Addendum Number 2

Project: McEniry HVAC Renovation
The University of North Carolina at Charlotte
SCO Project # SCO #18-19463-01

Date: January 30, 2019
Owner: The University of North Carolina at Charlotte
Designer: McCracken & Lopez, PA

NOTICE TO BIDDERS

This addendum is issued prior to receipt of bids, proposals, and its contents do hereby become a part of the pricing documents for the above referenced project.

All trade contractor bidders are responsible for assuring that their subcontractors and vendors are properly apprised of the contents of this Addendum.

All information contained in this Addendum supersedes and takes precedence over any conflicting information in the original pricing documents.

All bidders must acknowledge receipt of this Addendum in the space provided on the Form of Proposal for their bid package.

GENERAL INFORMATION

The bid date is February 6, 2019 at 2:00 PM. The location is Room 112B of the Cone University Building at UNC Charlotte.

Bidders who will not attend the Bid Opening need to ensure their sealed bids are delivered no later than 2:00 PM, February 6, 2019.

ATTACHMENTS

The following files are provided for reference:

1. Main Building Control Drawings from 2005 installation.
2. As builts for 1998 control system replacement. Reference these controls for AHU-4 (old 4a), AHU-5 (old 4b), AHU-6 (old 4c), AHU-7 (old 4d), AHU-8 (old 5a), AHU-9(old 5b)
3. 2016 Chiller plant control drawings not available. UNCC will provide for reference following bidding.

DRAWINGS

The following plans have been added, or updated/revised:

1. M203. Removed references to base bid and alternate #3 from reference chiller plant sequence.
2. M204. Added reheat coil and dehumidification to the old AHU-4a/b/c/d & AHU-5a/b sequence of operations. Reheat coil and dehumidification sequence is associated with Alternate #2 only.
3. M107 added. Sheet reflects additional scope associated for alternate #2 replacement of old AHU-4a/b/c/d & AHU-5a/b.
4. M006. Added schedule for AHU-4a/b/c/d & AHU-5a/b.

SPECIFICATIONS

Section 00 01 15 – List of Drawings

1. Add the following to the list of mechanical drawings: "M107 – Auditorium Enlarged Mechanical Rooms."

Section 01 23 00 – Alternates

2. This section is being reissued in its entirety. (see attached)

Section 23 09 00 – "Facility Management and Control System:

1. Paragraph 1.2.D, revise list of acceptable contractors to include:
    a. Platinum Building Automation (using Honeywell BACnet Controllers).
    b. Schneider Electric Controls (using Invensys I/A series or approved BACnet).
    c. McKenney's Automation Group (using Honeywell BACnet controllers).

Form of Proposal

1. This section is being reissued in its entirety. (see attached)

BIDDER QUESTIONS

1) Question: What version is the existing JACE in the chiller plant?
   Answer: The existing JACE panel is a series 8000
2) How many terminal units are to be provided with new controllers?
   Answer: There are 138 existing dual duct VAV terminal units and 8 single duct VAV terminal units. Of the 8 single duct VAV terminal units, 7 have hot water reheat coils.
3) Is all control wiring required to be replaced?
   Answer: Yes. All control wiring associated with the terminal units and air handling equipment shall be replaced. The wiring between the controllers and JACE shall also be replaced to ensure "like new" installation of air-side control system.

End of Addendum 2

United Automation Corporation
CONTROLS AND AUTOMATION SERVICES

PROJECT: McENIRY CLASSROOM BUILDING- COMPREHENSIVE RENOVATIONS

DRAWING INDEX:

United Automation Corporation
CONTROLS AND AUTOMATION SERVICES

PROJECT
McENIRY CLASSROOM BUILDING
UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
CHARLOTTE, NORTH CAROLINA

ARCHITECT

ENGINEER
UNITED ENGINEERING GROUP, INC
CONSULTING ENGINEERS
5624 EXECUTIVE CENTER DRIVE
SUITE 200
CHARLOTTE, NORTH CAROLINA 28212
704-532-9473

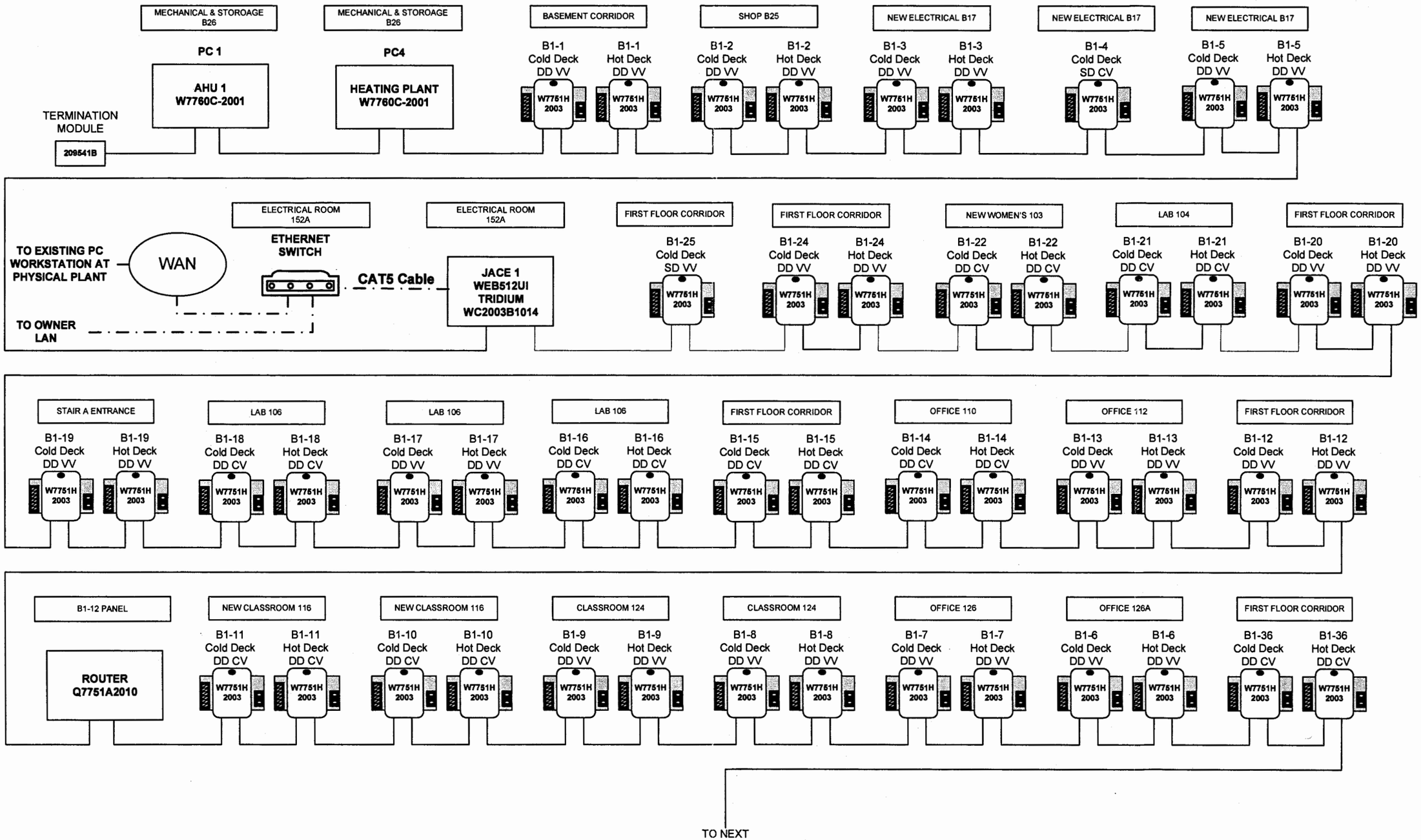
MECHANICAL CONTRACTOR
L.T. MECHANICAL, INC.
P.O. BOX 560246
CHARLOTTE, NC 28256
704-599-4445

INTEGRATION CONTRACTOR
UNITED AUTOMATION CORPORATION
2811 CENTRAL AVENUE
CHARLOTTE, NC 28205
704-342-0456

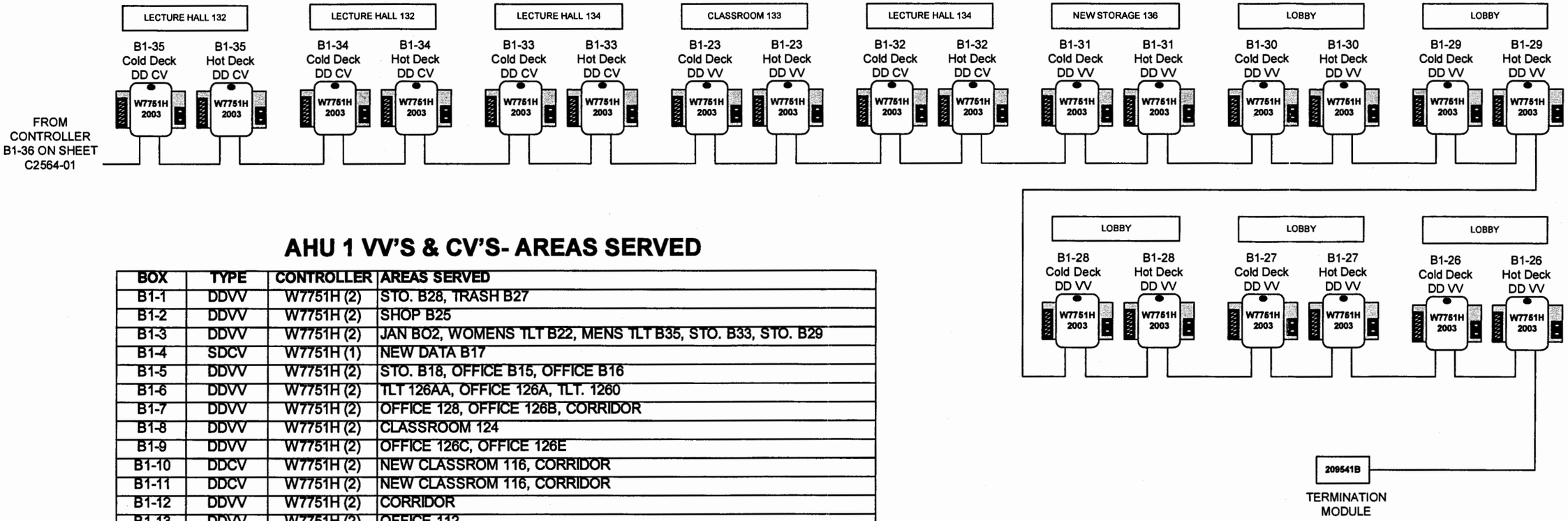
United Automation Corporation
2811 Central Avenue
Charlotte, NC 28205
Phone: (704) 342-0456
Fax: (704) 358-0747

Honeywell
AUTHORIZED CONTROLS INTEGRATOR

CONTRACT NUMBER	DATE:	REVISION NUMBER	REVISION DATE
2564-S	4/12/05	1	5/16/05



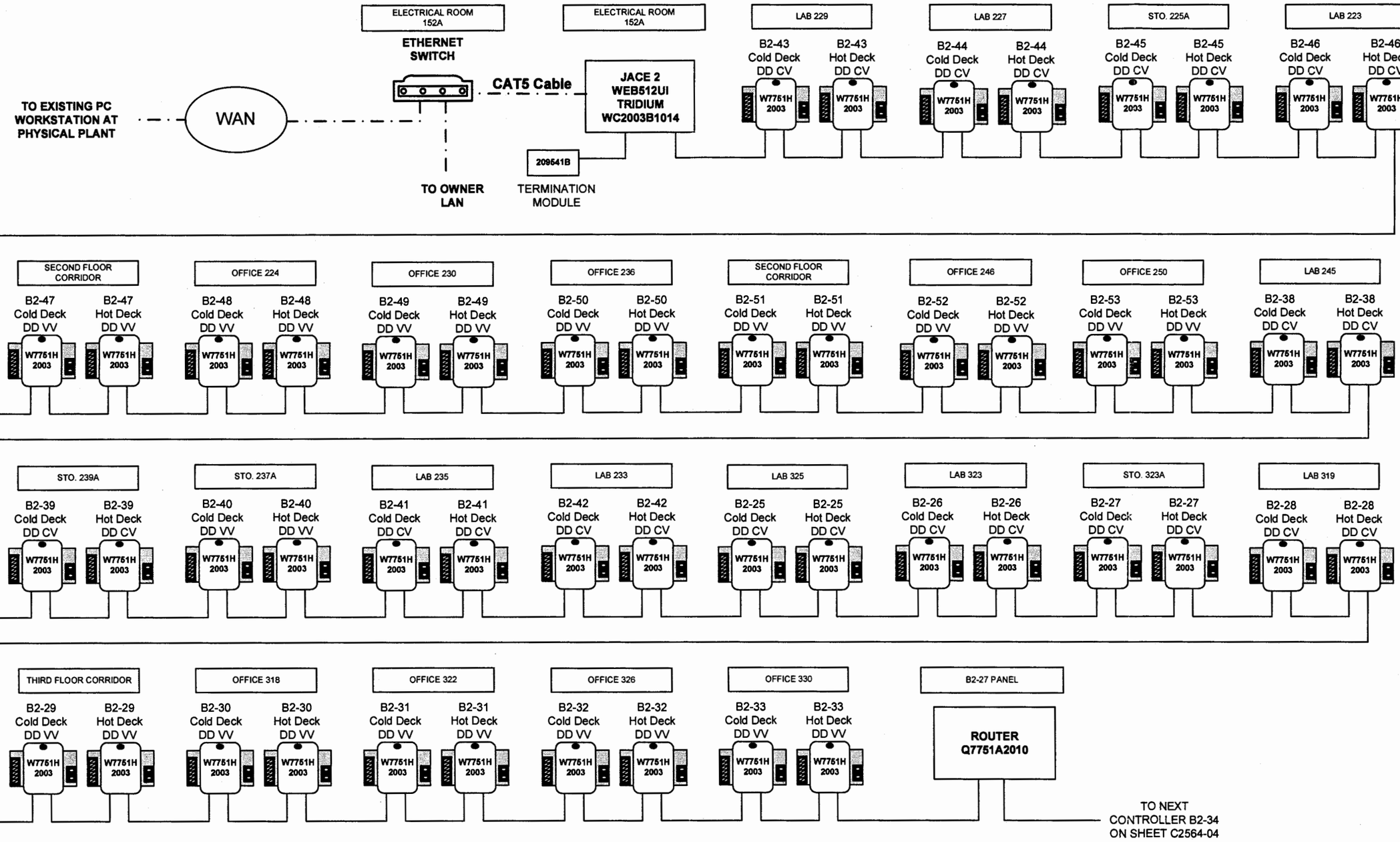
Project Title	McEniry Classroom Building
Drawing Title	JACE 1 Riser Diagram
Honeywell	AUTHORIZED CONTROLS INTEGRATOR
Application Engineer	BMR
Project Manager	JWJ
Sales Engineer	SJG
CONTRACT NUMBER	2564-S
DRAWING NUMBER	C2564-01



AHU 1 VV'S & CV'S- AREAS SERVED

BOX	TYPE	CONTROLLER	AREAS SERVED
B1-1	DDVV	W7751H (2)	STO. B28, TRASH B27
B1-2	DDVV	W7751H (2)	SHOP B25
B1-3	DDVV	W7751H (2)	JAN BO2, WOMENS TLT B22, MENS TLT B35, STO. B33, STO. B29
B1-4	SDCV	W7751H (1)	NEW DATA B17
B1-5	DDVV	W7751H (2)	STO. B18, OFFICE B15, OFFICE B16
B1-6	DDVV	W7751H (2)	TLT 126AA, OFFICE 126A, TLT. 1260
B1-7	DDVV	W7751H (2)	OFFICE 128, OFFICE 126B, CORRIDOR
B1-8	DDVV	W7751H (2)	CLASSROOM 124
B1-9	DDVV	W7751H (2)	OFFICE 126C, OFFICE 126E
B1-10	DDCV	W7751H (2)	NEW CLASSROM 116, CORRIDOR
B1-11	DDCV	W7751H (2)	NEW CLASSROM 116, CORRIDOR
B1-12	DDVV	W7751H (2)	CORRIDOR
B1-13	DDVV	W7751H (2)	OFFICE 112
B1-14	DDCV	W7751H (2)	OFFICE 110
B1-15	DDCV	W7751H (2)	LAB 108
B1-16	DDCV	W7751H (2)	LAB 106
B1-17	DDVV	W7751H (2)	LAB 106
B1-18	DDCV	W7751H (2)	106A
B1-19	DDVV	W7751H (2)	CORRIDOR
B1-20	DDVV	W7751H (2)	CORRIDOR
B1-21	DDCV	W7751H (2)	LAB 104
B1-22	DDCV	W7751H (2)	NEW WOMENS 103, NEW MENS 101
B1-23	DDVV	W7751H (2)	CLASSROOM 133
B1-24	DDVV	W7751H (2)	CORRIDOR
B1-25	SDVV	W7751H (1)	NEW TELECOM ROOM 152A
B1-26	DDVV	W7751H (2)	LOBBY
B1-27	DDVV	W7751H (2)	LOBBY
B1-28	DDVV	W7751H (2)	LOBBY
B1-29	DDVV	W7751H (2)	LOBBY
B1-30	DDVV	W7751H (2)	LOBBY
B1-31	DDVV	W7751H (2)	STO. 136A, EQUIP. 140
B1-32	DDVV	W7751H (2)	LECTURE HALL 134
B1-33	DDVV	W7751H (2)	LECTURE HALL 134
B1-34	DDVV	W7751H (2)	LECTURE HALL 132
B1-35	DDVV	W7751H (2)	LECTURE HALL 132
B1-36	DDVV	W7751H (2)	VEST. 127, EQUIP. 130

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: AHU1 VV & CV LIST		Project Manager: JWJ	DRAWING NUMBER: C2564-02
		Sales Engineer: SJG	



Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: JACE 2 Riser Diagram		Project Manager: JWJ	DRAWING NUMBER: C2564-03
		Sales Engineer: SJG	

FROM LAST CONTROLLER B2-33 ON SHEET C2564-03

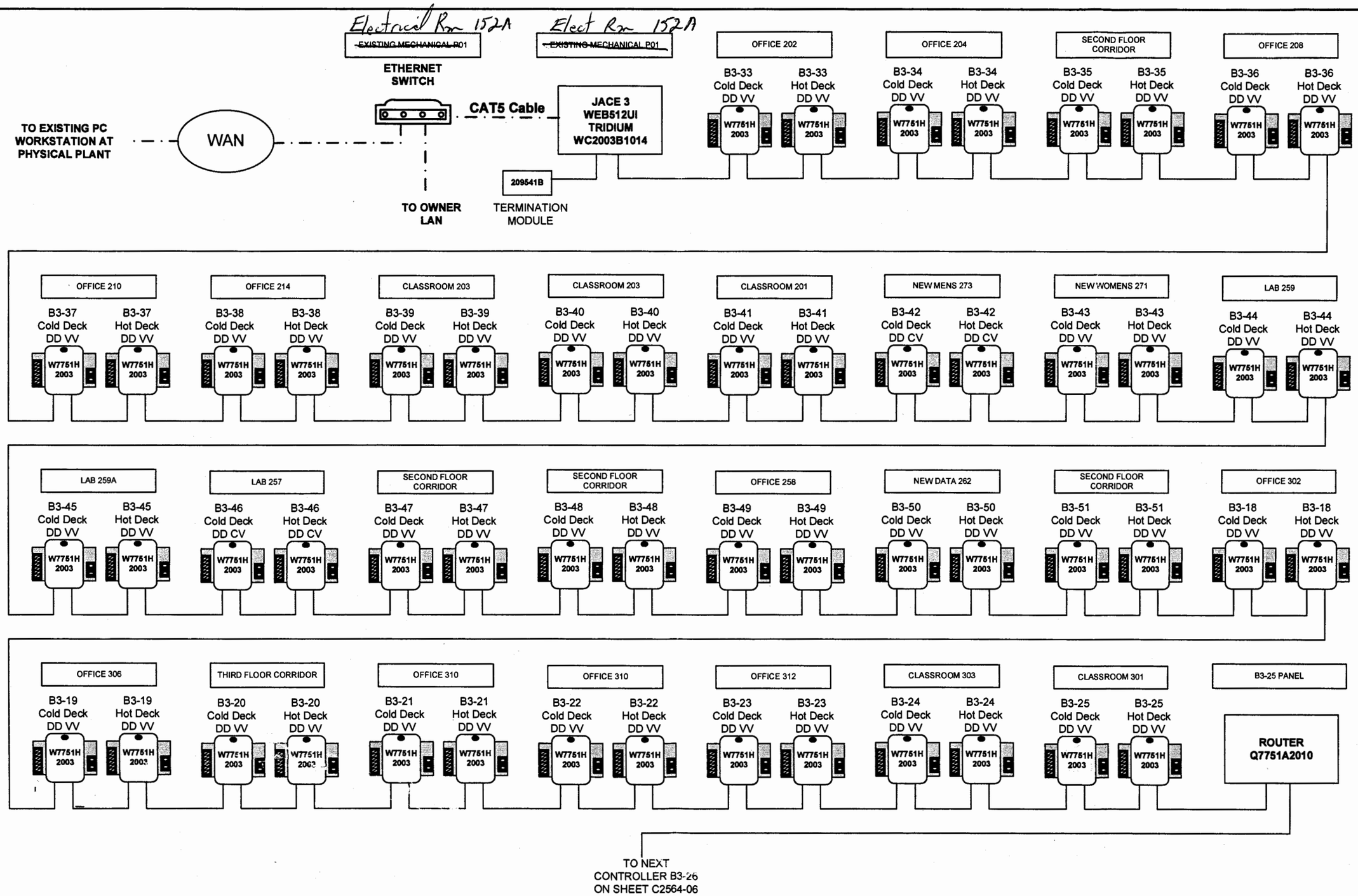
THIRD FLOOR CORRIDOR	OFFICE 336	OFFICE 340	OFFICE 342	THIRD FLOOR CORRIDOR	LAB 333	LAB 331	LAB 329
B2-34 Cold Deck DD VV	B2-35 Cold Deck DD VV	B2-36 Cold Deck DD VV	B2-37 Cold Deck DD VV	B2-20 Cold Deck DD VV	B2-21 Cold Deck DD CV	B2-22 Cold Deck DD CV	B2-23 Cold Deck DD CV
B2-34 Hot Deck DD VV	B2-35 Hot Deck DD VV	B2-36 Hot Deck DD VV	B2-37 Hot Deck DD VV	B2-20 Hot Deck DD VV	B2-21 Hot Deck DD CV	B2-22 Hot Deck DD CV	B2-23 Hot Deck DD CV
W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003

LAB 327	NEW CLASSROOM 439	NEW CLASSROOM 437	STORAGE 429A	LAB 417A	OFFICE 420	FOURTH FLOOR CORRIDOR	OFFICE 426A
B2-24 Cold Deck DD CV	B2-9 Cold Deck DD VV	B2-10 Cold Deck DD VV	B2-11 Cold Deck DD CV	B2-12 Cold Deck DD VV	B2-13 Cold Deck DD VV	B2-14 Cold Deck DD VV	B2-15 Cold Deck DD VV
B2-24 Hot Deck DD CV	B2-9 Hot Deck DD VV	B2-10 Hot Deck DD VV	B2-11 Hot Deck DD CV	B2-12 Hot Deck DD VV	B2-13 Hot Deck DD VV	B2-14 Hot Deck DD VV	B2-15 Hot Deck DD VV
W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003

OFFICE 432	OFFICE 438	OFFICE 444	STO. 448A	LAB 445	OFFICE 452	OFFICE 454	OFFICE 456
B2-16 Cold Deck DD VV	B2-17 Cold Deck DD VV	B2-18 Cold Deck DD VV	B2-19 Cold Deck DD VV	B2-5 Cold Deck DD VV	B2-4 Cold Deck DD VV	B2-3 Cold Deck DD VV	B2-2 Cold Deck DD VV
B2-16 Hot Deck DD VV	B2-17 Hot Deck DD VV	B2-18 Hot Deck DD VV	B2-19 Hot Deck DD VV	B2-5 Hot Deck DD VV	B2-4 Hot Deck DD VV	B2-3 Hot Deck DD VV	B2-2 Hot Deck DD VV
W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003

FOURTH FLOOR CORRIDOR	LAB 445	LAB443	LAB 441	EXISTING MECHANICAL P01
B2-1 Cold Deck DD VV	B2-6 Cold Deck DD VV	B2-7 Cold Deck DD CV	B2-8 Cold Deck DD VV	PC 2
B2-1 Hot Deck DD VV	B2-6 Hot Deck DD VV	B2-7 Hot Deck DD CV	B2-8 Hot Deck DD VV	AHU 2 W7760C-2001
W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	209541B TERMINATION MODULE

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR Project Manager: JWJ Sales Engineer: SJG	CONTRACT NUMBER: 2564-S
Drawing Title: JACE 2 Riser Continued			DRAWING NUMBER: C2564-04



Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: JACE 3 Riser Diagram		Project Manager: JWJ	DRAWING NUMBER: C2564-05
		Sales Engineer: SJG	

FROM LAST CONTROLLER B3-25 ON SHEET C2564-05

NEW MENS 357	LAB 351	LAB 351	THIRD FLOOR CORRIDOR	OFFICE 352	NEW DATA ROOM 356	THIRD FLOOR CORRIDOR	OFFICE 404
B3-26 Cold Deck DD VV	B3-27 Cold Deck DD VV	B3-28 Cold Deck DD VV	B3-29 Cold Deck DD VV	B3-30 Cold Deck DD VV	B3-31 Cold Deck DD VV	B3-32 Cold Deck DD VV	B3-1 Cold Deck DD VV
B3-26 Hot Deck DD VV	B3-27 Hot Deck DD VV	B3-28 Hot Deck DD VV	B3-29 Hot Deck DD VV	B3-30 Hot Deck DD VV	B3-31 Hot Deck DD VV	B3-32 Hot Deck DD VV	B3-1 Hot Deck DD VV
W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003

OFFICE 408	FOURTH FLOOR CORRIDOR	OFFICE 414A	OFFICE 414B	OFFICE 416E	CLASSROOM 407	CLASSROOM 401	CLASSROOM 401
B3-2 Cold Deck DD VV	B3-3 Cold Deck DD VV	B3-4 Cold Deck DD VV	B3-5 Cold Deck DD VV	B3-6 Cold Deck DD VV	B3-7 Cold Deck DD CV	B3-8 Cold Deck DD VV	B3-9 Cold Deck DD VV
B3-2 Hot Deck DD VV	B3-3 Hot Deck DD VV	B3-4 Hot Deck DD VV	B3-5 Hot Deck DD VV	B3-6 Hot Deck DD VV	B3-7 Hot Deck DD CV	B3-8 Hot Deck DD VV	B3-9 Hot Deck DD VV
W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003

NEW MENS 475	NEW CLASSROOM 471	LAB 467	LAB 465	FOURTH FLOOR CORRIDOR	OFFICE 466	NEW DATA ROOM 472	FOURTH FLOOR CORRIDOR
B3-10 Cold Deck DD VV	B3-11 Cold Deck DD VV	B3-12 Cold Deck DD VV	B3-13 Cold Deck DD VV	B3-14 Cold Deck DD VV	B3-15 Cold Deck DD VV	B3-16 Cold Deck DD VV	B3-17 Cold Deck DD VV
B3-10 Hot Deck DD VV	B3-11 Hot Deck DD VV	B3-12 Hot Deck DD VV	B3-13 Hot Deck DD VV	B3-14 Hot Deck DD VV	B3-15 Hot Deck DD VV	B3-16 Hot Deck DD VV	B3-17 Hot Deck DD VV
W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003	W7751H 2003

EXISTING MECHANICAL P01

PC 3

AHU 3
W7760C-2001

209541B

TERMINATION MODULE

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: JACE 3 Riser Continued		Project Manager: JWJ	DRAWING NUMBER: C2564-06
		Sales Engineer: SJG	

AHU 2 VV'S & CV'S- AREAS SERVED

BOX	TYPE	CONTROLLER	AREAS SERVED
B2-1	DDVV	W7751H (2)	OFFICE 462
B2-2	DDVV	W7751H (2)	OFFICE 456, OFFICE 458
B2-3	DDVV	W7751H (2)	OFFICE 454
B2-4	DDVV	W7751H (2)	OFFICE 452, OFFICE 450
B2-5	DDVV	W7751H (2)	FOURTH FLOOR CORRIDOR
B2-6	DDVV	W7751H (2)	LAB 445
B2-7	DDVV	W7751H (2)	STO. 447B, LAB 443, STO. 447A, STO. 447C, STO. 447D
B2-8	DDVV	W7751H (2)	LAB 441, LAB 447
B2-9	DDVV	W7751H (2)	NEW CLASSROOM 439
B2-10	DDVV	W7751H (2)	NEW CLASSROOM 437
B2-11	DDCV	W7751H (2)	STO. 429A, STO 429B
B2-12	DDVV	W7751H (2)	LAB 417A, LAB 417
B2-13	DDVV	W7751H (2)	OFFICE 420
B2-14	DDVV	W7751H (2)	FOURTH FLOOR CORRIDOR
B2-15	DDVV	W7751H (2)	STORGE 424, OFFICE 426A, OFFICE 426B, OFFICEE 428
B2-16	DDVV	W7751H (2)	OFFICE 430, OFFICE 432, OFFICE 434
B2-17	DDVV	W7751H (2)	OFFICE 436, OFFICE 438, OFFICE 440
B2-18	DDVV	W7751H (2)	OFFICE 442, OFFICE 444
B2-19	DDVV	W7751H (2)	STO. 448A, OFFICE 448
B2-20	DDVV	W7751H (2)	OFFICE 346
B2-21	DDCV	W7751H (2)	LAB 333, STO. 333A
B2-22	DDCV	W7751H (2)	LAB 331, STO. 331A
B2-23	DDCV	W7751H (2)	LAB 329, STO. 329A
B2-24	DDCV	W7751H (2)	LAB 327, STO. 327A
B2-25	DDCV	W7751H (2)	LAB 325, STO. 325A
B2-26	DDCV	W7751H (2)	LAB 323
B2-27	DDCV	W7751H (2)	STO. 323, STO. 323B
B2-28	DDCV	W7751H (2)	LAB 319, STO. 319A
B2-29	DDVV	W7751H (2)	THIRD FLOOR CORRIDOR, STO. 312AA, OFFICE 312
B2-30	DDVV	W7751H (2)	OFFICE 316, OFFICE 318
B2-31	DDVV	W7751H (2)	OFFICE 322, OFFICE 320
B2-32	DDVV	W7751H (2)	OFFICE 326, OFFICE 324
B2-33	DDVV	W7751H (2)	STO. 332, OFFICE 330, OFFICE 328
B2-34	DDVV	W7751H (2)	THIRD FLOOR CORRIDOR
B2-35	DDVV	W7751H (2)	OFFICE 336
B2-36	DDVV	W7751H (2)	OFFICE 340
B2-37	DDVV	W7751H (2)	OFFICE 342
B2-38	DDCV	W7751H (2)	LAB 245, NEW STORAGE 247, SECOND FLOOR CORRIDOR
B2-39	DDCV	W7751H (2)	STO. 239A, LAB 239
B2-40	DDVV	W7751H (2)	STO. 237A, LAB 237
B2-41	DDCV	W7751H (2)	LAB 235, STO. 235A
B2-42	DDCV	W7751H (2)	LAB 233, STO. 233A
B2-43	DDCV	W7751H (2)	LAB 229, STO. 229A
B2-44	DDCV	W7751H (2)	LAB 227, STO. 227A
B2-45	DDCV	W7751H (2)	LAB 225, STO. 225A
B2-46	DDCV	W7751H (2)	LAB 223, STO. 223A
B2-47	DDVV	W7751H (2)	SECOND FLOOR CORRIDOR, STORAGE 218
B2-48	DDVV	W7751H (2)	OFFICE 222, OFFICE 224, OFFICE 226
B2-49	DDVV	W7751H (2)	OFFICE 228, OFFICE 230, OFFICE 232
B2-50	DDVV	W7751H (2)	OFFICE 234, OFFICE 236, OFFICE 238
B2-51	DDVV	W7751H (2)	STO. 241, OFFICE 242
B2-52	DDVV	W7751H (2)	OFFICE 246, OFFICE 248
B2-53	DDVV	W7751H (2)	OFFICE 250

AHU 3 VV'S & CV'S- AREAS SERVED

BOX	TYPE	CONTROLLER	AREAS SERVED
B3-1	DDVV	W7751H (2)	OFFICE 402, OFFICE 404
B3-2	DDVV	W7751H (2)	OFFICE 408, OFFICE 406
B3-3	DDVV	W7751H (2)	FOURTH FLOOR CORRIDOR
B3-4	DDVV	W7751H (2)	OFFICE 414A, OFFICE 414B
B3-5	DDVV	W7751H (2)	OFFICE 416C, OFFICE 416B, OFFICE 418D, OFFIC 418C
B3-6	DDVV	W7751H (2)	OFFICE 416E, OFFICE 416D, OFFICE 416A, OFFICE 418E, OFFICE 418A, OFFICE 418B
B3-7	DDCV	W7751H (2)	STO. 407A, CLASSROOM 407
B3-8	DDVV	W7751H (2)	CLASSROOM 401
B3-9	DDVV	W7751H (2)	CLASSROOM 401
B3-10	DDVV	W7751H (2)	NEW MENS 475, NEW WOMENS 407
B3-11	DDVV	W7751H (2)	NEW CLASSROOM 471
B3-12	DDVV	W7751H (2)	LAB 467
B3-13	DDVV	W7751H (2)	LAB 465, STO. 465A, SERVICE 460
B3-14	DDVV	W7751H (2)	FOURTH FLOOR CORRIDOR
B3-15	DDVV	W7751H (2)	OFFICE 466, OFFICE 468
B3-16	DDVV	W7751H (2)	NEW DATA RM 472, NEW STO. 470
B3-17	DDVV	W7751H (2)	FOURTH FLOOR CORRIDOR
B3-18	DDVV	W7751H (2)	OFFICE 302, OFFICE 304
B3-19	DDVV	W7751H (2)	OFFICE 306
B3-20	DDVV	W7751H (2)	THIRD FLOOR CORRIDOR
B3-21	DDVV	W7751H (2)	OFFICE 310
B3-22	DDVV	W7751H (2)	OFFICE 310
B3-23	DDVV	W7751H (2)	OFFICE 312
B3-24	DDVV	W7751H (2)	CLASSROOM 303
B3-25	DDVV	W7751H (2)	STO. 301A, CLASSROOM 301, NEW STO. 359
B3-26	DDVV	W7751H (2)	NEW WOMENS 355, NEW MENS 357
B3-27	DDVV	W7751H (2)	LAB 351
B3-28	DDVV	W7751H (2)	STO. 351A, LAB 349, LAB 343
B3-29	DDVV	W7751H (2)	THIRD FLOOR CORRIDOR, SERVICE 344
B3-30	DDVV	W7751H (2)	OFFICE 350, OFFICE 352
B3-31	DDVV	W7751H (2)	NEW DATA RM 356, NEW STORAGE 354
B3-32	DDVV	W7751H (2)	THIRD FLOOR CORRIDOR
B3-33	DDVV	W7751H (2)	OFFICE 202
B3-34	DDVV	W7751H (2)	OFFICE 204
B3-35	DDCV	W7751H (2)	SECOND FLOOR CORRIDOR
B3-36	DDVV	W7751H (2)	OFFICE 206
B3-37	DDVV	W7751H (2)	OFFICE 212, OFFICE 210
B2-38	DDVV	W7751H (2)	OFFICE 214, OFFICE 216
B3-39	DDVV	W7751H (2)	STO. 211A, LAB 211
B3-40	DDVV	W7751H (2)	CLASSROOM 203
B3-41	DDVV	W7751H (2)	CLASSROOM 201
B3-42	DDCV	W7751H (2)	NEW MENS 273, NEW WOMENS 271
B3-43	DDVV	W7751H (2)	LAB 259
B3-44	DDVV	W7751H (2)	LAB 259B, LAB 259C
B3-45	DDVV	W7751H (2)	LAB 259A
B3-46	DDCV	W7751H (2)	LAB 257C, LAB 257, SERVICE 252
B3-47	DDVV	W7751H (2)	SECOND FLOOR CORRIDOR, OFFICE 254
B3-48	DDVV	W7751H (2)	LAB 257A, OFFICE 257B
B3-49	DDVV	W7751H (2)	OFFICE 258
B3-50	DDVV	W7751H (2)	NEEW DATA 262, NEW STORAGE 260
B3-51	DDVV	W7751H (2)	SECOND FLOOR CORRIDOR

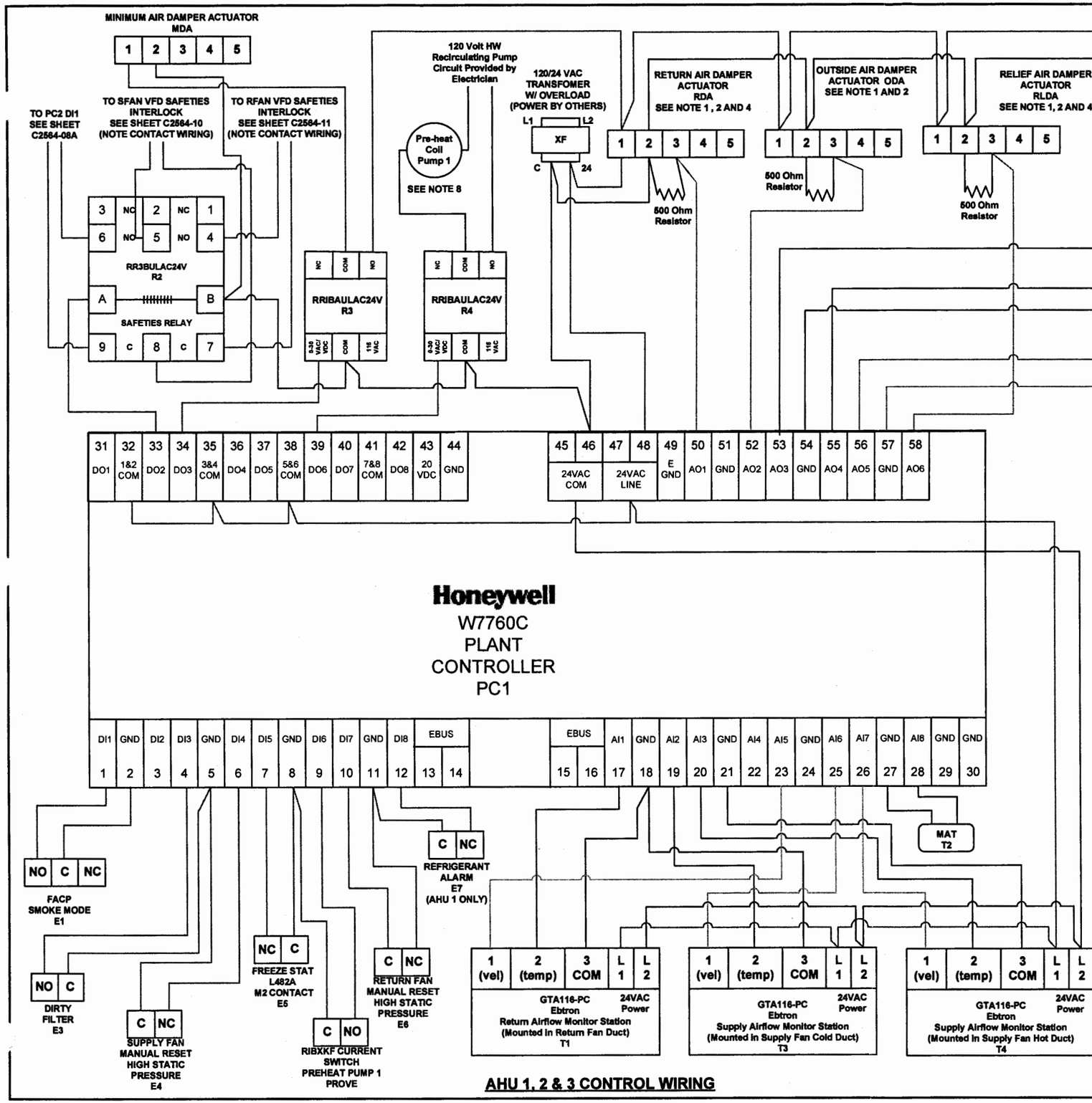
Project Title
McEniry Classroom Building

Drawing Title
AHU 2, 3 VV & CV LIST

Honeywell
AUTHORIZED CONTROLS INTEGRATOR

Application Engineer: BMR
Project Manager: JWJ
Sales Engineer: SJG

CONTRACT NUMBER: 2564-S
DRAWING NUMBER: C2564-07



AHU 1, 2 & 3 CONTROL WIRING

NOTES

NOTE 1: SOME DAMPERS REQUIRE MULTIPLE ACTUATORS. SEE SHEET C2564-09 FOR MULTIPLE ACTUATOR WIRING DETAILS.

NOTE 2: INSTALL 500 OHM ½ WATT RESISTOR AT ACTUATOR. FILED VERIFY DIRECTION OF SPRING OPERATION AND SET MODE SELECTOR TO MODULATING FORWARD OR REVERSE AS NECESSARY.

NOTE 3: INSTALL 500 OHM ½ WATT RESISTOR AT ACTUATOR. SET JUMPER W1 TO 0% POSITION, JUMPER W2 TO 0-10V POSITION, JUMPER W3 TO 10V UP POSITION

NOTE 4: INSTALL DIRECTION OF RELIEF AIR DAMPER THE SAME AS OUTDOOR AIR DAMPER. WHEN THE OUTDOOR AIR DAMPER ROTATES CLOSED THE RELIEF AIR DAMPER SHOULD ROTATE CLOSED.

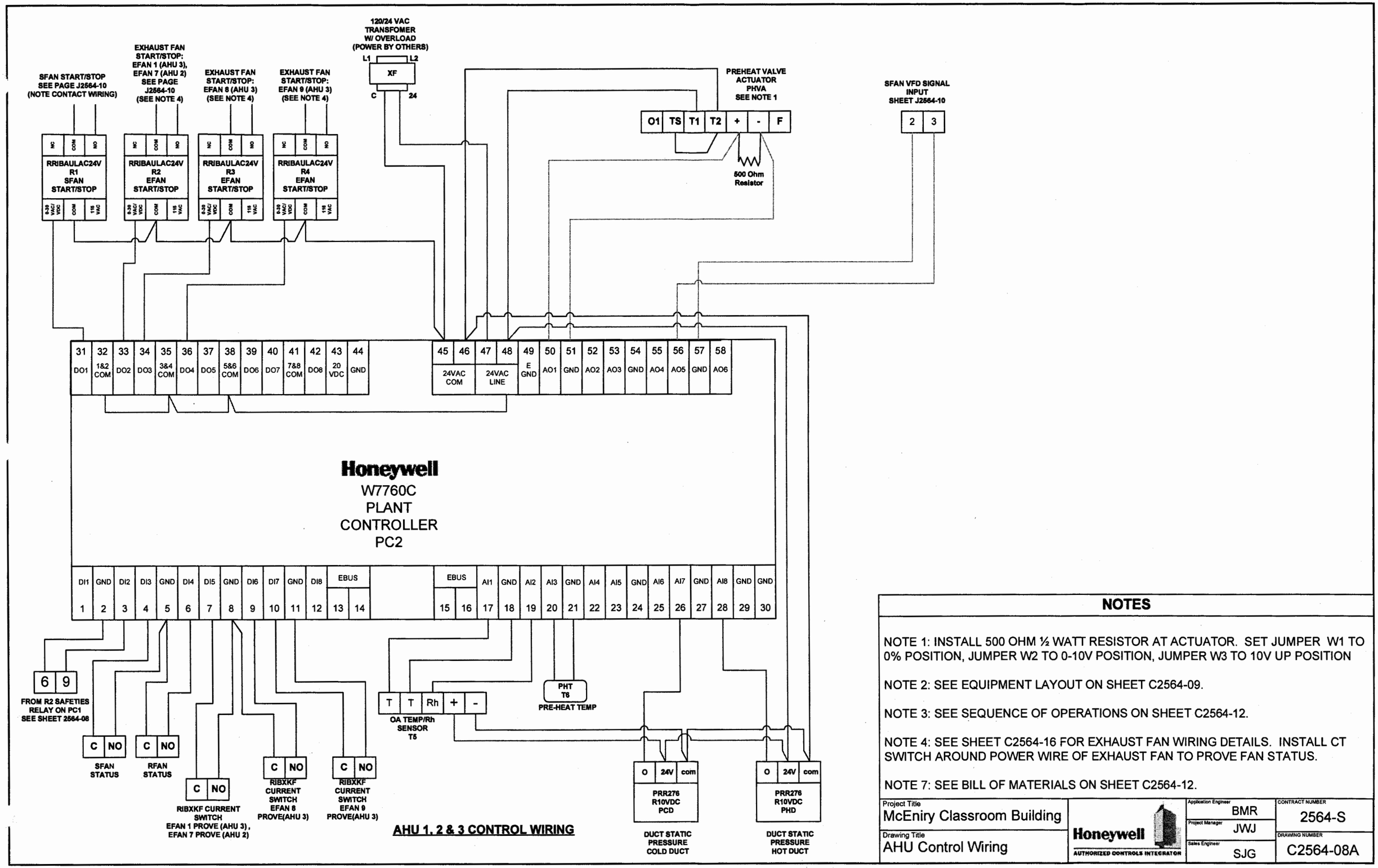
NOTE 5: SEE EQUIPMENT LAYOUT ON SHEET C2564-09.

NOTE 6: SEE SEQUENCE OF OPERATIONS ON SHEET C2564-12.

NOTE 7: SEE BILL OF MATERIALS ON SHEET C2564-12.

NOTE 8: R4 WILL BE ENERGIZED ANYTIME THE OUTDOOR AIR TEMPERATURE FALLS BELOW 40 F TO BRING ON THE PREHEAT COIL PUMP. AHU'S 1, 2, 3 EACH HAVE A PREHEAT COIL PUMP (P-1, P-2, P-3). PUMPS 1 TROUGH 3 ARE CONSTANT SPEED PUMPS. THE PUMP ENABLE RELAY, R4, BREAKS THE PUMP ELECTRICAL CIRCUIT.

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: AHU Control Wiring		Project Manager: JWJ	DRAWING NUMBER: C2564-08
		Sales Engineer: SJG	



AHU 1, 2 & 3 CONTROL WIRING

NOTES

NOTE 1: INSTALL 500 OHM ½ WATT RESISTOR AT ACTUATOR. SET JUMPER W1 TO 0% POSITION, JUMPER W2 TO 0-10V POSITION, JUMPER W3 TO 10V UP POSITION

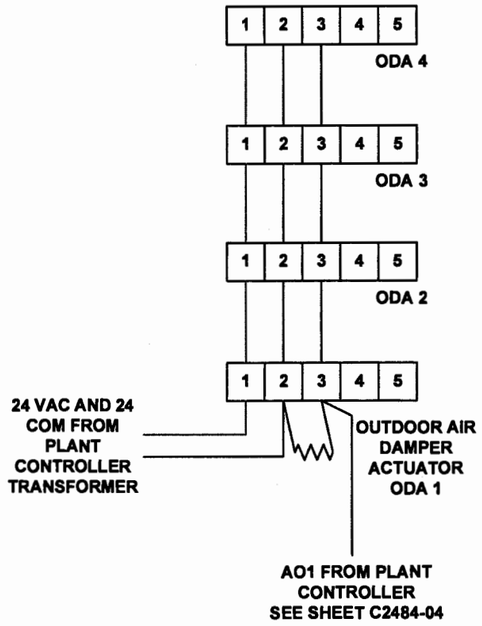
NOTE 2: SEE EQUIPMENT LAYOUT ON SHEET C2564-09.

NOTE 3: SEE SEQUENCE OF OPERATIONS ON SHEET C2564-12.

NOTE 4: SEE SHEET C2564-16 FOR EXHAUST FAN WIRING DETAILS. INSTALL CT SWITCH AROUND POWER WIRE OF EXHAUST FAN TO PROVE FAN STATUS.

NOTE 7: SEE BILL OF MATERIALS ON SHEET C2564-12.

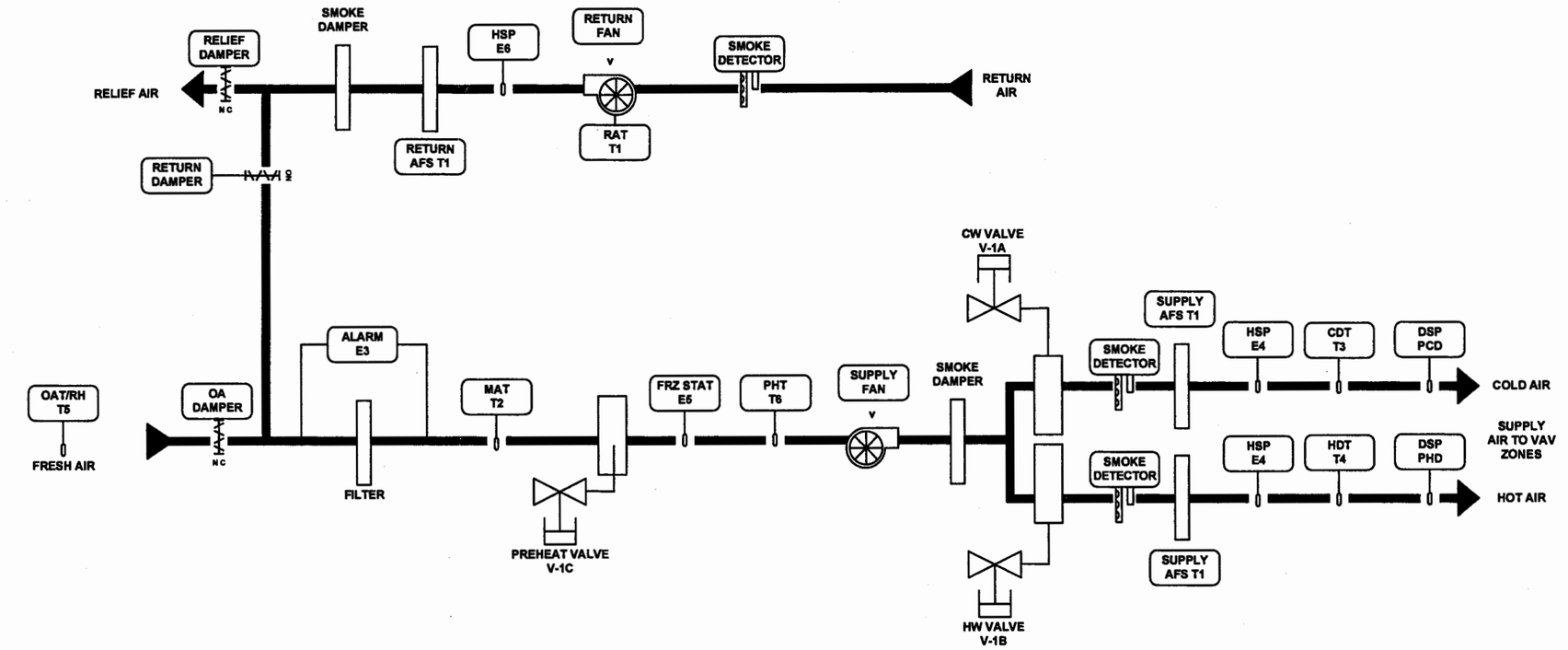
Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: AHU Control Wiring		Project Manager: JWJ	DRAWING NUMBER: C2564-08A
		Sales Engineer: SJG	



AHU1 OUTDOOR AIR DAMPER WIRING DETAILS- TYPICAL OF MULTIPLE ACTUATOR WIRING

Damper Actuator Count- 175inlb

Damper Actuator	AHU 1	AHU 2	AHU 3
Relief Air Damper	2	2	2
Return Air Damper	1	1	1
Outdoor Air Damper	4	1	1



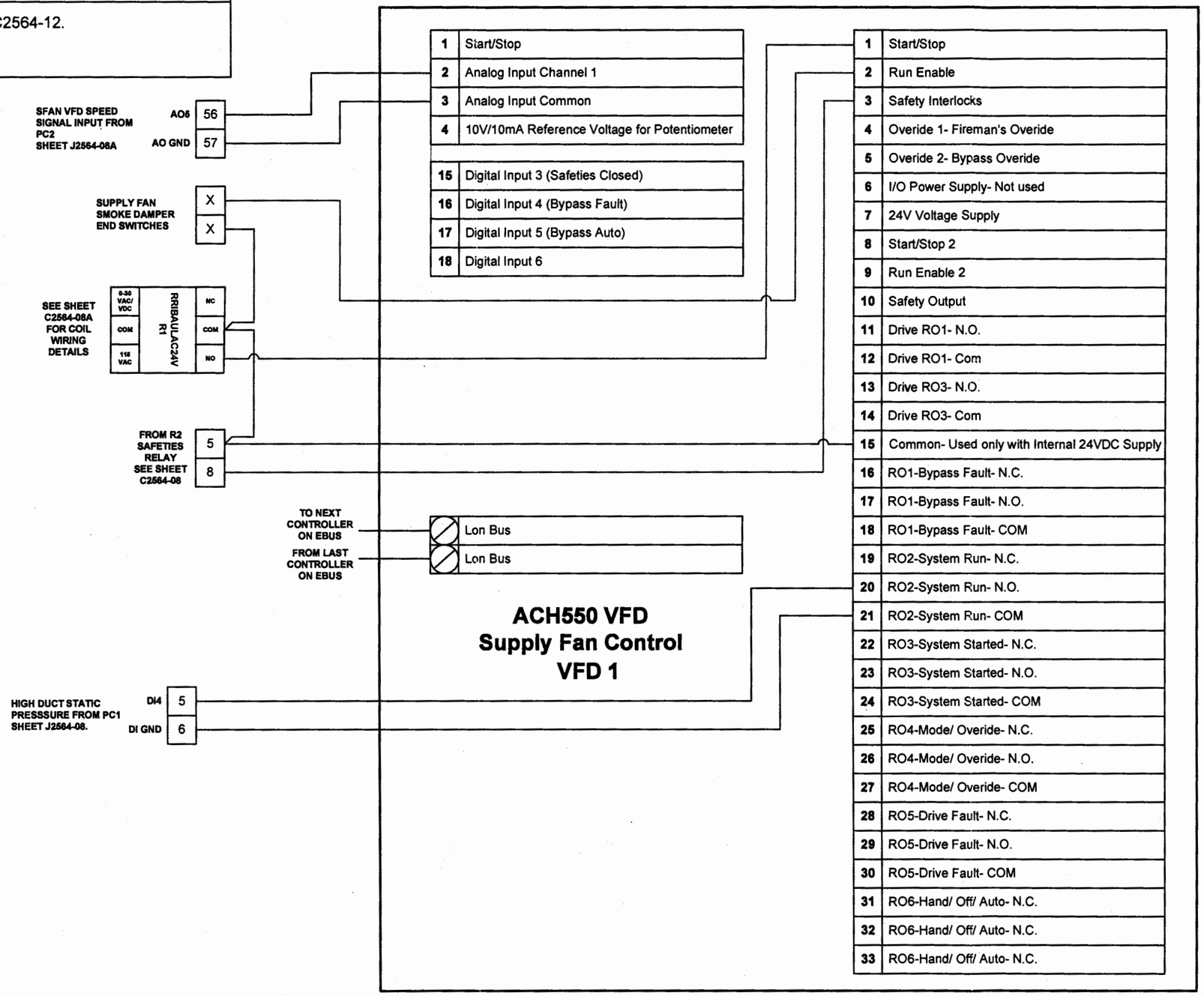
AHU FLOW DIAGRAM

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: Multiple Actuator Wiring		Project Manager: JWJ	DRAWING NUMBER: C2564-09
		Sales Engineer: SJG	

NOTES

NOTE 1: SEE SEQUENCE OF OPERATIONS ON SHEET C2564-12.

