Commissioning Report

7815-23 Johnsonville Elementary School Addition/Renovation, Ph. 2 Raleigh, NC

February 22, 2024

Prepared for: Cape Fear A/C & Heating Co. 1139 Robeson St. Fayetteville, NC 28305

P.O. Box 181 Lavonia, GA 30553 Office (706) 244-0383 info@cxsolutions.us

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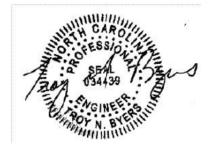
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Certification Statement

The Commissioning services provided on this project have followed the American Society of Heating, Refrigerating and Air Conditioning Engineers' (ASHRAE) Building Commissioning Guideline 0-2013. The commissioning process has been overseen by the AET Commissioning Team.

Commissioning services were provided for the building mechanical systems, controls systems, electrical systems, and other related building environmental systems. The specific commissioning process was comprised of a project review, periodic commissioning meetings, field inspections, TAB performance verification and mechanical functional performance testing. All findings were documented via independent inspection reports, tabulated test data reports, complete with photographic evidence of observed deficiencies and other miscellaneous issues. All information obtained throughout this process has been tabulated and compiled and is included with this final commissioning report.

All recommendations and the analysis of all findings summarized in this report are the opinions of the AET Commissioning Team. The analysis and recommendations are based upon the evidence compiled from the commissioning team. The test results and supporting documentation certify that the performance of the systems and equipment was satisfactory at the time of testing and verification. The results do not imply any future performance of equipment or systems. The Commissioning Team acknowledges the documentation included in this report, based on the data collected, is true and correct within the limits of field test error, and that the proposed recommendations are comprehensive in nature.



Troy N. Byers, PE, CxA Cx Solutions, LLC

Executive Summary

The intent of this project was to construct a new single story 17,405 SF building and connecting corridors. All HVAC systems are operational and functioning and have been final inspected and accepted.

Cx Solutions was contracted to provide commissioning services for the heating ventilation units and exhaust fans. The final Commissioning Report documents the efforts and contains all the information generated by the Commissioning Team during the course of the project. The structure of the report organizes the documentation to include all phases of the project; construction, acceptance and warranty. This will provide an effective, ongoing system management tool for the building operations team.

The overall goals and commissioning scope of work were conducted as described in the Final Commissioning Plan included in this report. Observations were made to verify the installation and operation of all systems was in accordance with the design intent of the final Construction Set of documents. The Project Commissioning Plan has been supplemented and enhanced by the Commissioning Agent (CxA), Construction Manager (CM), and other contractors throughout the construction process to form the Final Commissioning Record, compiled at the end of the project. Throughout the commissioning process, the CxA updated specific commissioning procedures and forms as necessary to suit project field conditions and actual approved manufacturer's equipment. The Commissioning Record provides a reference to system setup and operational data for the systems commissioned. Once complete, the Project Commissioning Record is then re-organized and combined with other project closeout documentation and submitted as the Final Commissioning Report.

After completion of all commissioning activities, the CxA submits the final report documenting the overall results of the commissioning process and recommending acceptance of the commissioning process and related documentation to the owner. The final commissioning report will include an overview or summary of the commissioning process, major results of the process, the final commissioning issues log, commissioning field reports, deferred testing, list of unresolved issues, and concluding with a recommendation to accept the process as complete.

Systems and Equipment Commissioned

Indoor Units – IDU 1-12 Heat Pumps – HP 1-12 DOAS – DOAS-1, DOAS-2 Exhaust Fans – F-1, F-2 Ductless AC Units - AC-1/ODU-1, AC-2/ODU-2 Electric Wall Heater

The system is functioning as designed. The following should be noted for the commissioning record, all systems were functionally tested, and the testing specifics, notes, and issues are included as part of this report. IDU-11 unit had low airflow, the unit was outside of the allowable deviation of airflow. TAB and mechanical contractors used all available methods to increase airflow but couldn't bring the IDU within range. Unit is still above the allowable minimum outside airflow and overall airflow. Engineer of Record (EOR) has accepted this condition and CxA has closed this issue in the issues log attached to this report.

Deferred Testing

The comprehensive verification of off-season testing is recommended as described in the CX Plan. Since most of the equipment was started and tested in the Winter season, the full functionality of the cooling systems was tested but not verified in seasonal conditions. Cooling system test data should be deferred to the Summer season as listed below:

Cx Deficiency Issues

As of the date of this report, all systems are performing as intended and all open deficiency items have been closed.

Conclusion

In general, the commissioning process for this building, based upon the results of this report, is deemed to be successful and will add significant value to the end user's investment. By ensuring the Mechanical and Lighting systems and Controls are fully integrated and effectively and efficiently performing at their optimum status will continue to provide the desired indoor conditions while reducing operating and maintenance costs.

The CxA recommends that the Commissioning process for this project is to be accepted as complete. See certification statement.

Final Commissioning Record – Attachments

- 1. Commissioning Plan
- 2. Commissioning Deficiency Issues Tracking Log Final CX Deficiency Log
- 3. Final Test, Adjust And Balance Report (TAB) TAB Report
- 4. Functional Performance Test Documents Functional Performance Tests
- 5. Training Agenda And Record (GC to provide)
- 6. O&M Manuals And Warranty Submittal Record (GC to provide)
- 7. As-Built Drawing Submittal Record (GC to provide)

Commissioning Plan

Johnsonville Elementary School Addition-Renovation

December 29, 2023

Prepared for: Todd McAmis Cape Fear Air, Electric, and Plumbing

Cx Solutions, LLC Po Box 181 Lavonia, GA 30553 706-886-5719

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Commissioning Plan

The intent of this project is to expand and renovate Johnsonville Elementary 18495 NC-27 Cameron NC. The goal for this construction was to complete the specified renovation in phases, and to the greatest extent possible, with minimal disruption for the staff, occupants, and operations of the Elementary School. Construction scope for the project included following work within the project limits: relocation of equipment was required by the Owner, demolition of specified interior finishes, HVAC, plumbing and electrical systems, the installation of new interior finishes, HVAC, plumbing and electrical services. The project provided the structural support, utilities, and all other requirements needed to support new equipment.

The Project Commissioning Plan has been supplemented and enhanced by the Commissioning Agent (CxA), Construction Manager (CM), and other contractors throughout the construction process to form the Project Commissioning Record at the end of the project. Throughout the commissioning process, the CxA revised the specific commissioning procedures and forms as necessary to suit project field conditions and actual approved manufacturer's equipment, to incorporate test data and procedure results, and to provide detailed scheduling for all commissioning tasks. The completed Commissioning Plan shall become the owner's Commissioning Record and shall provide a reference to system setup, test results, and operational data for the systems commissioned. Once complete and approved, the Project Commissioning Record is then re-organized and combined with other project closeout documentation.

Abbreviations and Definitions

The following are common abbreviations and definitions used in this document and throughout the commissioning process documentation:

A/E	Architect/Design Engineers	BOD	Basis of Design
СМ	Construction Manager	Сх	Commissioning
СхА	Commissioning Agent	FPT	Functional Performance Test
GC	General contractor	OPR	Owner's Project Requirements
PFC	Pre-Functional Checklists	РМ	Project Manager

Acceptance: A contractually defined action that permits an activity to commence or continue.

Basis of Design (BOD): A document that records the concepts, calculations, decisions, and product selections used to meet the Owner's Project Requirements and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

Commissioning: A quality-focused process for enhancing the delivery of a project. The process focuses on verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements.

Commissioning Agent (CxA): An entity identified by the owner who plans, schedules, and coordinates the commissioning team to implement the Commissioning Process.

Commissioning Field Report: A document that records the activities and results of the Commissioning Process.

Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the Commissioning Process.

Commissioning Team: The individuals who are responsible for implementing the Commissioning Process.

Johnsonville Elementary Commissioning Plan Page **3** of **12**

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Construction Documents: This includes a wide range of documents, which will vary from project to project, owner's needs, regulations, laws, and countries. Construction documents usually include the project manual (specifications), plans (drawings) and General terms of the contract, especially those required by subcontractors and vendors, suppliers and manufacturers of equipment, assemblies and systems.

Continuous Commissioning Process: A continuation of the Commissioning Process well into the Occupancy and Operations Phase to verify that a project continues to meet current and evolving Owner's Project Requirements. The Continuous Commissioning Process activities are on-going for the life of the facility.

Contract Documents: This includes a wide range of documents, which will vary from project to project, owner's needs, regulations, laws, and countries. It frequently includes price agreements, construction management process, subcontractor agreements or requirements, requirements and procedures for submittals, changes, and other construction requirements, timeline for completion, and the Construction Documents.

Coordination Drawings: Drawings showing the work of all trades to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers' recommended maintenance clearances.

Functional Performance Test (FPT): The purpose of a Functional Performance Test is to verify and document compliance with the stated criteria of acceptance. The CxA develops the specific test procedures and associated test forms to verify and document proper operation of each piece of equipment and system. The contractors execute and pass the functional performance tests for all the systems and equipment. The CxA directs and witnesses a sample of functional performance re-testing until he/she is satisfied that the equipment and systems are in accordance with the stated criteria of acceptance.

Issues Log: A formal and ongoing record of problems or concerns – and their resolution – that have been raised by members of the Commissioning Team during the course of the Commissioning Process.

Owner's Project Requirements (OPR): A written document that details the functional requirements of a project and the expectations of how it will be used and operated. This includes project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.

Pre-Functional checklist: A checklist of items that are to be completed as part of startup & initial checkout, preparatory to functional testing. Each checklist is for a specific piece/type of equipment and multiple contractors may have items on a checklist. Checklists that do not have an equipment tag, number, or other reference for a specific piece of equipment/system can be copied and used multiple times. For example, an occupancy sensor may not have unique number; therefore, multiple copies of the "occupancy sensor" checklist should be used. The checklists do not take the place of the manufacturer's recommended checkout and startup procedures or report.

Systems Manual: A system-focused composite document that includes the Commissioning Record, operation manual, maintenance manual, and additional information of use to the owner during the Occupancy and Operations Phase.

Training Plan: A written document that details the expectations, schedule, budget, and deliverables of Commissioning Process activities related to training of project operating and maintenance personnel, users, and occupants.

Verification: The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the Owner's Project Requirements.

Commissioning Process Description

The Commissioning Plan is a document that outlines the organization, schedule, allocation of resources, and documentation requirements of the Commissioning Process. The contractor verifies installation, provides scheduling and coordination of commissioning activities, performs training, starts up equipment, conducts test, corrects deficiencies, performs re-tests, and provides documentation of the process. The CxA provides the owner an unbiased, objective view of the systems installation, documentation, operation, and performance. Commissioning procedures and results are observed by the CxA. The contractor is expected to verify the functional readiness of systems to be tested prior to performing the tests in the presence of the witnesses. A high rate of test failure will indicate that the contractor has not adequately verified the readiness of the systems.

This plan is the key means for the CxA to inform all parties as to how each system functions independently and with respect to other systems. This plan shall be updated regularly and redistributed to the commissioning team for review and comment.

Design Phase

Owners Project Requirements

The OPR, relative to the building systems selected for commissioning, will be documented in order to establish a baseline of performance expectations to which the actual installed performance is compared. The CxA, with the assistance of the PM, CM, Owner, and A/E, discusses the Basis of Design Summary that documents the OPR for those building systems selected for commissioning. The OPR Summary reflects the underlying assumptions and requirements that become represented in the construction documents. The OPR is developed by the owner and Commissioning Team. For this project, the OPR is essentially the Project Statement of Work and its referenced design drawings.

Commissioning Plan

The Commissioning Plan is a living document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process. Ideally, the initial Commissioning Plan is created during the Pre-Design Phase. However, it may also be developed during the Design Phase, depending on when the Commissioning Team is officially formed. The Commissioning Plan serves as the road map for executing the process during the Construction and Occupancy and Operations Phases. The plan is continuously updated and added to until the end of the project, when it then becomes the Project Commissioning Record.

Basis of Design

The Basis of Design (BOD) is a document that records the concepts, calculations, decisions, and product selections used in the design to meet the Owner's Project Requirements and to satisfy applicable regulatory requirements, standards, and guidelines. The document generally includes both narrative descriptions and lists of individual items that support the design process. The BOD is developed by the Architect/Engineer of Record and the Commissioning Team.

Training Requirements

Training requirements are established during the Design Phase and are incorporated into the project specifications for each system that requires training.

Commissioning Issues Log

Also known as deficiency or non-conformance reports, Commissioning Issues provide a record of issues that are discovered through the commissioning process so that they may be tracked and appropriately resolved. The Commissioning Issues Log is a formal and ongoing record of problems or concerns – and their resolution – that have been raised by members of the Commissioning Team during the course of the commissioning process that synopsizes the issues recorded on the Commissioning Issues form. Design review comments are included in the Issues section to track issues raised during the design process separately from the Construction Phase issues. Commissioning Issues forms are completed during the Construction and Occupancy and Operations Phases to track concerns raised during the commissioning process. The Issues Log then synopsizes the issues and provides issue status at-a-glance.

Commissioning Specifications

Commissioning contract documents are developed during the design process and include commissioning specifications and commissioning procedures. Project specifications for commissioning are contained in the following Sections: 01 32 01.00 10 Project Schedule, 01 33 10.05 20 Design Submittal Procedures, 01 78 02.00 Closeout Submittals, and 01 78 23 Operation and Maintenance Data. References are also developed for the technical specification sections to integrate the commissioning process with the project technical requirements. The process is intended to be integrated with the normal construction process and check, test, and start-up activities.

Construction Phase

Commissioning ensures new building systems within our project boundary function per design intent and integrate with existing systems. Commissioning activities in the Construction Phase shall proceed from lower to higher levels of complexity. For each discrete subsystem or system, testing at the lower level shall be completed prior to starting the next higher level of tests. In general, the chronology of testing is as follows:

- 1. Submittal Review for systems / equipment in the Cx scope of work
- 2. Start-up and Pre-functional testing
- 3. Control point-to-point checks
- 4. Testing, Adjusting, Balancing (TAB)
- 5. Functional Performance Testing

Submittals

The general contractor will provide the CxA with a set of equipment and system submittals. This equipment data includes installation and start-up procedures, O&M data, performance data and temperature control drawings. The GC shall notify the CxA of any new OPR or operating parameter changes, added control strategies and sequences of operation, or other change orders that may affect commissioned systems

Installation Verification

The CxA will make site visits to witness equipment and system installations, spot checking completed

Construction Checklists submitted by the contractors. Each site visit will have a specific agenda and will be coordinated with the general contractor site supervisor. The GC provides the CxA with information regarding substitutions or change orders that may affect commissioned equipment or the commissioning schedule.

Pre-Functional Checklists

Pre-Functional Checklists are important to ensure that the equipment and systems are connected and operational and that the systems are ready for functional performance testing without unnecessary delays. Each piece of equipment receives full checkout by the contractor. No sampling strategies are used. The contractor will complete Pre-Functional Checklists for all equipment and systems prior to functional performance testing of equipment or subsystems of the given system. These checklists will be verified by the CxA. The Pre-Functional Checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., oil level verification, fan belt tension, labels affixed, gages in place, sensor calibration, etc.). However, some Pre-Functional Checklist items entail simple testing of the function of a component, a piece of equipment or system which will be combined with the manufacturer's start-up checklist. The table below lists the Pre-Functional Checklists that will be provided for this project. Additional checklists will be added as necessary as the project progresses.

Item	Quantity	Date Form was	Date Form was
		Provided to GC	Completed
DOAS	2	July 18 2023	-
Heat Pumps (Outdoor Unit)	12	July 18 2023	-
IDU	12	July 18 2023	-
Exhaust Fans	2	July 18 2023	-
Ductless AC Condensing Unit / Indoor	2	July 18 2023	-
Electric Wall heaters	1	July 18 2023	-

Table 1: List of Pre-Functional Checklists

Pre-Requisites for Functional Performance Testing

The following applicable prerequisite checklist items are to be completed and checked off by the GC, sub-contractors and CxA prior to functional performance testing.

- 1. All related equipment has been started up and start-up reports have been submitted and approved by the CxA and A/E.
- 2. Pre-Functional Checklists for items within the project scope have been completed by contractor.
- 3. Piping system flushing has been completed for systems within in contract areas that are within the scope of the project, and any required reports are approved.
- 4. Water treatment systems in the project scope are complete and operational.
- 5. Testing, Adjusting, and Balancing (TAB) complete and approved for the hydronic and air systems.
- 6. All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final set-points and schedules with debugging, loop tuning, and sensor calibrations completed.
- 7. Safeties and operating ranges reviewed by Building Operating Staff.

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- 8. Final sequences of operation confirmed, documented, and submitted to the Owner, CxA and Building Operating Staff.
- 9. Schedules and set-points established with owner, configured, and given to CxA.
- 10. Sufficient clearance around equipment for access during testing and for future servicing.
- 11. All A/E punch list items for this equipment corrected.
- 12. Certificate of Readiness certifying that the systems are ready for Functional Performance Testing has been submitted and approved.

Functional Performance Testing

Functional Performance Testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The CxA develops the Test Procedures in a sequential written form and tests and documents the actual performance. The end goals of the functional performance testing during the construction of this project are to:

- Ensure that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
- Verify and document proper performance of equipment and systems.
- Verify and document that systems and assemblies perform according to the OPR.
- Utilize quality-based sampling techniques to detect systemic problems.
- Verify proper coordination among systems and assemblies.
- Verify emergency power system interoperability.

The table below lists the Functional Performance Tests that will be provided for this project. Additional Test Procedures will be added as necessary.

Item		Date Form was	Date Form was
		Provided to GC	Completed
DOAS	2	July 18 2023	12/13/2023
Heat Pumps (Outdoor Unit)	12	July 18 2023	11/10/23
IDU	12	July 18 2023	11/10/23
Exhaust Fans	2	July 18 2023	11/10/23
Ductless AC Condensing Unit / Indoor	2	July 18 2023	11/10/23
Electric Wall heaters	1	July 18 2023	11/10/23

Table 2: List of Functional Performance Tests

Functional testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. The CxA will follow the specifications and use judgment where needed to determine which method is most appropriate.

For any given system/equipment, the CxA will wait until the GC and subcontractors provide a signed Certificate of Readiness that the system/equipment is ready for functional testing. The GC and subcontractors confirm that the functional performance tests have been passed. The GC will notify the CxA that the systems/equipment can be functionally tested again in the presence of the CxA. The contractors perform the testing and the CxA oversees, witnesses, and documents the functional testing of all equipment and systems according to the Specifications and the OPR. The CxA will use sampling of the systems as appropriate. The control system is tested before it is used to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems and finally to interlocks and connections between systems.

Occupancy and Operations Phase

Commissioning Issues and Retesting

The CxA records the results of the functional testing on the procedure or test form. All deficiencies identified during the verification testing are documented on an issue list standard form and reported to the owner. The deficiency report includes all details of the components or systems found to be non-compliant with the parameters of the test plans. The report details the adjustments or alterations required to correct system operation, at which time owner will identify the responsible party.

Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA with the concurrence of the owner. In such cases the deficiency and resolution will be documented on the procedure form. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.

For identified deficiencies:

If there is no dispute on the deficiency and the responsibility to correct it:

The CxA documents the deficiency and the adjustments or alterations required to correct it. The contractor corrects the deficiency and notifies the CxA that the equipment is ready to be retested. The CxA reschedules the test, and the test is repeated.

If there is a dispute about a deficiency or who is responsible:

The deficiency is documented on the issues form and a copy given the GC/PM. Resolutions are made at the lowest management level possible. Final interpretive authority is with the CM/Owner and the A/E. The CxA documents the resolution process.

Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency and notifies the CxA that the equipment is ready to be retested. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.

Deferred Testing

<u>Unforeseen Deferred Tests:</u> If any test cannot be completed due to the building structure, required occupancy condition, or other deficiency, the functional testing may be delayed upon

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approval of the owner. These tests are conducted in the same manner as the seasonal tests as soon as possible.

<u>Seasonal Testing</u>: Seasonal variation in operations or control strategies will be verified by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data

<u>Sampling</u>: At the discretion of the CxA, multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. The sampling rate for identical items is 10%.

Final Commissioning Report

All commissioning activities have been completed. A final report documenting the overall results of the commissioning process and recommended acceptance of the commissioning process and related documentation are included in this packet. The final commissioning report includes an overview or summary of the commissioning process, major results of the process, the final commissioning issues log and resolutions, commissioning progress and field reports, a deferred testing recommendation, and concluding with a recommendation to accept the process as complete.

Appendix B – Commissioning Team Contact Information

PROJECT: Johnsonville Elementary School						
AGENCY	NAME	OFFICE	ROLE/ POSITION	E-MAIL	PHONE	
GC	Todd McAmis	Cape Fear Air, Electrical & Plumbing	Commercial HVAC Project Manager	todd.mcamis@capefearair.com	910-930-8032	
GC						
A/E						
A/E						
MC						
MC						
MC						
EC						
TAB	Rob Stanley	Addison Energy Technologies, LLC	ТАВ	rstanley@addisonet.com	910-545-2430	
MR						
GNG						
СХА	Mark Rogers	Cx Solutions, LLC	СхА	mrogers@cxsolutions.us	803-288-1954	

Appendix D – Systems to Be Commissioned

The following systems and equipment were commissioned:

Item	Quantity
DOAS	2
Heat Pumps	12
IDU	12
Exhaust Fans	2
Ductless AC Units	2
Electric Wall heaters	1

Appendix E – Functional Performance Tests

Functional Performance Tests are merged to the end of this document.

Cx Solutions, LLC⁷⁸¹⁵⁻²³ Johnsonville Elementary School Addition/Renovation, Ph. 2 Commissioning Issue Log

Issue ID	Issue Date	Reported By	Issue Title	Issue Description	Location	Unit ID	Responsible Trade	Resolution	Resolved By	Date Completed	Status
1	11/10/23	Mark Rogers	Dehumidification On	DOAS dehumidification not BAS, unable to view this process or edit the setpoint.	Mechanical Space	DOAS-1	Mech	Verified remotely on 12/13/23	MR	12/13/23	Closed
2	11/11/23	Mark Rogers	Dehumidification On	DOAS dehumidification not BAS, unable to view this process or edit the setpoint.	Mechanical Space	DOAS-2	Mech	Verified remotely on 12/13/23	MR	12/13/23	Closed
3	11/11/23	Mark Rogers	Airflow	Low airflow: unit is outside allowable deviation of airflow.TAB and mechanical contractors used all available methods to increase airflow but could not bring the IDU within range. Unit is still above allowable minimum outside airflow and overall airflow	Mechanical Space	IDU	Mech	EOR accepted IDU low on airflow	EOR, TM, MR	12/13/23	Closed
4	11/10/23	Mark Rogers	Unit State	Unit was down for repairs, unable to test	Telecom Rm	AC-1	Mech	Units were repaired and are in working condition.	ТМ	12/13/23	Closed
5	11/10/23	Mark Rogers	Unit State	Unit was down for repairs, unable to test	Telecom Rm	AC-2	Mech	Units were repaired and are in working condition.	ТМ	12/13/23	Closed
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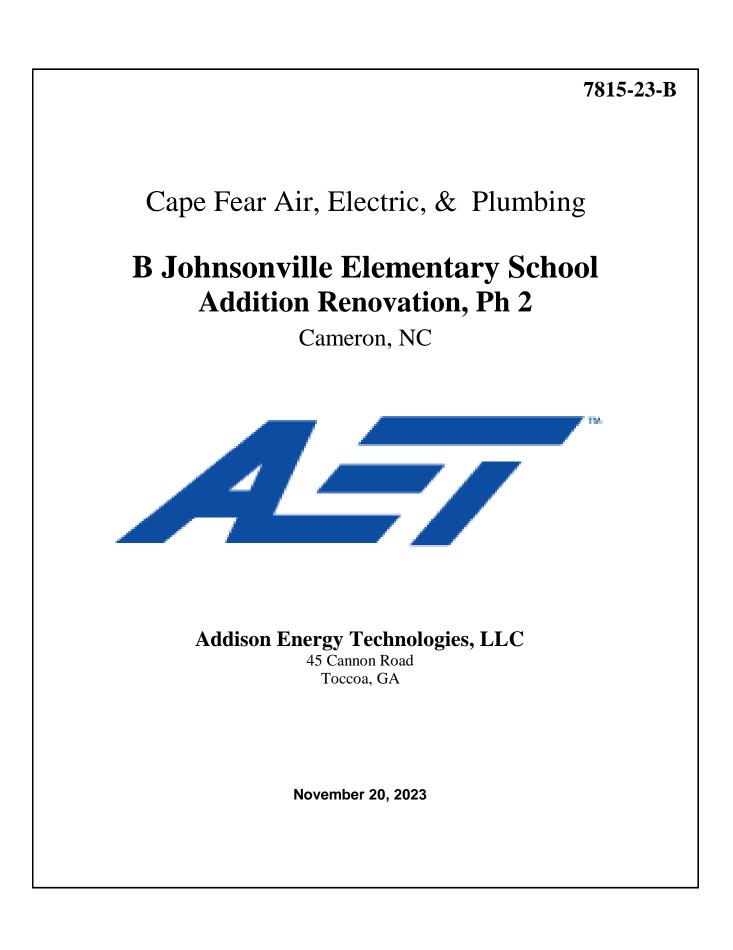




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CERTIFICATION

TEST, ADJUST, AND BALANCE REPORT

Project:	Johnsonville Elementary School Addition-Renovation, Ph 2
Location:	Cameron, NC

Declaration:

THE DATA PRESENTED IN THIS REPORT IS A RECORD OF SYSTEM MEASUREMENTS AND FINAL ADJUSTMENTS THAT HAVE BEEN OBTAINED IN ACCORDANCE WITH THE CURRENT EDITION OF THE AABC NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE. ANY VARIANCES FROM DESIGN QUANTITIES, WHICH EXCEED AABC TOLERANCES, ARE NOTED IN THE TEST-ADJUST-BALANCE REPORT PROJECT SUMMARY.

Contractor:	Cape Fear Air, Electric, & Plumbing		
Engineer:	Optima Engineeering, PA		
Architect:	A Architects, PA		
AABC Certified TAB	Firm Name:	Addison Energy Technologies, LLC	
		45 Cannon Road	
		Toccoa, GA 30577	
	Phone:	(706) 886-5719	

(706) 297-0156

TBE # 17-05-105

Fax:

Certification Expiration Date: 12/31/2023

Report Date: November 20, 2023

AABC Qualified TAB Supervisor Name:

Eddie M. Addison II

AABC Qualified TAB Supervisor Signature:

hAR



Report prepared by:

Deana Bell

AABC National Performance Guaranty Pursuant to the agreement between

AABC Certified Testing & Balancing Agency

and _

Client

All systems shall be tested and balanced in accordance with the project plans and specifications and to the optimum performance capabilities of the equipment. Testing and balancing shall be done in accordance with the standards published by the Associated Air Balance Council.

If the Agency listed above fails to comply with the specifications for any reason other than termination of business by the AABC agency or equipment malfunction or inadequacy which prevents proper balancing of the systems, AABC will investigate and, if warranted, will provide supervisory personnel to assist the member Agency to perform work in accordance with AABC Standards. This supervision will be provided at no additional cost to the building owner.

This Guaranty is valid for one year from the date of submission of a test and balance report, provided the Agency is a current member of AABC, and may only be invoked in writing by the building owner, architect, or engineer of record. The Guaranty is limited to the terms and conditions as stated herein.

Project Name	
Address	
Name of Engineer	
Engineering Firm	
Email Address	
Address	
	AABC
Date	Associated Air Balance Council
TBE #	1518 K Street, N.W. Washington, D.C. 20005
By AABC Certified TBE	202-737-0202 • Fax 202-638-4833 info@aabc.com • www.aabc.com



INSTRUMENT CALIBRATION REPORT

			CALIBRATION
INSTRUMENT	APPLICATION	SERIAL NO.	TEST DATE
Cooper SH66A-E Temperature Meter; w/ Probes	Water / Temperature Meter	061011054-SH66	4/27/2023
Amprobe / Digital Psychrometer	Dry Bulb / Wet Bulb & Relative Humidity Dew Point	100202417	4/27/2023
PLT-200 Laser Tachometer	RPM	1847198	5/1/2023
Amprobe AC75B	Volts-Amps	09070083	5/3/2023
Shortridge ADM-860C Airdata Multimeter	Air Volume	M12446	3/28/2023
Shortridge ADM-860C Airdata Multimeter	Air Volume	M11507	3/21/2023
Shortridge HDM-250 Hydrodata Multimeter	Hydronics	W14137	2/22/2023
Shortridge HDM-250 Hydrodata Multimeter	Hydronics	W13014	4/20/2023
Quest SP-DL-2-1/3 Soundpro DL Type 2	Sound Volume	BIP060009	6/1/2023
3M AC-300 Calibrator	Sound Volume	AC300005054	6/1/2023
Rotating Vane Anemometer RVA801	Air Volume	A05049	2/6/2023

Note: Not all instruments may be used for this project.



May 27, 2020

Eddie Addison Jr.

Dear Eddie,

This is to confirm that capture hoods manufactured by Evergreen Telemetry are used with a Wrist Reporter to display airflow measurements that are accurate within the specified tolerance. All capture hoods are checked at the factory against a NIST-traceable standard, and a Calibration Certificate is issued. The airflow measurements are correct as displayed, and do not require any further adjustments or factoring by field technicians.

