R454B

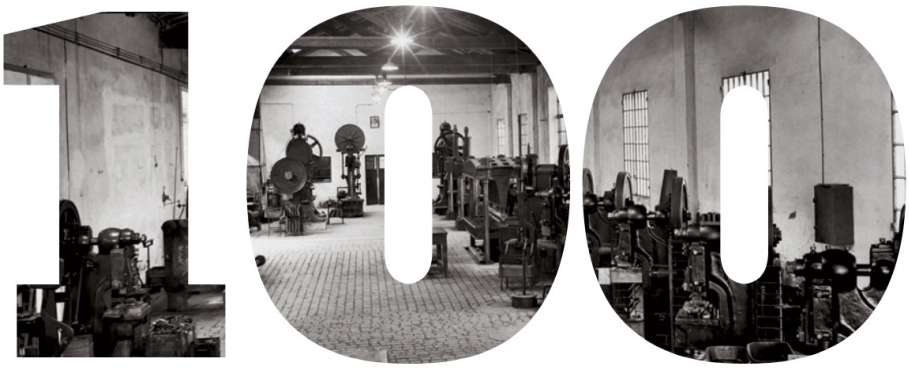
# HTH

HEAT PUMPS
WITH EVI TECHNOLOGY
FROM 30 TO 57 TONS

## Efficiency and reliability in **all weather conditions**




Galletti
AIR CONDITIONING



# MORE THAN 100 YEARS OF EXPERIENCE

1906 marked the beginning of Galletti. The founder was Ugo Galletti, who, guided by intuition, opened a small artisan workshop specialized in ironwork and the repair of farm tools and tractors in Castel Maggiore, on the outskirts of Bologna, Italy.

# WHO WE ARE TODAY

**Our Advanced Design Approach**

Today we continue to look toward the future. Through Advanced Design - a methodological approach to developing our solutions and engaging with the market - we are on a path to creating technologically advanced, high-performance, and highly customized solutions designed to reduce environmental impact.

The pillars of the “Advanced Design” approach include:

- Shifting the time horizon further ahead to anticipate future scenarios.
- Working daily within a network capable of involving diverse expertise that extends beyond the company's traditional domain.

For years, Galletti has been committed to projects involving startups, universities, and partners from the worlds of design. Collaborating in synergy with these diverse organizations serves as a powerful driver for developing increasingly innovative solutions aimed at meeting future market needs, while simultaneously providing vital energy for their continuous growth. The challenge for the future is to combine innovative thinking with the ability to contribute to scientific, human, and technological progress, translating these ideas into concrete design actions. In short: Think-Advance-Design.

# THINK.ADVANCE.DESIGN.

Shaping the future of climate control together with those who design it.

Envisioning the climate control of tomorrow requires looking beyond technology and the product itself. It means understanding how our living spaces are changing, what our needs will be, and which solutions will truly be sustainable in the long term. This is why Galletti has chosen an approach based on **Advanced Design**. This method combines research, design, engineering, architecture, and project culture.

We work closely with our customers every day to develop efficient, integrated, and forward-looking climate control solutions. Our goal is to anticipate trends in the HVAC sector and reduce our solutions' environmental impact.

## Our solutions are designed for every space and engineered for every experience.

Every environment has unique characteristics, functions, and requirements.

For **large residential buildings**, we offer systems that blend seamlessly into the domestic architecture while providing high performance and exceptionally low noise levels.

For the **commercial sector**, we offer compact, high-performance solutions for retail, food service, the hospitality sector, large sales areas, and small public spaces.

For the **service sector**, we develop systems that provide consistent comfort and precise control for offices, schools, healthcare facilities, and communal environments.

For **companies**, we analyze the best technical solutions and design complex systems for industrial and manufacturing complexes. In these environments, reliability, continuity, and precision are fundamental requirements, not extras.

# High temperature air to water heat pump with 454B refrigerant

Outdoor packaged unit

## HTH HB 30 to 57 tons




Heating/ Cooling | Plate exchanger | Axial fan | Scroll compressor | Refrigerant R-454B | DHW Production

### PLUS

- Production of hot water up to 145°F
- Operation at full load with ambient air to -4°F
- High efficiency under part load conditions
- COP up to 4.08
- Low-noise
- Modular ( bank of 6 units expandable with CPC)
- 3 way valve management for DHW production
- Indoor applications with "Hi-Turbo", high static, EC motor fan

HTH HB heat pumps are designed for heating or cooling water to be used in HVAC and DHW systems for residential, commercial or industrial applications.

The enthalpy vapor injection circuit (EVI) guarantees the production of hot water at high temperatures even in very hard outdoor conditions (down to -4°F).

Reliability and efficiency in every climatic condition

Galletti's HTH HB air-cooled packaged heat pump chiller - heaters feature enthalpy vapor injection technology allowing them to maintain peak performance at low ambient temperatures. The capacity range for the North American market is 30 tons to 57 tons in cooling mode, and 436 MBH to 773 MBH in heating mode. The modular structure with V-configuration condensing coils is designed to optimize air-side heat exchange while keeping the footprint small.

The HTH HB represents state-of-the-art performance, providing a large operating range with rated capacities down to -4F, optimal efficiency, with reliable components and quality construction. Other features include low noise operation, integrated control logic to control sequencing of multiple units, leaving water temperature reset based on outside air temperature, domestic hot water priority control, and remote connectivity.

### Structure
The HTH units are modular with V-configuration condensing coils and fans. Its design ensures stability, sturdiness even during the most critical phases (such as transportation), and maximum accessibility to components in every unit.

Fastening devices are made of non-rusting carbon steel that has undergone surface-passivating treatments.

Anti-intrusion metal grill kit with 0.75x0.75 inch mesh, painted in black RAL9005 and attached to the unit structure with trilobular self-tapping screws is always included as a standard feature.

