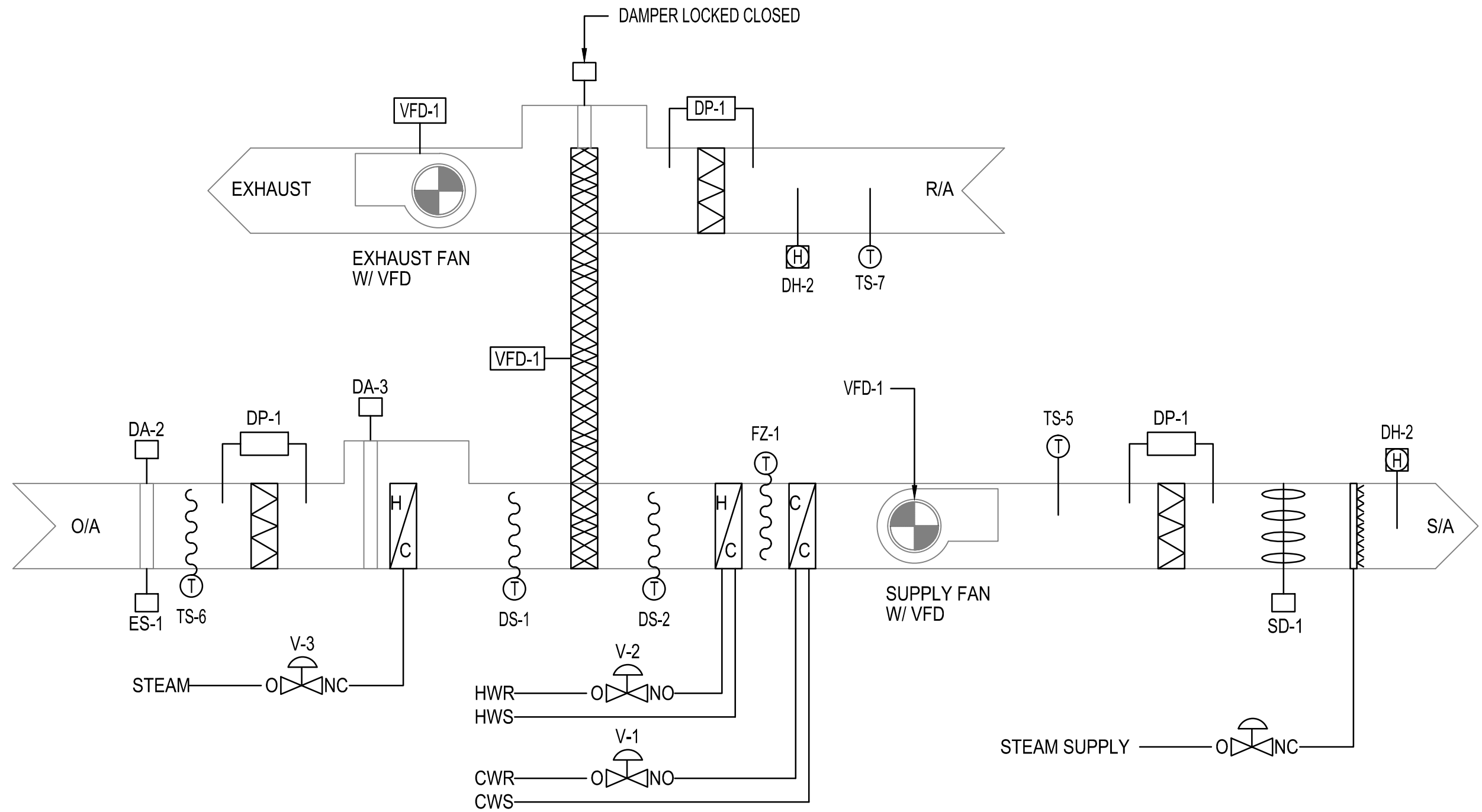


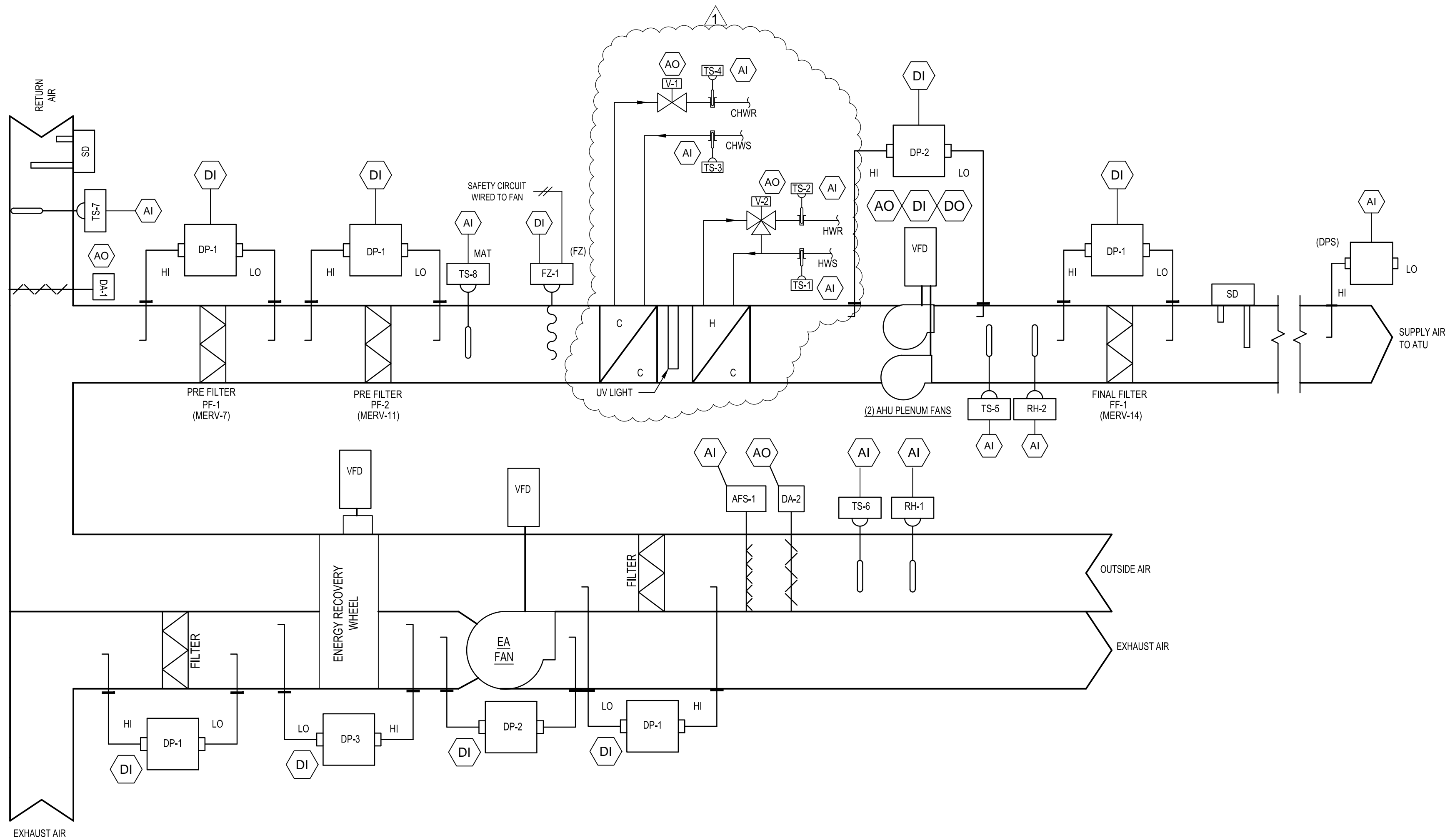
CONTROLS SYMBOL LEGEND	
ITEM SYMBOL	DESCRIPTION
	DUCT TEMPERATURE SENSOR
	SMOKE DAMPER
	DUCT HUMIDITY SENSOR
	DUCT HUMIDIFIER
	HEATING COIL
	COOLING COIL
	ELECTRIC RE-HEAT COIL
	FAN
	FREEZESTAT
	2-WAY CONTROL VALVE
	DAMPER ACTUATOR
	AIRFLOW MEASURING STATION
	3-WAY CONTROL VALVE
	STATIC PRESSURE SWITCH
	STATIC PRESSURE TRANSMITTER
	STATIC SAFETY SWITCH
	SMOKE DAMPER

