

**St. Charles City-County Library
Retro-Commissioning for the Spencer Road Branch
RFP**

Addendum 1

**Answers to Written Questions, Corrections, Clarifications, and Changes
Thursday, October 10, 2024**

**Required: Acknowledge Receipt of Addendum 1 on Page 3 of this Document
to be Returned with Proposal.**

Answers to Written Questions:

1. **Question:** We note that Wiegmann Associates (WA) is the firm that designed the HVAC system, installed the control system, and provides ongoing systems maintenance for the library. They are also a recognized Delta Controls contractor. One of their employees serves on the library board that will be deciding who the recipient of this contract will be. Since they possess the skills to provide retro commissioning on this project, they have an advantage based on familiarity and, presumably, cost. Will WA be allowed to respond to the RFP as the commissioning authority (CxA) on this project?

Answer: Yes, there are multiple factors that will be taken into consideration in selecting the proposal for this project and therefore Wiegmann Associates may submit a proposal. At this time there are not any Weigmann Associates employees currently serving on the library board.

2. **Question:** If they are required to recuse themselves from providing the commissioning services, and Energy Resources Group, Inc. (ERG) is fortunate enough to secure this contract, can ERG subcontract with WA to provide the field implementation of the revised sequences of operations that ERG develops in response to the controls improvements developed in the commissioning process?

Answer: Yes, at this time, they have not been required to recuse themselves.

3. **Question:** Is there a written sequences of operation SOO that is available for review for the current control system.

Answer: We requested the Sequence of Operations from Weigmann and received the following response: There is no sequence. It is a simple RTU and VAV/FTU system.

4. **Question:** Is there a list of Delta controllers, the equipment they manage, and the sensors they read to provide the feedback needed to manage the building automation system (BAS)?

Answer: In response to the question, we have provided a copy of the control drawings. (attached as "Temperature Control Drawings for: ST. CHARLES CITY-COUNTY LIBRARY DISTRICT SPENCER BRANCH").

5. **Question:** Is there remote access to the central BAS? Can we read it from our office and can we set up trend logs?

Answer: There is limited remote access, our preference is for the work to be done on site. Yes, trend logs can be set up.

6. **Question:** There are multiple references to Construction Manager (CM) in the RFP. Is this a holdover from the RFP that was the template for this RCx RFP? ERG will have a Certified Commissioning Authority (CxA) providing the services identified in the RFP for the CM. Please clarify.

Answer: Yes, the template for the RFP was a RFP for a Construction Manager please disregard references to a Construction Manager and Construction Management. Please disregard section 3d, 3e and 3g under Proposal Content. Please disregard number 10 in Evaluation Criteria.

7. **Question:** Is there a test and balance report from the start-up of the building?

Answer: In response to the question we have provided a copy of the test and balance report, as well as the start up report. (attached as "HVAC TEST AND BALANCE REPORT" and "START-UP REPORT").

8. **Question:** Please provide a copy of any St. Charles County affirmative action requirements that may apply in this case.

Answer: Please disregard the requirement related to affirmative action requirements, this was from the RFP template for Construction Management that was used to create the RFP. Please disregard section 3f under Proposal Content.

9. **Question:** Where do I find the RCx application and how to we obtain pre-approval?

Answer: <https://www.ameren.com/missouri/business/energy-efficiency/incentives>

**St. Charles City-County Library
Retro-Commissioning for the Spencer Road Branch
RFP**

Proposer Acknowledges Receipt of Addendum 1:

_____ **Yes**

Name:

Company Name:

Date:

Temperature Control Drawings for:

ST. CHARLES CITY-COUNTY LIBRARY DISTRICT SPENCER BRANCH

427 Spencer Road
St. Peters, MO 63376

DRAWING INDEX:

TC0-1 COVER SHEET

TC1-1 PROJECT NOTES ABD CABLING DETAILS

TC1-2 NETWORK ARCHITECTURE AND ADDRESSING

TC2-1 ROUTER BOARD DETAILS

TC2-2 TYPICAL SINGLE DUCT TERMINAL BOARD DETAILS

TC2-3 TYPICAL FAN TERMINAL BOARD DETAILS

TC2-4 TYPICAL FAN TERMINAL WITH TERMINATOR BOARD DETAILS

TC2-5 TYPICAL FAN TERMINAL WITH COMPUTER RM TEMP BOARD DETAILS

TC2-6 EXHAUST FAN CONTROLLER

TC2-7 MCQUAY BACNET WIRING DETAILS

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**ST. CHARLES CITY-COUNTY
LIBRARY DISTRICT
SPENCER BRANCH**

427 Spencer Road
St. Peters, Mo 63376

ENGINEERING # J10069

DATE: 9/07/10

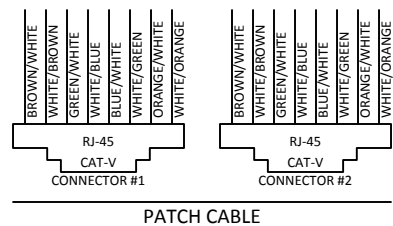
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SHEET: **TC0-1**

PROJECT GENERAL NOTES:

1. ALL 24 VAC POWER CABLE TO BE WINDY CITY WIRE # 0023650-S (OR APPROVED EQUIVALENT) - 18/2, PURPLE JACKET, TWISTED, NON SHIELDED, PLENUM-RATED CABLE, EXCEPT WHERE NOTED OTHERWISE.
2. ALL NET-1 LAN WIRING TO BE WINDY CITY WIRE # 044000-S (OR APPROVED EQUIVALENT) - 24/2, WHITE JACKET, LO-CAP, TWISTED, SHIELDED, PLENUM- RATED CABLE, EXCEPT WHERE NOTED OTHERWISE.
3. ALL NET-2 LAN WIRING TO BE WINDY CITY WIRE # 042000-S (OR APPROVED EQUIVALENT) - 24/2, BLUE JACKET, LO-CAP, TWISTED, SHIELDED, PLENUM-RATED CABLE, EXCEPT WHERE NOTED OTHERWISE.
4. ALL INPUT WIRING TO BE WINDY CITY WIRE # 0023230-S (OR APPROVED EQUIVALENT) - 18/2, YELLOW JACKET, TWISTED, SHIELDED, PLENUM-RATED CABLE, EXCEPT WHERE NOTED OTHERWISE.
5. ALL OUTPUT WIRING TO BE WINDY CITY WIRE # 0023240-S (OR APPROVED EQUIVALENT) - 18/2, ORANGE JACKET, TWISTED, SHIELDED, PLENUM-RATED CABLE, EXCEPT WHERE NOTED OTHERWISE.
6. ALL THERMOSTAT WIRING TO BE ONE 18/2 - WINDY CITY # 0023650-S (POWER) AND ONE 24/2 - WINDY CITY WIRE # 042000-S (NET-2), EXCEPT WHERE NOTED OTHERWISE.
7. ALL TRANSFORMERS, CONTROLLERS, MODULES, TRANSMITTERS, SENSORS, RELAYS, AND ALL OTHER DEVICES TO BE PROVIDED BY WIEGMANN ASSOCIATES EXCEPT WHERE NOTED OTHERWISE. CONTRACTOR TO RECEIVE AND INSTALL AS NECESSARY FOR A COMPLETE AND WORKING SYSTEM.
8. EXCEPT WHERE NOTED OTHERWISE, ALL HORIZONTAL CABLING ABOVE SUSPENDED CEILING (ACT) SHALL BE INSTALLED IN OPEN RACEWAY AND ROUTED TIGHT TO STRUCTURE ABOVE, SUPPORTED IN HOOKS, RINGS, AND/OR WIRE TIES IN A NEAT AND ORDERLY FASHION.
9. EXCEPT WHERE NOTED OTHERWISE, ALL HORIZONTAL CABLING ABOVE DRYWALL CEILING SHALL BE INSTALLED IN EMT CONDUIT.
10. EXCEPT WHERE NOTED OTHERWISE, ALL HORIZONTAL OR VERTICAL CABLING IN THE OPEN AREAS SHALL BE INSTALLED IN EMT CONDUIT.
11. ALL ROOM TEMPERATURE AND HUMIDITY SENSORS TO BE MOUNTED AT SAME ELEVATION AS LIGHT SWITCHES, EXCEPT WHERE NOTED OTHERWISE.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR WIRING WALL SENSOR, AS SHOWN ON SHEET TC2-5, IN THE THREE (3) COMPUTER ROOMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING THE BACNET MSTP COMMUNICATIONS CARD IN EACH OF THE FOUR (4) MCQUAY ROOFTOP UNITS AND RUNNING THE COMMUNICATIONS CABLE TO THE DELTA CONTROLS SYSTEM AS SHOWN ON SHEET TC1-2.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING DUCT MOUNTED CO2 SENSORS IN THE RETURN AIR OF EACH ROOFTOP UNIT AND WIRING THEM TO INPUTS ON VAV CONTROLLERS AS SHOWN ON SHEET TC2-2. ONLY ONE CO2 SENSOR WILL BE WIRED TO A SINGLE VAV CONTROLLER.
15. WIEGMANN ASSOCIATES SHALL PROVIDE ENCLOSURE FOR DSM-RTR AND ASSOCIATED DEVICES FOR FIELD MOUNTING IN THE COMPUTER ROOM, AND ENCLOSURE FOR EXHAUST FAN CONTROLLER IN THE BASEMENT ELECTRICAL ROOM. CONTRACTOR SHALL FURNISH AND INSTALL ANY OTHER ENCLOSURES THAT MAY BE NECESSARY.



1 CAT-5 CABLING DETAILS
NO SCALE

**ST. CHARLES CITY-COUNTY
LIBRARY DISTRICT
SPENCER BRANCH**

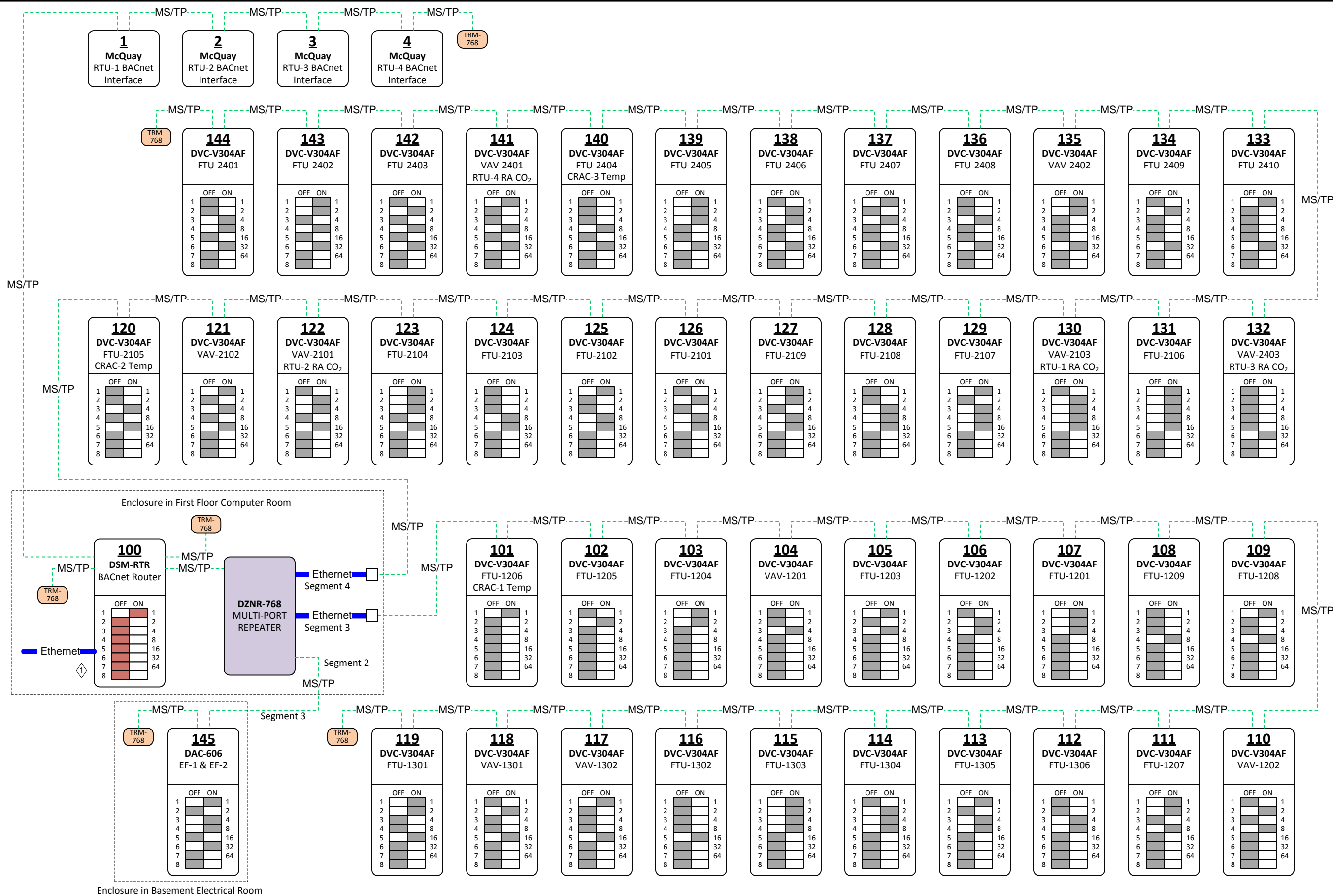
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St. Peters, Mo 63376

ENGINEERING #	J10069
DATE:	9/07/10
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SHEET:	TC1-1



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KEYED NOTES:

1 CONTRACTOR SHALL FURNISH AND INSTALL ONE (1) CAT-5 ETHERNET CABLE TO DSM-RTR (100) FOR LOCAL AND REMOTE COMMUNICATIONS. FIELD VERIFY ORIGIN OF ETHERNET CABLES AND COORDINATE WITH WIEGMANN. COORDINATE TERMINATION/PINOUT OF RJ-45 CONNECTORS WITH WIEGMANN ASSOCIATES.

