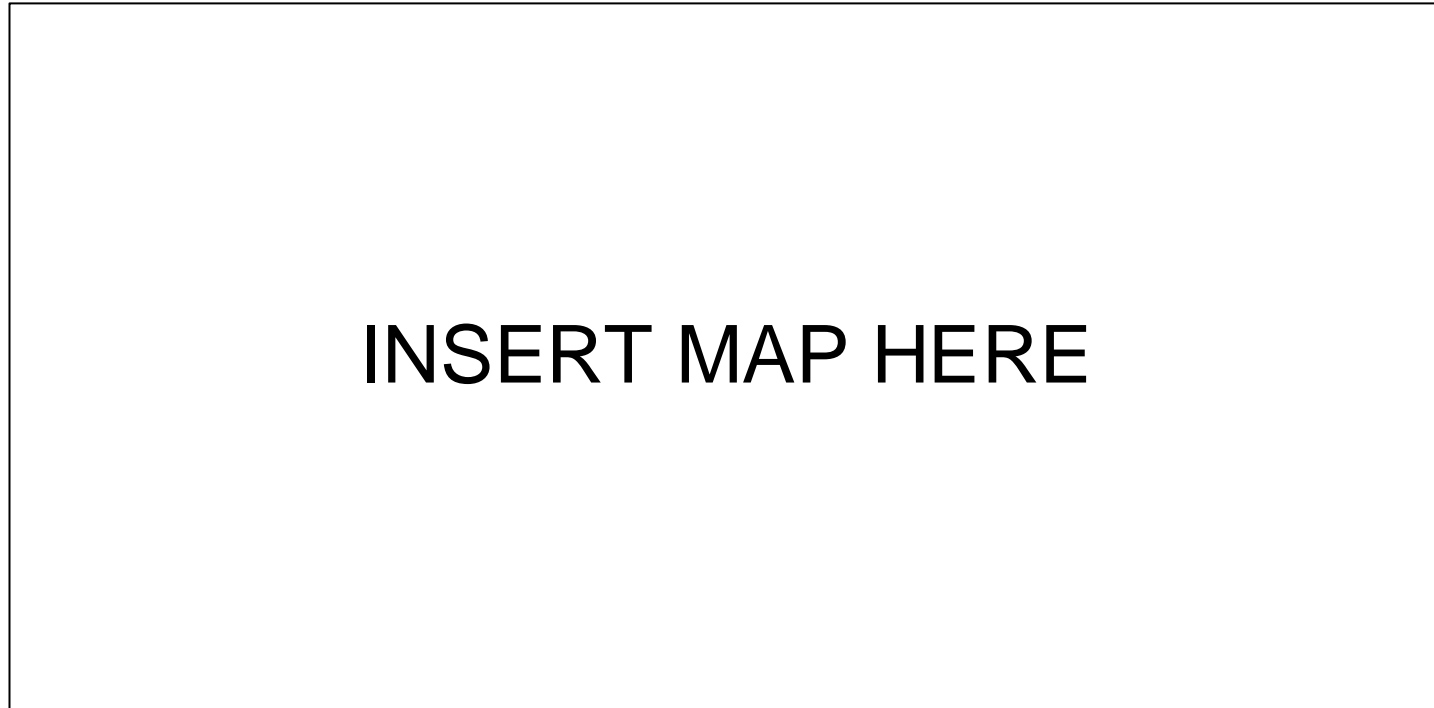


TITLE PAGE

SAMPLE PROJECT

BUILDING AUTOMATION SYSTEM

MAP TO SITE



GENERAL NOTES

1. ALL POWER WIRING 120 VAC AND ABOVE BY ELECTRICAL CONTRACTOR.

TEMPERATURE CONTROL LEGEND:

- | | | | |
|--|-----------------------|--|--------------------------|
| | MOUNTED ON PANEL FACE | | CONTROL VALVE, 2-WAY |
| | MOUNTED INSIDE PANEL | | CONTROL VALVE, 3-WAY |
| | CONTROL TUBE #3 | | PARALLEL BLADED DAMPER |
| | PNEUMATIC TUBING | | OPPOSED BLADED DAMPER |
| | WIRING | | SIGNAL LINE INSIDE PANEL |
| | TERMINAL BLOCK #6 | | |
| | SOLENOID VALVE | | |

ABBREVIATIONS:

- | | |
|-----------------------------------|--|
| AFMS- AIR FLOW MEASURING STATION | OA -OUTSIDE AIR |
| C- COMMON PORT | OL'S- MOTOR STARTER OVERLOADS |
| CCP- CENTRAL CONTROL PANEL | PC- PRESSURE CONTROLLER |
| CR- CONTROL RELAY | PE- PRESSURE TOGGLE SWITCH |
| CS- CURRENT SWITCH | PI- PRESSURE INDICATOR |
| DA-DAMPER ACTUATOR | PL- PILOT LIGHT |
| DPRO- DAMPER OUTPUT | PR- PNEUMATIC RELAY |
| DPRS- DAMPER STATUS | PT- PRESSURE TRANSMITTER |
| DPS- DIFFERENTIAL PRESSURE SWITCH | RC- RECEIVER CONTROLLER |
| DPT- DIFFERENTIAL PRESSURE TRANS | RR- REVERSING RELAY |
| EA- EXHAUST AIR | RT- ROOM THERMOSTAT |
| ES- END SWITCH, POSITION SWITCH | S- SWITCH |
| FS- FLOW SWITCH | SD- SMOKE DETECTOR |
| FSD- FIRE & SMOKE DAMPER | S/W- SUMMER/ WINTER SIGNAL |
| H- HUMIDISTAT | T- THERMOSTAT |
| HC- MOTOR STARTER HOLDING COIL | TS- TEMPERATURE SENSOR |
| HI- HUMIDITY INDICATOR | TC- TIME CLOCK |
| HL- HIGH LIMIT HUMIDISTAT | TDR- TIME DELAY RELAY |
| HS- HIGH SIGNAL SELECTOR | THL- TEMPERATURE HIGH LIMIT THERMOSTAT |
| HT- HUMIDITY TRANSMITTER | TI- TEMPERATURE INDICATOR |
| LCP- LOCAL CONTROL PANEL | TLL- TEMPERATURE LOW LIMIT THERMOSTAT |
| LS- LOW SIGNAL SELECTOR | TR- TRANSDUCER |
| MA- MIXED AIR | TT- TEMPERATURE TRANSMITTER |
| MOD-MOTER OPERATED DAMPER | TX- TRANSFORMER |
| NC- NORMALLY CLOSED | V- VALVE |
| NCP- NETWORK CONTROL PANEL | WB- WET BULB |
| NO- NORMALLY OPEN | WU- WARM-UP SIGNAL |

HVAC SYSTEM LEGEND:

- | | | | |
|--|---|--|-----------------------------------|
| | MOTOR OPERATED DAMPER | | FIRE & SMOKE DAMPER (BY OTHERS) |
| | PREHEAT COIL | | FREEZE STAT |
| | COOLING COIL | | DUCT MOUNTED TEMPERATURE SENSOR |
| | REHEAT COIL | | IMMERSION TYPE TEMPERATURE SENSOR |
| | HEATING COIL | | DUCT MOUNTED SMOKE DETECTOR |
| | OUTSIDE AIR TEMPERATURE & HUMIDITY SENSOR | | STATIC PRESSURE TRANSMITTER |
| | FAN | | PUMP |
| | MANUAL VALVE | | DUCT MOUNTED HUMIDITY SENSOR |
| | DUCT MOUNTED TEMPERATURE & HUMIDITY COMBINED SENSOR | | ROOM TEMPERATURE |
| | WATER FLOW SWITCH | | AIR FLOW MEASURING STATION |
| | AVERAGING TYPE TEMPERATURE SENSOR | | CONTROL RELAY |
| | DUCT STATIC PRESSURE SENSOR | | BUILDING STATIC PRESSURE SENSOR |
| | FILTER | | |

LEGEND

- Low Voltage, 18 AWG, Copper Wire
- Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
- Line Voltage, THHN Field Wiring

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Project: **SAMPLE PROJECT**

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LEGEND

-----	Low Voltage, 18 AWG, Copper Wire
-----	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
_____	Line Voltage, THHN Field Wiring

NO.	DATE	REVISION	BY
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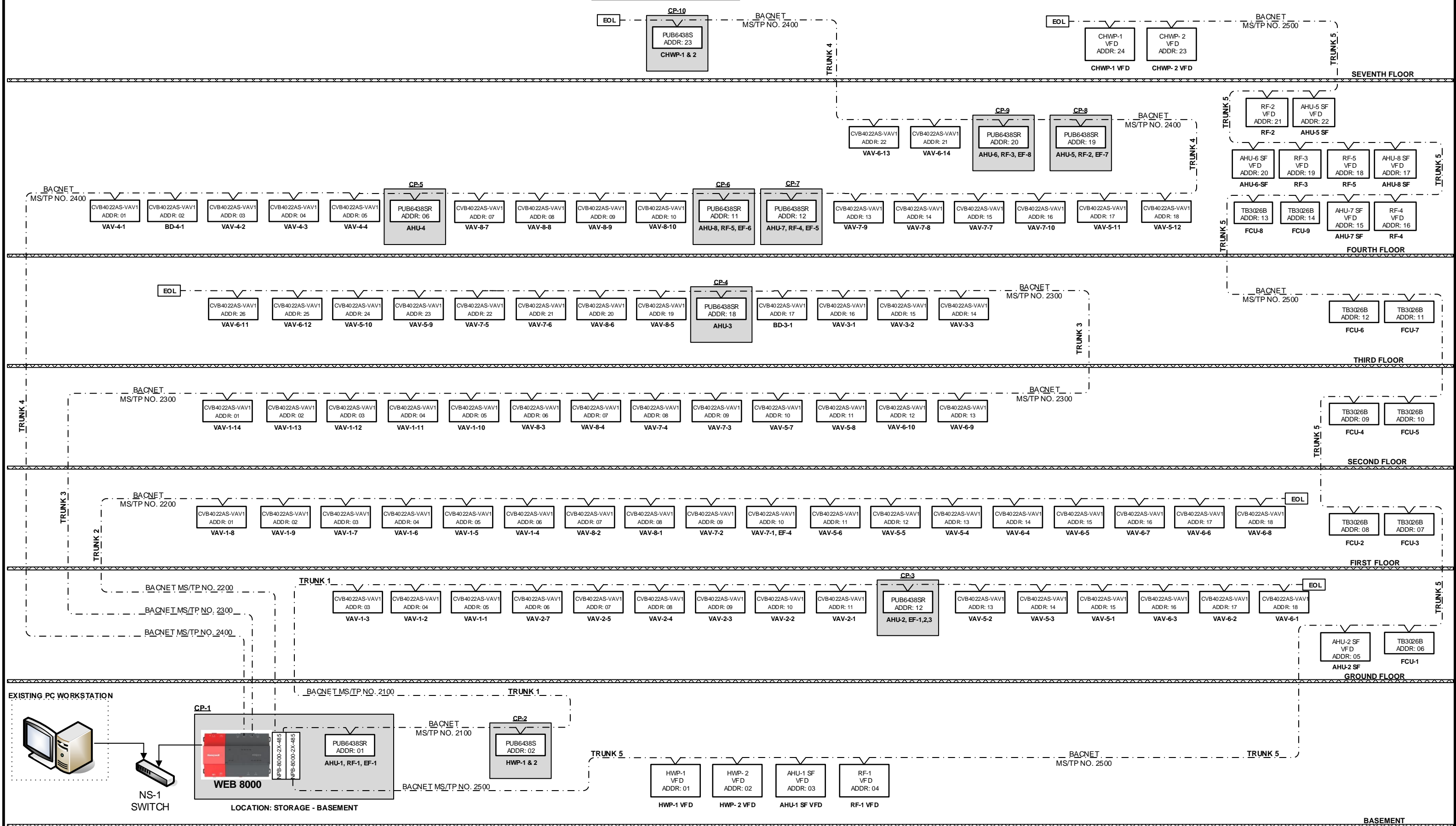


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NETWORK RISER



NO.	DATE	REVISION	BY

---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

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NETWORK RISER FOR ROTUNDA	
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NETWORK RISER SCHEDULE

Union County Courthouse - Rotunda				
Unit Tag/Equipment	Controller	Level	Device Instance	Mac Address
JACE	JACE 8000	Basement	200000	0

MS/TP TRUNK-1				
Unit Tag/Equipment	Controller	Level	Device Instance	Mac Address
AHU-1, RF-1, EF-1	PUB6438SR	Basement	210001	1
HWP-1 & 2	PUB6438S	Basement	210002	2
VAV-1-3	CVB4022AS-VAV1	Ground Floor	210003	3
VAV-1-2	CVB4022AS-VAV1	Ground Floor	210004	4
VAV-1-1	CVB4022AS-VAV1	Ground Floor	210005	5
VAV-2-7	CVB4022AS-VAV1	Ground Floor	210006	6
VAV-2-5	CVB4022AS-VAV1	Ground Floor	210007	7
VAV-2-4	CVB4022AS-VAV1	Ground Floor	210008	8
VAV-2-3	CVB4022AS-VAV1	Ground Floor	210009	9
VAV-2-2	CVB4022AS-VAV1	Ground Floor	210010	10
VAV-2-1	CVB4022AS-VAV1	Ground Floor	210011	11
AHU-2, EF-1,2,3	PUB6438SR	Ground Floor	210012	12
VAV-5-2	CVB4022AS-VAV1	Ground Floor	210013	13
VAV-5-3	CVB4022AS-VAV1	Ground Floor	210014	14
VAV-5-1	CVB4022AS-VAV1	Ground Floor	210015	15
VAV-6-3	CVB4022AS-VAV1	Ground Floor	210016	16
VAV-6-2	CVB4022AS-VAV1	Ground Floor	210017	17
VAV-6-1	CVB4022AS-VAV1	Ground Floor	210018	18

MS/TP TRUNK-2				
Unit Tag/Equipment	Controller	Level	Device Instance	Mac Address
VAV-1-8	CVB4022AS-VAV1	First Floor	220001	1
VAV-1-9	CVB4022AS-VAV1	First Floor	220002	2
VAV-1-7	CVB4022AS-VAV1	First Floor	220003	3
VAV-1-6	CVB4022AS-VAV1	First Floor	220004	4
VAV-1-5	CVB4022AS-VAV1	First Floor	220005	5
VAV-1-4	CVB4022AS-VAV1	First Floor	220006	6
VAV-8-2	CVB4022AS-VAV1	First Floor	220007	7
VAV-8-1	CVB4022AS-VAV1	First Floor	220008	8
VAV-7-2	CVB4022AS-VAV1	First Floor	220009	9
VAV-7-1	CVB4022AS-VAV1	First Floor	220010	10
VAV-5-6	CVB4022AS-VAV1	First Floor	220011	11
VAV-5-5	CVB4022AS-VAV1	First Floor	220012	12
VAV-5-4	CVB4022AS-VAV1	First Floor	220013	13
VAV-6-4	CVB4022AS-VAV1	First Floor	220014	14
VAV-6-5	CVB4022AS-VAV1	First Floor	220015	15
VAV-6-7	CVB4022AS-VAV1	First Floor	220016	16
VAV-6-6	CVB4022AS-VAV1	First Floor	220017	17
VAV-6-8	CVB4022AS-VAV1	First Floor	220018	18

MS/TP TRUNK-3				
Unit Tag/Equipment	Controller	Level	Device Instance	Mac Address
VAV-1-14	CVB4022AS-VAV1	Second Floor	230001	1
VAV-1-13	CVB4022AS-VAV1	Second Floor	230002	2
VAV-1-12	CVB4022AS-VAV1	Second Floor	230003	3
VAV-1-11	CVB4022AS-VAV1	Second Floor	230004	4
VAV-1-10	CVB4022AS-VAV1	Second Floor	230005	5
VAV-8-3	CVB4022AS-VAV1	Second Floor	230006	6
VAV-8-4	CVB4022AS-VAV1	Second Floor	230007	7
VAV-7-4	CVB4022AS-VAV1	Second Floor	230008	8
VAV-7-3	CVB4022AS-VAV1	Second Floor	230009	9
VAV-5-7	CVB4022AS-VAV1	Second Floor	230010	10
VAV-5-8	CVB4022AS-VAV1	Second Floor	230011	11
VAV-6-10	CVB4022AS-VAV1	Second Floor	230012	12
VAV-6-9	CVB4022AS-VAV1	Second Floor	230013	13
VAV-3-3	CVB4022AS-VAV1	Third Floor	230014	14
VAV-3-2	CVB4022AS-VAV1	Third Floor	230015	15
VAV-3-1	CVB4022AS-VAV1	Third Floor	230016	16
BD-3-1	CVB4022AS-VAV1	Third Floor	230017	17
AHU-3	PUB6438SR	Third Floor	230018	18
VAV-8-5	CVB4022AS-VAV1	Third Floor	230019	19
VAV-8-6	CVB4022AS-VAV1	Third Floor	230020	20
VAV-7-6	CVB4022AS-VAV1	Third Floor	230021	21
VAV-7-5	CVB4022AS-VAV1	Third Floor	230022	22
VAV-5-9	CVB4022AS-VAV1	Third Floor	230023	23
VAV-5-10	CVB4022AS-VAV1	Third Floor	230024	24
VAV-6-12	CVB4022AS-VAV1	Third Floor	230025	25
VAV-6-11	CVB4022AS-VAV1	Third Floor	230026	26

MS/TP TRUNK-4				
Unit Tag/Equipment	Controller	Level	Device Instance	Mac Address
VAV-4-1	CVB4022AS-VAV1	Fourth Floor	240001	1
BD-4-1	CVB4022AS-VAV1	Fourth Floor	240002	2
VAV-4-2	CVB4022AS-VAV1	Fourth Floor	240003	3
VAV-4-3	CVB4022AS-VAV1	Fourth Floor	240004	4
VAV-4-4	CVB4022AS-VAV1	Fourth Floor	240005	5
AHU-4	CVB4022AS-VAV1	Fourth Floor	240006	6
VAV-8-7	CVB4022AS-VAV1	Fourth Floor	240007	7
VAV-8-8	CVB4022AS-VAV1	Fourth Floor	240008	8
VAV-8-9	CVB4022AS-VAV1	Fourth Floor	240009	9
VAV-8-10	CVB4022AS-VAV1	Fourth Floor	240010	10
AHU-8, RF-5, EF-6	PUB6438SR	Fourth Floor	240011	11
AHU-7, RF-4, EF-5	PUB6438SR	Fourth Floor	240012	12
VAV-7-9	CVB4022AS-VAV1	Fourth Floor	240013	13
VAV-7-8	CVB4022AS-VAV1	Fourth Floor	240014	14
VAV-7-7	CVB4022AS-VAV1	Fourth Floor	240015	15
VAV-7-10	CVB4022AS-VAV1	Fourth Floor	240016	16
VAV-5-11	CVB4022AS-VAV1	Fourth Floor	240017	17
VAV-5-12	CVB4022AS-VAV1	Fourth Floor	240018	18
AHU-5, RF-2, EF-7	PUB6438SR	Fourth Floor	240019	19
AHU-6, RF-3, EF-8	PUB6438SR	Fourth Floor	240020	20
VAV-6-14	CVB4022AS-VAV1	Fourth Floor	240021	21
VAV-6-13	CVB4022AS-VAV1	Fourth Floor	240022	22
CHWP-1 & 2	PUB6438S	Seventh Floor	240023	23

MS/TP TRUNK-5				
Unit Tag/Equipment	Controller	Level	Device Instance	Mac Address
HWP-1 VFD	VFD	Basement	250001	1
HWP-2 VFD	VFD	Basement	250002	2
AHU-1 SF VFD	VFD	Basement	250003	3
RF-1 VFD	VFD	Basement	250004	4
AHU-2 SF VFD	VFD	Ground Floor	250005	5
FCU-1	TB3026B	Ground Floor	250006	6
FCU-3	TB3026B	First Floor	250007	7
FCU-2	TB3026B	First Floor	250008	8
FCU-4	TB3026B	Second Floor	250009	9
FCU-5	TB3026B	Second Floor	250010	10
FCU-7	TB3026B	Third Floor	250011	11
FCU-6	TB3026B	Third Floor	250012	12
FCU-8	TB3026B	Fourth Floor	250013	13
FCU-9	TB3026B	Fourth Floor	250014	14
AHU-7 SF VFD	VFD	Fourth Floor	250015	15
RF-4 VFD	VFD	Fourth Floor	250016	16
AHU-8 SF VFD	VFD	Fourth Floor	250017	17
RF-5 VFD	VFD	Fourth Floor	250018	18
RF-3 VFD	VFD	Fourth Floor	250019	19
AHU-6 SF VFD	VFD	Fourth Floor	250020	20
RF-2 VFD	VFD	Fourth Floor	250021	21
AHU-5 SF VFD	VFD	Fourth Floor	250022	22
CHWP-1 VFD	VFD	Seventh Floor	250023	23
CHWP-2 VFD	VFD	Seventh Floor	250024	24

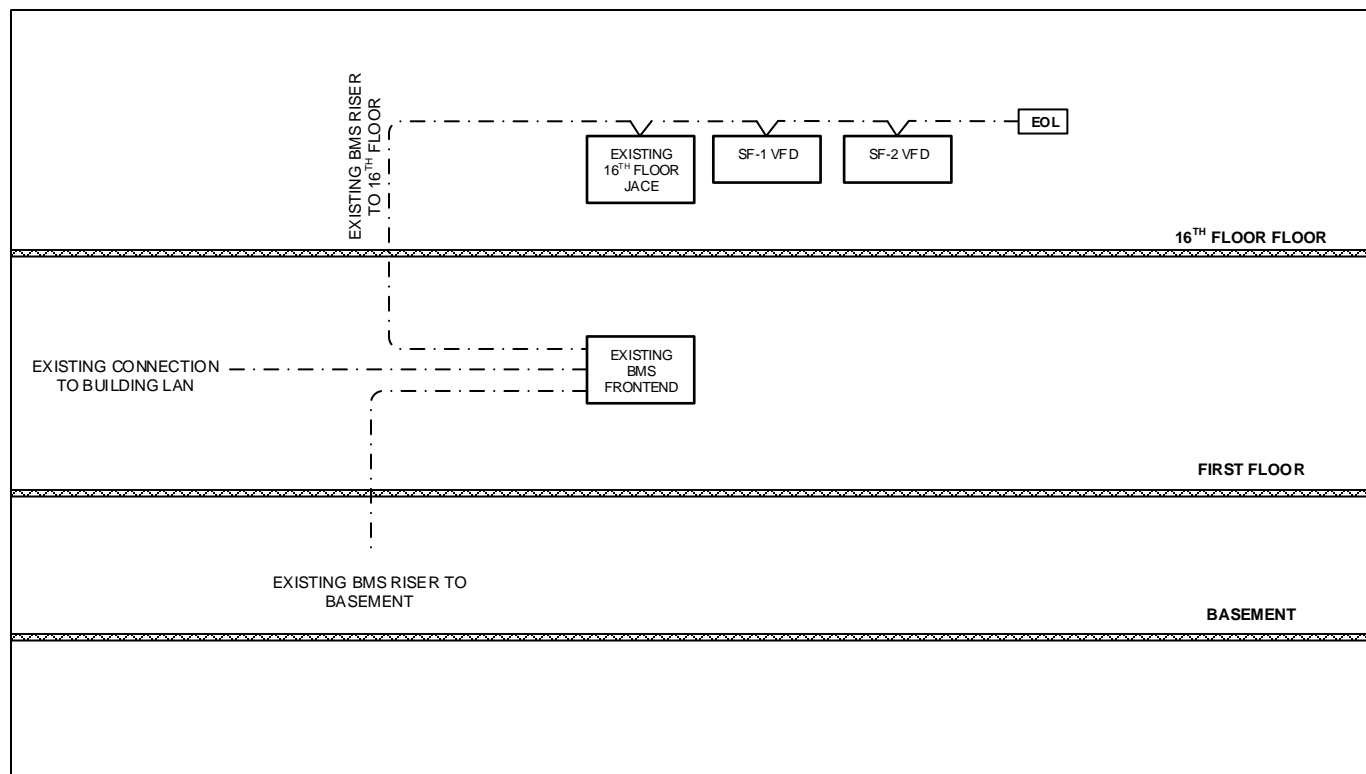
LEGEND	----- Low Voltage, 18 AWG, Copper Wire
	- - - - - Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____ Line Voltage, THHN Field Wiring

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NETWORK RISER SCHEDULE	
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NETWORK RISER FOR STAIR TOWER



LEGEND	Description
---	Low Voltage, 18 AWG, Copper Wire
-.-.-.-	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
—	Line Voltage, THHN Field Wiring

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NETWORK RISER FOR STAIR TOWER	
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NETWORK RISER BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	Programmable Controller	JACE	WEB8000	1	Base unit includes two isolated RS485 ports, two 10/100MB Ethernet ports, USB Backup & Restore and WiFi connectivity	Honeywell
2	Device	Device	NC-8100	1	Up to 100 devices/5,000 point core	Honeywell
3	Device	Device	DEVICE-10	1	Up to 10 devices/500 point upgrade (can be purchased during initial licensing)	Honeywell
4	SMA	SMA	SUP-1-SMA-INIT	1	18mo initial SMA (3YR or 5YR can be substituted)	Honeywell
5	RS-485 Module	RS-485 Module	NPB-8000-2X-485	2	WEB-8000 controller — add on dual port RS-485 module	Honeywell
6	Network Switch	NS	EISK8-100T	1	8 Ports 10/100 Mbps Skorpion switch	Contemporary Controls

*JACE TO BE MOUNTED IN PANEL CP-1 WITH AHU-1

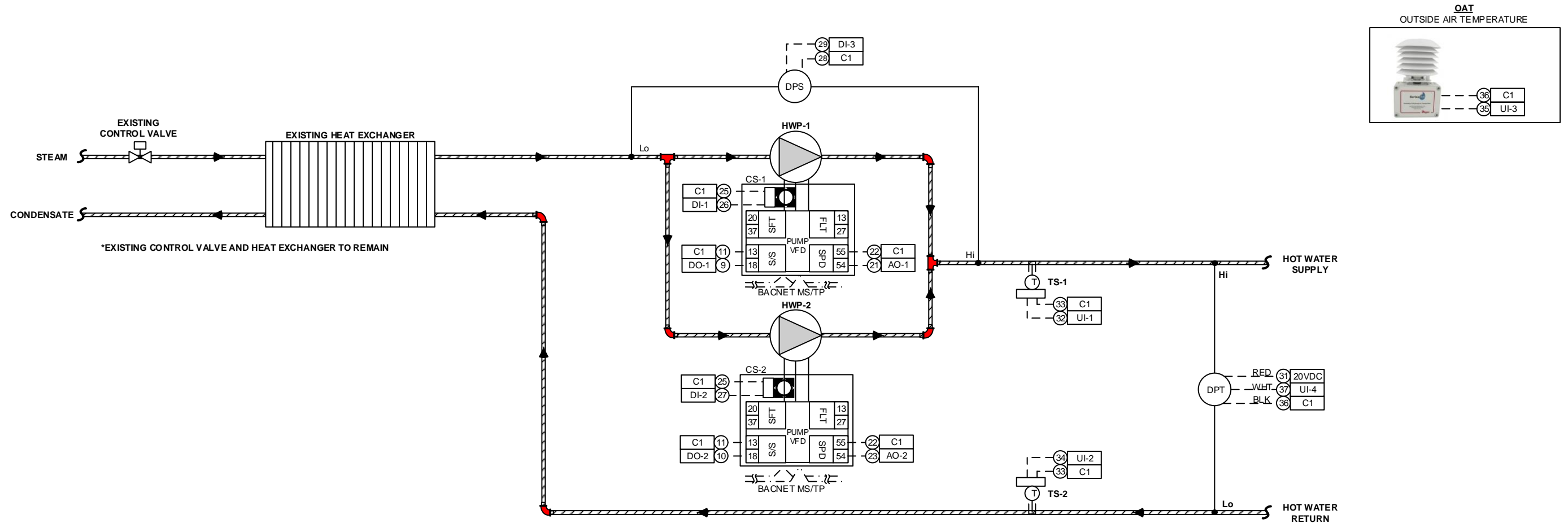
LEGEND

----- Low Voltage, 18 AWG, Copper Wire
 - - - - - Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire,
 Low Capacitance
 _____ Line Voltage, THHN Field Wiring

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HOT WATER PUMP SYSTEM (HWP-1 & 2) SCHEMATIC DIAGRAM



HOT WATER PUMP SYSTEM (HWP-1 & 2) SEQUENCE OF OPERATION :

PUMPS ENABLED:

1. WHEN THE OUTDOOR TEMPERATURE FALLS BELOW THE HEATING ENABLE SETPOINT THE PRIMARY CIRCULATING PUMP SHALL BE ENABLED. THE LEAD PUMP SHALL RAMP UP VIA THE VFD DRIVE TO MAINTAIN THE HEATING WATER PRESSURE SETPOINT. ONCE THE WATER PRESSURE SETPOINT IS ACHIEVED THE VFD DRIVE SHALL MODULATE THE PUMP SPEED UP AND DOWN TO MAINTAIN THE SETPOINT.
2. A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR THE DIFFERENTIAL WATER PRESSURE ACROSS THE PUMPS TO ENSURE PROPER FLOW. IF FLOW IS NOT ESTABLISHED WITHIN ONE (1) MINUTE (ADJ) THE LEAD PUMP SHALL BE DISABLED AND THE LAG PUMP SHALL BE ENABLED.

BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	Programmable Controller	C1	PUB6438S	1	Honeywell Spyder Controller with 6UI, 4DI,3AO, 8DO	Honeywell
2	Water Temperature Sensor	TS-1,2	A/20K-I-4-GD	2	Immersion 20 kΩ type IV thermistor with stainless well and 4" (10.1 cm) insertion	ACI
3	Outside air temperature	OAT	RHP-2-R-2-F	1	RH/Temperature Sensor Transmitter, 2% Accuracy, Radiation shield,20KΩ @ 25°C Thermistor	Dwyer
4	Current Switch	CS-1,2	C-2300	2	Split Core Adj.trip,Min trip at 0.5A, status output N.O.1.0 A @30V AC/DC	Senva
5	Wet differential pressure sensor	DPT	629C-05-CH-P2-E5-S3	1	Wet/wet differential pressure transmitter, range 0-100 psid	Dwyer
6	Wet differential pressure switch	DPS	DXW-11-153-1	1	Wet/wet differential pressure switch, range 10 to 25 psid	Dwyer
7	Relay	R-1,2	RIBU1C	2	Universal RIB Relay	Functional Devices
8	Panel	CP-2	SCE-16N1606LP	1	Saginaw, 16"H X 16"W X 6" Depth Nema1 enclosure, steel ANSI61-Grey	Saginaw
9	Perforated Subpanel	CP-2	SCE-16N16MP	1	Enclosure, Nema-1	Saginaw
10	Transformer	TR1	5051MWCB	1	Multi-Tap Class 2, 50VA, 120,208,240,277,480 Integrated overcurrent breaker	Senva

LEGEND	
-----	Low Voltage, 18 AWG, Copper Wire
-----	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
-----	Line Voltage, THHN Field Wiring

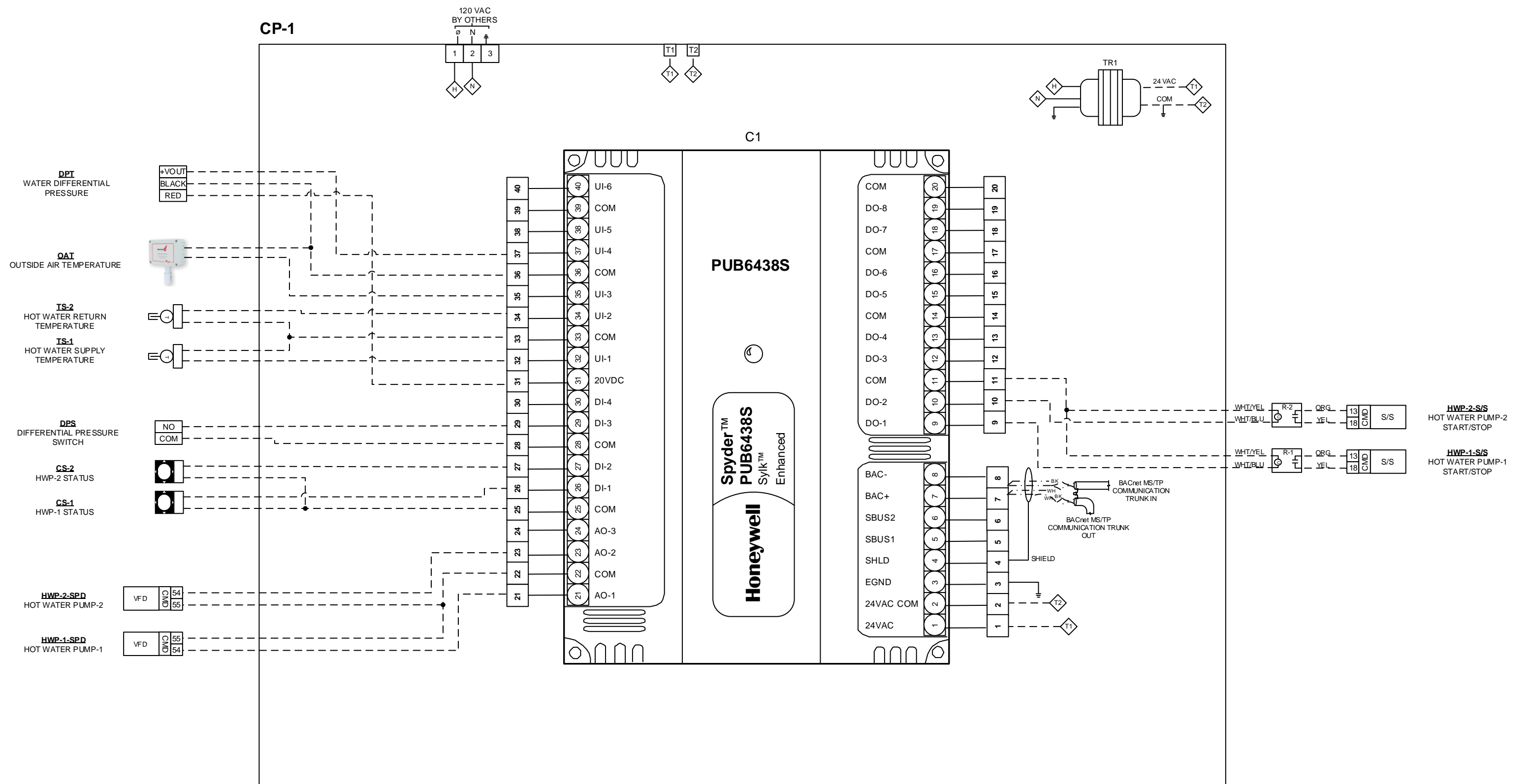
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HOT WATER PUMP SYSTEM (HWP-1 & 2)	
SCHEMATIC DIAGRAM	
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HOT WATER PUMP SYSTEM (HWP-1 & 2) WIRING DIAGRAM



PANEL LOCATION: MECHANICAL ROOM - BASEMENT

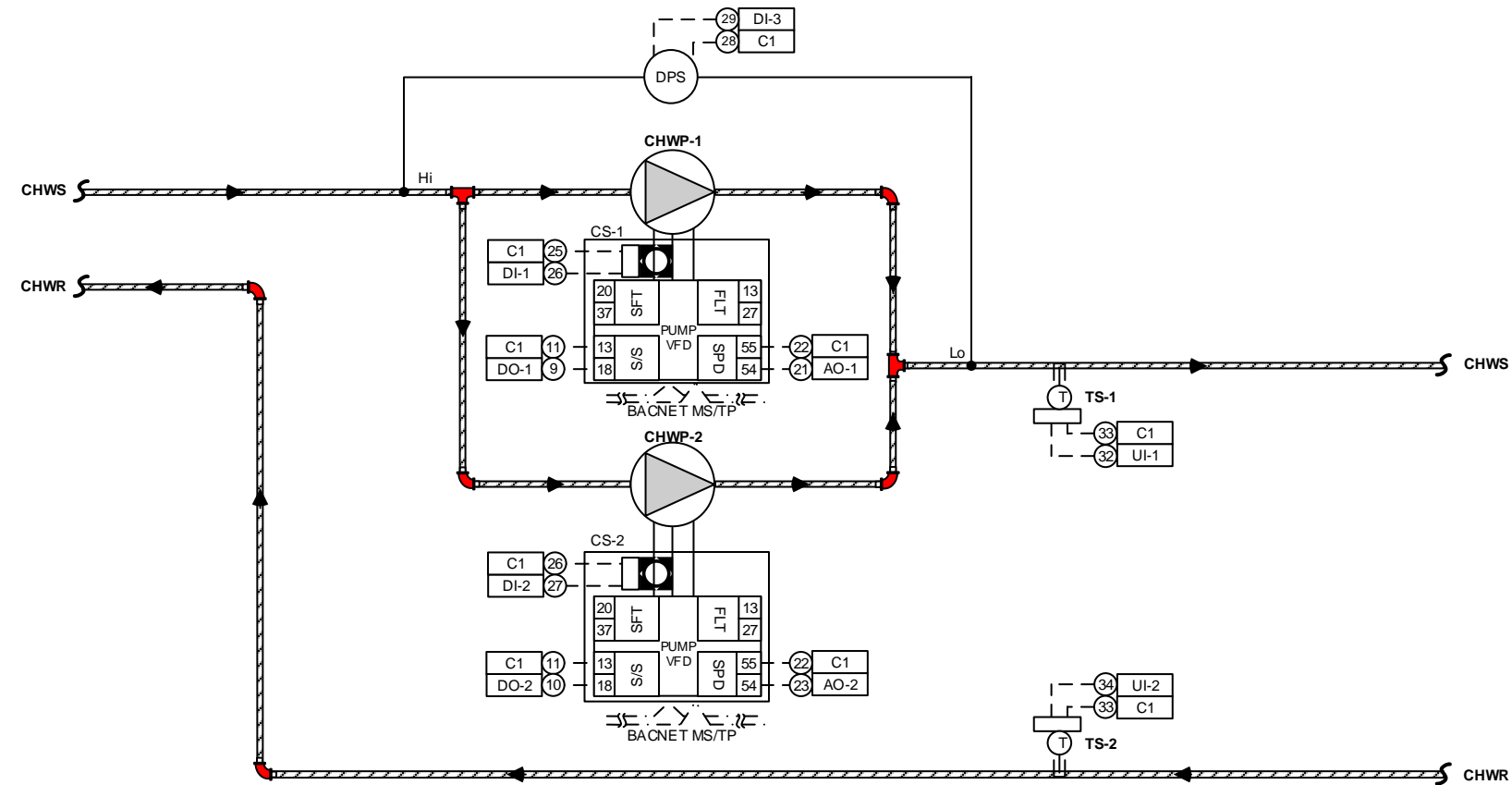
LEGEND	Description
---	Low Voltage, 18 AWG, Copper Wire
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---	Line Voltage, THHN Field Wiring

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HOT WATER PUMP SYSTEM (HWP-1 & 2)	
WIRING DIAGRAM	
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CHILLED WATER PUMPS (CHWP-1 & 2) SCHEMATIC DIAGRAM



CHILLED WATER PUMPS (CHWP-1 & 2) SEQUENCE OF OPERATION PRIMARY PUMPS

BMS CONTROL:

THE PUMPS OPTIMUM START, MONITORING, ALARM REPORTING AND REMOTE CONTROL FEATURES WILL BE VIA THE BUILDING MANAGEMENT SYSTEM (BMS)

PUMPS ENABLED:


1. WHEN THE OUTDOOR TEMPERATURE RISES ABOVE THE COOLING ENABLED SETPOINT THE PRIMARY CHILLED WATER CIRCULATING PUMPS SHALL BE ENABLED. THE LEAD PUMP SHALL START AND PROVIDE WATER FLOW.
2. A CURRENT SWITCH SHALL MONITOR THE MOTOR CURRENT TO DETERMINE PROPER FLOW. IF PROPER MOTOR CURRENT IS NOT ESTABLISHED WITHIN ONE (1) MINUTE (ADJ) THE LEAD PUMP SHALL BE DISABLED AND THE LAG PUMP SHALL BE ENABLED. AN ALARM SHALL BE GENERATED THROUGH THE BMS SYSTEM.
3. A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE. IF PROPER PRESSURE IS NOT ESTABLISHED WITHIN ONE (1) MINUTE (ADJ) THE LEAD PUMP SHALL BE DISABLED AND THE LAG PUMP SHALL BE ENABLED. AN ALARM SHALL BE GENERATED THROUGH THE BMS SYSTEM.
4. THE PUMPS SHALL ROTATE LEAD LAG OPERATION BASED ON ACTUAL RUNTIME. LEAD LAG TIME SHALL ROTATE A MINIMUM OF EACH WEEK.

BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	Programmable Controller	C1	PUB6438S	1	Honeywell Spyder Controller with 6UI, 4DI, 3AO, 8DO	Honeywell
2	Water Temperature Sensor	TS-1,2	A/20K-I-4-GD	2	Immersion 20 kΩ type IV thermistor with stainless well and 4" (10.1 cm)	ACI
3	Current Switch	CS-1,2	C-2300	2	Split Core Adj.trip, Min trip at 0.5A, status output N.O.1.0 A @30V AC/DC	Senva
4	Wet differential pressure switch	DPS	DXW-11-153-1	1	Wet/wet differential pressure switch, range 10 to 25 psid	Dwyer
5	Relay	R-1,2	RIBU1C	2	Universal RIB Relay	Functional Devices
6	Panel	CP-19	SCE-16N1606LP	1	Saginaw, 16"H X 16"W X 6" Depth Nema1 enclosure, steel ANSI61-Grey	Saginaw
7	Perforated Subpanel	CP-19	SCE-16N16MP	1	Enclosure, Nema-1	Saginaw
8	Transformer	TR1	5051MWCB	1	Multi-Tap Class 2, 50VA, 120,208,240,277,480 Integrated overcurrent breaker	Senva

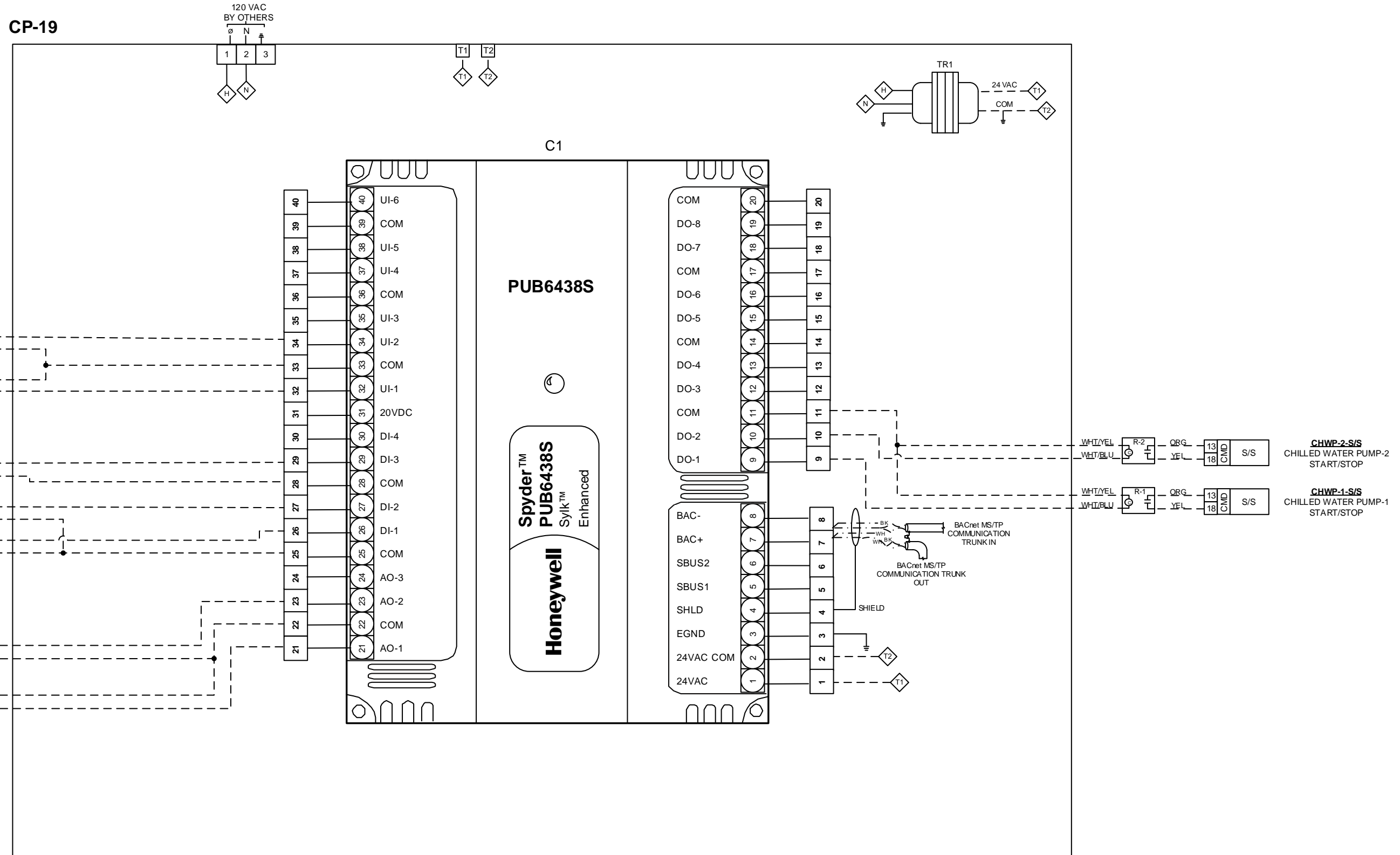
LEGEND	Symbol	Description
	---	Low Voltage, 18 AWG, Copper Wire
	---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	---	Line Voltage, THHN Field Wiring

0	04-11-2019	SAMPLE PROJECT	ICT
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ICT Solutions

Project: SAMPLE PROJECT	
CHILLED WATER PUMPS (CHWP-1 & 2) SCHEMATIC DIAGRAM	
Job No.	Page 9 of 48


CHILLED WATER PUMPS (CHWP-1 & 2) WIRING DIAGRAM



PANEL LOCATION: ROOF OLD COURTHOUSE ANNEX – SEVENTH FLOOR

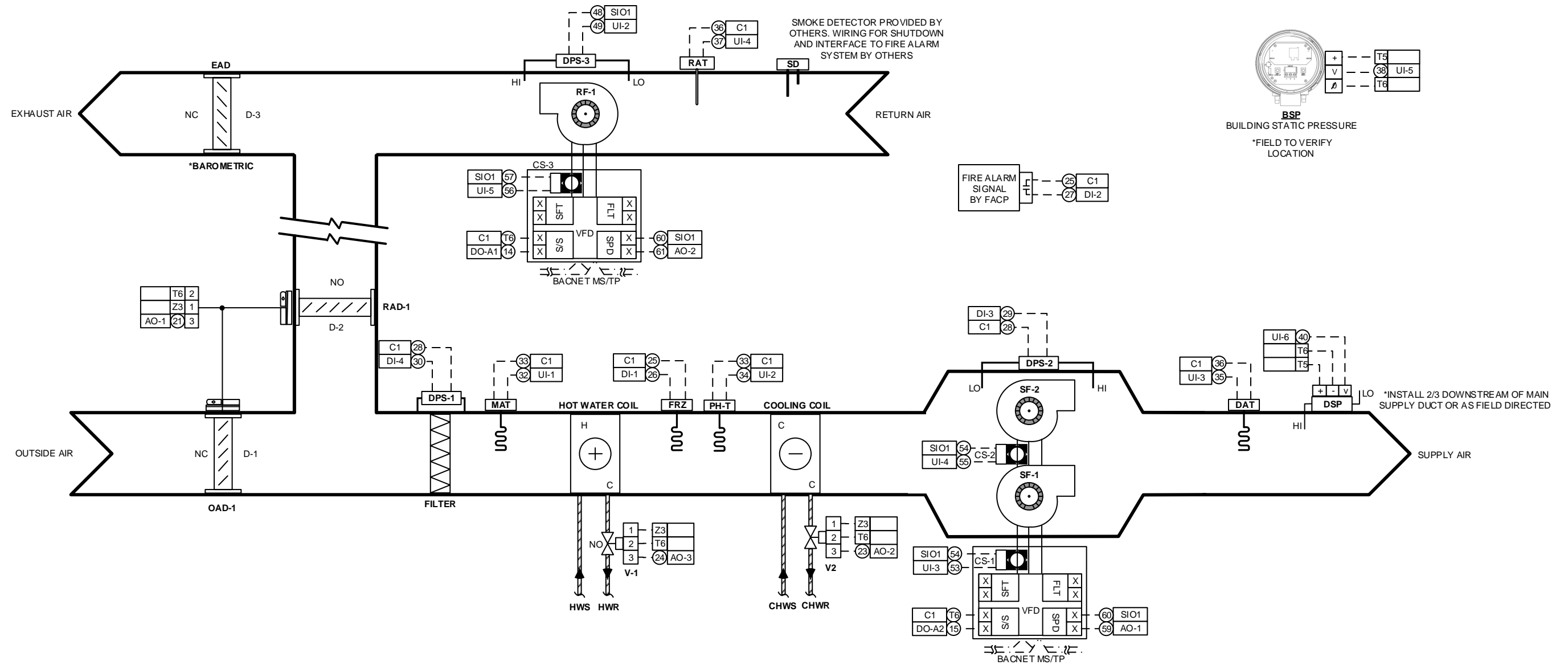
LEGEND	Description
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

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Project: SAMPLE PROJECT	
CHILLED WATER PUMPS (CHWP-1 & 2) WIRING DIAGRAM	
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AHU-1 / RF-1 SCHEMATIC DIAGRAM



*NOTE: ENGINEER TO VERIFY WHETHER DAMPER IS BAROMETRIC OR MOTORIZED

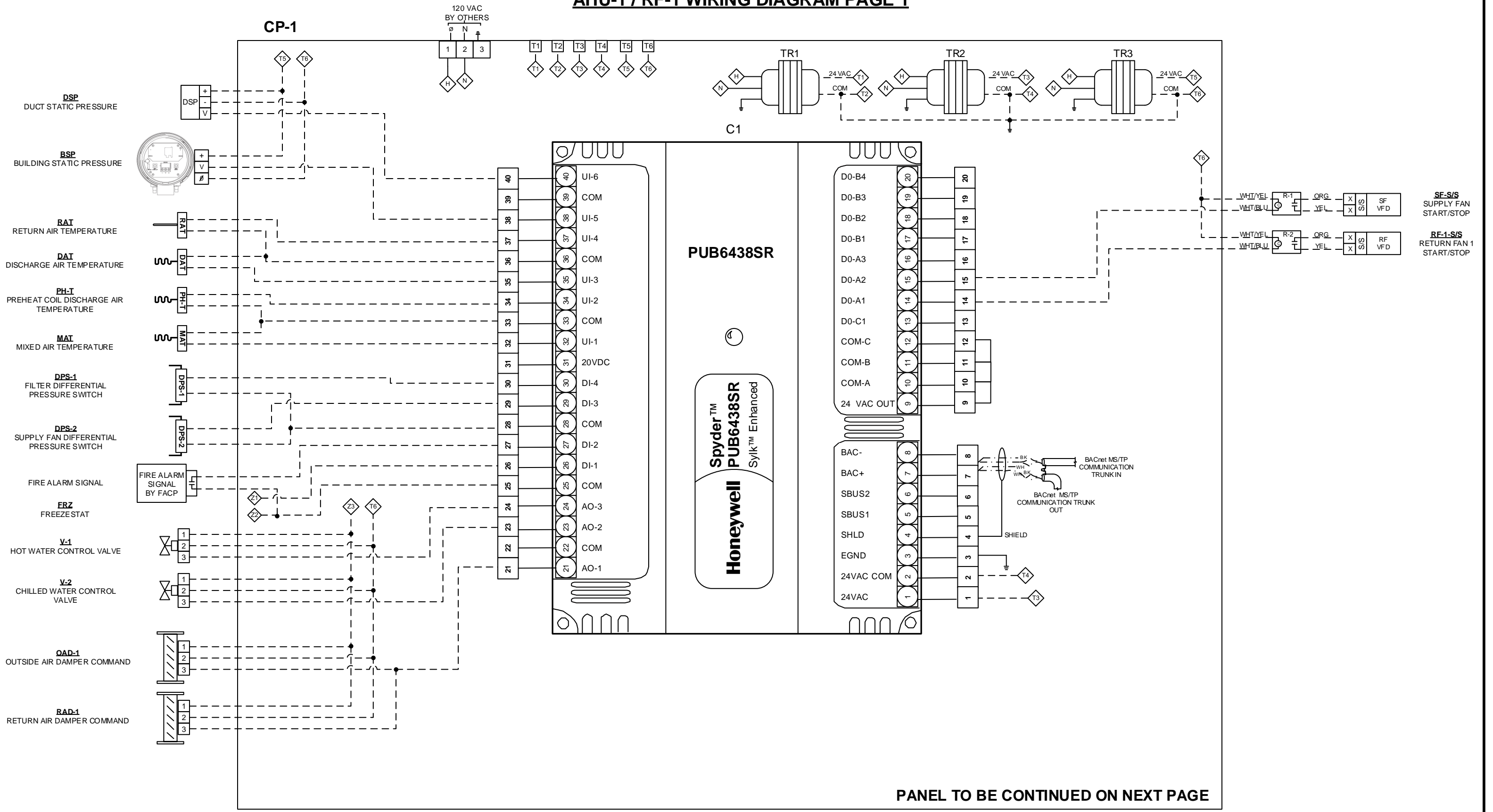
LEGEND	DESCRIPTION
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

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Project: SAMPLE PROJECT	
AHU-1 / RF-1 SCHEMATIC DIAGRAM	
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AHU-1 / RF-1 WIRING DIAGRAM PAGE 1




PANEL TO BE CONTINUED ON NEXT PAGE

PANEL LOCATION FOR AHU-1: STORAGE - BASEMENT

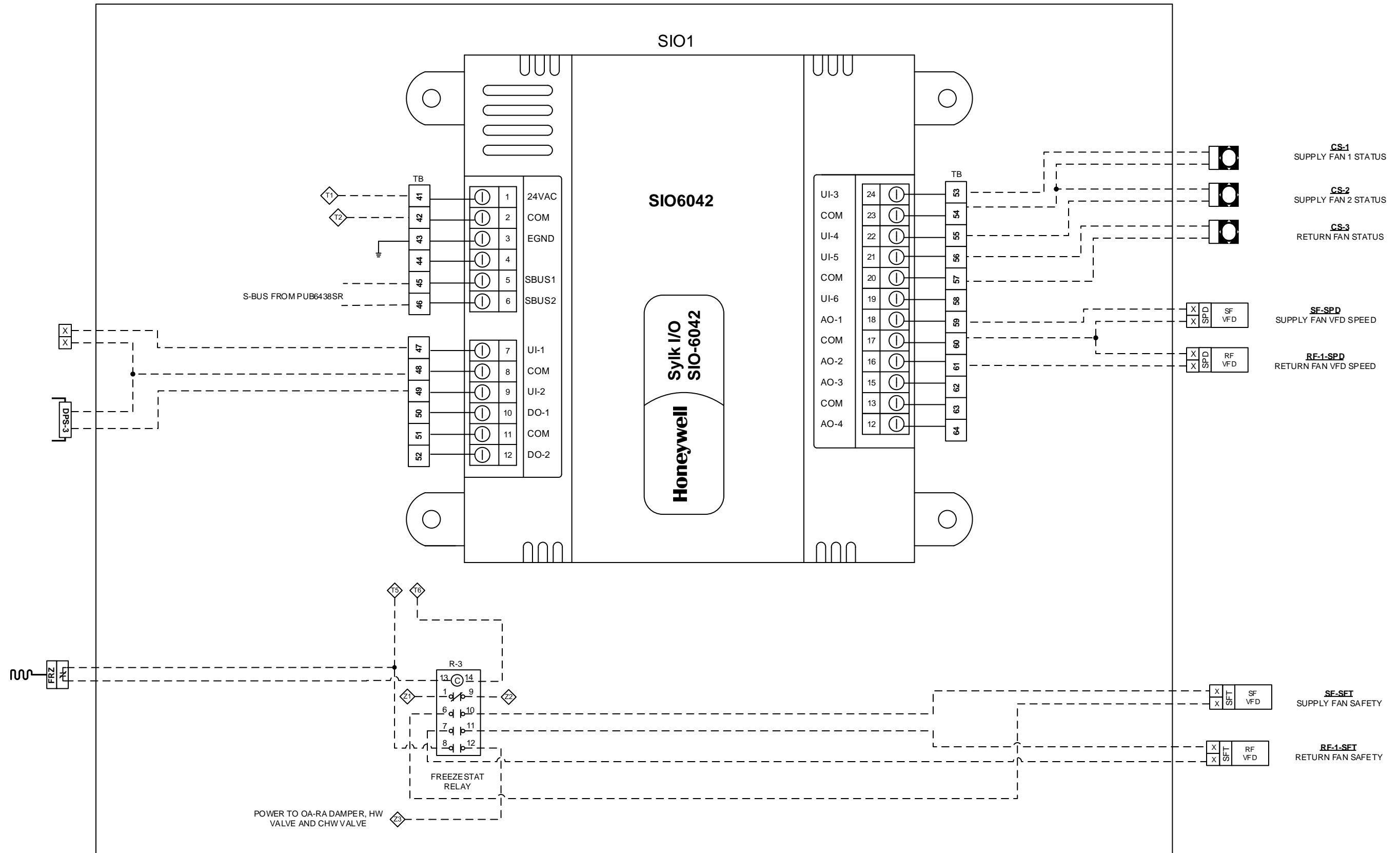
LEGEND	Description
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

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AHU-1 / RF-1 WIRING DIAGRAM PAGE 1	
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AHU-1 / RF-1 WIRING DIAGRAM PAGE 2



LEGEND	DESCRIPTION
---	Low Voltage, 18 AWG, Copper Wire
- - - - -	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
—	Line Voltage, THHN Field Wiring

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Project: SAMPLE PROJECT	
AHU-1 / RF-1 WIRING DIAGRAM PAGE 2	
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AHU-1 / RF-1 SEQUENCE OF OPERATION

TIME SCHEDULES

THE TIME SCHEDULES SHALL BE PROGRAMMED THROUGH THE MAIN FRONT END OPERATOR STATION AND STORED IN THE INDIVIDUAL CONTROLLERS. TIME SCHEDULES SHALL BE COORDINATED WITH THE BUILDING OWNER AT COMPLETION OF THE PROJECT, OR AS LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION SCHEDULES.

