

SIEMENS

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Building Technologies Division

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03/01/2016

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FOR REFERENCE ONLY

AS-BUILT DATA FOR
WSU School of Social Work Reno

Detroit, MI
USA

44OP-172565

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Wayne State University
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DWG DESCRIPTION		REVISION HISTORY		SIEMENS		WSU School of Social Work Reno		440P-172565 0	
GENERAL		1 3/1/2016 RTD AS-BUILT DRAWING		45470 Commerce Ctr. Dr. Plymouth Twp., MI 48170 USA PHONE: 734.456.3800 FAX: 866.815.0749		Detroit, MI		TOCA	
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900 — ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 23, Common Work Results for mechanical requirements apply to this section and will require the contractor participation on the Above Ceiling Coordination Program.

1.2 GENERAL INFORMATION

- A. This specification section shall include all electrical responsibilities required for the installation & wiring of all temperature controls, as outlined on job plans, specification and temperature control drawings. Specifically, this contractor shall provide pricing direct to those general or mechanical contractors (bid to prime on project) contractors bidding this work, and will be responsibilities for installation & wiring of all automatic temperature control devices furnished by Siemens Building Technologies as outlined below and as may be required per the project plans & specifications.

- B. Siemens Building Technologies, Inc. will provide the following equipment for the building automation system as shown in the temperature control drawings Bill of Materials to include but not limited to:

- 1. Terminal Equipment Controllers (TEC's)
- 2. Auxiliary TEC power panels
- 3. Room Temperature Sensors
- 4. Damper actuators
- 5. Relays
- 6. Low Voltage Transformers

The Electrical Installation & Wiring Contractor (EWC) shall be responsible for installation of all preceding devices as applicable to this project. This list shall not be considered complete and all bidders should refer to temperature control drawings for specific equipment quantities and locations.

- C. During the bidding process, the EWC shall address all questions relative to the Siemens temperature control drawings in writing (RFI) through the tier of bidding contractors. Siemens shall respond in writing through the tier of bidding contractors.
- D. EWC shall install all control equipment provided by Siemens. The EWC shall furnish, install, and terminate all necessary wiring, conduit, hangers, etc. to provide a complete control system installation. All controls to be installed and adjusted by a Siemens qualified electrician in the full time employ of the EWC.

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- E. The EWC must have full time project superintendent who shall attend all construction meetings after notification that their services are required onsite.

- F. Upon completion of all installation and wiring by the EWC, Siemens Building Technologies will conduct verification of point to point wiring and any pneumatic tubing. The EWC will be responsible to make any necessary wiring corrections. At the completion of the point to point verification, approval shall be made by the Owner's Construction Inspection Department and Siemens Building Technologies, Inc.

- G. Upon approval by the Owners Construction Inspection Department, Siemens shall program all DDC panels, create necessary graphics and provide any interface between the building automation system and the campus environmental control system.

- H. Upon completion of the aforementioned, a performance test shall be conducted as specified in the commissioning section of the specifications.

- I. Upon a successful conclusion of the final checkout, performance test and the Owner's acceptance, the EWC's responsibility reverts to a standard warranty (12 months) for labor and material installed by the EWC and labor only for equipment supplied by others.

- J. Siemens assumes the manufacturers warranty for all equipment supplied to the EWC for installation on this project.

- K. Siemens services to include the following: Design engineering labor required to interface with WSU and the consulting engineer to design the temperature control system. Supervision of the EWC installation and final checkout and approval.

- L. Equipment provided by others may require specific cable type and terminations. It is up to EWC to provide cable and terminations needed for a complete working system.

1.3 DEFINITIONS

- A. DDC: Direct digital control.
- B. I/O: Input/output.
- C. BACnet: A control network technology platform for designing and implementing interoperable control devices and networks.
- D. MS/TP: Master slave/token passing.
- E. PC: Personal computer.
- F. PID: Proportional plus integral plus derivative.
- G. RTD: Resistance temperature detector.

ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

26 0900 1

ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

26 0900 2

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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ELECTRICAL INSTALL SPEC.

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SPEC1

1.4 PRODUCTS & SERVICES PROVIDED BY OTHERS

- A. Mechanical Contractor: Installation of flow switches, temperature or thermometer sensor wells, gage taps, pressure sensor pipe taps, final valves & tubing into pipe pressure taps and variable frequency drives.
- B. Electrical Contractor: Provide 120/60 VAC power to all DDC panels, wire power to all VFD's. Furnish & install 4" x 4" trough above all control panels. Furnish & install conduit up maximum ten feet from all 4" x 4" troughs. Installation all required nipples between electrical panels and through.
- C. Sheetmetal Contractor: Installing all terminal units, airflow stations and dampers.

1.5 PRODUCTS INSTALLED BY THE EIMC BUT NOT FURNISHED UNDER THIS SECTION

- A. Connect control components, as shown on the plans, factory supplied as part of equipment controlled.

1.6 RELATED SECTIONS

- A. Division 23 - General Mechanical Requirements.
- B. Division 23 - Instrumentation and controls for HVAC.
- C. Division 23 - Indoor Air Handling Units.
- D. Division 23 - Air Terminal Units.
- E. Division 23 - Testing and Balancing for HVAC.
- F. Division 23 - Commissioning of HVAC.
- G. Division 26 - Electrical Work.
- H. Standard Specifications and Codes: In addition to the requirements shown or specified, comply with the following applicable standard specifications, codes or ordinances:
1. NFPA - National Fire Protection Association.
 2. UL - Underwriter's Laboratories.
 3. Rules and Regulations of the Michigan Department of Fire Prevention and Safety.

- G. Include all items of labor and material required to comply with such standards, codes or ordinances in accordance with the contract documents. Where quantities, sizes, or other requirements indicated on the drawings or herein specified are in excess of the standard or code requirements, the specification and drawings shall govern.

1.7 QUALIFICATIONS FOR THE EIMC

- A. Controls Installation Contractor: The EIMC's will be pre approved by WSU prior to bidding this project.

QUALITY ASSURANCE

- A. Installer Qualifications: EIMC contractor must be able to provide references, upon request, for similar projects (in size & scope) that were completed satisfactorily in Michigan. Project names, owner contacts and companies who awarded this work to you shall all be provided upon request to WSU and/or the AE of record. EIMC contractor must be prepared to submit a minimum of three (3) satisfactorily completed projects, annually, for the past five (5) years.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- C. Comply with ASHRAE 135 for DDC system components.

SEQUENCING AND SCHEDULING

- A. Sequence work to ensure installation of components is complimentary to installation of similar components in other systems.
- B. Coordinate work with other Contractors and subcontractors to ensure system is completed and commissioned by the Date of Substantial Completion.
- C. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

WARRANTY

- A. Provide as per project general conditions.

CONTROL WIRING

- A. The EIMC is required to use the cable below.
Refer to temperature control drawing ABAC Building Automation Cable Specification Catalog.
If a wire type is required that is not referenced on the ABAC sheet then it is up to the EIMC to provide the appropriate wire for the application.
- B. The EIMC is required to tag all wiring. Wiring that is used for DDC control points should be tagged with abbreviated DDC point name from control submittal.
If wire is to be demo'd make sure the wire is labeled "spare" or "not in use".

INSTALLATION

- A. Refer to project plans and DDC temperature control drawings for control wiring required and equipment locations.
- B. Install control devices per installation requirements of control device. Before installing, always refer to local codes.

ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

25 0900 1 ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

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JL TAJ 07/21/16 03/01/16

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SPEC2

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- 1.1 ELECTRICAL WIRING INSTALLATION BY THE EIW (Project Plans and Specifications Prevail)
- A. Furnish and install ALL wiring and interlock wiring as specified and as shown on the project plans DDC temperature control drawings. Connect controls in accordance with DDC temperature control drawings.
- B. Installation minimum requirements:
- 1. Mechanical Rooms & Penthouses Areas: EMT up ten feet, then exposed plenum I/O point wiring
 - 2. TEC Space Sensors: All cables furnished by Siemens, installed within wall construction without EMT
 - 3. Other Space Sensors: I/O point wire in EMT for all non-accessible walls, approved plenum open wire in accessible walls.
 - 4. Ceiling Returns (accessible, permanent, acoustical): Approved plenum rated cable.
 - 5. Ceiling Returns (non-accessible) and all other inaccessible areas: All wiring in EMT.
 - 6. Power and low voltage wiring shall not be run in the same conduit.
- 2.0 ON-SITE TESTING
- A. Provide Owner-approved operation and acceptance testing of the complete system. The following shall witness the performance test:
- 1. The EIW – Electrical (controls) installation & wiring contractor
 - 2. The equipment manufacturers representative
 - 3. The Owner's agent
 - 4. The Owner
 - 5. Architect/Engineer
- B. Field Test: When installation of the system is complete, all systems shall be tested to their sequence of operation including all safety circuits.

END OF SECTION 26 0900

ELECTRICAL INSTALLATION AND WIRING FOR HVAC TEMPERATURE AND LAB CONTROLS

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1	3/1/2016	RTD	AS-BUILT DRAWING
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ELECTRICAL INSTALL SPEC.

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SPEC3

Anixter Building Automation Cables

Non-Plenum

SBT Part Number	Description	Print Legend
H-TP20-CM	20AWG STR, 1TP, CM, BLUE JACKET	NORTHFLEX ® H-TP20-CM "DI, DO, AI, AO" (Mfg E#) 20AWG 1P 75°C CM (UL) C(UL)
H-3C20-CM	20AWG STR, 3COND, CM, BLUE JACKET	NORTHFLEX ® H-3C20-CM "TEC VID" (Mfg E#) 20 AWG 3C 75°C CM (UL) C(UL)
H-TP18-CMR	18AWG STR, 1TP, CMR, BLUE JACKET	NORTHFLEX ® H-TP18-CMR "DI, DO, AI, AO" (Mfg E#) 18AWG 1P 75°C CMR (UL) C(UL)
H-3C18-CMR	18AWG STR, 3COND, CMR, BLUE JACKET	NORTHFLEX ® H-3C18-CMR "TEC VID" (Mfg E#) 18 AWG 3C 75°C CMR (UL) C(UL)
H-2C14-CL3P	14AWG STR, 2COND, CL3P, DARK BLUE JACKET	H-2C14-CL3P "LV POWER" (Mfg E#) 14 AWG 2C 75°C CL3P (UL) C(UL)
H-B-TSP24LC-CM	BLN24AWG STR, TSP, LOCAP, CM, ORANGE JACKET	H-B-TSP24LC-CM "BLN" (Mfg E#) 24 AWG 1P 75°C CM (UL) C(UL)
H-F-TSP24LC-CM	FLN24AWG STR, TSP, LOCAP, CM, ORANGE JACKET W/ BLUE STRIPE	NORTHFLEX ® H-F-TSP24LC-CM "FLN" (Mfg E#) 24 AWG 1P 75°C CM (UL) C(UL)
H-3P24-CMR	24AWG SOL, 3P, CMR, BLUE JACKET	NORTHFLEX ® H-3P24-CMR "TEC STA" (Mfg E#) 24 AWG 3P 75°C CMR (UL) C(UL)
LON-1P22-CM	22AWG STR, 1PAIR, CM, ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-1P22-CM "LON FLN" (Mfg E#) 22AWG 1P 75°C CM (UL) C(UL)
LON-2P22-CM	22AWG STR, 2PAIR, CM, ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-2P22-CM "LON FLN" (Mfg E#) 22AWG 2P 75°C CM (UL) C(UL)
LON-1P22-CM	22AWG STR, 1PAIR, OAS, CM, ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-1P22-CM "LON FLN" (Mfg E#) 22AWG 1P 75°C CM (UL) C(UL)
LON-2P22-CM	22AWG STR, 2PAIR, OAS, CM, ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-2P22-CM "LON FLN" (Mfg E#) 22AWG 2P 75°C CM (UL) C(UL)
E-4TP24CAT5-CM	24AWG SOL, 4TP, CAT5, CM	NORTHFLEX ® E-4TP24CAT5-CM "ETHERNET" (Mfg E#) 24AWG 4P 75°C CM (UL) C(UL)
HA-1.5TSP24LC-CM	ALN485, 24AWG, STR, TP+1C, OAS, LOCAP, CM	NORTHFLEX ® HA-1.5TSP24LC-CM "ALN485" 24 AWG 1P+1C 75°C CM (UL) C(UL) (Mfg E#)
HF-1.5TSP24LC-CM	FLN485, 24AWG, STR, TP+1C, OAS, LOCAP, CM	NORTHFLEX ® HA-1.5TSP24LC-CM "FLN485" 24 AWG 1P+1C 75°C CM (UL) C(UL) (Mfg E#)

Plenum

SBT Part Number	Description	Print Legend
H-TP20-CMP	20AWG STR, 1TP, CMP, BLUE JACKET	NORTHFLEX ® H-TP20-CMP "DI, DO, AI, AO" (Mfg E#) 20 AWG 2C 75°C CMP (UL) C(UL)
H-3C20-CMP	20AWG STR, 3COND, CMP, BLUE JACKET	NORTHFLEX ® H-3C20-CMP "TEC VID" (Mfg E#) 20 AWG 3C 75°C CMP (UL) C(UL)
H-TP18-CMP	18AWG STR, 1TP, CMP, BLUE JACKET	NORTHFLEX ® H-TP18-CMP "DI, DO, AI, AO" (Mfg E#) 18 AWG 2C 75°C CMP (UL) C(UL)
H-3C18-CMP	18AWG STR, 3COND, CMP, BLUE JACKET	NORTHFLEX ® H-3C18-CMP "TEC VID" (Mfg E#) 18 AWG 3C 75°C CMP (UL) C(UL)
H-2C14-CL3P	14AWG STR, 2COND, CL3P, DARK BLUE JACKET	NORTHFLEX ® H-2C14-CL3P "LV POWER" (Mfg E#) 14 AWG 2C 75°C CL3P (UL) C(UL)
H-B-TSP24LC-CMP	BLN24AWG STR, TSP, LOCAP, CMP, ORANGE JACKET	NORTHFLEX ® H-B-TSP24LC-CMP "BLN" (Mfg E#) 24 AWG TSP 75°C CMP (UL) C(UL)
H-F-TSP24LC-CMP	FLN24AWG STR, TSP, LOCAP, CMP, ORANGE JACKET W/ BLUE STRIPE	NORTHFLEX ® H-F-TSP24LC-CMP "FLN" (Mfg E#) 24 AWG TSP 75°C CMP (UL) C(UL)
H-3P24-CMP	24AWG SOL, 3PAIR, CMP, BLUE JACKET	NORTHFLEX ® H-3P24-CMP "TEC STA" (Mfg E#) 24 AWG 3P 75°C CMP (UL) C(UL)
LON-1P22-CMP	22AWG STR, 1PAIR, CMP, ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-1P22-CMP "LON FLN" (Mfg E#) 22AWG 1P 75°C CMP (UL) C(UL)
LON-2P22-CMP	22AWG STR, 2PAIR, CMP, ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-2P22-CMP "LON FLN" (Mfg E#) 22AWG 2P 75°C CMP (UL) C(UL)
LON-1P22-CMP	22AWG STR, 1PAIR, OAS, CMP, ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-1P22-CMP "LON FLN" (Mfg E#) 22AWG 1P 75°C CMP (UL) C(UL)
LON-2P22-CMP	22AWG STR, 2PAIR, OAS, CMP, ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-2P22-CMP "LON FLN" (Mfg E#) 22AWG 2P 75°C CMP (UL) C(UL)
E-4TP24CAT5-CMP	24AWG SOL, 4TP, CAT5, CMP	NORTHFLEX ® E-4TP24CAT5-CMP "ETHERNET" (Mfg E#) 24AWG 4P 75°C CMP (UL) C(UL)
HA-1.5TSP24LC-CMP	ALN485, 24AWG, STR, TP+1C, OAS, LOCAP, CMP	NORTHFLEX ® HA-1.5TSP24LC-CM "ALN485" 24 AWG 1P+1C 75°C CM (UL) C(UL) (Mfg E#)
HF-1.5TSP24LC-CMP	FLN485, 24AWG, STR, TP+1C, OAS, LOCAP, CMP	NORTHFLEX ® HA-1.5TSP24LC-CM "FLN485" 24 AWG 1P+1C 75°C CM (UL) C(UL) (Mfg E#)

Assemblies

SBT Part Number	Description	Print Legend
550-827	CABLE ASSEMBLY TEC TO SSB 3 POS 10 FT	N/A
550-828	CABLE ASSEMBLY TEC TO SSC 3 POS 10 FT	N/A

REVISION HISTORY

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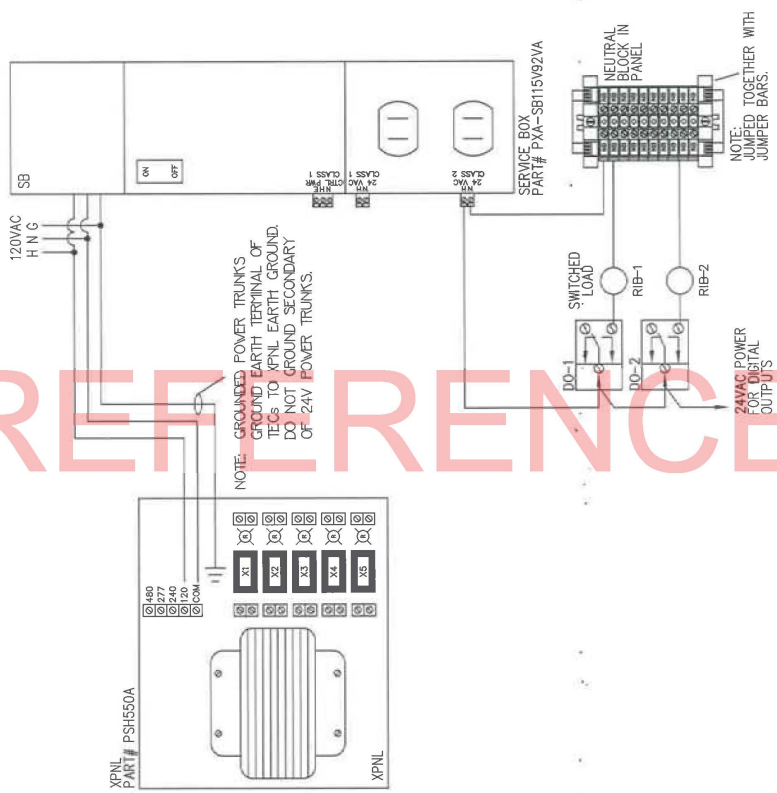
ANIXTER BUILDING AUTO. CABLES

440P-172585
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ABAC

FOR REFERENCE ONLY

- INSTALLATION NOTES:
- 1 ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.
 - 2 TERMINATE DEVICE NEUTRALS ON NEUTRAL BLOCK LOCATED IN PANEL.



