

LOUVER SCHEDULE										
MARK	MATERIAL	LOUVER SIZE W(IN)xH(IN)xD(IN)	DESIGN CFM	FREE AREA (SF)	VELOCITY (FPM)	SERVICE	MAX PRESS DROP (IN.W.G.)	ACCESS.	NOTES	MANUFACTURER & MODEL NUMBER
LV-1	ALUMINUM	24x30x5.5	1000	2.04	463	EXHAUST	0.1	1,2	1-5	GREENHECK EHV-550D
LV-2	ALUMINUM	24x30x5.5	-	2.04	-	EXHAUST	0.1	1,2	1-5	GREENHECK EHV-550D
LV-3	ALUMINUM	24x30x5.5	-	2.04	-	INTAKE	0.1	2,3	1-5	GREENHECK EHV-550D
LV-4	ALUMINUM	16x96x5.5	-	4.96	-	INTAKE	0.1	2,3	1-5	GREENHECK EHV-550D
LV-5	ALUMINUM	16x96x5.5	-	4.96	-	INTAKE	0.1	2,3	1-5	GREENHECK EHV-550D
LV-6	ALUMINUM	24x24x5.5	520	1.52	326	EXHAUST	0.1	1,2	1-5	GREENHECK EHV-550D

**ACCESSORIES (PROVIDE THE FOLLOWING)**  
 1. BIRD SCREEN IN REMOVABLE ALUMINUM FRAME  
 2. LOUVER SHALL BE FACTORY FINISHED WITH 70% KYNAR 500/HYLAR 5000 FINISH; COLOR: TO BE SELECTED BY ARCHITECT  
 3. INSECT SCREEN

**NOTES**  
 1. LOUVER IS A FLORIDA PRODUCT APPROVED WIND-DRIVEN RAIN LOUVER.  
 2. LOUVER IS A MIAMI-DADE QUALIFIED LOUVER WITH A PUBLISHED NOTICE OF ACCEPTANCE.  
 3. COORDINATE LOUVER ELEVATIONS AND OPENINGS WITH ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS.  
 4. PROVIDE COLOR SAMPLES TO THE ARCHITECT FOR COLOR SELECTION BEFORE PROCURING LOUVER.  
 5. LOUVER SHALL BE AMCA 540 AND AMCA 550 LISTED.

FAN SCHEDULE	
MARK	EF-1
MANUFACTURER	GREENHECK
MODEL	CSP-A700
APPLICATION	EXHAUST
<b>FAN</b>	
LOCATION	ABOVE STORAGE CEILING
AIR FLOW (CFM)	520
STATIC PRESSURE (IN.W.G.)	0.5
DRIVE/TYPE	DIRECT / CENT
WATTS	172
VOLTAGE/PHASE/HZ	115/1/60
<b>UNIT REQUIREMENTS</b>	
MAXIMUM SONES	0.7
OPERATING WEIGHT (LBS)	50
ACCESSORIES	1,2,3
NOTES	1
<b>ACCESSORIES (PROVIDE THE FOLLOWING)</b>	
1. FAN SPEED CONTROLLER	
2. MANUFACTURER'S VIBRATION ISOLATORS	
3. BACKDRAFT DAMPER	
<b>NOTES</b>	
1. FAN OPERATION SHALL BE CONTROLLED/MONITORED BY THE BMS.	

**DEDICATED OUTSIDE AIR SPLIT SYSTEM SCHEDULE**

INDOOR UNIT	
MARK	DOAS-1
LOCATION	MECH RM
MANUFACTURER	DESERT AIRE
MODEL	QV05
<b>FAN</b>	
TOTAL AIR FLOW (CFM)	1000
OUTSIDE AIR FLOW (CFM)	1000
ESP/TSP (IN.W.G.)	1.0 / 1.7
HP	1.0
<b>EVAPORATOR</b>	
NOMINAL TONS	5.0
TOTAL COOLING CAPACITY (MBH)	80.0
SENSIBLE COOLING CAPACITY (MBH)	43.9
ENTERING AIR TEMP (DB/WB)	95.0 / 78.0
LEAVING AIR TEMP (DB/WB)	54.7 / 54.0
PROTECTIVE COIL COATING	ELECTROFIN
<b>ELECTRIC HEATER</b>	
CAPACITY (KW)	10.0
ENTERING/LEAVING AIR TEMPERATURE (DEG F)	37.0 / 69.0
CONTROL	SCR
<b>COMPRESSORS</b>	
QUANTITY	1
TYPE	SCROLL
<b>FILTERS</b>	
EFFICIENCY	MERV 11
TYPE	DISPOSABLE
<b>GENERAL</b>	
WEIGHT	700
<b>ELECTRICAL</b>	
VOLTAGE/PHASE/HZ	208/3/60
COMPRESSOR 1 RLA (AMPS)	22.4
MOTOR RLA (AMPS)	4.2
HEATER DRAW (AMPS)	27.8
UNIT MCA (AMPS)	42
UNIT MOCP (AMPS)	50
<b>OUTDOOR UNIT</b>	
MARK	DC-1
LOCATION	GRADE
MANUFACTURER	DESERT AIRE
MODEL	RCS024C3K40900
REFRIGERANT	R-410A
OUTDOOR DESIGN TEMPERATURE (DEG F)	95
NUMBER OF FANS	1
TOTAL HEAT REJECTION (MBH)	98.0
PROTECTIVE COIL COATING	ELECTROFIN
UNIT WEIGHT (LBS)	250
<b>ELECTRICAL</b>	
VOLTAGE PHASE/HZ	208/3/60
MINIMUM CIRCUIT AMPACITY	5
MAXIMUM FUSE SIZE	9
<b>SYSTEM PERFORMANCE</b>	
AHRI 920 RATING	7.7