SYSTEM DE-ENERGIZED

WHEN THE SYSTEM IS DE-ENERGIZED, THE OUTDOOR AIR AND EXHAUST DAMPERS SHALL CLOSE, THE RETURN AIR DAMPER SHALL OPEN, THE SUPPLY AND RETURN AIR FANS SHALL BE DE-ENERGIZED.

SYSTEM ENERGIZED

OCCUPIED MODE

THE DAYS AND TIMES GOVERNING THIS MODE OF OPERATION SHALL BE DICTATED BY THE OWNER AND PROGRAMMED INTO THE BMS SYSTEM.

THE BMS SYSTEM SHALL INITIATE THE OCCUPIED MODE. THE OUTDOOR AIR DAMPER SHALL OPEN TO ITS MINIMUM VENTILATION POSITION, AND THE RETURN AIR DAMPER SHALL POSITION ITSELF ACCORDINGLY. THE SUPPLY AIR FAN SHALL START. THE SUPPLY AIR FAN SHALL RAMP UP OR DOWN VIA THE VARIABLE FREQUENCY DRIVE (VFD) MAINTAINING A CONSTANT STATIC PRESSURE OF 1.0" W.G. (ADJUSTABLE) AT THE POINT WHERE THE DUCT-MOUNTED STATIC PRESSURE SENSOR IS LOCATED. RETURN FAN SHALL START AND MAINTAIN THE REQUIRED AIRFLOW TO MAINTAIN A SLIGHT POSITIVE PRESSURE (0.01" WC) WITHIN THE BUILDING.

DISCHARGE AIR TEMPERATURE CONTROL

THE AHU SHALL MAINTAIN CONSTANT DISCHARGE AIR TEMPERATURE AS DICTATED BY THE DISCHARGE AIR TEMPERATURE SETPOINT. THE CHILLED WATER CONTROL VALVE SHALL BE MODULATED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET BASED ON THE DISCHARGE AIR TEMPERATURE RESET SCHEDULE LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION AND SCHEDULES.

THE HOT WATER COIL VALVE SHALL BE MODULATED TO MAINTAIN A MINIMUM OF 55T LEAVING AIR TEMPERATURE. THE CONTROL VALVE SHALL BE MODULATED TO PROVIDE HIGHER LEAVING AIR TEMPERATURES AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.

A RETURN AIR DUCT MOUNTED SENSOR SHALL MONITOR THE RETURN AIR TEMPERATURE. THE BMS SHALL RESET SUPPLY TEMPERATURE TO PROVIDE ADEQUATE COOLING.

ECONOMIZER MODE

WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 55°F, CHILLED WATER SHALL BE PROVIDED FOR COOLING. WHEN THE OUTDOOR AIR TEMPERATURE IS AT OR BELOW 55°F, THE OUTDOOR AIR DAMPER SHALL BE MODULATED OPEN TO PROVIDE FREE COOLING. AS THE OUTDOOR AIR DAMPER MODULATES OPEN, THE RETURN AIR DAMPER SHALL CORRESPONDINGLY MODULATE TOWARD ITS CLOSED POSITION. THE LOCAL CONTROLS SHALL LIMIT THE MIXED AIR TEMPERATURE FROM FALLING BELOW 52°F.

SPACE TEMPERATURE CONTROL

THE SPACE TEMPERATURE FOR EACH ZONE IS CONTROLLED BY THE VARIABLE AIR VOLUME (VAV) BOXES WHICH HAVE THEIR INDIVIDUAL TEMPERATURE SENSORS.

UNOCCUPIED MODE

THE DAYS AND TIMES GOVERNING THIS MODE OF OPERATION SHALL BE DICTATED BY THE OWNER AND PROGRAMMED INTO THE BMS SYSTEM.

WHEN THE SYSTEM IS INDEXED TO THE UNOCCUPIED MODE THE OUTDOOR AIR DAMPER

SHALL MOVE TO IT'S FULLY CLOSED POSITION, THE SUPPLY FAN AND RETURN FAN SHALL BE DE-ENERGIZED AND THE VAV BOXES SHALL MOVE TO THEIR FULLY OPEN POSITION.

IF DURING THE UNOCCUPIED MODE THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SPACE HEATING TEMPERATURE THE AHU SHALL START, THE STEAM VALVE SHALL BE OPENED TO THE FULLY OPENED POSITION TO PROVIDE HEATING TO THE AREA. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED SPACE HEATING SETPOINT, THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

IF DURING THE UNOCCUPIED MODE THE SPACE TEMPERATURE RISES ABOVE THE SPACE UNOCCUPIED COOLING TEMPERATURE SETPOINT THE UNIT SHALL START AND THE COOLING COIL VALVE SHALL MOVE TO THE OPEN POSITION TO MAINTAIN THE DISCHARGE AIR TEMPERATURE CONTROL SETPOINT TO PROVIDE COOLING FOR THE SPACE. ONCE THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SPACE TEMPERATURE SETPOINT, THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

MORNING WARM UP

IF THE RETURN AIR TEMPERATURE IS BELOW THE MORNING WARM UP SETPOINT WHEN THE UNIT IS INITIATED TO BEGIN THE OCCUPIED MODE THE UNIT SHALL ENTER THE MORNING WARM UP MODE. THE OUTDOOR AIR DAMPER SHALL REMAIN IN THE CLOSED POSITION. THE COOLING COIL VALVE WILL REMAIN CLOSED AND THE UNIT WILL CONTINUE TO OPERATE WITH THE FANS ONLY. ONCE THE RETURN AIR TEMPERATURE RISES ABOVE THE MORNING WARM UP SETPOINT, THE UNIT WILL ENTER THE OCCUPIED MODE.

SETPOINTS

1. DISCHARGE AIR TEMPERATURE SETPOINT 55°F (ADJ)
2. SUPPLY STATIC PRESSURE 1" WC (ADJ)
3. MORNING WARM UP MODE SETPOINT 74°F (ADJ)
4. OCCUPIED COOLING SETPOINT 74°F (ADJ)
5. OCCUPIED HEATING SETPOINT 70°F (ADJ)
6. UNOCCUPIED COOLING SETPOINT 80°F (ADJ)
7. UNOCCUPIED HEATING SETPOINT 65°F (ADJ)

SMOKE DETECTOR

UPON INDICATION OF SMOKE THE RETURN AIR SMOKE DETECTOR SHALL SHUT DOWN THE UNIT. BOTH SUPPLY AND RETURN FANS SHALL BE DE-ENERGIZED. THE OUTSIDE DAMPER SHALL RETURN TO ITS FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL RETURN TO THE FULLY OPEN POSITION. THE UNIT SHALL REMAIN IN THIS STATE UNTIL IT IS MANUALLY RESET FOR NORMAL OPERATION.

FREEZE PROTECTION

UPON DETECTION OF A FREEZING POTENTIAL THE FREEZE PROTECTION THERMOSTAT SHALL SHUT DOWN THE UNIT. BOTH SUPPLY AND RETURN FANS SHALL BE DE-ENERGIZED. THE OUTSIDE IT DAMPER SHALL RETURN TO IT'S FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL RETURN TO THE FULLY OPEN POSITION. THE HOT WATER COIL VALVE SHALL OPEN TO ITS FULLY OPEN POSITION. THE UNIT SHALL REMAIN IN THIS STATE UNTIL THE FREEZE PROTECTION THERMOSTAT IS MANUALLY RESET.

ALARMS

ALARMS SHALL BE GENERATED THROUGH THE BMS SYSTEM AND SHALL INCLUDE:

1. SUPPLY FAN FAILURE
2. RETURN FAN FAILURE
3. SUPPLY TEMP TOO HIGH
4. SUPPLY AIR TEMP TOO LOW
5. RETURN AIR TOO HIGH
6. UNABLE TO MAINTAIN STATIC PRESSURE
7. MIXED AIR TEMP TOO LOW
8. FREEZE PROTECTION THERMOSTAT ACTIVATED
9. VFD FAULT
10. SMOKE DETECTOR ACTIVATED

LEGEND	----- Low Voltage, 18 AWG, Copper Wire
	----- Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____ Line Voltage, THHN Field Wiring

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Project: **SAMPLE PROJECT**


AHU-1 / RF-1 SEQUENCE OF OPERATION

AHU-1 / RF-1 BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	Programmable Controller	C1	PUB6438SR	1	Honeywell Spyder Controller with 6UI, 4DI,3AO, 8DO, Dimensions 5.45in High X 6.85in wideX2.26in deep	Honeywell
2	I/O Module	SIO1	SIO6042	1	Sylk IO Module with 6UI, 4AO, 2DO	Honeywell
3	Averaging Air Temperature	MAT, PH-T, DAT	A/20K-FA-24'-GD	3	20K ohm NTC Duct Averaging Temp Sensor, 24' Flexible Cable	ACI
4	Return Air Temperature	RAT	A/20K-D-12"-GD	1	20K ohm NTC Duct Temp Sensor, 12" length, Galvanized	ACI
5	Building static pressure	BSP	MS-321	1	Differential pressure transmitter, 0-10 V output, selectable range 0.1", 0.25", 0.5" w.c.	Dwyer
6	Duct static pressure	DSP	MS-312	1	Differential pressure transmitter, 0-10 V output, selectable range 1", 2", 5" w.c., duct mount	Dwyer
7	Differential pressure switch	DPS-1	ADPS-04-2-N-C	3	Adjustable Differential Pressure Switch, Set Point Range in w.c. (Pa) 0.12 to 1.60 (30-400), w/ install kit	Dwyer
8	Freezestat	FRZ	DFS-DM20	1	Low limit temperature control, DPDT, Manual reset, 20' capillary	Dwyer
9	Current Transducer	CS-1,2,3	C-2300	3	Analog Current Sensors, 0-10VDC output , 30A, 60A & 120A Selectable Range split-cores	Senva
10	Relay	R-1,2	RIBU1C	2	Universal RIB Relay	Functional Devices
11	Panel Mounted Relay	R-3	784-4C-24A	1	Ice cube control relay, 24VAC coil voltage, 4PDT, 15A contact rating, with LED indicator	Automation Direct
12	Base	R-3	784-4C-SKT-1	1	Relay socket DIN Rail Mounted	Automation Direct
13	Panel	CP-1	SCE-24N2406LP	1	Saginaw, 24"H X 24"W X 6" Depth Nema1 enclosure, steel ANSI61-Grey	Saginaw
14	Perforated Subpanel	CP-1	SCE-24N24MP	1	Subpanel, Nema-1	Saginaw
15	Transformer	TR1,TR2,TR3	10051MWCB	3	Mult-Tap Class 2, 100VA, 120,208,240,277,480 Integrated overcurrent breaker	Senva

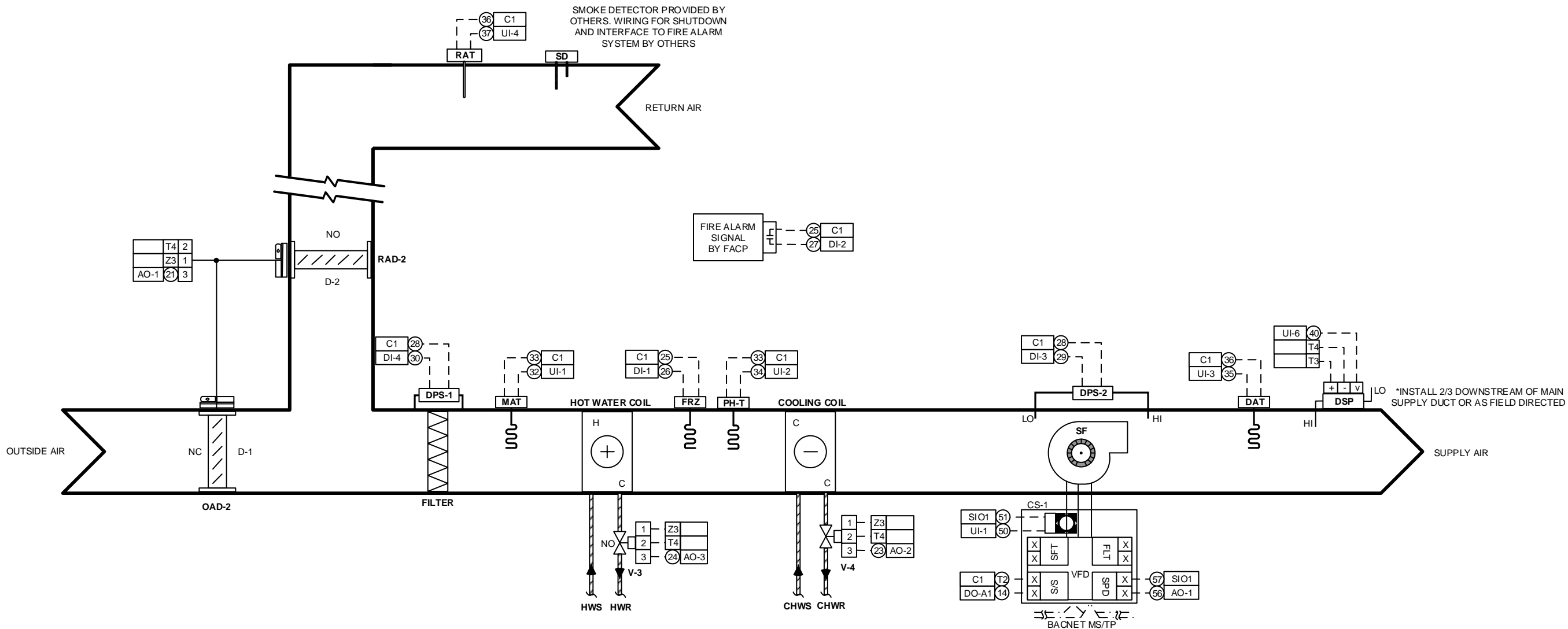
LEGEND	-----	Low Voltage, 18 AWG, Copper Wire
	-----	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____	Line Voltage, THHN Field Wiring

0	04-11-2019	SAMPLE PROJECT	ICT
NO.	DATE	REVISION	BY

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Project: SAMPLE PROJECT	
AHU-1 / RF-1 BILL OF MATERIAL	
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AHU-2 SCHEMATIC DIAGRAM



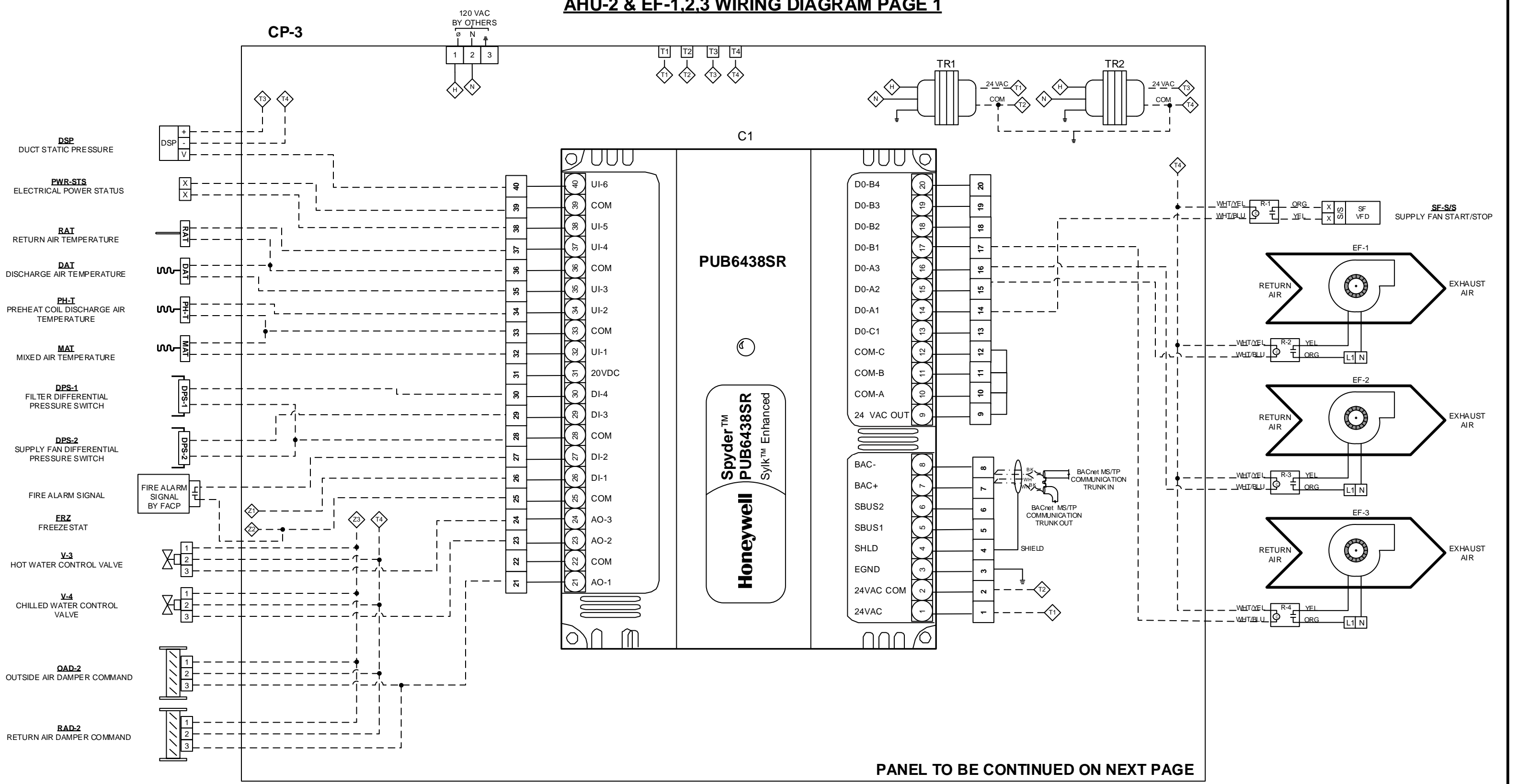
LEGEND	DESCRIPTION
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

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AHU-2 SCHEMATIC DIAGRAM	
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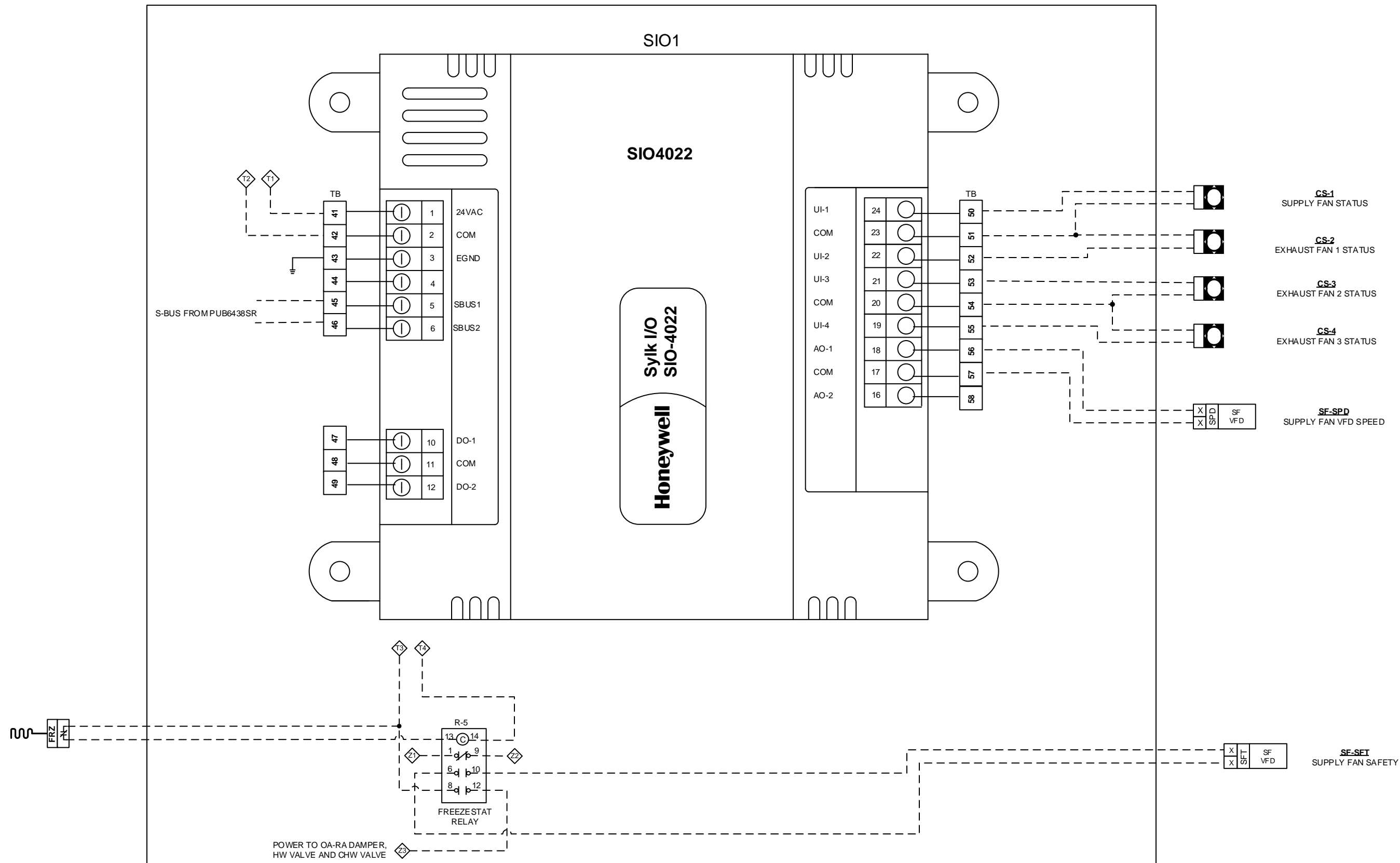
AHU-2 & EF-1,2,3 WIRING DIAGRAM PAGE 1



PANEL TO BE CONTINUED ON NEXT PAGE

PANEL LOCATION FOR AHU-2: HVAC ROOM – GROUND FLOOR


AHU-2 & EF-1,2,3 WIRING DIAGRAM PAGE 2



PANEL LOCATION FOR AHU-2: HVAC ROOM – GROUND FLOOR

LEGEND	Description
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

NO.	DATE	REVISION	BY
0	04-11-2019	SAMPLE PROJECT	ICT


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 Astoria, NY 11103
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Project: SAMPLE PROJECT	
AHU-2 & EF-1,2,3 WIRING DIAGRAM PAGE 2	
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AHU-2 SEQUENCE OF OPERATION

TIME SCHEDULES

THE TIME SCHEDULES SHALL BE PROGRAMMED THROUGH THE MAIN FRONT END OPERATOR STATION AND STORED IN THE INDIVIDUAL CONTROLLERS. TIME SCHEDULES SHALL BE COORDINATED WITH THE BUILDING OWNER AT COMPLETION OF THE PROJECT, OR AS LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION SCHEDULES.

SYSTEM DE-ENERGIZED

WHEN THE SYSTEM IS DE-ENERGIZED, THE OUTDOOR AIR DAMPER SHALL CLOSE, THE RETURN AIR DAMPER SHALL OPEN, THE SUPPLY AIR FAN SHALL BE DE-ENERGIZED.

SYSTEM ENERGIZED

OCCUPIED MODE

THE DAYS AND TIMES GOVERNING THIS MODE OF OPERATION SHALL BE DICTATED BY THE OWNER AND PROGRAMMED INTO THE BMS SYSTEM.

THE BMS SYSTEM SHALL INITIATE THE OCCUPIED MODE. THE OUTDOOR AIR DAMPER SHALL OPEN TO ITS MINIMUM VENTILATION POSITION, AND THE RETURN AIR DAMPER SHALL POSITION ITSELF ACCORDINGLY. THE SUPPLY AIR FAN SHALL START. THE SUPPLY AIR FAN SHALL RAMP UP OR DOWN VIA THE VARIABLE FREQUENCY DRIVE (VFD) MAINTAINING A CONSTANT STATIC PRESSURE OF 1.0" W.G. (ADJUSTABLE) AT THE POINT WHERE THE DUCT-MOUNTED STATIC PRESSURE SENSOR IS LOCATED.

DISCHARGE AIR TEMPERATURE CONTROL

THE AHU SHALL MAINTAIN CONSTANT DISCHARGE AIR TEMPERATURE AS DICTATED BY THE DISCHARGE AIR TEMPERATURE SETPOINT. THE CHILLED WATER CONTROL VALVE SHALL BE MODULATED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET BASED ON THE DISCHARGE AIR TEMPERATURE RESET SCHEDULE LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION AND SCHEDULES.

