Updated VAV Submittal

Prepared For:
Brandon Nowakowski
Dammon Engineering, Inc.

Date: *May 04, 2012*

Job Name:
Textron Marine Renovation

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

Product Summary

Qty	Product
29	Variable Air Volume Single Duct Terminal Units
3	Variable Air Volume Changeover/Bypass Units

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

Tyler Schmitz
Trane
530 Elmwood Park Blvd.
New Orleans, LA 70123-3308
Phone: (504) 733-6789
Cell: (504) 240-9759
Fax: (504) 731-0833

Table Of Contents

Tag Data - Variable Air Volume Single Duct Terminal Units (Qty: 29)

Item	Tag(s)	Qty	Description	Model Number
A1	4-C	1	Variable Air Volume Single Duct Terminal	VCEF05
A2	4-D, 4-E, 4-F, 4-G, 4-H, 4-I, 10-E, 10-F	8	Variable Air Volume Single Duct Termina	VCEF05
A3	4-A, 4-B, 8-C, 8-D, 8-E, 10-D, 10-H, 10-I, 10-J, 10-K, 10-M	11	Variable Air Volume Single Duct Termina	VCEF05
A4	8-A, 8-B, 8-F	3	Variable Air Volume Single Duct Termina	VCEF06
A5	10-A, 10-B	2	Variable Air Volume Single Duct Termina	VCEF06
A6	10-C	1	Variable Air Volume Single Duct Termina	VCEF14
A7	10-G	1	Variable Air Volume Single Duct Termina	VCEF10
A8	10-L, 10-N	2	Variable Air Volume Single Duct Termina	VCEF08

Product Data - Variable Air Volume Single Duct Terminal Units

All Units

Single duct with electric heat
Matte faced insulation - 1/2" (13 mm)
DDC, controls on/off electric heat control
Standard actuator
Left hand &/or same side connection (control &/or hot water coil)
Disconnect switch
480 volt, 3 phase
Stages - 2 - equal
Magnetic contactors - 24 volt

Item: A1 Qty: 1 Tag(s): 4-C

5" inlet size, 350 cfm (127mm inlet, 165 l/s)
Electric heater kW - 1.5

Item: A2 Qty: 8 Tag(s): 4-D, 4-E, 4-F, 4-G, 4-H, 4-I, 10-E, 10-F

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

Item: A3 Qty: 11 Tag(s): 4-A, 4-B, 8-C, 8-D, 8-E, 10-D, 10-H, 10-I, 10-J, 10-K, 10-M

5" inlet size, 350 cfm (127mm inlet, 165 l/s)
Electric heater kW - 2.0

Item: A4, A5 Qty: 5 Tag(s): 8-A, 8-B, 8-F, 10-A, 10-B

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

Item: A6 Qty: 1 Tag(s): 10-C

14" inlet size, 3000 cfm (356mm inlet, 1416 l/s)
Electric heater kW - 8.0

Item: A7 Qty: 1 Tag(s): 10-G

10" inlet size, 1400 cfm (254mm inlet, 661 l/s)
Electric heater kW - 8.0

Item: A8 Qty: 2 Tag(s): 10-L, 10-N

8" inlet size, 900 cfm (203mm inlet, 425 l/s)
Electric heater kW - 4.0

Performance Data - Variable Air Volume Single Duct Terminal Units

Tags	4-C	4-D, 4-E, 4-F, 4-G, 4-H, 4-I, 10-E, 10-F	4-A, 4-B, 8-C, 8-D, 8-E, 10-D, 10-H, 10-I, 10-J, 10-K, 10-M	8-A, 8-B, 8-F	10-A, 10-B	10-C
Design cooling airflow (cfm)	200	200	300	350	400	2600

Tags	4-C	4-D, 4-E, 4-F, 4-G, 4-H, 4-I, 10-E, 10-F	4-A, 4-B, 8-C, 8-D, 8-E, 10-D, 10-H, 10-I, 10-J, 10-K, 10-M	8-A, 8-B, 8-F	10-A, 10-B	10-C
Min cooling airflow (cfm)	50	50	50	100	100	500
Valve heating airflow (cfm)	175	125	200	200	200	800
Cooling inlet diameter	5"	5"	5"	6"	6"	14"
Cooling inlet velocity (ft/min)	1467	1467	2200	1783	2037	2432
APD @ cooling airflow (in H2O)	0.010	0.010	0.018	0.109	0.144	0.010
Discharge valve - 125 Hz (dB)	64	64	69	65	67	78
Discharge valve - 250 Hz (dB)	60	60	62	61	62	71
Discharge valve - 500 Hz (dB)	50	50	52	51	52	68
Discharge valve - 1 kHz (dB)	45	45	48	46	47	61
Discharge valve - 2 kHz (dB)	37	37	39	37	38	61
Discharge valve - 4 kHz (dB)	35	35	38	35	36	64
Discharge valve - NC ( )	20	20	26	19	20	31
Radiated valve - 125 Hz (dB)	49	49	52	56	57	71
Radiated valve - 250 Hz (dB)	45	45	48	50	51	68
Radiated valve - 500 Hz (dB)	41	41	44	45	46	59
Radiated valve - 1 kHz (dB)	35	35	38	37	38	53
Radiated valve - 2 kHz (dB)	30	30	33	31	32	48
Radiated valve - 4 kHz (dB)	24	24	27	26	26	46
Radiated valve - NC ( )	15	15	15	15	15	36
Full load amps (A)	1.80	1.20	2.41	2.41	2.41	9.62
Min circuit ampacity (A)	2.26	1.50	3.01	3.01	3.01	12.03
Max fuse size (A)	15.00	15.00	15.00	15.00	15.00	15.00
Operating weight (lb)	38.0	38.0	38.0	38.0	38.0	60.0
Run acoustics?	Yes	Yes	Yes	Yes	Yes	Yes
Max inlet SP (in H2O)	1.000	1.000	1.000	1.000	1.000	1.000
Discharge transfer function	AHRI 885-08	AHRI 885-08	AHRI 885-08	AHRI 885-08	AHRI 885-08	AHRI 885-08
Radiated transfer function	AHRI 885-90	AHRI 885-90	AHRI 885-90	AHRI 885-90	AHRI 885-90	AHRI 885-90
Coil heating capacity (MBh)	5.12	3.41	6.83	6.83	6.83	27.32
Room heat loss (MBh)	2.27	1.38	3.57	3.57	3.57	14.30
Room heating setpoint (F)	70.00	70.00	70.00	70.00	70.00	70.00
Primary EDB (F)	55.00	55.00	55.00	55.00	55.00	55.00
Unit LAT (F)	81.98	80.18	86.47	86.47	86.47	86.47
Electric heat kW (kW)	1.50	1.00	2.00	2.00	2.00	8.00

Tags	10-G	10-L, 10-N
Design cooling airflow (cfm)	1200	600
Min cooling airflow (cfm)	300	150
Valve heating airflow (cfm)	800	400
Cooling inlet diameter	10"	8"
Cooling inlet velocity (ft/min)	2200	1719
APD @ cooling airflow (in H2O)	0.040	0.051
Discharge valve - 125 Hz (dB)	75	70
Discharge valve - 250 Hz (dB)	64	63
Discharge valve - 500 Hz (dB)	62	56
Discharge valve - 1 kHz (dB)	57	50
Discharge valve - 2 kHz (dB)	52	48
Discharge valve - 4 kHz (dB)	53	56
Discharge valve - NC ( )	27	24
Radiated valve - 125 Hz (dB)	68	58

Tags	**10-G**	**10-L, 10-N**
Radiated valve - 250 Hz (dB)	59	52
Radiated valve - 500 Hz (dB)	54	50
Radiated valve - 1 kHz (dB)	48	44
Radiated valve - 2 kHz (dB)	46	47
Radiated valve - 4 kHz (dB)	42	43
Radiated valve - NC ( )	29	20
Full load amps (A)	9.62	4.81
Min circuit ampacity (A)	12.03	6.01
Max fuse size (A)	15.00	15.00
Operating weight (lb)	46.0	38.0
Run acoustics?	Yes	Yes
Max inlet SP (in H2O)	1.000	1.000
Discharge transfer function	AHRI 885-08	AHRI 885-08
Radiated transfer function	AHRI 885-90	AHRI 885-90
Coil heating capacity (MBh)	27.32	13.66
Room heat loss (MBh)	14.30	7.15
Room heating setpoint (F)	70.00	70.00
Primary EDB (F)	55.00	55.00
Unit LAT (F)	86.47	86.47
Electric heat kW (kW)	8.00	4.00

Mechanical Specifications - Variable Air Volume Single Duct Terminal Units
Item: A1 - A8 Qty: 29 Tag(s): 4-C, 4-D, 4-E, 4-F, 4-G, 4-H, 4-I, 10-E, 10-F, 4-A, 4-B, 8-C, 8-D, 8-E, 10-D, 10-H, 10-I, 10-J, 10-K, 10-M, 8-A, 8-B, 8-F, 10-A, 10-B, 10-C, 10-G, 10-L, 10-N

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, should be present for optimum airflow measurement performance. Upstream duct work should be the same diameter as the primary inlet connection.

