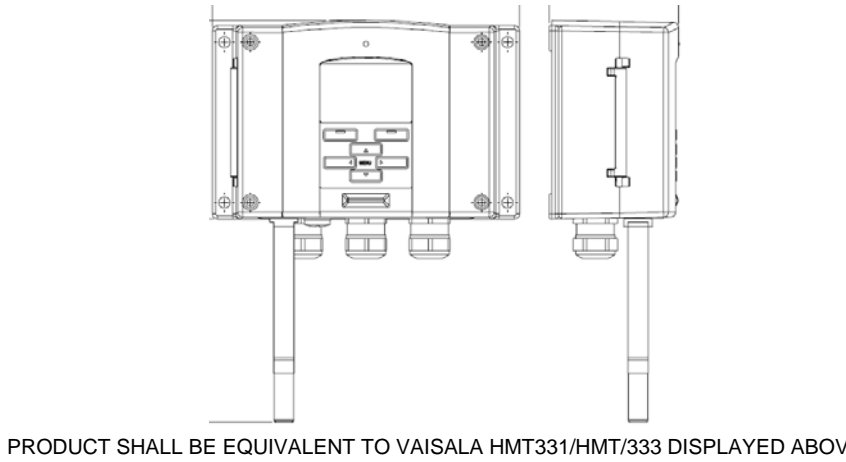


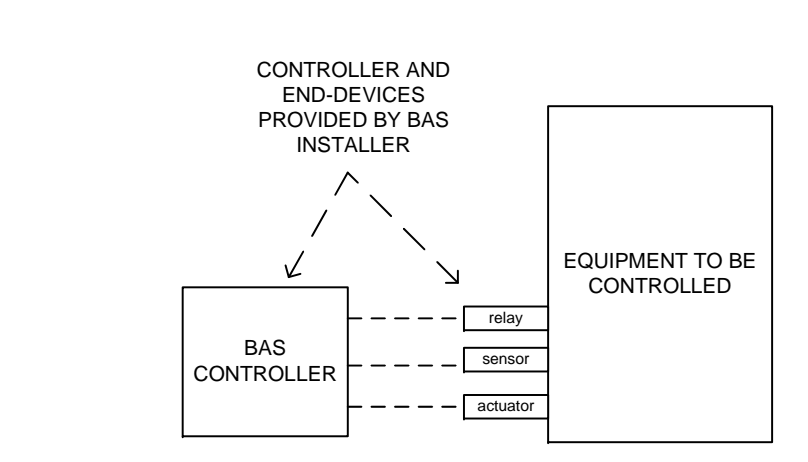
GENERAL NOTES

- 1. BUILDING AUTOMATION SYSTEM (BAS) INSTALLER SHALL FURNISH AND INSTALL A DIRECT DIGITAL CONTROL BAS THAT TIES IN TO THE EXISTING BAS FRONT-END...
2. ALL MATERIALS SHALL BE NEW, THE BEST OF THEIR RESPECTIVE KINDS WITHOUT IMPERFECTIONS OR BLEMISHES AND SHALL NOT BE DAMAGED IN ANY WAY...
3. THE SYSTEM MUST BE FULLY BACNET (ASHRAE 135-2010 OR LATER) COMPLIANT AT THE TIME OF INSTALLATION...
4. THE FOLLOWING ARE THE ONLY ACCEPTABLE MANUFACTURERS FOR BUILDING AUTOMATION SYSTEM EQUIPMENT...
5. ALL CONTROLS WORK SHALL BE INSTALLED BY THE BAS INSTALLER, UNLESS SPECIFIED OTHERWISE...
6. THE INSTALLATION OF ALL EQUIPMENT SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND INSTALLATION BOOK...
7. CRITICAL SAFETY INTERLOCKS, SUCH AS FREEZE/STATS, HIGH LIMIT PROTECTORS, END SWITCHES ETC., SHALL BE DIRECTLY CONNECTED...
8. LAMINATED CONTROL DRAWINGS INCLUDING SYSTEM CONTROL SCHEMATICS, SEQUENCES OF OPERATION AND PANEL TERMINATION DRAWINGS...
9. ELECTRONIC COPIES, INCLUDING EDITABLE AUTOCAD OR VISIO FILES, OF THE RECORD DRAWINGS SHALL BE PROVIDED TO THE INSTRUMENTATION & CONTROLS DEPARTMENT...
10. CONTROLS INSTALLER SHALL PROVIDE UNIVERSITY WITH ALL PRODUCT LINE TECHNICAL MANUALS AND TECHNICAL BULLETINS...
11. THE SYSTEM PROVIDED SHALL INCORPORATE HARDWARE RESOURCES SUFFICIENT TO MEET THE FUNCTIONAL REQUIREMENTS OF THE PROJECT PLUS 10% ADDITIONAL CAPACITY...
12. THE UNIVERSITY RESERVES THE RIGHT TO MAKE CHANGES TO THE BAS DURING THE WARRANTY PERIOD...