THE HOT WATER COIL VALVE SHALL BE MODULATED TO MAINTAIN A MINIMUM OF 55T LEAVING AIR TEMPERATURE. THE CONTROL VALVE SHALL BE MODULATED TO PROVIDE HIGHER LEAVING AIR TEMPERATURES AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.

A RETURN AIR DUCT MOUNTED SENSOR SHALL MONITOR THE RETURN AIR TEMPERATURE. THE BMS SHALL RESET SUPPLY TEMPERATURE TO PROVIDE ADEQUATE COOLING.

ECONOMIZER MODE

WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 55°F, CHILLED WATER SHALL BE PROVIDED FOR COOLING. WHEN THE OUTDOOR AIR TEMPERATURE IS AT OR BELOW 55°F, THE OUTDOOR AIR DAMPER SHALL BE MODULATED OPEN TO PROVIDE FREE COOLING. AS THE OUTDOOR AIR DAMPER MODULATES OPEN, THE RETURN AIR DAMPER SHALL CORRESPONDINGLY MODULATE TOWARD ITS CLOSED POSITION. THE LOCAL CONTROLS SHALL LIMIT THE MIXED AIR TEMPERATURE FROM FALLING BELOW 52°F.

SPACE TEMPERATURE CONTROL

THE SPACE TEMPERATURE FOR EACH ZONE IS CONTROLLED BY THE VARIABLE AIR VOLUME (VAV) BOXES WHICH HAVE THEIR INDIVIDUAL TEMPERATURE SENSORS.

UNOCCUPIED MODE

THE DAYS AND TIMES GOVERNING THIS MODE OF OPERATION SHALL BE DICTATED BY THE OWNER AND PROGRAMMED INTO THE BMS SYSTEM.

WHEN THE SYSTEM IS INDEXED TO THE UNOCCUPIED MODE THE OUTDOOR AIR DAMPER SHALL MOVE TO IT'S FULLY CLOSED POSITION, THE SUPPLY FAN SHALL BE DE-ENERGIZED AND THE VAV BOXES SHALL MOVE TO THEIR FULLY OPEN POSITION.

IF DURING THE UNOCCUPIED MODE THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SPACE HEATING TEMPERATURE THE AHU SHALL START, THE STEAM VALVE SHALL BE OPENED TO THE FULLY OPENED POSITION TO PROVIDE HEATING TO THE AREA. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED SPACE HEATING SETPOINT, THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

IF DURING THE UNOCCUPIED MODE THE SPACE TEMPERATURE RISES ABOVE THE SPACE UNOCCUPIED COOLING TEMPERATURE SETPOINT THE UNIT SHALL START AND THE COOLING COIL VALVE SHALL MOVE TO THE OPEN POSITION TO MAINTAIN THE DISCHARGE AIR TEMPERATURE CONTROL SETPOINT TO PROVIDE COOLING FOR THE SPACE. ONCE THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SPACE TEMPERATURE SETPOINT, THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

MORNING WARM UP

IF THE RETURN AIR TEMPERATURE IS BELOW THE MORNING WARM UP SETPOINT WHEN THE UNIT IS INITIATED TO BEGIN THE OCCUPIED MODE THE UNIT SHALL ENTER THE MORNING WARM UP MODE. THE OUTDOOR AIR DAMPER SHALL REMAIN IN THE CLOSED POSITION. THE COOLING COIL VALVE WILL REMAIN CLOSED AND THE UNIT WILL CONTINUE TO OPERATE WITH THE FANS ONLY. ONCE THE RETURN AIR TEMPERATURE RISES ABOVE THE MORNING WARM UP SETPOINT, THE UNIT WILL ENTER THE OCCUPIED MODE.

SETPOINTS

1. DISCHARGE AIR TEMPERATURE SETPOINT 55°F (ADJ)
2. SUPPLY STATIC PRESSURE 1" WC (ADJ)
3. MORNING WARM UP MODE SETPOINT 74°F (ADJ)
4. OCCUPIED COOLING SETPOINT 74°F (ADJ)
5. OCCUPIED HEATING SETPOINT 70°F (ADJ)
6. UNOCCUPIED COOLING SETPOINT 80°F (ADJ)
7. UNOCCUPIED HEATING SETPOINT 65°F (ADJ)

SMOKE DETECTOR

UPON INDICATION OF SMOKE THE RETURN AIR SMOKE DETECTOR SHALL SHUT DOWN THE UNIT. SUPPLY FAN SHALL BE DE-ENERGIZED. THE OUTSIDE DAMPER SHALL RETURN TO ITS FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL RETURN TO THE FULLY OPEN POSITION. THE UNIT SHALL REMAIN IN THIS STATE UNTIL IT IS MANUALLY RESET FOR NORMAL OPERATION.

FREEZE PROTECTION


UPON DETECTION OF A FREEZING POTENTIAL THE FREEZE PROTECTION THERMOSTAT SHALL SHUT DOWN THE UNIT. SUPPLY FAN SHALL BE DE-ENERGIZED. THE OUTSIDE IT DAMPER SHALL RETURN TO IT'S FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL RETURN TO THE FULLY OPEN POSITION. THE HOT WATER COIL VALVE SHALL OPEN TO ITS FULLY OPEN POSITION. THE UNIT SHALL REMAIN IN THIS STATE UNTIL THE FREEZE PROTECTION THERMOSTAT IS MANUALLY RESET.

ALARMS

ALARMS SHALL BE GENERATED THROUGH THE BMS SYSTEM AND SHALL INCLUDE:

1. SUPPLY FAN FAILURE
2. SUPPLY TEMP TOO HIGH
3. SUPPLY AIR TEMP TOO LOW
4. RETURN AIR TOO HIGH
5. UNABLE TO MAINTAIN STATIC PRESSURE
6. MIXED AIR TEMP TOO LOW
7. FREEZE PROTECTION THERMOSTAT ACTIVATED
8. VFD FAULT
9. SMOKE DETECTOR ACTIVATED

*NOTE: ENGINEER TO PROVIDE DISCHARGE AIR RESET SCHEDULE IF REQUIRED

LEGEND	----- Low Voltage, 18 AWG, Copper Wire				 32-72 Steinway St, 502 Astoria, NY 11103 (M) 718 350 8716	Project: SAMPLE PROJECT
 Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance					AHU-2 SEQUENCE OF OPERATION
	_____ Line Voltage, THHN Field Wiring					Job No. _____ Page 19 of 48
	0	04-11-2019	SAMPLE PROJECT	ICT		
	NO.	DATE	REVISION	BY		

AHU-2 & EF-1,2,3 BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	Programmable Controller	C1	PUB6438SR	1	Honeywell Spyder Controller with 6UI, 4DI,3AO, 8DO, Dimensions 5.45in High X 6.85in wideX2.26in deep	Honeywell
2	I/O Module	SIO1	SIO4022	1	Sylk IO Module with4UI, 2AO, 2DO	Honeywell
3	Averaging Air Temperature	MAT, PH-T, DAT	A/20K-FA-12'-GD	3	20K ohm NTC Duct Averaging Temp Sensor, 12' Flexible Cable	ACI
4	Return Air Temperature	RAT	A/20K-D-12"-GD	1	20K ohm NTC Duct Temp Sensor, 12" length, Galvanized	ACI
5	Duct static pressure	DSP	MS-312	1	Differential pressure transmitter, 0-10 V output, selectable range 1", 2", 5" w.c., duct mount	Dwyer
6	Differential pressure switch	DPS-1	ADPS-04-2-N-C	2	Adjustable Differential Pressure Switch, Set Point Range in w.c. (Pa) 0.12 to 1.60 (30-400), W/ install kit	Dwyer
7	Freezestat	FRZ	DFS-DM10	1	Low limit temperature control, DPDT, Manual reset, 10' capillary	Dwyer
8	Current Transducer	CS-1 THRU 4	C-2300	4	Analog Current Sensors, 0-10VDC output , 30A, 60A & 120A Selectable Range split-cores	Senva
9	Relay	R-1 THRU 4	RIBU1C	4	Universal RIB Relay	Functional Devices
10	Panel Mounted Relay	R-5	783-3C-24A	1	Ice cube control relay, 24VAC coil voltage, 3PDT, 15A contact rating, with LED indicator	Automation Direct
11	Base	R-5	783-3C-SKT-1	1	Relay socket DIN Rail Mounted	Automation Direct
12	Panel	CP-3	SCE-24N2406LP	1	Saginaw, 24"H X 24"W X 6" Depth Nema1 enclosure, steel ANSI61-Grey	Saginaw
13	Perforated Subpanel	CP-3	SCE-24N24MP	1	Subpanel, Nema-1	Saginaw
14	Transformer	TR1,TR2	10051MWCB	2	Mult-Tap Class 2, 100VA, 120,208,240,277,480 Integrated overcurrent breaker	Senva

LEGEND

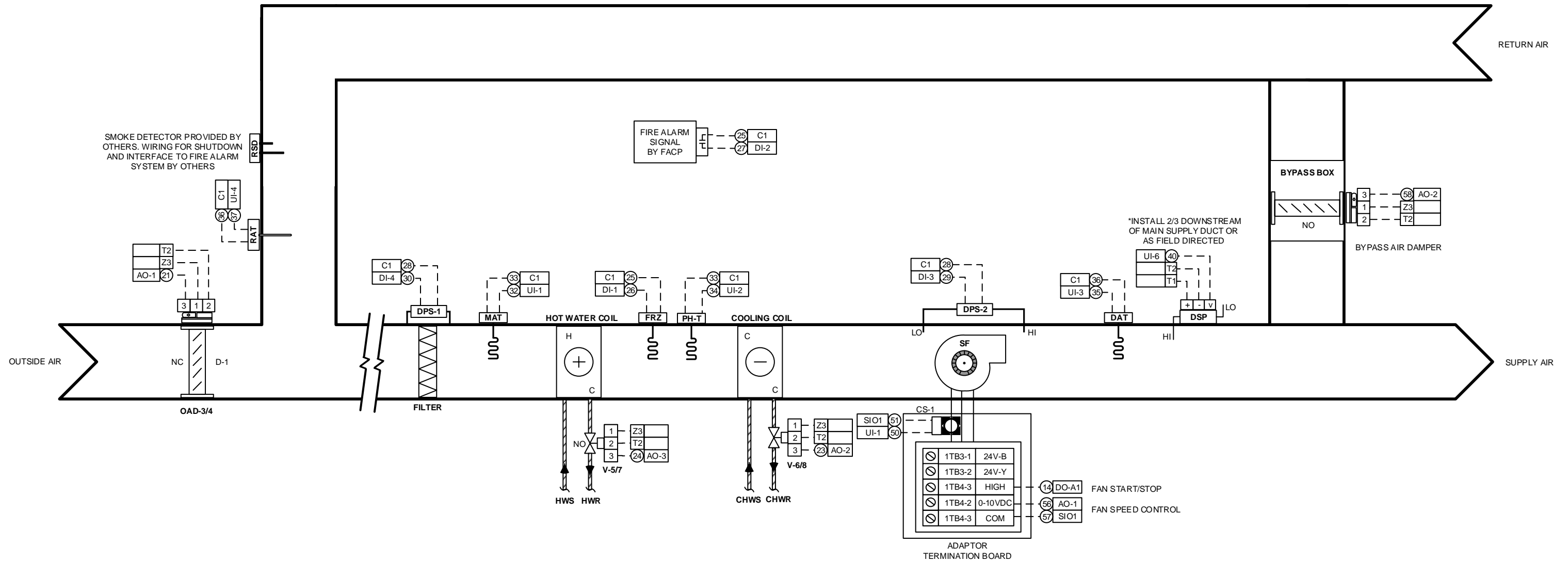
- - - - - Low Voltage, 18 AWG, Copper Wire
 - · - · - · Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
 _____ Line Voltage, THHN Field Wiring

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AHU-3 & 4 SCHEMATIC DIAGRAM

TYPICAL OF 2



LEGEND	DESCRIPTION
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

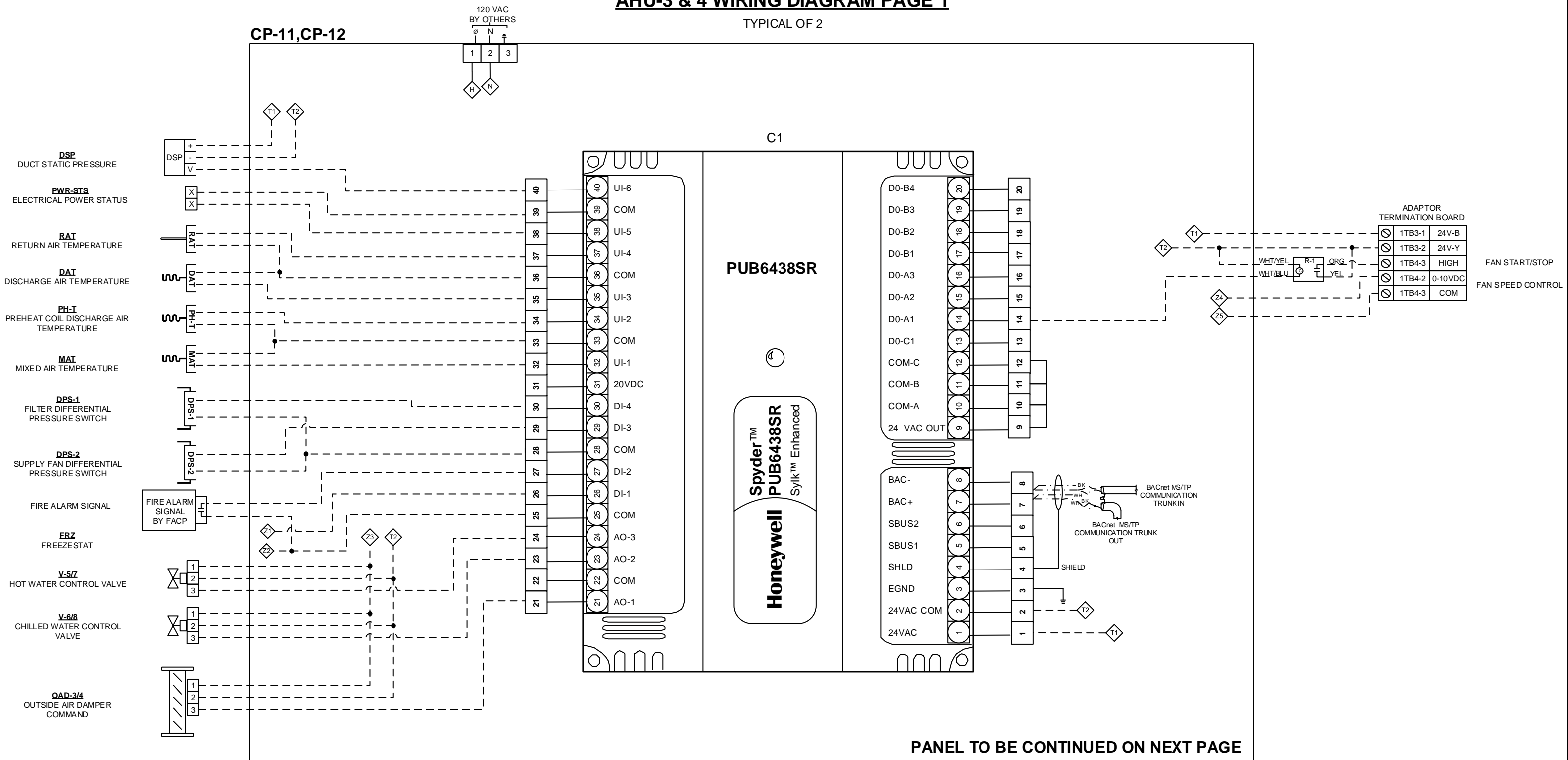
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AHU-3 & 4 WIRING DIAGRAM PAGE 1


TYPICAL OF 2



PANEL LOCATION FOR AHU-3: REST-THIRD FLOOR
 PANEL LOCATION FOR AHU-4: MECHANICAL ROOM – FOURTH FLOOR

LEGEND	Description
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

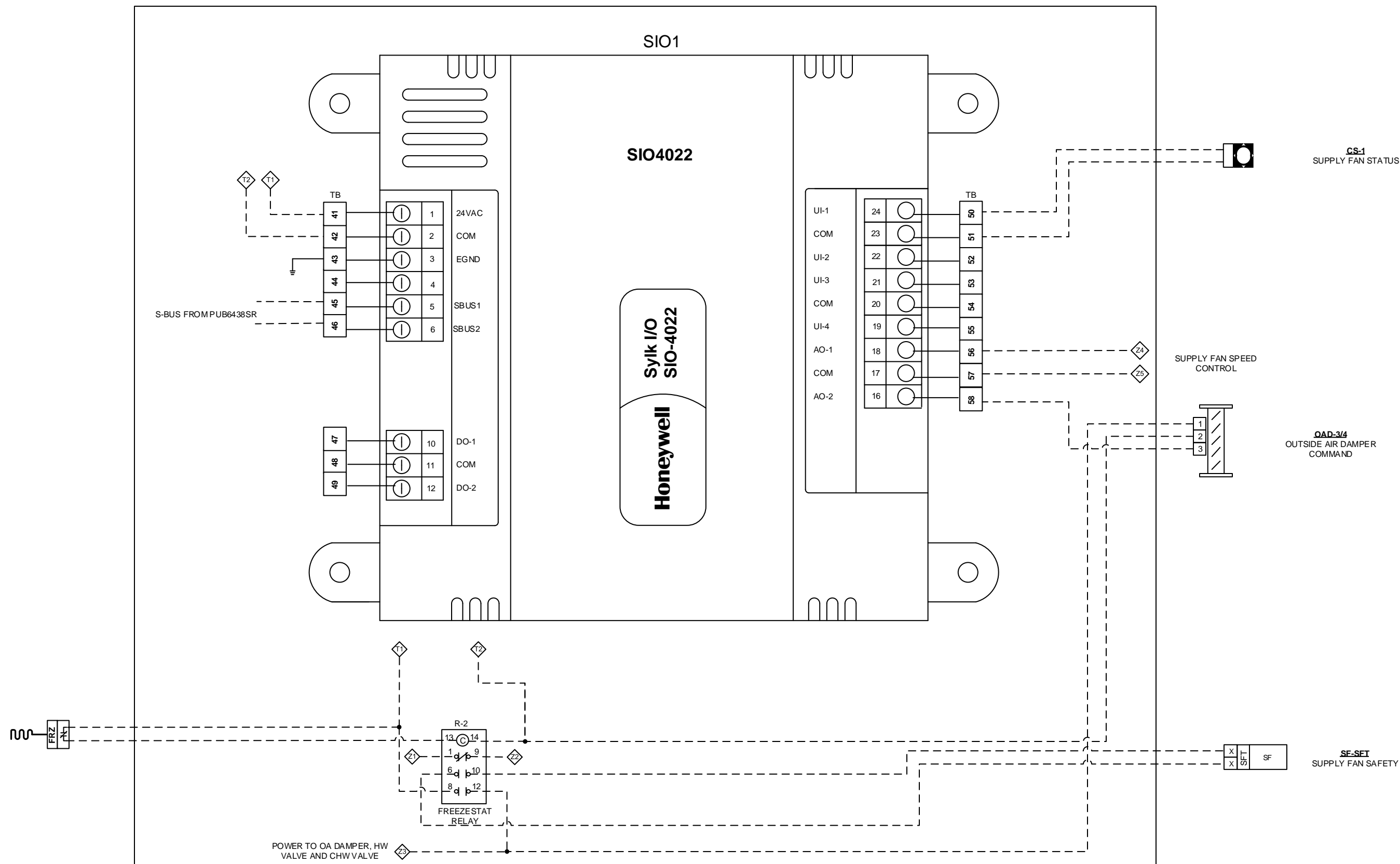
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AHU-3 & 4 WIRING DIAGRAM PAGE 2


TYPICAL OF 2



PANEL LOCATION FOR AHU-2: HVAC ROOM – GROUND FLOOR

LEGEND	DESCRIPTION
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

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AHU-3 & 4 SEQUENCE OF OPERATION

TIME SCHEDULES

THE TIME SCHEDULES SHALL BE PROGRAMMED THROUGH THE MAIN FRONT END OPERATOR STATION AND STORED IN THE INDIVIDUAL CONTROLLERS TIME SCHEDULES SHALL BE COORDINATED WITH THE BUILDING OWNER AT COMPLETION OF THE PROJECT, OR AS LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION SCHEDULES.

SYSTEM DE-ENERGIZED

WHEN THE SYSTEM IS DE-ENERGIZED, THE OUTDOOR AIR AND EXHAUST DAMPERS SHALL CLOSE, THE RETURN AIR DAMPER SHALL OPEN, THE SUPPLY AND RETURN AIR FANS SHALL BE DE-ENERGIZED.

SYSTEM ENERGIZED

OCCUPIED MODE

THE DAYS AND TIMES GOVERNING THIS MODE OF OPERATION SHALL BE DICTATED BY THE OWNER AND PROGRAMMED INTO THE BMS SYSTEM. THE BMS SYSTEM SHALL INITIATE THE OCCUPIED MODE. THE OUTDOOR AIR DAMPER SHALL OPEN TO ITS MINIMUM VENTILATION POSITION, AND THE RETURN AIR DAMPER SHALL POSITION ITSELF ACCORDINGLY. THE SUPPLY AIR FAN SHALL START. THE SUPPLY AIR FAN SHALL RAMP UP OR DOWN VIA THE VARIABLE FREQUENCY DRIVE (VFD) MAINTAINING A CONSTANT STATIC PRESSURE OF 1.0" W.G. (ADJUSTABLE) AT THE POINT WHERE THE DUCT-MOUNTED STATIC PRESSURE SENSOR IS LOCATED. RETURN FAN SHALL START AND MAINTAIN THE REQUIRED AIRFLOW TO MAINTAIN A SLIGHT POSITIVE PRESSURE (0.01" WC) WITHIN THE BUILDING.

DISCHARGE AIR TEMPERATURE CONTROL

THE AHU SHALL MAINTAIN CONSTANT DISCHARGE AIR TEMPERATURE AS DICTATED BY THE DISCHARGE AIR TEMPERATURE SETPOINT. THE CHILLED WATER CONTROL VALVE SHALL BE MODULATED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET BASED ON THE DISCHARGE AIR TEMPERATURE RESET SCHEDULE LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION AND SCHEDULES. THE HOT WATER COIL VALVE SHALL BE MODULATED TO MAINTAIN A MINIMUM OF 55°F LEAVING AIR TEMPERATURE. THE CONTROL VALVE SHALL BE MODULATED TO PROVIDE HIGHER LEAVING AIR TEMPERATURES AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. A RETURN AIR DUCT MOUNTED SENSOR SHALL MONITOR THE RETURN AIR TEMPERATURE. THE BMS SHALL RESET SUPPLY TEMPERATURE TO PROVIDE ADEQUATE COOLING.

SPACE TEMPERATURE CONTROL

THE SPACE TEMPERATURE FOR EACH ZONE IS CONTROLLED BY THE VARIABLE AIR VOLUME (VAV) BOXES WHICH HAVE THEIR INDIVIDUAL TEMPERATURE SENSORS.

BYPASS BOX

THE BYPASS BOX SHALL MODULATE OPEN AS THE SUPPLY AIR DUCT STATIC PRESSURE INCREASES AND MODULATE CLOSED AS THE SUPPLY AIR DUCT STATIC PRESSURE DECREASES.

AHU-3 AND AHU-4 ARE CONSTANT VOLUME UNITS UTILIZED WITH VAV BOXES. THEREFORE, AS THE VAV BOXES CLOSE AND THE DUCT STATIC RISES ABOVE 1.0 INWC THE BYPASS BOX DAMPER SHALL MODULATE TOWARDS THE OPEN POSITION TO ALLOW SUPPLY AIR TO RECIRCULATE BACK TO THE RETURN AIR SECTION AND MAINTAINING THE 1INWC SUPPLY DUCT STATIC PRESSURE. AS THE SUPPLY AIR DUCT STATIC PRESSURE FALLS BELOW 0.75 INWC THE BYPASS BOX SHALL MODULATE CLOSED TO INCREASE THE SUPPLY STATIC PRESSURE. THE BYPASS BOX DAMPER SHALL BE WITH FULL MODULATION FORM 0% OPEN TO 100% OPEN.

UNOCCUPIED MODE

THE DAYS AND TIMES GOVERNING THIS MODE OF OPERATION SHALL BE DICTATED BY THE OWNER AND PROGRAMMED INTO THE BMS SYSTEM.

WHEN THE SYSTEM IS INDEXED TO THE UNOCCUPIED MODE THE OUTDOOR AIR DAMPER SHALL MOVE TO IT'S FULLY CLOSED POSITION, THE SUPPLY FAN AND RETURN FAN SHALL BE DE-ENERGIZED AND THE VAV BOXES SHALL MOVE TO THEIR FULLY OPEN POSITION.

IF DURING THE UNOCCUPIED MODE THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SPACE HEATING TEMPERATURE THE AHU SHALL START, THE STEAM VALVE SHALL BE OPENED TO THE FULLY OPENED POSITION TO PROVIDE HEATING TO THE AREA. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED SPACE HEATING SETPOINT, THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

IF DURING THE UNOCCUPIED MODE THE SPACE TEMPERATURE RISES ABOVE THE SPACE UNOCCUPIED COOLING TEMPERATURE SETPOINT THE UNIT SHALL START AND THE COOLING COIL VALVE SHALL MOVE TO THE OPEN POSITION TO MAINTAIN THE DISCHARGE AIR TEMPERATURE CONTROL SETPOINT TO PROVIDE COOLING FOR THE SPACE. ONCE THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SPACE TEMPERATURE SETPOINT, THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

MORNING WARM UP

IF THE RETURN AIR TEMPERATURE IS BELOW THE MORNING WARM UP SETPOINT WHEN THE UNIT IS INITIATED TO BEGIN THE OCCUPIED MODE THE UNIT SHALL ENTER THE MORNING WARM UP MODE. THE OUTDOOR AIR DAMPER SHALL REMAIN IN THE CLOSED POSITION. THE COOLING COIL VALVE WILL REMAIN CLOSED AND THE UNIT WILL CONTINUE TO OPERATE WITH THE FANS ONLY. ONCE THE RETURN AIR TEMPERATURE RISES ABOVE THE MORNING WARM UP SETPOINT, THE UNIT WILL ENTER THE OCCUPIED MODE.

SETPOINTS

1. DISCHARGE AIR TEMPERATURE SETPOINT 55°F (ADJ)
2. SUPPLY STATIC PRESSURE 1" WC (ADJ)
3. MORNING WARM UP MODE SETPOINT 74°F (ADJ)
4. OCCUPIED COOLING SETPOINT 74°F (ADJ)
5. OCCUPIED HEATING SETPOINT 70°F (ADJ)
6. UNOCCUPIED COOLING SETPOINT 80°F (ADJ)
7. UNOCCUPIED HEATING SETPOINT 65°F (ADJ)

SMOKE DETECTOR

UPON INDICATION OF SMOKE THE RETURN AIR SMOKE DETECTOR SHALL SHUT DOWN THE UNIT. BOTH SUPPLY AND RETURN FANS SHALL BE DE-ENERGIZED. THE OUTSIDE DAMPER SHALL RETURN TO IT'S FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL RETURN TO THE FULLY OPEN POSITION. THE UNIT SHALL REMAIN IN THIS STATE UNTIL THE SMOKE DETECTOR IS MANUALLY RESET.

