VULCANO

Black Edition

Installation and User's Manual

Revision: A062026

Read and understand this manual before operating and installing air handler. All technical information subject to change without notice

Technical Portal Link

Table of Contents

Safety Information

Installers must ensure compliance with all national and local building codes and standards, along with the instructions in this manual. In the event of conflict, all applicable codes take precedence over any instructions made in this document.

This symbol signifies safety alerts. Whenever you encounter it on labels or in this manual, remain vigilant about potential personal injury risks. Pay close attention to the signal words **DANGER**, **WARNING**, **CAUTION** or **NOTE** to ensure safety.

DANGER Indicates an **immediate** hazard **will result in serious injury or death if not avoided.**

WARNING Indicates a **potentially** hazardous situation, **which if not avoided, could result in death or serious injury.**

CAUTION indicates a **potentially** hazardous situation, which if not avoided, **may result in a minor or moderate injury**. It is also used to alert against unsafe practices and hazards involving only property damage.

WARNING: Only qualified professionals should install, adjust, or service this product. Improper handling or installation may result in injury or property damage, serious injury or death.

CAUTION: This product must be installed in strict compliance with the installation instructions and any applicable local, state, and national codes including, but not limited to; building, electrical and mechanical codes.

WARNING: Equipment may contain water heated to 180°F. Use caution during maintenance to avoid burns. Allow components to cool before handling. There are limits to what piping or tubing materials can be used at 180^{O}F at various pressures. Ensure that the piping material exceeds working Temperature at the installed pressure relief valve setting. It is the Installer's responsibility to select installation materials suitable for the individual system operating temperatures and pressures.

WARNING: Failure to follow the safety warnings exactly could result property damage, serious injury or loss of life.

Label Identifications & Safety Markings

These labels are provided to indicate unit information, hazards, and warnings. All text appears in both English and French to meet Canadian compliance standards. If any label is damaged, illegible, or missing, DO NOT OPERATE the unit until the information is verified. Contact Vulcano Air for replacement labels and technical assistance.

Safety Warnings and Installation Instructions

These labels use **color-coded backgrounds** and **bold fonts** to convey hazard levels and instructions. All label information pertains to the stickers on the chassis of the THS unit.

Label Type	Background Color	Font Color	Purpose
Warning (Electrical, Disconnect, Shock)	Yellow / Red / White	Black / Red	Indicates serious hazards (shock, injury, death). Must be followed before service or installation.
Important	White	Black (bold)	Non-hazard-related installation checks and procedural reminders.
Copper Wiring Required	Orange	Black	Electrical requirement for proper unit performance and code compliance.
Warranty Disclaimer	Red	White	Highlights actions that void warranty, such as lifting by copper piping.

Label Appearance and Visibility Standards

- **Fonts**: All warning text is in high-contrast fonts (**typically 3.2mm to 6.4mm**) with bold emphasis on key words like "**WARNING**," "**IMPORTANT**," and "**DANGER**."
- **Bilingual Format**: All safety and installation-related stickers include both English and French to comply with CSA and federal guidelines.
- **Icons**: Standardized electrical hazard  icons are used to quickly draw attention to electrical risks.
- **Inspection Fields**: Some labels include blank lines for field inspection and approval signatures prior to startup.

Introduction

The Vulcano THS Series hydronic air handler is designed for performance, reliability, and compatibility across a wide range of residential and low-rise commercial settings. The water coil consists of only copper and brazed copper tubing for the water passageways. A high efficiency modulating blower motor adjusts airflow to match heating and cooling demand, enhancing comfort and reducing energy consumption. External terminal connections for thermostats and control wiring simplify installation and service by eliminating the need for internal access.

Key Features Include:

- Adjustable airflow speed taps for flexible installations.
- Auxiliary pump terminals with 120 VAC control and a 24-hour pump exerciser.
- Energy-efficient constant-speed EC motor.
- Integrated zone control supporting up to three zones.
- Coil freeze protection.
- Master logic for Zone 1 to prevent simultaneous heating and cooling.

Inputs (Thermostat Controls)

- **Continuous Fan (G):** Runs ECM motor at low speed. Activates all zones in multi-zone setups.
- **Heating (W1, W2, W3):** Engages pump relay and opens corresponding zone dampers. Fan speed adjusts based on call duration and active zones.
- **Cooling (Y1, Y2, Y3):** Activates associated zone damper and adjusts fan speed similarly to heating.

NOTE: Priority is assigned to the lowest zone number. For a single ducted zone, use W1/Y1. For two zones, use W1/Y1 and W2/Y2. Zone 1 should be the largest and most frequently used space.

Outputs

- **Boiler Relay:** Closes on a heat call (not Y1). Supports 24 VAC, 1 Amp max.
- **A/C Interlock:** Provides isolated 24 VAC output during cooling calls (not W1).
- **Zone Dampers (1, 2, 3):** Tracks thermostat activity with 24 VAC outputs.

Performance Ratings

The following tables show how much heat output each unit's coil can deliver based on:

