

DATE



Installer Certification Training

Industry-Leading Air-to-Water Heat Pumps & Hydronic Solutions

SPACEPAK®

FAQ's

I'm having problems with the audio, what should I do?

- If you joined this webinar using Computer/Internet Mode, you should dial in by phone with the number and access code provided in the invitation email.
- Call GoToWebinar Technical Support: (855) 352-9002

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- Yes, one hour after this webinar has ended you will receive an email with a link to the recorded video.

Can I receive a PDF copy of today's presentation?

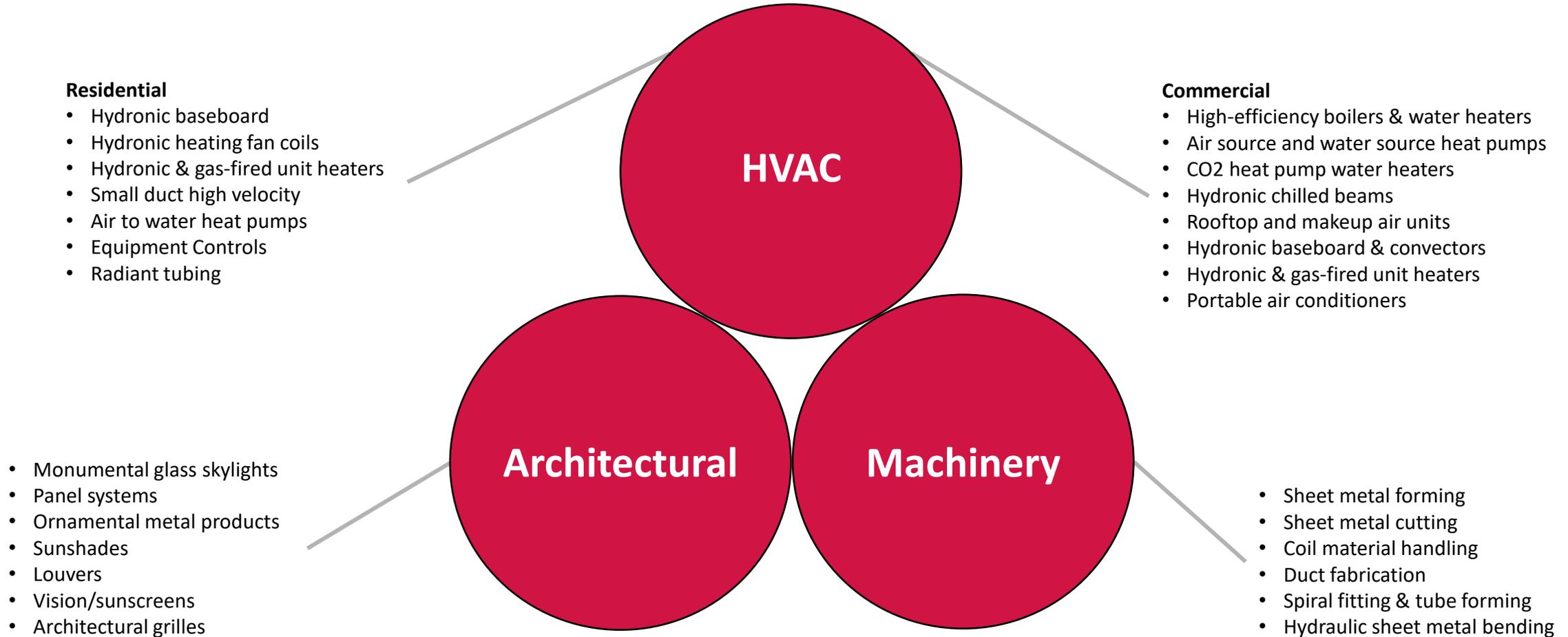
- Yes! You will receive a copy of the presentation in a follow-up email.

Mestek, Inc

- Established 1946 in Westfield, MA
- Privately owned
- Over 45 companies involved in the HVAC, Architectural, & Metal Forming Machinery & fabrication industries
- Began with founder John Reed and original Fin Tube Radiation in 1946 as Sterling Radiator Company
- 1975 Reed National
- 1986 merger becomes Mestek
- SpacePak joins Mestek family in 1991



Mestek Today



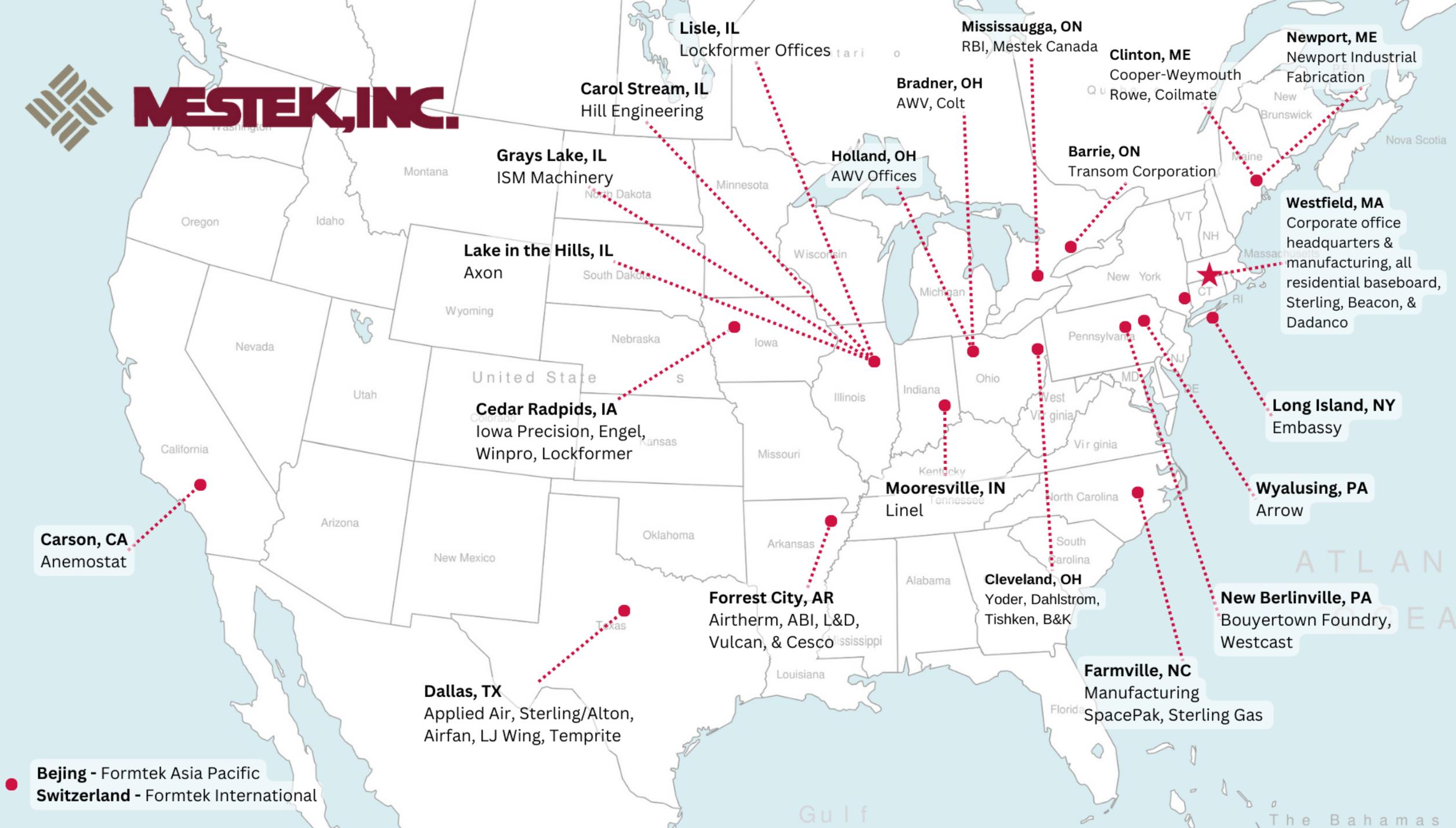








MESTEK, INC.



Lisle, IL
Lockformer Offices

Mississauga, ON
RBI, Mestek Canada

Newport, ME
Newport Industrial Fabrication

Clinton, ME
Cooper-Weymouth
Rowe, Coilmate

Bradner, OH
AWV, Colt

Holland, OH
AWV Offices

Barrie, ON
Transom Corporation

Grays Lake, IL
ISM Machinery

Westfield, MA
Corporate office headquarters & manufacturing, all residential baseboard, Sterling, Beacon, & Dadanco

Lake in the Hills, IL
Axon

Long Island, NY
Embassy

Cedar Rapids, IA
Iowa Precision, Engel, Winpro, Lockformer

Mooreville, IN
Linel

Wyalusing, PA
Arrow

Carson, CA
Anemostat

Forrest City, AR
Airtherm, ABI, L&D, Vulcan, & Cesco

Cleveland, OH
Yoder, Dahlstrom, Tishken, B&K

New Berlinville, PA
Bouyertown Foundry, Westcast

Dallas, TX
Applied Air, Sterling/Alton, Airfan, LJ Wing, Temprite

Farmville, NC
Manufacturing
SpacePak, Sterling Gas

Beijing - Formtek Asia Pacific
Switzerland - Formtek International

ATLANTIC OCEAN

Gulf

The Bahamas

Westfield, MA - Mestek Home Base



CORPORATE HEADQUARTER OFFICES

- Product & Engineering
- Sales & Marketing
- Executive Level Management
- Customer & Technical Service
- Accounting & Finance
- Human Resources & Legal
- IT & Technology



RESEARCH & DEVELOPMENT LAB

- New product development
- Product testing
- Performance testing



MANUFACTURING

- All residential baseboard lines
- Beacon Morris unit kickspace heaters
- Sterling Commercial
- Dadanco
- Vulcan
- MTI Controls



TRAINING CENTER & LIVE-FIRE SHOWROOM

- SpacePak
- Commercial Boilers
- Commercial Heat Pumps
- Show room

Jim Bashford

SpacePak National Sales & Training Manager

Jim has been with SpacePak for over 7 years. In addition to his role as National Sales and Training Manager, Jim has used his extensive knowledge of all SpacePak products to continually expand his role within the company, taking on greater responsibility with the training side of the business including instructing our SpacePak Systems and Applications seminars.

Before joining the SpacePak team, Jim was a manufacturer's representative for three years working with a variety of HVAC products. He has over 23 years of experience in the HVAC industry which includes experience as a contractor and business owner where he spent many years selling and installing SpacePak products.



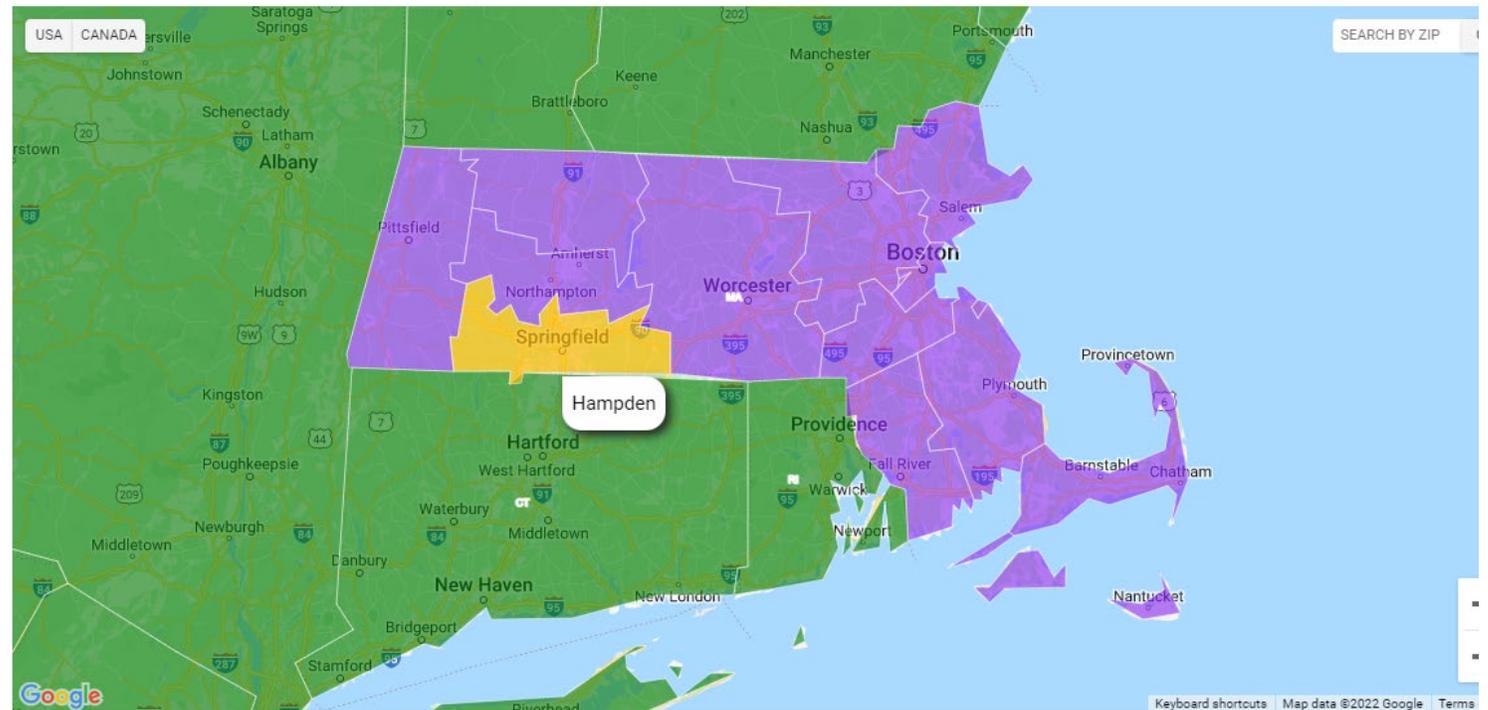
MESTEK: SpacePak Manufacturing in Farmville, NC

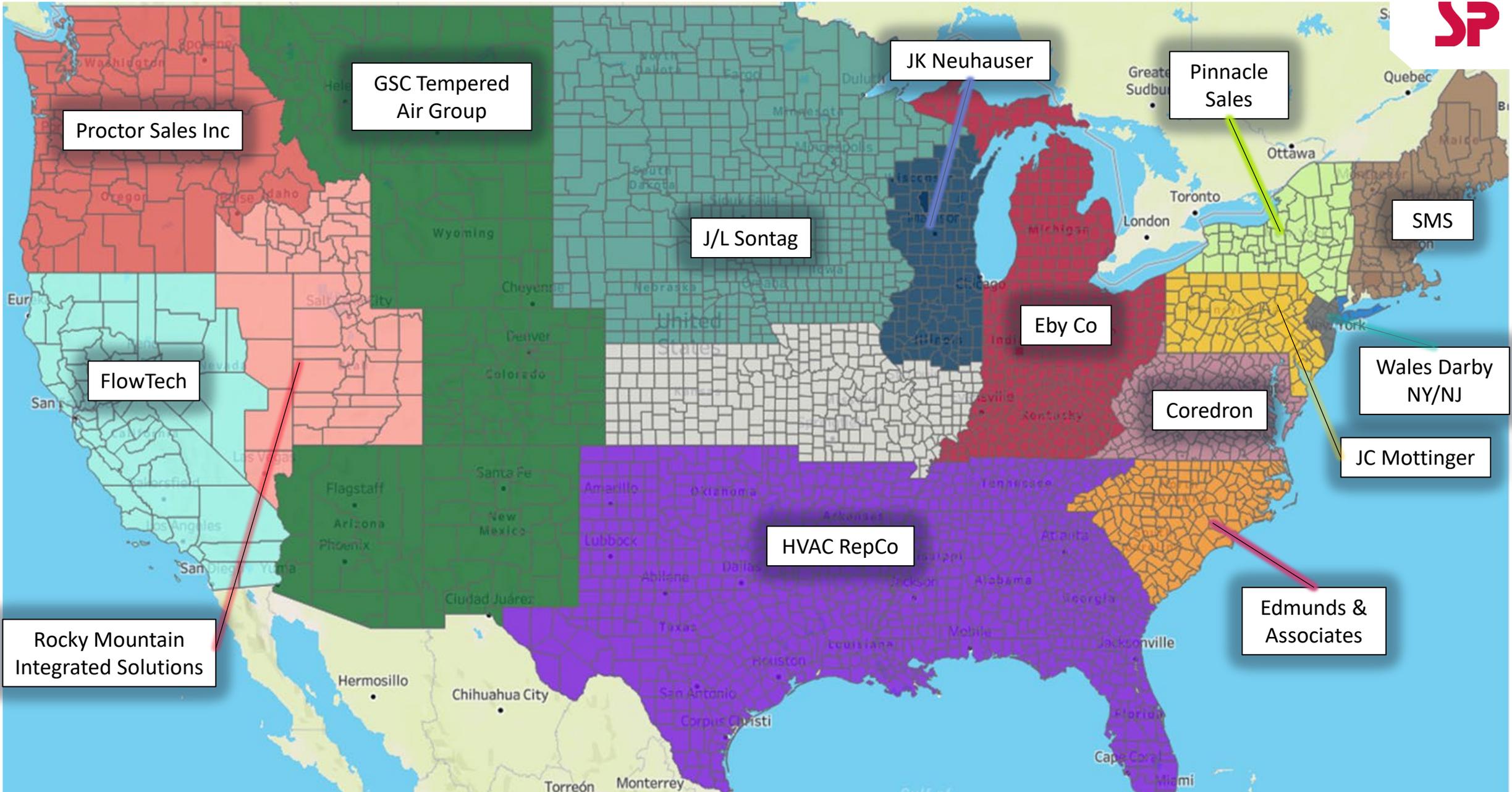


Local Representative Support

For all local field support, including **pricing, availability, and project questions**, please contact your local SpacePak Representative. For contact information visit: www.spacepak.com/RepLocator

Look up your local
SpacePak Rep!





U.S. Manufacturer Representative Network



Sales

- FI
- Mes.
- Proctor Sales Lynnwood



Canada Manufacturer Representative Network

Heat Pump Timeline

1991

SpacePak/Hydrotherm acquired by Mestek

The original small duct high velocity system – sole product focus for decades

2011

SpacePak introduces the SCM “chiller”

single speed



2014

SpacePak introduces the Solstice Extreme – Cold Climate HP

single speed



2019

SpacePak receives Energy Star Emerging Technology Award for Air to Water Heat Pump

ENERGY STAR 2019
Emerging Technology Award

2020

SpacePak begins roll out of variable-speed inverter-driven offering



2022

SpacePak introduces the Solstice Inverter Extreme - Cold Climate HP



2024

SpacePak introduces the R32 series of air to water heat pumps



The Evolution of ATWHP Technology in North America

2011

SpacePak introduces the SCM “chiller”

single stage/speed



2014

SpacePak introduces the Solstice Extreme – Cold Climate HP

single stage/speed



2019

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ENERGY STAR 2019
Emerging Technology Award

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variable speed



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variable speed



Certified Contractor Program

- Extended warranty*
- Listed on website
- Homeowner leads
- Pre-sale support
- Marketing support – co-op dollars

**with project registration*

Product Registration Form: <https://www.spacepak.com/warranty>



Pre-Sale Application Support Team

PreSaleSupport@SpacePak.com

Available to Representatives, Wholesalers, Contractors etc.

- System application support
- Equipment selection
- Load calculation and rough material list

Any questions regarding equipment already shipped should be directed to

TechnicalService@SpacePak.com (413) 564 - 5530



Customer & Technical Service

Customer Service – *During-Sale*

CustService@SpacePak.com

Technical Service – *Post-Sale*

questions regarding equipment already shipped

TechnicalService@SpacePak.com

(413) 564 - 5530



Warranty Policy

Inverter Series Air-to-Water Heat Pumps

Standard Warranty

- 2-year parts and 5-year compressor

Extended Warranty*

- 5-year parts and 10-year compressor

SDHV, hydronic fan coils, & associated equipment

Standard Warranty

- 1-year parts

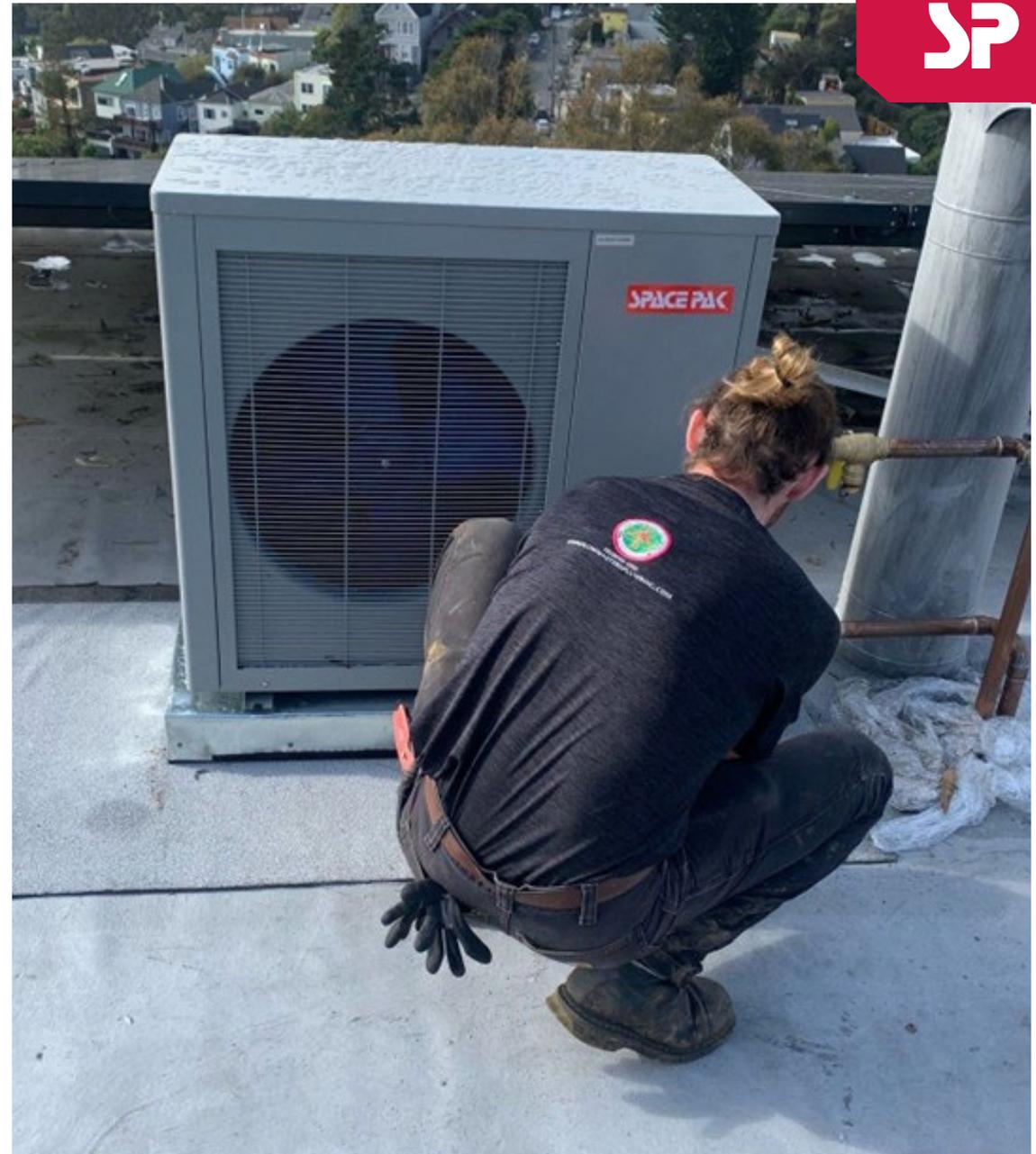
Extended Warranty*

- 5-year parts

Buffer Tanks

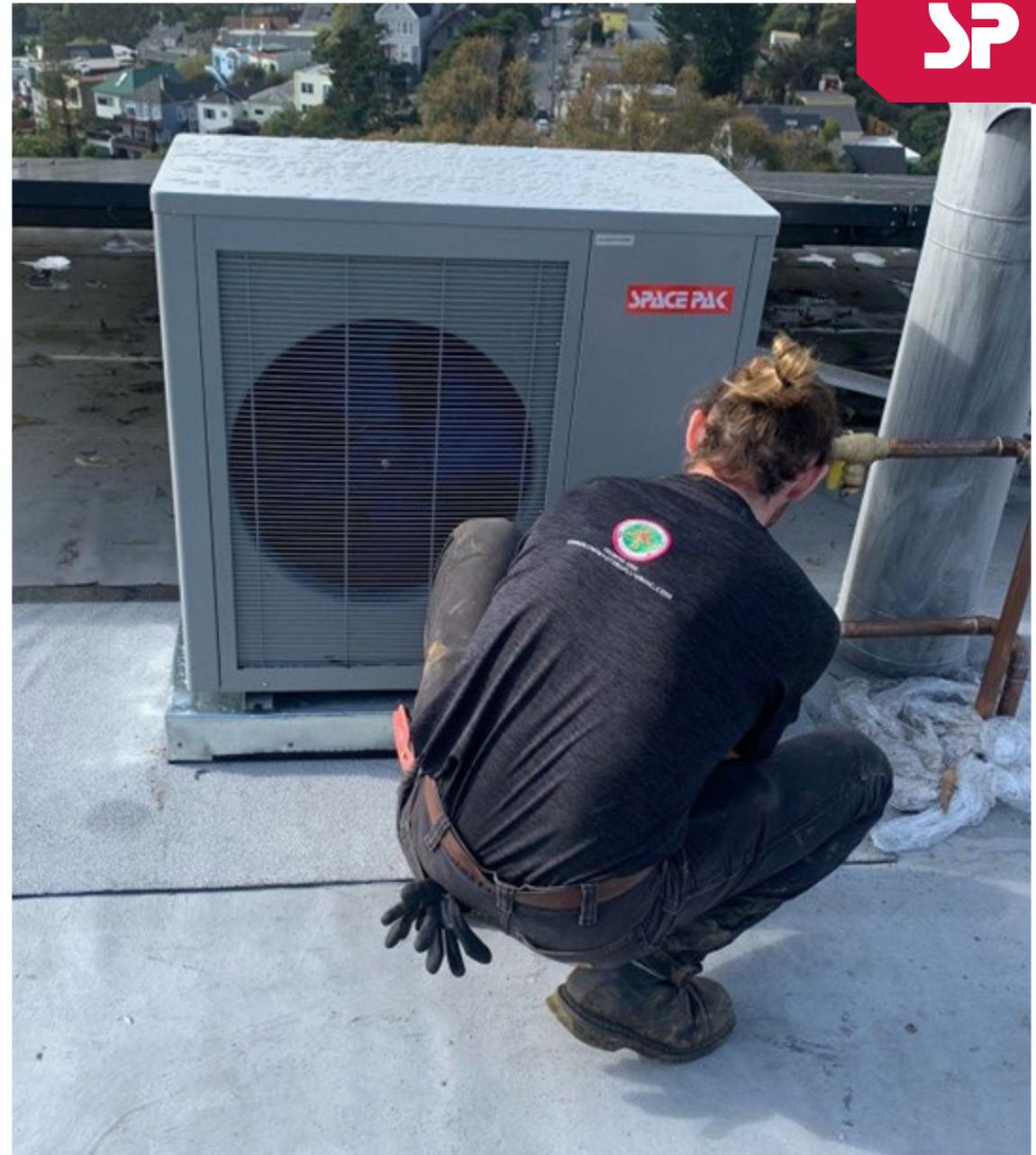
Standard Warranty

- 10-year on all buffer tanks

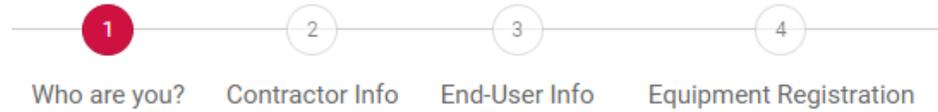


Extended Warranty Requirements*

- Must be listed as a [SpacePak Certified Contractor](#) at time of installation
- Must register project/equipment via [Product Registration Page](#) on website upon installation



Warranty Registration



Who are you?

- Homeowner/End-user
- Installing Contractor

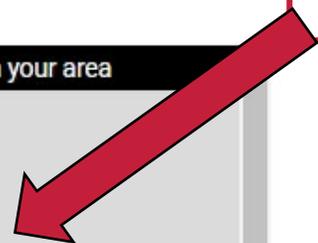
Next

Certified Contractor Map & Homeowner Leads

Map showing certified contractors in the area around Springfield, MA. A red circle highlights a specific geographic area centered on Springfield, MA, with several red location pins placed within it. The map interface includes a search bar at the top left with the zip code '01085' and a 'Find Me a Contractor' button. A sidebar on the right lists contractors with their names, distances, and contact information.

Certified Contractors in your area	
Charland Refrigeration	0 miles
North Road Westfield MA, 01085 tel: 413-564-0333	
Durfey Heating Systems	12 miles
131 Cross Rd Granville MA, 01034 tel: 413-357-6132	
Comfort Heating & Cooling	14 miles
7 Hinckley Street Florence MA, 01062 tel: 413-579-2380	
WL Heating & Cooling	15 miles
59 King Spring Road Windsor Locks CT, 06096 tel: 860-627-8000	
ASM Sheetmetal	19 miles
140 West St West Hatfield MA, 01088	

Your Company Here



Homeowner Leads Emailed Directly to you

Find a Certified Contractor

Are you interested in installing a SpacePak system in your home? Get the process started by requesting a free, no-commitment consultation. Once you've submitted your request, you'll receive contact information for local SpacePak certified contractors.



STEP 1

Who are you?

- Homeowner
- Contractor
- Architect
- Other

Which of these options best describes your need?

- Installing SpacePak in a current home
- Installing SpacePak in a new construction
- Installing SpacePak in a commercial space
- Service or repair for my SpacePak System

Which system are you most interested in?

- SpacePak Central Heating & Cooling
- SpacePak Hydronics
- Unsure

Next

NOTE: Extensive form guarantees only serious inquiries.

Our Offering



SIM



SIS



ILAHP



HP



CC32



TBD290

The future???



Rebate Programs are Slow to Recognize Air to Water

In 2018 Vermont established the first ATWHP rebate program in the country based on SpacePak's LAHP unit on a Habitat for Humanity project.

In 2019 the EPA recognized ATWHPs for Energy Star's Emerging Technology Award – SpacePak received this award.

In 2024 AHRI finally dedicated a working group to the establishment of a federal performance standard for **heating with air to water**.

By year-end, the AHRI air to water heating standard is expected.

We assume this will open the doors for fast and easy deployment and adoption of AWHP-specific incentive programs at both the federal and local levels.



Example residential ATWHP Rebates (and more!)

\$1,000/ton



\$1,250/ton



\$3,000



\$3,000



Now Eligible
for NYS Rebate Program &
NYSERDA Low Interest Loans!



Prior to 2024, it only applied to geothermal,
air-to-air, and heat pump water heaters

CERTIFICATION

Slow to Recognize Air-to-Water

Air Source Heat Pumps

- Air to Refrigerant
- Air to Air

Geothermal

- Water source
- Ground source

PERFORMANCE STANDARDS FOR “TRADITIONAL” AIR SOURCE HEAT PUMPS CAN NOT BE APPLIED TO AIR-TO-WATER

- SEER

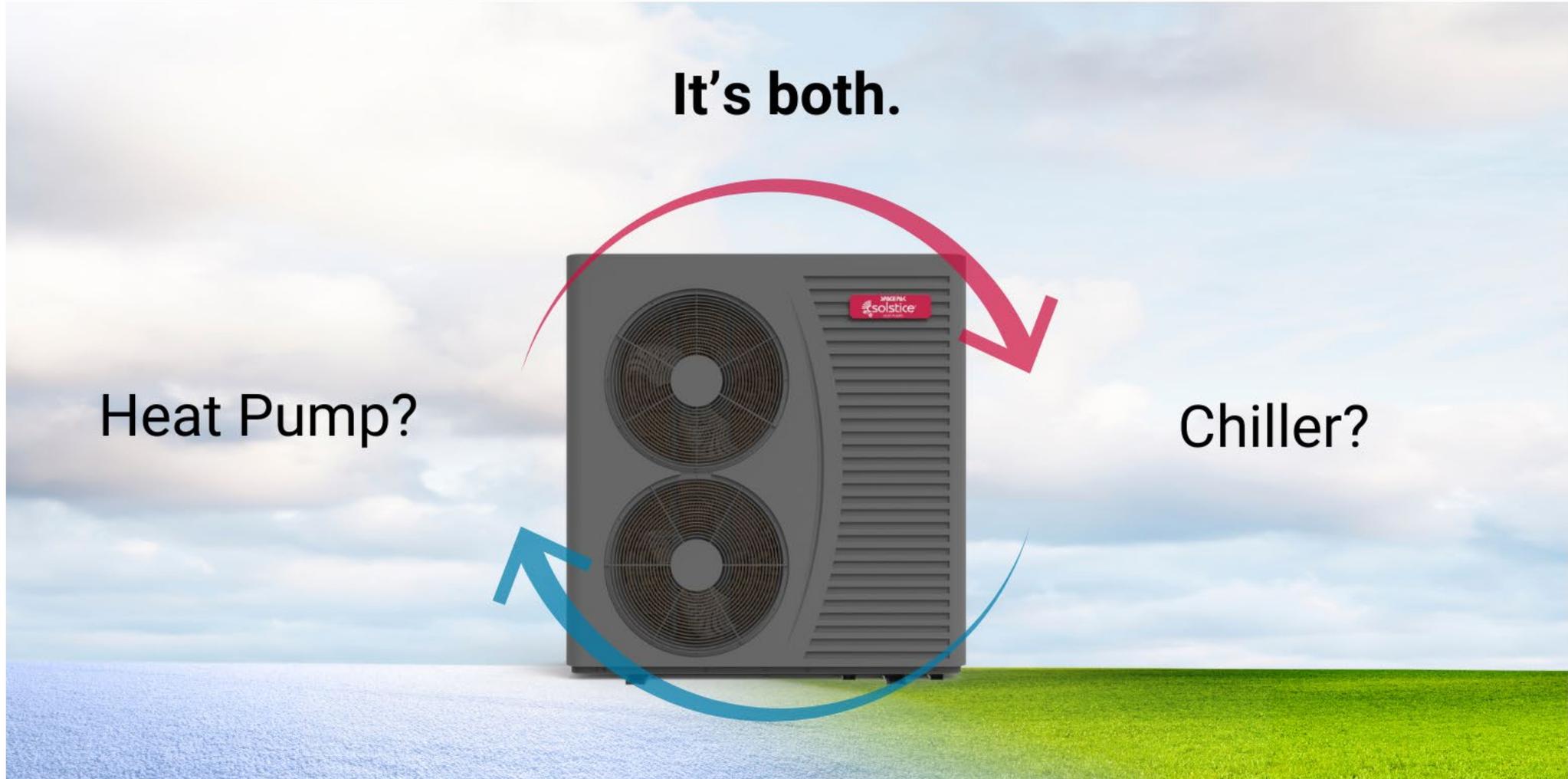
EUROPE AND ASIA HAVE ATW PERFORMANCE STANDARDS USA AND CANADA DO NOT





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Questions?

Air-to-water heat pumps, what are they?



Why Air to Water?

Ultimate design flexibility

Ease of zoning (limited only by one's ability to size systems)

Water carries more BTUs (per physical pipe size)

Integrates with existing hydronic, solar, geothermal

Partial load capabilities (vary water temperatures and flows)

Simpler maintenance - Water vs DX.. No reclaiming

Not restricted in length and lift of line set (monobloc)

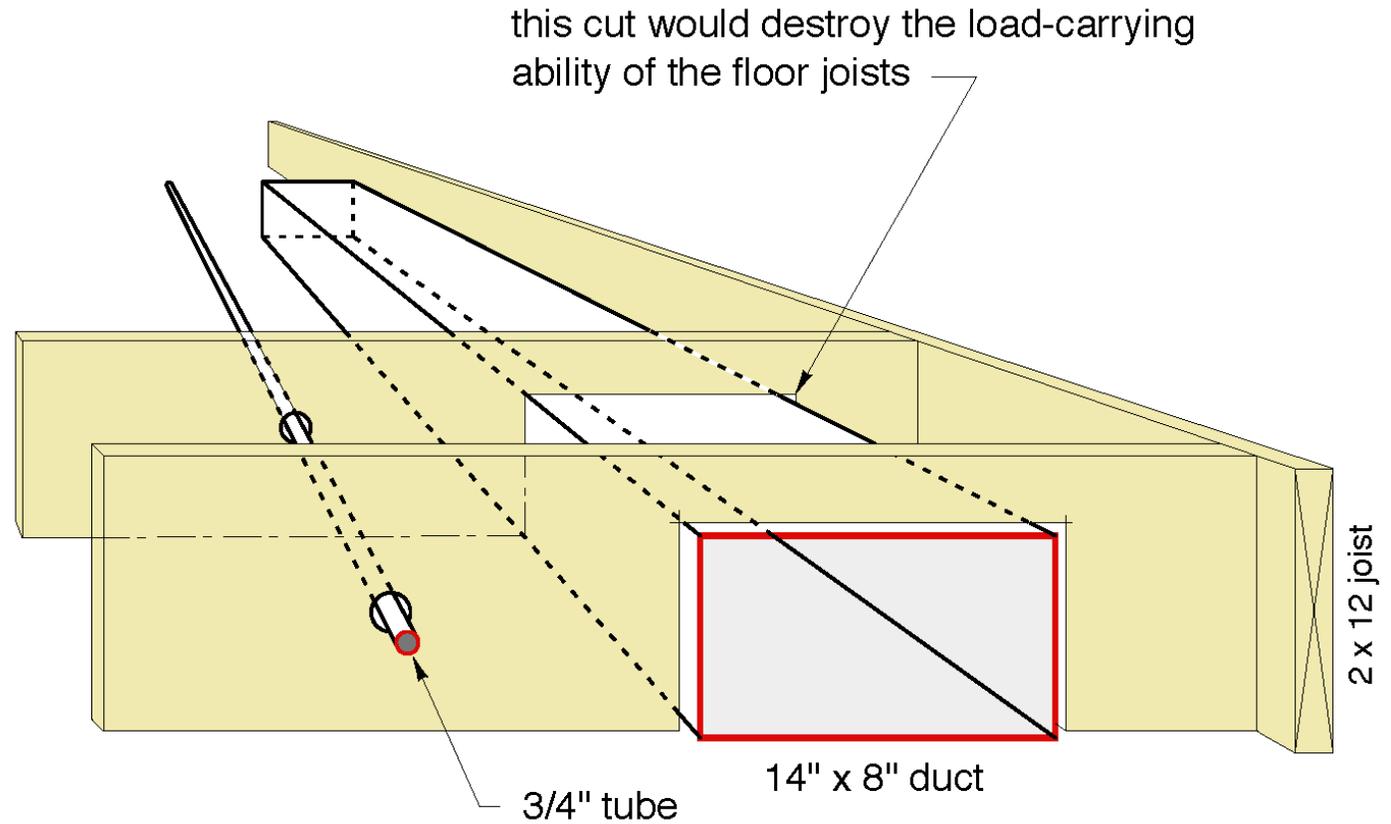
Superior dehumidification



Water Carries More BTUs

Water can carry far more heating and cooling energy than conventional air distribution methods

Results = Flexibility



A forever home should be **future-proof**.



Monoblocs Offer a Future Proof Solution

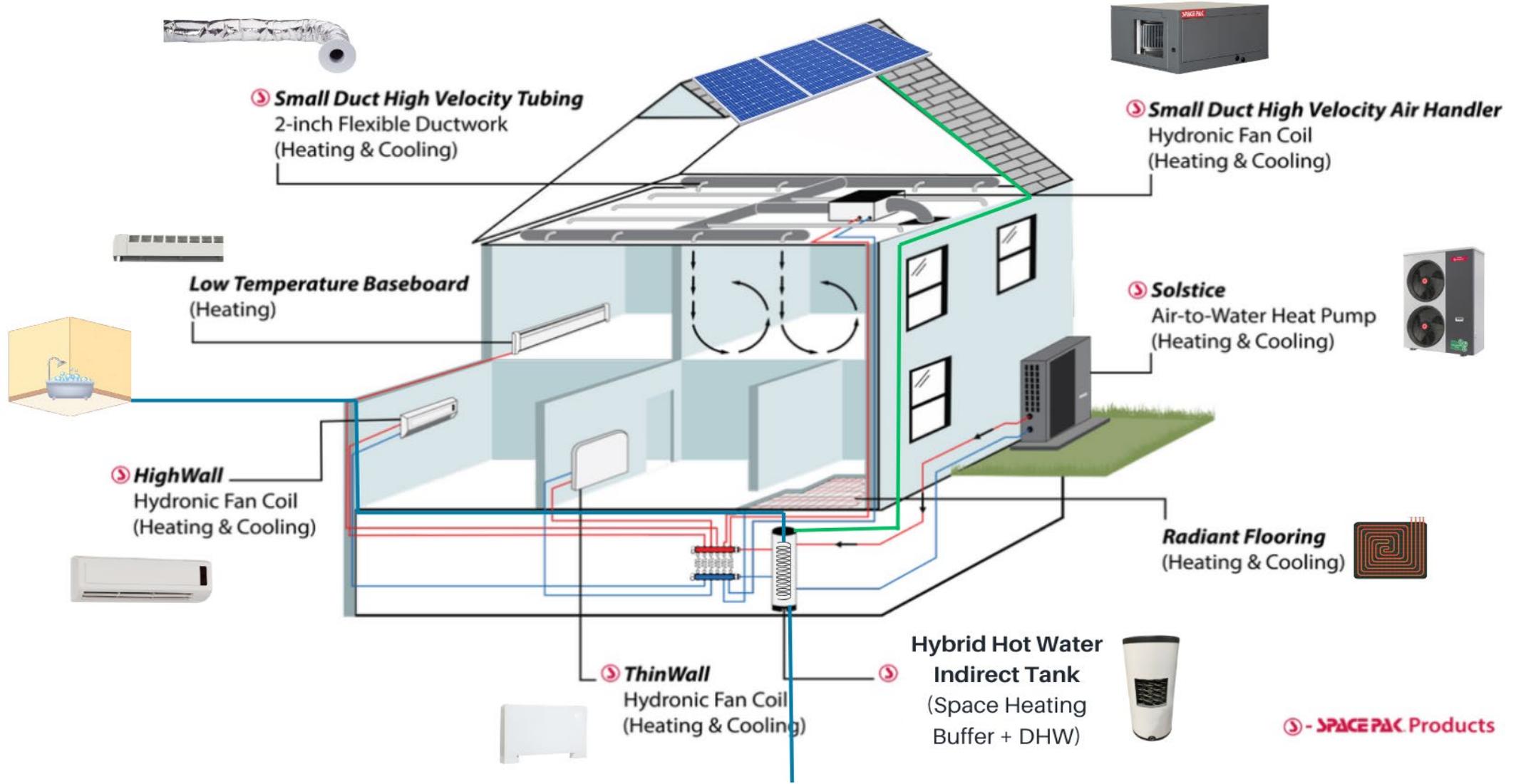


2012



2023 Upgrade

Complete System Integration



Two Types of Heat Pumps

Monobloc Design



This design arrives pre-charged and is installed outside. It is then piped to the buffer tank inside and then on to the system.

This unit requires no on-site refrigerant work.

Split System Design



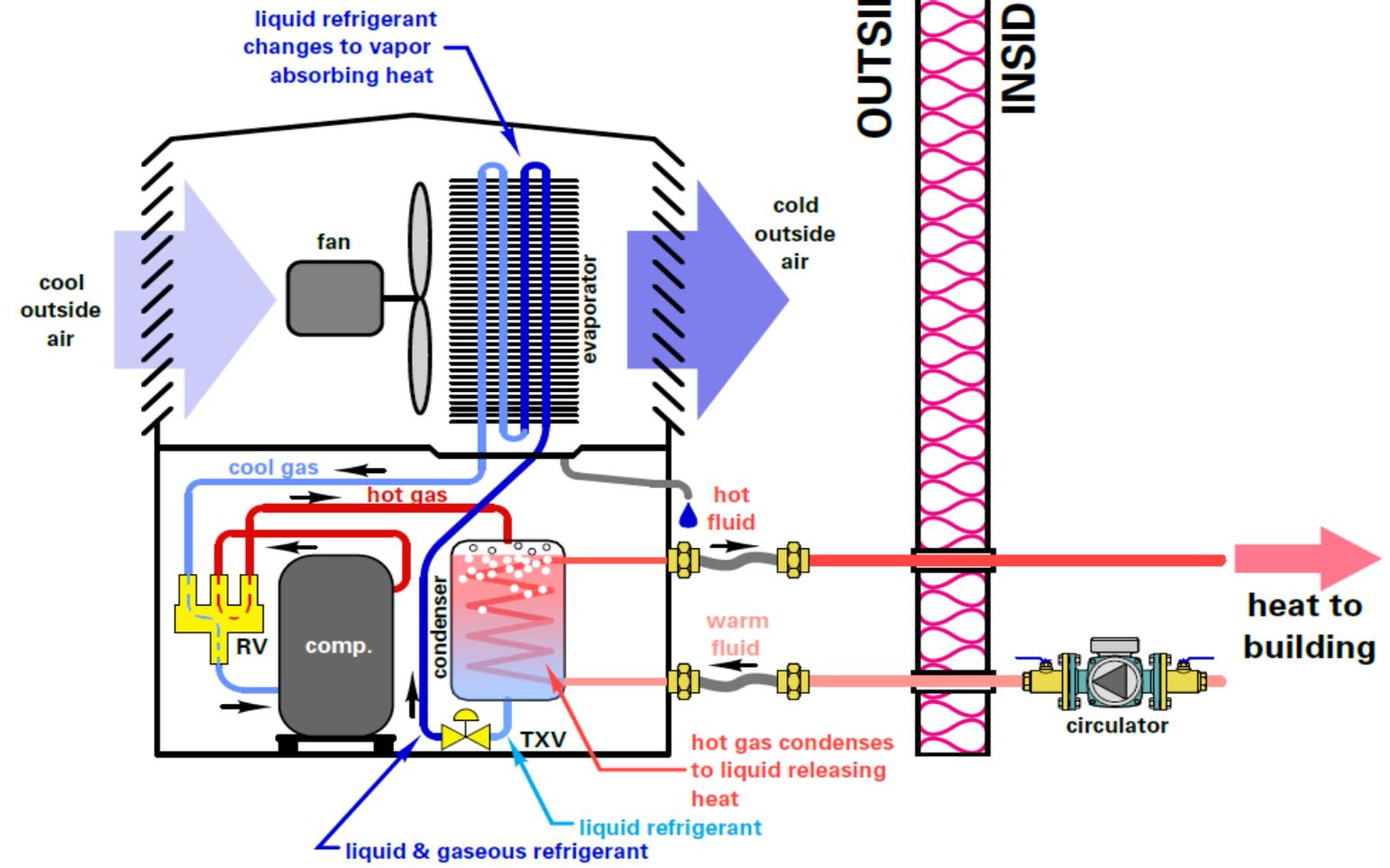
This design leaves the compressor outside with the refrigerant to water exchanger inside. These units are connected with a Standard line set (included).

Refrigerant knowledge and certification is required for this type of installation.

How they work

(monobloc design)

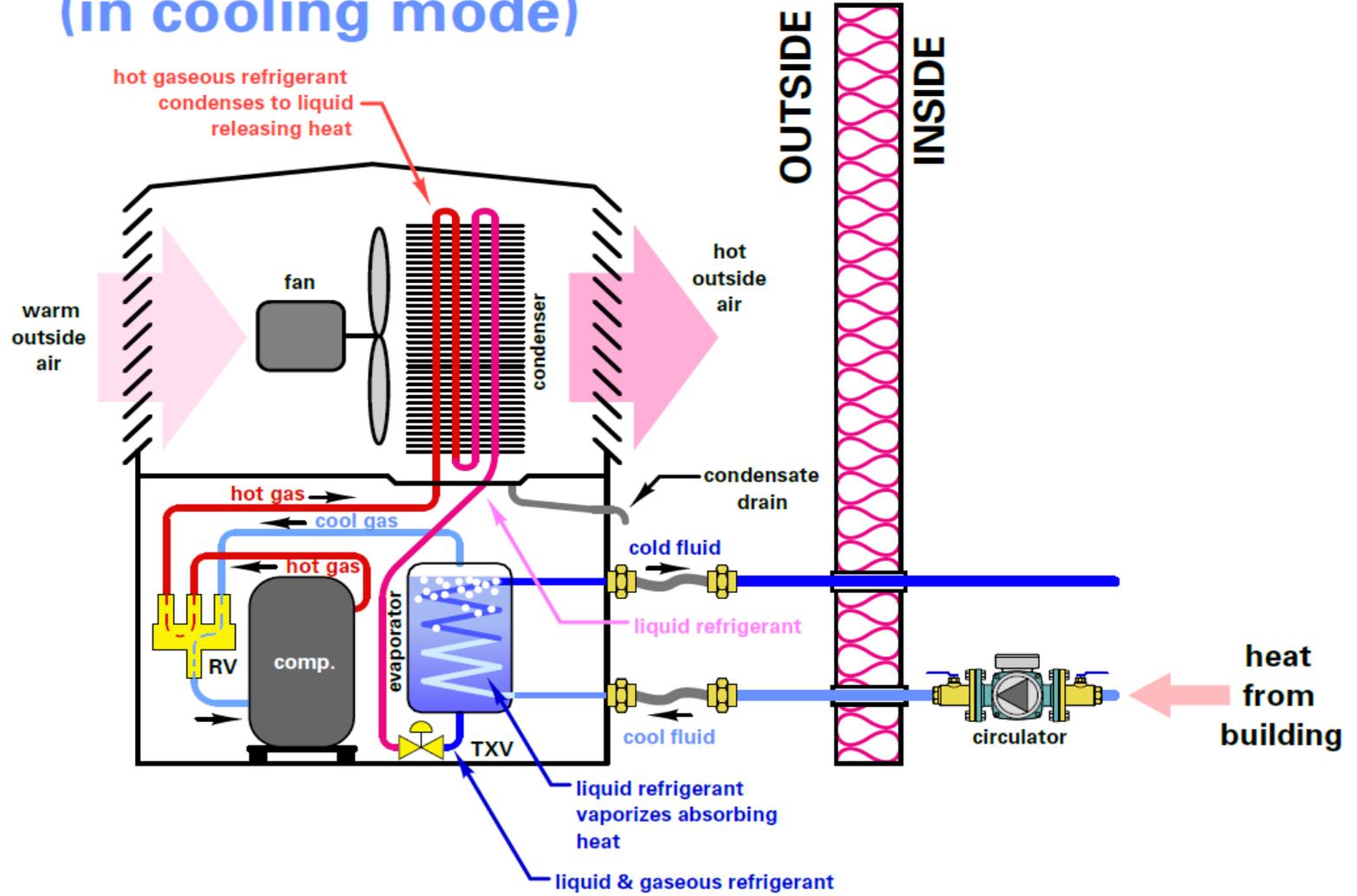
(in heating mode)



How they work

(monobloc design)

(in cooling mode)



“COP” The measure of efficiency in ATW equipment

A COP is defined as the relationship between the power (kW) that is drawn out of the heat pump as Cooling or Heat, and the power (kW) that is supplied to the compressor.

