

VA Hospital
Pharmacy Upgrade
1000 Locus St
Reno, NV

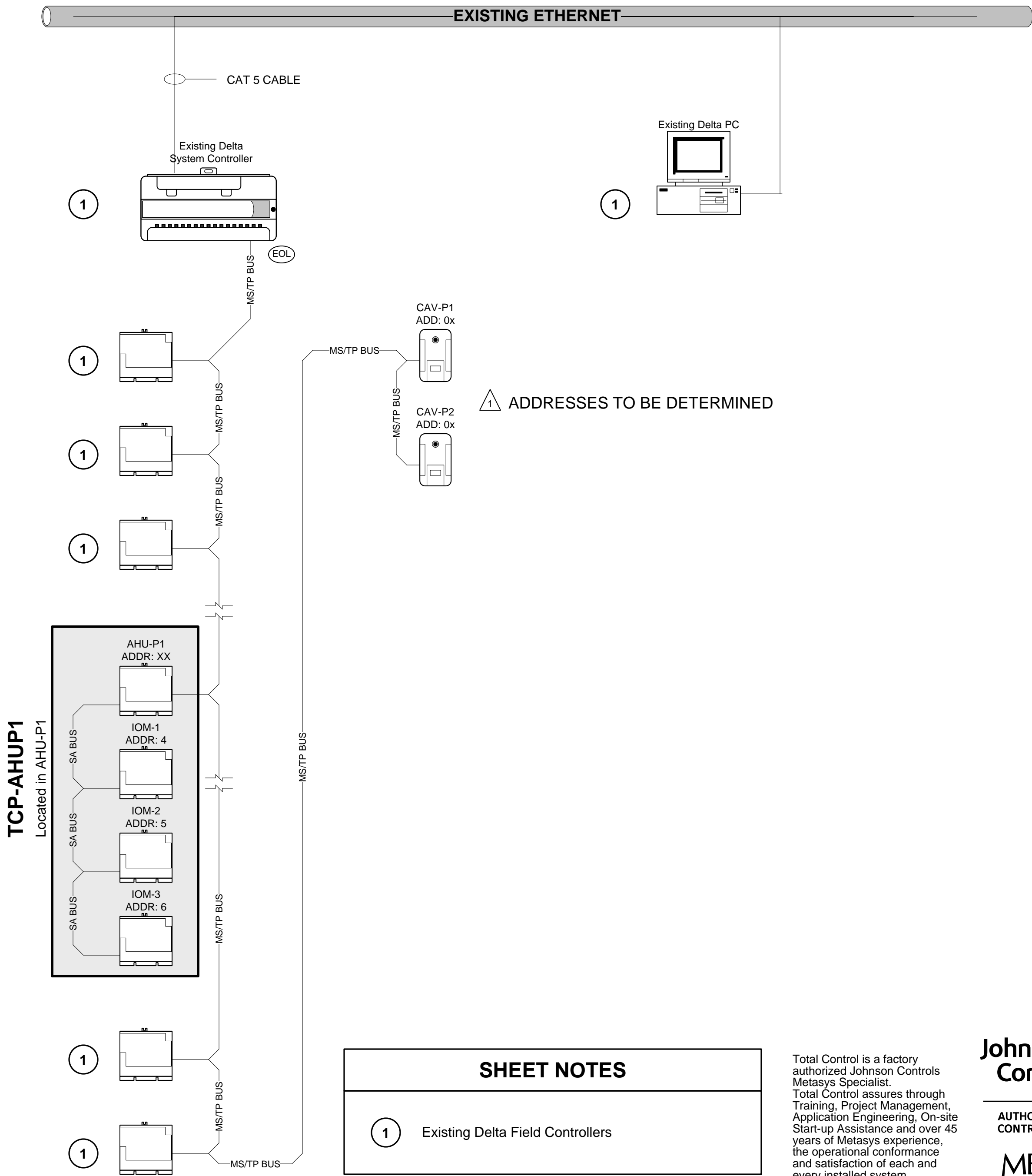
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LAN Architecture



SHEET NOTES

1 Existing Delta Field Controllers

Total Control is a factory authorized Johnson Controls Metasys Specialist. Total Control assures through Training, Project Management, Application Engineering, On-site Start-up Assistance and over 45 years of Metasys experience, the operational conformance and satisfaction of each and every installed system.



