Report By:

National TAB
1329 E. KEMPER ROAD
SUITE 4210
CINCINNATI, OH 45246

Report: TAB REPORT

Function: Test, Adjust, & Balance

Date: 07/19/2023

PROJECT

06-26-23 CARMAX #7179 - MILWAUKEE, WI

11011 WEST METRO BLVD

MILWAUKEE, WI 53224

Client

Comfort Systems USA

9450 W Wingfoot Rd

Houston, TX 77041

Issue List

- EF-12 unable to reduce flow
- RTU-2: Recommend Service
- RTU-7 Supply Fan Vibrating
- RTU-9 and RTU-10 OA filters Not installed.
- Utility Exhaust Fan on Roof- Cover Not Installed

06-26-23 CARMAX #7179 - MILWAUKEE, WI

Project Issue Information

Issue Name : EF-12 unable to reduce flow

Description : EF-12 is reading at 2,037 CFM. Unable to decrease flow. Currently a single speed fan. Recommend having a speed controller installed.

Created By : National TAB

Assigned To : National TAB - Dylan Crisman

Status : Open

Originated Date : 06/29/2023 - Dylan Crisman - National TAB

Project Issue File Details

EF12motorhousing
06/29/2023

EF12
06/29/2023

06-26-23 CARMAX #7179 - MILWAUKEE, WI

Project Issue Information

Issue Name : RTU-2: Recommend Service

Description : RTU-2 was found with several issues and it's motor was operating above FLA on arrival. The supply vfd is running at 20 HZ at times when normal operation calls for it to be off. VFD amperage was measured unstable on arrival. Recommend unit is inspected and serviced.

Created By : National TAB

Assigned To : National TAB - Michael McDonnell

Status : Open

Originated Date : 07/16/2023 - Michael McDonnell - National TAB

Project Issue File Details

RTU-2(1)
07/16/2023

RTU-2-unitlabel
07/16/2023

Project Issue Response Details

- **07/16/2023 National TAB - Michael McDonnell**
  - Disconnect switch is not accessible and cannot be operated without removing outer unit cover. Recommend service.

Disconnect
07/16/2023

- **07/16/2023 National TAB - Michael McDonnell**
  - Economizer dampers were not secured to actuator and were not opening or closing. NTAB tech secured dampers to actuator and performed calibration. Recommend actuator and dampers are inspected. OA positions marked on damper.

Positionsmarked
07/16/2023

Actuatornotsecured
07/16/2023

- **07/16/2023 National TAB - Michael McDonnell**
  - Motor sheave set key was found on bottom of blower compartment and sheave was frozen, turned all the way in at 0 turns open. NTAB tech was able to break pulley loose and reduce motor speed to below motor FLA.

Sheavefrozen
07/16/2023

Setkeynotinstalled
07/16/2023

06-26-23 CARMAX #7179 - MILWAUKEE, WI

Project Issue Information

Issue Name : RTU-7 Supply Fan Vibrating

Description : RTU-7 supply fan vibrates and makes noise when in high speed. Recommend unit is serviced.

Created By : National TAB

Assigned To : National TAB - Michael McDonnell

Status : Open

Originated Date : 07/16/2023 - Michael McDonnell - National TAB

Project Issue File Details

1. Open Supplyfan.MOV
   07/16/2023

RTU-7
07/16/2023

06-26-23 CARMAX #7179 - MILWAUKEE, WI

Project Issue Information

Issue Name : RTU-9 and RTU-10 OA filters Not installed.

Description : RTU-9 and 10 OA filters are not installed and are laying on the roof. RTU-9 has one filter installed, recommend it is cleaned.

Created By : National TAB

Assigned To : National TAB - Michael McDonnell

Status : Open

Originated Date : 07/16/2023 - Michael McDonnell - National TAB

Project Issue File Details

RTU-9filterdirty
07/16/2023

RTU-10filtersnotinsta..
07/16/2023

OAfilters
07/16/2023

06-26-23 CARMAX #7179 - MILWAUKEE, WI

Project Issue Information

Issue Name : Utility Exhaust Fan on Roof- Cover Not Installed

Description : Utility fan above the service garage (not in scope) did not have its motor covered installed. Cover was temporarily affixed with screws located on roof. Recommend cover is properly secured.

