fbt | architects

NEW MEXICO
TEXAS
COLORADO

CORPORATE OFFICE:
MAIL One Park Square
6501 Americas Pkwy NE, Ste. 300
Albuquerque, NM 87110
PHO 505.883.5200
WEB fbtarch.com

REGIONAL OFFICES:
MAIL 4416 W Lovers Lane, Ste. 100
Dallas, Texas 75209
PHO 469.998.5542

MAIL 415 N. Tejon St.
Colorado Springs, CO 80903
PHO 719.309.9440

ADDENDUM #2 (93 Pages), September 4, 2024

RE: Preschool Academy – Farmington Municipal School District

FROM: FBT Architects
6501 Americas Pkwy NE Suite 300
Albuquerque, New Mexico 87110
505.883.5200

TO: Prospective Offerors

PREVIOUSLY ISSUED: Addendum 01

The following revisions shall be incorporated into the Specifications and Drawings for the above-referenced project.

GENERAL CLARIFICATION

QUESTIONS FROM BIDDERS:

1. QUESTION: A lot of rooms with grid ceilings have flange fixtures specified. Is the ceiling changing? (Social worker 215, and almost all of the storage rooms)?
    a. ANSWER: All storage rooms will have a lay-in ceiling except for storage room 115 which we'll leave exposed.

2. QUESTION: Can we clarify the Type L11 fixtures on EL101C? It is difficult to make out where they are indicating the fixture.
    a. ANSWER: I see no L11 fixture used on EL101C, the only place we planned on using it is EL101A. As keynote EL47 states this is an LED tape light around the reception desk, the exact location and extent of the lighting will need to be coordinated with the vendor or architect on how the desk is designed.

3. QUESTION: Is there additional emergency lighting required for Multipurpose 101 other than the one type E4 fixture shown on EL101C?
    a. ANSWER: No, the Multipurpose space is open, and emergency lighting provided to illuminate egress pathways, there is the combo exit/bug eye over the door as well as emergency in the corridor, on sheet EL101B there are also 2 bugeyes on the 'west' side of that room to illuminate the seating/step area. This should be sufficient to provide the required footcandles.

4. Please clarify the lighting controls for Conference 205 on EL101A..
    a. ANSWER: Refer to Lighting Sequence of Operations on sheet E-603, section 'D – Conference Room'. The sequence there is pretty comprehensive, if there is a specific question related to it please clarify.

5. Unusual shape tackboards at Hallways.
    a. ANSWER: All tackboards at hallways to be frameless. Pinboard Linoleum cut to size. See revised Specification section 10 1100 Visual Display Surfaces – 2.1, 2.2.A, 2.2.B.

SUBSTITUTION REQUESTS:

1. SECTION 23 0923 – DDC Building Controls. Manufacturer: Carrier Corporation.

SPECIFICATIONS

1. SECTION 10 1100 – Visual Display Surfaces.
    a. Revised Section 2.1
    b. Revised Section 2.2.A
    c. Revised Section 2.2.B
    d. Revised Section 2.2.C

DRAWING CLARIFICATIONS

INTERIORS

1. Sheet ID-100 – INTERIOR FINISH SCHEDULE
    a. REPLACED Sheet

2. REPLACED Sheet ID-101 – FINISH PLAN – GROUND LEVEL 'A'
    a. REPLACED Sheet

3. REPLACED Sheet ID-102 – FINISH PLAN – GROUND LEVEL 'B'
    a. REPLACED Sheet

4. Sheet ID-103 – FINISH PLAN – LOWER LEVEL 'C'
    a. REPLACED Sheet

5. Sheet ID-104 – FINISH PLAN – UPPER LEVEL 'C'
    a. REPLACED Sheet

6. Sheet ID-402 – ENLARGED PLANS & ELEVATIONS – RESTROOMS
    a. REPLACED Sheet

7. Sheet ID-403 – ENLARGED PLANS & ELEVATIONS – CLASSROOMS
    a. REPLACED Sheet

8. Sheet ID-404 – ENALARGED PLANS & ELEVATIONS – ADMINISTRATION
    a. ADDED Sheet

9. Sheet ID-407 – ENLARGED PLANS & ELEVATIONS – WORKROOM
    a. ADDED Sheet

10. Sheet ID-408 – ENLARGED PLANS & ELEVATIONS – SPECIAL ED
    a. ADDED Sheet

MECHANICAL

11. MI-601 – MECHANICAL CONTROL DIAGRAMS
    a. REVISED Metering System Control Diagram
    b. REVISED Air Handling Unit Control Diagram

14. M-701 – MECHANICAL SCHEDULES
    a. REVISED Indirect/Direct Evaporative Cooling Section.

ELECTRICAL

15. ES-101 – ELECTRICAL SITE PLAN
    a. REVISED Sheet

16. E-703 – PANEL SCHEDULES
    b. REVISED Sheet

All other provisions and conditions of the Drawings and Specifications remain unchanged.

SECTION 10 1100 - VISUAL DISPLAY SURFACES - PSAE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Markerboards and tackboards.

1.2 RELATED SECTIONS

A. Section 09 29 00 - Gypsum Board: Concealed supports in metal stud walls.

B. Section 09 91 00 - Painting: Finishing of wood frame and chalk rail.

1.3 REFERENCES

A. AHA A135.4 - Basic Hardboard; American Hardboard Association; 1995.

B. ASTM A 424 - Standard Specification for Steel, Sheet, for Porcelain Enameling; 1996.

C. ASTM C 208 - Standard Specification for Cellulosic Fiber Insulation Board; 1995.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 1997a.

E. FS CCC-W-408 - Wall Covering, Vinyl-Coated; Federal Specifications and Standards; Revision D, 1994.

F. FS L-P-1040 - Plastic Sheets and Strips (Polyvinyl Fluoride); Federal Specifications and Standards; Revision B, 1977.

G. 1/8” cork sheet
   1. Provide in largest practical sizes to minimize seams.

1.4 SUBMITTALS

A. See Section 01 3300 – Submittal Procedures.

B. Product Data: Provide manufacturer's data on chalkboard, markerboard, tackboard, tackboard surface covering, trim, and accessories.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations.

D. Samples: Submit color charts for selection of color and texture of chalkboard, markerboard, tackboard, tackboard surface covering and trim and edging.

E. Test Reports: Show conformance to specified surface burning characteristics requirements.

F. Manufacturer's printed installation instructions.

G. Maintenance Data: Include data on regular cleaning, stain removal.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Mock-Up: See section 03-3100 Project Management and Coordination for Building Assemblies Mock-up requirements.

1.6 WARRANTY

A. See Section 01 77 00 - Closeout Procedures, for additional warranty requirements.

B. Provide five year warranty for chalkboard, markerboard and projection screens to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Visual Display Boards:

1. ASI Group – Integrated Building Products
2. Claridge Products and Equipment, Inc.
3. Nelson Adams
4. ADP Lemco Inc
5. Best-Rite
6. Aarco Products Inc.
7. Substitutions: See Section 01 6000 - Product Substitution Requirements
8. Forbo Flooring Systems

2.2 VISUAL DISPLAY BOARDS

A. Markerboards: Porcelain enamel on steel, laminated to core. Markerboards must be magnetic, and projection friendly.

1. Color: As selected by Architect from manufacturer’s full range.
2. Metal Face Sheet Thickness: 0.024 inch (24 gage).
3. Core: Hardboard, 1/2 inch thick, laminated to face sheet.
4. Backing: Aluminum foil, laminated to core.
5. Size: As indicated on drawings.
6. Frame: Aluminum
7. Frame Profile: Frameless
8. Frame Finish: Anodized, natural.
9. Accessories: Provide marker tray, map rail, 2” map hanger and flag holder (provide a

minimum of two flag holders per space where marker boards are installed).

B. Tackboards: Fine-grained, homogeneous natural cork – At all Classrooms

1. Cork Thickness: 1/8 inch.
2. Fabric: Vinyl coated fabric, Color as selected from manufacturer's full range.
3. Backing: Hardboard, 3/8 inch thick, laminated to tack surface.
4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E 84.
5. Size: As indicated on drawings.
6. Frame: Same type and finish as for markerboard.
7. Frame Profile: Frameless
8. Frame Finish: Anodized, natural.

C. Tackboards: Bulletin Board trackable surface sheet material – At Hallways

1. Thickness: 1/4" inch.
2. Tack Surface: Pinboard Linoleum, Color as selected from manufacturer's full range.
3. Backing: Hardboard, 3/8-inch-thick minimum.
4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E 84.
5. Size: Cut to size - As indicated on drawings.
6. Frame: Frameless.
8. Edge Finish: Beveled edge. Submit sample for prior approval.

D. Combination Units and Units Made of More Than One Panel: Factory-assembled chalkboards, markerboards, and tackboards in a single frame, of materials specified above.

1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
2. Configuration: 1 inch wide.
3. Units Too Large to Ship Assembled: Fully assembled in factory, then disassembled for shipping.

2.4 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A 424, Type I, commercial quality, with fired-on vitreous finish.

B. Vinyl-Coated Fabric: FS CCC-W-408; Type III - heavy; Class 2 - mildew resistant; clear top overcoat of polyvinyl fluoride in accordance with FS L-P-1040 Type 1, Grade B, Class 2, 0.0005 inch thick.

C. Hardboard for Cores: AHA A135.4, Class 1 - Tempered, S2S (smooth two sides).

D. Fiber Board: ASTM C 208, cellulosic fiber board.

E. Foil Backing: Aluminum foil sheet, 0.005 inch thick.

F. Adhesives: Type used by manufacturer.

G. Cork Sheet: Premium Grade, fine grain, natural tan 48-inch wide stock. Bangor Cork or equivalent. Adhesive as recommended by manufacturer.

2.5 ACCESSORIES

A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.

B. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.

C. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

D. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board. Furnish and install two (2) flag holders per space where display surface is shown.

E. Cleaning Instruction Plate: Provide instructions for chalkboard cleaning on a metal plate fastened to perimeter frame near checkrail.

F. Chalk Tray: Aluminum, manufacturer's standard profile one piece full length of chalkboard, closed ends; concealed fasteners, same finish as frame.

G. Mounting Brackets: Concealed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as instructed by the manufacturer.

3.2 INSTALLATION

A. Install boards in accordance with manufacturer's instructions.

B. See Section 06 1000 for placement of concealed supports in wall construction.

C. Install with top of chalk tray as indicated on the drawings.

D. Secure units level and plumb.

E. Butt Joints: Install with tight hairline joints.

F. Carefully cut holes in boards for thermostats, wall switches, and Call buttons, where required.

G. Attach sheet cork to wall board with adhesive. Application and installation per sheet cork

manufacturer’s recommendations.

3.3 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at date of Substantial Completion.

3.4 SCHEDULE

A. See Drawings for Visual Display Surfaces locations and sizes.

END OF SECTION 10 1100

PRIOR APPROVAL SUBSTITUTION REQUEST FORM

The undersigned, qualified bidder, subcontractor, manufacturer, or supplier requests that the following product be accepted for use in the Project

PRODUCT: Carrier i-Vu Building Automation System

MODEL NO.: Various

MANUFACTURER: Carrier Corporation

ADDRESS: 13995 Pasteur Blvd, Palm Beach Garden, FL 33418

The above product would be used in lieu of

PRODUCT: 23 09 23 - DDC Building Controls

specified in

SECTION: 23 09 23

PARAGRAPH: Spec section would apply in entirety to substitution request

Attached are the following circled items:

1. Product description including specifications, performance and test data, and applicable reference standards.
2. Drawings.
3. Photographs.
4. Samples.
5. Tabulated comparison with specified product.
6. For items requiring color selections, full range of manufacturer's color samples.
7. Other: _____

_____

_____

_____

_____

The undersigned certifies that the following statements are correct. Explanations for all items

which are **not** true are attached.

1. Proposed substitution has been thoroughly investigated and function, appearance, and quality meet or exceed that of specified product. TRUE FALSE

2. Same warranty will be provided for substitution as for specified product. TRUE FALSE

3. **No** aspect of Project will require re-design. TRUE FALSE

4. Use of substitution will **not** adversely affect:

   a. Dimensions shown on Drawings. TRUE FALSE

   b. Construction schedule and date of completion. TRUE FALSE

   c. Work of other trades. TRUE FALSE

5. Maintenance service and replacement parts for proposed substitution will be readily available in [Las Cruces] [El Paso] [Roswell] [Albuquerque] [Southern New Mexico] [Northern New Mexico] [_____] area. TRUE FALSE

6. Proposed substitution does **not** contain asbestos in any form. TRUE FALSE

Submitted By:

COMPANY: Farmington Heating & Metal Company
ADDRESS: 703 W Broadway, Farmington, NM 87401

TELEPHONE NUMBER: 505.325.4505

NAME OF PERSON SUBMITTING REQUEST: George A. Kuchera

TITLE: President

DATE: 8/28/2024

Farmington
HEATING & METAL CO.
703 West Broadway Farmington, NM 87401 – 505.325.4505 – 505.325.4506 fax

LICENSE NO. 2596

To whom it may concern.

Farmington Heating & Metal Company is a Carrier Controls Expert and has been performing work since 2018. During this time we have performed work using application specific controllers with factory loaded programs, customer programmable controllers with programming performed in house. The shop drawings and design and programming is performed in house by Farmington Heating & Metal Company personnel. Equipment that we have put under control include the following:

- Packaged Rooftop units
- Variable Air Volume Terminal Units
- Air Handlers
- Exhaust Fans – Temperature control, Occupied Exhaust, Buidling Pressure Control
- Damper Control for Building Pressure Control
- Chiller systems including pump control
- Boiler systems including pump control
- Smoke Control Panel
- Generator Monitoring and Modification and Load Shedding Based on Generator Status
- Split Systems and Air Handler Control
- CRACs
- PTACs
- Makeup Air Units with CELDEK (Discharge or Zone Temp Control)
- Pumps with VFD Control
- Baseboard Heaters
- Unit Heaters
- Heating and Cooling Coils
- ERVs and HRUs
- Custom HMIs / Equipment Touch Interfaces
- Lead / Lag Control for Pumps and HVAC Units
- Integration of Third Party Devices to allow for control and additional information (Typically Chillers, Boilers, Large AHUs / RTUs)

Farmington Heating & Metal has performed work for the following entities and projects listed below:

Central Consolidated School District

Kirtland Elementary School

Eva B Elementary School

Kirtland High School Fieldhosues

Contact: Candice Thompson – thomca@centralschools.org – Office - 505-598-4561

San Juan County

Administration Building

Dictrict 11 Courthouse

Sheriff's Office

Public Works

McGee Park Multi-Use Building

McGee Park Convention Center

Contact: Steve Dansie – steven.dansie@sjcounty.net – Office – 505-324-5569

City of Cortez

Cortez Recreation Center

Contact: Aaron Swisher – aswisher@cortezco.gov – Office – 970-564-4080

Please see attached summary of system description for an i-Vu Building Automation System and some attached product datasheets. If you need additional information please feel free to reach out to me.

Thanks,

George A. Kuchera

1 i-Vu Building Automation System Front End

1 i-Vu Building Automation System Front End

i-Vu® Building Automation System
i-Vu Pro 9.0 User Interface

The i-Vu Pro 9.0 user interface enables centralized control of the i-Vu building automation system (BAS) from any web-enabled device. By centralizing control and providing actionable insights, the web interface empowers facility managers and building owners to maintain optimal building comfort, performance, and sustainability.

Standard Features

- Intuitive, graphical navigation
- Animated graphics and dashboards provide real-time data and analytics
- Customizable graphics, dashboards, and reports
- Dynamic, scalable vector floor plan graphics convey a quick understanding of building conditions
- Easy setpoint adjustments help keep occupants comfortable
- Scheduling capabilities reduce energy waste and lower utility bills
- Robust alarming features notify operators of critical events
- Supports integration with various third-party systems and devices, providing convenient, centralized control of building systems
- Compatible with legacy CCN and Open controllers as well as Carrier TruVu™ controls
- Scales to accommodate buildings of various sizes, making it a versatile solution for different types of facilities
- Supports unlimited simultaneous users

New Features of v9.0

Enhanced Usability

- More granular control of user privileges
- Simplified alarm visualizations with filtering and search options

Improved Operator Efficiency

- Quickly link to external files (like installation manuals), from i-Vu graphics
- Faster controller downloads
- Enhanced engineering tools

Elevated Security

- New optional single sign-on (SSO) add-on
- New security report streamlines security assessments

Integration with Third Party Applications

- New RESTful API provides external applications with read-only access to i-Vu's alarm data

i-Vu Building Automation System
i-Vu Pro 9.0

Client Requirements

Mobile Devices	Smart phones Android™, iOS | Tablets: Android, iOS, Surface™			
Supported Browsers per Operating System		**Windows**	**Mac OS (Apple Mac only)**	**Linux**
	Google™ Chrome™ v84.0 or later	✓	✓	✓
	Microsoft® Edge v84 or later	✓		
	Mozilla® Firefox® v79.0 or later	✓	✓	✓
	Safari® v11 or later		✓	

Server Requirements (Server sold separately)

Specs	Quad core processor, 4G RAM, 100Mbps or higher LAN communications Supports PCs running Windows and Apple (Mac) PCs running Mac OS X
OS	The following operating systems in 64-bit versions: Windows 10 and 11 Professional and Enterprise Windows Server 2022 | Windows Server 2019 | Windows Server 2016

Other Features

Database	The i-Vu Pro v9.0 system supports the following and database engines are sold separately: Apache Derby (default database engine-included with purchase) SQL Server® Express 2019, 2017, 2016 SQL Server 2019, 2017, 2016 | Oracle 12c | MySQL 5.7.2 and 8.0 | PostgreSQL 9.4 through 12
Security	Supports TLS (Transport Layer Security) v1.3 with 256 bit encryption between client and i-Vu server Bacnet Secure Connect (BACnet/SC) secure, encrypted datalink layer
Supports	Unlimited simultaneous users Communication to field controllers via BACnet (TCP/IP)
Languages	International English, Brazilian Portuguese, Dutch, Finnish, French, French Canadian, German, Italian, Japanese, Korean, Norwegian, Russian, Simplified Chinese, Swedish, Thai, Traditional Chinese, Vietnamese
BACnet	Advanced Operator Workstation (B-AWS) supporting BACnet Revision 19

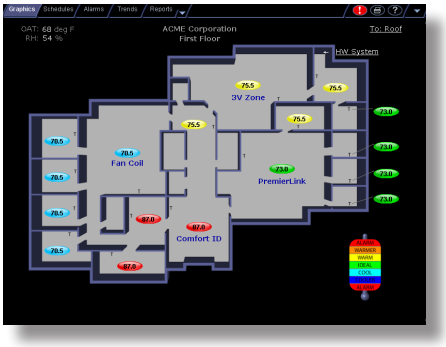
Available Versions

Part Number	Name	Features
CIV-OPNPR5	i-Vu 9.0 Pro-5	5 Controllers Maximum
CIV-OPNPR32	i-Vu 9.0 Pro-32	32 Controllers Maximum
CIV-OPNPR	i-Vu 9.0 Pro-750	750 Controllers Maximum + Custom Reports
CIV-OPNPRUL	i-Vu 9.0 Pro Unlimited	Unlimited Controllers + Custom Reports
CIV-OPNPRLS	i-Vu 9.0 Life Sciences	Unlimited Controllers + Life Sciences Features

For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

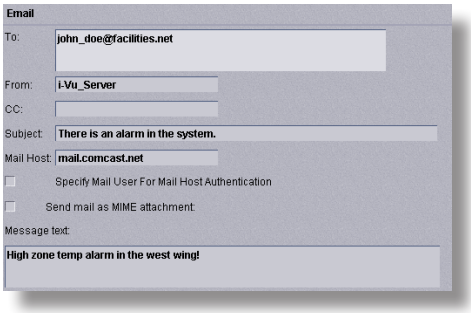
i-Vu® Building Automation System
i-Vu Alarming



Alarm Actions

i-Vu is easily configured to perform alarm actions that can notify personnel of an alarm or record information about an alarm in your Carrier system:

- Send an e-mail
- Print
- Play an audio file
- Pop-up a message on a client PC



System-Wide Alarms Button

A system-wide alarms button is always present and changes color based on severity of alarms in your Carrier system:

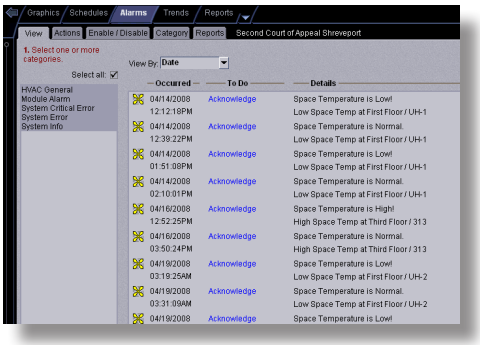
- Red - critical alarms need to be acknowledged
- Yellow - non-critical alarms need to be acknowledged
- Black - no alarms need to be acknowledged

Intuitive Alarm Viewer

i-Vu's powerful alarming capabilities allow you to see alarm events in your entire Carrier system from a single screen.

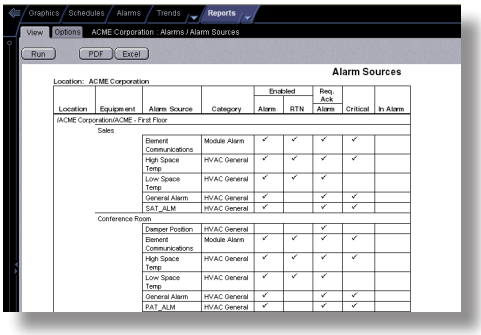
Alarms are easily sorted by date, type, or incident, allowing you to respond quickly to critical alarms while filtering out nuisance alarms.

- View, acknowledge, print, or delete alarms with ease
- Search for specific alarms based on time and date



Reports

- Alarms - view alarms that are currently in the system
- Alarm Sources - view all points that are configured to alarm
- Alarm Actions - view the configured actions for each alarm



For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

Carrier

i-Vu® Building Automation System
i-Vu Scheduling

Area Scheduling

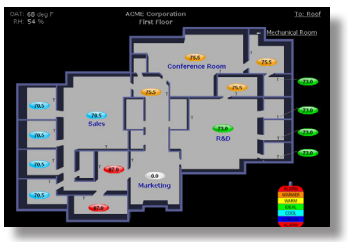
Scheduling your Carrier system is a breeze with i-Vu's intuitive scheduling interface. Simply point and click in i-Vu's navigation tree to enter schedules at the building, area, or zone level:

- Schedules added at the building level affect all equipment in the building
- Schedules added at an area level affect all pieces of equipment in that area.
- Schedules added at a zone level affects only the equipment in that zone.
- Define schedule groups for even greater flexibility. When you apply a schedule to a schedule group, the schedule affects all pieces of equipment in that group.

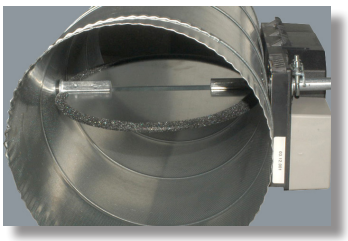
Viewing Schedules

Point and click in the navigation tree, and i-Vu allows you to view the relevant schedules at that level and below. The effective schedules (occupied or unoccupied), and priority schedules (Normal, Holiday, and Override), are all color-coded for easy viewing on one screen. View schedules for the current week, or rewind/fast forward to see past or future schedules.

Conserve Energy



Area Scheduling



Effective Control

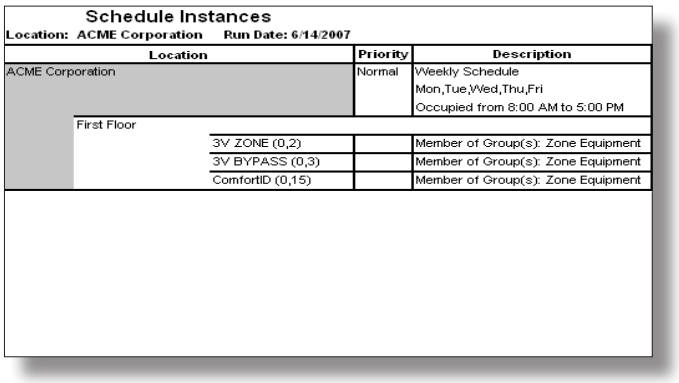
i-Vu® Building Automation System
i-Vu Scheduling

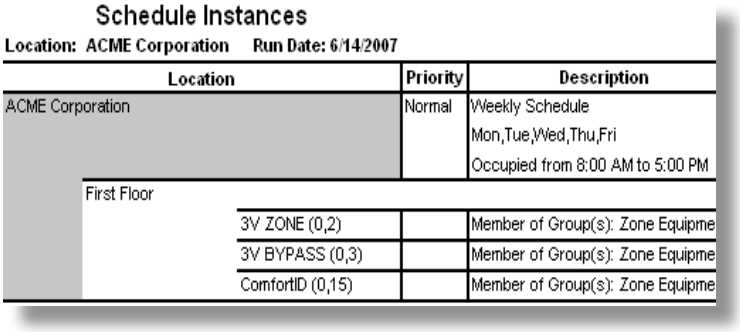
Creating Schedules

It's simple to add customized schedules to keep occupants comfortable and equipment running efficiently. First select the priority for the schedule that you wish to add (Normal is low priority; Holiday is medium; Override is high). Then select the schedule type that meets your needs:

- Weekly - every week on the specified days
- Date - on a single, specified date added
- Date Range - between two specified dates
- Date List - on multiple, specified dates
- Wildcard - according to a repeating pattern
- Continuous - continuously between specified times on two separate dates
- Dated Weekly - weekly between a start date and an end date
- Date List - on multiple, specified dates

Then simply drag the start and stop times on the schedule graph to complete the schedule. Once schedules are in the system, they can be easily edited by dragging the start and stop times to change them. You can also delete or print schedules with the click of a button, directly from the same screen.





Reports

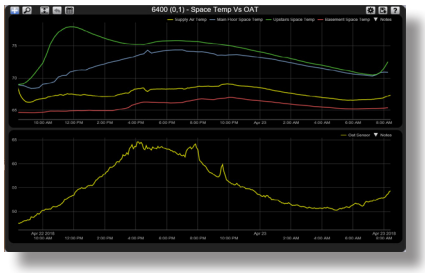
For added flexibility, i-Vu also supports schedule reports. These reports may be viewed within i-Vu, or they may be exported to .pdf or Excel for easy viewing.

- Schedule Instances - shows detailed information as to locations, priorities, and other schedule details such as start/stop times, days of week, etc. This report can help you discover newly added and conflicting schedules.
- Effective Schedules - View all equipment that may be scheduled and the net result of all schedules in effect for a selected time and date.

For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

i-Vu® Building Automation System
i-Vu Trends and Reports



Multiple Trend Samples

Automatic Trends and Powerful Reports

i-Vu's automatic trending capabilities mean that a history of your equipment's operation is being saved without any special setup. Trends can be easily modified to sample at different time intervals or on change of value instead.

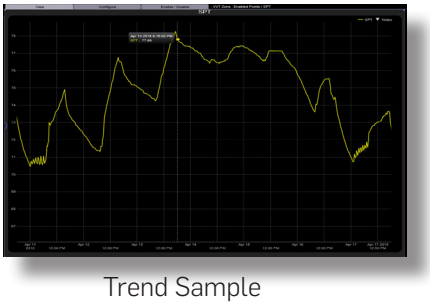
Turn trend data into interactive, graphical reports using i-Vu's reporting capabilities. Reports can be scheduled to run automatically, sent to e-mail recipients and stored in multiple file formats.

i-Vu Trends

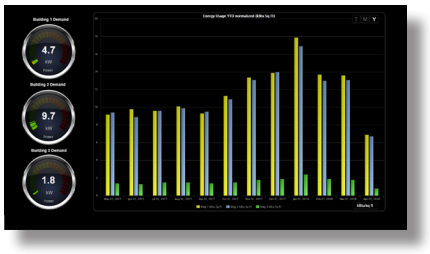
Viewing trends is effortless with i-Vu. Simply point and click to a piece of equipment in the navigation tree, and you will be presented with a comprehensive list of trend points that are already enabled. Pick any point to view the trend graph. While viewing the trend graph, there are many tools at your disposal:

- Use arrow keys to pan the trend graph in different directions.
- Draw a rectangle around a specific area to zoom-in on that data.
- Use the Page Down key to zoom-out on specific trend data.
- Enter a specific start date to jump to the trend graph for that date.
- Show point markers for each data point in the graph.
- Copy the trend graph data that is being displayed on the screen and paste it into Excel.

You can also graph multiple trend points simultaneously to help monitor and troubleshoot your system. A comparison trend graph can display up to four graphs on the same page.



Trend Sample

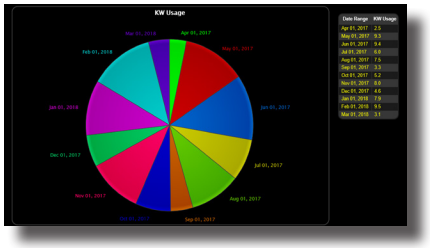


Reports -Bar Chart

i-Vu Reports

The i-Vu system includes standard reports that provide insight on equipment status and users of the system. Security, alarms, schedules, equipment and commissioning reports can be viewed and printed. i-Vu Plus and Pro systems also include custom reporting capabilities. Reports can be created, edited, viewed, and scheduled using the Report Manager tool. Easily create reports for energy usage, system status, historical data, and much more. The Report Manager also supports Java math functions to perform calculations on column data, allowing for easy creation of reports based on calculated data. Some examples include:

- BTU calculations from flow and delta temperature measurements
- Normalized energy usage
- Aggregate consumption
- Min/Max/Average values



Reports -Pie Chart

For more information, contact your local Carrier Controls Expert.

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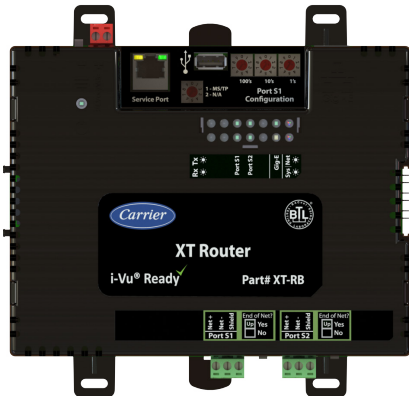
2 Networking and Integration Products

2 Networking and Integration Products

i-Vu® Building Automation System
i-Vu XT Router

Part Number: XT-RB



The i-Vu XT Router (XT-RB) is a high-performance BACnet router that provides routing of BACnet messages between several network types including BACnet/SC, BACnet/IP, BACnet Ethernet and BACnet MS/TP. With the Gen5 driver, the XT-RB supports BACnet Secure Connect (SC), which provides the means to create secure communications connections between controllers across the cloud and within facilities. This device can also support IPv6 and IPv4 networks concurrently.

BACnet Features

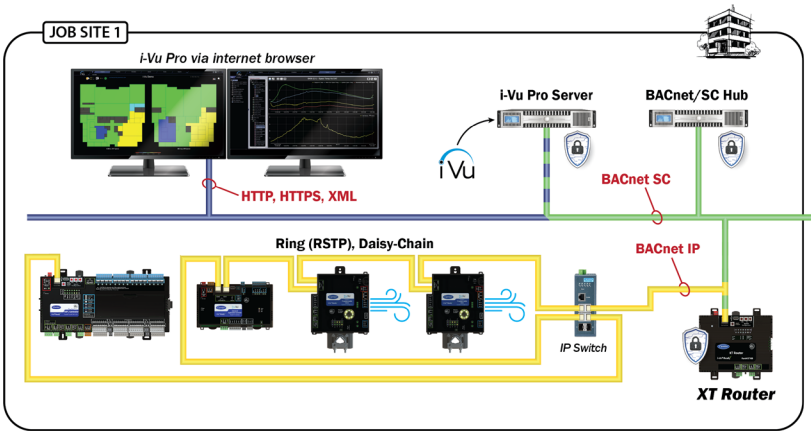
- Features end-to-end encrypted BACnet Secure Connect (BACnet/SC) routing between BACnet/SC hubs and the i-Vu system via BACnet/SC, an encrypted datalink layer specifically designed to meet the requirements, policies, and constraints of minimally-managed to professionally managed IP infrastructures
- Supports concurrent BACnet networks (BACnet/SC and non-BACnet/SC), allowing facilities to migrate to the BACnet/SC environment over time
- Includes two additional BACnet ports to support two simultaneous BACnet MS/TP networks (up to 60 controllers each) to simultaneously route and share data across a wide range of building subsystems
- Can serve as a BACnet Broadcast Management Device (BBMD) routing any BACnet broadcast messages directly to other BBMD devices on the BACnet network
- Supports BACnet Foreign Device Registration (FDR)

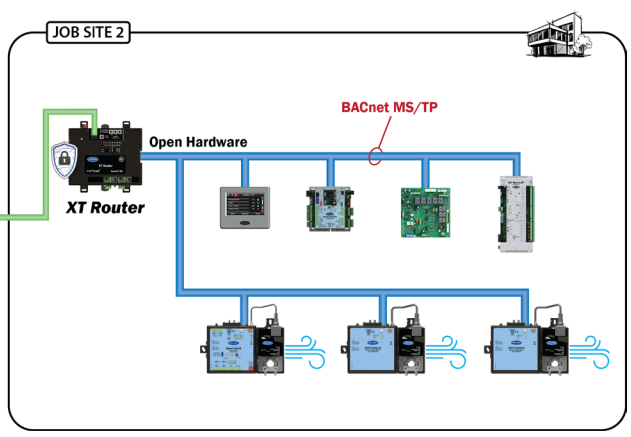
Hardware Features

- IPv6 and IPv4 networks are supported | 1000 BaseT speed
- Stateless auto-configuration of addresses (SLAAC), static IPv6 addressing, and DHCP IP addressing are supported
- Password protected Ethernet service port at 100 Mbps for system start-up and troubleshooting
- Web sever local access for properties such as network and alarm configuration, notification classes, etc.
- Capacitor-backed real-time clock keeps time in the event of power failure or network interruption for up to 3 days

System Benefits

- Connects seamlessly to the i-Vu building automation system
- Multiple serial communication ports to simultaneously route and share data across a wide range of building subsystems





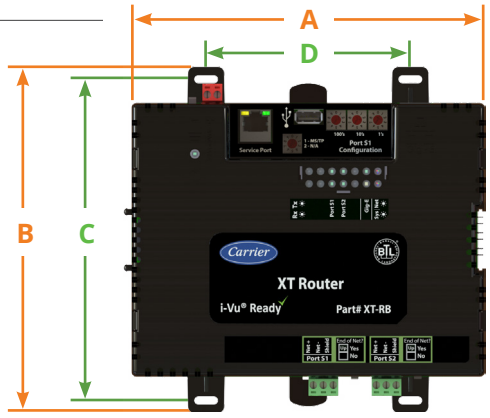
i-Vu® Building Automation System

i-Vu® XT Router

Part Number: XT-RB

Specifications

BACnet Support	Conforms to the BACnet Router (B-RTR) Standard Device and BACnet BBMD (B-BBMD) Device as defined in BACnet 135. Tested to and listed to Protocol Revision 19 (135-2016). BTL Listing
Power Requirements	24VAC ± 10%, 50-60Hz, 50 VA 26VDC ± 10%, 15W
Communication Ports	**Gig-E:** 10/100/1000 BaseT Ethernet port for BACnet/SC, BACnet/IP and/or BACnet/Ethernet communication on the Ethernet at 10, 100, or 1000 Mbps, full duplex | *Support for BACnet/SC requires driver version gen5_106-01-2380 or later - **IPv4:** 1000Mbps BACnet IP and DHCP IP addressing - **IPv6:** 1000Mbps BACnet IP for static IPv6 addressing and stateless auto-configuration of addresses (SLAAC) *Support for IPv6 requires driver version gen5_106-01-2380 or later **Port S1:** EIA-485 port for communication BACnet MS/TP network at 9,600 to 115,200 bps An **End of Net** switch can be turned on to terminate the network segment. **Port S2:** EIA-485 port for communication BACnet MS/TP network at 9,600 to 115,200 bps An **End of Net** switch can be turned on to terminate the network segment. **Service Port:** 10/100 Base T Ethernet port for system start-up and troubleshooting.
Protection	Device is protected by a replaceable, fast acting, 250Vac, 2A, 5mm x 20mm glass fuse. The power and network ports comply with the EMC requirements EN50491-5-2.
Real-Time Clock	Real-time clock keeps track of time in the event of a power failure for up to 3 days.
LED Status Indicators	Tricolor **NET** LED to show network status / Tricolor **SYS** LED to show system status A **TX** (Transmit) and **RX** (Receive) LED for: Gig-E port, Port S1, Port S2
Router Addressing	Rotary DIP switches set address of router
Environmental Operating Range	**Operating:** 0 to 140ºF (-18 to 60ºC); 10 to 90% RH, non-condensing **Storage:** -24 to 140ºF (-30 to 60ºC); 10 to 90% RH, non-condensing
Compliance	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE** Mark Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA** Mark compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Phyiscal	Fire-retardant plastic ABS, UL94-5VA
Dimensions	**Overall** **A:** 7.1 in. (18.03 cm) **B:** 6.95 in. (17.65 cm) **Mounting:** DIN rail mount or screw mount **C:** 6.45 in, (16.38 cm) **D:** 4.1 in. (10.4 cm) **Depth:** 2.79 in. (7.09 cm) **Weight:** 1.1 lbs. (.482 kg)



For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
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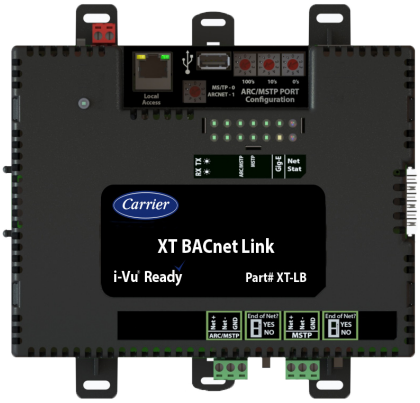
Carrier

i-Vu® Building Automation System
i-Vu XT BACnet Link

Part Number: XT-LB

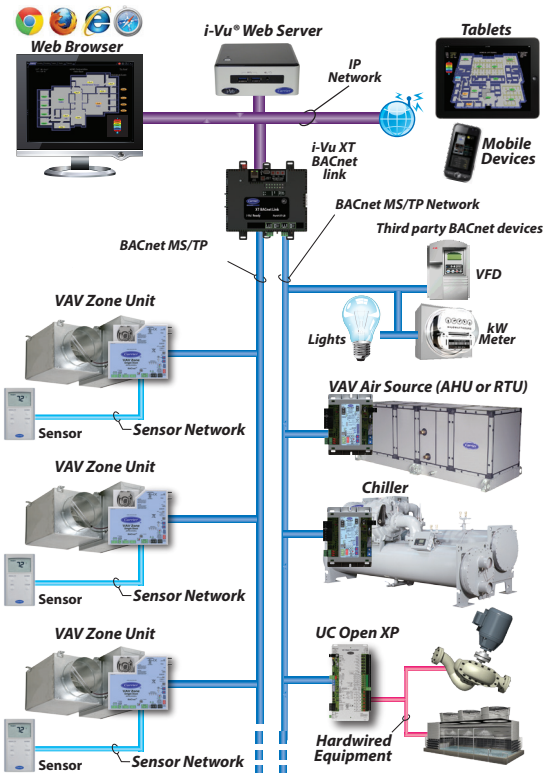


The i-Vu® XT BACnet link allows you to integrate other manufacturers' equipment into the i-Vu building automation system using BACnet and/or Modbus protocols, making it easy to tie in equipment such as VFDs, boilers, and lighting systems. Each i-Vu XT BACnet link supports up to 1,500 third party BACnet points and up to 500 Client/Server Modbus points using Modbus/IP or Modbus RTU protocols.

