RIADA

Line Card

Hydronic Systems

Galletti
AERCO A WATTS Brand
GRUNDFOS
GRISWOLD CONTROLS A FlowCon International/Griswold Controls LLC. Company
ALFA LAVAL
SUNAMP

Domestic Water

PVI A WATTS Brand
Lync by WATTS
SHARC ENERGY
HUBBELL a nudyne company
CEMLINE CORPORATION
TUNDRIS
OSO HOTWATER
RIADA SOLAR

Air Handling

TEMPEFF NORTH AMERICA
ANNEXAIR
CLIMATEWORX MISSION CRITICAL CLIMATE CONTROL
alnor
inVENTer

Instrumentation

ONICON Flow and Energy Measurement
Air Monitor Precision Airflow Measurement An ONICON Brand
THEDETECTIONGROUP
ACCUTROL LLC
BACHARACH MSA

Terminal Units

Twa
runtal RADIATORS Warmth by Design
KORADO LICON
WAYSOS
QMARK A Division of Marley Engineered Products
AIRTHERM A Mestek Company
STERLING HYDRONICS

Innovative & sustainable solutions that support a greener future.

1995
Beginnings

- Geoff Adair starts Riada Sales Inc.
- Drainage products and electric ceiling panels
- Built around honesty, service and support

1997
PVI

- Today a major Watts brand
- At the time helped Riada build a reputation for high quality long-lasting equipment

2013
Tempeff

- Partnered with Tempeff to help supply high efficiency ERV's
- Helped launch Riada's movement into HVAC

2018
Succession

- After a decade working under Geoff, Scott purchases Riada
- Vision to grow the business with innovative solutions
- Carrying forward Geoff's vision

2021
Lync

- Geoff transitions into retirement
- Lync heat pumps added – CO_2 based HPWH
- Riada moving forward with green solutions for the Canadian climate

2023
Grundfos

- Partnered with world's largest pump manufacturer
- Partnered with Galletti cold weather heat pumps
- Sustained growth

Riada - Team


Scott Adair


Brandon Bruce


Jonathan Brown


Reza Hosseini


Mike Andersen


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Robby Jang


Luke Ryan


Levon Powell


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Premium quality equipment with excellent support

Riada Services

Equipment Selection

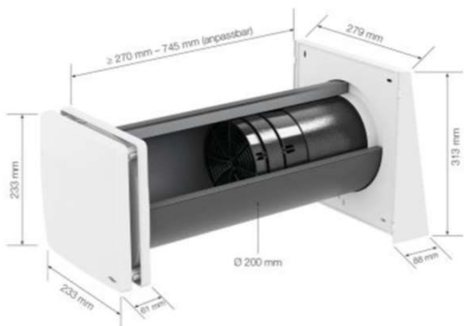
- Design assistance with specialties in domestic water heating & airside HVAC sizing
- Packaged equipment coordination reports
- Contractor & engineer coordination
- Education!

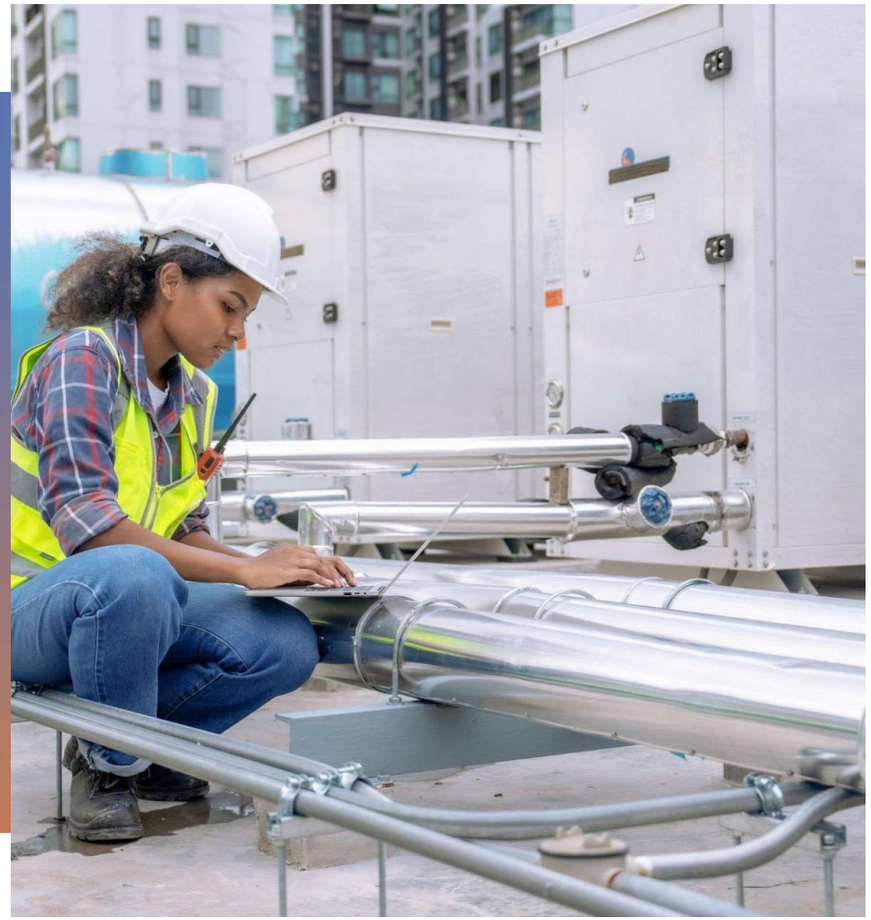
System Analysis & Startup

- Systems energy usage
- Payback analysis comparing different plant scenarios
- Value engineering assistance
- Equipment start-up & troubleshooting
- Flow metering & BACnet communications

Product Line Updates

- Tundris stainless steel electric water heaters
- Waysos through-wall heat pump, R32
- inVENTer Ductless ERV's
- AERCO Benchmark-E electric boilers





Today's Topics

- Introduction to Galletti
- EVI Technology
- Galletti Features & Models
- System Schematics
- Domestic Hot Water Applications

Introduction to Galletti

Galletti

AIR CONDITIONING

Galletti is an Italian manufacturer of high-quality commercial heat pumps & chillers. The company was founded over 100 years ago and today is one of the leading global brands in heat pump technology.

Galletti
AIR CONDITIONING

1906
ESTABLISHMENT
Ugo Galletti opened a small iron works factory and workshop for repairing agricultural equipment in Castel Maggiore, a town located near Bologna.

1920
COLD IS IN ITS DNA
The company began its expansion by specializing in the production of ice-making moulds.

1930
GROWTH
Galletti became an enterprise with more than 100 employees, working sheet metal as a subcontractor.

1950
THE WAR AND LARGE WORK ORDERS
It was the job of Ugo's sons, Fiorenzo and Luigi Galletti, to organize the recovery, with work orders from such prestigious companies as Ferrari, Lamborghini Trattori, Ducati, Landini, and Ferrovie dello Stato. Galletti also began manufacturing motorcycle chassis.

1960
THE BOOM YEARS
Galletti ceased being a subcontractor and entered the heating market with its own brand.

1970
FRESH AIR
A new range of products for air conditioning. After the heating sector, Galletti achieved great success in the air-conditioning market with its Polar Warm fan coil unit.

1980
WINDS FROM JAPAN
A partnership was established with a large Japanese air conditioning manufacturer. Galletti became the exclusive distributor for Italy of domestic split air conditioners. In 1982 the company moved to its current location in Bentivoglio.

1994
EUROVENT CERTIFICATION
Galletti obtained Eurovent certification for all of its products. A guarantee of quality and reliability.

2006
THE CENTENNIAL
The company celebrated its 100th year, and under the leadership of its CEO Luca Galletti, it confirmed its position as a leader in the market for hydronic indoor units and chillers.

2014
THE GROUP
The Group reached its full size of 8 different companies with 8 production plants, offering a comprehensive package of finished products and services in the HVACR sector.

2020
NEW CLIMATIC CHAMBER
Inauguration of the new climatic chamber for testing medium- and high-power heat pumps and chillers, which rounded out one of the most advanced R&D departments in the sector, confirming the company's strategic choice of continuous growth regarding highly complex solutions and systems.

2021
ENVIRONMENTAL CERTIFICATION
Galletti obtained UNI EN ISO 14001:2015 Environmental Certification.

2024
GALLETTI IS THE ADVANCED DESIGN COMPANY
Galletti redefines the HVAC industry standards combining performance, efficiency and advanced technology with aesthetics and environmental sustainability.

Galletti

Research & Development

Galletti's R&D **climatic chamber** lab represents the company's commitment to the accuracy of the declared performances.

All HTH-series ASHP's have been rigorously tested in the climatic chamber, ensuring the units will operate as expected when applied in the various climate zones across North America.

Galletti

Climatic Chamber Lab

- 1200 kW cooling capacity
- 720 kW heating capacity
- -20°C to +50°C temperature range
- 150,000 CFM airflow capacity
- >100 class A sensors
- Compatible with A3 refrigerants
- Eurovent certified performance

- Italian manufacturing with North American support
- Galletti North America
  - Heat pumps **in stock** in Plainview, NY
  - Technical support team in NA time zone
- Riada has access to comprehensive performance calculator for quick turnaround on selection requests

Case Study – Non-EVI vs. EVI

Target System – Electrification / GHG Reduction / Energy Step Code Target

- Incentives / by-laws / mandates pushing higher efficiency systems:
  - CleanBC – Provincial Government
  - Municipal/Federal Government
  - BC Hydro
  - Fortis BC

$$COP = \frac{Heat\ Out}{Electricity\ In}$$

- Building targets for:
  - Overall system efficiency *[or improvement]*
  - Estimated GHG reduction / electrification
  - Minimum equipment standards
  - Pre-approved systems

CITY OF VANCOUVER

BC Hydro

FORTIS BC™

Typical Differences Between Technology

NON-EVI – Heat Pumps

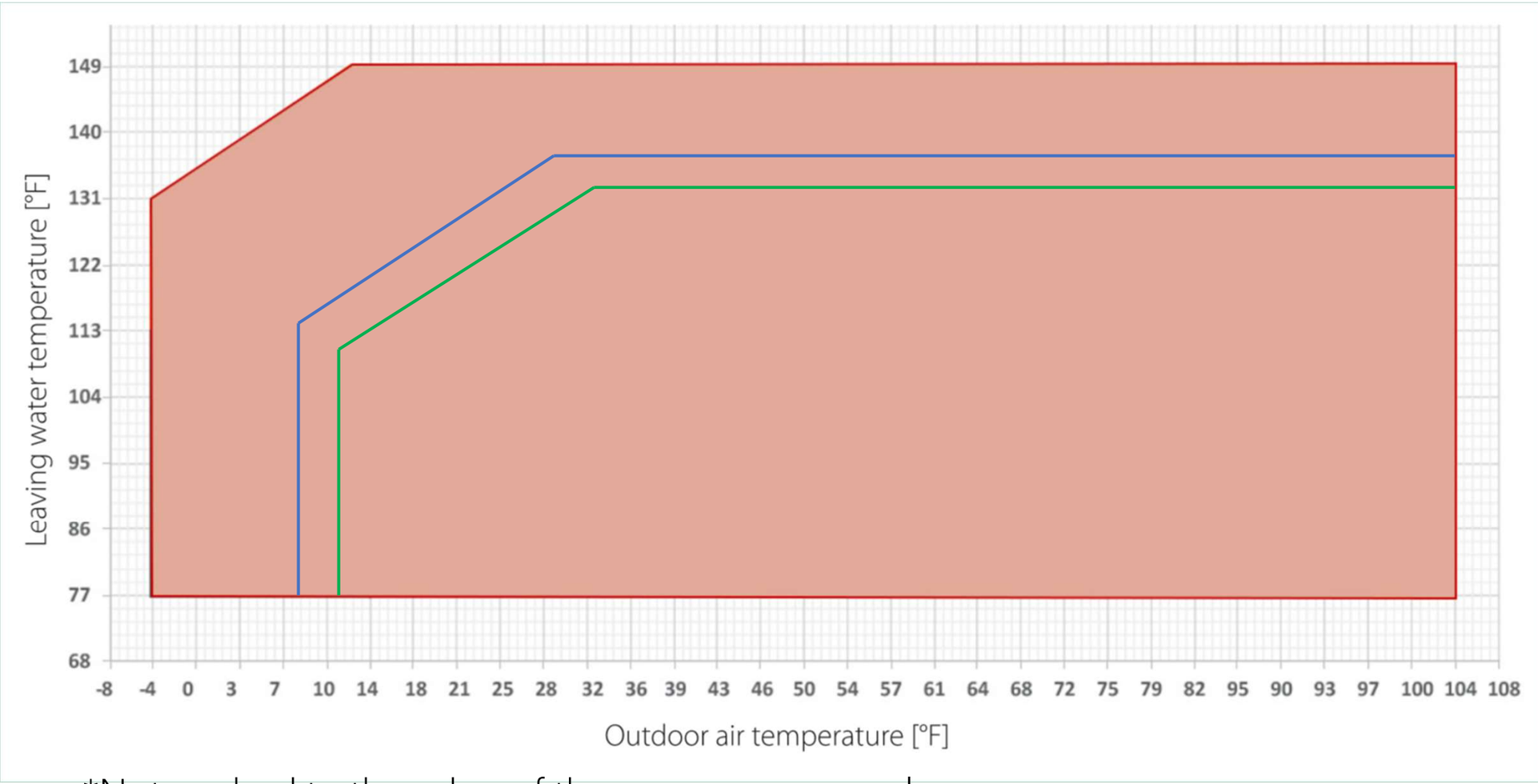
- **Compressor fall off operating Temperature**
  - **-3C to +3C**
- **Maximum hot water production**
  - **54C to 60C***
- **Typical sizes & Efficiency**
  - **30T – 200T**
  - **Average COP 2.5 - 3.0**
- *Not well suited to work at the edge of compressor map, maximum practical temperature can inhibit design*

EVI – Heat Pumps

- **Compressor fall off operating Temperature**
  - **-12C to -6C**
- **Maximum hot water production**
  - **60C to 65C***
- **Typical sizes**
  - **30T – 60T**
  - **Average COP 2.9 - 3.4**
- *Ideal for cold climates, system design makes it a flexible drop in solution*

*not including approach across any HX's

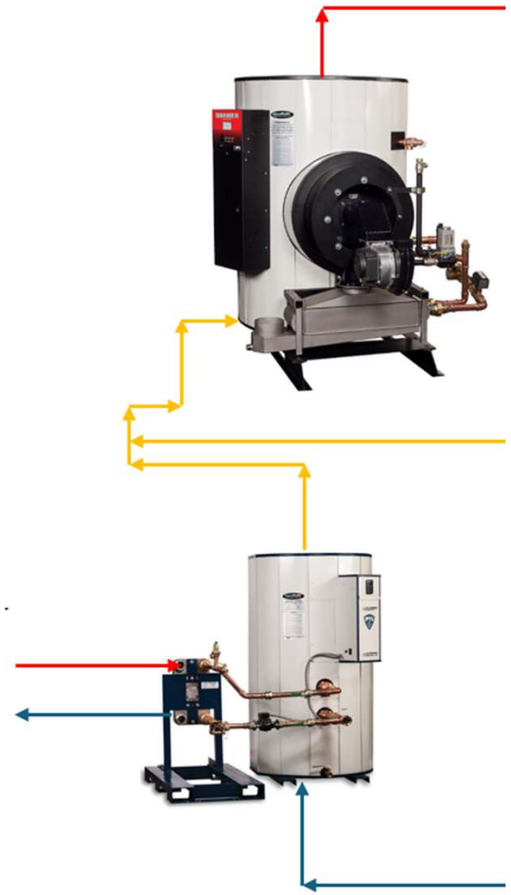
Typical Operating Envelopes



- EVI
- Non-EVI
- Non-EVI*

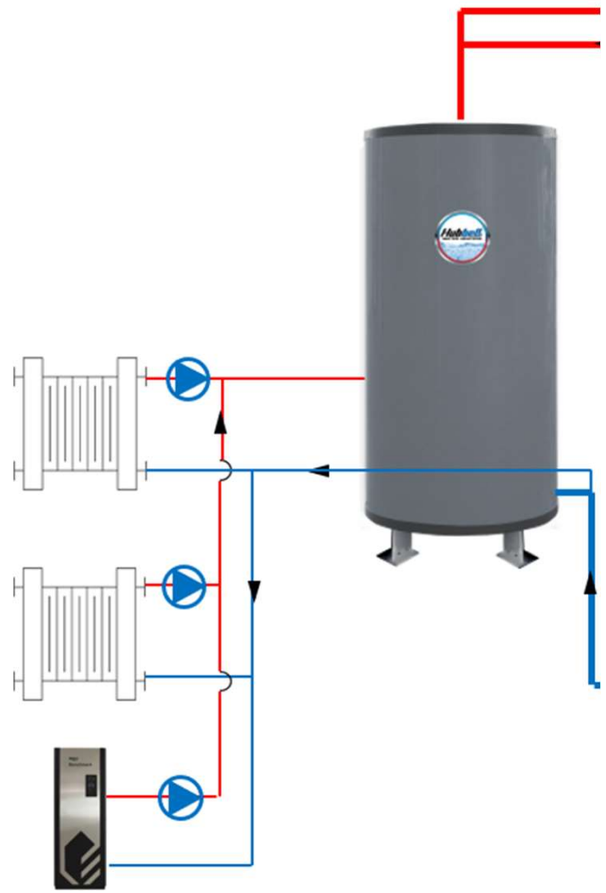
*Not pushed to the edge of the compressor envelope

