INVITATION TO BID
Informal Bid
HVAC REPLACEMENT – Sheppard Memorial Library
CITY OF GREENVILLE
NORTH CAROLINA

Find yourself in good company

PRE-BID MEETING: THURSDAY, JULY 29, 2021 @ 2:00 PM
SHEPPARD MEMORIAL LIBRARY
530 EVANS STREET, GREENVILLE, NC

BIDS DUE: THURSDAY, AUGUST 12, 2021 @ 2:00 PM
PUBLIC WORKS
1500 BEATTY STREET, GREENVILLE, NC 27834

CONTACT PERSONS:

QUESTIONS REGARDING THE BID PACKAGE:
Ms. Denisha Harris
Purchasing Manager
Telephone: (252) 329-4862
Email: dharris@greenvillenc.gov

QUESTIONS REGARDING THE SPECIFICATIONS:
Mr. Ross Peterson
Building and Grounds Supervisor
Telephone: (252) 329-4921
Email: rpeterson@greenvillenc.gov

CITY OF GREENVILLE
ADVERTISEMENT FOR PROPOSALS
"HVAC Replacement – Sheppard Memorial Library"

The City of Greenville, NC is requesting proposals for the "HVAC Replacement – Sheppard Memorial Library" located at the Sheppard Memorial Library, 530 Evans Street. The scope of work shall include but is not limited to the removal of the existing rooftop units, installation of new rooftop units, all electrical and other associated items.

This is a turn-key project.

A mandatory pre-bid meeting and site visit will be held at the Sheppard Memorial Library located at 530 Evans Street, Greenville, NC on Thursday, July 29, 2021 @ 2:00 PM.

A site visit is mandatory that will be available following the pre-bid meeting and an additional date for those that attend mandatory pre-bid will be Tuesday, August 3, 2021 @ 2:00 PM, by emailing Ross Peterson at rpeterson@greenvillenc.gov.

Sealed proposals will be received by the City of Greenville Public Works until Thursday, August 12, 2021 by 2:00 PM at the Public Works Reception Desk located at 1500 Beatty Street, Greenville, NC 27834.

Mailed bids must be delivered to 1500 Beatty Street, Greenville, NC 27834 on or before Thursday August 12, 2021 @ 2:00 PM and addressed to Mr. Ross Peterson, Building and Grounds Supervisor, with the words *Bid Enclosed*, *HVAC Replacement – Sheppard Memorial Library* on the outside of the mail carrier envelope. Bids received after the deadline will not be opened.

All bids will be marked with the date and time they are received by reception staff. Bids will NOT be opened and read aloud. Bids will be open and reviewed by city staff. A bid tabulation will be available upon request once the contract is awarded to the successful bidder.

The City of Greenville reserves the right to reject any or all bids, waive any informality and award contracts that appear to be in its best interest. The right is reserved to hold any or all proposals for a period of sixty (60) days from the bid opening thereof.

From the date of this advertisement until the date of opening the proposals, the plans and specifications of the proposed work and/or a complete description of the apparatus, supplies, materials or equipment are and will continue to be on file in the office of the City of Greenville Purchasing Manager, 201 W. 5th Street, Greenville, NC 27834, during regular business hours, and available to prospective bidders. Inquiries should be directed to the Purchasing Manager at the above address --- Telephone (252) 329-4862. Minority/Women owned business are encouraged to submit proposals.

INSTRUCTIONS TO BIDDERS

Proposal to Provide
HVAC Replacement – Sheppard Memorial Library
530 Evans Street, Greenville, NC 27834

1. **Contractor is to provide verification to the City that the company's employees are covered under worker's compensation insurance coverage.**

2. **It is expressly understood by the contractor offering a proposal after a written notice of award by the City, a purchase order will be required to be executed and will serve together with this proposal, these instructions, and any detailed specifications as the entire form of contract between the parties.**

3. **Each Contractor submitting a proposal is affirming that no official or employee of the City is directly or indirectly interested in this proposal for any reason of personal gain.**

4. **Sales taxes may be listed on the proposal, but as a separate item. No charge will be allowed for Federal Excise and Transportation Tax from which the City is exempt.**

5. **Questions regarding any procedure for submission of a proposal for the HVAC Replacement shall be directed by email to Ross Peterson, Building and Grounds Supervisor, @ rpeterson@greenvillenc.gov. Questions shall be submitted by 5:00 PM, Thursday, August 5, 2021. Answers will be provided in an addendum and email to those that signed in at the pre-bid by 5:00 PM, Monday, August 9, 2021. If an addendum is provided it must be indicated by initialing on bid form. Addendums will be available on city web page.**

6. **If the Contractor is unable to provide a proposal for any reason, please send an email with an explanation to rpeterson@greenvillenc.gov.**

7. **By submitting a proposal for HVAC REPLACEMENT – Sheppard Memorial Library, the Contractor attests that it is in compliance with all items listed in the bid/proposal instructions. Furthermore, the Contractor attests that the City of Greenville accepts no responsibility for any injuries to the firm's employees, while on City property performing their duties.**

8. **Contractor must comply with all OSHA requirements associated with the work within this contract.**

9. **It is expected that work would begin sometime in November. However, such starting date is subject to change based on time needed to finalize contract documents.**

10. **No work will be performed at any time without proper supervision. Names and experience of supervisors shall be provided.**

11. **Parking and staging areas for equipment and materials can be arranged on site during the pre-construction meeting conducted prior to the work starting.**

12. **Work on this project will have to be performed so as to not disrupt operations of the buildings and grounds.**

13. **All work must be performed Monday – Saturday from 7:00 AM to 7:00 PM. Other hours will have to be approved in advance.**

14. **The Contractor shall accompany a designated representative(s) of the City on inspections of work at any time during the contract period. The City reserves the right to make determinations as to whether service is performed satisfactorily. Deficiencies in work performance must be corrected immediately.**

SPECIFICATIONS

1.0 SCOPE:

The scope of work shall include, but is not limited to:

1.1 Contractor will have 5 consecutive working days to complete project. Building must be fully acclimated by end of 3rd day.

1.2 The Contractor shall provide all labor, equipment, crane, materials and insurance necessary to remove and replace a total of 5 the rooftop HVAC units [(1) 40 ton, (1) 27.5 ton, (1) 20 ton, (1) 15 ton, (1) 5 ton] and all necessary work to complete installation per the attached equipment specifications and drawings document, labeled as Exhibit "B".

1.3 New rooftop units shall be manufactured by Trane. No other manufacture will be accepted.

1.4 Include extended warranty of 10 years for compressor and heat exchanger parts as well as a 5 year parts, refrigerant and labor warranty.

1.5 Start up and commissioning shall be performed by Trane authorized representative.

1.6 New units shall have coil guards and hinged doors.

1.7 New 5 ton unit will need horizontal supply and return and curb adapter. Contractor responsible to verify with Trane.

1.8 The new units will be placed on the existing curb with a new gasket provided by contractor. Visual inspection by the city and contractor of duct shall be performed prior to setting units in place. If any work is deemed necessary by the City than a change order will be created.

1.9 There are two power supplies at each existing unit. One of the power supply is compatible for new units. The other power supply will be isolated in new weather tight termination box. Contractor is responsible to verify with Trane and license electrical contractor to ensure proper power source.

1.10 Install all new electrical service disconnects with watertight conduit from service disconnect to units.

1.11 All electrical and duct connections shall be included.

1.12 All low voltage wiring including controls and Life Safety shall be disconnected and reconnected by contractor.

1.13 Obtain all permits from the City of Greenville at no cost.

1.14 Cleanup and removal of all replacement units and debris at work site.

1.15 After completion owner and contractor will perform walk through to determine punch list items. Any punch list items shall be address within a week.

1.16 Provide close out documents to include warranty and manuals.

2.0 PAYMENT AND BID:

2.1 Bidders will comply with all local, state, and federal laws and ordinances governing said work including the Occupational Safety and Health Act of 1970.

2.2 By submitting a proposal, the firm is attesting that they are an Equal Opportunity Employer.

2.3 The City of Greenville has adopted an Affirmative Action Program. Firms submitting a proposal are attesting that they also have taken affirmative action to ensure equality of opportunity in all aspects of employment.

2.3 Minority and/or Women Business Enterprise (MWBE) Program

It is the policy of the City of Greenville to provide minorities and women equal opportunity for participating in all aspects of the City's contracting and procurement programs, including but not limited to, construction projects, supplies and materials purchases, and professional and personal service contracts. In accordance with this policy, the City has adopted a Minority and Women Business Enterprise (M/WBE) Plan and subsequent program, outlining verifiable goals.

The City has established a 10% Minority Business Enterprise (MBE) and 6% Women Business Enterprise (WBE) goal for the participation of MWBE firms in supplying goods and services for the completion of this project. All firms submitting bids agree to utilize minority and women-owned firms whenever possible.

Refer to Exhibit "C" for all Minority and/or Woman Business Enterprise (MWBE) requirements.

Questions regarding the City's M/WBE Program should be directed to Ferdinand Rouse in the M/WBE Office at (252) 329-4862.

2.5 The City of Greenville reserves the right to reject any and all bids, to waive any informalities and to accept the bid if seems most advantages to the City. Any bid submitted will be binding for sixty (60) days after the date of the bid opening.

2.6 Equal Employment Opportunity Clause

The City has adopted an Equal Employment Opportunity Clause, which is incorporated into all specifications, purchase orders, and contracts, whereby a vendor agrees not to discriminate against any employee or applicant for employment on the basis of race, color, religion, sex, national origin or ancestry. A copy of this clause may be obtained at the City Clerk's Office, City Hall, Greenville, NC. By submitting qualifications and/or proposals, the firm is attesting that they are an Equal Opportunity Employer. Federal law (Rehabilitation Act and ADA) prohibits handicapped discrimination by all governmental units. By submitting a proposal, the vendor is attesting to its policy of nondiscrimination regarding the handicapped.

2.7 Iran Divestment Act Certification:

The CONTRACTOR hereby certifies that, it is not on the Iran Final Divestment List created by the North Carolina State Treasurer pursuant to N.C.G.S. 147-86.58. The CONTRACTOR shall not utilize in the performance of the Agreement any subcontractor that is identified on the Iran Final Divestment List.

2.8 E-Verify Compliance:

The CONTRACTOR shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statues. Further if the CONTRACTOR utilizes a subcontractor, the CONTRACTOR shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statues. The CONTRACTOR represents that the CONTRACTOR and its subcontractors are in compliance with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes.

2.9 If necessary, the contractor must complete a new vendor application and associated documents as required upon acceptance of this contract.

2.10 The contractor will develop a lump sum bid; that will include, but is not limited to all work, equipment, parts, and labor specified herein.

3.0 WORKERS COMPENSATION AND INSURANCE:

3.1 The contractor must maintain during the life of this contract, Worker's Compensation Insurance for all employees working at the project site under this contract, or as otherwise required by North Carolina General Statutes.

3.2 The Contractor shall have in place for the life of this contract public liability and property damage insurance and shall protect the City of Greenville from claims for damage or personal injury, which may arise from operations under this contract. The amounts of such insurance shall not be less than $500,000 for injuries subject to the same limit per person and $1,000,000 for property damage or otherwise needed to protect the interests of the owner. The Contractor awarded this contract is to provide a Certificate of Insurance showing the City of Greenville named as an additionally insured on all coverage. All insurance must be maintained during the duration of the contract.

3.3 OTHER INSURANCE:

The contractor shall furnish such additional insurance as may be required by the General Statues of North Carolina, including motor vehicle insurance in amounts not less than statutory limits.

4.0 CANCELLATION:

4.1 Each certificate of insurance shall bear the provision that the policy cannot be altered or canceled in less than ten (10) days after mailing written notice to the assured of such alteration or cancellation, sent registered mail.

4.2 The contractor shall furnish the owner with satisfactory proof of insurance required before written approval of such insurance is granted by the owner.
Executed contract documents, insurance certifications, invoices and other information requested, are to be sent to:

Ross Peterson, Building and Grounds Supervisor
City of Greenville
1500 Beatty Street
Greenville, N.C. 27834
Email: rpeterson@greenvillenc.gov

5.0 DAMAGE TO CONTRACTORS PROPERTY:

5.1 The City of Greenville shall be under no obligation to replace or in any way compensate the contractor for fire, theft, vandalism or any other casualty, injury or damage to equipment or property belonging to the contractor while on City property.

5.2 The successful bidder agrees to indemnify or hold harmless the City of Greenville from and against any liability, loss, cost, damage suit, claim, or expense arising occurrence on the part of the successful bidder to include its officers, servants, agents or employees arising from its activities, operations, and performance of services while on City property and further agrees to release and discharge the City of Greenville and its Agents from all claims or liabilities arising from or caused by the successful bidder in fulfilling its obligations under this Agreement.

5.3 It is understood and agreed by the parties that the City of Greenville will assume no liability for damages, injury, or other loss to the successful bidder, its employees or property, tools or equipment, or to other persons or properties located on City facilities resulting from the successful bidder's activities and operations while performing those service enumerated herein. The successful bidder shall assume full and complete liability for any and all damages on City or private properties caused by or resulting from its activities, operations, and that of its employees, agents and officers.

6.0 ADDENDUM

6.1 Addendum: Any changes to the specifications will be issued as a written addendum. No oral statements, explanations, or commitments by whosoever shall be of any effect.

6.2 Amendment: The contract may be amended from time to time through written agreement by both parties.

7.0 REFERENCE INFORMATION

All bidders must provide a list of three (3) client references of similar work. The reference information must include the company's name, a contact person's name with his or her title and their telephone number. Contractor must provide the information below with their bid sheet. Contractor must be experienced in projects of similar construction.

1. Company name: _____

Contact person: _____

Title: _____ Phone No. _____

2. Company name:_____

Contact person: _____

Title: _____ Phone No. _____

3. Company name: _____

Contact person: _____

Title: _____ Phone No. _____

8.0 CONTRACTOR INFORMATION

Contractor must provide the information below with the bid sheet.

CITY OF GREENVILLE
NORTH CAROLINA
PROSPECTIVE CONTRACTOR DATA FORM

Company Name: _____

Address: _____

Phone Number: _____Mobile Phone Number: _____

Email: _____ ____Business Fax Number: _____

Tax ID# _____

NC General Contractors License#_____

Corporation or Partnership: _____

Number of Years in Business: _____

CITY OF GREENVILLE
PUBLIC WORKS DEPARTMENT
REQUEST FOR BIDS

In compliance with the request for bids by the City of Greenville and subject to all conditions and specifications thereof, the undersigned offers and agrees to furnish all equipment, labor and work site clean-up as provided in the above mentioned specifications.

Description

HVAC Replacement – Sheppard Memorial Library:

Lump Sum Bid Total

$_____

Bid reviewed, prepared and submitted by-

Company Name: _____ **Addenda Received:_____**

Signed: _____

Print Name:_____

Date: _____

Submittal

EXHIBIT B

Prepared For:
City of Greenville

Job Name:
Sheppard Memorial Library Replacement

Trane U.S. Inc. is pleased to provide the enclosed submittal for your review and approval.

Product Summary

Qty	Product
2	Packaged Rooftop, Cooling / Heating Units
2	Packaged Cooling Rooftop Units
1	3-10 Ton R-410A PKGD Unitary Cooling Rooftop

David McDaniel
Trane U.S. Inc.
401 Kitty Hawk Drive
Morrisville, NC 27560-8271
Phone: (919) 781-0458
Cell: (919) 632-0080
Fax: (919) 781-9195

The attached information describes the equipment we propose to furnish for this project, and is submitted for your approval.

Product performance and submittal data is valid for a period of 6 months from the date of submittal generation. If six months or more has elapsed between submittal generation and equipment release, the product performance and submittal data will need to be verified. It is the customer's responsibility to obtain such verification.

Table Of Contents

Tag Data - Packaged Rooftop, Cooling / Heating Units (Qty: 2)

Item	Tag(s)	Qty	Description	Model Number
A1	AHU-1	1	27.5 Ton	TCD330B40-6B1CEAA0-----HHB0100-*500-0000X---*
A2	AHU-3	1	40 Ton	TCD480B40-6B3MEAA0-----HHB0100-*500-0000X---*

Product Data - Packaged Rooftop, Cooling / Heating UnitsAll Units

DX Cooling - NO HEAT
Downflow supply and upflow return460 Volt 60 Hertz 3 Phase
Cooling only unit
100% Power exhaust w/ Stratitrac building pressure control2" MERV 8 High efficiency, throwaway filters
0-100% Economizer, differential enthalpy control VAV (DTC) with supply VFD & motor shaft groundingService valves
Hinged service access doors Louvered condenser coil hail guards
BACnet communication interface module5k SCCR
Pre-painted steel drain pan w/ condensate overflow switchStandard efficiency unit
TD5 Touchscreen display, human interface5 year parts & labor & refrigerant warranty 10 year compressor parts warranty

Item: A1 Qty: 1 Tag(s): AHU-1
27.5 ton 60 Hertz
7.5 hp supply motor
650/541 (60/50 hz) Supply fan driveNO
ADAPTER CURB REQUIRED

Item: A2 Qty: 1 Tag(s): AHU-3
40 ton 60 Hertz
15 hp supply motor
675/562 (60/50 hz) Supply fan driveNO
ADAPTER CURB REQUIRED

Performance Data - Packaged Rooftop, Cooling / Heating Units

Tags	AHU-1	AHU-3
Supply airflow (cfm)	9700	16000
Elevation (ft)	0.00	0.00
Cooling entering DB (F)	80.00	80.00
Cooling entering WB (F)	67.00	67.00
Ambient DB (F)	95.00	95.00
Cooling leaving unit DB (F)	58.39	60.14
Cooling leaving unit WB (F)	56.44	58.01
Cooling leaving coil DB (F)	56.55	57.73
Cooling leaving coil WB (F)	55.70	57.06
Gross total capacity (MBh)	340.50	498.60
Gross sensible capacity (MBh)	250.26	390.68
Gross latent capacity (MBh)	90.24	107.92
Net total capacity (MBh)	322.83	459.16
Net sensible capacity (MBh)	232.59	351.23
Net sensible heat ratio (%)	0.72	0.76
ESP (in H2O)	1.500	1.500
Total static pressure (in H2O)	1.949	2.470
Actual Supply Motor BHP (hp)	6.140	13.856
Supply Motor Power (kW) (rpm)	660	662
Indoor motor power (kW)	4.58	10.35
Outdoor motor power (kW)	0.01	0.02
Compressor power (kW)	24.23	33.21
System power (kW)	32.63	49.37
EER @ AHRI (EER)	10.3	10.3
IEER @ AHRI (EER)	12.4	11.8
Minimum circuit ampacity (A)	73.65	102.90
Maximum overcurrent protection (A)	90.00	125.00
Minimum disconnect switch size (A)	78.00	108.00
Compressor 1 RLA (A)	21.00	23.00
Compressor 2 RLA (A)	23.00	34.00
Compressor 3 RLA (A)	0.00	0.00
Supply fan FLA (A)	9.80	18.00
Condenser fan FLA (A)	3.50	3.50
Condenser fan count (Each)	3.00	4.00
Exhaust fan FLA (A)	1.80	2.70
Exhaust fan count (Each)	2.00	2.00
Electric heater FLA (A)	0.00	0.00
Crankcase heater FLA (A)	0.00	0.00
Unit est operating weight (lb)	4426.0	5517.0
HFCF-410A refrigerant charge - circuit 1 (lb)	24.6	19.4
HFCF-410A refrigerant charge - circuit 2 (lb)	-	37.0

Mechanical Specifications - Packaged Rooftop, Cooling / Heating Units
Item: A1, A2 Qty: 2 Tag(s): AHU-1, AHU-3

General R-410A
The units shall be downflow, horizontal, or mixed airflow. The operating range shall be between 115°F and 0°F in cooling as standard from the factory for all units. Cooling performance shall be rated in accordance with AHRI testing procedures. All units shall be factory assembled, internally wired, fully charged with R-410A refrigerant and 100% run tested to check cooling operation, fan and blower rotation and control sequence before leaving the factory. Wiring internal to the unit shall be numbered for simplified identification. Units shall be cULus listed.

Compressors R410A
The 3-D Scroll shall provide a completely enclosed compressor chamber with optimized scroll profiles which leads to increased efficiency. The 3-D Scroll shall include a direct-drive, 3600 rpm, suction gas cooled hermetic motor. The compressor shall include a centrifugal oil pump, scroll tips seals, internal heat shield that lowers the heat transfer from discharge and suction gas, oil level sight glass and oil charge valve. Some compressor models shall also provide a diptube that allows for oil draining, in addition to a low leakage internal discharge check valve to help prevent refrigerant migration. Each compressor shall have a crankcase heater installed, properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

Casing
Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel. Cabinet surface shall be tested 672 hours in salt spray in compliance with ASTM B117. All components shall be mounted in a weather resistant steel cabinet with a painted exterior. Where top cover seams exist, they shall be double hemmed and gasket sealed to prevent water leakage. Cabinet construction shall allow for all maintenance on one side of the unit. Service panels shallhave handles and shall be removable while providing a water and air tight seal. Control box access shall be hinged. Theindoor air section shall be completely insulated with fire resistant, permanent, odorless, foil faced glass fiber material. The base of the unit shall have provisions for crane lifting.

