Submittal

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Prepared For: Rob Mitchell

Date: *May 10, 2017*

Customer P.O. Number:
Customer Project Number:

Sold To: HVAC Services

Job Number:
Job Name:
HVAC Services - Rob - Baxter Academy

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

Product Summary

Qty	Product
45	Variable Air Volume Single Duct Terminal Units
5	Variable Air Volume Changeover/Bypass Units
5	VAV Changeover/Bypass-System Controllers
1	Tracker System Panels

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.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Table Of Contents

Product Summary 1

Variable Air Volume Single Duct Terminal Units (Items A1 - A45) 3
- Tag Data 3
- Product Data 4
- Performance Data 6
- Mechanical Specifications 8
- Unit Dimensions 11
- Accessory 18
- Field Wiring 19

Variable Air Volume Changeover/Bypass Units (Items B1 - B3) 22
- Tag Data 22
- Product Data 22
- Mechanical Specifications 23
- Unit Dimensions 24
- Accessory 27
- Field Wiring 28

VAV Changeover/Bypass-System Controllers (Item C1) 31
- Tag Data 31
- Product Data 31
- Mechanical Specifications 32
- Field Wiring 34

Light Commercial Unitary System Panels (Item D1) 35
- Tag Data 35
- Product Data 35
- Mechanical Specifications 36
- Unit Dimensions 42
- Field Wiring 44

Field Installed Options - Part/Order Number Summary 45
- Variable Air Volume Single Duct Terminal Units 45
- Variable Air Volume Changeover/Bypass Units 45

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Tag Data - Variable Air Volume Single Duct Terminal Units (Qty: 45)

Item	Tag(s)	Qty	Description	Model Number
A1	VAV 1-1	1	VCCF06	VCCF06
A2	VAV 1-2	1	Variable Air Volume Single Duct Termina	VCCF08
A3	VAV 1-3	1	VCEF10	VCEF10
A4	VAV 1-4	1	Variable Air Volume Single Duct Termina	VCEF10
A5	VAV 1-5	1	Variable Air Volume Single Duct Termina	VCEF10
A6	VAV 1-6	1	Variable Air Volume Single Duct Termina	VCCF06
A7	VAV 1-7	1	Variable Air Volume Single Duct Termina	VCEF08
A8	VAV 1-8	1	Variable Air Volume Single Duct Termina	VCEF14
A9	VAV 1-9	1	Variable Air Volume Single Duct Termina	VCCF06
A10	VAV 1-10	1	Variable Air Volume Single Duct Termina	VCEF06
A11	VAV 1-11	1	Variable Air Volume Single Duct Termina	VCEF06
A12	VAV 2-1	1	Variable Air Volume Single Duct Termina	VCEF10
A13	VAV 2-2	1	Variable Air Volume Single Duct Termina	VCEF10
A14	VAV 2-3	1	Variable Air Volume Single Duct Termina	VCEF10
A15	VAV 2-4	1	Variable Air Volume Single Duct Termina	VCEF08
A16	VAV 2-5	1	Variable Air Volume Single Duct Termina	VCCF06
A17	VAV 2-6	1	Variable Air Volume Single Duct Termina	VCCF08
A18	VAV 2-7	1	Variable Air Volume Single Duct Termina	VCCF08
A19	VAV 2-8	1	Variable Air Volume Single Duct Termina	VCCF06
A20	VAV 2-9	1	Variable Air Volume Single Duct Termina	VCCF06
A21	VAV 2-10	1	Variable Air Volume Single Duct Termina	VCCF08
A22	VAV 2-11	1	Variable Air Volume Single Duct Termina	VCEF06
A23	VAV 2-12	1	Variable Air Volume Single Duct Termina	VCEF06
A24	VAV 2-13	1	Variable Air Volume Single Duct Termina	VCEF06
A25	VAV 4-1	1	Variable Air Volume Single Duct Termina	VCCF08
A26	VAV 4-2	1	Variable Air Volume Single Duct Termina	VCCF08
A27	VAV 4-3	1	Variable Air Volume Single Duct Termina	VCCF08
A28	VAV 4-4	1	Variable Air Volume Single Duct Termina	VCCF06
A29	VAV 4-5	1	Variable Air Volume Single Duct Termina	VCCF06
A30	VAV 4-6	1	Variable Air Volume Single Duct Termina	VCCF08
A31	VAV 4-7	1	Variable Air Volume Single Duct Termina	VCCF08
A32	VAV 4-8	1	Variable Air Volume Single Duct Termina	VCCF10
A33	VAV 5-1	1	Variable Air Volume Single Duct Termina	VCCF08
A34	VAV 5-2	1	Variable Air Volume Single Duct Termina	VCCF08
A35	VAV 5-3	1	Variable Air Volume Single Duct Termina	VCCF08
A36	VAV 5-4	1	Variable Air Volume Single Duct Termina	VCCF06
A37	VAV 5-5	1	Variable Air Volume Single Duct Termina	VCCF10
A38	VAV 5-6	1	Variable Air Volume Single Duct Termina	VCCF06
A39	VAV 5-7	1	Variable Air Volume Single Duct Termina	VCCF08
A40	VAV 5-8	1	Variable Air Volume Single Duct Termina	VCCF08
A41	VAV 6-1	1	Variable Air Volume Single Duct Termina	VCCF10
A42	VAV 6-2	1	Variable Air Volume Single Duct Termina	VCCF06
A43	VAV 6-3	1	Variable Air Volume Single Duct Termina	VCCF08
A44	VAV 6-4	1	Variable Air Volume Single Duct Termina	VCCF06
A45	VAV 6-5	1	Variable Air Volume Single Duct Termina	VCCF06

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Product Data - Variable Air Volume Single Duct Terminal Units

All Units

Foil faced insulation - 1" (25 mm)
Standard actuator
1 DDC sensor with occp and set pt (Fld)

Item: A1, A6, A9, A16, A19, A20, A28, A29, A36, A38, A42, A44, A45 Qty: 13 Tag(s): VAV 1-1, VAV 1-6, VAV 1-9, VAV 2-5, VAV 2-8, VAV 2-9, VAV 4-4, VAV 4-5, VAV 5-4 , VAV 5-6 , VAV 6-2 , VAV 6-4 , VAV 6-5

Single duct cooling only terminal
6" inlet size, 500 cfm (152mm inlet, 236 l/s)
DDC without remote heat - cooling only
Left hand &/or same side connection (control &/or hot water coil)