1 WIRE CONTROLLER POWER WIRING

REVISION HISTORY			
1	3/1/2016	RTD	AS-BUILT DRAWING

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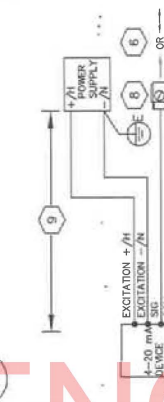
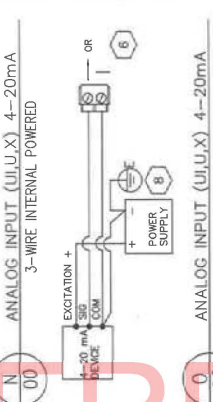
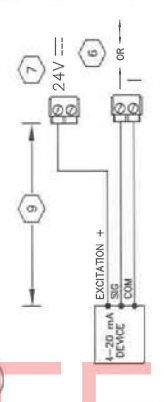
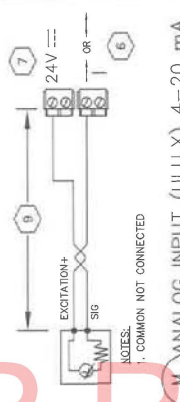
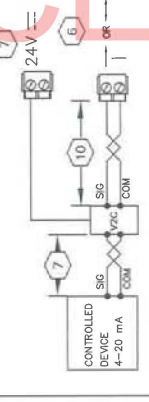
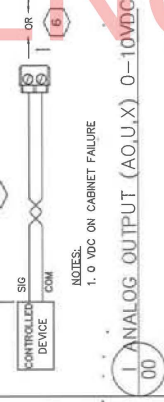
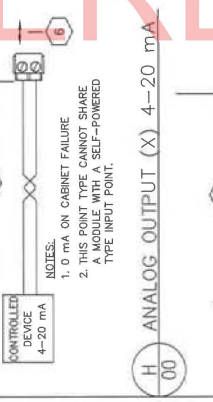
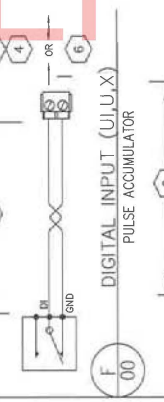
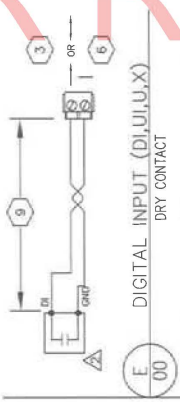
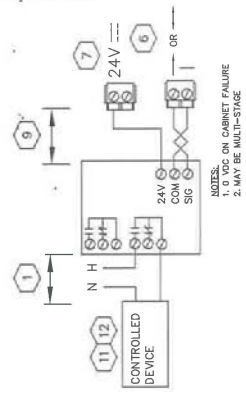
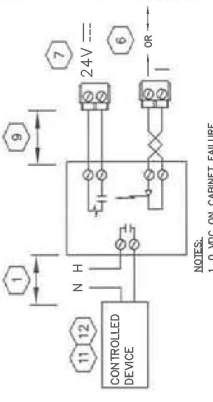
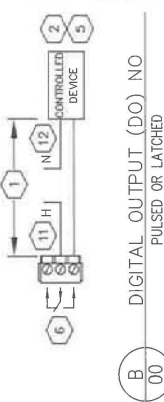
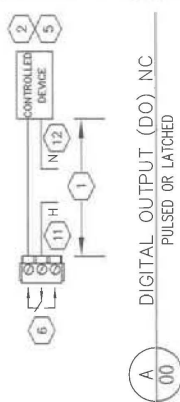
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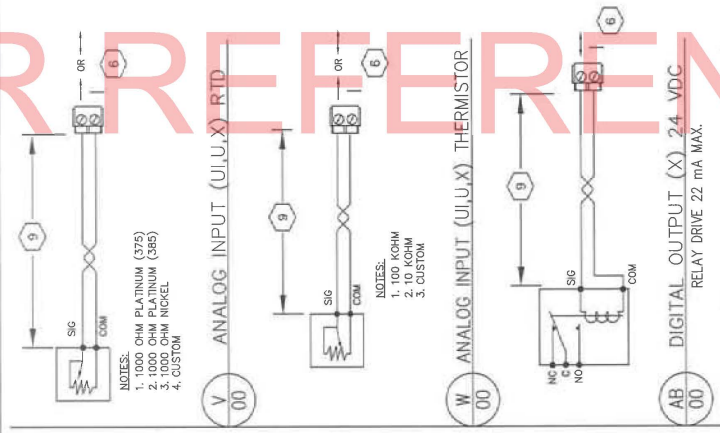
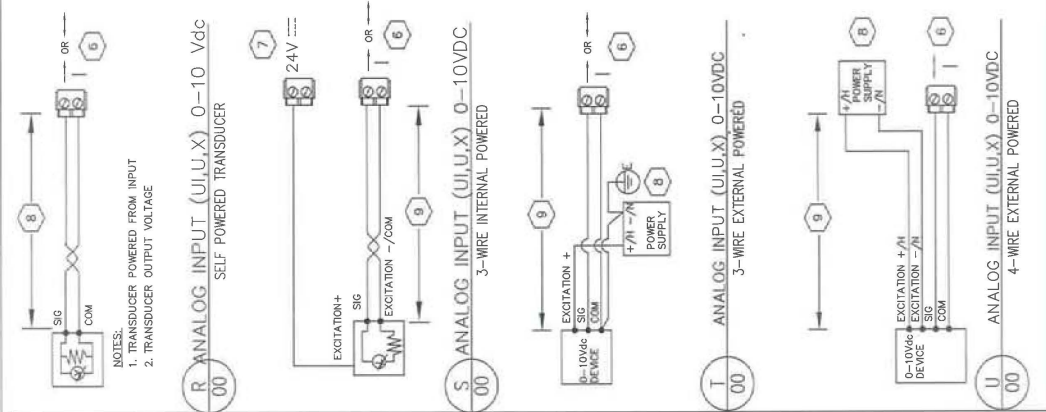
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PNL

TYPICAL PANEL WIRING



- 3 MAXIMUM CONTACT CLOSURE RATE IS 10 PER SECOND
DI EXITATION = 24VDC, 10mA
UI, U EXCITATION = 24VDC, 6mA,
150ms, 1mA
- 4 DI CANNOT BE USED FOR PULSE ACCUMULATION;
UI, U, X MAXIMUM PULSE RATE = 20HZ
(25ms PER STATE, 50ms PRE PULSE).
- 5 PXCC DO CONTACT RATINGS
AC OPERATION:
3A @ 240VAC (RESISTIVE)
4A @ 240VAC (INDUCTIVE)
SIZE 4 MOTOR STARTER
DC OPERATION:
40W @ < 50VDC
20W @ > 50VDC
- 6 REFER TO PXCC TERMINATION TABLES FOR ACTUAL POINT ADDRESSES.
COMMON TERMINAL MAY BE SHARED BY 2 POINTS, AND ORDER MAY BE REVERSED ON ADJACENT POINTS.
- 7 REFER TO DRAWING P2 ON PWR FOR MAXIMUM CURRENT PROVIDED BY THE PXCC 24VDC SENSOR SUPPLY.
- 8 EXTERNAL POWER SUPPLY CAN EITHER BE A 24VDC POWER SUPPLY OR A 24VAC TRANSFORMER DEPENDING ON THE SENSOR SELECTED. IF NOT AN ISOLATED NC CLASS 2 CIRCUIT THEN POWER SOURCE, NEUTRAL AND PXC COMPACT COMMON MUST BE BOTH CONNECTED TO THE SAME OR BONDED BUILDING APPROVED EARTH GROUND. FOR FURTHER DETAILS SEE EARTH GROUNDING RULES (125-3002) APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS.
- 9 50mA OR LESS – 750ft/230m
50mA TO 100mA – 375ft/115m
- 10 100mA TO 150mA – 250ft/76m
150mA TO 200mA – 187ft/57m
200mA TO 250mA – 150ft/46m
- 11 WHERE H TERMINAL IS NOT A NEC CLASS 2 CIRCUIT, RELAY COMMON TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED TO 10A MAXIMUM BY A NEC APPROVED MEANS. NOT A FUSE.
- 12 WHERE REQUIRED, NEUTRAL TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED BA A NEC APPROVED MEANS.

FOR REFERENCE ONLY



Point Address Table for the PXC16.			
Point Type	Point Number	Terminals	PXC Point Address
Universal Input (UI)	U1	25	1
	U2	26	2
	U3	27	3
	U4	28	4
Universal Input (UI) (X)	U5	30	5
	U6	31	6
	U7	32	7
	U8	33	8
Analog Output (AO)	A09	34	9
	A10	35	10
	A11	36	11
	A12	37	12
Digital Input (DI)	DI13	38	13
	DI14	39	14
	DI15	40	15
	DI16	41	16

Point Address Table for the PXC24.			
Point Type	Point Number	Terminals	PXC Point Address
Universal Input (UI)	U1	25	1
	U2	26	2
	U3	27	3
	U4	28	4
Universal Input (UI) (X)	U5	30	5
	U6	31	6
	U7	32	7
	U8	33	8
Analog Output (AO)	A09	34	9
	A10	35	10
	A11	36	11
	A12	37	12
Digital Input (DI)	DI13	38	13
	DI14	39	14
	DI15	40	15
	DI16	41	16

Point Address Table for the PXC36.			
Point Type	Point Number	Terminals	PXC Point Address
Super Universal Input (UI)	X1	30	1
	X2	31	2
	X3	32	3
	X4	33	4
Universal Input (UI) (X)	U5	34	5
	U6	35	6
	U7	36	7
	U8	37	8
Analog Output (AO)	A09	38	9
	A10	39	10
	A11	40	11
	A12	41	12
Digital Input (DI)	DI13	42	13
	DI14	43	14
	DI15	44	15
	DI16	45	16

Notes:

1. FOR PRE-PXC24.2 CONTROLLERS, POINTS 13-16 WERE UNIVERSAL I/O POINTS INSTEAD OF THE CURRENT SUPER UNIVERSAL I/O POINTS.
2. FOR THE APPROPRIATE TERMINAL SYMBOL, PLEASE REFER TO THE RESPECTIVE POINT TYPE COLUMN.
3. THE COMMON TERMINAL IS ALWAYS THE FOLLOWING SYMBOL:
C
C
4. SEE BELOW FOR DIGITAL OUTPUT SYMBOL:
NC
C
NO

REVISION HISTORY		SIEMENS		WSU School of Social Work Reno		440P-172585	
1	3/1/2016	RTD	AS-BUILT DRAWING	45470 Commerce Ctr. Dr. Plymouth Twp., MI 48170 USA PHONE: 734.468.3800 FAX: 866.815.0749	Detroit, MI	ENGINEER JL	440P-172585 0
				45470 Commerce Ctr. Dr. Plymouth Twp., MI 48170 USA PHONE: 734.468.3800 FAX: 866.815.0749		DESIGNED BY JL	440P-172585 0
				Siemens Industry, Inc. Building Technologies Division		TERMINATION SPEC. SHEET 2	440P-172585 0
				45470 Commerce Ctr. Dr. Plymouth Twp., MI 48170 USA PHONE: 734.468.3800 FAX: 866.815.0749		440P-172585 0	440P-172585 0

TEC - ELECTRONIC OUTPUT WIRING TYPE AND GAUGE REQUIREMENTS

TABLE 1A

CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING
INPUT POWER	2	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
DIGITAL OUTPUT	2	CHECK LOCAL CODES	150ft (46 m)	CHECK LOCAL CODES
DIGITAL INPUT	2	#18-22 TP #20 AWG TP	150ft (46 m)	CLASS 1 & 2 CHECK LOCAL CODES
ANALOG INPUT	2	#18-22 TP	100ft (30.5 m)	CLASS 2
ANALOG INPUT THERMISTOR	2	#20 TP	100ft (30.5 m)	CLASS 1 & 2 CHECK CODES
ROOM TEMP. SENSOR	2	6-WIRE RJ11	100ft (30.5 m)	CLASS 2
LAN TRUNK 1	2	#18-22 AWG TSP	4kft (1220 m)	CLASS 2 ONLY

TEC - PNEUMATIC OUTPUT WIRING TYPE AND GAUGE REQUIREMENTS

TABLE 1B

CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING
POWER TRUNK (LOW VOLTAGE)	2	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
POWER TRUNK (HIGH VOLTAGE)	1	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
DAMPER OUTPUT (LOW VOLTAGE)	2	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
DAMPER OUTPUT (HIGH VOLTAGE)	1	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
DIGITAL INPUT	2	#18-22 TP	100ft (30.5 m)	CLASS 1 & 2 CHECK LOCAL CODES
ANALOG INPUT	2	#18-22 TP	100ft (30.5 m)	CLASS 2
ROOM TEMP. SENSOR	2	6-WIRE RJ11	100ft (30.5 m)	CLASS 2
LAN TRUNK 1	2	#18-22 AWG TSP	4kft (1220 m)	CLASS 2 ONLY

TABLE 1A & 1B NOTES:

1. DISTANCE WILL DEPEND ON TRANSFORMER LOCATION.

TEC POWER SOURCE REQUIREMENTS

TEC TYPE	VOLTAGE	LINE FREQUENCY	MAX. POWER
ELECTRONIC OUTPUT	24 VAC +15% -20%	50 / 60 Hz	5.2 VA TO 43.5 VA ¹
PNEUMATIC OUTPUT (LOW VOLTAGE)	24 VAC +15% -20%	50 / 60 Hz	17 VA PLUS DAMPER VA
PNEUMATIC OUTPUT (HIGH VOLTAGE)	115/230 VAC +10% -15%	50 / 60 Hz	17 VA PLUS DAMPER VA

NOTES:

1. VA DEPENDS ON TEC APPLICATION.

DL, AL, AO WIRE SPECIFICATIONS

TABLE 2

SPECIFICATION	WIRE TYPE
CAPACITANCE WIRE TO WIRE	SHIELDED
CAPACITANCE BETWEEN ONE CONDUCTOR AND OTHER CONDUCTOR CONNECTED TO SHIELD	UNSHIELDED
WIRE LAY	NOT SPECIFIED
AWG	NOT SPECIFIED

LAN TRUNK WIRE

TABLE 3

SPECIFICATION	LENGTH OF TRUNK SECTION
CAPACITANCE WIRE TO WIRE	4000 FT
CAPACITANCE BETWEEN ONE CONDUCTOR WITH OTHER CONDUCTOR CONNECTED TO SHIELD	10,000 FT
WIRE LAY	60pF MAX. 2pF MAX.
AWG	100pF MAX. 4pF MAX.

TABLE 2 & 3 NOTES:

1. OPTIMAL NOISE REDUCTION IS ACHIEVED WITH TIGHTER WIRE LAYS (E.G. 1/2").

GENERAL NOTES:

- COMPLY WITH LOCAL BUILDING CODES.
- SIZE WIRE FOR LOAD, CURRENT, AND VOLTAGE.
- ALL WIRE TO BE APPROVED OR LISTED FOR THE INTENDED APPLICATION BY AGENCIES SUCH AS UL, CSA.
- ALWAYS REFER TO LOCAL CODES FOR CONDUIT SHARING.
- WIRING MUST HAVE INSULATION RATED FOR HIGHEST VOLTAGE CIRCUIT IN CONDUIT.
- PLENUM WIRING MAY BE USED IN PLACE OF ANY LOW-VOLTAGE WIRING WITHOUT CHANGES TO LENGTH EXCEPT FOR PMD OR LAN TRUNK. IN CASES WHERE PLENUM WIRE (#18 OR #20 AWG) IS USED FOR PMD OR LAN TRUNK, USE THE REDUCED LENGTHS OF #20 AWG CABLE.
- THE LAN TRUNK MUST BE AN UNINTERRUPTED RUN BETWEEN TEC'S. NO SPLICES ALLOWED.