Regards,

Pete Secor Owner / Manager 602.574.6192



ABBREVIATIONS

# Number % Percentage A Delta or Difference *F Degrees Fahrenheil APD Air Pressure Drop BHP Brahe Horsgrover CFH Cubic Feet per Hour CFM Cubic Feet per Hour CFM Color Feet per Hour CFM Color Feet per Hour CV Conflictent of Valocity CB Dechels DB Depthels DB Depthels DIF Differential DIF Differential EFF Elficiancy EFF Elficiancy EFF Elficiancy EFF Elficiancy EFF Elficiancy FT Feet GPM Galoos per Minute FT Feet GPM Galoos per Minute FT Feet GPM Galoos per Minute HP Horspectore HW Hot Water		
Δ Defas or Difference ·F Degrees Fahrenheit APD Air Pressure Drop BHP Brake Horspower CFH Cubic Feet per Moute CFM Cubic Feet per Moute CHW Chilled Water CV Conficient of Vacity dB Dactives DB Dry Buib DIA Darneter OK Conficient of Vacity CFF Differental (E) Existing EFF Efficiency ENT Entering EOF / E.O.F. Eyo Of Fan FL Full Load FPM Feet per Minute FT Feet GPM Galons per Minute HP Horsepower HW Hot Water / Heating Water HQ Horsepower HW Hot Water / Heating Water HQ Horsepower HW Hot Water / Heating Water HQ Horsepower HW		
Image: Product of the set o	%	Percentage
APD Air Pressure Drop BHP Brake Horsprop CFH Cubic Fest per Marte CFM Cubic Fest per Marte CHW Chiled Water CV Coefficient Of Vacity dB Decideis DB Dry Buib DIFF Differenter (E) Existing EFF Efficiency EFF Efficiency EFF Efficiency EFF Feet per Minute FL Feet per Minute FT Feet per Minute FT Feet per Minute HP Horsprover HW Hot Water / Heating Water HP Horsprover HW Hot Water / Heating Water HP Horsprover HW Kolowatis LVG Lewing MAX Maximum MIN Impelier IN Information MVD Maximum MNN Maximum MNN Maximum MIN Maximum MIN Maximum MIN Maximum MIN Maximum MIN Maximum MIN Maximum<		Delta or Difference
BHP Brake Horspower CFH Cubic Feet par Hour CFM Cubic Feet par Hour CHW Childel Water CV Coefficient of Velocity dB Doctbels DB Dry Buil DIFF Differential (E) Existing EFF Efficiency EFF Efficiency EFF Filleare CPM Feet per Minute FF Differential EOF /E.O.F. E.ye Of Fan FI Feet per Minute FF Feet per Minute FF Feet per Minute FF Feet per Minute FT Feet per Minute FT Feet per Minute HP Hotspower HP Hotspower HW Hot Water / Heating Water HZ Hetz IN Inches KW Klowatts LVG Leaving MAX Maximum MAX Maximum MN Minimum MN Minimum MAX Maximum MAX Maximum MAX Not In Scossible NA Not A	۴	Degrees Fahrenheit
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CFM Cubic Fey FMnute CV Coefficient of Velocity dB Decibels DB Dry Bub DIA Diamater DIFF Differential (E) Existing EFF Efficiency ENT Entring EOF / E.O.F. Eye Of Fan FIL Full Load FPM Gelow performed and and and and and and and and and an	BHP	Brake Horsepower
CFM Cubic Fey FMnute CV Coefficient of Velocity dB Decibels DB Dry Bub DIA Diamater DIFF Differential (E) Existing EFF Efficiency ENT Entring EOF / E.O.F. Eye Of Fan FIL Full Load FPM Gelow performed and and and and and and and and and an	CFH	Cubic Feet per Hour
CHW Child Water CV Coefficient of Valority dB Dorbels DB Dry Bulb DIA Diamoter DIFF Differential (E) Existing EFF Efficiency ENT Entering EOF /E.O.F. Eye Of Fan FIL Full Load FF Feet Per Minute FT Feet Per Minute FT Feet Per Minute HP Hord Segover HW Kot Water / Heating Water HW Hord Water / Heating Water HZ Heftz IMP Inspective IN Inches KW Klowatts LVG Leving MAX Maximum MND Manum MNA Not In Scope NA Not In Scope NA Not In Scope NPSH Net Positive Feet OD / O.D. Obtameter OD / O.D. Outside Damper OD / O.D. Outside Damper <th></th> <th></th>		
Cv Coefficient of Velocity dB Debols DB Dry Buils DIA Diameter DIFF Oliferential (E) Existing EFF Efficiency ENT Entering FC For and FI Full coad FT Fell for and FT Fell for and FT Fell for and FT Fell for and GPM Galors per Minute HP Horspower HW Hot Water / Heating Water HZ Hert z IMP Impeller IMP Impeller INP Impeller INN Inches KW Kalwatts LVG Laving MAX Mamun MIN Minimum MIN Minimum MIN Minimum MIN Minimum MIN Minimum MYA Not Accessible <	CHW	
dB Decbels DB Dry Bub DIA Diameter DIFF Differential (E) Existing EFF Efficiency EOF / E.O.F. Eye Of Fan FL Full Load FT Feet per Minute FT Feet per Minute FT Feet per Minute HP Horsepower HW Hot Water / Heating Water HZ Hetz IMP Inches KW Kiowatts LVG Leaving MN Minimum MNN Minimum MNN Minimum MNN Minimum MND Manual Volume Damper NA Not Applicable NA Not Applicable NA Not Applicable NS Not In Scope PF Pressure PF Power Factor PSH Net Positive Suction Head OD/ OD Opproved Blade Damper OD/ OD Opproved Blade Damper OD/ OD Opproved Blade Damper PF Power Factor PSI Power Factor PSI Power Factor		
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W Watts WB Wet Bulb W.C. / WC Water Column		
WB Wet Bulb W.C. / WC Water Column		
W.C. / WC Water Column		
w.g. / wg water Gauge		
	٧٧.G. / ٧٧G	water Gauge



PROJECT SUMMARY

JOB NAME: JOHNSONVILLE ELEMENTARY SCHOOL ADDITION RENOVATIN, PH 2 LOCATION: CAMERON, NC

THE DATA PRESENTED IN THIS REPORT IS A RECORD OF SYSTEM MEASUREMENTS AND FINAL ADJUSTMENTS THAT HAVE BEEN OBTAINED IN ACCORDANCE WITH THE CURRENT EDITION OF AABC'S **NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE.** ANY VARIANCES FROM DESIGN QUANTITIES, WHICH EXCEED AABC'S TOLERANCES, ARE NOTED ON THIS PROJECT SUMMARY.

IDU 11 DIRECT DRIVE UNIT RUNNING 88% ON HIGHEST SPEED SETTING.



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 **PROJECT:**

LOCATION: CAMERON, NC

UNIT NUMBER: DOAS-1

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER		-
SERVICE	IDU-1	- IDU-6	HP / BHP	- / -	1.30 / -
MANUFACTURER	AA	NON	PHASE / HZ	3/60	3/60
MODEL NUMBER	V3-BRB-3-	0-162C-5T4	VOLTAGE	460	500 / 499 / 501
SERIAL NUMBER	202208-C	JEB07740	AMPS	1.60	.4/.5/.4
FILTERS	1) 24	x24x4	MOTOR RPM	2580	VARRIABLE
			SF / EFF / PF	1.00	/ - / -
PERF	DRMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1400	1397	MOTOR SHEAVE SZ / BORE	DIREC	T DRIVE
TOTAL OUTLET CFM	1390	1388	FAN SHEAVE SZ / BORE	DIREC	T DRIVE
RETURN CFM	0	0	# BELTS / SIZE	DIREC	T DRIVE
OSA CFM	1400	1397	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.49	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	1.00	0.09			
EYE OF FAN	-	-0.45			
SUCTION PRESSURE	-	-0.05			
DISCHARGE PRESSURE	-	0.04			
DUCT STATIC P SETPOINT	-				
ELECT	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL

ELECTRIC HEAT			TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN ACTUAL		COOL ENT TEMP DB/WB	-	-	73.20	60.30
MODEL NUMBER		-	COOL LVG TEMP DB/WB	-	-	55.10	53.40
SERIAL NUMBER		-	HEAT ENT TEMP DB		-	73	.20
KW	30.00	*	HEAT LVG TEMP DB		-	112	2.00
PHASE / HZ	3/60	3/60					
VOLTAGE	460	*					
AMPS	37.70	*					

REMARKS: MOTOR SET AT 5.5 VDC

* ELECTRIC HEAT CONTROLED INTERNALLY TO UNIT NOT ABLE TO COMMAND ON.

TECHNICIAN: RS

TEST DATE: <u>11/16/2023</u>



DUCT TRAVERSE TEST SHEET

PROJEC	T: <u>JOH</u> DN: <u>Can</u>		LLE ELEM S	<u>SCHOO</u>	L ADD/RE	ENO-PHA	SE 2				
DUCT SI	: <u>DOA</u> ZE: <u>18x</u> REA: <u>1.50</u>	12	PLY					DESIG	N FPM: <u>9</u> N CFM: <u>1</u> L CFM: <u>1</u>	1390	
889	872	890	878								
908	974	964	902								
979	1010	958	952								
ACTUAL	FPM: <u>931</u>						ESSURE:		18	@ 187	
				I	FINAL ST	ATIC PRE	ESSURE:	0.0)4	@ 139 ⁻	7_CFM
SYSTEM	:										
DUCT SI											
DUCT AF	REA:							ACTUA			
ACTUAL	FPM:						ESSURE:			@	CFM
REMARK	S:				INAL ST		ESSURE:			@	CFM

TECHNICIAN: RS

_____ TEST DATE: <u>11/14/2023</u>



AIR DISTRIBUTION TEST SHEET

PROJECT: JO	HNS	SONVILL	E ELEN	I SCHOOL	ADD/RE	NO-PHAS	E 2				
LOCATION: CA	ME	RON, NC	;				UN		IBER: DO	DAS-1	
		0	UTLET		DESIGN	PRE	ELIMINAF	RY		FINAL	
AREA SERVED	#	TYPE	SIZE			FPM	CFM	%	FPM	CFM	%
IDU-5	1	OSA	8	0.35	215	628	220	102%	643	225	105%
IDU-6	2	OSA	10	0.55	270	535	294	109%	484	266	99%
IDU-3	3	OSA	8	0.35	215	571	200	93%	623	218	101%
IDU-4	4	OSA	10	0.55	270	556	306	113%	480	264	98%
IDU-1	5	OSA	8	0.35	205	471	165	80%	600	210	102%
IDU-2	6	OSA	8	0.35	215	703	246	114%	586	205	95%
TOTAL					1390		1431	103%		1388	100%

REMARKS:

TECHNICIAN: RS

TEST DATE: 11/14/2023



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: DOAS-2

UNI	UNIT DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER		-
SERVICE	IDU-7 - IDU-12		HP / BHP	- / -	1.30 / -
MANUFACTURER	AA	NON	PHASE / HZ	3/60	3/60
MODEL NUMBER	V3-BRB-3-	0-162C-5S3	VOLTAGE	460	499 / 498 / 501
SERIAL NUMBER	202208-C	JEB07741	AMPS	1.60	.25 /.35 / .3
FILTERS	1) 24	x24x4	MOTOR RPM	2580	VARRIABLE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME	-	
TOTAL FAN CFM	1100	1110	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE
TOTAL OUTLET CFM	1110	1105	FAN SHEAVE SZ / BORE	DIREC	T DRIVE
RETURN CFM	0	0	# BELTS / SIZE	DIREC	Γ DRIVE
OSA CFM	1100	1110	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.32	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	1.00	0.11			
EYE OF FAN	-	-0.27			
SUCTION PRESSURE	-	-0.06			
DISCHARGE PRESSURE	-	0.05			
DUCT STATIC P SETPOINT	-	-			
				DEGION	

ELECTRIC HEAT			TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN ACTUAL		COOL ENT TEMP DB/WB	-	-	71.40	59.60
MODEL NUMBER		-	COOL LVG TEMP DB/WB	-	-	50.40	49.80
SERIAL NUMBER		-	HEAT ENT TEMP DB		-		.70
KW	22.50	*	HEAT LVG TEMP DB		-	113	8.00
PHASE / HZ	3/60	3/60					
VOLTAGE	460	*					
AMPS	28.30	*					

REMARKS: MOTOR SET AT 4.5 VDC

* ELECTRIC HEAT CONTROLED INTERNALLY TO UNIT NOT ABLE TO COMMAND ON.

TECHNICIAN: RS

TEST DATE: <u>11/16/2023</u>



DUCT TRAVERSE TEST SHEET

PROJEC	DN: <u>CAN</u>			SCHOOL A	ADD/RENO-F	HASE 2				
DUCT SI	: <u>DO/</u> ZE: <u>18x</u> REA: <u>1.50</u>	12	PPLY				DESIG	N FPM: <u> </u> N CFM: <u> </u> L CFM: _	1110	
736	747	766	719							
730	758	743	709							
741	750	765	715							
ACTUAL	FPM: <u>740</u>)				PRESSURE: PRESSURE:			@ 202	
OVOTEM	L_			FIN	IAL STATIC	PRESSURE.		05		
SYSTEM								N FPM:_ N CFM:		
DUCT AF										
200174	REA:									
	REA:							_		
	REA:							_		
	REA:							_		
	REA:							_		
	REA:							_		
	REA:							_		
	REA:							_		
						PRESSURE:			@	CFM
ACTUAL	FPM:					PRESSURE: PRESSURE:				CFM CFM
	FPM:								@	

_____ TEST DATE: <u>11/14/2023</u>



AIR DISTRIBUTION TEST SHEET

PROJECT: JO	HNS	SONVILL	E ELEN	I SCHOOL	ADD/REI	NO-PHAS	6E 2					
LOCATION: CA	ME	RON, NC	;				UN	IIT NUN	IBER: DO	DAS-2		
		0	UTLET		DESIGN	ESIGN PRELIMINARY				FINAL		
AREA SERVED	#	TYPE	SIZE	FACTOR		FPM	CFM	%	FPM	CFM	%	
IDU-7	1	OSA	8	0.35	215	531	186	87%	611	214	100%	
IDU-8	2	OSA	8	0.35	215	491	172	80%	583	204	95%	
IDU-9	3	OSA	8	0.35	210	557	195	93%	603	211	100%	
IDU-10	4	OSA	8	0.35	210	603	211	100%	597	209	100%	
IDU-12	5	OSA	8	0.35	120	480	168	140%	360	126	105%	
IDU-11	6	OSA	8	0.35	140	500	175	125%	403	141	101%	
TOTAL					1110		1107	100%		1105	100%	

REMARKS:

TECHNICIAN: RS

TEST DATE: 11/14/2023



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-1

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER	GEN	ITEQ
SERVICE	310		HP / BHP	- / -	0.50 / -
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230	243
SERIAL NUMBER	22251	LPH1V	AMPS	3.50	2.30
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1200	1204	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE
TOTAL OUTLET CFM	1200	1204	FAN SHEAVE SZ / BORE	DIRECT	T DRIVE
RETURN CFM	995	994	# BELTS / SIZE	DIREC	Γ DRIVE
OSA CFM	205	210	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.59	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	0.40	0.33			
EYE OF FAN	-	-0.46			
SUCTION PRESSURE	-	-0.20			
DISCHARGE PRESSURE		0.13			
DUCT STATIC P SETPOINT	-	-			
ELECI	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL
	-				

ELEC	TRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB	-	-	75.40	62.30
MODEL NUMBER	WGM	11505A	COOL LVG TEMP DB/WB	-	-	55.10	52.90
SERIAL NUMBER	325134	-001-008	HEAT ENT TEMP DB		- 73.0		.00
KW	14.40	14.54	HEAT LVG TEMP DB		-	93	.60
PHASE / HZ	3/60	3/60					
VOLTAGE	480	498 / 498 / 500					
AMPS	17.30	16.7 / 16.9 / 16.9					

REMARKS:

TECHNICIAN: RS

TEST DATE: 11/14/2023



AIR DISTRIBUTION TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2											
LOCATION: CAMERON, NC UNIT NUMBER: IDU-1 SUPPLY											
		OUTLET			DESIGN	PRELIMINARY			FINAL		
AREA SERVED	#	TYPE	SIZE	FACTOR		FPM	CFM	%	FPM	CFM	%
310	1	CD	10	1.00	280	287	287	103%	287	287	103%
310	2	CD	10	1.00	280	272	272	97%	272	272	97%
310	3	CD	10	1.00	265	257	257	97%	257	257	97%
310	4	CD	10	1.00	245	260	260	106%	260	260	106%
311	5	CD	6	1.00	80	83	83	104%	83	83	104%
310A	6	CD	6	1.00	50	45	45	90%	45	45	90%
TOTAL					1200		1204	100%		1204	100%

REMARKS:

TECHNICIAN: RS

TEST DATE: 11/7/2023



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER:** IDU-1 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 985 994 310 1 24x24 994 101% 994 994 101%

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-2

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER	GEN	ITEQ
SERVICE	3	01	HP / BHP	- / -	0.50 / -
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230	243
SERIAL NUMBER	22243	H541V	AMPS	3.50	2.20
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1200	1174	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE
TOTAL OUTLET CFM	1200	1174	FAN SHEAVE SZ / BORE	DIREC	T DRIVE
RETURN CFM	985	969	# BELTS / SIZE	DIREC	Γ DRIVE
OSA CFM	215	205	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.58	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	0.40	0.31			
EYE OF FAN	-	-0.44			
SUCTION PRESSURE	_	-0.17			
DISCHARGE PRESSURE	_	0.14			
DUCT STATIC P SETPOINT	-	-			
ELECT	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL

ELEC	FRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB	-	-	73.30	60.50
MODEL NUMBER	WGN	1505A	COOL LVG TEMP DB/WB	-	-	53.20	51.40
SERIAL NUMBER	325134	-001-011	HEAT ENT TEMP DB	- 71.60		.60	
KW	14.40	14.60	HEAT LVG TEMP DB	-		95.40	
PHASE / HZ	3/60	3/60					
VOLTAGE	480	499 / 501 / 499					
AMPS	17.30	16.8 / 16.9 / 16.9					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

PROJECT: JO	HNS	SONVILL	E ELEN	I SCHOOL	ADD/REI	NO-PHAS	6E 2				
LOCATION: CA	ME	RON, NC	;				UN		IBER: ID	U-2 SUPF	PLY
		0	UTLET		DESIGN	PRI		Y		FINAL	
AREA SERVED	#	TYPE		FACTOR		FPM	CFM	%	FPM	CFM	%
301	1	CD	10	1.00	300	286	286	95%	287	287	96%
301	2	CD	10	1.00	300	267	267	89%	275	275	92%
301	3	CD	10	1.00	275	280	280	102%	285	285	104%
301	4	CD	10	1.00	275	267	267	97%	272	272	99%
301A	5	CD	6	1.00	50	67	67	134%	55	55	110%
TOTAL					1200		1167	97%		1174	98%
Ů					1		L				1

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC UNIT NUMBER: IDU-2 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 985 969 98% 301 1 24x24 969 98% 969 969

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-3

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER	GEN	ITEQ
SERVICE	3	09	HP / BHP	- / -	0.50 / -
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230	241
SERIAL NUMBER	22243	KJL1V	AMPS	3.50	2.10
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1200	1192	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE
TOTAL OUTLET CFM	1200	1192	FAN SHEAVE SZ / BORE	DIREC	Γ DRIVE
RETURN CFM	985	974	# BELTS / SIZE	DIREC	Γ DRIVE
OSA CFM	215	218	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.55	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	0.40	0.31			
EYE OF FAN	-	-0.42			
SUCTION PRESSURE	-	-0.18			
DISCHARGE PRESSURE	-	0.13			
DUCT STATIC P SETPOINT	-	-			
ELECI	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL

ELEC	FRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB	-	-	73.40	61.30
MODEL NUMBER	WGN	1505A	COOL LVG TEMP DB/WB	-	-	54.00	52.30
SERIAL NUMBER	325134	-001-009	HEAT ENT TEMP DB	- 72.8		.80	
KW	14.40	14.57	HEAT LVG TEMP DB	-		95	.00
PHASE / HZ	3/60	3/60					
VOLTAGE	480	499 / 500 / 500					
AMPS	17.30	17.0 / 16.8 / 16.7					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

309 1 CD 10 1.00 300 282 282 94% 304 304 10 309 2 CD 10 1.00 300 295 295 98% 316 316 10 309 2 CD 10 1.00 300 295 295 98% 316 316 10 309 3 CD 10 1.00 275 295 295 107% 251 251 9 309 4 CD 10 1.00 275 240 240 87% 267 267 99 309 5 CD 6 1.00 50 88 88 176% 54 54 10	PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2											
AREA SERVED # TYPE SIZE FACTOR CFM FPM CFM % FPM CFM % 309 1 CD 10 1.00 300 282 282 94% 304 304 10 309 2 CD 10 1.00 300 282 282 94% 304 304 10 309 2 CD 10 1.00 300 295 295 98% 316 316 10 309 3 CD 10 1.00 275 295 295 107% 251 251 99 309 4 CD 10 1.00 275 240 240 87% 267 267 99 309 5 CD 6 1.00 50 88 88 176% 54 54 10	LOCATION: C	CAME	RON, NC	;				UN	IIT NUN	IBER: ID	U-3 SUPF	'LY
309 1 CD 10 1.00 300 282 282 94% 304 304 10 309 2 CD 10 1.00 300 295 295 98% 316 316 10 309 2 CD 10 1.00 300 295 295 98% 316 316 10 309 3 CD 10 1.00 275 295 295 107% 251 251 99 309 4 CD 10 1.00 275 240 240 87% 267 267 99 309 5 CD 6 1.00 50 88 88 176% 54 54 10			0	UTLET		DESIGN	PRI	ELIMINAF	RY		FINAL	
309 2 CD 10 1.00 300 295 295 98% 316 316 10 309 3 CD 10 1.00 275 295 295 107% 251 251 99 309 4 CD 10 1.00 275 240 240 87% 267 267 99 309 5 CD 6 1.00 50 88 88 176% 54 54 10	AREA SERVED) #	TYPE	SIZE	FACTOR	CFM	FPM	CFM	%	FPM	CFM	%
309 3 CD 10 1.00 275 295 295 107% 251 251 9 309 4 CD 10 1.00 275 240 240 87% 267 267 99 309 5 CD 6 1.00 50 88 88 176% 54 54 10	309	1	CD	10	1.00	300	282	282	94%	304	304	101%
309 4 CD 10 1.00 275 240 240 87% 267 267 99 309 5 CD 6 1.00 50 88 88 176% 54 54 10	309	2	CD	10	1.00	300	295	295	98%	316	316	105%
309 5 CD 6 1.00 50 88 88 176% 54 54 10	309	3	CD	10	1.00	275	295	295	107%	251	251	91%
	309	4	CD	10	1.00	275	240	240	87%	267	267	97%
TOTAL 1200 1200 100% 1192 9 Image: Second Se	309	5	CD	6	1.00	50	88	88	176%	54	54	108%
	TOTAL					1200		1200	100%		1192	99%
Image: state of the state												
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			1		1						1	

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER: IDU-3 RETURN** INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 985 974 99% 309 1 24x24 974 99% 974 974

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-4

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER	GEN	ITEQ
SERVICE	3	02	HP / BHP	- / -	0.50 / -
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60
MODEL NUMBER	TAM9A0C	48V41DAB	VOLTAGE	230	242
SERIAL NUMBER	22333	LAD1V	AMPS	3.50	2.50
FILTERS	1) 20	0x22x1	MOTOR RPM	-	DIRECT DRIVE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1500	1468	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE
TOTAL OUTLET CFM	1500	1468	FAN SHEAVE SZ / BORE	DIREC	T DRIVE
RETURN CFM	1230	1204	# BELTS / SIZE	DIREC	Γ DRIVE
OSA CFM	270	264	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.65	CENTER DISTANCE	DIREC	Γ DRIVE
EXTERNAL STATIC P	0.40	0.38			
EYE OF FAN	-	-0.51			
SUCTION PRESSURE	-	-0.24			
DISCHARGE PRESSURE	_	0.14			
DUCT STATIC P SETPOINT	-	-			
ELECT	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL

ELEC	FRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB	-	-	75.30	62.00
MODEL NUMBER	WGN	1505A	COOL LVG TEMP DB/WB	-	-	55.10	53.30
SERIAL NUMBER	325134	-001-003	HEAT ENT TEMP DB	- 7		72	.70
KW	14.40	14.65	HEAT LVG TEMP DB	-		95.60	
PHASE / HZ	3/60	3/60					
VOLTAGE	480	499 / 501 / 501					
AMPS	17.30	16.8 / 17.0 / 16.9					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

				I SCHOOL	ADD/REI	NO-PHAS					
LOCATION: CA	ME	RON, NC	;				UN		IBER: ID	U-4 SUPF	PLY
		0	UTLET		DESIGN	PRI		Y		FINAL	
AREA SERVED	#	TYPE	-	-		FPM	CFM	%	FPM	CFM	%
302	1	CD	10	1.00	310	267	267	86%	279	279	90%
302	2	CD	10	1.00	310	317	317	102%	311	311	100%
302	3	CD	10	1.00	290	290	290	100%	299	299	103%
302	4	CD	10	1.00	290	297	297	102%	280	280	97%
302A	5	CD	6	1.00	50	66	66	132%	50	50	100%
311	6	CD	10	1.00	250	206	206	82%	249	249	100%
TOTAL					1500		1443	96%		1468	98%
										I	

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER:** IDU-4 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 1230 98% 302 1 24x24 1204 1204 98% 1204 1204

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-5

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	CAL LOFT	MANUFACTURER	GEN	ITEQ
SERVICE	3	08	HP / BHP	- / -	0.50 / -
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230	243
SERIAL NUMBER	22292	MX71V	AMPS	3.50	2.30
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1200	1155	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE
TOTAL OUTLET CFM	1200	1155	FAN SHEAVE SZ / BORE	DIREC	Γ DRIVE
RETURN CFM	985	930	# BELTS / SIZE	DIREC	Γ DRIVE
OSA CFM	215	225	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.56	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	0.40	0.29			
EYE OF FAN	-	-0.45			
SUCTION PRESSURE	-	-0.18			
DISCHARGE PRESSURE		0.11			
DUCT STATIC P SETPOINT	-	-			
ELECT	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL

ELEC	FRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB	-	-	73.50	61.00
MODEL NUMBER	WGM	1505A	COOL LVG TEMP DB/WB	-	-	54.20	52.50
SERIAL NUMBER	325134	-001-004	HEAT ENT TEMP DB	-		71	.80
KW	14.40	14.63	HEAT LVG TEMP DB	-		94	.60
PHASE / HZ	3/60	3/60					
VOLTAGE	480	501 / 502 / 499					
AMPS	17.30	16.9 / 16.8 / 16.9					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 LOCATION: CAMERON, NC UNIT NUMBER: IDU-5 SUPPLY											
LOCATION: CA	ME	KON, NC	;				UN		IBER: ID	U-5 SUPF	'LY
		0	UTLET	1	DESIGN	PRE	ELIMINAF	RY		FINAL	
AREA SERVED	#	TYPE	SIZE	FACTOR	CFM	FPM	CFM	%	FPM	CFM	%
308	1	CD	10	1.00	300	242	242	81%	273	273	91%
308	2	CD	10	1.00	300	263	263	88%	272	272	91%
308	3	CD	10	1.00	275	308	308	112%	282	282	103%
308	4	CD	10	1.00	275	251	251	91%	275	275	100%
308A	5	CD	6	1.00	50	85	85	170%	53	53	106%
TOTAL					1200		1149	96%		1155	96%
										1	
<u> </u>	1		I	L			I			I	L

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER:** IDU-5 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 985 930 308 1 24x24 930 94% 930 930 94%

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-6

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHANI	CAL LOFT	MANUFACTURER	GEN	ITEQ
SERVICE	3	03	HP / BHP	- / -	0.50 / -
MANUFACTURER	TRANE		PHASE / HZ	1/60	1/60
MODEL NUMBER	TAM9A0C	48V41DAB	VOLTAGE	230	242
SERIAL NUMBER	22334	L2P1V	AMPS	3.50	2.20
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1500	1534	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE
TOTAL OUTLET CFM	1500	1534	FAN SHEAVE SZ / BORE	DIREC	T DRIVE
RETURN CFM	1230	1268	# BELTS / SIZE	DIREC	Γ DRIVE
OSA CFM	270	266	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.79	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	0.40	0.37			
EYE OF FAN	-	-0.66			
SUCTION PRESSURE	-	0.24			
DISCHARGE PRESSURE	_	0.13			
DUCT STATIC P SETPOINT	-				
				DESIGN	
ELECT	RIC HEAT	1071141	TEMPERATURES °F	DESIGN	ACTUAL

ELEC	TRIC HEAT		TEMPERATURES °F	DES	SIGN	ACTUAL	
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB	-	-	75.20	62.00
MODEL NUMBER	WGM	11505A	COOL LVG TEMP DB/WB	-	-	54.50	52.60
SERIAL NUMBER	325134	-001-001	HEAT ENT TEMP DB		-	72	.50
KW	14.40	14.63	HEAT LVG TEMP DB		- 94.00		.00
PHASE / HZ	3/60	3/60					
VOLTAGE	480	499 / 501 / 502					
AMPS	17.30	17.0 / 16.8 / 16.8					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2											
LOCATION: CA	ME	RON, NC	;				UN	IIT NUN	IBER: ID	U-6 SUPF	νLΥ
		0	UTLET		DESIGN	PRE	ELIMINAF	% FPM CFN 89% 312 312 89% 317 317 89% 285 285 98% 308 308 176% 55 55 113% 257 257		FINAL	
AREA SERVED	#	TYPE		FACTOR		FPM	CFM	-	FPM	CFM	%
303	1	CD	10	1.00	310	277	277	89%	312	312	101%
303	2	CD	10	1.00	310	275	275	89%	317	317	102%
303	3	CD	10	1.00	290	258	258	89%	285	285	98%
303	4	CD	10	1.00	290	285	285	98%	308	308	106%
303A	5	CD	6	1.00	50	88	88	176%	55	55	110%
311	6	CD	10	1.00	250	282	282	113%	257	257	103%
TOTAL					1500		1465	98%		1534	102%