FREEZE PROTECTION

UPON DETECTION OF A FREEZING POTENTIAL THE FREEZE PROTECTION THERMOSTAT SHALL SHUT DOWN THE UNIT. BOTH SUPPLY AND RETURN FANS SHALL BE DE-ENERGIZED. THE OUTSIDE IT DAMPER SHALL RETURN TO IT'S FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL RETURN TO THE FULLY OPEN POSITION. THE HOT WATER COIL VALVE SHALL OPEN TO ITS FULLY OPEN POSITION. THE UNIT SHALL REMAIN IN THIS STATE UNTIL THE FREEZE PROTECTION THERMOSTAT IS MANUALLY RESET.


ALARMS

ALARMS SHALL BE GENERATED THROUGH THE BMS SYSTEM AND SHALL INCLUDE:

1. SUPPLY FAN FAILURE
2. RETURN FAN FAILURE
3. SUPPLY TEMP TOO HIGH
4. SUPPLY AIR TEMP TOO LOW
5. RETURN AIR TOO HIGH
6. UNABLE TO MAINTAIN STATIC PRESSURE
7. MIXED AIR TEMP TOO LOW
8. FREEZE PROTECTION THERMOSTAT ACTIVATED
9. VFD FAULT
10. SMOKE DETECTOR ACTIVATED

*NOTE: ENGINEER TO PROVIDE DISCHARGE AIR RESET SCHEDULE IF REQUIRED

LEGEND	----- Low Voltage, 18 AWG, Copper Wire			
	----- Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance			
	_____ Line Voltage, THHN Field Wiring			
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Project: **SAMPLE PROJECT**

AHU-3 & 4 SEQUENCE OF OPERATION

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AHU-3 & 4 BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	Programmable Controller	C1	PUB6438SR	2	Honeywell Spyder Controller with 6UI, 4DI,3AO, 8DO, Dimensions 5.45in High X 6.85in wideX2.26in deep	Honeywell
2	I/O Module	SIO1	SIO4022	2	Sylk IO Module with4UI, 2AO, 2DO	Honeywell
3	Averaging Air Temperature	MAT, PH-T, DAT	A/20K-FA-12'-GD	6	20K ohm NTC Duct Averaging Temp Sensor, 12' Flexible Cable	ACI
4	Return Air Temperature	RAT	A/20K-D-12"-GD	2	20K ohm NTC Duct Temp Sensor, 12" length, Galvanized	ACI
5	Duct static pressure	DSP	MS-312	2	Differential pressure transmitter, 0-10 V output, selectable range 1", 2", 5" w.c., duct mount	Dwyer
6	Differential pressure switch	DPS-1	ADPS-04-2-N-C	4	Adjustable Differential Pressure Switch, Set Point Range in w.c. (Pa) 0.12 to 1.60 (30-400), W/ install kit	Dwyer
7	Freezestat	FRZ	DFS-DM10	2	Low limit temperature control, DPDT, Manual reset, 10' capillary	Dwyer
8	Current Transducer	CS-1,2	C-2300	2	Analog Current Sensors, 0-10VDC output , 30A, 60A & 120A Selectable Range split-cores	Senva
9	Relay	R-1	RIBU1C	1	Field Mounted RIBU1C relay	Functional Devices
10	Panel Mounted Relay	R-2	783-3C-24A	1	Ice cube control relay, 24VAC coil voltage, 3PDT, 15A contact rating, with LED indicator	Automation Direct
11	Base	R-2	783-3C-SKT-1	1	Relay socket DIN Rail Mounted	Automation Direct
12	Panel	CP-11,CP-12	SCE-24N2406LP	2	Saginaw, 24"H X 24"W X 6" Depth Nema1 enclosure, steel ANSI61-Grey	Saginaw
13	Perforated Subpanel	CP-11,CP-12	SCE-24N24MP	2	Subpanel, Nema-1	Saginaw

LEGEND

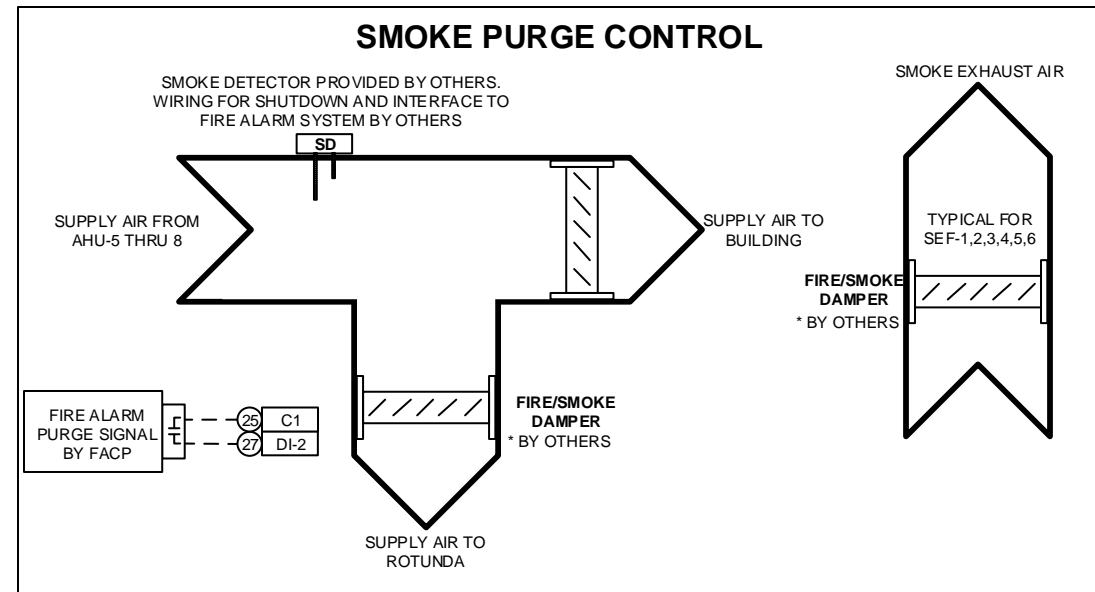
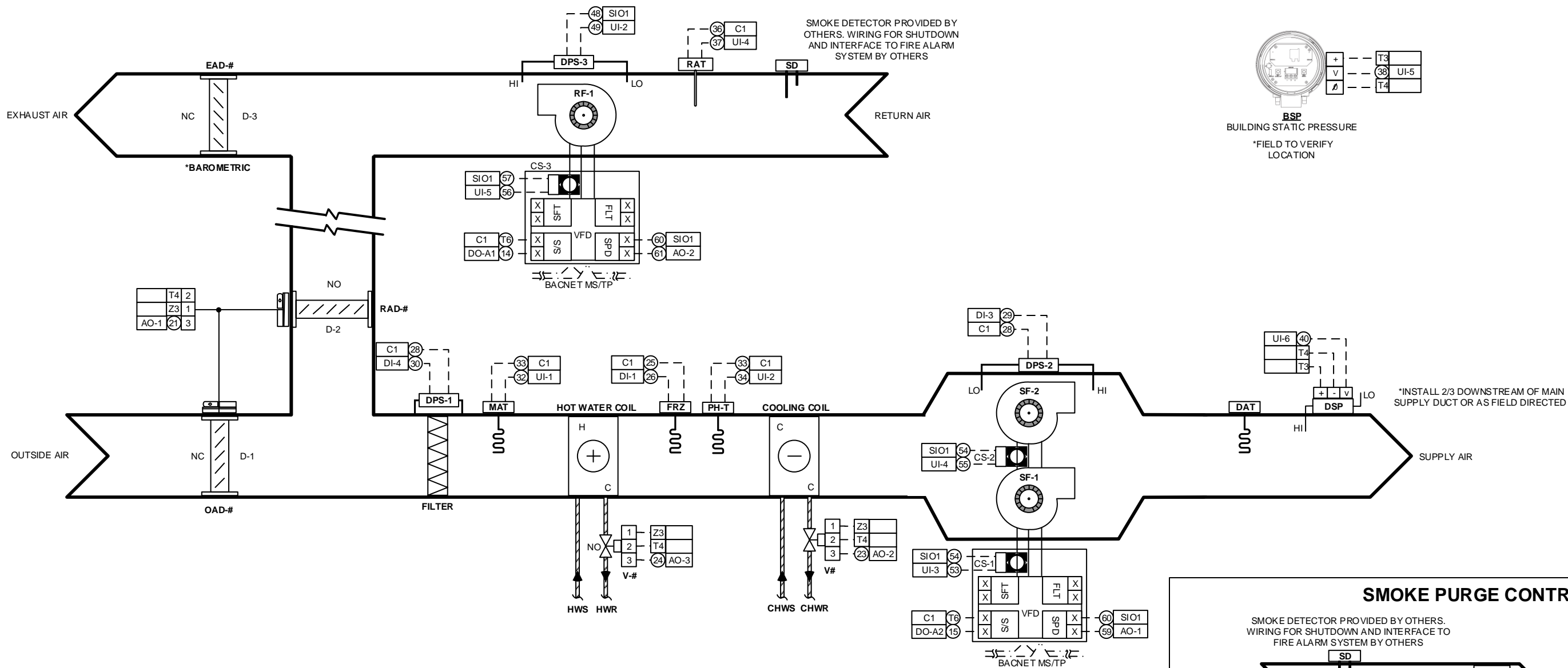
----- Low Voltage, 18 AWG, Copper Wire
 - - - - - Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
 _____ Line Voltage, THHN Field Wiring

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AHU-5 THRU 8 / RF-2 THRU 5, SMOKE PURGE CONTROL SCHEMATIC DIAGRAM


TYPICAL OF 4



- *NOTE:
1. INTERLOCK WIRING OF FIRE/SMOKE DAMPERS AND FAN VFD/STARTER IS BY OTHERS.
 2. SEF-1 THRU 6 CONSIDERED TO BE CONTROLLED BY OTHERS.
 3. ENGINEER TO VERIFY WHETHER DAMPER IS BAROMETRIC OR MOTORIZED

LEGEND	DESCRIPTION
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

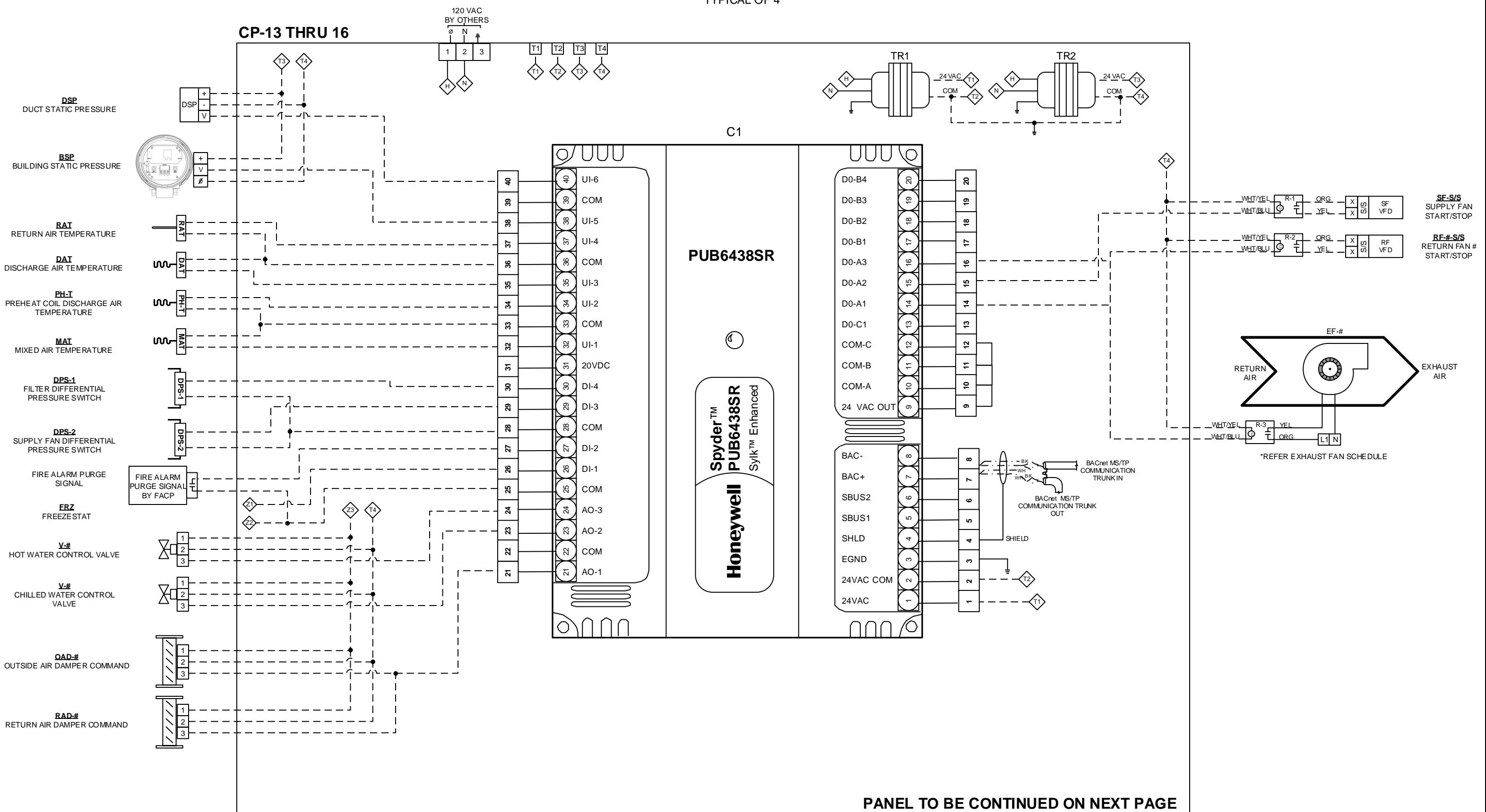
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AHU-5 THRU 8 / RF-2 THRU 5, SMOKE PURGE CONTROL SCHEMATIC DIAGRAM	
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AHU-5 THRU 8 / RF-2 THRU 5 / EF- 5 THRU 8 WIRING DIAGRAM PAGE 1


TYPICAL OF 4



PANEL LOCATION FOR AHU-5 THRU 8: MECHANICAL ROOM – FOURTH FLOOR

LEGEND	Description
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

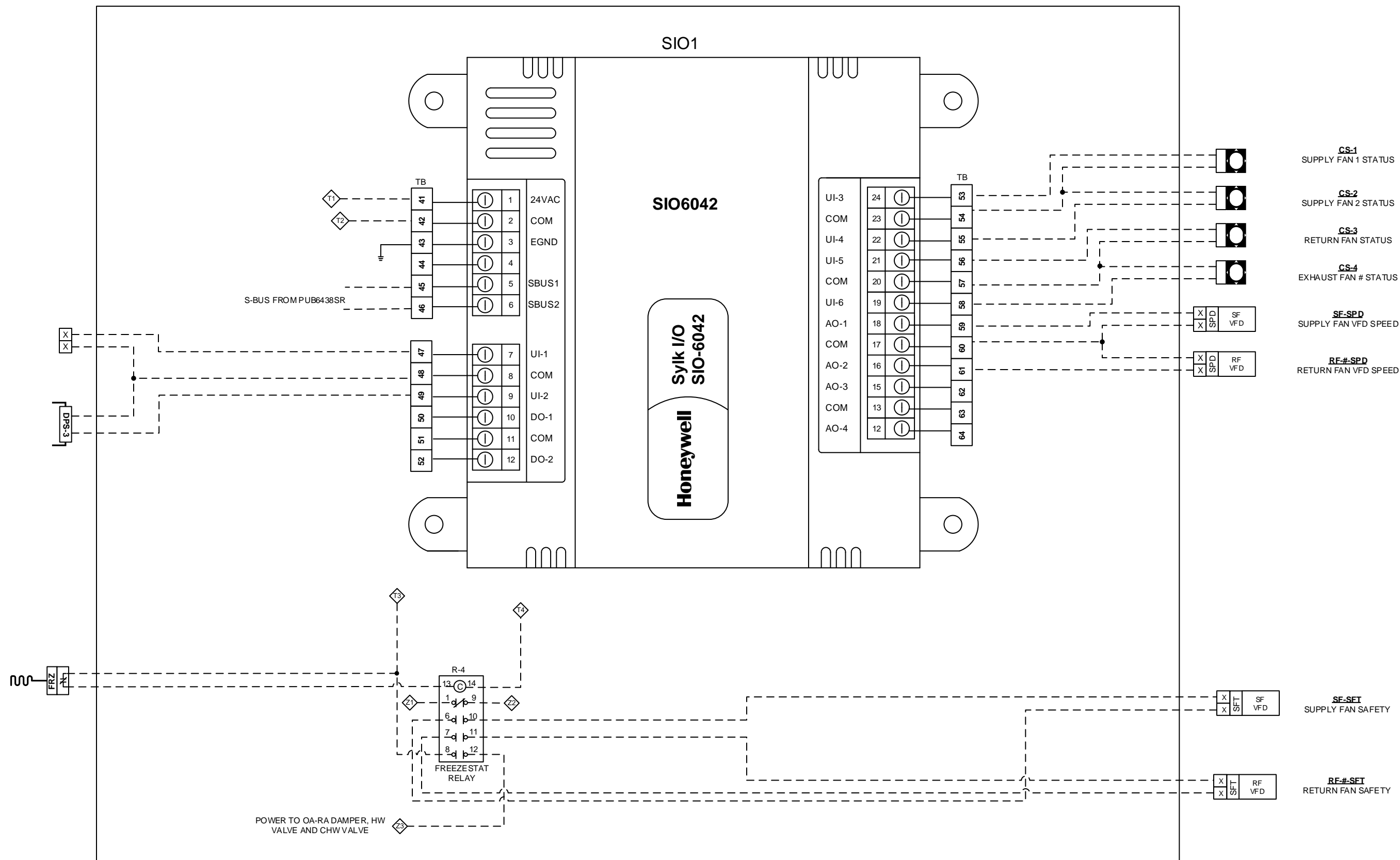
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AHU-5 THRU 8 / RF-2 THRU 5 / EF- 5 THRU 8 WIRING DIAGRAM PAGE 2


TYPICAL OF 4



PANEL LOCATION FOR AHU-1: STORAGE - BASEMENT

LEGEND	Description
---	Low Voltage, 18 AWG, Copper Wire
- - - - -	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
—	Line Voltage, THHN Field Wiring

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AHU-5 THRU 8 / RF-2 THRU 5 / EF- 5 THRU 8 WIRING DIAGRAM PAGE 2	
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AHU-5 THRU 8 / RF-2 THRU 5 & SMOKE PURGE CONTROL SEQUENCE OF OPERATION

TIME SCHEDULES

THE TIME SCHEDULES SHALL BE PROGRAMMED THROUGH THE MAIN FRONT END OPERATOR STATION AND STORED IN THE INDIVIDUAL CONTROLLERS. TIME SCHEDULES SHALL BE COORDINATED WITH THE BUILDING OWNER AT COMPLETION OF THE PROJECT, OR AS LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION SCHEDULES.

SYSTEM DE-ENERGIZED

WHEN THE SYSTEM IS DE-ENERGIZED, THE OUTDOOR AIR AND EXHAUST DAMPERS SHALL CLOSE, THE RETURN AIR DAMPER SHALL OPEN, THE SUPPLY AND RETURN AIR FANS SHALL BE DE-ENERGIZED.

SYSTEM ENERGIZED OCCUPIED MODE

THE DAYS AND TIMES GOVERNING THIS MODE OF OPERATION SHALL BE DICTATED BY THE OWNER AND PROGRAMMED INTO THE BMS SYSTEM.

THE BMS SYSTEM SHALL INITIATE THE OCCUPIED MODE. THE OUTDOOR AIR DAMPER SHALL OPEN TO ITS MINIMUM VENTILATION POSITION, AND THE RETURN AIR DAMPER SHALL POSITION ITSELF ACCORDINGLY. THE SUPPLY AIR FAN SHALL START. THE SUPPLY AIR FAN SHALL RAMP UP OR DOWN VIA THE VARIABLE FREQUENCY DRIVE (VFD) MAINTAINING A CONSTANT STATIC PRESSURE OF 1.0" W.G. (ADJUSTABLE) AT THE POINT WHERE THE DUCT-MOUNTED STATIC PRESSURE SENSOR IS LOCATED. RETURN FAN SHALL START AND MAINTAIN THE REQUIRED AIRFLOW TO MAINTAIN A SLIGHT POSITIVE PRESSURE (0.01" WC) WITHIN THE BUILDING.

DISCHARGE AIR TEMPERATURE CONTROL

THE AHU SHALL MAINTAIN CONSTANT DISCHARGE AIR TEMPERATURE AS DICTATED BY THE DISCHARGE AIR TEMPERATURE SETPOINT. THE CHILLED WATER CONTROL VALVE SHALL BE MODULATED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE. THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET BASED ON THE DISCHARGE AIR TEMPERATURE RESET SCHEDULE LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION AND SCHEDULES.

THE HOT WATER COIL VALVE SHALL BE MODULATED TO MAINTAIN A MINIMUM OF 55T LEAVING AIR TEMPERATURE. THE CONTROL VALVE SHALL BE MODULATED TO PROVIDE HIGHER LEAVING AIR TEMPERATURES AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.

A RETURN AIR DUCT MOUNTED SENSOR SHALL MONITOR THE RETURN AIR TEMPERATURE. THE BMS SHALL RESET SUPPLY TEMPERATURE TO PROVIDE ADEQUATE COOLING.

ECONOMIZER MODE

WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 55°F, CHILLED WATER SHALL BE PROVIDED FOR COOLING. WHEN THE OUTDOOR AIR TEMPERATURE IS AT OR BELOW 55°F, THE OUTDOOR AIR DAMPER SHALL BE MODULATED OPEN TO PROVIDE FREE COOLING. AS THE OUTDOOR AIR DAMPER MODULATES OPEN, THE RETURN AIR DAMPER SHALL CORRESPONDINGLY MODULATE TOWARD ITS CLOSED POSITION. THE LOCAL CONTROLS SHALL LIMIT THE MIXED AIR TEMPERATURE FROM FALLING BELOW 52°F.

SPACE TEMPERATURE CONTROL

THE SPACE TEMPERATURE FOR EACH ZONE IS CONTROLLED BY THE VARIABLE AIR VOLUME (VAV) BOXES WHICH HAVE THEIR INDIVIDUAL TEMPERATURE SENSORS.

UNOCCUPIED MODE

THE DAYS AND TIMES GOVERNING THIS MODE OF OPERATION SHALL BE DICTATED BY THE OWNER AND PROGRAMMED INTO THE BMS SYSTEM.

WHEN THE SYSTEM IS INDEXED TO THE UNOCCUPIED MODE THE OUTDOOR AIR DAMPER

SHALL MOVE TO IT'S FULLY CLOSED POSITION, THE SUPPLY FAN AND RETURN FAN SHALL BE DE-ENERGIZED AND THE VAV BOXES SHALL MOVE TO THEIR FULLY OPEN POSITION.

IF DURING THE UNOCCUPIED MODE THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SPACE HEATING TEMPERATURE THE AHU SHALL START, THE STEAM VALVE SHALL BE OPENED TO THE FULLY OPENED POSITION TO PROVIDE HEATING TO THE AREA. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED SPACE HEATING SETPOINT, THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

IF DURING THE UNOCCUPIED MODE THE SPACE TEMPERATURE RISES ABOVE THE SPACE UNOCCUPIED COOLING TEMPERATURE SETPOINT THE UNIT SHALL START AND THE COOLING COIL VALVE SHALL MOVE TO THE OPEN POSITION TO MAINTAIN THE DISCHARGE AIR TEMPERATURE CONTROL SETPOINT TO PROVIDE COOLING FOR THE SPACE. ONCE THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SPACE TEMPERATURE SETPOINT, THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

MORNING WARM UP

IF THE RETURN AIR TEMPERATURE IS BELOW THE MORNING WARM UP SETPOINT WHEN THE UNIT IS INITIATED TO BEGIN THE OCCUPIED MODE THE UNIT SHALL ENTER THE MORNING WARM UP MODE. THE OUTDOOR AIR DAMPER SHALL REMAIN IN THE CLOSED POSITION. THE COOLING COIL VALVE WILL REMAIN CLOSED AND THE UNIT WILL CONTINUE TO OPERATE WITH THE FANS ONLY. ONCE THE RETURN AIR TEMPERATURE RISES ABOVE THE MORNING WARM UP SETPOINT, THE UNIT WILL ENTER THE OCCUPIED MODE.

SETPOINTS

1. DISCHARGE AIR TEMPERATURE SETPOINT 55°F (ADJ)
2. SUPPLY STATIC PRESSURE 1" WC (ADJ)
3. MORNING WARM UP MODE SETPOINT 74°F (ADJ)
4. OCCUPIED COOLING SETPOINT 74°F (ADJ)
5. OCCUPIED HEATING SETPOINT 70°F (ADJ)
6. UNOCCUPIED COOLING SETPOINT 80°F (ADJ)
7. UNOCCUPIED HEATING SETPOINT 65°F (ADJ)

SMOKE DETECTOR

UPON INDICATION OF SMOKE THE UNIT SHALL BE USED FOR THE SMOKE PURGE SYSTEM. THE UNIT SHALL PROVIDE 100% OUTSIDE AIR AND THE RETURN FAN SHALL DE-ENERGIZE. REFER TO SMOKE PURGE CONTROL DIAGRAM. THE UNIT SHALL REMAIN IN THIS STATE UNTIL IT IS MANUALLY RESET FOR NORMAL OPERATION.

FREEZE PROTECTION

UPON DETECTION OF A FREEZING POTENTIAL THE FREEZE PROTECTION THERMOSTAT SHALL SHUT DOWN THE UNIT. BOTH SUPPLY AND RETURN FANS SHALL BE DE-ENERGIZED. THE OUTSIDE IT DAMPER SHALL RETURN TO IT'S FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL RETURN TO THE FULLY OPEN POSITION. THE HOT WATER COIL VALVE SHALL OPEN TO ITS FULLY OPEN POSITION. THE UNIT SHALL REMAIN IN THIS STATE UNTIL THE FREEZE PROTECTION THERMOSTAT IS MANUALLY RESET.

ALARMS

ALARMS SHALL BE GENERATED THROUGH THE BMS SYSTEM AND SHALL INCLUDE:

- | | |
|---------------------------|---|
| 1. SUPPLY FAN FAILURE | 2. RETURN FAN FAILURE |
| 3. SUPPLY TEMP TOO HIGH | 4. SUPPLY AIR TEMP TOO LOW |
| 5. RETURN AIR TOO HIGH | 6. UNABLE TO MAINTAIN STATIC PRESSURE |
| 7. MIXED AIR TEMP TOO LOW | 8. FREEZE PROTECTION THERMOSTAT ACTIVATED |
| 9. VFD FAULT | 10. SMOKE DETECTOR ACTIVATED |


SMOKE PURGE CONTROL

1. ONCE THE FIRE ALARM PANEL IS INDEXED FOR A SMOKE PURGE CONDITION, AHU-5,6,7,8 SHALL ENERGIZE ITS SUPPLY FAN.
2. THE FIRE/SMOKE DAMPERS AT THE ROTUNDA SUPPLY GRILLES SHALL OPEN. ALL OTHER FIRE/SMOKE DAMPERS AT THE SUPPLY DUCTS SHALL CLOSE. RETURN DUCT DAMPERS SHALL ALSO CLOSE.
3. THE SMOKE EXHAUST FANS (SEF-1,2,3,4,5,6) SHALL ENERGIZE.

*NOTE:

1. ENGINEER TO PROVIDE DISCHARGE AIR RESET SCHEDULE IF REQUIRED
2. INTERLOCK WIRING OF FIRE/SMOKE DAMPERS AND FAN VFD/STARTER IS BY OTHERS.
3. SEF-1 THRU 6 CONSIDERED TO BE CONTROLLED BY OTHERS.