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CALIFORNIA ENVIRONMENTAL SYSTEMS
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Project:

VA HOSPITAL PHARMACY UPGRADE
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INDEX & LAN Architecture

Revisions

Rev	Date	Change
1	06/13/12	Added VAV Controllers/Frz Slat
2	07-03-12	Miscellaneous Revisions

Job #:

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Designed By:

DLW

Drawing By:

DLW

Approved By:

DLW

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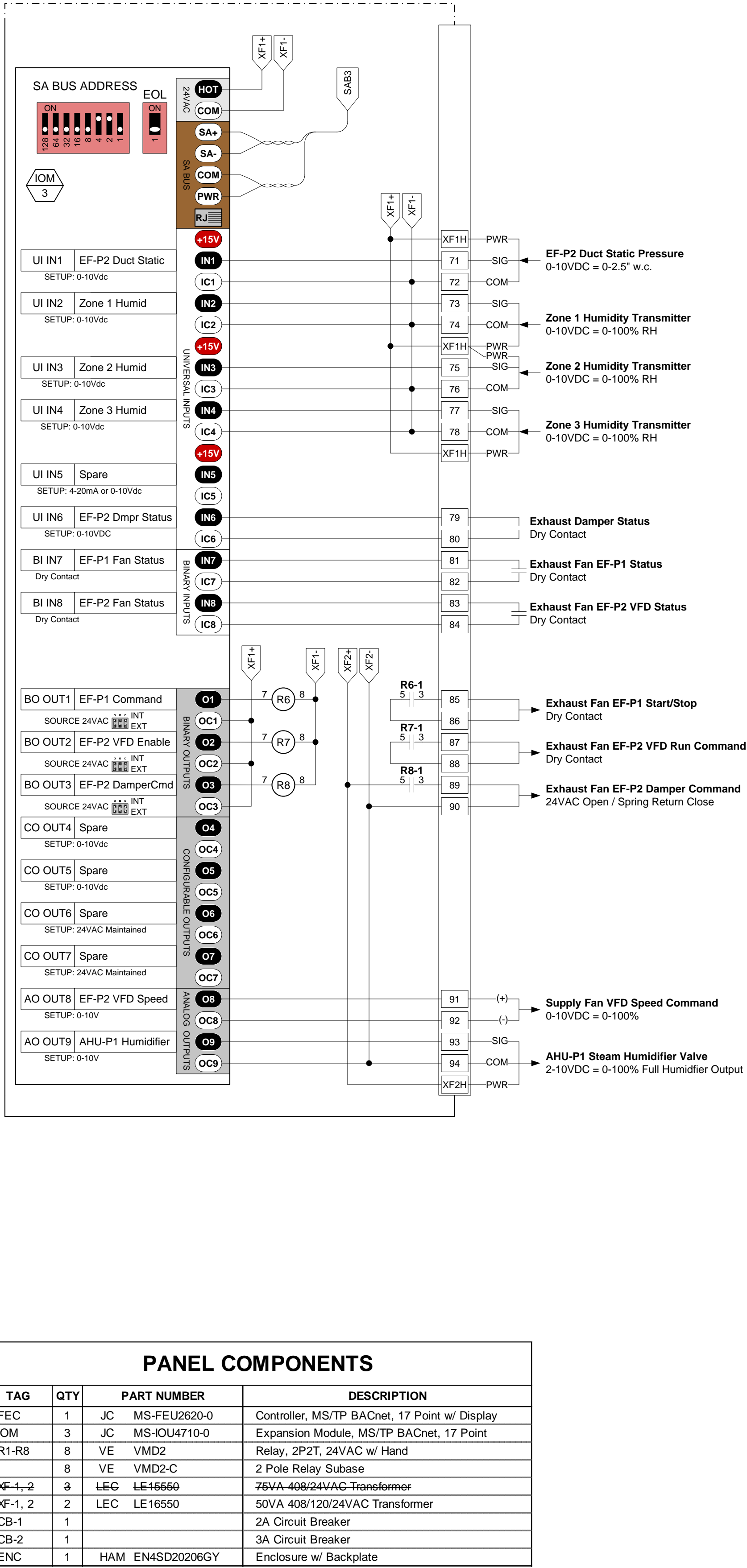
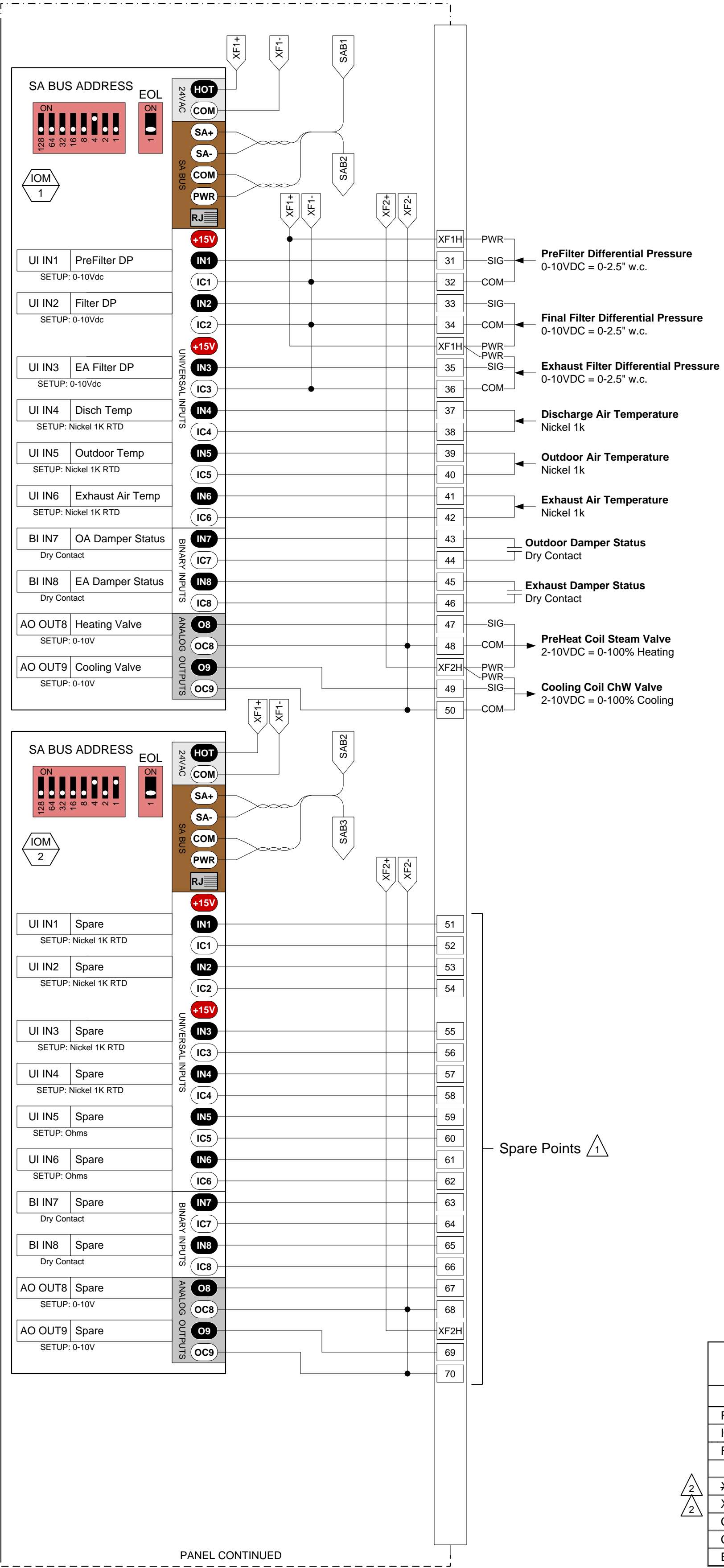
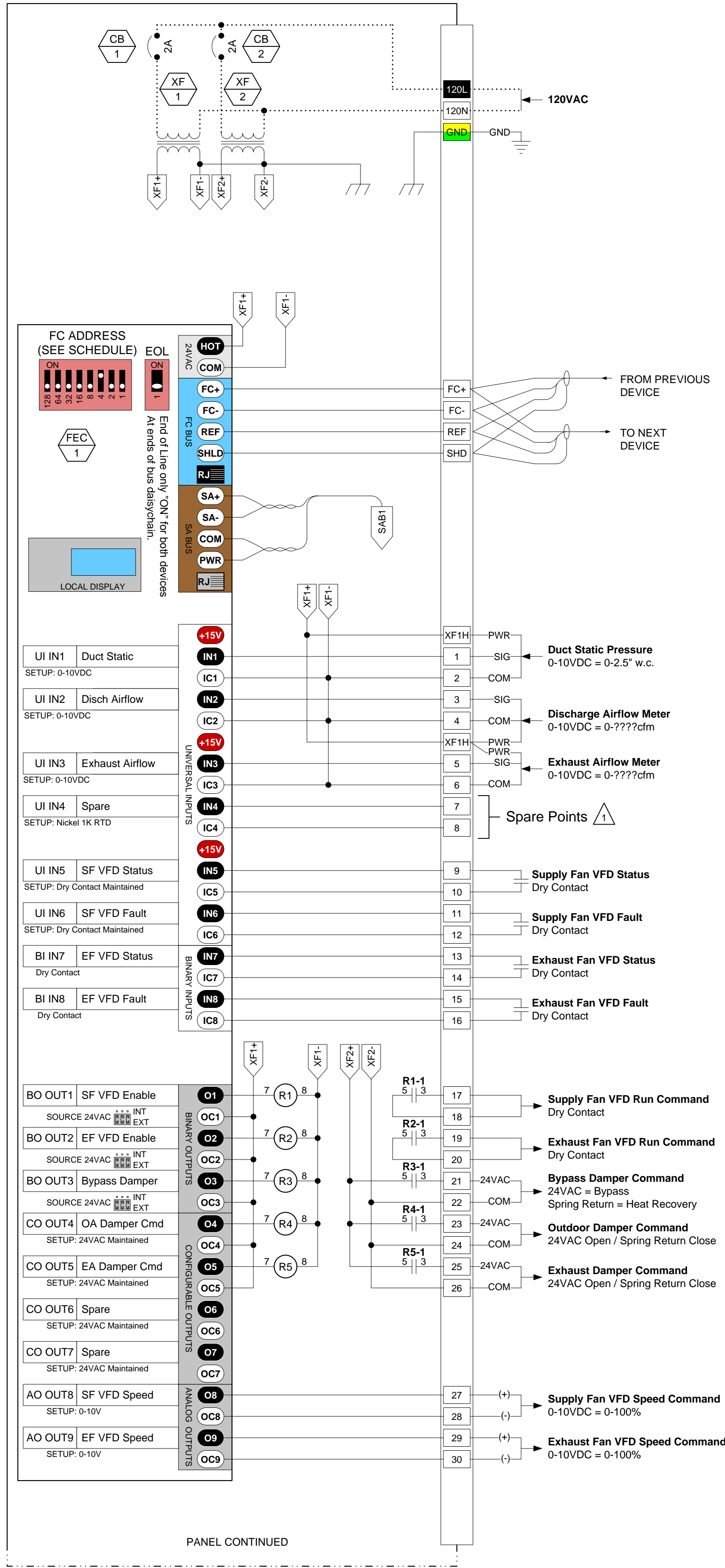
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Sheet Title:

