

SUBMITTAL  
ME EYE - 15 LOWELL ST  
PORTLAND, ME.

SUBM-2

**#17109**

GENERAL CONTRACTOR ..... HEBERT  
CONSTRUCTION  
LEWISTON, ME

SUBMITTED BY ..... JOHNSON & JORDAN  
SCARBOROUGH, ME.  
(207) 883-8345

SUBCONTRACTOR ..... N/A

SUPPLIER ..... TRANE

SPECIFICATION SECTION ..... N/A

PARAGRAPH ..... N/A

ITEM ..... RTU-1, VAV'S &  
BYPASS DAMPER

**JOHNSON & JORDAN, INC.**

18 Mussey Rd. Scarborough, ME

Approved \_\_\_\_\_ Approved as Noted \_\_\_\_\_

Re-Submit \_\_\_\_\_ Reviewed  X

Subject to Architects Approval \_\_\_\_\_

Date  8/24/17  By  Shane Watson



# Submittal

**Prepared For:** Shane Watson

**Date:** August 23, 2017

**Customer P.O. Number:**  
**Customer Project Number:**

**Sold To:** Johnson & Jordan

**Job Number:**  
**Job Name:**  
15 Lowel St - 3 ton RTU

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

## Product Summary

Qty	Product
1	3 Ton R410A PKGD Unitary Gas/Electric Rooftop
4	Variable Air Volume Single Duct Terminal Units
1	Bypass Damper
1	Tracer Concierge

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**Daniel Broderick**  
Trane  
860 Spring Street, Unit 1  
Westbrook, ME 04092  
Phone: (207) 828-1777  
Cell:  
Fax: (207) 828-1511

*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

<b>Product Summary</b> .....	<b>1</b>
<b>3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop (Item A1)</b> .....	<b>3</b>
Tag Data .....	3
Product Data .....	3
Performance Data.....	3
Mechanical Specifications.....	5
Unit Dimensions.....	8
Weight, Clearance & Rigging Diagram .....	12
Accessory .....	14
Field Wiring.....	20
<b>Variable Air Volume Single Duct Terminal Units (Items B1 - B4)</b> .....	<b>21</b>
Tag Data .....	21
Product Data.....	21
Performance Data.....	21
Mechanical Specifications.....	22
Unit Dimensions.....	24
Accessory .....	27
Field Wiring.....	28
<b>Variable Air Volume Changeover/Bypass Units (Item C1)</b> .....	<b>30</b>
Tag Data .....	30
Product Data.....	30
Performance Data.....	30
Mechanical Specifications.....	31
Unit Dimensions.....	32
<b>Tracer Concierge (Item D1)</b> .....	<b>33</b>
Tag Data .....	33
Product Data.....	33
Mechanical Specifications.....	34
<b>Start-up (Item E1)</b> .....	<b>35</b>
Tag Data .....	35
Product Data.....	<b>Error! Bookmark not defined.</b>
<b>Field Installed Options - Part/Order Number Summary</b> .....	<b>35</b>
3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop .....	35
Variable Air Volume Single Duct Terminal Units.....	35

**Tag Data - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop (Qty: 1)**

Item	Tag(s)	Qty	Description	Model Number
A1	RTU-1	1	3 Ton R410A PKGD Unitary Gas/Electric	YHC036E3RLA--H0C1A2A6B000000000000000000

**Product Data - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop****Item: A1 Qty: 1 Tag(s): RTU-1**

DX cooling, gas heat High efficiency  
 Convertible configuration  
 3 Ton  
 208-230/60/3  
 Microprocessor controls 3ph  
 Low gas heat 3ph  
 Economizer Comparative Enthalpy 0-100% with Barometric Relief  
 Hinged panels/2 in pleated filters Merv 8  
 Standard condenser coil w/hail guard  
 Through the base electrical 3ph  
 Circuit breaker  
 Unpowered convenience outlet (3ph units)  
 BACnet Communications Interface 3 ph  
 Dehumidification-hot gas reheat  
 Roof curb (Fld)  
 Humidity wall mounted sensor (Fld)  
 LP conversion kit (Fld)

**Performance Data - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop**

Tags	RTU-1
Design Airflow (cfm)	1200
Airflow Application	Downflow
Cooling Entering DB (F)	80.00
Cooling Entering WB (F)	67.00
Ent Air Relative Humidity (%)	51.08
Ambient Temp (F)	95.00
Evap Coil Leaving Air Temp (DB) (F)	58.44
Evap Coil Leaving Air Temp (DB) (F)	58.44
Evap Coil Leaving Air Temp (WB) (F)	56.60
Evap Coil Leaving Air Temp (WB) (F)	56.60
Cooling Leaving Unit DB (F)	60.02
Cooling Leaving Unit WB (F)	57.21
Cooling LDB with reheat (F)	75.88
Gross Total Capacity (MBh)	38.49
Gross Sensible Capacity (MBh)	27.94
Gross Latent Capacity (MBh)	10.55
Net sensible heat ratio w/reheat on (Number)	0.26
Net Total Capacity (MBh)	36.87
Net Sensible Capacity (MBh)	26.32
Net Sensible Heat Ratio (Number)	0.71
Heating EAT (F)	65.00
Heating LAT (F)	102.30
Heating Delta T (F)	37.30
Input Heating Capacity (MBh)	60.00
Output Heating Capacity (MBh)	48.00
Output Heating Cap. w/Fan (MBh)	49.62
Design ESP (in H2O)	0.750
Component SP (in H2O)	0.200
Field supplied drive kit required	None

Tags	RTU-1
Indoor mtr operating power (bhp)	0.54
Indoor RPM (rpm)	978
Indoor Motor Power (kW)	0.40
Outdoor Motor Power (kW)	0.22
Compressor Power (kW)	2.62
System Power (kW)	3.24
IPLV @ AHRI (IPLV)	15.0
MCA (A)	19.60
MOP (A)	30.00
Compressor 1 RLA (A)	11.50
Compressor 2 RLA (A)	0.00
Evaporator fan FLA (A)	5.00
Condenser fan FLA (A)	1.50
Min. unit operating weight (lb)	544.0
Max. unit operating weight (lb)	767.0
Fan motor heat (MBh)	1.62
Reheat Temp Rise (F)	17.44
Reheat Capacity (MBh)	22.70
Dew Point (F)	55.39
Dew Point (F)	55.39
Leaving Air Humidity Ratio (lb/lb)	0
Moisture Removal (gal/hr) (gph)	1.19
Mixed Air Humidity Ratio (lb/lb)	0
Leaving Unit Rel Humid w/Reheat (%)	49.02
Rated capacity (AHRI) (MBh)	37.00
Exhaust fan power (kW)	0.65
Refrig charge (HFC-410A) - ckt 1 (lb)	6.6
ASHRAE 90.1	Yes
Saturated Suction Temp Circuit 1 (F)	50.96
Saturated Discharge Temp Circuit 1 (F)	114.33
IEER ( )	15.00
EER @ AHRI Conditions (EER)	12.7
Total Static Pressure (in H2O)	0.950
Length (ft)	5.82
Width (ft)	3.69
Height (ft)	3.02
T24_SZVZV	NA
Indoor Fan Type	FC Centrifugal
Indoor Fan Drive Type	Direct
Outdoor Fan Type	Propeller
Outdoor Fan Drive Type	Direct
Outdoor Fan Quantity ( )	1
Exhaust Fan Type	FC Centrifugal
Exhaust Drive Type	Direct
Heating Type	Gas Heat
Heating Stages	1

**Mechanical Specifications - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop**

Item: A1 Qty: 1 Tag(s): RTU-1

**General**

The units shall be convertible airflow. The operating range shall be between 115°F and 0°F in cooling as standard from the 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 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. Units shall be cULus listed and labeled, classified in accordance for Central 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. 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. 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 with 1/8 inch, foil-faced, closed-cell insulation. All insulation edges shall be either captured or sealed. The unit's 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.

**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.

**Two-Inch Pleated Filters**

2" 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.

**Notes:**

Crankcase heaters are optional on YSC (036, 048, 060, 072, 090, 102, 120); standard on YHC (036, 048, 060, 072, 092, 102, 120).

**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 external rotor 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 (standard and high efficiency 3-phase) have multispeed, direct drive motors. All 6 to 8½ ton units (standard efficiency) shall have belt drive motors with an adjustable idler-arm assembly for quick-adjustment to fan belts and motor sheaves. All motors shall be 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).

**Outdoor Fans**

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

**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 standard

for 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 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. These all aluminum coils are recyclable. 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 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.

### **Tool-less Hail Guards**

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

### **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 all 24V 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. 24-volt electromechanical control circuit shall include control transformer and contactor

### **High Pressure Control**

All units include High Pressure Cutout as standard.

### **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.

### **BACnet Communications**

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

### **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.

### **Gas Heating Section**

The heating section shall have a progressive tubular heat exchanger design using stainless steel burners and corrosion resistant steel throughout. An induced draft combustion blower shall be used to pull the combustion products through the firing tubes. The heater shall use a direct spark ignition (DSI) system. On initial call for heat, the combustion blower shall purge the heat exchanger for 20 seconds before ignition. After three unsuccessful ignition attempts, the entire heating system shall be locked out until manually reset at the thermostat/zone sensor. Units shall be suitable for use with natural gas or propane (field-installed kit) and also comply with the California requirement for low NOx emissions (Gas/Electric Only).

### **Dehumidification**

The unit shall be equipped with internally finned, 5/16" copper tubes mechanically bonded to configured aluminum plate fins. The coil shall be 2 row with a minimum of 16 fins per inch. Dehumidification shall be achieved by routing hot refrigerant gas from the discharge line of the compressor through the reheat coil.

### **Hinged Access Doors**

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

### **Powered or Unpowered Convenience Outlet**

This is a GFCI, 120v/15amp, 2 plug, convenience outlet, either powered or unpowered. When the convenience outlet is

powered, a service receptacle disconnect will be available. The convenience outlet is powered from the line side of the disconnect or circuit breaker, and therefore will not be affected by the position of the disconnect or circuit breaker. This option can only be ordered when the Through the Base Electrical with either the Disconnect Switch or Circuit Breaker option is ordered.

**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 closing and 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 shall be moved to the operating position by the installing contractor.

**Through the Base Electrical Access**

An electrical service entrance shall be provided allowing electrical access for both control and main power connections inside the curb and through the base of the unit. Option will allow for field installation of liquid-tight conduit and an external field-installed disconnect switch.

**Through the Base Electrical with Circuit Breaker**

This option is a thermal magnetic, molded case, HACR Circuit Breaker with provisions for through the base electrical connections. The circuit breaker will be installed in a water tight enclosure in the unit with access through a swinging door. Wiring will be provided from the switch to the unit high voltage terminal block. The circuit breaker will provide overcurrent protection, be sized per NEC and UL guidelines, and be agency recognized by UL/CSA.

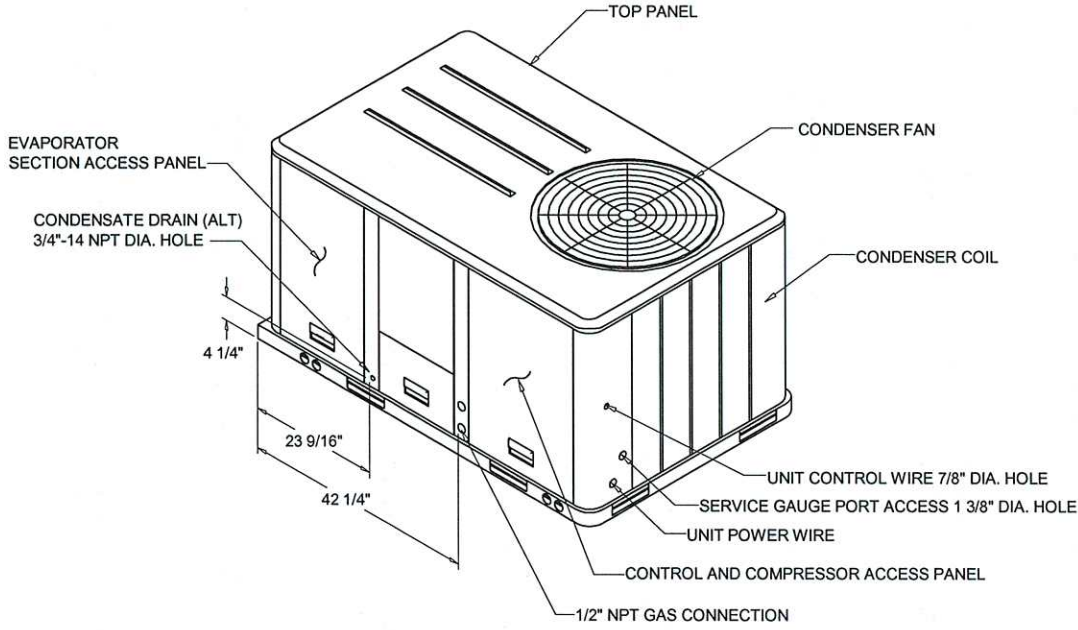
**Accessory - Roof Curb**

The roof curb shall be designed to mate with the unit's downflow supply and return and provide support and a water tight installation when installed properly. The roof curb design shall allow field fabricated rectangular supply/return ductwork to be connected directly to the curb. Curb design shall comply with NRCA requirements. Curb shall be shipped knocked down for field assembly and shall include wood nailer strips.