LEGEND	----- Low Voltage, 18 AWG, Copper Wire			
 Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance			
	_____ Line Voltage, THHN Field Wiring			
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Project: **SAMPLE PROJECT**

AHU-5 THRU 8 / RF-2 THRU 5 & SMOKE PURGE CONTROL SEQUENCE OF OPERATION

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AHU-5 THRU 8 / RF-2 THRU 5 / EF- 5 THRU 8 BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	Programmable Controller	C1	PUB6438SR	4	Honeywell Spyder Controller with 6UI, 4DI,3AO, 8DO, Dimensions 5.45in High X 6.85in wideX2.26in deep	Honeywell
2	I/O Module	SIO1	SIO6042	4	Sylk IO Module with 6UI, 4AO, 2DO	Honeywell
3	Averaging Air Temperature	MAT, PH-T, DAT	A/20K-FA-24'-GD	12	20K ohm NTC Duct Averaging Temp Sensor, 24' Flexible Cable	ACI
4	Return Air Temperature	RAT	A/20K-D-12''-GD	4	20K ohm NTC Duct Temp Sensor, 12" length, Galvanized	ACI
5	Building static pressure	BSP	MS-321	4	Differential pressure transmitter, 0-10 V output, selectable range 0.1", 0.25", 0.5" w.c.	Dwyer
6	Duct static pressure	DSP	MS-312	4	Differential pressure transmitter, 0-10 V output, selectable range 1", 2", 5" w.c., duct mount	Dwyer
7	Differential pressure switch	DPS-1	ADPS-04-2-N-C	12	Adjustable Differential Pressure Switch, Set Point Range in w.c. (Pa) 0.12 to 1.60 (30-400), W/ install kit	Dwyer
8	Freezestat	FRZ	DFS-DM20	4	Low limit temperature control, DPDT, Manual reset, 20' capillary	Dwyer
9	Current Transducer	CS-1 THRU 4	C-2300	16	Analog Current Sensors, 0-10VDC output , 30A, 60A & 120A Selectable Range split-cores	Senva
10	Relay	R-1 THRU 3	RIBU1C	12	Universal RIB Relay	Functional Devices
11	Panel Mounted Relay	R-4	784-4C-24A	4	Ice cube control relay, 24VAC coil voltage, 4PDT, 15A contact rating, with LED indicator	Automation Direct
12	Base	R-4	784-4C-SKT-1	4	Relay socket DIN Rail Mounted	Automation Direct
13	Panel	CP-13 THRU 16	SCE-24N2406LP	4	Saginaw, 24"H X 24"W X 6" Depth Nema1 enclosure, steel ANSI61-Grey	Saginaw
14	Perforated Subpanel	CP-13 THRU 16	SCE-24N24MP	4	Subpanel, Nema-1	Saginaw
15	Transformer	TR1,TR2	10051MWCB	8	Multi-Tap Class 2, 100VA, 120,208,240,277,480 Integrated overcurrent breaker	Senva

LEGEND	-----	Low Voltage, 18 AWG, Copper Wire
	-----	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____	Line Voltage, THHN Field Wiring

0	04-11-2019	SAMPLE PROJECT	ICT
NO.	DATE	REVISION	BY

32-72 Steinway St, 502
Astoria, NY 11103
(M) 718 350 8716

Project: SAMPLE PROJECT	
AHU-5 THRU 8 / RF-2 THRU 5 / EF- 5 THRU 8 BILL OF MATERIAL	
Job No.	Page 30 of 48

AHU-1 THRU 8 & RF-1 THRU 5 SCHEDULE

AHU & RETURN FAN SCHEDULE

ITEM #	UNIT NO.	ASSOCIATED RF	LOCATION	FLOOR	DESIGN AIRFLOW (CFM)	MECH. DWG. NO.
1	AHU-1	RF-1	STORAGE	BASEMENT FLOOR	6500	M.400B
2	AHU-2		HVAC ROOM	GROUND FLOOR	3300	M.400G
3	AHU-3		REST	THIRD FLOOR	2600	M.403
4	AHU-4		MECHANICAL	FOURTH FLOOR	3200	M.404
5	AHU-5	RF-2	MECHANICAL	FOURTH FLOOR	8000	M.404
6	AHU-6	RF-3	MECHANICAL	FOURTH FLOOR	8000	M.404
7	AHU-7	RF-4	MECHANICAL	FOURTH FLOOR	8000	M.404
8	AHU-8	RF-5	MECHANICAL	FOURTH FLOOR	8000	M.404

LEGEND

- Low Voltage, 18 AWG, Copper Wire
- Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
- _____ Line Voltage, THHN Field Wiring

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NO.	DATE	REVISION	BY



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Project: **SAMPLE PROJECT**

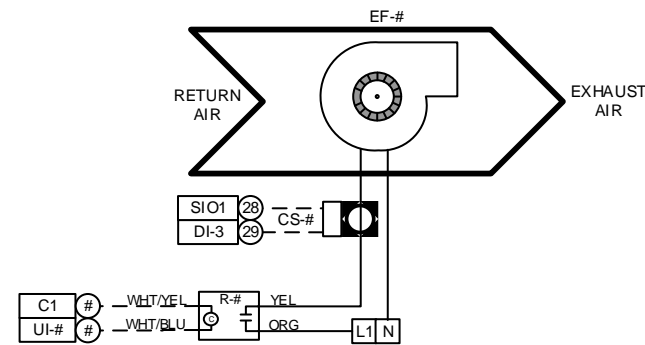
AHU-1 THRU 8 & RF-1 THRU 5 SCHEDULE

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EXHAUST FAN 1 THRU 8 SCHEMATIC DIAGRAM

TYPICAL OF 8



*NOTE: SPEED CONTROLLERS BY UNIT MAUFACTURER

EXHAUST FANS : SEQUENCE OF OPERATION

TIMES OF OPERATION SHALL BE PROGRAMMED INTO BUILDING BMS. FAN SHALL OPERATE CONTINUOUSLY DURING THE OCCUPIED TIME AND SHALL BE DE-ENERGIED DURING THE UNOCCUPIED TIMES.

EXHAUST FAN SCHEDULE

ITEM #	UNIT NO.	LOCATION	FLOOR	DESIGN AIRFLOW (CFM)	MECH. DWG. NO.	WIRED TO UNIT
1	EF-1	OFFICE	GROUND FLOOR	50	M.400G	AHU-2
2	EF-2	WOMEN'S BATHROOM	GROUND FLOOR	500	M.400G	AHU-2
3	EF-3	MEN'S LOCKER	GROUND FLOOR	950	M.400G	AHU-2
4	EF-4	REST ROOM	FIRST FLOOR	50	M.401	VAV-7-1
5	EF-5	MECHANICAL	FOURTH FLOOR	150	M.404	AHU-7
6	EF-6	MECHANICAL	FOURTH FLOOR	150	M.404	AHU-8
7	EF-7	MECHANICAL	FOURTH FLOOR	900	M.404	AHU-5
8	EF-8	MECHANICAL	FOURTH FLOOR	750	M.404	AHU-6

LEGEND

- Low Voltage, 18 AWG, Copper Wire
- Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
- _____ Line Voltage, THHN Field Wiring

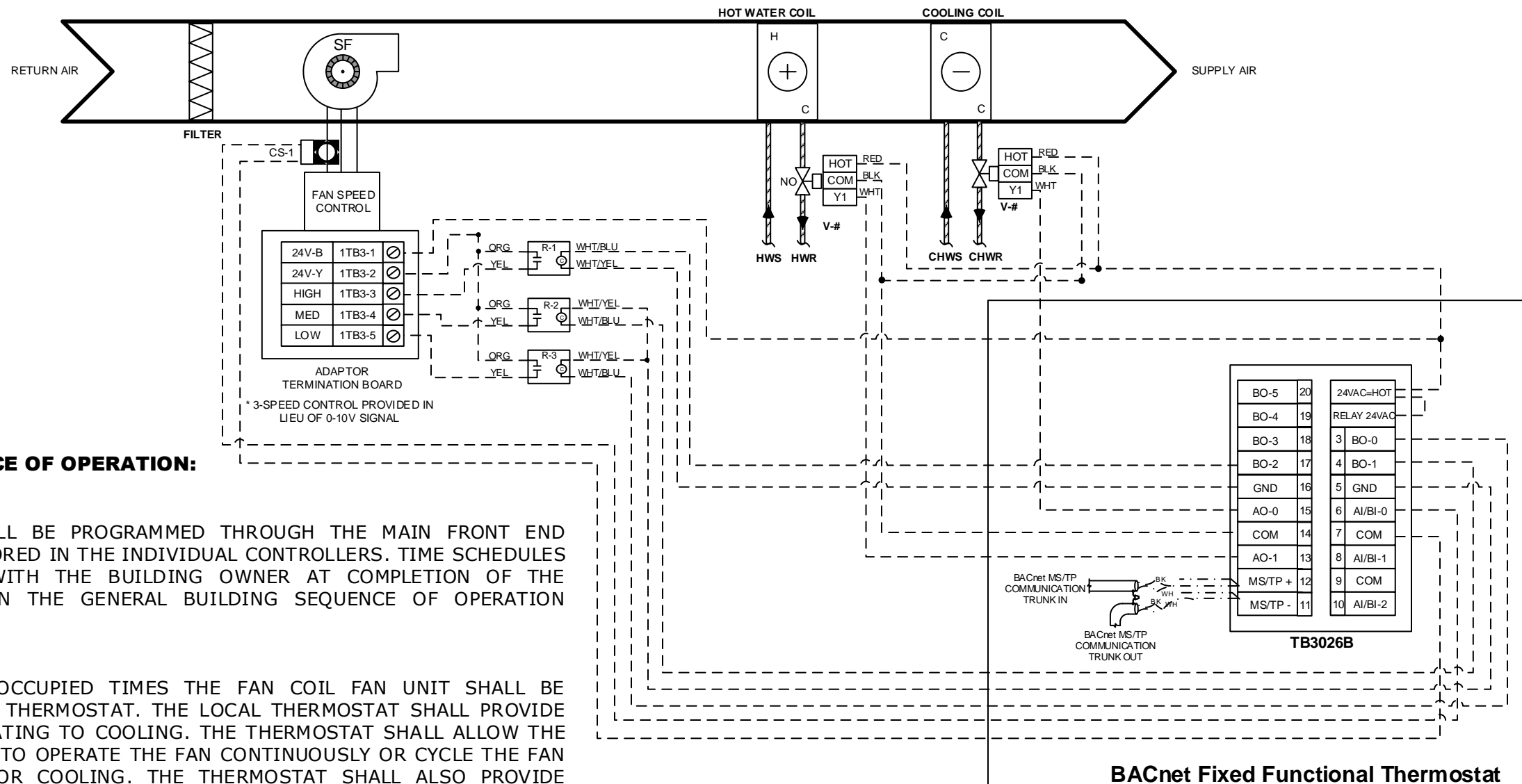
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EXHAUST FAN 1 THRU 8 SCHEMATIC DIAGRAM	
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FAN COIL UNIT 1 THRU 9 SCHEMATIC DIAGRAM

TYPICAL OF 9



FAN COIL UNITS SEQUENCE OF OPERATION:

TIME SCHEDULES

THE TIME SCHEDULES SHALL BE PROGRAMMED THROUGH THE MAIN FRONT END OPERATOR STATION AND STORED IN THE INDIVIDUAL CONTROLLERS. TIME SCHEDULES SHALL BE COORDINATED WITH THE BUILDING OWNER AT COMPLETION OF THE PROJECT, OR AS LISTED IN THE GENERAL BUILDING SEQUENCE OF OPERATION SCHEDULES.

OCCUPIED

WHEN INDEXED FOR THE OCCUPIED TIMES THE FAN COIL FAN UNIT SHALL BE CONTROLLED BY THE LOCAL THERMOSTAT. THE LOCAL THERMOSTAT SHALL PROVIDE THE CHANGEOVER FROM HEATING TO COOLING. THE THERMOSTAT SHALL ALLOW THE USER TO PROGRAM THE FAN TO OPERATE THE FAN CONTINUOUSLY OR CYCLE THE FAN UPON CALL FOR HEATING OR COOLING. THE THERMOSTAT SHALL ALSO PROVIDE CONTROL OF THE UNIT BASED ON THE ROOM TEMPERATURE. ROOM TEMPERATURES SHALL BE AS SCHEDULED BELOW. DURING HEATING AND COOLING CYCLES THE FAN SHALL BE PROGRAMMABLE TO AUTOMATICALLY SWITCH FAN SPEEDS BASED ON ROOM LOAD.

UNOCCUPIED

WHEN THE FAN COIL UNIT IS DE-ENERGIZED THE FAN MOTOR SHALL BE DE-ENERGIZED TO STOP THE AIRFLOW. THE HEATING VALVE SHALL MOVE TO THE FULL CLOSED POSITION AND THE COOLING VALVE SHALL MOVE TO THE FULL CLOSED POSITION. IF THE ROOM TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT OR FALLS BELOW THE ROOM UNOCCUPIED HEATING TEMPERATURE SETPOINT THE UNIT SHALL BE CYCLED TO PROVIDE HEATING AND COOLING ACCORDINGLY. ONCE THE TEMPERATURES ARE SATISFIED THE UNIT SHALL RETURN TO THE UNOCCUPIED MODE.

SETPOINTS

- OCCUPIED COOLING SETPOINT 74°F (ADJ)
- OCCUPIED HEATING SETPOINT 70°F (ADJ)
- UNOCCUPIED COOLING SETPOINT 80°F (ADJ)
- UNOCCUPIED HEATING SETPOINT 65°F (ADJ)

THE FAN COIL THERMOSTATS SHALL BE PROGRAMMED TO LOCK SETPOINT ADJUSTMENT TO WITHIN +/- 2 DEGREE S F OF BMS SETPOINT. TIME SCHEDULE SHALL BE PER THE BUILDING BMS PROGRAMMED TIMES.

BACnet Fixed Functional Thermostat

CONFIGURE THERMOSTAT FOR INBUILT AP 17

SCHEDULE

ITEM #	UNIT NO.	LOCATION	SERVING AREA	FLOOR	DESIGN AIRFLOW (CFM)	MECH. DWG. NO.
1	FCU-1	OFFICE	OFFICE, CORRIDOR, RESTROOM	GROUND FLOOR	504	M.400G
2	FCU-2	STORAGE	STORAGE, CORRIDOR, RESTROOM	FIRST FLOOR	504	M.401
3	FCU-3	STORAGE	STORAGE, RESTROOM	FIRST FLOOR	504	M.401
4	FCU-4	OFFICE	OFFICE, MEN'S RESTROOM	SECOND FLOOR	504	M.402
5	FCU-5	OFFICE	OFFICE, CORRIDOR	SECOND FLOOR	504	M.402
6	FCU-6	OFFICE	OFFICE, RESTROOM	THIRD FLOOR	504	M.403
7	FCU-7	OFFICE	OFFICE, CORRIDOR	THIRD FLOOR	504	M.403
8	FCU-8	OFFICE	OFFICE, STORAGE	FOURTH FLOOR	504	M.404
9	FCU-9	OFFICE	OFFICE, CORRIDOR	FOURTH FLOOR	504	M.404

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Project: **SAMPLE PROJECT**

FAN COIL UNIT 1 THRU 9 SCHEMATIC DIAGRAM

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FAN COIL UNIT 1 THRU 9 & EF-4 BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	BACnet Fixed Functional Thermostat	C1	TB3026B	9	BACnet Fixed Function Thermostat with 3UI, 6 BO, 2 AO	Honeywell
2	Current Switch	CS-1	C-2300	9	Split Core Adj.trip,Min trip at 0.5A, status output N.O.1.0 A @30V AC/DC	Senva
3	Relay	R-1 THRU 3	RIBU1C	27	Universal RIB Relay	Functional Devices

LEGEND

----- Low Voltage, 18 AWG, Copper Wire
 - - - - - Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire,
 Low Capacitance
 _____ Line Voltage, THHN Field Wiring

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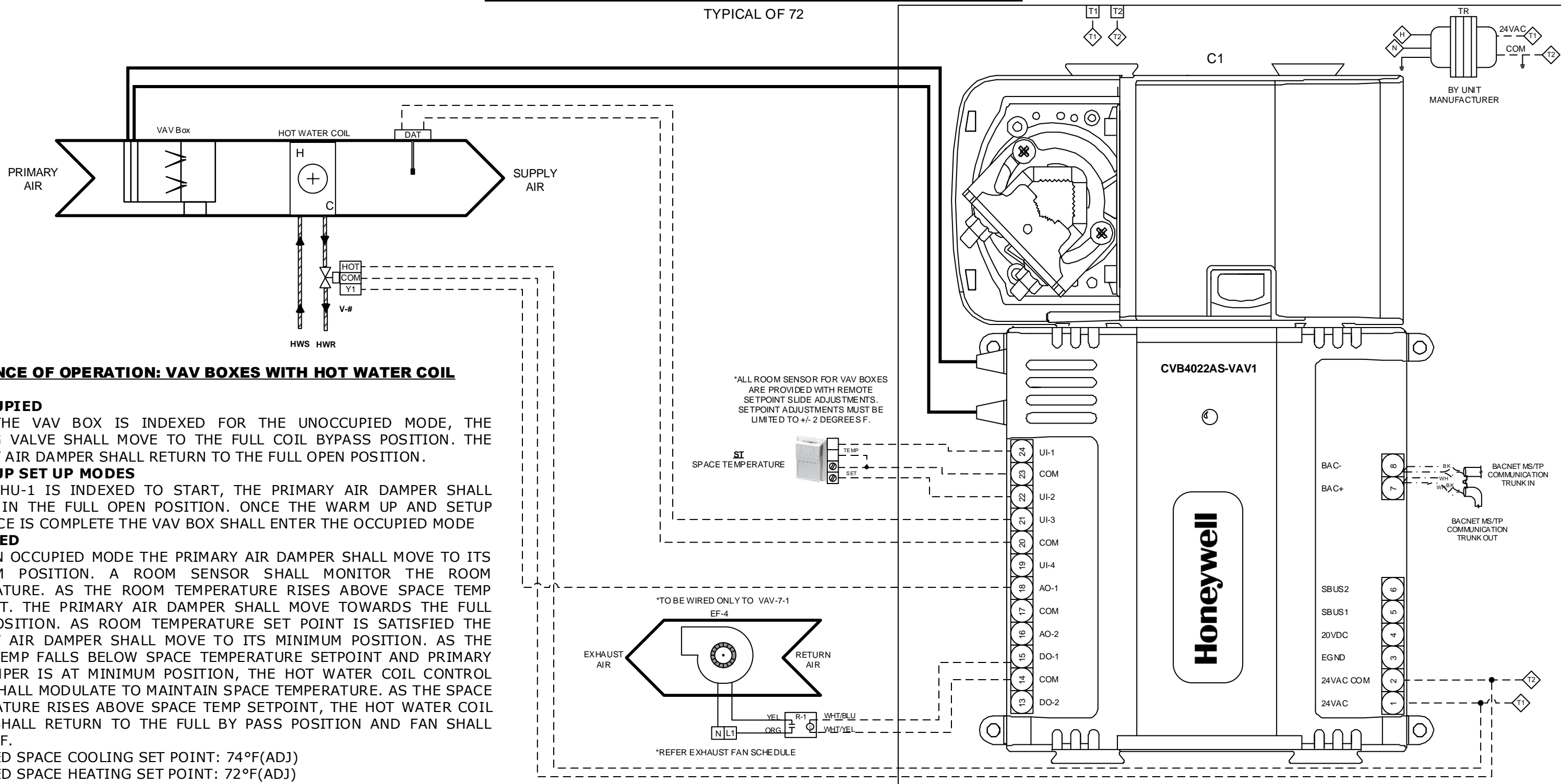
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ICT Solutions

Project: SAMPLE PROJECT	
FAN COIL UNIT 1 THRU 9 & EF-4 BILL OF MATERIAL	
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VAV BOX WITH HOT WATER COIL SCHEMATIC DIAGRAM

TYPICAL OF 72



LEGEND

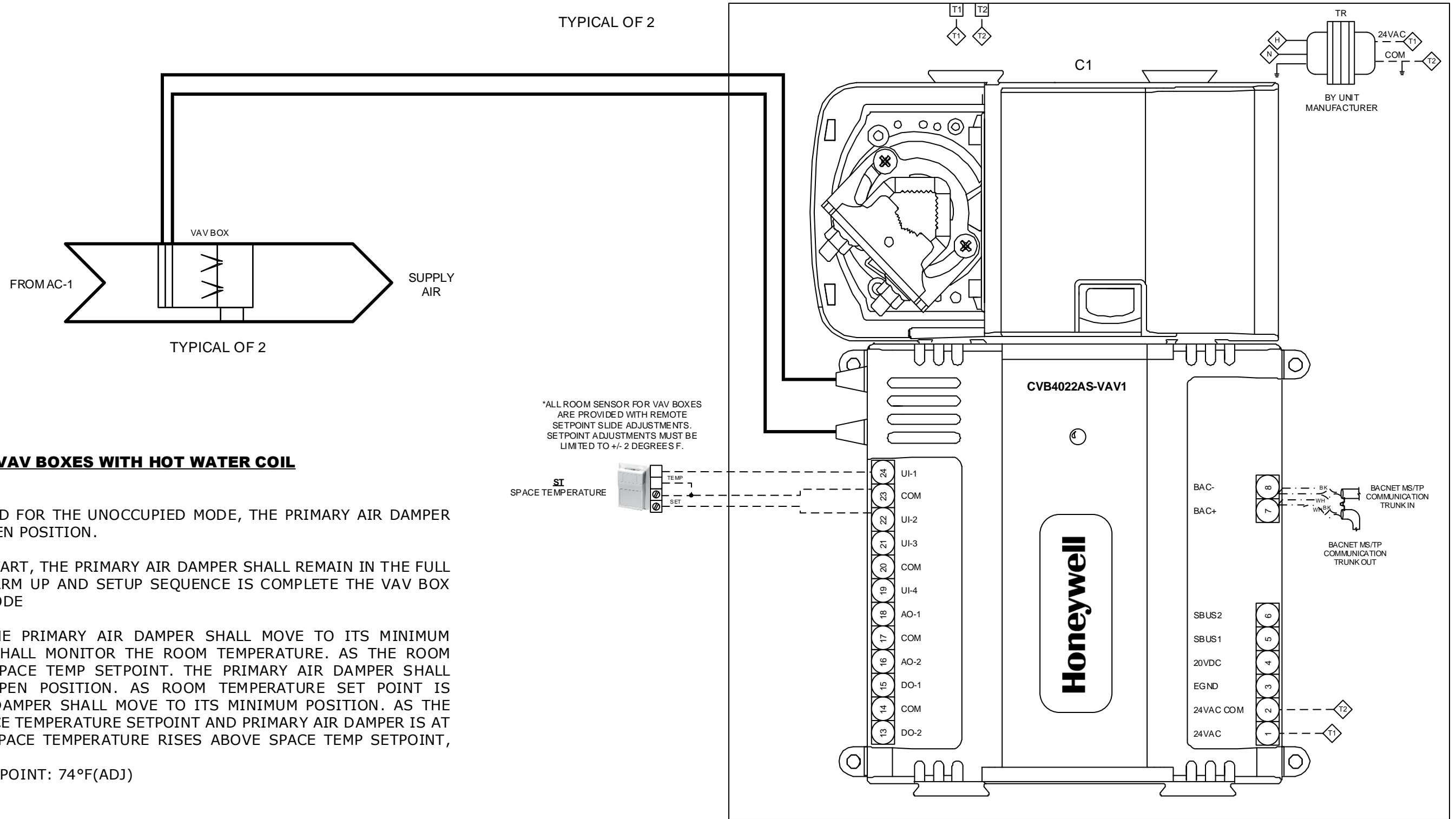
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

NO.	0	04-11-2019	SAMPLE PROJECT	ICT
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VAV BOX BPD-3-1 & BPD-4-1 SCHEMATIC DIAGRAM



SEQUENCE OF OPERATION: VAV BOXES WITH HOT WATER COIL

UNOCCUPIED

WHEN THE VAV BOX IS INDEXED FOR THE UNOCCUPIED MODE, THE PRIMARY AIR DAMPER SHALL RETURN TO THE FULL OPEN POSITION.

WARM UP SET UP MODES

WHEN AHU-1 IS INDEXED TO START, THE PRIMARY AIR DAMPER SHALL REMAIN IN THE FULL OPEN POSITION. ONCE THE WARM UP AND SETUP SEQUENCE IS COMPLETE THE VAV BOX SHALL ENTER THE OCCUPIED MODE

OCCUPIED

WHEN IN OCCUPIED MODE THE PRIMARY AIR DAMPER SHALL MOVE TO ITS MINIMUM POSITION. A ROOM SENSOR SHALL MONITOR THE ROOM TEMPERATURE. AS THE ROOM TEMPERATURE RISES ABOVE SPACE TEMP SETPOINT. THE PRIMARY AIR DAMPER SHALL MOVE TOWARDS THE FULL OPEN POSITION. AS ROOM TEMPERATURE SET POINT IS SATISFIED THE PRIMARY AIR DAMPER SHALL MOVE TO ITS MINIMUM POSITION. AS THE SPACE TEMP FALLS BELOW SPACE TEMPERATURE SETPOINT AND PRIMARY AIR DAMPER IS AT MINIMUM POSITION. AS THE SPACE TEMPERATURE RISES ABOVE SPACE TEMP SETPOINT, FAN SHALL TURN OFF.