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER: IDU-6 RETURN** INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 1230 103% 103% 303 1 24x24 1268 1268 1268 1268

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-7

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL	
LOCATION	MECHAN	CAL LOFT	MANUFACTURER	GEN	ITEQ	
SERVICE	3	07	HP / BHP	- / -	0.50 / -	
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60	
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230	243	
SERIAL NUMBER	22282	M0F1V	AMPS	3.50	2.20	
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE	
			SF / EFF / PF	1.00	/ - / -	
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P	
DATA	DESIGN	ACTUAL	FRAME			
TOTAL FAN CFM	1200	1135	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE	
TOTAL OUTLET CFM	1200	1135	FAN SHEAVE SZ / BORE	DIREC	Γ DRIVE	
RETURN CFM	985	921	# BELTS / SIZE	DIREC	Γ DRIVE	
OSA CFM	215	214	FAN RPM	-	DIRECT DRIVE	
TOTAL STATIC PRESSURE	-	0.59	CENTER DISTANCE	DIREC	T DRIVE	
EXTERNAL STATIC P	0.40	0.31				
EYE OF FAN	-	-0.46				
SUCTION PRESSURE	-	-0.18				
DISCHARGE PRESSURE	-	0.13				
DUCT STATIC P SETPOINT	-	-				
ELECI	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL	

ELEC	TRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN ACTUAL		COOL ENT TEMP DB/WB	-	-	74.00	62.10
MODEL NUMBER	WGM	1505A	COOL LVG TEMP DB/WB	-	-	55.40	52.90
SERIAL NUMBER	325134	-001-002	HEAT ENT TEMP DB		-	73	.30
KW	14.40	14.62	HEAT LVG TEMP DB		- 95.40		.40
PHASE / HZ	3/60	3/60					
VOLTAGE	480	502 / 501 / 498					
AMPS	17.30	16.9 / 16.8 / 16.9					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2											
LOCATION: CA	ME	RON, NC	;				UN	IIT NUN	IBER: ID	U-7 SUPF	ΊLΥ
		0	UTLET		DESIGN	PRI	ELIMINAF	RY		FINAL	
AREA SERVED	#	TYPE	SIZE	FACTOR		FPM	CFM	%	FPM	CFM	%
307	1	CD	10	1.00	300	250	250	83%	282	282	94%
307	2	CD	10	1.00	300	268	268	89%	282	282	94%
307	3	CD	10	1.00	275	244	244	89%	257	257	93%
307	4	CD	10	1.00	275	306	306	111%	265	265	96%
307	5	CD	6	1.00	50	96	96	192%	49	49	98%
TOTAL					1200		1164	97%		1135	95%
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REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER:** IDU-7 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 985 921 307 1 24x24 921 94% 921 921 94%

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-8

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL	
LOCATION	MECHAN	CAL LOFT	MANUFACTURER	GEN	ITEQ	
SERVICE	3	04	HP / BHP	- / -	0.50 / -	
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60	
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230 242		
SERIAL NUMBER	22282	L2N1V	AMPS	3.50	2.30	
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE	
			SF / EFF / PF	1.00	/ - / -	
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P	
DATA	DESIGN	ACTUAL	FRAME			
TOTAL FAN CFM	1200	1234	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE	
TOTAL OUTLET CFM	1200	1234	FAN SHEAVE SZ / BORE	DIREC	Γ DRIVE	
RETURN CFM	985	1030	# BELTS / SIZE	DIREC	Γ DRIVE	
OSA CFM	215	204	FAN RPM	-	DIRECT DRIVE	
TOTAL STATIC PRESSURE	-	0.63	CENTER DISTANCE	DIREC	T DRIVE	
EXTERNAL STATIC P	0.40	0.34				
EYE OF FAN	-	-0.50				
SUCTION PRESSURE	-	-0.21				
DISCHARGE PRESSURE	-	0.13				
DUCT STATIC P SETPOINT	-	-				
ELECT	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL	

ELEC	FRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB	-	-	74.50	61.60
MODEL NUMBER	WGM	11505A	COOL LVG TEMP DB/WB	-	-	53.90	51.40
SERIAL NUMBER	325134	-001-010	HEAT ENT TEMP DB		-	72	.60
KW	14.40	14.63	HEAT LVG TEMP DB		- 93.40		.40
PHASE / HZ	3/60	3/60					
VOLTAGE	480	498 / 498 / 501					
AMPS	17.30	16.9 / 16.8 / 17.1					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2											
LOCATION: CA	MEF	RON, NC	;				UN	IIT NUN	IBER: ID	U-8 SUPF	PLY
		0	UTLET		DESIGN	PRI	ELIMINAF	RY		FINAL	
AREA SERVED	#	TYPE	SIZE	FACTOR		FPM	CFM	%	FPM	CFM	%
304	1	CD	10	1.00	300	239	239	80%	307	307	102%
304	2	CD	10	1.00	300	261	261	87%	329	329	110%
304	3	CD	10	1.00	275	210	210	76%	291	291	106%
304	4	CD	10	1.00	275	237	237	86%	253	253	92%
304A	5	CD	6	1.00	50	87	87	174%	54	54	108%
TOTAL					1200		1034	86%		1234	103%
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REMARKS: 400 TON

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER: IDU-8 RETURN** INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 985 1030 105% 1030 105% 304 1 24x24 1030 1030

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-9

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER	GEN	ITEQ
SERVICE	3	06	HP / BHP	- / -	0.50 / -
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230	243
SERIAL NUMBER	22263	N2K1V	AMPS	3.50	2.50
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1200	1263	MOTOR SHEAVE SZ / BORE	DIREC	Γ DRIVE
TOTAL OUTLET CFM	1200	1263	FAN SHEAVE SZ / BORE	DIREC	T DRIVE
RETURN CFM	990	1052	# BELTS / SIZE	DIREC	Γ DRIVE
OSA CFM	210	211	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.72	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	0.40	0.36			
EYE OF FAN	-	-0.58			
SUCTION PRESSURE	-	-0.22			
DISCHARGE PRESSURE	_	0.14			
DUCT STATIC P SETPOINT	-	-			
ELECI	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL

ELEC	TRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB	-	-	73.50	61.30
MODEL NUMBER	WGM	1505A	COOL LVG TEMP DB/WB	-	-	53.40	51.50
SERIAL NUMBER	325134	-001-005	HEAT ENT TEMP DB		-	72	.80
KW	14.40	14.67	HEAT LVG TEMP DB		- 94.40		.40
PHASE / HZ	3/60	3/60					
VOLTAGE	480	498 / 499 / 501					
AMPS	17.30	16.8 / 17.1 / 17.0					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 LOCATION: CAMERON, NC UNIT NUMBER: IDU-9 SUPPLY											
LOCATION: CA	ME	RON, NC	;						IBER: ID	U-9 SUPF	<u>'LY</u>
		0	UTLET		DESIGN	PRI	ELIMINAF	RY	FINAL		
AREA SERVED	#	TYPE	SIZE	FACTOR	CFM	FPM	CFM	%	FPM	CFM	%
306	1	CD	10	1.00	300	224	224	75%	330	330	110%
306	2	CD	10	1.00	300	201	201	67%	293	293	98%
306	3	CD	10	1.00	275	217	217	79%	288	288	105%
306	4	CD	10	1.00	275	210	210	76%	299	299	109%
306A	5	CD	6	1.00	50	75	75	150%	53	53	106%
TOTAL					1200		927	77%		1263	105%
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REMARKS: 410 TON

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER:** IDU-9 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 985 1052 1052 107% 306 1 24x24 1052 107% 1052

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-10

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL	
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER	GEN	NTEQ	
SERVICE	3	05	HP / BHP	- / -	0.50 / -	
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60	
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230	242	
SERIAL NUMBER	22263	N191V	AMPS	3.50	2.30	
FILTERS	1) 20	0x22x1	MOTOR RPM	-	DIRECT DRIVE	
			SF / EFF / PF	1.00)/-/-	
PERF	ORMANCE		STARTER HEATER ELEMENTS	ATER ELEMENTS TP		
DATA	DESIGN	ACTUAL	FRAME		-	
TOTAL FAN CFM	1200	1162	MOTOR SHEAVE SZ / BORE	DIRECT DRIVE		
TOTAL OUTLET CFM	1200	1162	FAN SHEAVE SZ / BORE	DIRECT DRIVE		
RETURN CFM	990	953	# BELTS / SIZE	DIREC	T DRIVE	
OSA CFM	210	209	FAN RPM	-	DIRECT DRIVE	
TOTAL STATIC PRESSURE	-	0.58	CENTER DISTANCE	DIREC	T DRIVE	
EXTERNAL STATIC P	0.40	0.30				
EYE OF FAN	-	-0.48				
SUCTION PRESSURE	-	-0.20				
DISCHARGE PRESSURE	-	0.10				
DUCT STATIC P SETPOINT	-					
ELECI	TRIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL	
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB		74.70 61.40	

ELEC			IEWIPERATURES F	DES	NGN	ACTUAL			
DATA	DESIGN	ACTUAL	COOL ENT TEMP DB/WB			74.70	61.40		
MODEL NUMBER	WGM	1505A	COOL LVG TEMP DB/WB	-	-	53.50	51.70		
SERIAL NUMBER	325134	-001-007	HEAT ENT TEMP DB		-	73.10			
KW	14.40	14.65	HEAT LVG TEMP DB		-		- 95.40		.40
PHASE / HZ	3/60	3/60							
VOLTAGE	480	498 / 501 / 502							
AMPS	17.30	16.8 / 17.0 / 16.9							

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2											
LOCATION: CA	ME	RON, NC	;				UN	IIT NUN	IBER: ID	U-10 SUP	'PLY
		0	UTLET		DESIGN	PRI	ELIMINAF	Y	FINAL		
AREA SERVED	#	TYPE	SIZE	FACTOR		FPM	CFM	%	FPM	CFM	%
305	1	CD	10	1.00	300	211	211	70%	281	281	94%
305	2	CD	10	1.00	300	190	190	63%	274	274	91%
305	3	CD	10	1.00	275	202	202	73%	277	277	101%
305	4	CD	10	1.00	275	214	214	78%	282	282	103%
305A	5	CD	6	1.00	50	79	79	158%	48	48	96%
TOTAL					1200		896	75%		1162	97%
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REMARKS:

TECHNICIAN: RS

TEST DATE: 10/3/2023



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER:** IDU-10 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 985 953 97% 305 1 24x24 953 97% 953 953

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 **PROJECT:**

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-11

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL	
LOCATION	MECHAN	ICAL LOFT	MANUFACTURER	GEN	ITEQ	
SERVICE	3	13	HP / BHP	- / -	0.50 / -	
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60	
MODEL NUMBER	TAM9A0B	30V31DAB	VOLTAGE	230	243	
SERIAL NUMBER	22382	LOT1V	AMPS	3.50	2.60	
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE	
			SF / EFF / PF	1.00	/ - / -	
PERF	ORMANCE		STARTER HEATER ELEMENTS	TP		
DATA	DESIGN	ACTUAL	FRAME		-	
TOTAL FAN CFM	1000	868	MOTOR SHEAVE SZ / BORE	DIREC	T DRIVE	
TOTAL OUTLET CFM	1000	868	FAN SHEAVE SZ / BORE	DIREC	T DRIVE	
RETURN CFM	860	727	# BELTS / SIZE	DIREC	T DRIVE	
OSA CFM	140	141	FAN RPM	-	DIRECT DRIVE	
TOTAL STATIC PRESSURE	-	0.27	CENTER DISTANCE	DIREC	T DRIVE	
EXTERNAL STATIC P	0.40	0.16				
EYE OF FAN	-	-0.18				
SUCTION PRESSURE	-	-0.07				
DISCHARGE PRESSURE	-	0.09				
DUCT STATIC P SETPOINT	-	-				
ELECI	RIC HEAT		TEMPERATURES °F	DESIGN	ACTUAL	

ELECT	RIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN ACTUAL		COOL ENT TEMP DB/WB			74.00	61.70
MODEL NUMBER	WGN	/1002	COOL LVG TEMP DB/WB			53.40	51.90
SERIAL NUMBER	325134-002-001		HEAT ENT TEMP DB	-		73.50	
KW	9.60	9.53	HEAT LVG TEMP DB		-	94.90	
PHASE / HZ	1/60	1/60					
VOLTAGE	240	243					
AMPS	40.00	39.20					

REMARKS:

DIRECT DRIVE UNIT RUNNING 88% ON HIGHEST SPEED SETTING.

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

				/I SCHOOL	. ADD/REI	NO-PHAS					
LOCATION: CA	ME	RON, NC	;				UN	IIT NUN	IBER: ID	U-11 SUP	'PLY
		0	UTLET		DESIGN	PRI	PRELIMINA			FINAL	
AREA SERVED	#	TYPE	SIZE	FACTOR		FPM	CFM	%	FPM	CFM	%
313	1	CD	8	1.00	200	133	133	67%	177	177	89%
312	2	CD	8	1.00	200	154	154	77%	182	182	91%
317	3	CD	8	1.00	200	87	87	44%	150	150	75%
313	4	CD	8	1.00	175	133	133	76%	155	155	89%
313A	5	CD	6	1.00	50	72	72	144%	44	44	88%
312	6	CD	8	1.00	175	138	138	79%	160	160	91%
TOTAL					1000		717	72%		868	87%
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REMARKS: BALANCED PROPORTIONATLEY; UNIT ON HIGHEST SPEED SETTING

450 TON

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER:** IDU-11 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR FPM % CFM FPM CFM % CFM RAG 430 1 24x24 1.00 371 371 86% 371 371 86% 313 312 2 RAG 24x24 1.00 430 356 356 83% 356 356 83% TOTAL 860 727 85% 727 85%

REMARKS:

TECHNICIAN: RS



AIR MOVING EQUIPMENT TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: IDU-12

UNI	T DATA		MOTOR DATA	DESIGN	ACTUAL
LOCATION	MECHAN	CAL LOFT	MANUFACTURER	GEN	ITEQ
SERVICE	3	17	HP / BHP	- / -	0.50 / -
MANUFACTURER	TR	ANE	PHASE / HZ	1/60	1/60
MODEL NUMBER	TAM9A0C	36V31DAB	VOLTAGE	230	242
SERIAL NUMBER	22292	MYK1V	AMPS	3.50	2.20
FILTERS	1) 20	x22x1	MOTOR RPM	-	DIRECT DRIVE
			SF / EFF / PF	1.00	/ - / -
PERF	ORMANCE		STARTER HEATER ELEMENTS	Т	P
DATA	DESIGN	ACTUAL	FRAME		-
TOTAL FAN CFM	1200	1196	MOTOR SHEAVE SZ / BORE	DIREC	T DRIVE
TOTAL OUTLET CFM	1200	1196	FAN SHEAVE SZ / BORE	DIREC	T DRIVE
RETURN CFM	1080	1070	# BELTS / SIZE	DIREC	T DRIVE
OSA CFM	120	126	FAN RPM	-	DIRECT DRIVE
TOTAL STATIC PRESSURE	-	0.69	CENTER DISTANCE	DIREC	T DRIVE
EXTERNAL STATIC P	0.40	0.35			
EYE OF FAN	-	-0.53			
SUCTION PRESSURE	-	-0.19			
DISCHARGE PRESSURE		0.16			
DUCT STATIC P SETPOINT	-	-			
			TEMPERATURES °F	DESIGN	ACTUAL
			IEWIPERATURES F	DESIGN	ACTUAL

ELEC	TRIC HEAT		TEMPERATURES °F	DES	SIGN	ACT	UAL
DATA	DESIGN ACTUAL		COOL ENT TEMP DB/WB	-			60.40
MODEL NUMBER	WGM	11505A	COOL LVG TEMP DB/WB	-	-	53.60	51.60
SERIAL NUMBER	325134	-001-006	HEAT ENT TEMP DB		- 71		.50
KW	14.40	14.67	HEAT LVG TEMP DB		- 92.30		.30
PHASE / HZ	3/60	3/60					
VOLTAGE	480	497/495/497					
AMPS	17.30	17.2/17.0/17.0					

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2											
LOCATION: CA	ME	RON, NC	;				UN		IBER: ID	U-12 SUP	'PLY
		0	UTLET		DESIGN	PRI	RELIMINARY			FINAL	
AREA SERVED	#	TYPE	SIZE	FACTOR		FPM	CFM	%	FPM	CFM	%
317	1	CD	8	1.00	175	163	163	93%	180	180	103%
317	2	CD	8	1.00	175	45	45	26%	172	172	98%
316	3	CD	10	1.00	250	433	433	173%	244	244	98%
315	4	CD	10	1.00	250	307	307	123%	252	252	101%
317	5	CD	8	1.00	175	196	196	112%	160	160	91%
317	6	CD	8	1.00	175	48	48	27%	188	188	107%
TOTAL					1200		1192	99%		1196	100%

REMARKS:

TECHNICIAN: RS



AIR DISTRIBUTION TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT: LOCATION: CAMERON, NC **UNIT NUMBER:** IDU-12 RETURN INLET PRELIMINARY FINAL DESIGN AREA SERVED # TYPE SIZE FACTOR CFM % FPM CFM % CFM FPM RAG 1.00 1080 1070 99% 317 1 24x24 1070 99% 1070 1070

REMARKS:

TECHNICIAN: RS



DUCTLESS SPLIT SYSTEM TEST SHEET

PROJECT: JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2

LOCATION: CAMERON, NC

UNI	T DAT	ł				UNI	T DAT	A		
UNIT NUMBER		A/0	C-1		UI	NIT NUMBER		A/	C-2	
LOCATION		CEII	ING			LOCATION		CEI	LING	
SERVICE		CORF	RIDOR			SERVICE		COR	RIDOR	
MANUFACTURER	MITSUBISHI				MA	NUFACTURER		MITS	JBISHI	
MODEL NUMBER		FPLA0A0	181EA70E	3	MO	DEL NUMBER		TPLA0A0	181EA70E	3
SERIAL NUMBER		2ZM0047	965TMAJ		SE	RIAL NUMBER		2ZM0047	665TMAJ	
FILTERS	ΜΑΝΙ	JFACTUF	RE WASH	ABLE		FILTERS	MAN	NUFATUR	E WASHA	ABLE
PERF	PERFORMANCE					PERF	ORMAN	ICE		
DATA	DES	IGN	ACT	UAL		DATA	DES	SIGN	ACT	UAL
TOTAL FAN CFM	60	00	6	20	то	TAL FAN CFM	6	00	60	05
RETURN CFM	60	00	6	20	R	ETURN CFM	CFM 60		600 603	
OSA CFM	-	-		-		OSA CFM		-		-
FAN RPM				-		FAN RPM		-		-
MOTOR DATA	DES	IGN	ACT	UAL	MC	TOR DATA	DES	SIGN	ACT	UAL
MANUFACTURER			-		MA	NUFACTURER			-	
HP / BHP	- /	/ -	0.0	7/-		HP / BHP	-	/-	0.0	7/-
PHASE / HZ	1/0	60	1/	60		PHASE / HZ	1/60		1/60	
VOLTAGE	20	08	2	12		VOLTAGE	2	08	2	13
AMPS	0.3	34	0.	20		AMPS	0.	.34	0.	20
MOTOR RPM	-	-	н	GH	N	10TOR RPM		-	н	GH
SF / EFF / PF		1.00	/ - / -		S	SF / EFF / PF		1.00	/ - / -	
STARTER HEATER ELEMENTS		Т	P		STARTER	HEATER ELEMENTS		Т	P	
TEMPERATURES °F	DES	IGN	ACT	UAL	TEMP	ERATURES °F	DESIGN		ACT	UAL
COOL ENT TEMP DB/WB	-	-	72.60	60.10	COOL	ENT TEMP DB/WB	-	-	72.90	60.20
COOL LVG TEMP DB/WB	-	-	52.40	50.30	COOLI	VG TEMP DB/WB	-	-	53.00	51.60
HEAT ENT TEMP DB		-	71	.80	HEA	FENT TEMP DB		-	72	.00
HEAT LVG TEMP DB	- 96.20		.20	HEA	T LVG TEMP DB			95.70		

REMARKS:

TECHNICIAN: RS TEST DATE: 11/14/2023



EXHAUST FAN TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UNIT NUMBER: F-1

UNI	T DATA		PERFORI	MANCE DATA	
LOCATION	CEI	LING	AIRFLOW	DESIGN	ACTUAL
SERVICE	RESTROOMS	S/JANITORIAL	TOTAL FAN CFM	1150	1214
MANUFACTURER	CC	ЮК	TOTAL OUTLET CFM	1150	1214
MODEL NUMBER	120	SQN	EXTERNAL STATIC P	0.75	0.51
SERIAL NUMBER	413SK23186	6-00/0000701	SUCTION PRESSURE	-	-0.42
			DISCHARGE PRESSURE	-	0.09
MOTOR DATA	DESIGN	ACTUAL	DRIVE SYSTEM	DESIGN	ACTUAL
MANUFACTURER		-	MOTOR SHEAVE SZ / BORE	DIREC	T DRIVE
HP / BHP	0.50 / -	0.50 / -	FAN SHEAVE SZ / BORE	DIREC	T DRIVE
PHASE / HZ	1/60	1/60	# BELTS / SIZE	DIREC	T DRIVE
VOLTAGE	115	122	FAN RPM	-	DIRECT DRIVE
AMPS	2.30 1.80		CENTER DISTANCE	DIREC	T DRIVE
MOTOR RPM	- DIRECT DRIVE				
SF / EFF / PF	1.00 / - / -				
FRAME	-				

	UNIT AIR INLETS										
	INLET DESIGN PRELIMINARY						FINAL				
AREA SERVED	#	TYPE	SIZE	FACTOR	CFM	FPM	CFM	%	FPM	CFM	%
315	1	EAG	24x24	1.00	450	494	494	110%	484	484	108%
320	2	EAG	12x12	1.00	75	49	49	65%	72	72	96%
319	3	EAG	12x12	1.00	75	50	50	67%	81	81	108%
314	4	EAG	12x12	1.00	100	110	110	110%	108	108	108%
316	5	EAG	24x24	1.00	450	556	556	124%	469	469	104%
TOTAL					1150		1259	109%		1214	106%

REMARKS:

ADDISON ENERGY TECHNOLOGIES, LLC



EXHAUST FAN TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 **PROJECT:**

LOCATION: CAMERON, NC

UNIT NUMBER: F-2

UNI	T DATA		PERFOR	MANCE DATA	
LOCATION	CEILING		AIRFLOW	DESIGN	ACTUAL
SERVICE	318		TOTAL FAN CFM	800	874
MANUFACTURER	CC	ЮК	TOTAL OUTLET CFM	800	874
MODEL NUMBER	GEME	NI 800	EXTERNAL STATIC P	0.25	0.16
SERIAL NUMBER	*		SUCTION PRESSURE	-	-
			DISCHARGE PRESSURE	-	0.16
MOTOR DATA	DESIGN	ACTUAL	DRIVE SYSTEM	DESIGN	ACTUAL
MANUFACTURER	GEN	ITEQ	MOTOR SHEAVE SZ / BORE	DIRECT DRIVE	
HP / BHP	438 W / -	0.33 / -	FAN SHEAVE SZ / BORE	DIRECT DRIVE	
PHASE / HZ	1/60	1/60	# BELTS / SIZE	DIREC	T DRIVE
VOLTAGE	115	122	FAN RPM	-	DIRECT DRIVE
AMPS	4.30 4.30		CENTER DISTANCE	DIREC	T DRIVE
MOTOR RPM	1100	HIGH			
MOTOR RPM SF / EFF / PF		HIGH / - / -			

	UNIT AIR INLETS										
		INLET DI		DESIGN	PRE	ELIMINAR	ΥY	FINAL			
AREA SERVED	#	TYPE	SIZE	FACTOR	CFM	FPM	CFM	%	FPM	CFM	%

REMARKS: * NO TAG; MODEL CAME FROM MOTOR TAG.

TECHNICIAN: RS

TEST DATE: 11/14/2023

ADDISON ENERGY TECHNOLOGIES, LLC



ELECTRIC HEATER TEST SHEET

JOHNSONVILLE ELEM SCHOOL ADD/RENO-PHASE 2 PROJECT:

LOCATION: CAMERON, NC

UN	IT DATA	PERFORMANCE	DESIGN	ACTUAL
UNIT NUMBER EWH-1 LOCATION WALL SERVICE 318		CFM	175	184
		KW	4.00	4.00
		PHASE	1	1
MANUFACTURER	TPI	VOLTAGE	208	213
MODEL NUMBER	MODEL NUMBER F3326TD-RP SERIAL NUMBER -		19.20	18.80
SERIAL NUMBER			-	71.40
		LVG AIR TEMP °F	-	105.70

UNIT DATA	PERFORMANCE	DESIGN	ACTUAL
UNIT NUMBER	CFM		
LOCATION	KW		
SERVICE	PHASE		
MANUFACTURER	VOLTAGE		
MODEL NUMBER	AMPS		
SERIAL NUMBER	ENT AIR TEMP °F		
	LVG AIR TEMP °F		

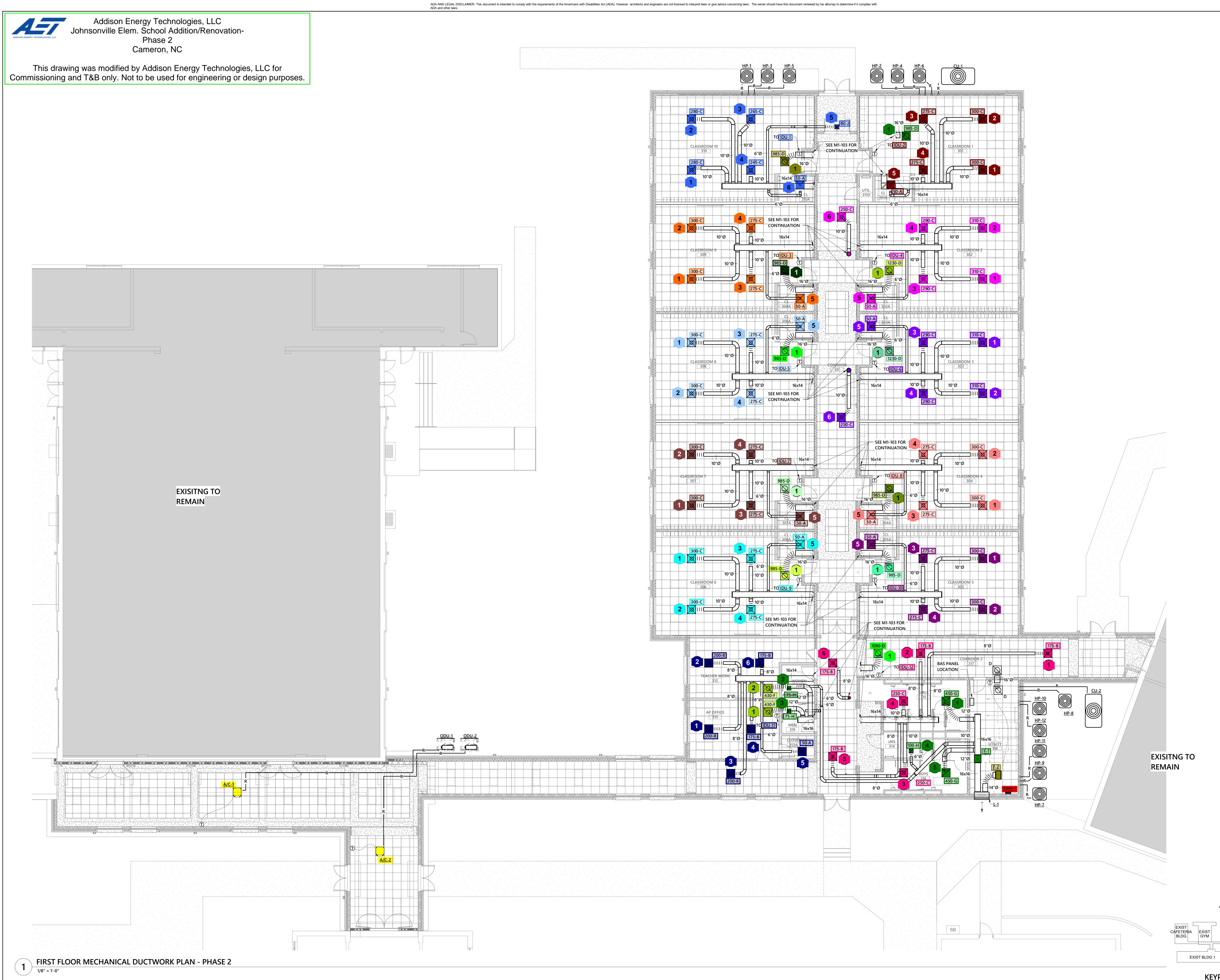
UNIT DATA	PERFORMANCE	DESIGN	ACTUAL
UNIT NUMBER	CFM		
LOCATION	КW		
SERVICE	PHASE		
MANUFACTURER	VOLTAGE		
MODEL NUMBER	AMPS		
SERIAL NUMBER	ENT AIR TEMP °F		
	LVG AIR TEMP °F		