Item: A2, A17, A18, A21, A25, A26, A27, A30, A31, A33, A34, A35, A39, A40, A43 Qty: 15 Tag(s): VAV 1-2, VAV 2-6, VAV 2-7, VAV 2-10, VAV 4-1, VAV 4-2, VAV 4-3, VAV 4-6, VAV 4-7, VAV 5-1, VAV 5-2, VAV 5-3, VAV 5-7, VAV 5-8, VAV 6-3

Single duct cooling only terminal
8" inlet size, 900 cfm (203mm inlet, 425 l/s)
DDC without remote heat - cooling only
Left hand &/or same side connection (control &/or hot water coil)

Item: A3, A4, A13, A14 Qty: 4 Tag(s): VAV 1-3, VAV 1-4, VAV 2-2, VAV 2-3

Single duct with electric heat
10" inlet size, 1400 cfm (254mm inlet, 661 l/s)
DDC, controls on/off electric heat control
Right/Left hand universal orientation
Duct temperature sensor -factory mounted
Disconnect switch
208 volt, 3 phase
Electric heater kW - 3.5
Stage -1
Magnetic contactors - 24 volt

Item: A5, A12 Qty: 2 Tag(s): VAV 1-5, VAV 2-1

Single duct with electric heat
10" inlet size, 1400 cfm (254mm inlet, 661 l/s)
DDC, controls on/off electric heat control
Right/Left hand universal orientation
Duct temperature sensor -factory mounted
Disconnect switch
208 volt, 3 phase
Electric heater kW - 4.0
Stages - 2 - equal
Magnetic contactors - 24 volt

Item: A7 Qty: 1 Tag(s): VAV 1-7

Single duct with electric heat
8" inlet size, 900 cfm (203mm inlet, 425 l/s)
DDC, controls on/off electric heat control
Right/Left hand universal orientation
Duct temperature sensor -factory mounted
Disconnect switch
208 volt, 3 phase
Electric heater kW - 2.5
Stage -1
Magnetic contactors - 24 volt

Item: A8 Qty: 1 Tag(s): VAV 1-8

Single duct with electric heat
14" inlet size, 3000 cfm (356mm inlet, 1416 l/s)
DDC, controls on/off electric heat control
Right/Left hand universal orientation
Duct temperature sensor -factory mounted

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Disconnect switch
208 volt, 3 phase
Electric heater kW - 9.0
Stages - 3 - equal
Magnetic contactors - 24 volt

Item: A10, A11, A22, A23 Qty: 4 Tag(s): VAV 1-10, VAV 1-11, VAV 2-11, VAV 2-12

Single duct with electric heat
6" inlet size, 500 cfm (152mm inlet, 236 l/s)
DDC, controls on/off electric heat control
Right/Left hand universal orientation
Duct temperature sensor -factory mounted
Disconnect switch
208 volt, 3 phase
Electric heater kW - 1.0
Stage -1
Magnetic contactors - 24 volt

Item: A15 Qty: 1 Tag(s): VAV 2-4

Single duct with electric heat
8" inlet size, 900 cfm (203mm inlet, 425 l/s)
DDC, controls on/off electric heat control
Right/Left hand universal orientation
Duct temperature sensor -factory mounted
Disconnect switch
208 volt, 3 phase
Electric heater kW - 2.0
Stage -1
Magnetic contactors - 24 volt

Item: A24 Qty: 1 Tag(s): VAV 2-13

Single duct with electric heat
6" inlet size, 500 cfm (152mm inlet, 236 l/s)
DDC, controls on/off electric heat control
Right/Left hand universal orientation
Duct temperature sensor -factory mounted
Disconnect switch
208 volt, 3 phase
Electric heater kW - 2.0
Stage -1
Magnetic contactors - 24 volt

Item: A32, A37, A41 Qty: 3 Tag(s): VAV 4-8, VAV 5-5 , VAV 6-1

Single duct cooling only terminal
10" inlet size, 1400 cfm (254mm inlet, 661 l/s)
DDC without remote heat - cooling only
Left hand &/or same side connection (control &/or hot water coil)

RESURGAM CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Performance Data - Variable Air Volume Single Duct Terminal Units

Tags	VAV 1-1, VAV 6-2 , VAV 6-4	VAV 1-2, VAV 2-6	VAV 1-3	VAV 1-4	VAV 1-5	VA VA VA
Design cooling airflow (cfm)	400	500	830	1000	1150	35
Min cooling airflow (cfm)	100	125	210	250	300	100
Valve heating airflow (cfm)	100	125	450	500	600	100
Cooling inlet diameter	6"	8"	10"	10"	10"	6"
Cooling inlet velocity (ft/min)	2037	1432	1522	1833	2108	1783
APD @ cooling airflow (in H2O)	0.139	0.025	0.020	0.029	0.037	0.105
Full load amps (A)	-	-	9.72	9.72	11.10	-
Min circuit ampacity (A)	-	-	12.14	12.14	13.88	-
Max fuse size (A)	-	-	15.00	15.00	15.00	-
Operating weight (lb)	-	-	46.0	46.0	46.0	-
Coil heating capacity (MBh)	-	-	11.95	11.95	13.66	-
Primary EDB (F)	55.00	55.00	68.00	68.00	68.00	55.00
Unit LAT (F)	55.00	55.00	92.48	90.03	88.98	55.00
Electric heat kW (kW)	0.00	0.00	3.50	3.50	4.00	0.00

Tags	VAV 1-7	VAV 1-8	VAV 1-9	VAV 1-10	VAV 1-11	VAV 2-1
Design cooling airflow (cfm)	650	2050	265	250	140	1100
Min cooling airflow (cfm)	165	600	75	75	75	300
Valve heating airflow (cfm)	325	1200	75	150	90	600
Cooling inlet diameter	8"	14"	6"	6"	6"	10"
Cooling inlet velocity (ft/min)	1862	1918	1350	1273	713	2017
APD @ cooling airflow (in H2O)	0.060	0.010	0.058	0.055	0.016	0.034
Full load amps (A)	6.94	24.98	-	2.78	2.78	11.10
Min circuit ampacity (A)	8.67	31.23	-	3.47	3.47	13.88
Max fuse size (A)	15.00	35.00	-	15.00	15.00	15.00
Operating weight (lb)	38.0	60.0	-	38.0	38.0	46.0
Coil heating capacity (MBh)	8.54	30.74	-	3.41	3.41	13.66
Primary EDB (F)	68.00	68.00	55.00	68.00	68.00	68.00
Unit LAT (F)	92.21	91.61	55.00	88.98	102.97	88.98
Electric heat kW (kW)	2.50	9.00	0.00	1.00	1.00	4.00

