Manufacturer's Roundtable

Hydronic Heating

June 25, 2025

CEDA California Energy Design Assistance

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WHAT IS CEDA?

CEDA

The California Energy Design Assistance (CEDA) program is the only statewide utility incentive program for new construction and major renovations.

- Promotes **electrification** and **decarbonization**
- CEDA works in collaboration with project teams to reduce energy demand, consumption, and carbon emissions.
- Serves commercial, public, high-rise multifamily, industrial, and agricultural projects in Pacific Gas & Electric (PG&E), Southern California Edison (SCE), SoCalGas (SCG), and San Diego Gas & Electric (SDG&E) service areas.

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WHY PARTICIPATE IN CEDA?

CEDA

- Receive complimentary **decarbonization** analysis tailored to project goals to identify most effective measures to implement
- Gain analysis of **energy costs and paybacks**
- Receive **financial incentives** to help offset the costs of decarbonization measures
- Demonstrate commitment to high performance building practices and design

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INCENTIVES

CEDA

$4,000
+
measure package incentive

- $4000 **Design team incentive** per project as a thank you for participation
- Based on the project measure package the design team chooses for implementation

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HIGH PERFORMANCE MEASURES

CEDA

CEDA aims to exceed California's decarbonization standards by identifying high performance measures and providing educational opportunities to explore use cases and best practices.

This not only advances the market, but also qualifies participants for enhanced incentives through our program.

A current list of eligible high-performance measures can be found on our website here.

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HAVE A PROJECT TO DISCUSS?

CEDA

For more information, please contact our program outreach specialists, visit our website, or fill out an interest form

Scan me to enroll a project

CaliforniaEDA.com

Sean M. Williams | Outreach Specialist
swilliams@willdan.com

Tina Hendrix | Program Outreach Specialist
thendrix@willdan.com
760.585.7577

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Today's Guest Moderator

Jonathan Koliner, Director of Research and Innovation, Slipstream

Innovative programs require innovative ideas and techniques. Dr. Koliner synthesizes technological, human, and design data to expand and improve demand-side energy use programs, with a focus on electrification and decarbonization. He draws on experience that spans physical science, data science, and behavioral science to triangulate the needs and opportunities for energy users.

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Today's Roundtable: Air-to-Water Heat Pumps

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Air-to-Water Heat Pumps

Hydronics: Water as a heat transfer medium

- Ducts and fans transfer heat with convection (*e.g. ducted furnace, unitary heat pump*)
- Refrigerant lines transfer heat in refrigerant (*e.g. mini-splits*)
- Pipes transfer heat in water *(e.g. air-to-water heat pumps)*

Air-to-water heat pumps are air source heat pumps that exchange heat with water for hydronic distribution.*

**by design*

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Hydronics Use Cases

Heating

- In-floor radiant
- Radiators
- Fan-coil heads and cassettes
- Air handlers

Domestic hot water

- Indirect via heat exchange coil in tank
- Direct heating of potable water

Energy storage

- Storage tank(s)
- Can combine with other storage media through heat exchange

Cooling

- Fan-coil units
- Air handlers

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AWHP Configurations

Monobloc: Outdoor unit has full refrigerant circuit, hydronics carry heat indoors.

- All refrigerant outside
- Need freeze protection

Split: Refrigerant lines run through the wall from outdoor to indoor unit, heat exchange to hydronics with indoor unit.

- IDU offers flexibility
- More expensive

Other Configuration Details

Multiple pipes: Hydronic outlets to multiple end uses to simplify piping, centralize controls within heat pump unit

Heat recovery: Run simultaneous DHW and cooling

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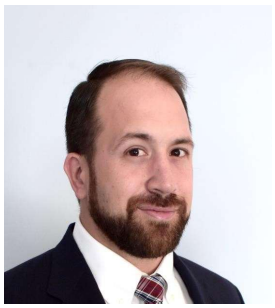
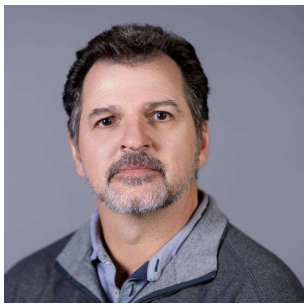
Today's Panelists

James Gagnon
Stiebel Eltron

John Williams
Chiltrix



Nick Conklin
LG



Rob Derksen
Enertech

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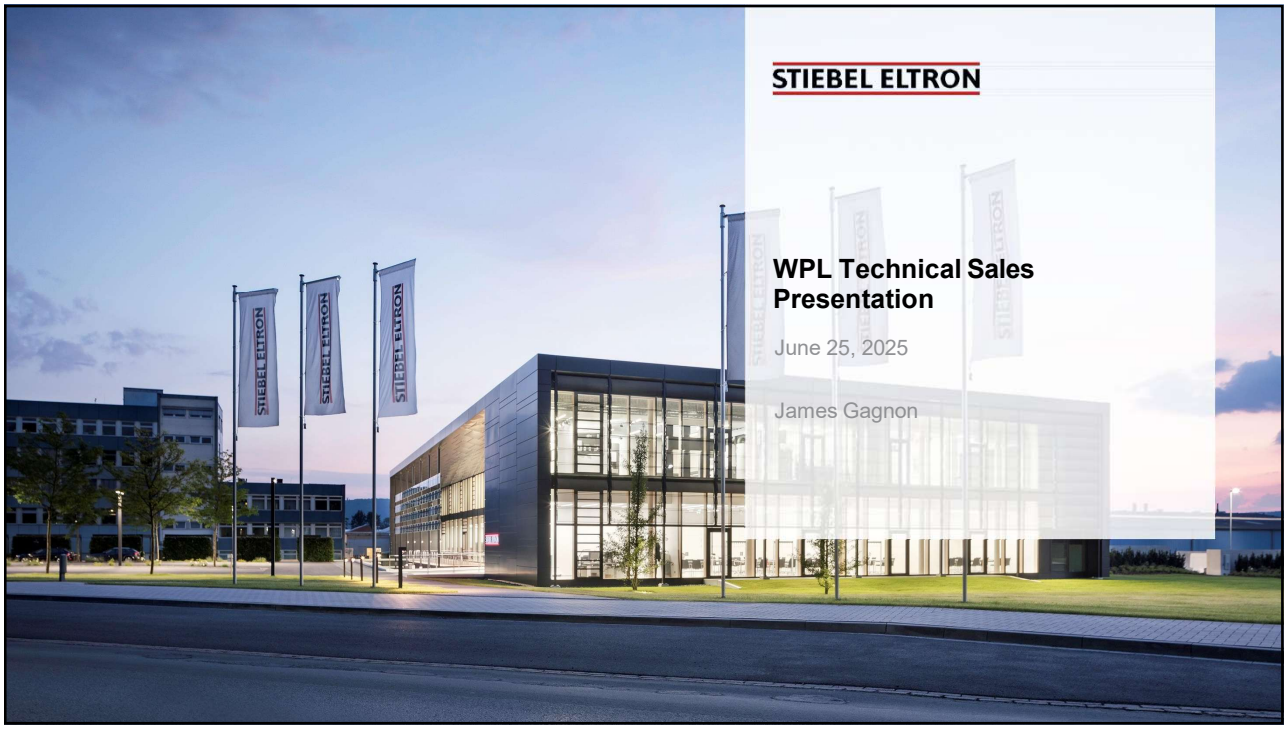
STIEBEL ELTRON
WPL Technical Sales Presentation
June 25, 2025
James Gagnon

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STIEBEL ELTRON
01 Introduction

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STIEBEL ELTRON WPL Technical Sales 3

Stiebel Eltron Gmbh & Co Kg

- Founded in 1924 as “ELTRON Dr. Theodor Stiebel”
- Privately held by Frank & Ulrich Stiebel
- 4,000+ employees worldwide
- 18 daughter companies
- Over $1 billion USD annual sales worldwide

Manufacturing Plants

- Holzminden, Germany
- Eschwege, Germany
- Poprad, Slovakia
- Ayutthaya, Thailand
- Tianjin, China
- W. Hatfield, Massachusetts, USA
- Sarasota, Florida, USA

Holzminden, Germany
World Headquarters

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STIEBEL ELTRON WPL Technical Sales 4

Product Introduction

WPL 15/25 A2W Premium
Monobloc air-to-water heat pump

HSBC 300 Integral
Integrated control with DHW and buffer tank

WPM
System Controller

FET
Room Thermostat

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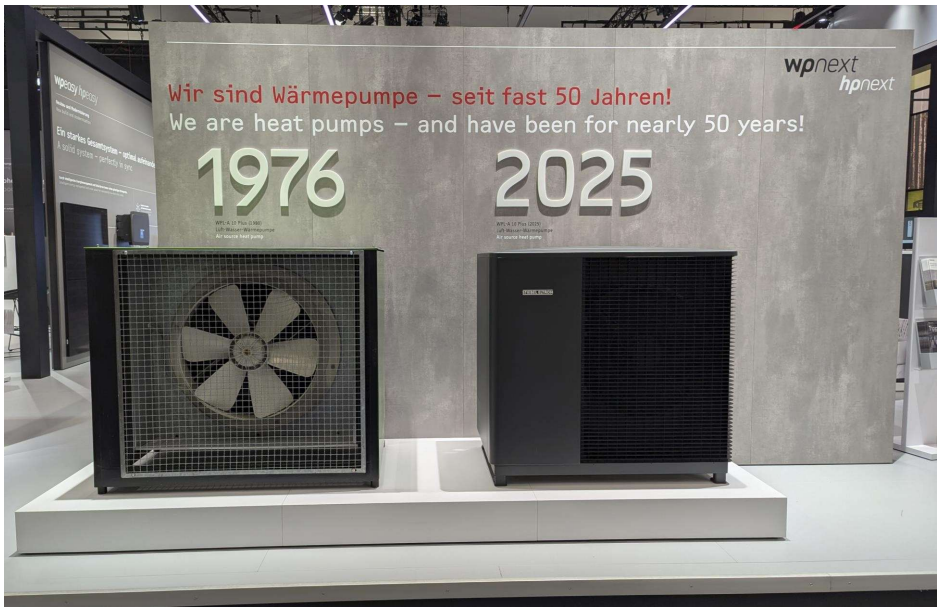
STIEBEL ELTRON WPL Technical Sales 5

Stiebel Eltron has always looked to the future of energy conservation. This has included the design, engineering, and manufacturing of heat pump technology for nearly 50 years.