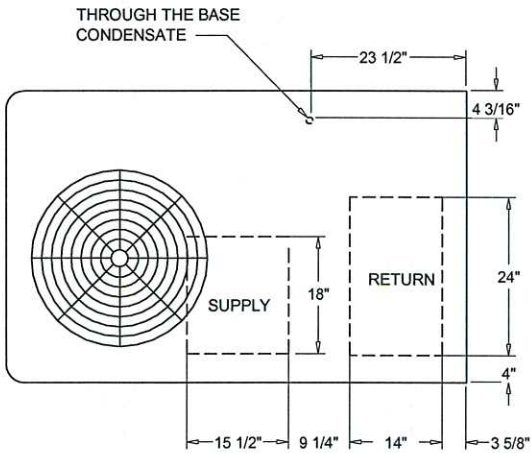


Unit Dimensions - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop

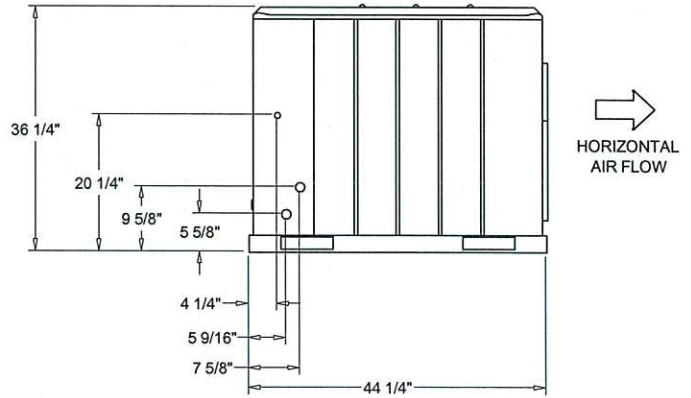
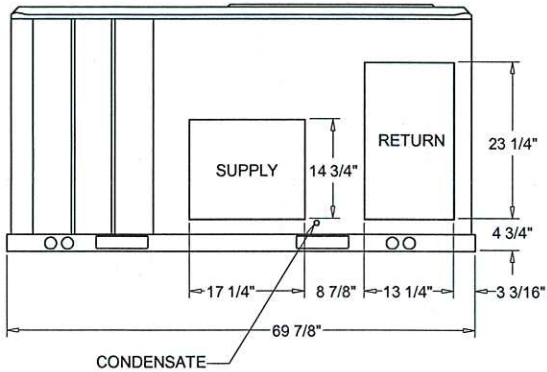
Item: A1 Qty: 1 Tag(s): RTU-1



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

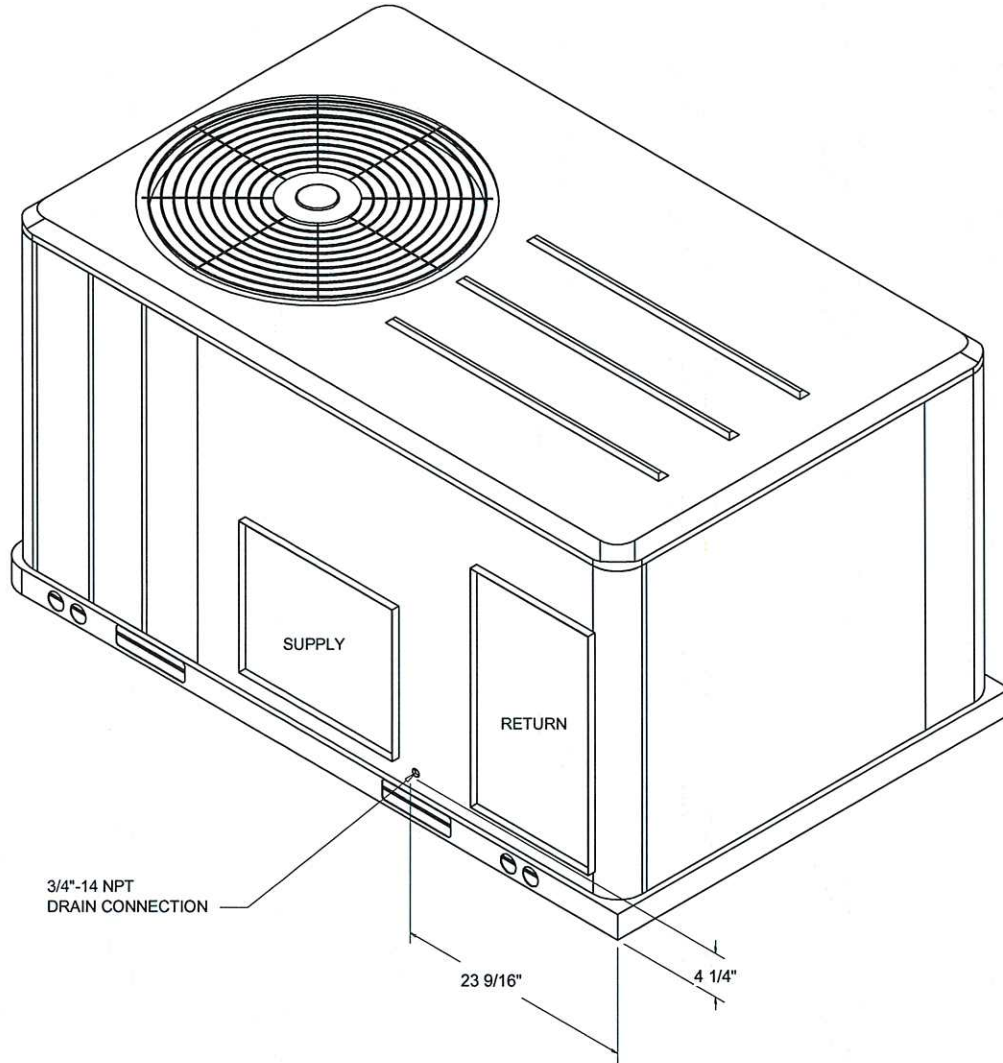


PLAN VIEW UNIT  
DIMENSION DRAWING



PACKAGED GAS / ELECTRICAL  
DIMENSION DRAWING

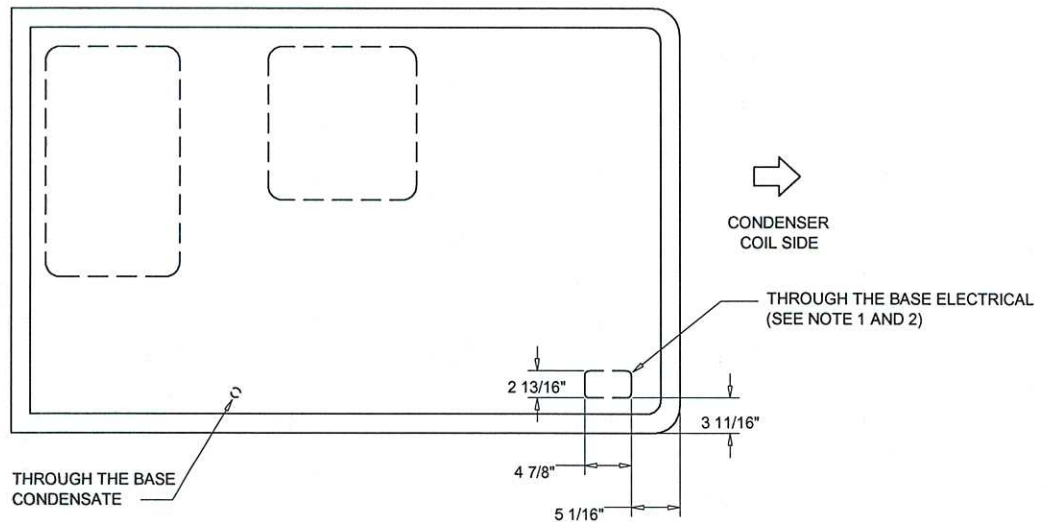
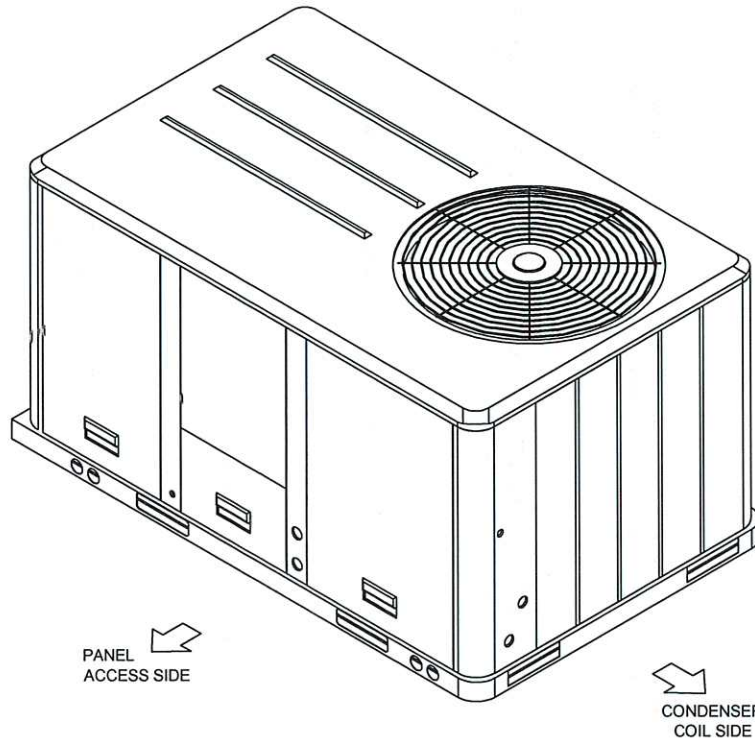
Unit Dimensions - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop  
Item: A1 Qty: 1 Tag(s): RTU-1



ISOMETRIC-PACKAGED COOLING

Unit Dimensions - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop

Item: A1 Qty: 1 Tag(s): RTU-1



PANEL ACCESS SIDE

- NOTES:
1. THRU -THE -BASE GAS AND ELECTRICAL IS NOT STANDARD. VERIFY OPTION IN PRODUCT DATA IN THIS DOCUMENT.
  2. VERIFY WEIGHT, CONNECTION, OPTION CONFIGURATION AND ALL DIMENSION WITH INSTALLER DOCUMENTS BEFORE INSTALLATION

