

Grimes County Courthouse Upgrade

BY:  **OpenTech**
CONTROL & SECURITY SOLUTIONS

17401 VILLAGE GREEN DR.
HOUSTON, TX 77040
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ACTIVITY	DATE
SUBMITTED FOR APPROVAL	4-27-2010

PROJECT INFORMATION	
SYSTEM DESIGNER:	Terry Traphagan
PROJECT MANAGER:	Gary Saluzzi
JOB NO:	RH100117
BRANCH:	Open Tech - Houston

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DDC System Settings

Grimes County Courthouse




NOTE: OpenTech will write the DDC program using the specified values. If no specified values are listed then OpenTech will use the default values unless alternate settings are marked on the submittal or otherwise communicated.




TEMPERATURES	Unit #	Area Served	Occupied Cooling Setpoint		Occupied Heating Setpoint		CO2 Setpoint		Heating Offset		Unoccupied Cooling Setpoint	Unoccupied Heating Setpoint
			Specified	Default	Specified	Default	Specified	Default	Specified	Default		
Unit Ventilators			74°F		70°F		1100					
AHUs			74°F		70°F		1100					
DX AHUs			74°F		70°F		1100				80°F	65°F

OPERATING HOURS			Occupied Hours Monday thru Friday		Occupied Hours Saturday & Sunday		Unoccupied Hours Monday thru Friday		Unoccupied Hours Saturday & Sunday	
			Specified	Default	Specified	Default	Specified	Default	Specified	Default
Unit Ventilators				5:00 am - 8:00 pm		5:00 am - 8:00 pm		8:01 pm - 4:59 am		8:01 pm - 4:59 am
AHUs				5:00 am - 8:00 pm		5:00 am - 8:00 pm		8:01 pm - 4:59 am		8:01 pm - 4:59 am

FIELD DEVICE & SYSTEM SETTINGS

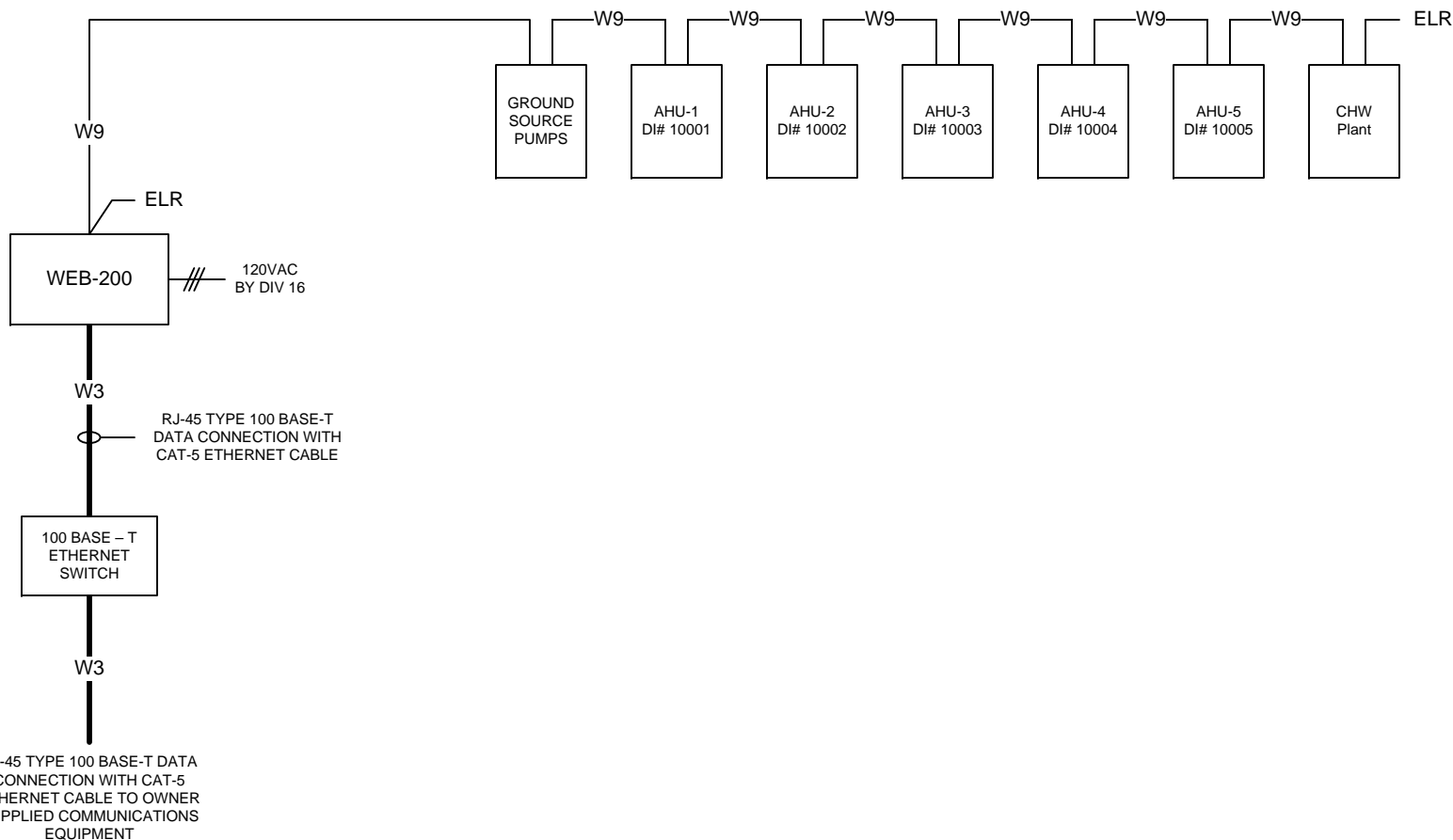
	Specified	Default
Chilled Water	40°F - 44°F	
Hot Water	180°F	

SYMBOL	PRODUCT	QUANTITY	PART NUMBER	DETAIL NUMBER	MANUFACTURER	DESCRIPTION
	100 BASE T NETWORK SWITCH	1	FS105	SEE DATA SHEETS	NETGEAR	ETHERNET 5-PORT SWITCH
	DC POWER SUPPLY	1	DCP-1.5W	SEE DATA SHEETS	KELE	24 VAC TO 24VDC, 1.50 AMP (36 VA) POWER SUPPLY
	BCM - MS/TP	1	BCM-MS/TP	SEE DATA SHEET	ALERTON	BACtalk VISUAL GLOBAL CONTROLLER MS/TP MODULE

	BACnet CONTROL MODULE	x	VLC-1188	SEE DATA SHEETS	ALERTON	BACtalk VISUAL LOGIC CONTROLLER
	BACnet CONTROL MODULE	76	VLC-853	SEE DATA SHEETS	ALERTON	BACtalk VISUAL LOGIC CONTROLLER
	BACnet CONTROL MODULE	4	VLC-550	SEE DATA SHEETS	ALERTON	BACtalk VISUAL LOGIC CONTROLLER

	BACtalk WALL SENSOR	80	MS-2000H-BT	SEE DATA SHEET	ALERTON	BACtalk WALL SENSOR WITH MULTIFUNCION LCD READOUT, FUNCTION KEYS, AND HUMIDITY SENSOR
	BACtalk WALL SENSOR	2	TS-1101-WA-10-AA	SEE DATA SHEETS	ALERTON	BACtalk STAINLESS STEEL WALL SENSOR
	10K DUCT TEMPERATURE SENSOR	76	TS-2008-GD-10-AA	SEE DATA SHEETS	ALERTON	10K OHM THERMISTOR, TEMPERATURE SENSOR DUCT PROBE
	BACtalk IMMERSION SENSOR	6	TS-2104-MH-10-AA / TS-3106-CI-00-AA	SEE DATA SHEETS	ALERTON	10K OHM THERMISTOR, TEMPERATURE SENSOR 6" IMMERSION w/ S.S. 1/2" TEMPERATURE WELL
	BACtalk IMMERSION SENSOR	10	TS-2106-GH-10-AA / TS-3106-CI-00-AA	SEE DATA SHEETS	ALERTON	10K OHM THERMISTOR, TEMPERATURE SENSOR 6" IMMERSION w/ S.S. 1/2" TEMPERATURE WELL
	BACtalk IMMERSION SENSOR	6	TS-2104-GH-10-AA / TS-3104-CI-00-AA	SEE DATA SHEETS	ALERTON	10K OHM THERMISTOR, TEMPERATURE SENSOR 4" IMMERSION w/ S.S. 1/2" TEMPERATURE WELL
	LOW TEMPERATURE SWITCH	12	CTE-3017	SEE DATA SHEETS	KREUTER	LOW LIMIT TEMPERATURE CONTROL FREEZESTAT w/ MANUAL RESET AND AVERAGING ELEMENT
	TEMPERATURE SENSOR GUARD	6	BA/BG2	SEE DATA SHEETS	KELE	CLEAR LOCKABLE THERMOSTAT / TEMPERATURE SENSOR GUARD OR SECURE HOUSING
	CARBON DIOXIDE SENSOR	11	C7632B1002	SEE DATA SHEETS	HONEYWELL	DUCT MOUNTED CARBON DIOXIDE SENSOR
	CARBON DIOXIDE SENSOR	65	C7632A1004	SEE DATA SHEETS	HONEYWELL	ROOM SURFACE MOUNTED CARBON DIOXIDE SENSOR w/ 4-20mA TRANSMITTER
	MOTION DETECTOR / OCCUPANCY SENSOR	65	DT-300	SEE DATA SHEETS	WATT STOPPER	360° DUAL TECHNOLOGY OCCUPANCY SENSOR CEILING MOUNT
	AIR FLOW SWITCH	11	ADPS-03-1-N	SEE DATA SHEETS	DWYER	DUCT MOUNTED DIFFERENTIAL PRESSURE SWITCH USED FOR AIR SERVICE
	PHOTOCELL CONTROL	1	EM-24A2	SEE DATA SHEETS	KELE	PHOTOCELL CONTROL
	DAMPER ACTUATOR	67	LF24-SR	SEE DATA SHEETS	BELIMO	DIRECT COUPLED ACTUATOR – 2-10VDC CONTROL 35 IN-LBS TORQUE 24VAC
	WATER DP TRANSMITTER	3	M230-025PD-C	SEE DATA SHEETS	SETRA / KELE	DIFFERENTIAL PRESSURE TRANSMITTER, WATER SER. 0-25 PSI RANGE 4-20mA OUTPUT
	OUTDOOR AIR TEMP/HUMIDITY SENSOR	1	RHT-O	SEE DATA SHEETS	DWYER	OUTDOOR AIR TEMPERATURE & HUMIDITY TRANSMITTER w/ SUNSHIELD