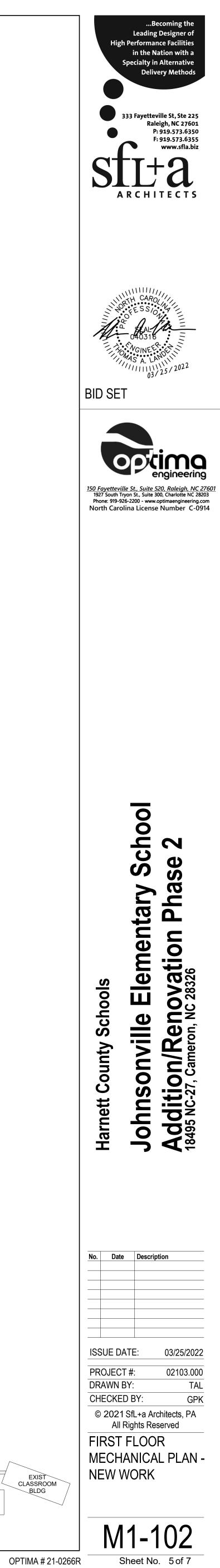
UNIT DATA	PERFORMANCE	DESIGN	ACTUAL
UNIT NUMBER	CFM		
LOCATION	KW		
SERVICE	PHASE		
MANUFACTURER	VOLTAGE		
MODEL NUMBER	AMPS		
SERIAL NUMBER	ENT AIR TEMP °F		
	LVG AIR TEMP °F		

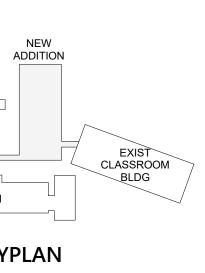
REMARKS:

TECHNICIAN: RS

TEST DATE: 11/14/2023



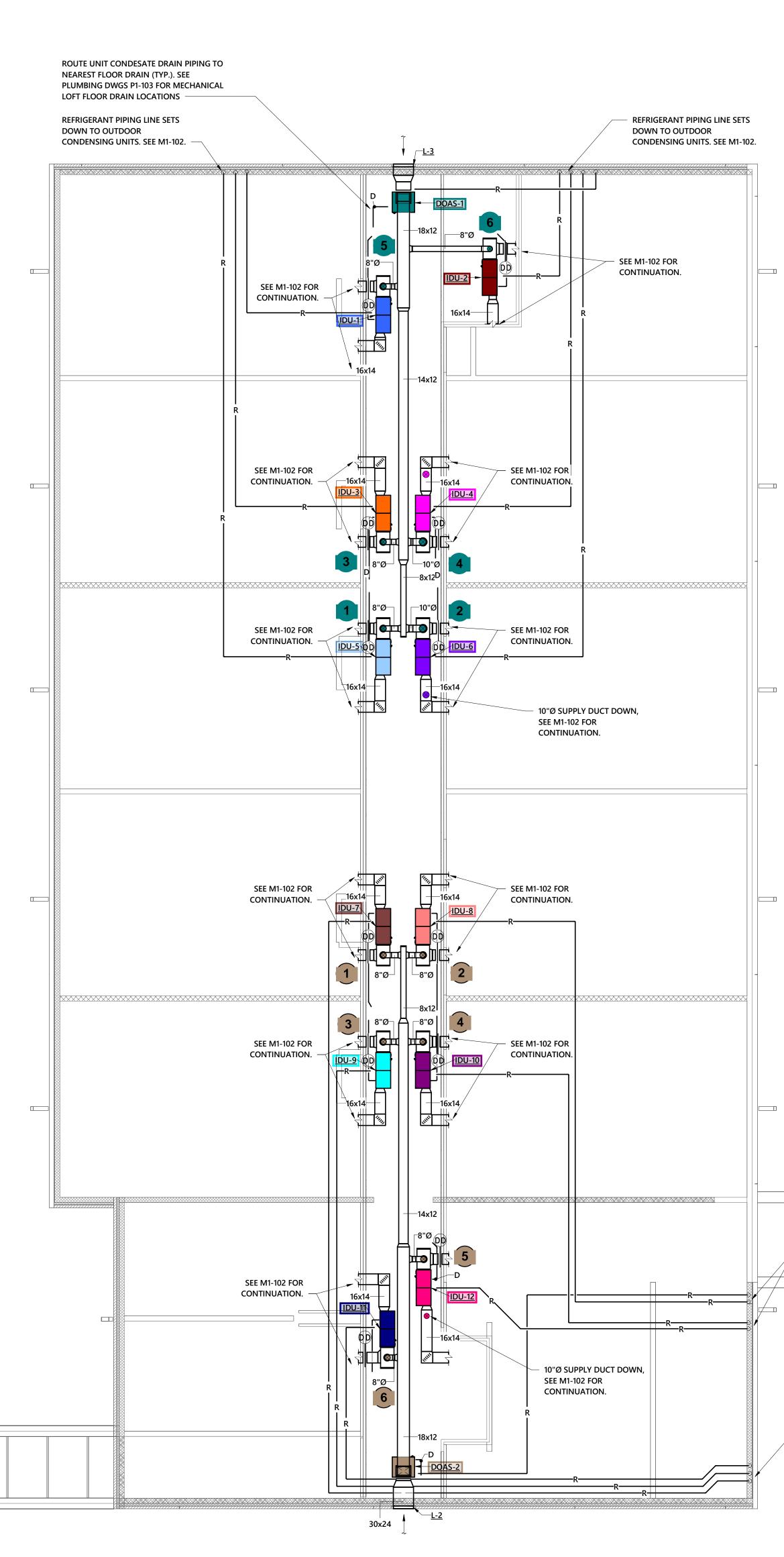






Addison Energy Technologies, LLC Johnsonville Elem. School Addition/Renovation-Phase 2 Cameron, NC

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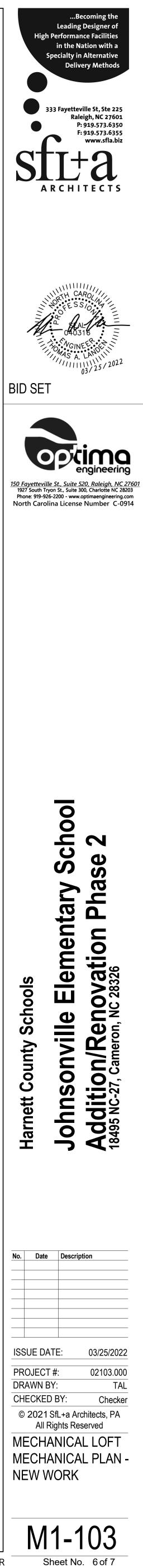


1 MECHANICAL LOFT MECHANICAL PLAN - PHASE 2

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REFRIGERANT PIPING LINE SETS DOWN TO OUTDOOR CONDENSING UNITS. SEE M1-102.

- REFRIGERANT PIPING LINE SETS DOWN TO OUTDOOR CONDENSING UNITS. SEE M1-102.



Cx Solutions, LLC

Functional Checklists

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Date: Original Test date - 11/10/23 - Additional Remote Verification 12/13/23 Tech / CxA: Mark Rogers

-		_
Item	Quantity	Тад
Indoor Units	12	IDU
Heat Pumps	12	НР
DOAS	2	DOAS
Exhaust Fans	2	F1, F2
Condensing/Indoor Units	2	AC-1/ODU-1, AC-2/ODU-2
Electric Wall Heater	1	Electric Wall Heater

Performance Verification Test

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: DOAS-1 Date: 12/13/2023 Tech / CxA: Mark Rogers

			Pass / Fail /	
#	Sequence	Data	Not	Comments
			Applicable	
	Safeties		Pass	
	SF motor failure alarm		Pass	
	Verify DOAS is operating in normal conditions		Pass	
4	Shut down the SF at the motor disconnect		Pass	
5	Verify an SF motor failure alarm is sent to the BAS	Alarmed on the Alarm Summary and System Graphic	Pass	30 Second Delay
	Return the unit to normal operation		Pass	
17	High LAT alarm		NA	Not Configured
18	Verify DOAS is operating in normal conditions		NA	
	Record the high LAT alarm		NA	
20	Record the current LAT		NA	
21	Override the alarm setpoint to below the current LAT		NA	
22	Verify an alarm is sent to the BAS		NA	
	Return the system to normal conditions		NA	
	Low LAT alarm		NA	Not Configured
25	Verify DOAS is operating in normal conditions		NA	
	Record the low LAT alarm		NA	
	Record the current LAT		NA	
	Override the alarm setpoint to above the current LAT	1	NA	
	Verify an alarm is sent to the BAS		NA	
	Verify the SF de-energizes		NA	
	Verify the EF de-energizes		NA	
	Return the system to normal conditions		NA	
	Dirty filters alarm		NA	Not Configured
	Verify DOAS is operating in normal conditions		NA	
	Record the dirty filter DP alarm setpoint		NA	
	Record the current filter DP		NA	
	Override the setpoint to below the current DP		NA	
	Verify a dirty filter alarm is sent to the BAS		NA	
	Return the system to normal conditions		NA	
	Unit smoke detection alarm	Does generate a BAS alarm	Pass	Tested as part of the FA system
	Verify DOAS is operating in normal conditions		NA	
	Trip the unit smoke detector		NA	
	Verify the SF stops		NA	
	Verify a smoke detection alarm is sent to the BAS		NA	
	Occupied		Pass	
	Verify DOAS is operating in normal conditions		Pass	
	Unoccupy the building Schedule		Pass	
	Verify All systems Unoccupied		Pass	
	Enable an IDU units using the Temporary Occupancy button		Pass	
	Verify the DOAS unit Occupies and starts		Pass	
	Force the Temporary Occupancy Override to expire			
			Pass	
	Verify the DOAS is Unoccupied Return the unit to normal conditions		Pass	
	Cooling		Pass Pass	
	Verify the unit is operating in normal conditions			
	Record the leaving Air setpoint	68DegF	Pass Pass	
	Record the current Leaving Air temperature	65DegF	Pass	
90		05Degr	Fass	Unit Controlled, Spec calls for DOAS mode to be determined by the
91	Override the setpoint to below the current Temperature	55DegF	Pass	majority of IDU modes
	ooling command increases without going over		Pass	
	Return the unit to normal operation		Pass	
	Unoccupied		Pass	
	Record the unit occupancy schedule		Pass	
	Override the unit into unoccupied mode		Pass	
	Verify the SF remains off		Pass	
	Verify Both Compressorsis OFF		Pass	
	Release all override and return the unit to normal operations		Pass	
122		ł	F 035	<u> </u>

***********END FUNCTIONAL CHECKS*********

Performance Verification Test

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC

Tag ID: DOAS-2 Date: 12/13/2023 Tech / CxA: Mark Rogers

			Pass / Fail /						
#	Sequence	Data	Not	Comments					
			Applicable						
	Safeties		Pass						
2	SF motor failure alarm		Pass						
3	Verify DOAS is operating in normal conditions		Pass						
4	Shut down the SF at the motor disconnect		Pass						
		Alarmed on the Alarm Summary		30 Second Delay					
5	Verify an SF motor failure alarm is sent to the BAS	and System Graphic	Pass						
6	Return the unit to normal operation		Pass						
17	High LAT alarm		NA	Not Configured					
18	Verify DOAS is operating in normal conditions		NA						
19	Record the high LAT alarm		NA						
20	Record the current LAT		NA						
21	Override the alarm setpoint to below the current LAT		NA						
22	Verify an alarm is sent to the BAS		NA						
23	Return the system to normal conditions		NA						
24	Low LAT alarm		NA	Not Configured					
	Verify DOAS is operating in normal conditions		NA						
	Record the low LAT alarm		NA						
	Record the current LAT		NA						
28	Override the alarm setpoint to above the current LAT		NA						
	Verify an alarm is sent to the BAS		NA						
	Verify the SF de-energizes		NA						
	Verify the EF de-energizes		NA						
	Return the system to normal conditions		NA						
	Dirty filters alarm		NA	Not Configured					
	Verify DOAS is operating in normal conditions		NA						
	Record the dirty filter DP alarm setpoint		NA						
	Record the current filter DP		NA						
	Override the setpoint to below the current DP		NA						
	Verify a dirty filter alarm is sent to the BAS		NA						
	Return the system to normal conditions		NA						
	Unit smoke detection alarm	Does generate a BAS alarm	Pass	Tested as part of the FA system					
	Verify DOAS is operating in normal conditions		NA	Tested as part of the TA system					
	Trip the unit smoke detector		NA						
	Verify the SF stops		NA						
	Verify a smoke detection alarm is sent to the BAS		NA						
	Occupied		Pass						
	Verify DOAS is operating in normal conditions		Pass						
	Unoccupy the building Schedule		Pass						
	Verify All systems Unoccupied		Pass						
	Enable an IDU units using the Temporary Occupancy button		Pass						
	Verify the DOAS unit Occupies and starts		Pass						
	Force the Temporary Occupancy Override to expire		Pass						
	Verify the DOAS is Unoccupied		Pass						
	Return the unit to normal conditions		Pass						
	Cooling		Pass						
	Verify the unit is operating in normal conditions		Pass						
	Record the leaving Air setpoint	68DegF	Pass						
	Record the current Leaving Air temperature	67DegF	Pass						
90	necord the current leaving An temperature	0, DCB	1 000	Unit Controlled, Spec calls for DOAS					
				mode to be determined by the					
01	Override the setpoint to below the current Temperature	55DegF	Pass	majority of IDU modes					
	ooling command increases without going over	55008	Pass	indjointy of 100 modes					
	Return the unit to normal operation		Pass						
	Unoccupied								
	Record the unit occupancy schedule		Pass						
	Override the unit into unoccupied mode		Pass	<u> </u>					
			Pass	<u> </u>					
	Verify the SF remains off		Pass	<u> </u>					
	Verify Both Compressorsis OFF		Pass	<u> </u>					
122	Release all override and return the unit to normal operations		Pass	Į					

************END FUNCTIONAL CHECKS*********

Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-1, IDU-1 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
2	Verify the outdoor air condensing unit is mounted securely.		Pass	
3			Data	
	Verify the outdoor air condensing unit has an electrical disconnect. Verify there is no damage to the outdoor air condensing unit.		Pass Pass	
	Verify the heat pump is mounted securely.		Pass	
	Verify the heat pumpt has an electrical disconnect.		Pass	
	Verify there is no damage to the heat pump.		Pass	
	Confirm discharge air temperature is indicated at the BAS.		Pass	
9	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
	Unoccupied Mode			
	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override			
	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode.		Pass	Occupancy Override is 1 hour and Adjustable
18	Activate the occupant override control to place the unit into occupied mode.		Pass	
19	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
	After the unoccupied override control timer has expired, verify the			
,,,	unit returns to unoccupied mode.		Pass	
	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
25	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
20	Record the Low Fan Speed setpoints (difference between space			
79	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).		NA	Fan is 2 speed controlled internally by trane ECM
	Record the High Fan Speed setpoints (difference between space		NA	by traile Leivi
31	temperature and space temperature setpoint).		NA	
32	Test the low, medium, and high fan speeds by overriding the space			
	temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal.		NA	
35	Compressor Minimum Runtime Record the user defined (adj.) minimum runtime currently entered for			
1	the compressor.	2min on time 5min off minnimum	Pass	
	Heating & Cooling			
37 1	Verify heating is enabled and cooling is disabled if outdoor air temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	OA supplied by DOAS and is conditioned
	Verify the cooling is enabled and heating is disabled if outdoor air			OA supplied by DOAS and is
38 1	temperature is > 65°F. Note: Outdoor air temperature sensor to be			conditioned
	factory mounted.		Pass	
39	Heating			
	Verify the heating mode is enabled based on outdoor air temperature.		Pass	Had to force heating by overridding Outside Air
41	Override the zone heating setpoint to a temperature above the current space temperature.		Pass	

