Hi-Velocity Systems™

Small Duct High Velocity Heating, Cooling and Home Comfort Systems

Cube EC Series Design & Installation Manual

Space Heating and Cooling

Fresh Air Make-Up

Exhaust Air

Models:

CU-31-EC

CU-51-EC

Manufactured By

Energy Saving PRODUCTS LTD

Manual-CU-Cube-EC-Design-and-Installation-120121

Please read the ENTIRE manual before beginning installation as this will help avoid mistakes that may cost time and money.

Quality Assurance

Air handler units shall be a total indoor air quality system complete with heating, cooling, air filtration, and possibility of humidity control and fresh air make up. The air handler must be factory manufactured, assembled and tested.

All equipment furnished under this specification shall comply with the following standards:

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
AHRI	Air-Conditioning, Heating, and Refrigeration Institute
CSA	Canadian Standards Association
CE	European Conformity
DOE	Department of Energy
UL	Underwriters Laboratories

Refer to *Module SPC - Specifications and Sizing* for system specifications, measurements, etc. For more detailed specification pages please see our website.

www.hi-velocity.com

Also available on our website:

- Installation Videos
- Promotional Video
- Engineering Specifications
- Downloadable Installation Modules
- Complete Parts List
- Complete list of Agents/Distributors
- Case Studies

Installation

IMPORTANT: The Hi-Velocity System is not to be used for temporary heating or cooling during the construction of the structure. If used in this capacity all warranties will be null and void.

For in-depth ducting, outlet, air handler and return air placement & installation, please contact the factory at 1-888-652-2219 or email info@hi-velocity.com

The Cube Series of air handlers by Energy Saving Products Ltd. can be installed in the hi-boy, horizontal, or counterflow positions. Return air access must be from the rear of the unit. The Cube air handler comes standard with backward curved centrifugal fan, 24 volt circuit board and a hydronic water coil.

The Cube can be ducted or unducted, with or without 24v controls, and can come with a hydronic water coil (H) or without (BU).

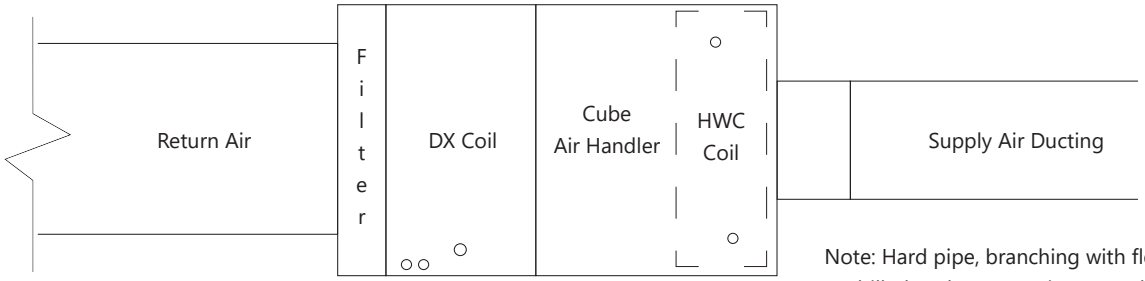
The Cube was designed to be versatile so it can be used in many different installation applications including indoors, attics, crawl spaces, garage and space heating/cooling locations.

A steam humidifier can be installed on ducted installations, 18" down stream of the supply air collar. When used for heating/cooling, the standard 24 volt circuit board can prioritize thermostat calls, turn on and off different fan speeds and control output signals to heating and cooling equipment.

Hydronic connections are 3/8" I.D. (Cube-31) and 3/4" I.D. (Cube-51). The connections are copper sweat connections, and should be piped to allow access to the filter and control access panel for maintenance and service.

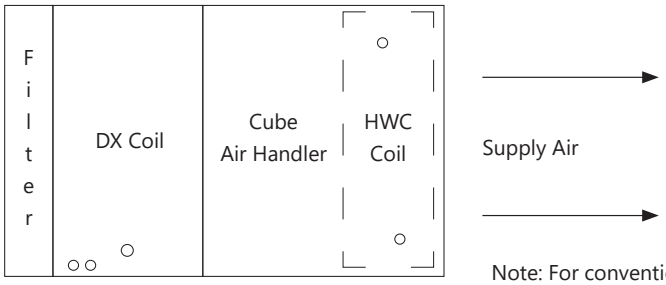
CUBE EC Air Handler - Typical Applications

CU-31/51 Space Heating or Cooling (Ducted)



Note: Hard pipe, branching with flex duct or drilled outlet system is acceptable

CU-31/51 Space Heating or Cooling (Non-Ducted or Conventional Ducting)



Note: For conventionally ducted applications, the 8" round supply air collar can be removed so it can be connected to conventional rectangular duct work. For unducted applications, the 8" round supply air collar can be used for increased air velocity and throw.

Cube Design

The following section is basic information needed for the designer. If not done already, this section should be read thoroughly before beginning installation.

IMPORTANT: For cooling applications, a minimum of 6 (six) HE outlets or 12 (twelve) 2" outlets per ton is required for all Cube Series air handlers. Any combination of HE and/or 2" outlets can be used to meet this minimum.

Table 01 - Allowable Flex Duct Branch Lengths

Model	Min. Length	Max. Length
Cube Series	5′ (1.52m)	10′ (3.05m)

IMPORTANT: The Cube Series Air Handler is designed for use with 5 foot flexible ducts. 10 foot flexible ducts can be used but the total number used cannot exceed 1/3 (33%) of the total number used on the system. Using all 10 foot lengths is allowable, but may result in a decrease in the system's total capacity.

Location

The multi-positional air handler can be installed in many different configurations. The air handler can be located in a Vertical, Horizontal, or Counter-Flow position.

The recommended size for main plenum is 8", though it is not required to use 8" for the whole run. If space or cost is a concern, the main plenum can be reduced down to a smaller size. If reducing the plenum, reference Table 02 for allowable length and maximum number of vents for the size chosen. Never reduce at a bullhead tee, always reduce after the bullhead tee or you can lose approximately 20% of your airflow.

Duct Reduction

Table 02 – Duct Reduction

Duct Size	# of HE Vents	# of 2" Vents	Max Length
5" (127mm)	3	6	30′ (9.14m)
6" (152mm)	6	12	40′ (12.19m)
7" (178mm)	9	18	40′ (12.19m)
8" (203mm)	12	24	50′ (15.24m)

Elbow and Tee Placement

Elbows and tees must not be placed any closer than 18" from supply outlet on the air handling unit. A significant loss of airflow can result if elbows or tees are installed closer than 18" (457mm). Figs. CUB-01 and Fig. CUB-02 illustrate a proper install with at least 18" of straight plenum after the unit supply outlet. Fig. CUB-03 shows the sigma velocity profile of the first 18" (457mm) of the main plenum and why it's important to allow the system to equalize air flow.

Branch Tees

When branch tees are used, the plenum split is to be a 70/30 main/branch split (Fig. CUB-01).