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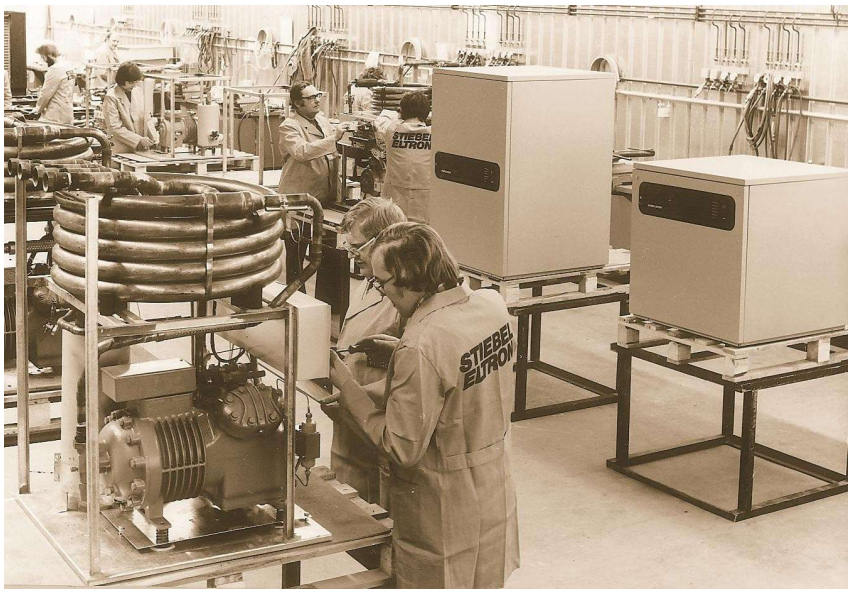
STIEBEL ELTRON WPL Technical Sales 6



Stiebel Eltron heat pump production c. 1970s

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WPL 15/25 A2W Premium Overview

Two Sizes Available

- WPL 15 A2W Premium (2 ton cooling, 23 kBTU/hr heating)
- WPL 25 A2W Premium (4 ton cooling, 50 kBTU/hr heating)

Broad Details

- Glycol water mix is circulated between WPL and the building
- Self-contained refrigerant circuit is filled at factory with refrigerant (R-410a) and sealed
- No refrigerant lines are run during installation
- A “mono-bloc” system, not a conventional “split-system”
- Heat pump operation at ambient temperatures to -4°F
- Enhanced Vapor Injection (EVI) inverter compressor provides water up to 149°F and increased capacity at lower temperatures

WPL 15/25 A2W Premium Heat Pump

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STIEBEL ELTRON WPL Technical Sales 8

HSBC 300 Integral Overview

Combination Tank

- 72 gal (270 l) DHW tank in top section
- 26 gal (100 l) buffer tank in bottom section

Integrated Components & Controls

- Built-in WPM controller manages heat pump operation as well as the heating, cooling, & DHW system
- Integrated heat pump & heating circuit circulator
- Includes diverter valve and sensors
- Automatically adjusts loading from DHW to heating circuit depending on current priority

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The WPM System

- The WPM System is a heat pump and system control ecosystem designed to operate Stiebel Eltron WPL heat pumps in conjunction with heating, cooling & DHW systems in the most efficient way possible.
- The main system controller is the WPM.
- The WPE extension module expands the controller's capability.
- FET thermostats can be installed in the living space, enabling control of the heating, cooling, & DHW settings.
- The WPL heat pump communicates with the WPM controller to keep the buffer and DHW tanks at their set temperature.
- The ISG web module (in development) will provide web functionality and control, as well as MODBUS capability.

WPM Controller

WPE Extension Module

FET Thermostat

ISG Web (Future)

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The WPM Controller

The main system controller (WPM) is integrated into the HSBC 300 Integral

HSBC 300 Integral

If for some reason HSBC 300 Integral is not practical for your application, the standalone WPM main system controller has more flexibility, but doesn't have the same tightly integrated functionality

WPM Controller

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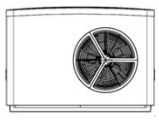
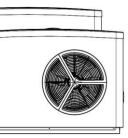
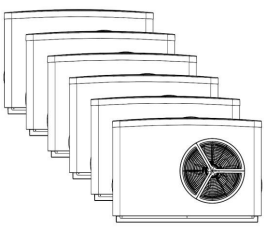
Up to 6 WPLs with WPM/WPE

HSBC 300 Integral	WPM	WPM WPE
		
		
1 WPL Only	Up to 2 WPLs	Up to 6 WPLs

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FET Room Thermostat

- Room thermostat mounted on a wall in the conditioned space.
- Communicates with WPM controller via CAN bus.
- Reports room temperature and relative humidity data.
- Must be allocated to a specific heating/cooling circuit in the WPM.
- At least one FET is required if cooling is desired in the system.
- Cannot be directly integrated with a zone controller.

FET Thermostat

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SBP Buffer Tanks

- Three sizes of buffer tank are available: 26, 55, & 110 gallons.
- Bare steel tanks
- Serve as hydraulic separation between heat pump and heating/cooling zones
- Adapter kits provided to 1” NPT (SBP 100 Plus) & 1¼” threads (SBP 200/400 E)
- Threaded stubs at top for vent installation

SBP 100 Plus SBP 200 E SBP 400 E

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Available WPL, HSBC, & Accessories

203252	WPL 15 A2W Premium	23 kBTU/hr heating / 2.13 ton cooling
203253	WPL 25 A2W Premium	50.4 kBTU/hr heating / 4.09 ton cooling
203727	WPL 15 A2W Premium Set	heat pump with connection set & T-mount
203728	WPL 25 A2W Premium Set	heat pump with connection set & T-mount

Heat pump mounting rack

230865	SK 1	stainless steel T-mount for WPL A2W
234654	WK 2	stainless steel wall-mount for WPL A2W

Connection set

203247	AS-WP	connection set

HSBC 300 Integral

HSBC 300 Integral is a companion appliance to the WPL A2W heat pumps. It consists of a 71 gallon /270 liter DHW tank with indirect coil, 26 gallon/100 liter buffer tank, heat pump manager (WPM), diverter valve, primary pump, and circulation pump. The appliance is connected hydraulically and electrically to the heat pump.

202493	HSBC 300 Integral	Companion tank appliance system

Buffer tanks

Buffer tanks recommended for use with the WPL A2W if the HSBC 300 Integral is not installed.

206279	SBP 100 Plus	26 gallon/100 liter buffer tank
185458	SBP 200 E	55 gallon/207 liter buffer tank
220824	SBP 400 E	110 gallon/415 liter buffer tank

SBP 200 E
SBP 400 E

SBP 100 Plus

Tank accessories

RBS-SBC integral is an optional accessory pipe assembly for the HSBC that routes the cold water inlet, DHW outlet, and DHW recirculation outlets from the back up to the outside top of the tank.

HSBC 3-HKM integral is an optional pump assembly for adding a second heating circuit with mixer.

203798	RBS-SBC integral	pipe assembly	routes DHW connections to top of tank
203799	HSBC 3-HKM integral	pump assembly	assembly for a second heating circuit mixer

Controllers

A **WPM** heat pump controller is integrated into the HSBC. Installations without an HSBC appliance require installation of this separate WPM controller. WPM controllers are delivered with an SD card for initial system parameter settings.

The **WPE** heat pump extension allows for additional inputs into the WPM controller, including a swimming pool program, operating control of up to 6 heat pumps, heating control of up to 5 circuits, and two differential controllers and thermostat function circuits.

The **FET** digital remote control enables convenient operation of one heating zone. The remote control measures the relative humidity and room temperature for accurate dew point control in cooling mode.

205311	WPM	HP controller	required if HSBC is not installed
205312	WPE	HP extension	adds additional inputs to WPM
234723	FET	Remote control	single zone remote control

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02 WPL In-depth

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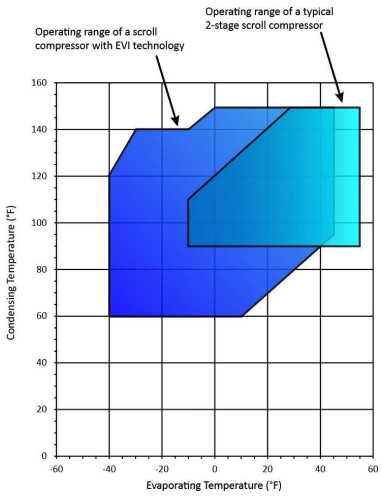
Increased Efficiency & Reliability, Even in Cold Climates

Increased efficiency & reliability

- Enhanced Vapor Injection boosts supply temps to 149°F (65°C), and increases heating capacity at lower ambient temperatures, down to -4°F (-20°C)
- Inverter driven compressor and fan increase part-load efficiency
- Compressor soft-start reduces starting current and is gentler on components
- Heating and cooling functionality enabled by reversing valve and bi-flow electronically controlled expansion valves
- A drip tray heated by the refrigerant circuit provides a reliable and efficient defrost process
- 6.75 kW backup element provides monovalent heat below -4°F (-20°C) and can be operated in parallel with heat pump above this point



Source: Caleffi idronics No 27, p. 17

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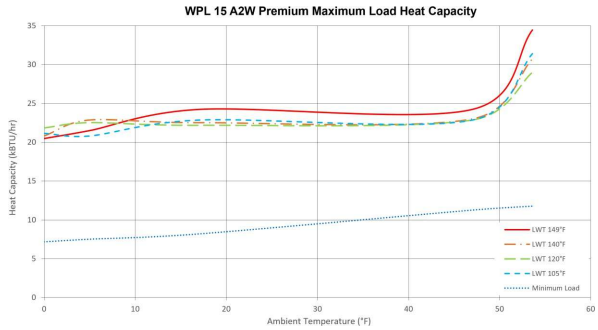
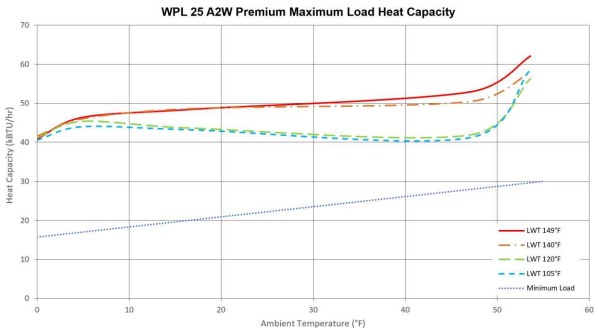
The WPL 15/25 Heating Capacity

- The maximum capacity of the WPL depends on the ambient temperature as well as the flow temperature.
- In some cases, capacity increases even with decreasing ambient temperatures. This is due to opening of the intermediate injection valve at these temperatures.
- The WPL inverter compressor will modulate to meet the calculated demand of the heating system.





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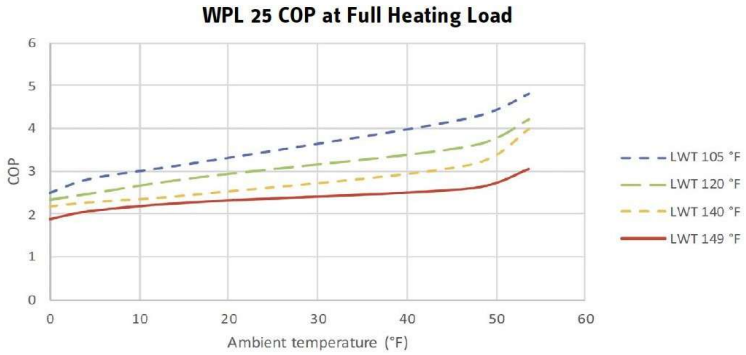
WPL 25 heating efficiency :

very high COP's at even cold ambient temperatures



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STIEBEL ELTRON WPL Technical Sales

Washington State Energy Code

- The Washington State Energy Code (2021) requires new dwellings to accumulate Energy Equalization Credits
- The WPL 15/25 have been tested according to AHRI 550/590, and is very efficient at those benchmarks standards so our WPL heat pumps are eligible for **a total of 4.0 credits**

1. Small Dwelling Unit: ..... 5.0 credits
   Dwelling units less than 1500 square feet in conditioned floor area with less than 300 square feet of fenestration area. Additions to existing building greater than 500 square feet of heated floor area but less than 1500 square feet.
2. Medium Dwelling Unit: ..... 8.0 credits
   All dwelling units that are not included in #1, #3 or #4.
3. Large Dwelling Unit: ..... 9.0 credits
   Dwelling units exceeding 5000 square feet of conditioned floor area.
4. Dwelling units serving Group R-2 occupancies: ..... 6.5 credits
   See Section R401.1 and *residential building* in Section R202 for Group R-2 scope.
5. Additions 150 square feet to 500 square feet: ..... 2.0 credits

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TABLE R406.2
ENERGY EQUALIZATION CREDITS