### Refrigerant
Use of R454B refrigerant with low environmental impact. R454B is the latest generation A2L refrigerant capable of guaranteeing one of the lowest GWPs on the market, 466.

### Electronic expansion valve
Electronic expansion valves (EEV) are standard on each independent circuit and modulate with over 300 steps of variable control over the entire operating range.



### Scroll compressors with enthalpy vapor injection (EVI)
The range consists of single and dual-circuit models. The distribution of load in multiple power steps and the use of tandem solutions (2 compressors on a single circuit) ensures maximum efficiency at partial loads and increased seasonal efficiency. Inter-cooled compression with enthalpy vapor injection allows better control of the end-compression temperature, keeping it within the limits imposed by the compressor envelope, even in the most unfavorable working conditions (low evaporation pressures and high compression pressures), this results in one of the largest operating ranges in the market.

## HTH HB CONFIGURATION

### » STANDARD

**Power supply**
460V-3-60Hz
**Electronic Expansion valve**
**Air flow modulation**
**Antifreezing kit**
**Acoustic insulation and attenuation**
**Metal safety grill for air louver entry**
**Outdoor coil and drip tray electric heaters**
**Hot wire flow switch**
**Special coils / Protective treatments**
Fins pre-coated with epoxy paint
**Anti vibration shock mounts**
Seismic spring anti vibration shock mounts
**Advanced onboard controller**

### » OPTION

**BACnet MSTP card**
**BACnet IP card**
**Compressor tandem isolation valves**
**EC inverter motor fans**
**EC inverter "Hi-Turbo" high static motor fan**
**Partial heat recovery (desuperheater)**
**tERA remote monitoring system**
**208-230V/3ph/60hz step up transformer**
**Factory skidded or enclosed platforms**



# THE CURRENT SCENARIO

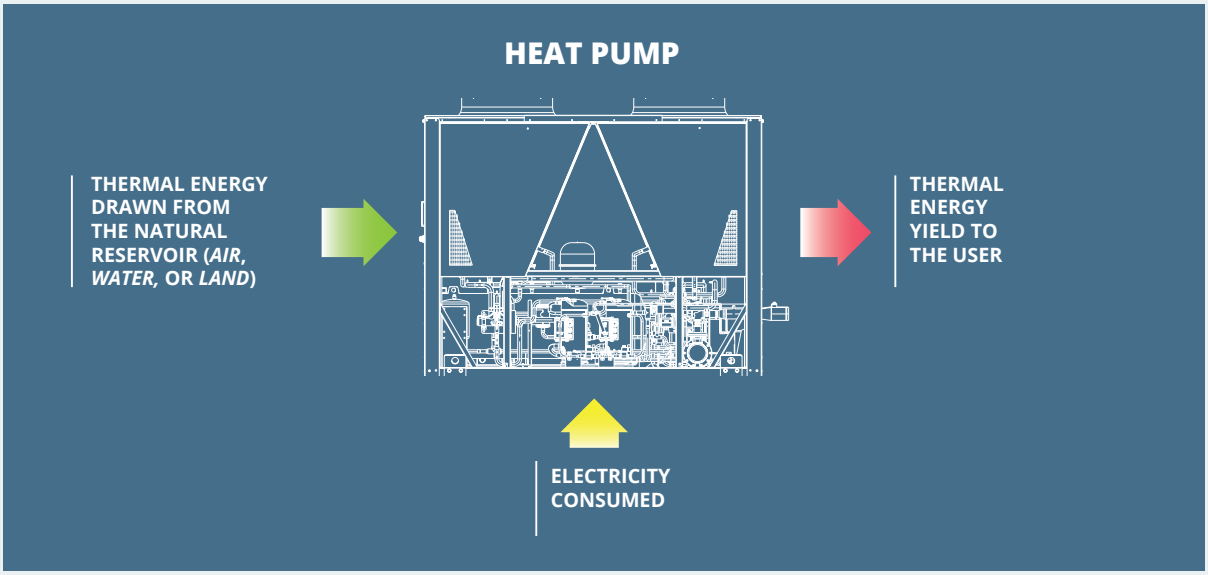
Addressing the climate crisis requires immediate and sustained investment to eliminate net global greenhouse gas emissions by mid-century, and this presents a transformational opportunity for the United States and the world. Investing in clean technologies, infrastructure, workforce, and systems of the future creates an unprecedented opportunity to improve quality of life and create vibrant, sustainable, resilient, and equitable economies.

**Within this scenario, heat pumps can play a leading role, since the main characteristic that distinguishes them is that they can take advantage of the renewable energy contained in the most common elements on our planet: AIR, WATER, and LAND.**




Analyzing the operation of a heat pump during the winter phase, it is possible to calculate the share of renewable energy in the total energy yield by defining the seasonal efficiency index **SCOP** as the ratio between the energy yield and the electrical energy consumed during the heating phase.

It is clear that an increase in the seasonal efficiency of the unit leads, with the energy yield being equal, to a reduction in consumption and an increase in the share of renewable energy used.