	Verify the heat pump is in heating mode by the discharge air			
42	temperature. Verify the outdoor air condensing unit is operating and	170.00 5		
	discharging cool air.	176.9DegF	Pass	DOAS supplying 65Degree Air
43	Remove the override on the zone heating setpoint and let the heat		Dese	
4.4	pump return to normal operation.		Pass	
44	Cooling			
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 71 5 DegE	1 400	
46	space temperature.		Pass	
	Verify the heat pump is in cooling mode by the discharge air			
	temperature. Verify the outdoor air condensing unit is operating and			
	discharging warm air.	49DegF	Pass	
48	Remove the override on the zone cooling setpoint and let the heat			
40	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and			
	verify there is an alarm sent to the BAS.		Pass	
52	Place the high zone air temperature alarm setpoint back to its original		_	
	setpoint. Verify the alarm clears at the BAS.		Pass	alarm is configured as a darbet
53	Percent the low zone air temperature alors retraint			alarm is configured as a deviation
	Record the low zone air temperature alarm setpoint Test the low zone air temperature alarm by changing the setpoint		pass	from zone setpoint +- 10Deg
51	value to a temperature above the current space temperature and			
54	verify there is an alarm sent to the BAS.		2255	
	Place the low zone air temperature alarm setpoint back to its original		pass	
55	setpoint. Verify the alarm clears at the BAS.		pass	
56	Test the freeze stat and verify the unit shuts off and there is an alarm			Tested by raising the freeze
	sent to the BAS.		Pass	temperature locally on the device
	Verify the smoke detector is wired to shut down the heat pump upon			
57	activation.		NA	Tested as part of FA system
= 0	Record the heat pump "Compressor Runtime Exceeded" alarm			
58	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			
59	overriding the timer to a value less than its current value. Verify there			
	is an alarm received at the BAS.		NA	not configured
60	Put the compressor runtime exceeded alarm setpoint back to its			
	previous value. Verify the alarm clears at the BAS.		NA	not configured
61				Value is alarmed by a deviation from
	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
~~~	Test the law discharge signature and we share by shere sign the establish			
02	Test the low discharge air temperature alarm by changing the setpoint value to a temperature above the current discharge temperature.		Pass	
63	Verify an alarm is sent to the BAS			
	Restore the low discharge air temperature alarm setpoint to its original		Pass	
64	value. Verify the alarm clears at the BAS.		Pass	
				Value is alarmed by a deviation from
65	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the			
66	setpoint value to a temperature below the current discharge			
	temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its			
	original value. Verify the alarm clears at the BAS.		Pass	
69	Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		NA	not configured
	Verify the operating of the fan runtime exceeded alarm by overriding			
70	the timer to a value less than its current value. Verify there is an alarm			
	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous			not configure d
	value. Verify the alarm clears at the BAS.		NA	not configured
72	Test the "Fan Failure" alarm by commanding the heat pump on using		Dece	
77	the time schedule and then shut the fan off.		Pass	
	Verify there is an alarm sent to the BAS. Restore the fan operation. Verify the alarm clears at the BAS.		Pass Pass	
74	Test the "Fan in Hand" alarm by commanding the heat pump off using		Pd55	
75	the time schedule and then manually start the heat pump.		NA	not configured
= c	Verify there is an alarm sent to the BAS.		NA	
	vering there is an alarm sell to the DAS.	1	NA	

77	Put the heat pump back into automatic operation. Verify the alarm	_	
	clears at the BAS.	Pass	
			Units have a sensor in the Pan.
78	Verify a condensate overflow alarm is not required. It did not appear		Contractor to add condensate alarm
	to be in the documentation.		
70	Put the schedule back to its original values, remove all overrides, and		
79	put the unit back into normal operation.	Pass	
****	******END FUNCTIONAL CHECKS********		

#### Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-2, IDU-2 Date: 11/10/2023 Tech / CxA: Mark Rogers

Installation         Verify the outdoor air condensing unit is mounted securely.         Verify the outdoor air condensing unit has an electrical disconnect.         Verify the outdoor air condensing unit has an electrical disconnect.         Verify the test pumps is mounted securely.         Verify the test pumps is mounted at the BAS.         Verify the test pumps is mounted at the BAS.         Verify the test pumps is mounted at the BAS.         Verify the test pumps is mounted securely.         Verify the test presenture is indicated at the BAS.         Verify the test presenture is indicated at the BAS.         Verify the test presenture setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the test pump sin S off adj.         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config s	#	Sequence	Data	Pass / Fail / Not Applicable	Comments
3         Verify the outdoor air condensing unit. Iss an electrical disconnect.         Pass.           4         Verify there is no damage to the back convex.         Pass.           5         Verify the hast pump is nounded security.         Pass.           6         Verify the hast pump is nounded security.         Pass.           7         Verify the hast pump is nounded security.         Pass.           9         Verify the hast pump is nounded security.         Pass.           9         Verify the hast pump is nounded security.         Pass.           9         Verify the acting accoling stippints can be changed by the occupant the acting pase temperature steppint is 30°T [doi].         Pass.           10         Inscrupted Mode.         Pass.         Septimis are adjustable.           11         Inscrupted Mode.         Pass.         Septimis are adjustable.           12         Verify the collong space temperature steppint is 30°T [doi].         Pass.         Septimis are adjustable.           12         Verify the collong space temperature steppint is 30°T [doi].         Pass.         Pass.           14         Verify the collong space temperature steppint is 30°T [doi].         Pass.         Pass.           14         Verify the collong acting acting space temperature steppint is are adjustable.         Pass.         Pass.	1	Installation			
4         Verify there is no damage to the dualoor air condeming unit.         Pass         Pass           5         Verify the heat pump is mouthed activated activated at the IAX.         Pass         In classroom user has (+) 3 Deg?           8         Outfind dicharge air temperature is indicated at the IAX.         Pass         In classroom user has (+) 3 Deg?           9         Verify the set is obtained to the the number of the occupant using the zone schedule, place the unit into unoccupied mode.         Pass         Septimine activate the number of the occupant using the zone schedule, place the unit into unoccupied mode.         Pass         Septimine are adjustable           10         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           11         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           12         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           13         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           14         Verify the number and the outdoor air damper is located.         Pass         Occupancy Override is 1 hour and Adjustable           14         Verify the heating goate temperature segont is 70° [dd]         Pass         Pass           15         Werify the heating goa	2	Verify the outdoor air condensing unit is mounted securely.		Pass	
4         Verify there is no damage to the dualoor air condeming unit.         Pass         Pass           5         Verify the heat pump is mouthed activated activated at the IAX.         Pass         In classroom user has (+) 3 Deg?           8         Outfind dicharge air temperature is indicated at the IAX.         Pass         In classroom user has (+) 3 Deg?           9         Verify the set is obtained to the the number of the occupant using the zone schedule, place the unit into unoccupied mode.         Pass         Septimine activate the number of the occupant using the zone schedule, place the unit into unoccupied mode.         Pass         Septimine are adjustable           10         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           11         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           12         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           13         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           14         Verify the number and the outdoor air damper is located.         Pass         Occupancy Override is 1 hour and Adjustable           14         Verify the heating goate temperature segont is 70° [dd]         Pass         Pass           15         Werify the heating goa	3	Verify the outdoor air condensing unit has an electrical disconnect		Pass	
Second the standard securely.         Pass           Verify the heat pump has an electrical disconnect.         Pass           Verify there is no damage to the heat pump.         Pass           Second motion description of the standard at the BAS.         Pass           Verify there is no damage to the heat pump.         Pass           Second motion description can be changed by the occupant using the rone sensor.         (+ 3) Deg E           10 interception description can be changed from the Graphic transmittion of the schedule, place the unit to unoccupied mode.         Pass           12 light the time schedule, place the unit into unoccupied mode.         Pass         Second motion schedule, place the unit into occupied mode.           12 light the time schedule, place the unit is not operating.         Explorits are adjustable         Cocupancy Override is 1 hour and Adjustable.           12 light the inter unoccupied overide control is programmed to override in occupied mode.         Pass         Second the time the unoccupied overide control is programmed to override in occupant override control to place the matery to adjustable.         Pass         Second the time schedule, place the part in the occupant override control to place the matery to adjustable.           12 liverify the leading space temperature seption it 377 (adj.)         Pass         Pass         Second the during space temperature seption it 377 (adj.)           12 liverify the colong space temperature seption it 377 (adj.)         Pass         Second the	4				
Verify the bar punct has an electrical disconnect.         Pass           7 Verify there is a drange to the heat puncy.         Pass           8 Contro discharge ar temperature is inflicated at the BAS.         Pass           9 Verify heating and cooling setpoints can be changed by the occupat using the zero sensor.         Pass           10 Unccupied Mode         Pass           11 Unccupied Mode         Pass           12 Verify the heating space temperature setpoint is 55° [4d])         Pass           14 Verify the colling space temperature setpoint is 55° [4d])         Pass           15 Verify the heating space temperature setpoint is 55° [4d])         Pass           16 Verify the heating space temperature setpoint is 75° [4d])         Pass           17 Neorophic ar condeming in the optrarting.         Pass           18 Verify the obtain goale temperature setpoint is 75° [4d])         Pass           18 Notify the heating space temperature setpoint is 75° [4d])         Pass           19 Naccord the time the unccupied mode.         Pass           10 Notify the heating space temperature setpoint in the outdoor air damper is closed.         Pass           10 Notify the heating space temperature setpoint in the outdoor air damper is closed.         Pass           10 Notify the cooling space temperature setpoint in 27° [ad])         Pass           10 Noretin the stame stemperature setpoint is 27° [ad])					
Verify there is no damage to the heat pump.         Pass         Index container and there are the action of the ac					
8     Contin discharge air temperature is indicated at the BAS.     Pass     In classroom user has (+) 3 Deg?       9     Verify heating and cooling setpoints can be changed by the occupant using the isone sensor.     Pass     Setpoints are adjustable       11     Onecupied Mode     Pass     Setpoints are adjustable       12     Using the time schedule. Jpace the unit into unccupied mode.     Pass     Setpoints are adjustable       13     Verify the bating space temperature setpoint is SPT (ad).     Pass     Setpoints are adjustable       14     Verify the outdoor air condensity units not operating.     Pass     Setpoints are adjustable       14     Verify the outdoor air condensity units not operating.     Pass     Occupient Voerride is 1 hour and Adjustable       17     Record the time the unccupied overide control is programmed to overide in cource piel dmode before terturing to unccupied mode.     Pass       18     Retrify the heat pump starts, the fan is on, and the outdoor air damper factor and the outdoor air damper factor and pass     Pass       19     Verify the outgo space temperature setpoint is 70°F (ad).     Pass       20     Verify the outgo space temperature setpoint is 00°F (ad).     Pass       21     Verify the outgo space temperature setpoint is 00°F (ad).     Pass       23     Occupied Mode     Pass       24     Verify the outgo space temperature setpoint is 00°F (ad).     Pass   <		, , ,			
9         Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.         in classroom user has (+-3) Deg. Pass         in classroom user has (+-3) Deg. Werify the schedule, place the unit into unoccupied mode.         Pass         Setpoints are adjustable           12         Using the time schedule, place the unit into unoccupied mode.         Pass         Setpoints are adjustable           13         Verify the basing space temperature setpoint is SPF (adj.)         Pass         Setpoints are adjustable           14         Verify the outdoor air condensing unit is not operating.         Pass         Setpoints are adjustable           14         Verify the base tump faits of and the outdoor air damper is closed.         Pass         Setpoints are adjustable           15         Unoccupied Override         Pass         Setpoints are adjustable         Adjustable           16         Unoccupied override control to place the unit lino occupied mode.         Pass         Adjustable           16         Nortex the heating space temperature setpoint is 72°F (adj.)         Pass         Pass           10         Verify the heating space temperature setpoint is 72°F (adj.)         Pass         Setpoints are adjustable           20         Verify the heating space temperature setpoint is 72°F (adj.)         Pass         Setpoints are adjustable           21         Veriffy the heating space temperature set					
12     Set points are adjustable     Pass     Set points are adjustable       13     Verify the bating space temperature setpoint is 80° (adj.)     Pass     Setpoints are adjustable       14     Verify the bate pump fain is off aft the outdoor all damper is closed.     Pass     Setpoints are adjustable       15     Verify the bate pump fain is off aft the outdoor all damper is closed.     Pass     Setpoints are adjustable       16     Inneccupied Override     Pass     Setpoints are adjustable       17     Record the time the unoccupied overlde control is programmed to override in cocupied mode.     Pass     Occupancy Override is 1 hour and Adjustable       18     Activate the occupant override control to place the unit into occupied mode.     Pass     Pass       18     Activate the occupant override control to place the unit into occupied mode.     Pass     Pass       19     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Pass       20     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Pass       21     Verify the neating space temperature setpoint is 70°F (adj.)     Pass     Pass       23     Occupied Mode     Pass     Pass       24     Mart the unoccupied overlative setpoint is 70°F (adj.)     Pass       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass <td< td=""><td></td><td>Verify heating and cooling setpoints can be changed by the occupant</td><td>(+- 3) Deg F</td><td></td><td>warm cool adj setpoint can be</td></td<>		Verify heating and cooling setpoints can be changed by the occupant	(+- 3) Deg F		warm cool adj setpoint can be
13     Verify the batting space temperature sequent is SPT (adj.)     Pass     Setpoints are adjustable       14     Verify the outdoor air condensing unit is not operating.     Pass     Setpoints are adjustable       14     Verify the outdoor air condensing unit is not operating.     Pass     Setpoints are adjustable       15     Uncorcupied Override     Pass     Occupancy Override is 1 hour and Adjustable       16     Uncorcupied Override control to piace the unit into occupied overide control to piace the unit into occupied     Pass     Occupancy Override is 1 hour and Adjustable       18     Activate the occupant override control to piace the unit into occupied     Pass     Pass     Image       18     Activate the occupant override control to piace the unit into occupied     Pass     Pass     Image       19     Verify the heats gave temperature setpoint is 70°F (adj.)     Pass     Image     Image       20     Verify the heats gave temperature setpoint is 70°F (adj.)     Pass     Image     Image       21     Verify the heat gave temperature setpoint is 70°F (adj.)     Pass     Image     Image       21     Cocupand Mode     Pass     Image     Image     Image       21     Cocupand Mode     Pass     Image     Image     Image       21     Verify the heat gave temperature setpoint is 70°F (adj.)     Pass     Image	11	Unoccupied Mode			
14     Verify the cooling space temperature settoom is 80°F (ad).     Pass     Settor the heat pump fain is of and the outdoor air damper is closed.       15     Verify the heat pump fain is of and the outdoor air damper is closed.     Pass     Occupancy Override is 1 hour and Adjustable       16     Unoccupied Override     Pass     Occupancy Override is 1 hour and Adjustable       17     Record the time the unoccupied overide control is programmed to override in accupied mode before returning to unoccupied mode.     Pass     Occupancy Override is 1 hour and Adjustable       18     McWare the occupant override control to place the unit into occupied mode.     Pass     Pass       19     Verify the heat pump starts, the fan is on, and the outdoor air damper in the onccupied override control timer has expired, verify the init returns to unoccupied mode.     Pass       20     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Pass       21     Verify the conling space temperature setpoint is 70°F (adj.)     Pass     Pass       23     Occupied Mode     Pass     Pass       24     Verify the conling space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       26	12	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
Werly the heat pump fan is off and the outdoor air damper is closed.         Pass         Coccupancy Override is 1 hour and Pass           16         Unoccupied Override         Doccupancy Override is 1 hour and Pass         Adjustable           17         Record the time the unoccupied overide control is programmed to override in accupied mode.         Pass         Doccupancy Override is 1 hour and Pass           18         Activate the corcupant override control to proceed the unit into occupied mode.         Pass         Doccupancy Override is 1 hour and Pass           19         Overrig the heating space temperature setpoint is 72°F (adj.)         Pass         Doccupancy Override is 1 hour and Pass           20         Verify the heating space temperature setpoint is 72°F (adj.)         Pass         Pass           21         Verify the heating space temperature setpoint is 70°F (adj.)         Pass         Pass           24         Using the time schedule, place the unit into occupied mode.         Pass         Pass           24         Using the time schedule, place the unit into occupied mode.         Pass         Setpoints are adjustable           25         Verify the heat pump starts, the fan is on, and the outdoor air damper opers.         Pass         Setpoints are adjustable           26         Verify the case pump starts, the fan is on, and the outdoor air damper opers.         Pass         Setpoints are adjustable	13	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
Jower of the cutdor air condensing unit is not operating.         Pass           16         Unaccupied Override         Cacupancy Override is 1 hour and Adjustable           17         Record the time the unaccupied override control is programmed to override in accupied mode before returning to unaccupied mode.         Pass           18         Microsoft in accupied mode before returning to unaccupied mode.         Pass           19         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           19         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           20         Verify the colling space temperture setpoint is 70°F [adj].         Pass           21         Verify the noting space temperture setpoint is 70°F [adj].         Pass           23         Occupied Mode         Pass           24         Using the time schedule, place the unit into accupied mode.         Pass           25         Verify the heating space temperature setpoint is 70°F [adj].         Pass           26         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           27         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           27         Verify the colling space temperature setpoint.         NA           28         Fan Speed a	14	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
17       Record the time the unoccupied overide control is programmed to override in occupied mode.       Pass       Occupancy Override is 1 hour and Adjustable         18       Retivate the occupant override control to place the unit into occupied mode.       Pass       Pass         19       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Pass         20       Verify the heating space temperature setpoint is 70°F (adj).       Pass       Pass         21       Verify the neating space temperature setpoint is 70°F (adj).       Pass       Pass         21       Verify the coling space temperature setpoint is 70°F (adj).       Pass       Pass         23       Occupaed Mode       Pass       Pass       Pass         24       Using the time schedule, place the unit into occupied mode.       Pass       Pass       Pass         25       Verify the heating space temperature setpoint is 70°F (adj).       Pass       Pass       Pass         26       Verify the heating space temperature setpoint is 72°F (adj.)       Pass       Pass       Pass         27       Verify the heating space temperature setpoints (difference between space temperature setpoints (difference between space temperature and space temperature setpoints.       NA       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature setpo		Verify the outdoor air condensing unit is not operating.		Pass	
17     Record the time the unoccupied orde control is programmed to override in occupied mode before returning to unoccupied mode.     Pass     Adjustable       18     Activate the occupant override control to place the unit into occupied mode.     Pass     Pass       19     persit, the heating space temperature setpoint is 70°F (adj).     Pass     Pass       20     Verify the heating space temperature setpoint is 70°F (adj).     Pass     Pass       21     Verify the heating space temperature setpoint is 70°F (adj).     Pass     Pass       22     After the unoccupied overide control timer has expired, verify the unit returns to unoccupied mode.     Pass     Pass       23     Occupied Mode     Pass     Pass     Pass       24     Wrify the heating space temperature setpoint is 70°F (adj).     Pass     Pass       25     Verify the heating space temperature setpoint is 72°F (adj).     Pass     Pass       26     Verify the heating space temperature setpoint is 72°F (adj).     Pass     Pass       27     Verify the heating space temperature setpoints is 72°F (adj).     Pass     Pass       28     Fan Speed     Pass     Pass       29     Record the Cow Fan Speed setpoints (difference between space temperature and space temperature setpoints.     NA       30     Record the High Fan Speed setpoints (difference between space temperature setpoint space setpoints (difference	16	Unoccupied Override			
18     mode.     Pass       19     Verify the heat pump starts, the fan is on, and the outdoor air damper apens.     Pass       20     Verify the heat pump starts, the fan is on, and the outdoor air damper apens.     Pass       21     Verify the heat pump starts, the fan is on, and the outdoor air damper unit returns to unoccupied override control timer has expired, verify the unit returns to unoccupied mode.     Pass       23     Occupied Mode     Pass       24     Using the time schedule, place the unit into occupied mode.     Pass       25     Verify the heating space temperature setpoint is 72°F (adj.)     Pass       26     Verify the heating space temperature setpoint is 72°F (adj.)     Pass       27     Verify the heating space temperature setpoint is 72°F (adj.)     Pass       28     Fan Speed     Pass       29     Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       29     Record the Headium Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       30     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       31     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       31     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).	17	override in occupied mode before returning to unoccupied mode.		Pass	
mode.         Pass           Worlfy the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           20 Verify the heating space temperature setpoint is 72°F (adj.)         Pass           21 Verify the cooling space temperature setpoint is 72°F (adj.)         Pass           22 Verify the cooling space temperature setpoint is 72°F (adj.)         Pass           23 Occupied Mode         Pass           24 Using the time schedule, place the unit into occupied mode.         Pass           25 Verify the heating space temperature setpoint is 70°F (adj.)         Pass           26 Verify the cooling space temperature setpoint is 70°F (adj.)         Pass           27 Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           28 Fan Speed         Pass           29 Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).         NA           30 Record the Hodium Fan Speed setpoints (difference between space temperature and space temperature setpoint).         NA           31 Record the Hodium Fan Speed setpoint (difference between space temperature and space temperature setpoints).         NA           31 Record the Hodium Fan Speed setpoint (difference between space temperature and space temperature setpoint).         NA           32 Record the user defined (adj.) minimum runtime currently entered for thetemperature setpoint back to normal.         NA	18	Activate the occupant override control to place the unit into occupied			
13     pens.     Pass       20     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       21     Verify the cooling space temperature setpoint is 72°F (ad).)     Pass       23     Occupied overide control timer has expired, verify the unit returns to unoccupied mode.     Pass       24     Using the time schedule, place the unit ho occupied mode.     Pass       25     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       26     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       27     opens.     Pass       28     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       29     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       20     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       20     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       21     Verify the heating space temperature setpoints (difference between space     Pass       21     Pass of the low Fan Speed setpoints (difference between space     NA       30     Record the Medium Fan Speed setpoints (difference between space     Fan is 2 speed controlled internally       31     Record the ligh Fan Speed setpoints (difference between space     NA       32     Test the low, medium, and high fan speeds by overriding the space     NA <td>10</td> <td>mode.</td> <td></td> <td>Pass</td> <td></td>	10	mode.		Pass	
21       Verify the cooling space temperature setpoint is 72° (adj.)       Pass         22       After the unoccupied overide control timer has expired, verify the unit returns to unoccupied mode.       Pass         23       Occupied Mode       Pass         24       Using the time schedule, place the unit into occupied mode.       Pass         25       Verify the heating space temperature setpoint is 70°F (adj.)       Pass         26       Verify the heating space temperature setpoint is 72°F (adj.)       Pass         27       Verify the heating space temperature setpoint is 72°F (adj.)       Pass         28       Fan Speed       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature setpoint).       NA         20       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         30       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         32       Test the low, medium, and high an speeds by overriding the space temperature and space temperature setpoint.       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint.       NA	19			Pass	
After the unoccupied override control timer has expired, verify the unit returns to unoccupied mode.     Pass       23     Occupied Mode     Pass       24     Using the time schedule, place the unit into occupied mode.     Pass       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       26     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       27     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       28     Fan speed     Pass       29     Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       30     Record the How medium, and high fan speed setpoints (difference between space temperature and space temperature setpoint).     NA       31     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       32     Test the low, medium, and high fan speed setpoints (difference between space temperature and space temperature setpoint).     NA       33     Record the Low fan Migh fan speed set by overriding the space temperature and space temperature setpoint.     NA       34     Compressor Minimum Rutime     NA       35     Record the user defined (adj.) minimum rutime currently entered for the compressor.     NA       36     Heating & Cooling     Z       37     temperature < 55°F. Note: Outdoor air temperature sensor	20	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
22     unit returns to unoccupied mode.     Pass       23     Occupied Mode     Pass       24     Using the time schedule, place the unit into occupied mode.     Pass       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       26     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       27     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       28     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       29     Record the Low Fan Speed setpoints (difference between space temperature setpoint).     Pass       20     Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).     Fan is 2 speed controlled internally by trane ECM       30     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       31     Record the user defined (adj.) minimum runtime currently entered for the user defined (adj.) minimum runtime currently entered for the cuser defined (adj.) minimum runtime currently entered for the cuser defined (adj.) minimum runtime currently entered for the congressor.     Oka supplied by DOAS and is conditioned       33     Return the space temperature sensor to be factory mounted.     Pass       34     temperature (55°F. Note: Outdoor air temperature sensor to be factory mounted.     Pass       35     temperature (55°F. Note: Outdoor air temperature sensor to be facto	21	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
unit returns to unoccupied mode.     Pass       23     Occupied Mode     Pass       24     Using the time schedule, place the unit into occupied mode.     Pass       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       26     Verify the heat pump starts, the fan is on, and the outdoor air damper opens.     Pass     Setpoints are adjustable       27     Verify the heat pump starts, the fan is on, and the outdoor air damper opens.     Pass     Setpoints are adjustable       29     Record the Low Fan Speed setpoints (difference between space temperature setpoint).     NA     Image: Controlled internally by trans ECM       30     Record the High Fan Speed setpoints (difference between space temperature setpoint).     NA     Fan is 2 speed controlled internally by trans ECM       31     Record the High Fan Speed setpoints (difference between space temperature setpoint).     NA     Setpoints are ECM       31     Record the High Fan Speed setpoints (difference between space temperature setpoint).     NA     Setpoints are ECM       32     Test the low, medium, and high fan speeds by overriding the space temperature setpoint by the values listed above.     NA     Setpoints are adjustable       33     Return the space temperature setpoint to at more farmal.     NA     NA     Setpoints are adjustable       34     Compressor.     Zmin on time Smin off minnimum     Pass <td></td> <td>After the unoccupied override control timer has expired, verify the</td> <td></td> <td></td> <td></td>		After the unoccupied override control timer has expired, verify the			
24     Using the time schedule, place the unit into occupied mode.     Pass     Setpoints are adjustable       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       26     Verify the heat pump starts, the fan is on, and the outdoor air damper opens.     Pass     Setpoints are adjustable       27     Verify the heat pump starts, the fan is on, and the outdoor air damper opens.     Pass     Setpoints are adjustable       28     Fan Speed     Pass     Pass     Setpoints are adjustable       29     Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA     Fan is 2 speed controlled internally by trane ECM       30     Record the High Fan Speed setpoints (difference between space temperature setpoint).     NA     NA       31     Record the Jigh Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       32     Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.     NA       32     Compressor Minimum Runtime     NA     Setopoints are adjustable       34     Compressor.     Zer of the user defined (adj.) minimum runtime currently entered for the compressor.     NA       34     Compressor.     Zer of the user defined and cooling is disabled if outdoor air temperature sensor to be factory mounted.     Pass       37	22	unit returns to unoccupied mode.		Pass	
25       Verify the heating space temperature setpoint is 72°F (adj.)       Pass       Setpoints are adjustable         26       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Setpoints are adjustable         27       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Pass         28       Fan Speed       Pass       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       Fan is 2 speed controlled internally by trane ECM         30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA         34       Compressor Minimum Runtime       2       2         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2       0A supplied by DOAS and is conflicted         36       Heating & Cooling       0A supplied by DOAS and is conditioned       2	23			Pass	
25       Verify the heating space temperature setpoint is 72°F (adj.)       Pass       Setpoints are adjustable         26       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Setpoints are adjustable         27       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Pass         28       Fan Speed       Pass       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       Fan is 2 speed controlled internally by trane ECM         30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA         34       Compressor Minimum Runtime       2       2         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2       0A supplied by DOAS and is conflicted         36       Heating & Cooling       0A supplied by DOAS and is conditioned       2	24	Using the time schedule, place the unit into occupied mode.		Pass	
26       Verify the cooling space temperature setpoint is 72°F (adj.)       Pass       Setpoints are adjustable         27       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Setpoints are adjustable         28       Fan Speed       Pass       Pass       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature setpoint).       NA       Fan is 2 speed controlled internally by trane ECM         30       temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature as the point back to normal.       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA         32       Test the low reference (adj.) minimum runtime currently entered for the compressor.       NA       Zmin on time Smin off minnimum         33       Recurd the user defined (adj.) minimum runtime currently entered for the cooling is disabled if outdoor air temperature sensor to be factory mounted.       OA supplied by DOAS and is conditioned         34       Heating & Cooling       Verify the cooling is enabled and cooling is disabled if outdoor air temperature sensor to be factory mounted.       OA supplied by DOAS and is conditioned         38       temperature is > 65°F. Note: Outdoor air temperature sensor to be factory mounted.				Pass	Setpoints are adjustable
7       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass         28       Fan Speed       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature setpoint).       NA         30       Record the Medium Fan Speed setpoints (difference between space temperature as the pace temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints but he values listed above.       NA         32       Test the low, medium, and high fan speeds to overriding the space temperature setpoints back to normal.       NA         33       Return the space temperature setpoint is a field above.       NA         34       Compressor Minimum Runtime       2         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2       2         36       Heating & Cooling is enabled and cooling is disabled if outdoor air       2       2         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.				Pass	Setpoints are adjustable
28       Fan Speed       Image: Constraint of the Con	27			Pass	
29       Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         30       Record the Medium Fan Speed setpoints (difference between space temperature setpoint).       Fan is 2 speed controlled internally by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       2         35       Heating & Cooling is enabled and cooling is disabled if outdoor air       2min on time 5min off minnimum         36       Heating is enabled and cooling is disabled if outdoor air       2         37       temperature s of 5 ^r . Note: Outdoor air temperature sensor to be factory mounted.       Pass       0A supplied by DOAS and is conditioned         38       temperature is of 5 ^r ^r . Note: Outdoor air temperature sensor to be factory mounted.       Pass       0A supplied by DOAS and is conditioned         39       Heating        Heating       Had to force heating by overridding         39       Heati	28				
129       temperature and space temperature setpoint).       NA         30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       by trane ECM         32       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         31       Record the space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints back to normal.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       Intervention         34       Compressor Minimum Runtime       2       Intervention       Pass         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2       2       OA supplied by DOAS and is conditioned         36       Heating & Cooling       Gasupelide if outdoor air       2       OA supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factor					
30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       Fan is 2 speed controlled internally by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA       SetUP         34       Compressor Minimum Runtime       Zmin on time Smin off minnimum       Pass       SetUP         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       Zmin on time Smin off minnimum       Pass       OA supplied by DOAS and is conditioned         37       temperature setS [*] F. Note: Outdoor air temperature sensor to be factory mounted.       Pass       OA supplied by DOAS and is conditioned         38       temperature is > 65°F. Note: Outdoor air temperature sensor to be factory mounted.       Pass       OA supplied by DOAS and is conditioned         39       Heating       Meating       Had to force heating by overridding         39       Heating       Ma       Matha to force heating by overrid	29			NA	
30       temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       NA         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA         34       Compressor Minimum Runtime       Record the user defined (adj.) minimum runtime currently entered for the compressor.       Zmin on time Smin off minimum       Pass         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       OA supplied by DOAS and is conditioned         36       Heating & Cooling       OA supplied of outdoor air       Pass       OA supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					Fan is 2 speed controlled internally
31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       NA         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       Zmin on time 5min off minimum         36       Heating & Cooling       OA supplied by DOAS and is conditioned factory mounted.         37       temperature sets of is enabled and heating is disabled if outdoor air temperature sensor to be factory mounted.       OA supplied by DOAS and is conditioned factory mounted.         38       Verify the cooling is enabled and heating is disabled if outdoor air temperature sensor to be factory mounted.       OA supplied by DOAS and is conditioned factory mounted.         39       Heating       OA supplied by DOAS and is conditioned factory mounted.       Pass         39       Heating       Heating mode is enabled based on outdoor air temperature.       Pass         40       Verify the heating mode is enabled based on outdoor air temperature.       Pass       Had to force heating by overridding Outside Air         41       Override the zone heating setpoint to a temperature above the       Pass       Had to force hea	30			NA	
31       temperature and space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       NA         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       NA         36       Heating & Cooling       Zmin on time Smin off minnimum         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					
32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       NA         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2min on time 5min off minnimum       Pass         36       Heating & Cooling       OA supplied by DOAS and is conditioned       conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	31			NA	
temperature setpoints by the values listed above.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       NA         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       NA         36       Heating & Cooling       Pass         37       the compressor.       2min on time 5min off minnimum       Pass         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					
33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       2         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2min on time 5min off minnimum       Pass         36       Heating & Cooling       2       2       2         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	32			NA	
34       Compressor Minimum Runtime       2min on time 5min off minnimum       Pass         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2min on time 5min off minnimum       Pass         36       Heating & Cooling       2min on time 5min off minnimum       Pass         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	33				
35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2min on time 5min off minnimum       Pass         36       Heating & Cooling       2min on time 5min off minnimum       Pass         36       Heating & Cooling       0A supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					
36       Heating & Cooling       OA supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	35		2min on time 5min off minnimum	Pass	
Verify heating is enabled and cooling is disabled if outdoor air       OA supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	36				
37     temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					OA supplied by DOAS and is
Verify the cooling is enabled and heating is disabled if outdoor air       OA supplied by DOAS and is conditioned         38       temperature is > 65°F. Note: Outdoor air temperature sensor to be factory mounted.       Pass         39       Heating       Had to force heating by overridding Outside Air         40       Verify the heating mode is enabled based on outdoor air temperature.       Pass         41       Override the zone heating setpoint to a temperature above the       Outside Air	37	temperature < 65°F. Note: Outdoor air temperature sensor to be		Pass	
38     temperature is > 65°F. Note: Outdoor air temperature sensor to be factory mounted.     conditioned       39     Heating     Pass       40     Verify the heating mode is enabled based on outdoor air temperature.     Pass       41     Override the zone heating setpoint to a temperature above the     Unit of the zone heating setpoint to a temperature above the		,			OA supplied by DOAS and is
factory mounted.     Pass       39     Heating     Image: Constraint of the section of the	38				
39     Heating     Had to force heating by overridding       40     Verify the heating mode is enabled based on outdoor air temperature.     Pass     Had to force heating by overridding Outside Air       41     Override the zone heating setpoint to a temperature above the     Pass     Outside Air	- 50			Pacc	Contantioned
40     Verify the heating mode is enabled based on outdoor air temperature.     Pass     Had to force heating by overridding Outside Air       41     Override the zone heating setpoint to a temperature above the     Pass     Outside Air	30	,		1 000	
41		-		Pass	
	41			Pass	

	Varify the heat nump is in heating mode by the discharge air			
42	Verify the heat pump is in heating mode by the discharge air			
42	temperature. Verify the outdoor air condensing unit is operating and discharging cool air.	145.22DegF	Pass	DOAS supplying 65 Dogroo Air
	Remove the override on the zone heating setpoint and let the heat	143.22Degr	Fass	DOAS supplying 65Degree Air
43	pump return to normal operation.		Pass	
44	Cooling		1 033	
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 68.6 DegF		
46	space temperature.		Pass	
	Verify the heat pump is in cooling mode by the discharge air			
47	temperature. Verify the outdoor air condensing unit is operating and			
	discharging warm air.	49.5DegF	Pass	
48	Remove the override on the zone cooling setpoint and let the heat			
40	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and		_	
	verify there is an alarm sent to the BAS.		Pass	
52	Place the high zone air temperature alarm setpoint back to its original		D	
	setpoint. Verify the alarm clears at the BAS.		Pass	alarm is configured as a deviation
53	Record the low zone air temperature alarm setpoint		noss	from zone setpoint +- 10Deg
	Test the low zone air temperature alarm setpoint Test the low zone air temperature alarm by changing the setpoint		pass	Tested by raising the freeze
51	value to a temperature above the current space temperature and			temperature locally on the device.
54	verify there is an alarm sent to the BAS.		pass	Freeze Stat is hardwired and stuts
	Place the low zone air temperature alarm setpoint back to its original		pass	
55	setpoint. Verify the alarm clears at the BAS.		pass	
			puss	
56	Test the freeze stat and verify the unit shuts off and there is an alarm			Tested by raising the freeze
	sent to the BAS.		Pass	temperature locally on the device
	Verify the smoke detector is wired to shut down the heat pump upon			
57	activation.		NA	Tested as part of FA system
<b>F</b> 0	Record the heat pump "Compressor Runtime Exceeded" alarm			
58	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			
59	overriding the timer to a value less than its current value. Verify there			
	is an alarm received at the BAS.		NA	not configured
60	Put the compressor runtime exceeded alarm setpoint back to its			
	previous value. Verify the alarm clears at the BAS.		NA	not configured
61				Value is alarmed by a deviation from
	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
~~	Test the low discharge air temperature alarm by changing the setuciat			
62	Test the low discharge air temperature alarm by changing the setpoint		Dava	
62	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS		Pass	
05	Restore the low discharge air temperature alarm setpoint to its original		Pass	
64	value. Verify the alarm clears at the BAS.		Pass	
			1 000	Value is alarmed by a deviation from
65	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the		1 435	
66	setpoint value to a temperature below the current discharge			
	temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
	Restore the high discharge air temperature alarm setpoint to its			
68	original value. Verify the alarm clears at the BAS.		Pass	
69	Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		NA	not configured
	Verify the operating of the fan runtime exceeded alarm by overriding			
70	the timer to a value less than its current value. Verify there is an alarm			
	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous			
, ₁	value. Verify the alarm clears at the BAS.		NA	not configured
72	Test the "Fan Failure" alarm by commanding the heat pump on using			
	the time schedule and then shut the fan off.		Pass	
	Verify there is an alarm sent to the BAS.		Pass	
74	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
75	Test the "Fan in Hand" alarm by commanding the heat pump off using			and an affect and
	the time schedule and then manually start the heat pump. Verify there is an alarm sent to the BAS.		NA	not configured
			NA	

77	Put the heat pump back into automatic operation. Verify the alarm		_		
	clears at the BAS.		Pass		
				Units have a sensor in the Pan.	
78	Verify a condensate overflow alarm is not required. It did not appear			Contractor to add condensate alarm	
	to be in the documentation.				
70	Put the schedule back to its original values, remove all overrides, and				
79	put the unit back into normal operation.		Pass		
****	**********END FUNCTIONAL CHECKS*******				

#### Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-3, IDU-3 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
2	Verify the outdoor air condensing unit is mounted securely.		Pass	
3	Verify the outdoor air condensing unit has an electrical disconnect.		Pass	
4	Verify there is no damage to the outdoor air condensing unit.		Pass	
5	Verify the heat pump is mounted securely.		Pass	
6	Verify the heat pumpt has an electrical disconnect.		Pass	
7	Verify there is no damage to the heat pump.		Pass	
8	Confirm discharge air temperature is indicated at the BAS.		Pass	
9	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
11	Unoccupied Mode			
	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
14	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override			
17	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode.		Pass	Occupancy Override is 1 hour and Adjustable
18	Activate the occupant override control to place the unit into occupied			
10	mode.		Pass	
19	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
20	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
21	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
	After the unoccupied override control timer has expired, verify the			
22	unit returns to unoccupied mode.		Pass	
23	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
25	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
29	Record the Low Fan Speed setpoints (difference between space			
29	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space			Fan is 2 speed controlled internally
	temperature and space temperature setpoint).		NA	by trane ECM
31	Record the High Fan Speed setpoints (difference between space			
	temperature and space temperature setpoint).		NA	
32	Test the low, medium, and high fan speeds by overriding the space			
- 22	temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal. Compressor Minimum Runtime		NA	
34	Compressor Minimum Runtime Record the user defined (adj.) minimum runtime currently entered for			
35	the compressor.	2min on time 5min off minnimum	Pass	
36	Heating & Cooling			
37	Verify heating is enabled and cooling is disabled if outdoor air temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		D	OA supplied by DOAS and is conditioned
	Tactory mounted. Verify the cooling is enabled and heating is disabled if outdoor air		Pass	OA supplied by DOAS and is
20	temperature is > 65°F. Note: Outdoor air temperature sensor to be			OA supplied by DOAS and is
38	factory mounted.		Pass	conditioned
20	Heating		1 000	
40	Verify the heating mode is enabled based on outdoor air temperature.		Pass	Had to force heating by overridding Outside Air
41	Override the zone heating setpoint to a temperature above the			
l	current space temperature.		Pass	

	Verify the heat pump is in heating mode by the discharge air			
42	temperature. Verify the outdoor air condensing unit is operating and			
	discharging cool air.	147.4DegF	Pass	DOAS supplying 65Degree Air
43	Remove the override on the zone heating setpoint and let the heat			
	pump return to normal operation.		Pass	
44	Cooling			
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 69 7 DegE	FdSS	
46	space temperature.	zone remperature 69.7 Degr	Pass	
	Verify the heat pump is in cooling mode by the discharge air		F 035	
47	temperature. Verify the outdoor air condensing unit is operating and			
	discharging warm air.	47.5DegF	Pass	
	Remove the override on the zone cooling setpoint and let the heat			
48	pump return to normal operation.		Pass	
49	Alarms			
<b>F</b> 0				alarm is configured as a deviation
50	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and			
	verify there is an alarm sent to the BAS.		Pass	
52	Place the high zone air temperature alarm setpoint back to its original			
	setpoint. Verify the alarm clears at the BAS.		Pass	
53				alarm is configured as a deviation
. 5	Record the low zone air temperature alarm setpoint		pass	from zone setpoint +- 10Deg
-	Test the low zone air temperature alarm by changing the setpoint			
54	value to a temperature above the current space temperature and			
	verify there is an alarm sent to the BAS.		pass	
55	Place the low zone air temperature alarm setpoint back to its original			
	setpoint. Verify the alarm clears at the BAS.		pass	Tested by usising the fusers
				Tested by raising the freeze
56				temperature locally on the device. Freeze Stat is hardwired and stuts
20	Test the freeze stat and verify the unit shuts off and there is an alarm			down unit. Not alarmed on Jace. 50
	sent to the BAS.		pace	complete
	Verify the smoke detector is wired to shut down the heat pump upon		pass	complete
57	activation.		NA	Tested as part of FA system
	Record the heat pump "Compressor Runtime Exceeded" alarm		INA .	Tested as part of TA system
58	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			not compared
59	overriding the timer to a value less than its current value. Verify there			
	is an alarm received at the BAS.		NA	not configured
~ ~	Put the compressor runtime exceeded alarm setpoint back to its			
60	previous value. Verify the alarm clears at the BAS.		NA	not configured
~				Value is alarmed by a deviation from
61	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
62	Test the low discharge air temperature alarm by changing the setpoint			
	value to a temperature above the current discharge temperature.		Pass	
63	Verify an alarm is sent to the BAS		Pass	
64	Restore the low discharge air temperature alarm setpoint to its original			
04	value. Verify the alarm clears at the BAS.		Pass	
65				Value is alarmed by a deviation fror
55	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the			
66	setpoint value to a temperature below the current discharge			
	temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its		_	
	original value. Verify the alarm clears at the BAS.		Pass	Last and Concerd
ь9	Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		NA	not configured
70	Verify the operating of the fan runtime exceeded alarm by overriding			
70	the timer to a value less than its current value. Verify there is an alarm received at the BAS.		NI A	not configured
	Put the fan runtime exceeded alarm setpoint back to its previous		NA	not configured
71			NIA	not configured
	value. Verify the alarm clears at the BAS. Test the "Fan Failure" alarm by commanding the heat pump on using		NA	not configured Mismatch Alarm command vs Statu
72	the time schedule and then shut the fan off.		Pass	Mismattin Alarm Commanu vs Statu
72	Verify there is an alarm sent to the BAS.		Pass	
	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
· +		1	1 435	
75	Test the "Fan in Hand" alarm by commanding the heat pump off using			

	Verify there is an alarm sent to the BAS.	NA	
77	Put the heat pump back into automatic operation. Verify the alarm		
	clears at the BAS.	Pass	
70	Verify a condensate overflow alarm is not required. It did not appear to be in the documentation.		Units have a sensor in the Pan. Need
			more information
70	Put the schedule back to its original values, remove all overrides, and		
79	put the unit back into normal operation.	Pass	

#### Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-4, IDU-4 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
2	Verify the outdoor air condensing unit is mounted securely.		Pass	
3	Verify the outdoor air condensing unit has an electrical disconnect.		Pass	
4	Verify there is no damage to the outdoor air condensing unit.		Pass	
	Verify the heat pump is mounted securely.		Pass	
	Verify the heat pumpt has an electrical disconnect.		Pass	
	Verify there is no damage to the heat pump.		Pass	
	Confirm discharge air temperature is indicated at the BAS.		Pass	
	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
11	Unoccupied Mode			
12	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
13	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
14	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override			
	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode. Activate the occupant override control to place the unit into occupied		Pass	Occupancy Override is 1 hour and Adjustable
18	mode. Verify the heat pump starts, the fan is on, and the outdoor air damper		Pass	
19	opens.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
21	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
22	After the unoccupied override control timer has expired, verify the unit returns to unoccupied mode.		Pass	
23	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
25	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
	Record the Low Fan Speed setpoints (difference between space			
29	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).		NA	Fan is 2 speed controlled internally by trane ECM
31	Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).			
32	Test the low, medium, and high fan speeds by overriding the space		NA	
	temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal.		NA	
34 35	Compressor Minimum Runtime Record the user defined (adj.) minimum runtime currently entered for			
	the compressor.	2min on time 5min off minnimum	Pass	
36	Heating & Cooling			
37	Verify heating is enabled and cooling is disabled if outdoor air temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	OA supplied by DOAS and is conditioned
38	Verify the cooling is enabled and heating is disabled if outdoor air temperature is > 65°F. Note: Outdoor air temperature sensor to be			OA supplied by DOAS and is conditioned
	factory mounted.		Pass	
39	Heating			
40	Verify the heating mode is enabled based on outdoor air temperature.		Pass	Had to force heating by overridding Outside Air
41	Override the zone heating setpoint to a temperature above the current space temperature.		Pass	

42	Verify the heat pump is in heating mode by the discharge air temperature. Verify the outdoor air condensing unit is operating and			
	discharging cool air.	157.79 DegF	Pass	DOAS supplying 65Degree Air
43	Remove the override on the zone heating setpoint and let the heat			
-	pump return to normal operation.		Pass	
	Cooling			
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
46	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 64.3 DegF		
	space temperature. Verify the heat pump is in cooling mode by the discharge air		Pass	
47	temperature. Verify the outdoor air condensing unit is operating and			
.,	discharging warm air.	43.8 DegF	Pass	
48	Remove the override on the zone cooling setpoint and let the heat			
_	pump return to normal operation. Alarms		Pass	
	Aldinis			alarm is configured as a deviation
50	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and verify there is an alarm sent to the BAS.		Daca	
	Place the high zone air temperature alarm setpoint back to its original		Pass	
52	setpoint. Verify the alarm clears at the BAS.		Pass	
53				alarm is configured as a deviation
	Record the low zone air temperature alarm setpoint Test the low zone air temperature alarm by changing the setpoint		pass	from zone setpoint +- 10Deg
54	value to a temperature above the current space temperature and			
	verify there is an alarm sent to the BAS.		pass	
55	Place the low zone air temperature alarm setpoint back to its original			
	setpoint. Verify the alarm clears at the BAS.		Pass	Tested by raising the freeze
				temperature locally on the device.
56	Test the freeze stat and verify the unit shuts off and there is an alarm			Freeze Stat is hardwired and shuts
	sent to the BAS.		Pass	down the unit.
57	Verify the smoke detector is wired to shut down the heat pump upon activation.		NA	Tostad as part of EA system
	Record the heat pump "Compressor Runtime Exceeded" alarm		NA NA	Tested as part of FA system
58	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			
59	overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS.		NA	not configured
	Put the compressor runtime exceeded alarm setpoint back to its		NA	not configured
60	previous value. Verify the alarm clears at the BAS.		NA	not configured
61				Value is alarmed by a deviation from
-	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
62	Test the low discharge air temperature alarm by changing the setpoint value to a temperature above the current discharge temperature.			
-			Pass	
63	Verify an alarm is sent to the BAS		Pass	
64	Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS.		Dass	
	אמועכ. אכוווץ נווב מומוווו נוכמוג מג נווב DAS.		Pass	Value is alarmed by a deviation from
65	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the			
66	setpoint value to a temperature below the current discharge		Dece	
67	temperature. Verify an alarm is sent to the BAS		Pass Pass	
68	Restore the high discharge air temperature alarm setpoint to its			
	original value. Verify the alarm clears at the BAS.		Pass	
69	Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding		NA	not configured
70	the timer to a value less than its current value. Verify there is an alarm			
. 0	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous			
	value. Verify the alarm clears at the BAS.		NA	not configured
72	Test the "Fan Failure" alarm by commanding the heat pump on using the time schedule and then shut the fan off.		Pass	Mismatch Alarm (Command vs Status)
73	Verify there is an alarm sent to the BAS.		Pass	
	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
75	Test the "Fan in Hand" alarm by commanding the heat pump off using			net easily with
	the time schedule and then manually start the heat pump.		NA	not configured

77	Put the heat pump back into automatic operation. Verify the alarm			
	clears at the BAS.	1	NA	not configured
70	Verify a condensate overflow alarm is not required. It did not appear			Units have a sensor in the Pan. Need
	to be in the documentation.			more information
70	Put the schedule back to its original values, remove all overrides, and			
79	put the unit back into normal operation.	P	Pass	

#### Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-5, IDU-5 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
	Verify the outdoor air condensing unit is mounted securely.		Pass	
3	Verify the outdoor air condensing unit has an electrical disconnect.		Pass	
4	Verify there is no damage to the outdoor air condensing unit.		Pass	
	Verify the heat pump is mounted securely.		Pass	
6	Verify the heat pumpt has an electrical disconnect.		Pass	
7	Verify there is no damage to the heat pump.		Pass	
8	Confirm discharge air temperature is indicated at the BAS.		Pass	
9	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
11	Unoccupied Mode			
12	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
13	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
14	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override			
17	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode.		Pass	Occupancy Override is 1 hour and Adjustable
18	Activate the occupant override control to place the unit into occupied			
19	mode. Verify the heat pump starts, the fan is on, and the outdoor air damper		Pass	
	opens.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
21	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
22	After the unoccupied override control timer has expired, verify the			
	unit returns to unoccupied mode.		Pass	
	Occupied Mode		Pass	
	Using the time schedule, place the unit into occupied mode.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
29	Record the Low Fan Speed setpoints (difference between space			
29	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space			Fan is 2 speed controlled internally
50	temperature and space temperature setpoint).		NA	by trane ECM
31	Record the High Fan Speed setpoints (difference between space			
51	temperature and space temperature setpoint).		NA	
32	Test the low, medium, and high fan speeds by overriding the space			
	temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal.		NA	
34	Compressor Minimum Runtime			
35	Record the user defined (adj.) minimum runtime currently entered for the compressor.	2min on time 5min off minnimum	Pass	
36	Heating & Cooling			
37	Verify heating is enabled and cooling is disabled if outdoor air temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	OA supplied by DOAS and is conditioned
38	Verify the cooling is enabled and heating is disabled if outdoor air temperature is > 65°F. Note: Outdoor air temperature sensor to be			OA supplied by DOAS and is conditioned
	factory mounted.		Pass	
39 40	Heating			Had to force heating by overridding
40	Verify the heating mode is enabled based on outdoor air temperature. Override the zone heating setpoint to a temperature above the		Pass	Outside Air
71	current space temperature.		Pass	

12	Verify the heat pump is in heating mode by the discharge air temperature. Verify the outdoor air condensing unit is operating and			
42	discharging cool air.	170.99 DegF	Pass	DOAS supplying 65Degree Air
42	Remove the override on the zone heating setpoint and let the heat	1,0,00 008.		
43	pump return to normal operation.		Pass	
44	Cooling			
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
40	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 69.4 DegF		
46	space temperature.		Pass	
	Verify the heat pump is in cooling mode by the discharge air			
47	temperature. Verify the outdoor air condensing unit is operating and discharging warm air.	45.98 DegF	Dace	
	Remove the override on the zone cooling setpoint and let the heat	45.98 Degr	Pass	
48	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
51	Test the high zone air temperature alarm by changing the setpoint value to a temperature below the current space temperature and			
51	verify there is an alarm sent to the BAS.		Pass	
52	Place the high zone air temperature alarm setpoint back to its original		Ī	
52	setpoint. Verify the alarm clears at the BAS.		Pass	
53	Record the low zone air temperature alarm setpoint			alarm is configured as a deviation
	Test the low zone air temperature alarm setpoint Test the low zone air temperature alarm by changing the setpoint		pass	from zone setpoint +- 10Deg
54	value to a temperature above the current space temperature and			