**ACCESSORIES (PROVIDE THE FOLLOWING)**  
 1. MODULATING HOT GAS REHEAT  
 2. HOT GAS BYPASS  
 3. 20-GAUGE STAINLESS STEEL DRAIN PAN  
 4. LOUVERED CONDENSER COIL GUARD  
 5. PROTECTIVE EVAPORATOR AND CONDENSER COIL COATINGS  
 6. CONTROLS  
 • MODEL CM3500 CONTROLLER, NO EXCEPTIONS  
 • OUTSIDE AIR SENSOR (FIELD INSTALLED)  
 • SUPPLY AIR TEMPERATURE CONTROL  
 • SUPPLY AIR DUCT TEMPERATURE SENSOR (FIELD INSTALLED)  
 • REMOTE DISPLAY TERMINAL  
 • INPUTS FROM BMS TO START AND STOP UNIT  
 • OUTPUTS TO BMS FOR ALARMS

**NOTES**  
 1. THE REFRIGERANT PIPING DESIGN AND SIZING SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. THE CONTRACTOR SHALL CONSIDER LENGTH OF RUN AND FIELD CONDITIONS WHEN SIZING PIPING.

**SPLIT SYSTEM AIR HANDLER SCHEDULE**

MARK	AH-1	AH-2	AH-3	AH-4	AH-5	AH-6
LOCATION	MECH RM	MECH RM	MECH RM	MECH RM	MECH RM	MECH RM
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL	GAM5B0C60	GAM5B0C60	GAM560C48	GAM5B0C48	GAM5B0C48	GAM5B0C60
<b>FAN</b>						
TOTAL AIR FLOW (CFM)	1980	1980	1575	1545	1500	1975
VENTILATION AIR FLOW (CFM)	205	205	165	165	165	95
EXTERNAL STATIC PRESSURE (IN.W.G.)	0.5	0.5	0.5	0.5	0.5	0.5
DRIVE/SPEED	DIRECT / HIGH	DIRECT / HIGH	DIRECT / HIGH	DIRECT / HIGH	DIRECT / HIGH	DIRECT / HIGH
MOTOR HP	1.0	1.0	3/4	3/4	3/4	1.0
<b>EVAPORATOR COIL</b>						
SENSIBLE CAPACITY (MBH)	43.4	43.4	34.4	33.6	33.1	43.6
TOTAL CAPACITY (MBH)	53.1	53.1	44.0	43.9	43.8	53.6
ENTERING AIR TEMP (DB/WB)	73 / 61.2	73 / 61.2	73 / 61.2	72.8 / 61.3	72.8 / 61.3	74.0 / 62.0
LEAVING AIR TEMP (DB/WB)	52.6 / 51.5	52.6 / 51.5	52.7 / 51.0	52.6 / 50.9	52.3 / 50.6	53.5 / 52.3
<b>HEAT PUMP HEATING CAPACITY</b>						
HEATING CAPACITY (MBH) @ 47°F	52.5	52.5	41.5	41.5	41.5	52.5
<b>AUXILIARY ELECTRIC HEATING COIL</b>						
INPUT (KW @ 208V)	7.2	7.2	7.2	7.2	7.2	7.2
<b>ELECTRICAL (CIRCUIT 1)</b>						
VOLTAGE/PHASE/HZ	208/3/60	208/3/60	208/3/60	208/3/60	208/3/60	208/3/60
MINIMUM CIRCUIT AMPACITY	34	34	32	32	32	34
MAXIMUM FUSE SIZE	35	35	35	35	35	35
<b>FILTERS</b>						
TYPE	THROW AWAY	THROW AWAY	THROW AWAY	THROW AWAY	THROW AWAY	THROW AWAY
SIZE / QUANTITY	22x20x1 / 1	22x20x1 / 1	22x20x1 / 1	22x20x1 / 1	22x20x1 / 1	22x20x1 / 1
<b>UNIT REQUIREMENTS</b>						
OPERATING WEIGHT (LBS)	200	200	200	200	200	200
ACCESSORIES	1-3	1-3	1-3	1-3	1-3	1-3
NOTES	1	1	1	1	1	1

