GENERAL NOTES

1. BUILDING AUTOMATION SYSTEM (BAS) INSTALLER SHALL FURNISH AND INSTALL A DIRECT DIGITAL CONTROL BAS THAT CONNECTS TO THE EXISTING BAS FRONT-END. THE SAME BAS MANUFACTURER SHALL BE USED THROUGHOUT A PARTICULAR BUILDING. THE NEW BAS SHALL UTILIZE ELECTRONIC SENSING, MICROPROCESSOR-BASED DIGITAL CONTROL, AND ELECTRONIC ACTUATION OF DAMPERS, VALVES AND DEVICES TO PERFORM CONTROL SEQUENCES AND FUNCTIONS SPECIFIED. REFER ALSO TO CONTROL DRAWINGS, SEQUENCES OF OPERATION, AND POINT LISTS ELSEWHERE IN THE CONTRACT DOCUMENTS.

2. ALL MATERIALS SHALL BE NEW, THE BEST OF THEIR RESPECTIVE KINDS WITHOUT IMPERFECTIONS OR BLEMISHES AND SHALL NOT BE DAMAGED IN ANY WAY, AND SHALL CONSIST OF THE MANUFACTURER'S LATEST PROVEN TECHNOLOGY AT THE TIME OF EQUIPMENT SUBMITTAL. USED EQUIPMENT SHALL NOT BE USED IN ANY WAY FOR THE PERMANENT INSTALLATION EXCEPT WHERE DRAWINGS OR SPECS SPECIFICALLY ALLOW EXISTING MATERIALS TO REMAIN IN PLACE.

3. THE SYSTEM MUST BE FULLY BACNET (ASHRAE 135-LATEST EDITION) COMPLIANT AT THE TIME OF INSTALLATION. THE SYSTEM MUST USE BACNET AS THE NATIVE COMMUNICATION PROTOCOL BETWEEN THE BAS DEVICES AND UNIVERSITY NETWORK SERVERS.

4. THE FOLLOWING ARE THE ONLY ACCEPTABLE MANUFACTURERS FOR BUILDING AUTOMATION SYSTEM EQUIPMENT: AUTOMATED LOGIC CORPORATION (WEBCTRL), JOHNSON CONTROLS, INC. (METASYS).

5. ALL CONTROLS WORK SHALL BE INSTALLED BY THE BAS INSTALLER, UNLESS SPECIFIED OTHERWISE. ALL EQUIPMENT SHALL BE DIRECTLY CONTROLLED BY THE BAS WHERE POSSIBLE IN LIEU OF THIRD-PARTY OR FACTORY CONTROLS.

6. THE INSTALLATION OF ALL EQUIPMENT SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND INSTALLATION BOOK.

7. CRITICAL SAFETY INTERLOCKS, SUCH AS FREEZESTATS, HIGH LIMIT PROTECTORS, END SWITCHES ETC., SHALL BE DIRECTLY CONNECTED, THROUGH WIRE, SO AS NOT TO DEPEND ON ANY DIGITAL CONTROL SYSTEM "SEQUENCE OF OPERATION" TO PERFORM THEIR SAFETY FUNCTION. CONTACTS SHALL BE PROVIDED SO THE SAFETY CAN BE MONITORED BY THE BAS. FREEZESTATS AND STATIC PRESSURE SWITCH CONTACTS SHALL BE MECHANICALLY LATCHING AND ONLY RESET MANUALLY.

8. LAMINATED CONTROL DRAWINGS INCLUDING NETWORK RISER DIAGRAM, SYSTEM CONTROL SCHEMATICS, SEQUENCES OF OPERATION AND PANEL TERMINATION DRAWINGS, SHALL BE PROVIDED IN EACH PANEL FOR THE EQUIPMENT SERVED BY THAT PANEL. TERMINAL UNIT DRAWINGS SHALL BE LOCATED IN THE CENTRAL PLANT EQUIPMENT PANEL OR MECHANICAL ROOM PANEL. THE DRAWINGS SHALL ACCURATELY RECORD THE ACTUAL CONTROLLER PROGRAMMING AND SETTINGS AT THE TIME OF BUILDING TURNOVER.

9. ELECTRONIC COPIES, INCLUDING EDITABLE AUTOCAD OR VISIO FILES, OF THE RECORD DRAWINGS SHALL BE PROVIDED TO THE INSTRUMENTATION & CONTROLS DEPARTMENT AND SHALL INCLUDE COPIES OF THE ABOVE NOTED SCHEMATICS, CONTROLLER SCHEMATICS, AS WELL AS INDIVIDUAL FLOOR PLANS WITH CONTROLLER LOCATIONS WITH ALL INTERCONNECTING ROUTING WIRING, SPACE SENSORS, LAN WIRING, POWER WIRING, AND LOW VOLTAGE POWER WIRING.

10. CONTROLS INSTALLER SHALL PROVIDE UNIVERSITY WITH ALL PRODUCT LINE TECHNICAL MANUALS AND TECHNICAL BULLETINS, TO INCLUDE NEW AND UPGRADED PRODUCTS, BY THE SAME DISTRIBUTION CHANNEL AS TO DEALERS OR BRANCHES THROUGHOUT THE WARRANTY PERIOD OF THE PROJECT.

11. BAS SHALL NOT BE UTILIZED FOR ANY ACTIVE SMOKE CONTROL SYSTEMS (UUKL/UL864).

12. THE UNIVERSITY RESERVES THE RIGHT TO MAKE CHANGES TO THE BAS DURING THE WARRANTY PERIOD. SUCH CHANGES DO NOT CONSTITUTE A WAIVER OF WARRANTY. THE INSTALLER SHALL WARRANT PARTS AND INSTALLATION WORK REGARDLESS OF ANY SUCH CHANGES MADE BY THE UNIVERSITY, UNLESS THE INSTALLER PROVIDES CLEAR AND INDISPUTABLE EVIDENCE THAT A SPECIFIC PROBLEM IS THE RESULT OF SUCH CHANGES TO THE BAS. ANY DISAGREEMENT BETWEEN THE UNIVERSITY AND THE INSTALLER ON SUCH MATTERS SHALL BE SUBJECT TO RESOLUTION THROUGH THE CONTRACT 'DISPUTES' CLAUSE.

13. BILLING METERS WILL BE OWNER FURNISHED CONTRACTOR INSTALLED. ALL BILLING METERS WILL BE CONNECTED TO THE EXISTING SCHNEIDER ELECTRIC POWER MONITORING EXPERT (PME) SOFTWARE..

(1) BAS RECORD DOCUMENTS

1. BAS RECORD DOCUMENTS SHALL CLEARLY CONVEY THE PHYSICAL DESIGN OF THE SYSTEM, NETWORK LAYOUTS, AS WELL AS MATERIALS AND DEVICES USED THEREIN.

2. EACH UNIQUE TYPE OF EQUIPMENT SHALL HAVE AN EQUIPMENT SCHEMATIC SHOWING HARDWARE LAYOUT, A MODULE OR PANEL DETAIL SHOWING LAYOUT AND CONNECTION, A BILL OF MATERIALS AND A CONCISE WRITTEN SEQUENCE DESCRIBING EACH MODE OF OPERATION.