TEC (ELECTRONIC OUTPUT) DO CONTACT RATING

24 VAC HOT @ 0.5 AMPS

WARNING: DO IS NOT A DRY CONTACT

TEC (PNEUMATIC OUTPUT) DO CONTACT RATING

DO CONTACT RATING NOT SPECIFIED

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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Detroit, MI

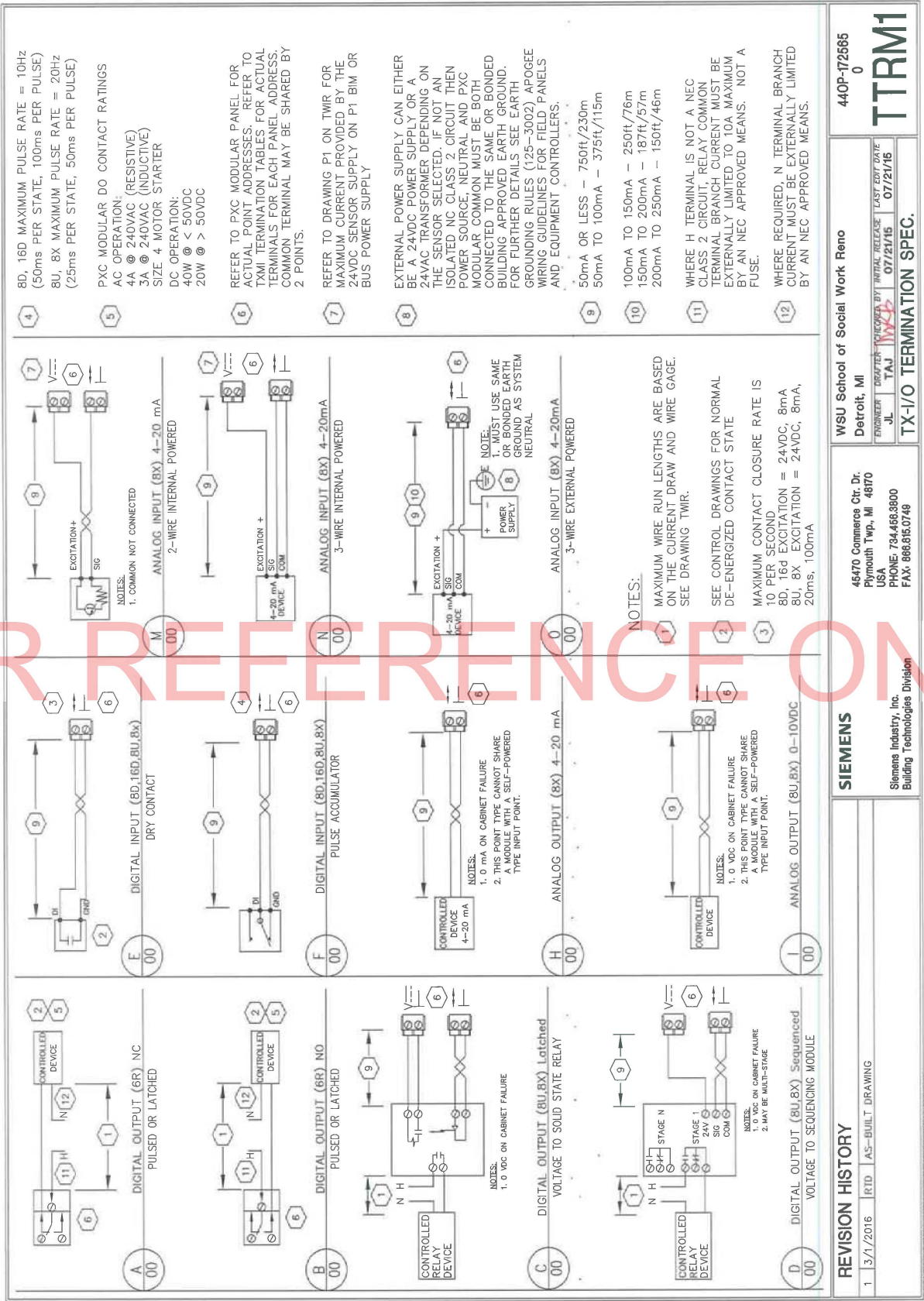
ENGINEER	DRAWN BY	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	WZ	07/21/16	07/21/15

TEC TERMINATION SPECIFICATION

440P-172585
0

TTRM

FOR REFERENCE ONLY



- 4 8D, 16D MAXIMUM PULSE RATE = 10Hz (50ms PER STATE, 100ms PER PULSE)
8U, 8X MAXIMUM PULSE RATE = 20Hz (25ms PER STATE, 50ms PER PULSE)
- 5 PXC MODULAR DO CONTACT RATINGS
AC OPERATION:
4A @ 240VAC (RESISTIVE)
3A @ 240VAC (INDUCTIVE)
SIZE 4 MOTOR STARTER
DC OPERATION:
40W @ < 50VDC
20W @ > 50VDC
- 6 REFER TO PXC MODULAR PANEL FOR ACTUAL POINT ADDRESSES. REFER TO TMI TERMINATION TABLES FOR ACTUAL TERMINALS FOR EACH PANEL ADDRESS. COMMON TERMINAL MAY BE SHARED BY 2 POINTS.
- 7 REFER TO DRAWING P1 ON TWIR FOR MAXIMUM CURRENT PROVIDED BY THE 24VDC SENSOR SUPPLY ON P1 BIM OR BUS POWER SUPPLY
- 8 EXTERNAL POWER SUPPLY CAN EITHER BE A 24VDC POWER SUPPLY OR A 24VAC TRANSFORMER DEPENDING ON THE SENSOR SELECTED. IF NOT AN ISOLATED NC CLASS 2 CIRCUIT THEN POWER SOURCE, NEUTRAL AND PXC MODULAR COMMON MUST BE BOTH CONNECTED TO THE SAME OR BONDED BUILDING APPROVED EARTH GROUND. FOR FURTHER DETAILS SEE EARTH GROUNDING RULES (125-3002) APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS.
- 9 50mA OR LESS - 750ft/230m
50mA TO 100mA - 375ft/115m
- 10 100mA TO 150mA - 250ft/76m
150mA TO 200mA - 187ft/57m
200mA TO 250mA - 150ft/46m
- 11 WHERE H TERMINAL IS NOT A NEC CLASS 2 CIRCUIT, RELAY COMMON TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED TO 10A MAXIMUM BY AN NEC APPROVED MEANS. NOT A FUSE.
- 12 WHERE REQUIRED, N TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED BY AN NEC APPROVED MEANS.

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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Building Technologies Division

WSU School of Social Work Reno

440P-172585
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TTRM1

ENGINEER	DRAWN	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	WJ	07/21/15	07/21/15

TX-I/O TERMINATION SPEC.

TXM1 TERMINATION TABLES

1. ALL TXM1 TERMINALS (MEASURING, NEUTRAL, RELAY, SUPPLY) ARE CONNECTED IN THE PLUG-IN I/O MODULE, NOT IN THE TERMINAL BUS.

I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL ¹	1	3	5	7	9	11	13	15
DIGITAL INPUT	1	2	4	6	8	10	12	14

1. NEUTRAL CAN BE CONNECTED TO ANY NEUTRAL TERMINAL ON SAME MODULE AND SEVERAL CAN SHARE SAME NEUTRAL TERMINAL.

I/O POINT	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
SYSTEM NEUTRAL	1	3	5	7	9	11	13	15
DIGITAL INPUT ¹	1	2	4	6	8	10	12	14

1. NO PULSE ACCUMULATOR

I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL	1	3	5	7	9	11	13	15
UNIVERSAL I/O	1	2	4	6	8	10	12	14
24V AC/DC ACTUATOR SUPPLY ¹	1	2	4	6	8	10	12	14

1. 24V DC ONLY AVAILABLE WITH BUS CONNECTOR MODULE (BCM) POWERED EXTERNALLY BY DC SUPPLY.

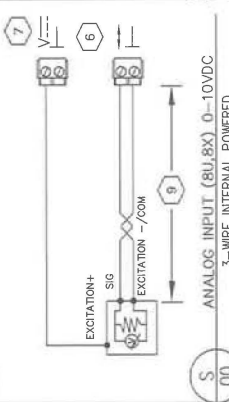
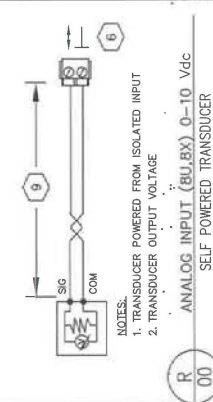
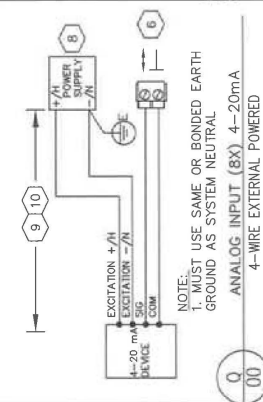
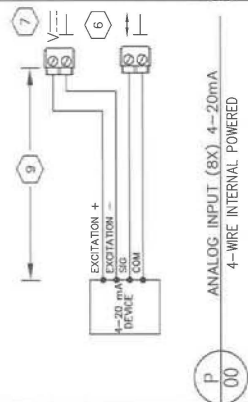
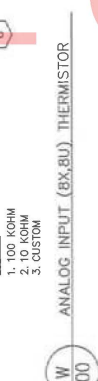
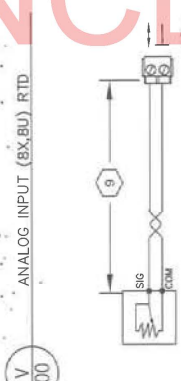
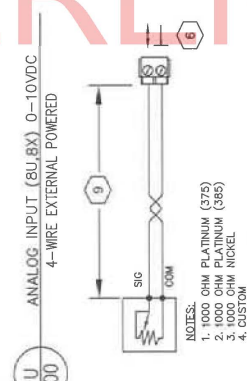
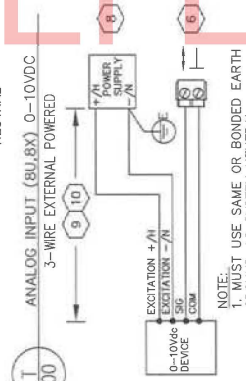
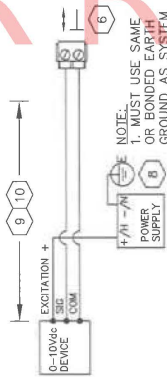
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL	1	3	5	7	9	11	13	15
UNIVERSAL I/O	1	2	4	6	8	10	12	14
24V AC/DC ACTUATOR SUPPLY ¹	1	2	4	6	8	10	12	14
24V DC SENSOR SUPPLY ²	1	2	4	6	8	10	12	14

1. 4-20 mA OUTPUT AVAILABLE ON POINTS 5-8 ONLY.
2. 24V DC ONLY AVAILABLE WITH BUS CONNECTOR MODULE (BCM) POWERED EXTERNALLY BY DC SUPPLY.
3. MAY POWER EXTERNAL SENSORS 0.6w (25mA) OR 1.2w (50mA) PER TERMINATION UP TO 2.4w (100mA) MAXIMUM FOR ALL TERMINATIONS.

I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
COMMON ¹	1	3	5	7	9	11	13	15
NORMALLY CLOSED	1	2	4	6	8	10	12	14
NORMALLY OPEN	1	2	4	6	8	10	12	14

1. COMMONS ARE NOT INTERNALLY CONNECTED.

NOTE: REFER TO TERMINATION SHEET #1 FOR INSTALLATION DETAILS.



REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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SIEMENS

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WSU School of Social Work Reno

ENGINEER	DRAWN	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	WJL	07/21/15	07/21/15

440P-172565

0

TTRM2

TX-I/O TERMINATION SPEC. 2

Siemens Industry, Inc.
Job Name: WSU School of Social Work Reno
Job Number: 44OP-172665

Air Flow Measuring Station Schedule

Submittal Date: 7/24/2015
Revision Date: 3/1/2016
Engineer: JL

System: AIR HANDLING UNIT AHU-1

Device Tag	Quantity	Product Number	Duct Height (in)	Duct Width (in)	Fan Diameter (in)	Airflow (CFM)	Area (Sq. Ft.)	Velocity (FPM)	Velocity Pressure (in W.C.)	Transmitter Range (in W.C.)	Comment
AFS-1	1	Ebtron - GTC116-PT	50.00	30.00		20000	10.42	1920.00	0.23	N/A	OUTDOOR AIR CFM
AFS-2	1	Ebtron - GTC108-f/a4	50.00	30.00		20000	10.42	1920.00	0.23	N/A	SUPPLY AIR CFM
AFS-3	1	Ebtron - GTC116-PT	50.00	18.00		18000	6.25	2880.00	0.52	N/A	EXHAUST AIR CFM

Notes: FBUM : Furnished By Unit Manufacturer

Siemens Industry, Inc.
Job Name: WSU School of Social Work Reno
Job Number: 44OP-172565

Damper Schedule

Submit Date: 7/21/2015
Revision Date: 3/1/2016
Engineer: JL

System: Air Handling Unit AHU-1

Damper Tag	Damper Quantity	Damper Model	Damper Mfg.	Duct Width (in.)	Duct Height (in.)	Number of Sections	Damper Area (Sq. Ft.)	Damper Torque (in-lb)	Blade Config.	Blade Width (in.)	Seals Edge	Seals Blade	Normal Position	Actuator Mounting	Actuator Model	Act. Torque Rating (in-lb/sq ft)	Actuator Mfg.	Actuator Quantity	Actuator Description	Comment
D-1	1	CD60	RUSKIN	50.00	30.00	2	10.42	72.92	PARALLEL	6.00	YES	YES	NC	EXT	GCA161.1P	160	SIEMENS	1	0/10 VAC	OA DAMPER
D-2	1	CD60	RUSKIN	50.00	30.00	2	10.42	72.92	PARALLEL	6.00	YES	YES	NO	EXT	GCA161.1P	160	SIEMENS	1	0/10 VAC	RA DAMPER
D-3	1	CD60	RUSKIN	50.00	30.00	2	10.42	72.92	PARALLEL	6.00	YES	YES	NC	EXT	GCA161.1P	160	SIEMENS	1	0/10 VAC	EA DAMPER

System: Exhaust Fan EF-1

Damper Tag	Damper Quantity	Damper Model	Damper Mfg.	Duct Width (in.)	Duct Height (in.)	Number of Sections	Damper Area (Sq. Ft.)	Damper Torque (in-lb)	Blade Config.	Blade Width (in.)	Seals Edge	Seals Blade	Normal Position	Actuator Mounting	Actuator Model	Act. Torque Rating (in-lb/sq ft)	Actuator Mfg.	Actuator Quantity	Actuator Description	Comment
D-1	1	CD60	RUSKIN	16.00	16.00	1	1.78	12.44	PARALLEL	6.00	YES	YES	NC	EXT	GMA221.1U	62	SIEMENS	1	120 VAC	ISOLATION DAMPER

System: Intake Hood IH-1

Damper Tag	Damper Quantity	Damper Model	Damper Mfg.	Duct Width (in.)	Duct Height (in.)	Number of Sections	Damper Area (Sq. Ft.)	Damper Torque (in-lb)	Blade Config.	Blade Width (in.)	Seals Edge	Seals Blade	Normal Position	Actuator Mounting	Actuator Model	Act. Torque Rating (in-lb/sq ft)	Actuator Mfg.	Actuator Quantity	Actuator Description	Comment
D-4	1	CD60	RUSKIN	82.00	20.00	2	11.39	79.72	PARALLEL	6.00	YES	YES	NC	EXT	GCA126.1P	160	SIEMENS	1	24 VAC	ISOLATION DAMPER

System: Gravity Relief Hood GRH-1

Damper Tag	Damper Quantity	Damper Model	Damper Mfg.	Duct Width (in.)	Duct Height (in.)	Number of Sections	Damper Area (Sq. Ft.)	Damper Torque (in-lb)	Blade Config.	Blade Width (in.)	Seals Edge	Seals Blade	Normal Position	Actuator Mounting	Actuator Model	Act. Torque Rating (in-lb/sq ft)	Actuator Mfg.	Actuator Quantity	Actuator Description	Comment
D-5	1	CD60	RUSKIN	44.00	38.00	2	11.61	81.28	PARALLEL	6.00	YES	YES	NC	EXT	GCA126.1P	160	SIEMENS	1	24 VAC	ISOLATION DAMPER

Notes: Duct size shown, deduct 1/4 in. for fabrication.

All shaft dimensions horizontal unless otherwise noted.