Fig. CUB-01 - Branch Tee, 70/30 split

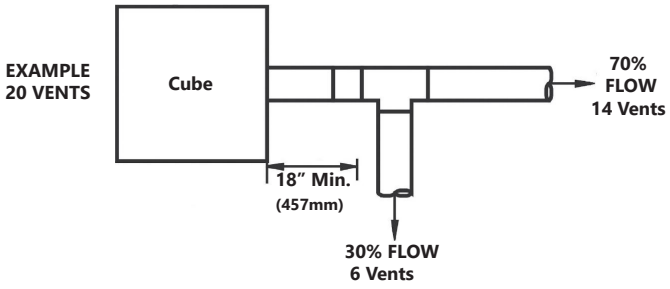
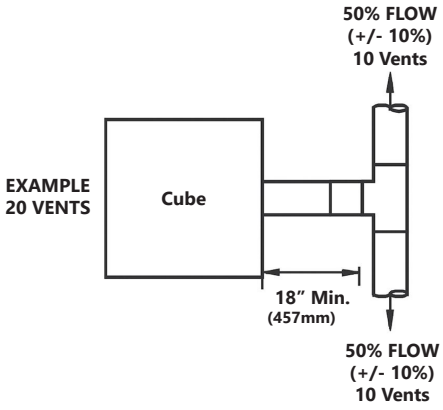
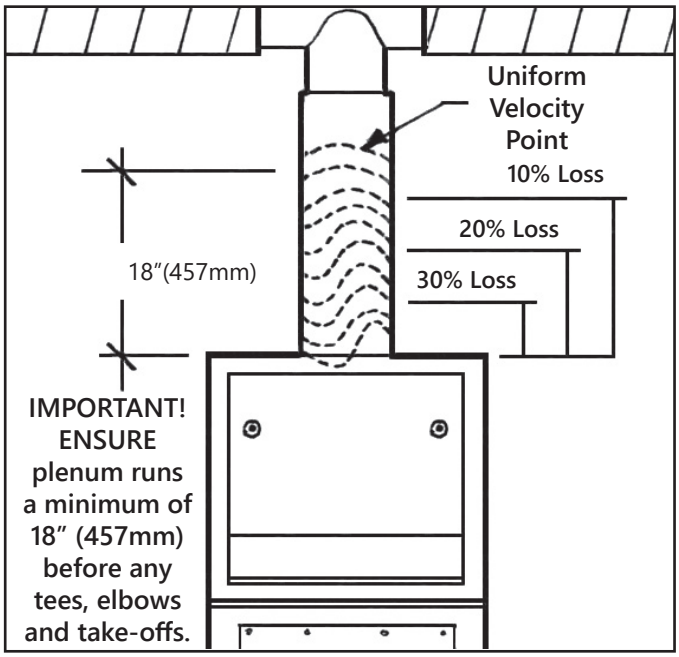


Fig. CUB-02 - Bullhead Tee, 50/50 split



IMPORTANT: If elbows, tees, or branch take-offs are placed closer than 18" (457mm) you may lose up to 30% of your airflow as illustrated in Fig. CUB-03.

Fig. CUB-03 - Sigma Velocity Profile

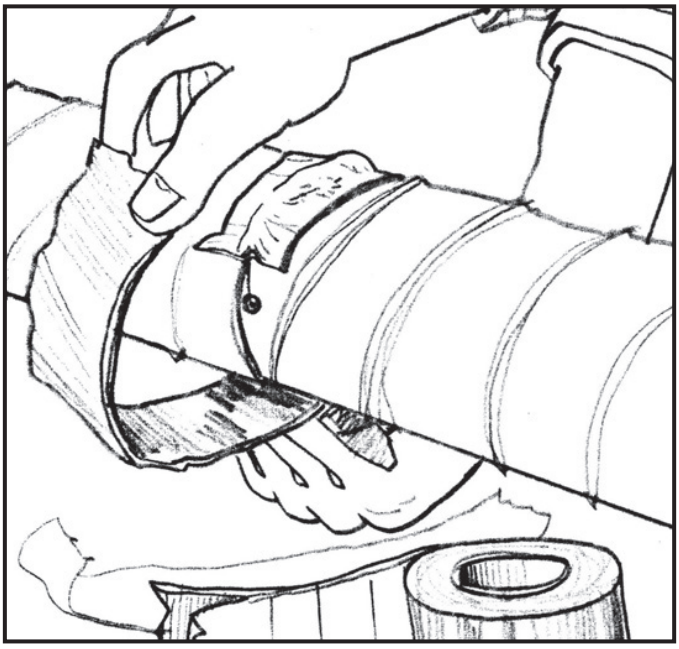


Bullhead Tees

Bullhead tees are to be maintained as close to a 50/50 split as possible, with a maximum 60/40 split (Fig. CUB-02). For the best system performance, keep the number of elbows and tees to a minimum.

After any connection is made, including the joints of elbows and tees, foil duct tape or a duct sealant should be used to eliminate any air leaks.

Fig. CUB-04 - Seal all connections



Return Air

When designing the return air for the Cube Series, there are a few things to consider. It is common to use centralized return air with systems that have rooms that are within a common area. Separate floors or rooms that have high loads and require a large amount of supply air flow should have their own return air, or be tied into the centralized return air to allow the air to return back to the air handler. Rooms or areas that cannot be tied into the return air should have an air transfer grill to allow the air to escape the room and flow back to a centralized return air.

The Cube Series Air Handler is a pressure supply duct system that forces the air into rooms through supply outlets. A closed room will pressurize, and air will escape through the undercut of a door back to a centralized return air. (i.e. a typical bedroom with two 2" outlets or 1 HE outlet will deliver 64 cfm into the space, a ½" undercut door will provide 15 square inches of r/a from the space at a transfer velocity of 4 fpm, sufficient to provide comfortable r/a.) If more than four 2" or two HE vents are installed in a room, or if there is a sealed door in the room, an air transfer grill or return air should be installed to allow the air back to the air handler.

The return air duct is not supplied with the Cube. It is to be supplied and installed by the contractor. The return air and fresh air make-up ducts are to be installed according to local building code.

The return air duct from the air handling units is to be acoustically lined for sound absorption, for the first five feet, or for the line of sight. This only applies on short return air duct work of less than 10 feet (3.05m).

Duct Sizing

The return air is to be sized on a 0.15 static pressure (37 pa) as compared to 0.10 static pressure (25 pa) for conventional forced air systems. The maximum length for an individual return air duct is thirty feet (9.14m).

Please note: It is VERY important NOT to undersize the return air, as this will create noise, increase motor power consumption and reduce airflow.

Table 03 has recommended return air sizes for round and rectangular ducts. A variance of **plus 20%** is allowable for sizing return ducts that connect to the Hi-Velocity Systems unit.

Table 03 – Return Air Duct Sizes

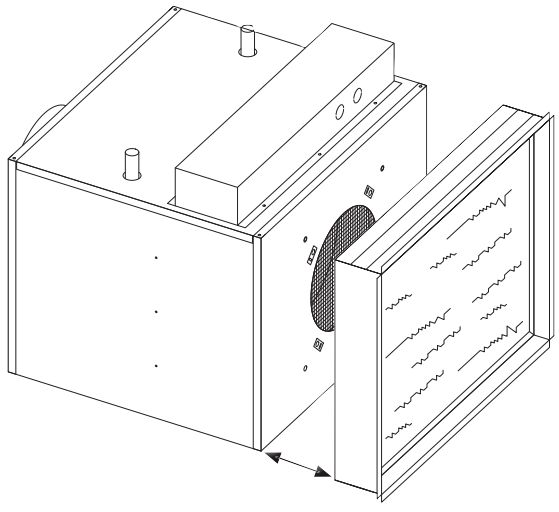
Unit	Rigid Ø	Flex Ø	Min Sq. Inches (Sq. cm)
CU-31	12" (305mm)	14" (356mm)	120 (774cm)
CU-51	12" (305mm)	14" (356mm)	120 (774cm)

Remember: When using flexible duct for return air, use one duct size larger due to the higher friction loss.