1 NETWORK ARCHITECTURE AND CONTROLLER ADDRESSING
NO SCALE

**ST. CHARLES CITY-COUNTY
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SPENCER BRANCH**

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ENGINEERING # J10069

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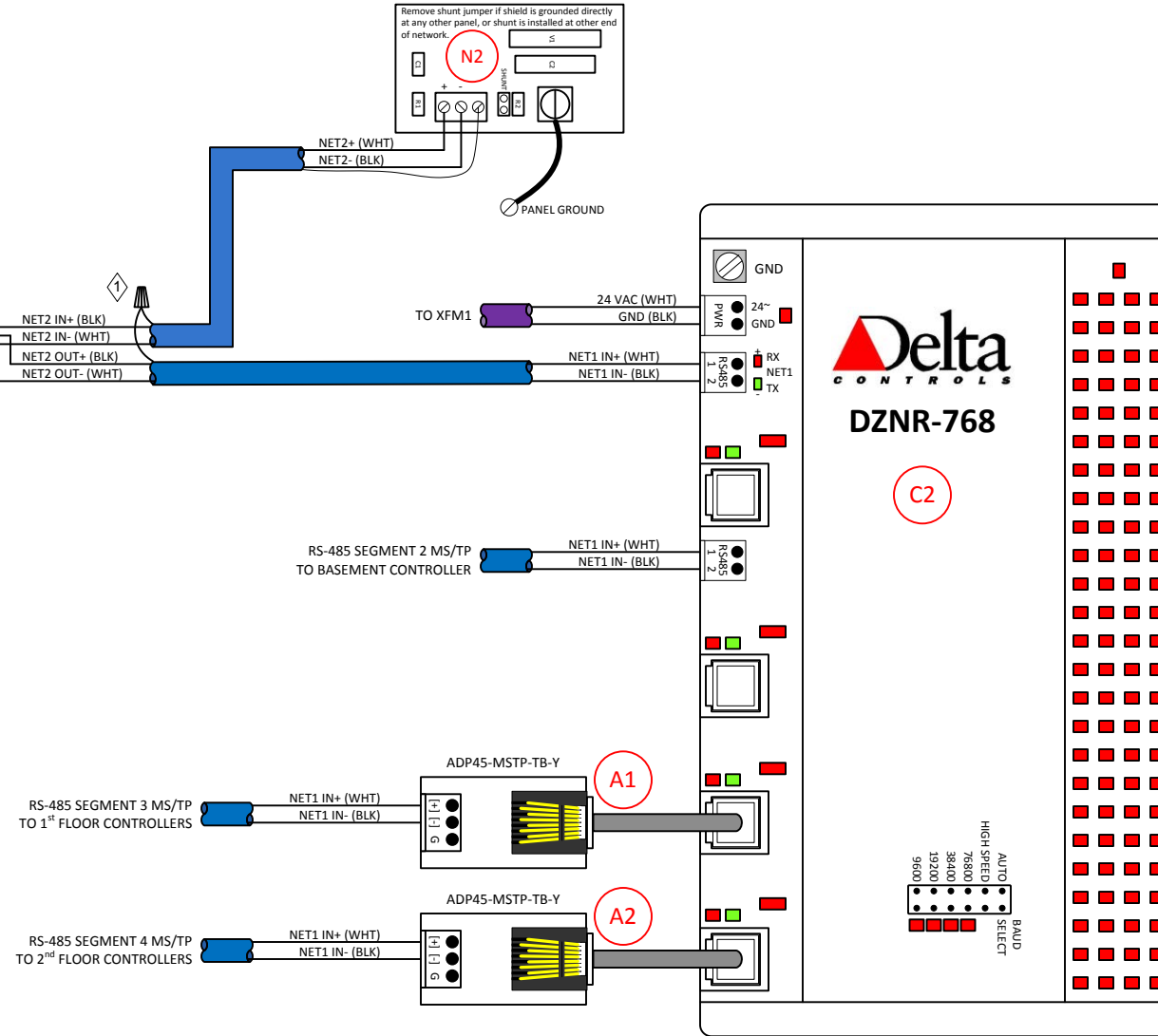
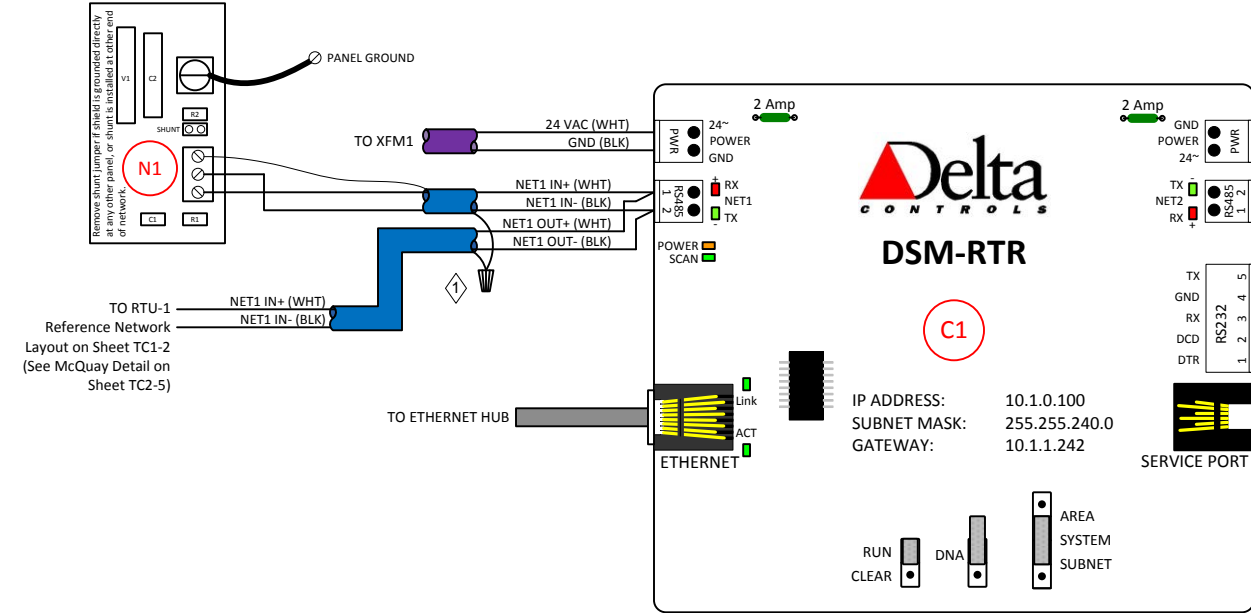
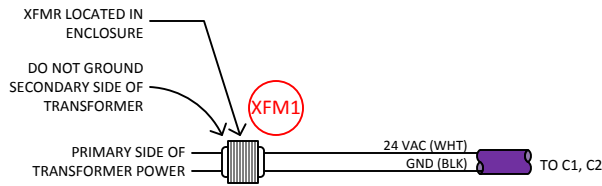
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GENERAL NOTES:

1. CONTROLS CONTRACTOR RESPONSIBLE FOR SETTING JUMPERS AS SHOWN ON CONTROLLER DETAIL

1 SYSTEM CONTROL ENCLOSURE
DSM-RTR ROUTERS AND DZNR REPEATER
NO SCALE

BILL OF MATERIALS			
ID	SUPPLIER	PART NUMBER	QTY
C1	DELTA	DSM-RTR	1
C2	DELTA	DZNR-768	1
N1 - N2	DELTA	TRM-768	2
XFM-1	KELE	TR100VA004	1
A1 - A2	DELTA	ADP45-MSTP-TB-Y	2
-	SCE	SCE-20N2006LP SCE-20N20MPP	1

ENGINEERING # J10069

DATE: 9/07/10

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SHEET: TC2-1

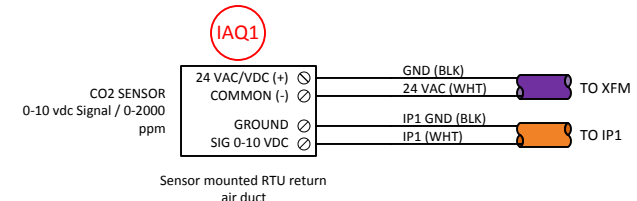
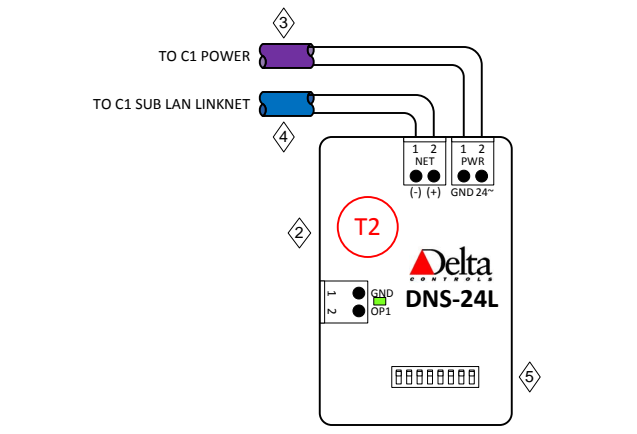
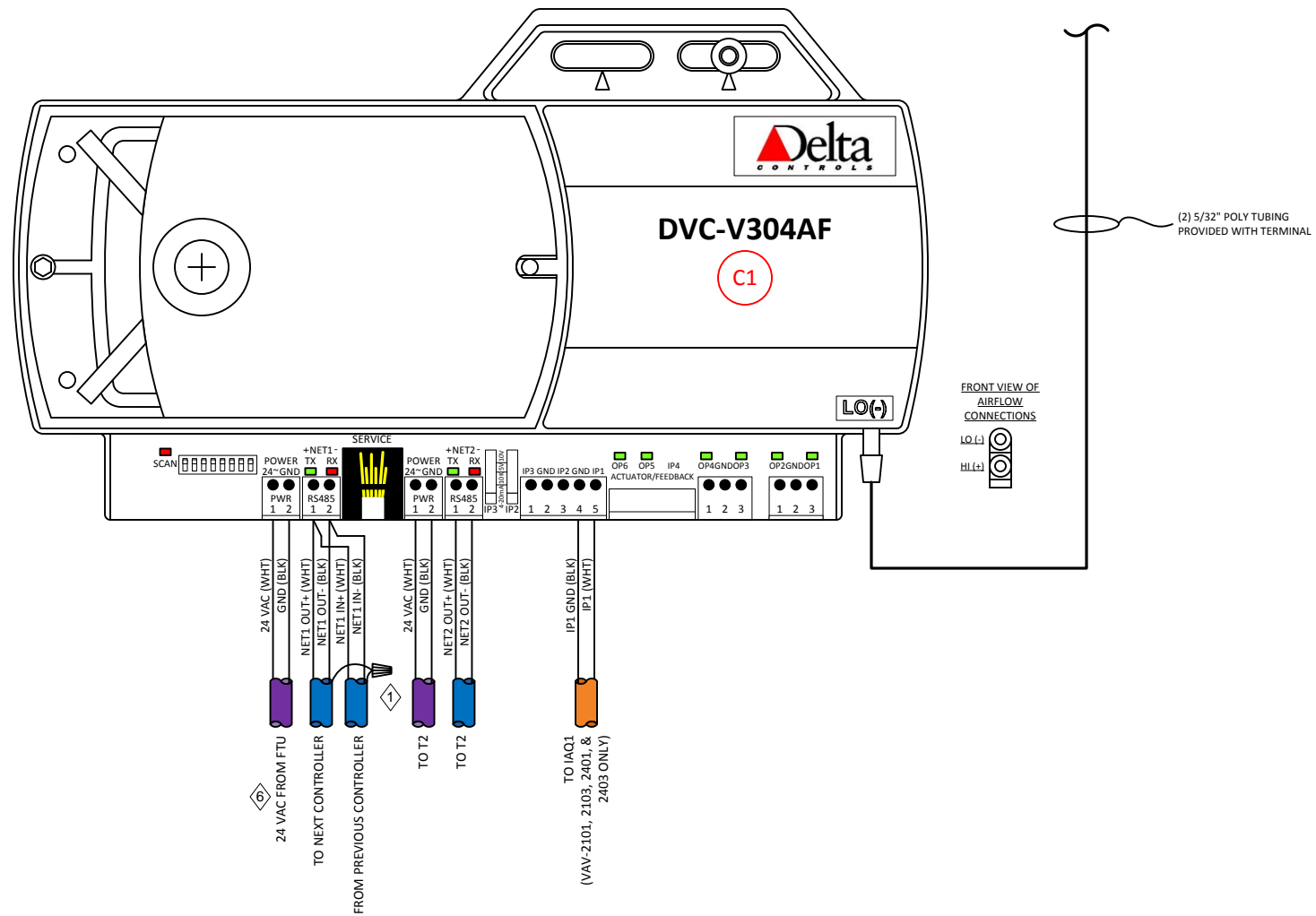
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TYPICAL RTU RETURN AIR CO2 WIRING

TYPICAL OF: VAV-2103 (RTU-1 RAC02)
 VAV-2101 (RTU-2 RAC02)
 VAV-2403 (RTU-3 RAC02)
 VAV-2401 (RTU-4 RAC02)

GENERAL NOTES:

- 1. CONTRACTOR TO LABEL ALL WIRES AS SHOWN ON DRAWING.