THRU THE BASE ELECTRICAL  
 PLAN / ISO VIEW DRAWING

**Unit Dimensions - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop**  
**Item: A1 Qty: 1 Tag(s): RTU-1**

**ELECTRICAL / GENERAL DATA**

<b>GENERAL</b> (2)(4)(6) Model: YHC036E Oversized Motor Unit Operating Voltage: 187-253 MCA: N/A Unit Primary Voltage: 208 MFS: N/A Unit Secondary Voltage: 230 MCB: N/A Unit Hertz: 60 Unit Phase: 3 <b>EER/SEER</b> Standard Motor Field Installed Oversized Motor MCA: 20.6 MCA: N/A MFS: 30.0 MFS: N/A MCB: 30.0 MCB: N/A		<b>HEATING PERFORMANCE</b> <b>HEATING - GENERAL DATA</b> Heating Model: Low Heating Input (BTU): 60,000 Heating Output (BTU): 48,000 No. Burners: 2 No. Stages: 1 Gas Inlet Pressure Natural Gas (Min/Max): 4.5/14.0 LP (Min/Max): 11.00/14.00 Gas Pipe Connection Size: 1/2"	
<b>INDOOR MOTOR</b> Standard Motor Oversized Motor Field Installed Oversized Motor Number: 1 Number: N/A Number: N/A Horsepower: 1.0 Horsepower: N/A Horsepower: N/A Motor Speed (RPM): - Motor Speed (RPM): N/A Motor Speed (RPM): N/A Phase: 3 Phase: N/A Phase: N/A Full Load Amps: 5.0 Full Load Amps: N/A Full Load Amps: N/A Locked Rotor Amps: 32.2 Locked Rotor Amps: N/A Locked Rotor Amps: N/A			
<b>COMPRESSOR</b> Circuit 1/2 Number: 1 Horsepower: 2.7 Phase: 3 Rated Load Amps: 12.8 Locked Rotor Amps: 95.0		<b>OUTDOOR MOTOR</b> Number: 1 Horsepower: 0.20 Motor Speed (RPM): 1075 Phase: 1 Full Load Amps: 1.5 Locked Rotor Amps: 2.4	
<b>POWER EXHAUST ACCESSORY</b> (3) (Field Installed Power Exhaust) Phase: N/A Horsepower: N/A Motor Speed (RPM): N/A Full Load Amps: N/A Locked Rotor Amps: N/A		<b>FILTERS</b> Type: Throwaway Furnished: Yes Number: 2 Recommended: 20"x30"x2"	
<b>REFRIGERANT</b> (2) Type: R-410 Factory Charge Circuit #1: 10.5 lb Circuit #2: N/A			

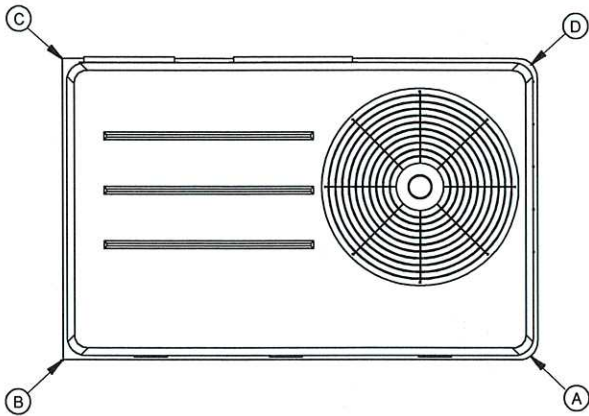
**NOTES:**

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.

**Weight, Clearance & Rigging Diagram - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop**  
 Item: A1 Qty: 1 Tag(s): RTU-1

**INSTALLED ACCESSORIES NET WEIGHT DATA**

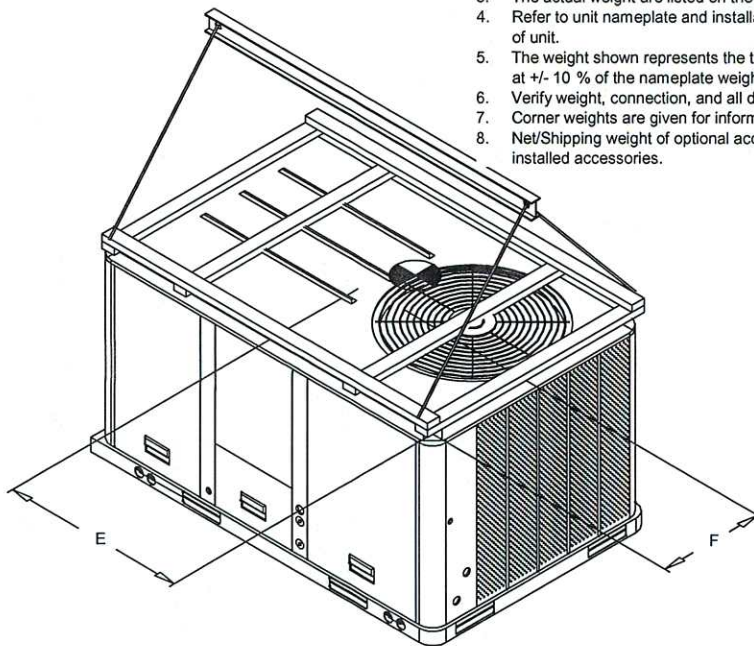
ACCESSORY		WEIGHTS			
ECONOMIZER		26.0 lb			
MOTORIZED OUTSIDE AIR DAMPER					
MANUAL OUTSIDE AIR DAMPER					
BAROMETRIC RELIEF					
OVERSIZED MOTOR					
BELT DRIVE MOTOR					
POWER EXHAUST					
THROUGH THE BASE ELECTRICAL/GAS (FIOPS)		8.0 lb			
UNIT MOUNTED CIRCUIT BREAKER (FIOPS)		5.0 lb			
UNIT MOUNTED DISCONNECT (FIOPS)					
POWERED CONVENIENCE OUTLET (FIOPS)					
HINGED DOORS (FIOPS)		10.0 lb			
HAIL GUARD		12.0 lb			
SMOKE DETECTOR, SUPPLY / RETURN					
NOVAR CONTROL					
STAINLESS STEEL HEAT EXCHANGER					
REHEAT		12.0 lb			
ROOF CURB		61.0 lb			
BASIC UNIT WEIGHTS		CORNER WEIGHTS		CENTER OF GRAVITY	
SHIPPING	NET	(A)	(C)	(E) LENGHT	(F) WIDTH
607.0 lb	532.0 lb	(B) 137.0 lb	(D) 134.0 lb	31"	19"



PACKAGED GAS / ELECTRICAL  
CORNER WEIGHT

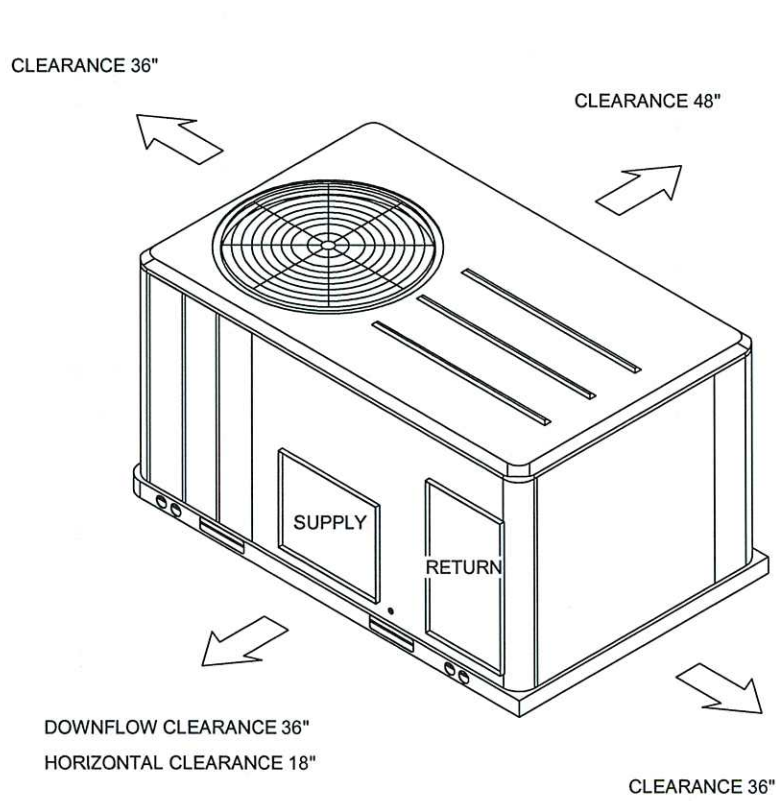
**NOTE:-**

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.

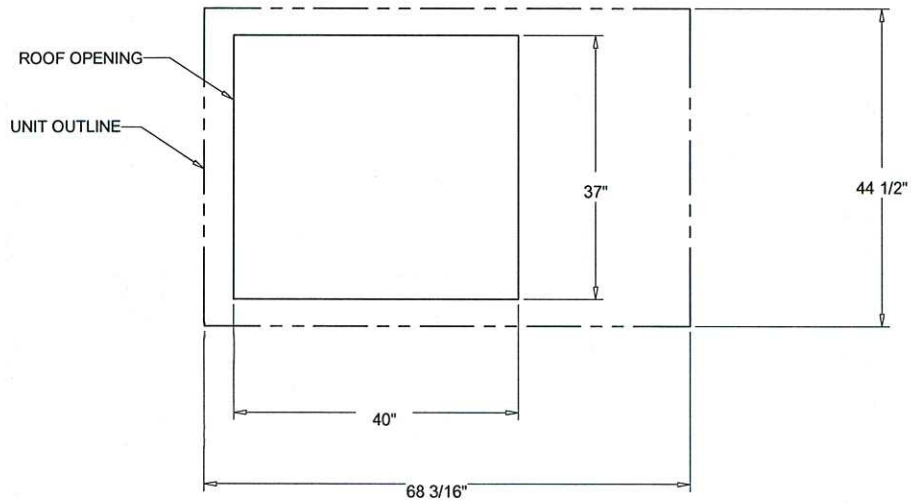


PACKAGED GAS / ELECTRICAL  
RIGGING AND CENTER OF GRAVITY

Weight, Clearance & Rigging Diagram - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop  
Item: A1 Qty: 1 Tag(s): RTU-1