NOTE 2: SEE BILL OF MATERIALS ON SHEET C2564-12.



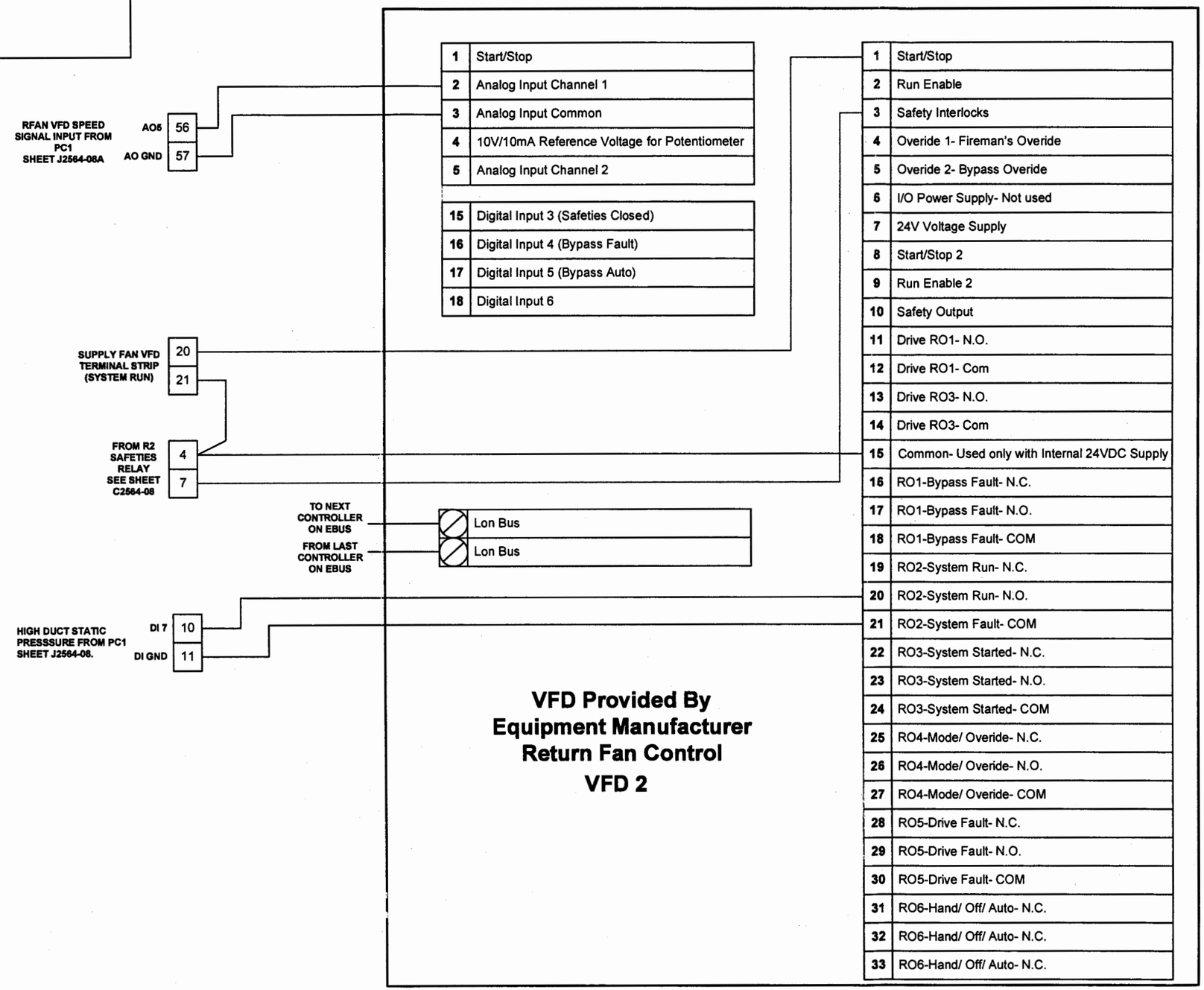
AHU-1, 2, 3 SUPPLY FAN AND DUCT PRESSURE MONITORING

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: Supply Fan Control Wiring		Project Manager: JWJ	DRAWING NUMBER: C2564-10
		Sales Engineer: SJG	

NOTES

NOTE 1: SEE SEQUENCE OF OPERATIONS ON SHEET C2564-12.

NOTE 2: SEE BILL OF MATERIALS ON SHEET C2564-12.



AHU- 1, 2, 3 RETURN FAN AND AIR FLOW MEASURING STATION

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: Return Fan Control Wiring		Project Manager: JWJ	DRAWING NUMBER: C2564-11
		Sales Engineer: SJG	

BILL OF MATERIALS AHU 1, 2 & 3 (Parts Repeated On Each AHU)

DESIGNATION	QTY	MARK	PART NUMBER	DESCRIPTION
Field Devices:	1	VFD1	ACH550	SUPPLY FAN VFD
	1	VFD2	ACH550	RETURN FAN VFD
	3	T3, 4, 6	TE-702-B-17-C	PREHEAT, COLD AND HOT DECK AIR TEMP SENSORS
	1	T2	TE-705-B-17-B-1	MIXED AIR TEMPERATURE SENSOR
	3	T1	GTA116-PC	EBTRON AIRFLOW (SUP/ RET) AND TEMP SENSOR (RET)
	1	T5	HO3XVSTM	OUTDOOR AIR TEMPERATURE/ Rh SENSOR
	1	E3	DWYER 1823-0	DIRTY FILTER
	3	E4/E6	AFS-460	MANUAL RESET HIGH STATIC PRESSURE
	1	E5	L482A-1004	FREEZE THERMOSTAT
	1	PCD	PRR275	DUCT STATIC PRES SENSORS, COLD DECK
	1	PHD	PRR275	DUCT STATIC PRES SENSORS, HOT DECK
Panel Devices:	1	XF	PSH100A100A	120 VAC TO 24 VAC TRANSFORMER
	4	R1,2,3,4	RRIBAULAC24V	PANEL MOUNTED RELAY
	1	PC1	W7760C-2001	HONEYWELL PLANT CONTROLLER

BILL OF MATERIALS AHU ACTUATORS AND VALVES (Specific to Each AHU)

DESIGNATION	QTY	MARK	PART NUMBER	DESCRIPTION
AHU 1:	1	V1A	N/A	EXISTING COLD WATER VALVE
	1	V1B	V5011N1081	2 WAY, GLOBE, 1 1/2", HOT WATER VALVE
	1	V1C	V5011N1073	2 WAY, GLOBE, 1 1/4", PREHEAT VALVE
	1	CWVA	GM24MFTUS	24 VAC, EXISTING BELIMO VALVE ACTUATOR
	1	HWVA	ML7425B	24 VAC ,MOD SR ACTUATOR FOR HW VALVE
	1	PHVA	ML7425B	24 VAC ,MOD SR ACTUATOR FOR PH VALVE
	1	RDA	MS7520A2007	RETURN AIR 175inlb DAMPER ACTUATOR
	4	ODA	MS7520A2007	OUTDOOR AIR 175inlb DAMPER ACTUATORS
	1	RLDA	MS7520A2007	RELIEF AIR 175inlb DAMPER ACTUATOR
	1	MDA	MS7520A2007	MINIMUM OA 175inlb DAMPER ACTUATOR
AHU 2:	1	V2A	N/A	EXISTING COLD WATER VALVE
	1	V2B	V5011N1081	2 WAY, GLOBE, 1 1/2", HOT WATER VALVE
	1	V2C	V5011N1073	2 WAY, GLOBE, 1 1/4", PREHEAT VALVE
	1	CWVA	GM24MFTUS	24 VAC, EXISTING BELIMO VALVE ACTUATOR
	1	HWVA	ML7425B	24 VAC ,MOD SR ACTUATOR FOR HW VALVE
	1	PHVA	ML7425B	24 VAC ,MOD SR ACTUATOR FOR PH VALVE
	1	RDA	MS7520A2007	RETURN AIR 175inlb DAMPER ACTUATOR
	1	ODA	MS7520A2007	OUTDOOR AIR 175inlb DAMPER ACTUATOR
	2	RLDA	MS7520A2007	RELIEF AIR 175inlb DAMPER ACTUATORS
	1	MDA	MS7520A2007	MINIMUM OA 175inlb DAMPER ACTUATOR
AHU 3:	1	V3A	N/A	EXISTING COLD WATER VALVE
	1	V3B	V5011N1081	2 WAY, GLOBE, 1 1/2", HOT WATER VALVE
	1	V3C	V5011N1065	2 WAY, GLOBE, 1", PREHEAT VALVE
	1	CWVA	GM24MFTUS	24 VAC, EXISTING BELIMO VALVE ACTUATOR
	1	HWVA	ML7425B	24 VAC ,MOD SR ACTUATOR FOR HW VALVE
	1	PHVA	ML7425B	24 VAC ,MOD SR ACTUATOR FOR PH VALVE
	1	RDA	MS7520A2007	RETURN AIR 175inlb DAMPER ACTUATOR
	1	ODA	MS7520A2007	OUTDOOR AIR 175inlb DAMPER ACTUATOR
	2	RLDA	MS7520A2007	RELIEF AIR 175inlb DAMPER ACTUATORS
	1	MDA	MS7520A2007	MINIMUM OA 175inlb DAMPER ACTUATOR

SEQUENCE OF OPERATION AHU 1, 2 & 3

CONTROL FEATURE	DESCRIPTION
Start/Stop	The air handling unit will be scheduled through the tridium workstation.
Supply Fan Control	The supply fan operates continuously in the occupied mode, and is cycled intermittently in the unoccupied mode with a call for cooling or heating. The supply fan VFD frequency is controlled to the Duct Static Pressure set point. Two static pressure sensors, PCD and PHD, placed in the hot and cold duct 2/3 of the distance of the main duct downstream from the fan will control the fan speed through the VFD. The lowest output of the two sensors will be the controlling duct static pressure sensor. The supply fan will be stopped if the return fan fails to operate.
Return Fan Control	The return fan will be interlocked with the supply fan to start simultaneously. It is controlled to maintain a difference in CFM between the supply and return fan. The return fan VFD maintains the minimum outdoor air quantity during periods where the economizer is disabled.
Minimum Outdoor Air Control	To maintain minimum outdoor air flow, Air Handler Units 1, 2 & 3 open their outside air damper to 50% (adj.) and modulate the return fan speed to maintain a 11,000 CFM offset between the supply air flow reading and the return airflow reading. The relief damper remains closed until the unit enters economizer conditions.
Economizer Control	During economizer conditions (outside air temperature below 55 degrees F) the relief, return and outside air dampers will modulate to maintain the cold deck air temperature at current set point. The return air fan will continue to maintain the offset airflow set point between supply and return.
Cooling Control	During start up, the outdoor air damper and the chilled water valve will remain closed until the return air temperature reaches the return temperature warm up set point. At this point, the outdoor air damper will open to its preset position and the cooling controls will be operational. If the outdoor air temperature, T5, is above 55 degrees F the economizer damper will be closed to minimum position and mechanical cooling will be enabled. The chilled water control valve will be modulated to maintain a discharge air temperature off 55 degrees F to 65 degrees F. The discharge air temperature set point will reset linearly from 55 degrees to 65 degrees as the outside air temperature drops from 80 degrees to 50 degrees.
Preheat Control	The preheat control valve will modulate to maintain a preheat temperature set point of 50 degrees. Preheat freeze protection pumps 1, 2 & 3 will be energized any time the outside air temperature drops to or below 40 degrees F.
Heating Control	At start-up, the unit will go into warm up mode with the outside air damper remaining closed and the hot water heating coil control valve being modulated wide open until the return air warm up set point of 70 degrees F is reached. The outdoor air damper will then be opened to its minimum position and the supply air temperature sensor in the hot duct, T4, will modulate the hot water valve to maintain the hot duct temperature set point. The set point will be based on outdoor temperature and will be increased linearly from 80 degrees F at 60 degrees F ambient to 110 degrees F at 40 degrees F ambient.
Emergency and Fire Operation	Upon activation of the building fire alarm system, E1 & E2, all outputs will be de-energized and dampers closed. Upon activation of the freeze protection thermostat, E5, the unit fans will be de-energized ,control dampers will be closed, and the hot water and preheat valves will be opened. Upon activation of the hi pressure switch, E4, the unit fans will be de-energized. Upon activation of the refrigerant alarm, E7, in the basement, all outputs will be de-energized and dampers closed on Air Handler Unit 1. The Air Handler will be reactivated after clearance of refrigerant alarm.

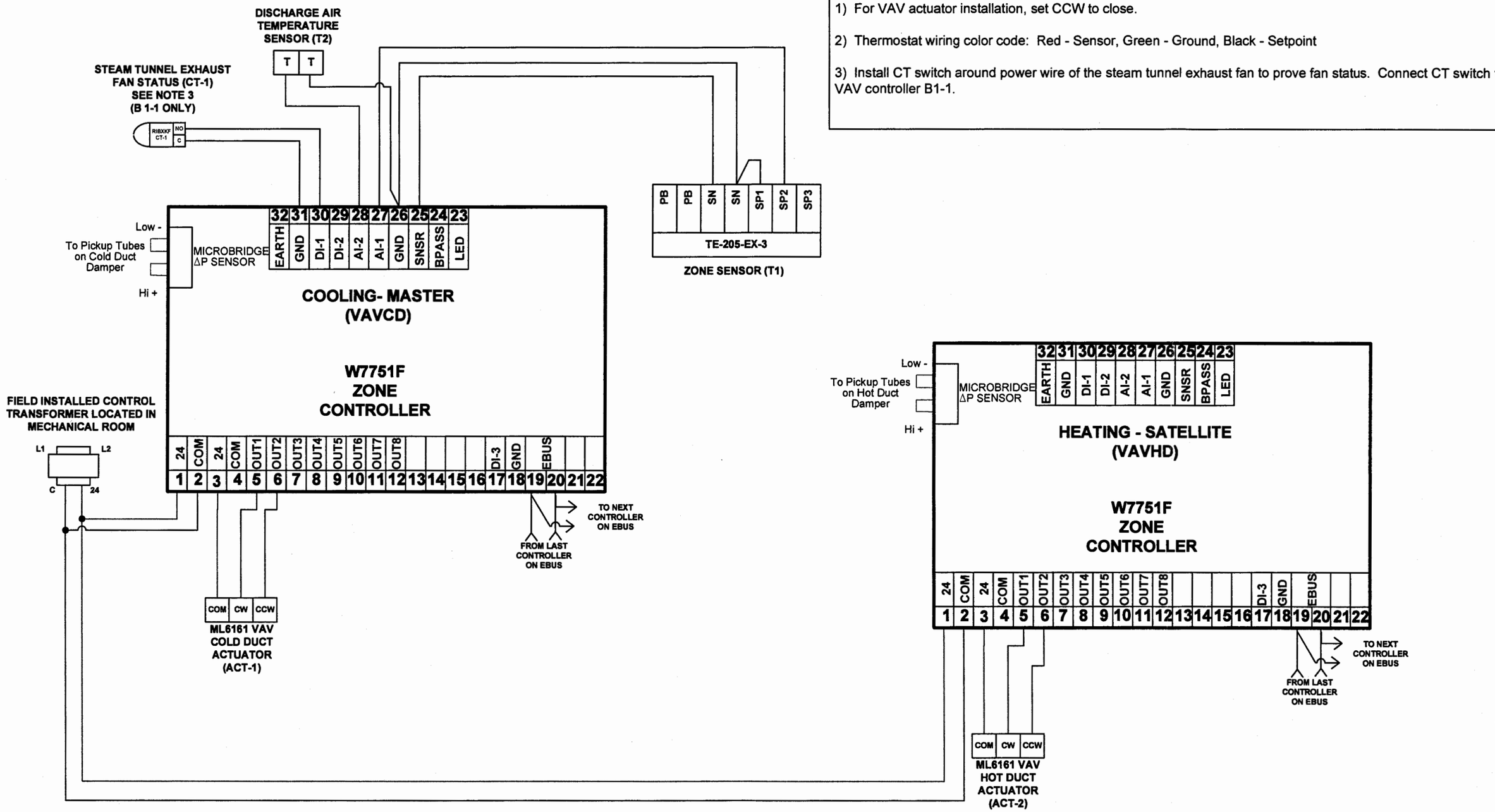
Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: AHU Sequence of Ops		Project Manager: JWJ	DRAWING NUMBER: C2564-12
		Sales Engineer: SJG	

EQUIPMENT NOTES

1) For VAV actuator installation, set CCW to close.

2) Thermostat wiring color code: Red - Sensor, Green - Ground, Black - Setpoint

3) Install CT switch around power wire of the steam tunnel exhaust fan to prove fan status. Connect CT switch to VAV controller B1-1.



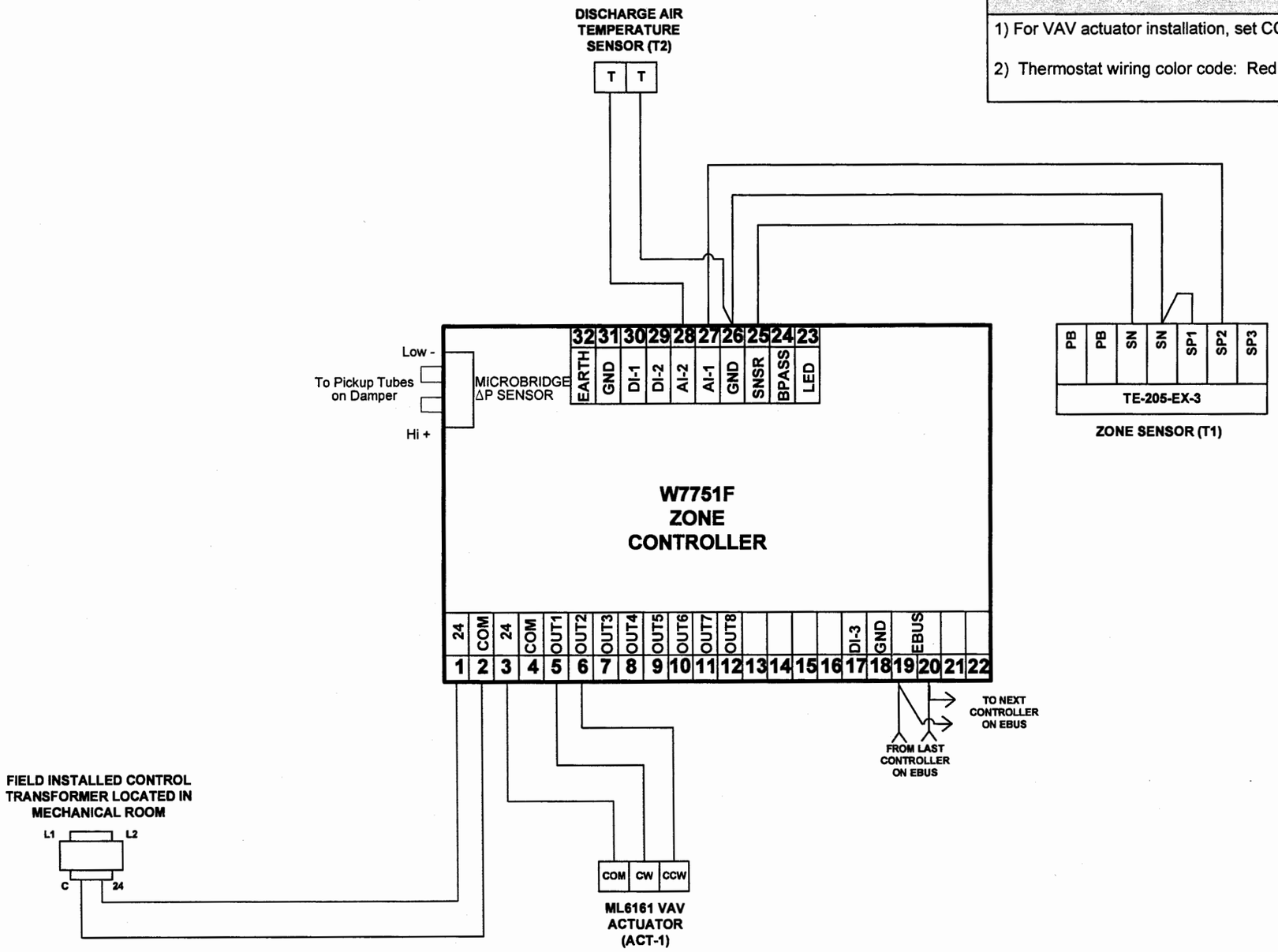
Dual Duct VV & CV Control Wiring

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: Dual Duct VV & CV Wiring		Project Manager: JWJ	DRAWING NUMBER: C2564-13
		Sales Engineer: SJG	

EQUIPMENT NOTES

1) For VAV actuator installation, set CCW to close.

2) Thermostat wiring color code: Red - Sensor, Green - Ground, Black - Setpoint



Single Duct VV & CV Control Wiring

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: Single Duct VV & CV Wiring		Project Manager: JWJ	DRAWING NUMBER: C2564-14
		Sales Engineer: SJG	

DUAL DUCT VAV BOXES BILL OF MATERIALS (PER VV OR CV BOX)

DESIGNATION	QTY	MARK	PART NUMBER	DESCRIPTION
Field Devices:	1	T1	TE-205-EX-3	ZONE SENSOR
	1	T2	TE-702-B17-D2	20 KOhm NTC DUCT TEMPERATURE PROBE
Panel Devices:	1	VAVCD	W7751F2003	HONEYWELL XL10 VAV CONTROLLER
	1	VAVHD	W7751F2003	HONEYWELL XL10 VAV CONTROLLER
	2	ACT-1/ACT-2	ML6161B2024	HONEYWELL 24 VAC ACTUATOR

SINGLE DUCT VAV BOXES BILL OF MATERIALS (PER VV OR CV BOX)

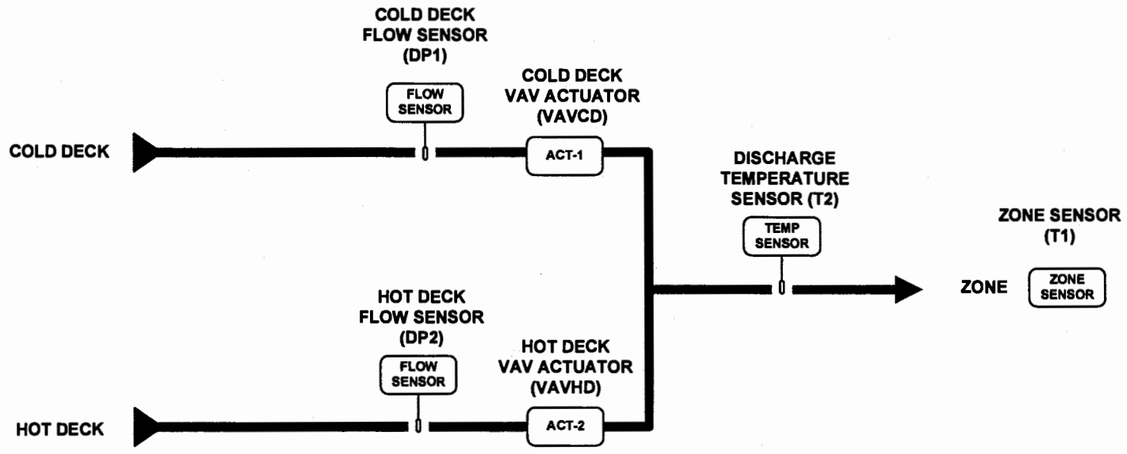
DESIGNATION	QTY	MARK	PART NUMBER	DESCRIPTION
Field Devices:	1	T1	TE-205-EX-3	ZONE SENSOR
	1	T2	TE-702-B17-D2	20 KOhm NTC DUCT TEMPERATURE PROBE
Panel Devices:				
	1	VAV	W7751F2003	HONEYWELL XL10 VAV CONTROLLER
	1	ACT-1	ML6161B2024	HONEYWELL 24 VAC ACTUATOR

SEQUENCE OF OPERATION DUAL DUCT VV & CV

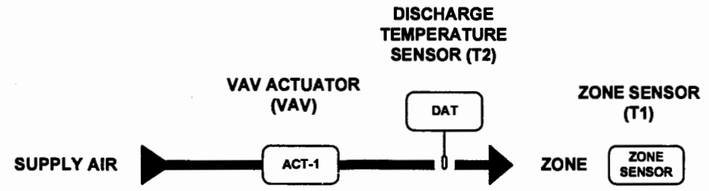
CONTROL FEATURE	DESCRIPTION
DUAL DUCT VAV	Dual duct flow mixing uses two controls devices, a master for the cold duct (VAVCD) and a satellite for the hot duct (VAVCD) to provide pressure independent control for the zone. If there is a need for cooling, dual duct flow mixing will control temperature to the cooling setpoint, setting the flow control setpoint for the cold duct between minimum and maximum flow while setting the hot duct flow setpoint to zero. If the temperature of the space is between the cooling and heating setpoints, the cold duct will control to the minimum flow while the hot duct flow is set to zero. If there is a need for heating, the controllers will try to control to the heating setpoint by first modulating the cold duct flow from minimum flow to zero while simultaneously modulating the hot duct flow from zero to minimum flow. If there is additional need for heat, the hot duct will modulate from minimum to maximum flow while the cold duct is held at zero.
SETPOINTS	Occupied and unoccupied cooling and heating setpoints are adjusted through the existing tridium interface. Zone sensors are provided with a setpoint adjustment knob, the amount of adjustment allowed for each zone is configurable from the tridium interface.
OCCUPIED/ UNOCCUPIED	When the associated air handling unit is occupied, the vav boxes will be set to the occupied state.

SEQUENCE OF OPERATION SINGLE DUCT VV & CV

CONTROL FEATURE	DESCRIPTION
SINGLE DUCT VAV	The strategy used is single duct, pressure independent cooling only. There is one control device on the vav damper (VAV). If there is a call for cooling, temperature is controlled to the cooling set point, with the flow thru the damper being maintained between min and max flow setpoints. When the space temperature is at or below the cooling setpoint, the damper will be at minimum flow.
SETPOINTS	Occupied and unoccupied cooling and heating setpoints are adjusted through the existing tridium interface. Zone sensors are provided with a setpoint adjustment knob, the amount of adjustment allowed for each zone is configurable from the tridium interface.
OCCUPIED/ UNOCCUPIED	When the associated air handling unit is occupied, the vav boxes will be set to the occupied state.

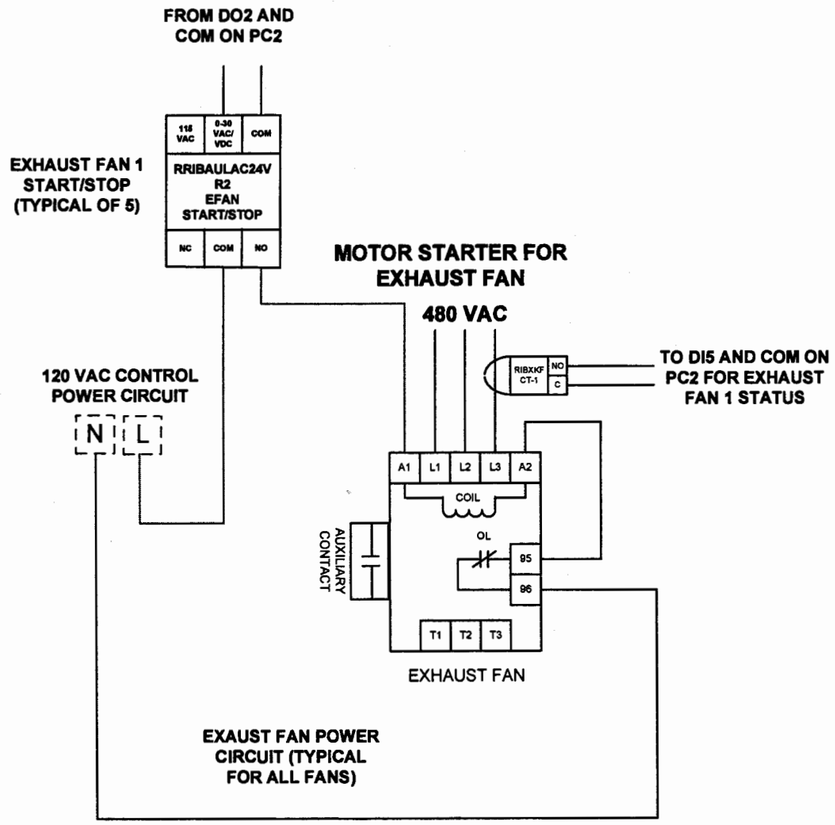


Dual Duct VV & CV Flow Diagram



Single Duct VV & CV Flow Diagram

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: VV & CV Sequence of Ops		Project Manager: JWJ	DRAWING NUMBER: C2564-15
		Sales Engineer: SJG	



EXAUST FAN BILL OF MATERIALS (Per Exhaust Fan)

DESIGNATION	QTY	MARK	PART NUMBER	DESCRIPTION
Field Devices:	5	CT-1	RIBXKF	CURRENT SWITCH- EXHAUST FAN PROVE
Panel Devices:	5	R2	RRIBAULAC24V	RELAY- EXHAUST FAN START/STOP

EXHAUST FAN MOTOR STARTERS

EXHAUST FAN	MOTOR STARTER	STARTED & MONITORED BY:
F-1: MIN 3HP	MAX 5 HP, 460V- CUTLER HAMMER ECN0501CAA	AHU 3 - PC 2
F-2: MIN 1/30 HP	MAX 2 HP, 460V- CUTLER HAMMER ECN05A1CAA	HEATING PLANT - PC4
F-7: MIN 2 HP	MAX 5 HP, 460V- CUTLER HAMMER ECN0501CAA	AHU 2 - PC 2
F-8: MIN 2 HP	MAX 5 HP, 460V- CUTLER HAMMER ECN0501CAA	AHU 3 - PC2
F-9; MIN 2 HP	MAX 5 HP, 460V- CUTLER HAMMER ECN0501CAA	AHU 3 - PC2

SEQUENCE OF OPERATION EXHAUST FANS

CONTROL FEATURE	DESCRIPTION
EXHAUST FAN STATUS	All new exhaust fans added with this project will be monitored with a current switch (CT) to prove fan operation.
EXHAUST FAN CONTROL	Exhaust fans designated in the project specifications will be controlled by a low voltage relay connected to the closest plant controller. The fans will run during occupied periods.
ALARMS	An alarm will be generated if the fan is scheduled to run but the current switch (CT-1) is not activated, or if the fan is not scheduled to run and the current switch (CT-1) is activated.

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: Exhaust Fan Control Wiring		Project Manager: JWJ	DRAWING NUMBER: C2564-16
		Sales Engineer: SJG	

PUMPING PACKAGE ENABLE

EXHAUST FAN 2 ENABLE

ON/OFF DOMESTIC WATER HEATER (COORDINATE WITH PLUMBING CONTRACTOR)

24V FROM TRANSFORMER SUPPLYING VFD

SCV-4 STEAM ACTUATOR

T1 | T2 | + | -

SCV-5 STEAM ACTUATOR

T1 | T2 | + | -

RIBMU1C (R1)

NC | COM | NO

116 VAC | 0-30 VAC/VDC | COM

RIBMU1C (R2)

NC | COM | NO

116 VAC | 0-30 VAC/VDC | COM

RIBMU1C (R3)

NC | COM | NO

116 VAC | 0-30 VAC/VDC | COM

L1 L2

XF

C 24

31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
DO1	1&2 COM	DO2	DO3	3&4 COM	DO4	DO5	5&6 COM	DO6	DO7	7&8 COM	DO8	20 VDC	GND	24VAC COM		24VAC LINE		E GND	AO1	GND	AO2	AO3	GND	AO4	AO5	GND	AO6

Honeywell

W7760C
PLANT
CONTROLLER
(PC4)

DI 1	GND	DI2	DI3	GND	DI4	DI5	GND	DI6	DI7	GND	DI8	EBUS		EBUS		AI1	GND	AI2	AI3	GND	AI4	AI5	GND	AI6	AI7	GND	AI8	GND	GND
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

TO NEXT CONTROLLER ON EBUS

FROM LAST CONTROLLER ON EBUS

Com | NO

DOMESTIC WATER HEATER ALARM

COORDINATION WITH PLUMBING SUB-CONTRACTOR REQUIRED

GAS CONSUMPTION

PULSE GAS METER CONTACTS PROVIDED BY PIEDMONT NATURAL GAS

STEAM CONSUMPTION

PULSE STEAM METER

DOMESTIC WATER CONSUMPTION

FROM DOMESTIC FLOW TRANSMITTER PROVIDED BY PLUMBING CONTRACTOR

4-20mA- BLUE

0-10Vdc-BROWN

24 V-RED

COM-BLACK

HOT WATER FLOW METER ONICON MODEL F-1210

F-2

Com | NO

RIB XKF PACKAGE PUMP 2A STATUS CS-1

Com | NO

RIB XKF PACKAGE PUMP 2B STATUS CS-2

Com | NO

PUMPING PACKAGE ALARM

Com | NO

RIB XKF DOMESTIC WATER PUMP STATUS CS-3

Com | NO

RIB XKF EXHAUST FAN 2 STATUS CS-4

(SEE SHEET C2564-16)

HW TEMPERATURE STEAM CONTROL MAMAC TE-703-A-17-B2

T-1

STEAM FLOW METER

F-1

Project Title	McEniry Classroom Building
Drawing Title	Heating Plant

Honeywell AUTHORIZED CONTROLS INTEGRATOR

Application Engineer	BMR
Project Manager	JWJ
Sales Engineer	SJG
CONTRACT NUMBER	2564-S
DRAWING NUMBER	C2564-17

BILL OF MATERIALS HW SYSTEM

DESIGNATION	QTY	MARK	PART NUMBER	DESCRIPTION
Field Devices:	2	CS1-2	RIBXKF	CURRENT SWITCH- PUMP PROVE
	1	T-1	TE-703-A-17-B2	HONEYWELL WELL TEMPERATURE SENSOR
	1	T-1	A5001B1	HONEYWELL 4" TEMPERATURE WELL
	1	F-1	EMCO PHD	EMCO PHD VORTEX FLOW METER
	1	SCV-4	ML7425B3013	HONEYWELL GLOBE 1/3 STEAM VALVE ACTUATOR
	1	SCV-4	V5011N2097	HONEYWELL 2-WAY, 2", 1/3 STEAM VALVE
	1	SCV-5	2XAF24-MFT-US	BELIMO 2/3 STEAM VALVE ACTUATOR
	1	SCV-5	G680	BELIMO 2-WAY, 3", 2/3 STEAM VALVE
	1	F-2	F-1210	ONICON HOT WATER FLOW METER
Panel Devices:	3	R1-3	RIBMU1C	PANEL MOUNTED RELAY
	1	PC1	W7760C-2001	HONEYWELL PLANT CONTROLLER

SEQUENCE OF OPERATION HOT WATER SYSTEM

CONTROL FEATURE	DESCRIPTION
STEAM CONTROL VALVE	Steam control valves SCV-4 and SCV-5 to hot water convertor will modulate to maintain desired supply water temperature determined by T-1.
HOT WATER PUMPS	Hot water pumps along with VFD control will be provided in pumping package. The building DDC system will monitor and alarm pump status and will enable pumps.
DOMESTIC WATER HEATER	Points are provided to monitor status and to activate/ deactivate domestic water heater. The Plumbing subcontractor will be coordinated with for point access.
GAS CONSUMPTION	Points are provided to monitor gas consumption from pulse gas meter to be provided by Piedmont Natural Gas Co.
ELECTRIC METER	Points are provided to read data remotely from the electric meter provided under Division 16 to monitor KWH consumption and demand KW, Amps, Volts, KVARS, KVA, PF, Frequency.
STEAM FLOW METER	Steam flow meter will monitor steam consumption for the building. The meter will be located in the branch main coming off the steam main in the crawl space.
DOMESTIC WATER CONSUMPTION	Points are provided to monitor building's domestic water consumption from the water meter to be provided on the water main in the building by the Plumbing Sub-contractor.
HOT WATER FLOW	Building Hot Water Flow will be monitored by the Hot Water Flow Meter, F2, and displayed graphically.

Project Title
McEniry Classroom Building

Drawing Title
HW Sys Sequence of Ops

Honeywell
AUTHORIZED CONTROLS INTEGRATOR

Application Engineer: BMR
Project Manager: JWJ
Sales Engineer: SJG

CONTRACT NUMBER: 2564-S
DRAWING NUMBER: C2564-18

CONTROL VALVE SCHEDULE

VALVE	SERVICE	GPM	Calc Cv	Valve Cv	SIZE	TYPE	VALVE	ACTUATOR
V-1A	AHU-1 CW	*	*	*	*	2W	*	*
V-1B	AHU-1 HW	56	28	29.3	1½"	2W	V5011N1081	ML7425B3012
V-1C	AHU-1 PREHEAT	33	16.5	18.7	1¼"	2W	V5011N1073	ML7425B3012
V-2A	AHU-2 CW	*	*	*	*	2W	*	*
V-2B	AHU-2 HW	60	30	29.3	1½"	2W	V5011N1081	ML7425B3012
V-2C	AHU-2 PREHEAT	37	18.5	18.7	1¼"	2W	V5011N1073	ML7425B3012
V-3A	AHU-3 CW	*	*	*	*	2W	*	*
V-3B	AHU-3 HW	63	31.5	29.3	1½"	2W	V5011N1081	ML7425B3012
V-3C	AHU-3 PREHEAT	21	10.5	11.7	1"	2W	V5011N1065	ML7425B3012
SCV-4	HX-1 1/3 VALVE	2400 #/hr	36.3	46.8	2"	2W	V5011N2097	ML7425B3012
SCV-5	HX-1 2/3 VALVE	4869 #/hr	73.6	90.0	3"	2W	G680	2XAF24-MFT-US

Water valve Cv calculated based on 4 PSI pressure drop at design flow, per specifications section 15980.2.1.C
*Existing chilled water valves to remain.

GENERAL NOTES

All points specified on drawing M2.4 will be included in the custom designed graphics. All graphics will be generated following the UNCC templates and will be submitted to UNCC for approval prior to deployment per the specifications section 15975.2.12 FMS GRAPHICS.

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: AHU Valve Schedule		Project Manager: JWJ	DRAWING NUMBER: C2564-19
		Sales Engineer: SJG	

AHU SYSTEMS POINT LIST

SYSTEM POINT DESCRIPTION		ANALOG										BINARY										SYSTEM FEATURES																								
		INPUT							OUTPUT			INPUT							OUTPUT			ALARMS										PROGRAMS											ANALOG INPUT			
Air Handling Units (Variable Vaolume with Static Pressure Optimization)	GRAPHIC	TEMPERATURE	PRESSURE	RH	KW	CFM	SETPOINT	LBS/HR	DDC (4-20 ma,0-10 VDC)		SET PINT ADJ.	PNEU. TRANSDUCER	STATUS ON/OFF	FILTER STATUS	STATUS OPEN/CLSD	STATUS	NO. OF STARTS	TIMED OVERRIDE	OFF/ON	OPEN/CLOSE	LOCKOUT	HIGH ANALOG	LOW ANALOG	HIGH BINARY	LOW BINARY	PROOF	SENSOR FAIL	FLOW FAIL	COMM FAIL		DIAGNOSTICS	TIME SCHEDULING	DEMAND LIMITING	OPT. START	RESET	EVENT PROGRAM	DDC	ALARM INSTRUCT	MAINT. WK. ORDER	RUN TIME	EXP. MESSAGE	SET BACK/SET UP	GPM			
AHU CONTORL PANEL																													X			X		X		X				X		X				
SUPPLY FAN	X												X						X									X																		
DISCHARGE STATIC	X		X								X																X								X											
FAN MODULATION	X								X																																					
SUPPLY AIR COLD DECK	X	X				X					X											X	X				X																			
HEATINGVALVE									X																																					
COOLING VALVE	X								X																																					
MIXED AIR	X	X									X											X	X				X																			
OUTDOOR AIR FLOW	X					X																					X																			
ECONOMIZER ACTUATOR OA/RA	X								X																																					
CRITICAL ZONE DAMPER POSITION	X					X																X	X															X								
SUPPLY AIR HOT DECK	X																					X	X				X																			
MIXED AIR LOW LIMIT															X										X																					
RETURN AIR	X	X		X		X		X														X	X				X																			
RETURN/ RELIEF FAN	X												X						X									X																		
CONVERTOR	X																																													
STEAM			X					X																																						
HW SUPPLY		X																																									X			
HW RETURN		X																																												
MISC.																																														
ELECTRIC METER					X																																									
GAS METER						X																																								
STEAM FLOW METER			X					X																																						
DOMESTIC WATER HEATER	X						X				X								X									X																		
DWH BOOSTER PUMP	X		X										X																																	
HW PUMPS (RECIRC PUMPS)	X															X												X																		

Project Title
McEniry Classroom Building

Drawing Title
AHU Point List

Honeywell
AUTHORIZED CONTROLS INTEGRATOR

Application Engineer BMR
Project Manager JWJ
Sales Engineer SJG

CONTRACT NUMBER
2564-S

DRAWING NUMBER
C2564-20

VAV SYSTEMS POINT LIST

SYSTEM POINT DESCRIPTION		ANALOG												BINARY									SYSTEM FEATURES																
		INPUT										OUTPUT		INPUT							OUTPUT			ALARMS							PROGRAMS								
VAV and Dual Duct VAV Terminal Units	GRAPHIC	TEMPERATURE	AMPS	RPM	KW	VOLTS	HERZ	PERCENT	CFM	SETPOINT	CO2 PPM	DDC (4-20 ma, 0-10 VDC)	SET PINT ADJ.	PNEU. TRANSDUCER	STATUS ON/OFF	FILTER STATUS	STATUS OPEN/CLSD	STATUS	NO. OF STARTS	TIMED OVERRIDE	OFF/ON	OPEN/CLOSE	LOCKOUT	HIGH ANALOG	LOW ANALOG	BINARY	PROOF	SENSOR FAIL	FLOW FAIL	COMM FAIL	DIAGNOSTICS	TIME SCHEDULING	DEMAND LIMITING	OPT. START	RESET	EVENT PROGRAM	DDC	ALARM INSTRUCT	MAINT. WK ORDER	RUN TIME	EXP. MESSAGE	SET BACK/SET UP
ZONE TEMP	X	X											X											X	X			X		X										
HEATING SETPOINT	X											X	X																											
COOLING SETPOINT	X											X	X																											
CFM	X								X			X																	X											
MAX CFM													X																											
MIN CFM													X																											
HEATING MAX CFM													X																											
HEAT STATUS	X														X						X			X	X			X												
DISCHARGE TEMP	X	X																																					
UNOCCUPIED HTG. SETPOINT	X												X																											
UNOCCUPIED CLG. SETPOINT	X												X																											
HEAT OVERIDE																																							
CONTROL OFFSET																																							
CALIBRATION																																							
VFD'S																																							
OUTPUT FREQUENCY	X						X																																
MOTOR CURRENT	X		X																																				
OUTPUT POWER	X				X																																		
OUTPUT VOLTAGE	X					X																																	
LINE VOLTAGE	X					X																																	
FREQUENCY SETPOINT	X												X																											
OUTPUT SPEED	X												X																											
MOTOR STATUS	X																X																							
GENERAL FAULT	X																								X												X		X	
START STOP (1)	X																				X																			
FANS																																							
ON/OFF	X														X						X																			
STATUS	X														X																									
FAILURE	X																																				X			
PUMPS	X														X														X										

Project Title: McEniry Classroom Building	Honeywell AUTHORIZED CONTROLS INTEGRATOR	Application Engineer: BMR	CONTRACT NUMBER: 2564-S
Drawing Title: VAV Point List		Project Manager: JWJ	DRAWING NUMBER: C2564-21
		Sales Engineer: SJG	

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SHEET	UNIT WIRING DETAIL
1	FIBER TRUNK
2	BCU-5 DETAIL
3	TYPICAL PCM WIRING
4	BCU-5 COMMUNICATION TRUNK
5-9	AHU S-1, UPCM-1
5, 10, 11	AHU S-10, UPCM-1
12-16	AHU S-2, UPCM-2
17-21	AHU S-3, UPCM-3
22-24	EXHAUST FANS, UPCM-4
25-31	PLANT, UPCM-5
32-34	AHU-4, PCM-1
35-37	AHU-5, PCM-4
38-40	AHU-6, PCM-5
41-43	AHU-7, PCM-6
44-46	AHU-8, PCM-3
47-49	AHU-9, PCM-2
50	ADDRESSES
51	SEQUENCE

Controls Submittal

Project Name: UNCC McEniry Building Renovations

Project No.#: ICS-98014

Engineer: SUD Associates, P.A.
Durham, North Carolina

AS-BUILTS

LEGEND
_____ INDICATES FACTORY WIRING
_ _ _ _ _ INDICATES FIELD WIRING

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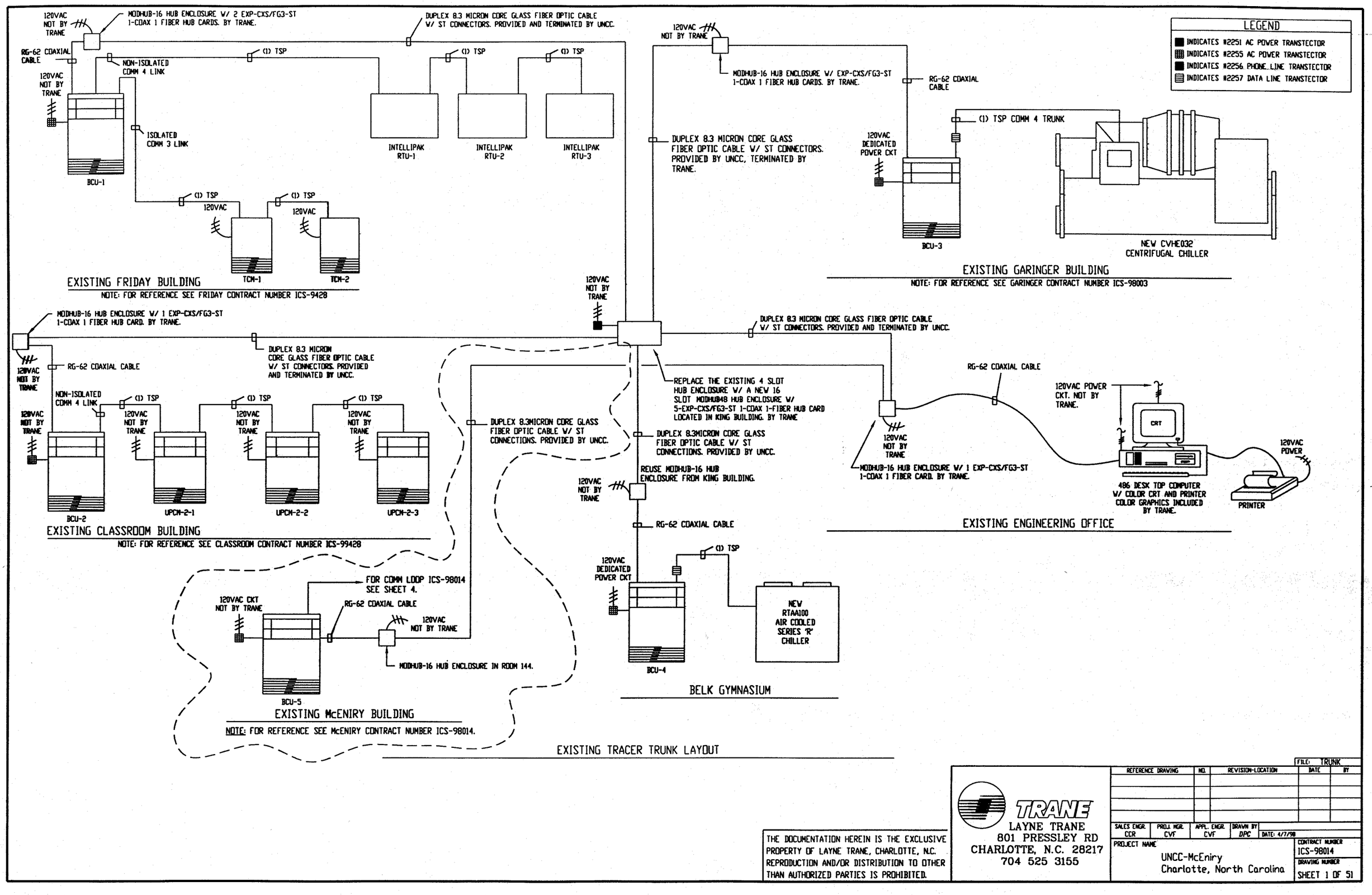
FILE: COVER

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CDR	CVF	CVF	DPC	4/3/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina
CONTRACT NUMBER: ICS-98014
DRAWING NUMBER: SHEET COVER



EXISTING TRACER TRUNK LAYOUT

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LAYNE TRANE
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FILE: TRUNK

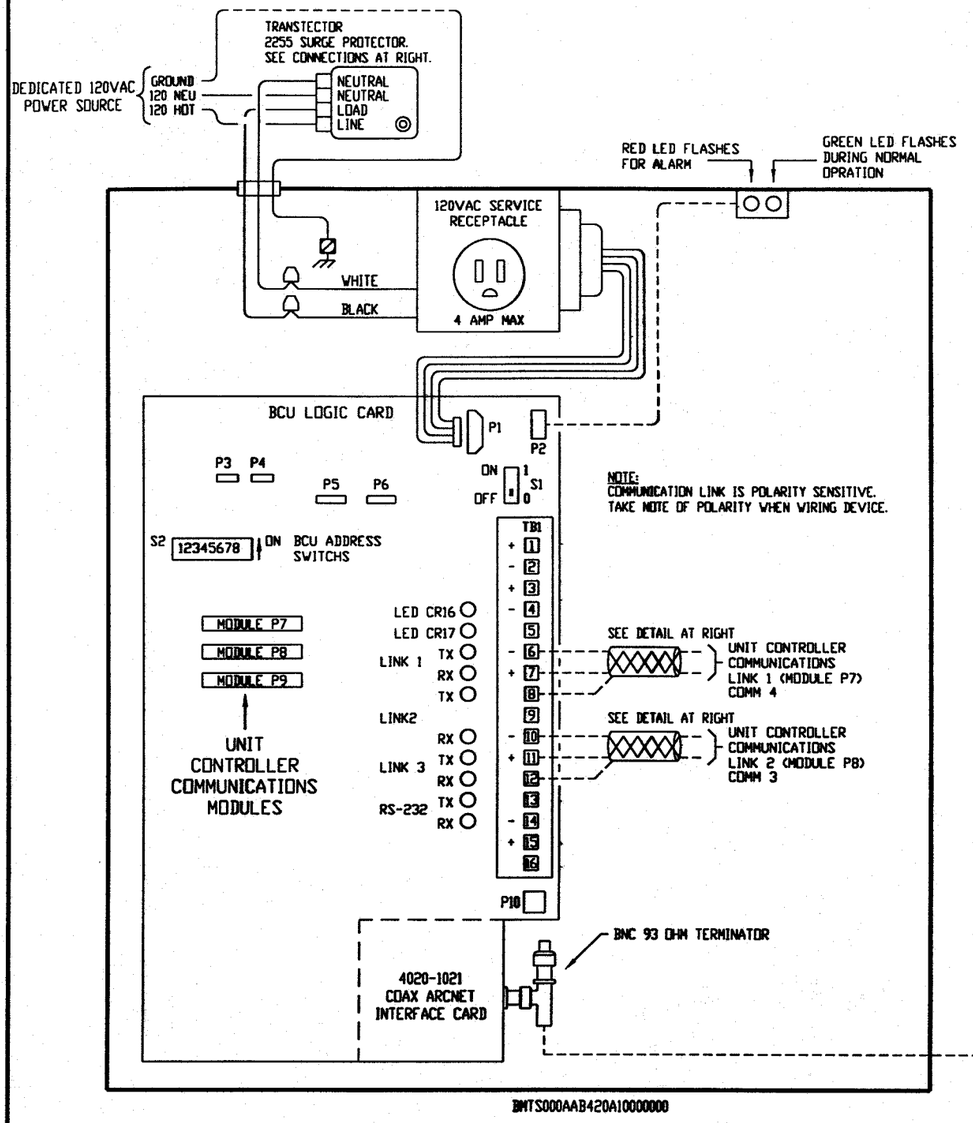
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/7/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

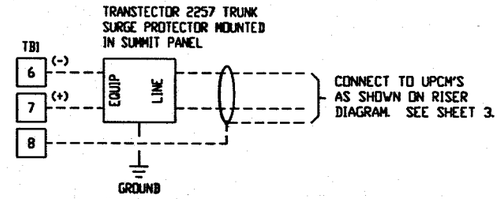
DRAWING NUMBER: SHEET 1 OF 51



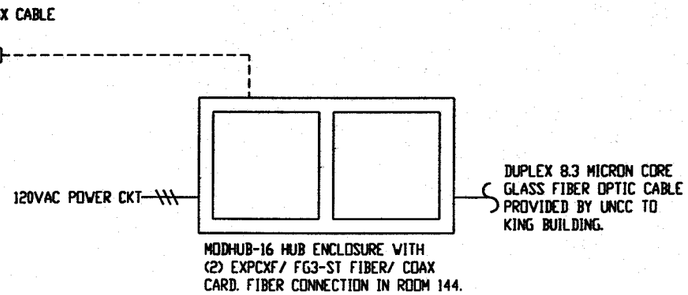
TRACER SUMMIT BCU-5 DETAIL

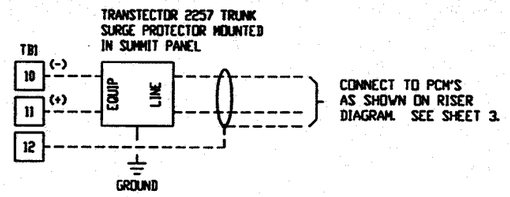
COSTOMER NOTE:

1. COMPONENTS AND WIRING SHOWN DASHED ARE FURNISHED AND INSTALL BY ELECTRICAL SUBCONTRACTOR.
2. ALL CONTROL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODES AND LOCAL CODES.
3. USE COPPER CONDUCTORS ONLY.
4. DO NOT RUN A/C POWER WITH ANY INPUT OR COMMUNICATIONS LINK WIRING.
5. INSTALL THE BCU INDOORS IN A CORROSIVE FREE, CLEAN ENVIRONMENT.
6. BINARY INPUT WIRING MUST BE SHIELDED, TWISTED PAIR. AND EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED WIRE SIZE IS 18 GUAGE. MAXIMUM BINARY INPUT WIRING DISTANCE IS 1000 FT.
7. ANALOG INPUT WIRING MUST BE SHIELDED, TWISTED PAIR, AND EACH CONDUCTOR MUST BE STRANDED TINNED COPPER. RECOMMENDED WIRE SIZE IS 18 GUAGE. MAXIMUM ANALOG INPUT WIRING DISTANCE IS 300 FT.
8. ALL COMMUNICATIONS LINK WIRING MUST BE LOW CAPACTANCE, 18 GUAGE, SHIELDED TWISTED PAIR WITH TINNED COPPER CONDUCTORS. MAXIMUM WIRE CAPACACITANCE BETWEEN CONDUCTORS IS TO BE 25 PF/FT MAXIMUM COMMUNICATIONS LINK WIRING AT 25 PF/FT IS 5000 FT. LOOP OR DAISY CHAIN THE COMMUNICATIONS LINK BETWEEN CONTROLLERS WHERE POSSIBLE.
9. LAN COMMUNICATIONSLINK WIRING MUST BE A 93 OHM COAXIAL CABLE (RG-62) WITH A SOLID CENTER CONDUCTOR. MAXIMUM LAN COMMUNICATIONS WIRING IS 1000 FT AND THE MINIMUM DISTANCE IS 6 FT.
10. THE AC POWER OUTLET IS A SERVICE TOOL RECEPTACLE ONLY.