**ACCESSORIES (PROVIDE THE FOLLOWING)**  
 1. SINGLE POINT POWER CONNECTION WITH FACTORY-INSTALLED PULL-TYPE DISCONNECT  
 2. PROTECTIVE EVAPORATOR COIL COATING  
 3. CONDENSATE OVERFLOW SAFETY SWITCH WHICH WILL SHUT DOWN THE AIR HANDLER IF THE PRIMARY CONDENSATE DRAIN LINE CLOGS. DESIGN BASIS: LITTLE GIANT PUMP COMPANY ACS-5

**NOTES**  
 1. LOCK-OUT ELECTRIC HEAT WHEN HEAT PUMP COMPRESSOR IS OPERATING.

**AIR-COOLED HEAT PUMP SCHEDULE**

MARK	HP-1	HP-2	HP-3	HP-4	HP-5	HP-6
LOCATION	GRADE	GRADE	GRADE	GRADE	GRADE	GRADE
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL NUMBER	4TWA4060	4TWA4060	4TWA4048	4TWA4048	4TWA4048	4TWA4060
NOMINAL TONS	5.0	5.0	4.0	4.0	4.0	5.0
REFRIGERANT	R-410A	R-410A	R-410A	R-410A	R-410A	R-410A
<b>COMPRESSOR</b>						
OUTDOOR DESIGN TEMPERATURE (DEG F)	95	95	95	95	95	95
NUMBER OF STAGES	1	1	1	1	1	1
NUMBER OF COMPRESSORS	1	1	1	1	1	1
<b>CONDENSER FAN</b>						
NUMBER OF FANS	1	1	1	1	1	1
MOTOR HP	1/5	1/5	1/5	1/5	1/5	1/5
<b>ELECTRICAL</b>						
VOLTAGE/PHASE/HZ	208/3/60	208/3/60	208/3/60	208/3/60	208/3/60	208/3/60
COMPRESSOR RLA EACH	15.9	15.9	13.7	13.7	13.7	15.9
CONDENSER FAN MOTOR FLA EACH	1.1	1.1	1.1	1.1	1.1	1.1
MINIMUM CIRCUIT AMPACITY	21	21	18	18	18	21
MAXIMUM PROTECTION RATING	35	35	30	30	30	35
<b>UNIT REQUIREMENTS</b>						
EER/SEER	12.0 / 14.5	12.0 / 14.5	12.0 / 14.5	12.0 / 14.5	12.0 / 14.5	12.0 / 14.5
COP @ 47°F / HSPF	3.5 / 8.5	3.5 / 8.5	3.4 / 8.2	3.4 / 8.2	3.4 / 8.2	3.5 / 8.5
UNIT WEIGHT (LBS)	400	400	400	400	400	400
ACCESSORIES	1-7	1-7	1-7	1-7	1-7	1-7
NOTES	1	1	1	1	1	1

**ACCESSORIES (PROVIDE THE FOLLOWING)**  
 1. LOUVERED COIL GUARD  
 2. MANUFACTURER'S ANCHOR BRACKET KIT  
 3. ANTI-SHORT CYCLE KIT  
 4. FREEZE PROTECTION KIT  
 5. HIGH AND LOW PRESSURE SWITCHES  
 6. REFRIGERANT CHARGING VALVES  
 7. CONDENSER PROTECTIVE COIL COATING