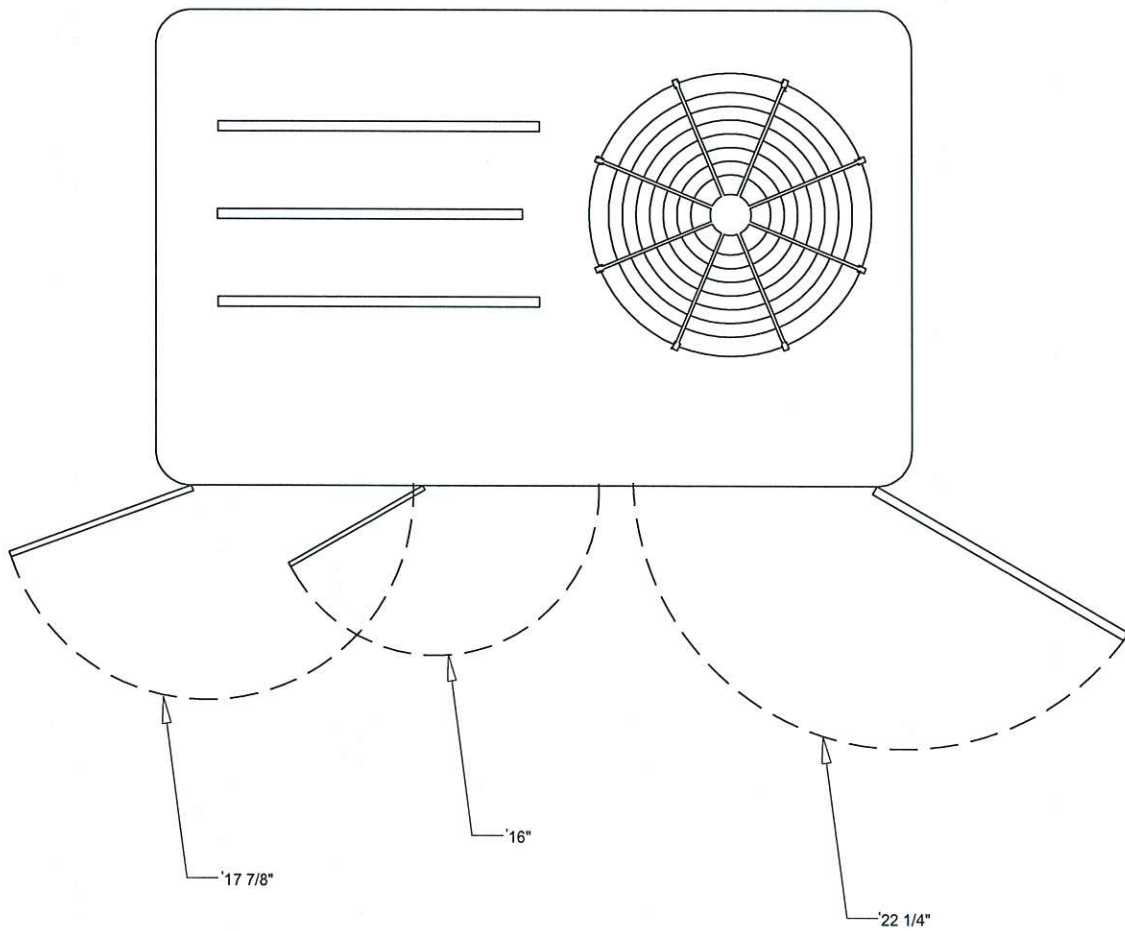


PACKAGED GAS / ELECTRIC  
CLEARANCE



PACKAGED GAS / ELECTRIC  
DOWNFLOW TYPICAL ROOF OPENING

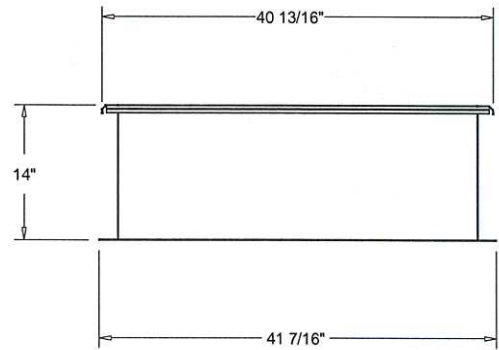
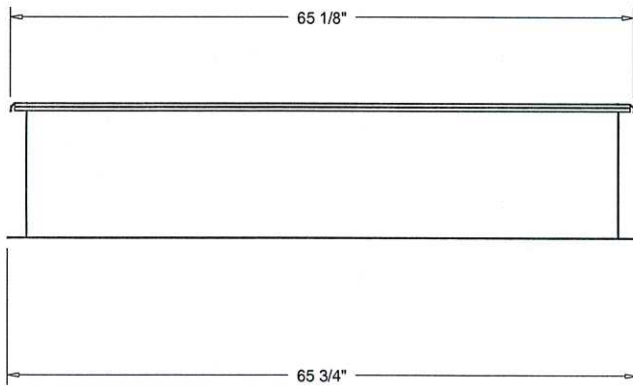
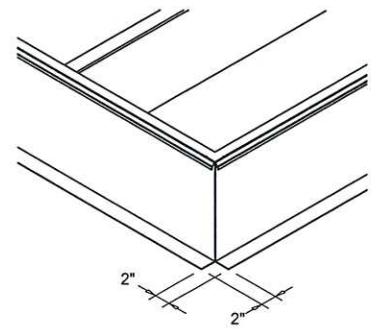
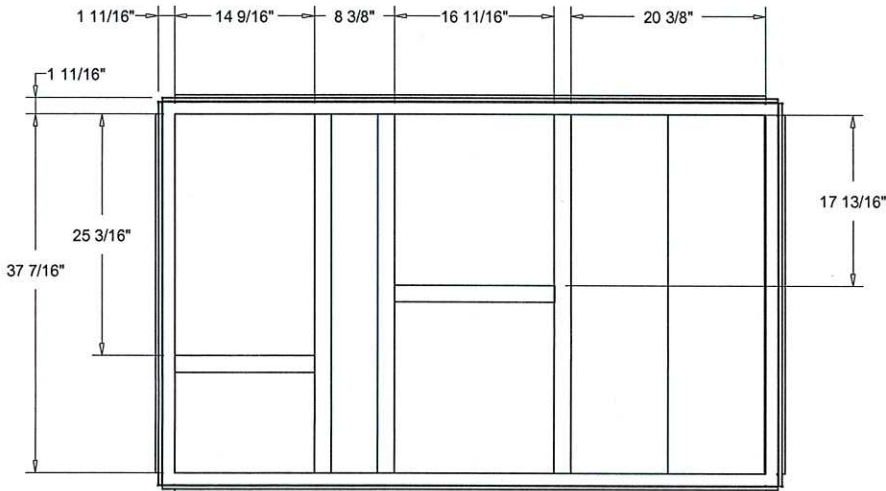
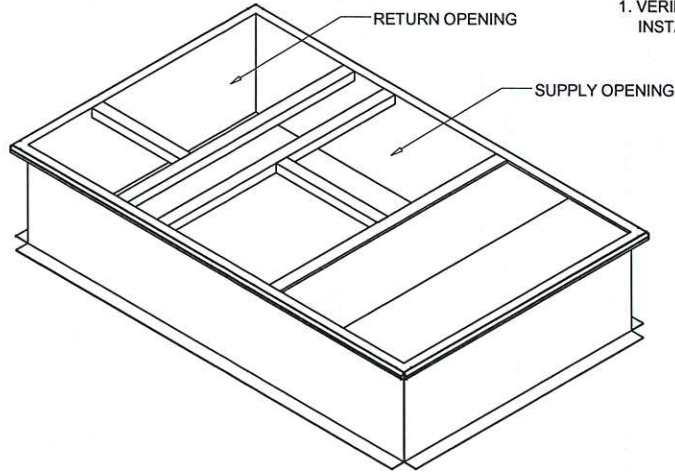
Accessory - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop  
Item: A1 Qty: 1 Tag(s): RTU-1



SWING DIAMETER - HINGED DOOR(S) OPTION  
ACCESSORY

Accessory - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop  
Item: A1 Qty: 1 Tag(s): RTU-1

NOTES:  
1. VERIFY WEIGHT, CONNECTION, AND ALL DIMENSION WITH  
INSTALLER DOCUMENTS BEFORE INSTALLATION



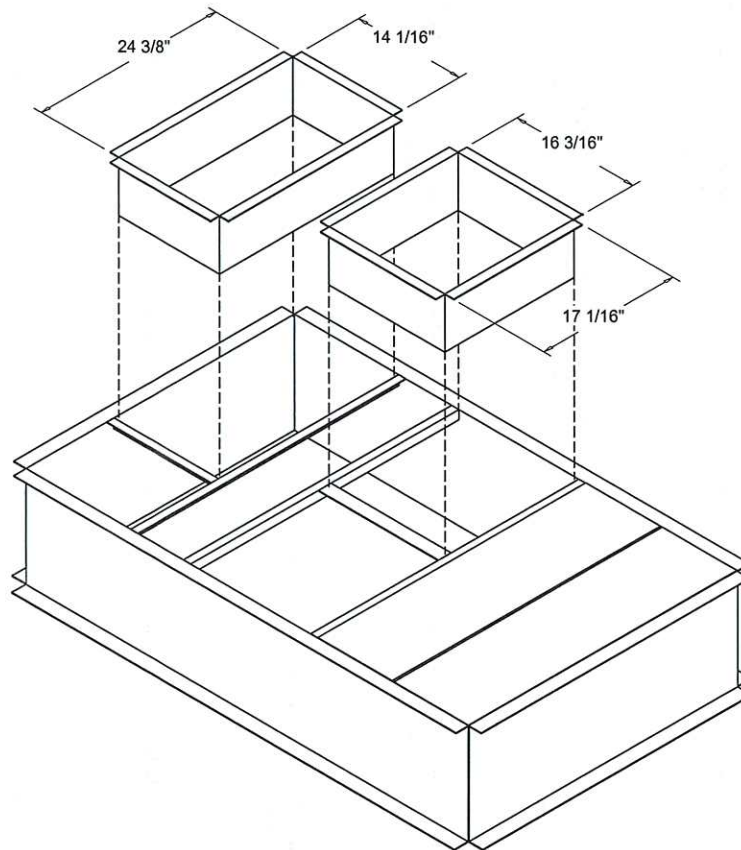
ROOF TOP CURB (BAYCURB042)  
ACCESSORY



Accessory - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop

Item: A1 Qty: 1 Tag(s): RTU-1

Downflow Duct Connections - Field Fabricated  
All Flanges - 1 1/4"

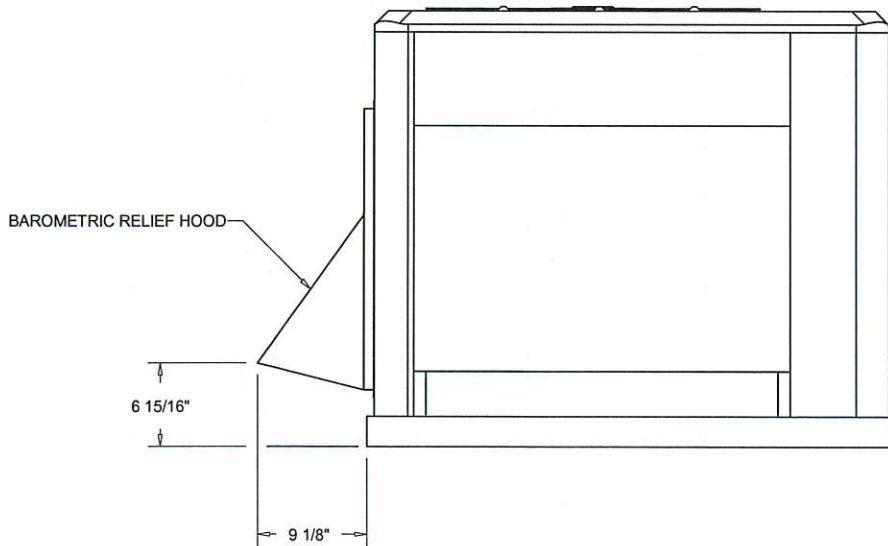
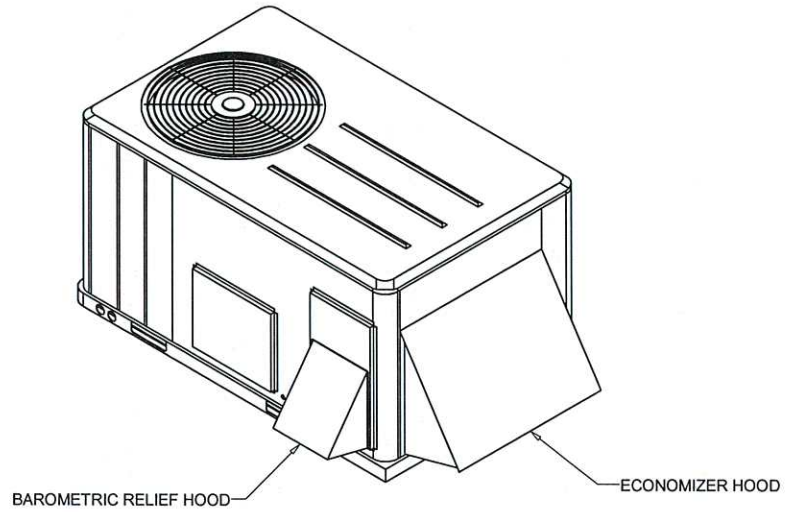


