

ADDENDUM 01

Issue Date: January 13, 2026

Project Information

Client: Abla Griffin Partnership
Project Name: Westmoore HS Comp Gym – RTU Replacement
Project Location: OKC, OK
Owner: Moore Public Schools
Engineer: Salas O'Brien, LLC

Project No. 2550-01871-00



To Prospective Bidders

- ▲ This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated November 13, 2025, (and previous Addenda), with amendments and additions noted below.
- ▲ This Addendum consists of (2) pages and (5) attachments.
 - Index of Attachments
 - M601
 - Earthsmart Controls Proposal
 - 00 01 10 Table of Contents
 - 23 08 00 Mechanical Commissioning Coordination
 - 23 73 14 Air Handling Units with Modulating Hot Gas Reheat
- ▲ Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may disqualify Bidder.

CHANGES TO BIDDING REQUIREMENTS

- ▲ The attached Earthsmart Temperature Control proposal shall be included as part of the mechanical bid for this project.



CHANGES TO THE DRAWINGS

Revisions have been made to the following drawings and are issued in the form of full-size plans. Edits are indicated by a revision delta and a cloud surrounding the affected portion of the drawing.

▲ M601 – MECHANICAL SCHEDULES

- Refer to clouds and deltas on plan.

CHANGES TO THE SPECIFICATIONS

▲ 00 01 10 – Table of Contents

- Added 23 08 00.

▲ 23 08 00 – Mechanical Commissioning Coordination.

- Added in entirety.

▲ 23 73 14 - Air Handling Units with Modulating Hot Gas Reheat

- Added section 3.5.

END OF ADDENDUM [01]



REVISIONS

Δ	DESCRIPTION	DATE
1	ADD 01	01/13/26



WESTMOORE HIGH
SCHOOL 2025
ARENA HVAC

sheet no:

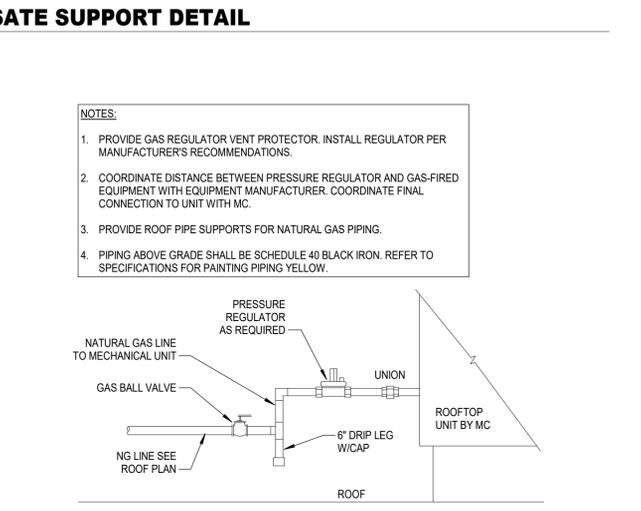
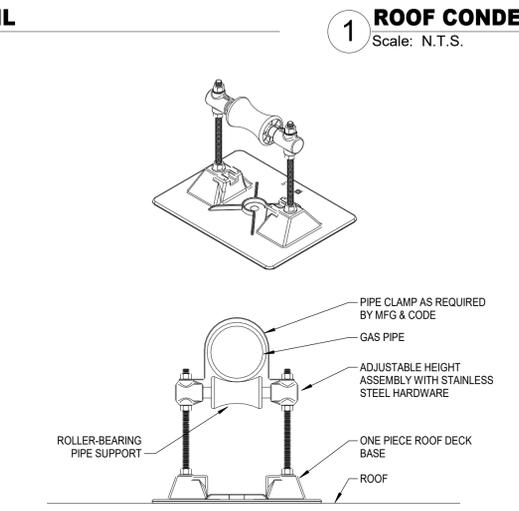
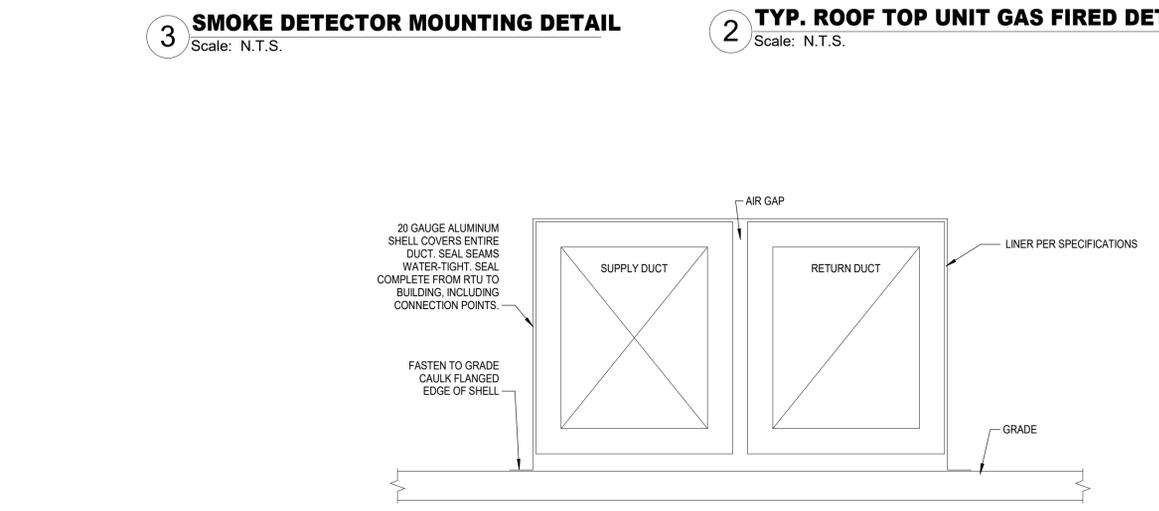
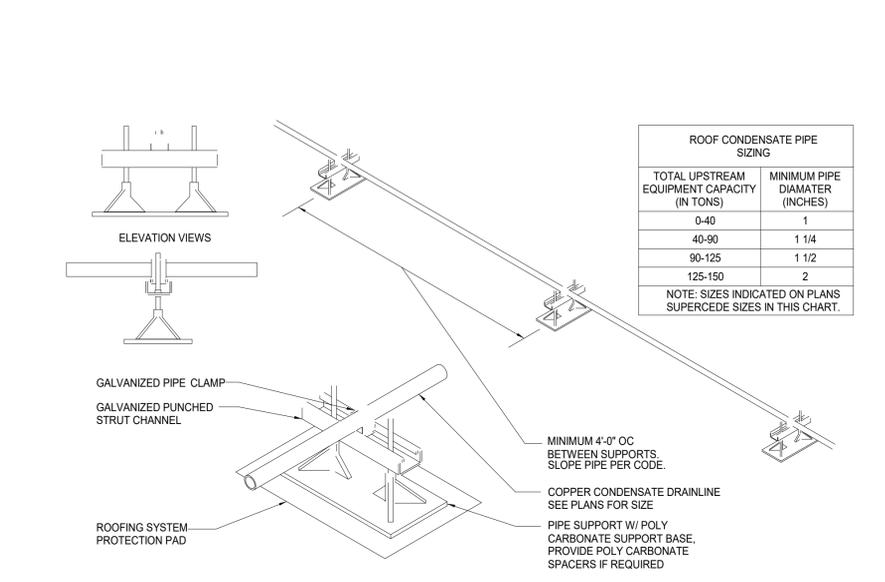
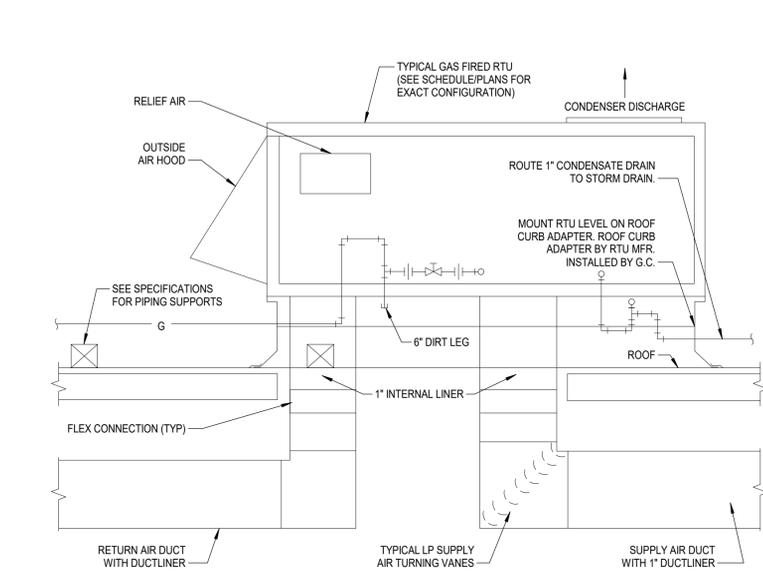
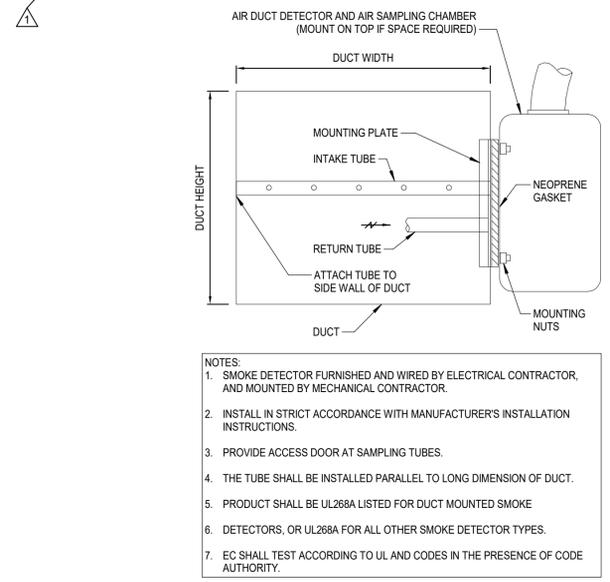
M601