KEYED NOTES:

- 1 TWIST AND TAPE SHIELD WIRES TOGETHER AT EACH DEVICE TO PREVENT SHORTING.
- 2 MOUNT THERMOSTAT ADJACENT AND SAME HEIGHT AS LIGHT SWITCH
- 3 THERMOSTAT WIRING TO BE ONE 18/2 WHITE JACKETED CABLE.
- 4 THERMOSTAT WIRING TO BE ONE 24/2 WHITE JACKETED CABLE.
- 6 ADDRESS LINKNET THERMOSTAT AT "1".
- 6 24 VAC POWER FOR VAV CONTROLLER WILL BE SHARED FROM THE NEAREST FTU. ONLY ONE VAV CAN BE POWERED FROM EACH FTU.

1 TYPICAL VAV CONTROLLER DVC-V304AF (TYPICAL OF 10)
 NO SCALE

BILL OF MATERIALS (TOTAL FOR 10 TYPICAL)			
ID	SUPPLIER	PART NUMBER	QTY
C1	DELTA	DVC-V304AF	10
T2	DELTA	DNS-24L	10
IAQ1	KELE	CDK-D-V	4

PANEL	
POINT	LOGICAL POINT NAME
IP1	RTU RETURN AIR CO2 (VAV-2101, 2103, 2401, & 2403 ONLY)
IP2	SPARE
IP3	SPARE
OP1	SPARE
OP2	SPARE
OP3	SPARE
OP4	SPARE

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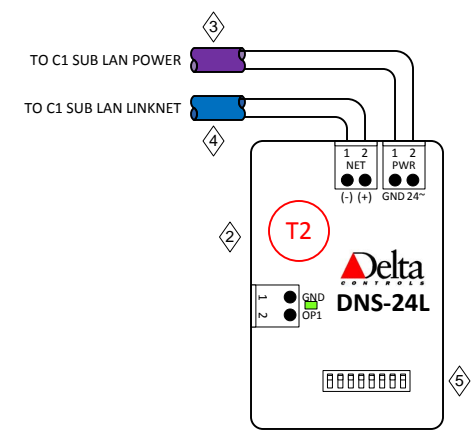
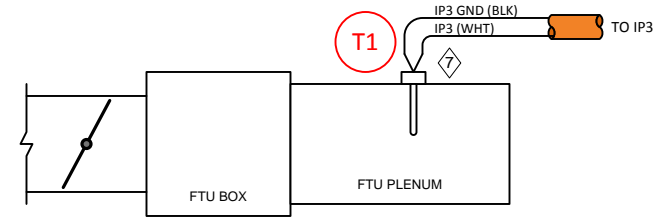
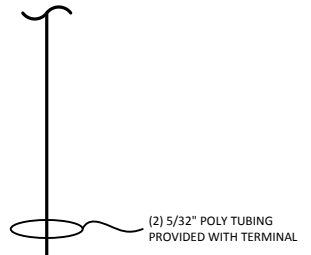
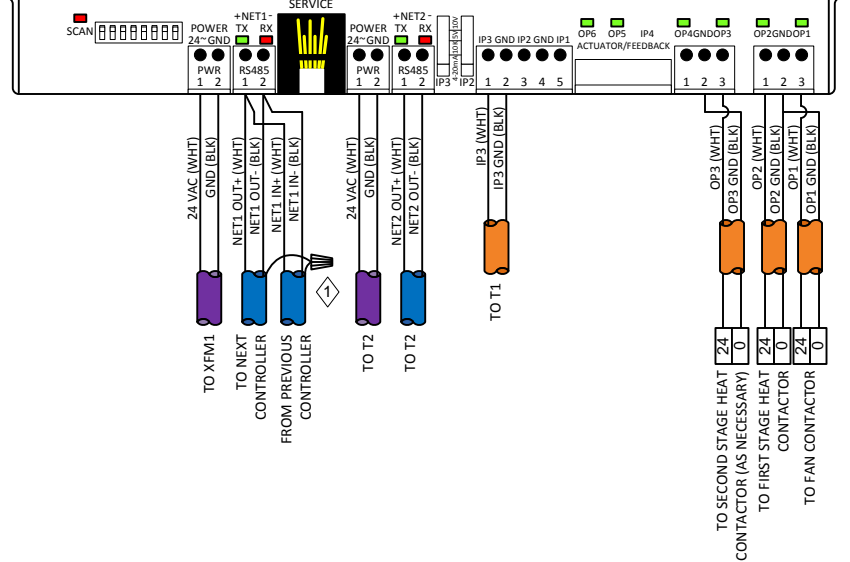
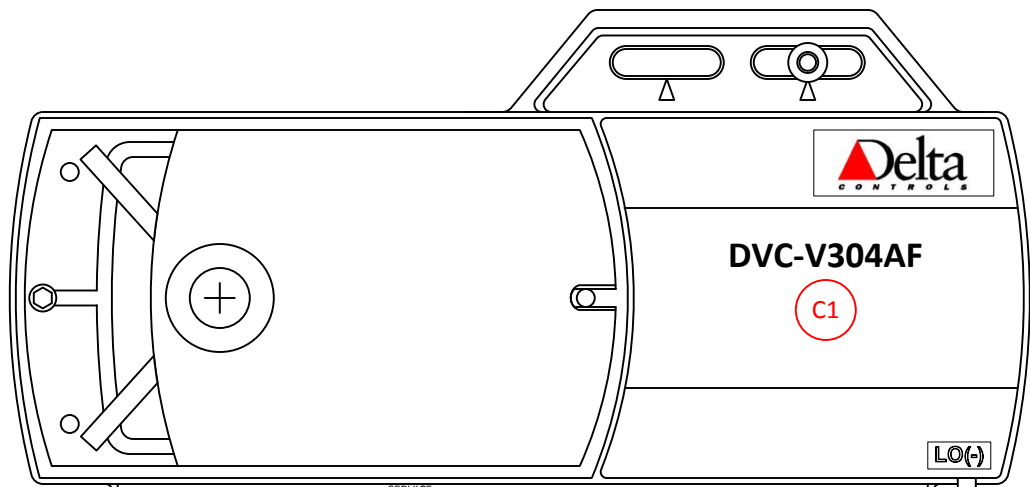
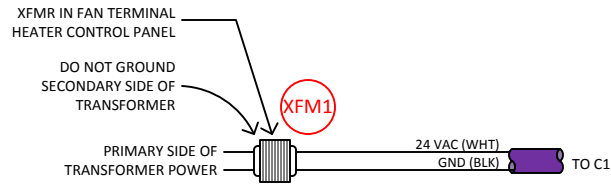
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FRONT VIEW OF AIRFLOW CONNECTIONS

GENERAL NOTES:

1. CONTRACTOR TO LABEL ALL WIRES AS SHOWN ON DRAWING.

KEYED NOTES:

- 1 TWIST AND TAPE SHIELD WIRES TOGETHER AT EACH DEVICE TO PREVENT SHORTING.
- 2 MOUNT THERMOSTAT ADJACENT AND SAME HEIGHT AS LIGHT SWITCH
- 3 THERMOSTAT WIRING TO BE ONE 18/2 WHITE JACKETED CABLE.
- 4 THERMOSTAT WIRING TO BE ONE 24/2 WHITE JACKETED CABLE.
- 5 ADDRESS LINKNET THERMOSTAT AT "1".
- 6 NOT USED
- 7 BA/10K-3-D-4" DISCHARGE AIR TEMPERATURE SENSOR TO BE INSTALLED IN BOX PLENUM. TEMPERATURE SENSOR IS A 10,000 OHM, TYPE II DEVICE.

1 TYPICAL FAN TERMINAL UNIT CONTROLLER DVC-V304AF (TYPICAL OF 29)
NO SCALE

BILL OF MATERIALS (TOTAL FOR 29 TYPICAL)			
ID	SUPPLIER	PART NUMBER	QTY
C1	DELTA	DVC-V304AF	29
T1	BAPI	BA/10K-3-D-4	29
T2	DELTA	DNS-24L	29
XFM1		FACTORY	

PANEL	
POINT	LOGICAL POINT NAME
IP1	SPARE
IP2	SPARE
IP3	SUPPLY AIR TEMPERATURE
OP1	TERMINAL FAN
OP2	ELECTRIC HEAT STAGE 1
OP3	ELECTRIC HEAT STAGE 2 (AS NECESSARY)
OP4	SPARE

ENGINEERING #	J10069
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SHEET:	TC2-3

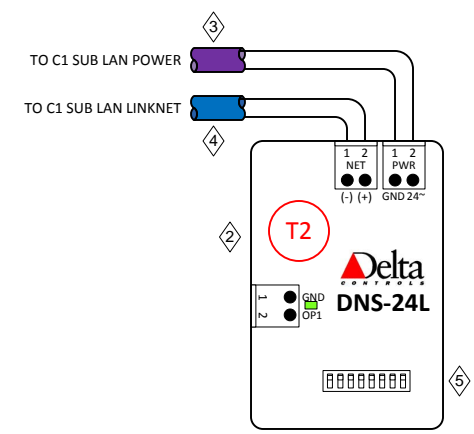
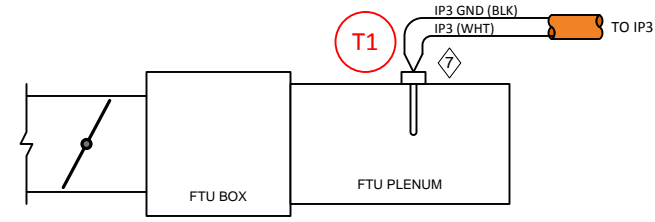
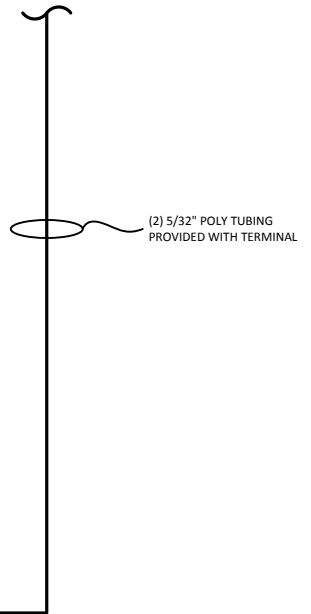
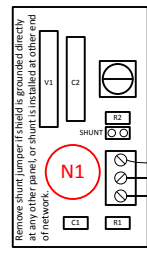
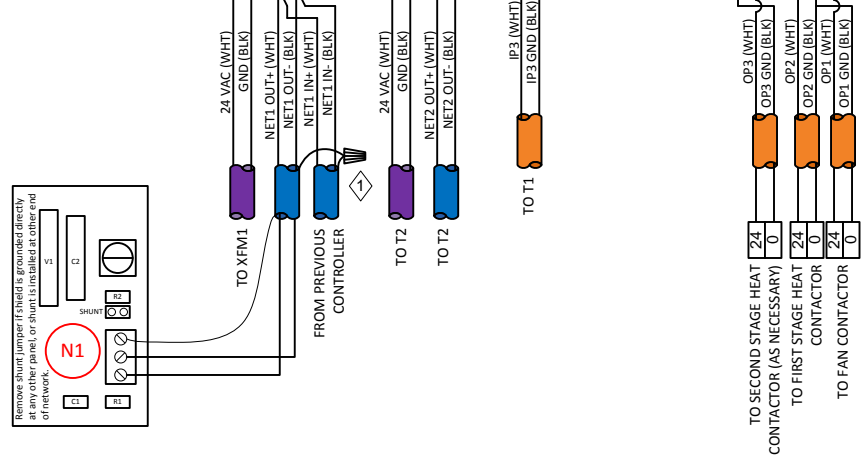
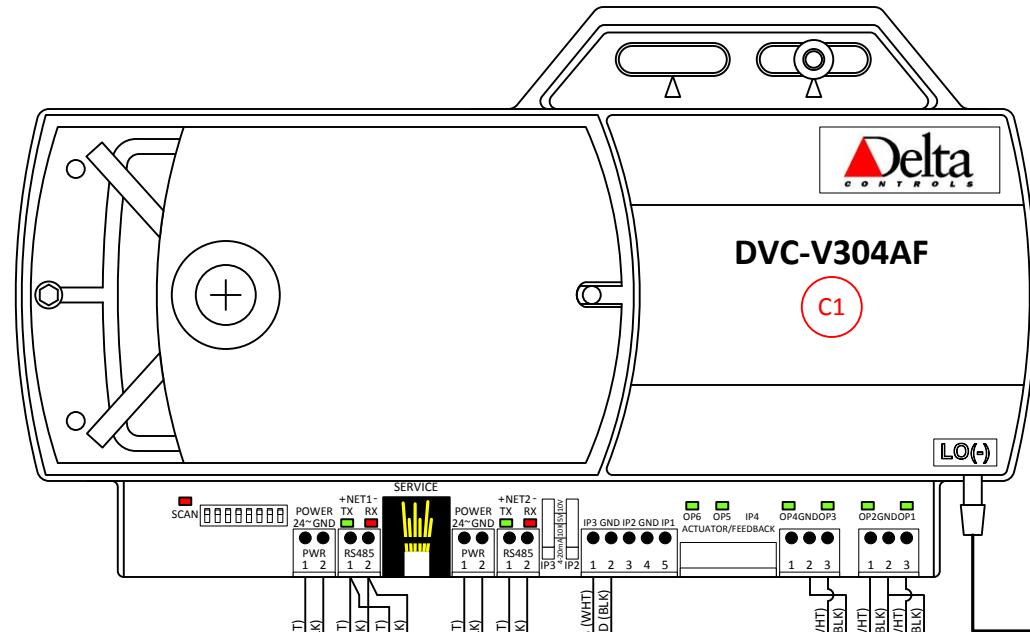
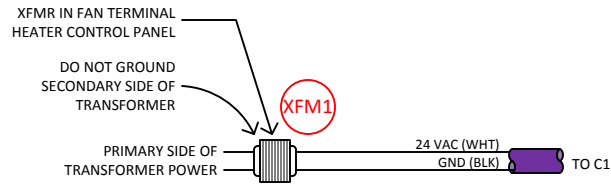
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GENERAL NOTES:

- 1. CONTRACTOR TO LABEL ALL WIRES AS SHOWN ON DRAWING.

KEYED NOTES:

- 1 TWIST AND TAPE SHIELD WIRES TOGETHER AT EACH DEVICE TO PREVENT SHORTING.
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- 4 THERMOSTAT WIRING TO BE ONE 24/2 WHITE JACKETED CABLE.
- 5 ADDRESS LINKNET THERMOSTAT AT "1".
- 6 NOT USED
- 7 BA/10K-3-D-4" DISCHARGE AIR TEMPERATURE SENSOR TO BE INSTALLED IN BOX PLENUM. TEMPERATURE SENSOR IS A 10,000 OHM, TYPE II DEVICE.

1 TYPICAL FAN TERMINAL UNIT CONTROLLER DVC-V304AF (TYPICAL OF 2) (119,145)
NO SCALE

BILL OF MATERIALS (TOTAL FOR 2 TYPICAL)			
ID	SUPPLIER	PART NUMBER	QTY
C1	DELTA	DVC-V304AF	2
T1	BAPI	BA/10K-3-D-4	2
T2	DELTA	DNS-24L	2
N1	DELTA	TRM-768	2
XF1	DELTA	FACTORY	2

PANEL	
POINT	LOGICAL POINT NAME
IP1	SPARE
IP2	SPARE
IP3	SUPPLY AIR TEMPERATURE
OP1	TERMINAL FAN
OP2	ELECTRIC HEAT STAGE 1
OP3	ELECTRIC HEAT STAGE 2 (AS NECESSARY)
OP4	SPARE

ENGINEERING #	J10069
DATE:	9/07/10
DRAWN BY:	MBS
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SHEET:	TC2-4

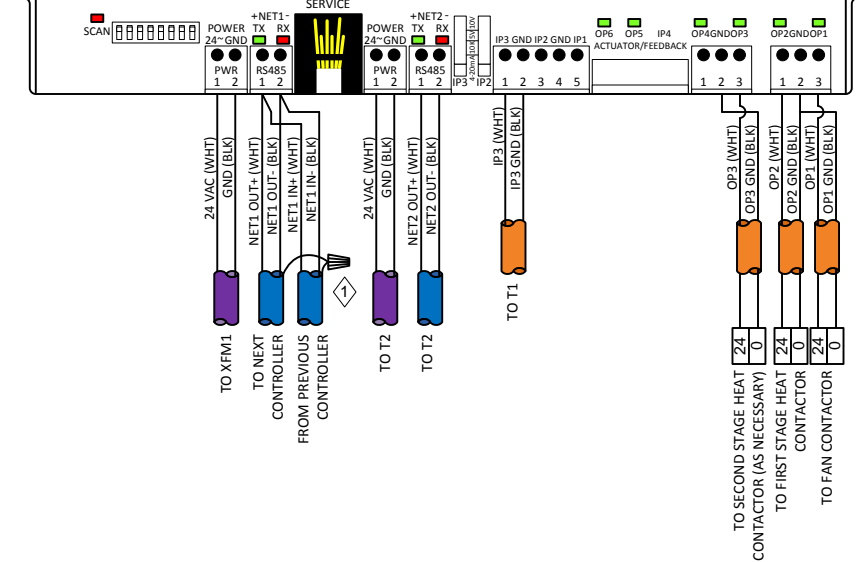
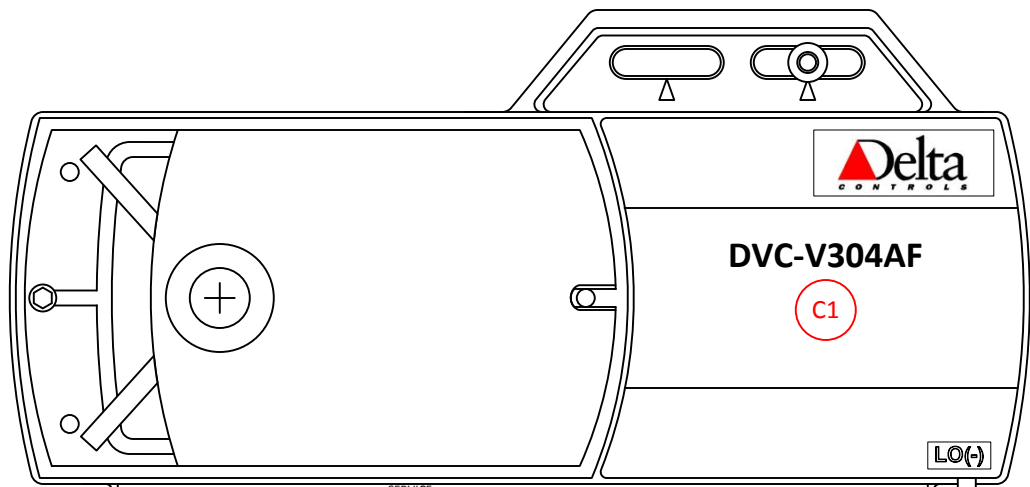
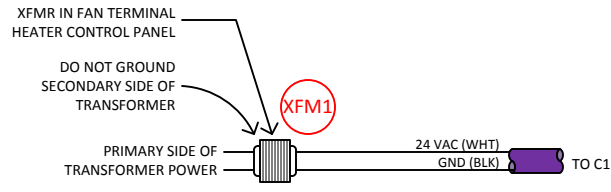
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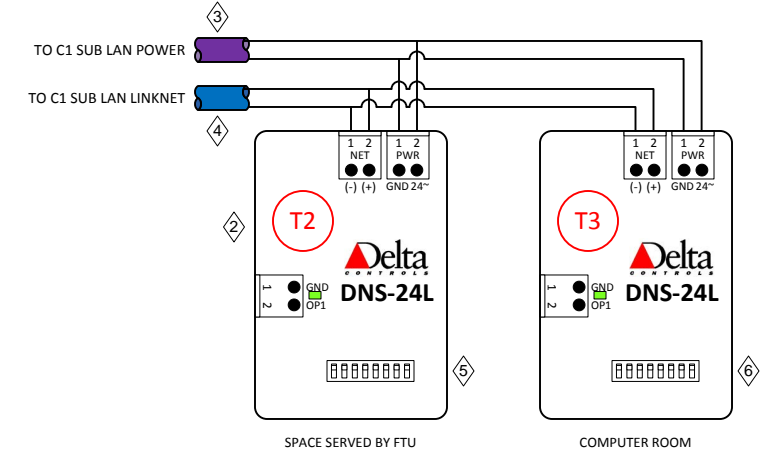
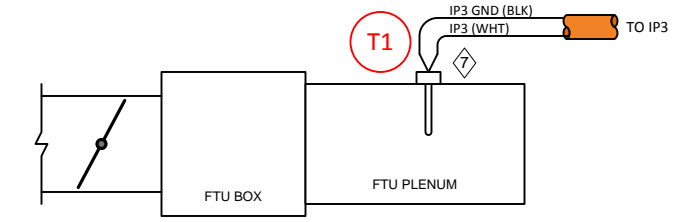
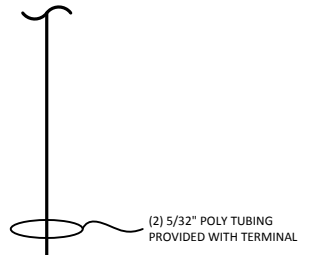


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FRONT VIEW OF AIRFLOW CONNECTIONS



BILL OF MATERIALS (TOTAL FOR 3 TYPICAL)			
ID	SUPPLIER	PART NUMBER	QTY
C1	DELTA	DVC-V304AF	3
T1	BAPI	BA/10K-3-D-4	3
T2 - T3	DELTA	DNS-24L	6
XFM1		FACTORY	

PANEL	
POINT	LOGICAL POINT NAME
IP1	SPARE
IP2	SPARE
IP3	SUPPLY AIR TEMPERATURE
OP1	TERMINAL FAN
OP2	ELECTRIC HEAT STAGE 1
OP3	ELECTRIC HEAT STAGE 2 (AS NECESSARY)
OP4	SPARE

GENERAL NOTES:

- CONTRACTOR TO LABEL ALL WIRES AS SHOWN ON DRAWING.

KEYED NOTES:

- TWIST AND TAPE SHIELD WIRES TOGETHER AT EACH DEVICE TO PREVENT SHORTING.
- MOUNT THERMOSTAT ADJACENT AND SAME HEIGHT AS LIGHT SWITCH
- THERMOSTAT WIRING TO BE ONE 18/2 WHITE JACKETED CABLE.
- THERMOSTAT WIRING TO BE ONE 24/2 WHITE JACKETED CABLE.
- ADDRESS LINKNET THERMOSTAT AT "1".
- ADDRESS LINKNET THERMOSTAT AT "2".
- BA/10K-3-D-4" DISCHARGE AIR TEMPERATURE SENSOR TO BE INSTALLED IN BOX PLENUM. TEMPERATURE SENSOR IS A 10,000 OHM, TYPE II DEVICE.

