Operation & Maintenance Manual

Unit Ventilators

IMPORTANT: Read and save this manual for future reference.
This manual is to be left with the equipment owner

Introduction

About the Unit Ventilator

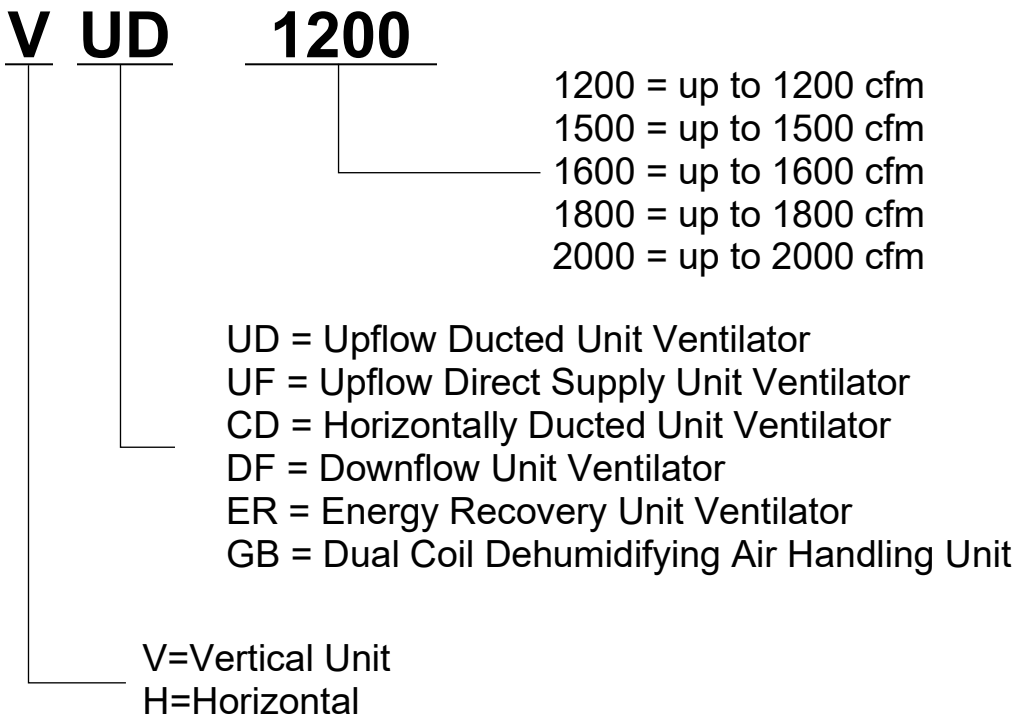
The Temspec Unit Ventilator is designed as a means for providing heating, cooling, and ventilation to the classroom. Our goal is to help create an enhanced learning environment by focusing on the following points when designing our equipment:

- Cooling, Heating, Humidity and Ventilation Control
- Air Distribution
- Sound Attenuation

By installing the Unit Ventilator into the classroom, superior control can be obtained for each room. Because the unit can be ducted, an even distribution of air can be achieved throughout the room. The Unit Ventilator is constructed with heavy gauge metal and sound absorbing insulation for optimal sound attenuation.

By applying sound engineering principles and thorough testing, we ensure the highest quality of performance of our Unit Ventilators.

Nomenclature For Non-Compressorized Unit Ventilators



Please refer the job submittals for unit specific identification and information. Contact Temspec or your local rep for more information.

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General Safety Warnings

Read the manual thoroughly before installing and using the appliance. This will ensure the best results and maximum safety.

WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.
Field wires on the line side of the disconnect located inside the unit remain live, even when the disconnect switch is off. Service and maintenance to incoming wiring cannot be performed until the main remote disconnect is turned off, locked out and tagged.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

WARNING

This appliance may contain UV-C LEDs

DO NOT OPERATE UV-C LAMPS OUTSIDE THE APPLIANCE

UV Light Hazard. Harmful to skin and eyes. Can cause temporary or permanent loss of vision. Never look at the lamp while illuminated. To prevent exposure to ultraviolet light, be sure the power is disconnected before servicing.

DO NOT touch UVC LEDs with bare hands

CAUTION

This appliance may contain an Ionizer

Ionizer generates high voltage. Make sure power is disconnected before cleaning the ionizer brush heads.

Remove any accumulated dirt on the ionizer brush heads to prevent risk of flashover or fire.

Electrical Connections

Use Copper Supply Wires Only

Use Supply Wires Suitable for 90°C

Our Unit Ventilators are available in the following voltages: 120/60~, 208/60~, 240/60~, 277/60~, 208/60 3~, 480/60 3~, 480/277/60 3N~

The electrical circuit in the Unit Ventilator is highly dependent on the controller and control sequence that is being utilized. A copy of the electrical schematic can be found folded in a pouch inside of the Unit Ventilator or in the final job submittal.
Access to power is through the top of the unit (unless ordered differently). The unit has a single point connection at the junction box (comes with disconnect switch) located inside the unit either above or below the electrical box. Junction box may be located on the rebate inside the unit if the electrical enclosure is door mounted. A circuit breaker may be used instead of the disconnect depending on the amperage.
The electrical wiring must be in accordance with the current applicable national and local codes. A qualified electrician must carry out the work. The electrical power to the unit should be disconnected by opening the remote disconnect device prior to opening the access panel. The wiring diagram shall be followed thoroughly when making connections to the unit.
A conduit is to be field installed in the unit such that hazardous voltage wiring is protected until it is terminated. In the junction box or electrical enclosure.
A local disconnect must be installed in accordance with current applicable national and local codes.

Line Voltage Connections

Connect power leads from the field disconnect to the pigtails provided and ground at the green screw located inside the electrical enclosure. See the job submittals for exact layout.
If a circuit breaker is used, terminate the field provided line leads directly at the circuit breaker. The neutral line to be terminated at the power distribution block and ground at the lug located beside the circuit breaker inside the electrical enclosure.

Type and Ratings of Fuses and Circuit Breakers

Up to 30A time delay fuses are used. Up to 3 pole 100A circuit breakers are used.

Grounding

The Unit Ventilator must be grounded for field connections wires up to #10 AWG using the green ground screw inside the junction box. If the field connection wires are larger than # 10 AWG, the grounding point is a ground lug installed in the electrical enclosure.

Low Voltage Connections

There is a sheet metal barrier between line voltage and extra low voltage circuits inside the electrical enclosure. Low voltage connections are to be made to the terminal block, or a controller mounted on the low voltage side of the electrical enclosure. The unit is equipped with 1/2-inch flex metal conduit to segregate wires entering unit. A conduit termination port is provided on the electrical enclosure.

Installation

DX Units

Pipe work

Pipework including piping material, pipe routing and installation shall include protection from physical damage in operation and service and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Codem or CSA B52. All field joints shall be accessible for inspection prior to be covered or enclosed.

After completion of field pipework, the field pipework shall be pressure tested with an inert case and then vacuum tested prior to refrigerant charge, according to the following requirements:

> The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams of refrigerant or better under a pressure of at least 0.25x the maximum allowable pressure. No leaks shall be detected.

Qualified Personnel

Any service work done on the refrigeration sections of the unit must be carried out by a qualified service person. A qualified service person is someone who has been trained on the procedures by national training organizations or manufacturers who are accredited to teach the relevant national competency standards set in legislation. Achievement should be documented by a certificate.

Clearance Requirements

The minimum clearance to combustible materials is 0” (0mm)

Vertical units can be installed touching walls or cabinets. Clearance of the unit width should be given in front of the unit to ensure proper access.

Horizontal units are hung by threaded rods which are the responsibility of the installer. If the return air is ducted, there in no minimum install height. If there is a free return, the minimum install height is 3ft (0.9m) to ensure proper airflow into the return air grille.

Any grilles, return or supply, should have a minimum of 3ft (0.9m) of clearance to ensure proper airflow.

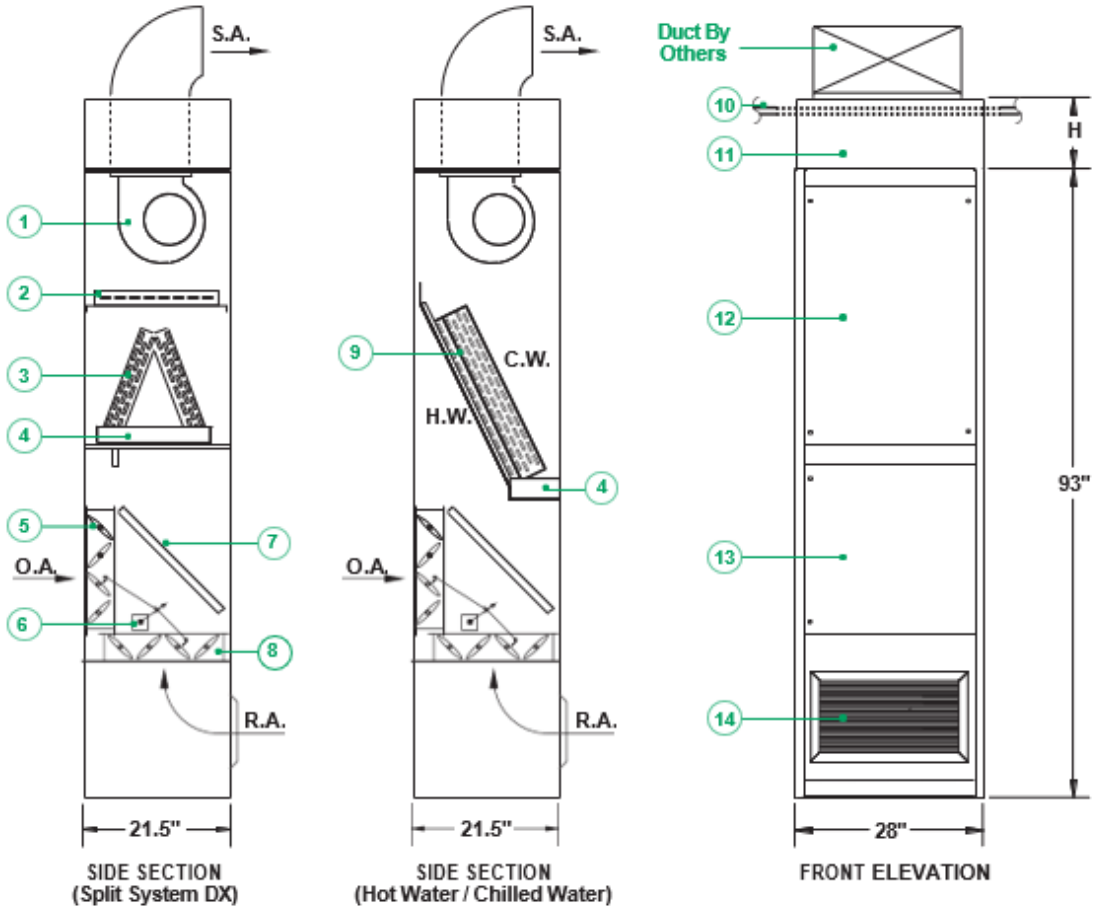
Mounting

Vertical units are to be installed on the floor. The units are stationary units. Please see the Accessories Instructions section for specific accessories.

Affixing to the floor or wall is not required by Temspec. If required for site conditions, contact a local structural engineer. Contact Temspec for unit specific Do Not Drill locations.

Typical Layouts

VUD 1200

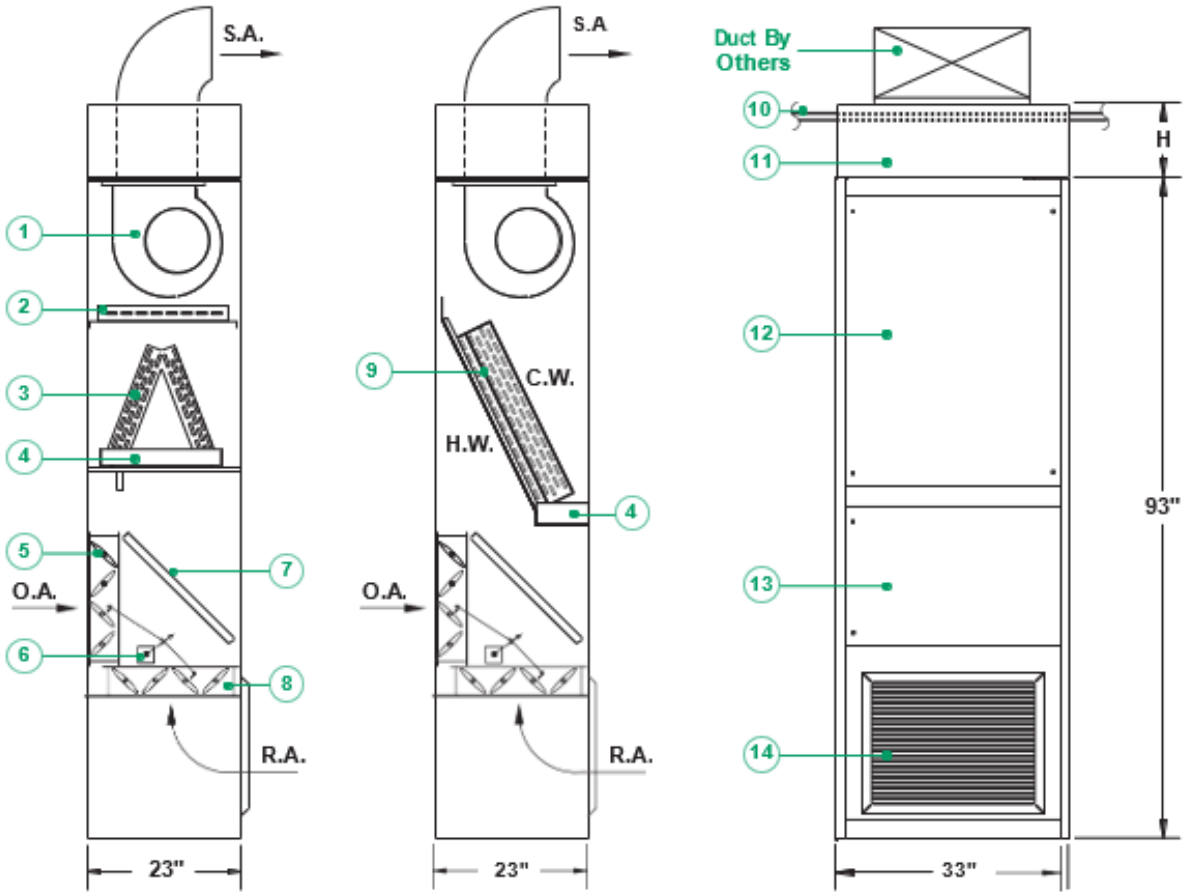


S.A. Supply Air O.A. Outdoor Air R.A. Return Air

1	Supply air fan.	8	Return air damper.
2	Hot water coil. Optional electric coil available.	9	2 pipe or 4 pipe (hot water coil can be in the reheat position).
3	DX cooling coil.	10	Ceiling tile.
4	Drain pan.	11	Top extension (optional).
5	Outdoor air damper.	12	Coil access panel.
6	Spring return mixed air damper actuator.	13	Hinged filter access panel.
7	Filters.	14	Heavy duty return air grille.

Note: The component arrangement shown above may vary slightly from that in the unit supplied.

VUD 1600

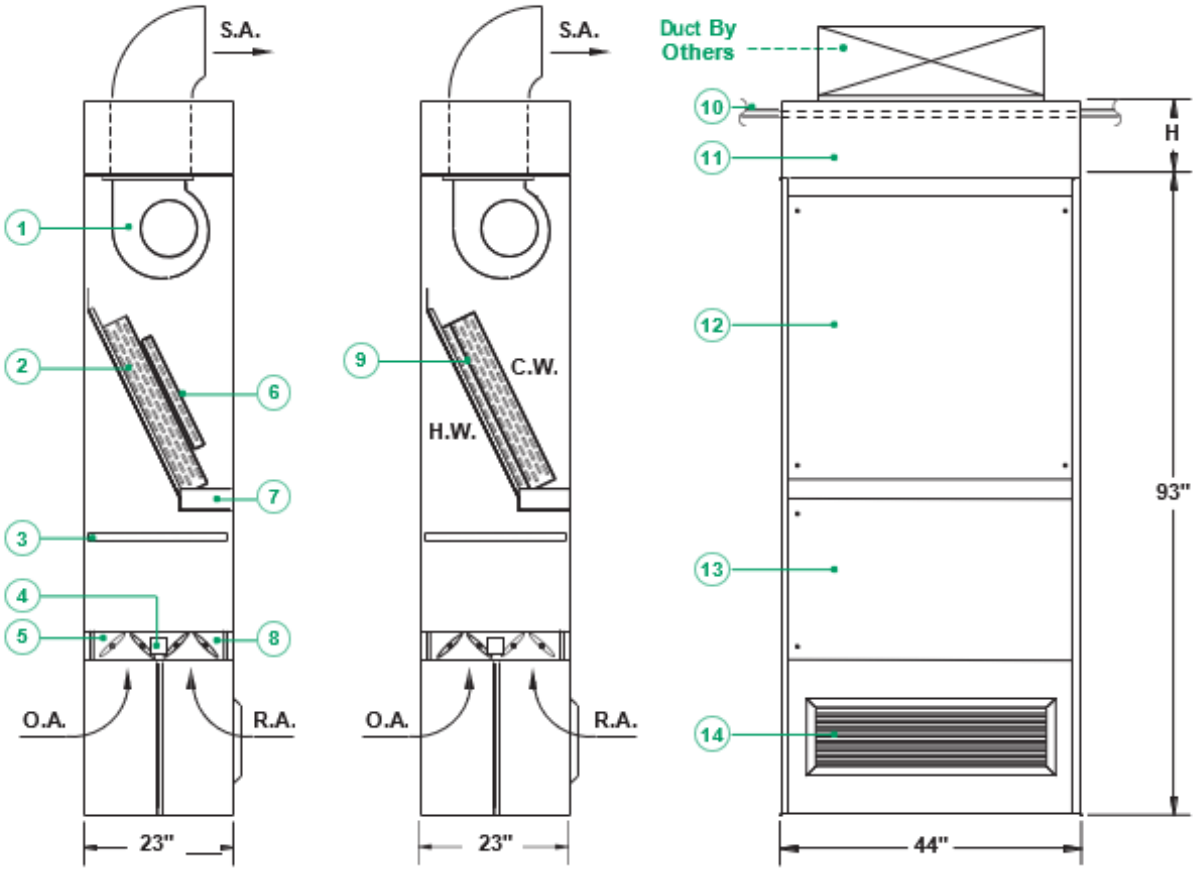


S.A. Supply Air O.A. Outdoor Air R.A. Return Air

1	Supply air fan.	8	Return air damper.
2	Hot water coil. Optional electric coil available.	9	2 pipe or 4 pipe (hot water coil can be in the reheat position).
3	DX cooling coil.	10	Ceiling tile.
4	Drain pan.	11	Top extension (optional).
5	Outdoor air damper.	12	Coil access panel.
6	Spring return mixed air damper actuator.	13	Hinged filter access panel.
7	Filters.	14	Heavy duty return air grille

Note: The component arrangement shown above may vary slightly from that in the unit supplied.