Where allowed by local codes, a single return air grill may be used. Note: Return air grill must have equal minimum of free air area to return air.

Important: When using flexible duct for return air, use one duct size larger due to the higher friction loss.

Important: Keep any restrictions like filters or coils a minimum of 2" away from the fan inlet, so maximum air flow of the system is not affected.

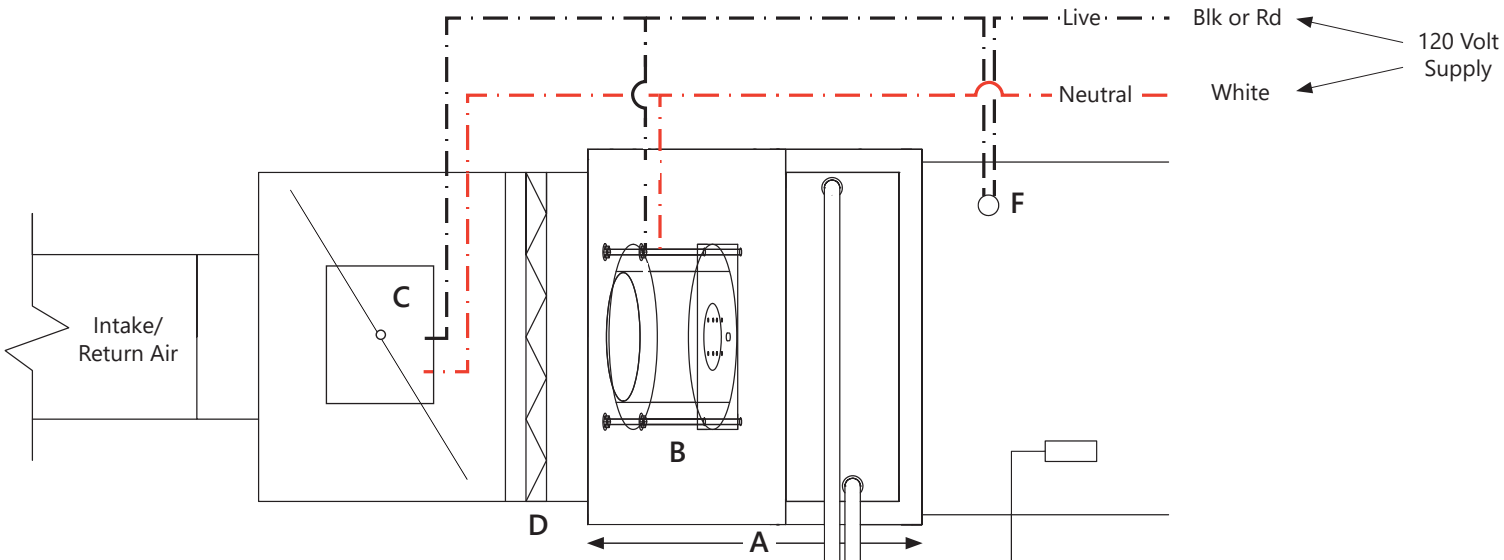


2" minimum before any restriction

IMPORTANT: Use of an air filter is always recommended.

CUBE EC Air Handler - Other Applications

Cube 31/51 Fresh Air Make-Up

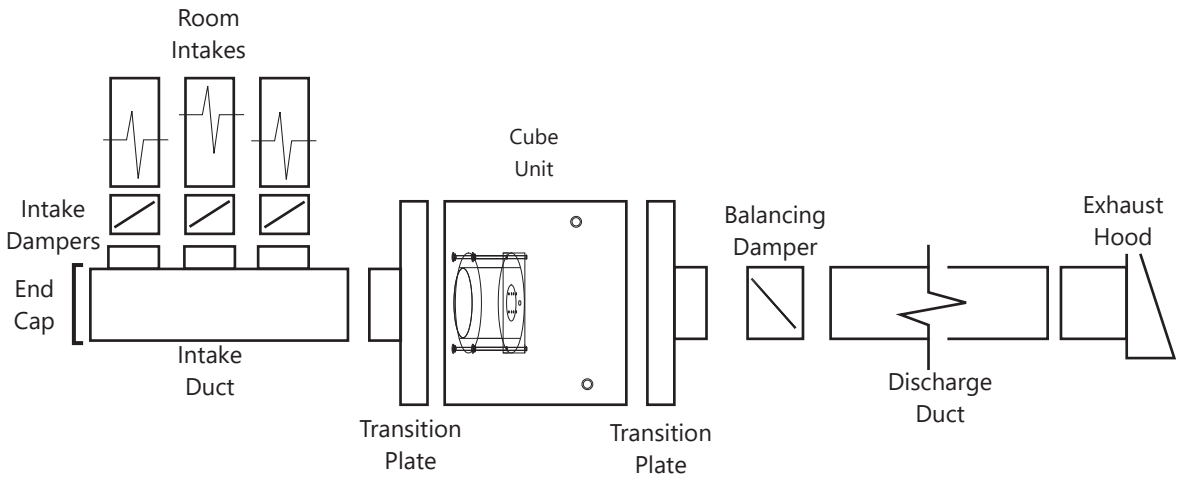


A - CU-31/51 Unit
B - CU-31/51 Fan
C - Fresh Air Damper
D - Filter
E - Constant Temp Control Valve
F - Low Temp. Cut-out

Cube Series Exhaust Air Units

Cube Series air handlers can be used as stand alone central exhaust ventilators, or as a fan coil for fresh air make-up to provide a balanced ventilation system. Typical installations will have an intake from each bathroom and an intake from the kitchen running to the unit with an eight inch exhaust to outside. Manual dampers are recommended to be installed on each duct run to assist in system balancing.

Cube Exhaust Air Unit Typical Connections



PSB / CUBE EC

POWER INPUT: 110-127/1/50-60

THERMOSTAT CONNECTIONS

R - 24 VAC OUTPUT
W1 - FIRST STAGE HEAT
W2 - SECOND STAGE HEAT (OR SINGLE STAGE)
Y1 - FIRST STAGE COOLING
Y2 - SECOND STAGE COOLING (OR SINGLE STAGE)
C - 24 VAC COMMON
G - THERMOSTAT FAN SWITCH
D - PRIORITY (RUNS AT W SPEED)
O/B - HEATPUMP REVERSING