INDEX & LAN Architecture

Air Handler and Exhaust Fan Detail



PANEL COMPONENTS			
TAG	QTY	PART NUMBER	DESCRIPTION
FEC	1	JC MS-FEU2620-0	Controller, MS/TP BACnet, 17 Point w/ Display
IOM	3	JC MS-IOU4710-0	Expansion Module, MS/TP BACnet, 17 Point
R1-R8	8	VE VMD2	Relay, 2P2T, 24VAC w/ Hand
8	VE	VMD2-C	2 Pole Relay Subase
XF-1, 2	3	LEC LE46550	75VA 408/24VAC Transformer
XF-1, 2	2	LEC LE16550	50VA 408/120/24VAC Transformer
CB-1	1		2A Circuit Breaker
CB-2	1		3A Circuit Breaker
ENC	1	HAM EN4SD20206GY	Enclosure w/ Backplate

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Sheet Title: AHU-P1 Temperature Control Panel Details

Revisions

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2	07-03-12	Miscellaneous Revisions

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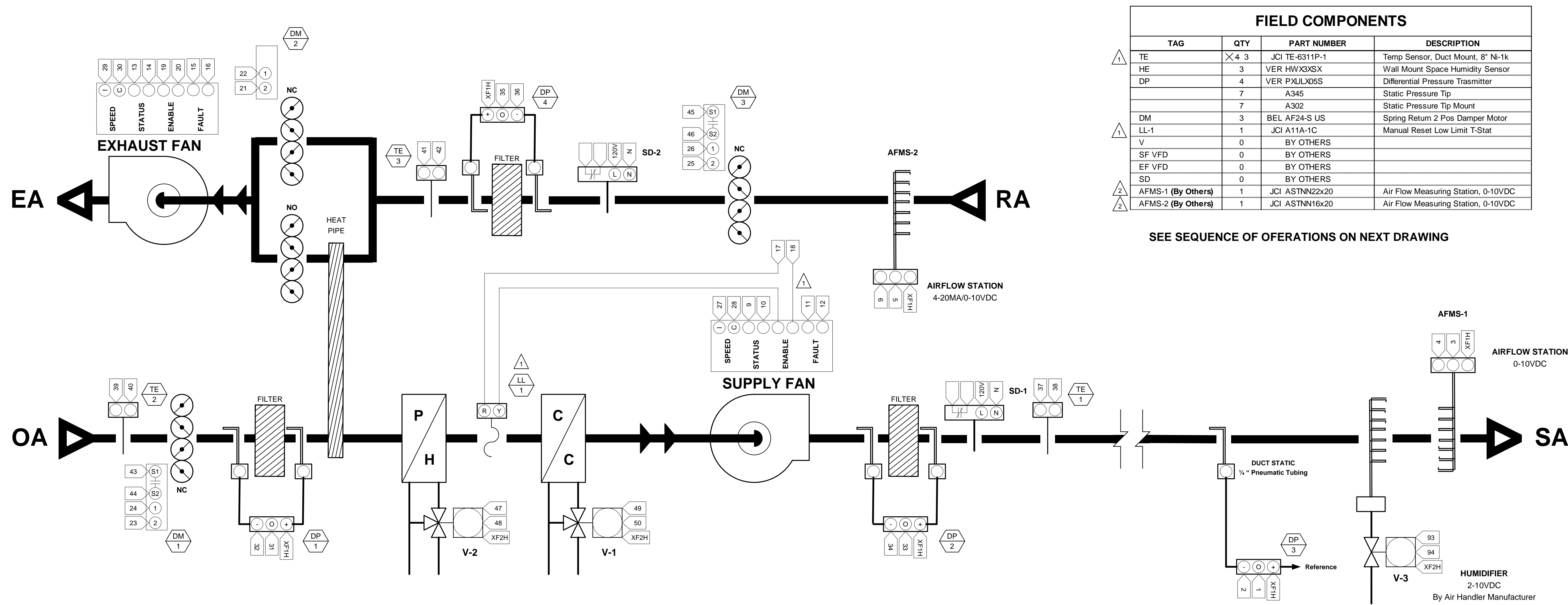
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Air Handler Flow Schematic (AHU-P1)