3. A NETWORK DIAGRAM SHALL BE PROVIDED FOR EACH PROJECT, INDICATING THE PHYSICAL LAYOUT, INCLUDING THE ROUTING OF NETWORK WIRE, AS WELL AS THE LOCATION OF EACH NODE AND THE EQUIPMENT IT SERVES. THIS DIAGRAM SHOULD INCLUDE ALL BAS MODULES, AS WELL AS ANY NETWORK DEVICES SUCH AS GATEWAYS, ROUTERS AND THIRD-PARTY DEVICES.

4. RECORD DOCUMENTS SHALL INCLUDE EQUIPMENT SCHEDULES DETAILING THE SPECIFICATION AND APPLICATION OF CONTROL VALVES, CONTROL DAMPERS AND ANY OTHER EQUIPMENT PROVIDED BY THE BAS CONTRACTOR.

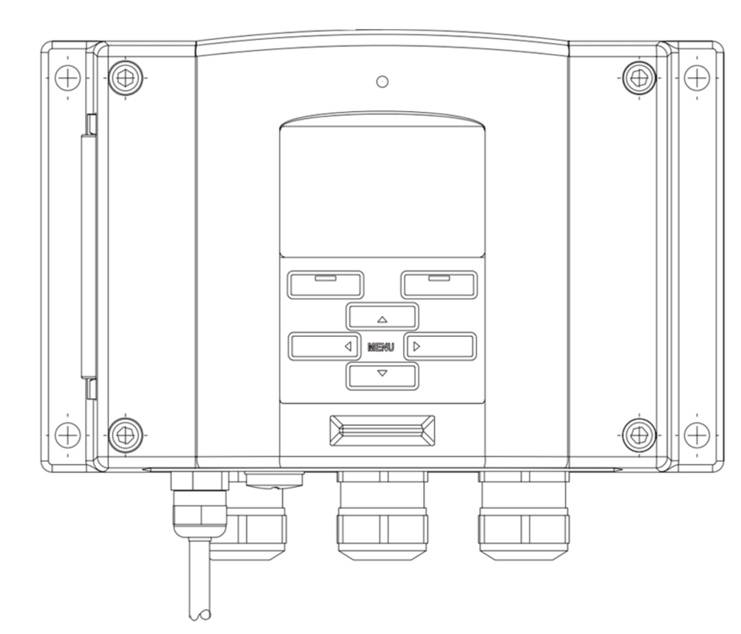
5. ALL RECORD DOCUMENTS ARE SUBJECT TO THE APPROVAL OF THE PROJECT ENGINEER OF RECORD, UVA AUTOMATION SERVICES AND THE UNIVERSITY BUILDING OFFICIAL (IF APPLICABLE).

(2) THIRD-PARTY INTEGRATION

NOTES:
1. THE BAS INSTALLER SHALL BE RESPONSIBLE FOR DIRECTLY CONNECTING AND CONTROLLING ALL EQUIPMENT AND ASSOCIATED SYSTEMS WITH THE BUILDING AUTOMATION SYSTEM. EQUIPMENT MANUFACTURER PROVIDED CONTROL OF EQUIPMENT (AKA "PACKAGED CONTROL") IS NOT ACCEPTABLE UNLESS PRE-APPROVED BY UVA.

2. ALL THIRD-PARTY INTEGRATION, INCLUDING THAT WHICH IS INTENDED FOR MONITORING-ONLY, SHALL BE ACCOMPLISHED VIA SERIAL EIA485 BACNET MS/TP CONNECTION. INTEGRATION UTILIZING ALTERNATIVE MEDIA (IP, EIA232, ETC) OR PROTOCOLS (MODBUS, LON, ETC) MUST BE PRE-APPROVED BY UVA.

3. WHERE A THIRD-PARTY INTERFACE IS APPROVED FOR THE EQUIPMENT CONTROL AND SEQUENCING, THE INTERFACE SHALL BE NATIVE BACNET AS PROVIDED BY THE MANUFACTURER AND SHALL BE WIRED TO THE BAS ON AN MS/TP COMMUNICATION TRUNK LOCAL TO THE BUILDING CONTROL NETWORK. ALL CONTROL AND MONITORING POINTS SHALL BE MADE AVAILABLE TO THE BAS WITH READ AND WRITE AUTHORIZATION AS APPLICABLE.



PRODUCT SHALL BE EQUIVALENT TO VAISALA HMT331/HMT/333 DISPLAYED ABOVE

(3) VIVARIUM LABORATORY TEMPERATURE AND HUMIDITY SENSORS

NOTES:
1. A NIST TRACEABLE TEMPERATURE AND HUMIDITY DISPLAY WITH A NEMA TYPE 2 OR HIGHER ENCLOSURE, AS REQUIRED BY THE ROOMS APPLICATION, SHALL BE PROVIDED FOR EACH ANIMAL HOLDING ROOM AND OTHER ROOMS AS SPECIFIED BY THE UNIVERSITY.

2. IF SENSOR IS LOCATED INSIDE THE ANIMAL ROOMS THEY SHALL HAVE A WATER PROOF ENCLOSURE SUITABLE FOR PERIODIC WASH DOWNS.

3. THE SENSORS FOR THESE DISPLAYS SHALL BE THE CONTROLLING SENSORS AND SHOULD BE SUITABLE FOR HIGH HUMIDITY ENVIRONMENTS WITH QUICK RECOVERY FOR SATURATION EVENTS, EQUIVALENT TO HMT337 SERIES.

(4) WIRING

GENERAL NOTES:
1. ALL CONTROL WIRING SHALL BE STRANDED, PLENUM RATED SHIELDED CABLE.

2. ALL CONTROL WIRING SHALL FOLLOW THE GENERAL CONVENTIONS LAID OUT IN THE CONTROL WIRING STANDARDS TABLE BELOW. BASIS OF DESIGN IS CONNECT AIR (PART NUMBERS LISTED). EQUIVALENT PRODUCTS FROM ALTERNATIVE MANUFACTURERS MAY BE USED, PROVIDED THEIR SPECIFICATIONS MEET OR EXCEED THE BASIS OF DESIGN.

3. ALL CONTROL WIRING SHALL BE LABELED AT EACH JUNCTION AND TERMINATION. SEE CONTROL WIRING STANDARDS TABLE FOR LABELING CONVENTIONS.