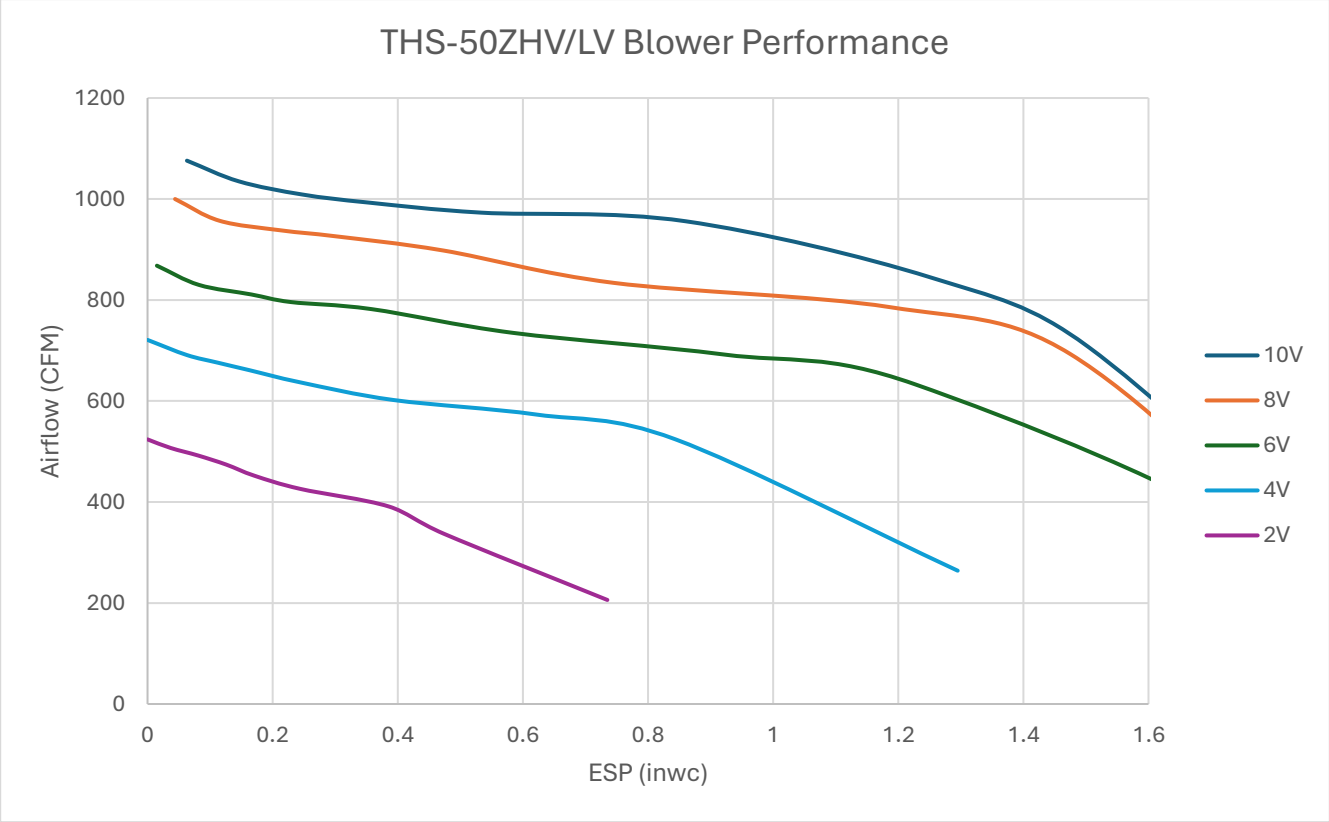
- The **airflow** going through the air handler (**CFM** – cubic feet per minute)
- The **water flow** through the heating coil (**GPM** – gallons per minute)
- **Heat output** is shown in **BTUH** (British Thermal Units per Hour)

THS-50Z

Heating Capacities									
CFM (ft^3/min)	GPM (gal/min)	kbtu/h @ Entering Water Temperature (°F)							Pressure Drop* (ft WC)
		120	130	140	150	160	170	180	
300	3	14.77	17.80	20.83	23.89	26.95	30.01	33.06	1.3
	4	15.19	18.27	21.35	24.44	27.53	30.63	33.73	2.2
	5	15.40	18.51	21.62	24.74	27.86	30.99	34.12	3.4
400	3	18.22	21.98	25.76	29.57	33.40	37.23	41.04	1.3
	4	18.97	22.85	26.72	30.60	34.49	38.39	42.29	2.2
	5	19.37	23.29	27.22	31.16	35.11	39.07	43.03	3.4
500	3	21.19	25.59	30.03	34.50	39.00	43.53	48.01	1.3
	4	22.33	26.93	31.51	36.10	40.71	45.34	49.97	2.2
	5	22.96	27.62	32.30	36.99	41.70	46.42	51.15	3.4
600	3	23.76	28.72	33.74	38.80	43.89	49.02	54.11	1.3
	4	25.33	30.57	35.80	41.04	46.30	51.58	56.87	2.2
	5	26.22	31.56	36.92	42.30	47.71	53.13	58.56	3.4
700	3	26.00	31.46	36.98	42.55	48.18	53.84	59.47	1.3
	4	28.01	33.83	39.65	45.47	51.32	57.19	63.08	2.2
	5	29.18	35.14	41.13	47.14	53.18	59.24	65.32	3.4

***Pressure drop measured at 140°F entering water temperature.**

The system curve below shows the external static pressure required at varying airflow rates for the **THS-50Z** unit with a 150 square inch supply opening.



The chart above can be interpreted using the following points, which explain how airflow and pressure relate in this system configuration and how to apply that information during setup or fan selection:

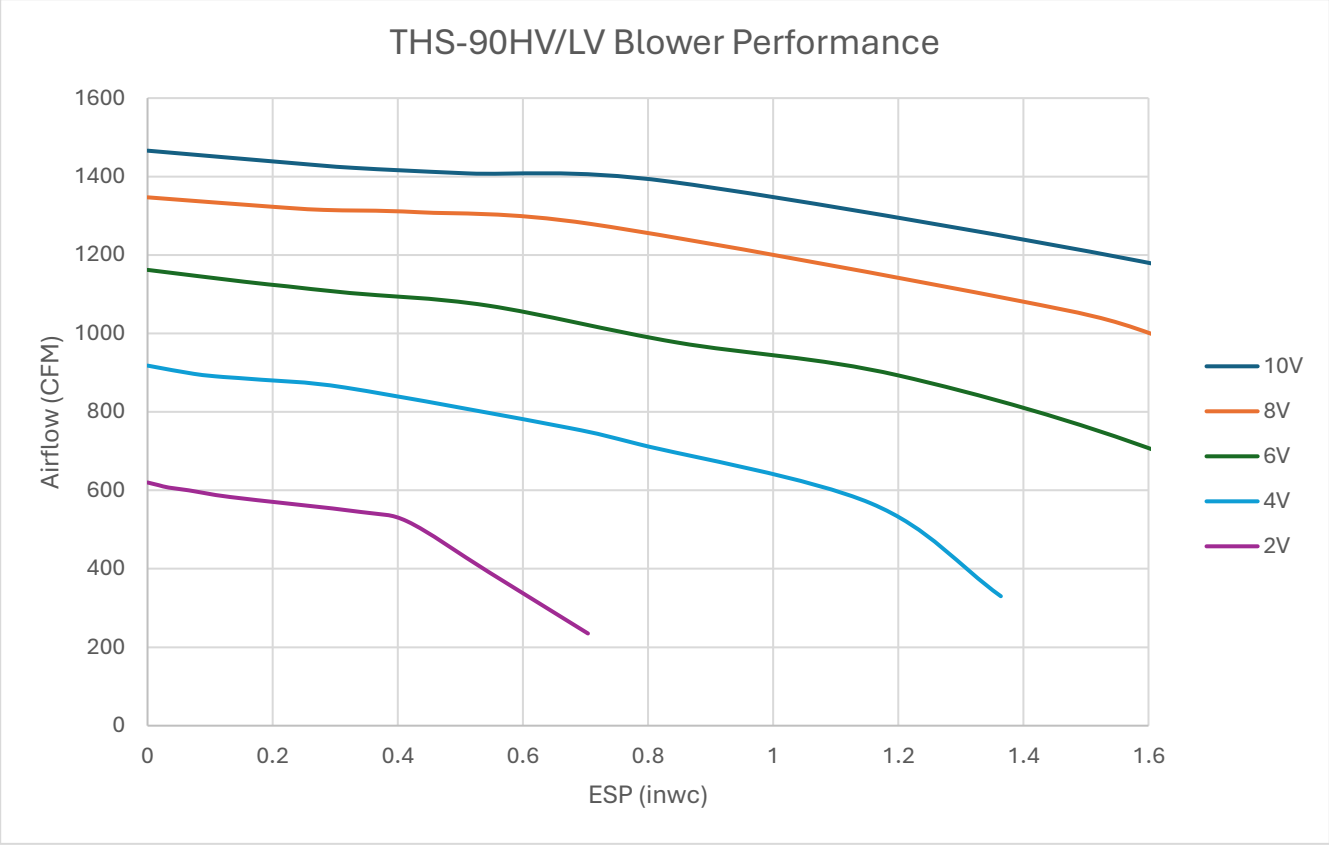
- Airflow (X-axis): Measured in CFM (Cubic Feet per Minute)
- Pressure (Y-axis): External static pressure in inches of water column (in.w.c.)
- Supply Opening Size: Curve reflects system behavior with a 150 sq.in. supply opening, matching the actual design of the THS-50Z unit
- Compare this curve to fan performance charts to verify proper system sizing and expected performance