DHW – System Design Differences



- *Non-EVI*

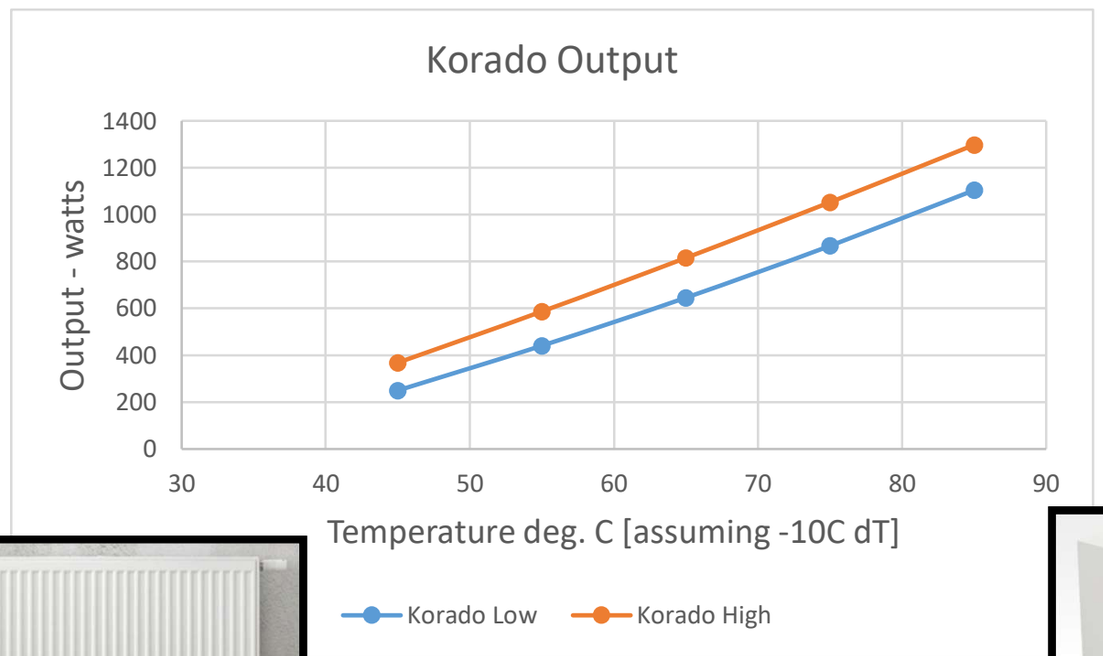
- Ability to handle DHW as a pre-heat or potential to provide full lift.
  - -pre-heat can have legionella concerns
- Potential to reduce redundancy in main DHW plant
- Ability to run at the edge of system's compressor map

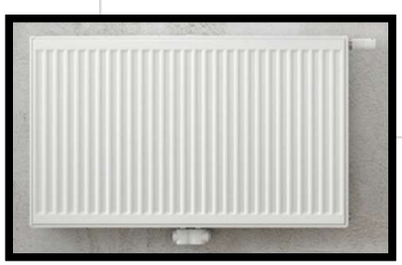


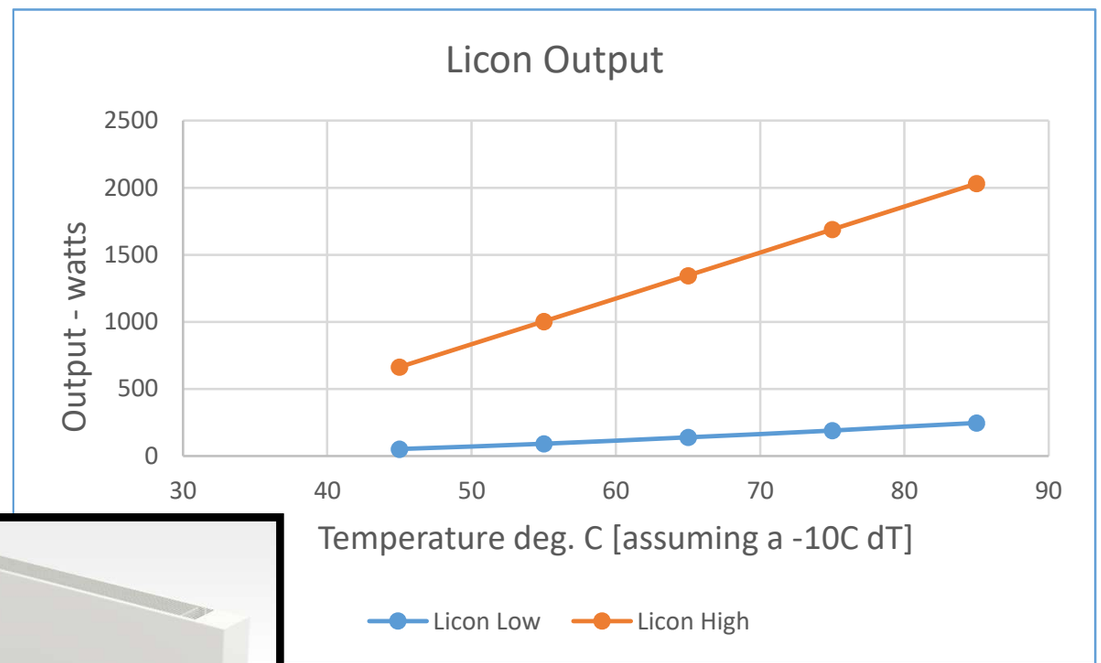
- *EVI option*

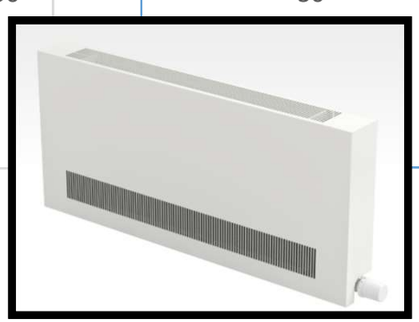
Terminal Unit Replacement / Retrofit

- Low temperature limitations can make retrofits very hard to hit capacity with existing terminal units - especially if there is no fan assistance.









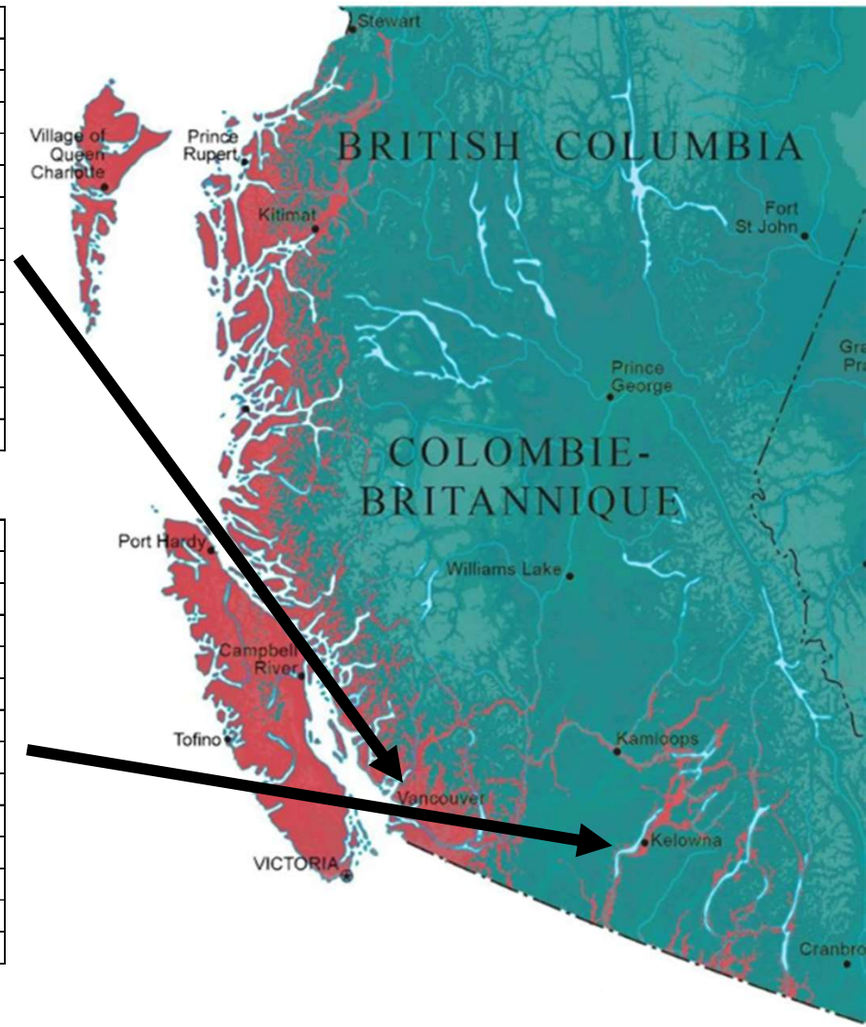
Backup Systems / Redundancy

- Design temperature of -10C or higher, EVI ASHP can reduce backup capacity / add redundancy to the system.

- Below 0C ~40% of the time. Hard to get high seasonal utilization out of a non-EVI model, but only below -15C ~5% of the time.

	Average Temperature	
Vancouver	0.0%	below -25
	0.0%	-25 to -20
	0.0%	-20 to -15
	0.2%	-15 to -10
	0.7%	-10 to -5
	3.8%	-5 to 0
	15.3%	0 to 5
	26.6%	5 to 10
	21.6%	10 to 15
	23.5%	15 to 20
	8.0%	20 to 25
	0.3%	25 to 30
	0.1%	30 to 35

	Average Temperature	
Kelowna	0.5%	below -25
	0.7%	-25 to -20
	1.7%	-20 to -15
	3.9%	-15 to -10
	12.2%	-10 to -5
	18.6%	-5 to 0
	15.5%	0 to 5
	14.5%	5 to 10
	16.5%	10 to 15
	13.9%	15 to 20
	1.6%	20 to 25
	0.4%	25 to 30
	0.0%	30 to 35

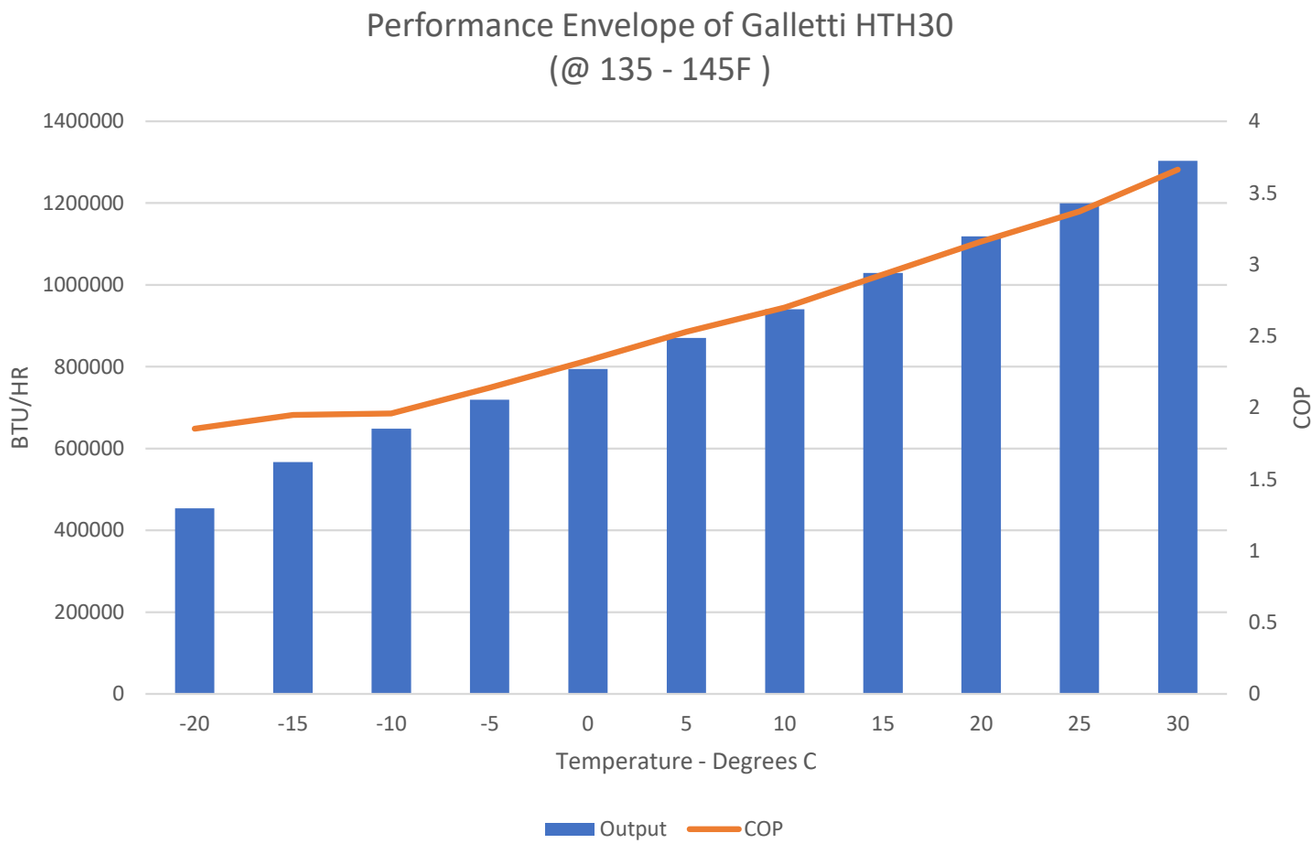


Future conditions?

Operating Envelope - Continued

Vancouver 2020-2023

Cum. % Days	Average Temperature
0.0%	below -25
0.0%	-25 to -20
0.0%	-20
0.2%	-15
0.7%	-10
3.8%	-5
15.3%	0
26.6%	5
21.6%	10
23.5%	15
8.0%	20
0.3%	25
0.1%	30



Annual COP also dependent on outdoor reset control strategy

Practical Design for Economics

Non-EVI Heat Pump		
Scenario	Boiler/E-Boiler Load Fraction	Heat Pump Load Fraction
Coast – full electrification*	100%	80%
Coast – GHG reduction	100%	50%
Interior – GHG reduction	100%	25%

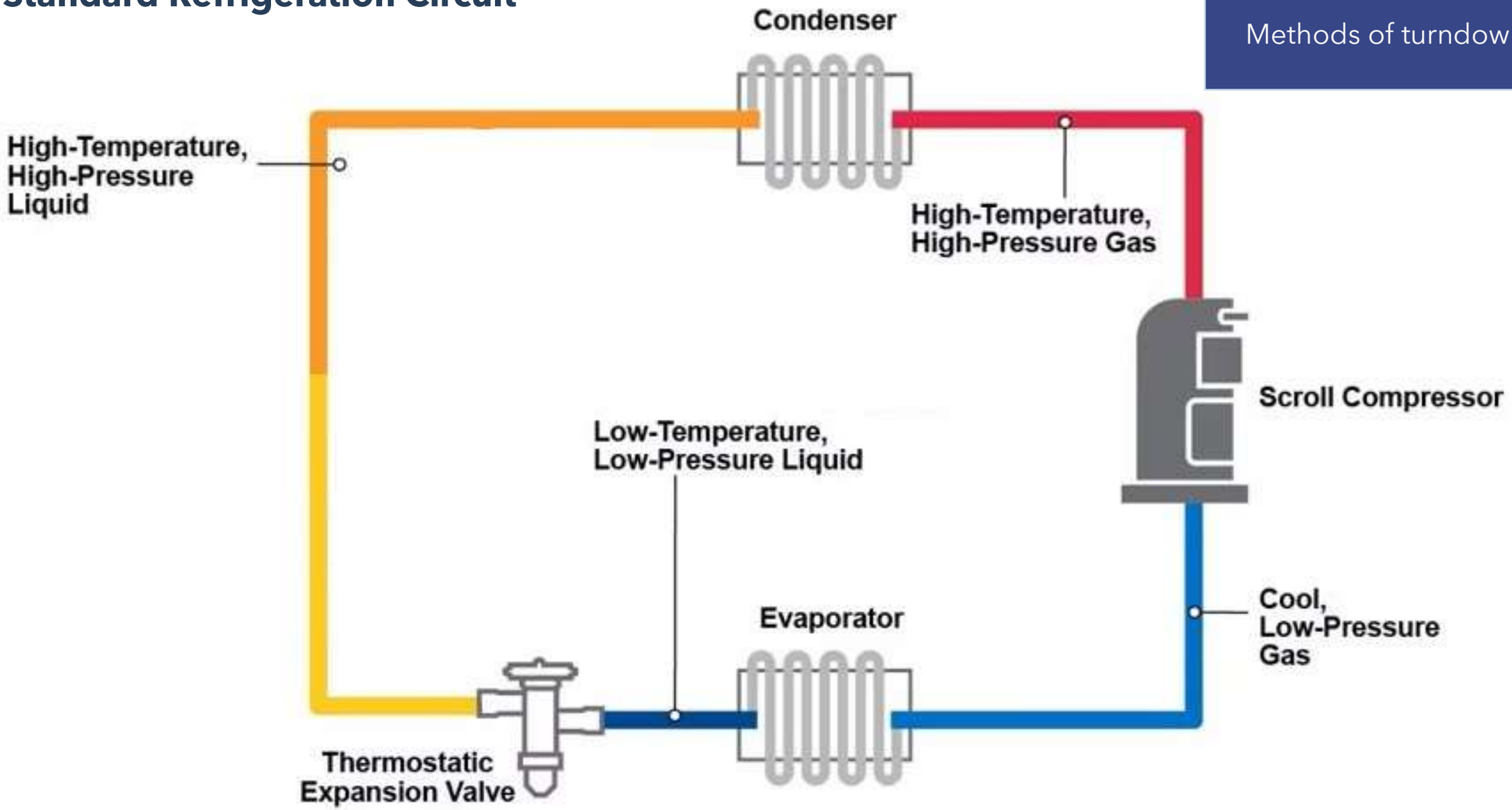
EVI Heat Pump		
Scenario	**Boiler/E-Boiler Load Fraction**	**Heat Pump Load Fraction**
Coast – full electrification*	50%	90%
Coast – GHG reduction	50%	60%
Interior – GHG reduction	100%	40%

Where is energy coming from when in peak heating season?