Tags	VAV 2-2	VAV 2-3	VAV 2-4	VAV 2-7, VAV 5-1, VAV 5-2	VAV 2-8, VAV 2-9	VAV 2-10, VAV 4-1, VAV 4-2
Design cooling airflow (cfm)	965	950	500	800	275	600
Min cooling airflow (cfm)	250	250	150	200	75	150
Valve heating airflow (cfm)	482	475	300	200	75	150
Cooling inlet diameter	10"	10"	8"	8"	6"	8"
Cooling inlet velocity (ft/min)	1769	1742	1432	2292	1401	1719
APD @ cooling airflow (in H2O)	0.027	0.026	0.036	0.066	0.063	0.036
Full load amps (A)	9.72	9.72	5.55	-	-	-
Min circuit ampacity (A)	12.14	12.14	6.94	-	-	-
Max fuse size (A)	15.00	15.00	15.00	-	-	-
Operating weight (lb)	46.0	46.0	38.0	-	-	-
Coil heating capacity (MBh)	11.95	11.95	6.83	-	-	-
Primary EDB (F)	68.00	68.00	68.00	55.00	55.00	55.00
Unit LAT (F)	90.85	91.19	88.98	55.00	55.00	55.00
Electric heat kW (kW)	3.50	3.50	2.00	0.00	0.00	0.00

CITY OF PORTLAND, MAINE RESURGAM
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Tags	VAV 2-11	VAV 2-12	VAV 2-13	VAV 4-3	VAV 4-4	VAV
Design cooling airflow (cfm)	185	280	400	560	415	420
Min cooling airflow (cfm)	75	75	100	150	150	150
Valve heating airflow (cfm)	105	160	250	150	150	150
Cooling inlet diameter	6"	6"	6"	8"	6"	6"
Cooling inlet velocity (ft/min)	942	1426	2037	1604	2114	2139
APD @ cooling airflow (in H2O)	0.029	0.069	0.144	0.032	0.150	0.154
Full load amps (A)	2.78	2.78	5.55	-	-	-
Min circuit ampacity (A)	3.47	3.47	6.94	-	-	-
Max fuse size (A)	15.00	15.00	15.00	-	-	-
Operating weight (lb)	38.0	38.0	38.0	-	-	-
Coil heating capacity (MBh)	3.41	3.41	6.83	-	-	-
Primary EDB (F)	68.00	68.00	68.00	55.00	55.00	55.00
Unit LAT (F)	97.97	87.67	93.18	55.00	55.00	55.00
Electric heat kW (kW)	1.00	1.00	2.00	0.00	0.00	0.00

Tags	VAV 4-6	VAV 4-7	VAV 4-8	VAV 5-3, VAV 5-7	VAV 5-5	VAV 5-6
Design cooling airflow (cfm)	480	530	1200	650	830	380
Min cooling airflow (cfm)	150	150	300	150	200	100
Valve heating airflow (cfm)	150	150	300	150	200	100
Cooling inlet diameter	8"	8"	10"	8"	10"	6"
Cooling inlet velocity (ft/min)	1375	1518	2200	1862	1522	1935
Primary EDB (F)	55.00	55.00	55.00	55.00	55.00	55.00
Unit LAT (F)	55.00	55.00	55.00	55.00	55.00	55.00
Electric heat kW (kW)	0.00	0.00	0.00	0.00	0.00	0.00

Tags	VAV 5-8	VAV 6-1	VAV 6-3	VAV 6-5
Design cooling airflow (cfm)	750	1150	520	260
Min cooling airflow (cfm)	175	300	125	75
Valve heating airflow (cfm)	175	300	125	75
Cooling inlet diameter	8"	10"	8"	6"
Cooling inlet velocity (ft/min)	2149	2108	1490	1324
Primary EDB (F)	55.00	55.00	55.00	55.00
Unit LAT (F)	55.00	55.00	55.00	55.00
Electric heat kW (kW)	0.00	0.00	0.00	0.00

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Mechanical Specifications - Variable Air Volume Single Duct Terminal Units
Item: A1 - A45 Qty: 45 Tag(s): VAV 1-1, VAV 1-2, VAV 1-3, VAV 1-4, VAV 1-5, VAV 1-6, VAV 1-7, VAV 1-9, VAV 1-10, VAV 1-11, VAV 2-1, VAV 2-2, VAV 2-3, VAV 2-4, VAV 2-5, VAV 2-6, VAV 2-7, VAV 2-8, VAV 2-10, VAV 2-11, VAV 2-12, VAV 2-13, VAV 4-1, VAV 4-2, VAV 4-3, VAV 4-4, VAV 4-5, VAV 4-6, VAV 4-8, VAV 5-1, VAV 5-2, VAV 5-3, VAV 5-4 , VAV 5-5 , VAV 5-6 , VAV 5-7, VAV 5-8, VAV 6-1, VAV VAV 6-3 , VAV 6-4 , VAV 6-5

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 - 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.

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.

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

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

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 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

D.D.C. Actuator
Trane 3 wire, 26 GA, 3.4 VA, 1.7W, 24 VAC, 50/60 Hz. with floating point 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 when Trane controls are not provided. An integral 3 screw terminal is provided for field wiring. Operating temperature 32.0 F to 125.0 F.

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

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Current zone temperature
Reheat status (on/off)
Fan status (on/off)
Calibration status (calibrating/not calibrating)

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 & 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.

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 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.

DDC Controls Option DD01, DD11, DD41 & DD71
Basic Operation: Cooling Only Control (No Remote Heat) (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.

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: A1, A6, A9, A16, A19, A20, A28, A29, A36, A38, A42, A44, A45 Qty: 13 Tag(s): VAV 1-1, VAV 1 VAV 1-9, VAV 2-5, VAV 2-8, VAV 2-9, VAV 4-4, VAV 4-5, VAV 5-4 , VAV 5-6 , VAV 6-2 , VAV 6-4 VAV 6-5

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

TOP VIEW

Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet standard.
3. Minimum of 1.5 duct diameters of straight duct required at inlet for proper flow reading.
4. Allow 36" on control side for servicing.
5. Unit is field-convertible from a left-hand connection (shown) to a right-hand by rotating unit.