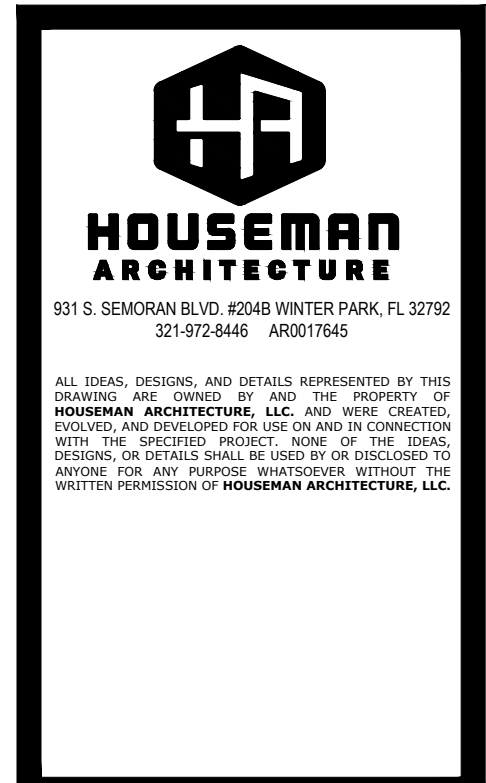
**NOTES**  
 1. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE EQUIPMENT MANUFACTURER FOR THE PROPER REFRIGERANT PIPE SIZING FOR THE APPLICATION.

**AIR DEVICE SCHEDULE**

MARK	MANUFACTURER	MODEL	TYPE	BORDER	AIR PATTERN	FACE/NECK	FINISH	MATERIAL	MAX NC LEVEL	MAX PRESS DROP (IN.W.G.)	ACCESS.	NOTES
<b>SUPPLY AIR DEVICES</b>												
CS-A	TITUS	TMS-AA	CEILING SUPPLY	LAY-IN	4-WAY	24x24/SEE TABLE 1	WHITE	ALUMINUM	25	0.08	1	1,2
SS-A	TITUS	272FL	SIDEWALL SUPPLY	SURFACE	2-WAY	REFER TO DRAWINGS	WHITE	ALUMINUM	25	0.08	1	1,2
<b>RETURN AIR DEVICES</b>												
CR-A	TITUS	TMS-AA	CEILING RETURN	LAY-IN	1-WAY	24x24/SEE TABLE 1	WHITE	ALUMINUM	25	0.08	1	1,2
SR-A	TITUS	350FL	SIDEWALL RETURN	SURFACE	1-WAY	REFER TO DRAWINGS	WHITE	ALUMINUM	25	0.08	1	1,2
<b>EXHAUST AIR DEVICES</b>												
CE-A	TITUS	50F	CEILING EXHAUST	LAY-IN	1-WAY	12x12/SEE TABLE 1	WHITE	ALUMINUM	25	0.08	2,3	1,2

**NOTES**  
 1. INSULATED DUCT BOOT FOR CONNECTION TO ROUND DUCTWORK  
 2. OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF AIR DEVICE  
 3. 12x12 GRILLE IN A 24x24 LAY-IN PANEL

TABLE 1		LEGEND	
AIR DEVICE NECK SIZING TABLE		AIR DEVICE TAG	
CFM RANGE	0-110   111-220   221-420   421-550   551-750	MARK - TYPE OR (INXIN)	EXAMPLES
NECK SIZE	6" DIA   8" DIA   10" DIA   12" DIA   14" DIA	AIRFLOW (CFM)	CS-A OR SS/12x6 100 CFM OR 100 CFM



DATE	01/15/2020
REVISION	2 ADDENDUM 2
DRAWN	
CHECKED	

12/20/2019  
 Job no. 2019-5743  
 Sheet no. M1.601

**ADDENDUM 2 - 01/15/2020**  
**SCHEDULES - MECHANICAL**  
**ERAU PRODUCTION BUILDING**  
 EMBRY-RIDDLE AERONAUTICAL UNIVERSITY, DAYTONA BEACH, FLORIDA



