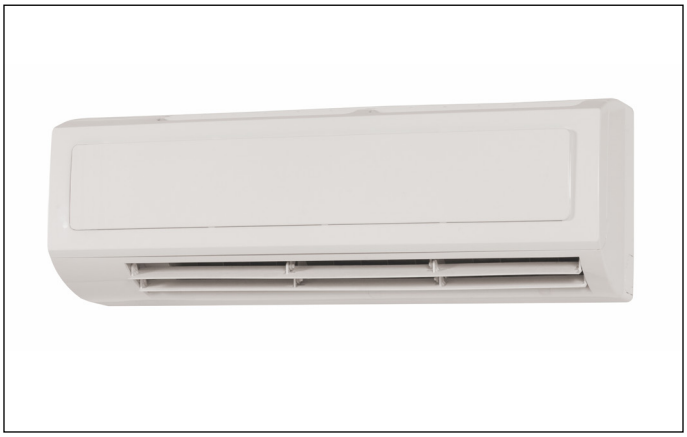
HWL2-1225

SPACE PAK®

MODEL HW-ECM INSTALLATION, OPERATION & MAINTENANCE MANUAL

Low Temperature High Wall Heating/ Cooling Fan Coil Units up to 25,000 BTU/hr Heating and 1 Ton Cooling Capacity



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IN UNITED STATES: 260 NORTH ELM ST. WESTFIELD, MA 01085 800-465-8558
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INVESTING IN QUALITY, RELIABILITY & PERFORMANCE.

ISO 9001 QUALITY

Every product is manufactured to meet the stringent requirements of the internationally recognized ISO 9001 standard for quality assurance in design, development and production.

World Leading Design and Technology
Equipped with the latest air-conditioning test rooms and manufacturing technology, we produce over 50,000 fan coil units each year, all conforming to the highest international standards of quality and safety.

ETL SAFETY STANDARDS

All products conform to UL standard for Safety for Heating and Cooling Equipment UL1995 4th Edition, October 14, 2011;

All products conform to CSA standard for Safety for Heating and Cooling Equipment CSA C22.2 No.236-11, 4th Edition, October 14 2011.

The Highest Standards of Manufacturing
In order to guarantee the very highest standards and performance, we manage every stage in the manufacturing of our products. Throughout the production process we maintain strict control, starting with our extensive resources in research and development through to the design and manufacture of almost every individual component, from molded plastics to the assembly of units and controllers.

WEEE MARK

All products conform to the **"WEEE"** directive to guarantee correct standards of environmental solutions.

Quality Controlled from Start to Finish
Our highly-trained staff and strict quality control methods enable us to produce products with an exceptional reputation for reliability and efficiency, maintained over many years. As well as full CE certification and ISO 9001, several products ranges have UL / ETL safety approval in the USA and Canada, Eurovent performance and sound certification as well as ROHS compliance for Europe, giving you the confidence of knowing our company is the right choice when selecting fan coil units.

ALWAYS MAKE SURE THIS MANUAL REMAINS WITH THE UNIT. READ THIS MANUAL BEFORE PERFORMING ANY OPERATION ON THE UNIT.

A. General Description

This HighWall Unit is designed to meet and exceed demanding requirements for efficiency, quiet operation and appearance. The sleek profile and elegantly styled cabinet complements any interior design theme, while the simple control platform integrates with any conventional room thermostat for ease of installation and operation.

Cabinet - the stylish cabinet is constructed of durable flame resistant acrylonitrile-butadiene-styrene (ABS) plastic. The silver white color and rounded corners provide its modern look.

Water Coil - the water coil has a large heat transfer surface and utilizes the latest fin profile technology. It combines an advanced technology approach with the security of a traditional design regarding tube thickness. The water coil is also equipped with an air vent valve and a water purge valve.

Integral Hoses - the included connection hoses are a synthetic elastomer tube, with stainless steel outer braiding and brass connectors, which enables quick, low cost connections with no brazing.

Blower and Motor - the unit incorporates only specially designed and tested EC motors, allowing the blower wheel to provide optimum performance in airflow-efficiency and quiet operation.

Filters - washable, easy-to-remove, fine mesh air filters are standard to all HighWall models. Tabs located on the front of the unit can be unsnapped, allowing the filter to be easily slid downward and removed. No tools are required, nor any dismantling of the equipment.

Air Grille Distribution - all units are equipped with both deflector blades and manual directional vanes, enabling supply air to be automatically distributed, and air flow and direction to be customized.

Microprocessor controls (S3 type)
The PCB (printed circuit board) Modbus microprocessor controls functionality of the indoor-fan motor and water valves (ON/OFF or modulating) to maintain room conditions at a user-defined set point. Temperature settings, fan speeds and other control functions can be changed by either infrared handset or wired wall pad.

- High efficiency EC motor.
- Three speed inputs as called.
- Heat and cool temperature protections and safety cut out.