OWNERSHIP USE OF DOCUMENTS:
AGP EXPRESSLY RESERVES ITS
COPYRIGHT AND OTHER PROPERTY
RIGHTS OF ALL PLANS AND DRAWINGS
DESIGNED AND/OR PRODUCED. PLANS
AND DRAWINGS ARE NOT TO BE
REPRODUCED IN ANY FORM OR MANNER
WITHOUT THE EXPRESSED WRITTEN
CONSENT OF AGP.

PACKAGED ROOFTOP UNIT - GAS HEAT NON CALC

MARK	SUPPLY CFM	FAN						ENERGY RECOVERY PERFORMANCE						COOLING						HEATING						BASIS OF DESIGN				REMARKS				
		OUTSIDE AIR CFM	EXT. STATIC PRESSURE (IN. W.C.)	HORSE POWER	CURRENT CHAR			SUMMER OA AIR DB/WB (°F)	SUMMER LAT DB/WB (°F)	SUMMER CAPACITY REDUCTION (BTUH)	WINTER OA DB/WB (°F)	WINTER LAT DB/WB (°F)	WINTER CAPACITY REDUCTION (BTUH)	AIR TEMPERATURE (°F)			TOTAL CAPACITY (BTU)	SENSIBLE CAPACITY (BTU)	STAGES	MINIMUM EER/ SEER	ENTERING AIR TEMP (°F)	PRESSURE (°F)	LAT (°F)	INPUT (BTUH)	OUTPUT (BTUH)	STAGES (HEAT)	AFUE %	MANUFACTURER	MODEL		MCA	MOCP	WEIGHT (LBS)	
					V	P	F							EAT DB	EAT WB WET BULB	LAT DB																		LAT WB
RTU-2	10,500	5,100	1.00	5.0	480	3	80	99.5 / 77.7	78.6 / 65.3	259,631	11.4 / 8.6	62.7 / 49.8	282,444	76.7	63.8	53 °F	53 °F	104 °F	340000	258000	SZVAV	9.8	67	110 °F	600000	486000	16:1 TURNDOWN	90	VALENT	VXE-312-74C-30I-0-J2	77	110	8100	1-10, 12-15
RTU-3	6,000	3,540	1.00	5.0	480	3	80	99.5 / 77.7	80.7 / 67.2	156,605	11.4 / 8.6	56.8 / 45.7	173,545	78.0	65.0	54 °F	54 °F	104 °F	195000	146000	SZVAV	10.8	63	100 °F	300000	243000	12:1 TURNDOWN	80	VALENT	VXE-212-52B-15I-J-G2	41	60	4300	1-9, 11-15
RTU-9	10,500	5,100	1.00	5.0	480	3	80	99.5 / 77.7	78.6 / 65.3	259,631	11.4 / 8.6	62.7 / 49.8	282,444	76.7	63.8	53 °F	53 °F	104 °F	340000	258000	SZVAV	9.8	67	110 °F	600000	486000	16:1 TURNDOWN	90	VALENT	VXE-312-74C-30I-0-J2	77	110	8100	1-10, 12-15
RTU-10	10,000	5,100	1.00	5.0	480	3	80	99.5 / 77.7	78.6 / 65.3	259,631	11.4 / 8.6	62.7 / 49.8	282,444	76.8	63.9	53 °F	53 °F	104 °F	270000	225000	SZVAV	9.8	67	110 °F	600000	486000	16:1 TURNDOWN	90	VALENT	VXE-312-74C-30I-0-J2	63	80	8100	1-10, 12-15

- GENERAL NOTES:**
- EXTERNAL STATIC PRESSURE INCLUDES LOSSES DUE TO DUCTWORK, AIR DEVICES, DAMPERS, AND DUCT MOUNTED HOT WATER COILS WHERE APPLICABLE. DIRTY FILTER AND UNIT CASING MUST BE ADDED TO EXTERNAL STATIC PRESSURE TO OBTAIN TOTAL PRESSURE LOSS. INCREASE HORSEPOWER AS REQUIRED TO MEET YOUR TOTAL PRESSURE LOSS. COORDINATE WITH ELECTRICIAN.
 - MAINTAIN MINIMUM CLEARANCE FOR COIL PULL AS RECOMMENDED BY UNIT MANUFACTURER. MAINTAIN MINIMUM CLEARANCE AS REQUIRED TO OPEN ACCESS AND CONTROL DOORS ON UNIT FOR SERVICE, MAINTENANCE, AND INSPECTION. MAINTAIN MINIMUM ELECTRICAL CLEARANCE AS REQUIRED BY NEC.
- REMARKS:**
- PROVIDE UNIT WITH DISCONNECT SWITCH, HAIL GUARD, AND LOW LEAK OUTSIDE AND RETURN AIR DAMPERS.
 - PROVIDE UNIT WITH DUCT SMOKE DETECTOR IN RETURN DUCTWORK.
 - PROVIDE UNIT WITH UNPOWERED FACTORY MOUNTED GFCI RECEPTACLE FOR ELECTRICIAN TO WIRE TO SEPARATE CIRCUIT. COORDINATE WITH EC.
 - PROVIDE WITH CURB ADAPTER. M.C. SHALL VERIFY EXISTING CURB SIZE.
 - PROVIDE UNIT WITH LOW AMBIENT CONTROL.
 - PROVIDE UNIT WITH TEMPERATURE AND HUMIDITY SENSOR AND BMS PROTOCOL. REPLACE EXISTING THERMOSTATS WITH NEW.
 - PROVIDE A WATER LEVEL SENSING DEVICE (FLOW SWITCH) IN THE PRIMARY DRAIN PAN. THIS DEVICE SHALL SHUT OFF THE APPLIANCE IN THE EVENT THE PRIMARY DRAIN LINE BECOMES RESTRICTED.
 - PROVIDE LOW LEAK ENTHALPY ECONOMIZER WITH POWERED EXHAUST.
 - MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL ELECTRICAL COSTS ASSOCIATED WITH ANY ALTERNATE UNIT IS PROVIDED WITH GREATER ELECTRICAL CHARACTERISTICS THAN SHOWN.
 - UNIT SHALL HAVE HORIZONTAL SUPPLY AND RETURN DUCT CONNECTIONS.
 - UNIT SHALL HAVE DOWN SUPPLY AND RETURN DUCT CONNECTIONS.
 - PROVIDE HGRH.
 - PROVIDE TERMINAL STRIP CONTROL FOR CONTROLS CONTRACTOR.
 - UNIT SHALL HAVE MINIMUM 2 IN. R-16 FOAM INSULATION.
 - ENERGY RECOVERY WHEEL SHALL BE POLYMER MATERIAL WITH SILICA GEL DESICCANT.