REVISION	DATE	DESCRIPTION
1	01/03/2020	ADDENDUM 1
2	01/15/2020	ADDENDUM 2

### CONTROL SYSTEM GENERAL NOTES

- A BUILDING MANAGEMENT SYSTEM (BMS) SHALL BE PROVIDED AS PART OF THIS PROJECT.
- THE WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
  - MICROPROCESSOR BASED CONTROLLERS
  - SENSORS
  - ROUTERS AND COMMUNICATION
  - PANELS
  - SWITCHES
  - WIRING AND CONDUIT
  - SOFTWARE OPERATING SYSTEMS, PROGRAMMING, AND FULL OPERATOR WORKSTATION SYSTEM GRAPHICS
  - COMMISSIONING, CALIBRATION, ACTIVATION, AND DE-BUGGING
  - DEMONSTRATIONS AND TRAINING
- THE CONTRACTOR IS RESPONSIBLE FOR ALL STARTERS, RELAYS, AND WIRING REQUIRED TO ACCOMPLISH THE SEQUENCES OF OPERATION DEFINED ON THIS SHEET.
- ENSURE THAT THE MEASURED SIGNALS ARE COMMUNICATED QUICKLY TO THE CONTROL LOOPS (AND NOT DELAYED DUE TO NETWORK TIMING).
- ALL SET POINTS SHALL BE USER-ADJUSTABLE.
- SEQUENCES ARE PERFORMANCE-BASED AND GENERALLY DO NOT REFER TO SPECIFIC DEAD-BANDS, RESET RATIOS, DELAYS, AND RANGES REQUIRED FOR STABLE OPERATION. THESE PARAMETERS SHALL BE FULLY ADJUSTABLE AT THE OPERATOR SOFTWARE INTERFACE.
- COORDINATE THE RANGE, SET POINT, DEAD-BAND, CHARACTERISTICS AND MOUNTING LOCATIONS OF SENSORS WITH THE ACTUAL EQUIPMENT FURNISHED. INSTALL SENSORS, TUBING, AND WIRING TO BE ACCESSIBLE AND AS NOT TO IMPEDE OR ENCRDACH UPON EQUIPMENT SERVICE AND ACCESS AREAS.
- WHERE PROPOSED SEQUENCES COULD DEFEAT THE EQUIPMENT MANUFACTURER'S EQUIPMENT SAFETIES OR BE DETRIMENTAL TO THE EQUIPMENT CONTROLLED, ALERT THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
- PROVIDE MODIFICATION TO THE SET POINTS, DEAD-BANDS, DELAYS AND RANGES BASED UPON THE ACTUAL PERFORMANCE OF THE CONTROLLED EQUIPMENT IN ORDER TO PROVIDE STABLE OPERATION WITHOUT EXCESSIVE CYCLING OR HYSTERESIS. DO NOT MODIFY THE SEQUENCE WITHOUT SUBMITTING AN ALTERNATE SEQUENCE TO THE ENGINEER FOR REVIEW AND APPROVAL.
- IN ADDITION TO SPECIFIC EQUIPMENT ALARMS NOTED IN THE CONTRACT DOCUMENTS, PROVIDE STANDARD ALARMS FOR ITEMS SUCH AS SENSOR FAILURE, OUT-OF-RANGE (HIGH/LOW LIMITS) AND SIMILAR ITEMS.
- COORDINATE SEQUENCES AND DATA ACQUISITION REQUIREMENTS AND PROVIDE FOR TREND LOGGING, REPORT GENERATION, CALCULATED RUN-HOURS, AND SIMILAR PREVENTATIVE MAINTENANCE FUNCTIONS.
- POWER WIRING SHALL NOT BE RUN IN THE SAME CONDUIT AS LOW VOLTAGE WIRING, SIGNAL, OR COMMUNICATIONS WIRING. FINAL CONNECTION TO SENSORS AND ACTUATORS MAY BE MADE WITH FLEXIBLE CONDUIT NOT TO EXCEED 30 INCHES IN LENGTH. COMMUNICATION CABLING CONCEALED ABOVE CEILING SHALL BE PLENUM-RATED AND MAY BE RUN WITHOUT CONDUIT, BUT SHALL BE SUPPORTED IN CABLE TRAY (WHERE AVAILABLE), OR SUPPORTED WITH BRIDAL RINGS. EXPOSED COMMUNICATION CABLING SHALL BE RUN IN CONDUIT, EXCEPT WHERE CABLE TRAY IS AVAILABLE TO BE USED.
- WIRING SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT VERSION OF THE NATIONAL ELECTRICAL CODE (NEC). CONDUCTORS SHALL BE COPPER, ONE-PIECE, INSTALLED WITHOUT SPLICES. WIRING SHALL BE COLOR-CODED.
- POWER (120V AND ABOVE) AND CONDUIT TO UNIT CONTROLLERS AND PANELS SHALL BE PROVIDED AND TERMINATED BY THE ELECTRICAL CONTRACTOR. TRANSFORMERS, DC POWER RECTIFIERS, AND EXTENSION OF LOW-VOLTAGE POWER TO ACTUATORS, TRANSMITTERS, AND SIMILAR CONTROL DEVICES AND SENSORS SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR.
- \*POWER BY DIV 26\* REFERS TO POWER PROVIDED BY THE ELECTRICAL CONTRACTOR REGARDLESS OF THE PROJECT SPECIFICATION NUMBERING.
- ALL AIR-MOVING EQUIPMENT SHALL SHUTDOWN DURING A FIRE ALARM AND SHALL AUTOMATICALLY RETURN TO NORMAL OPERATION AFTER THE FIRE ALARM HAS BEEN CLEARED.