Created By : National TAB

Assigned To : National TAB - Michael McDonnell

Status : Open

Originated Date : 07/16/2023 - Michael McDonnell - National TAB

Project Issue File Details

Coveroff
07/16/2023

Temporarysecure
07/16/2023

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.

Facility Identification and TAB Requirements
The mechanical equipment to be tested, adjusted, and balanced includes all RTU's and EF's on the Test and Balance Scope on the mechanical drawings.

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 particular 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 completed. 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.

Exhaust Fans
The exhaust fans were measured by reading each air device with a flow hood or via a velgrid reading times the free area of the inlets. The total airflow for each fan is equivalent to the sum of these readings. Fan speed was then adjusted so that the airflow was within tolernace of design. Any equipment that fell outside of this tolerance is noted throughout the report.

NATIONAL TAB

AIR BALANCE SCHEDULE

UNIT	AREA SERVED	HVAC SUPPLY		HVAC RETURN		HVAC OUTDOOR		OA %		HOOD MAKE-UP		HOOD EXHAUST		GENERAL EXH.	
		DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
RTU-1	MAIN SALES	5750	5741	5100	5063	650	678	11.3%	11.8%						
RTU-2	MAIN SALES	5750	5465	5100	4780	650	685	11.3%	12.5%						
RTU-3	SALES / OFFIC	1050	1108	930	984	120	124	11.4%	11.2%						
RTU-4	SALES / OFFIC	1800	1828	1600	1618	200	210	11.1%	11.5%						
RTU-5	SALES / OFFIC	1200	1264	1040	1095	160	169	13.3%	13.4%						
RTU-6	IT ROOM	975	1002	975	1002	0	0	0.0%	0.0%						
RTU-7	SALES / OFFIC	1500	1559	1200	1252	300	307	20.0%	19.7%						
RTU-8	SALES / OFFIC	1100	1145	940	990	160	155	14.5%	13.5%						
RTU-9	SERVICE GAR/	5600	5591	1600	1569	4000	4022	71.4%	71.9%						
RTU-10	SERVICE GAR/	5600	5606	1600	1533	4000	4073	71.4%	72.7%						
EF-12	SERVICE GARAGE											1500	2037		
TOTALS		30325	30309	20085	19886	10240	10423			0	0	1500	2037	0	0

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	10240	10423
TOTAL EXHAUST	1500	2037
NET AIRFLOW	8740	8386

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H20)
FRONT	
SIDE	
REAR	
AVERAGE	**#DIV/0!**

FINAL CHECKS

ACTUAL NET AIRFLOW COINCIDES WITH DESIGN: ✓

MEASURED PRESSURES COINCIDES WITH ACTUAL NET AIRFLOW:

PRESSURE FALLS WITHIN IMC TOLERANCE OF +/-0.02" W.C.

NOTES:

CheckList List

- SITE PICTURES
- TECH - RTU/EF CHECKLIST

06-26-23 CARMAX #7179 - MILWAUKEE, WI

CheckList Information

Name :	SITE PICTURES	**Status :**	Not Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	07/17/2023 - Michael McDonnell - National TAB		

CheckList Item Details

STORE FRONT

Comment:

Carmax-MKE
07/19/2023

RTU-1

Comment:

RTU-1
07/19/2023

Label
07/19/2023

RTU-2

Comment:

RTU-2(1)
07/19/2023

Label
07/19/2023

RTU-3

Comment:

RTU-3
07/19/2023

Label
07/19/2023

RTU-4

Comment:

RTU-4
07/19/2023

Label
07/19/2023

RTU-5

Comment:

RTU-5
07/19/2023

Label
07/19/2023

RTU-6

Comment:

RTU-6
07/19/2023

Label
07/19/2023

RTU-7

Comment:

RTU-7
07/19/2023

Label
07/19/2023

RTU-8

Comment:

RTU-8
07/19/2023

Label
07/19/2023

RTU-9

Comment:

RTU-9
07/19/2023

Label
07/19/2023

RTU-10

Comment:

RTU-10
07/19/2023

Label
07/19/2023

EF-12

Comment:

06-26-23 CARMAX #7179 - MILWAUKEE, WI

CheckList Information

Name :	TECH - RTU/EF CHECKLIST	**Status :**	Not Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	06/28/2023 - Brianna Biggs - National TAB		

CheckList Item Details

RTU's/AHU's

Economizers are assembled and functional?

