Building Load Side Distribution Options

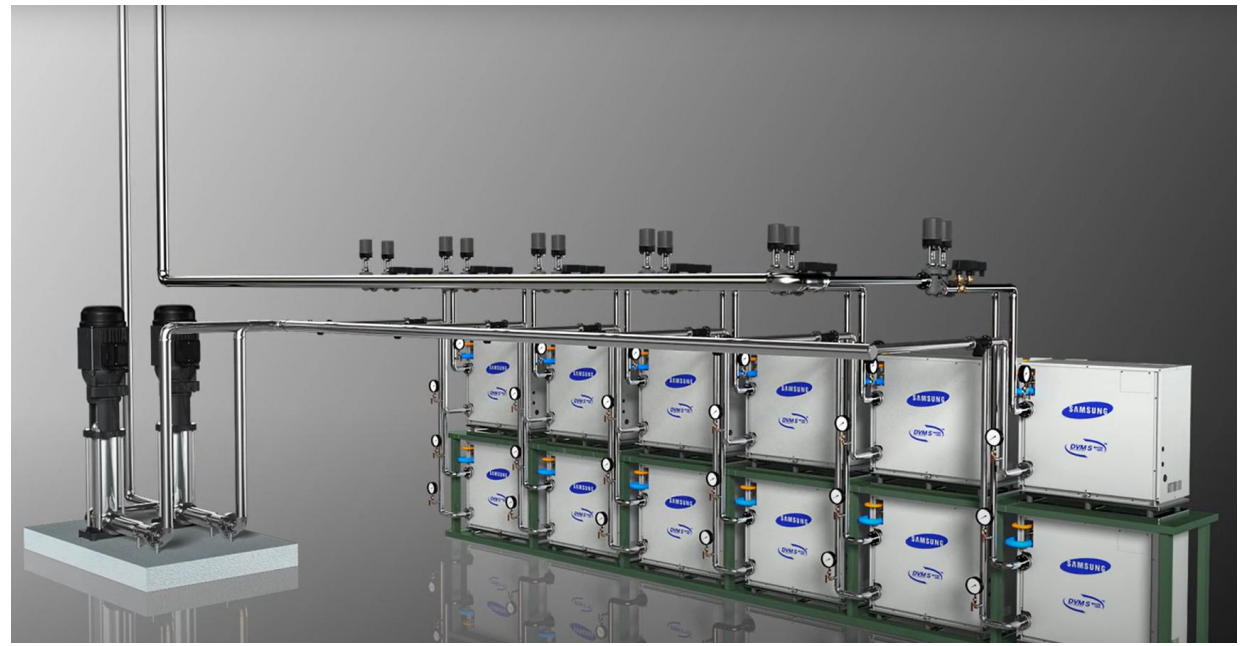
Moderator: Melanie Stachowiak / *M/E Engineering*

Panel: Jason Filler / *F.W. Webb (refrigerant)*
Justin Jobe / *Enertech (hydronic)*
Paul Selking / *WaterFurnace (6-pipe)*
Tim Mutkoski / *ClimateMaster (distributed heat pump)*