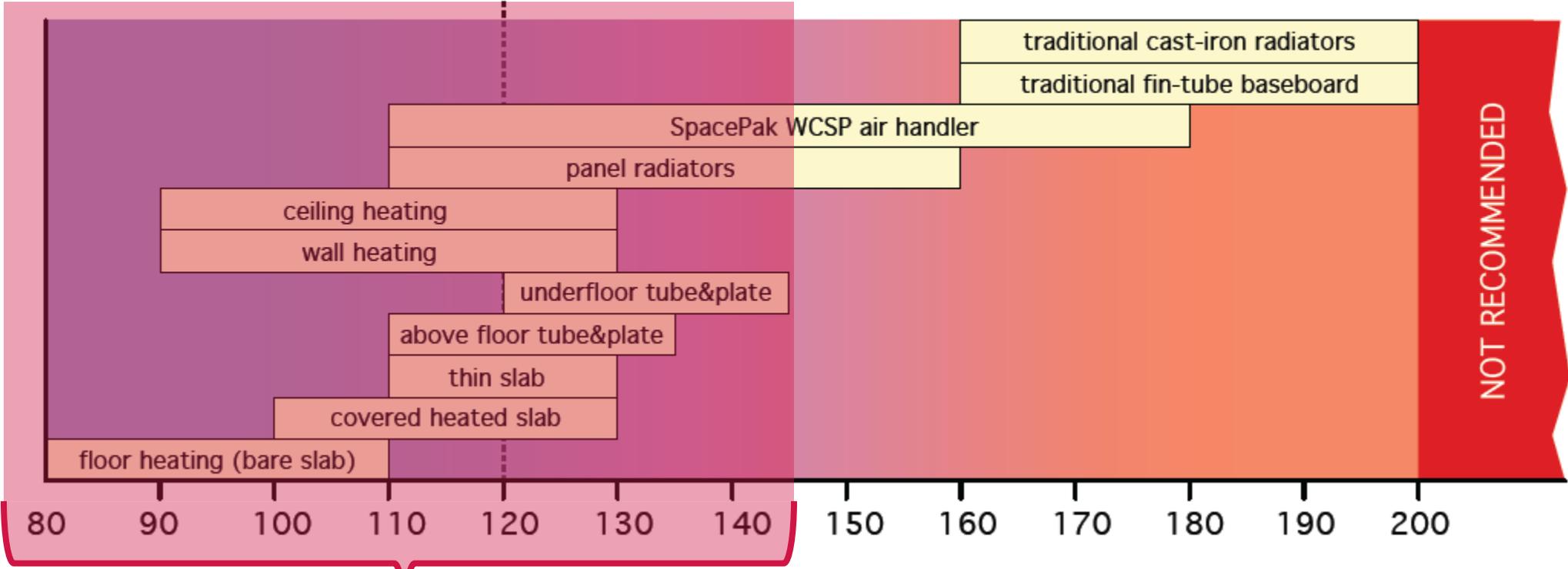
“COP” can be thought of as a “Dollar”

For example, if the unit is running at the COP of 1, that would mean with 1 Dollar worth of Energy input you would receive 1 dollar worth of energy back (100% efficient)

In a higher operational COP of 3, it would show that with 1 Dollar worth of energy input you would receive 3 dollars worth of energy output in return - resulting in a much higher efficiency.

Low Temperature Heating

120 °F suggested maximum supply water temperature for modern systems



Ideal temps for ATWHPs

APPLICATION

Application Examples

- Radiant heating
- Hydronic heating
- Forced air heating and cooling
- Centralized domestic hot water
- Snow melting
- Dehumidification
 - Mushroom farms
- Process cooling
 - Milk processing & distilleries
- Projects with limited interior space
- Projects with limited exterior space
- Projects with exterior façade restrictions

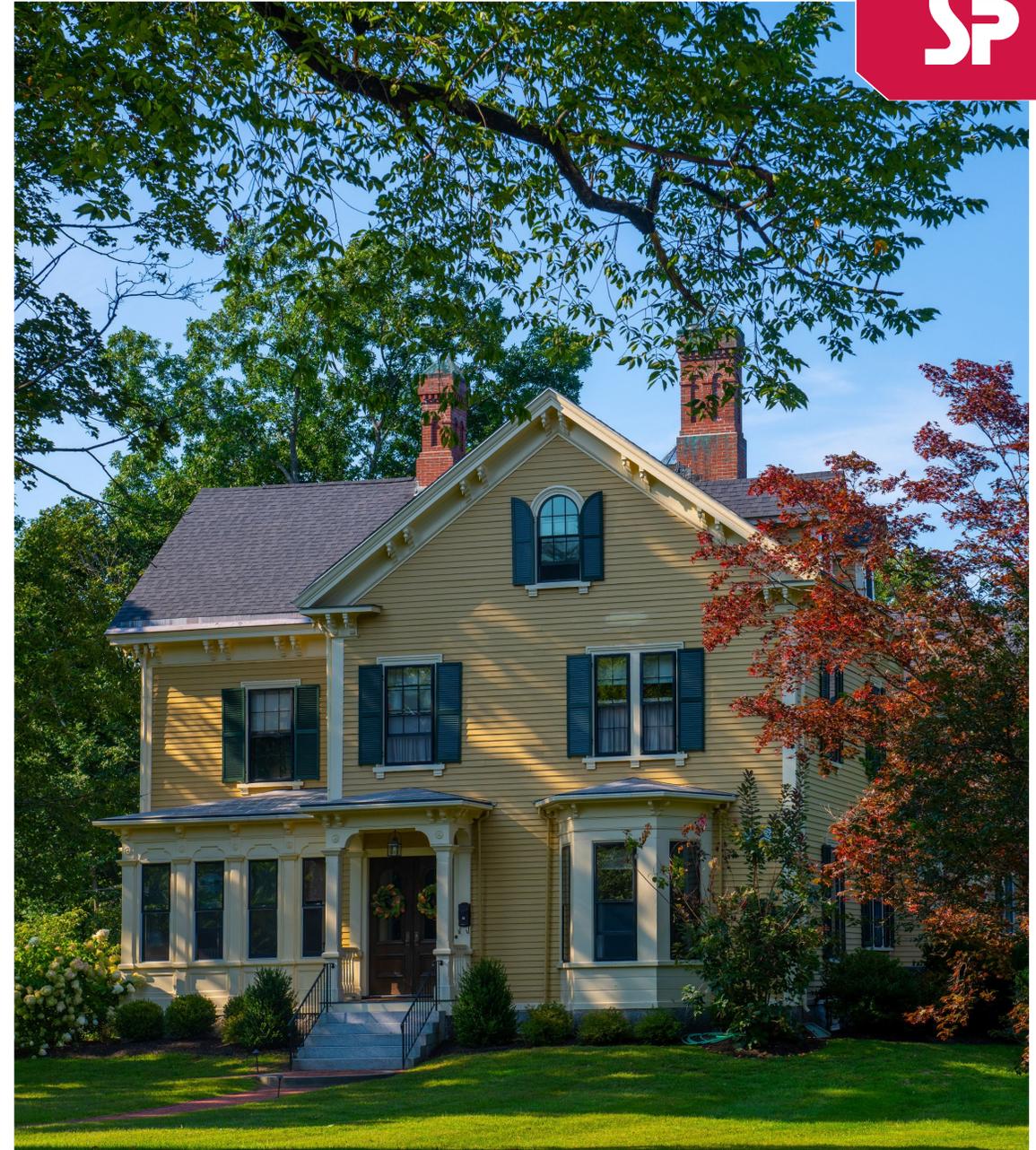
Unlimited. Design. Flexibility.



Will this work in my house?

Thing to know and to be aware of

- New construction or retrofit
- Room-by-room load calculation (most important)
- Heating, cooling, domestic hot water
- Existing or desired forms of conditioning
 - Hydronic or forced air
- Existing or desired room emitters
 - Radiant, baseboard, fan coils, etc.
- Water temperature required to meet load
- Climate zone(s)
- Single source electric or dual fuel



Load Calculations

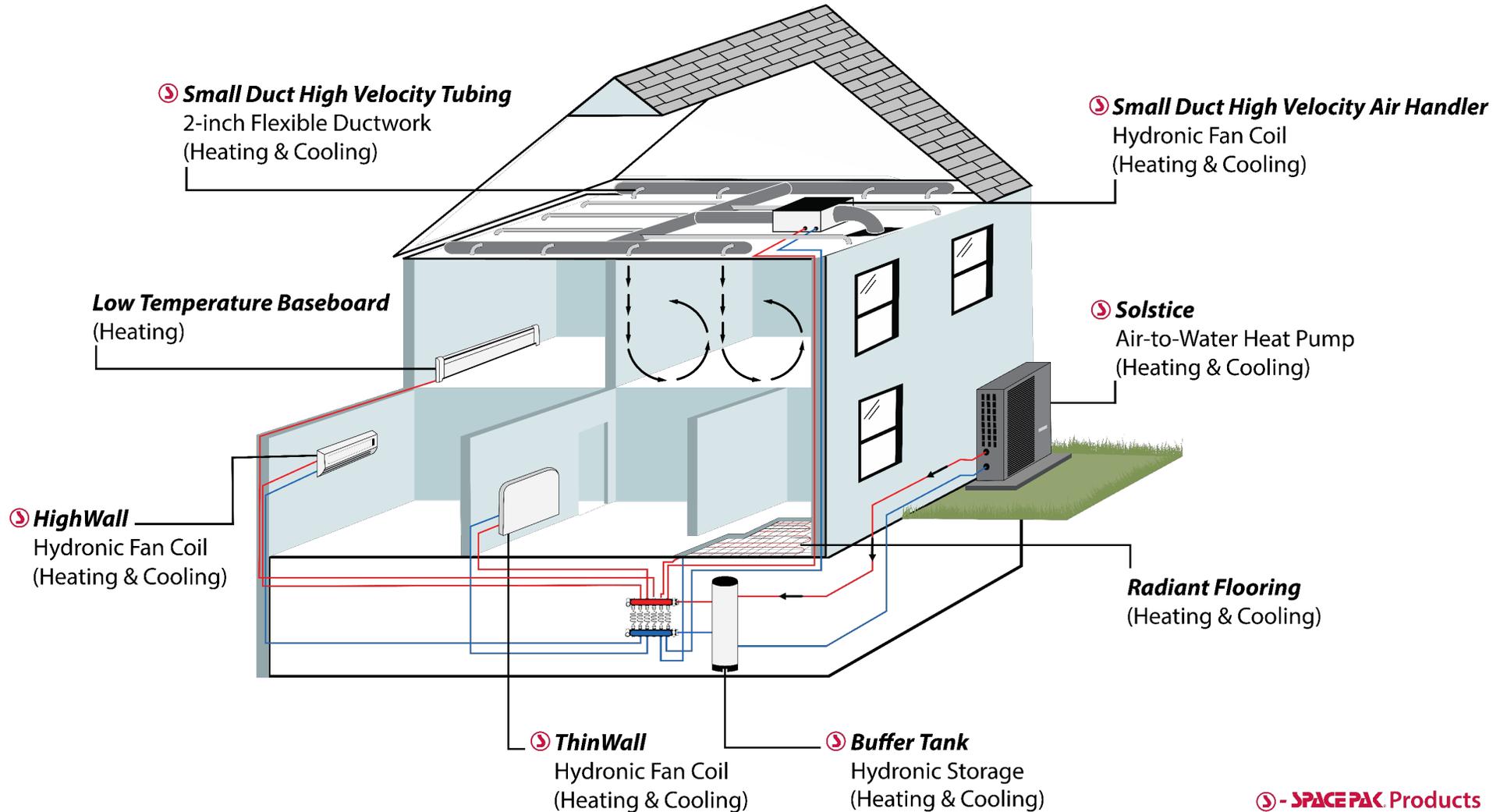
Results will determine air and water flow rates for sizing air handlers, ducts, piping, and pumps. ACCA Manual J or software based on that method should be used to ensure that each room or space receives the proper amount of heating and cooling. For systems with central air handlers and ducted air delivery, ACCA Manual D methods should also be used to properly size the ducts. ACCA lists several approved software-based sizing applications.

Inputs to these applications include:

- Building orientation
- Wall, roof, and floor u-values of exterior walls
- Window u-values and solar heat gain coefficients (SHGC)
- Floor areas and volumes of each room
- Building air leakage rate
- Duct insulation R-value
- Indoor “design” temperatures
- Outdoor “design” dry-bulb temperatures



Distribution Example



Ⓢ - **SPACE PAK** Products

Monobloc Models Can be Installed in Remote Locations



Note: Distances are only limited by the ability to size the pump and piping in accordance with required flow requirements and pressure drop, this creates opportunity for unlimited applications!

Up to 600 ft away!

Remote Mounting Examples



Hudson, NY



Cambridge, MA





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Questions?

SIM

Solstice Inverter Monobloc (SIM)

MILD CLIMATE

AIR TO WATER HEAT PUMP

- Available in 3- and 5-ton Models
- Heating, cooling, domestic hot water
- Eco-friendly monobloc design
- Cold climate cooling capabilities
- 42-130°F Output Water Temperature Ranges
- Reliable Mitsubishi Inverter Compressor
- Inverter Driven Fans & Fan Motors
- Controls on Return Water Temperature
- Freeze Protection
- Low Amp Draw
- Ultra Quiet Operation



SIM-036



SIM-060





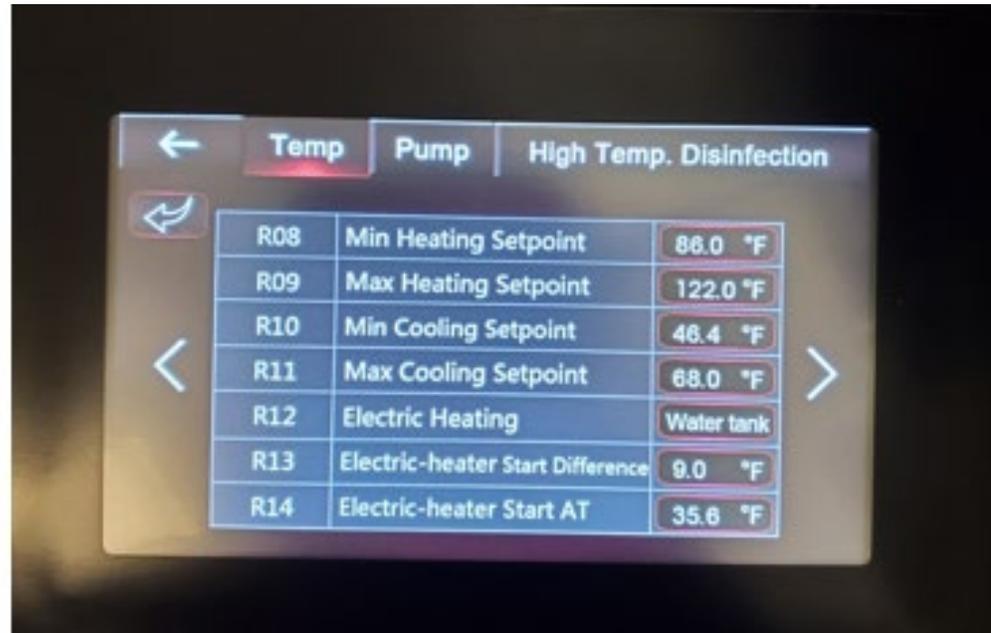
SIM

Monobloc Touch Screen Control

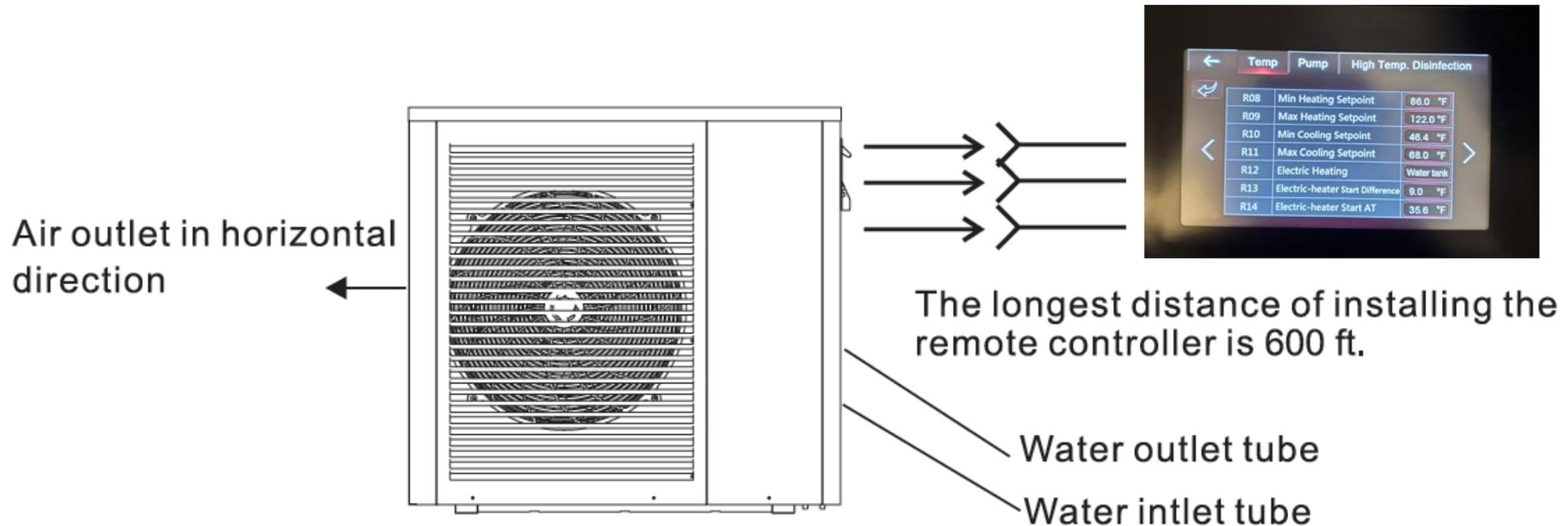
SIM036, SIM060, ILAHP48

Advanced Intelligent Internal Control Platform

- User-friendly color touchscreen
- Intelligent defrost
- Outdoor air reset
- Modbus compatible
- 24ga shielded 5 wire - can be remote mounted up to 600ft



Monobloc Touch Screen Display Wiring Layout



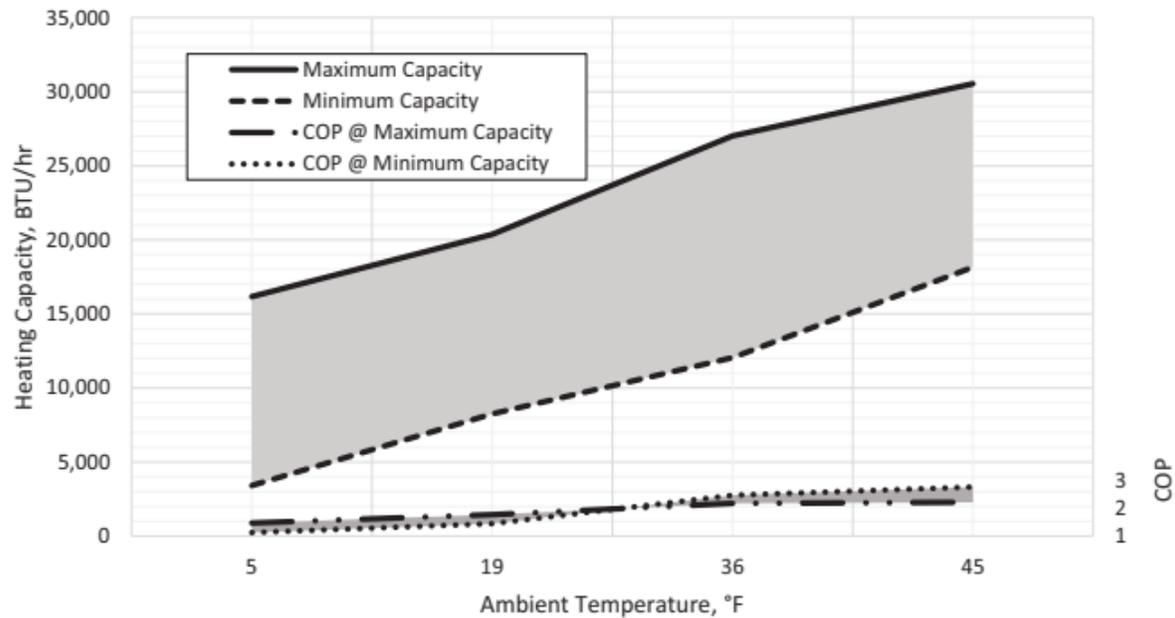
NOTE: A 65-foot 5 conductor shielded wire is supplied with the unit. In cases of longer runs, field supplied shielded wire can be used. However, the factory supplied Molex connectors will have to be attached at either end for proper installation.



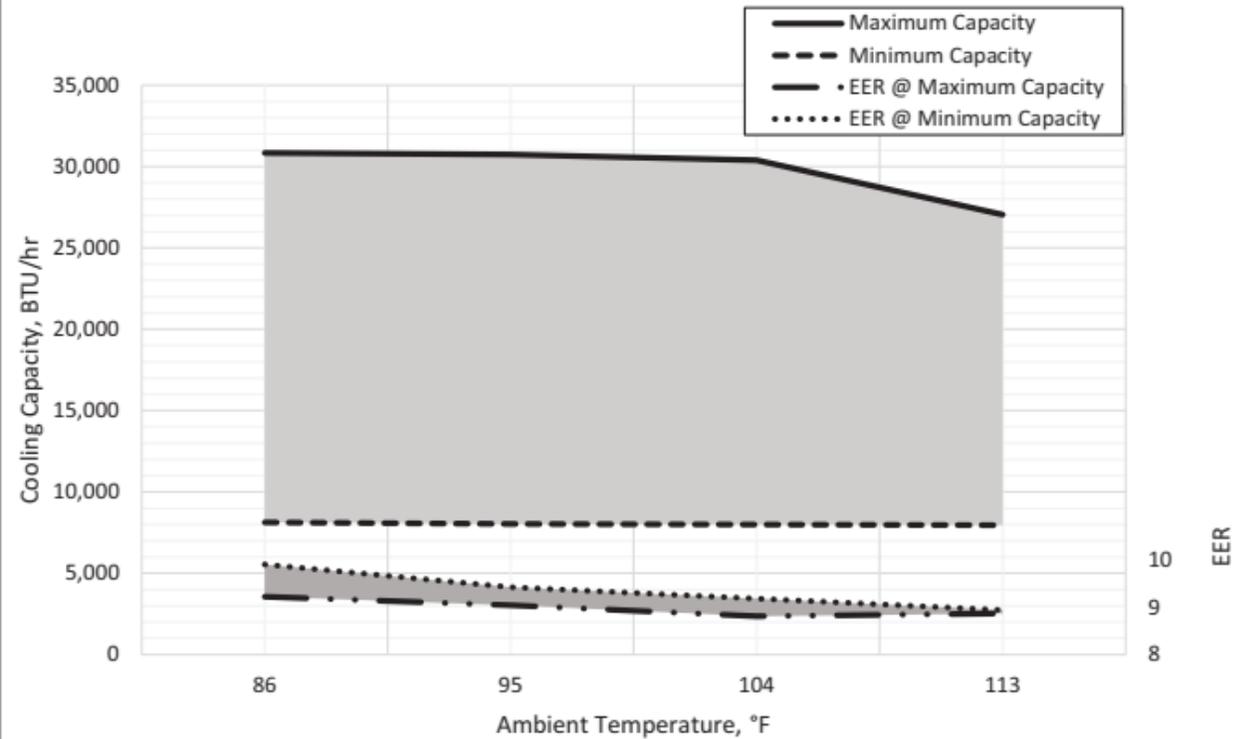
		Units	SIM-036	SIM-060
Cooling	Capacity Range	BTU/hr	12,704 - 34,423	17,884 - 59,523
	Efficiency Range	EER	11.26 - 11.74	10.75 - 11.26
	Efficiency	IPLV	12.2	12.1
	Water Temperature Setpoint	°F		46-68
	Ambient Temp Range	°F		5-110
Heating	Capacity Range	BTU/hr	13,191 - 38,755	25,413 - 70,666
	Efficiency Range	COP	4.04 - 5.01	3.69 - 4.67
	Water Temperature Setpoint	°F		86-130
	Ambient Temp Range	°F		5-109
CEC Data	Cooling Capacity/Efficiency*	BTU/hr/COP	34,120/10	49,490/8.8
	Heating Capacity/Efficiency**	BTU/hr/COP	39,240/3	56,315/3
	Heating Capacity/Efficiency***	BTU/hr/COP	21,236/1.9	48,260/1.9
Electrical	Power	V/Ph/Hz		230/1/60
Refrigerant	Type			R410A
Fan	Type			EC
Sound (@3meters)	Maximum	dBa	54	58
	Rated Flow	GPM	7	13
Hydronic	Max Water Temp	°F		131
	Piping Connections	inch	1	1 1/4
	Rated Pressure Drop @ Rated Flow	PSI (ft W.C.)	6/13.8	10/23
	Type			Rotary Inverter
Compressor	Speed Range	Hz		30-90
	Dimensions	Net Dimensions (L x W x H)	inch	39 x 18 x 35
Shipping Dimensions (L x W x H)		inch	41 x 19 x 36	42 x 18 x 53
Net Weight/Shipping Weight		lbs.	243/271	326/368

SIM-036 Performance Charts (pure water)

122°F Returning Water Temperature, Heating

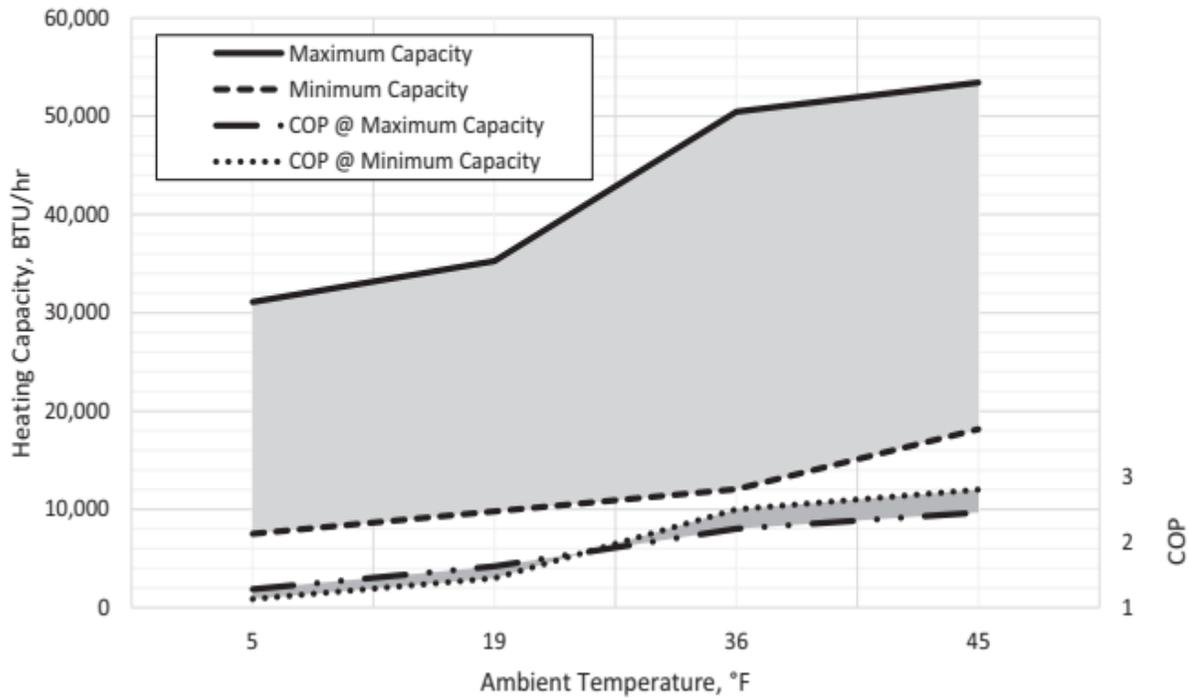


46°F Returning Water Temperature, Cooling

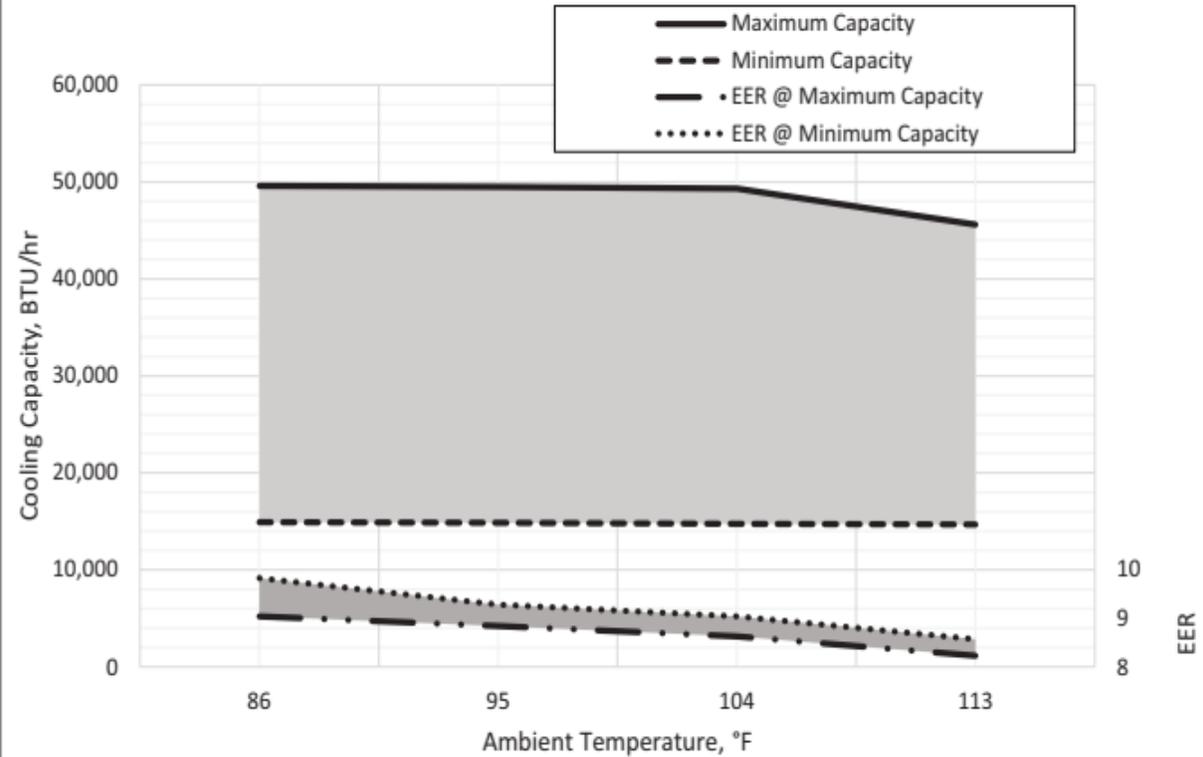


SIM-060 Performance Charts (pure water)

122°F Returning Water Temperature, Heating



46°F Returning Water Temperature, Cooling



Glycol-Water System (Monobloc)

*You must **always** use some level of Antifreeze!*

Table 1 ILAHP Glycol Concentrations (10% Minimum, 50% Maximum)

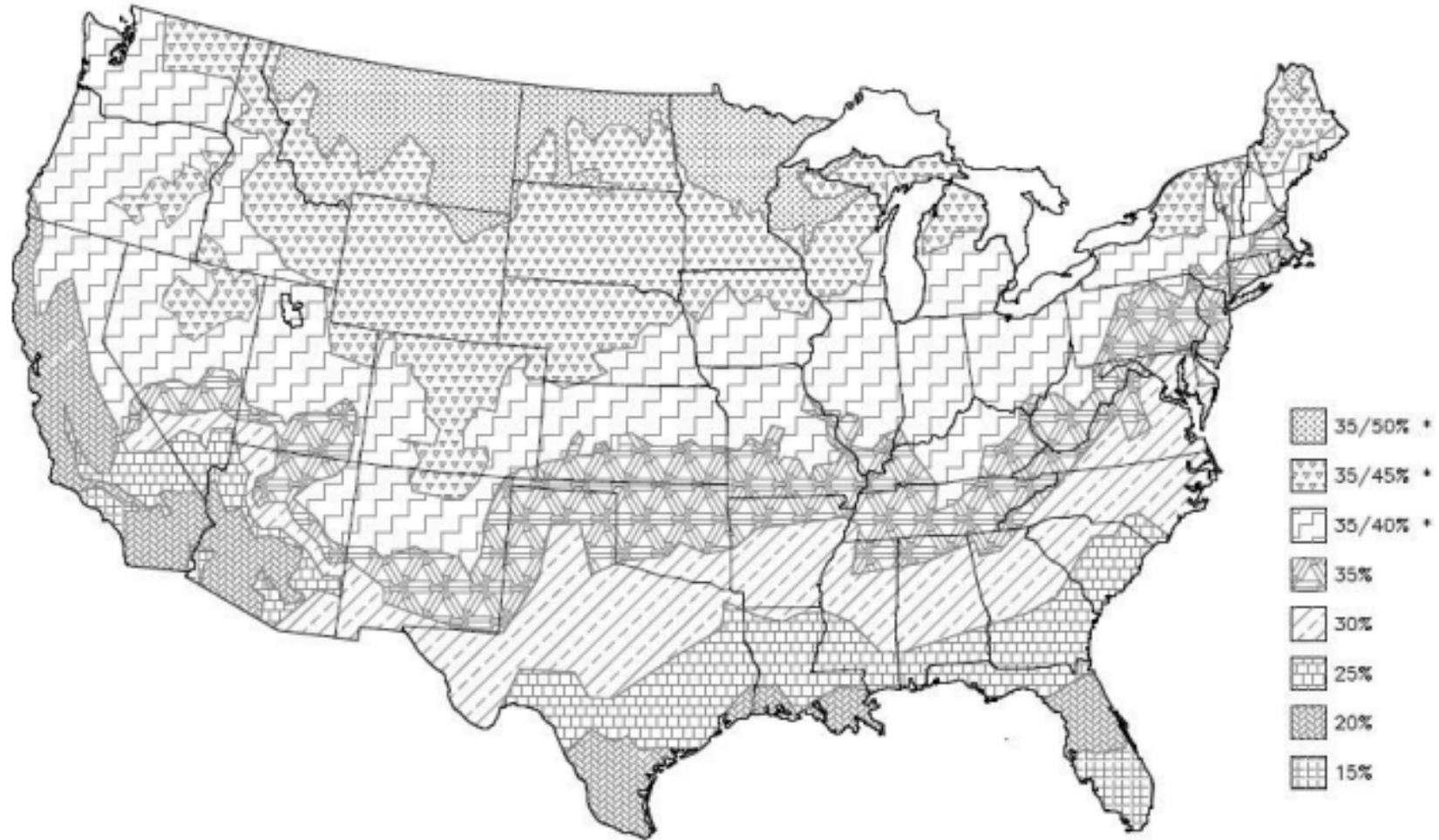
Ethylene Glycol %	10	20	30	40	50
Min. Ambient Temp for Operation	23°F/-5°C	14°F/-10°C	2°F/-17°C	-13°F/-25°C	-36°F/-38°C
SpacePak Capacity Multiplier	0.98	0.96	0.93	0.91	0.89
Pressure Drop Multiplier (Cooling)	1.06	1.12	1.16	1.25	1.36
Pressure Drop Multiplier (Heating)	1.06	1.12	1.16	1.22	1.28
Minimum Expansion Volume / System Volume					
Heating and Cooling (Gallons)	1 gallon expansion per 15 gallons system volume				
Heating only, HP only (Gallons)	1 gallon expansion per 20 gallons system volume				
Heating Only, with Boiler (Gallons)	1 gallon expansion per 15 gallons system volume				
Propylene Glycol %	10	20	30	40	50
Min. Ambient Temp for Operation	26°F/-3°C	18°F/-8°C	8°F/-13°C	-7°F/-22°C	-29°F/-34°C
SpacePak Capacity Multiplier	0.99	0.98	0.96	0.93	0.88
Pressure Drop Multiplier (Cooling)	1.10	1.20	1.34	1.5	1.65
Pressure Drop Multiplier (Heating)	1.10	1.20	1.34	1.46	1.5
Minimum Expansion Volume / System Volume					
Heating and Cooling	1 gallon expansion per 15 gallons system volume				
Heating only, HP only	1 gallon expansion per 20 gallons system volume				
Heating only, with Boiler	1 gallon expansion per 15 gallons system volume				

Non use of propylene glycol will void warranty.

This information is provided as a general guideline only, and is not intended to cover all possible conditions. It is ultimately the responsibility of the installer to ensure that proper freeze protection is provided.

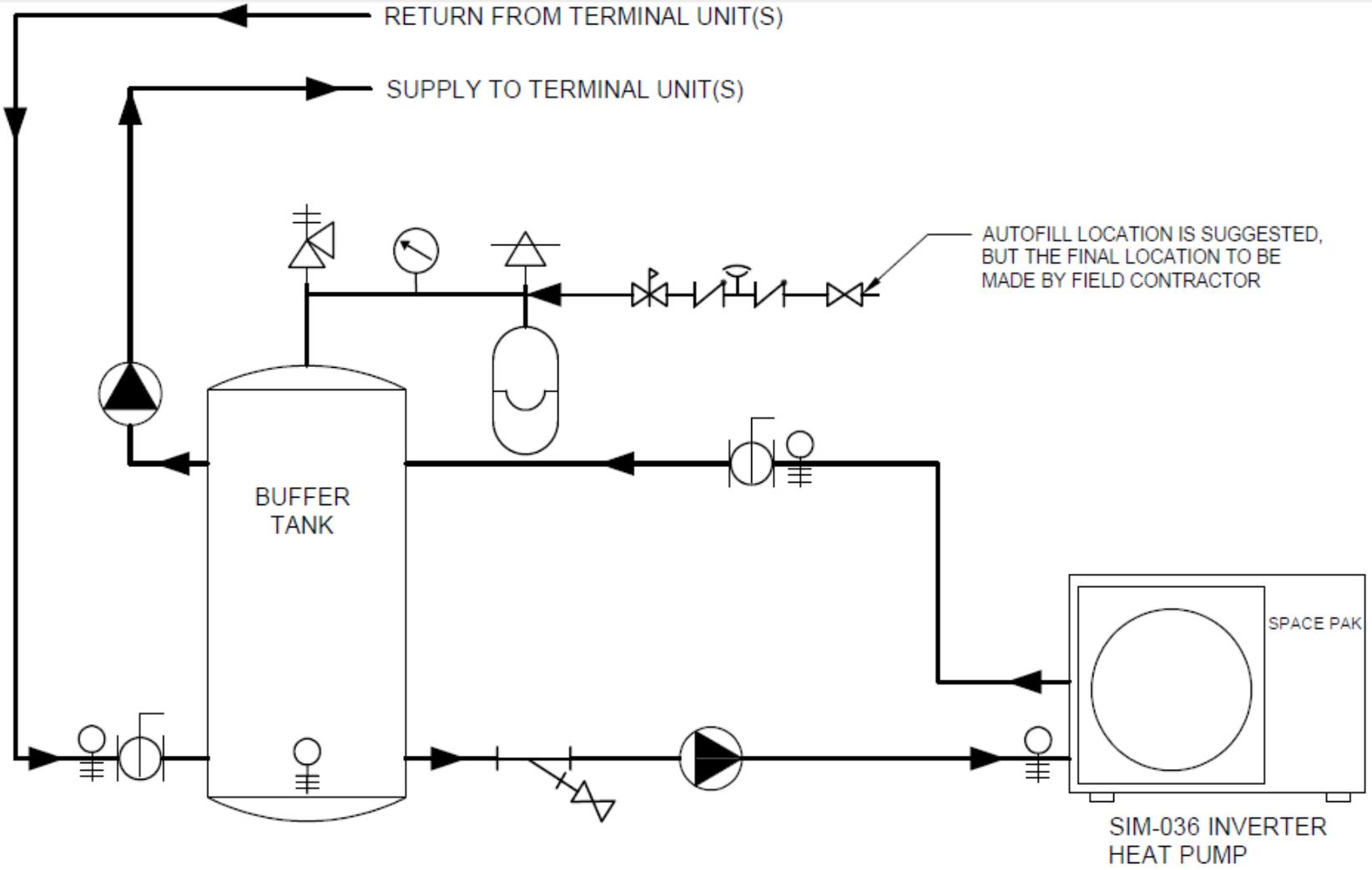
Antifreeze % Per Geographic Region

*You must **always** use some level of Antifreeze!*



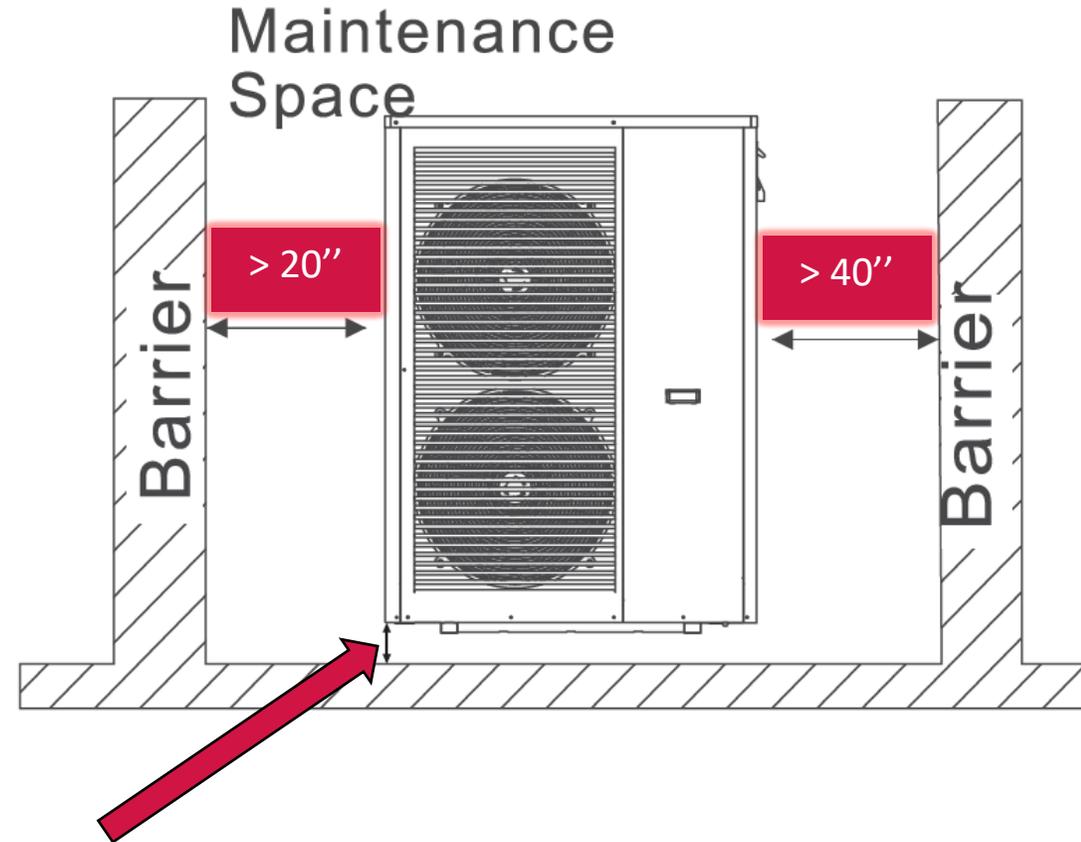
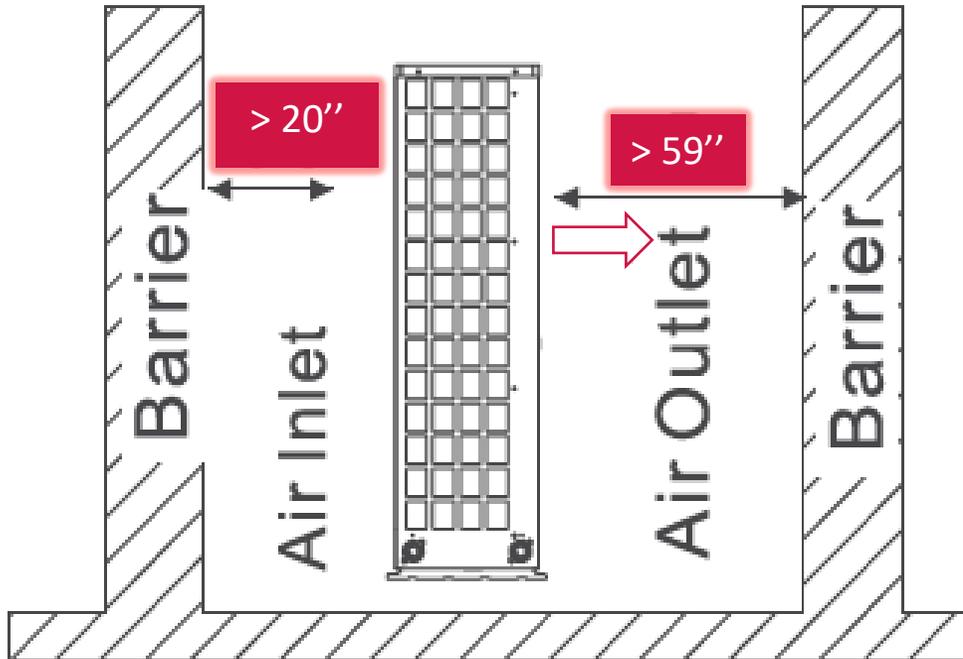
Basic Piping

SIM036 AND SIM060

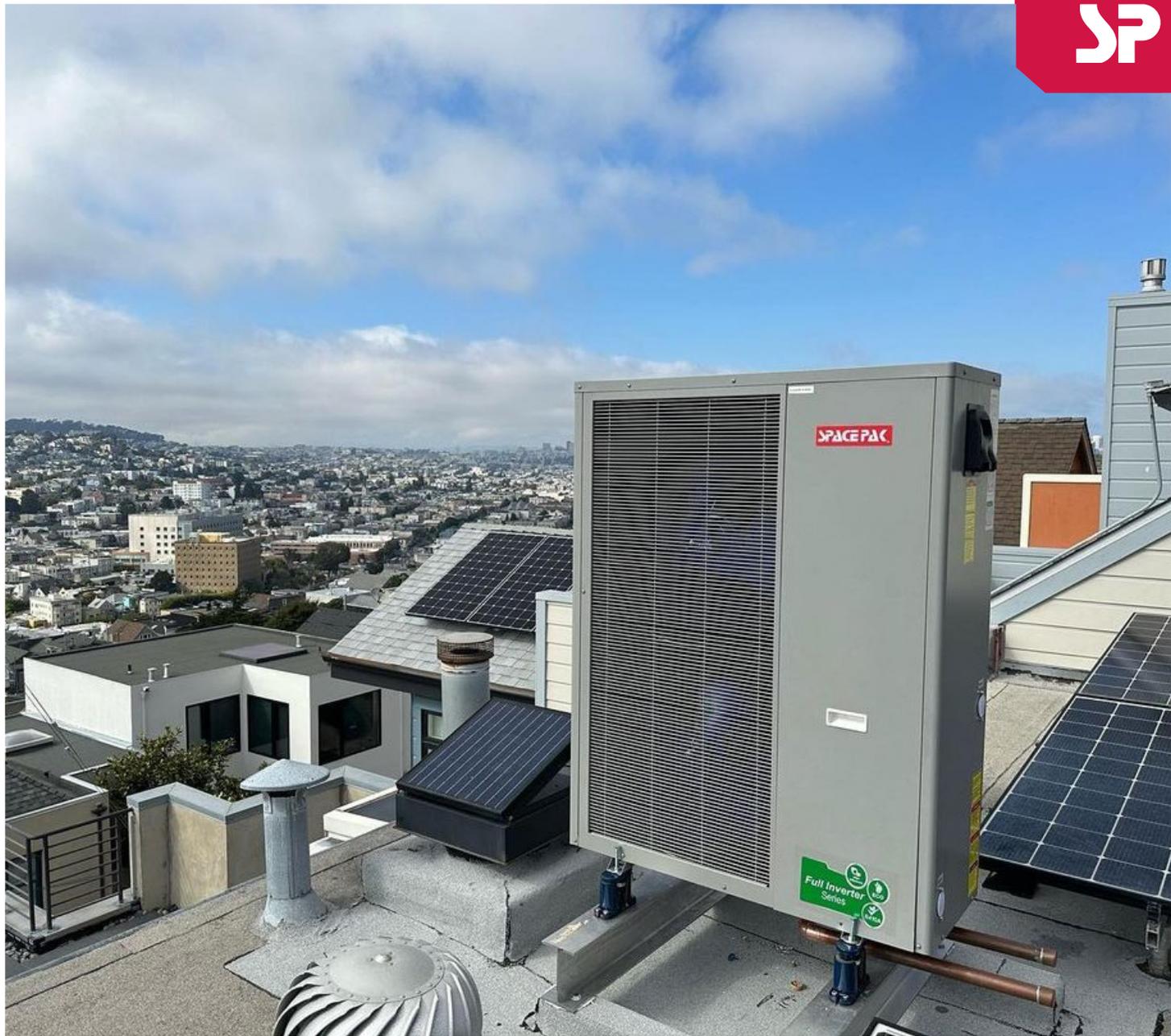


- CIRCULATOR
- DRAIN VALVE
- BALL VALVE
- STRAINER
- EXPANSION TANK
- AUTOMATIC AIR VENT
- VALVE
- PRESSURE RELIEF VALVE
- PRESSURE GAGE
- BACKFLOW-PREVENTION DEVICE
- PRESSURE REDUCING VALVE

Outdoor Clearances



Note 1: The base of the unit should be located above winter snow level to allow proper drainage of condensate. The condensate should be provided a path to drain before refreezing in an area that could create an obstruction or hazardous conditions such as on a walkway.