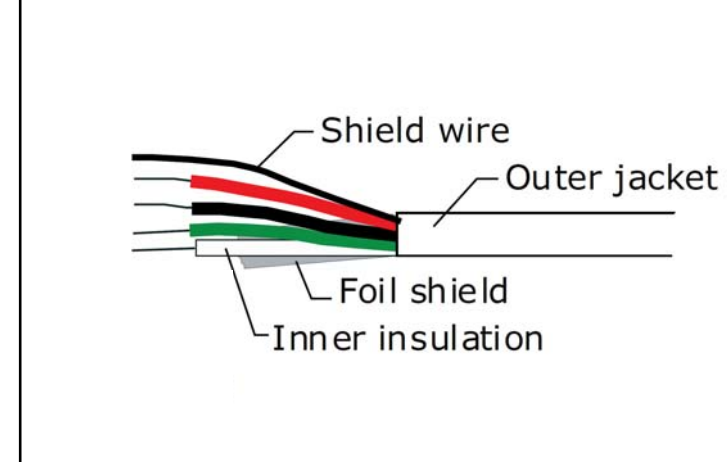
PRODUCT SHALL BE EQUIVALENT TO VAISALA HMT331/HMT333 DISPLAYED ABOVE

- 1. VIVARIUM LABORATORY TEMPERATURE AND HUMIDITY SENSOR
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 HMT333 SERIES.