Approximate Dry Weight	16.0 lb

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

BACK VIEW

Unit Dimensions - Variable Air Volume Single Duct Terminal Units

Item: A2, A17, A18, A21, A25 - A27, A30, A31, A33 - A35, A39, A40, A43 Qty: 15 Tag(s): VAV 1-2, VA VAV 2-7, VAV 2-10, VAV 4-1, VAV 4-2, VAV 4-3, VAV 4-6, VAV 4-7, VAV 5-1, VAV 5-2, VAV 5-3, VAV 5- VAV 5-8, VAV 6-3

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

TOP VIEW

BACK VIEW

Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet standard.
3. Minimum of 1.5 duct diameters of straight duct required at inlet for proper flow reading.
4. Allow 36" on control side for servicing.
5. Unit is field-convertible from a left-hand connection (shown) to a right-hand by rotating unit.

Approximate Dry Weight	16.0 lb

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

Unit Dimensions - Variable Air Volume Single Duct Terminal Units

Item: A3 - A5, A12 - A14 Qty: 6 Tag(s): VAV 1-3, VAV 1-4, VAV 1-5, VAV 2-1, VAV 2-2, VAV 2-3

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

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	46.0 lb

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

Unit Dimensions - Variable Air Volume Single Duct Terminal Units
Item: A7, A15 Qty: 2 Tag(s): VAV 1-7, VAV 2-4

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

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

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

Unit Dimensions - Variable Air Volume Single Duct Terminal Units

Item: A8 Qty: 1 Tag(s): VAV 1-8

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

TOP VIEW

BACK 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

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: A10, A11, A22 - A24 Qty: 5 Tag(s): VAV 1-10, VAV 1-11, VAV 2-11, VAV 2-12, VAV 2-13

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

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

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

Unit Dimensions - Variable Air Volume Single Duct Terminal Units
Item: A32, A37, A41 Qty: 3 Tag(s): VAV 4-8, VAV 5-5 , VAV 6-1

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

TOP VIEW

BACK VIEW

Customer Notes

1. Air Inlet is centered in unit front panel.
2. Slip & Drive discharge outlet standard.
3. Minimum of 1.5 duct diameters of straight duct required at inlet for proper flow reading.
4. Allow 36" on control side for servicing.
5. Unit is field-convertible from a left-hand connection (shown) to a right-hand by rotating unit.

Approximate Dry Weight	22.0 lb

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

Accessory - Variable Air Volume Single Duct Terminal Units

Item: A1 - A45 Qty: 45 Tag(s): VAV 1-1, VAV 1-2, VAV 1-3, VAV 1-4, VAV 1-5, VAV 1-6, VAV 1-7, VAV VAV 1-9, VAV 1-10, VAV 1-11, VAV 2-1, VAV 2-2, VAV 2-3, VAV 2-4, VAV 2-5, VAV 2-6, VAV 2-7, VAV 2 VAV 2-9, VAV 2-10, VAV 2-11, VAV 2-12, VAV 2-13, VAV 4-1, VAV 4-2, VAV 4-3, VAV 4-4, VAV 4-5, VAV VAV 4-7, VAV 4-8, VAV 5-1, VAV 5-2, VAV 5-3, VAV 5-4 , VAV 5-5 , VAV 5-6 , VAV 5-7, VAV 5-8

CITY OF PORTLAND, MAINE RESURGAM
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Customer Notes:

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

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Field Wiring - Variable Air Volume Single Duct Terminal Units

Item: A1, A2, A6, A9, A16 - A21, A25 - A45 Qty: 31 Tag(s): VAV 1-1, VAV 1-2, VAV 1-6, VAV 1-9, VAV
VAV 2-6, VAV 2-7, VAV 2-8, VAV 2-9, VAV 2-10, VAV 4-1, VAV 4-2, VAV 4-3, VAV 4-4, VAV 4-5, VAV 4-
VAV 4-7, VAV 4-8, VAV 5-1, VAV 5-2, VAV 5-3, VAV 5-4 , VAV 5-5 , VAV 5-6 , VAV 5-7, VAV 5-8
VAV 6-1, VAV 6-2 , VAV 6-3 , VAV 6-4 , VAV 6-5

⚠ 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: A3 - A5, A7, A8, A10 - A15, A22 - A24 Qty: 14 Tag(s): VAV 1-3, VAV 1-4, VAV 1-5, VAV 1-7, VA VAV 1-10, VAV 1-11, VAV 2-1, VAV 2-2, VAV 2-3, VAV 2-4, VAV 2-11, VAV 2-12, VAV 2-13

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

⚠ 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: A3 - A5, A7, A8, A10 - A15, A22 - A24 Qty: 14 Tag(s): VAV 1-3, VAV 1-4, VAV 1-5, VAV 1-7, VA VAV 1-10, VAV 1-11, VAV 2-1, VAV 2-2, VAV 2-3, VAV 2-4, VAV 2-11, VAV 2-12, VAV 2-13

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Tag Data - Variable Air Volume Changeover/Bypass Units (Qty: 5)

Item	Tag(s)	Qty	Description	Model Number
B1	No Tag	1	14" VAV Changeover/Bypass	VADB14
B2	No Tag	2	16" VAV Changeover/Bypass	VADB16
B3	No Tag	2	20" VAV Changeover/Bypass	VARA20

Product Data - Variable Air Volume Changeover/Bypass Units

All Units

Bypass
1 Communicating sensor/bypass control (Fld)

Item: B1 Qty: 1

Varitrac damper
14" [356 mm] round damper

Item: B2 Qty: 2

Varitrac damper
16" [406 mm] round damper

Item: B3 Qty: 2

Rectangular damper
20 x 20 rectangular bypass damper

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Mechanical Specifications - Variable Air Volume Changeover/Bypass Units
Item: B1 - B3 Qty: 5

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.

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 - 2020
5000.0 cfm, 20" x 20" rectangular bypass damper with 4 opposing blades.

Damper - 16
2000.0 cfm, 16" damper.

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

Damper - 14
1600.0 cfm, 14" damper.