VUD 2000

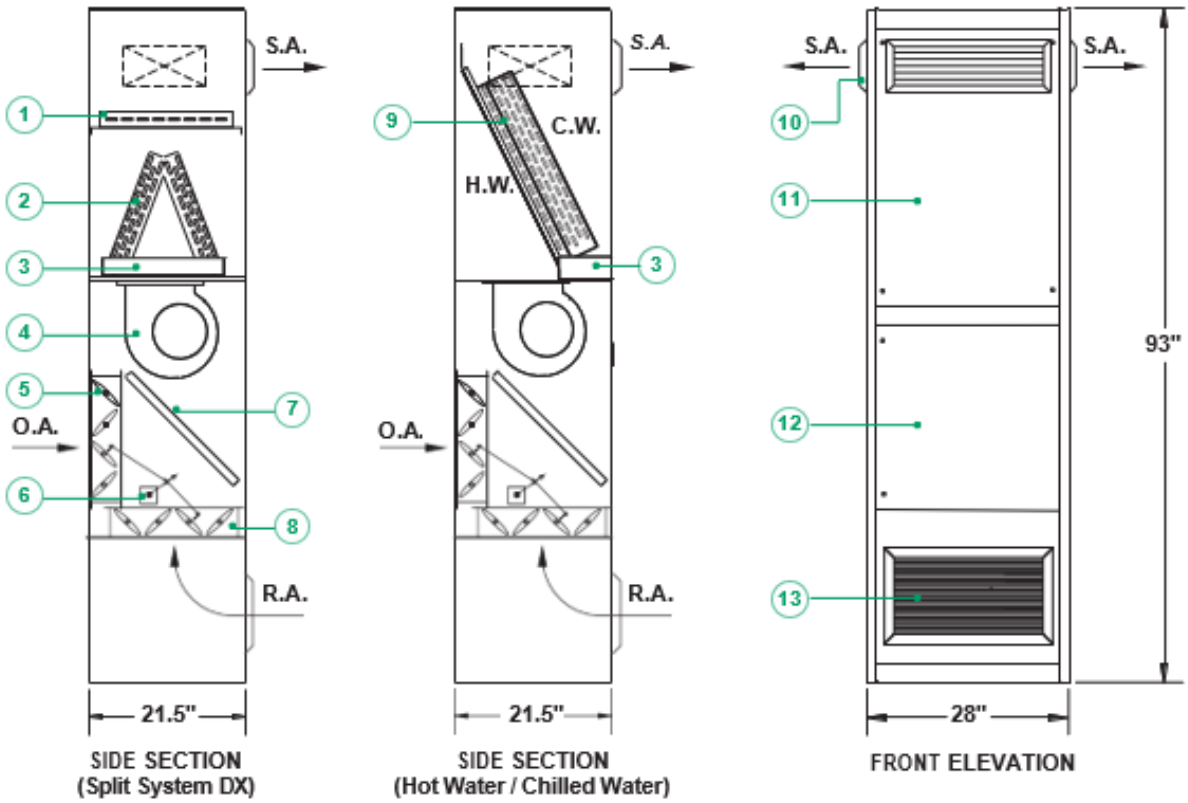


S.A. Supply Air O.A. Outdoor Air R.A. Return Air

1. Dual supply air fans.
2. DX cooling coil.
3. Filters.
4. Spring return mixed air damper actuator.
5. Outdoor air damper.
6. Hot water coil. Optional electric coil available.
7. Drain pan.
8. Return air damper.
9. 2 pipe or 4 pipe (hot water coil can be in the reheat position).
10. Ceiling tile.
11. Top extension (optional).
12. Coil access panel.
13. Hinged filter access panel.
14. Heavy duty return air grille.

Note: The component arrangement shown above may vary slightly from that in the unit supplied.

VUF 1200

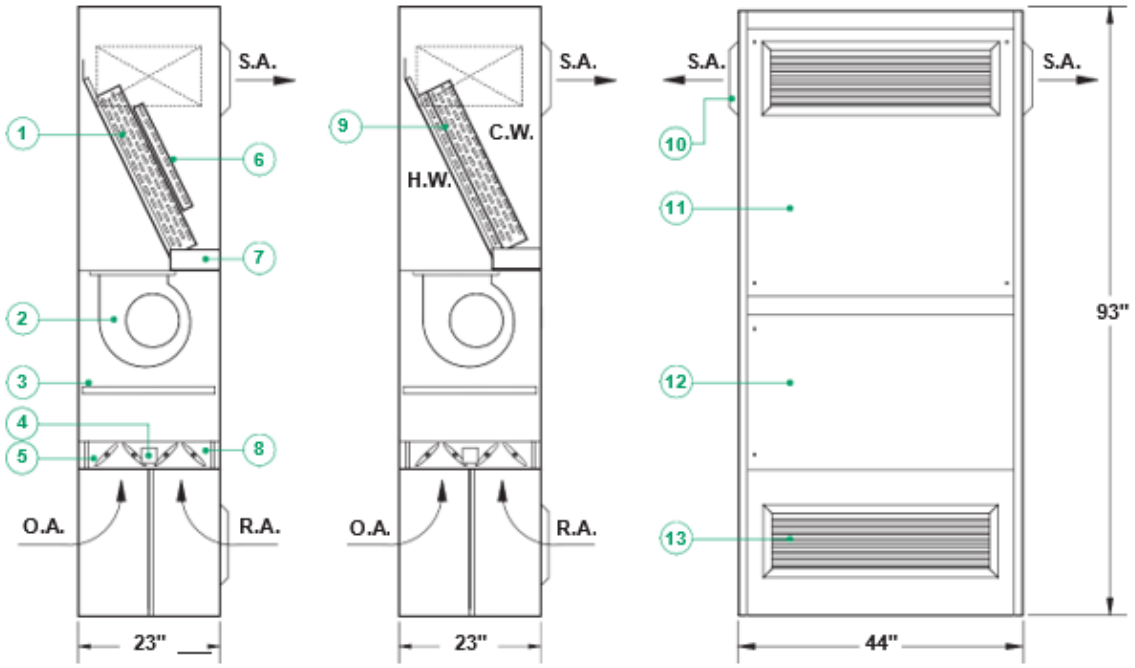


S.A. Supply Air O.A. Outdoor Air R.A. Return Air

1. Hot water coil. Optional electric coil available.
2. DX cooling coil.
3. Drain pan.
4. Supply air fan.
5. Outdoor air damper.
6. Spring return mixed air damper actuator.
7. Filters.
8. Return air damper.
9. 2 pipe or 4 pipe (hot water coil can be in the reheat position).
10. Double deflection supply air grille.
11. Coil access panel.
12. Hinged filter access panel.
13. Heavy duty return air grille.

Note: The component arrangement shown above may vary slightly from that in the unit supplied.

VUF 1500

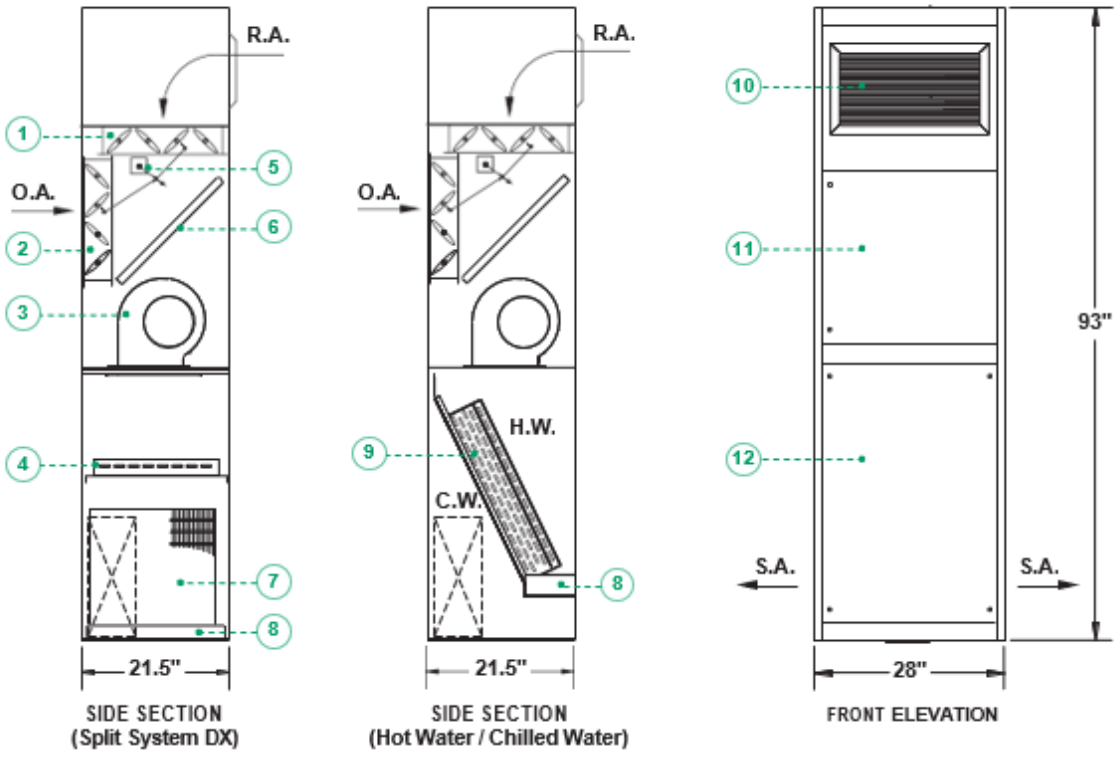


S.A. Supply Air O.A. Outdoor Air R.A. Return Air

1. DX cooling coil.
2. Dual supply air fans.
3. Filters.
4. Spring return mixed air damper actuator.
5. Outdoor air damper.
6. Hot water coil. Optional electric coil available.
7. Drain pan.
8. Return air damper.
9. 2 pipe or 4 pipe (hot water coil can be in the reheat position).
10. Double deflection grilles.
11. Coil access panel.
12. Hinged filter access panel.
13. Heavy duty return air grille.

Note: The component arrangement shown above may vary slightly from that in the unit supplied.

VDF 1200

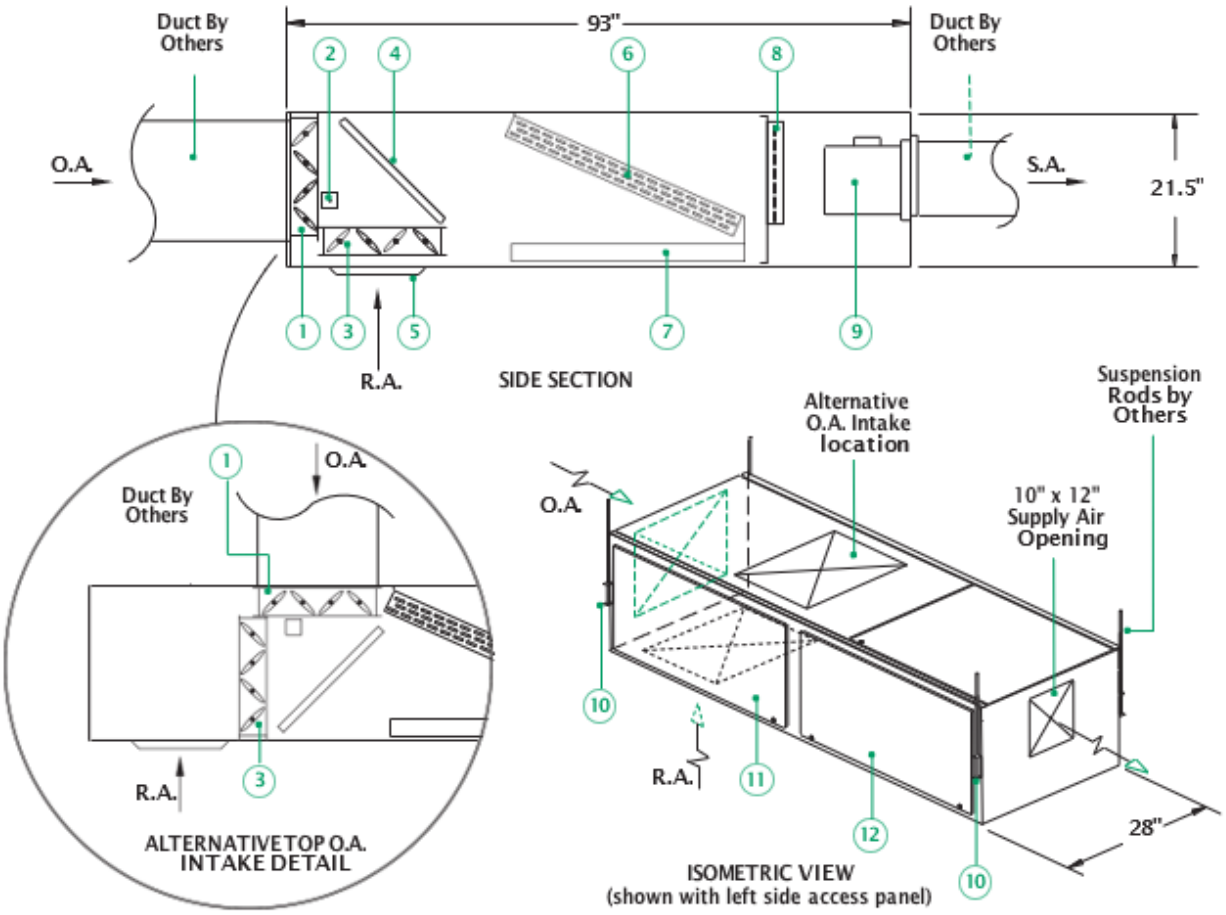


S.A. Supply Air O.A. Outdoor Air R.A. Return Air

1	Return air damper.	7	Slab type DX cooling coil.
2	Outdoor air damper.	8	Drain pan.
3	Supply air fan.	9	2 pipe or 4 pipe (hot water coil can be in the reheat position).
4	Hot water coil. Optional electric available.	10	Heavy duty return air grille.
5	Spring return mixed air damper actuator.	11	Hinged filter access panel.
6	Filters.	12	Coil access panel.

Note: The component arrangement shown above may vary slightly from that in the unit supplied.

HCD 1200

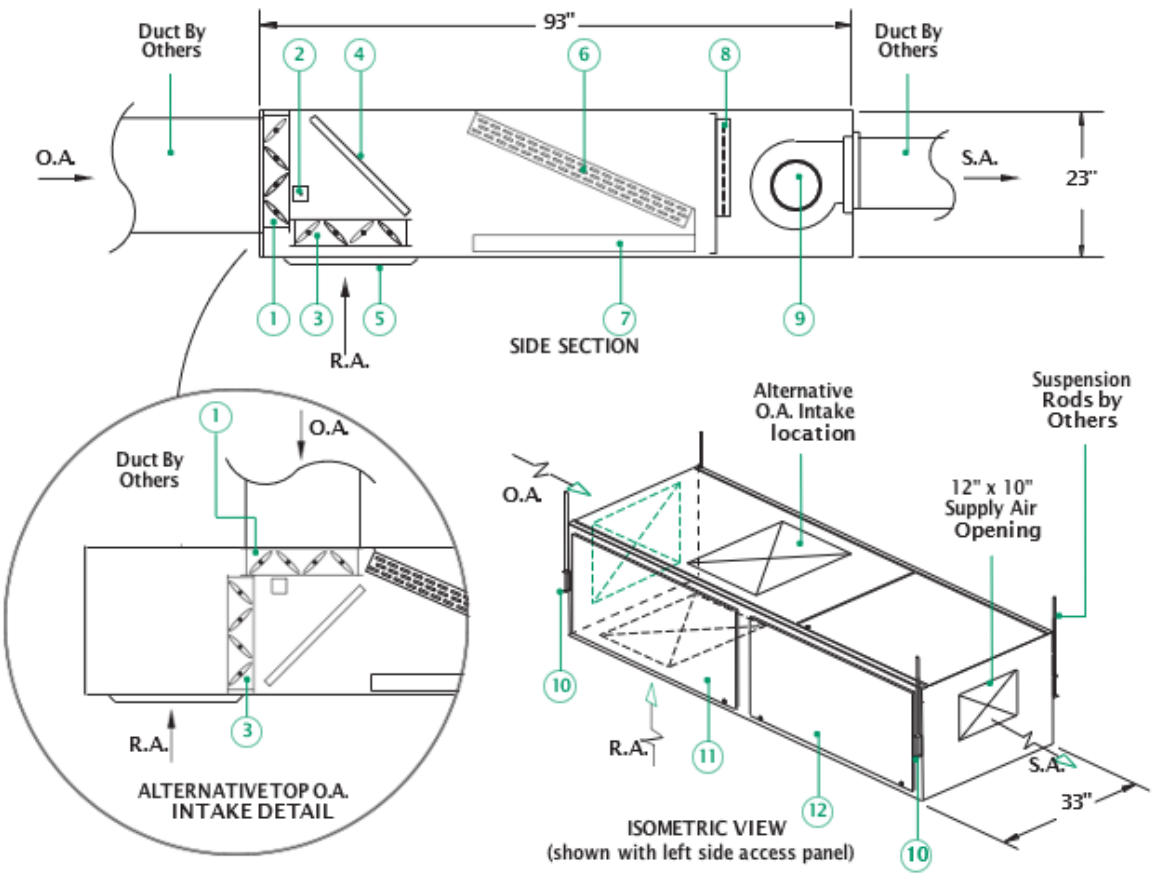


S.A. Supply Air O.A. Outdoor Air R.A. Return Air

1. Outdoor air damper.
2. Spring return mixed air damper actuator.
3. Return air damper.
4. Filters.
5. Heavy duty return air grille or duct collar.
6. Split DX or hot water/chilled water coil (2 pipe or 4 pipe).
7. Drain pan. Drain pan is removable when option for bottom access panels is selected.
8. Hot water coil for spilt system DX or heating only units. Optional electric heater also available.
9. Supply air fan.
10. Mounting brackets (4 per unit).
11. Left or Right side hinged filter access panel. Bottom hinged access panel also available.
12. Left or Right side hinged coil access panel. Bottom hinged access panel also available.

Note: The component arrangement shown above may vary slightly from that in the unit supplied.