	verify there is an alarm sent to the BAS.		pass	
55	Place the low zone air temperature alarm setpoint back to its original			
	setpoint. Verify the alarm clears at the BAS.		Pass	Tested by raising the freeze
				temperature locally on the device.
56	Test the freeze stat and verify the unit shuts off and there is an alarm			Freeze Stat is hardwired and shuts
	sent to the BAS.		Fail	the unit down.
57	Verify the smoke detector is wired to shut down the heat pump upon			
-	activation.		NA	Tested as part of FA system
58	Record the heat pump "Compressor Runtime Exceeded" alarm setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			liet compared
59	overriding the timer to a value less than its current value. Verify there			
	is an alarm received at the BAS.		NA	not configured
60	Put the compressor runtime exceeded alarm setpoint back to its		NA	not configurad
	previous value. Verify the alarm clears at the BAS.		NA	not configured Value is alarmed by a deviation fror
61	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
				·
62	Test the low discharge air temperature alarm by changing the setpoint			
62	value to a temperature above the current discharge temperature.		Pass	
63	Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original		Pass	
64	value. Verify the alarm clears at the BAS.		Pass	
65			Ī	Value is alarmed by a deviation fror
03	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
60	Test the high discharge air temperature alarm by changing the			
06	setpoint value to a temperature below the current discharge temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its			
	original value. Verify the alarm clears at the BAS.		Pass	
69	Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding		NA	not configured
70	the timer to a value less than its current value. Verify there is an alarm			
.0	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous			
, 1	value. Verify the alarm clears at the BAS.		NA	not configured
72	Test the "Fan Failure" alarm by commanding the heat pump on using		D	is a Missmatch alarm command vs
73	the time schedule and then shut the fan off. Verify there is an alarm sent to the BAS.		Pass Pass	Status
	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
75	Test the "Fan in Hand" alarm by commanding the heat pump off using			
-	the time schedule and then manually start the heat pump.		NA	not configured
70	Verify there is an alarm sent to the BAS.		NA	

77	Put the heat pump back into automatic operation. Verify the alarm				
//	clears at the BAS.		NA		
78	Verify a condensate overflow alarm is not required. It did not appear			Units have a sensor in the Pan. Need	
/0	to be in the documentation.		NA	more information	
79	Put the schedule back to its original values, remove all overrides, and				
79	put the unit back into normal operation.		Pass		
****	*********END FUNCTIONAL CHECKS******				

#### Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-6, IDU-6 Date: 11/10/2023 Tech / CxA: Mark Rogers

Installation         Verify the outdoor air condensing unit is mounted securely.         Verify the outdoor air condensing unit has an electrical disconnect.         Verify the outdoor air condensing unit has an electrical disconnect.         Verify the test pumps is mounted securely.         Verify the test pumps is mounted at the BAS.         Verify the test pumps is mounted at the BAS.         Verify the test pumps is mounted at the BAS.         Verify the test pumps is mounted securely.         Verify the test presenture is indicated at the BAS.         Verify the test presenture is indicated at the BAS.         Verify the test presenture setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is BAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the test pumps failed failed the setpoint (add)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)         Verify the config space temperature setpoint is DAT (adj.)	#	Sequence	Data	Pass / Fail / Not Applicable	Comments
3         Verify the outdoor air condensing unit. Iss an electrical disconnect.         Pass.           4         Verify there is no damage to the back convex.         Pass.           5         Verify the hast pump is nounded security.         Pass.           6         Verify the hast pump is nounded security.         Pass.           7         Verify the hast pump is nounded security.         Pass.           9         Verify the hast pump is nounded security.         Pass.           9         Verify the hast pump is nounded security.         Pass.           9         Verify the acting accoling stippints can be changed by the occupant the acting pase temperature steppint is 30°T [doi].         Pass.           10         Inscrupted Mode.         Pass.         Septimis are adjustable.           11         Inscrupted Mode.         Pass.         Septimis are adjustable.           12         Verify the collon gase temperature steppint is 30°T [doi].         Pass.         Septimis are adjustable.           12         Verify the collon gase temperature steppint is 30°T [doi].         Pass.         Pass.           14         Verify the collon gase temperature steppint is 30°T [doi].         Pass.         Pass.           14         Verify the collon air doal do the outdoor air doal do the o	1	Installation			
4         Verify there is no damage to the dualoor air condeming unit.         Pass         Pass           5         Verify the heat pump is mouthed activated activated at the IAX.         Pass         In classroom user has (+) 3 Deg?           8         Outfind dicharge air temperature is indicated at the IAX.         Pass         In classroom user has (+) 3 Deg?           9         Verify the set is obtained to the the number of the occupant using the zone schedule, place the unit into unoccupied mode.         Pass         Septimine activate the number of the occupant using the zone schedule, place the unit into unoccupied mode.         Pass         Septimine are adjustable           10         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           11         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           12         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           13         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           14         Verify the chains goate temperature segont is 70° [dd]         Pass         Occupancy Override is 1 hour and Adjustable           14         Werify the heat goang temperature segont is 70° [dd]         Pass         Pass           15         Mort the unoccupied mode. </td <td>2</td> <td>Verify the outdoor air condensing unit is mounted securely.</td> <td></td> <td>Pass</td> <td></td>	2	Verify the outdoor air condensing unit is mounted securely.		Pass	
4         Verify there is no damage to the dualoor air condeming unit.         Pass         Pass           5         Verify the heat pump is mouthed activated activated at the IAX.         Pass         In classroom user has (+) 3 Deg?           8         Outfind dicharge air temperature is indicated at the IAX.         Pass         In classroom user has (+) 3 Deg?           9         Verify the set is obtained to the the number of the occupant using the zone schedule, place the unit into unoccupied mode.         Pass         Septimine activate the number of the occupant using the zone schedule, place the unit into unoccupied mode.         Pass         Septimine are adjustable           10         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           11         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           12         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           13         Verify the chains goate temperature segont in SOF [dd]         Pass         Septimines are adjustable           14         Verify the chains goate temperature segont is 70° [dd]         Pass         Occupancy Override is 1 hour and Adjustable           14         Werify the heat goang temperature segont is 70° [dd]         Pass         Pass           15         Mort the unoccupied mode. </td <td>3</td> <td>Verify the outdoor air condensing unit has an electrical disconnect</td> <td></td> <td>Pass</td> <td></td>	3	Verify the outdoor air condensing unit has an electrical disconnect		Pass	
Second the standard securely.         Pass           Verify the heat pump has an electrical disconnect.         Pass           Verify there is no damage to the heat pump.         Pass           Second motion description of the standard at the BAS.         Pass           Verify there is no damage to the heat pump.         Pass           Second motion description can be changed by the occupant using the rone sensor.         (+ 3) Deg E           10 interception description can be changed from the Graphic transmittion of the schedule, place the unit to unoccupied mode.         Pass           12 light the time schedule, place the unit into unoccupied mode.         Pass         Second motion schedule, place the unit is not operating.           13 loccupied Mode         Pass         Second motion schedule, place the unit is not operating.         Pass           14 Merify the colloging acceleroperature seption tits 30° (adj.)         Pass         Cocupancy Override is 1 hour and Adjustable           10 Record the time the unoccupied overide control is programmed to override in occupant overfice control to place the matery to and coupant overfice control is programmed to override in occupant overfice control to place the matery elevel.         Pass           10 were the the standard place themperature seption to 77 (adj.)         Pass         Pass           10 were the the standard place themperature seption to 77 (adj.)         Pass         Pass           10 were the the standard place themene th	4				
Verify the bar punct has an electrical disconnect.         Pass           7 Verify there is a drange to the heat puncy.         Pass           8 Contro discharge ar temperature is inflicated at the BAS.         Pass           9 Verify heating and cooling setpoints can be changed by the occupat using the zero sensor.         Pass           10 Unccupied Mode         Pass           11 Unccupied Mode         Pass           12 Verify the heating space temperature setpoint is 55° [4d])         Pass           14 Verify the colling space temperature setpoint is 55° [4d])         Pass           15 Verify the heating space temperature setpoint is 55° [4d])         Pass           16 Verify the heating space temperature setpoint is 75° [4d])         Pass           17 Neoropheat mode by the occupied mode.         Pass           18 Verify the occupied override control to practing.         Pass           19 Neoropheat mode by the occupied mode.         Pass           10 Neor					
Verify there is no damage to the heat pump.         Pass         Index container and there are the action of the ac					
8     Contin discharge air temperature is indicated at the BAS.     Pass     In classroom user has (+) 3 Deg?       9     Verify heating and cooling setpoints can be changed by the occupant using the isone sensor.     Pass     Setpoints are adjustable       11     Onecupied Mode     Pass     Setpoints are adjustable       12     Using the time schedule. Jpace the unit into unccupied mode.     Pass     Setpoints are adjustable       13     Verify the bating space temperature setpoint is SPT (ad).     Pass     Setpoints are adjustable       14     Verify the outdoor air condensity units not operating.     Pass     Setpoints are adjustable       14     Verify the outdoor air condensity units not operating.     Pass     Occupient Voerride is 1 hour and Adjustable       17     Record the time the unccupied overide control is programmed to overide in control upface the unit into occupied mode.     Pass     Occupient Voerride is 1 hour and Adjustable       18     Retrify the heat pump starts, the fan is on, and the outdoor air damper forms appreciation is yo? For (adj.)     Pass     Pass       13     Verify the outgo space temperature setpoint is SPT (adj.)     Pass     Pass       20     Verify the outgo space temperature setpoint is OPT (adj.)     Pass       21     Verify the outgo space temperature setpoint is OPT (adj.)     Pass       23     Occupied Mode     Pass       24     Verify the out		, , ,			
9         Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.         in classroom user has (+-3) Deg. Pass         in classroom user has (+-3) Deg. Werify the schedule, place the unit into unoccupied mode.         Pass         Setpoints are adjustable           12         Using the time schedule, place the unit into unoccupied mode.         Pass         Setpoints are adjustable           13         Verify the basing space temperature setpoint is SPF (adj.)         Pass         Setpoints are adjustable           14         Verify the outdoor air condensing unit is not operating.         Pass         Setpoints are adjustable           14         Verify the base tump faits of and the outdoor air damper is closed.         Pass         Setpoints are adjustable           15         Unoccupied Override         Pass         Setpoints are adjustable         Adjustable           16         Unoccupied override control to place the unit lino occupied mode.         Pass         Adjustable           16         Nortex the heating space temperature setpoint is 72°F (adj.)         Pass         Pass           10         Verify the heating space temperature setpoint is 72°F (adj.)         Pass         Setpoints are adjustable           20         Verify the heating space temperature setpoint is 72°F (adj.)         Pass         Setpoints are adjustable           21         Veriffy the heating space temperature set					
12     Set points are adjustable     Pass     Set points are adjustable       13     Verify the bating space temperature setpoint is 80° (adj.)     Pass     Setpoints are adjustable       14     Verify the bate pump fain is off aft the outdoor all damper is closed.     Pass     Setpoints are adjustable       14     Verify the bate pump fain is off aft the outdoor all damper is closed.     Pass     Setpoints are adjustable       15     Verify the bate pump fain is off aft the outdoor all concepted downlde     Pass     Occupancy Override is 1 hour and Adjustable       17     Record the time the unoccupied overlde control to place the unit into occupied mode.     Pass     Occupancy Override is 1 hour and Adjustable       18     Mixtave the occupant override control to place the unit into occupied mode.     Pass     Pass       19     Verify the heat pump patris, the fain is on, and the outdoor all damper operature setpoint is 70°F (adj.)     Pass     Pass       20     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Pass       21     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Pass       23     Occupied Mode     Pass     Pass     Pass       24     Mart the unoccupied overlative setpoint is 70°F (adj.)     Pass     Pass       25     Verify the heating space temperature setpoints 20°F (adj.)     Pass     Setpoints are adjustable		Verify heating and cooling setpoints can be changed by the occupant	(+- 3) Deg F		warm cool adj setpoint can be
13     Verify the batting space temperature sequent is SPT (adj.)     Pass     Setpoints are adjustable       14     Verify the outdoor air condensing unit is not operating.     Pass     Setpoints are adjustable       14     Verify the outdoor air condensing unit is not operating.     Pass     Setpoints are adjustable       15     Uncorcupied Override     Pass     Occupancy Override is 1 hour and Adjustable       16     Uncorcupied Override control to piace the unit into occupied overide control to piace the unit into occupied     Pass     Occupancy Override is 1 hour and Adjustable       18     Activate the occupant override control to piace the unit into occupied     Pass     Pass     Image       18     Activate the occupant override control to piace the unit into occupied     Pass     Pass     Image       19     Verify the heats gave temperature setpoint is 70°F (adj.)     Pass     Image     Image       20     Verify the heats gave temperature setpoint is 70°F (adj.)     Pass     Image     Image       21     Verify the heat gave temperature setpoint is 70°F (adj.)     Pass     Image     Image       21     Cocupand Mode     Pass     Image     Image     Image       21     Cocupand Mode     Pass     Image     Image     Image       21     Verify the heat gave temperature setpoint is 70°F (adj.)     Pass     Image	11	Unoccupied Mode			
14     Verify the cooling space temperature settoom is 80°F (ad).     Pass     Settor the heat pump fain is of and the outdoor air damper is closed.       15     Verify the heat pump fain is of and the outdoor air damper is closed.     Pass     Occupancy Override is 1 hour and Adjustable       16     Unoccupied Override     Pass     Occupancy Override is 1 hour and Adjustable       17     Record the time the unoccupied overide control is programmed to override in accupied mode before returning to unoccupied mode.     Pass     Occupancy Override is 1 hour and Adjustable       18     McWare the occupant override control to place the unit into occupied mode.     Pass     Pass       19     Verify the heat pump starts, the fan is on, and the outdoor air damper in the onccupied override control timer has expired, verify the init returns to unoccupied mode.     Pass       20     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Pass       21     Verify the conling space temperature setpoint is 70°F (adj.)     Pass     Pass       23     Occupied Mode     Pass     Pass       24     Verify the conling space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       26     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       26	12	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
Werly the heat pump fan is off and the outdoor air damper is closed.         Pass         Coccupancy Override is 1 hour and Pass           16         Unoccupied Override         Doccupancy Override is 1 hour and Pass         Adjustable           17         Record the time the unoccupied overide control is programmed to override in accupied mode.         Pass         Doccupancy Override is 1 hour and Pass           18         Activate the corcupant override control to proceed the unit into occupied mode.         Pass         Doccupancy Override is 1 hour and Pass           19         Overrig the heating space temperature setpoint is 72°F (adj.)         Pass         Doccupancy Override is 1 hour and Pass           20         Verify the heating space temperature setpoint is 72°F (adj.)         Pass         Pass           21         Verify the heating space temperature setpoint is 70°F (adj.)         Pass         Pass           24         Using the time schedule, place the unit into occupied mode.         Pass         Pass           24         Using the time schedule, place the unit into occupied mode.         Pass         Setpoints are adjustable           25         Verify the heat pump starts, the fan is on, and the outdoor air damper opers.         Pass         Setpoints are adjustable           26         Verify the case pump starts, the fan is on, and the outdoor air damper opers.         Pass         Setpoints are adjustable	13	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
Jower of the cutdor air condensing unit is not operating.         Pass           16         Unaccupied Override         Cacupancy Override is 1 hour and Adjustable           17         Record the time the unaccupied override control is programmed to override in accupied mode before returning to unaccupied mode.         Pass           18         Microsoft in accupied mode before returning to unaccupied mode.         Pass           19         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           19         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           20         Verify the colling space temperture setpoint is 70°F (adj.)         Pass           21         Verify the noting space temperture setpoint is 70°F (adj.)         Pass           23         Occupied Mode         Pass           24         Using the time schedule, place the unit into occupied mode.         Pass           25         Verify the heating space temperature setpoint is 70°F (adj.)         Pass           26         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           27         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           27         Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass <t< td=""><td>14</td><td>Verify the cooling space temperature setpoint is 80°F (adj.)</td><td></td><td>Pass</td><td>Setpoints are adjustable</td></t<>	14	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
17       Record the time the unoccupied overide control is programmed to override in occupied mode.       Pass       Occupancy Override is 1 hour and Adjustable         18       Retivate the occupant override control to place the unit into occupied mode.       Pass       Pass         19       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Pass         20       Verify the heating space temperature setpoint is 70°F (adj).       Pass       Pass         21       Verify the neating space temperature setpoint is 70°F (adj).       Pass       Pass         21       Verify the coling space temperature setpoint is 70°F (adj).       Pass       Pass         23       Occupaed Mode       Pass       Pass       Pass         24       Using the time schedule, place the unit into occupied mode.       Pass       Pass       Pass         25       Verify the heating space temperature setpoint is 70°F (adj).       Pass       Pass       Pass         26       Verify the heating space temperature setpoint is 72°F (adj.)       Pass       Pass       Pass         27       Verify the heating space temperature setpoints (difference between space temperature setpoints (difference between space temperature and space temperature setpoints.       NA       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature setpo		Verify the outdoor air condensing unit is not operating.		Pass	
17     Record the time the unoccupied orde control is programmed to override in occupied mode before returning to unoccupied mode.     Pass     Adjustable       18     Activate the occupant override control to place the unit into occupied opens.     Pass     Pass       19     opens.     Pass     Pass       20     Verify the heating space temperature setpoint is 70°F (adj).     Pass     Pass       21     Verify the heating space temperature setpoint is 70°F (adj).     Pass     Pass       22     After the unoccupied override control timer has expired, verify the unit returns to unoccupied mode.     Pass     Pass       23     Occupied Mode     Pass     Pass       24     Using the time schedule, place the unit into occupied mode.     Pass       25     Verify the heating space temperature setpoint is 70°F (adj).     Pass       26     Verify the neating space temperature setpoint is 72°F (adj).     Pass       27     Verify the heating space temperature setpoints is 72°F (adj).     Pass       28     Ran Speed     Pass       29     Record the Couling space temperature setpoints.     Pass       20     Record the Couling space temperature setpoints.     Pass       21     Verify the heating space temperature setpoints.     Pass       20     Record the Couling space temperature setpoints.     Pass       21     <	16	Unoccupied Override			
18     mode.     Pass       19     Verify the heat pump starts, the fan is on, and the outdoor air damper apens.     Pass       20     Verify the heat pump starts, the fan is on, and the outdoor air damper apens.     Pass       21     Verify the heat pump starts, the fan is on, and the outdoor air damper unit returns to unoccupied override control timer has expired, verify the unit returns to unoccupied mode.     Pass       23     Occupied Mode     Pass       24     Using the time schedule, place the unit into occupied mode.     Pass       25     Verify the heating space temperature setpoint is 72°F (adj.)     Pass       26     Verify the heating space temperature setpoint is 72°F (adj.)     Pass       27     Verify the heating space temperature setpoint is 72°F (adj.)     Pass       28     Fan Speed     Pass       29     Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       29     Record the Headium Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       30     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       31     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       31     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).	17	override in occupied mode before returning to unoccupied mode.		Pass	
mode.         Pass           Worlfy the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           20 Verify the heating space temperature setpoint is 72°F (adj.)         Pass           21 Verify the cooling space temperature setpoint is 72°F (adj.)         Pass           22 Verify the cooling space temperature setpoint is 72°F (adj.)         Pass           23 Occupied Mode         Pass           24 Using the time schedule, place the unit into occupied mode.         Pass           25 Verify the heating space temperature setpoint is 70°F (adj.)         Pass           26 Verify the cooling space temperature setpoint is 70°F (adj.)         Pass           27 Verify the heat pump starts, the fan is on, and the outdoor air damper opens.         Pass           28 Fan Speed         Pass           29 Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).         NA           30 Record the Hodium Fan Speed setpoints (difference between space temperature and space temperature setpoint).         NA           31 Record the Hodium Fan Speed setpoint (difference between space temperature and space temperature setpoints).         NA           31 Record the Hodium Fan Speed setpoint (difference between space temperature and space temperature setpoint).         NA           32 Record the user defined (adj.) minimum runtime currently entered for thetemperature setpoint back to normal.         NA	18	Activate the occupant override control to place the unit into occupied			
13     pens.     Pass       20     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       21     Verify the cooling space temperature setpoint is 72°F (ad).)     Pass       23     Occupied overide control timer has expired, verify the unit returns to unoccupied mode.     Pass       24     Using the time schedule, place the unit ho occupied mode.     Pass       25     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       26     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       27     opens.     Pass       28     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       29     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       20     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       20     Verify the heating space temperature setpoint is 72°F (ad).)     Pass       21     Verify the heating space temperature setpoints (difference between space     Pass       21     Pass of the low Fan Speed setpoints (difference between space     NA       30     Record the Medium Fan Speed setpoints (difference between space     Fan is 2 speed controlled internally       31     Record the ligh Fan Speed setpoints (difference between space     NA       32     Test the low, medium, and high fan speeds by overriding the space     NA <td>10</td> <td>mode.</td> <td></td> <td>Pass</td> <td></td>	10	mode.		Pass	
21       Verify the cooling space temperature setpoint is 72° (adj.)       Pass         22       After the unoccupied overide control timer has expired, verify the unit returns to unoccupied mode.       Pass         23       Occupied Mode       Pass         24       Using the time schedule, place the unit into occupied mode.       Pass         25       Verify the heating space temperature setpoint is 70°F (adj.)       Pass         26       Verify the heating space temperature setpoint is 72°F (adj.)       Pass         27       Verify the heating space temperature setpoint is 72°F (adj.)       Pass         28       Fan Speed       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature setpoint).       NA         20       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         30       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         32       Test the low, medium, and high an speeds by overriding the space temperature and space temperature setpoint.       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint.       NA	19			Pass	
After the unoccupied override control timer has expired, verify the unit returns to unoccupied mode.       Pass         21       Occupied Mode       Pass         23       Occupied Mode       Pass         24       Using the time schedule, place the unit into occupied mode.       Pass         25       Verify the heating space temperature setpoint is 70°F (adj.)       Pass         26       Verify the heating space temperature setpoint is 70°F (adj.)       Pass         27       Verify the heating space temperature setpoint is 70°F (adj.)       Pass         28       Verify the heating space temperature setpoint is 70°F (adj.)       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint to act to normal.       NA         33       Record the user defined (adj.) minimum rutime currently entered for the compressor.       NA         34       Compressor Minimum Rutime       OA supplied by DOAS and is conditioned         35       Record the us	20	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
22     unit returns to unoccupied mode.     Pass       23     Occupied Mode     Pass       24     Using the time schedule, place the unit into occupied mode.     Pass       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       26     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       27     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       28     Verify the heating space temperature setpoint is 70°F (adj.)     Pass       29     Record the Low Fan Speed setpoints (difference between space temperature setpoint).     Pass       20     Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).     Fan is 2 speed controlled internally by trane ECM       30     Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       31     Record the user defined (adj.) minimum runtime currently entered for the user defined (adj.) minimum runtime currently entered for the cuser defined (adj.) minimum runtime currently entered for the cuser defined (adj.) minimum runtime currently entered for the congressor.     Oka supplied by DOAS and is conditioned       33     Return the space temperature sensor to be factory mounted.     Pass       34     temperature (55°F. Note: Outdoor air temperature sensor to be factory mounted.     Pass       35     temperature (55°F. Note: Outdoor air temperature sensor to be facto	21	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
unit returns to unoccupied mode.     Pass       23     Occupied Mode     Pass       24     Using the time schedule, place the unit into occupied mode.     Pass       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       26     Verify the heat pump starts, the fan is on, and the outdoor air damper opens.     Pass     Setpoints are adjustable       27     Verify the heat pump starts, the fan is on, and the outdoor air damper opens.     Pass     Setpoints are adjustable       29     Record the Low Fan Speed setpoints (difference between space temperature setpoint).     NA     Image: Controlled internally by trans ECM       30     Record the High Fan Speed setpoints (difference between space temperature setpoint).     NA     Fan is 2 speed controlled internally by trans ECM       31     Record the High Fan Speed setpoints (difference between space temperature setpoint).     NA     Setpoints are ECM       31     Record the High Fan Speed setpoints (difference between space temperature setpoint).     NA     Setpoints are ECM       32     Test the low, medium, and high fan speeds by overriding the space temperature setpoint by the values listed above.     NA     Setpoints are adjustable       33     Return the space temperature setpoint (other conce between space temperature setpoints)     NA     Setpoints are adjustable       34     Compressor Minimum Runtime     Comperssor     <		After the unoccupied override control timer has expired, verify the			
24     Using the time schedule, place the unit into occupied mode.     Pass     Setpoints are adjustable       25     Verify the heating space temperature setpoint is 70°F (adj.)     Pass     Setpoints are adjustable       26     Verify the heat pump starts, the fan is on, and the outdoor air damper opens.     Pass     Setpoints are adjustable       27     Verify the heat pump starts, the fan is on, and the outdoor air damper opens.     Pass     Setpoints are adjustable       28     Fan Speed     Pass     Pass     Setpoints are adjustable       29     Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA     Fan is 2 speed controlled internally by trane ECM       30     Record the High Fan Speed setpoints (difference between space temperature setpoint).     NA     NA       31     Record the Jigh Fan Speed setpoints (difference between space temperature and space temperature setpoint).     NA       32     Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.     NA       32     Compressor Minimum Runtime     NA     Setopoints are adjustable       34     Compressor.     Zer of the user defined (adj.) minimum runtime currently entered for the compressor.     NA       34     Compressor.     Zer of the user defined and cooling is disabled if outdoor air temperature sensor to be factory mounted.     Pass       37	22	unit returns to unoccupied mode.		Pass	
25       Verify the heating space temperature setpoint is 72°F (adj.)       Pass       Setpoints are adjustable         26       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Setpoints are adjustable         27       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Pass         28       Fan Speed       Pass       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       Fan is 2 speed controlled internally by trane ECM         30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA         34       Compressor Minimum Runtime       2       2         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2       2         36       Heating & Cooling       2       2       0A supplied by DOAS and is conditioned	23			Pass	
25       Verify the heating space temperature setpoint is 72°F (adj.)       Pass       Setpoints are adjustable         26       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Setpoints are adjustable         27       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Pass         28       Fan Speed       Pass       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       Fan is 2 speed controlled internally by trane ECM         30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA         34       Compressor Minimum Runtime       2       2         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2       2         36       Heating & Cooling       2       2       0A supplied by DOAS and is conditioned	24	Using the time schedule, place the unit into occupied mode.		Pass	
26       Verify the cooling space temperature setpoint is 72°F (adj.)       Pass       Setpoints are adjustable         27       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass       Setpoints are adjustable         28       Fan Speed       Pass       Pass       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature setpoint).       NA       Fan is 2 speed controlled internally by trane ECM         30       temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature as to pace temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA         32       Test the low reference (adj.) minimum runtime currently entered for the compressor.       NA       NA         34       Compressor Minimum Runtime       2       2       2       2       2       2       2       2       2       1       0 A supplied by DOAS and is conditioned       2       2       2       2       2       1       0 A supplied by DOAS and is conditioned       2       2       2       1       0 A supplied by DOAS and is conditioned       2       2       2       2       1				Pass	Setpoints are adjustable
7       Verify the heat pump starts, the fan is on, and the outdoor air damper opens.       Pass         28       Fan Speed       Pass         29       Record the Low Fan Speed setpoints (difference between space temperature setpoint).       NA         30       Record the Medium Fan Speed setpoints (difference between space temperature as the pace temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints but he values listed above.       NA         32       Test the low, medium, and high fan speeds to overriding the space temperature setpoints back to normal.       NA         33       Return the space temperature setpoint is a field above.       NA         34       Compressor Minimum Runtime       2         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2       2         36       Heating & Cooling is enabled and cooling is disabled if outdoor air       2       2         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.				Pass	Setpoints are adjustable
28       Fan Speed       Image: Constraint of the Con	27			Pass	
29       Record the Low Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         30       Record the Medium Fan Speed setpoints (difference between space temperature setpoint).       Fan is 2 speed controlled internally by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       2         35       Heating & Cooling is enabled and cooling is disabled if outdoor air       2min on time 5min off minnimum         36       Heating is enabled and cooling is disabled if outdoor air       2         37       temperature s of 5 ^r . Note: Outdoor air temperature sensor to be factory mounted.       Pass       0A supplied by DOAS and is conditioned         38       temperature is of 5 ^r ^r . Note: Outdoor air temperature sensor to be factory mounted.       Pass       0A supplied by DOAS and is conditioned         39       Heating        Heating       Had to force heating by overridding         39       Heati	28				
129       temperature and space temperature setpoint).       NA         30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       by trane ECM         32       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoint back to normal.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA       Image: Space Set Set Set Set Set Set Set Set Set Se					
30       Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).       Fan is 2 speed controlled internally by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA       SetUP         34       Compressor Minimum Runtime       Zmin on time Smin off minnimum       Pass       SetUP         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       Zmin on time Smin off minnimum       Pass       OA supplied by DOAS and is conditioned         37       temperature setS [*] F. Note: Outdoor air temperature sensor to be factory mounted.       Pass       OA supplied by DOAS and is conditioned         38       temperature is > 65°F. Note: Outdoor air temperature sensor to be factory mounted.       Pass       OA supplied by DOAS and is conditioned         39       Heating       Meating       Had to force heating by overridding         39       Heating       Ma       Mad to force heating by overriddi	29			NA	
30       temperature and space temperature setpoint).       NA       by trane ECM         31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA       NA         31       Record the High Fan Speed setpoints (difference between space temperature setpoint).       NA       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA       NA         33       Return the space temperature setpoint back to normal.       NA       NA         34       Compressor Minimum Runtime       Record the user defined (adj.) minimum runtime currently entered for the compressor.       Zmin on time Smin off minimum       Pass         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       OA supplied by DOAS and is conditioned         36       Heating & Cooling       OA supplied of outdoor air       Pass       OA supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					Fan is 2 speed controlled internally
31       Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       NA         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       Zmin on time 5min off minimum         36       Heating & Cooling       OA supplied by DOAS and is conditioned factory mounted.         37       temperature sets of is enabled and heating is disabled if outdoor air temperature sensor to be factory mounted.       OA supplied by DOAS and is conditioned factory mounted.         38       Verify the cooling is enabled and heating is disabled if outdoor air temperature sensor to be factory mounted.       OA supplied by DOAS and is conditioned factory mounted.         39       Heating       OA supplied by DOAS and is conditioned factory mounted.       Pass         39       Heating       Heating mode is enabled based on outdoor air temperature.       Pass         40       Verify the heating mode is enabled based on outdoor air temperature.       Pass       Had to force heating by overridding Outside Air         41       Override the zone heating setpoint to a temperature above the       Pass       Had to force hea	30			NA	
31       temperature and space temperature setpoint).       NA         32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       NA         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       NA         36       Heating & Cooling       Zmin on time Smin off minnimum         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					
32       Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       NA         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2min on time 5min off minnimum       Pass         36       Heating & Cooling       OA supplied by DOAS and is conditioned       conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	31			NA	
temperature setpoints by the values listed above.       NA         33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       NA         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       NA         36       Heating & Cooling       Pass         37       the compressor.       2min on time 5min off minnimum       Pass         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					
33       Return the space temperature setpoint back to normal.       NA         34       Compressor Minimum Runtime       2         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2min on time 5min off minnimum         36       Heating & Cooling       2         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	32			NA	
34       Compressor Minimum Runtime       2min on time 5min off minnimum       Pass         35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2min on time 5min off minnimum       Pass         36       Heating & Cooling       2min on time 5min off minnimum       Pass         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	33				
35       Record the user defined (adj.) minimum runtime currently entered for the compressor.       2min on time 5min off minnimum       Pass         36       Heating & Cooling       2min on time 5min off minnimum       Pass         36       Heating & Cooling       0A supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					
36       Heating & Cooling       OA supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	35		2min on time 5min off minnimum	Pass	
Verify heating is enabled and cooling is disabled if outdoor air       OA supplied by DOAS and is conditioned         37       temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.	36				
37     temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.					OA supplied by DOAS and is
Verify the cooling is enabled and heating is disabled if outdoor air       OA supplied by DOAS and is conditioned         38       temperature is > 65°F. Note: Outdoor air temperature sensor to be factory mounted.       Pass         39       Heating       Had to force heating by overridding Outside Air         40       Verify the heating mode is enabled based on outdoor air temperature.       Pass         41       Override the zone heating setpoint to a temperature above the       Outside Air	37	temperature < 65°F. Note: Outdoor air temperature sensor to be		Pass	
38     temperature is > 65°F. Note: Outdoor air temperature sensor to be factory mounted.     conditioned       39     Heating     Pass       40     Verify the heating mode is enabled based on outdoor air temperature.     Pass       41     Override the zone heating setpoint to a temperature above the     Unit of the zone heating setpoint to a temperature above the		,			OA supplied by DOAS and is
factory mounted.     Pass       39     Heating     Image: Constraint of the section of the	38				
39     Heating     Had to force heating by overridding       40     Verify the heating mode is enabled based on outdoor air temperature.     Pass     Had to force heating by overridding Outside Air       41     Override the zone heating setpoint to a temperature above the     Pass     Outside Air	- 50			Pacc	Contantioned
40     Verify the heating mode is enabled based on outdoor air temperature.     Pass     Had to force heating by overridding Outside Air       41     Override the zone heating setpoint to a temperature above the     Pass     Outside Air	30	,		1 000	
4		Verify the heating mode is enabled based on outdoor air temperature.		Pass	
	41			Pass	

	Marif, the bast summer is in basting made but he discharge sin			
12	Verify the heat pump is in heating mode by the discharge air			
42	temperature. Verify the outdoor air condensing unit is operating and discharging cool air.	176 0DogE	Pass	DOAS supplying 65 Dogroo Air
	Remove the override on the zone heating setpoint and let the heat	176.9DegF	FdSS	DOAS supplying 65 Degree Air
43	pump return to normal operation.		Pass	
44	Cooling		1 435	
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 72.1 DegF		
46	space temperature.		Pass	
	Verify the heat pump is in cooling mode by the discharge air			
47	temperature. Verify the outdoor air condensing unit is operating and			
	discharging warm air.	52DegF	Pass	
40	Remove the override on the zone cooling setpoint and let the heat	-		
48	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
50	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and			
	verify there is an alarm sent to the BAS.		Pass	
52	Place the high zone air temperature alarm setpoint back to its original			
	setpoint. Verify the alarm clears at the BAS.		Pass	
53				alarm is configured as a deviation
	Record the low zone air temperature alarm setpoint		pass	from zone setpoint +- 10Deg
<u>-</u> -	Test the low zone air temperature alarm by changing the setpoint			
54	value to a temperature above the current space temperature and			
	verify there is an alarm sent to the BAS.		pass	
55	Place the low zone air temperature alarm setpoint back to its original			
	setpoint. Verify the alarm clears at the BAS.		pass	
50	Tast the factor states and used, the use's should aff and these is an along			
56	Test the freeze stat and verify the unit shuts off and there is an alarm		Dass	Tested by raising the freeze
	sent to the BAS.		Pass	temperature locally on the device
57	Verify the smoke detector is wired to shut down the heat pump upon activation.		NA	Tostad as part of EA system
	Record the heat pump "Compressor Runtime Exceeded" alarm		NA	Tested as part of FA system
58	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by		INA .	not compared
59	overriding the timer to a value less than its current value. Verify there			
55	is an alarm received at the BAS.		NA	not configured
	Put the compressor runtime exceeded alarm setpoint back to its			not compared
60	previous value. Verify the alarm clears at the BAS.		NA	not configured
				Value is alarmed by a deviation from
61	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
62	Test the low discharge air temperature alarm by changing the setpoint			
	value to a temperature above the current discharge temperature.		Pass	
63	Verify an alarm is sent to the BAS		Pass	
64	Restore the low discharge air temperature alarm setpoint to its original			
04	value. Verify the alarm clears at the BAS.		Pass	
65				Value is alarmed by a deviation from
05	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
_	Test the high discharge air temperature alarm by changing the			
66	setpoint value to a temperature below the current discharge			
	temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its			
	original value. Verify the alarm clears at the BAS.		Pass	-
69	Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		NA	not configured
	Verify the operating of the fan runtime exceeded alarm by overriding			
70	the timer to a value less than its current value. Verify there is an alarm			
	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous			not configured
	value. Verify the alarm clears at the BAS.		NA	not configured
72	Test the "Fan Failure" alarm by commanding the heat pump on using		Dece	
77	the time schedule and then shut the fan off.		Pass	
	Verify there is an alarm sent to the BAS.		Pass	
74	Restore the fan operation. Verify the alarm clears at the BAS. Test the "Fan in Hand" alarm by commanding the heat pump off using	<u> </u>	Pass	+
75	the time schedule and then manually start the heat pump off using		NIA	not configured
76	Verify there is an alarm sent to the BAS.		NA NA	
	venity there is all alarm sent to the DAS.		INA	

77	Put the heat pump back into automatic operation. Verify the alarm	_	
	clears at the BAS.	Pass	
			Units have a sensor in the Pan.
78	Verify a condensate overflow alarm is not required. It did not appear		Contractor to add condensate alarm
	to be in the documentation.		
70	Put the schedule back to its original values, remove all overrides, and		
79	put the unit back into normal operation.	Pass	
****	******END FUNCTIONAL CHECKS********		

#### Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-7, IDU-7 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
2	Verify the outdoor air condensing unit is mounted securely.		Pass	
3			Data	
	Verify the outdoor air condensing unit has an electrical disconnect. Verify there is no damage to the outdoor air condensing unit.		Pass Pass	
	Verify the heat pump is mounted securely.		Pass	
	Verify the heat pumpt has an electrical disconnect.		Pass	
	Verify there is no damage to the heat pump.		Pass	
	Confirm discharge air temperature is indicated at the BAS.		Pass	
9	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
	Unoccupied Mode			
	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override			
	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode.		Pass	Occupancy Override is 1 hour and Adjustable
18	Activate the occupant override control to place the unit into occupied mode.		Pass	
19	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
	After the unoccupied override control timer has expired, verify the			
,,,	unit returns to unoccupied mode.		Pass	
	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
25	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
20	Record the Low Fan Speed setpoints (difference between space			
79	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).		NA	Fan is 2 speed controlled internally by trane ECM
	Record the High Fan Speed setpoints (difference between space		NA	by traile Leivi
31	temperature and space temperature setpoint).		NA	
32	Test the low, medium, and high fan speeds by overriding the space			
	temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal.		NA	
35	Compressor Minimum Runtime Record the user defined (adj.) minimum runtime currently entered for			
1	the compressor.	2min on time 5min off minnimum	Pass	
	Heating & Cooling			
37 1	Verify heating is enabled and cooling is disabled if outdoor air temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	OA supplied by DOAS and is conditioned
	Verify the cooling is enabled and heating is disabled if outdoor air			OA supplied by DOAS and is
38 1	temperature is > 65°F. Note: Outdoor air temperature sensor to be			conditioned
	factory mounted.		Pass	
39	Heating			
	Verify the heating mode is enabled based on outdoor air temperature.		Pass	Had to force heating by overridding Outside Air
41	Override the zone heating setpoint to a temperature above the current space temperature.		Pass	

	Varify the best nump is in besting mode by the discharge siz	1		
42	Verify the heat pump is in heating mode by the discharge air			
42	temperature. Verify the outdoor air condensing unit is operating and discharging cool air.	112 26 DogE	Pass	DOAS supplying 65 Dogroo Air
	Remove the override on the zone heating setpoint and let the heat	113.36 DegF	Fass	DOAS supplying 65Degree Air
43	pump return to normal operation.		Pass	
44	Cooling		F d 3 3	
	coomb			
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 71.1 DegF		
46	space temperature.		Pass	
	Verify the heat pump is in cooling mode by the discharge air			
47	temperature. Verify the outdoor air condensing unit is operating and			
	discharging warm air.	52DegF	Pass	
48	Remove the override on the zone cooling setpoint and let the heat			
40	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and		-	
	verify there is an alarm sent to the BAS.		Pass	
52	Place the high zone air temperature alarm setpoint back to its original		Dees	
	setpoint. Verify the alarm clears at the BAS.		Pass	alarm is configured as a deviation
53	Record the low zone air temperature alarm setpoint		Date	from zone setpoint +- 10Deg
	Test the low zone air temperature alarm by changing the setpoint		pass	Tested by raising the freeze
5/	value to a temperature above the current space temperature and			temperature locally on the device.
54	verify there is an alarm sent to the BAS.		pass	Freeze Stat is hardwired and stuts
	Place the low zone air temperature alarm setpoint back to its original		puss	
55	setpoint. Verify the alarm clears at the BAS.		pass	
			pubb	
56	Test the freeze stat and verify the unit shuts off and there is an alarm			Tested by raising the freeze
	sent to the BAS.		Pass	temperature locally on the device
	Verify the smoke detector is wired to shut down the heat pump upon			
57	activation.		NA	Tested as part of FA system
<b>F</b> 0	Record the heat pump "Compressor Runtime Exceeded" alarm			
58	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			
59	overriding the timer to a value less than its current value. Verify there			
	is an alarm received at the BAS.		NA	not configured
60	Put the compressor runtime exceeded alarm setpoint back to its			
	previous value. Verify the alarm clears at the BAS.		NA	not configured
61			-	Value is alarmed by a deviation fro
	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
62	Test the low discharge air temperature alarm by changing the setpoint			
02	value to a temperature above the current discharge temperature.		Pass	
63	Verify an alarm is sent to the BAS		Pass	
	Restore the low discharge air temperature alarm setpoint to its original		1 435	
64	value. Verify the alarm clears at the BAS.		Pass	
<i>c</i>	,			Value is alarmed by a deviation from
65	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the			
66	setpoint value to a temperature below the current discharge			
	temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its			
	original value. Verify the alarm clears at the BAS.		Pass	
69	Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		NA	not configured
	Verify the operating of the fan runtime exceeded alarm by overriding			
70	the timer to a value less than its current value. Verify there is an alarm			
	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous			
_	value. Verify the alarm clears at the BAS.		NA	not configured
72	Test the "Fan Failure" alarm by commanding the heat pump on using		5	
	the time schedule and then shut the fan off.		Pass	
	Verify there is an alarm sent to the BAS.		Pass	
/4	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
75	Test the "Fan in Hand" alarm by commanding the heat pump off using		N1 A	not configured
	the time schedule and then manually start the heat pump.		NA	not configured
70	Verify there is an alarm sent to the BAS.		NA	

77	Put the heat pump back into automatic operation. Verify the alarm	_	
	clears at the BAS.	Pass	
			Units have a sensor in the Pan.
78	Verify a condensate overflow alarm is not required. It did not appear		Contractor to add condensate alarm
	to be in the documentation.		
70	Put the schedule back to its original values, remove all overrides, and		
19	put the unit back into normal operation.	Pass	
****	******END FUNCTIONAL CHECKS********		

#### Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-8, IDU-8 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
2	Verify the outdoor air condensing unit is mounted securely.		Pass	
3			Data	
	Verify the outdoor air condensing unit has an electrical disconnect. Verify there is no damage to the outdoor air condensing unit.		Pass Pass	
	Verify the heat pump is mounted securely.		Pass	
	Verify the heat pumpt has an electrical disconnect.		Pass	
	Verify there is no damage to the heat pump.		Pass	
	Confirm discharge air temperature is indicated at the BAS.		Pass	
9	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
	Unoccupied Mode			
	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override			
	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode.		Pass	Occupancy Override is 1 hour and Adjustable
18	Activate the occupant override control to place the unit into occupied mode.		Pass	
19	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
	After the unoccupied override control timer has expired, verify the			
,,,	unit returns to unoccupied mode.		Pass	
	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
25	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
20	Record the Low Fan Speed setpoints (difference between space			
79	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).		NA	Fan is 2 speed controlled internally by trane ECM
	Record the High Fan Speed setpoints (difference between space		NA	by traile Leivi
31	temperature and space temperature setpoint).		NA	
32	Test the low, medium, and high fan speeds by overriding the space			
	temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal.		NA	
35	Compressor Minimum Runtime Record the user defined (adj.) minimum runtime currently entered for			
1	the compressor.	2min on time 5min off minnimum	Pass	
	Heating & Cooling			
37 1	Verify heating is enabled and cooling is disabled if outdoor air temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	OA supplied by DOAS and is conditioned
	Verify the cooling is enabled and heating is disabled if outdoor air			OA supplied by DOAS and is
38 1	temperature is > 65°F. Note: Outdoor air temperature sensor to be			conditioned
	factory mounted.		Pass	
39	Heating			
	Verify the heating mode is enabled based on outdoor air temperature.		Pass	Had to force heating by overridding Outside Air
41	Override the zone heating setpoint to a temperature above the current space temperature.		Pass	

12	Verify the heat pump is in heating mode by the discharge air			
42	temperature. Verify the outdoor air condensing unit is operating and			
	discharging cool air.	189.1 DegF	Pass	DOAS supplying 65Degree Air
43	Remove the override on the zone heating setpoint and let the heat			
	pump return to normal operation.		Pass	
44	Cooling			
45			Dees	
	Verify the cooling mode is enabled based on outdoor air temperature. Override the zone cooling setpoint to a temperature below the current	Zono Tomporaturo 72 1 Dog	Pass	
46	space temperature.	Zone Temperature 72.1 Degr	Pass	
	Verify the heat pump is in cooling mode by the discharge air		1 435	
47	temperature. Verify the outdoor air condensing unit is operating and			
	discharging warm air.	50.3DegF	Pass	
40	Remove the override on the zone cooling setpoint and let the heat			
48	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and			
	verify there is an alarm sent to the BAS.		Pass	
52	Place the high zone air temperature alarm setpoint back to its original		D	
	setpoint. Verify the alarm clears at the BAS.		Pass	alarm is configured as a deviation
53	Record the low zone air temperature alarm setpoint		pass	from zone setpoint +- 10Deg
	Test the low zone air temperature alarm by changing the setpoint		pass	Tom zone serpoint +- Topeg
5/	value to a temperature above the current space temperature and			
	verify there is an alarm sent to the BAS.		pass	
	Place the low zone air temperature alarm setpoint back to its original		pass	
55	setpoint. Verify the alarm clears at the BAS.		pass	
				Tested by raising the freeze
				temperature locally on the device.
56				Freeze Stat is hardwired and stuts
	Test the freeze stat and verify the unit shuts off and there is an alarm			down unit. Not alarmed on Jace. 50
	sent to the BAS.		pass	complete
57	Verify the smoke detector is wired to shut down the heat pump upon			
57	activation.		NA	Tested as part of FA system
58	Record the heat pump "Compressor Runtime Exceeded" alarm			
50	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			
59	overriding the timer to a value less than its current value. Verify there			
	is an alarm received at the BAS.		NA	not configured
60	Put the compressor runtime exceeded alarm setpoint back to its previous value. Verify the alarm clears at the BAS.			not configured
	previous value. Verify the alarm clears at the BAS.		NA	not configured Value is alarmed by a deviation from
61	Record the low discharge air temperature alarm setpoint (40°F - adj.).			setpoint +- 10DegF
	Record the low discharge all temperature alarm setpoint (401 - adj.).		Dace	
			Pass	
62	Test the low discharge air temperature alarm by changing the setnoint		Pass	
62	Test the low discharge air temperature alarm by changing the setpoint value to a temperature above the current discharge temperature.			
	Test the low discharge air temperature alarm by changing the setpoint value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS		Pass Pass Pass	
63	value to a temperature above the current discharge temperature.		Pass	
	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original		Pass	
63 64	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS.		Pass Pass	
63	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS.		Pass Pass	
63 64	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS.		Pass Pass Pass	Value is alarmed by a deviation from
63 64 65	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.).		Pass Pass Pass	Value is alarmed by a deviation from
63 64 65 66	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature.		Pass Pass Pass	Value is alarmed by a deviation from
63 64 65 66	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS		Pass Pass Pass Pass	Value is alarmed by a deviation from
63 64 65 66	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its		Pass Pass Pass Pass Pass	Value is alarmed by a deviation from
63 64 65 66 67 68	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS.		Pass Pass Pass Pass Pass Pass Pass Pass	Value is alarmed by a deviation from setpoint +- 10DegF
63 64 65 66 67 68	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		Pass Pass Pass Pass Pass Pass Pass	Value is alarmed by a deviation from
63 64 65 66 67 68 69	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding		Pass Pass Pass Pass Pass Pass Pass Pass	Value is alarmed by a deviation from setpoint +- 10DegF
63 64 65 66 67 68 69	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding the timer to a value less than its current value. Verify there is an alarm		Pass Pass Pass Pass Pass Pass Pass Pass	Value is alarmed by a deviation from setpoint +- 10DegF
63 64 65 66 67 68 69	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS.		Pass Pass Pass Pass Pass Pass Pass Pass	Value is alarmed by a deviation from setpoint +- 10DegF
63 64 65 66 67 68 69	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS.		Pass Pass Pass Pass Pass Pass Pass Pass	Value is alarmed by a deviation from setpoint +- 10DegF
63 64 65 66 67 68 69 70	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS. Put the fan runtime exceeded alarm setpoint back to its previous value. Verify the alarm clears at the BAS.		Pass Pass Pass Pass Pass Pass Pass Pass	Value is alarmed by a deviation from setpoint +- 10DegF not configured not configured not configured
63 64 65 66 67 68 69 70	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS. Put the fan runtime exceeded alarm setpoint back to its previous value. Verify the alarm clears at the BAS.		Pass Pass Pass Pass Pass Pass Pass NA NA NA	Value is alarmed by a deviation from setpoint +- 10DegF not configured not configured not configured
63 64 65 66 67 68 69 70 71 71 72	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS. Put the fan runtime exceeded alarm setpoint back to its previous value. Verify the alarm clears at the BAS. Test the "Fan Failure" alarm by commanding the heat pump on using the time schedule and then shut the fan off.		Pass Pass Pass Pass Pass Pass Pass NA NA NA NA	Value is alarmed by a deviation from setpoint +- 10DegF not configured not configured not configured
63 64 65 66 67 68 69 70 71 71 72 73	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS. Put the fan runtime exceeded alarm setpoint back to its previous value. Verify the alarm clears at the BAS. Test the "Fan Failure" alarm by commanding the heat pump on using the time schedule and then shut the fan off. Verify there is an alarm sent to the BAS.		Pass Pass Pass Pass Pass Pass Pass Pass	Value is alarmed by a deviation from setpoint +- 10DegF not configured not configured not configured
63 64 65 66 67 68 69 70 71 71 72 73	value to a temperature above the current discharge temperature. Verify an alarm is sent to the BAS Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the high discharge air temperature setpoint (120°F - adj.). Test the high discharge air temperature alarm by changing the setpoint value to a temperature below the current discharge temperature. Verify an alarm is sent to the BAS Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS. Put the fan runtime exceeded alarm setpoint back to its previous value. Verify the alarm clears at the BAS. Test the "Fan Failure" alarm by commanding the heat pump on using the time schedule and then shut the fan off.		Pass Pass Pass Pass Pass Pass Pass NA NA NA NA	Value is alarmed by a deviation from setpoint +- 10DegF not configured not configured

	Verify there is an alarm sent to the BAS.	NA	
77	Put the heat pump back into automatic operation. Verify the alarm		
	clears at the BAS.	Pass	
70	Verify a condensate overflow alarm is not required. It did not appear		Units have a sensor in the Pan. Need
	to be in the documentation.		more information
70	Put the schedule back to its original values, remove all overrides, and		
79	put the unit back into normal operation.	Pass	

#### Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-9, IDU-9 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Formanca	Data	Pass / Fail /	Comments
#	Sequence	Data	Not Applicable	comments
1	Installation			
2	Verify the outdoor air condensing unit is mounted securely.		Pass	
3	Verify the outdoor air condensing unit has an electrical disconnect.		Pass	
4	Verify there is no damage to the outdoor air condensing unit.		Pass	
	Verify the heat pump is mounted securely.		Pass	
	Verify the heat pumpt has an electrical disconnect.		Pass	
	Verify there is no damage to the heat pump.		Pass	
	Confirm discharge air temperature is indicated at the BAS.		Pass	
9	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
	Unoccupied Mode			
-	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
14	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override			
17	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode.		Pass	Occupancy Override is 1 hour and Adjustable
18	Activate the occupant override control to place the unit into occupied			
19	mode. Verify the heat pump starts, the fan is on, and the outdoor air damper		Pass	
	opens.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
21	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
22	After the unoccupied override control timer has expired, verify the			
~~~	unit returns to unoccupied mode.		Pass	
23	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
29	Record the Low Fan Speed setpoints (difference between space			
29	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space			Fan is 2 speed controlled internally
	temperature and space temperature setpoint).		NA	by trane ECM
31	Record the High Fan Speed setpoints (difference between space			
	temperature and space temperature setpoint).		NA	
32	Test the low, medium, and high fan speeds by overriding the space			
	temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal.		NA	
-	Compressor Minimum Runtime Record the user defined (adj.) minimum runtime currently entered for			
35	the compressor.	2min on time 5min off minnimum	Pass	
36	Heating & Cooling		. 355	
	Verify heating is enabled and cooling is disabled if outdoor air			OA supplied by DOAS and is
37	temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	conditioned
	Verify the cooling is enabled and heating is disabled if outdoor air			OA supplied by DOAS and is
38	temperature is $> 65^{\circ}$ F. Note: Outdoor air temperature sensor to be			conditioned
- 55	factory mounted.		Pass	
39	Heating			
				Had to force heating by overridding
40	Verify the heating mode is enabled based on outdoor air temperature.		Pass	Outside Air
	Override the zone heating setpoint to a temperature above the			
41	current space temperature.		Pass	