1 TYPICAL FTU CONTROLLER WITH COMPUTER RM SPACE TEMP DVC-V304AF (TYPICAL OF 3) (101,120,141)
NO SCALE

ST. CHARLES CITY-COUNTY LIBRARY DISTRICT SPENCER BRANCH

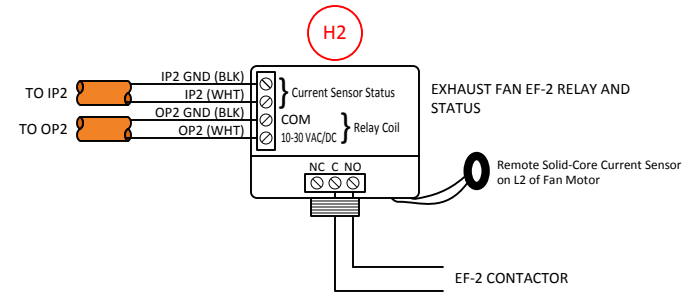
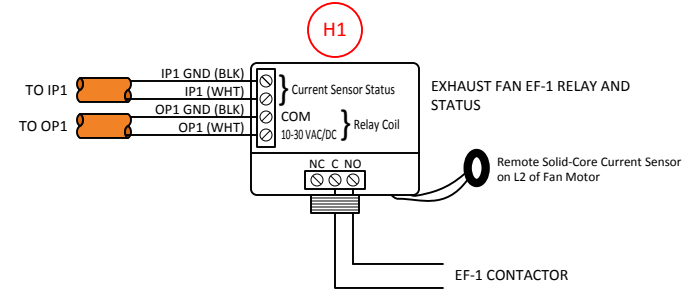
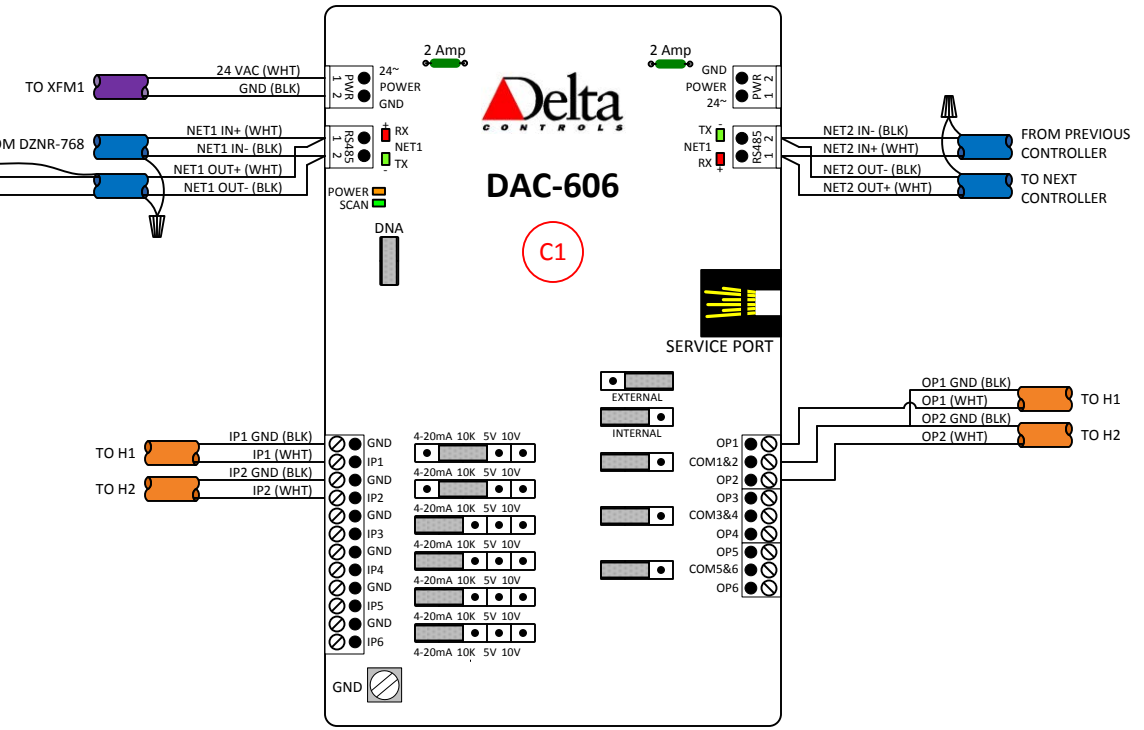
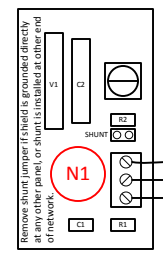
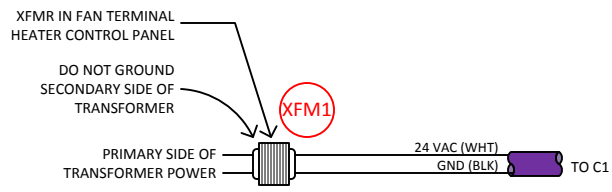
427 Spencer Road
St. Peters, Mo 63376

ENGINEERING #	J10069
DATE:	9/07/10
DRAWN BY:	MBS
CHECKED BY:	CW
SHEET:	TC2-5



750 Fountain Lakes Blvd.
St. Charles, MO 63301
Phone: (636) 940-1056
Fax: (636) 940-8808
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1 EXHAUST FAN CONTROLLER DAC-606 (145)
NO SCALE

BILL OF MATERIALS			
ID	SUPPLIER	PART NUMBER	QTY
C1	DELTA	DAC-606	1
H1 - H2	KELE	RIBXLCRA	2
N1	DELTA	TRM-768	1
XFM-1	KELE	TR100VA004	1
-	SCE	SCE-12N1206LP SCE-12N12MPP	1

PANEL	
POINT	LOGICAL POINT NAME
IP1	EXHAUST FAN EF-1 PROOF OF RUN
IP2	EXHAUST FAN EF-2 PROOF OF RUN
IP3	SPARE
IP4	SPARE
IP5	SPARE
IP6	SPARE
OP1	EXHAUST FAN EF-1 START/STOP
OP2	EXHAUST FAN EF-2 START/STOP
OP3	SPARE
OP4	SPARE
OP5	SPARE
OP6	SPARE

ENGINEERING # J10069
DATE: 9/07/10
DRAWN BY: MBS
CHECKED BY: CW

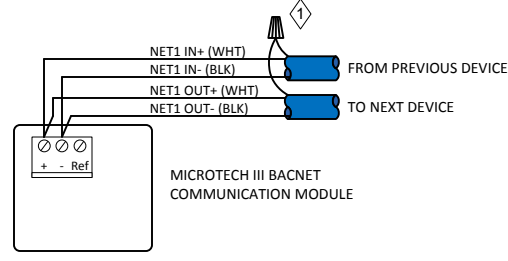
SHEET: TC2-6

**ST. CHARLES CITY-COUNTY
LIBRARY DISTRICT
SPENCER BRANCH**
427 Spencer Road
St. Peters, Mo 63376

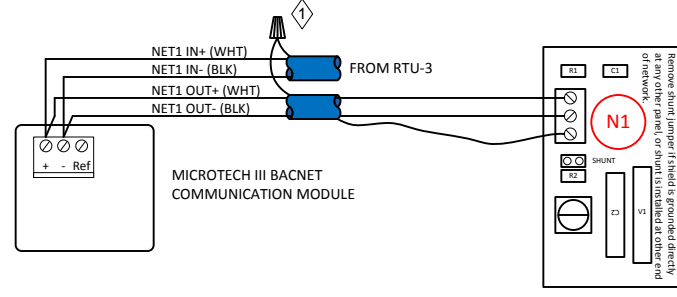


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1 RTU BACNET COMMUNICATIONS WIRING DETAIL
(TYPICAL OF RTU-1 THRU 3)
NO SCALE



1 RTU-4 BACNET COMMUNICATIONS WIRING DETAIL
NO SCALE

**ST. CHARLES CITY-COUNTY
LIBRARY DISTRICT
SPENCER BRANCH**

427 Spencer Road
St. Peters, Mo 63376

ENGINEERING # J10069

DATE: 9/07/10

DRAWN BY: MBS

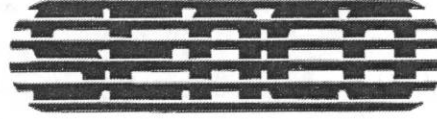
CHECKED BY: CW

SHEET: **TC2-7**



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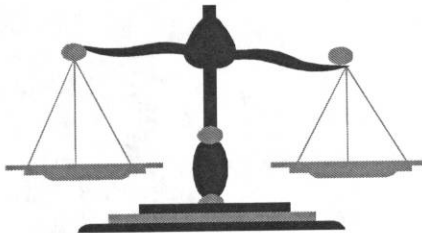
Senco Services Corporation

701 Emerson Road, Suite 220
Saint Louis, Missouri 63141-6753

HVAC TEST AND BALANCE REPORT

PROJECT NAME:

**St. Charles City-County Library District
Spencer Branch
427 Spencer Road
St. Peters, Missouri**



PREPARED FOR:

**Wiegmann Associates
Job# J10069**

DATE:

November 14, 2011

Table of Contents

AABC ANNUAL MEMBERSHIP CERTIFICATE

ADM-870 AIRDATA MULTIMETER CERTIFICATE OF CALIBRATION

RTU-1	1
RTU-2	5
RTU-3	10
RTU-4	14
EF-1	20
EF-2	22
EF-3 DIRECT DRIVE	23



Associated Air Balance Council

Annual Membership Certificate

Awarded to

Senco Services Corporation

as a member in good standing of the Associated Air Balance Council for the year

2011

This member has met all requirements for membership and is entitled to all rights and privileges of AABC certification. This certificate is renewable on an annual basis and expires December 31, 2011.



Michael T. Renovich, *President*

Kenneth M. Sufka, *Executive Director*

AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

Customer ID: 004849 S/N: M90885
 Customer: SENCO SERVICES CORPORATION City: ST. LOUIS State: MO
 As-Received Model #: ADM-870 Converted to Model #: _____ Order #: R112203
 PO #: _____ Customer Eqpt ID#: _____ Calibration Due Date: _____

This instrument has been calibrated using Calibration Standards which are traceable to NIST (National Institute of Standards and Technology). Quality Assurance Program and calibration procedures meet the requirements for ANSI/NCSS Z540-1-1994, ISO 17025, MIL-STD 45662A and manufacturer's specifications. Calibration accuracy is certified when meters are used with properly functioning accessories only. All Uncertainties are expressed in expanded terms (twice the calculated uncertainty). This report shall not be reproduced, except in full, without the written approval of Shortridge Instruments, Inc. Results relate only to the item calibrated. For limitations on use, see Shortridge Instruments, Inc. Instruction Manual for the use of AirData Multimeters. Procedure used: Procedure for Differential Pressure, Absolute Pressure and Temperature Recalibration of AirData Multimeters SIP-CP02 Revision: 27 Dated: 04/02/10

Calibration Technician(s): C. Kostel B. Cole Calibration Date: 07/21/11
 Calibration Approved by: L. Normand Title: DMN Date: 07/25/2011

AS-Received By <u>OK</u>	Final Test By <u>AC</u>	Test By _____
Date <u>07/19/11</u> Rh <u>50</u> %	Date <u>07/21/11</u> Rh <u>50</u> %	Date _____ Rh _____%
Ambient Temperature <u>73</u> °F	Ambient Temperature <u>74</u> °F	Ambient Temperature <u>NA</u> °F
Barometric Pressure <u>28.47</u> in Hg	Barometric Pressure <u>28.23</u> in Hg	Barometric Pressure _____ in Hg
All within spec <u>YES</u> NO NA	All within spec <u>YES</u> NO	All within spec YES NO

ABSOLUTE PRESSURE TEST (in Hg)

TEST METER TOLERANCE = ± 2.0 % ± .1 in Hg AS-RECEIVED TEST WITHIN SPEC YES NO N/A See Notes

Pressure Standard: Heise #02-R S/N: 41741/42451 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #12-R S/N: 43166/44731 <u>As-Rcvd</u> Test 2 Test 3
Pressure Standard: Heise #04-R S/N: 41743/42453 As-Rcvd <u>Test 2</u> Test 3	Pressure Standard: Heise #14-R S/N: 43412/45043 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #06-R S/N: 41742/42452 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #18-R S/N: 44581/46845 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #08-R S/N: 42186/43328 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #20-R S/N: 44582/46847 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #10-R S/N: 42203/43352 As-Rcvd Test 2 Test 3	

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
14.0	14.05	14.0	-.36	14.29	14.3	.07			
28.4	28.48	28.5	.07	28.23	28.4	.60			
40.0	40.05	40.1	.12	41.26	41.5	.58			

DIFFERENTIAL PRESSURE TEST (in wc)

TEST METER TOLERANCE = ± 2.0 % ± 0.001 in wc AS-RECEIVED TEST WITHIN SPEC YES NO N/A See Notes

Pressure Standard: Heise #01-L S/N: 41739/42449 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #11-L S/N: 43165/44551 <u>As-Rcvd</u> Test 2 Test 3
Pressure Standard: Heise #01-R S/N: 41739/42446 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #11-R S/N: 43165/44730 <u>As-Rcvd</u> Test 2 Test 3
Pressure Standard: Heise #02-L S/N: 41741/42454 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #12-L S/N: 43166/44732 <u>As-Rcvd</u> Test 2 Test 3
Pressure Standard: Heise #03-L S/N: 41738/42448 As-Rcvd <u>Test 2</u> Test 3	Pressure Standard: Heise #13-L S/N: 43415/45041 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #03-R S/N: 41738/42445 As-Rcvd <u>Test 2</u> Test 3	Pressure Standard: Heise #13-R S/N: 43415/45039 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #04-L S/N: 41743/42456 As-Rcvd <u>Test 2</u> Test 3	Pressure Standard: Heise #14-L S/N: 43412/45045 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #05-L S/N: 41740/42450 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #17-L S/N: 44579/46842 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #05-R S/N: 41740/42447 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #17-R S/N: 44579/46841 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #06-L S/N: 41742/42455 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #18-L S/N: 44581/46846 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #07-L S/N: 42185/42186 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #19-L S/N: 44580/46844 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #07-R S/N: 42185/43326 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #19-R S/N: 44580/46843 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #08-L S/N: 42186/43329 As-Rcvd Test 2 Test 3	Pressure Standard: Heise #20-L S/N: 44582/46848 As-Rcvd Test 2 Test 3
Pressure Standard: Heise #09-L S/N: 42202/43351 As-Rcvd Test 2 Test 3	
Pressure Standard: Heise #09-R S/N: 42202/43350 As-Rcvd Test 2 Test 3	
Pressure Standard: Heise #10-L S/N: 42203/43353 As-Rcvd Test 2 Test 3	