B. Technical Data
General Specification – HW-ECMB Series

Product range: HW-ECMB Hydronic High Wall 2 Pipe with EC Motor

Unit Configuration		Configuration			HW-06-ECMB	HW-15-ECMB	HW-18-ECMB
					2-Pipe		
Performance Data	Air	Air Flow	H	CFM	294	379	464
			M		218	294	435
			L		171	218	335
			H	m^3/hr	500	644	788
			M		370	500	740
			L		290	370	570
	Cooling	Cooling Capacity	H	BTU/Hr*	6968	10200	12590
			M		6151	9011	11132
			L		4866	7136	8813
			H	kW	2.04	3.00	3.69
			M		1.80	2.64	3.26
			L		1.43	2.09	2.58
	Heating	Heating Capacity	H	BTU/Hr*	13961	20436	25227
			M		10832	15856	19572
			L		7712	11302	13952
			H	kW	4.09	5.99	7.39
			M		3.17	4.65	5.74
			L		2.26	3.31	4.09
	Electrical	Fan motor power	H	W	18	22	30
			M		13	15	20
			L		10	10	13
		Voltage		V/Ph/Hz	115/1/60		
		Fan Motor Running Current @ H 115V		A	0.31	0.38	0.52
	Sound	Sound Pressure Level H/M/L		dB(A)	39/31/26	45/34/31	49/44/37
	Hydronic	Water Flow Rate		GPM	1.39	2.03	2.52
				l/hr	316	460	572
		Cooling Pressure Drop		ft. wg	7.9	9.7	13.5
				kPa	23.6	29.0	40.3
		Heating Pressure Drop		ft. wg	7	9	12
				kPa	21	27	36
		Volume		gal	0.02	0.03	0.05
				l	0.08	0.11	0.20
		Connections	Type		NPT Threaded Male		
			In	in	1/2		
			Out				
		Condensate Drainage Connection			5/8		
		Net Weight		lbs	26.5	28.7	30.9
				kg	12.0	13.0	14.0

a. Cooling:
Return air temperature: 80°F (26.7°C) DB/67°F (19.4°C) WB. Inlet/Outlet water temperature: 45°F (7.2°C)/55°F (12.8°C)

b. Heating Return air temperature: 70°F (21.1°C) Inlet water temperature: 140°F (60°C)

*Heating: water temperature difference is 20°F (-6.7°C).
Cooling: water temperature difference is 10°F (-12.2°C).

Coil Data – 2-Pipe Systems

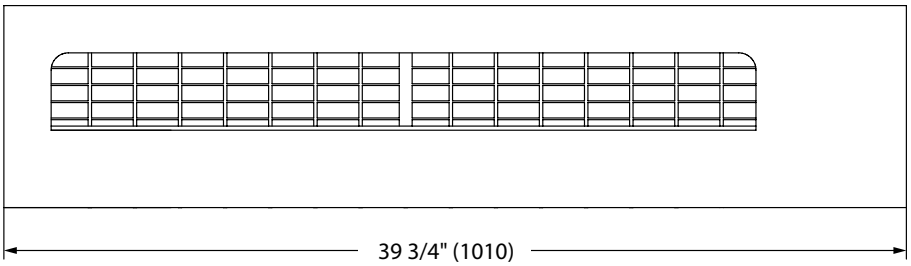
Model	Fin Height (inch/mm)	Fin Length (inch/mm)	Fin Space	No. of Rows	Tubes per Circuit	Number of Circuits	Tube Diameter
HW-06-ECM	9.1/231	26.8 /681	1.3mm	2	14	3	3.13"/8mm
HW-15-ECM	9.1/231	26.8/681		2	22	4	3.13"/8mm
HW-18-ECM	14.1/358	26.8/681		2	34	5	3.13"/8mm

Sound Power Data

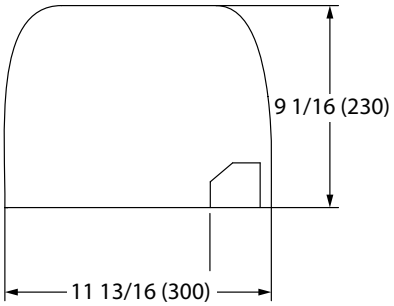
Model		HW-06-ECM			HW-15-ECM			HW-18-ECM		
Speed (CFM / m³/hr)		H(930 /1580)	M(700 /1190)	L(600 /1020)	H(1150 /1954)	M(800 /1360)	L(700 /1190)	H(1300 /2209)	M(1100 /1869)	L(900 /1530)
Sound Power dB(A)		**49.0**	**39.8**	**35.7**	**56.0**	**43.9**	**39.5**	**60.0**	**54.5**	**47.5**
Sound Power in 1/3 Octave-bands under ESP: 0Pa	**20.0 Hz**	15.8	19.8	17.1	21.1	19.9	19.9	14.7	23.8	19.0
	25.0 Hz	14.0	19.5	17.2	22.6	19.7	17.7	21.4	17.9	17.9
	31.5 Hz	23.2	16.6	21.8	22.7	16.3	18.4	21.2	17.9	19.1
	40.0 Hz	19.9	14.8	13.4	23.6	16.3	17.6	28.1	19.1	17.6
	50.0 Hz	22.0	17.8	16.6	20.3	20.2	18.9	23.2	26.0	20.8
	63.0 Hz	24.7	19.8	16.7	28.4	23.4	20.8	34.4	29.1	23.3
	80.0 Hz	26.1	20.3	12.4	32.1	21.0	21.8	38.8	31.2	26.0
	100.0 Hz	28.6	22.8	17.7	36.0	24.2	22.1	39.4	37.2	27.6
	125.0 Hz	32.1	26.3	25.9	38.0	27.3	26.3	43.2	34.6	28.8
	160.0 Hz	34.4	26.1	17.8	39.8	30.0	23.4	44.5	37.0	31.8
	200.0 Hz	33.2	26.0	17.7	39.2	29.6	23.9	44.6	37.5	31.3
	250.0 Hz	31.7	25.0	20.0	39.6	28.1	26.5	43.5	36.9	30.8
	315.0 Hz	35.2	25.6	22.1	40.9	30.5	25.7	45.0	40.4	34.3
	400.0 Hz	39.9	32.0	26.2	46.2	36.2	31.7	50.5	45.1	38.0
	500.0 Hz	42.3	31.1	25.1	47.5	37.9	32.4	50.9	46.3	41.3
	630.0 Hz	42.2	29.7	24.6	48.8	35.4	30.7	52.3	49.5	39.7
	800.0 Hz	37.6	27.9	22.6	46.5	32.8	28.2	50.8	44.4	37.2
	1000.0 Hz	39.5	28.6	23.1	48.5	33.6	28.8	52.6	45.7	39.1
	1250.0 Hz	36.3	24.7	21.0	45.2	30.5	24.3	49.1	43.9	35.0
	1600.0 Hz	32.8	22.6	21.6	42.7	26.7	22.8	47.1	39.4	31.3
	2000.0 Hz	29.6	20.8	19.8	39.4	23.4	21.2	44.4	36.8	28.0
	2500.0 Hz	26.9	20.9	20.0	36.7	22.2	20.4	41.6	34.1	25.9
	3150.0 Hz	24.5	20.9	20.7	33.3	21.9	20.9	38.3	31.3	23.7
	4000.0 Hz	23.1	20.8	20.8	31.5	21.3	20.7	36.6	29.5	22.9
	5000.0 Hz	21.8	20.7	20.6	27.8	20.9	20.6	32.7	25.9	21.6
	6300.0 Hz	20.5	20.2	20.0	24.5	20.3	20.2	29.1	23.1	20.4
	8000.0 Hz	19.2	19.2	19.1	21.2	19.2	19.1	24.6	20.5	19.3
	10000.0 Hz	17.2	17.5	17.3	17.9	17.3	17.2	19.5	17.7	17.3
	12500.0 Hz	14.3	14.5	14.4	14.6	14.4	14.5	15.3	14.5	14.4
	16000.0 Hz	11.6	11.2	11.2	11.9	11.3	11.3	11.9	11.4	11.6