System Type	Description of Primary Heating Source	Credits	
		All Other	Group R-2[a]
1	For combustion heating equipment meeting minimum federal efficiency standards for the equipment listed in Table C403.3.2(5) or C403.3.2(6)	0	0
2	For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(2) and supplemental heating provided by electric resistance or a combustion furnace meeting minimum standards listed in Table C403.3.2(5)[b]	1.5	0
3	For heating system based on electric resistance only (either forced air or Zonal)	0.5	-0.5
4[c]	For heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(2) or C403.3.2(9) **or** Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590	3.0	2.0
5	For heating system based on electric resistance with: 1. Inverter-driven ductless mini-split heat pump system installed in the largest zone in the dwelling, **or** 2. With 2kW or less total installed heating capacity per dwelling	2.0	0

AND

3.8[a,d]	Air-to-water heat pump with minimum COP of 3.2 at 47°F, rated in accordance with AHRI 550/590 by an accredited or certified testing lab. To qualify to claim this credit, the building permit drawings shall specify the option being selected, the heated floor area calculation, the heating equipment type(s), the minimum equipment efficiency, and total installed heat capacity (by equipment type).	1.0	NA

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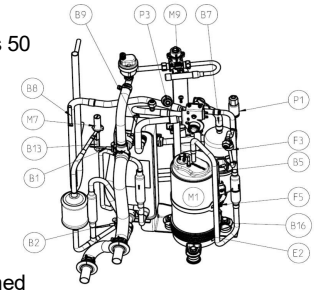
Additional Feature Details

Quiet Operation

- Large evaporator fin gaps and modulating fan make for very quiet operation
- Additional soundproofing and damping around refrigerant circuit reduces sound output
- Can be installed in dense neighborhoods with strict noise requirements.
- Sound Power Level (SWL) at max capacity is 61 and 66 dB(A) and silent mode output is 50 and 54 dB(A) for the WPL 15 and 25 respectively
- Air inlet designed to reduce air velocity, lowering sound output



Reduced Downtime

- Active cooling function shortens defrost events by reversing heat pump circuit
- Defrost-on-demand eliminates unnecessary defrost events compared to competitor's timed defrost events
- Inverter compressor varies capacity to meet demand, leading to long runtimes at more efficient part-load capacity

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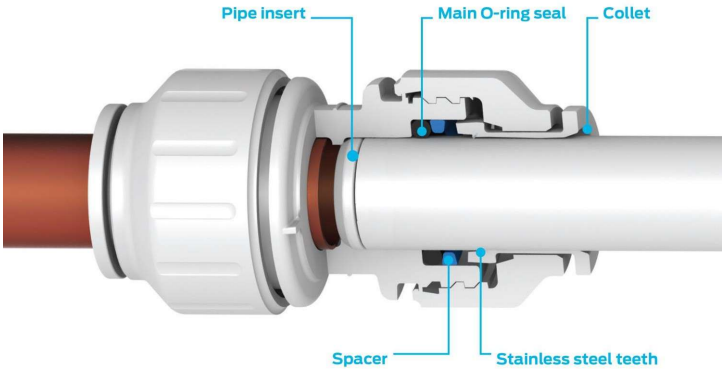
STIEBEL ELTRON WPL Technical Sales 21

WPL Hydraulic Connections

- The two 28 mm John Guest fittings are designed for easy and fast connection.
- Simply insert the pipe adapters (included in kit AS-WP) into the fitting and tighten the main nut.



Connection between copper pipe and JG fitting

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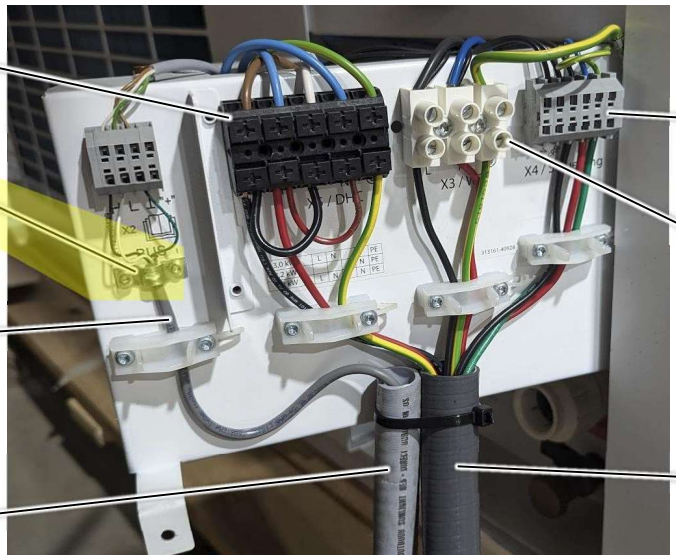
WPL Wiring Connections



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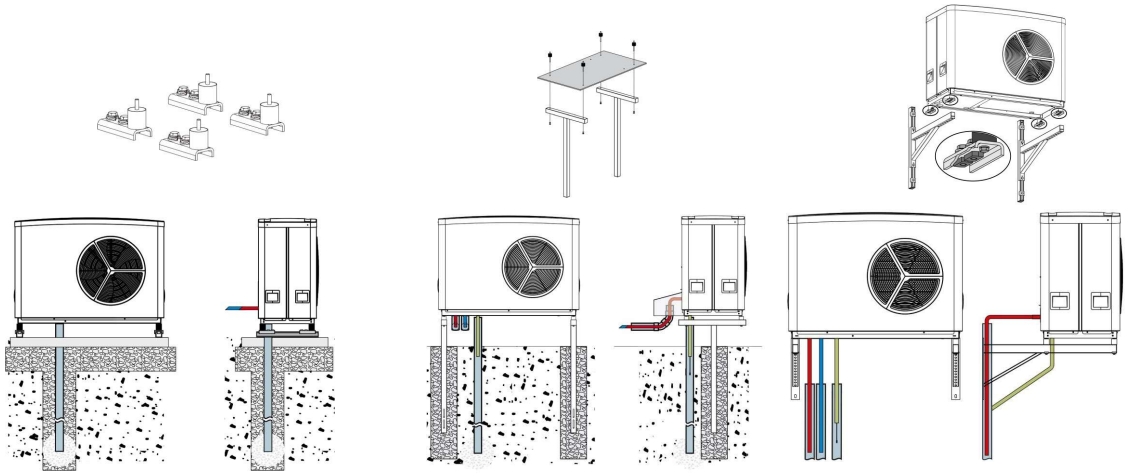
WPL Mounting Options

› We offer three options for mounting the WPL



Unistrut Mounting Kit | SK1 T-mount Kit | WK2 Wall-mount Kit

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STIEBEL ELTRON WPL Technical Sales 24

HSBC 300 Integral Overview

Combination Tank

› 72 gal (270 l) DHW tank in top section
› 26 gal (100 l) buffer tank in bottom section

Integrated Components & Controls

› WPM controller manages heat pump operation as well as the heating, cooling, & DHW system
› Integrated heat pump & heating circuit circulator
› Includes diverter valve and sensors
› Automatically adjusts loading from DHW to heating circuit depending on current priority

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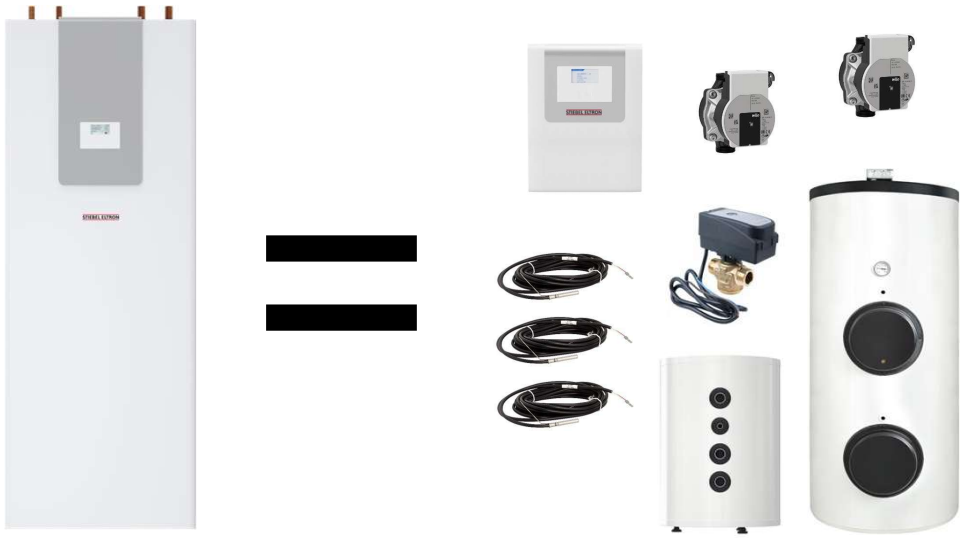
STIEBEL ELTRON WPL Technical Sales 25

HSBC 300 Integral – All-in-One Solution



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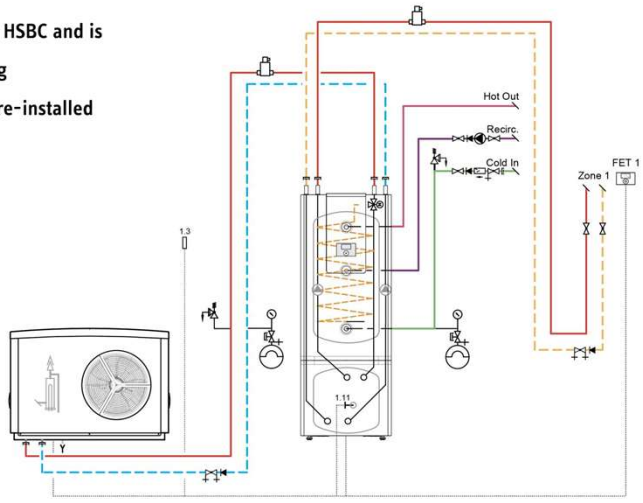
STIEBEL ELTRON WPL Technical Sales 26

WPL & HSBC 300 Integral – A Highly Integrated Solution

- The WPM controller is built into the front of the HSBC and is pre-programmed for fast system commissioning
- HSBC 300 Integral simplifies installation with pre-installed components



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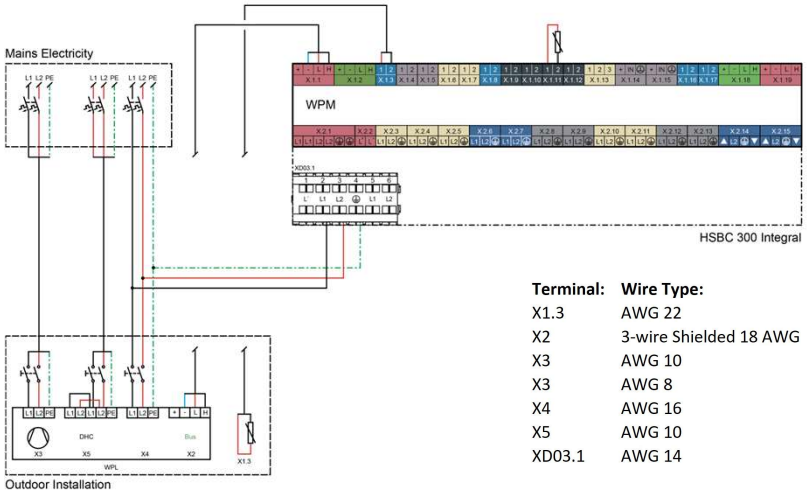
STIEBEL ELTRON WPL Technical Sales 27