Primary Cooling Applications



LOW AMBIENT COOLING: Mestek Server Room Chiller Upgrade After 10 Years



Westfield, MA



LOW AMBIENT COOLING: Chiller for Western New England University Quantum Computer Lab



Springfield, MA





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Questions?

Solstice Inverter Extreme (ILAHP)

COLD CLIMATE

AIR TO WATER HEAT PUMP

- Available in 4-ton Model
- Heating, cooling, domestic hot water
- Eco-friendly monobloc design
- 42-130°F Output Water Temperature Range
- Reliable Toshiba EVI Inverter Compressor
- Inverter Driven Fans & Fan Motors
- Controls on Supply Water Temperature
- Freeze Protection
- Low Amp Draw
- Ultra Quiet Operation
- Zero Ozone Depletion R410A



ILAHP48



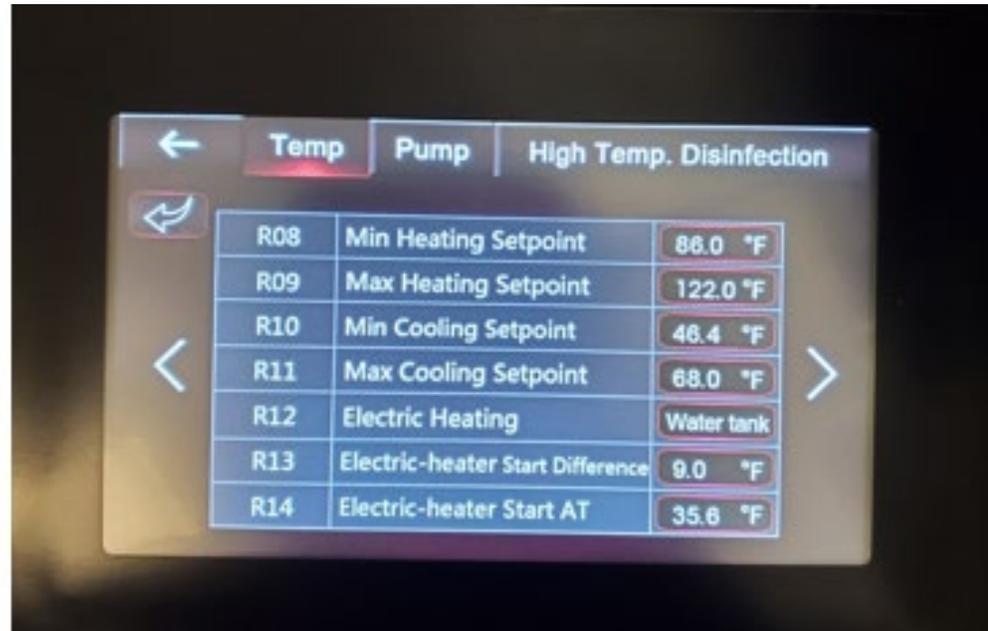
ILAHP

Monobloc Touch Screen Control

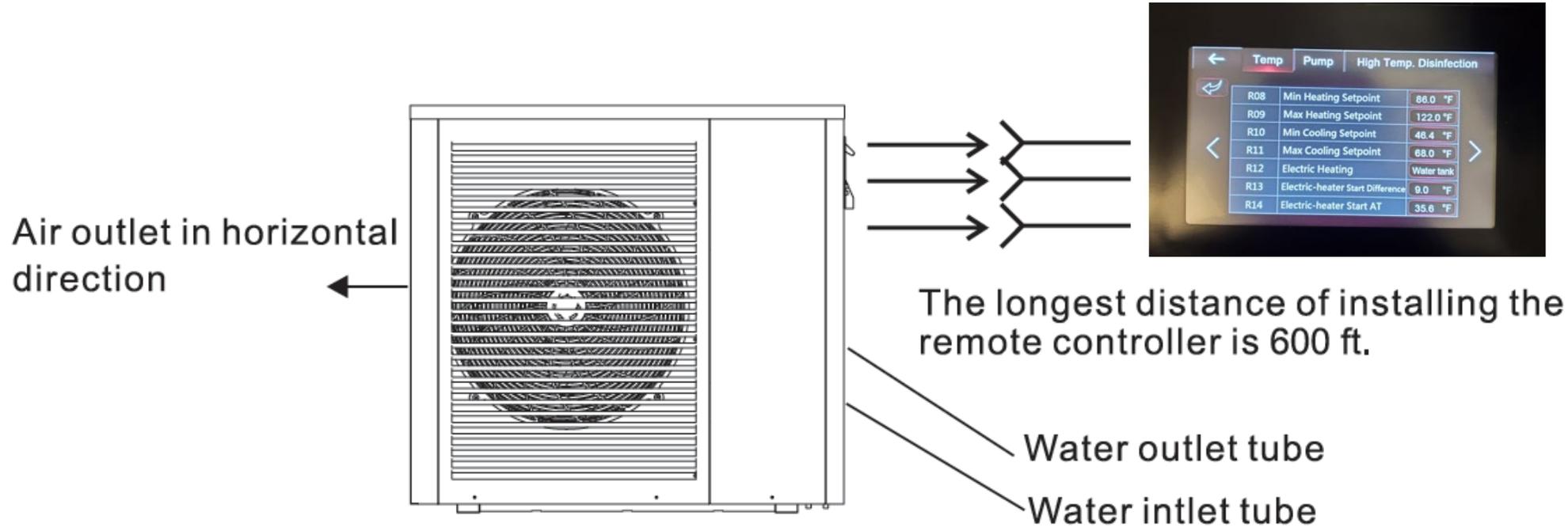
SIM036, SIM060, ILAHP48

Advanced Intelligent Internal Control Platform

- User-friendly color touch screen
- Intelligent defrost
- Outdoor air reset
- Modbus compatible
- 24ga shielded 5 wire - can be remote mounted up to 600ft



Monobloc Touch Screen Display Wiring Layout



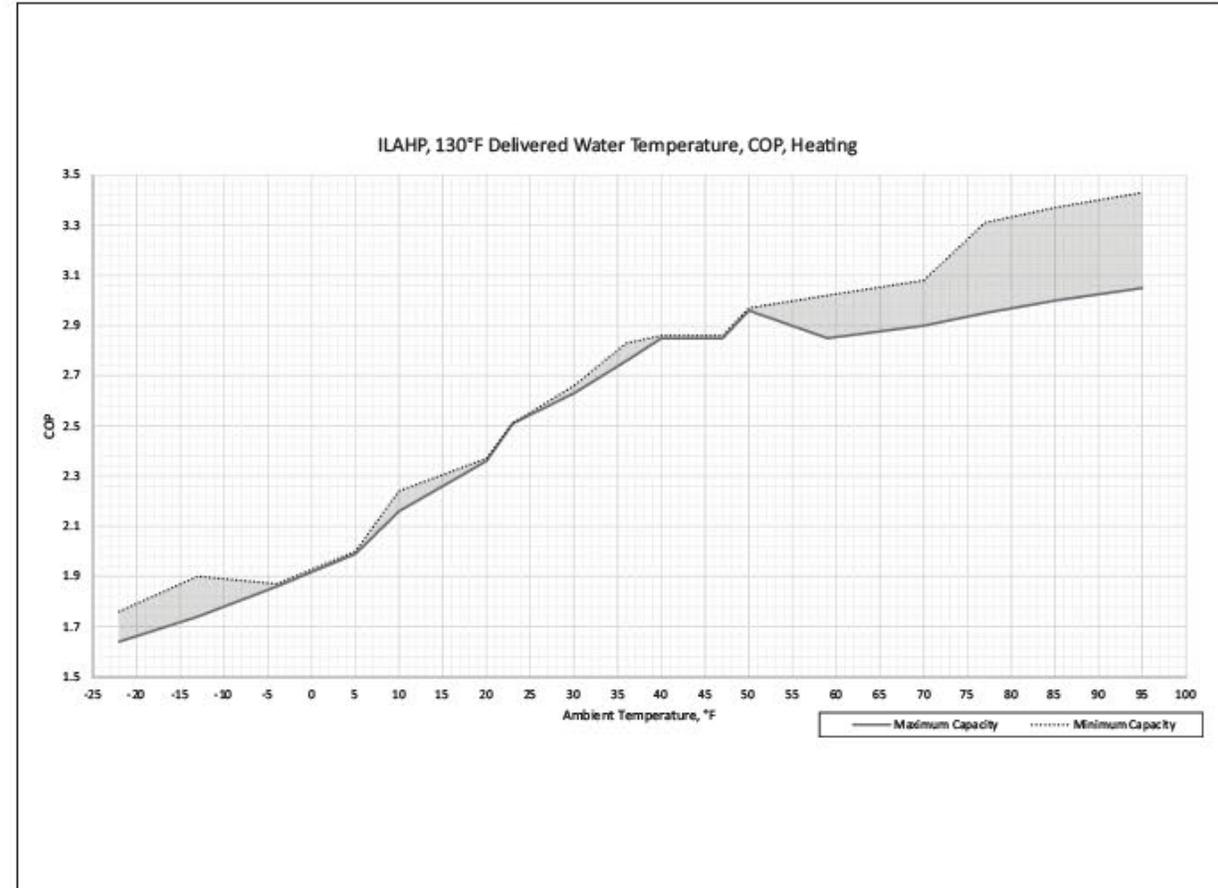
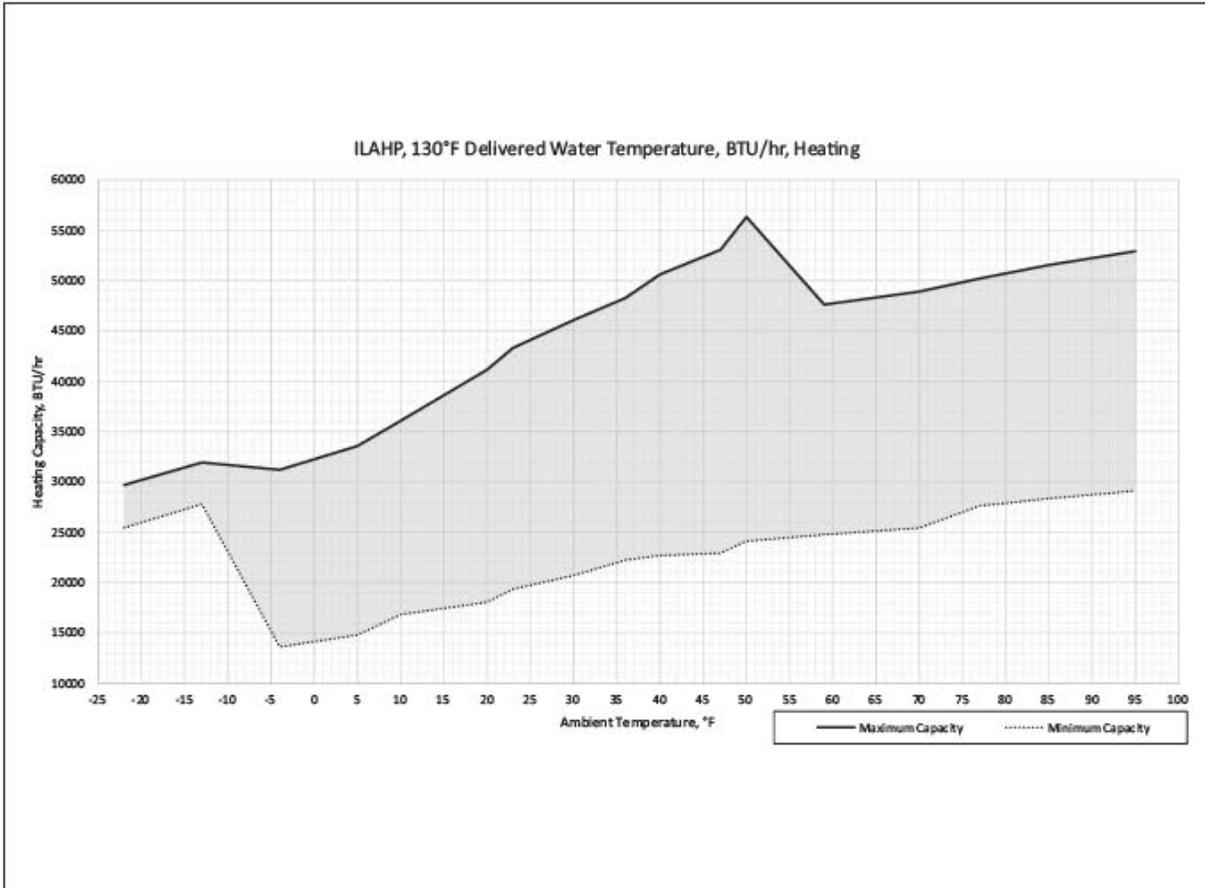
NOTE: A 65-foot 5 conductor shielded wire is supplied with the unit. In cases of longer runs, field supplied shielded wire can be used. However, the factory supplied Molex connectors will have to be attached at either end for proper installation.



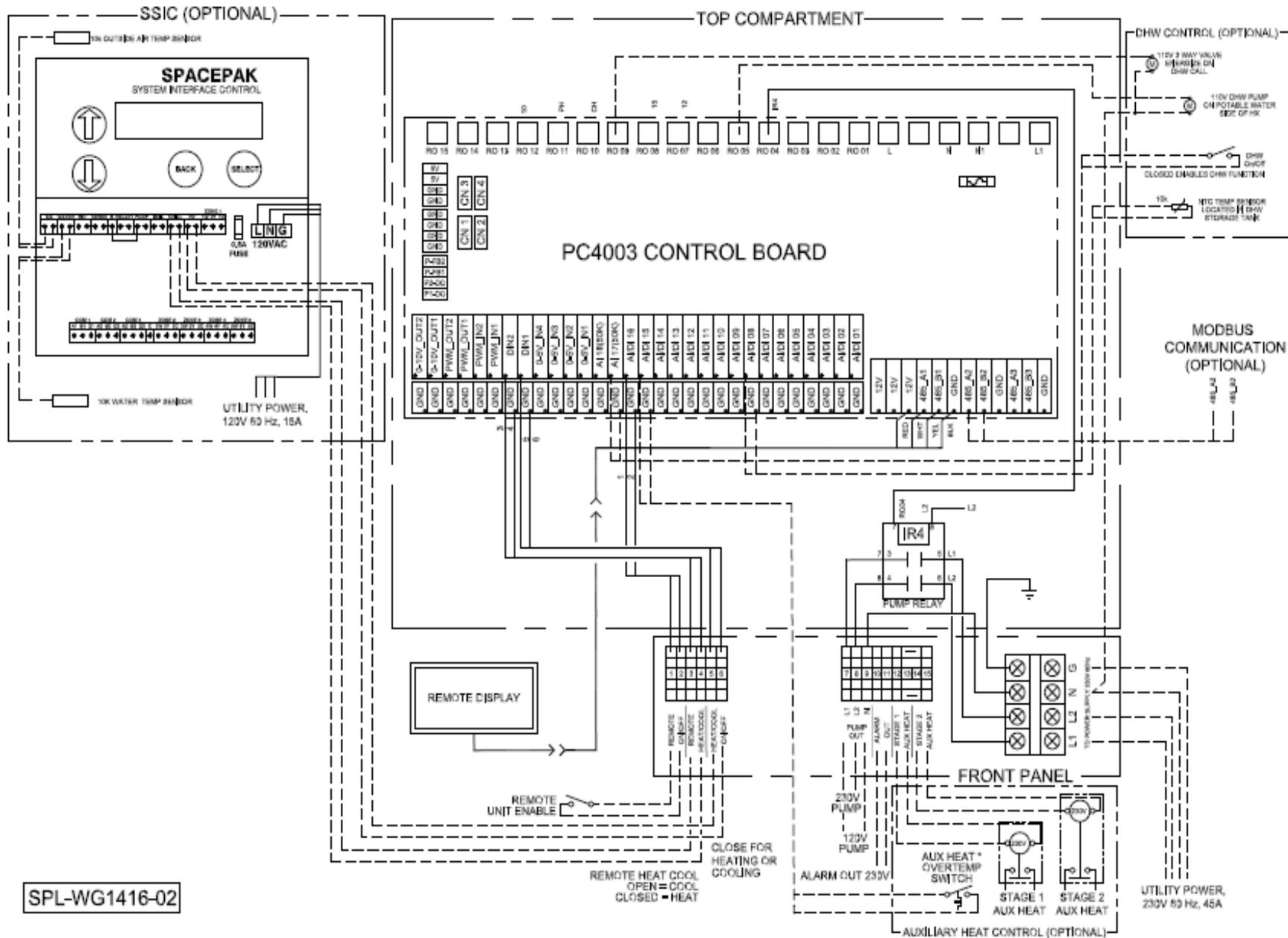
		Units	ILAHP
Cooling	Capacity Range	BTU/hr	24,226-63,466
	Efficiency Range	EER	7.26-10.41
	Efficiency	IPLV	18.4
	Delivered Water Temp Range	°F	42-77
	Ambient Temp Range	°F	5-109
Heating	Capacity Range	BTU/hr	15,354-63,807
	Efficiency Range	COP	1.64-5.41
	Delivered Water Temp Range	°F	59-130
	Ambient Temp Range	°F	-22 - 109
CEC Data	Cooling Capacity/Efficiency*	BTU/hr/COP	45,424/8.59
	Heating Capacity/Efficiency**	BTU/hr/COP	53,214/2.78
	Heating Capacity/Efficiency***	BTU/hr/COP	36,903/1.82
Electrical	Power	V/Ph/Hz	230/1/60
Refrigerant	Type		R410a
Fan	Type		EC
Sound	Range	dBa	47-57
Hydronic	Rated Flow	GPM	12
	Max Water Temp	°F	130
	Piping Connections	inch	1-1/4 NPT
	Rated Pressure Drop @ Rated Flow	PSI (ft W.C.)	12.8 (29.5)
Compressor	Type		Rotary Inverter, EVI
	Speed Range	Hz	30-90
Dimensions	Net Dimensions (L x W x H)	inch	39 x 16 x 52
	Shipping Dimensions (L x W x H)	inch	42 x 17 x 53
	Net Weight/Shipping Weight	lbs.	349/388



Heating Performance @ 130°F Deliver Water



Basic Wiring

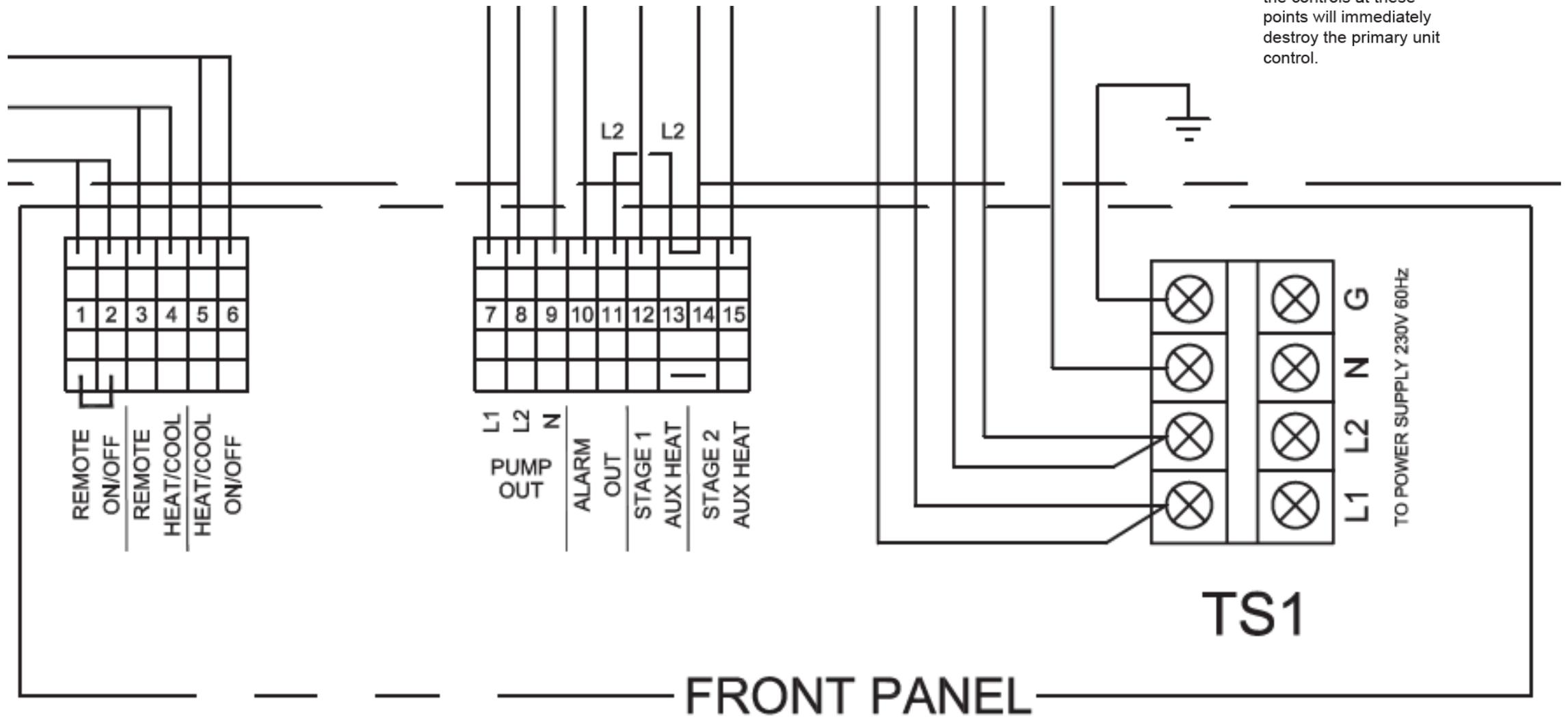


SPL-WG1416-02



Basic Wiring

CAUTION The remote On/Off, Remote Heat/Cool, Heat/Cool On/Off, and DHW Enable inputs are for voltage-free relay contacts only. Any voltage introduced to the controls at these points will immediately destroy the primary unit control.



Glycol Protection!

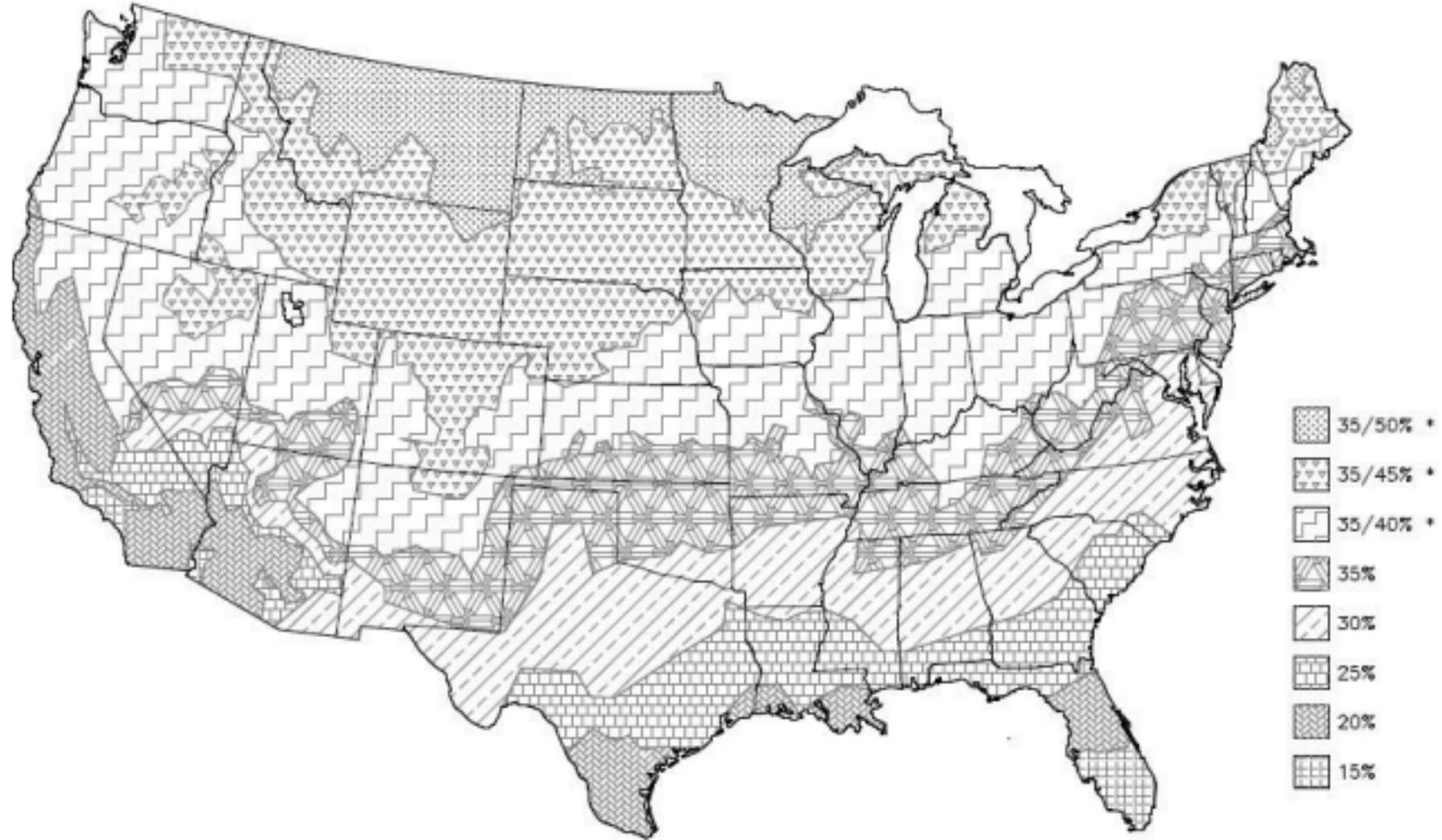
Table 1 ILAHP Glycol Concentrations (10% Minimum, 50% Maximum)

Ethylene Glycol %	10	20	30	40	50
Min. Ambient Temp for Operation	23°F/-5°C	14°F/-10°C	2°F/-17°C	-13°F/-25°C	-36°F/-38°C
SpacePak Capacity Multiplier	0.98	0.96	0.93	0.91	0.89
Pressure Drop Multiplier (Cooling)	1.06	1.12	1.16	1.25	1.36
Pressure Drop Multiplier (Heating)	1.06	1.12	1.16	1.22	1.28
Minimum Expansion Volume / System Volume					
Heating and Cooling (Gallons)	1 gallon expansion per 15 gallons system volume				
Heating only, HP only (Gallons)	1 gallon expansion per 20 gallons system volume				
Heating Only, with Boiler (Gallons)	1 gallon expansion per 15 gallons system volume				
Propylene Glycol %	10	20	30	40	50
Min. Ambient Temp for Operation	26°F/-3°C	18°F/-8°C	8°F/-13°C	-7°F/-22°C	-29°F/-34°C
SpacePak Capacity Multiplier	0.99	0.98	0.96	0.93	0.88
Pressure Drop Multiplier (Cooling)	1.10	1.20	1.34	1.5	1.65
Pressure Drop Multiplier (Heating)	1.10	1.20	1.34	1.46	1.5
Minimum Expansion Volume / System Volume					
Heating and Cooling	1 gallon expansion per 15 gallons system volume				
Heating only, HP only	1 gallon expansion per 20 gallons system volume				
Heating only, with Boiler	1 gallon expansion per 15 gallons system volume				

Non use of propylene glycol will void warranty.

This information is provided as a general guideline only, and is not intended to cover all possible conditions. It is ultimately the responsibility of the installer to ensure that proper freeze protection is provided.

Antifreeze % Per Geographic Region



ILAHP Installations



Northern Cali



Cambridge, MA



Upstate NY,
Shipping Container Home



Hudson, NY
Radiant Heating Net Zero Venue



Basillica Hudson



—
Questions?

Solstice Inverter Split (SIS)

COLD CLIMATE

AIR TO WATER HEAT PUMP

- Available in 5-ton Model
- Heating & cooling
- Split Design Provides the Flexibility to Reduce the Use of Glycol in the Hydronic Loop
- SIS System Includes both Indoor and Outdoor Units, Refrigerant Line Set (35'), and Control Wire (50')
- Simple Indoor Piping Similar to Wall Hung Boilers
- 42-130°F Output Water Temperature Range
- Reliable Panasonic EVI Inverter Compressor
- Inverter Driven Fans & Fan Motors
- Controls on Supply Water Temperature
- Freeze Protection
- Low Amp Draw



SIS-060

Indoor Unit

Outdoor Unit



		Units	Outdoor	Indoor
Cooling	Capacity Range	BTU/hr	21,484-74,489	
	Efficiency Range	EER	7.12-18.05	
	Efficiency	IPLV	17.14	
	Delivered Water Temp Range	°F	41-68	
	Ambient Temp Range	°F	5-109	
Heating	Capacity Range	BTU/hr	10,412-76,023	
	Efficiency Range	COP	1.19-3.92	
	Delivered Water Temp Range	°F	60-140	
	Ambient Temp Range	°F	-22-90	
CEC Data	Cooling Capacity/Efficiency*	BTU/hr/COP	39,714/8.14	
	Heating Capacity/Efficiency**	BTU/hr/COP	55,499/2.9	
	Heating Capacity/Efficiency***	BTU/hr/COP	37,505/1.9	
Electrical	Power	V/Ph/Hz	230/1/60	
Refrigerant	Type		R410A	
Fan	Type		EC	N/A
Sound	Range	dBa	50	38
Hydronic	Rated Flow	GPM	12	
	Max Water Temp	°F	130	
	Piping Connections	inch	N/A	1"
	Rated Pressure Drop @ Rated Flow	PSI (ft W.C.)	N/A	10.7/24.7
Compressor	Type		Rotary Inverter, EVI	
	Speed Range	Hz	30-90	
Dimensions	Net Dimensions (L x W x H)	inch	35x15x55	
	Shipping Dimensions (L x W x H)	inch	37x17x55	
	Net Weight/Shipping Weight	lbs.	293/337	

Glycol Considerations (Split System)

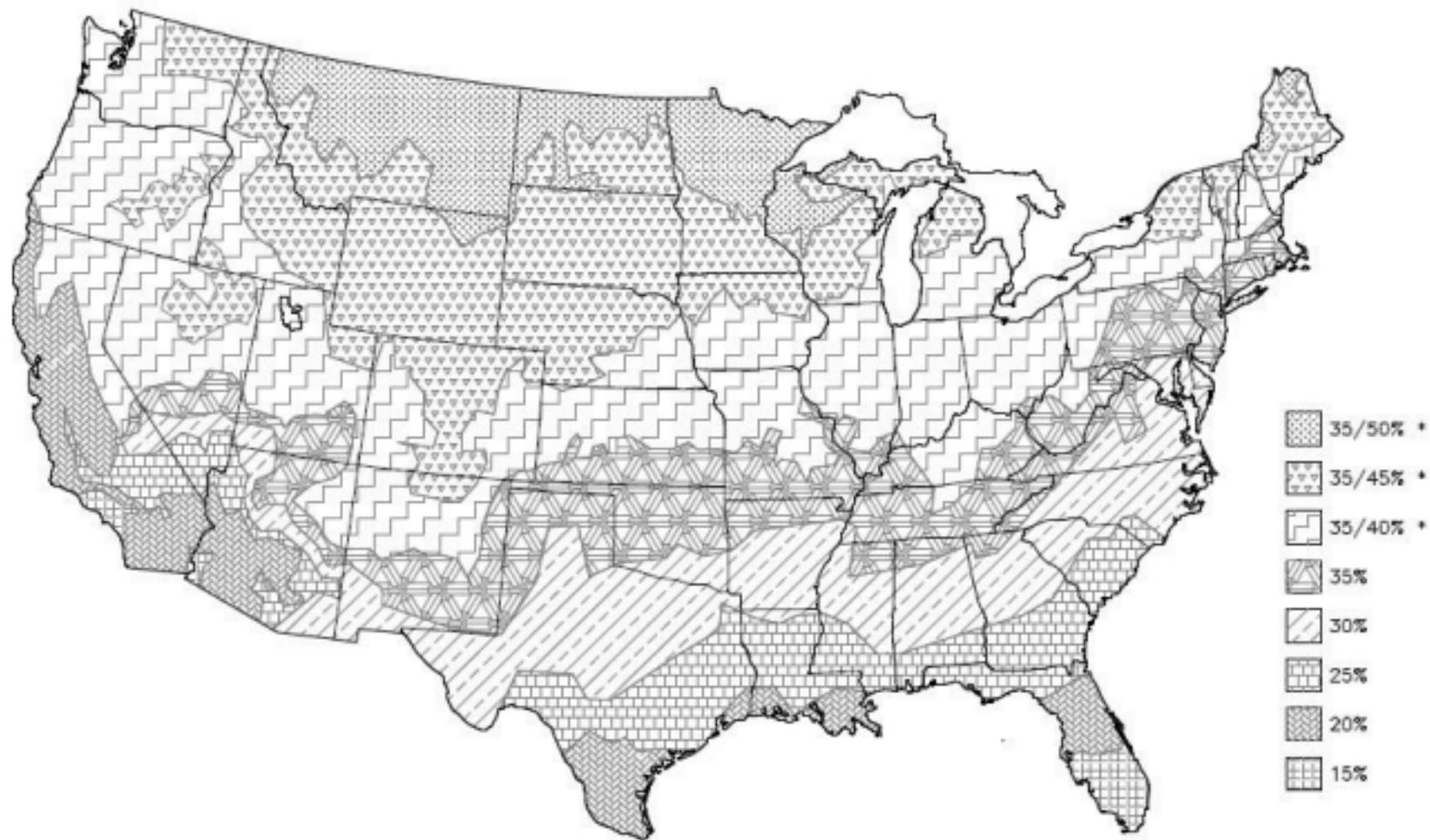
Table 1 SIS Glycol Concentrations (10% Minimum, 35% Maximum)

Propylene Glycol (concentration by volume)	10%	20%	25%	30%	35%
Min. temp of burst protection	22°F/-5.6°C	11°F/-11.7°C	-1°F/-18.3°C	-18°F/-27.8°C	-46°F/-43.3°C
Capacity Multiplier	0.99	0.98	0.97	0.96	0.94
Pressure Drop Multiplier (Cooling)	1.1	1.2	1.27	1.34	1.42
Pressure Drop Multiplier (Heating)	1.1	1.2	1.27	1.34	1.4
Minimum Expansion Volume/System Volume					
Heating and Cooling	1 gallon expansion per 15 gallons system volume				
Heating only, HP Only	1 gallon expansion per 20 gallons system volume				
Heating Only, with Boiler	1 gallon expansion per 15 gallons system volume				

Non use of propylene glycol will void warranty.

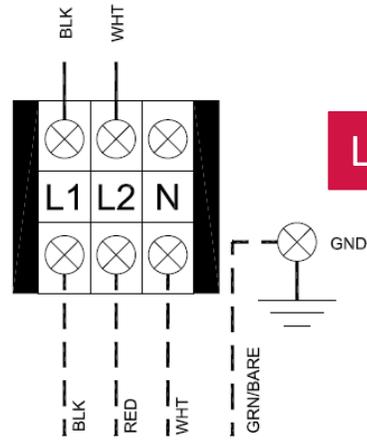
This information is provided as a general guideline only, and is not intended to cover all possible conditions. It is ultimately the responsibility of the installer to ensure that proper freeze protection is provided.

Antifreeze % Per Geographic Region



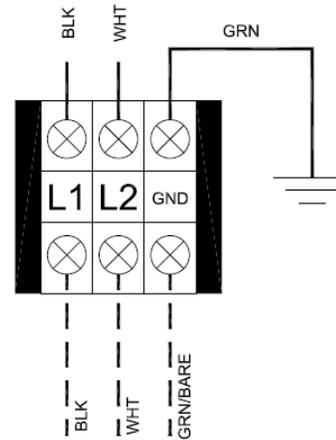
Basic Wiring

INDOOR MODULE



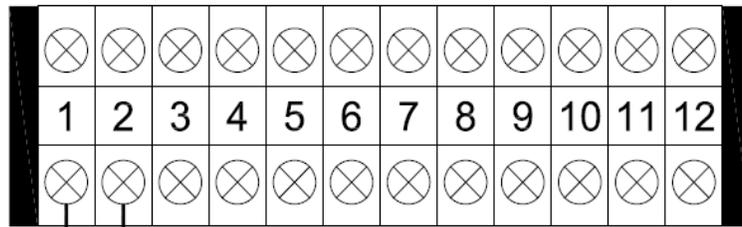
MIN CIRCUIT AMPACITY 15A
MAX FUSE/BREAKER 15A

OUTDOOR MODULE



MIN CIRCUIT AMPACITY 40A
MAX FUSE/BREAKER 50A

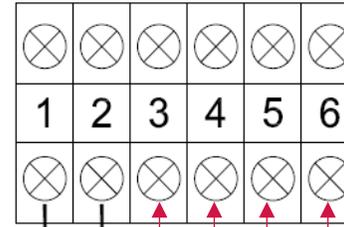
INDOOR MODULE



BLK
485A
RED
485B

Communication wiring (provided)

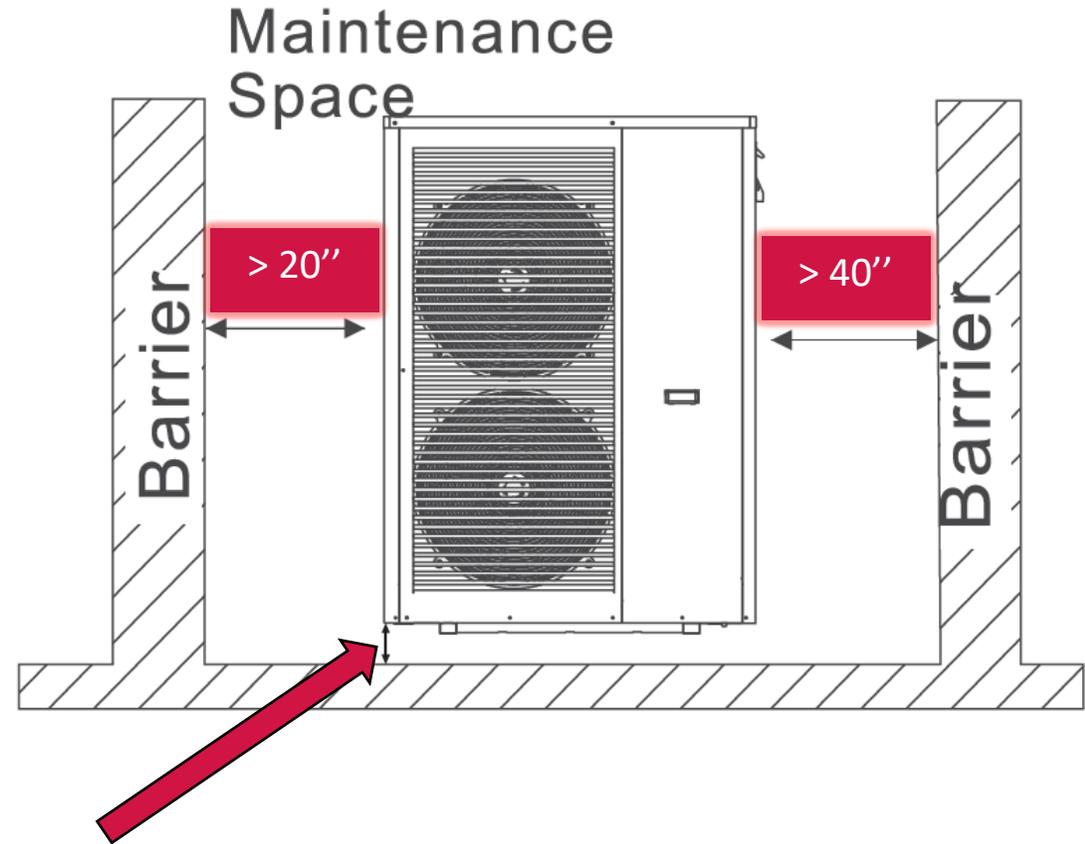
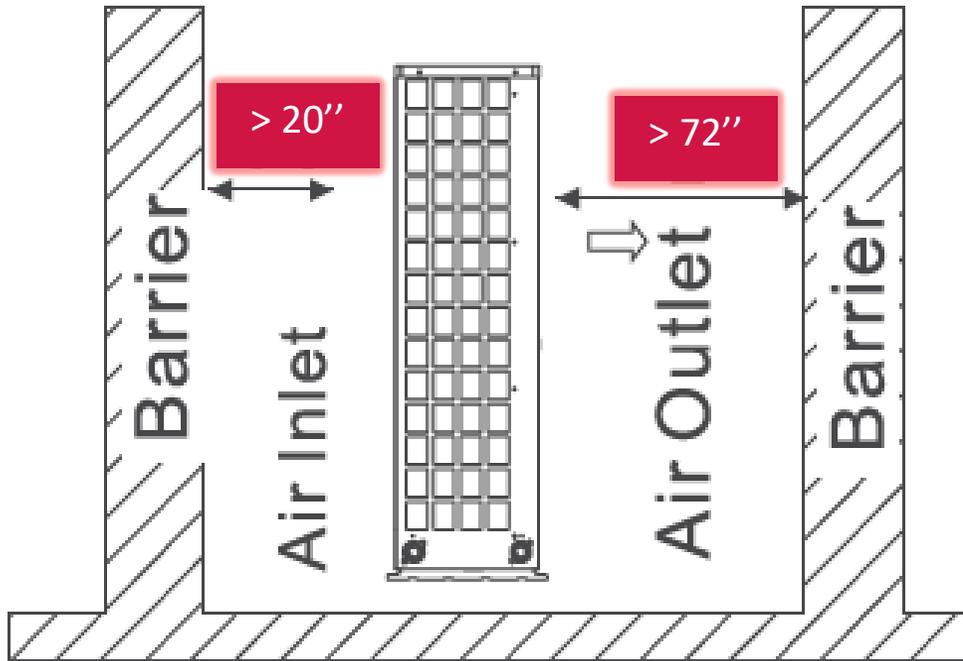
OUTDOOR MODULE



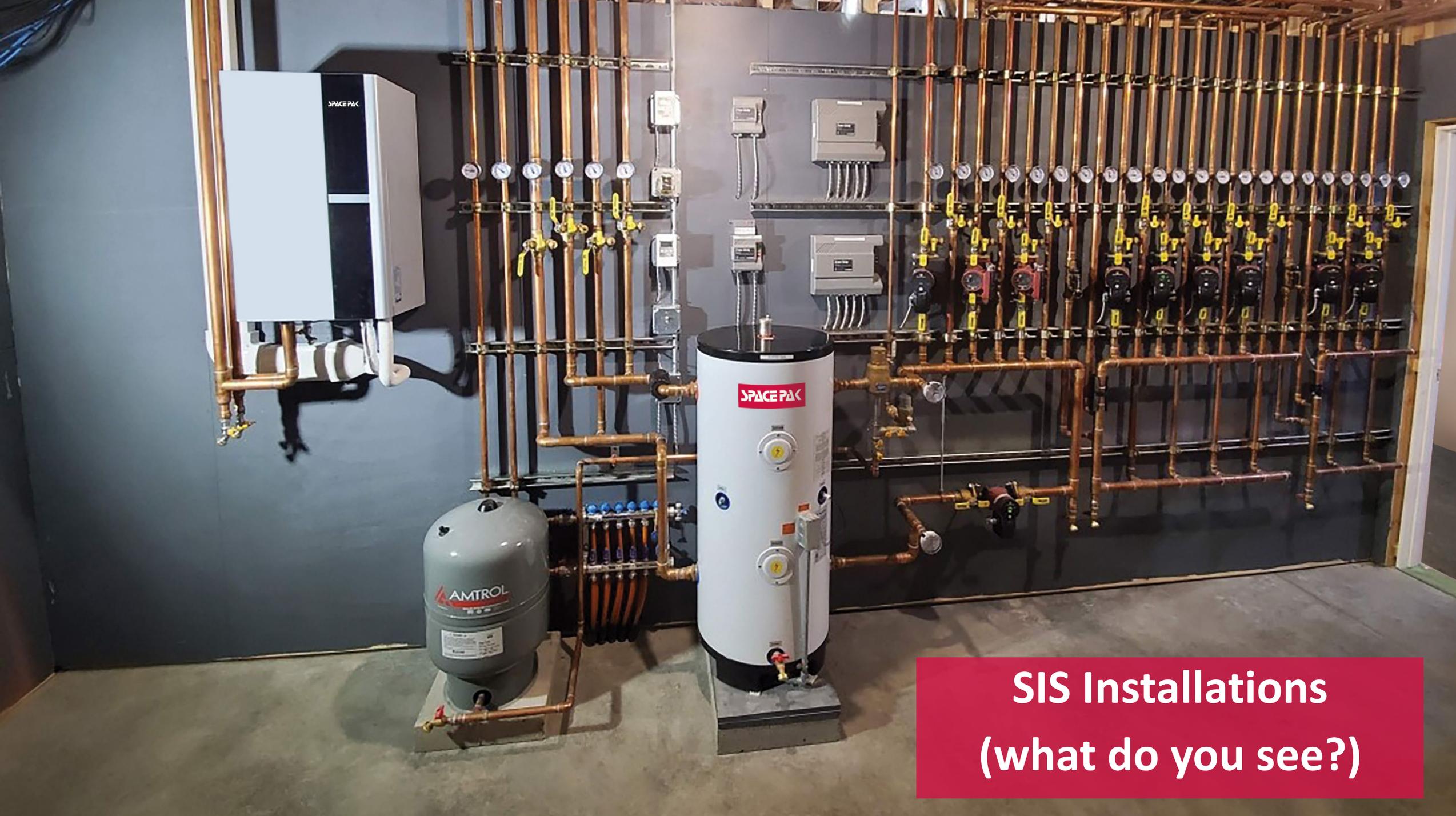
BLK
485A
RED
485B

On Heat
Off Cool

Outdoor Clearances



Note 1: The base of the unit should be located above winter snow level to allow proper drainage of condensate. The condensate should be provided a path to drain before refreezing in an area that could create an obstruction or hazardous conditions such as on a walkway.



