Fresno Unified School District

Preparing Career Ready Graduates

Purchasing Services
4498 N. Brawley Ave. Fresno, CA 93722
Ph. (559) 457-3588 Fax (559) 457-6040

BOARD OF EDUCATION
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April 22, 2021

ADDENDUM No. 1
BURROUGHS, EATON AND ROWELL ELEMENTARY SCHOOL
ENERGY MANAGEMENT SYSTEM REPLACEMENT
Bid No. 21-47

NOTICE TO ALL BIDDERS

This Addendum is attached to and made a part of the above entitled specifications for Fresno Unified School District with a scheduled bid opening on April 29, 2021 prior to 2:01 P.M. All changes and/or clarifications will appear in **bold** type and deletions will be struck out in revised sentences.

Incorporate the following into your bid response.

I. REFERENCE: LAWRENCE ENGINEERING GROUP ADDENDUM No. 1
Add: Incorporate LAWRENCE ENGINEERING GROUP Addendum No. 1.

Lawrence Engineering Group Addendum No. 1 dated April 22, 2021 shall be incorporated into the bid documents as part of the prime bidder proposal.

Instructions:

- Entire addendum may be downloaded from District Purchasing Web Site, under "Bid Opportunities". https://www.fresnou.org/dept/purchasing/Pages/Bid-Information.aspx

Acknowledge receipt and understanding of this addendum in designated area of the Bid Form.

Ann Loorz
Purchasing Manager

LAWRENCE
ENGINEERING GROUP

ADDENDUM NO. 1

PROJECT: BID NO. 21-47

FRESNO UNIFIED SCHOOL DISTRICT
EATON, ROWELL, BURROUGHS ELMENTARY SCHOOL
ENERGY MANGEMENT SYSTEM REPLACEMENT

APRIL 22, 2021

The following addendum becomes a part of the Contract Documents. It adds to, subtracts from or modifies the Contract Documents as noted. Bidders are required to acknowledge receipt of this addendum on the Bid Form. Failure to acknowledge receipt of each addendum may subject bidder to disqualification.

GENERAL ITEMS:

1. The mandatory Job Walk Sign-in Sheets are attached.
2. The Prequalified Contractor List is attached
3. EMS contractor shall submit .caf files for each device for approval during submittal process.
4. Coordinate with the District whether controls components will be returned to the District or demolished.
5. Provide 1 year warranty including parts and service for the Building Automation System.
6. New Johnson controls installed in existing panel does not require new UL listing of panel.
7. District personnel shall be present for all factory start-up and given 2 week notice.
8. Include factory start-up, and line reactors for Allen-Bradley drives.
9. Replace all existing Multi-zone Unit filters with MERV 13 filters, field verify size and quantity.
10. Revise project estimates as follow:
    a. Eaton - $356,235
    b. Rowell - $468,380
    c. Burroughs - $574,497
11. Replacement supply, return, and exhaust replacement motors are to be VFD rated with shaft grounding rings and premium efficiency.
12. Fresno Unified School District will provide a commissioning agent at all three sites.

DRAWINGS:

1. EATON ELEMENTARY SCHOOL: Refer to attached mechanical set, marked Delta 2.
2. ROWELL ELEMENTARY SCHOOL: Refer to attached mechanical set, marked Delta 2.
3. BURROUGHS ELEMENTARY SCHOOL: Refer to attached mechanical set, marked Delta 2.
4. ELECTRICAL DRAWINGS ALL SITES: Refer to attached addendum letter from Hardin-Davidson.
5. Prebid Request for Information: Refer to attached RFIs for response

SPECIFICATIONS:

1. Add to Specification Section 23 00 00,Paragraph 1.26:

SYSTEM ENERGY BALANCE:

A. Scope: Provide the services of an independent test and balance agency to test, adjust and balance, retest and record performance of the system to obtain design quantities as specified. The agency must prove that they have no affiliation with any equipment manufacturer, design engineer, installing contractor, or any other party which might lead to a conflict of interest, in order to provide an unbiased, third party system balance and report.

B. Qualifications: Prior to commencing work, the agency shall be reviewed by the Engineer and shall be certified by the Associated Air Balance Council, National Environmental Balancing Bureau or Testing, Adjusting and Balancing Bureau. The agency shall provide documentation of having successfully completed at least five projects of similar size and scope.

C. Instruments: All instruments shall be accurately calibrated; calibration histories shall be available for examination. Application of instrumentation shall be in accordance with AABC, NEBB or TABB standards.

D. Submittals: Include in shop drawings copies of forms to be used for testing and balancing showing all data which is to be recorded. Three copies of completed balance report shall be submitted to and reviewed by the Mechanical Engineer prior to the final mechanical construction review.

E. Procedure - General: Procedure shall be in accordance with Associated Air Balance Council's "National Standards for Field Measurements and Instrumentation - Total System Balance", Volume Two, No. 12173, or equivalent NEBB or TABB standards. System shall be in full, continuous operation during test. Balanced quantities shall be plus 10%, minus 0% of design quantities. All nameplate data, manufacturer, model and serial numbers shall be recorded for each item tested.

F. Extended Warranty: The test and balance agency shall include an extended warranty of 90 days after completion of test and balance work, during which time the Engineer, at his discretion, may request a recheck or resetting of any item or items in test report. The agency shall provide technicians to assist the Engineer in making any tests he may require during this period of time.

G. Air Balance Procedure (For Each Air Handling System):
   1. All air filters shall be clean when air balance is performed.
   2. Provide a sketch of the equipment showing exactly where all pressure readings were taken.
   3. Adjust blower RPM to design requirements.
   4. Record motor full load amperes.
   5. Make pitot tube traverse of main supply and return ducts and obtain design CFM at fans.

6. Record system static pressures, inlet and discharge.
7. Record filter quantity, size(s) and pressure drop across filter(s) at each filter bank.
8. Adjust system for design CFM recirculated air.
9. Adjust system for design CFM outside air.
10. Record entering air temperatures. (DB heating, DB and WB cooling.)
11. Record leaving air temperatures. (DB heating, DB and WB cooling.)
12. Adjust all main supply and return air ducts to design CFM.
13. Adjust all zones to design CFM, supply and return.
14. Adjust all diffusers, grilles and registers to plus 10%, minus 0% of design requirements.
15. Adjust CFM at all exhaust fans, make-up units, etc. (high and low speed, where applicable). Record applicable data from items 1 through 11 above.
16. Each grille, diffuser and register shall be identified as to location.
17. Verify proper diffusion pattern for all ceiling grilles and that all sidewall grilles are set for 5 degrees upward deflection unless otherwise noted. Make a notation of any that are not set properly.
18. Size, type and manufacturer of diffusers, grilles, registers and all tested items shall be identified and listed. Manufacturer's ratings shall be used to make required calculations on all items.
19. Readings and tests of diffusers, grilles, and registers shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.
20. In cooperation with the control manufacturer's representative, set adjustments of automatically operated dampers to operate as specified. Testing agency shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.
21. All diffusers, grilles and registers shall be adjusted for required air patterns and to minimize drafts.
22. As a part of the work of this contract, THE AIR CONDITIONING CONTRACTOR shall make any changes in pulleys, belts and dampers or the addition of dampers required for correct balance as recommended by air balance agency, at no additional cost to Owner.
23. Set, test and adjust packaged heating/cooling unit economizer operation in cooperation with controls contractor. Record minimum and maximum outside and exhaust airflows.

2. Refer to Specification Section 23 09 24 2.2 A: Revise “Allen-Bradley Powerflex 753, without substitution.” to “Allen-Bradley Powerflex 400 or 500, without substitution”

3. Refer to Specification Section 23 09 23 2.1 B: Omit the following:

    1. Local Display Devices - PC Touchscreens
    2. Portable Operator Terminals – Laptop with required software installed

4. Add Specification Sections:

    A. 09 90 00 Painting
    B. 09 90 01 Paint Material List

Attachment: Job Walk Sign-in Sheets (6 sheets)
Prequalified Contractors List (4 sheets)
Eaton Elementary School EMS Plans –Delta 2
Rowell Elementary School EMS Plans –Delta 2
Burroughs Elementary School EMS Plans –Delta 2
Electrical Addendum Letter
Prebid Request For Information No.1 through No.23
09 90 00 Painting
09 90 01 Paint Material List

END OF ADDENDUM NO. 1

MANDATORY Pre-Bid Conference / Job Walk Sign-in Sheet

Formal Bid No. 21-47, Sections A-C

Burroughs, Eaton and Rowell Elementary Schools Energy Management System Replacement

Pre-Bid Conference Date: April 9, 2021 @ 9:00 A.M.

District Address	Conference Location	District Contact
Fresno Unified School District Purchasing Department 4498 N. Brawley Ave Fresno CA 93722	in front of the Administration Office of **Burroughs Elementary School** **166 N. Sierra Vista Ave.** **Fresno, CA 93702**	Ann Loorz, Purchasing Manager 4498 N. Brawley Ave Fresno, CA 93722 559-457-3582

Contractor Information	Phone Number
Company Name: LPC Automation	(559) 907 - 2577
City: Fresno, Ca	Email: JOEC@LPCAutomation.com
Contact Name: Joe Calafiore	

Contractor Information	Phone Number
Company Name: FUSD	( ) -
City: Fresno	Email
Contact Name: William Anderson	

Contractor Information	Phone Number
Company Name: MESA ENERGY SYSTEMS	(559) 474 - 1493
City: FRESNO CA	Email: CAPETTY@EMCOR.NET
Contact Name: CLINT PETTY	

Contractor Information	Phone Number
Company Name: LEG	(559) 431- 0101
City: Fresno, CA	Email: ezequiel@legfresno.com
Contact Name: Ezequiel Fregoso	

Contractor Information	Phone Number
Company Name: Lawrence Engineering Group	(559) 970 - 0919
City: Fresno, CA	Email: jose@legfresno.com
Contact Name: Jose Jaime	

MANDATORY Pre-Bid Conference / Job Walk Sign-in Sheet

Formal Bid No. 21-47, Sections A-C

Burroughs, Eaton and Rowell Elementary Schools Energy Management System Replacement

Pre-Bid Conference Date: April 9, 2021 @ 9:00 A.M.

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Fresno Unified School District Purchasing Department 4498 N. Brawley Ave Fresno CA 93722	in front of the Administration Office of **Burroughs Elementary School** **166 N. Sierra Vista Ave.** **Fresno, CA 93702**	Ann Loorz, Purchasing Manager 4498 N. Brawley Ave Fresno, CA 93722 559-457-3582

Contractor Information	Phone Number
Company Name: Strategic Mechanical	(559) 291 - 1952
City: Fresno CA	Email: estimating@strategicmech.com
Contact Name: Daniel Brown	

Contractor Information	Phone Number
Company Name: Johnson Controls	(559) 474 - 3317
City: Fresno CA	Email: blake.1.semas@jci.com
Contact Name: Blake Semas	

Contractor Information	Phone Number
Company Name: FUSD- Purchasing	(559) 457 - 3582
City:	Email
Contact Name: Ann Loorz	

Contractor Information	Phone Number
Company Name:	( ) -
City:	Email
Contact Name:	

Contractor Information	Phone Number
Company Name:	( ) -
City:	Email
Contact Name:	

MANDATORY Pre-Bid Conference / Job Walk Sign-in Sheet

Formal Bid No. 21-47, Sections A-C

Burroughs, Eaton and Rowell Elementary Schools Energy Management System Replacement

Pre-Bid Conference Date: April 9, 2021 @ 9:00 A.M.

District Address	Conference Location	District Contact
Fresno Unified School District Purchasing Department 4498 N. Brawley Ave Fresno CA 93722	in front of the Administration Office of **Eaton Elementary School** **1451 E. Sierra Ave.** **Fresno, CA 93710**	Ann Loorz, Purchasing Manager 4498 N. Brawley Ave Fresno, CA 93722 559-457-3582

Contractor Information	Phone Number
Company Name: Eze & LEG	(559) 431 - 0101
	Email
City: Fresno, CA	ezequiel@legfresno.com
Contact Name: Ezequiel Fregoso	

Contractor Information	Phone Number
Company Name: Johnson Controls	(559) 474 - 3317
	Email
City: Fresno, CA	blake.1.jemas@jci.com
Contact Name: Blake Jemas	

Contractor Information	Phone Number
Company Name: MESA ENERGY SYSTEM	(559) 474 - 1453
	Email
City: FRESNO CA	CAPETTY@CMCORP.NET
Contact Name: CLINT PETTY	

Contractor Information	Phone Number
Company Name: Lawrence Engineering Group	(559) 970 - 0919
	Email
City: Fresno, CA	jose@legfresno.com
Contact Name: Jose Jaime	

Contractor Information	Phone Number
Company Name: LPC Automation.com	(559) 907 - 2577
	Email
City: Fresno, Ca	JOE@LPCAUTOMATION.COM
Contact Name: JOE Calafiore	

MANDATORY Pre-Bid Conference / Job Walk Sign-in Sheet

Formal Bid No. 21-47, Sections A-C

Burroughs, Eaton and Rowell Elementary Schools Energy Management System Replacement

Pre-Bid Conference Date: April 9, 2021 @ 9:00 A.M.

District Address	Conference Location	District Contact
Fresno Unified School District Purchasing Department 4498 N. Brawley Ave Fresno CA 93722	in front of the Administration Office of **Eaton Elementary School** **1451 E. Sierra Ave.** **Fresno, CA 93710**	Ann Loorz, Purchasing Manager 4498 N. Brawley Ave Fresno, CA 93722 559-457-3582

Contractor Information	Phone Number
Company Name: Strategic Mechanical	(559) 291-1952
City: Fresno	Email: estimating@strategicmechanical
Contact Name: Daniel Brown	

Contractor Information	Phone Number
Company Name: FUSD	( ) -
City: Fresno	Email
Contact Name: Danny Anderson	

Contractor Information	Phone Number
Company Name:	( ) -
City:	Email
Contact Name:	

Contractor Information	Phone Number
Company Name:	( ) -
City:	Email
Contact Name:	

Contractor Information	Phone Number
Company Name:	( ) -
City:	Email
Contact Name:	

MANDATORY Pre-Bid Conference / Job Walk Sign-in Sheet

Formal Bid No. 21-47, Sections A-C

Burroughs, Eaton and Rowell Elementary Schools Energy Management System Replacement

Pre-Bid Conference Date: April 9, 2021 @ 9:00 A.M.

District Address	Conference Location	District Contact
Fresno Unified School District Purchasing Department 4498 N. Brawley Ave Fresno CA 93722	in front of the Administration Office of **Rowell Elementary School** **3460 E. McKenzie Ave.** **Fresno, CA 93702**	Ann Loorz, Purchasing Manager 4498 N. Brawley Ave Fresno, CA 93722 559-457-3582

Contractor Information	Phone Number
Company Name: LPC Automation.	(559) 907 - 2577
City: Fresno, Ca	Email: JoeC@LPCAutomation.com
Contact Name: Joe Calafiore	

Contractor Information	Phone Number
Company Name: Strategic Mechanical	(559) 291 - 1952
City: Fresno CA	Email: estimating@strategicmech.com
Contact Name: Daniel Brown	

Contractor Information	Phone Number
Company Name: MESA ENERGY SYSTEMS	(559) 474 - 1493
City: FRESNO, CA	Email: CAPETTY@emcor.net
Contact Name: CLINT PETTY	

Contractor Information	Phone Number
Company Name: FUSD	( ) -
City: Fresno	Email: William.Anderson@fresnounified
Contact Name: Danny Anderson	

Contractor Information	Phone Number
Company Name:	( ) -
City:	Email:
Contact Name:	

MANDATORY Pre-Bid Conference / Job Walk Sign-in Sheet

Formal Bid No. 21-47, Sections A-C

Burroughs, Eaton and Rowell Elementary Schools Energy Management System Replacement

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District Address	Conference Location	District Contact
Fresno Unified School District Purchasing Department 4498 N. Brawley Ave Fresno CA 93722	in front of the Administration Office of **Rowell Elementary School** **3460 E. McKenzie Ave.** **Fresno, CA 93702**	Ann Loorz, Purchasing Manager 4498 N. Brawley Ave Fresno, CA 93722 559-457-3582

Contractor Information	Phone Number
Company Name: Johnson Controls, Inc.	(559) 474 - 3317
City: Fresno, CA	Email: blake.1.semas@jci.com
Contact Name: Blake Semas	

Contractor Information	Phone Number
Company Name: LAWRENCE ENGINEERING G.	(559) 431 - 0101
City: Fresno, CA	Email: ezequiel@legfresno.com
Contact Name: Ezequiel Fregoso	

Contractor Information	Phone Number
Company Name: Lawrence Engineering Group	(559) 970 - 0919
City: Fresno, CA	Email: jose@legfresno.com
Contact Name: Jose Jaime	

Contractor Information	Phone Number
Company Name: FUSD- Purchasing	(559) 457 - 3582
City:	Email:
Contact Name: Ann Loorz	

Contractor Information	Phone Number
Company Name:	( ) -
City:	Email:
Contact Name:	

PREQUALIFICATION CONTRACTORS LIST
($1 MILLION + PROJECTS)
AS OF APRIL 14, 2021

PRIME CONTRACTOR	CONTACT	PHONE No.	E-MAIL	LICENSE No.	LICENSES HELD	QUALIFIED DATE	VALID THROUGH
3D Datacom	Victor Biberston	559-593-0824	vbiberston@3dtsi.com	757157	B C7 C10	12/14/20	12/13/21
A-C Electric Company	Jim McGurk	559-233-2208	jimmcgurk@a-celectric.com	99849	A B C7 C10 C12 D42	07/14/20	07/13/21
Able Heating and Air Conditioning, Inc.	Shantel Nunn	619-409-9100	snunn@ableac.net	466861	B C20 C43	04/16/20	04/15/21
Acco Engineered Systems, Inc.	Randy Blunt	661-558-7014	rblunt@accoes.com	120696	A B C4 C10 C16 C20 C36 C38	10/02/20	10/01/21
Alcorn Aire, Inc.	Jodi Nagel	661-323-1992	jnagel@alcornaire.com	735144	B C20	03/15/21	03/14/22
American Incorporated	Pat Alvarez	559-651-1776	palvarez@aminc.com	292529	A B C4 C7 C10 C20 C21 C36 C38 C43 C61 D6	03/11/21	03/10/22
American Paving Co.	Stephen Poindexter	559-268-9886	spoindexter@americanpavingco.com	181430	A B C8 C12 C31	07/17/20	07/16/21
AMG & Associates, Inc.	Albert Giacomazzi	661-251-7401	estimating@amgassociatesinc.com	881824	A B	09/08/20	09/07/21
Ardent General, Inc.	James Myers	559-492-3969	estimating@ardentgeneral.com	968340	A B	12/01/20	11/30/21
Audeamus dba Sebastian	Tony Bustos	559-432-5800	estimating@sebastiancorp.com	940822	A B C7 C10	02/11/21	02/10/22
Avidex Industires LLC	Ron Ponce	949-428-6333	biddesk@avidex.com	981651	C7 C10	03/30/21	03/29/22
Avison Construcition Inc.	Curtis Short	559-431-0317	cshort@avisoninc.com	823535	A	04/05/21	04/04/22
Bay City Mechanical, Inc.	Crystal Rougeau	510-233-7000	crystal@baycitymech.com	645126	B C4 C20 C36 C43	04/24/20	04/23/21
Belmont Construction, Inc. dba R&H Construction	Jacob Belmont	559-492-1252	jbelmont@rhconst.org	923412	A B C8	07/13/20	07/12/21
Bill Nelson General Engineering Construction, Inc.	Stacy French	559-439-1756	estimating@bngec.us	692068	A	03/19/21	03/18/22
BMY Construction Group, Inc.	Eric Bower	559-243-4200	ebower@bmyinc.com; estimating@bmyinc.com	686178	A B C8	04/14/21	04/13/22
Bowen Engineering and Environmental	Erik Bowen	559-233-7464	office@bowendemo.com	816496	A B C10 C21 C22 C33 C39 C50 C61 D38	03/22/21	03/21/22
Brazos Urethane, Inc.	Craig Opel	559-674-1111	c.opel@brazosinc.com	982578	B C2 C33 C39 C43	03/19/21	03/18/22
Burke Diversified dba Burke Construction	Jason E. Burke	559-201-9335	jburke@burkediversified.com	61093	B C39	01/19/21	01/18/22
Bush Engineering, Inc.	Jasmine Cooper	559-584-1575	jasmine@bushconstruction.net	888139	A B C8 C21	12/22/20	12/21/21
BVI Construction, Inc.	Ken or Marla Grey	559-896-6450	ken@bviprojects.com; marla@bviprojects.com	702975	A B	04/01/21	03/31/22
Central California Electronics, Inc.	Matthew Berryhill	559-485-1254	mattb@ccefresno.com	299868	C7 C10	01/11/21	01/10/22
Central Valley Asphalt (Doug Ross, Inc.)	Chelsea Aleston	559-562-7802	chelseacva@ocsnet.net	777434	A	02/18/21	02/17/22
Clean Cut Landscape Inc.	Karry Wendel	559-322-2041	karry@cleancutland.com	722882	A C27	04/06/21	04/05/22
Collins Electrical Company, Inc.	David Plaster	209-466-3691	dplaster@collinselectric.com; atorres@collinselectric.com	115427	B C10 C31	02/04/21	02/03/22
Comfort Air, Inc.	Allan Goddard	209-466-4601	agoddard@comfortairinc.com	85895	B C4 C16 C20 C36 C38 C43	03/17/21	03/16/22
Contra Costa Electric, Inc.	Matt Furrer	559-252-1114	mfurrer@emcor.net	139885	A B C10	05/19/20	05/18/21
Control Fire Protection, Inc.	David Holt	661-322-1681	dholt@controlfire.net	534644	C16	10/09/20	10/08/21
Cosco Fire Protection, Inc.	Cody Stephens	559-275-3795	cstephens@coscofire.com	577621	C10 C16	03/30/21	03/29/22

PREQUALIFICATION CONTRACTORS LIST
($1 MILLION + PROJECTS)
AS OF APRIL 14, 2021

D. H. Williams Construction, Inc.	David Williams	559-241-0374	dhwco@comcast.net	571597	A	B											12/30/20	12/29/21
Dave Christian Construction Co., Inc.	Terri L. Emmett	559-255-1222	terri@davechristianconst.com	377698	A	C12											04/14/21	04/13/22
David A. Bush, Inc.	Jasmine Cooper	559-584-1575	jasmine@bushconstruction.net	492686	A	B	C8	C21									12/22/20	12/21/21
Davis Moreno Construction, Inc.	Stephen Davis	559-275-9410	stephen@davismorenoconstruction.com	804773	A	B	C8	C10	C61	D34							01/04/21	01/03/22
Digital Networks Group, Inc.	Ron Ponce, Felicia McGinn	949-428-6333	biddesk@digitalnetworksgroup.com	822511	C7	C10											11/23/20	11/22/21
Divcon Inc.	John Gandy	559-490-0205	john@divconinc.com	796543	A	B	C7										12/14/20	12/13/21
ECI (Engineered Controls, Inc.)	Richard Malcolm	559-323-9788	richard@ecihvac.com	714317	B	C20	C36	C43	C61	D62	D64						12/30/20	12/29/21
EKC Enterprises, Inc.	Greg Alavezos	559-438-0330	greg@ekccorp.com	916095	C7	C10											05/08/20	05/07/21
Famad Inc. dba Sitelogiq	Chris Bristow	916-988-8808	chris.bristow@sitelogiq.com	646794	A	B	C4	C10	C20	C36	C43						04/13/21	04/12/22
Elite Landscape Construction, Inc.	Cameron Nelson	559-292-2900	cameronn@eliteteamoffices.com	967955	C27												04/13/21	04/12/22
Fire System Solutions, Inc.	Jorge Moran	559-275-4894	jmoran@firesystemsolutions.com	982763	C10	C16											04/01/21	03/31/22
Fortune-Ratliff General Contractors, Inc.	Adam Myles	559-432-1306	adamm@fortuneratliff.com	496147	B	C8											10/28/20	10/27/21
Four C's Construction	Preston Cross	559-237-3990	preston@fourcsmetal.com	908294	B	C20	C36	C39	C43								02/01/21	01/31/22
Fresno Plumbing & Heating, Inc. (Costal Plumbing)	Wyndie Gibson	559-294-0200	wyndieg@fphinc.com	801642	B	C16	C20	C36									02/04/21	02/03/22
Fresno Roofing Co. Inc.	Edward Duarte	559-255-8377	ed@fresnoroofingco.net	302777	B	C2	C39										01/19/21	01/18/22
GC Builders	Gerardo Campos	559-478-3276	gcbuilders137@yahoo.com	933222	B												07/15/20	07/14/21
Graham Prewett, Inc.	Sean Prewett	559-291-3741	grmpre1@grahamprewett.com	793065	A	B	C33	C39	C43								11/30/20	11/29/21
Haydon Construction, Inc.	Nicole Hensley	559-251-5522	haydonconst@yahoo.com; haydon.hr@yahoo.	458977	A												06/30/20	06/29/21
Howe Electric Construction, Inc.	Kirstin Howe Lichtenwalner	559-255-8992	kirstin.howe@howe-electric.com	898737	B	C10	C46										12/18/20	12/17/21
HPS Mechanical, Inc.	Alma Martinez	661-397-2121	planroom@hpsmechanical.com	793014	A	B	C2	C4	C10	C16	C20	C34	C36	C42	C43	C46	03/25/21	03/24/22
Imperial Electric Service	Windell Pascascio Jr.	559-374-6484	windell@imperialelectricserviceinc.com	1015336	C10												01/05/21	01/04/22
J. Boone Mechanical, Inc.	Jim Boone	559-207-3470	jim@jboonemechanical.com	1302006	A	B	C4	C36	C38	C43							01/14/21	01/13/22
J. I. Garcia Construction, Inc.	Joseph V. Garica Karen Acosta	559-276-7726	joeg@jigarcia.com; karena@jigarcia.com	556003	A	B											12/30/20	12/29/21
J. Noble Binns Plumbing Co., Inc.	Michelle Heinrichs	661-615-6101	michelle@binnsplumbing.com	481544	C4	C16	C34	C36	C55								09/21/20	09/20/21
Jarrett Electric, Inc.	Melissa Sweaney	661-327-8046	melissa@cjelectric.net	667401	C10												09/18/20	09/17/21
Jerico Fire Protection Company Inc.	Chris Miller	559-255-6446	chris@jericofire.com	548570	C16												03/22/21	03/21/22
Johnson Plumbing Industrial, Inc.	Jenifer Cunningham	209-384-1566	jen@johnsonindustrial.net	526086	C36												09/21/20	09/20/21
Katch Environmental Inc.	Paul Katchadoorian	559-292-6653	paul@katchenvironmental.com	933096	A	B											02/01/21	01/31/22
Kings County Air Conditioning, Inc.	Mark Mathis	559-584-4383	mark@kcairinc.com	828256	B	C20	C43										11/23/20	11/22/21
Kitcor Corporation	Kent Kitchen	818-767-4800	kentkitchen@kitcor.com; ruby@kitcor.com	244236	C43												10/21/20	10/20/21
Klassen Corporation	Katie Angevine	661-324-3000	katiea@klassencorp.com	350573	B	C8	C51										04/22/20	04/21/21
Lawson Mechanical Contractors	Megan McCarthy	916-381-5000	mmccarthy@lawsonmechanical.com	178385	A	B	C2	C4	C16	C20	C36	C38	C43				12/22/20	12/21/21
Lindsay Electric (Steven Lindsay)	Steve Lindsay	559-281-6308	steve@lindsay-electric.com	932850	C10												11/18/20	11/17/21

PREQUALIFICATION CONTRACTORS LIST
($1 MILLION + PROJECTS)
AS OF APRIL 14, 2021

LPC Automation Inc.	Joe Calaflore	888-742-5572	joec@lpcautomation.com	886516	C10												12/28/20	12/27/21
Magnetar.us, Inc.	Greg Hardin	559-477-41347	sales@magnetar.us	904637	B	C7	C10										02/04/21	02/03/22
Mark III Construction, Inc.	Christina Kell	916-381-8080	estimating@mark-three.com	941726	A	B	C4	C7	C10	C16	C20	C36					05/26/20	05/25/21
Mark Wilson Construction Co., Inc.	Doug Reitz	559-348-0421	doug@markwilsonconstruction.com	774987	B												01/21/21	01/20/22
Marko Construction Group, Inc.	Paul K. Gong	559-222-7888	pkgong@markoconstruction.com	831764	A	B	C39										12/07/20	12/06/21
Mesa Energy Systems, Inc.	Rod Galvan	559-277-7900	mesanaservice@emcorgroup.com	611215	B	C4	C7	C10	C20	C36	C38	C46					03/15/21	03/14/22
Meyers Constructors, Inc.	Emily Mayoral	559-473-0014	emily@meyersconstructors.com	1004811	B	C51											10/13/20	10/12/21
Michael Cole Electric	Michael Cole	559-298-6464	mcecski@aol.com	625324	C10												01/11/21	01/10/22
Modern Air Mechanical	Dan Kumetat	209-722-0076	dan@modernair.biz; est@modernair.biz	569680	C20	C38	C43										07/01/20	06/30/21
Morris Levin and Son	Haley White; Del Freitas	559-686-8561	hwhite@morrislevin.com; dfreitas@morrislevin.com	167881	C2	C10	C34	C36	C38	C42	C60						10/26/20	10/25/21
Nations Roof West, LLC	Sean Rauch	559-252-1255	srauch@nationsroof.com	1012378	C39	C43											12/04/20	12/03/21
New England Sheet Metal and Mechanical Co.	John D. Sloan	559-268-7375	jsloan@nesm.com	433674	A	B	C4	C20	C36	C38	C43						01/19/21	01/18/22
Nolte Sheet Metal, Inc.	Ernie Nolte	559-275-1246	natalie@noltesheetmetal.com	438796	C20	C38	C43										02/09/21	02/08/22
Otavilla Mechanical Contractors Inc.	Mike Allivato	831-609-3000	mike@otavillamechanical.com	968640	C20												02/23/21	02/22/22
Patton Sheet Metal Works dba Patton Air Conditioning	Pat Shattuck	559-486-5222	pshattuck@pattonac.com; jfortmeyer@pattonac.com	256026	B	C4	C20	C36	C38	C43							05/20/20	05/19/21
PCD	Christian Velasquez	707-546-3633	cvelasquez@pcdinc.net	527657	C7	C10											03/31/21	03/30/22
Power Design Electric, Inc.	Gabriel Lopez; Robert Glover	559-897-2599	glopez@powerdesignelectric.com; robert@powerdesignelectric.com	851246	C10												09/21/20	09/20/21
Presidential Fire Protection, Inc.	Samantha Nigliazzo	916-379-9199	samantha@presidentialfireprotection.com	847133	C16												05/18/20	05/17/21
Pro-Craft Construction, Inc.	Estimating Department	909-790-5222	estimating@procraftci.com	467234	A	B	C2	C16	C34	C36	C42						02/16/21	02/15/22
R L H Fire Protection, Inc.	Bonnie Roberts	661-410-1321	broberts@rlhfp.com	777717	C10	C16											09/21/20	09/20/21
Rakkar Development & Construction	Tajinder Rakkar	559-994-9482	taj@rpccompanies.com	1037594	B												01/12/21	01/11/22
Red Moore Group, Inc.	Matthew Amato	559-538-5972	matthew.amato@rexmoore.com	976827	B	C10											04/28/20	04/27/21
San Joaquin Fire Protection Inc.	Georgia Sani	559-292-7111	georgia@sjfpmail.com	775461	C16												04/17/20	04/16/21
Schreder & Brandt Mfg. Inc.	Carolyn Atkinson	530-899-1104	carolyn@schrederandbrandt.com	748129	A	B											02/16/21	02/15/22
Schultz Industries, Inc. dba Sturdisteel Company	Ruth Lopez	800-433-3116	rlopez@sturdisteel.net	727715	A												09/02/20	09/01/21
Seal Rite Paving (Witbro, Inc.)	Brooke Ashjian	559-222-7325	bids@sealritepaving.com	805585	A												02/10/21	02/09/22
Seals Construction, Inc.	Nick Seals	559-651-4040	nick.seals@sealsconstruction.com	949738	A	B											11/20/20	11/19/21
Silver Creek Industries, LLC.	Dani Shaughnessy	951-943-5393	dshaughnessy@silver-creek.net	855259	B	C10	C20	C27	C36								03/22/21	03/21/22
Simco Mechanical, Inc.	Alexander J. Harbachian	818-957-4994	alex@simcomechanical.com	974288	C20												04/15/20	04/14/21
Smith Mechanical-Electrical-Plumbing (Brannon/Smith Electric)	Michael Brannon	805-621-5000	mb@smith-electric.com	420418	A	B	C2	C4	C7	C9	C10	C16	C20	C36	C43		09/08/20	09/07/21
Soltek Pacific Const. Co. (Solpac Constr., Inc.)	Kevin M. Cammall	619-296-6247	marketing@soltekpacific.com	886641	A	B											02/04/21	02/03/22

PREQUALIFICATION CONTRACTORS LIST
($1 MILLION + PROJECTS)
AS OF APRIL 14, 2021

Southern Bleacher Company, Inc.	David McClendon	940-549-0733	herndon@southernbleacher.com	564497 A	03/30/21	03/29/22
Starace Mechanical Heating & Air Cond.	Martino Starace	559-686-4312	staracemechanical@gmail.com	933756 C20 C43	05/08/20	05/07/21
Steven's Electrical Contracting	Steven Harris	559-363-9776	stevens3639776@gmail.com	661442 C10	12/30/20	12/29/21
Stockbridge General Contracting, Inc.	Guy Stockbridge	559-292-2900	guys@eliteteamoffices.com	967612 A B C8 C27 C61 D9 D34	04/06/21	04/05/22
Strategic Mechanical, Inc.	Chad Petty	559-291-1952	cpetty@strategicmech.com	834679 B C2 C4 C10 C16 C20 C23 C36 C38 C42 C43 C51 C60	12/28/20	12/27/21
T.P. Thomas Plumbing, Inc.	Mike Lansford	559-591-6499	mike@tptplumbing.com	613719 C36	12/18/20	12/17/21
Todd Companies (JT2)	James Todd	559-651-5820	jt2@jt2inc.com	788798 A C21 C36 D6	04/23/20	04/22/21
Turner Construction Company	Drake Costa	916-956-1206	dcosta@tcco.com	210639 A B	04/20/20	04/19/21
Valley Precision Grading, Inc.	Kristofer Olson	916-638-8800	kip@vpgrading.com	783244 A C61 D12	08/20/20	08/19/21
Valley Unique Electric, Inc.	Mark Worthington	559-237-4795	mark@valleyunique.com	464539 C10	09/11/20	09/10/21
Westech Systems, Inc.	Helder Domingos, Darin Culberson	559-455-1720	hd@westechsys.com; dc@westechsys.com	739791 C10 C46	12/22/20	12/21/21
Wild Electric, Incorporated	Craig Newton	559-251-7770	cnewton@wildelectric.net	500696 C10	02/18/21	02/17/22
Zumwalt Construction, Inc.	Robert McKnight	559-252-1000	rmcknight@zumwaltconst.com	706140 B	06/25/20	06/24/21

FRESNO UNIFIED SCHOOL DISTRICT

EATON ELEMENTARY SCHOOL
EMS REPLACEMENT
1451 EAST SIERRA AVE.
FRESNO, CALIFORNIA

OWNER
FRESNO UNIFIED SCHOOL DISTRICT

4600 N. BRAWLEY AVE.
FRESNO, CA 93722
(559) 457-3064

CONTACT: DANNY ANDERSON

MECHANICAL ENGINEER
LAWRENCE ENGINEERING GROUP

7084 NORTH MAPLE AVE. SUITE 101
FRESNO, CA 93720
(559) 431-0101

CONTACT: MIKE CANTELMI

ELECTRICAL ENGINEER
HARDIN-DAVIDSON ENGINEERING, INC.
356 POLLASKY AVE. SUITE 200
CLOVIS, CA 93612
(559) 323-4995

CONTACT: RICH HARDIN

GENERAL NOTES:

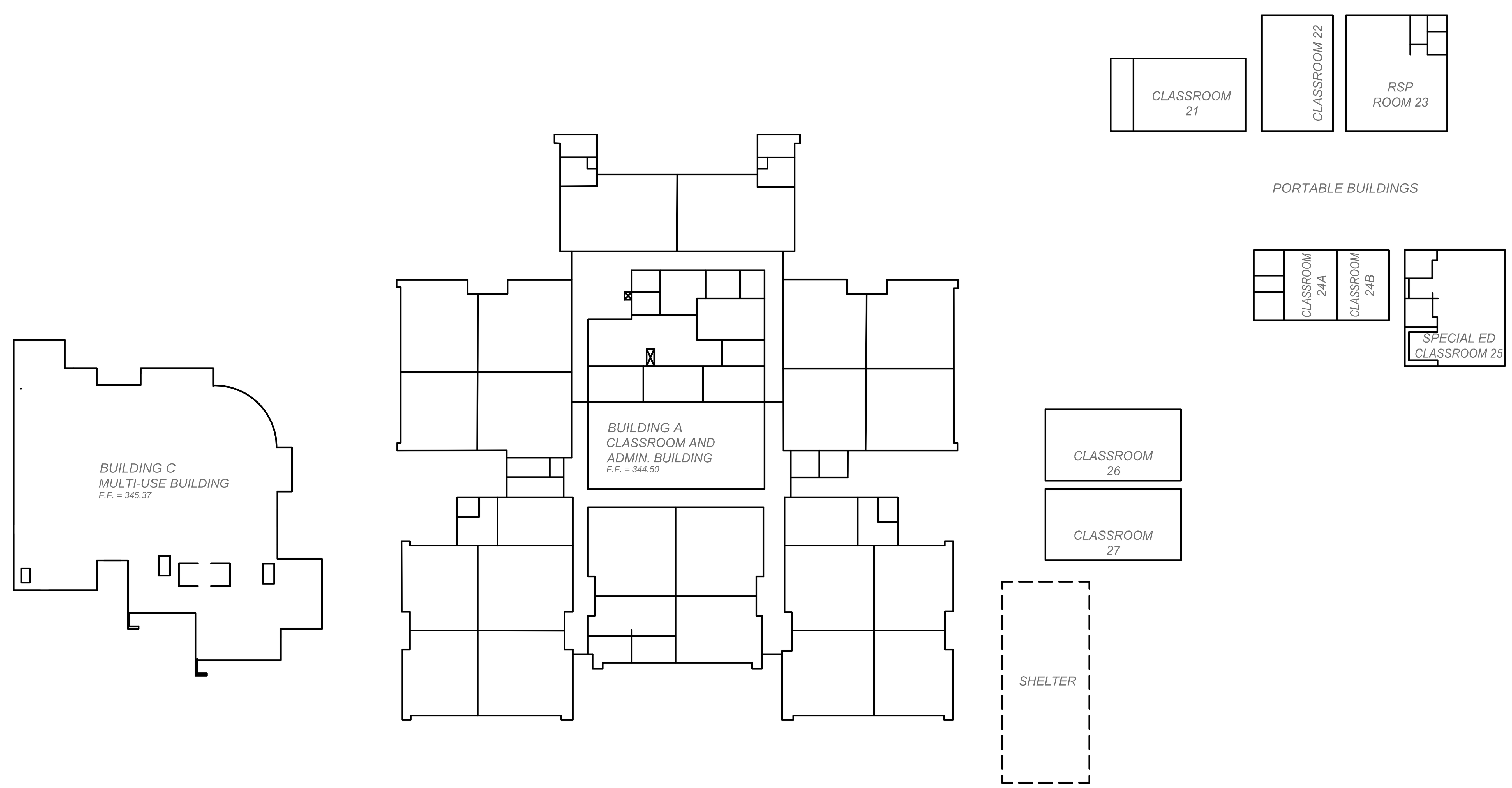
1. ALL WORK SHALL CONFORM TO 2019 EDITION TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).
2. CHANGE TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENT (CCD) APPROVED BY DSA, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.
3. A "DSA CERTIFIED" PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY DSA SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, CCR. PROJECT REQUIRES A CLASS 3 INSPECTOR.
4. A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE DISTRICT (OWNER) SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THE PROJECT.
5. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CCR. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CCR, A CONSTRUCTION CHANGE DOCUMENT (CCD), OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFING THE REQUIRED WORK SHALL SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE WORK. (SECTION 4-317(C), PART 1, TITLE 24, CCR)

PROJECT NOTES:

1. PROVIDE ALL NEW CONTROL WIRE.
2. PROVIDE ALL NEW ACTUATORS & SENSORS. RETURN EXISTING ACTUATORS TO DISTRICT.
3. PROVIDE A NEW OUTSIDE AIR TEMPERATURE SENSOR AT EACH MULTI-ZONE.
4. PROVIDE NEW CONTROLS FOR ALL EXHAUST FANS.
5. PROVIDE NEW CONTROLS FOR EXTERIOR LIGHTING. REFER TO FLOOR PLAN SHEETS. MOUNT HARDWARE IN NEW LOCKABLE ENCLOSURES.
6. PROGRAMMING SHALL BE IN THE CONTROLLERS AT THE UNIT, NOT THE FRONT END. THE FRONT END IS A MONITORING STATUS, ON-OFF DEVICE ONLY.
7. WIRING IN ATTICS SHALL BE SUPPORTED ON J-HOOKS. NO WIRING ON ROOF.
8. SALVAGE ALL CONTROL EQUIPMENT AND RETURN TO OWNER.
9. PROVIDE AND INSTALL A 20A/1P, DUPLEX RECEPTACLE WITH CIRCUIT AND CIRCUIT BREAKER FROM THE NEAREST 120 VOLT PANEL IS 80-FEET AWAY FIELD LOCATE. PROVIDE POWER CONNECTIONS TO EACH ENERGY MANAGEMENT RIB. REFER TO MECHANICAL/EMS PLANS FOR EQUIPMENT LOCATIONS.
10. CONTRACTOR MAY REUSE (E) CONTROLLER ENCLOSURE WHERE FEASIBLE. 2

APPLICABLE CODES

2019 California Administrative Code - CCR Title 24, Part 1
2019 California Building Code - CCR Title 24, Part 2
2019 California Electrical Code - CCR Title 24, Part 3
2019 California Mechanical Code - CCR Title 24, Part 4
2019 California Plumbing Code - CCR Title 24, Part 5
2019 California Energy Code - CCR Title 24, Part 6
2019 California Fire Code - CCR Title 24, Part 9
2019 Existing Building Code - CCR Title 24, Part 10
2019 California Green Code - CCR Title 24 Part 11
2019 California Reference Code - CCR Title 24 Part 12
Title 19 CCR Public Saftey, State Fire Marshall Regulations
2019 NFPA 72 for Fire Alarm System.
CFC CH 33 Fire Saftey During Construction and Demolition



BLDG SITE PLAN
SCALE: 1" = 30'-0"

SHEET INDEX

MECHANICAL		SHEET COUNT
G1	COVER SHEET	1
M1	BUILDING A - EMS PLAN	2
M2	BUILDING C - EMS PLAN	3
M3	PORTABLE BUILDING - EMS PLAN	4
M4	ENERGY MANAGEMENT DETAILS	5
M5	ENERGY MANAGEMENT DETAILS	6
M6	ENERGY MANAGEMENT DETAILS	7
M7	ENERGY MANAGEMENT DETAILS	8
M8	ENERGY MANAGEMENT DETAILS	9
M9	ENERGY MANAGEMENT DETAILS	10
M10	ENERGY MANAGEMENT DETAILS	11
ELECTRICAL		
E1	ELECTRICAL SYMBOLS AND NOTES	12
E2	ELECTRICAL PLAN	13
SHEET COUNT TOTAL:		13

SCOPE OF WORK

THE SCOPE OF WORK IS AS INDICATED BY THE CONTRACT DRAWINGS AND SPECIFICATION AND IS SUMMARIZED AS FOLLOWS:

- REPLACE EXISTING DDC CONTROLS w/(N) JOHNSON CONTROLS FX-80
- REPLACE AND UP SIZE EXISTING MULTI-ZONE UNIT SUPPLY AND RETURN / EXHAUST FAN WITH NEW MOTOR & VFD. SEE PLANS FOR SIZE & ELECTRICAL DRAWINGS.
- PROVIDE AN EXISTING CONDITION DUCT TRAVERSE FOR EACH SUPPLY ZONE, OUTSIDE AIR, & RETURN AIR ON MULTI-ZONE UNIT MZU-1, MZU-2, MZU-3 AND MZU-4 PRIOR TO START OF WORK AND ALSO UPON PROJECT COMPLETION.