Comment:

Yes

Motors are all operating below the FLA rating?

Comment:

On arrival, RTU-1 and RTU-2 motors operating above FLA. Fans were slowed to within amperage rating.

Are belts tight?

Comment:

Yes

If direct drive unit is the speed controller working.

Comment:

Yes

Is gas piping installed and valves turned on?

Comment:

Yes, RTU-6 does not have heat.

Unit free of noticeable noise and vibration

Comment:

All except RTU-7. See motor vibration issue.

Units are labeled and installed on proper curb

Comment:

Yes

Unit ductwork properly installed / sealed on curb

Comment:

Yes

Pulleys are properly aligned

Comment:

Yes

Condensate lines and P-Traps installed correctly Yes

Comment:

Disconnect Switch Installed

Comment:

Yes, however RTU-2 disconnect switch cannot be operated without removing unit cover. Recommend service.

Outside air dampers/Economizers installed and functioning

Comment:

RTU-2 economizer was not operating on arrival. Damper was not attached to actuator. NTAB corrected but recommend damper is inspected.

Additional Comments or recommendations:

Comment:

See issue regarding service to RTU-2.

EF's

Is back draft damper installed?

Comment:

Yes

EF12backdraftdamper.j..
06/29/2023

Are belts tight? (If direct drive put NA)

Comment:

NA

Free of abnormal noise or vibration?

Comment:

Yes

Disconnect switch installed and functional?

Comment:

Yes

Documentation

If issues, have NTAB team and Comfort Systems USA been notified ?

Comment:

Yes

If any issues, have Facilibuild issues been created explaining in detail?

Comment:

Yes

Pictures

All Issues

Comment:

Yes

Each Piece of equipment

Comment:

Yes

Each Piece of equipment

Comment:

Yes

Roof Top Layout

Comment:

Yes

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU1 AREA:SHOW ROOM

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622F01314
Model Num	LGH180H4M	LGH180H4M
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	3
OA Filter Size 1	-	23"X13.5"
Num Final Filter 1	-	6
Final Filter Size 1	-	24"X24"X2"

Motor Data		
	Design	**Actual**
Motor MFG	-	NIDEC MOTOR
Frame	-	184TZ
Horsepower	5.0	5.0
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	480	480
Rated Amperage	-	6.50

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VP50BB
Motor Bore Size	-	1 1/8"
Motor Sheave SetPt	-	5 TURNS OPEN
Fan Sheave Size	-	BK100
Fan Sheave Bore	-	1 3/16"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	BX61
Belt Alignment	-	VERIFIED

Test Data		
	Design	**Actual**
SF CFM	5750	5741
SF RPM	-	724
RA CFM	5100	5063
OA CFM	650	678
RL Voltage	-	467/471/72
RL Amperage	-	3.8/3.8/3.8
SF Rotation	-	CW
RA Damper Position	-	72%
Min OA Damper Position	-	28%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.32"
Fan Suction SP	-	-0.54"
Fan Discharge SP	-	0.23"
Total ESP	0.8"	0.55"
Fan Total SP	-	0.77"

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

Completed By: Dylan Crisman on 07/13/2023

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU2 AREA:SHOW ROOM

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622F01317
Model Num	LGH180H4M	LGH180H4M
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	3
OA Filter Size 1	-	23"X13.5"
Num Final Filter 1	-	6
Final Filter Size 1	-	24"X24"X2"

Motor Data		
	Design	**Actual**
Motor MFG	-	NIDEC MOTOR
Frame	-	184TZ
Horsepower	5	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	480	480
Rated Amperage	-	6.50

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VP50BB
Motor Bore Size	-	1 1/8"
Motor Sheave SetPt	-	3 TURNS OPEN
Fan Sheave Size	-	VK100
Fan Sheave Bore	-	1 3/16"
Belt CL Distance	-	21"
Num of Belts	-	1
Belt Size	-	BX61
Belt Alignment	-	VERIFIED

