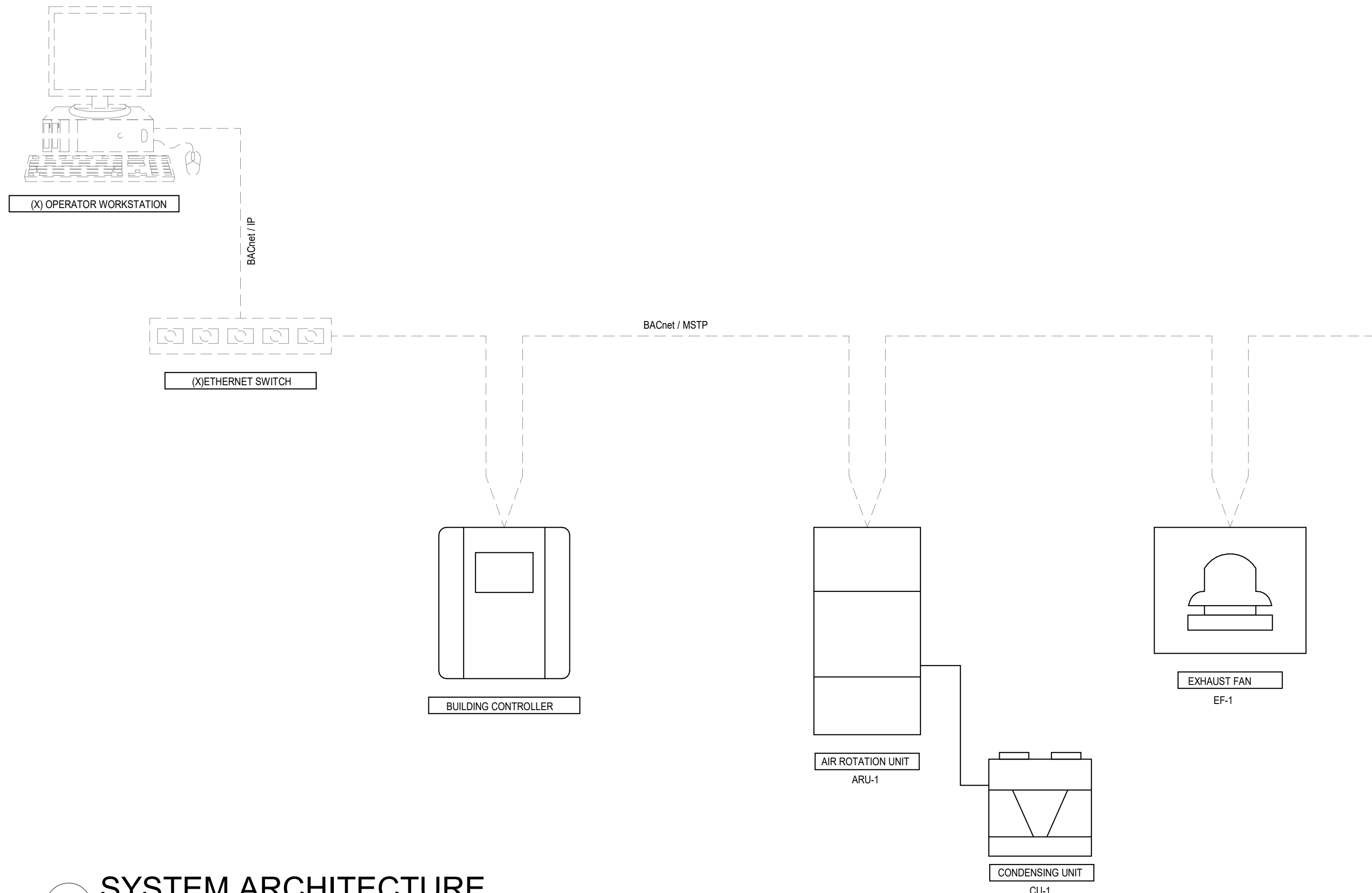