FIELD COMPONENTS			
TAG	QTY	PART NUMBER	DESCRIPTION
TE	4	JCI TE-6311P-1	Temp Sensor, Duct Mount, 8" Ni-1k
HE	3	VER HWX3XSX	Wall Mount Space Humidity Sensor
DP	4	VER PXULX05S	Differential Pressure Transmitter
	7	A345	Static Pressure Tip
	7	A302	Static Pressure Tip Mount
DM	3	BEL AF24-S US	Spring Return 2 Pos Damper Motor
LL-1	1	JCI A11A-1C	Manual Reset Low Limit T-Stat
V	0	BY OTHERS	
SF VFD	0	BY OTHERS	
EF VFD	0	BY OTHERS	
SD	0	BY OTHERS	
AFMS-1 (By Others)	1	JCI ASTNN22x20	Air Flow Measuring Station, 0-10VDC
AFMS-2 (By Others)	1	JCI ASTNN16x20	Air Flow Measuring Station, 0-10VDC

SEE SEQUENCE OF OPERATIONS ON NEXT DRAWING

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Sheet Title:
AHU-P1, EF-P1, & EF-P2 Control Details

Revisions		Change	Date	Rev
1		Added VAV Controllers/Frz Slat	06/13/12	1
2		Miscellaneous Revisions	07-03-12	2