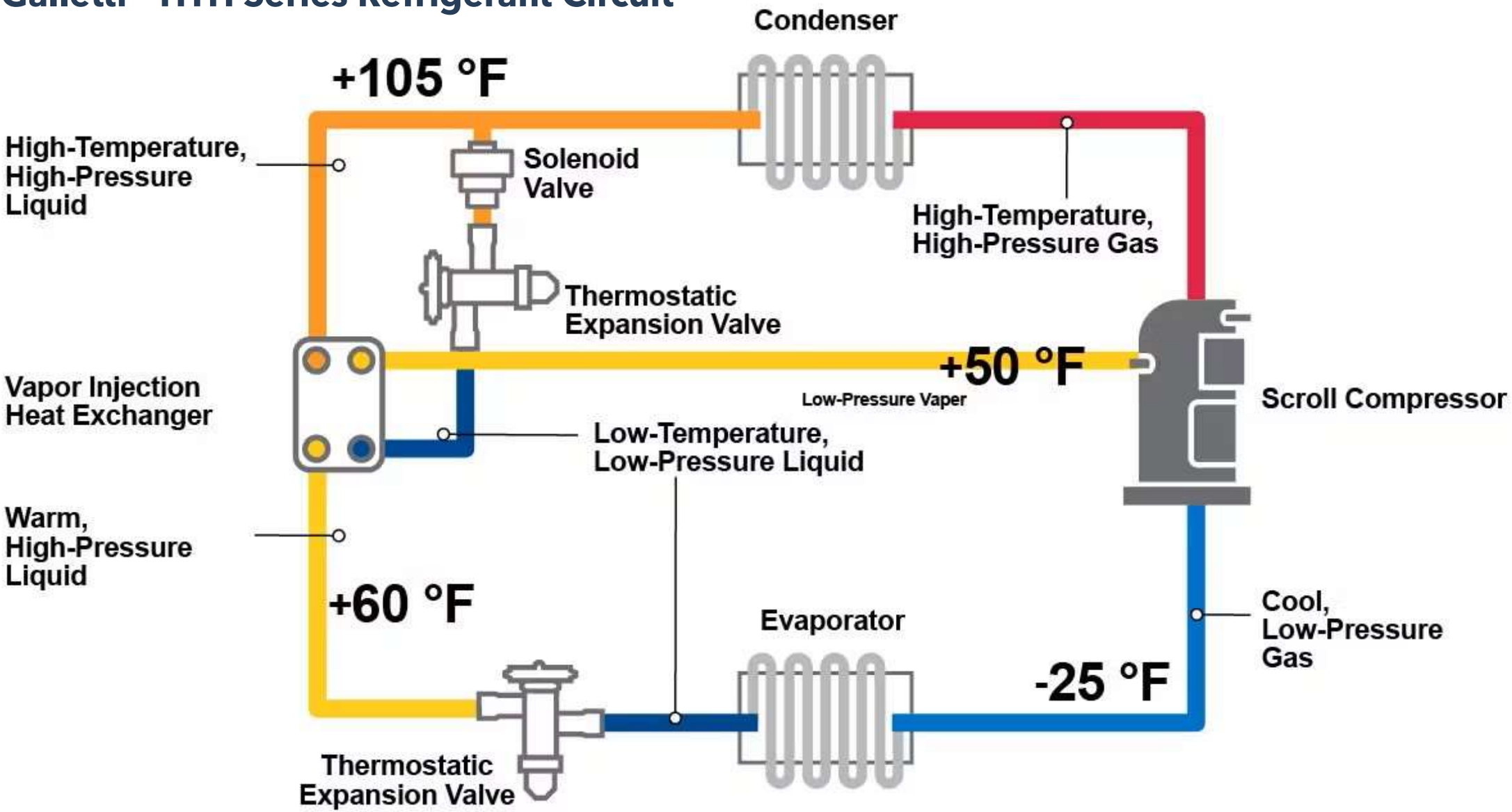
What is EVI

Standard Refrigeration Circuit

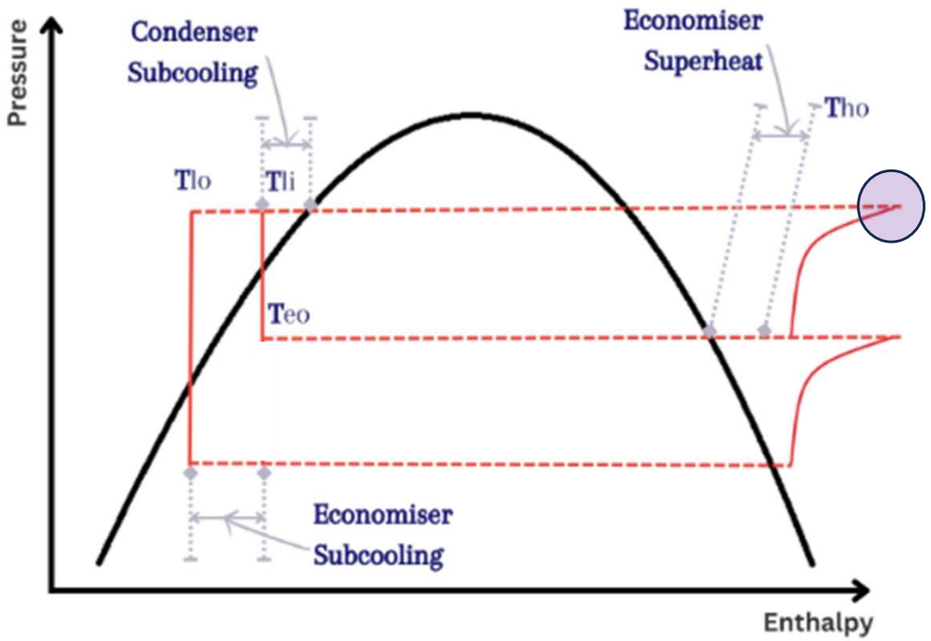
Methods of turndown?