F.W. WEBB COMPANY

A Wholesale Distributor and More

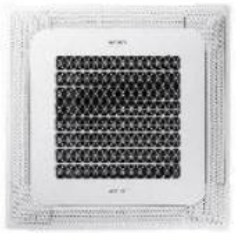

SAMSUNG
SAMSUNG
DVM S
DVM S


SAMSUNG


SAMSUNG
DVM S
SAMSUNG
DVM S

Indoor Units

360 Cassette
9K - 48K



WindFree™* 4-Way Cassette
6K - 48K

WindFree™* Mini 4-Way Cassette
5K - 20K

WindFree™* 1-Way Cassette
7K-12K

WindFree™* 2.0
5K - 28K

Max
32K

Duct S
6K - 48K

Slim Duct
7K - 48K

Floor Standing (Concealed)
6K - 24K

Big Ceiling
36K - 48K

Multi-Position Air Handler
12K - 60K

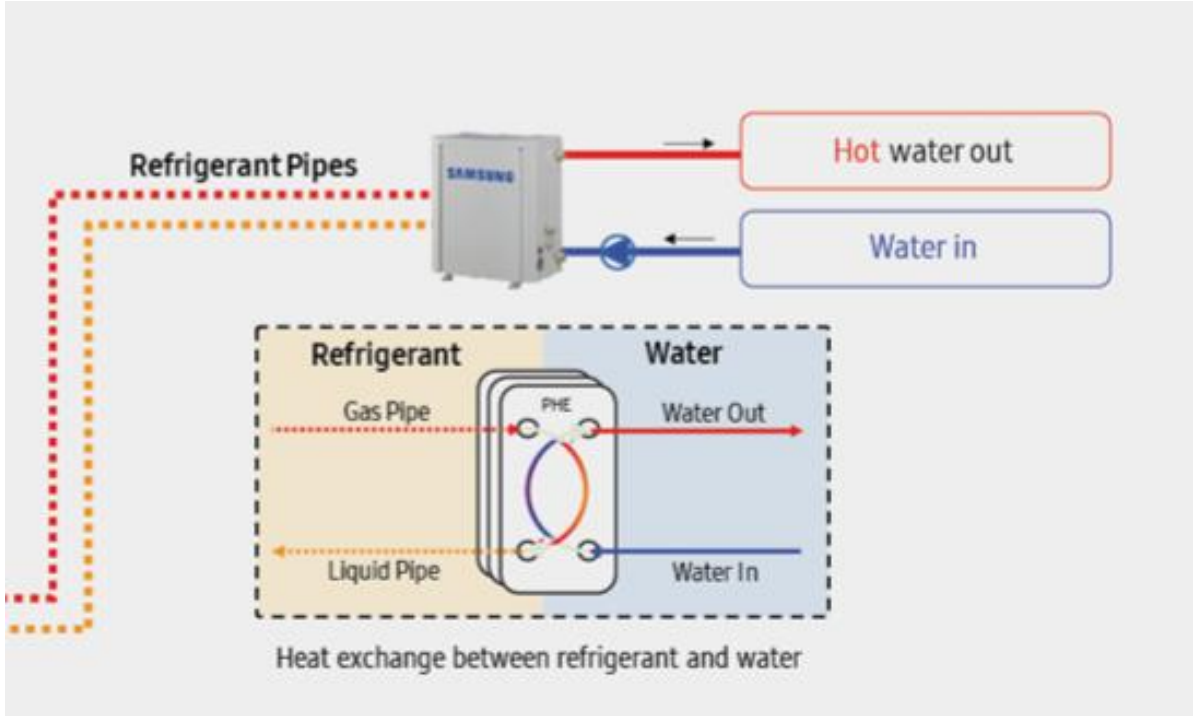
HSP Duct
54K

Floor Standing
(Exposed)
6K - 24K

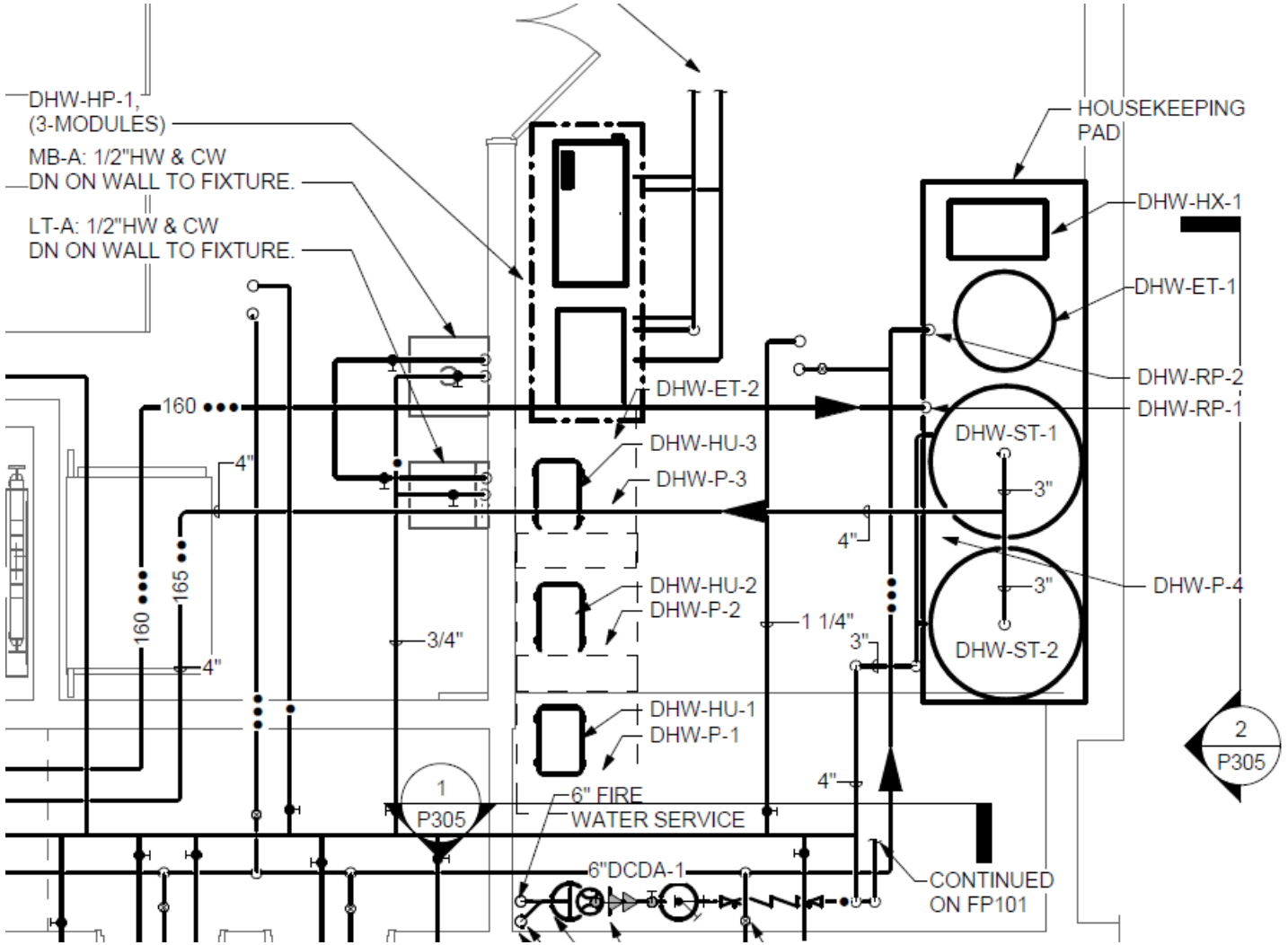
Under Ceiling
18K - 24K

Hydro Kits

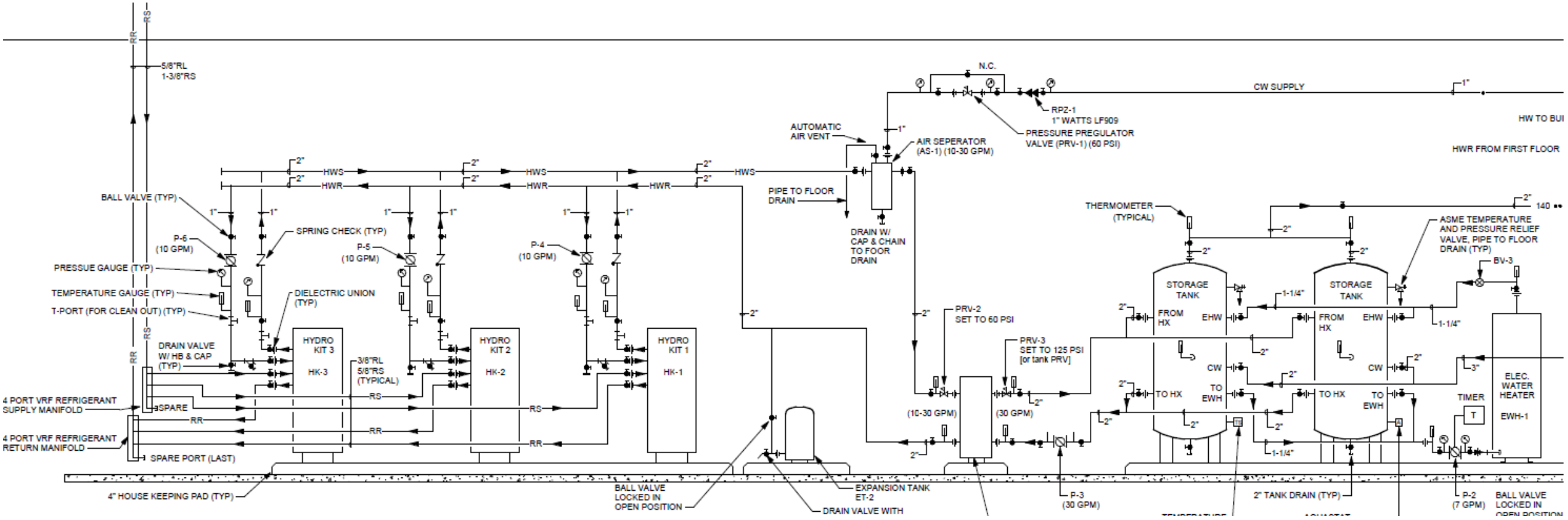

SAMSUNG
122°F
(50°C)
Hydro HE
176°F
(80°C)
SAMSUNG
Hydro HT


Refrigerant Pipes
Hot water out
Water in
Refrigerant
Water
Gas Pipe
PHE
Water Out
Liquid Pipe
Water In
Heat exchange between refrigerant and water

Domestic Hot Water



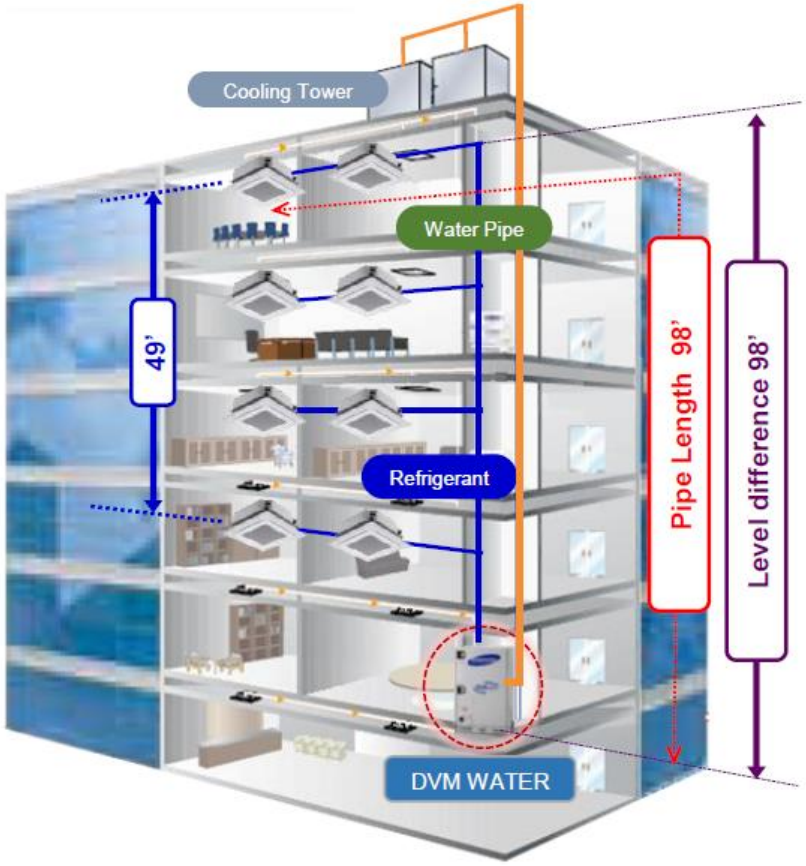
Domestic Hot Water



Refrigerant Piping-Single Phase

Piping limitations

- Total Pipe length : 656ft
- Max level difference(ODU~IDU)
- 98ft when ODU is highest
- 98ft when ODU is lowest
- Max level difference(IDU~IDU) : 49ft
- Max pipe length from 1st branch joint to furthest indoor unit: 131ft



Refrigerant Piping-3 Phase

Piping limitations

Total pipe length : 1640ft

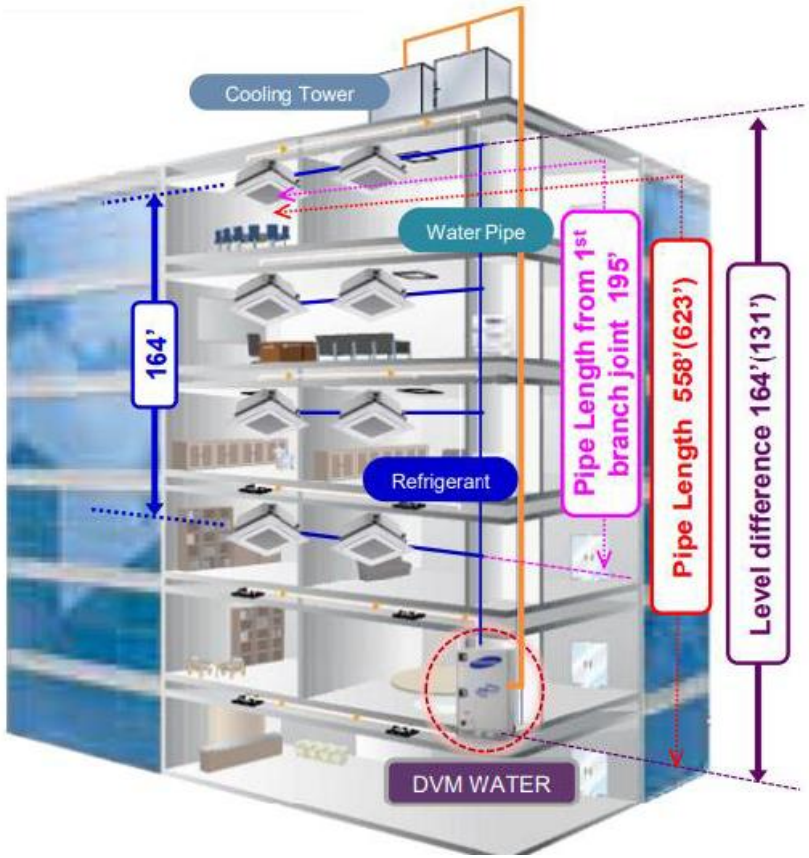
Max pipe length to furthest indoor: 558ft (623)

Max level difference(ODU~IDU)

- 164 ft when outdoor is above indoor
- 131 ft when outdoor is below indoor

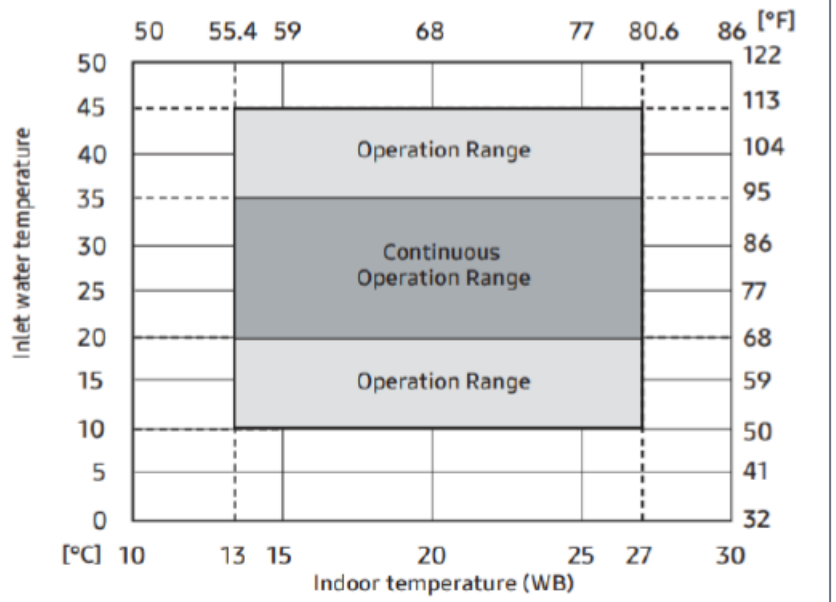
Max level difference (IDU-IDU): 164 ft

Max pipe length from 1st branch to furthest Indoor unit: 148 ft, 295 ft under special conditions

