

Report By:

National TAB
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Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 07/31/2023

PROJECT

07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

901 MURRAY OLDS DR

MIDLOTHIAN, VA

Client

Comfort Systems USA
9450 W Wingfoot Rd
Houston, TX 77041

Project Summary

The summary below provides a quick understanding of our scope of work and general testing procedures. Enclosed in the report is further detail about your building performance including recommendations, asset data, and pictures. Our focus is to work with the trades to remedy any issues or deficiencies during the actual field balancing and not after the balancing has occurred to achieve a positive environment and outcome. The level of success is determined by the availability of the trades, possible parts needed, or time constraints.

Standard RTU's

Each of the RTU's were measured at their terminal devices utilizing a flow hood or via total traverse. The sum of these readings is equal to the total flow for that unit. The total flow of each RTU was then adjusted to within tolerance of the specified design. Outside airflow was measured by reading the inlet with a velocity grid times the area of the filter. Any equipment that fell outside of this tolerance is noted throughout the report.

Bypass RTU's

The Bypass RTU's were measured by first closing the bypass damper completely. By doing this, the outside airflow is equal to the total flow for the unit. The airflow was measured using a velgrid at the outdoor air intake and multiplying by the free area of the filters. Adjustments made to the motor sheave in order to get airflow within tolerance of design. The bypass damper is then adjusted to so that bypass and OA flows are within tolerance.

ERV RTU's

The supply air portion of the ERV is 100% OA that is supplied to the space via two fans in series. The airflow was measured by reading the intake air filter with a velgrid and multiplying by the free area of the filter. Adjustments were made to the airflow by adjusting the motor sheaves to balance airflow within design tolerances. The exhaust system has one fan and was measured via either traverse or by reading the inlets with a velgrid and multiplying by the free area of the filter.

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU1

AREA:SHOW ROOM

Unit Data		
	Design	Actual
MFG	LENNOX	LENNOX
Serial Num	-	5622F04099
Model Num	LGH036H4M	LGH180H4M
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num OA Filters 1	-	3
OA Filter Size 1	-	23X13
Num Final Filter 1	-	6
Final Filter Size 1	-	24X24X2

Motor Data		
	Design	Actual
Motor MFG	-	Interlink
Frame	-	56HZ
Horsepower	5.0	3
Motor Rpm	-	1750
Phase	3	3
Rated Voltage	480	460
Rated Amperage	-	4.0

Drive Data		
	Design	Actual
Motor Sheave Size	-	3 7/8"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	3.5 Turns Out
Fan Sheave Size	-	BK72
Fan Sheave Bore	-	1 3/16"
Belt CL Distance	-	20 3/4"
Num of Belts	-	1
Belt Size	-	BX55
Belt Alignment	-	Good

Test Data		
	Design	Actual
SF CFM	5750	5820
SF RPM	-	792
RA CFM	5100	4960
OA CFM	850	860
RL Voltage	-	480/480/480
RL Amperage	-	4.0/3.8/3.8
SF Rotation	-	CCW
RA Damper Position	-	82%
Min OA Damper Position	-	18%
Min OA Damper Type	-	OBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.54"
Fan Suction SP	-	-0.91"
Fan Discharge SP	-	0.33"
Total ESP	0.8"	0.87"
Fan Total SP	-	1.24"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU2

AREA:SHOW ROOM

Unit Data		
	Design	Actual
MFG	LENNOX	Lennox
Serial Num	-	5622F04102
Model Num	LGH036H4M	LGH180H4M
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num OA Filters 1	-	3
OA Filter Size 1	-	23X13
Num Final Filter 1	-	6
Final Filter Size 1	-	24X24X2

Motor Data		
	Design	Actual
Motor MFG	-	Interlink
Frame	-	56HZ
Horsepower	5	3
Motor Rpm	-	1750
Phase	3	3
Rated Voltage	480	460
Rated Amperage	-	4.0

Drive Data		
	Design	Actual
Motor Sheave Size	-	3 7/8"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	3.5
Fan Sheave Size	-	BK72
Fan Sheave Bore	-	1 3/16"
Belt CL Distance	-	20 5/8"
Num of Belts	-	1
Belt Size	-	BX55
Belt Alignment	-	Good