The i-Vu® XT BACnet link also routes BACnet messages between the i-Vu building automation system backbone (BACnet/IP), and a subnetwork of i-Vu controllers (BACnet MS/TP). It connects directly to the Ethernet LAN and provides the i-Vu web server with access to the entire i-Vu system.

The i-Vu XT BACnet link also extends an i-Vu system, allowing individual BACnet MS/TP networks (with up to 60 controllers each) to be connected together via the i-Vu building automation system backbone.

The i-Vu® Building Automation System



Up to 60 i-Vu Controllers per BACnet MS/TP network

VFDs

Boilers

Lighting

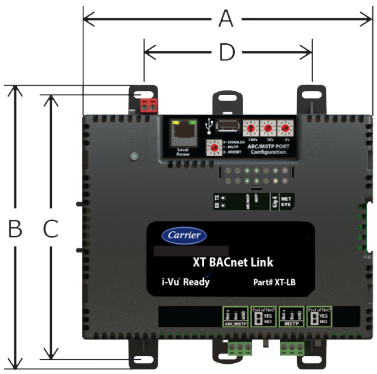
i-Vu® Building Automation System

i-Vu XT BACnet Link

Part Number: XT-LB

Specifications

BACnet Support	Conforms to the BACnet Building Controller (B-BC), BACnet Router (B-RTR), and BACnet BBMD (B-BBMD) device profiles as defined in BACnet 135-2012 Annex L, Protocol Revision 14
Power Requirements	24 VAC ± 10%, 50-60Hz, 50 VA 26 VDC ± 10%, 15W
Communication Ports	**Gig-E:** 10/100/1000 BaseT Ethernet port for BACnet/IP, BACnet/Ethernet and/or Modbus/IP networks **S1 MSTP:** High-speed EIA-485 port for connecting one of the following network types: BACnet MS/TP or Modbus RTU network at 9.6, 19.2, 38.4, 57.6, 76.8, 115.2 kbps **S2 MSTP:** Electrically isolated EIA-485 port for connecting BACnet MS/TP or Modbus RTU network at 9.6, 19.2, 38.4, 57.6, 76.8, 115.2 kbps **S1 and S2 End of Net** switch can be turned on to terminate the network segment **Local Access:** 10/100 Base T Ethernet port for system start-up and troubleshooting.
Protection	Device is protected by a replaceable, fast acting, 250 Vac, 2A, 5 mm x 20 mm glass fuse. The power and network ports comply with the EMC requirements EN50491-5-2.
Integration	Maximum 1500 third-party BACnet points (BACnet/IP, BACnet MS/TP, or BACnet ARCnet) Maximum 500 client or server Modbus points (Modbus/IP, Modbus RTU) Maximum 999 control programs or available memory
Real Time Clock	Real-time clock keeps track of time in the event of a power failure for up to 3 days.
LED Status Indicators	Tricolor **NET** LED to show network status Tricolor **SYS** LED to show system status A **TX** (Transmit) and **RX** (Receive) LED for: Gig-E port, ARC/MSTP port, and MSTP port
Router Addressing	Rotary DIP switches set address of router
Compliance	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE** Mark Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA** Mark compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and and RoHS for Electrical and Electronic Equipment 2012.
Environmental Operating Range	**Operating:** 32 to 140ºF (-18 to 60ºC); 10 to 90% RH, non-condensing **Storage:** -24 to 140ºF (-30 to 60ºC); 10 to 90% RH, non-condensing
Physical	Fire-retardant plastic ABS, UL94-5VA
Dimensions	**Overall** **A:** 7.1 in. (18.03 cm) **B:** 6.95 in. (17.65 cm) **Mounting** DIN rail mount or screw mount **C:** 6.45 in. (16.38 cm) **D:** 4.1 in. (10.4 cm) **Depth:** 2.79 in. (7.09 cm) **Weight:** 1.1 lbs. (.482 kg)



For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

Carrier

i-Vu® Building Automation System
IPS1-04
Managed IP Ethernet Switch

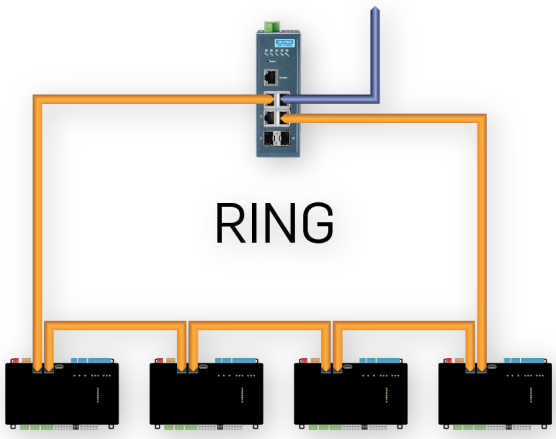
The IPS1-04 is ideal for implementing a ring or hybrid network with Carrier's TruVu™ dual IP controllers. The IPS1-04 features four gigabit Ethernet ports that support Rapid Spanning Tree Protocol (RSTP) for a completely redundant network connection. Rugged construction and din rail mounting make it well suited for panel installation in many HVAC applications.

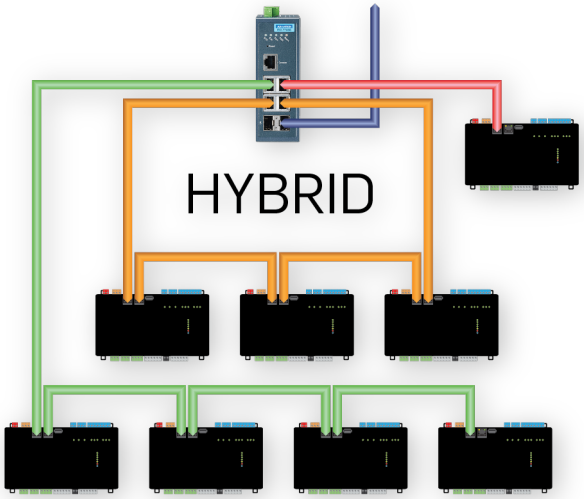
i Vu

Features

- 4 10/100 MB Ethernet ports + 2 SFP ports
- SFP socket for easy and flexible fiber expansion (optional accessory)
- Redundancy: X-Ring Pro (ultra high-speed recovery time < 20 ms), RSTP/STP (802.1w/1D)
- IXM function enables fast deployment
- Security: 802.1x (Port-based, MD5/TLS/TTLS/PEAP encryption), RADIUS
- Management: SNMP v1/v2c/v3, WEB, Telnet, standard MIB, private MIB
- -10 ~ 60 °C (14 ~ 140 °F) operating temperature
- Dual 12~48 VDC power input and 1 relay output for power failure notification
- 4 Ethernet ports support auto negotiation, MDI/MDI-X function, Full/Half duplex
- Supports security pack to fight against internal and external cyber threats
- Store and forward

Suggested Network Topologies





i-Vu Building Automation System
IPS1-04
Managed IP Ethernet Switch

Specifications

Interface
I/O Port: 4 x 10/100/1000BASE-T/TX RJ-45
2 x SFP (mini-GBIC) port
Console port: RS-232 (RJ45)
Power Connector: 6-pin screw terminal block (including relay)

Physical
Enclosure: Metal Shell
Protection Class: IP 30
Installation: DIN-Rail
Switch Fabric Speed: 12Gbps
Jumbo Frame: 9,216Bytes
Dimensions (W x H x D): 43 x 120 x 84 mm (1.69" x 4.72" x 3.31")

LED Display
System LED: PWR1, PWR2, SYS, Alarm and R.M.
Port LED: Link / Speed / Activity

Environment
Operating Temperature: -10 ~ 60 °C (14 ~ 140 °F)
Storage Temperature: -40 ~ 85 °C (-40 ~ 185 °F)
Ambient Relative Humidity: 10 ~ 95% (non-condensing)
Humidity: 10 ~ 95% (non-condensing)

Power
Power Consumption: 5.28W @ 48VDC (System)
Power Input: 12~48 VDC, redundant dual power input
Fault Output: 1 Relay Output 1A @ 24VDC Max
Reverse polarity protection: Supported
Overload current protection: Supported

QoS
Priority Queue: WRR (Weighted Round Robin), SP (Strict Scheduling Priority) hybrid priority
Class of Service: IEEE 802.1p based CoS, IP TOS, DSCP based CoS
Rate Limiting: Ingress rate limit, egress rate limit
Link Aggregation: IEEE 802.3ad dynamic port trunking, static port trunking

Certification
EMI: CE, FCC Class A
Safety: UL 61010, EN LVD 62368-1
EMC: EN 61000-4-2
EN 61000-4-3
EN 61000-4-4
EN 61000-4-5
EN 61000-4-6
EN 61000-4-8
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Railway Trackside: EN 50121-4

L2 Features
L2 MAC Address: 8K
Packet Buffer: 4.1 Mbit
VLAN Group: 256 (VLAN ID 1~4094)
VLAN Arrange: Tag-based VLAN, Q-in-Q (VLAN Stacking), GVRP
Port Mirroring: Per port, multi-source port
IP Multicast: IGMP snooping v1/v2/v3, MLD Snooping, IGMP immediate leave
Storm Control: Broadcast, multicast, unknown unicast
Redundancy: IEEE 802.1D-STP, IEEE 802.1s-MSTP, IEEE 802.1w-RSTP, X-Ring Pro, with ultra high-speed recovery time less than 20ms
IEEE Standard: 802.3, 802.3u, 802.3ab, 802.3x, 802.3z, 802.1D, 802.1w, 802.1p, 802.1Q, 802.1x, 802.3ad

Security
Port Security: Static, Dynamic IP Source Guard, ARP Spoofing Prevention, Access Control List, DHCP Snooping
Authentication: 802.1x (Port-Based, MD5/TLS/TTLS/PEAP Encryption), TACACS+

Management
DHCP: Client, server, option 66/67/82
Access: SNMP v1/v2c/v3, WEB, Telnet, RMON, standard MIB, private MIB
Security access: SSH2.0, SSL
Software upgrade: TFTP, HTTP, dual image
NTP: SNTP client

For more information, contact your local Carrier Controls Expert.
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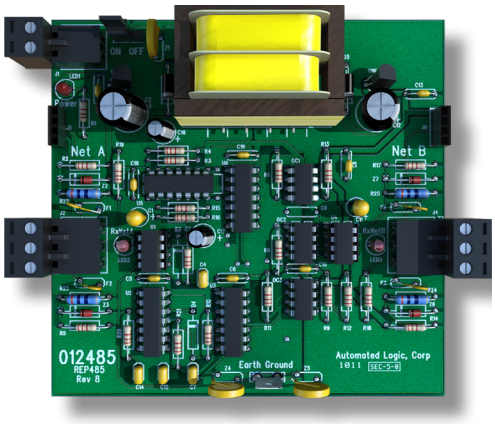
i-Vu® Building Automation System
Network Devices

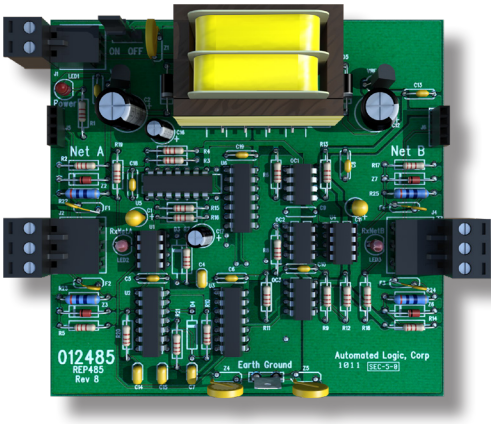
Part Numbers: REP485, PROT485, BT485



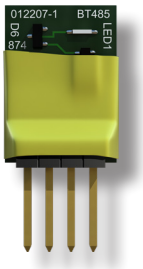
Carrier's ancillary network devices ensure optimum performance for BACnet MS/TP and other EIA-485 networks. These devices install easily and work together to amplify data signals and provide surge protection, bias, and termination to any EIA-485 network.

Key Features and Benefits

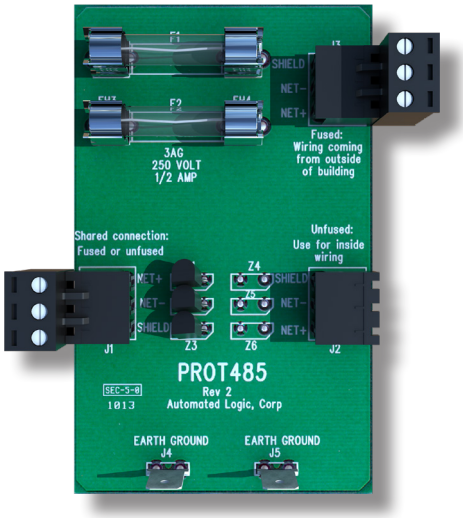
- The REP485 allows you to expand your overall network by repeating and amplifying network signals from one network segment to the next.
- The PROT485 provides electrical surge protection to controllers installed within 250 ft. (76 m).
- The BT485 prevents end-of-line reflections, noise, and signal distortion by effectively terminating and biasing each network segment.



485 Repeater
Part #REP485



Biasing Terminators (16 pack)
Part #BT485



Electrical Surge
Protection Board
Part #PROT485

i-Vu® Building Automation System

Network Devices

Part Numbers: REP485, PROT485, BT485

REP485

Power	24 VAC ± 10%, 50-60Hz, 6 VA power consumption
Mounting	4 in. Snap Track
Terminals	Removable screw terminals
Ports	Net A and Net B are both EIA-485 (optically isolated)
Network Requirement	1 after every 31 controllers, after every 2000ft. (609.6m), or at each branch of a hybrid network
Network Wiring	22/24 AWG, single twisted shielded pair, low capacitance, CL2P wire
Operating Temperature	0 to 130ºF (-17.8 to 54.4ºC), 5-95% relative humidity, non-condensing
Listed By	UL-916 (PAZX), cUL-916 (PAZX7), CE EN50082-1997
Dimensions	4 in. (width) by 4 in. (height) by 2 in. (depth) 102 mm (width) by 102 mm (height) by 51 mm (depth)

PROT485

Power	N/A
Mounting	4 in. Snap Track
Terminals	Removable screw terminals
Network Requirement	At each place wire enters or exits the building, or for maximum protection, 1 recommended within 250ft. (76m) of each controller
Network Wiring	22/24 AWG, single twisted shielded pair, low capacitance, CL2P wire
Protection	2 replaceable 0.5 A fuses protect the fused connection: F1, type 3AG, 250 Vac, 0.5 A, T (time-lag) F2, type 3AG, 250 Vac, 0.5 A, T (time-lag)
Operating Temperature	-20 to 140ºF (-29 to 60ºC), 10-90% relative humidity, non-condensing
Listed By	UL-916 (PAZX), cUL-916 (PAZX7), CE EN50082-1997
Dimensions	4 in. (width) by 4 in. (height) by 2 in. (depth); 102mm (width) by 102mm (height) by 51 mm (depth)

BT485

Network Requirement	1 at each controller that begins and ends a network segment greater than 10 ft (3 m)
Operating Temperature	-20 to 140ºF (-29 to 60ºC)
Listed By	UL-916 (PAZX), cUL-916 (PAZX7), CE EN50082-1997
Dimensions	.5 in. (width) by .6 in. (height); 12 mm (width) by 15 mm (height)

For more information, contact your local Carrier Controls Expert.

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3 ZS Space Sensors

3 ZS Space Sensors

i-Vu® Building Automation System
ZS Space Sensors

Carrier's line of intelligent ZS Space Sensors provide the function and flexibility you need to manage the conditions important to the comfort, productivity, and sustainability of your building. The ZS sensor is available in a variety of zone sensing combinations to address your application needs. These combinations include temperature, relative humidity, and indoor air quality (carbon dioxide). Designed to work with i-Vu controllers and the i-Vu building automation system, the ZS sensor line includes the ZS Standard, ZS Plus, ZS Pro, ZS-Pro-M and ZS Pro-F.

Features	ZS Standard	ZS Plus	ZS Pro	ZS Pro-F
				
Temp, CO_2, and humidity options	•	•	•	•
Motion sensing option	•	•	•	•
Addressable / supports daisy-chaining	•	•	•	•
Hidden communication port	•	•	•	•
Occupancy status indicator		•	•	•
Push-button occupancy override		•	•	•
Setpoint adjust		•	•	•
Large, easy- to-read LCD			•	•
Alarm indicator			•	•
Fan speed control				•
Cooling / Heating / Fan Only - mode control				•
°F to °C conversion button				•

ZS Pro with Motion

ZS2PL-HCM-CAR

- MODEL
  - [Blank]=Standard Model
  - PL=Plus Model
  - P=Pro Model
  - PF=Pro-F Model
- SENSING
  - H=Humidity
  - C=CO2
  - V=VOC
  - M=Motion
- BRANDING
  - CAR=Carrier
  - BNK=Blank

Parts Available

ZS Standard	ZS Plus	ZS Pro	ZS Pro (cont.)	ZS Pro-F
ZS2-CAR	ZS2PL-CAR	ZS2P-CAR	ZS2P-CM-CAR	ZS2PF-CAR
ZS2-C-CAR	ZS2PL-C-CAR	ZS2P-C-CAR	ZS2P-HM-CAR	ZS2PF-C-CAR
ZS2-H-CAR	ZS2PL-H-CAR	ZS2P-H-CAR	ZS2P-HCM-CAR	ZS2PF-H-CAR
ZS2-HC-CAR	ZS2PL-HC-CAR	ZS2P-HC-CAR	ZS2P-HVM-CAR	ZS2PF-HC-CAR
ZS2-M-CAR	ZS2PL-M-CAR	ZS2P-HV-CAR		ZS2PF-M-CAR
ZS2-HCM-CAR	ZS2PL-HCM-CAR	ZS2P-M-CAR		ZS2PF-HV-CAR
				ZS2PF-HCM-CAR

*Note: To order a sensor without a Carrier logo, use "BNK" in place of "CAR" above. Some models are only available without a logo.

i-Vu® Building Automation System
ZS Space Sensors

Sensing Element	Range	Accuracy
Temperature with any Option (excluding Humidity)	32° F to 122° F (0° C to 50° C)	±0.35° F (0.2° C)
Temperature with Humidity and any Option	50° F to 104° F (10° C to 40° C)	±0.5° F (0.3° C)
Humidity	20% to 80%	±2% typical
CO_2	400 to 1250 PPM 1250 to 2000 PPM	±30 PPM or +/- 3% of reading (greater of two) 5% of reading plus 30 PPM
Volitile Organic Compounds (VOC)	0 to 2000 PPM	±100 PPM

Power Requirements	Sensor Type	Power Required
Temperature Only	All Models	12 Vdc @ 8 mA
with Humidity	All Models	12 Vdc @ 8 mA
with VOC	All Models	12 Vdc @ 60 mA
with CO_2	All Models	12 Vdc @ 15 mA (idle) to 190 mA (CO_2 measurement cycle)

Specifications

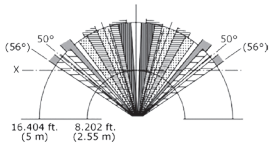
Power Supply
A controller supplies the Rnet sensor network with 12 Vdc @ 210 mA. Additional power may be required for your application. See sensor power requirements above.

Communication
115 kpbs Rnet connection between sensor(s) and controller
15 sensors max per Rnet network; 5 sensors max per control program.

Local Access Port
For connecting a laptop computer to the local equipment or i-Vu network for maintenance and commissioning.

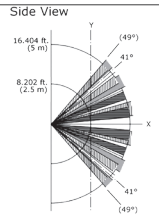
Motion Sensing

Top View



Sensor Type: passive infrared (PIR)
Distance: 16.4 ft. (5 m)
Detection Range: (HxV) 100° x 82°
Movement Speed: 2.62 to 3.94 ft/s (0.8 to 1.2 m/s)
Detection Object: 27.56 x 9.84 in. (700 x 250 mm)

Side View

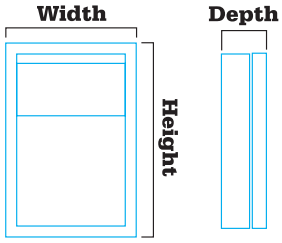


Environmental Operating Range
32° F to 122° F (0° - 50° C), 10% to 90% relative humidity, non-condensing

Mounting Dimensions
Standard 4"x 2" electrical box using provided 6/32" x 1/2" mounting screws

Dimensions

Overall
Width: 2.75 in. (6.99 cm)
Depth: 0.858 in. (2.18 cm)
Height: 4.75 in. (12.07 cm)



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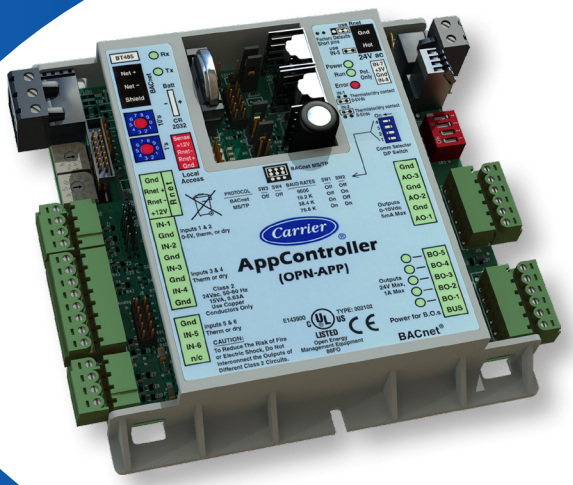
4 Programmable Controllers – BACnet MS/TP

4 Programmable Controllers – BACnet MS/TP

i-Vu® Building Automation System
AppController

Part Number: OPN-APP



Application Features

- Library of factory-engineered control programs for fan coils, unit ventilators, water source heat pumps, and constant volume AHUs
- Supports Snap graphical programming for creating customized control programs
- Supports Carrier communicating room sensors, which allow for local setpoint adjustment and local overrides

Hardware Features

- Battery-backed real time-clock keeps time in the event of power failure
- Stand-alone control of up to 14 I/O points using proven algorithms
- Native BACnet MS/TP or ARCNET communications

System Benefits

- Fully plug-and-play with the Carrier i-Vu Building Automation System
- Supports demand limiting for maximum energy savings

The AppController continuously monitors and regulates equipment operation with reliability and precision. The AppController's factory-engineered control programs provide optimum performance and energy efficiency for HVAC equipment such as fan coils, unit ventilators, water source heat pumps, and constant volume AHUs. It also features native BACnet communications and plug-and-play connectivity to the Carrier i-Vu Building Automation System.

Typical Applications

Unit Ventilator

Constant Volume AHU

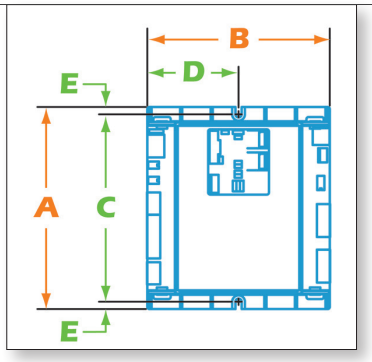
Fan Coil

WSHP

i-Vu® Building Automation System
AppController
Part Number: OPN-APP

Specifications

BACnet Support	Advanced Application Controller (B-AAC), as defined in BACnet 135-2012 Annex L Protocol rev. 9
Communication Ports	**BACnet port:** EIA-485 port for MS/TP (9600 bps – 76.8 Kbps) or ARCNET 156 kbps **Local Access port:** For system start-up and troubleshooting (115.2 kbps); **Rnet port:** For connecting Carrier communicating room sensors and Carrier's touchscreen user interface.
Inputs	**6 inputs** configurable for thermistor or dry contact. Inputs 1 and 2 are also configurable for 0–5 VDC. Inputs 7 and 8 are not used. AI's have 10 bit A/D resolution.
Outputs	**5 binary outputs:** Relay contacts rated at 1A max @ 24 VAC/VDC, configured normally open. **3 analog outputs:** Rated at 0-10VDC, 5mA max, with 8 bit D/A resolution using filtered PWM.
Protection	Incoming power and network connections are protected by non-replaceable internal solidstate polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, input, and output connections are also protected against voltage transient and surge events.
Real Time Clock	Battery-backed real time clock keeps track of time in event of power failure
Battery	10-year Lithium CR2032 battery: a minimum of 10,000 hours of trend data retention during power outages
Status Indicators	LED status indicators for communications, run status, error, power, and all digital outputs
Controller Addressing	Rotary DIP switches set BACnet MS/TP or ARCNET MAC addressing of controller
Listed by	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012
Environmental Operating Range	**Operating:** 0 to 140°F (-18 to 54°C), 10–90% relative humidity, non-condensing **Storage:** -24 to 140°F (-30 to 60°C), 10–90% relative humidity, non-condensing
Power Requirements	24VAC ± 10%, 50-60Hz 18 VA power consumption 26 VDC (25V min, 30V max) Single Class 2 source only, 100 VA or less
Dimensions	**Overall** **A:** 5-5/8 in. (14.3cm) **B:** 5-1/8 in. (13 cm) **Mounting** **D:** 2-9/16 in. (6.5 cm) **C:** 5-1/4 in. (13.3 cm) **E:** 3/16 in. (.5 cm) **Depth:** 2 in. (5.1 cm) **Weight:** .44 lbs. (0.20 kg)



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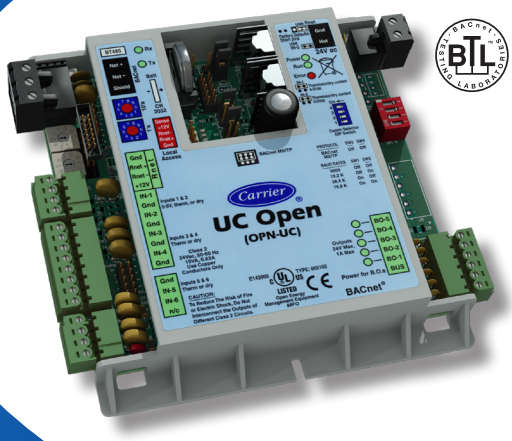
i-Vu® Building Automation System

UC Open Controller

Part Number: OPN-UC



The UC Open controller provides auxiliary building control to interface with lighting, fans, pumps, and other HVAC equipment. The UC Open's factory-engineered control programs provide simple building integration for commercial applications with 11 I/O point capability.

Application Features

- Comprehensive library of factory-engineered control programs available, including: Pump Control, Lighting Control, Time Scheduling with/without Override, Analog Temperature Control, Discrete & Permissive Interlock, Discrete Staging Control, OA Conditions, BTU Metering, Fuel Oil Metering, Electric Metering, Gas Metering, and Water Metering
- Supports Snap graphical programming for creating customized control programs
- Supports Carrier communicating room sensors, which allow for local setpoint adjustment and local overrides

Hardware Features

- Real time-clock keeps time in the event of power failure
- Stand-alone control of up to 11 I/O points using proven algorithms
- Native BACnet MS/TP or ARCNET communications

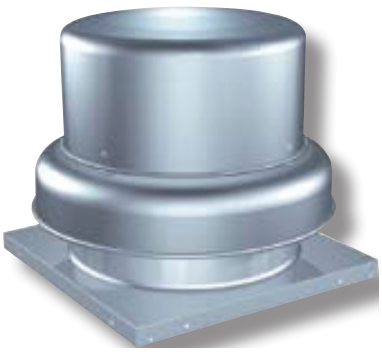
System Benefits

- Fully plug-and-play with the Carrier i-Vu Building Automation System
- Supports demand limiting for maximum energy savings

Sample Applications

Electric Meter

Lighting



Exhaust Fans

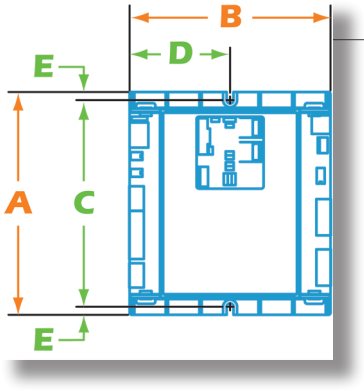
i-Vu® Building Automation System

UC Open Controller

Part Number: OPN-UC

Specifications

BACnet Support	Advanced Application Controller (B-AAC), as defined in BACnet 135-2001 Annex L Protocol rev. 9
Communication Ports	**BACnet port:** EIA-485 port for BACnet MS/TP communications (9600 bps, 19.2 kbps, 38.4 kbps, & 76.8 kbps) or ARCNET 156 kbps; **Local Access port:** For system start-up and troubleshooting (115.2 kbps); **Rnet port:** For connecting Carrier communicating room sensors and Carrier's touchscreen user interface
Inputs	**6 inputs:** Configurable for thermistor or dry contact. Inputs 1 and 2 are also configurable for 0–5 VDC sensors. AI's have 12 bit A/D resolution.
Outputs	**5 binary outputs:** Relay contacts rated at 1 A max. @ 24 VAC/VDC, configured normally open
Protection	Incoming power and network connections are protected by non-replaceable internal solid-state polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, input, and output connections are also protected against voltage transient and surge events.
Real Time Clock	Battery-backed real time clock keeps track of time in event of power failure
Battery	10-year Lithium CR2032 battery provides a minimum of 10,000 hours of trend data & time retention during power outages
Status Indicators	LED status indicators for communications, run status, error, and power
Controller Addressing	Rotary DIP switches set BACnet MS/TP or ARCNET address of controller
Listed by	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012
Environmental Operating Range	**Operating:** 0 to 140°F (-18 to 54°C), 10–90% relative humidity, non-condensing **Storage:** -24 to 140°F (-30 to 60°C), 10–90% relative humidity, non-condensing
Power Requirements	24VAC ± 10%, 50-60Hz 18 VA power consumption 26VDC (25V min, 30V max) Single Class 2 source only, 100 VA or less
Dimensions	**Overall** **A:** 5-5/8 in. (14.3 cm) **B:** 5-1/8 in. (13 cm) **Mounting** **C:** 5-1/4 in. (13.3 cm) **D:** 2-9/16 in. (6.5 cm) **E:** 3/16 in. (.5 cm) **Depth:** 2 in. 5.1 cm) **Weight:** .44 lbs (0.20 kg)



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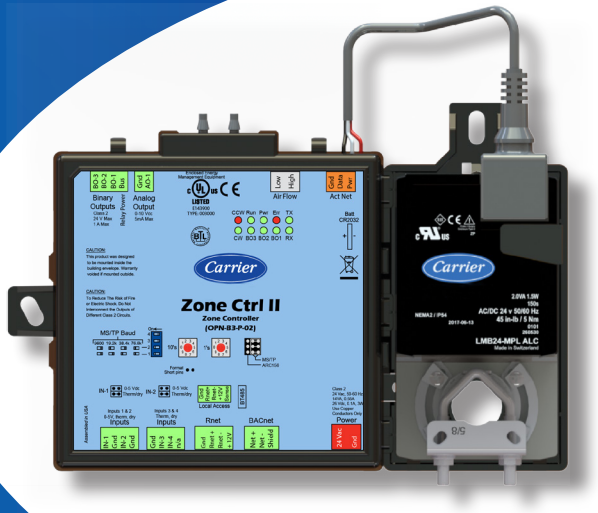
i-Vu® Building Automation System
Zone Ctrl II

Part Number: OPN-B3-P-02



The Zone Controller II provides zone level control for a variety of pressure-independent VAV and pressure dependent VVT applications. This completely programmable advanced controller features a separable actuator for easy installation onto fan-powered or single-duct air terminals. It also features native BACnet communications and plug-and-play connectivity to the Carrier i-Vu Building Automation System.

Application Features

- A library of sophisticated factory-engineered and tested control programs provide reliability and energy efficiency
- Programmable zone level control of terminal units, fan coils, lighting, exhaust fans and more
- Supports advanced control routines for zone level humidity control or zone level demand control ventilation (ASHRAE® 62)
- Supports Carrier communicating space sensors and touch screens which allow for local setpoint adjustment and local overrides
- Quick and easy test & balancing process

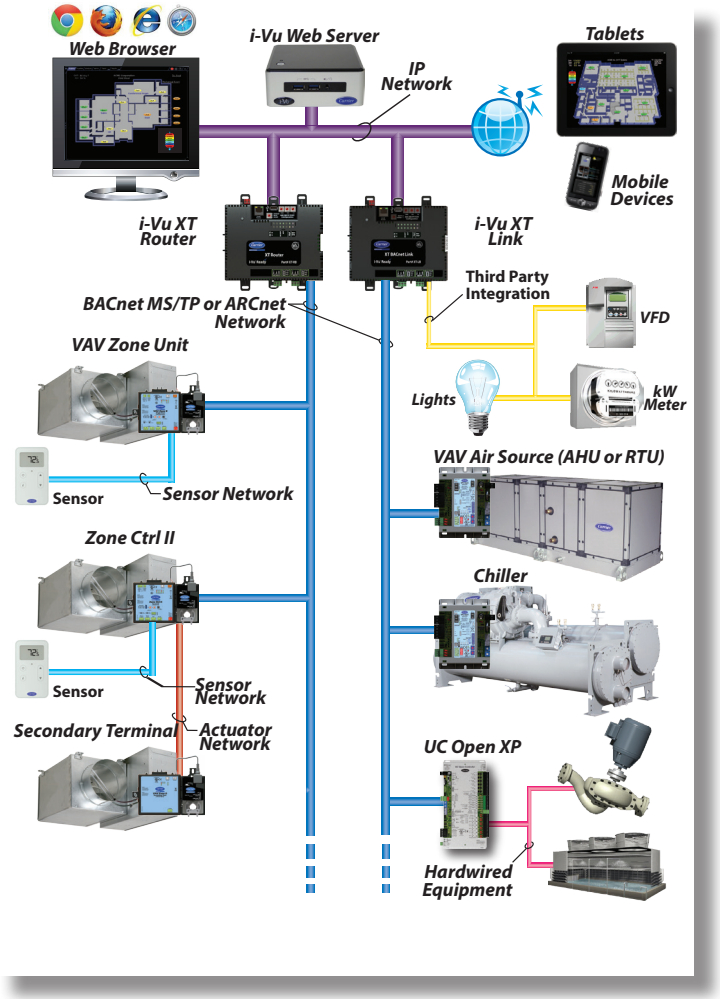
Hardware Features

- Separable brushless actuator for reliability and longevity
- Capable of system or stand-alone operation
- Native BACnet MS/TP or ARCNET communications
- Controls up to 8 points (3 binary outputs, 4 universal inputs and 1 analog output)

System Benefits

- Integrated Carrier airside linkage algorithm for plug-and-play integration with Carrier air sources
- Fully plug-and-play with the Carrier i-Vu Building Automation System
- Supports demand limiting for maximum energy savings
- Supports dual duct applications when used with Carrier's VAV Zone II Secondary Terminal Controller

The i-Vu Building Automation System



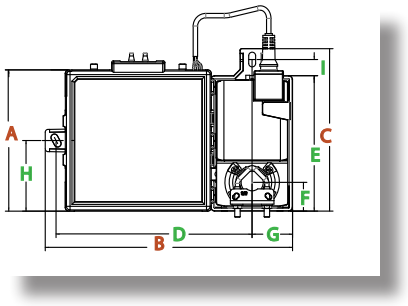
i-Vu® Building Automation System

Zone Ctrl II

Part Number: OPN-B3-P-02

Specifications

BACnet Support	Advanced Application Controller (B-AAC), as defined in BACnet 135-2012 Annex L Protocol rev. 9
Communication Ports	**BACnet port:** EIA-485 port for BACnet MS/TP communications (9600 bps, 19.2 kbps, 38.4 kbps, & 76.8 kbps) or ARCNET 156 kbps; **Local Access port:** For system start-up and troubleshooting (115.2 kbps); **Rnet port:** For connecting Carrier communicating room sensors and Carrier's touchscreen user interface **ACT net port:** For connecting the actuator cable
Inputs	**4 inputs** Configurable for thermistor or dry contact. Inputs 1 and 2 are also configurable for 0–5 Vdc 10 bit A/D resolution. Binary input pulse frequency 10 pulses per second. Minimum pulse width (on or off time) required for each pulse is 50 msec
Outputs	**3 binary outputs:** Relay contacts rated at 1A max @ 24VAC/VDC, configured normally open. **1 analog output:** 0 to 10VDC (5mA maximum) with 8 bit D/A resolution using filtered PWM.
Protection	Power and network connections protected by non-replaceable internal solid state resettable polyswitches. Power, network and I/O connections also protected against voltage transient and surge events lasting no more than 10 msec.
Separable Actuator	Brushless DC motor, torque 45 inch-pounds (5Nm), runtime 154 seconds for 90 degree travel
Integral Pressure Sensor	Precision low flow AWM series 0–2 in. H_2O, sensitive down to ±0.001 in. H_2O. Barbed tapered airflow connections accept 3/16 in. (4.75 mm) I.D. tubing. Allows for readings across the 0–2 in. H_2O range, accurate to ±5% of full flow at 2 in. H_2O
Battery	10-year Lithium CR2032 battery: min of 10,000 hours of trend data retention during power outages
Status Indicators	LED status indicators for BACnet communication, run status, error, power, and all digital outputs
Controller Addressing	Rotary DIP switches set BACnet MS/TP or ARCNET address
Listed by	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012
Environmental Operating Range	**Operating:** 32 to 130ºF (0 to 54ºC) 10 to 90% RH, non-condensing **Storage:** -24 to 140ºF (-30 to 60ºC) 0 to 90% RH, non-condensing
Power Requirements	24VAC ± 10%, 50-60Hz, 14 VA power consumption 26VDC (25V min, 30V max), Single Class 2 source only, 100 VA or less
Dimensions	**Overall** **A:** 5.10 in. (12.95 cm) **B:** 8.93 in. (22.68 cm) **C:** 5.87 in. (14.90 cm) **Depth:** 2.5 in. (6.4 cm) **Weight:** 1.8 lbs (0.82 kg) **Mounting** **D:** 7 in. (17.78 cm) **E:** 4.89 in. (12.42 cm) **F:** 1.04 in. (2.64 cm) **G:** 1.46 in. (3.71 cm) **H:** 2.55 in. (6.48 cm) **I:** 0.58 in. (1.47 cm) **Minimum Shaft Diameter:** 3/8 in. (.95 cm) **Maximum Shaft Diameter:** 1/2 in. (1.27 cm) **Minimum Shaft Length:** 1 3/4 in. (4.45 cm)



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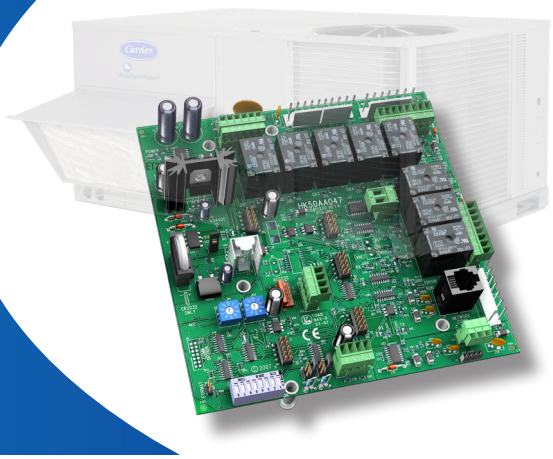
i-Vu® Building Automation System
RTU Open
Part Number: OPN-RTUM2

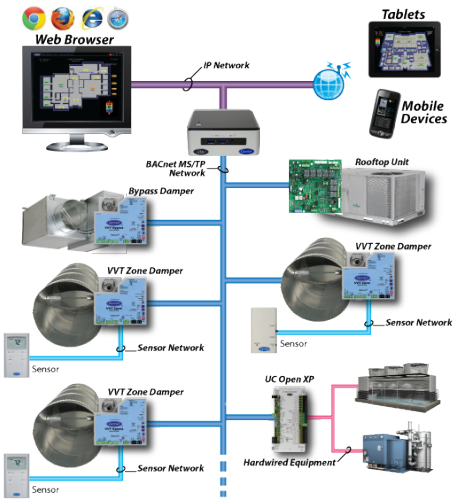


The RTU Open controller continuously monitors and regulates constant volume rooftop operation with reliability and precision. This advanced controller features a sophisticated, factory-engineered control program that provides optimum performance and energy efficiency. It also features plug-and-play connectivity to the Carrier i-Vu Building Automation System. For added flexibility, the RTU Open controller is capable of stand-alone operation, or, it can be integrated with any other Building Automation System utilizing the BACnet, Modbus®, LonWorks®, or N2 protocols.