42	Verify the heat pump is in heating mode by the discharge air temperature. Verify the outdoor air condensing unit is operating and			
	discharging cool air.	157.79 DegF	Pass	DOAS supplying 65Degree Air
43	Remove the override on the zone heating setpoint and let the heat			
	pump return to normal operation.		Pass	
	Cooling			
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
46	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 71.5 DegF		
	space temperature. Verify the heat pump is in cooling mode by the discharge air		Pass	
47	temperature. Verify the outdoor air condensing unit is operating and			
	discharging warm air.	51.3 DegF	Pass	
48	Remove the override on the zone cooling setpoint and let the heat			
10	pump return to normal operation. Alarms		Pass	
	Alamis			alarm is configured as a deviation
50	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and verify there is an alarm sent to the BAS.		Pass	
	Place the high zone air temperature alarm setpoint back to its original		F 835	
52	setpoint. Verify the alarm clears at the BAS.		Pass	
53	Providely and the later of the second s			alarm is configured as a deviation
	Record the low zone air temperature alarm setpoint Test the low zone air temperature alarm by changing the setpoint		pass	from zone setpoint +- 10Deg
54	value to a temperature above the current space temperature and			
	verify there is an alarm sent to the BAS.		pass	
55	Place the low zone air temperature alarm setpoint back to its original			
	setpoint. Verify the alarm clears at the BAS.		Pass	Tested by raising the freeze
				temperature locally on the device.
56	Test the freeze stat and verify the unit shuts off and there is an alarm			Freeze Stat is hardwired and shuts
	sent to the BAS.		Pass	down the unit.
57	Verify the smoke detector is wired to shut down the heat pump upon activation.		NA	Tested as part of FA system
	Record the heat pump "Compressor Runtime Exceeded" alarm			
58	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			
59	overriding the timer to a value less than its current value. Verify there is an alarm received at the BAS.		NA	not configured
~~	Put the compressor runtime exceeded alarm setpoint back to its			not compared
60	previous value. Verify the alarm clears at the BAS.		NA	not configured
61				Value is alarmed by a deviation from
	Record the low discharge air temperature alarm setpoint (40°F - adj.). Test the low discharge air temperature alarm by changing the setpoint		Pass	setpoint +- 10DegF
62	value to a temperature above the current discharge temperature.			
			Pass	
63	Verify an alarm is sent to the BAS		Pass	
64	Restore the low discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS.		Pass	
<u> </u>			1 435	Value is alarmed by a deviation from
65	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the			
66	setpoint value to a temperature below the current discharge temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its			
	original value. Verify the alarm clears at the BAS.		Pass	not configured
69	Record the heat pump "Fan Runtime Exceeded" alarm setpoint. Verify the operating of the fan runtime exceeded alarm by overriding		NA	not configured
70	the timer to a value less than its current value. Verify there is an alarm			
	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous			and an firmed
	value. Verify the alarm clears at the BAS. Test the "Fan Failure" alarm by commanding the heat pump on using		NA	not configured Mismatch Alarm (Command vs
72	the time schedule and then shut the fan off.		Pass	Status)
73	Verify there is an alarm sent to the BAS.		Pass	,
74	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
75	Test the "Fan in Hand" alarm by commanding the heat pump off using the time schedule and then manually start the heat pump.		NIA	not configured
	Verify there is an alarm sent to the BAS.		NA NA	not configured not configured