Test Data		
	Design	Actual
SF CFM	5750	5917
SF RPM	-	715
RA CFM	5100	5038
OA CFM	850	879
RL Voltage	-	480/480/480
RL Amperage	-	2.9/2.9/3.0
SF Rotation	-	CCW
RA Damper Position	-	87%
Min OA Damper Position	-	13%
Min OA Damper Type	-	OBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.42"
Fan Suction SP	-	-0.71"
Fan Discharge SP	-	0.23"
Total ESP	0.8"	0.65"
Fan Total SP	-	0.94"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU3

AREA: CUSTOMER WAITING

Unit Data		
	Design	Actual
MFG	LENNOX	Lennox
Serial Num	-	5622H03855
Model Num	LGH036H4M	LGH036H4E
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num OA Filters 1	-	1
OA Filter Size 1	-	29X14
Num Final Filter 1	-	4
Final Filter Size 1	-	16X20X2

Motor Data		
	Design	Actual
Motor MFG	-	Genteq
Frame	-	N/L
Horsepower	0.50	1/2
Motor Rpm	-	1050
Phase	3	1
Rated Voltage	480	460
Rated Amperage	-	2.2

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	DD
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Test Data		
	Design	Actual
SF CFM	1050	1062
SF RPM	-	38%
RA CFM	930	931
OA CFM	120	131
RL Voltage	-	479
RL Amperage	-	0.4
SF Rotation	-	CW
RA Damper Position	-	88%
Min OA Damper Position	-	12%
Min OA Damper Type	-	OBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.16"
Fan Suction SP	-	-0.24"
Fan Discharge SP	-	0.13"
Total ESP	0.6"	0.19"
Fan Total SP	-	0.37"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU4

AREA:BUYERS

Unit Data		
	Design	Actual
MFG	LENNOX	LENNOX
Serial Num	-	5622H03309
Model Num	LGH036H4M	LGH048H4ES5G
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num OA Filters 1	-	1
OA Filter Size 1	-	29x14
Num Final Filter 1	-	4
Final Filter Size 1	-	16X20

Motor Data		
	Design	Actual
Motor MFG	-	Genteq
Frame	-	N/L
Horsepower	1.0	3/4
Motor Rpm	-	1050
Phase	3	1
Rated Voltage	480	120
Rated Amperage	-	3.1

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	DD
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Test Data		
	Design	Actual
SF CFM	1280	1325
SF RPM	-	44%
RA CFM	1600	1116
OA CFM	200	209
RL Voltage	-	480
RL Amperage	-	1.2
SF Rotation	-	CW
RA Damper Position	-	75%
Min OA Damper Position	-	15%
Min OA Damper Type	-	OBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.11"
Fan Suction SP	-	-0.29"
Fan Discharge SP	-	0.54"
Total ESP	0.6"	0.65"
Fan Total SP	-	0.83"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU5

AREA:BUSINESS

Unit Data		
	Design	Actual
MFG	LENNOX	Lennox
Serial Num	-	562G097142
Model Num	LGH036H4M	LGH060H4E
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num OA Filters 1	-	1
OA Filter Size 1	-	29X14
Num Final Filter 1	-	4
Final Filter Size 1	-	20X20X2

Motor Data		
	Design	Actual
Motor MFG	-	Genteq
Frame	-	N/L
Horsepower	0.50	1
Motor Rpm	-	1050
Phase	3	1
Rated Voltage	480	120
Rated Amperage	-	12.8

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	DD
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Test Data		
	Design	Actual
SF CFM	1700	1763
SF RPM	-	59%
RA CFM	1040	1473
OA CFM	300	290
RL Voltage	-	480
RL Amperage	-	1.3
SF Rotation	-	CW
RA Damper Position	-	79%
Min OA Damper Position	-	21%
Min OA Damper Type	-	OBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.23"
Fan Suction SP	-	-0.43"
Fan Discharge SP	-	0.43"
Total ESP	0.6"	0.66"
Fan Total SP	-	0.86"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU6