Hinged Service Access
Filter access panel and supply fan access panel shall be hinged for ease of unit service.

Phase and Voltage Monitor
Standard on all Voyager Commercial units. Shall protects 3-phase equipment from phase loss, phase reversal, and low voltage. Any fault condition shall send the unit into an auto stop condition. cULus approved.

Service Valves
Service valves shall be provided factory installed and include suction and discharge 3-way shutoff valves.

Refrigerant Circuits
Each refrigerant circuit shall have independent thermostatic expansion devices, service pressure ports and refrigerantline filter driers factory-installed as standard. An area shall be provided for replacement suction line driers.

Outdoor Fans
The outdoor fan shall be direct-drive statically and dynamically balanced, draw through in the vertical discharge position.The fan motors shall be permanently lubricated and have built-in thermal overload protection.

Evaporator and Condenser Coils - R410A
Condenser coils shall have all Aluminum Microchannel coils. Evaporator coils shall be internally finned Copper tubes mechanically bonded to high performance Aluminum plate fins. All coils shall be leak tested at the factory to ensure pressure integrity. The evaporator coil is pressure tested to 450 psig and the condenser coil at 650 psig. All dual circuit evaporator coils shall be of intermingled configuration. Sloped condensate drain pans are standard.

Condensate Overflow Switch
This option shall shut the unit down in the event that a clogged condensate drain line prevents proper condensateremoval from the unit.

Louvered Hail Guard
Louvered, hail protection quality coil guards are available for condenser coil protection.

Indoor Fan, 60 Hz Supply Motor
Unit will have belt driven, forward curve, centrifugal fans with fixed motor sheaves. The supply fan motors will be circuit breaker protected. All 60 Hz supply fan motors meet the Energy Independence and Security Act of 2009 (EISA).

Variable Frequency Drive

Unit shall include factory-installed and tested variable frequency drive[s] (VFD) to provide motor speed modulation. The VFD shall receive a 0-10VDC speed signal from the unit controller. The drive will respond to the signal by acceleratingor decelerating to maintain the controlling set point (duct static, space pressure, etc). VFD shall also include the following features:

1. Designed, constructed, and tested in accordance with NEMA ICS, NFPA, and IEC standards and housed in a plastic IP20 enclosure.

2. DC link reactors on both the positive and negative rails of the DC bus equal to 3% impedance to minimize power line harmonics.

3. Full rated output current continuously - 110% of rated current for 60 seconds and 160% of rated current for up to 0.5 second while starting.

4. Isolation between the Drive's power circuitry and control circuitry to ensure operator safety and to protect connected electronic control equipment from damage caused by voltage spikes, current surges, and ground loop currents.

5. Audible noise reduction through automatic adjustment of the carrier frequency and frequency avoidance.

6. Rated at 40C with a standard operating range of -10 to 50C (14 to 124F) ambient temperatures and 0 to 95% relative humidity

7. Self-diagnostics and motor protections such as: cULus listed overload, phase loss, and internal thermal overload.

8. Off/Stop and Auto/Start selector switches to start and stop the AC Drive and determine the speed reference.

a. On units with bypass, an AC Drive/Off/Bypass hand selector switch shall be provided in the unit control box

b. In DRIVE mode speed reference shall be provided by a 0-10 VDC analog input

9. A keypad interface which shall be programmable by language and feature multiple lines for easy reading

10. Controlled and/or accessible points such as AC Drive Start/Stop, speed reference, and fault diagnostics.

11. Meter points such as motor power in HP, motor power in kW, motor kW-hr, motor current, motor voltage, hours run, DC link voltage, thermal load on motor, Thermal load on AC Drive and Heatsink temperature.

12. Troubleshooting features such as:
    a. AC Drive memory storage of the last 10 faults and related operational data
    b. Four simultaneous displays: frequency or speed, run time, output amps and output power
    c. Keypad which shall display: Reference Signal Value, Output Frequency in Hz or percent, Output Amps, Motor HP, Motor kW, kW

13. Coated circuit boards for protection against corrosive environments

14. Field readable BACnet points to allow for communication of stauts, setpoints and diagnostics to the BAS.

Motor Shaft Grounding Ring

Motors shall have internal bearing protection for use withVFDs to provide a conductive discharge path away from themotor bearings to ground. Bearing Protection Rings shall be circumferential rings with conductive micro fibers which provide the path of least resistance and dramatically extend motor life.

Modulating 100 Percent Exhaust Fan with Statitrac Control Option

A differential pressure control system, (Statitrac), shall use a differential pressure transducer to compare indoor building pressure to outdoor ambient atmospheric pressure and shall turn the exhaust fans on and off and modulate the barometric exhaust dampers to control the building pressure to within the adjustable, specified dead band that shall beadjustable at the RTVM board.

2" High Efficiency Filters - MERV 8

2" High Efficiency MERV 8 filters will be standard.

Economizer w Differential Enthalpy Control
Economizer shall be factory installed. The assembly shall include: fully modulating 0-100 percent motor and dampers, minimum position setting, preset linkage, wiring harness, and fixed dry bulb control. Differential enthalpy control shall bea factory or field installed option.

Controls
Unit shall be completely factory wired with necessary controls and terminal block for power wiring. Units shall provide an external location for mounting fused disconnect device. ReliaTel controls shall be provided for all 24 volt control functions. The resident control algorithms shall make all heating, cooling and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. The control algorithm maintains accuratetemperature control, minimizes drift from set point and provides better building comfort. ReliaTel controls shall provideanti-short cycle timing and time delay between compressors to provide a higher level of machine protection.

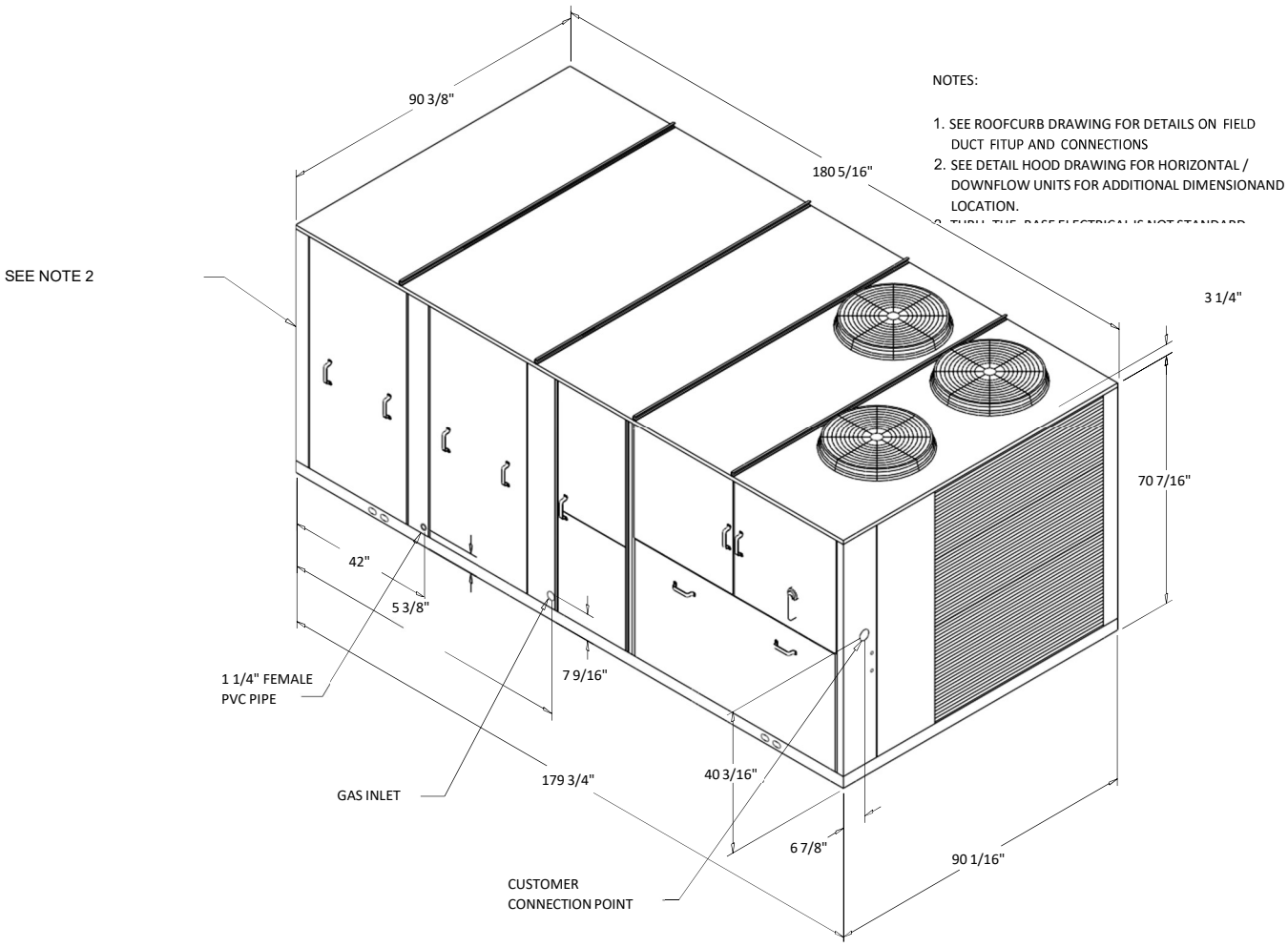
Human Interface
The Human Interface shall have a 5 inch color touchscreen display that conforms to FCC Part 15 Class B with an Ingress Protection Rating of IP24.The display text shall be readable by a person with 20/20 vision at a distance of 3 feetand 60 degree angle at lighting levels ranging from 100 lux - 25,000 lux. Also, the display shall operate at temperaturesof -40 Celsius to 70 Celsius. Firmware and unit configurations shall be able to be restored via a USB storage device.

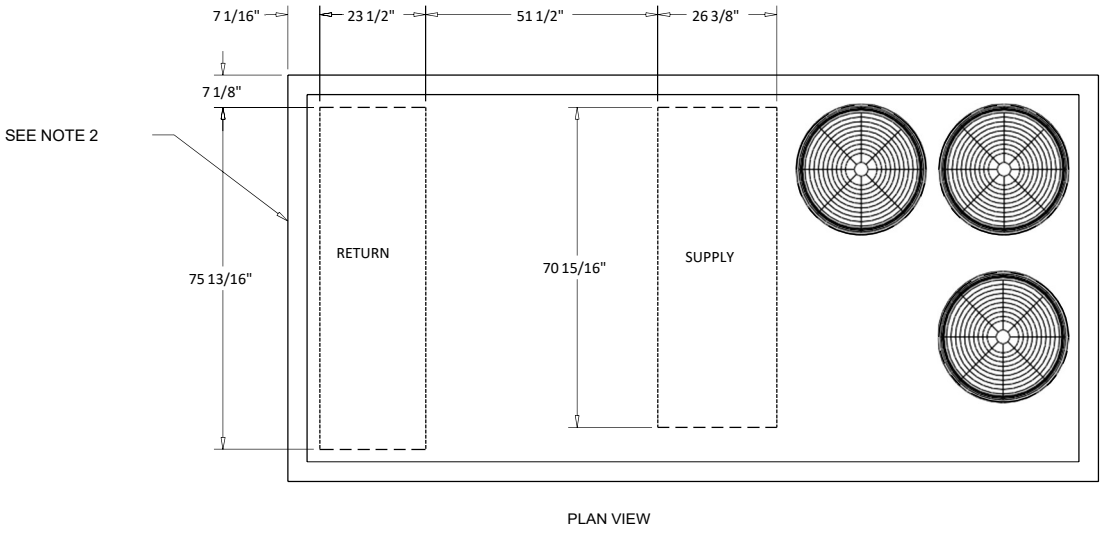
Unit Interrupt Rating (Standard Short Circuit Current Rating-SCCR)
A 5,000 Amp rating shall be applied to the unit enclosure using a non-fused circuit breaker for disconnect switch purposes. Fan motors, compressors, and electric heat circuits shall be provided with protective devices that will providethe unit rated level of fault protection. The unit shall be marked with approved cULus markings and will adhere to cULusregulations.

BACnet Communications
The BACnet communications interface shall allow the unit to communicate directly with a generic open protocol BACnet MS/TP Network Building Automation System Controls.

Certified AHRI Performance
Packaged Rooftop units cooling, heating capacities and efficiencies are rated within the scope of the Air-Conditioning, Heating & Refrigeration Institute (AHRI) Certification Program and display the AHRI Certified® mark as a visual confirmation of conformance to the certification sections of AHRI Standard 340-360 (I-P) and ANSIZ21.47 and 10 CFRPart 431 pertaining to Commercial Warm Air Furnaces.The applications in this catalog specifically excluded from the AHRI certification program are:
-Ventilation modes
-Heat Recovery

Unit Dimensions - Packaged Rooftop, Cooling / Heating Units
Item: A1 Qty: 1 Tag(s): AHU-1





PLAN VIEW

DOWNFLOW SUPPLY AND UPFLOW CONFIGURATION

DIMENSIONAL DRAWING

Unit Dimensions - Packaged Rooftop, Cooling / Heating Units
Item: A1 Qty: 1 Tag(s): AHU-1

ELECTRICAL / GENERAL DATA

UNIT	
Model (Tonnage)	TCD330 (27.5)
Operating voltage range:Primary	414 - 506
voltage:	460
Hertz: Phase:	60
EER / IEER:	3
	10.3 EER/12.4 EER

HEATING - PERFORMANCE	
Heat:	N/A
Heating Input (Btu/h): First	N/A
Stage (Btu/h): Heating Output	N/A
(Btu/h):First Stage (Btu/h):	N/A
No Burners:	N/A
No. Stages / Turn Down Rate:	N/A
	N/A
Gas Supply Pressure (in w.c.)Natural	
or LP:	
Gas Connection Pipe Size:	N/A
	N/A

COMPRESSOR	
NumberTons	1/1
Compressor Rated Load AmpsLocked	12.0/13.0
Rotor Amps	21.0/23.0
	147.0/158.0

ELECTRIC HEATER	
Electric Heater kw	N/A
Electric Heater Full Load Amps	N/A

INDOOR MOTOR SUPPLY FAN	
Horsepower	7.5
Motor speed (rpm)	1,760
Indoor motor full load amps	9.4

OUTDOOR MOTOR	
Number	3
HorsepowerPhase	1.1
Outdoor motor full load amps	1
	3.5

EXHAUST MOTOR	
Number	2
HorsepowerPhase	1.0
Exhaust motor full load amps	3
	1.8

FILTERS (7)	
Type Furnished	ThrowawayYes
Number	16
Recommended size	16"x20"x2"

REFRIGERANT TYPE (6)	
Type	R-410A
Factory Charge (Circuit #1)Factory	24.6 lb
Charge (Circuit #2)	Not Available

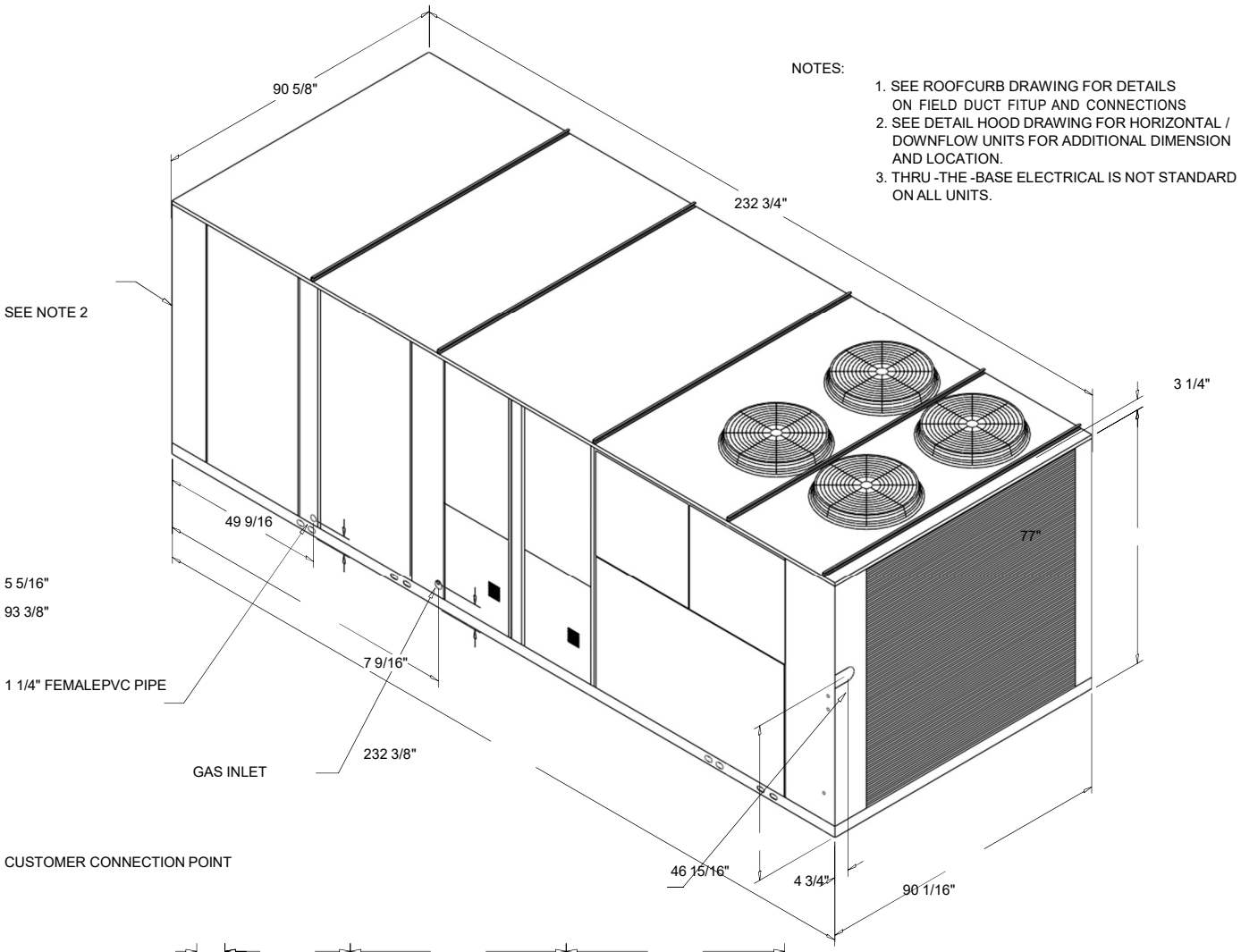
Cooling MCA = (1.25 x Load 1) + Load 2 + Load 4

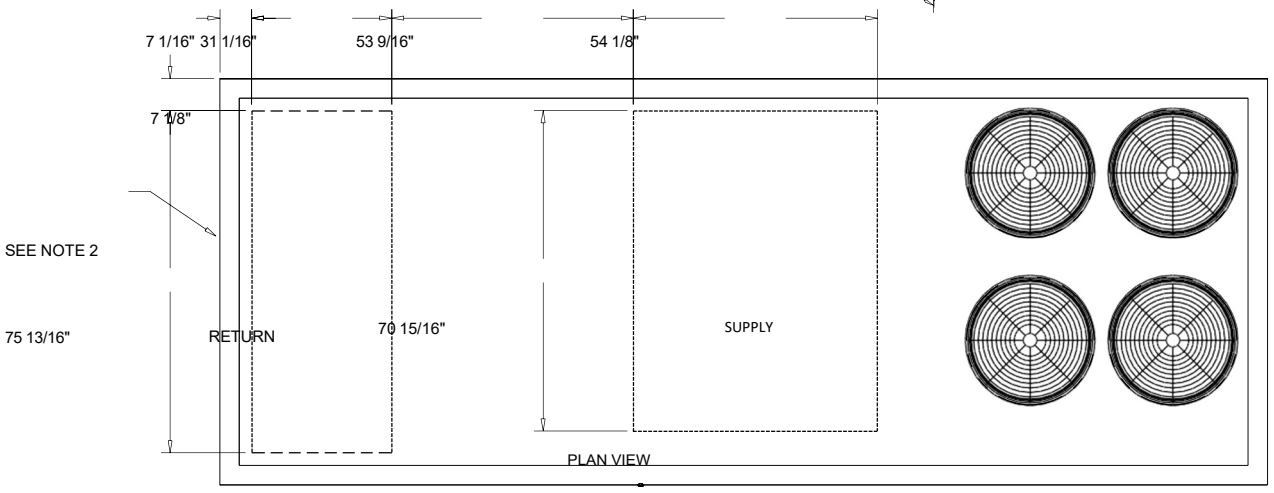
Cooling MOP = (2.25 x Load 1) + Load 2 + Load 4

Notes:

1. LOAD 1= Current of the largest motor (Compressor or Fan Motor); LOAD 2=Sum of the currents of all remaining motors LOAD 3= FLA(Full Load Amps) of the electric heater; LOAD 4= Any other load rated at 1 amp or more.
2. For Electric Heat MCA, MOP, RDE values, calculate for both cooling and heating modes.
3. If selected Max Over Cur is less than the Min Cir Amp, then select the lowest maximum fuse size which is equal to or larger than the Min Cir Amp, provided the selected fuse size does not exceed 800 amps.
4. The use of Liquid Propane (LP) requires unit modification. Contact a Trane salesman for information.
5. Compressor KW at AHRI rating conditions of 80/67 -95
6. Refrigerant charge is an approx. value. For a more precise value, see unit nameplate and service instructions.
7. Filter dimension are actual. Norminal filter size 16"x20"

Unit Dimensions - Packaged Rooftop, Cooling / Heating Units
Item: A2 Qty: 1 Tag(s): AHU-3





DOWNFLOW SUPPLY AND UPFLOW RETURN CONFIGURATION

DIMENSIONAL DRAWING

Unit Dimensions - Packaged Rooftop, Cooling / Heating Units
Item: A2 Qty: 1 Tag(s): AHU-3

ELECTRICAL / GENERAL DATA

UNIT	
Model (Tonnage)	TCD480 (40.0)
Operating voltage range:Primary	414 - 506
voltage:	460
Hertz: Phase:	60
EER / IEER:	3
	10.3 EER/11.8 EER

HEATING - PERFORMANCE	
Heat:	N/A
Heating Input (Btu/h): First	N/A
Stage (Btu/h): Heating Output	N/A
(Btu/h):First Stage (Btu/h):	N/A
No Burners:	N/A
No. Stages / Turn Down Rate:	N/A
	N/A
Gas Supply Pressure (in w.c.)Natural	
or LP:	
Gas Connection Pipe Size:	N/A
	N/A

COMPRESSOR	
NumberTons	2
Compressor Rated Load AmpsLocked	13/20
Rotor Amps	23/34
	158/215

ELECTRIC HEATER	
Electric Heater kw	N/A
Electric Heater Full Load Amps	N/A

INDOOR MOTOR SUPPLY FAN	
Horsepower	15.0
Motor speed (rpm)	1,760
Indoor motor full load amps	18.9

OUTDOOR MOTOR	
Number	4
HorsepowerPhase	1.1
Outdoor motor full load amps	1
	3.5

EXHAUST MOTOR	
Number	2
HorsepowerPhase	1.5
Exhaust motor full load amps	3
	2.7

FILTERS (7)	
Type Furnished	ThrowawayYes
Number	17
Recommended size	16"x20"x2"

REFRIGERANT TYPE (6)	
Type	R-410A
Factory Charge (Circuit #1)Factory	19.4 lb
Charge (Circuit #2)	37.0 lb

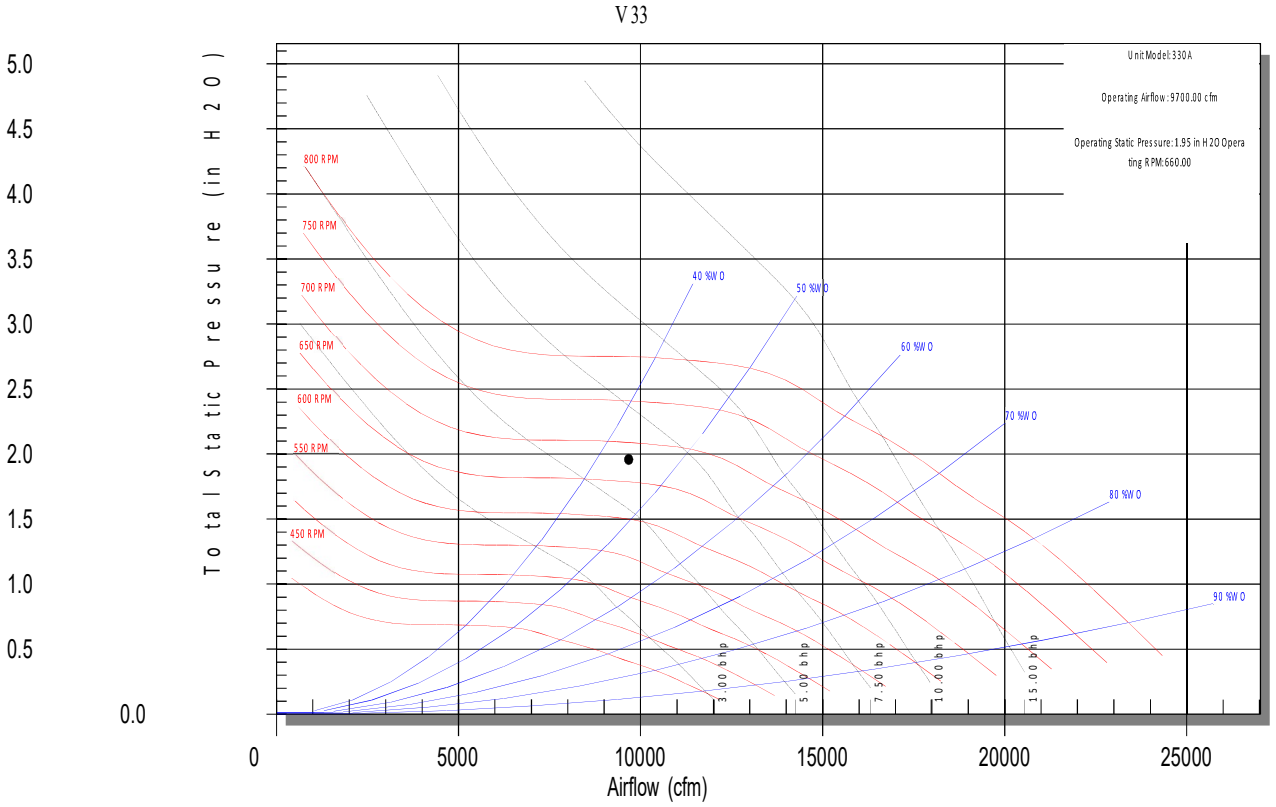
Cooling MCA = (1.25 x Load 1) + Load 2 + Load 4

Cooling MOP = (2.25 x Load 1) + Load 2 + Load 4

Notes:

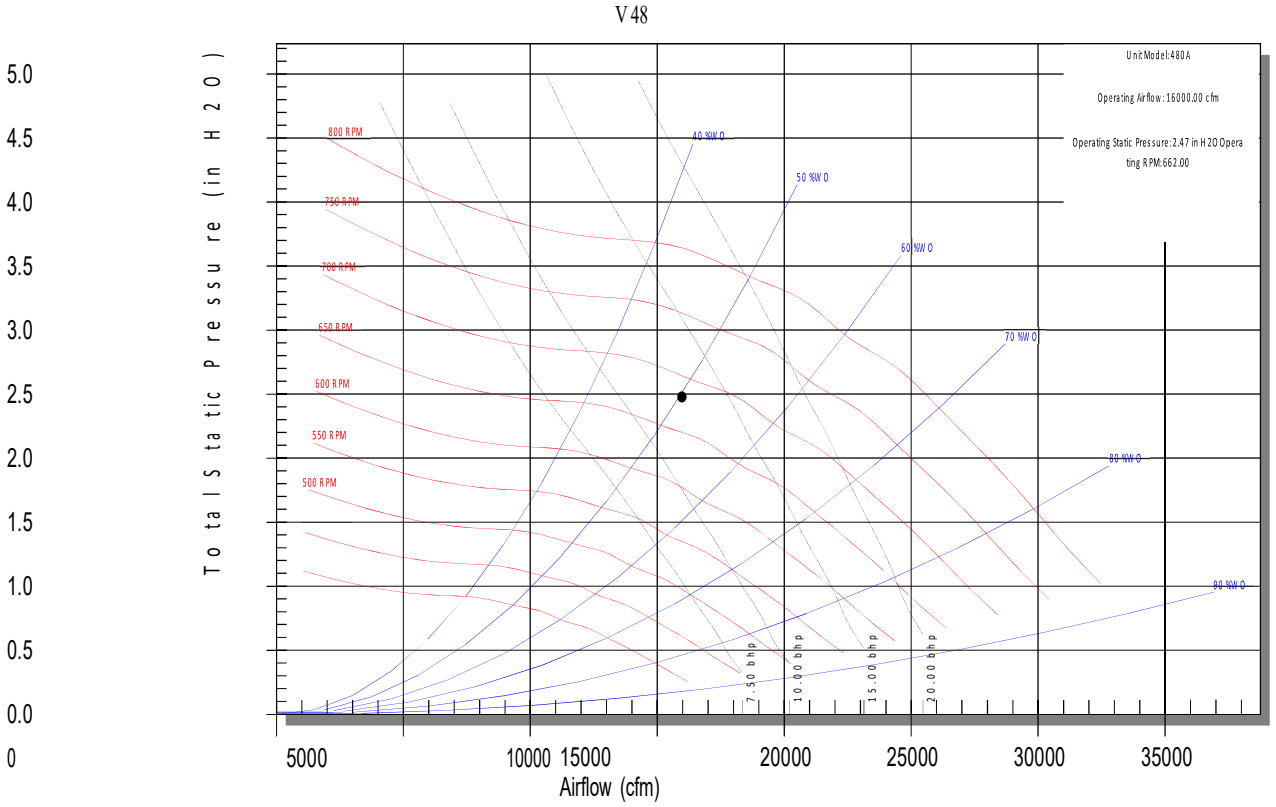
1. LOAD 1= Current of the largest motor (Compressor or Fan Motor); LOAD 2=Sum of the currents of all remaining motors LOAD 3= FLA(Full Load Amps) of the electric heater; LOAD 4= Any other load rated at 1 amp or more.
2. For Electric Heat MCA, MOP, RDE values, calculate for both cooling and heating modes.
3. If selected Max Over Cur is less than the Min Cir Amp, then select the lowest maximum fuse size which is equal to or larger than the Min Cir Amp, provided the selected fuse size does not exceed 800 amps.
4. The use of Liquid Propane (LP) requires unit modification. Contact a Trane salesman for information.
5. Compressor KW at AHRI rating conditions of 80/67 -95
6. Refrigerant charge is an approx. value. For a more precise value, see unit nameplate and service instructions.
7. Filter dimension are actual. Norminal filter size 16"x20"

Fan Curve - Packaged Rooftop, Cooling / Heating Units
Item: A1 Qty: 1 Tag(s): AHU-1



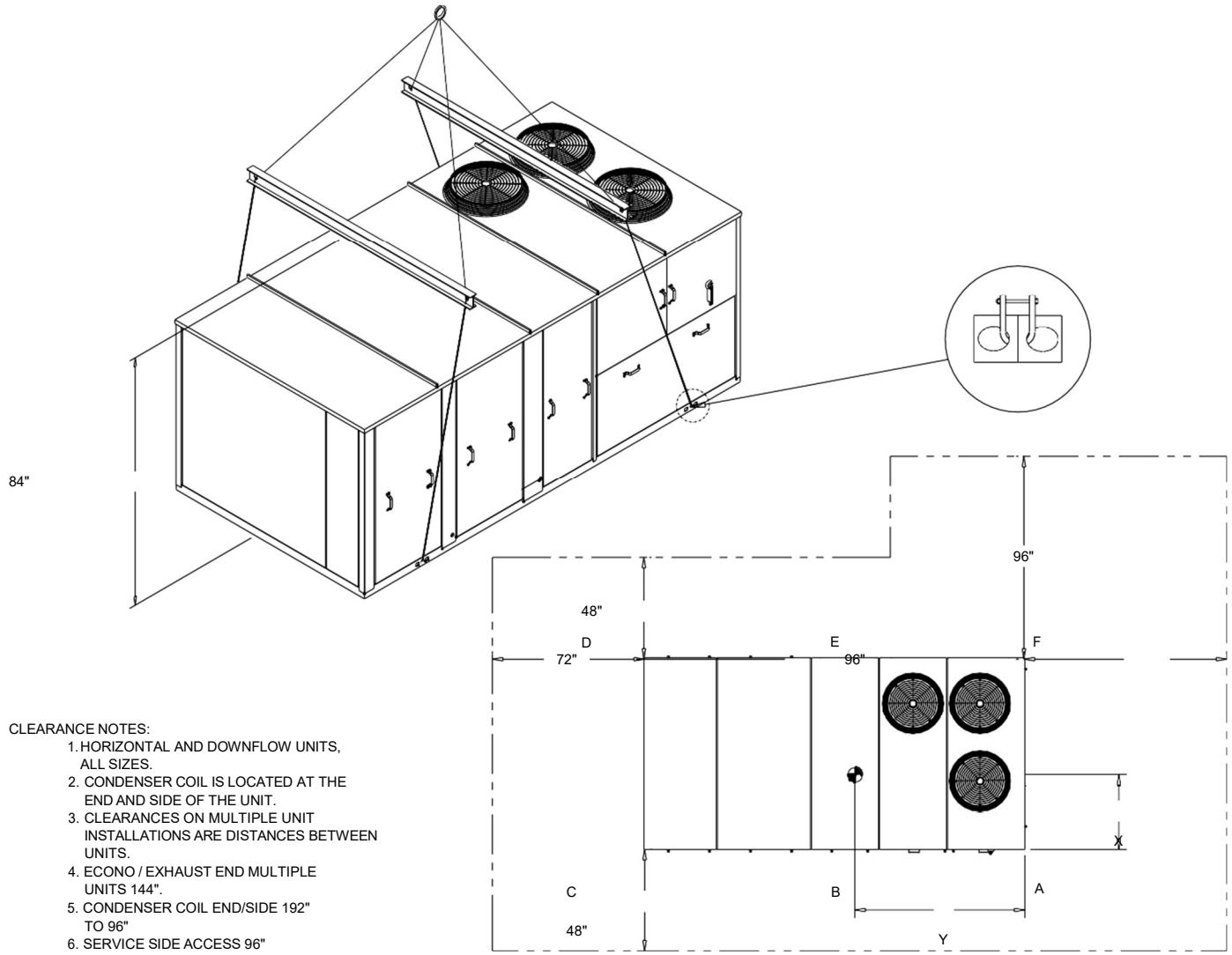
	63Hz	125Hz	250Hz	500Hz	1 kHz	2 kHz	4 kHz	8 kHz
Discharge duct:	87	84	81	84	75	72	68	63
Outdoor sound:	100	96	97	96	93	89	90	83
Return duct low exhaust:	94	93	84	83	85	84	84	81
Return duct medium exhaust:	93	91	86	84	86	86	85	84
Return duct high exhaust:	90	87	87	84	86	87	86	85

Fan Curve - Packaged Rooftop, Cooling / Heating Units
Item: A2 Qty: 1 Tag(s): AHU-3



	63Hz	125Hz	250Hz	500Hz	1 kHz	2 kHz	4 kHz	8 kHz
Discharge duct:	98	90	83	82	76	74	69	64
Outdoor sound:	104	97	96	97	95	93	88	79
Return duct low exhaust:	94	94	87	85	86	84	84	82
Return duct medium exhaust:	93	93	88	86	86	85	85	85
Return duct high exhaust:	91	91	89	86	86	87	86	85

Weight, Clearance & Rigging Diagram - Packaged Rooftop, Cooling / Heating Units
Item: A1 Qty: 1 Tag(s): AHU-1



CLEARANCE NOTES:

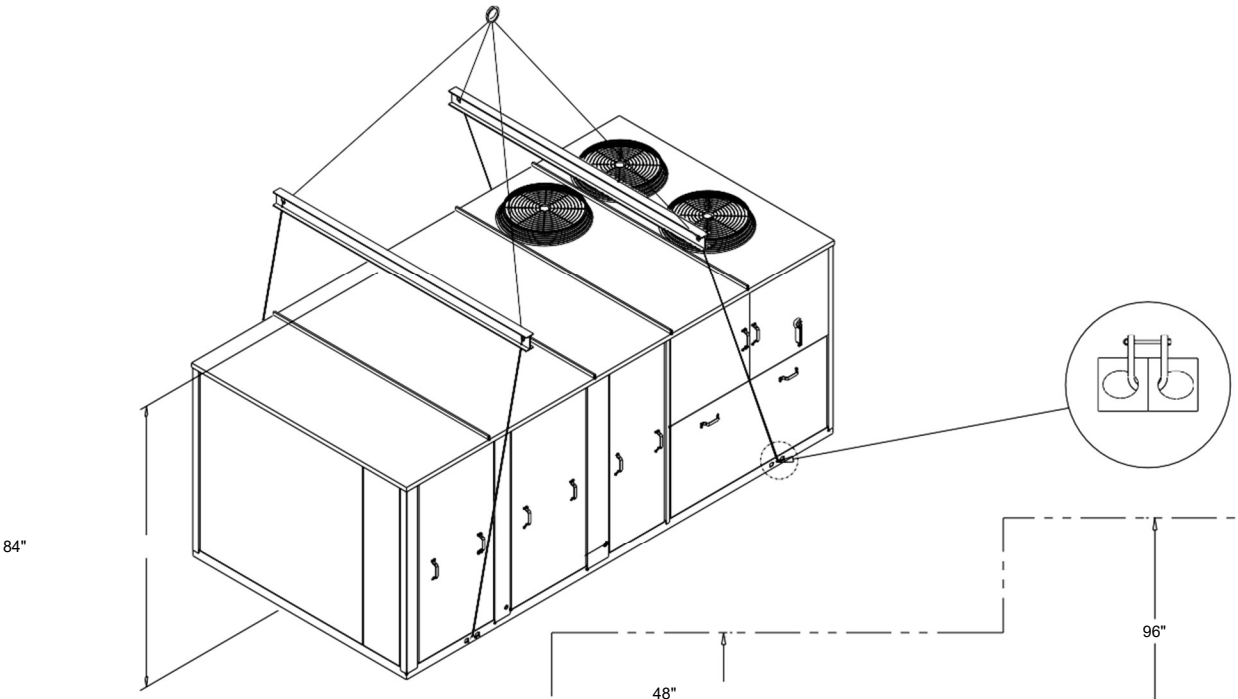
1. HORIZONTAL AND DOWNFLOW UNITS, ALL SIZES.
2. CONDENSER COIL IS LOCATED AT THE END AND SIDE OF THE UNIT.
3. CLEARANCES ON MULTIPLE UNIT INSTALLATIONS ARE DISTANCES BETWEEN UNITS.
4. ECONO / EXHAUST END MULTIPLE UNITS 144".
5. CONDENSER COIL END/SIDE 192" TO 96"
6. SERVICE SIDE ACCESS 96"

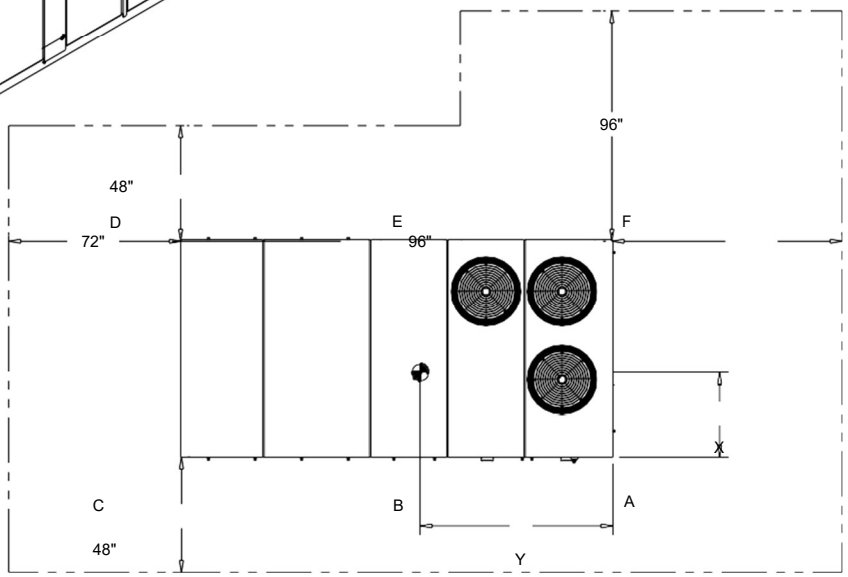
ESTIMATED OPERATING WEIGHT											
						OPTIONAL COMPONENTS					
X	42"	Y	76"	POWER EXHAUST	165.0 lb	BARO. RELIEF	N/A	SERVICE VALVES	18.0 lb		
CORNER LOADING PERCENTS						ECONOMIZER	260.0 lb	THRU-BASE ELECTRICAL	N/A	DISC. SWITCH	N/A
A	B	C	D	E	F	MANUAL DAMPERS	N/A	GFI WITH DISCON. SWITCH	N/A	VFD	85.0 lb
21%	17%	18%	18%	15%	12%	ULTRA LOW LEAK EXH.	N/A	ULTRA LOW LEAK ECON	N/A		
						COIL HAIL GUARD	105.0 lb	MOD. HOT GAS REHEAT	N/A		

WEIGHT NOTES:

1. THE WEIGHT SHOWN REPRESENTS THE TYPICAL UNIT OPERATING WEIGHT FOR THE CONFIGURATION SELECTED. ESTIMATED AT +/- 10 % OF THE NAMEPLATE WEIGHT.
2. THE ACTUAL WEIGHT IS STAMPED ON THE UNIT NAMEPLATE.