BCU TRUNK LINE SURGE PROTECTOR DETAIL





BCU TRUNK LINE SURGE PROTECTOR DETAIL

GENERAL WIRING NOTES:

(1) ALL WIRING IS TO BE LABELED WITH A NUMBER AT ALL POINTS OF TERMINATION OR JUNCTION.

(2) ALL WIRING SHOULD FOLLOW STANDARD COLORING CODING. EXAMPLE: ALL GROUND WIRES SHOULD BE GREEN WITH THE EXCEPTION OF BARE SHIELD WIRES IN CABLE.

(3) TYPE AND USE OF CONDUIT OR PLENUM RATED CABLE SHOULD BE TAKEN FROM JOB SPECIFICATIONS AND FOLLOWED.

(4) NO MORE THAN (1) EXTENSION ON A 4"X4" OR OTHER SIZED JUNCTION BOX. IF MORE ROOM IS NEEDED USE A BIGGER BOX.

(5) IT IS THE ELECTRICAL SUBCONTRACTORS RESPONSIBILITY TO GENERATE AS-BIULT PRINTS AS THE JOB IS WIRED TO REFLECT TRUE WIRING, DEVICES AND WIRE NUMBERS.

(6) PROVIDE A CONTROL CIRCUIT DISCONNECT SWITCH FOR EACH MECHANICAL ROOM OR DEVICE.

LEGEND

_____ INDICATES FACTORY WIRING
_ _ _ _ _ INDICATES FIELD WIRING

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FILE: BCU-1

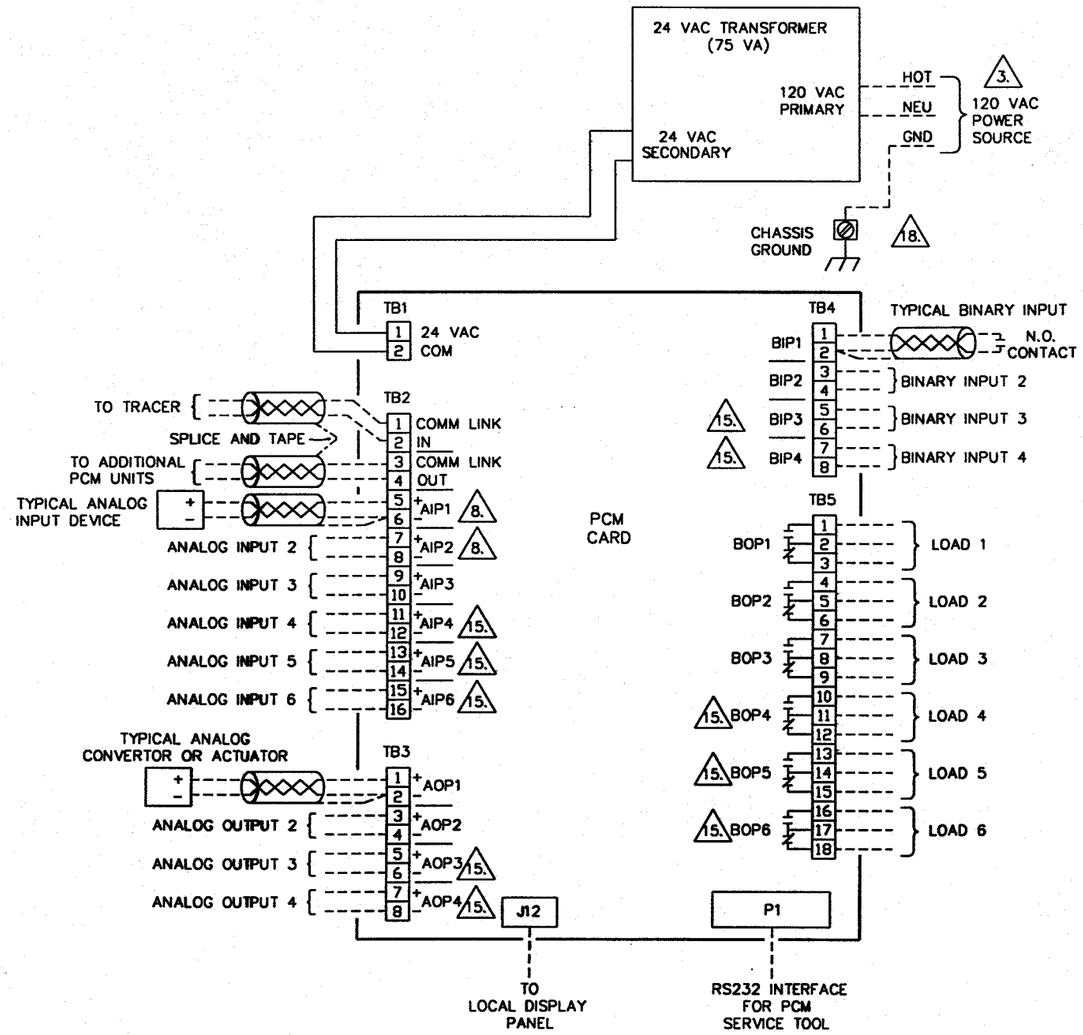
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/2/98
CCR	CVF	CVF	DPC	

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 2 OF 51



TYPICAL PCM DETAIL

CUSTOMER NOTE

1. COMPONENTS AND WIRING SHOWN DASHED ARE FIELD WIRING. SPECIFICATIONS DETERMINE DIFFERENTIAL BETWEEN ELECTRICAL AND MECHANICAL WIRING.
2. ALL CONTROL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODES AND LOCAL CODES.
3. THE NEMA 1 PCM REQUIRES A 120 VAC, 60 HZ, 1 AMP NON-DEDICATED AC POWER SOURCE.
4. BINARY INPUT (BIP) WIRING MUST BE SHIELDED, TWISTED PAIRS. RECOMMENDED SIZE IS 18 GA. AT SENSOR, SHIELD MUST BE CUT BACK AND TAPED. AT PCM BINARY INPUT TERMINALS, SHIELD MUST BE CONNECTED TO EVEN # TERMINAL OF THE RESPECTIVE INPUT. MAXIMUM BINARY INPUT WIRING DISTANCE IS 1000 FEET.
5. BINARY INPUTS MUST BE ISOLATED, UNGROUNDED CONTACTS.
6. ANALOG INPUT (AIP) WIRING MUST BE SHIELDED, TWISTED PAIRS. RECOMMENDED SIZE IS 18 GA. AT SENSOR, SHIELD MUST BE CUT BACK AND TAPED. AT PCM ANALOG INPUT TERMINALS, SHIELD MUST BE CONNECTED TO THE EVEN # TERMINAL OF THE RESPECTIVE INPUT. MAXIMUM ANALOG INPUT WIRING DISTANCE IS 300 FEET.
7. ANALOG INPUTS CAN BE RESISTANCE THERMISTOR TEMPERATURE SENSOR (-30 TO 220.F) AND IF SPECIFIED, PROVIDED WITH ADJUSTMENT KNOBS. ANALOG INPUTS CAN ALSO BE A 4 TO 20MA CURRENT SOURCE CAPABLE OF DRIVING 200 OHMS, OR A 0-10 VDC VOLTAGE SOURCE CAPABLE OF DRIVING 9000 OHMS.
8. ANALOG INPUTS 1 AND 2 (AIP1 AND AIP2) CAN ALSO BE RTD TEMPERATURE SENSORS (IN ADDITION TO THE STANDARD OPTIONS LISTED ABOVE). THE RANGE FOR 1000 OHM BALCO RTD'S IS -30 TO 220° F. THE RANGE FOR 1000 OHM 375 PLATINUM RTD'S IS -30 TO 200° F.
9. ANALOG OUTPUT (AOP) WIRING MUST BE SHIELDED, TWISTED PAIRS. RECOMMENDED SIZE IS 18 GA.. AT OUTPUT DEVICE, SHIELD MUST BE CUT BACK AND TAPED. AT PCM OUTPUT TERMINALS, SHIELD MUST BE CONNECTED TO EVEN # TERMINAL OF THE RESPECTIVE OUTPUT. MAXIMUM ANALOG OUTPUT DISTANCE IS 300 FEET.
10. ANALOG OUTPUTS PROVIDE A CONTINUOUS SIGNAL FOR DRIVING ANALOG TRANSDUCERS OR ACTUATORS. EACH ANALOG OUTPUT CAN PROVIDE 0 TO 10 VDC INTO 500 OHMS OR GREATER LOAD IMPEDANCE, OR 0 TO 20 MA INTO 500 OHMS OR LOWER LOAD IMPEDANCE.
11. BINARY OUTPUT (BOP) RELAY CONTACTS ARE RATED 24 VAC/VDC, 1 AMP, 24 VA PILOT DUTY.
12. THE TRACER COMMUNICATION LINK IS FOR COMMUNICATION WITH VARIOUS TRACER BUILDING MANAGEMENT SYSTEM CONTROLLERS. WIRING MUST BE 18 AWG TWISTED, SHIELDED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. THE WIRE CAPACITANCE BETWEEN CONDUCTORS (PICOFARADS PER FOOT) MUST BE IN ACCORDANCE WITH TABLE 1. MAXIMUM TOTAL WIRE LENGTH IS 5,000 FEET.
13. THE OPTIONAL 24 VDC POWER SUPPLY PROVIDES 24 VDC AT 100 MA MAXIMUM FOR USE WITH 4 TO 20 MA OR 0 TO 10 VDC TRANSMITTING SENSORS.
14. IN ADDITION TO POWERING THE PCM CARD AND THE OPTIONAL 24 VDC (100 MA) POWER SUPPLY, THE 24 VAC (75 VA) TRANSFORMER PROVIDES AN ADDITIONAL 35 VA TO POWER EXTERNAL BINARY OUTPUT LOAD RELAYS. A SEPARATE 1.5 AMP MAXIMUM FUSE MUST BE PROVIDED FOR THE EXTERNAL LOAD.
15. ANALOG INPUTS 4 THRU 6, ANALOG OUTPUTS 3 AND 4, BINARY INPUTS 3 AND 4, AND BINARY OUTPUTS 4 THRU 6 ARE ONLY AVAILABLE ON 20 POINT PCM'S.
16. ALL CUSTOMER CONNECTIONS ON THE PCM ARE #4 CAPTIVE SCREW TERMINALS WITH PRESSURE PLATES, SUITABLE FOR BARE WIRE TERMINATIONS.
17. NBLT DENOTES NOT BY LAYNE TRANE.
18. NOT CONNECTING GREEN GROUND WIRE WILL CAUSE ERRATIC PCM OPERATION.

TABLE 1 - COMMUNICATION LINK WIRING

MAXIMUM COMMUNICATION LINK WIRE LENGTH (FEET)	MAXIMUM CAPACITANCE BETWEEN CONDUCTORS (PICOFARADS/FOOT)
1,000	60
2,000	50
3,000	40
4,000	30
5,000	25

⚠ CAUTION
USE COPPER CONDUCTORS ONLY TO PREVENT EQUIPMENT DAMAGE. UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT ANY OTHER WIRING.

ATTENTION
UTILISER SEULEMENT DES CONDUCTEURS EN CUIVRE POUR EVITER D'ENDOMMAGER L'EQUIPMENT. LES BORNES NE SONT PAS PREVUES POUR AUTRES TYPES DE FILS CONDUCTEURS.

⚠ WARNING
DISCONNECT ELECTRIC POWER SUPPLY BEFORE SERVICING TO PREVENT INJURY OR DEATH DUE TO ELECTRICAL SHOCK.

AVERTISSEMENT
DEBRANCHER DU CIRCUIT D'ALIMENTATION ELECTRIQUE AVANT L'ENTRETIEN POUR EVITER BLESSURE OU MORT PAR ELECTROCUTION.

LEGEND
_____ INDICATES FACTORY WIRING
- - - - - - INDICATES FIELD WIRING

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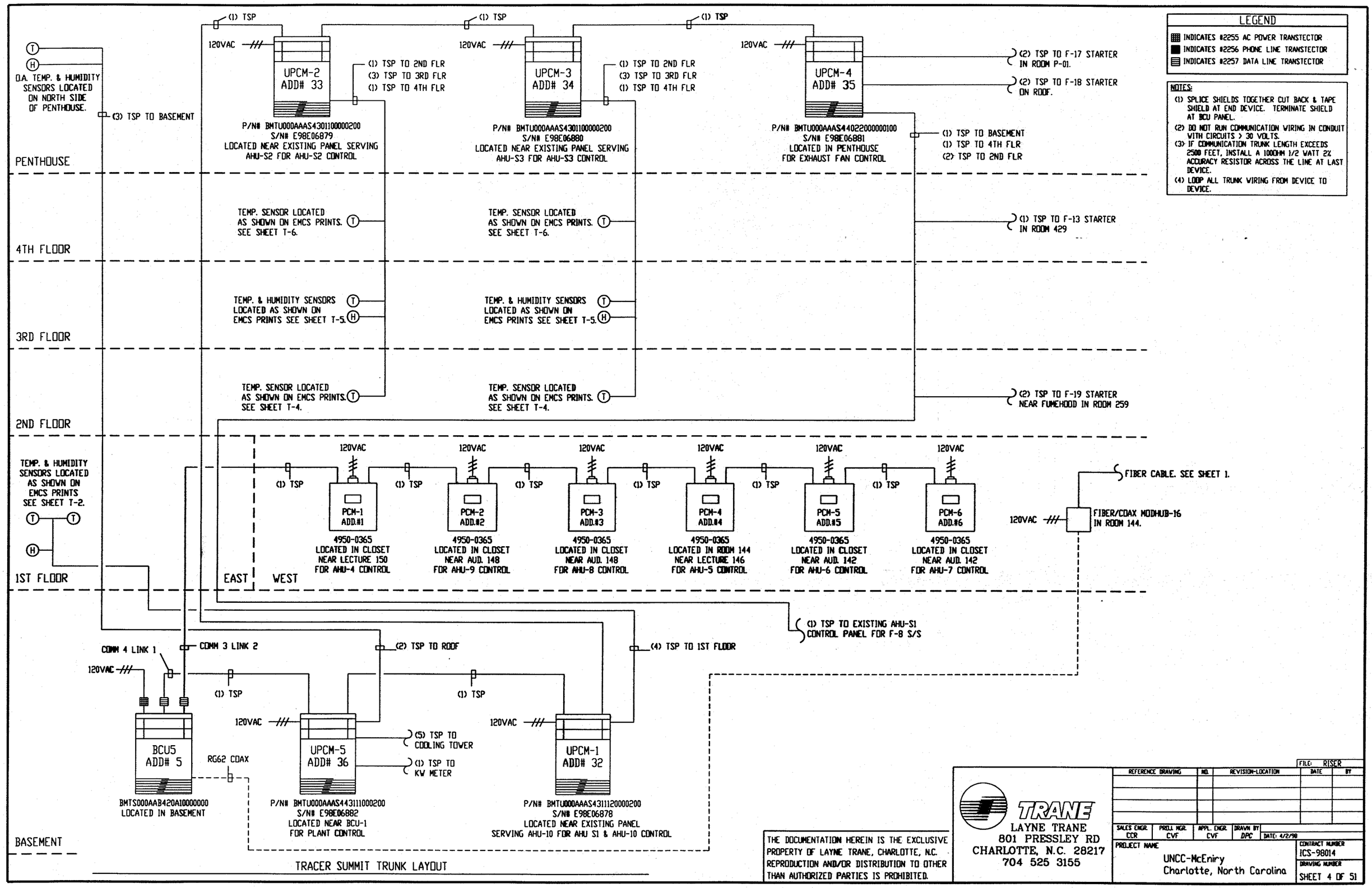
CHARLOTTE, N.C. 28217
704 525 3155

FILE: PCM

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina
CONTRACT NUMBER: ICS-98014
DRAWING NUMBER: SHEET 3 OF 51



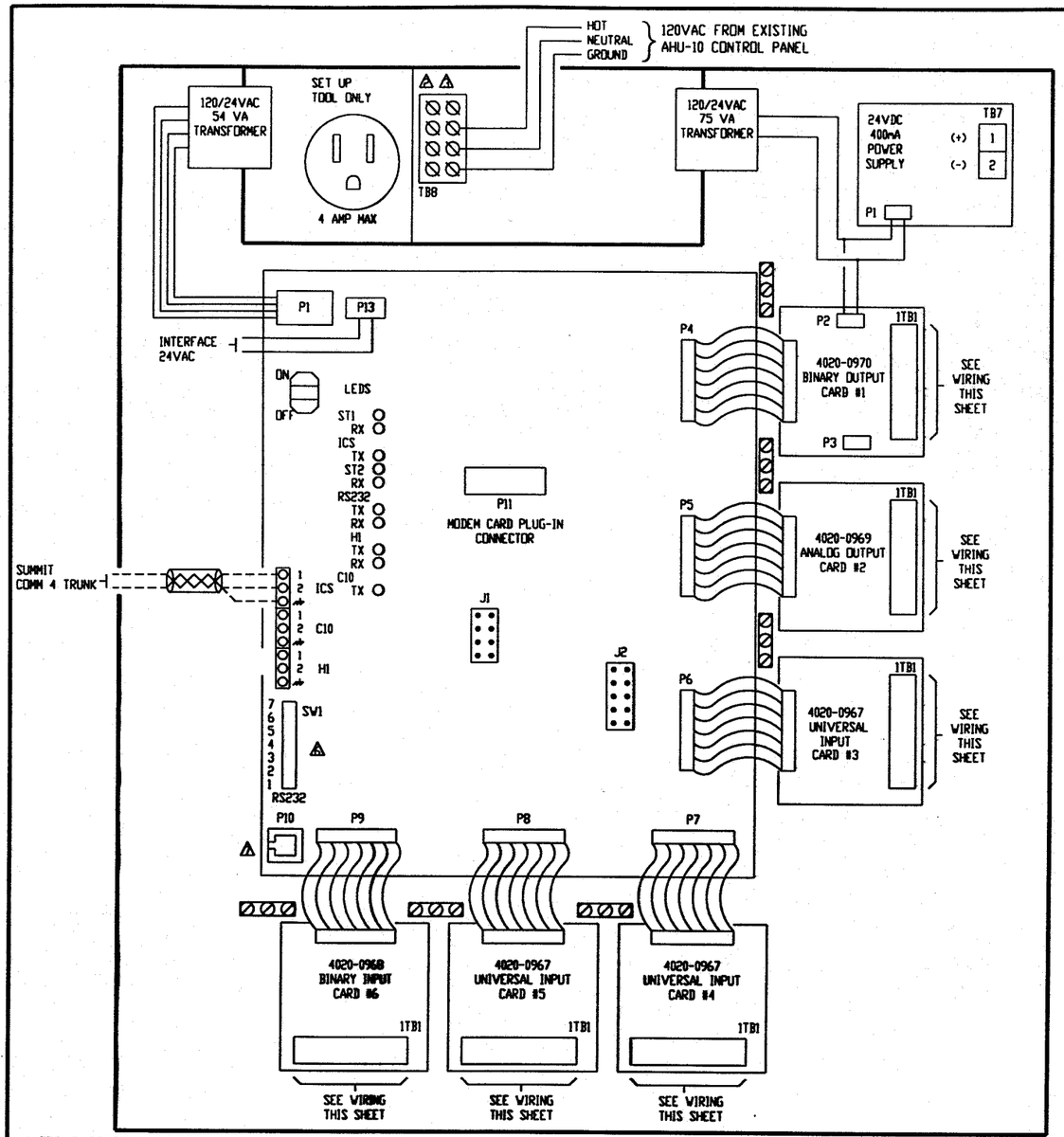
TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

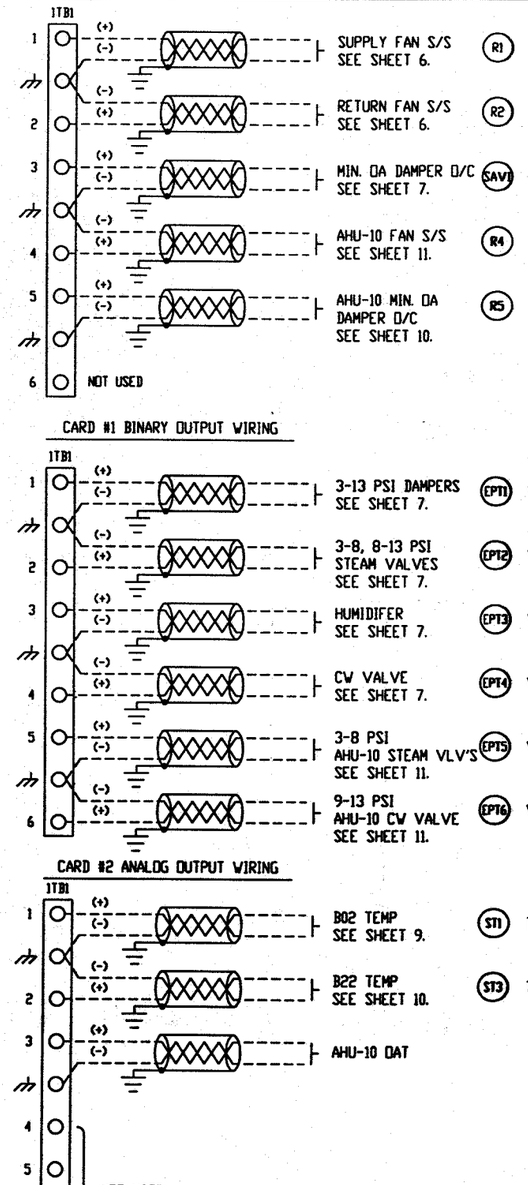
FILE: RISER

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina
CONTRACT NUMBER: ICS-98014
DRAWING NUMBER: SHEET 4 OF 51





WIRING DIAGRAM NOTES.

1. COMPONENTS AND WIRING SHOWN DASHED ARE FURNISHED AND FIELD INSTALLED.
2. ALL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODES AND LOCAL CODES. GREEN WIRE GROUND MUST BE CONTINUOUS BACK TO CIRCUIT BREAKER PANEL.
3. USE COPPER CONDUCTORS ONLY.
4. THE OPTIONAL 24 VAC, 75 VA TRANSFORMER PROVIDES 53 VA FOR BINARY OUTPUT TRIACS AND 22 VA TO THE 24VDC @ 400mA POWER SUPPLY.
5. THE OPTIONAL POWER SUPPLY PROVIDES 24VDC AT 400mA MAXIMUM FOR USE WITH 4 TO 20mA OR 0-10VDC TRANSMITTING SENSORS
6. SWITCH SW1 CONFIGURES UPCM ADDRESS. REFER TO INSTALLATION MANUAL FOR ADDRESS SETUP.
7. POSITION P10 IS AN RJ-12 PLUG FOR RS-232 CONNECTION. REFER TO INSTALLATION MANUAL FOR INFORMATION ON REQUIRED CABLES AND ADAPTERS.
8. BINARY OUTPUTS ARE TRIAC, 24VAC, RATED 12 VA MAX EACH.
9. ANALOG OUTPUTS ARE 0-20mA MAX. 0-10 VDC.
10. UNIVERSAL INPUTS CAN BE INDIVIDUALLY CONFIGURED FOR EITHER ANALOG INPUTS (AIP) OR BINARY INPUT (BIP).
11. ANALOG INPUT (AIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR, SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM ANALOG INPUT WIRING DISTANCE IS 300 FT (91 M). ANALOG INPUTS CAN BE THERMISTOR, RTD, 4-20mA OR 0-10VDC.
12. BINARY INPUT (BIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR. SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM BINARY INPUT WIRING DISTANCE IS 1000FT. (305), BINARY INPUTS MUST BE ISOLATED, UNGROUNDED CONTACTS.

UPCM-1 AHU-S1 & AHU-10

BMTU000AAAS4311120000200
S/N# E98E06878

TRANE
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801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: UPCM-1

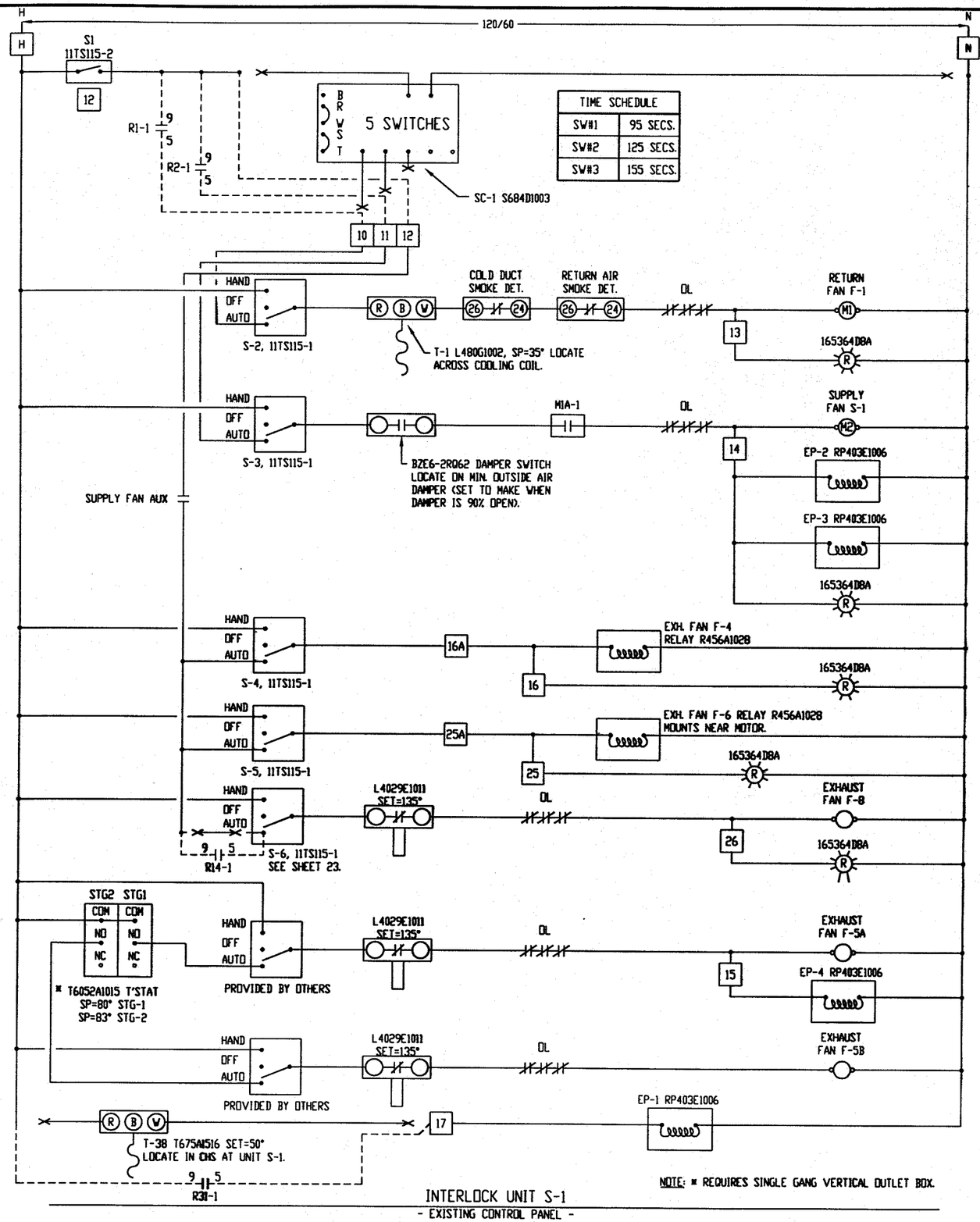
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry Charlotte, North Carolina

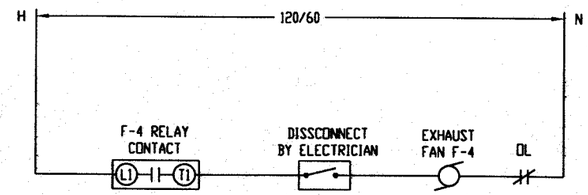
CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 5 OF 51



INTERLOCK UNIT S-1
- EXISTING CONTROL PANEL -

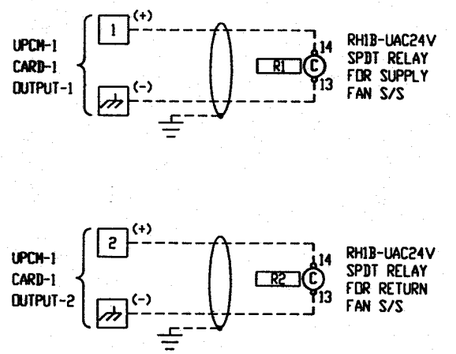
NOTE: * REQUIRES SINGLE GANG VERTICAL OUTLET BOX.

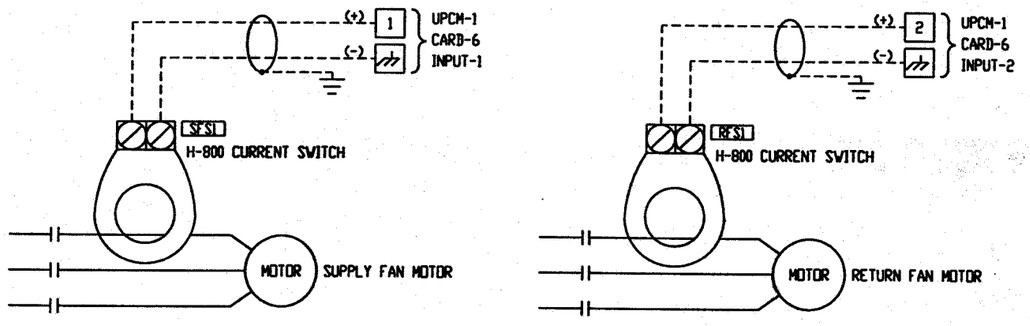


EXHAUST FAN F-4 WIRING

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING





SUPPLY & RETURN FAN S/S & STATUS

LEGEND

- _____ INDICATES EXISTING WIRING
- _ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DWG8

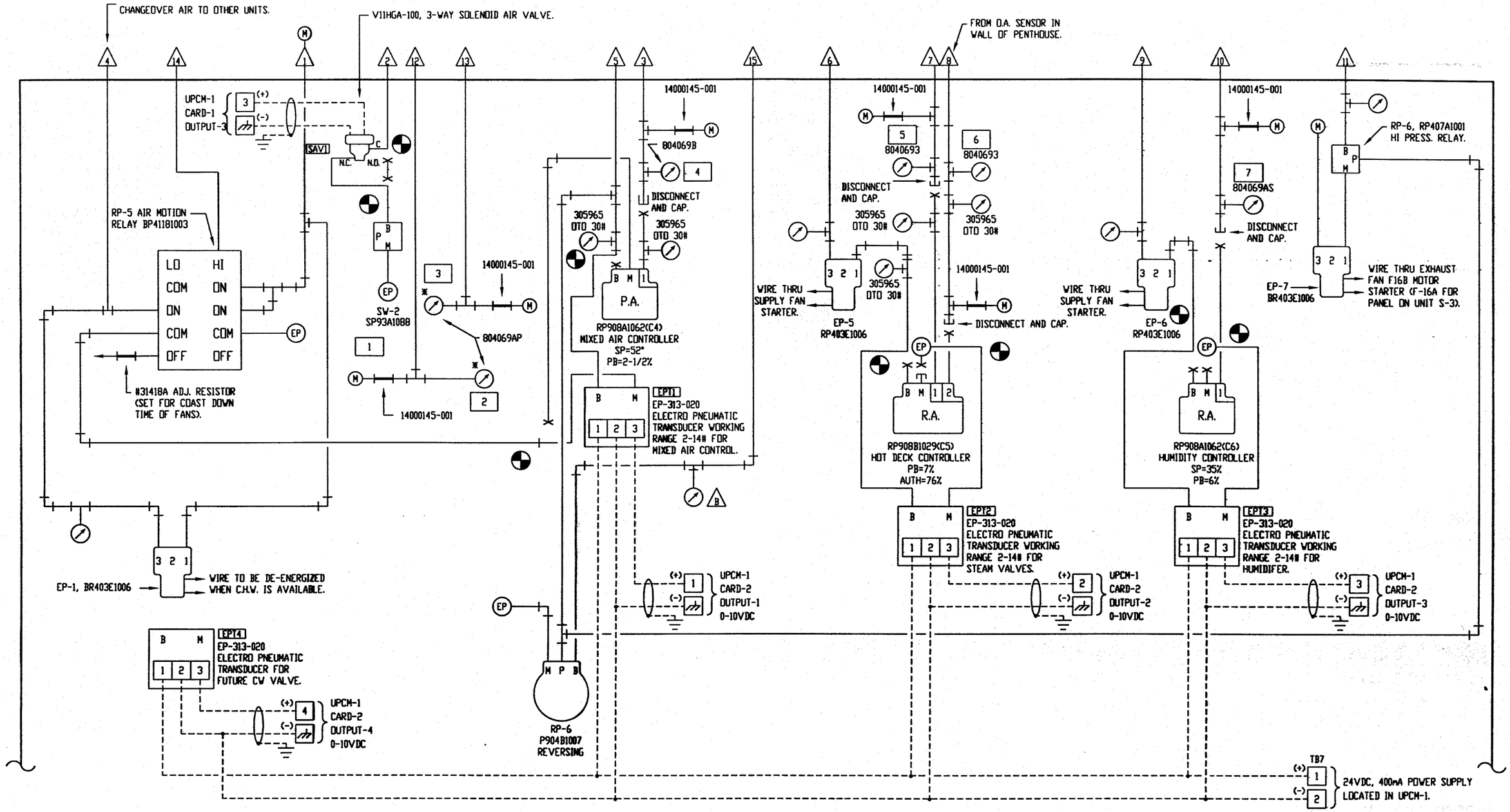
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/7/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 6 OF 51



LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

1	MIN. OA DAMPER POSITION
2	COLD DECK DISCHARGE TEMP.
3	RETURN AIR TEMP.
4	MIXED AIR TEMP.
5	HOT DECK DISCHARGE TEMP.
6	OUTSIDE AIR TEMP.
7	RETURN AIR TEMP.

AHU-S1 PANEL PNEUMATIC SCHEMATIC

- EXISTING CONTROL PANEL -

LEGEND

_____ INDICATES EXISTING WIRING

_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU1-P

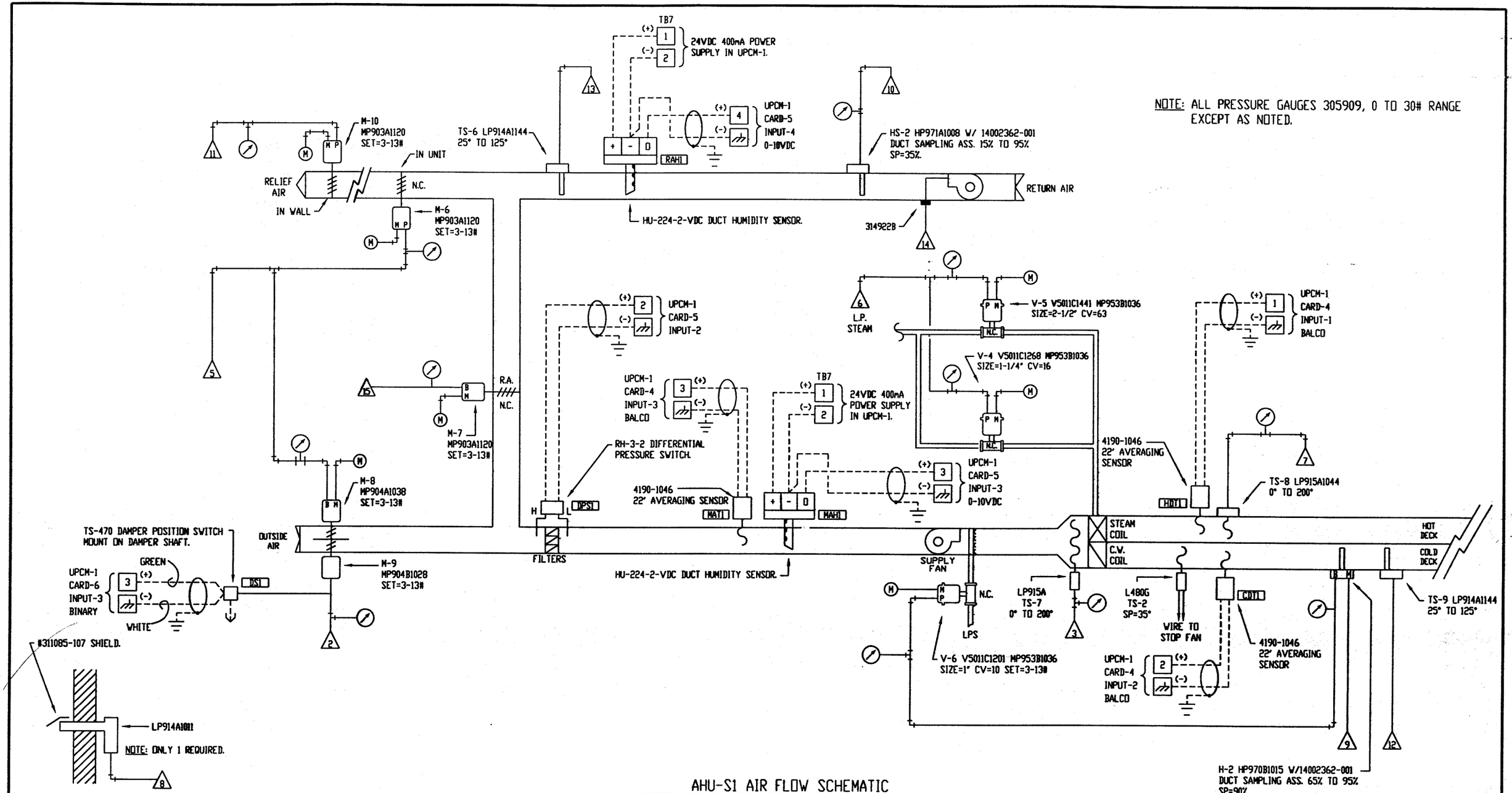
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 7 OF 51



NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.

AHU-S1 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- x INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-S1

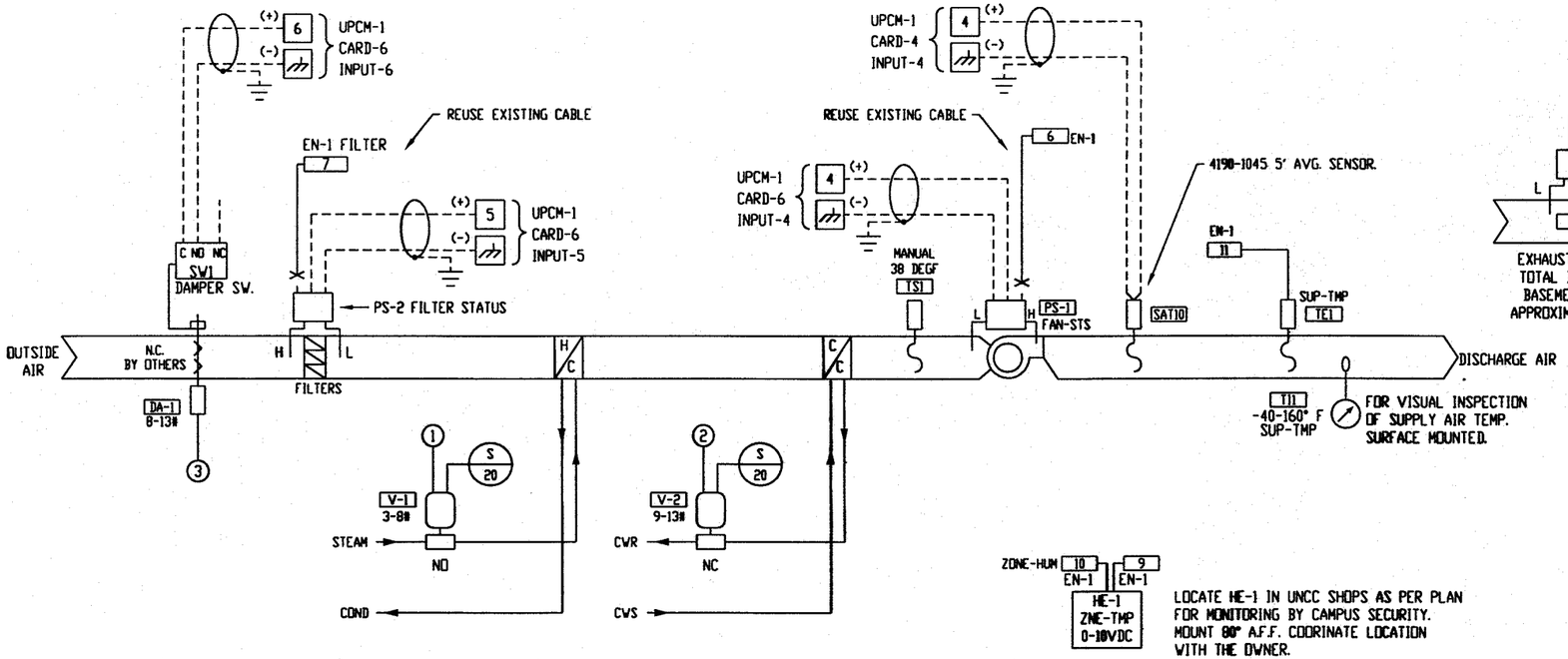
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	
CCR	CVF	CVF	DPC	DATE: 4/2/98

PROJECT NAME: UNCC-McEniry Charlotte, North Carolina

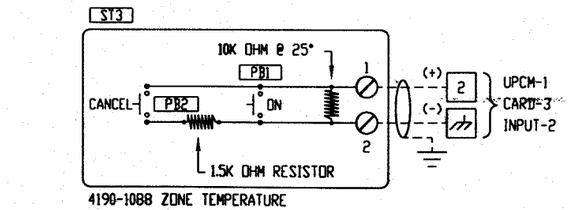
CONTRACT NUMBER: ICS-98014

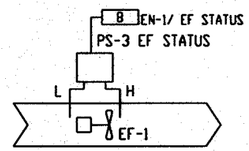
DRAWING NUMBER: SHEET 8 OF 51



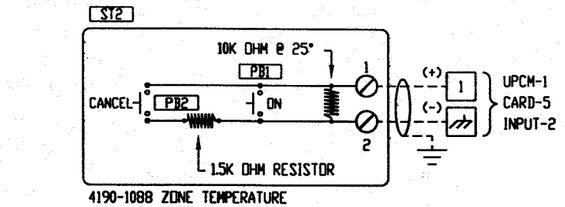
100% OUTSIDE AIR UNIT UNCC-McENIRY ANIMAL FACILITY

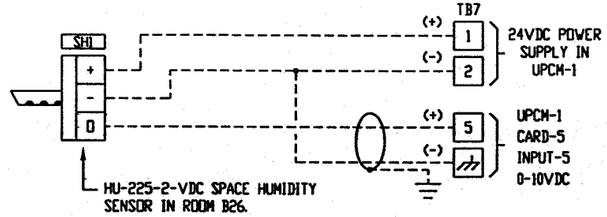
- AHU-10 -

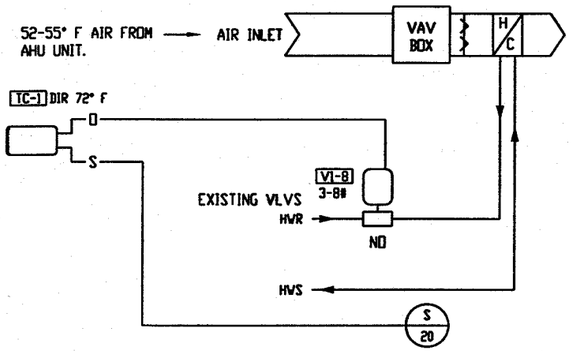




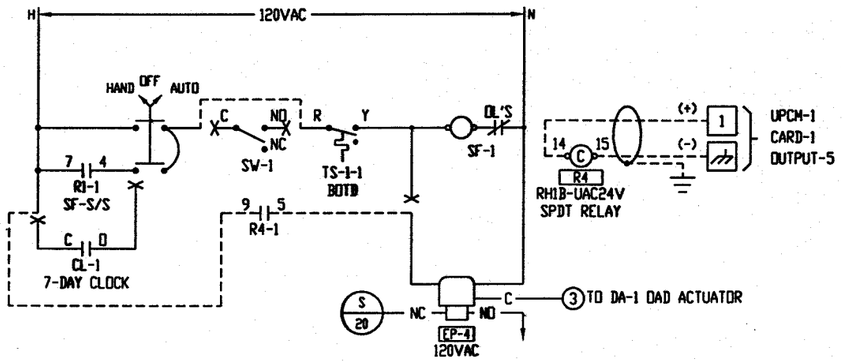
EXHAUST FAN ON ROOF TOTAL DISTANCE FROM BASEMENT TO FAN IS APPROXIMATELY 80 FEET.



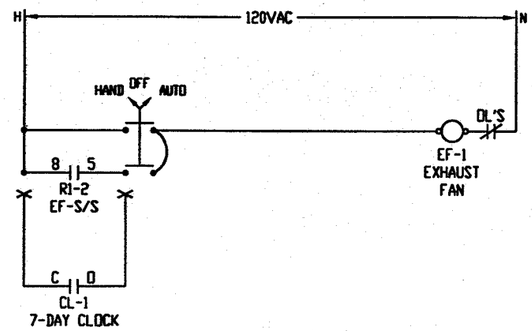




ZONE CONTROLS



SF MOTOR CONTROL WIRING DETAIL



EF MOTOR CONTROL WIRING DETAIL

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (S 20) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DWG2

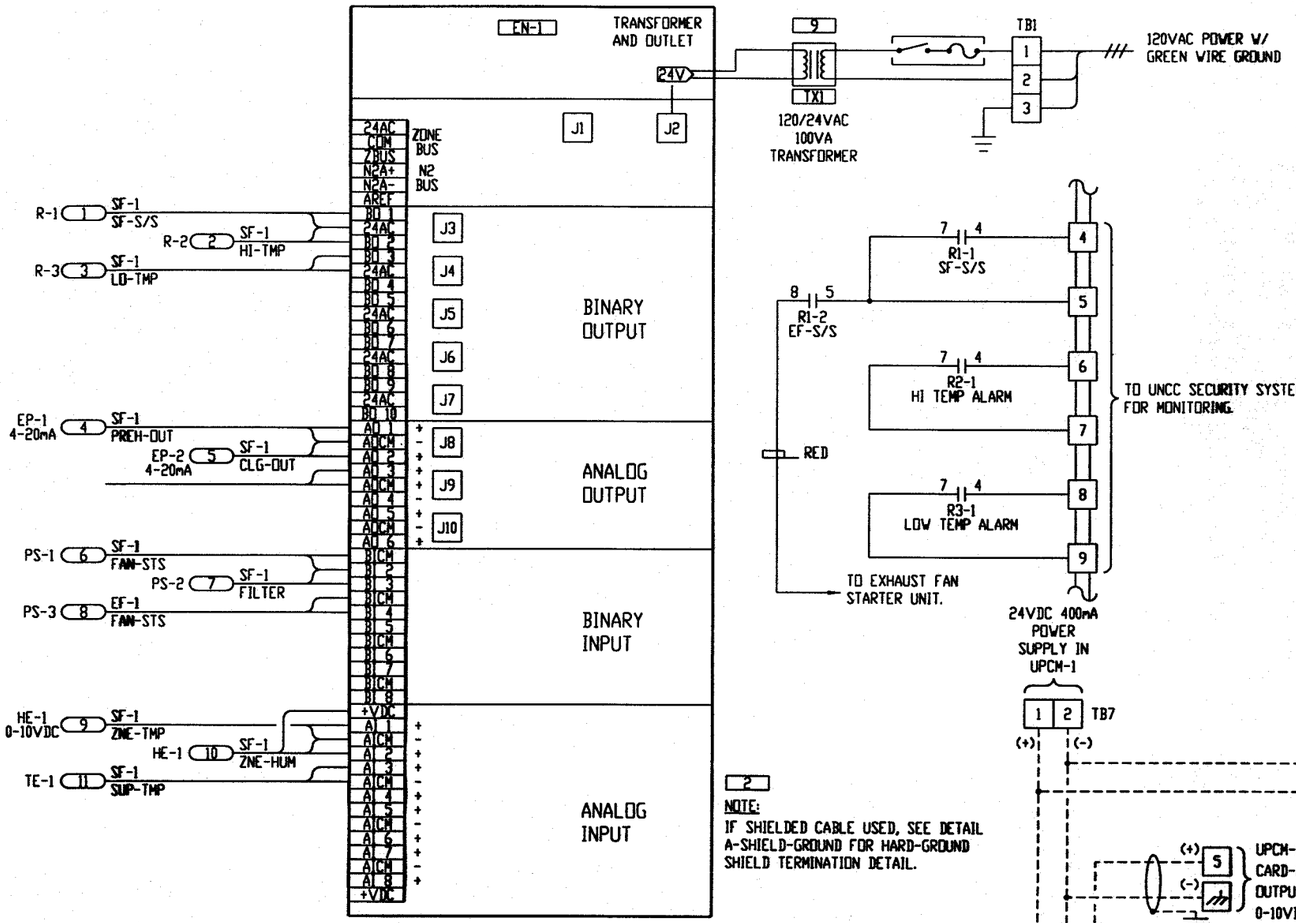
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/6/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

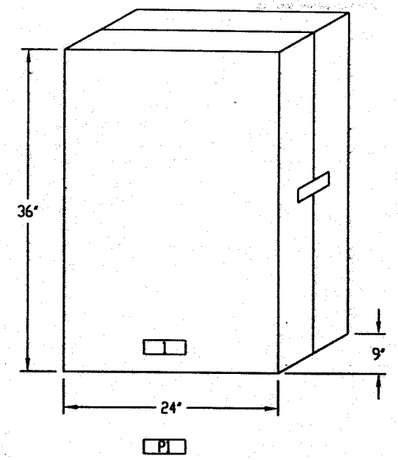
CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 10 OF 51



McENIRY ANIMAL FACILTY AHU-10 DDC DETAIL

NAMETAG SCHEDULE		
ITEM	DEVICE TAG	DESCRIPTION
1	P-1	UNCC McENIRY ANIMAL FACILITY DDC AIR HANDLER CONTROL PANEL.
2	EN-1	AIR HANDLER DDC CONTROL UNIT.
3	EP-1	PNEUMATIC X-DUCER, 4-20mA 3-15# PSI, PREHEAT CONTROL
4	EP-2	PNEUMATIC X-DUCER, 4-20mA 3-15# PSI, COOLING VLV CONTROL
5	R-1	3PDT/ 24VAC RELAY AIR HANDLER S/S CONTROL
6	R-2	3PDT/ 24VAC RELAY HIGH ZONE TEMP. ALARM
7	R-3	3PDT/ 24VAC RELAY LOW ZONE TEMP. ALARM
8	TX-1	100VA, 120/24VAC TRANSFORMER
9	MS-1	PANEL POWER DISCONNECT WITH 5 AMP BUSS SSU FUSE.