THS-90Z

Heating Capacities									
CFM (ft^3/min)	GPM (gal/min)	kbtu/h @ Entering Water Temperature (°F)							Pressure Drop* (ft WC)
		120	130	140	150	160	170	180	
500	4	24.90	29.95	34.99	40.03	45.08	50.13	55.19	1.4
	5	25.13	30.41	35.51	40.62	45.73	50.85	55.97	2.1
	7	25.72	30.89	36.06	41.24	46.42	51.61	56.79	3.8
600	4	28.76	34.61	40.46	46.30	52.15	58.01	63.88	1.4
	5	29.41	35.33	41.27	47.22	53.18	59.14	65.11	2.1
	7	30.05	36.09	42.14	48.20	54.27	60.34	66.42	3.8
700	4	32.32	38.91	45.50	52.08	58.68	65.29	71.91	1.4
	5	33.24	39.94	46.67	53.41	60.16	66.92	73.68	2.1
	7	34.16	41.04	47.93	54.83	61.74	68.66	75.58	3.8
800	4	35.58	42.85	50.14	57.41	64.70	72.00	79.31	1.4
	5	36.81	44.25	51.71	59.19	66.68	74.19	81.71	2.1
	7	38.06	45.74	53.43	61.13	68.85	76.57	84.30	3.8
900	4	38.58	46.48	54.42	62.32	70.24	78.18	86.13	1.4
	5	40.15	48.27	56.42	64.60	72.79	80.99	89.21	2.1
	7	41.77	50.20	58.65	67.12	75.59	84.09	92.59	3.8

***Pressure drop measured at 140°F entering water temperature.**

The system curve below shows the external static pressure required at varying airflow rates for the **THS-90Z** unit with a 150 square inch supply opening.



The chart above can be interpreted using the following points, which explain how airflow and pressure relate in this system configuration and how to apply that information during setup or fan selection:

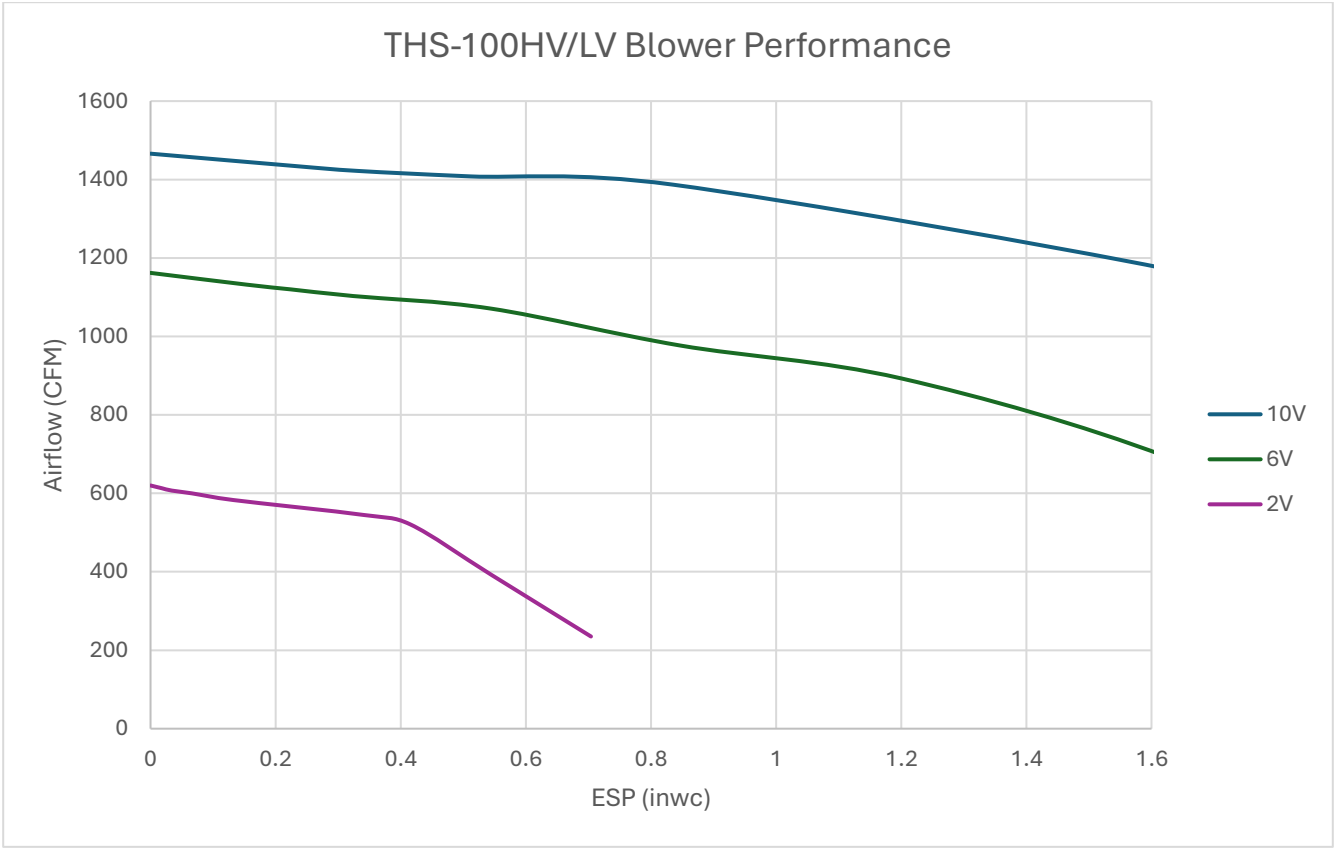
- **Airflow (X-axis):** Measured in CFM (Cubic Feet per Minute)
- **Pressure (Y-axis):** External static pressure in inches of water column (in.w.c.)
- **Supply Opening Size:** Curve reflects system behavior with a 150 sq.in. supply opening, matching the actual design of the THS-90Z unit
- Compare this curve to fan performance charts to verify proper system sizing and expected performance