Weight, Clearance & Rigging Diagram - Packaged Rooftop, Cooling / Heating Units
Item: A2 Qty: 1 Tag(s): AHU-3





CLEARANCE NOTES:

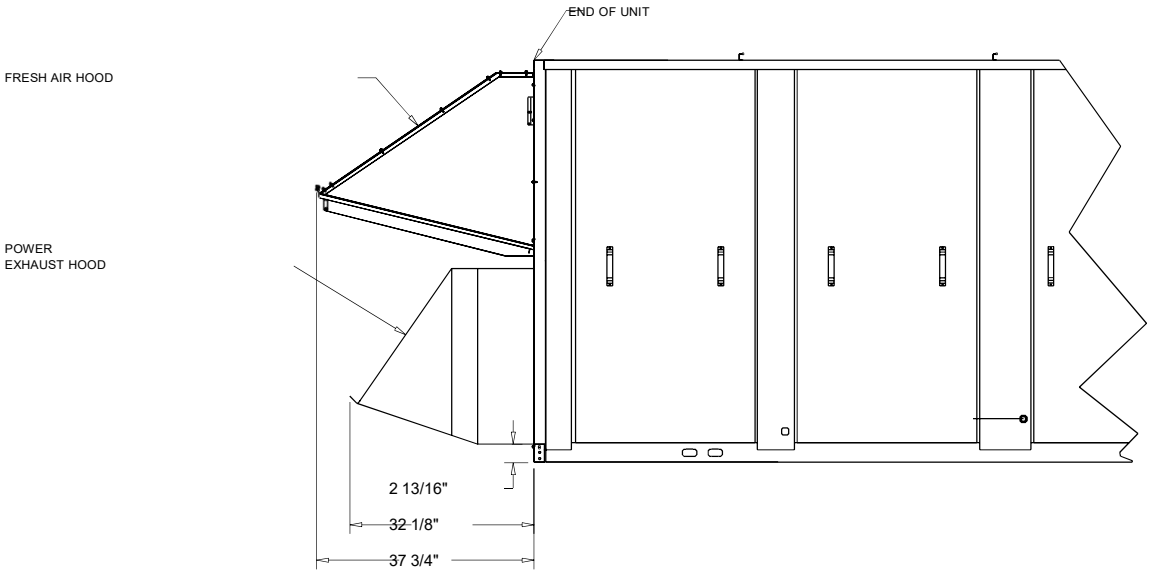
1. HORIZONTAL AND DOWNFLOW UNITS, ALL SIZES.
2. CONDENSER COIL IS LOCATED AT THE END AND SIDE OF THE UNIT.
3. CLEARANCES ON MULTIPLE UNIT INSTALLATIONS ARE DISTANCES BETWEEN UNITS.
4. ECONO / EXHAUST END MULTIPLE UNITS 144".
5. CONDENSER COIL END/SIDE 192" TO 96"
6. SERVICE SIDE ACCESS 96"

ESTIMATED OPERATING WEIGHT											
						OPTIONAL COMPONENTS					
X	42"	Y	111"	POWER EXHAUST	165.0 lb	BARO. RELIEF	N/A	SERVICE VALVES	18.0 lb		
CORNER LOADING PERCENTS						ECONOMIZER	290.0 lb	THRU-BASE ELECTRICAL	N/A	DISC. SWITCH	N/A
A	B	C	D	E	F	MANUAL DAMPERS	N/A	GFI WITH DISCON. SWITCH	N/A	VFD	115.0 lb
17%	18%	19%	15%	16%	16%	ULTRA LOW LEAK EXH.	N/A	ULTRA LOW LEAK ECON	N/A		
						COIL HAIL GUARD	130.0 lb	MOD. HOT GAS REHEAT	N/A		

WEIGHT NOTES:

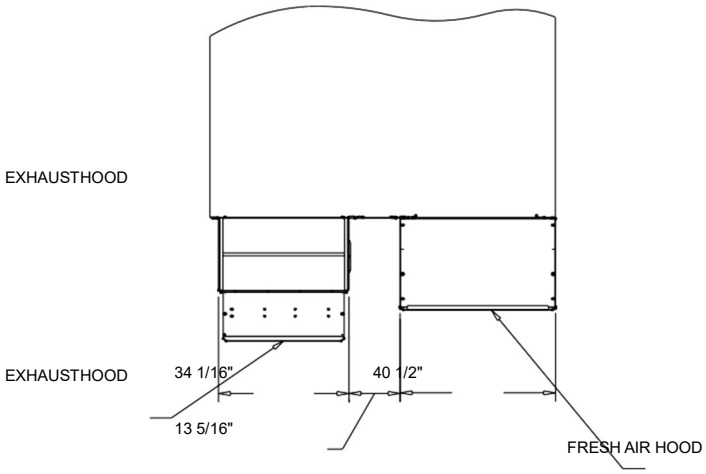
1. THE WEIGHT SHOWN REPRESENTS THE TYPICAL UNIT OPERATING WEIGHT FOR THE CONFIGURATION SELECTED. ESTIMATED AT +/- 10 % OF THE NAMEPLATE WEIGHT.
2. THE ACTUAL WEIGHT IS STAMPED ON THE UNIT NAMEPLATE.

Accessory - Packaged Rooftop, Cooling / Heating Units
Item: A1, A2 Qty: 2 Tag(s): AHU-1, AHU-3



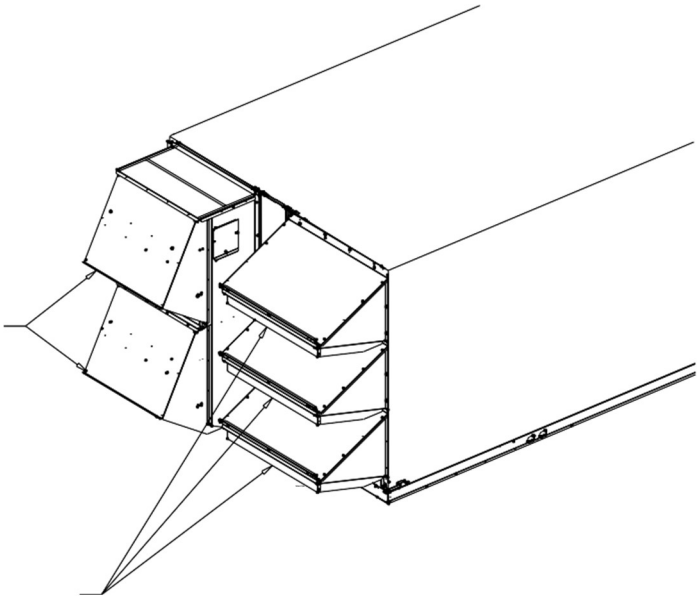
FRESH AIR AND POWER EXHAUST HOODS FOR DOWNFLOW RETURN UNIT DETAIL

Accessory - Packaged Rooftop, Cooling / Heating Units
Item: A2 Qty: 1 Tag(s): AHU-3



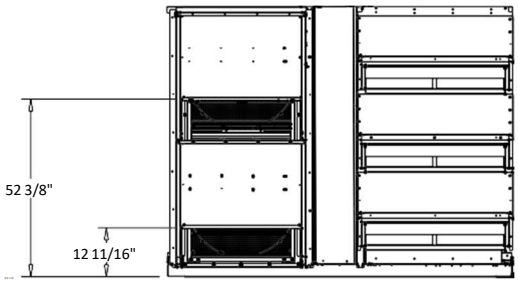
TOP VIEW

DIMENSIONAL DRAWING



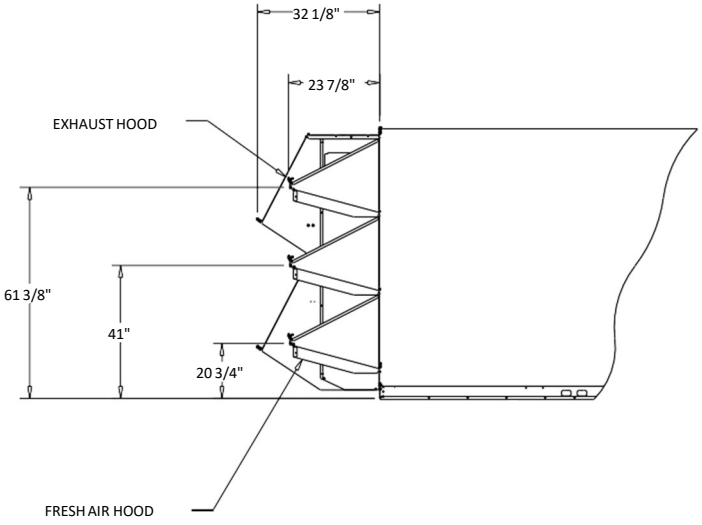
ISOMETRIC VIEW

PARTIAL DRAWING



BACK VIEW

DIMENSIONAL DRAWING



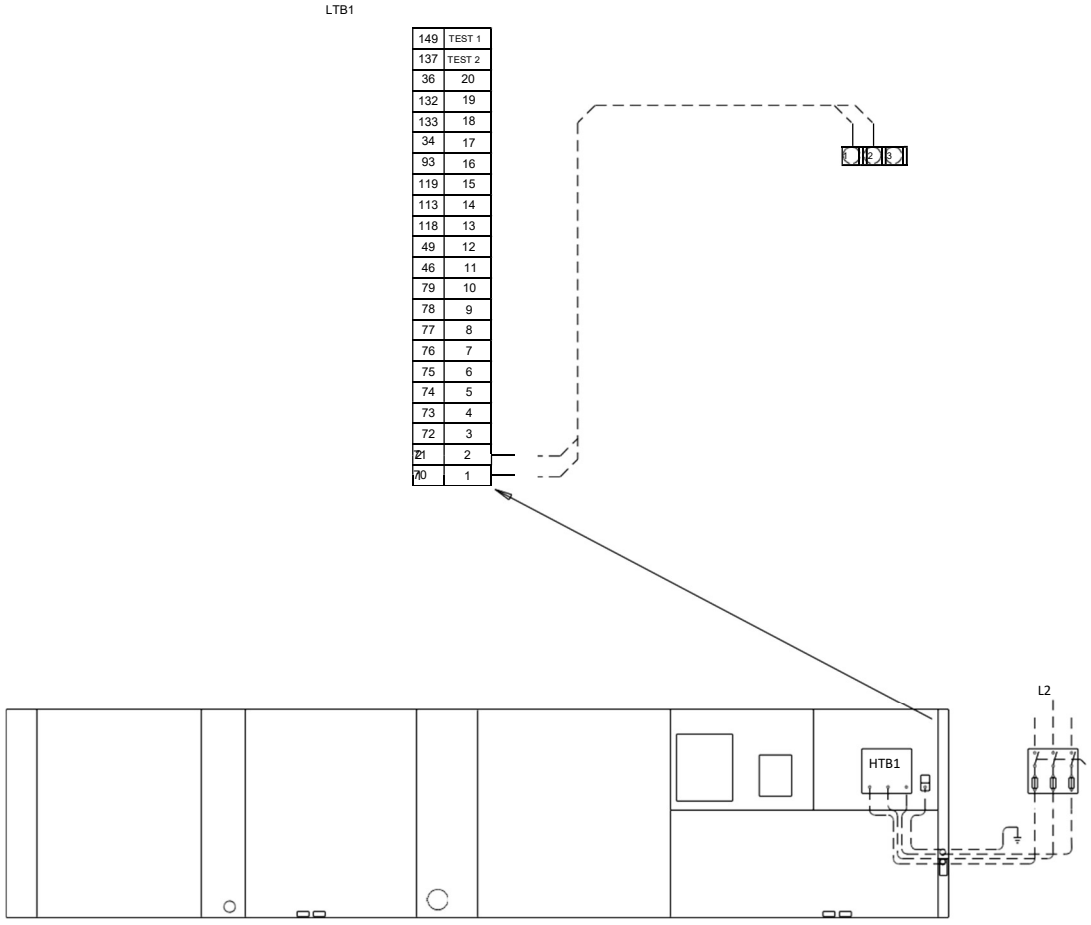
SIDE VIEW

DIMENSIONAL DRA

40-50 TON FRESH AIR AND POWER EXHAUST HOODS HORIZONTAL CONFIGURATION

DIMENSIONAL DRAWING

Field Wiring - Packaged Rooftop, Cooling / Heating Units
Item: A1, A2 Qty: 2 Tag(s): AHU-1, AHU-3



ZONE SENSOR WIRE TABLE

WIRE SIZE	MAXIMUM WIRE LENGTH in
22 GAUGE	1800"
20 GAUGE	3000"
18 GAUGE	4500"
16 GAUGE	7200"
14 GAUGE	11700"

NOTE:

1. All wiring and devices shown dashed to be supplied and installed by the customer in accordance with national and local electrical codes.
2. Low voltage control wiring must not be run in conduit with power wiring.
3. Cut wire jumper adjacent to the terminal 1 on zone sensor.

Tag Data - Packaged Cooling Rooftop Units (Qty: 2)

Item	Tag(s)	Qty	Description	Model Number
B1	AHU-2	1	20 Ton	TSD240G4R0C--H1C10006000H000000000000000
B2	AHU-4	1	15 Ton	TSD180G4R0C--H0C10006000H000000000000000

Product Data - Packaged Cooling Rooftop UnitsAll Units

DX cooling only – NO HEAT
Standard efficiencyDownflow
460/60/3
Reliatel
Economizer Comparative Enthalpy 0-100% with Barometric ReliefHinged panels/2" Pleated Filters MERV 8
Standard condenser coil with hail guardBACnet communications interface
Clogged filter switch, fan failure switch, discharge air sensing & Condensate Drainpan switch5 year parts & labor & refrigerant warranty
10 year compressor parts warranty

Item: B1 Qty: 1 Tag(s): AHU-2

20 Ton Oversize motor
High static drive (Fld)
NO ADAPTER CURB REQUIRED

Item: B2 Qty: 1 Tag(s): AHU-4

15 Ton
Low static drive (Fld)
NO ADAPTER CURB REQUIRED

Performance Data - Packaged Cooling Rooftop Units

Tags	AHU-2	AHU-4
Design Airflow (cfm)	7500	5400
Cooling Entering Dry Bulb (F)	80.00	80.00
Cooling Entering Wet Bulb (F)	67.00	67.00
Ambient Temp (F)	95.00	95.00
Cooling Leaving Unit DB (F)	59.27	57.54
Cooling Leaving Unit WB (F)	57.17	56.61
Gross Total Capacity (MBh)	253.45	180.54
Gross Sensible Capacity (MBh)	192.70	139.96
Gross Latent Capacity (MBh)	60.75	40.58
Net Total Capacity (MBh)	232.06	174.24
Net Sensible Capacity (MBh)	171.31	133.66
Net Sensible Heat Ratio (Number)	0.74	0.77
Design ESP (in H2O)	1.600	0.500
Electric Heat Static Press Add (in H2O)	0.000	0.000
Component SP Add (in H2O)	0.329	0.205
Indoor Mtr. Operating Power (bhp)	6.79	2.00
Indoor RPM (rpm)	912	563
Indoor Motor Power (kW)	5.06	1.49
Outdoor Motor Power (kW)	1.73	0.89
Compressor Power (kW)	19.73	13.53
System Power (kW)	26.52	15.91
IPLV @ AHRI (IPLV)	11.6	12.4
MCA (A)	56.00	36.00
MOP (A)	70.00	50.00
Compressor 1 RLA (A)	21.12	15.97
Compressor 2 RLA (A)	12.80	7.74
Condenser Fan FLA (A)	2.50	1.30
Evaporator Fan FLA (A)	11.00	4.80
Evaporator Face Area (sq ft)	23.00	23.00
Evaporator Face Velocity (ft/min)	326	235
Evaporator Fin Spacing (Per Foot)	192	192
Evaporator Rows ( )	2	2
Min. Unit Operating Weight (lb)	1902.0	1763.0
Max Unit Operating Weight (lb)	2984.0	2844.0
Fan Motor Heat (MBh)	21.39	6.30
Evap Coil Leav Air Temp (DB) (F)	56.21	56.00
Evap Coil Leav Air Temp (WB) (F)	55.97	56.00
Refrig charge (HFC-410A) - ckt 1 (lb)	12.4	9.0
Refrig charge (HFC-410A) - ckt 2 (lb)	7.2	5.0
ASHRAE 90.1	Yes	Yes
Saturated Suction Temp Circuit 1 (F)	47.11	45.32
Saturated Discharge Temp Circuit 1 (F)	122.91	119.72
Saturated Suction Temp Circuit 2 (F)	49.24	47.59
Saturated Discharge Temp Circuit 2 (F)	124.16	119.69
IEER Rating ( )	11.60	12.40
EER @ AHRI Conditions (EER)	10.0	11.0
Total Static Pressure (in H2O)	1.929	0.705

Mechanical Specifications - Packaged Cooling Rooftop Units
Item: B1, B2 Qty: 2 Tag(s): AHU-2, AHU-4

General - Downflow
The units shall be dedicated downflow airflow. The operating range shall be between 115°F and 0°F in cooling as standard from the factory for all units. Cooling performance shall be rated in accordance with ARI testing procedures. Allunits shall be factory assembled, internally wired, fully charged with R-410A, and 100 percent run tested to check cooling operation, fan and blower rotation and control sequence, before leaving the factory. Wiring internal to the unit shall be colored and numbered for simplified identification. 60 Hz units shall be UL listed and labeled, classified in accordance to UL 1995/C 22.2, 236-05 3rd Edition.

Packaged Rooftop units cooling, heating capacities, and efficiencies are AHRI certified within scope of AHRI Standard 340/360 (I-P) and ANSIZ21.47 and 10 CFR Part 431 pertaining to Commercial Warm
Air Furnaces (gas heating units).

Casing - Downflow
Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized, and finished with a weather-resistant baked enamel finish. Unit's surface shall be tested 672 hours in a salt spray test in compliance with *ASTM B117*. Cabinet construction shall allow for all maintenance on one side of the unit. In order to ensure a water and air tight seal, service panels shall have lifting handles and no more than three screwsto remove. All exposed vertical panels and top covers in the indoor air section shall be insulated with a 1/2", 1 pound density foil-faced, fire-resistant, permanent, odorless, glass fiber material. The base of the downflow unit shall be insulated with 1/2", 1 pound density foil-faced, closed-cell material. The downflow unit's base pan shall have no penetrations within the perimeter of the curb other than the raised 1 1/8" high supply/return openings to provide an added water integrity precaution, if the condensate drain backs up. The base of the unit shall have provisions for forkliftand crane lifting.

Unit Top (R-410A)
The top cover shall be one piece, or where seams exist, double hemmed and gasket sealed to prevent water leakage.

Filters
Two inch standard filters shall be factory supplied on all units.

Compressors (R-410A)
All units shall have direct-drive, hermetic, scroll type compressors with centrifugal type oil pumps. Motor shall be suction gas-cooled and shall have a voltage utilization range of plus or minus 10 percent of nameplate voltage. Internal overloads shall be provided with the scroll compressors. All models shall have crankcase heaters, phase monitors andlow and high pressure control as standard. Dual compressors are available on all standard efficiency models and 12.5 to20 tons high efficiency models and allow for efficient cooling utilizing 3 stages of compressor operation (high efficiencymodels only). 25 tons high efficiency units have 3 compressors for up to 4 stages of compressor operation.

Crankcase Heaters (R-410A)
These band heaters provide improved compressor reliability by warming the oil to prevent migration during off-cycles orlow ambient conditions.

Refrigerant Circuits (R-410A)
Each refrigerant circuit shall have service pressure ports, and refrigerant line filter driers factory installed as standard.An area shall be provided for replacement suction line driers.

High Pressure Cutout (R-410A)
This option is offered for units that do not have High Pressure cutout as standard.

Condenser Coils
The microchannel type condenser coil is standard for the standard efficiency models. Due to flat streamlined tubes with small ports, and metallurgical tube-tofin bond, microchannel coil has better heat transfer performance. Microchannel condenser coil can reduce system refrigerant charge by up to 50% because of smaller internal volume, which leads to better compressor reliability. Compact all-aluminum microchannel coils also help to reduce the unit weight.
All-aluminum construction improves re-cyclability. Galvanic corrosion is also minimized due to all aluminum construction. Strong aluminum brazed structure provides better fin protection. In addition, flat streamlined tubes also make microchannel coils more dust resistant and easier to clean. Coils shall be leak tested at the factory to ensure thepressure integrity. The evaporator coil and condenser coil shall be leak tested to 600 psig. The assembled unit shall beleak tested to 465 psig.

Outdoor Fans (R-410A)
The outdoor fan shall be direct-drive, statically and dynamically balanced, draw-through in the vertical dischargeposition. The fan motor(s) shall be permanently lubricated and shall have built-in thermal overload protection.