77	Put the heat pump back into automatic operation. Verify the alarm			
	clears at the BAS.	1	NA	not configured
70	Verify a condensate overflow alarm is not required. It did not appear			Units have a sensor in the Pan. Need
	to be in the documentation.			more information
70	Put the schedule back to its original values, remove all overrides, and			
79	put the unit back into normal operation.	P	Pass	

Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-10, IDU-10 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
2	Verify the outdoor air condensing unit is mounted securely.		Pass	
3	Verify the outdoor air condensing unit has an electrical disconnect.		Pass	
4	Verify there is no damage to the outdoor air condensing unit.		Pass	
-	Verify the heat pump is mounted securely.		Pass	
	Verify the heat pumpt has an electrical disconnect.		Pass	
-	Verify there is no damage to the heat pump.		Pass	
	Confirm discharge air temperature is indicated at the BAS.		Pass	
	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
11	Unoccupied Mode			
12	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
13	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override		1 400	
17	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode. Activate the occupant override control to place the unit into occupied		Pass	Occupancy Override is 1 hour and Adjustable
18	mode.		Pass	
19	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
21	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
22	After the unoccupied override control timer has expired, verify the unit returns to unoccupied mode.		Pass	
23	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
25	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
	Record the Low Fan Speed setpoints (difference between space			
29	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space temperature and space temperature setpoint).		NA	Fan is 2 speed controlled internally by trane ECM
31	Record the High Fan Speed setpoints (difference between space			
32	temperature and space temperature setpoint). Test the low, medium, and high fan speeds by overriding the space		NA	
	temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal.		NA	
34 35	Compressor Minimum Runtime Record the user defined (adj.) minimum runtime currently entered for			
	the compressor.	2min on time 5min off minnimum	Pass	
36	Heating & Cooling			
37	Verify heating is enabled and cooling is disabled if outdoor air temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	OA supplied by DOAS and is conditioned
38	Verify the cooling is enabled and heating is disabled if outdoor air temperature is > 65°F. Note: Outdoor air temperature sensor to be			OA supplied by DOAS and is conditioned
	factory mounted.		Pass	
39 40	Heating		_	Had to force heating by overridding
41	Verify the heating mode is enabled based on outdoor air temperature. Override the zone heating setpoint to a temperature above the		Pass	Outside Air
71	current space temperature.		Pass	

12	Verify the heat pump is in heating mode by the discharge air temperature. Verify the outdoor air condensing unit is operating and			
42	discharging cool air.	170.99 DegF	Pass	DOAS supplying 65Degree Air
42	Remove the override on the zone heating setpoint and let the heat			
43	pump return to normal operation.		Pass	
44	Cooling			
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 72.3 DegF	1 455	
46	space temperature.		Pass	
	Verify the heat pump is in cooling mode by the discharge air			
47	temperature. Verify the outdoor air condensing unit is operating and	40.2 D F	Deve	
	discharging warm air. Remove the override on the zone cooling setpoint and let the heat	48.3 DegF	Pass	
48	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
50	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
- 4	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and verify there is an alarm sent to the BAS.		Pass	
	Place the high zone air temperature alarm setpoint back to its original		1 455	
52	setpoint. Verify the alarm clears at the BAS.		Pass	
53				alarm is configured as a deviation
	Record the low zone air temperature alarm setpoint		pass	from zone setpoint +- 10Deg
5/	Test the low zone air temperature alarm by changing the setpoint value to a temperature above the current space temperature and			
54	verify there is an alarm sent to the BAS.		pass	
	Place the low zone air temperature alarm setpoint back to its original			
55	setpoint. Verify the alarm clears at the BAS.		Pass	
				Tested by raising the freeze
56				temperature locally on the device.
	Test the freeze stat and verify the unit shuts off and there is an alarm sent to the BAS.		Fail	Freeze Stat is hardwired and shuts the unit down.
	Verify the smoke detector is wired to shut down the heat pump upon		- Tun	
57	activation.		NA	Tested as part of FA system
58	Record the heat pump "Compressor Runtime Exceeded" alarm			
50	setpoint.		NA	not configured
59	Verify the operating of the compressor runtime exceeded by overriding the timer to a value less than its current value. Verify there			
	is an alarm received at the BAS.		NA	not configured
	Put the compressor runtime exceeded alarm setpoint back to its			liet compared
60	previous value. Verify the alarm clears at the BAS.		NA	not configured
61				Value is alarmed by a deviation from
	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
62	Test the low discharge air temperature alarm by changing the setpoint			
02	value to a temperature above the current discharge temperature.		Pass	
63	Verify an alarm is sent to the BAS		Pass	
64	Restore the low discharge air temperature alarm setpoint to its original			
54	value. Verify the alarm clears at the BAS.		Pass	
65	Record the high discharge air temperature setpoint (120°F - adj.).		Dace	Value is alarmed by a deviation from setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the		Pass	Serbourt TOPGRE
66	setpoint value to a temperature below the current discharge			
	temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its		_	
60	original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		Pass NA	not configured
09	Verify the operating of the fan runtime exceeded alarm by overriding		IN/A	
70	the timer to a value less than its current value. Verify there is an alarm			
	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous			
-	value. Verify the alarm clears at the BAS. Test the "Fan Failure" alarm by commanding the heat pump on using		NA	not configured
72	the time schedule and then shut the fan off.		Pass	is a Missmatch alarm command vs Status
73	Verify there is an alarm sent to the BAS.		Pass	
	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
75	Test the "Fan in Hand" alarm by commanding the heat pump off using			
-	the time schedule and then manually start the heat pump.		NA	not configured
76	Verify there is an alarm sent to the BAS.		NA	

77	Put the heat pump back into automatic operation. Verify the alarm					
//	clears at the BAS.		NA			
78	Verify a condensate overflow alarm is not required. It did not appear			Units have a sensor in the Pan. Need		
/0	to be in the documentation.		NA	more information		
79	Put the schedule back to its original values, remove all overrides, and					
79	put the unit back into normal operation.		Pass			
****	*********END FUNCTIONAL CHECKS*******					

Functional Performance Test

Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-11, IDU-11 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
2	Verify the outdoor air condensing unit is mounted securely.		Pass	
3	Verify the outdoor air condensing unit has an electrical disconnect.		Pass	
4	Verify there is no damage to the outdoor air condensing unit.		Pass	
5	Verify the heat pump is mounted securely.		Pass	
6	Verify the heat pumpt has an electrical disconnect.		Pass	
	Verify there is no damage to the heat pump.		Pass	
8	Confirm discharge air temperature is indicated at the BAS.		Pass	
	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
11	Unoccupied Mode			
12	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override		F 033	
	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode.		Pass	Occupancy Override is 1 hour and Adjustable
18	Activate the occupant override control to place the unit into occupied mode.		Pass	
19	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
20	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
21	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
22	After the unoccupied override control timer has expired, verify the unit returns to unoccupied mode.		Pass	
23	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
25	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
	Record the Low Fan Speed setpoints (difference between space			
29	temperature and space temperature setpoint). Record the Medium Fan Speed setpoints (difference between space		NA	Fan is 2 speed controlled internally
30	temperature and space temperature setpoint).		NA	by trane ECM
31	Record the High Fan Speed setpoints (difference between space temperature and space temperature setpoint).		NA	
32	Test the low, medium, and high fan speeds by overriding the space temperature setpoints by the values listed above.		NA	
	Return the space temperature setpoint back to normal.		NA	
34	Compressor Minimum Runtime			
35	Record the user defined (adj.) minimum runtime currently entered for the compressor.	2min on time 5min off minnimum	Pass	
36	Heating & Cooling			
37	Verify heating is enabled and cooling is disabled if outdoor air temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	OA supplied by DOAS and is conditioned
38	Verify the cooling is enabled and heating is disabled if outdoor air temperature is > 65°F. Note: Outdoor air temperature sensor to be		Doca	OA supplied by DOAS and is conditioned
	factory mounted.		Pass	
39	Heating			Lad to force besting by supplied the
40	Verify the heating mode is enabled based on outdoor air temperature.		Pass	Had to force heating by overridding Outside Air
41	Override the zone heating setpoint to a temperature above the current space temperature.		Pass	

	Verif. the bast summer is in basting mode by the discharge sig	1		
40	Verify the heat pump is in heating mode by the discharge air			
42	temperature. Verify the outdoor air condensing unit is operating and discharging cool air.	121 9 Dog	Dass	DOAS supplying 65Degree Air
	Remove the override on the zone heating setpoint and let the heat	121.8 DegF	Pass	DOAS supplying osDegree Air
43	pump return to normal operation.		Pass	
44	Cooling		1 435	
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 73.1 DegF		
46	space temperature.		Pass	
	Verify the heat pump is in cooling mode by the discharge air			
47	temperature. Verify the outdoor air condensing unit is operating and			
	discharging warm air.	49.9 DegF	Pass	
48	Remove the override on the zone cooling setpoint and let the heat			
	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
- 4	Test the high zone air temperature alarm by changing the setpoint			
51	value to a temperature below the current space temperature and verify there is an alarm sent to the BAS.		Dass	
			Pass	
52	Place the high zone air temperature alarm setpoint back to its original setpoint. Verify the alarm clears at the BAS.		Pass	
	serpoint. Verry the darm dears at the DAS.		r d55	alarm is configured as a deviation
53	Record the low zone air temperature alarm setpoint		pass	from zone setpoint +- 10Deg
	Test the low zone air temperature alarm by changing the setpoint			
54	value to a temperature above the current space temperature and			
	verify there is an alarm sent to the BAS.		pass	
	Place the low zone air temperature alarm setpoint back to its original			
55	setpoint. Verify the alarm clears at the BAS.		Pass	
				Tested by raising the freeze
56				temperature locally on the device.
56	Test the freeze stat and verify the unit shuts off and there is an alarm			Freeze Stat is hardwired and shuts
	sent to the BAS.		Pass	down the unit.
57	Verify the smoke detector is wired to shut down the heat pump upon			
57	activation.		NA	Tested as part of FA system
58	Record the heat pump "Compressor Runtime Exceeded" alarm			
	setpoint.		NA	not configured
	Verify the operating of the compressor runtime exceeded by			
59	overriding the timer to a value less than its current value. Verify there			a at a sufficient
	is an alarm received at the BAS. Put the compressor runtime exceeded alarm setpoint back to its		NA	not configured
60	previous value. Verify the alarm clears at the BAS.		NA	not configured
			ina -	Value is alarmed by a deviation from
61	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
	Test the low discharge air temperature alarm by changing the setpoint			
62	value to a temperature above the current discharge temperature.			
	· · · · · · · · · · · · · · · · · · ·		Pass	
63	Verify an alarm is sent to the BAS		Pass	
64	Restore the low discharge air temperature alarm setpoint to its original			
04	value. Verify the alarm clears at the BAS.		Pass	
65				Value is alarmed by a deviation from
05	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the			
66	setpoint value to a temperature below the current discharge			
	temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its		D · · ·	
60	original value. Verify the alarm clears at the BAS. Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		Pass	not configured
69	Verify the operating of the fan runtime exceeded alarm by overriding		NA	not configured
70	the timer to a value less than its current value. Verify there is an alarm			
,0	received at the BAS.		NA	not configured
	Put the fan runtime exceeded alarm setpoint back to its previous		ina.	
71	value. Verify the alarm clears at the BAS.		NA	not configured
	Test the "Fan Failure" alarm by commanding the heat pump on using			Mismatch Alarm (Command vs
72	the time schedule and then shut the fan off.		Pass	Status)
73	Verify there is an alarm sent to the BAS.		Pass	· ·
	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
75	Test the "Fan in Hand" alarm by commanding the heat pump off using			
/5	the time schedule and then manually start the heat pump.		NA	not configured
_	Verify there is an alarm sent to the BAS.		NA	not configured

77	Put the heat pump back into automatic operation. Verify the alarm			
	clears at the BAS.	1	NA	not configured
70	Verify a condensate overflow alarm is not required. It did not appear			Units have a sensor in the Pan. Need
	to be in the documentation.			more information
70	Put the schedule back to its original values, remove all overrides, and			
/9	put the unit back into normal operation.	P	Pass	

Functional Performance Test

Heat Pump with Indoor Unit

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: HP-12, IDU-12 Date: 11/10/2023 Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Installation			
-	Verify the outdoor air condensing unit is mounted securely.		Pass	
2				
3	Verify the outdoor air condensing unit has an electrical disconnect.		Pass	
	Verify there is no damage to the outdoor air condensing unit.		Pass	
5	Verify the heat pump is mounted securely.		Pass	
	Verify the heat pumpt has an electrical disconnect.		Pass	
	Verify there is no damage to the heat pump.		Pass	
8	Confirm discharge air temperature is indicated at the BAS.		Pass	
9	Verify heating and cooling setpoints can be changed by the occupant using the zone sensor.	(+- 3) Deg F	Pass	In classroom user has (+-) 3 DegF warm cool adj setpoint can be changed from the Graphic
11	Unoccupied Mode			
12	Using the time schedule, place the unit into unoccupied mode.		Pass	Setpoints are adjustable
	Verify the heating space temperature setpoint is 58°F (adj.)		Pass	Setpoints are adjustable
14	Verify the cooling space temperature setpoint is 80°F (adj.)		Pass	Setpoints are adjustable
15	Verify the heat pump fan is off and the outdoor air damper is closed. Verify the outdoor air condensing unit is not operating.		Pass	
16	Unoccupied Override			
17	Record the time the unoccupied overide control is programmed to override in occupied mode before returning to unoccupied mode.		Pass	Occupancy Override is 1 hour and Adjustable
	Activate the occupant override control to place the unit into occupied			
18	mode.		Pass	
19	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
20	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	
	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	
22	After the unoccupied override control timer has expired, verify the			
22	unit returns to unoccupied mode.		Pass	
23	Occupied Mode		Pass	
24	Using the time schedule, place the unit into occupied mode.		Pass	
25	Verify the heating space temperature setpoint is 70°F (adj.)		Pass	Setpoints are adjustable
26	Verify the cooling space temperature setpoint is 72°F (adj.)		Pass	Setpoints are adjustable
27	Verify the heat pump starts, the fan is on, and the outdoor air damper opens.		Pass	
28	Fan Speed			
29	Record the Low Fan Speed setpoints (difference between space			
	temperature and space temperature setpoint).		NA	
30	Record the Medium Fan Speed setpoints (difference between space			Fan is 2 speed controlled internally
	temperature and space temperature setpoint).		NA	by trane ECM
31	Record the High Fan Speed setpoints (difference between space		N 14	
	temperature and space temperature setpoint). Test the low, medium, and high fan speeds by overriding the space		NA	
32	temperature setpoints by the values listed above.		NA	
20	Return the space temperature setpoint back to normal.		NA	
	Compressor Minimum Runtime		IN/A	
54	Record the user defined (adj.) minimum runtime currently entered for			
35	the compressor.	2min on time 5min off minnimum	Pass	
36	Heating & Cooling			
	Verify heating is enabled and cooling is disabled if outdoor air			OA supplied by DOAS and is
37	temperature < 65°F. Note: Outdoor air temperature sensor to be factory mounted.		Pass	conditioned
	Verify the cooling is enabled and heating is disabled if outdoor air			OA supplied by DOAS and is
38	temperature is > 65°F. Note: Outdoor air temperature sensor to be			conditioned
	factory mounted.		Pass	
39	Heating			
40	Verify the heating mode is enabled based on outdoor air temperature.		Pass	Had to force heating by overridding Outside Air
41	Override the zone heating setpoint to a temperature above the			
41	current space temperature.		Pass	

42	Verify the heat pump is in heating mode by the discharge air temperature. Verify the outdoor air condensing unit is operating and			
42	discharging cool air.	122.26 DegF	Pass	DOAS supplying 65Degree Air
42	Remove the override on the zone heating setpoint and let the heat			
43	pump return to normal operation.		Pass	
44	Cooling			
45	Verify the cooling mode is enabled based on outdoor air temperature.		Pass	
	Override the zone cooling setpoint to a temperature below the current	Zone Temperature 72. DegF	1 033	
46	space temperature.		Pass	
	Verify the heat pump is in cooling mode by the discharge air			
47	temperature. Verify the outdoor air condensing unit is operating and	54.2 D 5	Deve	
	discharging warm air. Remove the override on the zone cooling setpoint and let the heat	51.2 DegF	Pass	
48	pump return to normal operation.		Pass	
49	Alarms			
50				alarm is configured as a deviation
50	Record the high zone air temperature alarm setpoint		Pass	from zone setpoint +- 10Deg
F 1	Test the high zone air temperature alarm by changing the setpoint			
21	value to a temperature below the current space temperature and verify there is an alarm sent to the BAS.		Pass	
	Place the high zone air temperature alarm setpoint back to its original		1 455	
52	setpoint. Verify the alarm clears at the BAS.		Pass	
53				alarm is configured as a deviation
	Record the low zone air temperature alarm setpoint		pass	from zone setpoint +- 10Deg
51	Test the low zone air temperature alarm by changing the setpoint value to a temperature above the current space temperature and			
54	verify there is an alarm sent to the BAS.		pass	
	Place the low zone air temperature alarm setpoint back to its original			
55	setpoint. Verify the alarm clears at the BAS.		Pass	
				Tested by raising the freeze
56	Test the freeze stat and verify the unit shuts off and there is an alarm			temperature locally on the device. Freeze Stat is hardwired and shuts
	sent to the BAS.		Fail	the unit down.
	Verify the smoke detector is wired to shut down the heat pump upon			
57	activation.		NA	Tested as part of FA system
58	Record the heat pump "Compressor Runtime Exceeded" alarm			
	setpoint.		NA	not configured
50	Verify the operating of the compressor runtime exceeded by overriding the timer to a value less than its current value. Verify there			
55	is an alarm received at the BAS.		NA	not configured
60	Put the compressor runtime exceeded alarm setpoint back to its			
60	previous value. Verify the alarm clears at the BAS.		NA	not configured
61				Value is alarmed by a deviation from
	Record the low discharge air temperature alarm setpoint (40°F - adj.).		Pass	setpoint +- 10DegF
62	Test the low discharge air temperature alarm by changing the setpoint			
-	value to a temperature above the current discharge temperature.		Pass	
63	Verify an alarm is sent to the BAS		Pass	
64	Restore the low discharge air temperature alarm setpoint to its original			
	value. Verify the alarm clears at the BAS.		Pass	Male a trada consider a da tatta da
65	Record the high discharge air temperature setpoint (120°F - adj.).		Pass	Value is alarmed by a deviation from setpoint +- 10DegF
	Test the high discharge air temperature alarm by changing the		1 000	
66	setpoint value to a temperature below the current discharge			
	temperature.		Pass	
67	Verify an alarm is sent to the BAS		Pass	
68	Restore the high discharge air temperature alarm setpoint to its original value. Verify the alarm clears at the BAS.		Doce	
69	Record the heat pump "Fan Runtime Exceeded" alarm setpoint.		Pass NA	not configured
	Verify the operating of the fan runtime exceeded alarm by overriding			
70	the timer to a value less than its current value. Verify there is an alarm			
	received at the BAS.		NA	not configured
71	Put the fan runtime exceeded alarm setpoint back to its previous		N A	not configured
	value. Verify the alarm clears at the BAS. Test the "Fan Failure" alarm by commanding the heat pump on using		NA	not configured is a Missmatch alarm command vs
72	the time schedule and then shut the fan off.		Pass	Status
	Verify there is an alarm sent to the BAS.		Pass	
73			Dava	
	Restore the fan operation. Verify the alarm clears at the BAS.		Pass	
	Restore the fan operation. Verify the alarm clears at the BAS. Test the "Fan in Hand" alarm by commanding the heat pump off using the time schedule and then manually start the heat pump.		NA	not configured

77	Put the heat pump back into automatic operation. Verify the alarm					
//	clears at the BAS.		NA			
78	Verify a condensate overflow alarm is not required. It did not appear			Units have a sensor in the Pan. Need		
/0	to be in the documentation.		NA	more information		
79	Put the schedule back to its original values, remove all overrides, and					
79	put the unit back into normal operation.		Pass			
****	*********END FUNCTIONAL CHECKS*******					

Functional Performance Test AC Unit Split System

/// 01	
Project: Jo	ohnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC
Tag ID: A	C-1, ODU-1
Date: 1	1/10/2023
Tech / CxA: M	1ark Rogers
	5

Prefunctional checklist items are to be completed as part of startup and initial checkout, preparatory to functional testing. This checklist does not take the place of the manufacturer's recommended checkout and startup procedures or report. The installing contractor's startup and checkout plan shall make reference to incorporating this checklist or have it attached when submitting the plan to the commissioning agent for approval, prior to execution. Note that sometimes more than one sheet needed for each test. If there are notes indicating there are "15 in Project" then 15 copies of that sheet will be needed - one for each piece of equipment.

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
	Override the cooling alarm setpoint to 10 F below the current space temperature		Pass	
2	Verify an alarm is sent to the BAS		Pass	
3	Release all overrides		Pass	
	Verify or override the unit cooling setpoint to match the current space temperature		Pass	
5	Verify the unit de-energizes		Pass	
	Override the cooling setpoint to 4 F below the current space temperature		Pass	
7	Verify the unit energizes		Pass	
8	Verify no alarm is sent to the BAS		Pass	
9	Release all overrides		Pass	
10	Return the unit to normal operation		Pass	

Functional Performance Test AC Unit Split System

~	e one spit system
Project:	Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC
Tag ID:	AC-2, ODU-2
Date:	11/10/2023
Tech / CxA:	Mark Rogers

Prefunctional checklist items are to be completed as part of startup and initial checkout, preparatory to functional testing. This checklist does not take the place of the manufacturer's recommended checkout and startup procedures or report. The installing contractor's startup and checkout plan shall make reference to incorporating this checklist or have it attached when submitting the plan to the commissioning agent for approval, prior to execution. Note that sometimes more than one sheet needed for each test. If there are notes indicating there are "15 in Project" then 15 copies of that sheet will be needed - one for each piece of equipment.

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
	Override the cooling alarm setpoint to 10 F below the current space		Pass	
1	temperature		Pass	
2	Verify an alarm is sent to the BAS		Pass	
3	Release all overrides		Pass	
	Verify or override the unit cooling setpoint to match the current space		Pass	
4	temperature		Pass	
5	Verify the unit de-energizes		Pass	
	Override the cooling setpoint to 4 F below the current space		Pass	
6	temperature		Pass	
7	Verify the unit energizes		Pass	
8	Verify no alarm is sent to the BAS		Pass	
9	Release all overrides		Pass	
10	Return the unit to normal operation		Pass	

***********END FUNCTIONAL CHECKS*********

Performance Verification Test

Exhaust Fan

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: F-1 Date: 11/10/2023

Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Verify the building is in occupied mode		Pass	
2	Verify fan is energized		Pass	
3	Verify sufficient air flow at intake and exhaust dampers		Pass	
4	Override the building to unoccupied mode		Pass	
5	Verify fan de-energizes		Pass	
6	Verify any related dampers modulate closed		Pass	

***********END FUNCTIONAL CHECKS********

Performance Verification Test

Exhaust Fan

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC Tag ID: F-2 Date: 11/10/2023

Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Verify the building is in occupied mode		Pass	
2	Verify fan is energized		Pass	
3	Verify sufficient air flow at intake and exhaust dampers		Pass	
4	Override the building to unoccupied mode		Pass	
5	Verify fan de-energizes		Pass	
6	Verify any related dampers modulate closed		Pass	

Performance Verification Test

Electric Wall Heater

Project: Johnsonville Elementary School Addition-Renovation, Phase 2, Raleigh NC

Tag ID: EWH-1 Date: 11/10/2023

Tech / CxA: Mark Rogers

#	Sequence	Data	Pass / Fail / Not Applicable	Comments
1	Verify the following points at the BAS		Pass	
2	Fan status		Pass	
3	Fan on/off		Pass	
4	Sensor normal/fail status		Pass	
1 5	Override the space temperature setpoint to below the current space temperature		Pass	
6	Verify the UH energizes		Pass	
7	Verify the LAT is appropriate for heating		Pass	
8	Release the space temperature heating setpoint override		Pass	
9	Verify the UH de-energizes		Pass	