1/2" Matte - Faced Insulation
The interior surface of the unit casing is acoustically and thermally lined with 1/2" 1.50 lb.cu. ft. [24.00 kg./cu. m.] composite density glass fiber with 4.0 lb. cu.ft. [64 kg./cu. m.] high density facing. The insulation is UL listed and meets NFPA-90A and UL 181 standards. The insulation R-value is 1.9. All cut edges of insulation are completely encapsulated in metal to prevent erosion.

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 composite nylon stub axle 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. At 4.0" w.g. air valve leakage does not exceed 1% of cataloged airflow.

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 Size - 10
Air Valve is 1400.0 cfm 10" inlet.

Air Valve Size - 14
Air Valve is 3000.0 cfm 14" inlet.

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. Heater control access is left hand. Right hand control access is optional.

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

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.

D.D.C. Actuator
Trane 3 wire, 26 GA, 3.4 VA, 1.7 W, 24 VAC, 50/60 Hz floating point control actuator with linkage release button.

Running torque is 35 in-lb (4 Nm) minimum and is non-spring return with a 90 second drive time. Travel is terminated by end stops at fully opened and closed positions. An integral magnetic clutch eliminates motor stall. When Trane controls are not provided an integral 3 screw terminal is provided for field wiring. Operating temperature is 32.0 F to 125.0 F.

System Communications
The controller is designed to send and receive data from a Tracer Summit or other Trane Controllers, or a VariTrac Central Control Panel. Current unit status conditions and set points may be monitored and/or edited via this data communication feature. The network type is a twisted wire pair serial communication.

Direct Digital Controller
The microprocessor based terminal unit controller provides accurate, pressure independent control through the use of a proportional integral control algorithm and direct digital control technology. The controller monitors zone temperature set points, zone temperature and its rate of change, and valve airflow using a differential pressure signal. Optionally, the controller can monitor either supply duct air temperature or CO2 concentration via appropriate sensors. The controller is provided in an enclosure with 7/8" knockouts for remote control wiring. A Trane zone sensor is required.

Override Commands
The following override commands may be received by the Unit Control Module (U.C.M.) from the Tracer System.

Control Mode, Action, Offset & Commands
* Control Mode - Occupied or Unoccupied
* Control Action - Heating or Cooling
* Control Offset - Enabling Control Offset will increase the cooling temperature setpoint and decrease the heating temperature setpoint by a control offset value.
* Drive damper fully open.
* Drive damper fully closed.
* Drive damper to maximum airflow setpoint.
* Drive damper to minimum airflow setpoint.
* Disable unit heat.
* Reset - Enabling the reset function forces the controller and the flow sensor to recalibrate.

Editable Set points and Functions
Occupied and unoccupied cooling temperature set point 30.0 F-100.0 F.
Occupied and unoccupied heating temperature set point 30.0 F-100.0 F.
Maximum flow set point (10-100% of unit equivalent cataloged airflow)
Minimum heating and cooling flow set point (0, 10-100% of unit equivalent cataloged airflow)
Cooling set point low and high limit
Low 30.0 F-100.0 F.
High 30.0 F-102.0 F.

Heating set point high and low limit 30.0 F-100.0 F.
Hot water valve drive time
Air valve drive time

Fan Control Offset - determines at what point a parallel fan is energized. This can be a function of temperature (degrees above heating set point) or primary airflow
Series Fan Configuration - allows series fan powered to shut off fan and close air valve when unit is unoccupied. Fan will operate in unoccupied mode if reheat is active.
Local heating flow set point enable/disable and set point
Analog input mode - auxiliary temperature sensor or CO2 detector
Binary input mode - generic or occupancy detector
Zone temperature, auxiliary temperature, and zone set point calibration corrections (± 10 ° F) [± -12°C]
Flow measurement calibration correction (60-150%)

Additional Status Information Available
Active cooling set point
Active heating set point
Current unit primary airflow
Current zone temperature
Reheat status (on/off)

Fan status (on/off)
Calibration status (calibrating/not calibrating)

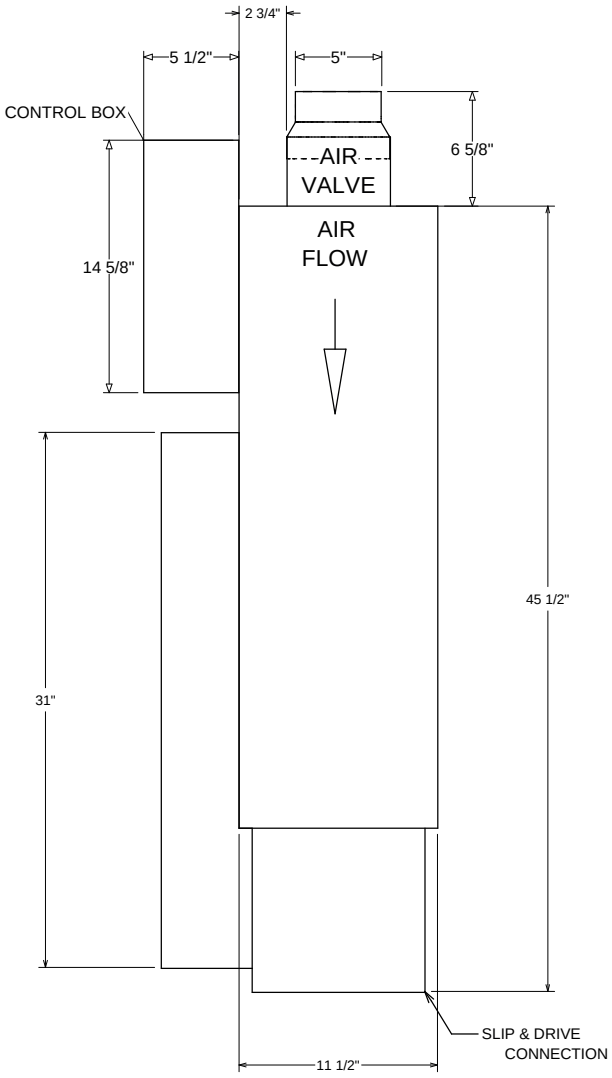
Auxiliary air temperature (if unit has auxiliary temperature sensor) Not available if CO2 sensor used.
CO2 concentration (if unit has CO2 sensor) Not available if auxiliary temperature sensor used.
Ventilation ratio
BIP state
Failure indicators
· Temperature sensor failures
· Flow Sensor failure
· Local zone sensor set point failure

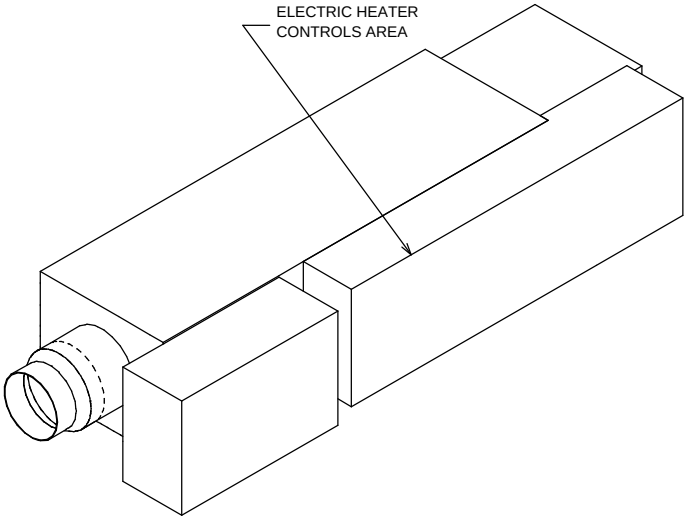
DDC Sequence of Operation
The unit controller continuously monitors the zone temperature against its set point and varies the primary airflow as required to meet zone set points. Airflow is limited by minimum and maximum airflow set points.

DDC Controls Option DD04, DD14 & DD44
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.