HCD 1600

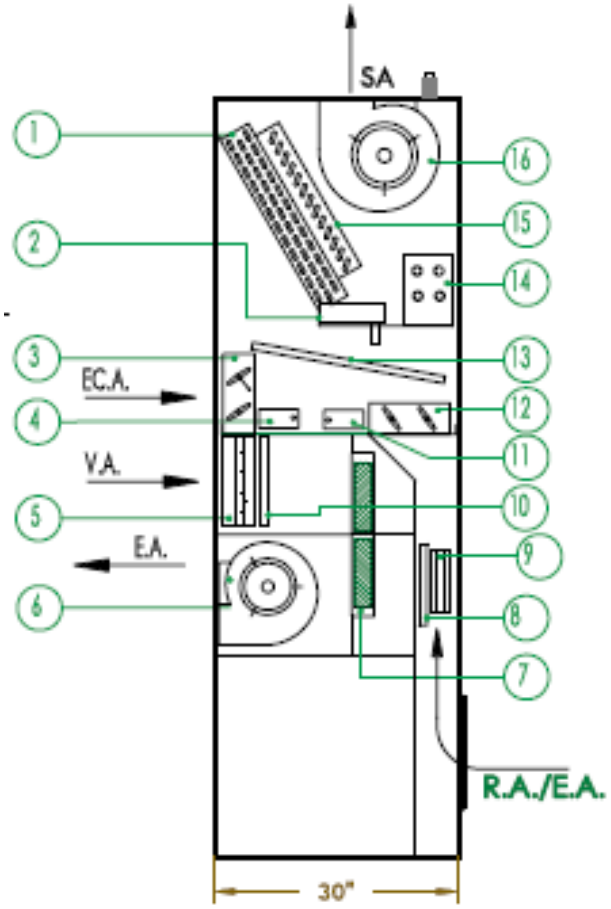


S.A. Supply Air O.A. Outdoor Air R.A. Return Air

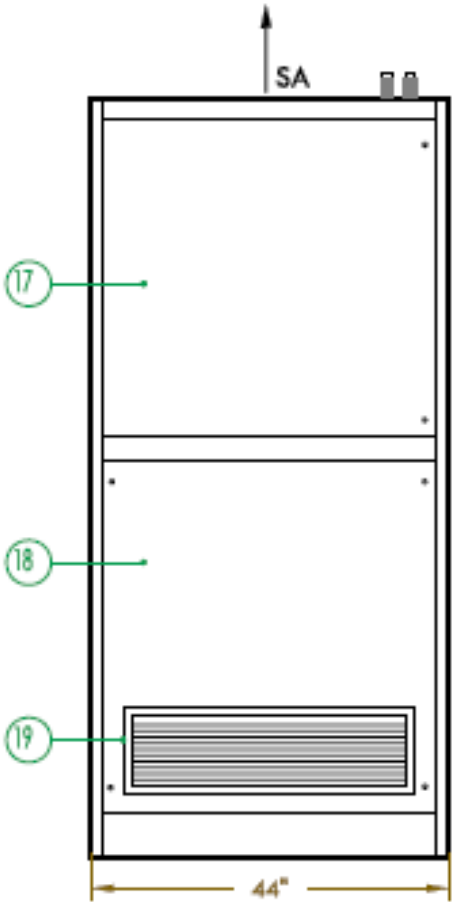
1. Outdoor air damper.
2. Spring return mixed air damper actuator.
3. Return air damper.
4. Filters.
5. Heavy duty return air grille or duct collar.
6. Split DX or hot water/chilled water coil (2 pipe or 4 pipe).
7. Drain pan. Drain pan is removable when option for bottom access panels is selected.
8. Hot water coil for spilt system DX or heating only units. Optional electric heater also available.
9. Supply air fan.
10. Mounting brackets (4 per unit).
11. Left or Right side hinged filter access panel. Bottom hinged access panel also available.
12. Left or Right side hinged coil access panel. Bottom hinged access panel also available.

Note: The component arrangement shown above may vary slightly from that in the unit supplied.

VER 1800



SIDE SECTION



FRONT ELEVATION

SA = Supply Air
RA = Return Air

VA = Ventilation Air
EA = Exhaust Air

ECA = Economizer Air

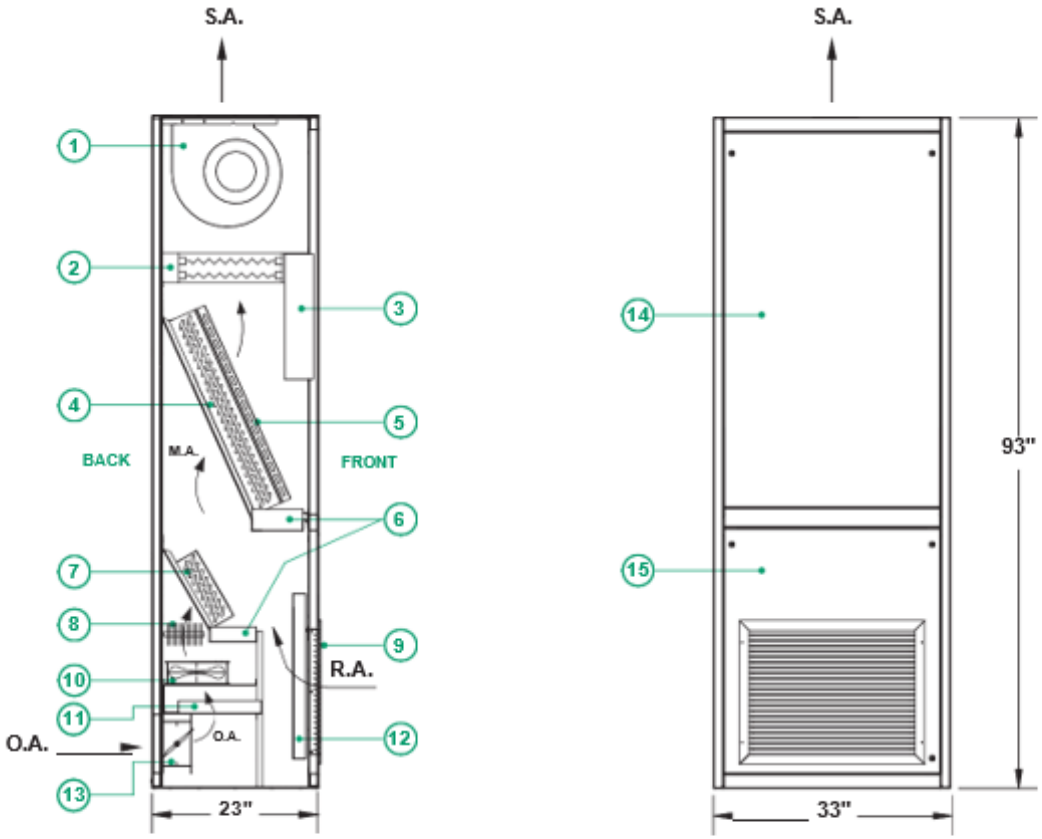
ITEM NO.	DESCRIPTION
1.	Evaporator Coil
2.	Drain Pan
3.	100% Economizer OA Damper
4.	Modulating damper actuator.
5.	ERV Damper with Actuator.
6.	ERV Exhaust Fan
7.	ERV Enthalpy Wheel

ITEM NO.	DESCRIPTION
8.	ERV Exhaust Filter
9.	Powered Exhaust Damper and Actuator
10.	ERV O.A. Filter
11.	RA Actuator
12.	RA Damper
13.	Mixed Air Filters
14.	Electrical Box/Controls Enclosure

ITEM NO.	DESCRIPTION
15.	Hot Water Coil
16.	Supply Air Fan
17.	LH Hinged Access Panel
18.	Removable Access Panel
19.	Heavy Duty RA Grille

Note: The component arrangement shown above may vary slightly from that in the unit supplied

VGB 1600

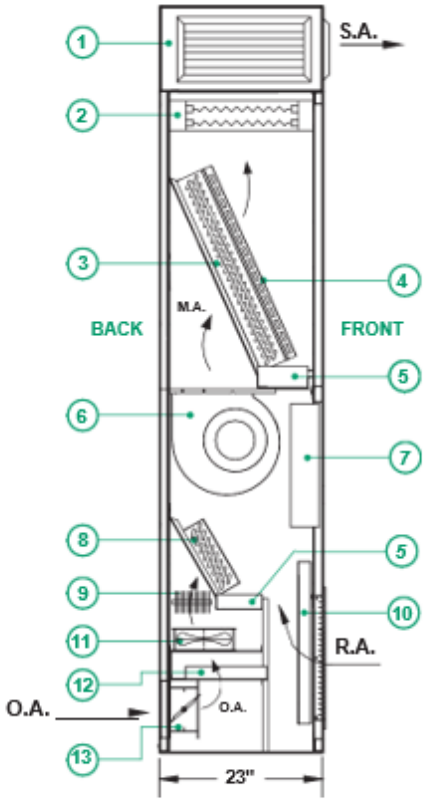


S.A.	Supply Air	**O.A.**	Outdoor Air	**R.A.**	Return Air	**M.A.**	Mixed Air

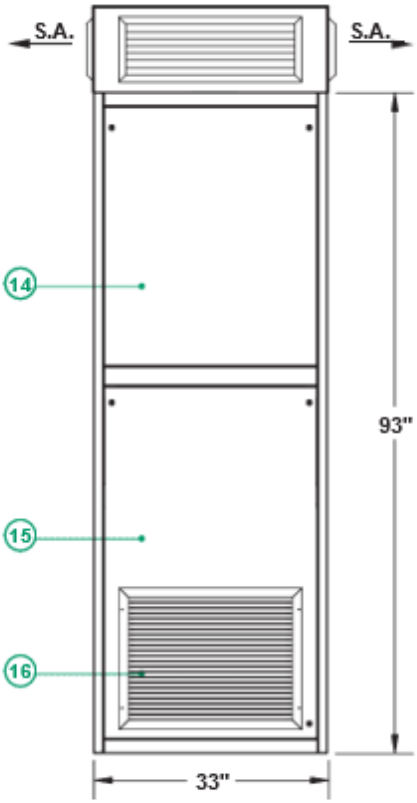
1. Supply air fan.
2. Optional electric heater.
3. Hinged electrical / control enclosure.
4. Primary coil (DX evaporator or chilled water).
5. Optional hot gas reheat coil (DX units only).
6. Drain pan.
7. Outdoor air coil (DX evaporator or chilled water).
8. Optional electric coil for freeze protection (chilled water units only).
9. Heavy duty return air grille.
10. Outdoor air fan.
11. Outdoor air filter.
12. Return air filters.
13. Motorized spring return outdoor air damper.
14. Coil access panel.
15. Return air filter access panel.

Note: The component arrangement shown above may vary slightly from that in the unit supplied

VGB 1500



SIDE SECTION



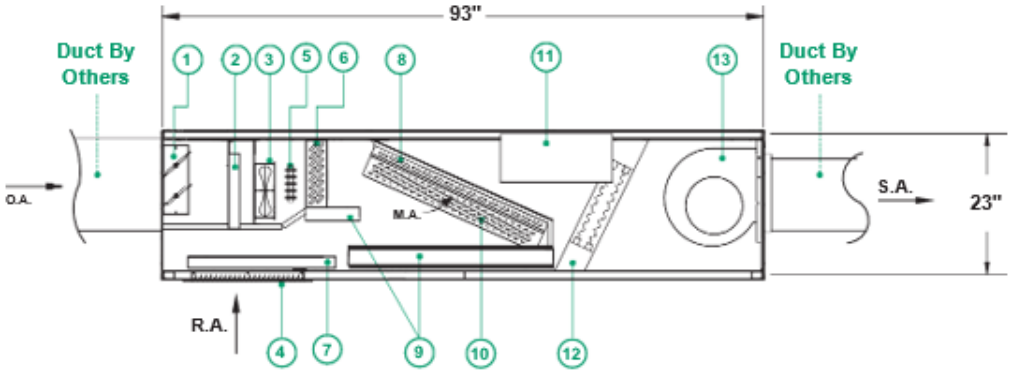
FRONT ELEVATION

S.A.	Supply Air	**O.A.**	Outdoor Air	**R.A.**	Return Air	**M.A.**	Mixed Air

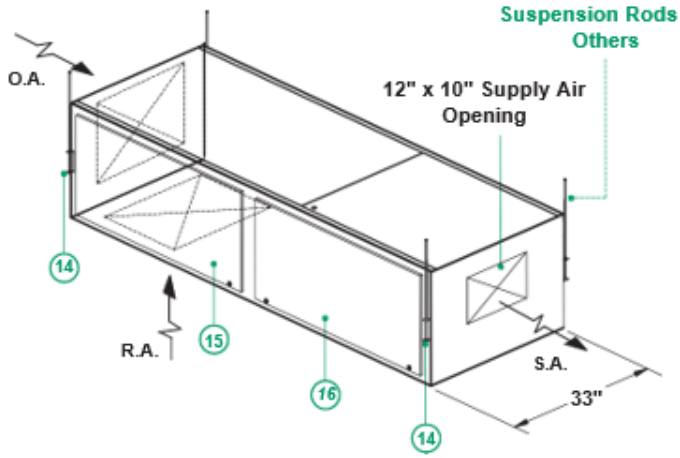
1. Optional top plenum with double deflection supply air grilles.
2. Optional electric heater.
3. Primary coil (DX evaporator or chilled water).
4. Option hot gas reheat coil (DX units only)
5. Drain pan.
6. Supply air fan.
7. Hinged electrical / control enclosure.
8. Outdoor air coil (DX evaporator or chilled water).
9. Optional electric coil for freeze protection (chilled water units only).
10. Return air filters.
11. Outdoor air fan.
12. Outdoor air filter.
13. Motorized spring return outdoor air damper.
14. Coil access panel.
15. Return air filter access panel.
16. Heavy duty return air grille.

Note: The component arrangement shown above may vary slightly from that in the unit supplied

HGB 1600



SIDE SECTION



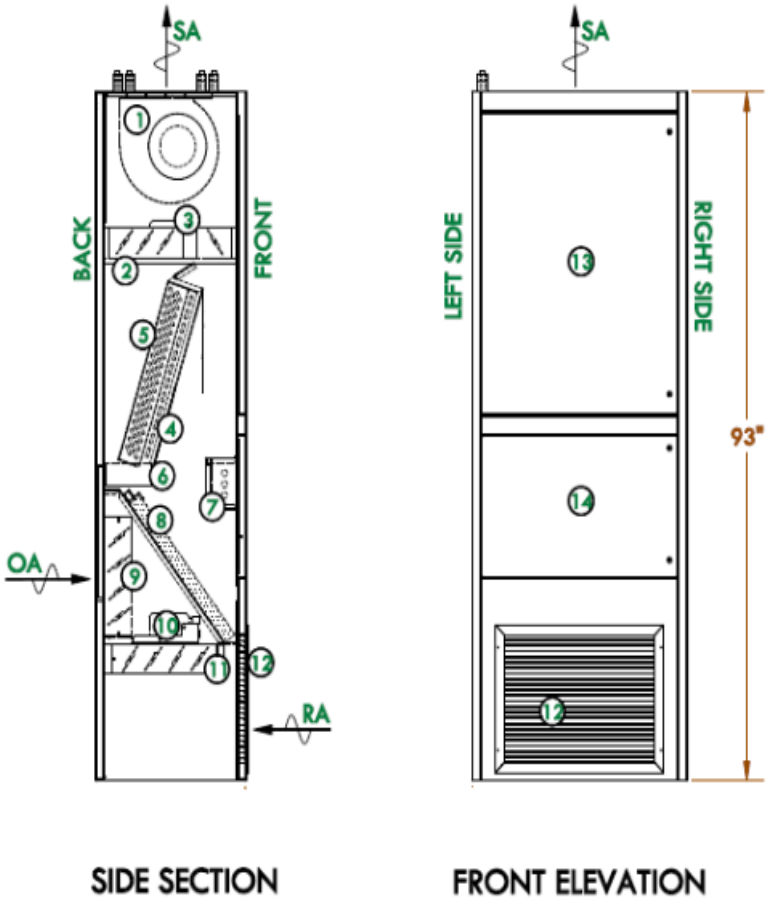
ISOMETRIC VIEW
(shown with left side access panel)

S.A.	Supply Air	**O.A.**	Outdoor Air	**R.A.**	Return Air

1. Outdoor air damper.
2. Outdoor air filter.
3. Outdoor air fan.
4. Heavy duty return air grille or duct collar.
5. Optional electric coil for freeze protection (chilled water units only).
6. Outdoor air chilled water or DX evaporator coil.
7. Return air filter.
8. Optional hot gas reheat coil (DX units only).
9. Drain pan. Drain pan is removable when option for bottom access panels is selected.
10. Primary chilled water or DX evaporator coil.
11. Electrical / control enclosure.
12. Optional electric heater.
13. Supply air fan.
14. Mounting brackets (4 per unit).
15. Left or Right side hinged filter access panel.
16. Left or Right side hinged coil access panel.

Note: The component arrangement shown above may vary slightly from that in the unit supplied

VUD Face and Bypass



SIDE SECTION FRONT ELEVATION

1. Supply air fan.
2. Face & bypass control dampers.
3. Face & bypass damper actuator.
4. Hot water coil.
5. Chilled water coil.
6. Drain pan.
7. Electrical / control enclodure.
8. Mixed air filters.
9. Outdoor air damper.
10. Mix air damper actuator.
11. Return air damper.
12. Heavy duty steel return air grille, painted.
13. Coil access panel, hinged.
14. Filter access panel, hinged.

Note: The component arrangement shown above may vary slightly from that in the unit supplied
Note: The cabinet size remains the same for Face and Bypass control or Valve control units

Operation

Typical Modes of Operation

The following are typical modes of operation for a classroom Unit Ventilator. Please refer to the manual provided by the control's contractor for a more specific control sequence.

Unoccupied Heating/Cooling
During Unoccupied heating/ cooling the outdoor air damper, wheel air damper (if applicable) and powered exhaust damper (if applicable) are fully closed. The powered exhaust fan (if applicable) and energy recovery wheel (if applicable) are off. The space is maintained at a setback temperature by modulating the control valve actuator or face and bypass damper actuator or outdoor condensing unit or electric heat as needed. The supply fan should only run when heating or cooling is required.

Occupied Heating/ Cooling
During Occupied heating/ cooling for standard Unit Ventilators (VUD, VUF, VDF, HCD) the outdoor air damper will modulate to the minimum required position. If the unit has powered exhaust, the powered exhaust damper will open, and the powered exhaust fan will turn on. The space temperature is maintained by modulating the control valve actuator or face and bypass damper actuator or outdoor condensing unit or electric heat as needed. The supply fan will run at all times.