SYMBOL	PRODUCT	PART NUMBER	MANUFACTURER	DESCRIPTION
—W1—	2 CONDUCTOR - 18 AWG WIRE	OTS18/2-Y	DATATECH	GENERAL APPLICATION - YELLOW JACKET
—W2—	3 CONDUCTOR - 18 AWG WIRE	OTS18/3-Y	DATATECH	TWISTED SHIELDED PAIR PLENUM GRADE
—W4—	8 CONDUCTOR - 24 AWG WIRE	OTEC5-B	DATATECH	GENERAL APPLICATION - DARK YELLOW JACKET
—W5—	2 CONDUCTOR - 18 AWG WIRE	OTT18/2-MG-S	DATATECH	TWISTED SHIELDED 3 CONDUCTOR PLENUM GRADE
—W6—	2 CONDUCTOR - 22 AWG COMMUNICATIONS WIRE	OTMSTP-22/2-R-S	DATATECH	ETHERNET CATEGORY 6 GRADE 10/100 BLUE JACKET
—W7—	2 CONDUCTOR - 14 AWG			PLENUM GRADE
—○—T1—○—	1/4" HARD DRAWN COPPER			TRUNK - MINT GREEN JACKET
—○—T2—○—	1/4" FR POLYETHYLENE			TWISTED SHIELDED 2 CONDUCTOR
—○—T3—○—	CLEAR BLUE POLYETHYLENE			MS/TP COMMUNICATIONS - PURPLE JACKET
—○—T4—○—	1/4"FR POLYETHYLENE IN EMT			TWISTED SHIELDED 2 CONDUCTOR
—○—T5—○—	3/8" HARD DRAWN COPPER			GENERAL APPLICATION - THHN 600VOLT JACKET
—○—T6—○—	1/2" HARD DRAWN COPPER			
				HARD DRAWN COPPER PROCESS TUBING
				FIRE RETARDANT BLACK POLYETHYLENE TUBING
				CLEAR BLUE POLYETHYLENE TUBING
				FIRE RETARDANT BLACK POLYETHYLENE TUBING
				INSTALLED IN EMT CONDUIT
				HARD DRAWN COPPER PROCESS TUBING - MAIN AIR
				HARD DRAWN COPPER PROCESS TUBING - MAIN AIR



ELR - END OF LINE
RESISTOR

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Upgrade

ARCHITECT:

ENGINEER:

REV:

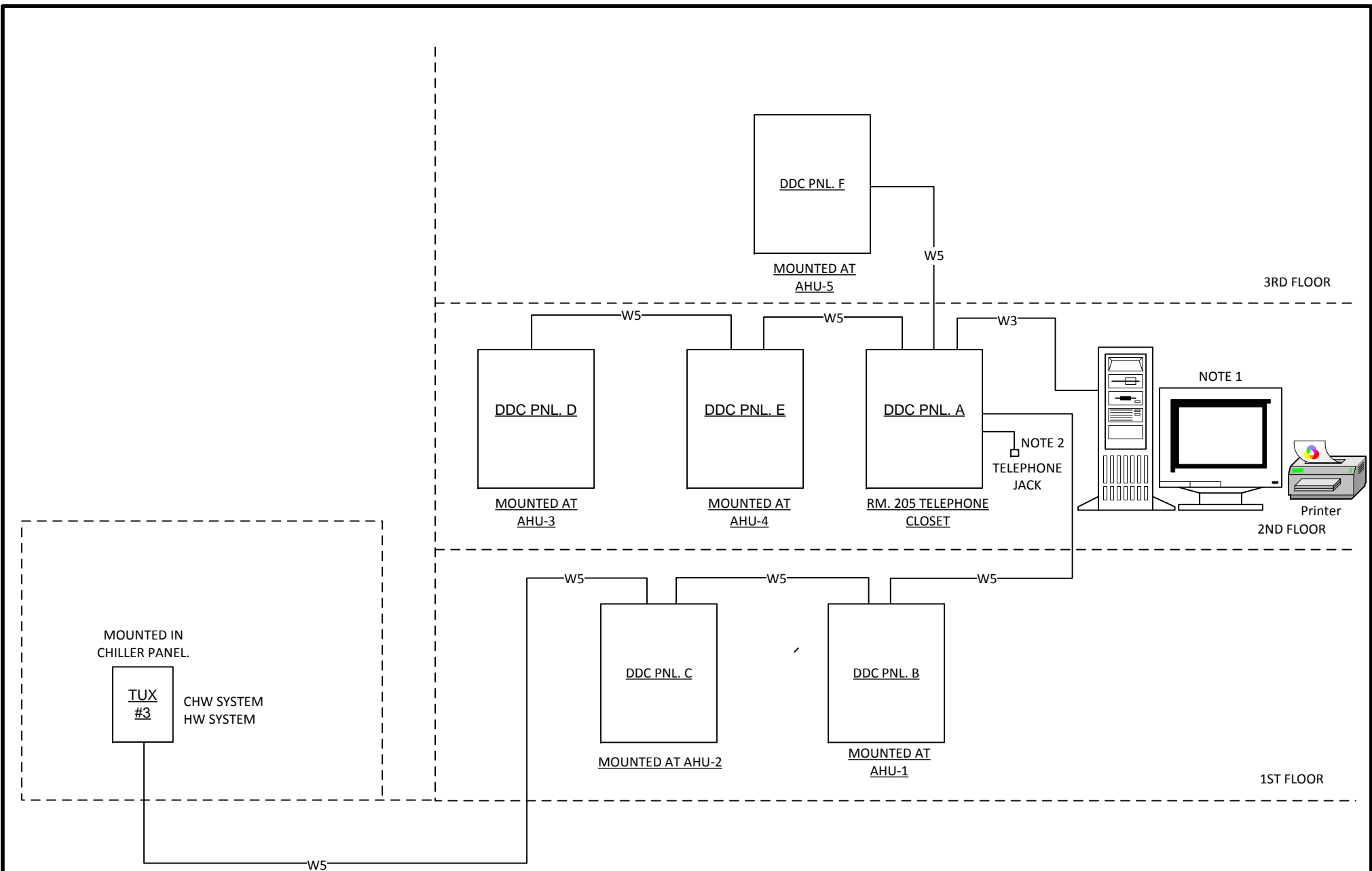
DESCRIPTION:

DATE:

APPROVED:

Network Communications

JOB NO: RH100117 | DWG NO: 6



- NOTES:
- 1.LOCATION OF WORKSTATION TO BE DETERMINED.
 2. OWNER TO FURNISH TELEPHONE LINE.

OpenTech

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Houston, Tx 77040

Tel: (713) 983-6500
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PROJECT:

GRIMES COUNTY
COUTHUSE
RESTORATION

ARCHITECT:

VOLZ & ASSOCIATES

ENGINEER:

JOHNSON CONSULTING

REV.

DESCRIPTION:

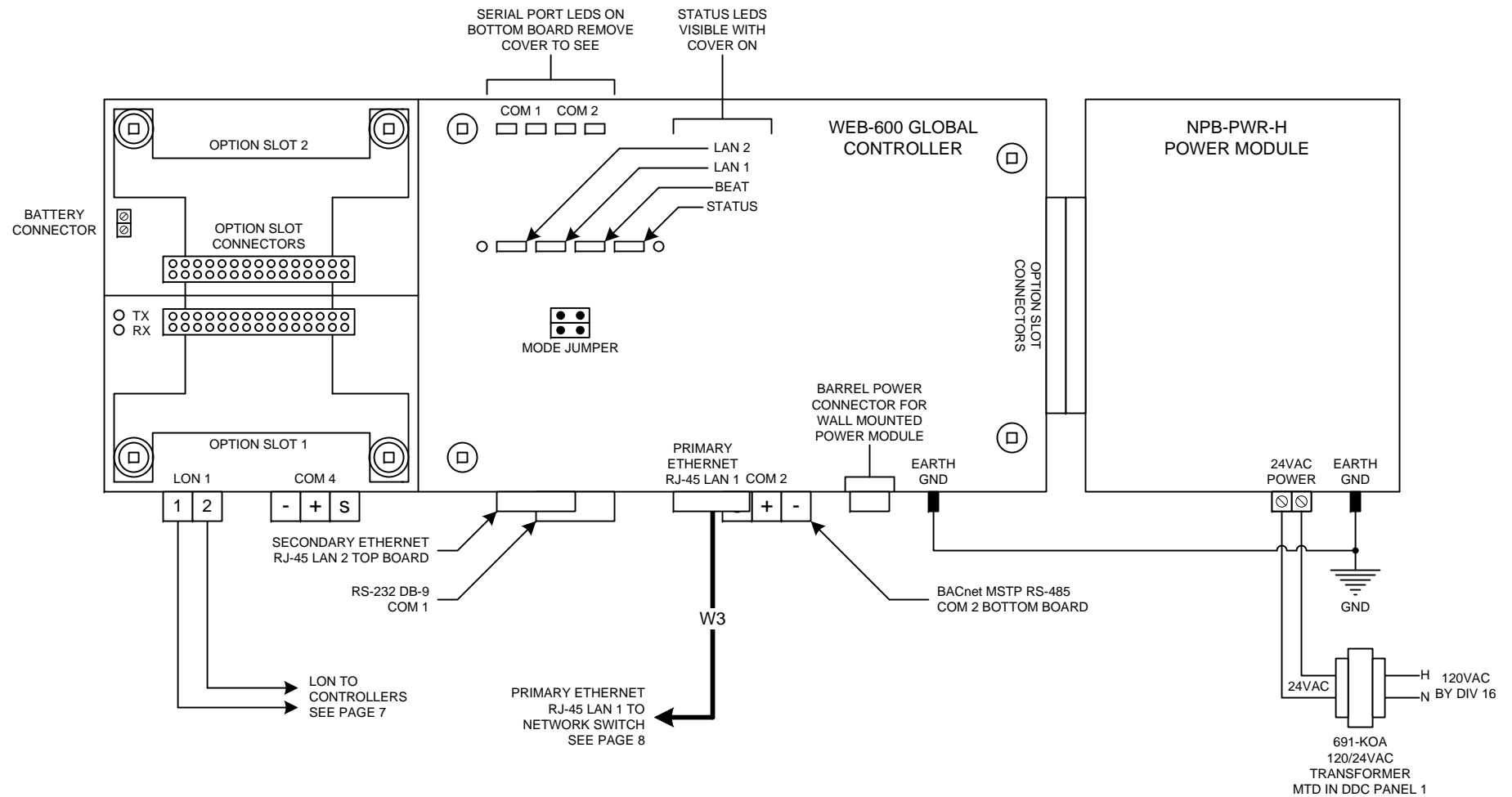
DATE:

APPROVED:

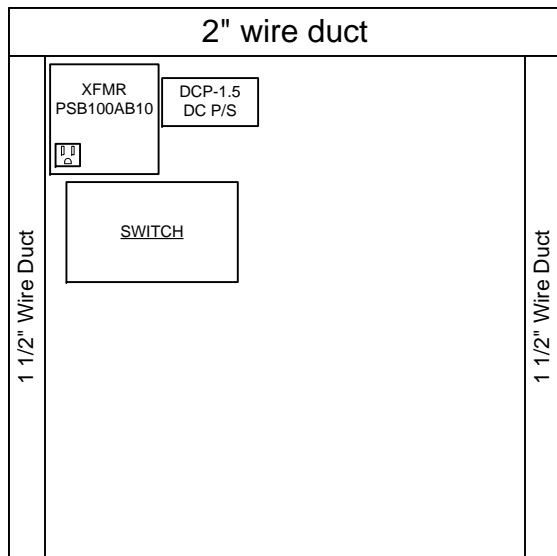
003 - NETWORK DIAGRAM.VSD

JOB NO: USERS\JL

DWG NO: 003

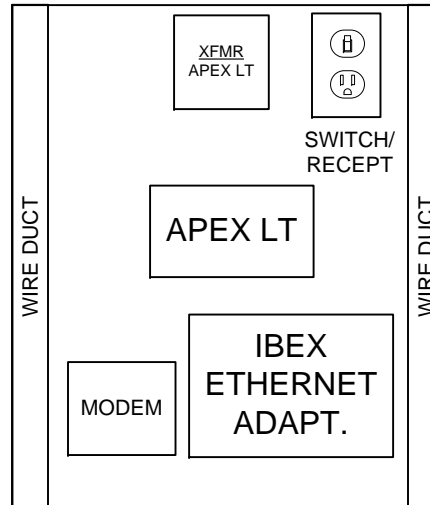


DDC PANEL 1
EXISTING



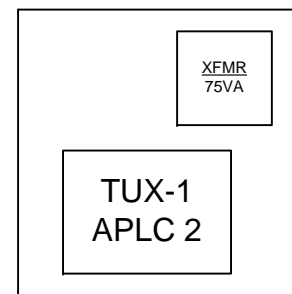
24 x 24 x 7
LOCATED IN
BOY'S COACH'S OFFICE

EXISTING
DDC PANEL A
RM. 205 TELEPHONE CLOSET



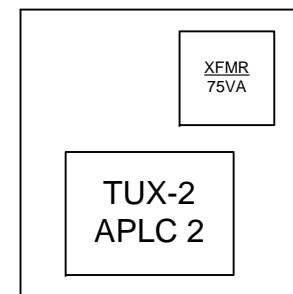
24 x 24 x 7

EXISTING
DDC PANEL B
AHU-1



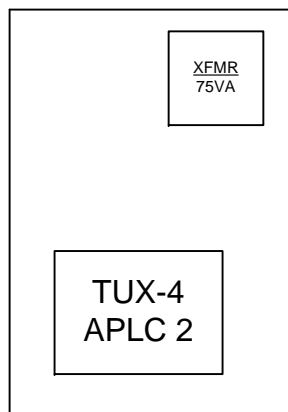
12 x 12 x 4

DDC PANEL C
AHU-2



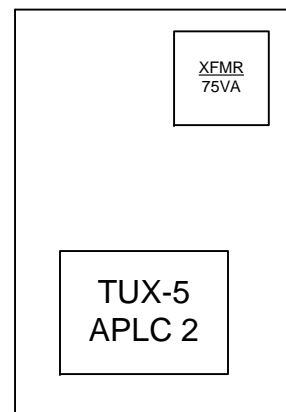
12 x 12 x 4

DDC PANEL D
AHU-3



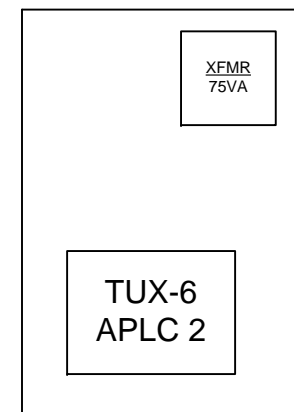
12 x 12 x 4

DDC PANEL E
AHU-4



12 x 12 x 4

DDC PANEL F
AHU-5



12 x 12 x 4

SEQUENCE OF OPERATION

THE CHILLED WATER SYSTEM CONSISTS OF AN AIR COOLED CHILLER AND TWO (2) PUMPS, CHWP-1 & 2. THE CHILLED WATER SYSTEM SHALL START THROUGH THE BCAS WHEN AN AIR HANDLING UNIT IS OPERATING AND THE OUTSIDE AIR TEMPERATURE IS ABOVE 45°F (ADJUSTABLE AT THE BCAS OPERATOR STATION). THE CHILLER SHALL START, ONLY WHEN A PUMP IS OPERATING AND MAINTAIN ITS SUPPLY WATER SETPOINT THROUGH ITS INTERNAL CONTROLS. THE CHILLER'S SUPPLY WATER SETPOINT IS ADJUSTABLE FROM THE BCAS OPERATOR STATION. ON SYSTEM SHUT-DOWN, THE PUMP SHALL RUN 5 MINUTES AFTER THE CHILLER STOP COMMAND TO ALLOW FOR CHILLER PUMP-DOWN.

THE PUMPS SHALL OPERATE IN A LEAD – STANDBY MODE. IF THE LEAD PUMP FAILS, THE STANDBY PUMP WILL START. THE LEAD PUMP WILL ALTERNATE WEEKLY THROUGH THE BCAS.

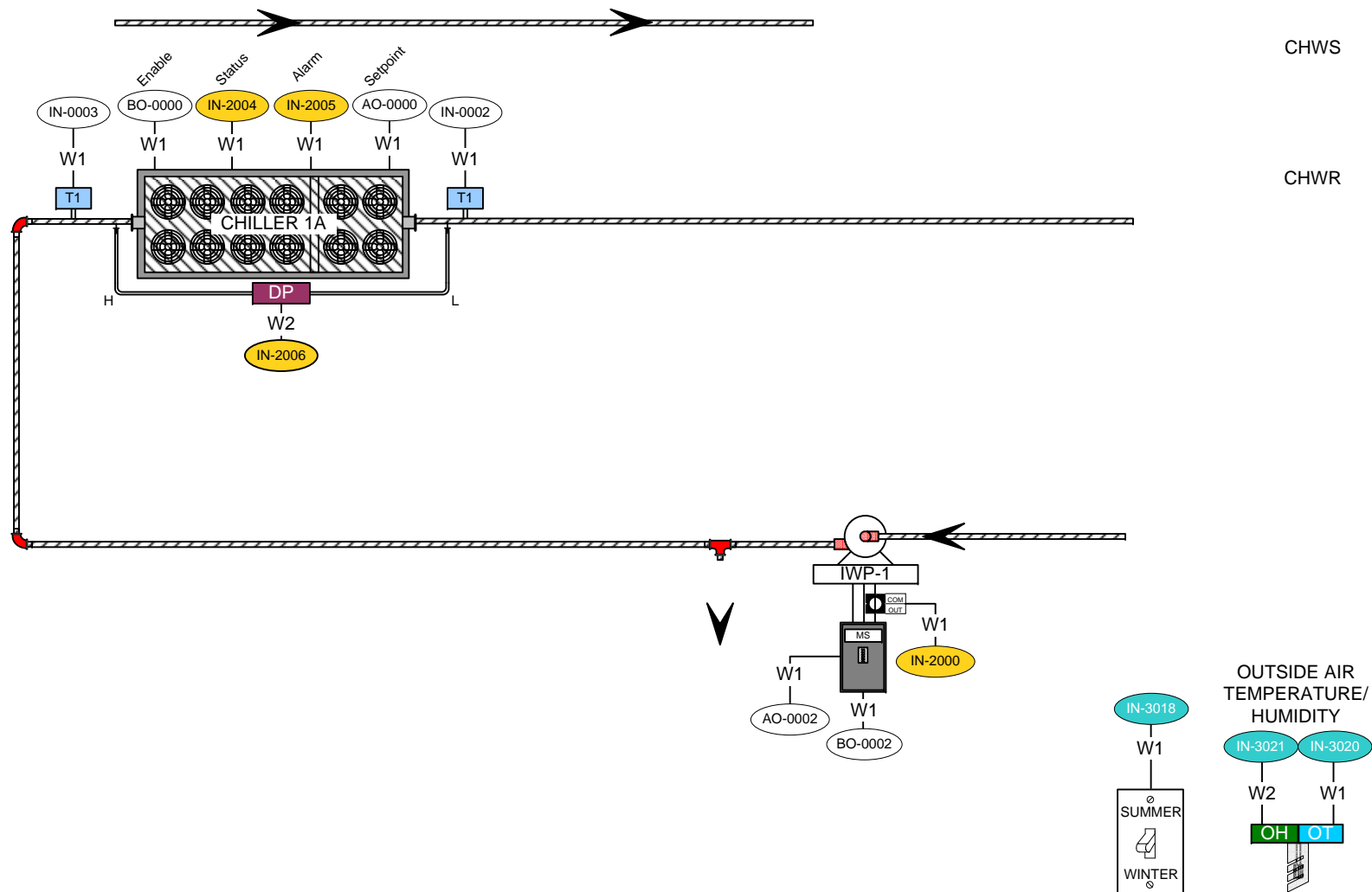
WHEN THE OUTSIDE AIR TEMPERATURE DROPS TO 35°F, THE LEAD PUMP SHALL START BUT THE CHILLER SHALL BE DISABLED.