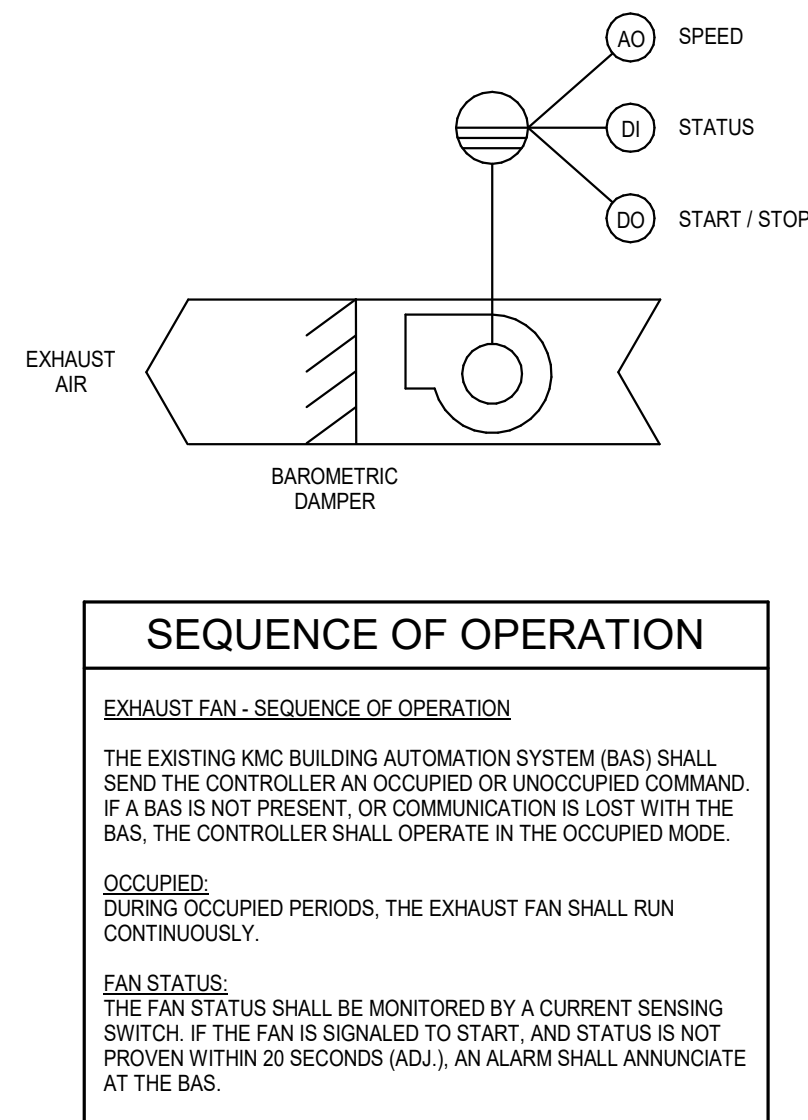