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. CANTELMI
M23588
REN. 9-30-2021
MECHANICAL
STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

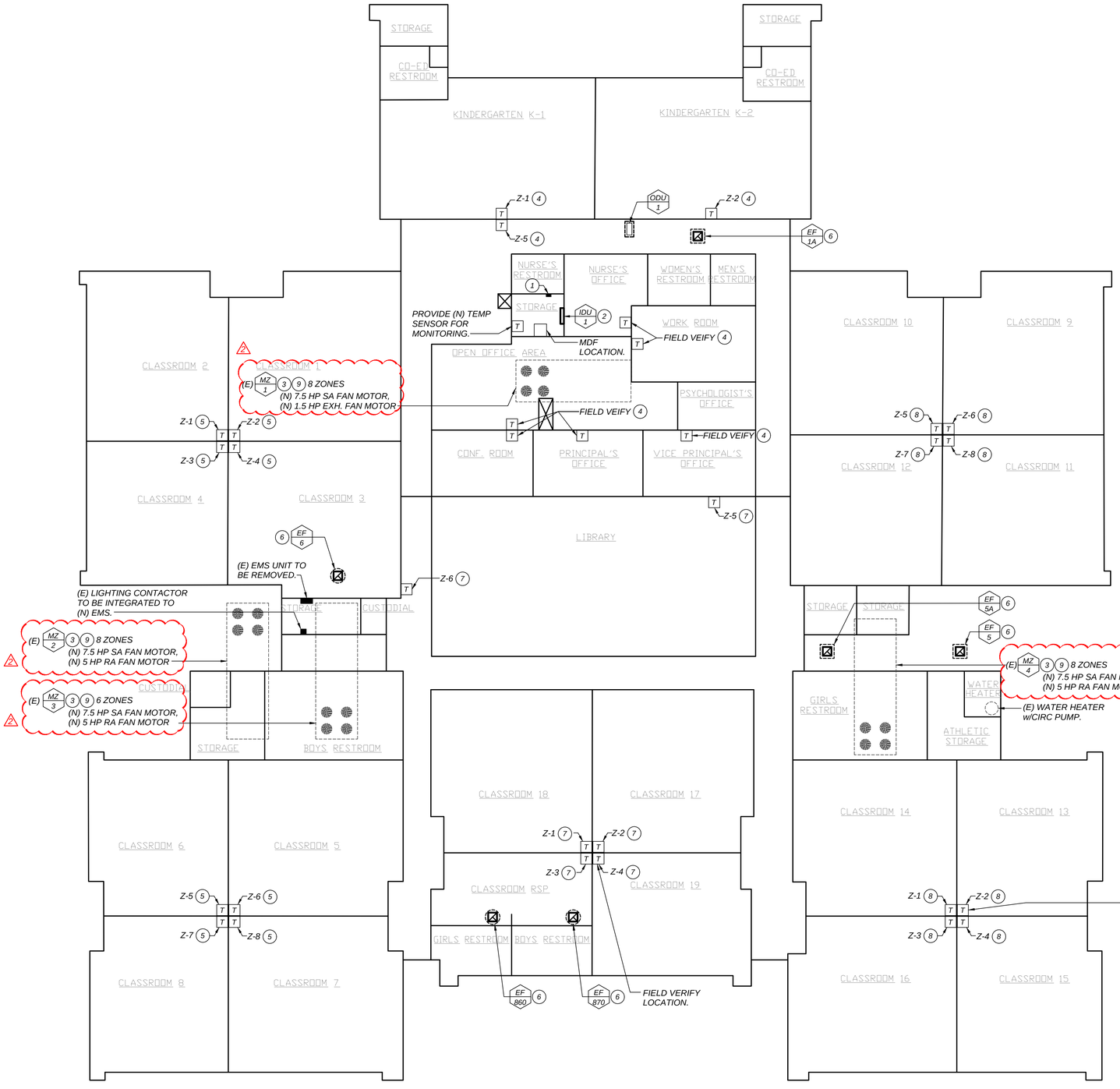
FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
2 4/22/21 EMS REVISIONS

LAWRENCE
ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
(559) 431-0101
Fresno, CA 93720
FAX (559) 431-1362

TITLE: COVER

SHEET: G1
PROJECT 20138

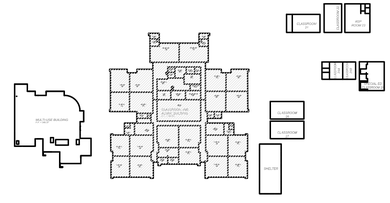


KEYNOTES: (THIS SHEET ONLY)

1. LOCATION OF (N) FX80. REFER TO DETAIL A/M-5.
2. (E) HIGH WALL MOUNTED SPLIT HEAT PUMP WITH ODU ON ROOF.
3. (E) MULTI-ZONE AIR HANDLER ON ROOF.
4. MZ 1 ZONE
5. MZ 2 ZONE
6. EXHAUST FAN ON ROOF.
7. MZ 4 ZONE
8. MZ 3 ZONE
9. REMOVE AND REPLACE (E) FAN MOTOR & ACCESSORIES w/(N) ALLEN BRADLEY VFD & COMPATIBLE MOTOR. PRE & POST AIR FLOW MEASUREMENTS TO MATCH. PROVIDE REPORTS TO MEOR.

BLDG. A - CLASSROOM & ADMIN. BUILDING

SCALE: 3/32"=1'-0"



KEY PLAN

APPROVALS:

APPLICATION # ?????????

REGISTERED PROFESSIONAL ENGINEER — MICHAEL D. GRIMES — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
1 4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-1001
FAX (559) 431-1082

TITLE: BUILDING "A" EMS PLAN

SHEET: M1

PROJECT 20138

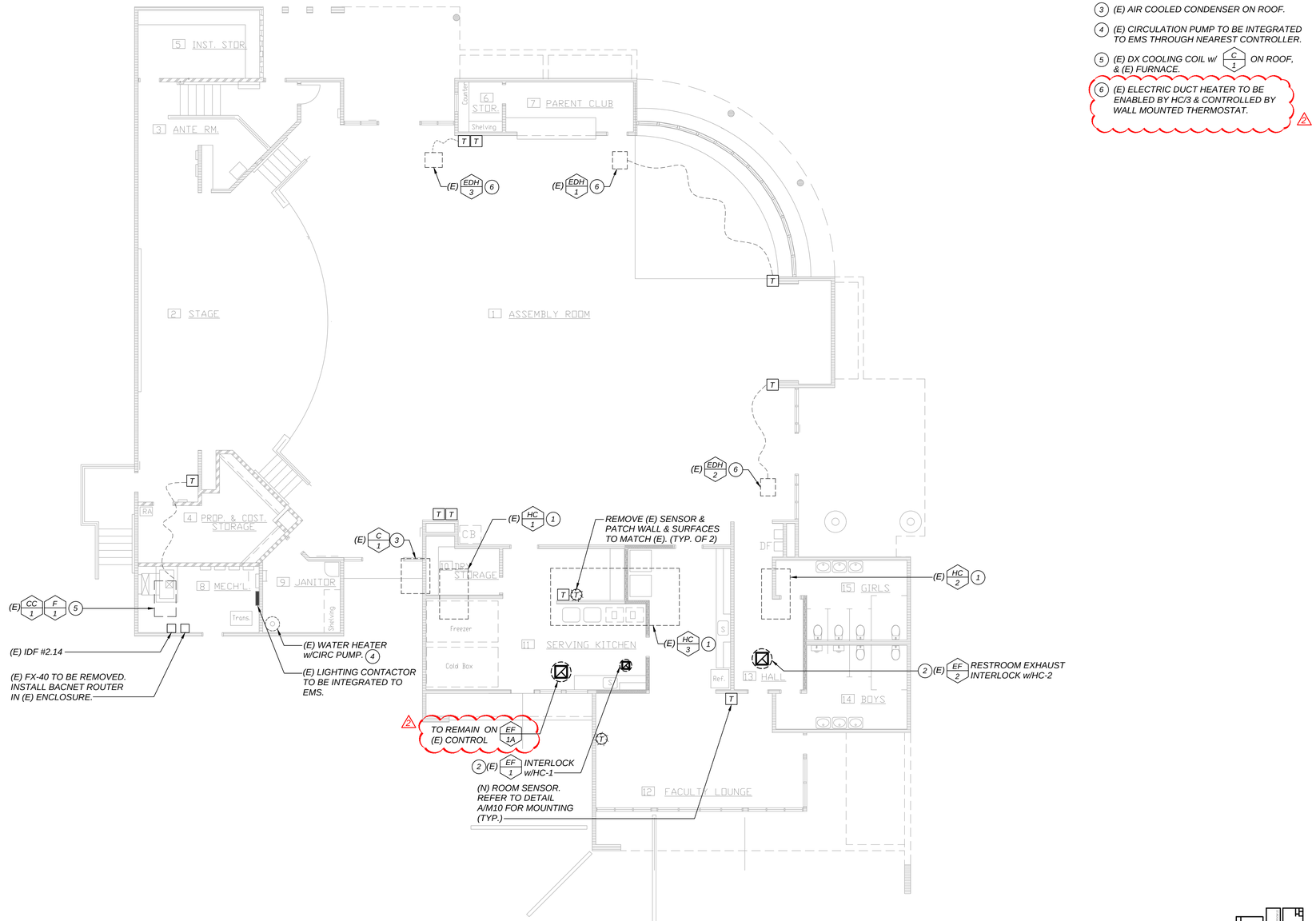
21 April 2021 10:48 PM P:\2020\20138 FUSD Eaton Elementary School\4-Drawings\4 M\M1 – BLDG A CLASSROOM & ADMIN BUILDING.dwg ezequiel

APPROVALS:

APPLICATION # ??????????

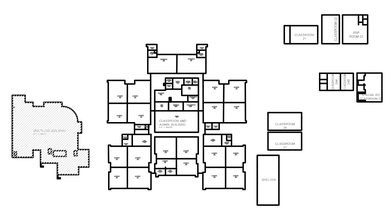
KEYNOTES: (THIS SHEET ONLY)

1. (E) PACKAGE AIR UNIT ON ROOF.
2. (E) EXHAUST FAN ON ROOF.
3. (E) AIR COOLED CONDENSER ON ROOF.
4. (E) CIRCULATION PUMP TO BE INTEGRATED TO EMS THROUGH NEAREST CONTROLLER.
5. (E) DX COOLING COIL w/ C-1 ON ROOF, & (E) FURNACE.
6. (E) ELECTRIC DUCT HEATER TO BE ENABLED BY HC/3 & CONTROLLED BY WALL MOUNTED THERMOSTAT. (2)



BLDG. C - MULTI-PURPOSE ROOM

SCALE: 1/8" = 1'-0"



KEY PLAN

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. CURRY
M28568
REN. 9-30-2021
MECHANICAL
STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
2 4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
Fresno, CA 93720
FAX (559) 431-1582
7084 N. Maple Ave., Suite 101
(559) 431-0101

TITLE:
BUILDING
"C" EMS
PLAN

SHEET: M2

PROJECT 20138

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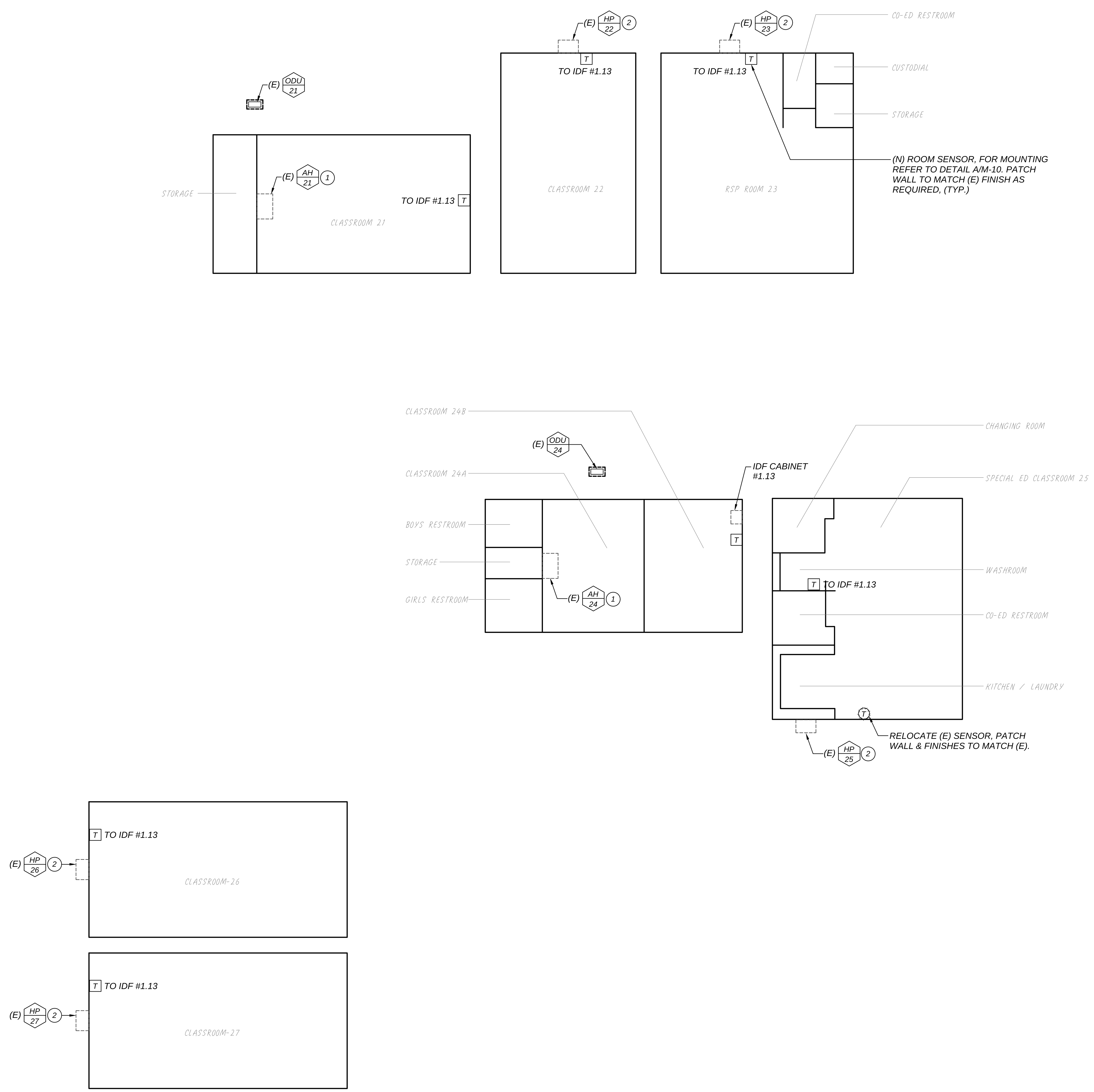
APPROVALS:
APPLICATION #
??????????

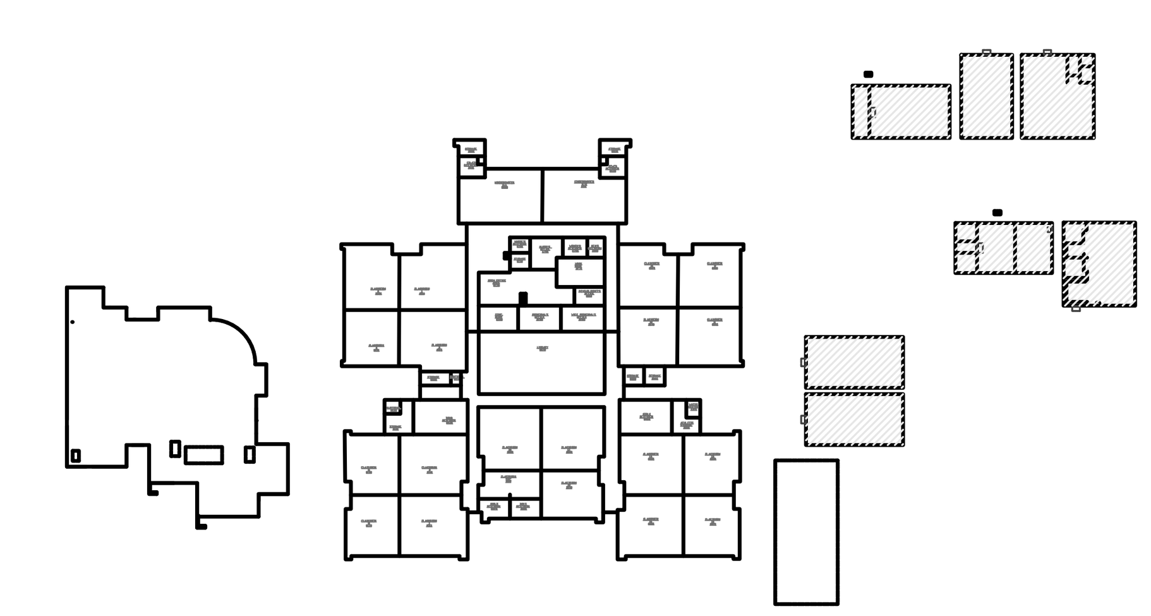


<u>KEYNOTES:</u> (THIS SHEET ONLY)

1. SPLIT SYSTEM WITH GAS FURNACE AND DX COOLING COIL.
2. WALL MOUNTED HEAT PUMP.

PORTABLE BUILDINGS - EMS PLAN

SCALE: 3/32"=1'-0"



KEY PLAN

REGISTERED PROFESSIONAL ENGINEER MICHAEL D. CANTELMI M23588 REN. 9-30-2021 MECHANICAL STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
2 4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-0101
FAX (559) 431-1362

TITLE: PORTABLE BUILDINGS EMS PLAN

SHEET: M3

PROJECT 20138

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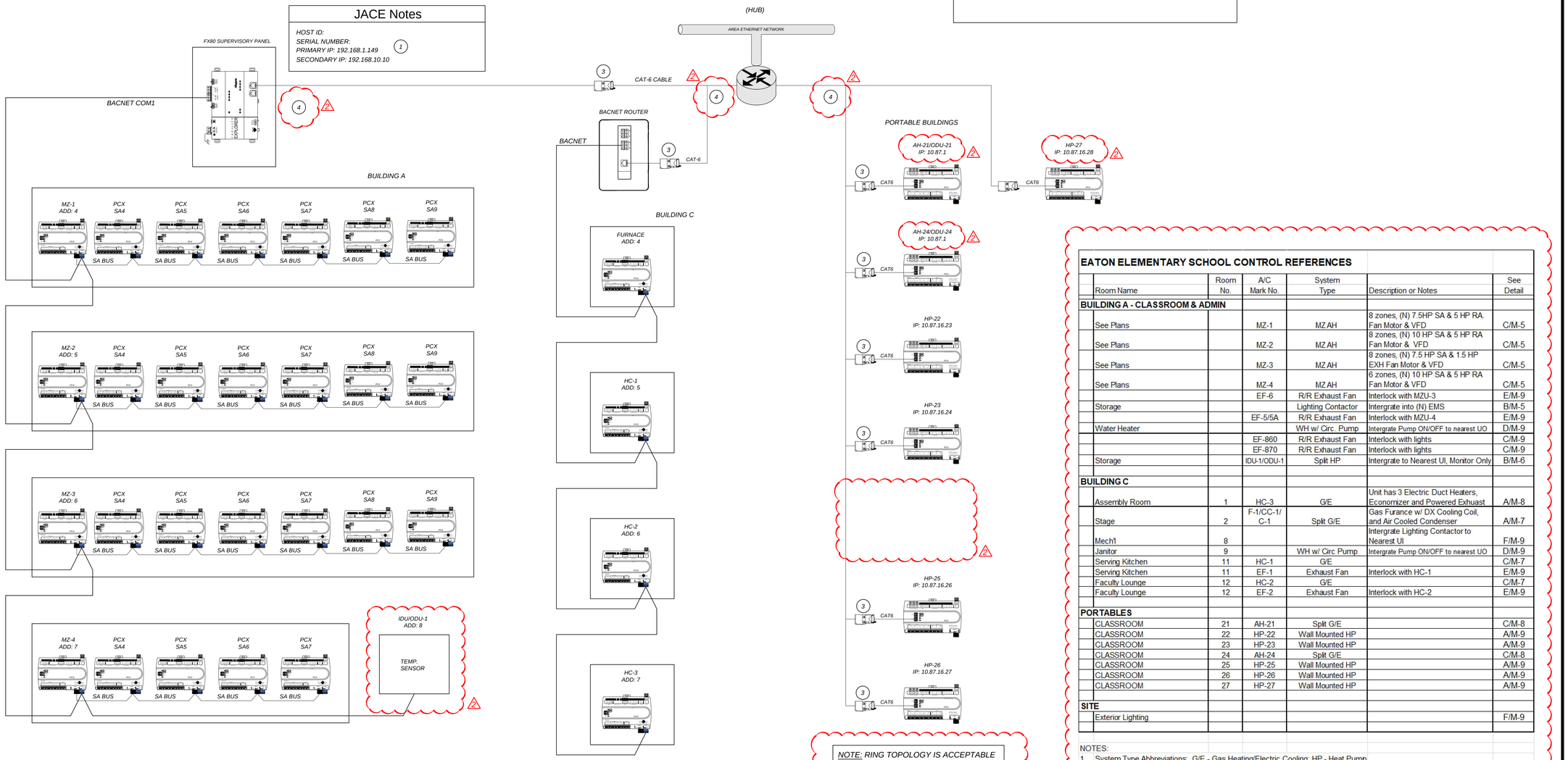
Sheet Notes

1. DEFAULT IP ADDRESS TO BE CHANGED DURING COMMISSIONING.
2. IP ADDRESSES TO BE PROVIDED BY FUSD.
3. A PANDUIT CJ688TGYL CONNECTOR IS REQUIRED BETWEEN ALL IP DEVICES AND THE NETWORK SWITCH.
4. BOTH ENDS OF ALL CAT-6 CABLES MUST BE LABELED WITH THE ROOM NUMBER, EQUIPMENT TYPE, AND PATCH PANEL NUMBER I.E. ROOM # ____ EQUIP. TYPE - PORT #
5. REFER TO E/M-4.

JACE Notes

HOST ID:
SERIAL NUMBER:
PRIMARY IP: 192.168.1.149
SECONDARY IP: 192.168.10.10 (1)



NOTE: RING TOPOLOGY IS ACCEPTABLE FOR CONTROLLERS SERVING PORTABLE BUILDINGS.

LAN ARCHITECTURE DETAIL — A / M-4

EATON ELEMENTARY SCHOOL CONTROL REFERENCES

Room Name	Room No.	A/C Mark No.	System Type	Description or Notes	See Detail
BUILDING A - CLASSROOM & ADMIN					
See Plans		MZ-1	MZ AH	8 zones, (N) 7.5HP SA & 5 HP RA. Fan Motor & VFD	C/M-5
See Plans		MZ-2	MZ AH	8 zones, (N) 10 HP SA & 5 HP RA Fan Motor & VFD	C/M-5
See Plans		MZ-3	MZ AH	8 zones, (N) 7.5 HP SA & 1.5 HP EXH Fan Motor & VFD	C/M-5
See Plans		MZ-4	MZ AH	6 zones, (N) 10 HP SA & 5 HP RA Fan Motor & VFD	C/M-5
		EF-6	R/R Exhaust Fan	Interlock with MZU-3	E/M-9
Storage			Lighting Contactor	Intergrate into (N) EMS	B/M-5
		EF-5/5A	R/R Exhaust Fan	Interlock with MZU-4	E/M-9
Water Heater			WH w/ Circ. Pump	Intergrate Pump ON/OFF to nearest UO	D/M-9
		EF-860	R/R Exhaust Fan	Interlock with lights	C/M-9
		EF-870	R/R Exhaust Fan	Interlock with lights	C/M-9
Storage		IDU-1/ODU-1	Split HP	Intergrate to Nearest UI, Monitor Only	B/M-6
BUILDING C					
Assembly Room	1	HC-3	G/E	Unit has 3 Electric Duct Heaters, Economizer and Powered Exhaust	A/M-8
Stage	2	F-1/CC-1/ C-1	Split G/E	Gas Furance w/ DX Cooling Coil, and Air Cooled Condenser	A/M-7
Mech1	8			Intergrate Lighting Contactor to Nearest UI	F/M-9
Janitor	9		WH w/ Circ Pump	Intergrate Pump ON/OFF to nearest UO	D/M-9
Serving Kitchen	11	HC-1	G/E		C/M-7
Serving Kitchen	11	EF-1	Exhaust Fan	Interlock with HC-1	E/M-9
Faculty Lounge	12	HC-2	G/E		C/M-7
Faculty Lounge	12	EF-2	Exhaust Fan	Interlock with HC-2	E/M-9
PORTABLES					
CLASSROOM	21	AH-21	Split G/E		C/M-8
CLASSROOM	22	HP-22	Wall Mounted HP		A/M-9
CLASSROOM	23	HP-23	Wall Mounted HP		A/M-9
CLASSROOM	24	AH-24	Split G/E		C/M-8
CLASSROOM	25	HP-25	Wall Mounted HP		A/M-9
CLASSROOM	26	HP-26	Wall Mounted HP		A/M-9
CLASSROOM	27	HP-27	Wall Mounted HP		A/M-9
SITE					
Exterior Lighting					F/M-9

NOTES:
1. System Type Abbreviations: G/E - Gas Heating/Electric Cooling; HP - Heat Pump
   CP - Central Plant Hot or Chilled Water
   LS - Light Switch
   UV - Unit Ventilator
   MUA- Make-up Air
   HW- Hot Water
   DHW- Domestic Hot Water
   MZ - Multizone
   AH - Air handler

APPROVALS:
APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — MICHAEL D. CURRY — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-1001
FAX (559) 431-1082

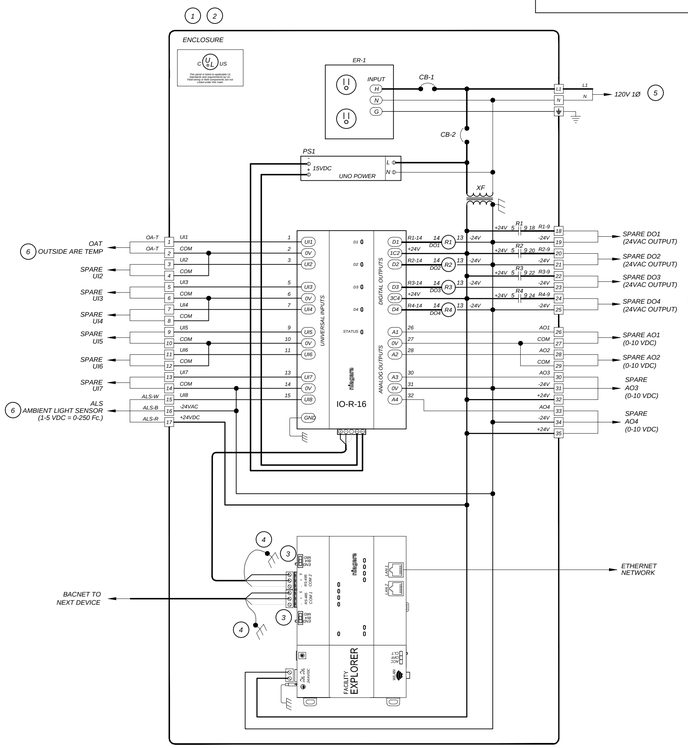
TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M4

PROJECT 20138

21 April 2021 10:48 PM P:\2020\20138 FUSD Eaton Elementary School\4-Drawings\4 M\M4 – CONTROLS.dwg ezequiel

NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.



Panel Components

TAG	DESCRIPTION
FX	FX-80 CONTROLLER AND SD CARD
	FX-80 SMA
	FX-80 DEVICE LICENCE
RIO16	16 POINT REMOTE INPUT/OUTPUT EXPANSION
XF	120 - 24V TRANSFORMER
CB-1	MANUAL RESET 15.0 AMP CIRCUIT BREAKER
CB-2	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	PANEL BACKPLATE
ENC	PADLOCK KIT
ER-1	ELECTRICAL OUTLET
R1-R4	2-POLE 24VAC RELAY W/LED
R1-R4	2-POLE RELAY BASE
PS-1	15VDC POWER SUPPLY

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. JACE SELECTOR SWITCH NEED TO BE SET TO THE "END" POSITION
4. RS-485 COMM BUS SHIELD TO BE GROUNDED AT THE SCP PANEL ONLY
5. LINE VOLTAGE & CONDUIT BY DIVISION 16
6. SEE DETAIL B/M-5

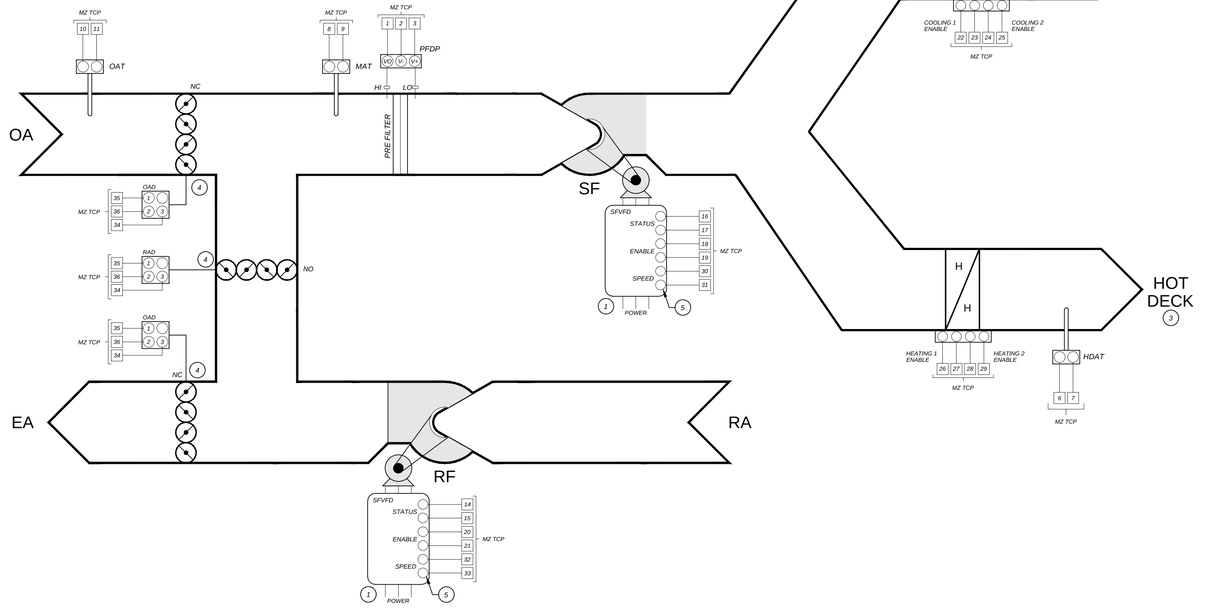
SUPERVISORY SCP SCHEMATIC DETAIL — A / M-5

Control Components

TAG	DESCRIPTION
CDAT,HDAT	DUCT TEMP SENSOR
OAT	OUTSIDE AIR SENSOR
MAT	AVERAGING DUCT TEMP SENSOR
OAD/RAD	SPRING RETURN DAMPER ACTUATOR
PFDP	PRESSURE TRANSDUCER
SFVFD	(N) VARIABLE FREQUENCY DRIVE

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
3. REFER TO DETAIL D/M5 FOR ZONE CONTROL DETAIL.
4. PROVIDE (N) ACTUATOR, FIELD VERIFY QUANITY.
5. (N) VARIBLE FREQUENCY DRIVE AND MOTOR



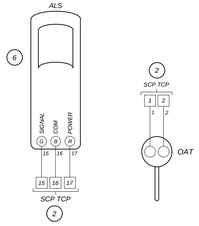
MULTI-ZONE CONTROL DETAIL — C / M-5

Control Components

TAG	DESCRIPTION
ALS	AMBIENT LIGHT SENSOR
OAT	10K TYPE 3 OUTDOOR SENSOR

Detail Notes

1. LOCATE AMBIENT LIGHT SENSOR AT NORTHERN EXPOSURE OF BUILDING.
2. SEE DETAIL A/M-5



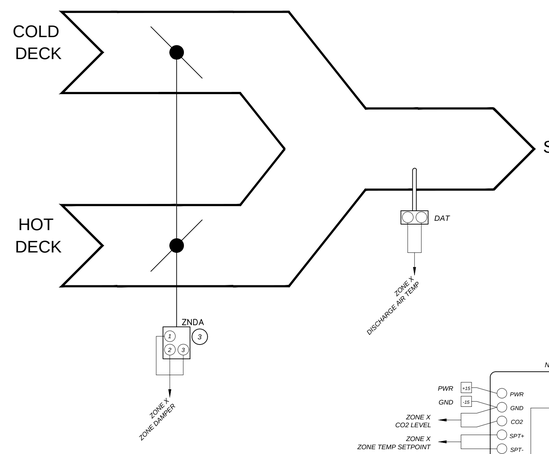
OUTDOOR PHOTOCELL AND TEMP SENSOR DETAIL — B / M-5

Control Components

TAG	DESCRIPTION
NZS	ZONE SENSOR W/ SETPOINT ADJUSTMENT
DAT	-
ZNDA	-

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
3. PROVIDE (N) ACTUATOR.



ZONE CONTROL DETAIL — D / M-5

APPROVALS:
APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — DONEL D. DEVEN — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
4/22/21 EMS REVISIONS

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7084 N. Maple Ave., Suite 101
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TITLE:
ENERGY MANAGEMENT DETAILS

SHEET: M5

PROJECT 20138

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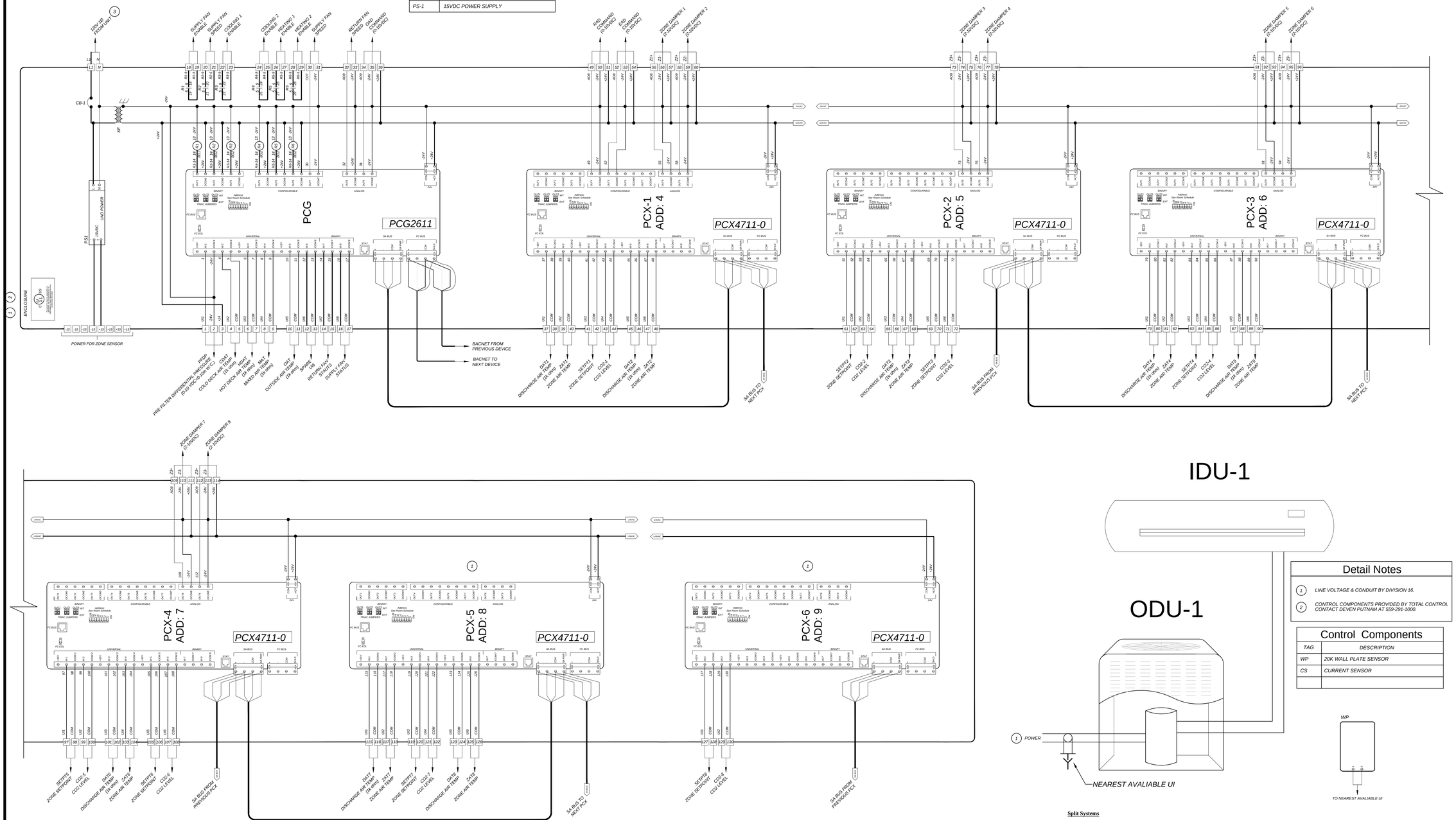
NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Sheet Notes

1. CONTROL PANELS FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE AND CONDUIT BY DIVISION 16.

Panel Components

TAG	DESCRIPTION
PCG	GENERAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	SOLID PANEL BACKPLATE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER
XF	96VA 24VAC TRANSFORMER
R1-R6	2-POLE 24VAC RELAY W/ LED
R1-R6	2-POLE RELAY BASE
PCX	I/O EXPANSION MODULE
PS-1	15VDC POWER SUPPLY



IDU-1

ODU-1

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.

Control Components

TAG	DESCRIPTION
WP	20K WALL PLATE SENSOR
CS	CURRENT SENSOR

Split Systems

Unit will be controlled by factory controller, BAS for temp monitoring only with alarms at district set thresholds. Unit will run 24/7.

MULTI-ZONE SCHEMATIC DETAIL P1 — A / M-6

ODU/IDU CONTROL DETAIL — B / M-6

APPROVALS:

APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — DANIEL D. CONNER — No. M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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4/22/21 EMS REVISIONS

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FAX (559) 431-3302

TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M6

PROJECT 20138

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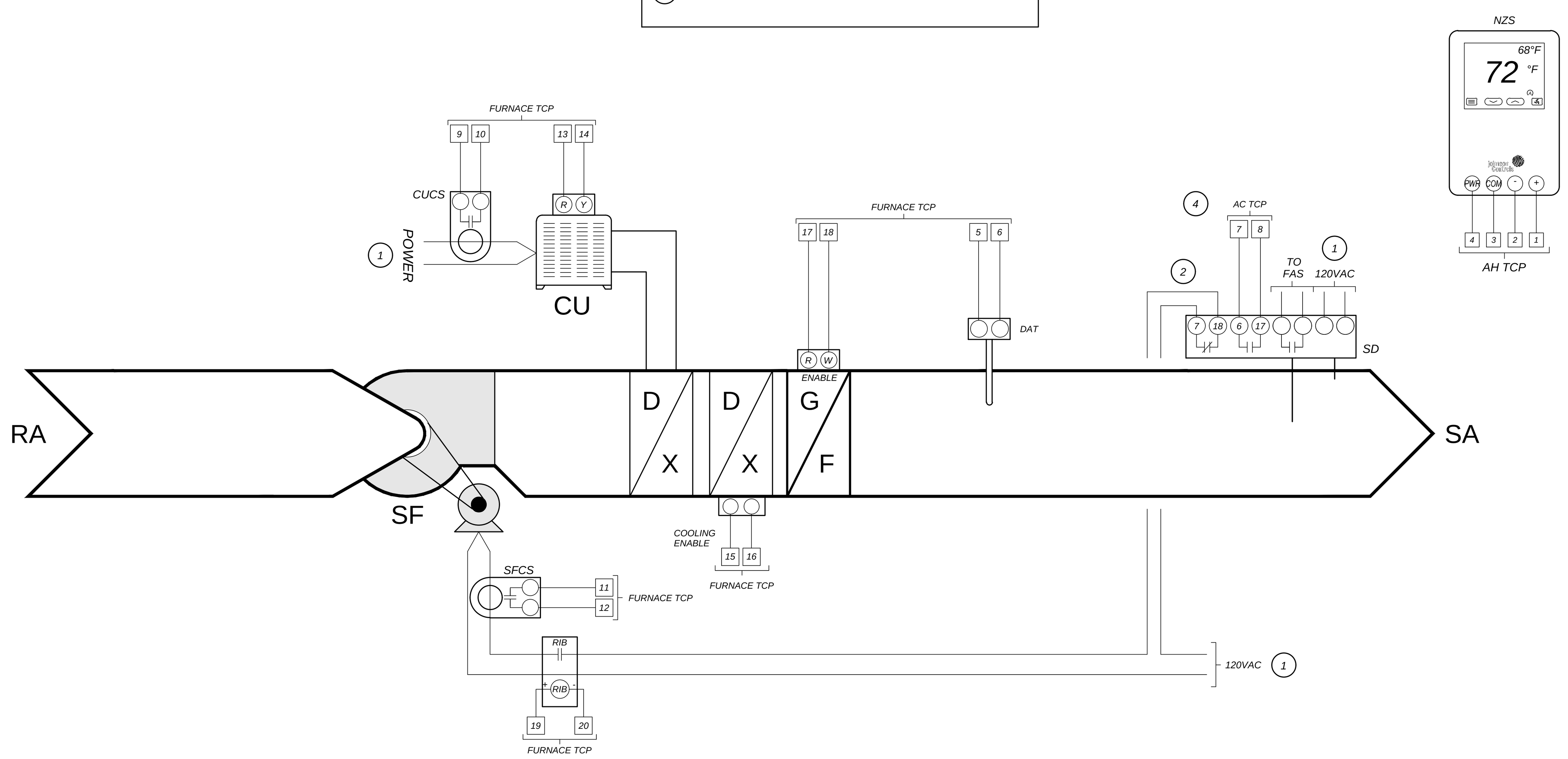
FURNACE C1/F-1 CONTROL DETAIL (A / M-7)

Control Components

TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
SFCS/CUCS	CURRENT SENSOR
RIB	24VAC RELAY IN A BOX
NZS	NETWORK ZONE SESNOR W/ CO_2

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. UNIT SHALL SHUT DOWN UPON DETECTION OF SMOKE. WIRE ACCORDINGLY.
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL B/M-7 FOR TCP DIAGRAM.



FURNACE C1/F-1 CONTROL DETAIL

ROOF TOP UNIT CONTROL (C / M-7)

Control Components

TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
CCS,SFCS	CURRENT SENSOR
NZS	NETWORK ZONE SENSOR W/ CO_2
OAD/RAD	SPRING RETURN DAMPER ACTUATOR

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. OAT GLOBALLY SHARED SOFTWARE POINT
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL D/M-7 FOR TCP DIAGRAM.

Package Unit

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

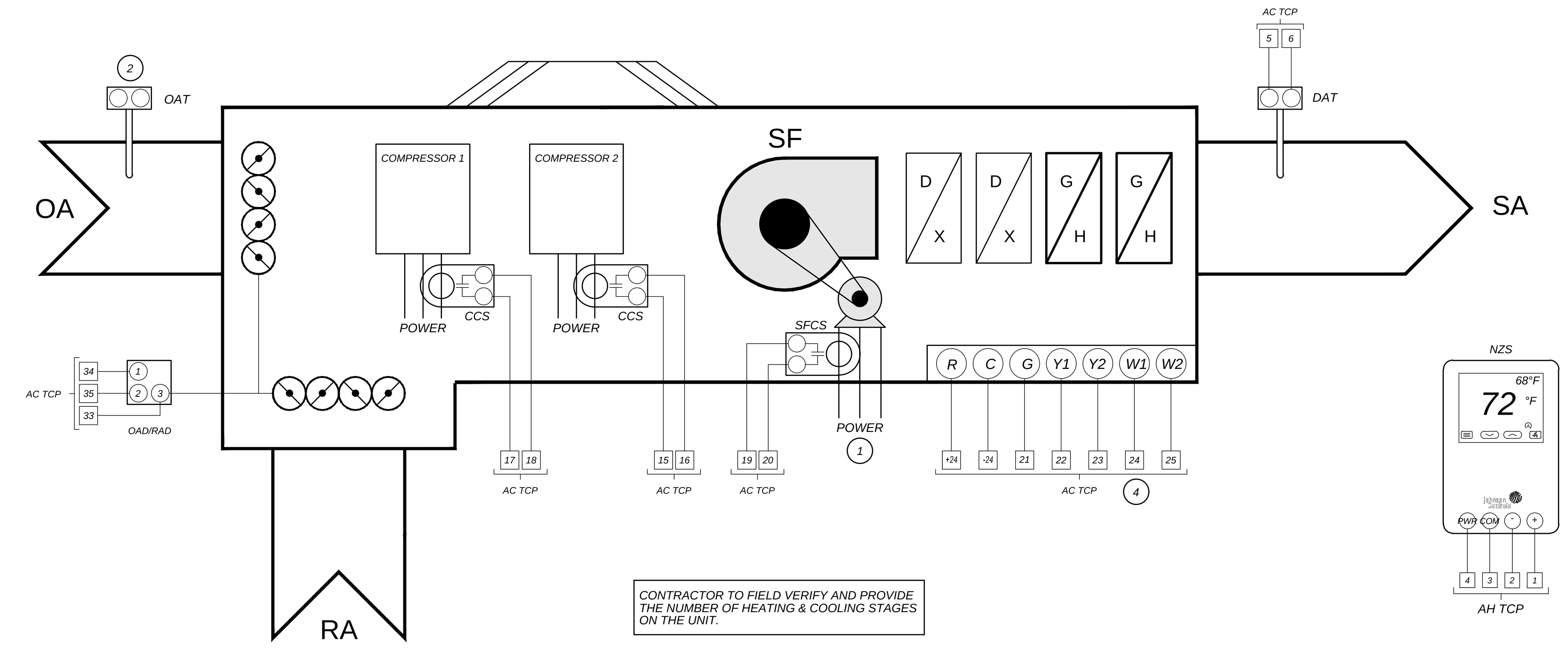
Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

Cooling Mode: When outside air is above the OA cooling lockout setpoint (65° F adjustable) and there is a call for cooling, the compressor shall stage on in order to satisfy the condition. Compressor shall be monitored with a current sensor to prove that the compressor is running.

Heating Mode: When outside air is below the OA heating lockout setpoint (60° F adjustable) and there is a call for heating the reversing valve shall stage on in order to satisfy the condition.