Test Data		
	Design	**Actual**
SF CFM	5750	5465
SF RPM	-	786
RA CFM	5100	
OA CFM	650	685
RL Voltage	-	471/473/474
RL Amperage	-	5.9/5.5/5.7
SF Rotation	-	CW
RA Damper Position	-	70%
Min OA Damper Position	-	30%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	D

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.43"
Fan Suction SP	-	-0.74"
Fan Discharge SP	-	0.30"
Total ESP	0.8"	0.73"
Fan Total SP	-	1.04"

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

Completed By: Dylan Crisman on 07/13/2023

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU3 AREA:CUSTOMER WAITING

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G11412
Model Num	LGH036H4E	LGH036H4E
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	29”X14”
Num Final Filter 1	-	4
Final Filter Size 1	-	16X20X2

Motor Data		
	Design	**Actual**
Motor MFG	-	GENTEQ
Frame	-	NL
Horsepower	0.50	0.50
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	480	115
Rated Amperage	-	2.2

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	67%
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	1108
SF RPM	-	DD
RA CFM	930	984
OA CFM	120	124
RL Voltage	-	121
RL Amperage	-	1.3
SF Rotation	-	CORRECT
RA Damper Position	-	HIGH: 76% LOW: 70%
Min OA Damper Position	-	HIGH: 24% LOW: 30%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.09"
Fan Suction SP	-	-0.17"
Fan Discharge SP	-	0.53"
Total ESP	0.6"	0.62"
Fan Total SP	-	0.70"

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

Completed By: Michael McDonnell on 07/16/2023

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU4 AREA:BUSINESS

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G11460
Model Num	LGH060H4E	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	-	NL
Horsepower	1.0	1.0
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	480	115
Rated Amperage	-	3.7

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	80%
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	1800	1828
SF RPM	-	DD
RA CFM	1600	1618
OA CFM	200	210
RL Voltage	-	120
RL Amperage	-	3.2
SF Rotation	-	CORRECT
RA Damper Position	-	HIGH: 78% LOW: 71%
Min OA Damper Position	-	HIGH: 22% LOW: 29%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.27"
Fan Suction SP	-	-0.44"
Fan Discharge SP	-	0.64"
Total ESP	0.6"	0.71"
Fan Total SP	-	0.91"

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

Completed By: Michael McDonnell on 07/19/2023

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU5 AREA:BUYERS

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G11419
Model Num	LGH036H4E	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	-	NL
Horsepower	0.50	0.5
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	480	115
Rated Amperage	-	2.2

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	75%
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	1200	1264
SF RPM	-	DD
RA CFM	1040	1095
OA CFM	160	169
RL Voltage	-	119
RL Amperage	-	1.6
SF Rotation	-	CORRECT
RA Damper Position	-	HIGH: 80% LOW: 70%
Min OA Damper Position	-	HIGH: 20% LOW: 30%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.09"
Fan Suction SP	-	-0.22"
Fan Discharge SP	-	0.59"
Total ESP	0.6"	0.68"
Fan Total SP	-	0.81"

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

Completed By: Michael McDonnell on 07/19/2023

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU6 AREA:PBX

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G08953
Model Num	LGH036H4E	LGH036H4E
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num Final Filter 1	-	4
Final Filter Size 1	-	16x20x2

Motor Data		
	Design	**Actual**
Motor MFG	-	GENTEQ
Frame	-	NL
Horsepower	0.50	0.50
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	480	120
Rated Amperage	-	2.2

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	48%
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	1002
SF RPM	-	DD
RA CFM	975	1002
OA CFM	0	0
RL Voltage	-	120
RL Amperage	-	0.9
SF Rotation	-	CORRECT
RA Damper Position	-	NA
Min OA Damper Position	-	NA
Min OA Damper Type	-	NA
OA Enthalpy Setpt	-	NA

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.16"
Fan Suction SP	-	-0.26"
Fan Discharge SP	-	0.13"
Total ESP	0.8"	0.29"
Fan Total SP	-	0.39"