CONTROL LEGEND	
V-1	COOLING COIL MOTORIZED CONTROL VALVE, N.O.
V-2	HEATING COIL MOTORIZED CONTROL VALVE, N.O.
V-3	STEAM MOTORIZED CONTROL VALVE, N.O.
DDCP	DIRECT DIGITAL CONTROL PANEL
DP-1	DIFFERENTIAL PRESSURE SENSOR/SWITCH ACROSS FILTER
DP-2	DIFFERENTIAL PRESSURE SENSOR/SWITCH ACROSS FAN
DP-3	DIFFERENTIAL PRESSURE SENSOR/SWITCH ACROSS WHEEL
VFD-1	MOTOR STATUS (ON/OFF) & FAN SPEED (HZ)
MD-1	MOTORIZED DAMPER - 2 POSITION
SD	SMOKE DETECTOR (UNITS OVER 2000 CFM)
TS-1	HOT WATER SUPPLY TEMPERATURE SENSOR
TS-2	HOT WATER RETURN TEMPERATURE SENSOR
TS-3	CHILLED WATER SUPPLY TEMPERATURE SENSOR
TS-4	CHILLED WATER RETURN TEMPERATURE SENSOR
TS-5	*SUPPLY AIR TEMPERATURE SENSOR*
TS-6	OUTSIDE AIR TEMPERATURE SENSOR
TS-7	RETURN AIR TEMPERATURE SENSOR
TS-8	MIXED AIR TEMPERATURE SENSOR
FZ-1	FREEZE STAT
TS-11	*SPACE AIR TEMPERATURE SENSOR*
RH-1	OUTSIDE AIR HUMIDITY SENSOR
RH-2	SUPPLY AIR HUMIDITY SENSOR (POST REHEAT)
DA-1	RETURN AIR DAMPER ACTUATOR
DA-2	OUTSIDE AIR DAMPER ACTUATOR
DA-3	BYPASS DAMPER
STM	STEAM
AFS-1	OUTSIDE AIR FLOW MEASURING STATION

* CONTROL LEGEND APPLIES TO THIS SHEET ONLY



1 (E)AHU-9 100% OA CONTROL DIAGRAM



2 AHU-13 CONTROL DIAGRAM

GENERAL NOTES:

ALL CONTROL DIAGRAMS AND SEQUENCE OF OPERATIONS BASED ON EXISTING CONDITIONS. THESE ARE FOR REFERENCE ONLY AND ARE NOT TO BE CHANGED.

SEQUENCE OF OPERATION (E)AHU-9

GENERAL OVERVIEW:
THE SEQUENCE OF OPERATION FOR (E) AHU-9 IS PROVIDED HERE WAS COPIED FROM EXISTING PLANS AND IS PROVIDED HERE FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY THE AIR HANDLER CONTROLS THE EXISTING SENSORS, DAMPERS, CONTROL VALVES AND OTHER ASSOCIATED APPURTENANCES ARE IN GOOD WORKING. THE CONTRACTOR SHALL REPORT ANY EQUIPMENT DEFICIENCIES TO THE CONTRACTING OFFICER.

SCHEDULE:
THE AHU OPERATES ON AN OCCUPIED/UNOCCUPIED SCHEDULE SET BY THE BUILDING OWNER.