Application Features

- Controls up to 2 stages of DX cooling (3 stages for 48/50 LC WeatherExpert®) to maintain space temperature setpoint
- Controls up to 2 stages of gas heat or combination of mechanical and electric heat to maintain space temperature setpoint (controls up to 4 stages of heat in heat pump mode)
- Integrated economizer[2] and power exhaust control provide optimized free cooling in combination with mechanical cooling
- 2 fan speed control options provide maximum energy savings and comfort
- Built-in advanced control routines for zone level humidity control or zone level demand control ventilation (ASHRAE 62)

The i-Vu Building Automation System



Hardware Features

- Can be factory-installed on Carrier WeatherExpert®, WeatherMaster®, and WeatherMaker® packaged rooftop units
- Can be field-installed on constant volume rooftop units; wiring harnesses (sold separately), provide quick field installation
- Integrates easily into any BAS using BACnet, Modbus, LonWorks[1], or N2 protocols
- On-board hardware clock, remote occupancy input, and support for Carrier communicating room sensors/ thermistor sensors provide stand-alone operation
- Easy startup and configuration with i-Vu User interfaces

System Benefits

- Integrated Carrier airside linkage algorithm for plug-and-play integration with the Carrier VVT® System
- Fully plug-and-play with the Carrier i-Vu Building Automation System
- Supports demand limiting for maximum energy savings
- Compatible with i-Vu Tenant Billing for tracking tenants' after-hours energy usage
- Performance and utilization runtime data stored locally on the controller for system analysis
- Includes multi-protocol support to integrate into BACnet, Modbus, N2 or LonWorks[1]

[1]LonWorks: Requires LON Option Card (part number LON-OC).
[2]Fault Detection and Diagnostics included as part of California Building Energy Efficiency Standard Title 24 Part 6.

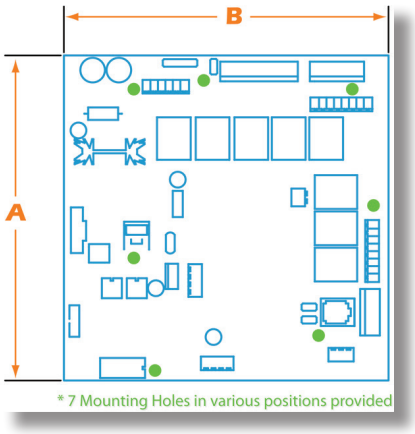
i-Vu® Building Automation System

RTU Open

Part Number: OPN-RTUM2

Specifications

BACnet Support	Advanced Application Controller (B-AAC), as defined in BACnet 135-2004 Annex L, Protocol rev 9
Communication Ports	**Network Comm port:** EIA-485 port for BACnet MS/TP or ARCNET 156 kbps, Modbus RTU, or N2 communications (protocol and baud rate are DIP switch selectable) **Comm Option port:** For connecting a LON Option Card **Local Access port:** For system start-up and troubleshooting (115.2 kbps) **Rnet port:** For connecting Carrier communicating room sensors and Carrier's touchscreen user interface
Inputs	**6 analog inputs:** 4 analog inputs dedicated to Space Temperature, Setpoint Adjust, Supply Air Temperature, and Outside Air Temperature. 2 others configurable for the following functions: Indoor Air Quality, Outdoor Air Quality, or Relative Humidity. AIs have 10 bit A/D resolution. **5 binary inputs:** 1 dedicated to Safety Chain Feedback, 4 others configurable for the following functions: Compressor Safety, Fire Shutdown, Enthalpy Switch, Humidistat, Supply Fan Status, Filter Status, Remote Occupancy, IGC Override (gas only), and Door Contact
Outputs	**8 binary outputs:** Supply Fan, Cool Stage 1, Cool Stage 2, Heat Stage 1, Heat Stage 2, Power Exhaust, Rev Valve/High Fan/Cool Stage 3, and Dehumidification. Relay contacts rated at 3A max @ 24VAC **2 analog outputs:** Economizer and Fan Speed (VFD). AOs have 10 bit D/A resolution.
Protection	Incoming power and network connections are protected by non-replaceable internal solid-state polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, input, and output connections are also protected against voltage transient and surge events.
Real Time Clock	Battery-backed real time clock keeps track of time in event of power failure
Battery	10-year Lithium CR2032 battery: a min of 10,000 hours of trend data/time retention during power outages
Status Indicators	LED status indicators for network communications, run status, error, power, and all digital outputs
Controller Addressing	Rotary dip switches set BACnet MS/TP or ARCNET, Modbus, or N2 address of controller
Listed by	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012
Environmental	**Operating & Storage:** -40 to 158ºF (-40 to 70ºC) 10 to 95% RH, non-condensing
Power Requirements	24VAC ± 10%, 50 to 60Hz, 20 VA power consumption, single Class 2 source only, 100 VA or less
Dimensions	**Overall** **A:** 6.5 in. (16.5 cm) **B:** 6.5 in. (16.5 cm) **Depth:** 2.5 in. (6.35 cm) **Weight:** .74 lbs (.34 kg) **Mounting** (*) 7 mounting positions in various positions provided



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Controls Expert Locator:
www.carrier.com/controls-experts

Carrier

i-Vu® Building Automation System

UC Open XP

Part Number: OPN-UCXP

The UC Open XP controller provides auxiliary building control to interface with air handlers, chiller plants, hot water systems, lighting, and other HVAC equipment. The UC Open XP's factory-engineered control programs provide simple building integration for commercial applications with 24 I/O point capability. The UC Open XP also provides support for 24 additional I/O points through the use of the UC Open XP IO Expander. When combined, these controllers can support up to 48 total I/O points for even greater flexibility.

Application Features

- Comprehensive library of factory-engineered control programs available for air and water systems, including: CV and VAV AHU control, WSHP loop control (boilers/towers/pumps), chiller plant control, hot water systems, lighting control, metering, and network data sharing
- Supports Snap graphical programming for creating customized control programs
- Supports Carrier communicating room sensors, which allow for local setpoint adjustment and local overrides

Hardware Features

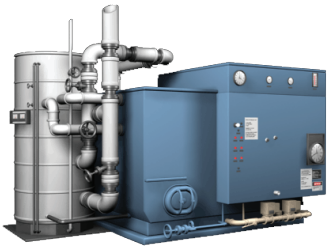
- Battery-backed real time clock keeps time in the event of power failure
- Supports up to 48 I/O points with UC XP IO expander
- Native BACnet MS/TP or ARCNET communications

System Benefits

- Integrated Carrier linkage algorithm for plug-and-play integration with Carrier systems
- Fully plug-and-play with the Carrier i-Vu Building Automation System
- Supports demand limiting for maximum energy savings

Sample Applications

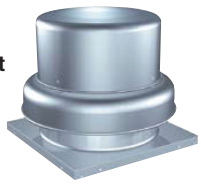
AHUs



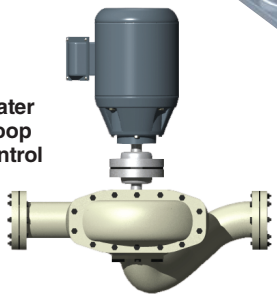
Boilers

Lighting

Exhaust Fans



Water Loop Control



Electric Meters

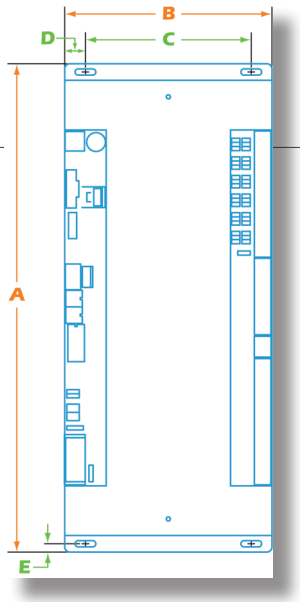
i-Vu® Building Automation System

UC Open XP

Part Number: OPN-UCXP

Specifications

BACnet Support	Advanced Application Controller (B-AAC), as defined in BACnet 135-2001 Annex L Protocol rev. 9
Communication Ports	**BACnet port:** EIA-485 port for BACnet MS/TP (baud rate is DIP switch selectable) or ARCNET 156 Kbps **Local Access port:** For system start-up and troubleshooting (115.2 kbps) **Rnet port:** For connecting Carrier communicating room sensors and Carrier's touchscreen user interface.
Inputs	**12 inputs:** Configurable for 0-10V, RTD/Thermistor/Dry contact, or 0-20mA. Inputs 1 and 2 may be used for pulse counting. All analog inputs have 12 bit A/D resolution.
Outputs	**6 binary outputs:** Configured as dry contact, normally open or normally closed. All binary outputs must be powered from a Class 2 power source. **6 analog outputs:** 1 and 2 are configurable for 0-10V or 0-20mA; 3-6 are 0-10V only. Analog outputs have 8 bit D/A resolution.
Protection	Incoming power and network connections are protected by non-replaceable internal solidstate polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, input, and output connections are also protected against voltage transient and surge events.
Real Time Clock	Battery-backed real time clock keeps track of time in event of power failure
Battery	10-year Lithium CR2032 battery: a min of 10,000 hours of trend data/time retention during power outages
Status Indicators	LED status of power, running, and errors. LED indicators for transmit/receive for BACnet port and for each of the 12 outputs
Controller Addressing	Rotary DIP switches set BACnet MS/TP or ARCNET MAC address of controller
Listed by	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012
Environmental Operating Range	**Operating:** -0 to 140°F (-18 to 60°C), 10–90% relative humidity, non-condensing **Storage:** -24 to 140°F (-30 to 60°C), 10–90% relative humidity, non-condensing
Power Requirements	24VAC ± 10%, 50-60Hz 20 VA power consumption 26VDC (25V min, 30V max) Single Class 2 source only, 100 VA or less
Dimensions	**Overall** **A:** 11-13/16 in. (30 cm) **B:** 5 in. (12.7 cm) **Mounting** **C:** 1/2 in. (1.3 cm) **D:** 4 in. (10.2 cm) **E:** 13/64 in. (.5 cm) **Depth:** 2 in. (5.1 cm) **Weight:** 1.1 lbs (0.50 kg)



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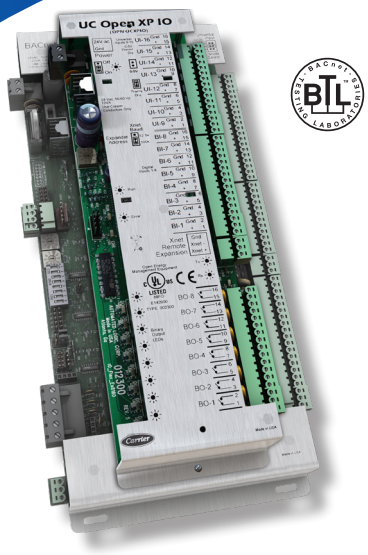
Carrier

i-Vu® Building Automation System

UC Open XP IO

Part Number: OPN-UCXPIO



The UC Open XP IO expander adds additional I/O point capacity to the UC Open XP Controller. These controllers provide auxiliary building control to interface with air handlers, chiller plants, hot water systems, lighting, and other HVAC equipment. The UC Open XP's factory-engineered control programs provide simple building integration for commercial applications with 24 I/O point capability. When the UC Open XP IO expander is added to the UC Open XP controller, up to 24 additional I/O points are available. Together, these controllers support up to 48 total I/O points for even greater flexibility.

Application Features

- Comprehensive library of factory-engineered control programs available for air and water systems, including: CV and VAV AHU control, WSHP loop control (boilers/towers/pumps), chiller plant control, hot water systems, lighting control, metering, and network data sharing
- Supports Snap graphical programming for creating customized control programs
- Supports Carrier communicating room sensors, which allow for local setpoint adjustment and local overrides

Hardware Features

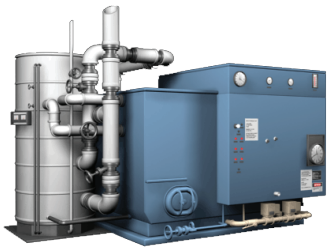
- Expands the UC Open XP Controller to support up to 48 I/O points
- Removable screw terminals for I/O connections
- Versatile mounting options: may be mounted directly onto the UC Open XP enclosure or separately within the mounting enclosure

System Benefits

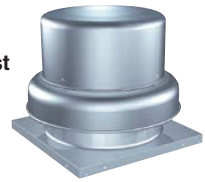
- Integrated Carrier linkage algorithm for plug-and-play integration with Carrier systems
- Fully plug-and-play with the Carrier i-Vu Building Automation System
- Supports demand limiting for maximum energy savings

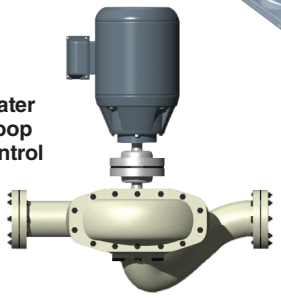
Sample Applications


AHUs


Boilers


Lighting


Exhaust Fans


Water Loop Control

Electric Meters

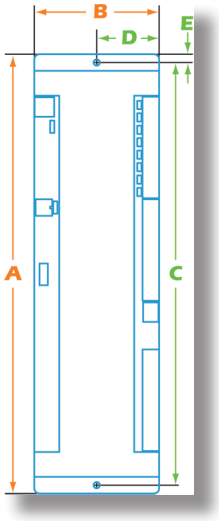
i-Vu® Building Automation System

UC Open XP IO

Part Number: OPN-UCXPIO

Specifications

Communication Ports	Xnet Remote Expansion port: For connecting to a UC XP Controller via the Xnet network
Inputs	**8 binary inputs:** Inputs 1-8 are binary only and support pulse counting up to 10 Hz. **8 analog inputs:** Inputs 9-16 are universal inputs, jumper selectable between thermistor/dry contact and 0 - 5VDC. All analog inputs have 10 bit A/D resolution.
Outputs	**8 binary outputs:** Configured as dry contact, normally open, and must be powered from a Class 2 power source.
Protection	Incoming power and network connections are protected by non-replaceable internal solidstate polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, input, and output connections are also protected against voltage transient and surge events
Status Indicators	LED status of power, outputs, running, and errors
Listed by	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012
Environmental Operating Range	**Operating:** 0° to 140°F (-18° to 60°C); 10 to 90% relative humidity, non-condensing **Storage:** -24° to 140°F (-30° to 60°C); 10 to 90% relative humidity, non-condensing
Power Requirements	24VAC ± 10%, 50-60Hz 13 VA power consumption 26VDC (25V min, 30V max) Single Class 2 source only, 100 VA or less
Dimensions	**Overall** **A:** 10-5/8 in. (26.9 cm) **B:** 3 in. (7.6 cm) **Mounting** **C:** 10-3/16 in. (25.9 cm) **D:** 1-1/2 in. (3.8 cm) **E:** 13/64 in. (.5 cm) **Depth:** 1-1/2 in. (3.8 cm) **Weight:** 0.73 lbs (0.33 kg)



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5 Programmable Controllers – BACnet IP

5 Programmable Controllers – BACnet IP

Carrier

TruVu

i-Vu® Building Automation System

TruVu™ MPC Processor

Part Number: TV-MPCXP

The Carrier® TruVu™ MPC Processor provides multi-purpose monitoring and control for a variety of HVAC system applications. Flexible and versatile, it supports multiple I/O configurations for accomplishing both common and custom HVAC control strategies.

i Vu

The TruVu MPC Processor features built-in routing and integration capabilities, along with support for up to nine TruVu MPC I/O expansion modules and a total of 180 input/output points.

Application Features

- Comprehensive library of factory-engineered control programs available for complete air-side and water-side system control
- Graphically programmable using the Snap programming tool
- Supports Carrier communicating room sensors, which allow for local setpoint adjustment and local overrides

Hardware Features

- Gig-E 1000 Mbps Ethernet port supports BACnet/IP, Modbus TCP/IP and DHCP addressing
- Local access 10/100 Ethernet port for system startup and troubleshooting
- Real-time clock keeps time in the event of power failure for up to 3 days without batteries
- Capable of system or stand-alone operation
- Can be din-rail or screw mounted
- Supports native BACnet MSTP and Modbus communications
- Supports up to 9 TruVu MPC I/O expanders (any combination of TV-MPCXPIO48, TV-MPCXPIO812 or TV-MPCXPIO012) and/or up to 6 legacy MPC Open XPIO expanders (max 9 total)

System Benefits

- Fully plug-and-play with the Carrier i-Vu building automation system
- Supports demand limiting and optimal start for maximum energy savings
- Supports up to 1,500 third-party BACnet points and up to 200 Modbus points for system integration
- Supports BACnet Foreign Device Registration (FDR)

BACnet Features

- BACnet Testing Laboratories (BTL) certified
- Conforms to the BACnet Building Controller (B-BC), BACnet Router (B-RTR), and BACnet BBMD (B-BBMD), standard device profiles
- Supports BACnet interoperability and routing with and between BACnet/IP and BACnet MS/TP
- Can serve as a BACnet Broadcast Management Device (BBMD)
- Supports BACnet Foreign Device Registration (FDR)

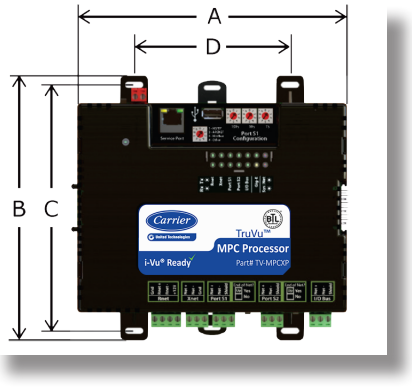
i-Vu® Building Automation System

TruVu™ MPC Processor

Part Number: TV-MPCXP

Specifications

BACnet Support	Conforms to the BACnet Building Controller (B-BC), BACnet Router (B-RTR), and BACnet BBMD (B-BBMD) device profiles as defined in BACnet 135-2012 Annex L, Protocol Revision 14
Communication Ports	**Gig-E:** 10/100/1000 BaseT Ethernet port for BACnet/IP and/or BACnet/Ethernet and/or Modbus TCP/IP communication **S1 MSTP:** High-speed EIA-485 port with End of Net switch for connecting one of the following: • BACnet MS/TP network at 9.6, 19.2, 38.4, 57.6, 76.8, or 115.2 kbps • Modbus RTU at 9.6, 19.2, 38.4, 57.6, 76.8 or 115.2 kbps **S2 MSTP:** Electrically isolated EIA-485 port with End of Net switch for connecting one of the following • BACnet MS/TP network at 9.6, 19.2, 38.4, 57.6, , 76.8, or 115.2 kbps • Modbus RTU at 9.6, 19.2, 38.4, 57.6, 76.8 or 115.2 kbps **Service:** 10/100 Base T Ethernet port for system start-up and troubleshooting; IO Bus port: Provides communication for wired TruVu MPC I/O expanders that are powered by external power supplies; **IO Bus edge connector:** 6-pin connector that provides communication and power to a directly-connected TruVu MPC I/O expander
Third Party Integration	Supports up to 1,500 third-party BACnet points and 200 Modbus points (memory dependent).
Physical	Fire-retardant plastic ABS, UL94-5VA
I/O Expanders	Supports up to 9 TruVu MPC I/O expanders and/or 6 MPC Open XPIO expanders (max 9 total)
Protection	Two fast acting, 5mm x 20mm glass fuses: • A 2A fuse for the TV-MPCXP's power • A 4A fuse for the I/O bus edge connector. The power and network ports comply with the EMC requirements EN50491-5-2.
Compliance	**United States**: FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ**: RCM Mark AS/NZS 61000-6-3; **Canada**: UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Real Time Clock	Real-time clock keeps track of time in the event of a power failure for up to 3 days
Environmental Operating Range	**Operating:** -40 to 158ºF (-40 to 70ºC) 10 to 95% RH, non-condensing
Power Requirements	24VAC ± 10%, 50-60Hz; 50 VA power consumption; 26VDC ± 10% 15W; Single Class 2 source only, 100 VA or less
Dimensions	**Overall** **A:** 7.1 in. (18.03 cm) **B:** 6.95 in. (17.65 cm) **Mounting** **C:** 6.45 in. (16.38 cm) **D:** 4.1 in. (10.4 cm) **Depth:** 2.09 in. (5.31 cm) **Weight:** 1 lb (0.45 kg)



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TruVu

i-Vu® Building Automation System

TruVu™ MPC I/O Expanders

Part Numbers: TV-MPCXPIO48, TV-MPCXPIO812, TV-MPCXPIO012

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The Carrier® TruVu™ MPC I/O expanders provide I/O point capacity for the TruVu MPC Processor and TV-MPCXP1628. Flexible and versatile, the TruVu MPCXP controllers support multiple I/O configurations for accomplishing both common and custom HVAC control strategies.

Application Features

- Comprehensive library of factory-engineered control programs available for complete air-side and water-side system control
- Graphically programmable using the Snap programming tool

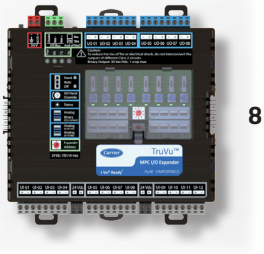
Hardware Features

- Adds up to 180 I/O points to the TruVu MPC Processor and TV-MPCXP1628
- Removable screw terminals for I/O connections
- Supports din-rail or screw tab mounting
- Hand-Auto-Off switches on all output channels
- Software selectable configuration - no jumpers
- Expanders can be mounted to MPC processor in a compact configuration or remotely mounted up to 1000 feet away

System Benefits

- Fully plug-and-play with the Carrier i-Vu® building automation system
- Supports demand limiting and optimal start for maximum energy savings
- Compatible with i-Vu Tenant Billing for tracking tenants' after-hours energy usage

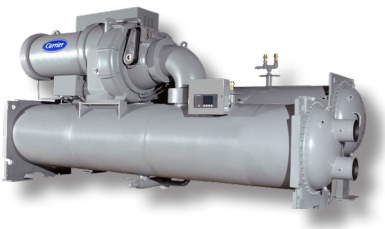
TV-MPCXPIO48
4 outputs & 8 inputs
12 points total



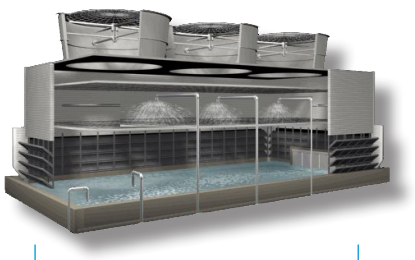
TV-MPCXPIO812
8 outputs & 12 inputs
20 points total

TV-MPCXPIO012
12 inputs
12 points total

AHUs



Chillers



Cooling Towers

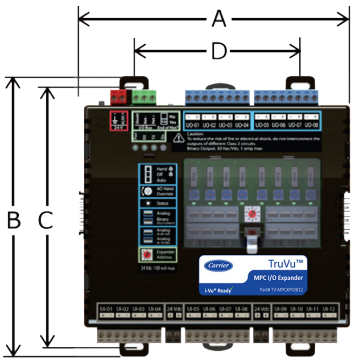
i-Vu® Building Automation System

TruVu™ MPC I/O Expanders

Part Numbers: TV-MPCXPIO48, TV-MPCXPIO812, TV-MPCXPIO012

Specifications

Communication Ports	**IO Bus port:** Provides communication for wired TruVu MPC I/O expanders that are powered by external power supplies. **IO Bus edge connector:** 6-pin connector that provides communication and power to a directly-connected TruVu MPC I/O expander
Inputs	**TV-MPCXPIO48:** 8 inputs **TV-MPCXPIO812:** 12 inputs **TV-MPCXPIO012:** 12 inputs -Inputs software configurable for 0-5 VDC, 0-10 VDC, 0-20 mA, thermistor (5k, 10k Type II), 1k RTD (Platinum,Nickel, or Balco), and Dry Contact. -Inputs are 16 bit A/D and support up to 60 pulses per second (8.33 msec per pulse).
Outputs	**TV-MPCXPIO48:** 4 outputs **TV-MPCXPIO812:** 8 outputs - Outputs can be set as analog or binary outputs. - Analog outputs can be used for 0-10 VDC, 0-20 mA (12 bit A/D). - Binary outputs have a built-in relay and can be used to switch external devices or relays up to 1A, 30Vac/Vdc. - HAO (hand/auto/off) switches are on each output, including potentiometers for manual adjustment of analog outputs.
Protection	Two fast acting, 5mm x 20mm glass fuses: -A 2A fuse for the TV-MPCXPIO expander's power -A 4A fuse for the I/O bus edge connector -The power and network ports comply with the EMC requirements EN50491-5-2.
Status Indicators	LED status of communications, power, running, errors, and outputs
Compliance	**United States**: FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ**: RCM Mark AS/NZS 61000-6-3; **Canada**: UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Environmental Operating Range	**Operating:** -40 to 158ºF (-40 to 70ºC) 10 to 95% RH, non-condensing
Power Requirements	24VAC ± 10%, 50-60Hz 50 VA power consumption 26VDC ± 10% 12W
Dimensions	**Overall** **A:** 6.9 in. (17.53 cm) **B:** 6.95 in. (17.65 cm) **Mounting** **C:** 6.45 in. (16.38 cm) **D:** 4.1 in. (10.4 cm) **Depth:** 2.09 in. (5.31 cm) **Weight:** 1.1 lbs (0.49 kg)



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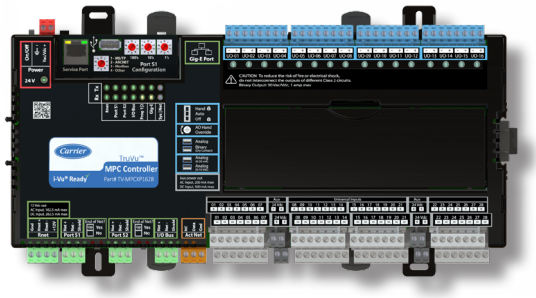

i-Vu® Building Automation System

TruVu™ MPCXP1628 Controller

Part Numbers: TV-MPCXP1628, TV-MPCXP1628-NR

i Vu

The Carrier® TruVu™ MPCXP1628 controller provides multi-purpose monitoring and control for a variety of HVAC system applications. Flexible and versatile, it supports multiple I/O configurations for accomplishing both common and custom HVAC control strategies.

The TruVu MPCXP1628 controller features built-in routing and integration capabilities, 44 universal I/O points, and support for up to nine TruVu MPC I/O expansion modules for a total of 224 hardware control points.

The TruVu MPCXP1628-NR controller has the same features as the TruVu MPCXP1628, but does not support BACnet routing.

Application Features

- Comprehensive library of factory-engineered control programs available for complete air-side and water-side system control
- Graphically programmable using the Snap programming tool
- Supports Carrier communicating room sensors, which allow for local setpoint adjustment and local overrides

Hardware Features

- Gig-E 1000 Mbps Ethernet port supports BACnet/IP, Modbus TCP/IP and DHCP addressing
- Local access 10/100 Ethernet port for system startup and troubleshooting
- Real-time clock keeps time in the event of power failure for up to 3 days without batteries
- Capable of system or stand-alone operation
- Can be din-rail or screw mounted
- Supports up to 9 TruVu MPC I/O expanders (any combination of TV-MPCXPIO48, TV-MPCXPIO812 or TV-MPCXPIO012)
- Act Net bus supports up to 16 communicating i-Vu smart valves

System Benefits

- Fully plug-and-play with the Carrier i-Vu building automation system
- Supports demand limiting and optimal start for maximum energy savings
- Supports up to 1,500 third-party BACnet points and up to 200 Modbus points for system integration

BACnet Features

- Conforms to the BACnet Building Controller (B-BC), BACnet Router (B-RTR, not applicable to -NR version), and BACnet BBMD (B-BBMD), standard device profiles
- Supports BACnet interoperability and routing with and between BACnet/IP, and BACnet MS/TP
- Can serve as a BACnet Broadcast Management Device (BBMD)
- Supports BACnet Foreign Device Registration (FDR)

i-Vu® Building Automation System

TruVu™ MPCXP1628 Controller

Part Numbers: TV-MPCXP1628, TV-MPCXP1628-NR

Specifications

BACnet Support	Conforms to the BACnet Building Controller (B-BC), BACnet Router (B-RTR, not applicable to -NR version), and BACnet BBMD (B-BBMD) device profiles as defined in in BACnet 135-2012 Annex L Protocol Revision 14
Communication Ports	**Gig-E:** 10/100/1000 BaseT Ethernet port for BACnet/IP and/or BACnet/Ethernet and/or Modbus TCP/IP communication **S1 MSTP:** High-speed EIA-485 port with **End of Net** switch for connecting one of the following: • BACnet MS/TP network at 9600 to 115.2 kbps • Modbus RTU at 9600 to 115.2 kbps **S2 MSTP:** Electrically isolated EIA-485 port with **End of Net** switch for connecting one of the following: • BACnet MS/TP network at 9600 to 115.2 kbps or Modbus RTU at 9600 to 115.2 kbps **Service:** 10/100 Base T Ethernet port for system start-up and troubleshooting and for connecting to TruVu EQT2 touch screens **IO Bus port:** Provides communication for wired TruVu MPC I/O expanders **IO Bus edge connector:** 6-pin connector that provides communication and power to a directly-connected TruVu MPC I/O expander **ActNet:** Communication port for connecting up to 16 smart actuators / valves **Rnet:** For connecting Carrier communicating room sensors and Carrier's touchscreen user interface
Third Party Integration	Supports up to 1,500 third-party BACnet points and 200 Modbus points (memory dependent).
Physical	Fire-retardant plastic ABS, UL94-5VA
Universal Inputs	**16 Bit A/D** with 28 channels electronically configured to any of the following input types: **Dry Contact** OR **Pulse Counting** inputs up to 60Hz OR **Voltage** (0-10 Vdc) OR **Current** (0-20 mA) OR **Thermistor** (Precon Type II 10kΩ OR Precon Type III 10kΩ OR Carrier YSI 5kΩ OR S-5700-850 10kΩ w/ 11kΩ shunt) OR **RTD** (Platinum RTD TS-8000 1kΩ @ 32°F (0.00385 TCR) OR Platinum RTD 1kΩ @ 32°F (0.00375 TCR) OR Nickel-iron RTD 1kΩ @ 70°F, 699 Ω @ -40°F OR Balco (Nickel-iron) TS8000 RTD 1kΩ @ 70°F, 779 Ω @ -40°F) **24VDC auxiliary sensor power:** 200mA max. (AC power input) 500 mA max. (DC power input)
Universal Outputs	D/A Resolution (analog out) 12 bits; 16 channels configurable to any of the following output types: **Voltage** (0-10 Vdc) OR **Current** (0-20 mA) OR **Relay contacts**, potential free, normally open, rated 24VAC/DC @ 1 Amp (resistive) Hand/Auto/Off override switches for all outputs, Potentiometer for manual adjustment of all analog outputs, Status LED for all outputs
Protection	Two fast acting, 5mm x 20mm glass fuses: • A 2.5A fuse for the TV-MPCXP1628's power • A 4A fuse for the I/O bus edge connector The power and network ports comply with the EMC requirements EN50491-5-2.
Compliance	**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE** Mark Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA** Mark compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and and RoHS for Electrical and Electronic Equipment 2012.
Real Time Clock	Real-time clock keeps track of time in the event of a power failure for up to 3 days.
Environmental Operating Range	**Operating:** -40 to 158ºF (-40 to 70ºC) 10 to 95% RH, non-condensing
Power Requirements	24VAC ± 15%, 50-60Hz; 100 VA power consumption; 24VDC ± 10% 48W; Single Class 2 source only, 100 VA or less
Dimensions	**Overall: Length:** 12.75 in. (32.38 cm) **Width:** 6.95 in. (17.68 cm) **Depth:** 2.09 in. (5.31 cm) **Mounting:** DIN rail or screw **Weight:** 2.80 lbs (1.3 kg)

For more information, contact your local Carrier Controls Expert.

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Carrier

TruVu

i-Vu® Building Automation System
TV-UC253-V
Advanced Application Controller

The TruVu Advanced Application Controller is ideal for HVAC equipment control, advanced air quality control and most zone-level applications. The TV-UC253-V features a built-in flow sensor, dual Ethernet ports with built-in fail-safe that supports direct connection or daisy chain topologies using BACnet/IP and 10 points of onboard control. Designed to operate in a wide range of environmental conditions, it is well suited for mechanical rooms, equipment boxes, or almost any other weather-tight location.

i Vu

Application Features

- Versatile controller suitable for a variety of applications, including: small AHUs, fan coils, exhaust fans
- Standard library of control programs available for most unitary equipment and zone applications
- Supports Snap graphical programming software
- Supports Carrier communicating sensors, which are available in a variety of zone and equipment sensing combinations
- Supports Carrier TruVu touchscreen interfaces for managing and troubleshooting the connected equipment easily and for occupant engagement
- Supports live, visual displays of control logic, which uses real time operational data and aids in optimizing and troubleshooting system operations

Hardware Features

- Dual 10/100 Mbps, BACnet IP and IP addressing
- Supports home run, daisy chain and ring IP network topologies
- Capacitor-backed real-time clock keeps time in the event of power failure or network interruption for at least three days
- Integral airflow sensor
- USB port for local device updates, hard-wired, and wireless service connections
- DIN rail or screw mounting

System Features

- Connects seamlessly to the i-Vu building automation system

i-Vu Building Automation System
TV-UC253-V

pecifications

BACnet Comformance		Conforms to the BACnet Advanced Application Controller (B-AAC) and BACnet Broadcast Management Device (B-BBMD) standard device profiles, as defined in BACnet 135-2001 2012 Annex L Protocol Rev 14
Power		24Vac +/- 15% , 50 - 60Hz, 55VA | 24Vdc +/- 10%, 20W. (80VA / 35W if additional Act Net devices are connected)
Communication	BAS Primary port	Dual 10/100 BaseT Ethernet ports with built-in fail safe, supporting direct connection or daisy chain topology natively using BACnet/IP (non-routing)
	Rnet port	12Vdc @ 260mA Supports the following: Up to 5 ZS sensors (freely mix ZS zone, ZS duct, ZS immersion and ZS outdoor sensors), iVu Equipment Touch, or TruVu ET Displays (external power required)
	Act Net port	Supports up to 5 Act Net communicating devices such as the i-Vu Smart Valves and Smart Damper Kit
	USB Service port	For TruVu ET Display support |configuration | wireless service access | firmware updates and controller recovery via USB drive
	USB Expansion port	For support of comm expansion devices (future)
Inputs	Universal	5 Universal Inputs electronically configurable to any of the following types: Dry | Pulse Counting |Thermistor | 0-10 Vdc
	Auxiliary Power	24Vdc @ 100mA total current capacity
Integral Airflow Sensor		Precision differential pressure sensor 0–2 in. H2O, sensitive down to ±0.001 in. H2O. Barbed tapered airflow connections accept 3/16 in. (4.75 mm) I.D. tubing. Allows for readings across the 0–2in. H2O range, accurate to ±5% of full flow at 2 in. H2O
Outputs	Universal output	1 Output selectable to 0–10 Vdc (20 mA max), 12 Vdc 80 Hz PWM, or (Dry Contact) Rated @24VAC 1 Amp
	Analog Output	2 Analog Outputs 10Vdc @ 20mA max (D/A Resolution 12 bits)
	Digital output	2 Digital outputs (Dry Contact) Rated @24Vac/Vdc 1 Amp. Configured normally open
Memory		4 GBs eMMC Flash memory and 256 MB DDR3 DRAM. User data is archived to non-volatile flash memory when parameters are changed, every 90 seconds
Real Time Clock		Real-time clock keeps track of time in the event of a power failure for at least 3 days
Compliance		**United States**: FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ**: RCM Mark AS/NZS 61000-6-3; **Canada**: UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Plastic Rating		Fire-retardant plastic ABS, UL94-5VA
Environmental		Operating Range: -22 to 158°F (-30 to 70°C), 10-95% RH, non-condensing Storage: -40 to 158°F (-40 to 70°C), 10-95% RH, non-condensing

Physical

Minimum panel depth: 2.75 in. (7 cm)

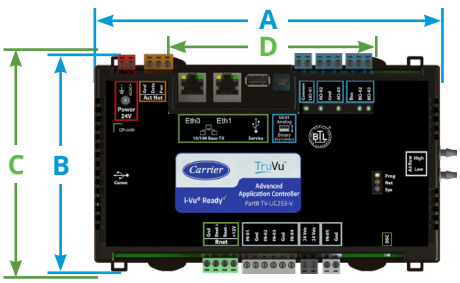
Dimensions:

Overall

A: 7.785 in. (19.77 cm)
B: 4.89 in. (12.43 cm)
Depth: 2.00 in. (5.09 cm)
Weight: 1.6 lb. (0.82 kg)

Screw Mounting

C: 6.45 in (16.38 cm) (fully extended)
D: 4.5 in. (11.43 cm)



DIN rail or Screw mounting

For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

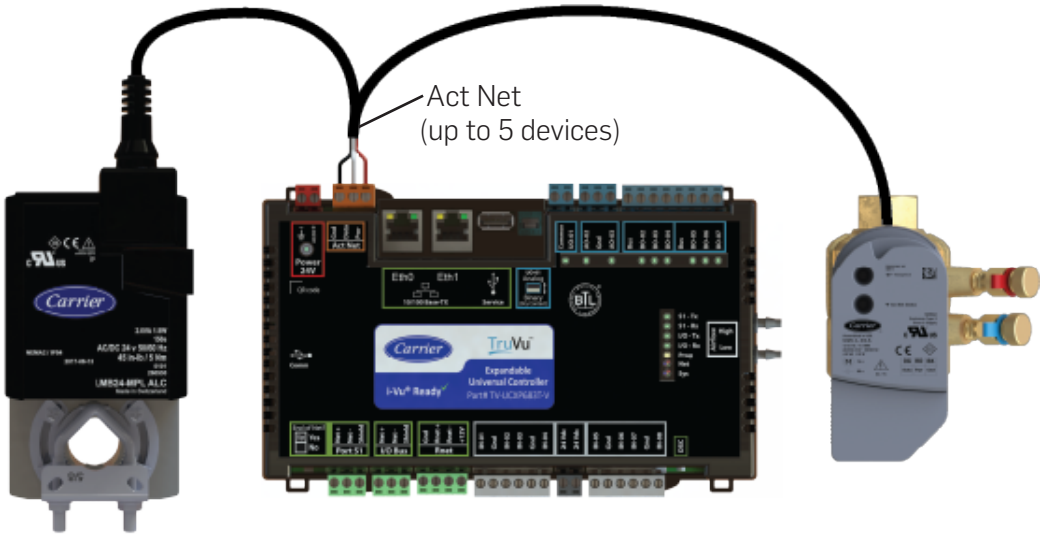
i-Vu® Building Automation System
DMPR-KIT-C
TruVu™ Damper Kit

The TruVu damper kit is used in conjunction with a TruVu controller in HVAC systems to control dampers. By utilizing an Act Net communication signal, the actuator places the damper at any point between fully open and fully closed. A critical element of an HVAC system, proper actuators ensure that zone dampers function properly and air flows properly to the zone.