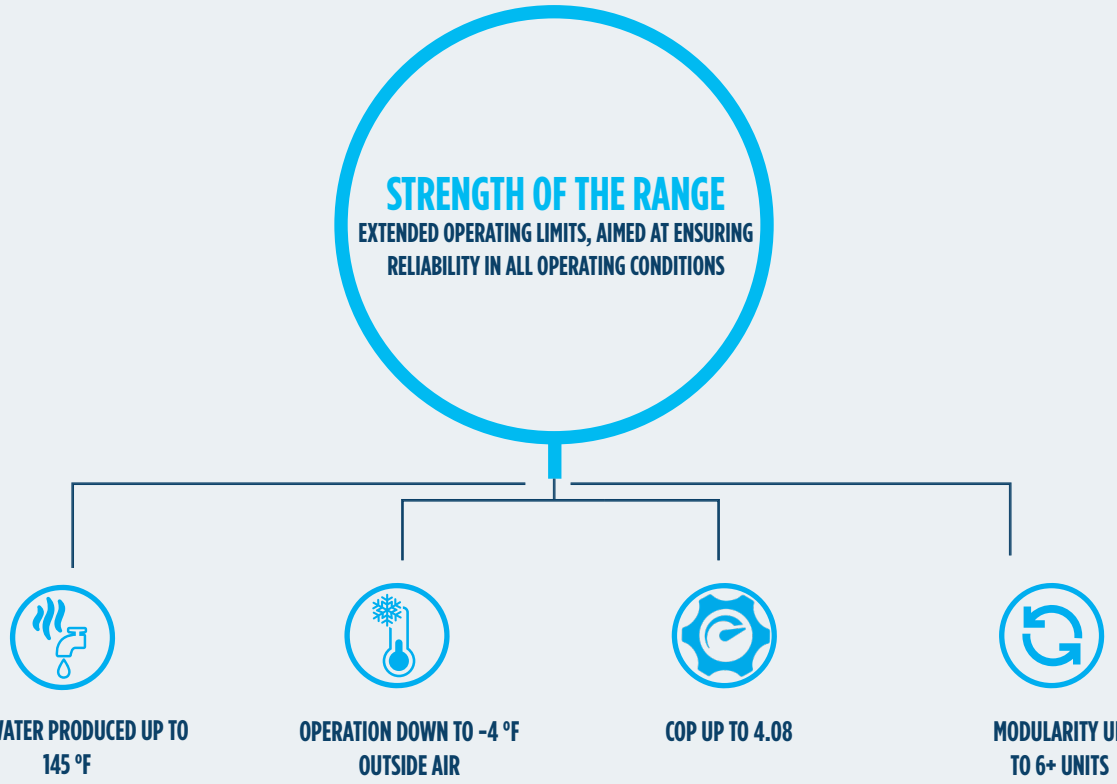

$$\text{RENEWABLE ENERGY} = \text{THERMAL ENERGY YIELD} * \left[1 - \frac{1}{\text{SCOP}}\right]$$

# GALLETTI'S SOLUTION

**Galletti's HTH series high efficiency air-source heat pumps, feature the most advanced R454B multiscroll units used in HVAC.**

A line consisting of 3 air-water models available as reversible heat pump version with cooling capacities ranging from **30** to **57 tons**. This product line uses enthalpy vapor injection **(EVI)**, which extends the operating range of these units **beyond conventional heat pumps**, providing more capacity and high seasonal efficiencies.

The Galletti HTH series can produce **145 °F hot water when it's below freezing outside.** This air-source heat pump can be used for HVAC heating or cooling, and for domestic hot water production via an indirect tank.




# EVI COMPRESSORS

The **HTH HB** series is equipped with scroll compressors with **EVI** (Enthalpy Vapor Injection) technology, complete with internal thermal protection of the windings, and installed on vibration dampers. These compressors are equipped with an additional port for vapor injection at an intermediate stage of the compression process capable of ensuring a double benefit:

- **Increased heating capacity at lower ambient conditions compared to conventional heat pumps.**

This results in the extension of the operating range *(hot water production up to 145 °F and operation at full capacity with outside air temperatures down to -4 °F)* and an increase in the efficiency of the cooling cycle. Single or dual-circuit units are available. Multiple compressors and refrigerant circuits provide **better load control, redundancy,** and **higher efficiencies in all seasons.**

# HTH HB

EXTENDED OPERATING RANGE

HIGH SEASONAL EFFICIENCY

CONFIGURABILITY

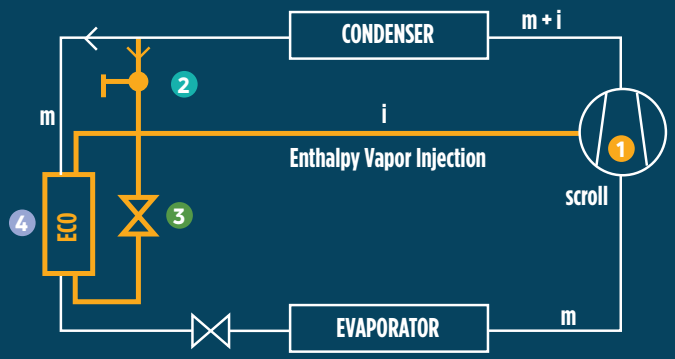
# EVI TECHNOLOGY

## THE COOLING CYCLE WITH ENTHALPY VAPOR INJECTION

The units that use enthalpy vapor injection technology are characterized by:

1. EVI COMPRESSOR
2. SOLENOID VALVE
3. ELECTRONIC EXPANSION VALVE
4. ECONOMIZER (ECO) PLATE HEAT EXCHANGER

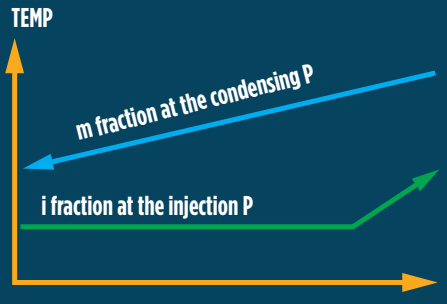
The **solenoid valve** 2 opens or closes respectively to enable or disable vapor injection; the **EVI valve** 3 laminates the **i** fraction of liquid refrigerant at the condenser outlet up to the optimum injection pressure between the condensing pressure and the evaporation pressure.




The economizer is a parallel evaporator circuit. Instead of using cold outside air to evaporate the refrigerant, it uses warm liquid refrigerant and a second EEV to regulate the refrigerant flow and pressure to ensure only vapor is added to the secondary port on the compressor.