Blade Configuration: OPP: Opposed PAR: Parallel

Actuator Mounting: EXT: Extended JAC: Jackshaft PIV: Pivot FRA: Frame

Siemens Industry, Inc.
Job Name: WSU School of Social Work Reno
Job Number: 44OP-172565

Differential Pressure Schedule

Submittal Date: 7/21/2015
Revision Date: 3/1/2016
Engineer: JL

System: BOILER HOT WATER

Device Tag	Quantity	Product Number	Manufacturer	Mechanical System	Service Medium	Location	Comment
DPT-1	1	7MF4433-1GA22-1AC7-Z A01+B21+C11+Y01+Y21	SIEMENS SE&A	HOT WATER SYSTEM	HOT WATER	CLASSROOM / COMP. LAB 225	HWS DPT-1
	1	MM4B-T-LSS	DA MFG				

Notes:

- A01 Mounting Bracket Steel
- B21 English Rating Plate (Calibration Certificate)
- C11 Manufacturer's Test Certificate "W"
- Y01 Measuring Range Linear PSI
- Y21 Pressure Indicator Units 0-80

Terminal Equipment Controller Schedule

Submittal Date: 7/21/2015
Revision Date: 3/1/2016
Engineer: JL

max

Unit Tag	SysName	Serves	Field Panel	FLN	Address	Application	VA Usage	Power Trunk	Duct Shape	Duct Dia	Duct Area	STPT Dial	Min. Ctg. Flw./Unocc. Flow	Max. Ctg. Flw./Flow	Min. Htg. Flw.	Max. Htg. Flw.	Valve Count	Comments
				1	2						97	14	31	32	33	34	88	
LOWER LEVEL																		
TU-2	F063.01.A01.101	OFFICE 047	F063.01.MER.044	1-1	1	2523	6	PT-1-1-1	RND	6	0.20	YES	66	100	66	66	1	
TU-1	F063.01.A01.102	OFFICE 049	F063.01.MER.044	1-1	2	2523	6	PT-1-1-1	RND	6	0.20	YES	66	100	66	66	1	
TU-19	F063.01.A01.103	OFFICE 053	F063.01.MER.044	1-1	3	2523	6	PT-1-1-1	RND	6	0.20	YES	66	200	66	100	1	
TU-18	F063.01.A01.104	OFFICE 051	F063.01.MER.044	1-1	4	2523	6	PT-1-1-1	RND	6	0.20	YES	66	200	66	100	1	
TU-17	F063.01.A01.105	OFFICE 061	F063.01.MER.044	1-1	5	2523	6	PT-1-1-1	RND	6	0.20	YES	66	100	66	66	1	
TU-16	F063.01.A01.106	OFFICE 059	F063.01.MER.044	1-1	6	2523	6	PT-1-1-1	RND	6	0.20	YES	66	100	66	66	1	
TU-15	F063.01.A01.107	ENG. ROOM 085	F063.01.MER.044	1-1	7	2523	6	PT-1-1-1	RND	6	0.20	YES	66	250	66	125	1	
TU-14	F063.01.A01.108	OFFICE 069	F063.01.MER.044	1-1	8	2523	6	PT-1-1-1	RND	6	0.20	YES	66	200	66	100	1	
TU-13	F063.01.A01.109	OFFICE 073	F063.01.MER.044	1-1	9	2523	6	PT-1-1-1	RND	6	0.20	YES	66	300	66	150	1	
TU-12	F063.01.A01.110	RESEARCH PROJECTS 079	F063.01.MER.044	1-1	10	2523	6	PT-1-1-1	RND	6	0.20	YES	66	200	66	100	1	
TU-11	F063.01.A01.111	T.I.P OFFICE 081	F063.01.MER.044	1-1	11	2523	6	PT-1-1-1	RND	6	0.20	YES	66	200	66	100	1	
TU-10	F063.01.A01.112	FIELD EDUCATION 083	F063.01.MER.044	1-1	12	2523	6	PT-1-1-2	RND	8	0.35	YES	150	500	150	250	1	
TU-3	F063.01.A01.113	OFFICE 041	F063.01.MER.044	1-1	13	2523	6	PT-1-1-2	RND	6	0.20	YES	66	100	66	66	1	
TU-9	F063.01.A01.114	OFFICE 036	F063.01.MER.044	1-1	14	2523	6	PT-1-1-2	RND	6	0.20	YES	90	300	90	150	1	
TU-8	F063.01.A01.115	OFFICE 028	F063.01.MER.044	1-1	15	2523	6	PT-1-1-2	RND	6	0.20	YES	90	300	90	150	1	
TU-4	F063.01.A01.116	OFFICE 029	F063.01.MER.044	1-1	16	2523	6	PT-1-1-2	RND	8	0.35	YES	135	400	135	200	1	
FIRST FLOOR																		
TU-24	F063.01.A01.201	OFFICE 149	F063.01.MER.044	1-2	1	2523	6	PT-1-1-3	RND	8	0.35	YES	175	575	175	288	1	
TU-22	F063.01.A01.202	OFFICE 154	F063.01.MER.044	1-2	2	2523	6	PT-1-1-3	RND	6	0.20	YES	66	200	66	100	1	
TU-21	F063.01.A01.203	OFFICE 162	F063.01.MER.044	1-2	3	2523	6	PT-1-1-3	RND	6	0.20	YES	90	300	90	150	1	
TU-20	F063.01.A01.204	OFFICE 173	F063.01.MER.044	1-2	4	2523	6	PT-1-1-3	RND	8	0.35	YES	135	400	135	200	1	
TU-23	F063.01.A01.205	WOMENS 184	F063.01.MER.044	1-2	5	2523	6	PT-1-1-3	RND	6	0.20	YES	220	220	220	220	1	
SECOND FLOOR																		
TU-28	F063.01.A01.301	OFFICE 247	F063.01.MER.044	1-3	1	2523	6	PT-1-1-4	RND	8	0.35	YES	135	425	135	212	1	
TU-27	F063.01.A01.302	OFFICE 256	F063.01.MER.044	1-3	2	2523	6	PT-1-1-4	RND	6	0.20	YES	66	200	66	100	1	
TU-26	F063.01.A01.303	OFFICE 268	F063.01.MER.044	1-3	3	2523	6	PT-1-1-4	RND	8	0.35	YES	135	400	135	200	1	
TU-25	F063.01.A01.304	OFFICE 269	F063.01.MER.044	1-3	4	2523	6	PT-1-1-4	RND	8	0.35	YES	135	400	135	200	1	
TU-36	F063.01.A01.305	WOMENS 284	F063.01.MER.044	1-3	5	2523	6	PT-1-1-4	RND	6	0.20	YES	110	110	110	110	1	
TU-37	F063.01.A01.306	MENS 286	F063.01.MER.044	1-3	6	2523	6	PT-1-1-4	RND	6	0.20	YES	110	110	110	110	1	
TU-31	F063.01.A01.307	OFFICE 289	F063.01.MER.044	1-3	7	2523	6	PT-1-1-4	RND	10	0.55	YES	288	960	288	480	1	
TU-29	F063.01.A01.308	OFFICE 243	F063.01.MER.044	1-3	8	2523	6	PT-1-1-4	RND	6	0.20	YES	100	325	100	160	1	
TU-30	F063.01.A01.309	TRAINING TECHNOLOGY CENTER 239	F063.01.MER.044	1-3	9	2523	6	PT-1-1-4	RND	10	0.55	YES	225	700	225	350	1	
TU-33	F063.01.A01.310	CONFERENCE 227	F063.01.MER.044	1-3	10	2523	6	PT-1-1-4	RND	10	0.55	YES	285	950	285	475	1	
TU-32	F063.01.A01.311	CONFERENCE 223	F063.01.MER.044	1-3	11	2523	6	PT-1-1-4	RND	12	0.79	YES	415	1375	415	688	1	

Siemens Industry, Inc.
Job Name: WSU School of Social Work Reno
Job Number: 44OP-172565

Valve Schedule

Submit Date: 7/21/2015
Revision Date: 3/1/2016
Engineer: JL

System: AIR HANDLING UNIT AHU-1

Number	Valve Tag	Quantity	Product Number	Line Sizes (in.)	Valve Sizes (in.)	Configuration	Body Style	Calculated Cv	Actual Cv	Failsafe	Flow (GPM)	Design P.D	Actual P.D	Close-Off (psi)	Document Number	Comment
1	HC-1	1	274-03169	2.50	1.50	2W/Sng	Globe	21.95	25.00	NO-SR	43.90	4.00	3.08	80	155-772	HEATING COIL VALVE

System: VAV TERMINAL UNITS

Number	Valve Tag	Quantity	Product Number	Line Sizes (in.)	Valve Sizes (in.)	Configuration	Body Style	Calculated Cv	Actual Cv	Failsafe	Flow (GPM)	Design P.D	Actual P.D	Close-Off (psi)	Document Number	Comment
1	TU-1	1	259-02030	0.75	0.50	2W/Sng	Globe	0.34	0.40	NO-NSR	0.50	2.17	1.56	120	155-306P25	
2	TU-2	1	259-02030	0.75	0.50	2W/Sng	Globe	0.34	0.40	NO-NSR	0.50	2.17	1.56	120	155-306P25	
3	TU-3	1	259-02030	0.75	0.50	2W/Sng	Globe	0.34	0.40	NO-NSR	0.50	2.17	1.56	120	155-306P25	
4	TU-4	1	259-02030	0.75	0.50	2W/Sng	Globe	0.41	0.63	NO-NSR	0.60	2.17	0.91	120	155-306P25	
5	TU-5	1	259-02032	0.75	0.50	2W/Sng	Globe	0.48	0.63	NO-NSR	0.70	2.17	1.23	120	155-306P25	
6	TU-6	1	259-02032	0.75	0.50	2W/Sng	Globe	0.48	0.63	NO-NSR	0.70	2.17	1.23	120	155-306P25	
7	TU-7	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
8	TU-8	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
9	TU-9	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
10	TU-10	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
11	TU-11	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
12	TU-12	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
13	TU-13	1	259-02032	0.75	0.50	2W/Sng	Globe	0.41	0.63	NO-NSR	0.60	2.17	0.91	120	155-306P25	
14	TU-14	1	259-02032	0.75	0.50	2W/Sng	Globe	0.34	0.40	NO-NSR	0.50	2.17	1.56	120	155-306P25	
15	TU-15	1	259-02030	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
16	TU-16	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
17	TU-17	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
18	TU-18	1	259-02032	0.75	0.50	2W/Sng	Globe	0.48	0.63	NO-NSR	0.70	2.17	1.23	120	155-306P25	
19	TU-19	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
20	TU-20	1	259-02032	0.75	0.50	2W/Sng	Globe	0.61	0.63	NO-NSR	0.90	2.17	1.23	120	155-306P25	
21	TU-21	1	259-02032	0.75	0.50	2W/Sng	Globe	0.48	0.63	NO-NSR	0.70	2.17	1.23	120	155-306P25	
22	TU-22	1	259-02032	0.75	0.50	2W/Sng	Globe	0.48	0.63	NO-NSR	0.70	2.17	1.23	120	155-306P25	
23	TU-23	1	259-02032	0.75	0.50	2W/Sng	Globe	0.44	0.63	NO-NSR	0.65	2.17	1.06	120	155-306P25	
24	TU-24	1	259-02032	0.75	0.50	2W/Sng	Globe	0.44	0.63	NO-NSR	0.65	2.17	1.06	120	155-306P25	
25	TU-25	1	259-02032	0.75	0.50	2W/Sng	Globe	0.81	0.63	NO-NSR	0.90	2.17	2.04	120	155-306P25	
26	TU-26	1	259-02032	0.75	0.50	2W/Sng	Globe	0.81	0.63	NO-NSR	0.90	2.17	2.04	120	155-306P25	
27	TU-27	1	259-02032	0.75	0.50	2W/Sng	Globe	0.48	0.63	NO-NSR	0.70	2.17	1.23	120	155-306P25	
28	TU-28	1	259-02032	0.75	0.50	2W/Sng	Globe	0.48	0.63	NO-NSR	0.70	2.17	1.23	120	155-306P25	
29	TU-29	1	259-02032	0.75	0.50	2W/Sng	Globe	0.41	0.63	NO-NSR	0.60	2.17	0.91	120	155-306P25	
30	TU-30	1	259-02032	0.75	0.50	2W/Sng	Globe	0.54	0.63	NO-NSR	0.80	2.17	1.61	120	155-306P25	
31	TU-31	1	259-02036	0.75	0.50	2W/Sng	Globe	1.09	1.60	NO-NSR	1.60	2.17	1.00	120	155-306P25	
32	TU-32	1	259-02036	0.75	0.50	2W/Sng	Globe	1.09	1.60	NO-NSR	1.60	2.17	1.00	120	155-306P25	
33	TU-33	1	259-02034	0.75	0.50	2W/Sng	Globe	0.88	1.00	NO-NSR	1.30	2.17	1.69	120	155-306P25	
34	TU-34	1	259-02034	0.75	0.50	2W/Sng	Globe	0.81	1.00	NO-NSR	1.20	2.17	1.44	120	155-306P25	
35	TU-35	1	259-02034	0.75	0.50	2W/Sng	Globe	0.81	1.00	NO-NSR	1.20	2.17	1.44	120	155-306P25	
36	TU-36	1	259-02034	0.75	0.50	2W/Sng	Globe	0.81	1.00	NO-NSR	1.20	2.17	1.44	120	155-306P25	
37	TU-37	1	259-02034	0.75	0.50	2W/Sng	Globe	0.81	1.00	NO-NSR	1.20	2.17	1.44	120	155-306P25	

System: CUH

Number	Valve Tag	Quantity	Product Number	Line Sizes (in.)	Valve Sizes (in.)	Configuration	Body Style	Calculated Cv	Actual Cv	Failsafe	Flow (GPM)	Design P.D	Actual P.D	Close-Off (psi)	Document Number	Comment
1	CUH-1	1	G325+NF120-S US	1.00	1.00	3W/Sng	Globe	2.43	14.00	SR	6.20	6.50	0.20	220	Belimo	
2	CUH-2	1	G325+NF120-S US	1.00	1.00	3W/Sng	Globe	2.43	14.00	SR	6.20	6.50	0.20	220	Belimo	
3	CUH-3	1	G325+NF120-S US	1.00	1.00	3W/Sng	Globe	1.84	14.00	SR	4.70	6.50	0.11	220	Belimo	
4	CUH-4	1	G325+NF120-S US	1.00	1.00	3W/Sng	Globe	1.84	14.00	SR	4.70	6.50	0.11	220	Belimo	

System: DOMESTIC WATER HEATER

Number	Valve Tag	Quantity	Product Number	Line Sizes (in.)	Valve Sizes (in.)	Configuration	Body Style	Calculated Cv	Actual Cv	Failsafe	Flow (GPM)	Design P.D	Actual P.D	Close-Off (psi)	Document Number	Comment
1	V-1	1	8040C004	1.00	1.00	2W/Sng	Solenoid	-	-	NC-SR	-	-	-	-	Asco	DWH-1 SHUTOFF VALVE

male

Notes:

All control valves and wells shall be installed by the mechanical contractor

Flow units are in GPM (Water) lbs/hr (Steam)

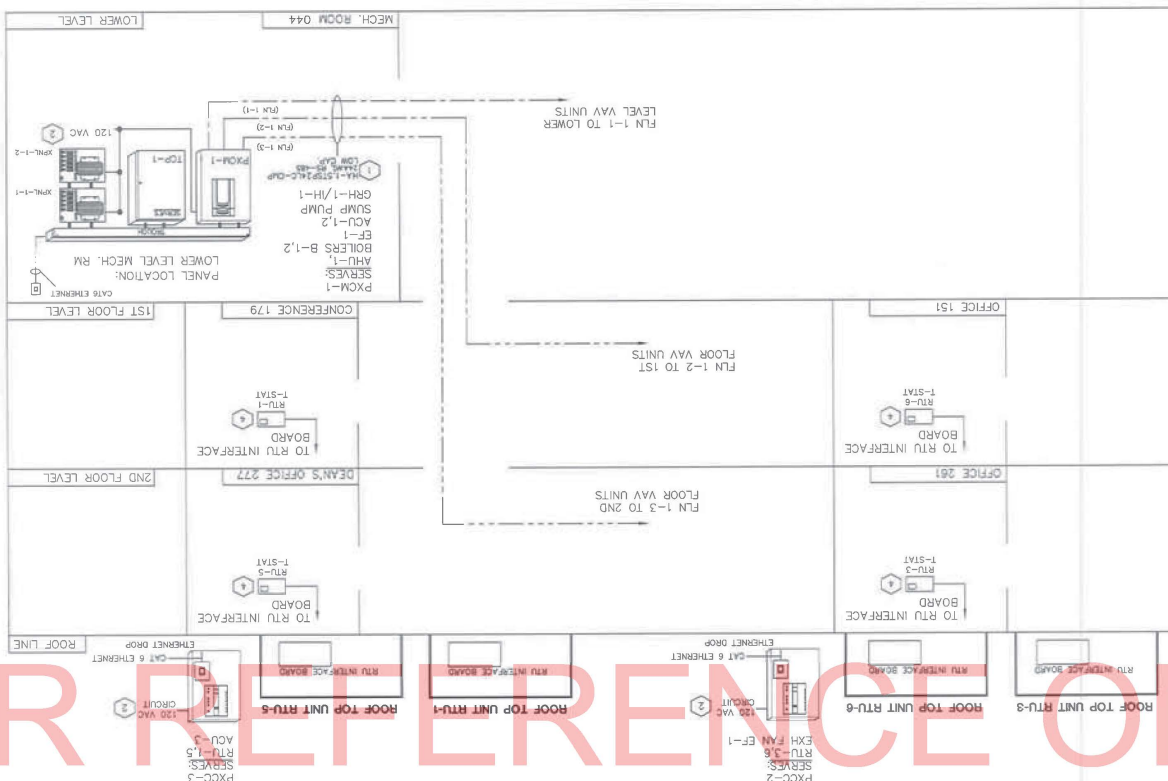
Failsafe Notation: NSR = Non-Spring Return, SR = Spring Return, FS = Failsafe

Valve Configuration Notation: 2W = 2-Way, 3W = 3-Way

Seating Notation: Sng = Single Seated, Dbl = Double Seated

FOR REFERENCE ONLY

WSU SCHOOL OF SOCIAL WORK BLDG.



- 1) USE SIEMENS APPROVED WIRING FOR ALN/ETHERNET/BACNET INSTALLATION NOTES.
- 2) NETWORKING.
- 3) DO NOT INSTALL 120 VAC CIRCUITS IN WIRING TROUGH, SEPARATION OF HIGH/LOW VOLTAGE WIRING MUST BE MAINTAINED.
- 4) ETHERNET DROP PROVIDED BY WAYNE STATE UNIVERSITY.

[illegible]

XMC-1	192.168.52.50	SUBNET MASK	GATTWAY
XMC-2	192.168.52.51		
XMC-3	192.168.52.55		

Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CS 1-3	3	H608	VERIS	H608	CUR SW SPLICER-ADJ SETPT W/LED
DPTC 1	1	DPTC	SEE SCHEDULE		SEE DPTC SCHEDULE
G 1	1	401132FL25L60PSI	ASHCROFT	1132	SH132 DIFF PRESS GAUGE
HTTE 1	1	QFA3171	SIEMENS	QFA3171	RH: 4-20MA / T: 4-20MA
	1	AGF3100	SIEMENS		RADIATION SHIELD OUTDOOR AIR
PTE 1	1	7MF15554BE005E1	SIEMENS		SENSOR, LIQUID/GAS, 4-20MA, 0-30 PSIG
RIB 1-2	2	RIBUC	FUNCTIONAL DEVICES	RIBUC	RIB 120VAC 24VAC/DC SPDT
RIB 4-5	2	RIBUC	FUNCTIONAL DEVICES	RIBUC	RIB 120VAC 24VAC/DC SPDT
SW 1	1	WFS-KR-ST	KELE INC		PLATE EMER PUSH SHUTDOWN; KEY RESET
	1	PLNCOB	PILLA	WPS	N/C CONTACT BLOCK
SW 2	1	WFS-KR-ST	KELE INC		PLATE EMER PUSH SHUTDOWN; KEY RESET
	1	PLNCOB	PILLA	WPS	N/C CONTACT BLOCK
TE 1	1	141-0522	SIEMENS	141-0522	ELECTRIC SURFACE MOUNT THERMOSTAT
TTE 1-6	6	536-767-25	SIEMENS	536-7XX	IMMEL SNR, 30-250JF, 2.5" LOTH
Panel Mounted Devices					
RE 1-3	3	RH3B-JLAC24V-KIT	LECTRO COM	RH3BUL 24	(1) RH3B-JLAC24V & (1) SH3B-05 SOCKET

HOT WATER HEATING SYSTEM CONTROL

SEQUENCE OF OPERATION

- ALL SETPOINTS, DEADBANDS, DELAY TIMERS, ETC., INCLUDING TIME-OF-DAY HOURS OF OPERATION AND SETPOINTS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS (CREATE REQUIRED VIRTUAL POINTS). APPROPRIATE DEADBANDS SHALL BE USED TO PREVENT SHORT CYCLING SITUATIONS.
- ALL MOTOR CONTROL SWITCHES SHALL BE IN "AUTO" POSITION.
- HOT WATER HEATING (HWH) SYSTEM SHALL BE ACTIVATED FOR CONTINUOUS OPERATION DURING BUILDING OCCUPANCY OR WHEN OUTDOOR AIR TEMPERATURE (HTE-1) IS BELOW 60° F FOR BUILDING UNOCCUPANCY. HWH SYSTEM SERVES ALL

TERMINAL UNITS WITH TEMPERING COILS FOR REHEAT DURING COOLING SEASON.