**SIS Installations
(what do you see?)**

SIS Installation at 10k ft Elevation in Colorado



Elevation Derate

Elevation above Sea Level

Feet	Meters
0	0
500	152
1000	305
2000	610
3000	914
4000	1219
5000	1524
6000	1829
7000	2134
8000	2438
9000	2743
10000	3048
11000	3353
12000	3658
13000	3962
14000	4267

Effect on Cooling

Capacity	EER or COP
1.00	1.00
1.00	0.99
0.99	0.98
0.98	0.95
0.97	0.93
0.96	0.90
0.95	0.88
0.95	0.86
0.94	0.84
0.93	0.82
0.92	0.80
0.91	0.78
0.90	0.76
0.89	0.74
0.89	0.72
0.88	0.70

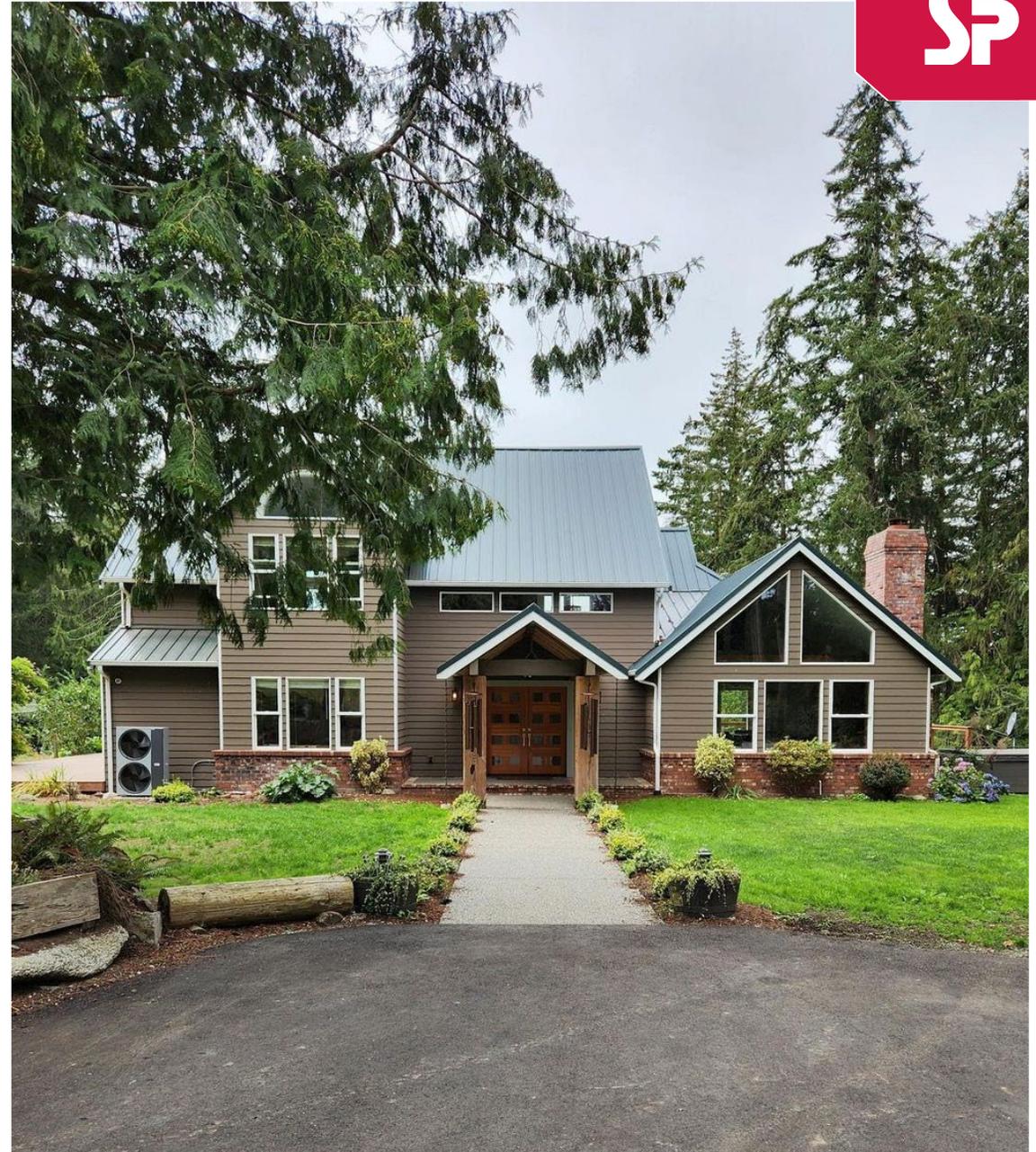
Effect on Heating

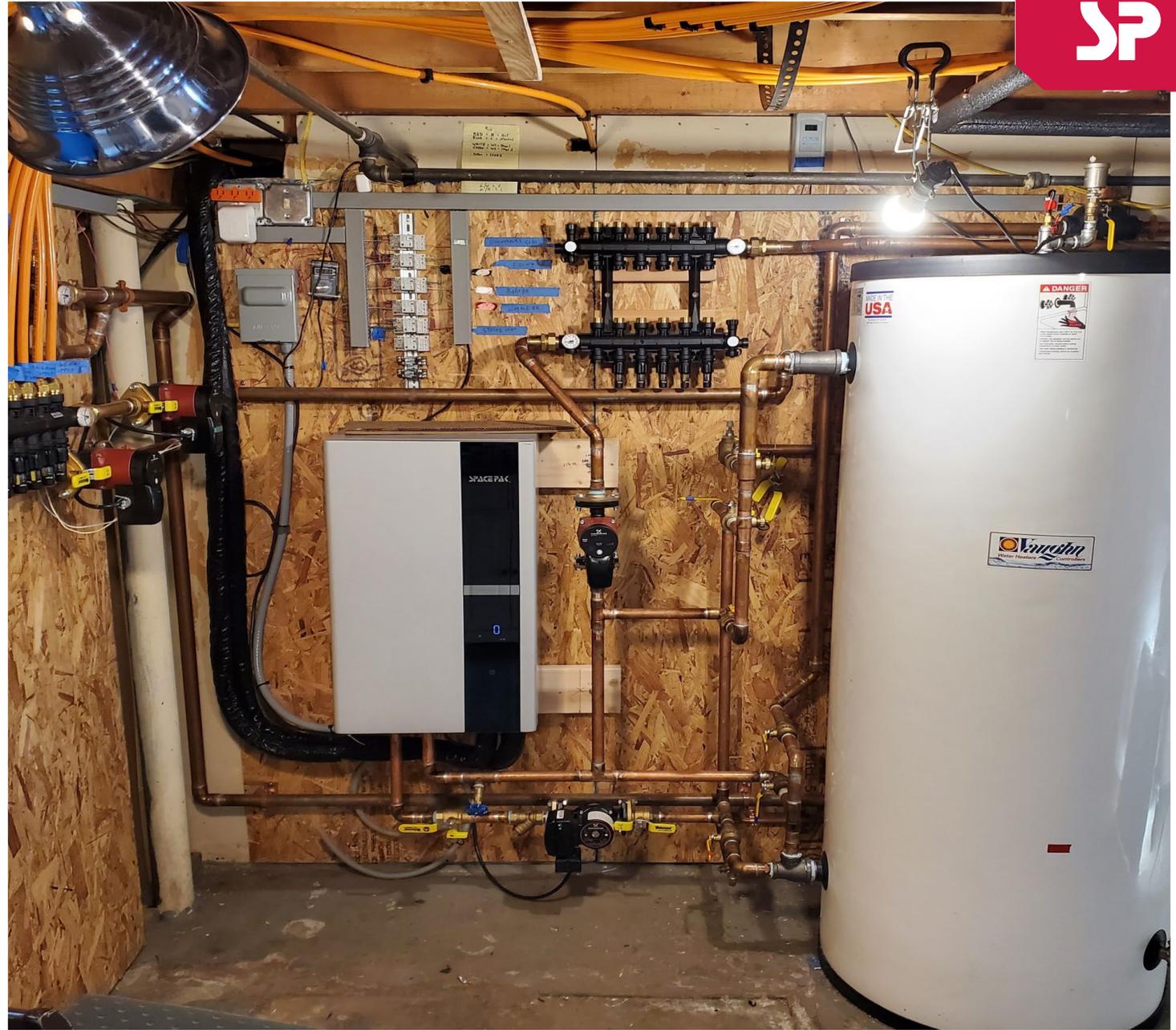
Capacity	EER or COP
1.00	1.00
0.99	1.00
0.98	0.99
0.96	0.98
0.94	0.97
0.91	0.96
0.89	0.95
0.87	0.95
0.86	0.94
0.84	0.93
0.82	0.92
0.80	0.91
0.78	0.90
0.77	0.89
0.75	0.89
0.73	0.88

Killington, VT



Washington State





Commercial Air to Water Heat Pump

Cold Climate Air to Water Heat Pump

- Available in 18-ton Model
- Heating & cooling
- Eco-friendly monobloc design
- 42-140°F Output Water Temperature Range
- Reliable Hitachi EVI Inverter Compressor
- Inverter Driven Fans & Fan Motors
- BMS compatible
- Independent refrigerant circuits





		Units	HP0275
Cooling	Capacity Range	BTU/hr	74,003-353,225
	Efficiency Range	EER	7.88-18.68
	Efficiency	IPLV	17.1
	Delivered Water Temp Range	°F	41-86
	Ambient Temp Range	°F	5-131
Heating	Capacity Range	BTU/hr	52,543-541,382
	Efficiency Range	COP	1.46-7.64
	Delivered Water Temp Range	°F	59-140
	Ambient Temp Range	°F	-22-109.4
CEC Data	Cooling Capacity*/Efficiency	BTU/hr/EER	226,586/8.95
	Heating Capacity**/Efficiency	BTU/hr/COP	274,965/2.43
	Heating Capacity***/Efficiency	BTU/hr/COP	187,254/1.82
Electrical	Power	V/Ph/Hz	460/3/60
Refrigerant	Type		R410A
Fan	Power Input	W	550
	Type		DC
Sound (@3meters)	Range	dBa	54-67
Hydronic	Rated Flow	GPM	52.83
	Max Water Temp	°F	140
	Piping Connections	inch	2.5
	Rated Pressure Drop	PSI (ft W.C.)	10.15 (23.3)
Compressor	Type		INVERTER SCROLL, EVI
	Speed Range	Hz	30-120
Dimensions	Net Dimensions (L x W x H)	inch	85.4×45.3×83.9
	Shipping Dimensions (L x W x H)	inch	86.6×52.2×88.2
	Net Weight/Shipping Weight	lbs.	1,616/1,709

Commercial Cold Climate ATWHP

Ultra Low Ambient Temperature

- Special design for areas with low ambient temperatures
- High-performance heating at outdoor temperatures as low as -20°F

Flexible Installation

- Maximum water outlet temperature 140°F
- Low-temperature heating / Carbon reduction during shoulder seasons

Multi-Use

- Can be widely applied in hotels, hospitals, exhibition centers etc.
- Boiler system back up



Commercial Applications

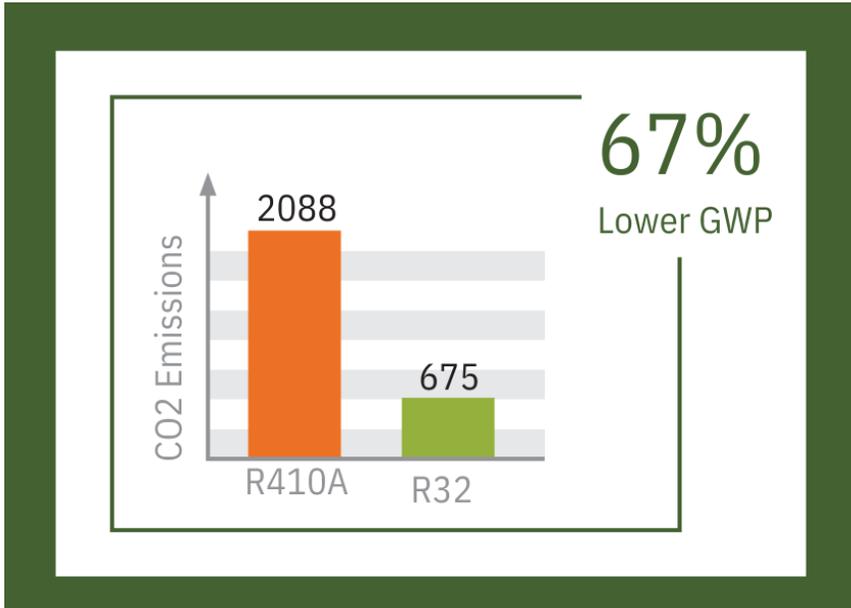
Decarbonization & Electrification Solution

Widely applicable for heating & cooling in commercial and light commercial applications

- Hotels
- Schools
- Multi-family housing complexes

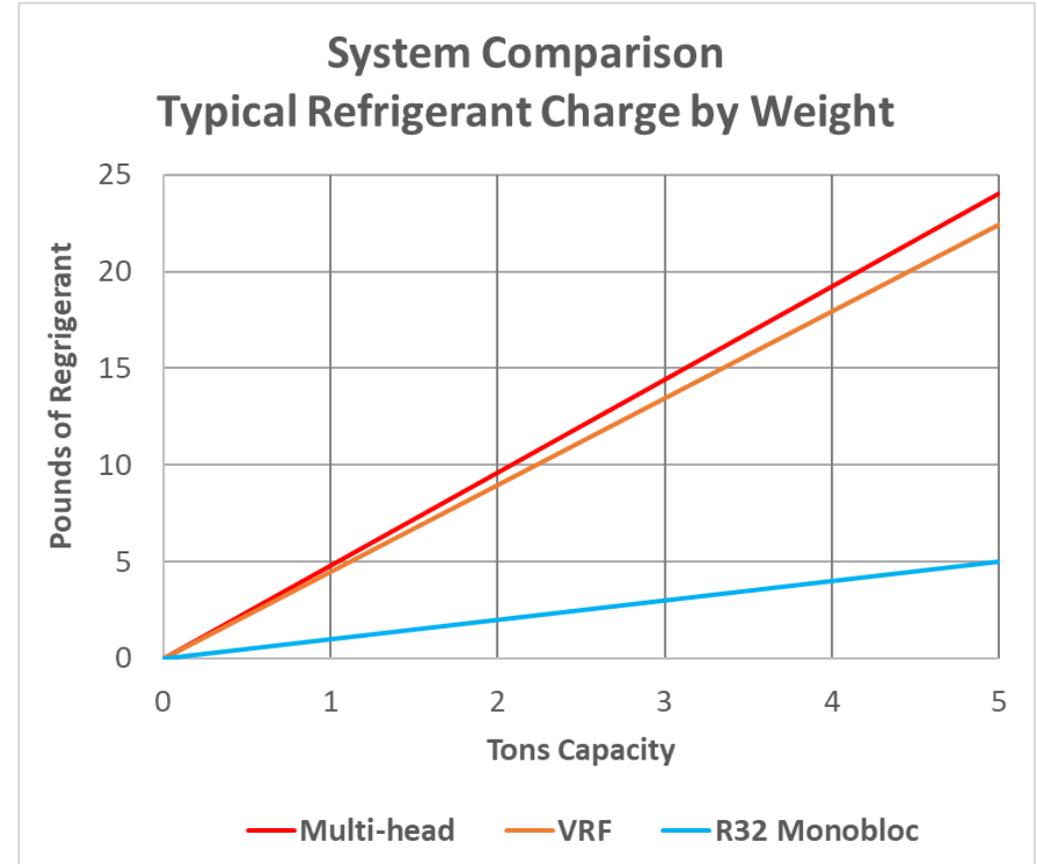


Switch to R32 Refrigerant



Meets the AIM Act Regulations

- Increased water temperatures
- Increased efficiencies
- Greater capacities in both heating and cooling modes
- Less total overall refrigerant volume



Monobloc = Future-Proof!

NEW

CC32

Solstice R32 Series (CC32)



COLD CLIMATE AIR TO WATER HEAT PUMP

- Available in 3 sizes
- Eco-friendly & future-proof monobloc design
- Heating, cooling, & domestic hot water
- High-performance heating operation down to -22°F (-30°C)
- Reliable water temperatures surpassing 140°F (54°C)
- Zero Ozone Depletion Potential (ODP = 0)
- Low Global Warming Potential (GWP = 675)
- Whisper-quiet operation! (CC32-18 = max 41dBA @ 1meter)

	CC32-18	CC32-40	CC32-60
Cooling Tons	1.5	3	4.3
Nominal BTUs/hr	22,827	41,219	70,461





		Units	CC32-18	CC32-40	CC32-60
Refrigerant	Type		R32		
	Factory Charge	lbs. (kg)	2.43 (1.1)	3.97 (1.8)	4.41 (2)
Fan	Quantity		1	1	2
	Power Input	W	150	170	75 (x2)
	Type		DC		
	Max Speed	RPM	600		
Sound (@1meters)	Maximum	dBa	41	43	46
Hydronic	Rated Flow	GPM	4.4	7.5	12.8
	Max Water Temp	°F (°C)	140 (60)		
	Piping Connections	inch (cm)	1 (2.54)		
	Rated Pressure Drop	PSI (ft W.C.)	2.9 (6.7)	4.4 (10.2)	6.5 (15)
Compressor	Type		Rotary		
	Speed Range	Hz	30-90		
	Brand		Panasonic		
	Quantity		1		
Dimensions	Net Dimensions (L x W x H)	inch (cm)	46 x 16 x 32 (117 x 41 x 80)	51 x 18 x 37 (129 x 46 x 93)	50 x 22 x 53 (125 x 54 x 133)
	Shipping Dimensions (L x W x H)	inch (cm)	54 x 22 x 39 (138 x 56 x 100)	59 x 24 x 46 (150 x 61 x 117)	58 x 26 x 60 (148 x 67 x 153)
	Net Weight	lbs. (kg)	200 (90)	292 (132)	459 (208)
	Shipping Weight	lbs. (kg)	304 (138)	391 (178)	535 (243)



		Units	CC32-18	CC32-40	CC32-60
Cooling	Capacity Range	BTU/hr (kW)	8,400 - 22,800 (2.5 - 6.7)	15,600 - 39,600 (4.6 - 11.6)	21,600 - 57,600 (6.3 - 16.9)
	Efficiency Range	EER	8.12 - 8.67	6.82 - 8.98	7.77 - 8.99
	Efficiency	IPLV	16.81	16.75	14.46
	Delivered Water Temp Range	°F (°C)	41 - 77 (5 - 25)		
	Ambient Temp Range	°F (°C)	50 - 109 (10 - 43)		
Heating	Capacity Range	BTU/hr (kW)	3,600 - 23,000 (1.1 - 6.7)	8,000 - 42,000 (2.3 - 12.3)	12,000 - 72,000 (3.5 - 21.1)
	Efficiency Range	COP	0.95 - 8.64	0.99 - 9.09	0.98 - 9
	Delivered Water Temp Range	°F (°C)	95-140		
	Ambient Temp Range	°F (°C)	-22 -110		
CEC Data	Cooling Capacity*	BTU/hr (kW)	17,183	35,120	52,001
	Cooling Efficiency*	EER	10.43	9.9	8.85
	Heating Capacity**	BTU/hr (kW)	18,919	35,424	62,760
	Heating Efficiency**	COP	3.07	2.9	3.13
	Heating Capacity***	BTU/hr (kW)	10,189	26,222	42,700
	Heating Efficiency***	COP	1.52	2.23	2.06
Electrical	Power	V/Ph/Hz	208-230/1/60		
	Fan Motor	A	0.8		2 x 0.8
	Compressor Motor	A	12.2	21	33.5
	MCA	A	17	28	44
	MOPD	A	25	45	70
	SCCR	kA	5kA		

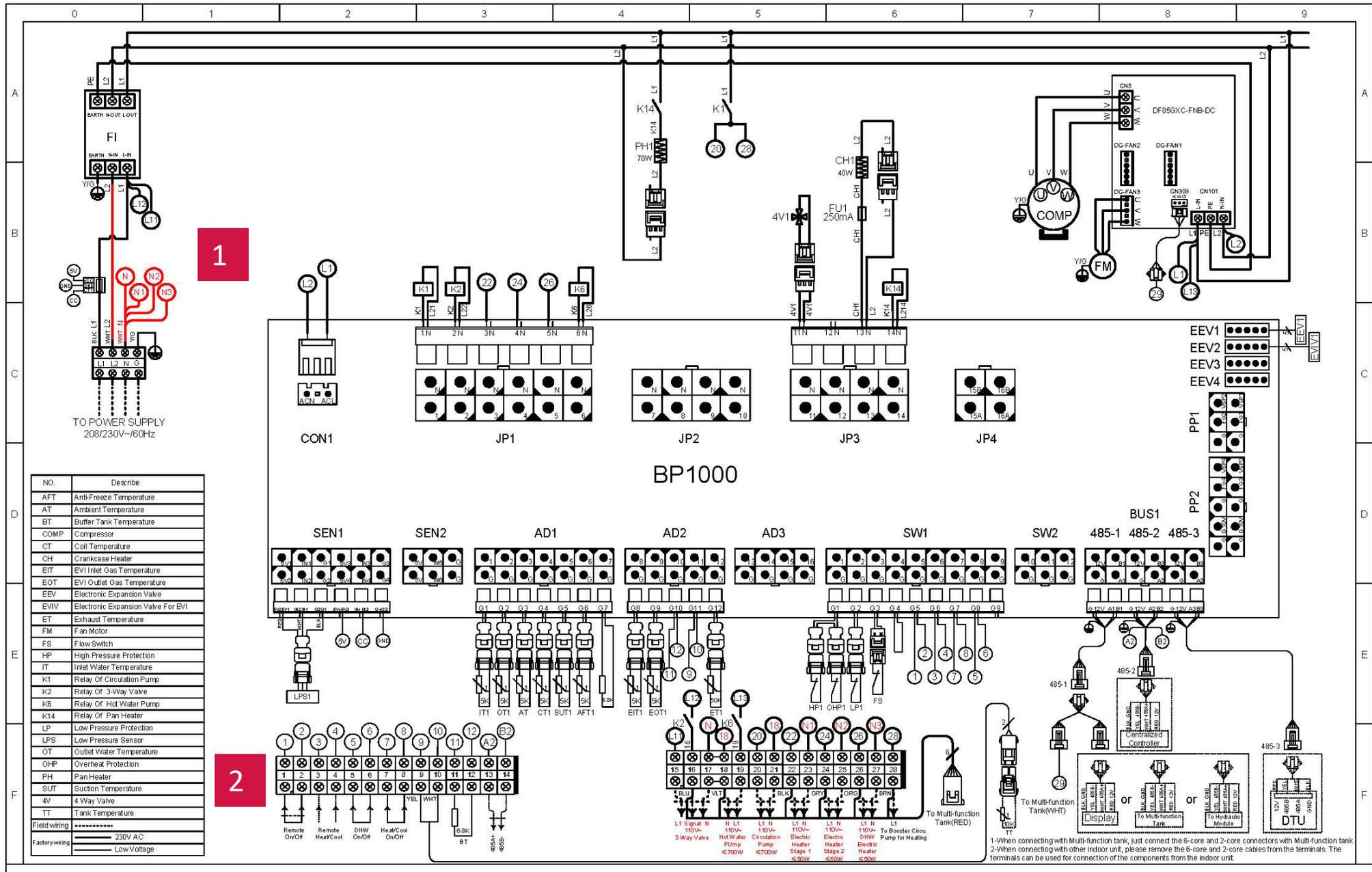
CEC is the California Energy Commission. Data is tested in accordance with AHRI 550/590

*= 44°F LWT 54°F EWT @3.75 at CC32-18/6.17 at CC32-40/11.45 at CC32-60 GPM & 95°F DB Ambient

**= 120°F LWT 107°F EWT @4.4 at CC32-18/7.5 at CC32-40/12.8 at CC32-60 GPM & 47°F DB Ambient

***=120°F LWT 110°F EWT @4.4 at CC32-18/7.5 at CC32-40/12.8 at CC32-60 GPM & 17°F DB Ambient

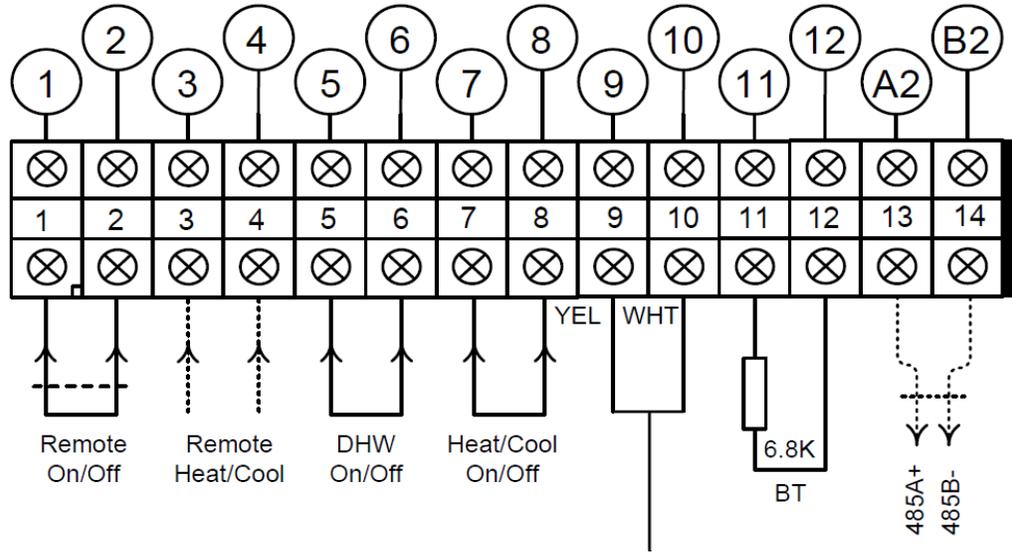
Basic Wiring



1-When connecting with Multi-function tank, just connect the 6-core and 2-core connectors with Multi-function tank.
 2-When connecting with other indoor unit, please remove the 6-core and 2-core cables from the terminals. The terminals can be used for connection of the components from the indoor unit.

Basic Wiring

2

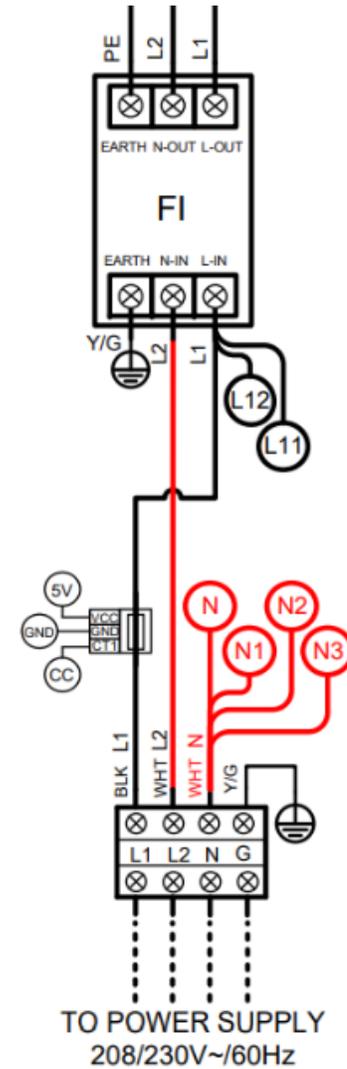


CAUTION

The remote On/Off, Remote Heat/Cool, Heat/Cool On/Off, and DHW Enable inputs are for voltage-free relay contacts only. Any voltage introduced to the controls at these points will immediately destroy the primary unit control.

No Voltage Control Wiring

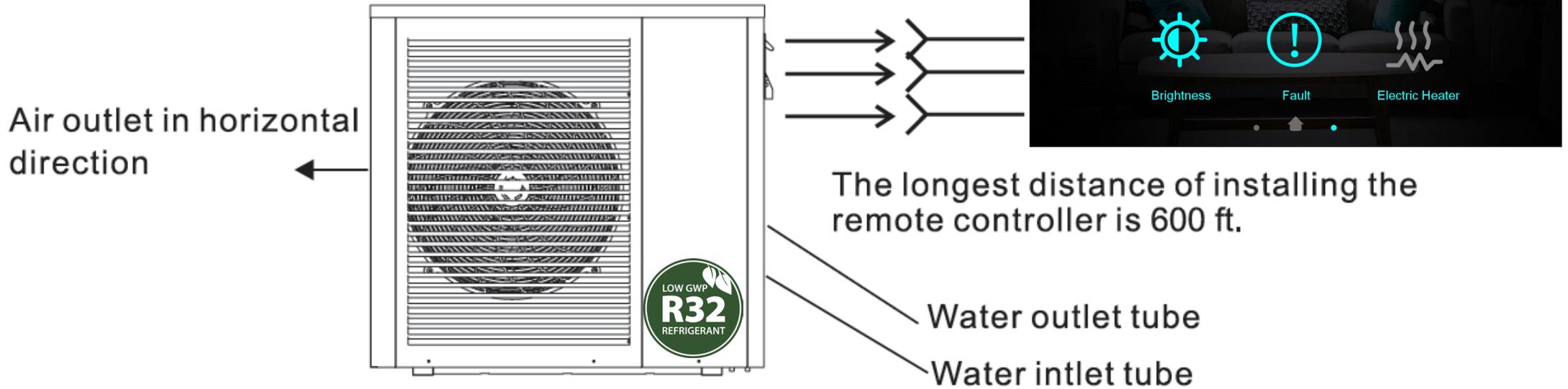
1



High Voltage Control Wiring

Note: 208volt

CC32 Monobloc Touch Screen Display Wiring Layout

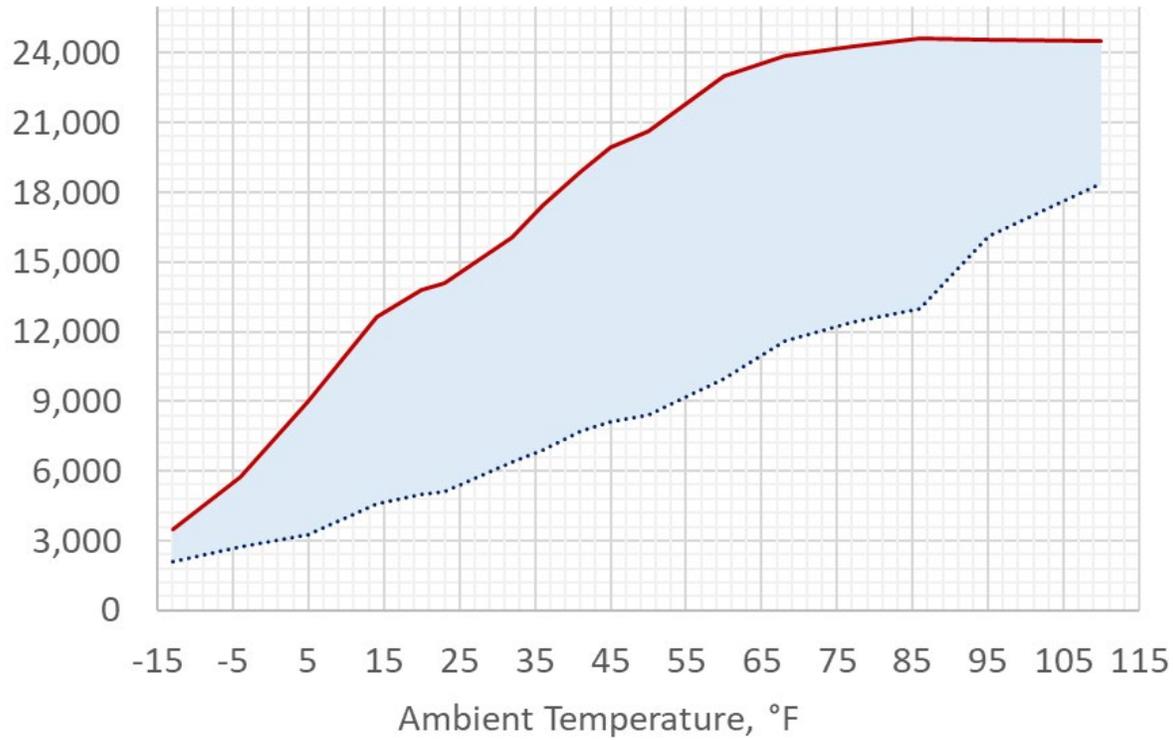


NOTE: A 65-foot 5 conductor shielded wire is supplied with the unit. In cases of longer runs, field supplied shielded wire can be used. However, the factory supplied Molex connectors will have to be attached at either end for proper installation.

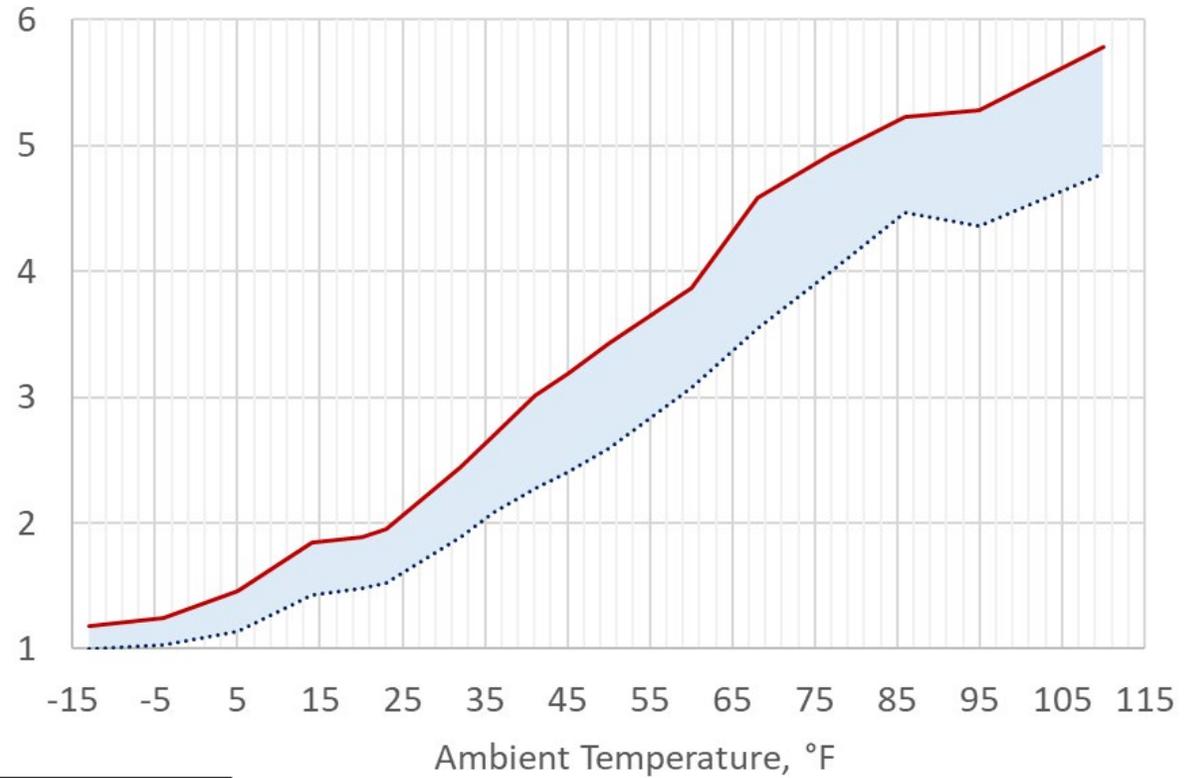


CC32-18 Heating Performance @ 120°F Water

Heating Capacity, BTU/hr



Heating Efficiency, COP



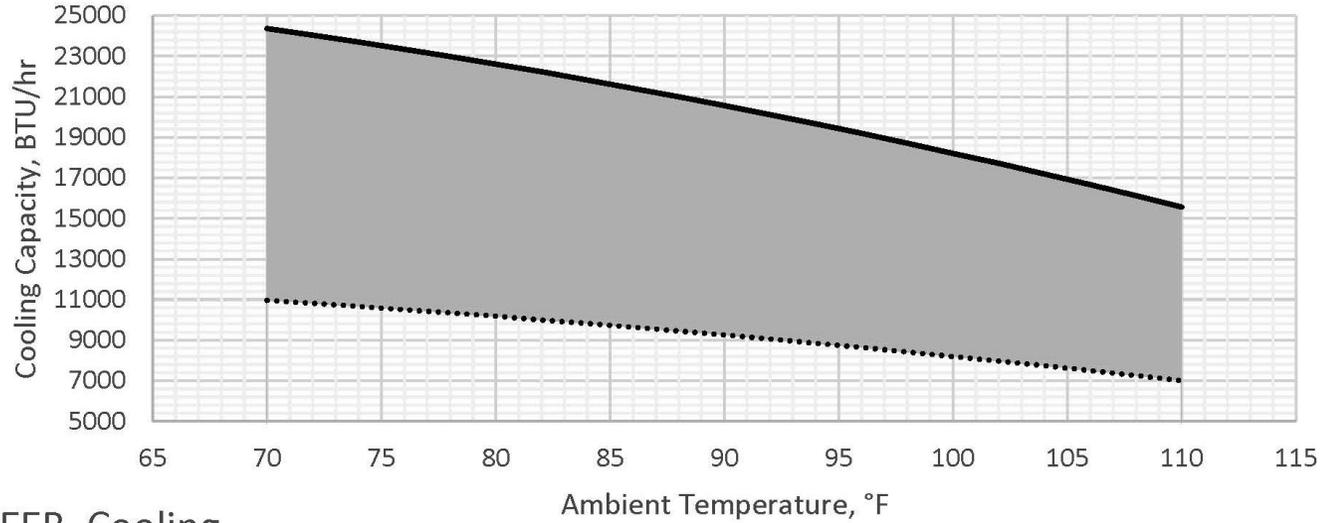
..... Minimum — Maximum

CC32

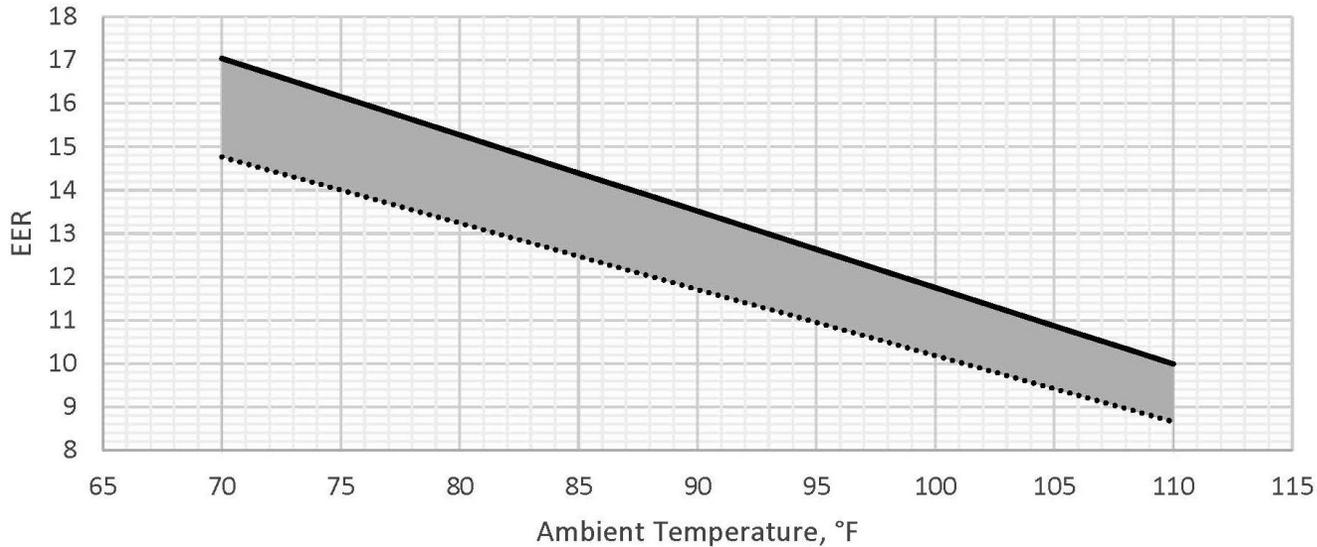
CC32-18 Cooling Performance @ 45°F Water

..... Minimum ——— Maximum

CC32-18, 45°F Delivered Water Temperature, BTU/hr, Cooling

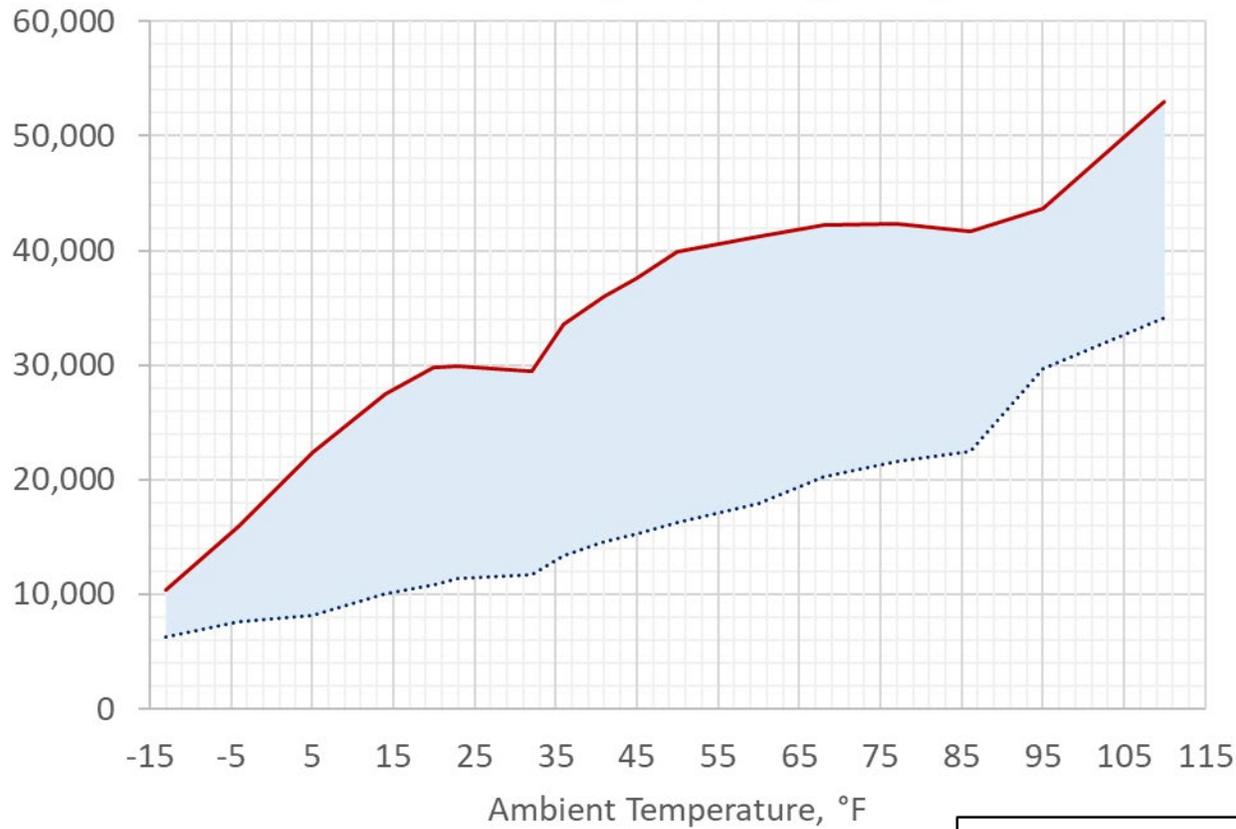


CC32-18, 45°F Delivered Water Temperature, EER, Cooling

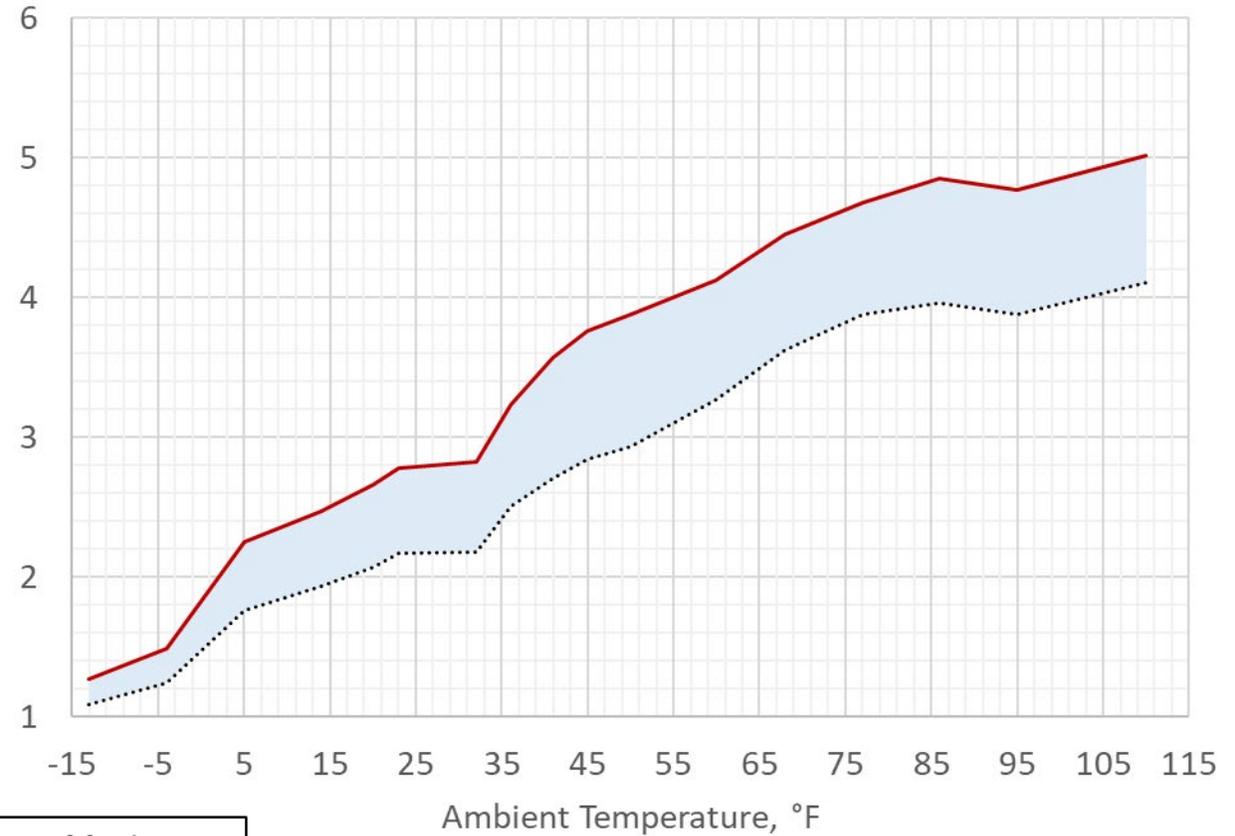


CC32-40 Heating Performance @ 120°F Water

Heating Capacity, BTU/hr



Heating Efficiency, COP



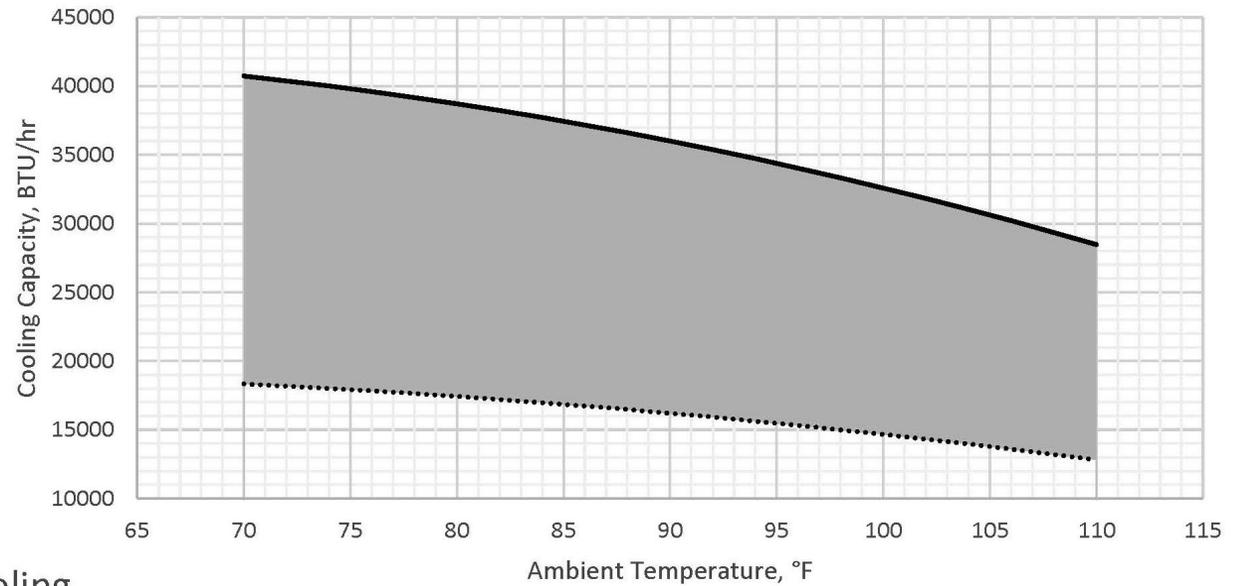
..... Minimum ——— Maximum

CC32

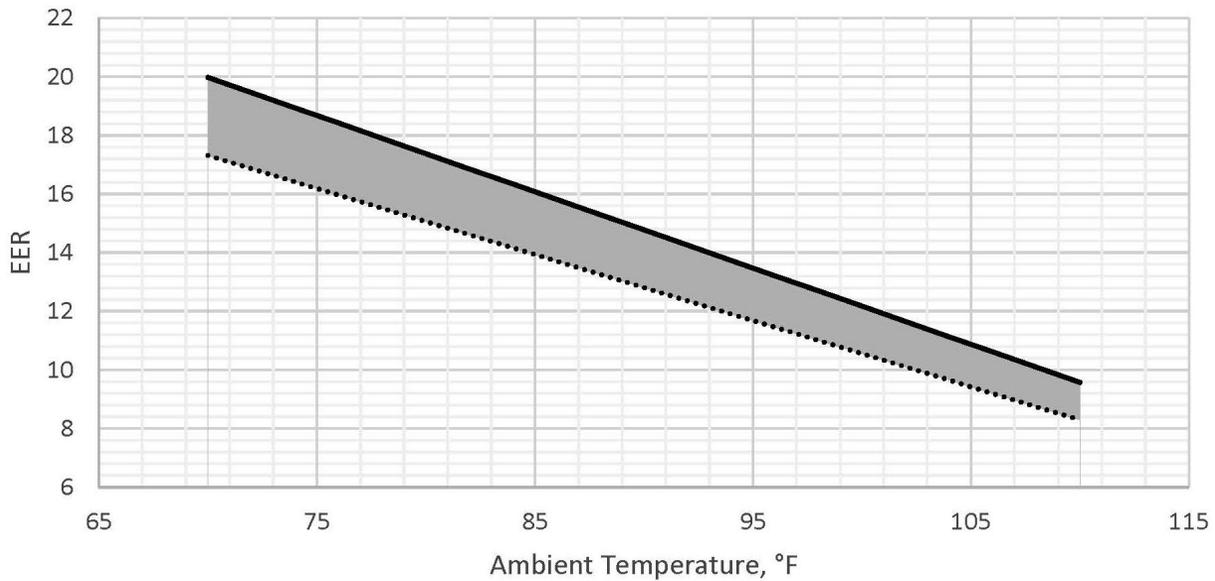
CC32-40 Cooling Performance @ 45°F Water