Dimensional Drawings – HW-06/15/18-ECM - (Inches (mm))

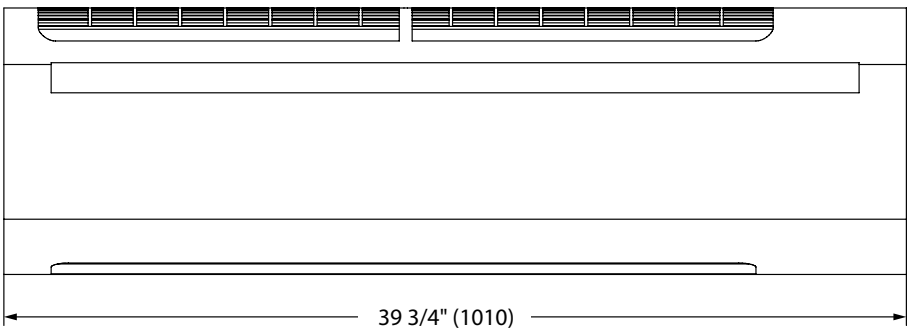
Top View



End View



Front View



C. Service and Installation

Operating Limits

Power Supplies

Volt	Phase	Hz
110-120	1	60

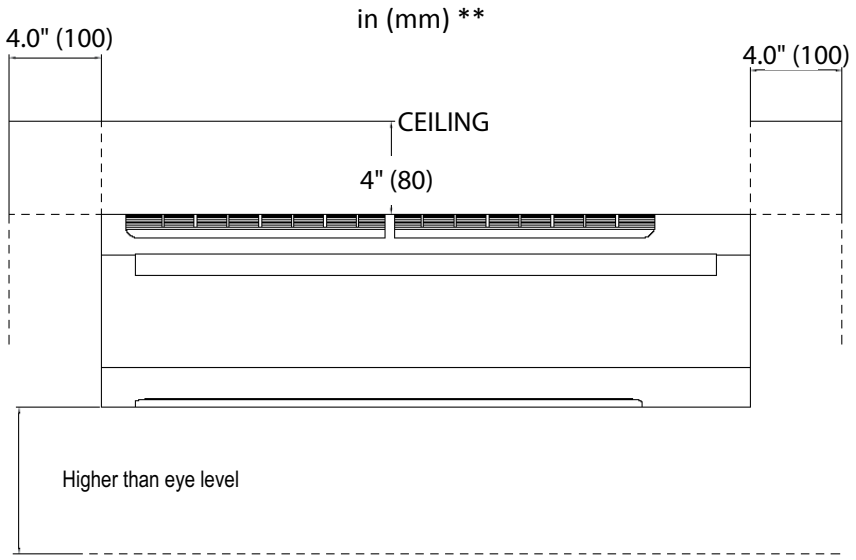
Water Circuit

Minimum entering water temperature	35.6°F (+2°C)
Maximum entering water temperature	160°F (+71°C)
Water side recommended maximum pressure	30 PSI (207 kPa)