If the unit is equipped with an Energy Recovery Wheel (VER), the wheel air damper will open, the wheel will start spinning and the powered exhaust fan will start. The economizer damper will remain closed. The space temperature is maintained by modulating the control valve actuator or electric heat as needed. The supply fan will run at all times.

Economizer (up to 100% outdoor air)
Economizer mode is activated when the controller compares the Outdoor Air Enthalpy to the Mixed Air Temperature and determines that the outdoor air is cool and dry enough to properly cool the space. During this mode the outdoor air damper and return air damper will modulate to maintain the space temperature.

If the unit is equipped with an Energy Recover Wheel, the wheel will stop, and the wheel air damper will close. When the economizer damper opens, the exhaust air damper will open, and the powered exhaust fan will run at high speed for 100% powered exhaust operation.

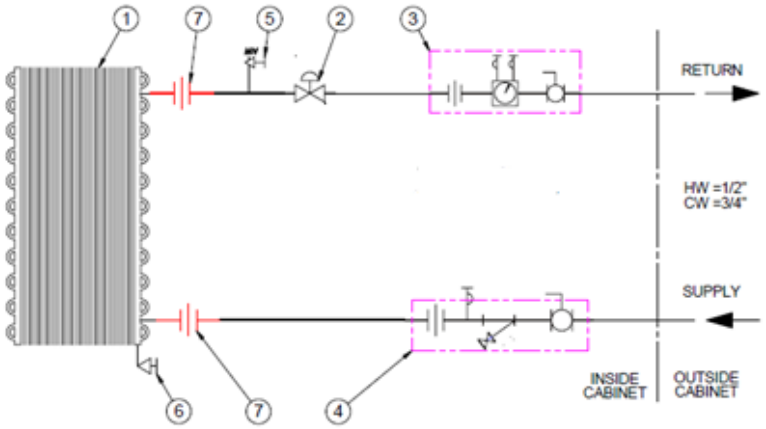
Dehumidifying Mode (VGB/HGB Series)
During occupied cooling, the Dehumidifying AHU can enter a dehumidifying mode. In this mode (normally when the outdoor air is above 55°F) water is diverted to the outdoor coil to cool and remove moisture from the entering outdoor air.

Freeze Protection
For units with a water coil, some type of freeze protection is usually implemented. This can be by either a low limit temperature control (auto reset or manual reset) or by using an air sensor and programming from the controller. When the mixed air temperature is determined to be too low, then the outdoor air damper will close, and the control valve will fully open. In some cases, the fan will also shut down until the temperature returns to normal levels. The standard hot water actuator is fail open.

Standard Piping

The following are typical hot water piping schematics for a Unit Ventilator. Please refer to the Job Submittal for a more specific layout.

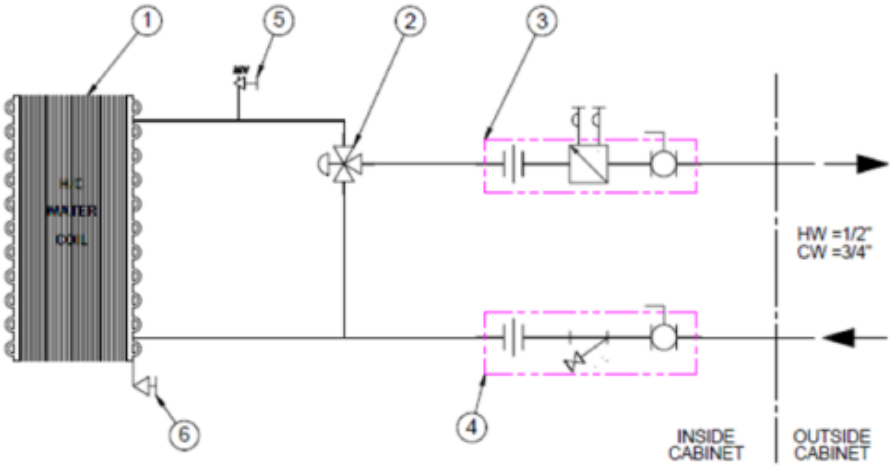
Hot Water / Chilled Water with 2-way Control



ITEM NO.	QTY.	NOTE	Description
1	1		WATER COIL
2	1		2 WAY CONTROL VALVE
3	1		MANUAL BALANCING/BALL VALVE WITH MEMORY STOP, PT PORTS AND UNION
4	1		STRAINER-UNION-BALL VALVE-WITH BLOW DOWN DRAIN VALVE-PT PORT
5	1		MANUAL AIR VENT
6	1		DRAIN COCK
7	2		UNION

Note: The component arrangement shown above may vary slightly from that in the unit supplied

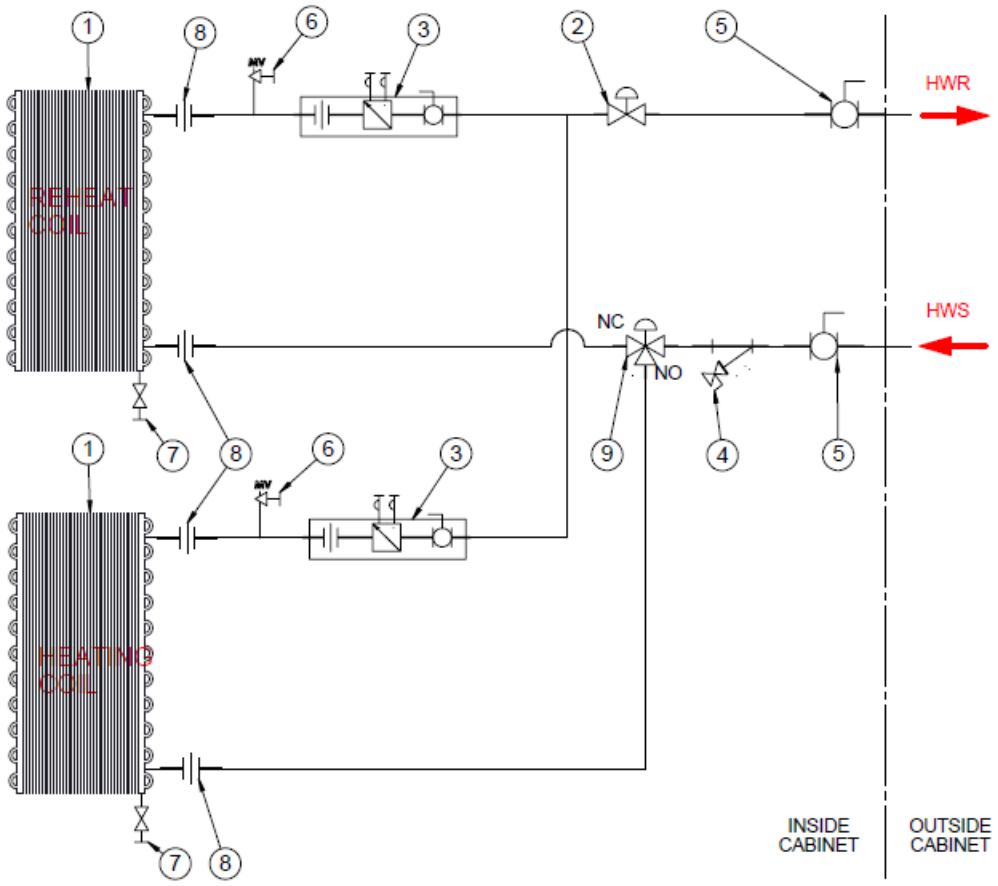
Hot Water / Chilled Water with 3-way Control



ITEM NO.	NOTE	Description	QTY.
1		WATER COIL	1
2		3 WAY CONTROL VALVE	1
3		AUTOMATIC BALANCING/BALL VALVE WITH MEMORY STOP, PT PORTS AND UNION	1
4		STRAINER-UNION-BALL VALVE-WITH BLOW DOWN DRAIN VALVE	1
5		MANUAL AIR VENT	1
6		DRAIN COCK	1

Note: The component arrangement shown above may vary slightly from that in the unit supplied

Hot Water with Reheat Configuration

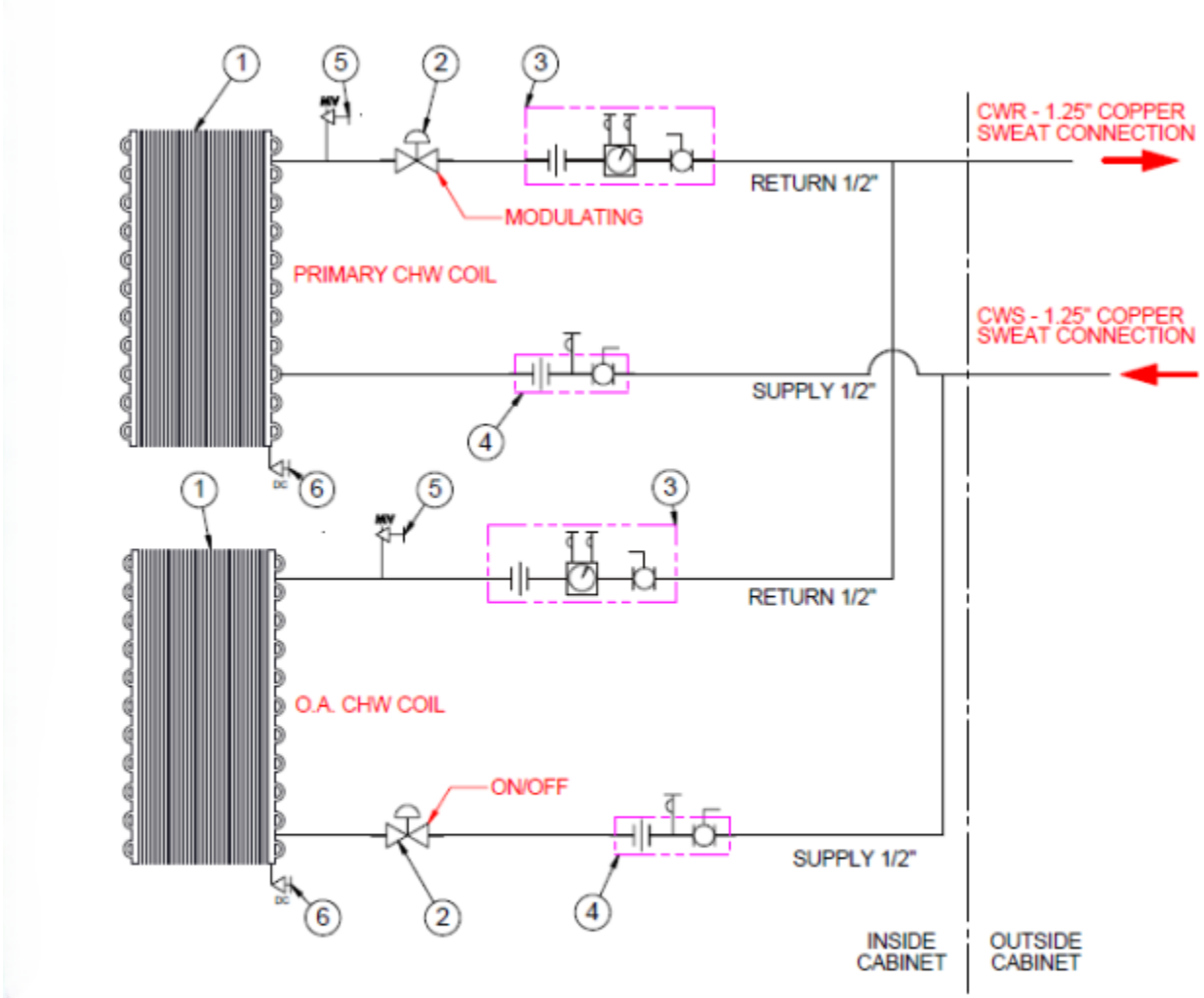


NOTE: ALL ITEMS SHOWN ARE SUPPLIED AND INSTALLED BY TEMSPEC.

ITEM NO.	NOTE	Description	QTY.
1		WATER COIL	1
2		2 WAY CONTROL VALVE	1
3		AUTOMATIC BALANCING/BALL VALVE WITH MEMORY STOP, PT PORTS AND UNION	2
4		STRAINER WITH BLOW DOWN VALVE	1
5		BALL VALVE	2
6		MANUAL AIR VENT	2
7		DRAIN VALVE	2
8		UNION	4
9		3 WAY CONTROL VALVE	1

Note: The component arrangement shown above may vary slightly from that in the unit supplied

VGB/HGB Dual Coil Piping Configuration



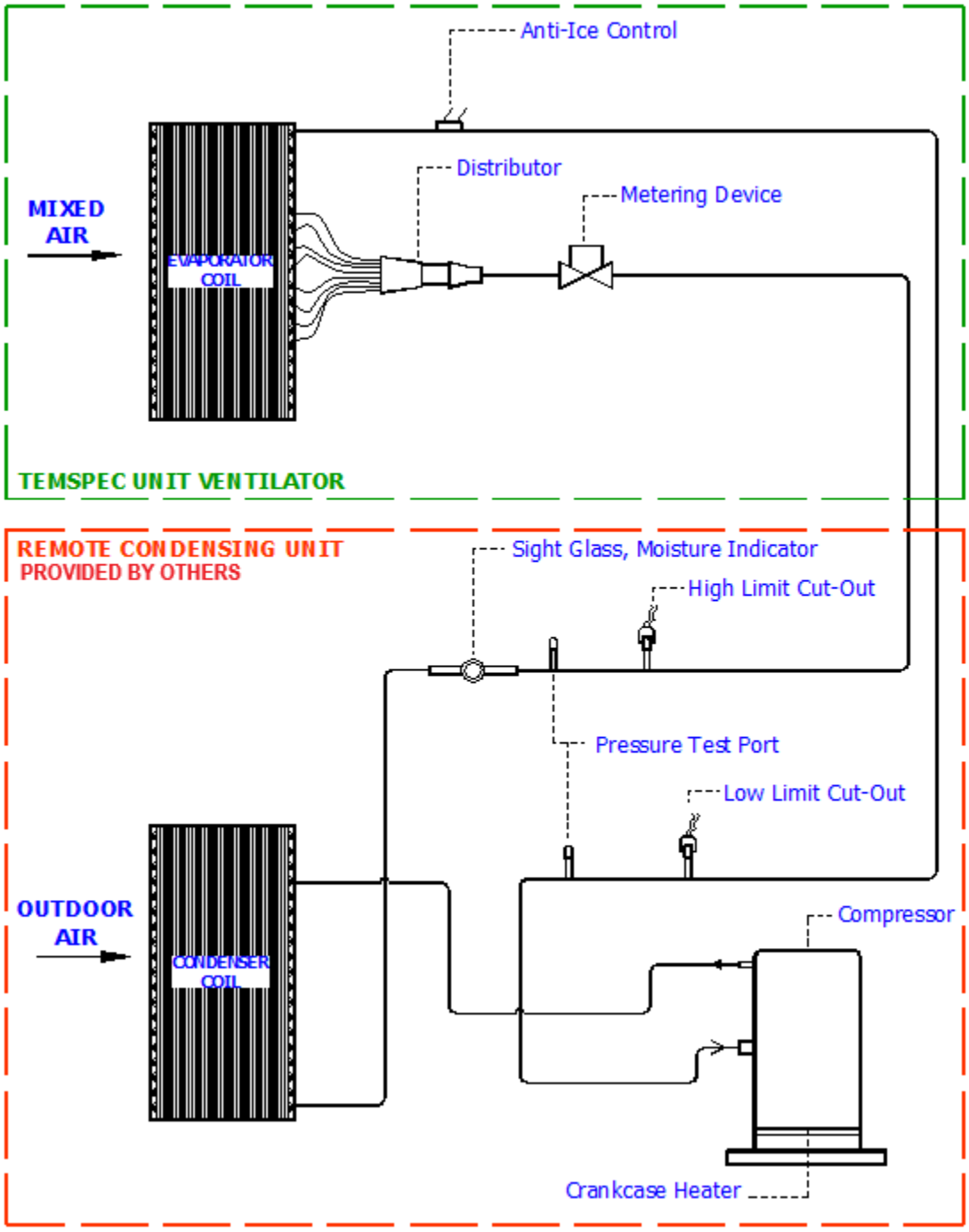
ITEM NO.	Note	QTY	Description
1		2	WATER COIL
2		2	2 WAY CONTROL VALVE
3		2	MANUAL BALANCING/BALL VALVE WITH MEMORY STOP, PT PORTS AND UNION
4		2	BALL VALVE WITH UNION & PT PORT
5		2	MANUAL AIR VENT
6		2	DRAIN COCK

Note: The component arrangement shown above may vary slightly from that in the unit supplied

Warning: City water is very corrosive to brass components. Provide water treatment as soon as the system is charged to avoid premature leaks and/ or failure of internal components.

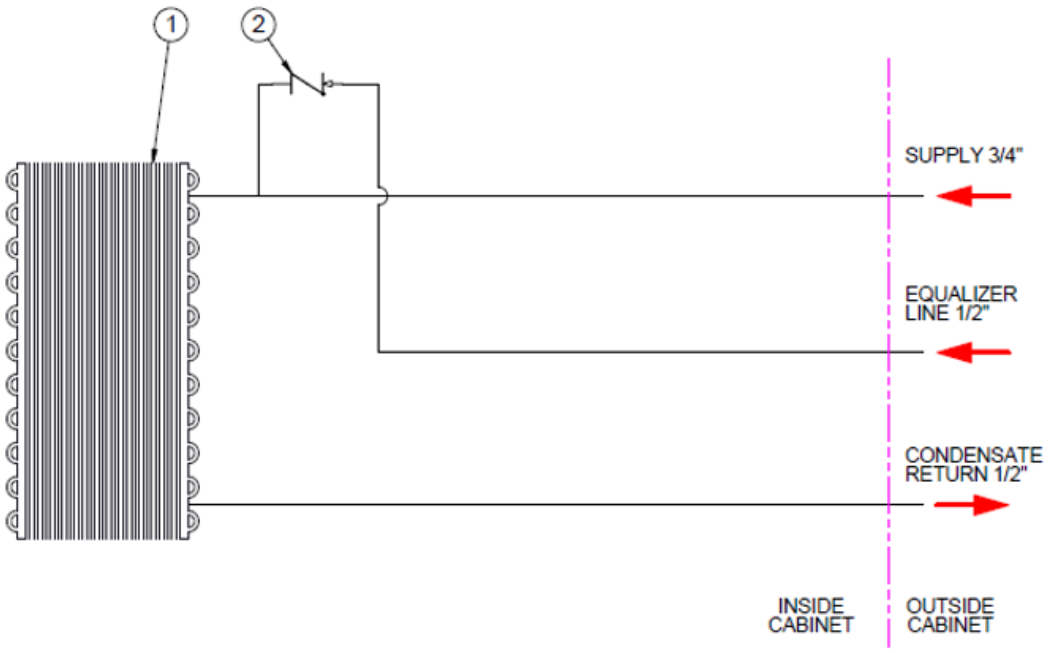
DX Split System

The following is a typical split system refrigeration circuit.