Unit Dimensions - Variable Air Volume Changeover/Bypass Units
Item: B1 Qty: 1

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

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: 2

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Approximate Dry Weight	11.0 lb

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

Unit Dimensions - Variable Air Volume Changeover/Bypass Units
Item: B3 Qty: 2

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

ACTUATOR DIMENSIONS

TOP VIEW

Wiring	Actuator	CCP
Black	CW	Close
White	COM	Com
White	CCW	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 Gauge Rolled Steel, Zinc Plated
Damper Shaft	1/2" Diameter Steel, Zinc Plated
Shroud	22 Gauge Galvanized Steel
Bearings	Self-lubricating Nylon
Cable	10.00 ft [3048 mm]
Weight	16.0 lb

Accessory - Variable Air Volume Changeover/Bypass Units
Item: B1 - B3 Qty: 5

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

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, B2 Qty: 3

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Field Wiring - Variable Air Volume Changeover/Bypass Units
Item: B1 - B3 Qty: 5

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

⚠ 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.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Field Wiring - Variable Air Volume Changeover/Bypass Units
Item: B3 Qty: 2

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Tag Data - VAV Changeover/Bypass-System Controllers (Qty: 5)

Item	Tag(s)	Qty	Description
C1	No Tag	5	CCP Controllers

Product Data - VAV Changeover/Bypass-System Controllers

Item: C1 Qty: 5

1 X13650941010 - CCP w/o Oper Display

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Mechanical Specifications - VAV Changeover/Bypass-System Controllers
Item: C1 Qty: 5

CCP-III W/O LCD

Program options:
Each central control panel is individually configurable as either an air conditioner controller or heat pump controller for a VariTrac system.

Outputs:
Binary outputs- optional relay board contacts rated at (1 A, 30VAC, 24 VA pilot duty), bypass damper control outputs (1A, 24 VAC).

Inputs:
Binary inputs are provided for occupied/unoccupied, auto/manual changeover, and manual heat/cool mode. Each binary input requires, should the function be desired, an isolated, ungrounded, remote contact. The contacts must be capable of passing 12 mA of current.

Velocity/static sensor input:
When used as a velocity sensor the input uses a self-calibrated velocity sensor for measuring the air handling unit discharge air velocity. The velocity sensor input is used for controlling the bypass damper. The velocity sensor input requires 3 conductor twisted shielded wire. Terminations are screw terminals. When used as static, the sensor will sense an increase in static as the zone damper closes down and will open the bypass damper to maintain the field desired static setpoint.

Supply air temperature sensor input:
The supply air temperature sensor monitors the air handling unit discharge air temperature, and is used by the central control panel to protect the air-handling unit from excessively high or low discharge air temperatures. The leaving air temperature sensor requires twisted, shielded pair wiring. Terminations are screw terminals.

Dimensions:
9 13/16 inches (250mm) high, 12 inches (305mm) wide, 2 13/16 inches (71mm) deep in a plastic enclosure.

Power:
20 to 30 VAC, 30 VA, 20 watts dedicated external transformer required.

Operating Temperature Range:
32-120F (2-49C)

Operating Humidity Range:
10-90% non-condensing

Functions

System control:
The central control panel scans the VariTrac unit control modules to determine the deviations from temperature setpoint, time of deviation, time from last changeover and number of unit control modules requiring heating or cooling. Based upon this information, the system heat/cool mode and stage of capacity are selected. The central control panel also monitors the system air temperature to ensure that high and low temperature limits are not violated.

System temperature control is accomplished by switching relays to sequence either the heat pump or air conditioning unit; alternatively, system temperature control may be accomplished through a communications link when a Voyager or other Reliatel control equipped unit is used.

The central control panel also controls system static air pressure or air velocity (depending on configuration) to the design point by opening and closing the bypass damper.

The systems sixth binary output can be configured to disable outside air
ventilation during the unoccupied mode, reflect the system heat/cool status, or be controlled by an ICS system.

Control options:

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

The following control options are selectable at the central control panel:

Energy saver mode:
Energy saver mode releases all VariTrac dampers from their minimum position settings when the system is operation, allowing zone dampers receiving undesirable supply air temperature to completely shut off there preventing the overheating or overcooling of the space.

Ventilation mode:
Ventilation mode allows enhanced ventilation by driving all zone dampers to four times their cooling minimum, limited by their maximum position when the system air handler is operating in a fan only mode.

Priority shutdown:
The central control panel will go into priority shutdown when the supply air temperature sensor fails, when communication to the communicating sensor/bypass control is lost or when contacts connected to the priority shutdown binary input are closed.

Air conditioning unit control:
When configured as a 2 heat/2 cool controller, the binary outputs are designated as follows:
1. Fan
2. Cool 1
3. Cool 2
4. Heat 1
5. Heat 2
6. Outside air, heat/cool, or ICS

Grouping:
Groups can provide greater flexibility for multiple tenant buildings. The central control panel can have up to four groups of zones. Overrides may be applied to groups.

Field Wiring - VAV Changeover/Bypass-System Controllers
Item: C1 Qty: 5

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

⚠ WARNING	⚠ AVERTISSEMENT	⚠ CAUTION
HAZARDOUS VOLTAGE! DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING. FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.	VOLTAGE HASARDEUX! DECONNECTEZ TOUTES LES SOURCES ELECTRIQUES INCLUANT LES DISJONCTEURS SITUES A DISTANCE AVANT D'EFFECTUER L'ENTRETIEN. FAUTE DE DECONNECTER LA SOURCE ELECTRIQUE AVANT D'EFFECTUER L'ENTRETIEN PEUT ENTRAINER DES BLESSURES CORPORELLES SEVERES OU LA MORT.	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: All customer wiring must be in accordance with national, state, and local electrical codes.
Note 2: Trane requires a dedicated transformer for 24 Vac power.
Note 3: Do not apply voltage to the priority shutdown or unoccupy.
Note 4: See product literature for Comm5 wire connection details.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Tag Data - Light Commercial Unitary System Panels (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
D1	No Tag	1	Tracker Panels	BMTK000ABB0110

Product Data - Light Commercial Unitary System Panels

Item: D1 Qty: 1

Standard Ship Cycle = Production Shipping Cycle
BMTK Tracker Bldg Mgmt Panel (Digit 1-4)
Power Requirements (Digits 5-8)
Ethernet and Modem
Model 12
Operator Display

Mechanical Specifications - Light Commercial Unitary System Panels
Item: D1 Qty: 1

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Tracker12, Tracker 24 Mechanical Specs

Simple Building Control
The Tracker Version 12 building automation system (BAS) is a heating, ventilating, and air conditioning (HVAC) energy management system for small- to medium-size buildings. It provides reliable, centralized control for HVAC equipment, managing it for optimal comfort and efficiency.
The Tracker BAS includes a controller with a liquid crystal display (LCD) touch screen. The Tracker BAS also includes optional Windows-based software that can be installed on a PC workstation.
The Tracker BAS is LonMark® compliant. It communicates with supported devices over a Trane Comm5 link. The Trane Comm5 link is a communication link that implements LonTalk and a LonTalk FTT-10A network. LonTalk is an open, industry-standard protocol.