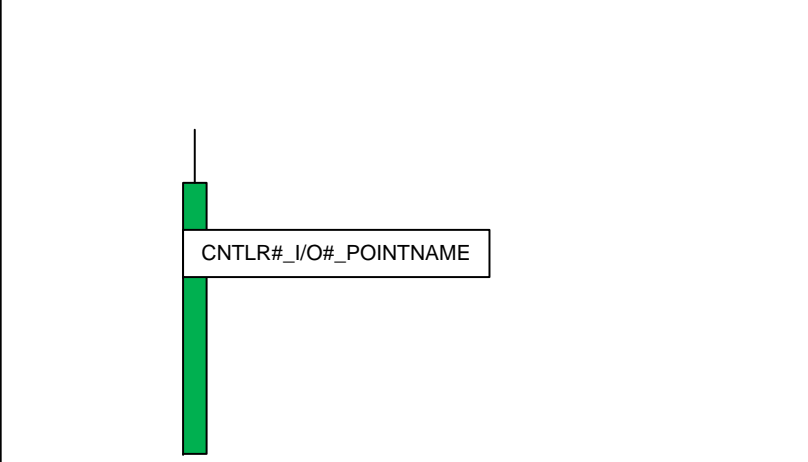
THIRD-PARTY INTEGRATION

- NOTES:
1. THE BAS INSTALLER SHALL BE RESPONSIBLE FOR DIRECTLY CONNECTING AND CONTROLLING ALL EQUIPMENT AND ASSOCIATED SYSTEMS WITH THE BUILDING AUTOMATION SYSTEM...
2. WHERE A THIRD-PARTY INTERFACE IS APPROVED FOR THE EQUIPMENT CONTROL AND SEQUENCING, THE INTERFACE SHALL BE NATIVE BACNET AS PROVIDED BY THE MANUFACTURER...
3. WIRE TERMINATIONS AND JOINTS SHALL BE MADE VIA SCREW TERMINALS...
4. WIRE NUTS ARE ONLY ACCEPTABLE WITHIN 6 INCHES OF AN END DEVICE...
5. ALL EXPOSED CONTROL WIRING AND CONTROL WIRING IN THE MECHANICAL, ELECTRICAL, TELEPHONE, AND SIMILAR ROOMS SHALL BE INSTALLED IN RACEWAYS...
6. #22 OR #18 GAGE WIRING SHALL BE USED FOR ALL 4-20MA AND PULSE SIGNALS...



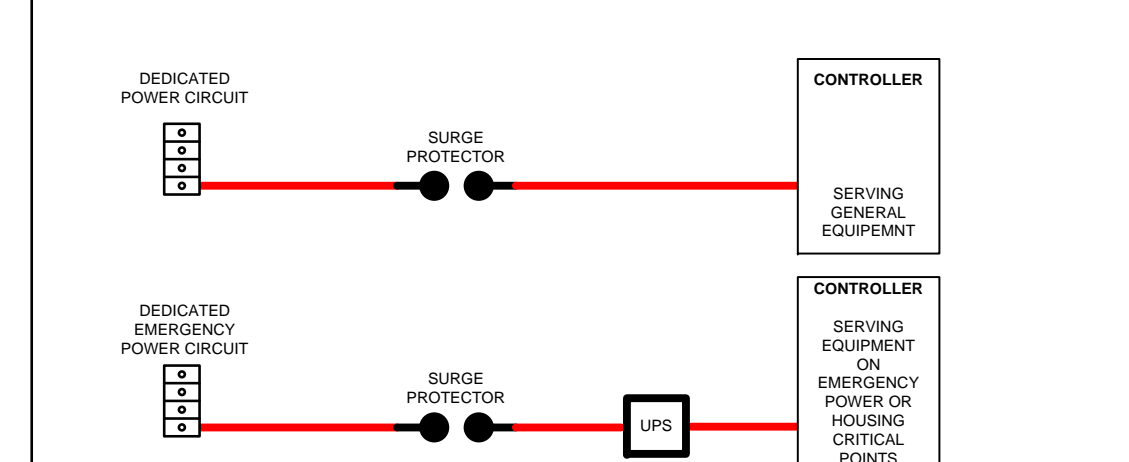
WIRING

- NOTES:
1. ALL CONTROL WIRING SHALL BE PLENUM RATED SHIELDED CABLE...
2. 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...
3. WIRE TERMINATIONS AND JOINTS SHALL BE MADE VIA SCREW TERMINALS...
4. WIRE NUTS ARE ONLY ACCEPTABLE WITHIN 6 INCHES OF AN END DEVICE...
5. ALL EXPOSED CONTROL WIRING AND CONTROL WIRING IN THE MECHANICAL, ELECTRICAL, TELEPHONE, AND SIMILAR ROOMS SHALL BE INSTALLED IN RACEWAYS...
6. #22 OR #18 GAGE WIRING SHALL BE USED FOR ALL 4-20MA AND PULSE SIGNALS...