As the refrigerant on the i-fraction evaporates, it sub-cools the m-fraction, which enables the outdoor evaporator coil to operate at lower ambient conditions than it would be able to without this circuit.

The total mass flow to the condenser is preserved, allowing for peak heating capacity, even at low ambient conditions.



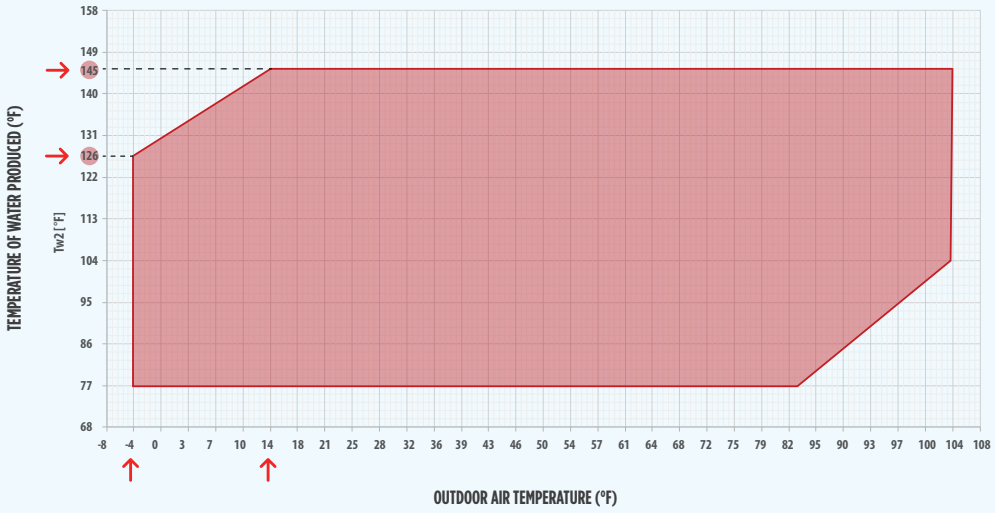

**What the graph is illustrating**
The capacity in the evaporator decreases (outdoor "source" HXR) while the capacity at the condenser is maintained (Load HXR), ensuring max capacity during low ambient conditions.

EXTENDED OPERATING RANGE

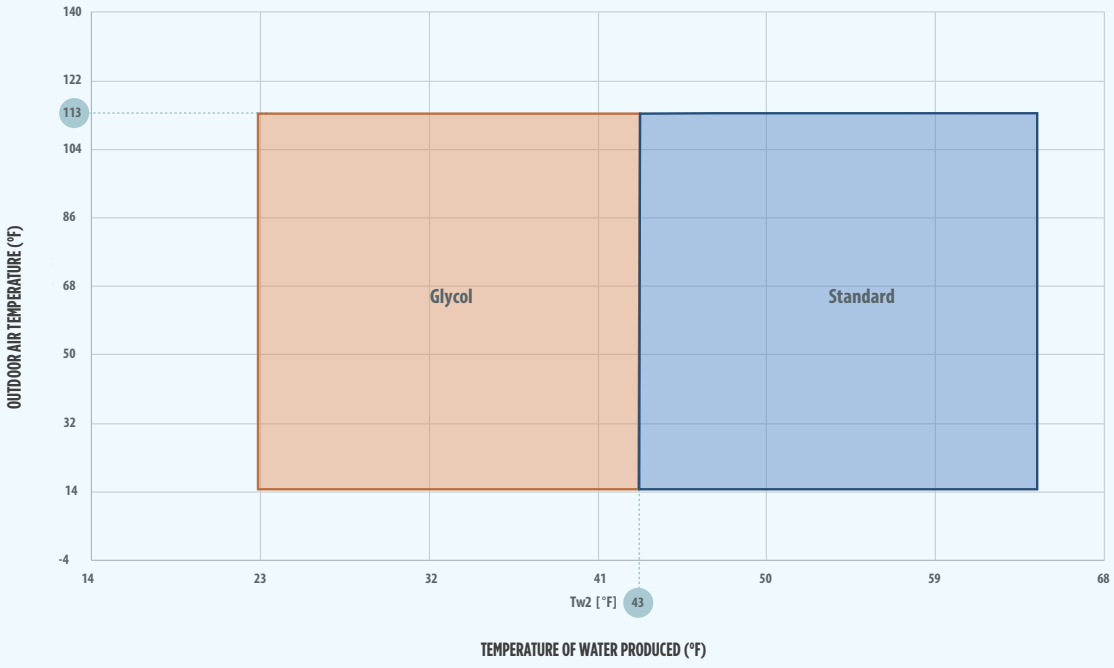
# EXTENDED OPERATING RANGE

The generous sizing of the heat exchanger surfaces and the use of EVI technology has made it possible to create a range that is not only efficient, but also has one of the best operating ranges on the market: **hot water production up to 145 °F** and **operation at full capacity with outside air temperatures down to -4 °F**.

RATED OPERATION IN HEATING MODE




RATED OPERATION IN COOLING MODE



# HVAC PERFORMANCE

## COMFORT SPACE
## HEATING & COOLING

EFFICIENT. RELIABLE. SUSTAINABLE.
COMFORT ALL YEAR ROUND.