Indoor Fan (R-410A)
Units above shall have belt driven, FC centrifugal fans with adjustable motor sheaves. Units with standard motors shallhave an adjustable idler-arm assembly for quick-adjustment of fan belts and motor sheaves. All motors shall be thermally protected. Oversized motors shall be available for high static application. All indoor fan motors meet the U.S.Energy Policy *Act of 1992 (EPACT).*

Controls (R-410A)
Unit shall be completely factory wired with necessary controls and contactor pressure lugs or terminal block for power wiring. Unit shall provide an external location for mounting a fused disconnect device. ReliaTel controls shall be provided for all 24 volt control functions. The resident control algorithms shall make all heating, cooling, and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. Thecontrol algorithm maintains accurate temperature control, minimizes drift from set point, and provides better building comfort. A centralized control shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection.

Discharge Line Thermostat (R410A)
A bi-metal element discharge line thermostat is installed as a standard option on the discharge line of each system. This standard option provides extra protection to the compressors against high discharge temperatures in case of lossof charge, extremely high ambient and other conditions which could drive the discharge temperature higher. Dischargeline thermostat is wired in series with high pressure control. When the discharge temperature rises above the protectionlimit, the bi-metal disc in the thermostat switches to the off position, opening the 24 VAC circuit. When the temperatureon the discharge line cools down, the bi-metal disc closes the contactor circuit, providing power to the compressor.
When the thermostat opens the fourth time, the ReliaTel control must be manually reset to resume operation on thatstage.

Economizer - Downflow (R-410A)
The assembly includes fully modulating 0-100 percent motor and dampers, barometric relief, minimum position setting, preset linkage, wiring harness with plug, fixed dry bulb and spring return actuator. The barometric relief damper shall be standard with the downflow economizer and shall provide a pressure operated damper that shall be gravity closing andshall prohibit entrance of outside air during the equipment "off" cycle. Solid state enthalpy and differential enthalpy control shall be field-installed.

BACnet Communications
The BACnet communications interface allows the unit to communicate directly with a generic open protocol BACnetMS/TP Network Building Automation System Controls.

FIOPS - Tool-less Hail Guards (R-410A)
Tool-less, hail protection quality coil guards are available for condenser coil protection.

FIOPS - Hinged Access Doors (R-410A)
Sheet metal hinges are available on the Filter/Evaporator Access Door and the Compressor/Control Access Door.

2" Pleated Filters (MERV 8 & 13)
2" pleated media filters shall be available on all models.

Condensate Overflow Switch
This option shall shut the unit down in the event that a clogged condensate drain line prevents proper condensateremoval from the unit.

FIOPS Reference or Comparative Enthalpy (R-410A)
Reference Enthalpy is used to measure and communicate outdoor humidity. The unit receives and uses this informationto provide improved comfort cooling while using the economizer. Comparative Enthalpy measures and communicates humidity for both outdoor and return air conditions, and return air temperature. The unit receives and uses this information to maximize use of economizer cooling, and to provide maximum occupant comfort control. Reference or Comparative Enthalpy option shall be available when a factory or field installed Downflow Economizer is ordered. This option is available on all downflow models.

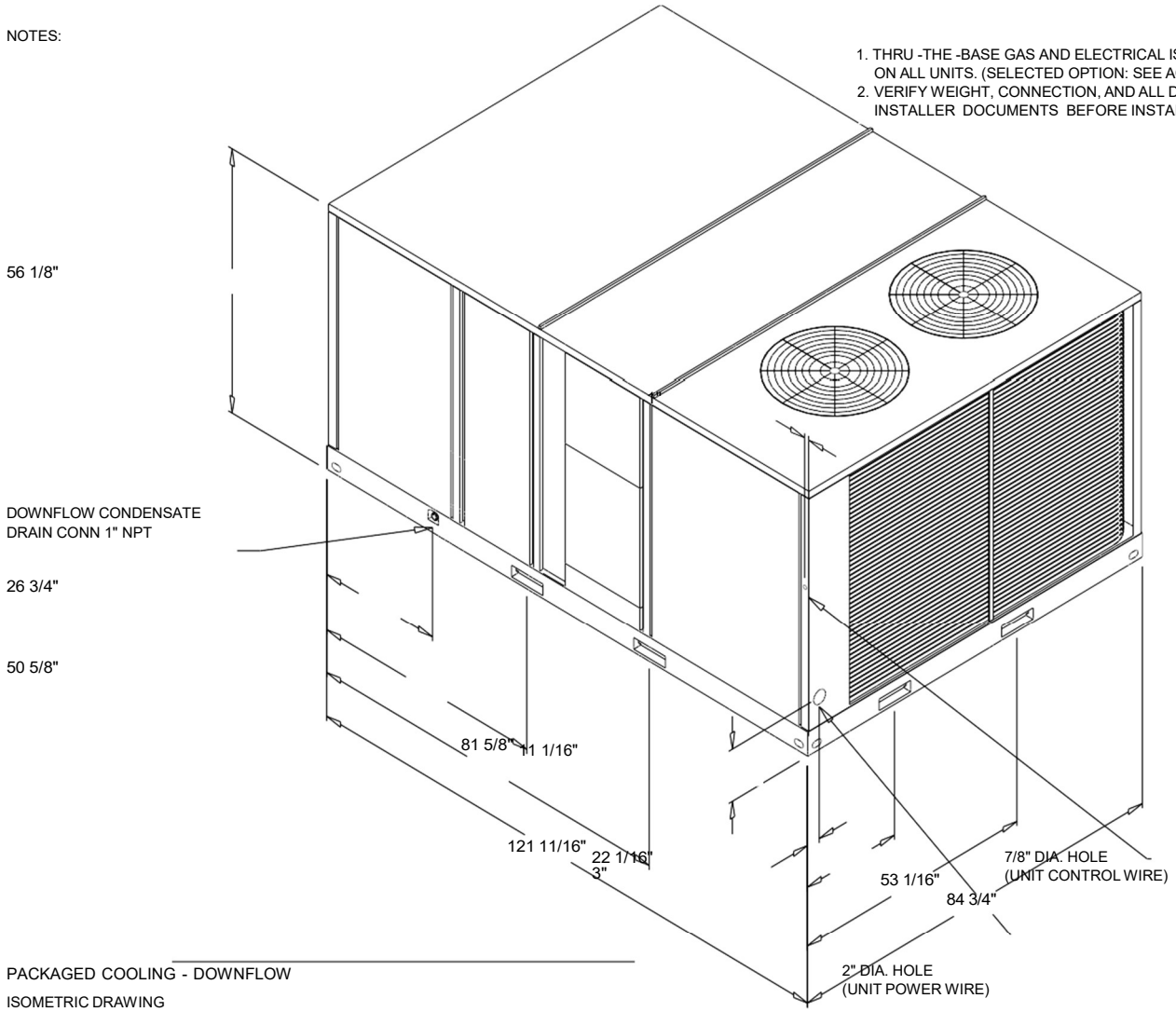
Accessory - High Static Drive (R-410A)

The high static drive option shall allow the standard motor on the 12½ and 20 ton units to operate with improved external static capabilities.

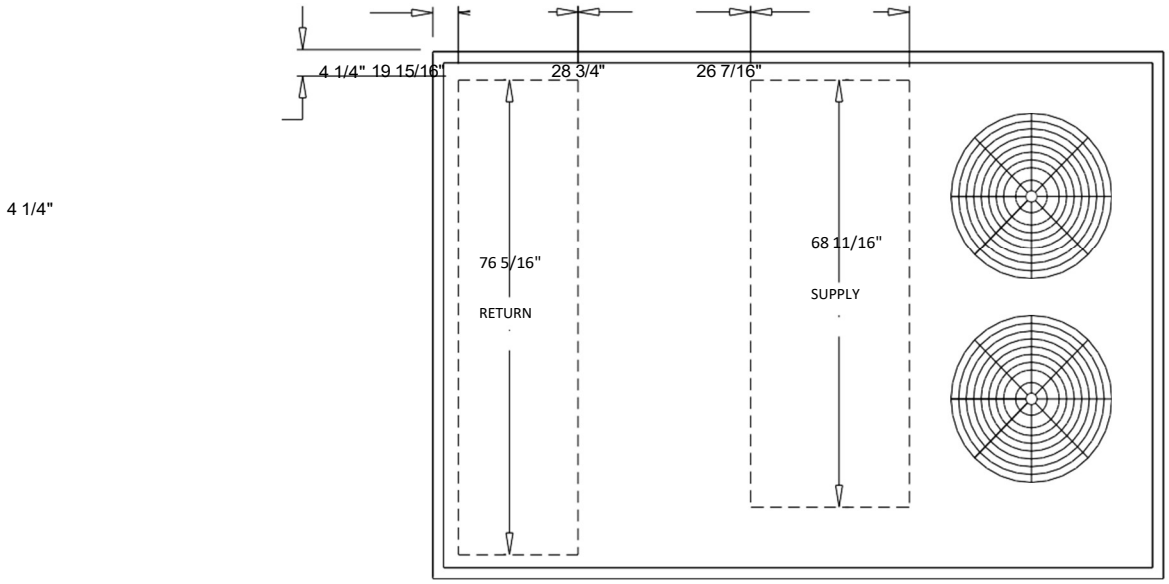
Unit Dimensions - Packaged Cooling Rooftop Units
Item: B1, B2 Qty: 2 Tag(s): AHU-2, AHU-4

NOTES:

1. THRU -THE -BASE GAS AND ELECTRICAL IS NOT STANDARD ON ALL UNITS. (SELECTED OPTION: SEE ACCESSORY SHEET)
2. VERIFY WEIGHT, CONNECTION, AND ALL DIMENSION WITH INSTALLER DOCUMENTS BEFORE INSTALLATION



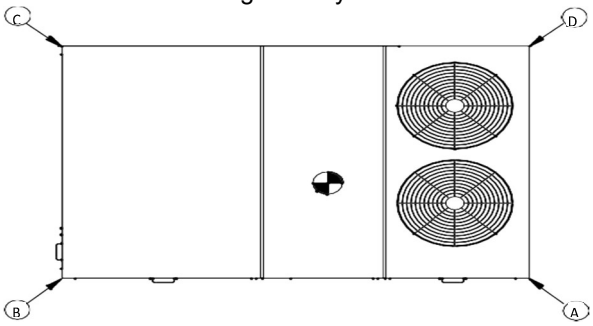
PACKAGED COOLING - DOWNFLOW
ISOMETRIC DRAWING



PACKAGED COOLING - DOWNFLOW
PLAN VIEW DRAWING

Weight, Clearance & Rigging Diagram - Packaged Cooling Rooftop Units
Item: B1 Qty: 1 Tag(s): AHU-2

Base Unit and Corner Weights Only



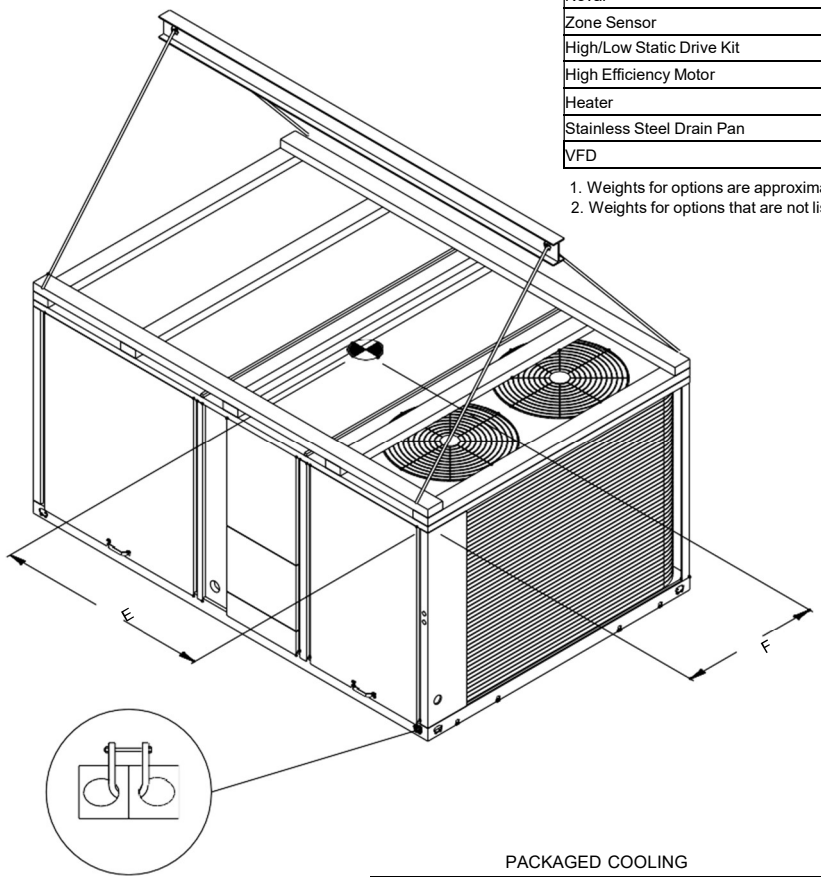
Base unit weights		Corner Weights				Center of Gravity	
SHIPPING	NET	(A)	(B)	(C)	(D)	E	F
2334.0 lb	1902.0 lb	615.0 lb	498.0 lb	375.0 lb	433.0 lb	55"	35"

1. All weights are approximate.
2. The actual weight are listed on the unit nameplate.
3. Refer to unit nameplate and installation guide for weights before scheduling transportation and installation of unit.
4. The weight shown represents the typical unit operating weight for the configuration selected. Estimated at +/- 10 % of the nameplate weight. .
5. Verify weight, connection, and all dimension with installer documents before installation.
6. Corner weights are given for information only.
7. Net/Shipping weight of optional accessories should be added to unit weight when ordering factory or field installed accessories.

Installed Options Net Weight Data

Accessory	Weight
Economizer, Manual and Motorized Outside Air Damper	80.0 lb
Power Exhaust	
Roof Curb	
Oversized Motor	5.0 lb
Hail Guard	43.0 lb
Hinged Access Doors	27.0 lb
Power Conv. Outlet	
Through the Base Electrical	
Circuit Breaker	
Disconnect	
Smoke Detector	
Novar	
Zone Sensor	
High/Low Static Drive Kit	2.0 lb
High Efficiency Motor	
Heater	
Stainless Steel Drain Pan	
VFD	

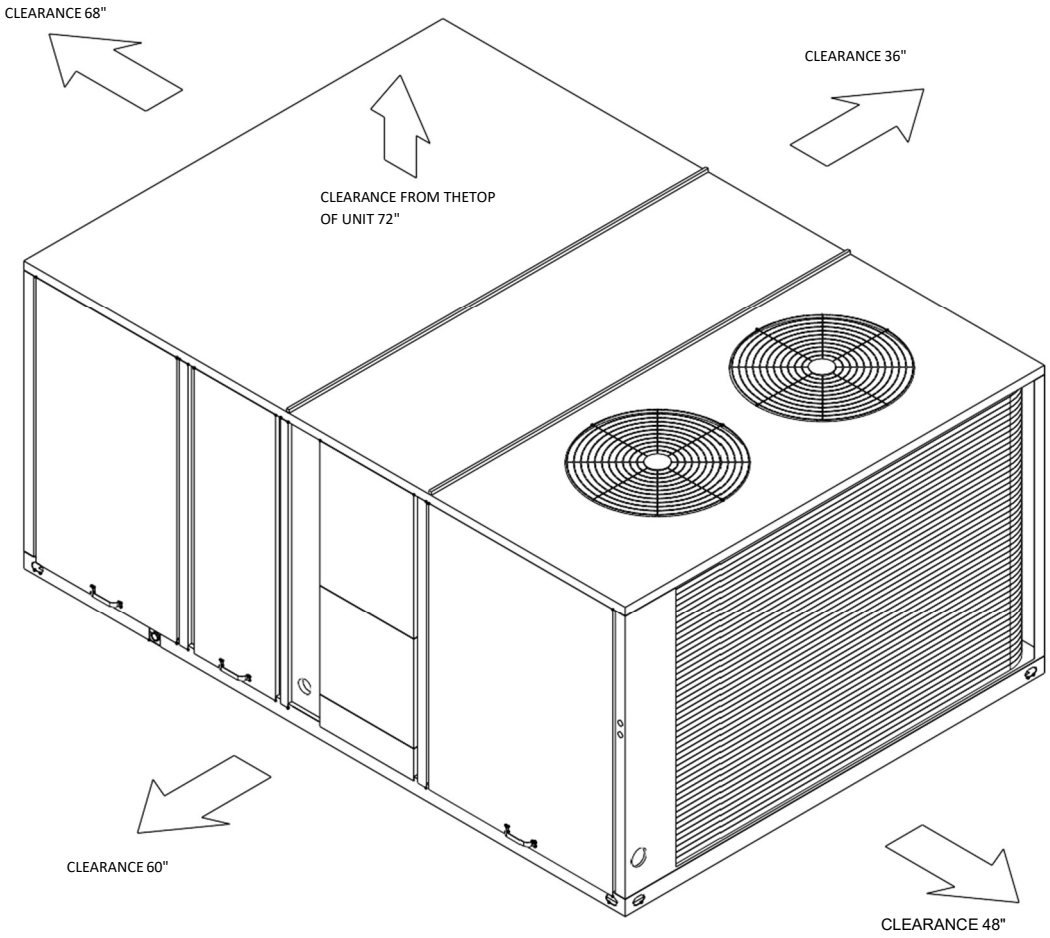
1. Weights for options are approximate.
2. Weights for options that are not list refer to Installation guide.



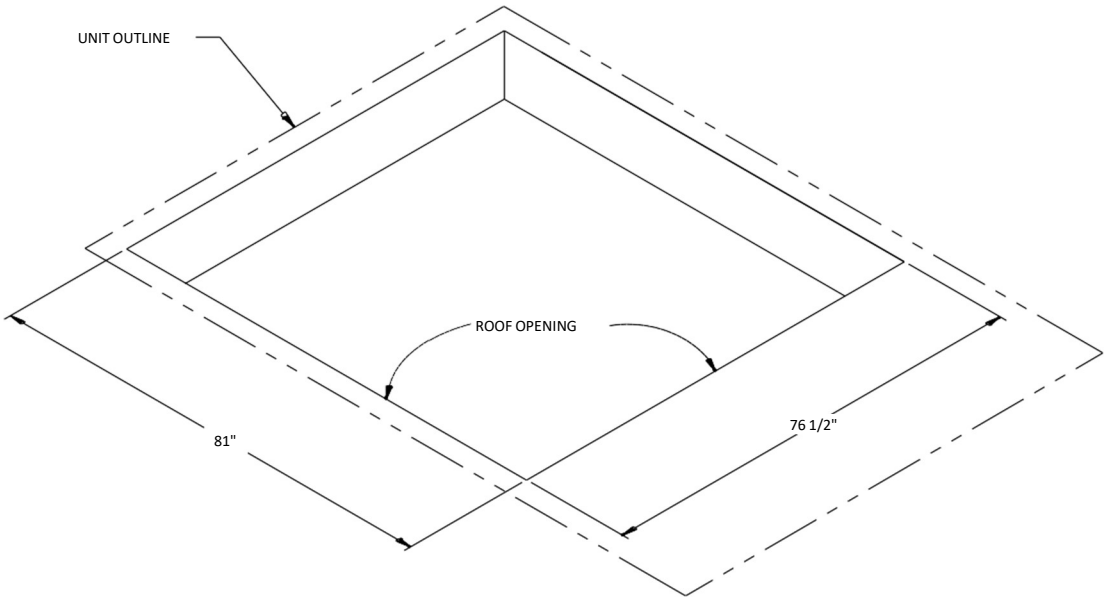
PACKAGED COOLING

RIGGING AND CENTER OF GRAVITY

Weight, Clearance & Rigging Diagram - Packaged Cooling Rooftop Units
Item: B1, B2 Qty: 2 Tag(s): AHU-2, AHU-4

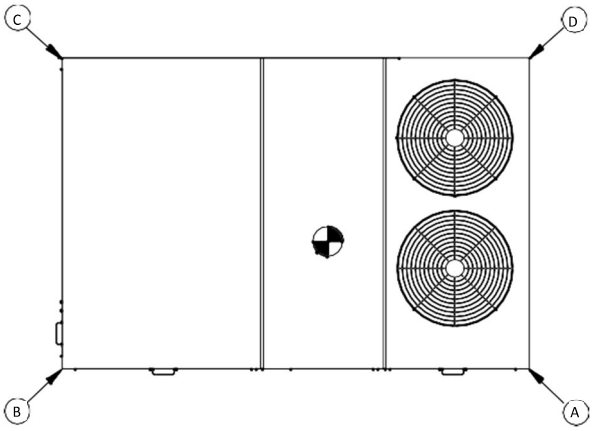


DOWNFLOW-PACKAGED COOLING WITH ELECTRIC CLEARANCE



DOWNFLOW-PACKAGED COOLING WITH ELECTRIC ROOF OPENING CLEARANCE

Weight, Clearance & Rigging Diagram - Packaged Cooling Rooftop Units
Item: B2 Qty: 1 Tag(s): AHU-4



Base Unit and Corner Weights Only

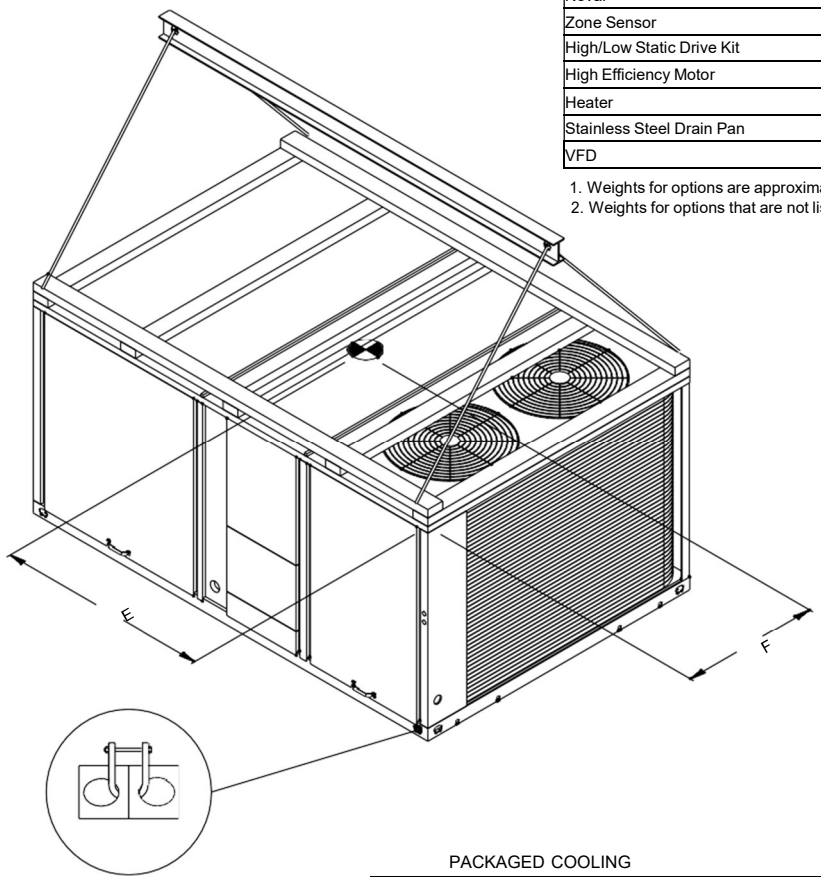
Base unit weights		Corner Weights				Center of Gravity	
SHIPPING	NET	(A)	(B)	(C)	(D)	E	F
2194.0 lb	1763.0 lb	575.0 lb	480.0 lb	338.0 lb	370.0 lb	56"	34"

1. All weights are approximate.
2. The actual weight are listed on the unit nameplate.
3. Refer to unit nameplate and installation guide for weights before scheduling transportation and installation of unit.
4. The weight shown represents the typical unit operating weight for the configuration selected. Estimated at +/- 10 % of the nameplate weight. .
5. Verify weight, connection, and all dimension with installer documents before installation.
6. Corner weights are given for information only.
7. Net/Shipping weight of optional accessories should be added to unit weight when ordering factory or field installed accessories.