DUCT CONNECTIONS

ACCESSORY

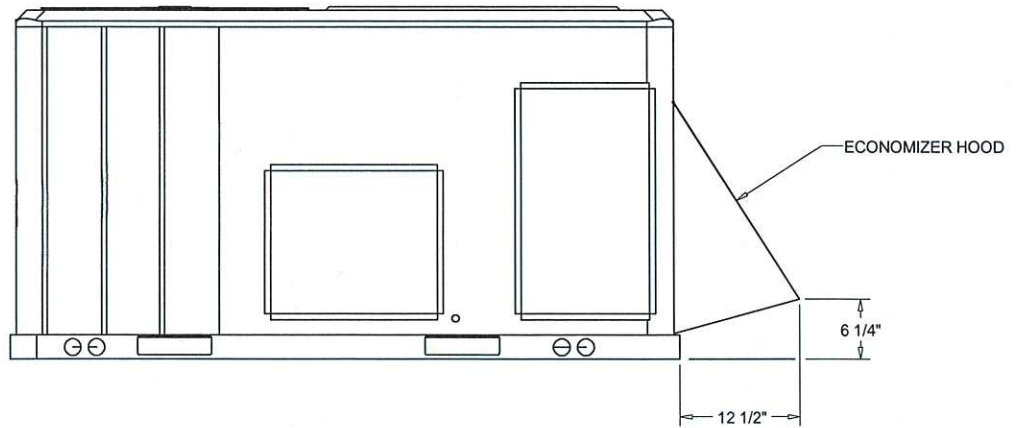
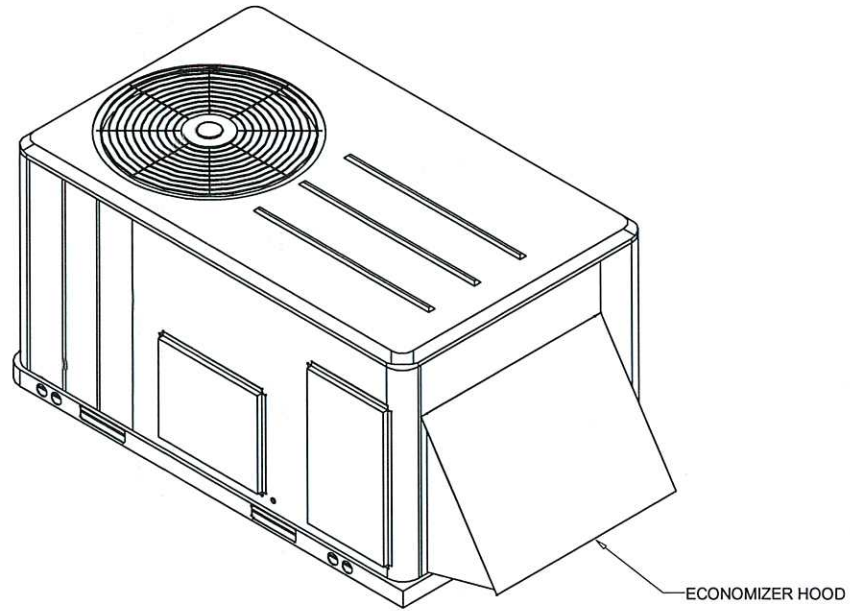
Accessory - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop

Item: A1 Qty: 1 Tag(s): RTU-1



ACCESSORY - BAROMETRIC RELIEF DAMPER HOOD

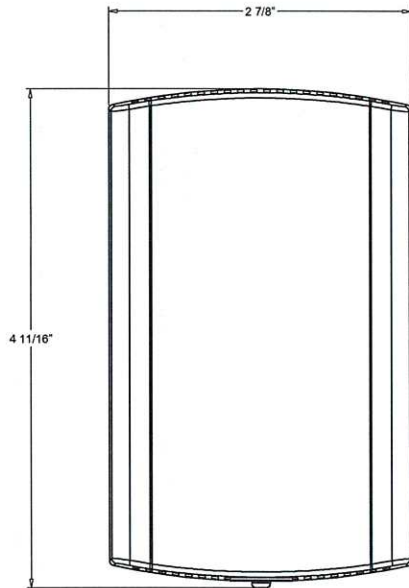
Accessory - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop  
Item: A1 Qty: 1 Tag(s): RTU-1



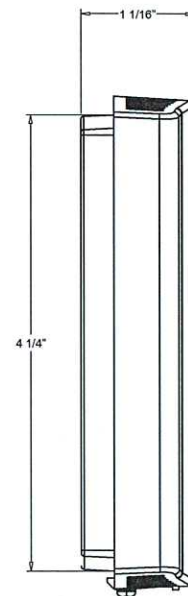
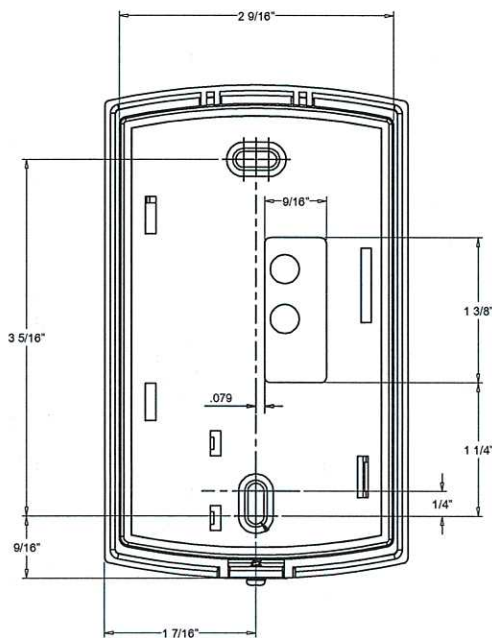
ACCESSORY - ECONOMIZER HOOD

Accessory - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop

Item: A1 Qty: 1 Tag(s): RTU-1



- NOTES:  
1. SEE ENGINEERING SPECIFICATION FOR DETAILS.  
2. VERIFY ALL DIMENSION WITH INSTALLER DOCUMENTS BEFORE INSTALLATION.

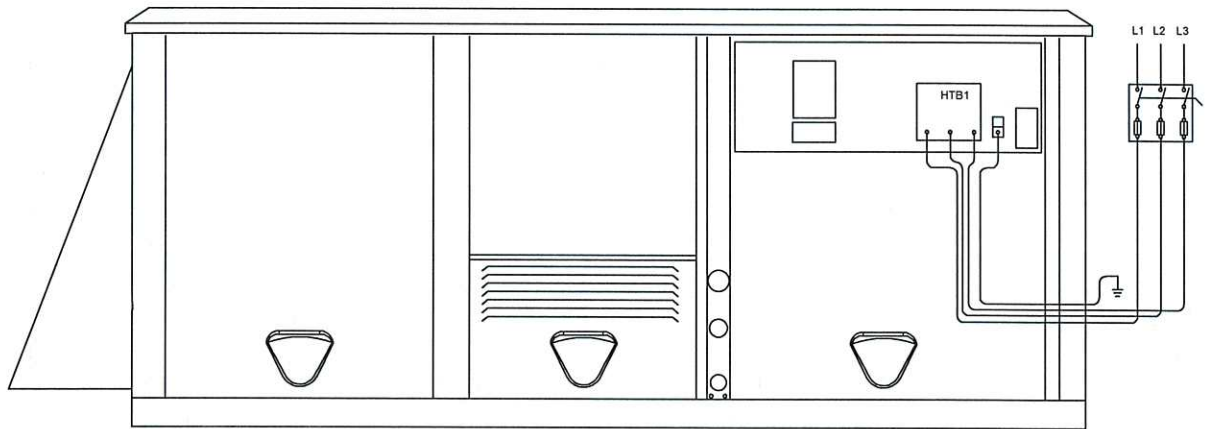


BAYSENS036A - WALL MOUNT HUMIDITY SENSOR

ACCESSORY

Field Wiring - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop

Item: A1 Qty: 1 Tag(s): RTU-1



ZONE SENSOR WIRE TABLE

WIRE SIZE	MAXIMUM WIRE LENGTH
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.

**Tag Data - Variable Air Volume Single Duct Terminal Units (Qty: 4)**

Item	Tag(s)	Qty	Description	Model Number
B1	VAV-1	1	VCEF08	VCEF08
B2	VAV-2	1	VCEF06	VCEF06
B3	VAV-3	1	VCEF05	VCEF05
B4	VAV-4	1	VCEF06	VCEF06

**Product Data - Variable Air Volume Single Duct Terminal Units****All Units**

Single duct with electric heat  
 Foil faced insulation - 1" (25 mm)  
 UC400 DDC-Basic (Electric heat- staged)  
 Standard actuator  
 Right/Left hand universal orientation  
 Duct temperature sensor -factory mounted  
 Disconnect switch  
 208 volt, 1 phase  
 Magnetic contactors - 24 volt  
 1 DDC sensor with occp and set pt (Fld)

**Item: B1 Qty: 1 Tag(s): VAV-1**

8" inlet size, 900 cfm (203mm inlet, 425 l/s)  
 Electric heater kW - 3.0  
 Stages - 2 - equal

**Item: B2, B4 Qty: 2 Tag(s): VAV-2, VAV-4**

6" inlet size, 500 cfm (152mm inlet, 236 l/s)  
 Electric heater kW - 2.0  
 Stages - 2 - equal

**Item: B3 Qty: 1 Tag(s): VAV-3**

5" inlet size, 350 cfm (127mm inlet, 165 l/s)  
 Electric heater kW - 1.0  
 Stage -1

**Performance Data - Variable Air Volume Single Duct Terminal Units**

Tags	VAV-1	VAV-2	VAV-3	VAV-4
UCM/UC400 address (001-999) ( )	11	12	13	14
Design cooling airflow (cfm)	500	232	150	309
Min cooling airflow (cfm)	105	60	60	60
Valve heating airflow (cfm)	250	170	85	170
Cooling inlet diameter	8"	6"	5"	6"
Cooling inlet velocity (ft/min)	1432	1182	1100	1574
APD @ cooling airflow (in H2O)	0.036	0.047	0.010	0.085
Full load amps (A)	14.42	9.62	4.81	9.62
Min circuit ampacity (A)	18.03	12.02	6.01	12.02
Max fuse size (A)	20.00	15.00	15.00	15.00
Operating weight (lb)	38.0	38.0	38.0	38.0
Coil heating capacity (MBh)	10.24	6.83	3.41	6.83
Room heat loss (MBh)	5.63	3.69	1.85	3.69
Room heating setpoint (F)	72.00	72.00	72.00	72.00
Primary EDB (F)	55.00	55.00	55.00	55.00
Unit LAT (F)	92.77	92.03	92.03	92.03
Electric heat kW (kW)	3.00	2.00	1.00	2.00

**Mechanical Specifications - Variable Air Volume Single Duct Terminal Units**

Item: B1 - B4 Qty: 4 Tag(s): VAV-1, VAV-2, VAV-3, VAV-4

**General Unit Information**

The unit casing is comprised of 22 gauge galvanized steel. Outlet connection is slip and drive.

Agency Listing - The unit is UL and Canadian UL listed as a room air terminal unit. UL Control # 9N65. All Trane terminal units are AHRI 880 - 98 certified.

**General Unit Clearance**

Allow adequate clearance to meet NEC on control box side of unit to meet NEC. A minimum of one and one half duct diameters of straight duct work, upstream of the air inlet connection, must be present for optimum airflow measurement performance. Upstream duct work should be the same diameter as the primary inlet connection. Allow access to the bottom of unit if Optional Bottom Access Door is selected.

**1" Foil - Faced Insulation**

The interior surface of the unit casing is acoustically and thermally lined with 1", 1.5 lb/cu. ft density glass fiber with foil facing. The insulation is UL listed and meets NFPA-90A, UL 181 standards, and bacteriological standard ASTM C 665. The insulation R-value is 4.1. All cut edges of insulation are completely encapsulated in metal to prevent erosion.

**Air Valve Size - 05**

Air Valve is 350.0 cfm 5" inlet.

**Air Valve Size - 06**

Air Valve is 500.0 cfm 6" inlet.

**Air Valve Size - 08**

Air Valve is 900.0 cfm 8" inlet.

**Air Valve Round**

The air inlet connection is an 18 gauge galvanized steel cylinder sized to fit standard round duct. A multiple point, averaging flow sensing ring is provided with balancing taps for measuring within +/- 5% of unit cataloged airflow. An airflow versus pressure differential calibration chart is provided. The damper blade is constructed of a closed cell foam seal mechanically locked between two 22 gauge galvanized steel disks. The damper blade assembly is connected through a cast zinc stub axle and shaft supported by self lubricating bearings. The shaft is cast with a damper position indicator. The valve assembly includes a mechanical stop to prevent over stroking. At 4.0" w.g. air valve leakage does not exceed 1% of cataloged airflow.

**Electric Heat Coil**

Factory provided and mounted, UL recognized, resistance open-type heater with airflow switch, a disc-type automatic pilot duty thermal primary cutoff, and manual reset load carrying thermal secondary device. Heater element material is nickel-chromium. The heater terminal box is provided with 7/8" knockouts for customer power supply. Terminal connections are plated steel with ceramic insulators. Unit is Flippable for both Left and Right hand control access.