Remote Communications
Modem - Both the controller and the PC (in its recommended hardware configuration) provide a modem. The modem enables off-site connections over standard phone lines. It enables remote operation of the Tracker BAS and provides the means to deliver alarms and messages to the workstation PC, email address, and pagers.

Ethernet LAN - Both the controller and typical PC are available with an Ethernet card option. This option allows the Tracker panel and PC workstation running Tracker PC Software to reside on an existing LAN (supplied by others). The panel and software allow for a static or DHCP IP address.

Both the touch screen and the PC provide an easy-to-use visual interface. The interfaces enable an operator to set up and change HVAC operating parameters and collect and display building information.

The Tracker BAS is a reliable and easy-to-install, operate, and service
building management system. It simplifies the work of the building operator and the installing contractor

System components
Currently, all equipment that makes up a comprehensive Tracker system is available from Trane. In addition to a Tracker BAS, a Tracker system can include the following Trane HVAC components:
· Trane Voyager constant-volume rooftop units (RTUs)
· Trane Precedent constant-volume RTUs with ReliaTel controls
· Trane VariTrac central control panels (CCPs)
· Trane Voyager III variable air volume (VAV) RTU (with CCP)
· Trane Tracer ZN517 unitary controllers - used to control and incorporate non-Trane equipment into the system
· Trane Tracer MP503 I/O modules
.
The Tracer MP503 I/O modules in a Tracker system are used to monitor and
control building equipment such as lights, exhaust fans, ventilation fans, and humidity control equipment
The components of the Tracker network are connected in a daisy chain or star configuration.

Features
Both the controller and the PC software of the Tracker BAS offer these features:
· Intuitive LCD touch screen user interface
· 365-day scheduling and 10 schedules
· Capability of including all equipment and devices in one schedule
· Temporary schedule override
· Easy-to-administer security system with two levels of access
· Automatic daylight savings time changeover
· Error and alarm messaging
· Setpoint viewing and editing
· Auto configuration
. Alarm log
. Global PC workstation software Alarm log - accepting remote alarms from capable panels.
. Trending of any point available in the system, 10 trends with up to 64 samples each
. Optimal start to insure space is to desired temperature at occupied time

. Reports are available to review and print. Standard reports include timed-override usage and energy reports Timed override will calculate the actual minutes per month of timed-override use; energy report which will indicate today's,

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

yesterdays, this month, last month, this years, and last years energy usage

Features exclusive to the controller
· Auto-configuration
· Pager notification for error and alarm messages
· LCD touch screen

Features exclusive to the PC software
· Dial-in connection
· Backup and restore capability
· Standard graphics and HTML graphical interface
· Binary output programming capability
· Operator-defined custom alarms capability
· Printer support
. Setting up and viewing trends and reports
Note: The Tracker PC software is not needed to set up and operate a typical building.

The Tracker is available in several models. Each model is distinguished by it's approvals and by the number and type of devices that it can communicate with and control.

Auto-configuration
Auto-configuration
When Trane Comm5 devices are used as a system and power is applied to the controller, the Tracker BAS automatically configures itself. It is no longer necessary to program the building management system. During auto configuration, the controller:
· Discovers all devices on the communication link
· Loads all devices into a non-erasable memory database
· Turns to On or Occupied all discovered HVAC equipment except the binary output relays of the Tracer MP503 I/O module, which remain de-energized (Off)
After auto configuration, the building is under the control of the Tracker controller and its factory defaults. At this point, the controller can run the building with no further involvement of personnel. The installer or operator can choose, now or later, to replace the device IDs (Neuron IDs set at the factory) with descriptive names and provide a building schedule.

Models/Capacities

Tracker 12:
12 SCC (Space Comfort Controllers as defined by LonMark) + 5 CCP (VariTrac Central Control Panels) + 4 MP503 (Input/Output Modules).

Tracer ZN517 unitary controller
The Tracer ZN517 unitary controller is a standalone HVAC controller. When connected to a Tracker controller, the Tracer ZN517 unitary controller becomes a communicating LonMark®-compliant device with an SCC profile. The Tracker controller, through the Tracer ZN517, can then communicate with and control the equipment.

Devices controlled by the Tracer ZN517 unitary controller include electro-mechanically controlled 2H/2C or 4C rooftop units, heat pumps, and split systems. The Tracer ZN517 controls temperature and other comfort-related conditions. Connecting a Tracker controller to it enables an operator to schedule, route alarms, and monitor the entire system.

Tracer ZN517 unitary controller I/O capacities

Binary inputs
- Enable/Disable or Occupancy
- Status: Fan or Generic

Analog Inputs
· Space Temperature
· Setpoint input
· Discharge air temperature
· Universal input (thermistor, 4-20mA)
· Outdoor air temperature

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Binary outputs
· Supply fan
· Cool 1/Compressor 1
· Cool 2/Compressor 2
· Heat 1/Reversing Valve/Cool3
· Heat 2/Auxiliary Heat/Cool 4
· Exhaust Fan/Generic/Occupancy
· Economizer Open/Close

Tracer ZN517 Features
· Minimum on/off timer: to protect equipment from duty cycling
· Fan status: to protect equipment from overheating
· Economizing
· Timed override
· Manual output test button
· Filter maintenance alarm: when used with a Tracker
· Discharge air tempering
· Demand control ventilation using CO2

Note: Each output is rated for a maximum of 1 Amp at 24 Vac. One normally open (Form A) relay contact will be provided. 24 Vac will be wired in common to one side of all relay contacts.

Tracer MP503 I/O module
The Tracer MP503 input/output module accepts electrical signals from a variety of sensors. It also controls the state of binary outputs by energizing and de-energizing relays. Changing the state of a relay enables the I/O module to turn a device on or off.

Using the Tracker PC software, the binary outputs can be programmed to energize and de-energize the relays in response to system conditions and schedules.
The module has universal inputs that can receive and interpret binary (on/off), and analog (range) values. Connecting to the module enables the Tracker controller to monitor Trane temperature, relative humidity (RH), and CO2 sensors.