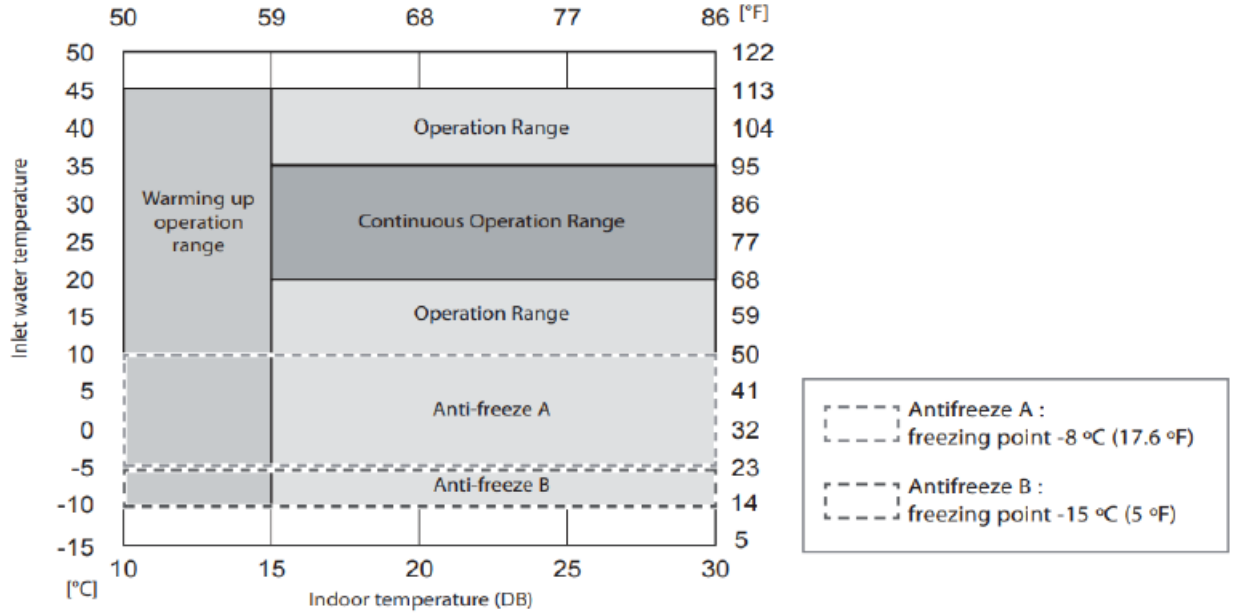


Operating Range

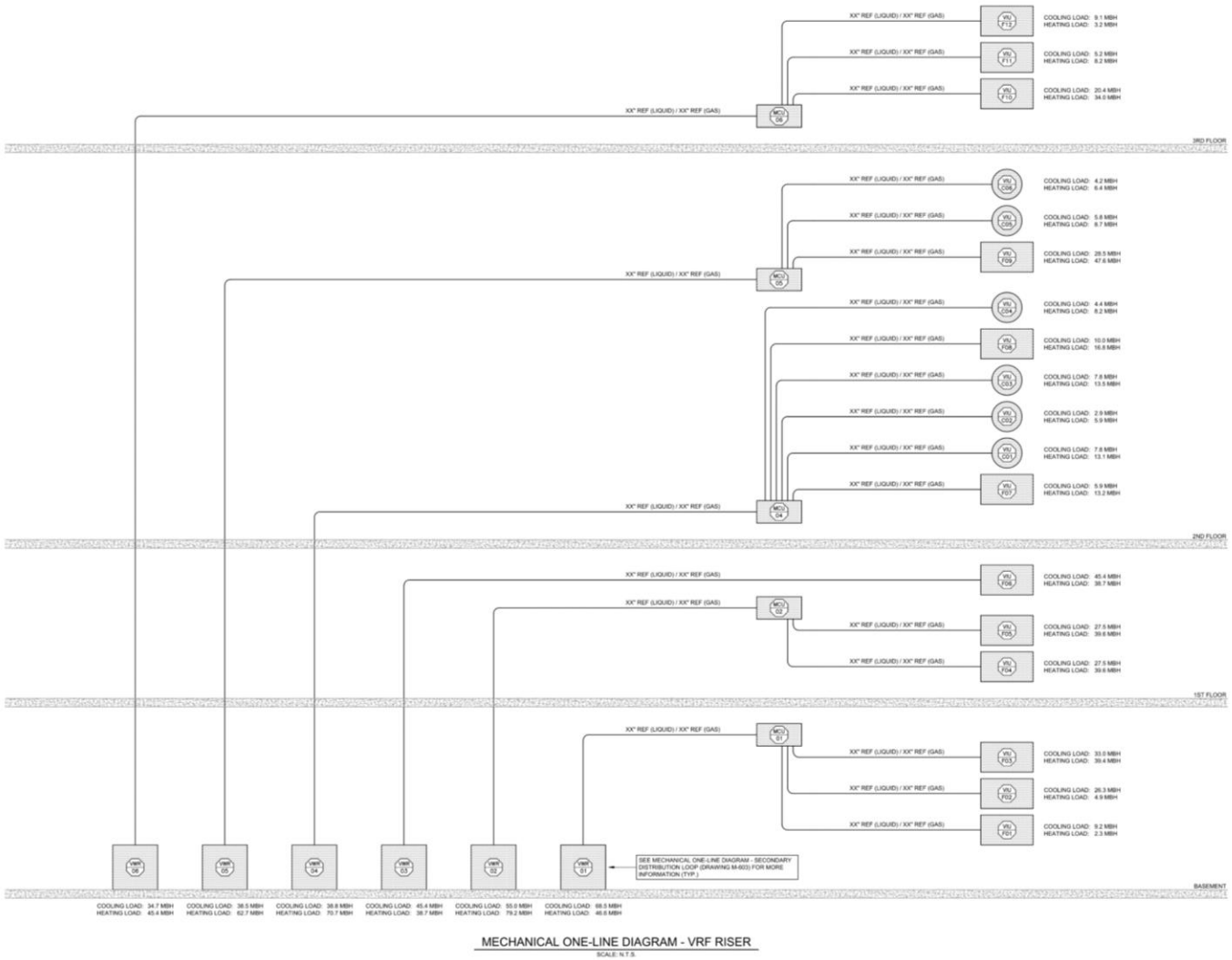
Cooling



Heating



Design



MECHANICAL ONE-LINE DIAGRAM - VRF RISER

SCALE: N.T.S.


thank you
danke
謝謝
ngiyabonga
рахмат
teşekkür ederim
gracias
Баярлалаа
спасибо
faafetai lava
mersi
kia ora
barka
welalin
tack
spas
vinaka
спасибі
blagodaram
dank je
misaotra
matondo
paldies
grazzi
mahalo
tapadh leat
kiitos
dankie
nanni
nandri
dhanyavad
bedankt
hvala
mauruuru
köszönöm
bayarlalaa
gràçie
enkosi
dziękuję
akun
dankon
aciū
хвала
asante
manana
obrigada
tenki
djiere dieuf
tau
mochchakkeram
дякую
mamnun
murakoze
chokrane
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sulpáy
go raibh maith agat
taiku
sobodi
dékuji
sagolun
sukriya
kop khun krap
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ありがとう
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takk
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najis tuke
tanemirt
grazie
rahmet
terima kasih
kam sah hamnida
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dhanyavadagalu
감사합니다
xièxie
merci

Variable Speed Hydronics

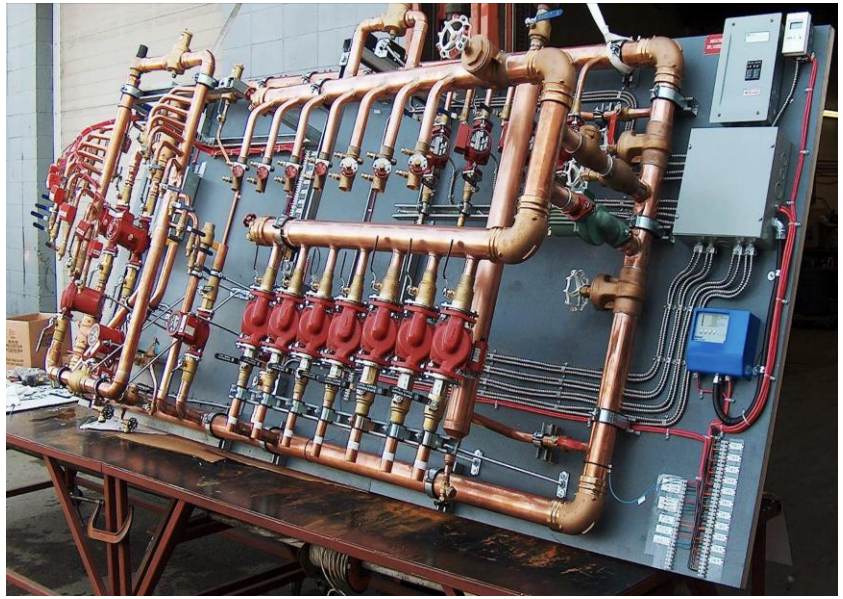
Justin Jobe

Enertech Advancement Training

ENERTECH UNIVERSITY

For years we have prioritized comfort over efficiency on every level…


TACO



A New Era with Hydronics!

There is a better way without losing comfort…

Variable-Speed Water-to-Water Heat Pumps

Variable Speed Air-to-Water Heat Pumps

Benefits

- Huge labor and space savings
- Direct to load piping – No buffer tanks!
- Better dehumidification
- Added benefit of up to 100% DHW
- Heating/Cooling/DHW from one unit
- Ultimate flexibility

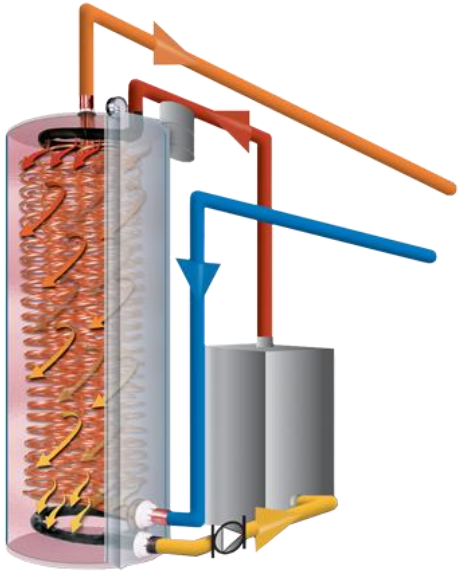
Benefits of Water to Water/ Air to Water HP's

- Hydronic heating/cooling is more efficient than forced air heating/cooling
  - 1" diameter pipe can carry as much heat as a 10" x 14" duct
- Added bonus of 100% DHW
- Great boiler replacement
- Heating/Cooling/DHW
- No More Buffer Tanks!
- Integrated backup
- Electric and Dual Fuel options