MECHANICAL CONTROL LEGEND

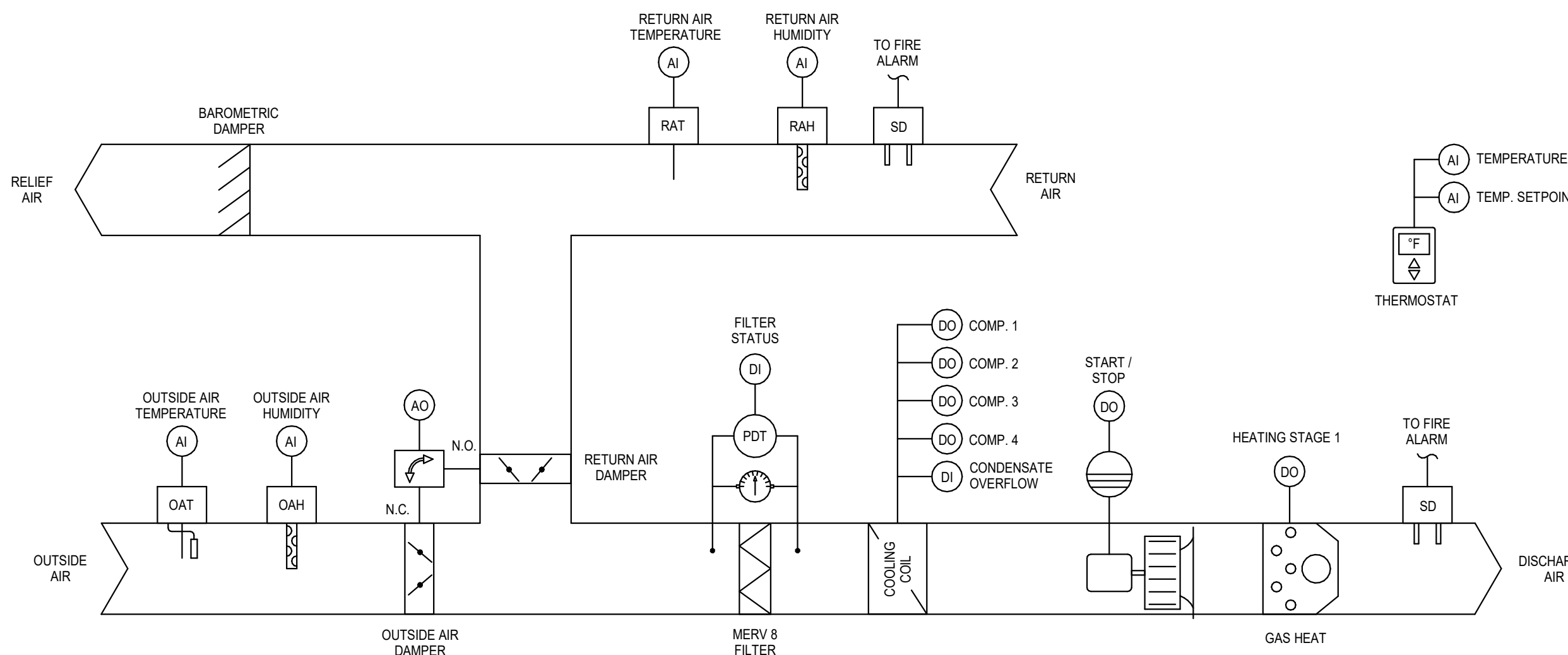
SYMBOL	DESCRIPTION	ABBREVIATION	DESCRIPTION
	ANALOG INPUT	DA	DISCHARGE AIR
	ANALOG OUTPUT	DAT	DISCHARGE AIR TEMPERATURE
	DIGITAL INPUT	DSP	DUCT STATIC PRESSURE
	DIGITAL OUTPUT	EA	EXHAUST AIR
	DIGITAL OUTPUT	HGRH	HOT GAS REHEAT
	ACTUATOR	MAT	MIXED AIR TEMPERATURE
		N.C.	NORMALLY CLOSED
		N.O.	NORMALLY OPEN
	CARBON DIOXIDE (CO2) SENSOR	OA	OUTSIDE AIR
		OAH	OUTSIDE AIR HUMIDITY
		OAT	OUTSIDE AIR TEMPERATURE
	AIR TEMPERATURE SENSOR	PPM	PARTS PER MILLION
		RA	RETURN AIR
		SD	SMOKE DETECTOR
		VFD	VARIABLE FREQUENCY DRIVE
	DIFFERENTIAL PRESSURE TRANSMITTER		
	DUCT STATIC PRESSURE SENSOR		
	ECM MOTOR		
	HUMIDITY SENSOR		
	LOW LIMIT SWITCH		
	MIXED AIR TEMPERATURE SENSOR		
	OUTDOOR AIR TEMPERATURE SENSOR		
	SMOKE DETECTOR		
	THERMOSTAT		
	VARIABLE FREQUENCY DRIVE (VFD)		



1 SYSTEM ARCHITECTURE
NOT TO SCALE:



2 EXHAUST FANS
NOT TO SCALE:



3 CONSTANT VOLUME - AIR ROTATION UNIT
NOT TO SCALE:

SEQUENCE OF OPERATION

AIR ROTATION UNIT - SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE

THE EXISTING KMC BUILDING AUTOMATION SYSTEM (BAS) SHALL SEND THE CONTROLLER OCCUPIED BYPASS, MORNING WARMUP/PRE-COOL, OCCUPIED/UNOCCUPIED AND HEAT/COOL MODES. IF A BAS IS NOT PRESENT, OR COMMUNICATION IS LOST WITH THE BAS, THE CONTROLLER SHALL OPERATE USING DEFAULT MODES AND SETPOINTS.