Installation of HighWall Unit

Selecting a Location

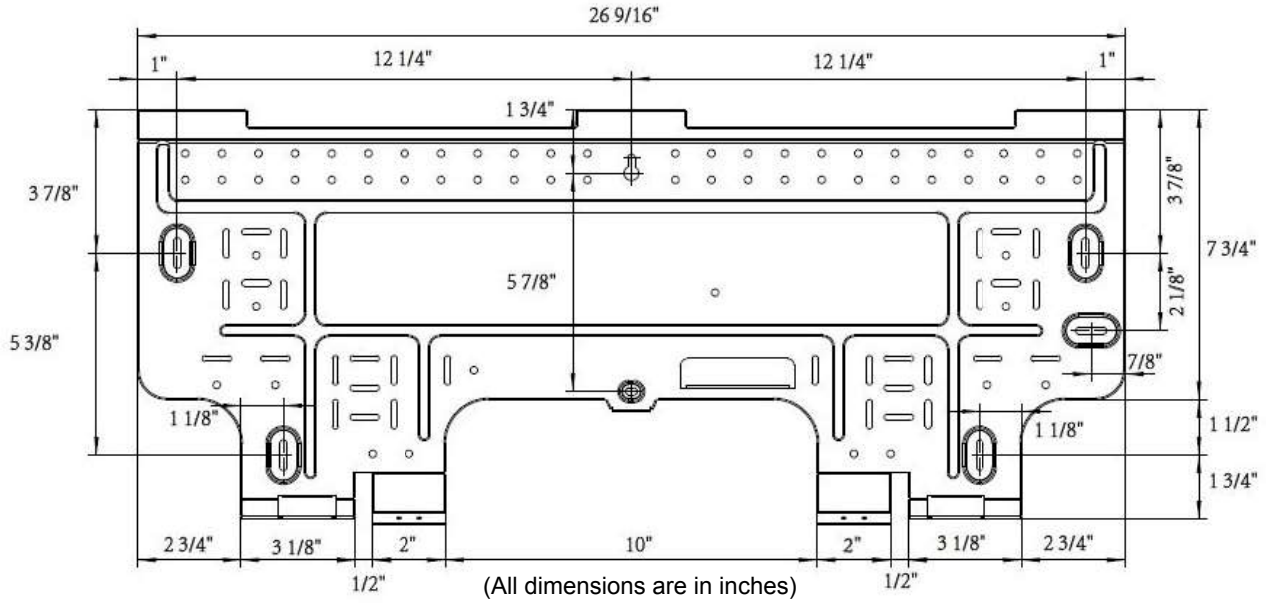
Select the location for the HighWall unit with the following considerations:
1. The air inlet and outlet area should be clear without obstructions. The air should flow freely.
2. The HighWall unit should be mounted on solid wall.
3. The location should allow easy access to connect water pipes easily achieve drainage.
4. Ensure the clearance around the fan coil unit conforms to the following drawing.
5. The unit should be installed higher than eye level.
6. Avoid installing the unit in direct sunlight.



Notes:
Required clearance for maintenance and servicing is as shown above.
All dimensions shown in inches (mm).

7. Avoid electromagnetic control system interference, ensure control wires are installed separately from 110 VAC power supply wires.
8. Use shielded sensor cables where electromagnetic interference may be present.
9. Install a noise filter if the power supply creates any unexpected operation.

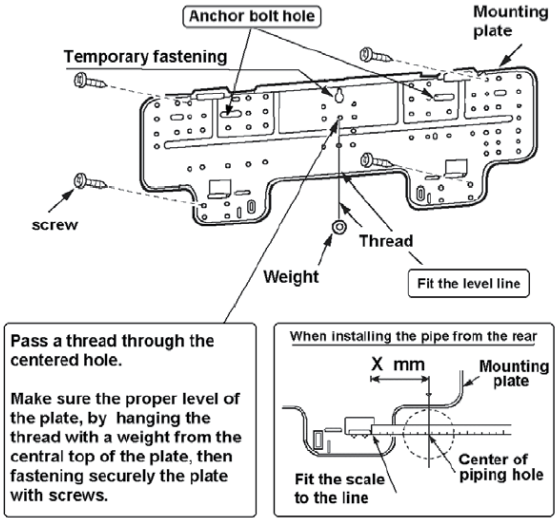
Mounting Plate Dimensions



(All dimensions are in inches)

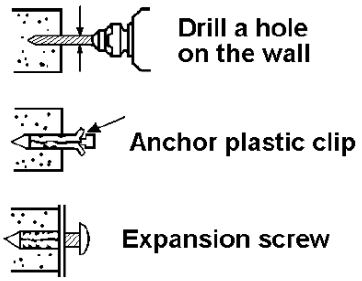
Installing the Mounting Plate

1. Select the structural position (e.g. a pillar or lintel) on the wall.
2. Then temporarily fasten the mounting plate on the wall with a steel nail.



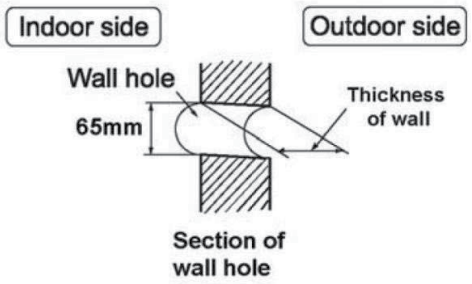
Note: designed for left side exit plumbing but can be configured to right side

3. Mount the mounting plate horizontally as shown in the above figure or by means of gradiometer. Failure to follow this may cause water to drip indoors and create atypical noise.
4. Fix the mounting plate by means of expansion screws or tapping screws.



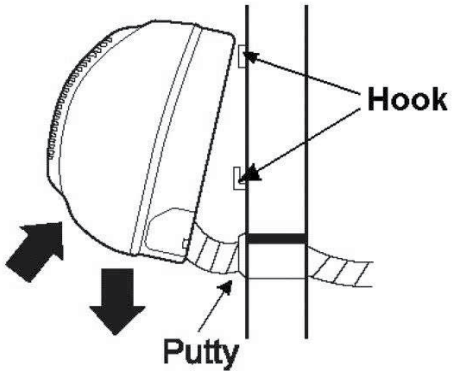
Drilling the Condensate Drain Hole

1. Ensure that the hole for condensate drain is correctly positioned. The height should be lower than the bottom edge of the indoor unit.
2. Drill a 2.5"/65mm diameter hole with a descending slope.
3. Seal it off with putty after installation.



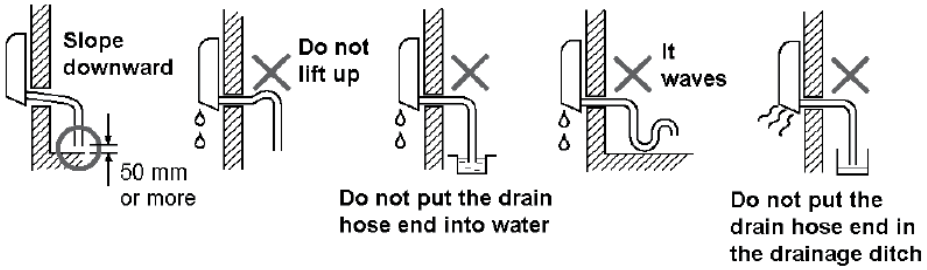
Installing the HighWall Unit

1. Pass the piping through the hole in the wall and hook the indoor unit on the mounting plate by the upper hooks.
2. Move the body of the unit from side to side to verify if it is securely fixed.
3. While pushing the unit toward the wall, lift it slightly from beneath to hook it up on the mounting plate by the lower hooks.
4. Make sure the unit firmly rests on the hooks of the mounting plate.