- VARIABLE SECONDARY HWH CIRCULATION PUMPS CP-3 & CP-4 SHALL HAVE START/STOP CAPABILITY FROM THE DDC SYSTEM. ONE OF THE TWO PUMPS SHALL BE ACTIVATED BY DDC TO OPERATE CONTINUOUSLY. THE OTHER WILL SERVE AS STANDBY.
- DDC SHALL ALTERNATE PUMP CP-3 & CP-4 OPERATION BASED ON RUNTIME HOURS - DURATION IS OPERATOR SELECTABLE.
- DDC SHALL MONITOR OPERATING STATUS OF EACH PUMP. UPON LEAD PUMP FAILURE, DDC SHALL ACTIVATE FAILURE ALARM AND AUTOMATICALLY START THE STANDBY PUMP.
- DDC SHALL MODULATE THE VARIABLE SPEED DRIVE (VFD) OF LEAD HWH CIRC. PUMP TO MAINTAIN LOOP DIFFERENTIAL PRESSURE SETPOINT TO BE DETERMINED AT SYSTEM BALANCING. INITIAL SETPOINT SHALL BE 25 FEET OF HEAD. WHEN DP REDUCES BELOW SETPOINT, DDC SHALL MODULATE THE PUMP MOTOR VFD SPEED HIGHER TO MEET SETPOINT. WHEN DP INCREASES ABOVE SETPOINT, DDC SHALL MODULATE THE PUMP MOTOR VFD SPEED LOWER TO MEET SETPOINT. PUMP MOTOR SPEED SHALL NOT BE ALLOWED TO REDUCE BELOW THE MFR'S PUMP CURVE AND SHALL BE HELD CONSTANT UNTIL DEMAND REQUIRES MORE PUMP SPEED.
- BOILER LOCAL/REMOTE SWITCH SHALL BE IN REMOTE POSITION. REMOTE CONTROL SHALL BE THRU BOILER SEQUENCING PANEL. FURNISHED BY BOILER SUPPLIER. DDC SYSTEM SHALL ENABLE BOILER SEQUENCING PANEL CONTROL WHEN SECONDARY HWH CIRC. PUMP CP-3 OR CP-4 IS ACTIVATED.
- WHENEVER A BOILER IS ACTIVATED, ITS RESPECTIVE PRIMARY CIRC. PUMP (CP-1 OR CP-2) SHALL BE ACTIVATED FROM THE LOCAL BOILER CONTROL PANEL FROM A FACTORY WIRE CONTROL RELAY. WHENEVER A BOILER IS DE-ACTIVATED, ITS RESPECTIVE PRIMARY CIRC. PUMP SHALL RUN FOR A FEW EXTRA MINUTES (BASED ON THE BOILER MANUFACTURER'S RECOMMENDATION) TO DISSIPATE HEAT FROM THE DE-ACTIVATED BOILER. A FACTORY-PROVIDED WATER FLOW SWITCH AT EACH BOILER SHALL PROVE WATER FLOW TO THE LOCAL CONTROL PANEL BEFORE THE BOILER IS ALLOWED TO FIRE.
- THE LOCAL CONTROL PANELS DETERMINE BURNER MODULATION TO MAINTAIN HWH SUPPLY TEMP (TTE, FACTORY PROVIDED) SETPOINT BASED ON BAS OUTDOOR AIR RESET SCHEDULE. WITH BOTH BOILERS AVAILABLE, SEQUENCE SHALL BE TO ACTIVATE LOW FIRE OF LEAD BOILER, FOLLOWED BY LOW FIRE OF LAG BOILER, THEN SIMULTANEOUS MODULATION OF BOILER BURNER MODULATION.
- THE BOILER SEQUENCING PANEL SHALL INCLUDE OPERATOR SELECTABLE BOILER LEAD/LAG OPERATION OR FIRST ON/FIRST OFF OPERATION.
- EACH BOILER LOCAL CONTROL PANEL SHALL INCLUDE AN OPERATOR LIMIT WITH SETPOINT OF 160° F (TO BE USED WHEN BOILER LOCAL/REMOTE SWITCH IS IN LOCAL POSITION) AND A MANUAL-RESET HI-LIMIT SAFETY WITH SETPOINT OF 180° F.
- DDC SHALL MONITOR BOILER RUN STATUS AND COMMON ALARM FOR EACH BOILER THROUGH DRY CONTACTS AVAILABLE IN RESPECTIVE BOILER CONTROL PANEL
- DDC SHALL MONITOR SECONDARY WATER TEMPERATURES (TTE-2,3) AND HEADER PRIMARY WATER TEMPERATURES (TTE-1,4) FOR DIAGNOSTIC PURPOSES.
- WHEN HWH SYSTEM IS ACTIVATED, DDC SHALL MONITOR SYSTEM PRESSURE (PTE-1) AND ACTIVATE AN ALARM IF PRESSURE DROPS BELOW ITS LOW LIMIT SETPOINT OF 20 PSIG (POSSIBLY INDICATING A SYSTEM WATER LEAK).
- WHEN ONE OF THE REMOTE BOILER SHUTDOWN SWITCHES IS PUSHED, BURNER CONTROLS FOR ALL BOILERS SHALL BE DE-ENERGIZED THRU HARDWARE INTERLOCK. DDC SHALL MONITOR SWITCH CIRCUIT AND ACTIVATE ALARM WHEN REMOTE BOILER SHUTDOWN CONDITION OCCURS.

REVISION HISTORY

1	2/18/2016	RTD	AS-BUILT DRAWING
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ENGINEER	DESIGNED BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	07/21/16	02/18/16

BOILER CONTROL DIAGRAM

440P-172585

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FOR REFERENCE ONLY

REMOTE BOILER/DWH EMERGENCY SHUTDOWN WIRING

SEQUENCE OF OPERATION:

1. UNDER NORMAL OPERATING CONDITIONS, THE PUSH BUTTON CIRCUIT ENERGIZES THE RELAY'S NORMALLY OPEN (NO) CONTACTS, WHICH CLOSE AND NORMALLY CLOSED (NC) CONTACTS, WHICH OPEN.
2. WHEN EITHER PUSH BUTTON IS ACTIVATED, THE RELAY NO CONTACTS SHALL OPEN AND INTERRUPT ALL BOILERS' CONTROL CIRCUITS AND THE NO CONTACT SHALL CLOSE THE DWH EMERGENCY GAS SOLENOID VALVE TO THE GAS SUPPLY.
3. WHEN PUSH BUTTON SWITCH IS KEY-RELEASED, THE RELAYS RE-ENERGIZE CONTACTS FOR BOILERS' CONTROL CIRCUITS AND OPEN DWH-1 EMERGENCY GAS SOLENOID VALVE.
4. DDC SHALL ACTIVATE AN ALARM WHEN A PUSH BUTTON SWITCH HAS BEEN PUSHED.

DOMESTIC HW SYSTEMS CONTROL

SEQUENCE OF OPERATION:

1. CIRC PUMP SHALL BE STARTED BY RESPECTIVE AQUASTAT (TE-1) WHEN WATER TEMPERATURE FALLS BELOW SETPOINT.
2. DDC SHALL MONITOR CIRC PUMP THRU CURRENT SWITCH FOR RUNTIME INFORMATION.
3. DDC SHALL MONITOR DOMESTIC HW SYSTEM SUPPLY TEMPERATURES AND DISPLAY FOR SYSTEM OPERATORS. DDC SHALL PROVIDE AN ALARM AT 120° F SETPOINT (ADJUSTABLE).
4. DOMESTIC HW SYSTEM HEATER SHALL BE CONNECTED TO MECH. RM EMERGENCY SHUTDOWN SYSTEM. (REFER TO BOILER WIRING DETAILS).

REVISION HISTORY

1	12/18/2016	RTD	AS-BUILT DRAWING
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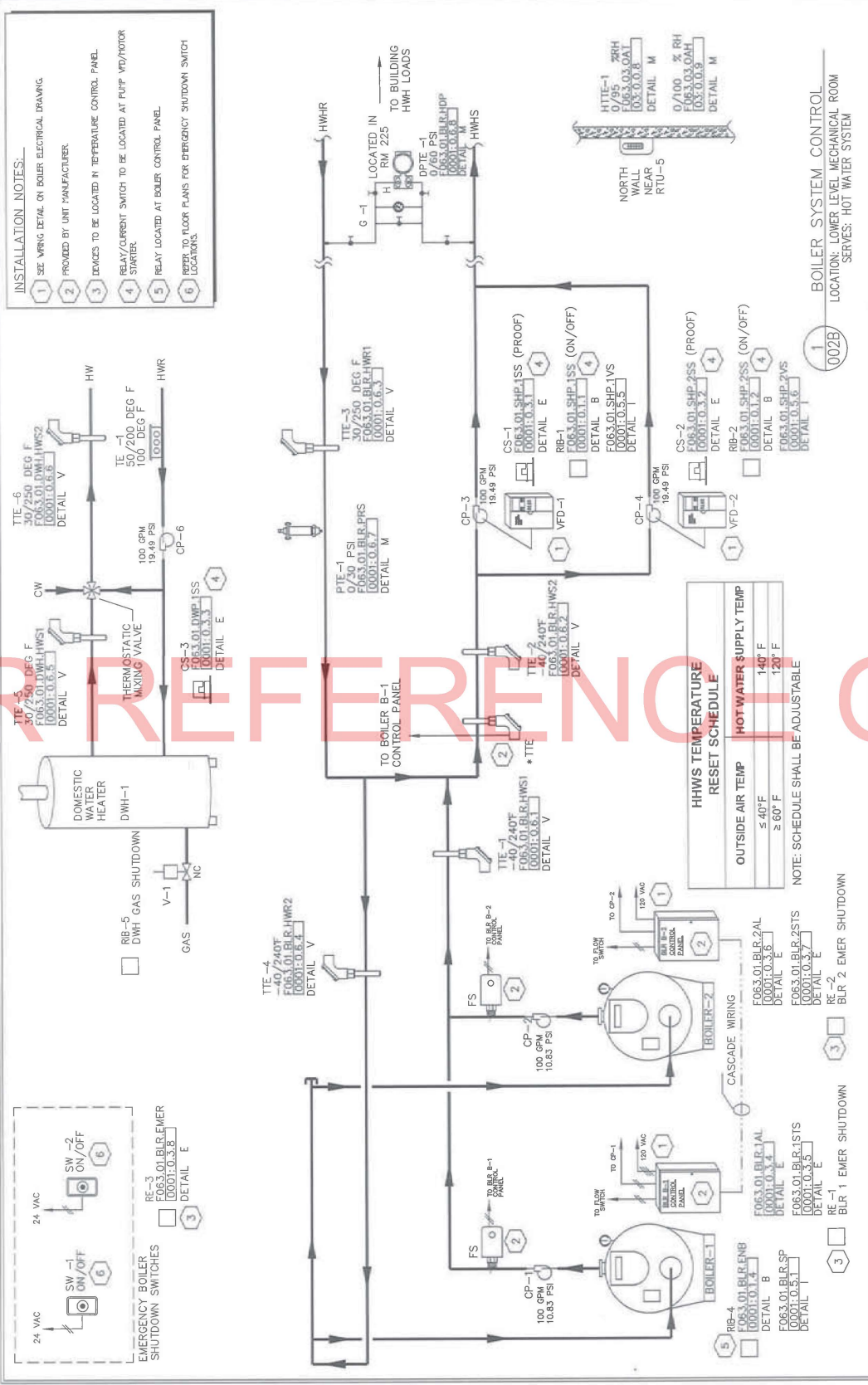
WSU School of Social Work Reno
Detroit, MI

ENGINEER	DESIGNED BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	07/21/16	02/18/16

BOILER CONTROL DIAGRAM

440P-172585
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REVISION HISTORY		SIEMENS		WSU School of Social Work Reno		440P-172585	
1	2/18/2016	RTD	AS-BUILT DRAWING		Detroit, MI		0
				45470 Commerce Ctr. Dr. Plymouth Twp. MI 48170 USA Phone: 734.468.3800 Fax: 866.815.0749		002B	
				ENGINEER: J.L. TAJ		03/01/16	
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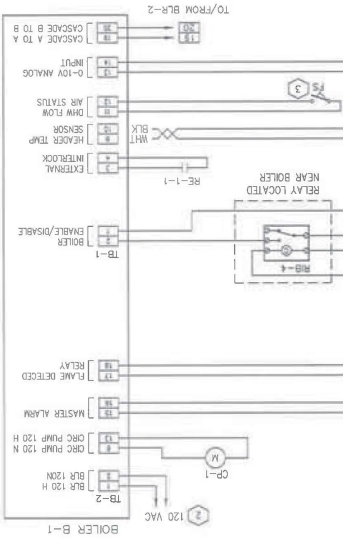
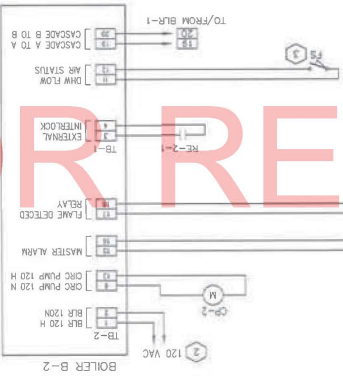
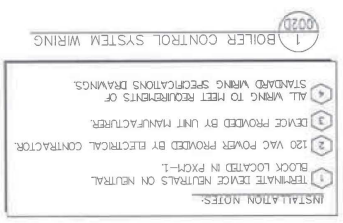
EL	PXDC-3	TEMP. CONTROL PANEL / POWER
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FIELD WIRING



STARTER WIRING



STATEMENT OF WORKING

FIELD WINING

TEMP. CONTROL PANEL / POWER [CP-1]

FXCM-1

Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1-3	3	GCA1611P	SIEMENS	GCA-161	MOD(V) SR24V, MED. PLUM
AFS 1-3	3	AFS	SEE SCHEDULE		SEE AIRFLOW STATION SCHEDULE
CS 1-6	6	H608	VERIS	H608	CUR SW SPLIT-DOOR-ADJ. SET PT W/LED
D					SEE DAMPER SUBMITTAL
HTE 1	1	QFM3101	SIEMENS	QFM3101	SENSOR (DUCT) RH: 4-20MA (HIGH QUALITY)
LIDE 1	2	134-1504	SIEMENS	134-1504	T'STAT, LOW TEMP.15/55,MANUAL
RIB 1-5	5	RIBUIC	FUNCTIONAL DEVICES	RIBUIC	RIB 120VAC 24VAC/DC SPDT
SPP 1-4	4	269-062	SIEMENS		PR269 ACCESSORY, SENSING TUBE
SPP 5	1	169-142	SIEMENS		STAT PRES ACC. SENSOR KIT
TTE 1	1	S457PEY40	MINCO		40 FT AVG TEMP SENSOR 100 OHM
	1	TT111PE1A	MINCO	TT111	TEMP XMTR 20/120 DEG F
TTE 2-3	2	544-339-18	SIEMENS	544-339-XX	DCI PT SNRS, PT 1K OHM, (375), 18" PROBE
V					SEE VALVE SUBMITTAL
Panel Mounted Devices					
DPS 1	1	141-0575	SIEMENS	141-0575	AIR FLOW SWITCH.05/12 MAN RESET
DPTA 1	1	26412R5MD111TC	SETRA	2641	DP TRAN AIR.1X2.5"
DPTA 2	1	2641010MD111TC	SETRA	2641	DP TRAN AIR.1X10"
DPTA 3	1	26412R5MD111TC	SETRA	2641	DP TRAN AIR.1X2.5"
FSA 1	1	RIBMALB-4	FUNCTIONAL	RIBMALB-4	AHU FAN SAFETY ALARM CIRCUIT 4-INPUT

AIR HANDLING UNIT AHU-1

SEQUENCE OF OPERATION

1. ALL SETPOINTS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS (GREATE REQUIRED VIRTUAL POINTS). APPROPRIATE DEADBANDS SHALL BE USED TO PREVENT SHORT CYCLING SITUATIONS.