OCCUPIED:

DURING OCCUPIED PERIODS, THE SUPPLY FAN SHALL RUN CONTINUOUSLY AND THE MIXED AIR DAMPERS SHALL OPEN TO MAINTAIN MINIMUM VENTILATION REQUIREMENTS. UPON A CALL FOR DX COOLING, THE UNIT CONTROLLER SHALL ENABLE THE FIRST FIXED SPEED COMPRESSOR. IF THE FIXED SPEED COMPRESSOR CANNOT SATISFY THE LOAD CONDITIONS, THE UNIT CONTROLLER SHALL START THE NEXT FIXED SPEED COMPRESSOR IN SEQUENCE TO ADD TO THE TOTAL UNIT COOLING LOAD PERCENTAGE. THIS PROCESS SHALL REPEAT UNTIL ALL OF THE FIXED SPEED COMPRESSORS HAVE BEEN STARTED OR UNTIL THE ACTIVE SPACE TEMPERATURE SETPOINT IS SATISFIED. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE DYNAMICALLY RESET BASED ON THE DEVIATION OF ACTUAL SPACE TEMPERATURE FROM THE ACTIVE SPACE TEMPERATURE SETPOINT. IF THE DISCHARGE AIR TEMPERATURE SENSOR FAILS, THE DX COOLING AND THE GAS HEAT SHALL CONTROL TO MAINTAIN THE ACTIVE SPACE TEMPERATURE SETPOINT AND AN ALARM SHALL ANNUNCIATE AT THE BAS. IF THE DISCHARGE AIR TEMPERATURE SENSOR AND THE SPACE TEMPERATURE SENSOR FAIL, THE DX COOLING SHALL BE DISABLED. THE GAS HEAT SHALL BE DISABLED, AND AN ALARM SHALL ANNUNCIATE AT THE BAS.

OCCUPIED SUMMER SETPOINT: 72.0 DEG. F
OCCUPIED WINTER SETPOINT: 70.0 DEG. F

UNOCCUPIED:

WHEN THE SPACE TEMPERATURE IS BELOW THE UNOCCUPIED HEATING SETPOINT OF 65.0 DEG. F (ADJ.), THE SUPPLY FAN SHALL BE COMMANDED ON. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AND THE GAS HEAT SHALL BE ENABLED. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT OF 65.0 DEG. F (ADJ.) PLUS THE UNOCCUPIED DIFFERENTIAL OF 2.0 DEG. F (ADJ.), THE SUPPLY FAN SHALL STOP AND THE GAS HEAT SHALL BE DISABLED. WHEN THE SPACE TEMPERATURE IS ABOVE THE UNOCCUPIED COOLING SETPOINT OF 75.0 DEG. F (ADJ.), THE SUPPLY FAN SHALL BE COMMANDED ON, AND THE DX COOLING SHALL BE ENABLED. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED COOLING SETPOINT OF 75.0 DEG. F MINUS THE UNOCCUPIED DIFFERENTIAL OF 2.0 DEG. F (ADJ.), THE SUPPLY FAN SHALL STOP. THE DX COOLING SHALL BE DISABLED AND THE OUTSIDE AIR DAMPER SHALL CLOSE.

OPTIMAL START:

THE BAS SHALL MONITOR THE SCHEDULED OCCUPIED TIME, OCCUPIED SPACE SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL START OCCURS.