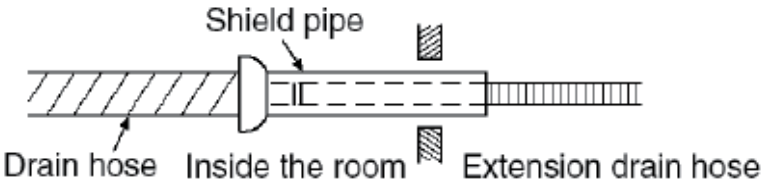


Condensate Drain Configuration

1. Install the drain hose so that it slopes downward slightly for free drainage. Avoid installing it as shown in the below illustrations marked with an “X”.



2. Put water in the drain pan and make sure that the water drains outdoors.
3. If the flexible drain hose provided with the indoor unit is not long enough, please extend it by joining it to a field supplied extension. Be sure to insulate the connecting part of the extension with a shield pipe as shown.



4. If the attached drain hose passes through an indoor area, insulate it with insulation material.

Unit Maintenance and Preparation

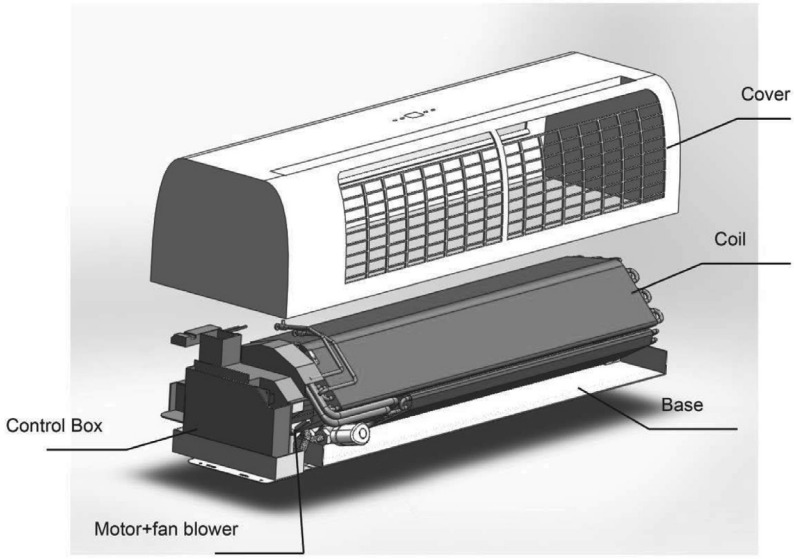
Opening and Closing Of Lift-Up Grille Cover

Open the grille cover by lifting from the bottom position indicated by the arrows.

Close the grille cover by pressing down at the positions indicated by the arrows.

Removing Front Cover Assembly

1. Set the horizontal louver to the horizontal position.
2. Remove the screw caps below the louver, and then remove the mounting screws.
3. Open the lift-up grille cover by grasping the panel at both sides as shown above.
4. Remove the remaining screws located in the center of the front cover.
5. Grasp the lower part of the front cover and pull the entire assembly out and up towards you.



Air Purging

1. After connecting the water inlet and outlet pipes to the main supply lines turn on the main breaker and operate the unit in COOLING mode.
2. Open the water inlet valve and flood the coil.
3. Check all connections for water leakage. If no leak is found, open the purging valve with an open end wrench while supporting the unit with your other hand. Then purge the air trapped inside the coil. When performing this activity, take care not to touch the electrical parts.
4. Close the purging valve when no bubbles appear.
5. Open the water outlet valve.

Wiring Connections

Unit components are wired to the terminal block of the indoor unit. Wiring can be accessed from the terminal block inside the control box.