Tracer MP503 I/O module I/O capacities

Universal inputs (4)
- Thermistor (10K W at 77°F [25°C])
- Trane CO2 sensor (0 to 10 Vdc)
- Trane relative humidity (RH) sensor (4 to 20 mA)
- Binary input

Binary outputs (4)
· Each output is rated for a maximum of 1 Amp at 24 Vac. One normally open (Form A) relay contact will be provided. 24 Vac will be wired in common to one side of all relay contacts

ZN524 input/output capabilities

Analog inputs
- Zone temperature
- Entering or leaving water temperature
- Discharge air temperature
- Zone temperature setpoint
- Fan mode switch
- Outside air temperature
- Relative Humidity

Binary inputs
- Occupancy
- Condensate overflow
- Fan status
- Low water temperature
- Low pressure protection
- High pressure protection

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Binary outputs
- Compressor 1
- Compressor 2
- Isolation valve 1 and 2
- Outside air damper (2-position)
- Reversing valve
- Fan on/off
- Electric Heat
- Reheat

Communication
The Tracker (BMTK) controller is a Comm5 device. Comm5 is the fifth generation Trane communication architecture. It implements LonTalk, an open, industry-standard protocol.
The RTUs, CCPs, unitary controllers, and I/O controllers that the Tracker controller communicates with reside on a LonTalk FTT-10A network. They provide data using LonMark® standard network variable types (SNVTs, pronounced Sniv-its) and configuration properties.
The HVAC equipment controllers employ SCC profiles, as defined by LonMark® Interoperability Association. Ancillary sensors (such as temperature and humidity sensors) that are hard-wired to the terminals on the Tracker, CCP, and I/O module are standard resistive type sensors and do not communicate using LonTalk. They only provide analog or binary inputs and outputs.

LonTalk devices from other manufacturers will be tested for compatibility
with the Tracker BAS. Devices that are compatible will be approved for inclusion in the Tracker system.

Necessary support documentation for approved devices will be released, when completed.
The Tracker controller is designed for easy installation. Its 3-module assembly enables the termination module to be mounted on a wall, and the main module and display module to be stored for their protection until the site is ready for the controller to be fully assembled.

3-module definition
The termination module contains the termination board, which accepts all electrical connections for the controller.
The main module contains the main logic board.
The display module contains the touch screen, which enables the operator to interact with the controller.

Connect the PC workstation
If the site requires the optional PC software, the installer connects the RJ-11 (modem connection) or RJ-12 (direct connection) cable to the appropriate connector on the underside of the controller.
Install the optional PC software
To install the optional PC software, the installer inserts the Tracker CD into the PC CD-ROM drive and follows the self-prompting installation wizard.

An operator can set up and change HVAC operating parameters and collect and display building information at either the Tracker controller or the PC workstation. Each location provides access to an easy-to-use user interface.
Tracker controller operation

LCD touch screen
The LCD touch screen, combined with an intuitive menu-driven user interface, provides access to the Tracker system from the controller.

The Tracker BAS goes well beyond accurate temperature control. It provides centralized scheduling and control for multiple RTUs and split systems. It provides multiple-zone control when paired with a VariTrac system. And it provides control for multiple VariTrac systems.

The Tracker BAS is capable of controlling multiple constant-volume Trane rooftop and split single-zone systems. The Trane unitary controller enables non-Trane HVAC systems to be easily integrated into the Tracker system.

The Tracker BAS communicates with the unit controllers on the Comm5
network and controls them to temperature setpoints and operating parameters determined by the operator. Once communicating, the Tracker BAS receives alarms automatically.

Connecting multiple unit controllers to the Tracker BAS enables the installer and operator to:
· Save installation time and materials costs by reducing the amount of wire used and by requiring only a thermistor in each area rather than a programmable zone sensor

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

· Schedule all devices from one location, rather than requiring that each device be scheduled independentl
· Monitor alarms from one location

Rooftop VAV and Changeover bypass operation
The Tracker BAS is capable of supervising and scheduling a VariTrac VAV system. To do this, Trane VariT changeover bypass zoning systems or VariTrac VAV Rooftop system are introduced into the Tracker system.
A Tracker controller is connected to one or more
VariTrac CCPs. Each CCP is connected to one Trane Voyager RTU.
The Tracker controller provides centralized scheduling and access to CCP alarms. Each CCP monitors its zone sensors and allows each zone to "vote" its needs, which are determined
by the schedule and its setpoints. Based on that data, the CCP sets the operating mode (heat or cool) of the HVAC equipment.
In addition, the CCP maintains a operator-defined static pressure in the ductwork by controlling a bypass damper or VAV (variable air volume) in the HVAC unit. If controlling a VAV HVAC unit the CCP will control either VFD (variable frequency drive) fans or inlet guide vanes.

Power requirements
24 Vac nominal (19-30 Vac)
50/60 Hz, 1 phase 40 VA minimum, Class 2 transformer required

Operating environment
Temperature: 32°F to 120°F (0-49°C)
Humidity: 10% to 90% relative humidity, non-condensing

Storage environment
Temperature: -40°F to 200°F (-40°C to 93°C)
Humidity: 5% to 95% relative humidity, non-condensing

Cabinet
NEMA 1 resin enclosure
Plenum rated
Mounting
Flat wall surface or with a conduit box that is either: Recessed, 2 in. × 4 in. (5 cm × 10 cm)
Recessed, 4 in. × 4 in. (10 cm × 10 cm)
Dimensions
Height: 8-3/4.in. (22.38 cm)
Width: 10-1/4 in. (26.04 cm)
Depth: 2-3/4 in. (6.99 cm)
Minimum clearances
Top: 12 in.
Bottom: 12 in.
Left: 12 in.
Right: 12 in.
Front: 36 in.
Weight
2.5 lb. (1.13 kg)

Analog input - Outside air temp.
Thermistor: 10K ohm at 77°F (25°C)
From -50°F to 200°F (-46°C to 93°C)

Binary inputs
Utility pulse meter: User-supplied dry contacts only
Tracker-supplied voltage: 12 Vdc nominal (10-14 Vdc), 12 mA nominal (10-14 mA)
Priority shutdown: User-supplied dry contacts only
Tracker-supplied voltage: 12 Vdc nominal (10-14 Vdc), 12 mA nominal (10-14 mA)

Binary output
Alarm relay: Tracker-supplied relay, Single-pole single-throw (SPST) dry contact rated at 24 Vac, 1 A maximum

Memory backup
At power loss, the Tracker controller backs up memory and stores all data for seven days; after seven days, trends and alarms are not retained

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Approvals
U.L.:Models 12, 24
FCC:Models 12, 24
C.E.:Model 12, 24

Notes:
Note 1:All customer wiring must be in accordance with national, state, and local electrical codes.
Note 2:Trane recommends a dedicated transformer for 24 Vac power.
Note 3:Alarm relay circuit must not exceed 24 Vac, 1 A.
Note 4:Do not apply voltage to the priority shutdown or meter inputs.
Note 5:See product literature for Comm5 wire connection details.