- ALL MOTOR CONTROL SWITCHES SHALL BE IN "AUTO" POSITION.
- SUPPLY FAN WITH INTERLOCKED RETURN FAN SHALL HAVE START/STOP CAPABILITY FROM THE DDC SYSTEM. AHU SHALL OPERATE BASED ON TIME SCHEDULED OCCUPIED MODE, MORNING WARM-UP/COOL-DOWN MODE, TEMPORARY OCCUPIED MADE FROM BAS, AND NIGHT CYCLE MODE.
- PRE-OCCUPANCY WARM-UP SHALL BE UTILIZED WITH OCCUPIED MODE TIME SCHEDULE BASED ON SPACE TEMPERATURE FEEDBACK.
- ONE HOUR (ADJUSTABLE) PRE-OCCUPANCY PURGE SHALL BE UTILIZED WITH OCCUPIED MODE TIME SCHEDULE WHEN ZONE SPACE TEMPERATURE IS GREATER THAN OCCUPIED COOLING SETPOINTS AND OA TEMP IS LESS THAN SPACE TEMP AND OUTSIDE AIR TEMPERATURE IS BELOW ECONOMIZER LOCKOUT SETPOINT OF 65° F; DAMPERS SHALL BE MODULATED OPEN TO FULL OA POSITION.
- SUPPLY FAN AND RETURN FAN STATUS SHALL BE MONITORED BY DDC THRU RESPECTIVE CURRENT SWITCHES. ABNORMAL STATUS CONDITION SHALL ACTIVATE ALARM.
- WHEN AHU IS ACTIVATED DURING OCCUPIED MODE; OUTSIDE AIR, RETURN AIR & RELIEF AIR DAMPERS (HEREIN REFERRED TO AS DAMPERS) SHALL BE ALLOWED TO MODULATE AS DESCRIBED. WHEN AHU IS DEACTIVATED OR OPERATING IN NIGHT CYCLE MODE OR MORNING WARM-UP MODE, DAMPERS SHALL REMAIN IN NORMAL POSITIONS.
- DDC SHALL ACTIVATE HEATING COIL CIRC PUMP (CP-5) WHENEVER OA TEMP IS BELOW 55° F WITH SF ACTIVATED OR WHENEVER OA TEMP IS BELOW 40° F WITH SF DEACTIVATED. PUMP STATUS SHALL BE MONITORED BY DDC THRU CURRENT SWITCH. ABNORMAL STATUS CONDITION SHALL ACTIVATE ALARM.
- OA ECONOMIZER IS AVAILABLE WHEN OA ENTHALPY IS LESS THAN OR EQUAL TO RA ENTHALPY.
- WHEN SUPPLY AIR (SA) TEMP (TTE-2) IS ABOVE SETPOINT AND ECONOMIZER IS AVAILABLE, DDC SHALL FIRST MODULATE DAMPERS ABOVE MINIMUM OA FLOW POSITION TO AS MUCH AS FULLY OPEN, FOLLOWED BY DX COOLING CONTROL STAGING TO MAINTAIN DA TEMP SETPOINT. HEATING CONTROL REMAINS OFF.
- WHEN SA TEMP IS ABOVE SETPOINT AND ECONOMIZER IS NOT AVAILABLE, DDC SHALL MODULATE DAMPERS TO MAINTAIN MINIMUM OA FLOW POSITION, AND USE DX COOLING CONTROL STAGING TO MAINTAIN SA TEMP SETPOINT. HEATING CONTROL REMAINS OFF.
- WHEN SA TEMP IS BELOW SETPOINT (AND ECONOMIZER IS NOT AVAILABLE), DDC SHALL MODULATE DAMPERS TO MAINTAIN MINIMUM OA FLOW POSITION AND ENABLE HEATING CONTROL TO MAINTAIN SA TEMP SETPOINT. DX COOLING CONTROL REMAINS OFF.
- DDC SHALL OVERRIDE DAMPER CONTROL TO PREVENT MIXED AIR TEMPERATURE FROM DROPPING BELOW LOW LIMIT SETPOINT. MIXED AIR TEMP SETPOINT SHALL BE BASED ON THE FOLLOWING OUTDOOR AIR TEMP RESET SCHEDULE:

OAT	MAT
≤ 20° F	50° F
≥ 40° F	40° F
- SUPPLY AIR TEMP (SAT) SETPOINT SHALL BE BASED ON THE FOLLOWING OUTDOOR AIR TEMP RESET SCHEDULE:

OAT	SAT
≤ 30° F	60° F
≥ 55° F	55° F
- DDC SHALL MONITOR OUTDOOR AIRFLOW (AFS-1) AND MODULATE DAMPERS ACCORDINGLY TO MAINTAIN MINIMUM OA CFM OF 3350 CFM. REFER TO MECHANICAL SCHEDULES FOR MINIMUM OUTDOOR AIR INFORMATION.
- SF VFD SHALL BE MODULATED BY DDC TO MAINTAIN SYSTEM SUPPLY AIR STATIC PRESSURE (DPTA-3) SETPOINT THAT

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AHU-1 CONTROL DIAGRAM

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- SHALL BE RESET BASED ON DAMPER POSITION FEEDBACK FROM ASSOCIATED VAV BOX CONTROLLERS AS FOLLOWS:
SETPOINT SHALL BE ADJUSTED TO ALLOW 3 SA TERMINAL UNITS TO OPERATE AT 90% OPEN DAMPER POSITION. BELOW 3
AT 90% SETPOINT SHALL BE SLOWLY DECREASED. ABOVE 3 AT 90% SETPOINT SHALL BE SLOWLY INCREASED. SETPOINT
RANGE SHALL BE 0.5" W.G. TO 1.5" W.G. (BOTH ADJUSTABLE).
17. RF VFD SHALL BE MODULATED TO MAINTAIN A 2000 CFM DIFFERENTIAL SETPOINT BETWEEN SUPPLY AIRFLOW (AFS-2)
AND RETURN AIRFLOW (AFS-3). REFER TO MECHANICAL SCHEDULES FOR SUPPLY AND RETURN AIRFLOW IN FORMATION. FOR
WARM-UP AND NIGHT CYCLE MODES (WHEN DAMPERS ARE IN NORMAL POSITION), THE CFM DIFFERENTIAL SHALL BE ZERO
AND SUPPLY STATIC PRESSURE CONTROL SHALL BE LIMITED BY THE MAXIMUM RF AIRFLOW.
18. FREEZESTAT(S) (LIDE-1) SHALL DEACTIVATE SUPPLY FAN WHEN TEMPERATURE IS 35° F OR BELOW. DDC SHALL
MONITOR FREEZESTAT STATUS AND ACTIVATE ALARM IF CONDITION OCCURS. PROVIDE MANUAL RESET FREEZESTAT.
19. DUCT SMOKE DETECTOR(S) SHALL DEACTIVATE SF & INTERLOCKED RF WHEN PRODUCTS OF COMBUSTION ARE DETECTED.
20. STATIC PRESSURE HIGH LIMIT (OPS-1) AT AHU WITH SETPOINT OF 5.0" W.G. SHALL PROVIDE OVERRIDE CONTROL AND
HIGH LIMIT SWITCH SHALL PROVIDE HARDWIRED SAFETY. PROVIDE MANUAL RESET SWITCH.
21. WHEN AHU IS DEACTIVATED IN NIGHT CYCLE AND OFF, DX COOLING SHALL BE COMMANDED OFF AND HEATING COIL
VALVE SHALL BE MODULATED BY DDC BASED ON MA TEMP TO MAINTAIN LOW LIMIT PLENUM TEMP SETPOINT OF 50° F.
OUTSIDE AND RELIEF AIR DAMPER CLOSURES FULLY AND THE RETURN AIR DAMPER OPENS FULLY. WHEN AHU IS IN NIGHT
CYCLE AND ON, OUTSIDE AND RELIEF DAMPERS REMAIN FULLY CLOSED, AND RETURN AIR DAMPER IS FULLY OPEN.
22. DURING UNOCCUPIED HEATING MODE, AHU SHALL UTILIZE NIGHT CYCLE MODE TO MAINTAIN A NIGHT SETBACK
TEMPERATURE OF 62° F. AHU SAT SETPOINT SHALL BE 90° F AND TERMINAL UNIT DAMPERS COMMANDED OPEN. DDC SHALL
REFERENCE ALL TERMINAL UNIT CONTROLLERS ASSOCIATED WITH RESPECTIVE AHU AND CYCLE AHU BASED ON LOWEST
SPACE TEMP READING. PROGRAM SHALL EXCLUDE SPACE TEMP SENSORS THAT MAY HAVE FAILED OR NOT COMMUNICATING
— PROVIDE SENSOR FAILURE ALARM WHEN CONDITION OCCURS.
23. DURING UNOCCUPIED COOLING MODE, AHU SHALL UTILIZE NIGHT CYCLE MODE TO MAINTAIN A NIGHT SETUP
TEMPERATURE OF 82° F. AHU SAT SETPOINT SHALL BE 55° F AND TERMINAL UNIT DAMPERS COMMANDED OPEN. DDC SHALL
REFERENCE ALL VAV BOX CONTROLLERS ASSOCIATED WITH RESPECTIVE AHU AND CYCLE AHU BASED ON HIGHEST SPACE
TEMP READING. PROGRAM SHALL EXCLUDE SPACE TEMP SENSORS THAT MAY HAVE FAILED OR NOT COMMUNICATING
— PROVIDE SENSOR FAILURE ALARM WHEN CONDITION OCCURS.
24. ASSOCIATED TERMINAL UNITS WITH TEMPERING COILS SHALL BE CONTROLLED BY UNITARY DDC CONTROLLERS (REFER TO
TERMINAL UNIT SEQUENCE OF OPERATION.)

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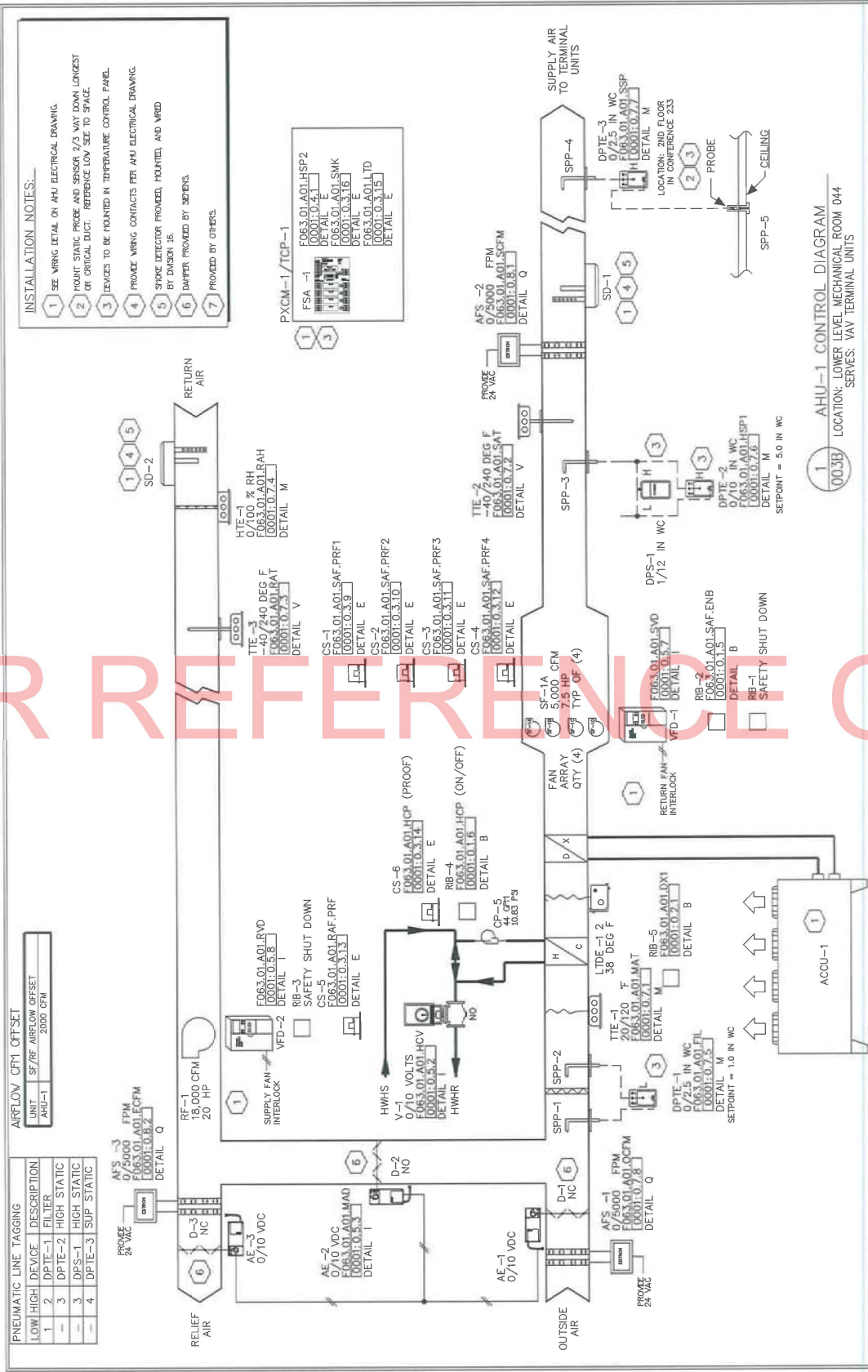
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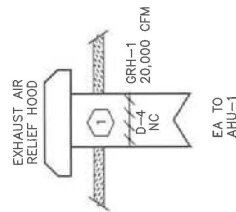
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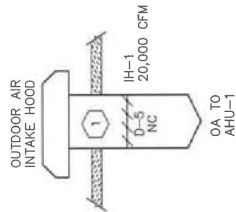
AHU-1 CONTROL DIAGRAM	
ENGINEER	JL TAJ
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DATE	07/21/16
LAST MOD. DATE	03/01/16

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INSTALLATION NOTES:
1 DRAFTER PROVIDED BY SIEMENS



1 GRAVITY RELIEF HOOD CONTROL
LOCATION: ROOF
SERVES: AHU-1 RELIEF AIR



2 INTAKE HOOD CONTROL
LOCATION: ROOF
SERVES: AHU-1 INTAKE AIR

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INITIAL RELEASE: 07/21/16
LAST EDIT DATE: 03/01/18
AHU-1 CONTROL DIAGRAM

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CS 1	4	H608	VERIS	1006cut016	CUR SW SPLITCO-ADJ SEIPT W/LED
0					SEE DAMPER SUBMITTAL

ROOF TOP UNIT CONTROL

SEQUENCE OF OPERATION:

1. SPACE SENSOR WILL BE WIRED TO PACKAGED UNIT CONTROLLER TO MAINTAIN SPACE TEMP SETPOINTS.
2. HEATING AND COOLING SETPOINTS SHALL BE LOCALLY ADJUSTABLE AT PROGRAMMABLE SENSOR. THERE SHALL BE A MINIMUM 3" DEG F DEADBAND BETWEEN SETPOINTS.
3. DDC SHALL MONITOR RUNNING STATUS OF ROOF TOP FAN THRU CURRENT SENSOR.
4. RECOMMENDED SETPOINTS SHALL BE:
 - 6.1. UNOCCUPIED HEATING 62° F (ADJUSTABLE)
 - 6.2. OCCUPIED HEATING 72° F (ADJUSTABLE)
 - 6.3. OCCUPIED COOLING 75° F (ADJUSTABLE)
 - 6.4. UNOCCUPIED COOLING 82° F (ADJUSTABLE)

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JL	TAJ	10/02		03/02/16

RTU-1 CONTROL DIAGRAM

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INSTALLATION NOTES:

1 RTU IS CONTROLLED BY UNIT MANUFACTURER.

2 DEVICE PROVIDED BY UNIT MANUFACTURER, INSTALLED AND WIRED BY OTHERS.



LOCATION	OCB MODE	UNIT STATUS	GENERAL ALARM	FAN PROOF	SUPPLY AIR
RTU-1	F063.03.RTU1.OCB 03.00.30 DETAIL B			F063.03.RTU1.SAF.PRF 03.00.30 DETAIL E	F063.03.RTU1.SAT 03.00.10 DETAIL V
RTU-5	F063.03.RTU5.OCB 03.00.30 DETAIL B			F063.03.RTU5.SAF.PRF 03.00.30 DETAIL E	F063.03.RTU5.SAT 03.00.10 DETAIL V

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RTU-1,5 CONTROL DIAGRAM

INSTALLATION NOTES:

① RTU IS CONTROLLED BY UNIT MANUFACTURER.

② DEVICE PROVIDED BY UNIT MANUFACTURER, INSTALLED AND WIRED BY OTHERS.



LOCATION	OCC MODE	UNIT STATUS	GENERAL ALARM	FAN PROOF	SUPPLY AIR
RTU-3				F06.3.02.RTU3.SAF.PRF 02.0.0.1 DETAIL E	F06.3.02.RTU3.SAT 02.0.0.1 DETAIL V
RTU-6				F06.3.02.RTU6.SAF.PRF 02.0.0.6 DETAIL F	F06.3.02.RTU6.SAT 02.0.0.4 DETAIL F

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Control Devices	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE	1	GMA221.1U	SIEMENS	GMA-221	2PT SR120V/52LBN
CS	1	H608	VERIS	H608	CUR SW SPLITCOR-ADJ SETPT W/LED
D					SEE DAMPER SUBMITTAL
RIB	1	RIBUTC	FUNCTIONAL DEVICES	RIBUTC	RIB 120VAC 24VAC/DC SPDT

EXHAUST FAN EF-1 CONTROL

SEQUENCE OF OPERATION:

- HAND/OFF/AUTO POSITIONS SHALL BE IN AUTO POSITION FOR AUTOMATED CONTROL THRU BAS.
- EXHAUST FAN SHALL BE STARTED AND STOPPED BY DDC BASED ON AHU-1 OCCUPIED SCHEDULE. WIRING INTERLOCK SHALL OPEN DAMPERS.
- DDC SHALL MONITOR EF RUN STATUS THRU CURRENT SWITCH. ABNORMAL STATUS CONDITION SHALL ACTIVATE ALARM.