AREA: BREAK ROOM

Unit Data		
	Design	Actual
MFG	LENNOX	Lennox
Serial Num	-	5622G11446
Model Num	LGH036H4M	LGH048H4E
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num Final Filter 1	-	4
Final Filter Size 1	-	16X20X2

Motor Data		
	Design	Actual
Motor MFG	-	Genteq
Frame	-	N/L
Horsepower	0.50	3/4
Motor Rpm	-	1050
Phase	3	1
Rated Voltage	480	120
Rated Amperage	-	3.1

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	DD
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Test Data		
	Design	Actual
SF CFM	1280	1317
SF RPM	-	43%
RA CFM	-	1157
OA CFM	-	160
RL Voltage	-	480
RL Amperage	-	1.1
SF Rotation	-	CW
RA Damper Position	-	90%
Min OA Damper Position	-	10%
Min OA Damper Type	-	OBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.27"
Fan Suction SP	-	-0.45"
Fan Discharge SP	-	0.22"
Total ESP	0.8"	0.49"
Fan Total SP	-	0.67"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU7

AREA:WRITE UP

Unit Data		
	Design	Actual
MFG	LENNOX	Lennox
Serial Num	-	5622H03308
Model Num	LGH036H4M	LGH048HES5G
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num OA Filters 1	-	1
OA Filter Size 1	-	29X14
Num Final Filter 1	-	4
Final Filter Size 1	-	16X20X2

Motor Data		
	Design	Actual
Motor MFG	-	Genteq
Frame	-	N/L
Horsepower	0.75	3/4
Motor Rpm	-	1050
Phase	3	1
Rated Voltage	480	460
Rated Amperage	-	3.1

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	DD
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Test Data		
	Design	Actual
SF CFM	1300	1342
SF RPM	-	44%
RA CFM	1200	1129
OA CFM	300	213
RL Voltage	-	480
RL Amperage	-	1.2
SF Rotation	-	CCW
RA Damper Position	-	85%
Min OA Damper Position	-	15%
Min OA Damper Type	-	OBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.22"
Fan Suction SP	-	-0.38"
Fan Discharge SP	-	0.24"
Total ESP	0.6"	0.46"
Fan Total SP	-	0.62"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU8

AREA:Service Area

Unit Data		
	Design	Actual
MFG	LENNOX	Lennox
Serial Num	-	5622H07175
Model Num	LGH036H4M	LGH300H4MH2G
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num OA Filters 1	-	2
OA Filter Size 1	-	39X11
Num Final Filter 1	-	12
Final Filter Size 1	-	20X20X2

Motor Data		
	Design	Actual
Motor MFG	-	US Motors
Frame	-	184TZ
Horsepower	5	5.00
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	480	460
Rated Amperage	-	7.6

Drive Data		
	Design	Actual
Motor Sheave Size	-	
Motor Bore Size	-	
Motor Sheave SetPt	-	3 Turns Out
Fan Sheave Size	-	11 7/8"
Fan Sheave Bore	-	1 1/4"
Belt CL Distance	-	23 5/8"
Num of Belts	-	1
Belt Size	-	BX71
Belt Alignment	-	Good

Test Data		
	Design	Actual
SF CFM	7000	7409
SF RPM	-	804
RA CFM	1600	2534
OA CFM	4600	4875
RL Voltage	-	480/481/480
RL Amperage	-	7.4/7.4/7.3
SF Rotation	-	CCW
RA Damper Position	-	Marked
Min OA Damper Position	-	100%
Min OA Damper Type	-	SBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.41"
Fan Suction SP	-	-0.98"
Fan Discharge SP	-	0.33"
Total ESP	0.8"	0.74"
Fan Total SP	-	1.31"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project:07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

AHU/RTU



Diffuser Supply (GRD)

RTU8/Service Area

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	SERVICE AREA	24/12	24/12	1050	1.26	944	1030	1030	98.1
SGRD2	SERVICE AREA	24/12	24/12	1050	1.26	998	1076	1076	102.5
SGRD3	SERVICE AREA	24/12	24/12	1050	1.26	1119	1201	1201	114.4
SGRD4	SERVICE AREA	24/12	24/12	1050	1.26	1216	1146	1146	109.1
SGRD5	SERVICE AREA	24/12	24/12	400	0.58	632	422	422	105.5
Total				4600		4909	4875	4875	105.98%