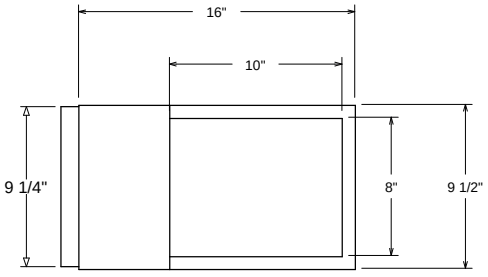
Unit Dimensions - Variable Air Volume Single Duct Terminal Units

Item: A1 - A3 Qty: 20 Tag(s): 4-C, 4-D, 4-E, 4-F, 4-G, 4-H, 4-I, 10-E, 10-F, 4-A, 4-B, 8-C, 8-D, 8-E, 10-D, 10-H, 10-I, 10-J, 10-K, 10-M





TOP VIEW



BACK VIEW

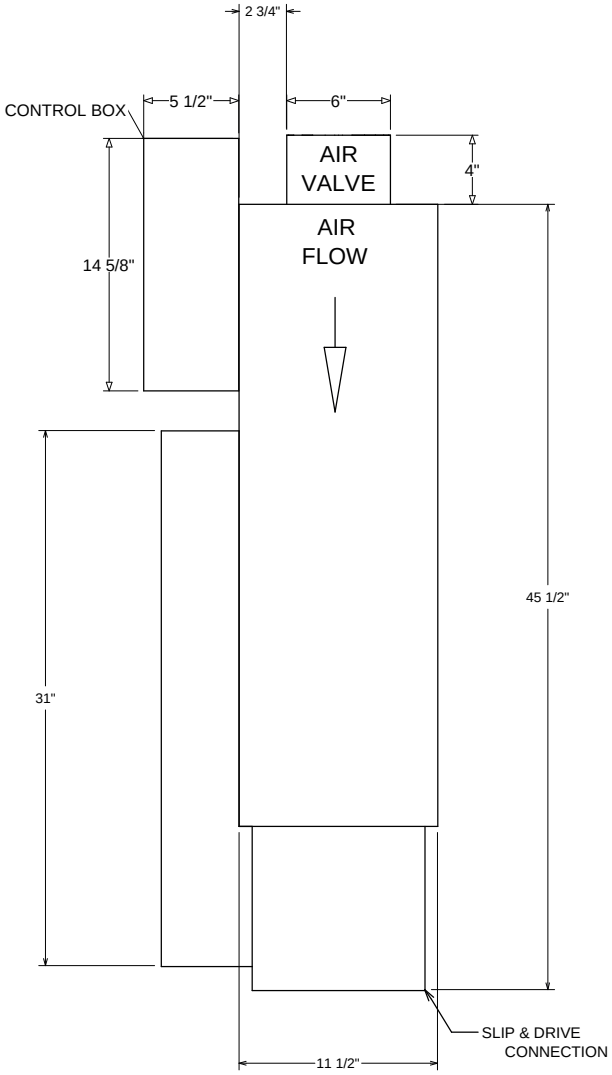
Customer Notes

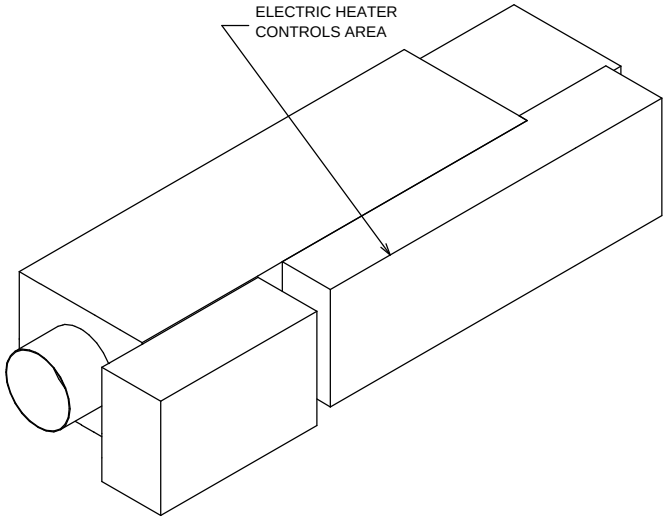
1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet on heater standard.
3. Allow 48" of straight duct downstream of unit before first runout & inside of the duct should be equal discharge size. (AxB)
4. For electric heater access, side hinged door must have minimum distance per NEC or local code.
5. Knockouts for power supply provided in top & bottom of terminal box.
6. Coils are provided without internal insulation. If the unit is to be installed in a location with high humidity, external insulation around the heating coil should be installed as required.

Approximate Dry Weight	38.0 lb

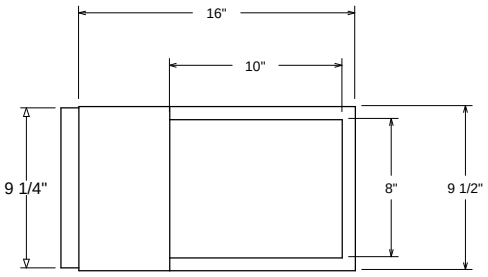
Weight reflected may vary ±5 lbs(2.27kgs) based upon options selected.

Unit Dimensions - Variable Air Volume Single Duct Terminal Units
Item: A4, A5 Qty: 5 Tag(s): 8-A, 8-B, 8-F, 10-A, 10-B





TOP VIEW



BACK VIEW

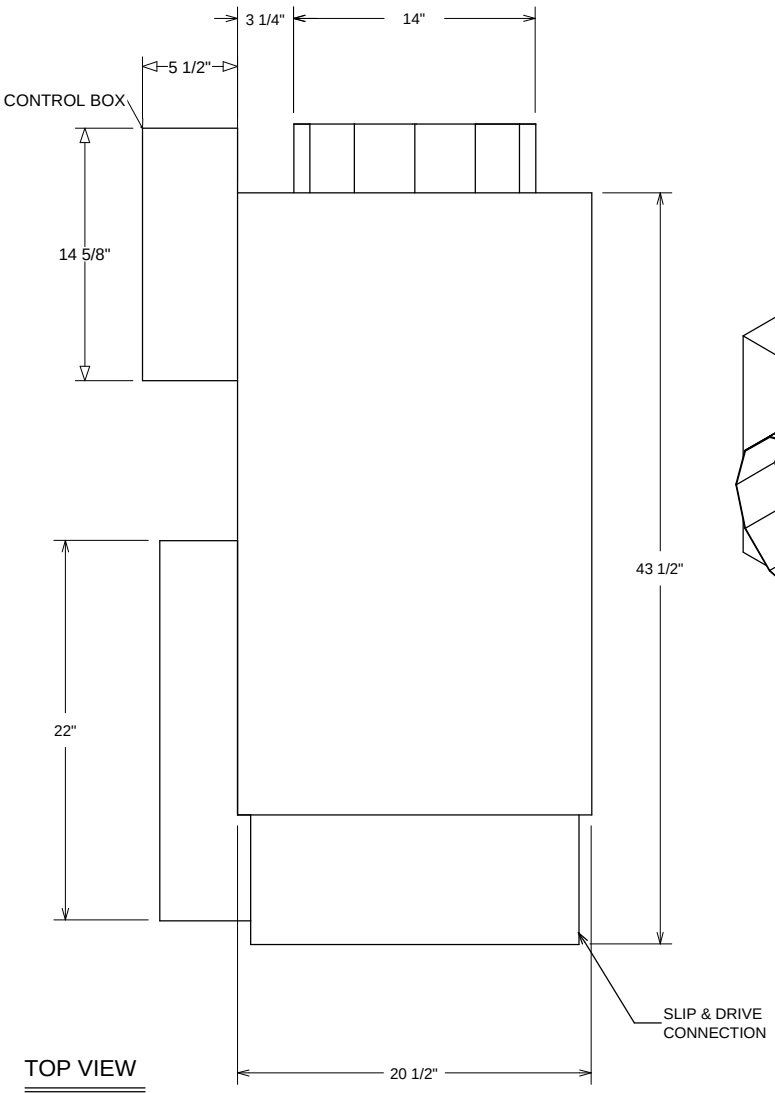
Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet on heater standard.
3. Allow 48" of straight duct downstream of unit before first runout & inside of the duct should be equal discharge size. (AxB)
4. For electric heater access, side hinged door must have minimum distance per NEC or local code.
5. Knockouts for power supply provided in top & bottom of terminal box.
6. Coils are provided without internal insulation. If the unit is to be installed in a location with high humidity, external insulation around the heating coil should be installed as required.

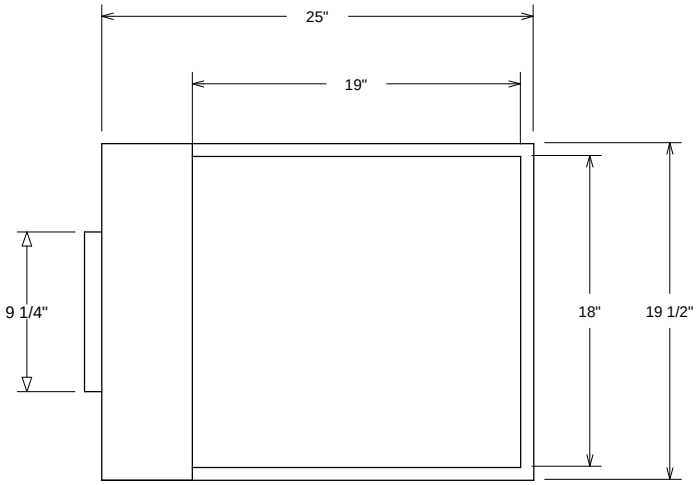
Approximate Dry Weight	38.0 lb

Weight reflected may vary ±5 lbs(2.27kgs) based upon options selected.