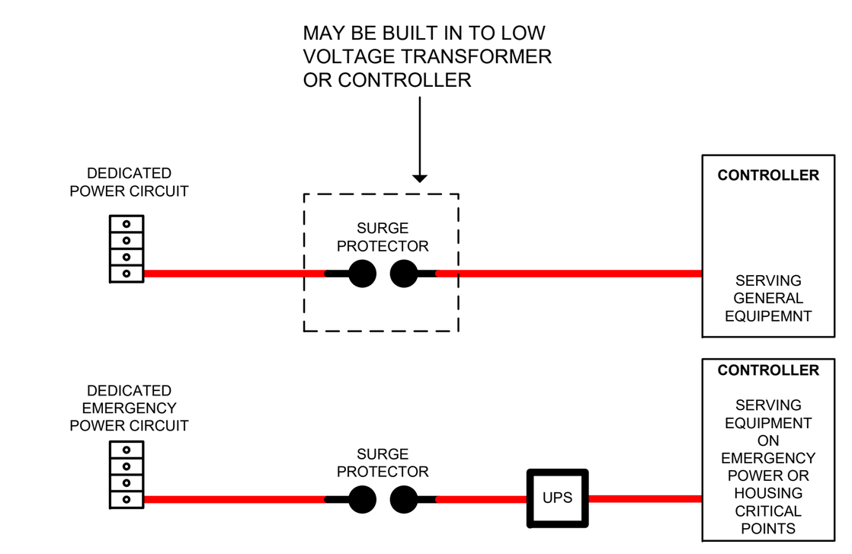
4. THE TERM "CONTROL WIRING" IS DEFINED TO INCLUDE THE PROVIDING OF WIRE, CONDUIT, AND MISCELLANEOUS MATERIALS AS REQUIRED FOR MOUNTING AND CONNECTING ELECTRIC OR ELECTRONIC CONTROL DEVICES IN PILOT CIRCUITS OF CONTACTORS, STARTERS, RELAYS, ETC., AND WIRING FOR VALVE AND DAMPER ACTUATORS AND METERS.

5. WIRE TERMINATIONS AND JOINTS SHALL BE MADE VIA SCREW TERMINALS. DOUBLE STACKING OF CONNECTIONS MUST BE APPROVED IN WRITING BY THE UVA AUTOMATION SERVICES DEPARTMENT. WIRE NUTS ARE NOT ACCEPTABLE. A WIRE CONNECTOR WITH A CLAMPING MECHANISM MAY BE USED WITHIN 36 INCHES OF AN END DEVICE AND WHERE THE END DEVICE IS NOT AVAILABLE WITH SCREW TERMINALS FOR TERMINATING FIELD WIRING. BASIS OF DESIGN IS WAGO 222 SERIES CONNECTORS.

6. ALL EXPOSED CONTROL WIRING AND CONTROL WIRING IN THE MECHANICAL, ELECTRICAL, TELEPHONE, AND SIMILAR ROOMS SHALL BE INSTALLED IN CONDUIT. ALL OTHER WIRING SHALL BE INSTALLED NEATLY AND INCONSPICUOUSLY ABOVE CEILINGS, ANCHORED TO THE PERMANENT BUILDING STRUCTURE, WITH SUPPORTS NO MORE THAN 6 FEET APART.

CONTROL WIRING STANDARDS

APPLICATION	TYPE	JACKET	CONDUCTORS	CONNECT AIR P/N	LABELING CONVENTION	
EIA-485/ARC156 NETWORKS	LOW-CAP SHIELDED 22AWG x 2	GREEN	WHITE : NET+ BLACK : NET- SHIELD : GND	ARC156	INDICATE THE NETWORK ADDRESS AND EQUIPMENT NAME (IF APP) OF THE NEXT DOWNSTREAM NODE *ex. "to CM01 : AHU-1"*	to CM01 : AHU1 GREEN WHITE BLACK SHIELD
LOW VOLTAGE POWER	SHIELDED 18AWG x 2	WHITE *with* RED STRIPE	RED : 24V+ BLACK : 24V- shield : not used	W181P-2040K2WRDR	INDICATE THE SOURCE TRANSFORMER, VOLTAGE AND CURRENT TYPE *ex. "TX1 : 24VAC"*	TX1 : 24VAC WHITE w/RED STRIPE WHITE RED shield (not used)
ANALOG & DIGITAL I/O SIGNAL	SHIELDED 18AWG x 2	WHITE	WHITE : SIGNAL BLACK : SIGNAL shield : not used	W181P-2040RIB	INDICATE THE I/O NUMBER AND POINT NAME ACRONYM *ex. "AI1 : DA-T"*	AI1 : DA-T WHITE WHITE : SIG BLACK : SIG shield (not used)
NETWORKED SENSORS & THERMOSTAT	SHIELDED 22AWG x 4	ORANGE	WHITE : Rnet+ BLACK : Rnet - RED : 12V+ GREEN : GND shield : not used	W181P-2040RIB	INDICATE THE NAME OF THE EQUIPMENT SERVED AND THE TYPE AND ADDRESS OF THE NETWORK SENSOR (IF APP) *ex. "VAV-1 : STAT01"*	VAV-1 : STAT01 ORANGE WHITE : Rnet+ BLACK : Rnet - RED : 12V+ GREEN : GND shield (not used)
FC BUS or N2	SHIELDED 18AWG x 3	BLUE	BLUE : + BLACK : - WHITE : COM SHIELD : SHLD	W223C-2144FCBJC	INDICATE THE NETWORK ADDRESS AND EQUIPMENT NAME (IF APP) OF THE NEXT DOWNSTREAM NODE *ex. "to [module type]01 : AHU-1"*	to FEC04 : AHU-1 BLUE BLUE : + BLACK : - WHITE : COM SHIELD : SHLD
SC or SA BUS	SHIELDED 22AWG x 4	BROWN	BLUE : + BLACK : - WHITE : COM RED : SA PWR shield : not used	W222P-2147BNRJC	INDICATE THE NAME OF THE EQUIPMENT SERVED AND THE TYPE AND ADDRESS OF THE NETWORK SENSOR (IF APP) *ex. "VAV-1 : STAT200"*	VAV-1 : STAT200 BROWN BLUE : + BLACK : - WHITE : COM RED : SA PWR shield (not used)



(5) POWER WIRING

NOTES:
1. ALL CONTROL PANELS SHALL BE SERVED BY DEDICATED POWER CIRCUITS FROM THE SAME SOURCE AND SERVICE LEVEL PROVIDED TO THE EQUIPMENT CONTROLLED. THE CONTROL PANEL SHALL BE LABELED WITH THE ELECTRICAL PANEL NAME AND CIRCUIT SOURCE.

2. BAS INSTALLER SHALL FURNISH AND INSTALL ANY POWER SUPPLY SURGE PROTECTION, FILTERS, ETC. AS NECESSARY FOR PROPER OPERATION AND PROTECTION OF ALL CONTROLLERS. ALL CONTROL EQUIPMENT MUST BE TOLERANT OF VOLTAGE VARIATIONS 10% ABOVE OR BELOW SCHEDULED NOMINAL WITH NO IMPACT ON HARDWARE, SOFTWARE, COMMUNICATIONS OR DATA STORAGE.

3. FOR EQUIPMENT ON EMERGENCY OR STANDBY POWER THE BAS CONTROLLER SERVING THAT EQUIPMENT SHALL BE PROVIDED WITH AN EXTERNAL UNINTERRUPTABLE POWER SUPPLY (UPS). ADDITIONALLY A UPS SHALL BE PROVIDED FOR EACH CONTROLLER REQUIRED TO MAINTAIN COMMUNICATION BETWEEN THE EQUIPMENT CONTROLLER AND THE BAS SERVER. THE UPS SHALL BE CONFIGURED TO PROVIDE UNINTERRUPTED SERVICE TO THE CONTROLLERS DURING TRANSITION TO/FROM NORMAL AND EMERGENCY/ STANDBY POWER. THE UPS SHALL HAVE A LOW BATTERY ALARM MONITORED WHILE FUNCTIONING ON NORMAL POWER AND WIRED TO THE BAS FOR NOTIFICATION. THE UPS SHALL PASS POWER THROUGH TO THE CONTROLLER IF THE UPS BATTERY FAILS. SOLA MODEL S4K2UC OR EQUAL SHALL BE USED.