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

Completed By: Michael McDonnell on 07/19/2023

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU7 AREA:BREAK ROOM

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G11261
Model Num	LGH048H4E	LGH048H4E
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	-	NL
Horsepower	0.75	0.75
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	480	115
Rated Amperage	-	3.1

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	78%
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	1500	1559
SF RPM	-	DD
RA CFM	1200	1252
OA CFM	300	307
RL Voltage	-	120
RL Amperage	-	2.4
SF Rotation	-	CORRECT
RA Damper Position	-	HIGH: 76% LOW: 72%
Min OA Damper Position	-	HIGH: 24% LOW: 28%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.46"
Fan Suction SP	-	-0.67"
Fan Discharge SP	-	0.45"
Total ESP	0.6"	0.91"
Fan Total SP	-	1.12"

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

Completed By: Michael McDonnell on 07/19/2023

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU8 AREA:SERVICE WRITER

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G114534
Model Num	LGH036H4E	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	-	NL
Horsepower	0.50	0.50
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	480	115
Rated Amperage	-	2.2

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	64%
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	1100	1145
SF RPM	-	DD
RA CFM	940	990
OA CFM	160	155
RL Voltage	-	119
RL Amperage	-	1.2
SF Rotation	-	CW, CORRECT
RA Damper Position	-	HIGH: 75% LOW: 71%
Min OA Damper Position	-	HIGH: 25% LOW: 29%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	5.0

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.23"
Fan Suction SP	-	-0.35"
Fan Discharge SP	-	0.35"
Total ESP	0.6"	0.58"
Fan Total SP	-	0.70"

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

Completed By: Michael McDonnell on 07/19/2023

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU9 AREA:SERVICE AREA

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622F01131
Model Num	LGH240H4B	LGH240H4B
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	31x17
Num Final Filter 1	-	6
Final Filter Size 1	-	24x24x2

Motor Data		
	Design	**Actual**
Motor MFG	-	NIDEC MOTOR
Frame	-	184TZ
Horsepower	5	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	480	480
Rated Amperage	-	6.50

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	6.5"
Motor Bore Size	-	1"
Motor Sheave SetPt	-	5 TURNS OUT
Fan Sheave Size	-	11"
Fan Sheave Bore	-	1 1/8"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	BX65
Belt Alignment	-	VERIFIED

Test Data		
	Design	**Actual**
SF CFM	5600	5591
SF RPM	-	872
RA CFM	1600	1569
OA CFM	4000	4022
RL Voltage	-	468.0/468.9/470.8
RL Amperage	-	5.8/5.8/6.0
SF Rotation	-	CW
RA Damper Position	-	28.1%
Min OA Damper Position	-	71.9%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	D

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.45"
Fan Suction SP	-	-0.91"
Fan Discharge SP	-	0.36"
Total ESP	0.8"	0.81"
Fan Total SP	-	1.27"

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

Completed By: Dylan Crisman on 07/04/2023

National TAB

Project:06-26-23 CARMAX #7179 - MILWAUKEE, WI

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	710	1.54			701	98.7
SGRD2	SERVICE AREA	NK	24/12	710	1.54			716	100.8
SGRD3	SERVICE AREA	NK	24/12	710	1.54			714	100.6
SGRD4	SERVICE AREA	NK	24/12	710	1.54			717	101.0
SGRD5	SERVICE AREA	NK	24/12	710	1.54			715	100.7
SGRD6	TOILET 155		6"	50	1.54			54	108.0
SGRD7	PARTS STORAGE	NK	12/6	200	1.54			214	107.0
SGRD8	PARTS STORAGE	NK	12/6	200	1.54			208	104.0
Total				4000		0	0	4039	100.98%

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

System/Unit: AHU/RTU

Asset: RTU10 AREA:SERVICE AREA

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622F01057
Model Num	LGH240H4B	LGH240H4B
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	31x17
Num Final Filter 1	-	6
Final Filter Size 1	-	24x24x2

Motor Data		
	Design	**Actual**
Motor MFG	-	NIDEC MOTOR
Frame	-	184TZ
Horsepower	5	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	480	480
Rated Amperage	-	6.50