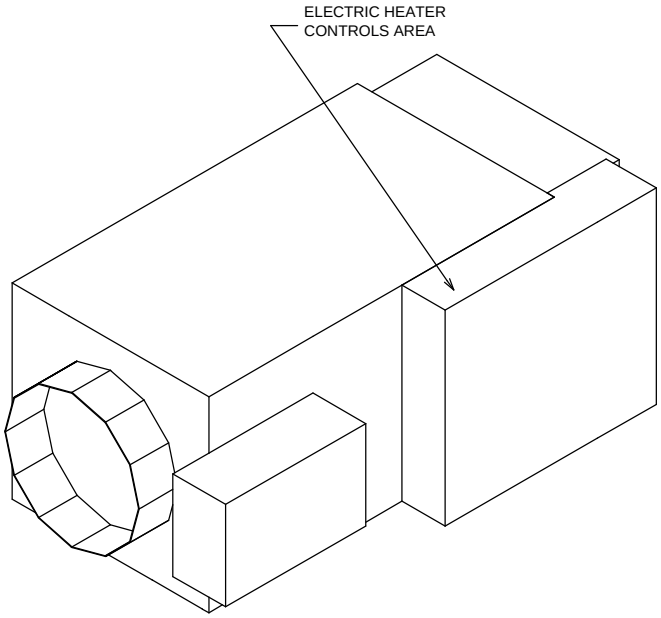
Unit Dimensions - Variable Air Volume Single Duct Terminal Units
Item: A6 Qty: 1 Tag(s): 10-C



TOP VIEW



BACK VIEW



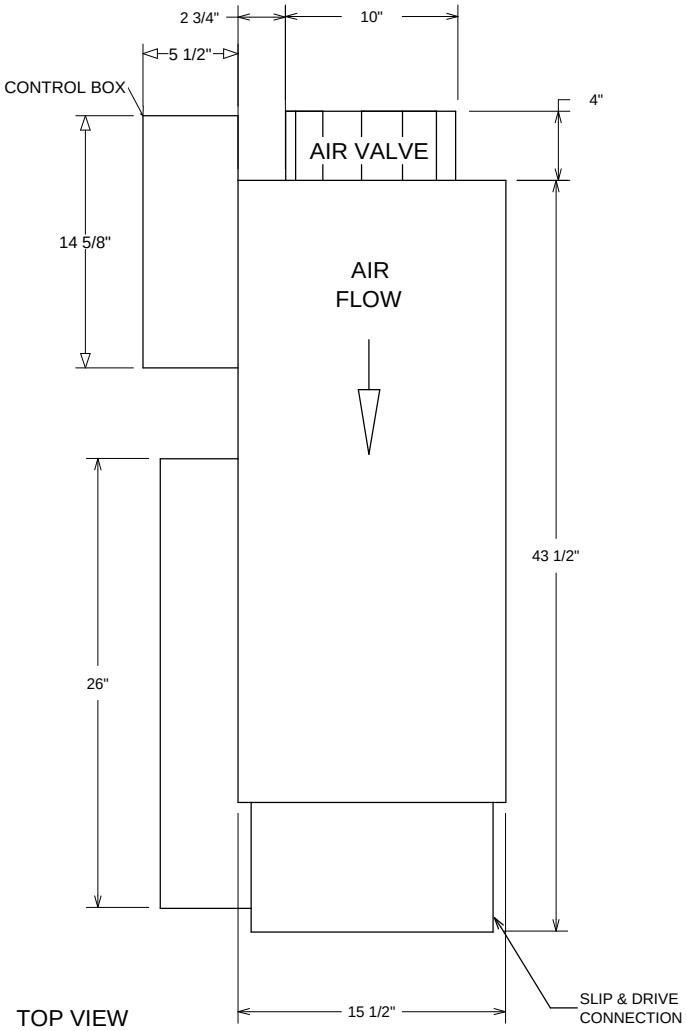
Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet on heater standard.
3. Allow 48" of straight duct downstream of unit before first runout & inside of the duct should be equal discharge size. (AxB)
4. For electric heater access, side hinged door must have minimum distance per NEC or local code.
5. Knockouts for power supply provided in top & bottom of terminal box.
6. Coils are provided without internal insulation. If the unit is to be installed in a location with high humidity, external insulation around the heating coil should be installed as required.

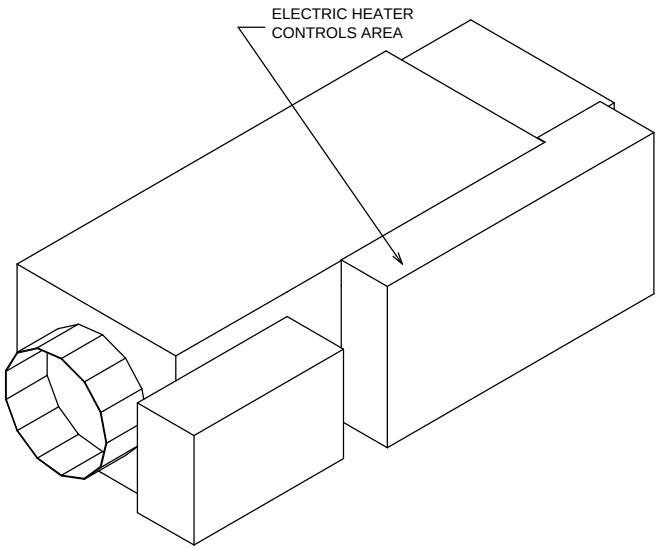
Approximate Dry Weight	60.0 lb

Weights reflected may vary ±5.0 lb based upon options selected.

Unit Dimensions - Variable Air Volume Single Duct Terminal Units
Item: A7 Qty: 1 Tag(s): 10-G

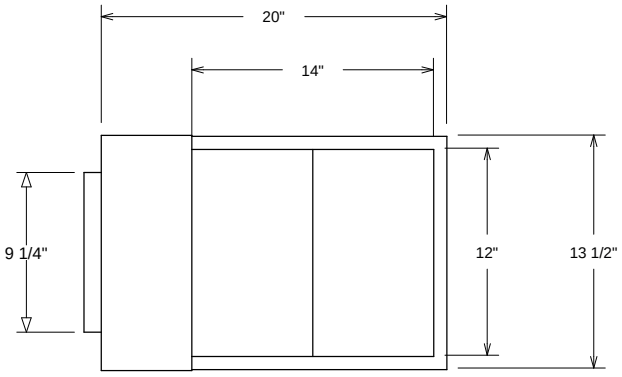


TOP VIEW



Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet on heater standard.
3. Allow 48" of straight duct downstream of unit before first runout & inside of the duct should be equal discharge size. (AxB)
4. For electric heater access, side hinged door must have minimum distance per NEC or local code.
5. Knockouts for power supply provided in top & bottom of terminal box.
6. Coils are provided without internal insulation. If the unit is to be installed in a location with high humidity, external insulation around the heating coil should be installed as required.

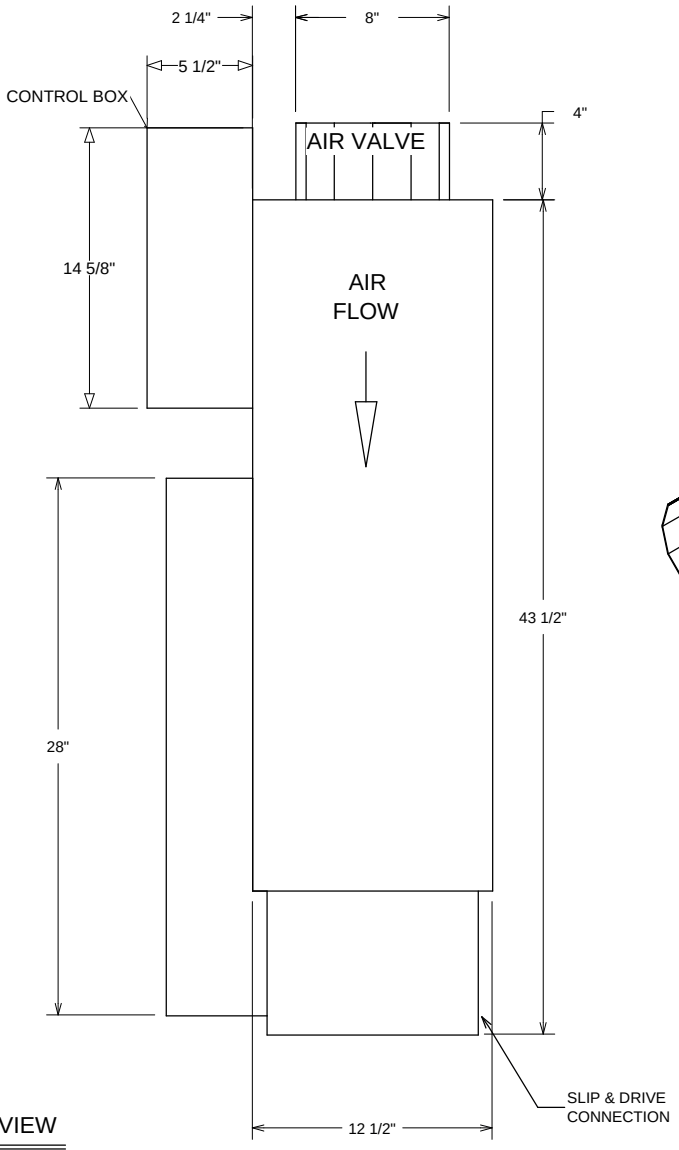


BACK VIEW

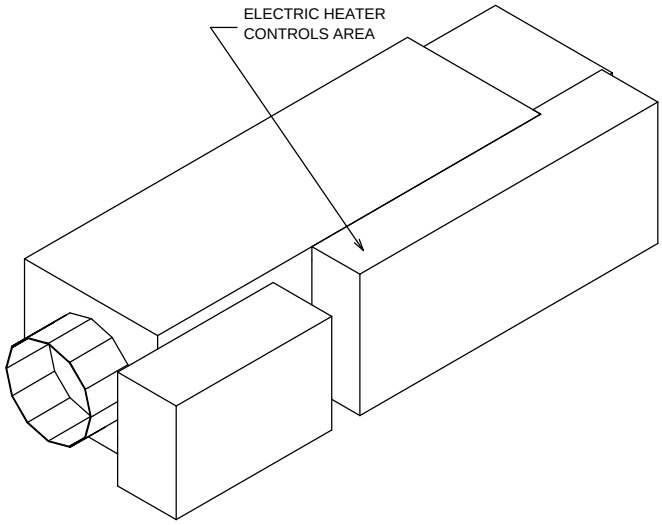
Approximate Dry Weight	46.0 lb

Weights reflected may vary ±5.0 lb based upon options selected.