D. Control Specifications: Simplified Control PCB - W Type Control

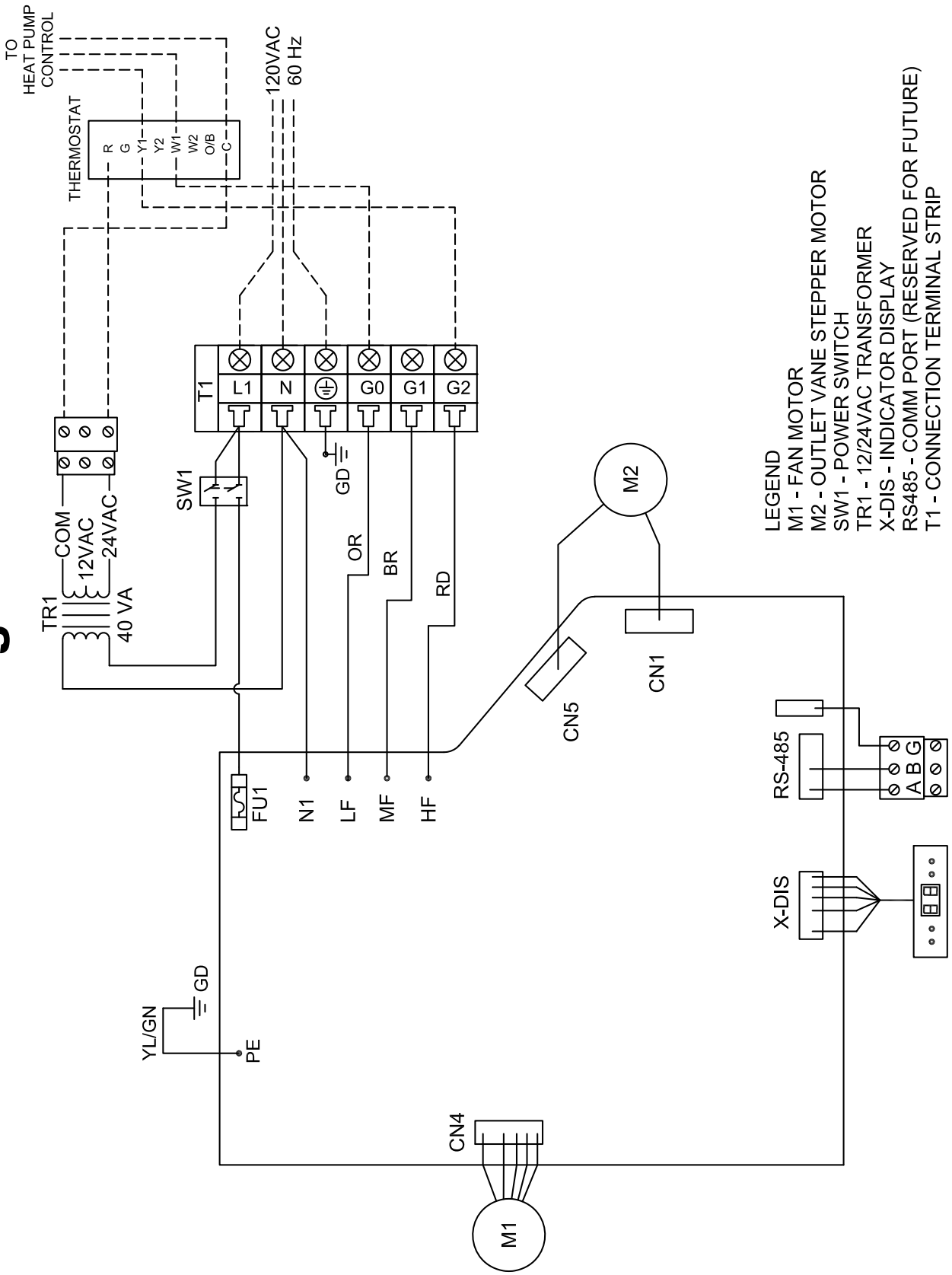
Definition of Input/Output

I/O		Code	2-Pipe
Power input	Phase	L1	Power supply: 115V/1Ph/60Hz
	Neutral	N	
	Earth	⏚	
Output	Fan	CN4	EC Fan driver
	Thermostat Power	24VAC/ COM	24V to room thermostat (supplied separately)
	Display Output	X-DIS	Display is used for commissioning and troubleshooting purpose only. It can be disconnected if preferred with no loss of function.
Input	Fan Low **	G0	24V from thermostat to operate fan at predetermined Low speed
	Fan Medium **	G1	24V from thermostat to operate fan at predetermined Medium speed
	Fan High **	G2	24V from thermostat to operate fan at predetermined High speed

**Fan control can be operated by any single 24VAC source connected to the fan inputs, such as G, Y and W for Fan only, Cooling and Heating.
The installing contractor is free to decide which call is associated with which fan speed.
However the control cannot accept multiple calls. So if your particular thermostat sends a Simultaneous G call with a Heating or Cooling call, the G output cannot be connected.