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	6.5"
Motor Bore Size	-	1"
Motor Sheave SetPt	-	3 turns out
Fan Sheave Size	-	11"
Fan Sheave Bore	-	1 1/8"
Belt CL Distance	-	21 3/8"
Num of Belts	-	1
Belt Size	-	BX65
Belt Alignment	-	VERIFIED

Test Data		
	Design	**Actual**
SF CFM	5600	5606
SF RPM	-	903
RA CFM	4000	1533
OA CFM	-	4073
RL Voltage	-	475.3/476.1/478.4
RL Amperage	-	5.7/5.8/6.1
SF Rotation	-	CW
RA Damper Position	-	27.3%
Min OA Damper Position	-	72.7%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	D

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.43"
Fan Suction SP	-	-0.90"
Fan Discharge SP	-	0.32"
Total ESP	0.8"	0.75"
Fan Total SP	-	1.22

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	NO
Condensate Drain Installed	-	YES

Completed By: Dylan Crisman on 07/04/2023

National TAB

Project:06-26-23 CARMAX #7179 - MILWAUKEE, WI

AHU/RTU

Diffuser Supply (GRD)

RTU10/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	665	2.05			672	101.1
SGRD2	SERVICE AREA	NK	24/12	665	2.05			656	98.6
SGRD3	SERVICE AREA	NK	24/12	665	2.05			651	97.9
SGRD4	SERVICE AREA	NK	24/12	665	2.05			684	102.9
SGRD5	SERVICE AREA	NK	24/12	665	2.05			682	102.6
SGRD6	SERVICE AREA	NK	24/12	665	2.05			662	99.5
Total				3990		0	0	4007	100.43%