4. A CENTRAL ONLINE UPS MAY BE USED IN PLACE OF INDIVIDUAL UPS'S FOR BAS EQUIPEMNT.

Name	Reference Name	Type	Value	Object Name
CHLR-CDW-DP	chlr-cdw-dp	(BAI)	6.0 psi	chlr-cdw-dp
CHLR-CDW-ENT-T	chlr-cdw-ent-t	(BAI)	56.9 °F	chlr-cdw-ent-t
CHLR-CDW-ENT-V-FB	chlr-cdw-ent-v-fb	(BAI)	100.0 %Open	chlr-cdw-ent-v-fb
CHLR-CDW-ENT-F	chlr-cdw-f	(BAI)	2883 gpm	chlr-cdw-f
CHLR-CDW-LVN-T	chlr-cdw-lvn-t	(BAI)	61.2 °F	chlr-cdw-lvn-t
CHLR-CHW-DP	chlr-chw-dp	(BAI)	6.5 psi	chlr-chw-dp
CHLR-CHW-ENT-T	chlr-chw-ent-t	(BAI)	48.3 °F	chlr-chw-ent-t
CHLR-CHW-ENT-V-FB	chlr-chw-ent-v-fb	(BAI)	100.0 %Open	chlr-chw-ent-v-fb
CHLR-CHW-ENT- F	chlr-chw-f	(BAI)	1659 gpm	chlr-chw-f
CHLR-CHW-LVN-T	chlr-chw-lvn-t	(BAI)	41.3 °F	chlr-chw-lvn-t

EXAMPLE NAMING STANDARD IN WEBCTRL

0260.VMA-13.D-C	42 % open	AHU-4 : FLR-G : RM-G002
0260.VMA-13.ZN-01-T	71.1 deg F	AHU-4 : FLR-G : RM-G002
0260.VMA-13.EFF-CLG-SP	74.5 deg F	AHU-4 : FLR-G : RM-G002
0260.VMA-13.HTG-V-C	0 % open	AHU-4 : FLR-G : RM-G002
0260.VMA-13.OCC-C	Occupied	AHU-4 : FLR-G : RM-G002
0260.VMA-13.SYS-MODE	Auto	AHU-4 : FLR-G : RM-G002
0260.VMA-13.ZN-01-T-SP	72.0 deg F	AHU-4 : FLR-G : RM-G002
0260.VMA-13.ZN-HTG-CLG-A...	0.5 deg F	AHU-4 : FLR-G : RM-G002
0260.VMA-13.EFF-HTG-SP	70.5 deg F	AHU-4 : FLR-G : RM-G002
0260.VMA-13.SA-T	65.7 deg F	AHU-4 : FLR-G : RM-G002
0260.VMA-13.SA-F	184 cfm	AHU-4 : FLR-G : RM-G002
0260.VMA-13.SA-F-SP	170.0 cfm	AHU-4 : FLR-G : RM-G002
0260.VMA-13.SA-T-HI-LMT-SP	85.0 deg F	AHU-4 : FLR-G : RM-G002
0260.VMA-13.EFF-SA-T-HI-LM...	85.5 deg F	AHU-4 : FLR-G : RM-G002
0260.VMA-13.SA-T-LMT-ENA	On	AHU-4 : FLR-G : RM-G002

EXAMPLE NAMING STANDARD IN METASYS

(6) POINT NAMING STANDARD

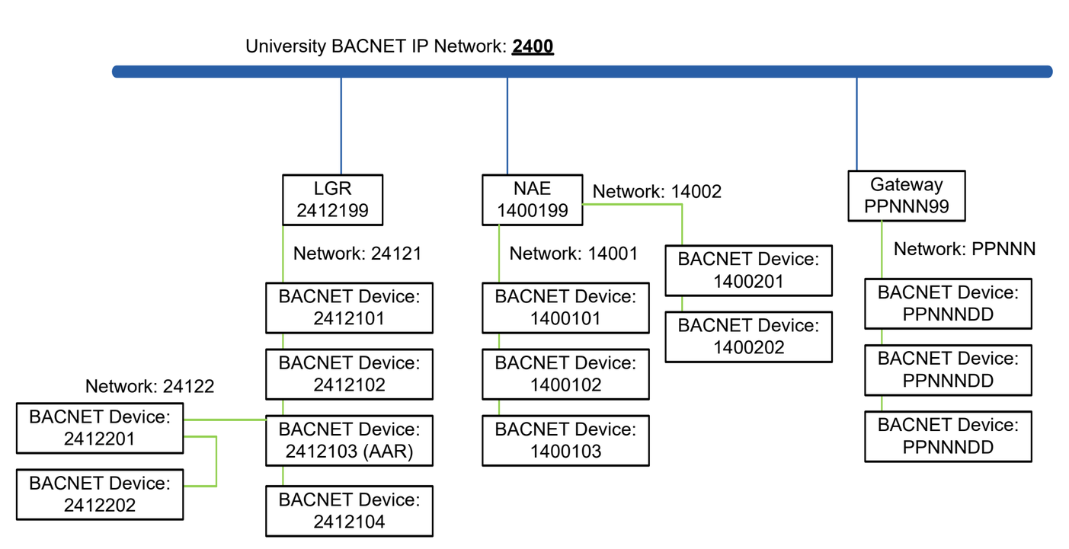
NOTES:
1. ALL POINT NAMES, INCLUDING DISPLAY NAMES, REFERENCE NAMES, AND BACNET OBJECT NAMES, SHALL USE A COMBINATION OF THE UVA STANDARD ABBREVIATIONS WITH A DASH (-) SEPARATING THE ABBREVIATIONS. FOR EXAMPLE, A SUPPLY AIR TEMPERATURE SENSOR WOULD BE INDICATED AS SA-T (SEE THE "BAS POINT NAME CONVENTION" REFERENCE DOCUMENT FOR ADDITIONAL INFORMATION ABOUT THE POINT NAMING STANDARDS, WHICH IS AVAILABLE UPON REQUEST FROM UVA AUTOMATION SERVICES). ALL FULLY QUALIFIED OBJECT NAME, WHERE APPLICABLE, SHALL INCLUDE THE RESPECTIVE BUILDING NUMBER, CONTROLLER IDENTIFICATION, AND APPROPRIATE POINT ABBREVIATION SEPARATED BY A PERIOD. FOR EXAMPLE, "0001.VAV-01.SA-T" WOULD REPRESENT A SUPPLY AIR TEMPERATURE ASSOCIATED WITH VARIABLE AIR VOLUME CONTROLLER NUMBER 01 IN BUILDING NUMBER 0001.