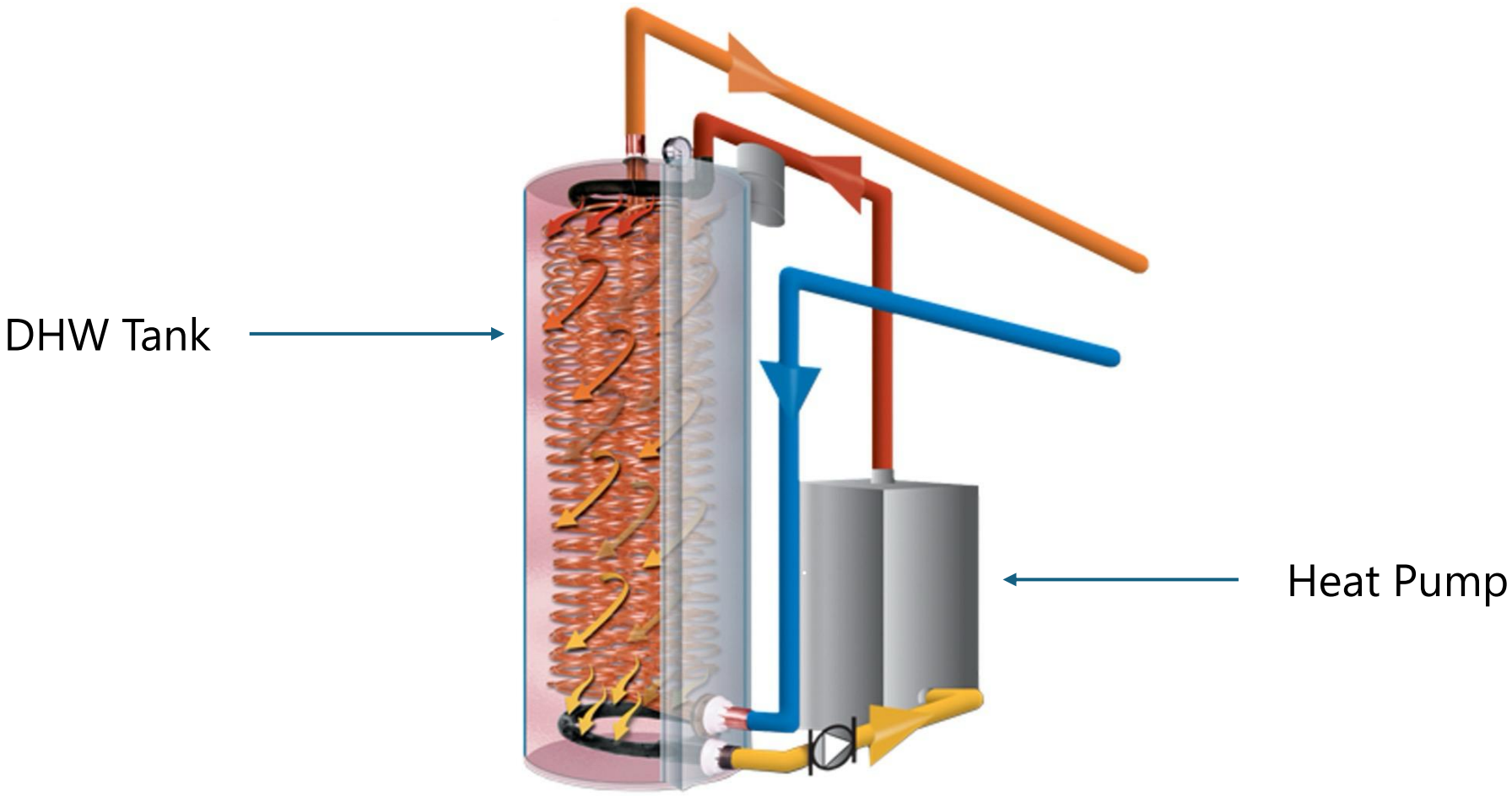
Variable Speed Hydronics Offer

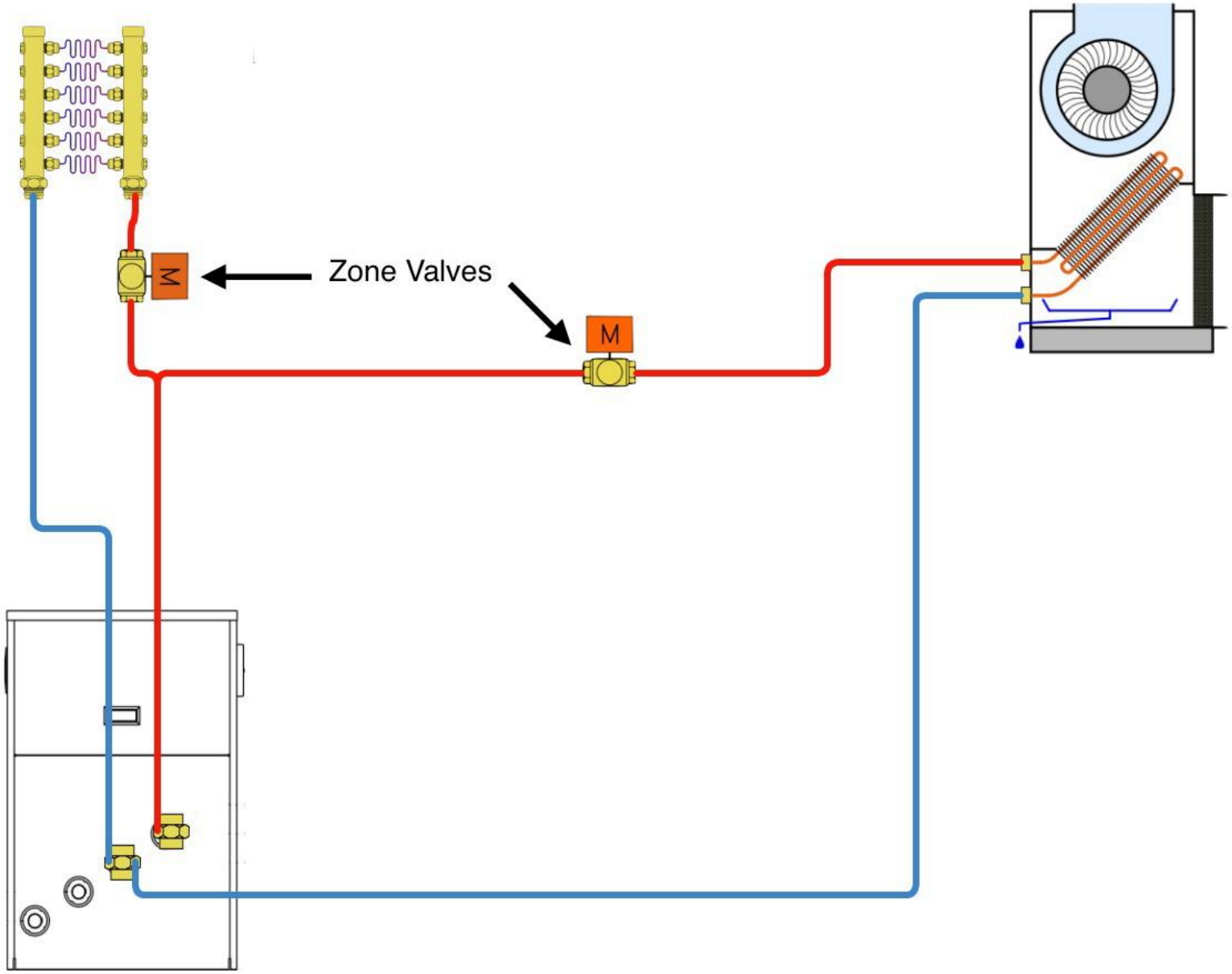
Limitless Flexibility

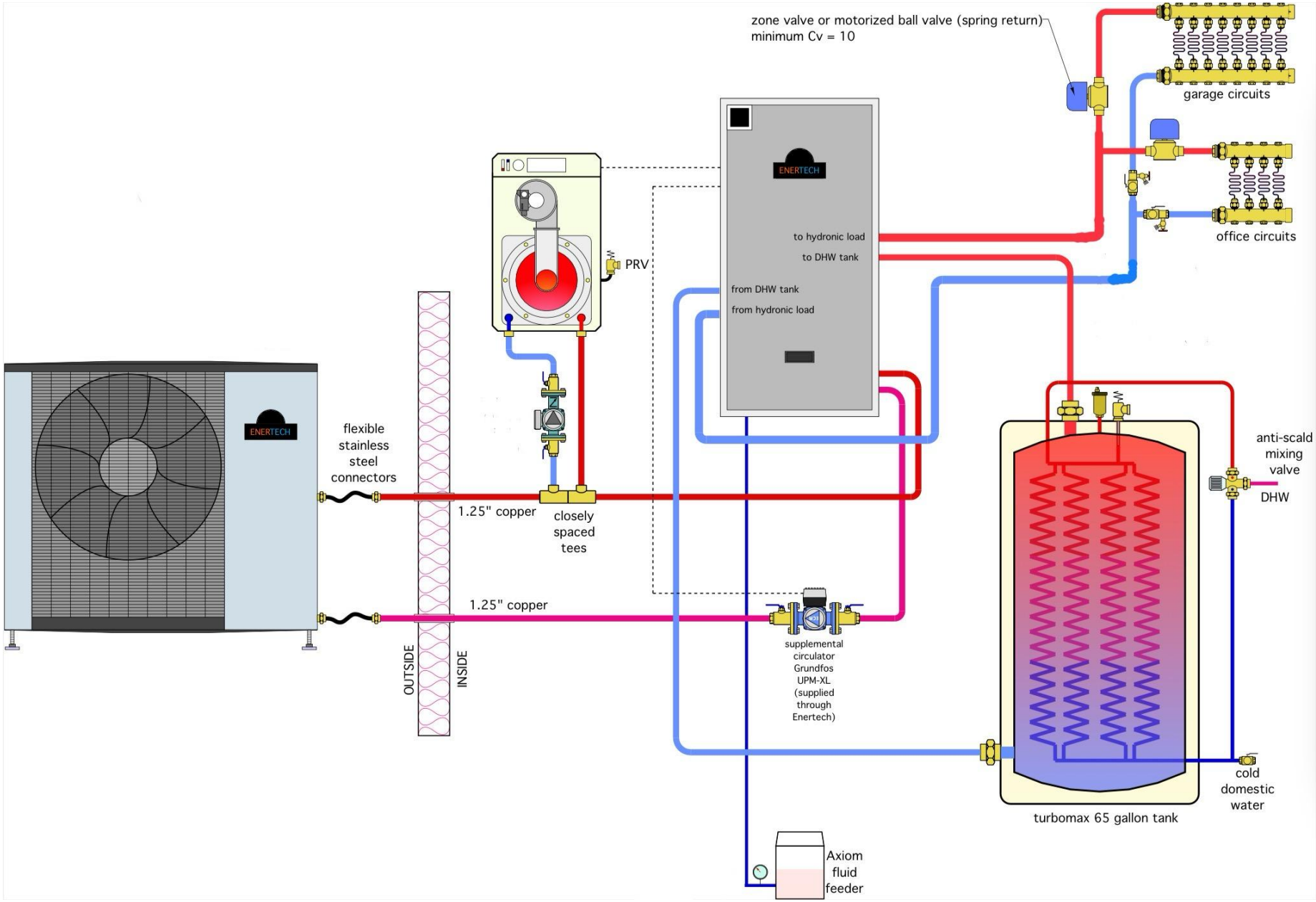
- Radiant floor
- Fan coil forced air heating and/or cooling
- Decorative low mass wall/baseboard radiation
- Domestic hot water generation



Up To 100% Domestic Hot Water




M
Zone Valves
M


zone valve or motorized ball valve (spring return)
minimum Cv = 10
garage circuits
office circuits
ENERTECH
to hydronic load
to DHW tank
from DHW tank
from hydronic load
PRV
flexible
stainless
steel
connectors
1.25" copper
closely
spaced
tees
1.25" copper
OUTSIDE
INSIDE
supplemental
circulator
Grundfos
UPM-XL
(supplied
through
Enertech)
anti-scald
mixing
valve
DHW
cold
domestic
water
turbomax 65 gallon tank
Axiom
fluid
feeder


turbomax
Hydron
NP SERIES


Hydron
Hydron
turbomax


FLAT OUT BEST

Thank You

6 PIPE CHILLERS FOR LOAD SIDE MANAGEMENT

Paul Selking

WaterFurnace

WATER SOURCE MODULAR CHILLERS

- Design Considerations / Features
- Applications / Case Study

DESIGN CONSIDERATIONS / FEATURES

System Compatibility:

- TruClimate 500 Header Rack Options
  - 4-Pipe Standard
  - 4-Pipe Reversing
  - 6-Pipe Standard
  - 6-Pipe Dedicated
- TC500 Chiller Options
  - Reversible
  - Non-Reversible

Head Rack Examples

4-Pipe

6-Pipe

DESIGN CONSIDERATIONS / FEATURES

Retrofit:

- Replacing large chillers, typically cooling only

- All water-to-water modules can fit through a doorway

DESIGN CONSIDERATIONS / FEATURES

Flexibility:

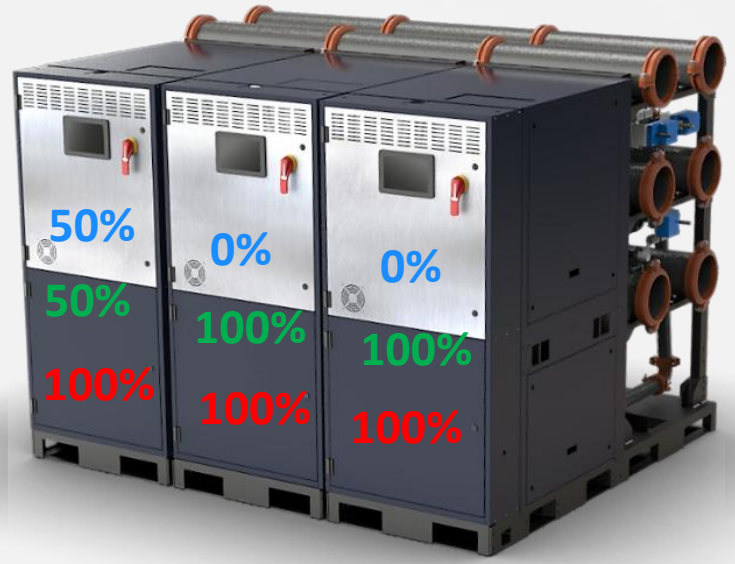
- Header racks for future expansion
- Different Size Options
  - 6” header rack can support up to about 300 tons
  - 8” header can support around 500 tons

DESIGN CONSIDERATIONS / FEATURES

Simultaneous Operation:

- Any Module, Any Mode, Any Time

- 6-Pipe Standard Header Rack
  - Control to HW setpoint and CW setpoint



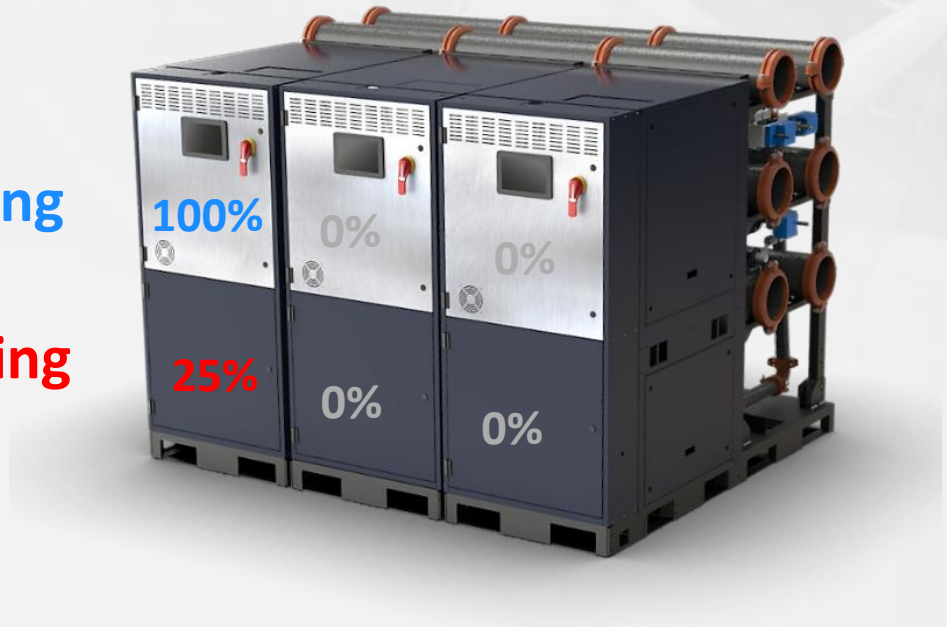
DESIGN CONSIDERATIONS / FEATURES

Simultaneous Operation:

- Example
  - Cooling Load: 100%
  - Heating Load: 25%

- WFI Approach
  - Run 1st Module at 100%
  - Utilize mixing valves to achieve 25% heating requirement

  - Requires 1 Module to achieve setpoints

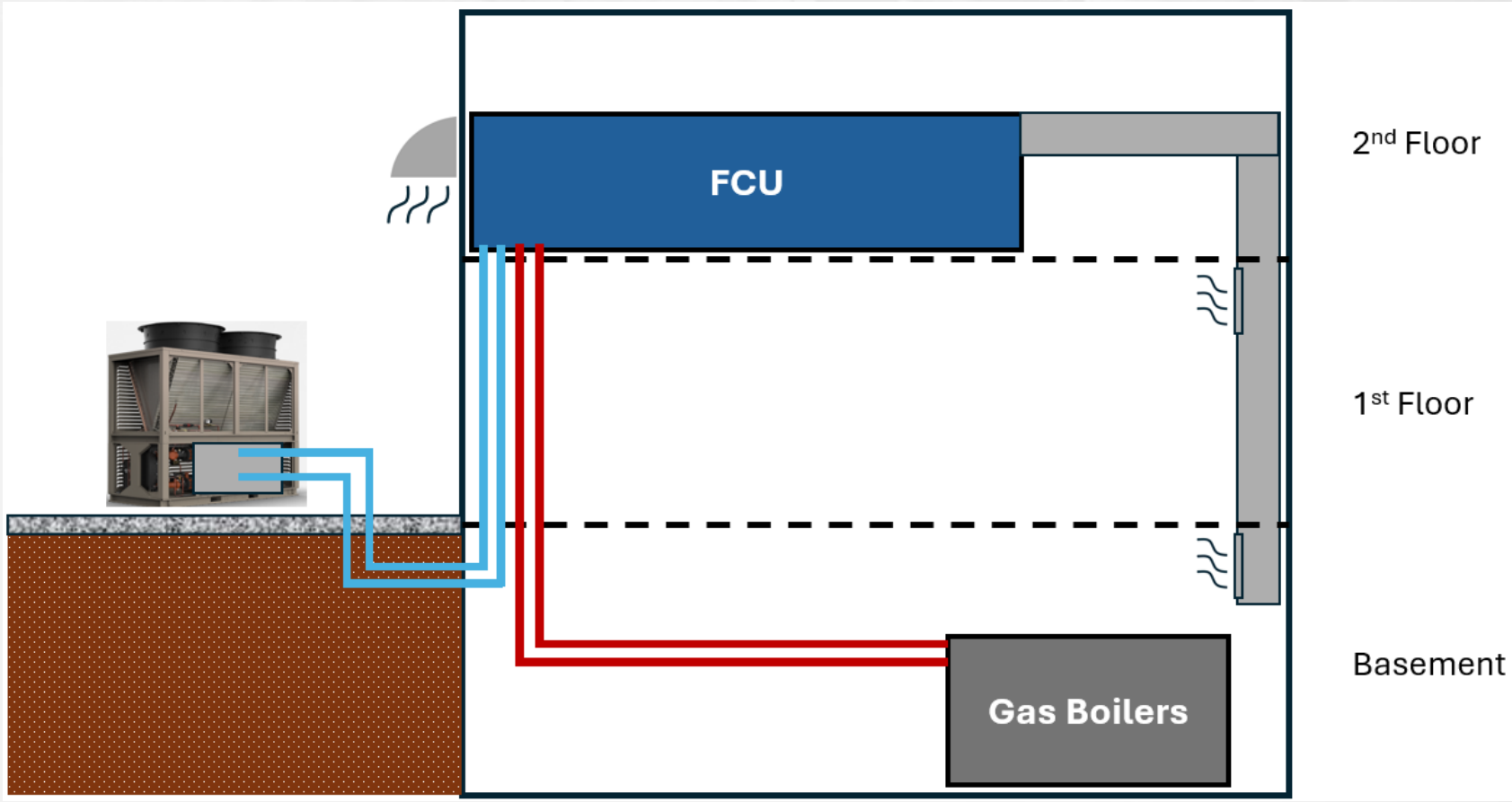


APPLICATIONS / CASE STUDY

Single Plant Solution Example:

- Case Study
  - Small hospital job

- Before
  - Outside: Cooling only chillers
  - Inside: Gas Boilers

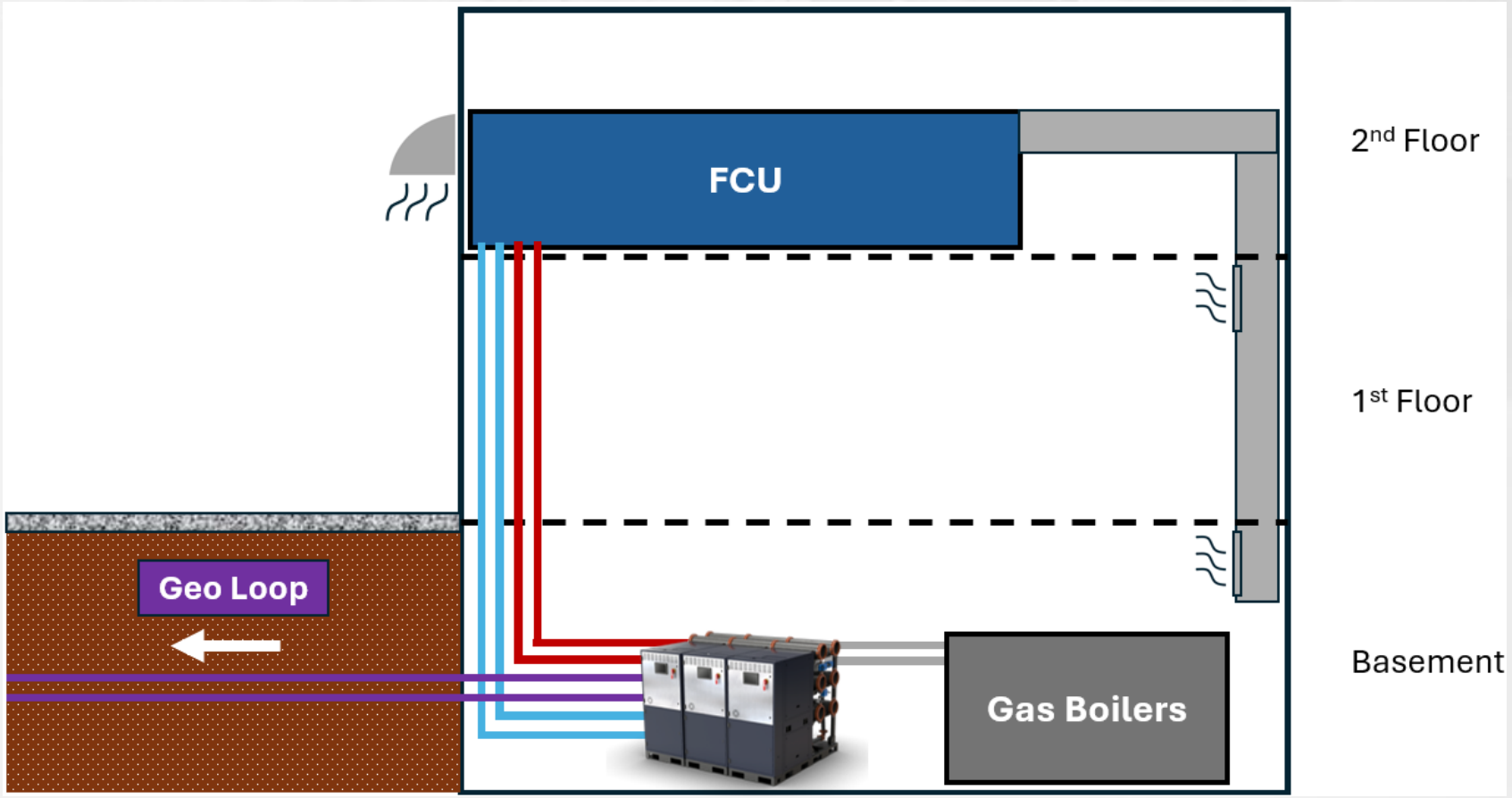


APPLICATIONS / CASE STUDY

Single Plant Solution Example:

- Case Study
  - Small hospital job

- After
  - Outside: N/A
  - Inside: TC500 Chiller Bank, Gas Boilers (Backup)



APPENDIX

PRODUCT OVERVIEW – TRUCLIMATE 500

- **Capacity Range (Tons):** 20-80
- **Heat Exchanger:** BPHE (2)
- **Compressor Options:**
  - Fixed: Dual Scroll
  - Variable: Lead VFD Dual Scroll (available in 30 & 50-ton units)
- **Bankability:** Up to 10 modules
- **Controls:** HydoLink2
- **Available Voltage(s):** 208-230/60/3, 460/60/3, 575/60/3
- **Additional Notes:**
  - Front access to all chiller components
  - True-dual circuit, oversized BPHEs

DESIGN CONSIDERATIONS / FEATURES

Redundancy:

- True independent design
  - Refrigeration circuits
  - Module configuration
  - Chiller bank
  - N+1

- Independent power connection
  - Backup power flexibility

CCG - Climate Control Group

ClimateMaster Inc.

Timothy Mutkoski – Specifying Engineer Relationship Manager

- Located in Oklahoma City, OK USA
- 500,000 square feet in OKC
- Founded in 1957 – longest tenure in industry
- Global leader with millions installed world-wide
- Largest market share
- Focused totally on water-source and geothermal heat pumps
- Myself - 30 plus years in Engineering Sales

Where Can We Use Geothermal Heat Pumps?

Primary markets:

- Residential
- Multifamily/Condos
- Education
- Hotels -Lodging
- Dormitories-Barracks
- Government Facilities
- Offices
- Healthcare
- Whare houses

Don’t let numbers stop you

Geothermal Heat Pumps

Statue of Liberty Gift Shop

ASHRAE Headquarters - Atlanta, GA

Galt House Hotel - Louisville, KY

Black Point Inn - Prouts Neck, ME

Alta Condos, Washington DC

Harvard Library – Cambridge, MA

French Laundry Rest.- Napa, CA

Whistler Village - BC, Canada

Yale Art Bld. – New Haven, CT

Gaillardia Offices – Okla. City

California University of PA

Hirschfeld Towers – Denver, CO

Commercial Buildings

PARTNER WITH THE BEST SYSTEM SOLUTION PROVIDER

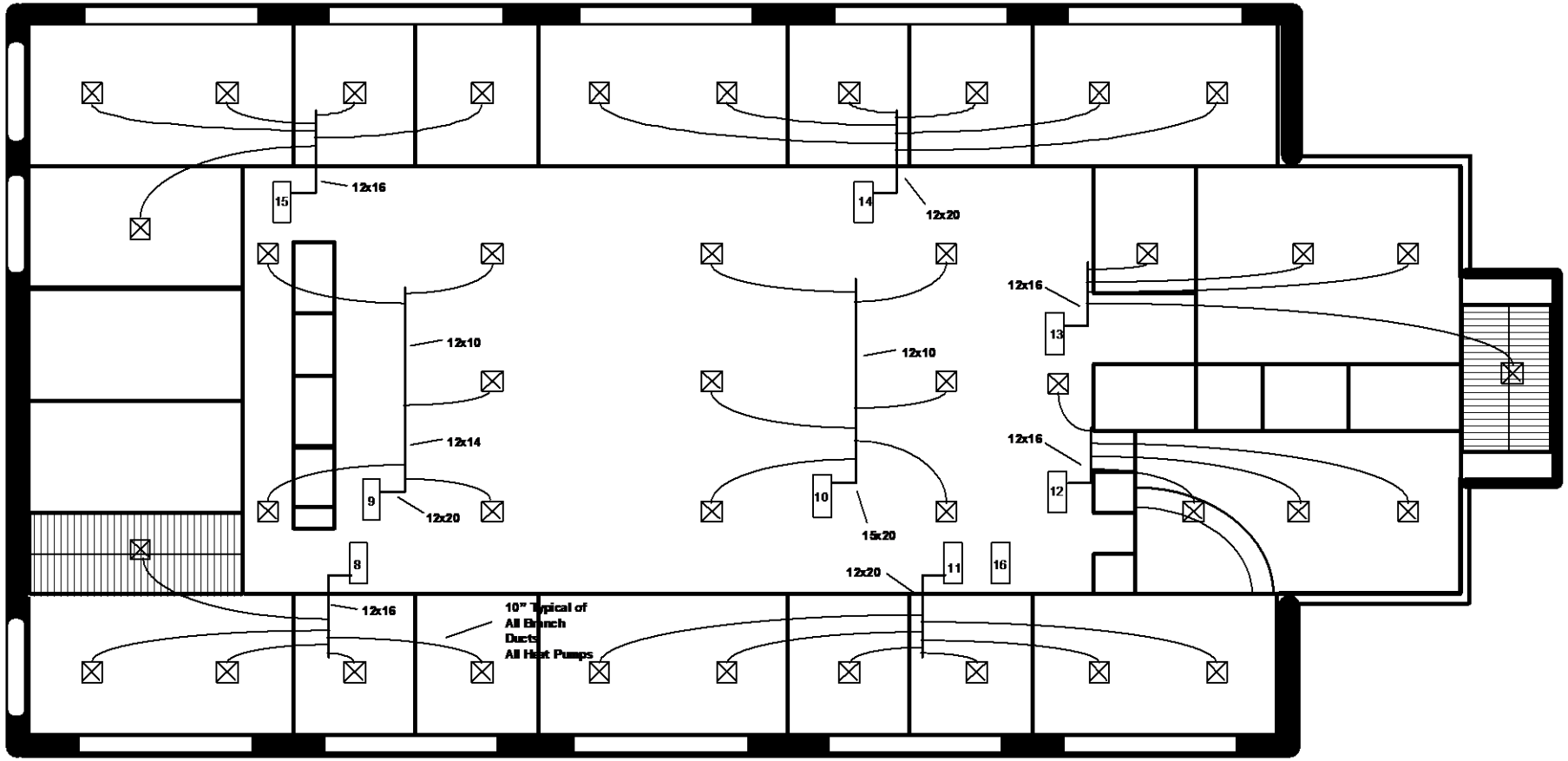
Wide Range of Water-Cooled System Options Available for a Variety of Applications

- Horizontal
- Vertical

- Console
- Vertical Stack

- Rooftop
- Slim

Geothermal Building
Floor to Heat Pump Supply Ducts



PARTNER WITH THE BEST SYSTEM SOLUTION PROVIDER

Wide Range of Water-Cooled System Options Available for a Variety of Applications