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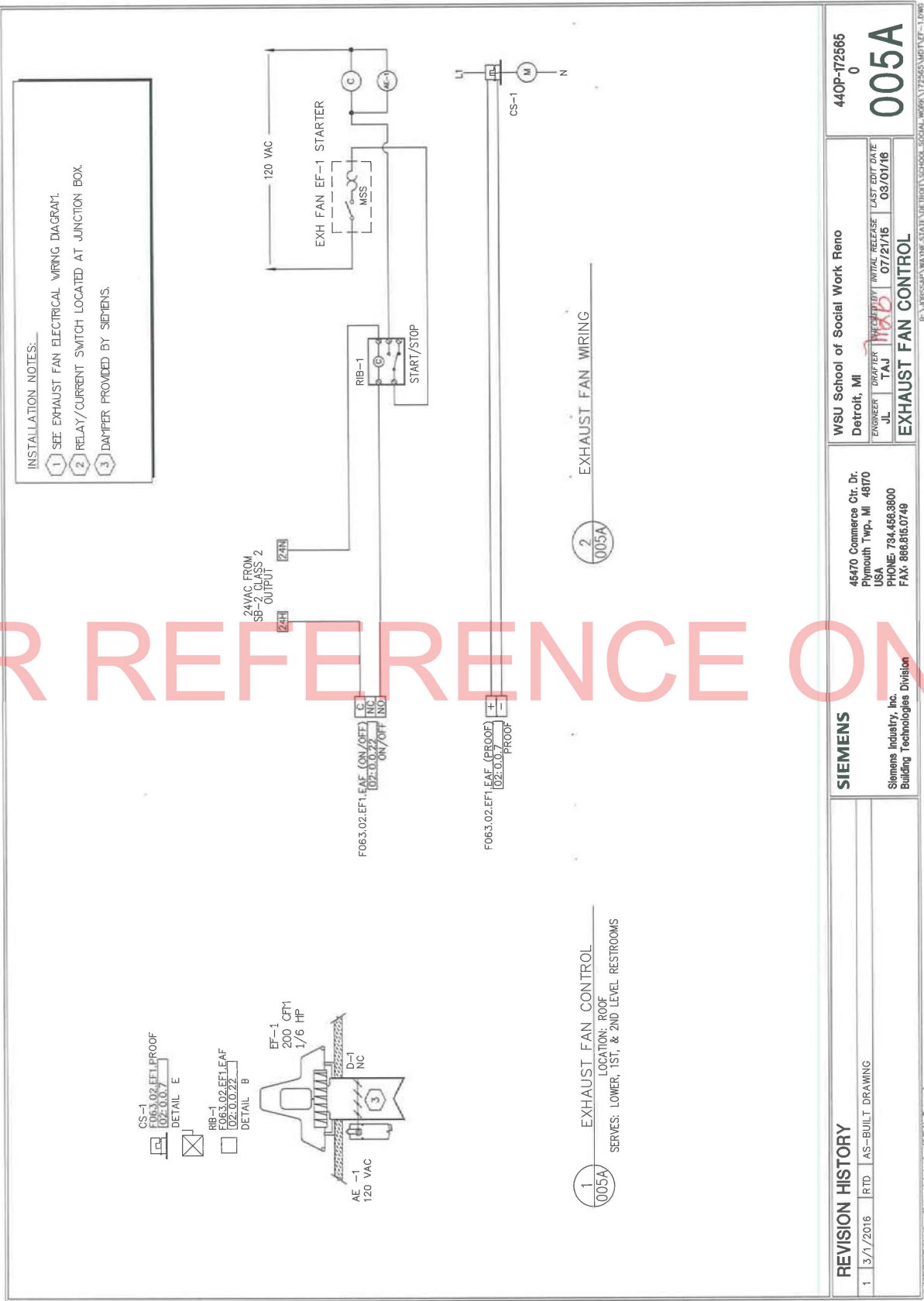
EXHAUST FAN CONTROL

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SUMP PUMP SP-1 ALARM MONITORING

SEQUENCE OF OPERATION

1. DDC SHALL MONITOR SUMP PUMP SYSTEM FOR HIGH WATER LEVEL ALARM.

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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ENGINEER	DRAWN BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	07/21/16	03/01/16

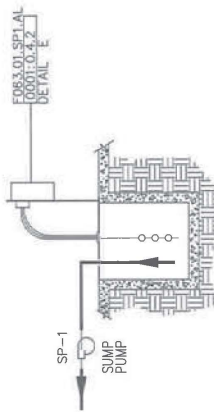
SUMP PUMP CONTROL DIAGRAM

440P-172565

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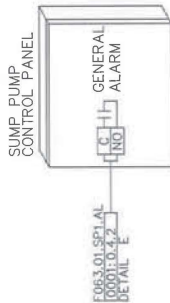
006

FOR REFERENCE ONLY



1
006A

SUMP PUMP MONITORING
LOCATION: ELEVATOR MACHINE 045
SERVES: ELEVATOR



2
006A

SUMP PUMP WIRING
LOCATION: JANITOR CLOSET 042

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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JL	TAJ	07/21/16	03/01/18

SUMP PUMP CONTROL DIAGRAM

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Control Devices	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
TTE 1	1	536-753B	SIEMENS	536-753B	SIK RM TEMP SNSR WHITE.20/120F
	1	544-782B	SIEMENS		SINGLE GOOF MOUNTING PLATE KIT WHITE
TTE 2	1	536-753B	SIEMENS	536-753B	SIK RM TEMP SNSR WHITE.20/120F
	1	544-782B	SIEMENS		SINGLE GOOF MOUNTING PLATE KIT WHITE
TTE 3	1	536-753B	SIEMENS	536-753B	SIK RM TEMP SNSR WHITE.20/120F
	1	544-782B	SIEMENS		SINGLE GOOF MOUNTING PLATE KIT WHITE

ACU-1, 2 & 3

SEQUENCE OF OPERATION:

1. DDC SHALL MONITOR SPACE TEMP AND ACTIVATE ALARM IF HIGH OR LOW LIMIT SETPOINTS (68/76 DEG F) ARE REACHED.

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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ENGINEER	DRAWN BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	07/21/16	03/01/18

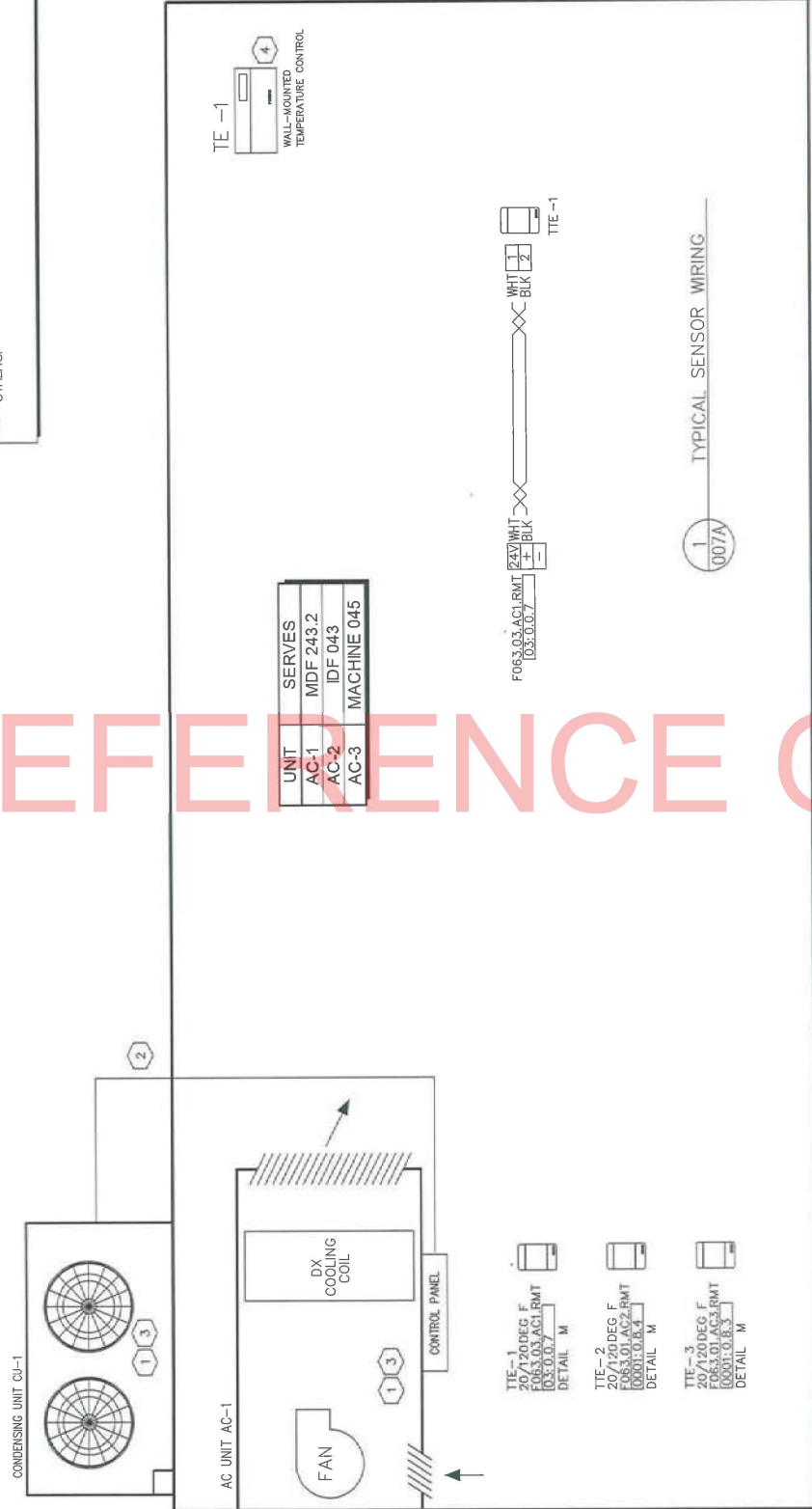
ACU CONTROL DIAGRAM

440P-172565
0

007

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- INSTALLATION NOTES:-
- 1 ALL EQUIPMENT/START-UP PROVIDED BY MECHANICAL CONTRACTOR
 - 2 CONTROL INTERLOCK WIRING BETWEEN CONDENSING UNIT AND AC UNIT BY OTHERS.
 - 3 230 VAC POWER TO UNIT BY DIVISON 16.
 - 4 PROVIDED BY UNIT MANUFACTURER, INSTALLED AND WIRED BY OTHERS.



REVISION HISTORY		SIEMENS		WSU School of Social Work Reno		440P-172585	
1	3/1/2016	RTD	AS-BUILT DRAWING	Detroit, MI		0	
				ENGINEER		007A	
				JL TAJ		07/21/16 03/07/16	
				ACU CONTROL DIAGRAM			
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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
ATEC 1	32	550-405	SIEMENS	550-405	ATEC VAV CONTROLLER
DBL 1	32	588-1008	SIEMENS		6-WIRE 2-RJ45 RS CABLE 50/PLIN
ITE 1	32	QAA2280.FWSC	SIEMENS	QAA2280.FWSC	RTS, TEC DIG., F-F, SL
ITE 2	32	536-811	SIEMENS	536-811	100K OHM DUCT TEMP SENSOR
V					SEE VALVE SUBMITTAL

TERMINAL UNIT WITH REHEAT COIL CONTROL

SEQUENCE OF OPERATION

NOTE: ALL SETPOINTS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS (CREATE REQUIRED VIRTUAL POINTS).

1. ALL VAV TU'S ASSOCIATED WITH A SINGLE ZONE SPACE TEMP SENSOR SHALL BE DEFINED AS A ZONE.
2. THE SUPPLY AIR TERMINAL UNIT'S (TU) MINIMUM AND MAXIMUM AIRFLOW SETTINGS SHALL BE AS INDICATED ON THE MECHANICAL SCHEDULES.
3. WHEN ZONE SPACE TEMP RISES ABOVE THE COOLING SETPOINT, THE SUPPLY AIR TU CONTROLLER SHALL KEEP THE TEMPERING COIL VALVE CLOSED AND MODULATE THE SUPPLY AIRFLOW BETWEEN ITS MINIMUM AND MAXIMUM SETTINGS.
4. FOR ZONES WITHOUT PERIMETER WALLS, WHEN ZONE SPACE TEMP FALLS BELOW HEATING SETPOINT, THE SUPPLY AIR TU CONTROLLER SHALL FIRST MODULATE TU DAMPER TOWARDS ITS MIN AIRFLOW SETTING. WHEN AIRFLOW IS AT MIN, CONTROLLER SHALL MODULATE TEMPERING COIL CONTROL VALVE TOWARDS OPEN TO MAINTAIN ROOM TEMPERATURE.
5. FOR ZONES WITH PERIMETER WALLS, WHEN ZONE SPACE TEMP FALLS BELOW HEATING SETPOINT, THE SUPPLY AIR TU CONTROLLER SHALL FIRST MODULATE TU DAMPER TOWARDS ITS MIN AIRFLOW SETTING. WHEN AIRFLOW IS AT MIN, CONTROLLER SHALL MODULATE TEMPERING COIL CONTROL VALVE TOWARDS OPEN. IF THE ROOM TEMP IS BELOW SETPOINT WITH TEMPERING COIL VALVE FULL OPEN, THE SUPPLY AIR TU CONTROLLER SHALL MODULATE THE SUPPLY AIRFLOW BETWEEN ITS MINIMUM AND MAXIMUM SETTING TO MAINTAIN ROOM TEMPERATURE.
6. (WHERE APPLICABLE), WHEN ZONE IS UNOCCUPIED DURING SCHEDULED OCCUPIED MODE AS DETERMINED BY MONITORING THE LIGHTING OCCUPANCY SENSOR AUX CONTACTS, DDC SHALL OPERATE TERMINAL UNIT IN A TEMPORARY UNOCCUPIED MODE

7. ZONE SPACE TEMPERATURE SETPOINTS SHALL BE AS FOLLOWS:

- HEATING OCCUPIED SETPOINT = 72° F
HEATING TEMPORARY UNOCCUPIED SETPOINT (WHERE APPLICABLE) = 68° F
HEATING UNOCCUPIED SETPOINT = 62° F
COOLING OCCUPIED SETPOINT = 75° F
COOLING TEMPORARY UNOCCUPIED SETPOINT (WHERE APPLICABLE) = 78° F
COOLING UNOCCUPIED SETPOINT = 82° F

DURING BUILDING UNOCCUPANCY, RELATED AHU SHALL CYCLE AS REQUIRED TO MAINTAIN BUILDING SETBACK AND SETUP TEMP SETPOINTS.

8. WHEN RELATED AHU ARE DEACTIVATED, THE TERMINAL UNIT TEMPERING COIL CONTROL VALVE SHALL REMAIN CLOSED.
9. WHEN RELATED AHU IS OPERATING IN WARM-UP OR PURGE MODES, THE TERMINAL UNIT SHALL MAINTAIN ITS MAXIMUM AIRFLOW SETTING UNTIL ZONE SPACE OCCUPIED TEMPERATURE SETPOINT IS ACHIEVED.

10. THE DDC TU CONTROLLER SHALL RECALIBRATE THE AIRFLOW SENSOR AND RESET FLOATING CONTROL DAMPER AND CONTROL VALVE ACTUATORS ONCE A WEEK MINIMUM. THE PROCESS SHALL OCCUR WHEN RELATED AHU IS DEACTIVATED.

11. TERMINAL UNIT SUPPLY AIR TEMP SHALL BE MONITORED FOR SYSTEM DIAGNOSTICS.

12. DDC SHALL SUM ALL ASSOCIATED TERMINAL UNIT AIR FLOWS FOR DISPLAY AT THE BAS AHU GRAPHIC.

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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ENGINEER	DRAWN	CHECKED	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	11/15	07/21/16	03/01/16
VAV W/REHEAT CONTROL SYSTEM				

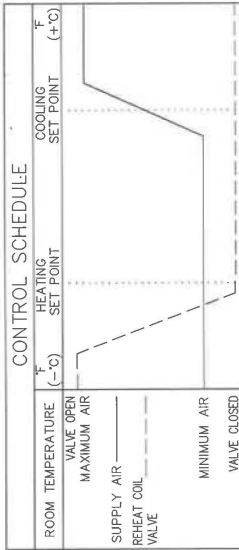
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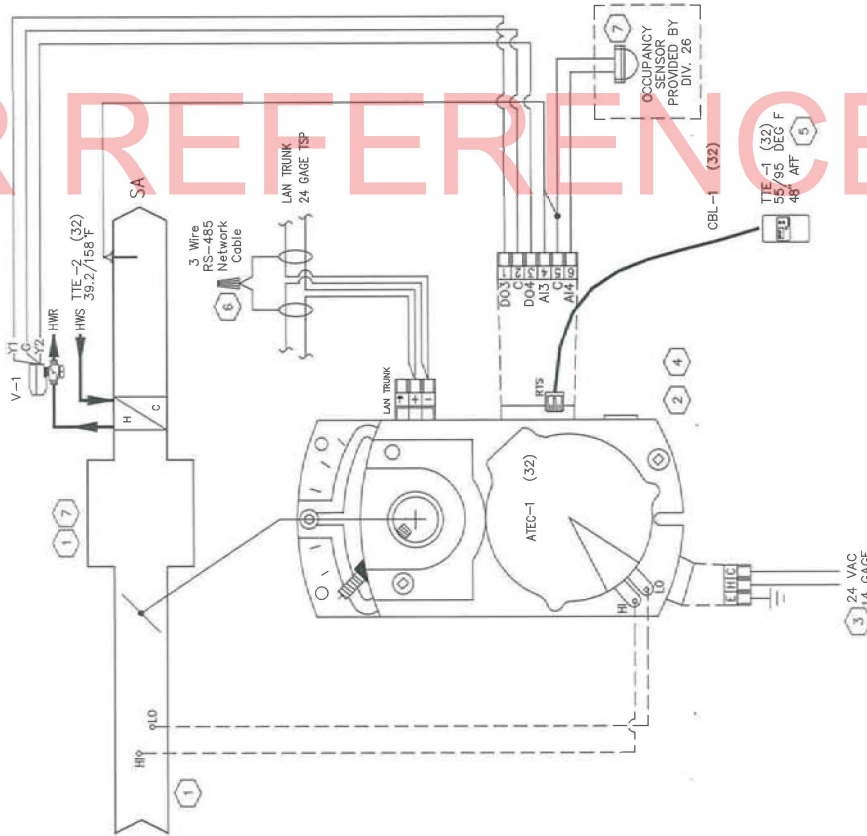
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- INSTALLATION NOTES:
- VAV BOX INSTALLED BY MECHANICAL CONTRACTOR WITH 3 TO 5 STRAIGHT DUCT DATAPETERS UPSTREAM OF BOX TO PROVIDE PROPER FLOW SENSING.
 - ATEC-1 TO BE MOUNTED IN SUPPLIED CONTROLLER ENCLOSURE.
 - REFER TO XREF LAYOUT DRAWING FOR 24 VAC POWER.
 - MOUNT ACTUATOR WITH DAMPER IN FULL OPEN POSITION. VERIFY ATEC-1 AND ACTUATOR REQUIREMENT WITH THE BOX MANUFACTURER.
 - LOCATE AS SHOWN ON FLOOR PLANS/CONTRACT DOCUMENTS.
 - WIRING SHOWN FOR BACNET MS/TP FLOW COMMUNICATION. FOR 2-WIRE RS-485 P.I. COMMUNICATION, ONLY THE SIGNAL (+/-) TERMINATIONS ARE USED. THE COMMON REFERENCE WIRE IS NOT USED. REFER TO AFRM1 DRAWING FOR FLOW COMMUNICATION WIRING DETAIL.
 - MULTIPLE OCCUPANCY SENSORS SHALL BE WIRED IN PARALLEL TO ONE COMMON BAS D.P.O. SEE CONTRACT DOCUMENTS FOR SENSOR LOCATIONS AND QUANTITIES.
 - REFER TO TEC SCHEDULE FOR VAV/CV BOX SIZES AND FLOW SETTINGS.