Electrical Scheme – WPL + HSBC Integral

› Additional schematics are available by request



Terminal:	Wire Type:	Circuit:
X1.3	AWG 22	Outdoor temperature sensor
X2	3-wire Shielded 18 AWG	WPL/HSBC Data Connection
X3	AWG 10	Compressor (WPL 15)
X3	AWG 8	Compressor (WPL 25)
X4	AWG 16	WPL Controller
X5	AWG 10	WPL Booster Heater
XD03.1	AWG 14	HSBC/WPM Controller

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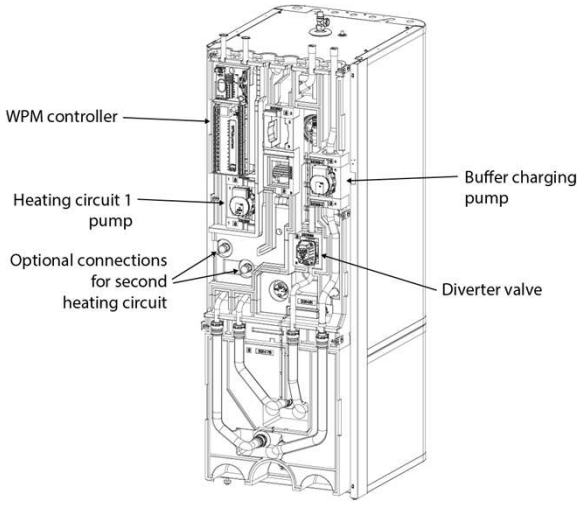
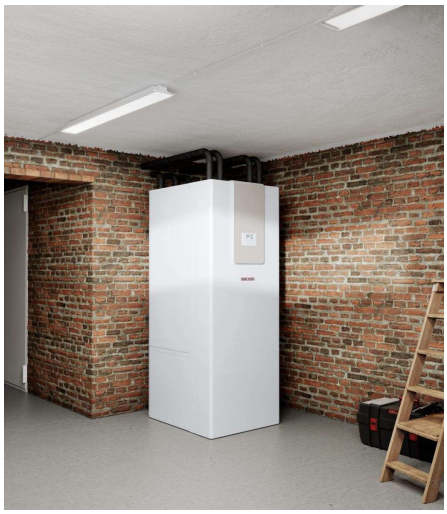
STIEBEL ELTRON WPL Technical Sales 28

HSBC 300 Integral Overview





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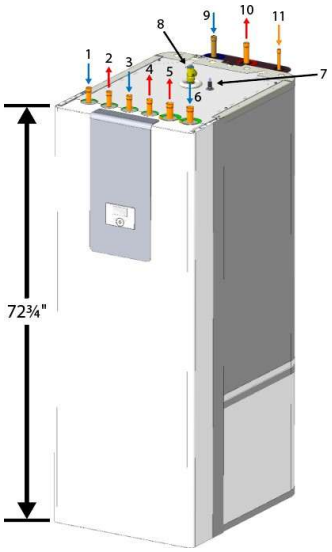
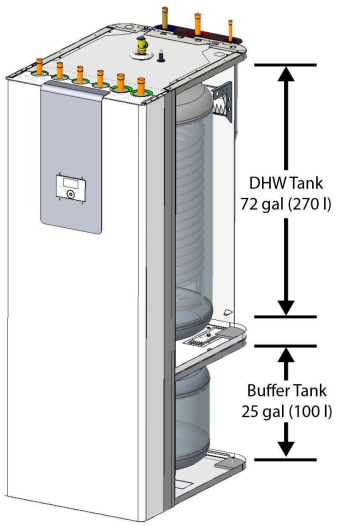
STIEBEL ELTRON WPL Technical Sales 29

Ease of Installation: WPL + HSBC



1	Heating cicuit 1 supply	3/4"	copper pipe
2	Heating cicuit 1 return	3/4"	copper pipe
3	Heating cicuit 2 supply (mixer)	3/4"	copper pipe
4	Heating cicuit 2 return (mixer)	3/4"	copper pipe
5	Heat pump supply	1"	copper pipe
6	Heat pump return	1"	copper pipe
7	Signal anode	1 1/4"	G thread
8	T&P valve		
9	DHW cold in	3/4"	copper pipe
10	DHW hot out	3/4"	copper pipe
11	DHW recirculation	1/2"	copper pipe



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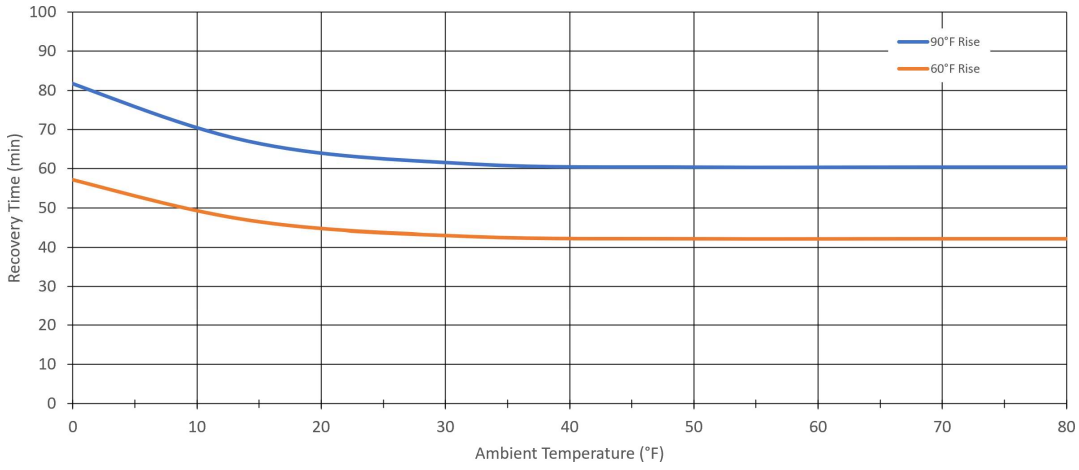
STIEBEL ELTRON WPL Technical Sales 30

WPL 25 A2W Premium & HSBC 300 Integral Recovery Time at Maximum Capacity

- 72 gallon DHW tank with indirect coil
- 50 kBTU/hr nominal heating capacity

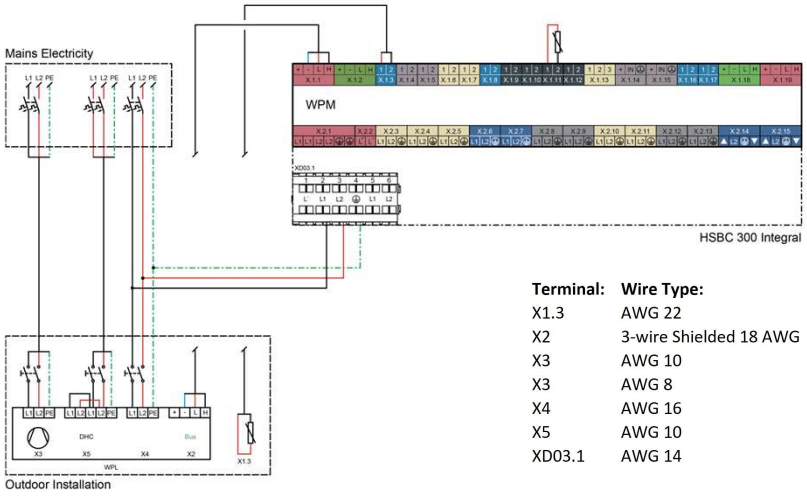


42

STIEBEL ELTRON WPL Technical Sales 31

Electrical Scheme – WPL + HSBC Integral

› Additional schematics are available by request



Terminal:	Wire Type:	Circuit:
X1.3	AWG 22	Outdoor temperature sensor
X2	3-wire Shielded 18 AWG	WPL/HSBC Data Connection
X3	AWG 10	Compressor (WPL 15)
X3	AWG 8	Compressor (WPL 25)
X4	AWG 16	WPL Controller
X5	AWG 10	WPL Booster Heater
XD03.1	AWG 14	HSBC/WPM Controller

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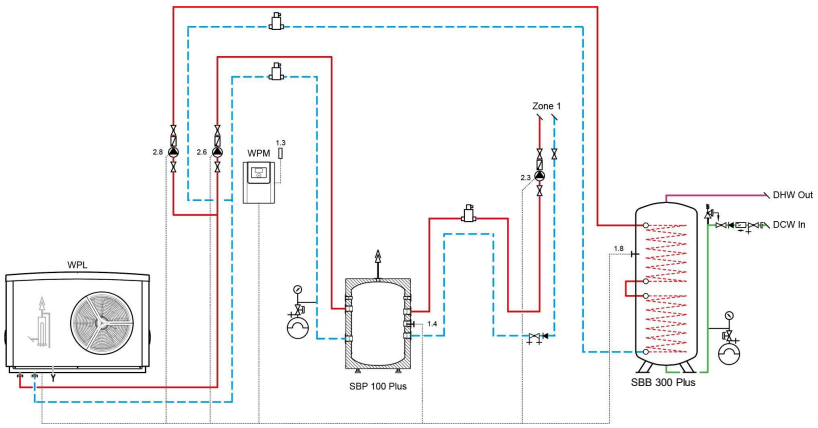
STIEBEL ELTRON WPL Technical Sales 32

Installation without HSBC Integral Tank (Hydronic)

› A buffer tank is required with ALL WPL systems (at least 25 gallons per WPL)

› Standalone WPM controller controls heat pump instead of WPM built into HSBC

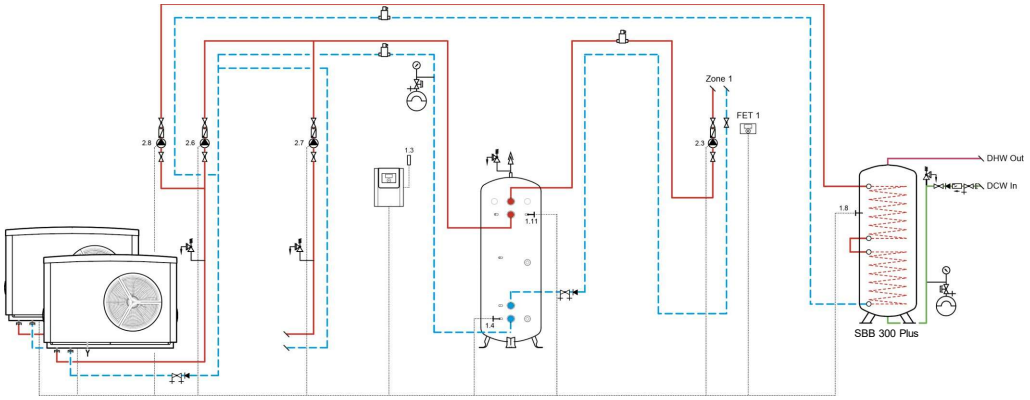


44

STIEBEL ELTRON WPL Technical Sales 33

Installation with 2 WPL 25s (Hydronic)