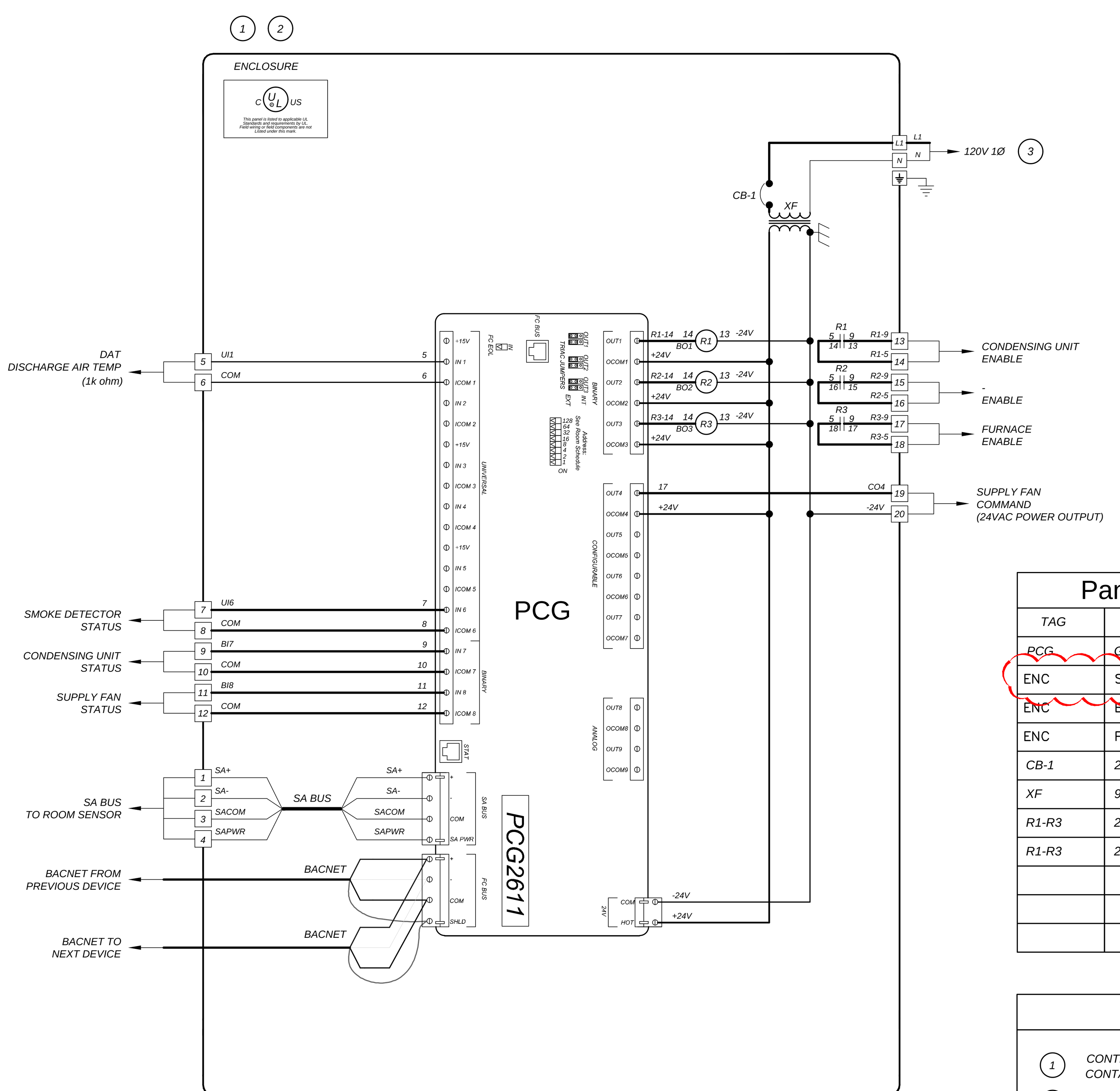
Demand Control Ventilation: CO2 readings shall come from the wall mount Temp/CO2 sensor. If the zone CO2 PPM reaches 800 ppm (adj.), the economizer shall modulate open to the maximum outdoor air position to satisfy the demand. Once the CO2 level drops below 800 ppm (adj.) , the economizer shall close to the minimum outdoor air position.

CO2 Monitoring: If CO2 in the space rises above CO2 alarm setpoint (adj.), the system will generate a Niagara alarm.



ROOF TOP UNIT CONTROL

FURNACE TCP SCHEMATIC DETAIL (B / M-7)



Panel Components

TAG	DESCRIPTION
PCG	GENERAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER
XF	96VA 24VAC TRANSFORMER
R1-R3	2-POLE 24VAC RELAY W/ LED
R1-R3	2-POLE RELAY BASE

△2

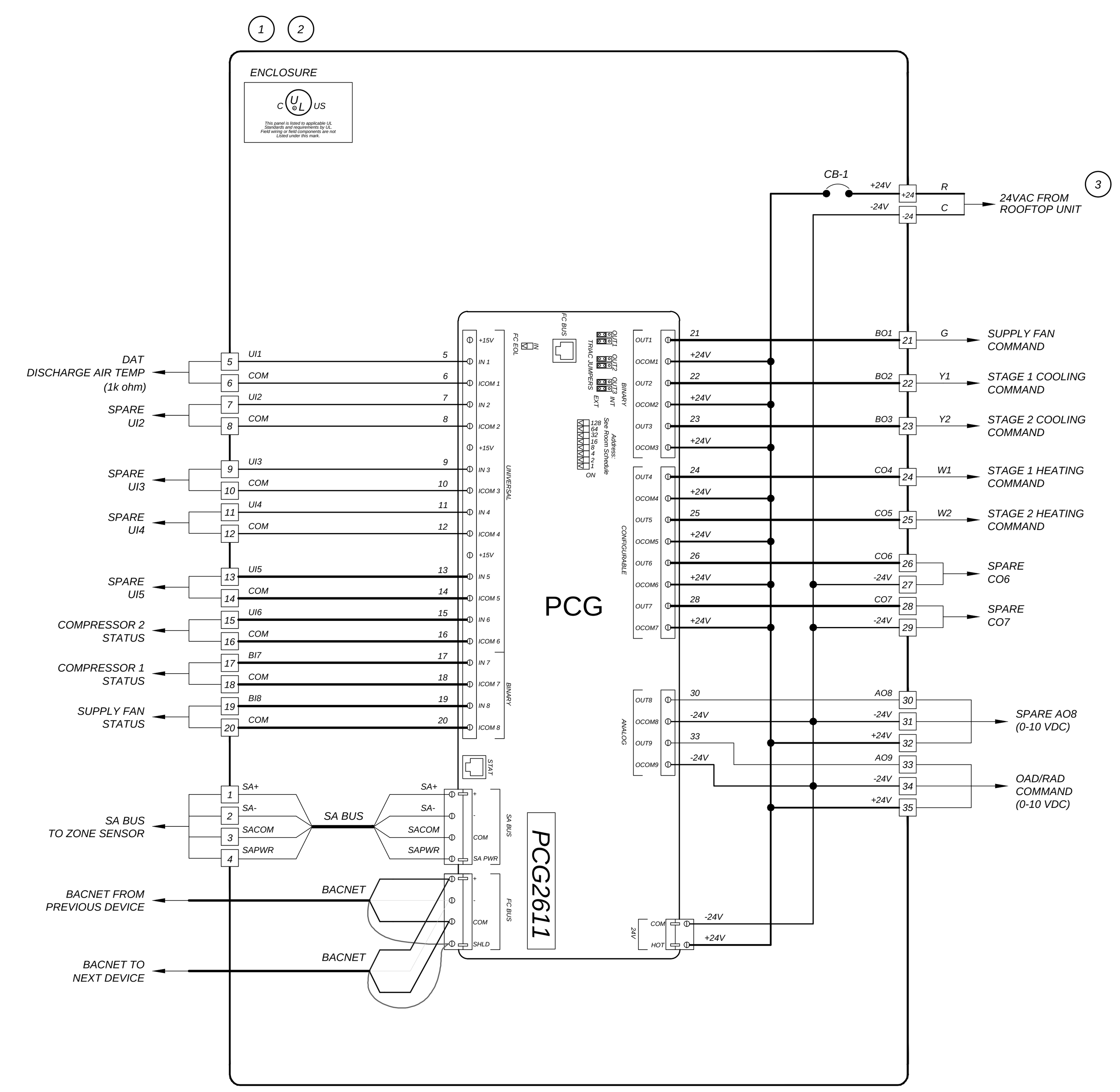
Detail Notes

1. CONTROL PANELS FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE AND CONDUIT BY DIVISION 16.

FURNACE TCP SCHEMATIC DETAIL

ROOF TOP UNIT TCP SCHEMATIC (D / M-7)

NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.



Panel Components

TAG	DESCRIPTION
PCG	GENERNAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER

△2

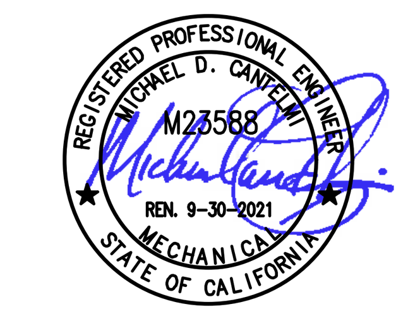
Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.

ROOF TOP UNIT TCP SCHEMATIC

APPROVALS:

APPLICATION # ??????????



DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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△2 4/22/21 EMS REVISIONS

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TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M7

PROJECT 20138

APPROVALS:

APPLICATION # ??????????

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
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Fresno, CA 93720
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(559) 431-1001

TITLE:
ENERGY
MANAGEMENT
DETAILS

SHEET: M8

PROJECT 20138

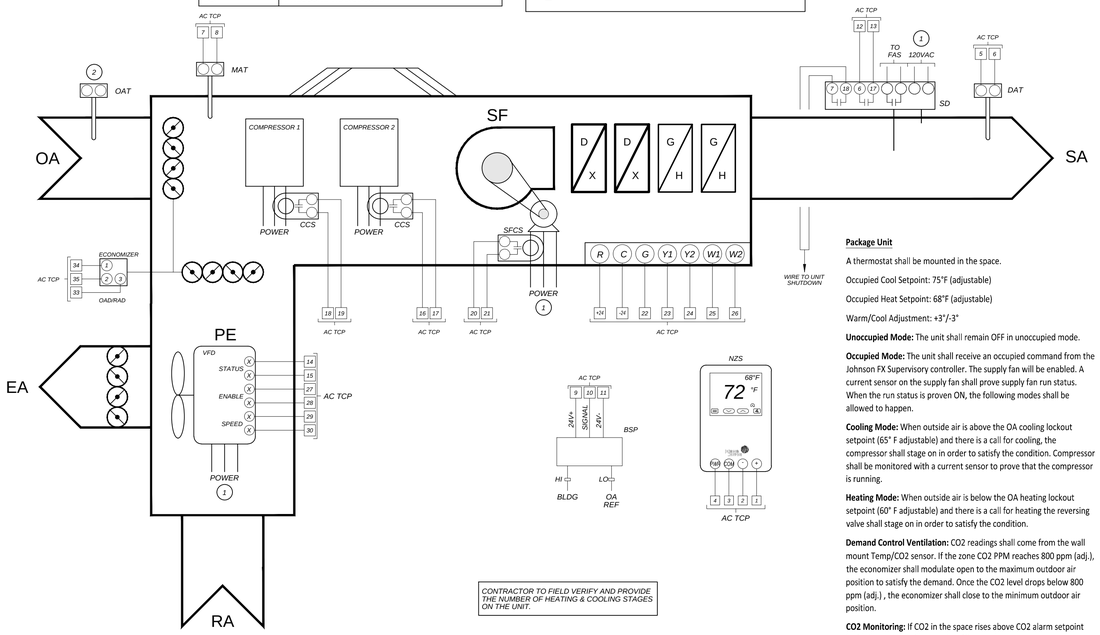
21 April 2021 10:49 PM P:\2020\20138 FUSD Eaton Elementary School\4-Drawings\4 M\M8 – CONTROLS.dwg ezequiel

Control Components

TAG	DESCRIPTION
DAT,MAT,RAT	DUCT TEMP SENSOR
CCS,SFCS	CURRENT SENSOR
NZS	NETWORK ZONE SENSOR WITH CO2
OAD/RAD	SPRING RETURN DAMPER ACTUATOR
BSP	PRESSURE TRANSDUCER

Sheet Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. OAT GLOBALLY SHARED SOFTWARE POINT
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL B/M8 FOR TCP DIAGRAM.



CONTRACTOR TO FIELD VERIFY AND PROVIDE THE NUMBER OF HEATING & COOLING STAGES ON THE UNIT.

Package Unit

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

Cooling Mode: When outside air is above the OA cooling lockout setpoint (65° F adjustable) and there is a call for cooling, the compressor shall stage on in order to satisfy the condition. Compressor shall be monitored with a current sensor to prove that the compressor is running.

Heating Mode: When outside air is below the OA heating lockout setpoint (60° F adjustable) and there is a call for heating the reversing valve shall stage on in order to satisfy the condition.

Demand Control Ventilation: CO2 readings shall come from the wall mount Temp/CO2 sensor. If the zone CO2 PPM reaches 800 ppm (adj.), the economizer shall modulate open to the maximum outdoor air position to satisfy the demand. Once the CO2 level drops below 800 ppm (adj.) , the economizer shall close to the minimum outdoor air position.

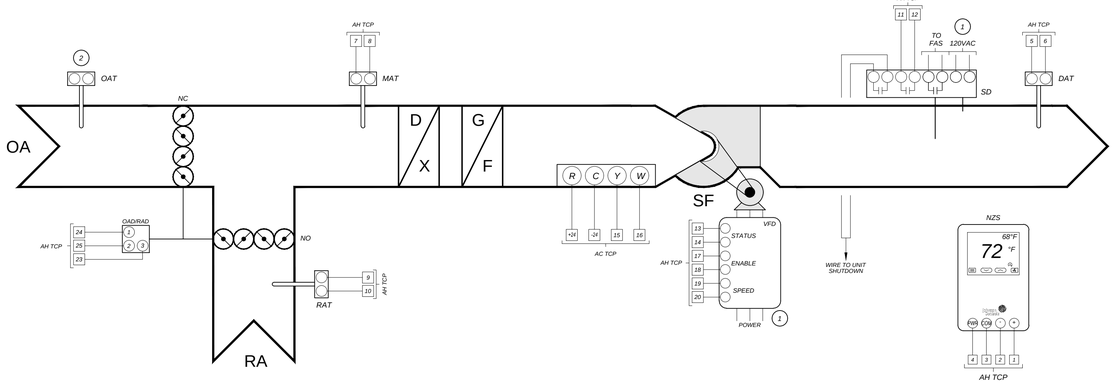
CO2 Monitoring: If CO2 in the space rises above CO2 alarm setpoint (adj.), the system will generate a Niagara alarm.

Control Components

TAG	DESCRIPTION
DAT,MAT,RAT	DUCT TEMP SENSOR
OAD/RAD	SPRING RETURN DAMPER ACTUATOR
NZS	NETWORK ZONE SESNOR W/ CO_2

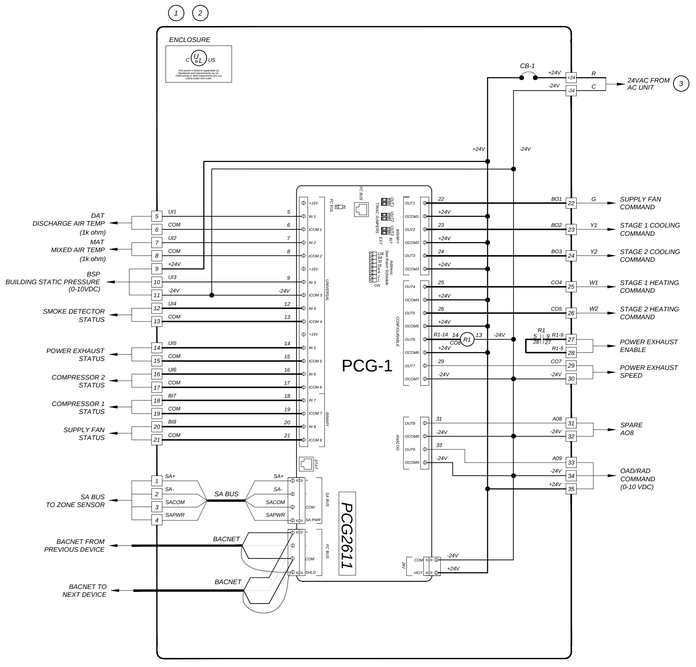
Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. OAT GLOBALLY SHARED SOFTWARE POINT
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL D/M-8 FOR TCP DIAGRAM.



ROOF TOP UNIT CONTROL DETAIL

A M-8



NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Panel Components

TAG	DESCRIPTION
PCG	GENERNAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER
R1	2-POLE 24VAC RELAY W/ LED
R1	2-POLE RELAY BASE

Sheet Notes

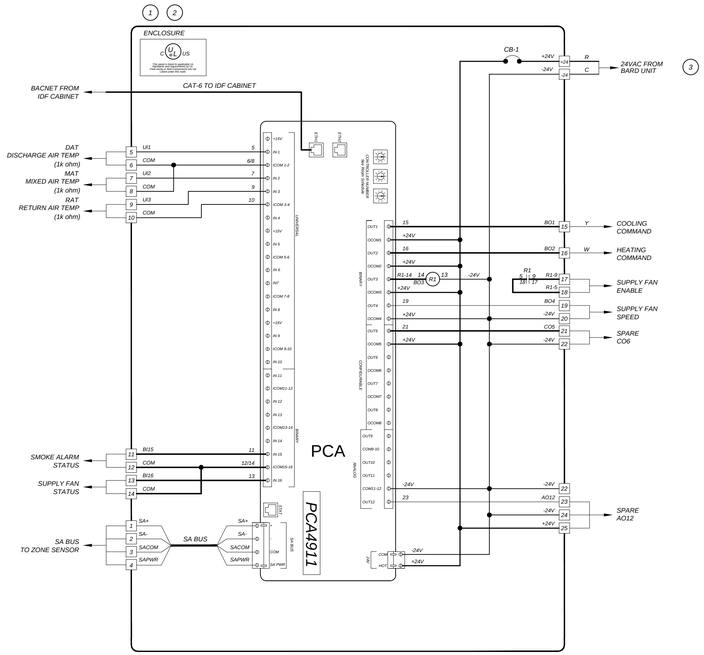
1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.

ROOF TOP UNIT TCP SCHEMATIC DETAIL

B M-8

AIR HANDLER CONTROL DETAIL

C M-8



NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Panel Components

TAG	DESCRIPTION
PCA	ADVANCED PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
R1	2-POLE 24VAC RELAY W/ LED
R1	2-POLE RELAY BASE

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.

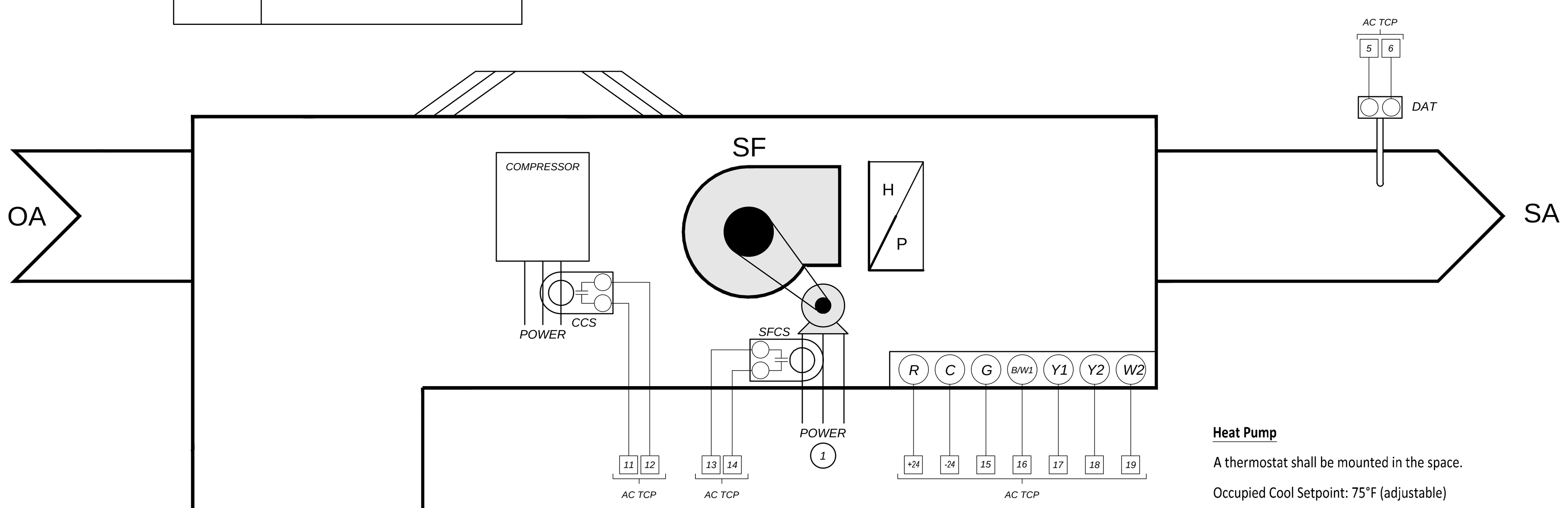
AIR HANDLER TCP SCHEMATIC DETAIL

D M-8

Control Components	
TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
SFCS,CCS	CURRENT SENSOR
NZS	NETWORK ZONE SESNOR W/ CO_2

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
3. SEE DETAIL B/M-9 FOR TCP DIAGRAM.



Heat Pump

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

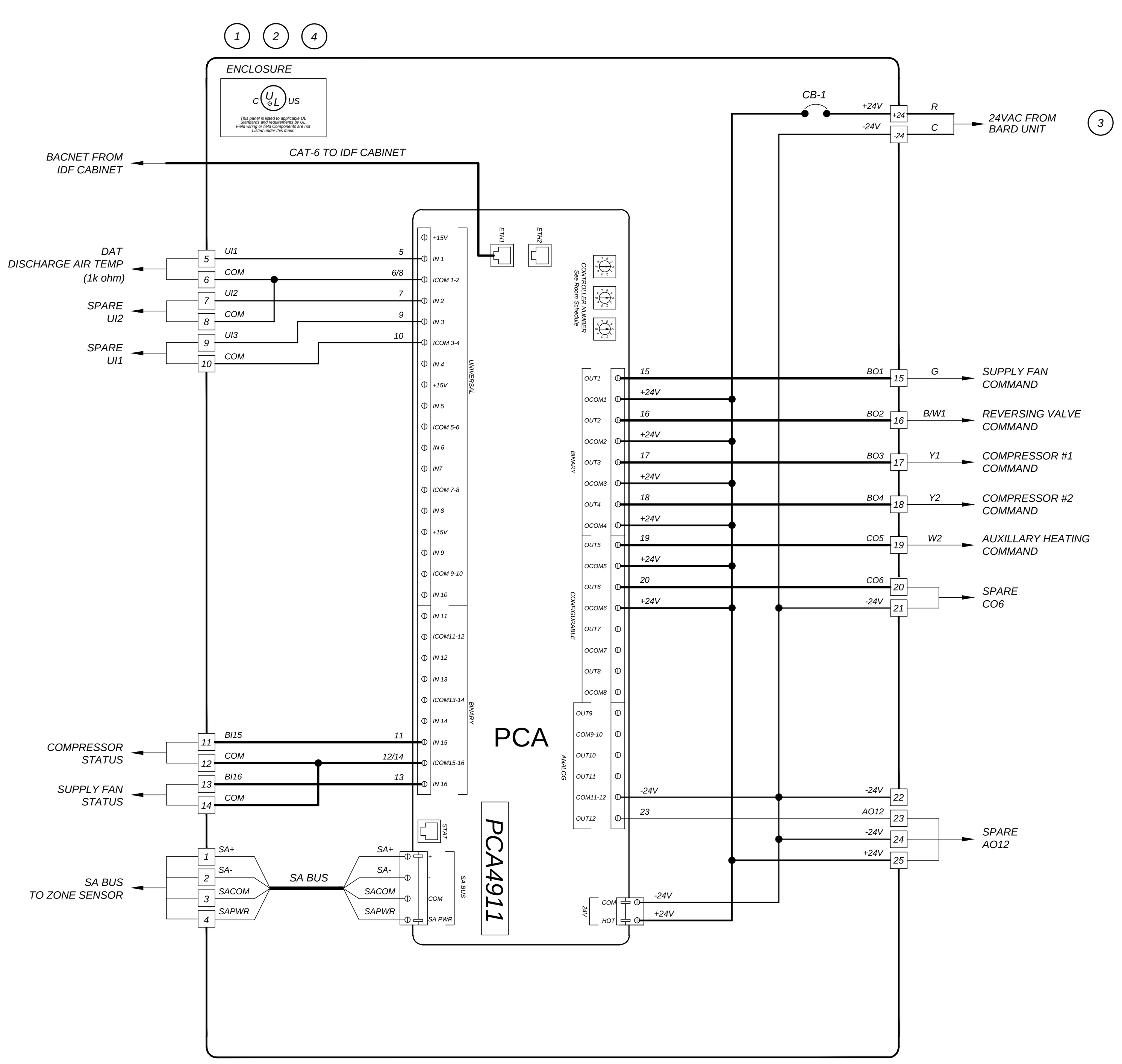
Cooling Mode: When outside air is above the OA cooling lockout setpoint (65° F adjustable) and there is a call for cooling, the compressor shall stage on in order to satisfy the condition. Compressor shall be monitored with a current sensor to prove that the compressor is running.

Heating Mode: When outside air is below the OA heating lockout setpoint (60° F adjustable) and there is a call for heating the reversing valve shall stage on in order to satisfy the condition.

WALL MOUNTED HEAT PUMP CONTROL DETAIL

A / M-9

NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.



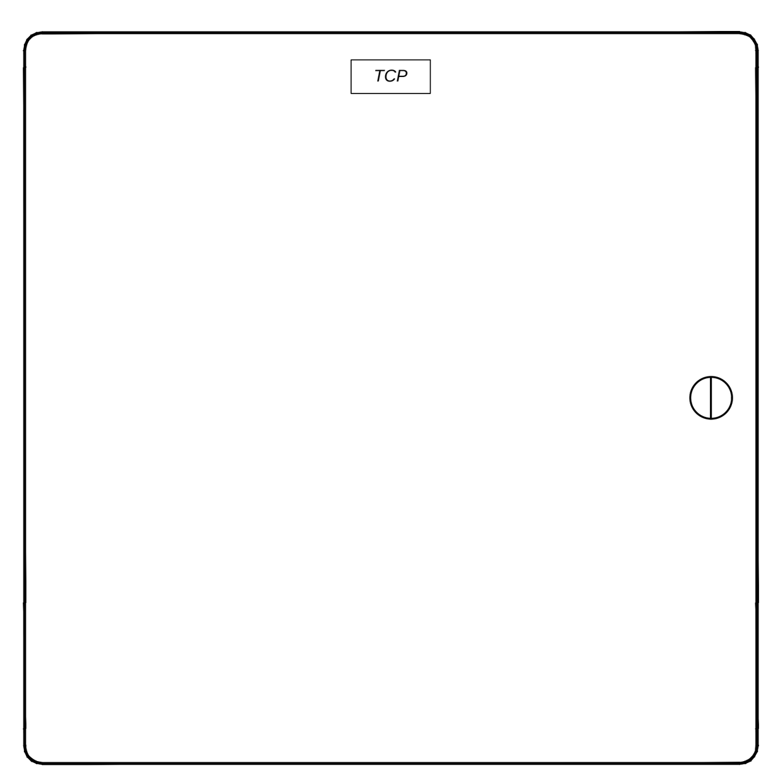
Panel Components	
TAG	DESCRIPTION
PCA	ADVANCED PROGRAMMABLE CONTROLLER
CB-1	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
TCP	TCP LABEL

2

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.
4.

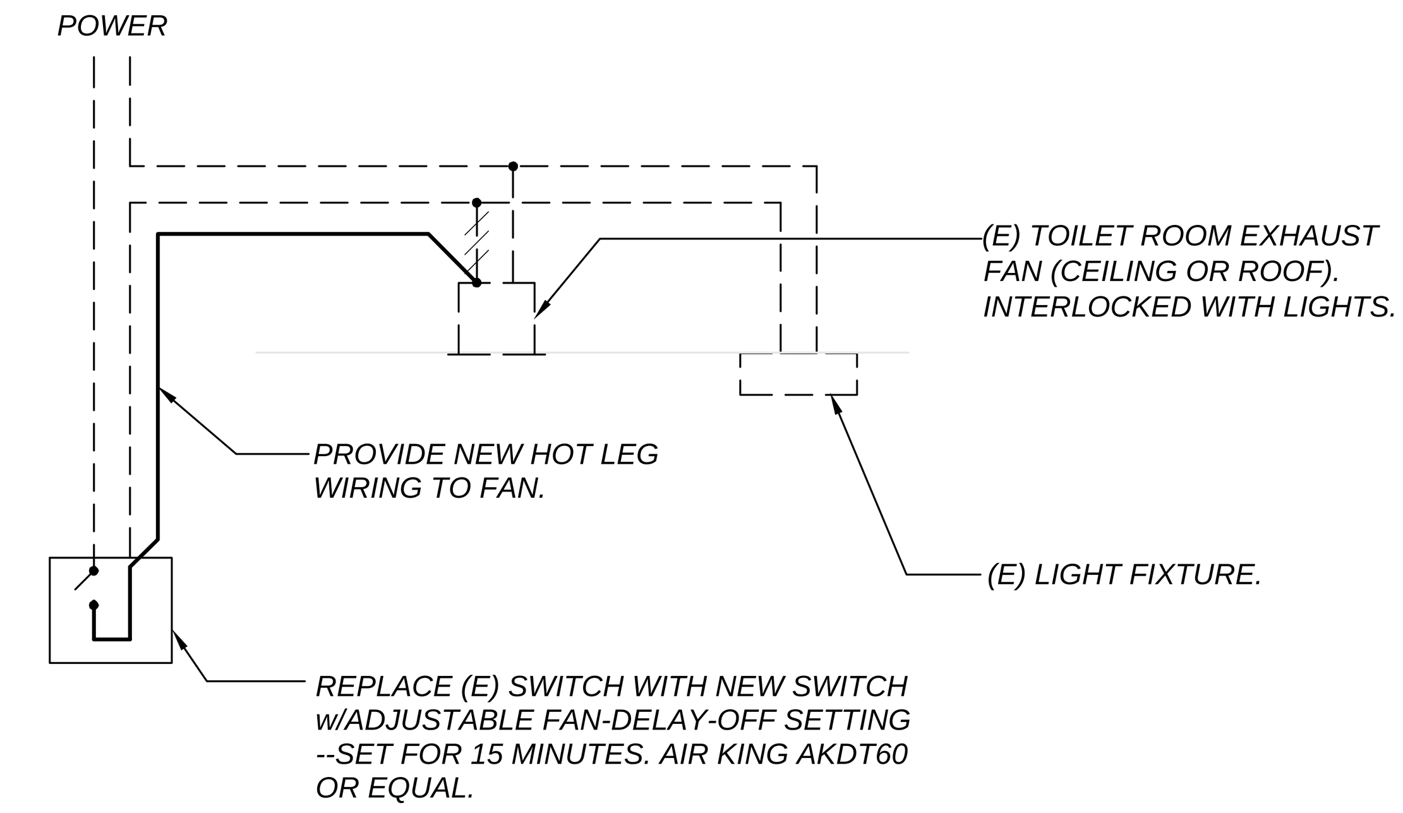
2



PANEL DOOR LAYOUT

WALL MOUNTED HEAT PUMP TCP SCHEMATIC DETAIL

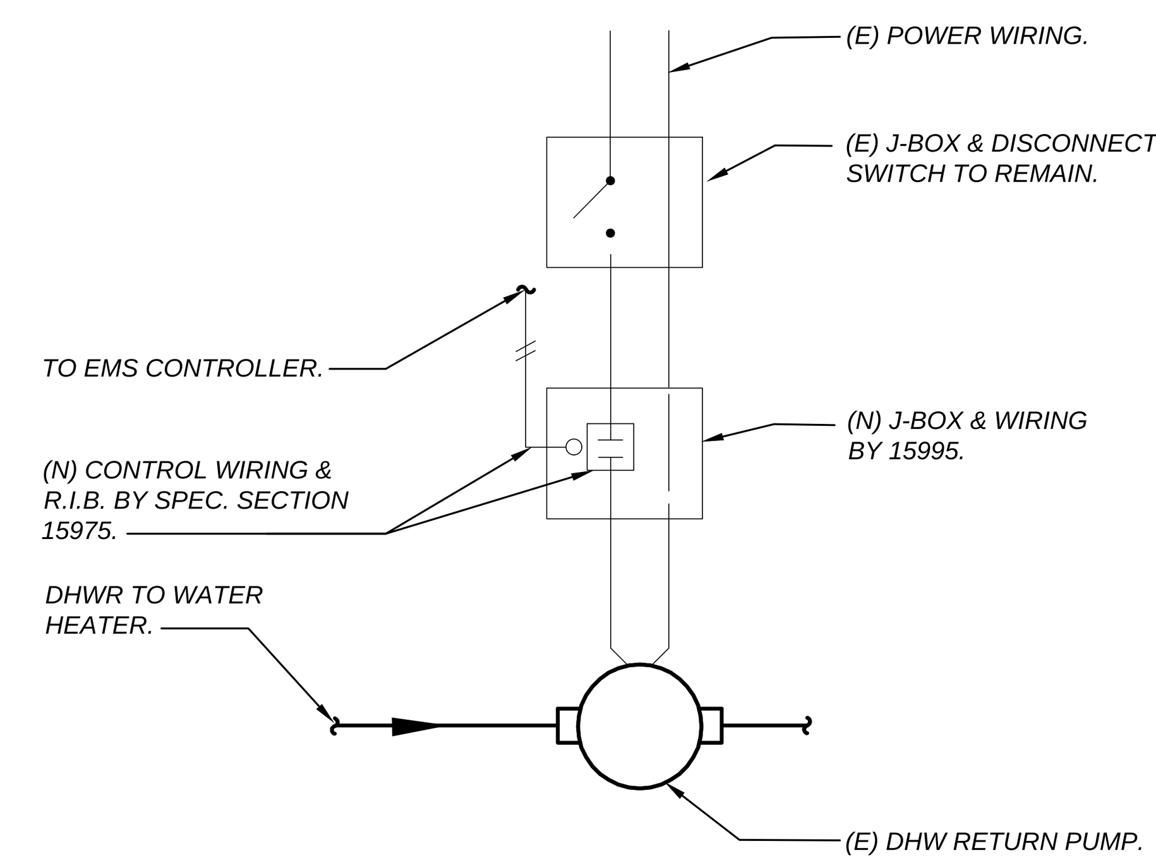
B / M-9



LIGHT / EXHAUST TIMER SWITCH

SCALE: NONE

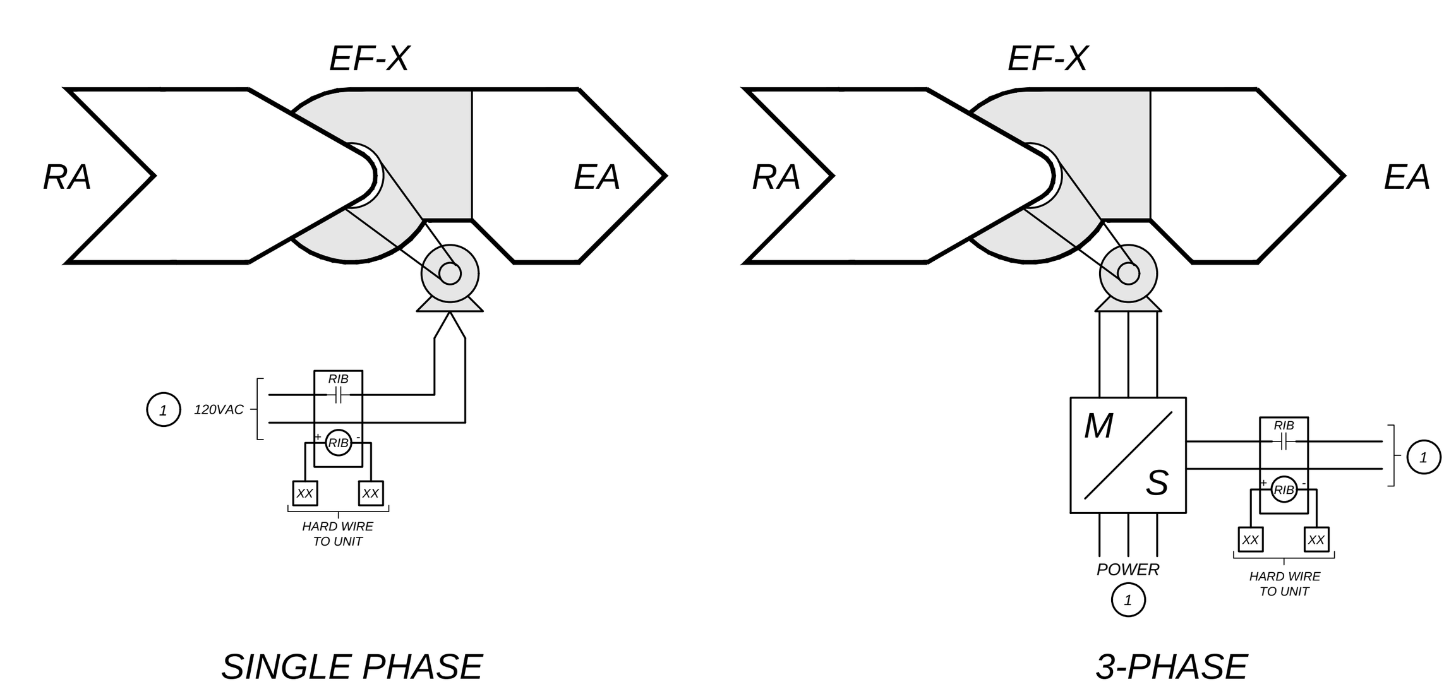
C / M-9



DOMESTIC H.W.R. PUMP CONTROL

SCALE: NONE

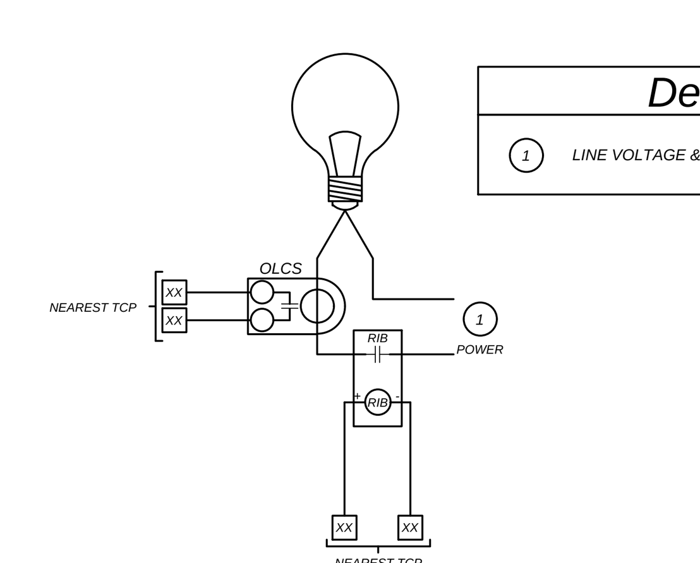
D / M-9



EXHAUST FAN INTERLOCK CONTROL

SCALE: NONE

E / M-9



Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.

LIGHTING CONTROL

EXTERIOR LIGHTING CONTROL DETAIL

SCALE: NONE

F / M-9

APPROVALS:

APPLICATION #
??????????

REGISTERED PROFESSIONAL ENGINEER MICHAEL D. CANTELMI M23588 REN. 9-30-2021 MECHANICAL STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS

2	4/22/21	EMS REVISIONS

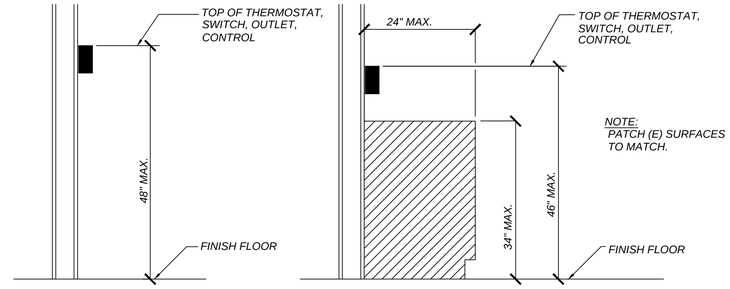
LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-0101
FAX (559) 431-1362

TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M9

PROJECT 20138

21 April 2021 10:49 PM P:\2020\20138 FUSD Eaton Elementary School\4-Drawings\4 M\M9 - CONTROLS.dwg ezequiel

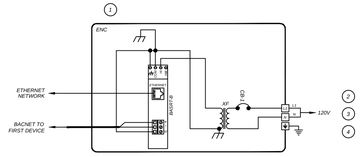


MOUNTING HEIGHT OVER OBSTRUCTION

THERMOSTAT MOUNTING

SCALE: NONE

A
M-10



Router Panel Components	
TAG	DESCRIPTION
CB-1	2.0 AMP CIRCUIT BREAKER
BASRT-B	BACNET/IP MS/TP ROUTER
XF	90A 24VAC TRANSFORMER
ENC	12X12 1 ENCLOSURE WITH BACKPLATE SEE SPEC'S FOR NEMA RATING

2

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. LINE VOLTAGE & CONDUIT BY DIVISION 16.
3. FOR PORTABLE BLDG, PROVIDE AND INSTALL A DEDICATED 20A/1P CIRCUIT BREAKER TO THE PORTABLE BUILDING PANEL.
4. FOR PERMANENT BLDG, CONNECT ROUTER TO (E) CIRCUIT.

BACNET/IP MS/TP ROUTER PANEL DETAIL

SCALE: NONE

B
M-10

APPROVALS:

APPLICATION # ??????????

DATE: 11-25-2020

EMS REPLACEMENT
EATON ELEMENTARY SCHOOL
1451 EAST SIERRA AVE. FRESNO, CA

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
1 4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-0101
FAX (559) 431-1982

TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M10

PROJECT 20138

21 April 2021 10:49 PM P:\2020\20138 FUSD Edon Elementary School\4-Drawings\4 M\M10 - CONTROLS.dwg ezequiel

FRESNO UNIFIED SCHOOL DISTRICT

ROWELL ELEMENTARY SCHOOL
EMS REPLACEMENT
3460 E. McKENZIE AVE.
FRESNO, CALIFORNIA 93702

OWNER
FRESNO UNIFIED SCHOOL DISTRICT

4600 N. BRAWLEY AVE.
FRESNO, CA 93722
(559) 457-3064

CONTACT: DANNY ANDERSON

MECHANICAL ENGINEER
LAWRENCE ENGINEERING GROUP

7084 NORTH MAPLE AVE. SUITE 101
FRESNO, CA 93720
(559) 431-0101

CONTACT: MICHAEL CANTELMI

ELECTRICAL ENGINEER

HARDIN-DAVIDSON ENGINEERING, INC.
356 POLLASKY AVE. SUITE 200
CLOVIS, CA 93612
(559) 323-4995

CONTACT: RICH HARDIN

GENERAL NOTES:

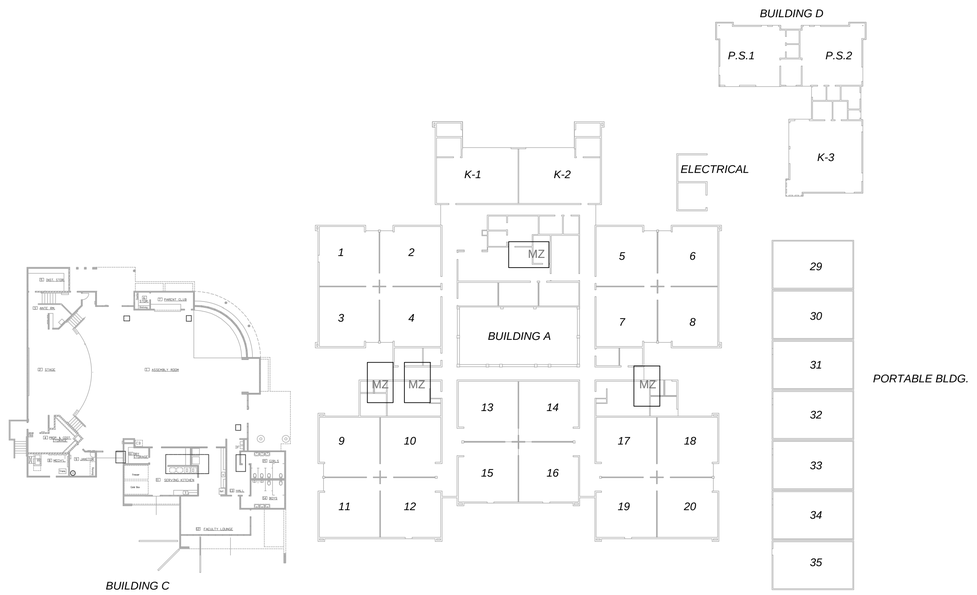
1. *ALL WORK SHALL CONFORM TO 2019 EDITION TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).*
2. *CHANGE TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENT (CCD) APPROVED BY DSA, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.*
3. *A "DSA CERTIFIED" PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY DSA SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, CCR. PROJECT REQUIRES A CLASS 3 INSPECTOR.*
4. *A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE DISTRICT (OWNER) SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THE PROJECT.*
5. *THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CCR. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CCR, A CONSTRUCTION CHANGE DOCUMENT (CCD), OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFING THE REQUIRED WORK SHALL SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE WORK. (SECTION 4-317(C), PART 1, TITLE 24, CCR)*

PROJECT NOTES:

1. *PROVIDE ALL NEW CONTROL WIRE.*
2. *PROVIDE ALL NEW ACTUATORS. RETURN EXISTING ACTUATORS TO DISTRICT.*
3. *PROVIDE A NEW OUTSIDE AIR TEMPERATURE SENSOR AT EACH MULTI-ZONE.*
4. *PROVIDE NEW CONTROLS FOR ALL EXHAUST FANS.*
5. *PROVIDE NEW CONTROLS FOR EXTERIOR LIGHTING. REFER TO FLOOR PLAN SHEETS. MOUNT HARDWARE IN NEW LOCKABLE ENCLOSURES.*
6. *PROGRAMMING SHALL BE IN THE CONTROLLERS AT THE UNIT, NOT THE FRONT END. THE FRONT END IS A MONITORING STATUS, ON-OFF DEVICE ONLY.*
7. *WIRING IN ATTICS SHALL BE SUPPORTED ON J-HOOKS. NO WIRING ON ROOF.*
8. *SALVAGE ALL CONTROL EQUIPMENT AND RETURN TO OWNER.*
9. *PROVIDE AND INSTALL A 20A/1P, DUPLEX RECEPTACLE WITH CIRCUIT AND CIRCUIT BREAKER FROM THE NEAREST 120 VOLT PANEL IS 80-FEET AWAY FIELD LOCATE. PROVIDE POWER CONNECTIONS TO EACH ENERGY MANAGEMENT RIB. REFER TO MECHANICAL/EMS PLANS FOR EQUIPMENT LOCATIONS.*
10. *REUSE (E) CONTROLLER ENCLOSURE WHERE FEASIBLE.* (2)

APPLICABLE CODES

2019 California Administrative Code - CCR Title 24, Part 1
2019 California Building Code - CCR Title 24, Part 2
2019 California Electrical Code - CCR Title 24, Part 3
2019 California Mechanical Code - CCR Title 24, Part 4
2019 California Plumbing Code - CCR Title 24, Part 5
2019 California Energy Code - CCR Title 24, Part 6
2019 California Fire Code - CCR Title 24, Part 9
2019 Existing Building Code - CCR Title 24, Part 10
2019 California Green Code - CCR Title 24 Part 11
2019 California Reference Code - CCR Title 24 Part 12
Title 19 CCR Public Saftey, State Fire Marshall Regulations
2019 NFPA 72 for Fire Alarm System.
CFC CH 33 Fire Saftey During Construction and Demolition



SITE PLAN
SCALE: 1" = 30'-0"

SHEET INDEX

SCOPE OF WORK

THE SCOPE OF WORK IS AS INDICATED BY THE CONTRACT DRAWINGS AND SPECIFICATION AND IS SUMMARIZED AS FOLLOWS:

- REPLACE EXISTING DDC CONTROLS w/(N) JOHNSON CONTROLS FX-80
- REPLACE AND UP SIZE EXISTING MULTI-ZONE UNIT SUPPLY AND RETURN / EXHAUST FAN WITH NEW MOTOR & VFD. SEE PLANS FOR SIZE & ELECTRICAL DRAWINGS.
- PROVIDE AN EXISTING CONDITION DUCT TRAVERSE FOR EACH SUPPLY ZONE, OUTSIDE AIR, & RETURN AIR ON MULTI-ZONE UNIT MZU-1, MZU-2, MZU-3 AND MZU-4 PRIOR TO START OF WORK AND ALSO UPON PROJECT COMPLETION.