PANEL DIMENSIONS

PANEL MATERIAL			
DEVICE TAG	QTY	CODE NUMBER	DESCRIPTION
ACC	10	M-8000-392	SCREW-ON LANCOID NAME-
ACC	8	PD-113-3	TERMINAL BLOCK, MEDIUM
ACC	1	PD-113-3	TERMINAL BLOCK, MEDIUM
	1	PD-113-4	END SECTION, F/PD, 113-3
CL-1	1	C-7335-1	TIME SWITCH, 7-DAY
EN-1	1	AS-AHU101-0	AIR HANDLING UNIT ENC/TER
	1	AS-AHU102-0	AIR HANDLING LOGIC B
EP-1-EP-2	2	EP-8000-4	EP TRANSD, 4/20 MILLI-A H
	2	A-4000-137	FILTER, OIL, IN-LINE
MS-1	1	PD-112-22	BUSS SSU FUSE HOLDER
	1	PD-112-23	FUSE T-5 (5AMP) FOR
P-1	1	M-8100-2436	CONTROL CABINET, STD. FACE
PI-1-PI-3	3	G-2010-5	AIR GAGE 1-1/2"
R-1-R-3	3	PD-109-21	RELAY, PLUG IN 3PDT
	3	PD-101-35	RELAY SOCKET, 11 PIN BLADE
TX-1	1	Y64AL-2C	TRANSFORMER

LEGEND

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- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
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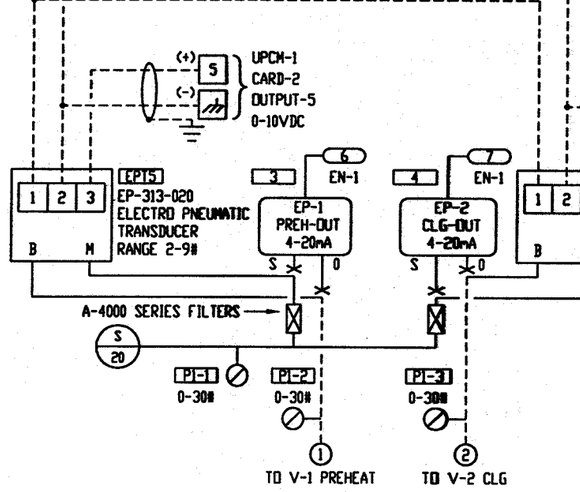
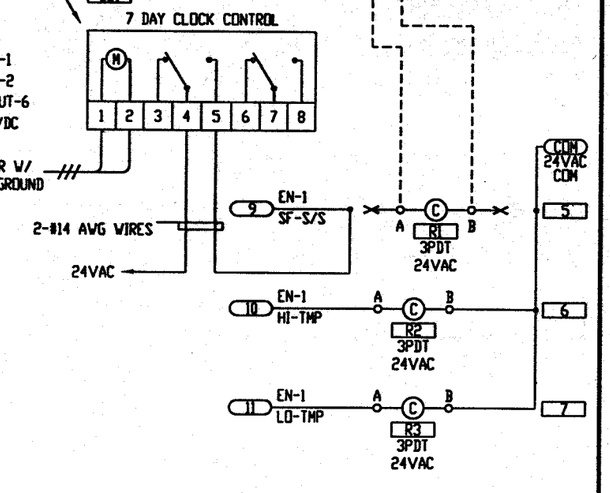
- CONNECT TO EXISTING



FIELD DEVICE CONNECTION DETAIL

LEGEND

- INDICATES EXISTING WIRING
- INDICATES FIELD WIRING



PANEL RELAY CONNECTION DETAIL

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DWG

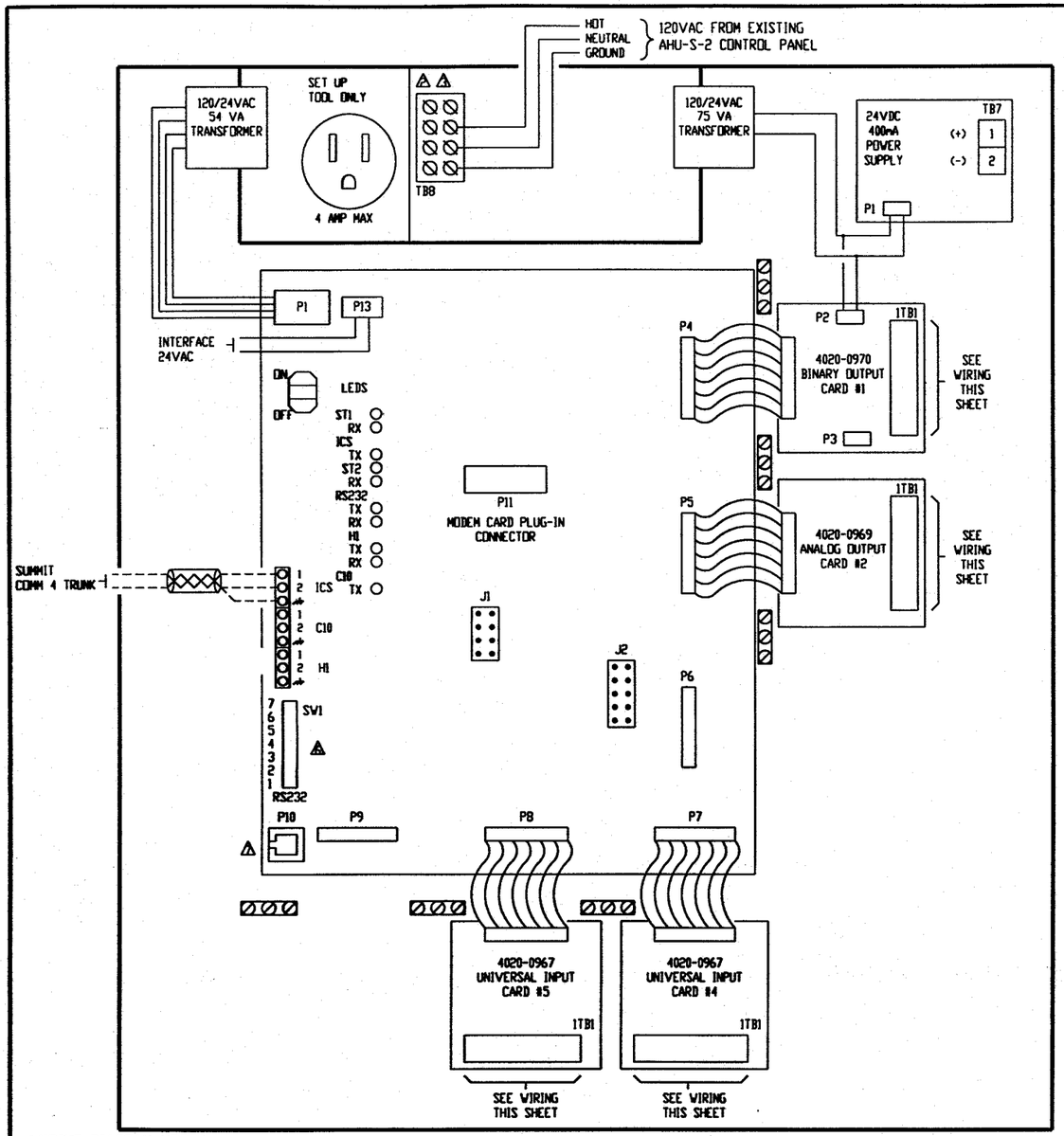
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/6/98

PROJECT NAME: UNCC-McEniry Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 11 OF 51



1TB1

1	SUPPLY FAN S/S SEE SHEET 13.	R6	
2	RETURN FAN S/S SEE SHEET 13.	R7	
3	MIN. OA DAMPER O/C SEE SHEET 14.	SAV2	
4	CHANGEOVER SEE SHEET 13.	R9	
5	NOT USED		
6			

CARD #1 BINARY OUTPUT WIRING

1TB1

1	DAMPERS SEE SHEET 14.	EPT7	V
2	STEAM VALVES SEE SHEET 14.	EPT8	V
3	HUMIDIFER SEE SHEET 14.	EPT9	V
4	CW VALVE SEE SHEET 14.	EPT10	V
5	NOT USED		
6			

CARD #2 ANALOG OUTPUT WIRING

1TB1

1		
2		
3		
4	NOT USED	
5		
6		

OPEN SLOT

1TB1

1	HOT DECK TEMP. SEE SHEET 15.	HDT2	BAL
2	COLD DECK TEMP. SEE SHEET 15.	CDT2	BAL
3	MIXED AIR TEMP. SEE SHEET 15.	MAT2	BAL
4	2ND FLOOR TEMP. SEE SHEET 16.	ST12	T
5	3RD FLOOR TEMP. SEE SHEET 16.	ST14	T
6	4TH FLOOR TEMP. SEE SHEET 16.	ST16	T

CARD #4 UNIVERSAL INPUT WIRING

1TB1

1	MIXED AIR HUMIDITY SEE SHEET 15.	MAH2	V
2	3RD FLOOR HUMIDITY SEE SHEET 16.	SH3	V
3	SUPPLY FAN STATUS SEE SHEET 13.	SFS2	B
4	RETURN FAN STATUS SEE SHEET 13.	RFS2	B
5	MIN. OA DAMPER STATUS SEE SHEET 15.	DS2	B
6	DIRTY FILTER SEE SHEET 15.	DPS2	B

CARD #5 UNIVERSAL INPUT WIRING

1TB1

1		
2		
3		
4	NOT USED	
5		
6		

OPEN SLOT

WIRING DIAGRAM NOTES:

1. COMPONENTS AND WIRING SHOWN DASHED ARE FURNISHED AND FIELD INSTALLED.
2. ALL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODES AND LOCAL CODES. GREEN WIRIE GROUND MUST BE CONTINUOUS BACK TO CIRCUIT BREAKER PANEL.
3. USE COPPER CONDUCTORS ONLY.
4. THE OPTIONAL 24 VAC, 75 VA TRANSFORMER PROVIDES 53 VA FOR BINARY OUTPUT TRIACS AND 22 VA TO THE 24VDC @ 400mA POWER SUPPLY.
5. THE OPTIONAL POWER SUPPLY PROVIDES 24VDC AT 400mA MAXIMUM FOR USE WITH 4 TO 20mA OR 0-10VDC TRANSMITTING SENSORS
6. SWITCH SW1 CONFIGURES UPCM ADDRESS. REFER TO INSTALLATION MANUAL FOR ADDRESS SETUP.
7. POSITION P10 IS AN RJ-12 PLUG FOR RS-232 CONNECTION. REFER TO INSTALLATION MANUAL FOR INFORMATION ON REQUIRED CABLES AND ADAPTERS.
8. BINARY OUTPUTS ARE TRIAC, 24VAC, RATED 12 VA MAX EACH.
9. ANALOG OUTPUTS ARE 0-20mA MAX. 0-10 VDC.
10. UNIVERSAL INPUTS CAN BE INDIVIDUALLY CONFIGURED FOR EITHER ANALOG INPUTS (AIP) OR BINARY INPUT (BIP).
11. ANALOG INPUT (AIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR, SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM ANALOG INPUT WIRING DISTANCE IS 300 FT (91 M). ANALOG INPUTS CAN BE THERMISTOR, RTD, 4-20mA OR 0-10VDC.
12. BINARY INPUT (BIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR. SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM BINARY INPUT WIRING DISTANCE IS 1000FT. (305), BINARY INPUTS MUST BE ISOLATED, UNGROUNDED CONTACTS.

UPCM-2 AHU-S2

BMTU000AAAS4301100000200

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: UPCM-2

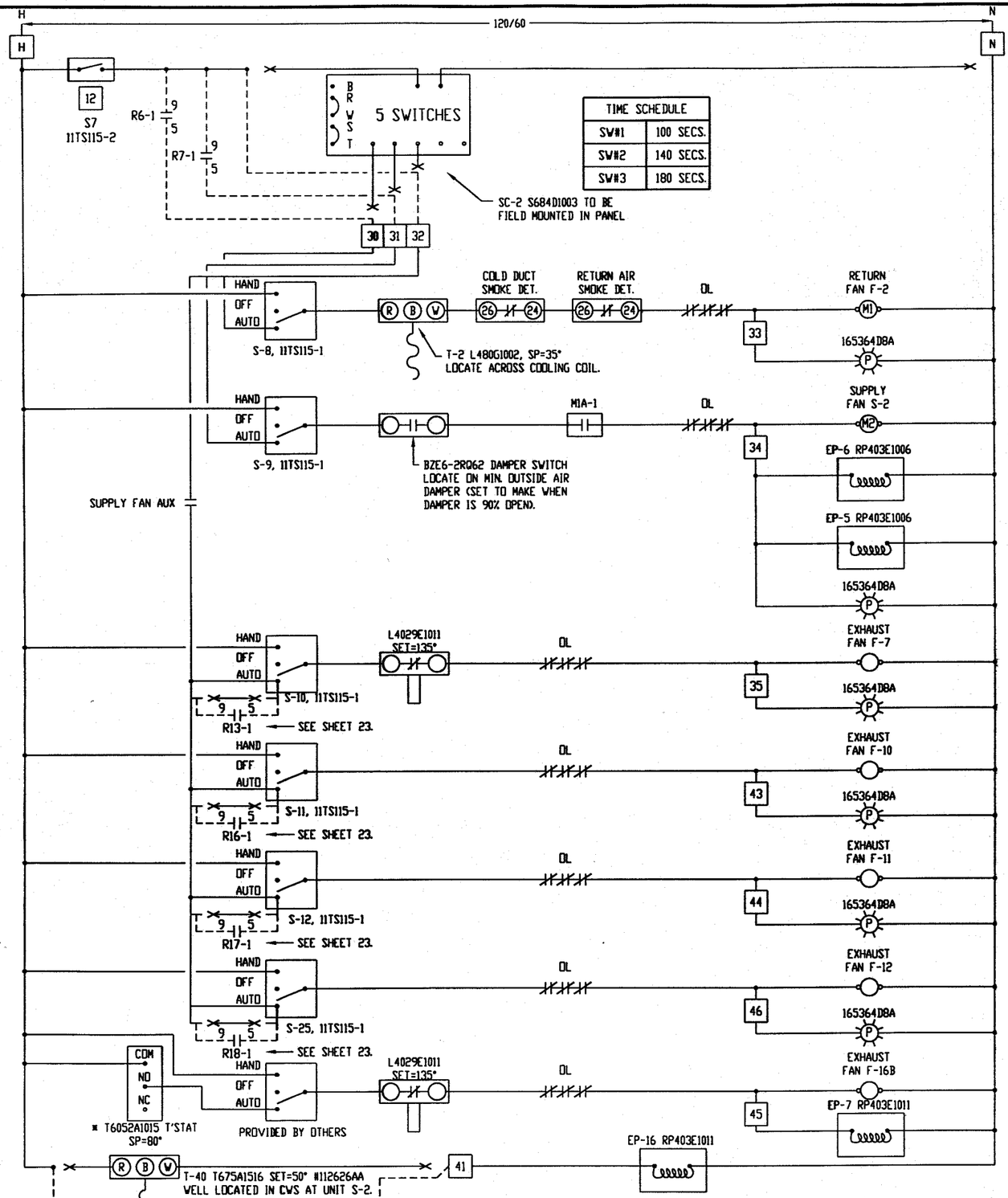
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

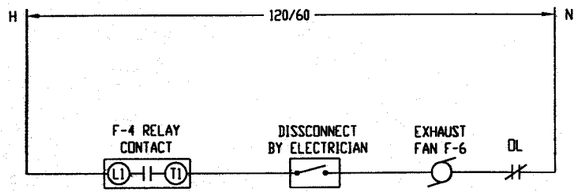
CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 12 OF 51



INTERLOCK UNIT S-2
- EXISTING CONTROL PANEL -

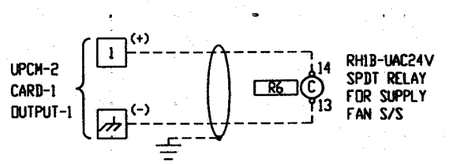
NOTE: * REQUIRES SINGLE GANG VERTICAL OUTLET BOX.

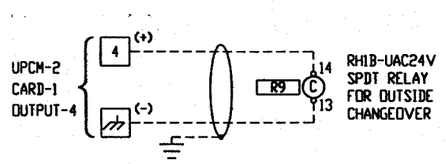


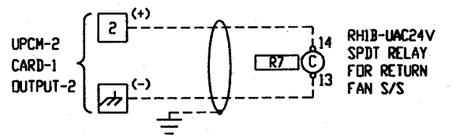
EXHAUST FAN F-6 WIRING

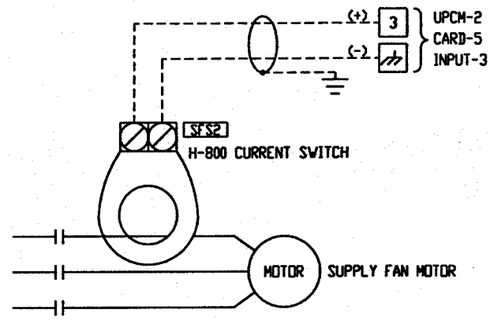
LEGEND

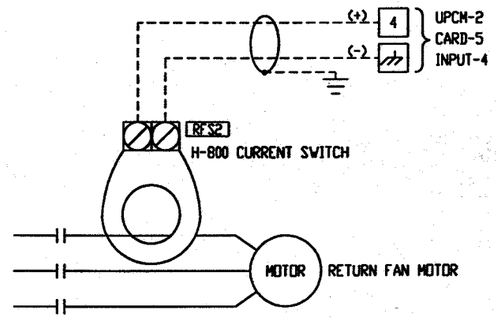
- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING











SUPPLY & RETURN FAN S/S/ SWITCH

LEGEND

_____ INDICATES EXISTING WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DWG7

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/7/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 13 OF 51

CHANGEOVER AIR TO UNIT S-3 PANEL. USE SEPERATE CHANGEOVER LOCATED IN PENTHOUSE.

V11HGA-100, 3-WAY SOLENOID AIR VALVE.

FROM O.A. SENSOR IN WALL OF PENTHOUSE.

UPCM-2 CARD-1 OUTPUT-3 (+) (-)

SAV2 C N.C. N.O.

RP-5 AIR MOTION RELAY BP41181003

LO HI COM ON ON ON COM COM OFF OFF

#31418A ADJ. RESISTOR (SET FOR COAST DOWN TIME OF FANS).

SW-2 SP93A1088

804069AP

14000145-001

804069B

DISCONNECT AND CAP. 305965 DTO 30#

P.A.

RP908A1062(C4) MIXED AIR CONTROLLER SP=52° PB=2-1/2%

EPT7 EP-313-020 ELECTRO PNEUMATIC TRANSDUCER WORKING RANGE 2-14# FOR MIXED AIR CONTROL.

8040693

DISCONNECT AND CAP.

WIRE THRU SUPPLY FAN STARTER.

EP-5 RP403E1006

R.A.

RP908B1029(C5) HOT DECK CONTROLLER PB=7% AUTH=76%

EPT8 EP-313-020 ELECTRO PNEUMATIC TRANSDUCER WORKING RANGE 2-14# FOR STEAM VALVES.

804069AS

EP-6 RP403E1006

RP908A1062(C6) HUMIDITY CONTROLLER SP=35% PB=6%

EPT9 EP-313-020 ELECTRO PNEUMATIC TRANSDUCER WORKING RANGE 2-14# FOR HUMIDIFER.

RP-6, RP407A1001 HI PRESS. RELAY.

EP-7 BR403E1006

WIRE THRU EXHAUST FAN F16B MOTOR STARTER (F-16A FOR PANEL ON UNIT S-3).

EP-16, BR403E1006 ONLY ON UNIT S-2.

WIRE TO BE DE-ENERGIZED WHEN C.H.W. IS AVAILABLE.

EPT10 EP-313-020 ELECTRO PNEUMATIC TRANSDUCER FOR FUTURE CW VALVE.

RP-6 P904B1007 REVERSING

UPCM-2 CARD-2 OUTPUT-1 0-10VDC

UPCM-2 CARD-2 OUTPUT-2 0-10VDC

UPCM-2 CARD-2 OUTPUT-3 0-10VDC

UPCM-2 CARD-2 OUTPUT-4 0-10VDC

TB7 24VDC, 400mA POWER SUPPLY LOCATED IN UPCM-2.

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- x INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

1. MIN. OA DAMPER POSITION
2. COLD DECK DISCHARGE TEMP.
3. RETURN AIR TEMP.
4. MIXED AIR TEMP.
5. HOT DECK DISCHARGE TEMP.
6. OUTSIDE AIR TEMP.
7. RETURN AIR TEMP.

AHU-S2 PANEL PNEUMATIC SCHEMATIC

- EXISTING CONTROL PANEL -

LEGEND

_____ INDICATES EXISTING WIRING

_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU2-P

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

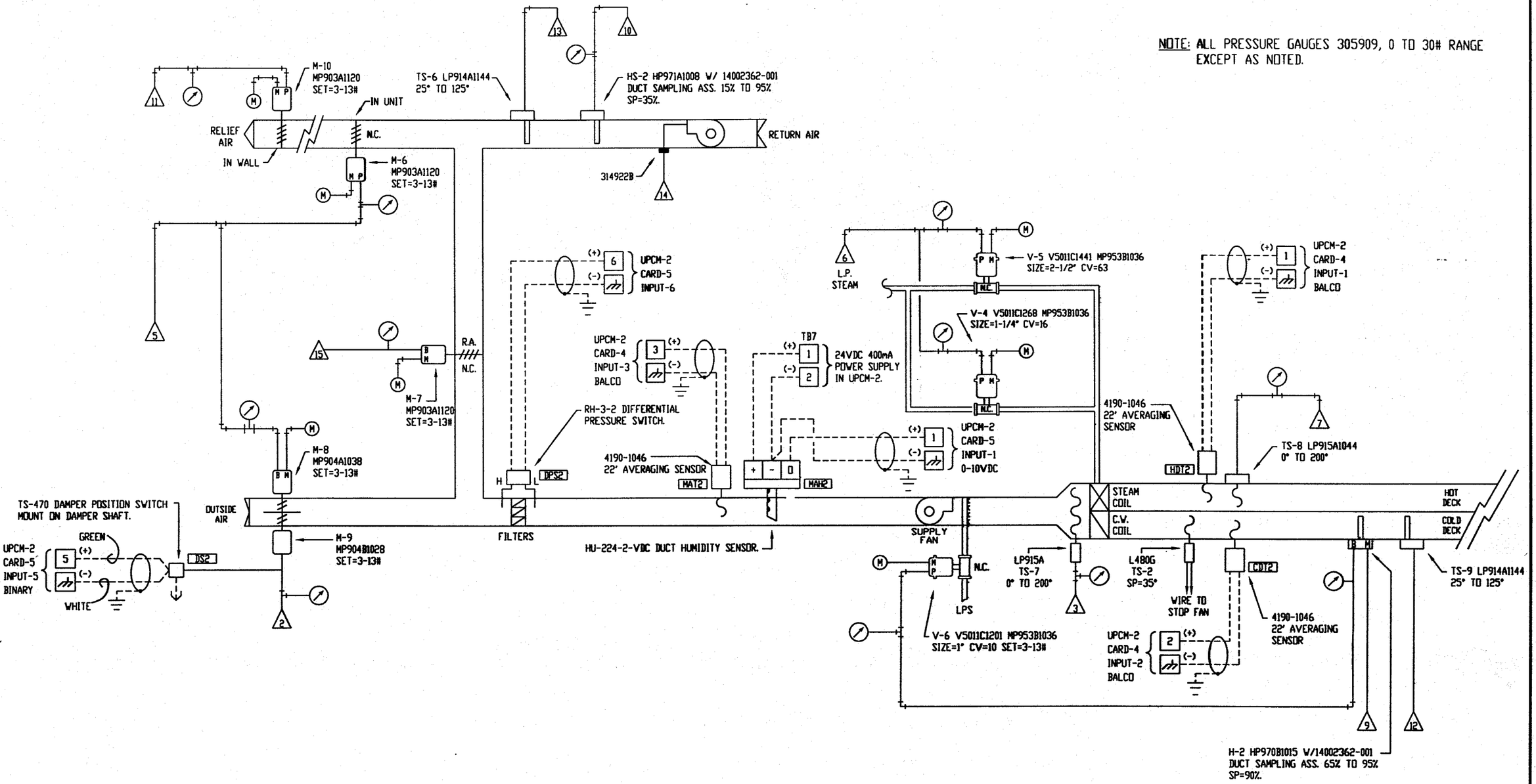
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 14 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-S2 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- x INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-S2

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

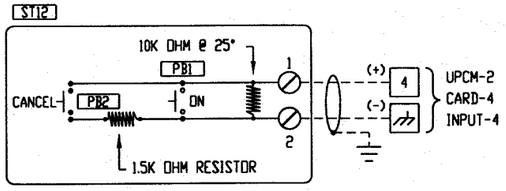
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

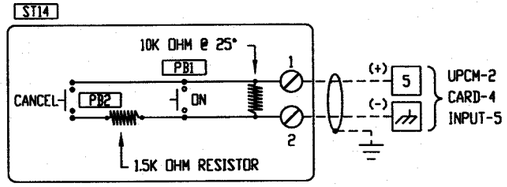
DRAWING NUMBER: SHEET 15 OF 51

ST12



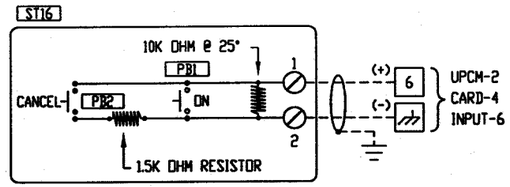
4190-1088 ZONE TEMPERATURE SENSOR LOCATED ON SECOND FLOOR IN CORRIDOR NEAR STAIRWELL 'D'.

ST14

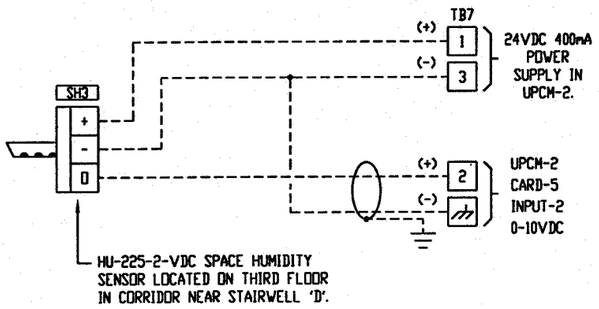


4190-1088 ZONE TEMPERATURE SENSOR LOCATED ON THIRD FLOOR IN COORIDOR NEAR STAIRWELL 'D'.

ST16



4190-1088 ZONE TEMPERATURE SENSOR LOCATED ON FOURTH FLOOR IN COORIDOR NEAR STAIRWELL 'D'.



LEGEND

_____ INDICATES FACTORY WIRING

_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: WIRC-2

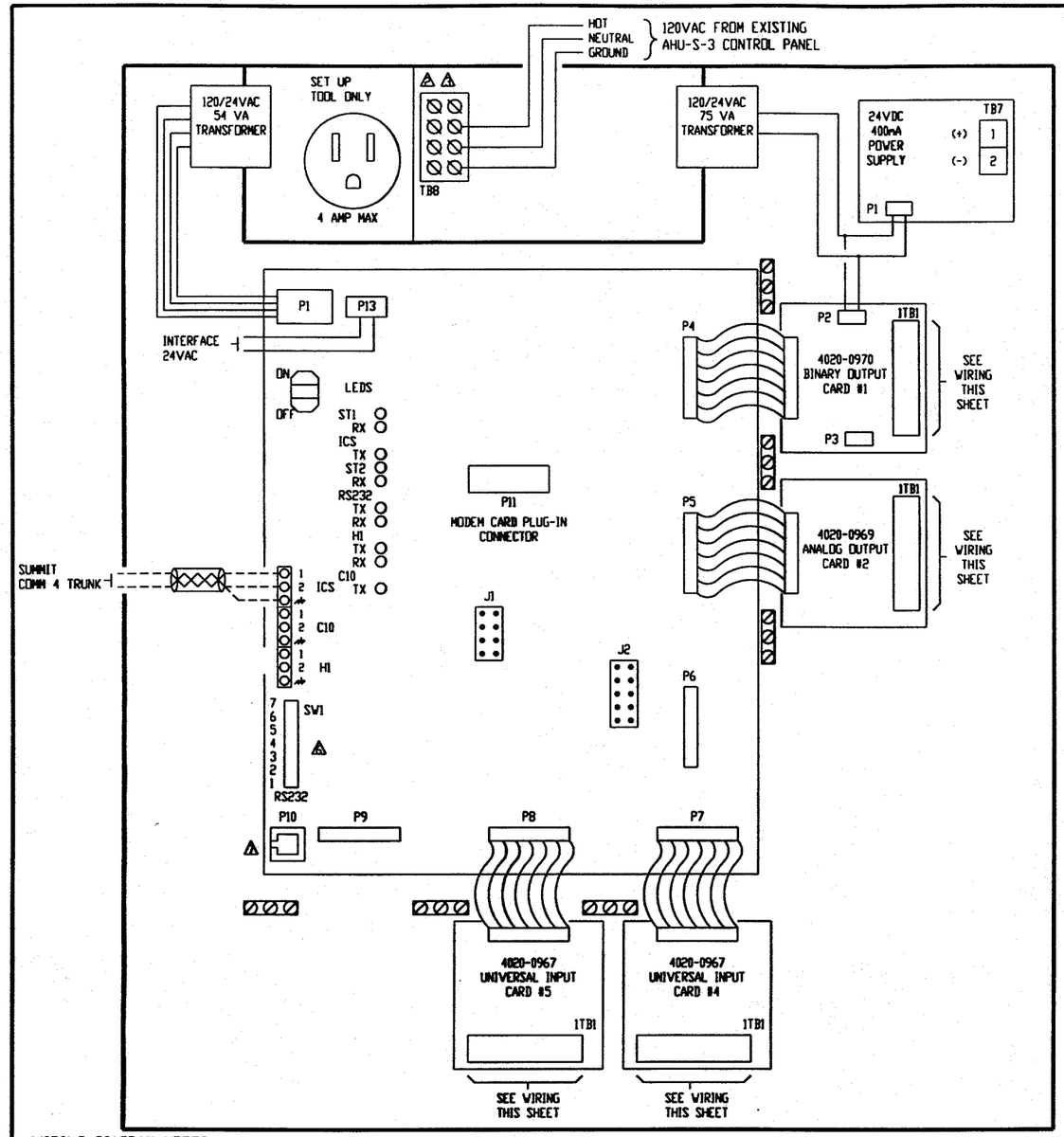
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

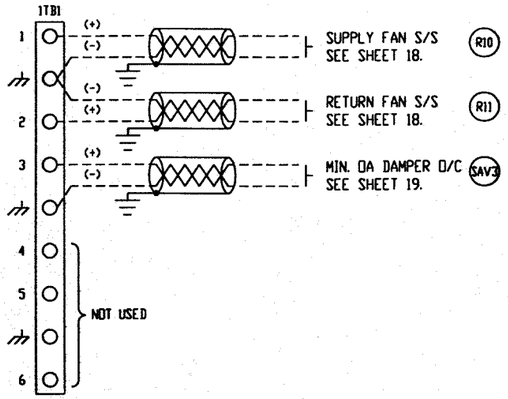
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/13/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

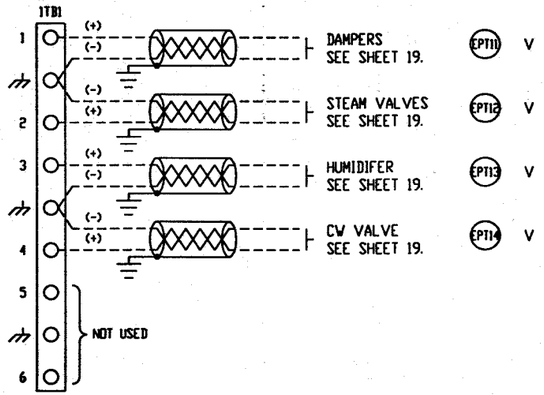
CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 16 OF 51

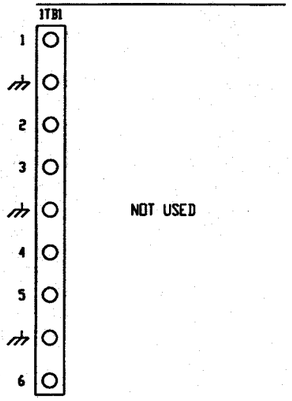




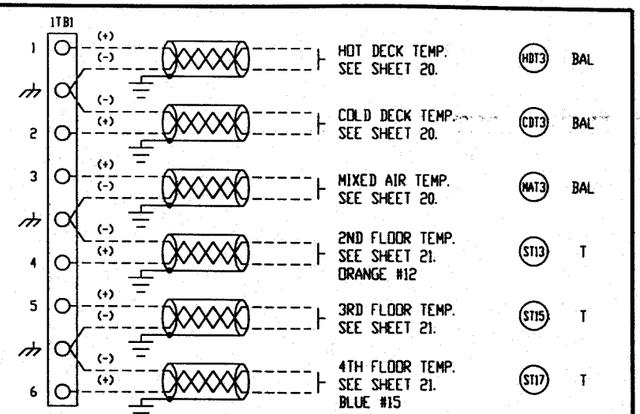
CARD #1 BINARY OUTPUT WIRING



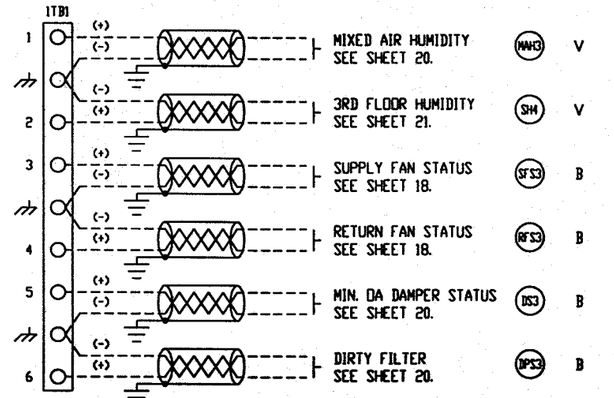
CARD #2 ANALOG OUTPUT WIRING



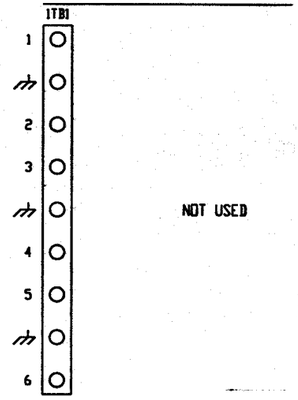
OPEN SLOT



CARD #4 UNIVERSAL INPUT WIRING



CARD #5 UNIVERSAL INPUT WIRING



OPEN SLOT

UPCM-3 AHU-S3

BMTU000AAAS4301100000200

WIRING DIAGRAM NOTES.

1. COMPONENTS AND WIRING SHOWN DASHED ARE FURNISHED AND FIELD INSTALLED.
2. ALL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODES AND LOCAL CODES. GREEN WIRE GROUND MUST BE CONTINUOUS BACK TO CIRCUIT BREAKER PANEL.
3. USE COPPER CONDUCTORS ONLY.
4. THE OPTIONAL 24 VAC, 75 VA TRANSFORMER PROVIDES 53 VA FOR BINARY OUTPUT TRIACS AND 22 VA TO THE 24VDC @ 400mA POWER SUPPLY.
5. THE OPTIONAL POWER SUPPLY PROVIDES 24VDC AT 400mA MAXIMUM FOR USE WITH 4 TO 20mA OR 0-10VDC TRANSMITTING SENSORS
6. SWITCH SW1 CONFIGURES UPCM ADDRESS. REFER TO INSTALLATION MANUAL FOR ADDRESS SETUP.
7. POSITION P10 IS AN RJ-12 PLUG FOR RS-232 CONNECTION. REFER TO INSTALLATION MANUAL FOR INFORMATION ON REQUIRED CABLES AND ADAPTERS.
8. BINARY OUTPUTS ARE TRIAC, 24VAC, RATED 12 VA MAX EACH.
9. ANALOG OUTPUTS ARE 0-20mA MAX. 0-10 VDC.
10. UNIVERSAL INPUTS CAN BE INDIVIDUALLY CONFIGURED FOR EITHER ANALOG INPUTS (AIP) OR BINARY INPUT (BIP).
11. ANALOG INPUT (AIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR. SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM ANALOG INPUT WIRING DISTANCE IS 300 FT (91 M). ANALOG INPUTS CAN BE THERMISTOR, RTD, 4-20mA OR 0-10VDC.
12. BINARY INPUT (BIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR. SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM BINARY INPUT WIRING DISTANCE IS 1000FT. (305), BINARY INPUTS MUST BE ISOLATED, UNGROUNDED CONTACTS.

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FILE: UPCM-3

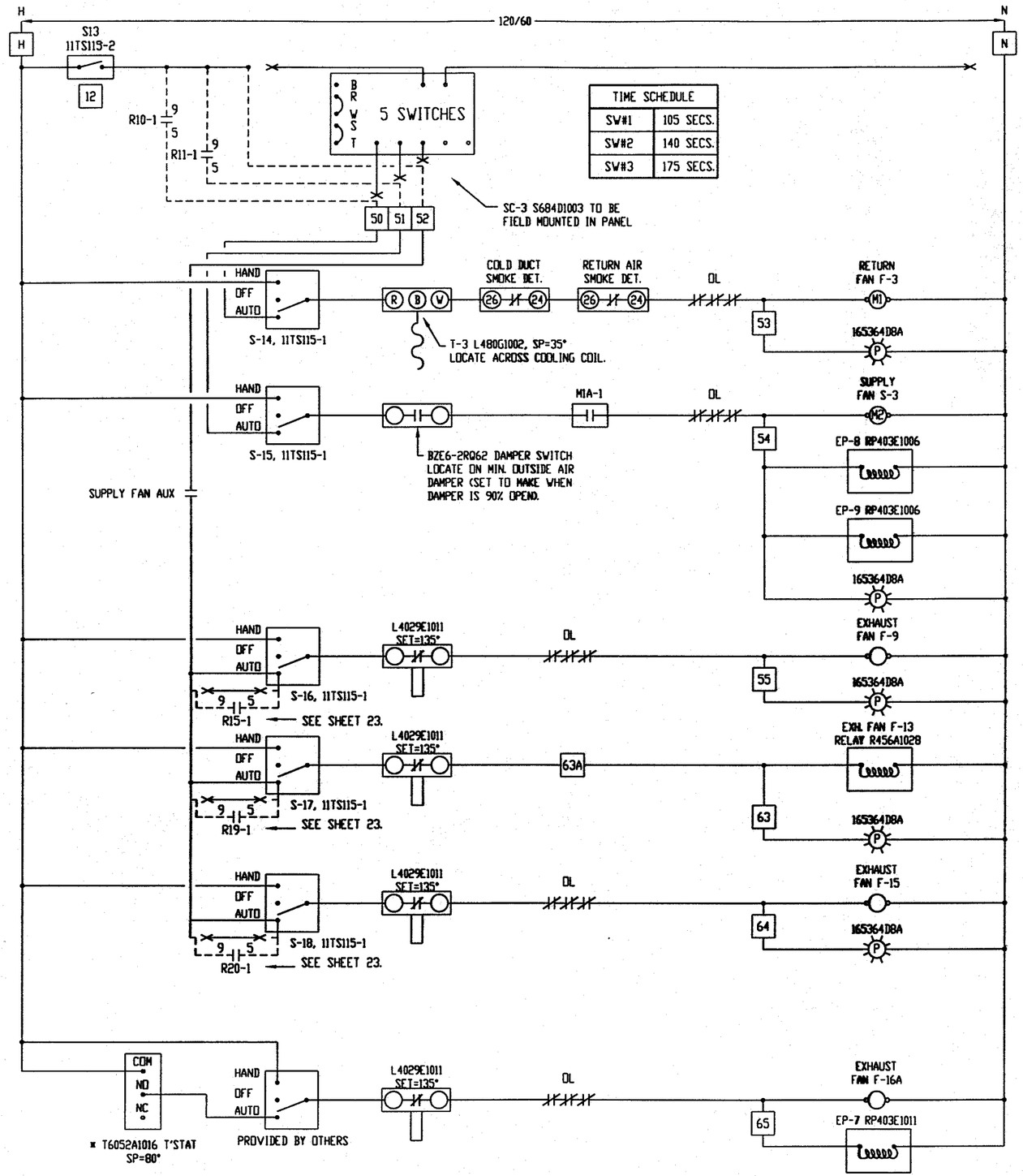
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

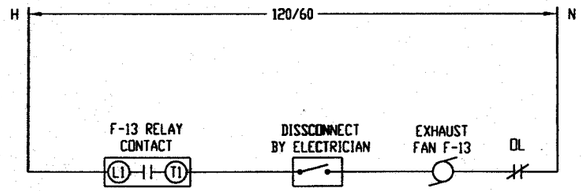
DRAWING NUMBER
SHEET 17 OF 51



INTERLOCK UNIT S-3

- EXISTING CONTROL PANEL -

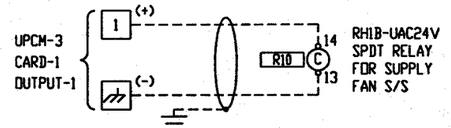
NOTE: * REQUIRES SINGLE GANG VERTICAL OUTLET BOX.

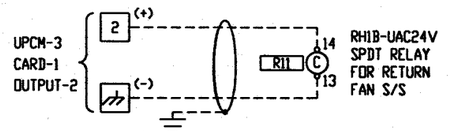


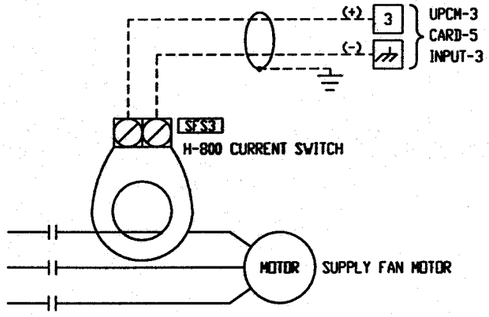
EXHAUST FAN F-13 WIRING

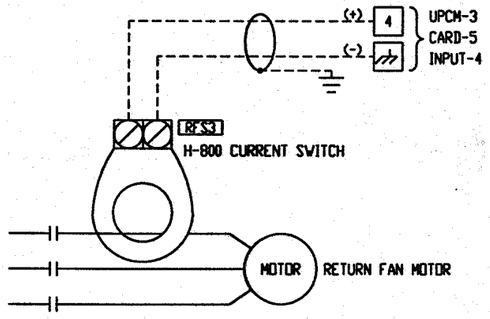
LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING









SUPPLY & RETURN FAN S/S/ SWITCH

LEGEND

_____ INDICATES EXISTING WIRING

_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DWG6

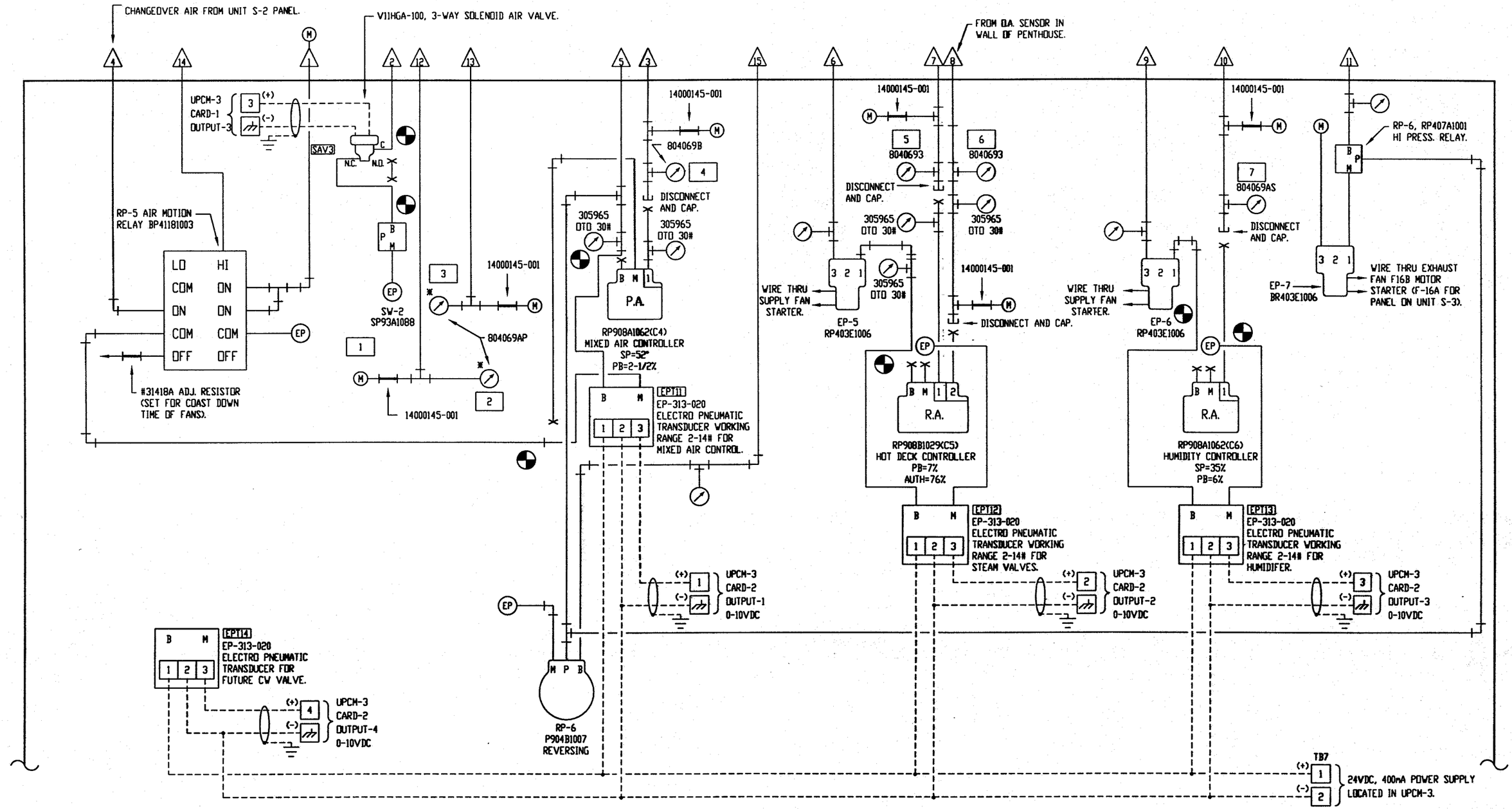
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/7/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 18 OF 51



LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

1. MIN. OA DAMPER POSITION
2. COLD DECK DISCHARGE TEMP.
3. RETURN AIR TEMP.
4. MIXED AIR TEMP.
5. HOT DECK DISCHARGE TEMP.
6. OUTSIDE AIR TEMP.
7. RETURN AIR TEMP.

AHU-S3 PANEL PNEUMATIC SCHEMATIC

- EXISTING CONTROL PANEL -

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU3-P

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

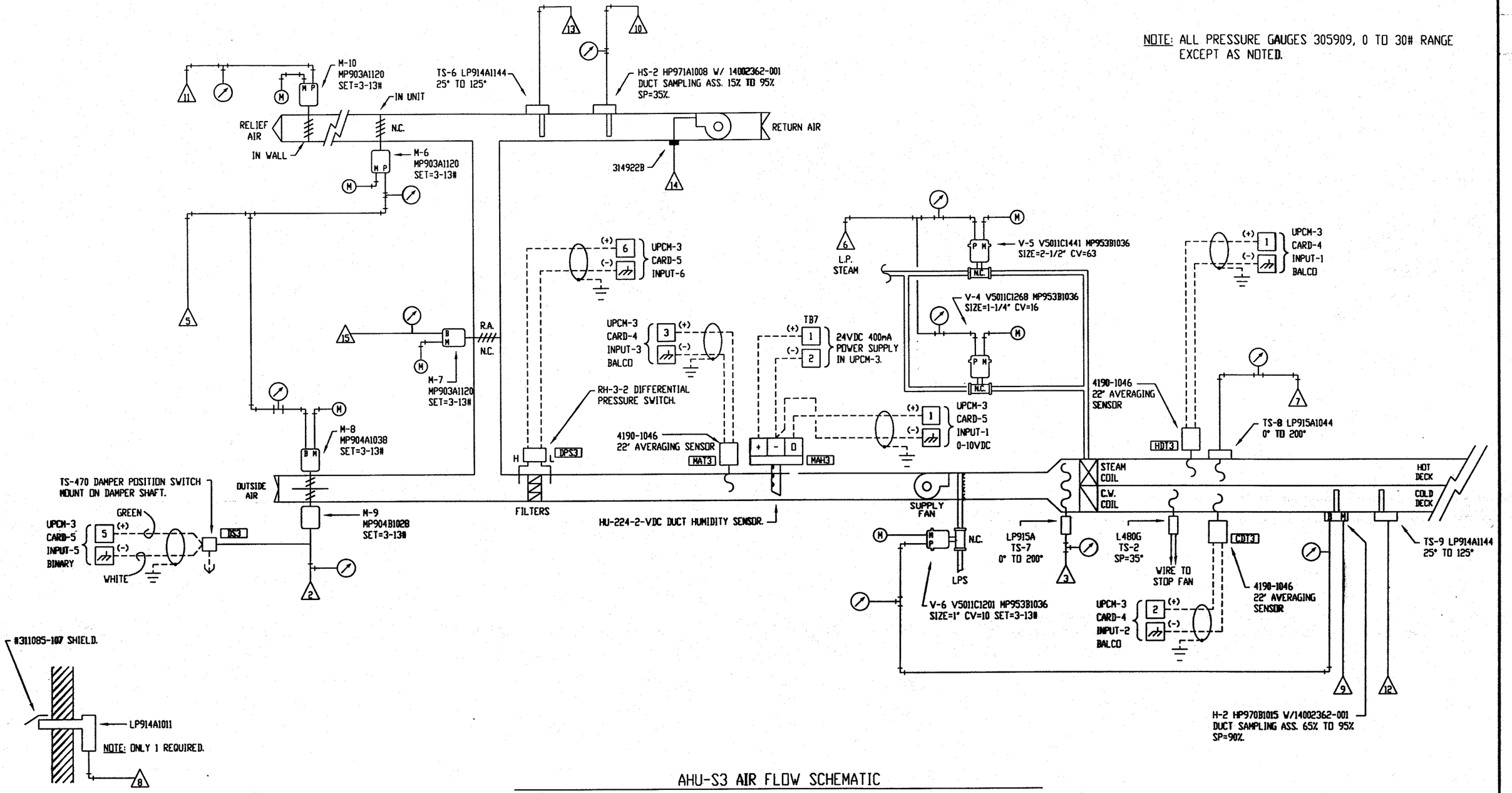
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 19 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-S3 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

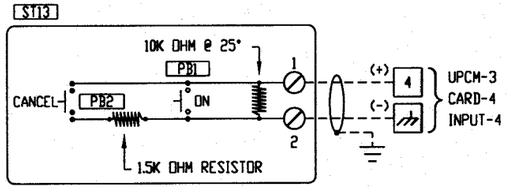
FILE: AHU-S3

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

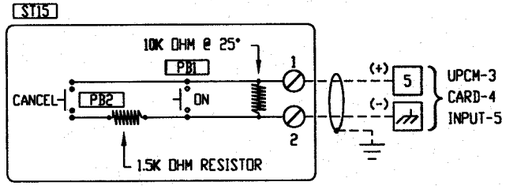
PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina
CONTRACT NUMBER: ICS-98014
DRAWING NUMBER: SHEET 20 OF 51

ST13



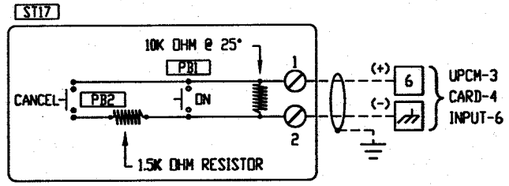
4190-1088 ZONE TEMPERATURE SENSOR LOCATED ON SECOND FLOOR IN CORRIDOR NEAR STAIRWELL 'B'.

ST15

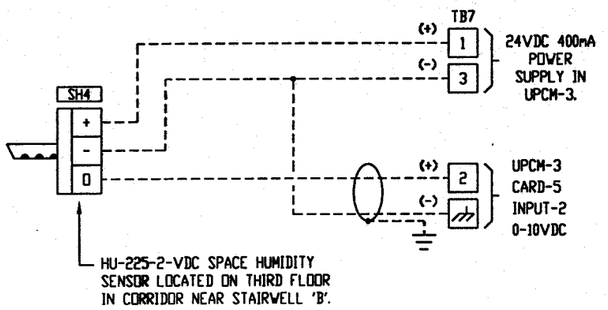


4190-1088 ZONE TEMPERATURE SENSOR LOCATED ON THIRD FLOOR IN CODRIDOR NEAR STAIRWELL 'B'.

ST17



4190-1088 ZONE TEMPERATURE SENSOR LOCATED ON FOURTH FLOOR IN CODRIDOR NEAR STAIRWELL 'B'.



LEGEND
_____ INDICATES FACTORY WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: WIRE-3

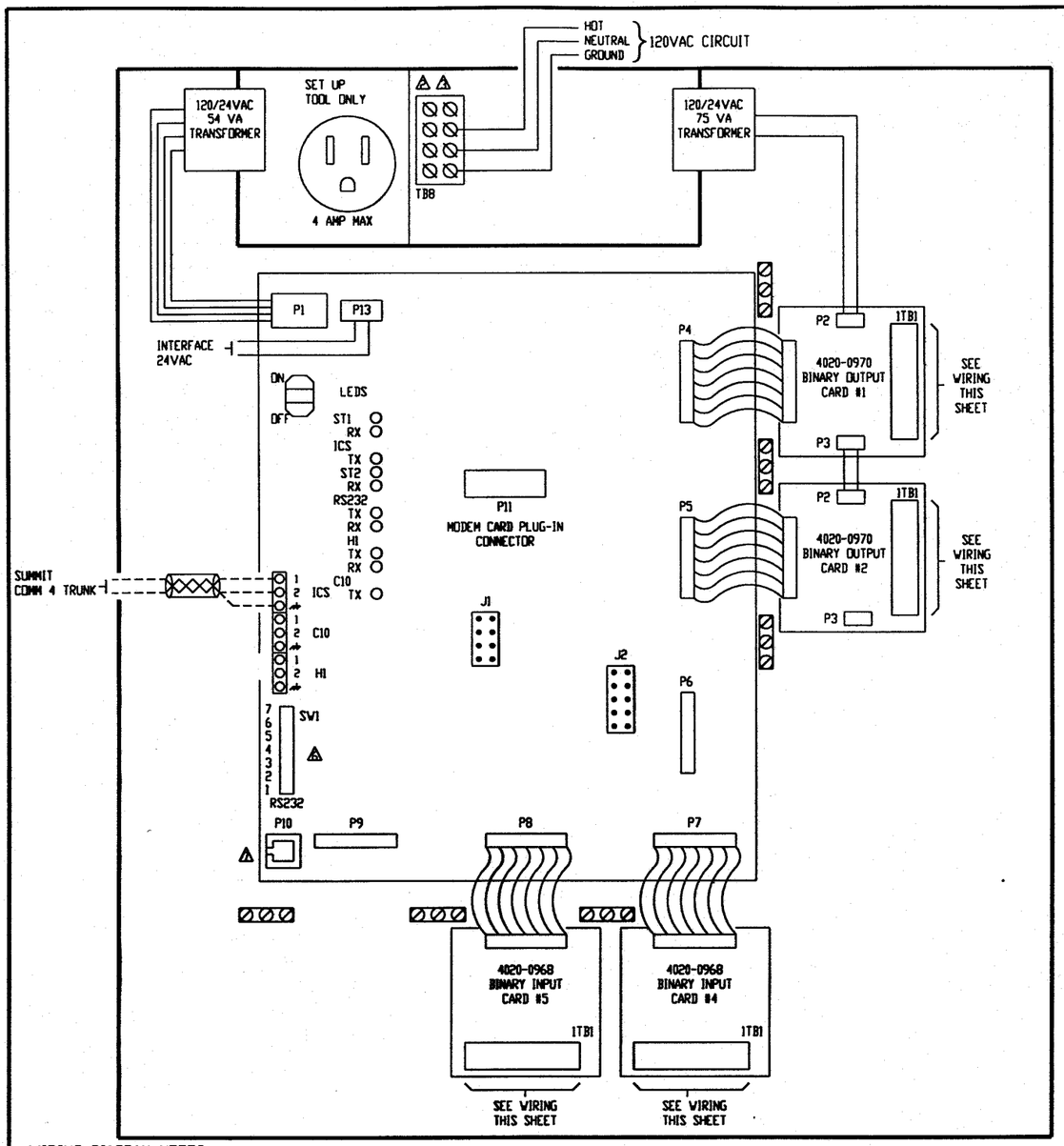
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/13/98

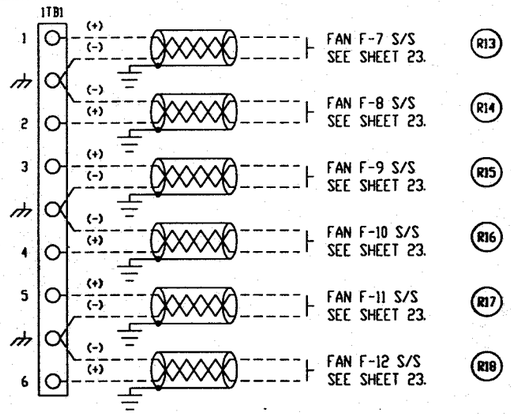
PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

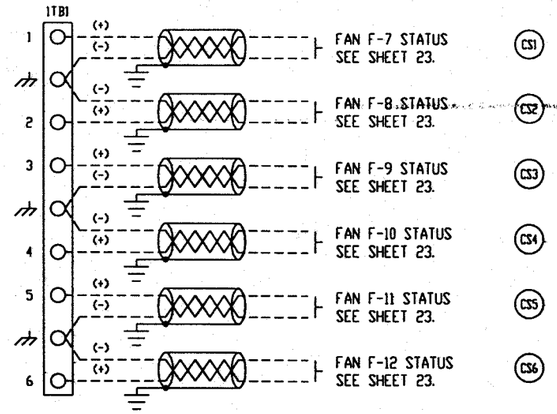
DRAWING NUMBER
SHEET 21 OF 51



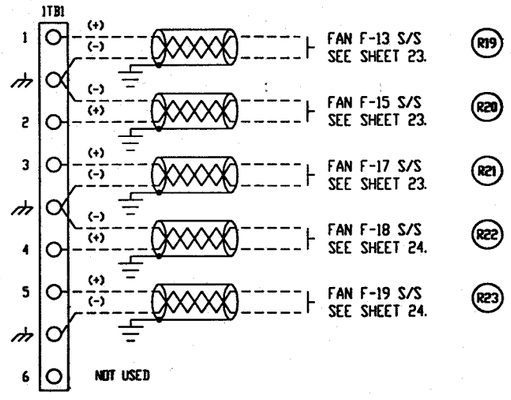
CARD #1 BINARY OUTPUT WIRING



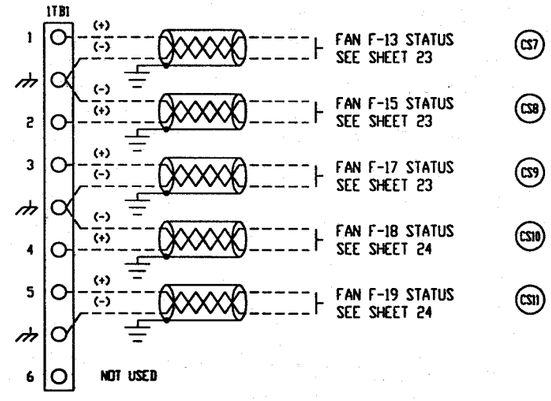
CARD #4 BINARY INPUT WIRING



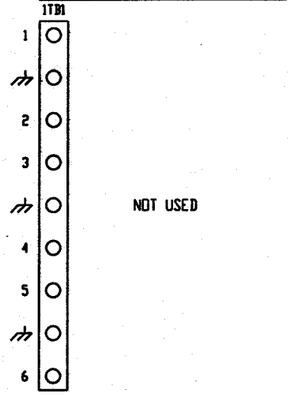
CARD #2 BINARY OUTPUT WIRING



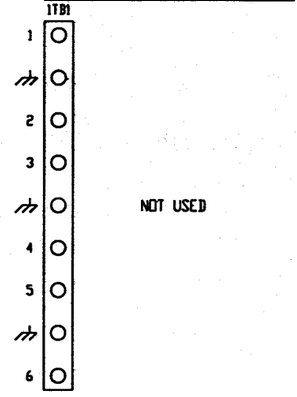
CARD #5 BINARY INPUT WIRING



CARD #3 OPEN SLOT



CARD #6 OPEN SLOT



WIRING DIAGRAM NOTES.