**Power Disconnect Switch (for VCEF)**

A factory provided interlocking door disconnect switch located on the electric heater control panel.

**Slip & Drive Connection**

A slip and drive connection has two straight flanges on the top and bottom, and two drive connections on the left and right sides. This is a standard option on all VAV single duct terminal units.

**Magnetic Contactor**

An electric heater 24 volt contact for use with Direct Digital Control (D.D.C.) or Analog Electronic VAV Controls.

**D.D.C. Floating Point Actuator**

Trane 3 wire, (open, close, common) 26GA when 6-pos amp connector is used for Tracer UC210, VV550, or VAV UCM, otherwise 18GA wires are used. 3.4 VA, 1.7W, 24 VAC, 50/60 Hz. Quarter turn control actuator with linkage release button. Actuator has a constant drive rate independent of load, a rated torque of 35 in-lb, a 90-second drive time and is non-spring return. Travel is terminated by end stops at fully opened and closed positions. An integral magnetic clutch eliminates motor stall. An integral 3 screw terminal block is provided for field wiring. Operating temperature 32.0 F to 125.0 F.

**DDC Controls Option DD04, DD14, DD44 & DD74**

Basic Operation: On/Off Staged Electric Heat (Normally Open Outputs) (DDC/UCM)

A voltage signal from the zone sensor indicates the zone temperature is used by the unit controller to determine an error from the set point. This error, as well as primary flow differential pressure, is used to determine damper position within minimum and maximum cooling airflow set points. As the zone temperature drops to the heating set point, primary airflow is controlled to minimum heating flow set point. Staged electric heat is energized.

**DDC Zone Sensor w/Setpoint & Occupancy**

This electronic device utilizes a thermistor to vary the voltage output in response to changes in the zone temperature. Wiring to the U.C.M. controls must be 18 to 22 awg. shielded twisted pair wiring. The setpoint adjustment range is 50.0 F - 88.0 F. This sensor is provided with an externally adjustable set point, a timed override button and a timed override cancel button. An optional communications jack is available which snaps into the enclosure backplate.

**Factory Mounted DTS Extension**

Factory Mounted on the discharge outlet of the Single Duct Terminal. The Factory Mounted Duct Temperature Sensor (DTS) Extension is a 4" sheet metal extension that the DTS is mounted into.

This extension measures the same discharge dimension as the unit it is attached to.

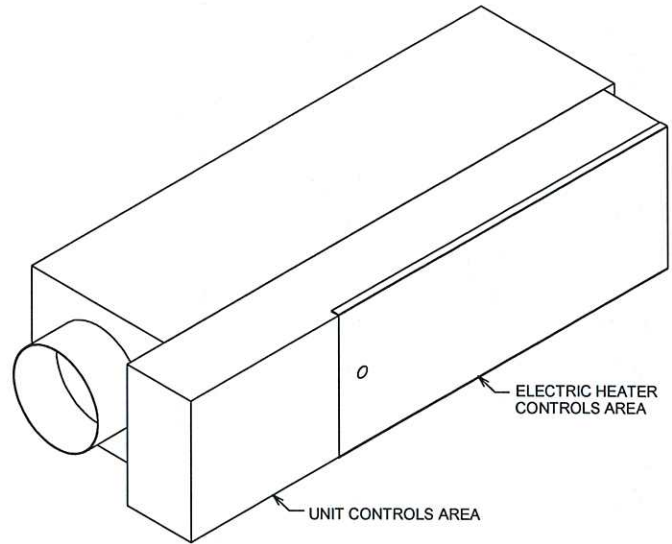
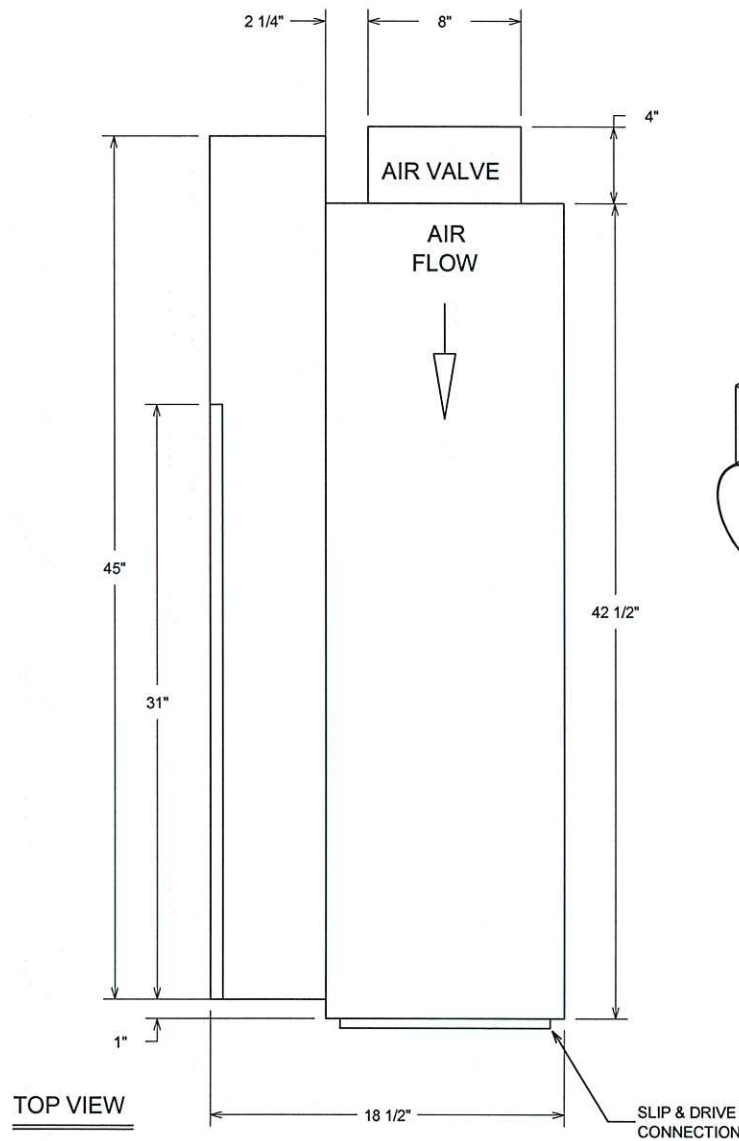
The DTS is a 4" 10k ohm thermistor and is factory mounted into the discharge extension and is factory wired back to the Trane controls.

The metal extension is not insulated and the field connection is slip and drive.



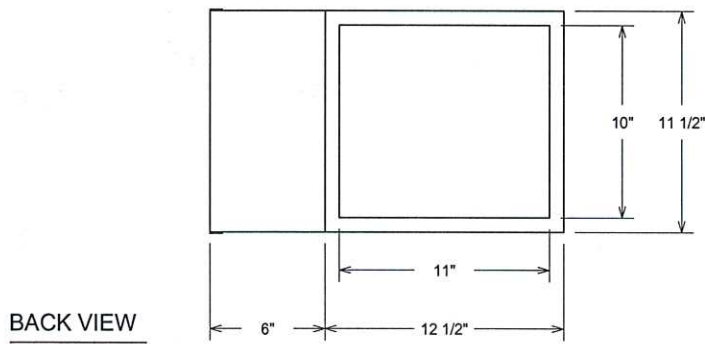
Unit Dimensions - Variable Air Volume Single Duct Terminal Units

Item: B1 Qty: 1 Tag(s): VAV-1



Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet standard.
3. Minimum of 1.5 times duct diameter of straight duct at inlet for proper flow reading.
4. For electric heater access, side hinged door must have minimum distance per NEC or local code.
5. Allow 48" of straight duct downstream of unit before first runout & inside of the duct should be equal discharge size. (A & B)
6. Left-hand orientation shown. (Facing discharge)  
Unit can be flipped to right-hand orientation

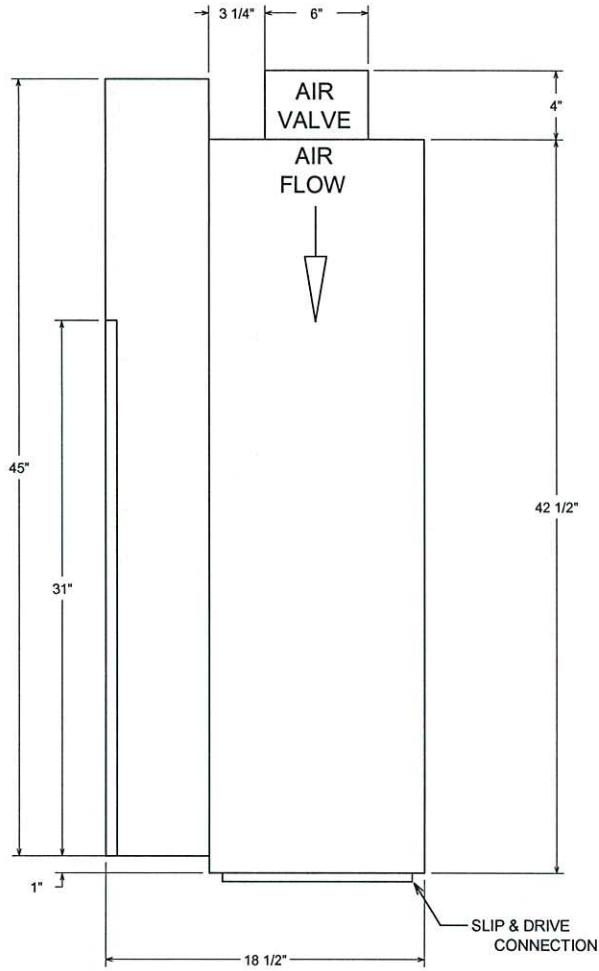


Approximate Dry Weight	38.0 lb
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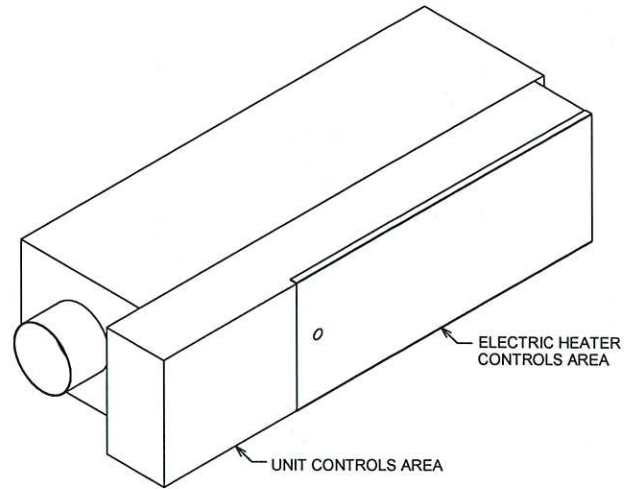
Weights reflected may vary ±5.0 lb based upon options selected.