THS-100Z

Heating Capacities									
CFM (ft^3/min)	GPM (gal/min)	kbtu/h @ Entering Water Temperature (°F)							Pressure Drop* (ft WC)
		120	130	140	150	160	170	180	
700	4	32.32	38.91	45.50	52.08	58.68	65.29	71.91	1.4
	5	33.24	39.94	46.67	53.41	60.16	66.92	73.68	2.1
	7	34.16	41.04	47.93	54.83	61.74	68.66	75.58	3.8
800	4	35.58	42.85	50.14	57.41	64.70	72.00	79.31	1.4
	5	36.81	44.25	51.71	59.19	66.68	74.19	81.71	2.1
	7	38.06	45.74	53.43	61.13	68.85	76.57	84.30	3.8
900	4	38.58	46.48	54.42	62.32	70.24	78.18	86.13	1.4
	5	40.15	48.27	56.42	64.60	72.79	80.99	89.21	2.1
	7	41.77	50.20	58.65	67.12	75.59	84.09	92.59	3.8
1000	4	41.33	49.81	58.35	66.83	75.39	83.87	92.41	1.4
	5	43.26	52.03	60.82	69.64	78.49	87.35	96.23	2.1
	7	45.28	54.43	63.60	72.80	82.01	91.23	100.4	3.8
1100	4	43.85	52.88	61.96	70.99	80.01	89.11	98.20	1.4
	5	46.16	55.53	64.93	74.36	83.82	93.29	102.7	2.1
	7	48.61	58.45	68.31	78.19	88.10	98.02	107.9	3.8
1200	4	46.18	55.70	65.28	74.82	84.36	93.94	103.5	1.4
	5	48.88	58.81	68.77	78.77	88.80	98.85	108.9	2.1
	7	51.78	62.26	72.77	83.32	93.88	104.4	115.0	3.8

***Pressure drop measured at 140°F entering water temperature.**

The system curve below shows the external static pressure required at varying airflow rates for the **THS100Z** unit with a 150 square inch supply opening.



The chart above can be interpreted using the following points, which explain how airflow and pressure relate in this system configuration and how to apply that information during setup or fan selection:

- **Airflow (X-axis):** Measured in CFM (Cubic Feet per Minute)
- **Pressure (Y-axis):** External static pressure in inches of water column (in.w.c.)
- **Supply Opening Size:** Curve reflects system behavior with a 150 sq.in. supply opening, matching the actual design of the THS-100Z unit
- Compare this curve to fan performance charts to verify proper system sizing and expected performance

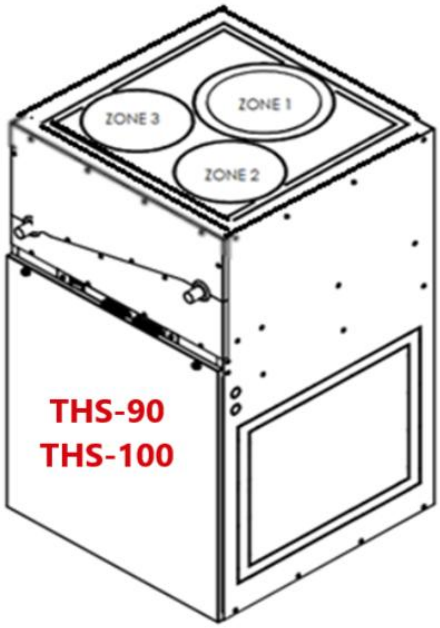
Dimensional Data

All Vulcano THS Series units come equipped with a universal top panel designed to accommodate either a square supply plenum opening or round supply duct ports.

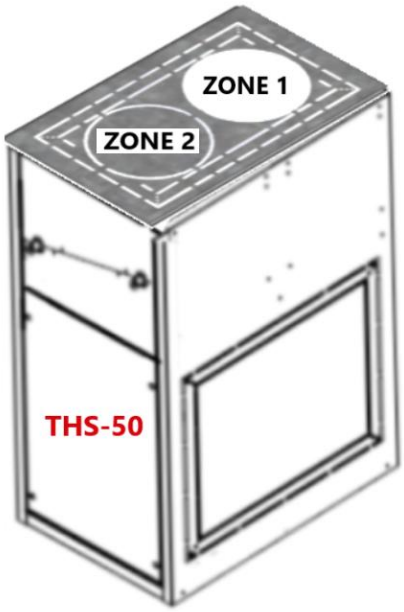
For a square plenum opening, remove the "Inner" rectangular section and bend the flange outward at a 90-degree angle.

For round duct ports, cut out **Zone 1** and install the provided collar.

If additional zones are needed, cut them out sequentially as required.



ISOMETRIC VIEW

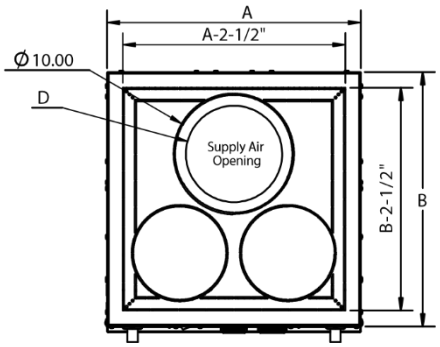


ISOMETRIC VIEW

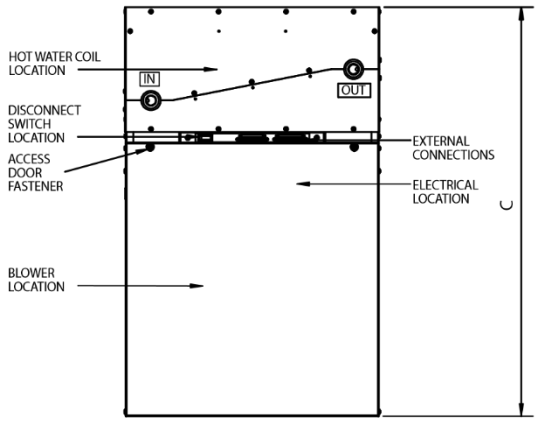
PHYSICAL DATA (inches)

Model	Overall Size W x D x H			Supply Air Opening Dia. Height	Return Air Opening (W x H)				Pipe Location distance from top	
	A	B	C	D	E	F	G	H	I	J
THS-50Z	17	17	34	zones 1&2 = 8	14	14.25	1.54	2.56	5.15	7.75
THS-90Z	21	21	34	zones 1,2&3 = 8	18.25	14.25	1.41	2.56	5.15	7.75
THS-100Z	21	21	34	zones 1,2&3 = 8*	18.25	14.25	1.41	2.56	5.15	7.75