1. COMPONENTS AND WIRING SHOWN DASHED ARE FURNISHED AND FIELD INSTALLED.
2. ALL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODES AND LOCAL CODES. GREEN WIRIE GROUND MUST BE CONTINUOUS BACK TO CIRCUIT BREAKER PANEL.
3. USE COPPER CONDUCTORS ONLY.
4. THE OPTIONAL 24 VAC, 75 VA TRANSFORMER PROVIDES 53 VA FOR BINARY OUTPUT TRIACS AND 22 VA TO THE 24VDC @ 400mA POWER SUPPLY.
5. THE OPTIONAL POWER SUPPLY PROVIDES 24VDC AT 400mA MAXIMUM FOR USE WITH 4 TO 20mA OR 0-10VDC TRANSMITTING SENSORS
6. SWITCH SW1 CONFIGURES UPCM ADDRESS. REFER TO INSTALLATION MANUAL FOR ADDRESS SETUP.
7. POSITION P10 IS AN RJ-12 PLUG FOR RS-232 CONNECTION. REFER TO INSTALLATION MANUAL FOR INFORMATION ON REQUIRED CABLES AND ADAPTERS.
8. BINARY OUTPUTS ARE TRIAC, 24VAC, RATED 12 VA MAX EACH.
9. ANALOG OUTPUTS ARE 0-20mA MAX. 0-10 VDC.
10. UNIVERSAL INPUTS CAN BE INDIVIDUALLY CONFIGURED FOR EITHER ANALOG INPUTS (AIP) OR BINARY INPUT (BIP).
11. ANALOG INPUT (AIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR, SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM ANALOG INPUT WIRING DISTANCE IS 300 FT (91 M). ANALOG INPUTS CAN BE THERMISTOR, RTD, 4-20mA OR 0-10VDC.
12. BINARY INPUT (BIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR. SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM BINARY INPUT WIRING DISTANCE IS 1000FT. (305), BINARY INPUTS MUST BE ISOLATED, UNGROUNDED CONTACTS.

UPCM-4 EXHAUST FANS

BMTU000AAAS4402200000100

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: UPCM-4

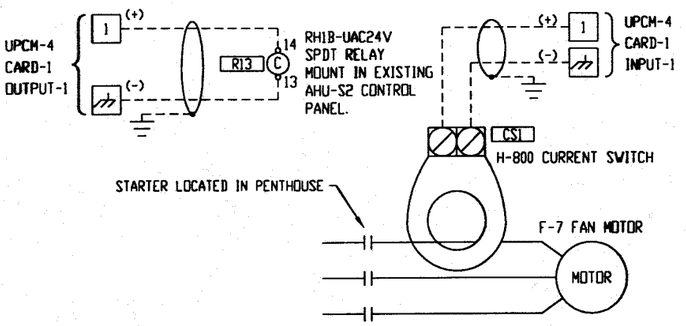
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/6/98

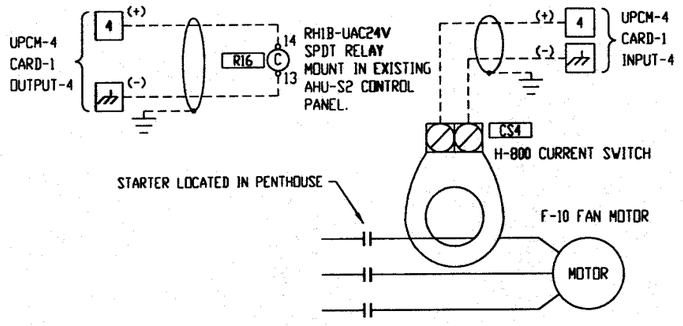
PROJECT NAME: UNCC-McEniry Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

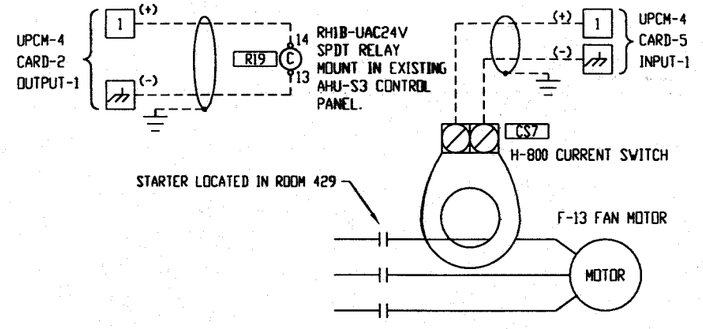
DRAWING NUMBER: SHEET 22 OF 51



EXHAUST FAN F-7 S/S AND STATUS



EXHAUST FAN F-10 S/S AND STATUS



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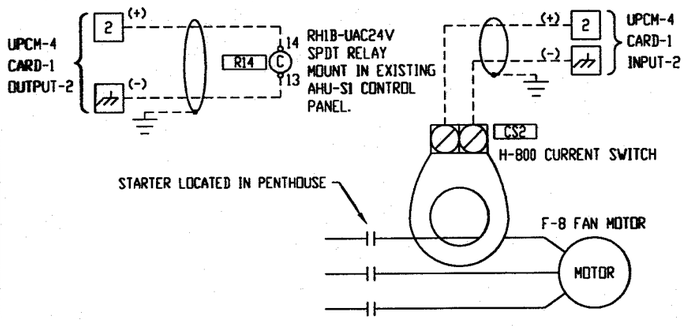
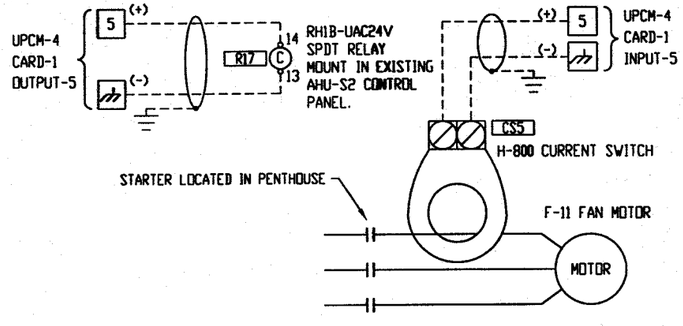


EXHAUST FAN F-8 S/S AND STATUS



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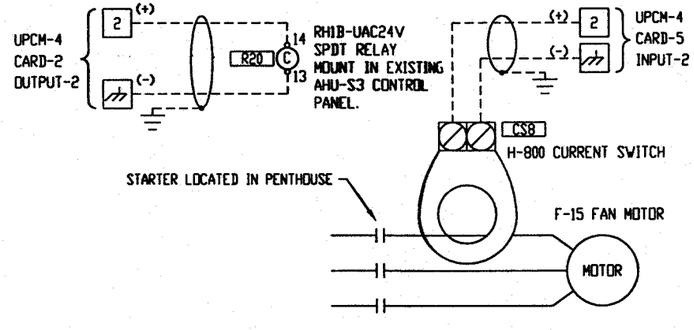
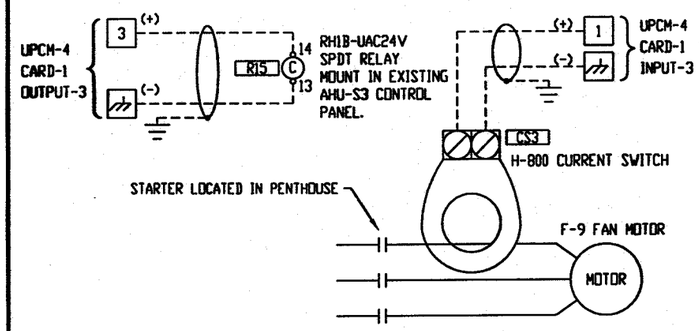
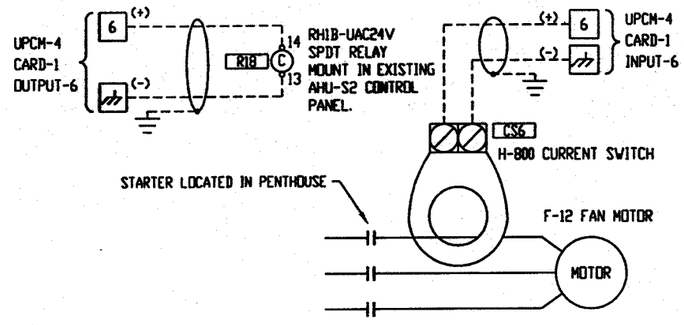


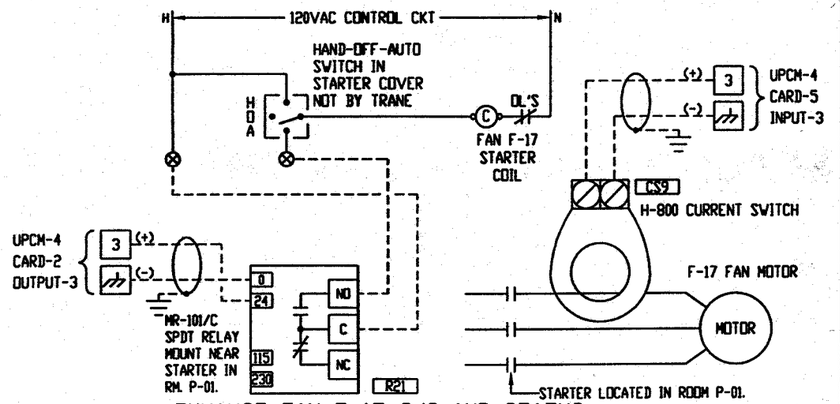
EXHAUST FAN F-15 S/S AND STATUS



EXHAUST FAN F-9 S/S AND STATUS



EXHAUST FAN F-12 S/S AND STATUS



EXHAUST FAN F-17 S/S AND STATUS

LEGEND

_____ INDICATES EXISTING WIRING

- - - - - INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: EXFANS

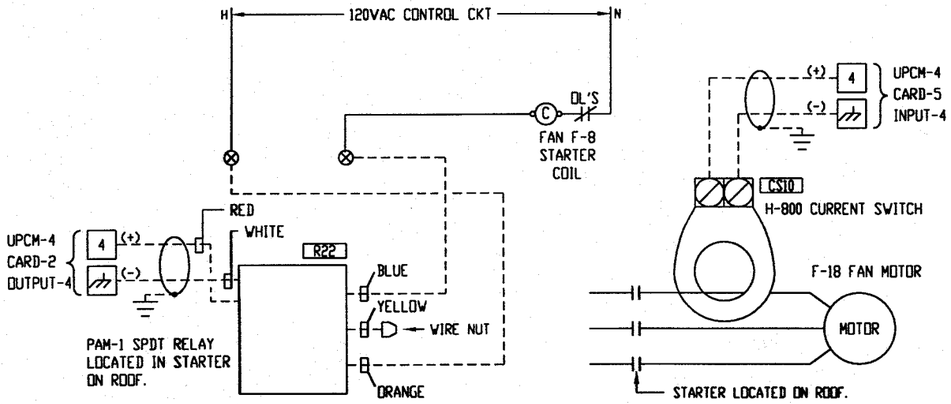
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/7/98

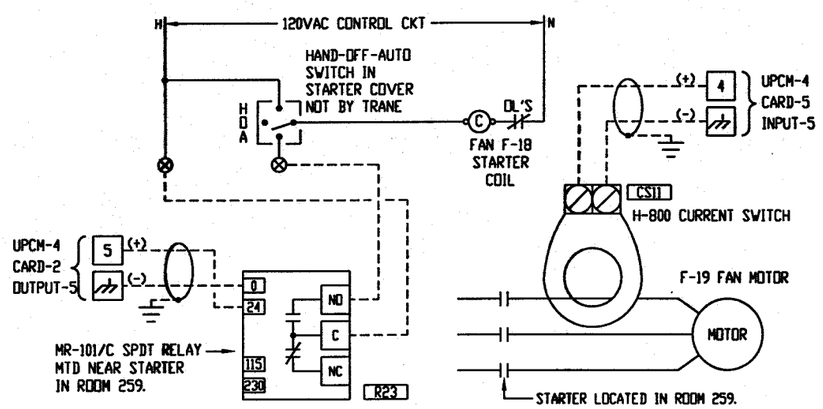
PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 23 OF 51



EXHAUST FAN F-8 S/S AND STATUS



EXHAUST FAN F-19 S/S AND STATUS

LEGEND
_____ INDICATES FACTORY WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
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704 525 3155

FILE: EXF-1

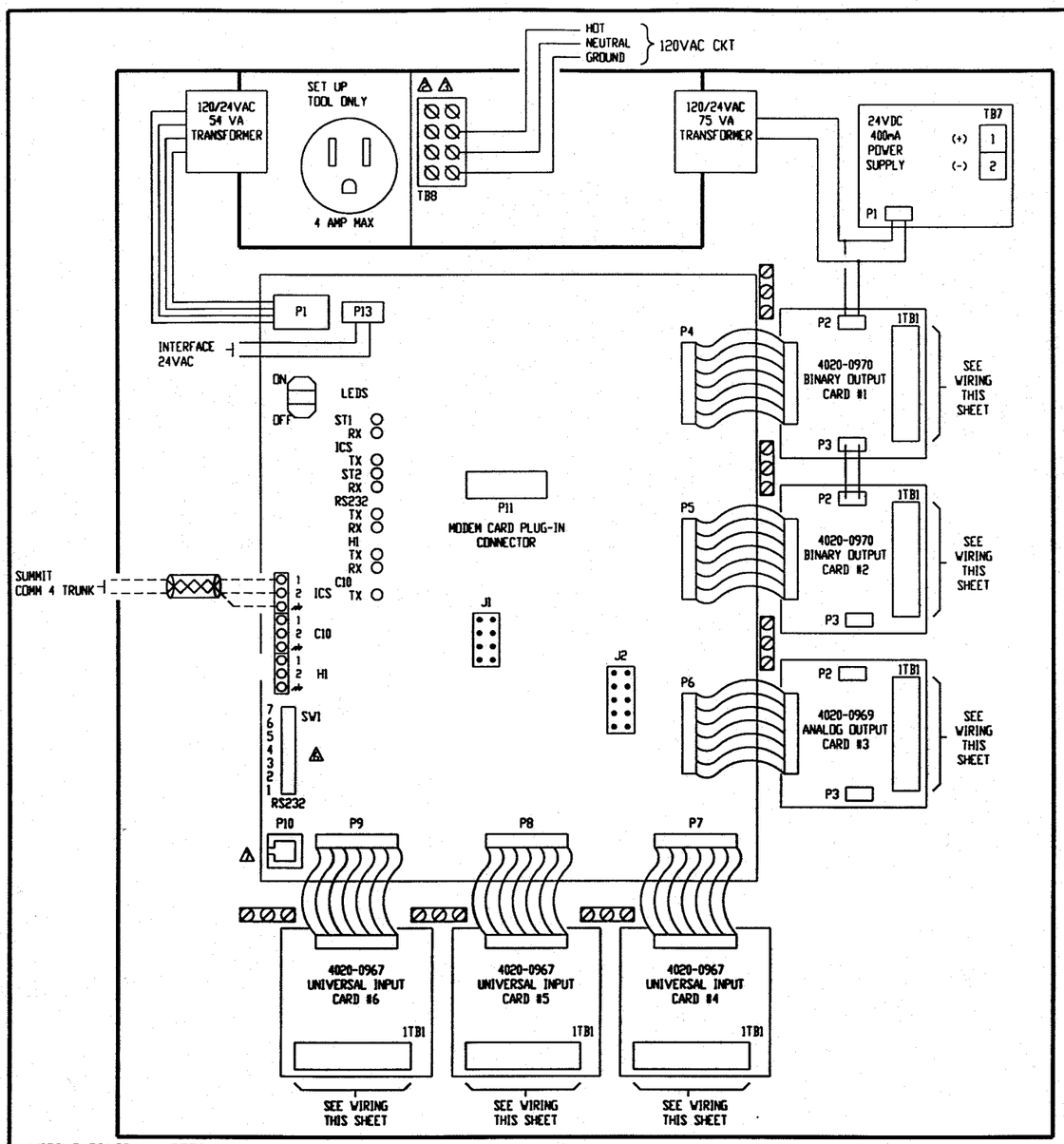
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

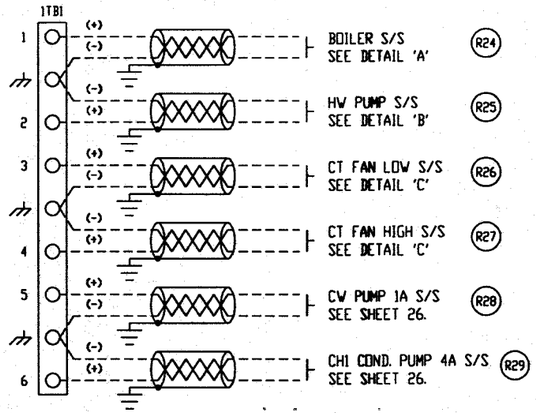
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/13/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

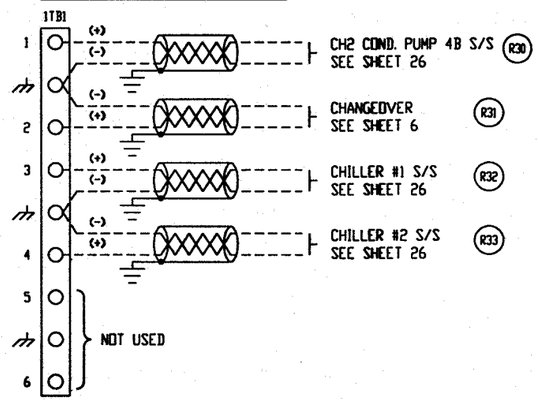
CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 24 OF 51

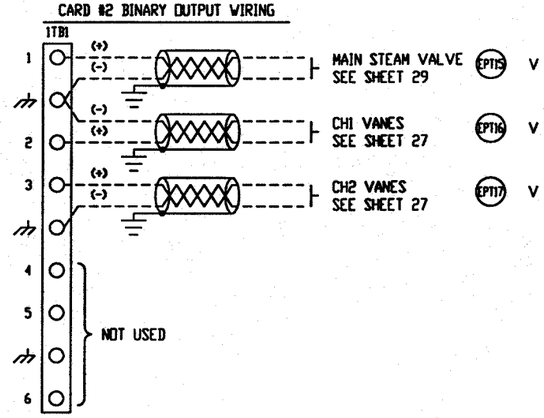




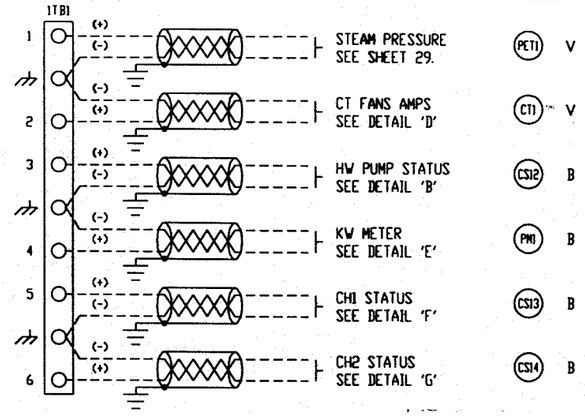
CARD #1 BINARY OUTPUT WIRING



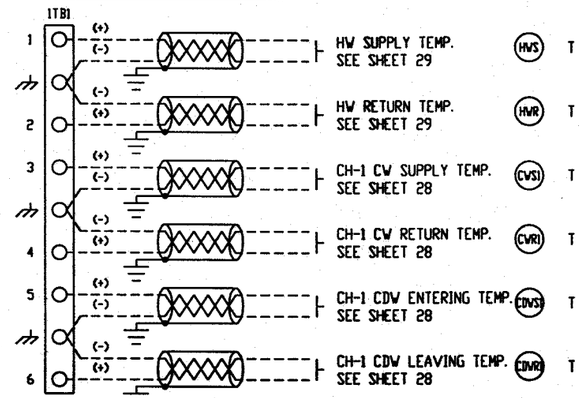
CARD #2 BINARY OUTPUT WIRING



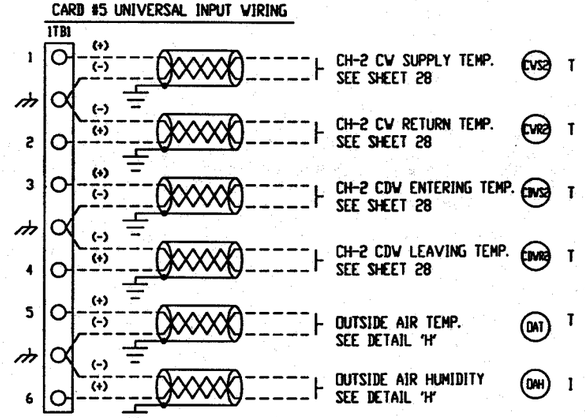
CARD #3 ANALOG OUTPUT WIRING



CARD #4 UNIVERSAL INPUT WIRING



CARD #5 UNIVERSAL INPUT WIRING



CARD #6 UNIVERSAL INPUT WIRING

WIRING DIAGRAM NOTES.

1. COMPONENTS AND WIRING SHOWN DASHED ARE FURNISHED AND FIELD INSTALLED.
2. ALL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODES AND LOCAL CODES. GREEN WIRIE GROUND MUST BE CONTINUOUS BACK TO CIRCUIT BREAKER PANEL.
3. USE COPPER CONDUCTORS ONLY.
4. THE OPTIONAL 24 VAC, 75 VA TRANSFORMER PROVIDES 53 VA FOR BINARY OUTPUT TRIACS AND 22 VA TO THE 24VDC @ 400mA POWER SUPPLY.
5. THE OPTIONAL POWER SUPPLY PROVIDES 24VDC AT 400mA MAXIMUM FOR USE WITH 4 TO 20mA OR 0-10VDC TRANSMITTING SENSORS
6. SWITCH SW1 CONFIGURES UPCM ADDRESS. REFER TO INSTALLATION MANUAL FOR ADDRESS SETUP.
7. POSITION P10 IS AN RJ-12 PLUG FOR RS-232 CONNECTION. REFER TO INSTALLATION MANUAL FOR INFORMATION ON REQUIRED CABLES AND ADAPTERS.
8. BINARY OUTPUTS ARE TRIAC, 24VAC, RATED 12 VA MAX EACH.
9. ANALOG OUTPUTS ARE 0-20mA MAX. 0-10 VDC.
10. UNIVERSAL INPUTS CAN BE INDIVIDUALLY CONFIGURED FOR EITHER ANALOG INPUTS (AIP) OR BINARY INPUT (BIP).
11. ANALOG INPUT (AIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR. SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM ANALOG INPUT WIRING DISTANCE IS 300 FT (91 M). ANALOG INPUTS CAN BE THERMISTOR, RTD, 4-20mA OR 0-10VDC.
12. BINARY INPUT (BIP) WIRING MUST BE SHIELDED, TWISTED PAIR. EACH CONDUCTOR MUST BE STRANDED, TINNED COPPER. RECOMMENDED SIZE IS 18-22 GAUGE AT SENSOR. SHIELD MUST BE CUT BACK AND TAPED. MAXIMUM BINARY INPUT WIRING DISTANCE IS 1000FT. (305), BINARY INPUTS MUST BE ISOLATED, UNGROUNDED CONTACTS.

UPCM-5 PLANT

BMTU000AAAS4431110000200

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FILE: UPCM-5

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

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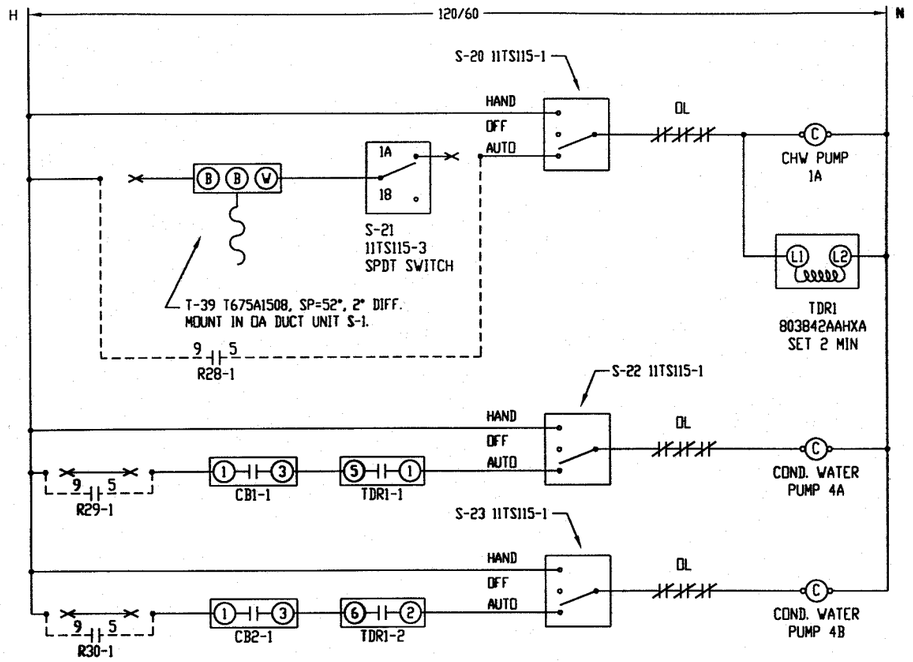
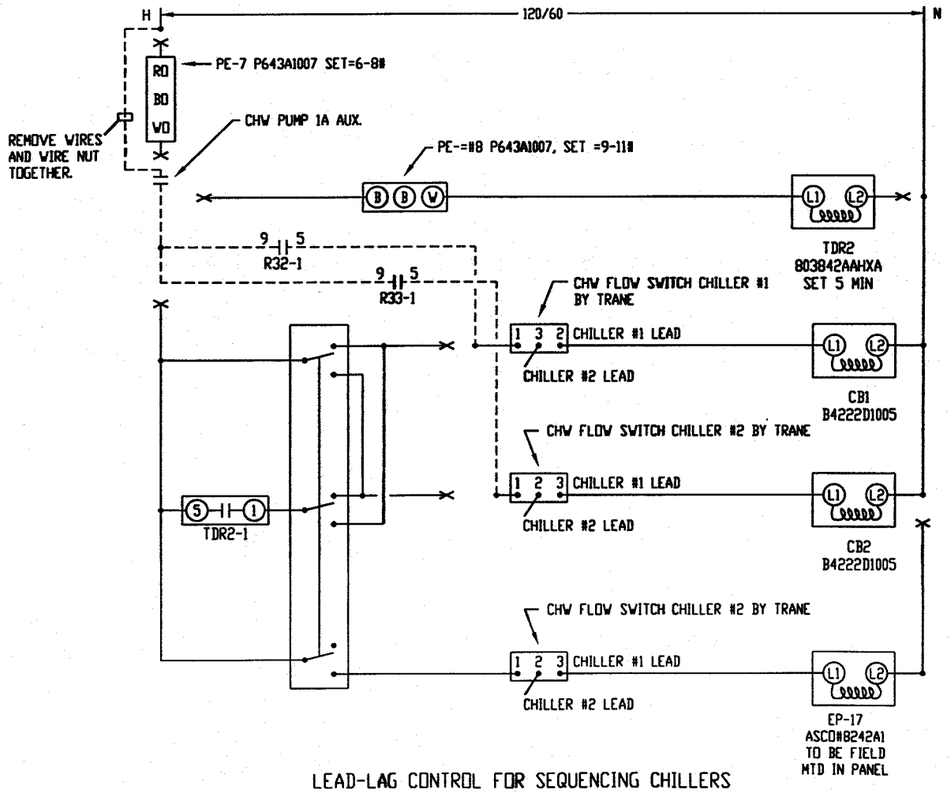
PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

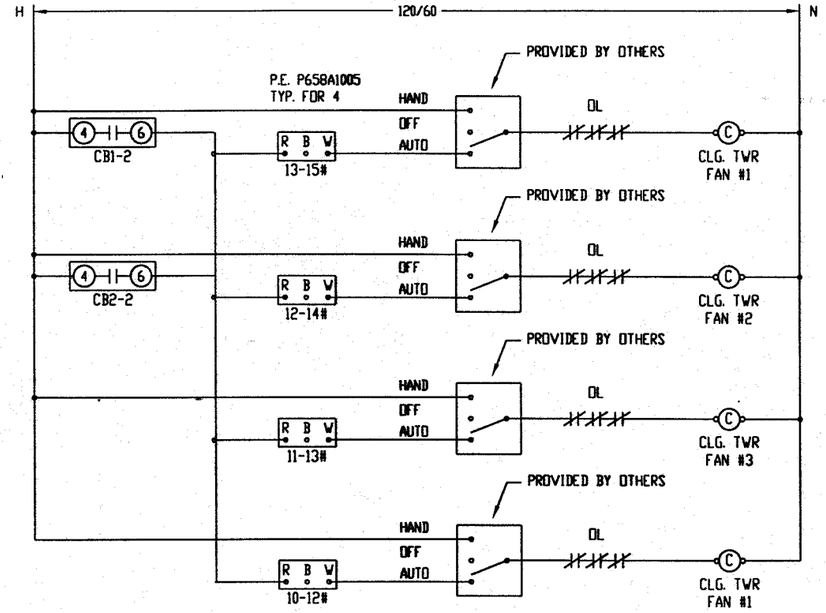
DRAWING NUMBER: SHEET 25 OF 51



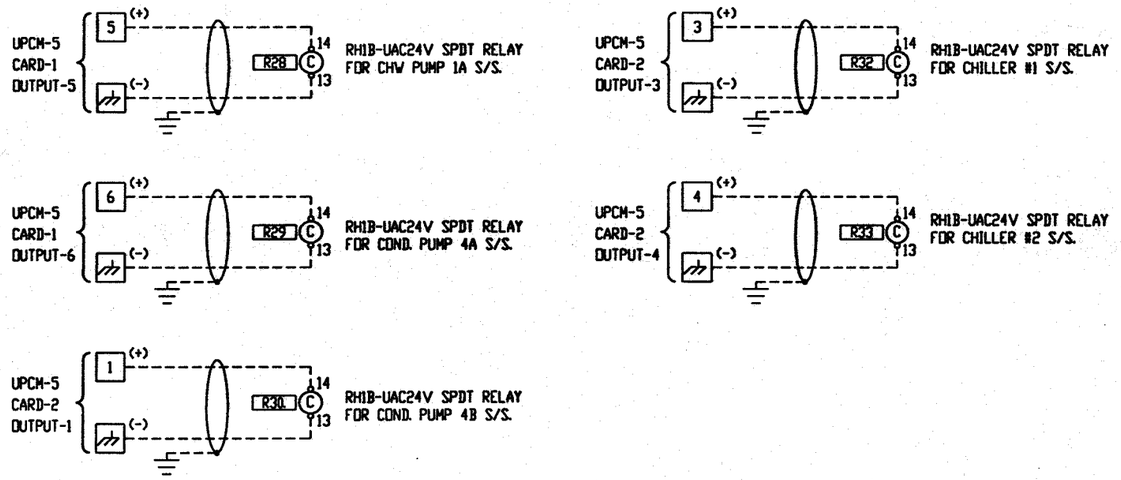
CHILL WATER & CONDENSER WATER PUMP CONTROL WIRING



LEAD-LAG CONTROL FOR SEQUENCING CHILLERS



COOLING TOWER FAN CONTROL WIRING



LEGEND

_____ INDICATES FACTORY WIRING

- - - - - INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DWG4

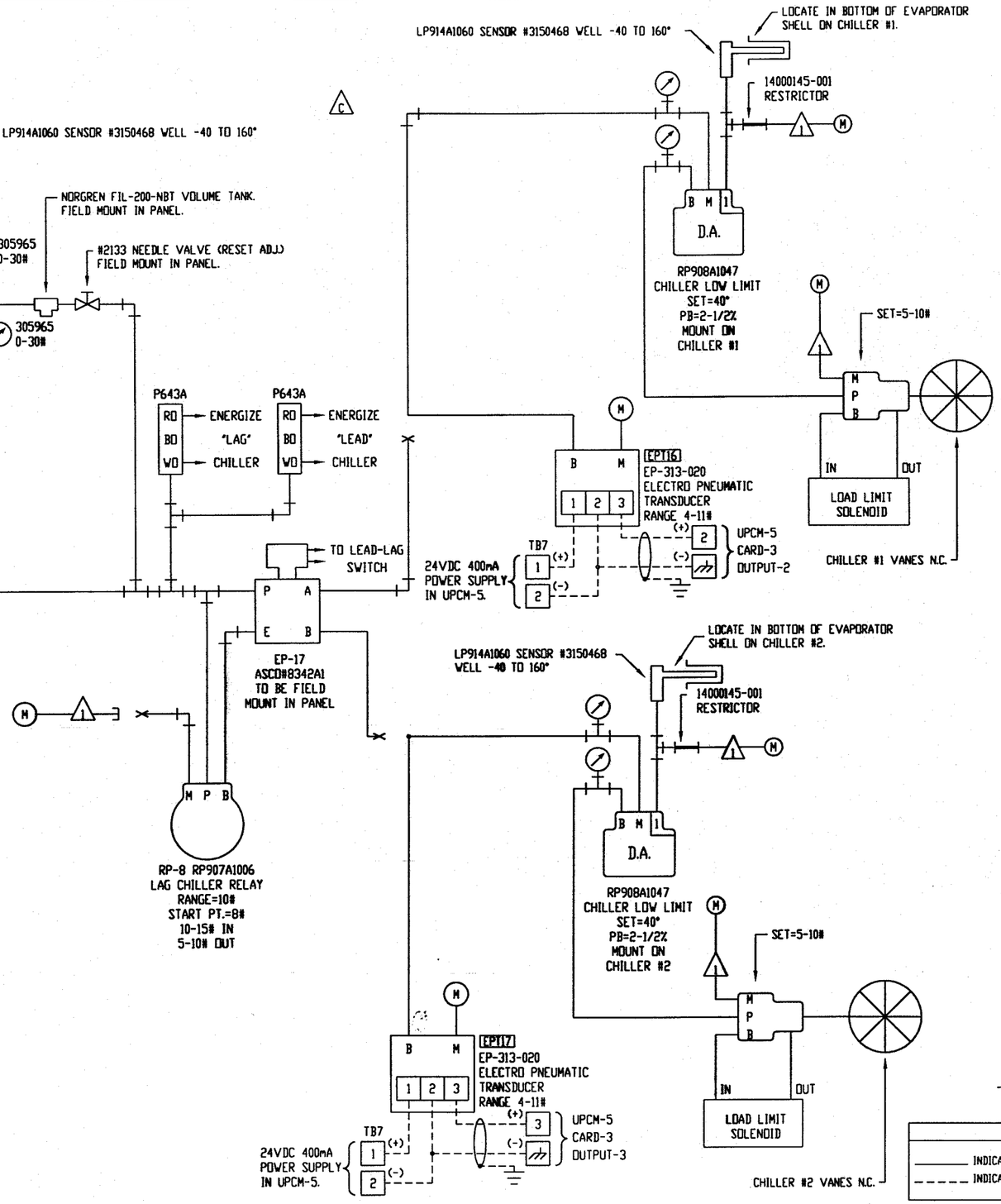
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/6/98
CCR	CVF	CVF	DPC	

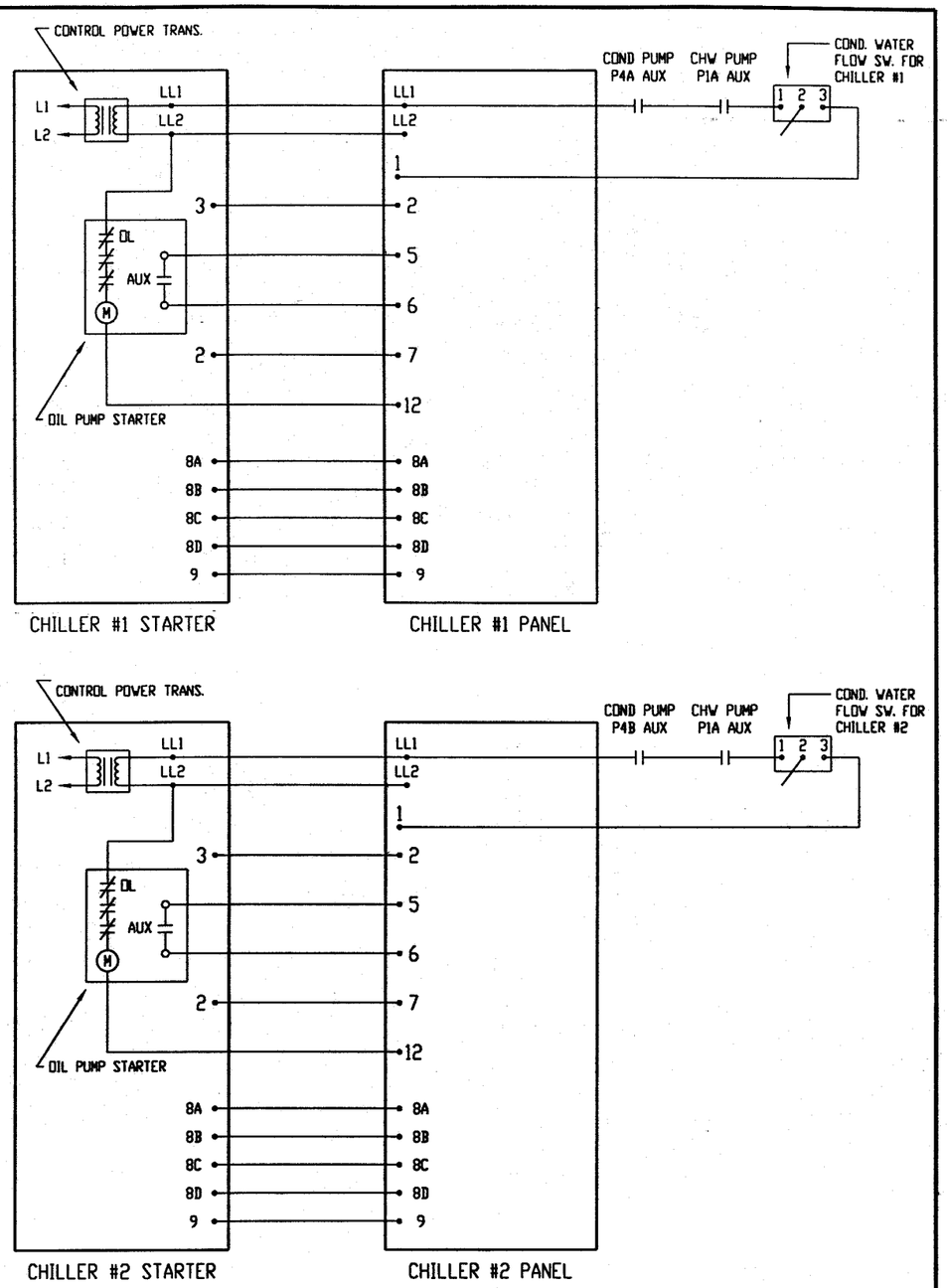
PROJECT NAME: UNCC-McEniry Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 26 OF 51



CHILLER CAPACITY CONTROL



CHILLER #1 & #2 WIRING

LEGEND

_____ INDICATES FACTORY WIRING

- - - - - INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
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FILE: DWGS

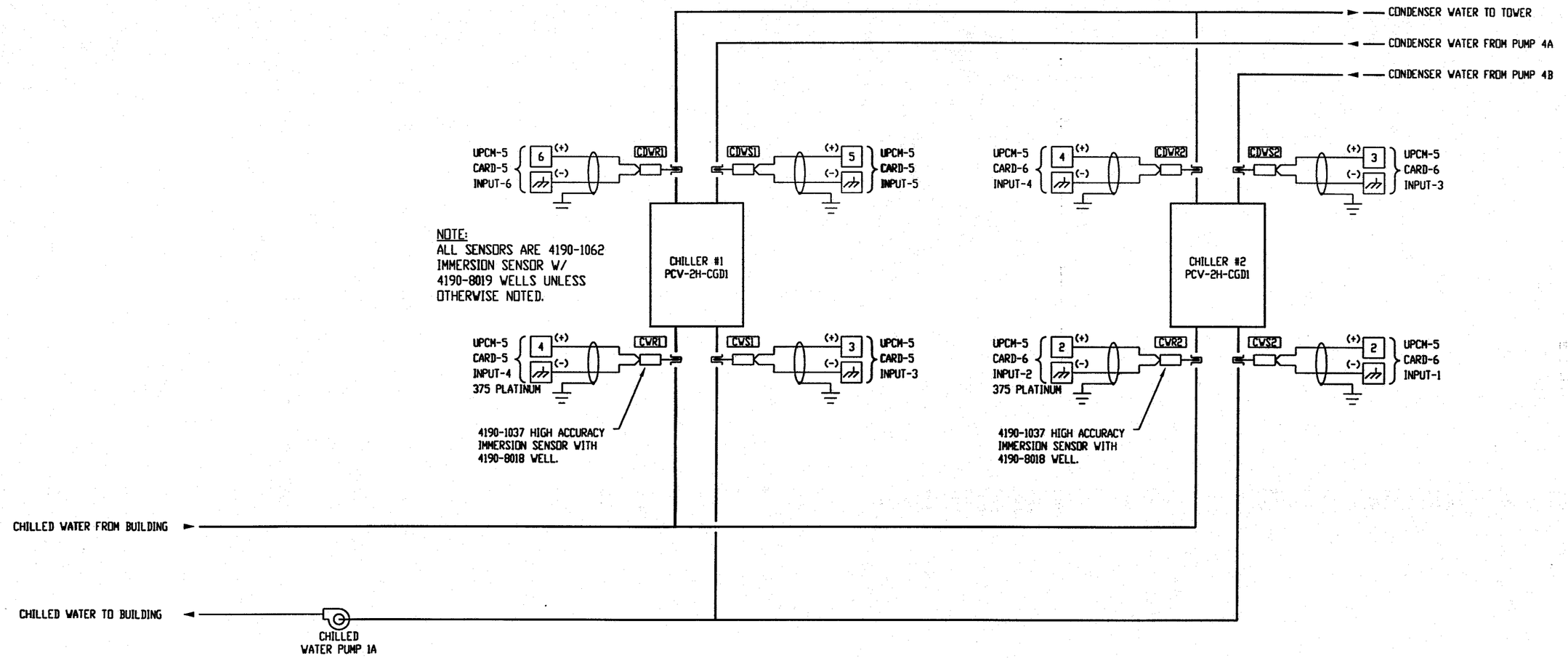
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/7/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 27 OF 51



CHILLER PIPING SCHEMATIC

LEGEND
_____ INDICATES EXISTING WIRING
- - - - - INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: MECH

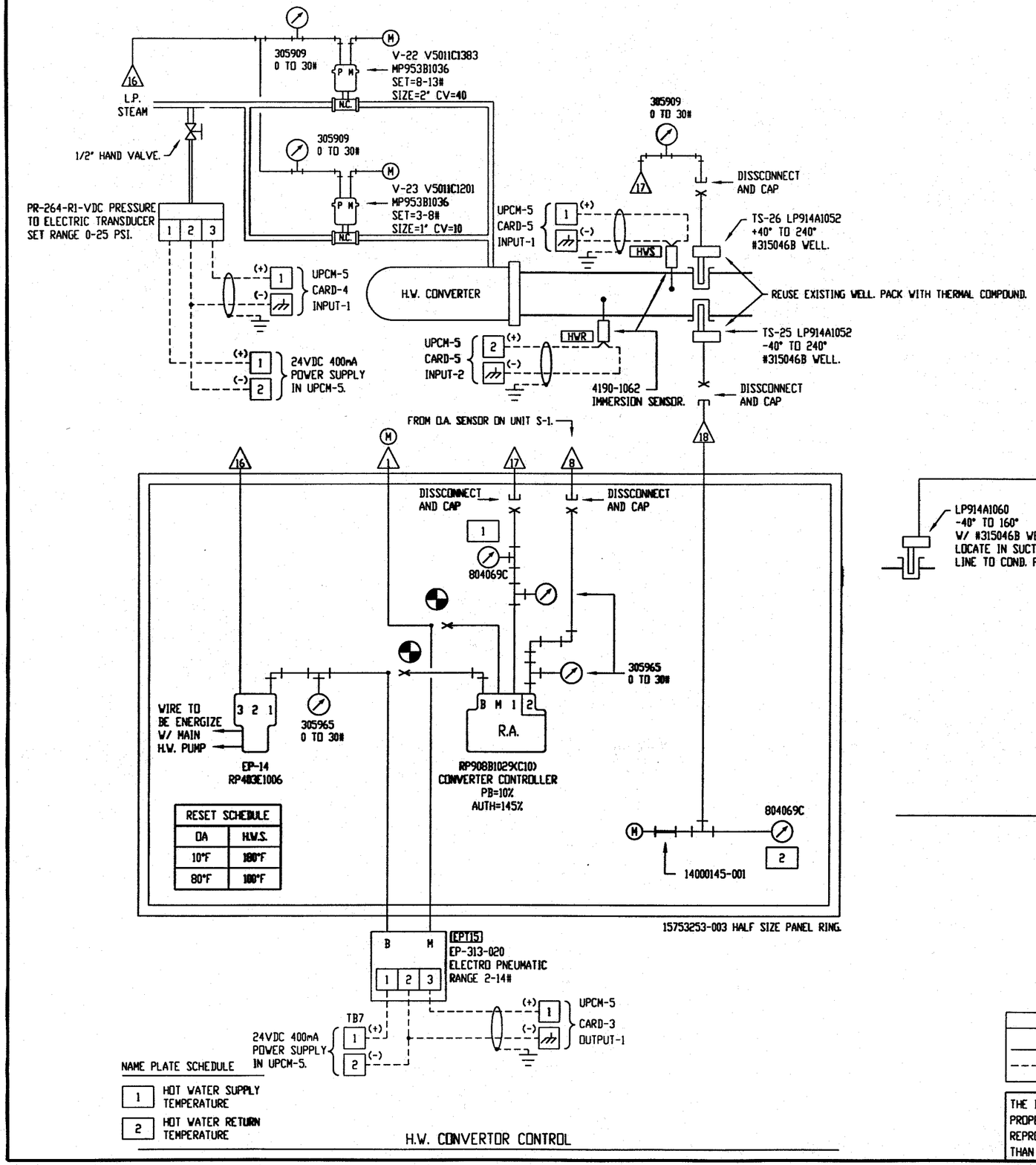
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/13/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 28 OF 51



TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DVG3

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

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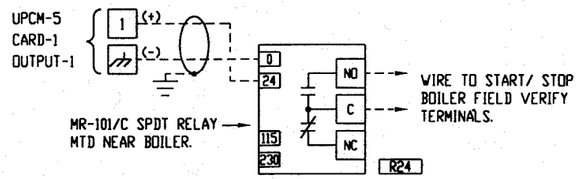
CCR	CVF	CVF	DPC	4/6/98

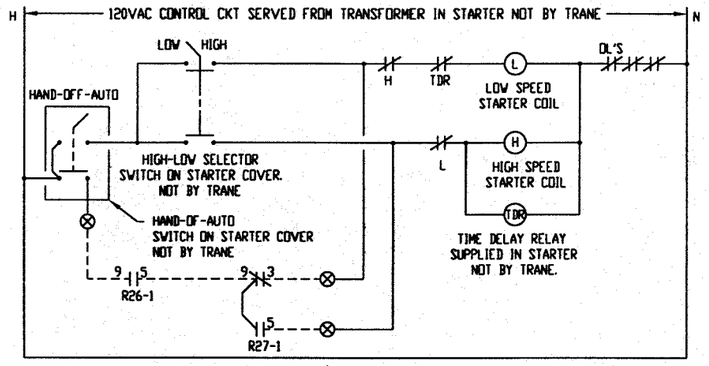
PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

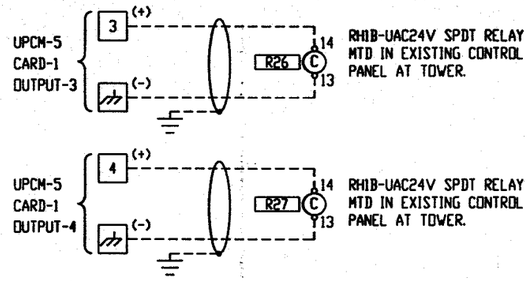
DRAWING NUMBER
SHEET 29 OF 51



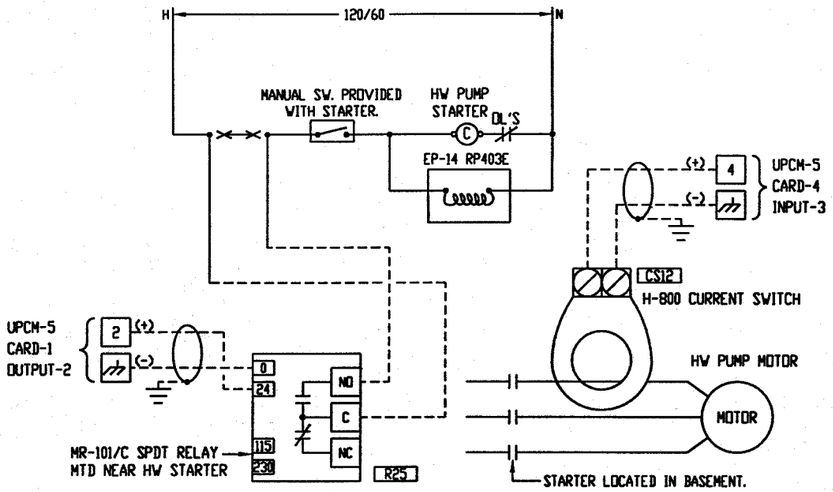
BOILER S/S DETAIL 'A'



FIELD VERIFY TERMINALS IN EXISTING TOWER FAN CONTROL PANEL.