**Unit Dimensions - Variable Air Volume Single Duct Terminal Units**

Item: B2, B4 Qty: 2 Tag(s): VAV-2, VAV-4

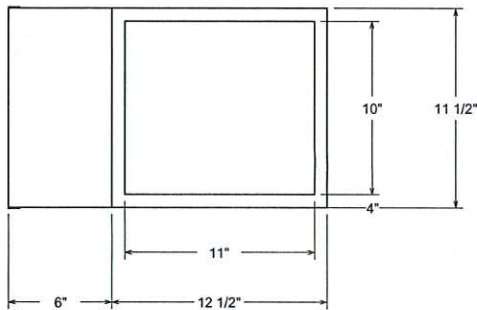


TOP VIEW



Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet standard.
3. Minimum of 1.5 times duct diameter of straight duct at inlet for proper flow reading.
4. For electric heater access, side hinged door must have minimum distance per NEC or local code.
5. Allow 48" of straight duct downstream of unit before first runout & inside of the duct should be equal discharge size. (A & B)
6. Left-hand orientation shown. (Facing discharge)  
Unit can be flipped to right-hand orientation



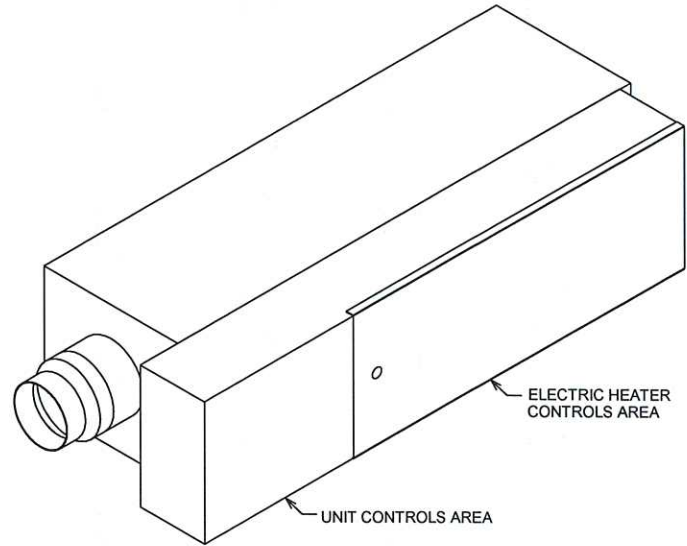
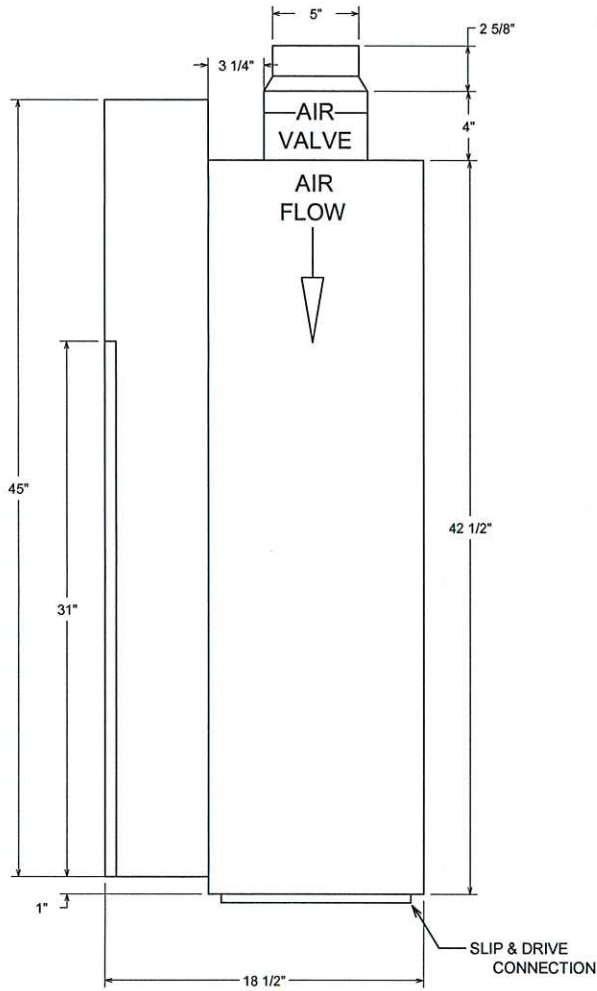
BACK VIEW

Approximate Dry Weight	38.0 lb
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Weight reflected may vary 5 lbs(2.27kgs) based upon options selected.

Unit Dimensions - Variable Air Volume Single Duct Terminal Units

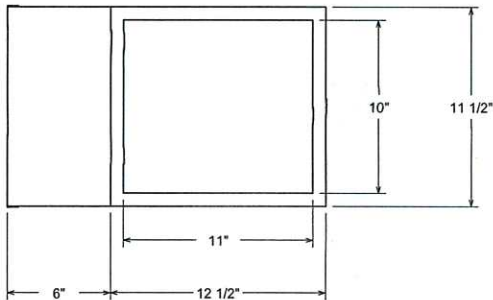
Item: B3 Qty: 1 Tag(s): VAV-3



Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet standard.
3. Minimum of 1.5 times duct diameter of straight duct at inlet for proper flow reading.
4. For electric heater access, side hinged door must have minimum distance per NEC or local code.
5. Allow 48" of straight duct downstream of unit before first runout & inside of the duct should be equal discharge size. (A & B)
6. Left-hand orientation shown. (Facing discharge)  
Unit can be flipped to right-hand orientation

TOP VIEW

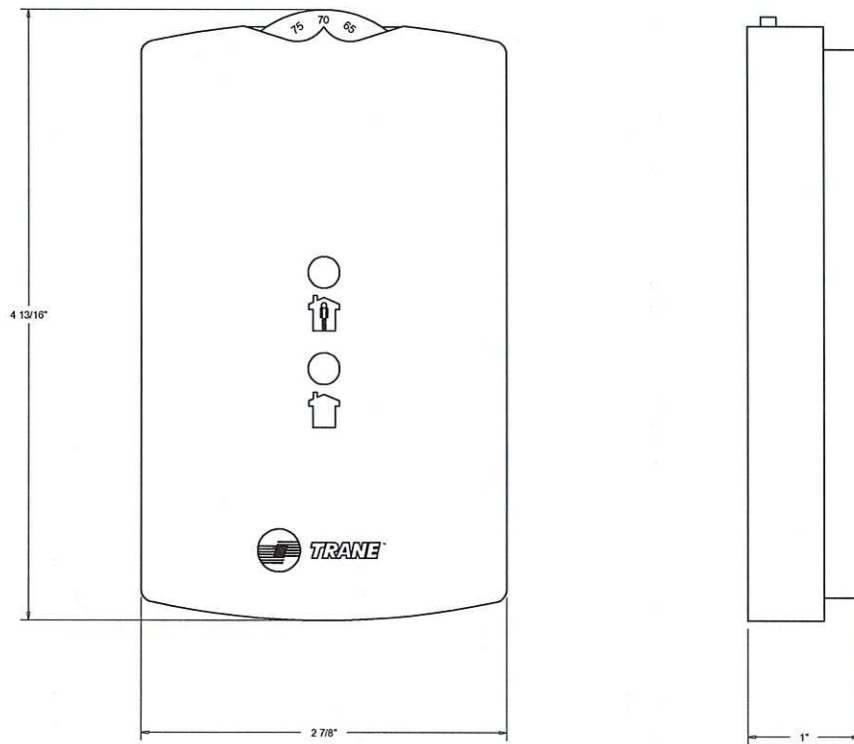


BACK VIEW

Approximate Dry Weight	38.0 lb
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Weight reflected may vary 5 lbs(2.27kgs) based upon options selected.

**Accessory - Variable Air Volume Single Duct Terminal Units**  
Item: B1 - B4 Qty: 4 Tag(s): VAV-1, VAV-2, VAV-3, VAV-4

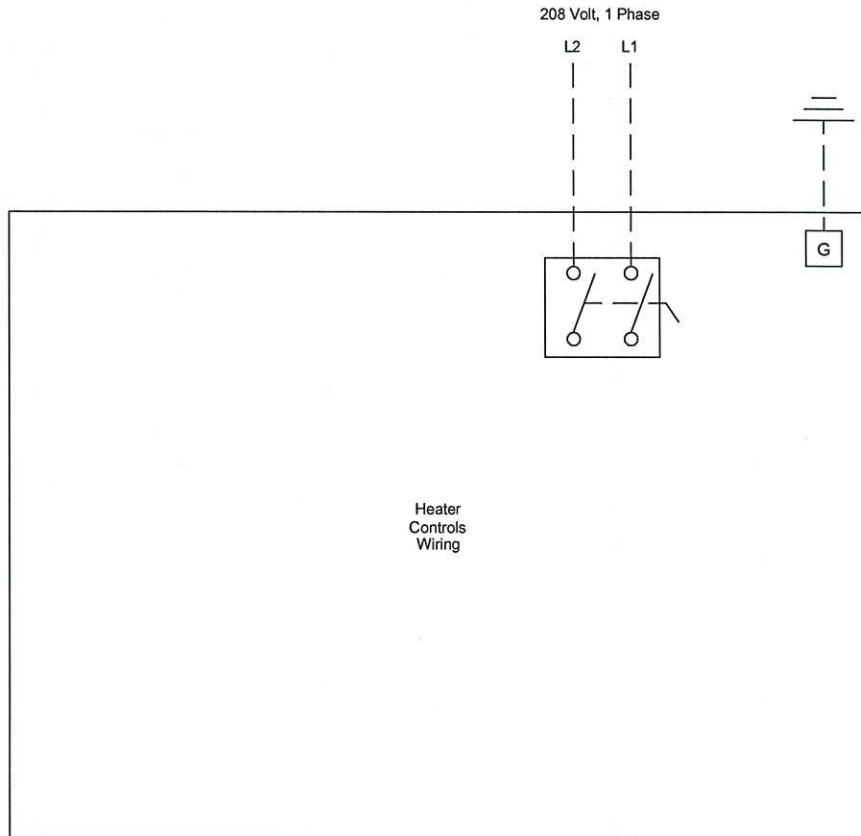


**Customer Notes:**

1. Zone Sensor with externally adjustable setpoint, a timed override button & a timed override cancel button.
2. Optional communications jack available.

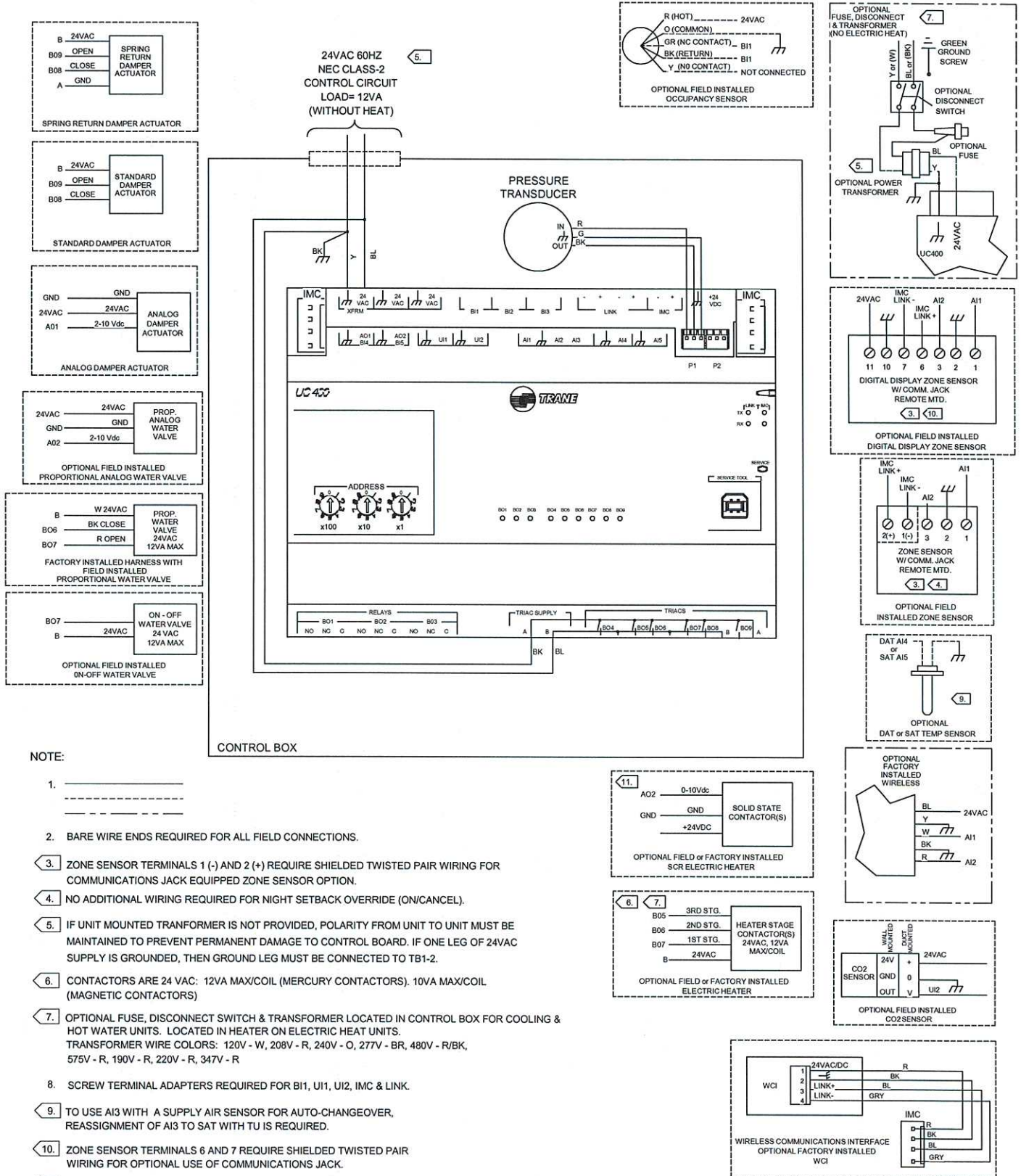
Field Wiring - Variable Air Volume Single Duct Terminal Units