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
.0500	.0509	.0511	.39	.0514	.0516	.39			
.1250	.1270	.1273	.24	.1273	.1280	.55			
.2250	.2277	.2280	.13	.2269	.2280	.48			
.2700	.2715	.2730	.55	.2719	.2737	.66			
2.000	2.026	2.034	.39	2.078	2.089	.53			
3.600	3.666	3.671	.14	3.638	3.642	.11			
4.400	4.420	4.445	.57	4.454	4.480	.58			
27.00	27.42	27.50	.29	27.38	27.57	.69			
50.00	50.26	50.38	.24	50.72	50.88	.32			
Overrange	NA	✓	NA	NA	✓	NA	NA	NA	NA

Shortridge Instruments, Inc.
 7855 East Redfield Road Scottsdale, Arizona 85260
 (480) 991-6744 • Fax (480) 443-1267 • www.shortridge.com

AIR HANDLER DATA SHEET

1

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-1
MANUFACTURER: MCQUAY
MODEL: MPS050FE
TECHNICIAN: M. WEGENER
DATE: 11/8/11

	DESIGN	PRELIMINARY	FINAL
SYSTEM CFM	13000	12687	12687
OUTSIDE AIR CFM	5630	5348	5348
(IN, OUT, PD) STATIC PRESSURE - EXTERNAL	2.00	-.39/1.43/1.82	-.39/1.43/1.82
MOTOR			
CURRENT	17.7 FLA	13.0/12.5/12.2	13.0/12.5/12.2
VOLTAGE	460/3/60	485/3/47	485/3/47
HORSEPOWER	9.7 BHP	15 SF 1.15	15 SF 1.15
FAN RPM	1209	1215	1215

SYSTEM CONDITIONS
SYSTEM TYPE: VAV
FILTERS: Clean
COOLING COIL: Dry
RETURN AIR: Maximum
OUTSIDE AIR: Minimum

AIR BALANCE DATA SHEET

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-1
TECHNICIAN: M. WEGENER
DATE: 10/24/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
240	1	2412	1.000	445	445	401	401	431	431	97%
240	2	2412	1.000	445	445	378	378	446	446	100%
240	3	2412	1.000	445	445	172	172	428	428	96%
240	4	2412	1.000	445	445	349	349	483	483	109%
240	5	2412	1.000	445	445	491	491	474	474	107%
240	6	2412	1.000	445	445	569	569	469	469	105%
VAV-2101 TOTAL					2670		2360		2731	102%
MINIMUM CFM					800		843		843	105%
224	1	2410	1.000	240	240	303	303	243	243	101%
234	2	2410	1.000	300	300	260	260	306	306	102%
232	3	2412	1.000	600	600	454	454	585	585	98%
229	4	2408	1.000	75	75	218	218	71	71	95%
231	5	2408	1.000	150	150	275	275	164	164	109%
VAV-2102 TOTAL					1365		1510		1369	100%
MINIMUM CFM					410		427		427	104%
262	1	2408	1.000	165	165	87	87	153	153	93%
262	2	2408	1.000	165	165	190	190	168	168	102%
268	3	2408	1.000	170	170	224	224	174	174	102%
268	4	2408	1.000	170	170	154	154	179	179	105%
VAV-2103 TOTAL					670		655		674	101%
MINIMUM CFM					200		213		213	107%
249	1	2410	1.000	295	295	197	197	296	296	100%
250	2	2408	1.000	230	230	145	145	217	217	94%
252	3	2408	1.000	170	170	119	119	175	175	103%
FTU-2101 TOTAL					695		461		688	99%
FAN CFM					265		278		278	105%
PRIMARY MINIMUM CFM					160		167		167	104%

AIR BALANCE DATA SHEET

3

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-1
TECHNICIAN: M. WEGENER
DATE: 10/24/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
246	1	2410	1.000	310	310	111	111	286	286	92%
247	2	2408	1.000	85	85	65	65	88	88	104%
248	3	2408	1.000	75	75	63	63	77	77	103%
	FTU-2102 TOTAL					470		239	451	96%
	FAN CFM					200		419	217	109%
	PRIMARY MINIMUM CFM					125		134	134	107%
243	1	2412	1.000	590	590	470	470	575	575	97%
243	2	2412	1.000	590	590	439	439	538	538	91%
243	3	2412	1.000	590	590	454	454	557	557	94%
243	4	2412	1.000	590	590	464	464	562	562	95%
	FTU-2103 TOTAL					2360		1827	2232	95%
	FAN CFM					945		1104	960	102%
	PRIMARY MINIMUM CFM					472		486	486	103%
240	1	2412	1.000	450	450	307	307	409	409	91%
240	2	2412	1.000	450	450	379	379	483	483	107%
240	3	2412	1.000	450	450	336	336	458	458	102%
237	4	2410	1.000	320	320	252	252	341	341	107%
	FTU-2104 TOTAL					1670		1274	1691	101%
	FAN CFM					668		949	715	107%
	PRIMARY MINIMUM CFM					335		322	322	96%
227	1	2410	1.000	385	385	246	246	387	387	101%
226	2	2410	1.000	340	340	247	247	323	323	95%
	FTU-2105 TOTAL					725		493	710	98%
	FAN CFM					290		504	308	106%
	PRIMARY MINIMUM CFM					150		162	162	108%

AIR BALANCE DATA SHEET

4

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-1
TECHNICIAN: M. WEGENER
DATE: 10/24/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
f259	1	2410	1.000	350	350	389	389	351	351	100%
259	2	2410	1.000	350	350	243	243	346	346	99%
259	3	2410	1.000	350	350	399	399	358	358	102%
259	4	2410	1.000	350	350	318	318	328	328	94%
263	5	2410	1.000	310	310	371	371	291	291	94%
263	6	2410	1.000	310	310	425	425	312	312	101%
265	7	2410	1.000	310	310	347	347	314	314	101%
265	8	2410	1.000	310	310	379	379	317	317	102%
FTU-2106 TOTAL					2640		2871		2617	99%
FAN CFM					1225		1584		1296	106%
PRIMARY MINIMUM CFM					625		642		642	103%
257	1	2408	1.000	120	120	138	138	128	128	107%
259	2	2410	1.000	315	315	274	274	305	305	97%
FTU-2107 TOTAL					435		412		433	100%
FAN CFM					200		480		216	108%
PRIMARY MINIMUM CFM					130		221		139	107%
255	1	2408	1.000	230	230	172	172	243	243	106%
256	2	2410	1.000	275	275	193	193	270	270	98%
256	3	2410	1.000	275	275	187	187	261	261	95%
FTU-2108 TOTAL					780		552		774	99%
FAN CFM					340		352		352	104%
PRIMARY MINIMUM CFM					220		209		209	95%
254	FTU-2109	2408	1.000	230	230	301	301	221	221	96%
FAN CFM					200		216		216	108%
PRIMARY MINIMUM CFM					80		85		85	106%

AIR HANDLER DATA SHEET

5

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-2
MANUFACTURER: MCQUAY
MODEL: MPS025FE
TECHNICIAN: M. WEGENER
DATE: 11/8/11

		DESIGN	PRELIMINARY	FINAL
SYSTEM CFM		9032	9043	9043
OUTSIDE AIR CFM		1770	1911	1911
(IN, OUT, PD) STATIC PRESSURE - EXTERNAL		2.00	-.29/1.47/1.76	-.29/1.47/1.76
MOTOR	CURRENT	12.5 FLA	12.2/11.9/11.7	12.2/11.9/11.7
	VOLTAGE	460/3/60	485/3/60	485/3/60
	HORSEPOWER	9.6 BHP	10 SF 1.15	10 SF 1.15
FAN RPM		1956	1965	1965

SYSTEM CONDITIONS
SYSTEM TYPE: VAV
FILTERS: Clean
COOLING COIL: Wet
RETURN AIR: Maximum
OUTSIDE AIR: Minimum

AIR BALANCE DATA SHEET

6

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-2
TECHNICIAN: M. WEGENER
DATE: 10/27/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
105	1	2410	1.000	370	370	330	330	358	358	97%
105	2	2410	1.000	365	365	452	452	375	375	103%
105	3	2410	1.000	365	365	344	344	379	379	104%
124	4	2408	1.000	200	200	275	275	212	212	106%
124	5	2408	1.000	200	200	290	290	217	217	109%
VAV-1201 TOTAL					1500		1691		1541	103%
MINIMUM CFM					450		467		467	104%
105	1	48x4	0.850	235	200	253	215	227	193	96%
105	2	48x4	0.850	235	200	260	221	242	206	103%
105	3	2408	1.000	100	100	65	65	92	92	92%
VAV-1202 TOTAL					500		501		491	98%
MINIMUM CFM					150		155		155	103%
126	1	2408	1.000	200	200	79	79	186	186	93%
126	2	2408	1.000	200	200	59	59	201	201	101%
126	3	2408	1.000	100	100	142	142	101	101	101%
126	4	2408	1.000	100	100	94	94	95	95	95%
126	5	2408	1.000	100	100	89	89	103	103	103%
126	6	2410	1.000	245	245	228	228	226	226	92%
126	7	2410	1.000	245	245	236	236	246	246	100%
127	8	2410	1.000	200	200	154	154	214	214	107%
FTU-1201 TOTAL					1390		1081		1372	99%
FAN CFM					525		618		540	103%
PRIMARY MINIMUM CFM					350		362		362	103%

AIR BALANCE DATA SHEET

7

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-2
TECHNICIAN: M. WEGENER
DATE: 11/1/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
128	1	2410	1.000	320	320	205	205	319	319	100%
128	2	2410	1.000	325	325	212	212	328	328	101%
	FTU-1202 TOTAL				645		417		647	100%
	FAN CFM				260		427		284	109%
	PRIMARY MINIMUM CFM				150		159		159	106%
129	1	2408	1.000	215	215	134	134	209	209	97%
129	2	2408	1.000	215	215	142	142	219	219	102%
	FTU-1203 TOTAL				430		276		428	100%
	FAN CFM				200		449		213	107%
	PRIMARY MINIMUM CFM				130		137		137	105%
122	1	12x12	0.659	190	125	121	80	177	117	93%
122	2	12x12	0.659	190	125	130	86	185	122	98%
122	3	12x12	0.659	190	125	170	112	205	135	108%
122	4	12x12	0.659	190	125	180	119	198	130	104%
	FTU-1204 TOTAL				500		397		505	101%
	FAN CFM				200		268		197	99%
	PRIMARY MINIMUM CFM				135		140		140	104%
121	1	2410	1.000	300	300	427	427	310	310	103%
120	2	2410	1.000	300	300	394	394	284	284	95%
119	3	12x12	1.000	200	200	337	337	193	193	97%
	FTU-1205 TOTAL				800		1158		787	98%
	FAN CFM				320		531		349	109%
	PRIMARY MINIMUM CFM				160		171		171	107%

AIR BALANCE DATA SHEET

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-2
TECHNICIAN: M. WEGENER
DATE: 10/27/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
115	1	2408	1.000	235	235	85	85	214	214	91%
115	2	2408	1.000	235	235	98	98	248	248	106%
116	3	2408	1.000	180	180	119	119	183	183	102%
116	4	2408	1.000	180	180	95	95	192	192	107%
116	5	2408	1.000	180	180	113	113	177	177	98%
116	6	2408	1.000	180	180	106	106	188	188	104%
116	7	2408	1.000	180	180	82	82	164	164	91%
FTU-1206 TOTAL					1370		698		1366	100%
FAN CFM					550		404		521	95%
PRIMARY MINIMUM CFM					275		289		289	105%
101	1	2408	1.000	225	225	90	90	218	218	97%
101	2	2408	1.000	225	225	89	89	220	220	98%
FTU-1207 TOTAL					450		179		438	97%
FAN CFM					200		414		214	107%
PRIMARY MINIMUM CFM					135		140		140	104%
123	1	2410	1.000	250	250	190	190	243	243	97%
123	2	12x12	1.000	250	250	159	159	264	264	106%
123	3	12x12	1.000	250	250	214	214	241	241	96%
123	4	12x12	1.000	255	255	230	230	258	258	101%
123	5	12x12	1.000	250	250	170	170	235	235	94%
123	6	12x12	1.000	250	250	250	250	261	261	104%
FTU-1208 TOTAL					1505		1213		1502	100%
FAN CFM					530		524		524	99%
PRIMARY MINIMUM CFM					350		364		364	104%

AIR BALANCE DATA SHEET

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-2
TECHNICIAN: M. WEGENER
DATE: 10/31/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
125	1	2410	1.000	300	300	234	234	289	289	96%
125	2	2410	1.000	250	250	203	203	244	244	98%
125	3	2410	1.000	250	250	247	247	263	263	105%
125	4	2410	1.000	300	300	47	47	303	303	101%
125	5	2410	1.000	300	300	254	254	323	323	108%
125	6	2410	1.000	300	300	259	259	307	307	102%
	FTU-1209 TOTAL					1700		1244	1729	102%
	FAN CFM					680		996	705	104%
	PRIMARY MINIMUM CFM					340		356	356	105%