Installed Options Net Weight Data

Accessory	Weight
Economizer, Manual and Motorized Outside Air Damper	80.0 lb
Power Exhaust	
Roof Curb	
Oversized Motor	
Hail Guard	43.0 lb
Hinged Access Doors	27.0 lb
Power Conv. Outlet	
Through the Base Electrical	
Circuit Breaker	
Disconnect	
Smoke Detector	
Novar	
Zone Sensor	
High/Low Static Drive Kit	2.0 lb
High Efficiency Motor	
Heater	
Stainless Steel Drain Pan	
VFD	

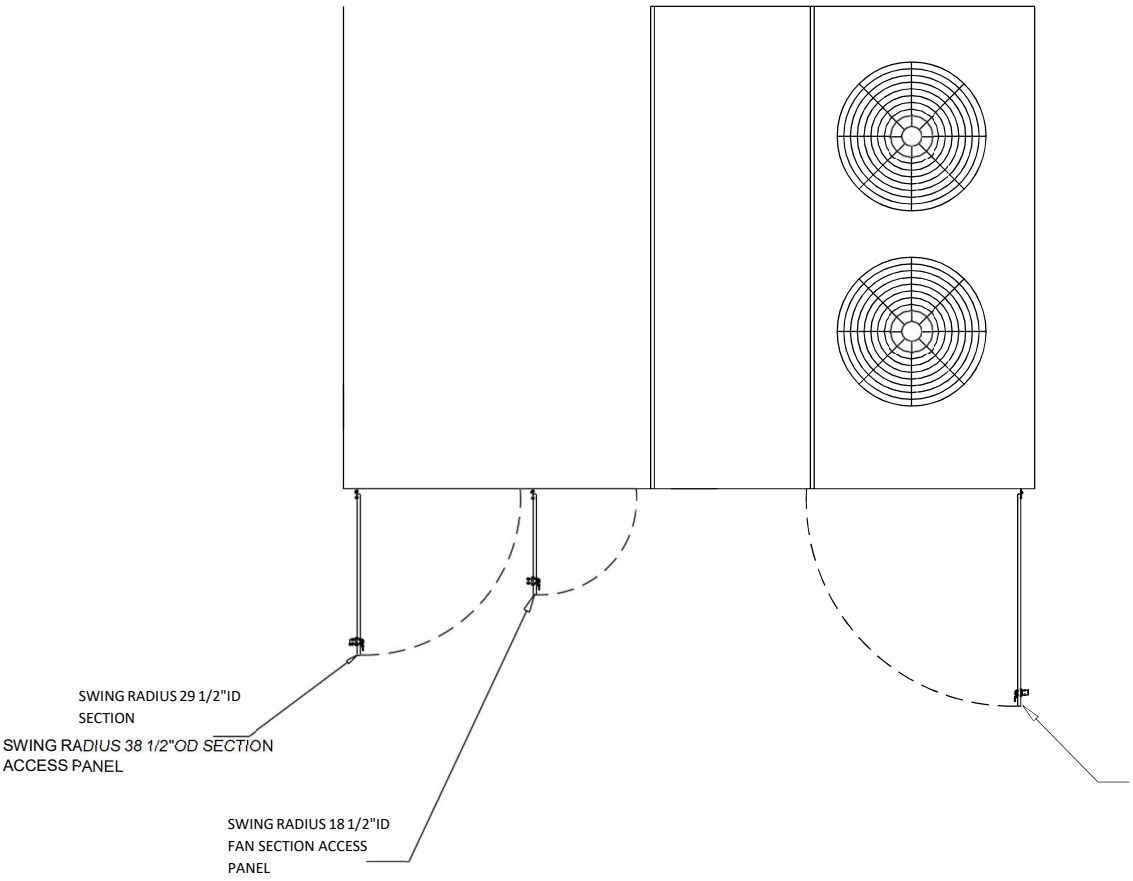
1. Weights for options are approximate.
2. Weights for options that are not list refer to Installation guide.



PACKAGED COOLING

RIGGING AND CENTER OF GRAVITY

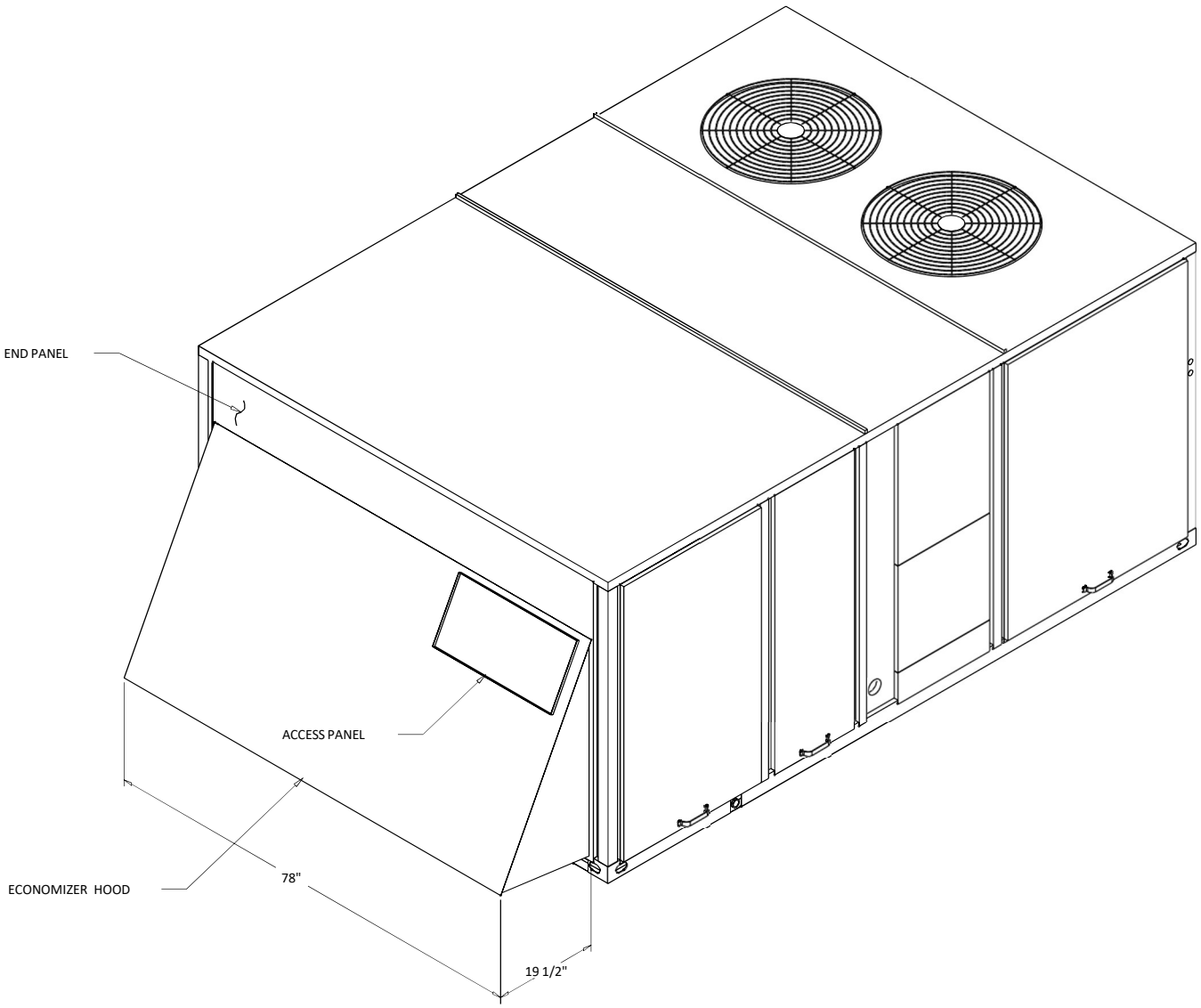
Accessory - Packaged Cooling Rooftop Units
Item: B1, B2 Qty: 2 Tag(s): AHU-2, AHU-4



HINGING ACCESS DOORS

ACCESSORY DRAWING

Accessory - Packaged Cooling Rooftop Units
Item: B1, B2 Qty: 2 Tag(s): AHU-2, AHU-4



ECONOMIZER HOOD

ACCESSORY DRAWING

Tag Data - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
C1	AHU-5	1	5 Ton	TSC060G4R0A--H1C10006010H000000000000000

Product Data - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop

Item: C1 Qty: 1 Tag(s): AHU-5

DX cooling – NO HEAT
Standard efficiency Convertible
configuration5 Ton
460/60/3
Microprocessor controls
Economizer Comparative Enthalpy 0-100% with Barometric ReliefOversize
motor
Hinged panels/2" Pleated Filters MERV 8Standard
condenser coil with hail guard BACnet
communications interface Frostat
Clogged filter switch, fan failure switch, discharge air sensing & Condensate Drainpan switch5 year parts
& labor & refrigerant warranty
10 year compressor parts warrantyAdapter
curb

Performance Data - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop

Tags	AHU-5
Airflow Application	Horizontal
Design Airflow (cfm)	2300
Cooling Entering Dry Bulb (F)	80.00
Cooling Entering Wet Bulb (F)	67.00
Ambient Temp (F)	95.00
Cooling Leaving Unit DB (F)	60.25
Cooling Leaving Unit WB (F)	59.26
Gross Total Capacity (MBh)	61.28
Gross Sensible Capacity (MBh)	53.83
Gross Latent Capacity (MBh)	7.45
Net Total Capacity (MBh)	59.07
Net Sensible Capacity (MBh)	51.62
Net Sensible Heat Ratio (Number)	0.87
Design ESP (in H2O)	1.000
Electric Heat Static Press Add (in H2O)	0.000
Component SP Add (in H2O)	0.355
Field Supplied Drive Kit Required	None
Indoor Mtr. Operating Power (bhp)	1.59
Indoor RPM (rpm)	1448
Indoor Motor Power (kW)	1.18
Compressor Power (kW)	3.93
System Power (kW)	4.95
IPLV @ AHRI (IPLV)	14.0
MCA (A)	14.00
MOP (A)	20.00
Compressor 1 RLA (A)	7.10
Compressor 2 RLA (A)	0.00
Condenser Fan FLA (A)	0.70
Evaporator Fan FLA (A)	0.00
Evaporator Face Area (sq ft)	6.98
Evaporator Face Velocity (ft/min)	330
Evaporator Fin Spacing (Per Foot)	192
Evaporator Rows ( )	2
Min. Unit Operating Weight (lb)	457.0
Max Unit Operating Weight (lb)	732.0
Fan Motor Heat (MBh)	2.21
Evap Coil Leav Air Temp (DB) (F)	58.66
Evap Coil Leav Air Temp (WB) (F)	58.66
Refrig charge (HFC-410A) - ckt 1 (lb)	4.8
ASHRAE 90.1	Yes
IEER Rating ( )	14.00
EER @ AHRI Conditions (EER)	12.0
Total Static Pressure (in H2O)	1.355

Mechanical Specifications - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop
Item: C1 Qty: 1 Tag(s): AHU-5

General
The units shall be convertible airflow. The operating range shall be between 115°F and 0°F in cooling as standard fromthe factory for units with microprocessor controls. Operating range for units with electromechanical controls shall be between 115°F and 40°F. Cooling performance shall be rated in accordance with ARI testing procedures. All units shallbe factory assembled, internally wired, fully charged with R-410A, and 100 percent run tested to check cooling operation, fan and blower rotation, and control sequence before leaving the factory. Wiring internal to the unit shall be colored and numbered for simplified identification. Units shall be cULus listed and labeled, classified in accordance forCentral Cooling Air Conditioners.

Casing
Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized, and finished with a weather-resistant baked enamel finish. Units surface shall be tested 672 hours in a salt spray test in compliance with ASTM B117. Cabinet construction shall allow for all maintenance on one side of the unit. Service panels shall have lifting handles and be removed and reinstalled by removing two fasteners while providing a water and air tight seal. All exposed vertical panels and top covers in the indoor air section shall be insulated with a cleanable foil-faced, fire-retardant permanent, odorless glass fiber material. The base of the unit shall be insulated with1/8", foil-faced, closed-cell insulation. All insulation edges shall be either captured or sealed. The units base pan shall have no penetrations within the perimeter of the curb other than the raised 1 1/8" inch high downflow supply/return openings to provide an added water integrity precaution, if the condensate drain backs up. The base of the unit shall have provisions for forklift and crane lifting, with forklift capabilities on three sides of the unit.

Hinged Access Doors
Sheet metal hinges are available on the Filter/Evaporator, Supply Fan/Heat, and the Compressor/Control AccessDoors.

Unit Top
The top cover shall be one piece construction or, where seams exist, it shall be double-hemmed and gasket-sealed.The ribbed top adds extra strength and enhances water removal from unit top.

Filters
Throwaway filters shall be standard on all units. Optional 2-inch MERV 8 and MERV 13 filters shall also be available.

Two-Inch Pleated Filters
Two inch pleated media filters shall be available on all models.

Compressors
All units shall have direct-drive, hermetic, scroll type compressors with centrifugal type oil pumps. Motor shall be suction gas-cooled and shall have a voltage utilization range of plus or minus 10 percent of unit nameplate voltage. Internal overloads shall be provided with the scroll compressors.

Dual compressors are outstanding for humidity control, light load cooling conditions and system back-up applications.Dual compressors are available on 7½-10 ton models and allow for efficient cooling utilizing 3-stages of compressor operation for all high efficiency models.

Evaporator and Condenser Coils
Internally finned, 5/16" copper tubes mechanically bonded to a configured aluminum plate fin shall be standard. Evaporator coils are standard for all 3 to 10 ton standard efficiency models. Microchannel condenser coils are standardfor all 3 to 10 ton standard efficiency models and 4, 5, 6, 7.5, 8.5 ton high efficiency models. The microchannel type condenser coil is not offered on the 4 and 5 ton dehumidification model. Due to flat streamlined tubes with small ports, and metallurgical tube-to-fin bond, microchannel coil has better heat transfer performance. Microchannel condenser coilcan reduce system refrigerant charge by up to 50% because of smaller internal volume, which leads to better compressor reliability. Compact all-aluminum microchannel coils also help to reduce the unit weight. These all aluminum coils are recyclable. Galvanic corrosion is also minimized due to all aluminum construction. Strong aluminumbrazed structure provides better fin protection. In addition, flat streamlined tubes also make microchannel coils more dust resistant and easier to clean. Coils shall be leak tested at the factory to ensure the pressure integrity. The evaporator coil and condenser coil shall be leak tested to 600 psig. The assembled unit shall be leak tested to 465 psig.The condenser coil shall have a patent pending 1+1+1 hybrid coil designed with slight gaps for ease of cleaning. A plastic, dual-sloped, removable and reversible condensate drain pan with through-the-base condensate drain is standard.

Condensate Overflow Switch
This option shall shut the unit down in the event that a clogged condensate drain line prevents proper condensateremoval from the unit.

Tool-less Hail Guards
Tool-less, hail protection quality coil guards are available for condenser coil protection.

Outdoor Fans
The outdoor fan shall be direct-drive, statically and dynamically balanced, draw-through in the vertical dischargeposition. The fan motor shall be permanently lubricated and shall have built-in thermal overload protection.

Indoor Fan
The following units shall be equipped with a direct drive plenum fan design (T/YSC120F,T/YHC074F, T/YHC092F,T/YHC102F, 120F). Plenum fan design shall include a backward-curved fan wheel along with an externalrotor direct drive variable speed indoor motor. All plenum fan designs will have a variable speed adjustment potentiometer located in the control box.

3 to 5 ton units (high efficiency 3-phase with optional motor) are belt driven, FC centrifugal fans with adjustable motor sheaves. 3 to 5 ton units have multispeed, direct drive motors. All 6 to 8½ ton units (standard efficiency) shall have beltdrive motors with an adjustable idler-arm assembly for quick-adjustment to fan belts and motor sheaves. All motors shallbe thermally protected. All 10 tons, 6 ton (074), 7½ to 8½ (high efficiency) units have variable speed direct drive motors.All indoor fan motors meet the U.S. Energy Policy Act of 1992 (EPACT).

Controls
Unit shall be completely factory-wired with necessary controls and contactor pressure lugs or terminal block for power wiring. Unit shall provide an external location for mounting a fused disconnect device. A choice of microprocessor or electromechanical controls shall be available. Microprocessor controls provide for volt control functions. The resident control algorithms shall make all heating, cooling, and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. The control algorithm maintains accurate temperature control, minimizes drift from set point, and provides better building comfort. A centralized Microprocessor shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection.

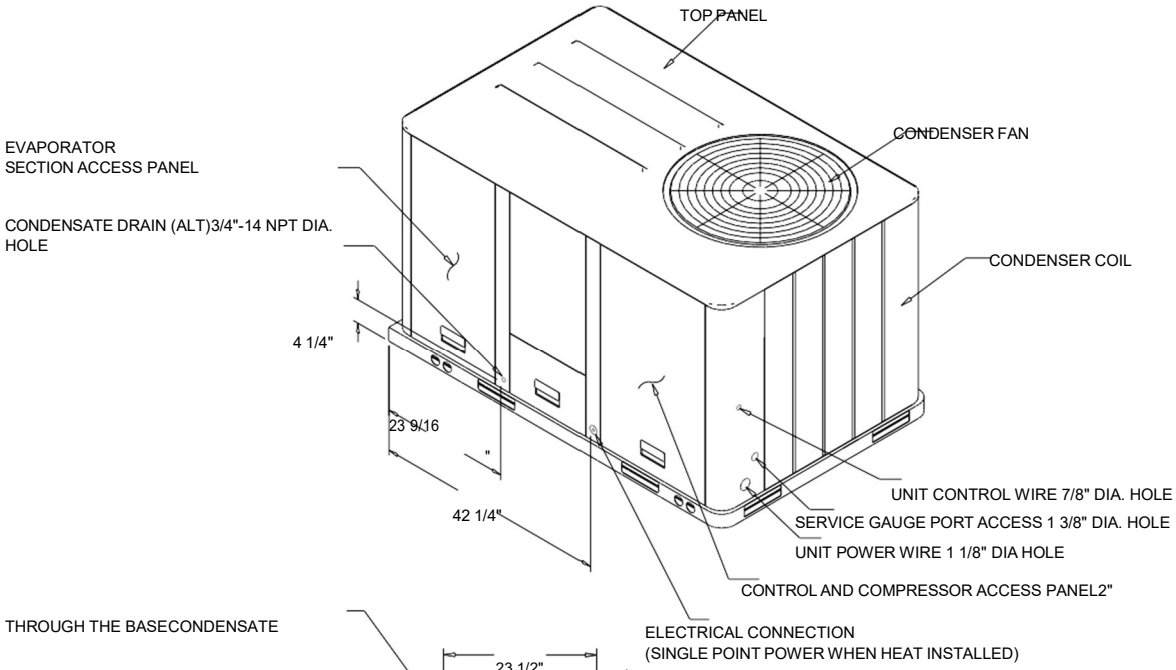
Refrigerant Circuits
Each refrigerant circuit offer thermal expansion valve as standard. Service pressure ports, and refrigerant line filter driers are factory-installed as standard. An area shall be provided for replacement suction line driers.