OCCUPIED SPACE COOLING SET POINT: 74°F(ADJ)

BILL OF MATERIAL

Item #	Application	Tag	Part no	Quantity	Description	Manufacturer
1	Programmable Controller	C1	CVB4022AS-VAV1	2	Stryker BACnet Configurable Controllers, 4 Universal/0 Digital Inputs, 2 Analog/2 Digital Outputs, Integrated Actuator	Honeywell
2	Space Temperature	ST	A/20K-RS	2	Room Temp sensor, 20K ohm, with setpoint	ACI

LEGEND	Wiring Type
---	Low Voltage, 18 AWG, Copper Wire
- - - - -	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
_____	Line Voltage, THHN Field Wiring

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0	04-11-2019	SAMPLE PROJECT	ICT



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Project: **SAMPLE PROJECT**
VAV BOX BPD-3-1 & BPD-4-1 SCHEMATIC DIAGRAM

VAV BOX SCHEDULE PAGE 1

ITEM #	UNIT NO.	LOCATION	SERVING AREA	FLOOR	DESIGN COOLING AIRFLOW (CFM)	MIN COOLNG AIRFLOW (CFM)	HOT WATER LINE SIZE (INCH)	GPM	SERVING AHU	MECH. DWG. NO.
1	VAV-1-1	GRAPHIC DESIGN	GRAPHIC DESIGN	GROUND FLOOR	625	220	3/4	1.0	AHU-1	M.400G
2	VAV-1-2	MAIL ROOM	RESTROOM	GROUND FLOOR	400	140	3/4	1.0	AHU-1	M.400G
3	VAV-1-3	MAIL ROOM	MAIL ROOM	GROUND FLOOR	675	240	3/4	1.0	AHU-1	M.400G
4	VAV-1-4	OFFICE	OFFICE	FIRST FLOOR	500	175	3/4	1.0	AHU-1	M.401
5	VAV-1-5	OFFICE	OFFICE	FIRST FLOOR	350	125	3/4	0.5	AHU-1	M.401
6	VAV-1-6	OFFICE	OFFICE	FIRST FLOOR	200	70	3/4	0.5	AHU-1	M.401
7	VAV-1-7	RESTROOM	RESTROOM, CORRIDOR	FIRST FLOOR	375	135	3/4	0.5	AHU-1	M.401
8	VAV-1-8	OFFICE	OFFICE	FIRST FLOOR	325	120	3/4	0.5	AHU-1	M.401
9	VAV-1-9	OFFICE	OFFICE	FIRST FLOOR	450	160	3/4	1.0	AHU-1	M.401
10	VAV-1-10	OFFICE	OFFICE	SECOND FLOOR	600	210	3/4	1.0	AHU-1	M.402
11	VAV-1-11	COURTROOM	COURTROOM	SECOND FLOOR	300	105	3/4	0.5	AHU-1	M.402
12	VAV-1-12	COURTROOM	COURTROOM	SECOND FLOOR	600	210	3/4	1.0	AHU-1	M.402
13	VAV-1-13	COURTROOM	COURTROOM	SECOND FLOOR	600	210	3/4	1.0	AHU-1	M.402
14	VAV-1-14	OFFICE	OFFICE, JUDGE	SECOND FLOOR	550	200	3/4	1.0	AHU-1	M.402
15	VAV-2-1	BREAK ROOM	WOMEN'S BATHROOM , WOMEN'S LOCKER	GROUND FLOOR	500	500	3/4	1.0	AHU-2	M.400G
16	VAV-2-2	BREAK ROOM	BREAK ROOM	GROUND FLOOR	250	90	3/4	0.5	AHU-2	M.400G
17	VAV-2-3	OFFICE	SHERIFF'S OFFICE CONTROL CENTER	GROUND FLOOR	1000	350	3/4	1.5	AHU-2	M.400G
18	VAV-2-4	OFFICE	OFFICE	GROUND FLOOR	300	105	3/4	0.5	AHU-2	M.400G
19	VAV-2-5	BREAK ROOM	OFFICE	GROUND FLOOR	550	200	3/4	1.0	AHU-2	M.400G
20	VAV-2-6	MEN'S LOCKER	MEN'S LOCKER	GROUND FLOOR	550	550	3/4	1.0	AHU-2	M.400G
21	VAV-2-7	MEN'S BATHROOM	MEN'S BATHROOM	GROUND FLOOR	350	350	3/4	0.5	AHU-2	M.400G
22	VAV-3-1	COURTROOM	COURTROOM, JUDGE	THIRD FLOOR	1650	560	3/4	2.5	AHU-3	M.403
23	VAV-3-2	COURTROOM	STAIRCASE CORRIDOR	THIRD FLOOR	300	105	3/4	0.5	AHU-3	M.403
24	VAV-3-3	JUDGE	JUDGE, OFFICE	THIRD FLOOR	600	210	3/4	1.0	AHU-3	M.403
25	BPD-3-1	COURTROOM	JUDGE	THIRD FLOOR	1660	0		1.0	AHU-3	M.403
26	VAV-4-1	COURTROOM	JURY ROOM, REST ROOM	FOURTH FLOOR	475	165	3/4	1.0	AHU-4	M.404
27	VAV-4-2	COURTROOM	COURTROOM	FOURTH FLOOR	1750	615	3/4	3.0	AHU-4	M.404
28	VAV-4-3	COURTROOM	OFFICE, REST ROOM	FOURTH FLOOR	525	185	3/4	1.0	AHU-4	M.404
29	VAV-4-4	COURTROOM	OFFICE	FOURTH FLOOR	425	150	3/4	1.0	AHU-4	M.404
30	BPD-4-1	COURTROOM	COURTROOM	FOURTH FLOOR	2060	0		1.0	AHU-4	M.404
31	VAV-5-1	OFFICE	JUDGE	GROUND FLOOR	450	160	3/4	1.0	AHU-5	M.400G
32	VAV-5-2	OFFICE	OFFICE	GROUND FLOOR	400	140	3/4	1.0	AHU-5	M.400G
33	VAV-5-3	OFFICE	COURTROOM	GROUND FLOOR	1700	595	3/4	3.0	AHU-5	M.400G
34	VAV-5-4	COURTROOM	COURTROOM	FIRST FLOOR	1000	350	3/4	2.0	AHU-5	M.401
35	VAV-5-5	OFFICE	OFFICE	FIRST FLOOR	400	140	3/4	1.0	AHU-5	M.401
36	VAV-5-6	JUDGE	JUDGE	FIRST FLOOR	475	165	3/4	1.0	AHU-5	M.401

LEGEND	-----	Low Voltage, 18 AWG, Copper Wire
	-----	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____	Line Voltage, THHN Field Wiring

0	04-11-2019	SAMPLE PROJECT	ICT
NO.	DATE	REVISION	BY

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Project: SAMPLE PROJECT	
VAV BOX SCHEDULE PAGE 1	
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VAV BOX SCHEDULE PAGE 2

ITEM #	UNIT NO.	LOCATION	SERVING AREA	FLOOR	DESIGN COOLING AIRFLOW (CFM)	MIN COOLNG AIRFLOW (CFM)	HOT WATER LINE SIZE (INCH)	GPM	SERVING AHU	MECH. DWG. NO.
37	VAV-5-7	OFFICE	OFFICE	SECOND FLOOR	400	140	3/4	1.0	AHU-5	M.402
38	VAV-5-8	OFFICE	OFFICE	SECOND FLOOR	425	150	3/4	1.0	AHU-5	M.402
39	VAV-5-9	OFFICE	OFFICE, STORAGE	THIRD FLOOR	400	140	3/4	1.0	AHU-5	M.403
40	VAV-5-10	OFFICE	OFFICE	THIRD FLOOR	350	125	3/4	0.5	AHU-5	M.403
41	VAV-5-11	MECHANICAL	MECHANICAL	FOURTH FLOOR	1000	350	3/4	2.0	AHU-5	M.404
42	VAV-5-12	MECHANICAL	MECHANICAL	FOURTH FLOOR	1000	350	3/4	2.0	AHU-5	M.404
43	VAV-6-1	OFFICE	OFFICE	GROUND FLOOR	350	125	3/4	0.5	AHU-6	M.400G
44	VAV-6-2	OFFICE	COURTROOM	GROUND FLOOR	1700	595	3/4	3.0	AHU-6	M.400G
45	VAV-6-3	OFFICE	OFFICE	GROUND FLOOR	400	140	3/4	1.0	AHU-6	M.400G
46	VAV-6-4	COURTROOM	COURTROOM	FIRST FLOOR	1000	350	3/4	2.0	AHU-6	M.401
47	VAV-6-5	OFFICE	OFFICE	FIRST FLOOR	225	80	3/4	0.5	AHU-6	M.401
48	VAV-6-6	JURY	CONFERENCE	FIRST FLOOR	400	140	3/4	1.0	AHU-6	M.401
49	VAV-6-7	JURY	JURY	FIRST FLOOR	350	125	3/4	0.5	AHU-6	M.401
50	VAV-6-8	JURY	CONFERENCE	FIRST FLOOR	300	105	3/4	0.5	AHU-6	M.401
51	VAV-6-9	OFFICE	OFFICE	SECOND FLOOR	325	115	3/4	0.5	AHU-6	M.402
52	VAV-6-10	JUDGE	JUDGE	SECOND FLOOR	425	150	3/4	1.0	AHU-6	M.402
53	VAV-6-11	OFFICE	OFFICE, REST	THIRD FLOOR	350	125	3/4	0.5	AHU-6	M.403
54	VAV-6-12	OFFICE	OFFICE	THIRD FLOOR	400	140	3/4	1.0	AHU-6	M.403
55	VAV-6-13	MECHANICAL	MECHANICAL	FOURTH FLOOR	1000	350	3/4	2.0	AHU-6	M.404
56	VAV-6-14	MECHANICAL	MECHANICAL	FOURTH FLOOR	1000	350	3/4	2.0	AHU-6	M.404
57	VAV-7-1	COURTROOM	COURTROOM, OFFICE	FIRST FLOOR	675	240	3/4	1.0	AHU-7	M.401
58	VAV-7-2	COURTROOM	COURTROOM	FIRST FLOOR	1200	420	3/4	2.0	AHU-7	M.401
59	VAV-7-3	MECHANICAL	MECHANICAL	FOURTH FLOOR	400	140	3/4	1.0	AHU-7	M.404
60	VAV-7-4	MECHANICAL	MECHANICAL	FOURTH FLOOR	425	150	3/4	1.0	AHU-7	M.404
61	VAV-7-5	OFFICE	OFFICE	THIRD FLOOR	425	150	3/4	1.0	AHU-7	M.403
62	VAV-7-6	OFFICE	OFFICE	THIRD FLOOR	325	120	3/4	0.5	AHU-7	M.403
63	VAV-7-7	MECHANICAL	MECHANICAL	FOURTH FLOOR	1750	620	3/4	4.0	AHU-7	M.404
64	VAV-7-8	MECHANICAL	MECHANICAL	FOURTH FLOOR	2000	700	3/4	4.0	AHU-7	M.404
65	VAV-7-10	LOBBY	OFFICE	FOURTH FLOOR	800	280	3/4	2.0	AHU-7	M.404
66	VAV-8-1	COURTROOM	COURTROOM	FIRST FLOOR	1200	420	3/4	3.0	AHU-8	M.401
67	VAV-8-2	COURTROOM	OFFICE	FIRST FLOOR	600	210	3/4	1.0	AHU-8	M.401
68	VAV-8-3	MECHANICAL	MECHANICAL	FOURTH FLOOR	275	125	3/4	0.5	AHU-8	M.404
69	VAV-8-4	MECHANICAL	MECHANICAL	FOURTH FLOOR	275	125	3/4	0.5	AHU-8	M.404
70	VAV-8-5	OFFICE	OFFICE	THIRD FLOOR	350	125	3/4	0.5	AHU-8	M.403
71	VAV-8-6	OFFICE	OFFICE	THIRD FLOOR	350	125	3/4	0.5	AHU-8	M.403
72	VAV-8-7	MECHANICAL	MECHANICAL	FOURTH FLOOR	1750	620	3/4	4.0	AHU-8	M.404
73	VAV-8-8	MECHANICAL	MECHANICAL	FOURTH FLOOR	2000	700	3/4	4.0	AHU-8	M.404
74	VAV-8-10	OFFICE	OFFICE	FOURTH FLOOR	800	280	3/4	2.0	AHU-8	M.404

LEGEND	-----	Low Voltage, 18 AWG, Copper Wire
	-----	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____	Line Voltage, THHN Field Wiring

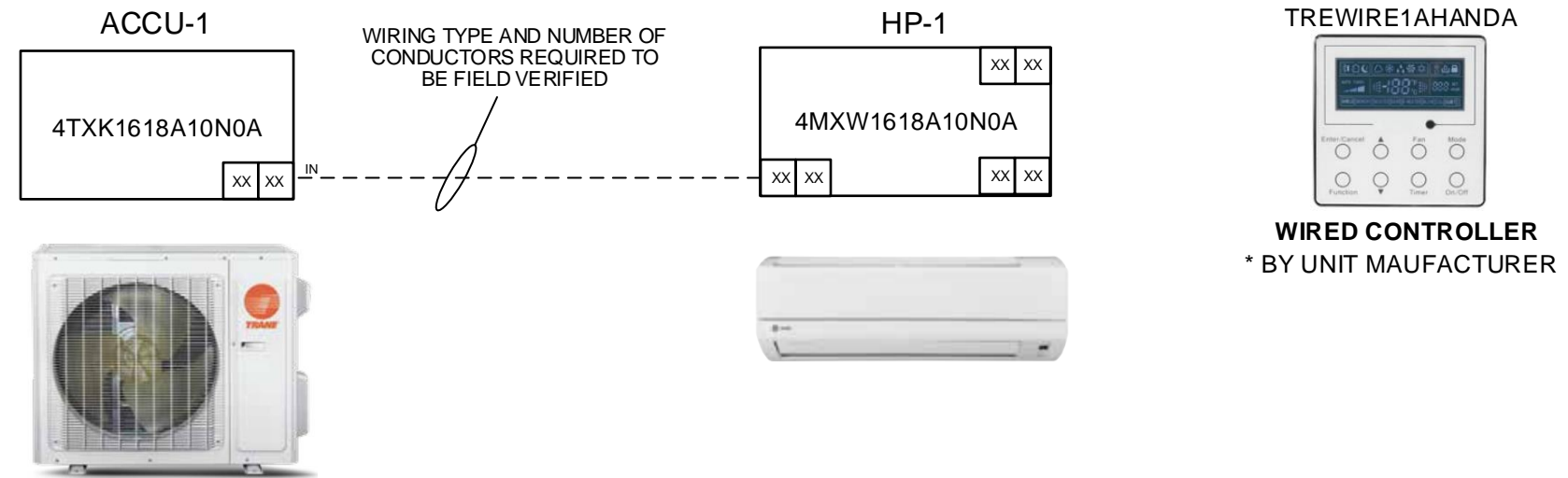
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DUCTLESS SPLIT HEAT PUMP HP-1/ACCU-1 SCHEMATIC & WIRING DIAGRAM

LOCATION : ELEVATOR MOTOR ROOM - BASEMENT



*NOTE: ALL VRF HEATPUMP DEVICES AND CONTROLS PROVIDED BY UNIT MANUFACTURER. ATC TO PROVIDE LOW VOLTAGE INTERLOCK WIRING AND INTERFACE TO EXISTING SYSTEM

LEGEND	Low Voltage, 18 AWG, Copper Wire					
	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance					
	Line Voltage, THHN Field Wiring					
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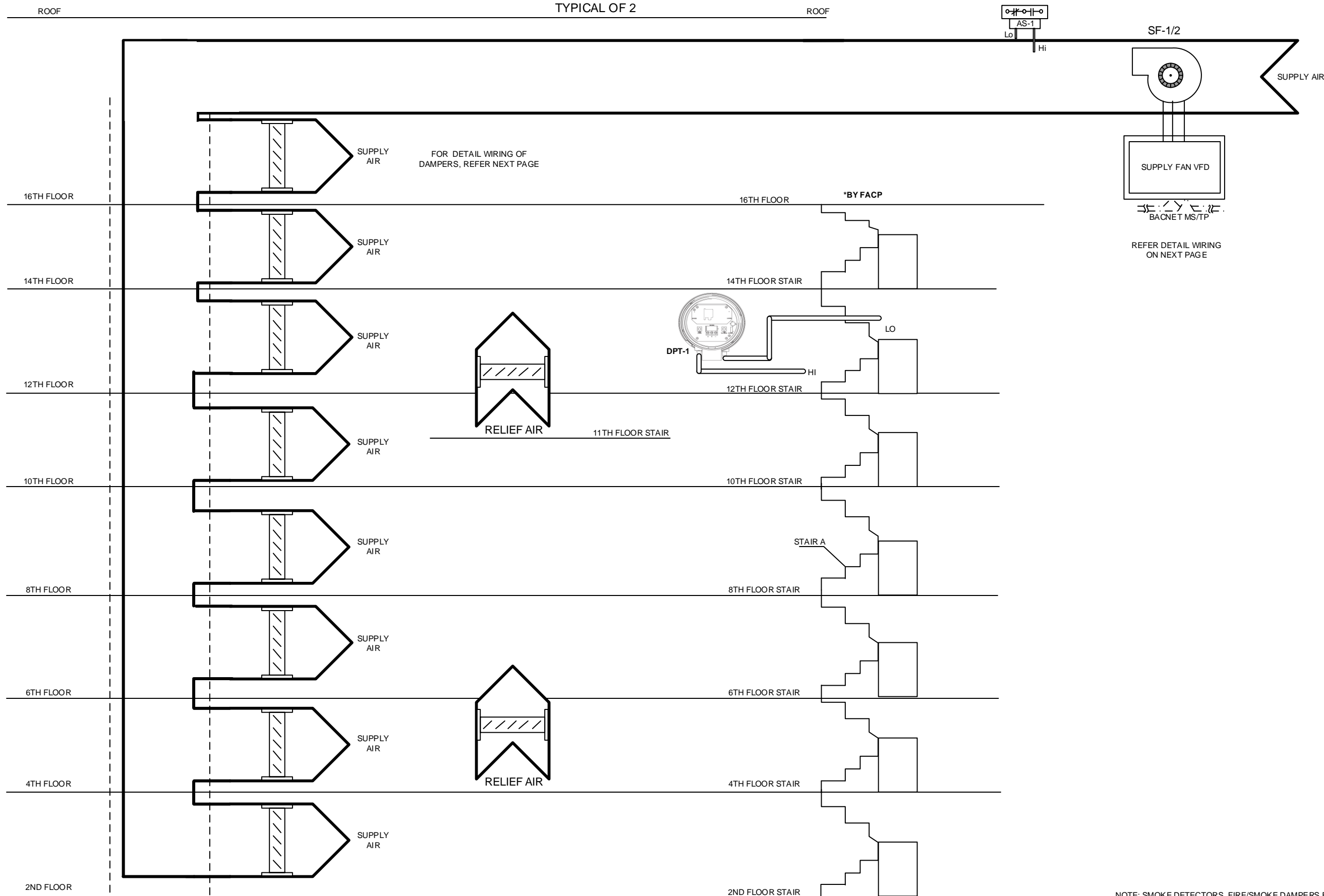
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DUCTLESS SPLIT HEAT PUMP HP-1/ACCU-1

SCHEMATIC & WIRING DIAGRAM

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STAIRWELL PRESSURIZATION SCHEMATIC DIAGRAM



NOTE: SMOKE DETECTORS, FIRE/SMOKE DAMPERS BY OTHERS

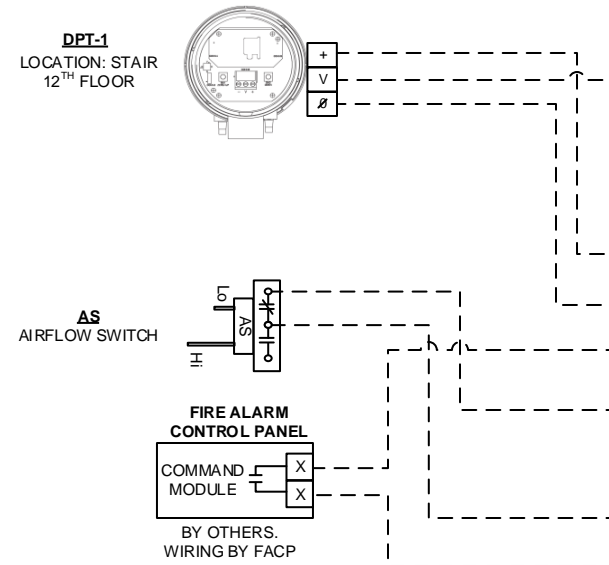
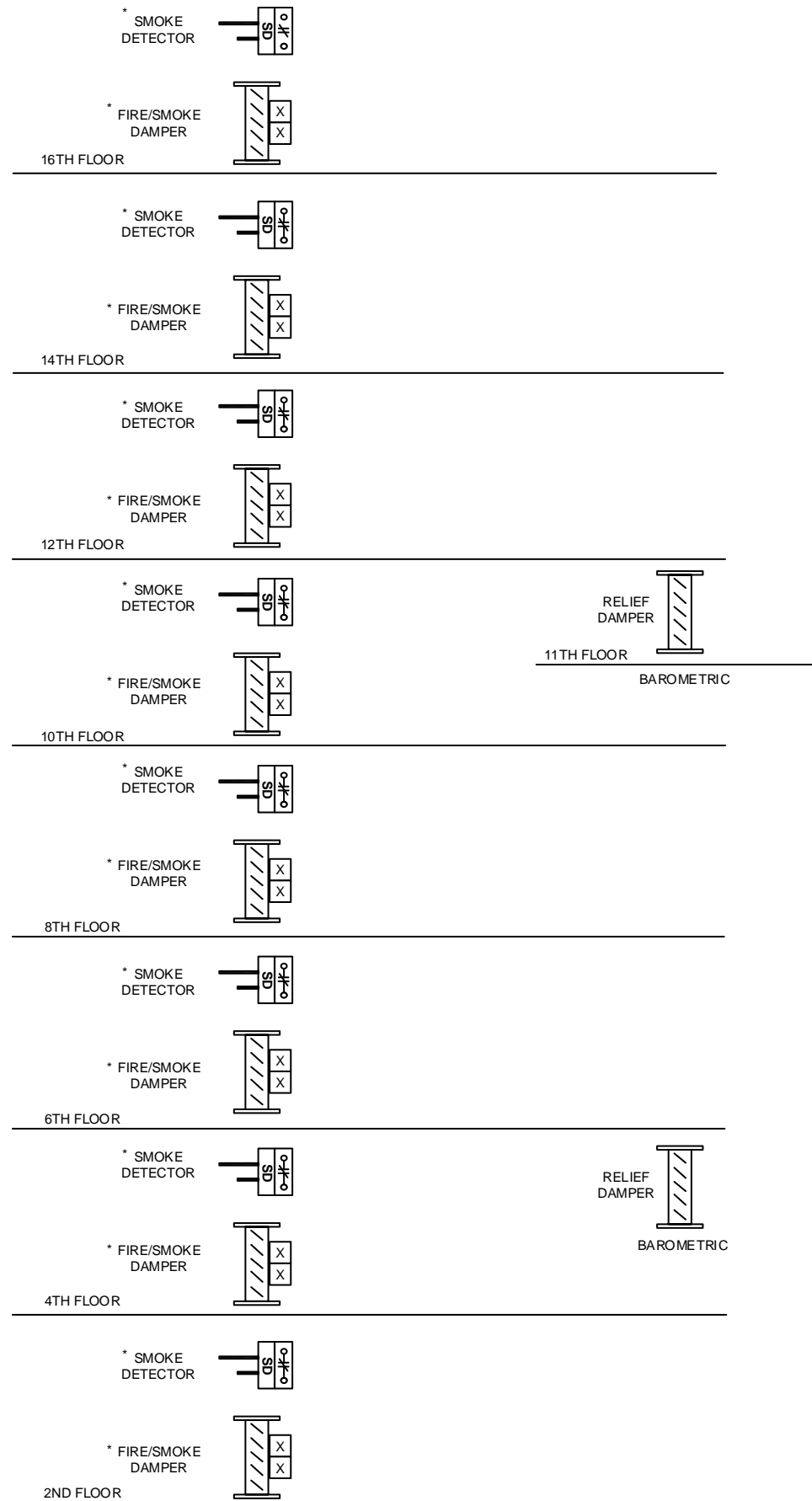
LEGEND	DESCRIPTION
---	Low Voltage, 18 AWG, Copper Wire
---	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

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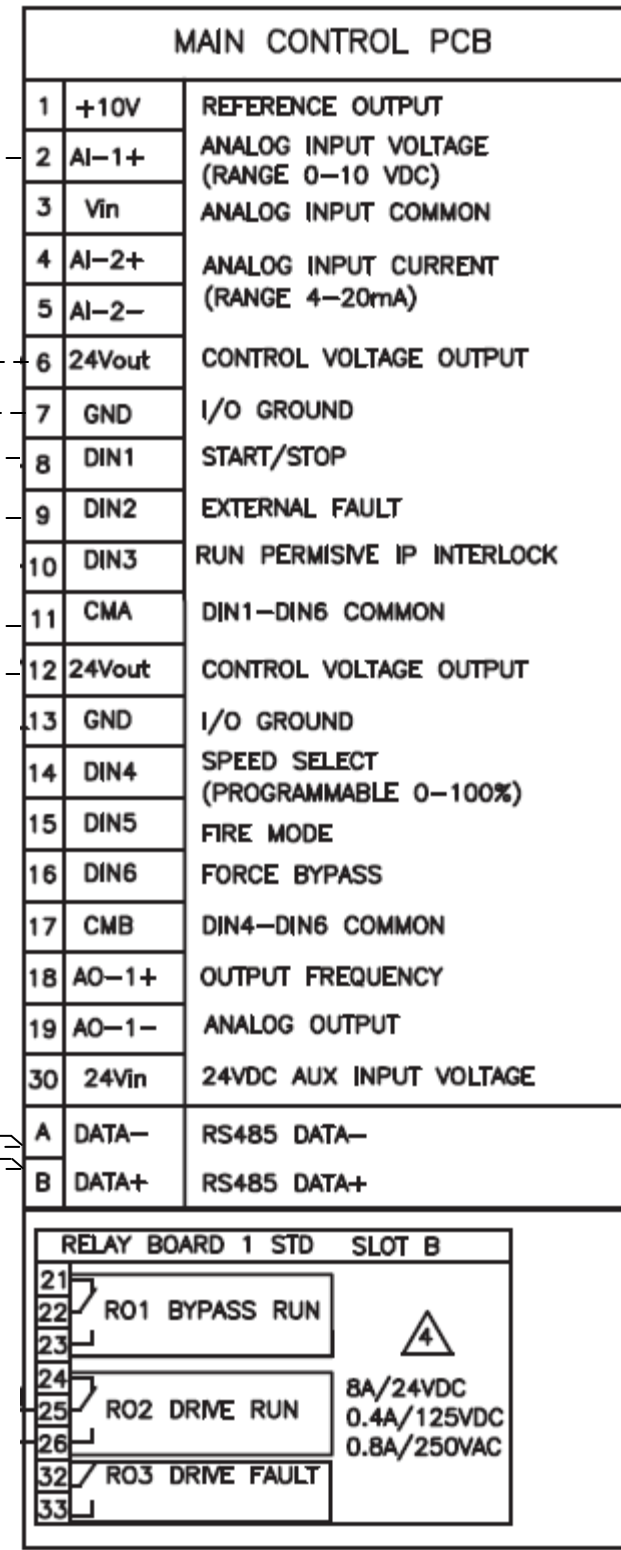
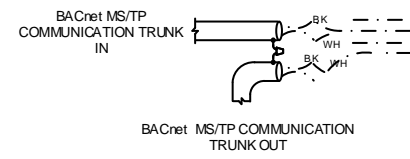
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STAIRWELL PRESSURIZATION SCHEMATIC DIAGRAM	
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STAIRWELL PRESSURIZATION WIRING DIAGRAM



ALL REQUIRED FSD & SMOKE DETECTOR INTERLOCK WIRING TO VFD'S BY OTHERS.



SUPPLY FAN 1 / 2 VFD
LOCATION: MECHANICAL ROOM - SIXTEENTH FLOOR

NOTE: 1. SMOKE DETECTORS, FIRE/SMOKE DAMPERS BY OTHERS.