SKU	Description
DMPR-KIT-C	Carrier Act Net communicating damper actuator for use with TruVu controllers. Each kit includes: • 1 Actuator Motor assembly with cable and plug • 1 Universal Mounting Bracket • 1 Male Act Net connector P/N 130135

Key Features

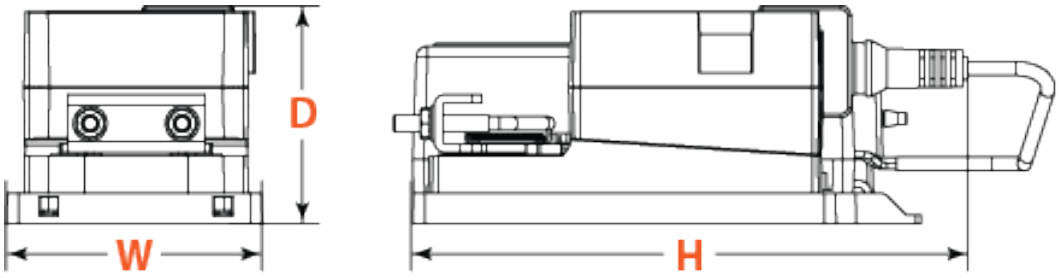
- 45 inch-pound (5 Nm) torque rating that can be mounted up to a maximum distance of 300 feet from the controller
- Brushlesss DC motor with overload protection provides reliable operation
- Connects seamlessly to TruVu controllers via the Act Net port (up to 5 devices)
- Receives power and control communication from the TruVu controllers



i-Vu Building Automation System
PART #: DMPR-KIT-C

Specifications

Power	Damper Kit receives power from the TruVu controller over the Act Net bus
Consumption in Operation	1.5 W
Consumption in Rest Position	0.2 W
Actuator	Belimo brushless DC motor, torque 45 inch-pounds (5 Nm), runtime 154 seconds
Noise level, motor	35 dB(A)
Actuator Override	External push button, or software
Operating Conditions	32 to 130°F (0 to 54.4°C), 10–90% relative humidity, non-condensing
Housing material	UL94-5VA
Agency Certifications	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU and 2014/35/EU
Weight	1.2 lb [0.53 kg]
Mounting Dimensions	4.4 in. (11.2 cm) from shaft center line to mounting hole centerline)
Overall Dimensions	**Width:** 3.0 in. (7.6 cm) **Height:** 5.9 in. (15.0 cm) **Depth:** 2.5 in. (6.4 cm)



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Carrier

TruVu

i-Vu® Building Automation System
TV-UC561
Advanced Application Controller

The TruVu™ Advanced Application Controller is ideal for HVAC equipment control, advanced air quality control and most zone-level applications. The TV-UC561 features dual Ethernet ports with built-in fail-safe that supports direct connection or daisy chain topologies using BACnet/IP and 12 points of onboard control. Designed to operate in a wide range of environmental conditions, it is well suited for mechanical rooms, equipment boxes, or almost any other weather-tight location.

i Vu

Application Features

- Versatile controller suitable for a variety of applications, including: small AHUs, fan coils, exhaust fans
- Standard library of control programs available for most unitary equipment and zone applications
- Supports Snap graphical programming software
- Supports Carrier communicating sensors, which are available in a variety of zone and equipment sensing combinations
- Supports Carrier TruVu touchscreen interfaces for managing and troubleshooting the connected equipment easily and for occupant engagement
- Supports live, visual displays of control logic, which uses real time operational data and aids in optimizing and troubleshooting system operations

Hardware Features

- Dual 10/100 Mbps, BACnet IP and IP addressing
- Supports home run, daisy chain and ring IP network topologies
- Capacitor-backed real-time clock keeps time in the event of power failure or network interruption for at least three days
- USB port for local device updates, hard-wired, and wireless service connections
- DIN rail or screw mounting

System Features

- Connects seamlessly to the i-Vu building automation system

i-Vu Building Automation System
TV-UC561

Specifications

BACnet Comformance		Conforms to the BACnet Advanced Application Controller (B-AAC) and BACnet Broadcast Management Device (B-BBMD) standard device profiles, as defined in BACnet 135-2001 2012 Annex L Protocol Rev 14
Power		24Vac +/- 15% , 50 - 60Hz, 55VA | 24Vdc +/- 10%, 20W. (80VA / 35W if additional Act Net devices are connected)
Communication	BAS Primary port	Dual 10/100 BaseT Ethernet ports with built-in fail safe, supporting direct connection or daisy chain topology natively using BACnet/IP (non-routing)
	Rnet port	12Vdc @ 260mA Supports the following: Up to 5 ZS sensors (freely mix ZS zone, ZS duct, ZS immersion and ZS outdoor sensors), iVu Equipment Touch, or TruVu ET Displays (external power required)
	Act Net port	Supports up to 5 Act Net communicating devices such as the i-Vu Smart Valves and Smart Damper Kit
	USB Service port	For TruVu ET Display support |configuration | wireless service access | firmware updates and controller recovery via USB drive
	USB Expansion port	For support of comm expansion devices (future)
Inputs	Universal	6 Universal Inputs electronically configurable to any of the following types: Dry | Pulse Counting |Thermistor | 0-10 Vdc
	Auxiliary Power	24Vdc @ 100mA total current capacity
Outputs	Universal output	1 Output selectable to 0–10 Vdc (20 mA max), 12 Vdc 80 Hz PWM, or (Dry Contact) Rated @24VAC 1 Amp
	Digital output	5 Digital outputs (Dry Contact) Rated @24Vac/Vdc 1 Amp. Configured normally open
Memory		4 GBs eMMC Flash memory and 256 MB DDR3 DRAM. User data is archived to non-volatile flash memory when parameters are changed, every 90 seconds
Real Time Clock		Real-time clock keeps track of time in the event of a power failure for at least 3 days
Compliance		**United States**: FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ**: RCM Mark AS/NZS 61000-6-3; **Canada**: UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Plastic Rating		Fire-retardant plastic ABS, UL94-5VA
Environmental		Operating Range: -22 to 158°F (-30 to 70°C), 10-95% RH, non-condensing Storage: -40 to 158°F (-40 to 70°C), 10-95% RH, non-condensing

Physical

DIN rail or Screw mounting

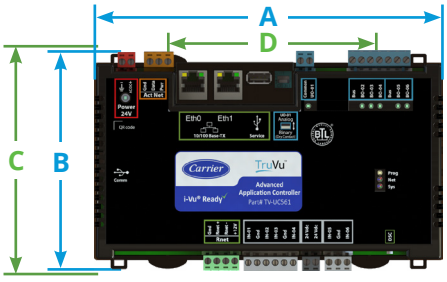
Minimum panel depth: 2.75 in. (7 cm)

Dimensions:
Overall

A: 7.785 in. (19.77 cm)
B: 4.89 in. (12.43 cm)
Depth: 2.00 in. (5.09 cm)
Weight: 1.6 lb. (0.82 kg)

Screw Mounting

C: 6.45 in (16.38 cm) (fully extended)
D: 4.5 in. (11.43 cm)



QR code on label to provide technician with access to MAC address, serial number and technical documentation

For more information, contact your local Carrier Controls Expert.

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Carrier

TruVu

i-Vu® Building Automation System
TV-UC683T
Universal Controller

The TruVu™ Universal Controller is ideal for HVAC equipment control, advanced air quality control and most zone-level applications. The TV-UC683T features dual Ethernet ports with built-in fail-safe that supports direct connection or daisy chain topologies using BACnet/IP and 17 points of onboard control. Designed to operate in a wide range of environmental conditions, it is well suited for mechanical rooms, equipment boxes, or almost any other weather-tight location.

i Vu

Application Features

- Versatile controller suitable for a variety of applications, including: small AHUs, fan coils, exhaust fans
- Standard library of control programs available for most unitary equipment and zone applications
- Supports Snap graphical programming software
- Supports Carrier communicating sensors, which are available in a variety of zone and equipment sensing combinations
- Supports Carrier TruVu touchscreen interfaces for managing and troubleshooting the connected equipment easily and for occupant engagement
- Supports live, visual displays of control logic, which uses real time operational data and aids in optimizing and troubleshooting system operations
- Supports 50 Modbus points for system integrations

Hardware Features

- Dual 10/100 Mbps, BACnet IP and IP addressing
- Supports home run, daisy chain and ring IP network topologies
- Capacitor-backed real-time clock keeps time in the event of power failure or network interruption for at least three days
- USB port for local device updates, hard-wired, and wireless service connections
- DIN rail or screw mounting

System Features

- Connects seamlessly to the i-Vu building automation system

i-Vu Building Automation System
TV-UC683T

Specifications

BACnet Comformance		Conforms to the BACnet Advanced Application Controller (B-AAC) and BACnet Broadcast Management Device (B-BBMD) standard device profiles, as defined in BACnet 135-2001 2012 Annex L Protocol Rev 14
Power		24Vac +/- 15% , 50 - 60Hz, 55VA | 24Vdc +/- 10%, 20W. (80VA / 35W if additional Act Net devices are connected)
Communication	BAS Primary port	Dual 10/100 BaseT Ethernet ports with built-in fail safe, supporting direct connection or daisy chain topology natively using BACnet/IP (non-routing)
	Serial port 1	RS-485 port for communication with third party devices (up to 50 points). Network at 9,600 to 115,200 bps
	Rnet port	12Vdc @ 260mA Supports the following: Up to 5 ZS sensors (freely mix ZS zone, ZS duct, ZS immersion and ZS outdoor sensors), iVu Equipment Touch, or TruVu ET Displays (external power required)
	Act Net port	Supports up to 5 Act Net communicating devices such as the i-Vu Smart Valves and Smart Damper Kit
	USB Service port	For TruVu ET Display support |configuration | wireless service access | firmware updates and controller recovery via USB drive
	USB Expansion port	For support of comm expansion devices (future)
Inputs	Universal	8 Universal Inputs electronically configurable to any of the following types: Dry | Pulse Counting |Thermistor | 0-10 Vdc
	Auxiliary Power	24Vdc @ 100mA total current capacity
Outputs	Universal output	1 Output selectable to 0–10 Vdc (20 mA max), 12 Vdc 80 Hz PWM, or (Dry Contact) Rated @24VAC 1 Amp
	Analog Output	2 Analog Outputs 10Vdc @ 20mA max (D/A Resolution 12 bits)
	Digital output	6 Digital outputs (Dry Contact) Rated @24Vac/Vdc 1 Amp. Configured normally open
Memory		4 GBs eMMC Flash memory and 256 MB DDR3 DRAM. User data is archived to non-volatile flash memory when parameters are changed, every 90 seconds
Real Time Clock		Real-time clock keeps track of time in the event of a power failure for at least 3 days
Compliance		**United States**: FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ**: RCM Mark AS/NZS 61000-6-3; **Canada**: UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Plastic Rating		Fire-retardant plastic ABS, UL94-5VA
Environmental		Operating Range: -22 to 158°F (-30 to 70°C), 10-95% RH, non-condensing Storage: -40 to 158°F (-40 to 70°C), 10-95% RH, non-condensing

Physical

DIN rail or Screw mounting

Minimum panel depth: 2.75 in. (7 cm)

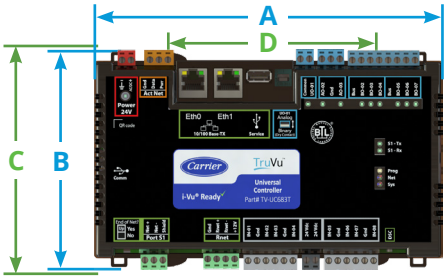
Dimensions:

Overall

A: 7.785 in. (19.77 cm)
B: 4.89 in. (12.43 cm)
Depth: 2.00 in. (5.09 cm)
Weight: 1.6 lb. (0.82 kg)

Screw Mounting

C: 6.45 in (16.38 cm) (fully extended)
D: 4.5 in. (11.43 cm)



QR code on label to provide technician with access to MAC address, serial number and technical documentation

For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

Carrier

TruVu

i-Vu® Building Automation System
TV-UCXP683T
Expandable Universal Controller

The TruVu™ Expandable Universal Controller is ideal for HVAC equipment control, advanced air quality control and most zone-level applications. The TV-UCXP683T features dual Ethernet ports with built-in fail-safe that supports direct connection or daisy chain topologies using BACnet/IP and 17 points of onboard control. Designed to operate in a wide range of environmental conditions, it is well suited for mechanical rooms, equipment boxes, or almost any other weather-tight location.

i Vu

Application Features

- Versatile controller suitable for a variety of applications, including: small AHUs, fan coils, exhaust fans
- Standard library of control programs available for most unitary equipment and zone applications
- Supports Snap graphical programming software
- Supports Carrier communicating sensors, which are available in a variety of zone and equipment sensing combinations
- Supports Carrier TruVu touchscreen interfaces for managing and troubleshooting the connected equipment easily and for occupant engagement
- Supports live, visual displays of control logic, which uses real time operational data and aids in optimizing and troubleshooting system operations
- Supports 50 Modbus points for system integrations

Hardware Features

- Dual 10/100 Mbps, BACnet IP and IP addressing
- Supports home run, daisy chain and ring IP network topologies
- Capacitor-backed real-time clock keeps time in the event of power failure or network interruption for at least three days
- I/O expander bus supports two TV-UCXP IO Expanders
- USB port for local device updates, hard-wired, and wireless service connections
- DIN rail or screw mounting

System Features

- Connects seamlessly to the i-Vu building automation system

i-Vu Building Automation System
TV-UCXP683T

Specifications

BACnet Comformance		Conforms to the BACnet Advanced Application Controller (B-AAC) and BACnet Broadcast Management Device (B-BBMD) standard device profiles, as defined in BACnet 135-2001 2012 Annex L Protocol Rev 14
Power		24Vac +/- 15% , 50 - 60Hz, 55VA | 24Vdc +/- 10%, 20W. (80VA / 35W if additional Act Net devices are connected)
Communication	BAS Primary port	Dual 10/100 BaseT Ethernet ports with built-in fail safe, supporting direct connection or daisy chain topology natively using BACnet/IP (non-routing)
	Serial port 1	RS-485 port for communication with third party devices (up to 50 points). Network at 9,600 to 115,200 bps.
	I/O Bus port	Supports up to two TV-UCXP I/O expanders
	Rnet port	12Vdc @ 260mA Supports the following: Up to 5 ZS sensors (freely mix ZS zone, ZS duct, ZS immersion and ZS outdoor sensors), iVu Equipment Touch, or TruVu ET Displays (external power required)
	Act Net port	Supports up to 5 Act Net communicating devices such as the i-Vu Smart Valves and Smart Damper Kit
	USB Service port	For TruVu ET Display support |configuration | wireless service access | firmware updates and controller recovery via USB drive
	USB Expansion port	For support of comm expansion devices (future)
Inputs	Universal	8 Universal Inputs electronically configurable to any of the following types: Dry | Pulse Counting |Thermistor | 0-10 Vdc
	Auxiliary Power	24Vdc @ 100mA total current capacity
Outputs	Universal output	1 Output selectable to 0–10 Vdc (20 mA max), 12 Vdc 80 Hz PWM, or (Dry Contact) Rated @24VAC 1 Amp
	Analog Output	2 Analog Outputs 10Vdc @ 20mA max (D/A Resolution 12 bits)
	Digital output	6 Digital outputs (Dry Contact) Rated @24Vac/Vdc 1 Amp. Configured normally open
Memory		4 GBs eMMC Flash memory and 256 MB DDR3 DRAM. User data is archived to non-volatile flash memory when parameters are changed, every 90 seconds
Real Time Clock		Real-time clock keeps track of time in the event of a power failure for at least 3 days
Compliance		**United States**: FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ**: RCM Mark AS/NZS 61000-6-3; **Canada**: UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Plastic Rating		Fire-retardant plastic ABS, UL94-5VA
Environmental		Operating Range: -22 to 158°F (-30 to 70°C), 10-95% RH, non-condensing Storage: -40 to 158°F (-40 to 70°C), 10-95% RH, non-condensing

Physical

DIN rail or Screw mounting

Minimum panel depth: 2.75 in. (7 cm)

Dimensions:
Overall

A: 7.785 in. (19.77 cm)
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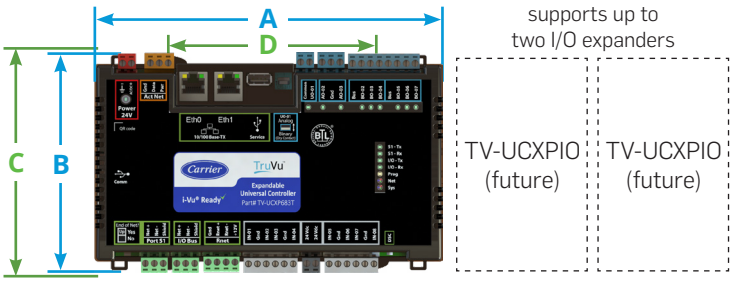

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Carrier

TruVu

i-Vu® Building Automation System
TV-UCXP683T-V
Expandable Universal Controller

i Vu

The TruVu™ Expandable Universal Controller is ideal for HVAC equipment control, advanced air quality control and most zone-level applications. The TV-UCXP683T-V features a built-in flow sensor, dual Ethernet ports with built-in fail-safe that supports direct connection or daisy chain topologies using BACnet/IP and 17 points of onboard control. Designed to operate in a wide range of environmental conditions, it is well suited for mechanical rooms, equipment boxes, or almost any other weather-tight location.

Application Features

- Versatile controller suitable for a variety of applications, including: small AHUs, fan coils, exhaust fans
- Standard library of control programs available for most unitary equipment and zone applications
- Supports Snap graphical programming software
- Supports Carrier communicating sensors, which are available in a variety of zone and equipment sensing combinations
- Supports Carrier TruVu touchscreen interfaces for managing and troubleshooting the connected equipment easily and for occupant engagement
- Supports live, visual displays of control logic, which uses real time operational data and aids in optimizing and troubleshooting system operations
- Supports 50 Modbus points for system integrations

Hardware Features

- Dual 10/100 Mbps, BACnet IP and IP addressing
- Supports home run, daisy chain and ring IP network topologies
- Capacitor-backed real-time clock keeps time in the event of power failure or network interruption for at least three days
- Integral airflow sensor
- I/O expander bus supports two TV-UCXP IO Expanders
- USB port for local device updates, hard-wired, and wireless service connections
- DIN rail or screw mounting

System Features

- Connects seamlessly to the i-Vu building automation system

i-Vu Building Automation System
TV-UCXP683T-V

Specifications

BACnet Comformance		Conforms to the BACnet Advanced Application Controller (B-AAC) and BACnet Broadcast Management Device (B-BBMD) standard device profiles, as defined in BACnet 135-2001 2012 Annex L Protocol Rev 14
Power		24Vac +/- 15% , 50 - 60Hz, 55VA | 24Vdc +/- 10%, 20W. (80VA / 35W if Act Net devices are connected)
Communication	BAS Primary port	Dual 10/100 BaseT Ethernet ports with built-in fail safe, supporting direct connection or daisy chain topology natively using BACnet/IP (non-routing)
	Serial port 1	RS-485 port for communication with third party devices (up to 50 points). Network at 9,600 to 115,200 bps.
	I/O Bus port	Supports up to two TV-UCXP I/O expanders
	Rnet port	12Vdc @ 260mA Supports the following: Up to 5 ZS sensors (freely mix ZS zone, ZS duct, ZS immersion and ZS outdoor sensors), iVu Equipment Touch, or TruVu ET Displays (external power required)
	Act Net port	Supports up to 5 Act Net communicating devices such as the i-Vu Smart Valves and Smart Damper Kit
	USB Service port	For TruVu ET Display support |configuration | wireless service access | firmware updates and controller recovery via USB drive | TruVu ET Displays
	USB Expansion port	For support of comm expansion devices (future)
Inputs	Universal	8 Universal Inputs configurable to any of the following: Dry | Pulse Counting |Thermistor | 0-10 Vdc
	Auxiliary Power	24Vdc @ 100mA total current capacity
Integral Airflow Sensor		Precision differential pressure sensor 0–2 in. H2O, sensitive down to ±0.001 in. H2O. Barbed tapered airflow connections accept 3/16 in. (4.75 mm) I.D. tubing. Allows for readings across the 0–2in. H2O range, accurate to ±5% of full flow at 2 in. H2O
Outputs	Universal output	1 Output selectable to 0–10 Vdc (20 mA max), 12 Vdc 80 Hz PWM, or (Dry Contact) Rated @24VAC 1 Amp
	Analog Output	2 Analog Outputs 10Vdc @ 20mA max (D/A Resolution 12 bits)
	Digital output	6 Digital outputs (Dry Contact) Rated @24Vac/Vdc 1 Amp. Configured normally open
Memory		4 GBs eMMC Flash memory and 256 MB DDR3 DRAM. User data is archived to non-volatile flash memory when parameters are changed, every 90 seconds
Real Time Clock		Real-time clock keeps track of time in the event of a power failure for at least 3 days
Compliance		**United States**: FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ**: RCM Mark AS/NZS 61000-6-3; **Canada**: UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE Mark** Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA Mark** compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Plastic Rating		Fire-retardant plastic ABS, UL94-5VA
Environmental		Operating Range: -22 to 158°F (-30 to 70°C), 10-95% RH, non-condensing Storage: -40 to 158°F (-40 to 70°C), 10-95% RH, non-condensing

Physical

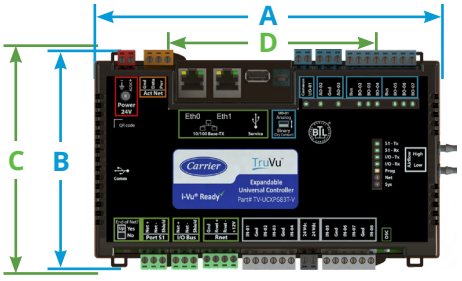
Minimum panel depth:
2.75 in. (7 cm)

Dimensions:
Overall

A: 7.785 in. (19.77 cm)
B: 4.89 in. (12.43 cm)
Depth: 2.00 in. (5.09 cm)
Weight: 1.6 lb. (0.82 kg)

Screw Mounting

C: 6.45 in (16.38 cm) (fully extended)
D: 4.5 in. (11.43 cm)



DIN rail or Screw mounting

supports up to two I/O expanders

TV-UCXPIO (future) | TV-UCXPIO (future)

For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

Carrier

TruVu

i-Vu® Building Automation System
TruVu™ Dual IP Zone Controller

Part Number: TV-VAVB3-E2

i Vu

The TruVu dual IP zone controller provides zone level control for a variety of pressure independent VAV and pressure dependent VVT applications. This completely programmable advanced controller features an integrated actuator for easy installation onto fan-powered or single-duct air terminals. It ships with Carrier factory engineered and tested applications for single zone and fan powered terminal control. The daisy chained BACnet IP communications deliver plug-and-play connectivity to the Carrier i-Vu building automation system.

Application Features

- Sophisticated factory-engineered and tested control programs provide reliability and energy efficiency
- Pressure independent space temperature, humidity and air quality control
- Supports modulating hot water, 2-position hot water, single, 2, or 3 stage electric heat, or zone perimeter heat
- Supports two simultaneous application control programs for customized application solutions
- Standard library of control programs available for most VAV equipment and zone applications
- Programmable zone level control of terminal units, fan coils, lighting, exhaust fans and more using Snap graphical programming
- Supports advanced control routines for zone level humidity control or zone level demand control ventilation (ASHRAE® 62.1)
- Supports Carrier communicating sensors which are available in a variety of zone and equipment sensing combinations
- Supports Carrier TruVu touchscreen interfaces for managing and troubleshooting the connected equipment easily and for occupant engagement
- Conforms to the BACnet Advanced Application Controller (B-AAC) Standard Device and BACnet Broadcast Management Device (B-BMD), as defined in BACnet 135-2001 2012 Annex L and tested to Protocol Revision 15

Hardware Features

- Integrated 45 in-lb 154 second actuator for reliability and longevity
- Dual 10/100 Mbps, BACnet IP and DCHP IP addressing
- Native BACnet IP or MS/TP communications
- Supports home run, daisy chain and ring IP network topologies
- Capacitor-backed real-time clock keeps time in the event of power failure or network interruption for up to three days
- Controls up to 9 points (3 binary outputs, 4 universal inputs and 2 analog output) plus up to 2 Act Net Smart Actuators
- USB port for local device updates, hard-wired, and wireless service connections
- Reversible airflow connections allows for error free tube installation

System Benefits

- Integrated Carrier airside linkage algorithm for plug-and-play integration with Carrier air sources
- Fully plug-and-play with the i-Vu building automation system
- Supports demand limiting for maximum energy savings
- Supports dual duct applications when used with Carrier's VAV Zone II secondary terminal controller

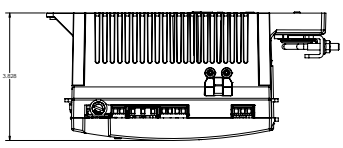
i-Vu Building Automation System

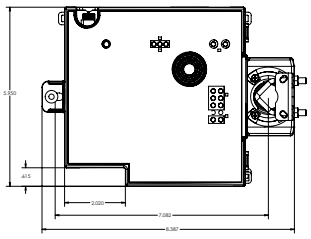
TruVu Dual IP Zone Controller

Part Number: TV-VAVB3-E2

Specifications

BACnet Support		Conforms to the BACnet Advanced Application Controller (B-AAC) and BACnet Broadcast Management Device (B-BBMD) standard device profiles, as defined in BACnet 135-2012 Annex L Protocol rev. 14
Power Requirements		24Vac +/- 15% , 50 - 60Hz, 50VA | 24Vdc +/- 10%, 18W. (75VA / 35W if additional Act Net devices are connected)
Communication	BAS Primary Port	Dual 10/100 BaseT Ethernet ports with built-in fail safe, supporting direct connection or daisy chain topology natively using BACnet/IP (non-routing)
	Serial Port 1	EIA-485 port for BACnet MS/TP communications (9600 bps to 115.2 kbps)
	Rnet Port	12Vdc @ 260mA supports the following: Up to 10 ZS sensors (mix ZS zone, ZS duct, ZS immersion and ZS outdoor sensors), i-Vu Equipment Touch, or TruVu ET Displays (external power required)
	Act Net Port	Supports up to 2 Act Net communicating i-Vu smart valves
	2 USB Ports	For TruVu ET Display support |configuration | wireless service access | firmware updates and controller recovery via USB drive
Inputs	Universal	4 Universal Inputs electronically configurable to any of the following types: Dry | Pulse Counting |Thermistor | 0-10 Vdc
Outputs	Analog	2 Analog Outputs 10Vdc (D/A Resolution 12 bits) | PWM 12Vdc @ 80Hz
	Digital	3 Digital outputs (Dry Contact) Rated @30Vac/Vdc @ 1.4 Amp. Configured normally open
Actuator		Brushless DC motor, torque 45 inch-pounds (5Nm), runtime 154 seconds for 90 degree travel during control
Integral Pressure Sensor		Precision low flow AWM series 0–2 in. H_2O, sensitive down to ±0.001 in. H_2O. Barbed tapered airflow connections accept 3/16 in. (4.75 mm) I.D. tubing. Allows for readings across the 0–2 in. H_2O range, accurate to ±3% of reading. Reversible connections
Real Time Clock		Real-time clock keeps track of time in the event of a power failure for at least 3 days
Status Indicators		LED status indicators for IP and S1 communications, run status, error, power, all outputs, and locator LEDs for controller identification and actuator rotation feedback
Memory		4 GBs eMMC Flash memory and 256 MB DDR3 DRAM. User data is archived to non-volatile flash memory when parameters are changed, every 90 seconds
Compliance		**United States:** FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed, File E143900; CCN PAZX, UL 916, Energy Management Equipment; **ANZ:** RCM Mark AS/NZS 61000-6-3; **Canada:** UL Listed File E143900, CCN PAZX7, CAN/CSA C22.2 No. 205 Signal Equip., Industry Canada Compliant ICES-003, Class A; **CE** Mark Compliant with 2014/30/EU, and RoHS Compliant: 2015/863/EU; **UKCA** Mark compliant with Electromagnetic Compatibility Regulations 2016 – Gov.UK and RoHS for Electrical and Electronic Equipment 2012.
Environmental Operating Range		**Operating:** 32 to 122ºF (0 to 50ºC) 10 to 95% RH, non-condensing **Storage:** -24 to 140ºF (-30 to 60ºC) 0 to 90% RH, non-condensing
Plastic		Fire-retardant plastic ABS, UL94-5VA
Dimensions		**Width:** 8.367 in. (21.25 cm) **Length:** 5.95 in. (15.11 cm) **Depth:** 3.828 in. (9.72 cm) **Weight:** 1.8 lbs (0.82 kg)





Minimum Shaft Diameter: 3/8 in. (.95 cm)
Maximum Shaft Diameter: 1/2 in. (1.27 cm)
Minimum Shaft Length: 1 3/4 in. (4.45 cm)

For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

6 Touchscreen Interface Panels

6 Touchscreen Interface Panels

Carrier

TruVu

i-Vu® Building Automation System
TruVu™ ET Displays

Part Numbers: EQT3-10, EQT3-7

i Vu

Carrier's TruVu equipment touch (ET) displays are an integrated component of the i-Vu building automation system. They feature illuminated color pixel touchscreens in two different sizes and connect to a single i-Vu controller. Designed for panel or wall mounting, they provide building occupants, facility managers, and technicians a powerful user interface for managing HVAC equipment in a building.

Key Features

- Available in two sizes (7" & 10")
- Rugged, industrial grade front display
- Connects to a single i-Vu controller using Rnet or Ethernet communications
- Intuitive icon-driven / website-like screen navigation
- Default system screens such as scheduling and trends
- Supports standard equipment touch files
- Supports international languages
- Support for graphics and animations
- Screen captures can be saved to a USB flash drive
- Built-in PDF viewer
- Touch files can be uploaded from connected controller or stored on TruVu ET display

Benefits

- View current space temperature
- View operating mode (heat/cool/economizer)
- Change setpoints easily
- View and edit time schedules
- Initiate timed local override
- Multi-level password protection for security
- Convenient "snapshot" screen shows equipment graphic and operating status
- Easy access to equipment configuration, schedules, trends, and alarms
- Visual alarm indication
- Trending with support for pinch zoom and swiping to move along time line
- Works great as a technician tool and as a user interface
- Rugged enough to mount in the mechanical room, resplendent enough to mount in the board room

TruVu ET 10 Display (EQT3-10)

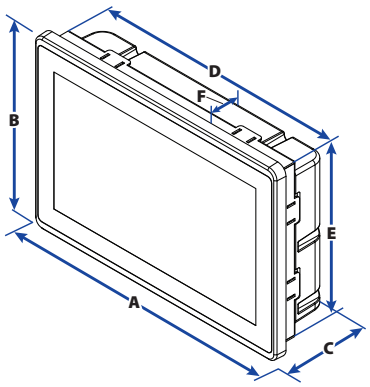
TruVu ET 7 Display (EQT3-7)

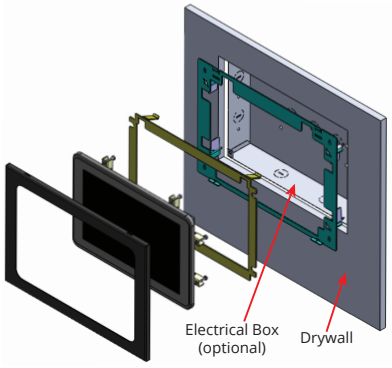
i-Vu® Building Automation System
TruVu™ ET Displays
Part Numbers: EQT3-10, EQT3-7

Specifications

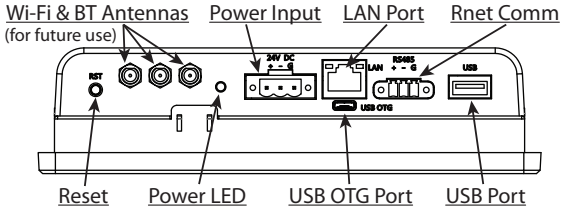
Power	24 VDC (±15%), 1 A, Class 2
Communication Ports	**Comm Input Port:** 2-wire EIA-485 port for connection to the Rnet sensor network (115kbps) **USB port:** for upgrades, file copying, screen captures, and connection to Service Port on TruVu controllers **Micro USB On The Go (OTG) port:** for firmware upgrades **LAN Port:** RJ-45 Ethernet connection to Service Port on TruVu controllers
System	**OS:** Android 11.0 **Processor :** MT8365 Quad-core Cortex-A53 up to 2.0GHz **System Memory:** 3 GB LPDDR4 RAM **Storage:** 32 GB onboard eMMC Flash storage
Environmental	**Operating Range:** -4°F to 122°F (-20°C to 50°C), 10–90% RH, non-condensing **Storage:** -13°F to 158°F (-25°C to 70°C)
Display	**Touch:** Projected Capacitive Multi-Touch (P-CAP) **E10:** **Display:** 10.1" TFT (Widescreen) **Resolution:** 1280 x 800 pixels (149 ppi) **Brightness:** 320 cd/m (typ.) **Contrast Ratio:** 800:1 (typ.) **Viewing Angle:** -85~85(H); -85~85(V) **Max Colors:** 16.7M (8-bit) **E7:** **Display:** 7" TFT **Resolution:** 1024 x 600 pixels (170 ppi) **Brightness:** 320 cd/m (typ.) **Contrast Ratio:** 1000:1 (typ.) **Viewing Angle:** -75~70(H); -75~75(V) **Max Colors:** 16.7M (8-bit)
Certifications	CE (Class B), FCC (Class B), UL 62368-1, Vibration tested to EN60068-2-6, IP65 rated (front) IP20 rated (rear)

	EQT3-10	EQT3-7
A	10.5 in. (26.7 cm)	7.28 in. (18.5 cm)
B	7.17 in. (18.2 cm)	5.04 in. (12.8 cm)
C	1.85 in. (4.7 cm)	1.81in. (4.6 cm)
D	9.61 in. (24.4 cm)	6.89 in. (17.5 cm)
E	6.26 in. (15.9 cm)	4.65 in. (11.8 cm)
F	1.52 in. (3.9 cm)	1.52 in. (3.9 cm)
Panel Cutout	9.607 x 6.26 in. (24.4 x 15.9 cm)	6.9 x 4.646 in. (17.5 x 11.8 cm)
Weight	40.6 oz (1151 g)	23.5 oz (666 g)





Wall Mounting Kits also available:
Parts: EQT2-7-MOUNT, EQT2-10-MOUNT



For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

i-Vu® Building Automation System

i-Vu® Equipment Touch

Part Number: EQT1-4-CAR

Carrier's i-Vu Equipment Touch is an integrated component of the i-Vu Building Automation System. It features an illuminated, 4.3" color pixel touchscreen display and connects to a single Open (BACnet) equipment controller. Designed for wall mounting, it provides building occupants, facility managers, and installers a powerful user interface for managing a single piece of HVAC equipment in a building.