NOTES:
1. Units built and tested in a Eurovent certified factory
2. Performance data rated in accordance with AHRI standard 550/590 I-P
3. Unit should be operated with a Delta T up to 14F
4. Chart of performance provides conditions as outlined in ASHRAE 90.1-2019, Table 6.8 1-16
5. 208-230V/3ph/60hz operation is available with provided step-up transformer (field wired)
6. Multiple units may be ordered on rigid frame with one point power connection

**Contact a Galletti representative for project specific performance calculations**

| HTH29-456HB | | | | HVAC PERFORMANCE |
|---|---|---|---|---|
| Cooling Capacity (Nominal) | Tons (kW) | 31.5 (110.8) | | |
| Ambient Air Temperature | F (C) | 95 (35) | | |
| Relative Humidity | % | 40 | | |
| Fluid | Water | Water | | |
| Entering Water Temperature [EWT]* | F (C) | 54.0 (12.2) | | |
| Leaving Water Temperature [LWT]* | F (C) | 44.0 (6.7) | | |
| Flow Rate [Water] | GPM (LPM) | 75.4 (285.4) | | |
| Pressure Drop [Water] | FT.HD. (kPa) | 8.9 (26.6) | | |
| Total Input Power | kW | 36.4 | | |
| Total Absorbed Current | A | 57.8 | | |
| EER | BTU/Wh | 10.3 | | |
| IPLV | BTU/Wh | 14.4 | | |
| Heating Capacity [Nominal] | MBH (kW) | 436.2 (127.8) | 444.1 (130.1) | 454.4 (133.1) |
| Ambient Air Temperature [DB/WB]* | F (C) | **47**/43 (8/6) | **47**/43 (8/6) | **47**/43 (8/6) |
| Fluid | Water | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 95 (35) | 105 (40.5) | 120 (48.9) |
| Leaving Water Temperature [LWT]* | F (C) | 105 (40.5) | 120 (48.9) | 140 (60) |
| Flow Rate [Water] | GPM (LPM) | 87.9 (332.7) | 59.8 (226.4) | 46 (174.1) |
| Pressure Drop [Water] | FT.HD. (kPa) | 10.8 (32.2) | 5.4 (16.1) | 3.3 (9.8) |
| Total Input Power | kW | 34.2 | 40.2 | 50.5 |
| Total Absorbed Current | A | 54.2 | 63.9 | 80.3 |
| Coefficient of Performance (COP) | kW / kW | 3.74 | 3.24 | 2.64 |
| Heating Capacity [Nominal] | MBH (kW) | 281.9 (82.6) | 288.9 (84.6) | 306.1 (89.7) |
| Ambient Air Temperature [DB/WB]* | F (C) | **17**/15 (-8/-9) | **17**/15 (-8/-9) | **17**/15 (-8/-9) |
| Fluid | Water | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 95 (35.0) | 105 (40.5) | 120 (48.9) |
| Leaving Water Temperature [LWT]* | F (C) | 105 (40.5) | 120 (48.9) | 136 (57.8) |
| Flow Rate [Water] | GPM (LPM) | 56.8 (215.0) | 38.9 (147.2) | 31 (117.3) |
| Pressure Drop [Water] | FT.HD. (kPa) | 4.9 (14.7) | 2.5 (7.4) | 1.9 (5.6) |
| Total Input Power | kW | 31.2 | 36.5 | 44.1 |
| Total Absorbed Current | A | 49.5 | 57.9 | 70.1 |
| Coefficient of Performance (COP) | kW / kW | 2.65 | 2.32 | 1.96 |
| Power Supply | V/PH/HZ | 460/3/60 | | |
| Start Up Current (LRA) | A | 240 | | |
| Full Load Amps (FLA) | A | 66 | | |
| Minimum Circuit Amperage (MCA) | A | 82 | | |
| Maximum Overcurrent Protection (MOCP) | A | 110 | | |
| Fan Air Flow | CFM (m^3/h) | 22,711 (38,586) | | |
| Fan External Static Pressure (ESP) | In.Wg. | 0.48 | | |
| Fan Quantity | | 2 | | |
| Sound Pressure [LP] @32.8 FT (10m) | dB (A) | 60 | | |
| Sound Power [LW] | dB (A) | 88 | | |
| Refrigerant [R454B] | GWP | 466 | | |
| Number of Compressor | | 2 | | |
| Number of Refrigeration Circuits | | 1 | | |
| Dimensions [LxDxH] | Inches | 105x59x96.5 | | |
| Weight | LBS | 3,100 | | |