LEGEND	
---	Low Voltage, 18 AWG, Copper Wire
- - - - -	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
---	Line Voltage, THHN Field Wiring

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STAIRWELL PRESSURIZATION WIRING DIAGRAM	
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STAIRWELL PRESSURIZATION SEQUENCE OF OPERATION OPERATION

STAIRWELL PRESSURIZATION SYSTEM OPERATION:

1. THE STAIRWELL PRESSURIZATION SYSTEM IS DESIGNED TO MAINTAIN 0.10 INWC WITHIN THE STAIRWELL WITH ALL DOORS CLOSED AND THE FAN OPERATING. THIS IS ABOVE THE MINIMUM REQUIRED 0.05 INWC REQUIREMENTS PER NFPA 92.
2. THE .10INWC WILL INCREASE THE PRESSURE IN THE STAIRWELL WHICH WILL REQUIRE A MAXIMUM FORCE OF 20 LB TO OPEN THE EXIT DOORS. THIS IS BASED ON A DOOR CLOSURE DEVICE THAT REQUIRES A 15LB FORCE TO OPEN THE DOOR. CONTRACTOR SHALL INSPECT AND ENSURE THAT ALL DOOR CLOSURES ARE RATED AT OR BELOW THE 15LB FORCE OPENING REQUIREMENT.
3. FANS SHALL BE INDEXED TO OPERATE VIA THE BUILDING FIRE ALARM SYSTEM. THE FIRE ALARM COMPANY SHALL PROVIDE CONTROL CIRCUITS TO INDEX THE FANS. ONCE THE FANS ARE ENERGIZED THEY WILL PROVIDE THE REQUIRED AIRFLOW TO MAINTAIN THE PRESSURE WITHIN THE STAIRWELL. THE FANS ARE PROVIDED WITH VFD DRIVES THEY WILL SPEED UP AND DOWN TO MAINTAIN THE PRESSURE SET POINT OF 0.10INWC. STAIRWELL PRESSURE WILL BE MONITORED BY STATIC PRESSURE SENSORS LOCATED IN THE STAIR WELLS.
4. RELIEF VENTS WITH FIRE/SMOKE AND BAROMETRIC DAMPERS ARE LOCATED ON THE FIRST AND SEVENTH FLOORS OF THE STAIRWELLS THAT WILL BE UTILIZED TO RELIEVE ANY EXCESS PRESSURE DURING THE MODULATION OF THE FAN SPEEDS. THESE DEVICES ARE PROVIDED TO ENSURE THAT THE MAXIMUM DIFFERENTIAL PRESSURE IS NOT EXCEEDED WHICH CAN CAUSE DIFFICULTIES IN OPENING THE EXIT DOORS. ONCE THE FANS ARE ENERGIZED THE FIRE/SMOKE DAMPERS SHALL BE DRIVEN INTO THE FULL OPEN POSITION EXPOSING THE BAROMETRIC DAMPER. THE BAROMETRIC DAMPERS SHALL BE SET TO MAINTAIN 0.15INWC. IF THE PRESSURE IN THE STAIRWELL EXCEEDS THIS VALUE THE BAROMETRIC DAMPERS SHALL OPEN TO RELIEVE THIS EXCESS AIR UNTIL THE FANS MODULATES THE FAN SPEED.
5. AS DOORS ARE OPENED AND CLOSED THE PRESSURE IN THE STAIRWELLS WILL CHANGE AND PRESSURE VARIATIONS ARE TO BE EXPECTED. HOWEVER, DURING TIMES WHEN THE DOORS ARE OPEN THE MINIMUM PRESSURE SETTING WILL NOT BE MAINTAINED. THE FANS WILL SPEED UP TO PROVIDE ADDITIONAL AIR AND SHALL PROVIDE DIRECTIONAL AIRFLOW THROUGH ALL OF THE OPEN DOORS THUS PREVENTING SMOKE FROM ENTERING THE STAIRWELL.
6. ONCE THE FIRE/SMOKE CONDITION IS REMOVED THE FIRE ALARM PANEL SHALL BE RESET TO NORMAL CONDITION. WHEN THE ALARM PANEL IS CLEARED THE SIGNAL TO THE FANS SHALL BE REMOVED AND THE FANS SHALL BE DE-ENERGIZED. THE FIRE SMOKE DAMPERS SHALL RETURN TO THE FULLY CLOSED POSITION.

LEGEND

-----	Low Voltage, 18 AWG, Copper Wire
-----	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
_____	Line Voltage, THHN Field Wiring

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STAIRWELL PRESSURIZATION SEQUENCE OF OPERATION OPERATION	
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STAIRWELL PRESSURIZATION BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Description	Manufacturer
1	Pressure Transducer	DPT	MS-321	2	Differential pressure transmitter, 0-10 V output, selectable range 0.1", 0.25", 0.5" w.c.	Dwyer
2	Air Flow switch	AS	AFS-262	2	0.05" to 2" W.C. (12.5 to 498 Pa)	Cleveland Controls

LEGEND

----- Low Voltage, 18 AWG, Copper Wire
 - - - - - Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire,
 Low Capacitance
 _____ Line Voltage, THHN Field Wiring

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STAIRWELL PRESSURIZATION BILL OF MATERIAL

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EXISTING RELOCATED EQUIPMENTS

EQUIPMENT	QUANTITY	NOTE
EXISTING RELOCATED VAV	4	RECONNECT & EXTEND EXISTING CONTROL WIRING AS NECESSARY
EXISTING RELOCATED AHU-10,11,12	3	RECONNECT & EXTEND EXISTING CONTROL WIRING AS NECESSARY
EXISTING RELOCATED DAMPER ACTUATORS	7	RECONNECT & EXTEND EXISTING CONTROL WIRING AS NECESSARY
EXISTING RELOCATED CONTROL PANELS	3	RECONNECT & EXTEND EXISTING CONTROL WIRING AS NECESSARY

NOTE: VAV BOX NEW LOCATIONS TO BE FIELD COORDINATED

EQUIPMENT TAG	EXISTING LOCATION	MECH DWG.	RELOCATED LOCATION	MECH DWG.	NOTES
AHU-10	OFFICE, REST ROOM - TENTH FLOOR	DM.410	OFFICE, REST ROOM - TENTH FLOOR	M.410	RECONNECT & EXTEND EXISTING CONTROL WIRING AS NECESSARY
AHU-11	COURTROOM - ELEVENTH FLOOR	DM.410	COURTROOM - ELEVENTH FLOOR	M.410	RECONNECT & EXTEND EXISTING CONTROL WIRING AS NECESSARY
AHU-12	COURTROOM - TWELFTH FLOOR	DM.411	COURTROOM - TWELFTH FLOOR	M.411	RECONNECT & EXTEND EXISTING CONTROL WIRING AS NECESSARY

LEGEND

----- Low Voltage, 18 AWG, Copper Wire
 - - - - - Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire,
 Low Capacitance
 _____ Line Voltage, THHN Field Wiring

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Project: **SAMPLE PROJECT**

EXISTING RELOCATED EQUIPMENTS

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DAMPER SCHEDULE

TAG	DESCRIPTION	ASSOCIATED SYSTEM	FLOOR	QTY	DAMPER DATA						ACTUATOR DATA				REMARKS		
					DAMPER TYPE (S OR R)	BLADE TYPE (P OR O)	WIDTH OR DIAMETER (INCHES)	HEIGHT (INCHES)	AREA (FT2)	TORQUE MULTIPLIER (LB-IN/FT2)	TORQUE REQ'D (LBS)	QTY	SPRING RETURN (Y/N)	TORQUE (LB-IN/FT2)		ACTUATOR	FAIL POSITION
OAD-1	OUTSIDE AIR DAMPER	AHU-1	BASEMENT FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
RAD-1	RETURN AIR DAMPER	AHU-1	BASEMENT FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL OPEN	24vac, Modulating, SR Damper actuator
EAD-1	EXHAUST AIR DAMPER	AHU-1	BASEMENT FLOOR	1	S	O	24	30	5.00	5	25.00	1	Y	27	MS7503A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
OAD-2	OUTSIDE AIR DAMPER	AHU-2	GROUND FLOOR	1	S	O	11.25	38	2.97	5	14.84	1	Y	27	MS7503A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
RAD-2	RETURN AIR DAMPER	AHU-2	GROUND FLOOR	1	S	O	11.25	38	2.97	5	14.84	1	Y	27	MS7503A2030	FAIL OPEN	24vac, Modulating, SR Damper actuator
OAD-3	OUTSIDE AIR DAMPER	AHU-3	THIRD FLOOR	1	S	O	18	10	1.25	5	6.25	1	Y	27	MS7503A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
BYPD-3	BYPASS AIR DAMPER	AHU-3	THIRD FLOOR	1	S	O				5		1	Y	27	MS7503A2030	FAIL OPEN	24vac, Modulating, SR Damper actuator
OAD-4	OUTSIDE AIR DAMPER	AHU-4	FOURTH FLOOR	1	S	O	18	10	1.25	5	6.25	1	Y	27	MS7503A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
BYPD-4	BYPASS AIR DAMPER	AHU-4	FOURTH FLOOR	1	S	O				5		1	Y	27	MS7503A2030	FAIL OPEN	24vac, Modulating, SR Damper actuator
OAD-5	OUTSIDE AIR DAMPER	AHU-5	FOURTH FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
RAD-5	RETURN AIR DAMPER	AHU-5	FOURTH FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL OPEN	24vac, Modulating, SR Damper actuator
EAD-5	EXHAUST AIR DAMPER	AHU-5	FOURTH FLOOR	1	S	O	36	36	9.00	5	45.00	1	Y	88	MS7510A2008	FAIL CLOSED	24vac, Modulating, SR Damper actuator
OAD-6	OUTSIDE AIR DAMPER	AHU-6	FOURTH FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
RAD-6	RETURN AIR DAMPER	AHU-6	FOURTH FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL OPEN	24vac, Modulating, SR Damper actuator
EAD-6	EXHAUST AIR DAMPER	AHU-6	FOURTH FLOOR	1	S	O	36	36	9.00	5	45.00	1	Y	88	MS7510A2008	FAIL CLOSED	24vac, Modulating, SR Damper actuator
OAD-7	OUTSIDE AIR DAMPER	AHU-7	FOURTH FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
RAD-7	RETURN AIR DAMPER	AHU-7	FOURTH FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL OPEN	24vac, Modulating, SR Damper actuator
EAD-7	EXHAUST AIR DAMPER	AHU-7	FOURTH FLOOR	1	S	O	36	36	9.00	5	45.00	1	Y	88	MS7510A2008	FAIL CLOSED	24vac, Modulating, SR Damper actuator
OAD-8	OUTSIDE AIR DAMPER	AHU-8	FOURTH FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL CLOSED	24vac, Modulating, SR Damper actuator
RAD-8	RETURN AIR DAMPER	AHU-8	FOURTH FLOOR	1	S	O	17	46	5.43	5	27.15	1	Y	44	MS7505A2030	FAIL OPEN	24vac, Modulating, SR Damper actuator
EAD-8	EXHAUST AIR DAMPER	AHU-8	FOURTH FLOOR	1	S	O	36	36	9.00	5	45.00	1	Y	88	MS7510A2008	FAIL CLOSED	24vac, Modulating, SR Damper actuator

NOTE: ENGINEER TO CLARIFY BYPD- 3 & 4 (HIGHLIGHTED DAMPER) DIMENSION.

LEGEND	-----	Low Voltage, 18 AWG, Copper Wire
	-----	Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____	Line Voltage, THHN Field Wiring

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VALVE SCHEDULE PAGE 1

SR NO.	EQUIPMENT NAME	VALVE TAG	SYSTEM DATA				Water Data				VALVE BODY DATA							ACTUATOR DATA		DESCRIPTION	
			Qty	EQUIPMENT LOCATION	SERVICE OR APPLICATION	Line Size (INCH)	Design Flow (gpm)	Design Pressure Drop (psi)	Size (IN)	Pressure Drop	Calculated CV	VALVE CV	PATTERN	TYPE	CONN.	PART NUMBER	TRIM	MANUFAC Turer	PART NUMBER		MANUFAC Turer
1	AHU-1	V-1	1	BASEMENT FLOOR	HW coil	1	10	5	1/2	4.53	4.47	4.7	2-WAY	Modulating	NPT	VBN2A004.70S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
2	AHU-1	V-2	1	BASEMENT FLOOR	CHW coil	2	58.21	5	1 1/4	2.48	26.03	37	2-WAY	Modulating	NPT	VBN2D037.00S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
3	AHU-2	V-3	1	GROUND FLOOR	HW coil	1	10	5	1/2	4.53	4.47	4.7	2-WAY	Modulating	NPT	VBN2A004.70S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
4	AHU-2	V-4	1	GROUND FLOOR	CHW coil	1 1/2	35	5	1 1/4	1.96	15.65	25	2-WAY	Modulating	NPT	VBN2D025.00S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
5	AHU-3	V-5	1	THIRD FLOOR	HW coil	1 1/2	3.44	5	1 1/4	1.89	1.54	2.5	2-WAY	Modulating	NPT	VBN2B002.50S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
6	AHU-3	V-6	1	THIRD FLOOR	CHW coil	1 1/2	17.4	5	1	3.74	7.78	9	2-WAY	Modulating	NPT	VBN2C009.00S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
7	AHU-4	V-7	1	THIRD FLOOR	HW coil	1 1/2	4.24	5	1	4.49	1.90	2	2-WAY	Modulating	NPT	VBN2A002.00S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
8	AHU-4	V-8	1	FOURTH FLOOR	CHW coil	1 1/2	23.8	5	1	2.42	10.64	15.3	2-WAY	Modulating	NPT	VBN2C015.30S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
9	AHU-5	V-9	1	FOURTH FLOOR	HW coil	1 1/2	22	5	1	2.07	9.84	15.3	2-WAY	Modulating	NPT	VBN2C015.30S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
10	AHU-5	V-10	1	FOURTH FLOOR	CHW coil	2 1/2	76	5	1 1/2	3.44	33.99	41	2-WAY	Modulating	NPT	VBN2E041.00S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
11	AHU-6	V-11	1	FOURTH FLOOR	HW coil	1 1/2	22	5	1	2.07	9.84	15.3	2-WAY	Modulating	NPT	VBN2C015.30S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
12	AHU-6	V-12	1	FOURTH FLOOR	CHW coil	2 1/2	76	5	1 1/2	3.44	33.99	41	2-WAY	Modulating	NPT	VBN2E041.00S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
13	AHU-7	V-13	1	FOURTH FLOOR	HW coil	1 1/2	22	5	1	2.07	9.84	15.3	2-WAY	Modulating	NPT	VBN2C015.30S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
14	AHU-7	V-14	1	FOURTH FLOOR	CHW coil	2 1/2	76	5	1 1/2	3.44	33.99	41	2-WAY	Modulating	NPT	VBN2E041.00S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
15	AHU-8	V-15	1	FOURTH FLOOR	HW coil	1 1/2	22	5	1	2.07	9.84	15.3	2-WAY	Modulating	NPT	VBN2C015.30S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
16	AHU-8	V-16	1	FOURTH FLOOR	CHW coil	2 1/2	76	5	1 1/2	3.44	33.99	41	2-WAY	Modulating	NPT	VBN2E041.00S	Stainless Steel	Honeywell	MS7505A2030	Honeywell	Ball Valve, SR 24Vac Actuator
17	FCU-1	V-17	1	GROUND FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
18	FCU-1	V-18	1	GROUND FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
19	FCU-2	V-19	1	FIRST FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
20	FCU-2	V-20	1	FIRST FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
21	FCU-3	V-21	1	FIRST FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
22	FCU-3	V-22	1	FIRST FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
23	FCU-4	V-23	1	SECOND FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
24	FCU-4	V-24	1	SECOND FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
25	FCU-5	V-25	1	SECOND FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
26	FCU-5	V-26	1	SECOND FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
27	FCU-6	V-27	1	THIRD FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
28	FCU-6	V-28	1	THIRD FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
29	FCU-7	V-29	1	THIRD FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
30	FCU-7	V-30	1	THIRD FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
31	FCU-8	V-31	1	FOURTH FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
32	FCU-8	V-32	1	FOURTH FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
33	FCU-9	V-33	1	FOURTH FLOOR	HW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
34	FCU-9	V-34	1	FOURTH FLOOR	CHW coil	3/4	3.7	4	1/2	0.39	1.85	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
35	VAV-1-1	V-35	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
36	VAV-1-2	V-36	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
37	VAV-1-3	V-35	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
38	VAV-1-4	V-36	1	FIRST FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
39	VAV-1-5	V-37	1	FIRST FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
40	VAV-1-6	V-38	1	FIRST FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
41	VAV-1-7	V-39	1	FIRST FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
42	VAV-1-8	V-40	1	FIRST FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
43	VAV-1-9	V-41	1	FIRST FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
44	VAV-1-10	V-42	1	SECOND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
45	VAV-1-11	V-43	1	SECOND FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
46	VAV-1-12	V-44	1	SECOND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
47	VAV-1-13	V-45	1	SECOND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
48	VAV-1-14	V-46	1	SECOND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
49	VAV-2-1	V-47	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
50	VAV-2-2	V-48	1	GROUND FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
51	VAV-2-3	V-49	1	GROUND FLOOR	HW coil	3/4	1.5	4	1/2	0.06	0.75	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
52	VAV-2-4	V-50	1	GROUND FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
53	VAV-2-5	V-51	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
54	VAV-2-6	V-52	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR

LEGEND

----- Low Voltage, 18 AWG, Copper Wire

----- Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance

----- Line Voltage, THHN Field Wiring

0	04-11-2019	SAMPLE PROJECT	ICT
NO.	DATE	REVISION	BY

32-72 Steinway St, 502
Astoria, NY 11103
(M) 718 350 8716

Project: **SAMPLE PROJECT**

VALVE SCHEDULE PAGE 1

Job No. _____ Page 46 of 48

VALVE SCHEDULE PAGE 2

SR NO.	EQUIPMENT NAME	VALVE TAG	SYSTEM DATA				Water Data		VALVE BODY DATA										ACTUATOR DATA		DESCRIPTION
			Qty	EQUIPMENT LOCATION	SERVICE OR APPLICATION	Line Size (INCH)	Design Flow (gpm)	Design Pressure Drop (psi)	Size (IN)	Pressure Drop	Calculated CV	VALVE CV	PATTERN	TYPE	CONN.	PART NUMBER	TRIM	MANUFAC TURER	PART NUMBER	MANUFAC TURER	
53	VAV-2-7	V-53	1	GROUND FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
54	VAV-3-1	V-54	1	THIRD FLOOR	HW coil	3/4	2.5	4	1/2	0.18	1.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
55	VAV-3-2	V-55	1	THIRD FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
56	VAV-3-3	V-56	1	THIRD FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
57	VAV-4-1	V-57	1	FOURTH FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
58	VAV-4-2	V-58	1	FOURTH FLOOR	HW coil	3/4	3.0	4	1/2	0.26	1.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
59	VAV-4-3	V-59	1	FOURTH FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
60	VAV-4-4	V-60	1	FOURTH FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
61	VAV-5-1	V-61	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
62	VAV-5-2	V-62	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
63	VAV-5-3	V-63	1	GROUND FLOOR	HW coil	3/4	3.0	4	1/2	0.26	1.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
64	VAV-5-4	V-64	1	FIRST FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
65	VAV-5-5	V-65	1	FIRST FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
66	VAV-5-6	V-66	1	FIRST FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
67	VAV-5-7	V-67	1	SECOND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
68	VAV-5-8	V-68	1	SECOND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
69	VAV-5-9	V-69	1	THIRD FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
70	VAV-5-10	V-70	1	THIRD FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
71	VAV-5-11	V-71	1	FOURTH FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
72	VAV-5-12	V-72	1	FOURTH FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
73	VAV-6-1	V-73	1	GROUND FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
74	VAV-6-2	V-74	1	GROUND FLOOR	HW coil	3/4	3.0	4	1/2	0.26	1.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
75	VAV-6-3	V-75	1	GROUND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
76	VAV-6-4	V-76	1	FIRST FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
77	VAV-6-5	V-77	1	FIRST FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
78	VAV-6-6	V-78	1	FIRST FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
79	VAV-6-7	V-79	1	FIRST FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
80	VAV-6-8	V-80	1	FIRST FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
81	VAV-6-9	V-81	1	SECOND FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
82	VAV-6-10	V-82	1	SECOND FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
83	VAV-6-11	V-83	1	THIRD FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
84	VAV-6-12	V-84	1	THIRD FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
85	VAV-6-13	V-85	1	FOURTH FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
86	VAV-6-14	V-86	1	FOURTH FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
87	VAV-7-1	V-87	1	FIRST FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
88	VAV-7-2	V-88	1	FIRST FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
89	VAV-7-3	V-89	1	FOURTH FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
90	VAV-7-4	V-90	1	FOURTH FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
91	VAV-7-5	V-91	1	THIRD FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
92	VAV-7-6	V-92	1	THIRD FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
93	VAV-7-7	V-93	1	FOURTH FLOOR	HW coil	3/4	4.0	4	1/2	0.46	2.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
94	VAV-7-8	V-94	1	FOURTH FLOOR	HW coil	3/4	4.0	4	1/2	0.46	2.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
95	VAV-7-10	V-95	1	FOURTH FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
96	VAV-8-1	V-96	1	FIRST FLOOR	HW coil	3/4	3.0	4	1/2	0.26	1.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
97	VAV-8-2	V-97	1	FIRST FLOOR	HW coil	3/4	1.0	4	1/2	0.03	0.50	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
98	VAV-8-3	V-98	1	FOURTH FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
99	VAV-8-4	V-99	1	FOURTH FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
100	VAV-8-5	V-100	1	THIRD FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
101	VAV-8-6	V-101	1	THIRD FLOOR	HW coil	3/4	0.5	4	1/2	0.01	0.25	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
102	VAV-8-7	V-102	1	FOURTH FLOOR	HW coil	3/4	4.0	4	1/2	0.46	2.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
103	VAV-8-8	V-103	1	FOURTH FLOOR	HW coil	3/4	4.0	4	1/2	0.46	2.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR
104	VAV-8-10	V-104	1	FOURTH FLOOR	HW coil	3/4	2.0	4	1/2	0.11	1.00	5.9	2-WAY	Modulating	NPT	Z2050QJ+CQB24-SR-R	Plated Brass	Belimo		Belimo	24V BELIMO ZONE TIGHT NSR

LEGEND	----- Low Voltage, 18 AWG, Copper Wire
	----- Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____ Line Voltage, THHN Field Wiring

0	04-11-2019	SAMPLE PROJECT	ICT
NO.	DATE	REVISION	BY

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Project: SAMPLE PROJECT	
VALVE SCHEDULE PAGE 2	
Job No.	Page 47 of 48

MASTER BILL OF MATERIAL

Item #	Application	Tag	Part No	Quantity	Shipped	Description	Manufacturer
1	Programmable Controller	JACE	WEB8000	1		Base unit includes two isolated RS485 ports, two 10/100MB Ethernet ports, USB Backup & Restore and WiFi connectivity	Honeywell
2	Device	Device	NC-8100	1		Up to 100 devices/5,000 point core	Honeywell
3	Device	Device	DEVICE-10	1		Up to 10 devices/500 point upgrade (can be purchased during initial licensing)	Honeywell
4	SMA	SMA	SUP-1-SMA-INIT	1		18mo initial SMA (3YR or 5YR can be substituted)	Honeywell
5	RS-485 Module	RS-485 Module	NPB-8000-2X-485	2		WEB-8000 controller — add on dual port RS-485 module	Honeywell
6	Network Switch	NS	EISK8-100T	1		8 Ports 10/100 Mbps Skorpion switch	Contemporary Controls
7	Programmable Controller	C1	PUB6438SR	8		Honeywell Spyder Controller with 6UI, 4DI,3AO, 8DO, Dimensions 5.45in High X 6.85in wideX2.26in deep	Honeywell
8	Programmable Controller	C1	PUB6438S	2		Honeywell Spyder Controller with 6UI, 4DI,3AO, 8DO	Honeywell
9	Programmable Controller	C1	CVB4022AS-VAV1	14		Stryker BACnet Configurable Controllers, 4 Universal/0 Digital Inputs, 2 Analog/2 Digital Outputs, Integrated Actuator	Honeywell
10	I/O Module	SIO1	SIO4022	3		Sylk IO Module with 4UI, 2AO, 2DO	Honeywell
11	I/O Module	SIO1	SIO6042	5		Sylk IO Module with 6UI, 4AO, 2DO	Honeywell
12	BACnet Fixed Functional Thermostat	C1	TB3026B	9		BACnet Fixed Function Thermostat with 3UI, 6 BO, 2 AO	Honeywell
13	Water Temperature Sensor	TS	A/20K-I-4-GD	4		Immersion 20 kΩ type IV thermistor with stainless well and 4" (10.1 cm) insertion	ACI
14	Outside air temperature	OAT	RHP-2-R-2-F	1		RH/Temperature Sensor Transmitter, 2% Accuracy, Radiation shield, 20KΩ @ 25°C Thermistor	Dwyer
15	Averaging Air Temperature	MAT, PH-T, DAT	A/20K-FA-12'-GD	9		20K ohm NTC Duct Averaging Temp Sensor, 12' Flexible Cable	ACI
16	Averaging Air Temperature	MAT, PH-T, DAT	A/20K-FA-24'-GD	15		20K ohm NTC Duct Averaging Temp Sensor, 24' Flexible Cable	ACI
17	Return Air Temperature	RAT	A/20K-D-12"-GD	8		20K ohm NTC Duct Temp Sensor, 12" length, Galvanized	ACI
18	Discharge Air Temperature VAV	DAT	A/20K-D-4"-PB	72		4" 20K Duct Temp Sensor for VAV Discharge Air Temp	ACI
19	Space Temperature	ST	A/20K-RS	74		Room Temp sensor, 20K ohm, with Setpoint	ACI
20	Building static pressure	BSP	MS-321	7		Differential pressure transmitter, 0-10 V output, selectable range 0.1", 0.25", 0.5" w.c.	Dwyer
21	Duct static pressure	DSP	MS-312	8		Differential pressure transmitter, 0-10 V output, selectable range 1", 2", 5" w.c., duct mount	Dwyer
22	Differential pressure switch	DPS	ADPS-04-2-N-C	21		Adjustable Differential Pressure Switch, Set Point Range in w.c. (Pa) 0.12 to 1.60 (30-400), W/ install kit	Dwyer
23	Wet differential pressure sensor	DPT	629C-05-CH-P2-E5-S3	1		Wet/wet differential pressure transmitter, range 0-100 psid	Dwyer
24	Wet differential pressure switch	DPS	DXW-11-153-1	2		Wet/wet differential pressure switch, range 10 to 25 psid	Dwyer
25	Air Flow switch	AS	AFS-262	2		0.05" to 2" W.C. (12.5 to 498 Pa)	Cleveland Controls
26	Freezestat	FRZ	DFS-DM10	3		Low limit temperature control, DPDT, Manual reset, 10' capillary	Dwyer
27	Freezestat	FRZ	DFS-DM20	5		Low limit temperature control, DPDT, Manual reset, 20' capillary	Dwyer
28	Current Transducer	CS	C-2300	39		Analog Current Sensors, 0-10VDC output, 30A, 60A & 120A Selectable Range split-cores	Senva
29	Relay	R-#	RIBU1C	51		Universal RIB Relay	Functional Devices
30	Panel Mounted Relay	R-#	783-3C-24A	2		Ice cube control relay, 24 VAC coil voltage, 3PDT	Automation Direct
31	Base	R-#	783-3C-SKT	2		Relay socket DIN Rail Mounted	Automation Direct
32	Panel Mounted Relay	R-#	784-4C-24A	5		Ice cube control relay, 24VAC coil voltage, 4PDT, 15A contact rating, with LED indicator	Automation Direct
33	Base	R-#	784-4C-SKT-1	5		Relay socket DIN Rail Mounted	Automation Direct
34	Panel	CP-#	SCE-16N1606LP	2		Saginaw, 16"H X 16"W X 6" Depth Nema1 enclosure, steel ANSI61-Grey	Saginaw
35	Perforated Subpanel	CP-#	SCE-16N16MP	2		Enclosure, Nema-1	Saginaw
36	Panel	CP-#	SCE-24N2406LP	8		Saginaw, 24"H X 24"W X 6" Depth Nema1 enclosure, steel ANSI61-Grey	Saginaw
37	Perforated Subpanel	CP-#	SCE-24N24MP	8		Subpanel, Nema-1	Saginaw
38	Transformer	TR-#	5051MWCB	2		Mult-Tap Class 2, 50VA, 120,208,240,277,480 Integrated overcurrent breaker	Senva
39	Transformer	TR-#	10051MWCB	13		Mult-Tap Class 2, 100VA, 120,208,240,277,480 Integrated overcurrent breaker	Senva
40	Damper Actuator	D	MS7503A2030	7		24vac, Modulating, SR Damper actuator, Torque-27 LB-IN/FT2	Honeywell
41	Damper Actuator	D	MS7505A2030	10		24vac, Modulating, SR Damper actuator, Torque-44 LB-IN/FT2	Honeywell
42	Damper Actuator	D	MS7510A2008	4		24vac, Modulating, SR Damper actuator, Torque-88 LB-IN/FT2	Honeywell

LEGEND	----- Low Voltage, 18 AWG, Copper Wire
	----- Low Voltage Communication Wiring 22/2 AWG, CL2P, Shielded Copper Wire, Low Capacitance
	_____ Line Voltage, THHN Field Wiring

NO.	0	04-11-2019	SAMPLE PROJECT	ICT
				BY

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