Hardware Features

- Illuminated 4.3", 480 x 272 color pixel touchscreen display (no buttons)
- Built-in temperature and humidity sensing
- Connects to a single Open (BACnet) controller using Rnet communications
- Supports remote thermistor sensor (such as Carrier T55)
- Intuitive icon-driven / website-like screen navigation
- Default system screens such as scheduling and trends support international languages
- Ideal for single-zone rooftop applications such as office spaces and warehouses

For Building Occupants

- View current space temperature
- View operating mode (heat/cool/economizer)
- Change setpoints easily
- Initiate timed local overrides

Equipment Snapshot Screen

For Facility Managers

- Multi-level password protection for security
- Convenient "Snapshot" screen shows equipment graphic and operating status
- Easy access to equipment configuration, schedules, trends, and alarms
- Audible & visual alarm indication

For Installers

- Simple 4-wire installation
- Auto-discovers connected Open (BACnet) controller
- Screen files can be auto-uploaded on select controllers[1], customized, or created from scratch
- Startup wizard and integrated help screens to assist with equipment start-up & commissioning

[1]For a complete list of controllers that include i-Vu Touch files, visit www.HVACPartners.com.

i-Vu® Building Automation System

i-Vu® Equipment Touch

Part Number: EQT1-4-CAR

Specifications

Power	24 Vac (±15%), 5 VA, 50-60 Hz, Class 2
Display	4.3 in. resistive touchscreen color LCD display with backlighting, 480x272 pixels
Communication Ports	**Rnet:** 2-wire EIA-485 port for connection to the Rnet sensor network (115kbps **NOTE: The i-Vu Equipment Touch is NOT compatible with SPT sensors.** **Sensor:** for connecting an optional remote thermistor sensor (like Carrier T55) **USB port:** for firmware upgrades
Real-Time Clock	A 365-day real time clock/calendar. Time and date will be maintained for a minimum of 72 hours after loss of power (at room temperature).
Audible Alarm Notification	A piezoelectric sounder
Temperature Sensor	**Range:** -4°F to 140°F (-20°C to 60°C) **Accuracy over 30°F to 100°F (-1°C to 38°C):** ±1.0°F (±0.55°C) **Accuracy over full range:** ±2.0°F (±1.1°C) **Resolution:** 0.2°F (0.1°C)
Humidity Sensor	**Range:** 0 to 100% RH **Accuracy over 20 to 80% RH:** ±3.0% RH **Accuracy over full range:** ±5.0% RH **Resolution:** 0.05% RH
Environmental Operating Range	4ºF to 140ºF (-20ºC to 60ºC), 10–90% RH, non-condensing
Mounting	Mounting plate included for mounting to wall or electrical junction box
Dimensions	**Overall** **Width:** 5.44 in. (13.82 cm) **Height:** 4.55 in. (11.56 cm) **Depth:** 1.24 in. (3.15 cm) **Mounting Plate** **Width:** 4.79 in. (12.2 cm) **Height:** 3.94 in. (10 cm) **Display Only** **Width:** 3.75 in. (9.5 cm) **Height:** 2.25 in. (5.7 cm)
Weight	8 oz. (0.23 kg)
Listed By	UL-916 (PAZX), CE, FCC Part 15-Subpart B-Class A

Home Screen | Alarms Screen | Schedules Screen

For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

i-Vu® Building Automation System

i-Vu® System Touch

Part Number: SYST1-4-CAR

Carrier's i-Vu System Touch is an integrated component of the i-Vu Building Automation System. It features an illuminated, 4.3" color pixel touchscreen display and connects directly to a network of Open (BACnet MS/TP), controllers. Designed for wall mounting, it provides building occupants, facility managers, and installers a powerful user interface for managing all of the equipment in a building.

Hardware Features

- Illuminated 4.3", 480 x 272 color pixel touchscreen display (no buttons)
- Built-in temperature and humidity sensing
- Supports remote thermistor sensor (such as Carrier T55)
- Connects directly to one Carrier Open (BACnet MS/TP) network and manages up to 60 Open controllers through a single touchscreen
- Intuitive icon-driven / website-like screen navigation
- Default system screens such as scheduling and trends support international languages
- Ideal for multi-zone commercial applications such as office buildings and retail stores

For Building Occupants

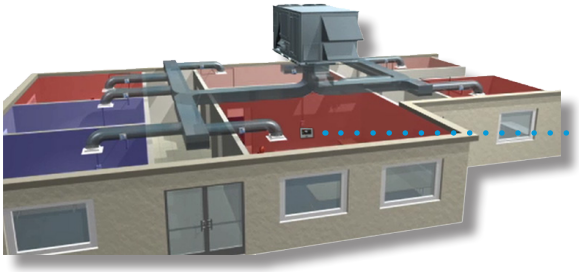
- View current space temperature
- View operating mode (heat/cool/economizer)
- Change setpoints easily
- Initiate timed local overrides

For Facility Managers

- Multi-level password protection for security
- Home screen shows temperatures and colors for all equipment in the building within a single view
- Convenient "Snapshot" screens show graphic and status for each piece of equipment in the building
- Manage schedules, trends, alarms, and configuration for all equipment in the system
- Configure individual and group schedules easily
- View, acknowledge, and delete system alarms from a single screen; audible indicator for all alarms

For Installers

- Simple 4-wire installation
- Auto-discovers all Open controllers on the BACnet MS/TP network
- Screen files can be auto-uploaded on select controllers[1], customized, or created from scratch
- Create customized screen files for navigating the entire system
- Startup wizard and integrated help screens to assist with equipment start-up & commissioning



Rooftop Status

Zone Status

System Status

[1]For a complete list of controllers that include i-Vu Touch files, visit www.HVACPartners.com.

i-Vu® Building Automation System

i-Vu® System Touch

Part Number: SYST1-4-CAR

Specifications

Power	24 Vac (±15%), 5 VA, 50-60 Hz, Class 2
Display	4.3 in. resistive touchscreen color LCD display with backlighting, 480x272 pixels
Communication Ports	**BACnet MS/TP:** 2-wire EIA-485 port for connection to the Open controller network **Sensor:** for connecting an optional remote thermistor sensor (like Carrier T55) **USB port:** for firmware upgrades
Real-Time Clock	A 365-day real time clock/calendar. Time and date will be maintained for a minimum of 72 hours after loss of power (at room temperature).
Audible Alarm Notification	A piezoelectric sounder
Temperature Sensor	**Range:** -4°F to 140°F (-20°C to 60°C) **Accuracy over 30°F to 100°F (-1°C to 38°C):** ±1.0°F (±0.55°C) **Accuracy over full range:** ±2.0°F (±1.1°C) **Resolution:** 0.2°F (0.1°C)
Humidity Sensor	**Range:** 0 to 100% RH **Accuracy over 20 to 80% RH:** ±3.0% RH **Accuracy over full range:** ±5.0% RH **Resolution:** 0.05% RH
Environmental Operating Range	-4ºF to 140ºF (-20ºC to 60ºC), 10–90% RH, non-condensing
Mounting	Mounting plate included for mounting to wall or electrical junction box
Dimensions	**Overall** **Width:** 5.44 in. (13.82 cm) **Height:** 4.55 in. (11.56 cm) **Depth:** 1.24 in. (3.15 cm) **Mounting Plate** **Width:** 4.79 in. (12.2 cm) **Height:** 3.94 in. (10 cm) **Display Only** **Width:** 3.75 in. (9.5 cm) **Height:** 2.25 in. (5.7 cm)
Weight	8 oz. (0.23 kg)
Listed By	UL-916 (PAZX), CE, FCC Part 15-Subpart B-Class A

Home Screen

Schedules Screen

Start-up Wizard

For more information, contact your local Carrier Controls Expert.

Controls Expert Locator:
www.carrier.com/controls-experts

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FARMINGTON PRESCHOOL
INTERIOR FINISH SCHEDULE

CARPET TILE

CARPET TILE - 18" X 36" W/ STANDARD BACKING

CPT1 — MFG: INTERFACE
COLLECTION: 125610 AKOO SIMPLE ABSTRACTION
COLOR: # 106017 - METAL

* NOTE: CARPET IN ADMIN. SUITE

WALK OFF CARPET - 24"x24" TILE

CPT2 — MFG: MASLAND CONTRACT FLOORING
SERIES: STREET LEVEL - GET A GRIP
COLOR: # T-7871 REMOVE

* NOTE: 1/4" TURNED INSTALLATION W/PRESSURE SENSITIVE ADHESIVE

CARPET TILE - W/ STANDARD BACKING

CPT3 — MFG: INTERFACE
COLLECTION: MONOCHROME
COLOR: # 101846 WATERFALL

* NOTE: ACCENT CARPET IN ADMINISTRATION SUITE

VINYL TILE/ SHEET GOODS

LINOLEUM TILE - 13" X 13"

MFG: FORBO FLOORING
COLLECTION: MCT TILE - 2.0 GAUGE
SERIES: ESSENTIALS

MCT1 — COLOR: # MCT - 3888 STONE
MCT2 — COLOR: # MCT - 3238 LAGUNA
MCT3 — COLOR: # MCT - 3030 BLUE
MCT4 — COLOR: # MCT - 3260 LEAF
MCT5 — COLOR: # MCT - 3282 MOSS
MCT7 — COLOR: # MCT - 3251 LEMON ZEST
MCT8 — COLOR: # MCT - 3287 MANDARIN
MCT9 — COLOR: # MCT - 3277 GRAPE

MFG: FORBO FLOORING
COLLECTION: MCT TILE - 2.0 GAUGE
SERIES: ELEMENTAL

MCT6 — COLOR: # MCT - 3601 WARM GREY

SHEET LINOLEUM

MFG: FORBO FLOORING
SERIES: MARMOLEUM SHEET - 2.5 GAUGE
SV1 — COLOR: # 5232 ROCKY ICE

* NOTE: HEAT WELD ALL SEAMS - COLOR: TBD

FLOOR TILE

PORCELAIN FLOOR TILE - 12" X 12"

MFG: DALTILE
FT1 — SERIES: VOLUME 1.0
COLOR: # VL73 STEREO GREY

* NOTE: EPOXY GROUT: MFG. CUSTOM BUILDER
COLOR: #165 DOLOREN GRAY

STAIR TREAD / RISER & STRINGER

RUBBER STAIR TREAD COLLECTION

MFG: FLEXCO
SERIES: SPEXTONES
FINISH: HAMMERTONE

RB1 — COLOR: # 301 TWILIGHT BLUE W/ ARTIC NEUTRAL
RB2 — COLOR: # 302 SPRING LEAF W/ ARTIC NEUTRAL

MISC. TRIM & FINISHES

VINYL WALL BASE - 4" H

MFG: ROPPE
VB1 — COLOR: # 175 SLATE

MFG: TBD
VB1 — COLOR: # TBD
VB1 — COLOR: # TBD
VB1 — COLOR: # TBD
VB1 — COLOR: # TBD

SEALED CONCRETE

SC — MFG: REFER TO PROJECT MANUAL

FLOOR TRANSITION STRIP -

MFG: SCHLUTER SYSTEMS
TS — SERIES: CARPET TO VINYL
VINYL TO PORCELAIN TILE
FINISH: BRUSHED ALUMINUM

SAFETY FLOORING - SLIP RESISTANT

KF1 — MFG: ECO GRIP FLOORING
FINISH: FOOD SERVICE
COLOR: SLATE

WALL TILE / CORNER PROTECTION

CERAMIC TILE

MFG: DALTILE -2" x 8" INSTALL TILE VERTICALLY
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC
WT1 — COLOR: # K175 (1) BISCUIT
WT2 — COLOR: # 0161 (2) URBAN PUTTY
WT3 — COLOR: # X114 (1) DESERT GRAY
WT4 — COLOR: # 0115 (3) EMERALD
WT5 — COLOR: # 1174 (3) SEA BREEZE
WT6 — COLOR: # 1049 (3) OCEAN BLUE

MFG: DALTILE - 2" x 8"
SERIES: COLOR STORY
WT7 — COLOR: # 0076 (3) GREEN APPLE

* NOTE: CLASSROOM RESTROOM & SINK AREA WALL TILE

MFG: DALTILE - 4" x 16"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC
WT8 — COLOR: # K175 (1) BISCUIT
WT9 — COLOR: # 0161 (2) URBAN PUTTY
WT10 — COLOR: # X114 (1) DESERT GRAY

* NOTE: PUBLIC ADULT GANG & SINGLE RESTROOMS

* GENERAL NOTE: WALL GROUT MFG. CUSTOM BUILDER - COLOR: #14 WHITE DOVE

METAL WALL TRIM

METAL U-SHAPE TOP CAP - TRANSITIONS TILE TO GYP. BOARD

MFG: SCHLUTER SYSTEMS
PROFILE: BRUSHED ALUMINUM FINISH

METAL CORNER BEAD - 90 DEGREE @ TILE LOCATIONS

MFG: SCHLUTER SYSTEMS
PROFILE: BRUSHED ALUMINUM FINISH

FRP PANEL

FIBERGLASS REINFORCED WALL PANEL (FRP) SIZE: 4' X 8'

FRP1 — MFG: MARLITE WALL PANELS
COLLECTION: STANDARD - SMOOTH FINISH
COLOR: WHITE

* NOTE: PRICE TO INCLUDE PVC EDGE CAP, DIVISION BAR & INSIDE AND OUTSIDE CORNER, PER MANUFACTURES SPECIFICATION

PAINT

WALL PAINT- SEMI GLOSS

P1 — MFG: SHERWIN WILLIAMS
COLOR: # SW-6385 DOVER WHITE
* NOTE: GENERAL WALL COLOR

P2 — MFG: SHERWIN WILLIAMS
COLOR: # SW 91770 ACIER
* NOTE: HMD & WINDOW FRAME

P3 — MFG: SHERWIN WILLIAMS
COLOR: # SW-6451 NURTURE GREEN
* NOTE: ACCENT WALLS

P4 — MFG: SHERWIN WILLIAMS
COLOR: # SW-6500 OPEN SEAS
* NOTE: ACCENT WALLS

P5 — MFG: SHERWIN WILLIAMS
COLOR: # SW- 6772 CAY
* NOTE: ACCENT WALLS

P6 — MFG: SHERWIN WILLIAMS
COLOR: # SW-0013 MAJOLICA GREEN
* NOTE: ACCENT WALLS

LAMINATE - HPL

PLASTIC LAMINATE

MFG: WILSONART
PL1 — COLOR: # 10776-60 KENSINGTON MAPLE MATTE FINISH

* LOCATION: UPPER & LOWER CASEWORK

MFG: WILSONART (PREMIUM HPL)
PL2 — COLOR: # TBD

* LOCATION: UPPER & LOWER CASEWORK

MFG: NEVAMAR
PL3 — COLOR: # S-3068 SUNKEN TREASURE

* LOCATION: ADMINISTRATION DESK CASEWORK

QUARTZ

QUARTZ SURFACE

MFG: WILSONART
QT1 — COLOR: # Q3008 RIO UPANO

* LOCATION: ADMINISTRATION DESK

WALLCOVERING

VINYL WALLCOVERING

MFG: MOMENTUM - WALL PROTECTION
SERIES: P3 - TECH
PATTERN: SAHARA SILK

VWC1 — COLOR: # P3T-60019 SAFI YELLOW
VWC2 — COLOR: # P3T-60020 BORTOKAL
VWC3 — COLOR: # P3T-60004 MENARA GARDENS
VWC4 — COLOR: # P3T-60003 TAGINE
VWC5 — COLOR: # P3T-60002 ZELLIJ
VWC6 — COLOR: # NEUTRAL FIELD - TBD

* NOTE: COLORS & LOCATIONS TO BE ASSIGNED BY ARCHITECT

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STATE OF NEW MEXICO
03/21/2024
SANJAY I. ENGINEER
No. 3088
REGISTERED ARCHITECT
ARCHITECT ENGINEER

FARMINGTON PRESCHOOL ACADEMY
5840 FORTUNA DR.
FARMINGTON, NM 87402

CONSTRUCTION DOCUMENTS
MARCH 2024

MARK	DATE	DESCRIPTION
2	9/3/2024	ADDENDUM 02

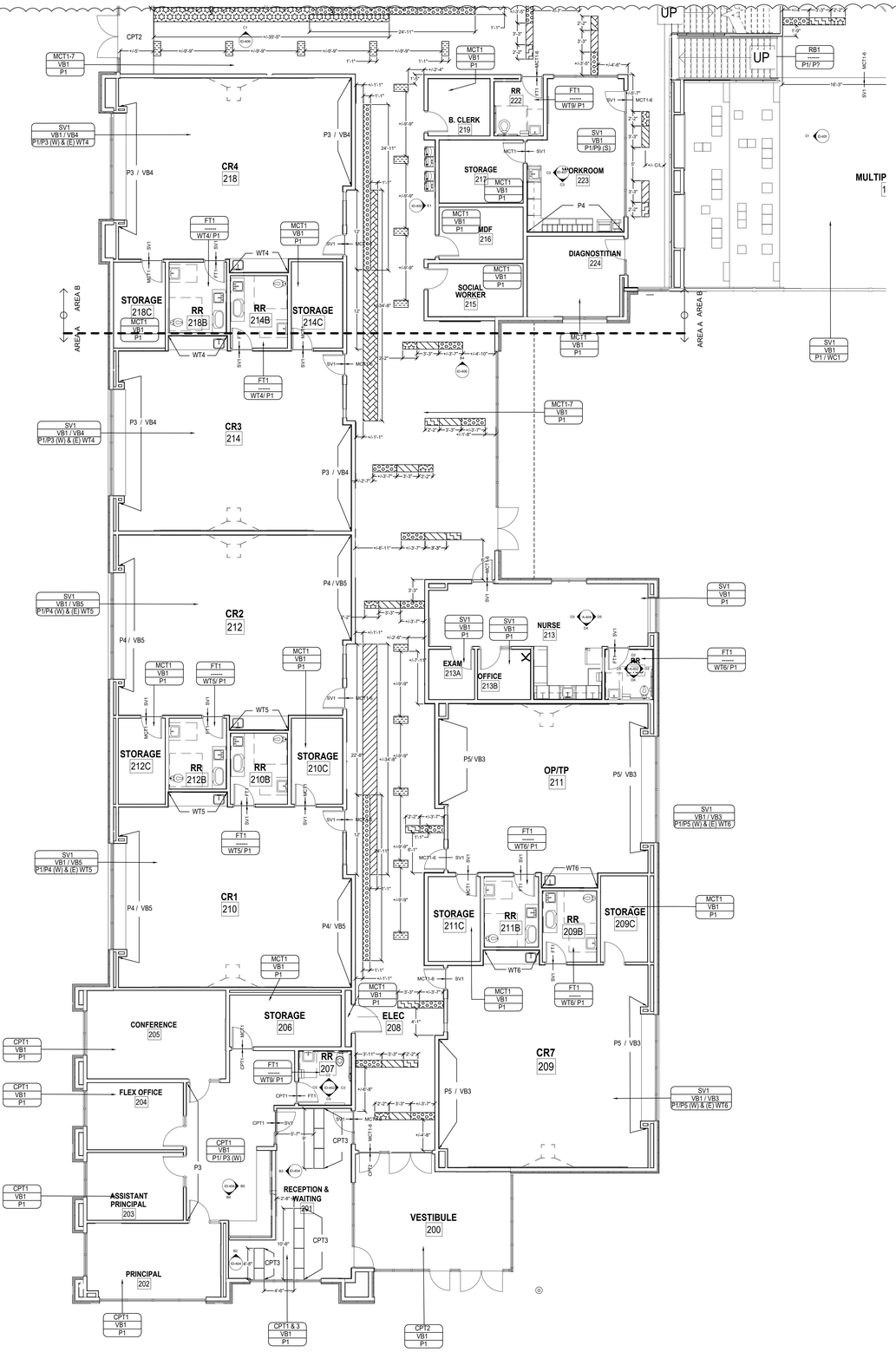
ISSUE:	
DATE:	
PROJECT NO:	
DRAWN BY:	
CHECKED BY:	

SHEET TITLE
FINISH PLAN - GROUND LEVEL "A"

ID-101

Farmington Preschool Academy

9/3/2024 4:20:41 PM



A1 FINISH PLAN - GROUND LEVEL 'A'
1/8" = 1'-0"

FLOOR PATTERN LEGEND

VINYL TILE/ SHEET GOODS

LINOLEUM TILE - 13" X 13"

MCT1 — MFG: FORBO FLOORING; COLLECTION: MCT TILE - 2.0 GAUGE; SERIES: ESSENTIALS; COLOR: # MCT- 3888 STONE

MCT2 — COLOR: # MCT - 3238 LAGUNA

MCT3 — COLOR: # MCT - 3030 BLUE

MCT4 — COLOR: # MCT - 3260 LEAF

MCT5 — COLOR: # MCT - 3282 MOSS

MCT7 — COLOR: # MCT - 3251 LEMON ZEST

MCT8 — COLOR: # MCT - 3278 MANDARIN

MCT9 — COLOR: # MCT - 3277 GRAPE

MCT6 — MFG: FORBO FLOORING; COLLECTION: MCT TILE - 2.0 GAUGE; SERIES: ELEMENTAL; COLOR: # MCT - 3601 WARM GREY

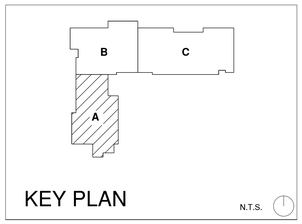
SHEET LINOLEUM

SV1 — MFG: FORBO FLOORING; COLLECTION: MARMOLEUM SHEET - 2.5 GAUGE; SERIES: STRIATO; COLOR: # 5232 ROCKY ICE

* NOTE: HEAT WELD ALL SEAMS - COLOR: TBD

CARPET TILE ACCENT

CPT3 — MFG: INTERFACE; COLLECTION: MONOCHROME; COLOR: # 101846 WATERFALL



KEY PLAN N.T.S.

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STATE OF NEW MEXICO — 03/21/2024 — SANJAY I. ENGINEER — No. 3088 — REGISTERED

ARCHITECT ENGINEER

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CONSTRUCTION DOCUMENTS
MARCH 2024

MARK	DATE	DESCRIPTION
2	9/3/2024	ADDENDUM 02

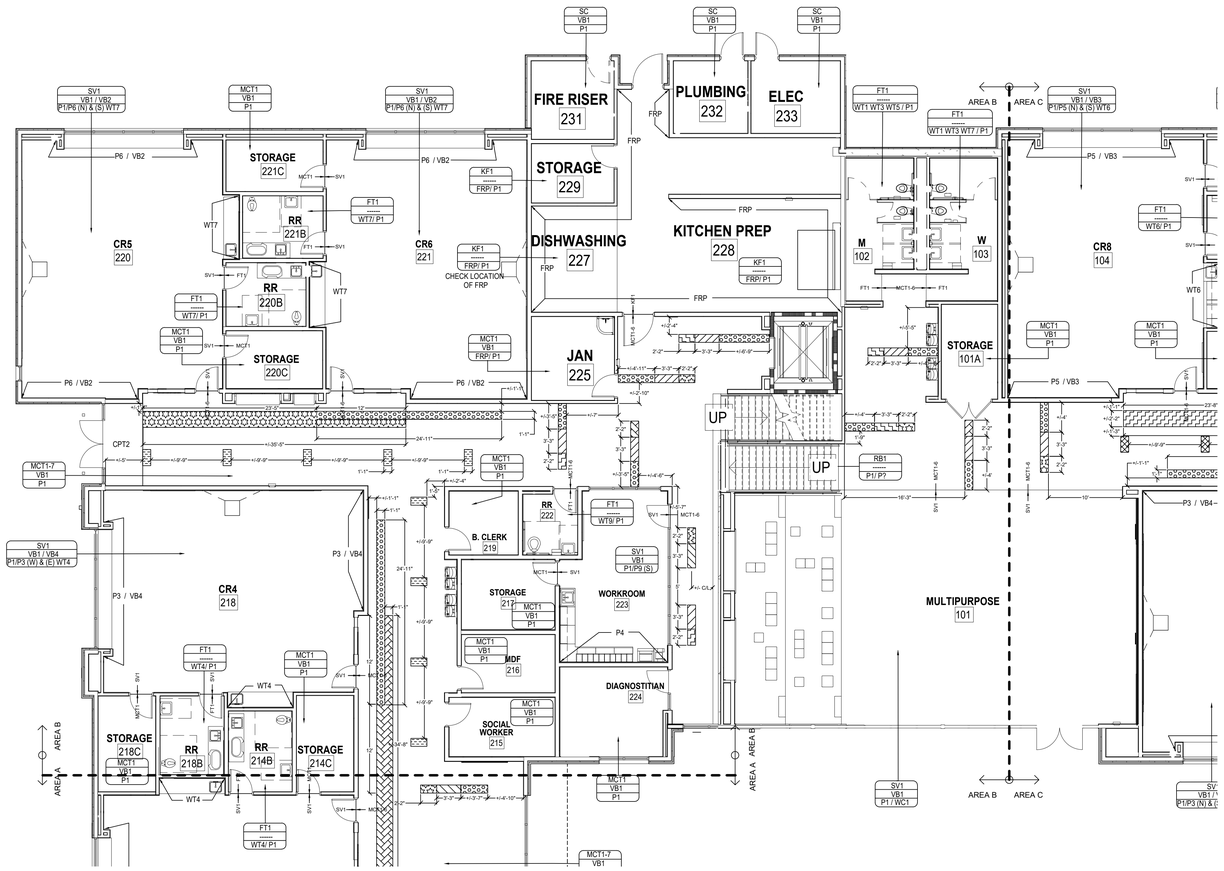
ISSUE:	Const Doc
DATE:	March 2024
PROJECT NO:	K23-001
DRAWN BY:	DRW
CHECKED BY:	CHK

SHEET TITLE
FINISH PLAN - GROUND LEVEL "A"

ID-101

Farmington Preschool Academy

9/3/2024 4:21:18 PM



A1 FINISH PLAN - GROUND LEVEL 'B'
1/8" = 1'-0"

FLOOR PATTERN LEGEND

VINYL TILE/ SHEET GOODS

LINOLEUM TILE - 13" X 13"

MCT1 — MFG: FORBO FLOORING; COLLECTION: MCT TILE - 2.0 GAUGE; SERIES: ESSENTIALS; COLOR: # MCT- 3888 STONE

MCT2 — COLOR: # MCT - 3238 LAGUNA

MCT3 — COLOR: # MCT - 3030 BLUE

MCT4 — COLOR: # MCT - 3260 LEAF

MCT5 — COLOR: # MCT - 3282 MOSS

MCT7 — COLOR: # MCT - 3251 LEMON ZEST

MCT8 — COLOR: # MCT - 3278 MANDARIN

MCT9 — COLOR: # MCT - 3277 GRAPE

MCT6 — MFG: FORBO FLOORING; COLLECTION: MCT TILE - 2.0 GAUGE; SERIES: ELEMENTAL; COLOR: # MCT - 3601 WARM GREY

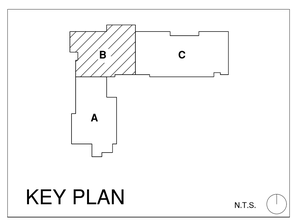
SHEET LINOLEUM

SV1 — MFG: FORBO FLOORING; COLLECTION: MARMOLEUM SHEET - 2.5 GAUGE; SERIES: STRIATO; COLOR: # 5232 ROCKY ICE

* NOTE: HEAT WELD ALL SEAMS - COLOR: TBD

CARPET TILE ACCENT

CPT3 — MFG: INTERFACE; COLLECTION: MONOCHROME; COLOR: # 101846 WATERFALL



2

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STATE OF NEW MEXICO
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CONSTRUCTION DOCUMENTS
MARCH 2024

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ISSUE:	Const Doc
DATE:	March 2024
PROJECT NO:	K23-001
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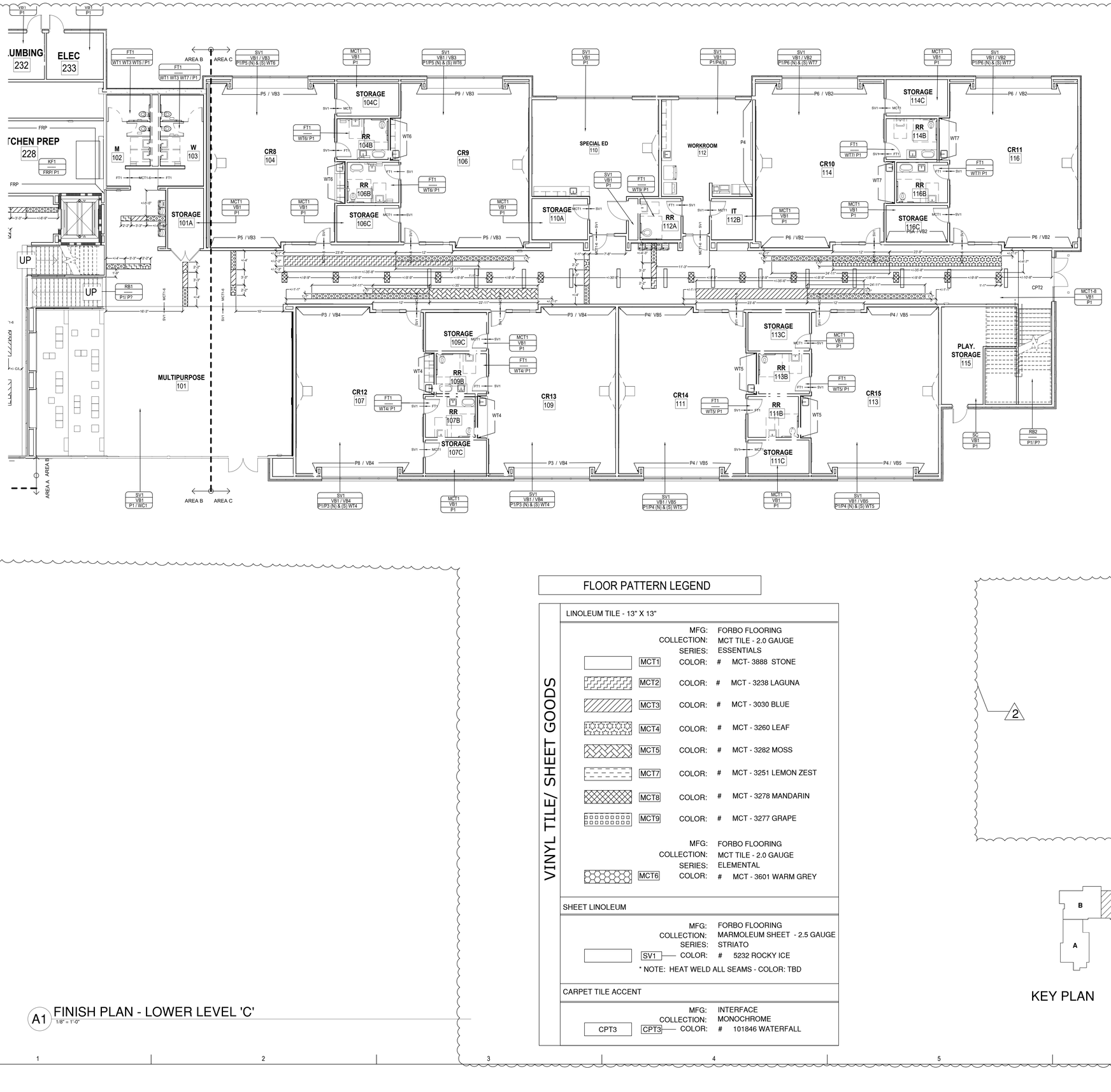
CHECKED BY:	CHK

SHEET TITLE
FINISH PLAN - GROUND LEVEL "B"

ID-102

Farmington Preschool Academy

9/3/2024 4:22:57 PM



FLOOR PATTERN LEGEND

VINYL TILE/ SHEET GOODS

LINOLEUM TILE - 13" X 13"

		MFG:	FORBO FLOORING
		COLLECTION:	MCT TILE - 2.0 GAUGE
		SERIES:	ESSENTIALS
	MCT1	COLOR: #	MCT- 3888 STONE
	MCT2	COLOR: #	MCT - 3238 LAGUNA
	MCT3	COLOR: #	MCT - 3030 BLUE
	MCT4	COLOR: #	MCT - 3260 LEAF
	MCT5	COLOR: #	MCT - 3282 MOSS
	MCT7	COLOR: #	MCT - 3251 LEMON ZEST
	MCT8	COLOR: #	MCT - 3278 MANDARIN
	MCT9	COLOR: #	MCT - 3277 GRAPE
		MFG:	FORBO FLOORING
		COLLECTION:	MCT TILE - 2.0 GAUGE
		SERIES:	ELEMENTAL
	MCT6	COLOR: #	MCT - 3601 WARM GREY

SHEET LINOLEUM

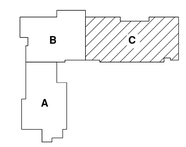
		MFG:	FORBO FLOORING
		COLLECTION:	MARMOLEUM SHEET - 2.5 GAUGE
		SERIES:	STRIATO
	SV1	COLOR: #	5232 ROCKY ICE

* NOTE: HEAT WELD ALL SEAMS - COLOR: TBD

CARPET TILE ACCENT

		MFG:	INTERFACE
		COLLECTION:	MONOCHROME
CPT3	CPT3	COLOR: #	101846 WATERFALL

2



KEY PLAN N.T.S.

A1 FINISH PLAN - LOWER LEVEL 'C'
1/8" = 1'-0"

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STATE OF NEW MEXICO 03/21/2024 SANJAY I. ENGINEER No. 3088 REGISTERED

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CONSTRUCTION DOCUMENTS
MARCH 2024

MARK	DATE	DESCRIPTION
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DATE:	March 2024
PROJECT NO:	K23-001
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SHEET TITLE
FINISH PLAN - LOWER LEVEL "C"

ID-103

Farmington Preschool Academy

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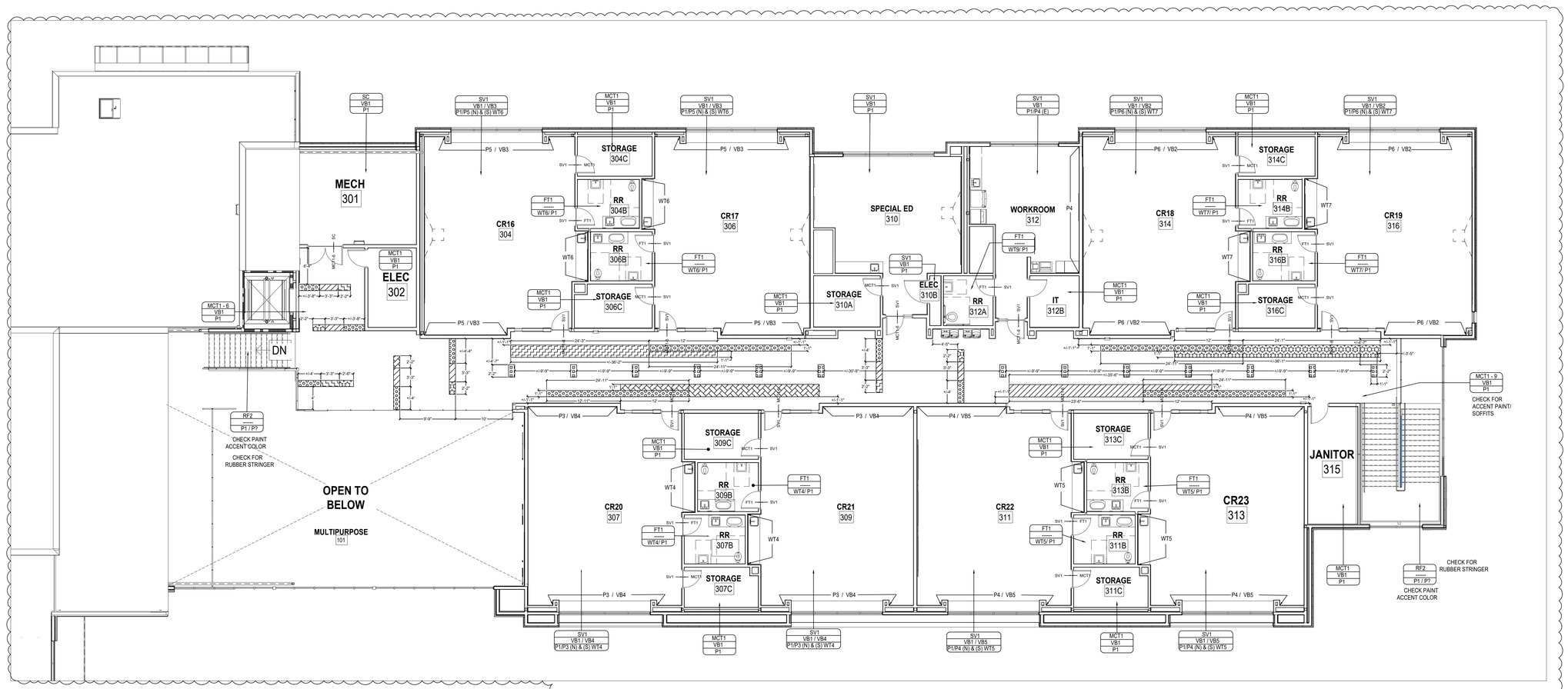

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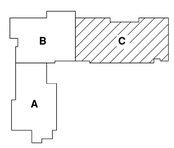

KEY PLAN N.T.S.