..... Minimum ——— Maximum

CC32-40, 45°F Delivered Water Temperature, BTU/hr, Cooling

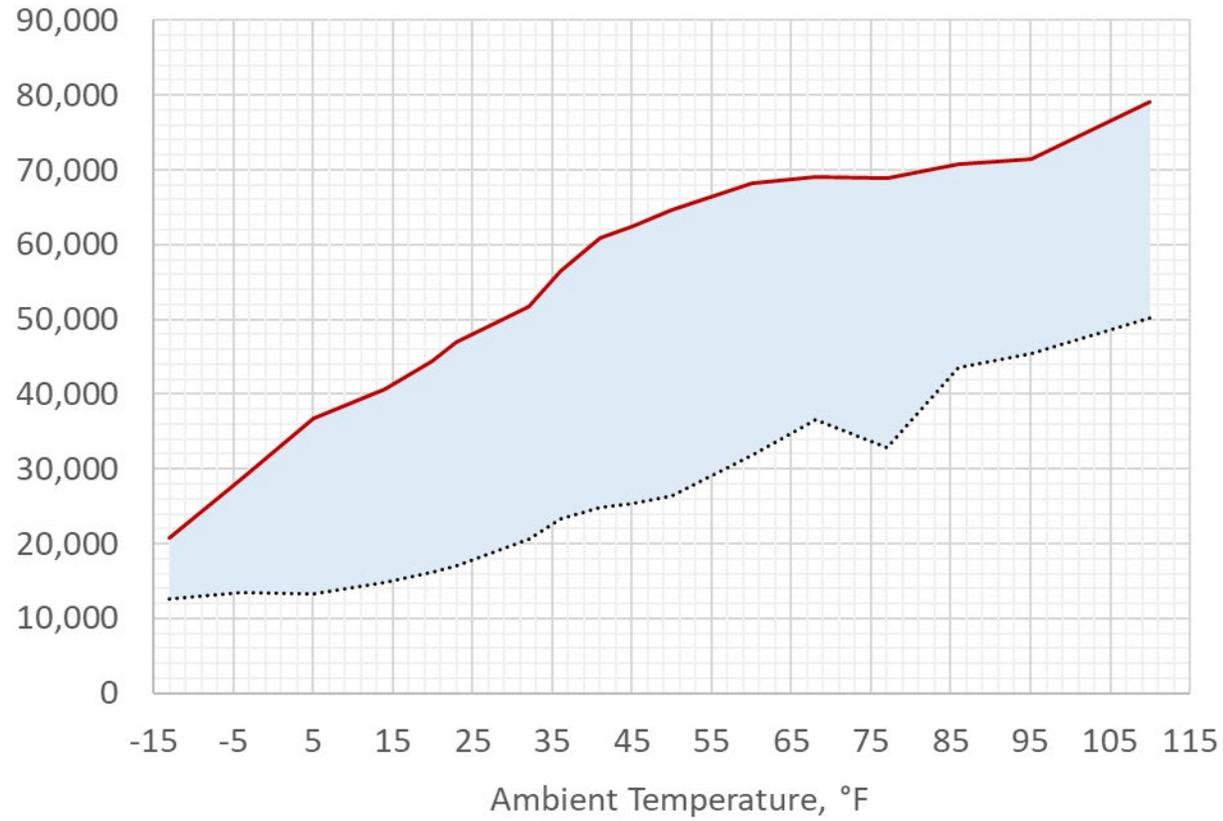


CC32-40, 45°F Delivered Water Temperature, EER, Cooling

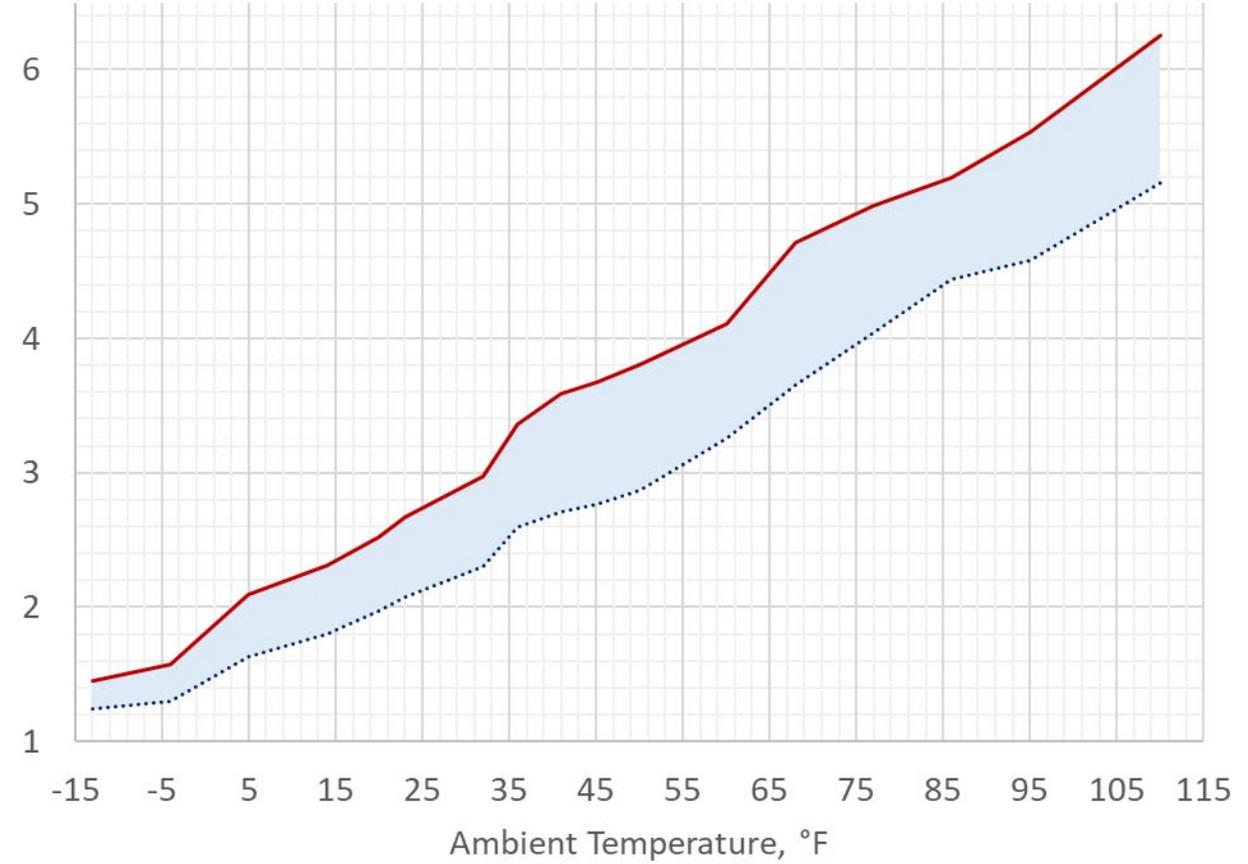


CC32-60 Heating Performance @ 120°F Water

Heating Capacity, BTU/hr



Heating Efficiency, COP



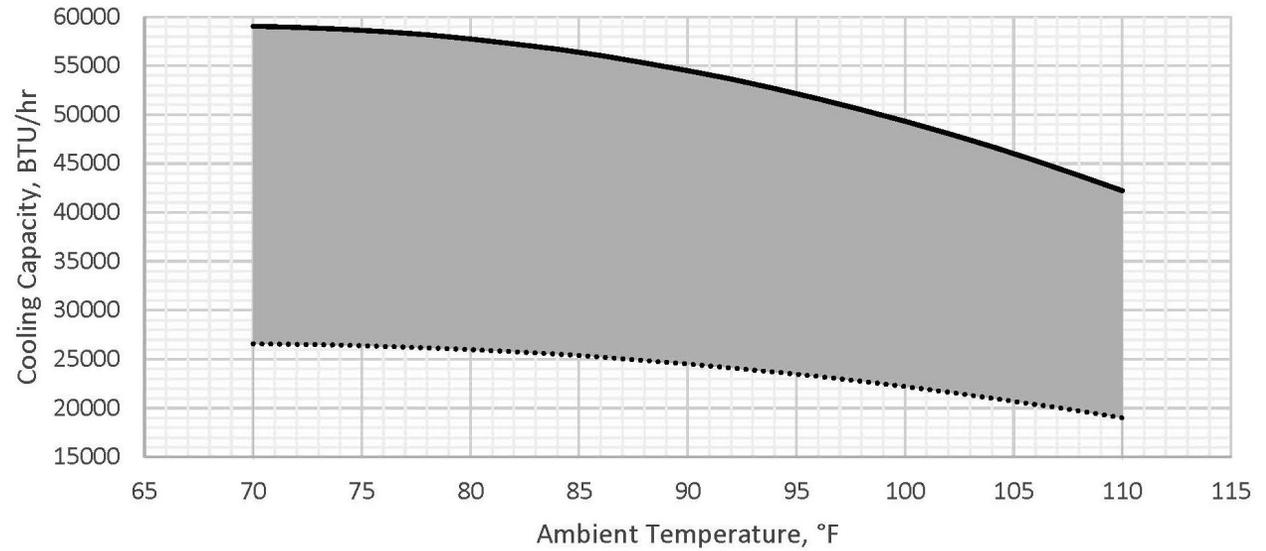
..... Minimum — Maximum

CC32

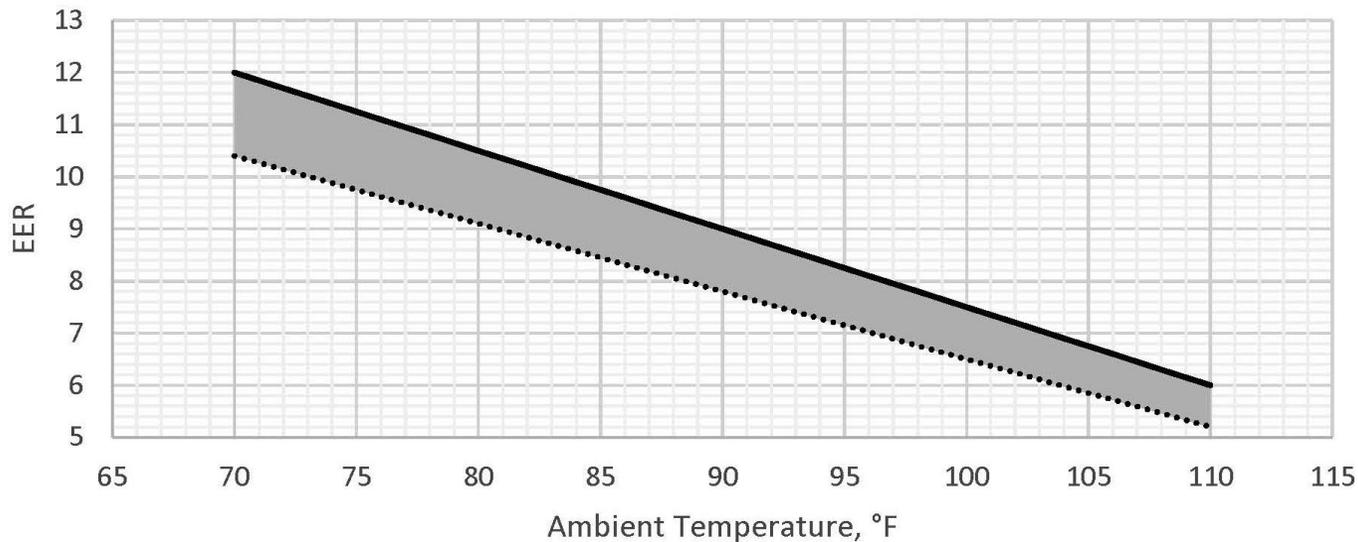
CC32-60 Cooling Performance @ 45°F Water

..... Minimum ——— Maximum

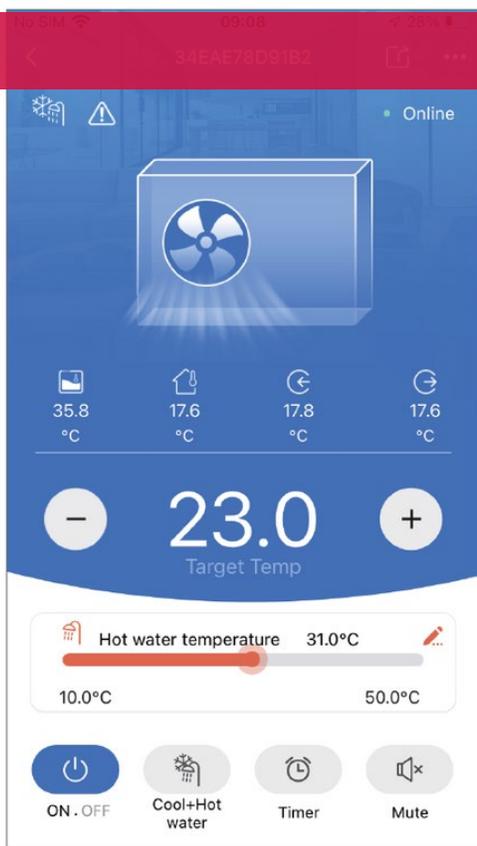
CC32-60, 45°F Delivered Water Temperature, BTU/hr, Cooling



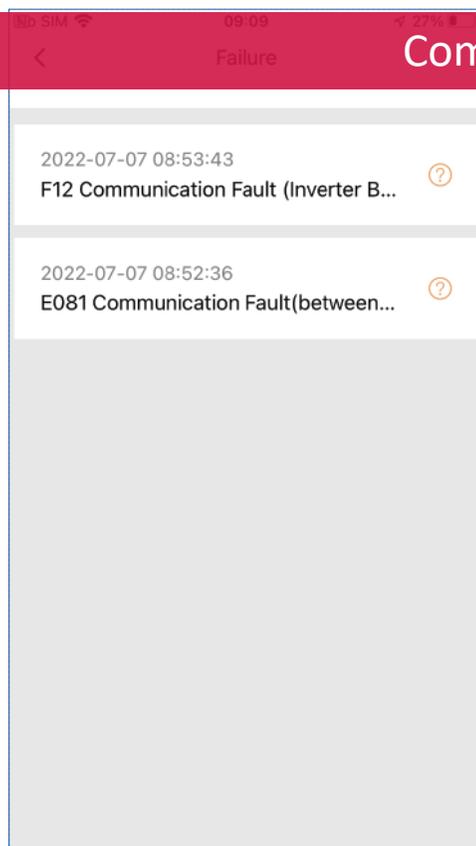
CC32-60, 45°F Delivered Water Temperature, EER, Cooling



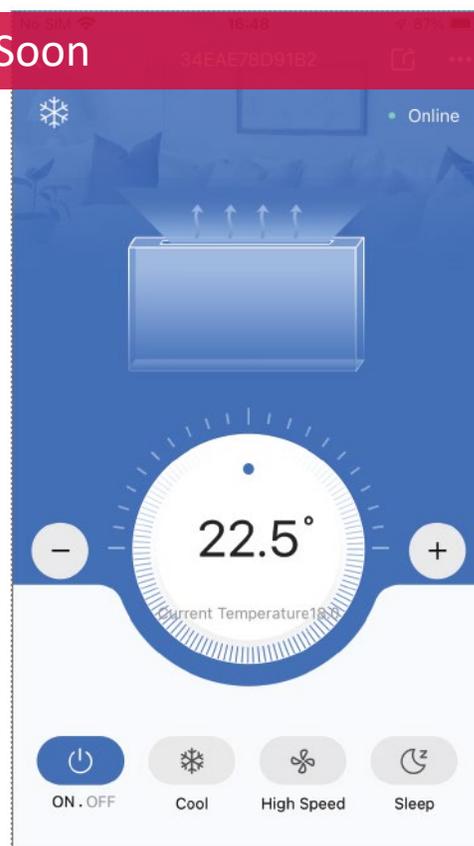
WarmLink App for Remote Monitoring, System Management & Support



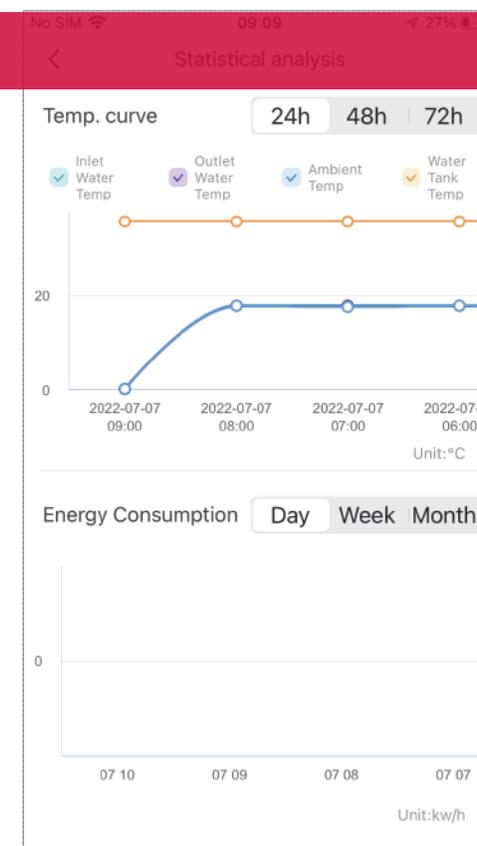
System Monitoring



Fault Logging



Device Management



Temperature Curve Data

Washington State



CC32



High-Temperature Cold Climate Air to Water Heat Pump

We're Ready for the Future of R290 and Its Expanded Potential

R290 (propane) is globally recognized as an eco-friendly, natural refrigerant alternative that is ideal for self-contained refrigeration as well outdoor systems such as air to water monobloc heat pumps.

R290 shows great promise as a sustainable, safe, convenient, and cost-effective retrofit solution for decarbonizing the large number of homes heated by oil and gas boilers

Current International Standards already allow for the safe use of A3 refrigerants in similar outdoor equipment. The harmonization process of U.S. safety standards with these international standards and codes is already underway - and **hopefully** will forward through the approval process.



GWP = 3

ODP = 0



- R290 Charge = .85kg /1.87lb
- Delivered water temperatures up to 167°F
- Heating – Cooling – DHW
- Allows for direct replacement of Oil and Gas fired boilers
- Enviro-Safe Monobloc Design



SpacePak has teased our future R290 unit at the AHR Expo 2 years in a row

The Roadmap to R290

In 2023, ASHRAE issued a proposal to amend its 15.2-2022 Safety Standard for Refrigeration Systems in Residential Applications to allow up to 4.9kg (10.9lbs) of flammable (A3) refrigerants like propane (R290) in outdoor heat pumps and air conditioners in the U.S.

September 2023

The proposed Addendum E to Standard 15.2-2022 completed a 45-day public review period.



January 2024

The ASHRAE standards committee decided that studies and tests on indirect HVAC systems using these refrigerants were needed to support an increase in charge. The Committee formed a working group, which developed a “work statement” to do computational fluid dynamics and verification testing

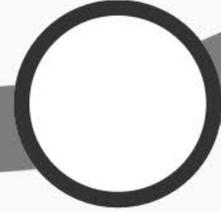


March 2024

The work statement is approved and Vice President of Research at AHRI who will lead the effort said they would now begin to seek the required research funding with expectations set to begin over the summer of 2024.

In process

With acquired funding, the Work Group will be conducting the studies and verification testing, as well as studying the European market where residential outdoor heat pumps using 4.9kg of R290 are already provided by a number of companies.



Pending next step

The Work Group must provide the ASHRAE standards committee with its findings that support the increase in charge. The committee must then give their final ruling of approval.



Pending next step

If approved by ASHRAE, UL must also endorse the charge limit under its 60335-2-40 standard.



Pending next step

If endorsed by UL, the U.S. EPA must also give their endorsement.

The Washington, D.C., branch of the Environmental Investigation Agency (EIA) strongly supports the agenda for enabling A3 refrigerants in low-probability systems outdoors and harmonization of U.S. safety standards and building codes with other international equivalents that already enable this application.

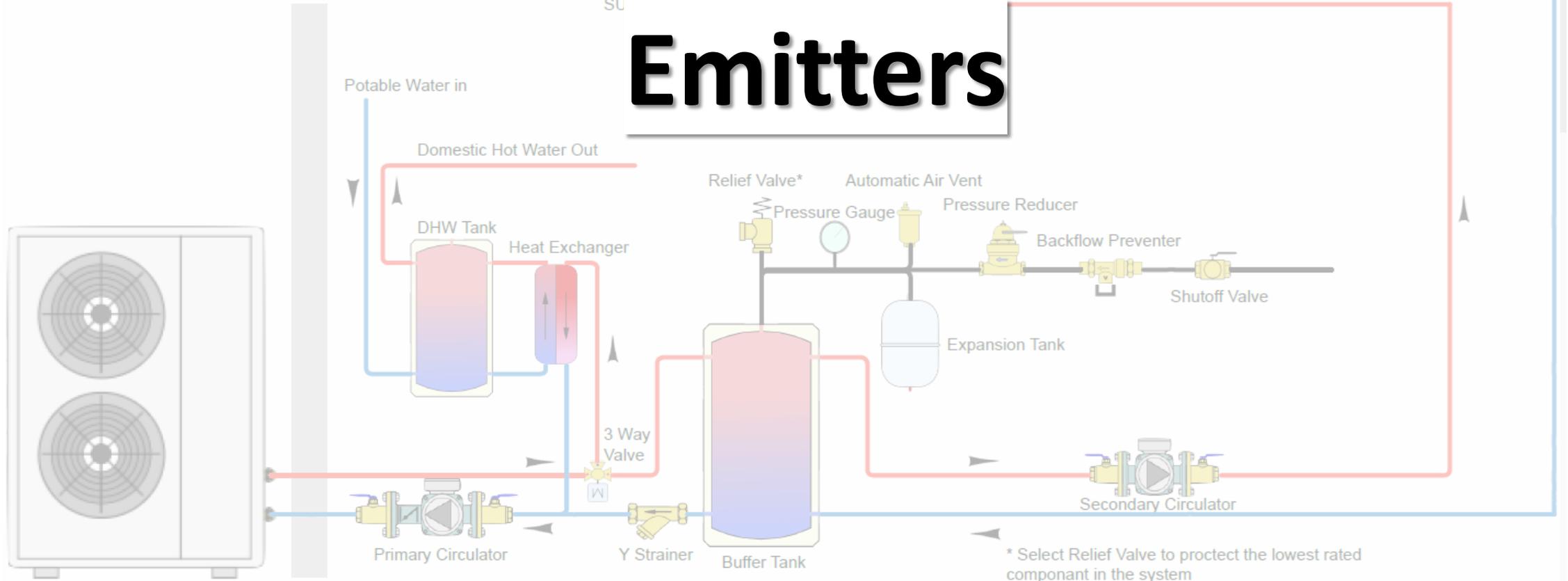


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Questions?

RETURN FROM TERMINAL UNIT(S)

SU

Emitters





Additional Equipment

SSIC Integrated Heat Pump Control Platform

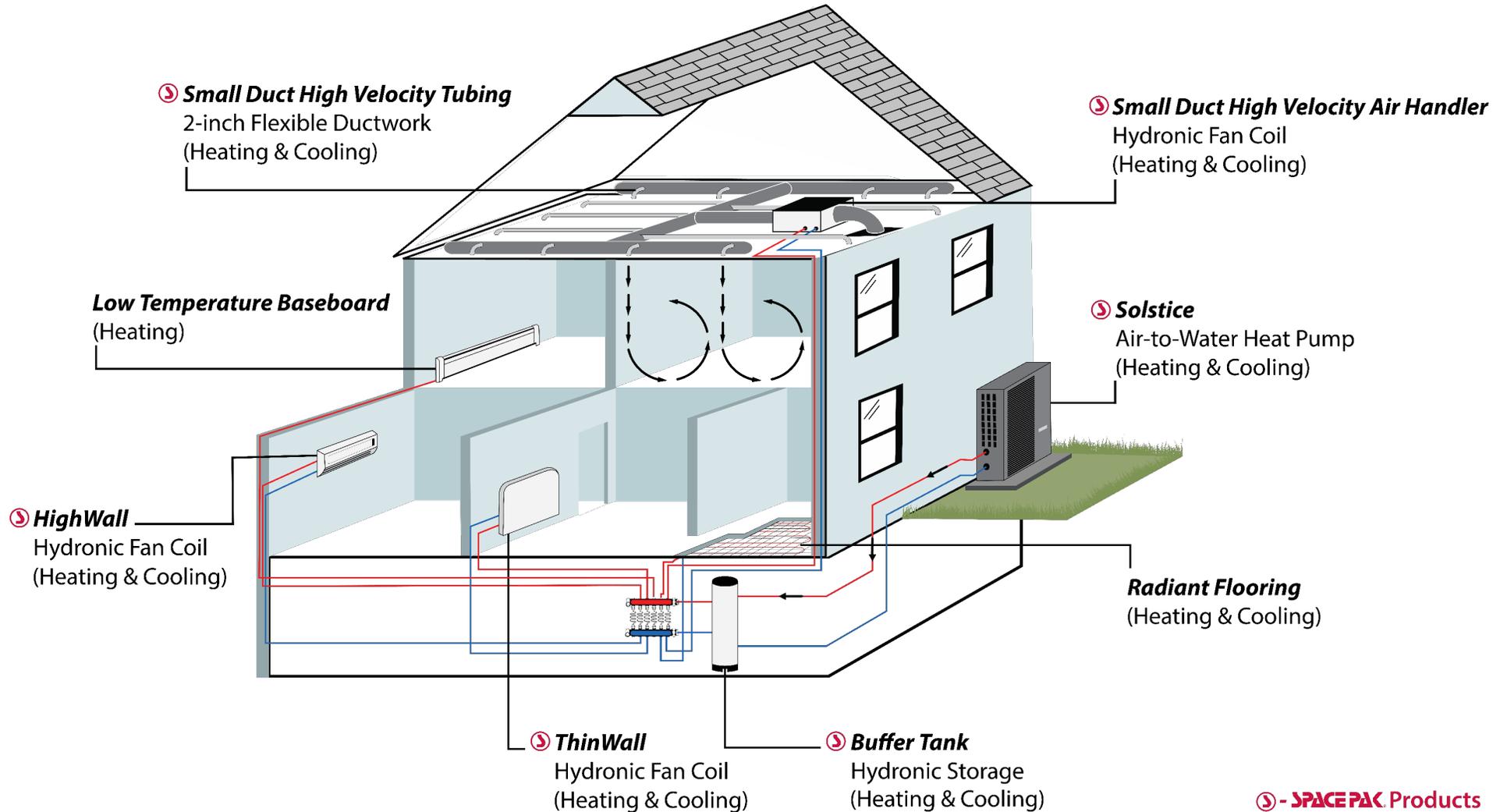
Hydronic Fan Coils

- HighWall
- ThinWall
- SDHV Air Handler

SS Buffer Tanks w Built-In Electric Backup

*Hybrid Domestic Hot Water Indirect Tank**

Distribution Example



③ - **SPACE PAK** Products

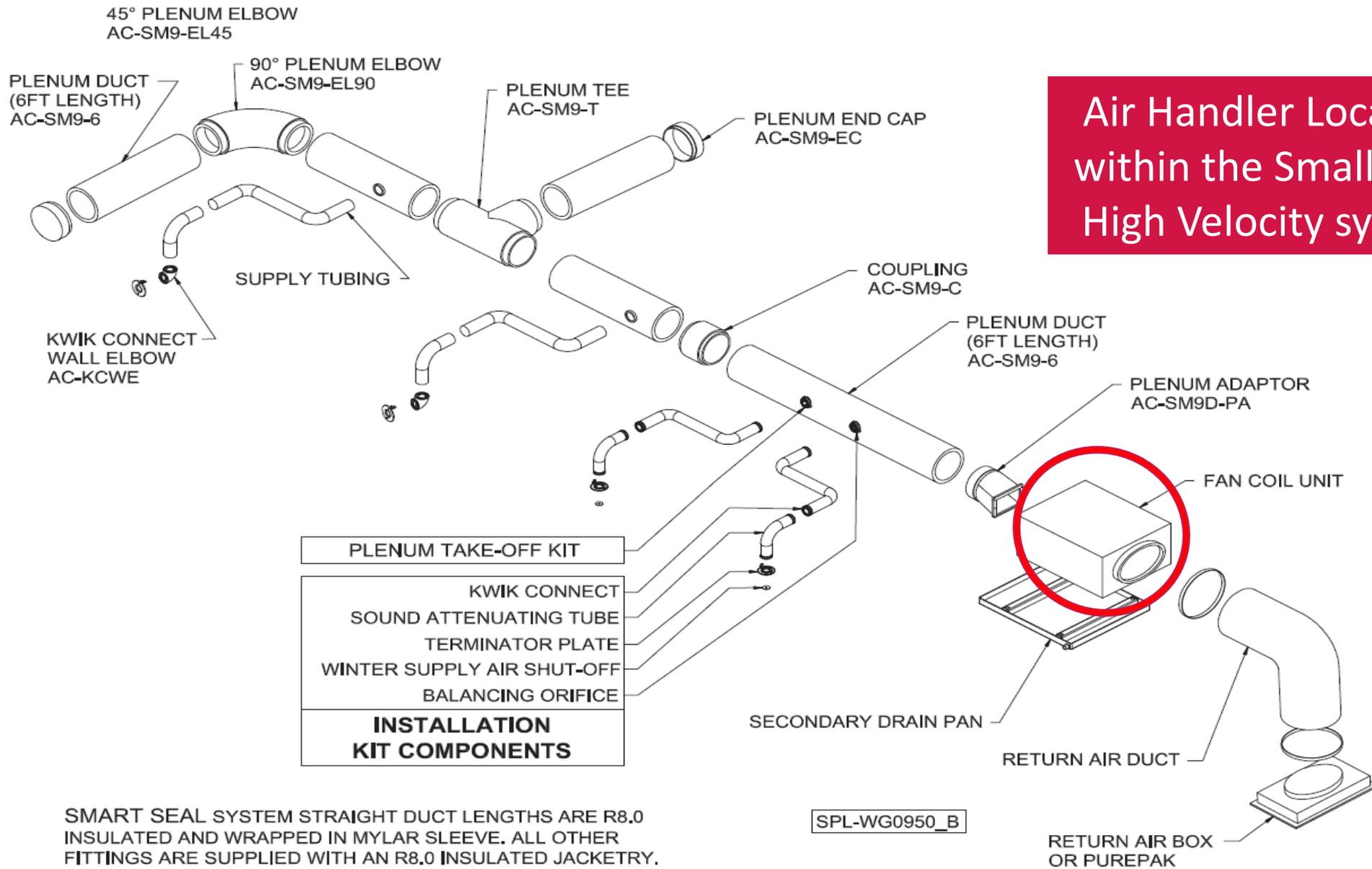
Small Ducted Hydronic Air Handler (WCSP)

Heating & Cooling

- J+ Advanced Control with digital display
- High Efficiency EC Integrated Motor/Blower Assembly
- 230V Standard Configuration Optional 115V Conversion
- 6-Row Copper/Aluminum Evaporator Coil
- Industry Leading Corrosion Resistant Cabinet
- Primary Drain Pan w/Integrated Float Switch
- Anti-Vibration Foam Strips
- Condensate Trap
- Slide out Blower
- 24 V 50/60hz Transformer
- Sweat-Type Connections



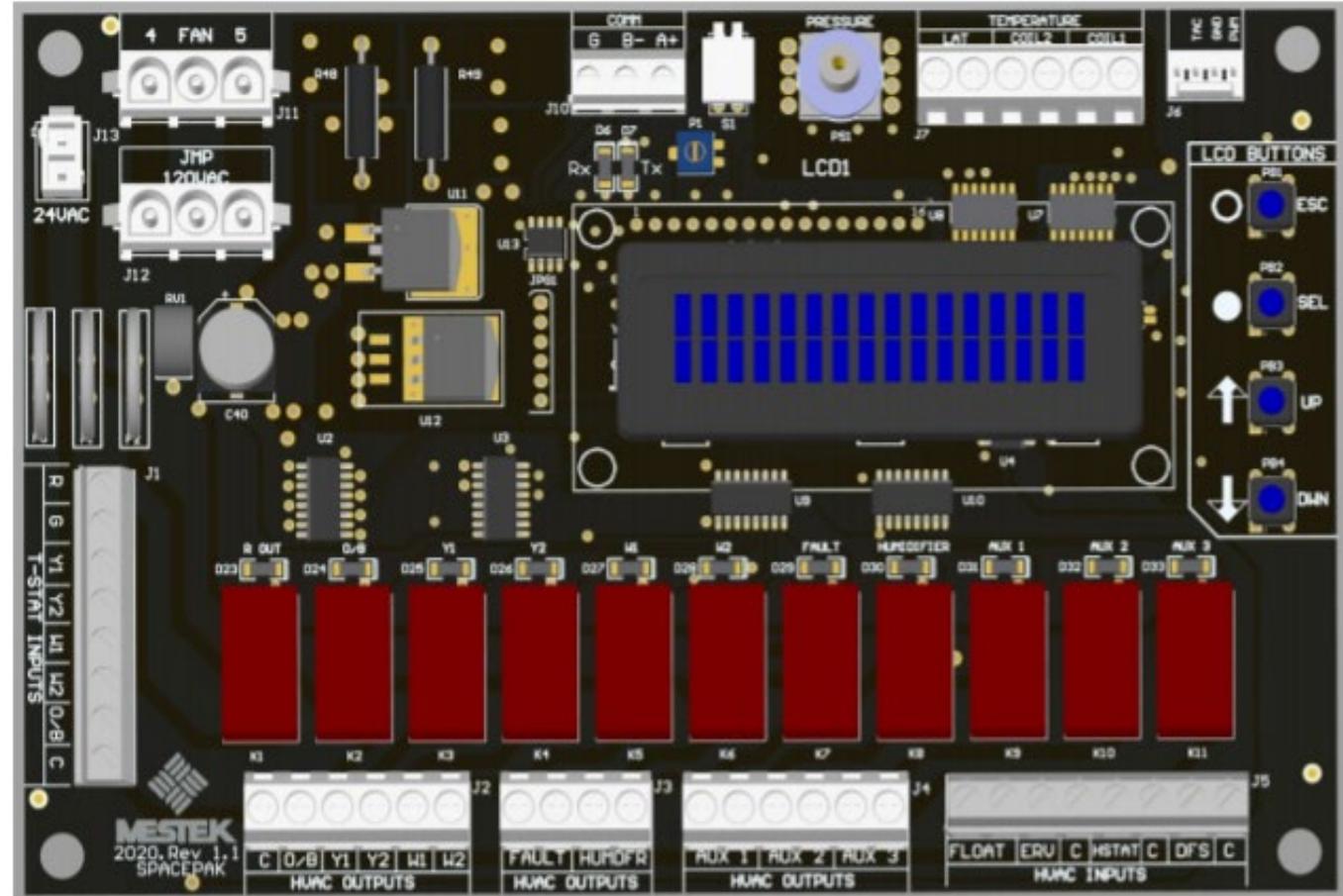
Air Handler Location within the Small Duct High Velocity system



SMART SEAL SYSTEM STRAIGHT DUCT LENGTHS ARE R8.0 INSULATED AND WRAPPED IN MYLAR SLEEVE. ALL OTHER FITTINGS ARE SUPPLIED WITH AN R8.0 INSULATED JACKETRY. DUCT COMPONENTS SHOWN WITHOUT FACTORY SUPPLIED R8.0 INSULATED JACKETRY.

J Plus Control Board

- More features and benefits for the contractor
- Digital display screen
- Screen displays (operating mode, cfm, %speed, S.P.)
- Speed is controlled by a static pressure tap on the blower
- Simpler wiring with less components
- Infinite speed variation
- Easy load matching
- Temperature sensors allow for delayed fan operation
- IAQ FRIENDLY!!!!



WCSP Specifications

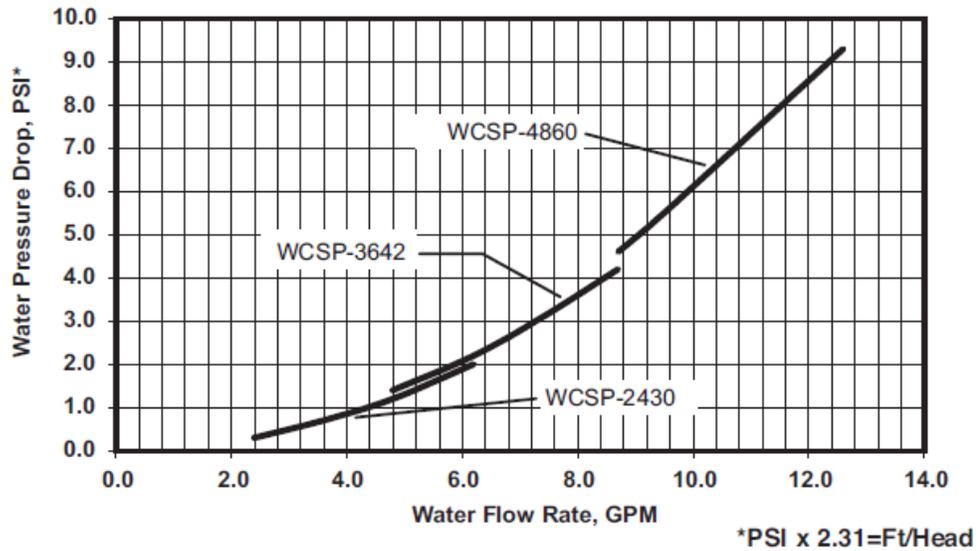


Model	Nominal System Capacity		Std. CFM @ 1.2" W.C.	F.L. Amps (115V/230V)	Motor HP	Connections (CTS)	
	Nom. Tons	Cool MBH*				Water In Line	Water Out Line
WCSP-2430J/V	2	24	440	5.6/2.8	3/4	7/8"	7/8"
	2-1/2	30	550				
WCSP-3642J/V	3	36	660	7.6/4	3/4	7/8"	7/8"
	3-1/2	42	850				
WCSP-4860J/V	4	48	880	10.6/5.4	3/4	7/8"	7/8"
	5	60	1150				

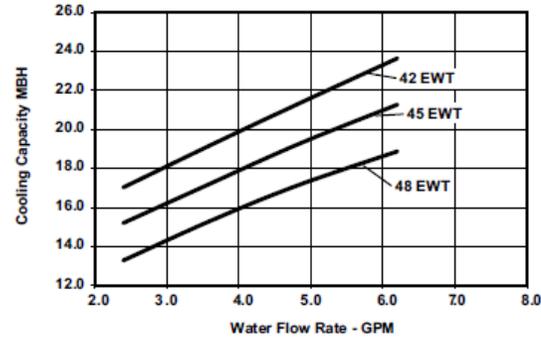
* Capacities based on 45°F entering water temperature at 5 G.P.M.

WCSP Capacity/Pressure Drop

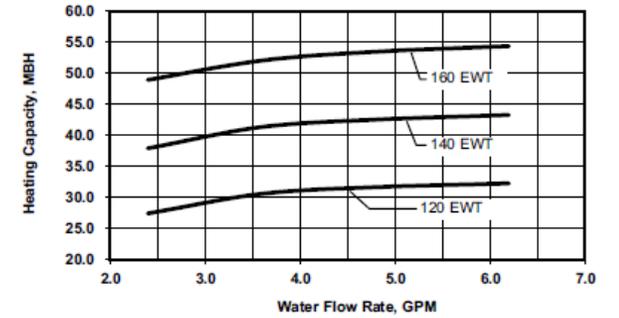
Hydronic Coil Pressure Drop Characteristics



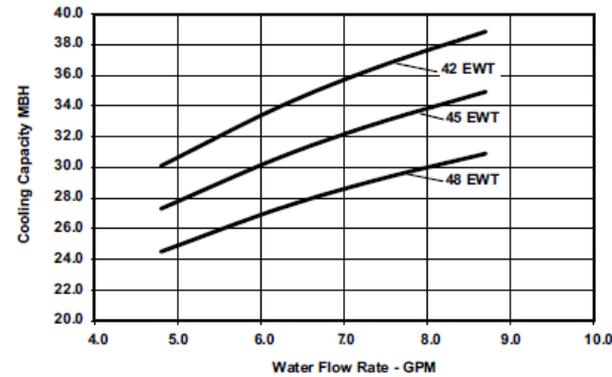
WCSP-2430 @ 550 cfm Cooling Capacity



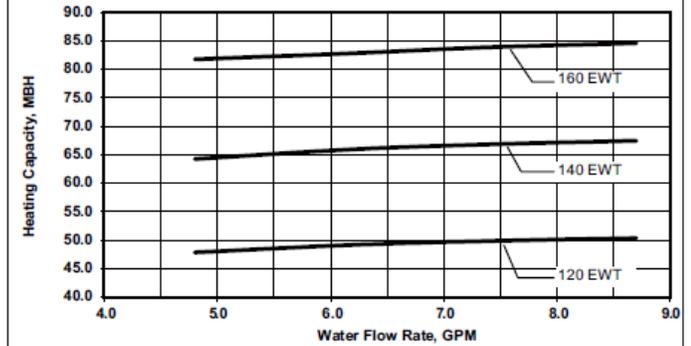
WCSP-2430 @ 550 cfm Heating Capacity



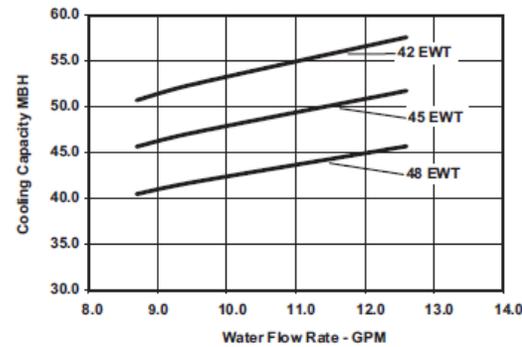
WCSP-3642 @ 850 cfm Cooling Capacity



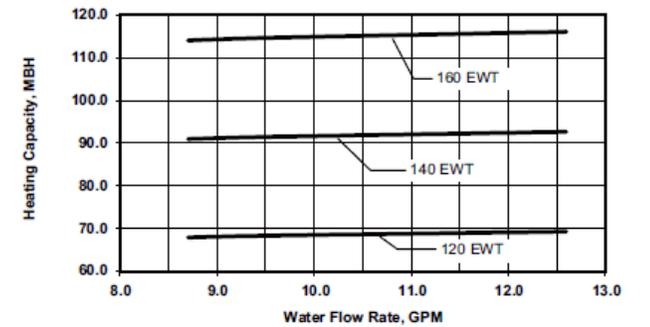
WCSP-3642 @ 850 cfm Heating Capacity



WCSP-4860 @ 1150 cfm Cooling Capacity



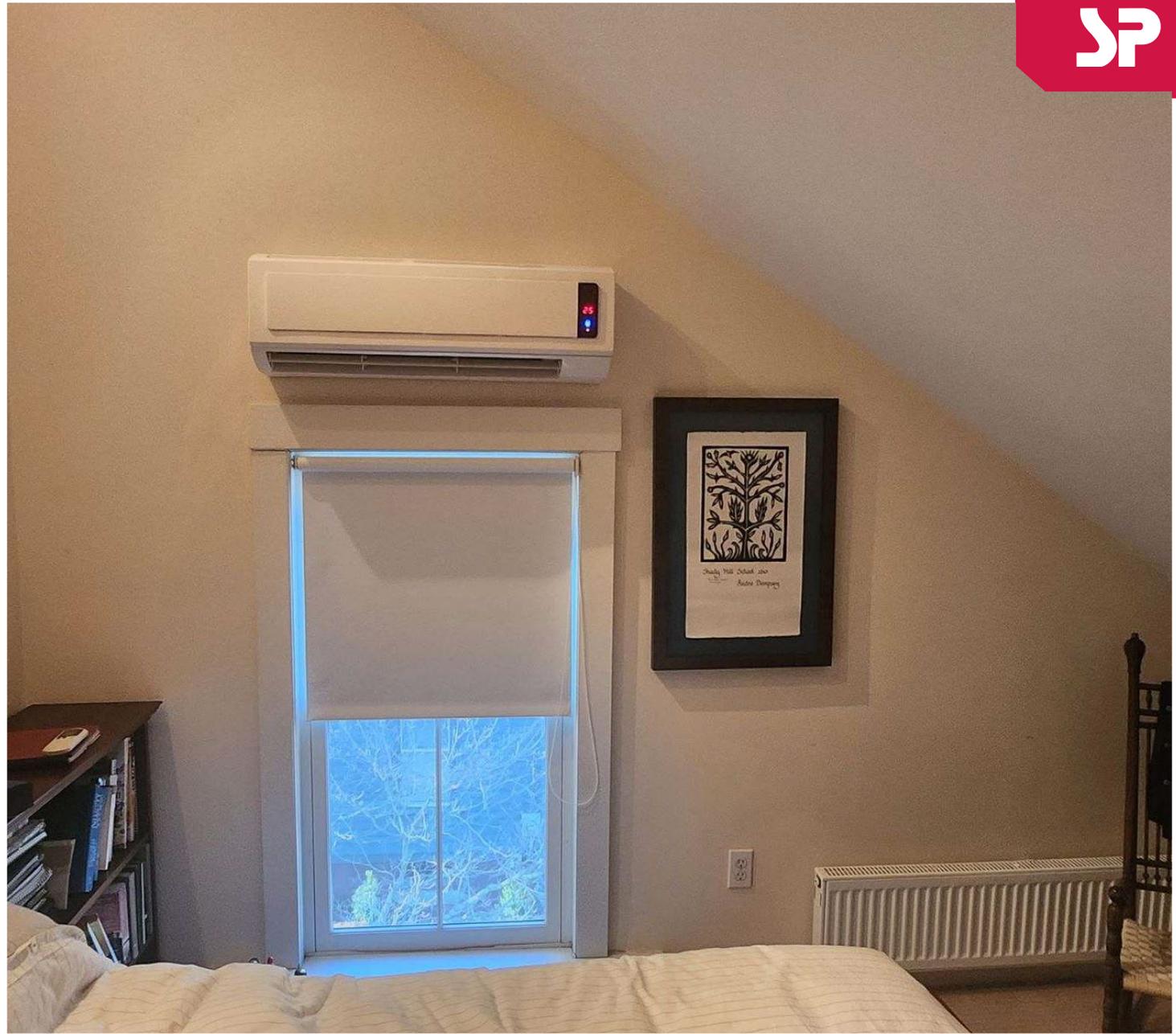
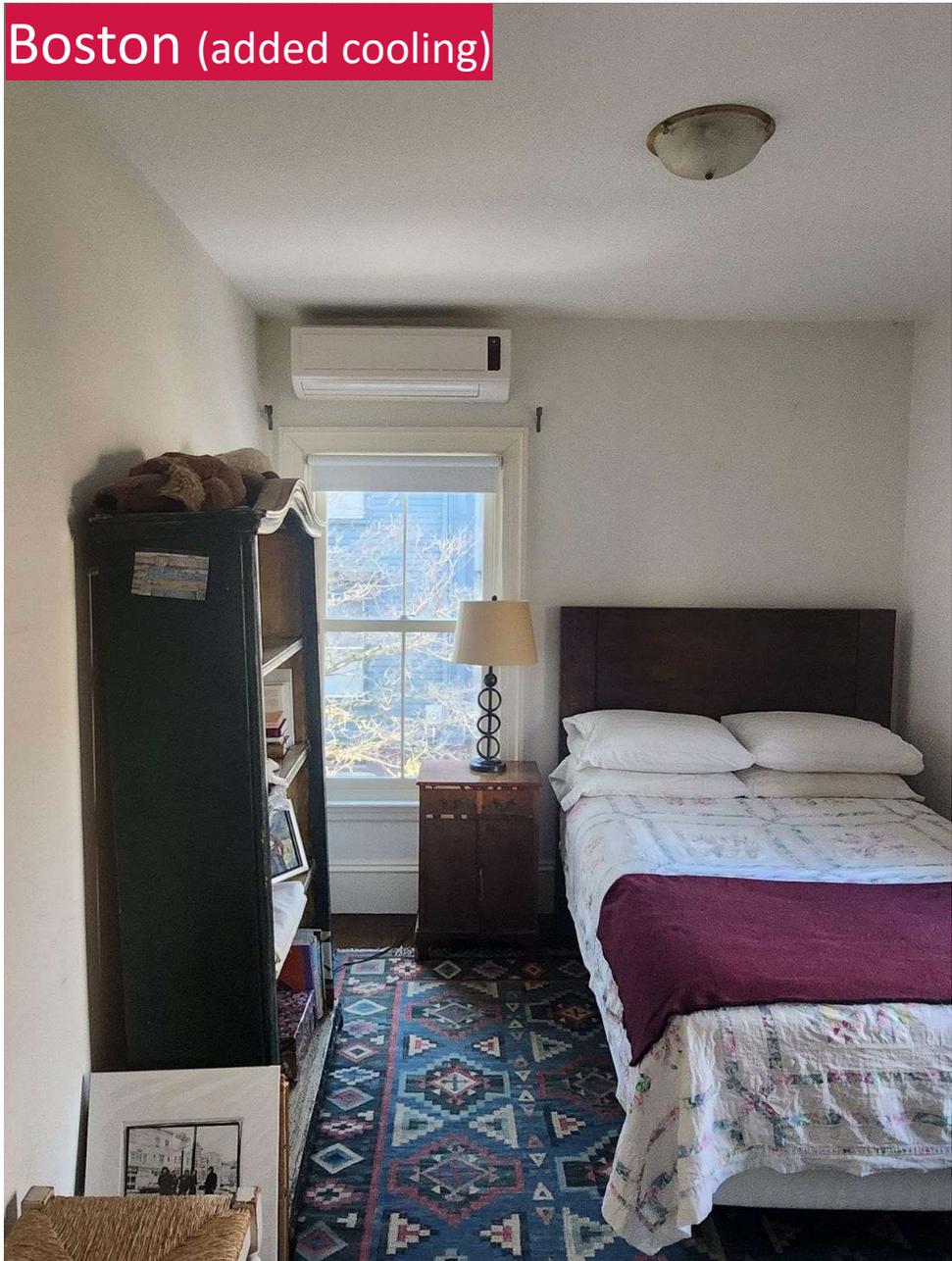
WCSP-4860 @ 1150 cfm Heating Capacity



HighWall Hydronic Low Temperature Fan Coil (HW)

- Hydronic Based - No Refrigerant
- High Efficiency EC Motor with Step-Less Speed Modulation
- Auto-Swing Damper for Uniform Air Distribution
- Whisper Quiet Operation (33-58 dB)
- Stainless Steel Flexible Hose Connections
- Equipped with Condensate Drip Pans for Use in Chilled-Water Cooling Applications
- Can Operate with Water Temperatures as Low as 120°F for Heating and as High as 50°F for Cooling
- 8,100 - 25,700 BTU/h Heating Capacity
- 7,300 - 13,100 BTU/h Cooling Capacity
- 5-Year Warranty for Certified Contractors





ThinWall Hydronic Low Temperature Fan Coil (HTW)

Heating & Cooling

- Hydronic Based - No Refrigerant
- Tempered Glass Front with Touch Screen Display
- Whisper Quiet, Modern Space-Saving Design
- Cross-Flow Blower Configuration with Integrated Air Guiding Technology
- ECM Blower
- Equipped with Condensate Drip Pans for Use in Chilled-Water Cooling Applications
- Can Operate with Water Temperatures as Low as 120°F for Heating and as High as 50°F for Cooling
- 8,700 - 32,000 BTU/h Heating Capacity
- 3,400 - 14,800 BTU/h Cooling Capacity
- 5-Year Warranty for Certified Contractors





Key components needed for

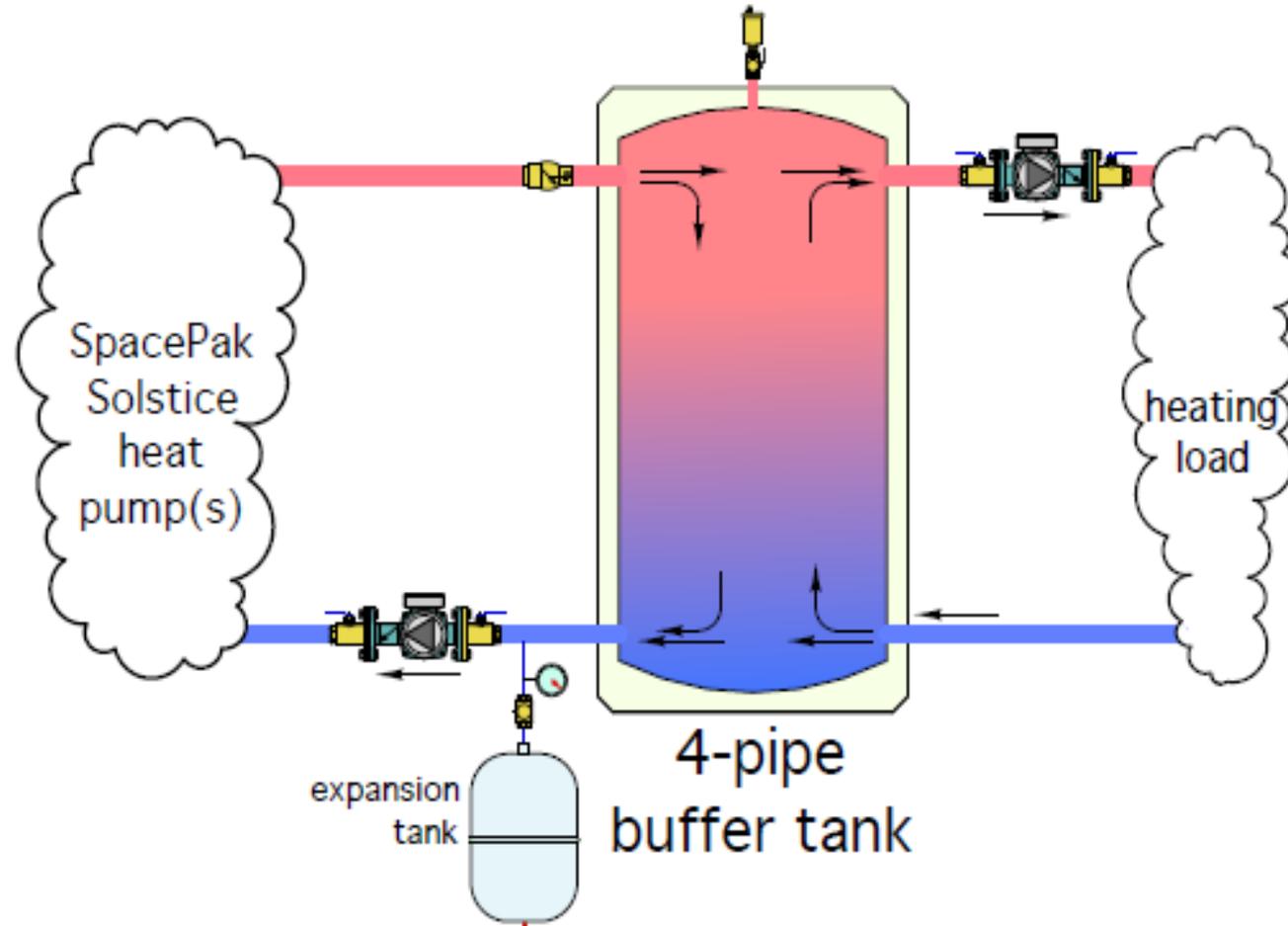


efficient and flexible systems.