EMERGENCY DISCONNECT

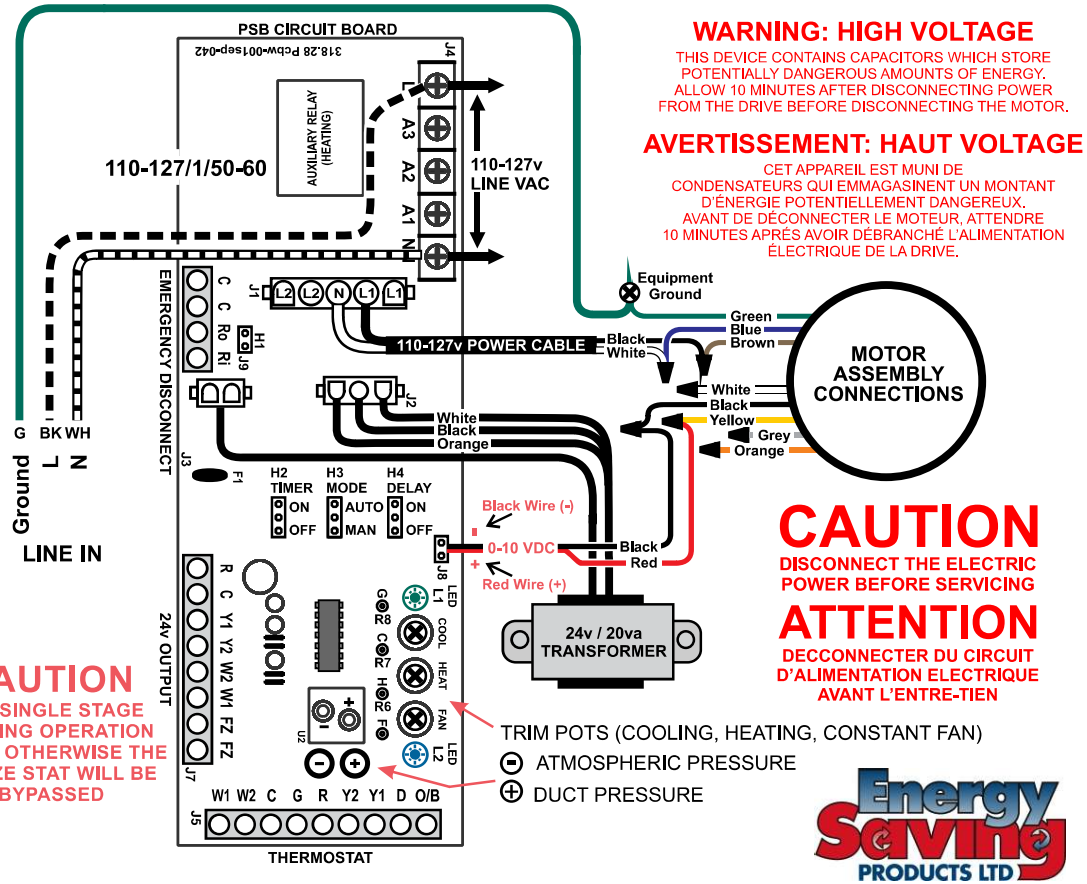
C - 24 VAC COMMON
C - 24 VAC COMMON
Ro - 24 VAC OUTPUT
Ri - 24 VAC INPUT

AUXILIARY HEATING RELAY

N - NEUTRAL
L - LINE VOLTAGE
A1 - AUXILIARY NORMALLY OPEN
A2 - AUXILIARY NORMALLY CLOSED
A3 - AUXILIARY COMMON

24 VAC OUTPUT CONNECTIONS

FZ - FREEZE STAT
FZ - FREEZE STAT
W1 - HEATING (W1) 24 VAC OUTPUT
W2 - HEATING (W2) 24 VAC OUTPUT
Y2 - CONDENSING UNIT 24 VAC OUTPUT
Y1 - CONDENSING UNIT 24 VAC OUTPUT
C - 24 VAC COMMON
R - 24 VAC OUTPUT



JUMPER PIN SETTINGS

H1 EMERGENCY DISCONNECT: REMOVE PIN IF WIRED TO EMERGENCY DISCONNECT.
H2 TIMER: AUXILIARY RELAY TIMER (SEE NOTES).
H3 MODE:
AUTO - FAN SPEED MODULATES DEPENDING UPON STATIC PRESSURE.
MANUAL - FAN SPEED OPERATES AT TRIM POTS SET AIR FLOW.
H4 DELAY: Y/20 AND W/30 SECOND FAN DELAY. Y AND W 30 SECOND POST PURGE.

LED LIGHT INDICATORS

LED 1 - GREEN LIGHT, PUMP TIMER AND OPERATION MODE INDICATOR.
LED 2 - BLUE LIGHT, PRESSURE SENSOR.

WARNING: HIGH VOLTAGE

THIS DEVICE CONTAINS CAPACITORS WHICH STORE POTENTIALLY DANGEROUS AMOUNTS OF ENERGY. ALLOW 10 MINUTES AFTER DISCONNECTING POWER FROM THE DRIVE BEFORE DISCONNECTING THE MOTOR.

AVERTISSEMENT: HAUT VOLTAGE

CET APPAREIL EST MUNI DE CONDENSATEURS QUI EMMAGASINENT UN MONTANT D'ÉNERGIE POTENTIELLEMENT DANGEREUX. AVANT DE DÉCONNECTER LE MOTEUR, ATTENDRE 10 MINUTES APRÉS AVOIR DÉBRANCHÉ L'ALIMENTATION ÉLECTRIQUE DE LA DRIVE.

CAUTION

DISCONNECT THE ELECTRIC POWER BEFORE SERVICING

ATTENTION

DECCONNECTER DU CIRCUIT D'ALIMENTATION ELECTRIQUE AVANT L'ENTRE-TIEN

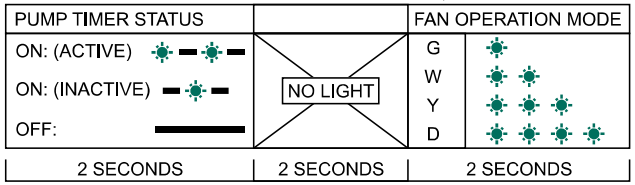
CAUTION

FOR SINGLE STAGE COOLING OPERATION USE Y2 OTHERWISE THE FREEZE STAT WILL BE BYPASSED

NOTES:

1) USE THERMOSTAT FAN SWITCH TO DISABLE/ENABLE CONTINUOUS FAN.
2) 'C' TERMINAL ON THERMOSTAT (COMMON) IS NOT NEEDED FOR SOME THERMOSTATS CONSULT THERMOSTAT INSTRUCTIONS FOR DETAILS.
3) W1 AND W2 ACTIVATES AUXILIARY RELAY (A3) ON CALL AND CAN BE USED WITH A1 AND/OR A2 AS DRY CONTACTS, ARMED 24VAC FROM THE 'R' TERMINAL, OR ARMED 110v FROM THE 'L' TERMINAL.
4) **H2:** AUXILIARY HEATING RELAY TIMER ACTIVATES CIRCUIT FOR 5 MINUTES EVERY 24 HOURS STARTING WHEN POWER IS APPLIED TO THE UNIT.
5) **LED 1: INDICATOR LIGHT FOR FAN SPEED OPERATION AND AUXILIARY RELAY OPERATION.** SEE BELOW FOR LIGHT OPERATION SEQUENCE.
6) SEE INSTALLATION MANUAL FOR MORE DETAILED WIRING DIAGRAMS.
7) FOR SINGLE STAGE COOLING OPERATION USE Y2, OTHERWISE THE FREEZESTAT WILL BE BYPASSED.
8) FAILURE TO SET PROPER AIR FLOW AND/OR OPERATION OF THE SYSTEM MAY RESULT IN DAMAGE TO EQUIPMENT.
9) FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLATION COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.
10) ENSURE THAT THE FILTER IS KEPT CLEAN AT ALL TIMES.
11) MOTOR HAS PERMANENT LUBE BEARINGS AND DOES NOT REQUIRE OILING.
12) WARRANTY VOID IF FAN COIL UNIT IS USED DURING CONSTRUCTION.