National TAB

Project: 06-26-23 CARMAX #7179 - MILWAUKEE, WI

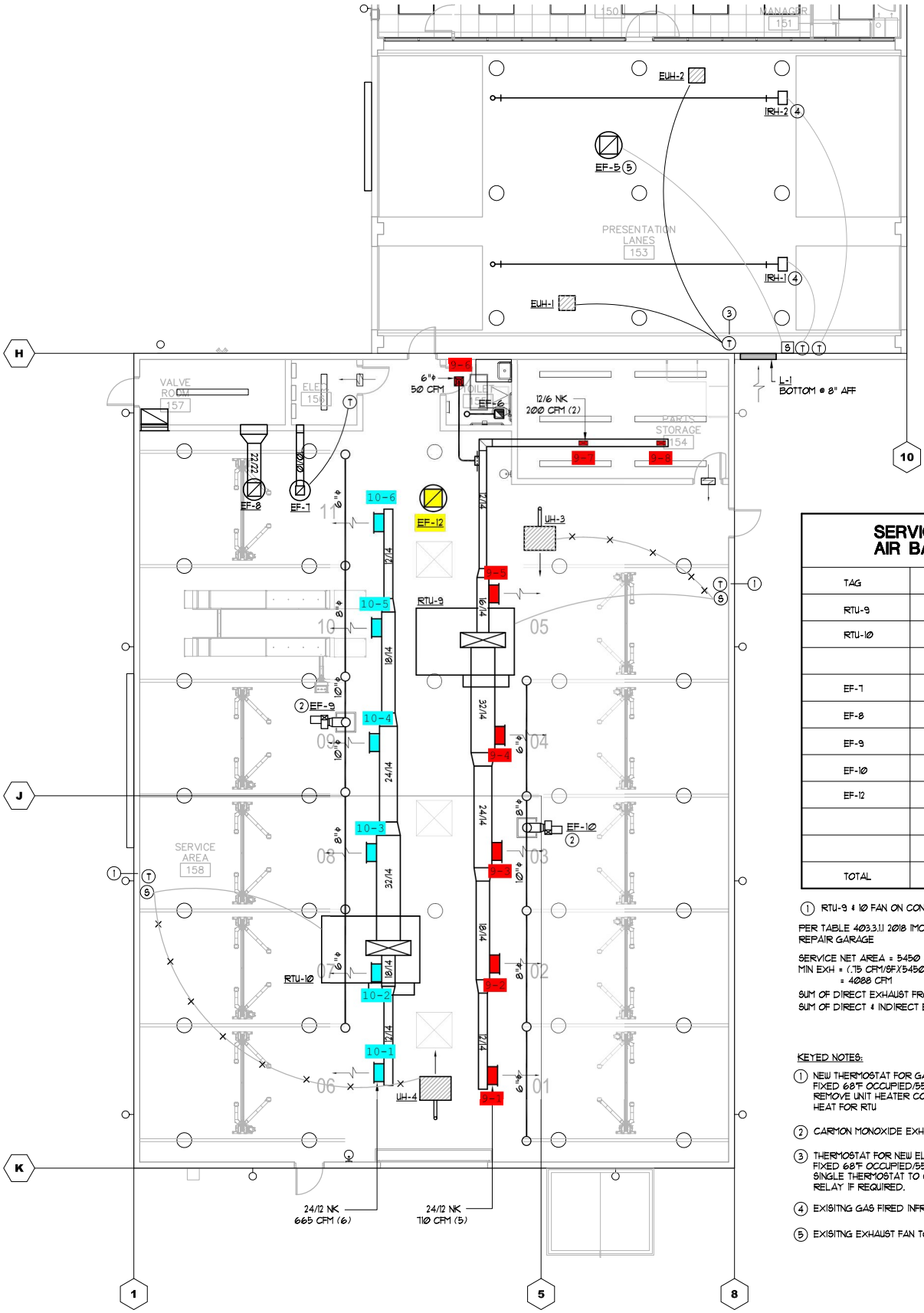
System/Unit: FAN - Exhaust

Asset: EF12 AREA:SERVICE

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	CUE-121-A	CUE-120-A-7-1-19-X
Serial Num	-	22307765
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NIDEC MOTOR
Frame	-	NL
Horsepower	1/2	3/4"
Motor Rpm	-	1680
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	8.2
Service Factor	-	1.0

Test Data		
	Design	**Actual**
CFM	1500	2037
Fan RPM	1725	1226
Fan Rotation	-	CCW
Motor RPM	-	1226
System SetPt	-	NA
RL Voltage	-	NA
RL Amperage	-	NA
Total ESP	0.375"	
Fan Inlet SP	-	
Fan Discharge SP	-	



SERVICE AREA AIR BALANCE		
TAG	OUTSIDE AIR	EXHAUST
RTU-9	4000 (1)	
RTU-10	4000 (1)	
EF-7		300
EF-8		2000
EF-9		1800
EF-10		1500
EF-12		1500
TOTAL	8000	7100

(1) RTU-9 & 10 FAN ON CONTINUOUSLY DURING OCCUPIED

PER TABLE 403.3.1.1 2018 IMC MINIMUM DIRECT EXHAUST .75 CFM/SF REPAIR GARAGE

SERVICE NET AREA = 5450 SF
MIN EXH = (.75 CFM/SF)(5450 SF)
= 4088 CFM

SUM OF DIRECT EXHAUST FROM EF- 9, 10, 12 = 4800 CFM
SUM OF DIRECT & INDIRECT EXHAUST = 7,100 CFM

KEYED NOTES:

(1) NEW THERMOSTAT FOR GAS UNIT HEATER LITESTAT TGH2-KRO FIXED 68°F OCCUPIED/55°F SETBACK. NO OTHER IS ACCEPTABLE. REMOVE UNIT HEATER CONTROL FROM EMS AS 3RD STAGE HEAT FOR RTU

(2) CARMON MONOXIDE EXHAUST FAN

(3) THERMOSTAT FOR NEW ELECTRIC UNIT HEATER LITESTAT TGH2-KRO FIXED 68°F OCCUPIED/55°F SETBACK. NO OTHER IS ACCEPTABLE. SINGLE THERMOSTAT TO CONTROL BOTH HEATERS. FURNISH 2 POLE RELAY IF REQUIRED.

(4) EXISITNG GAS FIRED INFRARED TUBE HEATERS TO REMAIN

(5) EXISITNG EXHAUST FAN TO REMAIN

NOTE: SHOWN FOR TEST AND BALANCE PURPOSES ONLY. SEE TEST AND BALANCE SCOPE ON M3.0

PART PLAN – HVAC

1 / M1.0

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