The All-Important Buffer Tank

What's the Purpose?

- Thermal storage (Heated or Chilled)
- Hydraulic separation (respect the flow)
- Optimizes system efficiency and run cycles
- Satisfy smaller loads with stored energy
- Allows proper use of on/off peak electrical demand benefits (go larger)

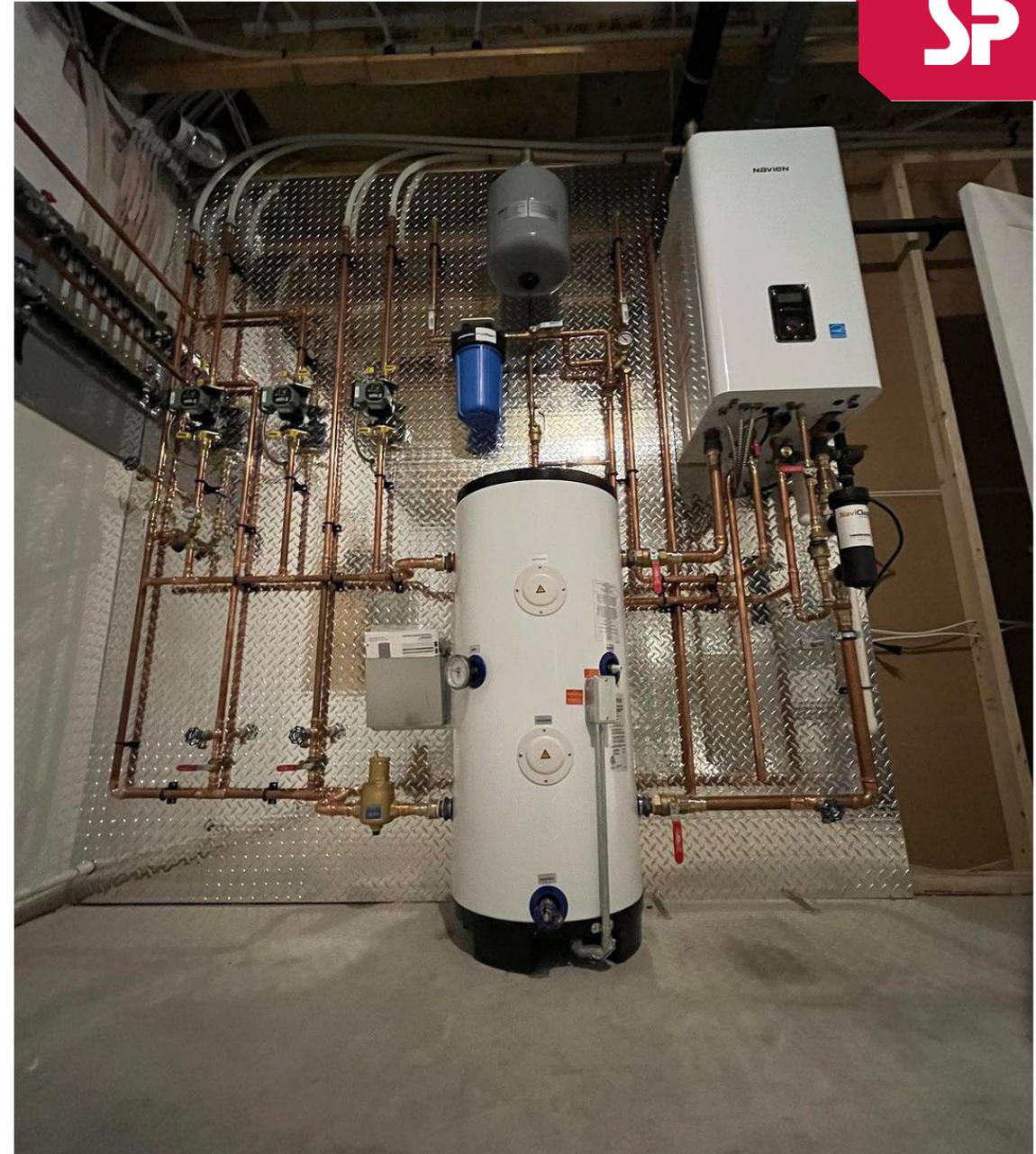


How to Size ?

Sizing – Keep it Simple

Minimum Buffer/System Volume must be equal to or greater than 7.5 gallons per nominal ton of unit's capacity at its lowest turndown (Heating or Cooling - whichever is larger)

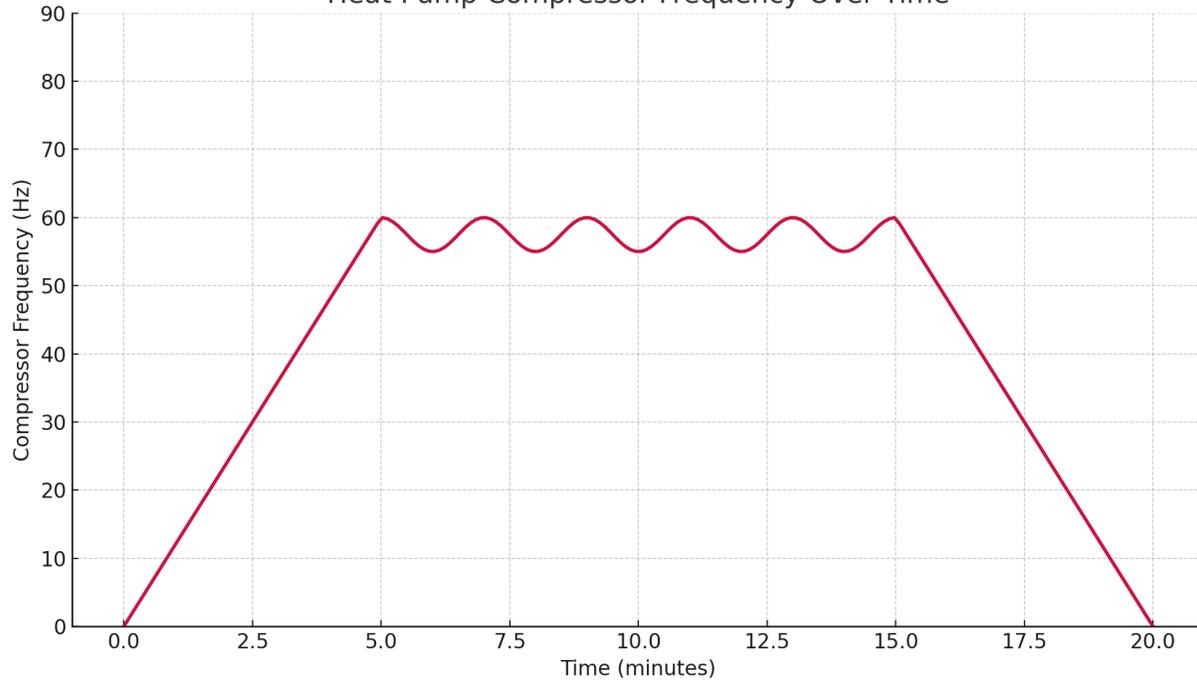
Note: Remember to consider the “systems” capacity. In a situation where there is a large volume (Cast Iron Radiators) you may want a larger buffer to accommodate a larger inrush of “load” and to prevent temperature swings.



Run Cycle Comparisons

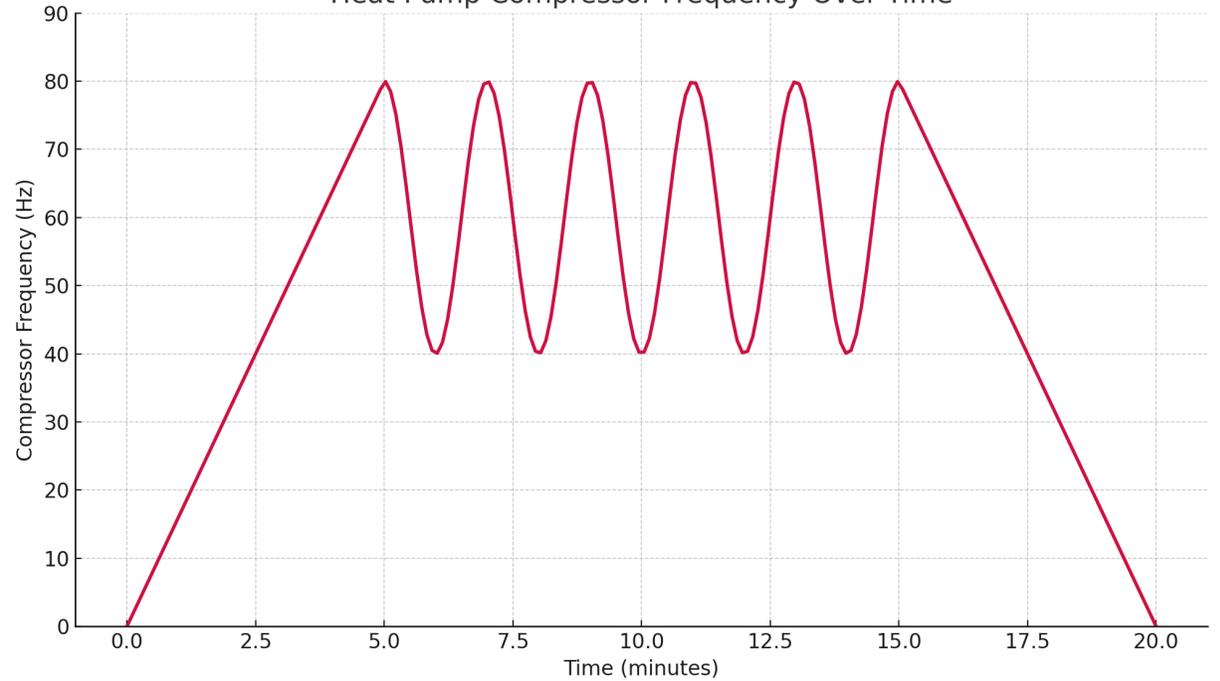
The Buffer Tank Advantage

Heat Pump Compressor Frequency Over Time



Properly Sized System

Heat Pump Compressor Frequency Over Time



Improperly Sized System

BUFFER TANKS

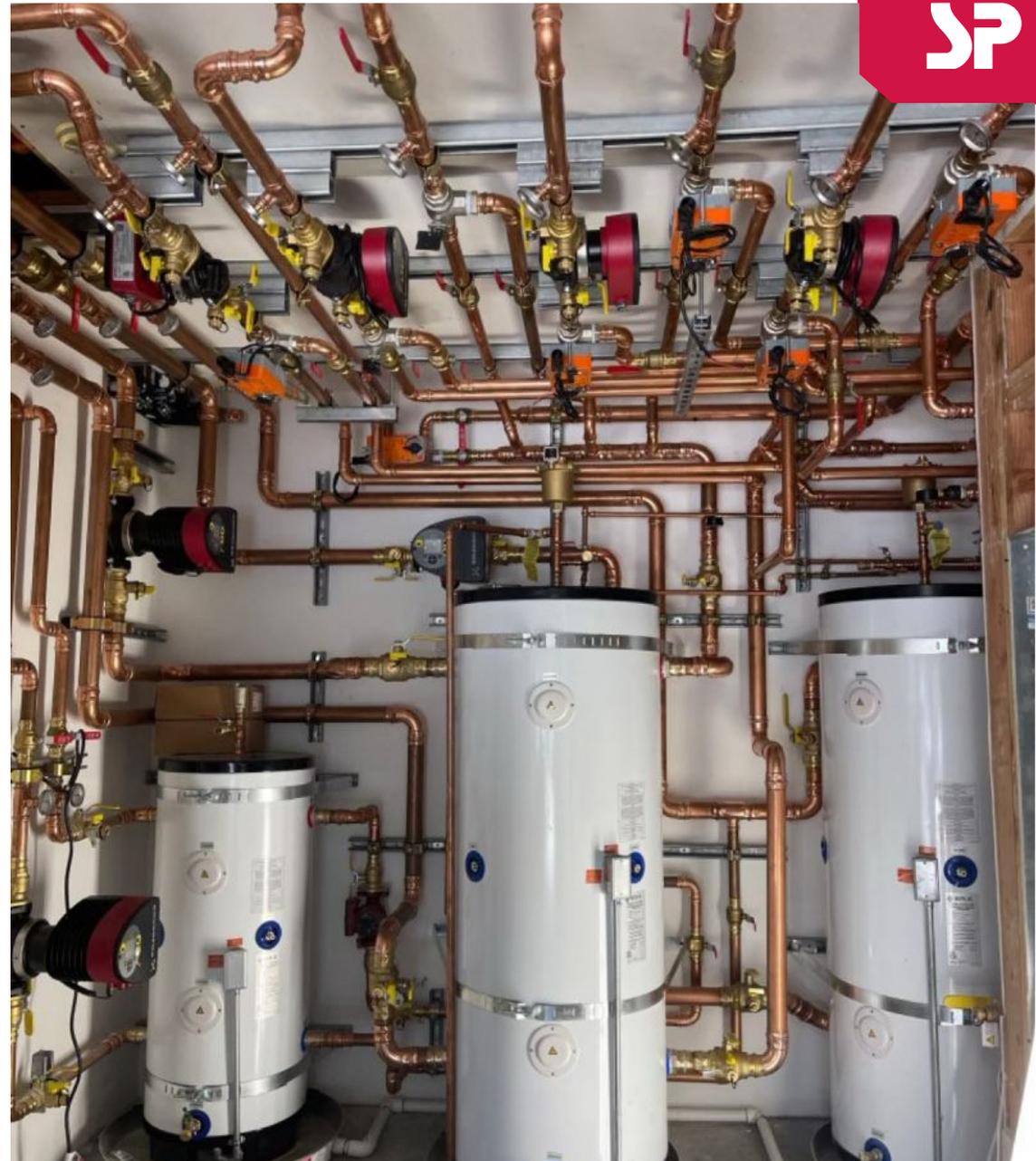
Stainless Steel Buffer Tanks with Built-in Electric Backup

- For Hot and Chilled Water
- Encouraged for Most Systems Using Solstice Heat Pumps
- Inner Tank 304 Stainless, Outer Galvanized Steel Jacket
- Polyurethane Resin Foam with R12 Insulation Valve
- Four-Port Open Tank Design
- Electric Elements Standard
- Standard 10-Year Warranty

119 Gal. Coming Soon!

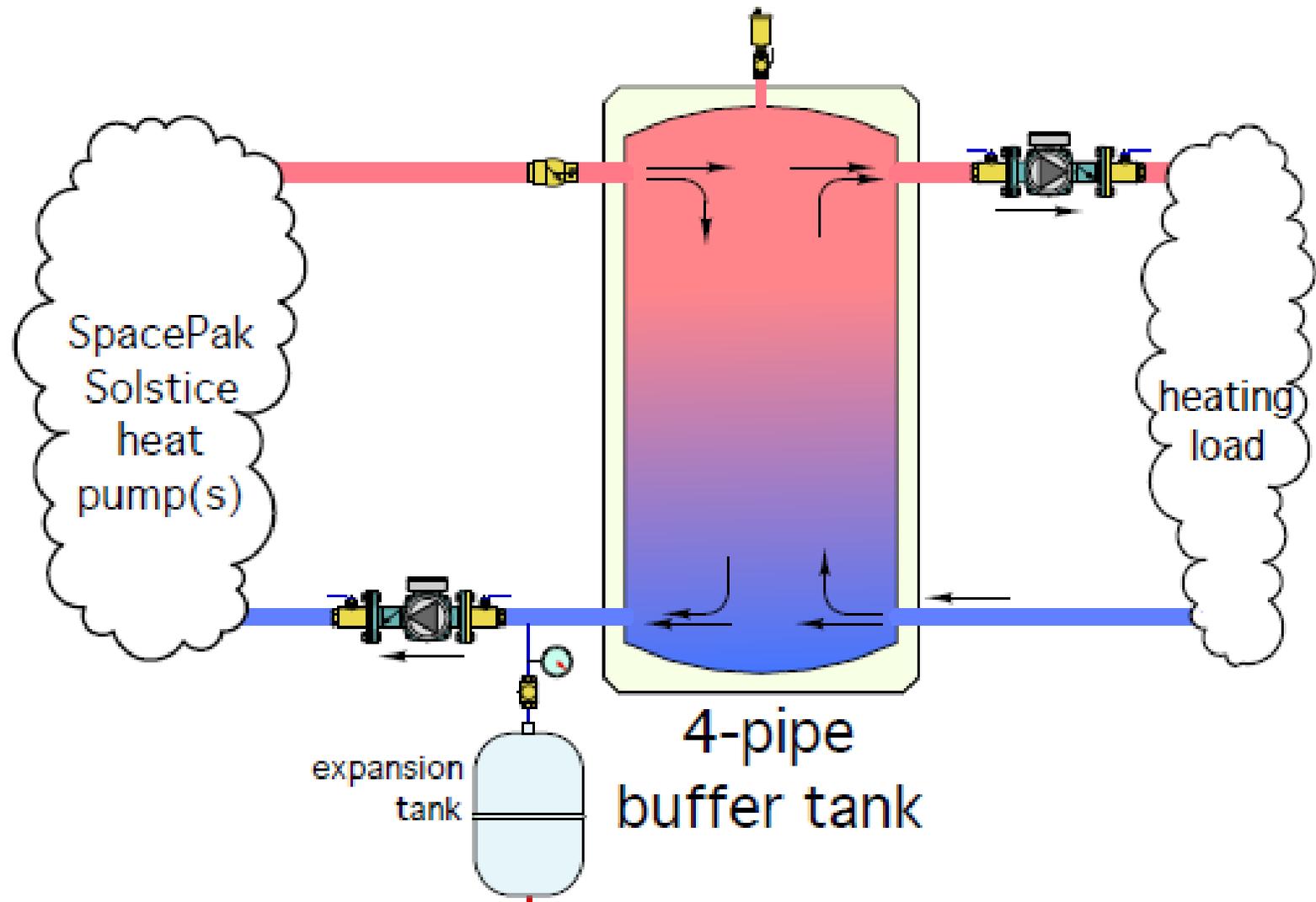
Model		BT13-H	BT26-H	BT40-H	BT80-H
Height	Inches	29-1/6	45	60	64-1/8
Diameter	Inches	18-1/2	18-1/2	18-1/2	23-5/8
Capacity	US Gal.	13	26	40	80
Max Water Flow	GPM	36	36	36	48
Ship Weight	lbs.	40	84	104	130
Empty Weight	lbs.	38	77	97	125
Full Weight	lbs.	148	304	446	805
Min Circuit Ampacity	Amps	15	30	30	30

Note: 13 Gallon buffer has 1-3 kw element



Buffer Example

NOTE: Buffer tanks provide the location for hydraulic separation, the system can operate 12 GPM flow on heat pump side and 1 GPM on the system side





SYSTEM DESIGN

Sizing – Keep it Simple

Buffer/System Volume must be equal to or greater than 7.5 gallons per nominal ton of unit's capacity at its lowest turndown (Heating or Cooling - whichever is larger)

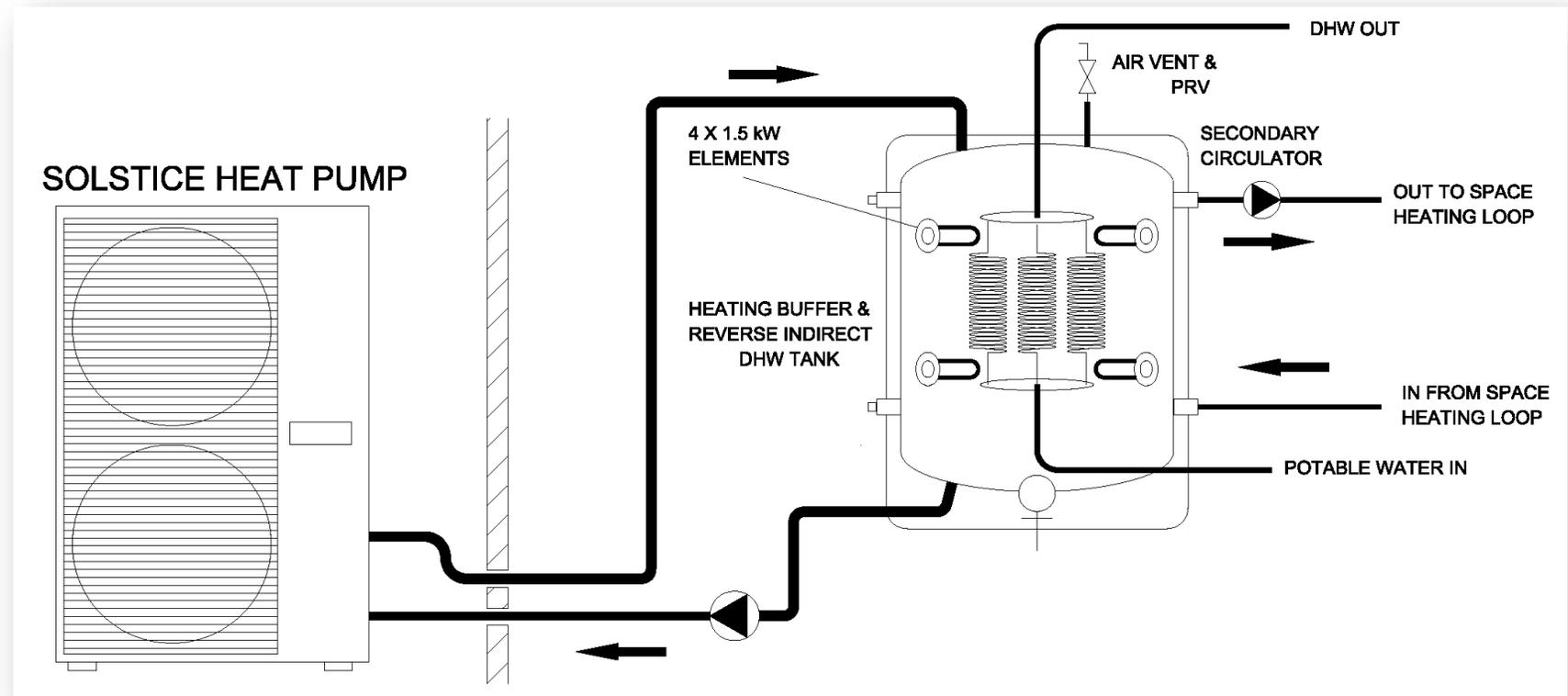
Example: If the unit's minimum turndown is 20k btu then the smallest buffer tank suggested would be our 13 Gallon 4 pipe Buffer Tank (BT13-H)

Note: Remember to consider the “systems” capacity. In a situation where there is a large volume (Cast Iron Radiators) you may want a larger buffer to accommodate a larger inrush of “load” and to prevent temperature swings.

Low-Temp Hybrid Hot Water Indirect Tank

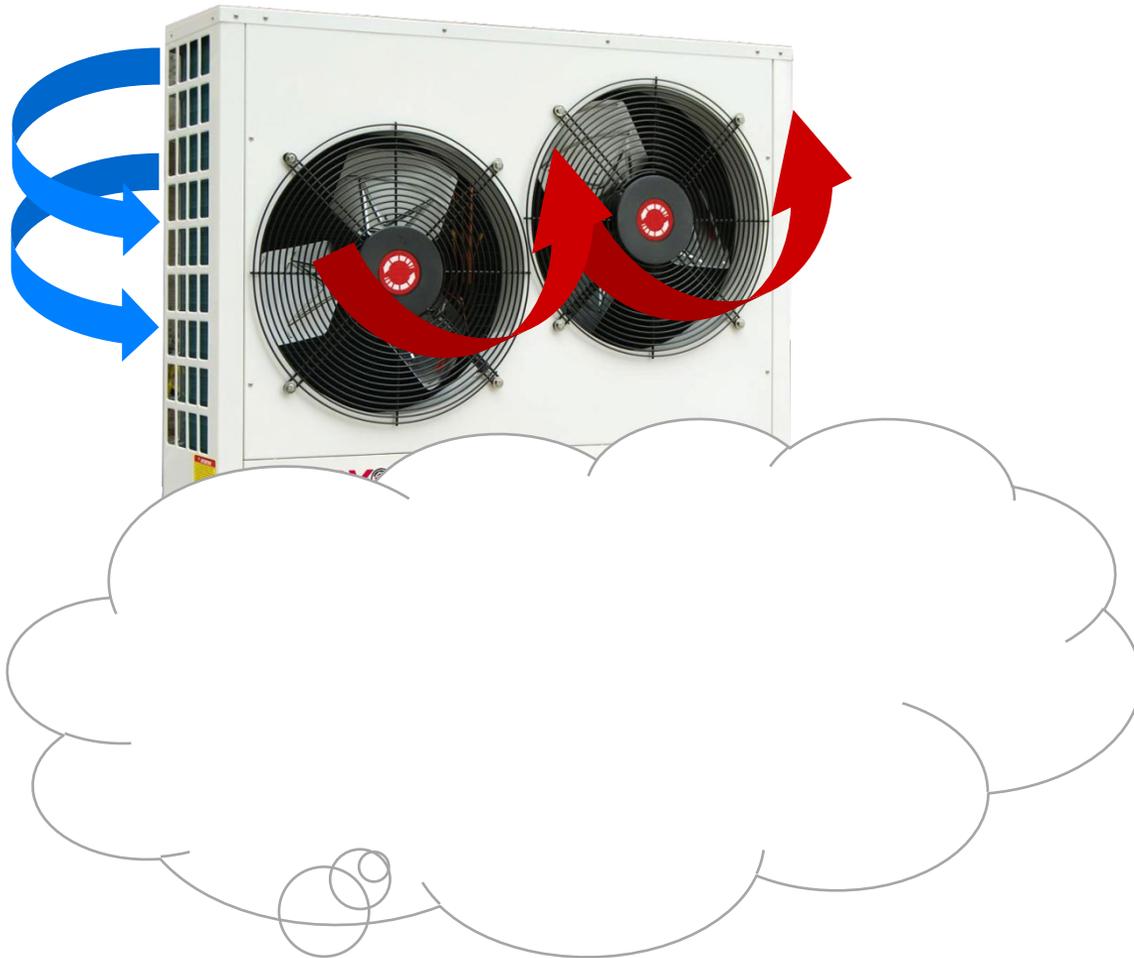
Combination Space Heating + Possible 100% Domestic Hot Water

Combination **thermal storage buffer tank**
 Low-temperature **space heating**
 On-demand **domestic hot water** supply for up to 100%
 load coverage – with built-in **electric backup**



INSTALLATION, & LAYOUT





SYSTEM DESIGN

Horizontal Discharge

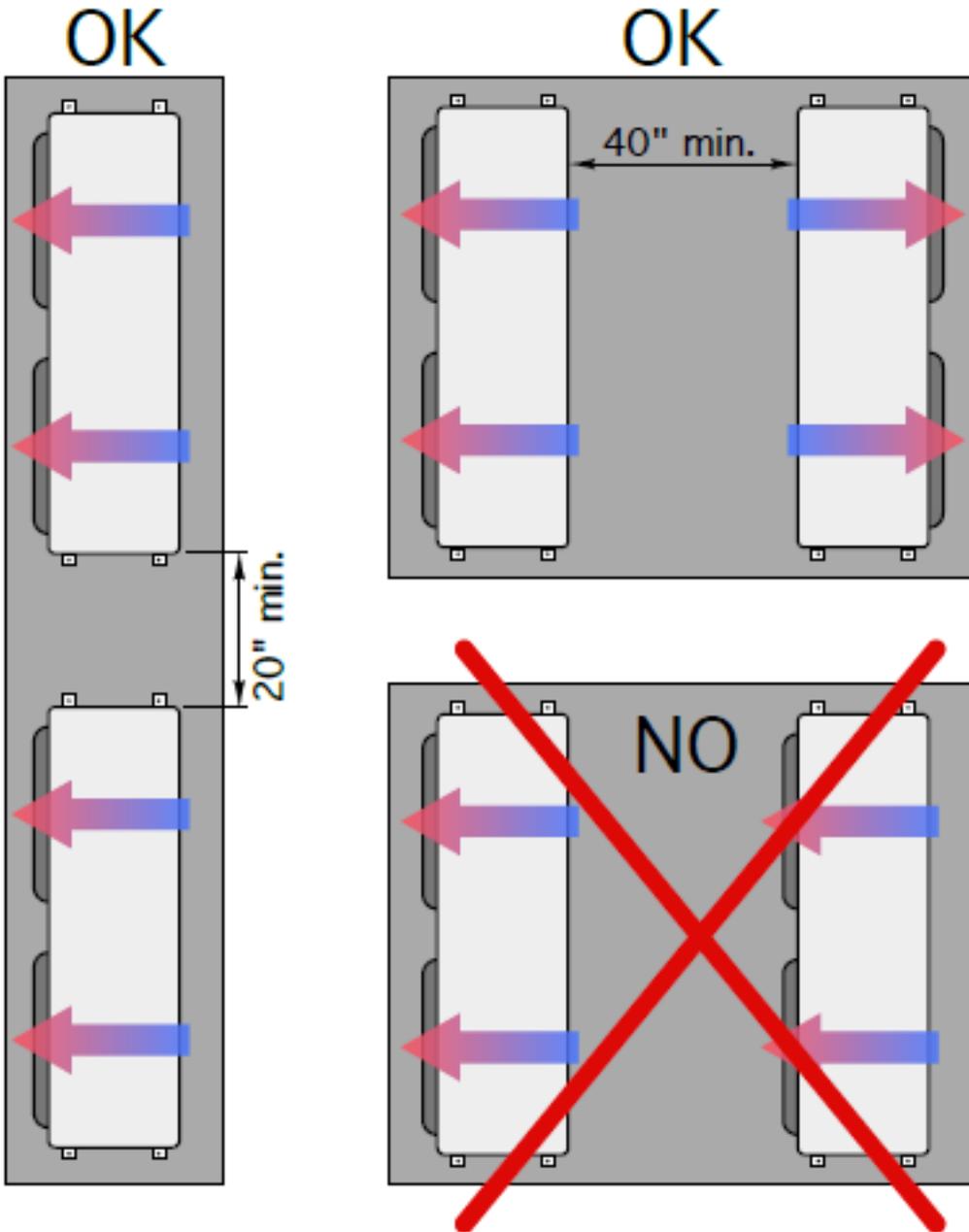
Standard on all Solstice models

Allows for installation under decks & other remote mounting options

Examples

Allowing for Design & Air Flow & Defrost





SYSTEM DESIGN

Airflow & Defrost Runoff

Be Mindful When Installing

- Airflow is crucial for system performance
- Assure foliage used to disguise does not cause any restrictions
- Be sure to locate away from any form of combustion exhaust

Potential for Air Flow AND Piping Complications



Multiple Heat Pump Applications



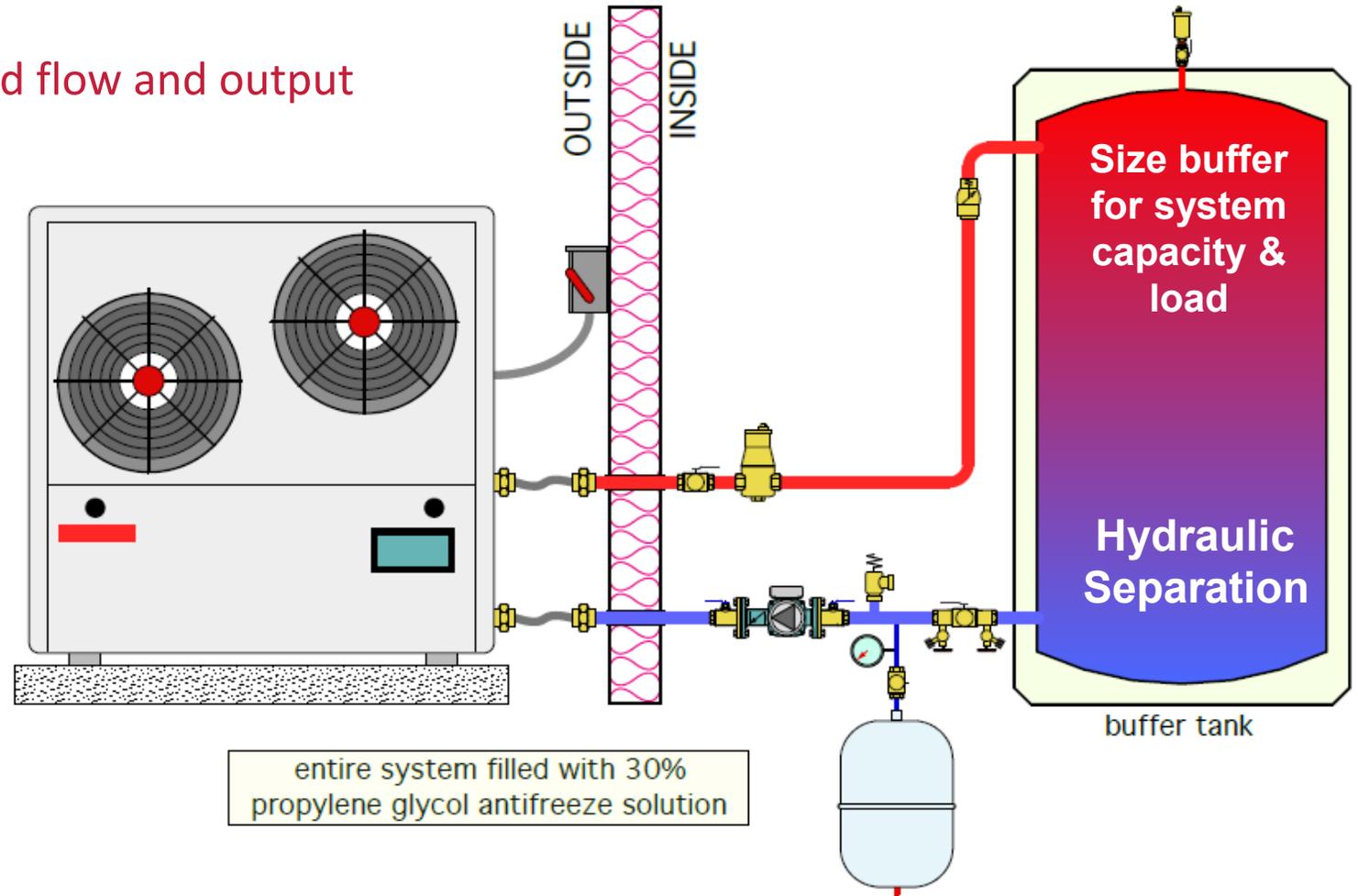
Multi-Unit Examples



The Basic System (the first step)

Be sure to size pump & pipe for required flow and output

NOTE: Buffer tanks provide the location for hydraulic separation, the system can operate 12 GPM flow on heat pump side and 1 GPM on the system side





SYSTEM DESIGN

Sizing – Keep it Simple

Buffer/System Volume must be equal to or greater than 7.5 gallons per nominal ton of unit's capacity at its lowest turndown (Heating or Cooling - whichever is larger)

Example: If the unit's minimum turndown is 20k btu then the smallest buffer tank suggested would be our 13 Gallon 4 pipe Buffer Tank (BT13-H)

Note: Remember to consider the “systems” capacity. In a situation where there is a large volume (Cast Iron Radiators) you may want a larger buffer to accommodate a larger inrush of “load” and to prevent temperature swings.

Take everything into account when sizing piping system

Piping Pressure Losses*

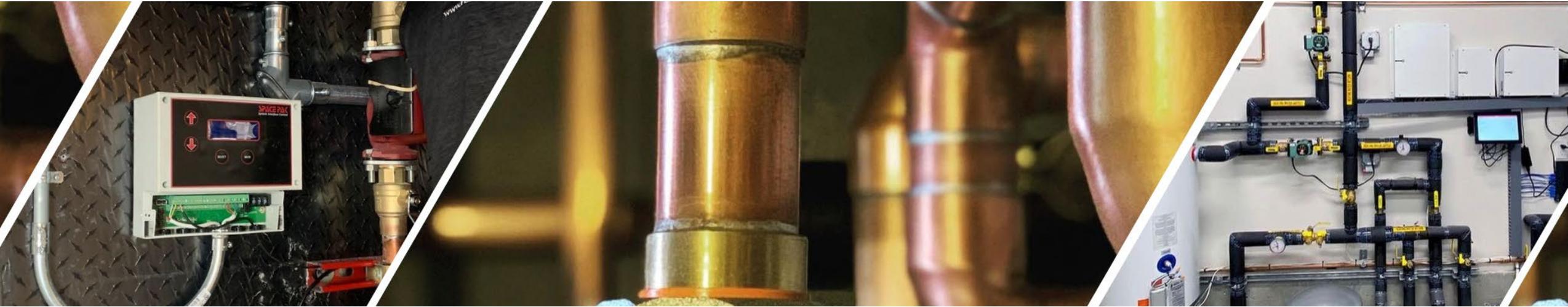
	Pressure Drop, Ft water/100Ft			
Flow rate GPM	1"	1-1/4"	1-1/2"	2"
Pex Pipe				
10	13.4	5.2	2.4	0.6
11	15.9	6.2	2.8	0.7
12	18.5	7.2	3.2	0.9
14	24.4	9.4	4.2	1.2
Copper Pipe (Type L)				
10	7.1	2.6	1.1	0.3
11	8.4	3.1	1.3	0.3
12	9.9	3.6	1.5	0.4
14	13.2	4.8	2	0.5

*Remember to check the CV rating of your fittings and valves to make sure your getting the correct flow through the equipment.

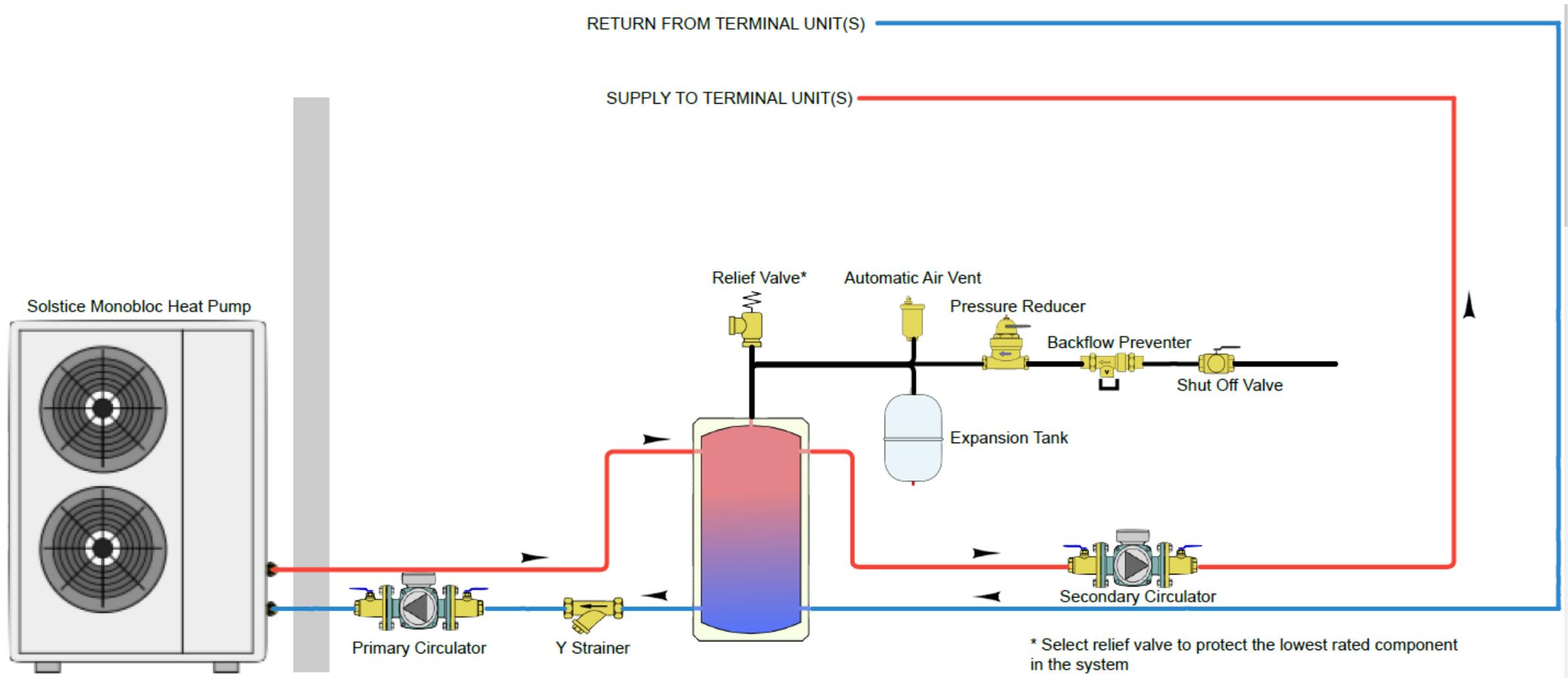


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Questions?