LED 1: (GREEN LIGHT)
PUMP TIMER/OPERATION MODE INDICATOR LIGHT SEQUENCE



LED 2: PRESSURE SENSING INDICATOR (BLUE LIGHT)
H3 JUMPER PIN: AUTO OR MANUAL MODE

AUTO MODE: LED 2 WILL SPORADICALLY FLICKER (ON/OFF)
TO SHOW THAT IT IS PROPERLY SENSING PRESSURE IN THE SYSTEM.
* **NO LIGHT** INDICATES TRIM POT IS ABOVE NORMAL OPERATING RANGE (COUNTER CLOCKWISE DECREASE).
* **SOLID LIGHT** INDICATES TRIM POT IS BELOW NORMAL OPERATING RANGE (CLOCKWISE, INCREASE).

MANUAL MODE: LED 2 WILL BE OFF, ADJUST EACH OF THE AIR FLOWS TO DESIRED CFM/LPS OUTPUT.

FAN ADJUSTMENT TRIM POTS

INCREASE AIR FLOW (CLOCKWISE)
DECREASE AIR FLOW (COUNTER CLOCKWISE)

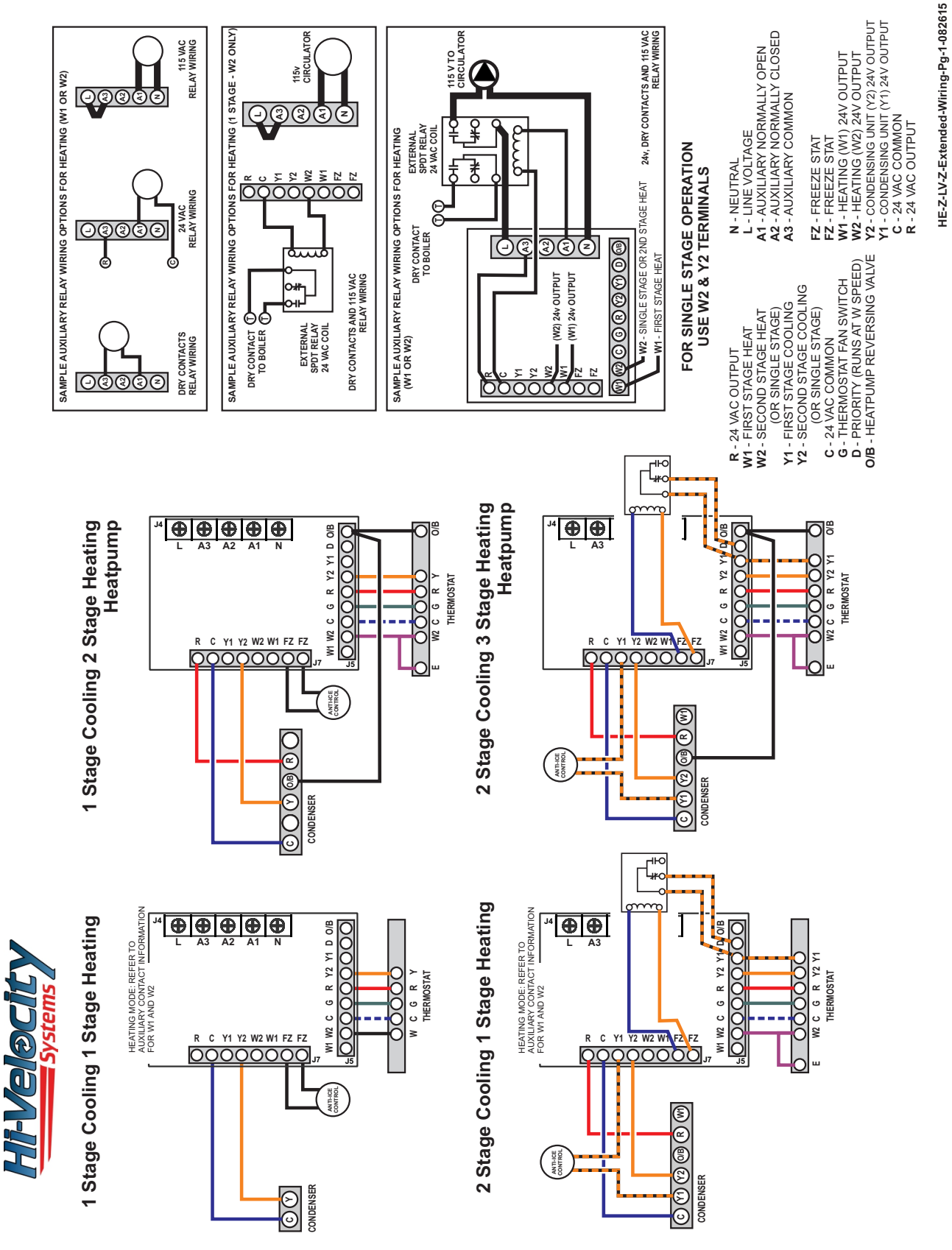
ADJUSTING TRIM POTS: ON POWER START UP, ALLOW 45 SECONDS FOR SYSTEM TO PRESSURIZE BEFORE MAKING ANY CHANGES.
DO NOT ADJUST MORE THAN A ½ TURN AT A TIME, ALLOW 30 SECONDS BETWEEN ADJUSTMENTS FOR THE PSB TO REACH SET POINT.

REFER AND COMPLETE COMMISSIONING REPORT PRIOR TO NORMAL OPERATION. FOR FULL DETAILS, REPORT IS AVAILABLE IN THE INSTALLATION MANUAL OR ONLINE AT **WWW.HI-VELOCITY.COM**