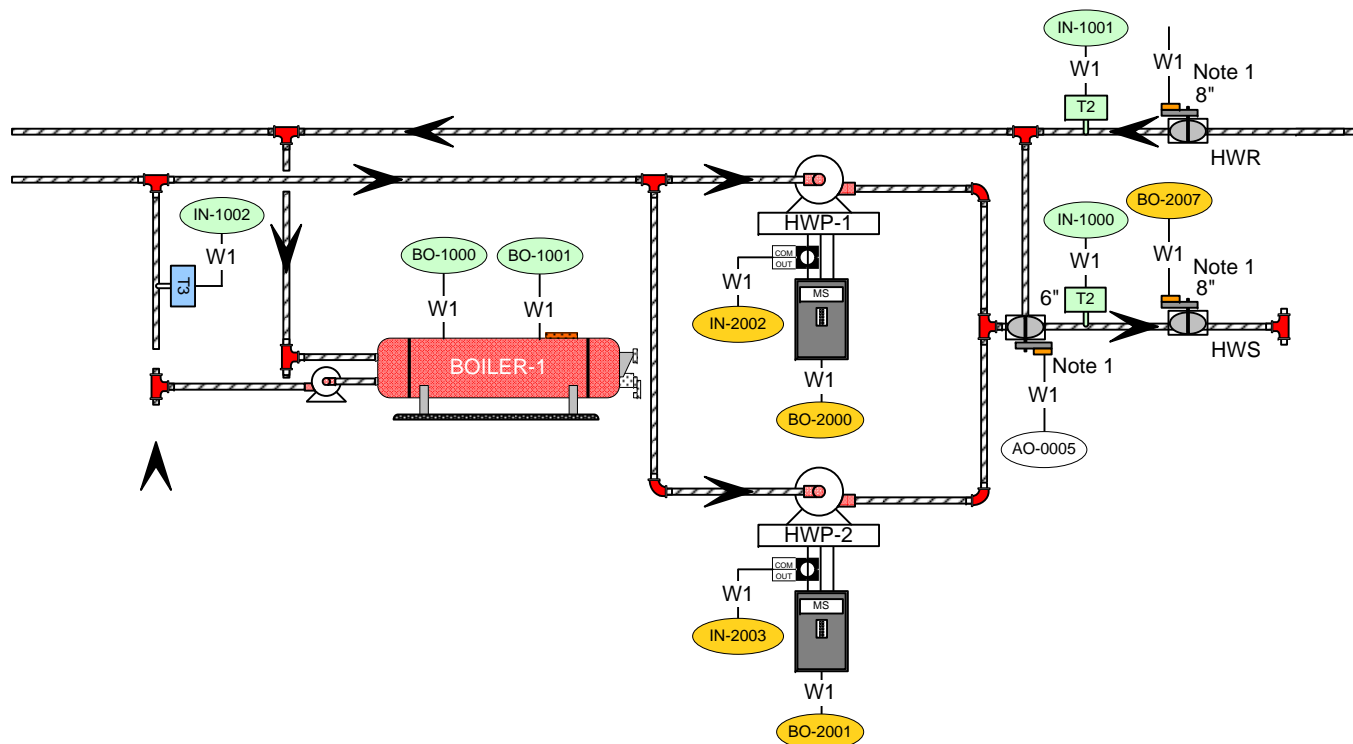
EACH CHILLER SAFETY SHUTDOWN ALARM SHALL BE MONITORED, THROUGH A COMMON ALARM OUTPUT, AT THE BCAS.

SEQUENCE OF OPERATION
HEATING WATER SYSTEM

THE SYSTEM CONSISTS OF ONE (1) BOILER AND TWO (2) PUMPS. THE BCAS SHALL ISSUE A START COMMAND TO THE HOT WATER PUMPS AND THE BOILER CONTROL SYSTEM WHEN ANY SPACE TEMPERATURE SENSOR DEMANDS HEATING. THE PUMPS SHALL OPERATE IN A LEAD/LAG MODE. THE LEAD PUMP SHALL ALTERNATE WEEKLY AND THE LAG PUMP SHALL START IF THE LEAD FAILS. THE BOILER CONTROL SYSTEM SHALL MAINTAIN SUPPLY WATER SETPOINT (ADJUSTABLE AT THE BOILER PANEL). THE PUMP SHALL RUN FOR A MINIMUM FIVE (5) MINUTES AFTER THE BOILER SYSTEM SHUT-DOWN.

REV:	DESCRIPTION:	DATE:	APPROVED:





NOTE 1: Existing Valve to be controlled with new system.

SEQUENCE OF OPERATION

THE AIR HANDLING UNIT SUPPLY FAN SHALL BE CONTROLLED BY THE H-O-A SWITCH ON THE MOTOR STARTER. WHEN THE H-O-A SWITCH IS IN THE AUTO POSITION, THE FAN SHALL BE STARTED AND STOPPED THROUGH THE BCAS. WHEN THE SWITCH IS IN THE HAND POSITION, THE FAN SHALL START MANUALLY. THE SUPPLY FAN RUN STATUS SHALL BE INDICATED AT THE BCAS OPERATOR STATION BY A CURRENT SENSING RELAY.

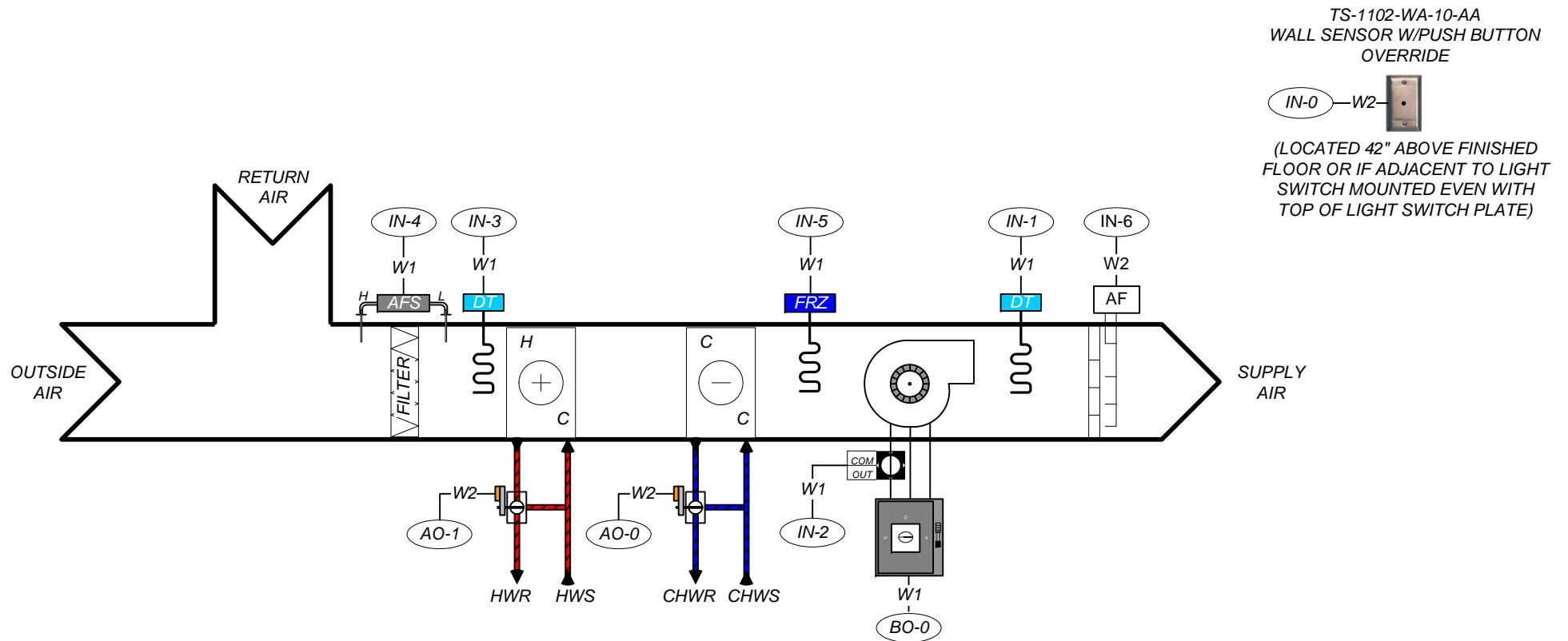
A SPACE TEMPERATURE SENSOR THROUGH A DDC CONTROLLER SHALL MODULATE THE CHILLED WATER CONTROL VALVE IN SEQUENCE WITH THE HOT WATER CONTROL VALVE TO MAINTAIN DESIRED COOLING AND HEATING SETPOINTS. SETPOINTS ARE ADJUSTABLE FROM THE BCAS OPERATOR STATION. WHEN ONE VALVE IS OPEN THE OTHER IS CLOSED. A FREEZESTAT ON THE INTAKE OF THE HEATING COIL, WHEN TEMPERATURE DROPS BELOW 35°F, SHALL STOP THE UNIT FAN, AND OPEN THE VALVES. DURING NORMAL OPERATION, THE VALVES SHALL CLOSE TO THE COIL WHEN THE UNIT IS OFF.

SMOKE DETECTORS IN THE SUPPLY AND RETURN AIR DUCTS SHALL SEND A SIGNAL TO THE FIRE ALARM SYSTEM TO SHUT-DOWN THE AIR UNIT DURING AN ALARM CONDITION.

MIXED AND SUPPLY AIR TEMPERATURES AND SUPPLY AIR CFM ARE DISPLAYED AT THE OPERATOR STATION.

DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTER SHALL INDICATE A DIRTY FILTER CONDITION AT THE BCAS OPERATOR STATION.