Note: The component arrangement shown above may vary slightly from that in the unit supplied

Steam Piping



MAX PRESSURE/TEMPERATURE
5 PSIg + 10° F SUPERHEAT

NOTE: ALL ITEMS ARE SUPPLIED AND INSTALLED BY TEMSPEC.

ITEM NO.	Description	QTY	NOTE
1	COIL-STEAM	1	
2	CHECK VALVE	1	

Temspec steam units are designed to have a gravity fed condensate return. The Equalizer line is present to ensure there is not a vacuum formed in the system when the steam is not flowing. The line needs to be connected to a pipe that is at atmospheric pressure.
In a gravity return system the Condensate line is not pressurized and open to the atmospheric pressure, the Equalizer line can be connected to the condensate line after the external steam trap.
If the Condensate line is pressurized, the Equalizer line should not be connected to the pressurized condensation return line.

Dampers

All dampers for outdoor air come standard with a spring return actuator. Internal dampers such as Face and Bypass dampers are non-spring return. If the unit has both an outdoor air damper and return air damper, they will be mechanically linked (excluding VER units which have an economizer damper and a return air damper). As the outdoor air dampers open, the return air dampers close. The damper actuator manufacturer can vary. Please refer to the wiring schematic for the damper actuator model type.

Powered Exhaust

Internal powered exhaust is an optional feature that is provided with our standard vertical series Unit Ventilators. This feature comes with a fan and damper module that is mounted into the return air section of the unit. Control should be set up by the temperature controls contractor to operate as an on/off device as the outdoor air damper opens and closes.

For the Energy Recovery units, the exhaust fan is a standard option. It is located in the middle of the unit near the Energy Recovery Wheel. The fan is standard two speed. Low speed during regular wheel operation and high speed during economizer mode.

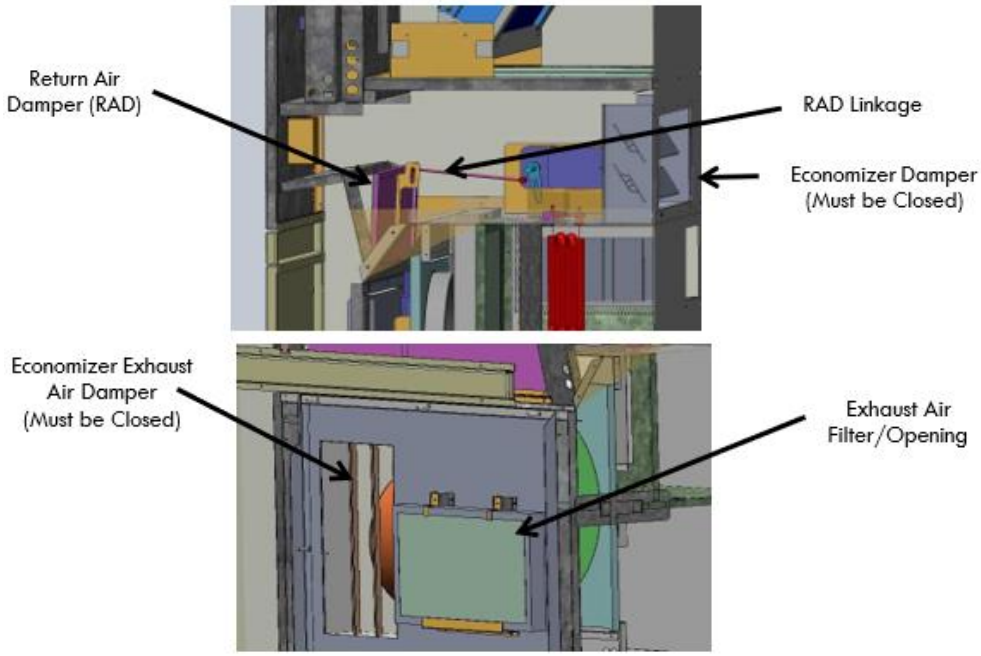
Filtration

Typically, 1” or 2” disposable filters are provided in the unit with an extra set shipped loose for when the unit is ready for start-up. Please refer to the Job Submittal for specific details on filter construction and thickness. Below are sizes and quantity per unit for the different model types.

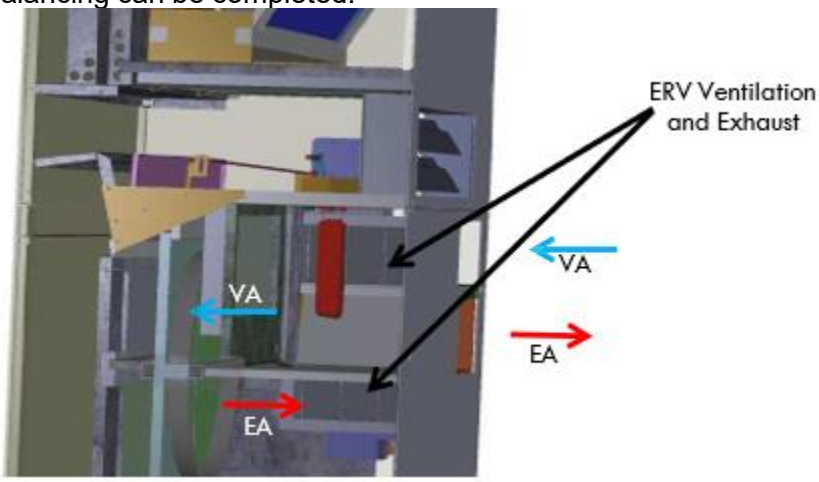
Model Number	Filter location	Filter Size	Quantity per Unit
VUD, VDF, VUF, HCD 1200	Mixed Air (L-Type Damper)	12” x 20” nominal	2
	Mixed Air (Inline Damper)	20” x 20” nominal	1
VUD, HCD 1600	Mixed Air (L-Type Damper)	12” x 24” nominal	2
	Mixed Air (Inline Damper)	20” x 24” nominal	1
VUD 2000, VUF 1500	Mixed Air (Inline Damper)	16” x 21” nominal	2
VER 1800	Mixed Air	18” x 22” nominal	2
	Energy Recovery Module	12” x 20” nominal	2
VGB 1500, 1600	Return Air	12” x 24” nominal	2
	Outdoor Air	12” x 24” nominal	1

VER ERW Balancing Procedure

1. Prior to starting to balance, disconnect the power to the energy recovery wheel by disconnecting the wire harness plug that supplies power to the wheel.
2. If the unit has an Economizer damper, ensure the Economizer damper along with the economizer exhaust damper is in the closed position prior to commencing balancing.



3. Ensure the unit is in "Occupied" mode. This will open the ERV Ventilation air and Exhaust air damper so that proper balancing can be completed.



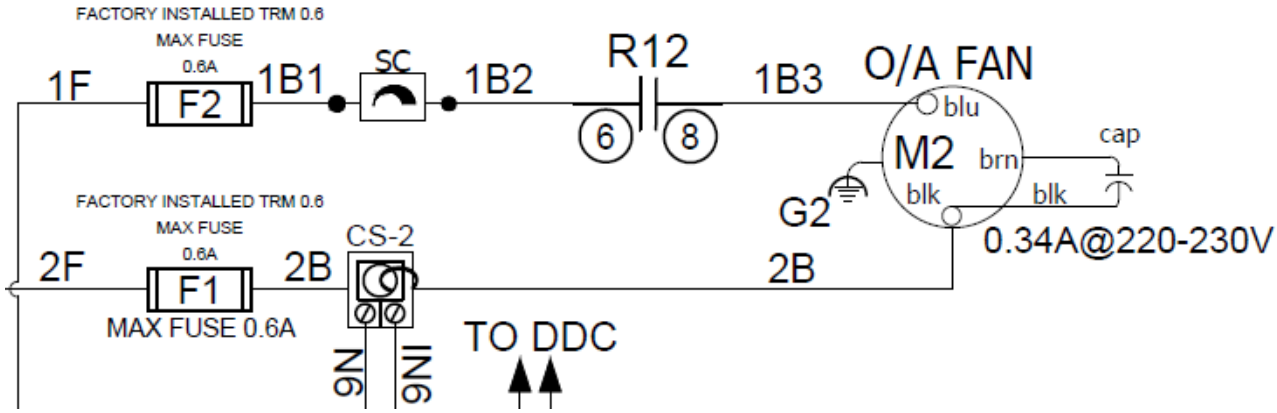
4. Balance the supply air to scheduled values via the supply air speed taps.
5. Balance the ventilation air and return air by using the temperature balancing method described below. Balance the fresh air on the Energy Recovery Wheel by using the return air damper. Adjust the RAD damper and linkage (figure 1) until the proper fresh air volume is achieved.
6. If additional restriction is required to achieve proper balancing, the Exhaust Air fan speed may be adjusted using the speed taps. Based on field conditions, the ERV exhaust air opening may require to be partially blocked off with sheet metal.

VGB Outdoor Air Balancing Procedure

Since the VGB units do not have mixed air dampers for adjusting the outdoor air, a few options are given to balance in the field.

Fan Speed Potentiometer

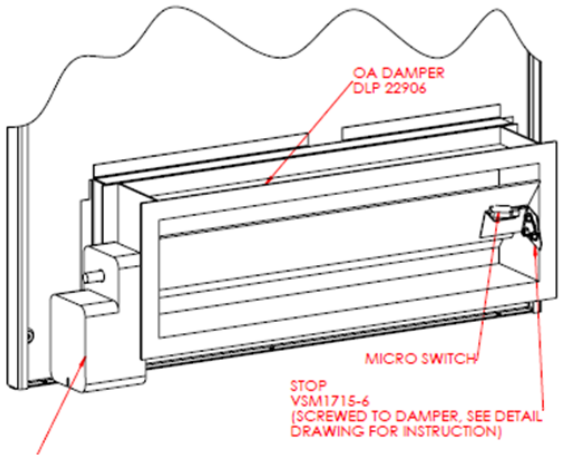
This dial allows adjusts the outdoor air fan for quick smaller adjustments. The dial is located near the electrical box. The speed controller is labeled as SC in our electrical schematics.

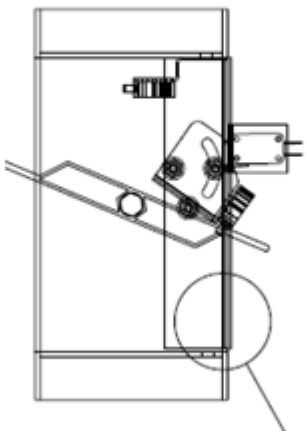


Outdoor Air Damper Stop

The VGB units have a physical stop on the outdoor air damper. This is preset by the factory based on test data but may need to be adjusted on site.

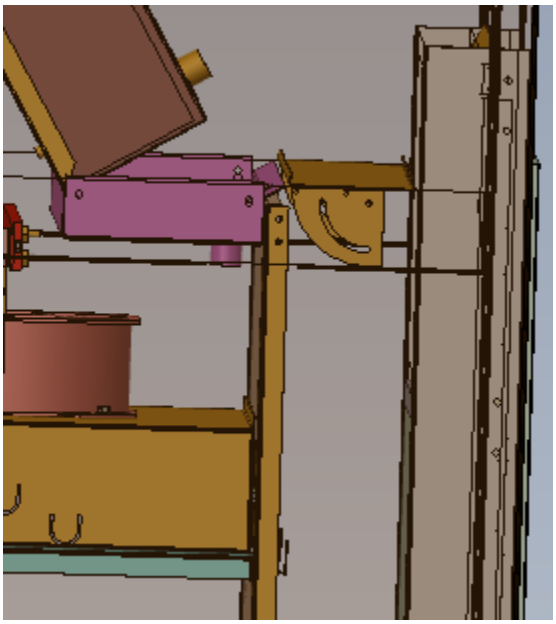
To adjust, get access by removing the OA Module Access panel. The stop can be adjusted by loosening the closest screw and rotating the stop. Rotating up allows more airflow and down reduces the airflow.





Return Air Block Off
This block off is only added on units where there is a higher ratio of outdoor air to return air and is located in the return air chamber after the grille.

This can be rotated to block off the return air to force more air to be drawn through the outdoor damper of the unit.



Maintenance

CAUTION: Disconnect power before servicing the unit.

Servicing the Unit

Access to the components is gained through front access panels. Typically, the panels are fastened by heavy duty Phillips head screws. If the units have hinged doors, loosen but do not remove the screws, and swing the door open. If the unit has removable panels, loosen but do not remove the screws, and carefully store the panel in a place where it will not get damaged. The horizontal style units utilize hinged access side panels with locking side supports to hold the panel open.

The access panels have a door switch installed that will shut the supply air fan off once the panel is removed. This will only disconnect the power to the supply air fans. Be sure to disconnect ALL power by turning the remote disconnect switch to the off position.

Drain Pan Instruction

- Please check the drain pan for proper drainage as part of commissioning.
- Drain pan should be slopped towards the drain connection
- Check to make sure the drain pain overflow switch didn't come loose or shift during shipping as part of commissioning.
- The unit should be checked to ensure the drain pan is level, free of debris, and the drain line properly connected to the drain pan stub-out.

Servicing DX Units

General Information

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

All maintenance staff and other working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks must be made after installation:

- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected
- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.

Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking
- That no live electrical components and wiring are exposed while charging, recovering or purging the system
- That there is continuity of earth bonding

All sealed electrical and intrinsically safe components shall be replaced.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration for sources such as compressor or fans.

Charge Removal and Evacuation

When breaking into the refrigerant system to make repairs (or any other purpose) the following procedure shall be adhered to:

Evacuate
Purge with an inert gas (optional)
Evacuate (If purged with inert gas)
Continuously flush or purge with inert gas when using flame to open circuit
Open circuit

Recover the charge if venting is not allowed by national and local codes. The system shall be purged with oxygen-free nitrogen to render the appliance safe for refrigerant. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to the atmosphere and finally pulling down to a vacuum (optional). When the final nitrogen charge is vented to atmospheric pressure, work can take place.

The outlet of the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

Charging the System

The following requirements shall be followed when charging (in addition to conventional charging procedures):

Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them
Cylinders shall be kept in an appropriate position according to manufacturer instructions
Ensure that the Refrigeration System is earthed (grounded) prior to charging the system with refrigerant
Label the system when charging is complete (if not already)
Extreme care shall be taken not to overfill the Refrigeration System

Refrigerant Recovery

When removing refrigerant from a system, it is recommended good practice that all refrigerants are removed safely and to local and national code standards.

When transferring to cylinders, ensure appropriate cylinders are used, and contain pressure relief valves, shutoff valves and are in working order. Ensure the correct number of cylinders for holding the total system charge. All cylinders to be used are designated for the recovery and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Empty cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment at hand and shall be suitable for the recovery of the refrigerant in the system. All scales shall be calibrated and in working order. Hoses shall have leak-free disconnect couplings and in good working order. Before using the recovery machine, check that it is in working order, has been properly maintained and that any electrical components are sealed to prevent ignition in the event of a refrigerant release. Contact the manufacturer if in doubt.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to the re-use o the recovered refrigerant. It is essential that electrical power is available before the task is commenced.

Become family with the equipment and its operation
Isolate system electrically
Before attempting the procedure, ensure that:
Mechanical handling equipment is available, if required, for handling refrigerant cylinders
All personal protective equipment is available and being used correctly
That the recovery process is supervised at all times by a competent person
Recovery equipment and cylinders conform to the appropriate standards
Pump down the refrigerant system, if possible
If a vacuum is not possible, make a manifold so that the refrigerant can be removed from carious parts of the system
Make sure that the cylinder is situated on the scales before recovery takes palace
Start the recovery machine and operate in accordance with instructions
Do not overfill the cylinders (no more than 80% volume liquid charge)
Do not exceed the maximum working pressure of the cylinder, even temporarily
When the cylinders have been filled correctly and the process completed make sure that

the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off
Recovered refrigerant shall not be charged into another Refrigerating System unless it has been cleaned and checked

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed.

Maintenance Schedule

Frequency maintenance greatly depends on the surrounding conditions (inside and outside of the building). The following is a typical maintenance schedule for a classroom Unit Ventilator.

Every **3 months** – Change filters

Every **6 months** – Visually inspect the condition of the ERV desiccant wheel, clean if necessary

Every **12 months** – Vacuum out drain pans
– Clean strainer in hydronic circuit (if applicable)

Every **24 months** – Clean evaporator coil
– Vacuum any loose debris from interior of the unit
– Inspect dampers to ensure that there is a proper seal when closed

Changing the Filters

The outdoor and indoor conditions will determine the frequency of filter changes. Temspec recommends that the filters be changed every 3 months as a rule-of-thumb. Note that dirty filters will affect the overall performance of the unit.

To change the filters, open / remove the filter access panel, remove the filters, and replace with the new ones.

Maintenance and Media Pad replacement of the Dynamic Polarized-Media Filter

WARNING
WHENEVER INSTALLING OR REMOVING THE AIR CLEANER, THE POWER TO THE AIR HANDLER MUST BE TURNED OFF. CARE SHOULD BE TAKEN NOT TO LET THE JACK TOUCH ANY GROUNDED OR METAL SURFACES. ALTHOUGH THE JACK IS SHIELDED, IT IS POSSIBLE FOR THE CENTRAL POWER INSERT TO CONTACT GROUND WHICH COULD RESULT IN DAMAGE TO THE TRANSFORMER OR ELECTRONICS.

1. Turn off the power to the unit
2. Open the filter access door
3. Unplug the power supply cord from the filter powerhead
4. Remove the filter from the filter rack
5. Open the filter latch and remove the old media pad and discard
6. If dust has accumulated on the outer screen of the filter, clean with a dry brush or vacuum.
7. Position the new replacement media pad so that it is centered within the air cleaner frame

8. Close and re-latch the filter.
9. Return the filter to its location in the unit.
10. Plug the power supply cord into the filter once it is securely in place.
11. Switch to turn on the unit power and close the filter access panel

NOTE: Media pads generally last 3 to 4 months. Only Genuine Dynamic replacement media pads should be used with your Dynamic Air Cleaner. Failure to do so could cause damage to the air cleaner, alter air cleaner performance, and/or void your warranty.

WARNING: FAILURE TO CHANGE THE MEDIA PAD ON A REGULAR BASIS COULD REDUCE AIRFLOW AND CAUSE DAMAGE TO THE HEATING AND COOLING SYSTEM.

Cleaning the Coils

To clean the coil, purchase a suitable evaporator coil cleaning solution such as those offered by NU-CALGON (www.nucalgon.com). Follow the manufacturer's instructions for use.