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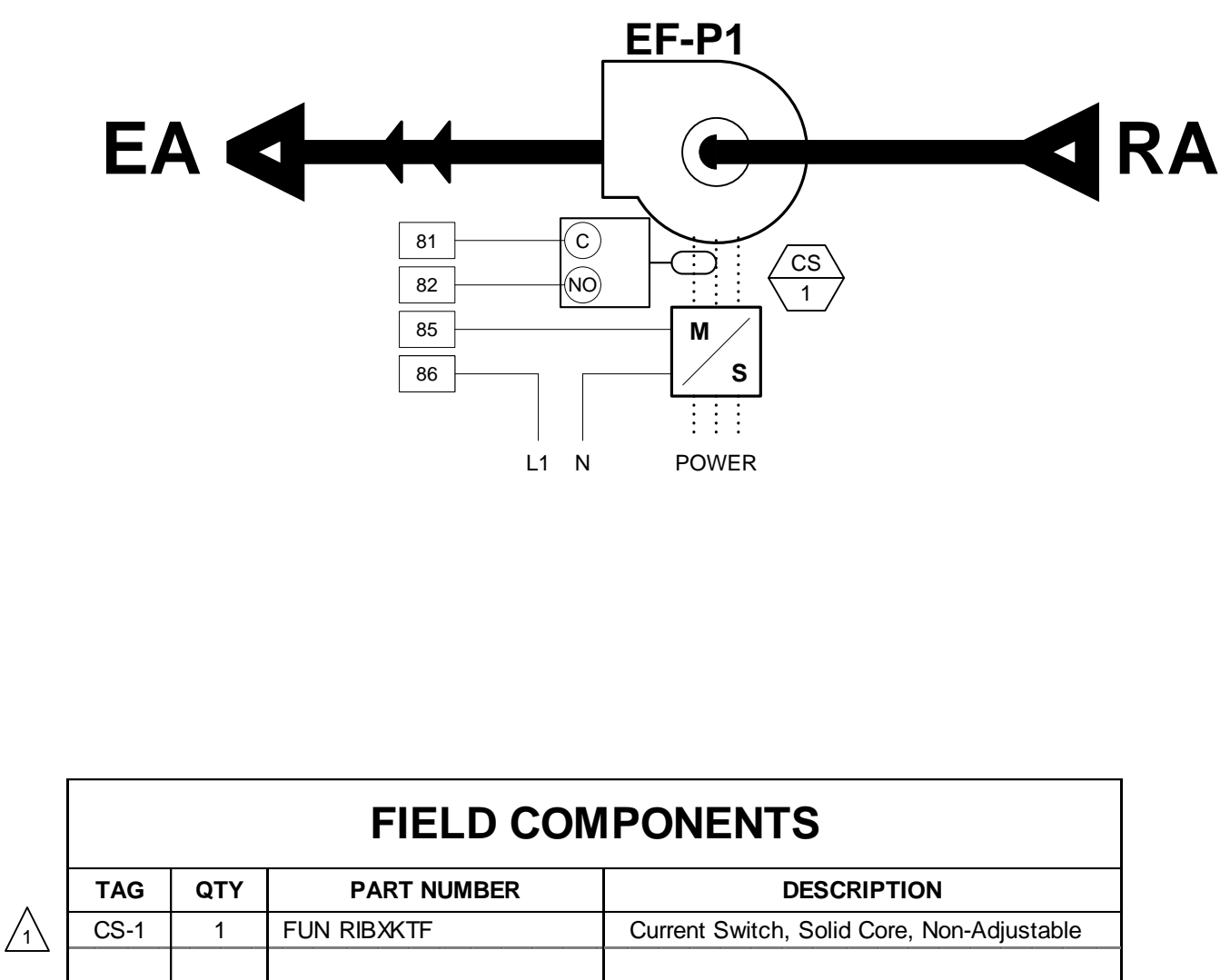
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