EARTHSMART CONTROLS

5305 N Santa Fe Avenue
Oklahoma City, OK 73118

www.earthsmartcontrols.com

Phone: (405) 778-8008
Fax: (866) 676-5602

To: Mechanical Bidders
Attn: Estimators

December 17, 2025

This is a proposal to install controls in the new RTUs at Westmoore High School Arena.

RTUs (4)

- Provide and install new controls on new RTUs.
- Includes Honeywell Optimizer unitary controllers to accommodate input and output points. Includes: supply air temp, space temp/humidity, mixed air temp, CO2 sensor, filter pressure sensors(x2), new panel/backplate, new relays/current sensors for fans, ERV enable, compressors/cooling enables/statuses and heat enable. (Actuators excluded with controls as they should come with the unit)
- Program RTU to function as designed.
- Commission system to ensure proper operation.
- Tie into existing Niagara 4 front end.

The price for the above is: \$57,176.00
Fifty-Seven Thousand One Hundred and Seventy-Six Dollars

Commissioning for RTUs (4)

- Provide full commissioning for RTUs after installation and integration.
- Work with mechanical company, factory startup personnel and customer to ensure system is fully functional per design intent.
- Provide NEBB reports.

The price for the above is: \$5,232.00
Five Thousand Two Hundred and Thirty-Two Dollars

Exclusions: Any wiring above 24V, VFDs, actuators and anything not mentioned in this proposal.

Continued on next page...

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Phone: (405) 778-8008
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We thank you for the opportunity to bid and look forward to working with you soon.

If you have any questions, please feel free to contact us at (405) 778-8008.



Erin Bevill
Controls Manager
EarthSmart Controls, LLC

Company: _____

Signature: _____

Date: _____

Printed Name: _____

Title: _____

PO #: _____

SECTION 00 01 10

TABLE OF CONTENTS

Engineer of Record
Divisions 21, 22, 23
Dwayne McDonald Gordon
Mechanical Engineer
Salas O'Brien, LLC
OK 30822 / EXP 02.28.2026
CA 7058/ EXP 06.30.2027



DIVISION 21 - FIRE SUPPRESSION - Not Used

DIVISION 22 - PLUMBING - Not Used

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

- 23 05 00 Mechanical General Provisions
- 23 05 11 Mechanical Alterations Project Procedures
- 23 05 12 HVAC Shop Drawings, Coordination Drawings & Product Data
- 23 05 13 Electrical Provisions of HVAC Work
- 23 05 14 HVAC Condensate Drain Piping
- 23 05 93 Testing, Adjusting, and Balancing of Environmental Systems
- 23 07 13 External Duct Insulation
- 23 08 00 Mechanical Commissioning Coordination
- 23 31 13 Ductwork
- 23 72 23 Energy Recovery Units
- 23 73 14 Air Handling Units with Modulating Hot Gas Reheat
- 23 82 16 Heating and Cooling Coils

SECTION 23 08 00

MECHANICAL COMMISSIONING COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section outlines commissioning requirements and activities of Contractor, Owner, CxA and Design Professionals as related to the Division 23 Mechanical.
- B. Related Sections:
 - 1. Division 01 – General Requirements and Specification Section 01 91 13, General Commissioning
 - 3. Division 23 – Mechanical
 - 4. Division 26 – Electrical

1.2 DEFINITIONS

- A. Refer to Specification Section 01 91 13, General Commissioning for definitions.

1.3 CONTACT INFORMATION

- A. The Owner will contract directly for commissioning services.
 - 1. Commissioning Agent fee will be paid for directly by the owner.
 - 2. Cost of contractor coordination with the CxA is specified in this section.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. Contractor shall provide all standard and specialized testing equipment required to perform Start-up and Functional Performance Testing. Test equipment required for Functional Performance Testing including, but not limited to equipment listed below. Data logging equipment and software required to test equipment shall be provided by the Contractor.
- B. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 1.0°F and a resolution of + or - 0.2°F). Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and following any repairs to the equipment. Calibration tags shall be affixed or certificates readily available.
- C. Test equipment includes:
 - 1. Air flow measuring devices (hoods, anemometers, etc.)
 - 2. Water flow measuring devices
 - 3. Temperature measuring devices (air and water)
 - 4. Humidity sensors
 - 5. Pressure gauges (air and water)
 - 6. CO2 sensors

2.2 OTHER CONTRACTOR PROVIDED EQUIPMENT

- A. Ladders and/or lifts and appropriate fall protection as required by Contractor site requirements.

PART 3 - EXECUTION

3.1 COORDINATION - GENERAL

- A. Except for the activities to be performed by the CxA called for herein, all component and system installation work required by the Division 22, 23 and 26 specifications including specific contractor furnished items indicated by this Section shall be provided by the Contractor.

3.2 SUBMITTALS

- A. Mechanical
 - 1. Mechanical Equipment as needed

3.3 EQUIPMENT START-UP

- A. Notification
 - 1. Contractor shall provide ten Owner business days' notice to CxA, Owner and Design Team of start-up dates.
- B. Prior to start-up, contractor shall:
 - 1. Verify that equipment and systems are complete, accessible, correctly connected to utilities and ready for operation. Perform all pre-start inspections and tests as called for in Division 23.
 - 2. Comply with pre-start requirements of manufacturer and complete applicable documentation.
 - 3. Complete applicable sections of Prefunctional Checklists.
 - 4. Coordinate start-up attendance by manufacturer or authorized representative as required by specifications or manufacturer.
- C. At start-up, contractor shall:
 - 1. Supervise the activities of the authorized start-up technician or manufacturer's representative.
 - 2. Verify proper voltage, phase, overcurrent protection, drive rotation and any other conditions that may cause damage if not correct.
 - 3. Execute start-up under supervision of qualified contractor and equipment manufacturer personnel and in accordance with the manufacturer's instruction.
 - 4. Complete manufacturer start-up requirements and documentation. Provide a copy of documentation to the CxA for inclusion in the Cx Manual.
 - 5. Complete PFC's and provide documentation to CxA.6. Provide documentation of any issues noted during start-up to CxA, Owner and Design Team. Outline recommendations for corrective action.

3.4 PRE-FUNCTIONAL CHECKLISTS

- A. Contractor shall forward completed copies of PFCs to the CxA for inclusion into the Cx documentation. PFCs will be provided by the CxA. As an alternate, contractor shall submit their versions of the PFCs to the CxA for review and comment.
- B. Contractor shall complete PFC for each of the following equipment:

1. Mechanical:
 - a. Air Handling Units
 - b. Energy Recovery Units

3.5 TEST AND BALANCE

- A. Contractor shall forward the T&B Execution Plan to the CxA prior to performing the field T&B activities. CxA will review and comment on Plan.
- B. Contractor shall notify CxA a minimum of three (3) days prior to conducting field T&B activities. Failure to provide CxA with adequate notification may result in additional field time by T&B Contractor to demonstrate T&B results.
- C. Key T&B activities that CxA requires notification on:
 1. Terminal Units.
 2. Air Handling Unit.
 3. Energy Recovery Unit.
 4. Heat Exchanger/Converter.
 5. Pumps.