CONTROL WIRE LABELING

- NOTES:
1. ALL CONTROL WIRING SHALL BE LABELED INSIDE THE CONTROL PANEL AND AT THE END DEVICES USING VINYL TAPE...
2. LABELING SHALL INCLUDE THE CONTROLLER NAME, ABBREVIATION WITH ADDRESS, THE POINT TYPE (AL, AO, BI, BO), THE CONTROLLER INPUT/OUTPUT NUMBER, AND THE POINT ABBREVIATION...
3. WIRE TERMINATIONS AND JOINTS SHALL BE MADE VIA SCREW TERMINALS...
4. WIRE NUTS ARE ONLY ACCEPTABLE WITHIN 6 INCHES OF AN END DEVICE...
5. ALL EXPOSED CONTROL WIRING AND CONTROL WIRING IN THE MECHANICAL, ELECTRICAL, TELEPHONE, AND SIMILAR ROOMS SHALL BE INSTALLED IN RACEWAYS...
6. #22 OR #18 GAGE WIRING SHALL BE USED FOR ALL 4-20MA AND PULSE SIGNALS...



POWER WIRING

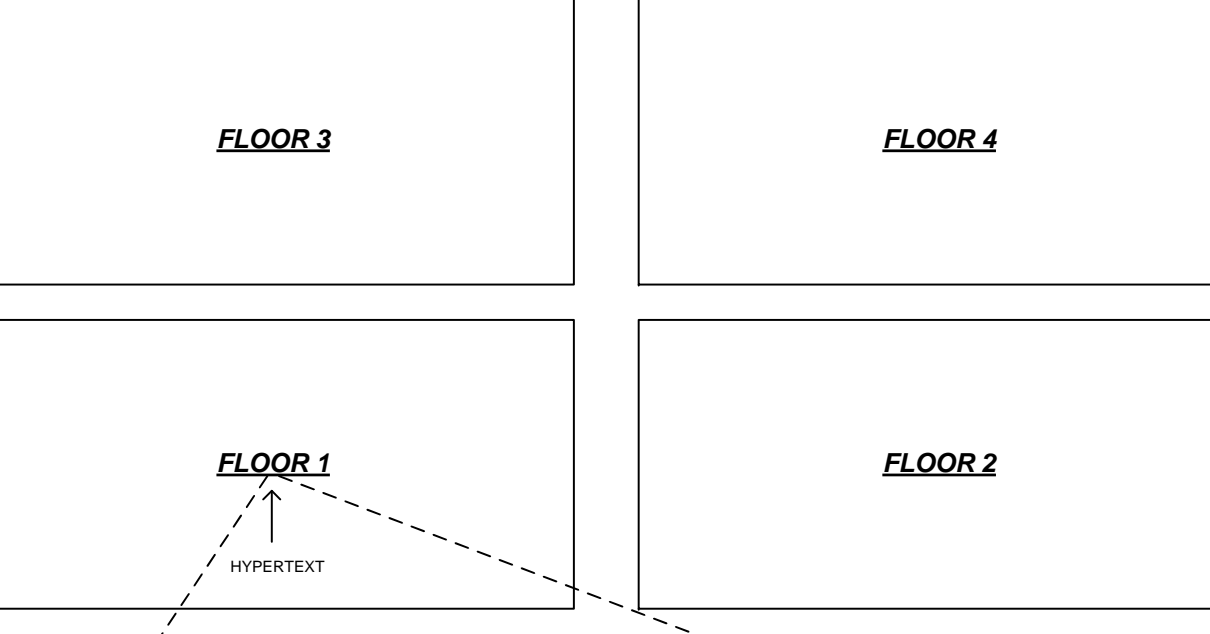
- NOTES:
1. ALL CONTROL PANELS SHALL BE SERVED BY DEDICATED POWER CIRCUITS FROM THE SAME SOURCE AND SERVICE LEVEL PROVIDED TO THE EQUIPMENT CONTROLLED...
2. BAS INSTALLER SHALL FURNISH AND INSTALL ANY POWER SUPPLY SURGE PROTECTION FILTERS, ETC., AS NECESSARY FOR PROPER OPERATION AND PROTECTION OF ALL CONTROLLERS...
3. FOR EQUIPMENT ON EMERGENCY OR STANDBY POWER THE BAS CONTROLLERS SHALL BE PROVIDED WITH AN EXTERNAL UNINTERRUPTIBLE POWER SUPPLY (UPS)...