**See notes on page 10**

* Note #4

| HTH30-453HB | | HVAC PERFORMANCE | | |
|---|---|---|---|---|
| Cooling Capacity (Nominal) | Tons (kW) | 32.8 (115.3) | | |
| Ambient Air Temperature | F (C) | 95 (35) | | |
| Relative Humidity | % | 40 | | |
| Fluid | Water | Water | | |
| Entering Water Temperature [EWT]* | F (C) | 54.0 (12.2) | | |
| Leaving Water Temperature [LWT]* | F (C) | 44.0 (6.7) | | |
| Flow Rate [Water] | GPM (LPM) | 78.5 (297.1) | | |
| Pressure Drop [Water] | FT.HD. (kPa) | 6 (17.9) | | |
| Total Input Power | kW | 37.2 | | |
| Total Absorbed Current | A | 59 | | |
| EER | BTU/Wh | 10.6 | | |
| IPLV | BTU/Wh | 13.05 | | |
| Heating Capacity [Nominal] | MBH (kW) | 428.8 (125.6) | 436.4 (127.8) | 446.1 (130.7) |
| Ambient Air Temperature [DB/WB]* | F (C) | **47**/43 (8/6) | **47**/43 (8/6) | **47**/43 (8/6) |
| Fluid | Water | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 95 (35) | 105 (40.5) | 120 (48.9) |
| Leaving Water Temperature [LWT]* | F (C) | 105 (40.5) | 120 (48.9) | 140 (60) |
| Flow Rate [Water] | GPM (LPM) | 86.4 (327.0) | 58.7 (222.2) | 45.2 (171.1) |
| Pressure Drop [Water] | FT.HD. (kPa) | 5.4 (16.1) | 2.7 (8) | 1.6 (4.7) |
| Total Input Power | kW | 33 | 38.9 | 48.9 |
| Total Absorbed Current | A | 52.8 | 61.8 | 77.8 |
| Coefficient of Performance (COP) | kW / kW | 3.81 | 3.29 | 2.67 |
| Heating Capacity [Nominal] | MBH (kW) | 277.1 (81.2) | 284.3 (83.2) | 296.6 (86.9) |
| Ambient Air Temperature [DB/WB]* | F (C) | **17**/15 (-8/-9) | **17**/15 (-8/-9) | **17**/15 (-8/-9) |
| Fluid | Water | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 95 (35) | 105 (40.5) | 120 (48.9) |
| Leaving Water Temperature [LWT]* | F (C) | 105 (40.5) | 120 (48.9) | 136 (57.8) |
| Flow Rate [Water] | GPM (LPM) | 55.8 (211.2) | 38.2 (144.6) | 37.5 (141.9) |
| Pressure Drop [Water] | FT.HD. (kPa) | 2.4 (7.1) | 1.1 (3.2) | 1.1 (3.2) |
| Total Input Power | kW | 31 | 36.3 | 43.5 |
| Total Absorbed Current | A | 49.1 | 57.6 | 69.1 |
| Coefficient of Performance (COP) | kW / kW | 2.62 | 2.30 | 1.96 |
| Power Supply | V/PH/HZ | 460/3/60 | | |
| Start Up Current (LRA) | A | 240 | | |
| Full Load Amps (FLA) | A | 66 | | |
| Minimum Circuit Amperage (MCA) | A | 82 | | |
| Maximum Overcurrent Protection (MOCP) | A | 110 | | |
| Fan Air Flow | CFM (m^3/h) | 22,711 (38,586) | | |
| Fan External Static Pressure (ESP) | In.Wg. | 0.48 | | |
| Fan Quantity | | 2 | | |
| Sound Pressure [LP] @32.8 FT (10m) | dB (A) | 60 | | |
| Sound Power [LW] | dB (A) | 88 | | |
| Refrigerant [R454B] | GWP | 466 | | |
| Number of Compressor | | 2 | | |
| Number of Refrigeration Circuits | | 2 | | |
| Dimensions [LxDxH] | Inches | 105x59x96.5 | | |
| Weight | LBS | 3,277 | | |