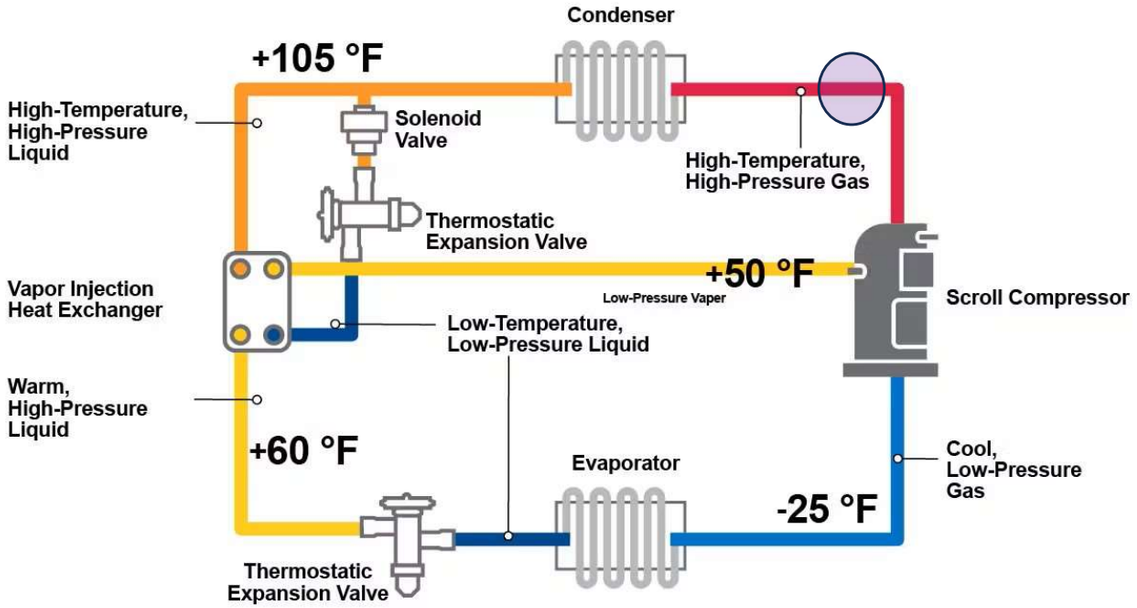


Galletti – HTH Series Refrigerant Circuit

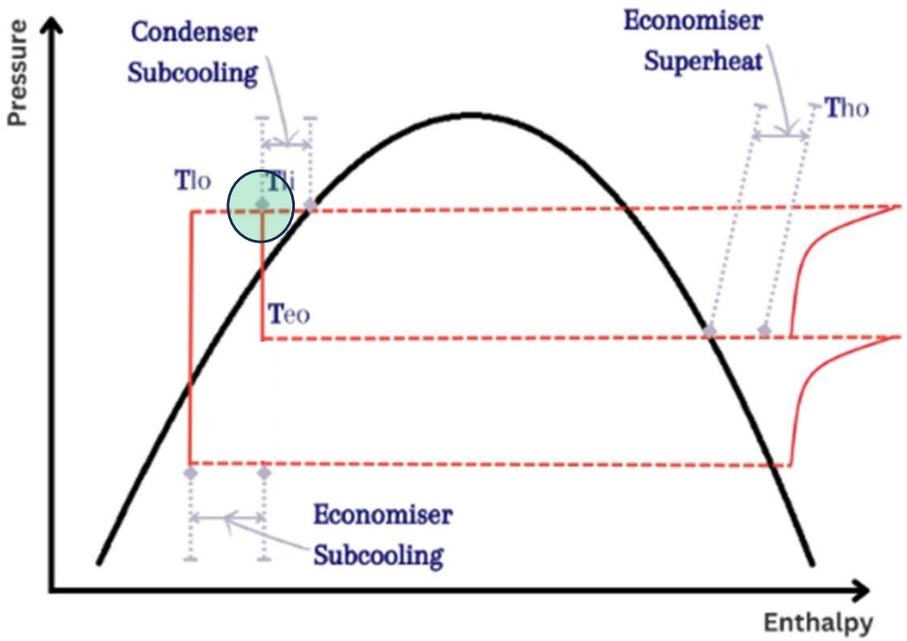


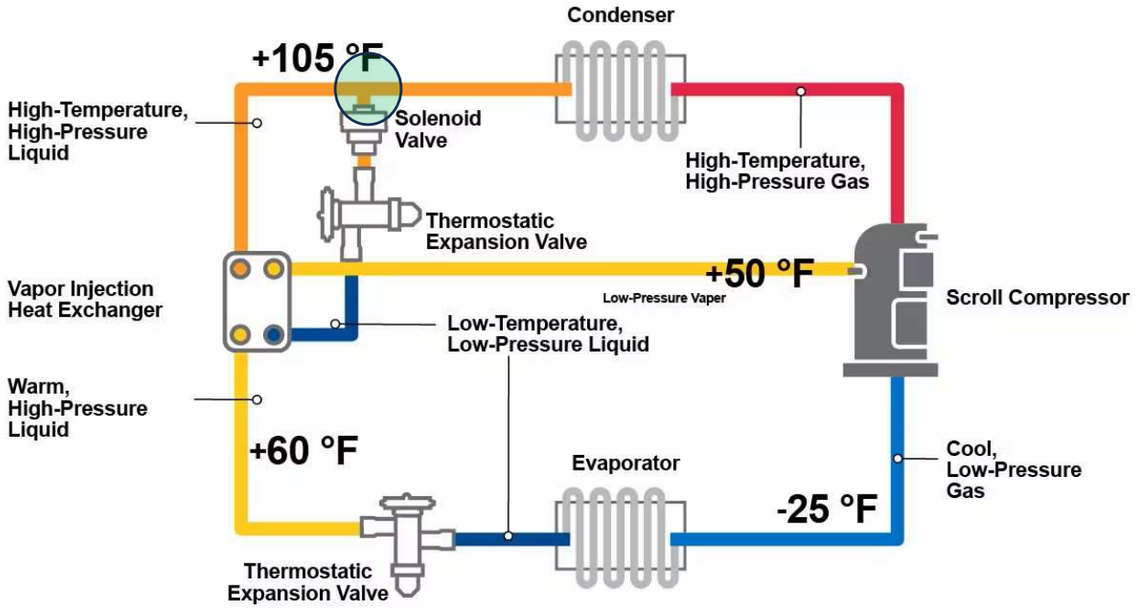
Post Compressor – HTHP Gas



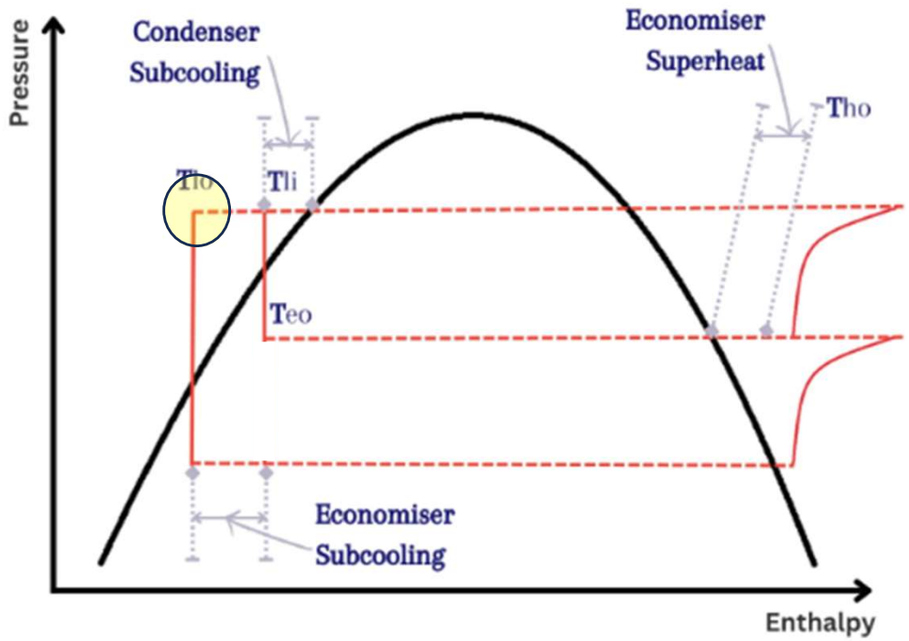


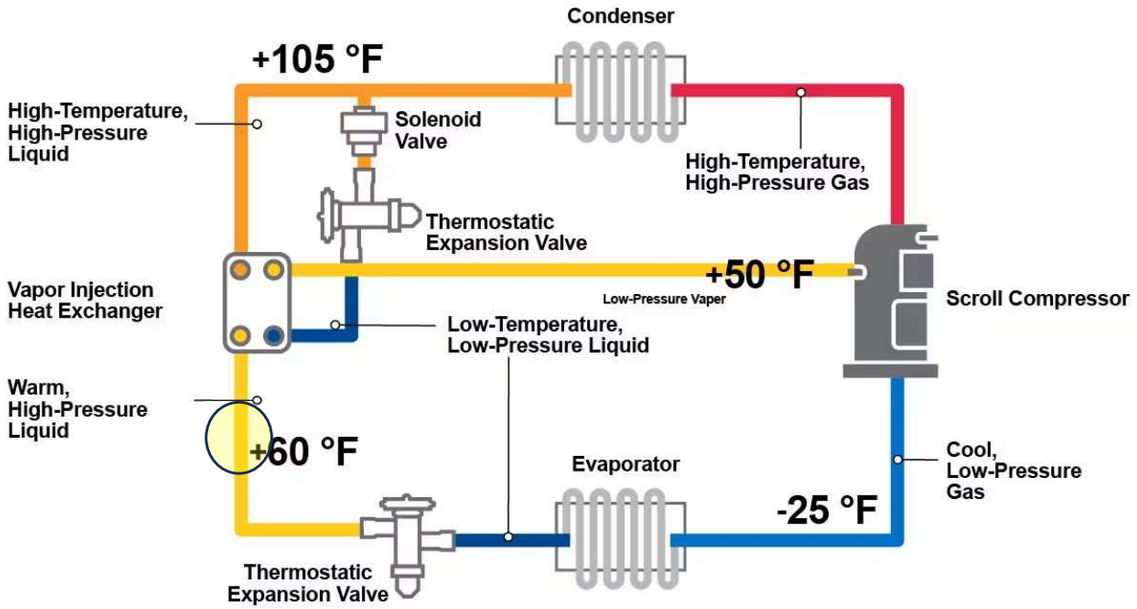
Post Condenser – HTHP Liquid





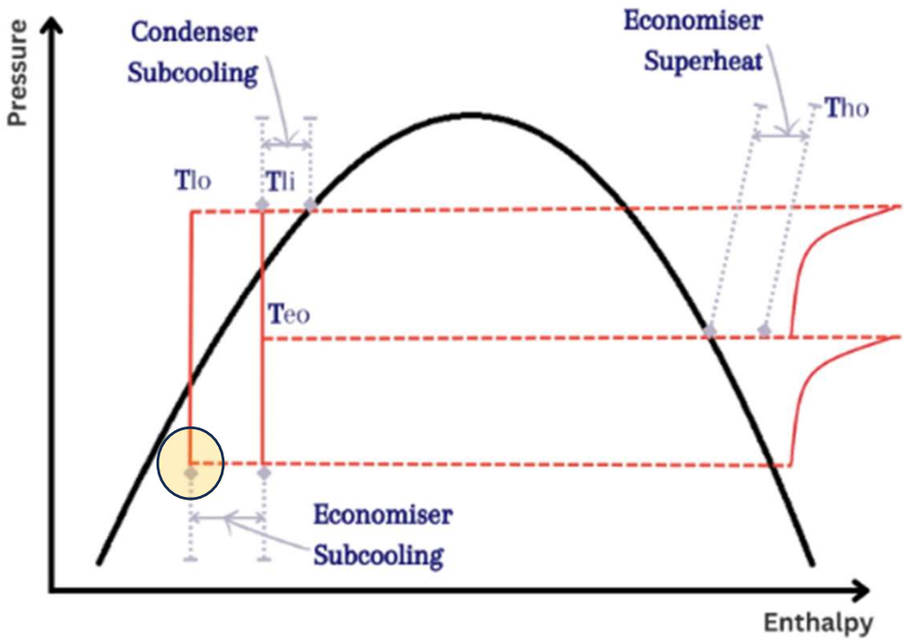
Post EVI-HX – Subcooled MTHP Liquid

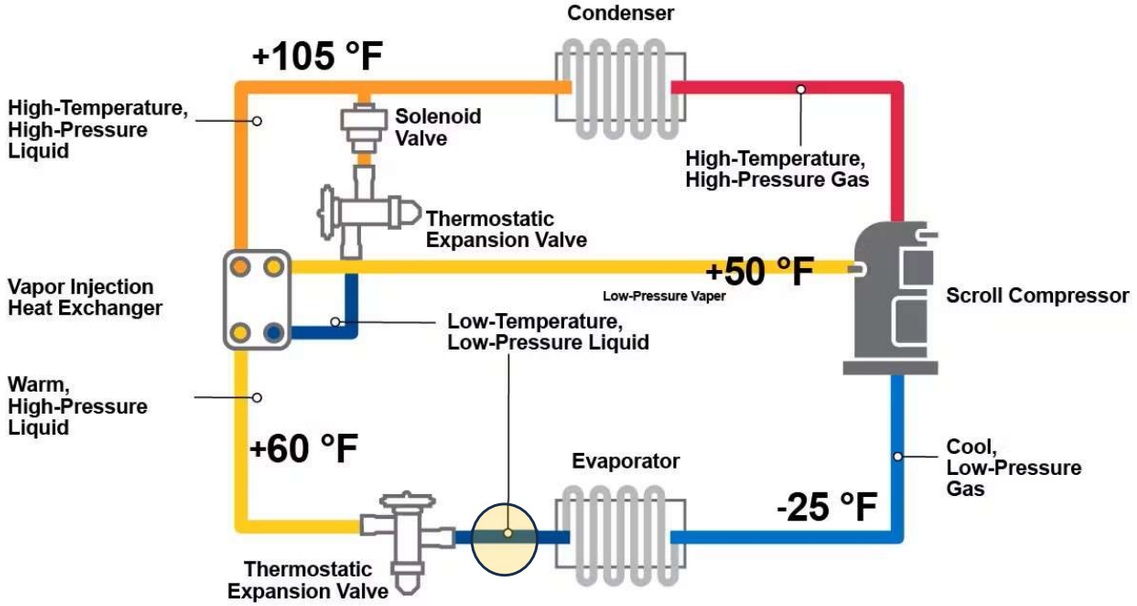




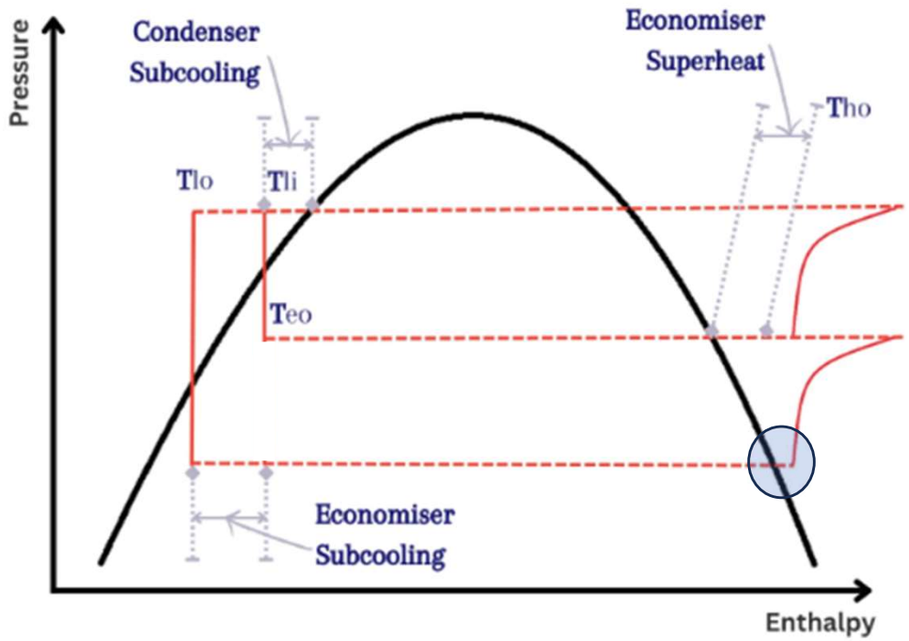
Post Expansion Valve – LTLP Liquid

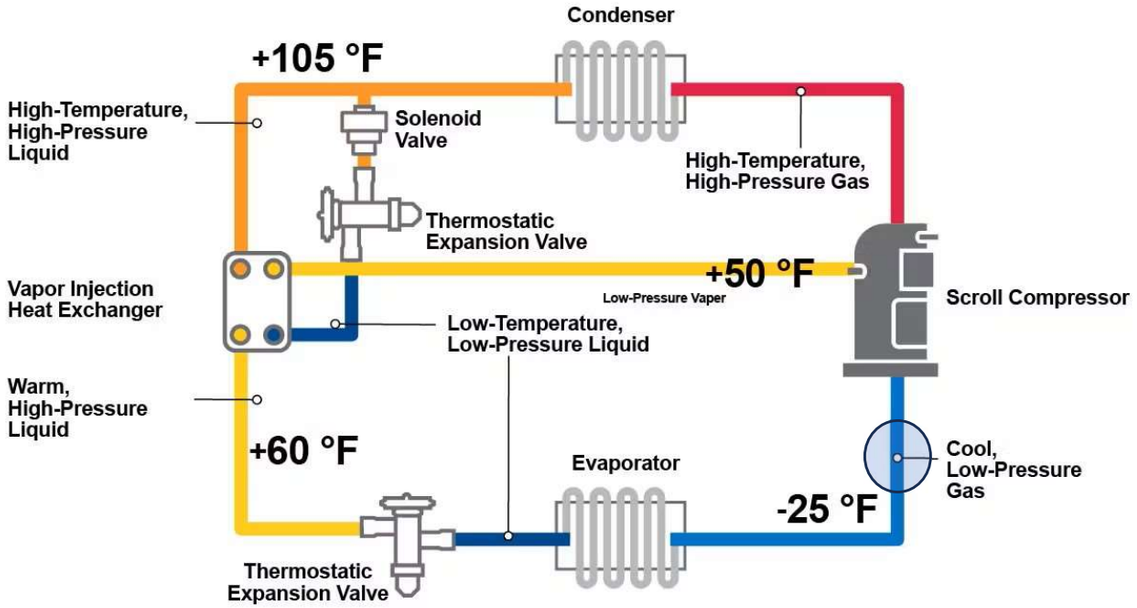
Refrigerant will more readily accept heat due to subcooling





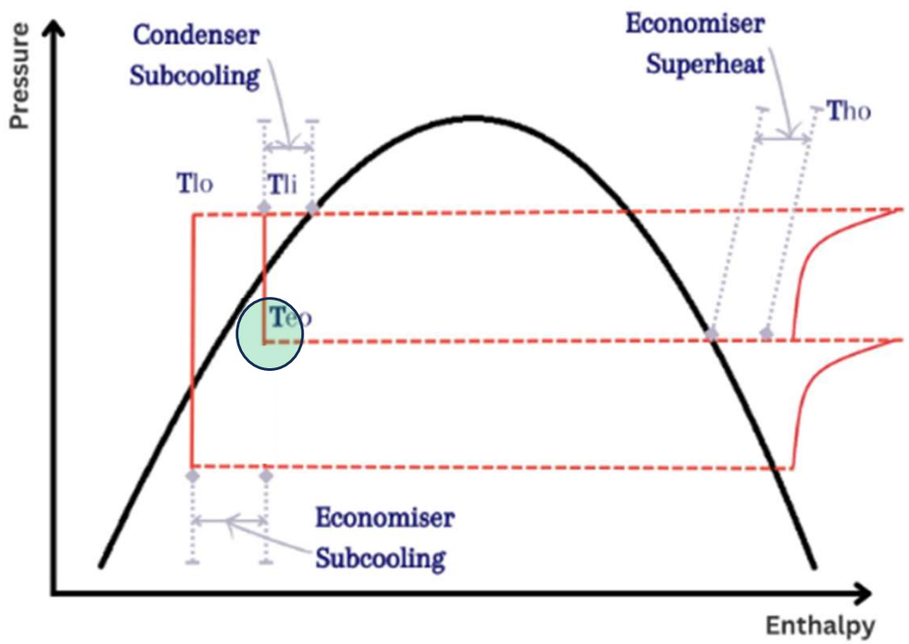
Post Evaporator – LTLP Gas

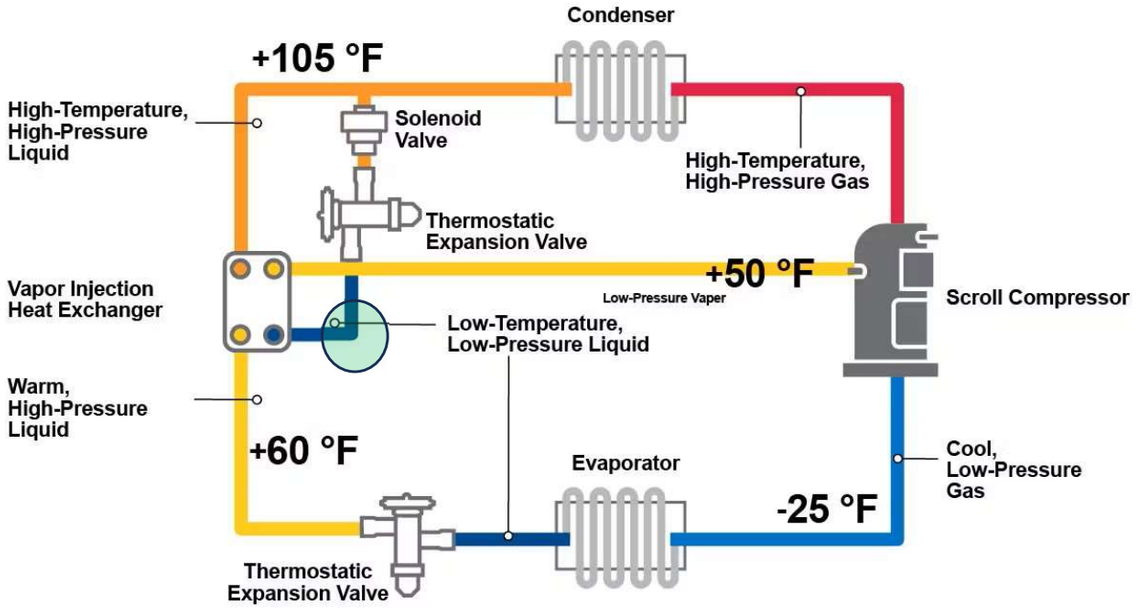




Post EVI-Expansion Valve – LTLP Liquid

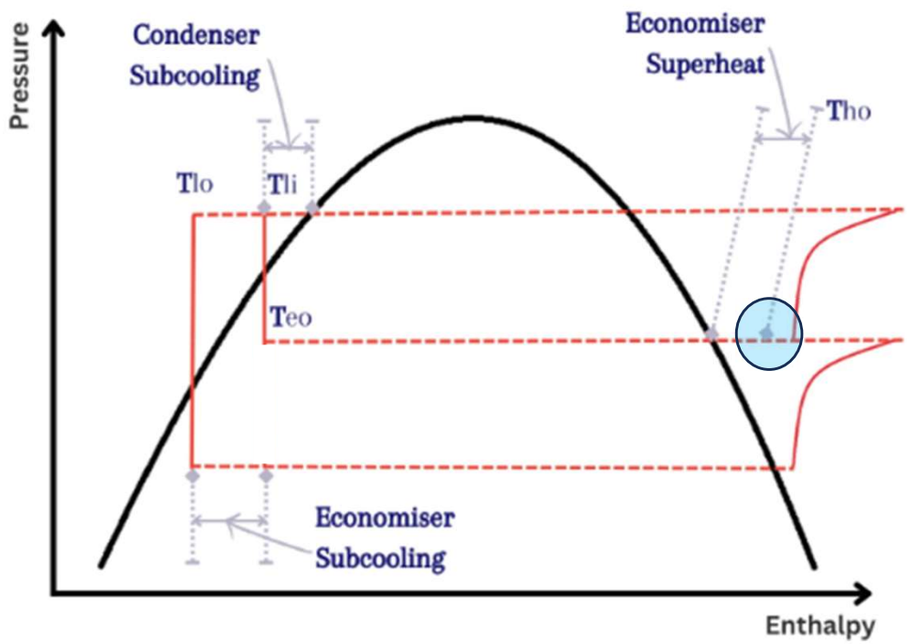
A portion of the condensed liquid goes through a secondary expansion valve turning it to mixed liquid/gas

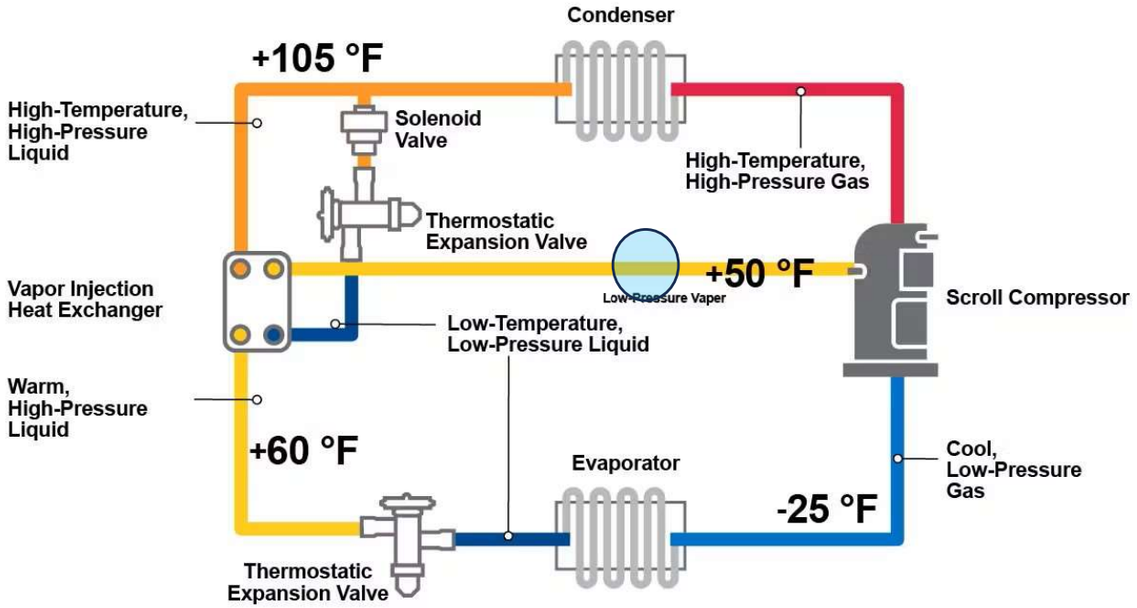




Post EVI-HX – MTMP Vapour

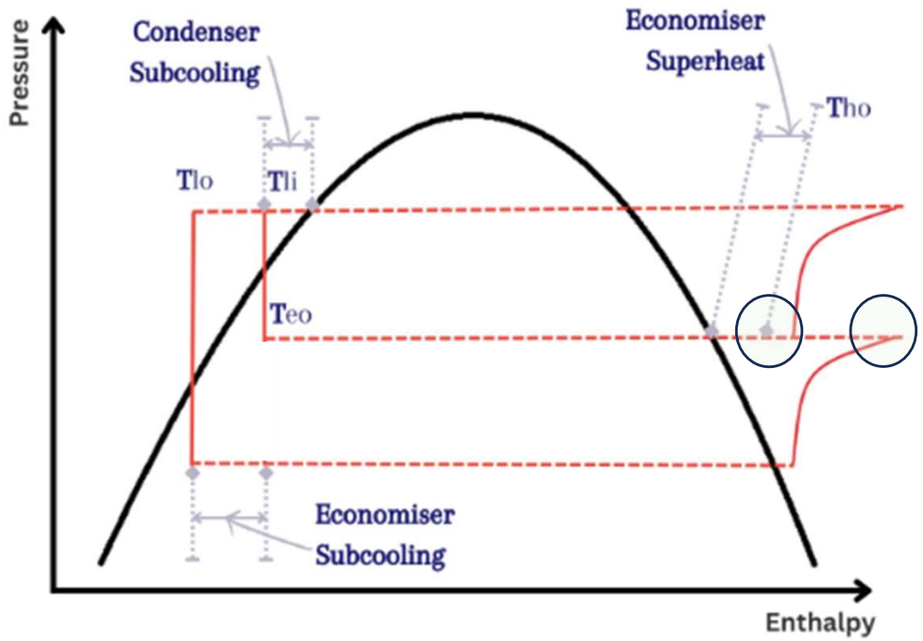
The mixed fluid goes through the 'economizer' and phase changes to a superheated gas

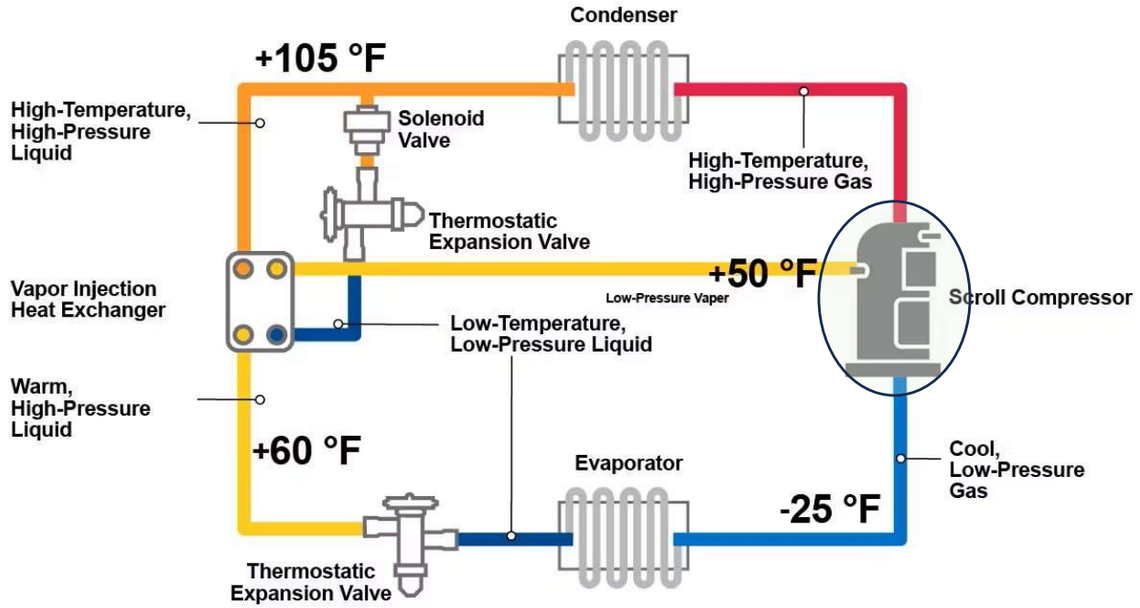




Multiple Enthalpy Compressor Injection

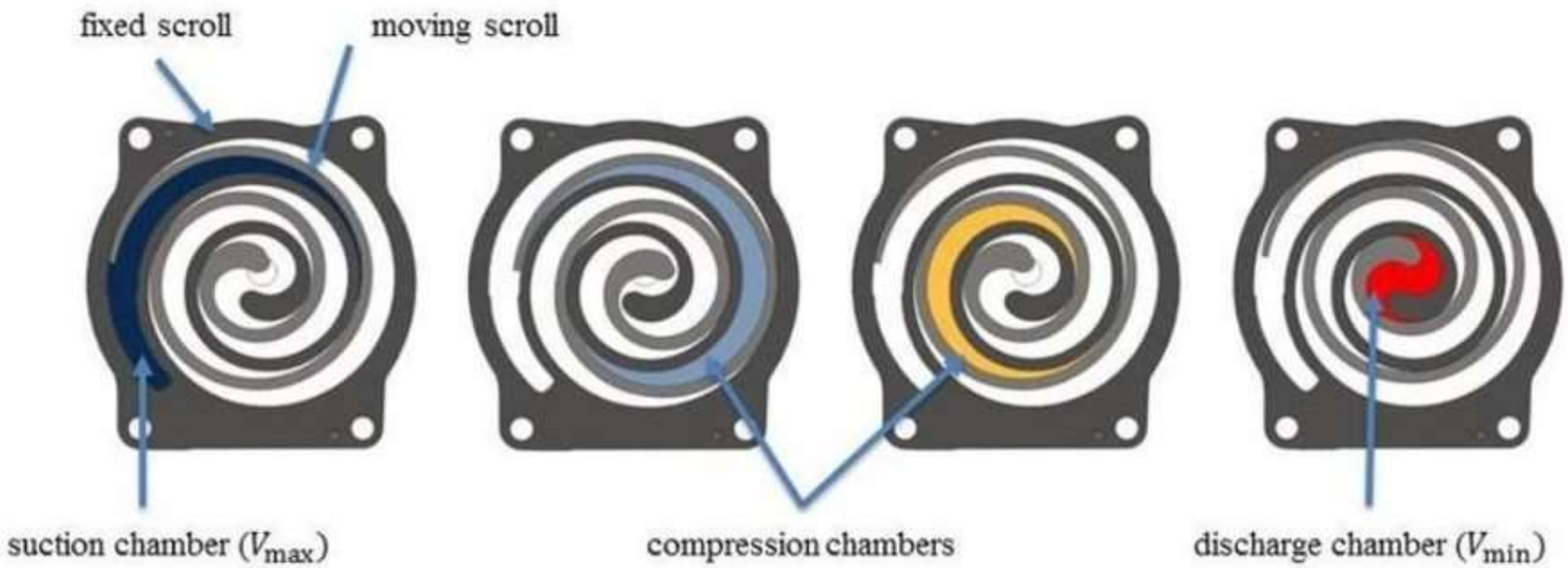
Superheated gas cools the compressor helping it run more stable at the edge of the envelope