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU9

AREA:Service Area

Unit Data		
	Design	Actual
MFG	LENNOX	Lennox
Serial Num	-	5622H07176
Model Num	LGH036H4M	LGH300H4MH2G
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num OA Filters 1	-	2
OA Filter Size 1	-	39X11
Num Final Filter 1	-	12
Final Filter Size 1	-	20X20X2

Motor Data		
	Design	Actual
Motor MFG	-	US Motors
Frame	-	184TZ
Horsepower	5	5.00
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	480	460
Rated Amperage	-	7.3

Drive Data		
	Design	Actual
Motor Sheave Size	-	VP56
Motor Bore Size	-	1 3/16"
Motor Sheave SetPt	-	3.5 Turns Out
Fan Sheave Size	-	11 7/8"
Fan Sheave Bore	-	1 1/4"
Belt CL Distance	-	23 3/4"
Num of Belts	-	1
Belt Size	-	BX71
Belt Alignment	-	Good

Test Data		
	Design	Actual
SF CFM	5600	7295
SF RPM	-	794
RA CFM	4000	2748
OA CFM	-	4519
RL Voltage	-	480/480/482
RL Amperage	-	7.0/7.1/7.2
SF Rotation	-	CCW
RA Damper Position	-	Marked
Min OA Damper Position	-	100%
Min OA Damper Type	-	OBD
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.46"
Fan Suction SP	-	-0.94"
Fan Discharge SP	-	0.43"
Total ESP	0.8"	0.89"
Fan Total SP	-	1.37"

General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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Project:07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

AHU/RTU



Diffuser Supply (GRD)

RTU9/Service Area

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	SERVICE AREA	NK	24/12	920	1.54	892	890	890	96.7
SGRD2	SERVICE AREA	NK	24/12	920	1.54	1041	931	931	101.2
SGRD3	SERVICE AREA	NK	24/12	920	1.54	986	946	946	102.8
SGRD4	SERVICE AREA	NK	24/12	920	1.54	862	891	891	96.8
SGRD5	SERVICE AREA	NK	24/12	920	1.54	759	861	861	93.6
Total				4600		4540	4519	4519	98.24%

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Project: 07-17-23 CARMAX #7242 - MIDLOTHIAN, VA

System/Unit: AHU/RTU



Asset: RTU10

AREA:PBX

Unit Data		
	Design	Actual
MFG	LENNOX	Lennox
Serial Num	-	5622H03205
Model Num	LGH036H4M	LCH036H4EN4G
Type	RTU	RTU
Configuration	VERTICAL	Vertical
Num Final Filter 1	-	4
Final Filter Size 1	-	16X20

Motor Data		
	Design	Actual
Motor MFG	-	Genteq
Frame	-	N/L
Horsepower	0.50	0.50
Motor Rpm	-	1050
Phase	3	1
Rated Voltage	480	460
Rated Amperage	-	2.2

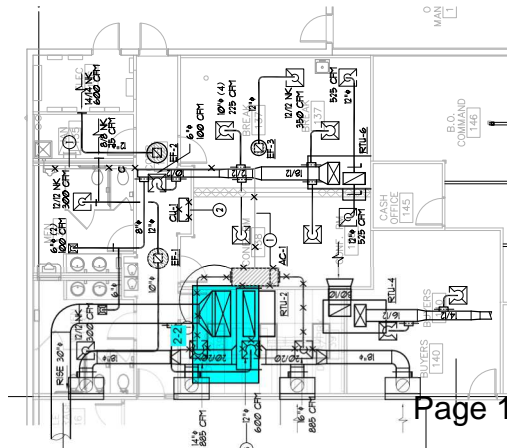
Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	DD
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Test Data		
	Design	Actual
SF CFM	975	958
SF RPM	-	71%
RA CFM	975	985
RL Voltage	-	480
RL Amperage	-	1.4
SF Rotation	-	CCW