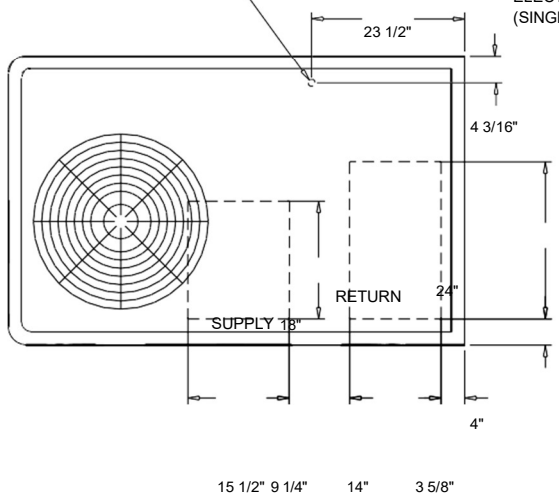
Phase monitor
Phase monitor shall provide 100% protection for motors and compressors against problems caused by phase loss, phase imbalance, and phase reversal. Phase monitor is equipped with an LED that provides an ON or FAULT indicator.There are no field adjustments. The module will automatically reset from a fault condition.

Economizer
This accessory shall be available with or without barometric relief. The assembly includes fully modulating 0-100 percent motor and dampers, minimum position setting, preset linkage, wiring harness with plug, spring return actuator and fixed dry bulb control. The barometric relief shall provide a pressure operated damper that shall be gravity closingand shall prohibit entrance of outside air during the equipment off cycle. Optional solid state or differential enthalpy control shall be available for either factory or field installation. The economizer arrives in the shipping position and shallbe moved to the operating position by the installing contractor.

Frostat
This option is to be utilized as a safety device. The Frostat opens when temperatures on the evaporator coil fall below10°F. The temperature will need to rise to 50°F before closing. This option should be utilized in low airflow or high outside air applications. (Cooling with Electric Heat Only.)

Unit Dimensions - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop
Item: C1 Qty: 1 Tag(s): AHU-5

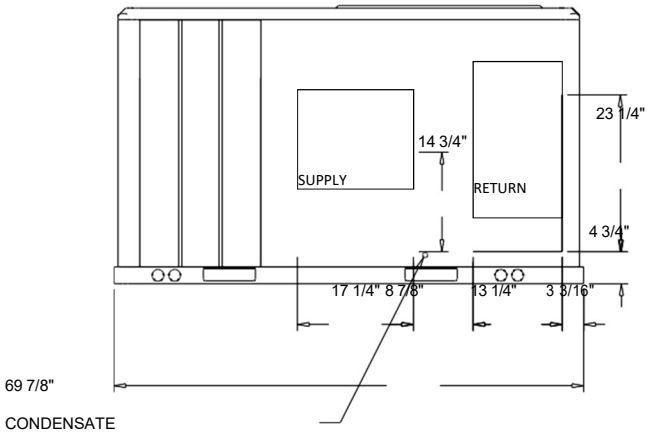


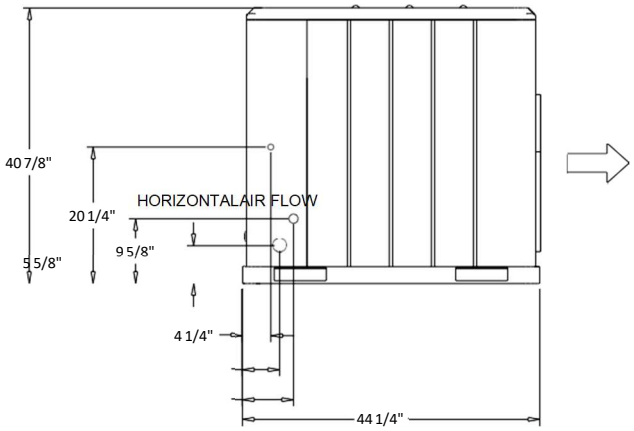


NOTES:
1. THRU -THE -BASE ELECTRICAL IS NOT STANDARD ON ALL UNITS.
2. VERIFY WEIGHT, CONNECTION, AND ALL DIMENSION WITH INSTALLER DOCUMENTS BEFORE INSTALLATION

PLAN VIEW UNIT

DIMENSION DRAWING

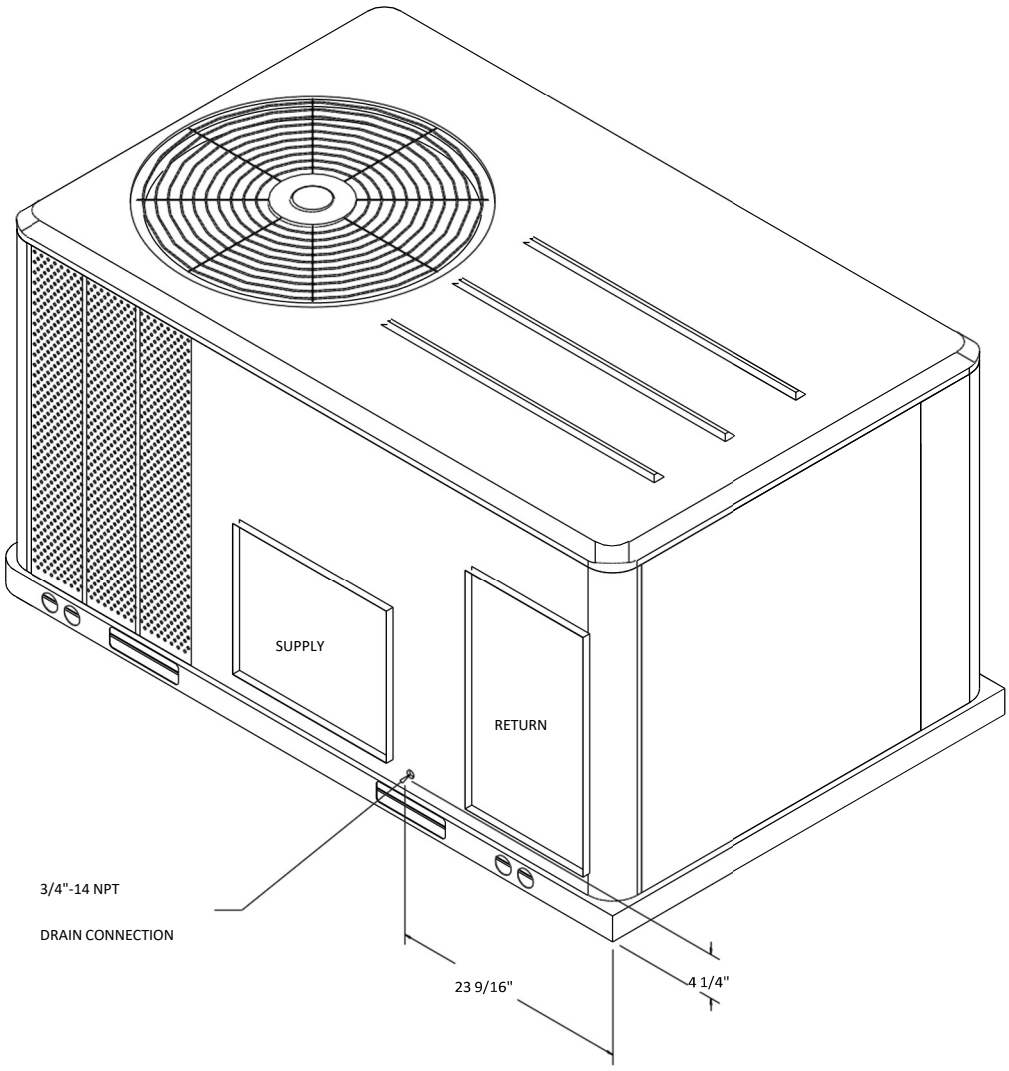




PACKAGED COOLING

DIMENSION DRAWING

Unit Dimensions - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop
Item: C1 Qty: 1 Tag(s): AHU-5



ISOMETRIC-PACKAGED COOLING

Unit Dimensions - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop
Item: C1 Qty: 1 Tag(s): AHU-5

ELECTRICAL / GENERAL DATA

(2)(4)(6)
GENERAL

Model:	TSC060G
Unit Operating Voltage:	414-506
Unit Primary Voltage: Unit	460
Secondary VoltageUnit	--
Hertz:	60
Unit Phase:	3
EER/SEER	12.0/14.0

Standard Motor		Oversized Motor		Field Installed Oversized Motor	
Minimum Circuit Ampacity:	13.0	Minimum Circuit Ampacity:	14.0	Minimum Circuit Ampacity:	
Maximum Fuse Size:	15.0	Maximum Fuse Size:	20.0	Maximum Fuse Size:	
Maximum (HACR) Circuit Breaker:	15.0	Maximum (HACR) Circuit Breaker:	20.0	Maximum (HACR) Circuit Breaker:	

INDOOR MOTOR

Standard Motor		Outsized Motor		Field Installed Oversized Motor	
Number:	1	Number:	1	Number:	N/A
Horsepower:	1.0	Horsepower:	1.5	Horsepower:	N/A
Motor Speed (RPM):	--	Motor Speed (RPM):	--1	Motor Speed (RPM):	N/A
Phase:	1	Phase:	4.2	Phase:	N/A
Full Load Amps: Locked	2.5	Full Load Amps: Locked	--	Full Load Amps:	N/A
Rotor Amps:	--	Rotor Amps:		Locked Rotor Amps:	N/A

COMPRESSOR Circuit 1/2

Number:	1
Horsepower:	4.3
Phase:	3
Rated Load Amps: Locked	7.1
Rotor Amps:	52.0

OUTDOOR MOTOR

Number:	1
Horsepower:	0.40
Motor Speed (RPM):	1100
Phase:	3
Full Load Amps: Locked	0.7
Rotor Amps:	2.6

POWER EXHAUST ACCESSORY (3,7)
(Field Installed Power Exhaust)

Phase:	N/A
Horsepower:	N/A
Motor Speed (RPM):Full	N/A
Load Amps:	N/A
Locked Rotor Amps:	N/A

FILTERS

Type: Furnished:
Number
Recommended

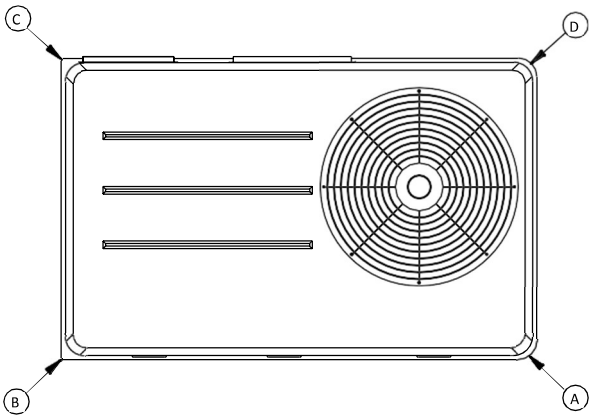
REFRIGERANT (2)

Type	R-410
Factory Charge	
Circuit #1	4.8 lb
Circuit #2	N/A

NOTES:

1. Maximum (HACR) Circuit Breaker sizing is for installations in the United States only.
2. Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
3. Value does not include Power Exhaust Accessory.
4. Value includes oversized motor.
5. Value does not include Power Exhaust Accessory.
6. EER is rated at AHRI conditions and in accordance with DOE test procedures.
7. Installation of this power exhaust kit will affect unit level MCA and could affect MOP sizing having a direct impact on existing field wiring and unit protection devices. The change in MCA/MOP is the sole responsibility of the field installing party. Trane will not issue new nameplates as a result of this power exhaust accessory installation. FLA of the power exhaust kit option must be added to the MCA of the unit for building supply conductor sizing determination.

Weight, Clearance & Rigging Diagram - 3-10 Ton R-410A PKGD Unitary Cooling RooftopItem: C1 Qty: 1 Tag(s): AHU-5

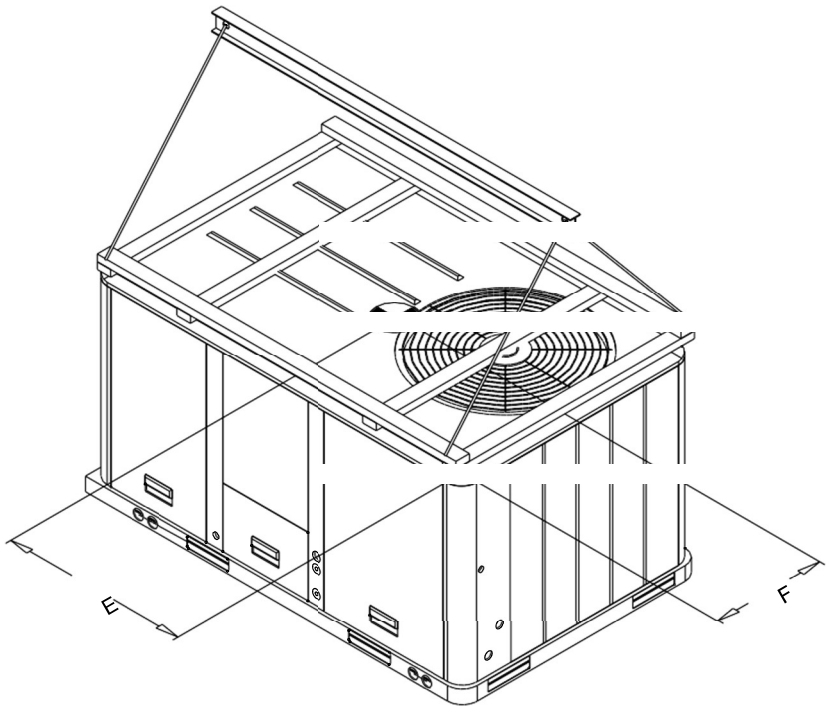


CORNER WEIGHT

INSTALLED ACCESSORIES NET WEIGHT DATA

ACCESSORY	WEIGHTS
ECONOMIZER	26.0 lb
MOTORIZED OUTSIDE AIR DAMPER	
MANUAL OUTSIDE AIR DAMPER	
BAROMETRIC RELIEF	
OVERSIZED MOTOR	
BELT DRIVE MOTOR	
POWER EXHAUST	
HEATER	
REHEAT	
THROUGHT THE BASE ELECTRICAL (FIOPS)	
UNIT MOUNTED CIRCUIT BREAKER (FIOPS)	
UNIT MOUNTED DISCONNECT (FIOPS)	
POWERED CONVENIENCE OUTLET (FIOPS)	
HINGED DOORS (FIOPS)	10.0 lb
HAIL GUARD	
SMOKE DETECTOR, SUPPLY / RETURN	
NOVAR CONTROL	
ROOF CURB	

BASIC UNIT WEIGHTS		CORNER WEIGHTS				CENTER OF GRAVITIY	
SHIPPING	NET	A◯	218.0 lb	C	50.0 lb	(E) LENGHT	(F) WIDTH
603.0 lb	498.0 lb	B◯	140.0 lb	D	90.0 lb	27"	12"



RIGGING AND CENTER OF GRAVITY

NOTE:

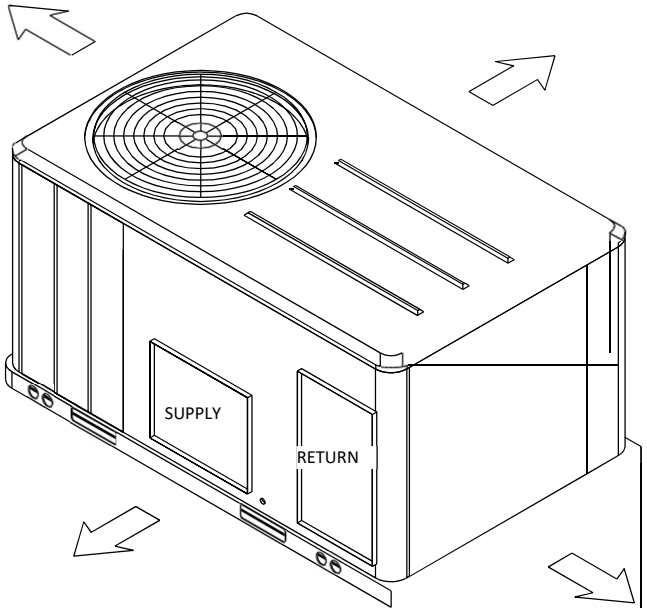
1. All weights are approximate.
2. Weights for options that are not list refer to Installation guide.
3. The actual weight are listed on the unit nameplate.
4. Refer to unit nameplate and installation guide for weights before scheduling transportation and installation of unit.
5. The weight shown represents the typical unit operating weight for the configuration selected. Estimated at +/- 10 % of the nameplate weight. .
6. Verify weight, connection, and all dimension with installer documents before installation.
7. Corner weights are given for information only.
8. Net/Shipping weight of optional accessories should be added to unit weight when ordering factory or field installed accessories.

Weight, Clearance & Rigging Diagram - 3-10 Ton R-410A PKGD Unitary Cooling RooftopItem: C1 Qty: 1 Tag(s): AHU-5

CLEARANCE FROM TOP OF UNIT 72"

CLEARANCE 36"

CLEARANCE 48"



DOWNFLOW CLEARANCE 36"

HORIZONTAL CLEARANCE 18"

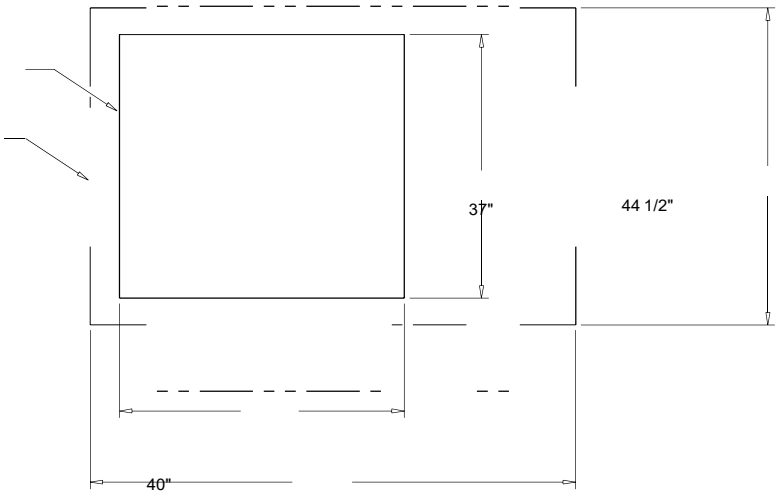
CLEARANCE 36"

PACKAGED COOLING

CLEARANCE

ROOF OPENING

UNIT OUTLINE

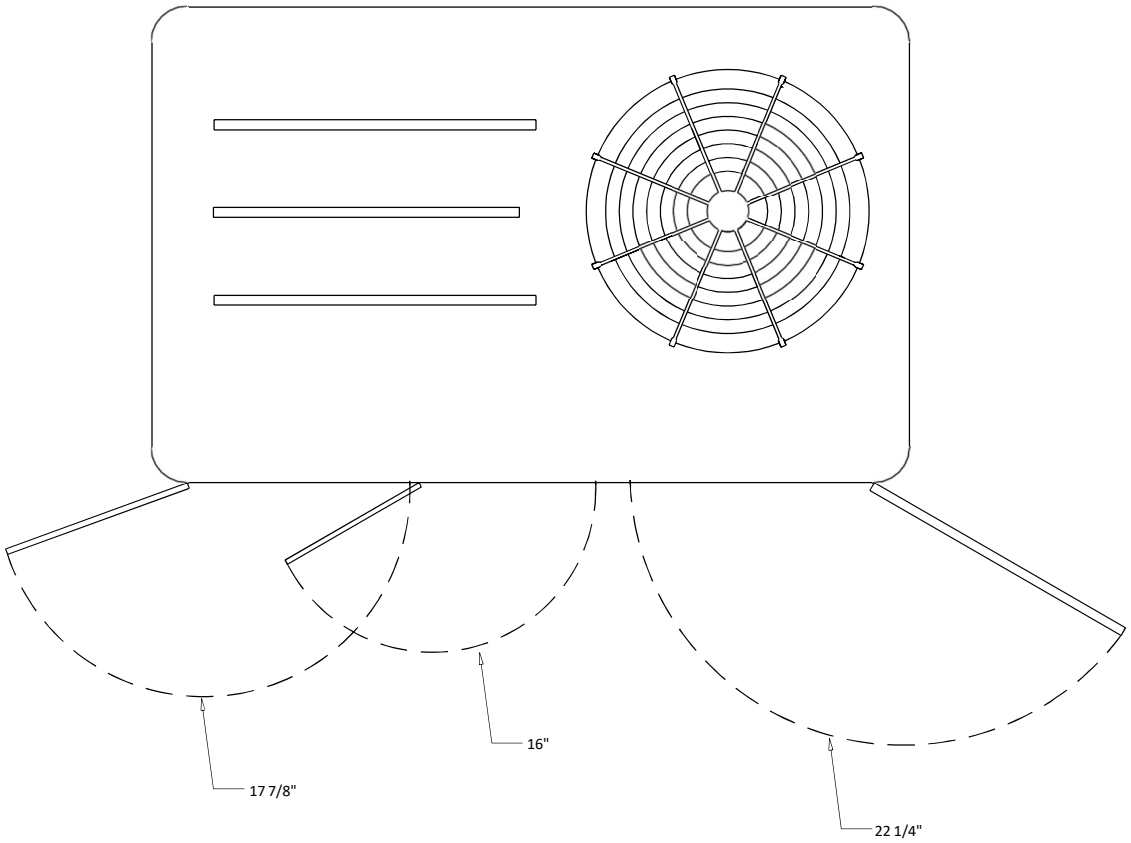


68 3/16"