- Raises suction side enthalpy, decreasing overall pressure ratio
- Increases mass flow through upper scroll section for increased heating capacity

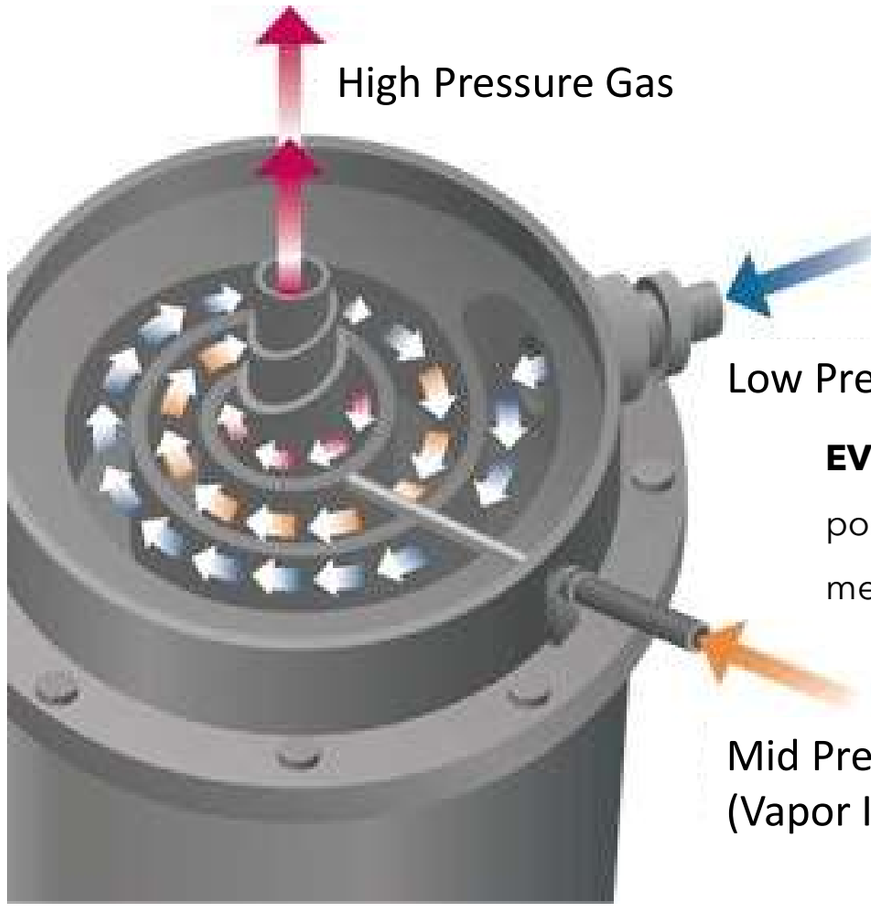
Scroll Compressor Working Principle



Units come with 2 – 4 compressors, performance modulation is accomplished through the adjustments in the expansion valve, and compressor/circuit activation – practical estimation ~5:1 on a 4 compressor unit

Galletti - HTH HS Series

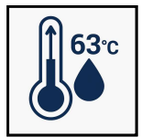
Scroll Compressor Details



EVI circuits require dual suction port compressor with low and medium pressure suction ports

EVI Benefits Summary

Low ambient temperature operation without the need to ‘winterize’ system.



High water production temperatures.

Flexible operation through two expansion valve adjustment mechanisms – high part load efficiencies.

Expanded outdoor temperature reset control benefits

Lower compressor temperatures extending component life

Common Features & Sizes

Galletti

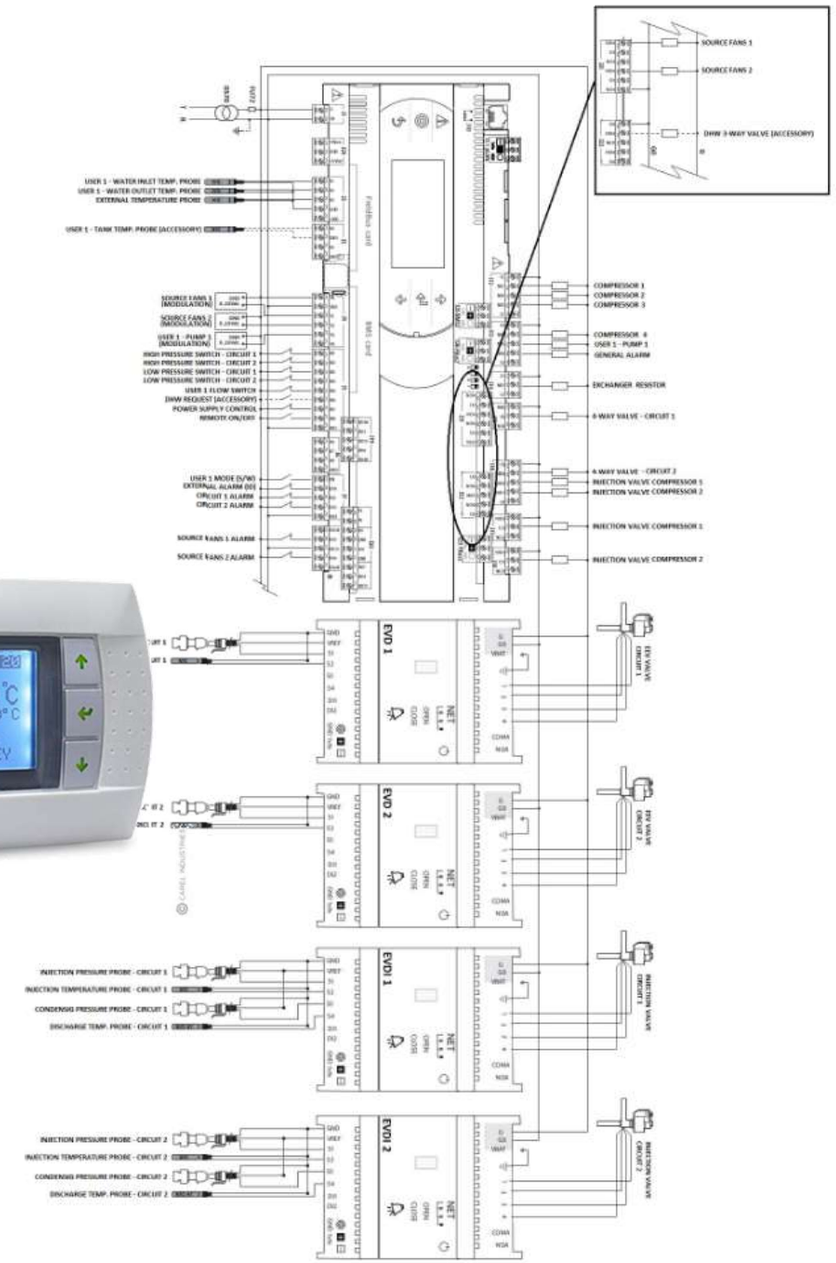
Features & Benefits Overview

- **EVI scroll compressors** – Expands operating envelope
- **Electronic expansion valve** – 300 steps of control
- **Low-GWP refrigerant** – R454B, an A2L refrigerant
- **Antifreeze Kit** – factory installed heat trace around the brazed plate heat exchanger; the “load-side” heat exchanger
- **Enclosed Compressor Compartment** – lowers compressor noise transmission as well as provides a level of security to key components
- **Epoxy Coated Air-Source Coils** – Epoxy coated fins protect against salt, corrosion, galvanic-corrosion, mitigates biofilm build up, etc.
- **Acoustically optimized fans** – Reduces noise created by airflow
- **Vibration Isolators** – Factory provided, field installed spring vibration isolation

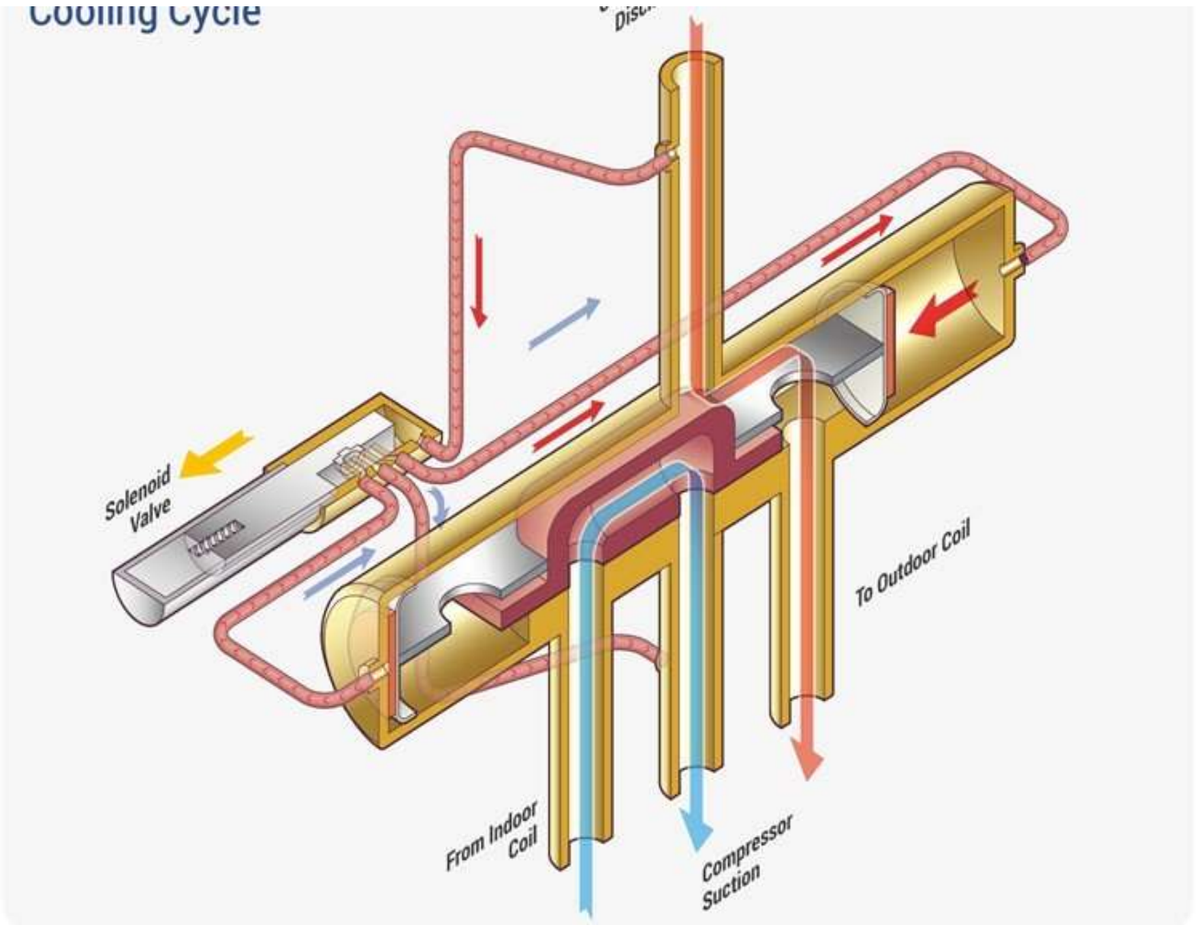
Galletti HTH-series

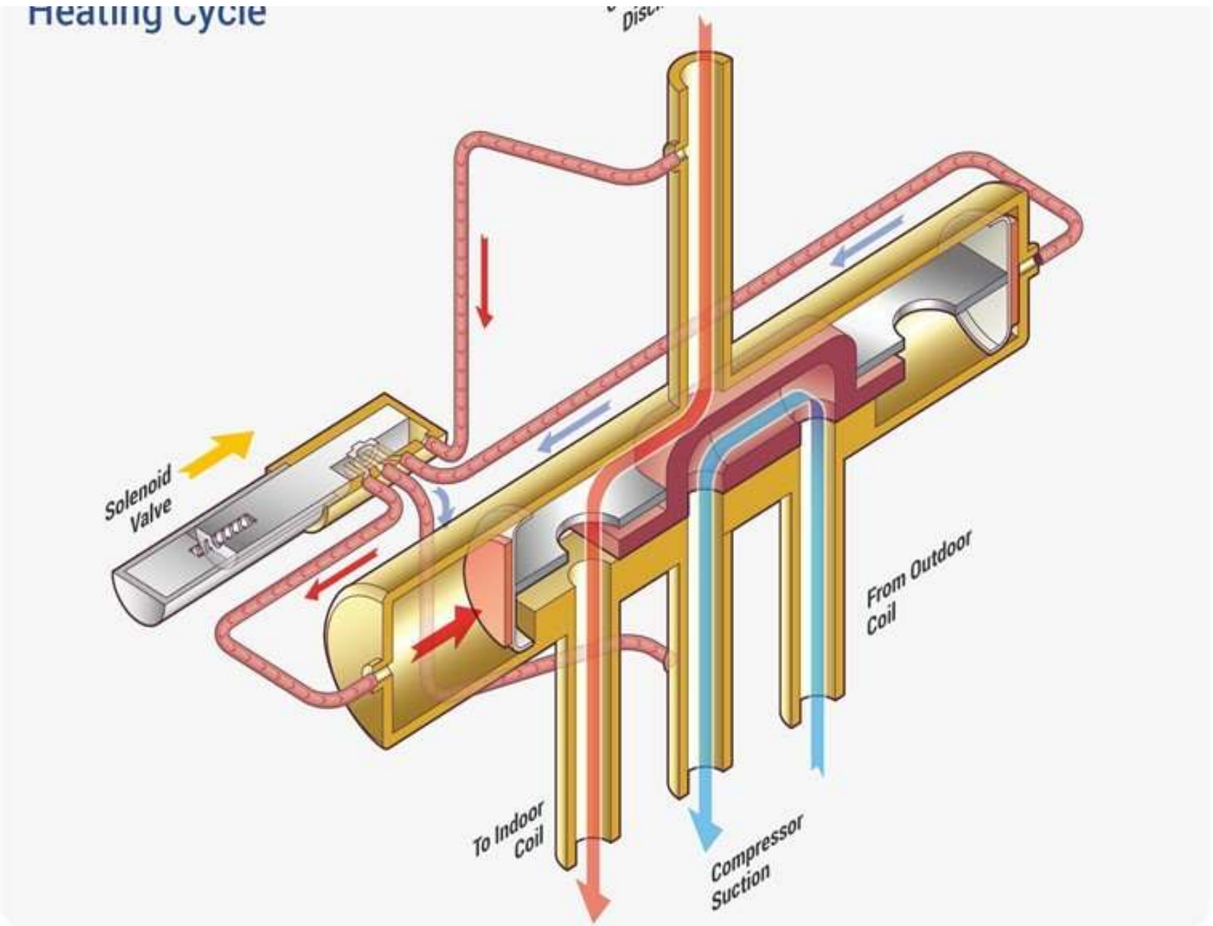
Onboard Controls

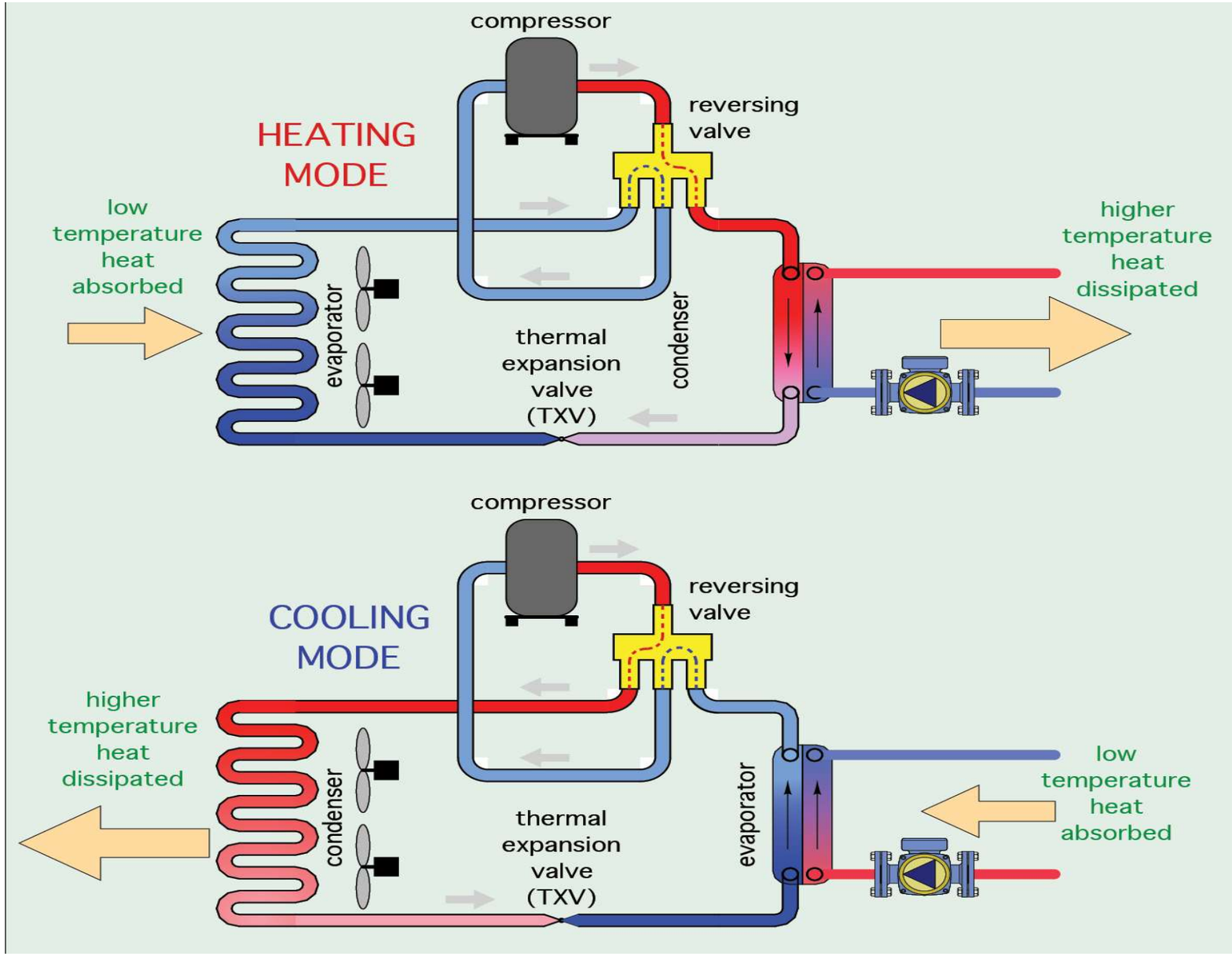
- Integral plant control (up to 6-units, 2-pipe configuration)
- Compressor staging, unit staging
- Lead-lag operation (auto-rotation)
- Freeze protection (pump operation, electric heat)
- Defrost mode control
- Modulating hydronic pump control 0-10v
- EVI operation managament
- Alarm management
- LWT reset based on outside air temp (summer/winter)
- Low noise operation (time based)
- Optional cellular remote monitoring and access