2. THE DETAILS/DESCRIPTION FIELD, WHERE APPLICABLE, SHOULD CONTAIN FLOOR, ROOM, AND ASSOCIATED COOLING/HEATING SOURCE IN THAT ORDER. FOR EXAMPLE, ROOM ZONE TEMPERATURE - "FLR 3 : RM 321 : AHU-06" THIS WOULD INDICATE THE LOCATION OF THE POINT AND ITS RESPECTIVE HEATING/COOLING SOURCE, WHICH IS AIR HANDLER 06.

DESIGNATED NETWORK AND DEVICE ADDRESS RANGES	
BACNET RANGE	**ALLOCATION**
12001-19999	DEVICES WITH INSTANCE ID LIMITATIONS (APPROVAL REQUIRED)
11000-11999	UVA BAS
1100000-1199999	
12000-12999	UVA METERING
1200000-1299999	
14000-14999	JCI CONSTRUCTION PROJECTS
1400000-1499999	
2400-2499	ALC CONSTRUCTION PROJECTS
2400000-2499999	

GATEWAY DEVICE ADDRESSING (PPNNN99):
'PP' IS BASED ON THE ALLOCATED ADDRESS SPACE AND PPNNN IS THE NETWORK NUMBER FOR THE FIRST BACNET TRUNK EXTENDING FROM THE GATEWAY.

THE FOLLOWING DIAGRAM IS TO SERVE AS A GUIDE:



*In the event that more than 98 addresses are needed for a particular network, the next available network address may be reserved for additional space. However, in that case, the additional network number will not be utilized.

For example:
Network: 123
Gateway: 12399
Devices: 12301, 12302, 12303…..12398

- Network address 124 may be reserved and additional devices may be addressed as 12400, 12401, 12402, 12402….and assigned to the 123 network.

(8) BAS NETWORKING AND CYBERSECURITY

NOTES:
1. THE MAIN UNIVERSITY BACNET IP NETWORK IS 2400. ALL BACNET IP DEVICES RESIDING ON THE MAIN UNIVERSITY SYSTEM SHALL BE ASSIGNED NETWORK NUMBER 2400.

2. PLEASE CONTACT THE AUTOMATION SERVICES DEPARTMENT FOR NEXT AVAILABLE BACNET ADDRESS.

2. UNIVERSITY IP ADDRESSES SHALL BE REQUESTED THROUGH AUTOMATION SERVICES.

3. BACNET BROADCAST MANAGEMENT DEVICES (BBMDS) ARE CONFIGURED MANUALLY BY THE UNIVERSITY. WHEN A NEW NETWORK CONTROLLER IS CONNECTED TO THE BAS NETWORK, THE BAS INSTALLER SHALL WORK WITH AUTOMATION SERVICES TO CONFIGURE ANY NECESSARY BBMDS. AUTOMATIC MANAGEMENT OF THE BBMDS SHALL BE DISABLED.

4. THE NETWORK TREE ON THE CONTROL SYSTEM SHALL USE THE FOLLOWING NAMING CONVENTION FOR THE TOP LEVEL NETWORK CONTROLLERS: [DEVICE TYPE][BUILDING NUMBER][A,B,C]-[IP ADDRESS][(BACNET ADDRESS/LOCATION)]. EXAMPLE: LGR0001A – 10.182.55.55 (2410199/RM020] OR NAE0002A – 10.182.55.55 (1410199/RM020).

5. ANYAND ALL IP ADDRESS REQUESTS ASSOCIATED WITH THE BAS SHALL BE MADE THROUGH UVA AUTOMATION SERVICES.

6. ALL DEFAULT/ GENERIC USER ACCOUNTS AND PASSWORDS SHALL BE CHANGED PRIOR TO PLACING ANY CONTROLLER ONLINE IN THE PRODUCTION ENVIRONMENT.

ALARM TYPE	PRIORITY	DELAY (SEC)
UTILITIES (CHW, HW, MTHW, STEAM, GENERATOR, ETC)	1	60
PATIENT CARE AREA (OPERATING & ISOLATION ROOMS, ED, ETC)	3	300
PHARMACY (ROOM TEMP, FREEZERS, REFRIGERATORS, ETC)	5	300
MEDICAL GAS	7	300
VIVARIUM CRITICAL	14	300
BSL3 RESEARCH FACILITY	15	30
OTHER FREEZERS, COLD ROOMS, INCUBATORS, REFRIGERATORS (ETC)	18	60
RESEARCH & LAB SPACES	20	300
IT INFRASTRUCTURE (SERVER ROOMS, ETC)	40	600
FREEZESTAT	60	60
SYSTEM CRITICAL NETWORK DEVICE	106	60
METERING	110	900
ENERGY/SUSTAINABILITY	112	900
HVAC GENERAL	148	1800
NORMAL	200	
AUTOMATIC (RESERVED FOR EMAIL NOTIFICATION FILTERS)	225-240	

(10) ALARMING STANDARDS

NOTES:
1. ALARM SETTINGS FOR CRITICAL AREAS SUCH AS VIVARIUM ROOMS OR LAB SPACES MUST BE DISCUSSED WITH THE ROOM OR LAB OCCUPANTS AND/OR THE FACILITIES COORDINATOR AS WELL AS SYSTEMS CONTROL CENTER.

2. TEXT SHALL BE ADDED TO THE ALARM MESSAGE BLOCK WHEN CREATING ALARMS TO PROVIDE THE OPERATORS AND MAINTENANCE PERSONNEL WITH ADDITIONAL INFORMATION. MESSAGES SHALL FOLLOW THE BELOW FORMAT:

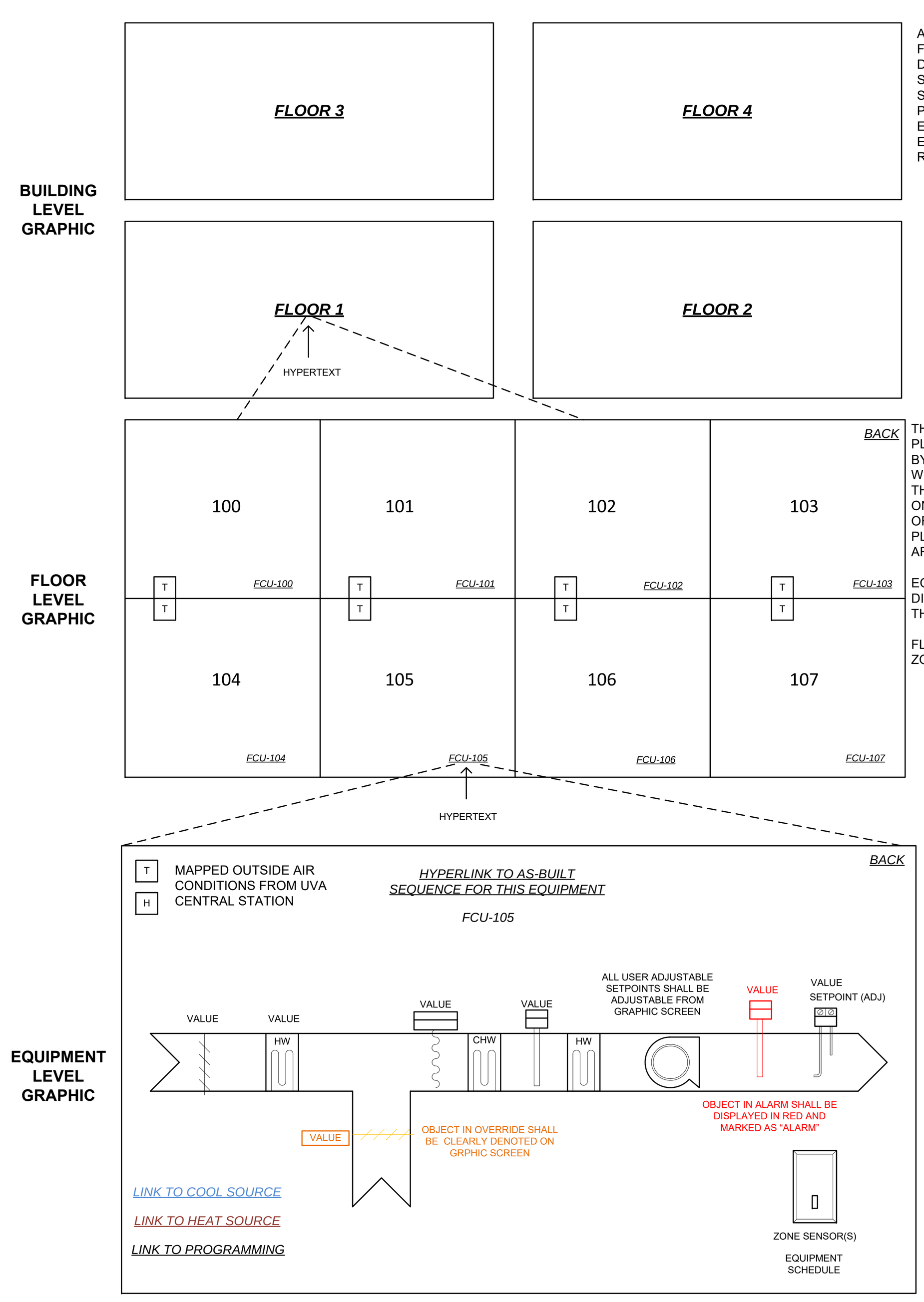
Building Number.System.Point Identification.ALARM

Example: "0228.AHU-01.SA-T.ALARM"

3. CRITICAL ALARM POINTS WILL REQUIRE A SPECIFIC MESSAGE TO BE PROVIDED AND THIS MESSAGE SHALL BE COORDINATED WITH SYSTEMS CONTROL CENTER.

4. FOR WEBCTRL PROJECTS, ENSURE NOTIFICATION CLASS FOR ALARMS IS SET TO THE PROPER IP ADDRESS OF THE SERVER INSTEAD OF THE BACNET ID.

5. UPON SYSTEM TURNOVER TO THE UVA PRODUCTION ENVIRONMENT, SYSTEM SHALL BE FREE OF ANY NUISANCE AND ERRONEUS ALARMS.



A BUILDING LEVEL GRAPHIC SHALL BE PROVIDED THAT DISPLAYS ALL FLOORS AND AREAS SERVED ON ONE SCREEN. FLOOR PLANS SHALL DYNAMICALLY UPDATE TO VISUALLY DEPICT THE ZONE ALARM (EVENT) STATUS OF THE SPACES BEING SERVED. THE MAIN BUILDING GRAPHIC SHALL INCLUDE LINKS AND ALARM STATUS INDICATORS FOR EACH PIECE OF CENTRAL EQUIPMENT (E.G. AIR HANDLERS, PUMPS, HEAT EXCHANGERS, ETC), BUILDING EQUIPMENT SUCH AS GENERATORS, ELEVATOR ALARMS, ETC., AND CRITICAL POINTS SUCH AS FREEZER/ REFRIGERATOR MONITORING, VIVARIUM AREAS, ETC.

THE CONTROLS INSTALLER SHALL PROVIDE AN INDIVIDUAL FLOOR PLAN GRAPHIC FOR ALL FLOORS REPRESENTING THE SPACES SERVED BY EACH PIECE OF PRIMARY EQUIPMENT. THE FLOOR PLAN GRAPHIC WILL INCLUDE THE ROOM NUMBERS OF THE SPACES BEING SERVED. THERMOSTAT/SENSOR LOCATIONS SHALL BE ACCURATELY DISPLAYED ON GRAPHICS AND REMOTE SENSOR LOCATIONS (E.G. DDSP AND END OF LINE DIFFERENTIAL PRESSURE) SHALL BE DISPLAYED ON FLOOR PLAN GRAPHIC WITH A HYPERLINK TO THE PROGRAM WHERE THEY ARE LOCATED.

EQUIPMENT LOCATIONS AND SPACE TEMPERATURES SHALL BE DISPLAYED ON THE FLOOR PLAN GRAPHIC EITHER THERMOGRAPHICALLY OR NUMERICALLY.

FLOOR PLANS SHALL DYNAMICALLY UPDATE TO VISUALLY DEPICT THE ZONE ALARM (EVENT) STATUS OF THE SPACES BEING SERVED.

ALL EQUIPMENT SHALL HAVE AN INTERACTIVE LINK ON THE EQUIPMENT GRAPHIC PAGE THAT LINKS TO THE LOGIC PROGRAMMING. THE PROGRAMMING LOGIC SHALL BE SHOWN WITH REAL-TIME VALUES, ACCESSIBLE VIA THE STANDARD THIN-CLIENT USER INTERFACE PROGRAM.

A VENDOR-SUPPLIED TOOLSET THAT ALLOWS THE UNIVERSITY TO VIEW THE LOGIC PROGRAMMING WITH REAL TIME VALUES WILL BE ACCEPTABLE, BUT IS NOT PREFERRED.

(7) USER INTERFACE GRAPHICS

NOTES:
1. ALL CONTROLLED EQUIPMENT SHALL HAVE A REPRESENTATIVE EQUIPMENT GRAPHIC.

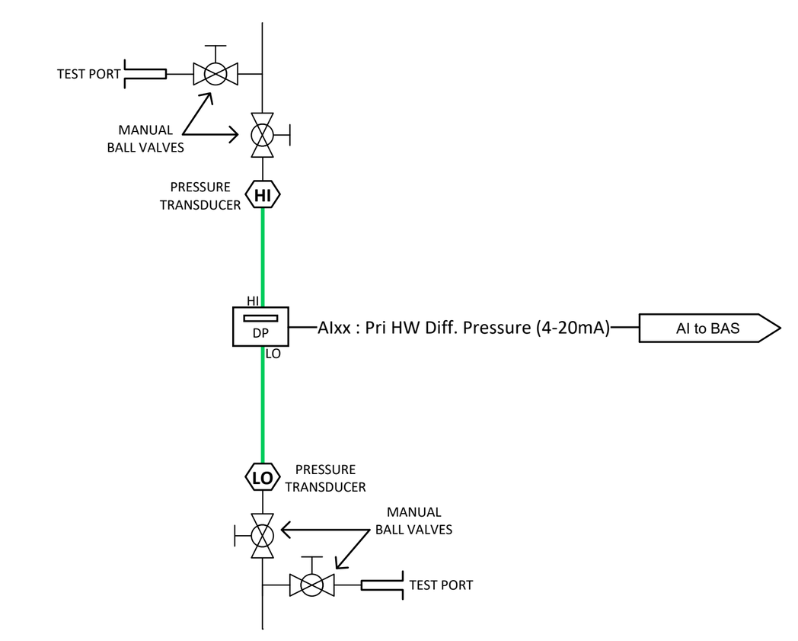
2. AT A MINIMUM, THE LEVEL OF DETAIL DISPLAYED ON THE GRAPHIC SCREENS SHALL BE EQUIVALENT TO THE EXAMPLE SHOWN IN THIS DETAIL OR ON THE CONTROL SCHEMATIC, WHICHEVER IS GREATER.