Unit Dimensions - Variable Air Volume Single Duct Terminal Units
Item: A8 Qty: 2 Tag(s): 10-L, 10-N

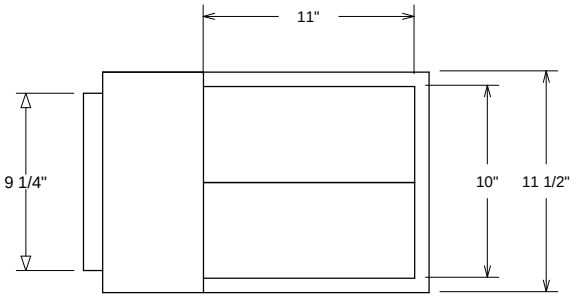


TOP VIEW



Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet on heater standard.
3. Allow 48" of straight duct downstream of unit before first runout & inside of the duct should be equal discharge size. (AxB)
4. For electric heater access, side hinged door must have minimum distance per NEC or local code.
5. Knockouts for power supply provided in top & bottom of terminal box.
6. Coils are provided without internal insulation. If the unit is to be installed in a location with high humidity, external insulation around the heating coil should be installed as required.



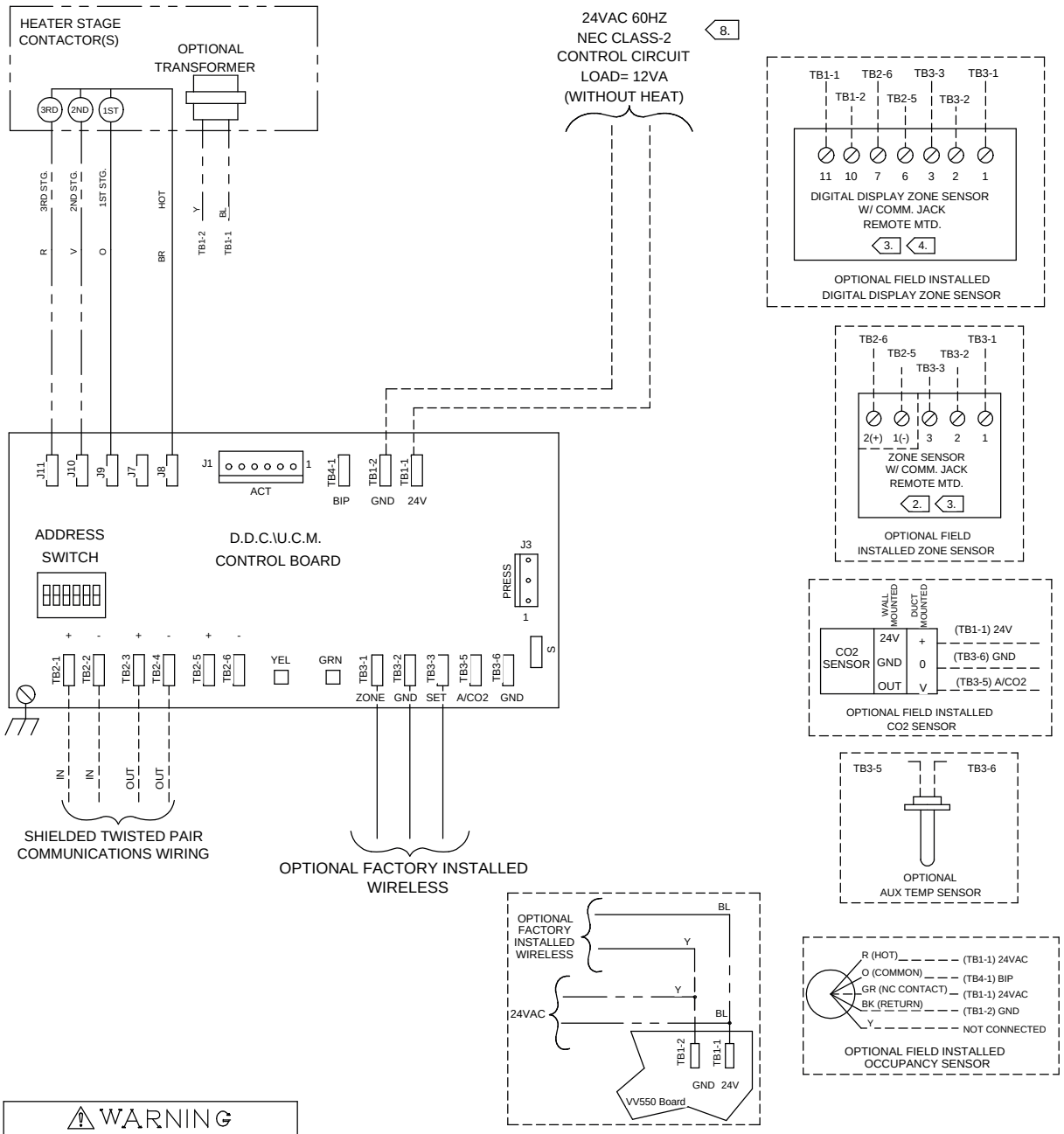
BACK VIEW

Approximate Dry Weight	38.0 lb

Weights reflected may vary ±5.0 lb based upon options selected.

Field Wiring - Variable Air Volume Single Duct Terminal Units

Item: A1 - A8 Qty: 29 Tag(s): 4-C, 4-D, 4-E, 4-F, 4-G, 4-H, 4-I, 10-E, 10-F, 4-A, 4-B, 8-C, 8-D, 8-E, 10-D, 10-H, 10-I, 10-J, 10-K, 10-M, 8-A, 8-B, 8-F, 10-A, 10-B, 10-C, 10-G, 10-L, 10-N



⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.

FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

⚠ CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

NOTE:

1. ——————— FACTORY WIRING
   - - - - - - - - - - FIELD WIRING
   ——— – – ——— OPTIONAL OR ALTERNATE WIRING

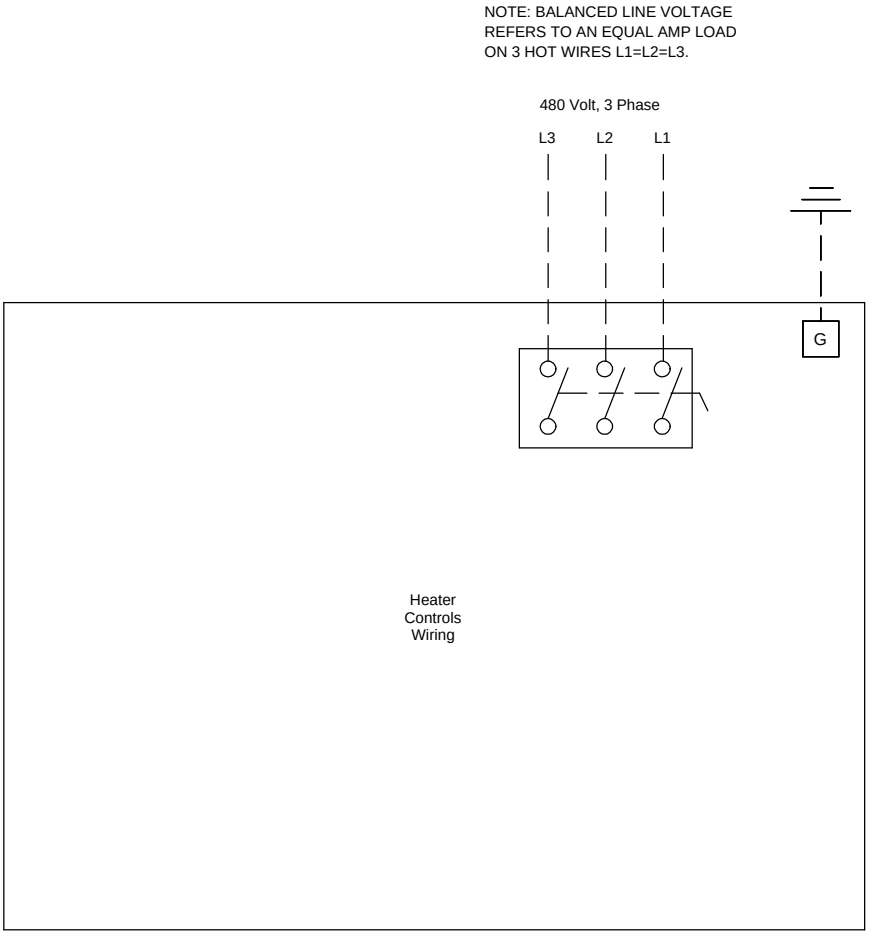
2. ZONE SENSOR TERMINALS 1 (-) AND 2 (+) REQUIRE SHIELDED TWISTED PAIR WIRING FOR COMMUNICATIONS JACK EQUIPPED ZONE SENSOR OPTION.