Note: Chlorine-based or anti-fungal "pucks" or "socks" are acceptable when placed in the drain pan. Be sure to vacuum the drain pan during the cleaning process.

If the filters are regularly changed, the heating coils do not require cleaning.

WARNING: Do NOT use chlorine-based cleaners or anti-fungal treatments on the aluminum fins of coil.

Motors

Temspec provides motors that are permanently lubricated. No maintenance is required.

Note: Temspec does not recommend the use of a Unit Ventilator during construction/drywall installation as a space heater or air conditioner. Motor exposure to construction or drywall dust can reduce motor life and leads to premature failure

Cleaning the Energy Recovery Wheel

Temspec recommends that the ERV desiccant wheel be cleaned with a vacuum periodically and that the use of a cleanser is only required when necessary. When cleaning the wheel with a vacuum take care not to damage the wheel's polymer material.

WARNING: Do NOT use ACID based solutions, AROMATIC solvents, STEAM OR WATER with temperatures GREATER than 170°F.

The clean desiccant coated polymer energy recovery wheel requires a non-acid based (evaporator) coil cleanser or alkaline detergent.

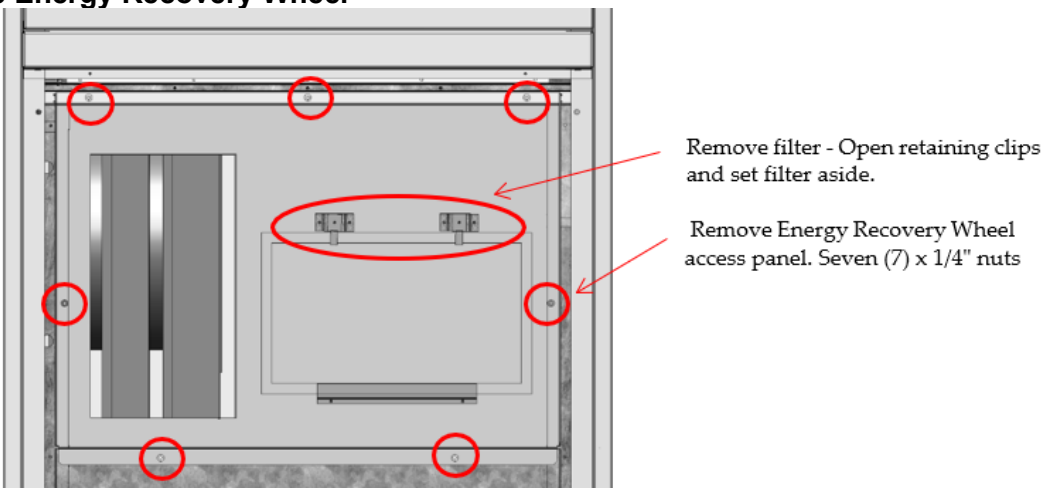
First you must gain access to the energy recovery wheel by removing the return air and ERV access panel by loosening the required fasteners. Once this is completed follow the recommended steps of the wheel manufacturer Airxchange listed below:

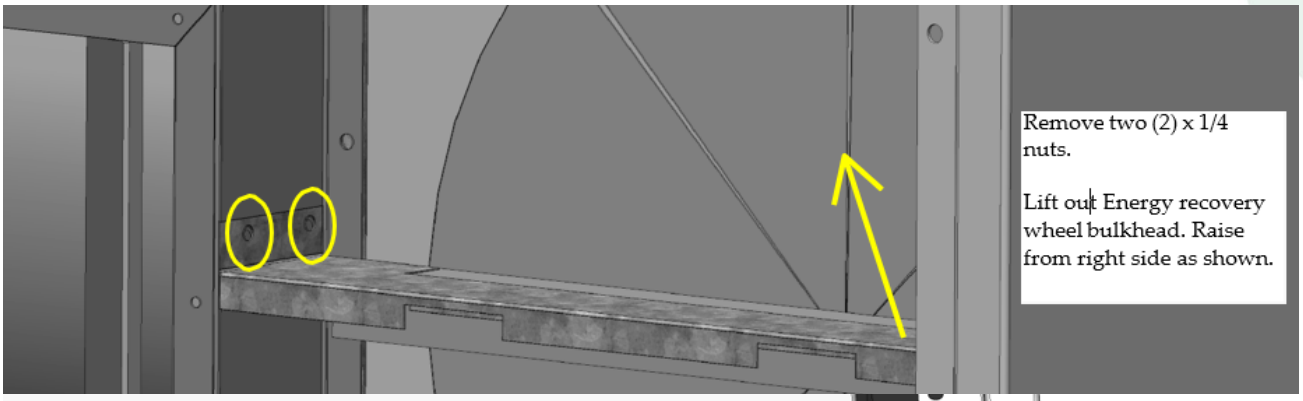
- Remove wheel from Unit Ventilator
- Remove the wheel from the cassette
- Remove loose accumulated dirt by brushing the wheel face
- Wash the wheel with a non-acid based (evaporator) coil cleanser or alkaline detergent solution. (The wheel manufacturer suggests cleaners such as KMP Acti-Klean in a 5% solution works well)
- If the wheel is extremely dirty it may be required to soak overnight to remove all contaminants.
- Once soaking is completed, rinse the solution from the wheel until the water comes clear.
- Allow excess water to drain and re-install cassette.

Note: There may be some staining to the desiccant, however this will not adversely affect the performance.

For more information, please see the ERV manufacturers' website:
http://www.airxchange.com/resource-center-technical-notes.htm

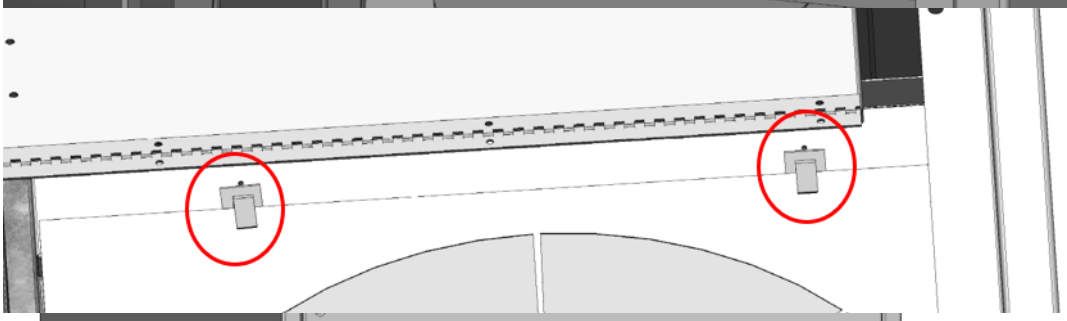
Removing the Energy Recovery Wheel





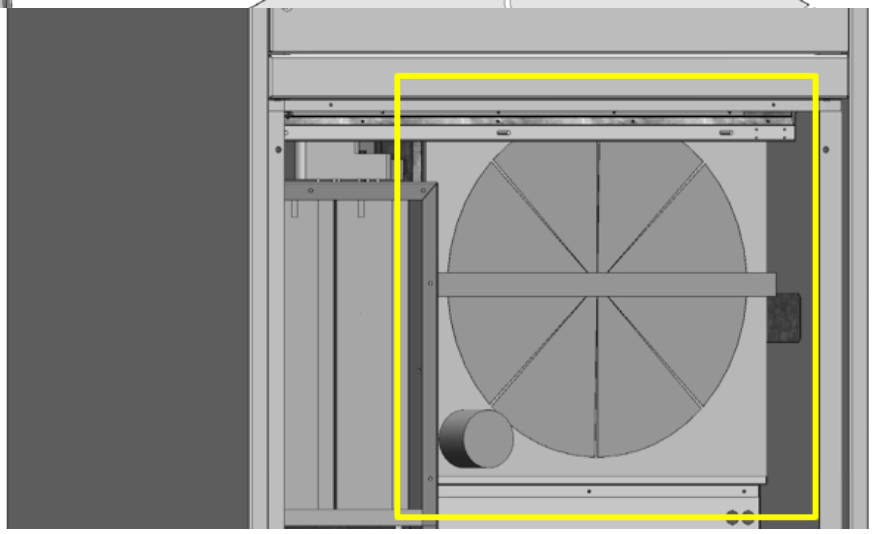
Remove two (2) x 1/4 nuts.

Lift out Energy recovery wheel bulkhead. Raise from right side as shown.



Open energy recovery wheel retaining clips. On top of wheel. (Somewhat hidden from sight.)

Disconnect energy recovery wheel power cable (Not shown).



Remove energy recovery wheel by grasping the wheel assembly cross member. Lift up to clear bottom bracket. Rotate slightly and remove wheel.

Duct Attenuation

Attenuation of air noise from HVAC equipment in the classroom is critically important. The Temspec classroom fan coil units are constructed to minimize sound breakout from the cabinet by the use of heavy gauge steel and duct liner.

For units with a Draw-Through configuration (supply air fan at the top of the unit), air noise from the return air grille is negligible since the supply air blower is typically 7ft. distance from the return air opening. Supply air blower noise at the discharge must be adequately attenuated.

The following method is recommended for duct work associated with the classroom Unit Ventilators. Note: This recommendation only applies to the Draw-Though units that do not utilize Temspec's top acoustical plenum.

Fabricate the discharge elbow using heavy gauge steel, a minimum of 20ga. Line the elbow and first 8 ft. of duct with 1" duct liner. Line the remainder of the duct with a 1/2" duct liner. Pay particular attention to ensuring that there is no air leakage at the joint at the discharge from the unit. Do not use a flexible joint at the discharge as the blower and motor have vibration isolation mountings. Avoid locating supply air grilles / diffusers closer than 8ft. from the fan discharge.

Only one 90-degree elbow after the supply plenum in the first 5ft of ductwork.

Care should be taken for units with dual supply air blowers to ensure proper transitions to the ductwork to avoid excess air turbulence. The transition from the unit to the main duct must be symmetrical. Failure to follow these guidelines could cause fan turbulence that can generate noise.

External cladding of the elbow with a high-density material will assist in reducing low frequency sound breakout.

Maximum Operating Conditions

Condition	Value
Max Water Temperature	200F
Min Water Temperature	40F
Max Steam Pressure and Temperature	5PSI + 10F superheat
Max External Static Pressure Tested	1” W.C.
Max Operating Water Pressure	150PSI
Min Distance to Structure	0”
Refrigeration	R410A
Max Refrigeration Pressure	600PSI

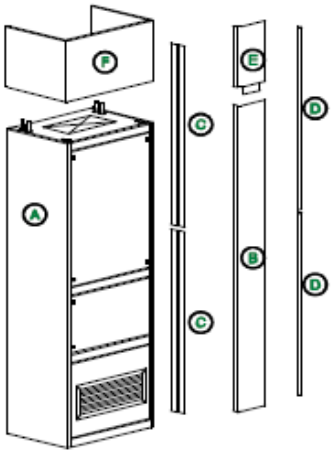
Troubleshooting

Problem	Troubleshooting
Fan not running	Verify power to the motor
	Ensure all wiring connections are correct and secure
	Ensure the controller is sending the correct signal
	Check the fan relay is energizing properly
	Check the speed board is working (if applicable)
	Swap motor with a working unit to ensure motor is not failed
Damper not working	Ensure all wiring connections are correct and secure
	Ensure actuator is getting proper voltage
	Ensure controller is sending the proper control signal
Water valve not working	Ensure all wiring connections are correct and secure
	Ensure actuator is getting proper voltage
	Ensure controller is sending the proper control signal
	Check overflow switch is not tripped
Electric heat not working	Ensure all wiring connections are correct and secure
	Ensure heater relay is functioning and proper voltage is reaching the heater
	Ensure the controller is sending the correct signal
	Ensure the manual high temperature switch is not tripped
Outdoor Fan not supplying enough air (VGB/HGB)	Adjust the speed control
	Check the stopper bracket position on the outdoor air damper, adjust if required
	Check the unit has a proper seal to the outside Louver
	Adjust the outdoor air damper minimum position

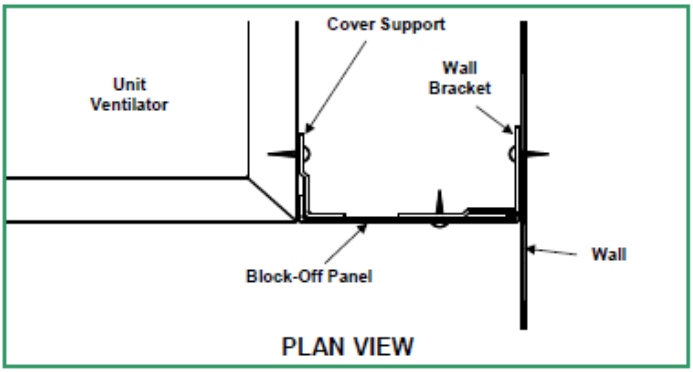
Accessories Instructions

For other accessories not listed, please contact Temspec.

Block-off Panel

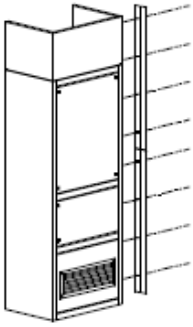


NOTE: Please refer to the 'Unit Layout' and 'Application Layout' pages in these submittals for precise pipe & duct connection locations and additional accessories.

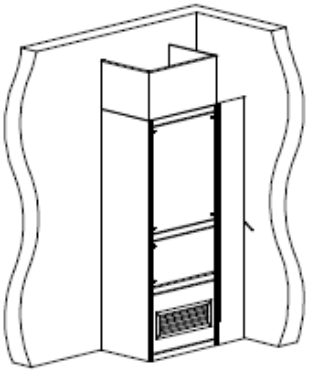


A) Classroom Unit
B) Block-Off Panel
C) Cover Support
D) Wall Bracket
E) Block-Off Extension (if applicable)
F) Top Extension or Plenum (if applicable).

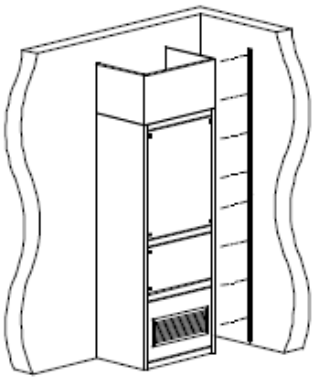
NOTE: Installation screws NOT PROVIDED.



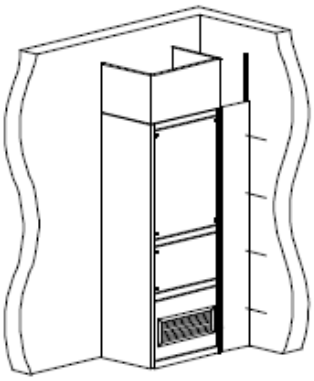
STEP 1:
Fasten COVER SUPPORT (C) to the side of the Classroom Unit, almost flush to the front edge. This bracket should be approximately 1" off of the finished floor level.



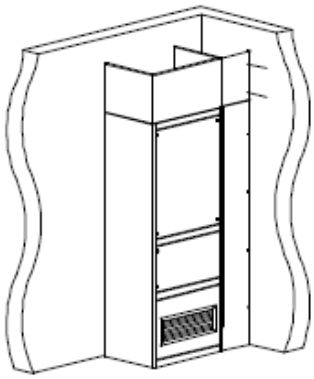
STEP 2:
Put the main BLOCK-OFF PANEL (B) into place and mark off where the edge of the panel meets the wall. Remove BLOCK-OFF PANEL.



STEP 3:
Line up the edge of the WALL BRACKETS (D) to the mark from the previous step. Fasten brackets to the wall.



STEP 4:
Put the BLOCK-OFF PANEL (B) back into place. Fasten the BLOCK OFF-PANEL to the WALL BRACKET (D) using flat head sheet metal screws (not provided).

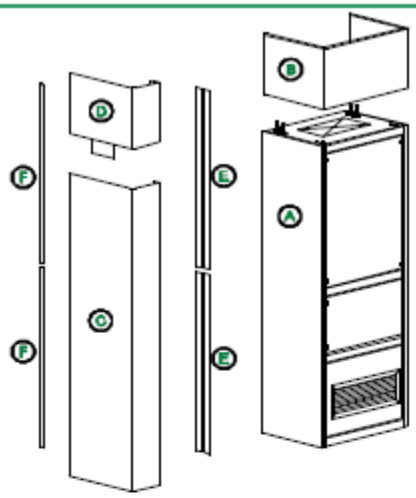


STEP 5:
If required, align the BLOCK-OFF EXTENSION (E) to the BLOCK-OFF PANEL (B) and fasten. Using the touch-up paint provided, paint screw heads to match the cover.

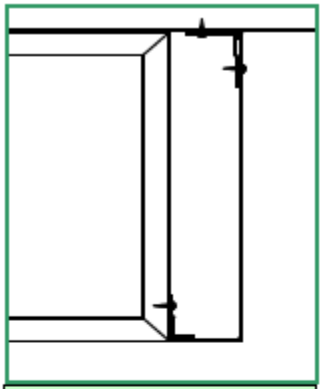
Side Pipe Cover

NOTE: Installation screws NOT PROVIDED.

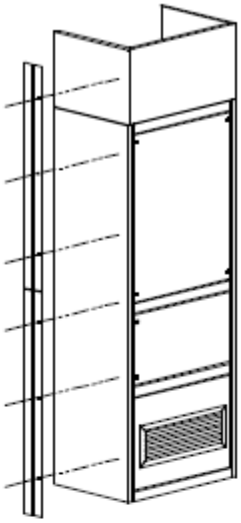
NOTE: Please refer to the 'Unit Layout' and 'Application Layout' pages in these submittals for precise pipe & duct connection locations and additional accessories.



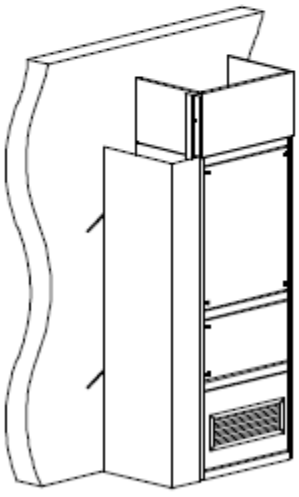
A) Classroom Unit
B) Top Extension or Plenum (if applicable).
C) Side Pipe Cover
D) Pipe Cover Extension (if applicable)
E) Cover Support
F) Wall Bracket



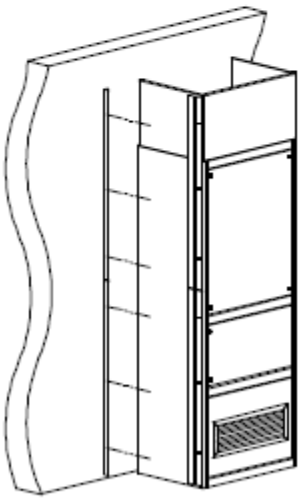
PLAN VIEW



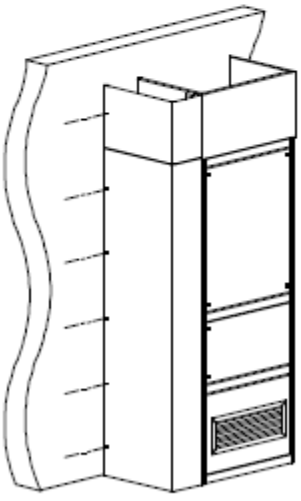
STEP 1:
If applicable, install the top extension or plenum onto the CLASSROOM UNIT (**A**). Fasten the COVER SUPPORT (**E**) to the CLASSROOM UNIT. This bracket should be installed 1 inch off of the finished floor level.