APPROVALS:
APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. CANTELMI
M28568
REN. 9-30-2021
MECHANICAL
STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
2 4/22/21 EMS REVISIONS

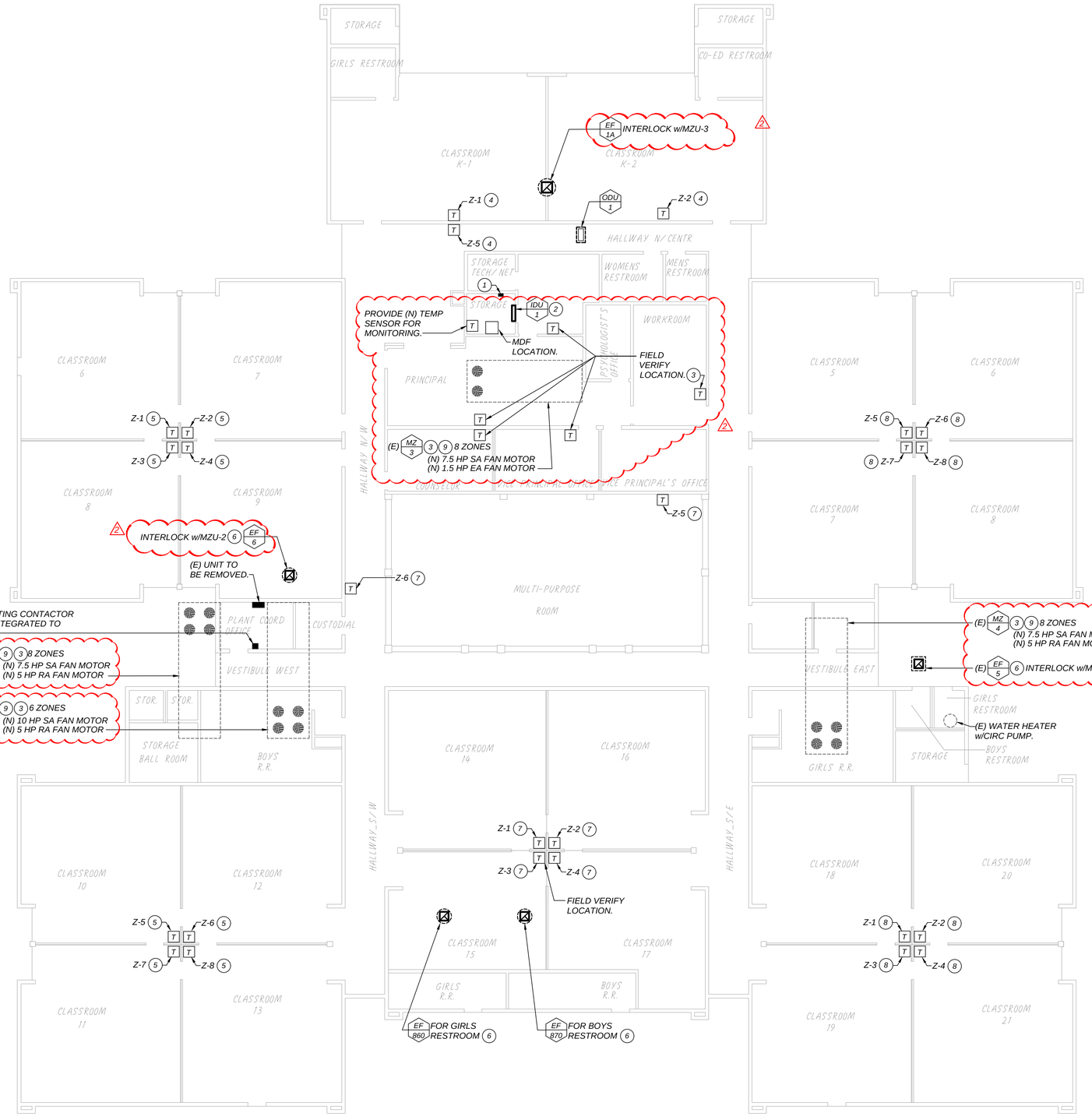
LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-0101
FAX (559) 431-1062

TITLE: COVER

SHEET: G1

PROJECT 20139

21 April 2021 10:51 PM P:\2020\20139 FUSD Rowell Elementary School\4-Drawings\4 M\G1 – BLDG. SITE PLAN.dwg ezequiel



KEYNOTES: (THIS SHEET ONLY)

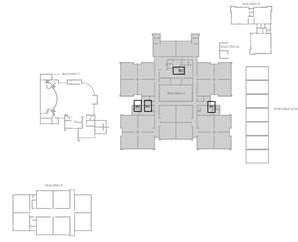
1. LOCATION OF (N) EMS ROUTER, FIELD VERIFY LOCATION. 2
2. (E) HIGH WALL MOUNTED SPLIT HEAT PUMP WITH ODU ON ROOF.
3. (E) MULTI-ZONE AIR HANDLER ON ROOF.
4. MZ 1 ZONE
5. MZ 2 ZONE
6. EXHAUST FAN ON ROOF.
7. MZ 4 ZONE
8. MZ 3 ZONE
9. REMOVE AND REPLACE (E) FAN MOTOR & ACCESSORIES w/(N) ALLEN BRADLEY VFD & COMPATIBLE MOTOR. PRE & POST AIR FLOW MEASUREMENTS TO MATCH. PROVIDE REPORTS TO MEOR.

BUILDING A - EMS PLAN

SCALE: 3/32" = 1'-0"

KEYPLAN

SCALE: NONE



APPROVALS:

APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — MICHAEL D. CURRY — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS	
1	4/22/21 EMS REVISIONS
2	
3	
4	
5	
6	

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 432-1011
FAX (559) 433-1062

TITLE:
BUILDING A
EMS PLAN

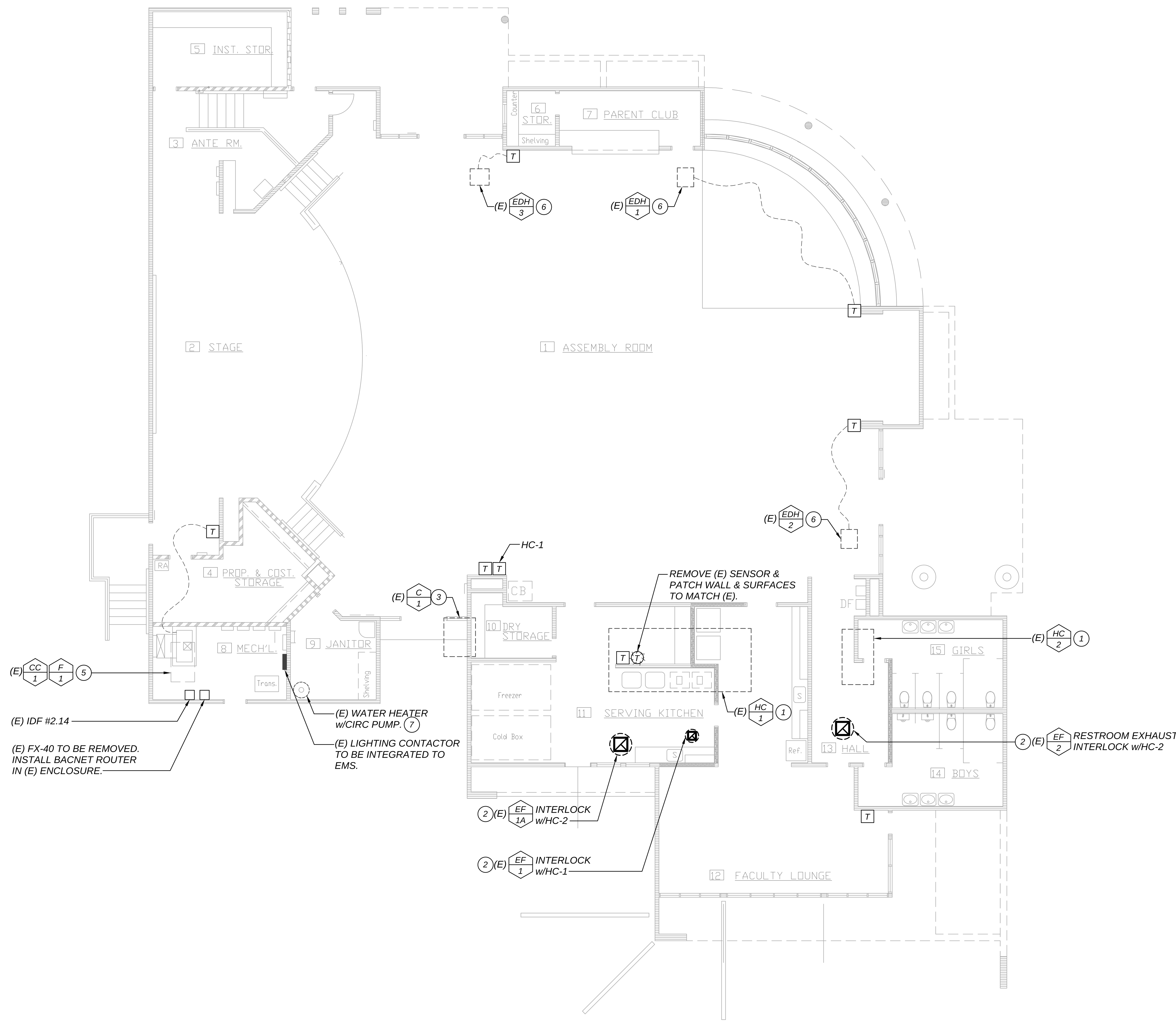
SHEET: M1

PROJECT 20139

21 April 2021 10:51 PM P:\2020\20139 FUSD Rowell Elementary School\4-Drawings\x4 M\M1 – BLDG. A LIBRARY MEDIA CLASSROOMS .dwg ezequiel

21 April 2021 10:51 PM P:\2020\20139 FUSD Rowell Elementary School\4-Drawings\4 M\M2 - BLDG. C MULTI-PURPOSE ROOM.dwg ezequiel

APPROVALS:
APPLICATION #
??????????



BUILDING. C - MULTI-PURPOSE ROOM

SCALE: 1/8" = 1'-0"

KEYNOTES: (THIS SHEET ONLY)

1. (E) PACKAGE AIR UNIT ON ROOF.
2. (E) EXHAUST FAN ON ROOF.
3. (E) AIR COOLED CONDENSER ON ROOF.
4. (E) CIRCULATION PUMP TO BE INTEGRATED TO EMS THROUGH NEAREST CONTROLLER.
5. (E) DX COOLING COIL w/ C 1 ON ROOF, & (E) FURNACE.
6. (E) ELECTRIC DUCT HEATER TO BE ENABLED ONLY WHEN UNIT IS FUNCTIONING AND CONTROLLED BY (N) TERMOSTAT w/± 3° ADJUSTMENT. 2
7. REFER TO DETAIL D/M9.

REGISTERED PROFESSIONAL ENGINEER MICHAEL D. CANTELMI M23588 REN. 9-30-2021 MECHANICAL STATE OF CALIFORNIA

DATE: 11-25-2020

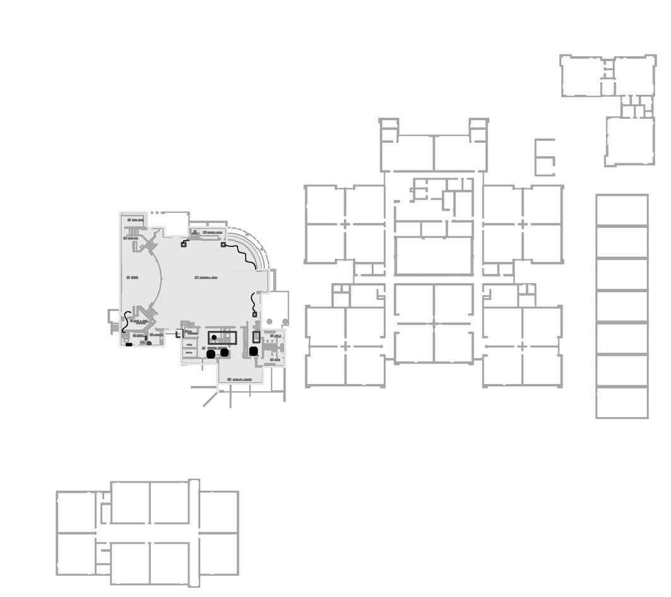
EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS

2	4/22/21	EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
(559) 431-0101
Fresno, CA 93720
FAX (559) 431-1362



KEYPLAN

SCALE: NONE

TITLE:
LIBRARY
MEDIA
CLASSROOMS

SHEET:
M2

PROJECT 20139

APPROVALS:

APPLICATION # ??????????

DATE: 11-25-2020

EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS

4/22/21	EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-1001
FAX (559) 431-1002

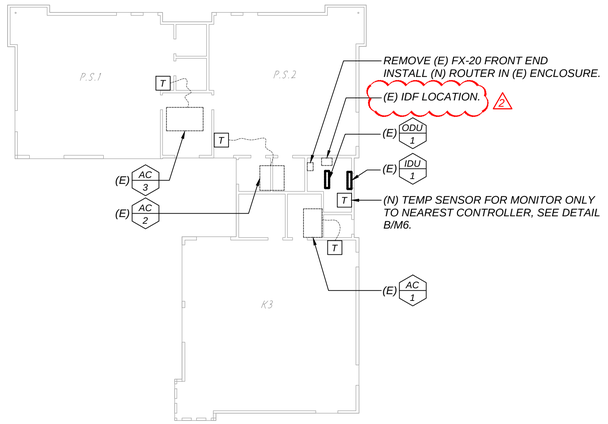
TITLE:
BUILDINGS
"D" AND "E"
EMS PLAN

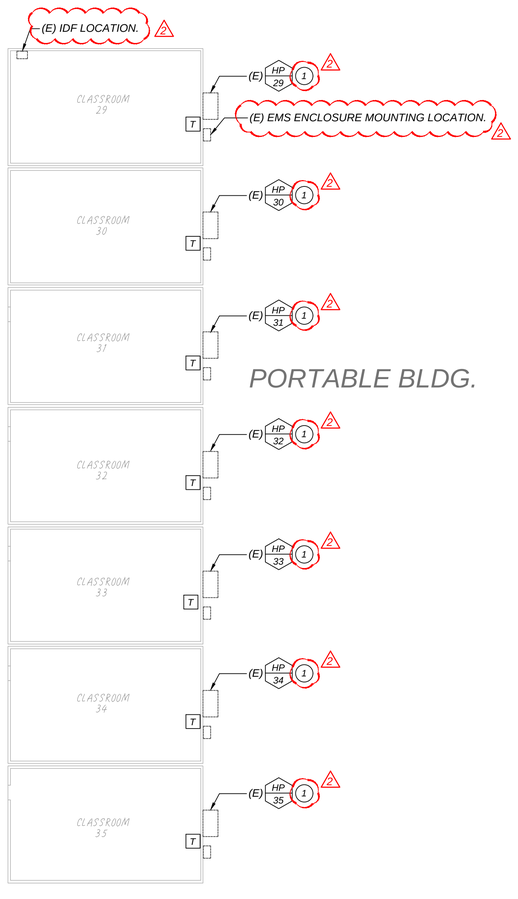
SHEET: M3

PROJECT 20139

21 April 2021 10:51 PM P:\2020\20139 FUSD Rowell Elementary School\4-Drawings\4 M\M3 - BLDG. D & E & PORTABLE ROOMS.dwg ezequiel

BUILDING D

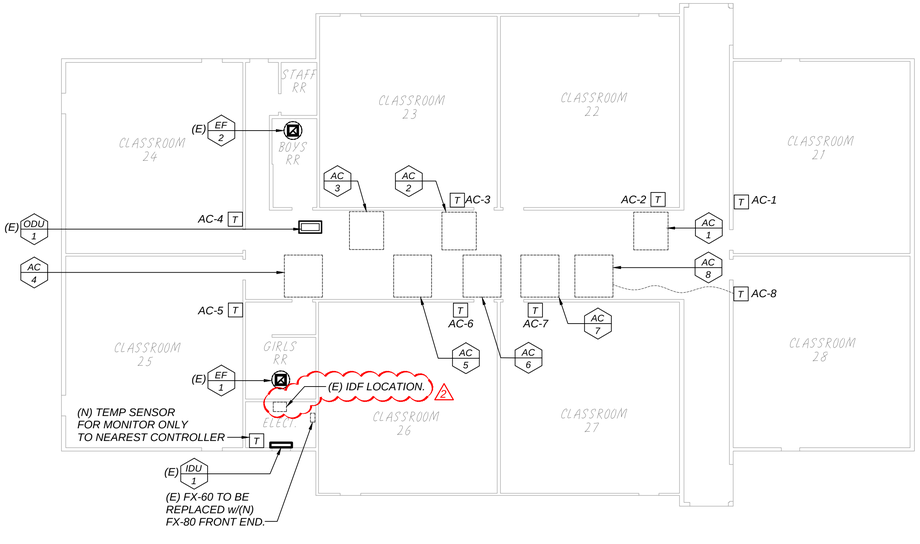




PORTABLE BLDG.

KEYNOTES: (THIS SHEET ONLY)

1. CONNECT TO IDF IN CLASSROOM #29. 2



BUILDING E - EMS PLAN

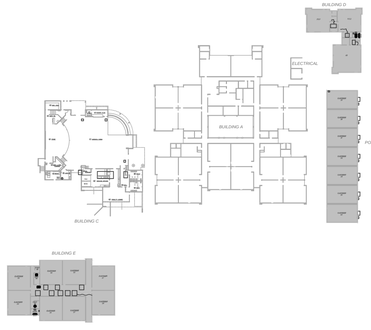
SCALE: 1"=10'-0"

A M3

BUILDING D AND PORTABLES - EMS PLAN

SCALE: 1"=40'-0"

B M3



KEYPLAN

SCALE: 1" = 200'-0"

JACE Notes

HOST ID:
SERIAL NUMBER:
PRIMARY IP: 192.168.1.149
SECONDARY IP: 192.168.10.10

(1)

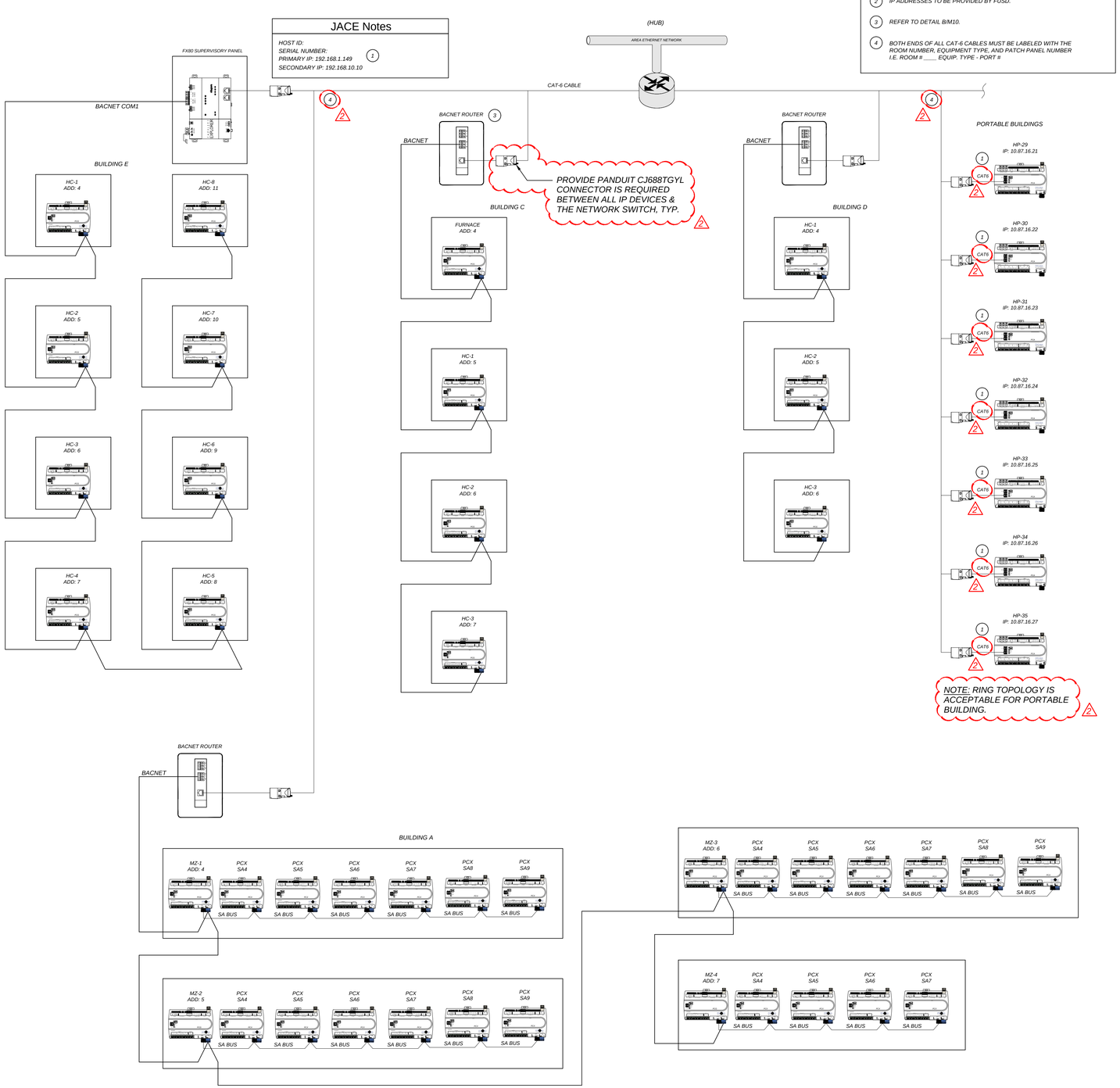
Sheet Notes

(1) *DEFAULT IP ADDRESS TO BE CHANGED DURING COMMISSIONING.*

(2) *IP ADDRESSES TO BE PROVIDED BY FUSD.*

(3) *REFER TO DETAIL B/M10.*

(4) *BOTH ENDS OF ALL CAT-6 CABLES MUST BE LABELED WITH THE ROOM NUMBER, EQUIPMENT TYPE, AND PATCH PANEL NUMBER I.E. ROOM # ____ EQUIP. TYPE - PORT #*



ROWELL ELEMENTARY SCHOOL CONTROL REFERENCES

Room Name	Room No.	A/C Mark No.	System Type	Description or Notes	See Detail
BUILDING A - CLASSROOM & ADMIN					
See Plans		MZ-3	MZ AH	8 zones, (N) 7.5 HP SA & 1.5 HP EXH. Fan Motor and VFD	C/M-5
See Plans		MZ-1	MZ AH	8 zones, (N) 7.5 HP SA & 5 HP RA Fan Motor and VFD	C/M-5
See Plans		MZ-4	MZ AH	8 zones, (N) 7.5 HP SA & 5 HP RA Fan Motor and VFD	C/M-5
See Plans		MZ-2	MZ AH	6 zones, (N) 10HP SA & 5 HP RA Fan Motor and VFD	C/M-5
		EF-6	R/R Exhaust Fan	Interlock with MZU-4	E/M-9
Storage			Lighting Contactor	Intergrate into (N) EMS	B/M-5
		EF-5	R/R Exhaust Fan	Interlock with MZU-4	E/M-9
Water Heater			WH w/ Circ. Pump	Intergrate Pump ON/OFF to nearest UO	D/M-9
		EF-860	R/R Exhaust Fan	Interlock with lights	C/M-9
		EF-870	R/R Exhaust Fan	Interlock with lights	C/M-9
Storage		IDU-1/ODU-1	Split HP	Intergrate to Nearest UI, Monitor Only	B/M-6
BUILDING C					
Assembly Room	1	HC-1	G/E	Unit has 3 Electric Duct Heaters, Economizer and Powered Exhuast	A/M-8
Stage	2	F-1/CC-1/ C-1	Split G/E	Gas Furance w/ DX Cooling Coil, and Air Cooled Condenser	A/M-7
Mech'l	8			Intergrate Lighting Contactor to Nearest UI	F/M-9
Janitor	9		WH w/ Circ Pump	Intergrate Pump ON/OFF to nearest UO	D/M-9
		EF-1	Exhaust Fan	INTERLOCK w/ HC-2	E/M9
Serving Kitchen	11	EF-1A	Exhaust Fan	Interlock with HC-2	E/M-9
Faculty Lounge	12	HC-2	G/E	Rooftop Packaged Unit	C/M-7
Faculty Lounge	12	EF-2	Exhaust Fan	Interlock with HC-2	E/M-9
BUILDING D					
Classroom	K3	AC-1	G/E	Rooftop Packaged Unit	C/M-7
Classroom	P.S.1	AC-2	G/E	Rooftop Packaged Unit	C/M-7
Classroom	P.S.2	AC-3	G/E	Rooftop Packaged Unit	C/M-7
Electrical Room		IDU-1/ODU-1	Split HP	Intergrate to Nearest UI, Monitor Only	B/M-6
BUILDING E					
Classroom	21	AC-1	G/E	Rooftop Packaged Unit	C/M-7
Classroom	22	AC-2	G/E	Rooftop Packaged Unit	C/M-7
Classroom	23	AC-3	G/E	Rooftop Packaged Unit	C/M-7
Classroom	24	AC-4	G/E	Rooftop Packaged Unit	C/M-7
Classroom	25	AC-5	G/E	Rooftop Packaged Unit	C/M-7
Classroom	26	AC-6	G/E	Rooftop Packaged Unit	C/M-7
Classroom	27	AC-7	G/E	Rooftop Packaged Unit	C/M-7
Classroom	28	AC-8	G/E	Rooftop Packaged Unit	C/M-7
Electrical	-	IDU-1/ODU-1	Split HP	Intergrate to Nearest UI, Monitor Only	B/M-6
Boys RR	-	EF-2	R/R Exhaust Fan	Interlock with lights	C/M-9
Girls RR	-	EF-1	R/R Exhaust Fan	Interlock with lights	C/M-9
PORTABLES					
CLASSROOM	29	HP-29	Wall Mounted HP		C/M-8
CLASSROOM	30	HP-30	Wall Mounted HP		A/M-9
CLASSROOM	31	HP-31	Wall Mounted HP		A/M-9
CLASSROOM	32	HP-32	Wall Mounted HP		C/M-8
CLASSROOM	33	HP-33	Wall Mounted HP		A/M-9
CLASSROOM	34	HP-34	Wall Mounted HP		A/M-9
CLASSROOM	35	HP-35	Wall Mounted HP		A/M-9
SITE					
Exterior Lighting					F/M-9

NOTES:
1. System Type Abbreviations: G/E - Gas Heating/Electric Cooling; HP - Heat Pump
   CP - Central Plant Hot or Chilled Water
   LS - Light Switch
   UV - Unit Ventilator
   MUA- Make-up Air
   HW- Hot Water
   DHW- Domestic Hot Water
   MZ - Multizone
   AH - Air handler
   WH- Domestic Water Heater
   Fur - Furnance

LAN ARCHITECTURE DETAIL — A / M-4

APPROVALS:
APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — MICHAEL D. CONNER — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
Fresno, CA 93720
FAX (559) 431-1582
7084 N. Maple Ave., Suite 101
(559) 431-0101

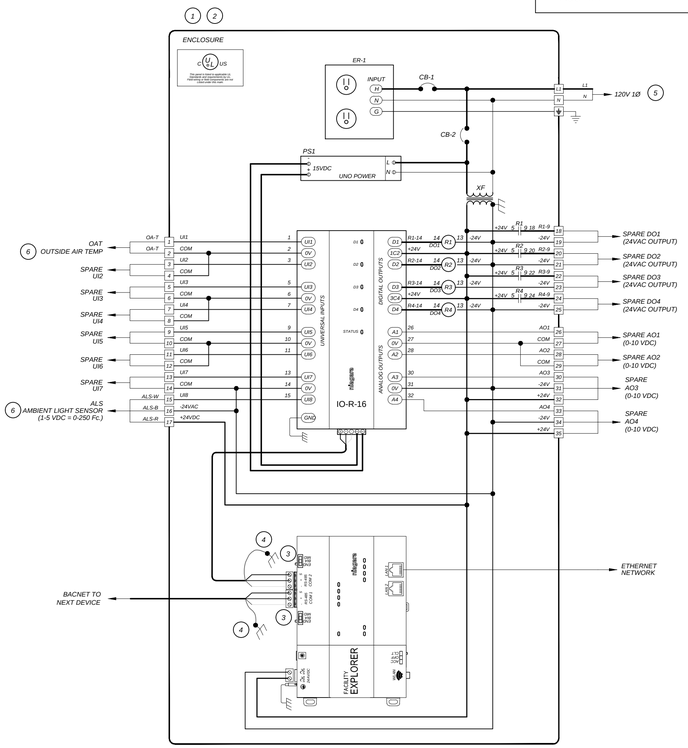
TITLE:

SHEET: M4

PROJECT 20139

21 April 2021 10:51 PM P:\2020\20139 FUSD Rowell Elementary School\4-Drawings\4 M\M4 – CONTROLS.dwg ezequiel

NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.



Panel Components

TAG	DESCRIPTION
FX	FX-80 CONTROLLER AND SD CARD
	FX-80 SMA
	FX-80 DEVICE LICENCE
RIO16	16 POINT REMOTE INPUT/OUTPUT EXPANSION
XF	120 - 24V TRANSFORMER
CB-1	MANUAL RESET 15.0 AMP CIRCUIT BREAKER
CB-2	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	PANEL BACKPLATE
ENC	PADLOCK KIT
ER-1	ELECTRICAL OUTLET
R1-R4	2-POLE 24VAC RELAY W/LED
R1-R4	2-POLE RELAY BASE
PS-1	15VDC POWER SUPPLY

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. JACE SELECTOR SWITCH NEED TO BE SET TO THE "END" POSITION
4. RS-485 COMM BUS SHIELD TO BE GROUNDED AT THE SCP PANEL ONLY
5. LINE VOLTAGE & CONDUIT BY DIVISION 16
6. SEE DETAIL B/M5.

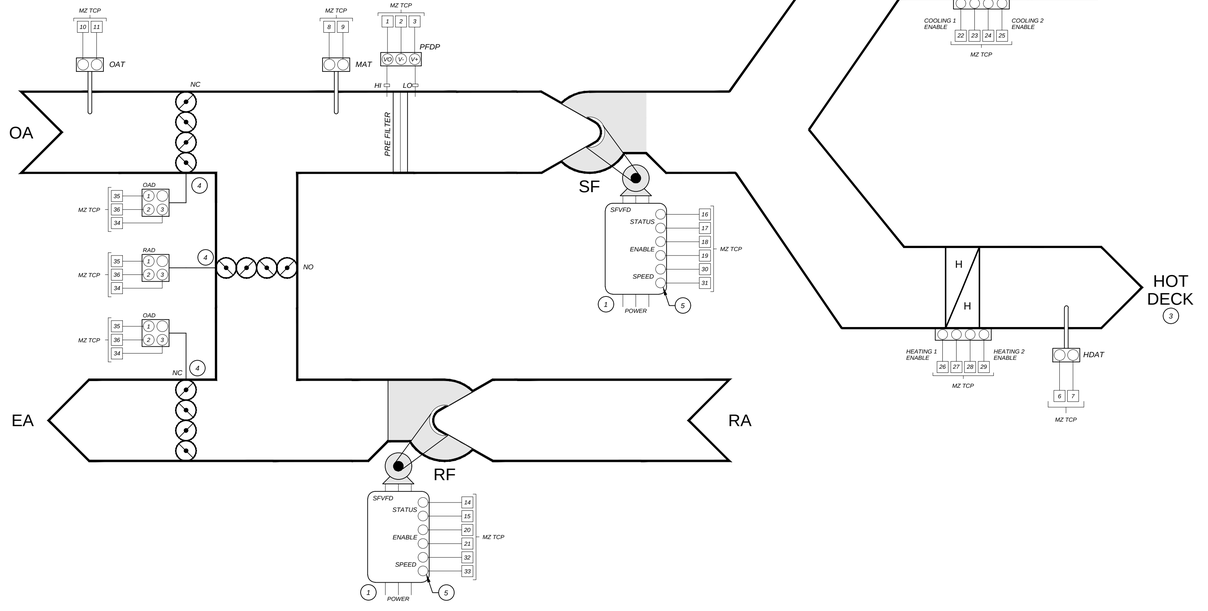
SUPERVISORY SCP SCHEMATIC DETAIL — A / M-5

Control Components

TAG	DESCRIPTION
CDAT,HDAT	DUCT TEMP SENSOR
OAT	OUTSIDE AIR SENSOR
MAT	AVERAGING DUCT TEMP SENSOR
OAD/RAD	SPRING RETURN DAMPER ACTUATOR
PFDP	PRESSURE TRANSDUCER
SFVFD	(N) VARIABLE FREQUENCY DRIVE

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
3. REFER TO DETAIL D/M5 FOR ZONE CONTROL DETAIL.
4. PROVIDE (N) ACTUATOR, FIELD VERIFY QUANITY.
5. (N) VARIBLE FREQUENCY DRIVE.



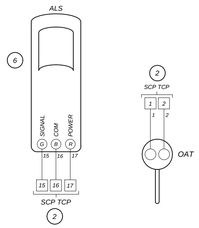
MULTI-ZONE CONTROL DETAIL — C / M-5

Control Components

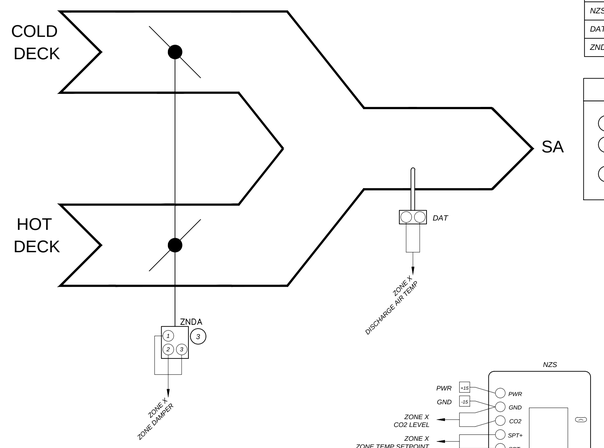
TAG	DESCRIPTION
OAT	10K TYPE 3 OUTDOOR SENSOR
ALS	AMBIENT LIGHT SENSOR

Detail Notes

1. LOCATE AMBIENT LIGHT SENSOR AT NORTHERN EXPOSURE OF BUILDING.
2. SEE DETAIL A/M-5



OUTDOOR PHOTOCELL AND TEMP SENSOR DETAIL — B / M-5



Control Components

TAG	DESCRIPTION
NZS	ZONE SENSOR W/ SETPOINT ADJUSTMENT
DAT	-
ZNDA	-

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
3. PROVIDE (N) ACTUATOR.

ZONE CONTROL DETAIL — D / M-5

APPROVALS:

APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — DANIEL D. CURRY — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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7084 N. Maple Ave., Suite 101
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TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M5

PROJECT 20139

21 April 2021 10:52 PM P:\2020\20139 FUSD Rowell Elementary School\4-Drawings\4 M\M5 - CONTROLS.dwg ezequiel

APPROVALS:

APPLICATION # ??????????

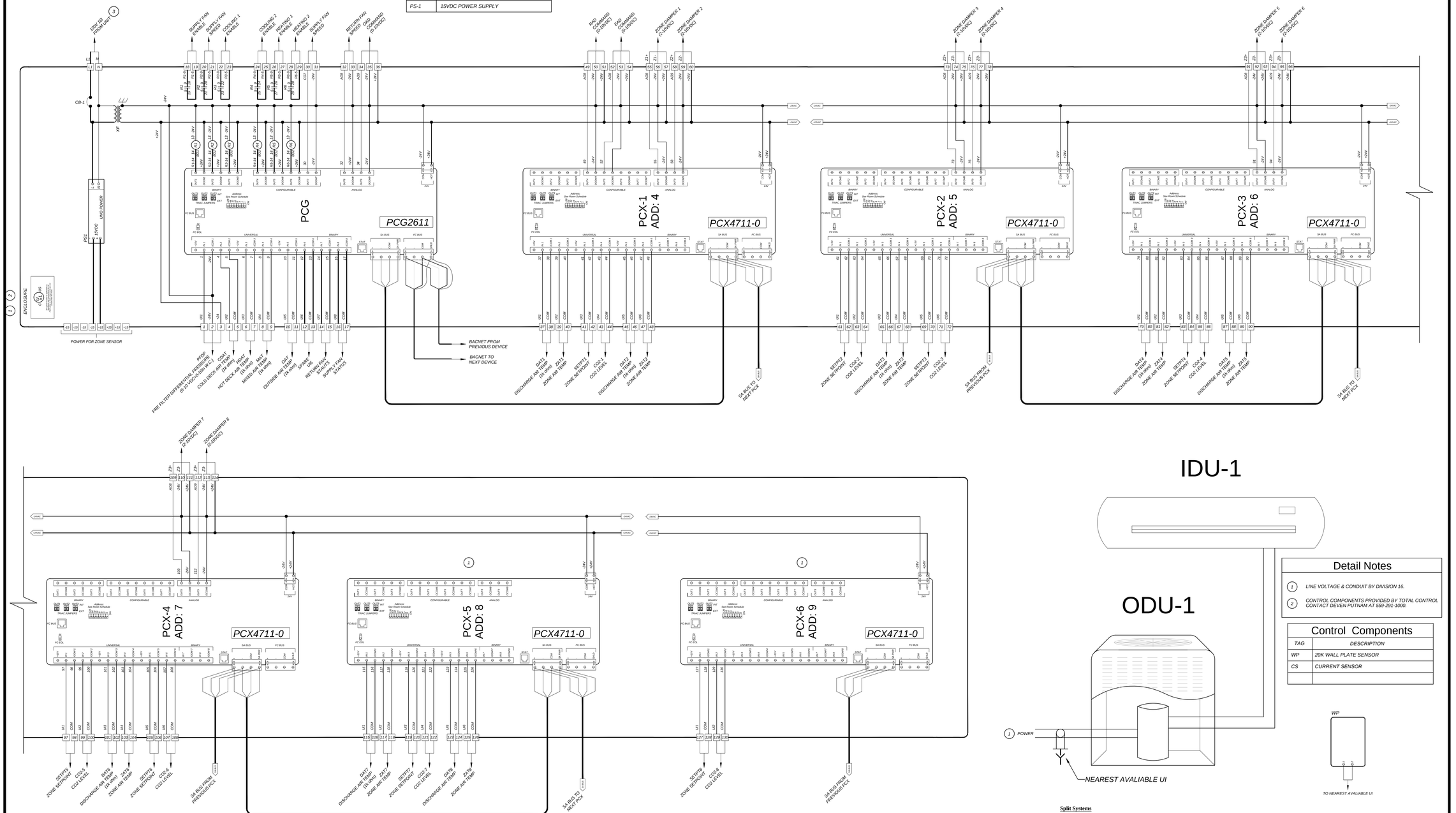
NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Sheet Notes

1. CONTROL PANELS FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE AND CONDUIT BY DIVISION 16.

Panel Components

TAG	DESCRIPTION
PCG	GENERAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	SOLID PANEL BACKPLATE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER
XF	96VA 24VAC TRANSFORMER
R1-R6	2-POLE 24VAC RELAY W/ LED
R1-R6	2-POLE RELAY BASE
PCX	I/O EXPANSION MODULE
PS-1	15VDC POWER SUPPLY



IDU-1

ODU-1

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.

Control Components

TAG	DESCRIPTION
WP	20K WALL PLATE SENSOR
CS	CURRENT SENSOR

Split Systems

Unit will be controlled by factory controller, BAS for temp monitoring only with alarms at district set thresholds. Unit will run 24/7.

MULTI-ZONE SCHEMATIC DETAIL P1 — A / M-6

ODU/IDU CONTROL DETAIL — B / M-6

DATE: 11-25-2020

REGISTERED PROFESSIONAL ENGINEER — DANIEL D. CURRY — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

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4600 N. BRAWLEY AVE. FRESNO, CA.

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TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M6

PROJECT 20139

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APPROVALS:

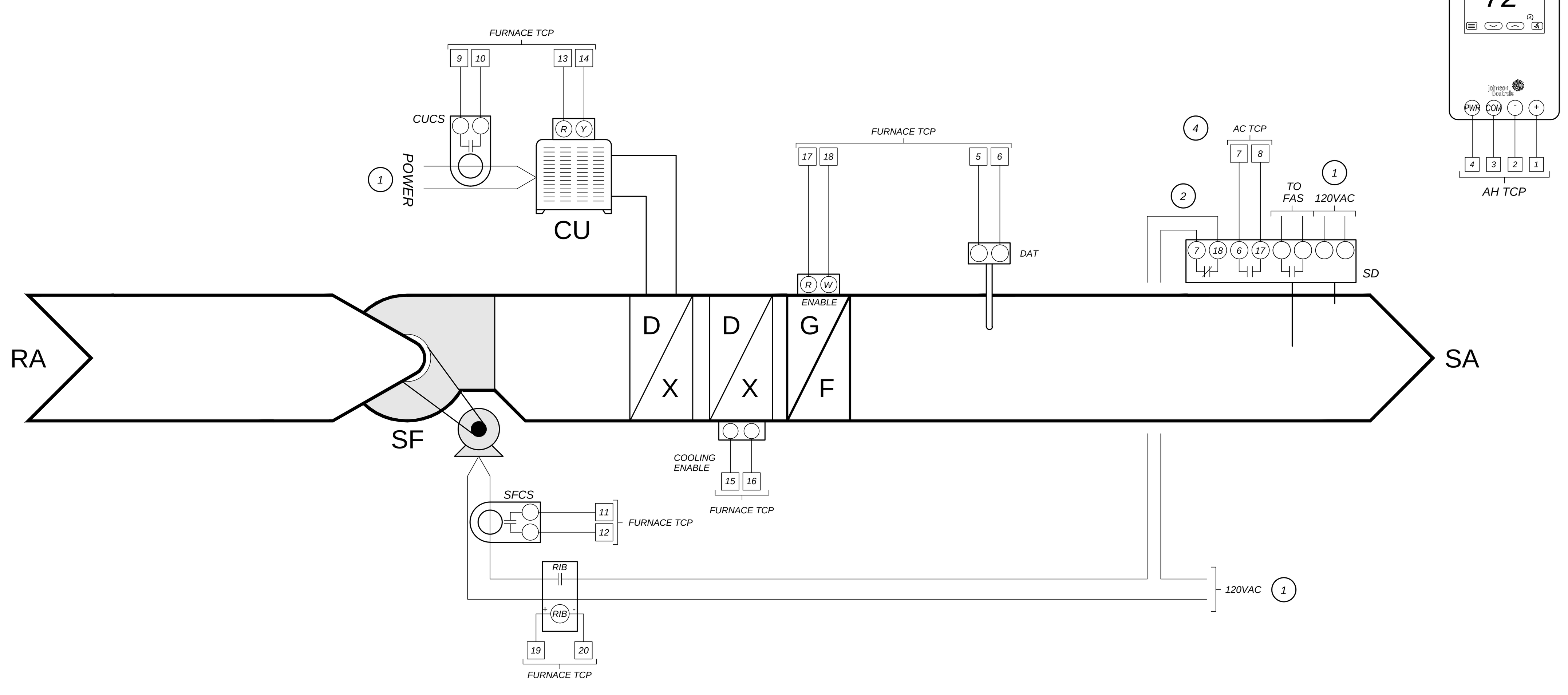
APPLICATION #
??????????