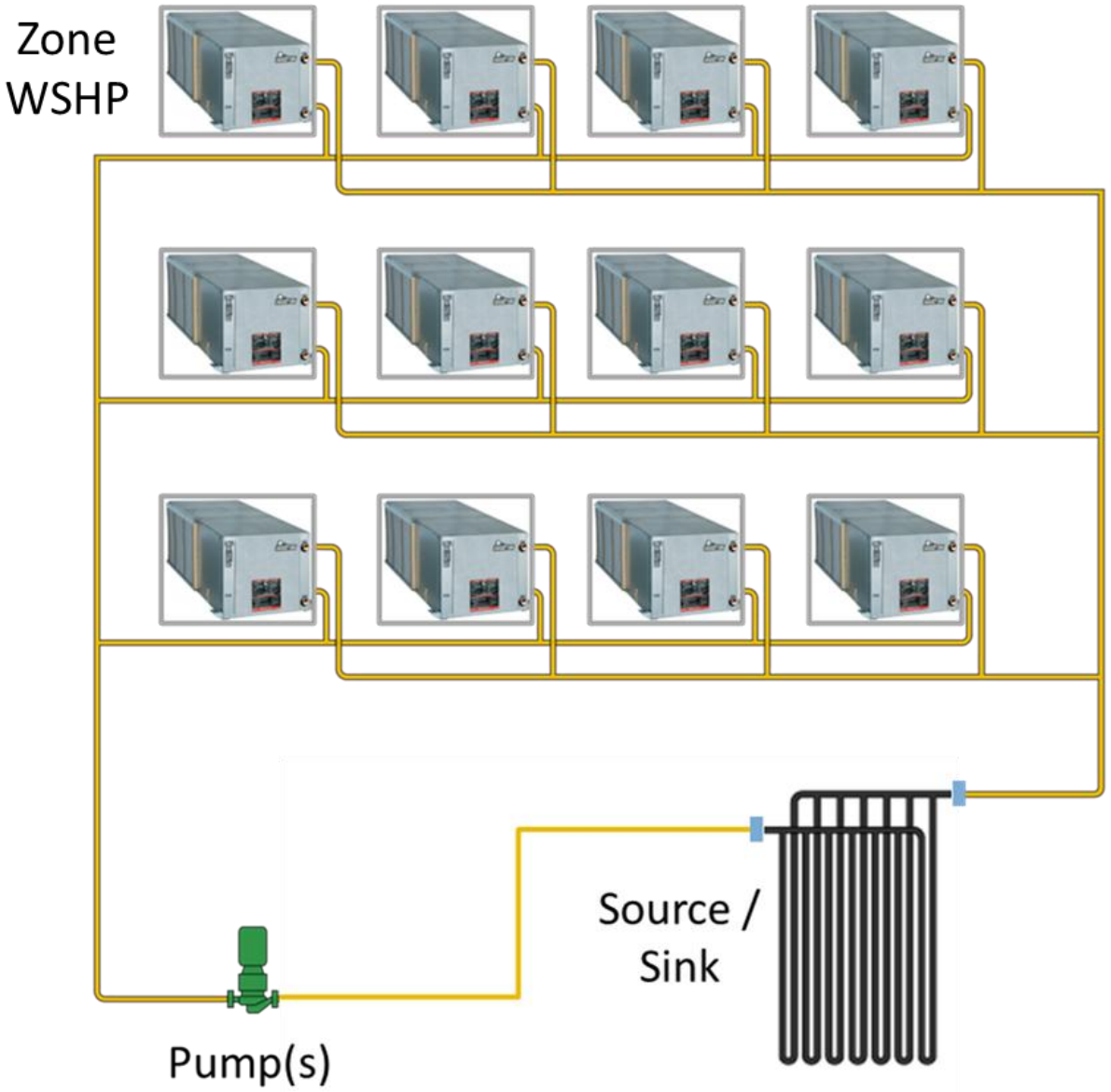
- Horizontal
- Vertical

- Console
- Vertical Stack

- Rooftop
- Slim

TYPICAL HEAT PUMP SYSTEMS

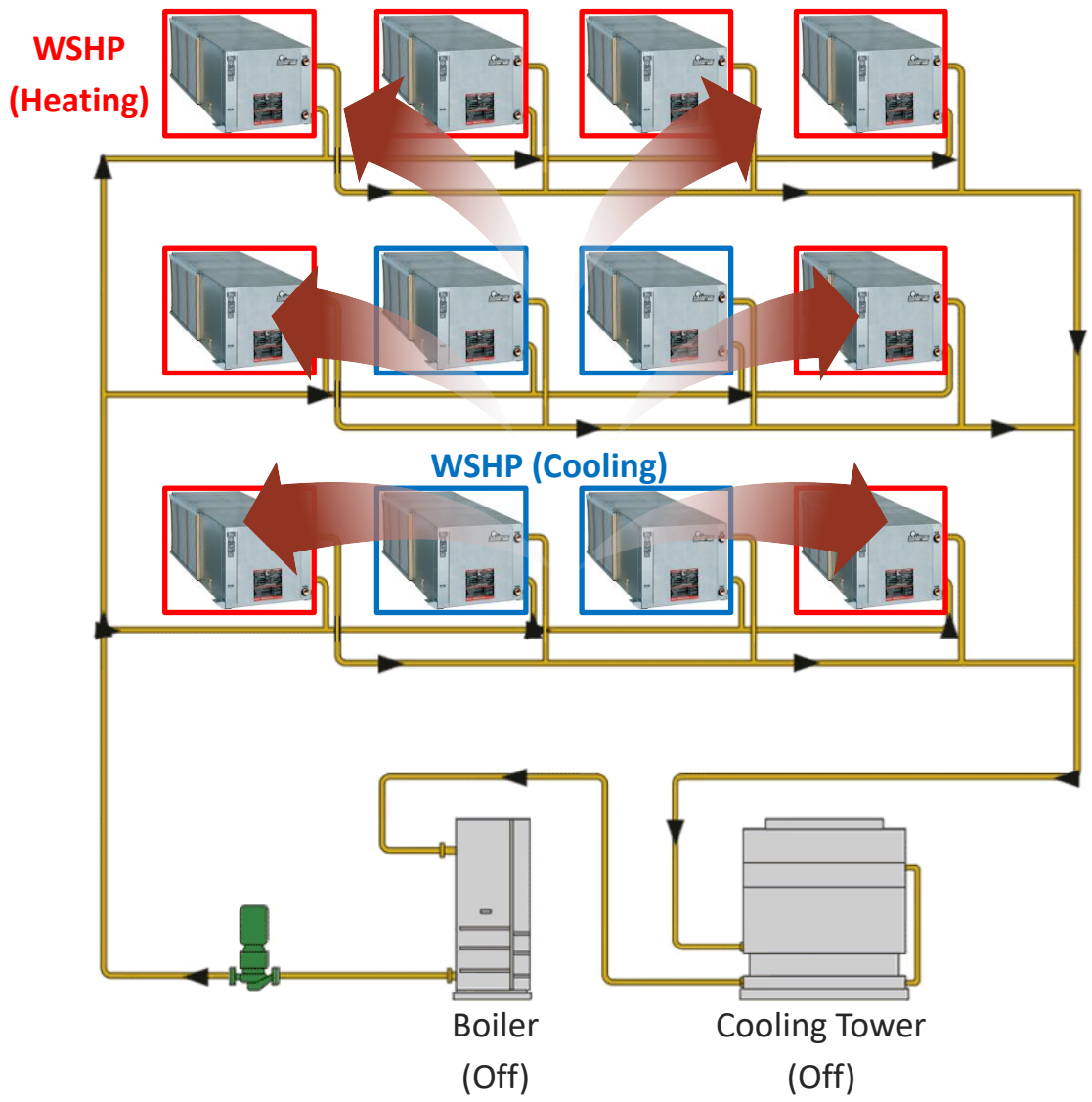
- Water Source Heat Pump (WSHP)
- Water Loop Piping
- Water Loop Circulating Pump
- Heat Source/Heat Sink
  - Ground Source
  - Boiler
  - Tower



CLIMATEMASTER®

WSHP SYSTEM HEAT RECOVERY OPERATION

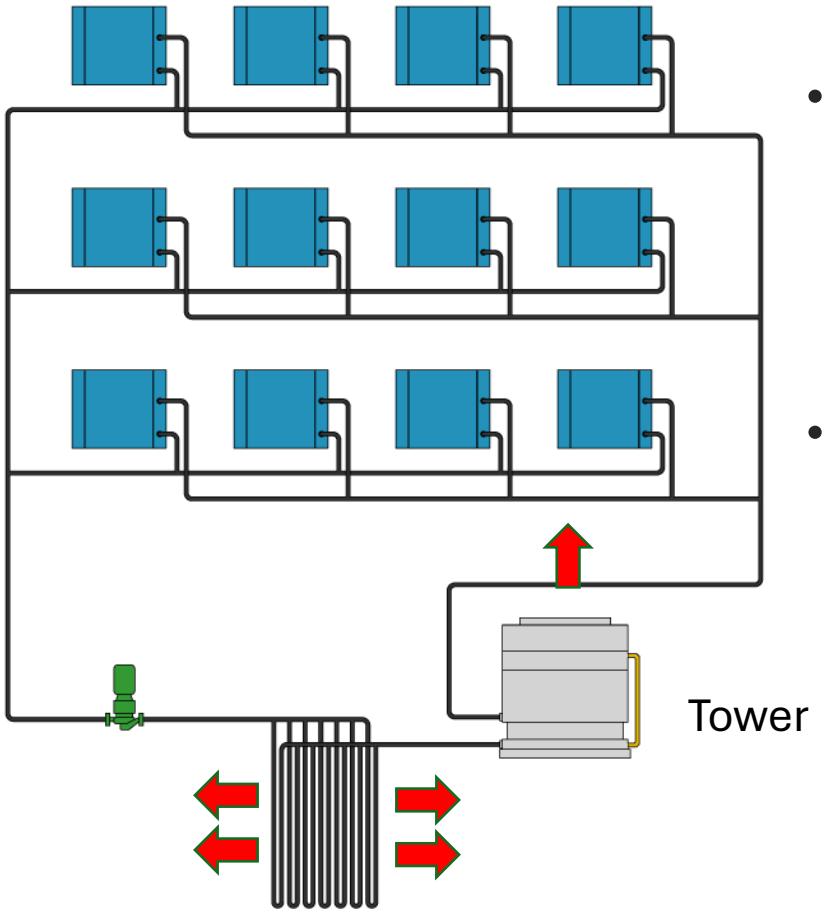
- Building core zones will require cooling due to internal heat gains. These WSHPs will be in **cooling mode**.
- Perimeter building zones will require heating. These WSHPs will be in **heating mode**.
- Heat is being simultaneously rejected into and extracted from the water loop.