3. NO ADDITIONAL WIRING REQUIRED FOR NIGHT SETBACK OVERRIDE (ON/CANCEL).

4. ZONE SENSOR TERMINALS 6 AND 7 REQUIRE SHIELDED TWISTED PAIR WIRING FOR OPTIONAL USE OF COMMUNICATIONS JACK.

Field Wiring - Variable Air Volume Single Duct Terminal Units

Item: A1 - A8 Qty: 29 Tag(s): 4-C, 4-D, 4-E, 4-F, 4-G, 4-H, 4-I, 10-E, 10-F, 4-A, 4-B, 8-C, 8-D, 8-E, 10-D, 10-H, 10-I, 10-J, 10-K, 10-M, 8-A, 8-B, 8-F, 10-A, 10-B, 10-C, 10-G, 10-L, 10-N



Tag Data - Variable Air Volume Changeover/Bypass Units (Qty: 3)

Item	Tag(s)	Qty	Description	Model Number
B1	Zone 4 Bypass, Zone 8 Bypass	2	VAV Changeover/Bypass	VADB14
B2	Zone10 Bypass	1	VAV Changeover/Bypass	VARA30

Product Data - Variable Air Volume Changeover/Bypass Units

All Units

Bypass
1 Communicating sensor/bypass control (Fld)

Item: B1 Qty: 2 Tag(s): Zone 4 Bypass, Zone 8 Bypass

Varitrac damper
14" [356 mm] round damper

Item: B2 Qty: 1 Tag(s): Zone10 Bypass

Rectangular damper
30 x 20 rectangular bypass damper

Mechanical Specifications - Variable Air Volume Changeover/Bypass Units
Item: B1, B2 Qty: 3 Tag(s): Zone 4 Bypass, Zone 8 Bypass, Zone10 Bypass

Round Damper General Data
Cylinder - Rolled and seam welded 18 gauge galvanized steel. The discharge end is roll crimped to fit standard round ductwork.
Damper - A 22 gauge (18 gauge on size 08) galvanized steel damper blade sets against a single rolled bead in the cylinder with a factory provided integral 24 VAC electric actuator.

The damper actuator is a synchronous motor driven actuator with a three-wire connection terminal strip and is factory installed. This non-spring return actuator has a 53 lb-in [6 N.m] running torque, and a 1 minute, 90.00 Deg travel time. The 1/2" coupler fits over the round shaft of the damper. The actuator requires 2.5 VA at the nominal 24 VAC, 50/60 Hz.

Rectangular Bypass Damper General Data
Damper frames are constructed with formed 18-gauge galvanized steel, mechanically joined with linkage concealed in the side channel. Self lubricating nylon bearings provide support and alignment for blade movement.

The blades are 18 gauge galvanized steel with 4" or 5" nominal width. These are opposed rotation blades set in the frame mounted in a 16" long sheet metal casing. The metal casing is constructed of 22 gauge galvanized sheet metal, and includes a pre-formed "S" cleat on each side of the inlet and outlet of the unit.

Dampers are rated for up to 3000 fpm at 2" of static pressure. The unit has an airflow direction label.

Damper - 3020
7500.0 cfm, 20" x 30" rectangular bypass damper with 4 opposing blades.

Rectangular Damper Actuator
The rectangular damper actuator is a synchronous motor driven actuator with a three-wire connection terminal strip and is factory installed. This non-spring return actuator has a 35 lb-in [4 N.m] running torque, and a 1 minute, 90 degree travel time. The 1/2" coupler fits over the round shaft of the damper. The actuator requires 2.5 VA at the nominal 24 VAC, 50/60 Hz.

Damper - 14
1600.0 cfm, 14" damper.

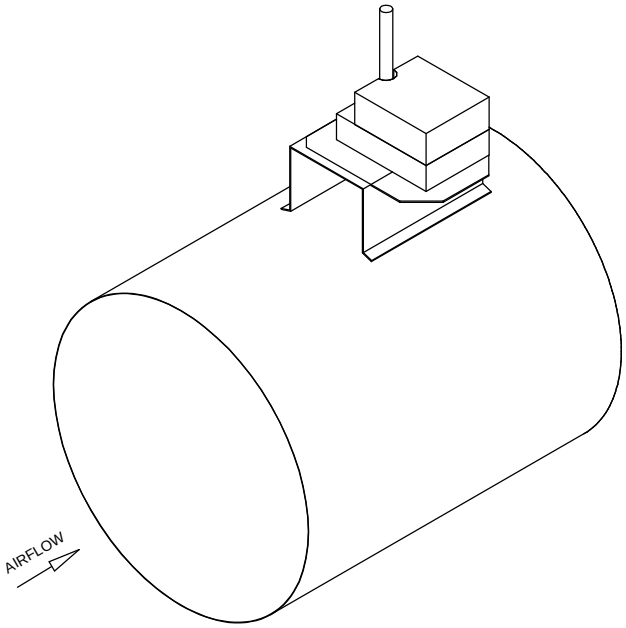
Bypass Damper Control
Bypass damper control is accomplished by a communicating sensor/bypass control assembly that includes a Unit Control Module.

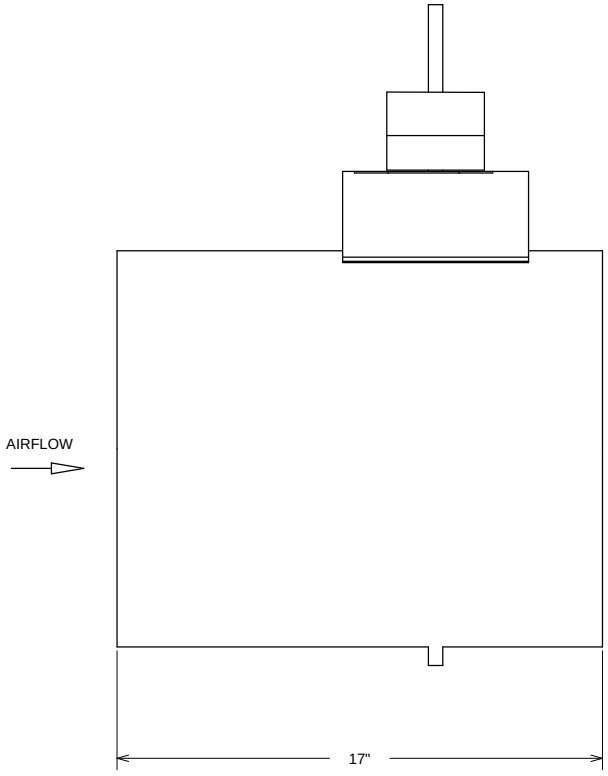
Rectangular Damper Actuator
The rectangular damper actuator is a synchronous motor driven actuator with a three-wire connection terminal strip and is factory installed. This non-spring return actuator has a 53 lb-in [6 N.m] running torque, and a 1 minute, 90 degree travel time. The 1/2" coupler fits over the round shaft of the damper. The actuator requires 2.5 VA at the nominal 24 VAC, 50/60 Hz.

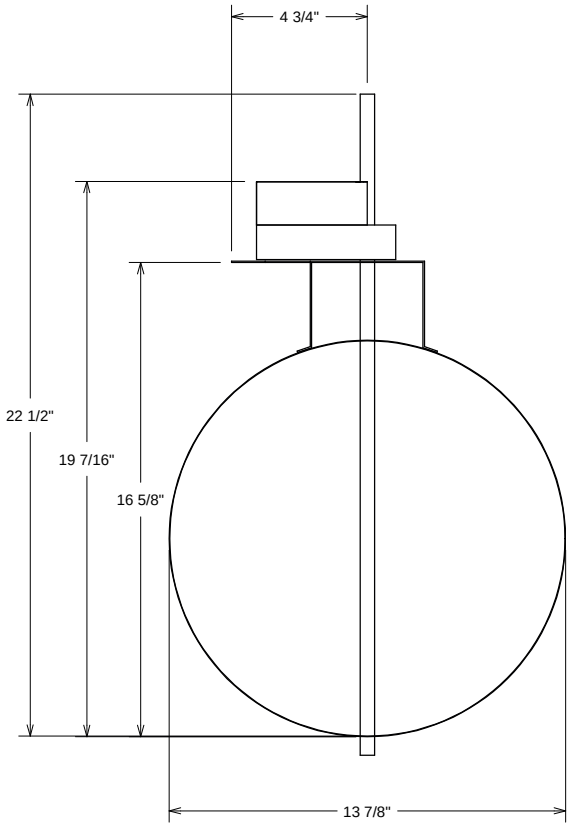
Unit Dimensions - Variable Air Volume Changeover/Bypass Units
Item: B1 Qty: 2 Tag(s): Zone 4 Bypass, Zone 8 Bypass

Approximate Dry Weight	10.0 lb

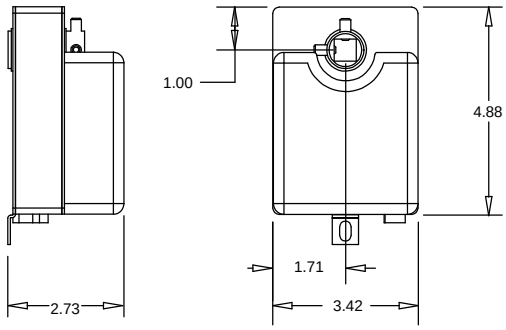
Weights reflected may vary ±5.0 lb based upon options selected.