Item: B1 - B4 Qty: 4 Tag(s): VAV-1, VAV-2, VAV-3, VAV-4



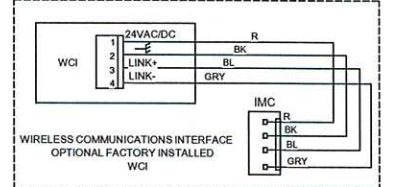
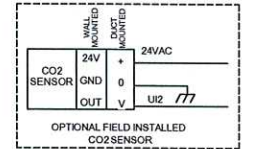
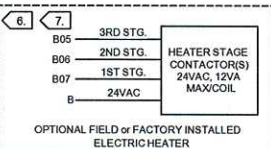
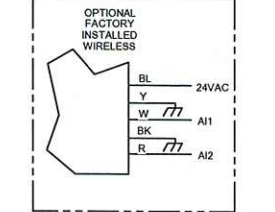
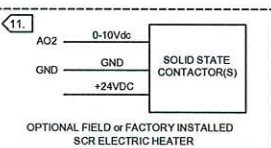
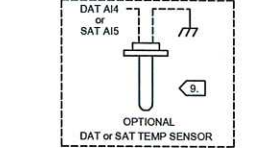
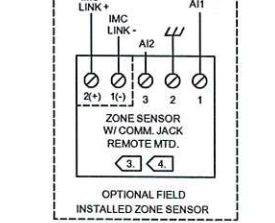
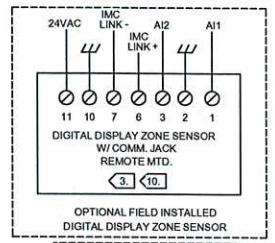
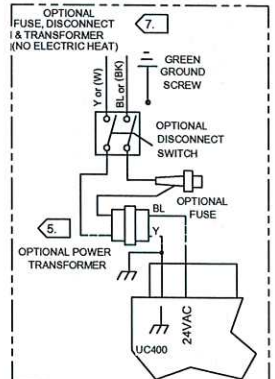
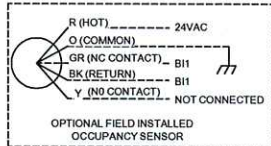
Field Wiring - Variable Air Volume Single Duct Terminal Units

Item: B1 - B4 Qty: 4 Tag(s): VAV-1, VAV-2, VAV-3, VAV-4



NOTE:

1. \_\_\_\_\_
2. BARE WIRE ENDS REQUIRED FOR ALL FIELD CONNECTIONS.
3. ZONE SENSOR TERMINALS 1 (-) AND 2 (+) REQUIRE SHIELDED TWISTED PAIR WIRING FOR COMMUNICATIONS JACK EQUIPPED ZONE SENSOR OPTION.
4. NO ADDITIONAL WIRING REQUIRED FOR NIGHT SETBACK OVERRIDE (ON/CANCEL).
5. IF UNIT MOUNTED TRANSFORMER IS NOT PROVIDED, POLARITY FROM UNIT TO UNIT MUST BE MAINTAINED TO PREVENT PERMANENT DAMAGE TO CONTROL BOARD. IF ONE LEG OF 24VAC SUPPLY IS GROUNDED, THEN GROUND LEG MUST BE CONNECTED TO TB1-2.
6. CONTACTORS ARE 24 VAC: 12VA MAX/COIL (MERCURY CONTACTORS), 10VA MAX/COIL (MAGNETIC CONTACTORS)
7. OPTIONAL FUSE, DISCONNECT SWITCH & TRANSFORMER LOCATED IN CONTROL BOX FOR COOLING & HOT WATER UNITS. LOCATED IN HEATER ON ELECTRIC HEAT UNITS. TRANSFORMER WIRE COLORS: 120V - W, 208V - R, 240V - O, 277V - BR, 480V - R/BK, 575V - R, 190V - R, 220V - R, 347V - R
8. SCREW TERMINAL ADAPTERS REQUIRED FOR B11, UI1, UI2, IMC & LINK.
9. TO USE AI3 WITH A SUPPLY AIR SENSOR FOR AUTO-CHANGEOVER, REASSIGNMENT OF AI3 TO SAT WITH TU IS REQUIRED.
10. ZONE SENSOR TERMINALS 6 AND 7 REQUIRE SHIELDED TWISTED PAIR WIRING FOR OPTIONAL USE OF COMMUNICATIONS JACK.
11. 24Vdc REQUIRED FOR TRANE SCR ELECTRIC HEAT MODULE.



**Tag Data - Variable Air Volume Changeover/Bypass Units (Qty: 1)**

Item	Tag(s)	Qty	Description	Model Number
C1	Bypass	1	VAV Changeover/Bypass	VADB10

**Product Data - Variable Air Volume Changeover/Bypass Units****Item: C1 Qty: 1 Tag(s): Bypass**

Varitrac damper

10" [254 mm] round damper

**Performance Data - Variable Air Volume Changeover/Bypass Units**

Tags	Bypass
Design cooling airflow (cfm)	500
Cooling inlet velocity (ft/min)	917

**Mechanical Specifications - Variable Air Volume Changeover/Bypass Units****Item: C1 Qty: 1 Tag(s): Bypass****Round Damper General Data**

Cylinder - Rolled and seam welded 18 gauge galvanized steel.

Damper - The damper blade is constructed of a closed cell foam seal mechanically locked between two 22 gauge galvanized steel disks. The damper blade assembly is connected to a cast zinc shaft supported by self-lubricating bearings. The shaft is cast with a damper position indicator. The valve assembly includes a mechanical stop to prevent over stroking. Factory provided integral 24 VAC electric actuator provided if selected.

**Damper - 10**

800.0 cfm, 10" damper.

**None**

Stand off w/mounting plank. No Actuator.

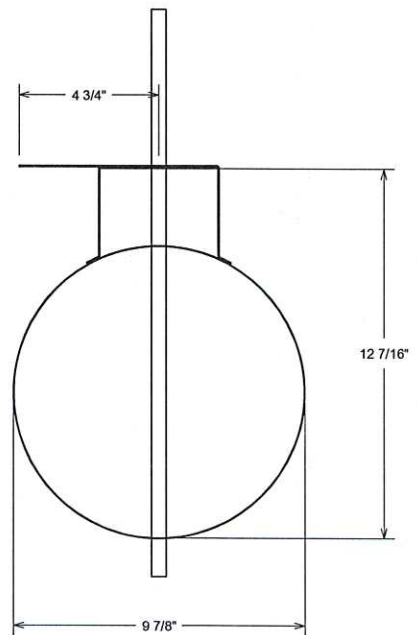
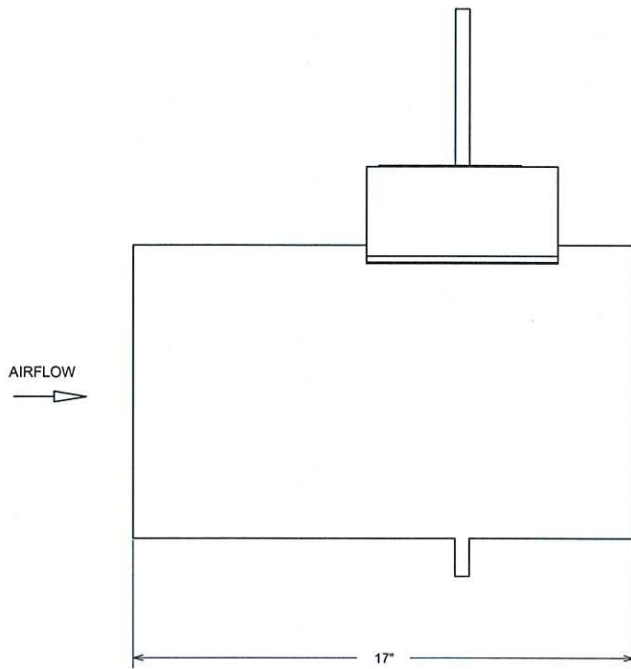
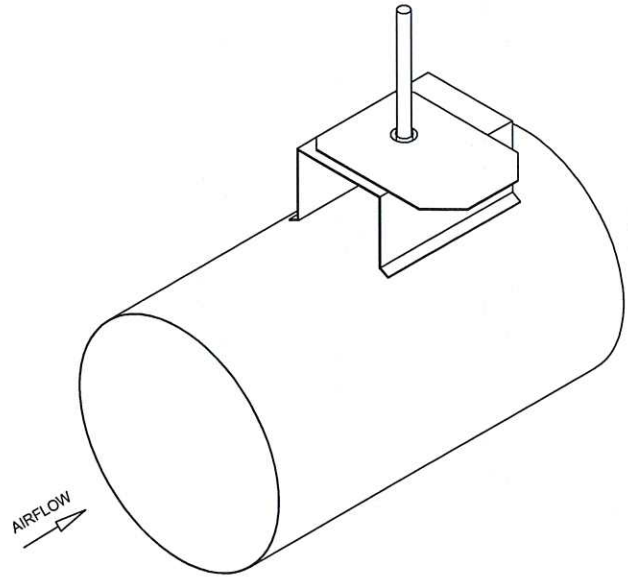


Unit Dimensions - Variable Air Volume Changeover/Bypass Units

Item: C1 Qty: 1 Tag(s): Bypass

Approximate Dry Weight	8.0 lb
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Weights reflected may vary  $\pm 5.0$  lb based upon options selected.



**Tag Data - Tracer Concierge (Qty: 1)**

Item	Tag(s)	Qty	Description	Model Number
D1	No Tag	1	Tracer Concierge	BMTC015BAB011

**Product Data - Tracer Concierge****Item: D1 Qty: 1**

Tracer Concierge (Digits 1-4)  
15 Devices  
Remote Cable WCI  
with WCI  
Metal Enclosure  
1 X13760351002 - Tracer 10" Display  
1 BMUC210ACA0T00011 - PPG UC210 for Bypass

**Mechanical Specifications - Tracer Concierge**

Item: D1 Qty: 1

**Round Damper General Data**

Cylinder - Rolled and seam welded 18 gauge galvanized steel.

Damper - The damper blade is constructed of a closed cell foam seal mechanically locked between two 22 gauge galvanized steel disks. The damper blade assembly is connected to a cast zinc shaft supported by self-lubricating bearings. The shaft is cast with a damper position indicator. The valve assembly includes a mechanical stop to prevent over stroking. Factory provided integral 24 VAC electric actuator provided if selected.

**Damper - 10**

800.0 cfm, 10" damper.

**None**

Stand off w/mounting plank. No Actuator.

**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 - 3-10 Ton R410A PKGD Unitary Gas/Electric Rooftop**

Item	Tag(s)	Qty	Description	Model Number
A1	RTU-1	1	3 Ton R410A PKGD Unitary Gas/Electric	YHC036E3RLA--H 0C1A2A6B000000 000000000000

Field Installed Option Description	Part/Ordering Number
Roof curb	BAYCURB042A
LP conversion kit	BAYLPKT050C
Humidity wall mounted sensor	BAYSENS036A

**Product Family - Variable Air Volume Single Duct Terminal Units**

Item	Tag(s)	Qty	Description	Model Number
B1	VAV-1	1	VCEF08	VCEF08
B2	VAV-2	1	VCEF06	VCEF06
B3	VAV-3	1	VCEF05	VCEF05
B4	VAV-4	1	VCEF06	VCEF06

Field Installed Option Description	Part/Ordering Number
DDC sensor with occupancy and set point knob	X13511527010