COOLING TOWER FAN S/S DETAIL 'C'



HW PUMP S/S AND STATUS DETAIL 'B'

LEGEND

_____ INDICATES FACTORY WIRING

- - - - - INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DETAIL-1

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

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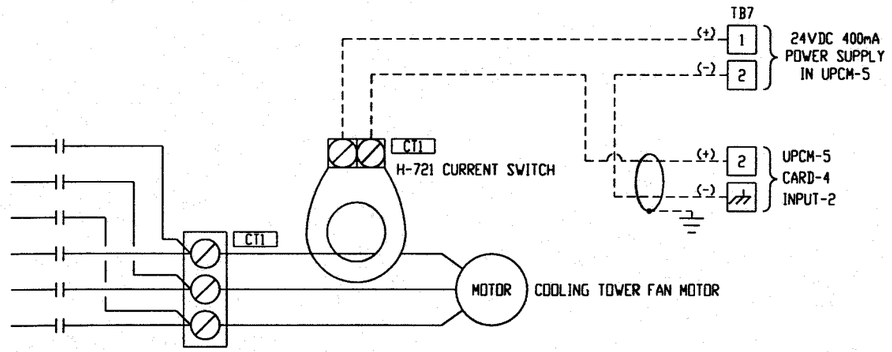
CCR	CVF	CVF	DPC	

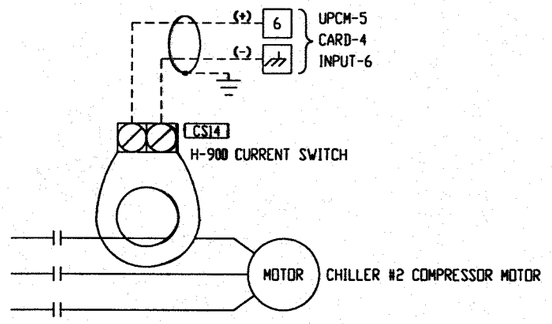
PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

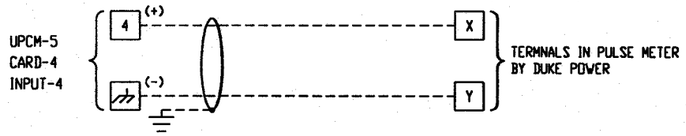
DRAWING NUMBER
SHEET 30 OF 51



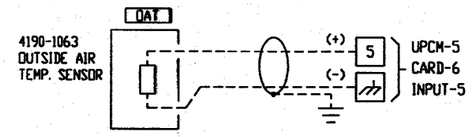
COOLING TOWER FAN AMPS DETAIL 'D'

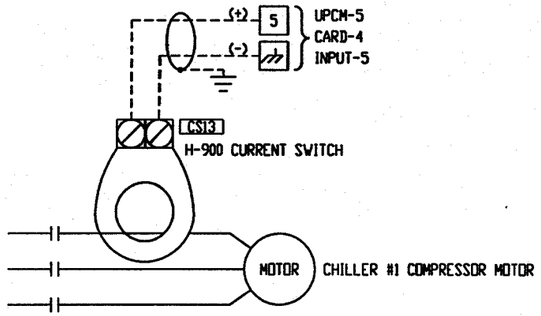


CHILLER #2 STATUS DETAIL 'G'

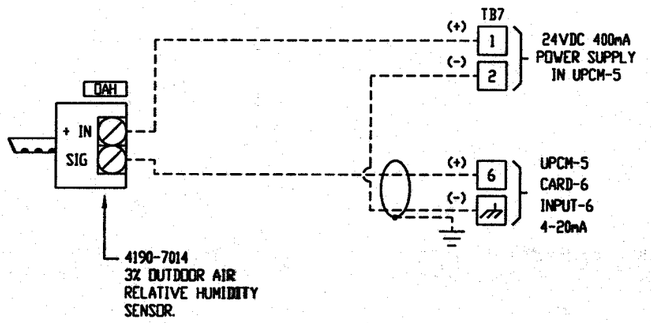


KW PULSE METER DETAIL 'E'





CHILLER #1 STATUS DETAIL 'F'



NOTE:
CORRECT PLACEMENT OF THESE SENSORS IS CRITICAL TO BUILDING FUNCTIONS. SENSORS SHOULD BE LOCATED IN THE SHADE AWAY FROM ALL DEVICES (SUCH AS EXHAUST FANS). THE BEST LOCATION WOULD BE BELOW THE EAVES, ONE FOOT DOWN FROM THE TOP OF A WALL WITH A NORTHERN EXPOSURE.

OUTSIDE AIR TEMPERATURE & HUMIDITY DETAIL 'H'

LEGEND
_____ INDICATES FACTORY WIRING
- - - - - INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: DETAIL-2

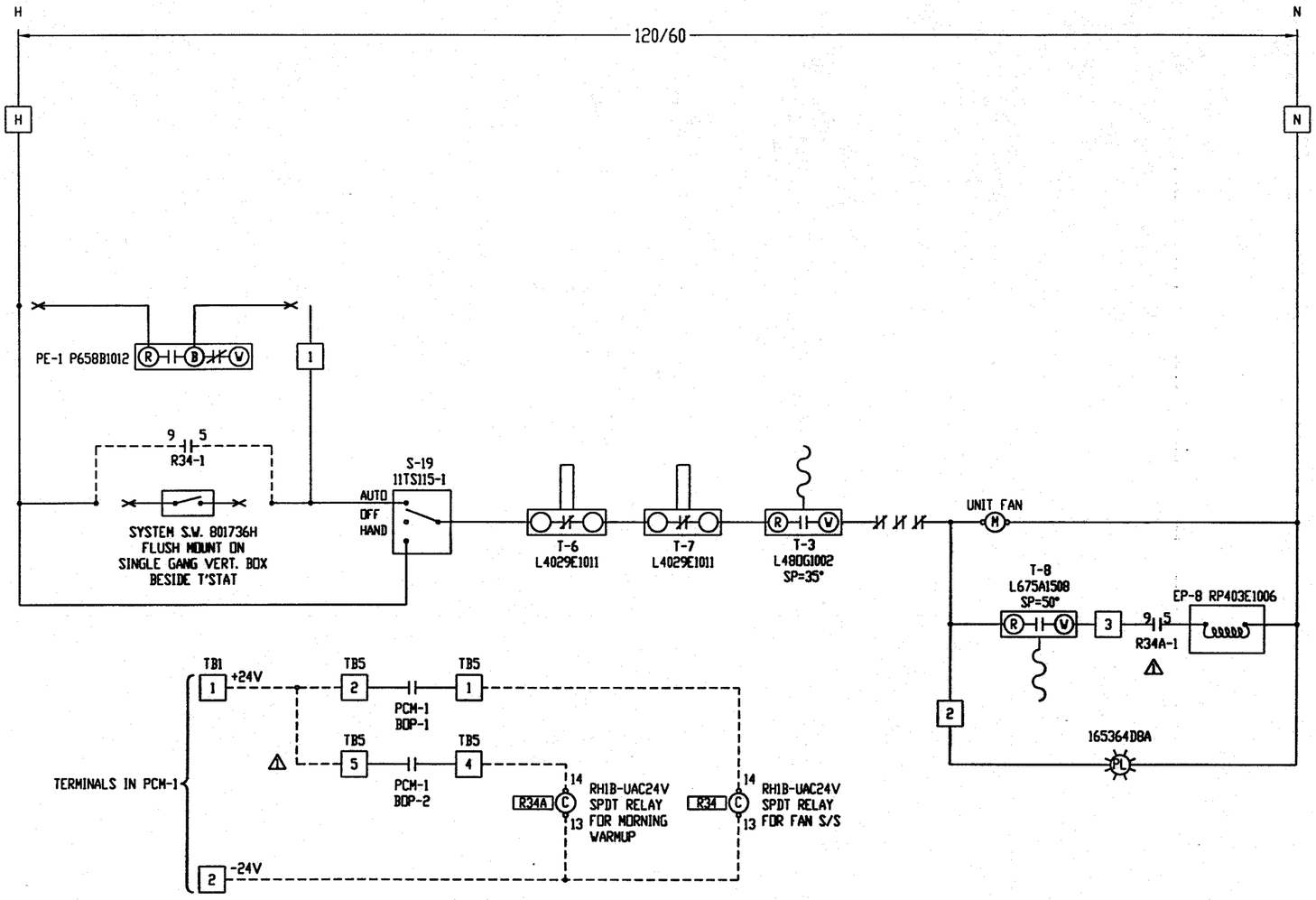
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/13/98
CCR	CVF	CVF	DPC	

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 31 OF 51



AHU-4 INTERLOCK WIRING DIAGRAM

- EXISTING CONTROL PANEL -

AHU-4 POINTS LIST FOR PCM-1. S/N# E98E06415

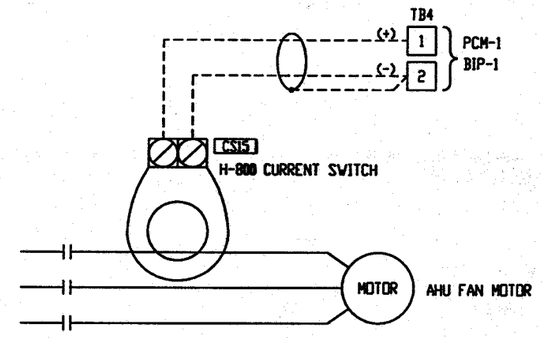
- SERVING AHU-4 -

AIP-1 MIXED AIR TEMPERATURE MAT-4.
AIP-2 LECTURE 150 TEMPERATURE ST-6.
AIP-3 SPARE

AOP-1 VALVE CONTROL EPT-18.
AOP-2 SPARE

BIP-1 FAN STATUS CS-15.
BIP-2 SPARE

BOP-1 FAN START/STOP R34.
⚠ BOP-2 M.W. RELAY
BOP-3 SPARE



FAN STATUS SWITCH

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ✖ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

LEGEND

_____ INDICATES EXISTING WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: [L-DWG]

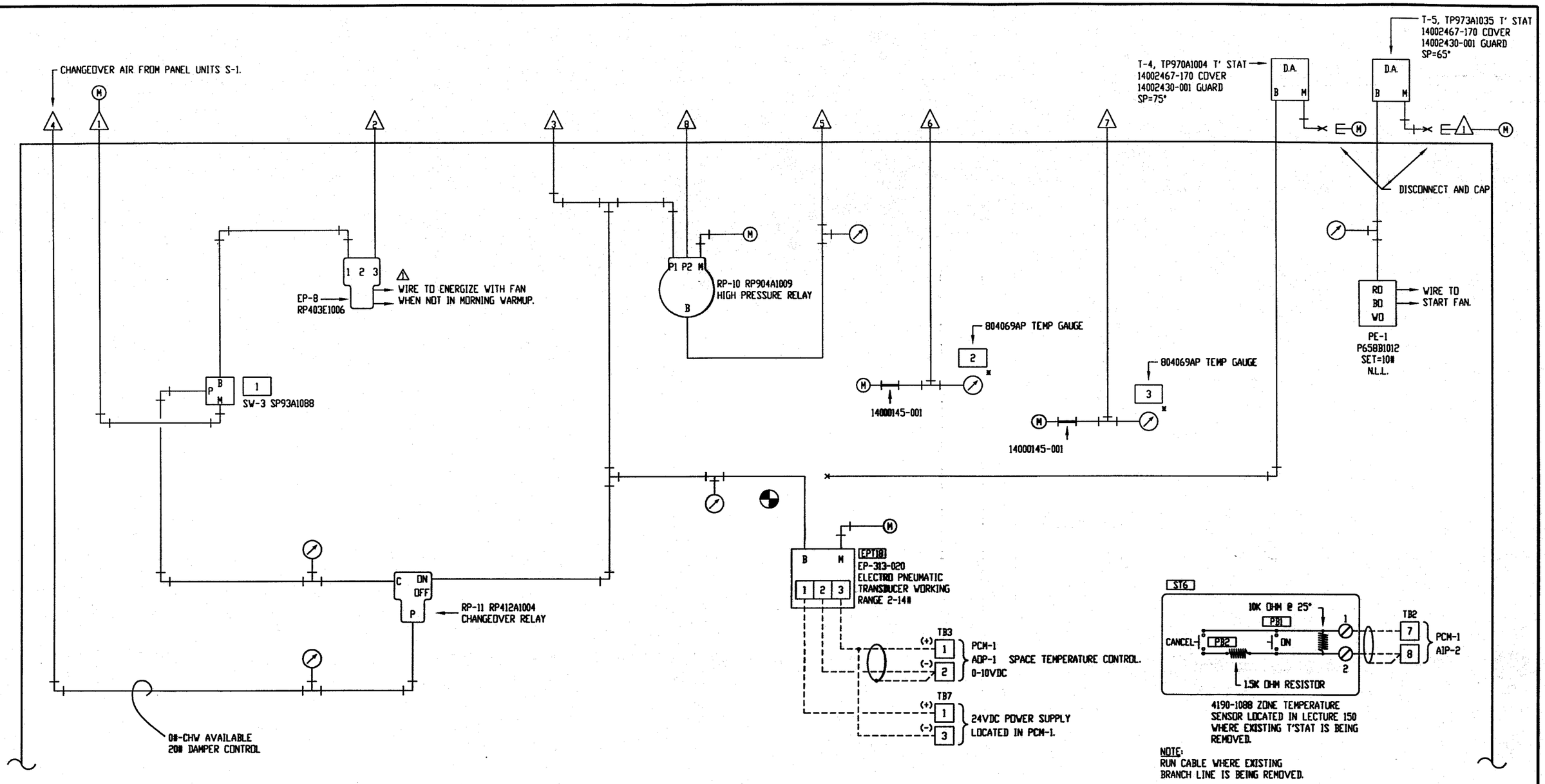
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	⚠	AS-BUILT	4/9/99	CVF

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/8/98
CCR	CVF	CVF	DPC	

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 32 OF 51



AHU-4 PANEL PNEUMATIC SCHEMATIC

- EXISTING CONTROL PANEL -

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ✱ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

1. MIN. OA DAMPER POSITION
2. SUPPLY AIR TEMP.
3. RETURN AIR TEMP.

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LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU4-P

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	1	AS-BUILT	4/9/99	CVF

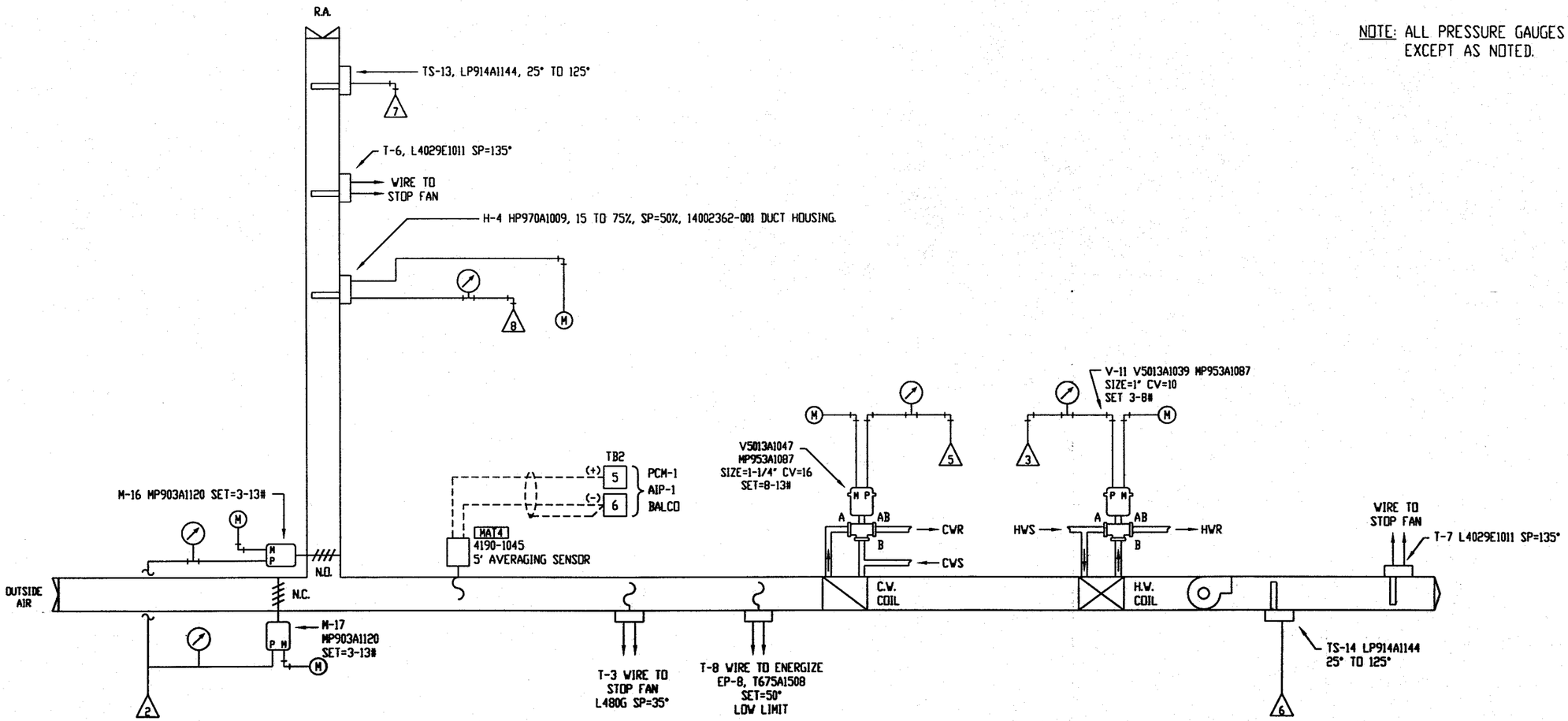
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/2/98
CCR	CVF	CVF	DPC	

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 33 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-4 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-4

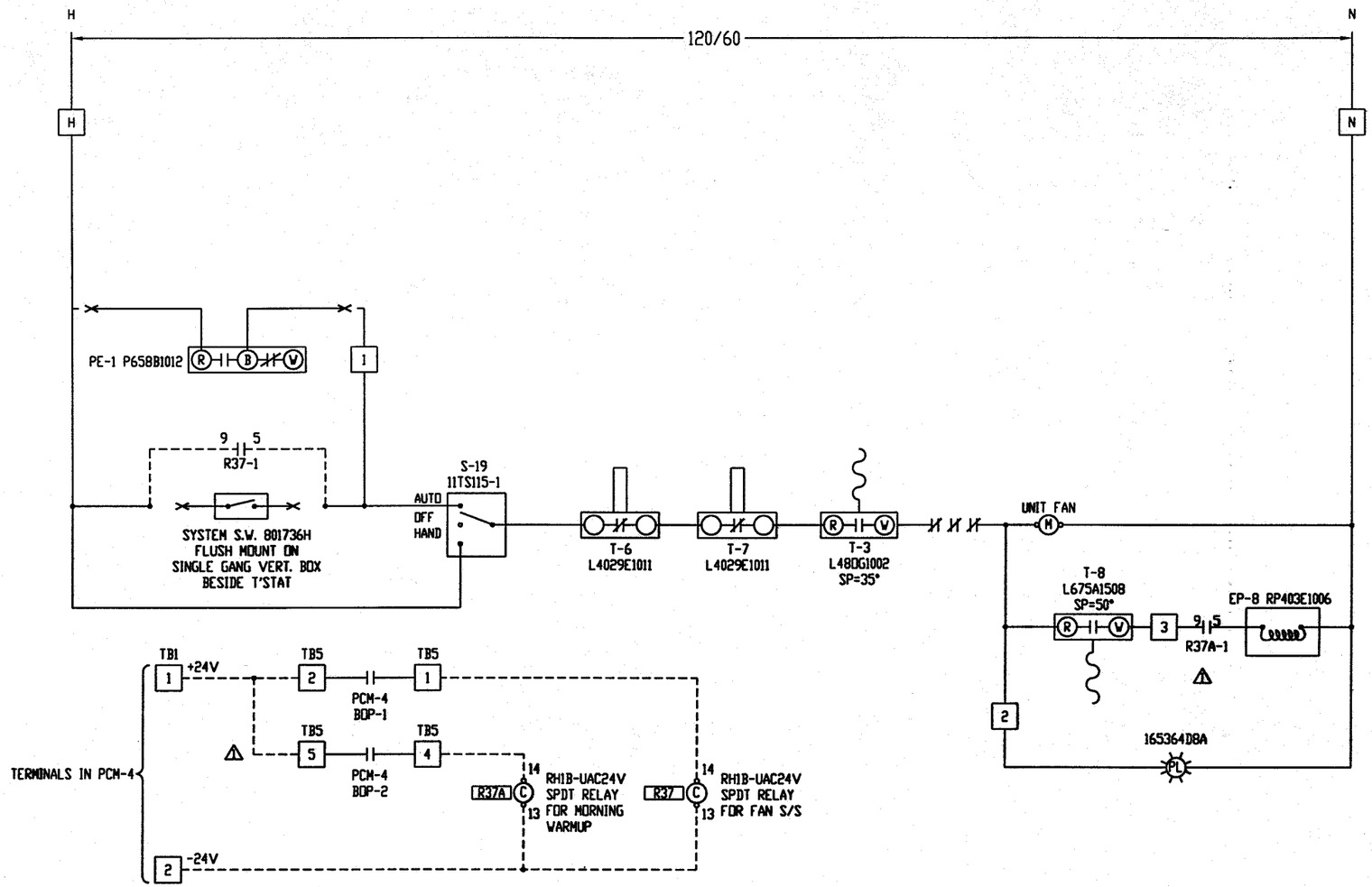
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 34 OF 51



AHU-5 INTERLOCK WIRING DIAGRAM

- EXISTING CONTROL PANEL -

AHU-5 POINTS LIST FOR PCM-4. S/N# E98E06414

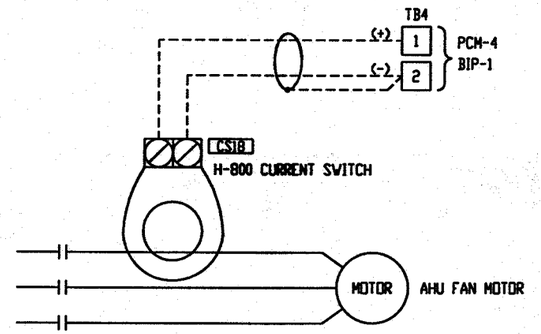
- SERVING AHU-5 -

AIP-1 MIXED AIR TEMPERATURE MAT-5.
AIP-2 LECTURE 146 TEMPERATURE ST-9.
AIP-3 SPARE

AOP-1 VALVE CONTROL EPT-21.
AOP-2 SPARE

BIP-1 FAN STATUS CS-18.
BIP-2 SPARE

BOP-1 FAN START/STOP R-37.
⚠ BOP-2 M.V. RELAY
BOP-3 SPARE



FAN STATUS SWITCH

LEGEND
■ THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
■ THIS COLOR IS INDICATING TO BE REMOVED.
■ THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
■ THIS COLOR IS INDICATING NEW TO BE ADDED.
(M) MAIN AIR
⁎ INDICATES GAUGE MOUNTED ON PANEL FACE.
⊕ CONNECT TO EXISTING

LEGEND
_____ INDICATES EXISTING WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: IL-DWG2

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	⚠	AS-BUILT	4/9/99	CVF

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/8/98
CCR	CVF	CVF	DPC	

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 35 OF 51

CHANGEOVER AIR FROM PANEL UNITS S-1.

T-4, TP970A1004 T' STAT
14002467-170 COVER
14002430-001 GUARD
SP=75°

T-5, TP973A1035 T' STAT
14002467-170 COVER
14002430-001 GUARD
SP=65°

D.A.

DISCONNECT AND CAP

EP-8 RP403E1006

WIRE TO ENERGIZE WITH FAN WHEN NOT IN MORNING WARMUP.

RP-10 RP904A1009
HIGH PRESSURE RELAY

804069AP TEMP GAUGE

14000145-001

RO
BO
WO
WIRE TO START FAN.

PE-1
P658B1012
SET=10#
N.L.L.

SW-3 SP93A1088

RP-11 RP412A1004
CHANGEOVER RELAY

0#-CHW AVAILABLE
20# DAMPER CONTROL

EPT21
EP-313-020
ELECTRO PNEUMATIC
TRANSDUCER WORKING
RANGE 2-14#

TB3
PCM-4
AOP-1 SPACE TEMPERATURE CONTROL.
0-10VDC

TB7
24VDC POWER SUPPLY
LOCATED IN PCM-4.

ST9
10K OHM @ 25°
PB1
PB2
CANCEL
ON
1.5K OHM RESISTOR
TB2
PCM-4
AIP-2

4190-1088 ZONE TEMPERATURE SENSOR LOCATED IN LECTURE 146 WHERE EXISTING T'STAT IS BEING REMOVED.

NOTE:
RUN CABLE WHERE EXISTING BRANCH LINE IS BEING REMOVED.

AHU-5 PANEL PNEUMATIC SCHEMATIC

- EXISTING CONTROL PANEL -

LEGEND
THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
THIS COLOR IS INDICATING TO BE REMOVED.
THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
THIS COLOR IS INDICATING NEW TO BE ADDED.
(M) MAIN AIR
* INDICATES GAUGE MOUNTED ON PANEL FACE.
CONNECT TO EXISTING

1. MIN. OA DAMPER POSITION
2. SUPPLY AIR TEMP.
3. RETURN AIR TEMP.

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU5-P

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	1	AS-BUILT	4/9/99	CVF

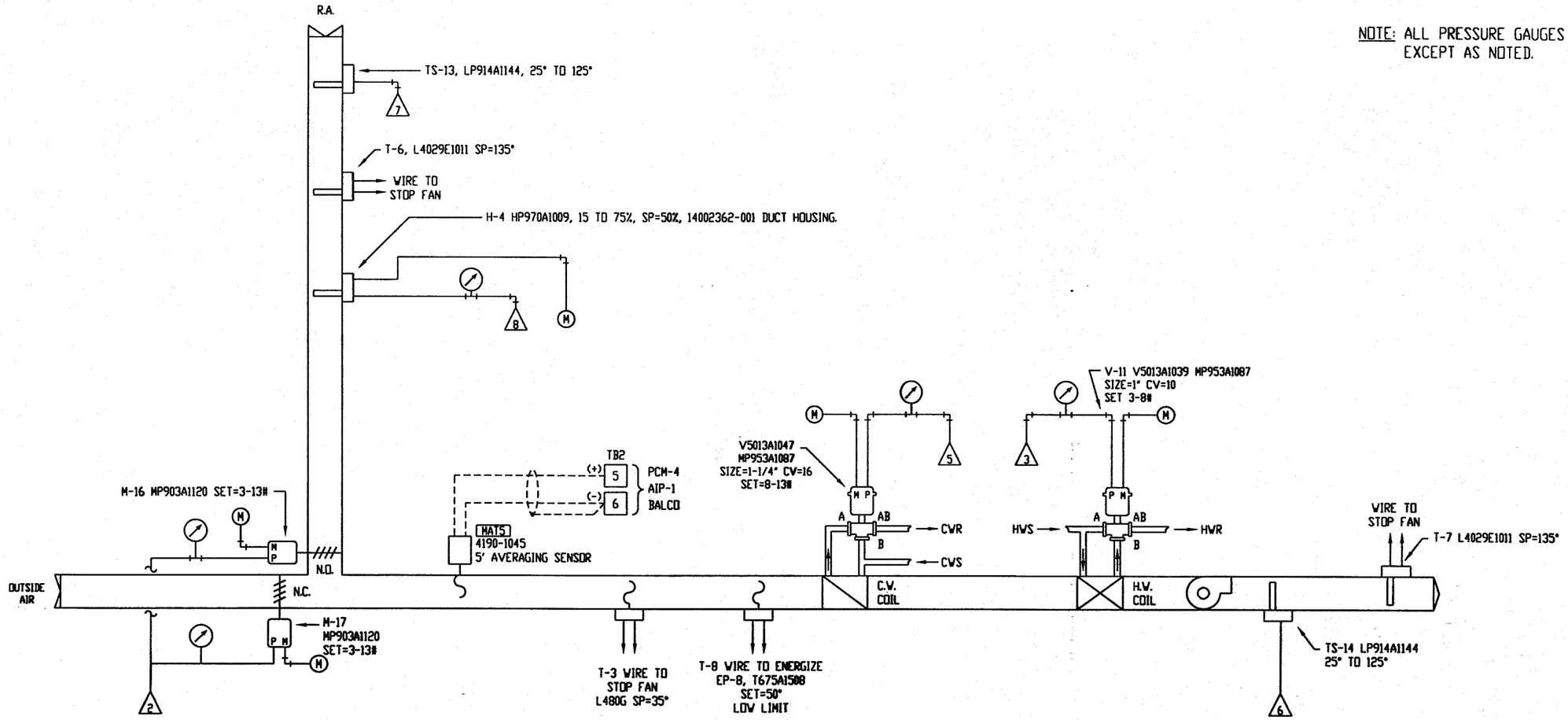
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/2/98
CCR	CVF	CVF	DPC	

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 36 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-5 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ✱ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-5

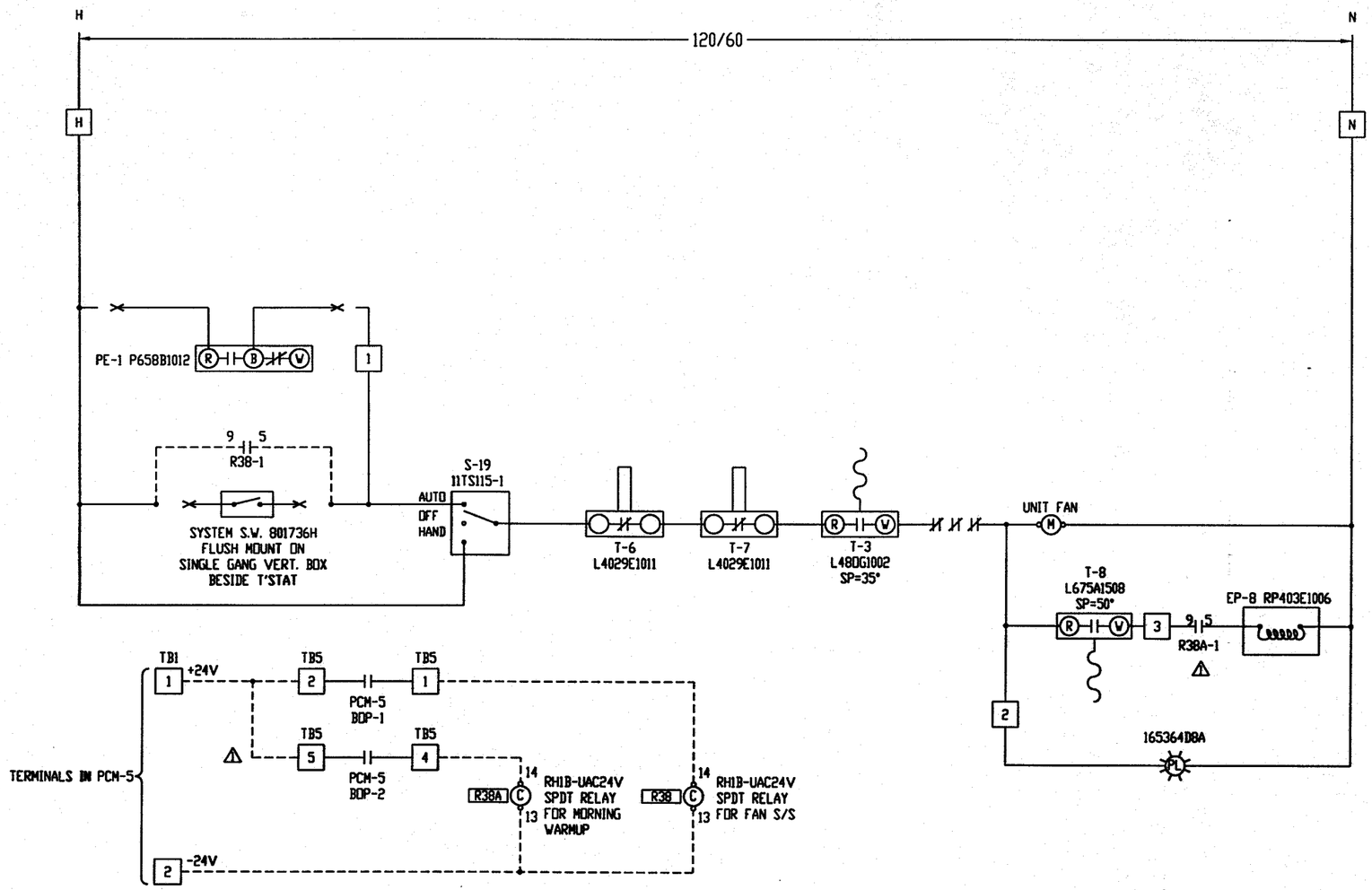
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 37 OF 51



AHU-6 INTERLOCK WIRING DIAGRAM

- EXISTING CONTROL PANEL -

AHU-6 POINTS LIST FOR PCM-5. S/N# E98E06413

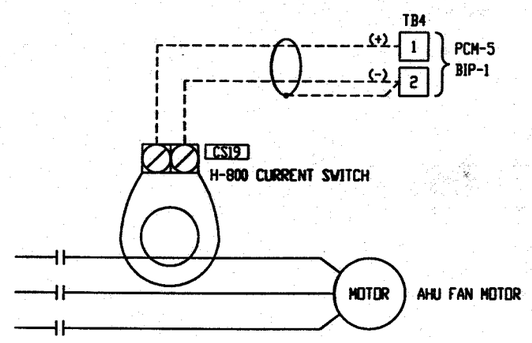
- SERVING AHU-6 -

AIP-1 MIXED AIR TEMPERATURE MAT-6.
AIP-2 AUDITORIUM 142 TEMPERATURE ST-10.
AIP-3 SPARE

AOP-1 VALVE CONTROL EPT-22.
AOP-2 SPARE

BIP-1 FAN STATUS CS-19.
BIP-2 SPARE

BOP-1 FAN START/STOP R-38.
⚠ BOP-2 M.V. RELAY
BOP-3 SPARE



FAN STATUS SWITCH

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MIAN AIR
- x INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

LEGEND

_____ INDICATES FACTORY WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: IL-DWG3

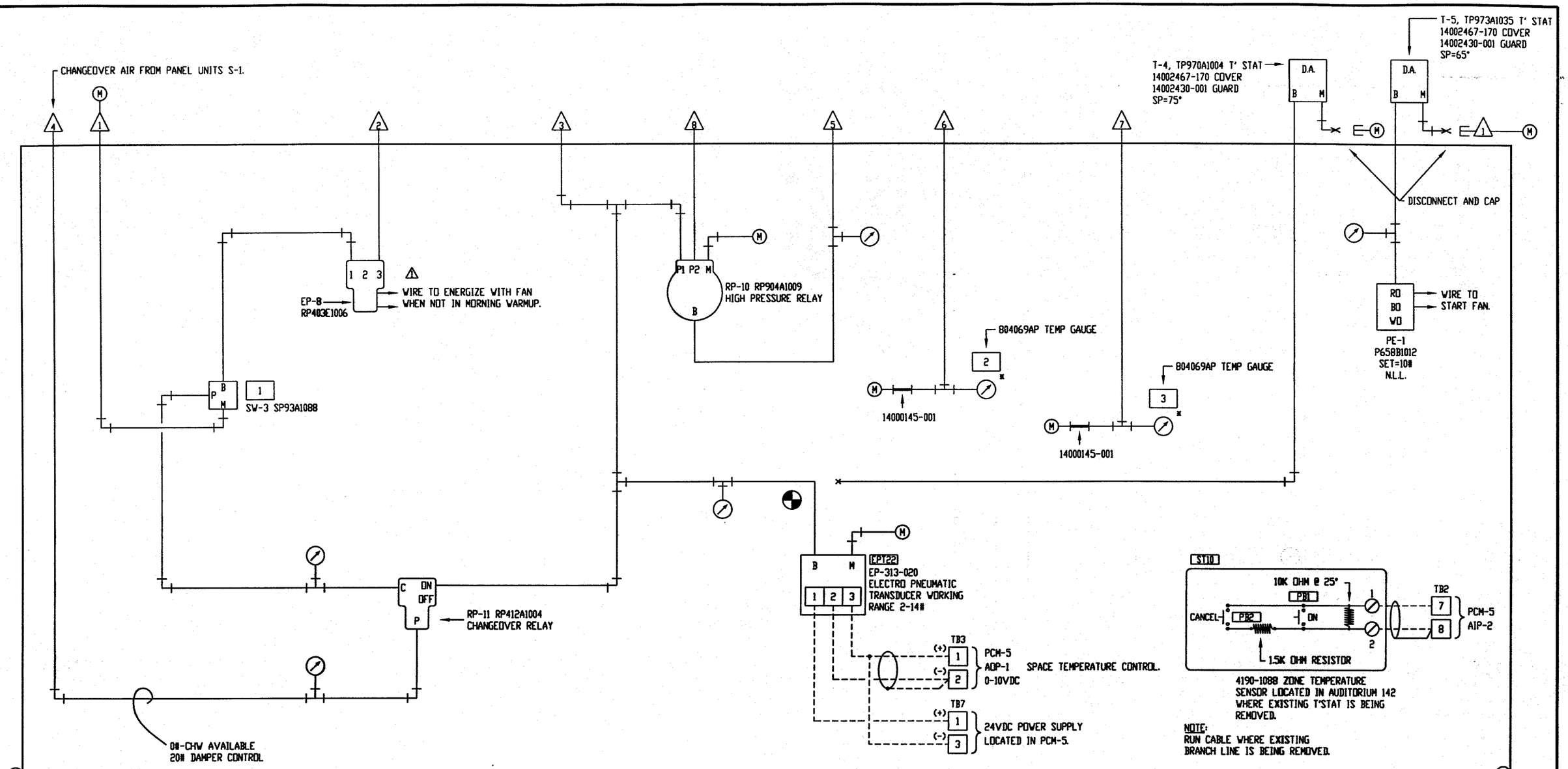
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	⚠	AS-BUILT	4/9/99	CVF

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/8/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 38 OF 51



AHU-6 PANEL PNEUMATIC SCHEMATIC

- EXISTING CONTROL PANEL -

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ⁎ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

1. MIN. OA DAMPER POSITION
2. SUPPLY AIR TEMP.
3. RETURN AIR TEMP.

TRANE
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CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU6-P

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	1	AS-BUILT	4/9/99	CVF

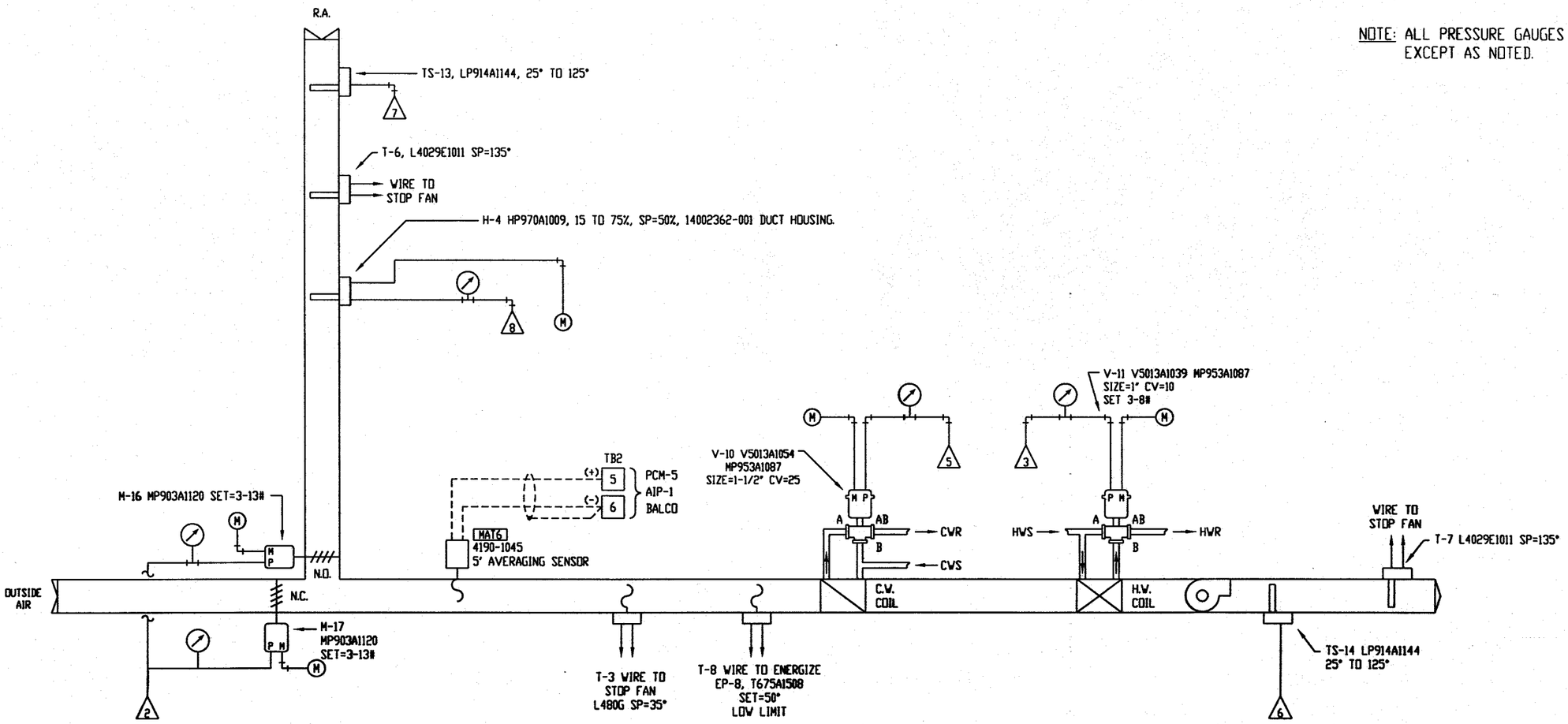
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/2/98
CCR	CVF	CVF	DPC	

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 39 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-6 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ▪ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-6

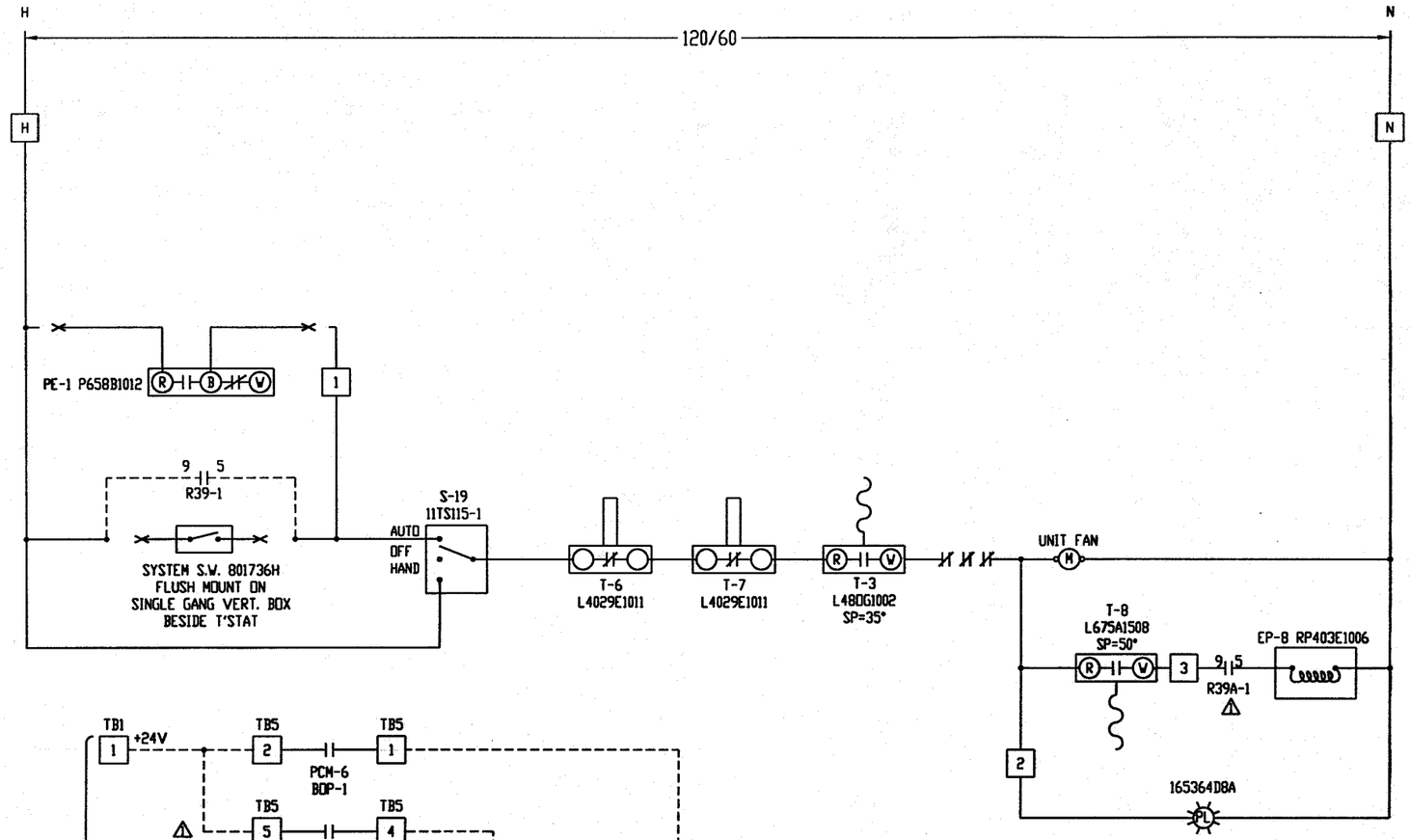
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

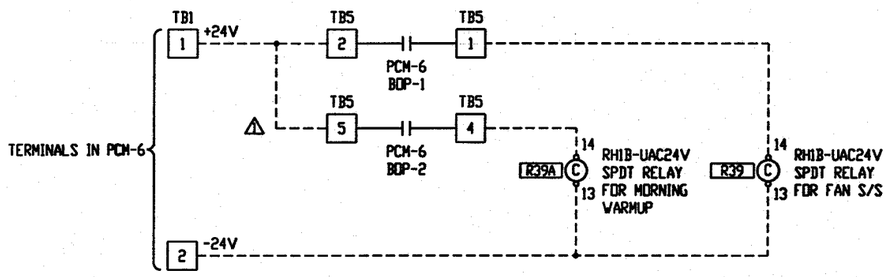
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 40 OF 51





AHU-7 INTERLOCK WIRING DIAGRAM

- EXISTING CONTROL PANEL -

AHU-7 POINTS LIST FOR PCM-6

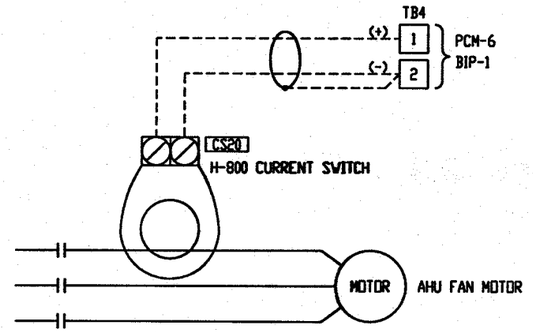
- SERVING AHU-7 -

AIP-1 MIXED AIR TEMPERATURE MAT-7.
AIP-2 AUDITORIUM 142 TEMPERATURE ST-11.
AIP-3 SPARE

AOP-1 VALVE CONTROL EPT-23.
AOP-2 SPARE

BIP-1 FAN STATUS CS-20.
BIP-2 SPARE

BOP-1 FAN START/STOP R-39.
⚠ BOP-2 M.V. RELAY
BOP-3 SPARE



FAN STATUS SWITCH

LEGEND
■ THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
■ THIS COLOR IS INDICATING TO BE REMOVED.
■ THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
■ THIS COLOR IS INDICATING NEW TO BE ADDED.
(M) MIAN AIR
* INDICATES GAUGE MOUNTED ON PANEL FACE.
CONNECT TO EXISTING

LEGEND
_____ INDICATES EXISTING WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: L-DWG4

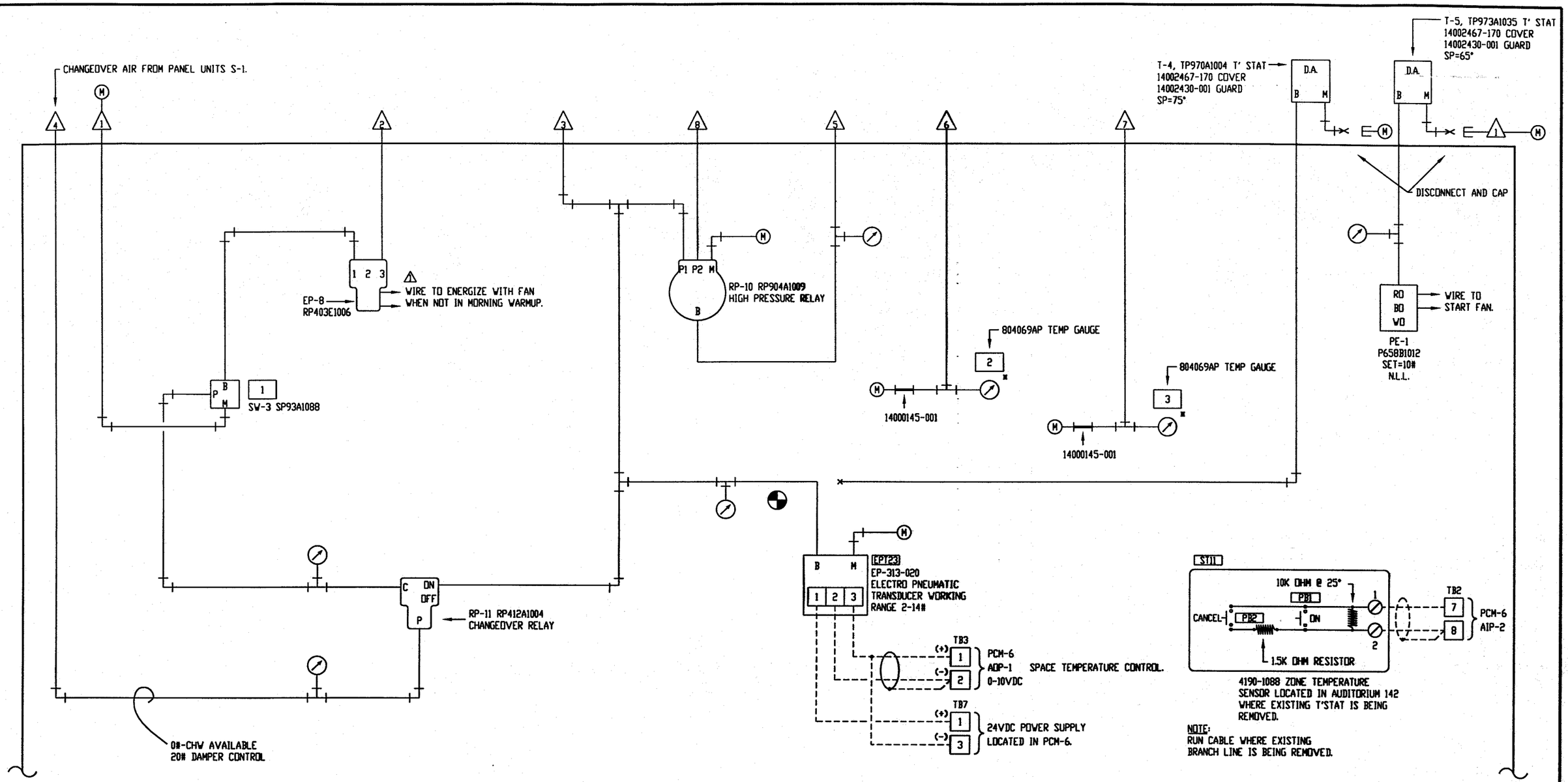
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	⚠	AS-BUILT	4/9/99	CVF

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/8/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 41 OF 51



AHU-7 PANEL PNEUMATIC SCHEMATIC

- EXISTING CONTROL PANEL -

LEGEND
■ THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
■ THIS COLOR IS INDICATING TO BE REMOVED.
■ THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
■ THIS COLOR IS INDICATING NEW TO BE ADDED.
(M) MAIN AIR
x INDICATES GAUGE MOUNTED ON PANEL FACE.
CONNECT TO EXISTING

[1] MIN. OA DAMPER POSITION

[2] SUPPLY AIR TEMP.

[3] RETURN AIR TEMP.