Heat Pump Reversing Valve





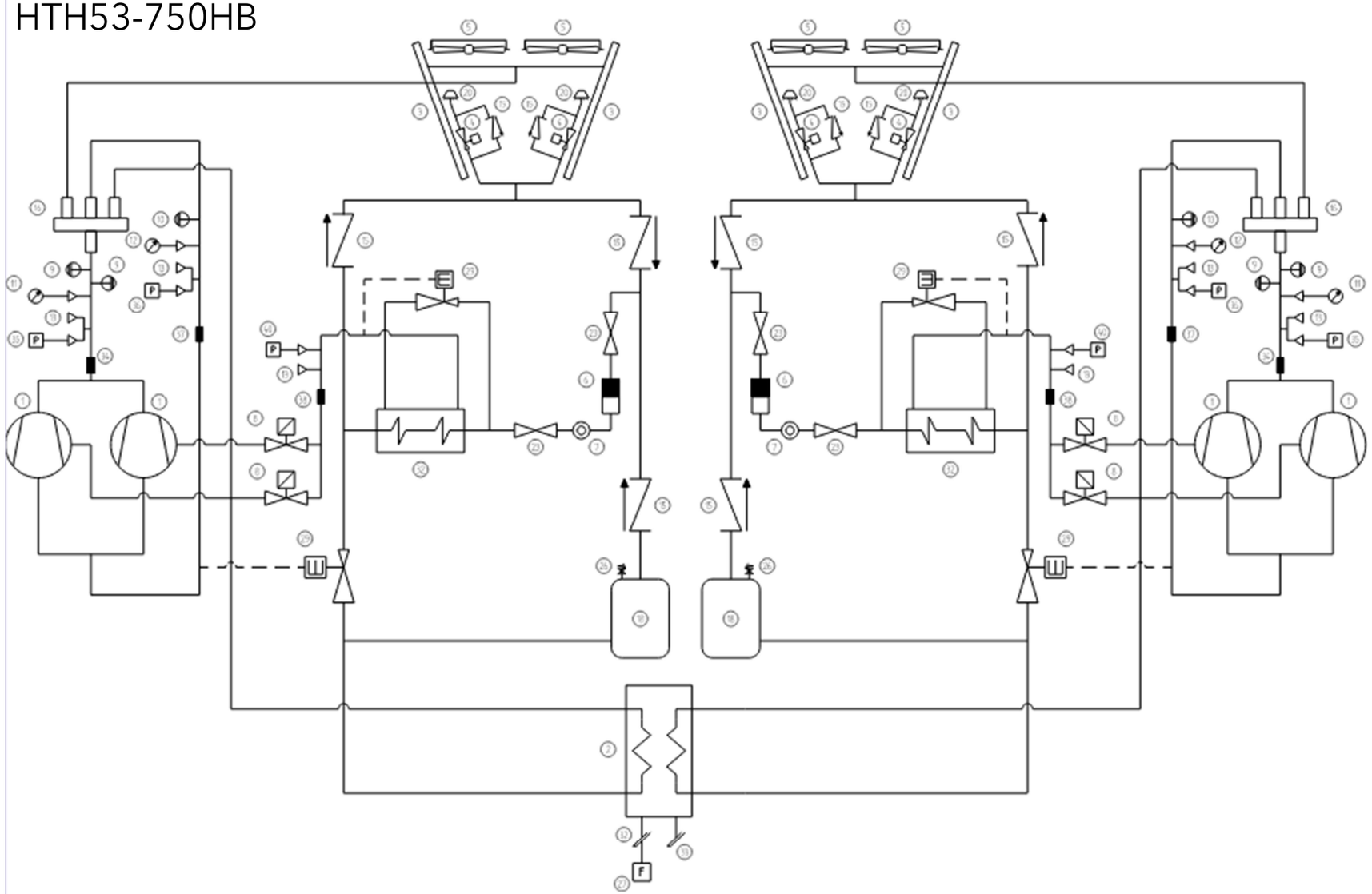

compressor
reversing valve
HEATING MODE
low temperature heat absorbed
higher temperature heat dissipated
evaporator
thermal expansion valve (TXV)
condenser
compressor
reversing valve
COOLING MODE
higher temperature heat dissipated
low temperature heat absorbed
condenser
thermal expansion valve (TXV)
evaporator

Defrost Strategy – Independent Circuit Reversal

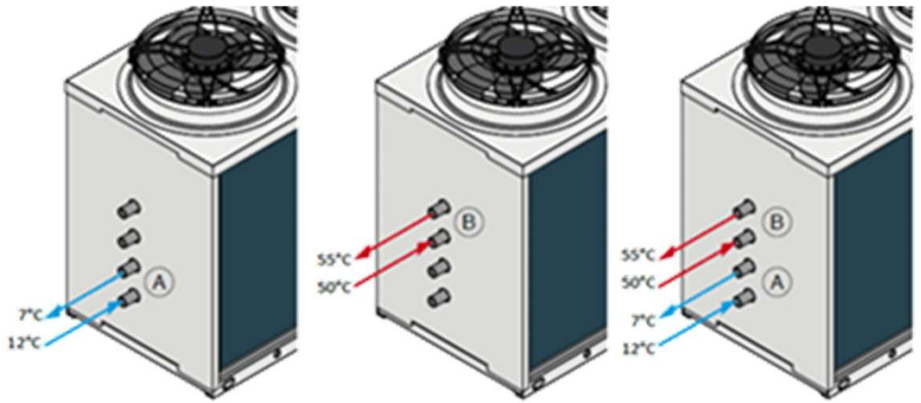
Refrigeration Diagram - HTH53-750HB

Dual Circuits

Dual Manifolded Compressor Circuits



2-Pipe vs. 4-Pipe (Heat Recovery)



2-Pipe

- Cost effective units that have a straightforward design
- Easily applied in multiple modules to allow for redundancy and simultaneous heating/cooling

4-Pipe

- Load sharing capabilities in shoulder seasons
- Allows domestic hot water preheat in the summer while cooling
- More sophisticated unit, can take more time to get commissioned properly
- Requires more advanced BMS controls sequences & capable maintenance/operations staff

Galletti HTH-series
Capacity Overview

Rate at specific conditions!

30 tons	54 tons
460-MBH	778-MBH
HTH30-460HS	HTH54-778HS
COP = 4.04	COP = 4.09

* COP rating @ 47^{0}F w/105^{0}F LWT

All models currently 460V/3/60

IN STOCK, COMPETITIVE PRICING

COMING SOON

DISSIPATION WITH AIR

Water chillers and heat pumps using air as thermal source

DISSIPATION WITH WATER

water chillers and heat pumps using water as thermal source

COMING SOON

COMING SOON

MULTIFUNCTIONAL WITH DISSIPATION WITH AIR

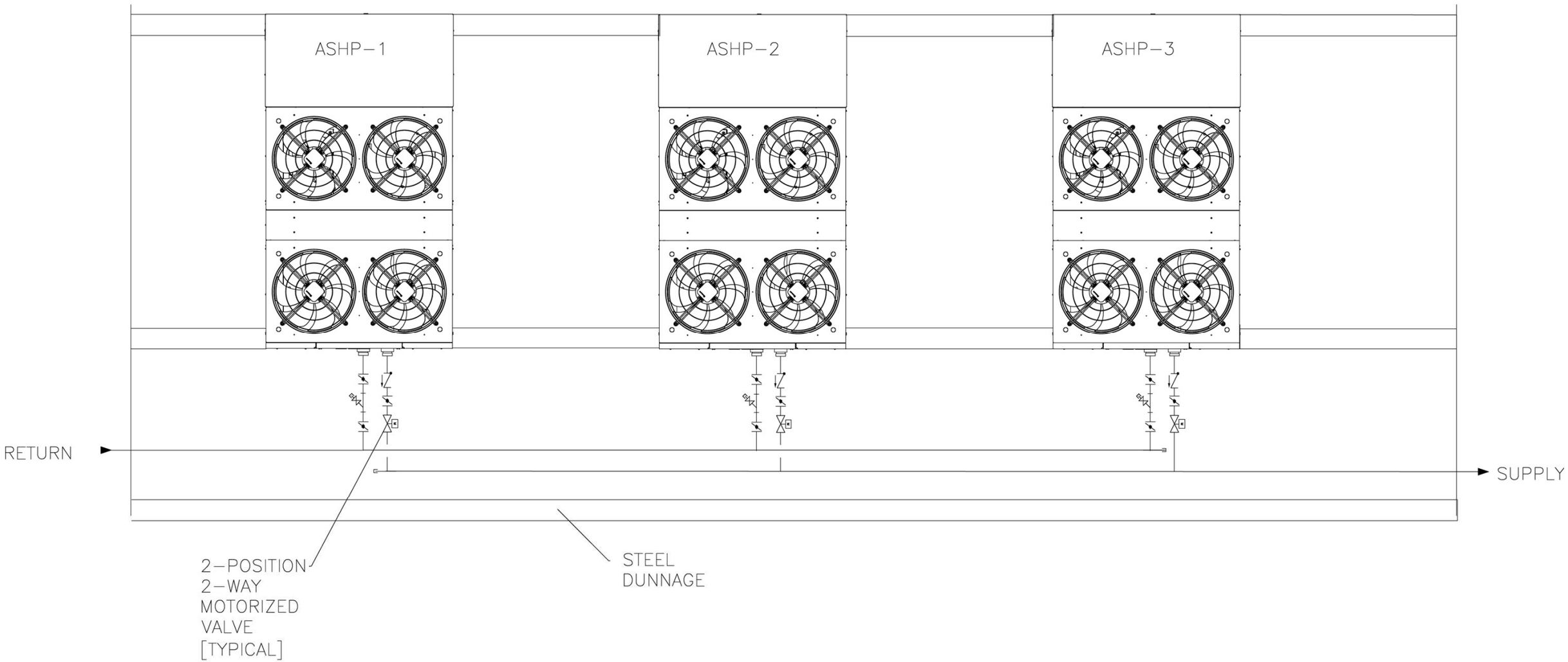
Total condensation heat recovery heat pumps using air as thermal source

MULTIFUNCTIONAL WITH DISSIPATION WITH WATER

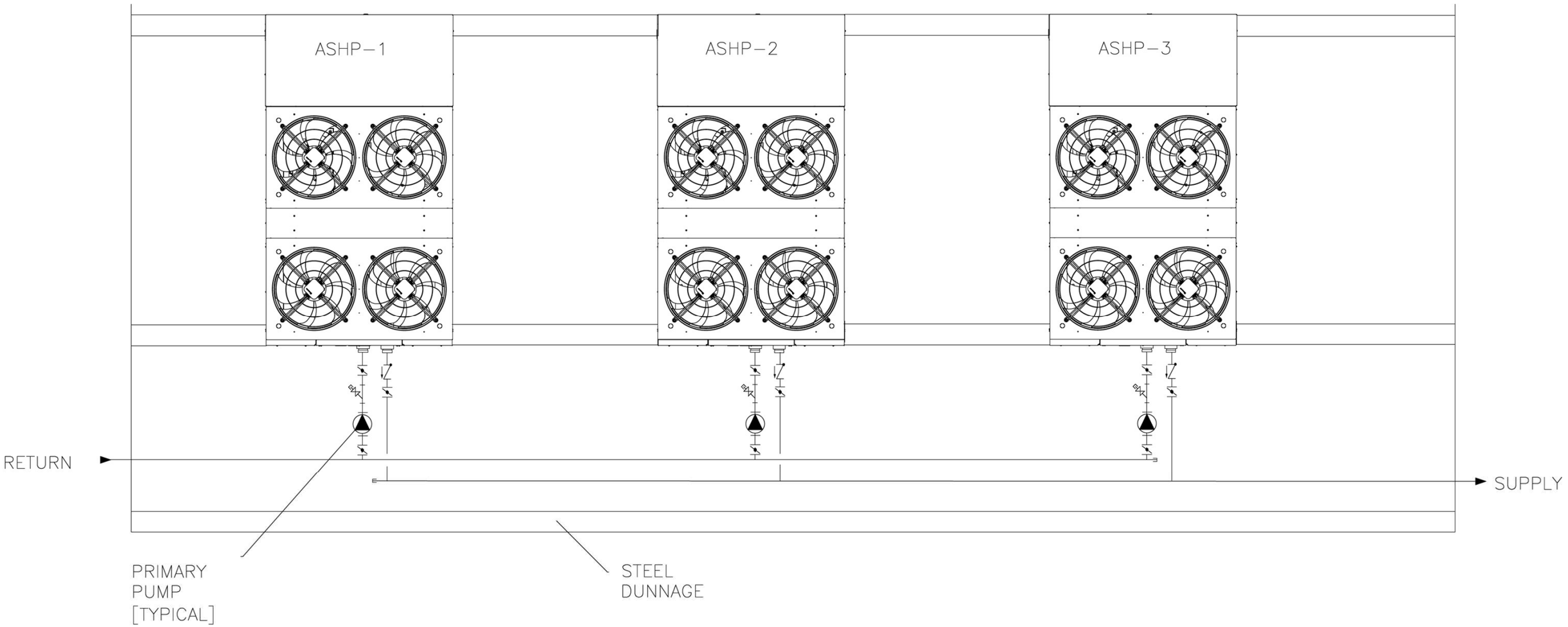
Total condensation heat recovery heat pumps using water as thermal source

