature setpoint plus 2°F (adj.).
2. Space heating setpoint shall be the Normal space temperature setpoint minus 2°F (adj.).

During periods of unoccupied operation (space is scheduled unoccupied or no occupancy is detected for a preset period) the operator may adjust Setback heating (50°F adj.), and Setback cooling (85°F adj.) setpoints. The BAS will prevent the operator from entering a Setback heating setpoint higher than the Space heating setpoint OR entering a Setback cooling setpoint lower than the Space cooling setpoint.

Occupancy Override: Occupancy override shall be initiated at the local primary sensor or via the occupancy sensor. Unit shall change to the occupied mode whenever the override button is depressed (or signal is received from the occupancy sensor) for a period of 2 hours (adj.) and reset to normal operation at the end of the period or whenever the override button is held for more than 5 seconds (adj.).

Occupancy Sensor:

OCCUPIED MODE SENSING: Once scheduled occupancy is established the BAS shall monitor the occupancy sensor contact and adjust the space temperature set point as follows:

A) Sensor detects occupancy during occupied period:
   1) BAS shall maintain normal occupancy set points.

B) Sensor indicates no occupancy during occupied period:
   1) Every continuous 15 minute (adj.) period after non-occupancy the normal space set points shall be reset 25% (adj.) toward their unoccupied set point. (i.e. 72F normal cooling, 80F setback cooling; after first 15 minutes set point adjusts to 74F)
   2) When occupancy is detected during occupied period set points shall reset to normal occupied schedule.

C) Sensor detects occupancy during unoccupied period:
   1) BAS shall initiate an occupancy override and reset to normal occupancy set points.

Primary Damper: Primary damper shall modulate in a PI loop to maintain primary volume setpoint. Primary volume setpoint shall be reset between maximum and minimum volume settings to maintain space temperature cooling setpoint with a 2°F (adj.) reset range. Primary volume setpoint shall be set to the heating volume setpoint whenever the space temperature falls below the heating space temperature setpoint.

1. Cooling minimum volume setpoint shall be determined as scheduled on the drawings. In the unoccupied period the minimum volume setpoint shall be 0 cfm.
2. Cooling maximum volume setpoint shall be as scheduled on the drawings during the occupied period and shall be set to zero otherwise.
3. Heating minimum volume setpoint: Whenever heating is requested from the box in any period, the minimum volume shall be set to an adjustable heating setpoint airflow. Initially, this setpoint shall equal the cooling minimum volume setpoint.

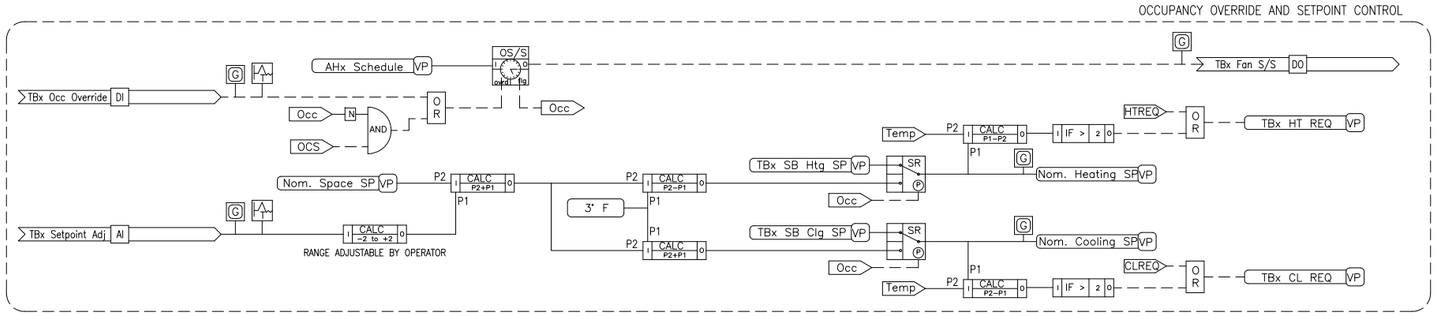
Fan: BAS shall start fan and it shall run continuously whenever the space is occupied or in setback heating or cooling. For occupied or setback cooling operation, fan shall be started 1 minute (adj.) prior to the AHU.

Hydronic Reheat: N.C. Primary reheat coil valve shall modulate in a PI loop to maintain space temperature heating setpoint as defined above with a 2°F throttling range. Valve shall be closed whenever the parent AHU is off, unless setback heating is engaged.

Heating Request: This terminal shall issue a "HEATING REQUEST" to the HW System as follows:
1. Whenever the reheat output is greater than 90% (adj.), OR
2. Whenever the space temperature falls below the throttling range of the heating loop.

Cooling Request: This terminal shall issue a "COOLING REQUEST" to the parent AHU as follows.
1. Whenever the primary damper output is controlling for a cooling setpoint and the calculated signal is greater than 90% (adj.), OR
2. Whenever the space temperature rises above the throttling range of the cooling loop.

CONTROL SCHEMATIC

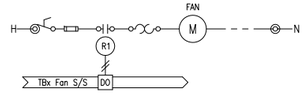


CONTROL LOGIC

LOGIC VARIABLES

BINARY	ANALOG	DESCRIPTION	#
Occ		ON WHEN UNIT IS INDEXED TO OCCUPIED MODE	5
OCS		ON WHEN OCCUPANCY SENSOR IS ACTIVE	3
HTREQ		ON WHEN HW VALVE REQUESTS HEAT	2
CLREQ		ON WHEN DAMPER REQUESTS COOL	2
	Temp	VARIABLE VALUE OF CURRENT ZONE TEMPERATURE	5
	HTSP	VARIABLE VALUE OF ACTIVE HEATING SETPOINT	3
	CLSP	VARIABLE VALUE OF ACTIVE COOLING SETPOINT	2

ELECTRIC LADDER DIAGRAMS



(Actual wiring configuration to be confirmed by installer)

FAN WIRING

Developed in Association with
Facility Dynamics ENGINEERING
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Columbia, MD 21046 (410) 290-0900

UNIVERSITY of VIRGINIA
FACILITIES MANAGEMENT

HVAC CONTROLS STANDARDS

Eng	HJN
Drawn	HJN
Chkd	---
Appd	---
Issued	8/4/11
Job No.	10080
Scale	N/A
Proj Code	

STANDARD

SERIES FAN POWERED TERMINAL BOX

13 OF 30
SHEET NUMBER

C-2.2
DWG NUMBER