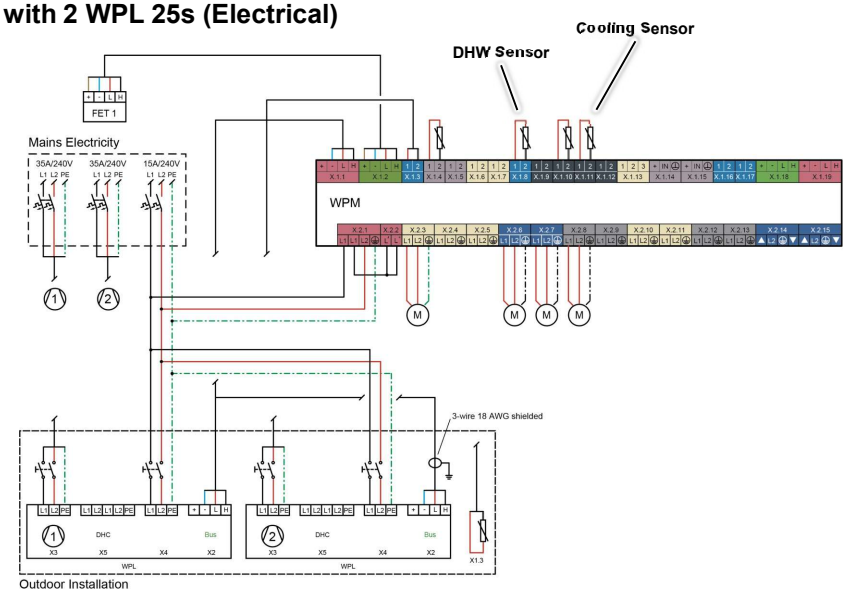
- Buffer storage of at least 50 gallons required (25 gallons per heat pump)
- DHW heat exchanger must be sized to WPL maximum capacity
- Standalone WPM controller controls heat pump instead of WPM built into HSBC
- This system is configured for heating, DHW, and cooling



45

STIEBEL ELTRON WPL Technical Sales 34

Installation with 2 WPL 25s (Electrical)



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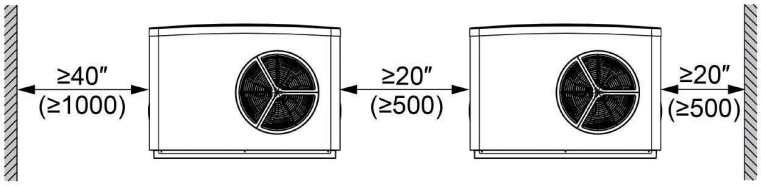
STIEBEL ELTRON WPL Heat Pump Training 65

WPL Cascade Installation

- For cascade installations the minimum clearances must also be followed.
- The 40” clearance on the left side of units is reduced to 20” in all units in the cascade except for the left-most unit.



35

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STIEBEL ELTRON

Unistrut kit mounting examples

- Installation Examples

36

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STIEBEL ELTRON

WPL SK “T-mount” examples

› Installation Examples



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STIEBEL ELTRON WPL Technical Sales

Questions, Comments, & Additional Discussions

Thank you for your time!

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STIEBEL ELTRON WPL Technical Sales 39

Required (& Optional) Components for a WPL/HSBC System

Required for Any System


WPL 15 or WPL 25

AF PT (included)


HSBC 300 Integral


AS-WP

Required for Cooling


TAF PT 2m


FET Thermostat (1 Per Cooling Zone)

Optional


HSBC-3 HKM Integral


RBS-SBC Integral


SK1 T-mount


Unistrut Mount


WK2 Wall-mount

STIEBEL ELTRON WPL Technical Sales 40

Required (& Optional) Components for a WPL/WPM System

Required for Any System


WPL 15 or WPL 25

AF PT (included)


WPM


Buffer Tank (>25 gal)


AS-WP

Required for Cooling


FET Thermostat (1 Per Cooling Zone)

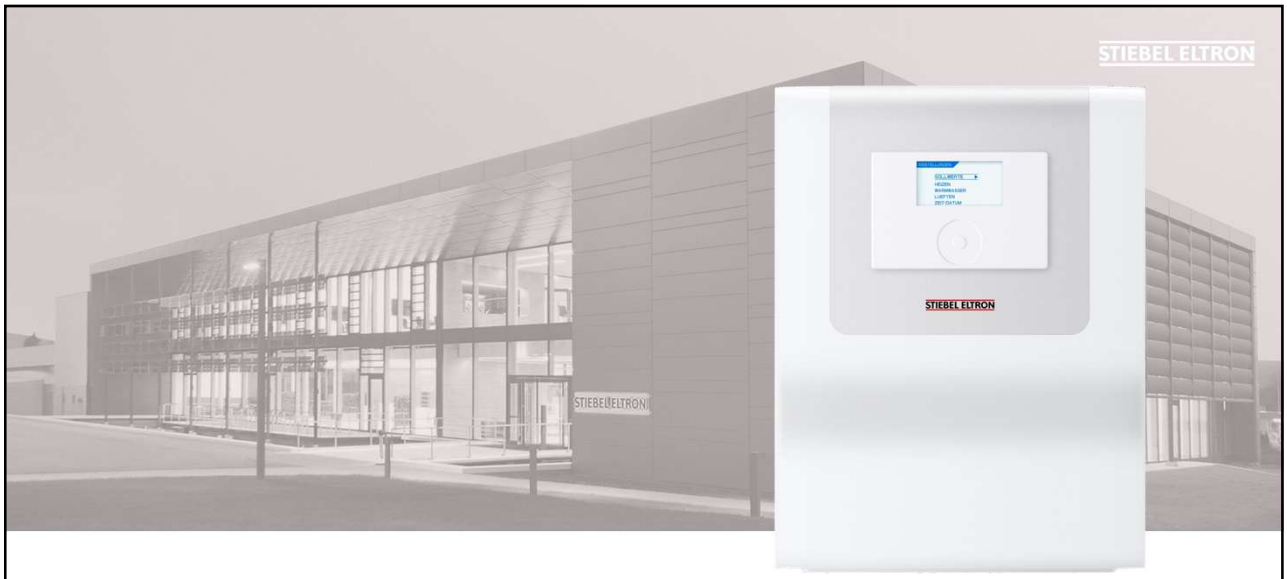
Optional


DHW Tank


SK1 T-mount


Unistrut Mount


WK2 Wall-mount



07 Final Takeaways

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STIEBEL ELTRON WPL Technical Sales 42

Main Takeaways – Design & Installation

The following points must be followed for fast, safe, and trouble-free installation!

- Perform a Manual J for heating & cooling capacities.
- The installation space for the WPL and HSBC must follow the defined clearances. Cramping yourself in makes both commissioning and troubleshooting more difficult.
- Use 240V pumps with the current model of WPM (updated model coming in the future).
- If cooling is desired at least 1 FET is required, and a TAF PT 2m is required if using the HSBC.
- 3 separate 240V circuits are needed (15A, 20/35A, 30A). The 30A is optional if there is a separate backup heat source.
- Wire the 15A circuit to the WPL and WPM in such a way that a disconnect can be pulled and the WPM will still be under power, but not the WPL.
- Use an air separator at the high point between the buffer and WPL & also between the buffer and heating circuits. Avoid installing high points in the pipe system where air can accumulate but can't be easily eliminated.

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"World's Most Efficient"

Chiltrix

Air To Water Heat Pumps

(Reverse Cycle Chillers or Hydronic Heat Pumps)

Serving the USA Market With Air To Water Heat Pumps Since 2015

ENERGY STAR 2019
Emerging Technology Award

1

55

Chiltrix

Chiltrix Air-To-Water Heat Pumps

"World's Most Efficient"

- Laser Focus: We only make monobloc air to water heat pumps and related accessories.
- One of the first air to water heat pumps in the USA market, over 10 years experience with American installers and customers.
- USA design and engineering. Patent protected controls and special features.

2

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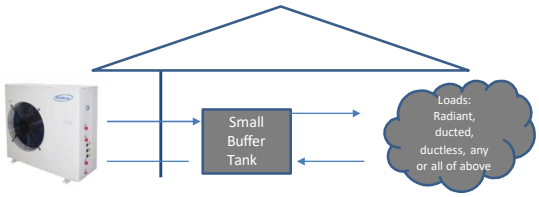
Chiltrix Air-To-Water Heat Pumps

System Overview – High Level

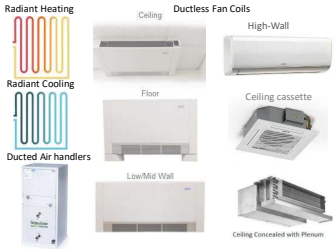
"World's Most Efficient"

- Chiltrix air to water heat pumps use the proven "monoblock" design.
- All refrigerant is self-contained and sealed in the outdoor unit.
- The outdoor unit connects to indoor equipment via insulated water lines (water or water/glycol). Water lines are usually PEX.
- No refrigerant is ever inside the building envelope.

Simplified typical example (Domestic Water Heating Not Shown)



Can be used for radiant heating or cooling, ductless fan coil units, ducted air handlers, or a combination using any or all of these can be used in a single installation.



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Chiltrix Air-To-Water Heat Pumps

Basic System Overview - Functions

"World's Most Efficient"

Suitable For Any Combination of:

- Cooling
- Heating
- Domestic Hot Water (DHW)

Install With Any Combination of:

- Radiant System (Heating and/or Cooling)
- Ductless Room Fan Coil Units (Up to 16 or more per system)
  (High-Wall, Ultra Thin Low Wall, Ceiling Cassette)
- Ducted Air Handlers
- Concealed Ceiling Fan Coil Units
- Indirect Water Heater Tank

ENERGY STAR 2019 Emerging Technology Award

The Chiltrix ultra-high efficiency air-to-water heat pump CX34 has been awarded the EPA **ENERGY STAR 2019/2020 Emerging Technology Award**

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Chiltrix Air-To-Water Heat Pumps

"World's Most Efficient"

- Ultra-High Efficiency up to IPLV EER 23 / COP 4.9
- World's Record Efficiency
  (Highest Among All Certified Air To Water Heat Pumps)
- 43% Higher Cooling Efficiency On Average
- Equivalent Seasonal Average Heating COP w/ Leading Brands

- CX35 2 Tons Cooling, 3.4 Tons Heating w/Seasonal Average COP 4.69
- CX50 3.5 Tons Cooling, 4.7 Tons Heating w/ Seasonal Average COP 4.55
- CX65 EVI Coming in Q3 2025 w/ Performance at -28C (-18F)

- Feature Rich
- Best of Breed Components
- Dynamic Humidity Control
- Dynamic Backup Heat
- Dynamic Dew-Point Control For Radiant Cooling
- Direct Access to USA Based Engineering

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Chiltrix Air-To-Water Heat Pumps

"World's Most Efficient"

Prüfbericht - Produkte
Test Report - Products

TÜVRheinland®

Prüfbericht-Nr.: *Test report no.:*	CN22ULR3 002	**Auftrags-Nr.:** *Order no.:*	**170311612**	Seite 1 von 13 *Page 1 of 13*
Kunden-Referenz-Nr.: *Client reference no.:*	CX35	**Auftragsdatum:** *Order date:*	2022.06.24	

SCOPon	4.74	SCOPnet	4.77
SCOP	4.69		
η_s	185		

Prüfbericht - Produkte
Test Report - Products

TÜVRheinland®

Prüfbericht-Nr.: *Test report no.:*	CN22ULR3 001	**Auftrags-Nr.:** *Order no.:*	**170311612**	Seite 1 von 13 *Page 1 of 13*
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	CX50			

SCOPon	4.57	SCOPnet	4.60
SCOP	4.55		
η_s	179		

6

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Chiltrix

Psychrologix™ & DHC Controller

AHRI CERTIFIED®
"World's Most Efficient"

Below, the top chart shows IPLV, the bottom chart shows NPLV. Both are results from the same official AHRI lab test and are based on identical ambient conditions.

The difference – IPLV shows cooling EER at loop (coil) temperature 44.6 °F (7 °C) w/ Strong Dehumidification Active. NPLV shows cooling EER at coil temperature 55 °F (13 °C) w/ Dehumidification Reduced or Disabled. Important for use with Dynamic Humidity Control or Radiant Cooling.

Up to IPLV EER 40 when used for radiant cooling.