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.24"
Fan Suction SP	-	-0.38"
Fan Discharge SP	-	0.27"
Total ESP	0.6"	0.51"
Fan Total SP	-	0.65"

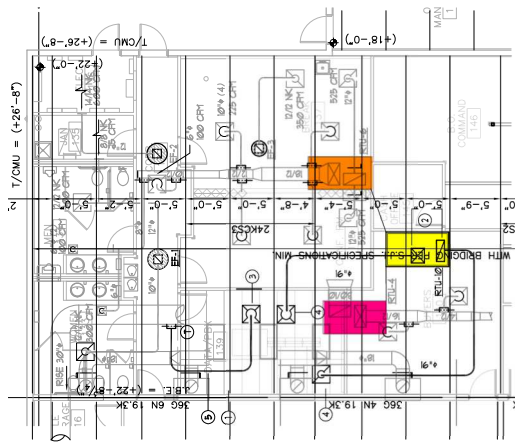
General		
	Design	Actual
Fan Rotation Correct	-	Yes
Unit Filters Clean	-	Yes
Condensate Drain Installed	-	Yes

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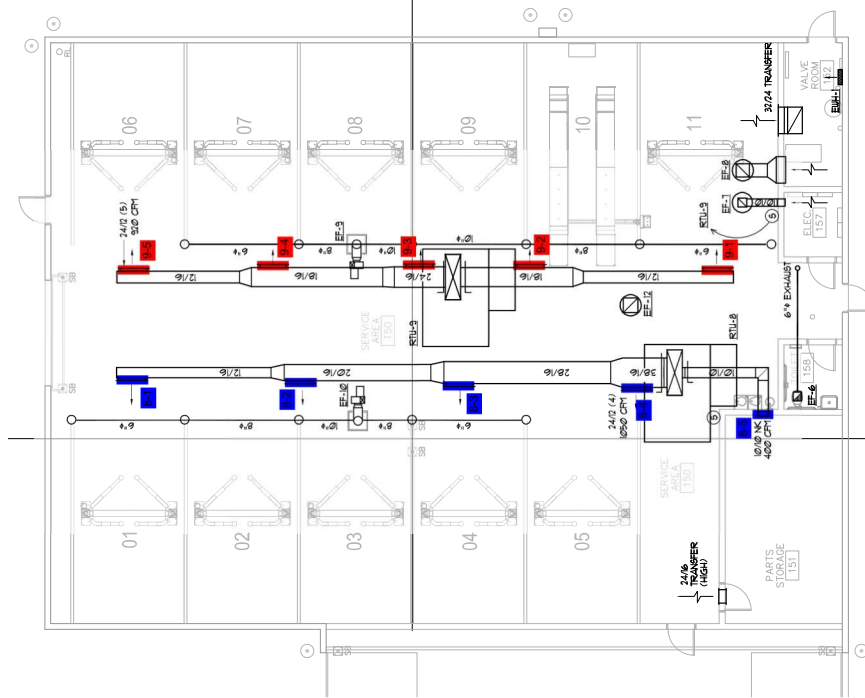
- KEYED NOTES:
1. REMOVE COMPUTER ROOF AND ALL ASSOCIATED DUCT AND PIPING
 2. REMOVE ROOF MOUNTED CONDENSER SEAL ANY FIRE PENETRATIONS OF THE ROOF THAT REMAIN
 3. REMOVE EXISTING THERMISTERS 1/2" DUCT TO REMAIN & BE REPAID
 4. RETURN REGISTERS FOR RTU-2

2 DEMO PART PLAN - HVAC
 MI.0 SCALE: 1/8" = 1'-0"



- KEYED NOTES:
1. RTU-2 NOT SHOWN FOR CLARITY. SEE DEMO PART PLAN
 2. FLENN FULL SIZE OF CURB CONNECTION
 3. FLENN 1/2\"/>

3 PART PLAN - HVAC
 MI.0 SCALE: 1/8" = 1'-0"



SHOWN FOR RTU-849 TEST AND BALANCE PURPOSES ONLY