Indoor Piping

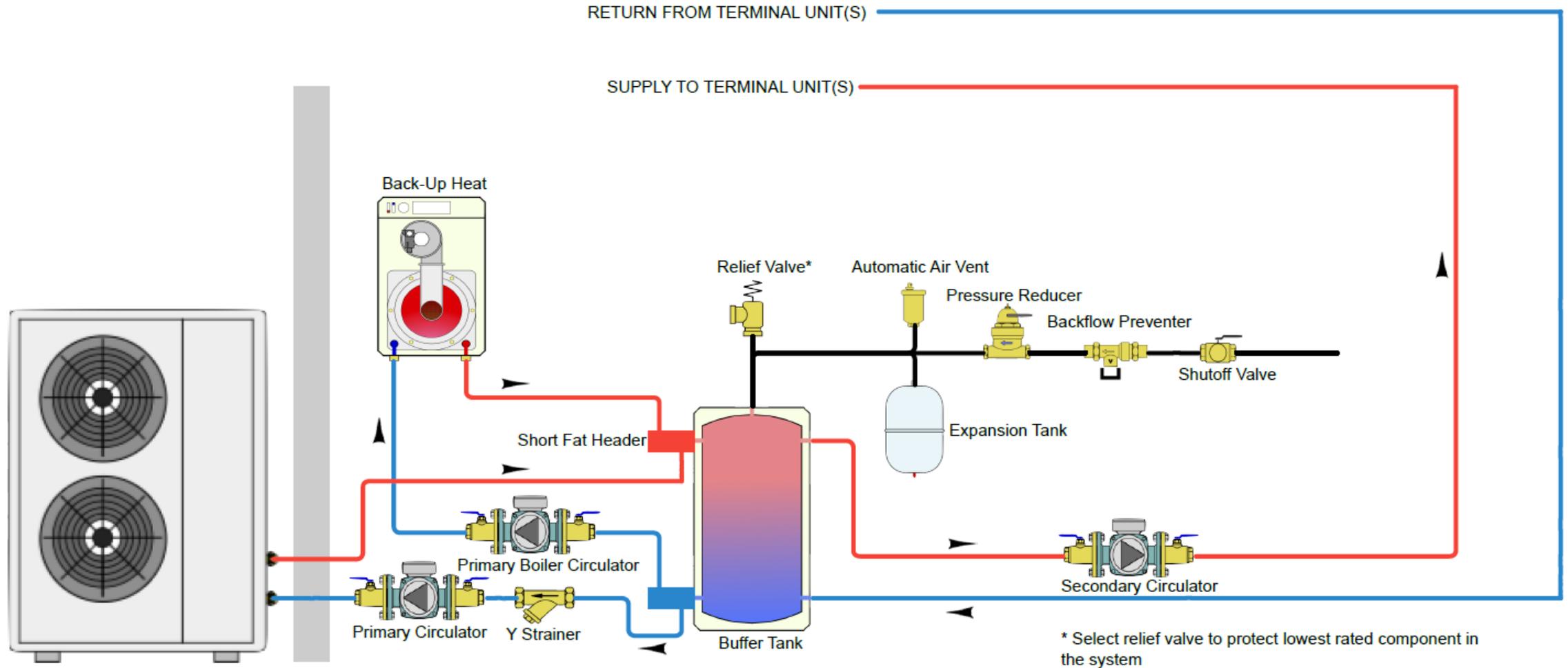


Basic Heat Pump Installation Monobloc



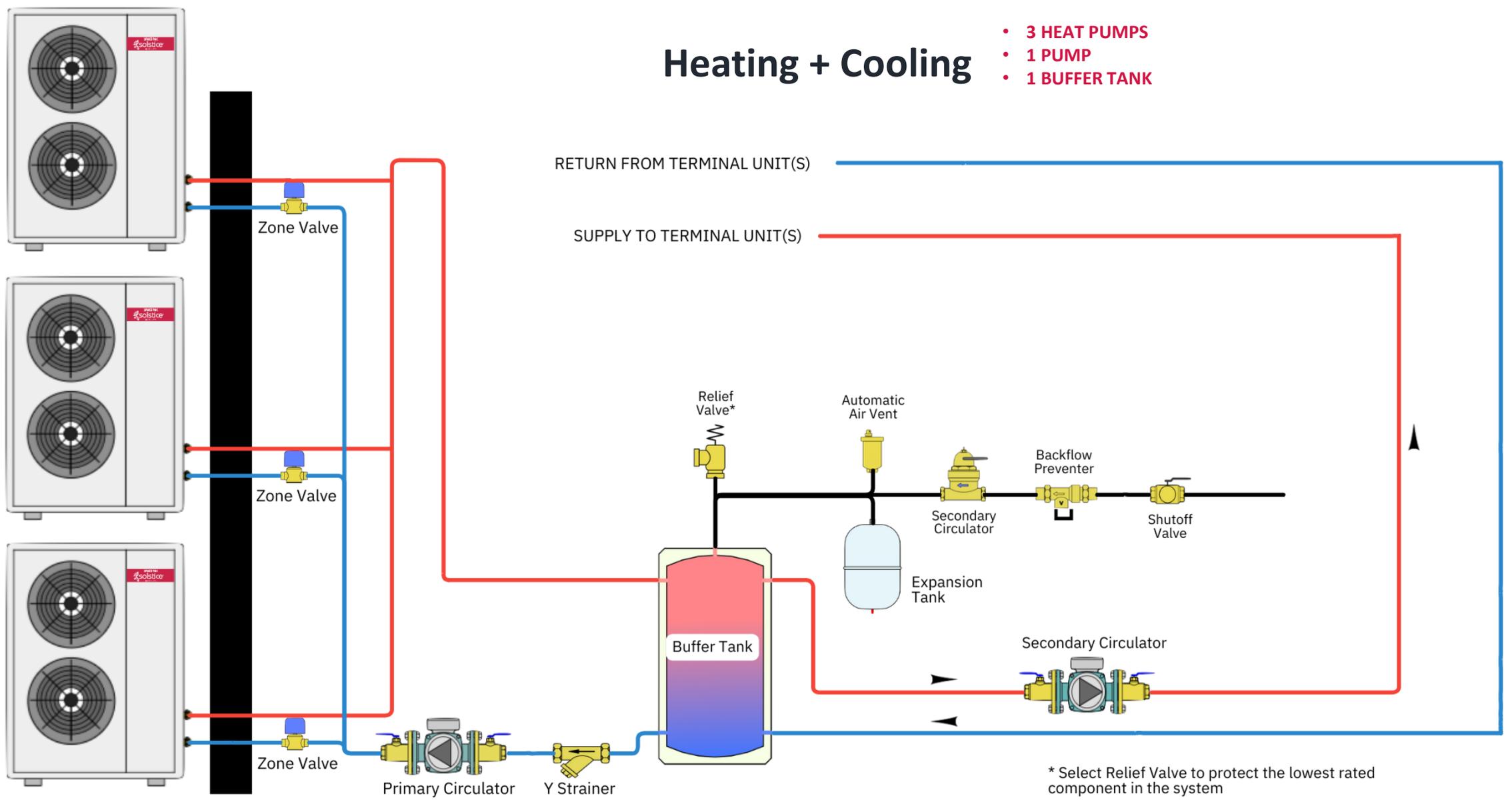
* Select relief valve to protect the lowest rated component in the system

Heat Pump With Backup Heat (Oil/Electric/Propane)



Heating + Cooling

- 3 HEAT PUMPS
- 1 PUMP
- 1 BUFFER TANK



RETURN FROM TERMINAL UNIT(S)

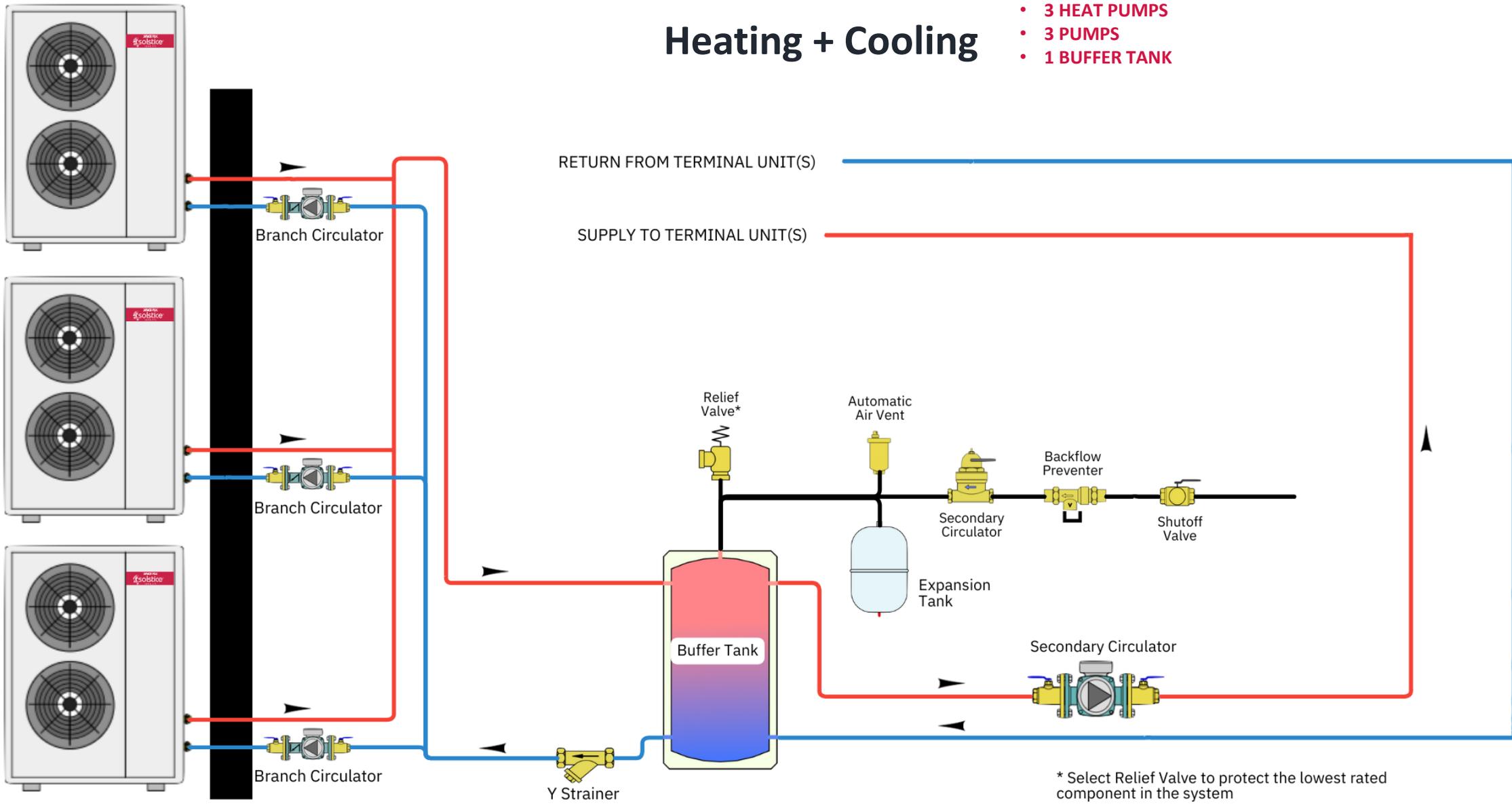
SUPPLY TO TERMINAL UNIT(S)

* Select Relief Valve to protect the lowest rated component in the system

Solstice Monobloc Air to Water Heat Pumps

Heating + Cooling

- 3 HEAT PUMPS
- 3 PUMPS
- 1 BUFFER TANK

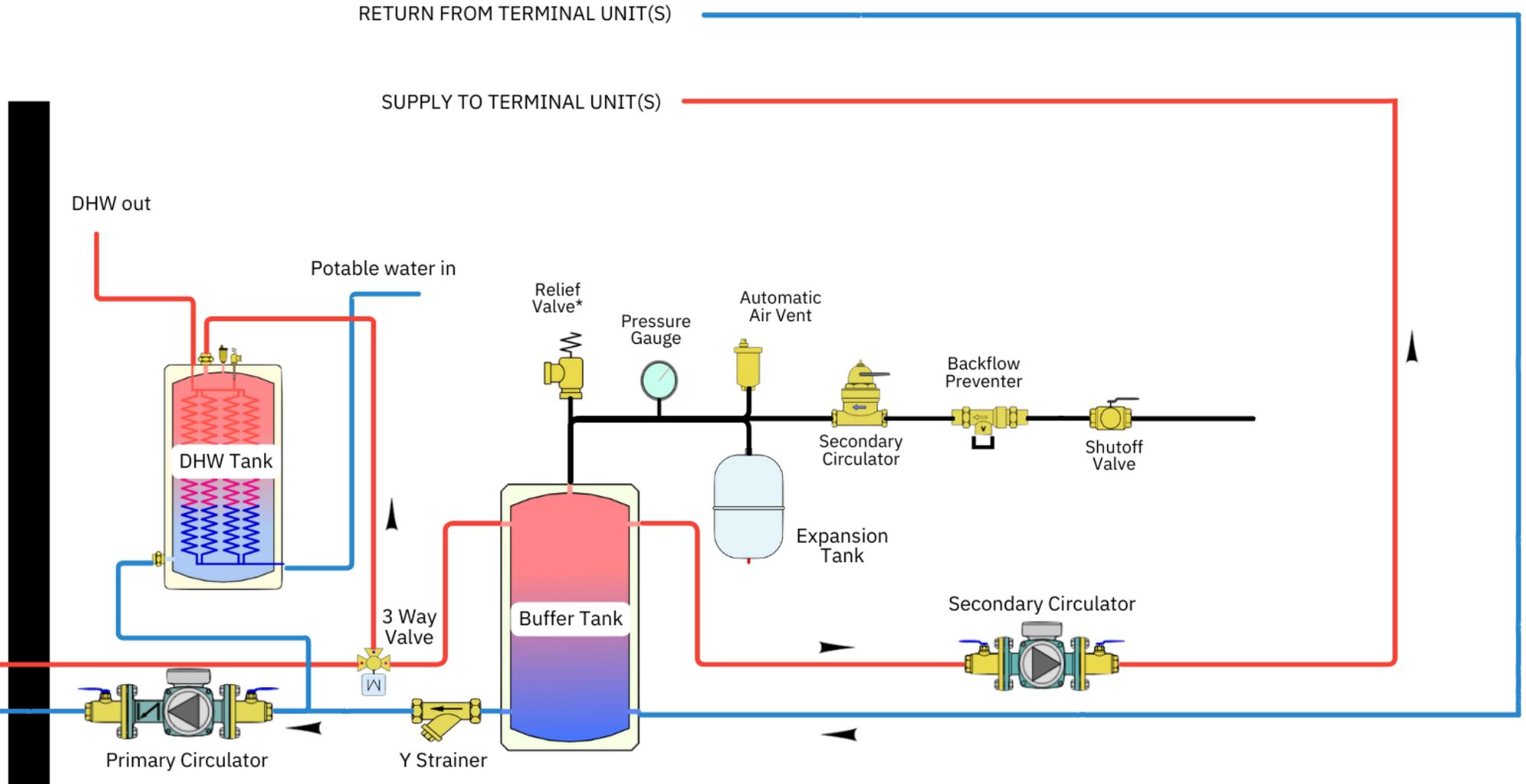


* Select Relief Valve to protect the lowest rated component in the system

Solstice Monobloc Air to Water Heat Pumps

Heating + Cooling + Domestic Hot Water

- 1 HEAT PUMP
- 1 BUFFER TANK
- 1 DHW TANK

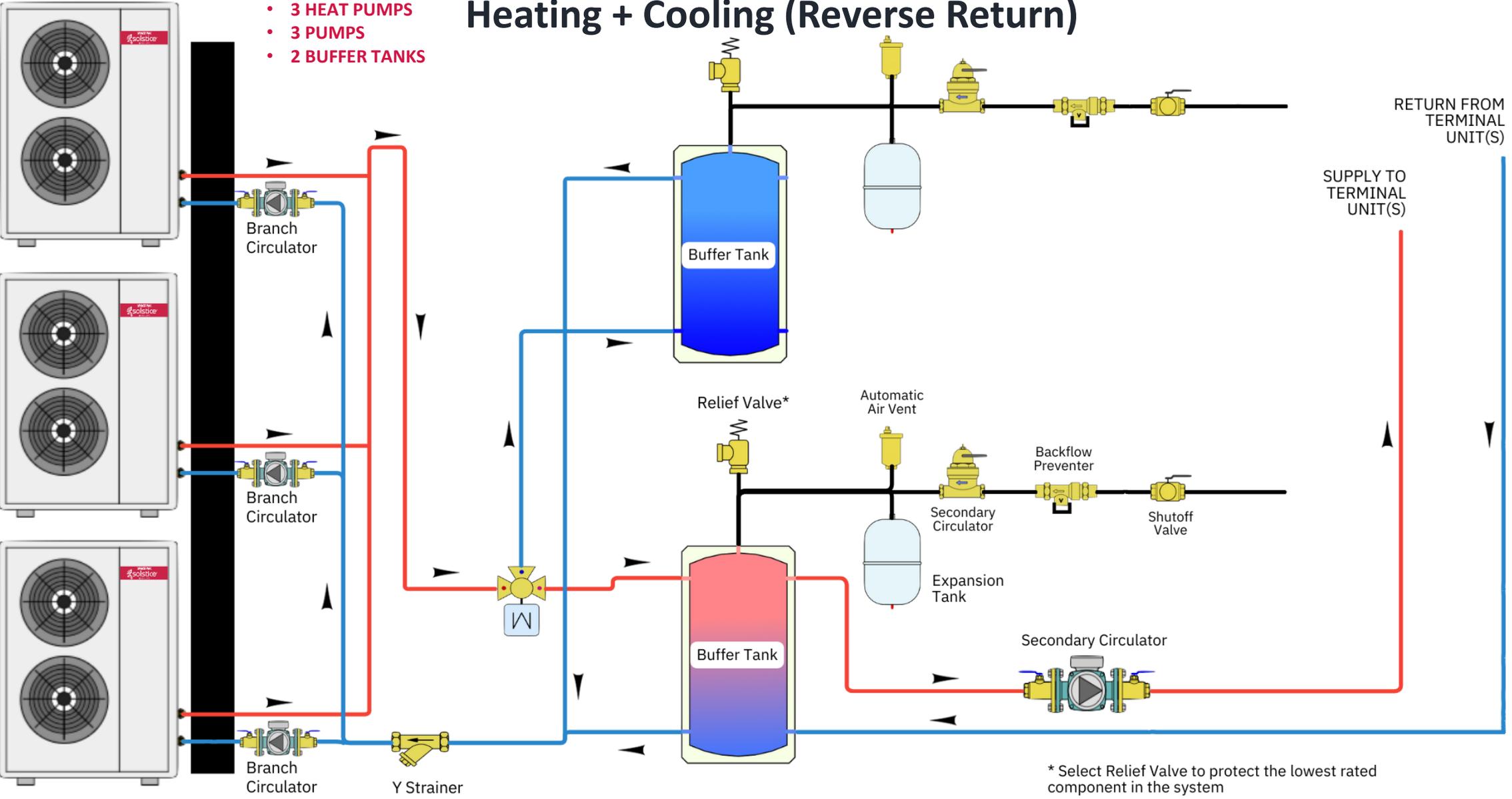


* Select Relief Valve to protect the lowest rated component in the system

Solstice Monobloc Air to Water Heat Pump

Heating + Cooling (Reverse Return)

- 3 HEAT PUMPS
- 3 PUMPS
- 2 BUFFER TANKS



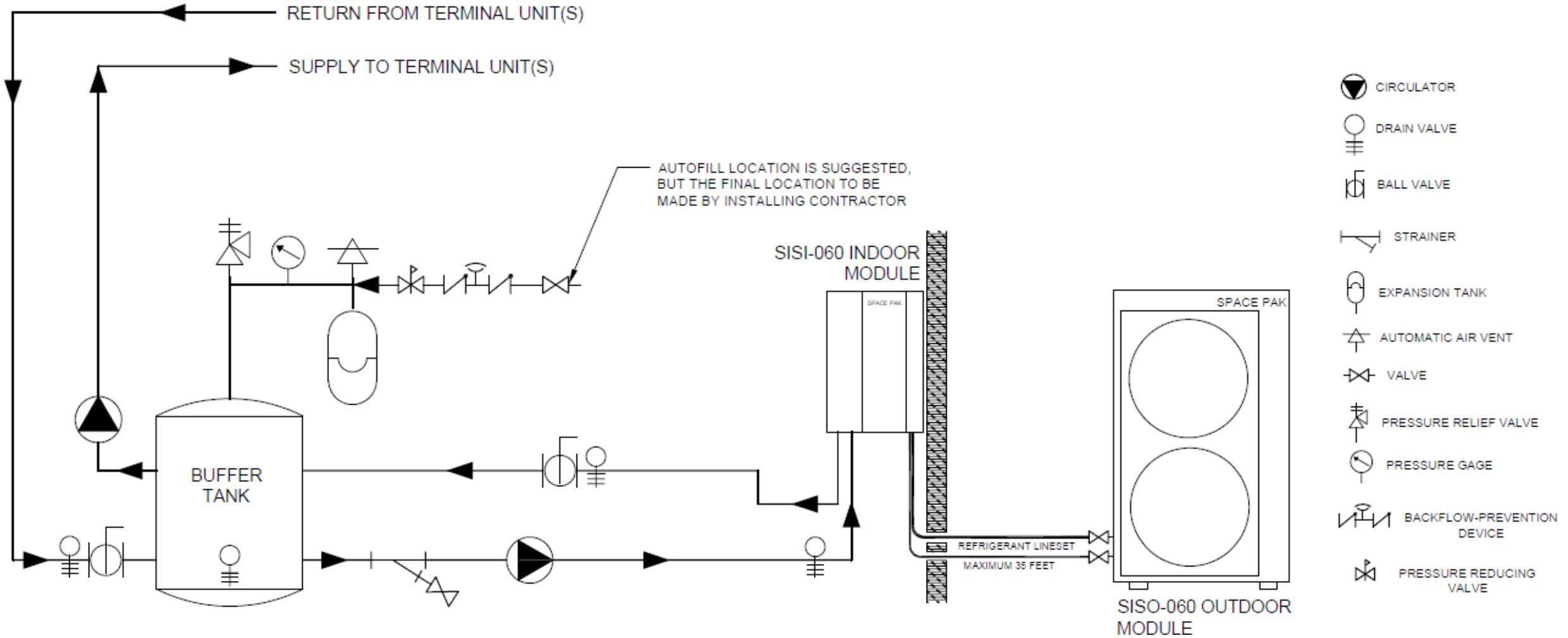
RETURN FROM
TERMINAL
UNIT(S)

SUPPLY TO
TERMINAL
UNIT(S)

Solstice Monobloc Air to Water Heat Pumps

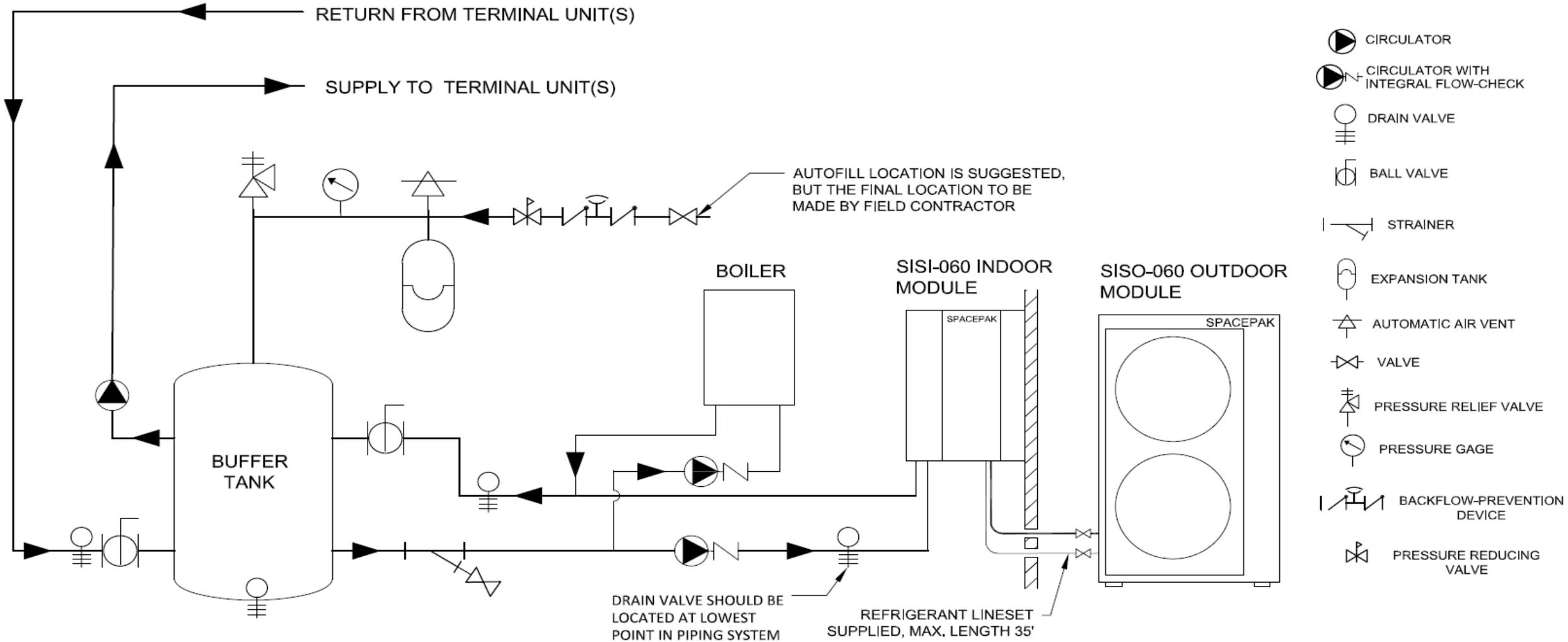
* Select Relief Valve to protect the lowest rated component in the system

Basic Split System

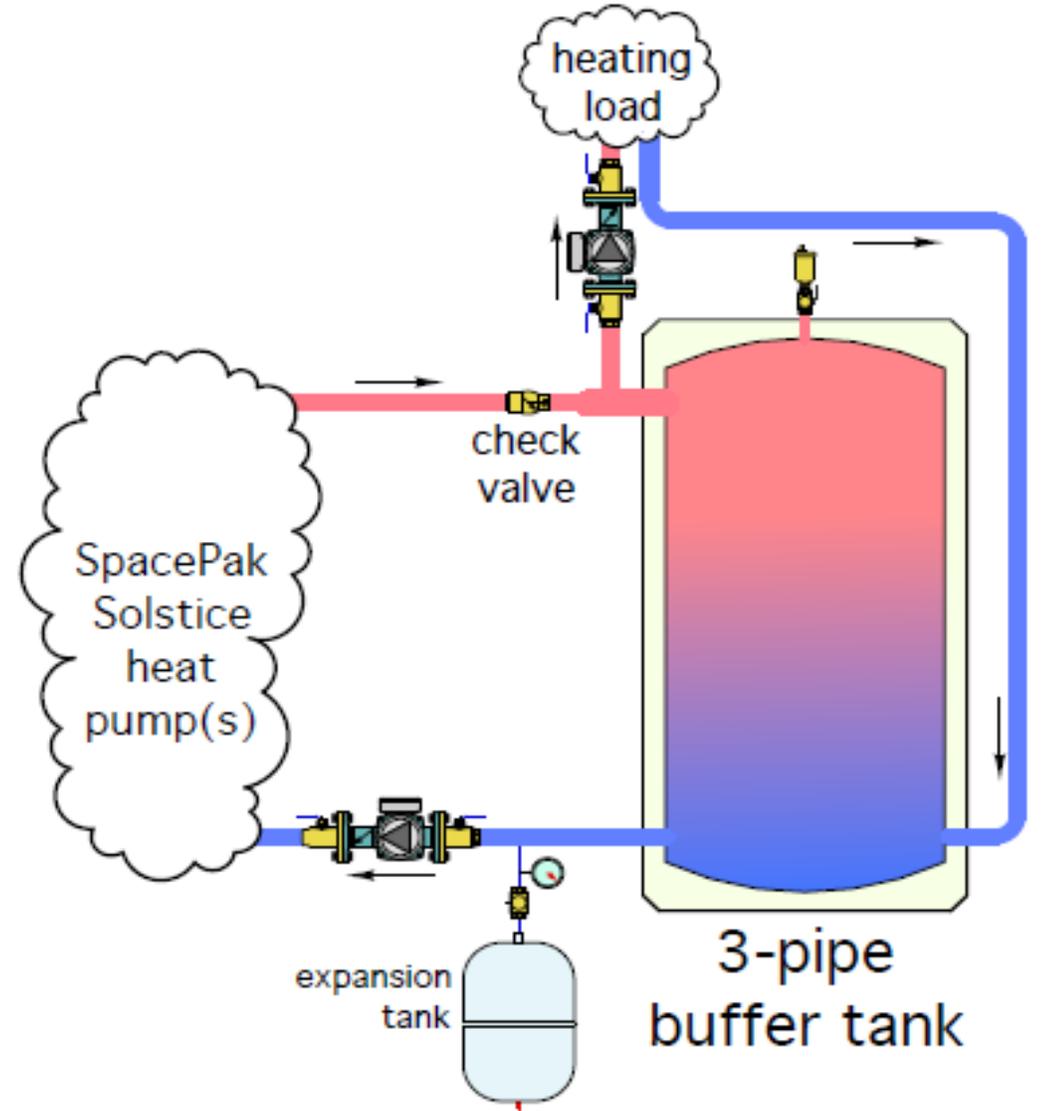
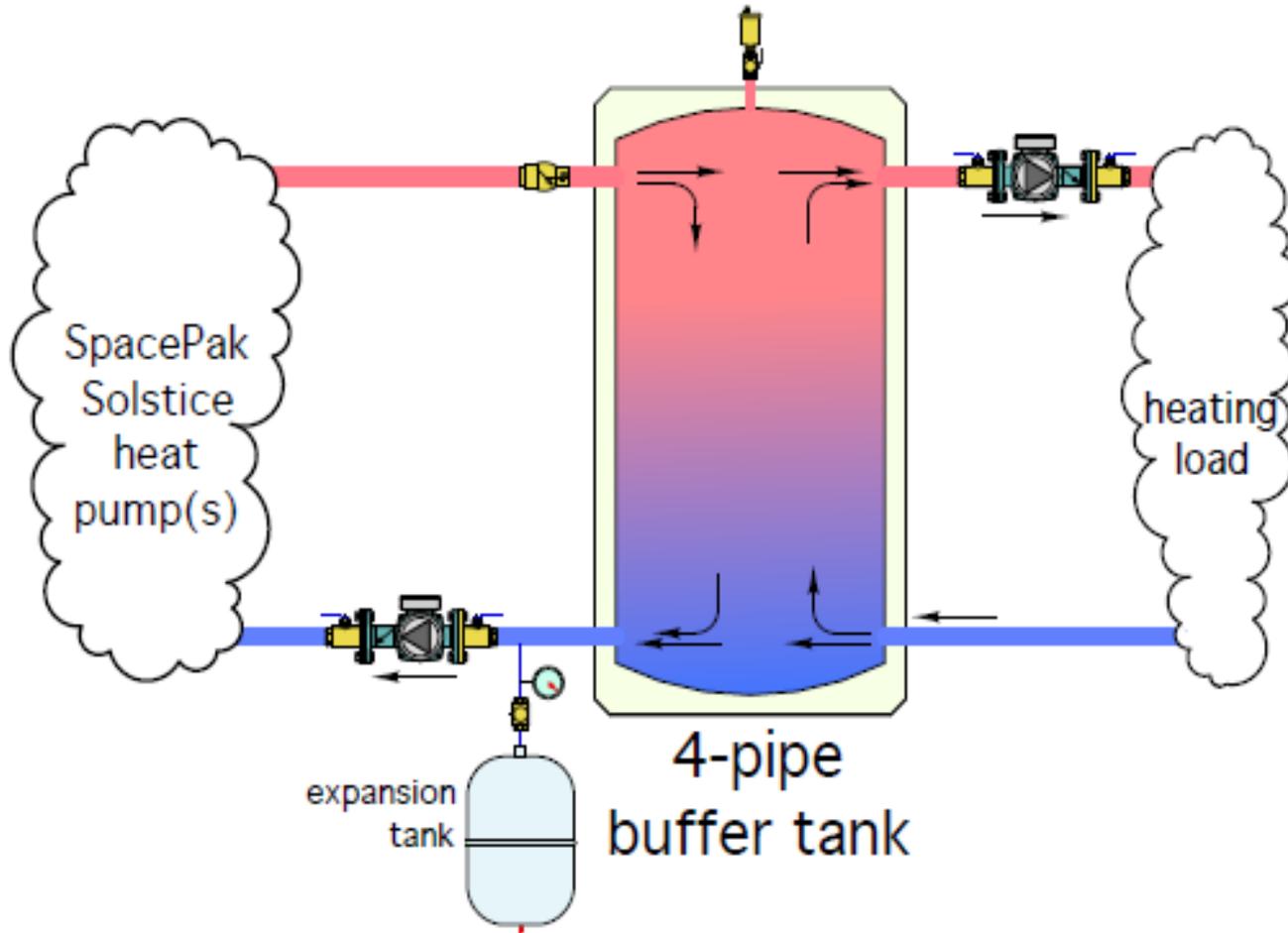


- CIRCULATOR
- DRAIN VALVE
- BALL VALVE
- STRAINER
- EXPANSION TANK
- AUTOMATIC AIR VENT
- VALVE
- PRESSURE RELIEF VALVE
- PRESSURE GAGE
- BACKFLOW-PREVENTION DEVICE
- PRESSURE REDUCING VALVE

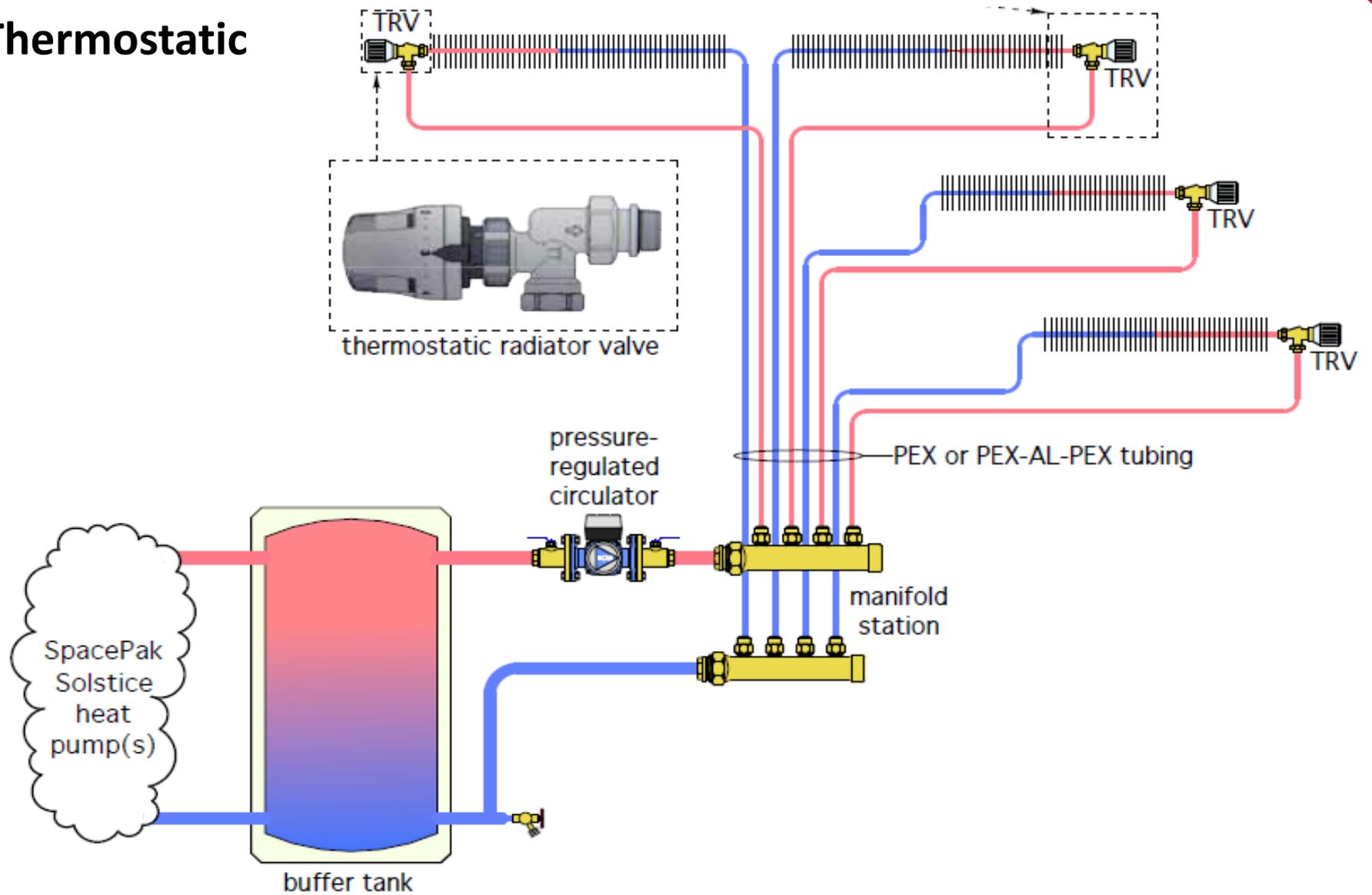
Split System with Boiler Backup



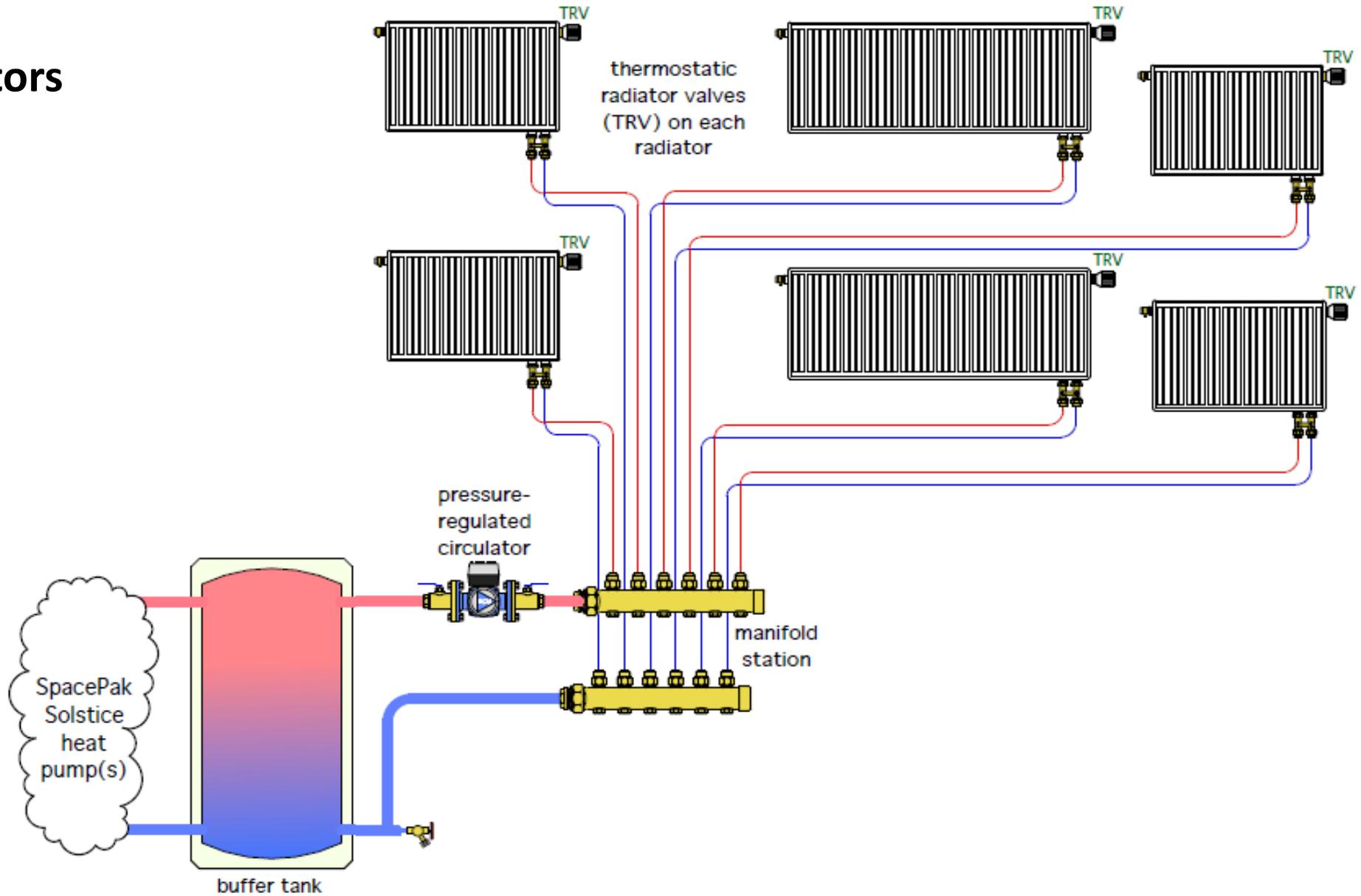
Basic Plumbing Options



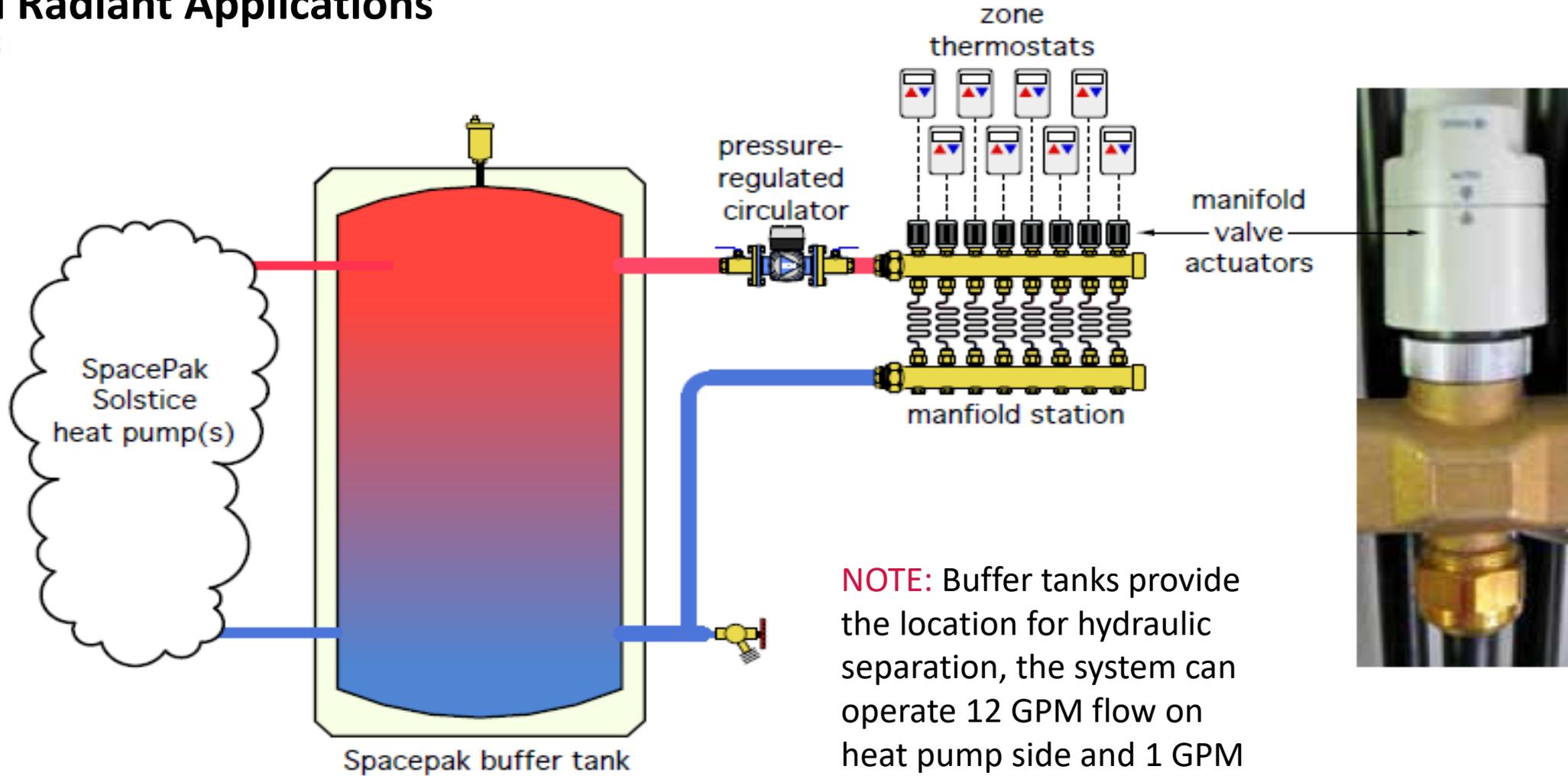
Heat Pump with Thermostatic Valve Application



Panel Radiators

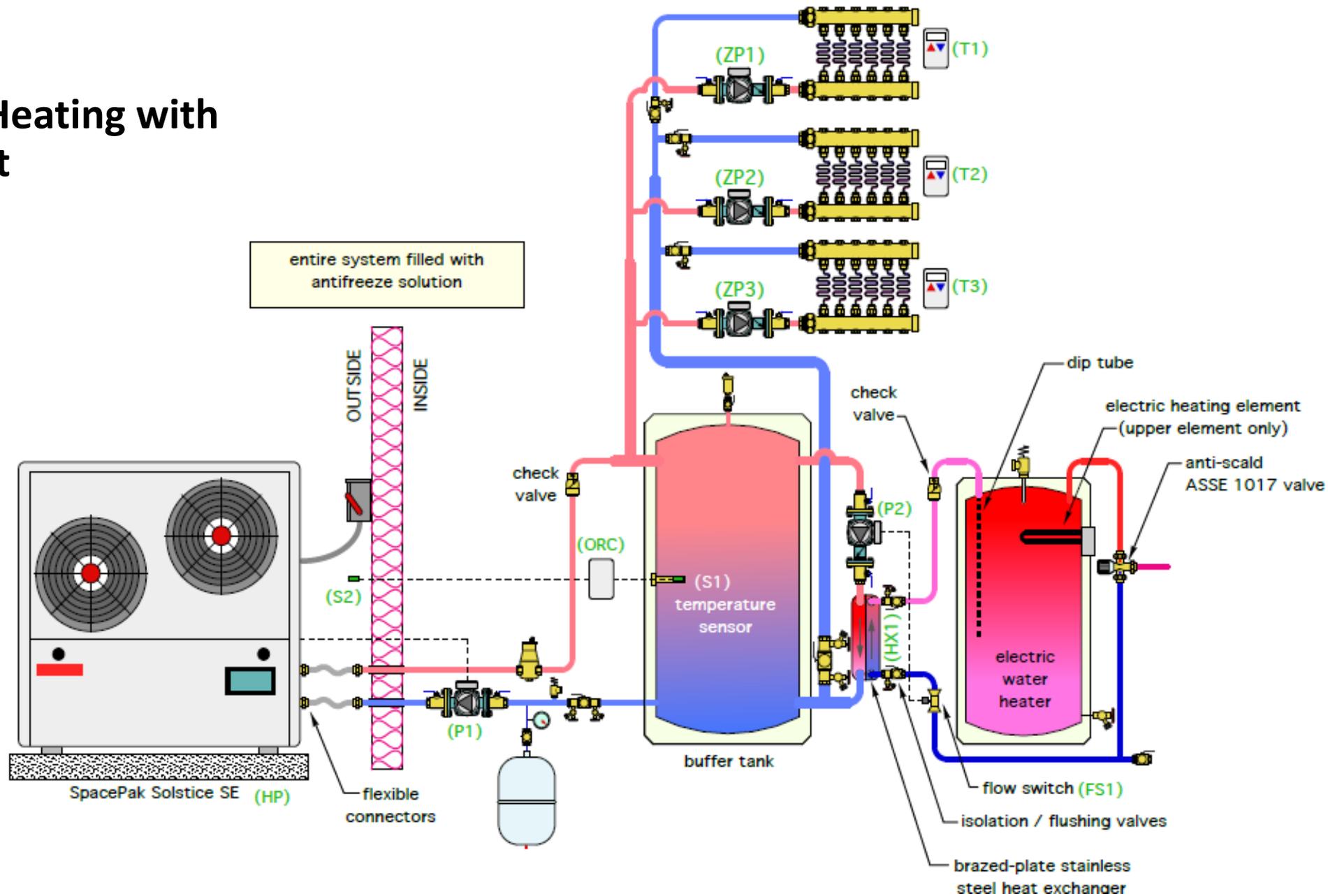


Zoned Radiant Applications

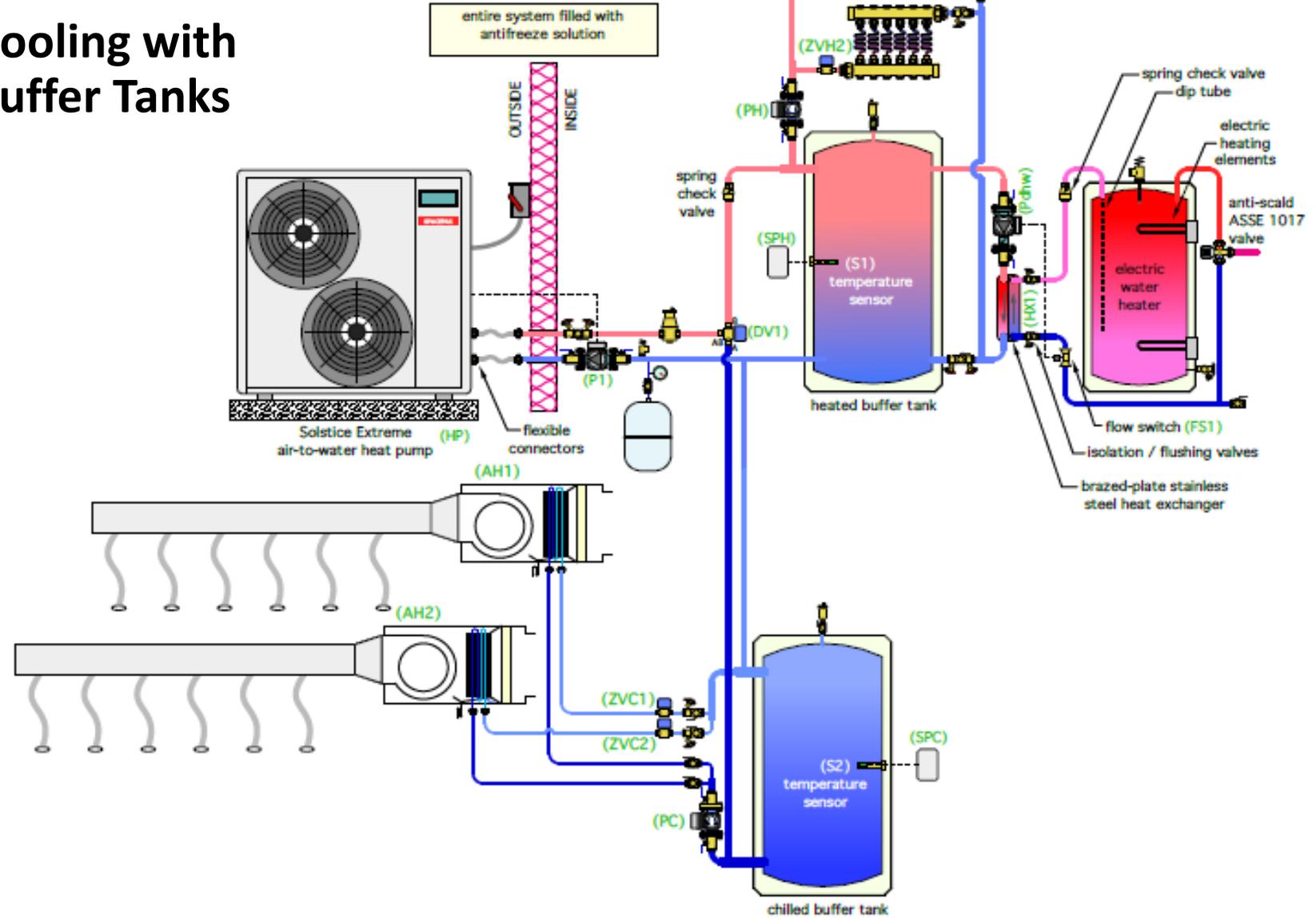


NOTE: Buffer tanks provide the location for hydraulic separation, the system can operate 12 GPM flow on heat pump side and 1 GPM on the system side.