Published Performance	Evaporator Leaving Water Temperature, °C	Condenser Entering Air Dry Bulb, °C and % Load			
		35, 100%	27, 75%	19, 50%	13, 25%
Capacity, kW	7.00	7.500	5.625	3.750	1.875
Total Power, kW		2.381	1.187	0.5054	0.1959
Efficiency, COP (W/W)		3.150	4.740	7.420	9.570
	IPLV.SI	6.510 kW/kW	**EER 22.21**		

Published Performance	Evaporator Leaving Water Temperature, °C	Condenser Entering Air Dry Bulb, °C and % Load			
		35, 100%	27, 75%	19, 50%	13, 25%
Capacity, kW	13.00	8.807	6.605	4.404	2.202
Total Power, kW		2.455	1.138	0.4085	0.1613
Efficiency, COP (W/W)		3.587	5.804	10.78	13.65
	NPLV.SI	8.963 kW/kW	**EER 30.58**		

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Chiltrix

Heating Operation

AHRI CERTIFIED®
"World's Most Efficient"

Detailed Performance Maps Allow Precise Sizing

CX35 Outlet Water Temp										
Temperature °F		-4	5	14	17(15)	23	32	47(43)	59	77
86	Capacity	16,730	20,439	24,165	26,103	29,037	32,518	42,038	48,589	58,348
	Power Input	1.90	1.96	2.01	2.02	2.04	2.13	2.08	2.09	2.10
	COP	2.580	3.050	3.520	3.780	4.180	4.470	5.930	6.810	8.130
95	Capacity	16,139	19,893	23,646	25,113	27,365	31,119	40,468	46,815	56,300
	Power Input	2.07	2.17	2.24	2.27	2.30	2.35	2.42	2.35	2.28
	COP	2.285	2.687	3.094	3.242	3.487	3.881	4.901	5.839	7.237
104	Capacity	15,580	19,142	22,725	24,158	26,683	30,880	39,513	45,416	54,253
	Power Input	2.30	2.38	2.44	2.46	2.50	2.56	2.67	2.59	2.51
	COP	1.990	2.357	2.730	2.878	3.128	3.535	4.337	5.139	6.335
113	Capacity		18,613	22,315	23,817	26,035	29,754	38,182	43,812	52,206
	Power Input		2.59	2.63	2.64	2.66	2.68	2.76	2.79	2.81
	COP		2.107	2.487	2.644	2.869	3.254	4.055	4.602	5.445
122	Capacity			20,541	22,145	24,567	28,628	37,226	42,413	50,158
	Power Input			2.89	2.91	2.93	2.96	3.30	3.26	3.23
	COP			2.083	2.230	2.457	2.835	3.306	3.813	4.551
131	Capacity			18,767	20,507	23,134	27,502	35,793	40,741	48,111
	Power Input			3.3	3.3	3.32	3.34	3.66	3.75	3.86
	COP			1.67	1.82	2.04	2.41	2.87	3.18	3.65

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Heating Operation

"World's Most Efficient"

Detailed Performance Maps Allow Precise Sizing

Outlet water temp		Full Speed @ Outdoor Air Temperature dB (wB)								
Temperature °F		-4	5	17(15)	23	32	47(43)	59	68	77
86	Capacity	26,956	31,426	38,489	42,447	47,565	59,917	68,755	75,306	81,891
	Power Input	3.26	3.32	3.39	3.41	3.47	3.46	3.48	3.49	3.50
	COP	2.423	2.774	3.328	3.648	4.017	5.075	5.790	6.324	6.857
95	Capacity	26,069	30,880	37,636	40,536	45,347	56,983	65,752	72,269	78,820
	Power Input	3.43	3.48	3.54	3.56	3.58	3.61	3.66	3.70	3.73
	COP	2.227	2.601	3.116	3.337	3.712	4.626	5.265	5.725	6.193
104	Capacity	25,182	29,413	35,350	38,898	44,767	55,413	63,568	69,642	75,750
	Power Input	3.63	3.65	3.68	3.76	3.86	3.93	3.97	3.99	4.01
	COP	2.033	2.362	2.815	3.032	3.399	4.132	4.693	5.116	5.536
113	Capacity		28,423	34,954	38,625	43,710	54,219	61,623	67,151	72,679
	Power Input		3.99	4.10	4.13	4.19	4.28	4.32	4.35	4.37
	COP		2.088	2.490	2.741	3.057	3.713	4.181	4.524	4.874
122	Capacity			34,409	36,715	42,174	53,809	60,156	64,865	69,608
	Power Input			4.58	4.56	4.54	4.76	4.80	4.82	4.85
	COP			2.202	2.360	2.723	3.313	3.673	3.944	4.206
131	Capacity			33,900	35,710	41,321	50,704	57,051	61,794	66,537
	Power Input			5.20	5.13	5.02	5.23	5.36	5.42	5.50
	COP			1.910	2.129	2.412	2.841	3.120	3.341	3.546

9

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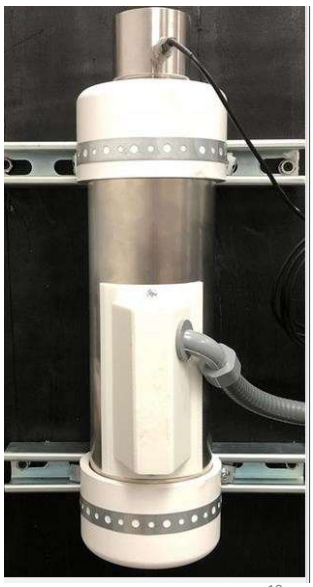
Dynamically Variable
V18 Backup Heater
Patented Exclusive

"World's Most Efficient"

- The V18 is controlled by the Chiltrix heat Pump to target a BTU shortfall, dynamically matching variable output to any heating capacity shortfall.
- V18 backup heat output is continuously adjusted in 1% power increments. Compressor stays at full speed.
- Stable temperatures.
- 0-18,7660 BTU (Variable) Per V18. Use up to three per heat pump.



10

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Chiltrix Fan Coil Units (FCU)

"World's Most Efficient"

4 Sizes: 5.1" Thin Euro-Style Fan Coil Units
¼ ton, ½ ton, ¾ ton, 1 ton
DC Inverter Fan Motors – Nearly Silent
Universal Mounting – Wall, Floor, Ceiling

Ducted Air Handlers
Variable Speed
4 Sizes: 1 Ton – 5 Tons

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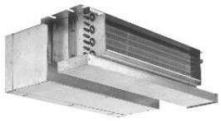
Chiltrix Air-To-Water Heat Pumps

"World's Most Efficient"

"Mini" Duct / Concealed Ceiling Systems
Variable Speed 20 Models. 1 Ton – 2.5 Ton.

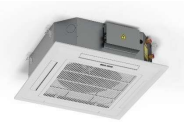
Ceiling Recessed



Ceiling Concealed with Plenum

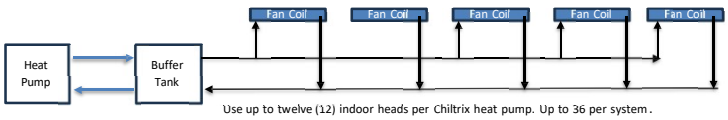
Ceiling Concealed (Un-Cased)

High Wall & Cassette Units
Variable Speed 7 Models ½ Ton to 1.5 Tons



Symphony™ Compatible

New!
Available Q3 2025



Use up to twelve (12) indoor heads per Chiltrix heat pump. Up to 36 per system.

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Chiltrix

DHW Tanks
Domestic Hot Water

AHRI CERTIFIED®
"World's Most Efficient"

DHW80
71 Gallons Net / Well Insulated Poly 50mm
GIANT Coil: 72 ft. x 1.25" Convoluted Coil 32 ft^2 Surface Area
Inner Tank & Coil: Duplex 2205 Stainless Steel
Outer Tank: 304 Stainless Steel

DHW105
99 Gallons Net / Well Insulated Poly 50mm
GIANT Coil: 196 ft. x 1.25" Convoluted Coil 98 ft^2 Surface Area
Inner Tank & Coil: Duplex 2205 Stainless Steel
Outer Tank: 304 Stainless Steel

ENERGY GUIDE

FACT: The DHW105 99 Gallon Reverse-Return Configuration holds a **World's-Record** UEF Rating among all U.S. Department of Energy Certified Water Heaters with the Highest Uniform Efficiency Factor **(UEF 4.95)** of any certified tank. And it holds a **World's Record First-Hour Rating of 101 Gallons**, the highest of any certified heat pump tank under 119 Gallons.

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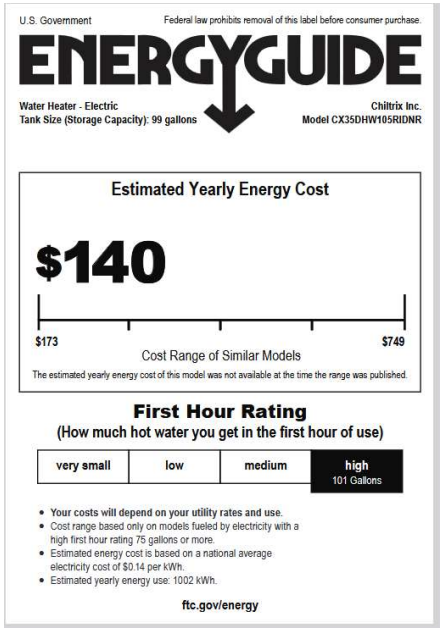
Chiltrix

AHRI CERTIFIED®
"World's Most Efficient"

When we say "off the charts" performance, we mean it.

Literally.

See the Energy Guide label, where our 99 gallon tank broke the current version of the U.S. Dept. of Energy Guide label format by $33 per year.



U.S. Government — Federal law prohibits removal of this label before consumer purchase.

ENERGYGUIDE

Water Heater - Electric
Tank Size (Storage Capacity): 99 gallons

Chiltrix Inc.
Model CX35DHW105RIDNR

Estimated Yearly Energy Cost

$140

$173 — $749

Cost Range of Similar Models

The estimated yearly energy cost of this model was not available at the time the range was published.

First Hour Rating
(How much hot water you get in the first hour of use)

very small	low	medium	high 101 Gallons

- Your costs will depend on your utility rates and use.
- Cost range based only on models fueled by electricity with a high first hour rating 75 gallons or more.
- Estimated energy cost is based on a national average electricity cost of $0.14 per kWh.
- Estimated yearly energy use: 1002 kWh.

ftc.gov/energy

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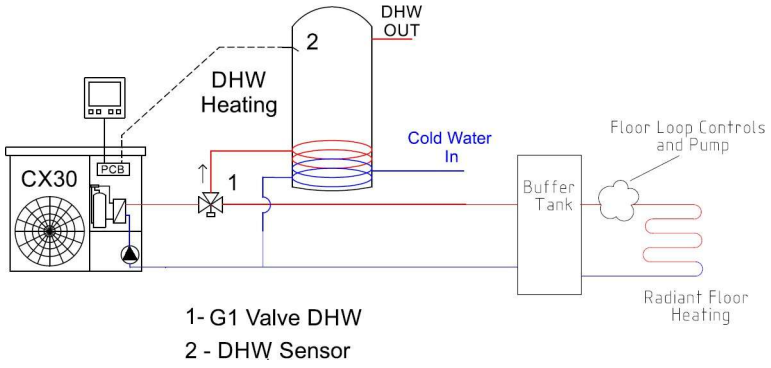
Chiltrix Air-To-Water Heat Pump
(Shown w/ DHW & Radiant System)

"World's Most Efficient"



1- G1 Valve DHW
2 - DHW Sensor

All Chiltrix Tanks are Certified to UL 174/CSA 22.2. Chiltrix Domestic Hot Water Tanks are also certified by the U.S. Department of Energy with up to UEF 4.95.