**See notes on page 10**

* Note #4

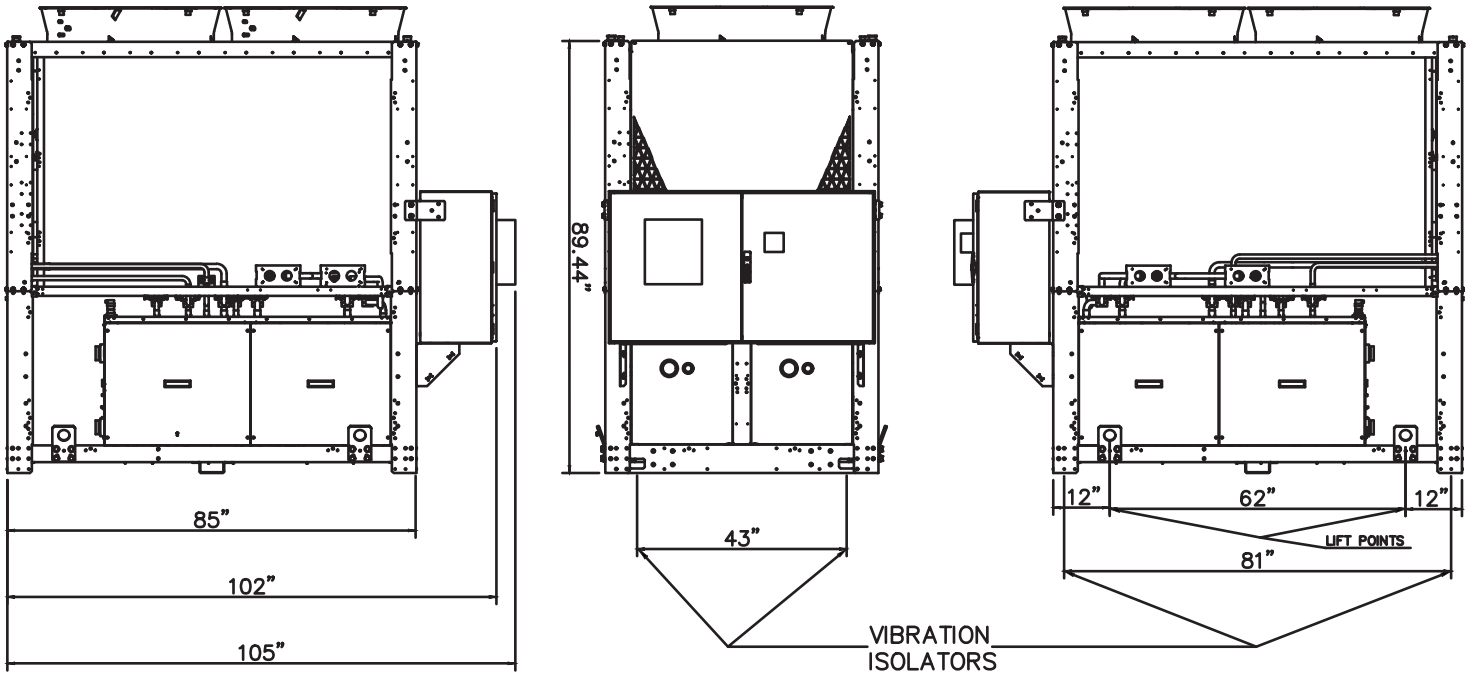
| HTH53-766HB | | | | HVAC PERFORMANCE |
|---|---|---|---|---|
| Cooling Capacity (Nominal) | Tons (kW) | 57.27 (201.4) | | |
| Ambient Air Temperature | F (C) | 95 (35) | | |
| Relative Humidity | % | 40 | | |
| Fluid | Water | Water | | |
| Entering Water Temperature [EWT]* | F (C) | 54.0 (12.2) | | |
| Leaving Water Temperature [LWT]* | F (C) | 44.0 (6.7) | | |
| Flow Rate [Water] | GPM (LPM) | 137 (518.6) | | |
| Pressure Drop [Water] | FT.HD. (kPa) | 6.8 (20.3) | | |
| Total Input Power | kW | 64.9 | | |
| Total Absorbed Current | A | 102.9 | | |
| EER | BTU/Wh | 10.6 | | |
| IPLV | BTU/Wh | 15.25 | | |
| Heating Capacity [Nominal] | MBH (kW) | 759.5 (222.5) | 771.1 (225.9) | 771.9 (226.2) |
| Ambient Air Temperature [DB/WB]* | F (C) | **47**/43 (8/6) | **47**/43 (8/6) | **47**/43 (8/6) |
| Fluid | Water | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 95 (35) | 105 (40.5) | 120 (48.9) |
| Leaving Water Temperature [LWT]* | F (C) | 105 (40.5) | 120 (48.9) | 140 (60) |
| Flow Rate [Water] | GPM (LPM) | 153 (579.1) | 103.8 (392.9) | 78.2 (296.0) |
| Pressure Drop [Water] | FT.HD. (kPa) | 7.6 (22.7) | 3.7 (11) | 2.2 (6.5) |
| Total Input Power | kW | 58.7 | 68.9 | 86.3 |
| Total Absorbed Current | A | 92.9 | 109.4 | 137.1 |
| Coefficient of Performance (COP) | kW / kW | 3.79 | 3.28 | 2.62 |
| Heating Capacity [Nominal] | MBH (kW) | 489.3 (143.3) | 501 (146.8) | 522.4 (153.1) |
| Ambient Air Temperature [DB/WB]* | F (C) | **17**/15 (-8/-9) | **17**/15 (-8/-9) | **17**/15 (-8/-9) |
| Fluid | Water | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 95 (35) | 105 (40.5) | 120 (48.9) |
| Leaving Water Temperature [LWT]* | F (C) | 105 (40.5) | 120 (48.9) | 136 (57.8) |
| Flow Rate [Water] | GPM (LPM) | 98.6 (373.2) | 67.4 (255.1) | 66.2 (250.6) |
| Pressure Drop [Water] | FT.HD. (kPa) | 3.4 (10.1) | 1.7 (5) | 1.69 (5.0) |
| Total Input Power | kW | 54.9 | 64.2 | 76.6 |
| Total Absorbed Current | A | 86.9 | 101.7 | 121.7 |
| Coefficient of Performance (COP) | kW / kW | 2.61 | 2.29 | 2.00 |
| Power Supply | V/PH/HZ | 460/3/60 | | |
| Start Up Current (LRA) | A | 266 | | |
| Full Loads Amps (FLA) | A | 119 | | |
| Minimum Circuit Amperage (MCA) | A | 138 | | |
| Maximum Overcurrent Protection (MOCP) | A | 150 | | |
| Fan Air Flow | CFM (m^3/h) | 45,422 (77,172) | | |
| Fan External Static Pressure (ESP) | In.Wg. | 0.48 | | |
| Fan Quantity | | 4 | | |
| Sound Pressure [LP] @32.8 FT (10m) | dB (A) | 62 | | |
| Sound Power [LW] | dB (A) | 90 | | |
| Refrigerant [R454B] | GWP | 466 | | |
| Number of Compressor | | 4 | | |
| Number of Refrigeration Circuits | | 2 | | |
| Dimensions [LxDxH] | Inches | 134x87x96.5 | | |
| Weight | LBS | 5,950 | | |