STEP 2:
Put SIDE PIPE COVER (**C**) into place. Mark off where the edge of the SIDE PIPE COVER meets the wall.



STEP 3:
Remove the SIDE PIPE COVER (**C**). Install the WALL BRACKET (**F**) in relation to the 'Marks' on the wall (from previous step).

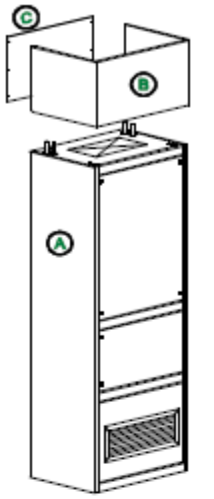


STEP 4:
Put the SIDE PIPE COVER (**C**) back into place and fasten to the WALL BRACKETS (**F**) using flat head type screws. Install PIPE COVER EXTENSION (**D**) in the same fashion. Using the cabinet touch-up paint provided, touch up the screw heads to match the cabinet.

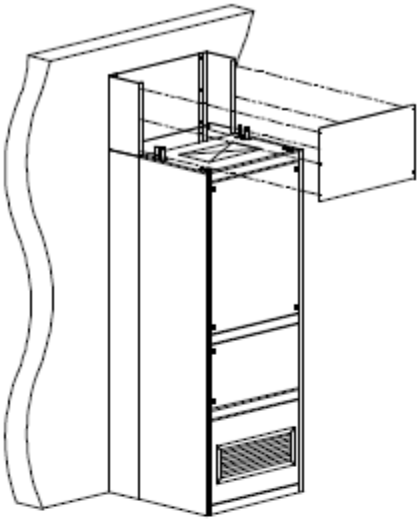
Top Extension

NOTE: Installation screws NOT PROVIDED.

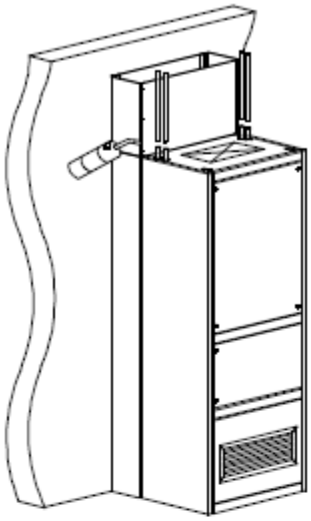
NOTE:
Drawings are conceptual. Please refer to the 'Unit Layout' and 'Application Layout' pages in these submittals for precise pipe & duct connection locations and additional accessories.



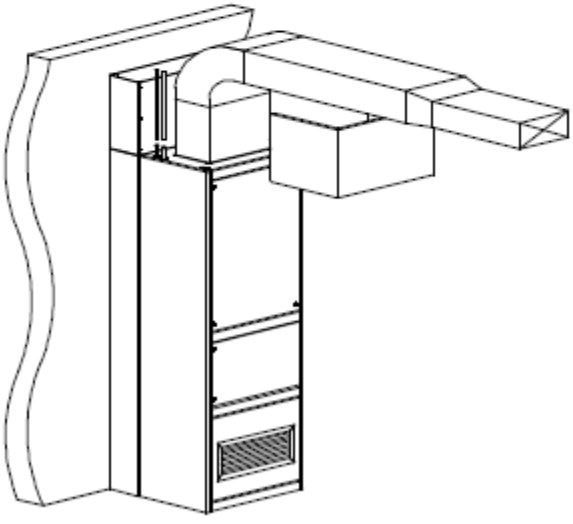
A) Classroom Unit
B) Top Extension (duct shroud).
C) Top Extension Back Panel
(only used with rear plenum).



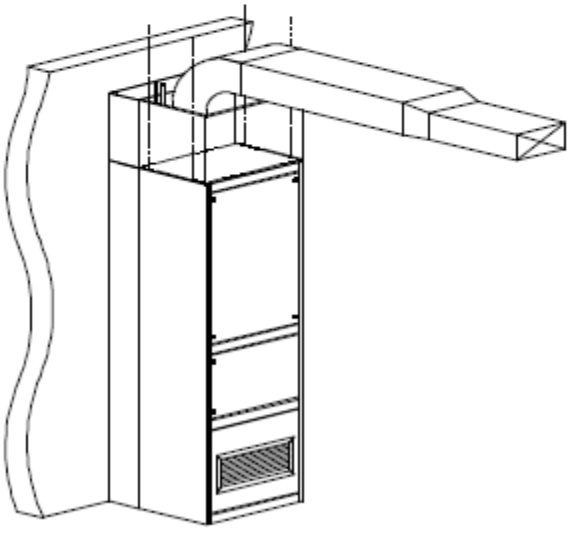
STEP 1:
If a rear plenum is to be installed, proceed with *STEP 1*. Otherwise skip to *STEP 2*. Install rear plenum assembly as per the instructions provided. Attach the TOP EXTENSION BACK PANEL (**C**) to the front of the rear plenum extension assembly as shown.



STEP 2:
Make piping and electrical connections to the CLASSROOM UNIT (**A**) where required.



STEP 3:
Install duct work (if applicable). Carefully slide TOP EXTENSION (**B**) on top of CLASSROOM UNIT (**A**) so that side edges are flush to the cabinet.

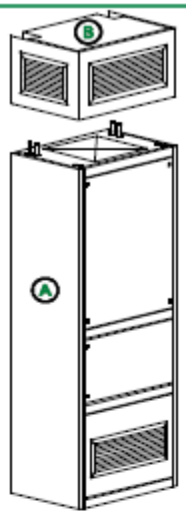


STEP 4:
Fasten TOP EXTENSION (**B**) to the top of the CLASSROOM UNIT (**A**).

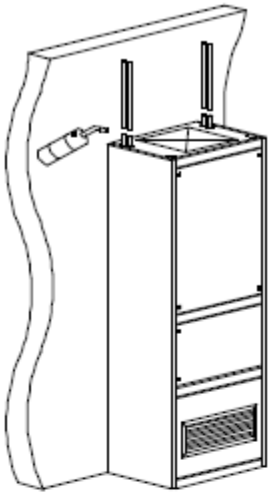
Top Plenum – Direct Supply

NOTE: Installation screws NOT PROVIDED.

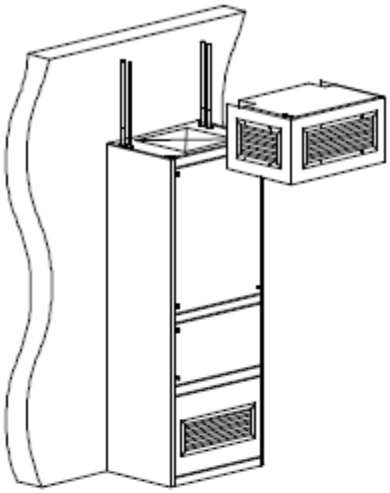
NOTE:
Drawings are conceptual. Please refer to the 'Unit Layout' and 'Application Layout' pages in these submittals for precise pipe & duct connection locations and additional accessories.



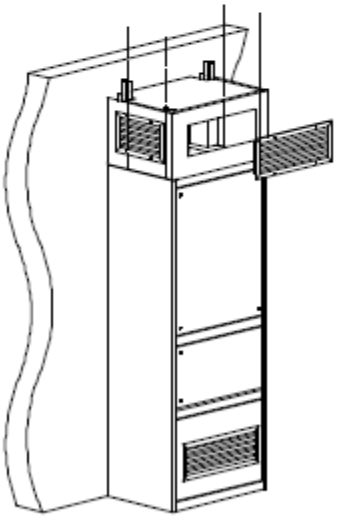
A) Classroom Unit
B) Top Plenum.



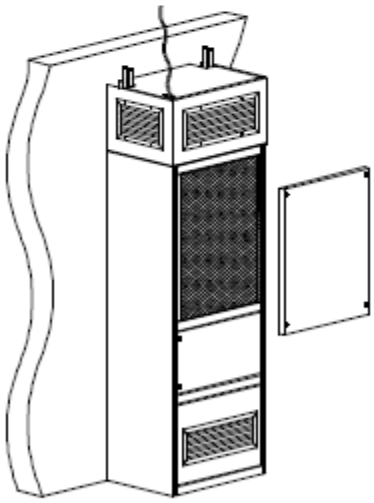
STEP 1:
Put the CLASSROOM UNIT (**A**) into place and make applicable piping connections.



STEP 2:
Slide the TOP PLENUM (**B**) onto the CLASSROOM UNIT (**A**). Align the TOP PLENUM (**B**) to the CLASSROOM UNIT (A) so that the front, back and sides are flush.



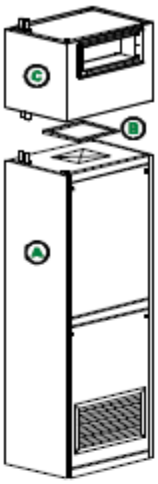
STEP 3:
Remove the supply air grille from the TOP PLENUM (**B**). Fasten the TOP PLENUM to the CLASSROOM UNIT (**A**) by securing the plenum flanges (located at the bottom of the plenum) to the top of the CLASSROOM UNIT with #8 self-drilling tapping sheet metal screws.



STEP 4:
Remove the top access panel of the CLASSROOM UNIT (**C**). Feed the electrical and control wiring through the TOP PLENUM (**B**) and through the top panel of the CLASSROOM UNIT. Make electrical connections inside of the electrical / control enclosure. Re-install the supply air grille.

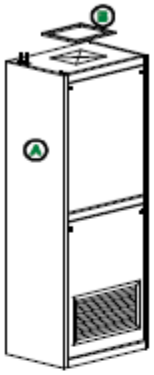
Top Acoustical Plenum

NOTE: Installation screws, washers and sealing gasket NOT PROVIDED.

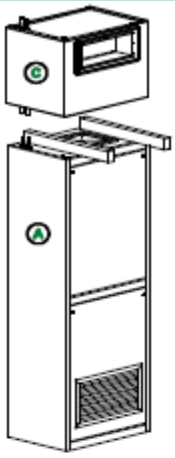


A) Classroom Unit
B) Sealing Gasket (by others)
C) Top Acoustical Plenum

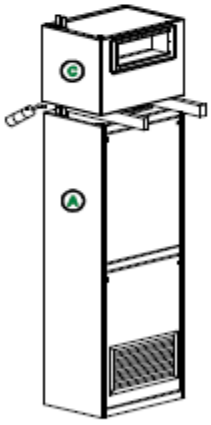
NOTE:
Drawings are conceptual. Please refer to the 'Unit Layout' and 'Application Layout' pages in these submittals for precise pipe & duct connection locations and additional accessories.



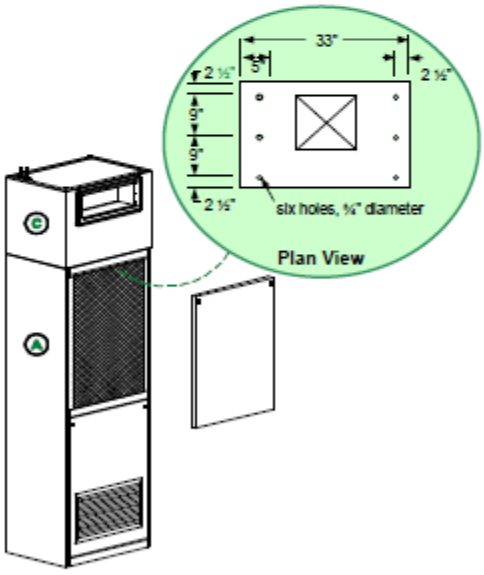
STEP 1:
Fit a suitable compressible SEALING GASKET (**B**) around the suppy air fan discharge to prevent air leakage at the interface of the unit and the TOP ACOUSTICAL PLENUM (**C**).



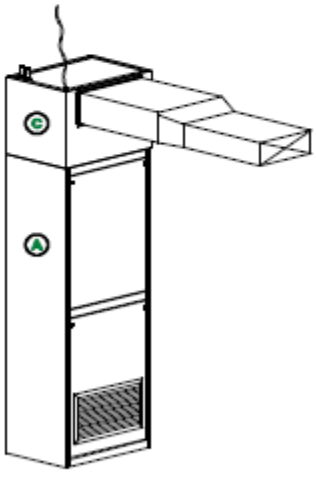
STEP 2:
Stand the TOP ACOUSTICAL PLENUM (**C**) onto two pieces of 2"x4" wood on top of the CLASSROOM UNIT (**A**).



STEP 3:
Within the 4" gap, make soldered connections between the CLASSROOM UNIT (**A**) stub-outs and the bottom end of the pipe extensions in the TOP ACOUSTICAL PLENUM (**C**). Remove the 2"x4" wood and allow the TOP ACOUSTICAL PLENUM to rest on the CLASSROOM UNIT squarely.



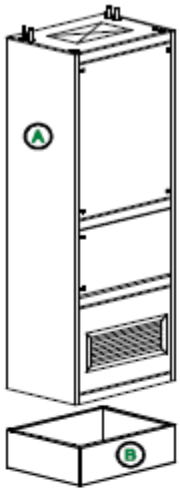
STEP 4:
Remove the top access panel of the CLASSROOM UNIT (**C**). Locate the six 3/4" clearance holes in the top horizontal panel of the CLASSROOM UNIT. The holes are beneath the insulation. Using six 1/4" x 20 t.p.i. Screws and 1 1/4" O.D. flat washers under the screw heads, secure the top of the CLASSROOM UNIT to the TOP ACOUSTICAL PLENUM (**A**). The TOP ACOUSTICAL PLENUM has weld nuts (flush mounted) on the bottom surface.



STEP 5:
Feed the power cable down through the 1" conduit, pre-installed within the TOP ACOUSTICAL PLENUM (**C**) and down into the CLASSROOM UNIT (**A**) to the terminal block within the electrical enclosure. Attach the duct to the pre-installed supply air collar on the TOP ACOUSTICAL PLENUM (**C**).

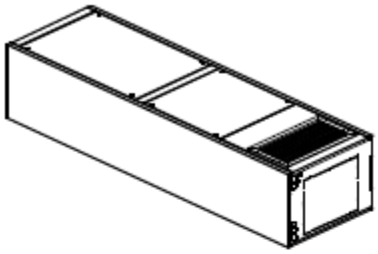
Raised Base

NOTE: Installation screws, washers and sealing gasket NOT PROVIDED.

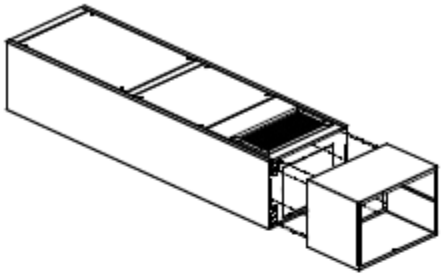


A) Classroom Unit
B) Raised Base

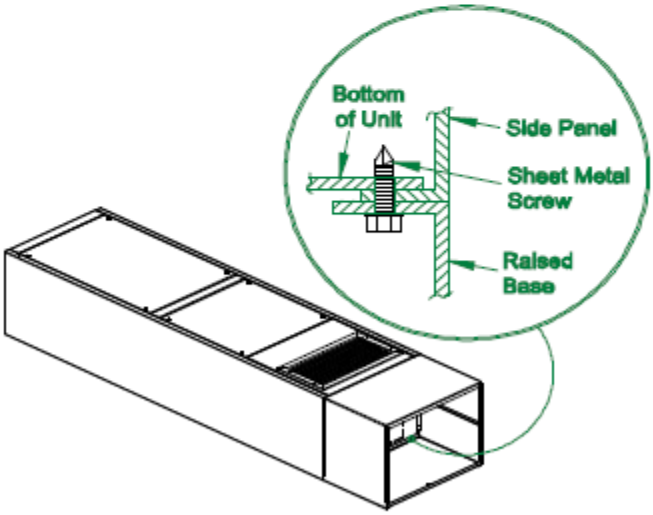
NOTE:
Drawings are conceptual. Please refer to the 'Unit Layout' and 'Application Layout' pages in these submittals for precise pipe & duct connection locations and additional accessories.



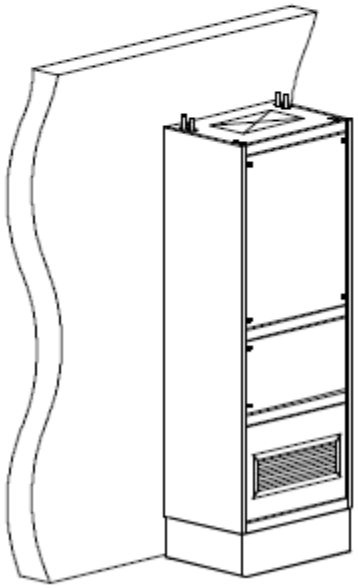
STEP 1:
Lay down the CLASSROOM UNIT (**A**) carefully on the floor. Note: the CLASSROOM UNIT may slide during laying down operation. Special precautions should be taken by the installer to prevent damage or injury.



STEP 2:
Align the RAISED BASE (**B**) to the bottom of the CLASSROOM UNIT (**A**) so that the front, back and sides are flush.



STEP 3:
Using #8 self-drilling tapping sheet metal screws, fasten the RAISED BASE (**B**) to the CLASSROOM UNIT (**A**).

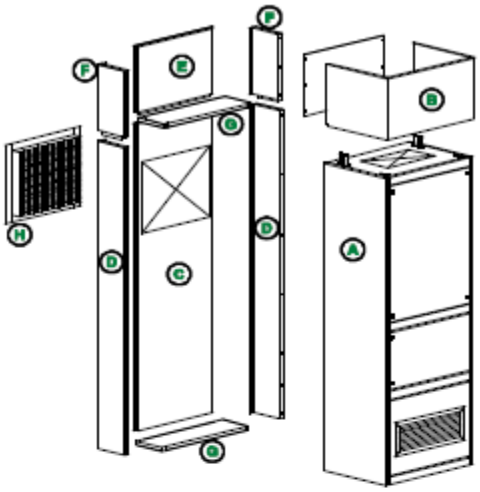


STEP 4:
Carefully tilt the CLASSROOM UNIT(**A**) with the attached RAISED BASE (**B**) up to a vertical position. Continue with other installation steps.