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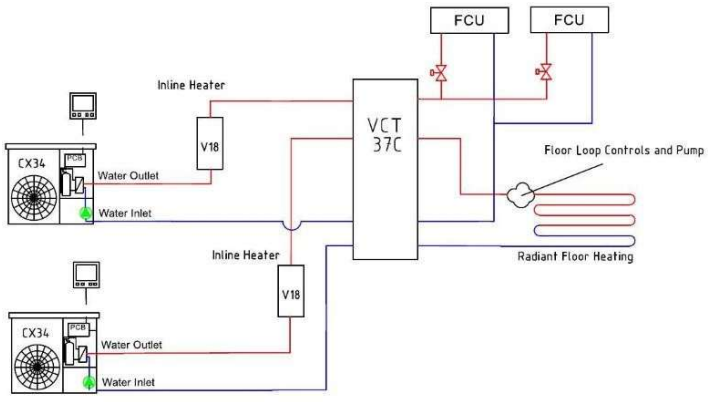
Chiltrix Air-To-Water Heat Pump
(Shown 2x CX Heat Pumps w/ 2x V18s,
Buffer Tank, Radiant & Fan Coils)

"World's Most Efficient"



Simplified concept drawing – not all components shown

Hundreds or even thousands of designs are possible.

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Chiltrix Air-To-Water Heat Pumps

"World's Most Efficient"

Serving the USA Market
With Air To Water Heat Pumps
Since 2015

Thank You!

John Williams
Chiltrix Inc.

More Questions? Please call or email:
john@chiltrix.com / 757-410-8640 Ext. 152

And please visit https://www.chiltrix.com/

ENERGY STAR 2019
Emerging Technology Award

17

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focus on energy®
Partnering with Wisconsin utilities

slipstream

Focus on Energy AWHP Field Study

Conducted by Slipstream

Jon Koliner | Slipstream

June 25th, 2025

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Study Goals and Plan

Goals

- Demonstrate AWHP through installations in Wisconsin
- Gather qualitative and quantitative data to inform future programs
  (performance monitoring, installation barriers, customer satisfaction)

Project Phases

- Identify Products
- Recruit and Install
- Monitor and Report

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SF Retrofit #1
- LG Therma V monobloc
- In-floor radiant heat
- Cooling through air handler

SF Retrofit #2
- Enertech Advantage monobloc
- In-floor radiant heat
- Domestic hot water through HX

4-unit MF Retrofit
- 2x Enertech Advantage monoblocs
- In-floor radiant heat
- Domestic hot water through heat exch.

SF New Construction site installing within 2 weeks!

focus on energy® Partnering with Wisconsin utilities

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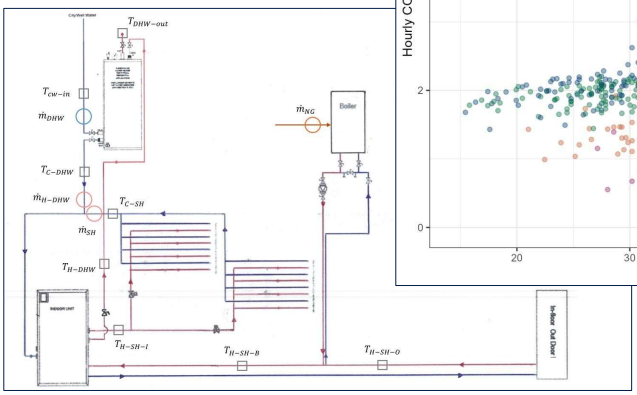
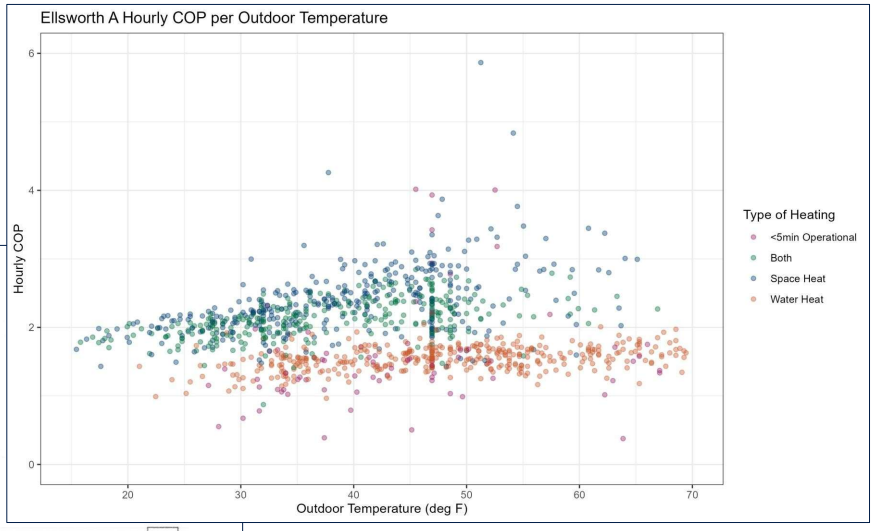
Monitoring is Ongoing





focus on energy®
Partnering with Wisconsin utilities

75

LG

LG Hot Water and Hydronic Solutions

Overview

Life's Good.

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Hot Water Solutions

Inverter Heat Pump Water Heater

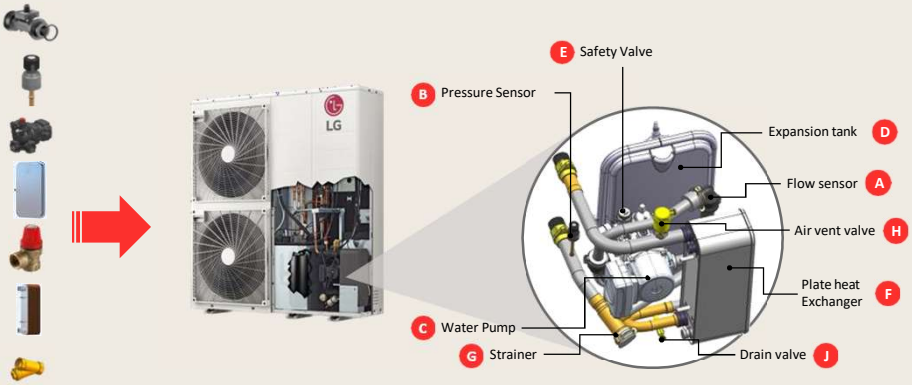
Air-to-Water Heat Pump (AWHP)

Hydro Kit

Integrated Hydronic Components

All hydronic components are integrated into one unit, helping save time and cost for additional installation work.

- Flow Sensor (A)
- Pressure Sensor (B)
- Water Pump (C)
- Expansion Tank (D)
- Safety valve (E)
- Plate heat exchanger (F)
- Strainer (G)
- Air Vent Valve (H)
- Drain Valve (J)



Applications

- Hot Water
  - Radiators
  - Radiant Floor
- Chilled Water
  - Fan Coil Units / AHU
  - Mini Chiller Replacement
- Domestic Hot Water

Heating and Cooling Performance

Water Specifications		KPHTC411M	KPHTC481M	KPHTC551M
Operation Range (Leaving Water Temp.)	Cooling Min. ~ Max. (°F)	41 ~ 80.6	41 ~ 80.6	41 ~ 80.6
	Heating Min. ~ Max. (°F)	59 ~ 149	59 ~ 149	59 ~ 149
	DHW Min. ~ Max. (°F)	59 ~ 149	59 ~ 149	59 ~ 149

Refrigerant Specifications		KPHTC411M	KPHTC481M	KPHTC551M
Operation Range (Outdoor Temp.)	Cooling Min. ~ Max. (°F DB)	41 to 118.4		
	Heating Min. ~ Max. (°F DB)	-13 to 95		

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Capacity Correction

Maximum Heating Capacity Table for KPHTC551M (includes defrost effect)

Table 13: Max. Heating Capacity Table.

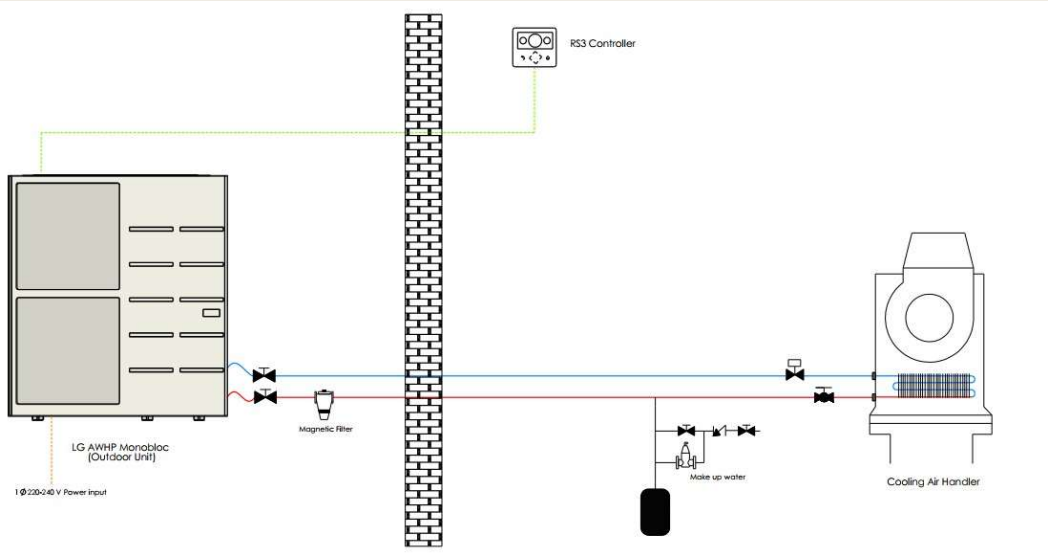
Out-door Temp.	Water flow rate 12.14 GPM								Water flow rate 7.60 GPM				Water flow rate 6.07 GPM			
	LWT 86°F		LWT 95°F		LWT 104°F		LWT 113°F		LWT 122°F		LWT 131°F		LWT 140°F		LWT 149°F	
	Capa-city (BTU/h)	COP (W/W)	Capa-city (BTU/h)	COP (W/W)	Capa-city (BTU/h)	COP (W/W)	Capac-ity (BTU/h)	COP (W/W)	Capa-city (BTU/h)	COP (W/W)	Capac-ity (BTU/h)	COP (W/W)	Capac-ity (BTU/h)	COP (W/W)	Capac-ity (BTU/h)	COP (W/W)
-13.0°F DB	35,827	1.96	35,827	1.84	35,827	1.72	35,827	1.60								
-4.0°F DB	45,211	2.48	45,211	2.32	45,211	2.15	45,211	1.98	42,959	1.82						
5.0°F DB	54,594	2.71	49,135	2.45	49,135	2.41	49,135	2.37	46,678	2.16	46,678	1.94				
19.4°F DB	54,594	3.46	54,594	3.27	54,594	3.13	54,594	2.98	54,594	2.70	54,594	2.41	54,594	2.12		
24.8°F DB	54,594	3.75	54,594	3.58	54,594	3.40	54,594	3.22	54,594	2.90	54,594	2.58	54,594	2.27	54,594	1.95
28.4°F DB	54,594	4.16	54,594	3.78	54,594	3.58	54,594	3.38	54,594	3.05	54,594	2.72	54,594	2.38	54,594	2.05
35.6°F DB	54,594	4.57	54,594	4.19	54,594	3.95	54,594	3.71	54,594	3.35	54,594	2.98	54,594	2.62	54,594	2.25
44.6°F DB	54,594	5.08	54,594	4.70	54,594	4.41	54,594	4.13	54,594	3.72	54,594	3.31	54,594	2.91	54,594	2.50
50.0°F DB	54,594	5.67	54,594	5.24	54,594	4.80	54,594	4.37	54,594	3.94	54,594	3.51	54,594	3.08	54,594	2.65
59.0°F DB	54,594	6.20	54,594	5.73	54,594	5.26	54,594	4.79	54,594	4.32	54,594	3.84	54,594	3.37	54,594	2.90
64.4°F DB	54,594	6.52	54,594	6.03	54,594	5.53	54,594	5.04	54,594	4.54	54,594	4.04	54,594	3.55	54,594	3.05
68.0°F DB	54,594	6.74	54,594	6.23	54,594	5.71	54,594	5.20	54,594	4.69	54,594	4.18	54,594	3.66	54,594	3.15
95.0°F DB	54,594	8.35	54,594	7.71	54,594	7.08	54,594	6.44	54,594	5.81	54,594	5.17	54,594	4.54	54,594	3.90