Table with 2 columns: Abbreviation and Description. Lists various equipment types like Accumulator, Fan Coil Unit, Generator, etc.

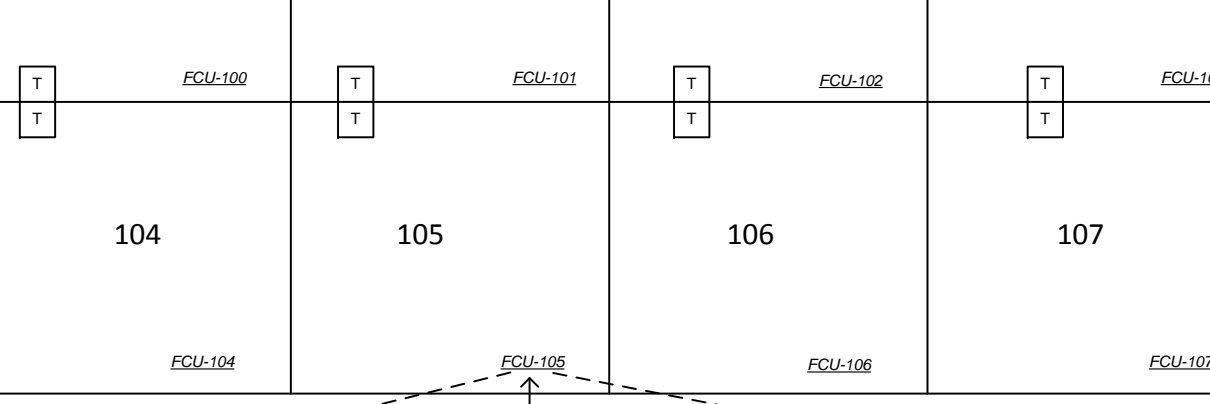
Table with 2 columns: Abbreviation and Description. Lists various equipment types like Hand, High, Heat Recovery Coil, etc.

Table with 2 columns: Abbreviation and Description. Lists various equipment types like Pilot, Peak, Plant, Pump, etc.

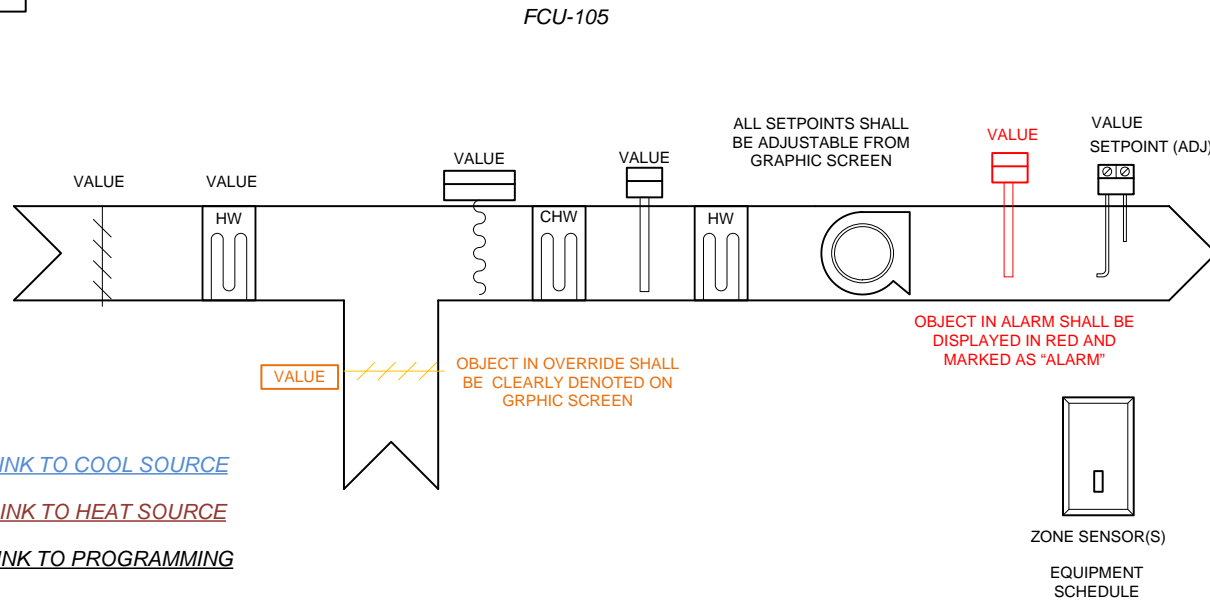
Table with 2 columns: Abbreviation and Description. Lists various equipment types like Radiator, Rectifier operational, Receiver, etc.