Wiring Diagram Simple Control PCB - W Control Type

Wiring Schematic



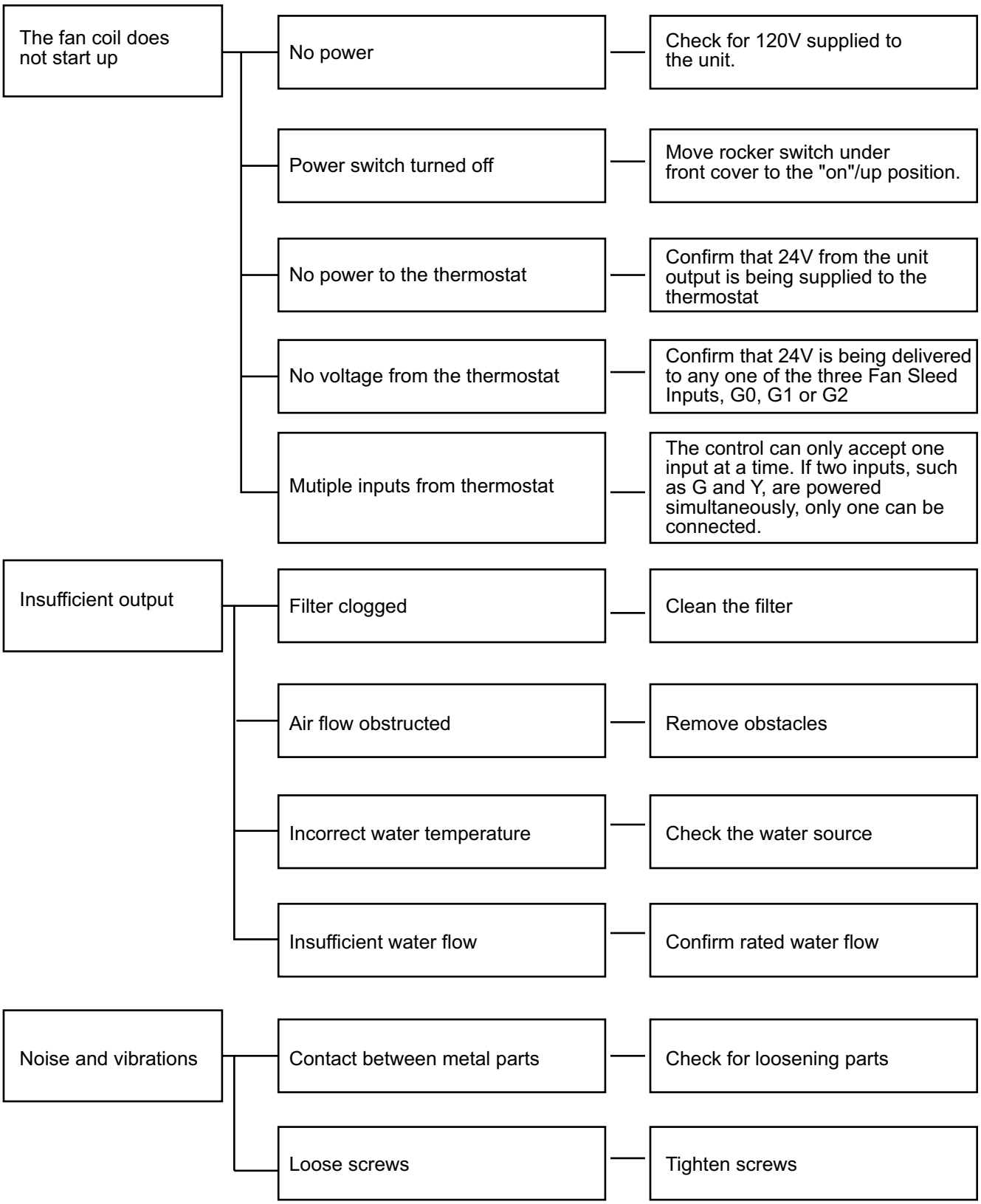
HighWall Unit ON/OFF

The High Wall unit can be turned completely off by using the rocker switch under the front cover.

LED Lights (When display is connected)

For all units Power / Operation LED light (both green)	
Unit on	Power LED Off, Operation LED On
Unit in standby	Power LED On, Operation LED Off

E. Troubleshooting Guide



IMPORTANT NOTICE
PRODUCT REGISTRATION & EXTENDED WARRANTY

Extended Warranty Requirements
- Project/Equipment Registration
- Active SpacePak Certified Contractor Status at Time of Installation

To visit the **Product Registration Page**, click or scan the QR code.

Are You Certified?
Check our **Contractor Locator** map to find out.

Benefits of Becoming a SpacePak Certified Contractor:
- Local Leads
- Listed on SpacePak Website
- Sales & Marketing Support
- Pre-Sale Application Support & Load Calculations
- Extended Warranty

SpacePak Offers Factory Authorized Training for Certification On:
- Small Duct High Velocity Equipment
- Air-to-Water Heat Pump & Hydronic Equipment

Available Training Certification - Methods Include:
- Online Webinar Training
- Local Field Training
- Corporate Headquarter Factory Training

For All Training Inquiries, Contact Your Local Spacepak Manufacturers Representative:
https://www.spacepak.com/RepLocator

Limited Warranty Statement

SpacePak "Solstice Inverter"* Series Air to Water Heat Pumps

Subject to the terms and conditions of this Limited Warranty Statement (the "Limited Warranty"), SpacePak warrants to the original purchaser of the "Solstice Inverter" Series that:

1) The parts are warranted for a period of two (2) years to the original owner of the System (as such term is defined in part (4) below). If any parts should prove defective due to improper workmanship and/or material for a period of two (2) years from the date of installation, SpacePak will replace any defective part without charge for that part. Replacement parts are warranted for the remainder of the original 2-year warranty period. Parts used as replacement may be of like kind and quality and may be new or remanufactured. Defective parts must be available for SpacePak in exchange for the replacement parts and become the property of SpacePak.
2) The compressor is warranted for a period of five (5) years to the original owner of the System. If the compressor should prove defective due to improper workmanship and/or material for a period of five (5) years from the date of installation, SpacePak will replace the defective compressor without charge for the compressor. Replacement compressors are warranted for the remainder of the original 5-year warranty period. Compressors used for replacement may be of like kind and quality and may be new or remanufactured. Defective compressors must be made available to SpacePak in exchange for the replacement compressor and become the property of SpacePak.
3) **Notwithstanding the foregoing, if the System is installed in a residential single-family home by a SPACEPAK CERTIFIED CONTRACTOR THAT IS CERTIFIED ON OR BEFORE THE DATE OF INSTALLATION, the parts will be warranted for five (5) years and compressor will be warranted for a period of ten (10) years, to the original owner, so long as the original owner resides in the home.** Specifically, if any parts and/or the compressor should prove defective due to improper workmanship and/or material for the period listed above from the date of installation, SpacePak will replace any defective parts or compressor without charge for the part or compressor. The replacement parts and/or compressor are warranted for the remainder of the original warranty period. Parts and/or compressors used for replacement may be of like kind and quality and may be new or remanufactured. Defective parts and/or compressors must be made available to SpacePak in exchange for the replacement parts and become the property of SpacePak.
4) For purposes of this Solstice Inverter" Series Limited Warranty, as used herein, the term "System" shall mean the Solstice Inverter outdoor and indoor components connected via refrigerant piping and electrical wiring purchased on or after February 1, 2021, (i) sold from a licensed HVAC representative of SpacePak (and not an unauthorized third party) to the original owner, (ii) installed by such contractor in accordance to local and National regulations in the continental U.S., Alaska, Hawaii, and Canada; and (iii) registered on SpacePak's website located at www.SpacePak.com/warranty)

*For any Solstice equipment that is non-inverter, please refer to warranty located in the equipment original installation manual.