System Schematics & Sizing Buffer Tanks

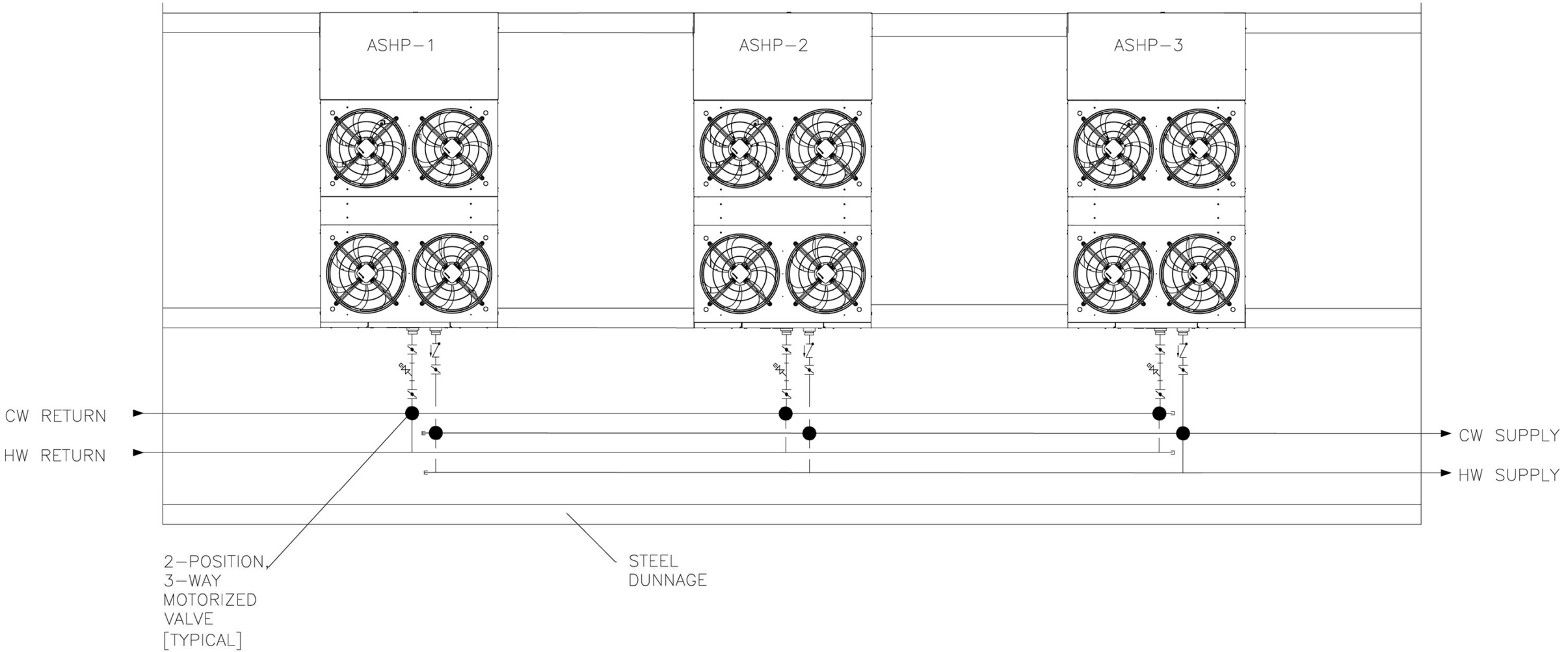
Two Pipe Systems – 2-Way Valve Control



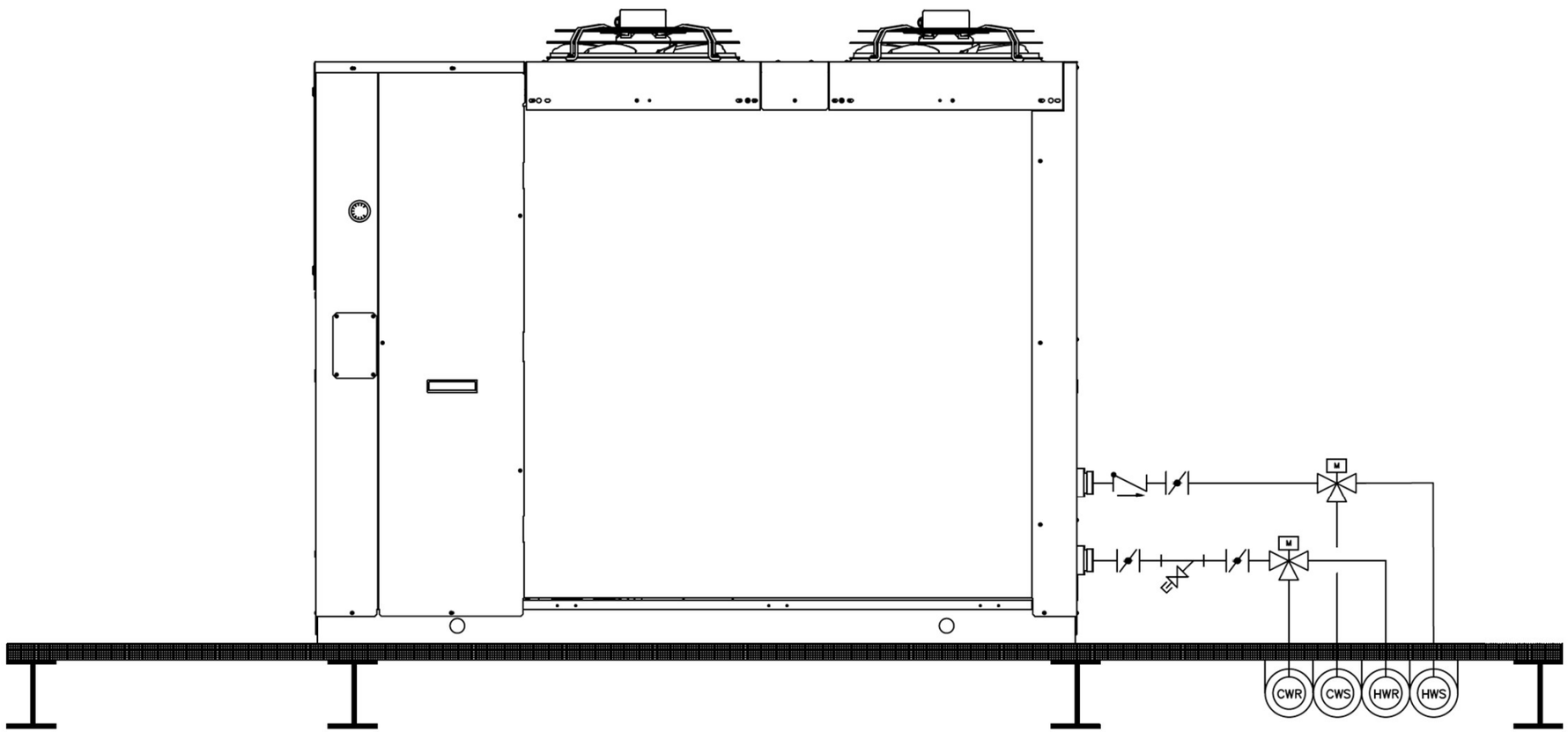
Two Pipe Systems – Primary Pumps



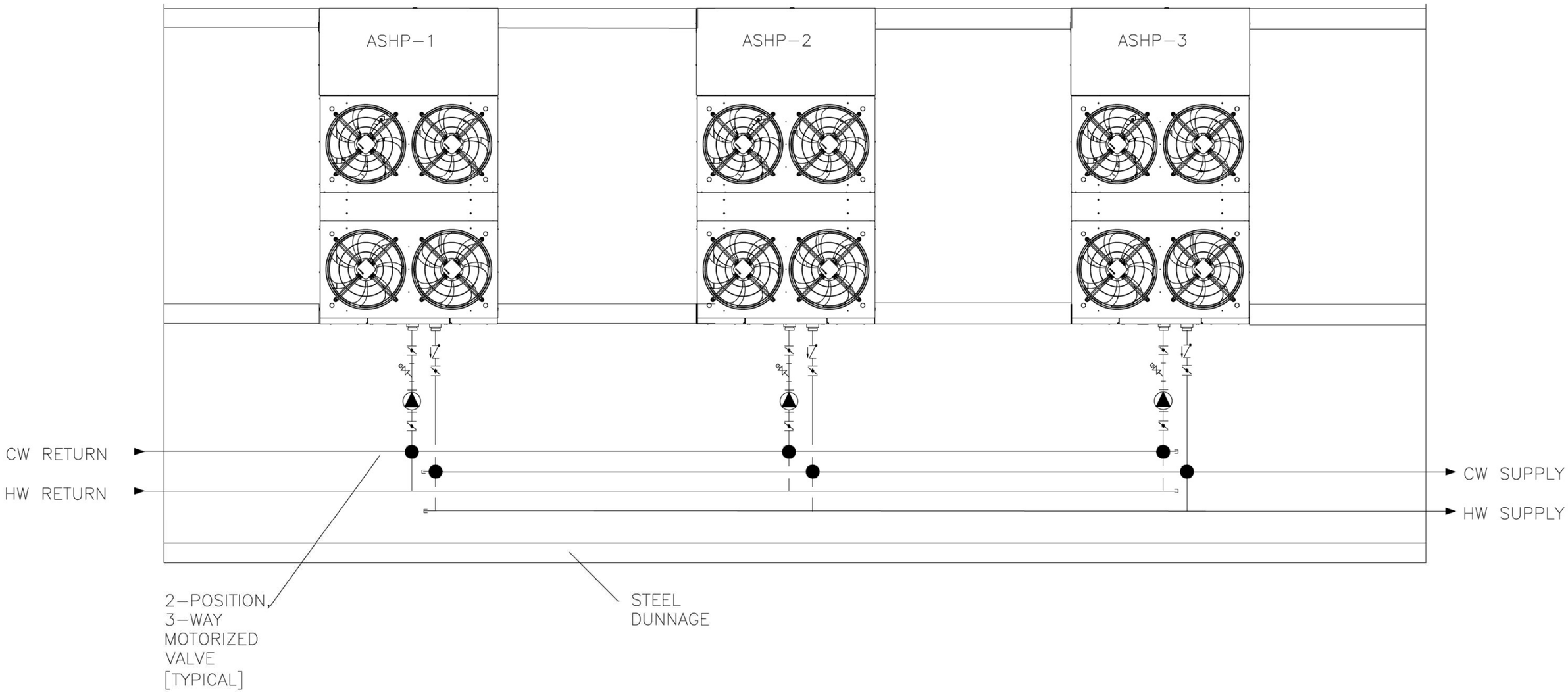
Four Pipe Systems – 3-Way Changeover Valves



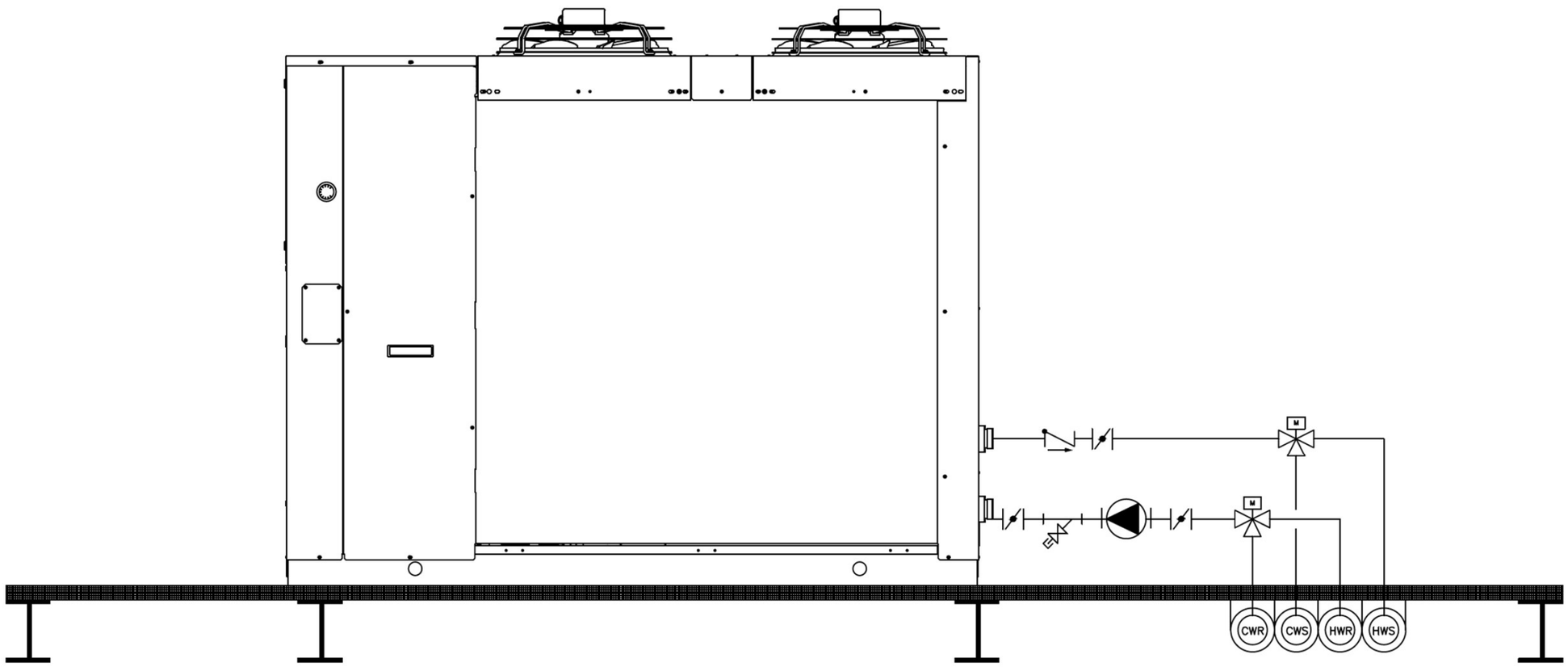
Four Pipe Systems – 3-Way Changeover Valves