I/O IDENTIFIER	DESCRIPTION	I/O IDENTIFIER	DESCRIPTION	I/O IDENTIFIER	DESCRIPTION	
IN-0	SPACE TEMPERATURE	BO-0	FAN START/STOP	AO-0	CHW VALVE SIGNAL(0-10VDC)	
IN-1	SUPPLY AIR TEMPERATURE			AO-1	HW VALVE SIGNAL(0-10VDC)	
IN-2	FCU STATUS - CURRENT SWITCH			AO-2	SPARE	
IN-3	MIXED AIR TEMPERATURE					
IN-4	FILTER STATUS					
IN-5	FREEZE STAT					
IN-6	AIR FLOW SATION					
IN-7	SPARE					



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REV:	DESCRIPTION:	DATE:	APPROVED:

**Air Handling Unit
Control Diagram**

JOB NO: RH100117 | DWG NO: 16

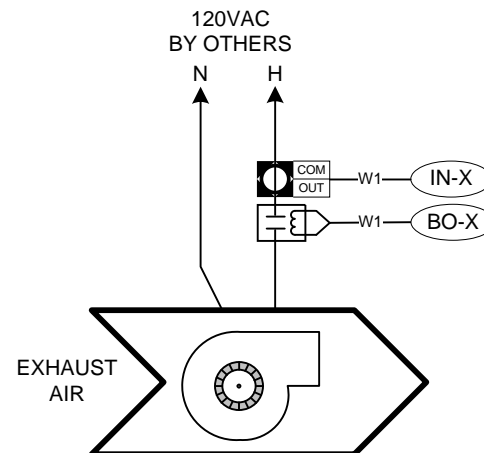
I/O IDENTIFIER	DESCRIPTION	I/O IDENTIFIER	DESCRIPTION	I/O IDENTIFIER	DESCRIPTION
IN-0	EF-X STATUS	BO-0	EF-X START/STOP		

Exhaust Fan Schedule							
TAG	TEMP SENSOR	STATUS	START/STOP	DI#	PANEL	LOCATION	INTERLOCK
EF-1	N/A	IN-0	BO-0	xxxxx	xxxxx	Boiler Room	----
EF-2	N/A	IN-1	BO-1	xxxxx	xxxxx	Boiler Room	----

Exhaust Fan Sequence of Operations

General Exhaust Fans

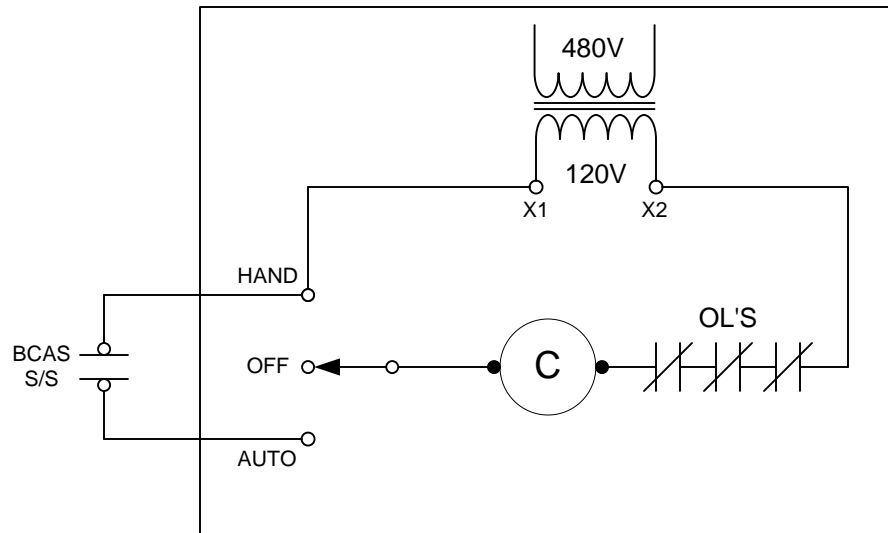
Provide start/stop and status of each fan. Status shall be by current switch.



NOTE:

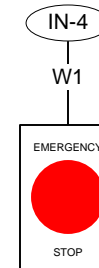
1. Field verify quantity of Exhaust Fans.

PUMP STARTER WIRING



DETAIL A

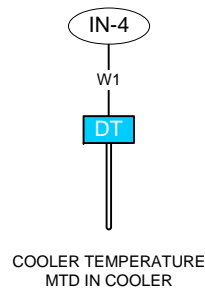
EMERGENCY AHU SHUTDOWN



REMOVED FROM COACHES OFFICE
AND MOUNTED IN ADMINISTRATION

DI# 208047

KITCHEN COOLER TEMPERATURE

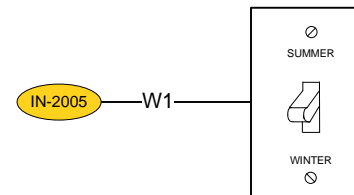


MOUNT TEMPERATURE SENSORS AWAY FROM ENTRY DOOR

WIRE COOLER TEMPERATURE TO VLC-208042.