Freeze Protection & Capacity Correction Factor

Antifreeze Type	Antifreeze mixing ratio					
	32°F	23°F	14°F	5°F	-4°F	-13°F
Ethylene glycol	0%	12%	20%	30%	-	-
Propylene glycol	0%	17%	25%	33%	-	-
Methanol	0%	6%	12%	16%	24%	30%

Antifreeze Type	Item	Antifreeze % by wt				
		10%	20%	30%	40%	50%
Ethylene glycol	Cooling	0.996	0.991	0.987	0.983	0.979
	Heating	0.993	0.985	0.977	0.969	0.961
	Pressure Drop	1.024	1.068	1.124	1.188	1.263
Propylene glycol	Cooling	0.993	0.987	0.98	0.974	0.968
	Heating	0.966	0.973	0.96	0.948	0.935
	Pressure Drop	1.04	1.098	1.174	1.273	1.405
Methanol	Cooling	0.998	0.997	0.995	0.993	0.992
	Heating	0.995	0.99	0.985	0.979	0.974
	Pressure Drop	1.023	1.057	1.091	1.122	1.16

AWHP Hydronic FCU



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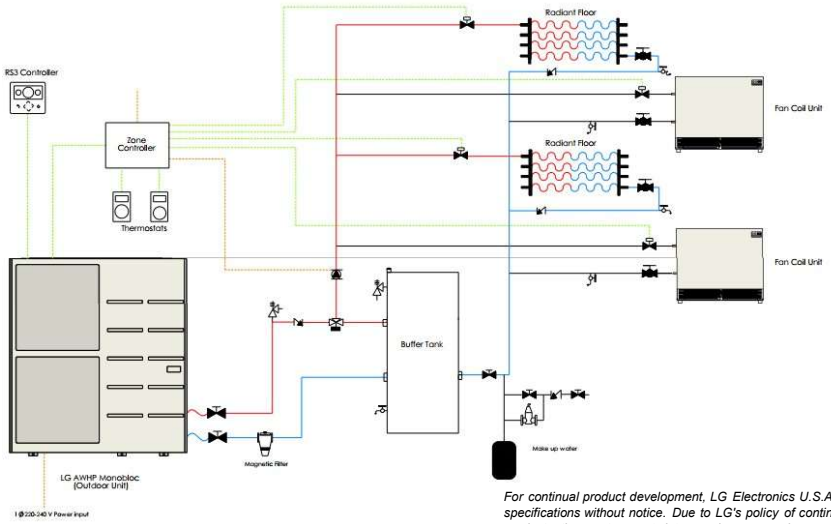
AWHP Radiant and FCU



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AWHP Case Study

Life's Good.

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Why LG Heat Pump Water Heater?

Differentiated Design

LG's exclusive square design and luxury silver color make it an excellent design for the interior.

58Gal 80Gal

Red Dot Design Award 2020
iF DESIGN AWARD 2020

reddot winner 2020

Basement

Life's Good.

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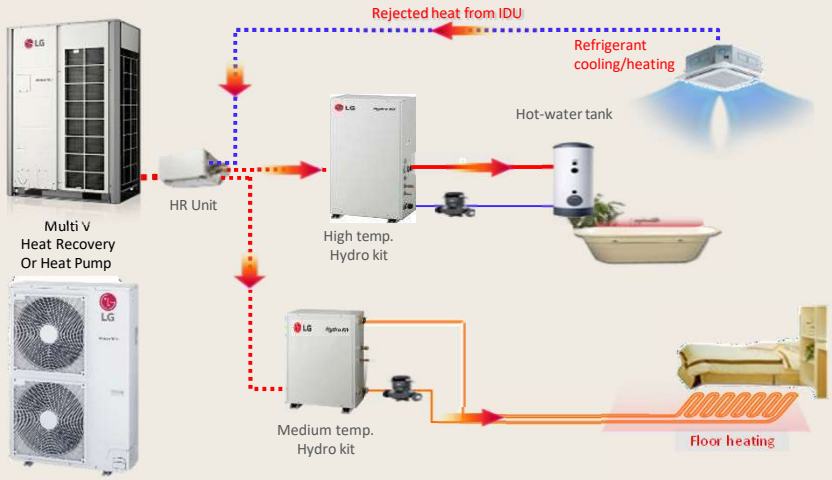
Hydrokit



Life's Good.

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Thank you

Life's Good.

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Introduction to Enertech

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Advantage Air to Water Heat Pump

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Outdoor Unit

- **Monoblock design**
- **Factory charged with refrigerant**
- **Only plumbing enters the building**
- **Makes installation simple and provides access to more skilled trades.**
- **2 sizes - 2.5 Ton – 5 Ton**

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Indoor Module

- **Simplified installation**
- **Pre-built with all controls, pumps and valves**
- **Comes in 2 models - Electric back up (9kw) and Boiler back-up**
- **Wifi Connected controls comes standard**
- **One 3 wire communication wire between indoor & outdoor unit**

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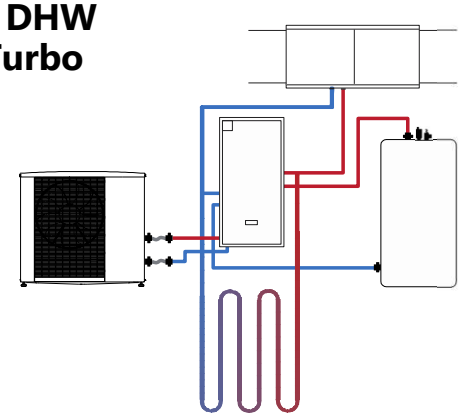
Domestic Hot Water

- **Provides up to 100% DHW when paired with a Turbo max tank.**



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Operational Details

- **Cold climate compatible down to -13F**
- **Delivers water temps between 42F – 135F**
- **Maintains high C.O.P heating efficiency even at the lowest operating conditions. Over 2.0 @ -13F**
- **System uses refrigerant system for drain pan defrost**

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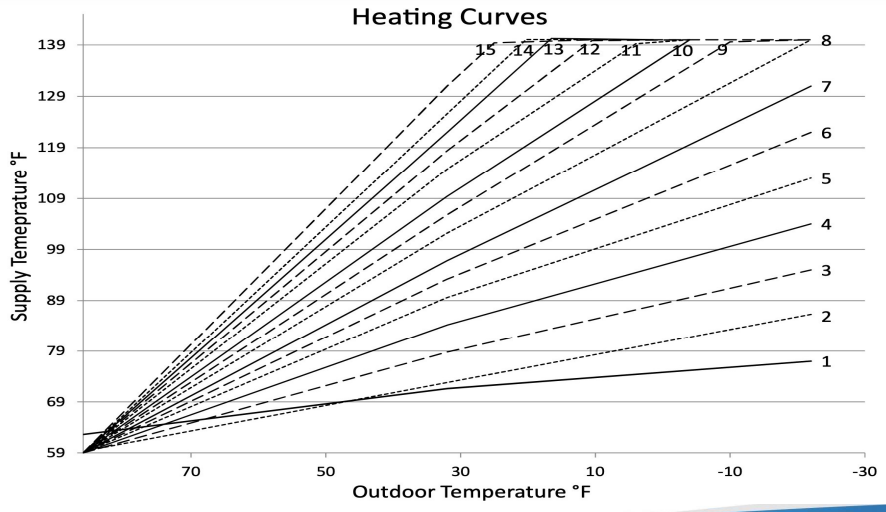
15 selectable heat curves to target precise heating supply temps for radiant floor applications to maximize efficiency



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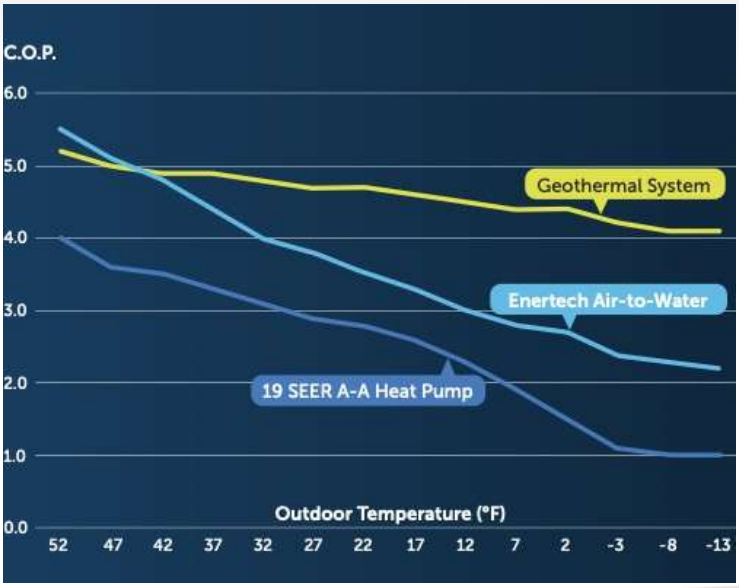
Maintains high C.O.P heating efficiency even at the lowest operating conditions. Over 2.0 @ -13F



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Applications

- **Direct to load piping (no buffer tanks or additional pumps)**
- **Radiant in-floor**
- **Forced air heating & cooling**
- **Up to 100% Domestic Hot water**

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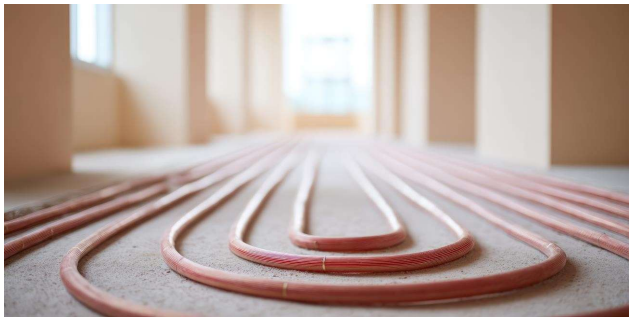
Accessories



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Accessories

- **Matched multi-position hydronic air handlers available 2-5 tons**
- **Radiant floor tubing manifolds and controls**
- **Compatible with most radiant heat products on the market that are designed for heat pump delivery temps**
- **HBX Controls for customizable control strategies**

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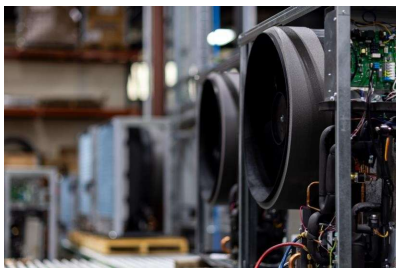
Warranty & Support

- **USA made in Greenville IL**
- **USA based Engineering & Technical Support**
- **3-year warranty on all parts, 7 years on Compressor**



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