RR MuG9 225X50R
S04-A1-1
110V Wiring
032619

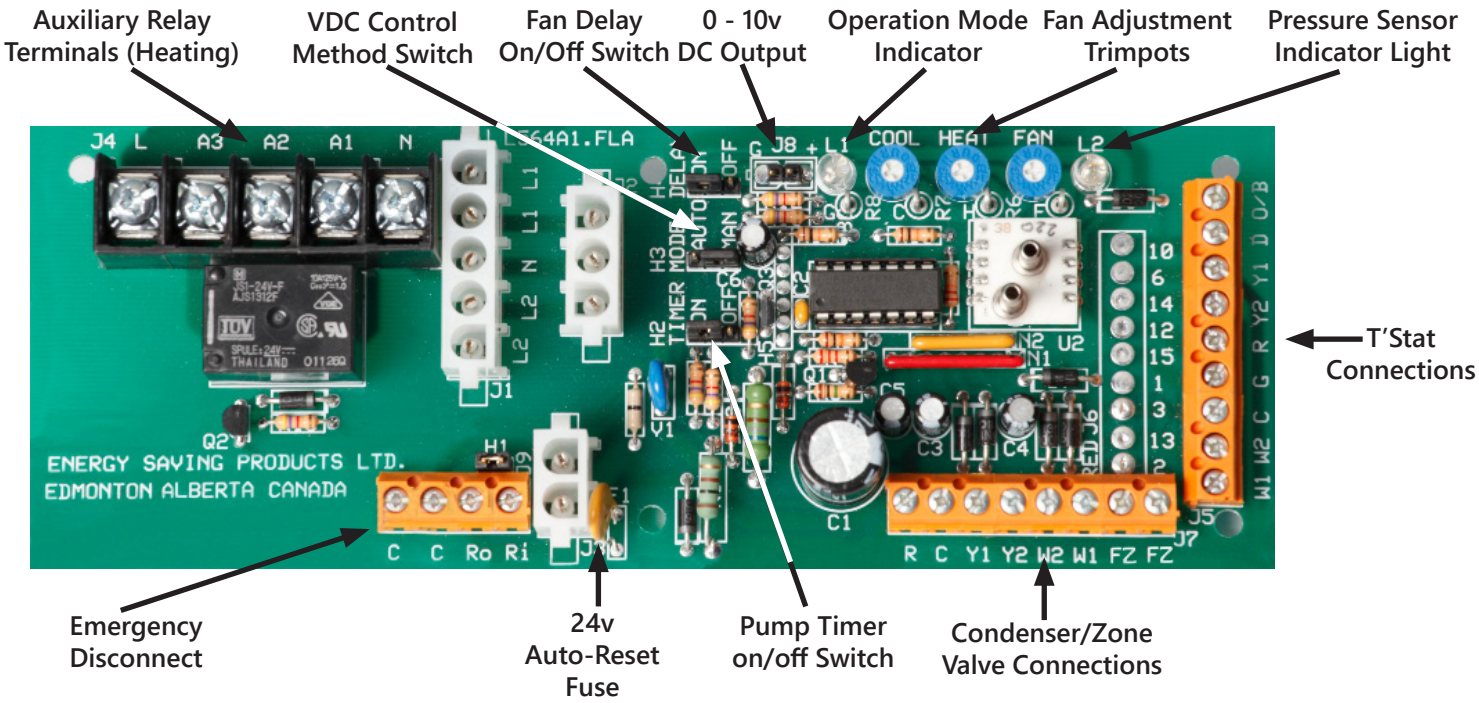
Cube Air Handler - Extended Wiring Diagrams

Extended wiring diagrams for the various applications the Hi-Velocity Cube model can be used for. If you do not find the wiring configuration you require, please call the technical department at Energy Saving Products Ltd. for further assistance.



CUBE EC PSB Circuit Board

The Hi-Velocity CUBE-EC Series Air Handler utilizes a dual function Circuit Board. The Cube Series comes standard in manual mode (H3 mode jumper in "MAN" position) for direct fan speed adjustments using the trim pots.



Features:

- Wiring the circuit board is a quick and simple task.
- Clearly labeled connections.
- No additional relays typically required.
- The Cube Series comes set in "Manual" mode and allows for direct speed control of the fan anywhere from 0-100% capability.
- Fan speeds are individually set for cooling, heating and constant fan using the three trim pots located on the PSB.
- Circuit board is capable of controlling boilers, dual purpose hot water heaters, heat pumps, and geothermal systems, as well as our manufactured slide-in electric strip heaters (ESH).
- The circuit board is also designed to send control signals to cooling sources such as condensing units, chillers, heat pumps and geothermal systems.
- Circuit board features an auxiliary relay with dry contacts connections, so that any applications requiring 24v, 120v, 230v or dry contacts (boilers, hot water heaters, heat pumps & humidifiers) can be automatically started when there's a call for heat.
- Circulator timer chip is provided to prevent water stagnation in potable water systems and to provide pump rotor protection for water source heating and cooling.
- If you wish to have the timer cycle operate at a specific time of day, simple turn off power to the air handler for ten seconds at that time and then turn the power back on..
- If you do not need to use the timer, move the jumper header from the On pins to the Off pins and it will be disabled.
- Circuit board is equipped with an emergency disconnect feature. If there's an emergency this feature will de-energizing all fan speeds and connected equipment.
- For this emergency disconnect feature to be active a jumper header must be remove from the pins located close to the emergency disconnect terminal strip.
- A fan delay is programmed into the circuit board. This delay will prevent the fan from starting for 20 seconds on cooling, 30 seconds on heating, and purge for 30 seconds on shut-down. This delay is beneficial in certain applications to give the heating or cooling equipment a "head start" before the fan turns on.

Function:

- Manages input power and through the use of a transformer it supply 24vac to additional equipment.
- Organizes all thermostat inputs and prioritizes them accordingly.
- Sends a 0-10vdc output to the fan assembly, dependent on how fast it wants the fan to run.

CUBE EC Air Handler - PSB Circuit Board Wiring

24 VAC Input terminals (t-stat connections):

W1:	1st stage Heating, Runs at the heating speed when 24v (R) is supplied, set by the heat trim pot.
W2:	2nd stage Heating, Runs at the heating speed when 24v (R) is supplied, set by the heat trim pot. The difference between a W1 call and a W2 call is the output terminal that will be energized with 24v. (W1 energized on t-stat terminal strip will provide 24v to W1 on output terminal strip, W2 energized on t-stat terminal strip will provide 24v to W2 on output terminal strip,)
C:	Common
G:	Constant Fan, Runs at the Constant Fan speed when 24v (R) is supplied, set by the Fan trim pot.
R:	24 volt supply (Note: As long as Transformer is connected & the Fire Disconnect/Jumper Pin Header is Present)
Y2:	2nd stage Cooling, Runs at the Cooling speed when 24v (R) is supplied, set by the Cool trim pot.
Y1:	1st stage Cooling, Runs at the Cooling speed when 24v (R) is supplied, set by the Cool trim pot. The difference between a Y1 call and a Y2 call is the output terminal that will be energized with 24v. (Y1 energized on t-stat terminal strip will provide 24v to Y1 on output terminal strip, Y2 energized on t-stat terminal strip will provide 24v to Y2 on output terminal strip,)
D:	Runs at 70% Cooling speed when 24v (R) is supplied, set by the Cool trim pot.
O/B:	Heat Pump Reversing

Fan Speed Priority Sequence (from highest to lowest): D=1st Y=2nd W=3rd G=4th

24 VAC Output terminals (24v output connections):

R:	24 volt Supply (Note: As long as Transformer is connected & the Fire Disconnect/Jumper Pin Header is Present)
C:	Common
Y1:	1st Stage Cooling Equipment
Y2:	2nd Stage Cooling Equipment*
W2:	24v Output to 2nd Stage Heating Equipment.
W1:	24v Output to 1st Stage Heating Equipment.
FZ:	Freeze Stat Connection*
FZ:	Freeze Stat Connection*

***Note: FZ to FZ** recommended to be wired to Freeze Stat (Anti-Ice Control). For chilled water applications, a jumper between FZ to FZ must be installed to complete the Y2 - 24V Signal to Y on Condenser.

Emergency Disconnect:

C:	Common
C:	Common
Ro:	Provides 24VAC to the entire PSB board. In order for "Ro" to receive power it must be connected to terminal "Ri". This can be done via the three pin jumper header (H1) located above the terminal strip, a wire jumper or normally closed safety device installed between "Ro" and "Ri". **The jumper pin header (H1) will need to be removed to activate the emergency disconnect option.**
Ri:	Receives 24VAC direct from the transformer. Power must then be sent to the "Ro" terminal to be distributed throughout the rest of the PSB board.