FLOOR PATTERN LEGEND

VINYL TILE/ SHEET GOODS

LINOLEUM TILE - 13" X 13"

MFG: FORBO FLOORING
COLLECTION: MCT TILE - 2.0 GAUGE
SERIES: ESSENTIALS

MCT1	COLOR: #	MCT- 3888 STONE
MCT2	COLOR: #	MCT - 3238 LAGUNA
MCT3	COLOR: #	MCT - 3030 BLUE
MCT4	COLOR: #	MCT - 3260 LEAF
MCT5	COLOR: #	MCT - 3282 MOSS
MCT7	COLOR: #	MCT - 3251 LEMON ZEST
MCT8	COLOR: #	MCT - 3278 MANDARIN
MCT9	COLOR: #	MCT - 3277 GRAPE

MFG: FORBO FLOORING
COLLECTION: MCT TILE - 2.0 GAUGE
SERIES: ELEMENTAL

MCT6	COLOR: #	MCT - 3601 WARM GREY

SHEET LINOLEUM

MFG: FORBO FLOORING
COLLECTION: MARMOLEUM SHEET - 2.5 GAUGE
SERIES: STRIATO

SV1	COLOR: #	5232 ROCKY ICE

* NOTE: HEAT WELD ALL SEAMS - COLOR: TBD

A1 FINISH PLAN - UPPER LEVEL 'C'
1/8" = 1'-0"

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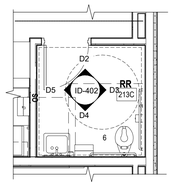
SHEET TITLE
FINISH PLAN - UPPER LEVEL

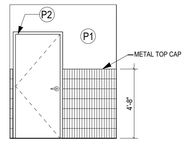
ID-104

Farmington Preschool Academy

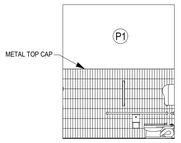
9/3/2024 4:25:09 PM



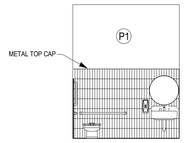
D1 ENLARGED PLAN - NURSE CHILD RR
1/4" = 1'-0"



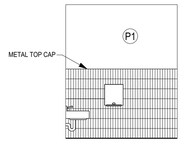
D2 CHILD RR - SIDE 1
1/4" = 1'-0"



D3 CHILD RR- FIXTURE
1/4" = 1'-0"



D4 CHILD RR - SIDE 2
1/4" = 1'-0"



D5 CHILD RR - BACK
1/4" = 1'-0"

TYPICAL CHILD RR - WALL TILE 2"X8" COLOR INDICATED HERE
TYPICAL CHILD RR - PAINT COLOR INDICATED HERE

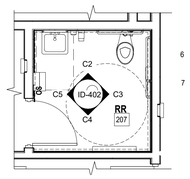
GROUND/LOWER LEVEL
WALL FINISHES - NURSE CHILD RR
CERAMIC TILE
MFG: DALTILE - 2" x 8"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC
PAINT - ACCENT
MFG: SHERMAN WILLIAMS/BENJAMIN MORE

WT6 - OCEAN BLUE RR-213C
* P3 SW-6385 DOVER WHITE RR-213C

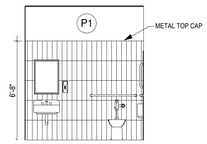
PAINT WALL FINISHES

P1 MFG: SHERWIN WILLIMAS
COLOR: # SW-6385 DOVER WHITE
NOTE: GENERAL WALL COLOR

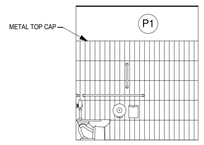
P2 MFG: SHERWIN WILLIAMS
COLOR: # SW 9170 ACIER
NOTE: HMD & WINDOW FRAME



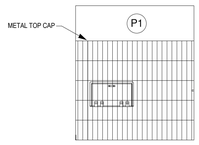
C1 ENLARGED PLAN - ADULT RR
1/4" = 1'-0"



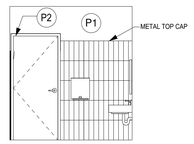
C2 TYP. RESTROOM - SIDE 1
1/4" = 1'-0"



C3 TYP. RESTROOM - FIXTURE
1/4" = 1'-0"



C4 TYP. RESTROOM - SIDE 2
1/4" = 1'-0"



C5 TYP. RESTROOM - BACK
1/4" = 1'-0"

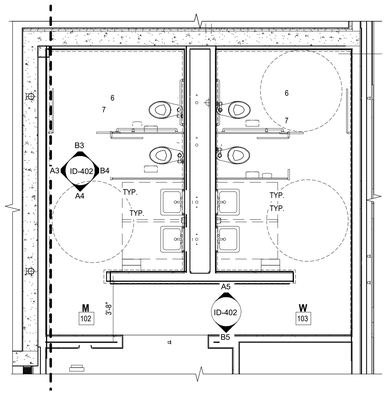
TYPICAL ADULT RR - WALL TILE 4"X16" COLOR INDICATED HERE
TYPICAL ADULT RR - PAINT COLOR INDICATED HERE

WALL FINISHES - TYP. ADULT RR
CERAMIC TILE
MFG: DALTILE - 4"X16"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC
GROUND/LOWER LEVEL

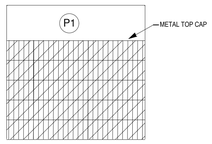
WT9 - URBAN PUTTY
RR-112A
RR-207
RR-222

WALL FINISHES - TYP. ADULT RR
CERAMIC TILE
MFG: DALTILE - 4"X16"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC
UPPER LEVEL

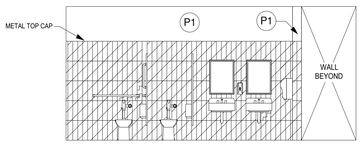
WT9 - URBAN PUTTY
RR-312A



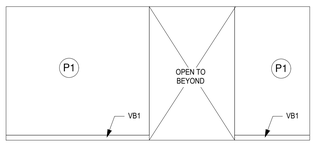
A1 ENLARGED PLAN - RR 102 & RR 103
1/4" = 1'-0"



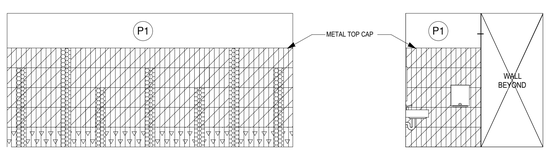
B3 RR 102 & 103 - NORTH
1/4" = 1'-0"



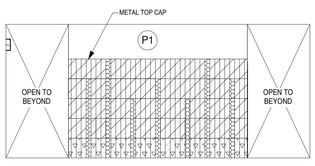
B4 RR 102 - EAST & 103 WEST
1/4" = 1'-0"



B5 VESTIBULE RR 102 & 103 - SOUTH
1/4" = 1'-0"



A3 RR 102 - WEST & 103 EAST
1/4" = 1'-0"



A4 RR 102 & 103 - SOUTH
1/4" = 1'-0"

A5 VESTIBULE RR 102 & 103 - NORTH
1/4" = 1'-0"

TYPICAL ADULT GANG RR - WALL TILE 4"X16" COLOR INDICATED HERE
TYPICAL ADULT RR - PAINT COLOR INDICATED HERE

WALL FINISHES - TYP. ADULT GANG RR
CERAMIC TILE
MFG: DALTILE - 4" x 16"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC
GROUND/LOWER LEVEL

WT5 - #1174 (3) SEA BREEZE RR-102

WT7 - #0076 (3) GREEN APPLE RR-103

WT1 - #K175 (1) BISCUIT RR-102 RR-103

WT3 - #X114 (1) DESERT GRAY RR-102 RR-103

TILE LOCATION ON PLAN

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CONSTRUCTION DOCUMENTS
MARCH 2024

MARK	DATE	DESCRIPTION
2	9/3/2024	ADDENDUM 02

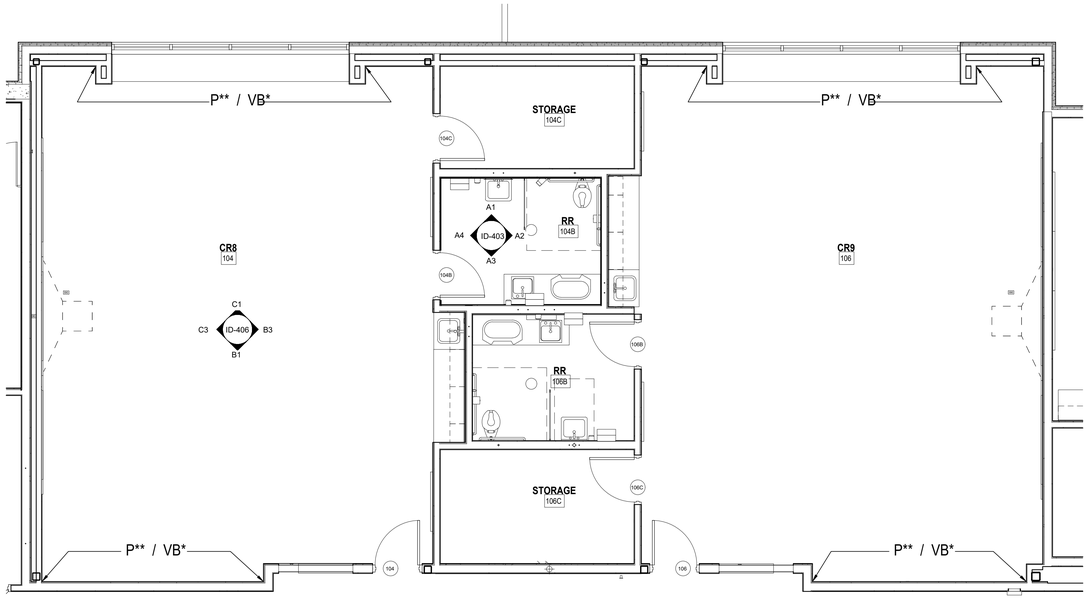
ISSUE:	Const Doc
DATE:	March 2024
PROJECT NO:	K23-001
DRAWN BY:	DRW
CHECKED BY:	CHK

SHEET TITLE
ENLARGED PLANS & ELEVATIONS - RESTROOMS

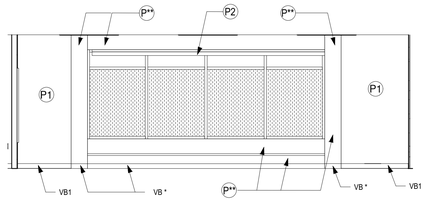
ID-402

Farmington Preschool Academy

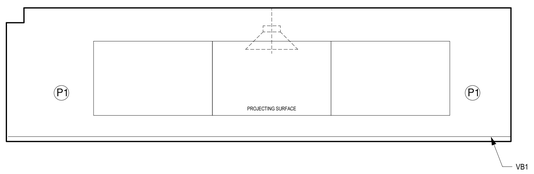
9/3/2024 4:26:07 PM



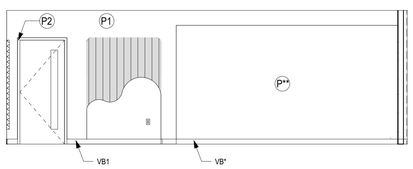
D1 ENLARGED PLAN - TYPICAL CLASSROOM
1/4" = 1'-0"



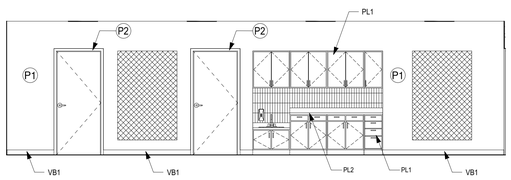
C1 TYP. CLASSROOM - WINDOW WALL
1/4" = 1'-0"



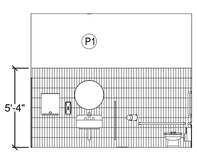
C3 TYP. CLASSROOM - INSTRUCTION WALL
1/4" = 1'-0"



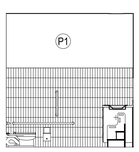
B1 TYP. CLASSROOM - ENTRY WALL
1/4" = 1'-0"



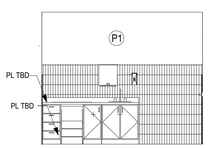
B3 TYP. CLASSROOM - SIDE WALL
1/4" = 1'-0"



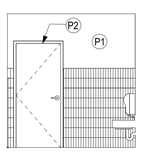
A1 FIXTURE WALL
1/4" = 1'-0"



A2 SIDE WALL 1
1/4" = 1'-0"



A3 CHANGING
1/4" = 1'-0"



A4 SIDE WALL 2
1/4" = 1'-0"

GROUND/LOWER LEVEL - TYP CHILD RESTROOM

WALL FINISHES
CERAMIC TILE
MFG: DALTILE - 2" x 8"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC

WT4 - EMERALD — * P1 SW-6385 DOVER WHITE
RR-107B
RR-109B
RR-214B
RR-218B

WT5 - SEA BREEZE
RR-111B
RR-113B
RR-210B
RR-212B

WT6 - OCEAN BLUE
RR-104B
RR-106B
RR-209B
RR-211B

WT7 - GREEN APPLE
RR-221B
RR-220B
RR-114B
RR-116B

GROUND/LOWER LEVEL - TYP CHILD CLASSROOM

WALL FINISHES
CERAMIC TILE
MFG: DALTILE - 2" x 8"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC
PAINT - ACCENT
MFG: TBD
VINYL BASE - ACCENT
MFG: TBD

WT4 - EMERALD CR-107 CR-109 CR-214 CR-218	** P3 SW-6451 NURTURE GREEN CR-107 CR-109 CR-214 CR-218	*VB4 - TBD CR-107 CR-109 CR-214 CR-218
WT5 - SEA BREEZE CR-111 CR-113 CR-210 CR-212	** P4 SW-6500 OPEN SEAS CR-111 CR-113 CR-210 CR-212	*VB5 - TBD CR-111 CR-113 CR-210 CR-212
WT6 - OCEAN BLUE CR-104 CR-106 CR-209 CR-211	** P5 SW- 6772 CAY CR-104 CR-106 CR-209 CR-211	*VB3 - TBD CR-104 CR-106 CR-209 CR-211
WT7 - GREEN APPLE CR-221 CR-220 CR-114 CR-116	** P6 SW-0013 MAJOLICA GREEN CR-221 CR-220 CR-114 CR-116	*VB2 - TBD CR-221 CR-220 CR-114 CR-116

LOWER LEVEL - TYP CHILD RESTROOMS

WALL FINISHES
CERAMIC TILE
MFG: DALTILE - 2" x 8"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC

WT4 - EMERALD — * P1 SW-6385 DOVER WHITE
RR-307B
RR-309B

WT5 - SEA BREEZE
RR-311B
RR-313B

WT6 - OCEAN BLUE
RR-304B
RR-306B

WT7 - GREEN APPLE
RR-314B
RR-316B

UPPER LEVEL - TYP CHILD CLASSROOMS

WALL FINISHES
CERAMIC TILE
MFG: DALTILE - 2" x 8"
SERIES: COLOR WHEEL - LINEAR GLAZED CERAMIC
PAINT - ACCENT
MFG: TBD
VINYL BASE ACCENT
MFG: TBD

WT4 - EMERALD CR-307 CR-309	** P5 SW-6451 NURTURE GREEN CR-307 CR-309	*VB4 - TBD CR-307 CR-309
WT5 - SEA BREEZE CR-311 CR-313	** P4 SW-6500 OPEN SEAS CR-311 CR-313	*VB5 - TBD CR-311 CR-313
WT6 - OCEAN BLUE CR-304 CR-306	** P3 SW- 6772 CAY CR-304 CR-306	*VB3 - TBD CR-304 CR-306
WT7 - GREEN APPLE CR-314 CR-316	** P5 SW-0013 MAJOLICA GREEN CR-314 CR-316	*VB2 - TBD CR-314 CR-316

NOTE:
(P*) ACCENT PAINT IN CHILD RESTROOMS
(P**) ACCENT PAINT IN CHILD CLASSROOMS

2

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CONSTRUCTION DOCUMENTS
MARCH 2024

MARK	DATE	DESCRIPTION
2	9/3/2024	ADDENDUM 02

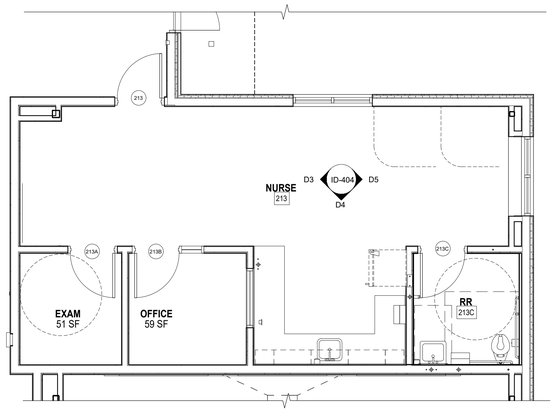
ISSUE:	Const Doc
DATE:	March 2024
PROJECT NO:	K23-001
DRAWN BY:	DRW
CHECKED BY:	CHK

SHEET TITLE
ENLARGED PLANS & ELEVATIONS - CLASSROOMS

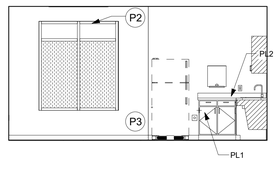
ID-403

Farmington Preschool Academy

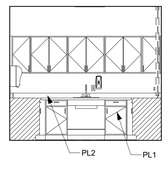
9/3/2024 4:27:10 PM



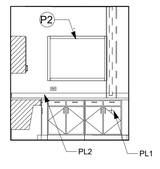
D1 ENLARGED PLAN - NURSE
1/4" = 1'-0"



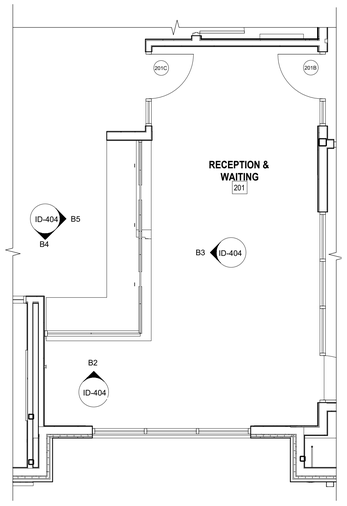
D5 NURSE - EAST
1/4" = 1'-0"



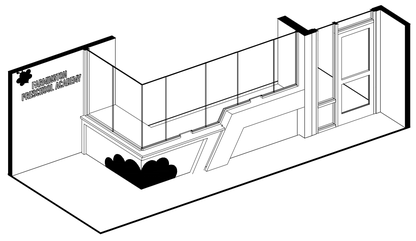
D4 NURSE - SOUTH
1/4" = 1'-0"



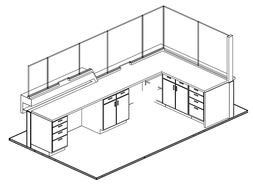
D3 NURSE - WEST
1/4" = 1'-0"



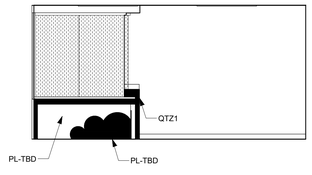
B1 ENLARGED PLAN - RECEPTION
1/4" = 1'-0"



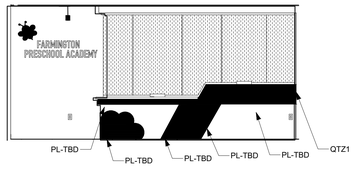
C1 RECEP. DESK - VIEW 1



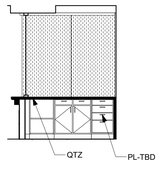
C2 RECEP. DESK - VIEW 2



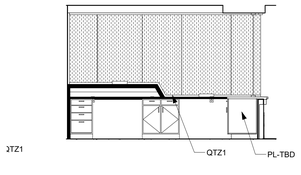
B2 ELEVATION - SIDE 1
1/4" = 1'-0"



B3 ELEVATION - FRONT
1/4" = 1'-0"



B4 ELEVATION - SIDE 2
1/4" = 1'-0"



B5 ELEVATION - BACK
1/4" = 1'-0"

PAINT WALL FINISHES

P1 MFG: SHERWIN WILLIMAS
COLOR: # SW-6385 DOVER WHITE
NOTE: GENERAL WALL COLOR

P2 MFG: SHERWIN WILLIAMS
COLOR: # SW 9170 ACIER
NOTE: HMD & WINDOW FRAME

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2

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DRAWN BY:	DRW
CHECKED BY:	CHK

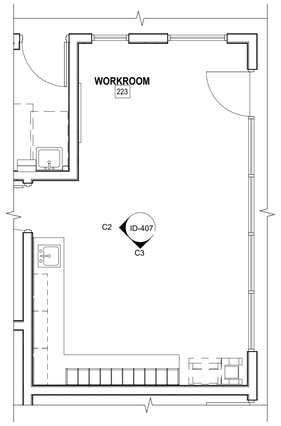
SHEET TITLE

ENLARGED PLANS & ELEVATIONS - ADMINISTRATION

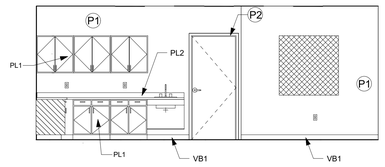
ID-404

Farmington Preschool Academy

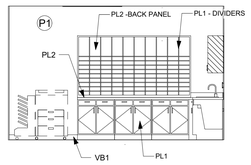
9/3/2024 4:27:43 PM



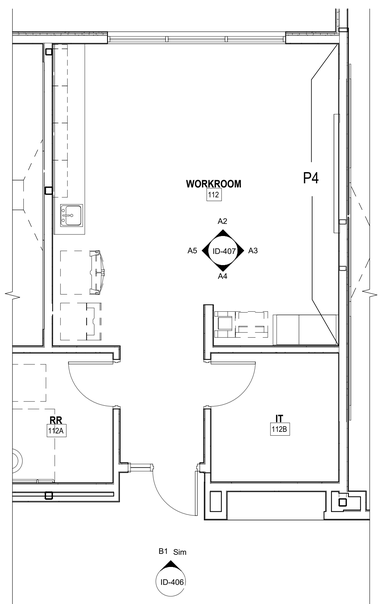
C1 ENLARGED PLAN - WORKROOM 223
1/4" = 1'-0"



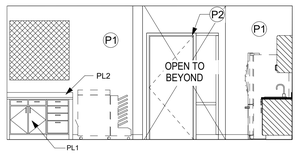
C2 WORKROOM 223 - WEST
1/4" = 1'-0"



C3 WORKROOM 223 - SOUTH
1/4" = 1'-0"

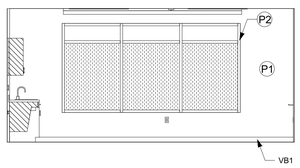


A1 ENLARGED PLAN - WORKROOM 112
1/4" = 1'-0"

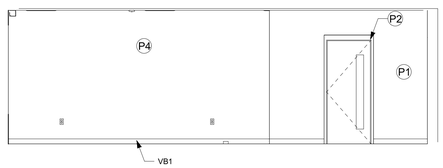


B1 WORKROOM 312 - SOUTH
1/4" = 1'-0"

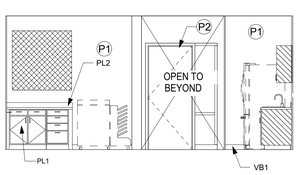
B2 WORKROOM 312 - WEST
1/4" = 1'-0"



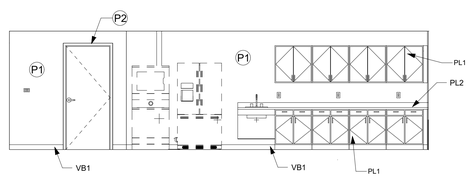
A2 WORKROOM 112 - NORTH
1/4" = 1'-0"



A3 WORKROOM 112 - EAST
1/4" = 1'-0"



A4 WORKROOM 112- SOUTH
1/4" = 1'-0"



A5 WORKROOM 112 - WEST
1/4" = 1'-0"

2

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03/21/2024
SANJAY L. ENGINEER
No. 3088
REGISTERED ARCHITECT
ARCHITECT

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CONSTRUCTION DOCUMENTS
MARCH 2024

MARK	DATE	DESCRIPTION
2	9/3/2024	ADDENDUM 02

ISSUE:	Const Doc
DATE:	March 2024
PROJECT NO:	K23-001
DRAWN BY:	Author
CHECKED BY:	Checker

SHEET TITLE

ENLARGED PLANS & ELEVATIONS - WORKROOM

ID-407

Farmington Preschool Academy

Branch Panel: L1C

Location: ELEC 110B
Supply From: DPL1A
Mounting: Surface
Enclosure: Type 1

Volts: 120/208 Wye
Phases: 3
Wires: 4
Spaces: 84

MINIMUM A.I.C. Rating: 10,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	NC WORKROOM 112	20 A	1	500 VA	900 VA					1	20 A	CON CR10 114	2
3	CON CR11 116	20 A	1			900 VA	1260 VA			1	20 A	WORKROOM 112	4
5	CON SPECIAL ED 110	20 A	1					900 VA	180 VA	1	20 A	REC WORKROOM 112	6
7	REC SPECIAL ED 110	20 A	1	720 VA	1080 VA					1	20 A	REC	8
9	REC CR10 114	20 A	1			720 VA	720 VA			1	20 A	REC CR11 116	10
11	REC CR13 109	20 A	1					900 VA	720 VA	1	20 A	REC CR13 109	12
13	REC CR14 111	20 A	1	900 VA	720 VA					1	20 A	REC CR14 111	14
15	REC CR15 113	20 A	1			900 VA	720 VA			1	20 A	REC CR15 113	16
17	REC WORKROOM 112	20 A	1					180 VA	180 VA	2	20 A	CON WORKROOM 112	18
19	REC HALLWAY 100	20 A	1	180 VA	180 VA					--	--	--	20
21	REC HALLWAY 100	20 A	1			180 VA							22
23													24
25													26
27													28
29													30
31													32
33													34
35													36
37													38
39													40
41													42
		Total Load:		5180 VA		5400 VA		3060 VA					
		Total Amps:		46 A		48 A		26 A					

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
NC	680 VA	100.00%	680 VA		
CON	360 VA	125.00%	450 VA	**Total Conn. Load:**	13640 VA
REC	12600 VA	89.68%	11300 VA	**Total Est. Demand:**	12430 VA
				Total Conn. Current:	38 A
				Total Est. Demand Current:	35 A

Branch Panel: H1A

Location: ELEC 233
Supply From: MSB
Mounting: Surface
Enclosure: Type 1

Volts: 480/277 Wye
Phases: 3
Wires: 4
Spaces: 42

MINIMUM A.I.C. Rating: 42,000
Mains Type: MLO
Mains Rating: 225 A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	CON MARQUEE SIGN	20 A	1	0 VA	850 VA					1	20 A	LTG Lighting	2
3	Lighting MULTIPURPOSE 101	20 A	1			418 VA	850 VA			1	20 A	LTG Lighting	4
5	Room 200, 201	20 A	1					1416 VA	692 VA	1	20 A	Room 203, 204, 202, 206, 207, 201, 308, 205	6
7	LTG Room 213A, 213, 213C, 213B	20 A	1	200 VA	549 VA					1	20 A	LTG Lighting	8
9	LTG CR2 212	20 A	1			850 VA	850 VA			1	20 A	LTG CR4 218	10
11	LTG Room 217, 219, 223, 224, 216, 215, 222	20 A	1					325 VA	850 VA	1	20 A	LTG OP/TP 211	12
13	Room 229, 225, 232, 233, 231, 226, 230, 228, 227	20 A	1	624 VA	850 VA					1	20 A	LTG CR5 220	14
15	HALLWAY 100	20 A	1			884 VA	25 VA			1	20 A	LTG Lighting	16
17	Room 115	20 A	1					433 VA	162 VA	1	20 A	Room 103, 102, 100	18
19	LTG Lighting	20 A	1	850 VA	850 VA					1	20 A	LTG Lighting	20
21	LTG Lighting	20 A	1			850 VA	113 VA			2	20 A	LTG Exterior Drive Lane Lighting	22
23	LTG Lighting	20 A	1					216 VA	113 VA	--	--	--	24
25	LTG Exterior Bus Dropoff Lighting	20 A	2	150 VA									26
27	--	--	--			150 VA	300 VA			2	20 A	LTG Exterior Parking Lighting	28
29	LTG Exterior Parking Lighting	20 A	2					500 VA	300 VA	--	--	--	30
31	--	--	--	500 VA									32
33													34
35													36
37													38
39													40
41													42
43													44
45													46
47													48
49													50
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67													68
69													70
71													72
73													74
75													76
77													78
79													80
81													82
83													84
		Total Load:		5423 VA		5290 VA		5007 VA					
		Total Amps:		20 A		19 A		18 A					

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
CON	0 VA	0.00%	0 VA		
LTG	13785 VA	125.00%	17231 VA	**Total Conn. Load:**	15719 VA
Lighting	560 VA	125.00%	700 VA	**Total Est. Demand:**	19305 VA
Other	1374 VA	100.00%	1374 VA	**Total Conn. Current:**	19 A
				Total Est. Demand Current:	23 A

Branch Panel: MPH

Location: PENTHOUSE 2 406
Supply From: DPH2
Mounting: Surface
Enclosure: Type 1

Volts: 480/277 Wye
Phases: 3
Wires: 4
Spaces: 84

MINIMUM A.I.C. Rating: 42,000
Mains Type: MLO
Mains Rating: 400 A

Notes:

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	NC EUH-3	35 A	1	7500 VA	444 VA					3	20 A	MTR - MAU-1	2
3	NC EUH-4	35 A	1			7500 VA	444 VA			--	--	--	4
5	MTR MZU - 1 RETURN	20 A	3					2106 VA	444 VA	--	--	--	6
7	--	--	--	2106 VA	2106 VA					3	20 A	MTR MZU - 1 SUPPLY 1	8
9	--	--	--			2106 VA	2106 VA			--	--	--	10
11	MTR MZU-1 SUPPLY 2	20 A	3					2106 VA	2106 VA	--	--	--	12
13	--	--	--	2106 VA	2106 VA					3	20 A	MTR PENTHOUSE 2 MZU-2 EXHAUST	14
15	--	--	--			2106 VA	2106 VA			--	--	--	16
17	MTR PENTHOUSE 2 MZU-2 SUPPLY 1	20 A	3					2106 VA	2106 VA	--	--	--	18
19	--	--	--	2106 VA	2106 VA					3	20 A	MTR PENTHOUSE 2 MZU-2 SUPPLY 2	20
21	--	--	--			2106 VA	2106 VA			--	--	--	22
23	MTR CU-1	70 A	3					11528 VA	2106 VA	--	--	--	24
25	--	--	--	11528 VA	13967 VA					3	80 A	MTR CU-2	26
27	--	--	--			11528 VA	13967 VA			--	--	--	28
29									13967 VA	--	--	--	30
31													32
33													34
35													36
37													38
39													40
41													42
		Total Load:		46077 VA		46077 VA		38577 VA					
		Total Amps:		171 A		171 A		139 A					

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
NC	15000 VA	100.00%	15000 VA		
MTR	115731 VA	100.00%	115731 VA	**Total Conn. Load:**	130731 VA
				Total Est. Demand:	130731 VA
				Total Conn. Current:	157 A
				Total Est. Demand Current:	157 A

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ENGINEER

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CONSTRUCTION DOCUMENTS
AUGUST 2024

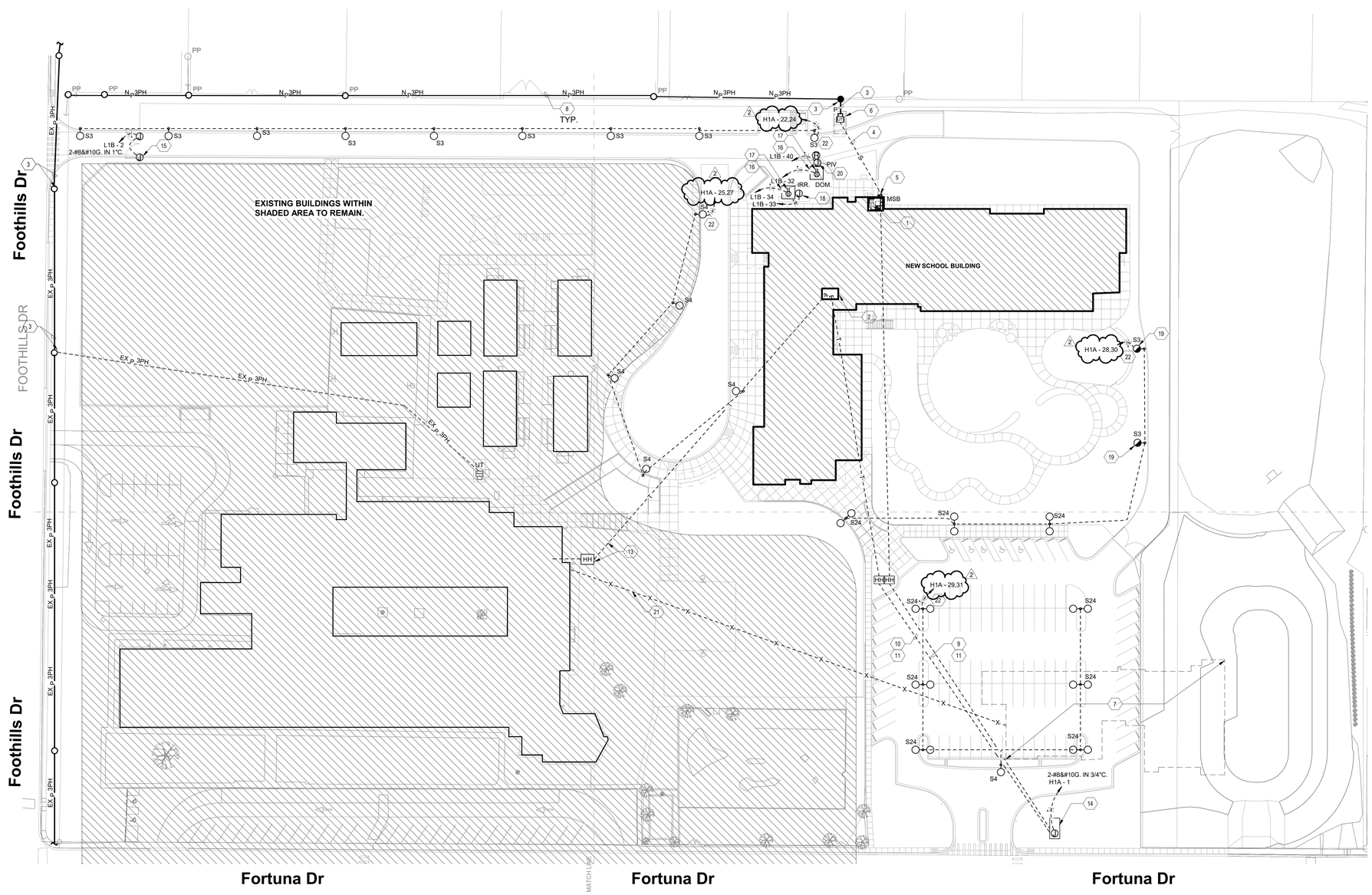
MARK	DATE	DESCRIPTION
	08/06/24	Addendum 001
	9/04/24	Addendum 002

ISSUE:	CONSTRUCTION DOCUMENTS
DATE:	AUGUST 2024
PROJECT NO:	K23-001
DRAWN BY:	Author
CHECKED BY:	Checker

SHEET TITLE

PANEL SCHEDULES

E-703



A1 ELECTRICAL SITE PLAN
1" = 40'-0"

0' 20' 40' 80'

GENERAL NOTES

A. REFER TO SHEET SERIES "EP" FOR ELECTRICAL ROOM EQUIPMENT LAYOUTS AND EQUIPMENT SIZES.
B. REFER TO SHEET SERIES "C", "AS", "M", "T" AND "P" FOR OTHER UTILITIES WITHIN ROUTING PATH OF ELECTRICAL RACEWAYS. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ANY UTILITIES SHOWN ON THIS SHEET PRIOR TO COMMENCEMENT OF ANY WORK FOR BEST LOCATION OF THESE UTILITIES.
C. REFER TO SHEET E-601 FOR ELECTRICAL EQUIPMENT, CONDUIT SIZE AND ADDITIONAL INFORMATION ON ELECTRICAL DISTRIBUTION SYSTEM. REFER TO SHEET SERIES "T" FOR TELECOMMUNICATION ROOMS, EQUIPMENT LAYOUTS AND EQUIPMENT SIZES.
D. ALL EXTERIOR BUILDING LUMINAIRES AND POLE MOUNTED SITE LUMINAIRES WILL BE ROUTED THROUGH A TIME CLOCK LOCATED IN THE ELECTRICAL ROOM WHERE PANEL CIRCUITING THOSE LUMINAIRES IS LOCATED. THE EXTERIOR BUILDING LUMINAIRES AND SITE LUMINAIRES MUST BE CONTROLLED SEPARATELY. ALL SITE POLES TO BE #8's.
E. WHERE CONDUITS CROSS A DRIVEWAY, ROADWAY OR PARKING AREA, CONDUITS SHALL BE CONCRETE ENCASED.
F. REFER TO SHEET E-701 FOR LUMINAIRE SCHEDULE.
G. SHOULD CONTRACTOR AT ANY TIME NOTICE THAT THE ACTUAL FIELD CONDITIONS DO NOT CORRESPOND TO THE INFORMATION GIVEN ON THE DRAWINGS, THEN IT WILL BE THEIR RESPONSIBILITY TO NOTIFY THE ARCHITECT FOR CLARIFICATION, PRIOR TO COMMENCING ANY WORK.
H. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH ALL TRADES FOR THE EXACT LOCATION OF EQUIPMENT THAT REQUIRE ELECTRICAL CONNECTIONS PRIOR TO COMMENCEMENT OF ANYWORK.

KEYNOTES

1. ELECTRICAL ROOM. REFER TO "EP" SHEET SERIES FOR ELECTRICAL EQUIPMENT LAYOUT.
2. MDF ROOM. REFER TO SHEET SERIES "TELECOM DESIGN SHEETS" FOR ELECTRICAL EQUIPMENT LAYOUT.
3. UTILITY TO PROVIDE NEW POWER POLE FOR UNDERGROUND DISTRIBUTION. UNDERGROUND PRIMARY DISTRIBUTION FROM POWER POLE PER UTILITY DIRECTION TO NEW UTILITY TRANSFORMER LOCATION. COORDINATE WITH UTILITY REPRESENTATIVE AND SERVICE GUIDE PRIOR TO COMMENCEMENT OF ANY WORK FOR CONTRACTOR WORK RESPONSIBILITIES.
4. NEW SECONDARY FEEDER FROM UTILITY TRANSFORMER TO BUILDING SERVICE DISCONNECT SWITCH. REFER TO SHEETS E-501 AND E-601 FOR ADDITIONAL INFORMATION. COORDINATE UG PATHWAY WITH PLUMBING PLAN P5101. MAINTAIN REQUIRED HORIZONTAL CLEARNCES.
5. ELECTRICAL SERVICE DISCONNECT FOR BUILDING. REFER TO SHEET EP101B AND E-601 FOR ADDITIONAL INFORMATION.
6. NEW UTILITY TRANSFORMER LOCATION. CONTRACTOR TO PROVIDE CONCRETE PAD PER UTILITY COMPANY SERVICE INSTALLATION GUIDE AND/ OR COORDINATION WITH UTILITY REPRESENTATIVE.
7. EXISTING BUILDING TO BE REMOVED ALONG WITH ALL ELECTRICAL AND FIRE ALARM SYSTEMS BACK TO SYSTEM EQUIPMENT SOURCE. BUILDING WILL BE REMOVED AT SUCH TIME IN CONSTRUCTION THAT IT ALLOWS FOR NEW SITE WORK. REMOVAL OF EXISTING ELECTRICAL SERVICE TO BE COORDINATED WITH FEUS. REFER TO SHEET SERIES "A" FOR ADDITIONAL INFORMATION.
8. UTILITY COMPANY WILL UPGRADE EXISTING SINGLE PHASE OVERHEAD DISTRIBUTION TO THREE PHASE.
9. PROVIDE 1" CONDUIT WITH PULLSTRING FOR MARQUEE SIGN POWER TO ELECTRICAL ROOM 233, PANEL 'H1A'.
10. PROVIDE 2" CONDUIT WITH PULLSTRING FOR MARQUEE SIGN DATA TO MDF ROOM 216.
11. INSTALLATION OF UNDERGROUND CONDUIT FROM HANDHOLES TO MARQUEE SIGN TO BE COMPLETED AFTER DEMOLITION OF EXISTING BUILDING IS COMPLETED. COORDINATE PHASING OF WORK WITH ARCHITECT.
12. NOT USED
13. EXTEND (1) 4" CONDUIT FROM EXISTING COUNTRY CLUB SCHOOL FIBER DEMARK POINT TO NEW SCHOOL MDF ROOM 216. STUB CONDUIT UP 6" INTO BOTTOM RIGHT CORNER OF ROOM. COORDINATE LOCATION OF FIBER DEMARK IN EXISTING COUNTRY CLUB SCHOOL IN FIELD. COORDINATE QUANTITY AND LOCATIONS OF ANY REQUIRED HANDHOLE OR PULLBOXES AS WELL AS PHASING OF ALL ASSOCIATED WORK AND CONDUIT ROUTING WITH SCHOOL DISTRICT IT REPRESENTATIVE, NCI, AND ARCHITECT.
14. APPROXIMATE LOCATION OF MARQUEE SIGN. COORDINATE EXACT LOCATION WITH ARCHITECT.
15. POWER FOR MOTORIZED GATE. COORDINATE EXACT LOCATION WITH ARCHITECT AND REQUIREMENTS WITH MANUFACTURERS SPECIFICATIONS. PROVIDE 2-#10 & # 10G. IN 1" CONDUIT.
16. BACKFLOW PREVENTER HOT BOX ENCLOSURE. COORDINATE REQUIREMENTS WITH CIVIL AND OWNER PRIOR TO ROUGH IN.
17. 120V RECEPTACLE FOR HEATED ENCLOSURE. REFER TO DETAIL "LI-501/A1" FOR TERMINATION DETAILS.
18. PEDESTAL MOUNTED IRRIGATION CONTROLLER. PROVIDE 3/4" RIGID PVC SWEEP ELL FOR 120V POWER. REFER TO DETAIL "LI-501/C1" FOR TERMINATION DETAILS.
19. UL924 EMERGENCY BATTERY PACK FOR EGRESS FIXTURES INDICATED. COORDIANTE WITH VENDOR.
20. POST INDICATOR VALVE. COORDINATE FA REQUIREMENTS.
21. EXISTING FIBER LINE AND ASSOCIATED CONDUIT TO BE ABANDONED AFTER EXISTING PRESCHOOL DEMOLITION. COORDINATE FIBER AND CONDUIT REMOVAL WITH OWNER AND ARCHITECT. COORDINATE PHASING OF ALL ASSOCIATED WORK WITH ARCHITECT AND OWNER. REFER TO KEYNOTE '13' FOR ADDITIONAL INFORMATION.
22. ALL POLE BASED SITE LIGHTING TO BE (2)#12+#12 GND IN 1"C. U.O.N.