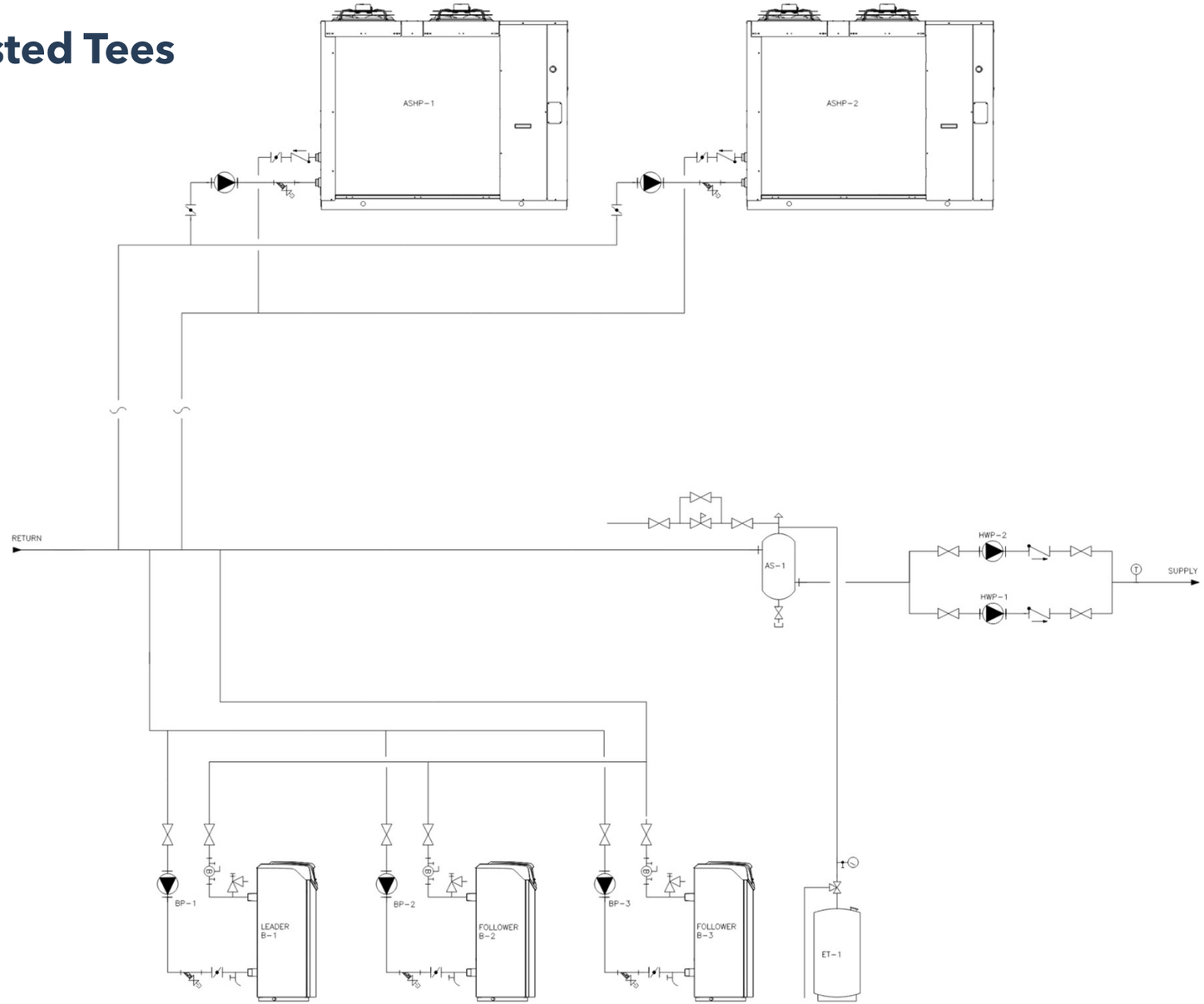
Four Pipe Systems – Primary Pumps



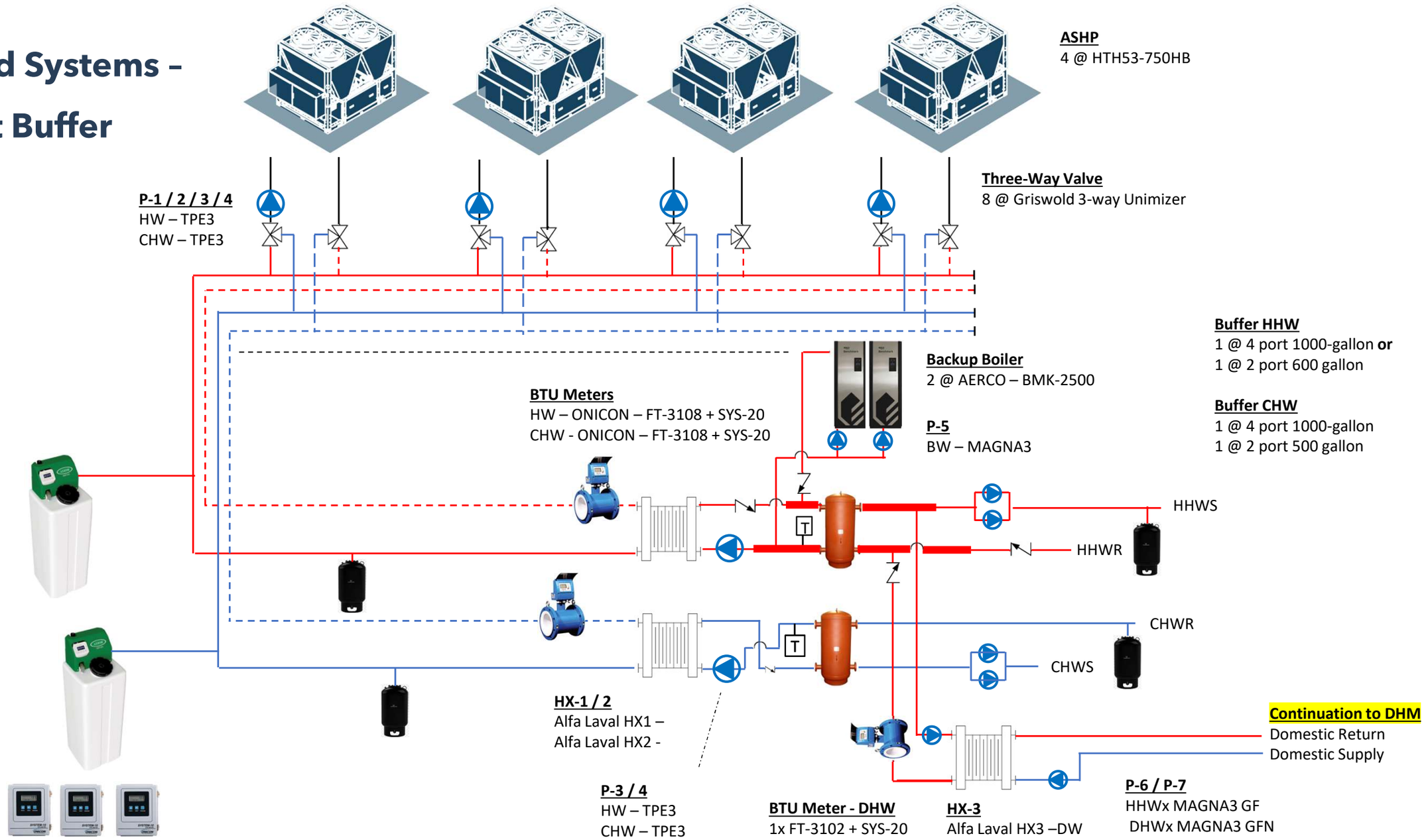
Four Pipe Systems – Primary Pumps



Hybrid Systems – Nested Tees

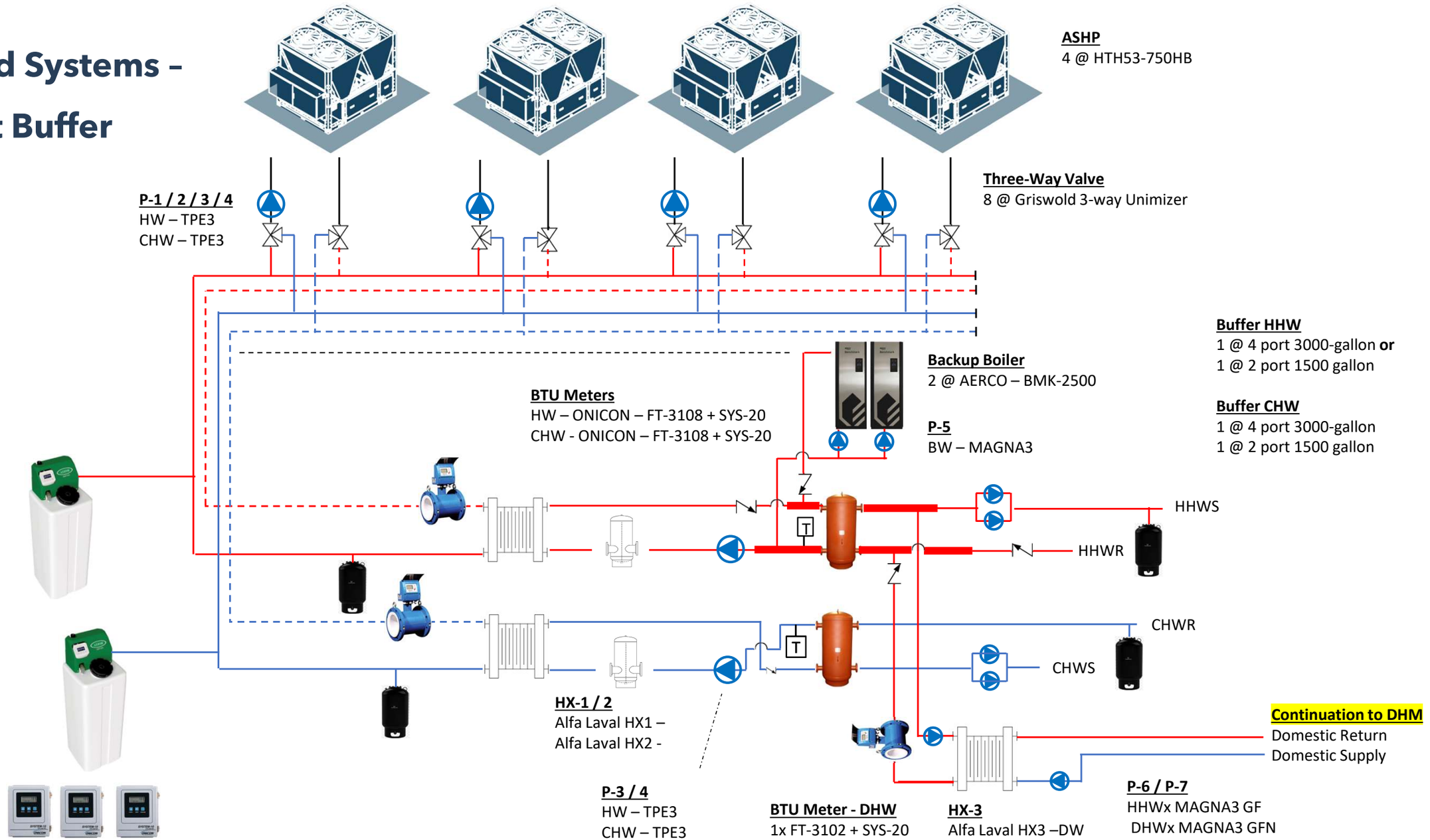


Hybrid Systems –
4-Port Buffer



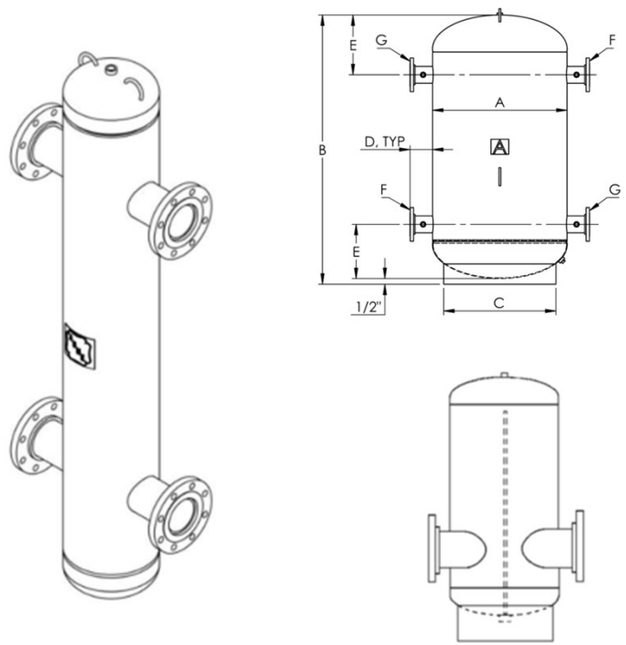
Hybrid Systems –

2-Port Buffer



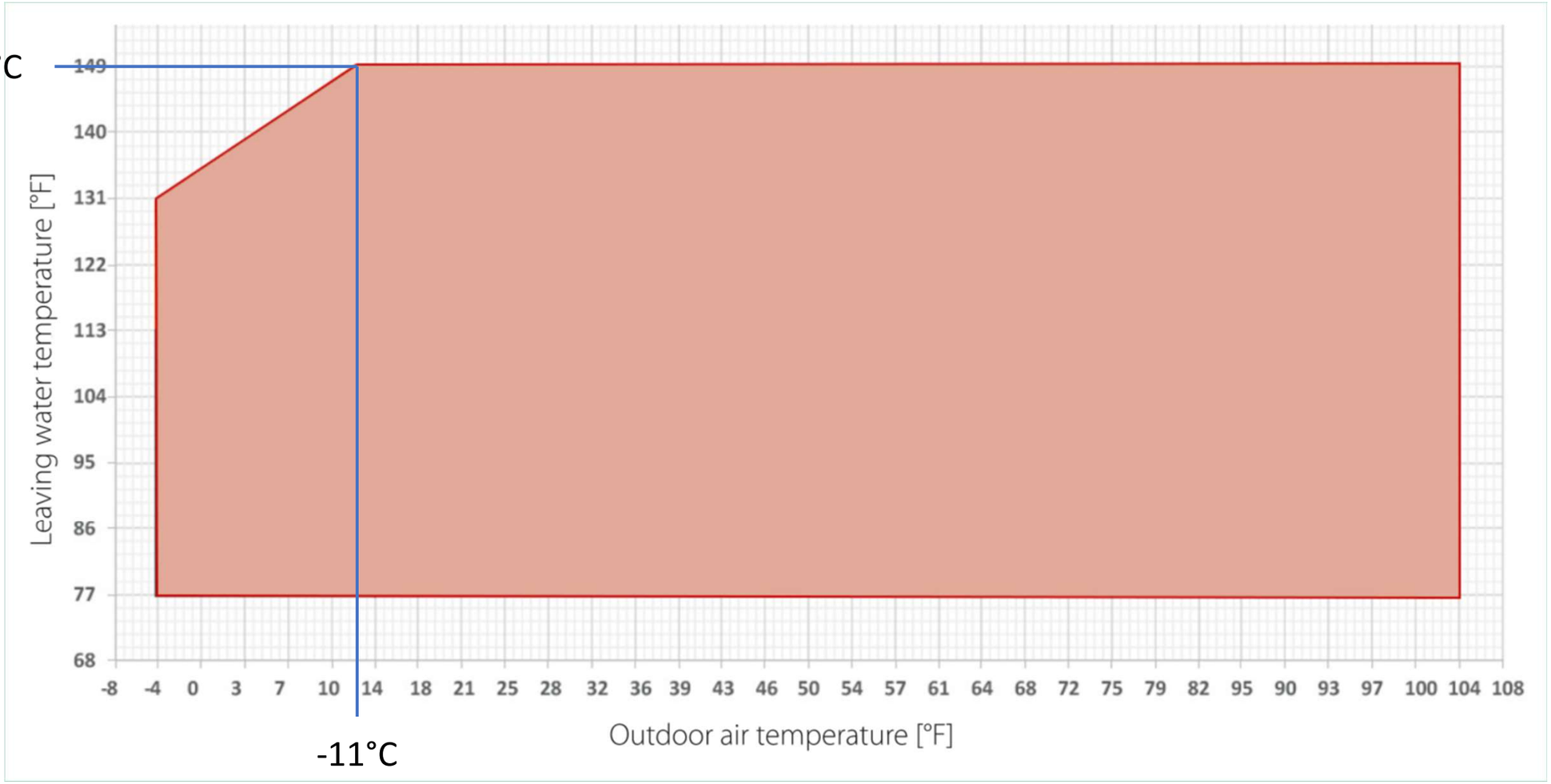
Buffer Tank / LLH Sizing and Selection

- EVI optimization and system longevity recommend 10-minutes minimum run time
  - E.G. - 750,000 BTUh / 500 / 10F = 150 gpm - *[should subtract minimum system load]*
    - 150gpm * 10 minutes = 1500 gallons
- 5-minute run time acceptable for minimum short cycle damage avoidance
- More usable buffer volume available in 2-port systems for large plant, as well as larger standard connections to LLH
- 4-port systems can be effective to combine buffer volume and hydraulic separation for smaller systems
- Port size should maintain 2-4 ft/s flow velocity ideally

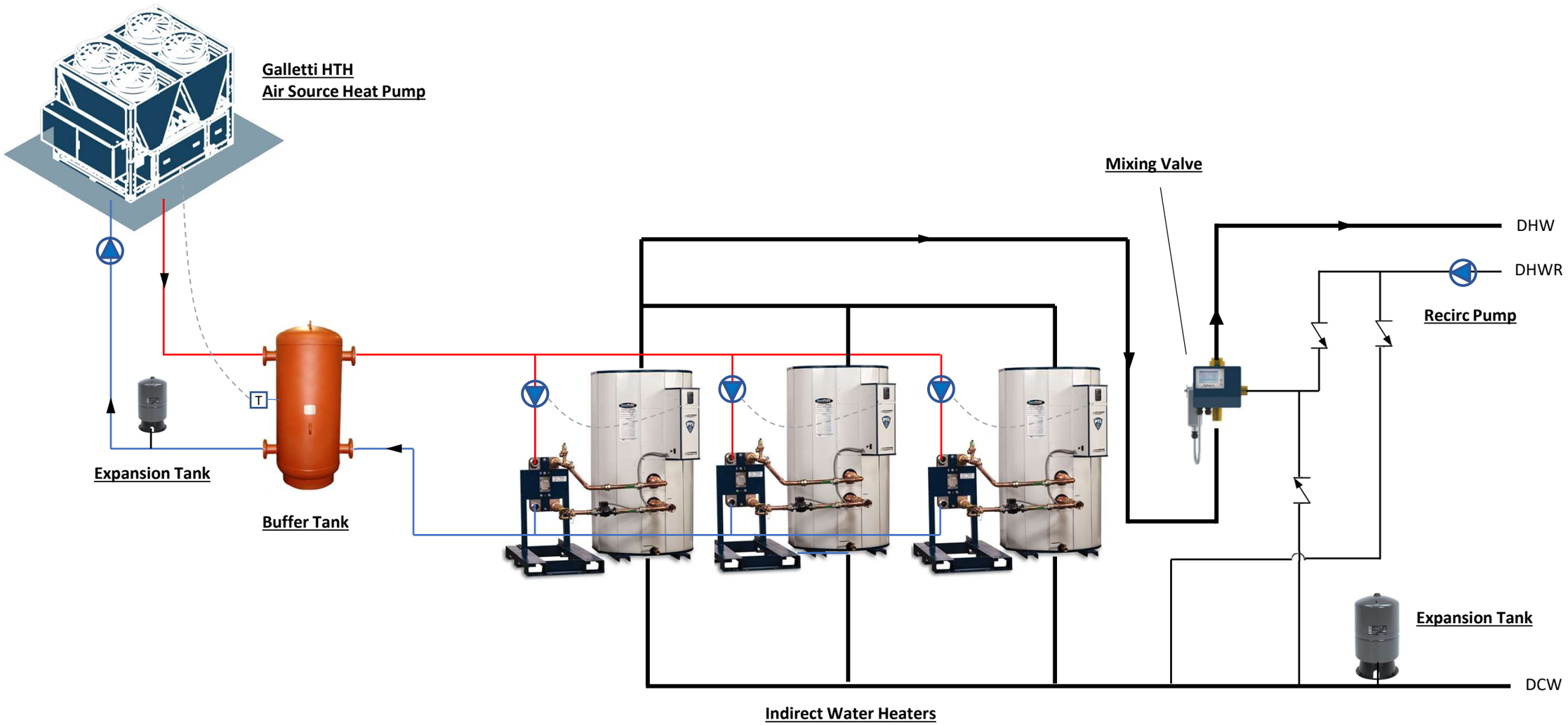


Applying ASHP to Domestic Hot Water

Operating Envelope – DHW Consideration

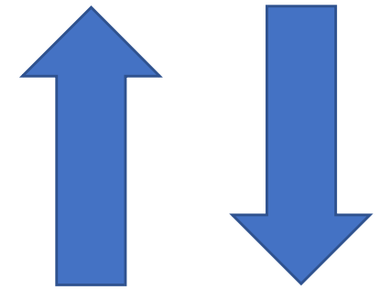


Example DHW Schematic



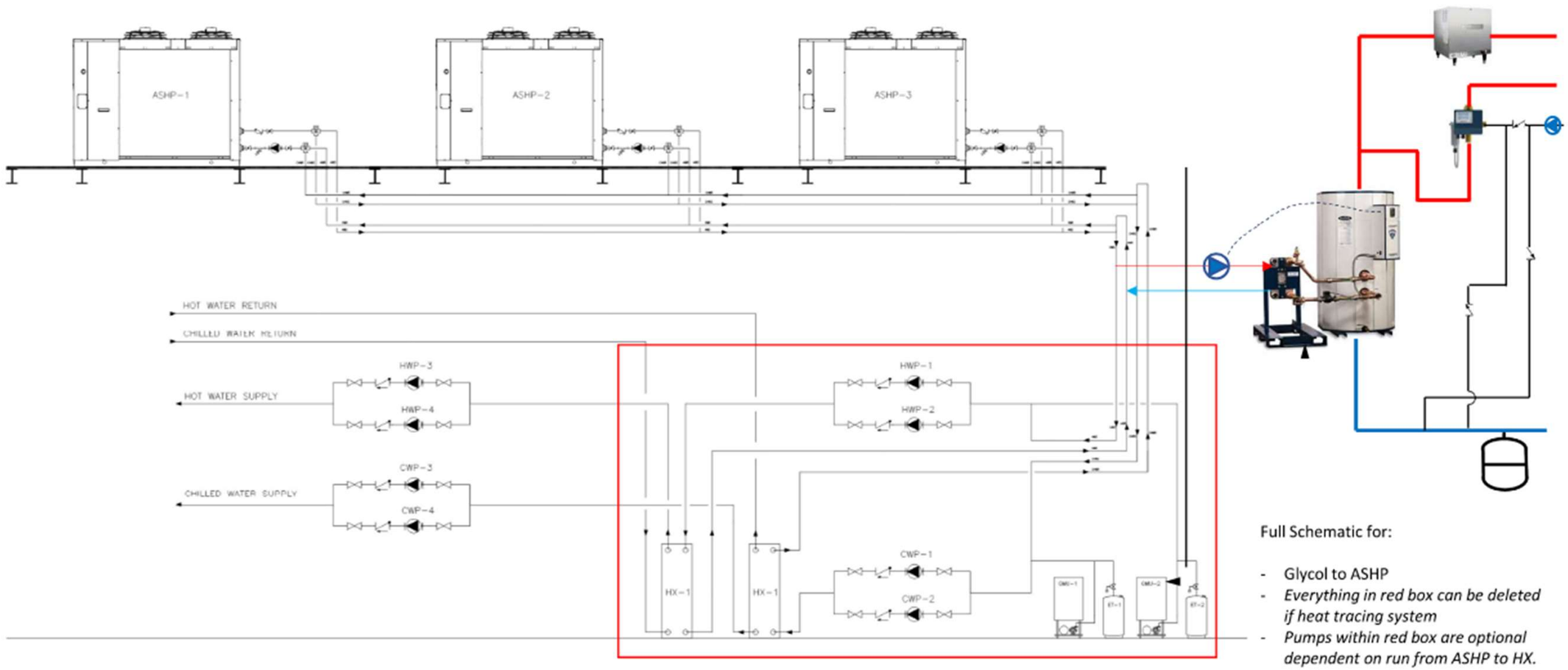
DHW Design Conditions

HPWH systems are sized with more storage & less power input than traditional water heaters.



- Cost of the heat pump is higher than tanks
- Lower power-to-storage ratio helps reduce cycling
- These are not ‘semi-instantaneous’ DHW systems
- Consider mechanical room space for tanks!
- Multi-pass heat pumps capable of handling recirculation losses, but can cause excessive cycling

Combi-Plant Sample Schematic



Full Schematic for:

- Glycol to ASHP
- *Everything in red box can be deleted if heat tracing system*
- *Pumps within red box are optional dependent on run from ASHP to HX. Likely not required.*
- Primary/Secondary loop separation

Combi-Plant Size Reduction

No difference for including heat pump in plant!

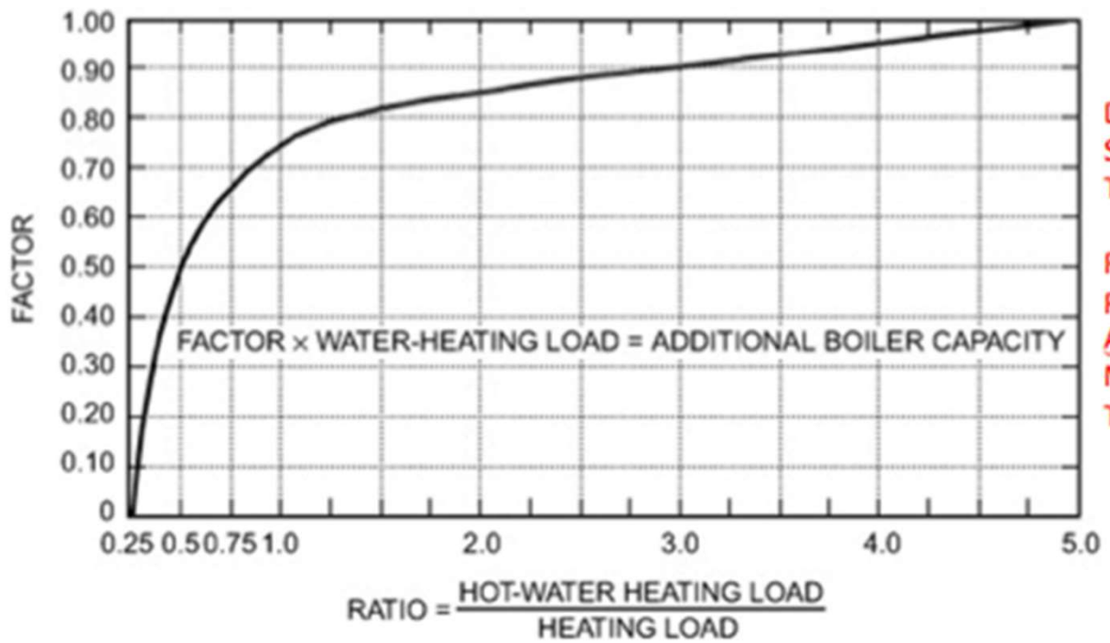


Figure 27. Sizing Factor for Combination Heating and Water-Heating Boilers

DHW: 5 MMBTH
S.H.: 10 MMBTH
Total: 15 MMBTH

Ratio: 0.5
Factor: 0.5
Add'l Boil. Cap: 2.5 MMBTH
Total: 12.5 MMBTH

Source: ASHRAE Handbook, HVAC Applications, Chapter 50

Thank You!
Questions?

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RIADA

Make sure to check out the demo unit!