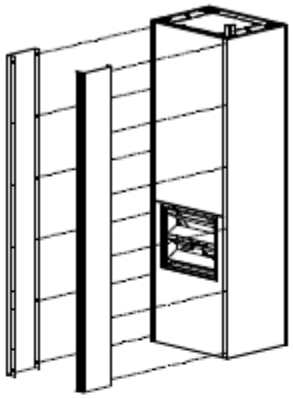
Rear Plenum

NOTE: Installation screws NOT PROVIDED.

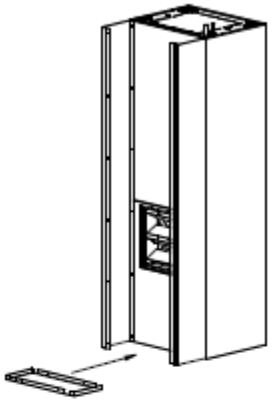
NOTE: Please refer to the 'Unit Layout' and 'Application Layout' pages in these submittals for precise pipe & duct connection locations and additional accessories.



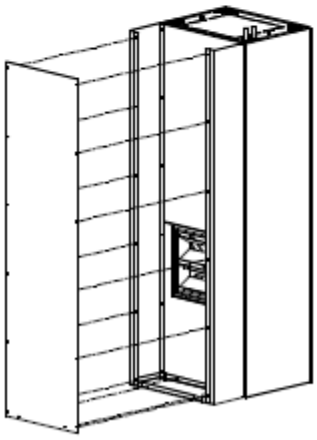
A) Classroom Unit
B) Top Extension or Plenum (if applicable).
C) Rear Plenum Back Panel
D) Rear Plenum Side Panel
E) Rear Plenum Back Extension (if applicable)
F) Rear Plenum SideExtension (if applicable).
G) Top/Bottom/Middle Block-Off
H) Outdoor Air Louver (if applicable)



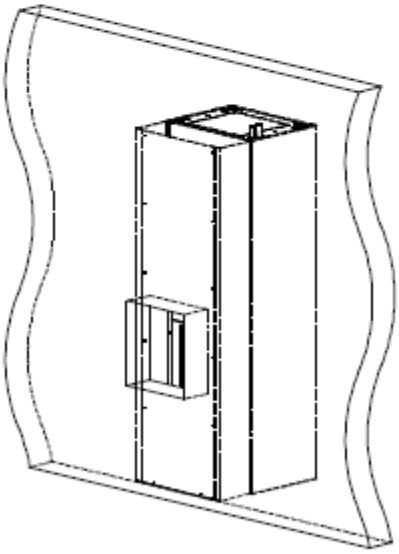
STEP 1:
Using the pre-drilled holes on the REAR PLENUM SIDE PANELS (**D**), fasten the REAR PLENUM SIDE PANELS to the back of the CLASSROOM UNIT (**A**). Ensure that each REAR PLENUM SIDE PANEL is flush with the side of the CLASSROOM UNIT.



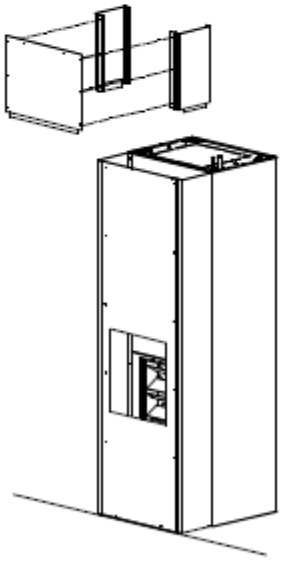
STEP 2:
Insert the BOTTOM BLOCK-OFF (**G**) so that it is square to the CLASSROOM UNIT (**A**).



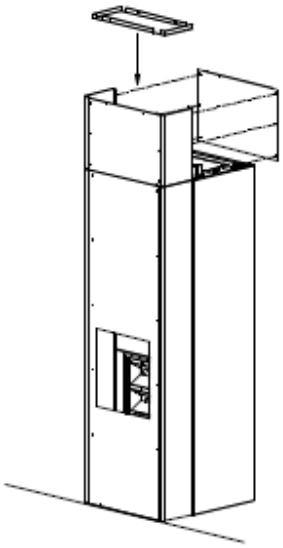
STEP 3:
Fasten the BOTTOM BLOCK-OFF PANEL (**G**) to the back of the CLASSROOM UNIT (**A**). Using the pre-drilled holes, align and fasten the REAR PLENUM BACK PANEL (**C**) to the REAR PLENUM SIDE PANELS (**D**).



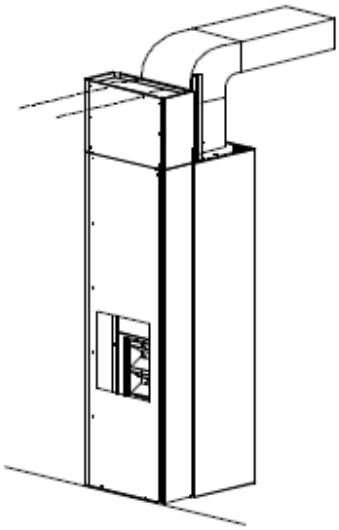
STEP 4:
Center the CLASSROOM UNIT (**A**) to the wall opening. Cut the outdoor air intake opening in the REAR PLENUM BACK PANEL (**C**) to suit the wall opening.



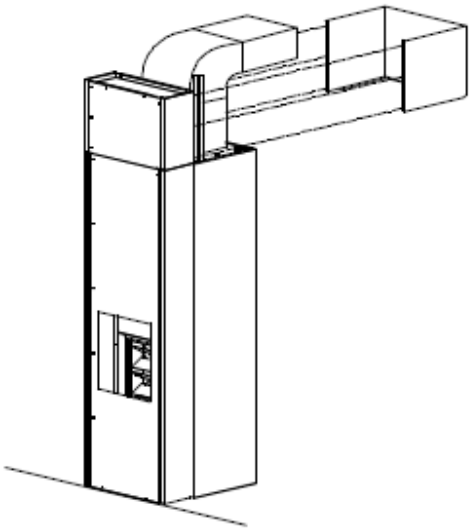
STEP 5:
Using the pre-drilled holes, fasten the REAR PLENUM BACK EXTENSIONS (**E**) to the two REAR PLENUM SIDE EXTENSIONS (**F**). Insert the extension assembly into the top of the rear plenum.



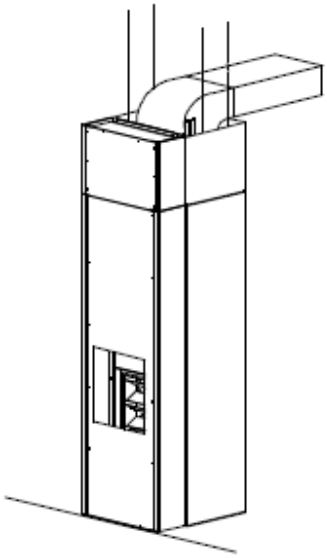
STEP 6:
Fasten the back piece of the TOP EXTENSION (**B**) to the REAR PLENUM SIDE EXTENSIONS (**F**). Insert the REAR PLENUM TOP BLOCK-OFF PANEL (**G**) into the top of the extension assembly.

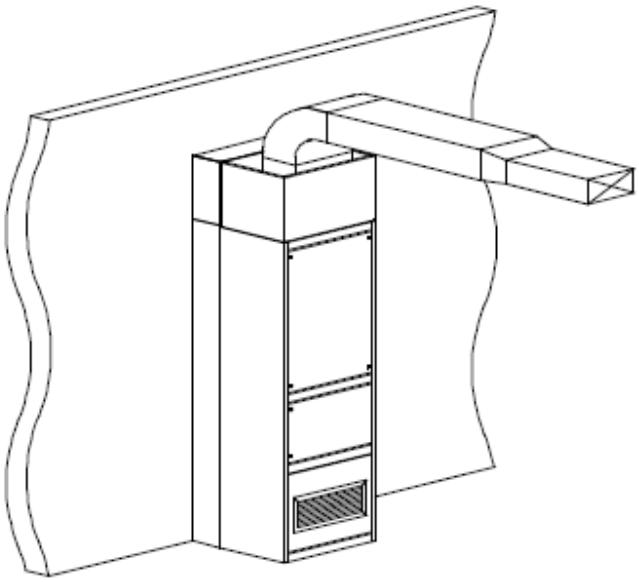


STEP 7:
Using the pre-drilled holes, fasten the REAR PLENUM TOP BLOCK-OFF PANEL (**G**) to the CLASSROOM UNIT (**A**) and to the REAR PLENUM BACK EXTENSION (**E**). Where required, make duct and pipe connections to the CLASSROOM UNIT (**A**).



STEP 8:
If applicable, slide the TOP EXTENSION (**B**) into place and fasten to the top extension back panel.





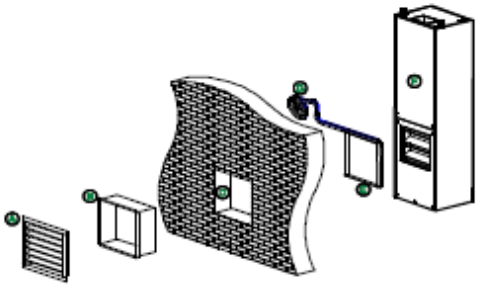
STEP 9:
Secure the TOP EXTENSION (**B**) to the top of the CLASSROOM UNIT (**A**) (if applicable).

Wall Assembly

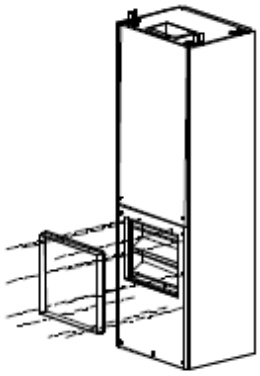
NOTE:
Installation screws and caulking NOT PROVIDED.

If a REAR PLENUM is installed, the rear collar and weather strip will not be provided.

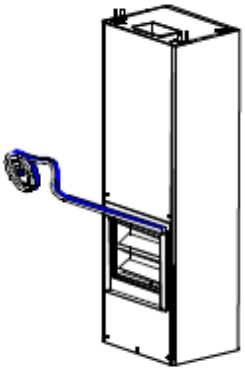
NOTE:
Drawings are conceptual. Please refer to the 'Unit Layout' and 'Application Layout' pages in these submittals for precise pipe & duct connection locations and additional accessories.



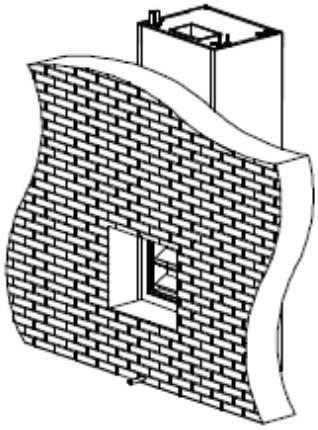
A) Wall Louver.
B) Wall Sleeve (if applicable).
C) Wall.
D) Weather Strip Gasketing.
E) Rear Collar.
F) Classroom Unit.



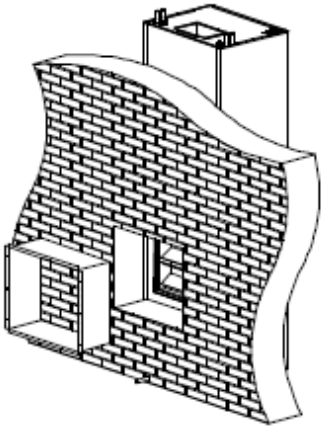
STEP 1:
Attach the 2" deep REAR COLLAR (**E**) to the back of the CLASSROOM UNIT (**F**) using the pre-drilled holes.



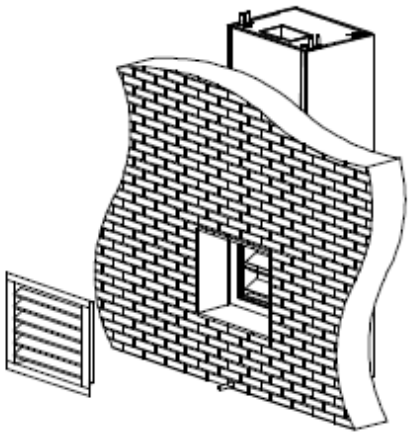
STEP 2:
Apply the self-adhesive 1" square foam WEATHER STRIP (**D**) around the outside of the REAR COLLAR (**E**). This is to prevent outdoor air leakage into the room from around the perimeter of the wall opening.



STEP 3:
For units with a cooling coil, a 5/8" vinyl condensate tubing is coiled up in the return section for field use. Before proceeding to *Step 4*, determine where the condensate line will drain out. If the condensate line is to exit through the wall, then refer to the submittals for condensate opening locations on the CLASSROOM UNIT (**F**).



STEP 4:
Push the CLASSROOM UNIT (**F**) into position with the REAR COLLAR (**E**) penetrating the wall opening, compressing the foam WEATHER STRIP (**D**). Plumb the CLASSROOM UNIT unit using shims if necessary. Insert the WALL SLEEVE (B) into the wall opening from outside the building. The WALL SLEEVE is an inside fit into the REAR COLLAR (E). Secure the sleeve to the side flange (NOT BOTTOM) of the REAR COLLAR. Caulk all joints.



STEP 5:
Insert the LOUVER (**A**) into the WALL SLEEVE (**B**) and secure to the WALL (**C**). Caulk the top horizontal edge and two side vertical edges of the WALL LOUVER (**A**). **DO NOT CAULK THE BOTTOM HORIZONTAL EDGE.**

UVC Light

UVC lights are installed in the blower housing and only available in Draw Through unit layouts with ducting. UVC is not available with A2L units.

To avoid UVC exposure, there MUST be at least 8ft of internally insulated ductwork between the first supply air grille/ diffuser and the fan discharge. The insulation must UVC rated and non reflective (i.e., not aluminum foil insulation).

The UVC light has a built-in airflow sensor, so the light will turn on and off to match the blower, extending the life of the bulb. The bulb is rated for 50,000 hours of operation. Cleaning of the UVC bulb is not required.

The UVC light is UL2998 rated and will not produce ozone.

Do not operate the UVC light if obviously damaged. Unintended use of the unit, or damage to housing mar result in the escape of dangerous UVC radiation. UVC radiation may, even in small doses cause harm to the eyes and skin.

Access panels bearing the ultraviolet radiation hazard symbol which may have UV-C SPECTRAL IRRADIANCE greater than 1,7 μW/cm2 are provided with an interlock switch to interrupt the power to the UV-C LAMPS for your safety. Do not override.

Before opening doors and access panels bearing the ULTRAVIOLET RADIATION hazard symbol for the conducting USER MAINTENANCE, it is recommended to disconnect the power.

UV-C BARRIERS bearing the ULTRAVIOLET RADIATION hazard symbol should not be removed.

Do not operate UV-C LAMPS outside of the appliance.

Replacing the UVC Bulb

Ensure power is disconnected from the UVC light and the bulb has cooled after operation.

Remove the cover and disconnect the wiring from the LED module. Remove the bulb from the blower and dispose of the bulb appropriately.

When installing the new bulb (Temspec Part# EUV 30843), be sure to not touch the bulb with bare hands as oil from hands may damage the bulb.

For more information, please contact the factory.

Replacement Parts

Limited Warranty

TEMSPEC INCORPORATED warrants the equipment from factory defects in material or workmanship for a period of one year from installation or 18 months from the date of shipment, whichever occurs first.

For this warranty to be valid, the unit(s) must be installed and maintained in accordance with the manufacturer's printed instructions. It does not cover parts damaged by vandalism, improper installation, maintenance, or abuse.

Should any replacement parts be required within the warranty period, they will be supplied at no charge, freight prepaid to the jobsite. The cost of labor or incidental expenses incurred in the repair or replacement of parts does not form part of this warranty.

The warranty period commences from the date of shipment, except when otherwise agreed at the point of sale (see specific warranty terms and conditions for details).

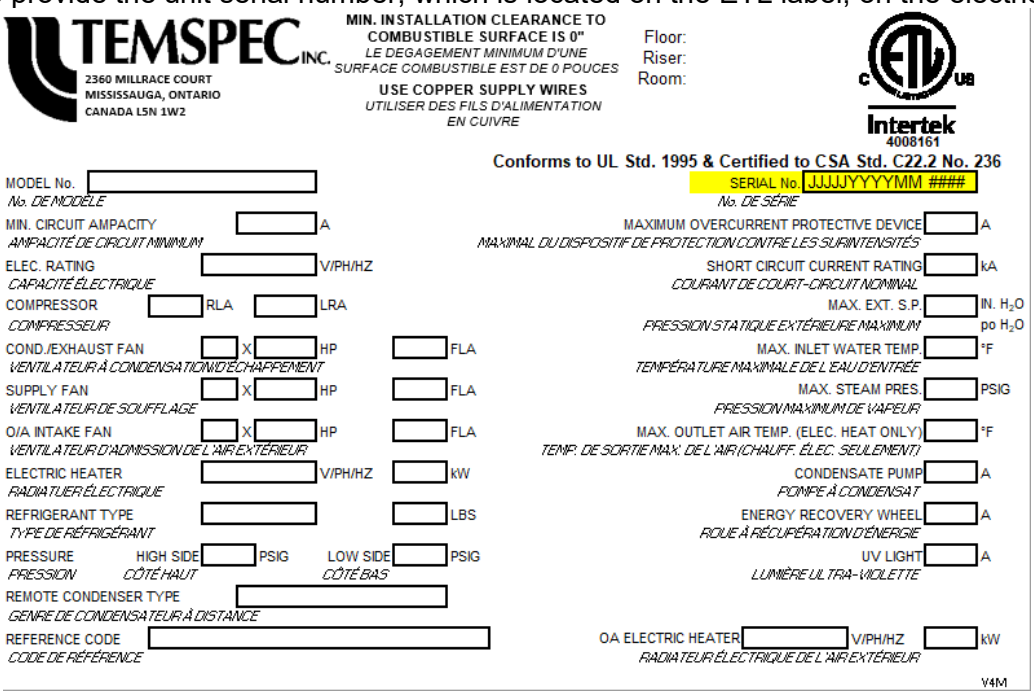
Part Sales

Contact the factory at: 1-888-TEMSPEC or (905) 670-3595

sales@temspec.com

Ask for 'parts sales'

Be sure to provide the unit serial number, which is located on the ETL label, on the electrical box



Model Number Reference Code

FINISHED GOODS PART #'S FOR TEMSPEC MANUFACTURED, SINGLE ZONE HVAC UNITS - NON-A2L