CUBE EC Air Handler - PSB Circuit Board Wiring Cont'd

3 Pin Jumper Terminals:

H1:	Emergency Disconnect
H2 Timer:	Pump timer cycles the pump on for 5 minutes every 24 hours to prevent stagnant water. (on/off) **The jumper pin header (H2) will need to be in the ON position for the timer to be active.**
H3 Mode:	Switches the control method used by the PSB to control motor speed. "Auto" uses the pressure transducer in order to modulate fan speed to maintain a constant supply pressure. "Man" allows for direct speed control of the motor by-passing the pressure transducer. **The jumper pin header (H3) determines the control method.**
H4 Delay:	Cooling/20 second, Heating/30 second fan delay, and 30 second post purge. **The jumper pin header (H4) will need to be in the ON position for the delay to be active.**

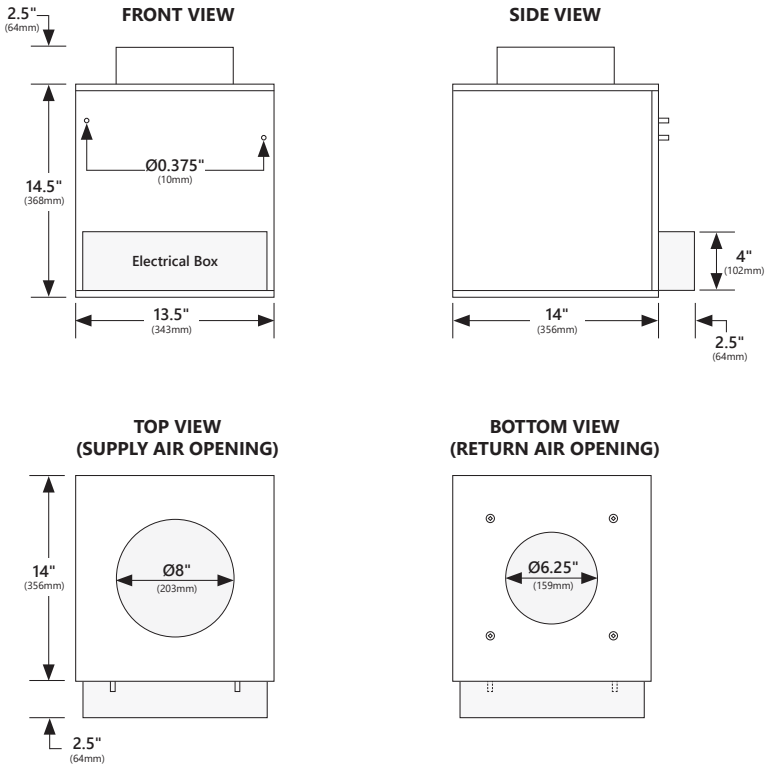
Auxiliary Heating Relay:

N:	Neutral
L:	Line Voltage
A1:	Auxiliary Relay Normally Open
A2:	Auxiliary Relay Normally Closed
A3:	Auxiliary Relay Common

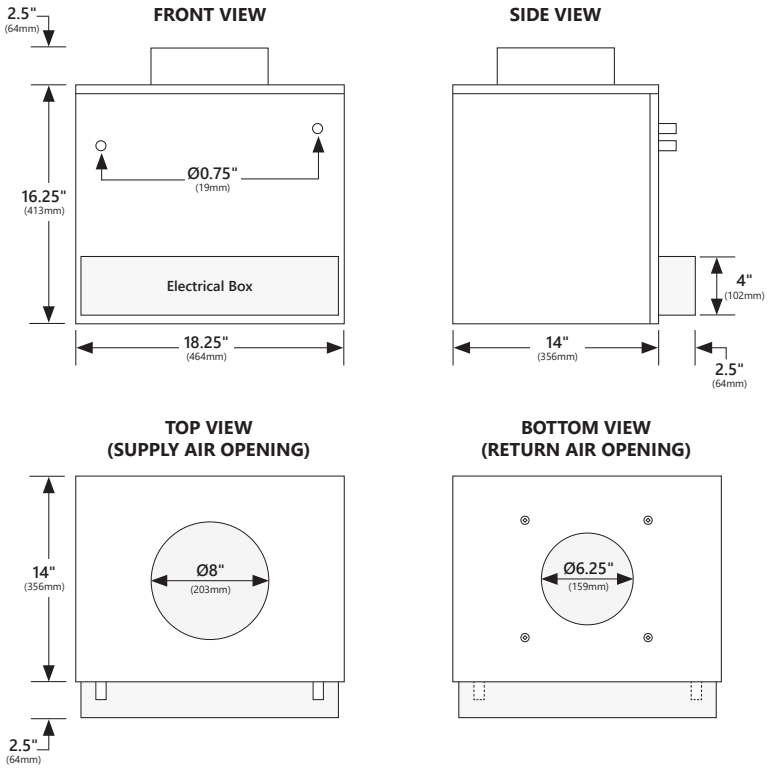
Control Signal:

J8:	0-10 Volt DC Output to VFD

CU-31 EC Dimensions



CU-51-EC Dimensions



Matching Coils
Refrigerant Coils
RCM-30, RBM/RPM-E/RCM-50
Chilled Water Coils
WBM/WCM-50
Hot Water Coils
HWC-30, HWC-50