3. ALL HARDWARE POINTS AND SETPOINTS SHALL BE DISPLAYED ON EACH EQUIPMENT GRAPHIC. ALL SETPOINTS SHALL BE ADJUSTABLE OR WITH MANUAL OVERRIDE CAPABILITY FROM THE GRAPHICS SCREEN.

4. THE LATEST VERSION OF THE BAS VENDOR'S ADVANCED ANIMATED GRAPHICS SOFTWARE SHALL BE USED TO ITS FULLEST EXTENT IN THE CREATION OF GRAPHICS.

5. POINT NAMES DISPLAYED ON GRAPHIC SHALL ADHERE TO THE POINT NAMING STANDARD SHOWN IN DETAIL 6.

6. ALL ALARM POINTS DEFINED IN THE PROGRAM SHALL BE DISPLAYED AS HIDDEN TEXT ON THE GRAPHICS SCREEN UNTIL ACTIVATED. ALARM NOTIFICATIONS AND LOCKED VALUES SHALL BE HIGHLIGHTED WITH AN INDICATOR THAT IS OBVIOUS TO THE OPERATOR.

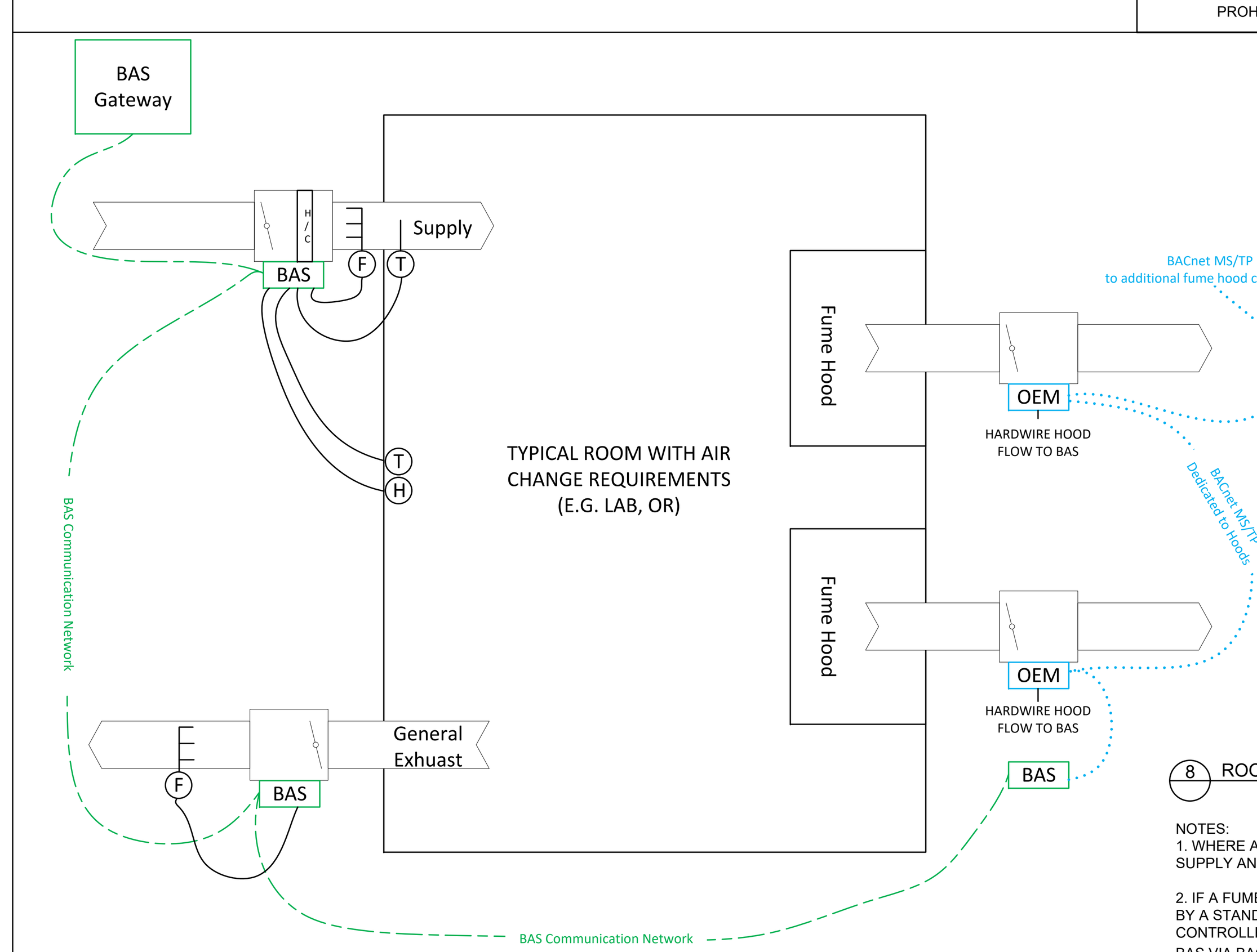


(11) HYDRONIC DIFFERENTIAL PRESSURE TRANSMITTER

NOTES:
1. HYDRONIC DIFFERENTIAL PRESSURE TRANSMITTERS SHALL BE THE REMOTE TRANSDUCER TYPE (RATHER THAN INTEGRATED TRANSDUCERS) AND SHALL INCLUDE INTEGRATED DISPLAYS. BASIS OF DESIGN IS SETRA 231G-RS.

2. EACH TRANSDUCER LOCATION SHALL INCLUDE ALL NECESSARY HARDWARE TO ISOLATE, BLEED AND TEST THE INDIVIDUAL SENSOR (SEE SCHEMATIC).