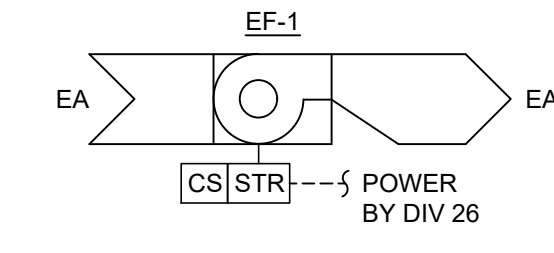
### TYPICAL CONTROL POINT LIST

CONTROL POINT	AI	AO	BI	BO
OUTDOOR AIR TEMPERATURE (DEG F)	●	○	○	○
OUTDOOR AIR HUMIDITY (% RH)	●	○	○	○
OUTDOOR AIR ENTHALPY (BTUS/LB DRY AIR)	●	○	○	○
BUILDING FIRE ALARM	○	○	○	●
EF-1 ON/OFF	○	○	○	●
EF-1 STATUS (CURRENT SWITCH)	○	○	○	●
SPLIT SYSTEM CONTROLLER (SEE NOTE 2)	AI	AO	BI	BO
ZONE TEMPERATURE SENSOR 1 (DEG F)	○	○	○	○
ZONE HUMIDITY (% RH)	○	○	○	○
ZONE TEMPERATURE SET POINT (DEG F)	○	○	○	○
SYSTEM ENABLE/DISABLE	○	○	○	○
FAN (STATUS) 2	○	○	○	○
COOLING MODE	○	○	○	○
HEATING MODE - HEAT PUMP	○	○	○	○
HEATING MODE - AUX ELECTRIC HEAT	○	○	○	○
DUCT-MOUNTED SA TEMP SENSOR (DEG F)	○	○	○	○
RA NEEDLEPOINT BIPOLAR IONIZATION (ON/OFF)	○	○	○	○
100% OA SPLIT SYSTEM CONTROLLER (SEE NOTE 3)	AI	AO	BI	BO
SYSTEM ENABLE/DISABLE	○	○	○	○
MODE (COOLING/HEATING/ECONOMIZING)	○	○	○	○
OA DAMPER POSITION WITH END SWITCH	○	○	○	○
OA NEEDLEPOINT BIPOLAR IONIZATION (ON/OFF)	○	○	○	○
SA DUCT-MOUNTED TEMP SENSOR (DEG F)	○	○	○	○
ALARM	○	○	○	○

- NOTES**
- THIS SCHEDULE SHOWS THE MINIMUM POINTS REQUIRED. PROVIDE ALL POINTS AS REQUIRED FOR THE MECHANICAL EQUIPMENT TO PERFORM THE SEQUENCE OF OPERATIONS.
  - SPLIT SYSTEM CONTROLLERS SHALL HOUSE ALL OPERATING SEQUENCES FOR STAND-ALONE OPERATION IF COMMUNICATION TO BMS IS TEMPORARILY LOST.
  - 100% OA UNIT SHALL BE CONTROLLED BY THE MANUFACTURER'S CONTROLLER AND SHALL COMMUNICATE TO THE BMS VIA BACNET. THE POINTS LISTED ARE THE MINIMUM POINTS TO BE MONITORED/ADJUSTED THROUGH THE BMS.