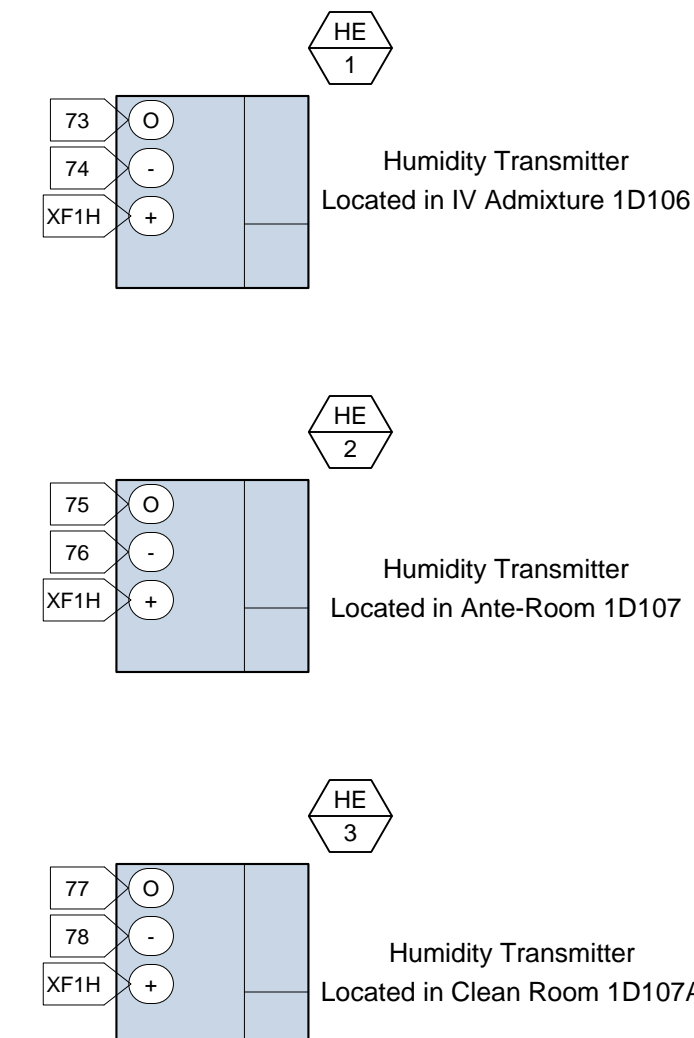
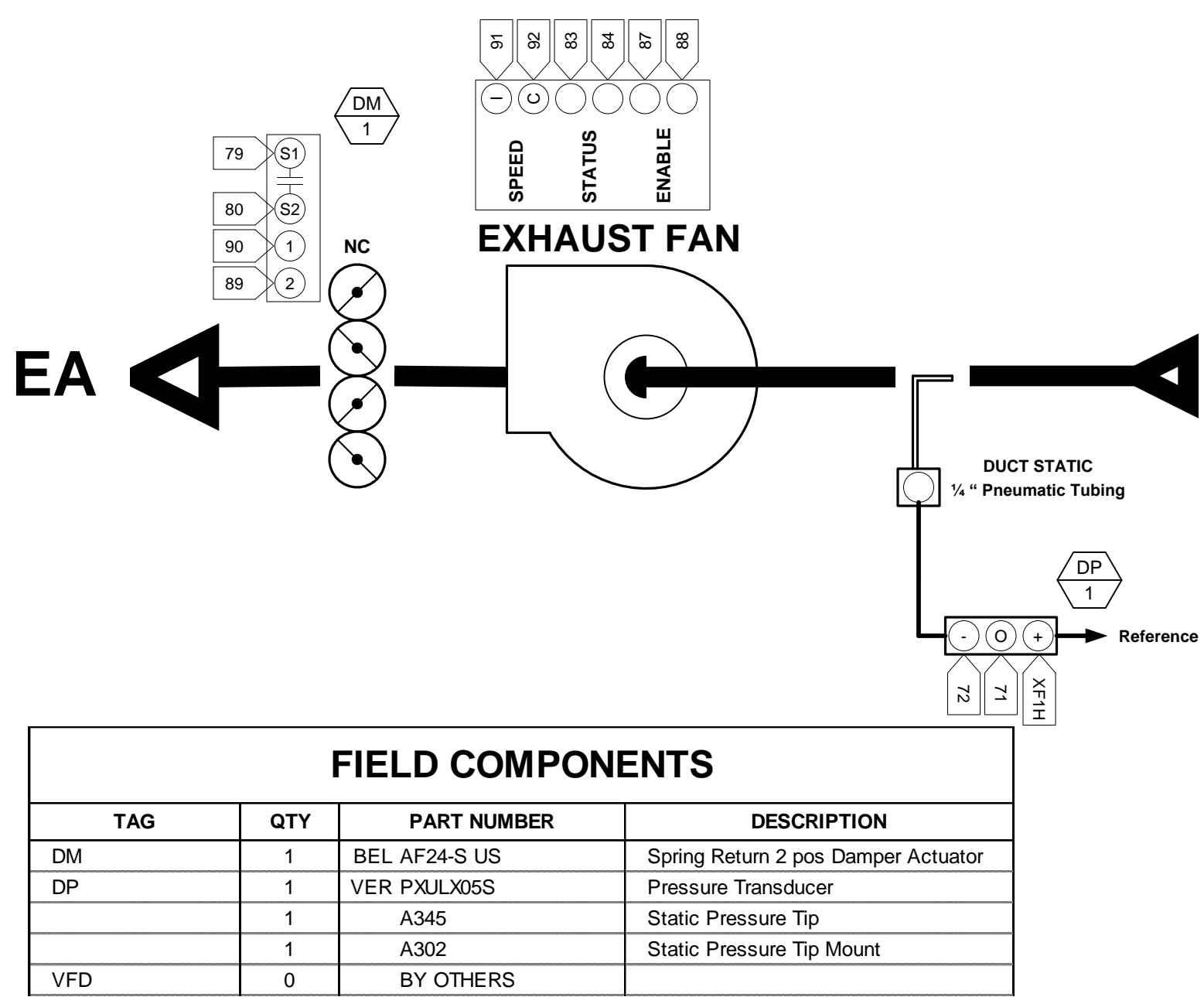
2 CAV-P1 (TYP of CAV-P2)