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU7-P

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	1	AS-BUILT	4/9/99	CVF

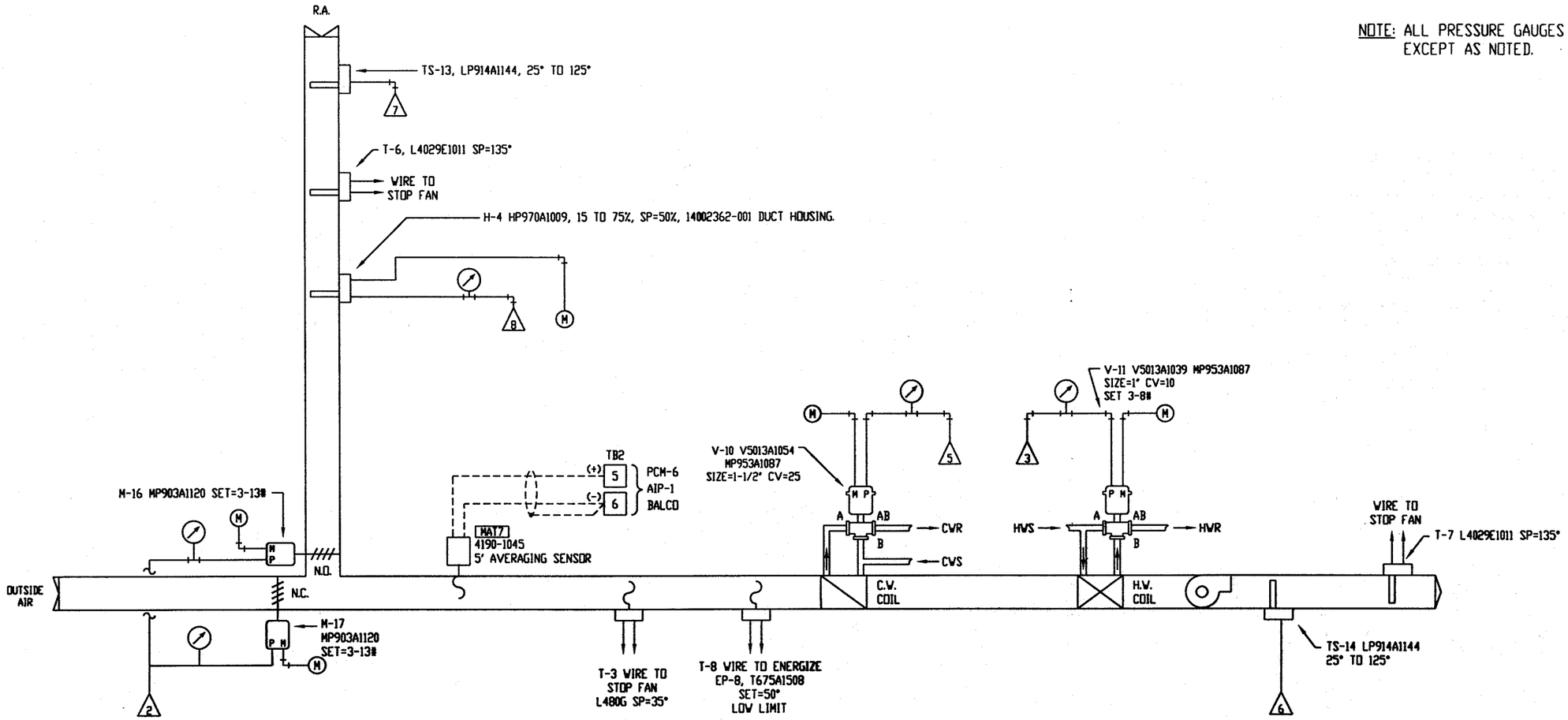
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/2/98
CCR	CVF	CVF	DPC	

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 42 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-7 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-7

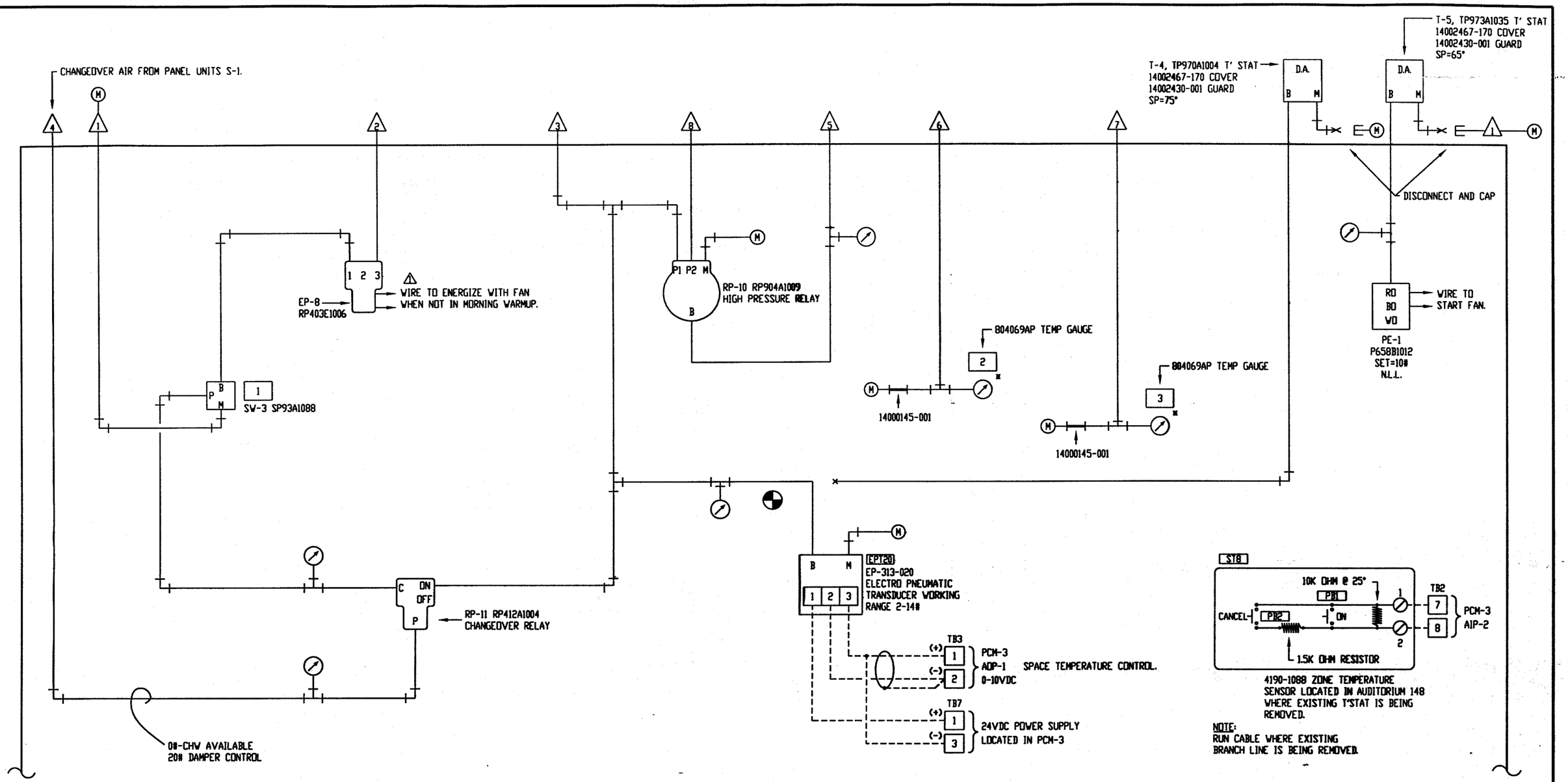
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CDR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 43 OF 51



AHU-8 PANEL PNEUMATIC SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ⁂ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

1. MIN. OA DAMPER POSITION
2. SUPPLY AIR TEMP.
3. RETURN AIR TEMP.

LEGEND

_____ INDICATES EXISTING WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU8-P

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	1	AS-BUILT	4/9/99	CVF

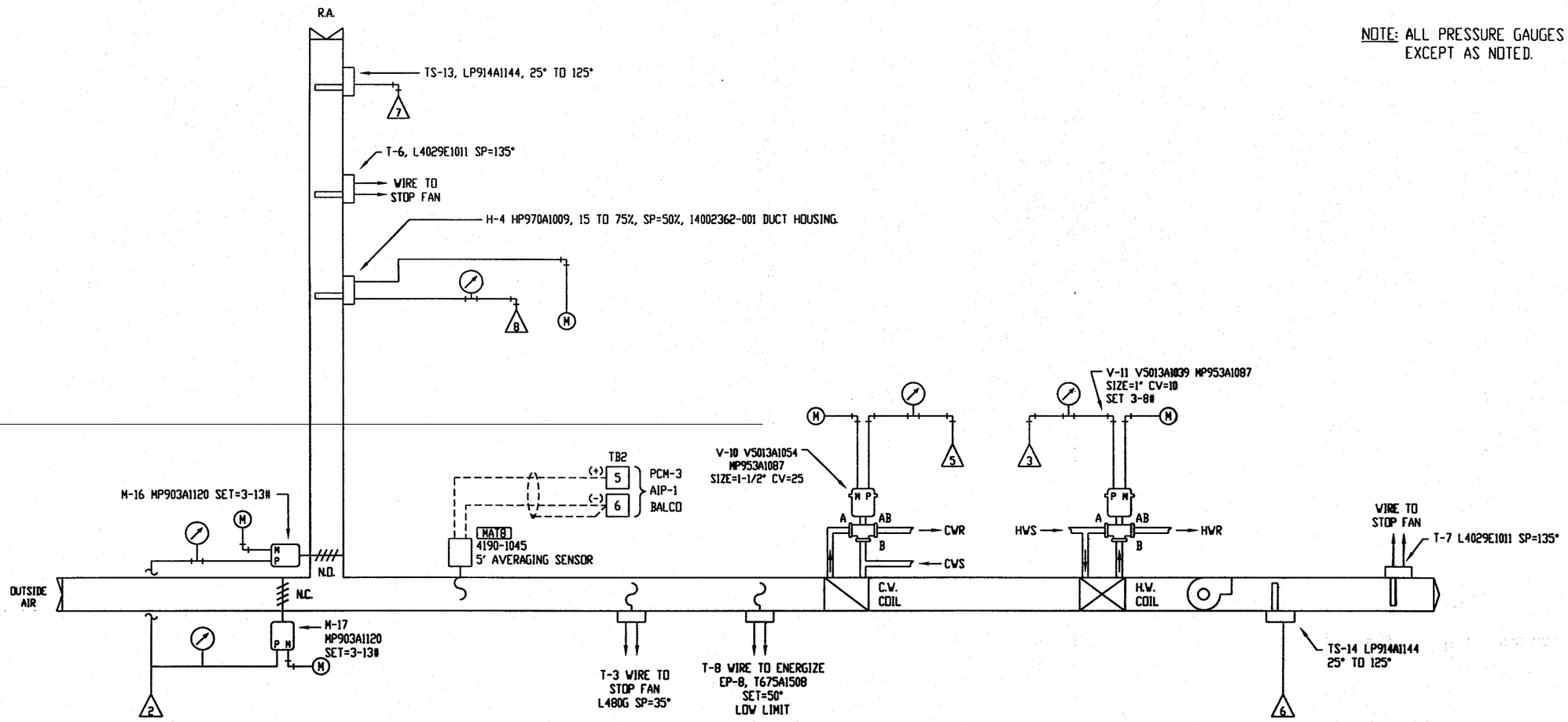
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 45 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-8 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ✖ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-8

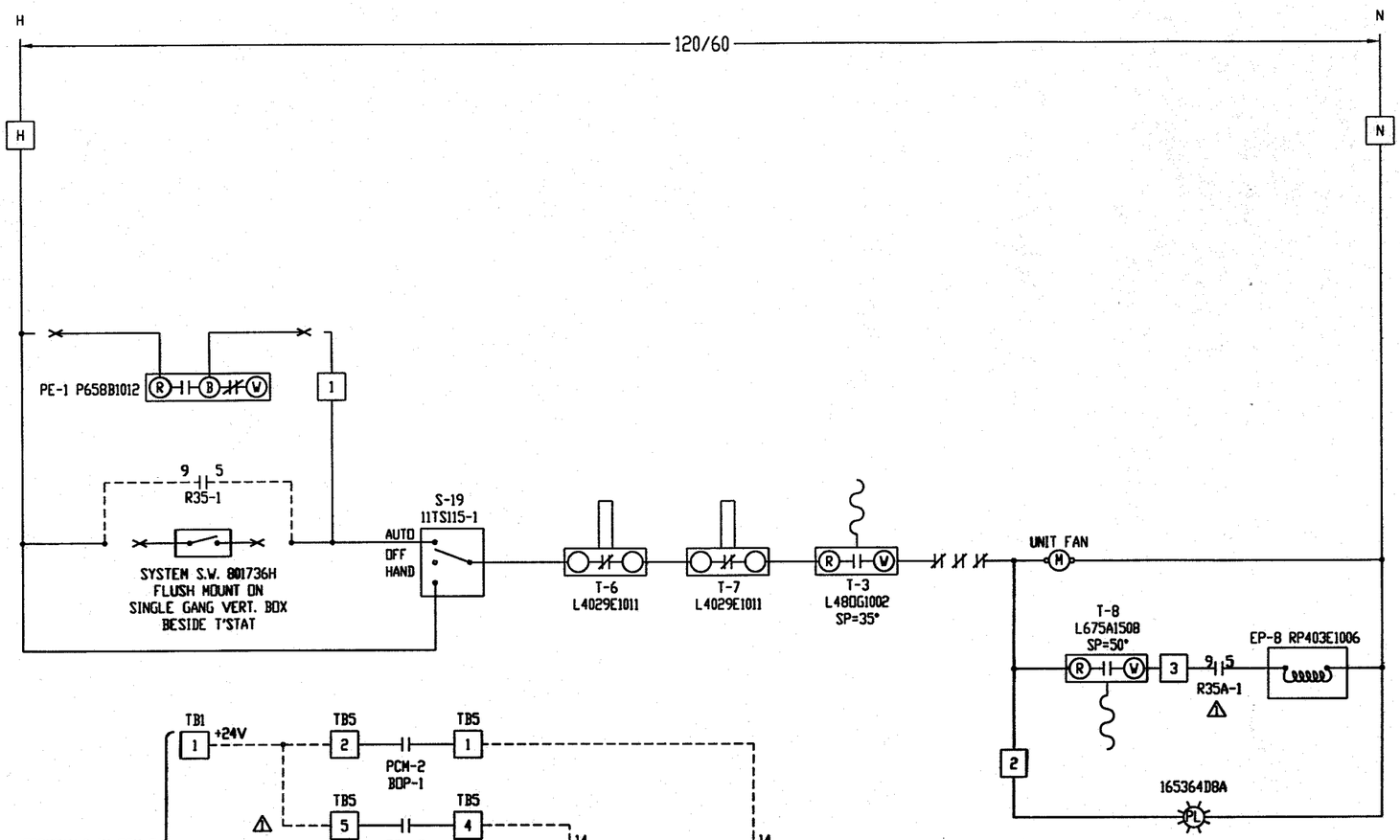
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 46 OF 51



AUU-9 INTERLOCK WIRING DIAGRAM

- EXISTING CONTROL PANEL -

AHU-9 POINTS LIST FOR PCM-2. S/N# E98E06412

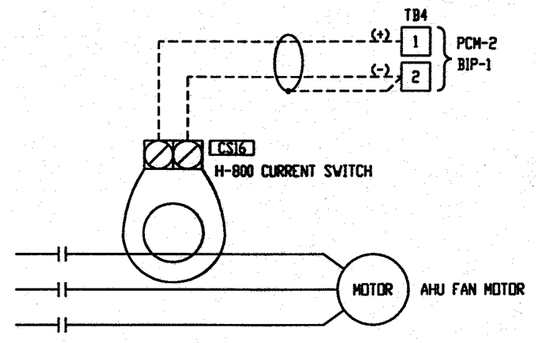
- SERVING AHU-9 -

AIP-1 MIXED AIR TEMPERATURE MAT-9.
AIP-2 AUDITORIUM 148 TEMPERATURE ST-7.
AIP-3 SPARE

AOP-1 VALVE CONTROL EPT-19.
AOP-2 SPARE

BIP-1 FAN STATUS CS-16.
BIP-2 SPARE

BOP-1 FAN START/STOP R-35.
⚠ BOP-2 M.V. RELAY
BOP-3 SPARE



FAN STATUS SWITCH

LEGEND

- ■ THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- ■ THIS COLOR IS INDICATING TO BE REMOVED.
- ■ THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- ■ THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MIAN AIR
- x INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

LEGEND

_____ INDICATES EXISTING WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: IL-DWGS

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	⚠	AS-BUILT	4/9/99	CVF

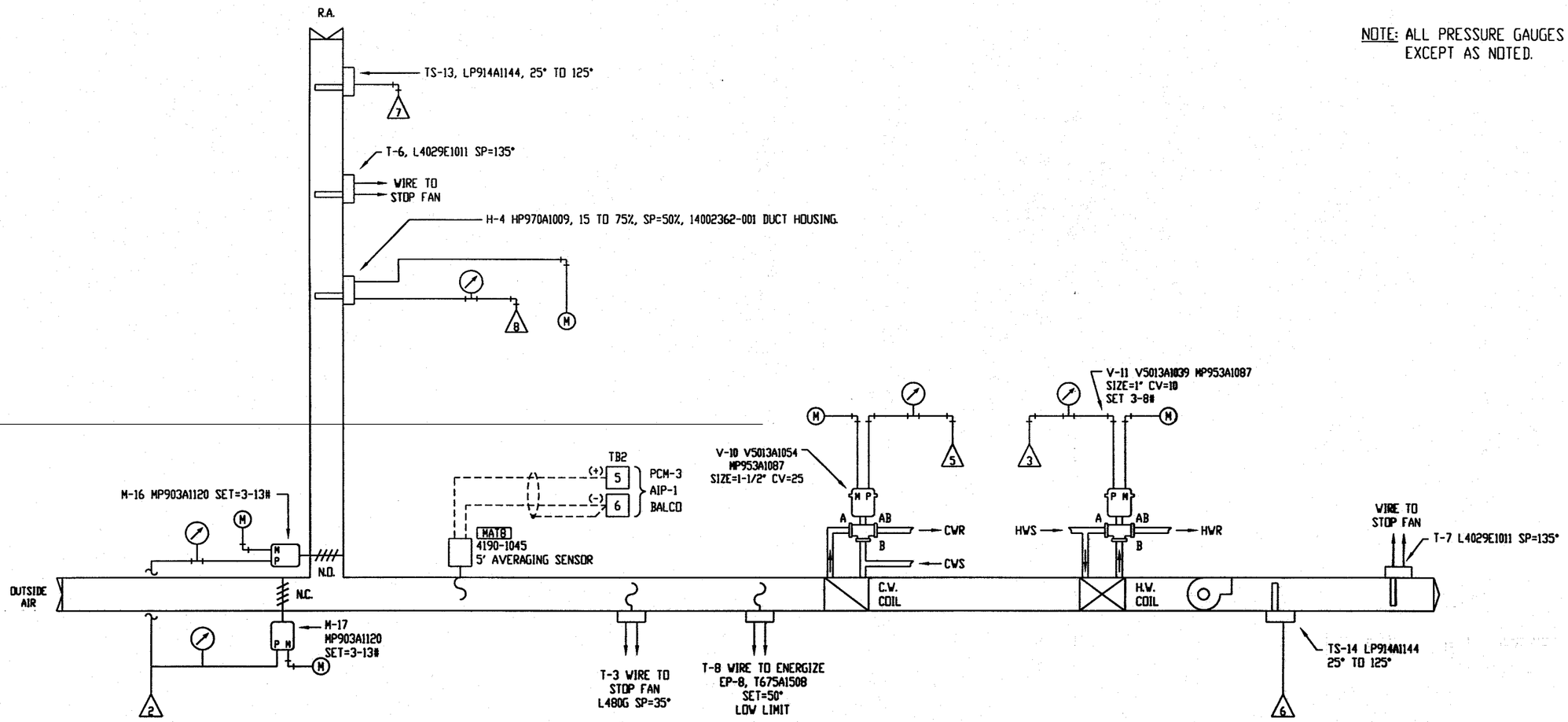
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/8/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 47 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-8 AIR FLOW SCHEMATIC

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ✖ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-8

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

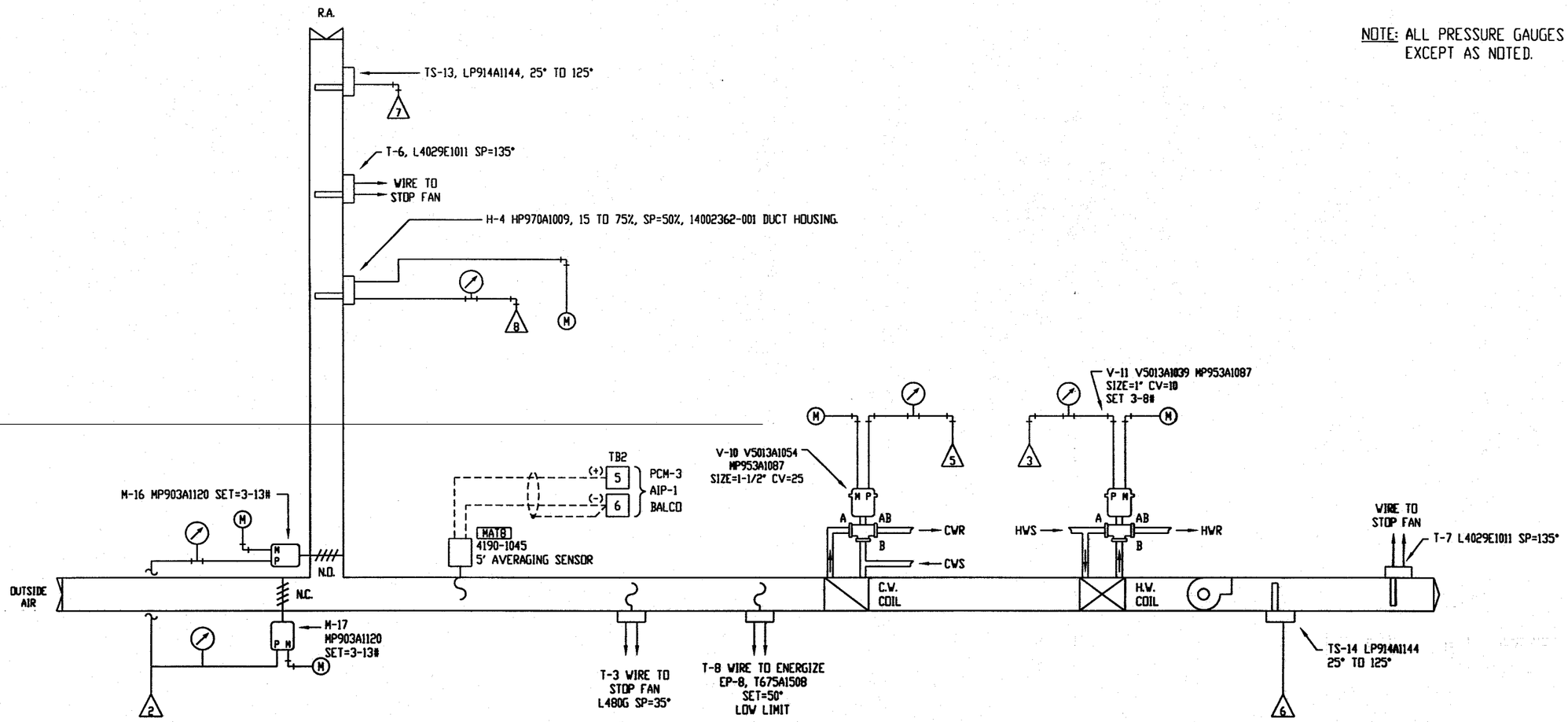
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 46 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



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- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- ✖ INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

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704 525 3155

FILE: AHU-8

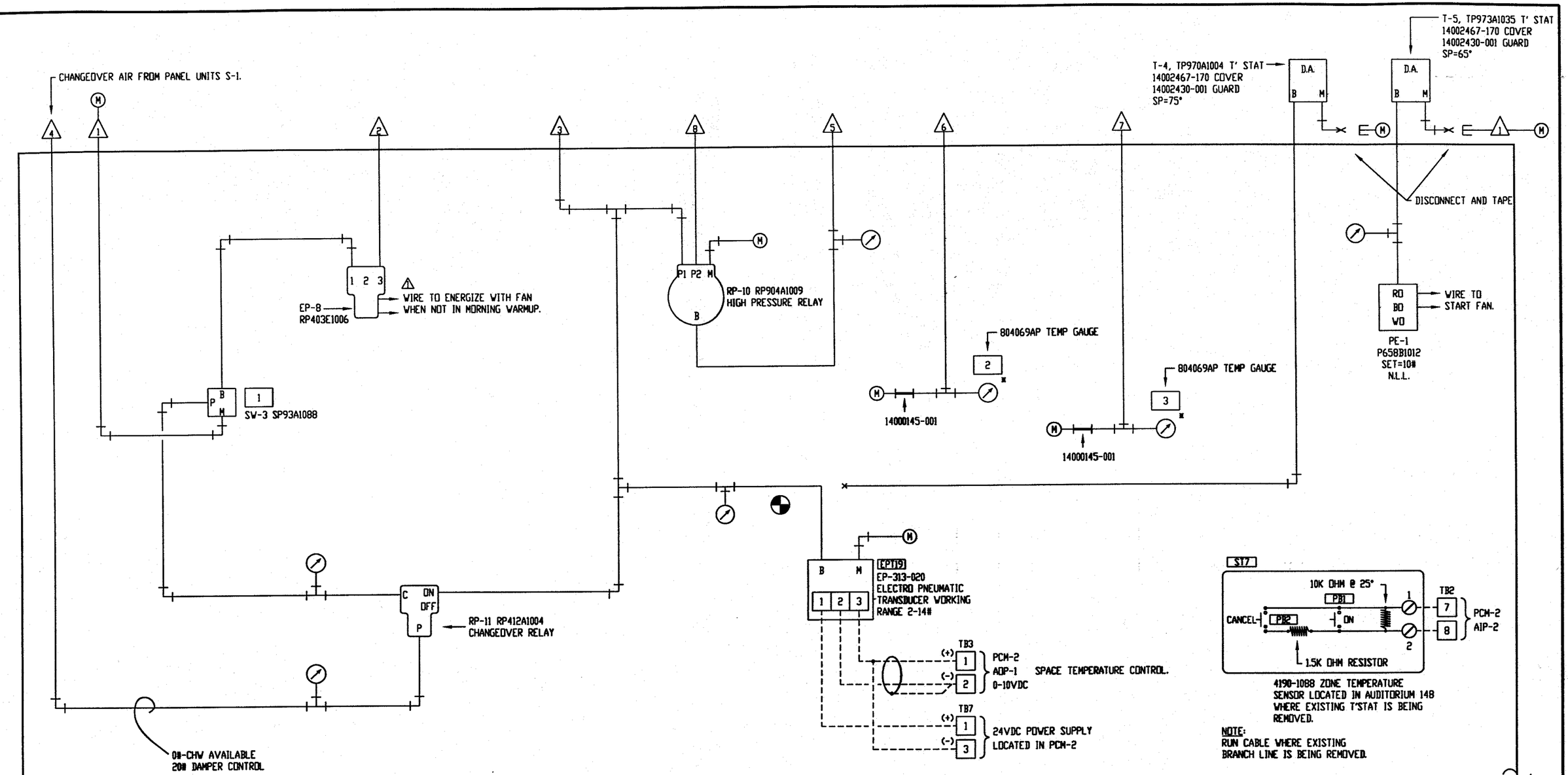
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 46 OF 51



AHU-9 PANEL PNEUMATIC SCHEMATIC

- EXISTING CONTROL PANEL -

LEGEND

- THIS COLOR IS INDICATING EXISTING, TO REMAIN AS IS.
- THIS COLOR IS INDICATING TO BE REMOVED.
- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- * INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

1. MIN. OA DAMPER POSITION
2. SUPPLY AIR TEMP.
3. RETURN AIR TEMP.

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801 PRESSLEY RD
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704 525 3155

FILE: AHU9-P

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY
	⚠	AS-BUILT	4/9/99	CVF

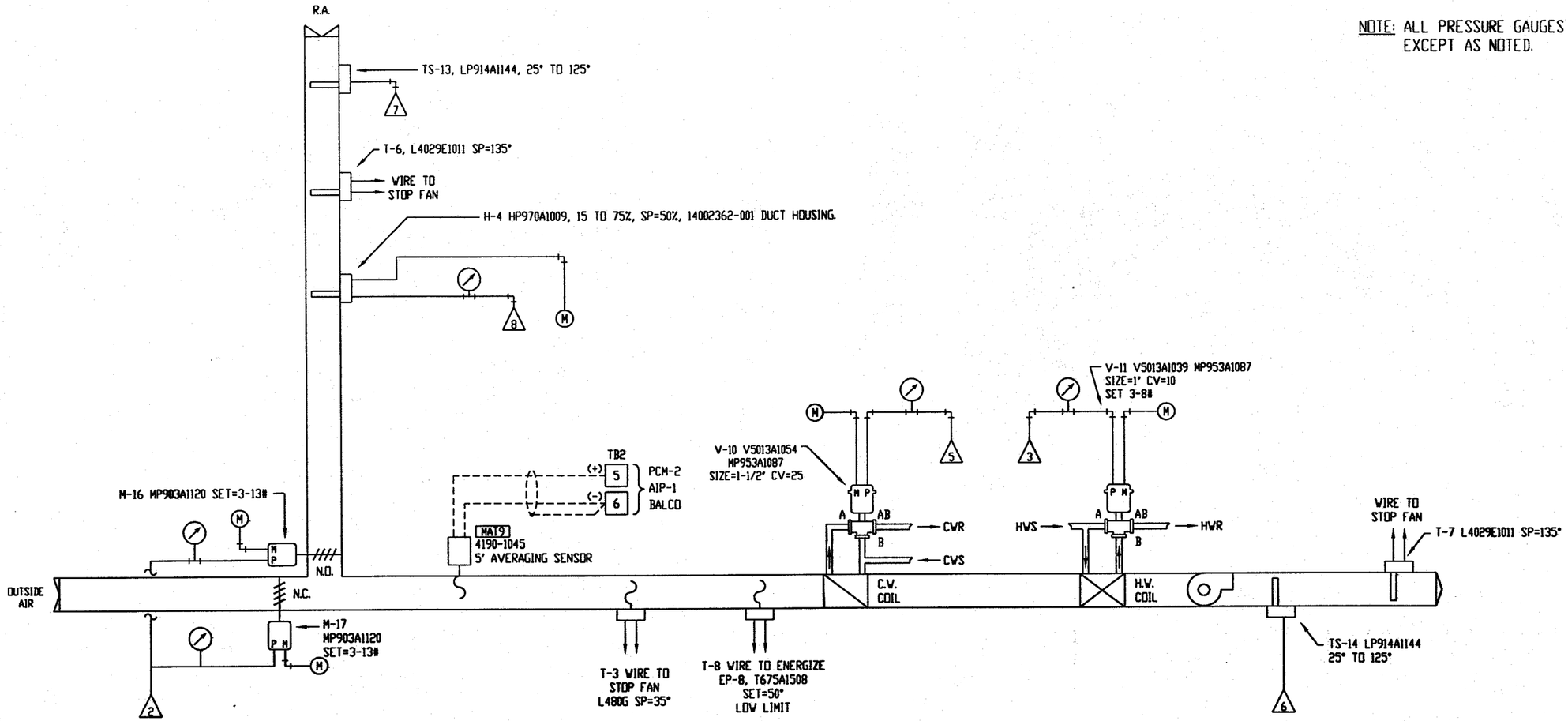
SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE: 4/2/98
CCR	CVF	CVF	DPC	

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina

CONTRACT NUMBER: ICS-98014

DRAWING NUMBER: SHEET 48 OF 51

NOTE: ALL PRESSURE GAUGES 305909, 0 TO 30# RANGE EXCEPT AS NOTED.



AHU-9 AIR FLOW SCHEMATIC

LEGEND

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- THIS COLOR IS INDICATING TO BE ABANDONED IN PLACE.
- THIS COLOR IS INDICATING NEW TO BE ADDED.
- (M) MAIN AIR
- x INDICATES GAUGE MOUNTED ON PANEL FACE.
- CONNECT TO EXISTING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: AHU-9

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CDR	CVF	CVF	DPC	4/2/98

PROJECT NAME: UNCC-McEniry, Charlotte, North Carolina
CONTRACT NUMBER: ICS-98014
DRAWING NUMBER: SHEET 49 OF 51

DEVICE ID	BCU DIP SWITCH SETTINGS							
	S2-1	S2-2	S2-3	S2-4	S2-5	S2-6	S2-7	S2-8
05	OFF	ON	OFF	ON	ON	ON	ON	ON

BCU ADDRESSES

UNIT	UCM ADDRESS	UNIVERSAL PCN SW1 DIP SWITCH SETTINGS						
		1	2	3	4	5	6	7
UPCM-1	32	OFF	OFF	OFF	OFF	OFF	ON	OFF
UPCM-2	33	ON	OFF	OFF	OFF	OFF	ON	OFF
UPCM-3	34	OFF	ON	OFF	OFF	OFF	ON	OFF
UPCM-4	35	ON	ON	OFF	OFF	OFF	ON	OFF
UPCM-5	36	OFF	OFF	ON	OFF	OFF	ON	OFF

UPCM ADDRESSES

- BCU-5 LINK-1 -

UNIT #	UCM ADDRESS	PCN DIP SWITCH SETTINGS							
		S2-1	S2-2	S2-3	S2-4	S2-5	S2-6	S2-7	S2-8
PCM-1	1	OFF	ON	ON	ON	ON	ON	OFF	OFF
PCM-2	2	ON	OFF	ON	ON	ON	ON	OFF	OFF
PCM-3	3	OFF	OFF	ON	ON	ON	ON	OFF	OFF
PCM-4	4	ON	ON	OFF	ON	ON	ON	OFF	OFF
PCM-5	5	OFF	ON	OFF	ON	ON	ON	OFF	OFF
PCM-6	6	ON	OFF	OFF	ON	ON	ON	OFF	OFF

PCM ADDRESSES

- BCU-5 LINK-2 -

LEGEND

_____ INDICATES FACTORY WIRING

_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: ADD

REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	
CCR	CVF	CVF	DPC	DATE: 5/8/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

CONTRACT NUMBER
ICS-98014

DRAWING NUMBER
SHEET 50 OF 51

Sequence of Operations

Dual Duct Units (AHU S1, S2, & S3)

The unit will run whenever a occupied signal from a time of day schedule is received, timed override request is made, or any zone temperature falls below the night setback setpoint. The time of day schedule is adjustable through the front end computer. The time of day schedule has the ability to perform optimal start and optimal stop. The timed override request is generated by pushing the "on" button on any zone sensor. The timed override period will last for two hours. The timed override amount can be changed through the front end to any desired value. The timed override request can be cancel at any time by pushing the "cancel" button on any zone thermostat. The timed override periods will be trended.
The unit will start the return fan first, then open the minimum outside air damper, and finally start the supply fan. If the outdoor air enthalpy is below the changeover setpoint, the unit will use outdoor air for cooling. When in 'free cooling' mode, the unit will modulate the return, outdoor, and relief dampers to maintain a mixed air temperature of 52 degrees. If the mixed air temperature were to fall below 45 degrees, the maximum outdoor air dampers will go fully closed. If the unit is in the 'mechanical cooling' mode, then the chilled water valve will modulate to maintain a cold deck temperature of 55 degrees. The chilled water valve will be added in the future by the owner; however, the programming will already be in place. Until the chilled water valve is installed, when in 'mechanical cooling' then unit will have whatever cooling is available from the chilled water system. The steam valves will modulate to maintain a hot deck discharge setpoint. The hot deck discharge setpoint is reset on the following schedule. If the outdoor air temperature is 10 degrees or below the setpoint will be 120 degrees and if the outdoor air temperature is 80 degrees or above the setpoint will be 80 degrees. The setpoint will vary linearly between those two values as the outdoor air temperature changes.
The humidifier valve will modulate to maintain a minimum space relative humidity of 35 percent. If the humidity in the supply duct exceeds 95 percent, the humidifier valve will close.
The unit will shut-down on a safety if the mixed air temperature falls below 40 degrees or a smoke detector in the return or supply air stream activates.

Single Zone Air Handling Units (AHU's 4,5,6,7,8, and 9)

The unit will run whenever a occupied signal from a time of day schedule is received, timed override request is made, or any zone temperature falls below the night setback setpoint. The time of day schedule is adjustable through the front end computer. The time of day schedule has the ability to perform optimal start and optimal stop. The timed override request is generated by pushing the "on" button on any zone sensor. The timed override period will last for two hours. The timed override amount can be changed through the front end to any desired value. The timed override request can be cancel at any time by pushing the "cancel" button on any zone thermostat. The timed override periods will be trended.
If the outdoor air enthalpy is below the changeover setpoint, the unit will use outdoor air for cooling. When in 'free cooling' mode, the unit will modulate the return and outdoor dampers to maintain space temperature at setpoint if a cooling load is present. If the mixed air temperature were to fall below 45 degrees, the outdoor air damper will go to its minimum position. If the unit is in the 'mechanical cooling' mode, then the chilled water valve will modulate to maintain the space temperature at setpoint if a cooling load is present.
The hot water valve will modulate to maintain the space temperature at setpoint if a heating load is present.
The humidifier valve will modulate to maintain the return air relative humidity at 50 percent. If the humidity exceeds 50 percent, the chilled water valve will modulate open to dehumidify the air the hot water valve will modulate open to reheat the air.
The unit will shut-down on a safety if the mixed air temperature falls below 40 degrees, a smoke detector in the return or supply air stream activates or the high limit sensor in the supply air stream trips.

Animal Laboratory Unit (AHU 10)

The unit will run whenever a occupied signal from a time of day schedule is received, timed override request is made, or any zone temperature falls below the night setback setpoint. The time of day schedule is adjustable through the front end computer. The time of day schedule has the ability to perform optimal start and optimal stop. The timed override request is generated by pushing the "on" button on any zone sensor. The timed override period will last for two hours. The timed override amount can be changed through the front end to any desired value. The timed override request can be cancel at any time by pushing the "cancel" button on any zone thermostat. The timed override periods will be trended.
The unit will open the outside air damper first then start the supply fan.
The chilled water valve will modulate to maintain the discharge air temperature at 55 degrees. The steam valve will modulate to maintain the heating coil discharge temperature at 52 degrees.
The unit will shut-down on a safety if the mixed air temperature falls below 40 degrees or the high limit sensor in the supply air stream trips.

Chiller Plant

If any air handling unit is running and the outdoor air enthalpy is above 18 btu/lb then the chiller plant will be enabled. If the outdoor air enthalpy falls below 17 btu/lb then the changeover relay will be energized enabling air handling units to use outdoor air for cooling and disabling chiller plant operations.
The chillers will lead/lag weekly. The lead chiller will start when the chiller plant is enabled. The chiller will not run until chilled and condenser water flow has been proven. The inlet vanes on the chiller will modulate to maintain a chilled water return temperature of 55 degrees. If the lead chillers vanes are open at 85 percent or greater for 10 continuous minutes, the lag chiller will start. The lead chiller will unload it vanes to 40 percent. Both chillers will hold their vanes at 40 percent for 3 minutes to equalize load, then both of the chillers vanes will modulate together to maintain the lead chillers return water temperature at 55 degrees. If the vanes on both chillers are at 40 percent or less for 10 continuous minutes, the lag chiller will be stopped and the lead chiller will assume the load.
The cooling tower fan will stage both of its stages to maintain a condenser water entering temperature at the lead chiller of 75 degrees.

Steam Plant

If any air handling unit is running and the outdoor air temperature is below 75 degrees, the steam or hot water valve on any unit is open greater than 5 percent, or the outdoor air temperature is below 35 degrees the boiler and hot water pump will run. The steam valves on the hot water converter will modulate to maintain the hot water supply temperature at setpoint. The hot water supply setpoint will vary between 180 degrees when the outdoor air temperature is 0 degrees or less and 90 degrees when the outdoor air temperature is 70 degrees or greater. The setpoint will vary linearly as the outdoor air temperature changes.

Installation Notes:

1. No work shall be done outside of the mechanical rooms while school is in session.
2. No unit, chiller, or boiler shall be down during exam week.
3. Run all wire in conduit. Run conduit only in approved areas due to osbestos.
4. Devices removed are to be returned to the owner.
5. Schedule all unit down times with owner.
6. Run wiring for space thermostats and humidity sensors inside of the wall. Wire mold to be used only when approved by owner.
7. Bring to the attention of the owner any existing wiring or pneumatic tubing that may be a safety or operational concern.

Checkout Notes:

1. No checkout to occur while school is in session.
2. Changeover one complete unit at a time. Do not start checkout on a second unit until the first unit is fully operational in the automatic mode.
3. Schedule any down time with the owner. Any animal lab unit work should be scheduled with the owner.
4. All existing devices being utilized shall be checked for proper operation. Bring to the attention of the owner any device that may be a safety or operational concern.

LEGEND

_____ INDICATES FACTORY WIRING
_ _ _ _ _ INDICATES FIELD WIRING

TRANE
LAYNE TRANE
801 PRESSLEY RD
CHARLOTTE, N.C. 28217
704 525 3155

FILE: SEQ

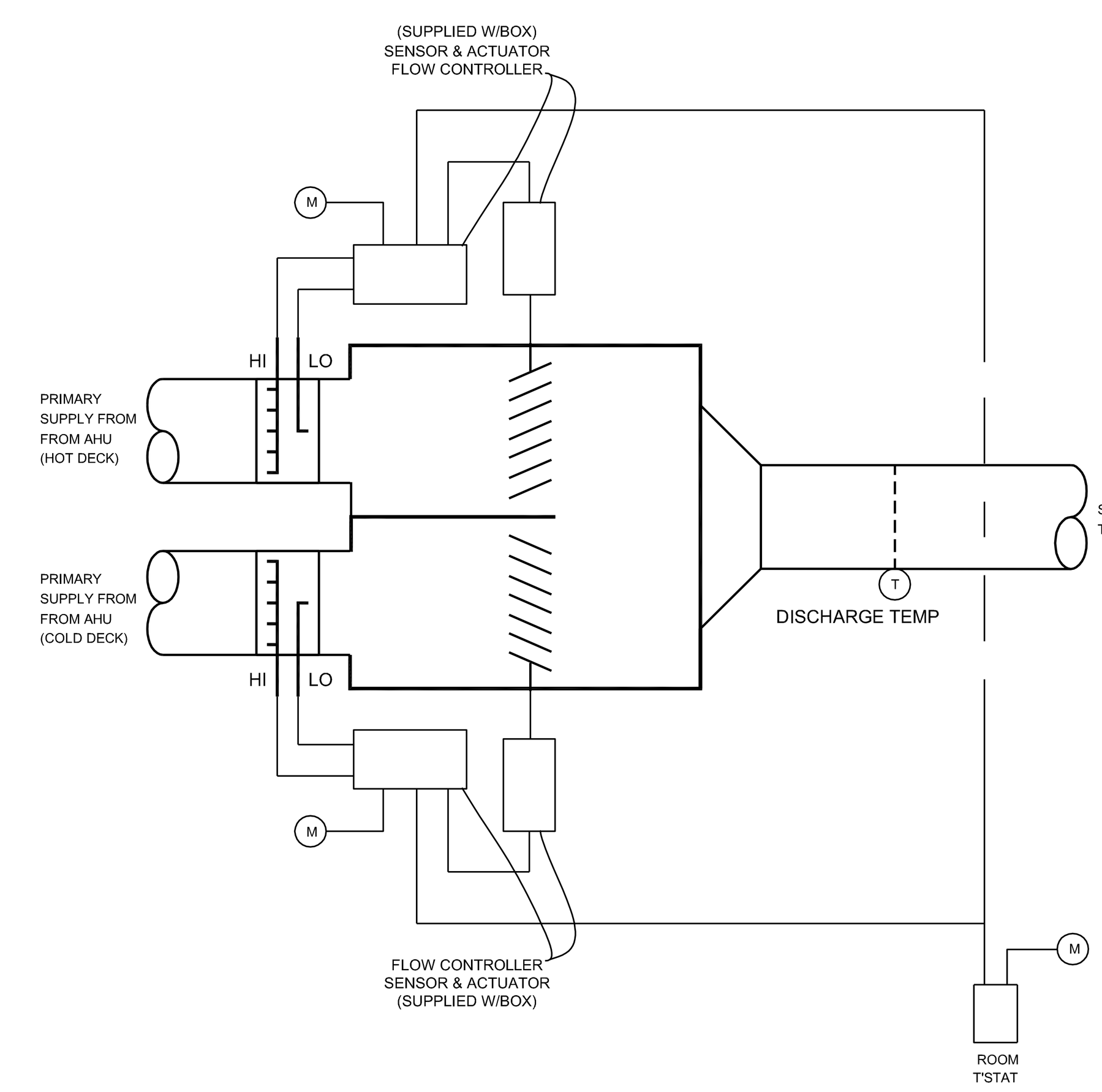
REFERENCE DRAWING	NO.	REVISION-LOCATION	DATE	BY

SALES ENGR.	PROJ. MGR.	APPL. ENGR.	DRAWN BY	DATE
CCR	CVF	CVF	DPC	5/11/98

PROJECT NAME
UNCC-McEniry
Charlotte, North Carolina

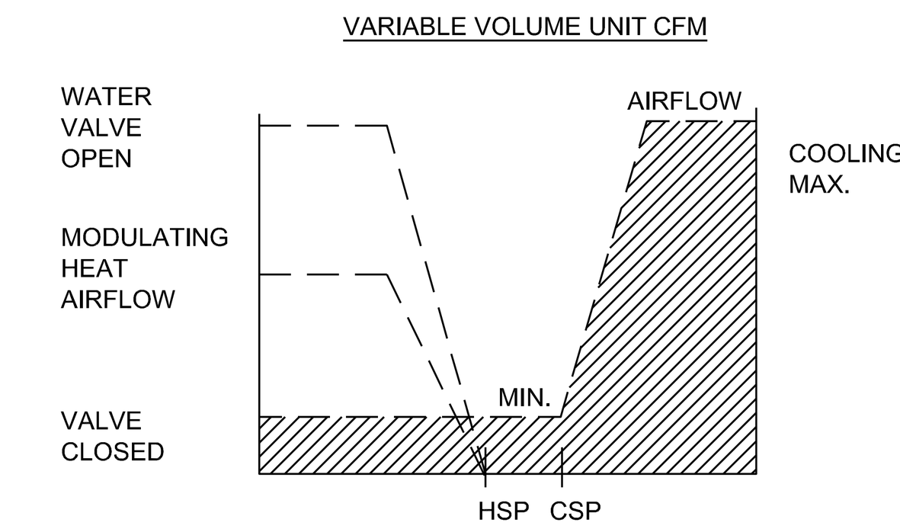
CONTRACT NUMBER
ICS-98014

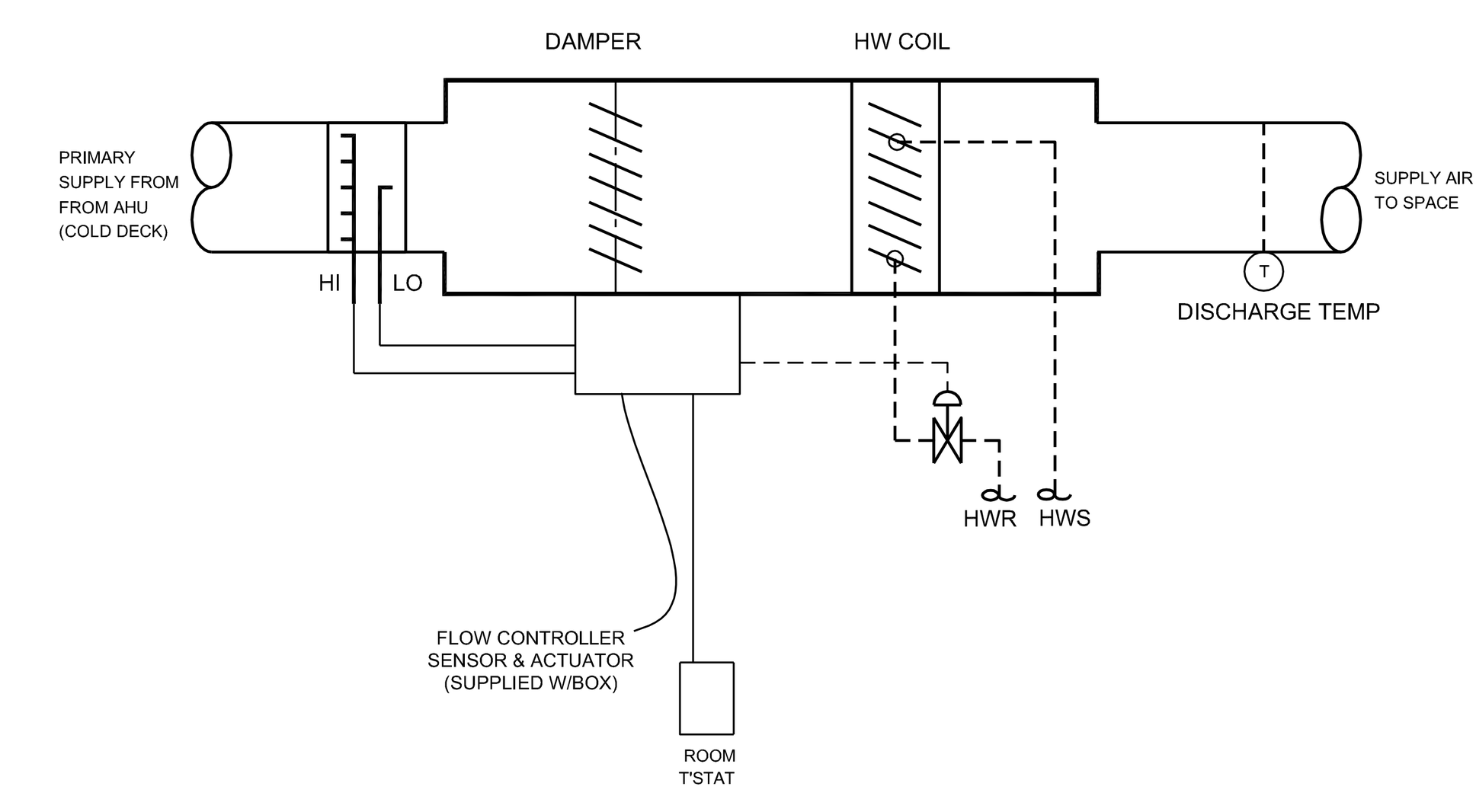
DRAWING NUMBER
SHEET 51 OF 51



1 / M203 — DUAL DUCT VAV BOX

SCALE : NOT TO SCALE





2 / M203 — VAV BOX WITH REHEAT

SCALE : NOT TO SCALE

SYSTEM POINTS LIST

SYSTEM POINT DESCRIPTION: VAV AND DUAL DUCT VAV TERMINAL UNITS

ANALOG

VAV AND DUAL DUCT VAV TERMINAL UNITS	GRAPHIC	INPUT: TEMPERATURE	AMPS	RPM	KW	VOLTS	HERTZ	PERCENT	CFM	SETPOINT	CO2 PPM	OUTPUT: DDC (4-20 ma,0-10 VDC)		SET POINT ADJ.
ZONE TEMP	X	X												
HEATING SETPOINT	X											X		X
COOLING SETPOINT	X											X		X
CFM	X								X			X		
MAX COOLING CFM														X
MIN COOLING CFM														X
HEATING MAX CFM														X
HEATING MIN CFM (DUAL DUCT ONLY)														X
HEAT STATUS	X													
DISCHARGE TEMP.	X	X												
UNOCCUPIED HTG. SETPOINT	X													X
UNOCCUPIED CLG. SETPOINT	X													X
HEAT OVERIDE														
CONTROL OFFSET														
CALIBRATION														

BINARY

VAV AND DUAL DUCT VAV TERMINAL UNITS	INPUT: PNEU. TRANSDUCER	STATUS ON/OFF	FILTER STATUS	STATUS OPEN/CLSD	STATUS	NO. OF STARTS	TIMED OVERRIDE	OUTPUT: OFF/ON	OPEN/CLOSED	LOCK OUT	ENABLE/ DISABLE		
ZONE TEMP													
HEATING SETPOINT													
COOLING SETPOINT													
CFM													
MAX COOLING CFM													
MIN COOLING CFM													
HEATING MAX CFM													
HEATING MIN CFM (DUAL DUCT ONLY)													
HEAT STATUS		X											
DISCHARGE TEMP.													
UNOCCUPIED HTG. SETPOINT													
UNOCCUPIED CLG. SETPOINT													
HEAT OVERIDE								X					
CONTROL OFFSET													
CALIBRATION													

SYSTEM FEATURES — ALARMS

VAV AND DUAL DUCT VAV TERMINAL UNITS	HIGH ANALOG	LOW ANALOG	BINARY		PROOF	SENSOR FAIL	FLOW FAIL	COMM. FAIL	
ZONE TEMP	X	X				X		X	
HEATING SETPOINT									
COOLING SETPOINT									
CFM							X		
MAX COOLING CFM									
MIN COOLING CFM									
HEATING MAX CFM									
HEATING MIN CFM (DUAL DUCT ONLY)									
HEAT STATUS	X	X				X			
DISCHARGE TEMP.									
UNOCCUPIED HTG. SETPOINT									
UNOCCUPIED CLG. SETPOINT									
HEAT OVERIDE									
CONTROL OFFSET									
CALIBRATION									

SYSTEM FEATURES — PROGRAMS

VAV AND DUAL DUCT VAV TERMINAL UNITS	DIAGNOSTICS	TIME SCHEDULING	DEMAND LIMITING	OPT. START/STOP	RESET	EVENT PROGRAM	DDC	ALARM INSTRUCT	MAINT. WK. ORDER	RUN TIME	EXP. MESSAGE	SET BACK/SET UP			CHILLER SEQUENCING	TOTALIZING	TIMED OVERRIDE	NOTES
ZONE TEMP																		
HEATING SETPOINT																		
COOLING SETPOINT																		
CFM																		
MAX COOLING CFM																		
MIN COOLING CFM																		
HEATING MAX CFM																		
HEATING MIN CFM (DUAL DUCT ONLY)																		
HEAT STATUS																		
DISCHARGE TEMP.																		
UNOCCUPIED HTG. SETPOINT																		
UNOCCUPIED CLG. SETPOINT																		
HEAT OVERIDE																		
CONTROL OFFSET																		
CALIBRATION																		

GENERAL NOTES:

1. START/STOP AND 4-20 MA SETPOINT SIGNAL TO BE WIRED TO RESPECTIVE DDC CONTROLS.

DUAL DUCT VARIABLE VOLUME TERMINAL UNIT - SEQUENCE OF OPERATION:

EACH TERMINAL SHALL BE INTERLOCKED TO BE ENERGIZED WHEN ITS ASSOCIATED AIR HANDLER IS ENERGIZED. SUPPLY AIR FROM THE AIR HANDLER SHALL BE DELIVERED TO THE CONDITIONED SPACE THROUGH THE TERMINAL BY A PRESSURE INDEPENDENT VELOCITY CONTROLLER. THE VELOCITY SENSOR SHALL BE LOCATED IN EACH OF THE HOT/COLD DUCT TERMINAL SUPPLY AIR INLETS AND SHALL SENSE AVERAGE AIR VELOCITY AT EACH. THE INDIVIDUAL VALVE CFM AND TOTAL UNIT CFM SHALL BE DISPLAYED ON THE GRAPHIC.

ON A RISE IS SPACE TEMPERATURE TOWARD SETPOINT THE CONTROLLER SHALL MODULATE THE COLD DUCT INLET OPEN TO MAXIMUM COLD DUCT CFM. A FALL IN SPACE TEMPERATURE BELOW THE COOLING SETPOINT SHALL MODULATE THE COOLING AIRFLOW DOWNWARD TO 30% OF MAXIMUM COOLING AIRFLOW SETPOINT.

WHILE SPACE TEMPERATURE REMAINS ABOVE HEATING SETPOINT, THE HEATING VALVE SHALL REMAIN CLOSED. AS THE SPACE TEMPERATURE APPROACHES HEATING SETPOINT, THE HEATING VALVE SHALL MODULATE OPEN TO MAINTAIN SPACE TEMPERATURE. SHOULD THE HEATING CFM SUPPLIED EXCEED 50% OF MAX HEATING CFM, THE COOLING VALVE SHALL MODULATE CLOSED AND THE HEATING VALVE SHALL CONTINUE TO MODULATE OPEN UNTIL THE HEATING SETPOINT IS REACHED. ON A RISE IN TEMPERATURE, THE REVERSE SHALL OCCUR.

DUAL DUCT LAB CONSTANT VOLUME TERMINAL UNIT - SEQUENCE OF OPERATION:

EACH TERMINAL SHALL BE INTERLOCKED TO BE ENERGIZED WHEN ITS ASSOCIATED AIR HANDLER IS ENERGIZED. SUPPLY AIR FROM THE AIR HANDLER SHALL BE DELIVERED TO THE CONDITIONED SPACE THROUGH THE TERMINAL BY A PRESSURE INDEPENDENT VELOCITY CONTROLLER. THE VELOCITY SENSOR SHALL BE LOCATED IN EACH OF THE HOT/COLD DUCT TERMINAL SUPPLY AIR INLETS AND SHALL SENSE AVERAGE AIR VELOCITY AT EACH. THE INDIVIDUAL VALVE CFM AND TOTAL UNIT CFM SHALL BE DISPLAYED ON THE GRAPHIC.