3.6 FUNCTIONAL TESTING

- A. General
 1. Contractor shall organize and schedule Construction Team members to execute the functional testing, which will be directed by CxA. Construction Team members may include Mechanical Sub, T&B Sub, Controls Sub, Electrical Sub, Fire Alarm Sub or Plumbing Sub. Contractor shall note that certain activities, such as sensor calibration, can be organized so that the T&B Sub is scheduled efficiently.
- E. Air Handling Units
 1. Graphics
 2. Start/Stop/Schedule
 3. Fan Operation (On/Off/Hand/Auto)
 4. Temperature Calibration (Air/Water)
 5. Damper Positions (Off/On/Safety)
 6. Valve Positions (Off/On/Safety)
 7. Safeties (Low Limit/Smoke Detectors/Fire Alarm/Static Pressure)
 8. Alarms (Filter/Temperature/etc.)
 9. Damper Operation (Normal/Economizer)
 10. Valve Operation (Normal Heating & Cooling/Economizer)
 11. Fan Speed Control (VFD)
 12. Temperature Reset Sequences
 13. Static Reset Sequences
- F. Energy Recovery Units
 1. Graphics
 2. Start/Stop/Schedule
 3. Fan Operation (On/Off/Hand/Auto)
 4. Temperature Calibration (Air/Water)
 5. Air Flow Station Calibration
 6. Damper Positions (Off/On/Safety)
 7. Valve Positions (Off/On/Safety)
 8. Safeties (Low Limit/Smoke Detectors/Fire Alarm/Static Pressure)
 9. Alarms (Filter/Temperature/etc.)
 10. Damper Operation (Normal/Economizer)
 11. Valve Operation (Normal Heating & Cooling/Economizer)

12. Fan Speed Control (VFD)
13. Temperature Reset Sequences
14. Static Reset Sequences

3.7 TREND DATA

- A. Contractor shall enable trend data as indicated herein and as specified by contract documents and Owner's requirements. Trends shall be stored to a repository device that can be recalled at any time period. Sampling rate shall vary based upon the trend and may range from change of value (COV) to a maximum of 15 minutes.
- B. Ambient (Outdoor) Conditions
 1. Dry Bulb Temperature
 2. Wet Bulb Temperature
 3. CO2 Level
- E. Air Handling Unit Supply Air
 1. Supply Air Temperature.
 2. Supply Air Temperature Setpoint.
 3. Mixed Air Temperature.
 4. Mixed Air Temperature Setpoint.
 5. Chilled Water Valve Position.
 6. Hot Water Valve Position.
 7. Critical Terminal Unit Air Valve and Heating Position
- F. Air Handling Unit Static Pressure
 1. Duct Static Pressure.
 2. Duct Static Pressure Setpoint.
 3. Fan Speed
 4. Critical Terminal Unit Air Valve Position
- G. Air Handling Unit Economizer
 1. Supply Air Temperature.
 2. Supply Air Temperature Setpoint.
 3. Mixed Air Temperature.
 4. Mixed Air Temperature Setpoint.
 5. Return Air Temperature.
 6. Return Air Enthalpy.
 7. Outside Air Temperature.
 8. Outside Air Enthalpy.
 9. Chilled Water Valve Position.
 10. Hot Water Valve Position.
 11. Return Damper Position
 12. Relief Damper Position
 13. Outside Air Damper Position

END OF SECTION

SECTION 23 73 14

AIR HANDLING UNITS WITH MODULATING HOT GAS REHEAT

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Furnish and install air handling units with casing, fans, coils, filters, modulating gas reheat and special items.

1.2 RELATED WORK

- A. Division 23 Mechanical
 - 1. Air Balance.
 - 2. Controls.
 - 3. Electrical Provisions of Mechanical Work.
 - 4. Ductwork.
 - 5. Air filtration.
 - 6. Heating and Cooling Coils.

1.3 REFERENCES

- A. ANSI/ARI 410 - force circulation air cooling and air heating coils
- B. National Electrical Code

1.4 QUALITY ASSURANCE

- A. Unit shall be certified in accordance with UL Standard 1995, Safety Standard for Heating and Cooling Equipment.
- B. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.
- C. Unit shall be safety certified by ETL and be ETL US listed.

1.5 SUBMITTALS

- A. Submit manufacturer's dimensioned product data sheets.
 - 1. Show location of filter access doors.
- B. Submit fan performance curve for each unit:
 - 1. Plot fan volume against static pressure, horsepower and efficiency.
 - 2. Show point of rating based on static requirements of the system.
- C. Submit the fan performance plot at each motor speed position with consideration for the reduced internal static.
- D. Submit a chart of specific sound power level at each octave band center frequency.
- E. Submit manufacturer's certified heating and cooling coil capacity data.
- F. Submit filter manufacturer's product data sheets and capacity information.
- G. Submit manufacturer's data on housing insulation material.

- H. Product Data: Literature shall be provided that indicates dimensions, weights, capacities, ratings, fan performance, filter information, electrical characteristics and connection requirements. Installation, Operation and Maintenance manual shall be provided.
- I. Shop Drawings: Unit drawings shall be provided that indicate assembly, unit dimensions, construction details and connection details. Computer generated fan curves for each blower shall be submitted with specific design operation point noted. Wiring diagram shall be provided with detail for power and control systems and differentiate between factory installed and field installed wiring.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Unit shall be wrapped in plastic prior to shipment to prevent damage during transport and thereafter while in storage awaiting installation.
- B. Unit shall be stored in a clean, dry place protected from weather and construction traffic in accordance with Installation, Operation and Maintenance manual instructions.
- C. Unit shall be handled carefully to avoid damage to components, enclosures and finish.

1.7 WARRANTY

- A. Manufacturer shall provide a warranty for a period of 12 months from the date of substantial completion. Warranty shall cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer's written instructions for installation, operation, and maintenance have been followed. Warranty excludes parts associated with routine maintenance, such as belts and air filters.

1.8 CAPACITY

- A. Refer to equipment schedule.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not operate units until ductwork is clean, filters are in place, bearings lubricated, condensate properly tapped, piping connections verified and leak tested, belts aligned and tensioned, all shipping braces have been removed, and fan has been tested under observation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Valent .
- B. Addison.
- C. Captive Aire.
- D. Aaon.
- E. Grease Master.
- F. Innovent.

2.2 UNIT HOUSING

- A. All cabinet walls and access doors shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
- B. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D-1929 for a minimum flash ignition temperature of 610°F.
- C. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel and prevents exterior condensation on the panel.
- D. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Sealing shall be included between panels and between access doors and openings to reduce air leakage. Refrigerant piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
- E. Access to filters, cooling coil, reheat coil, heaters, supply fans and electrical and controls components shall be through hinged access doors. Stainless steel hinges shall be included on the doors.
- F. Access doors shall be flush mounted to cabinetry, with stainless steel removable hinges and quarter-turn, zinc cast handles.
- G. Condensation on the exterior of the unit is not approved.
- H. Insulation, vapor barriers, facings and adhesives shall have:
 - 1. Flame spread not higher than 25.
 - 2. Smoke developed rating not higher than 50.

2.3 ELECTRICAL

- A. Unit shall be provided with standard power block for connecting power to the unit.
- B. Unit shall include a factory installed 24V control circuit transformer.

2.4 SUPPLY FANS

- A. Blower assembly shall consist of an electric motor and direct- drive fan(s). Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motor(s) shall be capable of continuous speed modulation and controlled by a VFD.
- B. Blower and motor assembly shall be dynamically balanced and mounted on rubber isolators.
- C. Motor shall be standard (premium) efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
- D. Variable frequency drive shall be factory wired and mounted in the control compartment. Fan motor shall be premium efficiency.

2.5 EXHAUST FANS

- A. Exhaust Air blower assemblies: Blower assembly shall consist of an electric motor a direct-drive fan. Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motor shall be capable of continuous speed modulation and controlled by a VFD.

2.6 COOLING COIL

- A. Coil shall be designed for use with R-454B refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings.
- B. Coil with dual circuits shall have interlaced circuitry.
- C. Coil shall be furnished with a factory installed electronic thermostatic expansion valves. The sensing bulbs shall be field installed on the suction line immediately outside the cabinet.
- D. Coil shall have left hand external piping connections. Liquid and suction connections shall be sweat connection. Coil connections shall be labeled, extend beyond the unit casing and be factory sealed with grommets that cover both the interior and exterior of the unit casing, to minimize air leakage and condensation inside the panel assembly.
- E. Cooling coils shall be mechanically supported above the drain pan by multiple supports that allow drain pan cleaning and coil removal.
- F. Provide hail guards for condenser coils.
- G. Modulating hot gas reheat shall be provided on the lead refrigeration circuit. Refrigeration circuit shall be provided with (interlaced) hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a dehumidification control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space. Modulating reheat valves shall be factory installed. Reheat line connections shall be labeled, extend beyond the unit casing and be located near the suction and liquid line connections for ease of field connection. Connections shall be factory sealed with a grommet on the exterior of the unit casing to minimize air leakage.
- H. Reference Schedule and Specification Section 23 82 16.

2.7 COMPRESSOR

- A. Provide a thermally protected, serviceable semi-hermetic compressor or hermetic compressor with service valves, vibration isolation, crankcase heaters, sight glass and filter drier. Provide with a 5 year warranty.

2.8 EVAPORATOR FANS

- A. Provide a belt-driven, forward-curved, centrifugal evaporator fan, with adjustable motor sheaves. Motor shall contain permanently lubricated bearings. Provide motor HP as indicated on the drawings.