Control Components

TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
SFCS/CUCS	CURRENT SENSOR
RIB	24VAC RELAY IN A BOX
NZS	NETWORK ZONE SESNOR W/ CO_2

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. UNIT SHALL SHUT DOWN UPON DETECTION OF SMOKE. WIRE ACCORDINGLY.
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL B/M-7 FOR TCP DIAGRAM.



FURNACE C1/F-1 CONTROL DETAIL

A / M-7

Control Components

TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
CCS,SFCS	CURRENT SENSOR
NZS	NETWORK ZONE SENSOR W/ CO_2
OAD/RAD	SPRING RETURN DAMPER ACTUATOR

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. OAT GLOBALLY SHARED SOFTWARE POINT
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL D/M-7 FOR TCP DIAGRAM.

Package Unit

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

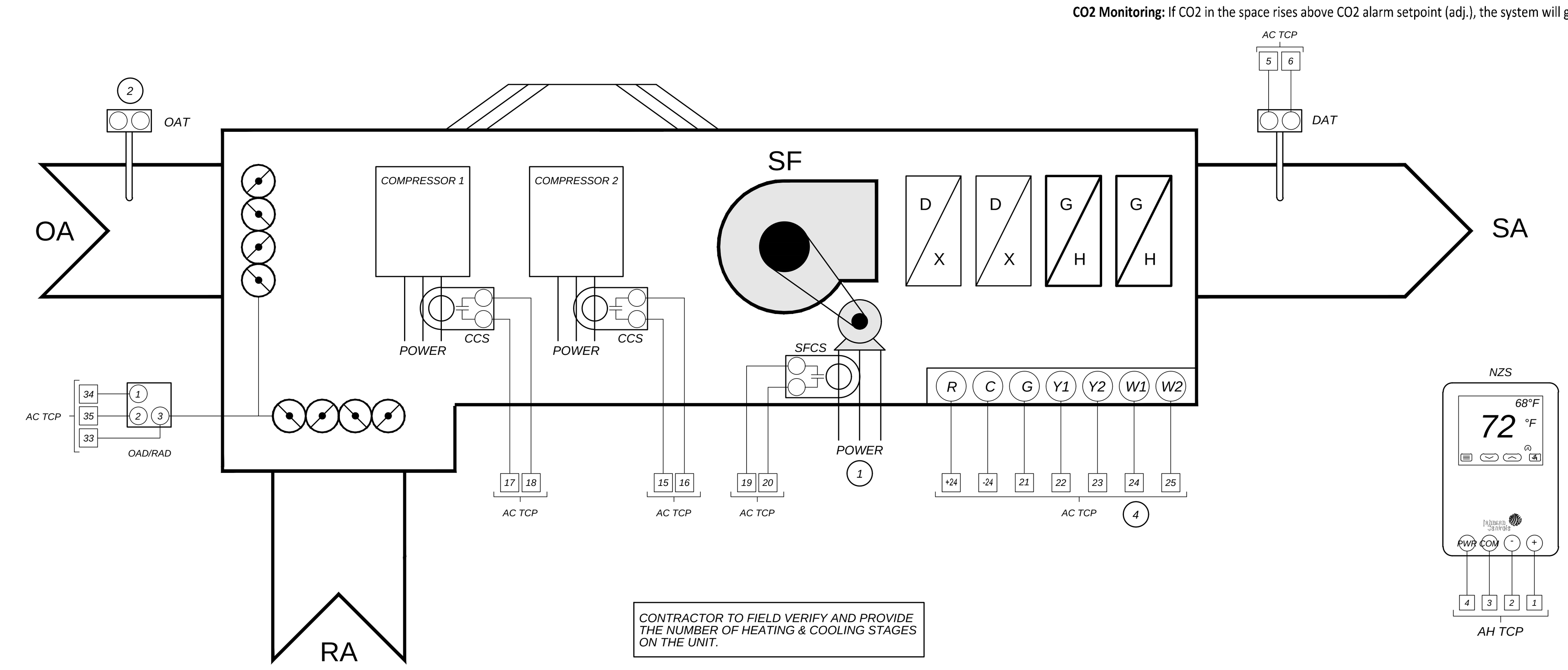
Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

Cooling Mode: When outside air is above the OA cooling lockout setpoint (65° F adjustable) and there is a call for cooling, the compressor shall stage on in order to satisfy the condition. Compressor shall be monitored with a current sensor to prove that the compressor is running.

Heating Mode: When outside air is below the OA heating lockout setpoint (60° F adjustable) and there is a call for heating the reversing valve shall stage on in order to satisfy the condition.

Demand Control Ventilation: CO2 readings shall come from the wall mount Temp/CO2 sensor. If the zone CO2 PPM reaches 800 ppm (adj.), the economizer shall modulate open to the maximum outdoor air position to satisfy the demand. Once the CO2 level drops below 800 ppm (adj.) , the economizer shall close to the minimum outdoor air position.

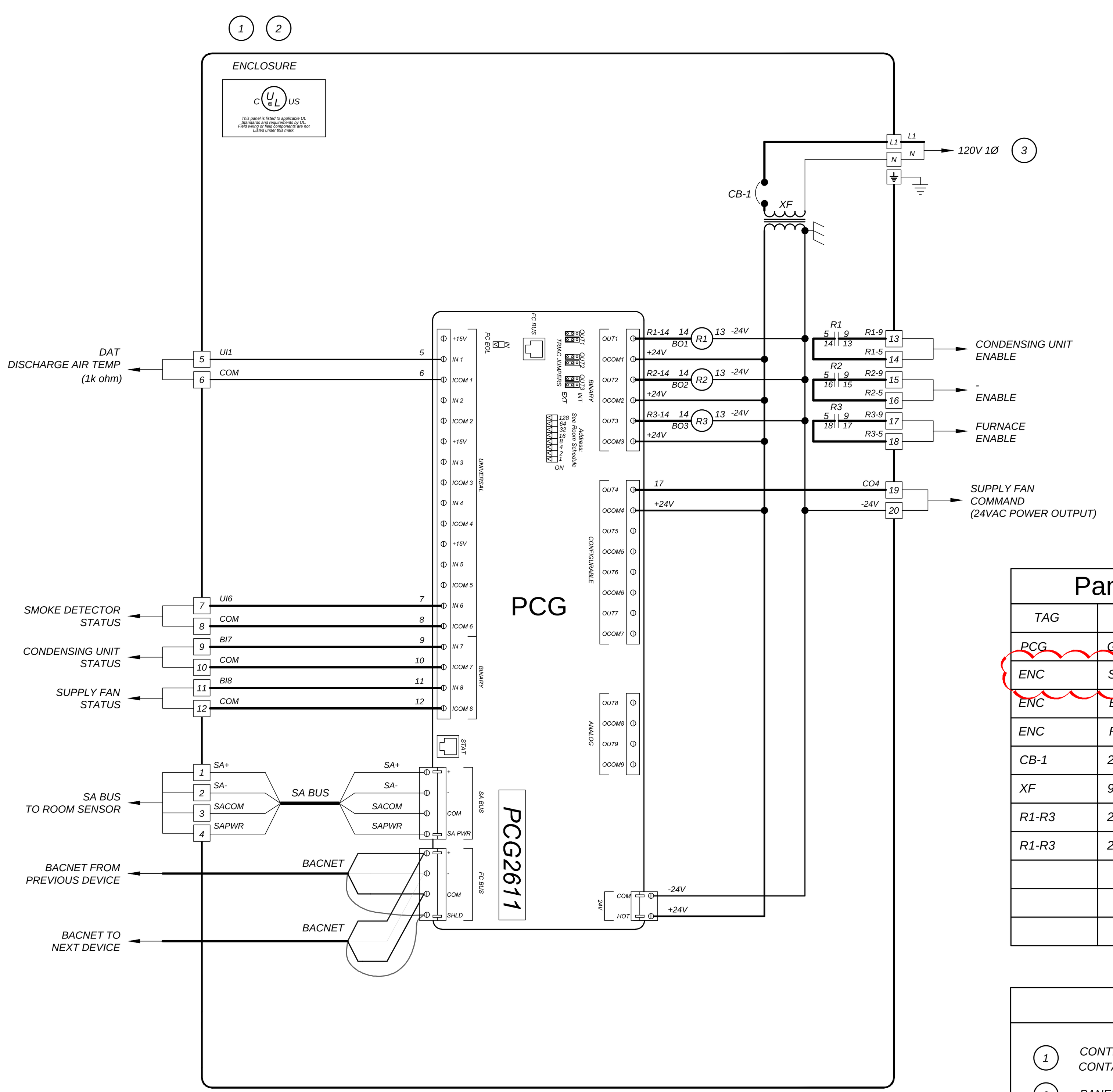
CO2 Monitoring: If CO2 in the space rises above CO2 alarm setpoint (adj.), the system will generate a Niagara alarm.



CONTRACTOR TO FIELD VERIFY AND PROVIDE THE NUMBER OF HEATING & COOLING STAGES ON THE UNIT.

ROOF TOP UNIT CONTROL DETAIL

C / M-7



Panel Components

TAG	DESCRIPTION
PCG	GENERAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER
XF	96VA 24VAC TRANSFORMER
R1-R3	2-POLE 24VAC RELAY W/ LED
R1-R3	2-POLE RELAY BASE

2

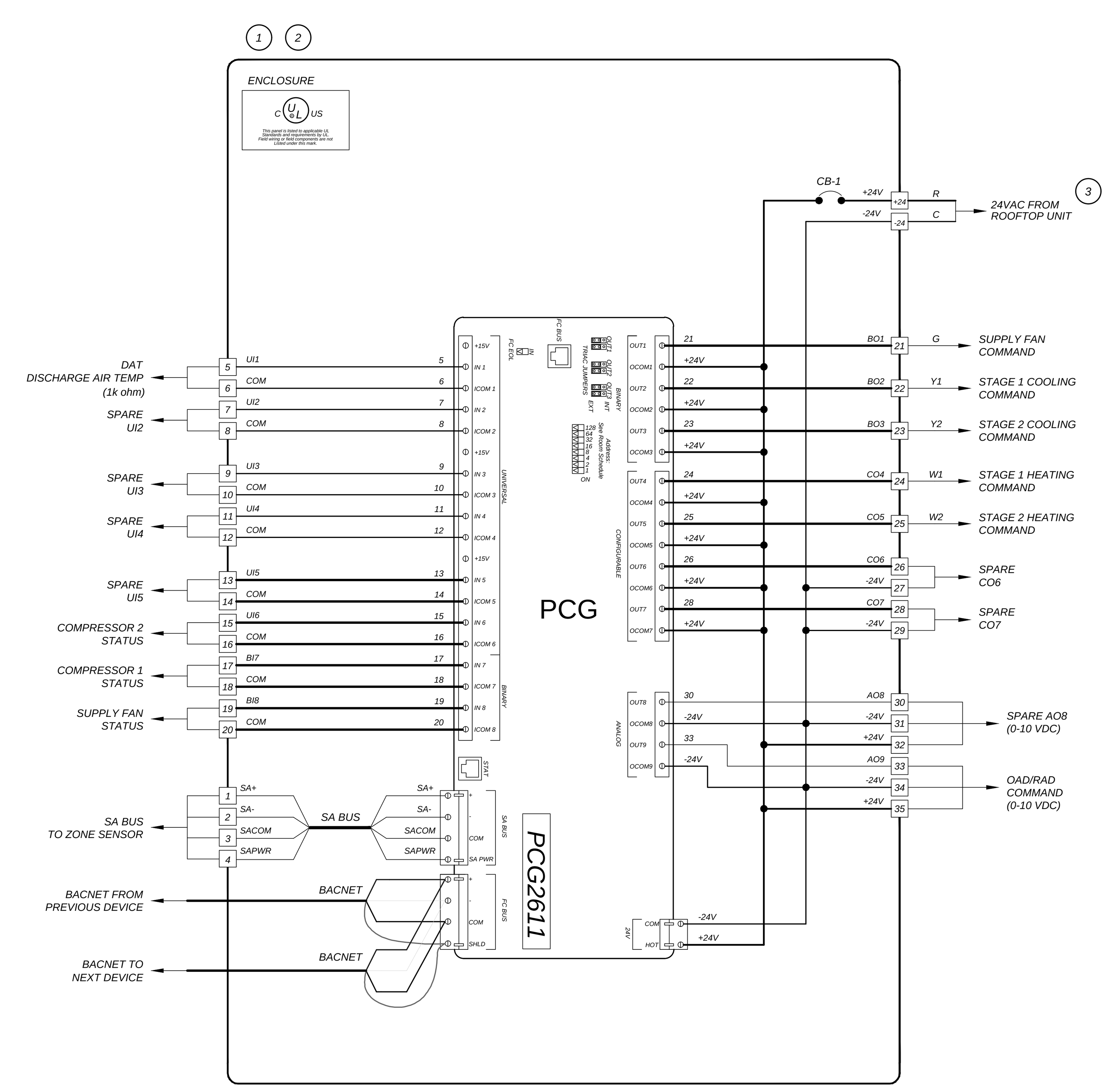
Detail Notes

1. CONTROL PANELS FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE AND CONDUIT BY DIVISION 16.

FURNACE TCP SCHEMATIC DETAIL

B / M-7

NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.



Panel Components

TAG	DESCRIPTION
PCG	GENERNAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER

2

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.

ROOF TOP UNIT TCP SCHEMATIC DETAIL

D / M-7

REGISTERED PROFESSIONAL ENGINEER MICHAEL D. CANTELMI M23588 REN. 9-30-2021 MECHANICAL STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT ROWELL ELEMENTARY SCHOOL

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FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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(559) 431-0101
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TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M7

PROJECT 20139

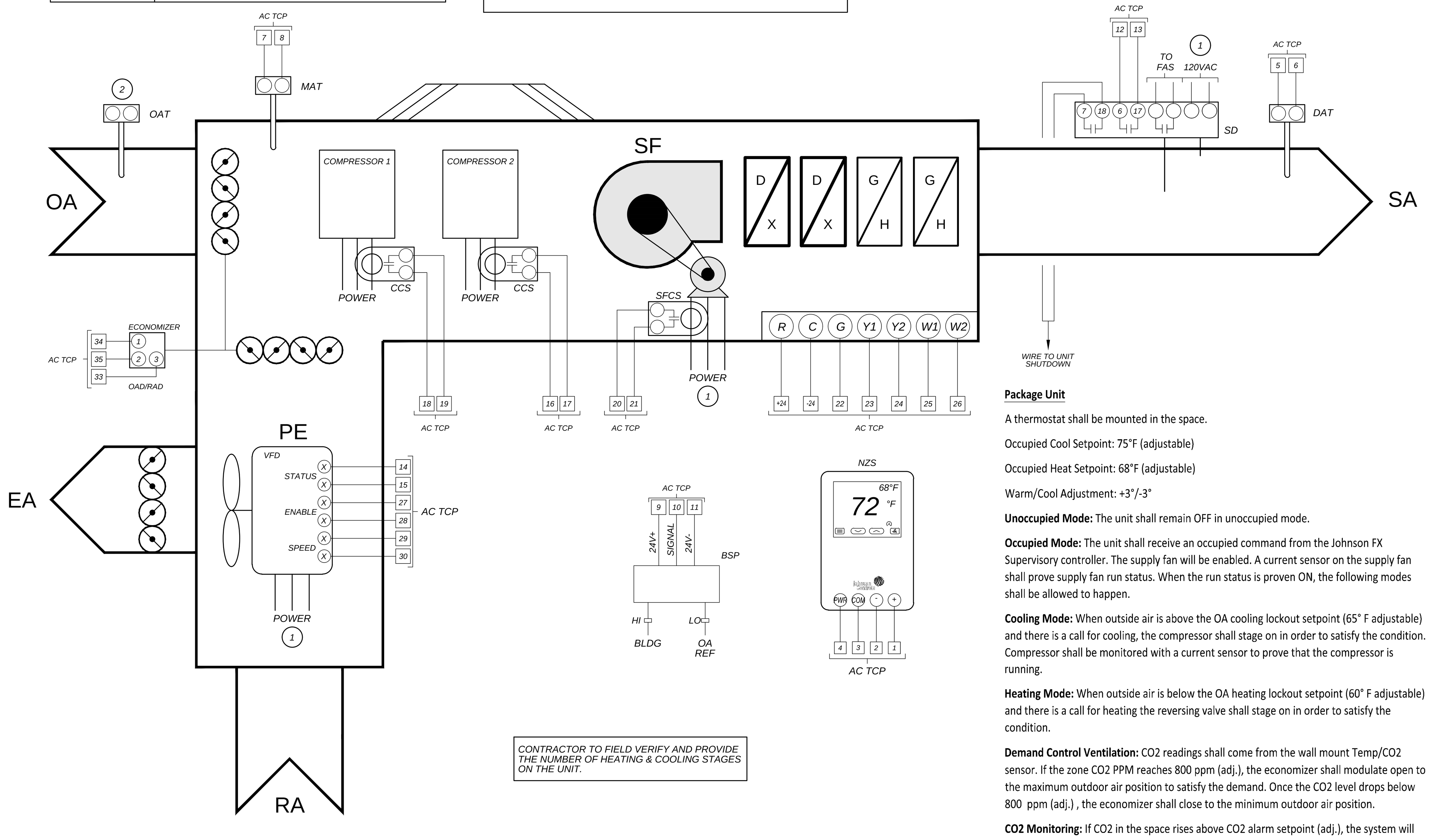
APPROVALS:
APPLICATION #
??????????

Control Components

TAG	DESCRIPTION
DAT,MAT,RAT	DUCT TEMP SENSOR
CCS,SFCS	CURRENT SENSOR
NZS	NETWORK ZONE SENSOR WITH CO_2
OAD/RAD	SPRING RETURN DAMPER ACTUATOR
BSP	PRESSURE TRANSDUCER

Sheet Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. OAT GLOBALLY SHARED SOFTWARE POINT
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL B/M-8 FOR TCP DIAGRAM.



Package Unit

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

Cooling Mode: When outside air is above the OA cooling lockout setpoint (65° F adjustable) and there is a call for cooling, the compressor shall stage on in order to satisfy the condition. Compressor shall be monitored with a current sensor to prove that the compressor is running.

Heating Mode: When outside air is below the OA heating lockout setpoint (60° F adjustable) and there is a call for heating the reversing valve shall stage on in order to satisfy the condition.

Demand Control Ventilation: CO2 readings shall come from the wall mount Temp/CO2 sensor. If the zone CO2 PPM reaches 800 ppm (adj.), the economizer shall modulate open to the maximum outdoor air position to satisfy the demand. Once the CO2 level drops below 800 ppm (adj.) , the economizer shall close to the minimum outdoor air position.

CO2 Monitoring: If CO2 in the space rises above CO2 alarm setpoint (adj.), the system will generate a Niagara alarm.

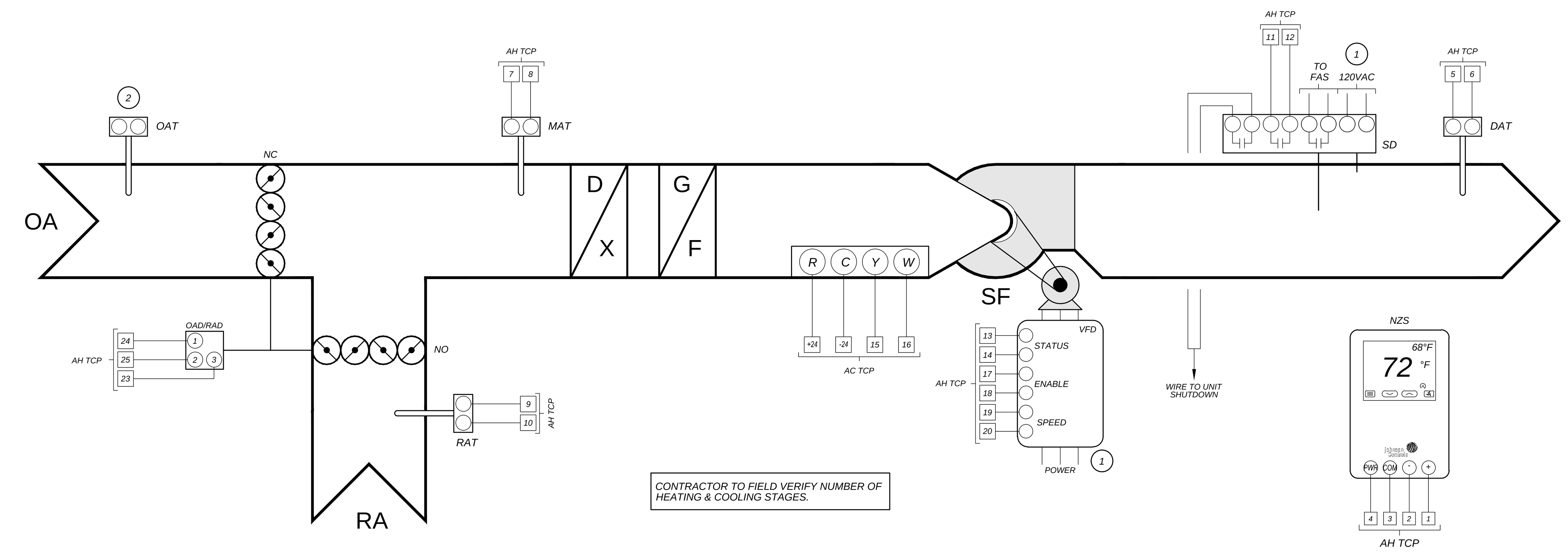
ROOF TOP UNIT CONTROL — A / M-8

Control Components

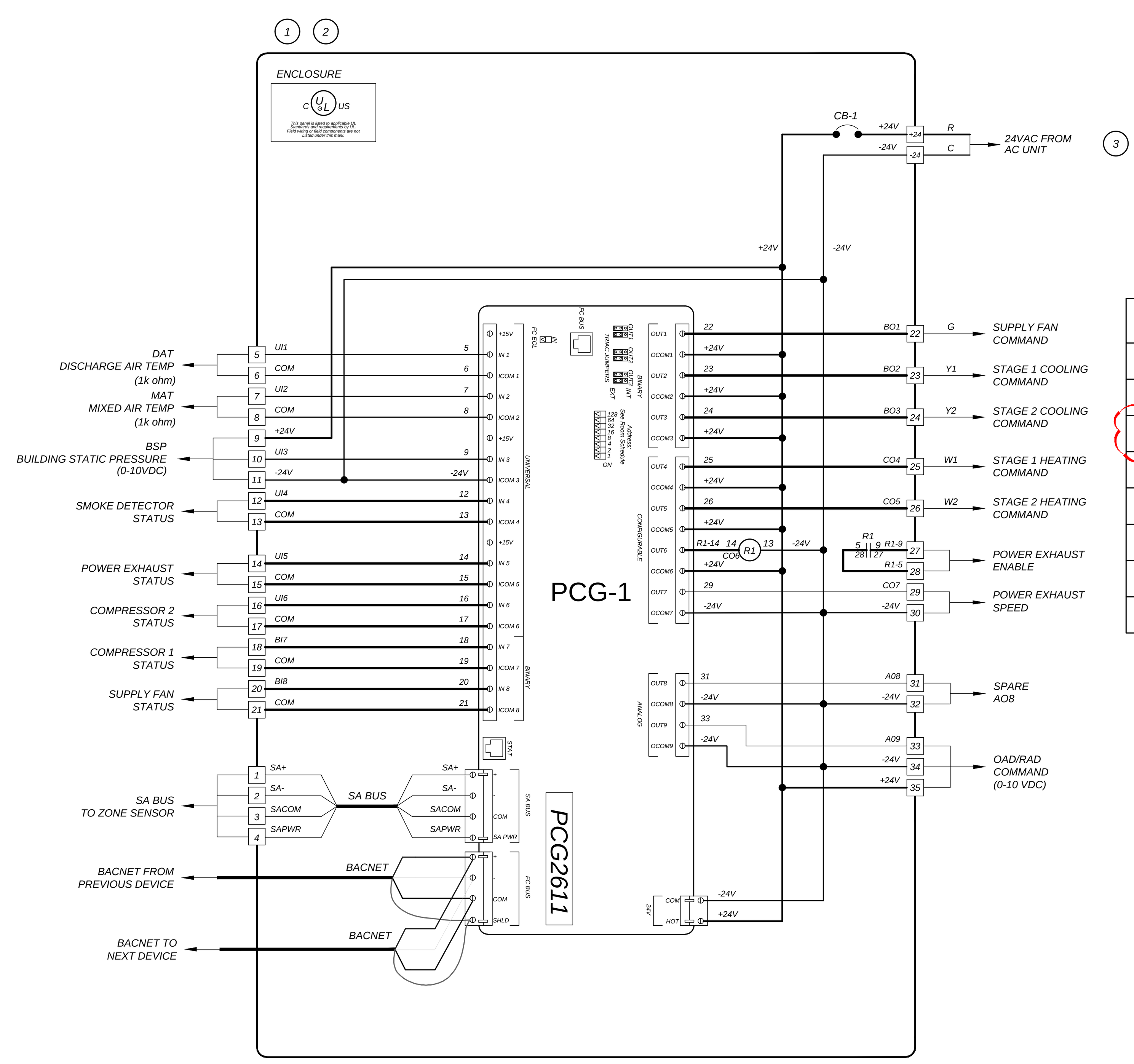
TAG	DESCRIPTION
DAT,MAT,RAT	DUCT TEMP SENSOR
OAD/RAD	SPRING RETURN DAMPER ACTUATOR
NZS	NETWORK ZONE SESNOR W/ CO_2

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. OAT GLOBALLY SHARED SOFTWARE POINT
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL D/M-8 FOR TCP DIAGRAM.



AIR HANDLER CONTROL DETAIL — C / M-8



NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Panel Components

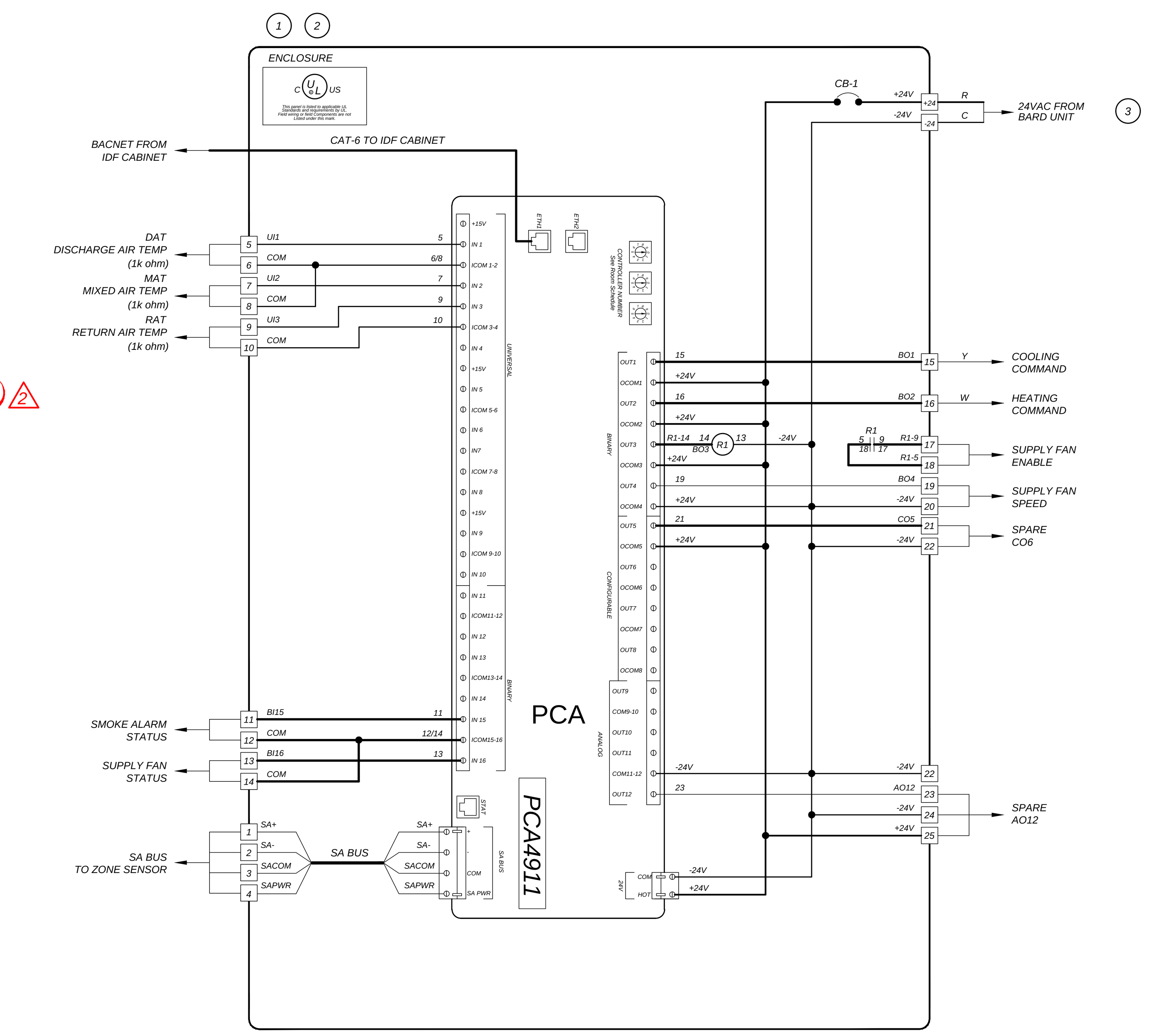
TAG	DESCRIPTION
PCG	GENERNAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER
R1	2-POLE 24VAC RELAY W/ LED
R1	2-POLE RELAY BASE

Sheet Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.

ROOF TOP UNIT TCP SCHEMATIC — B / M-8

HC-2



NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Panel Components

TAG	DESCRIPTION
PCA	ADVANCED PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
R1	2-POLE 24VAC RELAY W/ LED
R1	2-POLE RELAY BASE

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.

AIR HANDLER TCP SCHEMATIC DETAIL — D / M-8

REGISTERED PROFESSIONAL ENGINEER MICHAEL D. CANTELMI M23588 REN. 9-30-2021 MECHANICAL STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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FAX (559) 431-1362

TITLE: ENERGY MANAGEMENT DETAILS

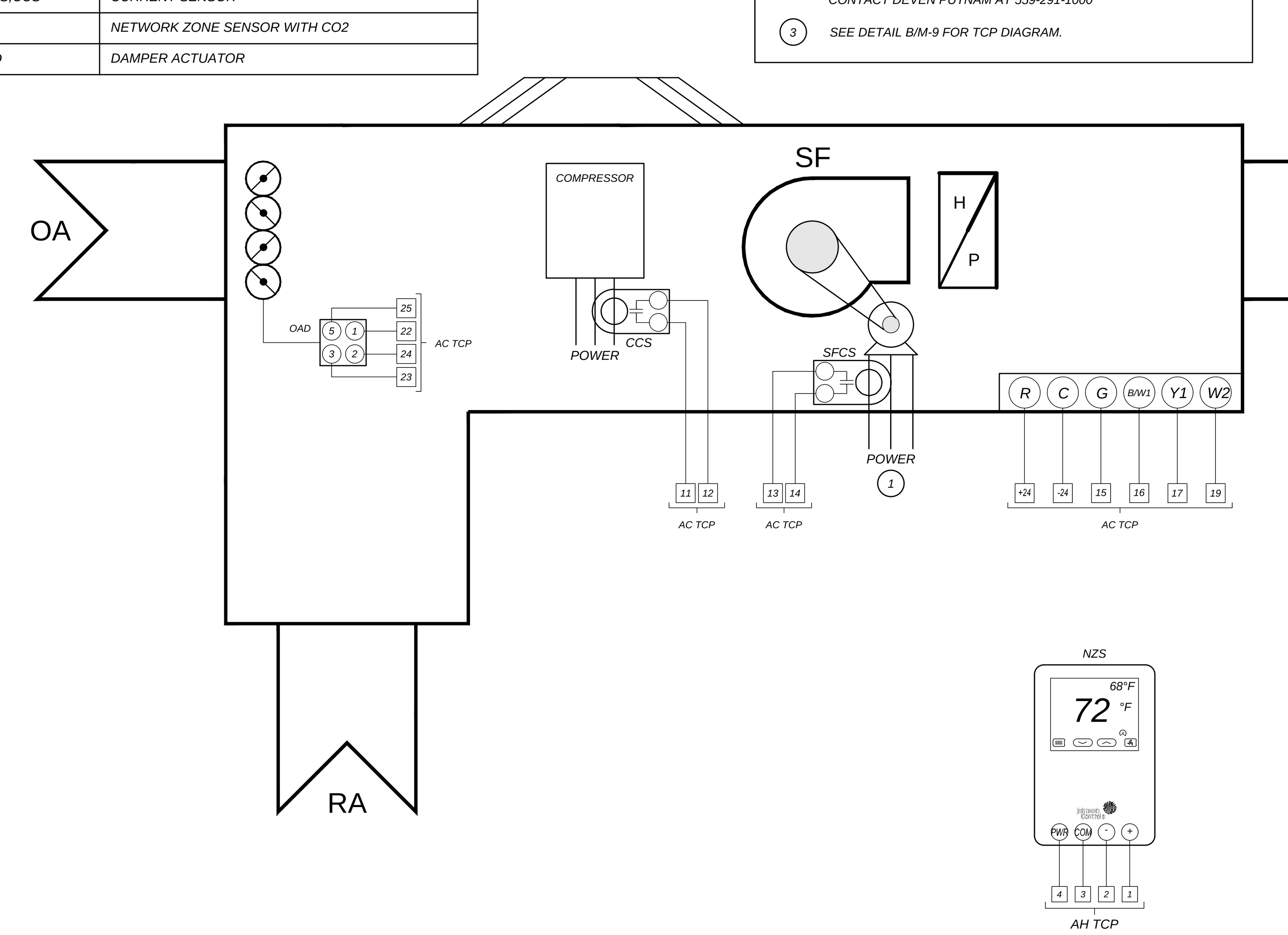
SHEET: M8

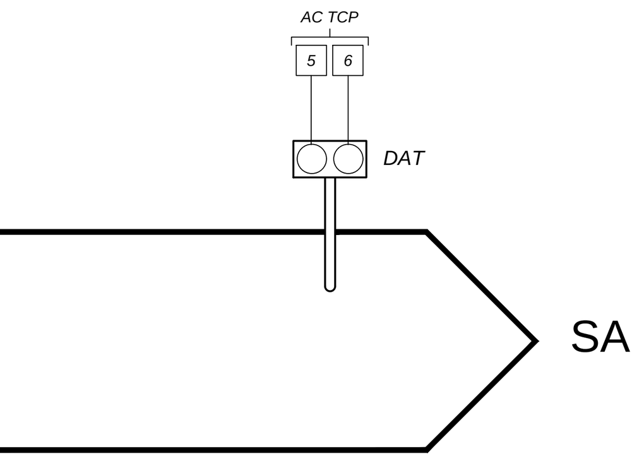
PROJECT 20139

Control Components	
TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
SFCS,CCS	CURRENT SENSOR
NZS	NETWORK ZONE SENSOR WITH CO2
OAD	DAMPER ACTUATOR

Sheet Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
3. SEE DETAIL B/M-9 FOR TCP DIAGRAM.





Heat Pump

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

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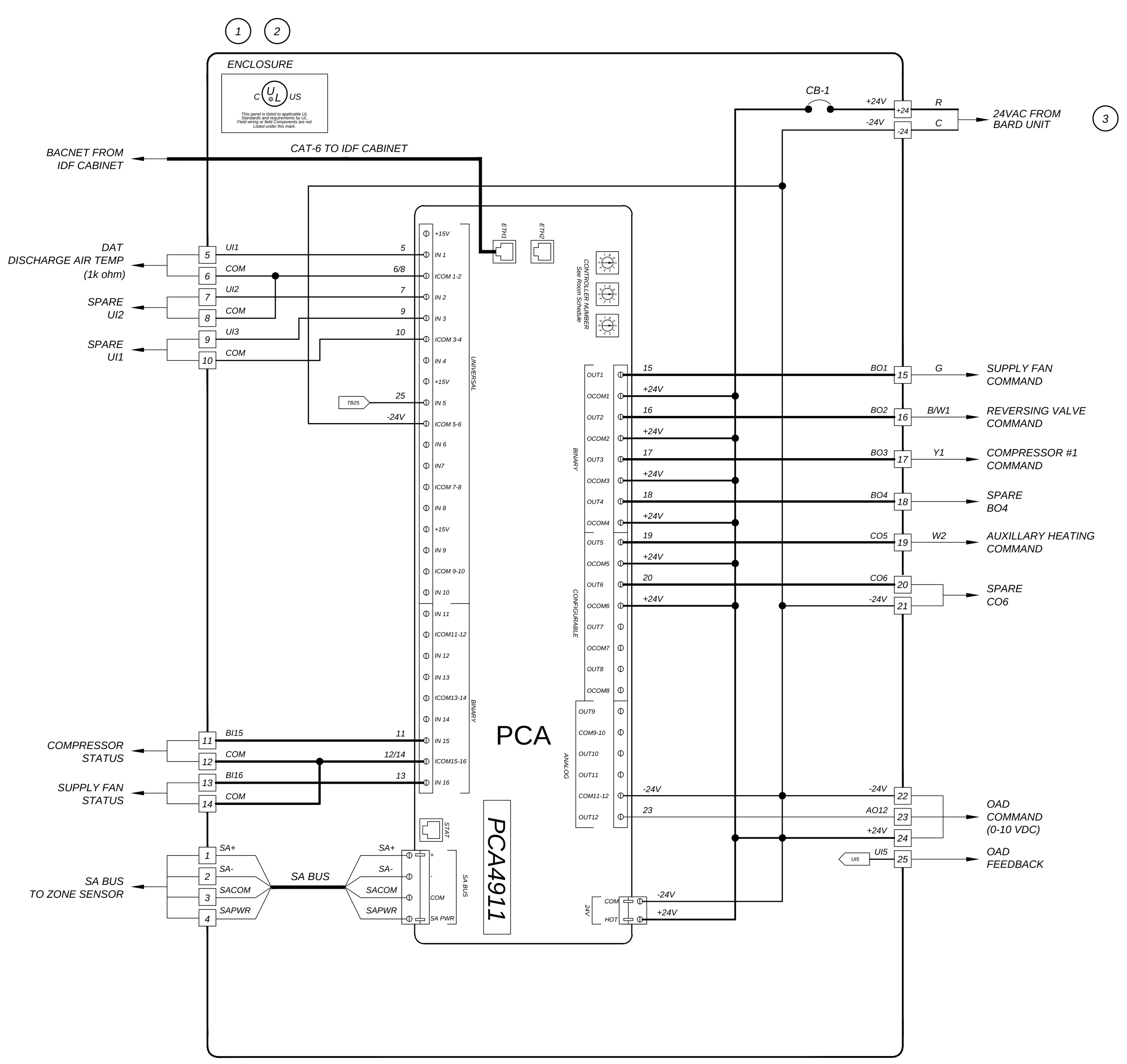
Demand Control Ventilation: CO2 readings shall come from the wall mount Temp/CO2 sensor. If the zone CO2 PPM reaches 800 ppm (adj.), the economizer shall modulate open to the maximum outdoor air position to satisfy the demand. Once the CO2 level drops below 800 ppm (adj.) , the economizer shall close to the minimum outdoor air position.

CO2 Monitoring: If CO2 in the space rises above CO2 alarm setpoint (adj.), the system will generate a Niagara alarm.

WALL MOUNTED HEAT PUMP UNIT CONTROL DETAIL

A / M-9



WALL MOUNTED HEAT PUMP TCP SCHEMATIC DETAIL

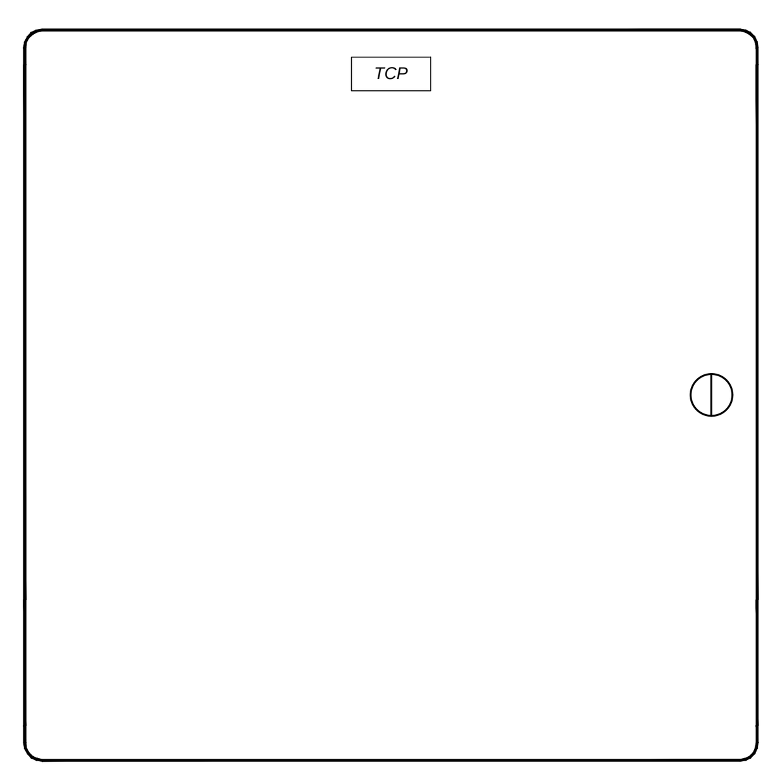
B / M-9

NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

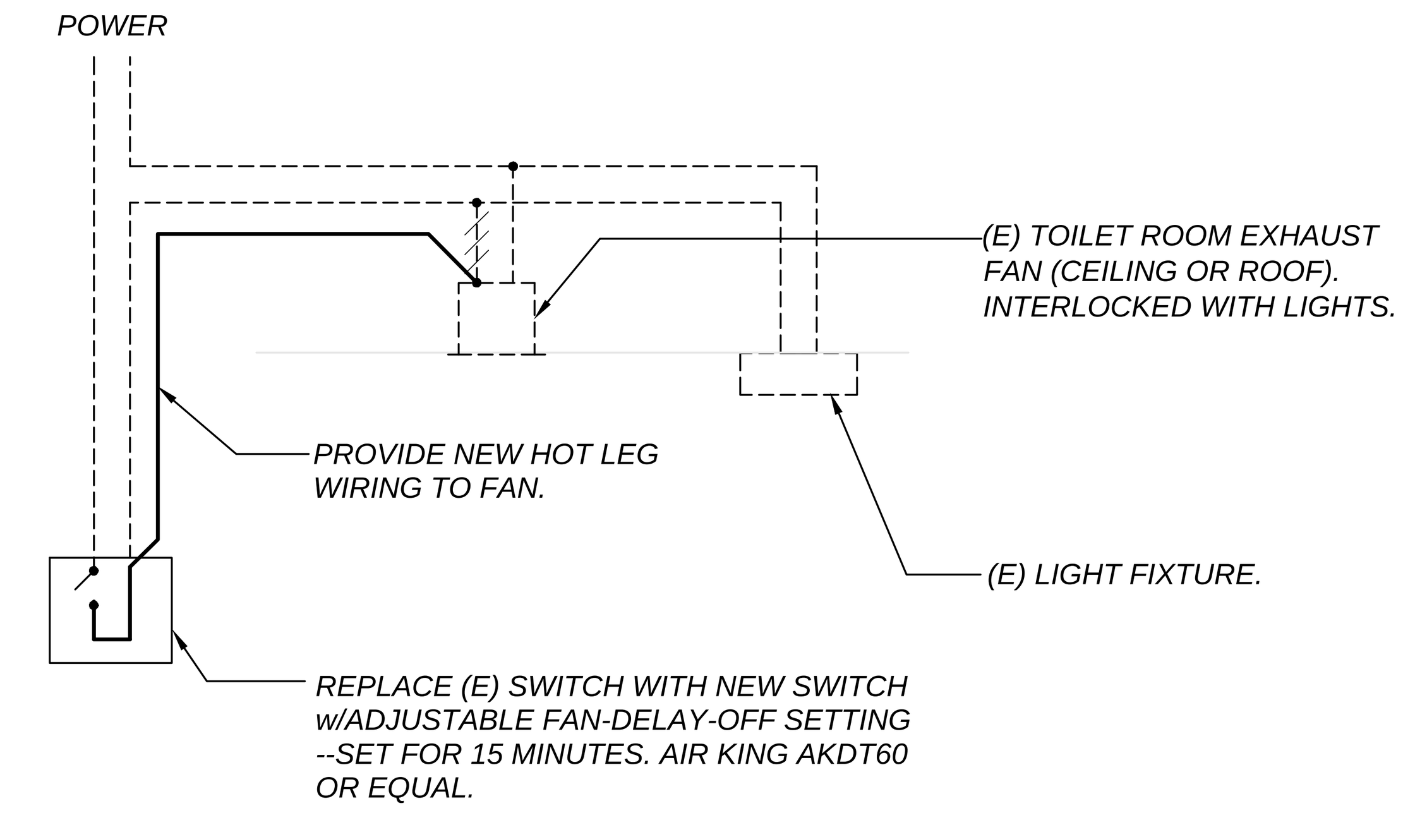
Panel Components	
TAG	DESCRIPTION
PCA	ADVANCED PROGRAMMABLE CONTROLLER
CB-1	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
ENC	SEE SPEC'S FOR NEMA RATING (revision 2)
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
TCP	TCP LABEL

Sheet Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.