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Digitally signed by John F. Heck
Date: 2024.09.04 16:12:47 -06'00'
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CONSTRUCTION DOCUMENTS
AUGUST 2024

MARK	DATE	DESCRIPTION
	08/06/24	Addendum 001
	9/04/24	Addendum 002

ISSUE:	CONSTRUCTION DOCUMENTS
DATE:	AUGUST 2024
PROJECT NO:	K23-001
DRAWN BY:	Author
CHECKED BY:	Checker

SHEET TITLE
ELECTRICAL SITE PLAN

ES101

Bridgers & Paxton Project No: 8819 9/4/2024 4:09:45 PM D:\Revit 2023\Projects\8819_MEP_Farmington Preschool Academy_WLStacy.rvt
Farmington Preschool Academy

INDOOR VAV MULTIZONE AIR HANDLING UNIT WITH INDIVIDUAL ZONE REHEAT - SECTION 23 7313

SYMBOL	MANUFACTURER & MODEL NO.	TYPE	LOCATION	SUPPLY FAN SECTION: TOTAL AIRFLOW (CFM)	FAN SIZE AND TYPE	PER FAN: FAN ARRAY QTY.	PER FAN: AIRFLOW (CFM)	PER FAN: EXT. SP. (IN. WC)	PER FAN: TOTAL SP. (IN. WC)	PER FAN: BHP	PER FAN: RPM	MOTOR: QTY	MOTOR: HP EACH	MOTOR: V/PH/H	EXHAUST FAN SECTION: TOTAL AIRFLOW (CFM)	FAN SIZE AND TYPE	PER FAN: FAN QTY	PER FAN: AIRFLOW (CFM)	MOTOR: QTY	MOTOR: HP EACH	MOTOR: V/PH/H	DIRECT EXPANSION COOLING COIL: REFR. TYPE	MAX. FACE VEL. (FPM)	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	EAT (°F): DB/WB	LAT (°F): DB/WB	AIR MAX. PD (IN. WC)
MZU-1	TRANE CSAA025UA	PERFORMANCE CLIMATE CHANGER	405 PENTHOUSE 1	9,300	DIRECT DRIVE PLENUM	2	4,650	1.1	2.552	7.428	2414	2	5	460/3/60	9,300	DIRECT DRIVE PLENUM	1	9,300	1	5	460/3/60	410A	376	265.0	265.0	84/58	52/46	0.188
MZU-2	TRANE CSAA025UA	PERFORMANCE CLIMATE CHANGER	406 PENTHOUSE 2	10,400	DIRECT DRIVE PLENUM	2	5,200	1.1	2.621	9.280	2605	2	5	460/3/60	10,400	DIRECT DRIVE PLENUM	1	10,400	1	5	460/3/60	410A	420	318.0	318.0	85/58	51/45	0.207
MZU-3	TRANE CSAA035UA	PERFORMANCE CLIMATE CHANGER	403 PENTHOUSE 3	15,800	DIRECT DRIVE PLENUM	2	7,900	1.5	3.155	12.963	2092	2	7.5	460/3/60	15,800	DIRECT DRIVE PLENUM	2	7,900	2	3	460/3/60	410A	452	492.0	492.0	85/58	50/45	0.313
MZU-4	TRANE CSAA030UA	PERFORMANCE CLIMATE CHANGER	403 PENTHOUSE 3	12,900	DIRECT DRIVE PLENUM	2	6,450	1.3	2.920	10.813	2164	2	7.5	460/3/60	12,900	DIRECT DRIVE PLENUM	2	6,450	2	3	460/3/60	410A	436	372.0	372.0	86/60	54/48	0.293

CONTINUED - INDOOR VAV MULTIZONE AIR HANDLING UNIT WITH INDIVIDUAL ZONE REHEAT - SPECIFICATION SECTION 23 7313

SYMBOL	MAIN HOT WATER HEATING COIL: TOTAL CAPACITY (MBH)	MAX. FACE VELOCITY (FPM)	EAT (°F)	LAT (°F)	GPM	WATER TEMP (°F): ENT.	WATER TEMP (°F): LVG.	MAX PRESSURE LOSS: AIR (IN. WC)	MAX PRESSURE LOSS: WATER (FT. WC)	INDIRECT/DIRECT EVAPORATIVE COOLING SECTION: INDIRECT: AIRFLOW RATE (CFM)	INDIRECT: SENSIBLE CAPACITY (MBH)	INDIRECT: EAT DB/WB (°F)	INDIRECT: LAT DB/WB (°F)	INDIRECT: STATIC PRESSURE DROP (IN H20)	INDIRECT: COOLING EFFICIENCY (%)	INDIRECT: PUMP: QTY	INDIRECT: PUMP PER PUMP: HP	INDIRECT: PUMP PER PUMP: GPM	INDIRECT: PUMP PER PUMP: V/PH/H	DIRECT: AIRFLOW RATE (CFM)	DIRECT: ADIABATIC COOLING CAPACITY (MBH)	DIRECT: EAT DB/WB (°F)	DIRECT: LAT DB/WB (°F)	DIRECT: STATIC PRESSURE DROP (IN H20)	DIRECT: COOLING EFFICIENCY (%)	DIRECT: COOLING MEDIA	DIRECT: PUMP: QTY	DIRECT: PUMP PER PUMP: HP	DIRECT: PUMP PER PUMP: GPM	DIRECT: PUMP PER PUMP: VOLT/PH/H	FILTER: TYPE	MIN OUTSIDE AIR (CFM)	TOTAL OPERATING WEIGHT (LBS.)	OVERALL UNIT DIMENSIONS (H X W X L) (INCHES)
MZU-1	213.57	201	7.0	60.0	21.41	130	110	0.011	15.82	9,300	174.03	96/65	74/58	0.8	72	1	1/3	29	115/1/60	9,300	103.53	74/58	60/58	0.2	80	12" CELDEK	1	1/3	29	115/1/60	2" MERV 8	4,500	12,000	136" X 84" X 311"
MZU-2	248.77	220	7.0	60.0	24.94	130	110	0.017	1.27	10,400	194.61	96/65	74/58	0.8	72	1	1/3	29	115/1/60	10,400	115.78	74/58	60/58	0.2	80	12" CELDEK	1	1/3	29	115/1/60	2" MERV 8	5,300	12,000	136" X 84" X 311"
MZU-3	394.28	257	7.0	60.0	39.52	130	110	0.022	3.13	15,800	295.66	96/65	74/58	0.8	72	1	1/3	29	115/1/60	15,800	175.89	74/58	60/58	0.2	80	12" CELDEK	1	1/3	29	115/1/60	2" MERV 8	8,400	16,000	136" X 120" X 317"
MZU-4	342.65	254	7.0	60.0	34.34	130	110	0.022	2.45	12,900	241.40	96/65	74/58	0.8	72	1	1/3	29	115/1/60	12,900	143.61	74/58	60/58	0.2	80	12" CELDEK	1	1/3	29	115/1/60	2" MERV 8	7,200	14,000	136" X 96" X 302"

CONTINUED INDOOR VAV MULTIZONE AIR HANDLING UNIT WITH INDIVIDUAL ZONE REHEAT - SPECIFICATION SECTION 23 7313 /2

ZONE	DISCHARGE SOUND POWER BY OCTIVE BAND: 63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NOTES
MZU-1	74	77	83	80	81	82	79	68	
MZU-2	76	80	81	86	84	83	83	71	
MZU-3	80	82	90	86	87	87	87	77	
MZU-4	77	80	83	86	82	84	78	68	

LIGHTS AND SWITCH- 115/1/60 CIRCUIT /2

CONDENSING BOILERS - SECTION 23 5216

SYMBOL	MANUFACTURER & MODEL NO.	LOCATION	SERVICE	SEA LEVEL INPUT (BTUH)	FLUE SIZE (IN.)	COMBUSTION AIR INLET SIZE (IN.)	ELECTRICAL DATA: VOLT	PHASE	HZ	THERMAL EFFICIENCY (%)	OPERATING WEIGHT (LBS.)	NOTES
B-1	LOCHINVAR FB-1751	301 MECH	HEATING WATER SYSTEM	1,750,000	8	8	120	1	60	99	2,500	130 deg F SUPPLY WATER TEMPERATURE
B-2	LOCHINVAR FB-1751	301 MECH	HEATING WATER SYSTEM	1,750,000	8	8	120	1	60	99	2,500	130 deg F SUPPLY WATER TEMPERATURE

PROVIDE CONDENSATE NEUTRALIZATION KIT, BMS GATEWAY - BACNET IP

PUMPS

SYMBOL	BELL & GOSSETT MODEL NO.	LOCATION	SERVICE	TYPE	CAPACITY (GPM)	MIN. FLOW (GPM)	TOTAL HEAD (FT. WG)	PUMP RPM	MOTOR HP	ELECTRICAL DATA: VOLT	PHASE	HZ	OPERATING WEIGHT (LBS.)	NOTES
IP-1	SERIES e-60 MODEL 1x1x5-1/4	405 PENTHOUSE 1	MZU-1 HEATING WATER COIL	IN-LINE	25	4.68	20	1750	0.33	208	1	60	60	
IP-2	SERIES e-60 MODEL 1x1x5-1/4	406 PENTHOUSE 2	MZU-2 HEATING WATER COIL	IN-LINE	25	4.68	20	1750	0.33	208	1	60	60	
IP-3	SERIES e-60 MODEL 1.5x1x5-1/4	403 PENTHOUSE 3	MZU-3 HEATING WATER COIL	IN-LINE	40	8.11	20	1750	0.5	208	1	60	60	
IP-4	SERIES 60 MODEL 1-1/4x5-1/4	403 PENTHOUSE 3	MZU-4 HEATING WATER COIL	IN-LINE	35	8.11	20	1750	0.5	208	1	60	60	
IP-B1	SERIES e-80 MODEL 3x3x7C	301 MECH	HEATING WATER SYSTEM	IN-LINE	168	31.5	25	1750	2	460	3	60	180	
IP-B2	SERIES e-80 MODEL 3x3x7C	301 MECH	HEATING WATER SYSTEM	IN-LINE	168	31.5	25	1750	2	460	3	60	180	
P-1	SERIES e-1510 MODEL 2-1/2BB	301 MECH	HEATING WATER SYSTEM	BASE MOUNTED	240	48.8	60	1603	7.5	460	3	60	400	PROVIDE VFD
P-2	SERIES e-1510 MODEL 2-1/2BB	301 MECH	HEATING WATER SYSTEM	BASE MOUNTED	240	48.8	60	1603	7.5	460	3	60	400	PROVIDE VFD

VARIABLE FREQUENCY DRIVES

SYMBOL	MANUFACTURER & MODEL NO.	LOCATION	ELECTRICAL: VOLT	PHASE	HZ	MOTOR HP	NOTES
VFD1-1	ABB MODEL ACH550	MZU-1 SUPPLY	460	3	60	5	HEAVY DUTY WITH FUSED DISCONNECT
VFD1-2	ABB MODEL ACH550	MZU-1 SUPPLY	460	3	60	5	HEAVY DUTY WITH FUSED DISCONNECT
VFD1-3	ABB MODEL ACH550	MZU-1 EXHAUST	460	3	60	5	HEAVY DUTY WITH FUSED DISCONNECT
VFD2-1	ABB MODEL ACH550	MZU-2 SUPPLY	460	3	60	5	HEAVY DUTY WITH FUSED DISCONNECT
VFD2-2	ABB MODEL ACH550	MZU-2 SUPPLY	460	3	60	5	HEAVY DUTY WITH FUSED DISCONNECT
VFD2-3	ABB MODEL ACH550	MZU-2 EXHAUST	460	3	60	5	HEAVY DUTY WITH FUSED DISCONNECT
VFD3-1	ABB MODEL ACH550	MZU-3 SUPPLY	460	3	60	7.5	HEAVY DUTY WITH FUSED DISCONNECT
VFD3-2	ABB MODEL ACH550	MZU-3 SUPPLY	460	3	60	7.5	HEAVY DUTY WITH FUSED DISCONNECT
VFD3-3	ABB MODEL ACH550	MZU-3 EXHAUST	460	3	60	3	HEAVY DUTY WITH FUSED DISCONNECT
VFD3-4	ABB MODEL ACH550	MZU-3 EXHAUST	460	3	60	3	HEAVY DUTY WITH FUSED DISCONNECT
VFD4-1	ABB MODEL ACH550	MZU-4 SUPPLY	460	3	60	7.5	HEAVY DUTY WITH FUSED DISCONNECT
VFD4-2	ABB MODEL ACH550	MZU-4 SUPPLY	460	3	60	7.5	HEAVY DUTY WITH FUSED DISCONNECT
VFD4-3	ABB MODEL ACH550	MZU-4 EXHAUST	460	3	60	3	HEAVY DUTY WITH FUSED DISCONNECT
VFD4-4	ABB MODEL ACH550	MZU-4 EXHAUST	460	3	60	3	HEAVY DUTY WITH FUSED DISCONNECT
VFD-P1	ABB MODEL ACH550	BOILER	460	3	60	7.5	HEAVY DUTY WITH FUSED DISCONNECT
VFD-P2	ABB MODEL ACH550	BOILER	460	3	60	7.5	HEAVY DUTY WITH FUSED DISCONNECT

ALL VFDS SHALL BE FIELD INSTALLED. REFER TO SPECIFICATION SECTION 23 0550- VARIABLE FREQUENCY DRIVES.

ALL SELECTIONS ARE BASED ON 5500 FT. ABOVE SEA LEVEL.

EXPANSION TANK

SYMBOL	BELL & GOSSETT MODEL NO.	LOCATION	SERVICE	TANK VOLUME (GALLONS)	ACCEPTANCE VOLUME (GALLONS)	WEIGHT (LBS.)	NOTES
ET-1	D-120V	301 MECH	HEATING WATER SYSTEM	68	34	800	INITIAL TANK PRESSURE 12 PSIG

AIR SEPARATOR

SYMBOL	MANUFACTURER & MODEL NO.	LOCATION	SERVICE	CAPACITY (GPM)	WATER TEMP. (DEG F)	PIPE CONNECTION (IN)	WEIGHT (LBS)
AS-1	ROLAIRTROL R-6F	301 MECH	HEATING WATER SYSTEM	700	130	6"	600

CHEMICAL FEED SYSTEM

SYMBOL	MANUFACTURER & MODEL NO.	LOCATION	TYPE	CAPACITY (GALLONS)	NOTES
CF-1	NEPTUNE FTF-5DB	301 MECH	VERTICAL DISCHARGE BOTTOM DRAIN	5	PROVIDE FILTER BAG

INDOOR VAV MULTIZONE AIR HANDLING UNIT WITH INDIVIDUAL ZONE REHEAT - INDIVIDUAL ZONE SCHEDULE

ZONE	T-STAT LOCATION	MULTIZONE UNIT	CONNECTION SIZE TO MZU (IN.)	MAXIMUM AIRFLOW (CFM)	MINIMUM AIRFLOW (CFM)	HEATING MAX AIRFLOW (CFM)	COIL EAT (°F)	COIL LAT (°F)	COIL CAPACITY (MBH)	FLOW RATE (GPM)
1-01	209 CLASSROOM	MZU-1	16X16	1550	465	698	55	95	30.3	3.0
1-02	200 VESTIBULE	MZU-1	10X16	600	180	270	55	95	11.7	1.7
1-03	201 RECEPTION & WAITING	MZU-1	12X16	985	296	443	55	95	19.2	1.9
1-04	202 DIRECTOR	MZU-1	12X16	950	285	428	55	95	18.6	1.9
1-05	203 SOCIAL WORKER	MZU-1	10X16	760	228	342	55	95	14.8	1.5
1-06	205 CONFERENCE	MZU-1	10X16	710	213	320	55	95	13.9	1.4
1-07	210 CLASSROOM	MZU-1	16X16	1440	432	648	55	95	28.1	2.8
1-08	212 CLASSROOM	MZU-1	16X16	1440	432	648	55	95	28.1	2.8
1-09	213 NURSE	MZU-1	10X16	825	248	371	55	95	16.1	1.6
1-10	211 OP/TP	MZU-1	16X16	1450	435	653	55	95	28.3	2.8
2-01	217 OFFICE	MZU-2	8X16	310	93	140	55	95	6.1	0.6
2-02	224 DIAGNOSTITIAN	MZU-2	10X16	680	204	306	55	95	13.3	1.3
2-03	201 HALLWAY	MZU-2	20X16	2100	630	945	55	95	41.0	4.1
2-04	214 CLASSROOM	MZU-2	16X16	1440	432	648	55	95	28.1	2.8
2-05	218 CLASSROOM	MZU-2	16X16	1440	432	648	55	95	28.1	2.8
2-06	220 CLASSROOM	MZU-2	20X16	2000	600	900	55	95	39.1	3.9
2-07	221 CLASSROOM	MZU-2	14X16	1280	384	576	55	95	25.0	2.5
2-08	226 KITCHEN	MZU-2	20X16	1900	570	855	55	95	37.1	3.7
2-09	223 WORKROOM	MZU-2	14X16	990	297	446	55	95	19.3	1.9
3-01	116 CLASSROOM	MZU-3	12X18	1300	390	585	55	95	25.4	2.5
3-02	112 WORKROOM	MZU-3	8X18	760	228	342	55	95	14.8	1.5
3-03	114 CLASSROOM	MZU-3	12X18	1300	390	585	55	95	25.4	2.5
3-04	113 CLASSROOM	MZU-3	16X18	1720	516	774	55	95	33.6	3.4
3-05	111 CLASSROOM	MZU-3	14X18	1400	420	630	55	95	27.3	2.7
3-06	109 CLASSROOM	MZU-3	14X18	1400	420	630	55	95	27.3	2.7
3-07	101 MULTIPURPOSE	MZU-3	20X18	2700	810	1215	55	95	52.7	5.3
3-08	107 CLASSROOM	MZU-3	14X18	1400	420	630	55	95	27.3	2.7
3-09	101 MULTIPURPOSE	MZU-3	20X18	2500	750	1125	55	95	48.8	4.9
3-10	106 CLASSROOM	MZU-3	14X18	1620	486	729	55	95	31.6	3.2
3-11	110 SPECIAL ED	MZU-3	8X18	840	252	378	55	95	16.4	1.6
3-12	104 CLASSROOM	MZU-3	14X18	1420	426	639	55	95	27.7	2.8
4-01	312 WORKROOM	MZU-4	10X18	800	240	360	55	95	15.6	1.6
4-02	314 CLASSROOM	MZU-4	12X18	1300	390	585	55	95	25.4	2.5
4-03	316 CLASSROOM	MZU-4	12X18	1300	390	585	55	95	25.4	2.5
4-04	300 EAST STAIR	MZU-4	20X18	2000	600	900	55	95	39.1	3.1
4-05	313 CLASSROOM	MZU-4	14X18	1420	426	639	55	95	27.7	2.8
4-06	311 CLASSROOM	MZU-4	14X18	1420	426	639	55	95	27.7	2.8
4-07	319 CLASSROOM	MZU-4	14X18	1420	426	639	55	95	27.7	2.8
4-08	307 CLASSROOM	MZU-4	14X18	1420	426	639	55	95	27.7	2.8
4-09	304 CLASSROOM	MZU-4	16X18	1700	510	765	55	95	33.2	3.3
4-10	306 CLASSROOM	MZU-4	12X18	1300	390	585	55	95	25.4	2.5
4-11	310 SPECIAL ED	MZU-4	10X18	840	252	378	55	95	16.4	1.6

PROVIDE 3/4" HWS AND 3/4" HWR TO EACH COIL.
REFER TO SPECIFICATION 23 7313.
DDC CONTROLS CONTRACTOR SHALL PROVIDE 2-WAY MODULATING CONTROL VALVE, 120/24 VAC TRANSFORMER, LOW VOLTAGE ACTUATOR, AIRFLOW STATION, AND SENSORS FOR EACH ZONE. SEE SPECIFIACTION 23 0900.
DDC CONTROLS CONTRACTOR SHALL LOCATE ALL TRANSFORMERS AND DDC CONTROLLERS INSIDE CONTROL PANEL MOUNTED ON THE SIDE OF MZU (DISCHARGE SECTION).

LOUVERS

SYMBOL	GREENHECK MODEL NO.	LOCATION	APPLICATION	LOUVER DIMENSIONS (INCH): WIDTH	LOUVER DIMENSIONS (INCH): HEIGHT	FREE AREA: SQ. FT.	FREE AREA: VELOCITY (FT/MIN)	PRESSURE DROP (IN. WG)
L-1	ESD-635	405 PENTHOUSE 1	INTAKE	84	60	21.5	424	0.027
L-2	ESD-635	405 PENTHOUSE 1	RELIEF	84	60	21.5	424	0.024
L-3	ESD-635	406 PENTHOUSE 2	INTAKE	90	60	23.1	437	0.029
L-4	ESD-635	406 PENTHOUSE 2	RELIEF	90	60	23.1	437	0.026
L-5	ESD-635	403 PENTHOUSE 3	INTAKE	108	72	34.6	457	0.031
L-6	ESD-635	403 PENTHOUSE 3	RELIEF	108	72	34.6	457	0.031
L-7	ESD-635	403 PENTHOUSE 3	INTAKE	90	72	28.4	448	0.030
L-8	ESD-635	403 PENTHOUSE 3	RELIEF	90	72	28.4	448	0.027
L-9	ESD-635	301 MECHANCIAL	INTAKE	24	24	1.8	439	0.029

AIR COOLED CONDENSERS

SYMBOL	TRANE MODEL NO.	TYPE	UNIT SERVED	NOMINAL CAPACITY (TONS)	REFR. TYPE	CONDENSER DATA: LIQUID LINE	CONDENSER DATA: SUCTION LINE	CONDENSER DATA: AMBIENT TEMP (DEG F)	CONDENSER DATA: NUMBER OF CIRCUITS	CONDENSER DATA: EER/IPLV	CONDENSER DATA: COMPRESSOR QUANTITY	ELECTRICAL DATA: VOLT	PHASE	HZ	MCA	MOCP	OPERATING WEIGHT (LBS.)
C-1	RAUJ25	AIR COOLED CONDENSER	MZU-1	25	R-410A	7/8"	1-5/8"	95	1	12.1	2	460	3	60	52	70	2,500
C-2	RAUJ30	AIR COOLED CONDENSER	MZU-2	30	R-410A	7/8"	2-1/8"	95	1	11.4	2	460	3	60	63	80	2,500
C-3	RAUJ40	AIR COOLED CONDENSER	MZU-3	40	R-410A	5/8"	1-5/8"	95	2	11.7	4	460	3	60	87	100	3,800
C-4	RAUJ30	AIR COOLED CONDENSER	MZU-4	30	R-410A	7/8"	2-1/8"	95	1	11.4	2	460	3	60	63	80	2,500

PROVIDE SINGLE POINT CONNECTION WITH FUSED DISCONNECT. PROVIDE REFRIGERANT PIPING AND ALL ACCESSORIES FOR A COMPLETE AND FUNCTIONAL SYSTEM PER MANUFACTURER'S INSTALLATION MANUAL. PROVIDE HOT GAS BYPASS (FROST CONTROL FOR COIL PROTECTION IS ACCEPTABLE). PROVIDE ROOF CURB WITH 2" SPRING VIBRATION ISOLATORS- THYBARVIBRO CURB III OR EQUIVALENT. PROVIDE HAIL GUARDS. REFER TO SPECIFICATIONS 23 2313.

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ILIR MESITI NEW MEXICO 20505 — Digitally signed by Ilir Mesiti — Date: 2024.10.04 10:42:17 -06'00' — PROFESSIONAL ENGINEER

ENGINEER

FARMINGTON PRESCHOOL ACADEMY
5840 FORTUNA DR.
FARMINGTON, NM 87402

CONSTRUCTION DOCUMENTS
AUGUST 2024

MARK	DATE	DESCRIPTION
	9/04/24	Addendum 002

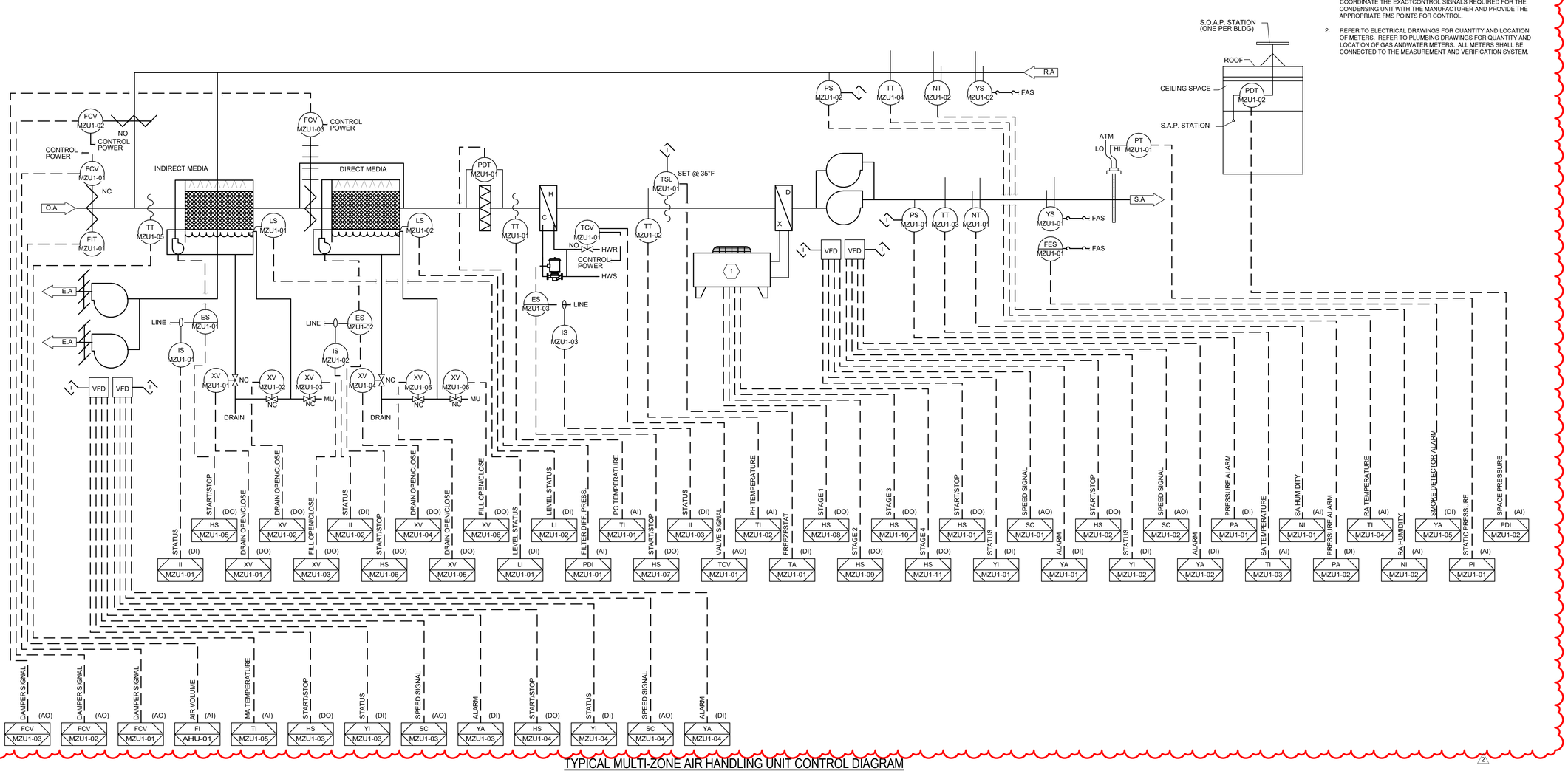
ISSUE:	CONSTRUCTION DOCUMENTS
DATE:	AUGUST 2024
PROJECT NO:	K23-001
DRAWN BY:	LMD
CHECKED BY:	IM

SHEET TITLE
MECHANICAL SCHEDULES

M-701

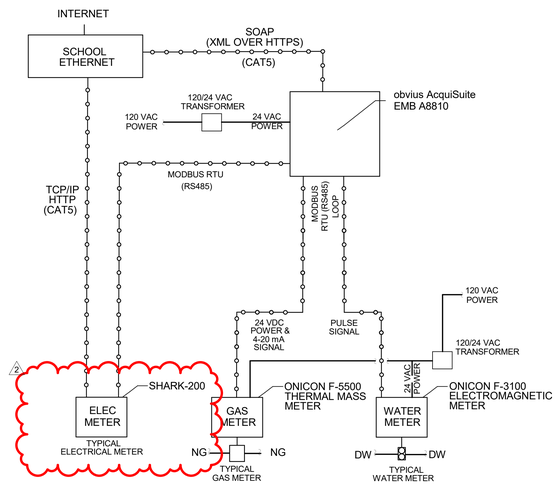
KEYNOTES

1. PROVIDE INSTALLATION OF ALL FIELD MOUNTED SENSORS, VALVE, AND SAFETIES FURNISHED WITH THE REMOTE CONDENSING UNIT. COORDINATE THE EXACTCONTROL SIGNALS REQUIRED FOR THE CONDENSING UNIT WITH THE MANUFACTURER AND PROVIDE THE APPROPRIATE FMS POINTS FOR CONTROL.
2. REFER TO ELECTRICAL DRAWINGS FOR QUANTITY AND LOCATION OF METERS. REFER TO PLUMBING DRAWINGS FOR QUANTITY AND LOCATION OF GAS ANDWATER METERS. ALL METERS SHALL BE CONNECTED TO THE MEASUREMENT AND VERIFICATION SYSTEM.

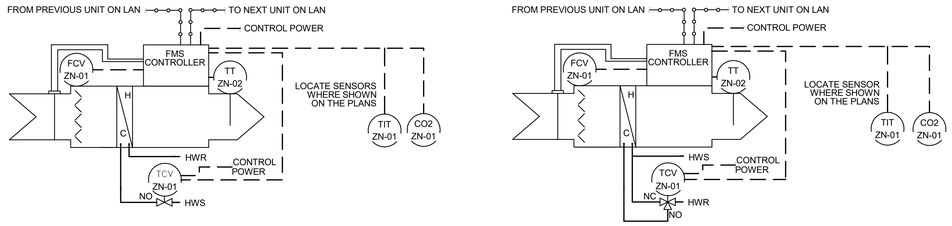


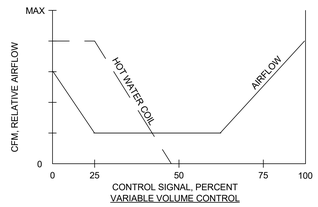
TYPICAL MULTI-ZONE AIR HANDLING UNIT CONTROL DIAGRAM

(TYPICAL FOR MZU-1 THRU MZU-4)



PSFA MEARSUREMENT & VERIFICATION METERING SYSTEM CONTROL DIAGRAM





VARIABLE VOLUME CONTROL

EACH ZONE SHALL BE EQUIPPED WITH ITS OWN STAND ALONE CONTROLLER WHICH SHALL HAVE THE CAPABILITIES DESCRIBED IN THE SPECIFICATION. THE WIRING SHOWN IS PROVIDED AS A GENERAL DESCRIPTION AND IS NOT AS A DETAILED WIRING DIAGRAM WHICH VARIES WITH THE MANUFACTURER.

TYPICAL VAV ZONE WITH HW REHEAT CONTROL DIAGRAM

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SHEET TITLE

MECHANICAL CONTROLS DIAGRAMS

MI601

Farmington Preschool Academy

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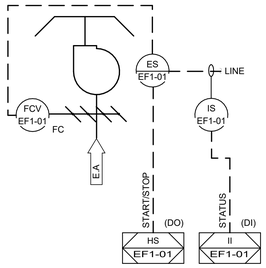
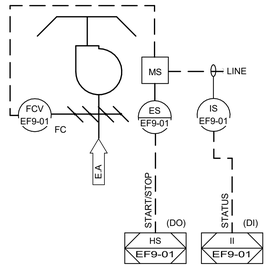
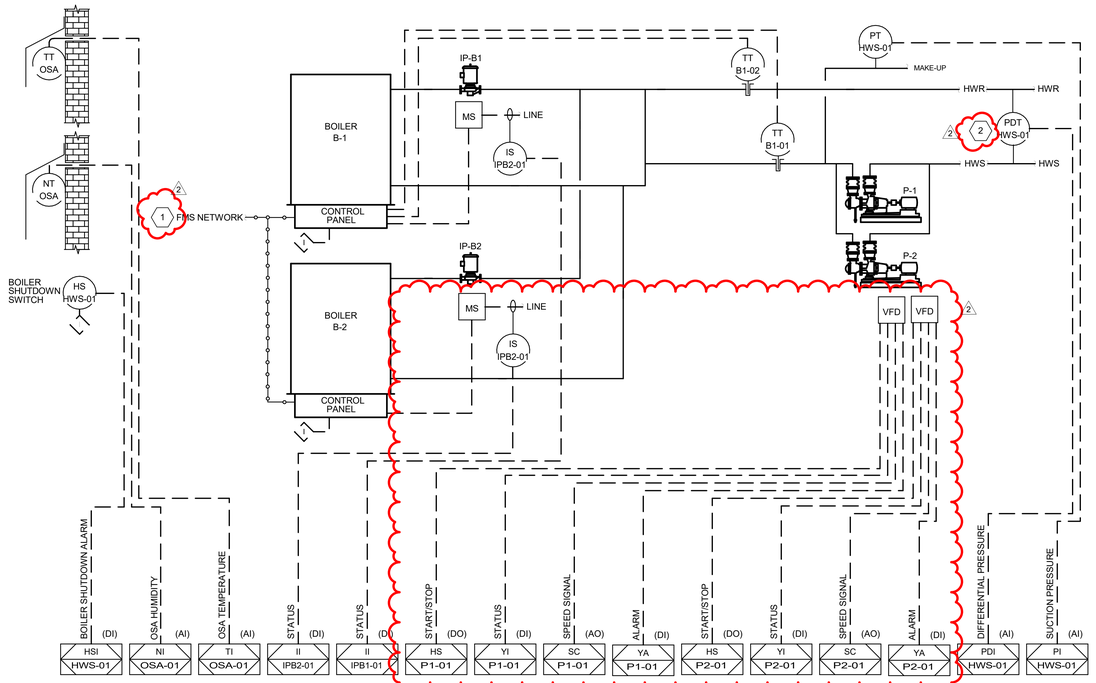


EXHAUST FAN EF-1 CONTROL DIAGRAM
(TYPICAL FOR EF-2 THRU EF-8)



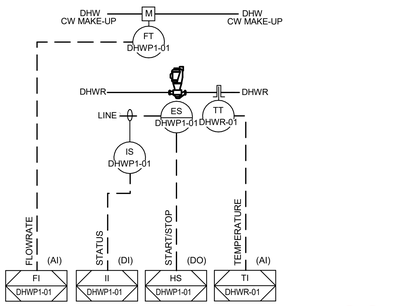
EXHAUST FAN EF-9 CONTROL DIAGRAM



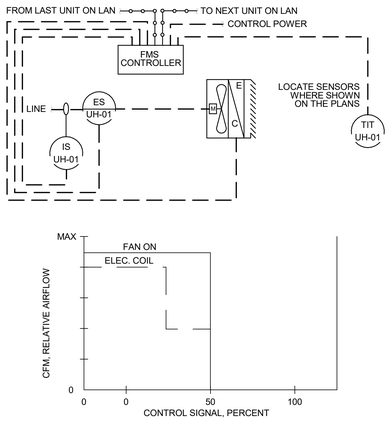
HOT WATER SYSTEM CONTROL DIAGRAM

KEYNOTES

1. THE BOILER SYSTEM SHALL BE CONNECTED TO THE FMS NETWORK THROUGH A DIRECT BACNET NETWORK CONNECTION AS INDICATED. THE FOLLOWING POINTS SHALL BE INTEGRATED INTO AND MONITORED BY THE FMS IF AVAILABLE FROM THEMANUFACTURER:
   - A. SYSTEM ENABLE/DISABLE COMMAND
   - B. OPERATING FIRING RATE
   - C. RUNTIME STATUS
   - D. SYSTEM ALARMS
   - E. PUMP ON/OFF COMMANDED STATUSES
   - F. BOILER OUTLET TEMPERATURE SETPOINT
   - G. BOILER OUTLET TEMPERATURE
   - H. BOILER INLET TEMPERATURE
   - I. SYSTEM HOT WATER SUPPLY SETPOINT COMMAND
   - J. SYSTEM HOT WATER SUPPLY TEMPERATURE
   - K. SYSTEM HOT WATER RETURN TEMPERATURE
2. LOCATE ONE DIFFERENTIAL PRESSURE TRANSMITTER IN EACH PENTHOUSE.
3. PROVIDE INTERLOCK WIRING BETWEEN MAKE-UP UNIT, EXHAUST FAN, AND HOODS AS REQUIRED BY MANUFACTURER.
4. REFER TO PLUMBING DRAWINGS FOR QUANTITY AND LOCATION OF PUMPS, TEMPERATURE SENSORS, AND FLOW TRANSMITTERS.