PACKAGED COOLING

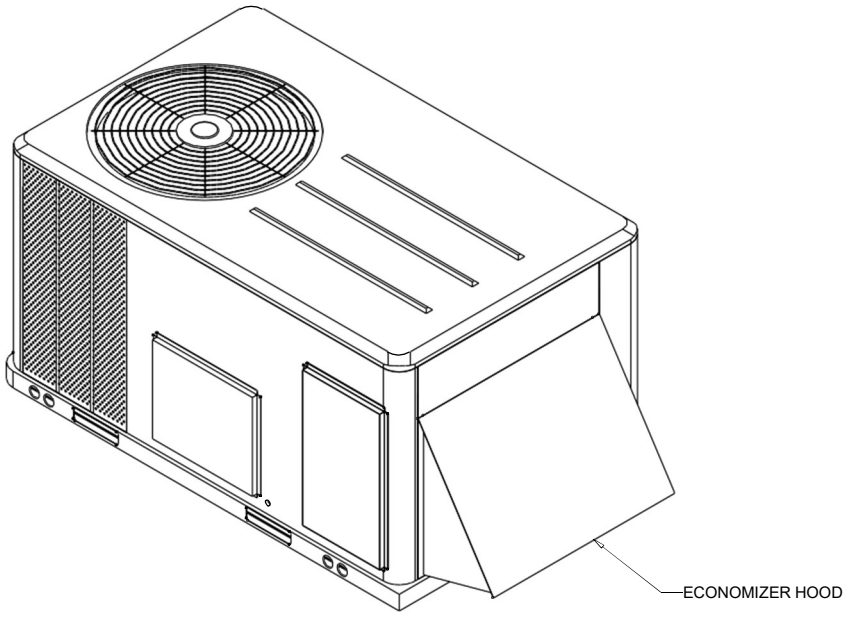
DOWNFLOW TYPICAL ROOF OPENING

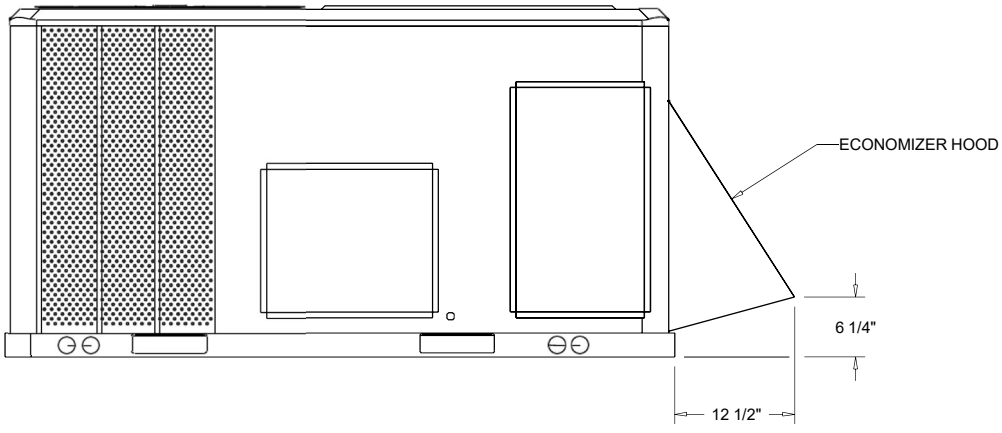
Accessory - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop
Item: C1 Qty: 1 Tag(s): AHU-5



SWING DIAMETER - HINGED DOOR(S) OPTION

Accessory - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop
Item: C1 Qty: 1 Tag(s): AHU-5

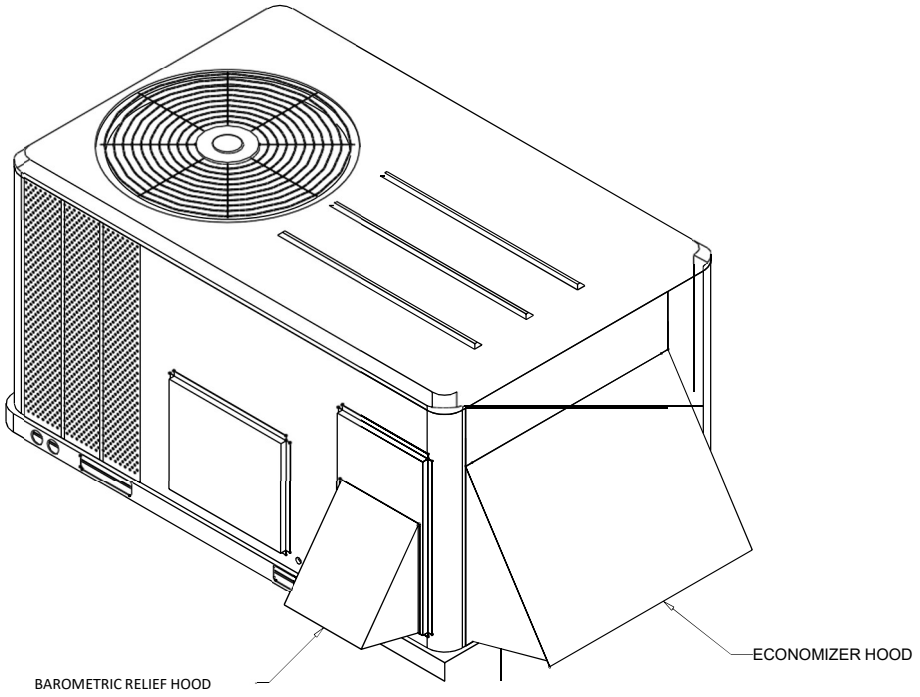


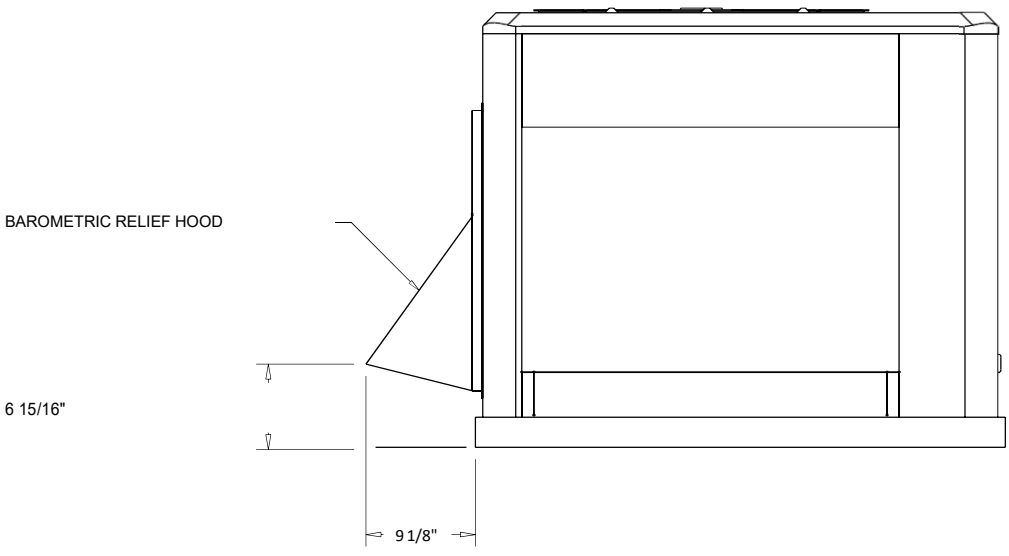


ECONOMIZER HOOD

ACCESSORY

Accessory - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop
Item: C1 Qty: 1 Tag(s): AHU-5





BAROMETRIC RELIEF DAMPER HOOD

ACCESSORY

Field Installed Options - Part/Order Number Summary
This is a report to help you locate field installed options that arrive at the jobsite. This report provides part or order numbers for each field installed option, and references it to a specific product tag. It is NOT intended as a bill of material for the job.

Product Family - Packaged Cooling Rooftop Units

Item	Tag(s)	Qty	Description	Model Number
B1	AHU-2	1	20 Ton	TSD240G4R0C--H 1C10006000H000 000000000000

Field Installed Option Description	Part/Ordering Number
High static drive	
6th-10th yr compressor warranty	2705-8008-A4-00

Item	Tag(s)	Qty	Description	Model Number
B2	AHU-4	1	15 Ton	TSD180G4R0C--H 0C10006000H000 000000000000

Field Installed Option Description	Part/Ordering Number
Low static drive	
6th-10th yr compressor warranty	2705-8008-A2-00

Product Family - 3-10 Ton R-410A PKGD Unitary Cooling Rooftop

Item	Tag(s)	Qty	Description	Model Number
C1	AHU-5	1	5 Ton	TSC060G4R0A--H 1C10006010H000 000000000000

Field Installed Option Description	Part/Ordering Number
Year 6-10 compressor warranty	2705-8008-A1-00

EXHIBIT C

City of Greenville/Greenville Utilities Commission
Minority and Women Business Enterprise (MWBE) Program

City of Greenville
Construction Guidelines and Affidavits
$100,000 and above

These instructions shall be included with each bid solicitation.

City of Greenville/Greenville Utilities Commission
Minority and Women Business Enterprise Program

$100,000 and Construction Guidelines for MWBE Participants

Policy Statement

It is the policy of the City of Greenville and Greenville Utilities Commission to provide minorities and women equal opportunity for participating in all aspects of the City's and Utilities' contracting and procurement programs, including but not limited to, construction projects, supplies and materials purchases, and professional and personal service contracts.

Goals and Good Faith Efforts

Bidders responding to this solicitation shall comply with the MWBE program by making Good Faith Efforts to achieve the following aspiration goals for participation.

	CITY	
	MBE	**WBE**
Construction This goal includes Construction Manager at Risk.	10%	6%

Bidders shall submit MWBE information with their bids on the forms provided. This information will be subject to verification by the City prior to contract award. **As of July 1, 2009, contractors, subcontractors, suppliers, service providers, or MWBE members of joint ventures intended to satisfy City MWBE goals shall be certified by the NC Office of Historically Underutilized Businesses (NC HUB) only.** Firms qualifying as "WBE" for City's goals must be designated as a "women-owned business" by the HUB Office. Firms qualifying as "MBE" for the City's goals must be certified in one of the other categories (i.e.: Black, Hispanic, Asian American, American Indian, Disabled, or Socially and Economically Disadvantaged). Those firms who are certified as both a "WBE" and "MBE" may only satisfy the "MBE" requirement. **Each goal must be met separately. Exceeding one goal does not satisfy requirements for the other.** A complete database of NC HUB certified firms may be found at http://www.doa.nc.gov/hub/. An internal database of firms who have expressed interest to do business with the City and GUC is available at www.greenvillenc.gov. However, the HUB status of these firms must be verified by the HUB database. The City shall accept NCDOT certified firms on federally funded projects only. Please note: A contractor may utilize any firm desired. However, for participation purposes, all MWBE vendors who wish to do business *as a minority or female* must be certified by NC HUB.

The Bidder shall make good faith efforts to encourage participation of MWBEs prior to submission of bids in order to be considered as a responsive bidder. Bidders are cautioned that even though their submittal indicates they will meet the MWBE goal, they should document their good faith efforts and be prepared to submit this information, if requested.

The MWBE's listed by the Contractor on the **Identification of Minority/Women Business Participation** which are determined by the City to be certified shall perform the work and supply the materials for which they are listed unless the Contractors receive prior authorization from the City to perform the work with other forces or to obtain materials from other sources. If a contractor is proposing to perform all elements of the work with his own forces, he must be prepared to document evidence satisfactory to the owner of similar government contracts where he has self-performed.

The Contractor shall enter into and supply copies of fully executed subcontracts with each MWBE or supply signed Letter(s) of Intent to the Project Manager after award of contract and prior to Notice to Proceed. Any amendments to subcontracts shall be submitted to the Project Manager prior to execution.

Instructions

The Bidder shall provide with the bid the following documentation:

☐ Identification of Minority/Women Business Participation
(if participation is zero, please mark zero—Blank forms will be considered nonresponsive)

☐ Affidavit A (if subcontracting)

OR

☐ Identification of Minority/Women Business Participation
(if participation is zero, please mark zero—Blank forms will be considered nonresponsive)

☐ Affidavit B (if self-performing; must attest that bidder does not customarily subcontract work on this type of project—includes supplies and materials)

Within 72 hours or 3 business days after notification of being the apparent low bidder who is subcontracting anything must provide the following information:

☐ Affidavit C (if aspirational goals are met or are exceeded)

OR

☐ Affidavit D (if aspirational goals are not met)

After award of contract and prior to issuance of notice to proceed:

☐ Letter(s) of Intent or Executed Contracts

****With each pay request, the prime contractors will submit the Proof of Payment Certification, listing payments made to MWBE subcontractors.**

*****If a change is needed in MWBE Participation, submit a Request to Change MWBE Participation Form. Good Faith Efforts to substitute with another MWBE contractor must be demonstrated.**

Minimum Compliance Requirements:

All written statements, affidavits, or intentions made by the Bidder shall become a part of the agreement between the Contractor and the City for performance of contracts. Failure to comply with any of these statements, affidavits or intentions or with the minority business guidelines shall constitute a breach of the contract. A finding by the City that any information submitted (either prior to award of the contract or during the performance of the contract) is inaccurate, false, or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the City whether to terminate the contract for breach or not. In determining whether a contractor has made Good Faith Efforts, the CITY will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts.

Identification of Minority/Women Business Participation

I,_____,
(Name of Bidder)
do hereby certify that on this project, we will use the following minority/women business enterprises as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work type	*MWBE Category

*MWBE categories: Black, African American (**B**), Hispanic, Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

If you will not be utilizing MWBE contractors, please certify by entering zero "0"

The total value of MBE business contracting will be ($)_____.

The total value of WBE business contracting will be ($)_____.

City of Greenville AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of _____

_____

_____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- ❑ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ❑ **2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ❑ **3** – **(15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ❑ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ❑ **5** – **(10 pts)** Attended prebid meetings scheduled by the public owner.
- ❑ **6** – **(20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ❑ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ❑ **8** – **(25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- ❑ **9** – **(20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ❑ **10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority/Women Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority/women business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of_____, County of_____

Subscribed and sworn to before me this _____day of_____20___

Notary Public_____

My commission expires _____

City of Greenville --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____

_____

_____

_____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____

_____contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date:_____Name of Authorized Officer:_____

Signature:_____

SEAL

Title:_____

State of _____, County of_____

Subscribed and sworn to before me this _____day of _____20___

Notary Public _____

My commission expires_____

City of Greenville - AFFIDAVIT C - Portion of the Work to be Performed by MWBE Firms

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by MWBE businesses as defined in GS143-128.2(g) and the COG/CITY MWBE Plan sec. III is equal to or greater than 16% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID#_____ Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises and a minimum of _____% of the total dollar amount of the contract with women business enterprises. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below.

Attach additional sheets if required

Name and Phone Number	*MWBE Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with MWBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

SEAL

Signature:_____

Title:_____

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20_____

Notary Public_____

My commission expires_____

City of Greenville AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 16% participation by minority/women business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____I do hereby certify that on the
(Name of Bidder)

(Project Name)

Project ID#_____Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises and a minimum of % ~~of the to~~tal dollar amount of the contract with women business enterprises. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*MWBE Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**),Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

Examples of documentation required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.

B. Copies of quotes or responses received from each firm responding to the solicitation.

C. A telephone log of follow-up calls to each firm sent a solicitation.

D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.

E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.

F. Copy of pre-bid roster.

G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.

H. Letter detailing reasons for rejection of minority business due to lack of qualification.

I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with MWBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of _____, County of _____
Subscribed and sworn to before me this _____day of _____20_____
Notary Public_____
My commission expires _____

LETTER OF INTENT
MWBE Subcontractor Performance

Please submit this form or executed subcontracts with MWBE firms after award of contract and prior to issuance of notice to proceed.

PROJECT: _____
(Project Name)

TO: _____
(Name of Prime Bidder/Architect)

The undersigned intends to perform work in connection with the above project as a:

____Minority Business Enterprise _____Women Business Enterprise

The MWBE status of the undersigned is certified the NC Office of Historically Underutilized Businesses (required). ___ Yes ___ No

The undersigned is prepared to perform the following described work or provide materials or services in connection with the above project at the following dollar amount:

Work/Materials/Service Provided	Dollar Amount of Contract	Projected Start Date	Projected End Date

_____
(Date)

_____ _____
(Address) (Name & Phone No. of MWBE Firm)

_____ _____
(Name & Title of Authorized Representative of MWBE) (Signature of Authorized Representative of MWBE)

REQUEST TO CHANGE MWBE PARTICIPATION

(Submit changes only if notified as apparent lowest bidder, continuing through project completion)

Project: _____

Bidder or Prime Contractor: _____

Name & Title of Authorized Representative: _____

Address: _____ **Phone #:** _____

_____ **Email Address:** _____

Total Contract Amount (including approved change orders or amendments): $_____

Name of subcontractor: _____

Good or service provided: _____

Proposed Action:

___Replace subcontractor
___Perform work with own forces

For the above actions, you must provide one of the following reasons (Please check applicable reason):

___ The listed MBE/WBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract.

___The listed MBE/WBE is bankrupt or insolvent.

___The listed MBE/WBE fails or refuses to perform his/her subcontract or furnish the listed materials.

___The work performed by the listed subcontractor is unsatisfactory according to industry standards and is not in accordance with the plans and specifications; or the subcontractor is substantially delaying or disrupting the progress of the work.

If replacing subcontractor:

Name of replacement subcontractor: _____

The MWBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required). ___Yes ___No

Dollar amount of original contract $_____

Dollar amount of amended contract $ _____

Other Proposed Action:

___Increase total dollar amount of work
___Decrease total dollar amount of work
___Add additional subcontractor
___Other

Please describe reason for requested action: _____

_____

If adding additional subcontractor:*

The MWBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required).___Yes ___No

**Please attach Letter of Intent or executed contract document*

Dollar amount of original contract $_____

Dollar amount of amended contract $ _____

Interoffice Use Only:

Approval __Y __N

Date_____

Signature

Proof of Payment Certification

MWBE Contractors, Suppliers, Service Providers

Pay Application No. _____

Purchase Order No. _____

Project Name: _____

Prime Contractor: _____

Current Contract Amount (including change orders): $_____

Requested Payment Amount for this Period: $_____

Is this the final payment? ___Yes ___No

Firm Name	MWBE Category*	Total Amount Paid from this Pay Request	Total Contract Amount (including changes)	Total Amount Remaining

*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

Date:_____

Certified By:_____
Name

_____
Title

_____
Signature

EXHIBIT D

STATE OF NORTH CAROLINA

AFFIDAVIT

CITY OF GREENVILLE

****

I, _____(the individual attesting below), being duly authorized by and on behalf of

_____ (the entity bidding on project hereinafter "Employer") after first being duly

sworn hereby swears or affirms as follows:

1. Employer understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25(5).

2. Employer understands that Employers Must Use E-Verify. Each employer, after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS§64-26(a).

3. Employer is a person, business entity, or other organization that transacts business in this State and that employs 25 or more employees in this State. (mark Yes or No)

a. YES _____, or

b. NO _____

4. Employer's subcontractors comply with E-Verify, and if Employer is the winning bidder on this project Employer will ensure compliance with E-Verify by any subcontractors subsequently hired by Employer.

This ____ day of _____, 20____.

_____

Signature of Affiant
Print or Type Name: _____

State of North Carolina City of Greenville

Signed and sworn to (or affirmed) before me, this the _____

day of _____, 20____.

My Commission Expires:

_____

___

Notary Public

(Affix Official/Notarial Seal)