CLIMATEMASTER®

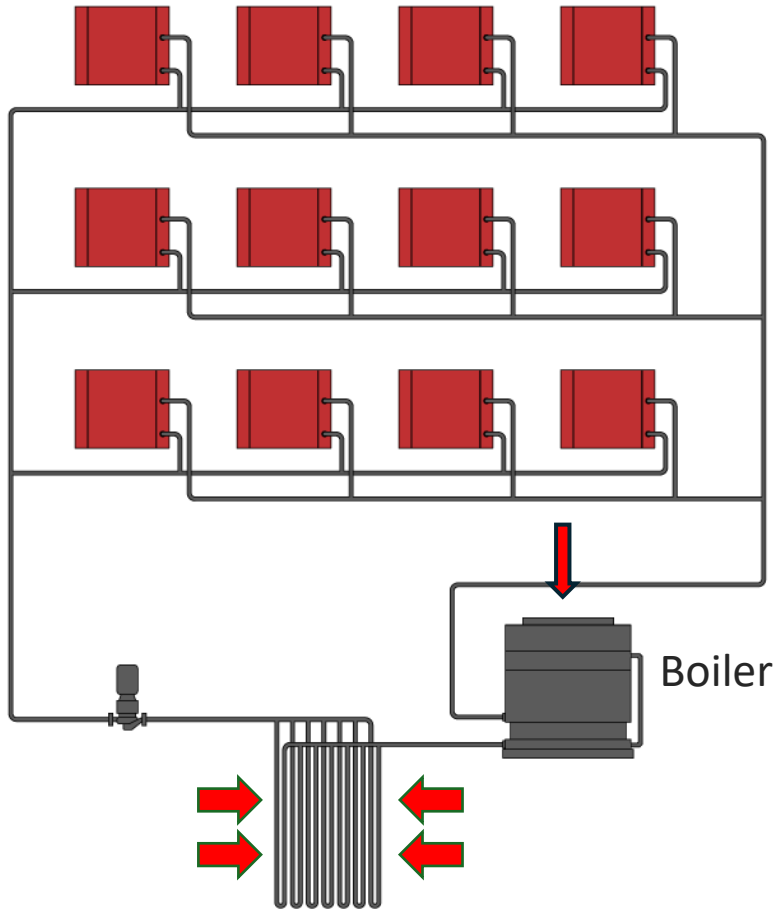
Geothermal Hybrid System Operation

Summer Operation

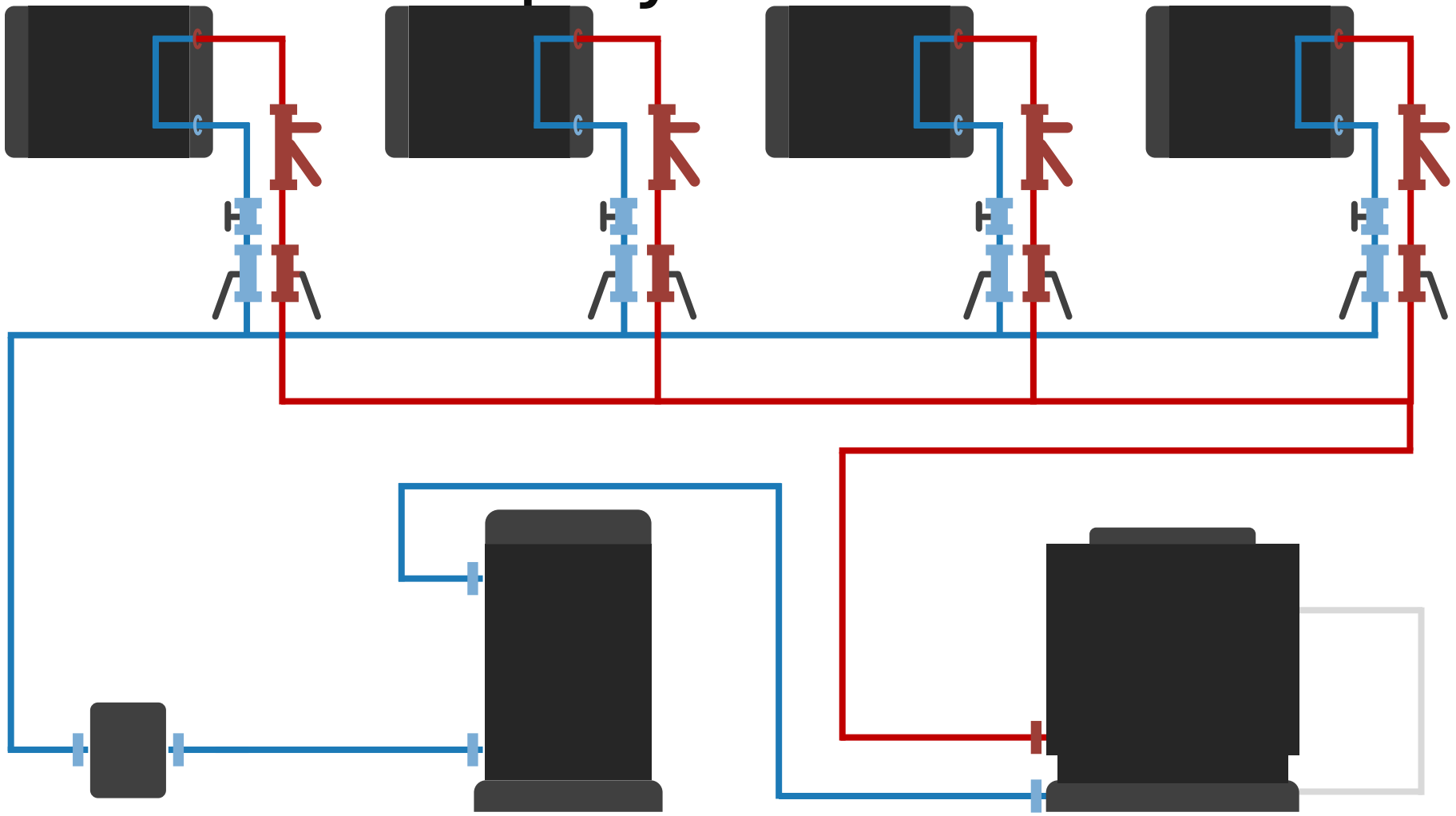


- In Summer…we are rejecting heat to the geo loop and the cooling tower.
- In Winter…the geo loop is our source of heat along with the boiler.

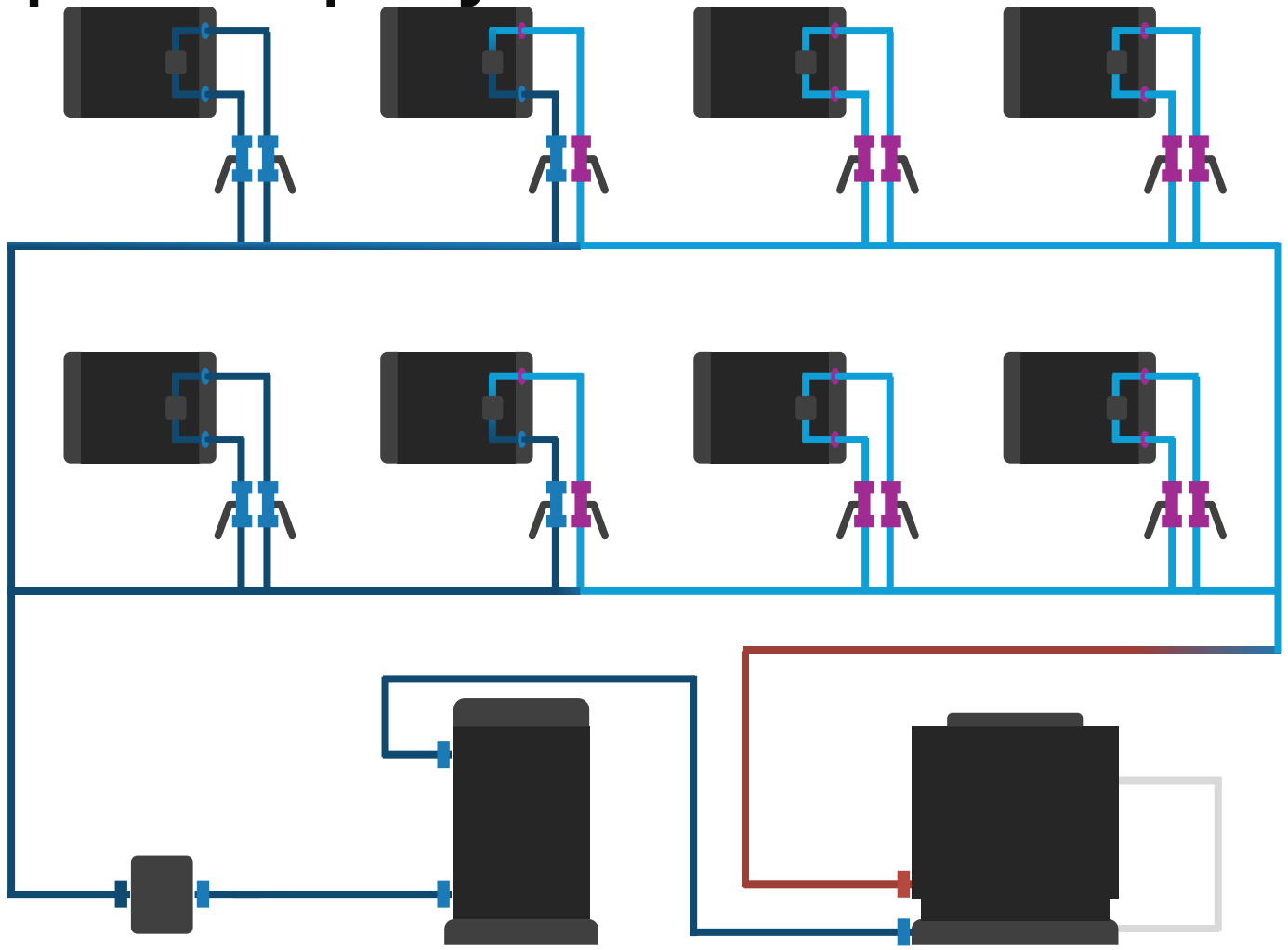
Winter Operation



Typical Water Loop System



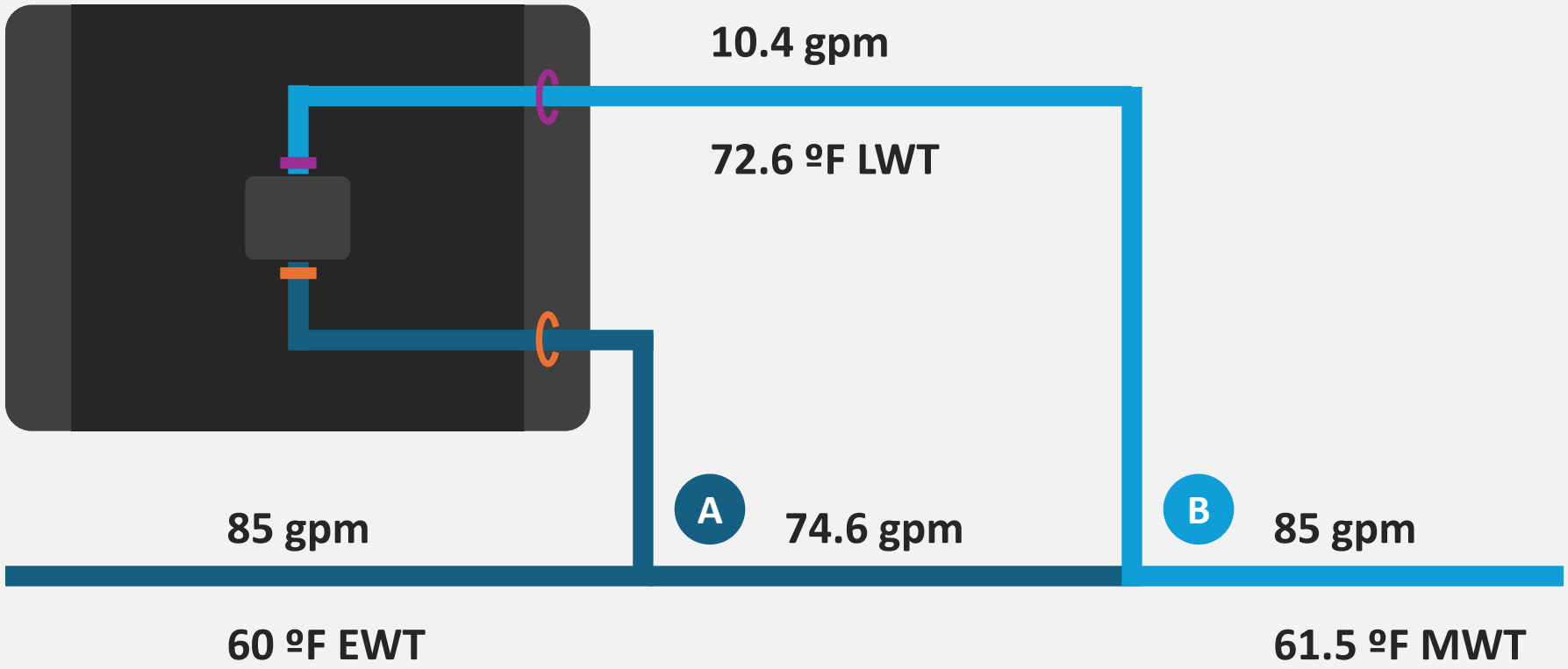
Single-Pipe Loop System



CLIMATEMASTER®

Thank you for your time!!

Sample Loop Calculations




7300
CLIMATEMASTER
CLIMATEMASTER

Building Load Side Distribution Options

Moderator: Melanie Stachowiak / *M/E Engineering*

Panel: Jason Filler / *F.W. Webb (refrigerant)*
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