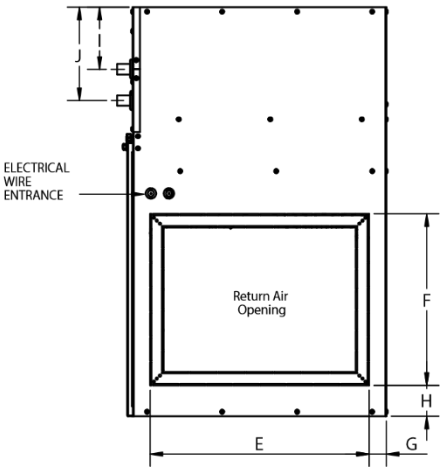
* If one zone is used on a 100 model a 10" diameter pipe must be installed on the air handler first. Zone 1 = 10"



TOP VIEW



FRONT VIEW



SIDE VIEW

Installation Guidelines

Clearances remain consistent regardless of orientation. Note that this unit is intended for indoor use only. **The installation must adhere to all relevant local and national codes governing this type of equipment.**

WARNING: All **warning and safety labels must be legible** before installation. If any label is missing or unreadable, **contact Vulcano** to request a replacement.

CAUTION: The air handler **CANNOT** be mounted on its back. The electrical components should **NEVER** be facing up.

CAUTION: The air handler should be installed in a manner that ensures electrical components remain safeguarded from exposure to water, including spraying, splashing, or other forms of moisture, both during operation and servicing.

CAUTION: Exercise special care around the coil to prevent punctures. When securing the supply air duct, fasten it to the opening flange instead of the top of the cabinet.

*Mount configuration **MUST** be indicated at time of order.

Minimum Clearances

Clearance For All Models	
From Combustibles (in)	Recommended Minimum for Service (in)
Top: 0	Top: 0
Bottom: 0	Bottom: 0
Front: 0	Front: 24
Sides: 0	Sides: 1
Back: 0	Back: 0

These dimensions indicate the recommended service clearance for the air handler only. Sufficient space must be provided for proper installation of ductwork, piping, and electrical connections. While zero clearance is permitted between the unit and ducting, ensure adequate access is maintained for servicing plumbing and electrical components. These units require no clearance to combustible materials.

Air Handler Mounting

- This unit supports up-flow, down-flow, and left/right horizontal configurations.
- Install the air handler with the door in place to maintain cabinet alignment.
- For down-flow installations, flip the unit so the top becomes the bottom—no modifications are required.

The return air can enter from either side of the cabinet and **MUST be ducted**. Install a filter rack for easy access to a standard 16” x 20” filter or 16” x 24” filter.

(Note: Filter and rack are not included.)

Freeze Protection/Inhibitor

Avoid installing the air handler in unheated spaces. If installation in such areas is unavoidable, add ethylene or propylene glycol to the hydronic heating system to prevent freezing. Ensure the glycol is compatible with all system components and adheres to local and national codes. It is also recommended that inhibitor is used in all closed loop systems.

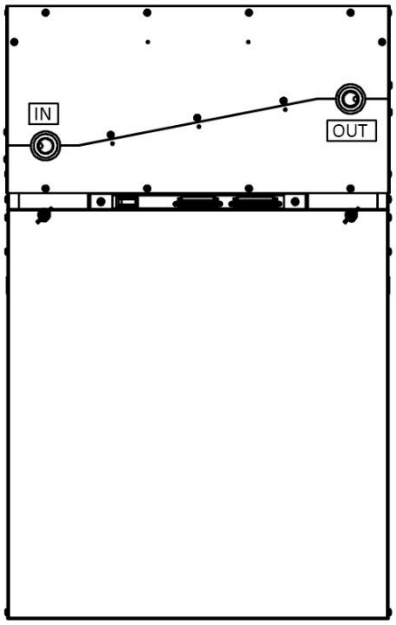
Check Valve Requirements

In most cases check valves are not practical and creates problems within the system. A check valve may be necessary to meet local codes and ensure proper system functionality. Its purposes include:

- Preventing backflow to avoid short-circuiting around the water heater during domestic use.
- Reducing thermal siphoning (use a spring-loaded check valve).
- Complying with regulations for all potable water systems.

Additional Recommendations

- Install a drain pan beneath the appliance for all setups to manage potential leaks. This appliance uses a water coil and is installed with water piping system, ensure that there is a floor drain that is properly functioning and that floor in the mechanical room is capable of containing any water that may escape from the water piping system.



WARNING: Do not exceed maximum fluid pressure of 150 PSI or fluid temperature of 180°F (82°C). Operating above these limits may result in equipment failure, leaks, or serious personal injury. Always verify system pressure and temperature before operation or maintenance.

CAUTION: This air handler is not approved for installation at elevations above 2,000 meters (6,562 feet). At high altitudes, lower air density reduces electrical insulation strength, increasing the risk of electrical arcing or shock — even at a distance. Installation above this limit may result in serious safety hazards, electrical failure, and equipment damage.

Water Heater or Boiler Setup

Follow the manufacturer's installation and start-up instructions for the water heater or boiler. Ensure the equipment is turned off during installation and servicing. Verify that the equipment is properly refilled and all air has been purged from the system before turning the heater back on.

WARNING: If the system operates with water temperatures exceeding 125°F, a mixing valve must be installed to lower the domestic hot water temperature and prevent the risk of scalding.

Combo Systems

The air handler is perfect for use in combo systems that deliver both space heating and domestic hot water from one heat source. A properly sized gas, propane, or oil-fired water heater or boiler can be used in a combo system. Ensure that the water heater chosen is approved for combo applications.

Electrical Requirements

Electrical Information

WARNING: Make sure when installing to meet all electrical codes, national and local.

The air handler operates on 120VAC, 60Hz, single-phase line voltage and requires a dedicated breaker or fuse as specified on the rating label.

- Control circuits use 24VAC.
- Ground the air handler at the electrical box lug.