MORNING WARMUP MODE:

DURING OPTIMAL START, IF THE SPACE TEMPERATURE IS BELOW THE OCCUPIED HEATING SETPOINT A MORNING WARMUP MODE SHALL BE ACTIVATED. WHEN MORNING WARMUP IS INITIATED THE UNIT SHALL ENABLE THE HEATING AND FANS. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. WHEN THE SPACE TEMPERATURE REACHES THE OCCUPIED HEATING SETPOINT (ADJ.), THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

PRE-COOL MODE:

DURING OPTIMAL START, IF THE SPACE TEMPERATURE IS ABOVE THE OCCUPIED COOLING SETPOINT, PRE-COOL MODE SHALL BE ACTIVATED. WHEN PRE-COOL IS INITIATED THE UNIT SHALL ENABLE THE FAN AND COOLING. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. WHEN THE SPACE TEMPERATURE REACHES OCCUPIED COOLING SETPOINT (ADJ.), THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

OPTIMAL STOP:

THE BAS SHALL MONITOR THE SCHEDULED UNOCCUPIED TIME, OCCUPIED SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL STOP OCCURS. WHEN THE OPTIMAL STOP MODE IS ACTIVE THE UNIT CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE TO THE SPACE TEMPERATURE OFFSET SETPOINT. OUTSIDE AIR DAMPER SHALL REMAIN ENABLED TO PROVIDE MINIMUM VENTILATION.

OCCUPIED BYPASS:

THE BAS SHALL MONITOR THE STATUS OF THE ON AND CANCEL BUTTONS OF THE SPACE TEMPERATURE SENSOR. WHEN AN OCCUPIED BYPASS REQUEST IS RECEIVED FROM A SPACE SENSOR, THE UNIT SHALL TRANSITION FROM ITS CURRENT OCCUPANCY MODE TO OCCUPIED BYPASS MODE AND THE UNIT SHALL MAINTAIN THE SPACE TEMPERATURE TO THE OCCUPIED SETPOINTS (ADJ.).

HEAT/COOL MODE:

WHEN THE SPACE TEMPERATURE RISES ABOVE THE OCCUPIED COOLING SETPOINT THE MODE SHALL TRANSITION TO COOLING. WHEN THE SPACE TEMPERATURE FALLS BELOW THE OCCUPIED HEATING SETPOINT THE MODE SHALL TRANSITION TO HEATING. WHEN THE SPACE TEMPERATURE IS ABOVE THE OCCUPIED COOLING SETPOINT OR BELOW THE OCCUPIED HEATING SETPOINT THE MODE SHALL REMAIN IN ITS LAST STATE. IF THE SPACE TEMPERATURE SENSOR FAILS THE MODE SHALL REMAIN IN ITS LAST STATE AND AN ALARM SHALL ANNUNCIATE AT THE BAS. IF THE LOCAL AND COMMUNICATED SETPOINTS FAIL, THE CONTROLLER SHALL DISABLE THE SUPPLY FAN AND AN ALARM SHALL ANNUNCIATE AT THE BAS.

SUPPLY FAN:

THE SUPPLY FAN SHALL BE ENABLED WHILE IN THE OCCUPIED MODE AND CYCLED ON DURING THE UNOCCUPIED MODE. RELIEF AIR AND BUILDING PRESSURE CONTROL. THE BAROMETRIC RELIEF DAMPERS SHALL OPEN WITH INCREASED BUILDING PRESSURE. AS THE BUILDING PRESSURE INCREASES, THE PRESSURE IN THE UNIT RETURN SECTION ALSO INCREASES, OPENING THE DAMPERS AND RELIEVING AIR.

FILTER STATUS:

A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER(S) WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSURES DURING NORMAL OPERATION A DIRTY FILTER ALARM SHALL ANNUNCIATE AT THE BAS.

CONDENSATE OVERFLOW SHUTDOWN:

THE UNIT SHALL SHUT DOWN IN RESPONSE TO A SIGNAL FROM THE CONDENSATE OVERFLOW SENSOR. THE SENSOR SHALL BE INTERLOCKED TO THE UNIT COOLING CONTROLLER FOR IMMEDIATE SHUTDOWN OF COOLING.

SMOKE DETECTOR SHUTDOWN:

THE UNIT SHALL SHUT DOWN IN RESPONSE TO A SIGNAL FROM THE SMOKE DETECTOR INDICATING THE PRESENCE OF SMOKE. THE SMOKE DETECTOR SHALL BE INTERLOCKED TO THE UNIT THROUGH THE DRY CONTACTS OF THE SMOKE DETECTOR. A MANUAL RESET OF THE SMOKE DETECTOR SHALL BE REQUIRED TO RESTART THE UNIT.