Cube EC Series Specifications

Space Heating, Cooling and Fresh Air Make-Up

		CU-31-EC	CU-51-EC	
Hot Water Heating		**Max Air Flow**	**Max Air Flow**	
Coil Type		-	6 Row/10 FPI	
Max. BTUH @ 200°F E.W.T. (kW @ 93°C)		31,400 (9.2 kW)	64,300 (18.8 kW)	
Max. BTUH @ 190°F E.W.T. (kW @ 88°C)		29,200 (8.6 kW)	59,400 (17.4 kW)	
Max. BTUH @ 180°F E.W.T. (kW @ 82°C)		26,900 (7.9 kW)	54,500 (16.0 kW)	
Max. BTUH @ 170°F E.W.T. (kW @ 77°C)		24,600 (7.2 kW)	49,600 (14.5 kW)	
Max. BTUH @ 160°F E.W.T. (kW @ 71°C)		22,300 (6.5 kW)	44,600 (13.1 kW)	
Max. BTUH @ 150°F E.W.T. (kW @ 66°C)		21,100 (6.1 kW)	39,700 (11.6 kW)	
Max. BTUH @ 140°F E.W.T. (kW @ 60°C)		17,800 (5.2 kW)	34,700 (10.2 kW)	
Max. BTUH @ 130°F E.W.T. (kW @ 54°C)		15,600 (4.6 kW)	29,700 (8.7 kW)	
GPM Flow Ratings (L/s Flow Ratings)		2 (0.13 L/s)	5 (0.32 L/s)	
Pressure Drop in Ft. H_2O (Drop in KPa)		6.3 (18.83 KPa)	3 (8.97 KPa)	
Chilled Water Cooling[1]		**N/A**	**WBM/WCM-50**	
Coil Type		-	6 Row/10 FPI	
WBM/WCM Modules in **Cooling Mode**		N/A	Total	Sensible
Max. BTUH @ 48°F E.W.T. (kW @ 8.9°C)		-	19,300 (5.7 kW)	13,700 (4.0 kW)
Max. BTUH @ 46°F E.W.T. (kW @ 7.8°C)		-	20,900 (6.1 kW)	14,200 (4.2 kW)
Max. BTUH @ 44°F E.W.T. (kW @ 6.7°C)		-	22,600 (6.6 kW)	14,900 (4.4 kW)
Max. BTUH @ 42°F E.W.T. (kW @ 5.6°C)		-	24,200 (7.1 kW)	15,700 (4.6 kW)
Max. BTUH @ 40°F E.W.T. (kW @ 4.4°C)		-	25,800 (7.6 kW)	16,300 (4.8 kW)
WBM/WCM Modules in **Heating Mode**		N/A	Total	
Max. BTUH @ 150°F E.W.T. (kW @ 66°C)		-	39,700 (11.6 kW)	
Max. BTUH @ 140°F E.W.T. (kW @ 60°C)		-	34,700 (10.2 kW)	
Max. BTUH @ 130°F E.W.T. (kW @ 54°C)		-	29,700 (8.7 kW)	
Max. BTUH @ 120°F E.W.T. (kW @ 49°C)		-	24,800 (7.3 kW)	
Max. BTUH @ 110°F E.W.T. (kW @ 43°C)		-	20,100 (5.9 kW)	
GPM Flow Ratings (L/s Flow Ratings)		-	5 (0.32 L/s)	
Pressure Drop in Ft. H_2O (Drop in KPa)		-	3 (8.97 KPa)	
Refrigerant Cooling[1]		**RCM-30**	**RBM/RPM-E/RCM-50**	
RBM/RPM-E/RCM Modules BTUH Refrigerant TX Cooling		1.0 Ton (3.5 kWh)	1.5 - 2 Tons (5.3-7.0 kWh)	
Electrical Heating		**ESH/VESH-400**	**ESH/VESH-650**	
Kilowatt Range (240v)		5 - 10 kW	5 - 10 kW	
Specifications		**CU-31-EC**	**CU-51-EC**	
Nominal CFM (L/s)		400 (190 L/s)	500 (236 L/s)	
Max Rated CFM (L/s)		450 (212 L/s)	550 (260 L/s)	
Voltage		115/1/50/60 F.L.A. 2 amp	115/1/50/60 F.L.A. 2 amp	
Nominal Operating Amperage		1.5	1.5	
Horse Power - Watts		1/4 - 215	1/4 - 215	
Motor RPM		Variable / 3340 (max)	Variable / 3340 (max)	
Hydronic Connections	Supply	Ø3/8" (9.5mm)	Ø3/4" (19mm)	
	Return	Ø3/8" (9.5mm)	Ø3/4" (19mm)	
Supply Air Size		Round Duct	Rectangular Duct	Round Duct	Rectangular Duct
		Ø8" round (203mm)	12.5" x 13" (318mm x 330mm)	Ø8" round (203mm)	17.5" x 13" (445mm x 330mm)
Supply Maximum Length[2]		50' (15.24m)	50' (15.24m)	
Return Size Needed		Ø10" or 100 in^2	Ø12" or 120 in^2	
Nominal Outlets[3] Maximum Outlets [3]		6 (HE) 12 (2") 10 (HE) 20 (2")	10 (HE) 20 (2") 12 (HE) 24 (2")	
Shipping Weight (w/ Heating Coil)		25 lbs (11.3 Kg)	40 lbs (18.1 Kg)	
Air Handler Size (L x W x H) (Add 2 1/2 inches to height for collars)		14" x 13 1/2" x 14 1/2" (356mm x 343mm x 368mm)	14 x 18 1/4" x 16 1/4" (356mm x 464mm x 413mm)	

[1] **Heating** specs are rated at 68°F E.A.T., **Cooling** specs are rated at 80°F/67°F dB/wB

[2] Maximum length is from the unit to the supply run end cap. More than one run per unit is allowable.

[3] Refer to page 5 of **Cube Installation Manual** for details on flex allowances.

BTUH - British Thermal Units per Hour
E.W.T. - Entering Water Temperature
GPM - US Gallons per Minute
L/s - Litres per Second
CFM - Cubic Feet per Minute
F.L.A. - Full-Load Amperage
RPM - Revolutions per Minute
EAT- Entering Air Temperature

WARRANTY

Energy Saving Products Ltd. is proud to offer a limited warranty. This warranty applies strictly to the first purchaser at wholesale level and only to the Air Handler unit and module. It does not include connections, attachments and other products or materials furnished by the installer.

This warranty excludes any damages caused by changes, relocation to, or installation in a new site. This warranty does not cover any defects caused by failure to follow the installation and operating instructions furnished with the Air Handler. This warranty does not cover defects caused by failing to adhere to local building codes and following good industry standards. Failure to correctly install the Air Handler, or material related to the unit, may result in improper system performance and/or damages and will void this warranty. This warranty does not cover material installed in or exposed to a corrosive environment. This warranty does not cover products subjected to abnormal use, misuse, improper maintenance, or alteration of the product. Using the Air Handler and/or module as a source of temporary heating/cooling during construction will void this warranty.

A **Five (5) Year Limited Warranty** is extended on all components in products manufactured exclusively by Energy Saving Products. These components include Motors, WEG Controller, Circuit Boards, Dampers, Zoning Controls, Blowers, Motor & Blower Assemblies, Heating Coils, Chilled Water Coils, and Air Conditioning Coils. Note: If any product is installed in or exposed to a corrosive environment, warranty will be void.

A **Three (3) Year Limited Warranty** is extended on Electric Strip Heaters.

A **One (1) Year Limited Warranty** is extended on replacement parts.

Products sold by Energy Saving Products but manufactured by others, will carry the original manufacturer's warranty.

TERMS & CONDITIONS

- **Warranty will not be considered unless a contractor has contacted Energy Saving Products Ltd. Technical Support department for assistance, and received a tech code.**
- Any repair performed under warranty must be approved by Energy Saving Products Ltd. for this warranty to be valid.
- The liability of Energy Saving Products Ltd. is limited to and shall not exceed the cost of pre-approved replacement parts.
- This warranty does not cover shipping costs to and from the factory, labor costs or any other cost associated with the installation of the replacement part.
- Inoperative parts must be returned to Energy Saving Products Ltd. with an ESP RMA Form that includes model, serial number, and a detailed description of the entire problem. Inoperative parts must be returned in testable condition.
- Energy Saving Products Ltd. is not liable for any other damages, personal injury, or any other losses of any nature.

Follow these steps for Service or Repair:

1. Contact the installer of the product or a licensed service company
2. Contact the distributor
3. Contact Energy Saving Products Ltd. Mon-Fri 8 am – 4:30 pm MT 1-888-652-2219

This warranty replaces all other warranties expressed or implied.

www.hi-velocity.com

Energy Saving Products Ltd, established in 1983, manufactures the Hi-Velocity Systems™ product line for residential, commercial and multi-family markets. Our facilities house Administration, Sales, Design, Manufacturing, as well as Research & Development complete with an in-house test lab. Energy Saving Products prides itself on Customer Service and provides design services and contractor support.

For all of your Heating, Cooling and Indoor Air Quality needs, the Hi-Velocity System is the right choice for you!

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