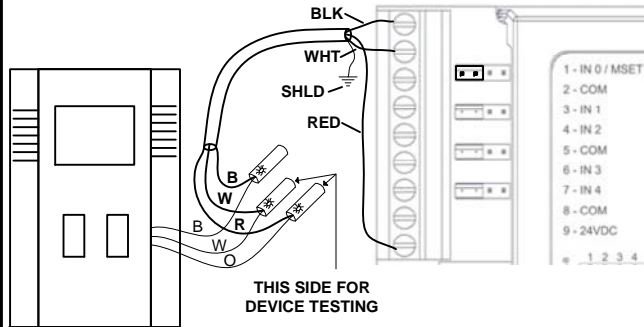
DETAIL C

SUMMER / WINTER SWITCH

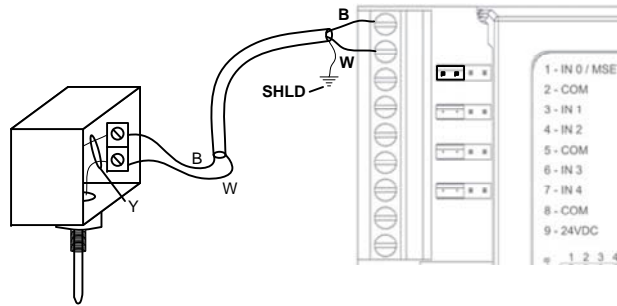


MOUNTED IN PANEL 2

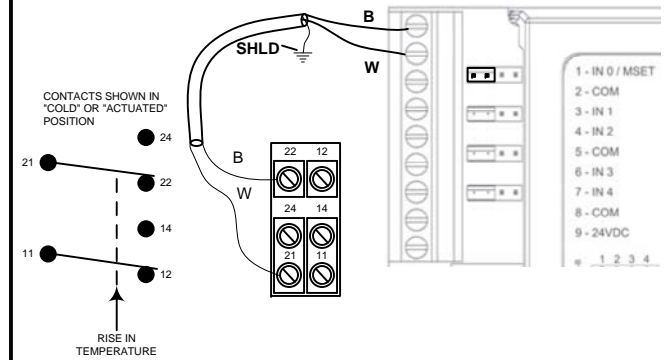
Device Name: MS-2000-BT



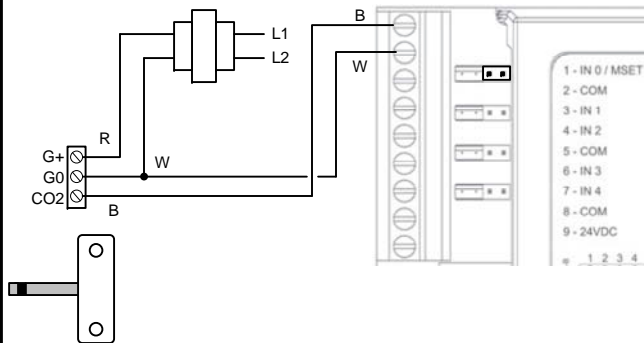
Device Name: TS-2104-MH-10-AA



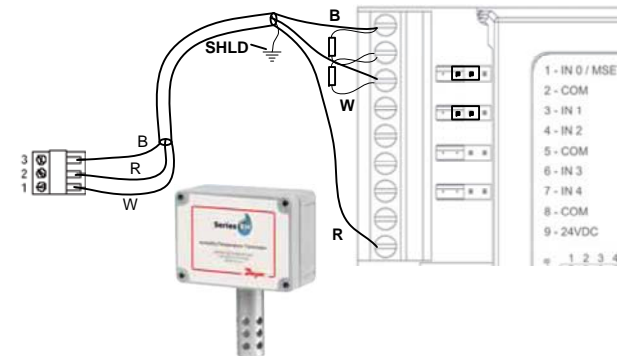
Device Name: CTE-3017



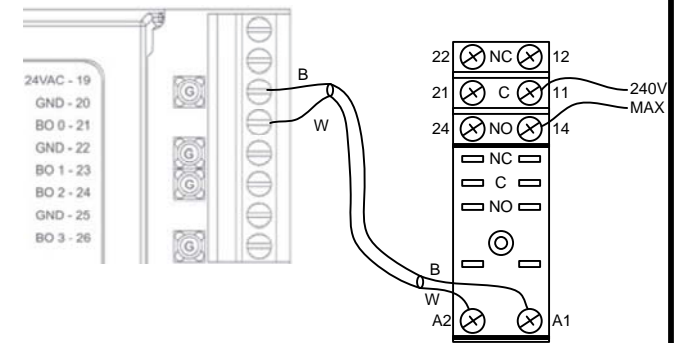
Device Name: C7632B1002



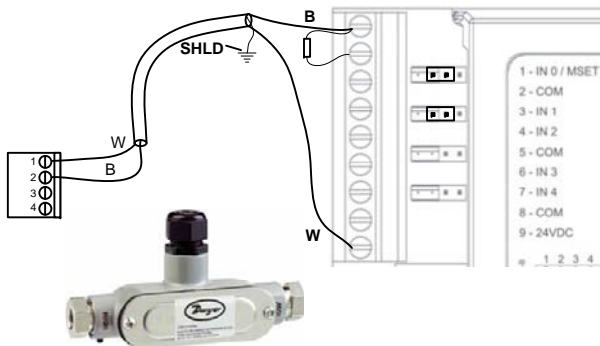
Device Name: RHT-O



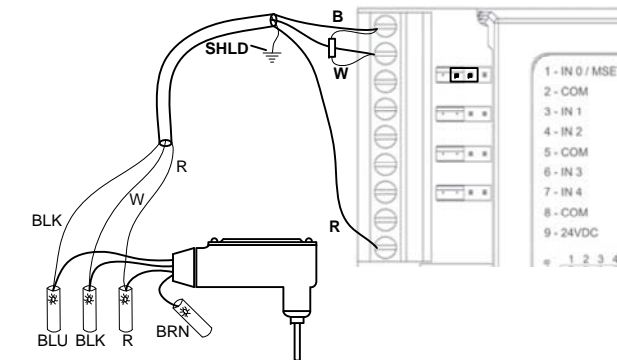
Device Name: XT484R24



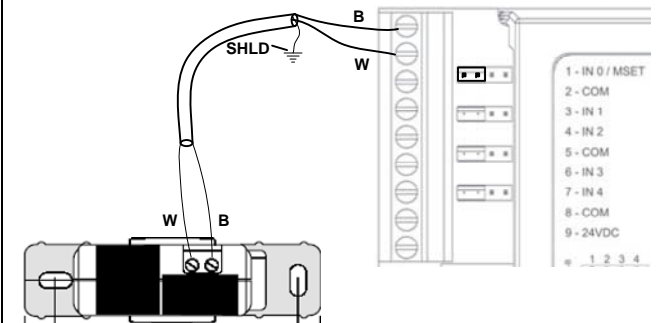
Device Name: 629



Device Name: F-1110



Device Name: H600/800



SEQUENCE OF OPERATION

THE AIR HANDLING UNIT SUPPLY FAN SHALL BE CONTROLLED BY THE H-O-A SWITCH ON THE MOTOR STARTER. WHEN THE H-O-A SWITCH IS IN THE AUTO POSITION, THE FAN SHALL BE STARTED AND STOPPED THROUGH THE BCAS. WHEN THE SWITCH IS IN THE HAND POSITION, THE FAN SHALL START MANUALLY. THE SUPPLY FAN RUN STATUS SHALL BE INDICATED AT THE BCAS OPERATOR STATION BY A CURRENT SENSING RELAY.

OUTSIDE AIR DAMPER (NORMALLY CLOSED) SHALL OPEN 35% AND THE RETURN AIR DAMPER (NORMALLY OPEN) SHALL REMAIN 100% OPEN WHEN THE FAN STARTS. A WALL MOUNTED CARBON DIOXIDE SENSOR TRANSMITTER THROUGH THE DDC CONTROLLER (TUX) SERVING AHU-4 SHALL MONITOR THE CO2 LEVEL IN THE COURTROOM. WHEN THE CO2 LEVEL EXCEEDS 1000 PPM THE OUTSIDE AIR DAMPER SHALL OPEN 100% AND THE RETURN AIR DAMPER SHALL MOVE TO THE 70% OPEN POSITION. THE CO2 LEVEL SETPOINT IS ADJUSTABLE FROM THE OPERATOR STATION.

A SPACE TEMPERATURE SENSOR THROUGH A DDC CONTROLLER (TUX) SHALL MODULATE THE CHILLED WATER CONTROL VALVE IN SEQUENCE WITH THE HOT WATER CONTROL VALVE TO MAINTAIN DESIRED COOLING AND HEATING SETPOINTS. SETPOINTS ARE ADJUSTABLE FROM THE BCAS OPERATOR STATION. WHEN ONE VALVE IS OPEN THE OTHER IS CLOSED. A FREEZESTAT ON THE INTAKE OF THE HEATING COIL, WHEN TEMPERATURE DROPS BELOW 35°F, SHALL STOP THE UNIT FAN, AND OPEN THE VALVES. DURING NORMAL OPERATION, THE VALVES SHALL CLOSE TO THE COIL WHEN THE UNIT IS OFF.

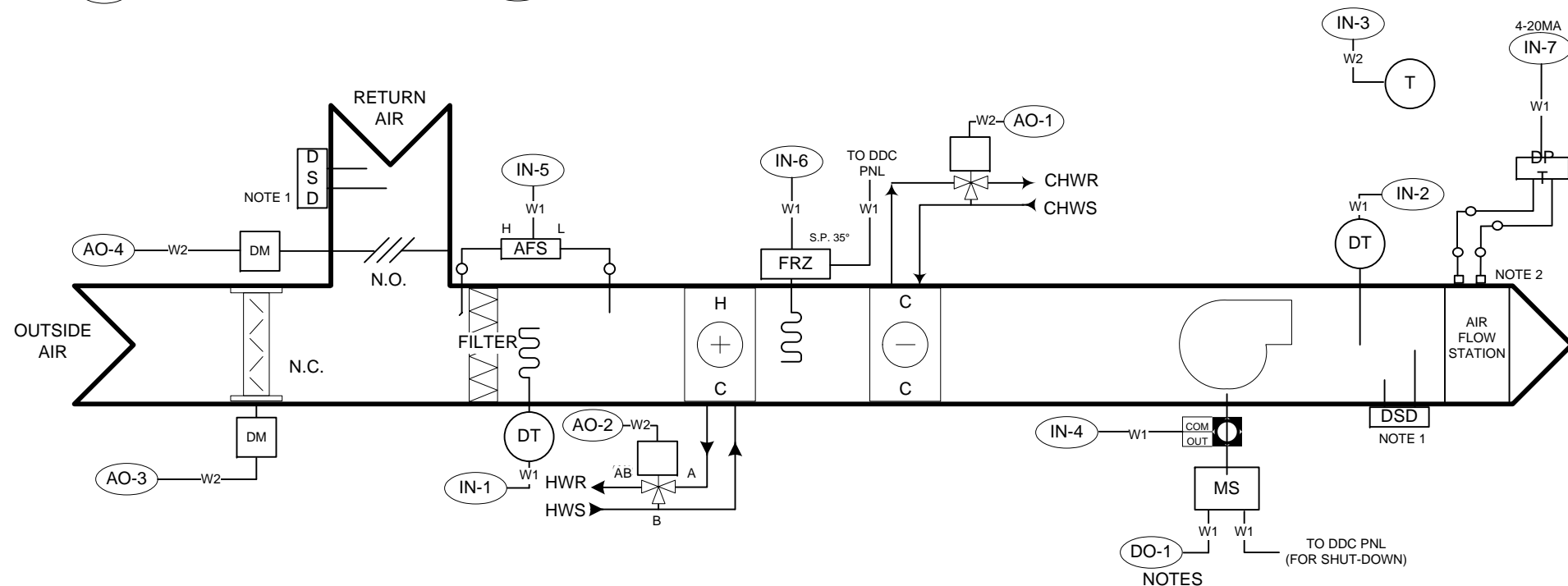
SMOKE DETECTORS IN THE SUPPLY AND RETURN AIR DUCTS SHALL SEND A SIGNAL TO THE FIRE ALARM SYSTEM TO SHUT-DOWN THE AIR UNIT DURING AN ALARM CONDITION.

MIXED AND SUPPLY AIR TEMPERATURES AND SUPPLY AIR CFM ARE DISPLAYED AT THE OPERATOR STATION.

DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTER SHALL INDICATE A DIRTY FILTER CONDITION AT THE BCAS OPERATOR STATION.

I/O IDENTIFIER DESCRIPTION

(IN-1)	MIXED AIR TEMPERATURE	(IN-6)	FREEZE STAT	(AO-3)	OUTSIDE AIR DAMPER (2-10 VDC)
(IN-2)	SUPPLY AIR TEMPERATURE	(IN-7)	AIR FLOW STATION DIFF PRESSURE	(AO-4)	RETURN AIR DAMPER (2-10 VDC)
(IN-3)	SPACE TEMPERATURE	(DO-1)	AHU START / STOP		
(IN-4)	AHU FAN RUN STATUS	(AO-1)	CHW CONTROL VALVE (2 - 10 VDC)		
(IN-5)	FILTER STATUS	(AO-2)	HW CONTROL VALVE (2 - 10 VDC)		



TUX	UNITs	TUX LOCATION
4	AHU-3	DDC PNL D,

NOTES:

1. DUCT SMOKE DETECTOR FURNISHED, MOUNTED AND WIRED FOR UNIT SHUT-DOWN BY DIV. 16.
2. DPT MOUNTED NEAR AIRFLOW STATION.

SEQUENCE OF OPERATION

THE AIR HANDLING UNIT SUPPLY FAN SHALL BE CONTROLLED BY THE H-O-A SWITCH ON THE MOTOR STARTER. WHEN THE H-O-A SWITCH IS IN THE AUTO POSITION, THE FAN SHALL BE STARTED AND STOPPED THROUGH THE BCAS. WHEN THE SWITCH IS IN THE HAND POSITION, THE FAN SHALL START MANUALLY. THE SUPPLY FAN RUN STATUS SHALL BE INDICATED AT THE BCAS OPERATOR STATION BY A CURRENT SENSING RELAY.

OUTSIDE AIR DAMPER (NORMALLY CLOSED) SHALL OPEN 35% AND THE RETURN AIR DAMPER (NORMALLY OPEN) SHALL REMAIN 100% OPEN WHEN THE FAN STARTS. A WALL MOUNTED CARBON DIOXIDE SENSOR TRANSMITTER THROUGH A DDC CONTROLLER (TUX) SHALL MONITOR THE CO2 LEVEL IN THE COURTROOM. WHEN THE CO2 LEVEL EXCEEDS 1000 PPM THE OUTSIDE AIR DAMPER SHALL OPEN 100% AND THE RETURN AIR DAMPER SHALL MOVE TO THE 70% OPEN POSITION. THE CO2 LEVEL SETPOINT IS ADJUSTABLE FROM THE OPERATOR STATION.

A SPACE TEMPERATURE SENSOR THROUGH A DDC CONTROLLER (TUX) SHALL MODULATE THE CHILLED WATER CONTROL VALVE IN SEQUENCE WITH THE HOT WATER CONTROL VALVE TO MAINTAIN DESIRED COOLING AND HEATING SETPOINTS. SETPOINTS ARE ADJUSTABLE FROM THE BCAS OPERATOR STATION. WHEN ONE VALVE IS OPEN THE OTHER IS CLOSED. A FREEZESTAT ON THE INTAKE OF THE HEATING COIL, WHEN TEMPERATURE DROPS BELOW 35°F, SHALL STOP THE UNIT FAN, AND OPEN THE VALVES. DURING NORMAL OPERATION, THE VALVES SHALL CLOSE TO THE COIL WHEN THE UNIT IS OFF.