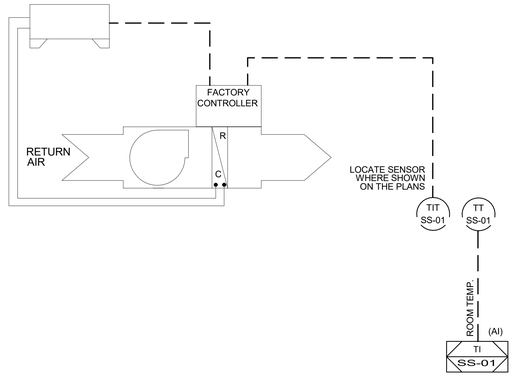


TYPICAL DOMESTIC HW PUMP CONTROL DIAGRAM 4 2

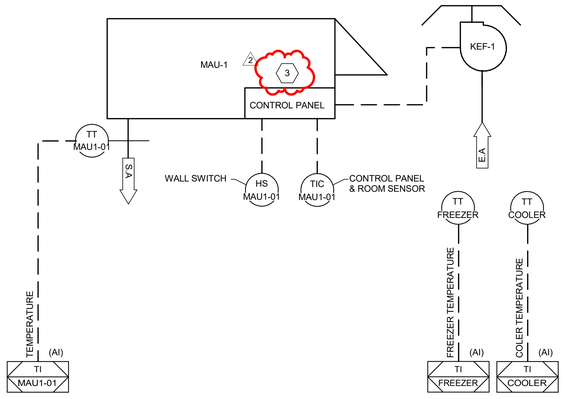


EACH UNIT HEATER SHALL BE EQUIPPED WITH ITS OWN STAND ALONE CONTROLLER WHICH SHALL HAVE THE CAPABILITIES DESCRIBED IN THE SPECIFICATION. THE WIRING SHOWN IS PROVIDED AS A GENERAL DESCRIPTION AND IS NOT AS A DETAILED WIRING DIAGRAM WHICH VARIES WITH THE MANUFACTURER.

TYPICAL ELECTRIC HEAT UNIT HEATER CONTROL DIAGRAM



TYPICAL SPLIT SYSTEM CONTROL DIAGRAM



KITCHEN SYSTEMS CONTROL DIAGRAM

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CONSTRUCTION DOCUMENTS
AUGUST 2024

MARK	DATE	DESCRIPTION
	9/04/24	Addendum 002

ISSUE:	CONSTRUCTION DOCUMENTS
DATE:	AUGUST 2024
PROJECT NO:	K23-001
DRAWN BY:	SB
CHECKED BY:	IM

SHEET TITLE

MECHANICAL CONTROLS DIAGRAMS

MI602

SEQUENCE OF OPERATIONS

GENERAL

PROGRAMMING
THE FMS SHALL BE PROGRAMMED ACCORDING TO THE FOLLOWING SEQUENCE OF OPERATIONS INCLUDING ALL ENERGY REDUCTION OPERATIONS DESCRIBED IN THIS SEQUENCE AND IN THE PROJECT SPECIFICATIONS.

SYSTEM STATUS DISPLAY
THE FMS SHALL PROVIDE OPERATING STATUS FOR ALL SYSTEMS CONTROLLED BY THE FMS. THE DISPLAYS SHALL INCLUDE ALL POINTS INDICATED ON THE DRAWINGS AND ANY OTHERS REQUIRED TO ACHIEVE THE SEQUENCE OF OPERATIONS. THE FMS SHALL BE ABLE TO INTEGRATE SYSTEM DIAGNOSTICS INTO CONTROL ACTION DECISIONS. THIS SHALL ALSO INCLUDE THE ABILITY TO DESIGNATE INDIVIDUAL UNITS AS BEING IN MAINTENANCE MODE TO AVOID GENERATING ALARMS. ALL SYSTEM CONTROL AND STATUS EVENTS SHALL BE RECORDED, AT THE OPERATOR'S SELECTION, IN THE FMS EVENT LOG TO FACILITATE TROUBLESHOOTING. ALL DETECTED ALARMS OR FAILURES SHALL INITIATE AN ALARM WITHIN THE FMS.

POWER FAILURE RECOVERY
THE FMS SHALL CONTAIN A POWER FAILURE RECOVERY MODE (OPERATOR ADJUSTABLE). THE POWER FAILURE RECOVERY CAPABILITY SHALL RETURN THE SYSTEM TO ITS LAST STATE (BEFORE THE BUILDING LOST POWER).

OCCUPANCY CONTROL
THE FMS SHALL BE SETUP WITH AN OCCUPANCY SCHEDULE FOR DIFFERENT AREAS OF THE BUILDING. THE OWNER SHALL BE INTERVIEWED BY THE CONTRACTOR AT START-UP TO ESTABLISH THESE SCHEDULES. SOME AREAS OF THE BUILDING MAY BE SETUP TO BE CONTINUOUSLY OCCUPIED.

EMERGENCY OUTDOOR AIR OVERRIDE
THE FMS SHALL HAVE AN EMERGENCY OUTDOOR AIR OVERRIDE SWITCH ON THE MAIN GRAPHIC AT THE OPERATOR WORKSTATION WHICH WILL ALLOW THE OPERATOR TO SHUTDOWN THE OUTSIDE AIR INTAKE DAMPERS AND RELIEF DAMPERS FOR ALL AIR HANDLING UNITS IN THE EVENT THAT TOXIC ODORS ARE DETECTED OUTSIDE. WHEN THE OUTSIDE AIR AND RELIEF DAMPERS FULLY CLOSE, THE RETURN AIR DAMPER SHALL FULLY OPEN. THE OUTSIDE AIR INTAKE DAMPERS FOR ALL UNITS SHALL REMAIN CLOSED UNTIL THE OPERATOR RESETS THE OVERRIDE.

MULTIZONE AIR HANDLING UNITS

SUPPLY FAN CONTROL
THE SUPPLY FAN VFD SHALL BE STARTED AND STOPPED BY THE FMS SYSTEM BASED ON AN OCCUPANCY SCHEDULE FOR THE BUILDING PROGRAMMED INTO THE FMS. THE FAN SHALL OPERATE CONTINUOUSLY DURING OCCUPIED PERIODS. IF DURING UNOCCUPIED PERIODS, ANY OF THE SPACE TEMPERATURES RISE ABOVE THE UNOCCUPIED COOLING SETPOINT OR FALL BELOW THE UNOCCUPIED HEATING SETPOINT, THE AIR HANDLING UNIT SHALL START AND OPERATE TO RAISE THE SPACE TEMPERATURE 2°F (ADJUSTABLE) BEFORE STOPPING. IF DURING UNOCCUPIED PERIODS, ANY OF THE SPACE OCCUPANCY SWITCHES ARE ACTIVATED, THE AIR HANDLING UNIT SHALL START AND OPERATE FOR A PERIOD OF TWO HOURS BEFORE STOPPING.

SUPPLY AIR STATIC SETPOINT CONTROL
THE FMS SHALL RESET THE STATIC PRESSURE SETPOINT USING A TRIM AND RESPOND LOGIC WITHIN THE RANGE OF 0.5" W.G. TO 1.2" W.G. WHEN THE FAN IS OFF, THE SETPOINT SHALL BE 1.0" W.G. ONCE THE FAN IS STARTED, THE SETPOINT SHALL BE TRIMMED BY 0.04" W.G. EVERY TWO MINUTES IF THERE ARE TWO OR FEWER ZONE PRESSURE REQUESTS. IF THERE ARE MORE THAN TWO ZONE PRESSURE REQUESTS, RESPOND BY INCREASING THE SETPOINT BY 0.06" W.G. A ZONE PRESSURE REQUEST IS GENERATED WHEN A VAV DAMPER IS GREATER THAN 95% OPEN UNTIL IT DROPS TO 80% OPEN. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE OPERATOR WORKSTATION. THE FMS SHALL AUTOMATICALLY DETECT ANY ZONE THAT EXCESSIVELY DRIVES THE RESET SETPOINT AND GENERATE AN ALARM FOR THE ZONE. THE OPERATOR SHALL HAVE THE ABILITY TO REMOVE ANY ZONE FROM THE RESET ALGORITHM THROUGH THE OPERATOR WORKSTATION.

SUPPLY FAN VFD CONTROL
THE VFD SHALL BE MODULATED TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE AT A SET POINT OF 1.0" W.G. (ADJUSTABLE). THE RAMP OF THE VFD SHALL BE ADJUSTED TO RESTRICT THE RATE OF CHANGE OF THE VFD OUTPUT TO SIXTY SECONDS FOR A ZERO TO ONE HUNDRED PERCENT CONTROL SIGNAL CHANGE.

SUPPLY FAN MONITORING
THE VFD OPERATION SHALL BE INDICATED TO THE FMS THROUGH A SET OF CONTACTS IN THE VFD. IF AN ALARM CONDITION IS DETECTED, THE FMS SHALL INITIATE AN ALARM.

RELIEF FAN VFD CONTROL
THE FMS SHALL MODULATE THE RELIEF FANS TO MAINTAIN THE BUILDING DIFFERENTIAL PRESSURE MEASURED IN THE SPACE AND THE OUTSIDE AIR PRESSURE AT A POSITIVE SPACE PRESSURE OF 0.05" W.C. (ADJUSTABLE) ANYTIME THE AIR HANDLING UNIT IS OPERATING. AS BUILDING PRESSURE INCREASES, THE FMS SHALL INCREASE THE SPEED OF THE RELIEF FANS. THE RAMP OF THE VFD SHALL BE ADJUSTED TO RESTRICT THE RATE OF CHANGE OF THE VFD OUTPUT TO SIXTY SECONDS FOR A ZERO TO ONE HUNDRED PERCENT CONTROL SIGNAL CHANGE.

RELIEF FAN MONITORING
THE VFD OPERATION SHALL BE INDICATED TO THE FMS THROUGH A SET OF CONTACTS IN THE VFD. IF AN ALARM CONDITION IS DETECTED, THE FMS SHALL INITIATE AN ALARM.

MINIMUM OUTSIDE AIR SETPOINT CONTROL
THE FMS SHALL MONITOR THE CO_2 LEVEL IN THE SPACES THROUGHOUT THE BUILDING IN LOCATIONS INDICATED ON THE MECHANICAL FLOOR PLANS. THE TIME BASED AVERAGE FOR EACH CO_2 SENSOR SHALL BE CALCULATED IN AN INTERVAL OF 20 MINUTES (ADJUSTABLE). THE CALCULATED VALUE SHALL BE USED FOR CONTROL. IN THE EVENT ANY OF THE CO_2 LEVELS RISE ABOVE SETPOINT IN ACCORDANCE WITH ASHRAE 62.1 GUIDELINES, THE FMS SHALL FIRST GRADUALLY INCREASE THE FLOWRATE OF THE TERMINAL UNIT TO INDUCE ADDITIONAL OUTSIDE AIR INTO THE SPACE. IF THE TERMINAL UNIT REACHES ITS MAXIMUM AIRFLOW SETPOINT AND THE CO_2 LEVEL IS STILL NOT BELOW SETPOINT, THE FMS SHALL RESET THE MINIMUM OUTSIDE AIR VOLUME SETPOINT FOR THE ASSOCIATED UNIT TO INDUCE MORE OUTSIDE AIR INTO THE AIR HANDLING UNIT. THE MINIMUM OUTSIDE AIR VOLUME SETPOINT SHALL BE RESET BETWEEN THE SCHEDULED MINIMUM AND MAXIMUM SETPOINTS. THE FMS SHALL INITIATE AN ALARM IF THE CONCENTRATION LEVELS RISE 20% (ADJUSTABLE) ABOVE SETPOINT. THE FMS SHALL TREND ALL CARBON DIOXIDE LEVELS MEASURED.

MINIMUM OUTSIDE AIR CONTROL
THE OUTSIDE AIR VOLUME SHALL BE CONTROLLED BY THE FMS THROUGH THE OUTSIDE AIR FLOW MEASURING DAMPER WHICH MEASURES THE OUTSIDE AIR VOLUME. THE FMS SHALL NOT MODULATE THE OUTSIDE AIR DAMPER BELOW MINIMUM OUTSIDE AIR VOLUME SETPOINT. IF THE AIR HANDLING UNIT IS STOPPED, THE FMS SHALL CLOSE THE DAMPER. THE FMS SHALL TREND AND LOG THE OUTSIDE AIR VOLUME BEING BROUGHT IN BY THE AIR HANDLING UNIT.

MIXED AIR DAMPER INTERLOCKS
CONTROL SIGNALS FROM THE FMS SYSTEM SHALL MODULATE THE MIXED AIR DAMPERS. UPON INITIAL START-UP, THE FMS SYSTEM SHALL NOT BEGIN MODULATION OF THE MIXING DAMPERS FOR 5 MINUTES (ADJUSTABLE) TO ALLOW THE CONTROL LOOPS TO STABILIZE. THE MIXED AIR DAMPER MODULATION RATE SHALL BE LIMITED TO 5 MINUTES (ADJUSTABLE) FOR FULL MODULATION RANGE.

SUPPLY AIR TEMPERATURE SETPOINT CONTROL
THE FMS SHALL CONTROL THE AIR HANDLING UNIT TO MAINTAIN AN ADJUSTABLE SUPPLY AIR TEMPERATURE SETPOINT. THE TEMPERATURE SETPOINT SHALL BE RESET BASED ON THE DEMAND OF THE ZONE DAMPERS SERVED BY IT SO THAT AT LEAST ONE ZONE IS 90% OPEN AND STILL MAINTAINING THE ROOM TEMPERATURE SETPOINT. THE RESET RANGE SHALL BE BETWEEN 55°F AND 85°F (ADJUSTABLE) DRYBULB. THE SETPOINT FOR THE DIRECT/INDIRECT (DI) SECTION OF THE AIR HANDLING UNIT SHALL BE 2°F (ADJUSTABLE) LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT. WET BULB TEMPERATURES SHALL BE CALCULATED USING DRY BULB TEMPERATURE AND RELATIVE HUMIDITY LEVELS.

SUPPLY AIR TEMPERATURE CONTROL - COOLING
IF THE SYSTEM REQUIRES COOLING TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT, THE FMS SHALL CONTROL THE UNIT THROUGH THE FOLLOWING FOUR STAGES.

STAGE 1: IF THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE SUPPLY AIR TEMPERATURE THE FMS SHALL MODULATE THE OUTSIDE AIR AND RETURN AIR DAMPERS TO MAINTAIN THE DI SECTION SUPPLY TEMPERATURE AT SETPOINT. THE DIRECT AND INDIRECT COOLING PUMPS SHALL BE OFF.

STAGE 2: IF THE DI SECTION SETPOINT CANNOT BE MAINTAINED AT SETPOINT WITH STAGE 1, THE FMS SHALL START STAGE 2. THE FMS SHALL START THE INDIRECT COOLING PUMP AND MODULATE THE OUTSIDE AIR AND RETURN AIR DAMPERS TO MAINTAIN THE DI SECTION SUPPLY TEMPERATURE AT SETPOINT. AS MORE COOLING IS REQUIRED, THE FMS SHALL INCREASE THE AMOUNT OF OUTSIDE AIR BEING BROUGHT INTO THE UNIT. IF THE COOLING DEMAND DECREASES AND THE OUTSIDE AIR TEMPERATURE FALLS BELOW THE RETURN AIR TEMPERATURE SUCH THAT STAGE 1 CAN MEET THE DEMAND, THE FMS SHALL STOP STAGE 2. THE FMS SHALL MONITOR THE STATUS OF THE INDIRECT PUMP THROUGH A CURRENT SWITCH INSTALLED ON THE MOTOR. IF A PUMP FAILURE OCCURS, THE FMS SHALL INITIATE AN ALARM AND REMOVE STAGE 2 FROM THE STAGING CONTROL SEQUENCE. ONCE THE PUMP IS FIXED AND THE ALARM CONDITION IS CLEARED, STAGE 2 CONTROL SHALL BE REINSERTED INTO THE STAGING CONTROL SEQUENCE.

STAGE 3: IF THE DI SECTION SETPOINT CANNOT BE MAINTAINED AT SETPOINT WITH STAGE 2, THE FMS SHALL START STAGE 3. IF THE OUTSIDE AIR WETBULB TEMPERATURE IS LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT MINUS A 4°F (ADJUSTABLE) OFFSET, THE FMS SHALL START THE DIRECT COOLING PUMP AND MODULATE THE FACE AND BYPASS DAMPER TO MINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. THE FMS SHALL FULLY OPEN THE OUTSIDE AIR DAMPERS AND CLOSE THE RETURN AIR DAMPERS. IF THE COOLING DEMAND DECREASES SUCH THAT STAGE 2 CAN MEET THE DEMAND, OR IF THE RETURN HUMIDITY LEVEL RISES ABOVE 60% RH (ADJUSTABLE), THE FMS SHALL STOP STAGE 3. THE FMS SHALL MONITOR THE STATUS OF THE DIRECT PUMP THROUGH A CURRENT SWITCH INSTALLED ON THE MOTOR. IF A PUMP FAILURE OCCURS, THE FMS SHALL INITIATE AN ALARM AND REMOVE STAGE 3 FROM THE STAGING CONTROL SEQUENCE. ONCE THE PUMP IS FIXED AND THE ALARM CONDITION IS CLEARED, STAGE 3 CONTROL SHALL BE REINSERTED INTO THE STAGING CONTROL SEQUENCE. THE INDIRECT SECTION SHALL CONTINUE TO OPERATE DURING STAGE 3 OPERATION.

STAGE 4: IF THE DI SECTION SETPOINT CANNOT BE MAINTAINED AT SETPOINT WITH STAGE 3 OR IF THE OUTSIDE AIR WETBULB TEMPERATURE IS NOT WITHIN THE RANGE SPECIFIED, THE FMS SHALL START STAGE 4. THE FMS SHALL STOP THE DIRECT COOLING PUMP. THE INDIRECT SECTION SHALL CONTINUE TO OPERATE DURING STAGE 4 OPERATION. THE FMS SHALL CONTROL THE CONDENSING UNIT STAGES TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. AS THE COOLING DEMAND DECREASES AND THE CONDENSING UNIT STAGES ARE OFF FOR A PERIOD OF 30 MINUTES (ADJUSTABLE), THE FMS SHALL RETURN TO STAGE 3 IF THE CONDITIONS OF STAGE 3 CAN BE REACHED. ONCE STAGE 4 IS STARTED, IT SHALL OPERATE FOR A MINIMUM OF ONE HOUR (ADJUSTABLE) BEFORE THE SYSTEM CAN SWITCH BACK TO STAGE 3 TO PREVENT SHORT CYCLING OF THE CONDENSING UNIT.

SUPPLY AIR TEMPERATURE CONTROL - HEATING
IF THE SYSTEM REQUIRES HEATING TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT, THE FMS SHALL POSITION THE OUTSIDE AIR AND RETURN AIR DAMPERS TO THE MINIMUM OUTSIDE AIR SETPOINT. THE FMS SHALL MODULATE THE HOT WATER COIL VALVE TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE DIRECT, INDIRECT PUMPS, AND CONDENSING UNIT SHALL BE OFF.

FILTER MONITORING
THE DIFFERENTIAL PRESSURE ACROSS THE FILTER SHALL BE MONITORED BY THE FMS THROUGH A DIFFERENTIAL PRESSURE TRANSMITTER. IF THE DIFFERENTIAL PRESSURE EXCEEDS SET POINT, THE FMS SHALL INITIATE AN ALARM.

FREEZESTAT
A FREEZESTAT SET AT 35°F LOCATED DOWNSTREAM OF THE HOT WATER COIL SHALL INITIATE AN ALARM AT THE FMS AND STOP THE SUPPLY FAN IF AN ALARM CONDITION IS DETECTED.

SMOKE DETECTORS
SMOKE DETECTORS LOCATED IN THE SUPPLY AIR AND RETURN AIR STREAMS, SHALL STOP THE FANS THROUGH THE FIRE ALARM SYSTEM IF AN ALARM CONDITION IS DETECTED. WHEN THE FANS ARE STOPPED, THE FMS SHALL POSITION THE DAMPERS TO THEIR NORMAL STATE.

PRESSURE SAFETY SWITCHES
SAFETY SWITCHES INSTALLED IN THE SUPPLY AND RETURN AIR DUCTS FOR EACH UNIT SHALL ALARM THE FMS IF THE DUCT PRESSURE IS ABOVE THE HIGH ALARM SETPOINT. THE HIGH ALARM SETPOINT SHALL BE 150% OF THE NORMAL OPERATING STATIC OF THE SYSTEM. IF THE FMS SENSES AN ALARM CONDITION, THE FMS SHALL STOP THE SUPPLY AND RETURN FANS.

SUMP FILL AND DUMP CONTROL
THE FMS SHALL OPEN THE FILL VALVE ANYTIME THE SYSTEM IS NOT WINTERIZED AND THE SUMP LEVEL SWITCH IS INDICATES A LOW WATER CONDITION. ONCE THE LEVEL SWITCH REACHES THE FULL LEVEL, THE FMS SHALL CLOSE THE FILL VALVE. THE FMS SHALL OPEN THE DUMP VALVES BASED ON AN OPERATOR ADJUSTABLE TIME SCHEDULE PROGRAMMED INTO THE FMS TO REMOVE SOLIDS FROM THE WATER. ANYTIME THE DUMP VALVES ARE OPEN, THE FMS PREVENT THE FILL VALVE FROM OPENING AND THE PUMPS FROM OPERATING. THE OPERATOR SHALL HAVE THE ABILITY TO REMOTELY WINTERIZE THE SUMP SYSTEM THROUGH THE OPERATOR WORKSTATION. WHEN THE SYSTEM IS PLACE IN A WINTERIZED MODE, THE FMS SHALL OPEN THE DUMP VALVES FOR A PERIOD OF ONE HOUR, CLOSE THE FILL VALVE. THE SYSTEM SHALL REMAIN IN THE WINTERIZED MODE UNTIL RELEASED BY THE OPERATOR.

START/STOP OPTIMIZATION
THE FMS SHALL BE PROGRAMMED WITH A SELF-ADJUSTING START/STOP OPTIMIZATION SEQUENCE WHICH SHALL PROVIDE THE OPTIMUM START TIME FOR THE UNIT IN ORDER TO HAVE THE SPACE TEMPERATURES AT THE OCCUPIED SETPOINTS WHEN SCHEDULED OCCUPANCY IS TO OCCUR EACH DAY. THE FMS SHALL BE PROGRAMMED WITH A SELF-ADJUSTING SEQUENCE WHICH SHALL INCREASE THE SPACE OCCUPIED COOLING SETPOINTS BY 2°F AND DECREASE THE SPACE OCCUPIED HEATING SETPOINTS BY 2°F AT AN OPTIMIZED TIME EACH DAY IN ORDER TO REACH THE NEW SETPOINTS IN THE SPACES JUST PRIOR TO THE SPACE SCHEDULED UNOCCUPIED TIMES.

MORNING WARM-UP
IF THE SPACES REQUIRE HEATING TO REACH THE OCCUPIED SPACE TEMPERATURE SETPOINTS, THE FMS SHALL OPERATE THE UNIT USING A MORNING WARM-UP CYCLE. DURING THE MORNING WARM-UP CYCLE, THE UNIT SHALL OPERATE WITH THE OUTSIDE AIR AND RELIEF AIR DAMPER CLOSED WITH THE RETURN AIR DAMPER FULLY OPEN. THE FMS SHALL RAISE SUPPLY AIR TEMPERATURE SETPOINT TO THE HEATING MAXIMUM TEMPERATURE AND OPERATE THE HOT VALVE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. ONCE THE SPACE TEMPERATURE OCCUPIED SETPOINTS ARE REACHED, THE UNIT SHALL RETURN TO NORMAL OCCUPIED CONTROL. DURING MORNING WARM-UP, THE TERMINAL UNITS SHALL OPERATE AT THEIR MAXIMUM AIRFLOW SETPOINTS UNTIL THEIR SPACE TEMPERATURE SETPOINTS ARE REACHED. TERMINAL UNITS WHICH DO NOT REQUIRE HEATING OR HAVE REACHED THEIR OCCUPIED SETPOINTS, SHALL OPERATE WITH THEIR DAMPERS CLOSED.

ZONE CONTROL
EACH ZONE CONTROLLER SHALL MODULATE THE SUPPLY AIR DAMPER TO MAINTAIN THE SPACE TEMPERATURE CONDITIONS. IF THE ZONE REQUIRES COOLING, THE SUPPLY AIR DAMPER SHALL BE MODULATED BETWEEN THE MINIMUM AND MAXIMUM COOLING AIR FLOWS TO MAINTAIN THE SPACE TEMPERATURE AT THE COOLING SETPOINT OF 76°F (ADJUSTABLE) FOR OCCUPIED PERIODS AND 85°F (ADJUSTABLE) DURING UNOCCUPIED PERIODS. IF THE ZONE CALLS FOR HEATING, THE SUPPLY AIR DAMPER SHALL BE MODULATED TO A MINIMUM AND THE HEATING VALVE SHALL BE MODULATED OPEN TO MAINTAIN THE SPACE TEMPERATURE AT THE HEATING SETPOINT OF 71°F (ADJUSTABLE) FOR OCCUPIED PERIODS AND 55°F FOR UNOCCUPIED PERIODS. THE CONTROLLER SHALL LIMIT THE HEATING CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT OR BELOW 90°F (ADJUSTABLE). IF ADDITIONAL HEATING IS REQUIRED WHEN THE VALVE IS OPERATING AT THE MAXIMUM DISCHARGE TEMPERATURE SETPOINT, THE SUPPLY AIR DAMPER SHALL BE MODULATED TO MEET THE ROOM TEMPERATURE REQUIREMENTS WHILE MAINTAINING THE MAXIMUM DISCHARGE TEMPERATURE AT SETPOINT. IF DURING AN UNOCCUPIED PERIOD THE SPACE OCCUPANCY SWITCH IS ACTIVATED, THE SPACE SHALL RETURN TO THE OCCUPIED SETPOINTS FOR A PERIOD OF TWO HOURS BEFORE SWITCH BACK TO THE UNOCCUPIED STATE. THE CONTROLLER SHALL MAINTAIN A MINIMUM OF A 5°F DEADBAND BETWEEN HEATING AND COOLING SETPOINTS AND NOT ALLOW THE HEATING SETPOINT TO EXCEED THE COOLING SETPOINT.

HOT WATER PLANT

BOILER PLANT ENABLE
THE FMS SHALL ENABLE THE BOILER PLANT THROUGH A USER INPUT FROM THE OPERATOR WORKSTATION OR ANYTIME THE BUILDING REQUIRES HEAT WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 65°F (ADJUSTABLE). THE LEAD BOILER SHALL OPERATE WHENEVER THE BOILER WATER PLANT IS ENABLED.

HOT WATER TEMPERATURE CONTROL
THE FMS CONTROL SYSTEM SHALL RESET THE SECONDARY HOT WATER TEMPERATURE SETPOINT BASED ON THE OUTSIDE AIR TEMPERATURE CONDITIONS. AT AN OUTSIDE AIR TEMPERATURE OF 70°F (ADJUSTABLE), THE HOT WATER TEMPERATURE SETPOINT SHALL BE 110°F (ADJUSTABLE). AT AN OUTSIDE AIR TEMPERATURE OF 40°F (ADJUSTABLE), THE HOT WATER TEMPERATURE SETPOINT SHALL BE 130°F (ADJUSTABLE). THE FMS SHALL MONITOR AND TREND THE TEMPERATURES AND PRESSURES OF THE SYSTEM AS INDICATED ON THE CONTROL DIAGRAMS.

BOILER CONTROL
THE BOILER CONTROL SYSTEM SHALL MODULATE AND STAGE OF EACH OF THE BOILERS TO MAINTAIN THE SECONDARY HOT WATER SUPPLY TEMPERATURE AT SETPOINT BASED ON THE FACTORY RECOMMENDED STAGING CONFIGURATION.

BOILER ROTATION
AUTOMATIC ROTATION OF THE BOILERS SEQUENCE SHALL BE ALLOWED BASED ON THE MANUFACTURER'S STANDARD ROTATION SEQUENCE. THE BOILER CONTROL PANEL SHALL START THE ASSOCIATED BOILER PUMP ANYTIME THE BOILER IS OPERATING.

BOILER FAILURE DETECTION AND RECOVERY
THE FMS SHALL MONITOR THE ALARM AND STATUS CONDITIONS OF EACH BOILER THROUGH THE BACNET NETWORK CONNECTION. UPON SENSING A BOILER FAILURE, THE FMS SHALL INITIATE AN ALARM. THE NEXT BOILER IN THE SEQUENCE SHALL BE ENABLED (IF THE BOILER FAILS WHILE RUNNING OR TRYING TO START). THE FAILED BOILER SHALL BE DISABLED.

PRIMARY PUMP FAILURE DETECTION AND RECOVERY
THE FMS SHALL MONITOR THE STATUS OF EACH PRIMARY PUMP THROUGH A CURRENT SWITCH INSTALLED IN THE MOTOR STARTER AND THE COMMANDED STATUS OF THE PUMP THROUGH THE MODBUS NETWORK CONNECTION. UPON SENSING A PRIMARY PUMP FAILURE, THE FMS SHALL INITIATE AN ALARM.

SECONDARY HOT WATER DIFFERENTIAL PRESSURE SETPOINT CONTROL
THE FMS SHALL RESET THE SYSTEM DIFFERENTIAL PRESSURE SETPOINT USING A TRIM AND RESPOND LOGIC WITHIN THE RANGE OF 5 PSIG TO 15 PSIG ONCE THE MINIMUM HOT WATER TEMPERATURE SETPOINT IS REACHED. ONCE THE TEMPERATURE SETPOINT IS REACHED, THE DIFFERENTIAL PRESSURE SETPOINT FOR THE CONTROLLING ZONE SHALL BE TRIMMED BY 0.1 PSIG EVERY TWO MINUTES UNTIL A VALVE IN THE SYSTEM IS 50% OPEN. WHEN A VALVE IN THE SYSTEM RISES TO 80% OPEN, THE DIFFERENTIAL PRESSURE SETPOINT FOR THE CONTROLLING ZONE SHALL BE INCREASED BY 0.1 PSIG EVERY TWO MINUTES. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE OPERATOR WORKSTATION FOR EACH DIFFERENTIAL PRESSURE SENSOR.

SECONDARY HOT WATER PUMP CONTROL
EACH SET OF SECONDARY HOT WATER PUMPS SHALL OPERATE IN A LEAD/LAG CONFIGURATION. THE LEAD PUMP SHALL OPERATE ANYTIME THE HOT WATER SYSTEM IS ENABLED. THE FMS SHALL MODULATE THE PUMPS TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE AT SETPOINT AS MEASURED BY DIFFERENTIAL PRESSURE SENSORS. WITH JUST THE LEAD PUMP OPERATING, IF THE SPEED OF THE PUMP REACHES 100%, THE FMS SHALL START THE LAG PUMP AND OPERATE BOTH PUMPS AT THE SAME SPEED TO MAINTAIN THE DIFFERENTIAL PRESSURE SETPOINT. WITH BOTH PUMPS OPERATING, IF THE SPEED OF THE PUMPS FALLS BELOW 40%, THE FMS SHALL STOP THE LAG PUMP AND OPERATE THE LEAD PUMP TO MAINTAIN THE DIFFERENTIAL PRESSURE SETPOINT.

SECONDARY HOT WATER PUMP ROTATION
MANUAL OR AUTOMATIC ROTATION OF THE SECONDARY PUMP SEQUENCE SHALL BE ALLOWED. ROTATION TIME INTERVAL SHALL BE 30 DAYS (ADJUSTABLE), AND BE THROUGH A TIME AND DATE, OPERATOR INTERVENTION, OR EXTERNAL COMMUNICATED INPUT. THE APPLICATION SHALL ALSO PROVIDE A SETTING (OPERATOR SELECTABLE) TO ALLOW A FORCED ROTATION WHICH SHALL CAUSE THE SECONDARY PUMPS IN THE SEQUENCE TO BE IMMEDIATELY ENABLED /DISABLED TO COMPLY WITH THE NEW SEQUENCE OR A NORMAL ROTATION WHICH SHALL TAKES ADVANTAGE OF THE LOAD VARIATIONS IN THE SYSTEM TO ADJUST THE SEQUENCE OF SECONDARY PUMPS ENABLING AND DISABLING.

SECONDARY PUMP FAILURE DETECTION AND RECOVERY
THE FMS SHALL MONITOR THE VFD STATUS THROUGH A SET OF CONTACTS IN THE VFD. UPON SENSING A SECONDARY PUMP FAILURE, THE FMS SHALL LOCKOUT THAT PUMP AND IMMEDIATELY INITIATE THE START OF THE NEXT PUMP IN THE ROTATION SEQUENCE. WHEN A PUMP IS MARKED AS HAVING FAILED, THE FAILED PUMP SHALL BE TAKEN OUT OF THE SEQUENCE. THE NEXT PUMP IN THE SEQUENCE SHALL BE ENABLED (IF THE PUMP FAILS WHILE RUNNING OR TRYING TO START). THE FAILED PUMP SHALL BE DISABLED.

SECONDARY PUMP FAILURE RESET
WHEN AN INDIVIDUAL PUMPS FAILURE IS RESET AT THE OPERATOR WORKSTATION, THE FMS SHALL RE-INSERT THAT PUMP INTO THE SEQUENCE OF PUMPS. WHEN A SYSTEM FAILURE RESET IS PERFORMED, ALL PUMPS THAT WERE MARKED AS FAILED SHALL BE RE-INSERTED INTO THE SEQUENCE. AN OPERATOR CONFIGURED SETTING SHALL DETERMINE WHETHER THE FMS SHALL ENFORCE THE SEQUENCE IMMEDIATELY OR IF NORMAL PLANT CHANGES (ADDS AND SUBTRACTS) SYNCHRONIZE THE PLANT WITH THE NEW SEQUENCE. ALL FAILURES SHALL BE RESETTABLE THROUGH THE FMS OPERATOR WORKSTATION.

BOILER SYSTEM SHUTDOWN SWITCH
BOILER SHUTDOWN SWITCHES SHALL BE INSTALLED AT THE BOILER ROOM DOOR AND SHALL KILL POWER TO THE BOILERS WHEN ACTIVATED. THE FMS SHALL STOP THE SECONDARY PUMPS WHEN THE SWITCH IS ACTIVATED AND INITIATE AN ALARM.

SUCTION PRESSURE MONITORING
THE FMS SHALL MONITOR THE SUCTION PRESSURE OF THE SYSTEM. IF THE PRESSURE FALLS BELOW THE ALARM LEVEL, THE FMS SHALL INITIATE AN ALARM AND STOP THE SYSTEM.

GENERAL EXHAUST FANS

EXHAUST FAN CONTROL
EACH FAN SHALL OPERATE BASED ON THE OCCUPANCY SCHEDULE IN THE FMS. THE FAN SHALL OPERATE CONTINUOUSLY DURING OCCUPIED PERIODS.

EXHAUST FAN MONITORING
THE FAN OPERATION SHALL BE INDICATED TO THE FMS THROUGH A CURRENT SWITCH INSTALLED ON THE MOTOR. IF A FAN FAILURE IS DETECTED, THE FMS SHALL STOP THE FAN AND INITIATE AN ALARM

EXHAUST FAN ISOLATION DAMPER CONTROL
EACH EXHAUST FAN DAMPER SHALL BE OPEN ANYTIME THE FAN IS OPERATING. IF THE FAN IS STOPPED, THE DAMPER SHALL CLOSE.

TYPICAL SPLIT SYSTEM

EACH UNIT SHALL BE PROVIDED WITH A FACTORY PACKAGED CONTROL SYSTEM WHICH SHALL CONTROL THE UNIT TO MAINTAIN THE SPACE TEMPERATURE AT SETPOINT. THE FMS SHALL MONITOR THE SPACE TEMPERATURE THROUGH A SEPARATE SPACE TEMPERATURE SENSOR AND SHALL INITIATE AN ALARM IF THE SPACE TEMPERATURE RISES ABOVE THE SPACE HIGH TEMPERATURE ALARM SETPOINT.

KITCHEN MAKE-UP UNIT MONITORING

THE MAKE-UP UNIT SHALL BE CONTROLLED BY THE FACTORY PACKAGED CONTROLS TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT WHEN THE UNIT IS OPERATING. THE FMS SHALL MONITOR THE SUPPLY AIR TEMPERATURE FOR THE MAKE-UP UNIT. IF THE SUPPLY AIR TEMPERATURE FALLS BELOW THE LOW LEVEL SETPOINT, THE FMS SHALL INITIATE AN ALARM.

KITCHEN COLD STORAGE TEMPERATURE MONITORING

A TEMPERATURE SENSOR LOCATED IN THE WALK-IN REFRIGERATOR AND WALK-IN FREEZER SHALL BE PROVIDED AND CONNECTED TO THE FMS. THE FMS SYSTEM AND TEMPERATURE SENSORS SHALL BE CONFIGURED TO TREND TEMPERATURES ON AN HOURLY BASIS FOR 7 DAY PERIODS. THE TRENDS SHALL OVERWRITE OLD DATA WITH NEW DATA.

DOMESTIC HOT WATER PUMP

THE FMS SHALL OPERATE EACH PUMP ANYTIME HOT WATER FLOW IS SENSED BY THE FLOW TRANSMITTER IN THE HOT WATER MAKE-UP LINE OR THE HOT WATER RETURN TEMPERATURE IS BELOW SETPOINT. IF FLOW IS NO LONGER SENSED AND THE RETURN TEMPERATURE REACHES SETPOINT, THE PUMP SHALL STOP. THE FMS SHALL MONITOR THE STATUS OF THE PUMP THROUGH A CURRENT SWITCH INSTALLED ON THE MOTOR. IF A PUMP FAILURE IS DETECTED, THE FMS SHALL INITIATE AN ALARM.

ELECTRIC COIL UNIT HEATER

THE UNIT HEATER SHALL STAGE THE ELECTRIC COIL TO MAINTAIN THE SPACE TEMPERATURE AT A HEATING SETPOINT OF 55 °F (ADJUSTABLE). THE FAN SHALL ONLY OPERATE WHEN HEATING IS NEEDED BY THE SPACE. THE FMS SHALL MONITOR THE STATUS OF THE FAN THROUGH A CURRENT SWITCH. IF A FAN FAILURE IS DETECTED, THE FMS SHALL INITIATE AN ALARM.

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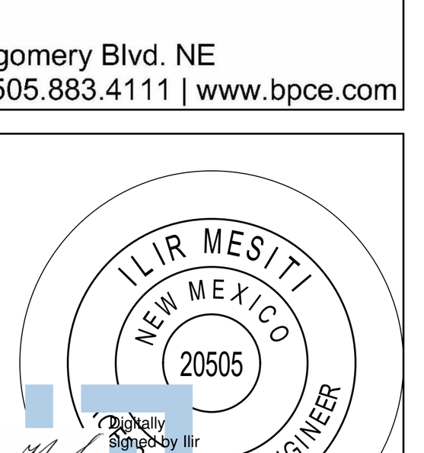

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CONSTRUCTION DOCUMENTS
AUGUST 2024

MARK	DATE	DESCRIPTION
	9/04/24	Addendum 002

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DATE:	AUGUST 2024
PROJECT NO:	K23-001
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SHEET TITLE
SEQUENCE OF OPERATIONS

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Farmington Preschool Academy