Unit Dimensions - Light Commercial Unitary System Panels
Item: D1 Qty: 1

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Unit Dimensions - Light Commercial Unitary System Panels
Item: D1 Qty: 1

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

FRONT VIEW

SIDE VIEW

FRONT VIEW MOUNTING

Field Wiring - Light Commercial Unitary System Panels
Item: D1 Qty: 1

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

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.

AVERTISSEMENT

VOLTAGE HASARDEUX!

DECONNECTEZ TOUTES LES SOURCES ELECTRIQUES INCLUANT LES DISJONCTEURS SITUES A DISTANCE AVANT D'EFFECTUER L'ENTRETIEN.

FAUTE DE DECONNECTER LA SOURCE ELECTRIQUE AVANT D'EFFECTUER L'ENTRETIEN PEUT ENTRAINER DES BLESSURES CORPORELLES SEVERES OU LA MORT.

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: All customer wiring must be in accordance with national, state, and local electrical codes.
Note 2: Trane recommends a dedicated transformer for 24 Vac power.
Note 3: Alarm relay circuit must not exceed 24 Vac, 1A.
Note 4: Do not apply voltage to the priority shutdown or meter inputs.
Note 5: See product literature for Comm5 wire connection details.

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 order numbers for each field installed option, and references it to a specific product tag. It is NOT intende bill of material for the job.

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

Product Family - Variable Air Volume Single Duct Terminal Units

Item	Tag(s)	Qty	Description	Model Number
A1	VAV 1-1	1	VCCF06	VCCF06
A2	VAV 1-2	1	Variable Air Volume Single Duct Termina	VCCF08
A3	VAV 1-3	1	VCEF10	VCEF10
A4	VAV 1-4	1	Variable Air Volume Single Duct Termina	VCEF10
A5	VAV 1-5	1	Variable Air Volume Single Duct Termina	VCEF10
A6	VAV 1-6	1	Variable Air Volume Single Duct Termina	VCCF06
A7	VAV 1-7	1	Variable Air Volume Single Duct Termina	VCEF08
A8	VAV 1-8	1	Variable Air Volume Single Duct Termina	VCEF14
A9	VAV 1-9	1	Variable Air Volume Single Duct Termina	VCCF06
A10	VAV 1-10	1	Variable Air Volume Single Duct Termina	VCEF06
A11	VAV 1-11	1	Variable Air Volume Single Duct Termina	VCEF06
A12	VAV 2-1	1	Variable Air Volume Single Duct Termina	VCEF10
A13	VAV 2-2	1	Variable Air Volume Single Duct Termina	VCEF10
A14	VAV 2-3	1	Variable Air Volume Single Duct Termina	VCEF10
A15	VAV 2-4	1	Variable Air Volume Single Duct Termina	VCEF08
A16	VAV 2-5	1	Variable Air Volume Single Duct Termina	VCCF06
A17	VAV 2-6	1	Variable Air Volume Single Duct Termina	VCCF08
A18	VAV 2-7	1	Variable Air Volume Single Duct Termina	VCCF08
A19	VAV 2-8	1	Variable Air Volume Single Duct Termina	VCCF06
A20	VAV 2-9	1	Variable Air Volume Single Duct Termina	VCCF06
A21	VAV 2-10	1	Variable Air Volume Single Duct Termina	VCCF08
A22	VAV 2-11	1	Variable Air Volume Single Duct Termina	VCEF06
A23	VAV 2-12	1	Variable Air Volume Single Duct Termina	VCEF06
A24	VAV 2-13	1	Variable Air Volume Single Duct Termina	VCEF06
A25	VAV 4-1	1	Variable Air Volume Single Duct Termina	VCCF08
A26	VAV 4-2	1	Variable Air Volume Single Duct Termina	VCCF08
A27	VAV 4-3	1	Variable Air Volume Single Duct Termina	VCCF08
A28	VAV 4-4	1	Variable Air Volume Single Duct Termina	VCCF06
A29	VAV 4-5	1	Variable Air Volume Single Duct Termina	VCCF06
A30	VAV 4-6	1	Variable Air Volume Single Duct Termina	VCCF08
A31	VAV 4-7	1	Variable Air Volume Single Duct Termina	VCCF08
A32	VAV 4-8	1	Variable Air Volume Single Duct Termina	VCCF10
A33	VAV 5-1	1	Variable Air Volume Single Duct Termina	VCCF08
A34	VAV 5-2	1	Variable Air Volume Single Duct Termina	VCCF08
A35	VAV 5-3	1	Variable Air Volume Single Duct Termina	VCCF08
A36	VAV 5-4	1	Variable Air Volume Single Duct Termina	VCCF06
A37	VAV 5-5	1	Variable Air Volume Single Duct Termina	VCCF10
A38	VAV 5-6	1	Variable Air Volume Single Duct Termina	VCCF06
A39	VAV 5-7	1	Variable Air Volume Single Duct Termina	VCCF08
A40	VAV 5-8	1	Variable Air Volume Single Duct Termina	VCCF08
A41	VAV 6-1	1	Variable Air Volume Single Duct Termina	VCCF10
A42	VAV 6-2	1	Variable Air Volume Single Duct Termina	VCCF06
A43	VAV 6-3	1	Variable Air Volume Single Duct Termina	VCCF08
A44	VAV 6-4	1	Variable Air Volume Single Duct Termina	VCCF06
A45	VAV 6-5	1	Variable Air Volume Single Duct Termina	VCCF06

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

Product Family - Variable Air Volume Changeover/Bypass Units

Item	Tag(s)	Qty	Description	Model Number
B1	No Tag	1	14" VAV Changeover/Bypass	VADB14
B2	No Tag	2	16" VAV Changeover/Bypass	VADB16
B3	No Tag	2	20" VAV Changeover/Bypass	VARA20

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/17/17

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