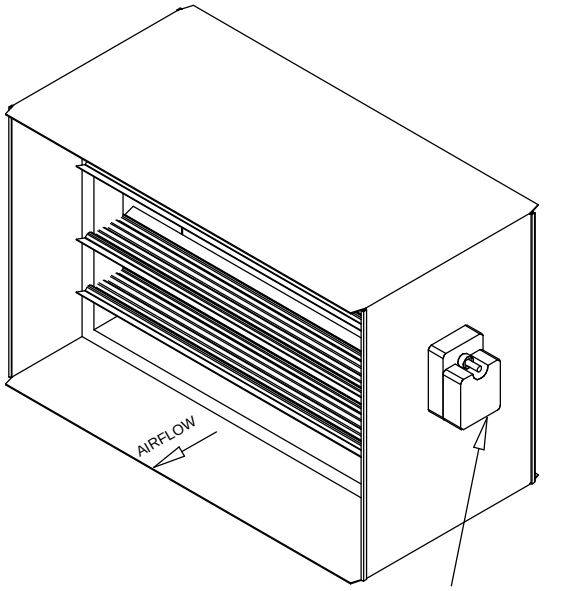


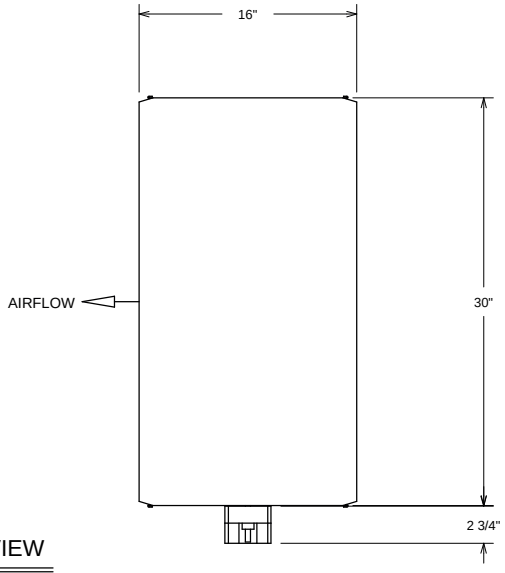


Unit Dimensions - Variable Air Volume Changeover/Bypass Units
Item: B2 Qty: 1 Tag(s): Zone10 Bypass



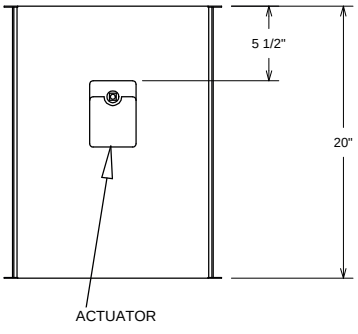
ACTUATOR DIMENSIONS





TOP VIEW

Wiring	Actuator	CCP
Red	CCW	Close
White	COM	Com
Black	CW	Open

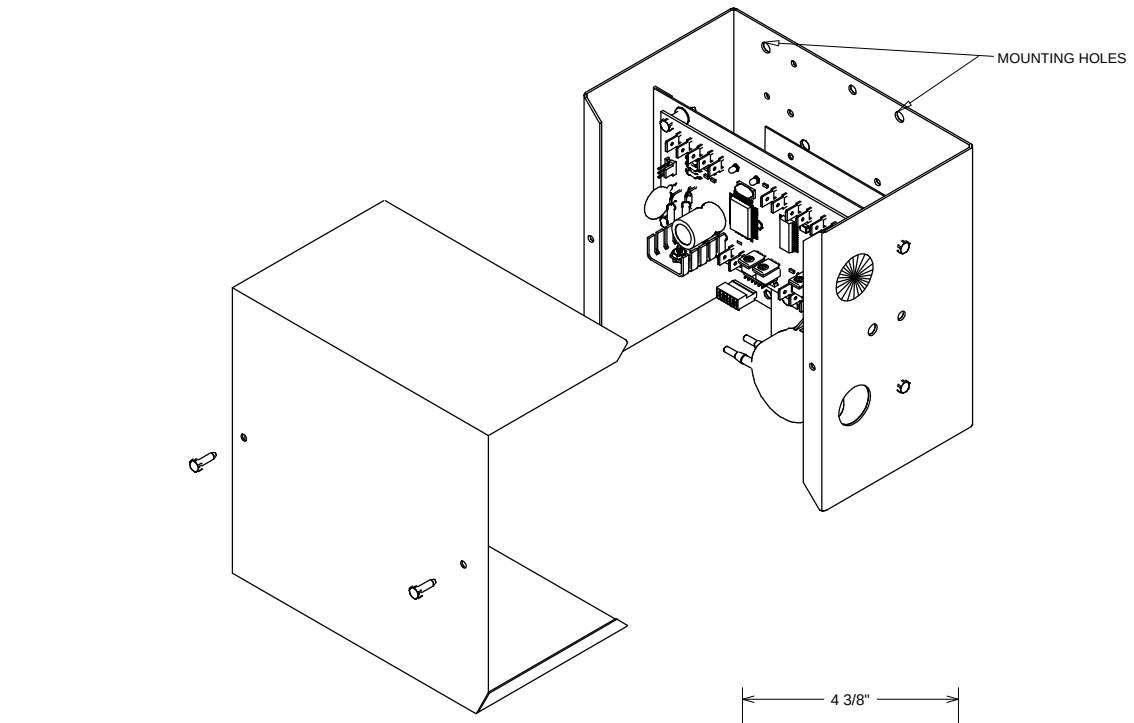


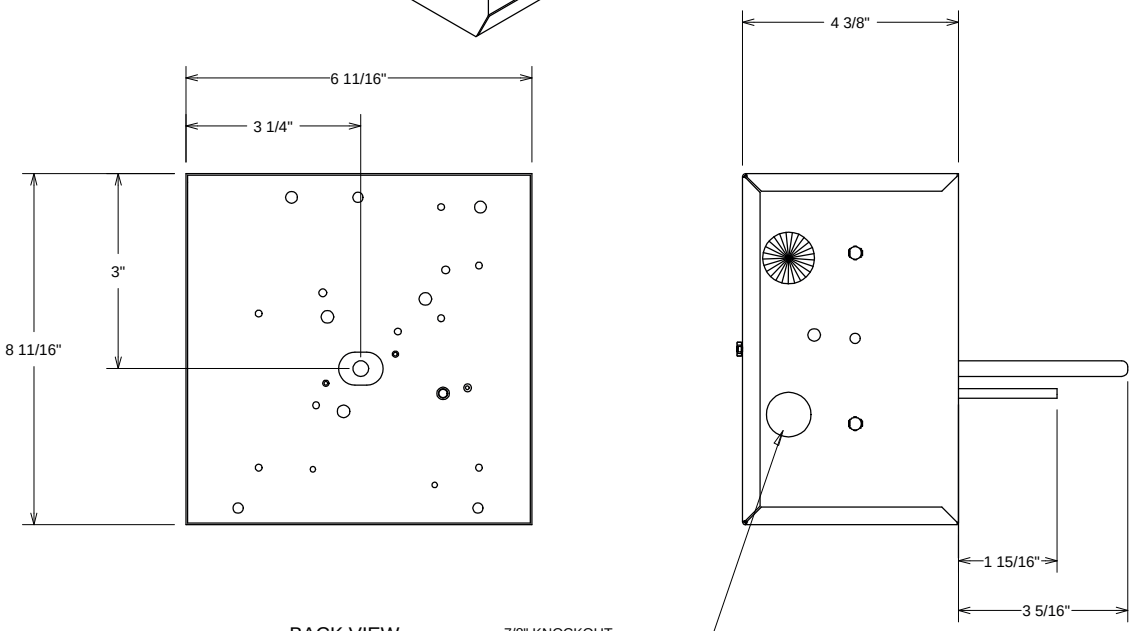
SIDE VIEW

DAMPER FRAME DATA

Frame	18-gauge Galvanized Steel
Blades	18-gauge Galvanized Steel All blades are 4" or 5" nominal width
Linkage	14 GA Rolled Steel, Zinc Plated
Damper Shaft	1/2" Diameter Steel, Zinc Plated
Bearings	Self-lubricating Nylon
Cable	10.00 ft [3048 mm]
Weight	16.0 lb
Shroud	22 GA Galvanized Steel

Accessory - Variable Air Volume Changeover/Bypass Units
Item: B1, B2 Qty: 3 Tag(s): Zone 4 Bypass, Zone 8 Bypass, Zone10 Bypass