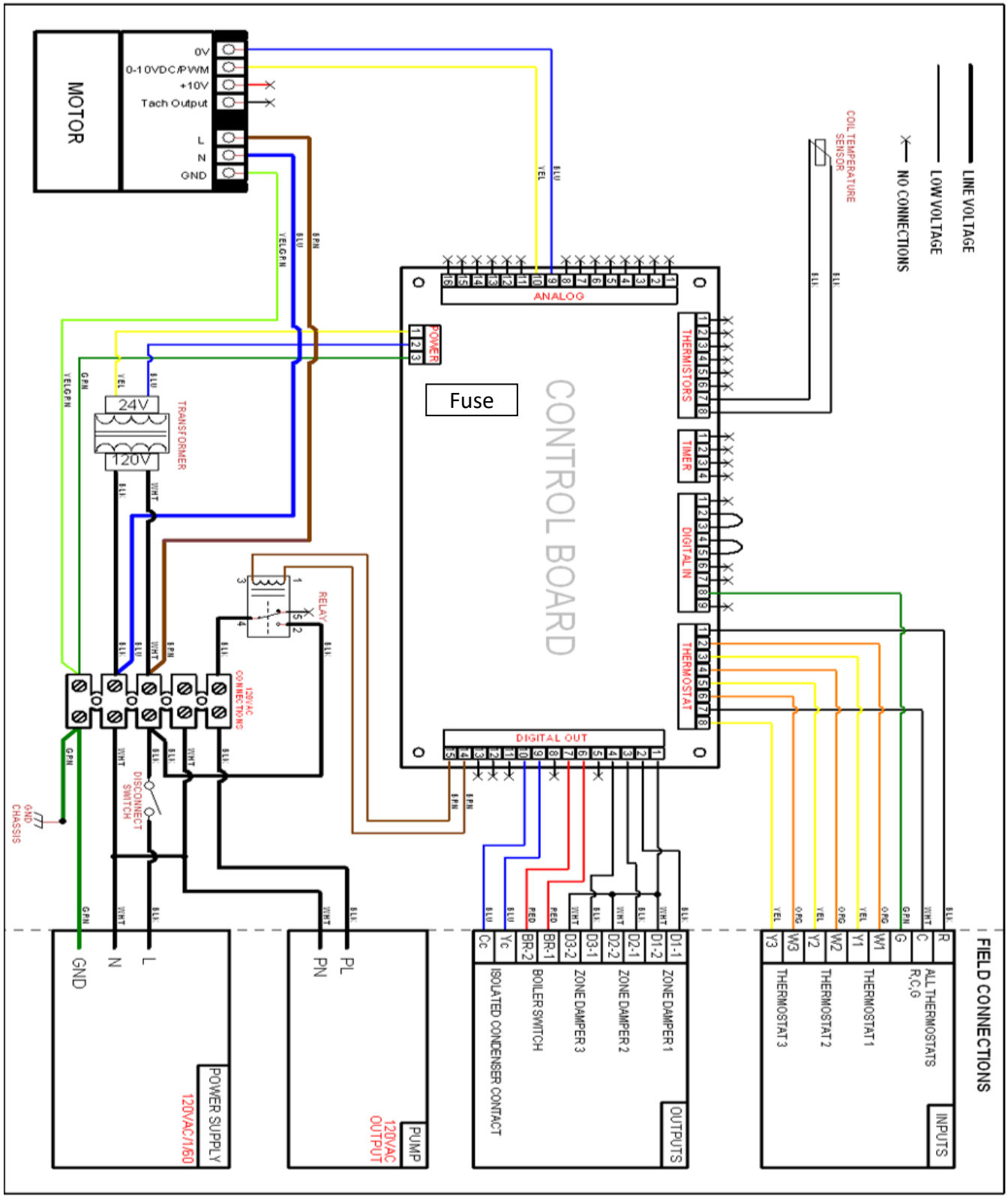
Thermostat Wiring

- Any standard heat/cool thermostat is compatible.
- For smart thermostats, ensure a continuous 'C' connection. Wire the thermostat to the 9-pin green terminal.

WARNING: DISCONNECT POWER BEFORE SERVICING AIR HANDLER. If any of the original wires as supplied with the appliance must be replaced, it must be replaced with the exact equivalent.

CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation.

Control Diagram



*** Control Diagrams will also be on the front of your air handler**

Start-up Procedure

1. Fill the system with water but do not start it yet.
2. Purge all air from the system using isolation and purge valves.
3. Flush air from the heating loop by closing the return leg isolation valve and opening the drain valve. Then, close the drain and reopen the return valve.
4. Start the hot water equipment according to the manufacturer's instructions.
5. Set the water temperature to meet heating requirements.
6. Turn on power to the air handler and set the thermostat to heat. Increase the temperature setting to initiate a call for heat.
7. Once hot water is flowing, verify a temperature difference between supply and return pipes. Use caution with water temperatures exceeding 125°F / 51°C

Sequence of Operation

LED Indicators: The control board has three LEDs:

- **POWER**: Green when powered.
- **RUN**: Will always be green. Will be on by default. Flashes depending on operation:
    - Slow, single, short green flash = standby.
    - Single rapid flash = call for heat.
    - Three rapid flash and a gap = call for cool.
    - Long single green flash = call for fan only.
- **FAULT:** Will turn red when an error occurs. Will be off by default. Flashes depending on error:
    - Single rapid flash with slow red flash = call for heat but water supply not hot.
    - Rapid red flash only = flood. Activated when flood accessory has been installed.
    - Two quick red flash = float. Activated when float accessory has been installed.
    - Long single red flash = freeze on the coil.

Control Board Information

The following tables provide detailed wiring information for connecting external control devices to the unit's internal circuit board. Each terminal input and output is labeled with its function and the corresponding circuit board connection point.

- **External Inputs Table**: Shows where to connect power, fan signals, heat relays, and compressor relays from external controllers (like thermostats or automation systems).
- **External Outputs Table**: Lists the output terminals used to control accessories such as zone dampers, boilers, and condensers.

External Inputs

External Inputs	Function	Circuit Board Connection
R	24VAC Power	24Rx
C	24VAC Common	24C
G	Fan Relay	AQU
W1	Heat Relay (Master)	W1
Y1	Compressor Contractor (Master)	Y1
W2	Heat Relay (Slave 1)	G1
Y2	Compressor Contactor (Slave 1)	G2
W3	Heat Relay (Slave 2)	G3
Y3	Compressor Contactor (Slave 2)	AUX

External Outputs

External Outputs	Function	Circuit Board Connection
D1-1	Zone Damper 1 (24vac)	FH
D1-2		24C
D2-1	Zone Damper 2 (24vac)	FM
D2-2		24C
D3-1	Zone Damper 3 (24vac)	FL
D3:2		24C
BR-1	Boiler Switch (Dry Contact)	24C
BR-2		W-Y
Yc	Isolated Condenser Contacts	24C
Cc		Y1

Blower Operation:

- Heating: Delayed activation (15 seconds) and variable speeds based on runtime.

Pump Operation (if installed):

- Activates for heating demands and during freeze protection.
- Runs for one minute every 24 hours if idle.

Zone 1 Damper:

- The damper is never fully closed; there is an Integrated Air Pressure Relief of approximately 25% open.
- Zone 1 is the master zone and any heating or cooling demands from Zone 1 will determine the operating mode.
- The Zone 1 damper is activated for any heating or cooling call in Zone 1 (W1/Y1).
- The Zone 1 damper is activated for any fan-on request from any zone (G1, G2, or G3).

Zone 2 Damper:

- The damper is never fully closed; there is an Integrated Air Pressure Relief of approximately 25% open.
- The Zone 2 damper is activated for any heating or cooling demand in Zone 2 (W2/Y2)..
- The Zone 2 damper is activated for any fan-on request from any zone (G1, G2, or G3).