2.9 GAS HEATING

- A. Unit shall be equipped with corrosion resistant burners and heat exchangers.

- B. Gas Controls.
 - 1. Automatic gas valve and pressure regulator.
 - 2. A manual shutoff valve.
 - 3. Pilot valve.
 - 4. Two flame rollout limit switches.
 - 5. An adjustable fan control.
 - 6. Fixed high limit controls.
- C. Unit shall be equipped with an electric spark pilot ignition system.
 - 1. Electronic flame detection.
 - 2. 100% safety shutoff.
- D. Combustion air shall be induced by a positive pressure power venting fan.
 - 1. Prepurge of combustion chamber.
- E. Furnish through-the-bottom electrical service connection.

2.10 ENERGY WHEEL

Unit energy wheel shall be sized for the full volume of outdoor and exhaust air without an energy wheel bypass damper(s). Bypass dampers are only acceptable during economizer operation – they cannot be used during normal operation. Energy wheel shall be of total enthalpy, rotary air-to-air type and shall be an element of a removable energy wheel cassette. The cassette shall consist of a galvanized steel framework (designed to produce laminar air flow through the wheel), an energy wheel as specified and a motor and drive assembly. The cassette shall incorporate a pre-tensioned urethane drive belt or a link style belt with a five-year warranty. Non-segmented energy wheels are not acceptable. Silica gel desiccant shall be permanently bonded to the polymer film and is designed and constructed to permit cleaning and servicing. The energy wheel is to have a five-year warranty. Performance criteria are to be as specified in AHRI Standard 1060, complying with the Combined Efficiency data in the submittal.

2.11 FILTERS

- A. Unit shall include 4 inch thick, pleated panel pre filters with an ASHRAE efficiency of 30% and MERV rating of 8, upstream of the cooling coil.
- B. Locate behind access doors.
 - 1. Construct with substantial hinges.
 - 2. Neoprene gaskets.
 - 3. Permanent quick-release latching devices.
- C. Provide full length tracks to support the filter.

2.12 CONDENSATE DRAIN PANS

- A. IAQ style drain pans shall be provided under all coils.
 - 1. Pitch to drain connection.
 - 2. Fabricated from 16 gauge 304 stainless steel.
 - 3. Triple pitched for complete drainage with no standing water.
 - 4. Insulated to prevent condensation.
 - 5. Welded corners.
 - 6. Stainless drain connection.

2.13 CONTROLS

- A. Control panel shall be connected to the air handling unit with a 6 foot low voltage and high voltage connections and shall be mounted in the field.
- B. Factory Installed and Factory Provided Controller
 - 1. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested.
 - 2. Controller shall be capable of stand alone operation with unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.
 - 3. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.
 - 4. Controller shall include non-volatile memory to retain all programmed values, without the use of an external battery, in the event of a power failure.
 - 5. With the modulating hot gas reheat option a space humidity sensor and supply air temperature sensor shall be furnished with the unit for field installation. Suction pressure sensor shall be factory installed. Supply air temperature and space humidity setpoints, for the dehumidification mode of operation, shall be adjustable.
- C. Make-Up Air Controller:
 - 1. Outside air temperature sensor and supply air temperature sensor shall be furnished with the unit for field installation.
 - 2. Unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling shall be accomplished with connection to interface module with LCD screen and input keypad, interface module with touch screen, or with connection to PC with free configuration software. Controller shall be capable of connection with other factory installed and factory provided unit controllers with individual unit configuration, setpoint adjustment, sensor status viewing, and occupancy scheduling available from a single unit. Connection between unit controllers shall be with a modular cable. Controller shall be capable of communicating and integrating with a BACnet network.

2.14 ROOF CURB

- A. Install a roof curb of the same manufacture as the air conditioning unit.
 - 1. Curb to support the unit and provide a watertight enclosure to protect ductwork and utility services.
 - 2. Use a design complying with National Roofing Contractors Association requirements.
 - 3. Level curb according to manufacturer's recommendations.

PART 3 - EXECUTION

3.1 SPARE PARTS

- A. Provide the following spare parts and material to the Owner for use after the warranty period.
 - 1. One spare fan motor for each size of fan motor on the project.
 - 2. One spare set of filters or filter media for each fan coil unit on the project.

3.2 ELECTRICAL REQUIREMENTS

- A. Bring electrical connections to a common junction box.

3.3 STORAGE

- A. Storage and shipping in accordance with manufacturer's recommendations.

3.4 INSTALLATION

- A. Install unit so motor connections and filters are accessible.

3.5 STARTUP

- A. Provide the services of a factory trained service technician employed full time by the unit manufacturer to start-up the system, or manufacturer's factory authorized representative under the supervision of the factory trained service technician. Upon completion of the installation, the system shall be started and commissioned by the manufacturer's factory authorized representative who will verify a complete fully functional system. The factory authorized representative will verify that accessories are installed and performing the specified functions. (Contractor startup is unacceptable.)
- B. The attached written startup report shall be provided to the owner and engineer upon completion.

Start-Up and Service Data Checklist

Date: _____

Job Name: _____

Customer: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Model No.: _____

Serial No.: _____

Start-Up Technician Name: _____ Signature: _____

Certification Number: _____

HVAC Contractor: _____ Phone: _____

Address: _____

Contractor's E-mail Address: _____

Electrical Contractor: _____ Phone: _____

Distributor Name: _____ Phone: _____

This information will be available from the latest mechanical construction documents. When the system is VAV, the CFM is the airflow when the remote VAV boxes are in the fully open position. Do not proceed with the equipment start-up without the design CFM information.

Design Supply Air CFM: _____ Design Return Air CFM: _____

Design Outdoor Air CFM at Minimum Position: _____

Total External Static Pressure: _____

Supply Static Pressure: _____

Return Static Pressure: _____

Design Building Static Pressure: _____

Outside Air Dilution: Economizer Position Percentage: _____ CFM: _____

Supply Gas Pressure after Regulator without Heat Active: _____ Inches: _____

ELECTRICAL SAFETY PRECAUTIONS PRIOR TO INSPECTION

	Completed	See Notes
Voltage supplied to the unit is within the nameplate range	<input type="checkbox"/>	<input type="checkbox"/>
Voltage supplied to both unit power connections is within the nameplate range	<input type="checkbox"/>	<input type="checkbox"/>
Transformer(s) primary tap set for the voltage supplied	<input type="checkbox"/>	<input type="checkbox"/>
All power is disconnected from the unit for the remaining unit inspection items (except where noted)	<input type="checkbox"/>	<input type="checkbox"/>
All electrical connections are checked	<input type="checkbox"/>	<input type="checkbox"/>
Grounding wire from building service is attached to the unit grounding lug	<input type="checkbox"/>	<input type="checkbox"/>
Ultraviolet (UV) lamp installation is complete	<input type="checkbox"/>	<input type="checkbox"/>
Wet in use/ standard weather cover for convenience outlet is in place	<input type="checkbox"/>	<input type="checkbox"/>

GENERAL UNIT AND SYSTEM INSPECTION

	Completed	See Notes
Note any unit inspection deficiencies or damage	<input type="checkbox"/>	<input type="checkbox"/>
Unit lifted properly as witnessed by a member of the start-up team	<input type="checkbox"/>	<input type="checkbox"/>
Verify refrigerant circuits do not have any refrigerant leaks	<input type="checkbox"/>	<input type="checkbox"/>
Unit has adequate clearance for operation and service	<input type="checkbox"/>	<input type="checkbox"/>
Split sections are assembled completely (split shipment units only)	<input type="checkbox"/>	<input type="checkbox"/>
Field supplied curb/field built-up unit support is installed and sealed weather-tight	<input type="checkbox"/>	<input type="checkbox"/>
Roof curb cap segment below unit condenser section properly assembled and sealed weather-tight	<input type="checkbox"/>	<input type="checkbox"/>
Return duct connection is sealed/gasketed to curb	<input type="checkbox"/>	<input type="checkbox"/>
Return duct connection is sealed weather-tight	<input type="checkbox"/>	<input type="checkbox"/>
Supply duct connection is sealed/gasketed to curb	<input type="checkbox"/>	<input type="checkbox"/>
Supply duct connection is sealed weather-tight	<input type="checkbox"/>	<input type="checkbox"/>
Return duct system is complete	<input type="checkbox"/>	<input type="checkbox"/>
Supply duct system is complete	<input type="checkbox"/>	<input type="checkbox"/>
VAV boxes are complete and operational	<input type="checkbox"/>	<input type="checkbox"/>
This unit is part of a twinned system	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Isolation damper(s) is complete	<input type="checkbox"/>	<input type="checkbox"/>
Bottom/side utility openings are sealed	<input type="checkbox"/>	<input type="checkbox"/>
Condensate piping is complete and trap is primed	<input type="checkbox"/>	<input type="checkbox"/>
A field installed condensate switch was added	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Door tieback brackets are installed on the unit base rail.	<input type="checkbox"/>	<input type="checkbox"/>
NOTE: Door tieback brackets are used to secure the door in the open position while servicing. Brackets and chains are shipped loose in the supply fan section of the cabinet	<input type="checkbox"/>	<input type="checkbox"/>
Access door handle height positioned properly for application's needs (applies to all)	<input type="checkbox"/>	<input type="checkbox"/>
Condenser fans turn freely and set screws are tight	<input type="checkbox"/>	<input type="checkbox"/>