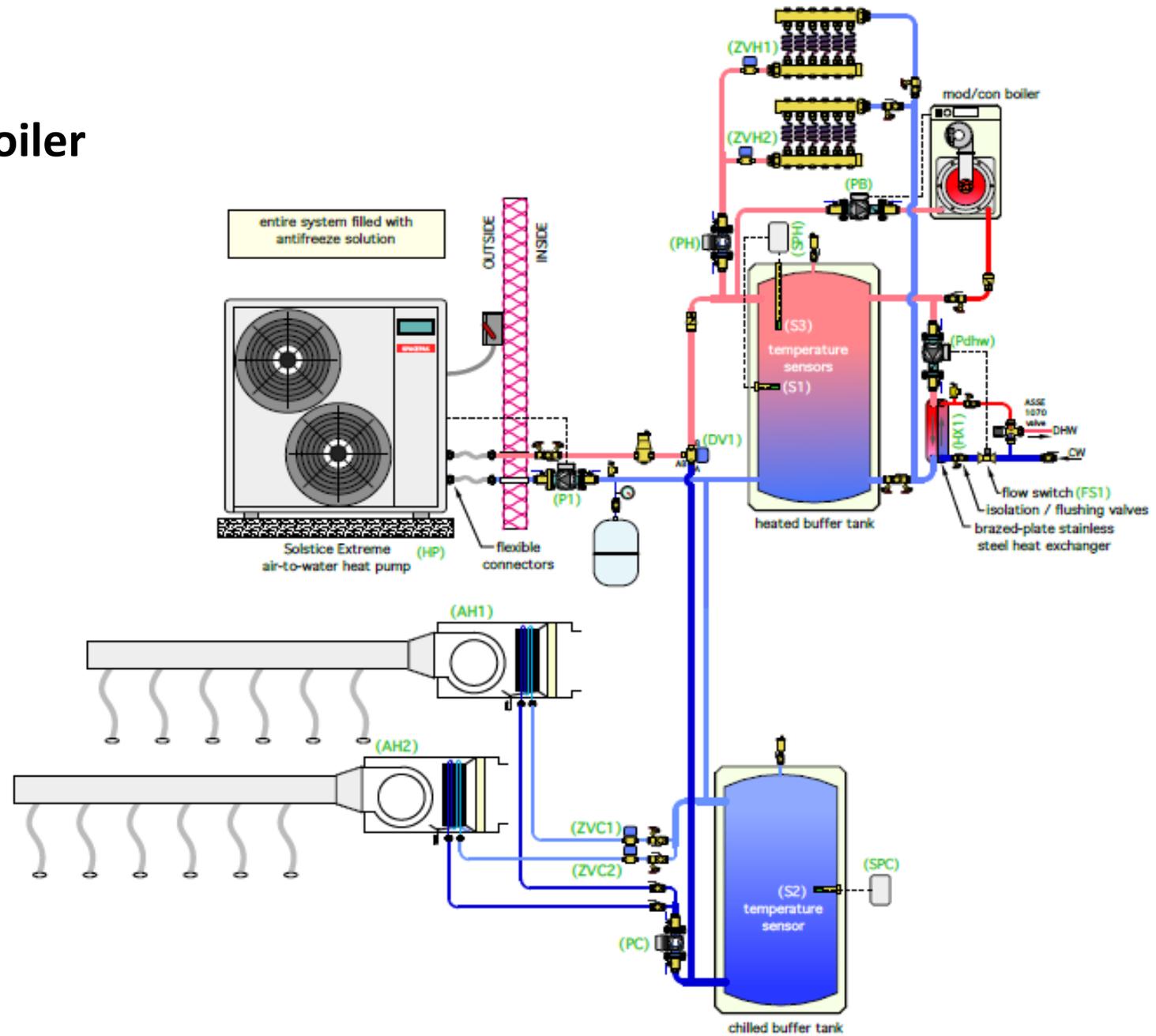
Radiant Heating with HW Reset



Radiant Heating & Cooling with HW Preheat and 2 Buffer Tanks



Heating & Cooling with Boiler and HW Preheat



PLEASE DON'T...

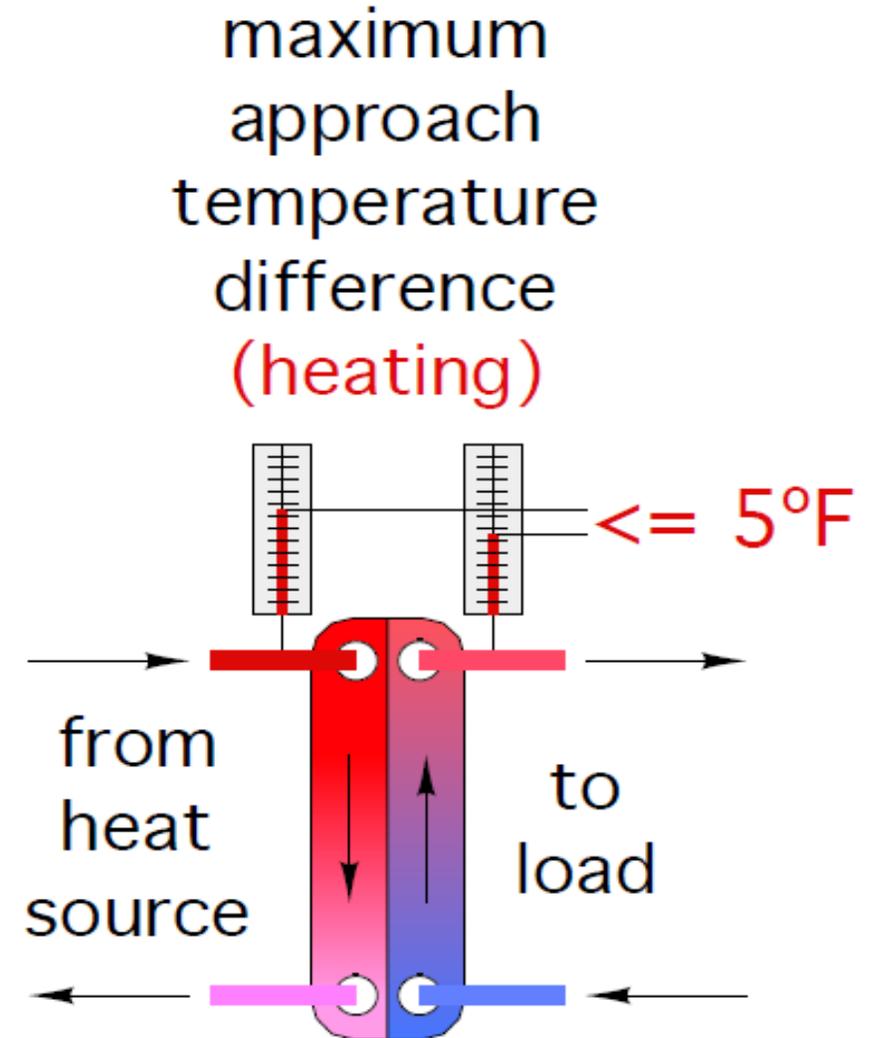




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Questions?

Plate Exchanger Considerations

- Be sure to size heat exchanger properly
- Cold water applications react differently than hot
- If not sized properly short cycling **WILL** occur
- Buffer tank target temperatures are subject to and limited by the exchanger and its capacity
- Cold water temperature differentials can be affected more than in heating applications



Heat Pump with Plate Heat Exchanger

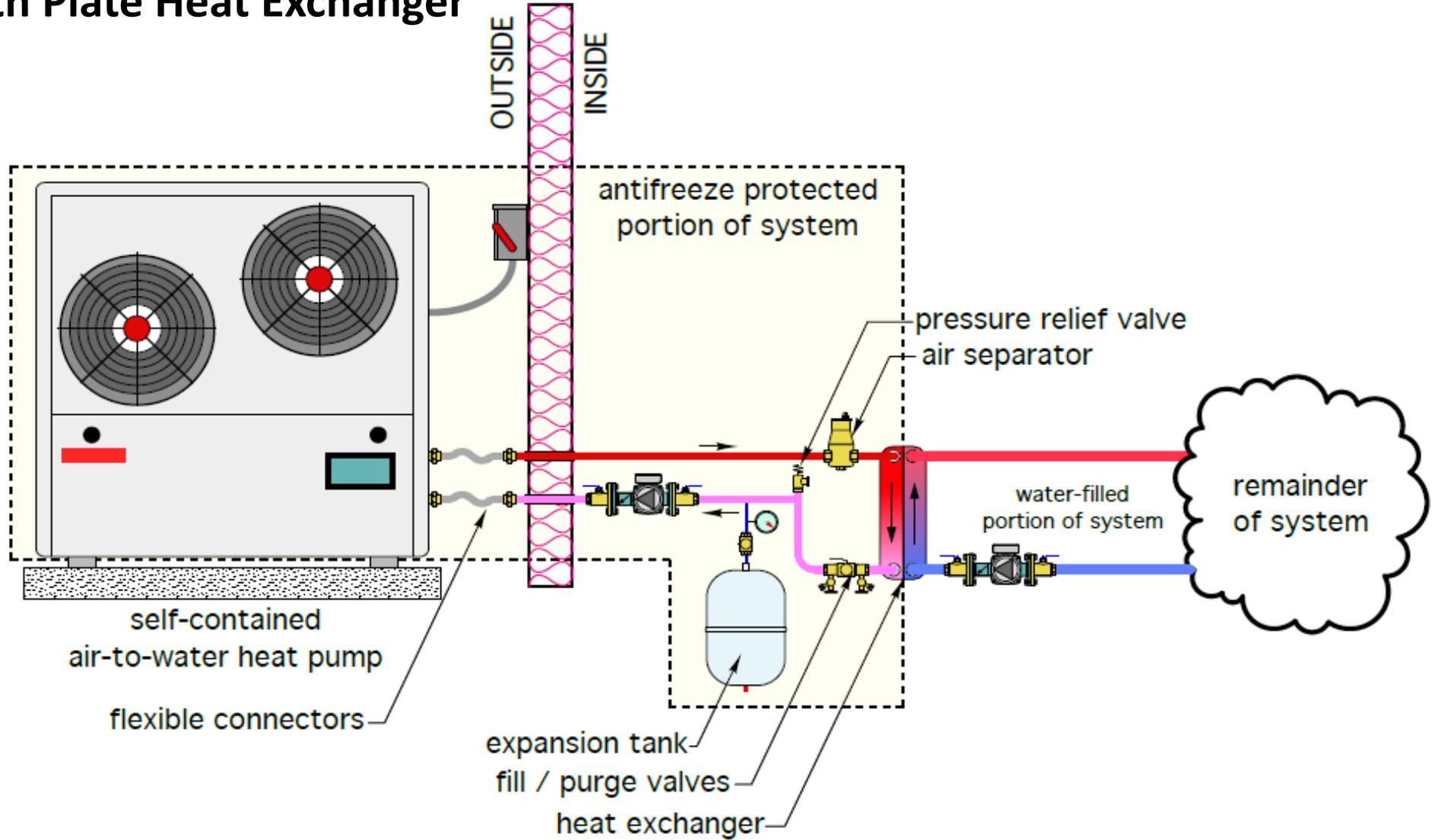


Plate Exchanger Application (900 gallons of storage)



Insulate-Insulate-Insulate



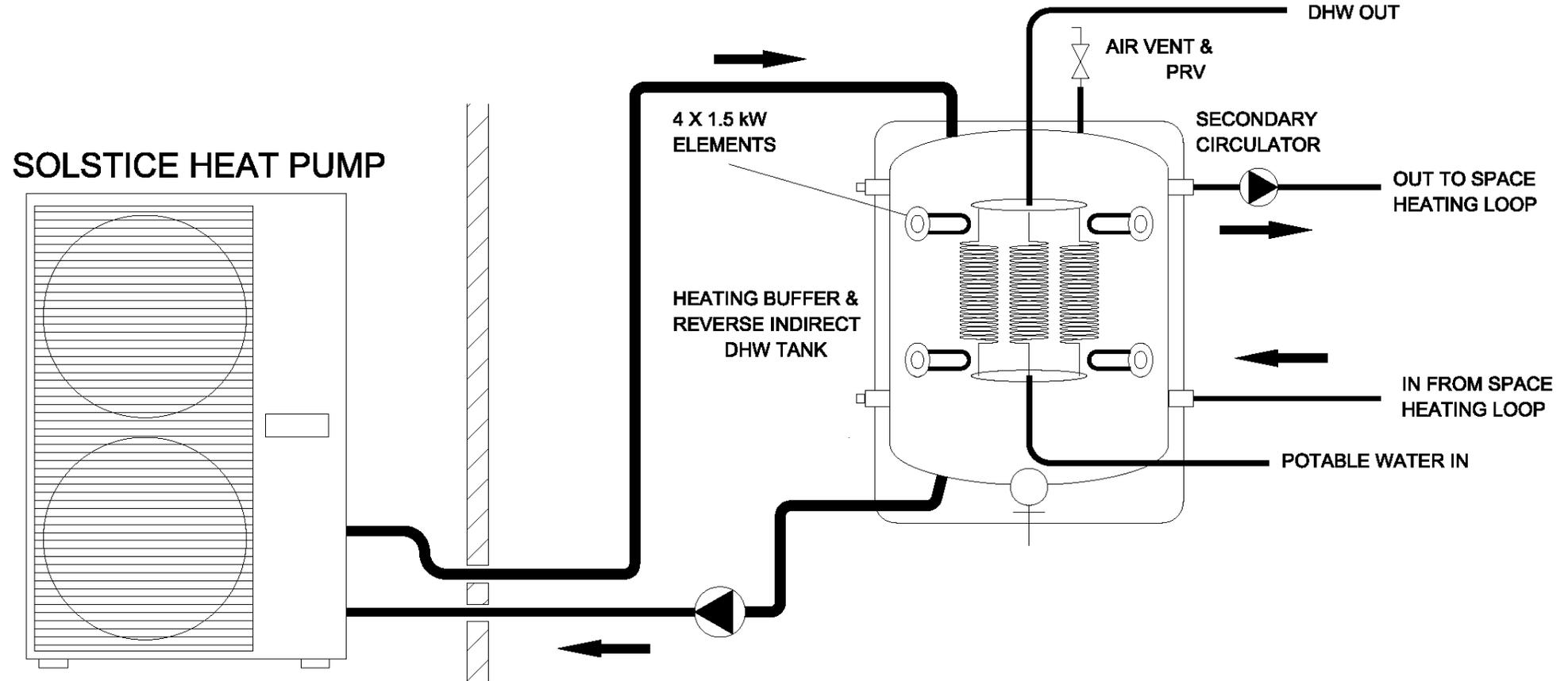
Chilled water WILL result in condensation!

Domestic Hot Water Opportunities



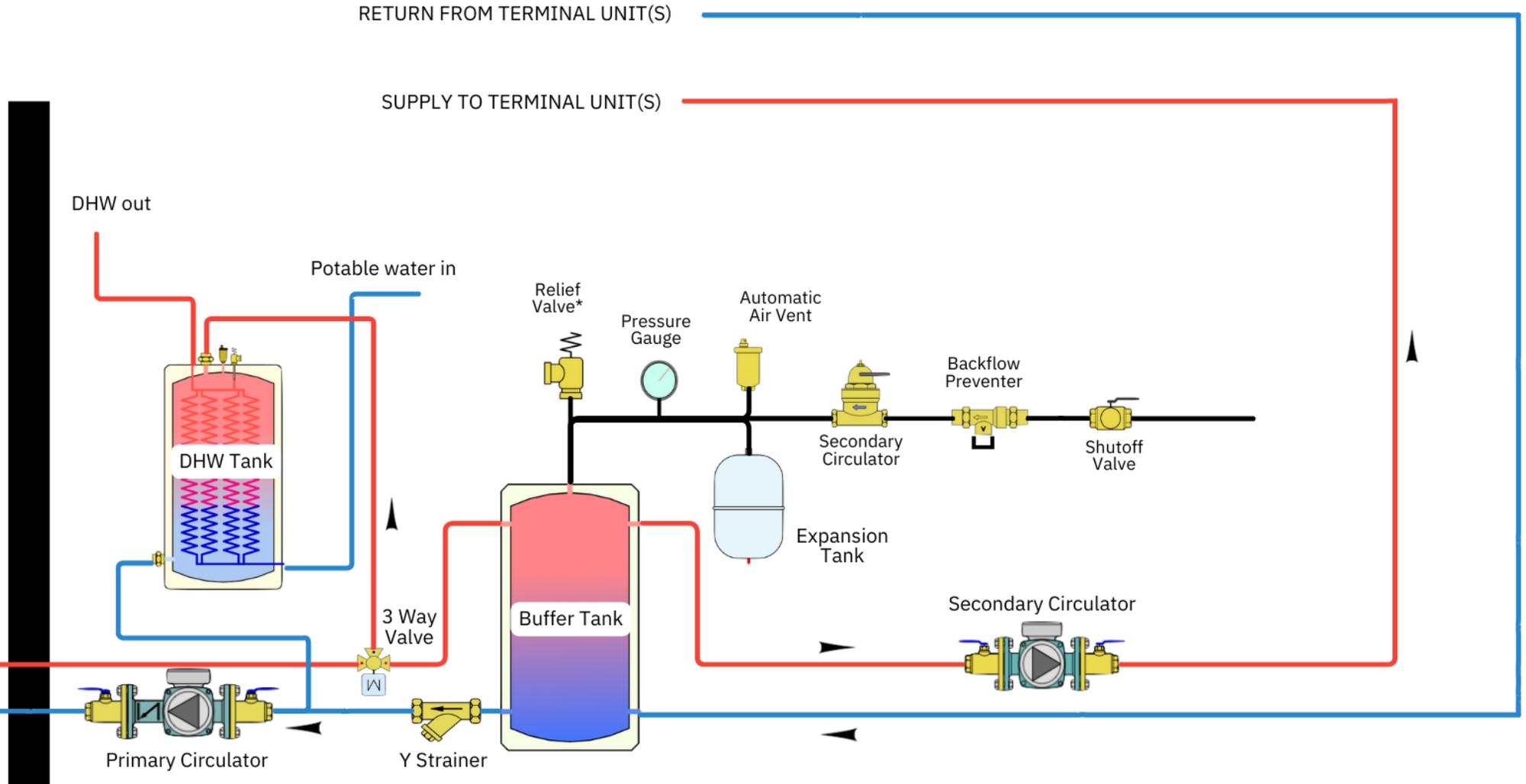
Low-Temp Hybrid Reverse Style Indirect Tank

Combination Thermal Storage Buffer Tanks for Low Temperature Space Heating + up to 100% Domestic Hot Water



Heating + Cooling + Domestic Hot Water

- 1 HEAT PUMP
- 1 BUFFER TANK
- 1 DHW TANK

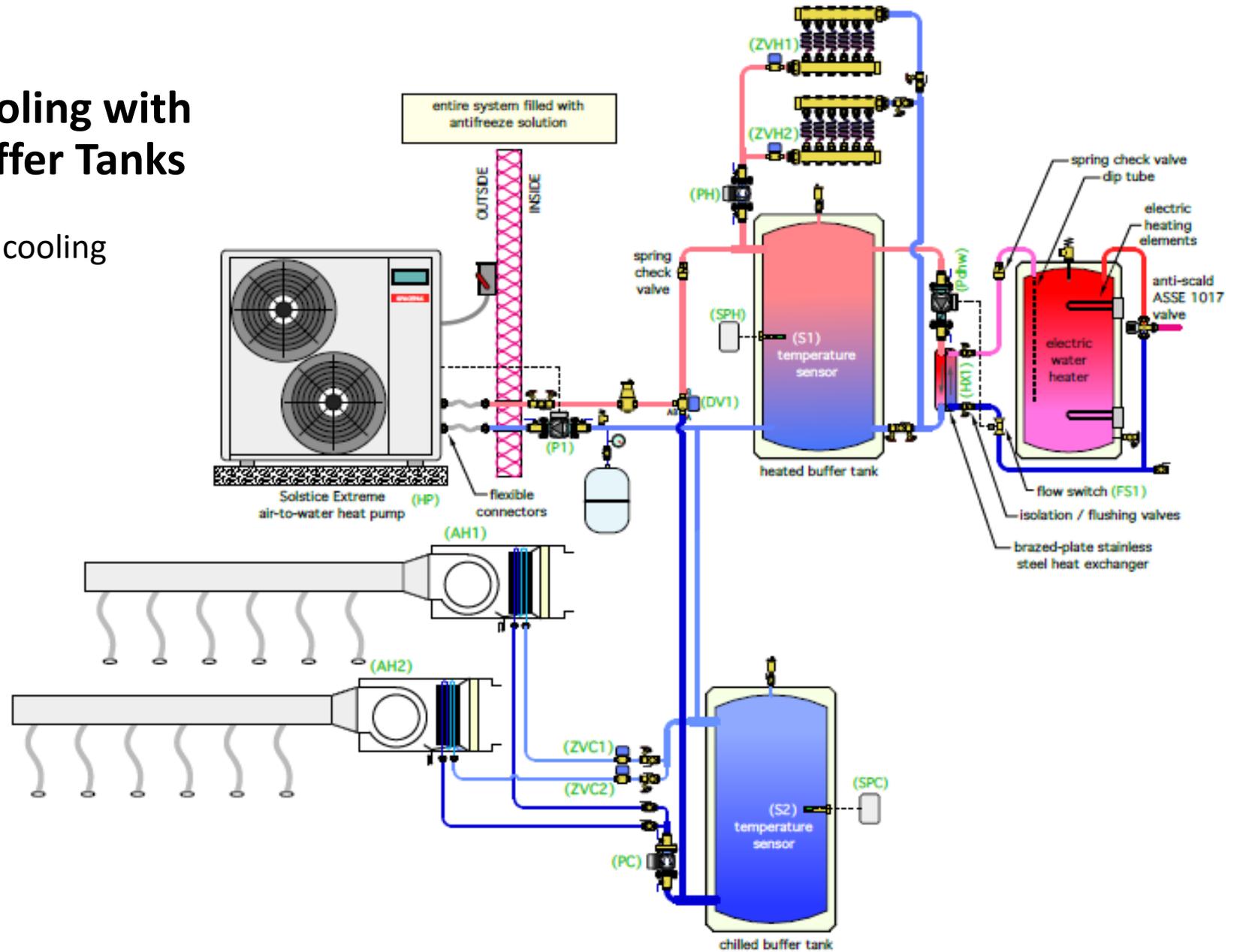


* Select Relief Valve to protect the lowest rated component in the system

Solstice Monobloc Air to Water Heat Pump

Radiant Heating & Cooling with HW Preheat and 2 Buffer Tanks

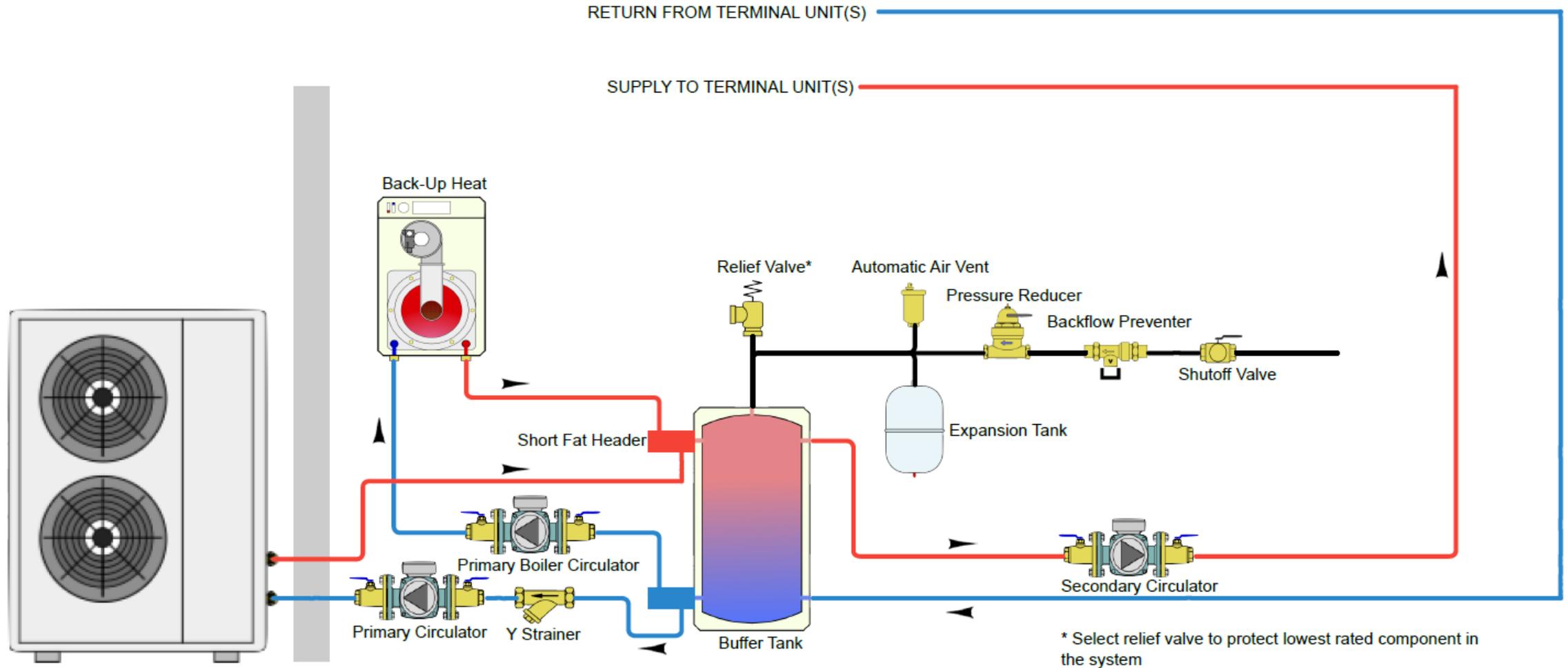
- Simultaneous heating and cooling
- Dehumidification
- Single control platform



Dual-fuel opportunities



Heat Pump With Backup Heat (Oil/Electric/Propane)



How to efficiently control ATWHP Systems



SpacePak System Interface Control (SSIC)

TOTAL HEAT PUMP & HYDRONIC SYSTEM CONTROL

Heating, Cooling, & Domestic Hot Water Production

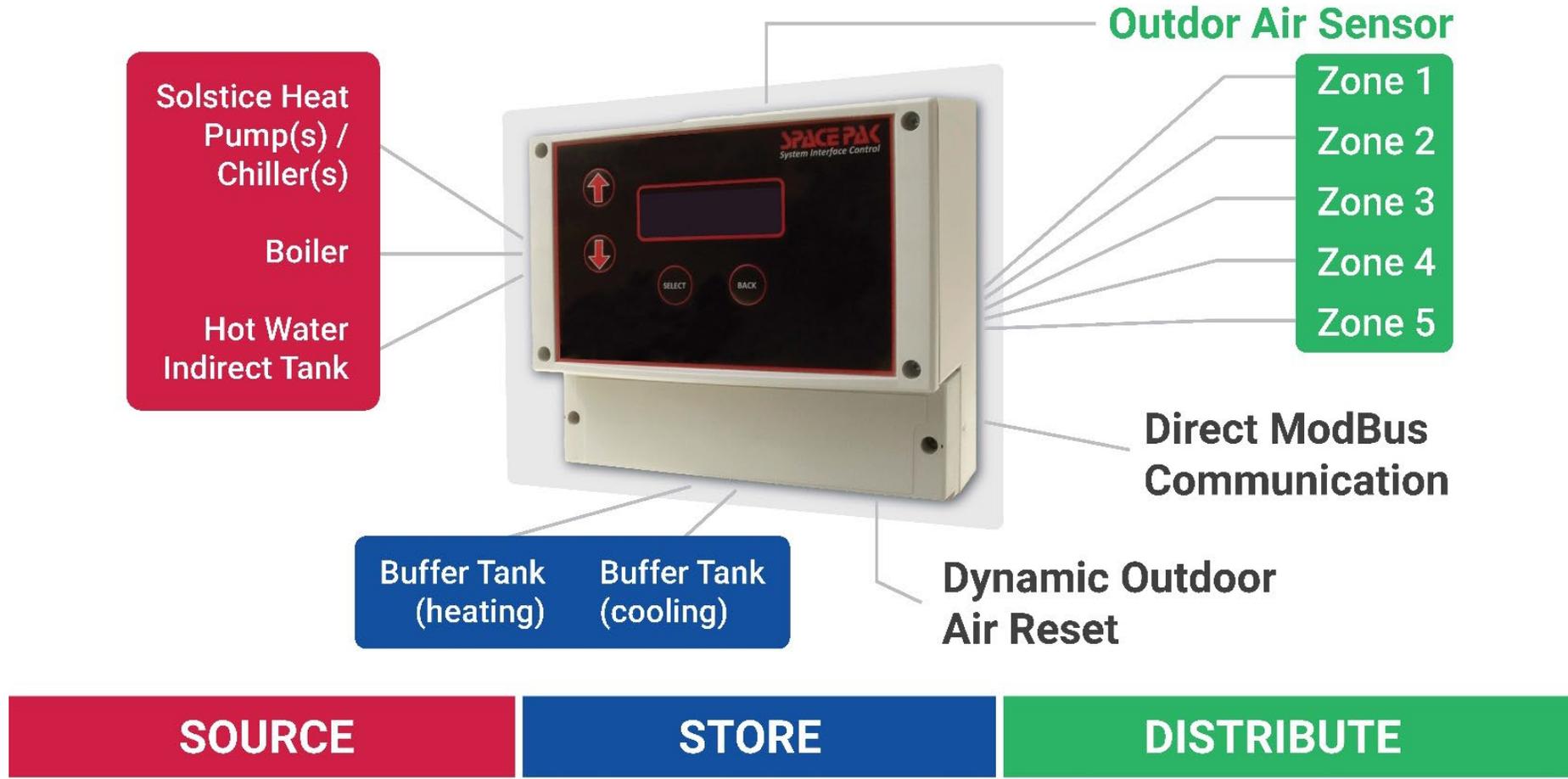


The SpacePak System Interface Control (SSIC) is a uniquely flexible external control module that enables the interface, control, and communication of the individual components in hydronic systems using Solstice air-to-water heat pumps.





SpacePak System Interface Control (SSIC)





HOT

COLD

**SIMULTANEOUS
CONTROL**
of **Hot** & **Cold** Storage Tanks

**x20**

**STAGING AND UNIT
ROTATION FOR UP TO
20 SOLSTICE UNITS**

PRECISE LOAD MATCHING AND RUNTIME SHARING



MULTIPLE RUN MODES

OA Switchover
Buffer Tank Priority | Boiler Help
Master Zone or First on Priority



MULTI-ZONE SYSTEMS WITH UP TO 5 INPUTS

Radiant Floors / Panels
Ducted Air Handlers / Fan Coils
Ductless Fan Coils | Panel Radiators
Baseboard | Convectors

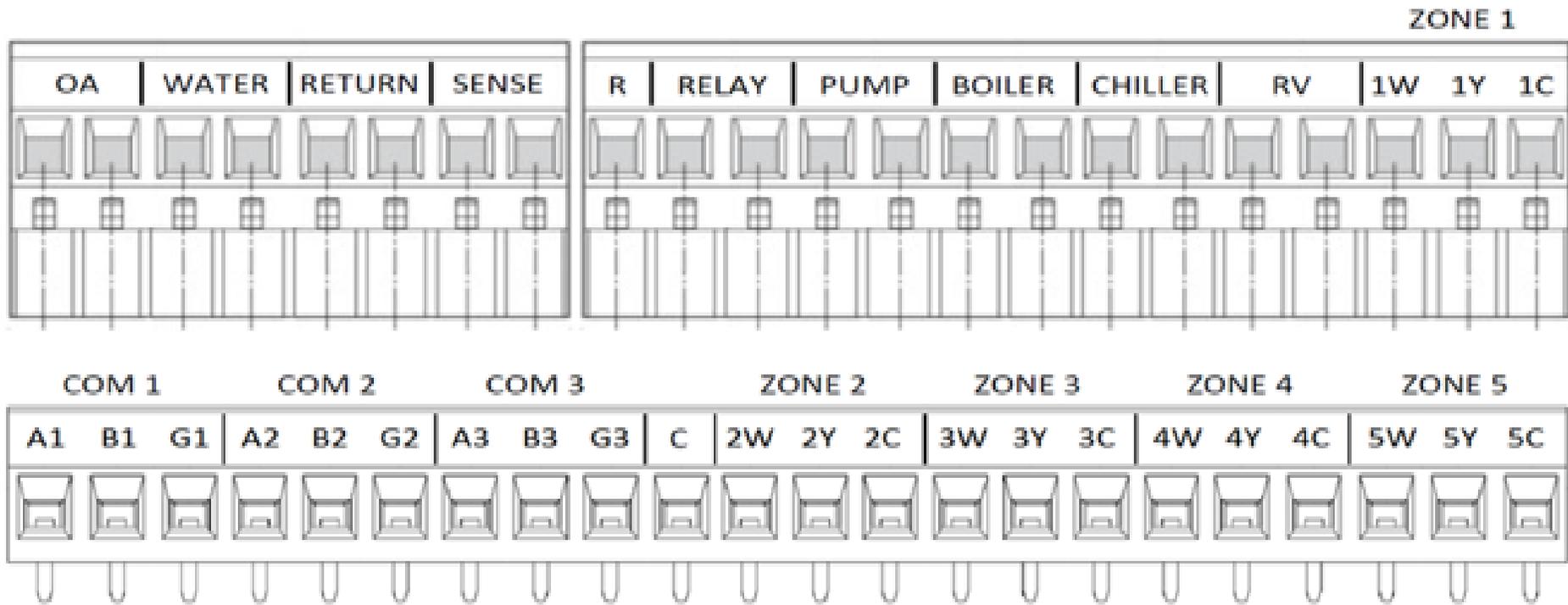
SSIC Standard Features

- Basic Modes Include- Boiler Only, Chiller Only, Outdoor Temp Switch over, boiler help and staging and outdoor reset
- Normal Zone Controlled Mode- Used when there is not a need to maintain a buffer tank temperature
- Buffer Tank Priority- Maintain a constant heating or cooling setpoint within the buffer based on outside temperature
- Buffer Tank Setpoint Curve- Maintain a varied buffer setpoint based on outside air temperature (coming soon)
- Boiler Help Mode- Based on the buffer tank set point, OAT and differentials the boiler can be called on during a heating cycle to assist the Heat Pump in reaching buffer setpoint under above average loads.
- Accepts individual (24V) calls from Air handlers (or terminal units when properly equipped) for proper operation during times where outside temperatures do not require the buffer to maintain a specific temperature
- Auxiliary Pump relay – For use when a Primary system pump is needed ex. zone valve system
- Buffer tank Bypass function- for use when the oppositely maintained tank temperature is needed for a short amount of time
- Unit Staging and rotation (20 systems)
- Multiple tanks maintained (Hot and Cold) (Cold and DHW) (Hot and Hotter)



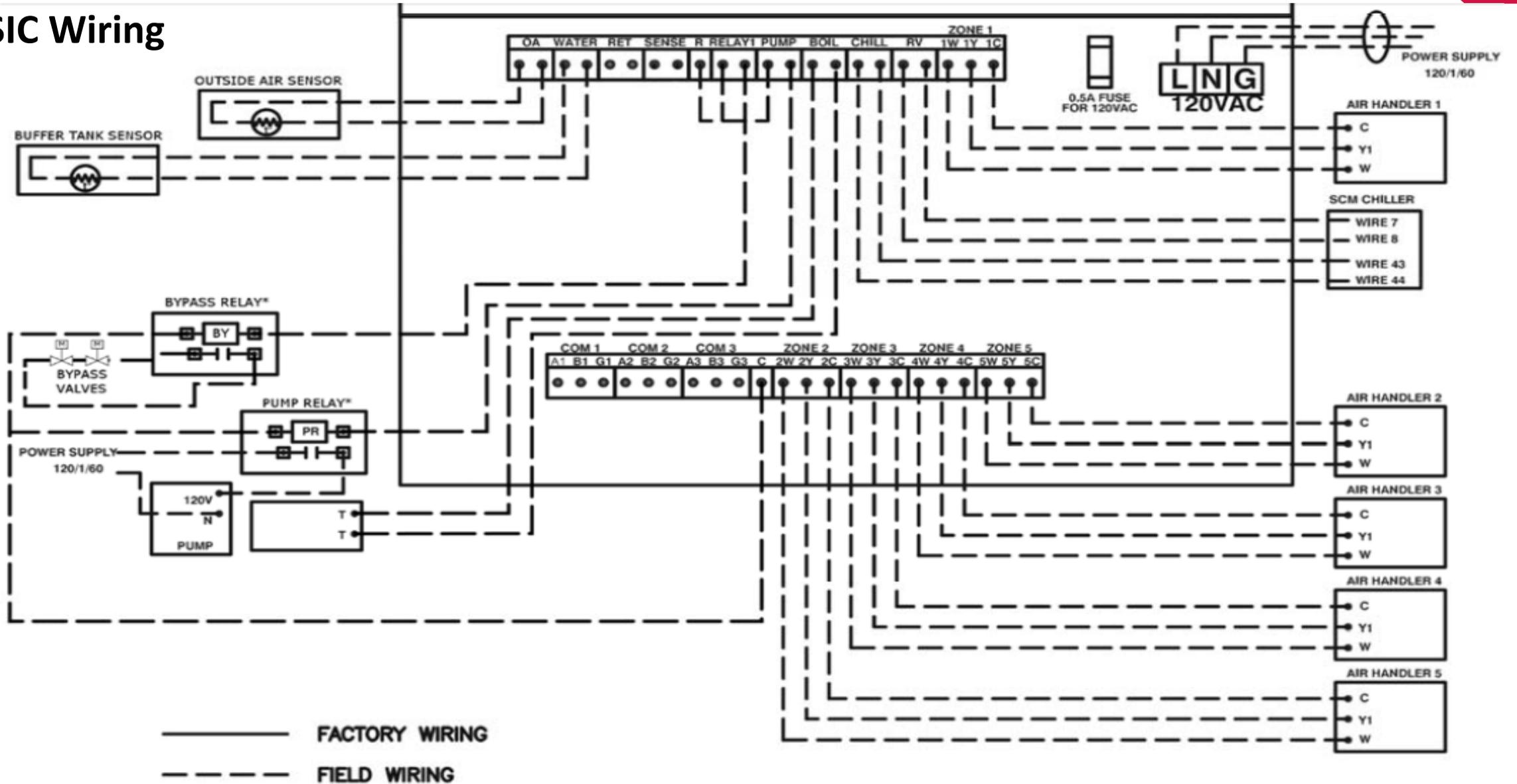


SSIC Wiring Callouts



OA	Outdoor Air Temperature Sensor	ZONE X	Connection from Zone X (1-5) Air Handler
WATER	Water Temperature Sensor	XW	24VAC Heating Signal from Air Handler
RETURN	Return Temperature Sensor	XY	24VAC Cooling Signal from Air Handler
SENSE	Misc. Temperature Sensor (N/A*)	XC	Ground from Air Handler
R	24VAC	COM X	Connections for Future Models (N/A*)
RELAY	Misc. Relay for Future Models (N/A*)	C	24VAC Return
PUMP	Dry Contact Relay to activate the Pump		
BOILER	Dry Contact Relay to activate the Boiler		
CHILLER	Dry Contact Relay to activate the Chiller's enable		
RV	Dry Contact Relay to activate Chiller's Reversing Valve		

SSIC Wiring



Certified Installer **Company** Registration

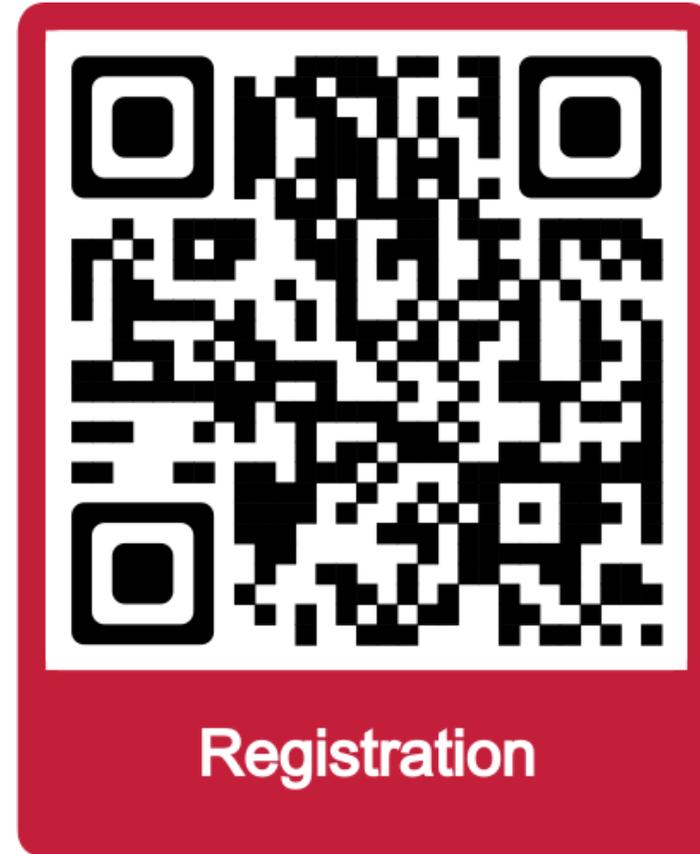
For licensed installing contractors
seeking certification /website listing

Only Submit One Form Per Company!

url: <https://forms.gle/ze9dJohdfFJEsvjNA>

To scan QR code
open the camera on your phone
and point at the code

Link also provided in chat



Pre-Sale Application Support Team

PreSaleSupport@SpacePak.com

Available to Representatives, Wholesalers and Contractors, etc.

- System application support
- Equipment selection
- Load calculation and rough material list

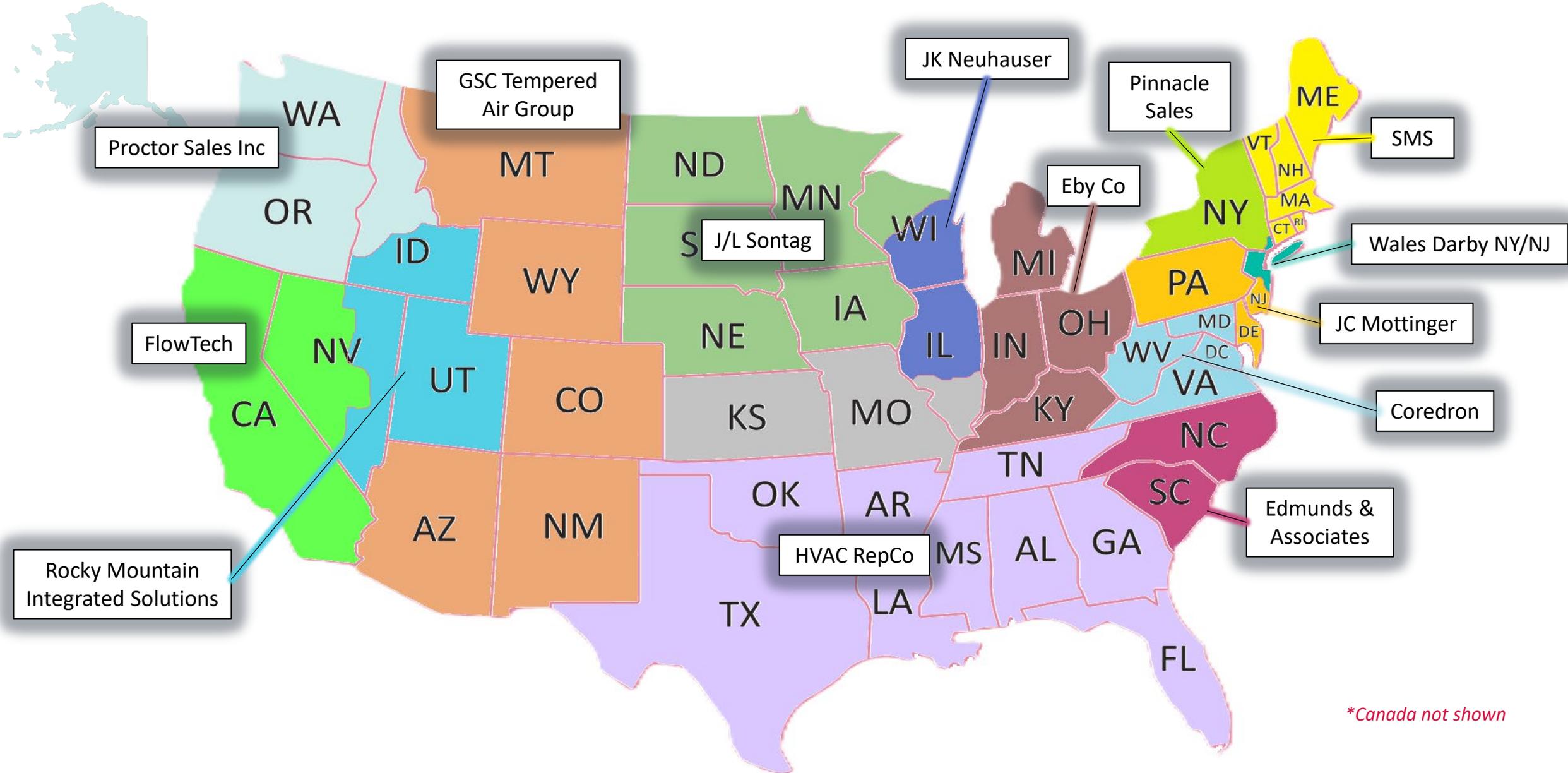
Any questions regarding equipment already shipped should be directed to

TechnicalService@SpacePak.com (413) 564 – 5530

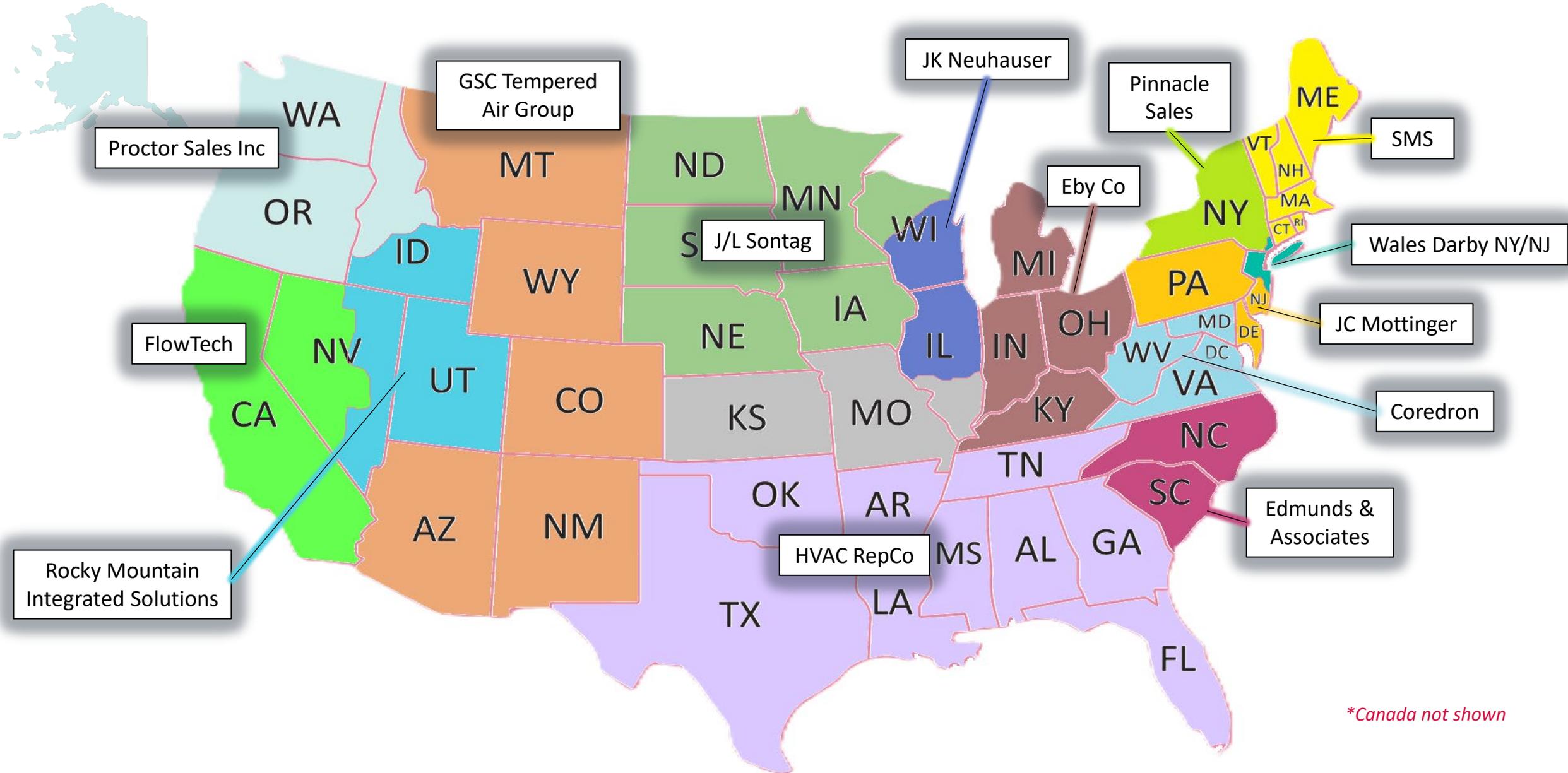


More questions?

www.SpacePak.com/RepLocator



**Canada not shown*



*Canada not shown

Let's Connect



#spacepak #hydronics
#airtowaterheatpumps

@spacepaksystem
@thespacepakjim



Questions?



Thank you!