3. USE OF SOFT TUBING (COPPER, POLY, ETC.) AND/OR VALVED MANIFOLDS IS PROHIBITED.



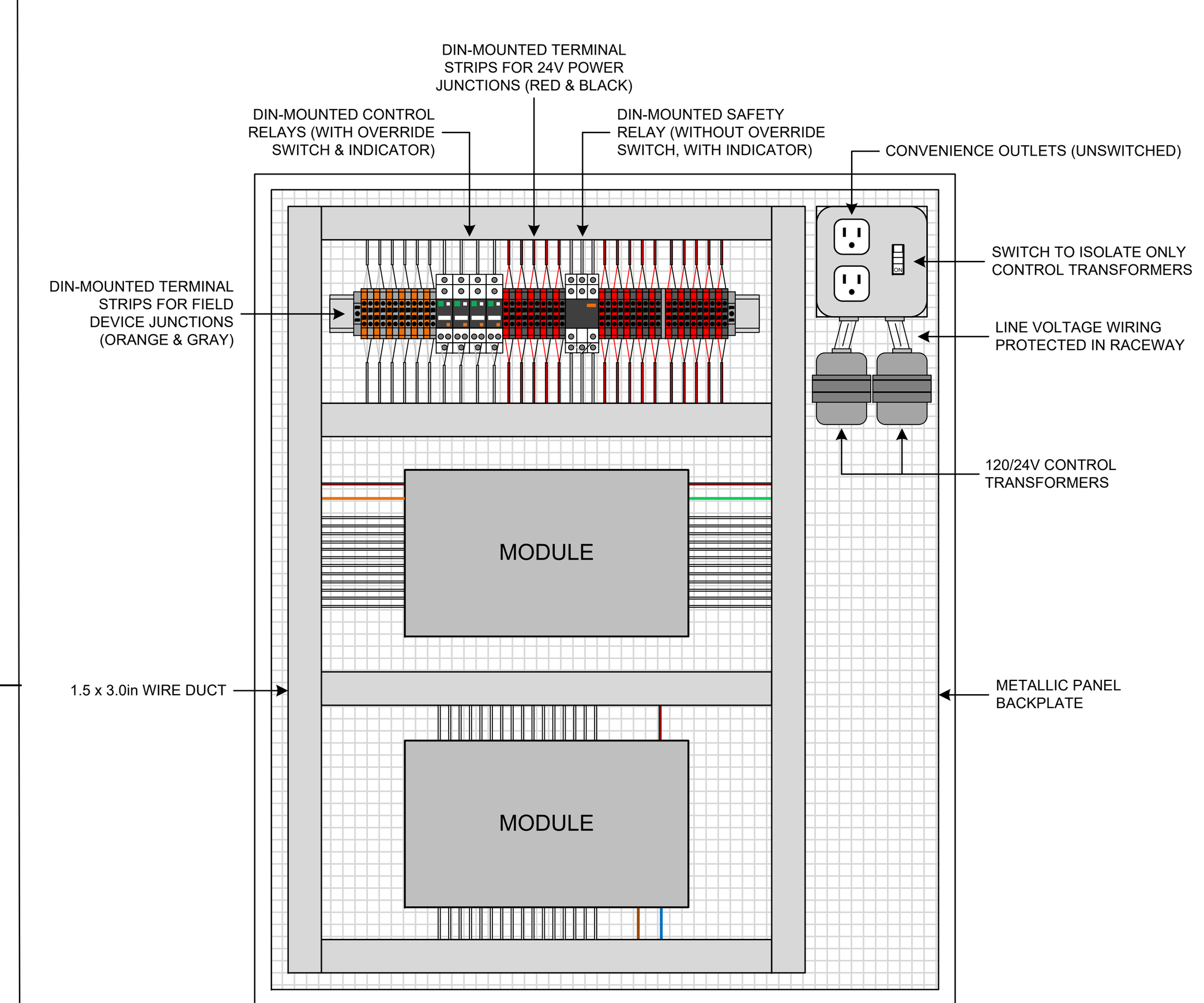
(T) TEMPERATURE
(H) HUMIDITY
(F) FLOW
BAS — BAS MANUFACTURER CONTROLLER
OEM — EQUIPMENT MANUFACTURER CONTROLLER

Point Description	Hardware Points AI	AO	BI	BO	Software Points AV	BV	Trend	Notes
SUPPLY AIR FLOW	X						X	
SUPPLY DAMPER		X					X	
REHEAT COIL VALVE		X					X	
SUPPLY AIR TEMPERATURE	X						X	
SPACE TEMPERATURE	X						X	
SPACE HUMIDITY	X						X	
GENERAL EXHAUST AIR FLOW	X						X	
GENERAL EXHAUST DAMPER		X					X	
FUME HOOD 1 EXHAUST AIR FLOW	X						X	READ ONLY
FUME HOOD 2 EXHAUST AIR FLOW	X						X	READ ONLY
FUME HOOD 1 ALARMS						X	X	ALL ALARMS
FUME HOOD 2 ALARMS						X	X	ALL ALARMS
FUME HOOD 1 EXHAUST SETPOINT					X		X	READ/WRITE
FUME HOOD 2 EXHAUST SETPOINT					X		X	READ/WRITE

(8) ROOM PRESSURIZATION

NOTES:
1. WHERE A ROOM REQUIRES ACTIVE PRESSURIZATION CONTROL, THE AIR SUPPLY AND EXHAUST SHALL BE CONTROLLED DIRECTLY BY THE BAS.

2. IF A FUME HOOD IS REQUIRED, THE FUME HOOD SHALL BE CONTROLLED BY A STAND-ALONE ORIGINAL EQUIPMENT MANUFACTURER (OEM) CONTROLLER WITH THE POINTS LISTED IN THIS DETAIL PROVIDED TO THE BAS VIA BACNET MS/TP OR HARDWIRED, AS NOTED.



(12) CONTROL PANEL LAYOUT

CONVENTIONS:
1. ALL LINE VOLTAGE WIRING AND CONNECTIONS MUST BE PROTECTED BEHIND COVERS AND/OR IN RACEWAYS. EXPOSED LINE VOLTAGE CIRCUITRY IS PROHIBITED.

2. CONTROL WIRING SHALL BE NEATLY ROUTED AND TERMINATED WITHOUT EXCESSIVE CABLE LENGTH. WHEREVER POSSIBLE, CONTROL WIRING SHOULD BE CONCEALED BY WIRE DUCT (SEE SCHEMATIC ABOVE).

3. ALL CONTROL PANELS SHALL BE EQUIPPED WITH 120VAC CONVENIENCE OUTLETS.

4. LINE VOLTAGE POWER SHALL BE USED ONLY TO SUPPLY CONTROL TRANSFORMER PRIMARY WINDINGS AND CONVENIENCE OUTLETS. A SWITCH SHALL BE PROVIDED TO ISOLATE THE CONTROL TRANSFORMERS. NO OTHER LINE VOLTAGE COMPONENTS ARE ALLOWED WITHOUT PRIOR AUTHORIZATION FROM UVA AUTOMATION SERVICES.

5. ALL FIELD DEVICE JUNCTIONS SHALL BE MADE IN A NEATLY CONFIGURED DIN-MOUNTED TERMINAL STRIP. TERMINAL STRIP COMPONENTS MUST FOLLOW UVA STANDARD COLOR CODING.

6. CONTROL RELAYS SHALL BE DIN-MOUNTED AND PROVIDED WITH A VISUAL STATUS INDICATOR AND OVERRIDE SWITCH. BASIS OF DESIGN IS MAGNECRAFT 78X SERIES.

7. RELAYS PERTAINING TO SAFETY CIRCUITS SHALL OMIT OVERRIDE SWITCHES.

DRAWN	WGS, WTM	SIZE		DWG NO UVA CONTROL SYSTEM STANDARDS		REV 4.0
ISSUED	5-1-2018	SCALE	NTS		SHEET	1 OF 1