OCCUPIED:
THE OUTDOOR AIR DAMPER IS OPENED. THE SUPPLY AND EXHAUST FANS ARE ENERGIZED, AND SET TO AN ADJUSTABLE SPEED.
THE HEAT WHEEL DRIVE IS ENERGIZED AND SET TO AN ADJUSTABLE SPEED.
IN THE HEATING MODE, THE PREHEAT COIL FACE & BYPASS DAMPER AND CONTROL VALVE WILL MODULATE TO MAINTAIN THE PREHEAT DISCHARGE SETPOINT OF 60 DEGREES.
IN THE COOLING MODE, THE COOLING COIL VALVE WILL MODULATE TO MAINTAIN A SUPPLY AIR SETPOINT OF 50 DEGREES.
IF THE SUPPLY AIR AND HUMIDITY LEVELS ARE SATISFIED, THE HEAT WHEEL BYPASS DAMPER WILL BE OPENED.
THE RETURN AIR HUMIDITY SENSOR WILL MODULATE THE HUMIDIFIER VALVE TO MAINTAIN THE RETURN AIR HUMIDITY SETPOINT. A SUPPLY AIR HUMIDITY SENSOR WILL LIMIT THE HUMIDIFIER TO AN 80% SUPPLY HUMIDITY LEVEL. WHEN THE HUMIDIFIER IS NOT REQUIRED, THE CONTROL AND SOLENOID VALVES WILL BOTH CLOSE.

UNOCCUPIED:
THE SUPPLY AND EXHAUST FANS ARE OFF, THE HEAT WHEEL STOPPED, AND THE OUTDOOR AIR DAMPER CLOSSES. THE COOLING COIL VALVE CLOSSES. THE PREHEAT VALVE MODULATES TO MAINTAIN A 50 DEGREE AHU CASE TEMPERATURE.

SAFETIES:
THE FOLLOWING SAFETIES WILL SHUT THE AHU FANS DOWN, CLOSE THE OUTDOOR AIR DAMPER AND REGISTER AN ALARM WITH THE EMCS. BOTH REQUIRE MANUAL RESET:
-AIR TEMPERATURE LEAVING THE PREHEAT COIL DROPS BELOW 35 DEGREES.
-DUCT SMOKE DETECTOR SENSES PRODUCTS OF COMBUSTION.
-SUPPLY DUCT STATIC PRESSURE EXCEEDS SETPOINT.
-OA PLENUM STATIC PRESSURE DROPS BELOW SETPOINT.
WHEN THE SAFETY CONTROL IS RESET, THE AHU WILL AUTOMATICALLY RESTART.

MONITORING:
THE PRE, FINAL AND RETURN FILTER PRESSURE DROPS ARE MONITORED WITH AN ADJUSTABLE ALARM LIMIT.

SEQUENCE OF OPERATION AHU-13

STARTING AND STOPPING OF EQUIPMENT SHALL BE ACCOMPLISHED THROUGH A VFD. THE UNIT SHALL BE STARTED AUTOMATICALLY BY THE DDC SYSTEM AND ALL CONTROLS ACTIVATED SUBJECT TO FIRE ALARM RELAY, SAFETIES AND OVERLOADS. THE UNIT OCCUPANCY SCHEDULE SHALL BE SCHEDULED AS OCCUPIED 24HR/DAY/7 DAY/WEEK.

OCCUPIED MODE: THE OA DAMPER SHALL OPEN TO THE BALANCED POSITION. THE AHU FAN SHALL OPERATE CONTINUOUSLY WITHIN THE SPECIFIED SETPOINTS.

UNOCCUPIED MODE: THE OA DAMPER SHALL BE CLOSED. THE AHU FAN SHALL OPERATE ONLY AS NECESSARY TO SATISFY SPACE TEMPERATURE SETPOINTS.