AIR HANDLER DATA SHEET

10

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-3
MANUFACTURER: MCQUAY
MODEL: MPS025FE
TECHNICIAN: M. WEGENER
DATE: 11/8/11

	DESIGN	PRELIMINARY	FINAL
SYSTEM CFM	8684	8574	8574
OUTSIDE AIR CFM	2070	2156	2156
(IN, OUT, PD) STATIC PRESSURE - EXTERNAL	2.00	-.40/1.49/1.89	-.40/1.49/1.89
MOTOR			
CURRENT	12.5 FLA	11.9/11.7/11.6	11.9/11.7/11.6
VOLTAGE	460/3/60	485/3/60	485/3/60
HORSEPOWER	8.9 BHP	10 SF 1.15	10 SF 1.15
FAN RPM	1904	1910	1910

SYSTEM CONDITIONS

SYSTEM TYPE: VAV
FILTERS: Clean
COOLING COIL: Dry
RETURN AIR: Maximum
OUTSIDE AIR: Minimum

AIR BALANCE DATA SHEET

11

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-3
TECHNICIAN: M. WEGENER
DATE: 10/27/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
105	1	48x4	0.850	235	200	208	177	254	216	108%
105	2	48x4	0.850	235	200	158	134	217	185	92%
105	3	2410	1.000	250	250	312	312	253	253	101%
	VAV-1301 TOTAL				650		623		654	101%
	MINIMUM CFM				150		156		156	104%
111	1	2410	1.000	265	265	255	255	268	268	101%
111	2	2410	1.000	265	265	208	208	260	260	98%
111	3	2410	1.000	270	270	230	230	281	281	104%
111	4	2410	1.000	275	275	230	230	282	282	103%
	VAV-1302 TOTAL				1075		923		1091	101%
	MINIMUM CFM				325		334		334	103%
112	1	2408	1.000	230	230	160	160	225	225	98%
112	2	2408	1.000	230	230	147	147	210	210	91%
112	3	2408	1.000	230	230	182	182	229	229	100%
112	4	2408	1.000	230	230	168	168	243	243	106%
	FTU-1301 TOTAL				920		657		907	99%
	FAN CFM				340		399		352	104%
	PRIMARY MINIMUM CFM				225		235		235	104%
110	1	2410	1.000	310	310	246	246	281	281	91%
110	2	2410	1.000	310	310	253	253	294	294	95%
110	3	2410	1.000	310	310	309	309	316	316	102%
110	4	2410	1.000	310	310	309	309	311	311	100%
110	5	2410	1.000	310	310	320	320	325	325	105%
110	6	2410	1.000	310	310	299	299	307	307	99%
	FTU-1302 TOTAL				1860		1736		1834	99%
	FAN CFM				745		778		778	104%
	PRIMARY MINIMUM CFM				375		385		385	103%

AIR BALANCE DATA SHEET

12

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-3
TECHNICIAN: M. WEGENER
DATE: 10/27/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
109	1	2410	1.000	270	270	217	217	265	265	98%
109	2	2410	1.000	270	270	133	133	268	268	99%
109	3	2410	1.000	270	270	146	146	284	284	105%
109	4	2410	1.000	275	275	234	234	251	251	91%
109	5	2410	1.000	270	270	289	289	279	279	103%
109	6	2410	1.000	275	275	258	258	260	260	95%
FTU-1303 TOTAL					1630		1277		1607	99%
FAN CFM					655		643		643	98%
PRIMARY MINIMUM CFM					325		318		318	98%
107	1	2410	1.000	390	390	221	221	356	356	91%
107	2	2410	1.000	390	390	226	226	362	362	93%
107	3	2410	1.000	395	395	273	273	407	407	103%
107	4	2410	1.000	395	395	267	267	418	418	106%
107	5	2410	1.000	390	390	262	262	411	411	105%
FTU-1304 TOTAL					1960		1249		1954	100%
FAN CFM					785		979		751	96%
PRIMARY MINIMUM CFM					392		409		409	104%
107	1	2410	1.000	280	280	151	151	258	258	92%
107	2	2410	1.000	280	280	168	168	267	267	95%
107	3	2410	1.000	280	280	256	256	294	294	105%
107	4	2410	1.000	285	285	287	287	279	279	98%
107	5	2410	1.000	285	285	254	254	307	307	108%
FTU-1305 TOTAL					1410		1116		1405	100%
FAN CFM					540		718		539	100%
PRIMARY MINIMUM CFM					350		338		338	97%

AIR BALANCE DATA SHEET

13

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-3
TECHNICIAN: M. WEGENER
DATE: 10/27/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
106	1	2410	1.000	235	235	137	137	224	224	95%
106	2	2410	1.000	235	235	121	121	214	214	91%
106	3	2410	1.000	240	240	181	181	245	245	102%
106	4	2410	1.000	240	240	244	244	248	248	103%
106	5	2410	1.000	240	240	264	264	256	256	107%
106	6	2410	1.000	240	240	289	289	261	261	109%
	FTU-1306 TOTAL					1430		1236	1448	101%
	FAN CFM					575		639	570	99%
	PRIMARY MINIMUM CFM					350		356	356	102%

AIR HANDLER DATA SHEET

14

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-4
MANUFACTURER: MCQUAY
MODEL: MPS050FE
TECHNICIAN: M. WEGENER
DATE: 11/8/11

	DESIGN	PRELIMINARY	FINAL
SYSTEM CFM	16433	16030	16030
OUTSIDE AIR CFM	3520	3587	3587
(IN, OUT, PD) STATIC PRESSURE - EXTERNAL	2.00	-.37/1.28/1.65	-.37/1.28/1.65
MOTOR			
CURRENT	17.7 FLA	14.1/13.8/13.5	14.1/13.8/13.5
VOLTAGE	460/3/60	485/3/60	485/3/60
HORSEPOWER	14.7 BHP	15 SF 1.15	15 SF 1.15
FAN RPM	1404	1410	1410

SYSTEM CONDITIONS

SYSTEM TYPE: VAV
FILTERS: Clean
COOLING COIL: Dry
RETURN AIR: Maximum
OUTSIDE AIR: Minimum

AIR BALANCE DATA SHEET

15

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-4
TECHNICIAN: M. WEGENER
DATE: 10/21/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
204	1	12x12	0.659	326	215	219	144	316	208	97%
204	2	12x12	0.659	326	215	246	162	320	211	98%
204	3	12x12	0.659	326	215	234	154	342	225	105%
204	4	12x12	0.659	326	215	217	143	331	218	101%
204	5	12x12	0.659	326	215	248	163	352	232	108%
204	6	12x12	0.659	326	215	237	156	349	230	107%
204	7	12x12	0.659	326	215	211	139	302	199	92%
204	8	12x12	0.659	326	215	234	154	329	217	101%
204	9	12x12	0.659	326	215	250	165	322	212	99%
204	10	12x12	0.659	326	215	247	163	340	224	104%
VAV-2401 TOTAL					2150		1543		2176	101%
MINIMUM CFM					650		646		646	99%
207	1	12x12	0.659	440	290	271	179	411	271	93%
207	2	12x12	0.659	440	290	233	154	432	285	98%
207	3	12x12	0.659	440	290	285	188	465	307	106%
207	4	12x12	0.659	440	290	298	197	473	312	107%
222	5	12x12	0.659	440	290	262	173	410	270	93%
222	6	12x12	0.659	440	290	224	148	406	268	92%
205	7	12x12	0.659	440	290	280	185	441	291	100%
205	8	12x12	0.659	440	290	286	189	447	295	102%
205	9	12x12	0.659	440	290	293	193	452	298	103%
205	10	12x12	0.659	440	290	310	204	472	311	107%
205	11	12x12	0.659	440	290	321	211	476	314	108%
VAV-2402 TOTAL					3190		2021		3220	101%
MINIMUM CFM					960		646		964	100%

AIR BALANCE DATA SHEET

16

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-4
TECHNICIAN: M. WEGENER
DATE: 10/24/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN	
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM		
201	1	12x12	0.659	331	218	273	180	342	226	104%	
201	2	12x12	0.659	331	218	256	169	327	216	99%	
201	3	12x12	0.659	331	218	293	193	356	235	108%	
201	4	12x12	0.659	331	218	239	158	314	207	95%	
201	5	12x12	0.659	331	218	261	172	320	211	97%	
201	6	12x12	0.659	331	218	270	178	340	224	103%	
201	7	12x12	0.659	331	218	233	154	306	202	93%	
201	8	12x12	0.659	331	218	265	175	332	219	100%	
201	9	12x12	0.659	331	218	286	188	349	230	106%	
201	10	12x12	0.659	331	218	259	171	318	210	96%	
201	11	12x12	0.659	331	218	272	179	341	225	103%	
201	12	12x12	0.659	331	218	261	172	320	211	97%	
201	13	12x12	0.659	331	218	297	196	350	231	106%	
201	14	12x12	0.659	331	218	261	172	331	218	100%	
201	15	12x12	0.659	331	218	236	156	312	206	94%	
201	16	12x12	0.659	331	218	247	163	317	209	96%	
	OUTLET TOTAL					3485		2777		3480	100%
	VAV-2403		0.785	2223	1745	1788	1404	2232	1752	100%	
	MINIMUM CFM					525		541		541	103%
	FTU-2410		0.785	2217	1740	1750	1373	2202	1728	99%	
	FAN CFM				800		1494		837	105%	
	PRIMARY MINIMUM CFM					800		822		822	103%

AIR BALANCE DATA SHEET

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-4
TECHNICIAN: M. WEGENER
DATE: 10/21/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
225	1	2408	1.000	225	225	258	258	227	227	101%
225	2	2408	1.000	225	225	249	249	219	219	97%
223	3	2410	1.000	380	380	410	410	375	375	99%
223	4	2410	1.000	380	380	458	458	409	409	108%
FTU-2401 TOTAL						1210		1375	1230	102%
FAN CFM						485		514	514	106%
PRIMARY MINIMUM CFM						242		260	260	107%
221	1	2412	1.000	590	590	90	90	592	592	100%
221	2	2412	1.000	590	590	89	89	597	597	101%
221	3	2412	1.000	590	590	89	89	571	571	97%
FTU-2402 TOTAL						1770		268	1760	99%
FAN CFM						708		1197	750	106%
PRIMARY MINIMUM CFM						354		341	341	96%
220	1	2408	1.000	230	230	220	220	220	220	96%
220	2	2408	1.000	230	230	225	225	225	225	98%
FTU-2403 TOTAL						460		445	445	97%
FAN CFM						220		537	235	107%
PRIMARY MINIMUM CFM						120		126	126	105%
219	1	2408	1.000	215	215	136	136	219	219	102%
218	2	2408	1.000	275	275	205	205	266	266	97%
211	3	2408	1.000	220	220	136	136	222	222	101%
FTU-2404 TOTAL						710		477	707	100%
FAN CFM						285		529	298	105%
PRIMARY MINIMUM CFM						150		159	159	106%

AIR BALANCE DATA SHEET

18

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-4
TECHNICIAN: M. WEGENER
DATE: 10/21/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
215	1	2410	1.000	400	400	219	219	413	413	103%
214	2	2410	1.000	275	275	219	219	268	268	97%
213	3	2410	1.000	275	275	241	241	267	267	97%
	FTU-2405 TOTAL				950		679		948	100%
	FAN CFM				380		834		384	101%
	PRIMARY MINIMUM CFM				225		236		236	105%
212	1	2412	1.000	475	475	621	621	483	483	102%
212	2	2412	1.000	475	475	590	590	472	472	99%
	FTU-2406 TOTAL				950		1211		955	101%
	FAN CFM				380		883		397	104%
	PRIMARY MINIMUM CFM				225		236		236	105%
211	1	2410	1.000	250	250	324	324	258	258	103%
211	2	2410	1.000	315	315	193	193	297	297	94%
211	3	2410	1.000	315	315	160	160	334	334	106%
	FTU-2407 TOTAL				880		677		889	101%
	FAN CFM				795		1016		814	102%
	PRIMARY MINIMUM CFM				265		276		276	104%
209	1	2408	1.000	265	265	127	127	253	253	95%
208	2	2408	1.000	175	175	138	138	176	176	101%
	FTU-2408 TOTAL				440		265		429	98%
	FAN CFM				225		476		241	107%
	PRIMARY MINIMUM CFM				125		131		131	105%

AIR BALANCE DATA SHEET

19

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: RTU-4
TECHNICIAN: M. WEGENER
DATE: 10/21/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
205	1	12x12	0.659	303	200	189	125	277	183	91%
205	2	2410	0.659	303	200	232	153	297	196	98%
205	3	2410	0.659	303	200	223	147	314	207	104%
205	4	2410	0.659	303	200	288	190	327	216	108%
205	5	2410	0.659	303	200	312	206	324	214	107%
205	6	2410	0.659	303	200	200	132	320	211	106%
205	7	2410	0.659	303	200	177	117	302	199	100%
205	8	2410	0.659	303	200	194	128	294	194	97%
205	9	2410	0.659	303	200	202	133	323	213	107%
205	10	2410	0.659	303	200	264	174	308	203	101%
205	11	2410	0.659	303	200	280	185	286	189	94%
205	12	2412	0.659	303	200	298	197	285	188	94%
FTU-2409 TOTAL					2400		1887		2413	101%
FAN CFM					1032		1416		1064	103%
PRIMARY MINIMUM CFM					516		531		531	103%