SMOKE DETECTORS IN THE SUPPLY AND RETURN AIR DUCTS SHALL SEND A SIGNAL TO THE FIRE ALARM SYSTEM TO SHUT-DOWN THE AIR UNIT DURING AN ALARM CONDITION.

MIXED AND SUPPLY AIR TEMPERATURES AND SUPPLY AIR CFM ARE DISPLAYED AT THE OPERATOR STATION.

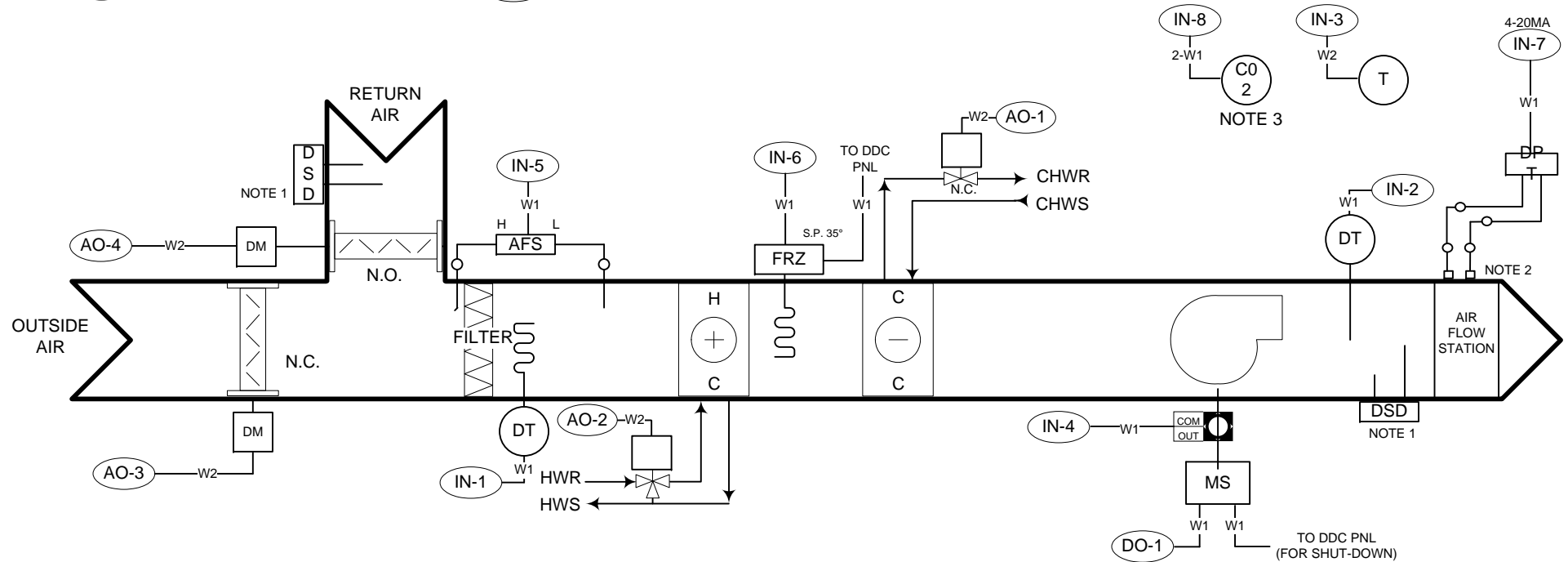
DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTER SHALL INDICATE A DIRTY FILTER CONDITION AT THE BCAS OPERATOR STATION.

I/O IDENTIFIER DESCRIPTION

(IN-1) MIXED AIR TEMPERATURE
 (IN-2) SUPPLY AIR TEMPERATURE
 (IN-3) SPACE TEMPERATURE
 (IN-4) AHU FAN RUN STATUS
 (IN-5) FILTER STATUS

(IN-6) FREEZE STAT
 (IN-7) AIR FLOW STATION DIFF PRESSURE
 (IN-8) SPACE CARBON DIOXIDE LEVEL (PPM)
 (DO-1) AHU START / STOP
 (AO-1) CHW CONTROL VALVE (2 - 10 VDC)

(AO-2) HW CONTROL VALVE (2 - 10 VDC)
 (AO-3) OUTSIDE AIR DAMPER (2-10 VDC)
 (AO-4) RETURN AIR DAMPER (2-10 VDC)

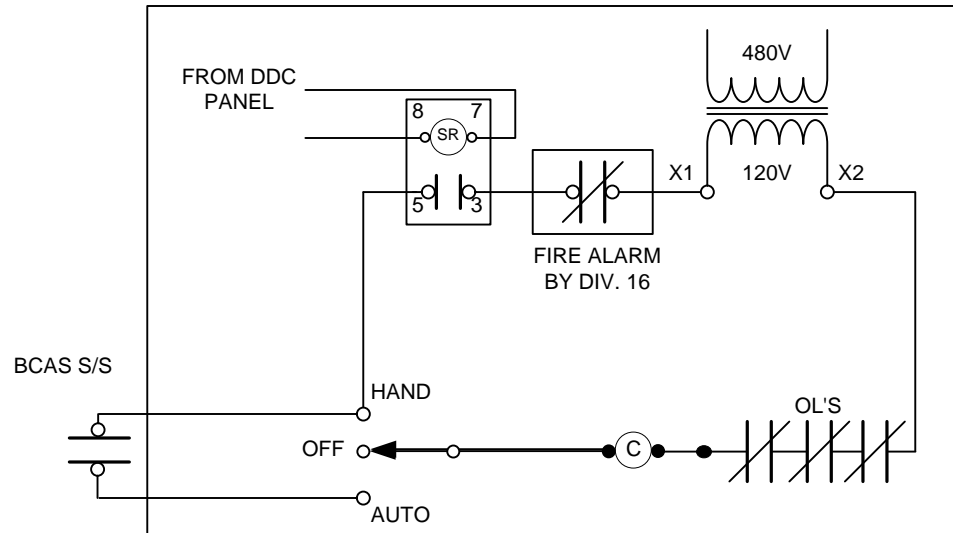


TUX	UNITs	TUX LOCATION
5	AHU-4	DDC PNL E,

NOTES:

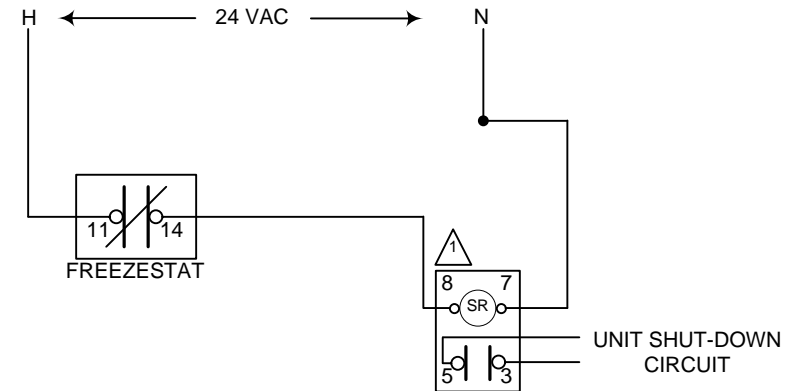
1. DUCT SMOKE DETECTOR FURNISHED, MOUNTED AND WIRED FOR UNIT SHUT-DOWN BY DIV. 16.
2. DPT MOUNTED NEAR AIRFLOW STATION.
3. WALL MOUNTED NEAR CEILING IN COURTROOM 200. SEE PLANS SHEET M-4 FOR EXACT LOCATION.

TYPICAL AHU STARTER WIRING



DETAIL A

TYPICAL AHU SHUT-DOWN RELAY

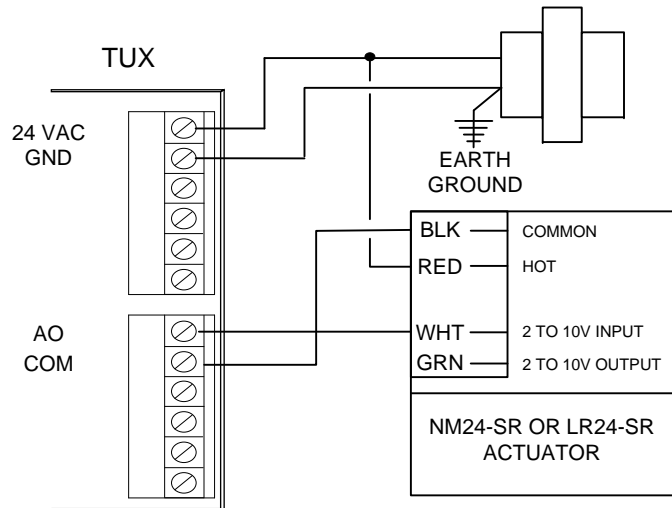


DETAIL B



MOUNTED NEAR FAN STARTER

MODULATING DAMPER AND VALVE ACTUATOR WIRING



DETAIL C

DETAIL D

OpenTech
CONTROL & SECURITY SOLUTIONS

17401 Village Green Drive
Houston, TX 77040

Tel: (713) 983-6500
Fax: (713) 983-6900

PROJECT:

Grimes County Courthouse
Upgrade

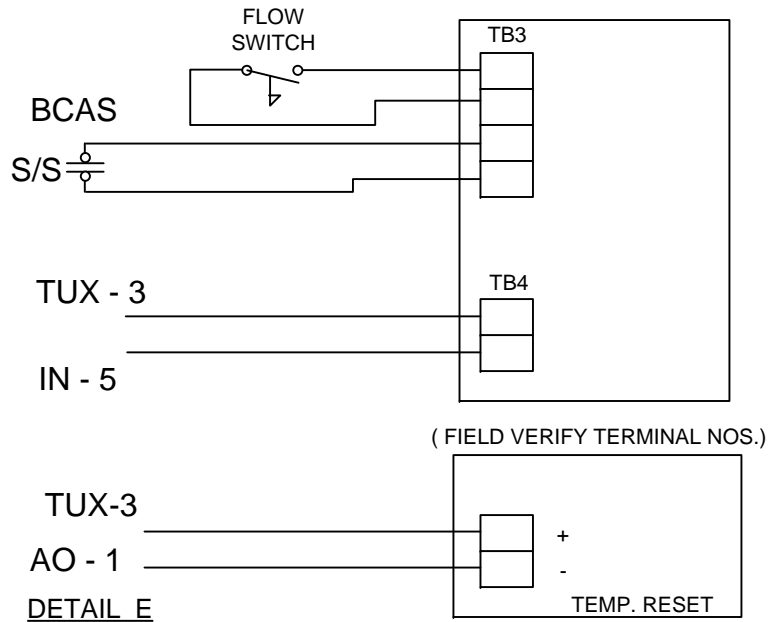
ARCHITECT:

ENGINEER:

REV:	DESCRIPTION:	DATE:	APPROVED:

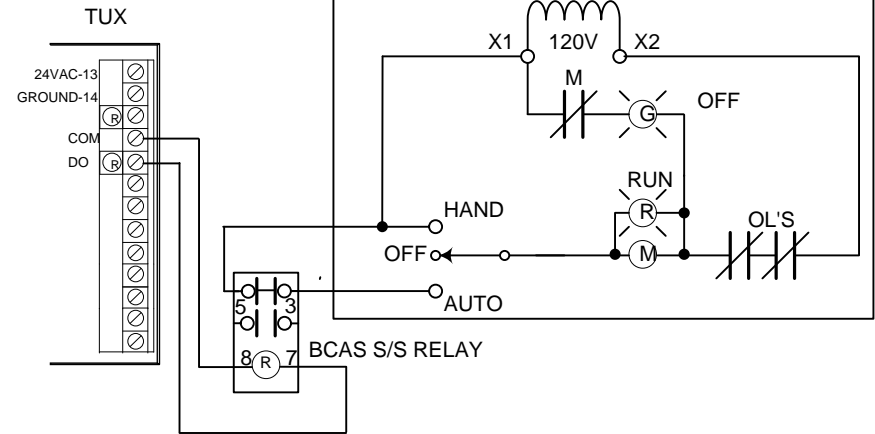
JOB NO: RH100117 DWG NO: 24

CHILLER WIRING



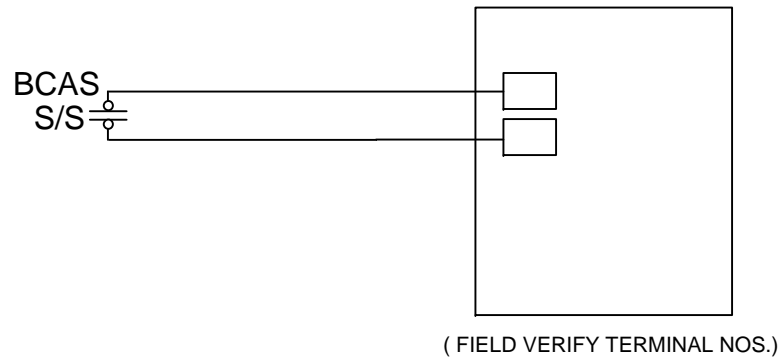
DETAIL E

TYPICAL PUMP STARTER



DETAIL F

BOILER WIRING



DETAIL G

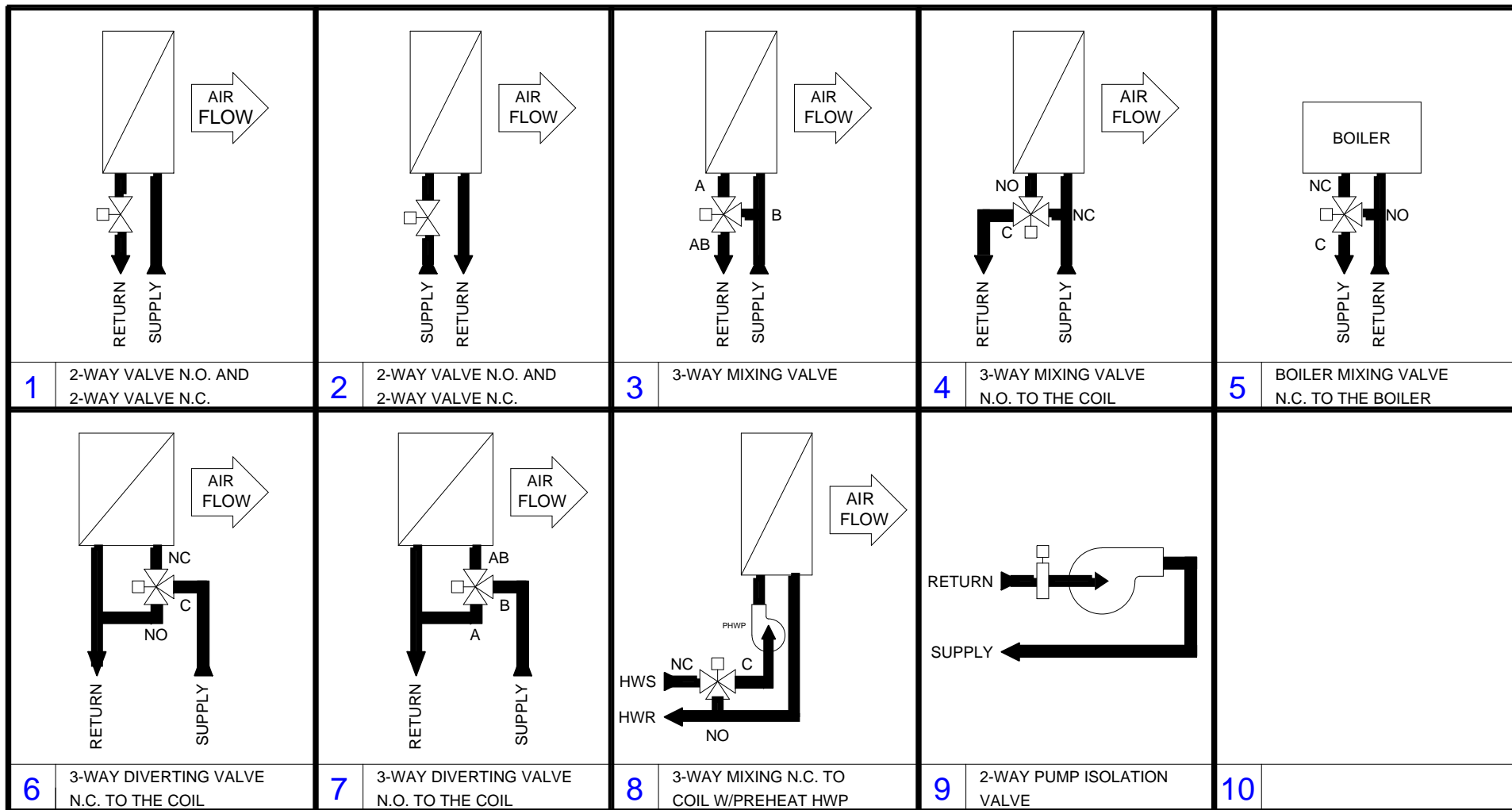
DETAIL H

EXISTING
CONTROL DAMPER SCHEDULE

TAG	QTY.	LOCATION	SERVICE	SIZE	SECTIONS	DAMPER MANF.	MODEL	BLADES	ACTUATOR
DM1	1	AHU-3	OUTSIDE	18 X 16	1	DELTA	COABH	OPPOSED	BELIMO NM24SR
DM2	1	AHU-3	RETURN	34 X 24	1	DELTA	COABH	OPPOSED	BELIMO NM24SR
DM1	1	AHU-4	OUTSIDE	18 X 16	1	DELTA	COABH	OPPOSED	BELIMO NM24SR
DM2	1	AHU-4	RETURN	34 X 24	1	DELTA	COABH	OPPOSED	BELIMO NM24SR

EXISTING
CONTROL VALVE SCHEDULE

UNIT	SERVICE	GPM	Cv	SIZE	DP, PSI	PATTERN	TYPE	MANF.	MODEL	PIPING DET.
AHU-1	CHW	18.6	10	1"	3.46	3 WAY	BALL-SCREW	BELIMO	B323-NM24SR	3
AHU-2	CHW	15	7.4	3/4"	4.12	3 WAY	BALL-SCREW	BELIMO	B318-LR24SR	3
AHU-3	CHW	40	25	1 1/4"	2.56	3 WAY	BALL-SCREW	BELIMO	B331-NM24SR	3
AHU-4	CHW	40	25	1 1/4"	2.56	3 WAY	BALL-SCREW	BELIMO	B331-NM24SR	3
AHU-5	CHW	15	7.4	3/4"	4.12	3 WAY	BALL-SCREW	BELIMO	B318-LR24SR	3
AHU-1	HW	10	4.7	1/2"	4.54	3 WAY	BALL-SCREW	BELIMO	B313-LR24SR	3
AHU-2	HW	8	4.7	1/2"	2.89	3 WAY	BALL-SCREW	BELIMO	B313-LR24SR	3
AHU-3	HW	17	10	1"	2.89	3 WAY	BALL-SCREW	BELIMO	B323-NM24SR	3
AHU-4	HW	17	10	1"	2.89	3 WAY	BALL-SCREW	BELIMO	B323-NM24SR	3
AHU-5	HW	8.5	4.7	1/2"	3.28	3 WAY	BALL-SCREW	BELIMO	B313-LR24SR	3



N.O. - NORMALLY OPEN
N.C. - NORMALLY CLOSED

EXISTING
AIR FLOW MEASURING STATION SCHEDULE

TAG	QTY.	LOCATION	SERVICE	SIZE	MANUF.	MODEL NO.	DESIGN CFM	Vp(IN. W.C.)	REMARKS
AHU-1SA	1	AHU-1	SUPPLY AIR	22" 0	AIR MONITOR	FAN - E	2950	0.080	
AHU-2SA	1	AHU-2	SUPPLY AIR	22" X 14"	AIR MONITOR	FAN - E	2400	0.080	
AHU-3SA	1	AHU-3	SUPPLY AIR	38" X 16"	AIR MONITOR	FAN - E	5000	0.088	
AHU-4SA	1	AHU-4	SUPPLY AIR	38" X 16"	AIR MONITOR	FAN - E	5000	0.088	
AHU-5SA	1	AHU-5	SUPPLY AIR	28" X 12"	AIR MONITOR	FAN - E	2450	0.069	