COOLING COIL FREEZE PROTECTION: THE DDC SYSTEM SHALL CLOSE THE OUTSIDE AIR DAMPER ANYTIME THE COOLING COIL ENTERING AIR TEMPERATURE FALLS BELOW 40°F FOR LONGER THAN 5 MINUTES. THE LOW LIMIT FREEZE STAT SHALL STOP THE AHU FAN MOTOR ANYTIME THE COOLING COIL ENTERING AIR TEMPERATURE FALLS BELOW 35°F AND AN ALARM WILL BE POSTED TO THE DDC SYSTEM.

DISCHARGE TEMPERATURE CONTROL: THE DDC SYSTEM SHALL MODULATE THE TWO-WAY CHILLED WATER AND THREE-WAY HOT WATER VALVE AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SET POINT.

FAN SPEED CONTROL: THE ADJUSTABLE VARIABLE FREQUENCY DRIVE SHALL MODULATE FAN SPEED AS REQUIRED TO MAINTAIN A CONSTANT STATIC PRESSURE AT THE DUCT MOUNTED STATIC PRESSURE SENSOR. THE DUCT STATIC PRESSURE SENSOR WILL BE LOCATED APPROXIMATELY 2/3 OF THE DISTANCE TO THE MOST HYDRAULICALLY REMOTE TERMINAL UNIT AS DETERMINE BY TEST & BALANCE. THE DUCT STATIC PRESSURE SET POINT SHALL BE SET AT THE MINIMUM REQUIRED FOR TEST AND BALANCE. WHEN NONE OF THE ATU'S ASSOCIATED WITH THE AHU HAVE BEEN IN FULL COOLING MODE FOR FIVE MINUTES, THE DDC SHALL RESET THE DUCT STATIC PRESSURE DOWN 0.15". AHU AIRFLOW SHALL BE LIMITED TO SCHEDULED MAXIMUM AND MINIMUM VALUES. AHU FAN SHALL RUN CONTINUOUSLY.

OUTSIDE AIR CONTROL: THE AUTOMATIC OUTSIDE AIR AND RETURN AIR DAMPERS SHALL MODULATE - BASED ON A SIGNAL FROM THE OUTSIDE AIR THERMAL DISPERSION AIRFLOW MEASURING STATION (AFMS) - TO MAINTAIN A CONSTANT OUTSIDE AIR FLOW RATE. IF THE OUTSIDE AIR DAMPER REACHES FULL OPEN AND OUTSIDE AIR VOLUME IS NOT SATISFIED, THEN THE AUTOMATIC CONTROL DAMPER IN THE RETURN AIR DUCT SHALL MODULATE CLOSED TO MAINTAIN SCHEDULED OUTSIDE AIRFLOW. UPON FAILURE, THE OA DAMPER SHALL BE NORMALLY CLOSED. WHENEVER THE AHU OPERATES DURING UNOCCUPIED MODE, THE OA DAMPER SHALL REMAIN CLOSED.

ENTHALPY WHEEL CONTROL: DURING THE COOLING SEASON THE WHEEL SHALL OPERATE CONTINUOUSLY WHEN THE ENTHALPY OF THE OUTDOOR AIR IS GREATER THAN THE ENTHALPY OF THE EXHAUST AIR. HOWEVER, WHEN THE ENTHALPY OF THE OUTDOOR AIR DROPS BELOW THE ENTHALPY OF THE EXHAUST AIR THE WHEEL SHALL TURN OFF.

THE ENTHALPY WHEEL'S VARIABLE FREQUENCY DRIVE SHALL MODULATE ENTHALPY WHEEL SPEED DURING THE WINTER TO PREVENT FROST.

CONSTRUCTION DOCUMENT SUBMISSION FULLY SPRINKLERED

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1 ADDENDUM #1				BES DESIGN/BUILD, LLC 766 Middle St, Fairhope, AL 36532 Phone: 251990.5778 Fax: 251990.3716		Date 05-16-2014		Checked CD		Drawing Number MI601	
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