NOTES:

GENERAL UNIT AND SYSTEM INSPECTION (CONTINUED)

Completed See Notes

For Units with Outside Air/Economizer		
Outside air intake hoods are assembled and mist eliminators are in place	<input type="checkbox"/>	<input type="checkbox"/>
For Units with Exhaust Fan		
Exhaust hood is assembled and barometric dampers operate freely (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>
Exhaust fan assembly tie-down bolts are removed	<input type="checkbox"/>	<input type="checkbox"/>
Exhaust fan assembly set screws are tight	<input type="checkbox"/>	<input type="checkbox"/>
Spare exhaust fan belts are properly stored	<input type="checkbox"/>	<input type="checkbox"/>
For Units with Return Fan		
Return fan assembly tie-down bolts are removed	<input type="checkbox"/>	<input type="checkbox"/>
Return fan assembly set screws are tight	<input type="checkbox"/>	<input type="checkbox"/>
Spare return fan belts for belt driven fans are properly stored	<input type="checkbox"/>	<input type="checkbox"/>
Supply Fan Section Inspection		
Supply fan assembly tie-down bolts are removed	<input type="checkbox"/>	<input type="checkbox"/>
Supply fan assembly set screws are tight	<input type="checkbox"/>	<input type="checkbox"/>
Humidifier Inspection		
A steam humidifier was added	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Steam humidifier supply piping is completed and the control valve actuator is installed	<input type="checkbox"/>	<input type="checkbox"/>
Steam humidifier drain piping is completed and protected from freezing	<input type="checkbox"/>	<input type="checkbox"/>
Heating Section Inspection		
Gas Heat		
Type of gas supplied	Liquid Propane (LP) <input type="checkbox"/> Natural <input type="checkbox"/>	
Gas heat flue stack is installed and the combustion air openings are clear	<input type="checkbox"/>	<input type="checkbox"/>
Gas supply piping is completed and has a drip leg	<input type="checkbox"/>	<input type="checkbox"/>
High altitude natural gas conversion kit is installed (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>
Field adjustment to local combustion conditions is completed	<input type="checkbox"/>	<input type="checkbox"/>
Propane gas conversion kit is installed (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>
High altitude propane gas conversion kit is installed (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>
Propane gas conversion kit for less than 4,000 feet is installed (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>
Hot Water/Steam Heat		
Hydronic heat piping is completed and protected from freezing, and the control valve actuator is installed	<input type="checkbox"/>	<input type="checkbox"/>

NOTES:

GENERAL UNIT AND SYSTEM INSPECTION (CONTINUED)

	Completed	See Notes
Filters Inspection		
Draw-thru filter is installed (field or factory)	<input type="checkbox"/>	<input type="checkbox"/>
Draw-thru filters are clean	<input type="checkbox"/>	<input type="checkbox"/>
Draw-thru filter transducer/magnehelic gauge sensing tubing is in place	<input type="checkbox"/>	<input type="checkbox"/>
Final filter is installed (field or factory)	<input type="checkbox"/>	<input type="checkbox"/>
Final filters are clean	<input type="checkbox"/>	<input type="checkbox"/>
Final filter transducer/magnehelic gauge sensing tubing is in place	<input type="checkbox"/>	<input type="checkbox"/>
ERW outside air filters are clean	<input type="checkbox"/>	<input type="checkbox"/>
ERW exhaust air filters are clean	<input type="checkbox"/>	<input type="checkbox"/>
Controls and Sensors Inspection		
Display panel height positioned properly for application's needs	<input type="checkbox"/>	<input type="checkbox"/>
One or more zone CO ₂ NetSensor(s) are connected on the SA bus (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>
NetSensor with zone humidity sensing is connected to the SA bus (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>
Supply duct static pressure sensing tubing is installed to the duct static pressure transducer HI port	<input type="checkbox"/>	<input type="checkbox"/>
Building static pressure sensing tubing is installed to the building static pressure transducer HI port	<input type="checkbox"/>	<input type="checkbox"/>
Red bird, atmospheric, and return air (as applicable with return fan) reference sensing tubing is installed to the duct and/or building static pressure transducer LO port(s)	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the main control board OCC-S input [24 VAC occupancy input status]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the main control board SMOKE-A input [24 VAC smoke detector alarm contact]	<input type="checkbox"/>	<input type="checkbox"/>
SMOKE-A input is active in the factory unit configuration NOTE: If SMOKE-A is not active, contact Ducted Systems Product Technical Support to correct the issue.	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the main control board FC bus [3-wire + shield network]	<input type="checkbox"/>	<input type="checkbox"/>
Main control board FC bus networking is active with the Ethernet switch installed	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the main control board SS-S input [24 VAC safety switch status]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the main control board SA bus [4-wire, shield recommended]	<input type="checkbox"/>	<input type="checkbox"/>
One or more zone temperature NetSensor(s) are connected on the SA bus	<input type="checkbox"/>	<input type="checkbox"/>
For Units with Options Board Installed in Controls Section		
Demand ventilation is active in the factory unit configuration NOTE: If demand ventilation is not active, contact Ducted Systems Product Technical Support to correct the issue.	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the options board COND-A input [24 VAC condensate alarm)	<input type="checkbox"/>	<input type="checkbox"/>
COND-A is active in the factory unit configuration NOTE: If COND-A is not active, contact Ducted Systems Product Technical Support to correct the issue.	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the options board DAT-SP input [0–10 VDC discharge air temperature reset)	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the options board DAP-SP input [0–10 VDC discharge air static pressure reset)	<input type="checkbox"/>	<input type="checkbox"/>

NOTES:

GENERAL UNIT AND SYSTEM INSPECTION (CONTINUED)

Completed See Notes

For units with Customer Terminal board installed in Controls section		
Wiring is field connected for the customer terminal board G, Y1, Y2, W1, and W2 inputs [24 VAC thermostat commands]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board ADR-S input [24 VAC load shed command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board Safety1-S input [24 VAC smoke/purge command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board Safety2-S input [24 VAC smoke/purge command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board Safety3-S input [24 VAC smoke/purge command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board HUMIDISTAT input [24 VAC humidification command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board HUMIDISTAT input [24 VAC dehumidification command]	<input type="checkbox"/>	<input type="checkbox"/>
Ensure humidistat input can be used for both humidification and dehumidification NOTE: If the humidistat input does not operate for both applications, contact Ducted Systems Product Technical Support to correct the issue.	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the isolation damper(s) to the customer terminal board ISOD1-S and ISOD2-S inputs [24 VAC damper status] and ISOD-C output [dry contact]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board EAD-REF input [0–10 VDC exhaust air damper positioning command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board EF-REF input [0–10 VDC exhaust fan speed positioning command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board HTGV-O output [0–10 VDC hydronic heating actuator positioning command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board HUM-O output [0–10 VDC steam humidifier actuator positioning command] and/or HUM-C output [dry contact steam humidifier enable command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board ALARM1-C output [dry contact remote alarming command]	<input type="checkbox"/>	<input type="checkbox"/>
Wiring is field connected for the customer terminal board VAVHTG-C output [dry contact VAV box interlock command]	<input type="checkbox"/>	<input type="checkbox"/>

NOTES:

PRE-OPERATION

Record the following values prior to start-up of the unit.	
Specified/required demand ventilation (indoor air quality (IAQ)) maximum outside airflow stated	CFM
Specified/required demand ventilation (IAQ) maximum outside airflow CFM	CFM
Specified/required demand ventilation (IAQ) maximum outside airflow percentage	%
Indoor dry bulb temperature	°F
Indoor wet bulb temperature	°F
Outside dry bulb temperature	°F

Power the unit for the remaining pre-operation checks in this section.	
--	--

 WARNING	Lethal voltages exist within the control panels. Before performing the following checks, open and lock-out-tag out all disconnect switches.	
Voltage measured at the unit power supply connection: L1 to L2		Volts
Voltage measured at the unit power supply connection: L1 to L3		Volts
Voltage measured at the unit power supply connection: L2 to L3		Volts
(Dual point power only) Voltage measured at the second power supply connection: L1 to L2		Volts
(Dual point power only) Voltage measured at the second power supply connection: L1 to L3		Volts
(Dual point power only) Voltage measured at the second power supply connection: L2 to L3		Volts
Confirm the unit electrical grounding is intact; "lighting circuit voltage" is read from each power supply leg to the cabinet ground	Yes <input type="checkbox"/>	No <input type="checkbox"/>

 WARNING	When the unit electrical grounding cannot be confirmed intact, an unsafe condition exists. DO NOT continue with unit start-up until electrical grounding is corrected.	
Voltage measured at the 1T control transformer secondary		Volts
Voltage measured at the 2T control transformer secondary		Volts
Voltage measured at the convenience outlet [3T control transformer secondary]		Volts
Voltage measured at the 3T control transformer secondary		Volts
Voltage measured at the 3T control transformer secondary		Volts
Voltage measured at the 3T control transformer secondary		Volts

NOTES:

AIRFLOW

Completed See Notes

Supply Fan Section		
Throughout this section, ensure all VAV boxes are set to their maximum cooling airflow and the duct pressure setpoint is set for the job site requirements	<input type="checkbox"/>	<input type="checkbox"/>
Throughout this section, ensure an occupied fan command is created so the supply fan operates with the fan % command at 100%	<input type="checkbox"/>	<input type="checkbox"/>
Supply fan operates with correct rotation (always shown)	<input type="checkbox"/>	<input type="checkbox"/>
Supply fan current draw does NOT exceed [service factor amps noted on the motor nameplate]	<input type="checkbox"/>	<input type="checkbox"/>
Initial supply fan airflow measurement NOTE: Increase/decrease supply fan variable frequency drive (VFD) maximum frequency as needed to meet the specified/required indoor airflow.	CFM	
Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L1)	Amps	
Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L2)	Amps	
Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L3)	Amps	
Second supply fan [60-80 ton units] current draw (at VFD maximum frequency after adjustment, measured at VFD L1)	Amps	
Second supply fan [60-80 ton units] current draw (at VFD maximum frequency after adjustment, measured at VFD L2)	Amps	
Second supply fan [60-80 ton units] current draw (at VFD maximum frequency after adjustment, measured at VFD L3)	Amps	
Redundant VFD [25-50 ton units] - Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L1)	Amps	
Redundant VFD [25-50 ton units] - Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L2)	Amps	
Redundant VFD [25-50 ton units] - Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L3)	Amps	
Return Fan Section		
Return fan control sequence is selected for the unit	<input type="checkbox"/>	<input type="checkbox"/>
Return fan operates with the correct rotation (always shown)	<input type="checkbox"/>	<input type="checkbox"/>
Return fan current draw does NOT exceed [service factor amps noted on the motor nameplate]	<input type="checkbox"/>	<input type="checkbox"/>
Return fan operates with the return fan VFD % command at 100%	<input type="checkbox"/>	<input type="checkbox"/>
Return fan pressure low and high setpoints are set for job site requirements	<input type="checkbox"/>	<input type="checkbox"/>
Return fan operates with the return fan VFD % command at 100% using the pressure setpoint	<input type="checkbox"/>	<input type="checkbox"/>
Return fan current draw (at VFD maximum frequency after adjustment, measured at VFD L1)	Amps	
Return fan current draw (at VFD maximum frequency after adjustment, measured at VFD L2)	Amps	
Return fan current draw (at VFD maximum frequency after adjustment, measured at VFD L3)	Amps	
Redundant VFD [60-80 ton units] - Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L1)	Amps	
Redundant VFD [60-80 ton units] - Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L2)	Amps	
Redundant VFD [60-80 ton units] - Supply fan current draw (at VFD maximum frequency after adjustment, measured at VFD L3)	Amps	

VENTILATION

Completed See Notes

If an exhaust fan is not installed on the unit, please move to the next section.		
Throughout this section, continue to operate the supply fan with the fan % command at 100%	<input type="checkbox"/>	<input type="checkbox"/>
Throughout this section, continue to operate the exhaust fan with the fan % command at 100%	<input type="checkbox"/>	<input type="checkbox"/>
Throughout this section, continue to operate the return fan with the fan % command at 100%	<input type="checkbox"/>	<input type="checkbox"/>
Throughout this section, continue to operate the ERW with the face and bypass dampers closed	<input type="checkbox"/>	<input type="checkbox"/>
Economizer return and outside air dampers operate through full stroke without binding	<input type="checkbox"/>	<input type="checkbox"/>
Ensure exhaust fan operates	<input type="checkbox"/>	<input type="checkbox"/>
Exhaust fan operates with correct rotation		
ERW operates with the face and bypass dampers closed NOTE: Increase/decrease exhaust fan VFD maximum frequency for the exhaust airflow needs of the application as needed.	<input type="checkbox"/>	<input type="checkbox"/>
Exhaust fan current draw (at VFD maximum frequency after adjustment, measured at L1)		Amps
Exhaust fan current draw (at VFD maximum frequency after adjustment, measured at L2)		Amps
Exhaust fan current draw (at VFD maximum frequency after adjustment, measured at L3)		Amps

NOTES:

HEATING

Completed See Notes

If a unit is cooling only, please move to the next section.		
Gas Heat	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Throughout this section, ensure all VAV boxes are set to their maximum cooling airflow and the duct pressure setpoint is set for the job site requirements	<input type="checkbox"/>	<input type="checkbox"/>
Measure static/unit off inlet gas pressure		inches WC
<div style="border: 2px solid orange; padding: 2px; display: inline-block;">⚠ WARNING</div> Inlet gas pressure cannot exceed 14 inches water column (WC). Do not continue with unit start-up until unit gas inlet pressure is corrected.		
Measure gas valve 1 low fire manifold pressure		inches WC
Measure gas valve 1 high fire manifold pressure		inches WC
Measure gas valve 1 manifold pressure at lowest firing rate (modulating heat)		inches WC
Measure gas valve 1 manifold pressure at highest firing rate (modulating heat)		inches WC
Measure gas valve 2 low fire manifold pressure		inches WC
Measure gas valve 2 high fire manifold pressure		inches WC
Measure gas valve 3 low fire manifold pressure		inches WC
Measure gas valve 3 high fire manifold pressure		inches WC
Measure gas valve 4 low fire manifold pressure		inches WC
Measure gas valve 4 high fire manifold pressure		inches WC
Measure gas valve 5 low fire manifold pressure		inches WC
Measure gas valve 5 high fire manifold pressure		inches WC
Measure gas valve 6 low fire manifold pressure		inches WC
Measure gas valve 6 high fire manifold pressure		inches WC
Operate heat section at full capacity	<input type="checkbox"/>	<input type="checkbox"/>

	Completed	See Notes
Measure inlet gas pressure with heat section operating at fully capacity		inches WC
Gas heat input capacity to use for sensible heat calculation	Unit nameplate measurement	BTU
	Clocked meter measurement (7-digit number)	BTU
Electric Heat	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Total/overall current draw of electric heat section L1		Amps
Total/overall current draw of electric heat section L2		Amps
Total/overall current draw of electric heat section L3		Amps
Hot Water/Steam Heat	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Hot water heat control valve actuator operates at full stroke	<input type="checkbox"/>	<input type="checkbox"/>
Steam humidifier control valve actuator operates at full stroke	<input type="checkbox"/>	<input type="checkbox"/>

NOTES:

COOLING

	Completed	See Notes
Throughout this section, ensure all VAV boxes are set to their maximum cooling airflow and the duct pressure setpoint is set for the job site requirements	<input type="checkbox"/>	<input type="checkbox"/>
Operate cooling at full capacity	<input type="checkbox"/>	<input type="checkbox"/>
All compressors operate with correct rotation	<input type="checkbox"/>	<input type="checkbox"/>
⚠ CAUTION Do not continue with unit start-up until compressor rotation is corrected.		
All condenser fans operate with correct rotation	<input type="checkbox"/>	<input type="checkbox"/>
⚠ CAUTION Do not continue with unit start-up until condenser fan rotation is corrected.		
Allow time for refrigerant circuits to stabilize	<input type="checkbox"/>	<input type="checkbox"/>
Refrigerant circuit 1 suction pressure		psi
Refrigerant circuit 1 suction line temperature		°F
Refrigerant circuit 1 liquid/discharge pressure		psi
Refrigerant circuit 1 liquid line temperature		°F
Refrigerant circuit 1 discharge temperature		°F
Measurements for refrigerant circuit 1 are affected by the low ambient outside fan cycling/speed control	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Refrigerant circuit 2 suction pressure		psi
Refrigerant circuit 2 suction line temperature		°F
Refrigerant circuit 2 liquid/discharge pressure		psi
Refrigerant circuit 2 liquid line temperature		°F
Refrigerant circuit 2 discharge temperature		°F
Measurements for refrigerant circuit 1 are affected by the low ambient outside fan cycling/speed control	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Compressor 1A current draw L1		Amps
Compressor 1A current draw L2		Amps
Compressor 1A current draw L3		Amps
Compressor 1B current draw L1		Amps
Compressor 1B current draw L2		Amps
Compressor 1B current draw L3		Amps

Completed See Notes

Compressor 2A current draw L1	Amps	
Compressor 2A current draw L2	Amps	
Compressor 2A current draw L3	Amps	
Compressor 2B current draw L1	Amps	
Compressor 2B current draw L2	Amps	
Compressor 2B current draw L3	Amps	
Condenser fan 1A current draw L1	Amps	
Condenser fan 1A current draw L2	Amps	
Condenser fan 1A current draw L3	Amps	
Condenser fan 1B current draw L1	Amps	
Condenser fan 1B current draw L2	Amps	
Condenser fan 1B current draw L3	Amps	
Condenser fan 1C current draw L1	Amps	
Condenser fan 1C current draw L2	Amps	
Condenser fan 1C current draw L3	Amps	
Condenser fan 2A current draw L1	Amps	
Condenser fan 2A current draw L2	Amps	
Condenser fan 2A current draw L3	Amps	
Condenser fan 2B current draw L1	Amps	
Condenser fan 2B current draw L2	Amps	
Condenser fan 2B current draw L3	Amps	
Condenser fan 2C current draw L1	Amps	
Condenser fan 2C current draw L2	Amps	
Condenser fan 2C current draw L3	Amps	
Discharge air temperature with cooling is operating at full capacity	<input type="checkbox"/>	<input type="checkbox"/>
Dehumidification mode (hot gas reheat (HGRH)) operation is tested	<input type="checkbox"/>	<input type="checkbox"/>

NOTES:

CONTROL PARAMETERS

Completed See Notes

Set controller time and date	<input type="checkbox"/>	<input type="checkbox"/>
Set [unit] Name and DevName (Device Name) as needed for the application through the MAP gateway or local display	<input type="checkbox"/>	<input type="checkbox"/>
Touchscreen display setup completed – if applicable	<input type="checkbox"/>	<input type="checkbox"/>
Set the unit occupancy status according to one of the following options:		
Set OccMode (Occupancy Mode) to External for the unit occupancy response to the main control board OCC-S input [24 VAC occupancy command]	<input type="checkbox"/>	<input type="checkbox"/>
Set OccMode to External for the unit occupancy response to the communicated command	<input type="checkbox"/>	<input type="checkbox"/>
Set OccMode to Schedule and enter the application's occupied and unoccupied start times in the <i>Schedule</i> menu	<input type="checkbox"/>	<input type="checkbox"/>
Set Tstat-Only (Thermostat Only Control Enabled) to YES for unit response to the customer terminal board thermostat inputs	<input type="checkbox"/>	<input type="checkbox"/>
Set Tstat-Only to NO for unit response to sensor inputs	<input type="checkbox"/>	<input type="checkbox"/>
Set the SZVAVEn (SZVAV Enabled) to OFF to configure the unit for a VAV zoned duct system	<input type="checkbox"/>	<input type="checkbox"/>
Set the SZVAVEn to ON to configure the unit for an unzoned duct system	<input type="checkbox"/>	<input type="checkbox"/>
Set the temperature settings for heating/cooling mode auto changeover as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>

CONTROL PARAMETERS (CONTINUED)

	Completed	See Notes
Set ClgDATUp-SP and ClgDATLo-SP (Cooling Discharge Air Temperature Upper and Lower Set-points) as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Set HtgDATUp-SP and HtgDATLo-SP (Heating Discharge Air Temperature Upper and Lower Set-points) as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Set the DAT-Spconfig (Discharge Air Temperature Setpoint Configuration) to External for unit response to the option board DAT-SP input [0–10 VDC discharge air temp reset]	<input type="checkbox"/>	<input type="checkbox"/>
Set the parameters for the discharge air temperature reset function for the application needs	<input type="checkbox"/>	<input type="checkbox"/>
Set HumidistatMode to Humidification for unit response to the customer terminal board humidistat input [24 VAC humidification command]	<input type="checkbox"/>	<input type="checkbox"/>
Set HumidistatMode to Dehumidification for unit response to the customer terminal board humidistat input [24 VAC dehumidification command]	<input type="checkbox"/>	<input type="checkbox"/>
Set SafetySetup1 for unit response to the customer terminal board SMOKE1-S input [24 VAC smoke/purge command]	<input type="checkbox"/>	<input type="checkbox"/>
Set SafetySetup2 for unit response to the customer terminal board SMOKE2-S input [24 VAC smoke/purge command]	<input type="checkbox"/>	<input type="checkbox"/>
Set SafetySetup3 for unit response to the customer terminal board SMOKE3-S input [24 VAC smoke/purge command]	<input type="checkbox"/>	<input type="checkbox"/>
Set parameters for the <i>Commission > FaultOut1</i> menu to configure the customer terminal board ALARM1-C output [dry contact remote alarming command]	<input type="checkbox"/>	<input type="checkbox"/>
Set parameters for the <i>Commission > FaultOut1</i> menu to configure the customer terminal board ALARM2-C output [dry contact remote alarming command]	<input type="checkbox"/>	<input type="checkbox"/>
Set parameters in the <i>Details > T24LoadShed</i> menu for the unit response to the customer terminal board ADR-S input [24 VAC load shed command]	<input type="checkbox"/>	<input type="checkbox"/>
Set the HydReverse (Hydronic Heat Valve Reverse Acting) for the hydronic heat control valve configuration	<input type="checkbox"/>	<input type="checkbox"/>
Set the Group ID and Device# as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Set the ExDmprCtrlSrc (Exhaust Damper Control Source) to Hardware for unit response to the customer terminal board EAD-REF input [0–10 VDC exhaust damper positioning command]	<input type="checkbox"/>	<input type="checkbox"/>
Set the ExFanCtrlSrc (Exhaust Fan Control Source) to Hardware for unit response to the customer terminal board EF-REF input [0–10 VDC exhaust fan positioning command]	<input type="checkbox"/>	<input type="checkbox"/>
Set OADmprCtrlSrc (Outdoor Air Damper Control Source) to Hardware for unit response to the customer terminal board OAD-REF input [0–10 VDC exhaust damper positioning command]	<input type="checkbox"/>	<input type="checkbox"/>
Set the parameters for the economizer free cooling functions as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Set the parameters for the demand ventilation functions as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Set the Bldg-Sp (Building Pressure Setpoint) as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Set the parameters for the dehumidification mode (HGRH) in the <i>Details > Humidity</i> menu as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Set the parameters for the humidification mode (steam humidifier) in the <i>Details > Humidity</i> menu as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Set the parameters for network communication in the <i>Controller > Network</i> menu as needed for the application	<input type="checkbox"/>	<input type="checkbox"/>
Insert a compatible flash drive into the main control board USB port and perform a backup (<i>Update > Backup</i> menu), and save the "BKP_" file	<input type="checkbox"/>	<input type="checkbox"/>

NOTES:

END OF SECTION