FAN DATA SHEET

20

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: EF-1
MANUFACTURER: ACME
MODEL: PV165
TECHNICIAN: M. WEGENER
DATE: 11/8/11

	DESIGN	PRELIMINARY	FINAL
SYSTEM CFM	2200	2324	2244
(IN, OUT, PD) STATIC PRESSURE - FAN	.75	NA	-.68/0/.68
MOTOR -			
CURRENT	1.1 FLA	1.1/1.1/1.1	1.1/1.1/1.1
VOLTAGE	460/3/60	485/3/60	485/3/60
HORSEPOWER	.483 BHP	1/2 SF 1.25	1/2 SF 1.25
FAN RPM	1180	1210	1210

AIR BALANCE DATA SHEET

21

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: EF-1
TECHNICIAN: M. WEGENER
DATE: 11/2/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
234	1	2410	1.100	341	375	380	418	348	383	102%
232	2	2414	1.100	614	675	621	683	668	735	109%
236	3	1206	1.100	68	75	87	96	74	81	109%
238	4	1206	1.100	68	75	96	106	71	78	104%
131	5	1206	1.100	68	75	102	112	71	78	104%
130	6	1206	1.100	68	75	86	95	73	80	107%
114	7	1208	1.100	91	100	191	210	97	107	107%
121	8	2410	1.100	341	375	263	289	311	342	91%
120	9	2410	1.100	341	375	287	316	327	360	96%
SYSTEM TOTAL					2200		2324		2244	102%

FAN DATA SHEET

22

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: EF-2
MANUFACTURER: ACME
MODEL: PV075
TECHNICIAN: M. WEGENER
DATE: 11/2/11

	DESIGN	PRELIMINARY	FINAL
SYSTEM CFM	350	376	376
(IN, OUT, PD) STATIC PRESSURE - FAN	.50	-.38/0/.38	-.38/0/.38
MOTOR - CURRENT	5.0 FLA	4.7	4.7
VOLTAGE	115/1/60	120/1/60	120/1/60
HORSEPOWER	.067 BHP	1/4 SF 1.35	1/4 SF 1.35
FAN RPM	1329	1315	1315

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
103	1	12x12	0.659	531	350	571	376	571	376	108%

AIR BALANCE DATA SHEET

23

PROJECT NAME: SPENCER BRANCH LIBRARY - ST PETERS, MO
SYSTEM: EF-3 DIRECT DRIVE
TECHNICIAN: M. WEGENER
DATE: 11/2/11

ROOM NO.	OPENING		FLOW FACTOR	DESIGN		PRELIMINARY		FINAL		% OF DESIGN
	NO.	SIZE		VEL	CFM	VEL	CFM	VEL	CFM	
251	1	NA	1.100	68	75	70	77	70	77	103%

START-UP REPORT

Job Name:	Spencer Library
Store No:	Start-Up Date: 10/4/11
Address:	427 Spencer Road
City:	St. Peters State: MO
Start-Up Contractor:	Wiegmann Assoc.
Technician:	Ryan Greiner
Model No:	MPS050FE4DVIDYRY
Serial No:	FBOU1010000942
RTU No.: 1	Catalog No.

Inspections and Checks	
Unit damaged?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> R22 <input type="checkbox"/> R410A <input checked="" type="checkbox"/> Other <input type="checkbox"/>
If yes, reported to:	
Remarks:	
Verify factory and field-installed accessories.	<input checked="" type="checkbox"/>
Check electrical connections (tighten if needed):	<input checked="" type="checkbox"/>
Supply voltage:	L 1-L2 L1-L3 L2-L3
If unit contains a 208-230/240 volt transformer:	
Check primary transformer tap:	<input type="checkbox"/>
Transformer secondary voltage:	

Cooling Checks												
Compressor Rotation:		<input checked="" type="checkbox"/>	Ambient Temp. <u>82</u>		Return Air Temp. <u>75</u>		Supply Air Temp. <u>56</u>					
	Compressor Amps			Compressor Volts			Pressures		Condenser Fan Amps			CC Heater Amps
	L1	L2	L3	L1-L2	L1-L3	L2-L3	Disch.	Suct.	L1	L2	L3	L1
1	14	13.7	14.1	489	491	491	270	115				
2	13.8	13.1	13.5	489	491	491	265	110				
3	14.1	13.3	13.6	489	491	491	275	115				
4	13.9	13.1	13.4	489	491	491	270	110				
									2.2	2.2	2.1	

Blower Checks			
Pulley/Belt Alignment	<input checked="" type="checkbox"/>	Blower Rotation	<input checked="" type="checkbox"/>
Set Screws Tight	<input checked="" type="checkbox"/>	Belt Tension	<input checked="" type="checkbox"/>
Nameplate Amps:	17.7	Volts:	460
Fan Motor	Amps	Volts	
	L1 17.2	L1-L2	489
	L2 17.4	L1-L3	491
	L3 17.2	L2-L3	491

Heating Checks - Electric									
Return Air Temp.:				<u>72</u>	Supply Air Temp.:				<u>120</u>
Limits Operate:				<input checked="" type="checkbox"/>					
	Amps								
	L1	L2	L3	Amps	L1	L2	L3		
1	72	72	72	10					
2				11					
3				12					
4				13					
5				14					
6				15					
7				16					
8				17					
9				18					

Heating Checks - Gas	
Fuel type: Nat.	<input type="checkbox"/> LP <input type="checkbox"/> Inlet Press.: in. w.c.
RA Temp.:	SA Temp.:
Altitude:	Primary Limits Operate: <input type="checkbox"/>
Manifold Pressure	
Gas Value	Low Fire High Fire
GV1	
GV2	

Accessory Checks	
Power Exhaust Amps	
1	2 None <input type="checkbox"/>
Economizer Operation	
Min. Pos. <input checked="" type="checkbox"/>	Motor travel full open/close <input checked="" type="checkbox"/>

Control Type
Delta Controls / BACnet

Notes/Remarks:

Belts 2 - BP88
 Filters 4 - 18 x 24 x 2
 8 - 24 x 24 x 2

START-UP REPORT

Job Name:	Spencer Library		
Store No:	Start-Up Date:	10/4/11	
Address:	427 Spencer Road		
City:	St. Peters	State:	MO
Start-Up Contractor:	Wiegmann Assoc.		
Technician:	Ryan Greiner		
Model No:	MPS025FE4DVIDYRY		
Serial No:	FBOU101000781		
RTU No.: 3	Catalog No.		

Inspections and Checks	
Unit damaged?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> R22 <input type="checkbox"/> R410A <input checked="" type="checkbox"/> Other <input type="checkbox"/>
If yes, reported to:	
Remarks:	
Verify factory and field-installed accessories.	<input checked="" type="checkbox"/>
Check electrical connections (tighten if needed):	<input checked="" type="checkbox"/>
Supply voltage:	L 1-L2 L1-L3 L2-L3
If unit contains a 208-230/240 volt transformer:	
Check primary transformer tap:	<input type="checkbox"/>
Transformer secondary voltage:	

Cooling Checks												
Compressor Rotation:		<input checked="" type="checkbox"/>	Ambient Temp. <u>84</u>		Return Air Temp. <u>74</u>		Supply Air Temp. <u>55</u>					
	Compressor Amps			Compressor Volts			Pressures		Condenser Fan Amps			CC Heater Amps
	L1	L2	L3	L1-L2	L1-L3	L2-L3	Disch.	Suct.	L1	L2	L3	L1
1	7.6	6.8	6.7	491	489	489	260	115				
2	14.8	14.1	14.4	491	489	489	275	120				
3	8.2	7.7	7.5	491	489	489	265	115				
4												

Blower Checks	
Pulley/Belt Alignment <input checked="" type="checkbox"/>	Blower Rotation <input checked="" type="checkbox"/>
Set Screws Tight <input checked="" type="checkbox"/>	Belt Tension <input checked="" type="checkbox"/>
Nameplate Amps: 12.5	Volts: 460
Fan Motor	
Amps	Volts
L1 <u>11.2</u>	L1-L2 <u>491</u>
L2 <u>11.4</u>	L1-L3 <u>489</u>
L3 <u>11.2</u>	L2-L3 <u>489</u>

Heating Checks - Electric							
Return Air Temp.: <u>73</u>				Supply Air Temp.: <u>118</u>			
Limits Operate: <input checked="" type="checkbox"/>							
	Amps						
	L1	L2	L3		L1	L2	L3
1	44.5	44.2	44.3	10			
2				11			
3				12			
4				13			
5				14			
6				15			
7				16			
8				17			
9				18			

Heating Checks - Gas	
Fuel type: Nat. <input type="checkbox"/> LP <input type="checkbox"/>	Inlet Press.: _____ in. w.c.
RA Temp.: _____	SA Temp.: _____
Altitude: _____	Primary Limits Operate: <input type="checkbox"/>
Manifold Pressure	
Gas Value	Low Fire High Fire
GV1	
GV2	

Accessory Checks		
Power Exhaust Amps		
1	2	None <input type="checkbox"/>
Economizer Operation		
Min. Pos. <input checked="" type="checkbox"/>	Motor travel full open/close <input checked="" type="checkbox"/>	

Control Type
Delta Controls / BACnet

Notes/Remarks:

Belts 2 - BP70
Filters 6 - 24 x 24 x 2

START-UP REPORT

Job Name:	Spencer Library		
Store No:	_____	Start-Up Date:	10/4/11
Address:	427 Spencer Road		
City:	St. Peters	State:	MO
Start-Up Contractor:	Wiegmann Assoc.		
Technician:	Ryan Greiner		
Model No:	MPS050FE4DVIDYRY		
Serial No:	FBOU101000779		
RTU No.: 4	_____	Catalog No.	_____

Inspections and Checks	
Unit damaged?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> R22 <input type="checkbox"/> R410A <input checked="" type="checkbox"/> Other <input type="checkbox"/>
If yes, reported to:	_____
Remarks:	Verify factory and field-installed accessories. <input checked="" type="checkbox"/>
Check electrical connections (tighten if needed):	<input checked="" type="checkbox"/>
Supply voltage:	L 1-L2 _____ L1-L3 _____ L2-L3 _____
If unit contains a 208-230/240 volt transformer:	_____
Check primary transformer tap:	<input type="checkbox"/>
Transformer secondary voltage:	_____

Cooling Checks												
Compressor Rotation: <input checked="" type="checkbox"/>		Ambient Temp. <u>84</u>			Return Air Temp. <u>73</u>			Supply Air Temp. <u>54</u>				
	Compressor Amps			Compressor Volts			Pressures		Condenser Fan Amps			CC Heater Amps
	L1	L2	L3	L1-L2	L1-L3	L2-L3	Disch.	Suct.	L1	L2	L3	L1
1	15.6	14.6	14.5	491	493	492	260	110				
2	15.1	14.2	14.1	491	493	492	265	112				
3	15.2	14.3	14.4	491	493	492	275	115				
4	14.9	14.2	14.1	491	193	492	270	115				
									2.1	2.0	2.2	

Blower Checks	
Pulley/Belt Alignment <input checked="" type="checkbox"/>	Blower Rotation <input checked="" type="checkbox"/>
Set Screws Tight <input checked="" type="checkbox"/>	Belt Tension <input checked="" type="checkbox"/>
Nameplate Amps:	Volts:
Fan Motor	
L1 <u>15.5</u>	L1-L2 <u>491</u>
L2 <u>14.2</u>	L1-L3 <u>493</u>
L3 <u>15.2</u>	L2-L3 <u>492</u>

Heating Checks - Electric							
Return Air Temp.: <u>72</u>				Supply Air Temp.: <u>115</u>			
Limits Operate: <input checked="" type="checkbox"/>							
	Amps						
	L1	L2	L3		L1	L2	L3
1	66	66.5	68	10			
2				11			
3				12			
4				13			
5				14			
6				15			
7				16			
8				17			
9				18			

Heating Checks - Gas	
Fuel type: Nat. <input type="checkbox"/> LP <input type="checkbox"/>	Inlet Press.: _____ in. w.c.
RA Temp.: _____	SA Temp.: _____
Altitude: _____	Primary Limits Operate: <input type="checkbox"/>
Manifold Pressure	
Gas Value	Low Fire _____ High Fire _____
GV1	
GV2	

Accessory Checks	
Power Exhaust Amps	
1 _____	2 _____ None <input type="checkbox"/>
Economizer Operation	
Min. Pos. <input checked="" type="checkbox"/>	Motor travel full open/close <input checked="" type="checkbox"/>

Control Type
Delta Controls / BACnet

Notes/Remarks:

Belts 2 - BP88
 Filters 4 - 18 x 24 x 2
 8 - 24 x 24 x 2