BUILDING LEVEL GRAPHIC

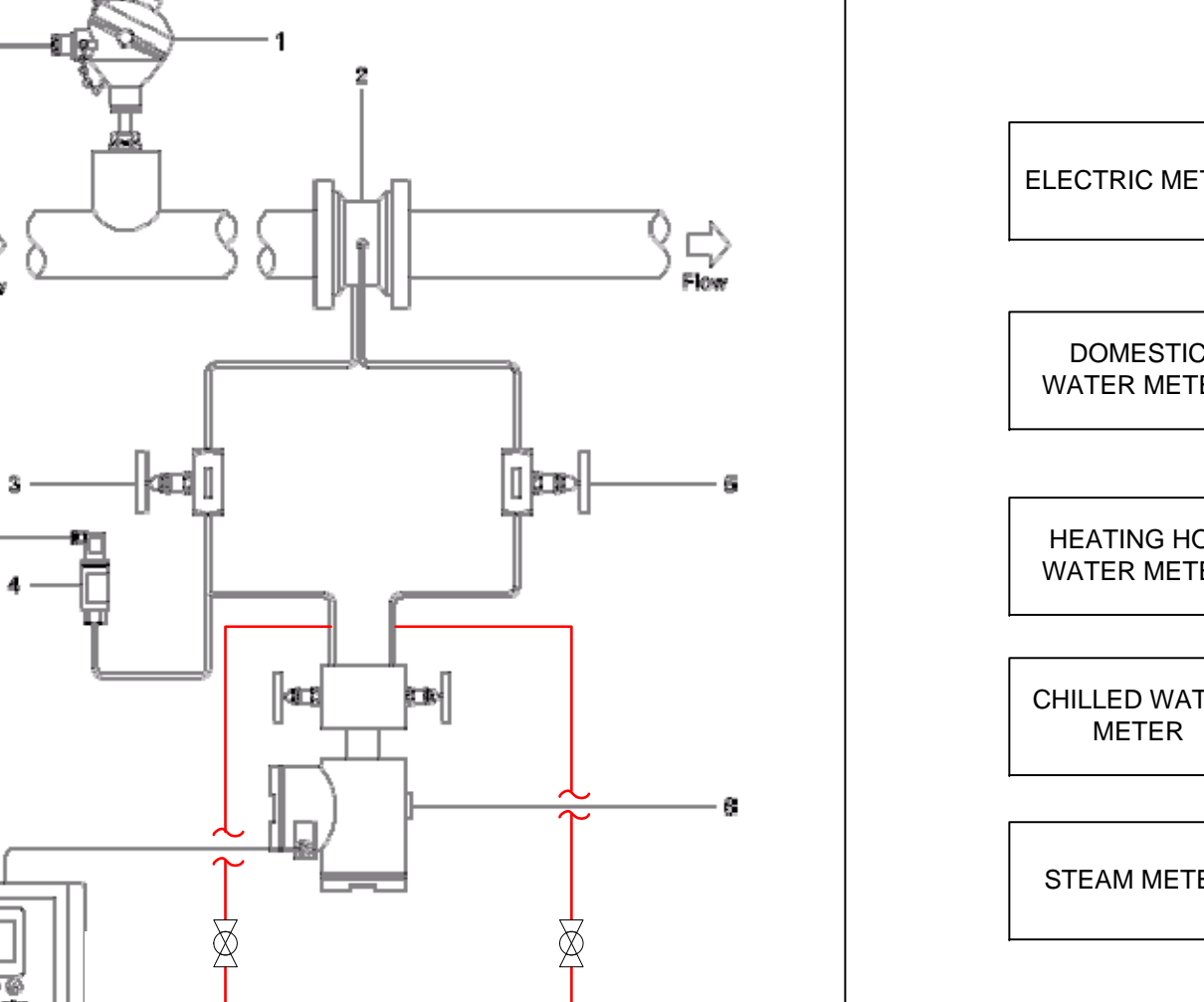


FLOOR LEVEL GRAPHIC



EQUIPMENT LEVEL GRAPHIC

- 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...
3. ALL HARDWARE POINTS AND SETPOINTS SHALL BE DISPLAYED ON EACH EQUIPMENT GRAPHIC...
4. THE LATEST VERSION OF THE BAS VENDORS ADVANCED ANIMATED GRAPHICS SOFTWARE SHALL BE USED...
5. POINT NAMES DISPLAYED ON GRAPHIC SHALL ADHERE TO THE POINT NAMING STANDARD SHOWN IN DETAIL 6.



STEAM METER INSTALLATIONS

- NOTES:
1. BLOWDOWN LINES SHALL BE INSTALLED AS SHOWN IN THIS DETAIL...
2. ALL TUBING SHALL BE STAINLESS STEEL WITH SWAGelok FITTINGS RATED FOR THE CORRECT PSI OF THE STEAM...
3. COMMUNICATIONS PROTOCOL CONVERTERS SHALL NOT BE INSTALLED BETWEEN ANY METER AND THE BAS.

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 CONTROLS INSTALLER SHALL PROVIDE AN INDIVIDUAL FLOOR PLAN GRAPHIC FOR ALL FLOORS REPRESENTING THE SPACES SERVED BY EACH PIECE OF PRIMARY EQUIPMENT...

EQUIPMENT LOCATIONS AND SPACE TEMPERATURES SHALL BE DISPLAYED ON THE FLOOR PLAN GRAPHIC. FLOOR PLANS SHALL DYNAMICALLY UPDATE TO VISUALLY DEPICT THE ZONE ALARM (EVENT) STATUS OF THE SPACES BEING SERVED.