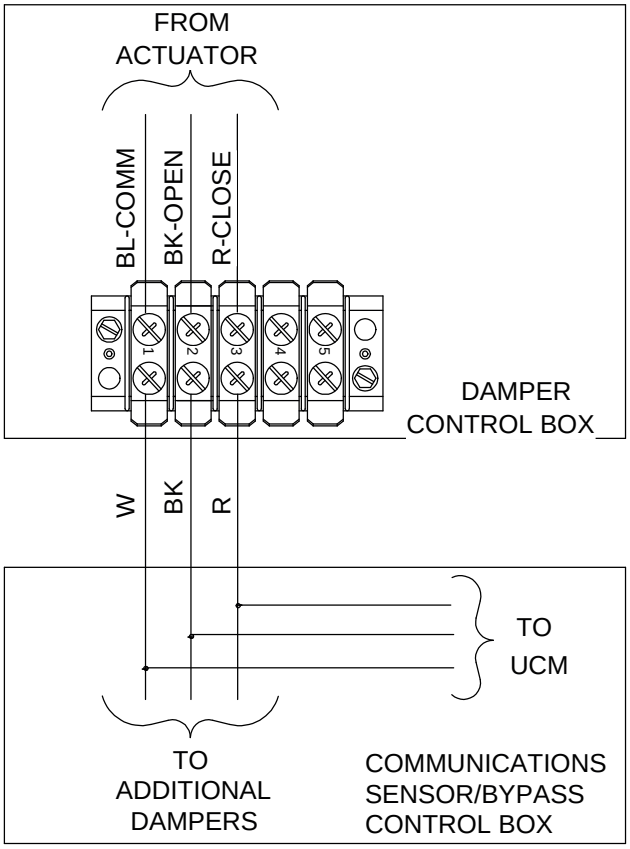




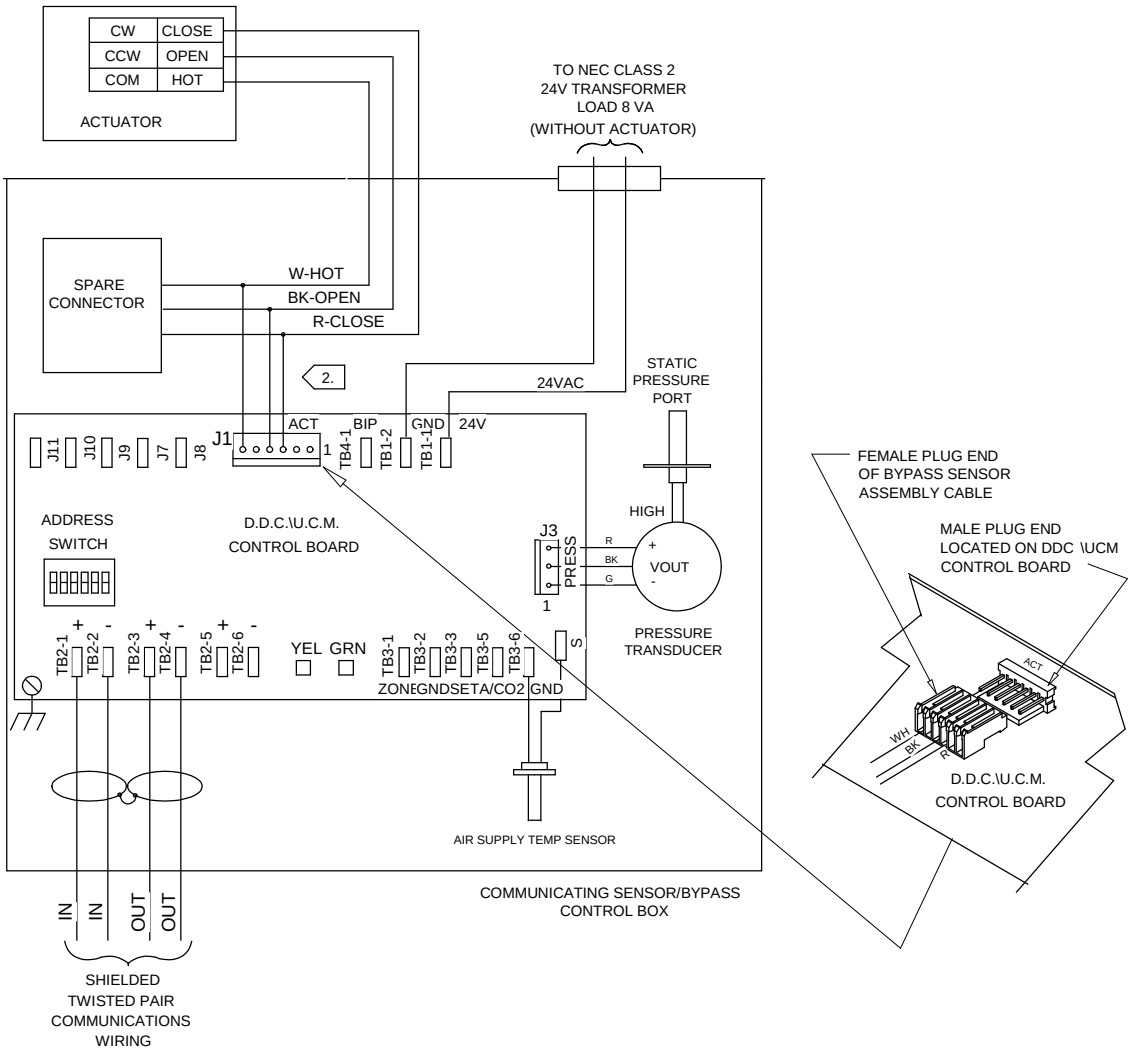
NOTES:

WEIGHT:	3.3 lb
OPERATING TEMPERATURES	
TEMPERATURE:	32.0 F TO 140.0 F
HUMIDITY:	5 TO 95% (NON-CONDENSING)
MOUNTING METHOD:	4 - #8 SELF DRILL SHEET METAL SCREWS

Field Wiring - Variable Air Volume Changeover/Bypass Units
Item: B1 Qty: 2 Tag(s): Zone 4 Bypass, Zone 8 Bypass



Field Wiring - Variable Air Volume Changeover/Bypass Units
Item: B1, B2 Qty: 3 Tag(s): Zone 4 Bypass, Zone 8 Bypass, Zone10 Bypass



⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.

FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

⚠ CAUTION

USE COPPER CONDUCTORS ONLY!

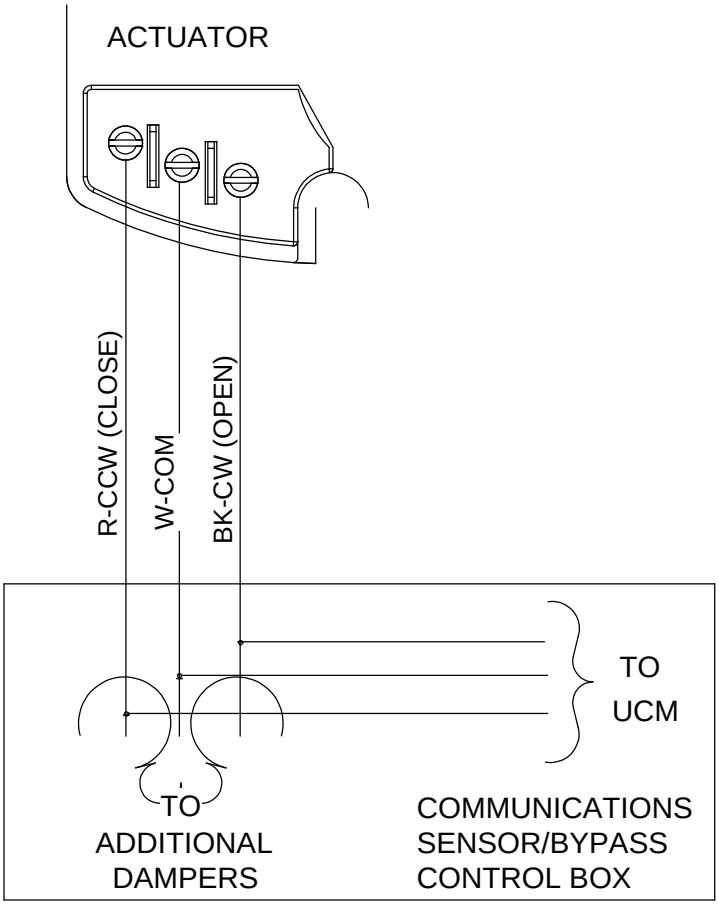
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

Customer Notes:

1. ———— Factory installed.
   — — — — Optional or installed by others.
2. Factory wiring furnished with bypass damper, field connection to DDC/UCM required.

Field Wiring - Variable Air Volume Changeover/Bypass Units
Item: B2 Qty: 1 Tag(s): Zone10 Bypass



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 - Variable Air Volume Changeover/Bypass Units

Item	Tag(s)	Qty	Description	Model Number
B1	Zone 4 Bypass, Zone 8 Bypass	2	VAV Changeover/Bypass	VADB14
B2	Zone10 Bypass	1	VAV Changeover/Bypass	VARA30

Field Installed Option Description	Part/Ordering Number
Communicating sensor/bypass control	501860870100