SpacePak Small Duct High Velocity Air Handlers and Hydronic Fan Coils

Subject to the terms and conditions of this Limited Warranty Statement (the "Limited Warranty"), SpacePak warrants to the original purchaser of the Small Duct High Velocity Air Handlers and hydronic fan coils that:

1) The parts are warranted for a period of one (1) year to the original owner of the System (as such term is defined in part (3) below). If any parts should prove defective due to improper workmanship and/or material for a period of one (1) year from the date of installation, SpacePak will replace any defective part without charge for that part. Replacement parts are warranted for the remainder of the original 1-year warranty period. Parts used as replacement may be of like kind and quality and may be new or remanufactured. Defective parts must be available for SpacePak in exchange for the replacement parts and become the property of SpacePak.
2) Notwithstanding the foregoing, if the System is installed in a residential single-family home by a SPACEPAK CERTIFIED CONTRACTOR the parts will be warranted for five (5) years, to the original owner, so long as the original owner resides in the home. Specifically, if any parts should prove defective due to improper workmanship and/or material for the period listed above from the date of installation, SpacePak will replace any defective parts or compressor without charge for the part or compressor. The replacement parts are warranted for the remainder of the original warranty period. Parts used for replacement may be of like kind and quality and may be new or remanufactured. Defective parts must be made available to SpacePak in exchange for the replacement parts and become the property of SpacePak.
3) For purposes of this Small Duct High Velocity Air Handlers and hydronic fan coils limited warranty, as used herein, the term "System" shall mean the "SpacePak Small Duct High Velocity Air Handlers, hydronic fan coils purchased on or after February 1, 2021, (i) sold from a licensed HVAC representative of SpacePak (and not an unauthorized third party) to the original owner, (ii) installed by such contractor in accordance to local and National regulations in the continental U.S., Alaska, Hawaii, and Canada; (iii) registered on SpacePak's website located at www.SpacePak.com/warranty); and (iv) comprised of SpacePak original components or SpacePak certified components. TO THE EXTENT THAT NON-SPACEPAK OR NON-SPACEPAK CERTIFIED COMPONENTS ARE UTILIZED IN THE SYSTEM, ALL WARRANTIES SHALL NOT BE APPLICABLE.

SpacePak Buffer Tanks

The "Manufacturer" warrants to the original owner at the original installation site that the Hydronic Buffer Tanks (the "Product") will be free from defects in material or workmanship for a period not to exceed ten (10) years from the startup, provided the product is installed in accordance with the manufacturers installation instructions. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective.

The following items apply to each Limited Warranty offered by SpacePak.

4) **NO LABOR.** Each Limited Warranty offered by SpacePak does NOT include labor or any other costs incurred for service, maintenance, repair, removing, replacing, installing, complying with local building and electric codes, shipping or handling, or replacement of the System/Products, compressors or any other parts. For items that are designed to be maintained or replaced by the original owner, the original owner is solely responsible for all labor and other costs of maintaining, installing, replacing, disconnecting or dismantling the System/ Products and parts in connection with owner-required maintenance. Please consult the applicable technical documentation for regularly suggested maintenance procedures.
5) **PROPER INSTALLATION.** This Limited Warranty applies only to Systems/Products that are sold by SpacePak HVAC representatives, installed by contractors who are licensed for HVAC installation under applicable local and state law, and who install the Systems/Products in accordance with (i) all applicable building codes and permits: (ii) SpacePak's installation and operation instructions: and (iii) good trade practices.
6) **BEFORE REQUESTING SERVICE,** please review the applicable technical documentation to insure proper installation and correct customer control adjustment for the System/Products. If the problem persists, please arrange for warranty service.
    a. **TO OBTAIN WARRANTY SERVICE:**
        i. Contact the licensed contractor who installed the System/Products or the nearest licensed contractor, dealer, or distributor (whose name and address may be obtained on our website at www.SpacePak.com of any defect within the applicable warranty time period.
        ii. Proof of the installation date by a licensed contractor is required when requesting warranty service. Present the sales receipt, building permit or other document which establishes proof and date of installation. In the absence of acceptable proof, this Limited Warranty shall be deemed to begin one hundred twenty (120) days after the date of manufacture stamped on the System/Products.
        iii. This Limited Warranty applies only to System/Products purchased on or after February 1, 2021 only while the System/Products remains at the site of the original installation, and only to locations within the continental United States, Alaska, Hawaii and Canada.
        iv. Shipment, to the Manufacturer, of that part of the Product thought to be defective. Goods can only be returned with prior written approval from the Manufacturer. All returns must be freight prepaid. Determination, in the reasonable opinion of the Manufacturer, that there exists a defect in material or workmanship.
    b. **THIS LIMITED WARRANTY DOES NOT COVER:** property damages, malfunction or failure of the System/ Products, or personal injury caused by or resulting from: (a) accident, abuse, negligence or misuse; (b) operating the System/Products in a corrosive or wet environment, including those containing chlorine, fluorine or any other hazardous or harmful chemicals or environmental factors, including sea- or salt-water; (c) installation, alteration, repair or service by anyone other than a licensed contractor or other than pursuant to the manufacturer's instructions; (d) improper matching of System/Products components; (e) improper sizing of the System/Products; (f) improper or deferred maintenance contrary to the manufacturer's instructions; (g) physical abuse to or misuse of the System/Products (including failure to perform any maintenance as described in the Operation manual, or any System/ Products damaged by excessive physical or electrical stress; (h) System/Productss that have had a serial number or any part thereof altered, defaced or removed; (i) System/Products used in any manner contrary to the Operation Manual; (j) freight damage; or (k) events of force majeure or damage caused by other external factors such as lightning, power surges, fluctuations in or interruptions of electrical power, rodents, vermin, insects, or other animal- or pest-related issues.
    c. **THIS LIMITED WARRANTY ALSO EXCLUDES:** (a) SERVICE CALLS WHERE NO DEFECT IN THE SYSTEM/ PRODUCTS COVERED UNDER THIS WARRANTY IS FOUND: (b) System/Products installation or set-ups; (c) Adjustments of user controls; (d) System/Products purchased or installed outside the continental United States, Alaska, Hawaii and Canada; or (e) System/Products purchased or installed prior to **February 1, 2021**. Consult the operating instructions for information regarding user controls.

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