THESE DUAL DUCT CONSTANT VOLUME BOXES SHALL OPERATE TO PROVIDE A CONSTANT CFM TO THE LAB SPACES AS FOLLOWS:

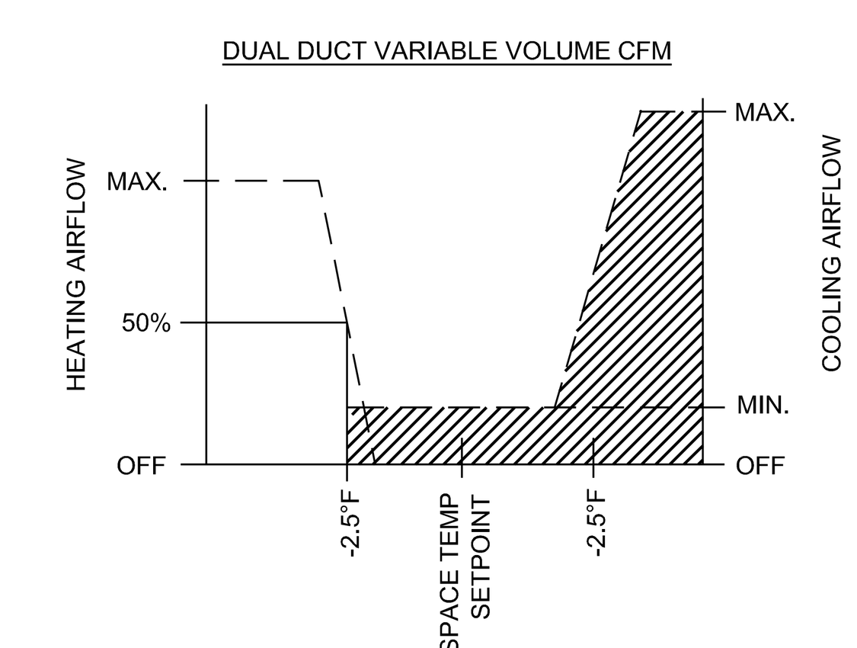
AT OR ABOVE SPACE COOLING TEMPERATURE SETPOINT, THE TERMINAL UNIT SHALL DELIVER A CONSTANT VOLUME OF AIR FROM THE COLD DECK ONLY. AS THE TEMPERATURE IN THE SPACE FALLS, THE UNIT CONTROLLERS SHALL MODULATE THE COOLING VALVE CLOSED AND THE HEATING VALVE OPEN SLOWLY MAINTAINING A CONSTANT VOLUME OF AIR TO THE SPACE. AS THE TEMPERATURE CONTINUES TO FALL, THE COOLING VALVE SHALL CONTINUE TO CLOSE AND THE HEATING VALVE SHALL CONTINUE TO OPEN. IN MAX HEATING, THE COOLING VALVE SHALL BE CLOSED TO MINIMUM CFM AND THE HEATING VALVE FULL OPEN.

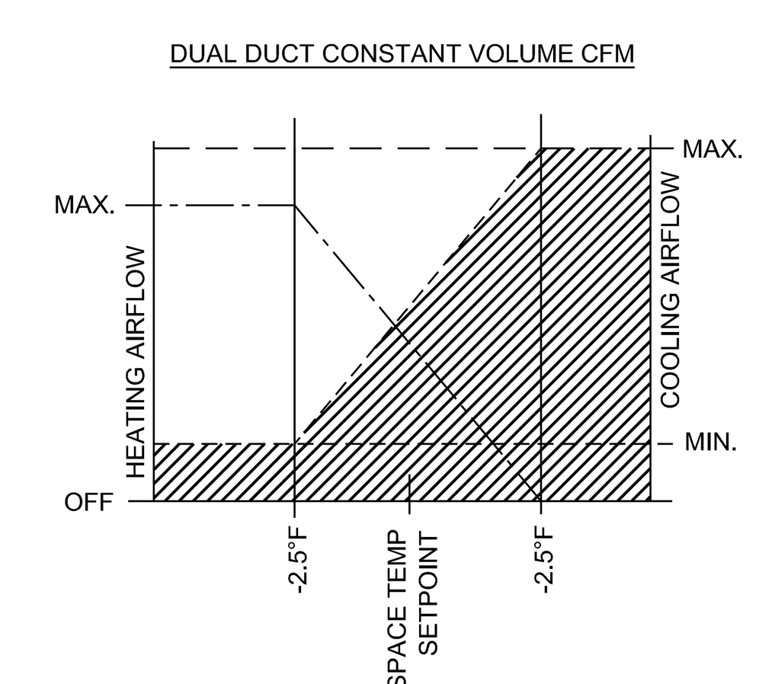
VARIABLE VOLUME TERMINAL UNIT WITH HOT WATER REHEAT - SEQUENCE OF OPERATION:

EACH TERMINAL SHALL BE INTERLOCKED TO BE ENERGIZED WHEN ITS ASSOCIATED AIR HANDLER IS ENERGIZED. SUPPLY AIR FROM THE AIR HANDLER SHALL BE DELIVERED TO THE CONDITIONED SPACE THROUGH THE TERMINAL BY A PRESSURE INDEPENDENT VELOCITY CONTROLLER. THE VELOCITY SENSOR SHALL BE LOCATED IN THE TERMINAL SUPPLY AIR INLET AND SHALL SENSE AVERAGE AIR VELOCITY IN THE INLET. THE CONDITIONED SPACE TEMPERATURE SHALL RESET THE VELOCITY CONTROLLER SETPOINT UPWARD ON RISE IN SPACE TEMPERATURE, AND DOWNWARD ON A FALL IN SPACE TEMPERATURE. THE VELOCITY SHALL BE RESET DOWNWARD TO A MINIMUM COOLING CFM. ON A CONTINUED FALL IN ROOM TEMPERATURE, THE HOT WATER VALVE SHALL BE MODULATED OPEN TO THE COIL, AND THE AIR VELOCITY SHALL GRADUALLY INCREASE TO THE HEATING MAXIMUM (ADJUSTABLE) TO SATISFY THE ROOM TEMPERATURE REQUIREMENT. UPON RISE IN SPACE TEMPERATURE ABOVE ONE SETTING, THE REVERSE SHALL OCCUR.

TYPICAL NOTE ALL UNITS, EXISTING AND NEW:

THE TERMINAL UNIT CONTROLS SHALL BE ELECTRICALLY OPERATED DDC AND SHALL BE PROVIDED AND INSTALLED IN THE FIELD BY THE CONTROL SYSTEM VENDOR. ALL SENSORS AND WIRING SHALL BE REMOVED FROM THE EXISTING UNIT AND REPLACED WITH NEW. A NEW CONTROL CABINET SHALL BE PROVIDED AT NO ADDITIONAL COST SHOULD THE CONTROL NOT FIT WITHIN THE EXISTING CABINETS.





EXISTING CHILLER PLANT SEQUENCE OF OPERATION: (REFERENCE ONLY)

1. CHILLER PLANT.
2. FAN.
3. REFRIGERANT LEAK DETECTION SYSTEM.

1. CHILLER PLANT

CHILLER 1 SHALL BE INTERLOCKED TLU·OUGH CHILLER PANEL WITH CONDENSER WATER PUMP P-5 AND CHILLED WATER PUMP P-3. CHILLER-2 SHALL BE INTERLOCKED WITH CONDENSER WATER PUMP P-6 AND CHILLED WATER PUMP P-4. ON ACTIVATION OF CHILLER THE RESPECTIVE PUMPS SHALL BE ACTIVATED AND NORMALLY CLOSED CONTROL VALVE IN THE CONDENSER WATER SUPPLY LINE TO THE CHILLER SHALL OPEN. ONLY ON PROVEN FLOW BY FLOW SWITCHES, THE REFRIGERATION MACHINE SHALL BE ACTIVATED. THE CHILLER CONTROLS SHALL MAINTAIN DESIRED CHILLED WATER SUPPLY TEMPERATURE. PROVIDE ALARMS FOR EACH PUMP FAILURE.

COOLING TOWER FANS SHALL BE CONTROLLED BY TEMPERATURE SENSOR IN THE CONDENSER WATER SUPPLY LINE. FANS SHALL BE ACTIVATED ON LOW SPEED IN SEQUENCE AND HIGH SPEED IN SEQUENCE TO MAINTAIN SUPPLY WATER TEMPERATURE AT 85 DEGREES F. COOLING TOWER BYPASS VALVES SHALL MODULATE TO MAINTAIN CONDENSER SUPPLY WATER TEMPERATURE ABOVE 65 DEGREES F (ADJUSTABLE). COOLING TOWER BASIN HEATERS SHALL BE ACTIVATED BY AQNASTAT TO MAINTAIN BASIN WATER TEMPERATURE ABOVE 40 DEGREES F.

PUMPS P-1, 2 AND FUTURE PUMPS P-7, 8 ARE SECONDARY CHILLED WATER PUMPS, WITH ONE ACTING AS STAND-BY IN EACH SET, SHALL BE ACTIVATED THROUGH DDC. PROVIDE MANUAL OVERRIDE. STANDBY SECONDARY CHILLED WATER PUMP WILL BE ACTIVATED ON FAILURE O FLEAD SECONDARY CHILLED WATER PUMP. PROVIDE LEAD LAG CONTROL FOR THE PUMP.

CHILLERS 1 AND 2 SHALL BE ACTIVATED BY OUTDOOR TEMPERATURE SENSOR. PROVIDE A LEAD LAG CONTROL ON THE CHILLERS. AT START-UP LEAD CHILLER SHALL BE ACTIVATED. SECONDARY CHILLED WATER PUMPS WILL RIDE PUMP CURVE AT REDUCED FLOW. DIFFERENTIAL PRESSURE VALVE V-1 SHALL BE SET TO OPEN AT A DIFFERENTIAL PRESSURE SETTING REPRESENTING MINIMUM FLOW REQUIRED FOR THE OPERATION OF THE PUMP. LAG CHILLER AND RESPECTIVE PRIMARY PUMP SHALL BE ACTIVATED AUTOMATICALLY ON FAILURE OF THE LEAD CHILLER AND PUMP. ANY PUMP AND CHILLER CAN BE SELECTED AS LEAD EQUIPMENT AND SHALL BE ALTERNATED.

COMMON CHILLED WATER RETURN TEMPERATURE SHALL ACTIVATE LAG CHILLER AND LAG SECONDARY PUMP WHEN COMMON RETURN WATER TEMPERATURE RISES ABOVE SETPOINT, 56°F (ADJ) AND DEACTIVATE LAG CHILLER WHEN COMMON RETURN WATER TEMPERATURE DROPS BELOW SETPOINT, 46°F (ADJ).

PROVIDE ALARMS FOR HIGH CHILLED WATER SUPPLY TEMPERATURE AND SECONDARY PUMP FAILURE. PROVIDE ALARM FOR HIGH AND LOW CONDENSER WATER SUPPLY TEMPERATURE AND CHILLER FAILURE.

PROVIDE A TRANSLATOR TO ALLOW REMOTE MONITORING, AT THE PHYSICAL PLANT, OF THE POINTS MONITORED BY THE MICRO-COMPUTER CONTROL CENTER ON THE CHILLER PROVIDED BY THE CHILLER MANUFACTURER FOR THE LIST OF THE POINTS AS A MINIMUM TO BE MONITORED.

2. FANS

EXHAUST FAN F-1 SHALL BE ACTIVATED BY ROOM THENNOSTAT SET AT 85°F. INTAKE LOUVER DAMPERS SHALL OPEN ON FAN ACTIVATION. ROOM THENNOSTAT WILL MODULATE THE FAN SPEED TO MAINTAIN ITS SET POINT.

EXHAUST FAN F-1 SHALL BE ACTIVATED WHEN REFRIGERANT LEAK DETECTION SYSTEM IS IN ALARN1. FAN WILL OVERRIDE THERMOSTAT CONTROL AND NM AT FULL SPEED.

PROVIDE MANUAL START-UP OF FAN FROM OUTSIDE OF THE MECHANICAL ROOM.

3. REFRIGERANT LEAK DETECTION SYSTEM

ON ACTIVATION OF REFRIGERANT LEAK DETECTION SYSTEM ALARM, AN AUDIBLE ALARM SHALL BE SOUNDED OUTSIDE OF THE MECHANICAL ROOM. EXHAUST FAN F-1 SHALL BE ACTIVATED. CHILLERS SHALL BE DEACTIVATED.

INTERLOCK ALARM WITH EXISTING AIR HANDLERS IN THE CHILLER ROOM TO DEACTIVATE THE FANS OF THE AIR HANDLERS ON ACTIVATION OF LEAK DETECTION SYSTEM. AIR HANDLER FANS WILL HAVE TO BE MANUALLY RESTARTED. PROVIDE A WEATHERPROOF CONTROL PANEL WITH A LOCK. PANEL SHALL BE LOCATED OUTSIDE THE MECHANICAL ROOM THAT WILL ALLOW TO ACTIVATE FAN F-1 AND TURN THE CHILLERS OFF MANUALLY.

PROVIDE A MANUAL SWITCH TO DEACTIVATE THE ALARM ON THE CONTROL PANEL OF THE LEAK DETECTION SYSTEM.

PROVIDE A MANUAL SWITCH TO ACTIVATE FANS F-1 ON THE CONTROL PANEL.

PROVIDE A MANUAL SWITCH TO DEACTIVATE THE CHILLERS ON THE CONTROL PANEL.

PROVIDE A DRY CONTACT FOR REMOTE MONITORING OF THE ALARM.

NOTE: TUNING PARAMETERS ON NEW DDC CONTROLS VALVES SHALL BE ADJUSTABLE FROM BAS CONTROL SCREEN.

1

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UNC CHARLOTTE

McENIRY HVAC MODERNIZATION

ISSUED FOR CONSTRUCTION

SCO # 18-19463-01

Charlotte, North Carolina

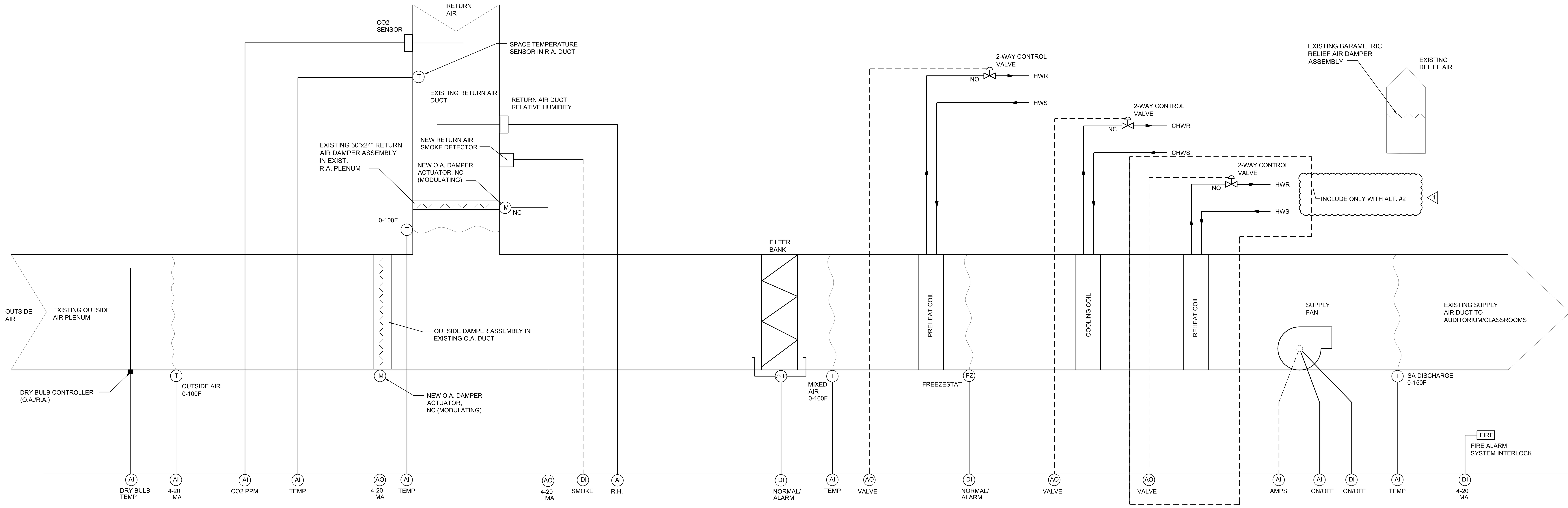
DRAWN BY: JLC
CHECKED BY: JLC
DATE: 01/17/2019
REVISIONS:
1 01/30/2019 ADDENDUM NO. 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 31478 JAMES L. CURRIE 01/17/2019

COMMISSION NUMBER: 218.063

DRAWING TITLE:
TEMPERATURE CONTROL SEQUENCES

DRAWING NUMBER:
M203



EXISTING AUDITORIUM/CLASSROOM CONSTANT AIR VOLUME AIR HANDLING UNIT AHU-4A/4B/4C/4D/5A/5B - SEQUENCE OF OPERATION

NOT TO SCALE

POINT LIST

SYSTEM:

	HARDWARE																			
	OUTPUT								INPUT											
	DIGITAL				ANALOG				DIGITAL						ANALOG					
POINT DESCRIPTION	CONTROL RELAY	SOLENOID	CONTACTOR			ELECTRICAL TRANSDUCER	SPEED		PRESSURE	FLOW SWITCH (ΔP)	SWITCH CLOSURE	AUXILIARY CONTACT			TEMPERATURE	RELATIVE HUMIDITY	IN OF H2O		FLOW	AMPS
SUPPLY FAN (SAF)	•					•														•
RETURN AIR TEMP															•		•			
MIXED AIR TEMP															•					
PREHEAT AIR TEMP															•					
DISCHARGE AIR TEMP															•		•			
OUTSIDE AIR (MAX. AND MIN.)	•														•					
PREHEAT VALVE						•														
REHEAT VALVE						•														
COOLING VALVE						•														
FIRE ALARM												•								
HIGH PRESSURE CUTOUT												•								
SMOKE DETECTOR (NOTE 1)												•								
OUTSIDE AIR DAMPER						•														
RETURN AIR DAMPER						•														
PREHEAT IFB DAMPER						•														
RELIEF DAMPER (BAROMETRIC)																				
FILTER BANK (2)									•											
SPACE PRESSURE																		•		
SPACE T'STAT															•					

	SOFTWARE																													
	ALARMS							BAS FUNCTIONS																						
	DIGITAL			ANALOG																										
POINT DESCRIPTION	EQUIPMENT STATUS	MAINTENANCE		HIGH LIMIT	LOW LIMIT	RUN TIME		SCHEDULED START/STOP	OPTIMUM START/STOP	DUTY CYCLING	DEMAND LIMITING	DAY/NIGHT SETBACK	ECONOMIZER	VENTILATION/RECIRCULATION	TEMPERATURE CONTROL	DRY BULB TEMPERATURE	SUPPLY AIR OPTIMIZATION	REHEAT COIL RESET	STEAM BOILER OPTIMIZATION	HOT WATER BOILER OPTIMIM.	HW OA RESET				LIGHTING CONTROL	SMOKE	HUMIDITY CONTROL		COLOR GRAPHIC	TREND ARCHIVE
SUPPLY FAN (SAF)	•	•				•		•	•																	•			•	•
RETURN AIR TEMP				•	•								•			•										•			•	•
MIXED AIR TEMP				•	•								•																•	•
PREHEAT AIR TEMP				•	•								•																•	•
DISCHARGE AIR TEMP				•	•										•		•												•	•
OUTSIDE AIR (MAX. AND MIN.)													•			•										•			•	•
PREHEAT VALVE															•														•	•
REHEAT VALVE															•														•	•
COOLING VALVE															•														•	•
FIRE ALARM																										•			•	•
HIGH PRESSURE CUTOUT																														•
SMOKE DETECTOR (NOTE 1)																										•			•	•
OUTSIDE AIR DAMPER													•	•	•														•	•
RETURN AIR DAMPER													•	•	•														•	•
PREHEAT IFB DAMPER													•	•	•														•	•
RELIEF DAMPER (BAROMETRIC)																														
FILTER BANK (2)				•	•																								•	•
SPACE PRESSURE																													•	•
SPACE T'STAT																													•	•

INCLUDE ONLY WITH ALT. #2

NOTES:
1. SEE PLANS FOR LOCATION & QUANTITY.

AUDITORIUM/CLASSROOM SINGLE ZONE CONSTANT VOLUME SEQUENCE OF OPERATION

AIR HANDLING UNIT

INTERLOCK

THE UNIT SHALL BE INDEXED FOR OCCUPIED/UNOCCUPIED OPERATION BY THE BAS.

THE UNIT SHALL BE INTERLOCKED WITH THE FIRE ALARM SYSTEM, FREEZESTAT, LOW LIMIT CUTOUT, HIGH LIMIT CUTOUT (2 EACH) AND SMOKE DETECTORS SO THAT AN ALARM CONDITION FROM ANY OF THESE ITEMS SHALL SHUT DOWN THE FANS, CLOSE THE TWO (2) OUTSIDE AIR DAMPERS, OPEN THE RETURN AIR DAMPER AND ALARM TO THE BAS. A RETURN AIR SMOKE DETECTOR SHALL BE FURNISHED AND WIRED BY DIVISION 26. THE MECHANICAL CONTRACTOR SHALL USE AUXILIARY CONTACTS IN THE FIRE ALARM CONTROL PANEL TO HARD WIRE SHUT DOWN THE APPROPRIATE AHU-5 FAN SYSTEM AND INFORM THE BAS OF A SMOKE CONDITION. FREEZESTAT, LOW/HIGH PRESSURE CUTOUTS SHALL BE HARD WIRED TO ACCOMPLISH THEIR FUNCTIONS. AUXILIARY CONTROLS SHALL INFORM THE BAS.

UNOCCUPIED MODE

DURING UNOCCUPIED PERIODS, THE SUPPLY FAN SHALL BE NORMALLY OFF, RETURN DAMPER OPEN, RELIEF DAMPER AND THE OUTSIDE DAMPER CLOSED. IF DURING UNOCCUPIED PERIOD THE ROOM SPACE TEMPERATURE DROPS BELOW 55F (ADJ.), THE AHU SUPPLY FAN SHALL ENERGIZE AND DELIVER 60F LAT (ADJ) SUPPLY AIR. AHU DAMPERS SHALL REMAIN IN THEIR UNOCCUPIED MODE POSITION. WHEN THE SPACE IS ABOVE 55F (ADJ.), THE SYSTEMS SHALL DE-ENERGIZE. IF DURING UNOCCUPIED MODE ANY SPACE TEMPERATURE RISES ABOVE 85F (ADJUSTABLE) OR HUMIDITY LEVEL RISES ABOVE (55%RH), THE AHU SUPPLY FAN SHALL ENERGIZE AND DELIVER 55F LAT (ADJ.). SHOULD DRY BULB TEMPERATURE CONDITIONS ALLOW, THE ECONOMIZER SHALL BE ENABLED AND OPERATE IN LIEU OF UTILIZING CHILLED WATER TO MAINTAIN THE LAT SETPOINT. IF DRY BULB TEMPERATUE CONTROL IS NOT AVAILABLE, THE CHILLED WATER SYSTEM SHALL ENERGIZE TO ENABLE MECHANICAL COOLING. WHEN ALL SPACES ARE BELOW 85F (ADJ.), THE SYSTEMS SHALL DE-ENERGIZE.

OCCUPIED MODE

DURING OCCUPIED PERIODS, THE SUPPLY FAN SHALL RUN CONTINUOUSLY TO MAINTAIN THE SYSTEM STATIC PRESSURE SETPOINT (ADJ.). THE RETURN AIR DAMPER SHALL OPEN TO PRESET BALANCED POSITION. THE MIN/MAX OUTSIDE AIR DAMPERS SHALL MODULATE AS REQUIRED TO PROVIDE THE SCHEDULED MINIMUM OA CFM. THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL REFERENCE STATIC PRESSURE TRANSMITTERS IN THE SUPPLY DUCTWORK TO MAINTAIN A CONSTANT STATIC PRESSURE. .

SUPPLY FAN CONTROL

WHEN ENERGIZED, THE SUPPLY FAN SHALL RUN CONTINUOUSLY. THE OUTSIDE AIR DAMPER SHALL OPEN TO A POSITION DETERMINED BY THE BAS CONTROL LOGIC.

AIRSIDE ECONOMIZER

THE ECONOMIZER MODE SHALL BE A DRY BULB TEMPERATURE TYPE. BELOW THE ECONOMIZER SETPOINT, THE MAXIMUM OUTSIDE AIR DAMPER BE MODULATED OPEN, AND THE RETURN DAMPER SHALL BE MODULATED CLOSED TO MAINTAIN AHU LAT. WHEN THE AMBIENT OUTDOOR AIR TEMPERATUE IS ABOVE THE CHANGEOVER SETPOINT, THE MAXIMUM OUTSIDE AIR DAMPER SHALL MODULATE CLOSED, AND THE RETURN DAMPER SHALL MODULATE OPEN. THE AHU-5 SYSTEM BAROMETRIC RELIEF DAMPER SHALL OPEN BY BUILDING PRESSURE DURING ECONOMIZER OPERATION AND BE CLOSED DURING NORMAL SYSTEM OPERATION. THE CHILLED WATER CONTROL VALVE SHALL BE MODULATED OPEN AND CLOSED AS NECESSARY TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.

O.A. DAMPERS

THE DAMPER SHALL HAVE MINIMUM/MAX, CLOSE AND MODULATING OPERATING MODES.

PREHEAT COIL

WHEN THE UNIT IS ENERGIZED, THE MIXED AIR SENSOR SHALL ACT THROUGH THE BAS TO MODULATE THE PREHEATING COIL 2-WAY HOT WATER VALVE TO MAINTAIN THE PREHEAT COIL DISCHARGE AIR TEMPERATURE AS SENSED BY THE PREHEAT TEMPERATURE SENSOR IMMEDIATELY DOWNSTREAM OF THE COIL TO NOT LESS THAN 40°F.

HUMIDITY CONTROL

WHEN RETURN AIR RELATIVE HUMIDITY IS ABOVE SET POINT (55 PERCENT RH), THE COOLING COIL VALVE SHALL FULLY OPEN, THE ECONOMIZER SHALL LOCK OUT AND THE REHEAT COIL CONTROL VALVE SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE HUMIDITY (50 PERCENT RH (ADJ)).

REHEAT COIL

THE MODULATING CONTROL VALVE SHALL MAINTAIN SPACE TEMPERATURE.

INCLUDE ONLY WITH ALT. #2

COOLING COIL

WHEN THE UNIT IS ENERGIZED THE SENSOR IN THE RETURN DUCT SHALL ACT THROUGH THE BAS TO MODULATE THE COOLING COIL VALVE OR THE ECONOMIZER DAMPERS (AS DESCRIBED ABOVE) TO MAINTAIN SPACE TEMPERATURE.

MORNING WARM-UP AND COOL DOWN

WHEN THE UNIT IS INITIALLY PLACED INTO THE OCCUPIED MODE, AND THE RETURN AIR TEMPERATURE IS ABOVE 80°F (ADJ.) OR BELOW 68°F (ADJ.) THE DAMPERS SHALL REMAIN IN THE UNOCCUPIED MODE POSITION UNTIL THE RETURN AIR TEMPERATURE IS ABOVE 68°F (ADJ.) OR BELOW 80°F (ADJ.) AT WHICH TIME THE MINIMUM OUTSIDE AIR DAMPER SHALL OPEN TO ITS BALANCED POSITION. WHEN ENTHALPY CONDITIONS ARE APPROPRIATE, THE ECONOMIZER CONTROL ROUTINE SHALL OVERRIDE THIS WARM-UP/COOL DOWN MODE. THE WARM-UP/COOL DOWN MODE SHALL BE ACTIVATED ONLY AT SYSTEM START-UP. UNIT SHALL RELEASE WARM UP/COOL DOWN AND OPERATE IN OCCUPIED MODE WHEN OCCUPIED SCHEDULE IS IN EFFECT.

FILTER SWITCH

A DIFFERENTIAL PRESSURE SWITCH ACROSS EACH OF THE TWO (2) FILTERS SHALL ALARM TO THE BAS WHEN THE PRESSURE DROP ACROSS EACH OF THE TWO (2) FILTERS RISES ABOVE THE FILTER MANUFACTURER'S RECOMMENDED SETPOINT.

NOTES:

HOT WATER CONTROL VALVES SHALL NOT BE OPEN WHEN THE CHILLED WATER CONTROL VALVES ARE OPEN (UNLESS REQUIRED BY FREEZESTAT ACTIVATION).

CHILLED WATER CONTROL VALVES SHALL NOT BE OPEN WHEN THE HOT WATER CONTROL VALVES ARE OPEN (UNLESS REQUIRED BY FREEZESTAT ACTIVATION).

IF THE LOW PRESSURE SWITCH IN THE MIXING BOX DROPS BELOW (-)3" W.C. (ADJ.), THE SUPPLY AND RETURN FANS SHALL DE-ENERGIZE AND AN ALARM SHALL BE SENT TO THE BAS. THE BAS OPERATOR SHALL ACKNOWLEDGE THIS ALARM BEFORE IT IS RESET.

IF THE HIGH PRESSURE SWITCH IN THE MIXING BOX OR SUPPLY DUCTWORK RISES ABOVE SETPOINT OF +3" W.C.(ADJ.), THE SUPPLY AND RETURN FANS SHALL DE-ENERGIZE AND AN ALARM SHALL BE SENT TO THE BAS. THE BAS OPERATOR SHALL ACKNOWLEDGE THIS ALARM BEFORE IT IS RESET.

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UNC CHARLOTTE

McENIRY HVAC MODERNIZATION

ISSUED FOR CONSTRUCTION

SCO # 18-19463-01

Charlotte, North Carolina

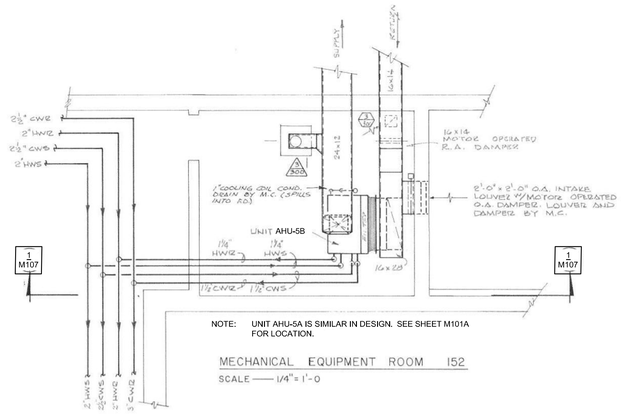
DRAWN BY: JLC
CHECKED BY: JLC
DATE: 01/17/2019
REVISIONS:
1 01/30/19 ADDENDUM #2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL JAMES L. CURRIE
01/17/2019

COMMISSION NUMBER: 218.063

DRAWING TITLE:
TEMPERATURE CONTROL SEQUENCES - ALTERNATE #1 & #2

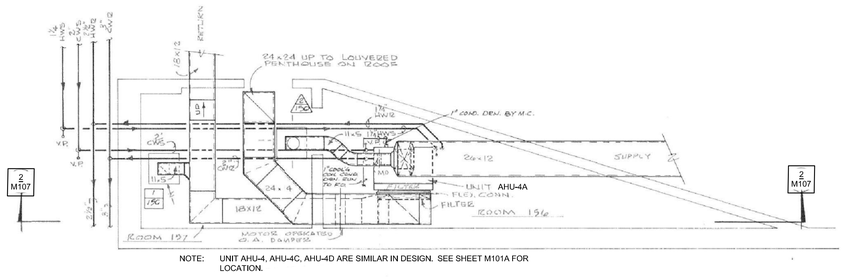
DRAWING NUMBER:
M204



NOTE: UNIT AHU-5A IS SIMILAR IN DESIGN. SEE SHEET M101A FOR LOCATION.

MECHANICAL EQUIPMENT ROOM 152

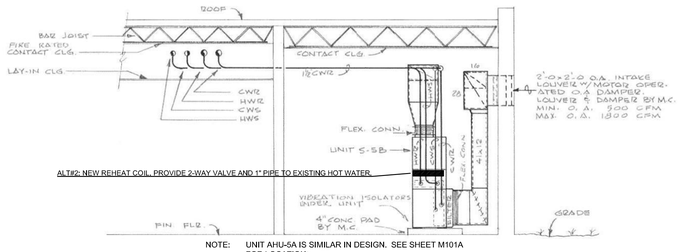
SCALE — 1/4"= 1'-0



NOTE: UNIT AHU-4, AHU-4C, AHU-4D ARE SIMILAR IN DESIGN. SEE SHEET M101A FOR LOCATION.

MECHANICAL EQUIPMENT ROOM #156

SCALE — 1/4"= 1'-0

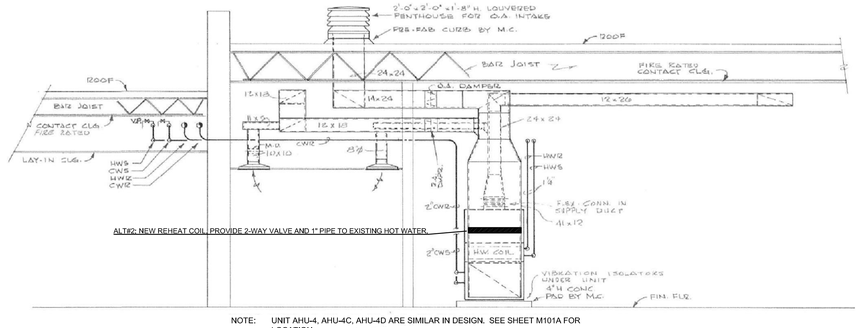


NOTE: UNIT AHU-5A IS SIMILAR IN DESIGN. SEE SHEET M101A FOR LOCATION.

SECTION

SCALE 1/4"= 1'-0

1 M107 | 1 M107



NOTE: UNIT AHU-4, AHU-4C, AHU-4D ARE SIMILAR IN DESIGN. SEE SHEET M101A FOR LOCATION.

SECTION

SCALE 1/4"= 1'-0

2 M107 | 2 M107

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McENIRY HVAC MODERNIZATION

ISSUED FOR CONSTRUCTION

SCO # 18-19463-01

Charlotte, North Carolina

DRAWN BY: JLC
CHECKED BY: JLC
DATE: 01/17/2019
REVISIONS:
1 01/30/19 ADDENDUM #2

NORTH CAROLINA PROFESSIONAL SEAL 31404 ENGINEER JAMES L. CURRIE

01/17/2019

COMMISSION NUMBER: 218.063

DRAWING TITLE:
AUDITORIUM ENLARGED MECHANICAL ROOMS

DRAWING NUMBER:

M107

EXISTING AIR HANDLING UNIT SCHEDULE

GENERAL					FAN DATA											
TAG	AREA SERVED	LOCATION	MIN. O.A. CFM	UNIT TYPE	CFM	ESP (IN.)	TSP (IN.)	FAN TYPE	WHEEL DIA.	FAN R.P.M.	O.V. F.P.M.	DRIVE TYPE	BHP	MIN. HP (1)	VOLTS/ PHASE
AHU 4A/B/C/D	AUDITORIUM	SEE SHEET M101A	300	SZ VAV	2,000	0.75	1.75	FC	12"	1040	1300	BELT	1.25	2	460/3
AHU 5A/B	CLASSROOM	SEE SHEET M101A	240	SZ VAV	1,800	0.75	1.60	FC	12"	1000	1300	BELT	0.9	1.5	460/3

	COOLING COIL DATA												
TAG	CFM	MAX. FACE VEL. (FPM)	ENT. AIR °DB	ENT. AIR °WB	LVG. AIR °DB	LVG. AIR °WB	COIL CAP. (MBH) SENS./TOT.	MIN. NO. OF ROWS	MAX APD (" W.G.)	GPM	EWT (°F)	LWT (°F)	MAX WPD (FT.)
AHU 4A/B/C/D	2,000	380	86.5	72	52	51.5	74.5/135.5	4	0.75	28.5	44	54	15.0
AHU 5A/B	1,800	350	82.5	68.7	55	54	53.4/84.2	4	0.75	18.1	44	54	12.0

	REHEATING COIL DATA (ALTERNATE #2 ONLY)										
TAG	CFM	MAX FACE VELOCITY	E.A.T. (°F)	L.A.T. (°F)	MINIMUM COIL CAP. (MBH)	GPM	EWT (°F)	LWT (°F)	MIN. NO. OF ROWS	MAX APD ("WG)	MAX WPD (FT)
AHU 4A/B/C/D	2,000 *	360	40	80	949	12	180	140	2	0.20	4
AHU 5A/B	1,800	350	40	80	896	11	180	140	2	0.20	4

	PRE-HEAT COIL DATA											
TAG	CFM	MAX FACE VELOCITY	E.A.T. (°F)	L.A.T. (°F)	MINIMUM COIL CAP. (MBH)	GPM	EWT (°F)	LWT (°F)	MIN ROWS	MAX APD ("WG)	MAX WPD (FT)	BASIS OF DESIGN
AHU 4A/B/C/D	2,000	360	40	60	43.5	3	180	150	1	.12	2.6	TRANE LPCC006
AHU 5A/B	1,800	350	40	60	40.0	2.9	180	150	1	.16	.88	TRANE LPCC006

NOTES:

1. ALL MOTORS SHALL BE PREMIUM EFFICIENCY ECM MOTOR WITH SPEED INPUT FROM BAS.
2. EQUIVALENT UNITS AS MANUFACTURED BY TRANE OR EQUAL BY CARRIER, DAIKAN OR COMFORTAIR.
3. UNITS SHALL BE PROVIDED WITH 65% EFFICIENCY, PLEATED FILTER WITH 1" THROWAWAY PRE-FILTER (30%) EFFICIENCY..
4. ALL AIR HANDLING UNITS SHALL HAVE INTERNAL VIBRATION ISOLATION.
5. REFER TO "ELECTRICAL CONNECTION TYPE SCHEDULE" FOR WIRING DETAILS.
6. UNIT TYPES: SZ = SINGLE ZONE
7. AHU SHALL BE PROVIDED WITH VFD OR ECM MOTOR AS PART OF ALTERNATE #2.
8. UNITS SHALL BE DOUBLE WALL CONSTRUCTION ALL COMPONENTS.
9. UNITS SHALL HAVE STAINLESS STEEL DRAIN PANS.

1

EXISTING PUMP SCHEDULE

MARK	TYPE	SERVICE	GPM	FT. HEAD	RPM	ELECTRICAL BHP	HP	VOLTS	Ø	CONTROL	PUMP MODEL
PCHWP-1	BASE MOUNTED END SUCTION	PRIMARY CHW	1350	*	1750	*	*	460	3	CV	*
PCHWP-2	BASE MOUNTED END SUCTION	PRIMARY CHW	1350	*	1750	*	*	460	3	CV	*
SCHWP-1	BASE MOUNTED END SUCTION	SECOND. CHW	1350	*	1750	*	*	460	3	VFD	*
SCHWP-2	BASE MOUNTED END SUCTION	SECOND. CHW	1350	*	1750	*	*	460	3	VFD	*
CWP-5	BASE MOUNTED HORIZ. SPLIT CASE	COND. PUMP	1500	69	1750	35	40	460	3	CV	B&G 6X8X13 HSC
CWP-6	BASE MOUNTED HORIZ. SPLIT CASE	COND. PUMP	1500	*	1750	*	*	460	3	CV	*

NOTES: * INFORMATION NOT AVAILABLE AT TIME. FIELD VERIFY FROM NAMEPLATE.

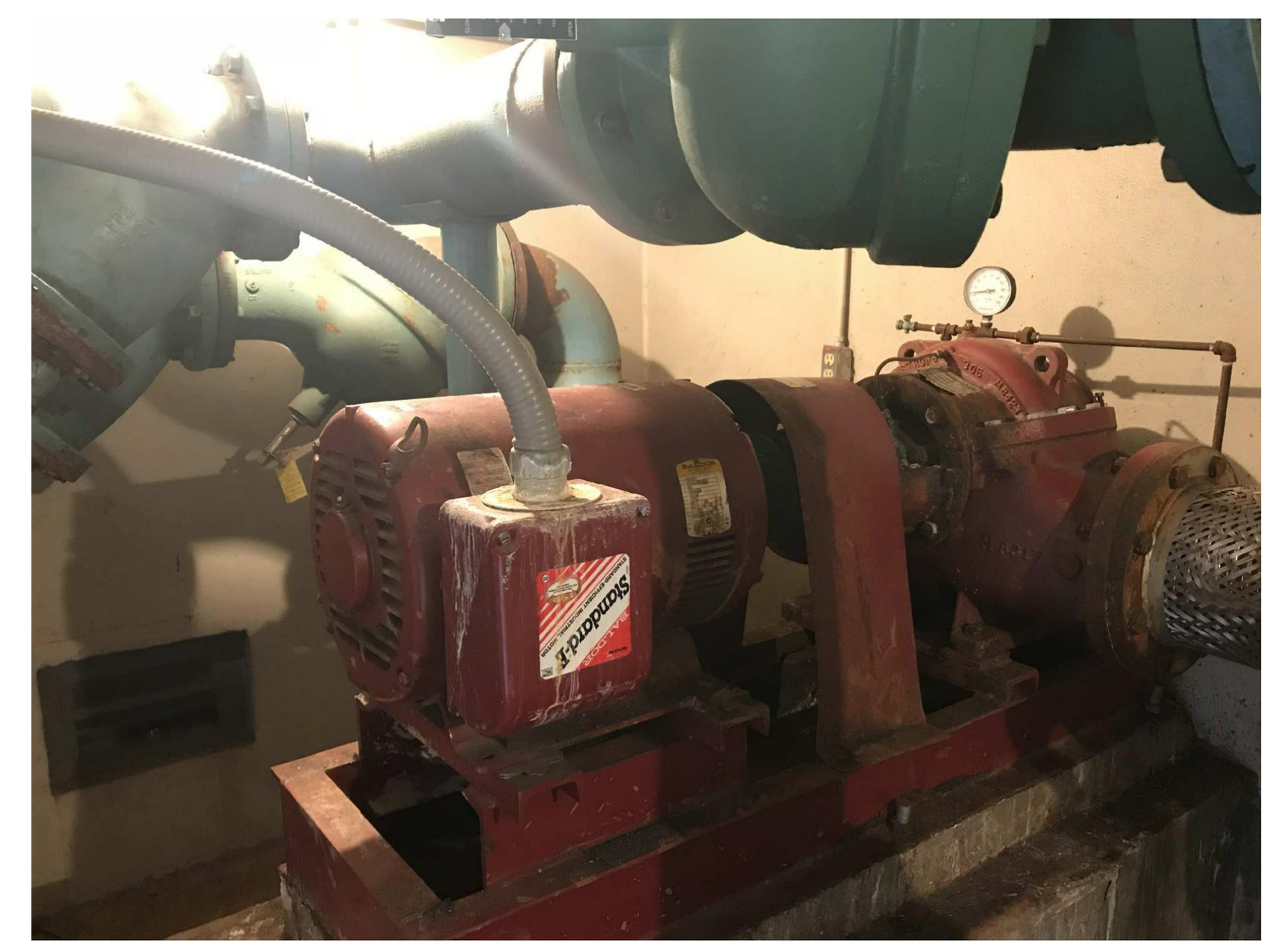


PHOTO OF EXISTING CWP-5 TO BE REPLACED BELOW TOWER

1

EXISTING WATER-COOLED CHILLER SCHEDULE

UNIT DESIGNATION	CH-1	CH-2
NOMINAL TONS	550	550
MANUFACTURER	YORK	-
MODEL NUMBER	YMC2-S1934AB	-
REFRIGERANT TYPE	R-134a	-
REFRIGERANT CHARGE (LBS.)	1396	-
OPERATING WEIGHT (LBS.)	25,102	-
EVAPORATOR:		
ENTERING WATER TEMP. (˚F)	52	52
LEAVING WATER TEMP. (˚F)	42	42
FLOW RATE (GPM)	1320	1320
PASSES	2	2
PRESSURE DROP (FT.)	17.5	17.5
FOULING FACTOR	0.0001	0.0001
WORKING FLUID	WATER	WATER
CONDENSER:		
ENT. WATER TEMP. (˚F)	85	85
LVG. WATER TEMP. (˚F)	95	95
FLOW RATE (GPM)	1650	1650
PASSES	2	2
PRESSURE DROP (FT.)	10.3	10.3
FOULING FACTOR	0.00025	0.00025
WORKING FLUID	WATER	WATER
ELECTRICAL DATA		
UNIT VOLTAGE/PHASE	460/3	460/3
MCA/MOCP	522/800	-
PRIMARY L.R.A.	417	-
MAX. KW/TON	0.573	-
MAX N.P.L.V. KW/TON	0.329	-

NOTES

1. Provide 3/4" Armaflex Factory insulation on all cold parts.
2. Chiller shall turn down to 20% at constant 85F condenser water temp w/o hot gas bypass.
3. Provide VFD starter and factory installed IEEE 519 filter. Performance ratings shall include filter.
4. Chiller shall be provided with chiller controller and tied into existing building automation system.
5. See specifications for owner witness test requirements.
6. 5 year extended warranty on unit, including parts, labor and refrigerant.
7. Soft interlock chiller w/ primary pump through flow or pressure switch.
8. Approved Manufacturers: York, Daikin, Smardt.

EXISTING SINGLE DUCT CONSTANT VOLUME TERMINAL UNIT SCHEDULE

MARK	UNIT TYPE (3)	CFM RANGE MIN.	CFM RANGE MAX.	MODEL NO	BOX INLET	TERMINAL UNIT (MINIMUM CFM)	REHEAT COIL CFM	MBH	GPM	# ROWS	L.A.T. °F	BRANCH PIPE SIZE IN.	REMARKS (NOTES)
VAV-05	VV	50	100	30RW-5	A	B	50	3	0.5	1	112	½"	
VAV-05	VV	85	165	30RW-5	A	B	85	4.3	0.5	1	101	½"	-
VAV-05	VV	90	175	30RW-5	A	B	90	3	0.5	1	101	½"	-
VAV-05	VV	90	180	30RW-5	A	B	90	4.5	0.5	1	112	½"	
VAV-08	VV	100	200	30RW-8	A	B	100	4.8	0.5	1	99	½"	-
VAV-08	VV	120	240	30RW-8	A	B	120	5.5	0.5	1	96	½"	-
VAV-08	VV	155	300	30RW-8	A	B	155	7.7	0.5	1	101	½"	-

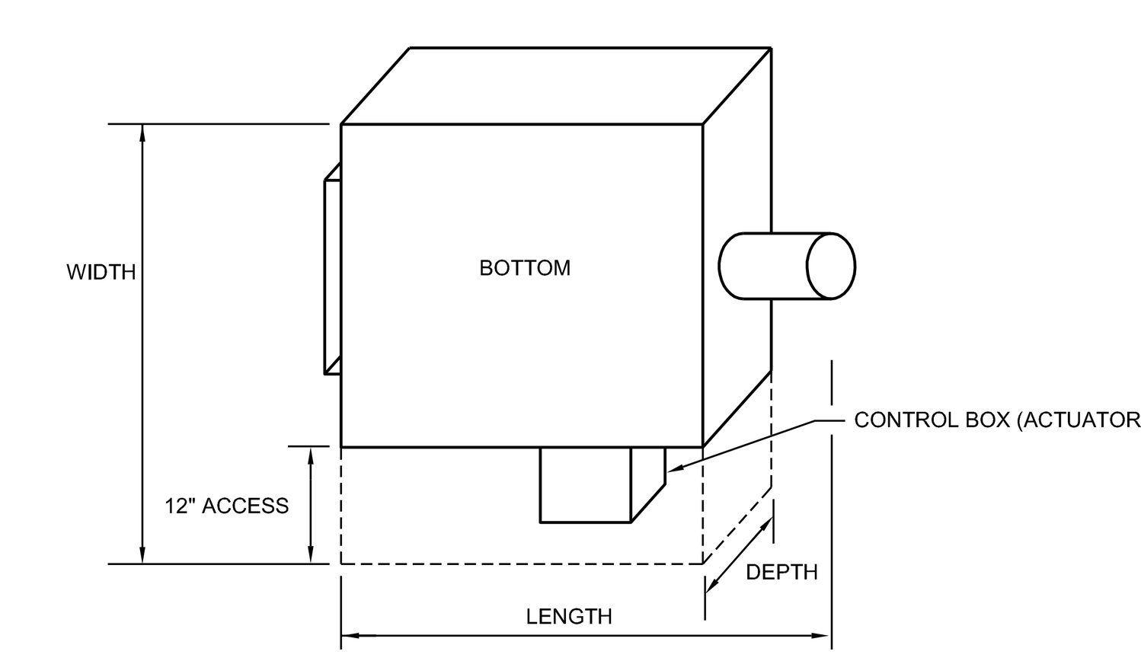
TERMINAL UNIT PERFORMANCE:

A — REFER TO PLANS FOR TERMINAL UNIT MAXIMUM CFM.

B — REFER TO PLANS FOR TERMINAL UNIT MINIMUM CFM (SAME AS MAXIMUM CFM FOR CONSTANT VOLUME DUAL DUCT UNITS).

REMARKS (NOTES):

1. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AT EACH TERMINAL UNIT PRIOR TO ORDERING UNIT. TERMINAL UNIT PHYSICAL SIZE, INCLUDING CLEARANCES @ CONTROLS AND ACCESS AS RECOMMENDED BY MANUFACTURERS, SHALL BE FABRICATED TO FIT INTO AVAILABLE SPACE. CONTROL BOXES MAY NEED TO BE REMOTELY LOCATED. CONTRACTOR TO ALTER EXISTING DUCTWORK, CONDUITS AND/OR OTHER OBSTRUCTIONS AS REQUIRED TO ACCOMMODATE NEW UNIT AND ASSOCIATED CONNECTION SIZES AND CONFIGURATION.
2. MAXIMUM WIDTH OF SINGLE DUCT CAV TERMINAL UNITS SHALL INCLUDE 12" CLEARANCE ON DAMPER OPERATOR CONTROL SIDE FOR ACCESS. THIS ACCESS SPACE MUST BE MAINTAINED. ACTUAL WIDTH OF UNIT CAN BE NO MORE THAN 24" LESS THAN INDICATED. NOTE - THERE WILL BE NO EXCEPTIONS!
3. UNIT TYPES ARE AS FOLLOWS:
   CV = SINGLE DUCT CONSTANT AIR VOLUME
4. UNITS SHALL BE NAILOR MODEL 3101 OR EQUAL BY METALAIRE, ENVIROTEC, OR TRANE - SEE NOTES 2 & 5 REGARDING MAXIMUM SIZES.
5. MAXIMUM LENGTH DIMENSION "L" INCLUDES INLET DUCT COLLARS.
6. MAXIMUM ALLOWABLE NC LEVEL @ 1.0" SP IS 30.



DDCAV DIMENSION SCHEMATIC

McCracken & Lopez, P.A.
Consulting Engineers
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Charlotte, North Carolina 28203
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Charlotte, North Carolina 28232
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UNC CHARLOTTE

McENIRY HVAC MODERNIZATION

ISSUED FOR CONSTRUCTION

SCO # 18-19463-01

Charlotte, North Carolina

DRAWN BY: JLC
CHECKED BY: JLC
DATE: 01/17/2019
REVISIONS:
1 01/30/19 ADDENDUM #2

NORTH CAROLINA PROFESSIONAL SEAL 31478 ENGINEER JAMES L. CURRIE
01/17/2019

COMMISSION NUMBER: 218.063

DRAWING TITLE:
EXISTING EQUIPMENT SCHEDULES FOR REFERENCE

1

DRAWING NUMBER:
M006

SECTION 01 23 00 – ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

B. The contractor shall review all addenda, drawings, and specifications to fully appraise the extent of each alternate.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate 1: Provide Add Cost to Base Bid for:

1. Removal and replacement of the five terminal units in the auditorium prefunction area lobby. This will include low pressure duct removal and replacement as well as reinsulation of ductwork.

2. Cost to internally clean cold/hot deck medium pressure in Lobby, reseal joints, pressure test ducts and install new external insulation.
3. Replace controls and valve actuators for existing AHU-4a, AHU-4b, AHU-4c, AHU-4d, AHU-5a, AHU-5b.

B. Alternate 2: Provide Add Cost to Base Bid for:
1. Removal and replacement of existing six (6) auditorium air handling units. Refer to sheet M006 for schedules and as reflected on sheet M107 for details.
2. Installation of new reheat coil for each air handler listed above.
3. Replace existing condenser water pump CWP-5.
4. Repair existing heat tape at cooling towers. Replace thermostat and reconnect to power.
5. Replace float and makeup water controller at cooling tower CT-1.
6. Reconnect power to sump heater at CT-1 and replace basin thermostat.

END OF SECTION 01 23 00

F O R M O F P R O P O S A L

McEniry HVAC Renovation Contract:

University of North Carolina at Charlotte Bidder:

SCO-ID #18-19463-01 Date:

The undersigned, as bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. The bidder further declares that he has examined the site of the work and the contract documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed. The bidder further declares that he and his subcontractors have fully complied with NCGS 64, Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

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The Bidder proposes and agrees if this proposal is accepted to contract with the **UNC Charlotte** in the form of contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of **McEniry HVAC Renovation** in full in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of **the State of North Carolina, the requirements of McCracken & Lopez, P.A. and The University of North Carolina at Charlotte** with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the contract documents, for the sum of:

SINGLE PRIME CONTRACT:

Base Bid:

Dollars($)

General Subcontractor: Plumbing Subcontractor:

Lic Lic

Mechanical Subcontractor: Electrical Subcontractor:

Lic Lic

GS143-128(d) requires all single prime bidders to identify their subcontractors for the above subdivisions of work. A contractor whose bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (i) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (ii) with the approval of the awarding authority for good cause shown by the contractor.

ALTERNATES:

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be "added to" or "deducted from" the base bid. (List "Add (+)" or "Deduct (-)" as appropriate.)

Alternate 1: Provide Add Cost to Base Bid for:

1. Removal and replacement of the five terminal units in the auditorium prefunction area lobby. This will include low pressure duct removal and replacement as well as reinsulation of ductwork.
2. Cost to internally clean cold/hot deck medium pressure in Lobby, reseal joints, pressure test ducts and install new external insulation.
3. Replace controls and valve actuators for AHU-4a, 4b, 4c, 4d, 5a, 5b.

_____Dollars($)_____

Alternate 2: Provide Add Cost to Base Bid for:

1. Removal and replacement of existing six (6) auditorium air handling units. Refer to sheet M006 for schedules and as reflected on sheet M107 for details. Include recommection of power wiring and smoke detection at AHU-4a/b/c/d.
2. Installation of new reheat coil for each air handler listed above.
3. Replace existing condenser water pump CWP-5. Cost should include disconnect and reconnect of power and controls.
4. Repair existing heat tape at cooling towers. Replace thermostat and reconnect to power.
5. Replace float and makeup water controller at cooling tower CT-1.
6. Reconnect power to sump heater at CT-1 and replace basin thermostat.

_____Dollars($)_____

UNIT PRICES

None

ALLOWANCES

None

MINORITY BUSINESS PARTICIPATION REQUIREMENTS

Provide with the bid - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. **Also** list the good faith efforts (Affidavit **A**) made to solicit minority participation in the bid effort.
NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (**B)** to that effect in lieu of Affidavit (**A)** required above. The MB Participation Form must still be submitted even if there is zero participation.

After the bid opening - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (**C**) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit **D** is not necessary;

*** OR ***

If less than the 10% goal, Affidavit (**D**) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations

and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

Note: Bidders must always submit **with their bid** the Identification of Minority Business Participation Form listing all MB contractors, vendors and suppliers that will be used. If there is no MB participation, then enter none or zero on the form. Affidavit A **or** Affidavit B, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid.

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

_____
(Name of firm or corporation making bid)

WITNESS:

_____
(Proprietorship or Partnership)

By: _____
Signature

Name: _____
Print or type

Title _____
(Owner/Partner/Pres./V.Pres)

Address _____

_____

ATTEST:

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(CORPORATE SEAL)

Addendum received and used in computing bid:

Addendum No. 1 _____ (check)

Addendum No. 2 _____ (check)