DEVICE	SIEMENS	EMC	MANUFACTURER	DIVISION 15
CBL-1		W		
ENC-1		M, W		
TTE-1, 2				
ATEC-1		M, P		
V-1		W		
LAN TRUNK		W		
POWER (24VAC)		W		



1 VAV WITH REHEAT COIL (#2523)
 008A
 LOCATION: SEE TEC SCHEDULE
 SERVES: SEE TEC SCHEDULE



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1	3/1/2016	RTD	AS-BUILT DRAWING
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ENGINEER: J.L. TAJ
 CHECKED BY: J.L. TAJ
 DESIGNED BY: J.L. TAJ
 INITIAL REVIEW: 07/21/16
 LAST REV DATE: 09/01/16
 VAV W/REHEAT CONTROL DIAGRAM

440P-172565
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008A

FOR REFERENCE ONLY

Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
V					SEE VALVE SUBMITTAL

CABINET UNIT HEATER CONTROL

SEQUENCE OF OPERATION

1. ELECTRIC ROOM THERMOSTAT SHALL OPEN AND CLOSE HEATING VALVE TO MAINTAIN TEMPERATURE SETPOINT.
2. FAN SHALL ACTIVATE UPON PROOF OF HWHR BY AQUASTAT (WHEN HWHS TEMPERATURE REACHES DESIRED SETPOINT).

REVISION HISTORY

	DATE	BY	REASON
1	3/1/2016	RTD	AS-BUILT DRAWING

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JL	TAJ	07/21/16	03/01/16	

CABINET UNIT HEATER CONTROL

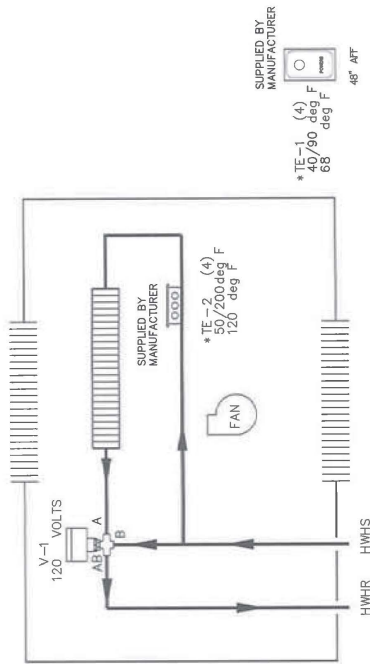
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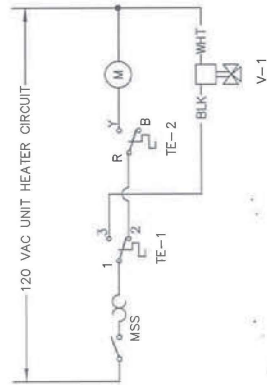
009

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UNIT	SERVES/LOCATION
CUH-1	MAIN LOBBY 130 W
CUH-2	MAIN LOBBY 130 E
CUH-3	ENTRY VESTABULE 190.04
CUH-4	STAIR C 190.08



2 CABINET UNIT HEATER CONTROL
LOCATION: SEE CHART
SERVES: SEE CHART



1 CABINET UNIT HEATER WIRING

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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JL	TAJ	07/21/16	03/01/16	

CABINET UNIT HEATER CONTROL

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009A

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
XPNL 1-1-1-2	2	PSH500A	FUNCTIONAL DEVICES	PSH500A	PS FME 100VA C2 120-24VAC ENC

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1	3/1/2016	RTD	AS-BUILT DRAWING
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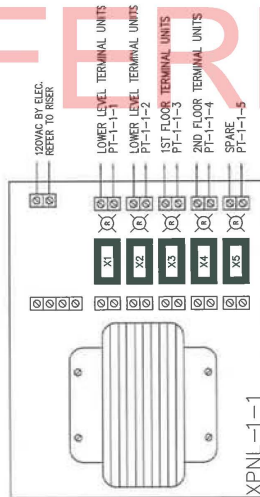
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JL	TAJ	1122	07/21/16	03/01/16	

XPNL LAYOUT

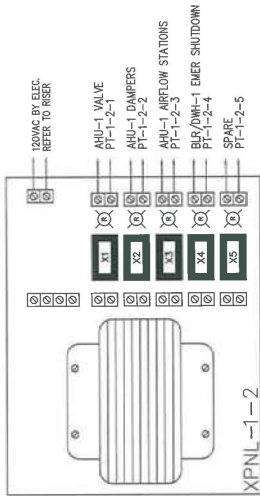
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1 XPNL-1-1 PANEL LAYOUT
LOCATION: MECHANICAL ROOM 044



2 XPNL-1-2 PANEL LAYOUT
LOCATION: MECHANICAL ROOM 044

REVISION HISTORY

NO.	DATE	BY	REASON
1	3/1/2016	RTD	AS-BUILT DRAWING

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JL	TAJ	07/21/16	03/01/18

XPNL LAYOUT

440P-172585

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010A

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
PNL 1	1	PXA-ENC34	SIEMENS	PXA-ENC	ENCLOSURE ASSY 34
	1	PXA-SBT151/192VA	SIEMENS		SERVICE BOX 115V, 24VAC, 192VA
TOP 1	1	567-353	SIEMENS	567-353	#4 PANEL PANEL 36X24X9
Panel Mounted Devices					
PXCM 000	1	PXC100-E36.A	SIEMENS	PXCM	PXC MOD, BACNET, TX-/O, 96 NODE, APOGE
	1	PXX-485.3	SIEMENS	PXCM	PXC MOD EXPANSION MODULE, 3 RS-485
	1	TXA1X24	SIEMENS	TXIO	ADDRESS KEY 1-24
	1	TXS112F4	SIEMENS	TXIO	24VDC SUPPLY 1200MA, 4 A FUSE
	2	TXM1BR-M	SIEMENS	TXIO	6 RELAY OUTPUT MODULE W/OVD
	2	TXM116D	SIEMENS	TXIO	16 DIGITAL INPUT MODULE
	4	TXM1BX-ML	SIEMENS	TXIO	8 UNIV I/O W/ 4-20MA, OVD&CD
	1	TXS1EF4	SIEMENS	TXIO	BUS CONNECTION MODULE 4A FUSE

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1	3/1/2016	RTD	AS-BUILT DRAWING
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ENGINEER	DRAWER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	12/16	07/21/16	03/07/16

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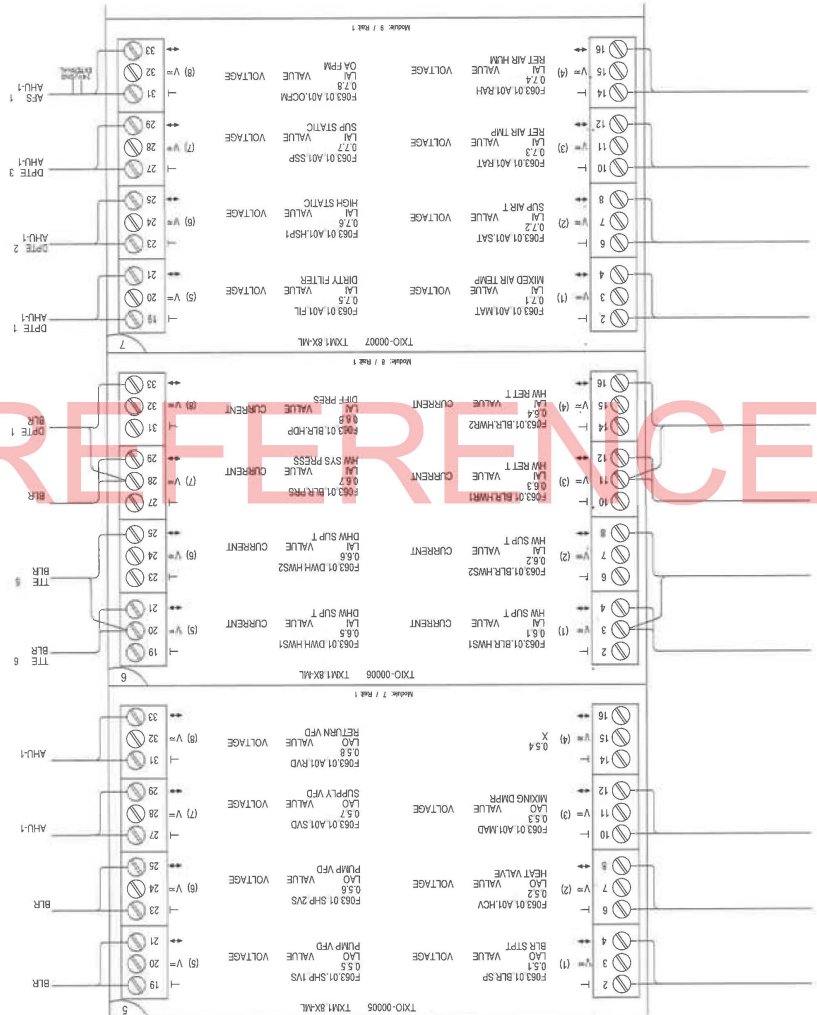
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JL	TAJ	<i>TAJ</i>	07/21/15	03/01/16

F063.01.MER.44p002

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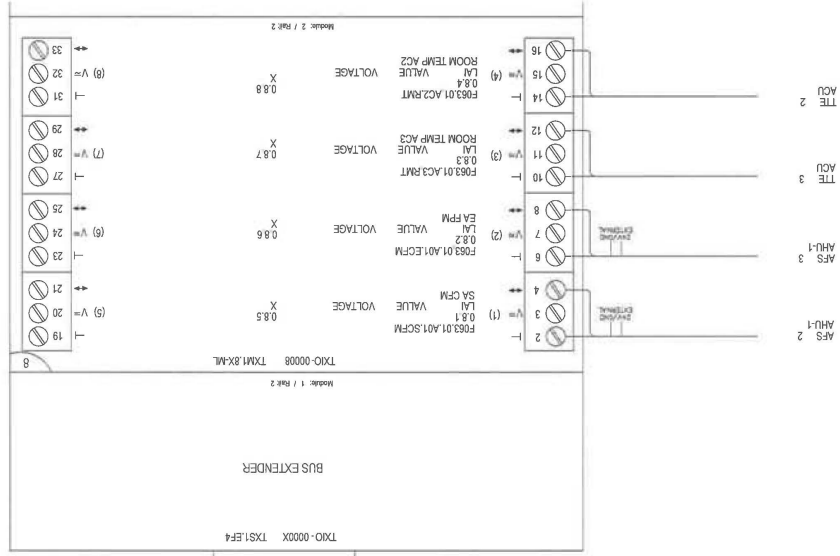
ENGINEER	DATE	INITIAL	RELEASE	LAST EDIT DATE
JL	07/21/15	03/01/16		

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ENGINEER	DATE	INITIAL	RELEASE	LAST EDIT DATE
JL	TAJ	07/21/15	03/02/16	

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
PINL 1	1	A-30H24ALP-P	HOFFMAN		NEMA 4 30V24X6 ENCLOSURE W/PANEL
Panel Mounted Devices					
PXCC 000	1	PXK2.2-ERA	SIEMENS	PXCC BAC	APGEE 24PT, BACKNET ETHERNET, ROOFTOP
SB 1	1	PXA-SB15/192VA	SIEMENS		SERVICE BOX 115V, 24VAC, 192VA

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1	3/1/2016	RTD AS—BUILT DRAWING

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Detroit, MI			
ENGINEER	DRAWN BY	INITIAL RELEASE	LAST EDIT DATE
JL	TAJ	07/21/15	03/01/16

F063.02.ROOF LAYOUT

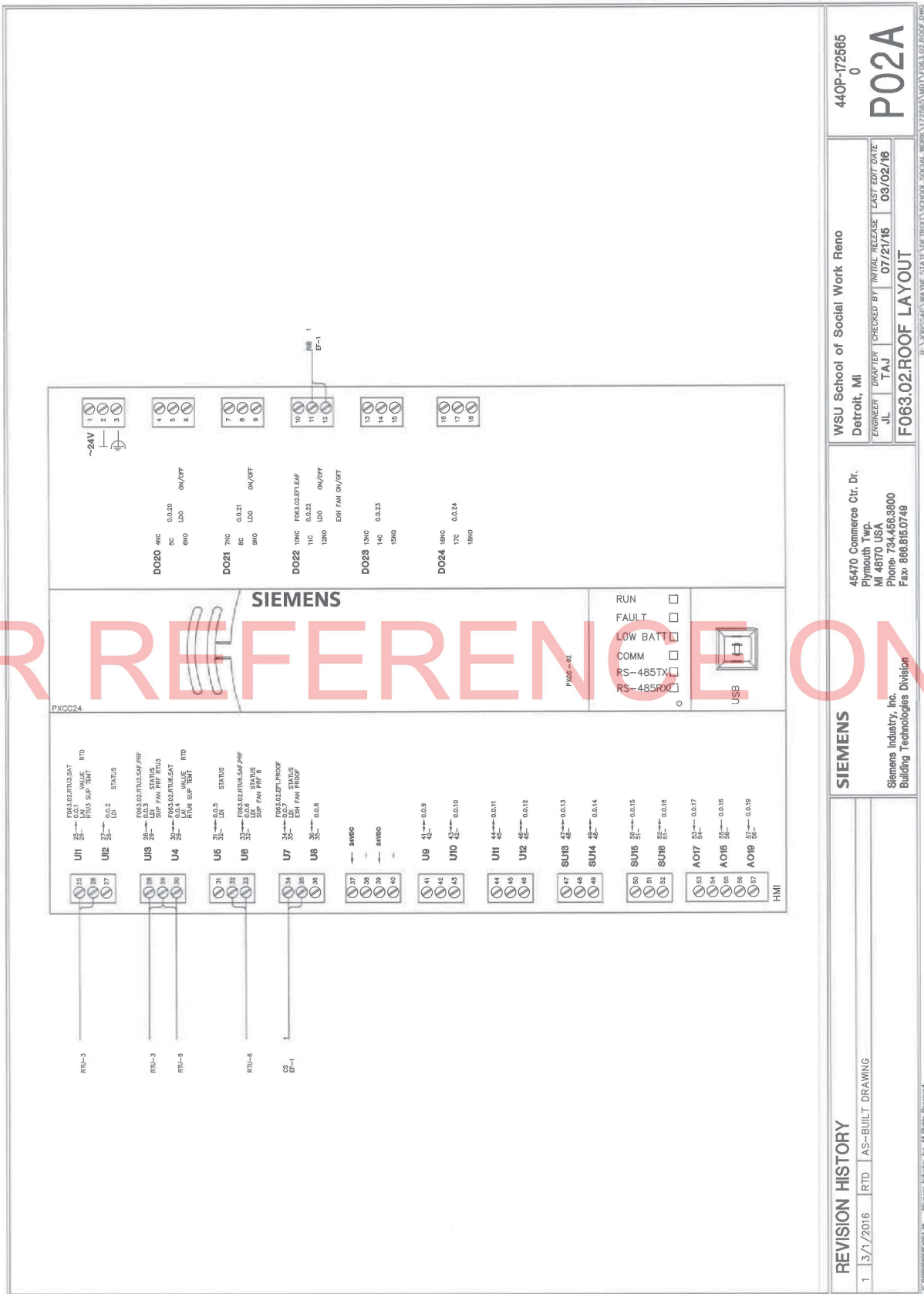
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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
PNL 1	1	A-30H24ALP-P	HOFFMAN		NEW 4 30X24IN ENCLOSURE W/PANEL
Panel Mounted Devices					
PXCC 03	1	PXC24.2-ER-A	SIEMENS	149206	APOGEE 24PT. BACKET ETHERNET, ROOFTOP
SB 1	1	PXA-SB115V192VA	SIEMENS		SERVICE BOX 115V, 24VAC, 192VA

REVISION HISTORY

1	3/1/2016	RTD	AS-BUILT DRAWING
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ENGINEER	DRAWN BY	REVIEWED BY	INITIAL	RELEASE	LAST TEST DATE
JL	TAJ	11/22	07/21/16	03/02/16	

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