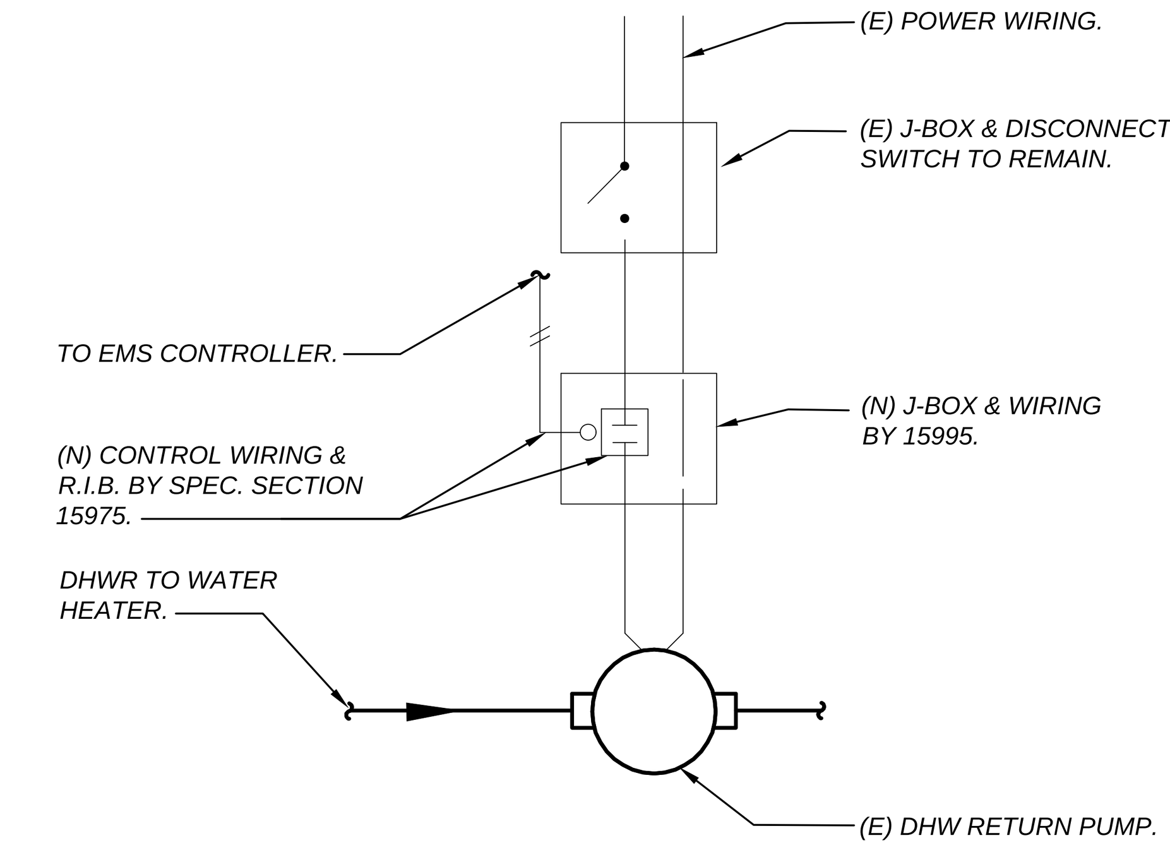
PANEL DOOR LAYOUT



LIGHT / EXHAUST TIMER SWITCH

SCALE: NONE

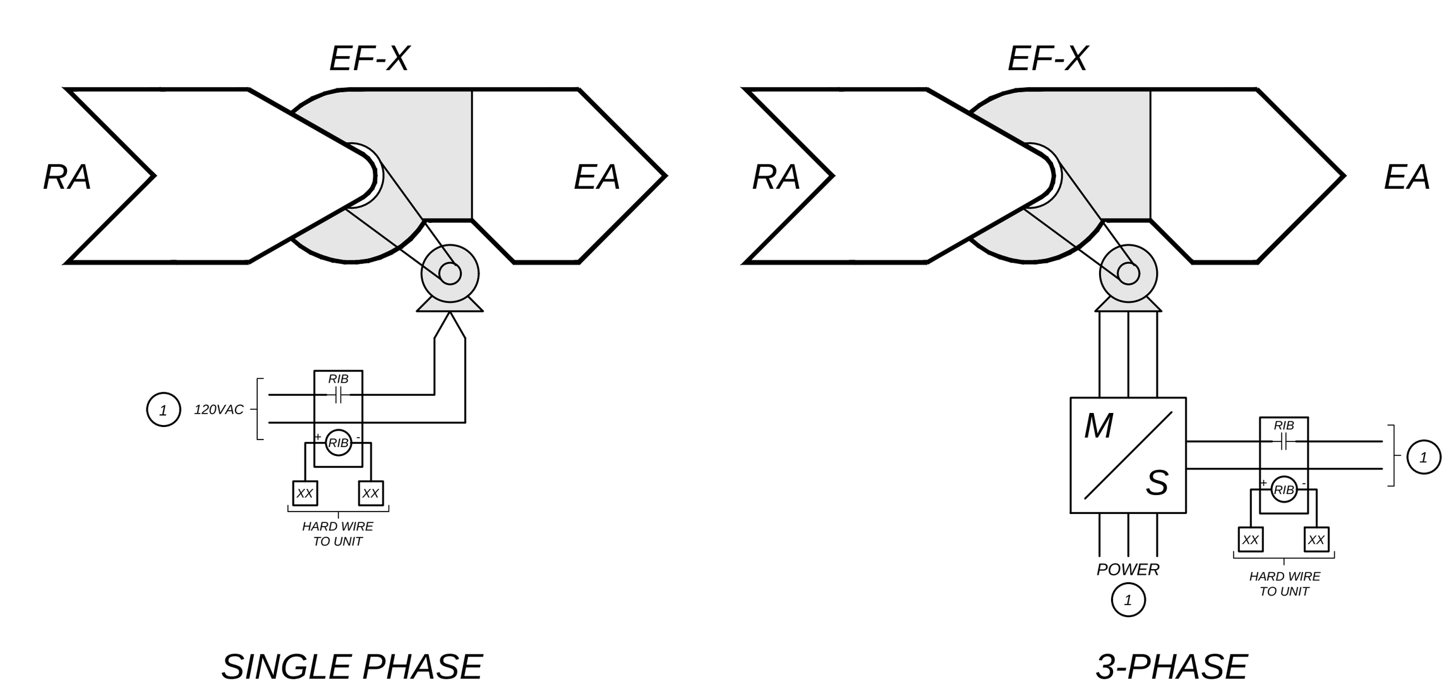
C / M-9



DOMESTIC H.W.R. PUMP CONTROL

SCALE: NONE

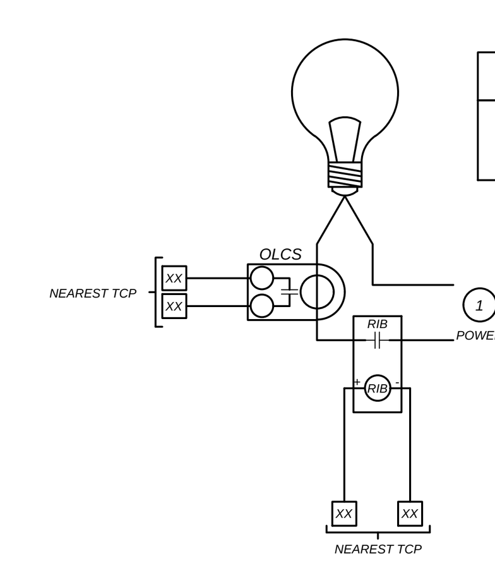
D / M-9



EXHAUST FAN INTERLOCK CONTROL

SCALE: NONE

E / M-9



Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.

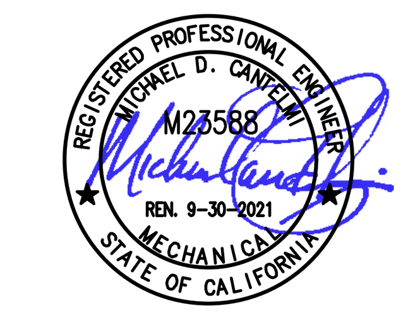
LIGHTING CONTROL

EXTERIOR LIGHTING CONTROL DETAIL

SCALE: NONE

F / M-9

APPROVALS:
APPLICATION #
??????????



DATE: 11-25-2020

EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M9

PROJECT 20139

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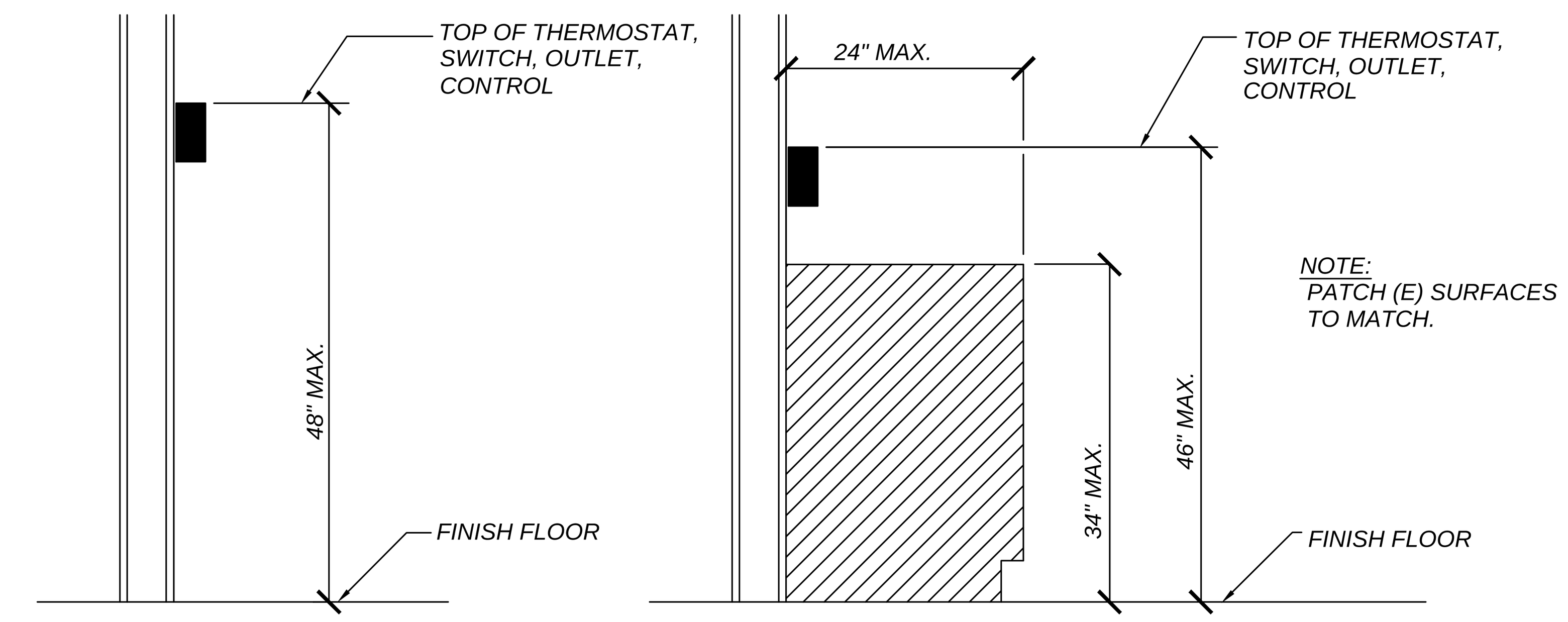


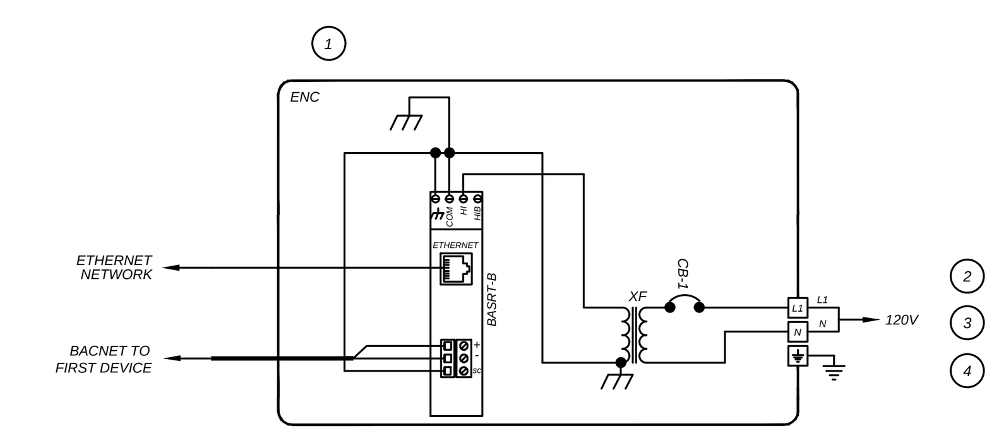
MOUNTING HEIGHT

OVER OBSTRUCTION

THERMOSTAT MOUNTING

SCALE: NONE

A / M-10



Router Panel Components

TAG	DESCRIPTION
CB-1	2.0 AMP CIRCUIT BREAKER
BASRT-B	BACNET/IP MS/TP ROUTER
XF	50A 24VAC TRANSFORMER
ENC	12X12 ENCLOSURE WITH BACKPLATE. SEE SPEC'S FOR NEMA RATING

2

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. LINE VOLTAGE & CONDUIT BY DIVISION 16.
3. FOR PORTABLE BLDG, PROVIDE AND INSTALL A DEDICATED 20A/1P CIRCUIT BREAKER TO THE PORTABLE BUILDING PANEL.
4. FOR PERMANENT BLDG, CONNECT ROUTER TO (E) CIRCUIT.

BACNET/IP MS/TP ROUTER PANEL DETAIL

SCALE: NONE

B / M-10

APPROVALS:
APPLICATION #
??????????

REGISTERED PROFESSIONAL ENGINEER MICHAEL D. CANTELMI M23588 REN. 9-30-2021 MECHANICAL STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
ROWELL ELEMENTARY SCHOOL
3460 EAST McKENZIE AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
2 4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
(559) 431-0101
Fresno, CA 93720
FAX (559) 431-1362

TITLE:
ENERGY
MANAGEMENT
DETAILS

SHEET:
M10

PROJECT 20139

21 April 2021 10:53 PM P:\2020\20139 FUSD Rowell Elementary School\4-Drawings\4 M\M10 - CONTROLS.dwg ezequiel

FRESNO UNIFIED SCHOOL DISTRICT

BURROUGHS ELEMENTARY SCHOOL
EMS REPLACEMENT
166 N. SIERRA VISTA AVE.
FRESNO, CALIFORNIA 93702

OWNER	MECHANICAL ENGINEER	ELECTRICAL ENGINEER
FRESNO UNIFIED SCHOOL DISTRICT	*LAWRENCE ENGINEERING GROUP*	*HARDIN-DAVIDSON ENGINEERING, INC.*
4600 N. BRAWLEY AVE.	*7084 NORTH MAPLE AVE. SUITE 101*	*356 POLLASKY AVE. SUITE 200*
FRESNO, CA 93722	*FRESNO, CA 93720*	*CLOVIS, CA 93612*
(559) 457-3064	*(559) 431-0101*	*(559) 323-4995*
CONTACT: DANNY ANDERSON	*CONTACT: MIKE CANTELMI*	*CONTACT: RICH HARDIN*

GENERAL NOTES:

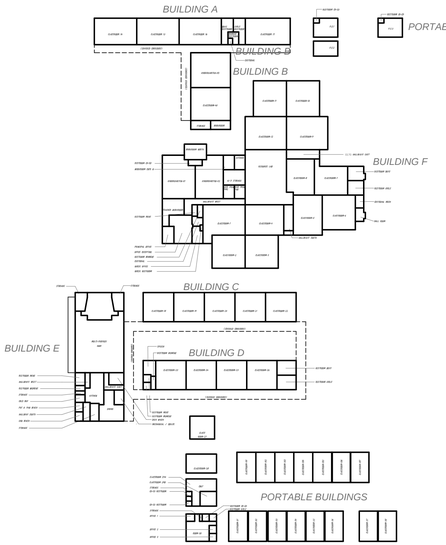
1. *ALL WORK SHALL CONFORM TO 2019 EDITION TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).*
2. *CHANGE TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENT (CCD) APPROVED BY DSA, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.*
3. *A "DSA CERTIFIED" PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY DSA SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, CCR. PROJECT REQUIRES A CLASS 3 INSPECTOR.*
4. *A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE DISTRICT (OWNER) SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THE PROJECT.*
5. *THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CCR. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CCR, A CONSTRUCTION CHANGE DOCUMENT (CCD), OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFING THE REQUIRED WORK SHALL SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE WORK. (SECTION 4-317(C), PART 1, TITLE 24, CCR)*

PROJECT NOTES:

1. *PROVIDE ALL NEW CONTROL WIRE.*
2. *PROVIDE ALL NEW ACTUATORS. RETURN EXISTING ACTUATORS TO DISTRICT.*
3. *PROVIDE A NEW OUTSIDE AIR TEMPERATURE SENSOR AT EACH MULTI-ZONE.*
4. *PROVIDE NEW CONTROLS FOR ALL EXHAUST FANS.*
5. *PROVIDE NEW CONTROLS FOR EXTERIOR LIGHTING. REFER TO FLOOR PLAN SHEETS. MOUNT HARDWARE IN NEW LOCKABLE ENCLOSURES.*
6. *PROGRAMMING SHALL BE IN THE CONTROLLERS AT THE UNIT, NOT THE FRONT END. THE FRONT END IS A MONITORING STATUS, ON-OFF DEVICE ONLY.*
7. *WIRING IN ATTICS SHALL BE SUPPORTED ON J-HOOKS. NO WIRING ON ROOF.*
8. *SALVAGE ALL CONTROL EQUIPMENT AND RETURN TO OWNER.*
9. *PROVIDE AND INSTALL A 20A/1P, DUPLEX RECEPTACLE WITH CIRCUIT AND CIRCUIT BREAKER FROM THE NEAREST 120 VOLT PANEL IS 80-FEET AWAY FIELD LOCATE. PROVIDE POWER CONNECTIONS TO EACH ENERGY MANAGEMENT RIB. REFER TO MECHANICAL/EMS PLANS FOR EQUIPMENT LOCATIONS.*
10. *CONTRACTOR MAY REUSE (E) CONTROLLER ENCLOSURE WHERE FEASIBLE.*

APPLICABLE CODES

2019 California Administrative Code - CCR Title 24, Part 1
2019 California Building Code - CCR Title 24, Part 2
2019 California Electrical Code - CCR Title 24, Part 3
2019 California Mechanical Code - CCR Title 24, Part 4
2019 California Plumbing Code - CCR Title 24, Part 5
2019 California Energy Code - CCR Title 24, Part 6
2019 California Fire Code - CCR Title 24, Part 9
2019 Existing Building Code - CCR Title 24, Part 10
2019 California Green Code - CCR Title 24 Part 11
2019 California Reference Code - CCR Title 24 Part 12
Title 19 CCR Public Saftey, State Fire Marshall Regulations
2019 NFPA 72 for Fire Alarm System.
CFC CH 33 Fire Saftey During Construction and Demolition



BLDG SITE PLAN

SCALE: 1" = 40'-0"

SHEET INDEX

SCOPE OF WORK

THE SCOPE OF WORK IS AS INDICATED BY THE CONTRACT DRAWINGS AND SPECIFICATION AND IS SUMMARIZED AS FOLLOWS:

- REPLACE EXISTING DDC CONTROLS w/(N) JOHNSON CONTROLS FX-80
- REPLACE AND UP SIZE EXISTING MULTI-ZONE UNIT SUPPLY AND RETURN / EXHAUST FAN WITH NEW MOTOR & VFD. SEE PLANS FOR SIZE & ELECTRICAL DRAWINGS.
- PROVIDE AN EXISTING CONDITION DUCT TRAVERSE FOR EACH SUPPLY ZONE, OUTSIDE AIR, & RETURN AIR ON MULTI-ZONE UNIT MZU-1, MZU-2, MZU-3 AND MZU-4 PRIOR TO START OF WORK AND ALSO UPON PROJECT COMPLETION.

APPROVALS:
APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. CANTELMI
M28568
REN. 9-30-2021
MECHANICAL
STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
BURROUGHS ELEMENTARY SCHOOL
166 N SIERRA VISTA AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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4/22/21 EMS REVISIONS

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(559) 431-0101

TITLE: COVER

SHEET: G1 2

PROJECT 20140

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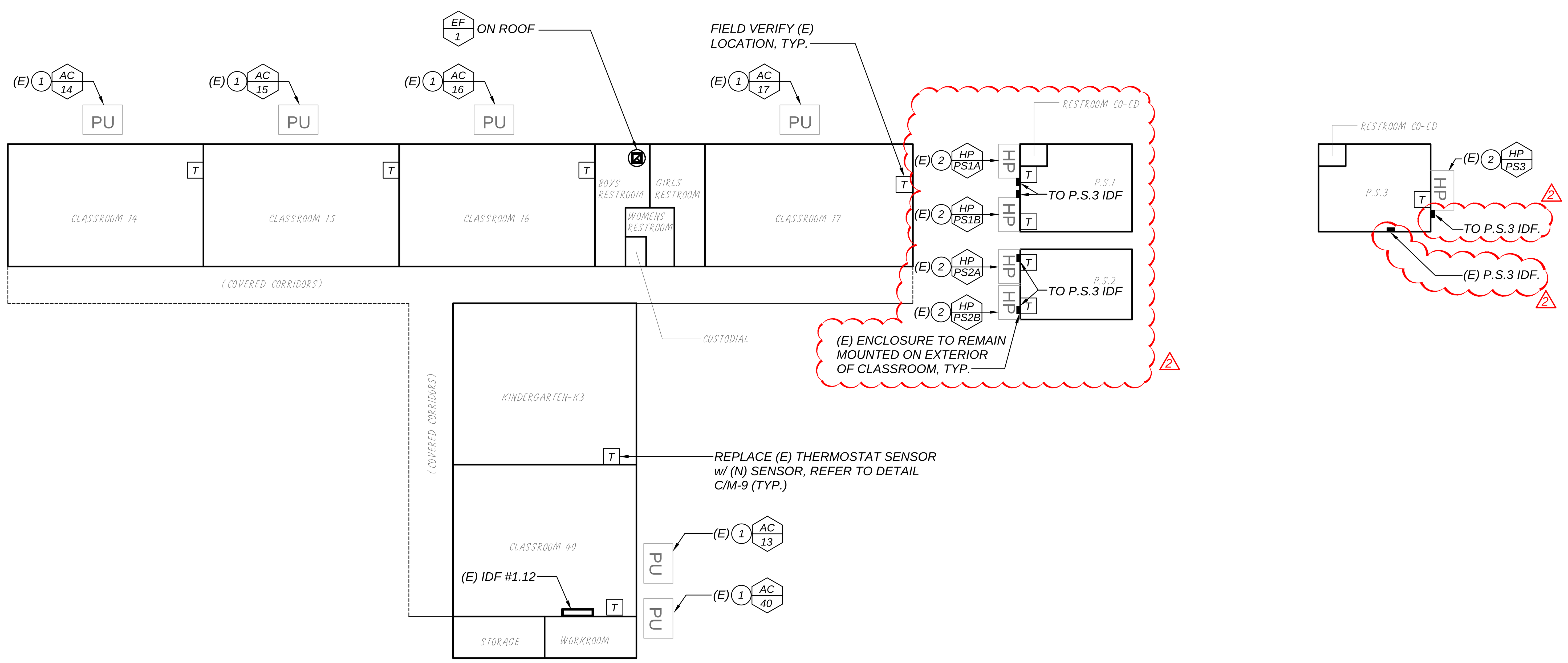
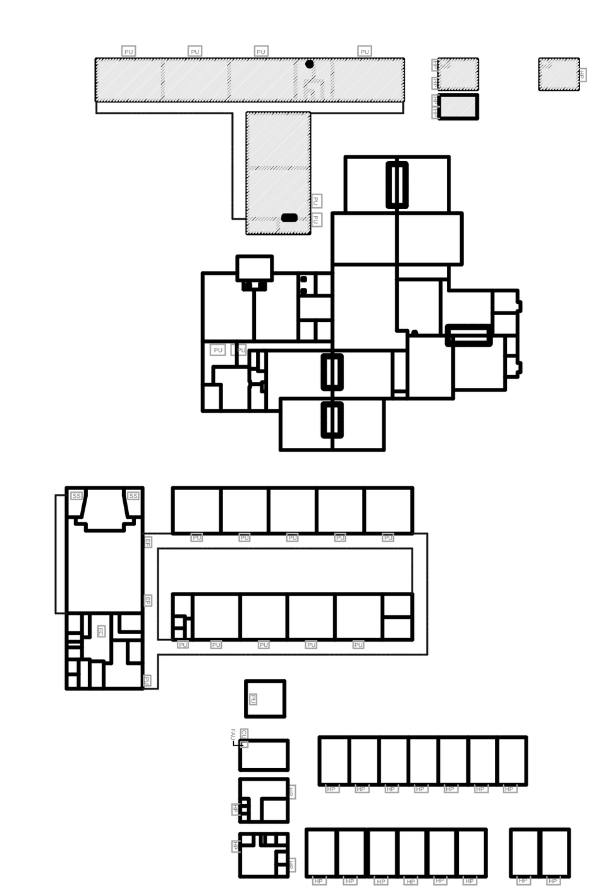


BLDG. A & BLDG. B EMS PLAN

SCALE: 1/16" = 1'-0"

KEYNOTES: (THIS SHEET ONLY)

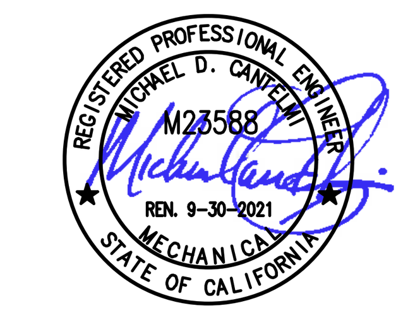
1. H/C UNIT MOUNTED ON GRADE.
2. WALL MOUNTED HEAT PUMP.



KEY PLAN

APPROVALS:

APPLICATION #
??????????



DATE: 11-25-2020

EMS REPLACEMENT
BURROUGHS ELEMENTARY SCHOOL
166 N SIERRA VISTA AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS

2	4/22/21	EMS REVISIONS

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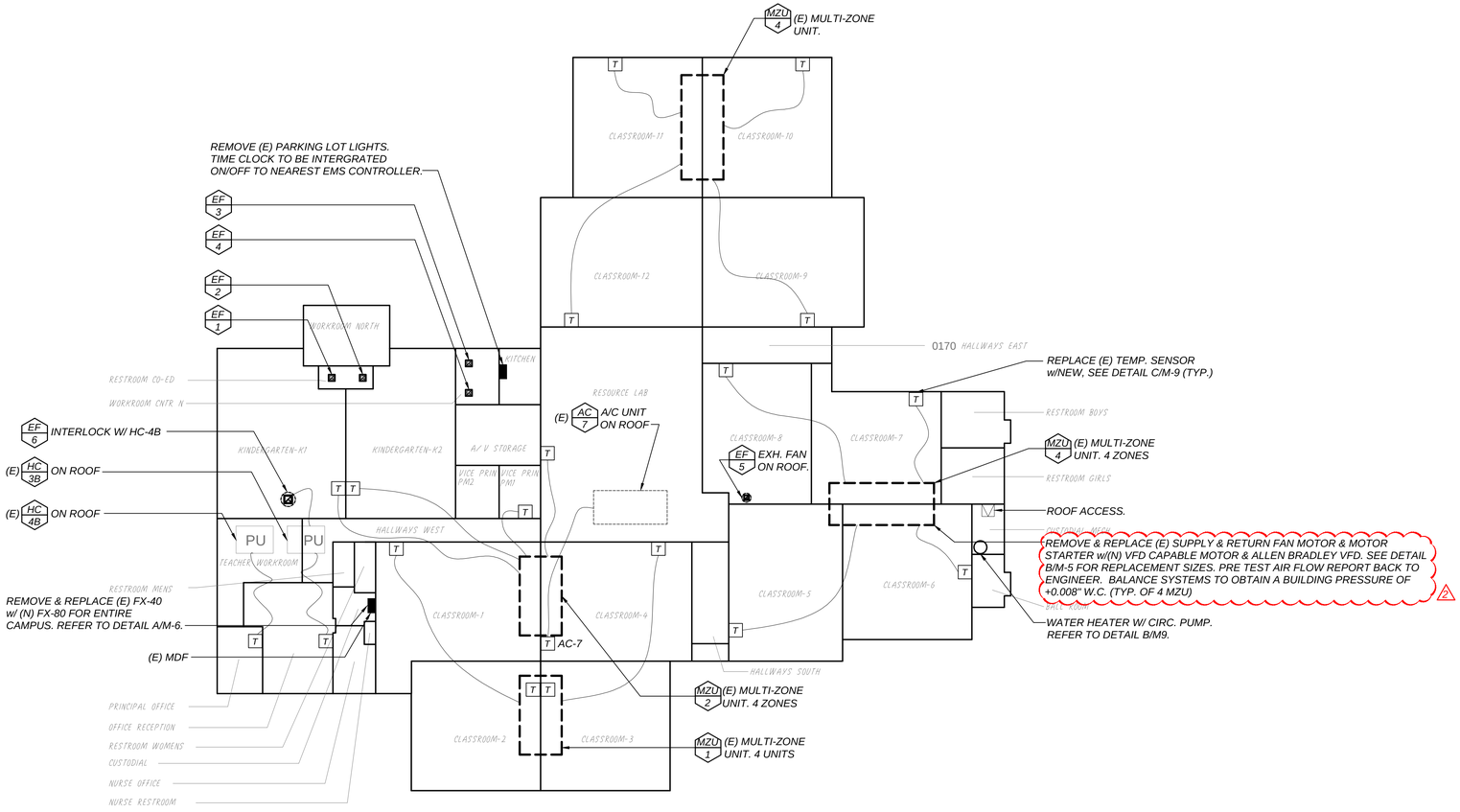
TITLE: BLDG A & BLDG B EMS PLAN

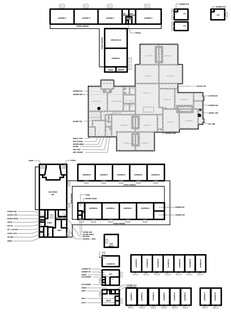
SHEET: M1

PROJECT 20140



BLDG. F EMS PLAN

SCALE: 1/16" = 1'-0"



KEY PLAN

APPROVALS:

APPLICATION # ??????????

DATE: 11-25-2020

EMS REPLACEMENT
BURROUGHS ELEMENTARY SCHOOL
166 N SIERRA VISTA AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
2 4/22/21 EMS REVISIONS

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(559) 431-1001
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TITLE:
BLDG F
EMS PLAN

SHEET: M2 2

PROJECT 20140

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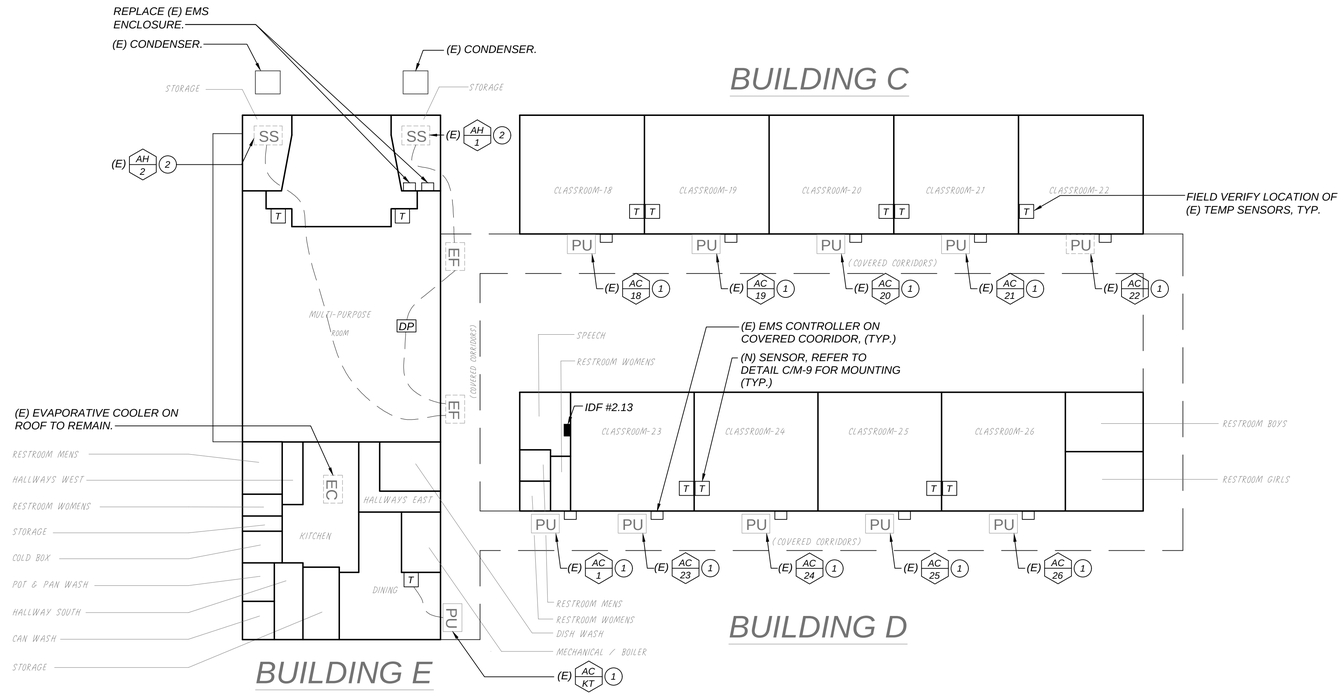
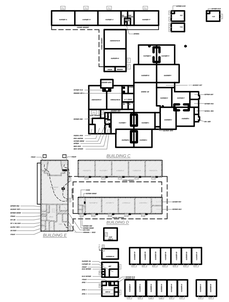


KEYNOTES: (THIS SHEET ONLY)

1. HEATING & COOLING UNIT ON COVERED CORRIDOR.
2. SPLIT SYSTEM VERTICAL AIR HANDLER w/GAS FURNACE. DX COOLING COIL & AIR COOLED CONDENSER ON GRADE.
3. (E) EXHAUST FANS CONTROLLED w/DIFERENTIAL PRESSURE SENSOR. INTERLOCK EXHAUST ENABLE w/ AH-1 & AH-2.

BLDG. C, D, & E EMS PLAN

SCALE: 1/16" = 1'-0"



KEY PLAN

APPROVALS:

APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — MICHAEL D. CURRY — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
BURROUGHS ELEMENTARY SCHOOL
166 N SIERRA VISTA AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

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TITLE: BLDG. C,D, & E EMS PLAN

SHEET: M3 2

PROJECT 20140

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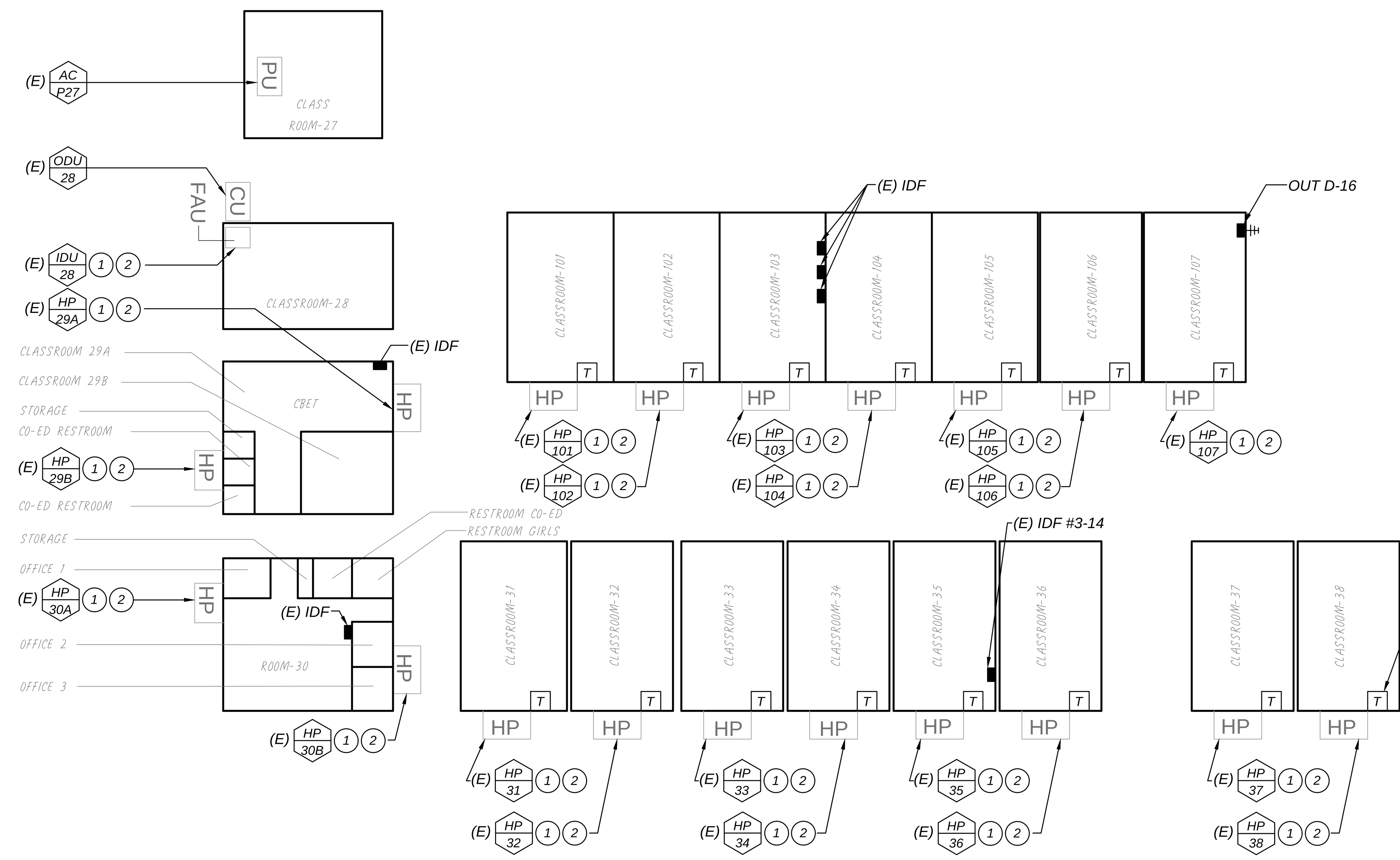


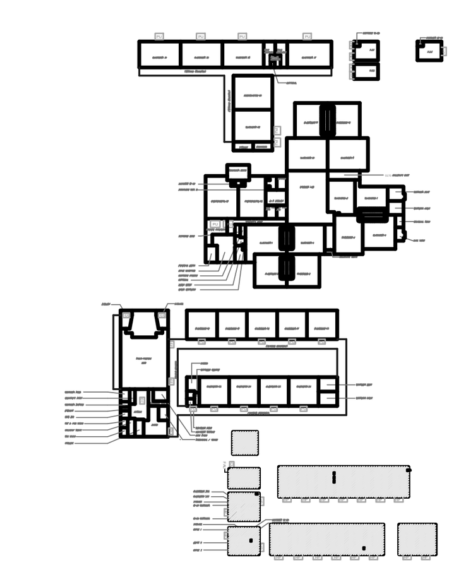
(N) SENSOR, REFER TO DETAIL C/M-9 FOR MOUNTING. REMOVE (E) SENSOR/ THERMOSTAT & PATCH TO MATCH (E) FINISH SURFACES AS REQUIRED.

PORTABLE BUILDINGS

SCALE: 1/16" = 1'-0"

KEYNOTES: (THIS SHEET ONLY)

1. WALL MOUNTED HEAT PUMP.
2. REVUSE (E) EMS ENCLOSURE OR PROVIDE (N) IF (E) ENCLOSURE IS NOT SALVAGEABLE. △2



KEY PLAN

APPROVALS:

APPLICATION #
??????????

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. CANTELMI
M23588
REN. 9-30-2021
MECHANICAL
STATE OF CALIFORNIA

DATE: 11-25-2020

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FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS

△2 4/22/21 EMS REVISIONS

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FAX (559) 431-1362

TITLE: PORTABLE BUILDINGS

SHEET: M4 △2

PROJECT 20140

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JACE Notes

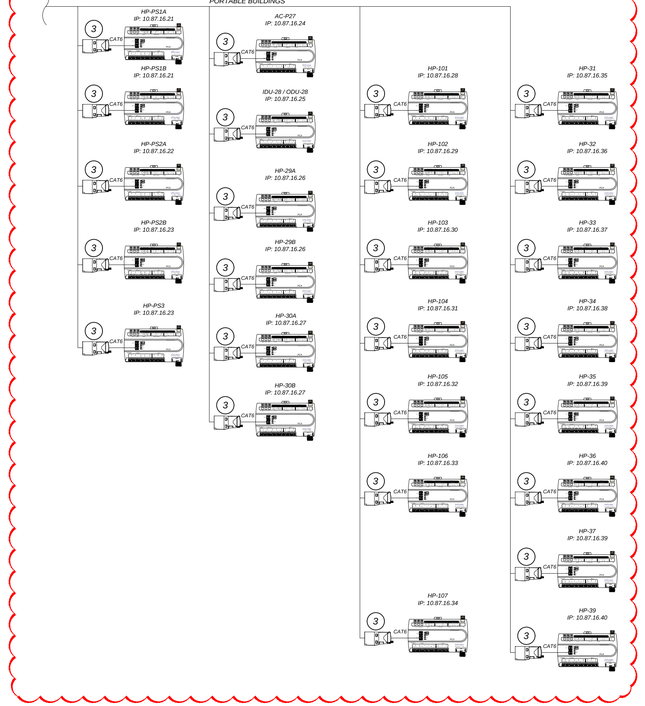
HOST ID:
SERIAL NUMBER:
PRIMARY IP: 192.168.1.149
SECONDARY IP: 192.168.10.10

1

Sheet Notes

1. DEFAULT IP ADDRESS TO BE CHANGED DURING COMMISSIONING.
2. IP ADDRESSES TO BE PROVIDED BY FUSD.
3. A PANDUIT CJ688TGYL CONNECTOR IS REQUIRED BETWEEN ALL IP DEVICES AND THE NETWORK SWITCH.
4. BOTH ENDS OF ALL CAT-6 CABLES MUST BE LABLED WITH THE ROOM NUMBER, EQUIPMENT TYPE, AND PATCH PANEL NUMBER I.E. ROOM # EQUIP. TYPE - PORT #.

2



NOTE: RING TOPOLOGY IS ACCEPTABLE FOR CONTROLLERS SERVING PORTABLE BUILDINGS.