### CONTROL LEGEND

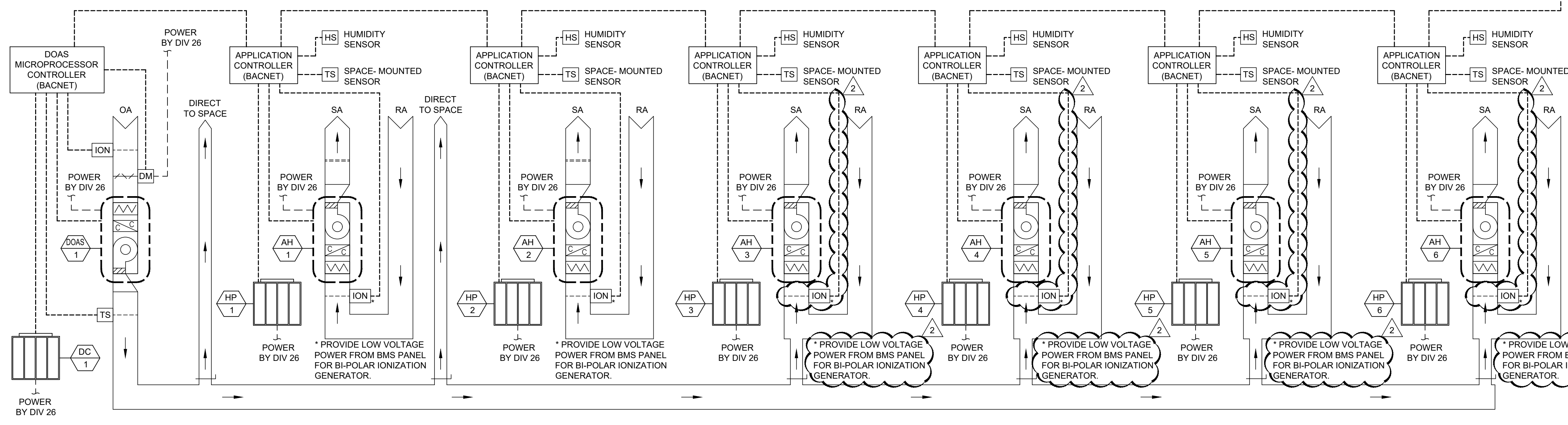
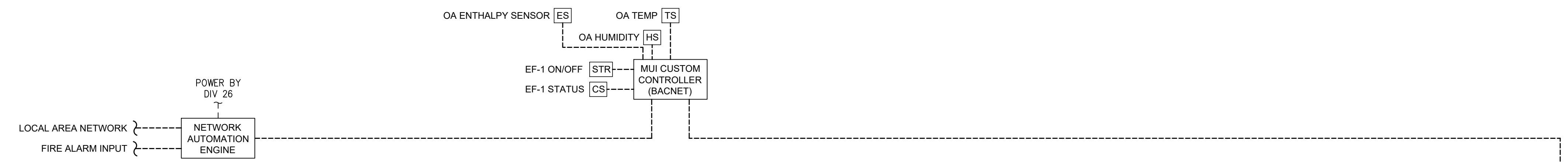
SYMBOL	DESCRIPTION
CS	CURRENT SWITCH
DM	DAMPER MOTOR - ELECTRIC
DPS	DIFFERENTIAL PRESSURE SWITCH
ES	ENTHALPY SENSOR
HS	HUMIDITY SENSOR
ION	BIPOLAR IONIZATION BAR
RLY	RELAY
SD	SMOKE DETECTOR
STR	MOTOR STARTER WITH RELAYS
T/H/S	TEMPERATURE AND HUMIDITY SENSOR
TS	TEMPERATURE SENSOR
DIV 16	ELECTRICAL CONTRACTOR
F/A	FIRE ALARM SYSTEM
T	THERMOSTAT
[Symbol]	MANUAL DAMPER
[Symbol]	CONTROL DAMPER
[Symbol]	FAN
[Symbol]	COOLING COIL
[Symbol]	HEATING COIL
[Symbol]	AIR FILTERS



THE INLINE FAN SERVING THE RESTROOMS AND JANITOR CLOSET SHALL BE CONTROLLED BY THE BMS TO OPERATE ON A TIME-OF-DAY SCHEDULE. THE TIME-OF-DAY SCHEDULE SHALL BE COORDINATED TO MATCH THE 100% DEDICATED OUTDOOR AIR SPLIT SYSTEM (DOAS) SCHEDULE. THE EXHAUST FAN STATUS WILL BE MONITORED BY THE BMS.

### 2 EXHAUST FAN SEQUENCE AND SCHEMATIC

M1.701 NOT TO SCALE



### 1 CONTROL SCHEMATIC BUILDING HVAC CONTROLS

M1.701 NOT TO SCALE

#### SEQUENCE OF OPERATION - BUILDING HVAC SYSTEM

**SUPPLY FANS**

THE SUPPLY FAN SHALL BE STARTED AND STOPPED BY THE BMS BASED ON AN OCCUPANCY SCHEDULE. THE FAN START SHALL BE SUBJECT TO SAFETIES SUCH AS FIRE ALARM, SMOKE DETECTORS, OVERLOADS, ETC. WHEN THE SUPPLY FAN STATUS INDICATES THE FAN STARTED, THE CONTROL SEQUENCE SHALL BE ENABLED. UPON A LOSS OF FAN STATUS, THE SYSTEM SHALL ATTEMPT TO AUTOMATICALLY RESTART UNTIL POSITIVE STATUS IS ACHIEVED.

PROVIDE INTEGRAL PUSH BUTTON OVERRIDE ON ZONE TEMPERATURE SENSOR TO START THE RESPECTIVE ZONE SPLIT SYSTEM, DEDICATED OUTSIDE AIR SYSTEM AND BUILDING EXHAUST FAN FOR 2 HOURS (ADJUSTABLE) DURING TIMES WHEN THE BMS SYSTEM HAS THE UNITS SCHEDULED OFF. THE FAN START SHALL BE SUBJECT TO SAFETIES SUCH AS FIRE ALARM, SMOKE DETECTORS, OVERLOADS, ETC.