Zone 3 Damper:

- The damper is never fully closed; there is an Integrated Air Pressure Relief of approximately 25% open.
- The Zone 3 damper is activated for any heating or cooling demand in Zone 3 (W3/Y3)..
- The Zone 3 damper is activated for any fan-on request from any zone (G1, G2, or G3).

A/C Interlock Function:

- The A/C Interlock is ON during any cooling demand (Y1, Y2, or Y3) as long as there is no higher priority heating call (W1, W2, or W3).
  - Example: Y1 and W2 both active → A/C Interlock is ON.
  - Example: Y2 and W1 both active → A/C Interlock is OFF.
- The A/C Interlock is OFF for any heating demand (W1, W2, or W3) unless there is a higher priority cooling call (Y1, Y2, or Y3), as described above.

Output States:

		Zone1 (red)	Zone2 (orange)	Zone3 (blue)	Low (green)	Medium (white)	Boiler (blue)	Pump (orange)	A/C (green)
1	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{off}$/Y2$_{off}$/W3$_{off}$/Y3$_{off}$								
2	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{off}$/Y2$_{off}$/W3$_{off}$/Y3$_{on}$								
3	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{off}$/Y2$_{off}$/W3$_{on}$/Y3$_{off}$								
4	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{off}$/Y2$_{on}$/W3$_{off}$/Y3$_{off}$								
5	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{on}$/Y2$_{off}$/W3$_{off}$/Y3$_{off}$								
6	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{off}$/Y2$_{off}$/W3$_{off}$/Y3$_{off}$								
7	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{off}$/Y2$_{off}$/W3$_{off}$/Y3$_{off}$								
8	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{off}$/Y2$_{on}$/W3$_{off}$/Y3$_{off}$								
9	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{off}$/Y2$_{on}$/W3$_{off}$/Y3$_{off}$								
10	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{on}$/Y2$_{off}$/W3$_{off}$/Y3$_{off}$								
11	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{on}$/Y2$_{off}$/W3$_{off}$/Y3$_{off}$								
12	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{off}$/Y2$_{on}$/W3$_{off}$/Y3$_{on}$								
13	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{on}$/Y2$_{off}$/W3$_{off}$/Y3$_{on}$								
14	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{off}$/Y2$_{off}$/W3$_{off}$/Y3$_{on}$								
15	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{off}$/Y2$_{off}$/W3$_{off}$/Y3$_{on}$								
16	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{off}$/Y2$_{on}$/W3$_{on}$/Y3$_{off}$								
17	G$_{off}$/W1$_{off}$/Y1$_{off}$/W2$_{on}$/Y2$_{off}$/W3$_{on}$/Y3$_{off}$								
18	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{off}$/Y2$_{off}$/W3$_{on}$/Y3$_{off}$								
19	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{off}$/Y2$_{off}$/W3$_{on}$/Y3$_{off}$								
20	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{off}$/Y2$_{on}$/W3$_{off}$/Y3$_{on}$								
21	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{off}$/Y2$_{on}$/W3$_{off}$/Y3$_{on}$								
22	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{on}$/Y2$_{off}$/W3$_{off}$/Y3$_{on}$								
23	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{on}$/Y2$_{off}$/W3$_{off}$/Y3$_{on}$								
24	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{off}$/Y2$_{on}$/W3$_{on}$/Y3$_{off}$								
25	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{off}$/Y2$_{on}$/W3$_{on}$/Y3$_{off}$								
26	G$_{off}$/W1$_{off}$/Y1$_{on}$/W2$_{on}$/Y2$_{off}$/W3$_{on}$/Y3$_{off}$								
27	G$_{off}$/W1$_{on}$/Y1$_{off}$/W2$_{on}$/Y2$_{off}$/W3$_{on}$/Y3$_{off}$								

`

Control Logic:

Inputs	Device	Onboard Marker
R	All thermostat R	24Rx
C	All thermostat C	24C
G	All thermostat G	AQU
W	Thermostat 1 Heating	W1
Y	Thermostat 1 Cooling	Y1
W2	Thermostat 2 Heating	G1
Y2	Thermostat 2 Cooling	G2
W3	Thermostat 3 Heating	G3
Y3	Thermostat 3 Cooling	AUX

Priority is Zone 1 then Zone 2 to determine whether system is in heating or cooling mode.

The following are OFF or ON (voltage signals) states for THS Series Air Handlers

Blower				
OFF	Low (5)	Med (4)	High (3)	OFF (Highest Priority)
Default	G	Y1 or Y2 or Y3 for the first minute	Y1 or Y2 or Y3 after 1 minute	W1 or W2 or W3 and coil temperature is less than 25ºC
	W1 or W2 or W3	W1 or W2 or W3 between the 5th and 10th minutes of call	W1 or W2 or W3 after 10 minutes of call	Fan activates when coil temperature is greater than 28ºC
		W1 and W2		
		W1 and W3		
		W2 and W3		

Pump

OFF	ON	OFF
Default	W1 or W2 or W3 plus 45 second post purge after demand ends	Y1 or Y2 or Y3
	Coil temperature is less than 3ºC	
	Exercise 1 minute if idle for 24 hours	

Boiler Switch

OFF	ON	OFF
Default	W1 or W2 or W3	Y1 or Y2 or Y3
	Coil temperature is less than 3ºC	

AC Interlock

OFF	ON	OFF
Default	Y1 or Y2 or Y3 and coil temperature is greater than 3ºC	Coil temperature is less than 3ºC

Zone 1 Damper

OFF	ON	OFF
Defualt	G	
	W1	
	Y1	
	Damper Delay Timer of 20 seconds	

Zone 1 Damper Delay Timer

OFF	ON	OFF
Default	G	
	End of W1 demand	
	End of Y1 demand	

Zone 2 Damper

OFF	ON	OFF
Default	G	
	W2	
	Y2	
	Damper Delay Timer of 20 seconds	

Zone 2 Damper Delay Timer

OFF	ON	OFF
Default	G	
	End of W2 demand	
	End of Y2 demand	

Zone 3 Damper

OFF	ON	OFF
Default	G	
	W3	
	Y3	
	Damper Delay Timer of 20 seconds	

Zone 3 Damper Delay Timer

OFF	ON	OFF
Default	G	
	End of W3 demand	
	End of Y3 demand	

Special Features

Condenser Lockout/Freeze Protection

The air handler features a condenser lockout and freeze protection sensor designed to prevent damage to the hot water coil due to freezing. In any mode—heating, cooling, or standby—if the coil temperature drops to 3°C or below, the air handler will activate the pump relay and boiler switch while opening the A/C interlock to shut off the condenser unit.

Pump Exerciser

The circulating pump is activated for 1 minute if there has been no activity for 24 hours.

Fuse Protection

The main control board has fuse protection for low voltage to protect the transformer.