2

BURROUGHS ELEMENTARY SCHOOL CONTROL REFERENCES

Room Name	Room No.	A/C Mark No.	System Type	Description or Notes	See Detail
BUILDING A & B- CLASSROOMS					
Classroom	14	AC-14	G/E	Packaged Unit	B/M-7
Classroom	15	AC-15	G/E	Packaged Unit	B/M-7
Classroom	16	AC-16	G/E	Packaged Unit	B/M-7
Classroom	17	AC-17	G/E	Packaged Unit	B/M-7
		EF-1	R/R Exhaust Fan	Interlock with lights	A/M-10
Kindergarten	K3	AC-13	G/E	Packaged Unit	B/M-7
Classroom	40	AC-40	G/E	Packaged Unit	B/M-7
BUILDING C - CLASSROOM					
Classroom	18	AC-18	G/E	Rooftop Packaged Unit	B/M-7
Classroom	19	AC-19	G/E	Rooftop Packaged Unit	B/M-7
Classroom	20	AC-20	G/E	Rooftop Packaged Unit	B/M-7
Classroom	21	AC-21	G/E	Rooftop Packaged Unit	B/M-7
Classroom	22	AC-22	G/E	Rooftop Packaged Unit	B/M-7
BUILDING D - CLASSROOM					
Speech/Restrooms	1	AC-1	G/E	Rooftop Packaged Unit	B/M-7
Classroom	23	AC-23	G/E	Rooftop Packaged Unit	B/M-7
Classroom	24	AC-24	G/E	Rooftop Packaged Unit	B/M-7
Classroom	25	AC-25	G/E	Rooftop Packaged Unit	B/M-7
Classroom	26	AC-26	G/E	Rooftop Packaged Unit	B/M-7
BUILDING E - MULTI-PURPOSE					
Dining		AC-1	G/E	Floor Mounted Packaged Unit	B/M-7
Multi-purpose room		AH-1/AH-2	G/E	G/E split system	A/M-9
Multi-purpose room		EF-1/EF-2	Exhaust Fan	Exhaust Fan on Pressure sensor, Interlock operation with AH-1/AH-2	
BUILDING F - CLASSROOMS & ADMIN					
SEE PLANS		MZU-1	MZ AH	4 zones, (N) 7.5 HP SA & 1 HP EXH.Fan Motor and VFD	C/M-6
SEE PLANS		MZU-2	MZ AH	4 zones, (N) 10 HP SA & 2 HP EXH. Fan Motor and VFD	C/M-6
SEE PLANS		MZU-3	MZ AH	4 zones, (N) 7.5 HP SA & 1 HP EXH. Fan Motor and VFD	C/M-6
SEE PLANS		MZU-4	MZ AH	4 zones, (N) 10 HP SA & 1 HP EXH.Fan Motor and VFD	C/M-6
Administration		HC-3B	G/E	Rooftop Packaged Unit	B/M-7
Administration		HC-4B	G/E	Rooftop Packaged Unit	B/M-7
		EF-1	R/R Exhaust Fan	Leave on (E) Wall Switch	
		EF-2	R/R Exhaust Fan	Leave on (E) Wall Switch	
		EF-3	R/R Exhaust Fan	Leave on (E) Wall Switch	
		EF-4	R/R Exhaust Fan	Leave on (E) Wall Switch	
		EF-5	R/R Exhaust Fan	Interlock with MZU-4	
		EF-6	R/R Exhaust Fan	Interlock with HC-4B	
CLASSROOM	4	AC-7	G/E	Rooftop Packaged Unit	B/M-7
PORTABLE BUILDINGS					
CLASSROOM	27	AC-P27	G/E	Rooftop Packaged Unit	B/M-7
CLASSROOM	28	IDU-28, ODU-28	G/E	Vertical air handler w/ air cooled condenser	A/M-9
CLASSROOM	29A	HP-29A	Wall Mounted HP		C/M-9
CLASSROOM	29B	HP-29B	Wall Mounted HP		C/M-9
CLASSROOM	30A	HP-30A	Wall Mounted HP		C/M-9
CLASSROOM	30B	HP-30B	Wall Mounted HP		C/M-9
CLASSROOM	31	HP-31	Wall Mounted HP		C/M-9
CLASSROOM	32	HP-32	Wall Mounted HP		C/M-9
CLASSROOM	33	HP-33	Wall Mounted HP		C/M-9
CLASSROOM	34	HP-34	Wall Mounted HP		C/M-9
CLASSROOM	35	HP-35	Wall Mounted HP		C/M-9
CLASSROOM	36	HP-36	Wall Mounted HP		C/M-9
CLASSROOM	101	HP-101	Wall Mounted HP		C/M-9
CLASSROOM	102	HP-102	Wall Mounted HP		C/M-9
CLASSROOM	103	HP-103	Wall Mounted HP		C/M-9
CLASSROOM	104	HP-104	Wall Mounted HP		C/M-9
CLASSROOM	105	HP-105	Wall Mounted HP		C/M-9
CLASSROOM	106	HP-106	Wall Mounted HP		C/M-9
CLASSROOM	107	HP-107	Wall Mounted HP		C/M-9
SITE					
Exterior Lighting					F/M-9

NOTES:
1. System Type Abbreviations: G/E - Gas Heating/Electric Cooling; HP - Heat Pump
   CP - Central Plant Hot or Chilled Water
   LS - Light Switch
   UV - Unit Ventilator
   MUA- Make-up Air
   HW- Hot Water
   DHW- Domestic Hot Water
   MZ - Multizone
   AH - Air handler
   WH- Domestic Water Heater
   Fur - Furnance

2

LAN ARCHITECTURE DETAIL 1 — A / M-5

EMS DETAIL REFERENCE LIST — B / M-5

APPROVALS:
APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — DANIEL D. CURRIER — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
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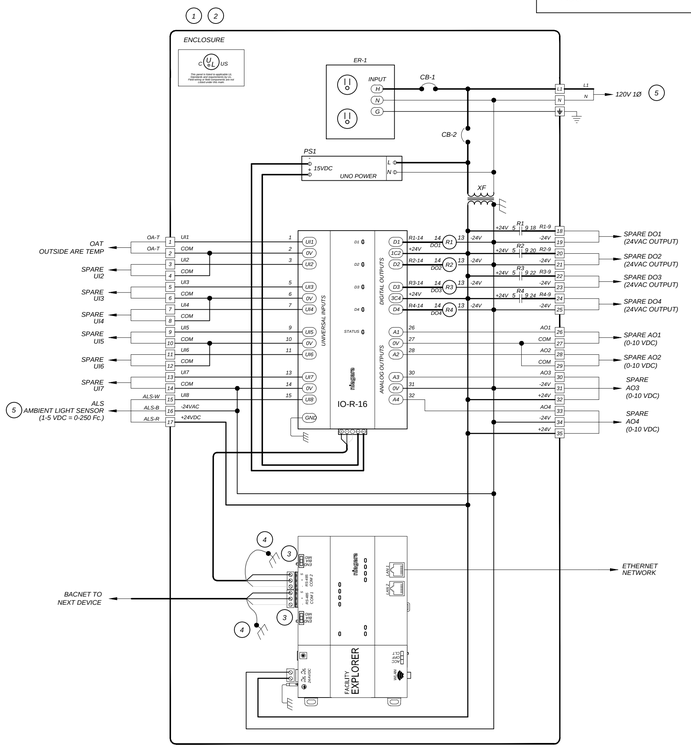
TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M5

PROJECT 20140

21 April 2021 10:42 PM P:\2020\20140 FUSD Burroughs EMS Replacement\4-Drawings\4 M\M5 – CONTROLS.dwg ezequel

NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.



Panel Components

TAG	DESCRIPTION
FX	FX-80 CONTROLLER AND SD CARD
	FX-80 SMA
	FX-80 DEVICE LICENCE
RIO16	16 POINT REMOTE INPUT/OUTPUT EXPANSION
XF	120 - 24V TRANSFORMER
CB-1	MANUAL RESET 15.0 AMP CIRCUIT BREAKER
CB-2	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
ENC	SEE SPEC'S FOR NEMA RATING.
ENC	PADLOCK KIT
ER-1	ELECTRICAL OUTLET
R1-R4	2-POLE 24VAC RELAY W/LED
R1-R4	2-POLE RELAY BASE
PS-1	15VDC POWER SUPPLY

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. JACE SELECTOR SWITCH NEED TO BE SET TO THE "END" POSITION
4. RS-485 COMM BUS SHIELD TO BE GROUNDED AT THE SCP PANEL ONLY
5. SEE DETAIL B/M-6

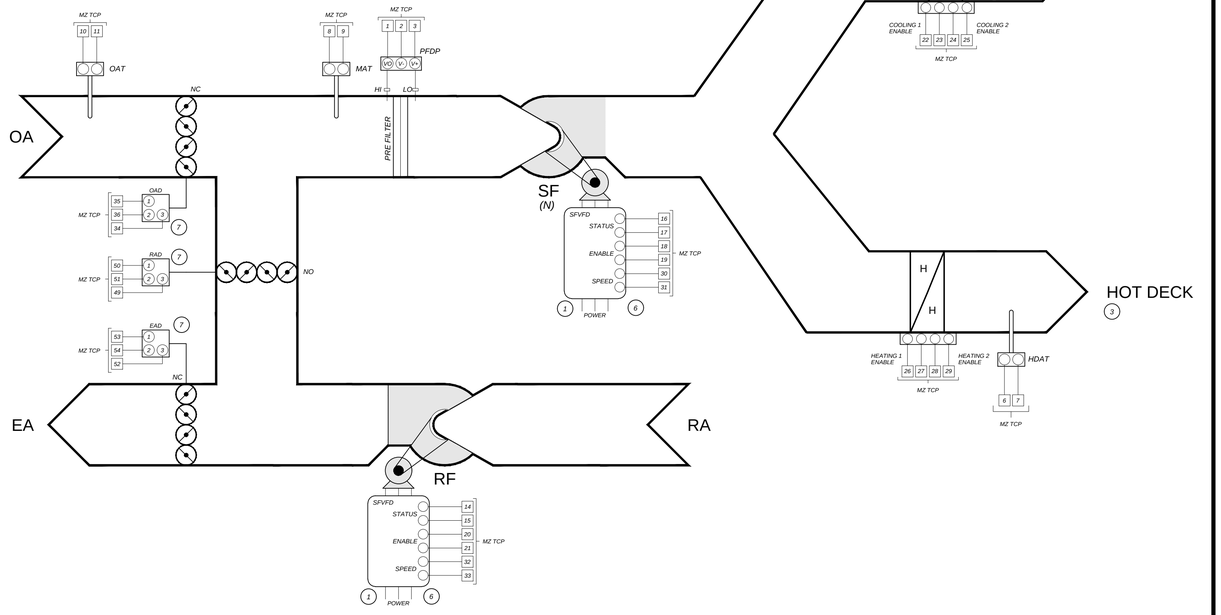
SUPERVISORY SCP SCHEMATIC DETAIL — A / M-6

Control Components

TAG	DESCRIPTION
CDAT,HDAT	DUCT TEMP SENSOR
OAT	OUTSIDE AIR SENSOR
MAT	AVERAGING DUCT TEMP SENSOR
OAD	SPRING RETURN DAMPER ACTUATOR
RAD	SPRING RETURN DAMPER ACTUATOR
EAD	SPRING RETURN DAMPER ACTUATOR
PFDP	PRESSURE TRANSDUCER
SFVFD	(N) VARIABLE FREQUENCY DRIVE

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
3. REFER TO DETAIL D/M-6 FOR ZONE CONTROL DETAIL.
4. SEE DETAIL A/M-7 FOR TCP DIAGRAM.
5. FUSD TO PROGRAM MZU
6. (N) VARIBLE FREQUENCY DRIVE AND MOTOR
7. PROVIDE (N) ACTUATOR, FIELD VERIFY QUANITY.



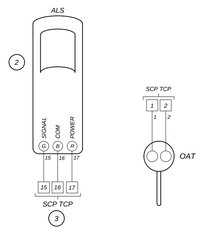
MULTI-ZONE CONTROL DETAIL — C / M-6

Control Components

TAG	DESCRIPTION
OAT	10K TYPE 3 OUTDOOR SENSOR
ALS	AMBIENT LIGHT SENSOR

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16
2. LOCATE AMBIENT LIGHT SENSOR AT NORTHERN EXPOSURE OF BUILDING.
3. SEE DETAIL A/M-6



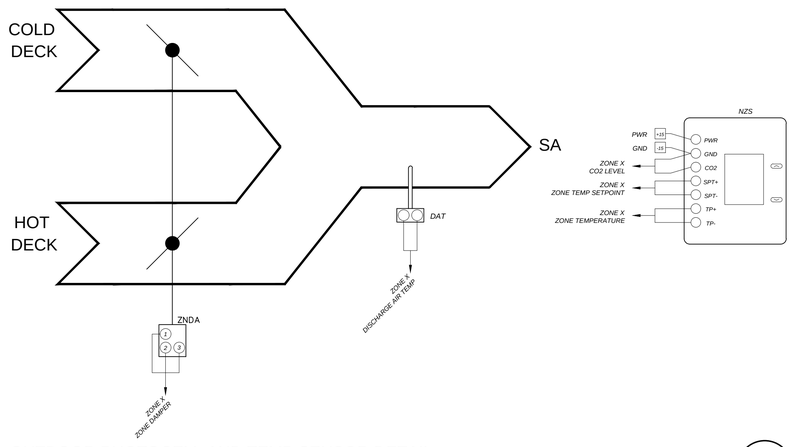
OUTDOOR PHOTOCELL AND TEMP SENSOR DETAIL — B / M-6

Control Components

TAG	DESCRIPTION
NZS	ZONE SENSOR W/ SETPOINT ADJUSTMENT
DAT	DISCHARGED AIR TEMP SENSORS
ZNDA	ZONE DAMPER ACTUATOR

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.



OUTDOOR PHOTOCELL AND TEMP SENSOR DETAIL — D / M-6

APPROVALS:
APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — MICHAEL D. CONROY — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
BURROUGHS ELEMENTARY SCHOOL
166 N SIERRA VISTA AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
1 4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-0101
FAX (559) 431-3562

TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M6

PROJECT 20140

21 April 2021 10:42 PM P:\2020\20140 FUSD Burroughs EMS Replacement\4-Drawings\4 M\M6 – CONTROLS.dwg ezequiel

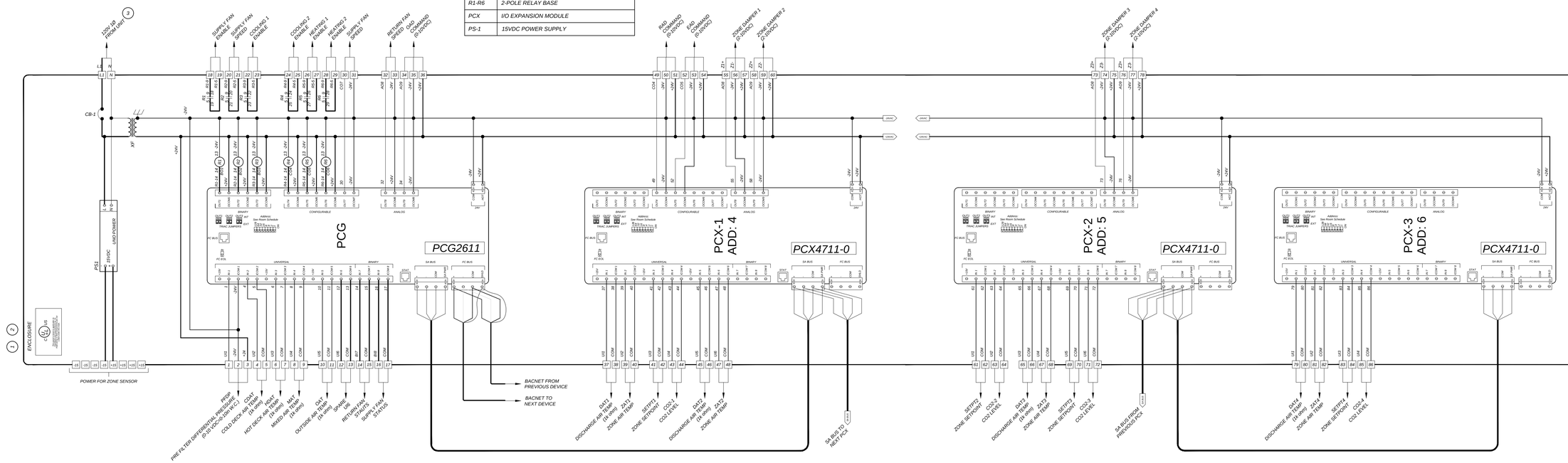
NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Detail Notes

1. CONTROL PANELS FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE AND CONDUIT BY DIVISION 16.

Panel Components

TAG	DESCRIPTION
PCG	GENERAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	SOLID PANEL BACKPLATE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER
XF	96VA 24VAC TRANSFORMER
R1-R6	2-POLE 24VAC RELAY W/ LED
R1-R6	2-POLE RELAY BASE
PCX	I/O EXPANSION MODULE
PS-1	15VDC POWER SUPPLY



MULTI-ZONE SCHEMATIC DETAIL

A / M-7

Package Unit

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

Cooling Mode: When outside air is above the OA cooling lockout setpoint (65° F adjustable) and there is a call for cooling, the compressor shall stage on in order to satisfy the condition. Compressor shall be monitored with a current sensor to prove that the compressor is running.

Heating Mode: When outside air is below the OA heating lockout setpoint (60° F adjustable) and there is a call for heating the reversing valve shall stage on in order to satisfy the condition.

Demand Control Ventilation: CO2 readings shall come from the wall mount Temp/CO2 sensor. If the zone CO2 PPM reaches 800 ppm (adj.), the economizer shall modulate open to the maximum outdoor air position to satisfy the demand. Once the CO2 level drops below 800 ppm (adj.) , the economizer shall close to the minimum outdoor air position.

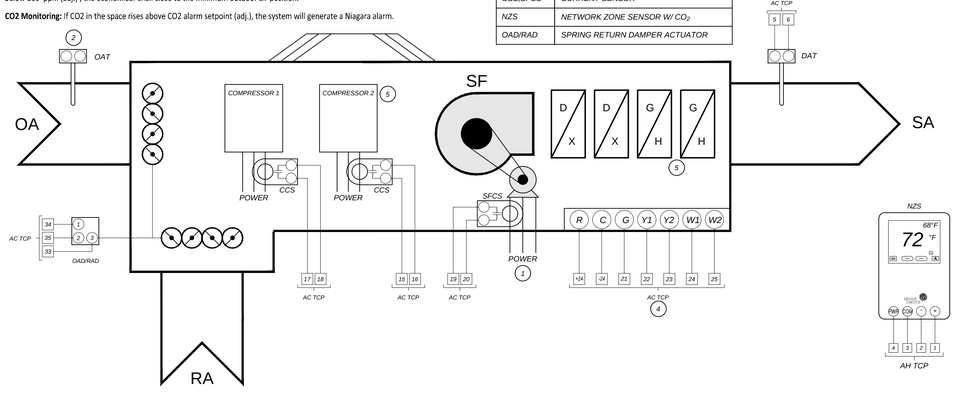
CO2 Monitoring: If CO2 in the space rises above CO2 alarm setpoint (adj.), the system will generate a Niagara alarm.

Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. OAT GLOBALLY SHARED SOFTWARE POINT
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL C/M-7 FOR TCP DIAGRAM.
5. FIELD VERIFY NUMBER OF COOLING & HEATING STAGES.

Control Components

TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
CCS,SFCS	CURRENT SENSOR
NZS	NETWORK ZONE SENSOR W/ CO_2
OAD/RAD	SPRING RETURN DAMPER ACTUATOR



H/C UNIT CONTROL DETAIL

B / M-7

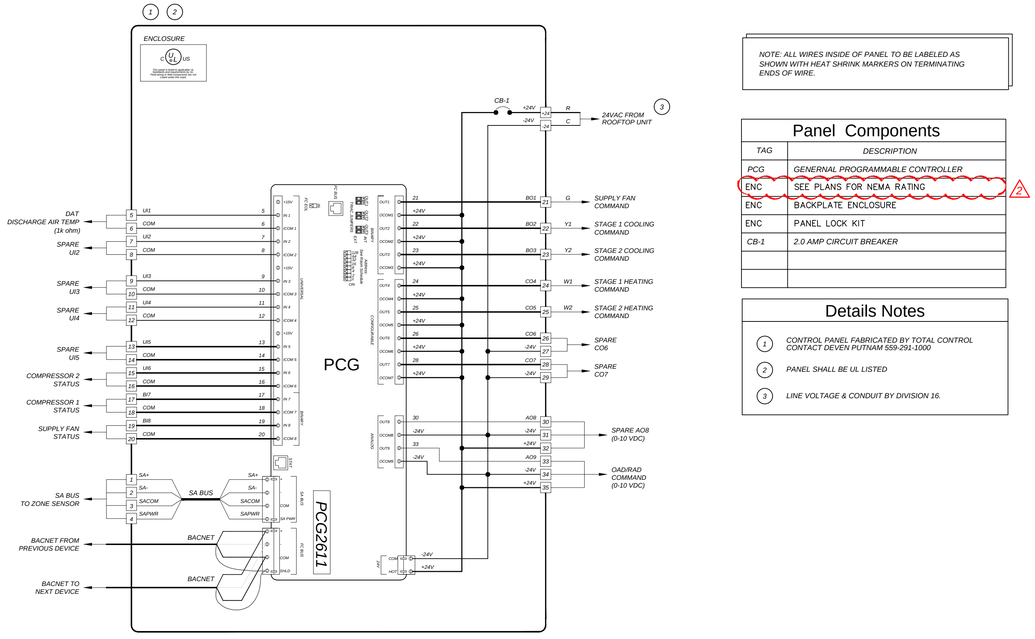
NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Panel Components

TAG	DESCRIPTION
PCG	GENERNAL PROGRAMMABLE CONTROLLER
ENC	SEE PLANS FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER

Details Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.



ROOF TOP UNIT TCP SCHEMATIC DETAIL 1

C / M-7

APPROVALS:

APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — DANIEL D. CURRY — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
BURROUGHS ELEMENTARY SCHOOL
166 N SIERRA VISTA AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
Fresno, CA 93720
FAX (559) 431-1982
7084 N. Maple Ave., Suite 101
(559) 431-0101

TITLE:
ENERGY MANAGEMENT DETAILS

SHEET: M7

PROJECT 20140

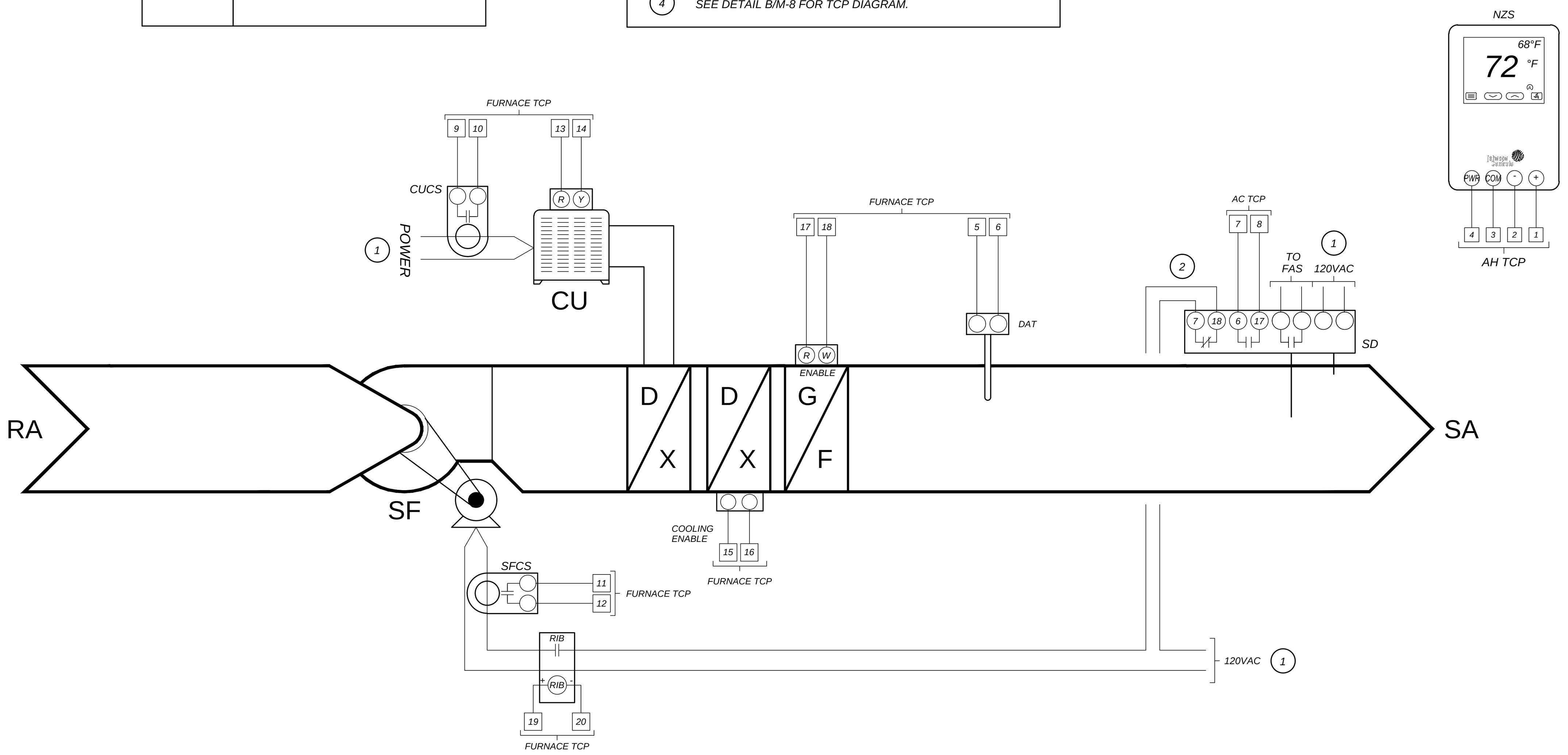
21 April 2021 10:42 PM P:\2020\20140 FUSD Burroughs EMS Replacement\4-Drawings\4 M\M7 – CONTROLS.dwg ezequiel

Control Components

TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
SFCS/CUCS	CURRENT SENSOR
RIB	24VAC RELAY IN A BOX
NZS	NETWORK ZONE SESNOR W/ CO_2

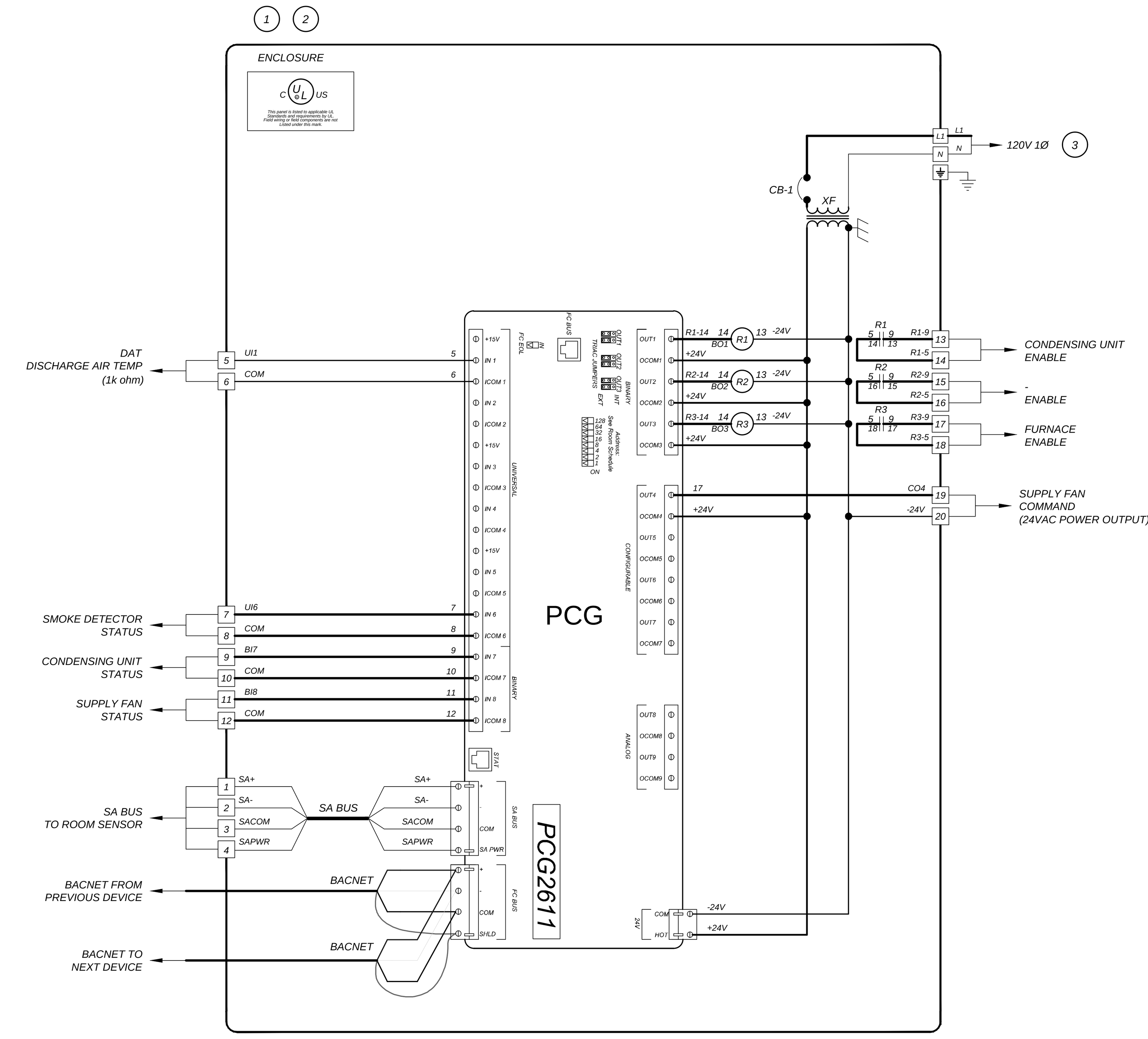
Detail Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. UNIT SHALL SHUT DOWN UPON DETECTION OF SMOKE. WIRE ACCORDINGLY.
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. SEE DETAIL B/M-8 FOR TCP DIAGRAM.



FURNACE C1/F-1 CONTROL DETAIL

A
M-8



FURNACE TCP SCHEMATIC DETAIL

B
M-8

Panel Components

TAG	DESCRIPTION
PCG	GENERAL PROGRAMMABLE CONTROLLER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
CB-1	2.0 AMP CIRCUIT BREAKER
XF	96VA 24VAC TRANSFORMER
R1-R3	2-POLE 24VAC RELAY W/ LED
R1-R3	2-POLE RELAY BASE

2

Detail Notes

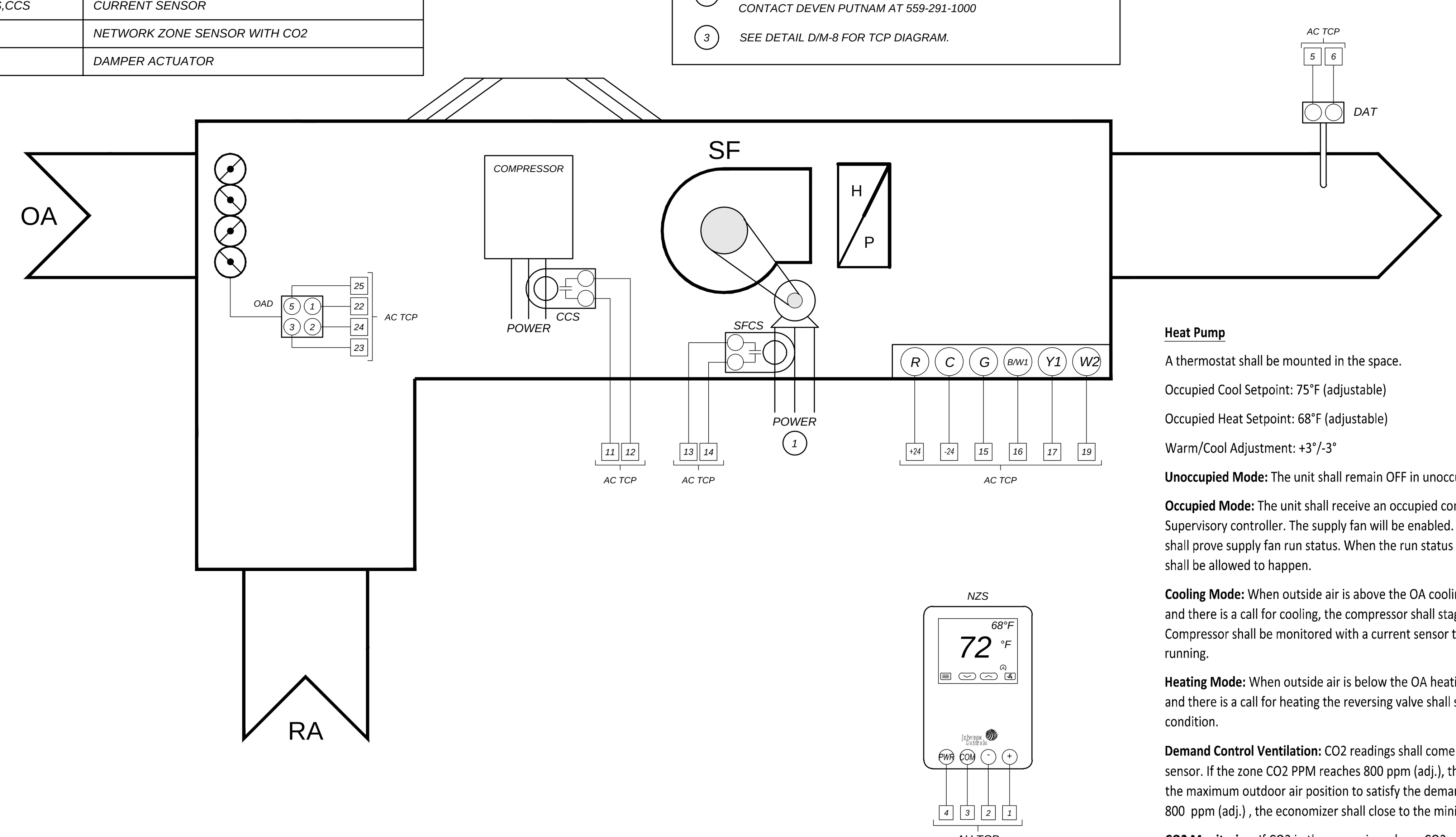
1. CONTROL PANELS FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE AND CONDUIT BY DIVISION 16.

Control Components

TAG	DESCRIPTION
DAT	DUCT TEMP SENSOR
SFCS,CCS	CURRENT SENSOR
NZS	NETWORK ZONE SENSOR WITH CO2
OAD	DAMPER ACTUATOR

Sheet Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000
3. SEE DETAIL D/M-8 FOR TCP DIAGRAM.



Heat Pump

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

Cooling Mode: When outside air is above the OA cooling lockout setpoint (65° F adjustable) and there is a call for cooling, the compressor shall stage on in order to satisfy the condition. Compressor shall be monitored with a current sensor to prove that the compressor is running.

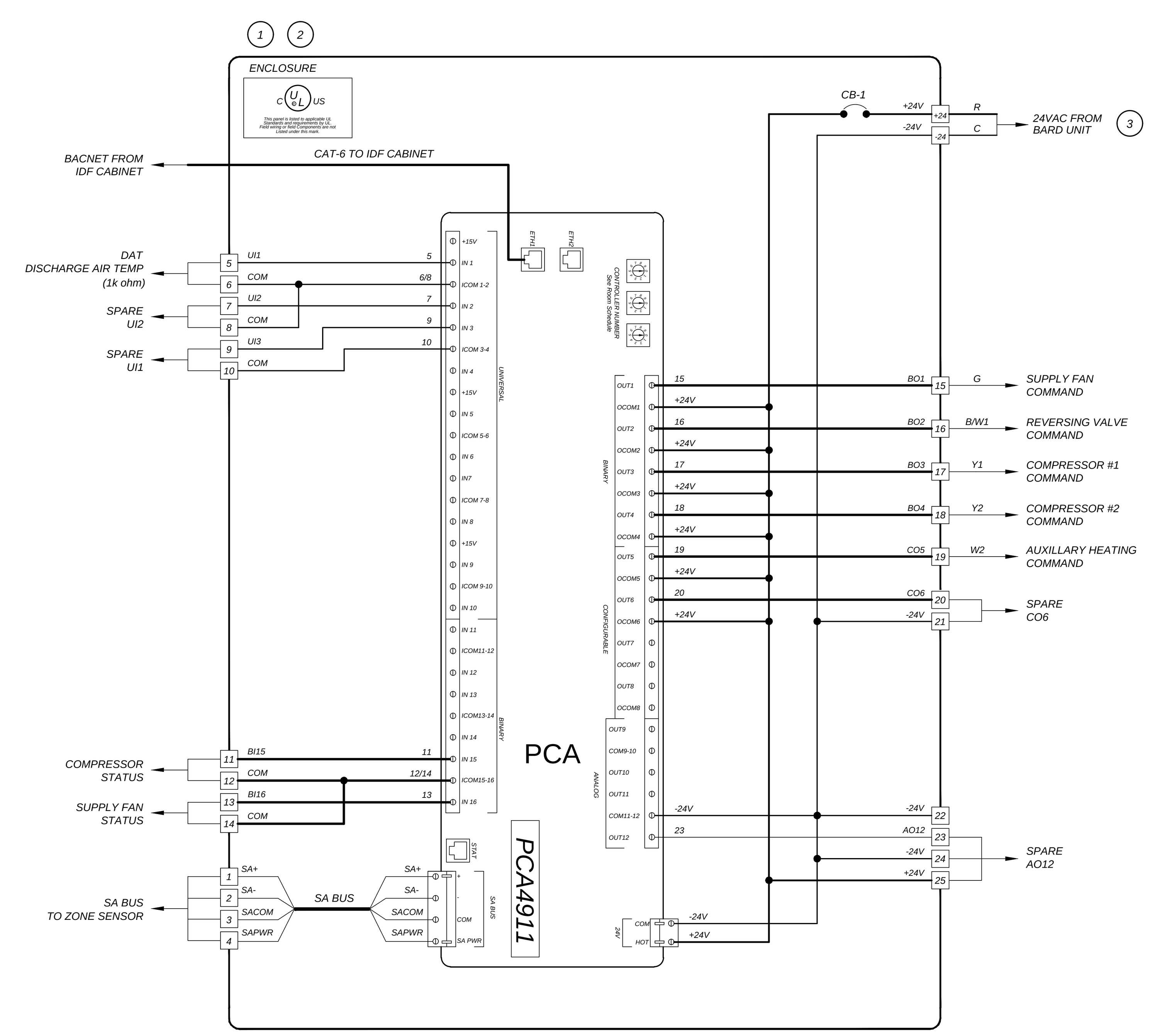
Heating Mode: When outside air is below the OA heating lockout setpoint (60° F adjustable) and there is a call for heating the reversing valve shall stage on in order to satisfy the condition.

Demand Control Ventilation: CO2 readings shall come from the wall mount Temp/CO2 sensor. If the zone CO2 PPM reaches 800 ppm (adj.), the economizer shall modulate open to the maximum outdoor air position to satisfy the demand. Once the CO2 level drops below 800 ppm (adj.) , the economizer shall close to the minimum outdoor air position.

CO2 Monitoring: If CO2 in the space rises above CO2 alarm setpoint (adj.), the system will generate a Niagara alarm.

WALL MOUNTED HEAT PUMP CONTROL DETAIL

C
M-8



WALL MOUNTED HEAT PUMP TCP SCHEMATIC DETAIL

D
M-8

NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

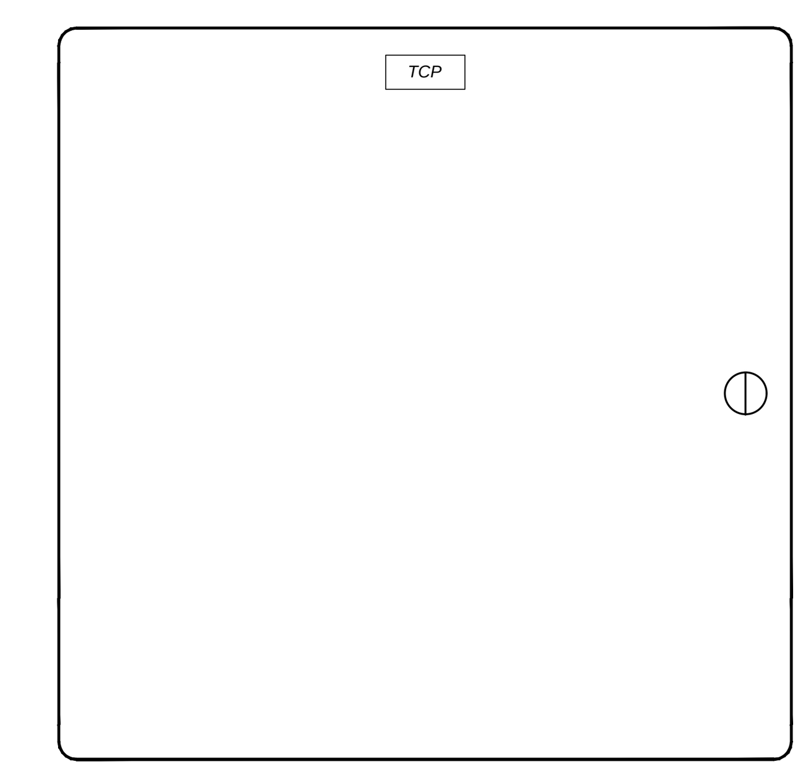
Panel Components

TAG	DESCRIPTION
PCA	ADVANCED PROGRAMMABLE CONTROLLER
CB-1	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
TCP	TCP LABEL

2

Details Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.



PANEL DOOR LAYOUT

APPROVALS:
APPLICATION #
??????????

DATE: 11-25-2020

EMS REPLACEMENT
BURROUGHS ELEMENTARY SCHOOL
166 N SIERRA VISTA AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
2 4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
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(559) 431-0101
FAX (559) 431-1362

TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M8

PROJECT 20140

21 April 2021 10:42 PM P:\2020\20140 FUSD Burroughs EMS Replacement\4-Drawings\4 M\M8 - CONTROLS.dwg ezequiel

Control Components		
TAG	QTY	DESCRIPTION
DAT	-	DUCT TEMP SENSOR
CCS,SFCS	-	CURRENT SENSOR
NZS	-	NETWORK ZONE SENSOR WITH CO2
OAD/RAD	-	SPRING RETURN DAMPER ACTUATOR

Sheet Notes

1. LINE VOLTAGE & CONDUIT BY DIVISION 16.
2. OAT GLOBALLY SHARED SOFTWARE POINT
3. CONTROL COMPONENTS PROVIDED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
4. REFER TO DETAIL F/M9

Package Unit

A thermostat shall be mounted in the space.

Occupied Cool Setpoint: 75°F (adjustable)

Occupied Heat Setpoint: 68°F (adjustable)

Warm/Cool Adjustment: +3°/-3°

Unoccupied Mode: The unit shall remain OFF in unoccupied mode.

Occupied Mode: The unit shall receive an occupied command from the Johnson FX Supervisory controller. The supply fan will be enabled. A current sensor on the supply fan shall prove supply fan run status. When the run status is proven ON, the following modes shall be allowed to happen.

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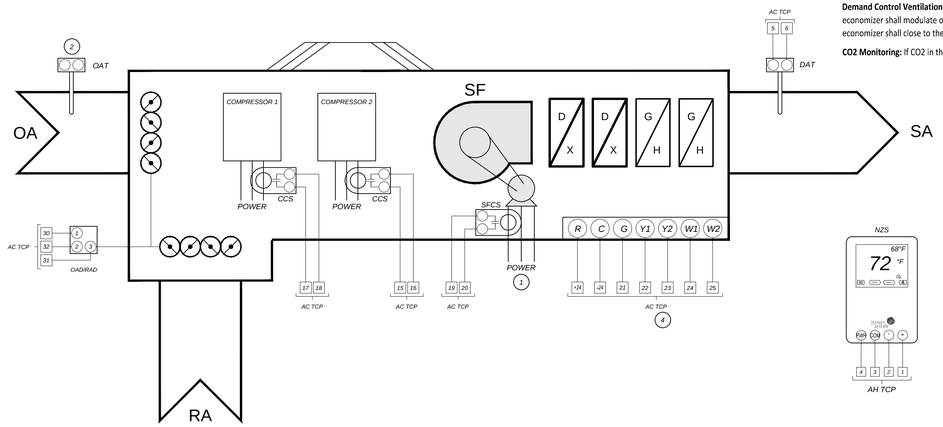
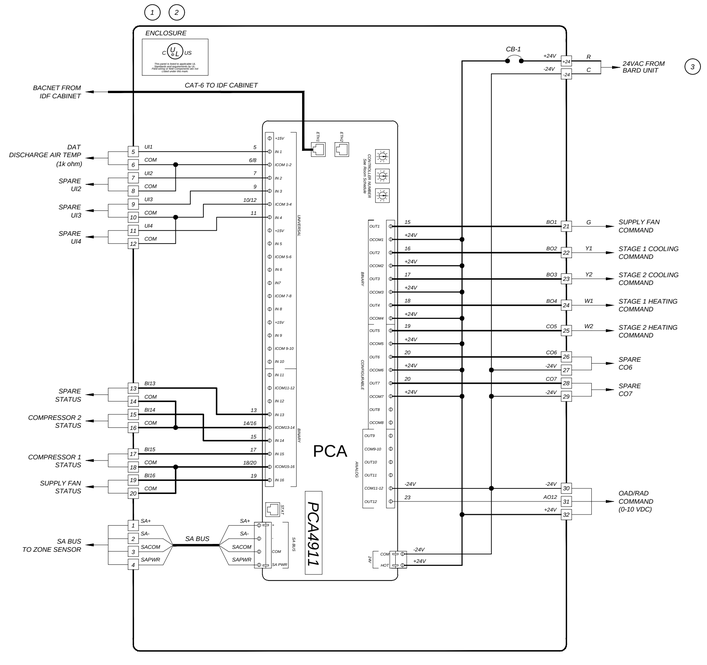
Demand Control Ventilation: CO2 readings shall come from the wall mount Temp/CO2 sensor. If the zone CO2 PPM reaches 800 ppm (adj.), the economizer shall modulate open to the maximum outdoor air position to satisfy the demand. Once the CO2 level drops below 800 ppm (adj.) , the economizer shall close to the minimum outdoor air position.

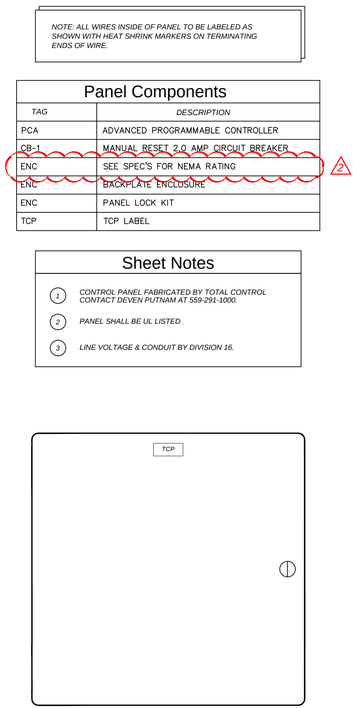
CO2 Monitoring: If CO2 in the space rises above CO2 alarm setpoint (adj.), the system will generate a Niagara alarm.



ROOF TOP UNIT CONTROL

E M9



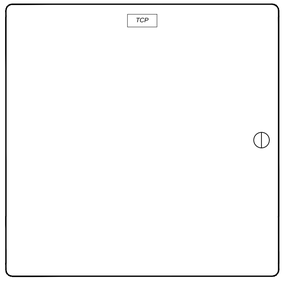


NOTE: ALL WIRES INSIDE OF PANEL TO BE LABELED AS SHOWN WITH HEAT SHRINK MARKERS ON TERMINATING ENDS OF WIRE.