**OCCUPIED MODE**

- DOAS-1 OUTSIDE AIR DAMPER SHALL OPEN
- DOAS-1 SHALL BE ENABLED TO OPERATE CONTINUOUSLY
- AH-1, AH-2, AH-3, AH-4, AH-5 AND AH-6 TEMPERATURE SET POINTS SHALL BE SWITCHED TO THE OCCUPIED MODE SET POINTS
- AH-1, AH-2, AH-3, AH-4, AH-5 AND AH-6 SHALL ENTER FAN-ON MODE AND CYCLE THE COOLING AND HEATING AS NEEDED TO MAINTAIN ZONE TEMPERATURE SETPOINT
- DOAS-1, AH-1, AH-2, AH-3, AH-4, AH-5 AND AH-6 BI-POLAR IONIZATION GENERATOR SHALL BE INTERLOCKED WITH AIR HANDLING UNIT FAN TO ENERGIZE WHENEVER FAN OPERATES.

**UNOCCUPIED MODE**

- AH-1, AH-2, AH-3, AH-4, AH-5 AND AH-6 TEMPERATURE SET POINTS SHALL BE SWITCHED TO THE UNOCCUPIED MODE SET POINTS
- AH-1, AH-2, AH-3, AH-4, AH-5 AND AH-6 SHALL SWITCH TO FAN-AUTO MODE AND THE UNITS SHALL CYCLE AS NEEDED TO MAINTAIN THE ZONE TEMPERATURE SETPOINT
- DOAS-1 SHALL BE DISABLED AND SHALL NOT OPERATE IN THE UNOCCUPIED MODE
- DOAS-1 OUTSIDE AIR DAMPER SHALL CLOSE
- AH-1, AH-2, AH-3, AH-4, AH-5 AND AH-6 BI-POLAR IONIZATION GENERATOR SHALL CYCLE WITH THE FAN.

**UNOCCUPIED MODE - HUMIDITY CONTROL**

IF THE BUILDING HUMIDITY IN ANY ZONE RISES ABOVE THE UNOCCUPIED MAXIMUM SPACE RELATIVE HUMIDITY SET POINT THE FOLLOWING SHALL OCCUR:

- DOAS-1 SHALL REMAIN DISABLED AND THE DOAS-1 OUTDOOR AIR DAMPER SHALL REMAIN CLOSED
- AH-1, AH-2, AH-3, AH-4, AH-5 OR AH-6 SHALL BE SWITCHED TO FAN-ON MODE AND THE TEMPERATURE SET POINTS SHALL BE RESET 70 DEGREES F. THE UNIT(S) SERVING THE ZONE(S) WHERE THE HUMIDITY HAS BEEN DETERMINED TO BE ABOVE THE HUMIDITY SET POINT SHALL START AND SHALL OPERATE UNTIL THE SENSED HUMIDITY IS 5% BELOW THE UNOCCUPIED SET POINT.
- AH-1, AH-2, AH-3, AH-4, AH-5 OR AH-6 SHALL REVERT TO THE UNOCCUPIED MODE WHEN THE ZONE RELATIVE HUMIDITY IS LOWERED 5% BELOW THE UNOCCUPIED HUMIDITY SET POINT

**ECONOMIZER MODE (DOAS-1 ONLY):**

WHEN THE OUTSIDE AIR ENTHALPY CONDITIONS AS MEASURED BY THE OUTSIDE AIR ENTHALPY SENSOR IS LESS THAN OR EQUAL TO 28 BTUS/LB OF DRY AIR, THE DOAS UNIT COMPRESSOR SHALL BE TURNED OFF AND THE DOAS SHALL DELIVER 100% OUTSIDE AIR TO THE BUILDING. THE ECONOMIZER SHALL ACT AS THE INITIAL STAGE OF COOLING AND SHALL WORK IN SEQUENCE WITH THE COOLING COIL. ONCE THE OUTSIDE AIR ENTHALPY CONDITIONS AS MEASURED BY THE OUTSIDE AIR ENTHALPY SENSOR ARE GREATER THAN 28 BTUS/LB OF DRY AIR, THE DOAS SHALL RETURN TO NORMAL OCCUPIED MODE OPERATION.

SET POINTS (USER ADJUSTABLE)

OCCUPIED SPACE COOLING TEMPERATURE SET POINT:	75 DEG F
OCCUPIED SPACE HEATING TEMPERATURE SET POINT:	72 DEG F
UNOCCUPIED SPACE COOLING SET POINT:	80 DEG F
UNOCCUPIED SPACE HEATING SET POINT:	80 DEG F

ADDENDUM 2 - 01/15/2020