Service and Maintenance

***The air handler is not intended for temporary heating during construction. Using it for this purpose will **void the equipment warranty**.

Filter

Inspect the filter monthly and clean or replace it as needed. You can vacuum or rinse it if reusable. A clogged or neglected filter may reduce performance and **void the equipment warranty**.

WARNING: Only qualified professionals should adjust and service this product. Improper handling or installation of the following may result in property damage, injury, serious injury or death.

Coils

If the filter maintenance schedule is followed, heating and cooling coils should remain clean. However, if the filter is damaged or clogged, dust may build up on the coil surfaces. In this case, replace the filter and carefully vacuum the coils.

Note: You may need to remove the fan to access the face of the heating coil.

Fan and Motor

Inspect the fan for dust once a year. If it's dirty, vacuum or wash it to remove the dust. Keeping the fan blades clean will help reduce noise and enhance the capacity and efficiency of the heating system.

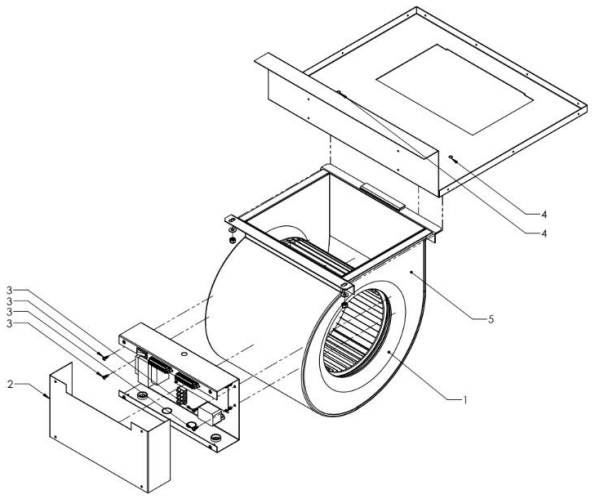
Troubleshooting

WARNING: Only qualified professionals should install, adjust, or service this product. Improper handling or installation may result in property damage, injury, serious injury or death.

WARNING: DISCONNECT POWER BEFORE SERVICING AIR HANDLER. If any of the original wires as supplied with the appliance must be replaced, it must be replaced with the exact equivalent.

Removing blower/control assembly

1. Unplug electrical from motor (NOT SHOWN)
2. Remove electrical cover
3. Dismount electrical enclosure (4 screws)
4. Detach blower assembly from bulkhead (2 nuts)
5. Slide blower assembly out of cabinet



Board Fuse

There is a fuse inserted in the main control board to protect any short that may exist within thermostat wiring. If there is no power between “C” and “R” check to see if the fuse has blown.

Thermostat Call Error

If the air handler doesn’t run when the thermostat is calling for heat or cooling, jumper R to W for heating or R to Y (Y2) to determine if the issue lies with the thermostat or the air handler control. Keep in mind that some thermostats have a delay (typically five minutes) before restarting cooling to prevent compressor damage.

External Pump Does Not Run

In areas with hard water, the pump may seize and fail to operate. To address this, close the isolation valve on the return leg and open the drain port to allow water to flow through the pump, which may free it. If this doesn’t resolve the issue, the pump will need to be removed for cleaning or replacement. The daily pump exercise will help prevent pump seizing.

External Pump is Noisy at Start-Up

If the noise does not subside within 1 minute, there may be air in the system that needs to be purged. If the

heat source is a water heater, ensure the branch connections for the heating loop are horizontal to prevent air from collecting in the loop.

Water Heater Temperature and Pressure Relief Valve is Weeping

A check valve or back-flow preventer may have been installed in the system, and pressure relief may be necessary. Consult the water heater manufacturer's instructions for solutions. Options include:

- Installing an expansion tank or check the charge pressure of the expansion tank.
- Installing a pressure relief valve.

Insufficient or No Heat

- Verify the heat generator is working properly
- Check for a clogged air filter or coil. Refer to the maintenance section for filter and coil care
- Purge air from the heating loop
- Verify inlet and outlet connections to the air handler are correct—reverse if needed
- Check for a restricted or damaged water heater dip tube—replace if necessary
- Ensure the supply water temperature is set correctly and calibrated
- Check for restrictions in the heating loop—remove any obstructions, check for stuck valves, or ensure isolation valves aren't too restrictive or partially closed after purging

Cold Water at Hot Faucet

When using a water heater as the heat source, reverse flow through the heating loop from a stuck check valve is the most likely cause. Repair or replace the valve.

Fan Runs for Cooling but Not for Heating

The room thermostat may be incorrectly wired. Refer to the electrical section or the wiring schematic on the air handler for correct installation. Check the water temperature in the system if the water temperature is less than 25^{o}C then the fan will not activate.

Construction Heat

The air handler is not permitted to be used for heating of buildings or structures under construction. Warranty is void if the air handler was used during construction period.

Finishing Heat

The air handler can be used as finishing heat provided that the following requirements are met;

- **The air handler's return air and supply air openings must be covered to minimize infiltration of dust prior to and during dust-generating construction activities (e.g. drywall installation, woodworking).**
- **All interior drywall must be installed, taped, sanded and first coat of primer applied.**
- **The building must be cleaned of all debris and drywall dust.**
- **A new air handler filter must be installed, rated at MERV 11 or finer. The filter itself must be labelled accordingly by the manufacturer for easy identification.**
- **The air handler must be commissioned by a TSSA (or Authority Having Jurisdiction) registered heating contractor in accordance with the manufacturer's certified installation instructions and to match values depicted in the Installation manual.**
- **Arrangements must be made with the fuel distributor to inspect the air handler subsequent to it being used for Finishing Heat (can be done in conjunction with inspection of all other gas appliances prior to final occupancy).**

Additional requirements are;

- **The air handler ducts are expected to be free and clear of debris prior to final occupancy. A new filter must be installed before occupancy.**
- **Fuel distributors may require the heating contractor's/builder's to complete, sign, and post the Finishing Heat Activation Form on the return air ducting, in advance of a air handler being activated for Finishing Heat. The fuel distributor may reject the installation if the form is missing, incomplete or unsigned.**
- **Fuel distributors may have other requirements that must be fulfilled and should be contacted for specific details.**

Warranty will not be granted if all the above requirements have not been met.

Warranty

One year standard parts warranty. Please refer to the Technical Portal Link for further information.

Limitation of Liability

Vulcano Air's total liability for any claims, damages, or losses related to the product is strictly limited to the product's purchase price. Vulcano Air, nor any of its affiliates will not be liable for any special, indirect, incidental, or consequential damages, including but not limited to lost profits, lost production, construction delays, property damage, or personal injury suffered by the purchaser or any third party. Furthermore, Vulcano Air and its affiliates disclaim all liability for costs, claims, or damages arising from strict liability claims