Panel Components	
TAG	DESCRIPTION
PCA	ADVANCED PROGRAMMABLE CONTROLLER
CB-1	MANUAL RESET 2.0 AMP CIRCUIT BREAKER
ENC	SEE SPEC'S FOR NEMA RATING
ENC	BACKPLATE ENCLOSURE
ENC	PANEL LOCK KIT
TCP	TCP LABEL

Sheet Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. PANEL SHALL BE UL LISTED
3. LINE VOLTAGE & CONDUIT BY DIVISION 16.



PANEL DOOR LAYOUT

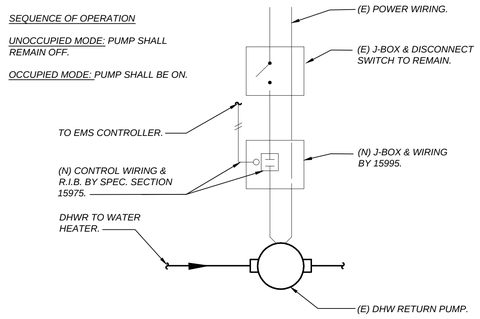
ROOF TOP UNIT TCP SCHEMATIC

F M9

LIGHT / EXHAUST TIMER SWITCH

A M9

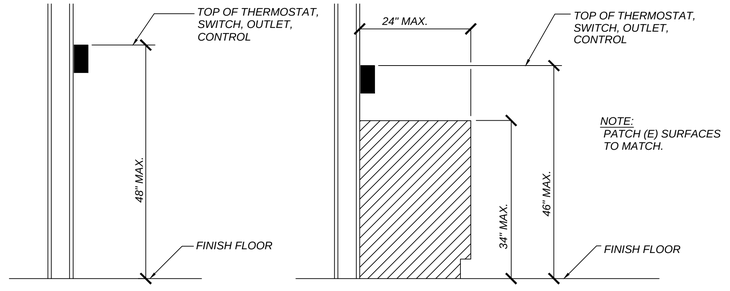
SCALE: NONE



DOMESTIC H.W.R. PUMP CONTROL

B M9

SCALE: NONE

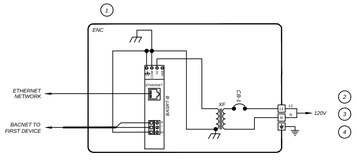


MOUNTING HEIGHT OVER OBSTRUCTION

THERMOSTAT MOUNTING

C M9

SCALE: NONE



Router Panel Components	
TAG	DESCRIPTION
CB-1	2.0 AMP CIRCUIT BREAKER
BASRT-B	BACNET/IP MS/TP ROUTER
XF	50A 24VAC TRANSFORMER
ENC	12X12 NEMA 1 ENCLOSURE WITH BACKPLATE

Detail Notes

1. CONTROL PANEL FABRICATED BY TOTAL CONTROL CONTACT DEVEN PUTNAM AT 559-291-1000.
2. LINE VOLTAGE & CONDUIT BY DIVISION 16.
3. FOR PORTABLE BLDG, PROVIDE AND INSTALL A DEDICATED 20A/1P CIRCUIT BREAKER TO THE PORTABLE BUILDING PANEL.
4. FOR PERMANENT BLDG, CONNECT ROUTER TO (E) CIRCUIT.

BACNET/IP MS/TP ROUTER PANEL DETAIL

D M9

SCALE: NONE

APPROVALS:

APPLICATION # ??????????

REGISTERED PROFESSIONAL ENGINEER — MICHAEL D. GRIFFIN — M28568 — REN. 9-30-2021 — MECHANICAL — STATE OF CALIFORNIA

DATE: 11-25-2020

EMS REPLACEMENT
BURROUGHS ELEMENTARY SCHOOL
166 N SIERRA VISTA AVE. FRESNO, CA 93702

FRESNO UNIFIED SCHOOL DISTRICT
4600 N. BRAWLEY AVE. FRESNO, CA.

REVISIONS
4/22/21 EMS REVISIONS

LAWRENCE ENGINEERING GROUP
7084 N. Maple Ave., Suite 101
Fresno, CA 93720
(559) 431-1001
FAX (559) 431-1082

TITLE: ENERGY MANAGEMENT DETAILS

SHEET: M9

PROJECT 20140

21 April 2021 10:43 PM P:\2020\20140 FUSD Burroughs EMS Replacement\4-Drawings\4 M\M9 – CONTROLS.dwg ezequiel

HARDIN-DAVIDSON ENGINEERING

356 Pollasky Ave • Suite 200 • Clovis, CA 93612
559.323.4995 tel • 559.323.4928 fax

Date: April 20, 2021

To: LEG
7084 N Maple Avenue
Fresno, California 93720
(559) 431-0101 Fax (559) 431-1362

Attn: Ezequiel Fregoso

Project: EMS Replacement Projects at Burroughs, Eaton & Rowell Elementary Schools, Fresno Unified School District

The following is an addendum to the scope of the above referenced projects.

These items apply to all sites:

1. On Sheet E-2 (typical), Drawing Key Note 1, should be modified as such:

   “DISCONNECT EXISTING FAN MOTORS AND STARTERS IN AC UNIT. REMOVE EXISTING FVNR MOTOR STARTER. INSTALL AND CONNECT NEW VFDS AS REQUIRED WITH ALL NEW WIRING AND PROVIDE FUSING AS REQUIRED BY VFD MANUFACTURER. CONNECT NEW MOTOR. SEE MECHANICAL DRAWINGS AND COORDINATE WITH MECHANICAL CONTRACTOR. REPLACE ANY EXISTING LIQUID-TITE FLEXIBLE CONDUIT WITH NEW (MAXIMUM LENGTH OF 36" PER DISTRICT STANDARD). CONTRACTOR IS TO VISIT THE JOBSITE AND OBSERVE THE EXISTING CONDITIONS.”

2. Note to contractor: The motors will not be changing in size. The “Motor Replacement Schedule” and “Unit MCA Requirements” charts as shown on Sheet E-2 are not needed.

Sincerely,

Patrick May
Electrical Designer/Project Manager

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 01
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Commissioning Agents**		

« In spec section 019113-5 it discusses the qualifications of the commissioning agents. Please clarify if 3rd party commissioning agents are to be secured by the contractor for this project or if they are to be provided by the district. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
FRESNO UNIFIED SCHOOL DISTRICT WILL PROVIDE COMMISSIONING AGENT. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 02
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Touchscreens and Laptops**		

« In spec section 230923-5 it states that PC Touchscreens and Laptops are to be furnished as part of this project. Please verify that these items are not required. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION

PC TOUCHSCREENS AND LAPTOPS ARE NOT REQUIRED, REFER TO ADDENDUM 1.
-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 03
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Convenience Receptacle**		

« In spec section 230923-13 it states that a convenience 120V receptacle is to be provide in each control panel enclosure. This would require that a 120V circuit be run to every control panel which is most likely not existing for every piece of equipment. Typically, this receptacle (and 120V circuit) is only provided for instances where the panel serves a chiller or boiler. Please verify that the receptacle will only be required for Supervisory Control Panels (panels with the FX-80 controller) or central plant panels (panels that serve chillers, boilers, pumps ect..). »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
120V RECEPTACLES ARE ONLY REQUIRED AT SUPERVISORY CONTROL PANELS. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 04
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1	REQUEST & SUGGESTED SOLUTION		
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Balancing, Duct Cleaning, and Water Treatment**		

« There is not a specification section for balancing (air or water). In the drawings for all three schools, it discusses how some of the units are to have duct traverses before and after upgrades have been made to measure air flow. Please provide a specification for the air balancing work. Please verify that there is no water balancing, duct cleaning or water treatment included as part of this project. »

SECTION 2	
Received by:	**Date:**

SECTION 3	FINAL RESOLUTION

REFER TO ADDENDUM #1, FOR SPECIFICATION ADDITION.
-LEG

Solution by:	**Date:**

SECTION 4	ACTION	Information Only: ☐	Change Order Required: ☐
Signature:			**Date:**

SECTION 5	DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 05
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**VFD**		

« On the M sheets for all three schools, there is a note for the MZ unit that calls for new AB VFD's for the Supply and Return fans. In past projects the district has used AB VFD's for Central Plant Equipment (Pumps) and other brands of drives (Honeywell, JCI, Eaton, ect…) for the fans on AHU's. Would it be acceptable to use other brands of drives instead of AB drives? If only AB drives are to be allowed, will line reactors be required? »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
ALLEN-BRADLEY DRIVES MUST BE INSTALLED, WITHOUT SUBSITUTION. PROVIDE LINE REACTORS FOR ALLEN-BRADLEY DRIVES. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 06
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Enclosures**		

« On M sheets for all three schools it states that the SCP is to be installed in a N12 enclosure. It shows the TCP's being in N4 enclosures. In the specifications 230924-2 it states that the enclosures for the Control Panels are to be N1 if indoor and N3R if outdoor. Please clarify the Nema rating required for the control panels. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
NEMA RATINGS SHALL FOLLOW SPECIFICATION SECTION 230924-2. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 07
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**EF Interlocking**		

« In the M sheets for all three schools there is a detail for the interlock of the exhaust fan with the lighting by replacing the existing light switch with a new switch that has fan control and pull a new hot leg off the lighting circuit to power the fan. We have found in the past that this has not worked because the exhaust fan sometimes is not on the same circuit as the lighting as shown in the detail and is even a different voltage than the lighting. Please verify that the interlocked exhaust fans are currently on the same circuit as the lighting as shown in the detail. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
Use this method where possible, and provide a solution in situations where this method does not work. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 08
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Electrical Feeders**		

« On sheet E-2 for all three schools it states that feeders for some of the HVAC equipment are to be replaced. Please indicate from what electrical panels these units are currently fed from. Please indicate if any of the circuit breakers for these units will need to be replaced. Please indicate if any of the raceways will need to be replaced due to upsize of feeders for derations as indicated on the drawings. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
SEE ADDENDUM #1 FOR SCOPE CLARIFICATION. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	**Information Only:** ☐	**Change Order Required:** ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	**See Below:** ☐	**Project Distribution Matrix:** ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 09
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Ethernet for Controllers**		

« On the LAN architecture drawings for all three schools the PCA are shown to wire back to the local network switches. The cabling used varies from school to school. Also, the use of the Panduit CJ688TGYL connectors varies from school to school on these details. Please indicate which cable is to be used and if the connectors are required. Please indicate which IDF's these PCA controllers are to be wired to and verify if there are available ports on the switch to be wired into. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
REFER TO ADDENDUM #1 FOR REVISED DRAWING SETS. CAT 6 CABLEING IS TO BE USED ON ALL SITES, PER FUSD STANDARDS THE CONNECTORS ARE REQUIRED. PCA ARE TO BE CONNECTED TO THE NEAREST IDF CABINET. FUSD WILL ADD ADDITIONAL PORTS, AS REQUIRED. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	**Information Only:** ☐	**Change Order Required:** ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	**See Below:** ☐	**Project Distribution Matrix:** ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 10
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Burroughs Drawings**		

« The drawings for Burroughs have several letters replaced by squares. Can new drawings be provided? »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
SEE REVISED DRAWINGS.	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 11
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Bacnet Router 120V power**		

« Would it be acceptable to tap off the 120V power for the IDF's that the bacnet router panels are mounted next to in order to provide power for the bacnet router panel? »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION

NO, PROVIDE A DEDICATED 120V RUN.
-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 12
RFI Date: 4/5/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Drawing scales**		

« In scaling off the drawings on Burroughs I found that at least one of the buildings was not the same size on the drawing as it should be based on the drawing scale. Please verify scaling on drawings. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION

SEE REVISED DRAWINGS.
-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 13
RFI Date: 4/6/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**EC**		

« On sheet M-3 for Burroughs on the MPR kitchen there is an evap cooler unit that is to remain. Does this unit need to be controlled by the new EMS? »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION

UNIT IS TO REMAIN OFF NEW EMS.
-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 14
RFI Date: 4/6/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**HP's and PCA Controllers**		

« On sheet M1 it shows two HP's for portable classrooms but M5 only shows one PCA controller for each portable. Please verify that that if there are two HP's serving the same space that these are to be controlled by only one PCA controller.

On M4 there are also dual HP's per portable but for those portables they have individual PCA controllers shown on M5.

Also on M4 it shows HP37 and HP38 but these units do not have a PCA controller shown on M5. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
SEE REVISED DRAWINGS. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 15
RFI Date: 4/6/2021
Respond By: 4/9/2021

SECTION 1	REQUEST & SUGGESTED SOLUTION		
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Eaton MZU Zones Bldg A**		

« On M1 it appears that the zones for the units may be mislabeled. Please verify. Also MZU-1 states that it has 8 zones but only 3 zones are shown on the drawing. »

SECTION 2	
Received by:	**Date:**

SECTION 3	FINAL RESOLUTION

ADDITIONAL ZONES HAVE BEEN ADDED.
-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 16
RFI Date: 4/6/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Eaton EF 5 and 5A**		

« On M1 it shows EF5 and 5A. On sheet M4 it shows only EF5. Is EF5A to be controlled the same as EF5? »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION

YES-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 17
RFI Date: 4/6/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Eaton EDH**		

« On M2 it shows several electric duct heaters. Are these to be included on the new controls? If so, how are they to be incorporated in the new EMS? »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION

SEE REVISED DRAWINGS.
-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 18
RFI Date: 4/7/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Eaton – EF1A**		

« On M2 it shows EF1A. Is this exhaust fan to be incorporated into the new EMS? »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
SEE REVISED DRAWINGS. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 19
RFI Date: 4/8/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Eaton - Portable Equipment Numbers**		

« On M4 It shows AH-27 and HP's 22-26. On sheet M3 It shows HP's 22, 23, 25, 26, 27 and no AH-27. Please verify the corrected HP numbering on the Lan Drawing or the HP's and the elimination of AH-27 from the LAN drawing on M3. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
SEE REVISED DRAWINGS, LAN HAS BEEN CORRECTED. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 20
RFI Date: 4/8/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Eaton – Mini Split Bacnet Card**		

« On M4 it shows a bacnet card for the mini split unit shown on M1. Please verify that a bacnet card for this unit is available from the manufacturer. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION

SEE REVISED DRAWINGS, NO BACnet CARD REQUIRED.
-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 21
RFI Date: 4/8/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Rowell - MZU Zones**		

« On M1 MZU-1 states that it has 8 zones but only 3 zones are shown on the drawing. Please clarify. »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION	
SEE REVISED DRAWINGS. -LEG	
Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 22
RFI Date: 4/6/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Rowell - EDH**		

« On M2 it shows several electric duct heaters. Are these to be included on the new controls? If so, how are they to be incorporated in the new EMS? »

SECTION 2	
Received by:	**Date:**

SECTION 3 FINAL RESOLUTION

SEE REVISED DRAWINGS.
-LEG

Solution by:	**Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

STRATEGICMECHANICAL
Mechanical Electrical Plumbing

REQUEST FOR INFORMATION

Prebid RFI No: 23
RFI Date: 4/6/2021
Respond By: 4/9/2021

SECTION 1 REQUEST & SUGGESTED SOLUTION			
Project Name:	**FUSD Burroughs, Eaton, Rowell**		
Sent To:	**LEG**		
Requestor:	**Strategic Mechanical**	**Schedule Impact:**	**Cost Impact:** X
Subject:	**Rowell – New FX-80s**		

« On M1 it shows the installation of a new FX-80 control panel in the storage room in Building A. On M3 it shows the installation of a new FX-80 in the electrical room of Building E. On Sheet M4 it only shows the installation of a new FX-80 in Building E with a bacnet Router used for Building A. Please clarify how many FX-80's are to be used. »

SECTION 2

Received by: **Date:**

SECTION 3 FINAL RESOLUTION

SEE REVISED DRAWINGS, ONE FX-80 IS REQUIRED AND TO BE INSTALLED IN BUILDING E.
-LEG

Solution by: **Date:**

SECTION 4 ACTION	Information Only: ☐	Change Order Required: ☐
Signature:		**Date:**

SECTION 5 DISTRIBUTION	See Below: ☐	Project Distribution Matrix: ☐

FRESNO UNIFIED SCHOOL DISTRICT
PAINTING

PART 1 - GENERAL

1.01 REFERENCE:
Requirements in Addenda, Alternates, Conditions, and Division 1 collectively apply to this work.

1.02 DESCRIPTION:

A. Principal Work Items Are:

1. Complete application of paint to interior and exterior surfaces.
   a. Unfinished materials.
   b. Back-priming.
   c. Metals, including certain hidden surfaces.
   d. Woods and fabrications of wood.
   e. Sheet metal.
   f. Plaster, except where integrally colored.
   9. Gypsum wallboard.
   h. Doors.
   I. Exposed piping, conduits, ducts, panels, mechanical and electrical equipment and items.
   j. Visible roof-top equipment.
   k. Miscellaneous items.
   I. Concrete block.
   m. Painted stripes at stairs, to conform to Handicap Requirements.
2. Application of finish coats to shop-primed metal surfaces:
   a. Door louvers.
   b. Pressed metal frames.
   c. Hollow metal doors.
   d. Coiling grilles.
3. Structural steel.

B. Some Surfaces Not to Be Painted:

1. In general, items with District approved integral finishes, approved plated finishes, approved complete factory finishes, except where otherwise indicated.
2. Finish hardware, except where primed for paint.
3. Integrally colored plaster.
4. Acoustical materials: Acoustic tile, acoustic panels, and exposed suspension grids.

5. Metal items:
   a. Approved plated or factory finished items.
   b. Anodized and color anodized aluminum.
   c. Stainless steel.
   d. Toilet partitions.
   e. Factory finished steel or aluminum frame sliding glass doors.
   f. Passenger lift doors, frames and cars.

C. Related Work Specified Elsewhere:
   1. Materials and items which receive paint: Respective Sections.
   2. Factory finished items: Respective Sections.
   3. Paint Materials List: Section 09901.
   4. Paint & Coatings Surface Prep Guidelines: 09904
   5. General Painting Requirements: 09905
   6. Electrical fixture trim and plates removal and replacement in coordination with painting work: Division 16.

D. Definitions:
   1. DFT: Abbreviation for dry film thickness.
   2. Concealed Ungalvanized Steel: Defined in Paragraph 3.06B.
   3. Paint: A collective general reference to include all materials of every componentfor finishing systems of every type, and preparation of surfaces for and application of said materials.
   4. Rough-surface wood: Rough-sawn, re-sawn, or sandblasted woods.
   5. Visible roof-top equipment: Mechanical and electrical equipment, piping, ducts, conduits, panels and other materials exposed on building roof tops which can be seen by a person standing on the earth's surface at any point within 1,000' of any building.

1.03 SUBSTITUTIONS:
Only written approval of the will permit substitutions for materials specified. Refer toSection 00700, Article 30, Substitutions, for procedure.

1.04 QUALITY ASSURANCE:
A. Reference Standards: Steel Structures Painting Council-Surface PreparationSpecifications (SSPC-SP).
B. Job Mock-Up, Supergraphic Designs: Layout designs full-size on indicated walls, revise as required by District. Obtain District's approval prior to doing any finished work.

C. Paint Contractor must have completed 2 projects in last 3 years of similar size and scope in order to qualify for award. Contractor shall submit reference information for verification at time of bid or within 24 hours of request.

1.05 SUBMITTALS:

A Samples

1. Number required: Three each, submitted by Manufacturers of the material being used.
2. Paints and enamels:

Typical: Each type, in each selected color; 8.5" x 11" size on stiff smoothmaterial typical; on sandpaper for rough surfaces.

   a. Stipple enamel: Each selected color District approved, roller texture on 12" x 24" piece of drywall.
3. Stains, varnishes, lacquers: Each finish type on each specie and texture of wood; 8.5" x 11" size for plywood, 16" length for casing or boards, show clearly each step of finishing process.
4. Make samples by same methods to be used to produce actual work. Samples will be examined for color, texture, and workmanship.
5. Re-make and re-submit samples when required for approval.

B. Product Data: Complete list of all paint materials.

C. Submittal requirements related to hazardous materials as specified in 09904.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Deliver in sealed containers. Manufacturer, brand name, product, and use instructions clearly identified thereon.

B. Store in assigned spaces.

C. Handle to prevent damage during storage and use.

1.07 JOB CONDITIONS:

A. Environmental Requirements:

1. Follow manufacturer's printed recommendations for product when they are more stringent than limits stated herein.
2. Do not apply materials when RH is above 90%.
3. As necessary to provide air movement, aid drying, disperse noxious fumes.
4. Do not apply paint to wet-applied construction until such work is dry, and acceptable to District and paint manufacturer.
5. Do not apply exterior paint in rainy, damp, misty, smoggy, or excessively windy weather.
6. Do not apply paint in areas where dust is being generated.

B. Protection:
   1. Cover or otherwise protect finished work of other trades, work not to be painted concurrently, landscaping, and adjacent property from damage.
   2. When not in use, store paints in designated areas. Keep containers closed. At end of day's work, remove empty containers, paint-soaked rags, and debris. Vent fumes. Take precautions to prevent fire.

C. Sequencing, Scheduling:
   1. Coordinate removal and replacement of hardware, electrical fixtures and trim, and related work of other Sections.
   2. Stain, prime, back paint, and pre-finish items before installation as required.

D. Cleaning and Disposal:
   1. Do not use Project plumbing fixtures or piping systems for:
      a. Cleaning painting equipment and utensils.
      b. Disposal of waste from cleaning or disposal of paints.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Acceptable Manufacturers and Products:
   1. Materials shall be those listed in Paint Materials List Specifications, Section 09901.
   2. Each material type to be same manufacturer throughout. All materials in a coating system to be by a single manufacturer.
   3. Brand Names: Shall constitute a standard of quality.
   4. Other Manufacturers: Refer to General Conditions for Substitution Requirements.

B. Colors:
   1. As selected by, using ICI/Sinclair color and finish systems as a standard.
   2. Concrete block: As selected by District using Triarch Industries, Incorporated and Pittsburgh Paints color and finish systems as a standard.
   3. Colors to be factory mixed, and to match approved samples.
   4. Tint undercoats sufficiently different so that they are readily distinguishable in any light from each other and the finish coat.

2.02 - MIXING:

A Follow manufacturer's printed recommendations.

B. Mix all paints thoroughly prior to application.

C. Inspection during mixing process shall take place at District request.

D. Except where thinning is specifically recommended by manufacturer, do not thin products.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Examine surfaces for suitability to receive paint. Prior to application of any paint, surfaces to be cleaned free of dust, corrosion, and other foreign matter.

B. Sand, scrape, fill and repair surfaces flush with suitable materials. Fill voids between adjoining surfaces flush with suitable fillers.

C. Wood:
1. Clean solid surfaces.
2. Except for rough-surface finishes, sand to a smooth even finish and dust clean.
3. Seal knots, pitch spots, and resinous sapwood with shellac or knot sealer before priming.
4. Puttying:
   a. Do after first priming coat is dry.
   b. For transparent or stained work, color putty to match finish.
   c. Fill flush all nail holes, open joints, cracks and other defects.

D. Drywall:
1. Fill any cracks or defects with drywall joint compound or speckle. Sand any roughspots smooth. Do not raise nap on paper covering.
2. Portland Cement Plaster:
   a. Where surfaces alkali is present, wash surface clean with zinc-sulphate in water solution. Fill cracks and defects with cement grout, match surface texture. Smalldefects may be filled with exterior spackle.
3. Concrete:
   a. Brush and wash with clean water to remove laitance, efflorescence, from oil bond breaker, and other foreign matter. Fill cracks and defects with cement grout; match surface texture.
4. Galvanized Metal:
   a. Cleaning: Solvent clean per SSPC-SP, No. 1, Solvent Cleaning.
   b. Vinyl wash: Apply Dunn-Edwards Galva-Etch, No. GE-123. Followmanufacturer's directions.
   c. Application: Mop or brush-apply in a thin even coat.
   d. Remove excessivesolution from surface with rags, squeegee, or sponge. When using full strength, rinse surface with water.
5. Thinning: Use water, do not reduce solution beyond three parts water to onepart Galva-Etch.
6. Drying: One-half hour minimum and four hours maximum before priming.
7. Ungalvanized Shop Primed Structural Steel:

8. Cleaning method: Clean member free of corrosion, loose paint, and foreign matter by either SSPC-SP, No. 2, Hand Cleaning or SSPC-SP, No. 3, PowerBrush Cleaning at the Project site after steel is erected. Touch-up paint, with compatible primer, all abraded, damaged, or uncoated areas.
9. Ungalvanized Shop Primed Metals Other Than Paragraph G Above:
   a. Clean free of all loose paint and foreign matter. Touch-up paint, with compatibleprimer, all abraded, damaged, or uncoated areas.
10. Factory Finished Equipment and Items:
   a. Where indicated to receive job-applied finish coats, sand or etch factory finish asrequired for proper paint adherence.
11. Concrete Block:
   a. Substrate shall be cleaned of dust, oils, and other substances that might reduceadhesion of the finish material.

3.02 APPLICATION:

A. Workmanship:
   1. Execute all work with skilled craftsmen.
   2. Evenly apply all coats with suitable equipment, well flowed on, free of laps, runs,skips, dead spots, and other imperfections. Last coat to present a uniform surface, color and texture.
   3. Stipple texture to be as approved by District.
B. Manufacturer's Printed Recommendations:
   1. Follow where more stringent than limits specified herein.
C. Equipment:
   1. Brushes, rollers, and spraying equipment as required and suitable for material being applied; keep clean and in proper operating condition.
D. General:
   1. Paint and color areas per District's color schedules.
   2. Mask and cut-in as required to accomplish the various color combinations. Make edges of paint clean and sharp (no overlaps) where they adjoin other colors or materials.
   3. Paint entire surface parts and items including reveals, returns, rebates, soffits, projections, openings, and ornamental features.
   4. Do not apply initial coating until moisture content of surface is within paintmanufacturer's recommended limits.
   5. Do not apply next coat until previous coats are properly cured and prepared to receive them.
E. Examination of Work:
   1. Refer to Paragraph 3.03, Field Quality Control, for required examination of work.
   2. Written notification must be provided to District when work is ready for examination.
   3. Do not proceed with next operation until required examination has been made.
F. Number of Coats:
   1. Specified number is the minimum number to be applied.
   2. Contractor shall, at his expense, apply additional coats as directed by District if:
      a. Contractor does not produce full even coverage and/or required dry filmthickness with specified number of coats.
      b. Contractor applies a coat before Inspector has examined previous coat.
G. Dry Film Thickness:
   1. DFT thickness stated in Paragraph 3.06, Schedule of Paint Finishes, is the minimum thickness to be applied and must be increased to manufacturer recommended thickness when such exceeds the thickness stated herein.

H. Drying Time:
1. Minimum interval between coats shall be the most stringent of the following conditions:
   a. Until coat is dry.
   b. Manufacturer's printed recommendations.
   c. Three days for exterior work, two days for interior work, except where other time requirements are specifically stated in manufacturer's printed recommendations.

I. Preparation of Work Between Coats:
1. General: Repair defects, sand, dust, wipe clean.
2. Wood, enameled: When dry, lightly sand smooth.
3. Wood, varnished or lacquered: When dry, steel wool smooth.
4. Plaster and concrete: Neutralize suction spots or hot spots then touch up so coat surface is uniform.

J. Back-Priming:
1. Immediately upon delivery to Project site, backprime all surfaces which will be concealed after installation for following items: exterior and interior finish lumberand millwork, door frames, trim, plywood wall lining and paneling.
2. Painted or Enameled Work: One coat clear sealer.
3. Work with Stained Finish: One coat linseed oil.
4. Keep back-priming off exposed faces.

K. Priming:
1. General: Prime work as soon as possible after surfaces are prepared.
2. Ungalvanized Steel: Prime immediately after cleaning on the same day.
3. Galvanized Sheet Metal: Prime immediately after erection.
4. Exterior and Interior Woodwork: Prime immediately after erection.
5. At Glazing: Paint all glass beads, stops and rebates, except for aluminum.

L. Application Methods:
1. Apply by brush or roller, except as listed below:
   a. Enamel: to doors: Roller only.
   b. Enamel: Roller typically.
   c. Stipple enamel: Roller only, with District approved texture.
   d. Varnish or lacquer: Spray.
   e. Exterior wood stains: Apply by brush or roller only. Work well into surface, especially on rough surface woods.
   f. Doors:
      1. Finish faces, edges, top, and bottom. On wood doors, apply first coat to all parts atthe same time. At exterior doors, paint interior face with same material used on the exterior face.
   g. Colors:
      1. Make color changes at inside corners typically. Paint to a clean straight line.

3.03 FIELD QUALITY CONTROL:

A. Examination of Work (By District Appointed Inspector):
1. Notification: Contractor to provide 24-hr written notice to District Project Manager upon readiness for inspection of work steps.
2. Work shall not proceed to subsequent step without written authorization from District personnel.
3. Refer to Part V of Specification 09905 for specific inspection requirements.

3.04 ADJUSTMENT AND CLEANING:

A Cleaning:

1. Clean surfaces as work progresses.
2. Remove all paint spillage and droppings and stains as soon as possible.
3. Do not use tools or cleaners, which will mar finish of item being cleaned.
4. Leave work and paint storage area clean and free of droppings, stains, dirt or defacements resulting from this work.

B. Correction of Defective Work:

1. Repair abraded, damaged or incomplete paint surfaces by methods acceptable to District. Spot repairs to be well-blended into adjacent work. For large repairs, re-coat entire plane or building element in which damaged area occurs.
2. Defaced surfaces of work not to be painted shall be cleaned and their original finish restored.

3.05 SCHEDULE OF PAINT FINISHES:

A. Metal Work, Exterior and Interior:

1. Galvanized Metal Exterior and Interior:
   a. Coat 1: Zinc Dust Primer or Oil-Cementitious Primer. If Oil Cementitious Primer is used, it shall be re-coated within 48 hours in accordance with the manufacturer's recommendations.
   b. Coat 2: Sash and trim.
   c. Coat 3: Sash and trim.
   d. DFT: Five mils.
2. Ungalvanized Shop-Primed Structural Steel, Exposed On Building Exterior: Apply prime coat immediately after steel is cleaned.
   a. Touch-Up: Spot prime any abraded, damaged, rusted, or uncoated areas with rust inhibitive primer for ferrous metals.
   b. Coat 1: Rust Inhibitive Primer For Ferrous Metals.
   c. DFT For Coat 1: 1.3 mils.
   d. Coat 2: Sash and trim.
   e. Coat 3: Sash and trim.
   f. DFT For Coats 2 + 3: 3 mils.
3. Ungalvanized Shop Primed Structural Steel, Exposed On Building Interior:
   a. Touch-up: Spot prime any abraded, damaged, rusted, or uncoated areas with rust inhibitive primer for ferrous metals.
   b. Coat 1: Sash and trim.
   c. Coat 2: Sash and trim.
   d. DFT: 4.5 mils.

4. Ungalvanized Shop Primed Structural Steel, Concealed: Touch-up by spot priming any abraded, damaged, rusted, or uncoated areas with rust inhibitive primer for ferrous metals.
5. Shop Primed Metals and Door Louvers, Exterior and Interior, Except For Subparagraphs 2, 3, and 4 above:
   a. Coat 1: Sash and trim.
   b. Coat 2: Sash and trim.
   c. DFT: Three mils.
6. Factory Finished Equipment and Items, Exterior and Interior:
   a. Coat 1: Sash and trim.
   b. DFT: 1.5 mils.
7. Visible Roof-Top Equipment: Refer to definition in Paragraph 1.02, D.
   a. Paint the various materials, items, and equipment per requirements of Paragraph 3.06, B, Metal Work, Exterior and Interior.

B. Exterior Work, Other Than Metals:
   1. Wood Typical:
      a. Coat 1: Exterior wood primer.
      b. Coat 2: Sash and trim.
      c. Coat 3: Sash and trim.
      d. DFT: Five mils.
   2. Surface Trim, Wood, And Plywood:
      a. Coat 1: Exterior wood stain, opaque.
      b. Coat 2: Exterior wood stain, opaque.
      c. Application Rate: 150 SF per gallon per coat.
   3. Surface Plywood Siding:
      a. Coat 1: Exterior wood stain, opaque. Prime all surfaces of all pieces completely before installation (faces, edges, ends).
      b. After installation, inspect members; touch-up any damage, cuts, and nail holes.
      c. Application Rate: 150 SF per gallon per coat.
   4. Surface Boards Over Plywood at Building Facias and Certain Building.
   5. Walls, Both Stained Same Color:
      a. Finish: Exterior wood stain, opaque.
      b. Coat 1, Plywood: Apply stain after plywood is installed, but before any boards or trim are installed over plywood.
      c. 2 x 3 Boards:
         1. Boards to be cut to size by Carpentry Section prior to any staining.
         2. Coat 1: Prime stain all surfaces of all pieces completely before installation (faces, backs, edges, ends).
         3. Touch-Up: After installation over plywood by Carpentry Section, inspect members, touch-up stain any damage, cuts and nail holes.
      d. Coat 2, All Parts: Apply stain to all exposed wood and plywood surfaces.
      e. Application Rate: 150 SF per gallon per coat.

6. Exposed Structural Plywood Sheathing At Roof Screens Smooth Surface:
   a. Coat 1: Exterior wood stain, opaque.
   b. Coat 2: Exterior wood stain, opaque.
   c. Application Rate: 250 SF per gallon per coat.
7. Soffit Construction Behind Screen Vents:
   a. Coat 1: Exterior wood stain, opaque; black color.
   b. Application Rate: 250 SF per gallon per coat.
   c. Apply to all construction, which will be visible through installed vents. Apply prior to installation of screen.
8. Plaster Smooth Troweled Finish:
   a. Coat 1: Exterior masonry finish.
   b. Coat 2: Exterior masonry finish.
   C. DFT: 2.3 mils.
9. Concrete Exposed Foundation Walls and Curbs, Recessed Letters at Sandblasted Concrete Name and Office Signs:
   a. Coat 1: Concrete sealer.
   b. Coat 2: Exterior masonry finish.
   c. Coat 3: Exterior masonry finish.
   d. DFT: 3.6 mils.
10. Plastic Condensate Piping and Other Plastic Piping Exposed On Rooftops:
   a. Coat 1: Chlorinated rubber base paint.
   b. Application Rate: One coat to cover.
11. Building Dado (8' Height):
   a. Coat 1: Light tack coat.
   b. Coat 2: Semi-gloss enamel.

D. Interior Work, other Than Metals:
   1. Softwood Typical:
      a. Coat 1: Enamel undercoat.
      b. Coat 2: Sash and trim.
      c. Coat 3: Sash and trim.
      d. DFT: 4 mils.

   2. Hardwood Doors and Handrails, Softwood Casework Where Not Factory Finished:
      a. Sealer: At Contractor's option and expense, Clear Sealer may be used as an aid in obtaining a uniform stain color.
      b. Coat 1: Oil Stain, or wiped white glaze, as selected by District.
      c. Coat 2: Gloss varnish. Sand smooth.
      d. Coat 3: Gloss varnish. Steel wool smooth.
      e. Coat 4: Satin varnish.
      f. DFT: 3.5 mils.
      g. Lacquer Option: With specific approval of District, lacquer may be used in lieu of varnish.

3. Rough Surface Wood and Trim:
   a. Coat 1: Exterior wood stain, semi-transparent.
   b. Coat 2: Exterior wood stain, semi-transparent.
   c. Application Rate: 150 SF per gallon per coat.
4. Rough Surface Board On Plywood Wall Treatment:
   a. Coat 1: Exterior wood stain, semi-transparent. Prime all pieces completely before installation (faces, edges, and ends). After installation, inspect members, touch up any damage, cuts, and nail holes.
   b. Coat 2: Exterior wood stain, semi-transparent. Apply to all exposed surfaces.
   c. Application Rate: 150 SF per gallon per coat.
5. Plywood Wall Lining At Storage Areas:
   a. Coat 1: Exterior wood stain, semi-transparent.
   b. Coat 2: Exterior wood stain, semi-transparent.
   c. Application Rate: 250 SF per gallon per coat.
6. Hardboard Panels At Integrated Ceiling:
   a. Coat 1: Clear methacrylic lacquer.
   b. Apply before items are installed.
7. Concrete; Exposed Foundation Wall and Curbs:
   a. Coat 1: Concrete sealer.
   b. Coat 2: Exterior masonry finish.
   c. Coat 3: Exterior masonry finish.
   d. DFT: 3.6 mils.
8. Drywall Walls; Typical:
   a. Coat 1: Latex sealer.
   b. Coat 2: Enamel undercoater.
   c. Coat 3: Stipple enamel, semi-gloss. Apply with a District approved heavy-texture stipple roller.
   d. DFT: 5 mils.
9. Drywall Ceilings, Soffits, and Beams:
   a. Coat 1: Latex sealer.
   b. Coat 2: Flat wall latex.
   c. Coat 3: Flat wall latex.
   d. DFT: 4 mils.
10. Drywall Walls and Ceilings at Janitor's Rooms, Toilets, Storage Rooms, And Kitchen:
   a. Coat 1: Latex sealer.
   b. Coat 2: Enamel undercoat.
   c. Coat 3: Stipple enamel, semi-gloss. Apply with a District approved heavy-texture stipple roller.
   d. OFT: Five mils.
11. Painted Strips at Interior Concrete Stairs, Conform to State Handicap Requirements:
   a. Coat 1: Traffic paint.
   b. Coat 2: Traffic paint.
   c. Application Rate: Two coats, at 400 SF per gallon per coat.
   d. Stripes: 2" wide, located 1" maximum from and parallel to nosing.
   e. Required Locations: Bottom tread and upper approach of each flight of stairs and landings.

12. Concrete Block:
    a. SPRAYTEK II over undercoat.
        1. Coat 1: Primer, undercoat with hopper or other equipment qualified for heavy bodied material to a minimum thickness of 20 mils.
        2. Finish Coat: SPRAYTEK, minimum thickness of 1O mils.
        3. Texture: Smooth sand; OS-IV Texture.
    b. Water-base Acrylic-epoxy
        1. Pittsburgh Paints; Pitt-glaze, (tinted).
        2. Wet film; 20 to 40 mils thickness as required to fill the surface. Films in excess of 25 mils wet should be applied in two coats to facilitate their cure.

E. Mechanical and Electrical Work:
    1. General: Unless otherwise specified herein, paint all exposed mechanical, plumbing, fire sprinklers, and electrical equipment, apparatus, piping, conduit, fittings incidental thereto, and coverings applied thereto as specified above in Paragraph 3.06, B, Metal Work, Exterior and Interior.
        a. Finished rooms and spaces: Paint equipment, panel boards, and all other items to match room finish.
        b. Unfinished rooms and spaces: Same requirements as "Finished Rooms and Spaces," except that equipment, panel boards, and other items with complete factory-applied paint finishes need not be painted.
        c. Do not paint out nameplates, labels, or stamped designations of sizes, qualities, standards and manufacture on pieces of equipment.
        d. Do not paint canvas connections between fans and ducts.
        e. Do not paint brass fittings, rough or polished, plated or non-plated.
        f. Items mounted in floors: Paint cover plates to sumps and pipe trenches, and manhole covers and rings mounted in floors, and similar items two coats of cement color floor paint.
        g. Exposed exterior items: Paint per Paragraph 3.06, B.
        h. Painting flat black: Paint two coats flat black color as far back as visible the inside surfaces of ducts, dampers, louvers, vents, and similar items.
        I. Plumbing fixtures: Paint unfinished exposed surfaces to match adjoiningwalls.
        j. Main sprinkler riser: Paint bright red color.
        k. Sprinkler head canopies: Paint to match color of adjacent surfaces, unless canopies are chrome-finished or stainless steel.
        l. Paint work not specifically mentioned shall be as specified for work of similar character.

END OF SECTION

FRESNO UNIFIED SCHOOL DISTRICT
PAINT MATERIALS LIST

PART 1 - GENERAL

1.01 REFERENCE:
- A. General Conditions & Requirements
- B. Specification Sections 09900, 09904 & 09905

PART 2 - PRODUCTS

2.01 MATERIALS GENERAL:
- A. Standard Materials and Finishes: Use pure unadulterated factory-mixed material delivered to site in unopened containers bearing manufacturer's name and brand; colors, as selected by District, shall be factory-mixed.
  1. Manufacturers shall verify that their products conform to latest California Air Resources Board regulations.

2.02 ACCEPTABLE MANUFACTURERS AND PRODUCTS:
- A. General:
  All materials used in the work shall be a proprietary brand of one of the manufacturers listed below for each type. Should a listed manufacturer's product no longer be available, an equivalent product may be submitted for District review in order to ensure conformance with current Industry standards for both quality and applicable regulations.

- B. Metal Primers:

MANUFACTURER	PRODUCT
1. Zinc Dust:	
Sherwin-Williams	B69A8 Zinc-Clad IV
ICI/Sinclair Paint Co.	Zinc Dust - Zinc Oxide Primer #25
2. Oil-Cementitious:	
Sherwin-Williams	B66-310 ProCryl Universal Primer
Dunn Edwards	Galv-Alum White Anti-Corrosion Primer #43-7
TNEMEC	Series 22 Galv-Gard Oil Cementitious Exterior Coating
Ameritone Mirrolac	Galvanized Metal Primer#13201
3. Rust-Inhibitive Primer for Ferrous Metals:	
Dunn Edwards	Block-Rust Red Oxide Primer #43-4
Sherwin-Williams	DTM Primer/Finish B66W1
ICI/Sinclair	15 Red Oxide Primer

- C. Exterior Wood Primers:

Dunn Edwards	Apex Extr. Primer # 42-9
Sherwin-Williams	ProBlock Latex Primer B51W20
ICI/Sinclair	Exterior Wood Primer #289

D. Exterior Surfaces - Acrylic Enamel:

Dunn Edwards	Permasheen Semi Gloss W901
Sherwin-Williams	A-100 Gloss A8 Series
ICI/Sinclair	2406 Dulux

E. Semi-Transparent Exterior Wood Stain; For Interior Wood; Must Be An Oil-Base Stain:

Dunn Edwards	Rancho-Hues, #17 Series Semi-Transparent
Sherwin-Williams	WoodScapes Ext. Semi-Transparent Stain A15T5
ICI/Sinclair	Stainteke, Semi-Transparent #3900 Series

F. Opaque Exterior Wood Stains; For Exterior Wood; Must Be An Oil-Base Stain:

Olympic	Exterior, Solid Color Stain
ICI/Sinclair	Stainteke, Heavy-Bodied Opaque #4700 Series
Sherwin-Williams	WoodScapes Ext. Solid Color Stain A15W50 Series

G. Exterior Masonry Finish:

Dunn Edwards	Evershield #W 701-1; 100% acrylic
Sherwin-Williams	A-100 Flat A6 Series
ICI/Sinclair	Stuc-O-Life #1300, 100% Acrylic Dulux 2200

H. Sealer; Latex:

Dunn Edwards	Vinylastic Pigmented Wall Sealer W-101
Sherwin-Williams	ProGreen 200 Latex Primer B28W600
ICI/Sinclair	P.V.A. Sealer #1770 (1030 U/H PVA Primer)

I. Sealer; Concrete:

Dunn Edwards	Eff-Stop Concrete Sealer W-709.
Sherwin-Williams	Loxon Masonry Primer A24W300
ICI/Sinclair	18 EPO Primer 3210 Gripper

J. Interior Finishes:

1. Enamel Undercoater. Interior:

Dunn Edwards	Enamel Undercoater #42-31 or E22-1 Super-U 365
Sherwin-Williams	Water Reducible Alkyd Primer B49WJ1100
ICI/Sinclair	Sinco Prime Undercoater #975

2. Enamel. Semi-Gloss Stipple:

Sherwin-Williams	ProGreen 200 Semi-Gloss B31W600 Series
Dunn Edwards	Semi-Gloss Stipple Enamel #8-14
ICI/Sinclair	Semi-Gloss Stipple #782

   a. Color Selection: Dunn Edwards, Navajo White 60.

3. Lacquer Sanding Sealer: High Solids:

Dunn Edwards	Lacquer Sanding Sealer #LQ-101
Sherwin-Williams	Lacquer Sanding Sealer B44MJ91
ICI/Sinclair	Lacquer Sanding Sealer, Clear #2610

4. Interior Lacquer System:

Dunn Edwards	Lacquer Clear (gloss #LQ-103) (Semi-gloss #LQ-104) (Flat #LQ-105)

Sherwin-Williams	ProMar High Build Lacquer (Gloss B44CJ89)(Semi-Gloss B44FJ86)(Satin B44KJ84)
ICI/Sinclair	Lacquer #2600 Series "Lac-O-Rite"

5. Interior Varnish System:

Dunn Edwards	Pale Synthetic Varnish: Gloss #V-197; Satin #V-199
Sherwin-Williams	WoodClassics Waterborne Polyurethane Varnish A68-90 Series
ICI/Sinclair	Woodpride Varnish: #400 Gloss; #410 Semi-gloss; #407 Velvet

6. Clear Sealer:

Dunn Edwards	Reinseal Clear Sealer #V-195
Sherwin-Williams	WoodClassics Waterborne Polyurethane Varnish A68-90 Series
ICI/Sinclair	Primer Sealer #3352

K. Traffic Paint:

Dunn Edwards	"Vin-L-Stripe" #W-801, vinyl-epoxy.
J.E. Bauer	Latex base; formulas #1030A9 white, #1056A9 Yellow, #1865A9 blue, #1118A9 Green, and #1854A9 Red.
ICI/Sinclair	#160 Vinyl Traffic Line Paint, Water-base.
Sherwin-Williams	Set Fast Traffic Marking Paint

1. Color Selection:
   a. Text: White.
   b. Parking Dividers: White.
   c. No Parking Zones: Yellow.
   d. No Parking Curb: Red.
   e. Handicap Zones: Blue.
   f. Directional Arrows: White.
   g. Driving Lane Dividers: White.
   h. Playground Striping: Beige or Green.
2. Blue paint for Handicap shall match No. 15090 in Federal Standard 595A.

END OF SECTION