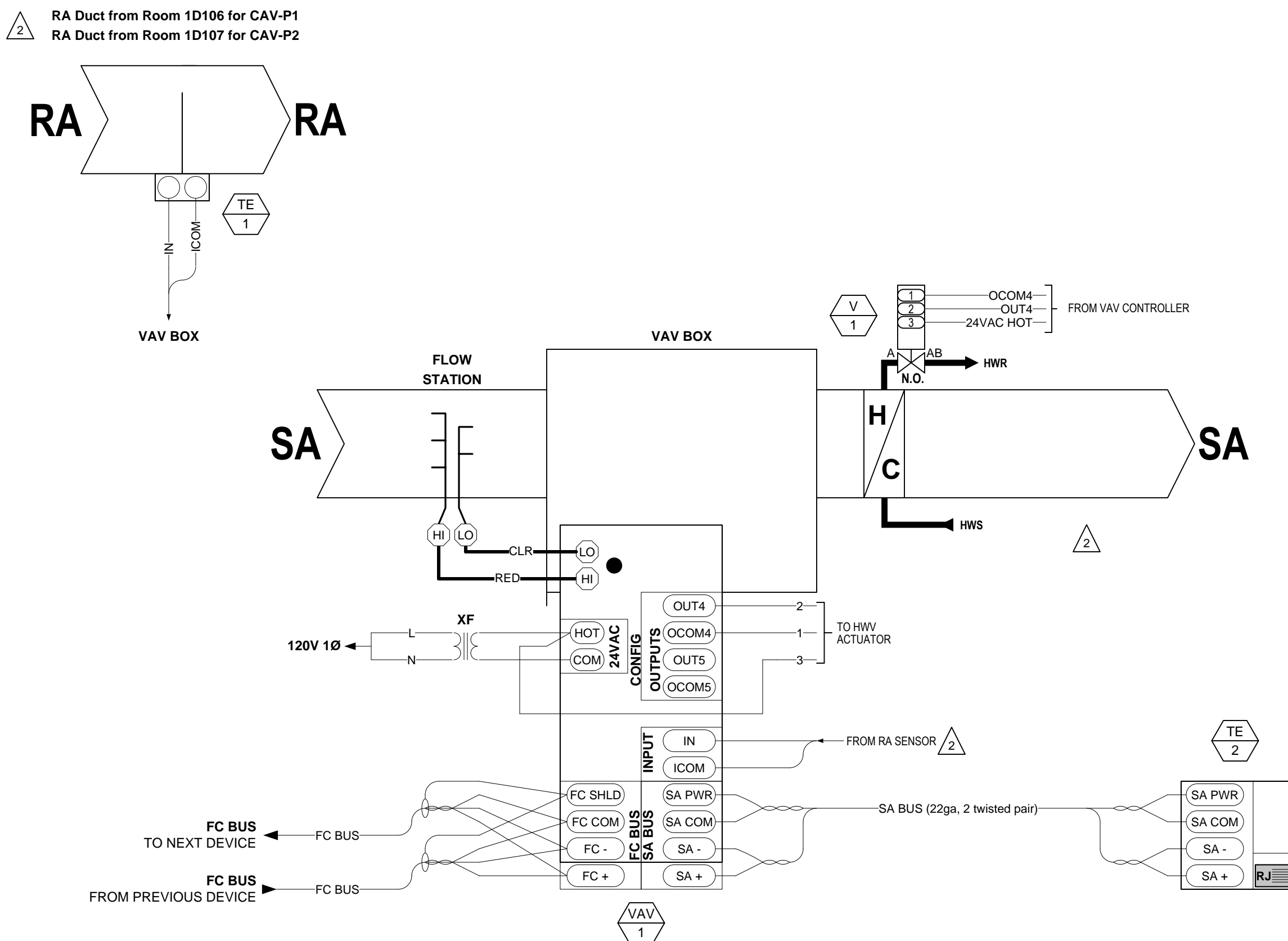
△ ZONE REHEATS MOVED TO NEXT DRAWING

3 EF-P1



4 EF-P2





FIELD COMPONENTS			
TAG	QTY	PART NUMBER	DESCRIPTION
VAV-1	2	JC MS-VMA1620-0	VAV Controller w/ Integral Damper Actuator
XF-1	2	VER X050CAA	120/24VAC, 50VA Transformer w/ Internal Circuit Brkr
TE-1	2	JC TE-6311P-1	Temp Sensor, Duct Mount, 8" Ni-1k
TE-2	2	JC TE-67NT	Temp Sensor w/ Warm/Cool Adj., Wall
TE-2	2	JC NS-BTP7002-0	Network Sensor Zone Temp, Wall Mt. W/C Adj. & PB
V-1	1	BEL B214+TR24-SR	CAV-P1 Valve & Proportional Actuator (2-10VDC)
V-2	1	BEL B218+TR24-SR	CAV-P2 Valve & Proportional Actuator (2-10VDC)

Sequence of Operations

General:

Air Handler Unit (AHU) is automatically enabled by the Start/Stop Program at the DDC Controller. During normal operation, hand-off-auto switches shall be kept in the “Auto” position. In the normal mode, supply and exhaust fans shall run continuously. The supply fan shall be interlocked to run only when the associated exhaust fans are enabled. Anytime the AHU is turned off, AHU smoke dampers in the supply duct/exhaust duct, outside air damper, and general exhaust air damper shall close. All dampers shall be proven open, before fans are allowed to start again. Anytime the supply and exhaust fans are turned off, the associated combination fire/smoke dampers (CSFD) in the AHU duct distribution system, shall close. All dampers shall be proven open before fans start again. Pressure differential transmitters DP-1, DP-2 & DP-4, monitor three separate filter banks respectively, for dirty filter status.

Automatic Shutdown Mode:

Automatic shutdown of the AHU system shall be accomplished by interrupting the power source of the air moving equipment via the Fire alarm contacts at the FACP. If smoke is detected by the supply or exhaust air smoke detectors, the supply fan and exhaust fan shall be disabled, and the outside air damper shall close. AHU supply air and exhaust air smoke dampers shall be closed. Other associated exhaust fans shall continue to operate. SF/EF status’s shall be monitored by the VFD Status Outputs, and the outside air/exhaust air damper positions shall be indicated by end switch inputs, for unit operation condition.

Air Flow & Static Pressure Control-Normal Operation:

Supply air flow and static pressure shall be controlled by the DDC Controller to compensate for filter dust loading and wet/dry cooling coil pressure drop. The DDC Controller shall modulate the supply fan VFD to maintain the duct static pressure setpoint of 1.0” W.C. (adj.), as sensed by DP-3.

Air flow measuring station signals for the supply air and return air (AFMS-1 & AFMS-2 respectively), reset the exhaust fan (VFD) to maintain a constant air flow differential between the supply fan and the exhaust fan equal to the capacity of general exhaust fan (EF-P1) serving the unpacking area.

The same air flow signals shall be used as status indication that each fan is operating. Alarm if no air flow, when fans are programmed to operate.

Analog filter pressure drop transmitter shall alarm at the DDC controller at the filter pressure drop set point (adj.).

Humidification Control:

The Energy Management System (EMS) shall monitor zone relative humidity levels through wall-mounted relative humidity sensors as scheduled on drawing. The average zone relative humidity level shall be calculated by the EMS and used to modulate the steam humidifier control valve (analog output) to maintain a zone relative humidity set point (adj.).

Supply Air Temperature Control:

The facility EMS with supply air temperature input from a supply air sensor in the supply air stream (TE-1) shall control the position of the stream and chilled water coil control valves in sequenced to maintain supply air temperature set point. The facility EMS shall continuously monitor the heating or cooling demand of each zone where an EMS temperature sensor is located and reset the supply air temperature set point to satisfy the zone with the highest cooling demand.

Max. CAV Zone Temperature Difference:	Supply Air Set Point:
2	55
1	60
0 to -1.9	65

On a call for cooling, when the outside sir temp is below 72°F (adj.) the cooling coil control valve will be opened to allow increasing amounts of chilled water to the coil to meet the cooling demand.

On a call for heating, the heating control valve will be opened to allow increasing amounts of hot water to the coil to meet the heating demand.

Freeze protection low limit thermostat (LL-1) across the face of the cooling coil shall alarm at DCP if air temperature is 40°F or below.

Heat Recovery Loop Bypass Damper Control (Normal Position “Closed”):

Cooling Mode (Outside Air Temperature):

- Above 75°F the “Bypass Damper” shall remain closed.
- At 75°F or below the “Bypass Damper” shall remain Closed.

Heating Mode (Outside Air temperature):

- Below 50°F the “Bypass Damper” shall remain Closed
- At 55°F or above the “Bypass Damper” open position shall be determined by the discharge supply air set point.

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Sheet Title: CAV-P1 & P2 Control Details & Sequence Of Operations

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