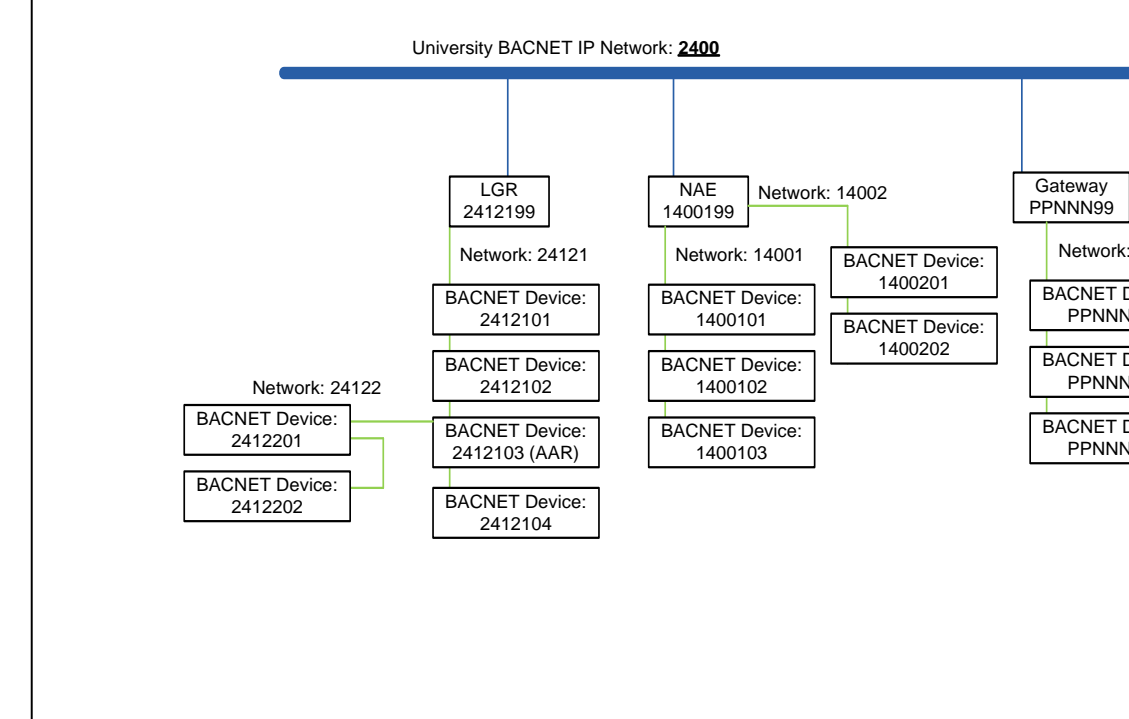
University BACNET IP Network 2400

ALL EQUIPMENT SHALL HAVE AN INTERACTIVE LINK ON THE EQUIPMENT GRAPHIC PAGE THAT LINKS TO THE LOGIC PROGRAMMING... A VENDOR-SUPPLIED TOOLSET THAT ALLOWS THE UNIVERSITY TO VIEW THE LOGIC PROGRAMMING WITH REAL TIME VALUES WILL BE ACCEPTABLE, BUT IS NOT PREFERRED.

Designated Network and Device Address Ranges

- Address space reserved for devices with instance ID limitations...
o UVA BAS
o UVA Meeting
o JCI Construction Jobs
o ALC Construction Jobs
o Phoenix Construction Jobs

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.



\*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.

- For example:
Network: 1233
Gateway: 12399
Devices: 12301, 12302, 12303, ..., 12398

8. BAS NETWORKING

- NOTES:
1. FOR BAS INSTALLATIONS THE ADDRESSING STANDARD OUTLINED IN THIS DETAIL SHALL BE ADHERED TO...
2. UNIVERSITY IP ADDRESSES SHALL BE REQUESTED THROUGH THE INSTRUMENTATION & CONTROLS DEPARTMENT...
3. BACNET BROADCAST MANAGEMENT DEVICES (BMBDS) ARE CONFIGURED MANUALLY BY THE UNIVERSITY...
4. THE NETWORK TREE ON THE CONTROL SYSTEM SHALL USE THE FOLLOWING NAMING CONVENTION FOR THE TOP LEVEL NETWORK CONTROLLERS...

Table with columns: Meter Name, Type, Units, Modbus, BACnet, etc. Lists various meters and their communication protocols.

METERING POINTS

- NOTES:
1. WHERE POINTS ARE NETWORKED TO THE BAS THROUGH THE METER (E.G. VIA BACNET MODBUS), THE POINTS NAMES SHALL BE AS DEFINED IN THIS DETAIL...
2. DOMESTIC WATER METER SHALL NOT BE DAISY CHAINED WITH ANY OTHER INTEGRATION DEVICES.

6. POINT NAMING STANDARD

- NOTES:
1. ALL POINT NAMES, INCLUDING DISPLAY NAMES, REFERENCE NAMES, AND BACNET OBJECT NAMES, SHALL USE A COMBINATION OF THE ABBREVIATIONS SHOWN IN THIS DETAIL...
2. THE DETAILS/DESCRIPTION FIELD, WHERE APPLICABLE, SHOULD CONTAIN FLOOR, ROOM, AND ASSOCIATED COOLING/HEATING SOURCE IN THAT ORDER...
3. THE DETAILS/DESCRIPTION FIELD, WHERE APPLICABLE, SHOULD CONTAIN FLOOR, ROOM, AND ASSOCIATED COOLING/HEATING SOURCE IN THAT ORDER...