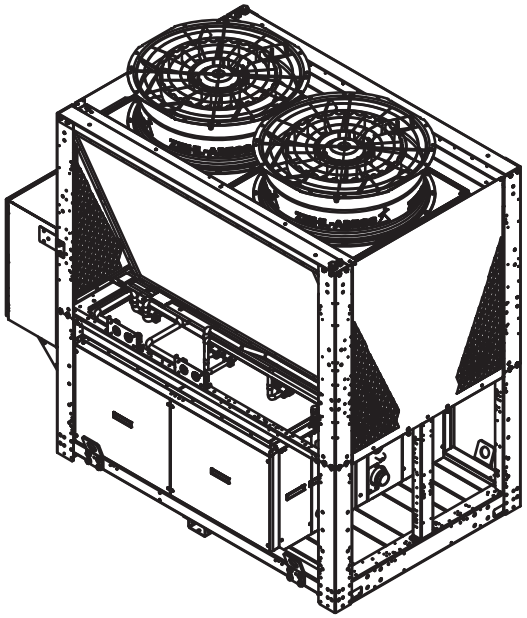
**See notes on page 10**

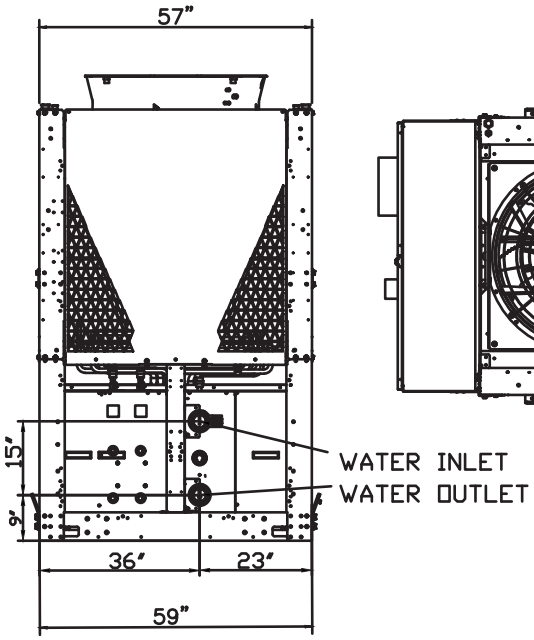
* Note #4

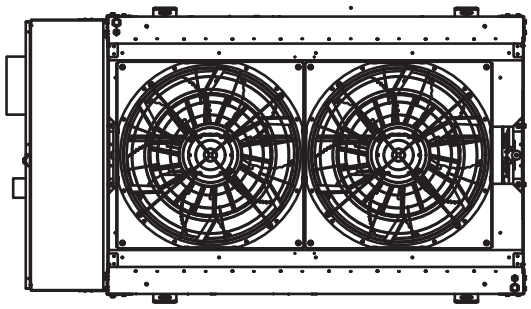
# DIMENSIONAL DRAWING MODEL: HTH29 | HTH30

# HVAC PERFORMANCE





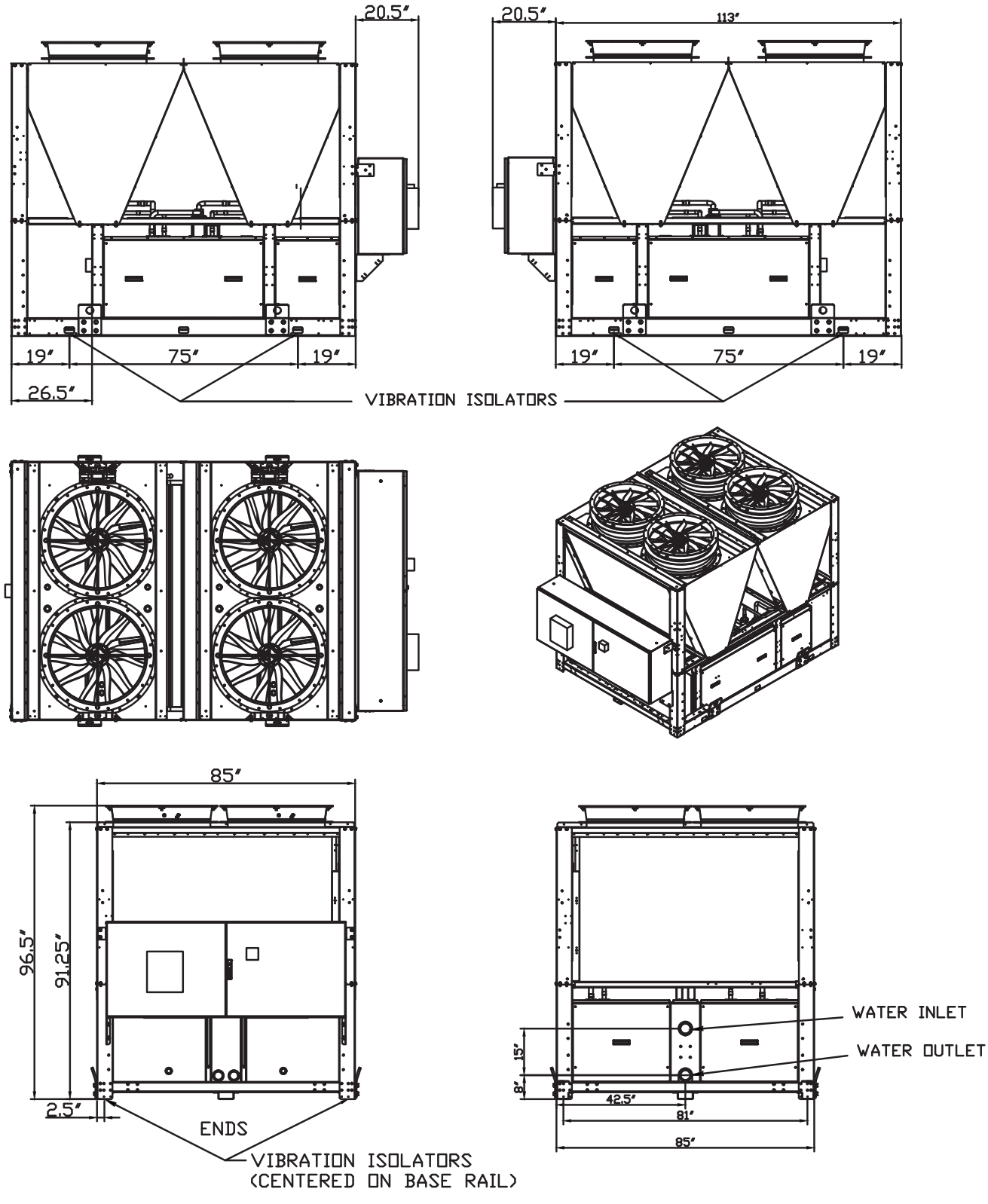
NOTE: The units have grooved 2.5” connections. To keep pressure drops low, 3” piping to and from the unit is recommended.

Measurement unit: Inches

| | | |
|---|---|---|
| 1 | GROOVED WATER OUTLET | 2.5” |
| 2 | GROOVED WATER INLET | 2.5” |

# DIMENSIONAL DRAWING MODEL: HTH53






NOTE: The units have grooved 3″ connections. To keep pressure drops low, 4″ piping to and from the unit is recommended.

Measurement unit: Inches

| | | |
|---|---|---|
| 1 | GROOVED WATER OUTLET | 3” |
| 2 | GROOVED WATER INLET | 3” |

# CONFIGURATION OPTION: HYDROKIT



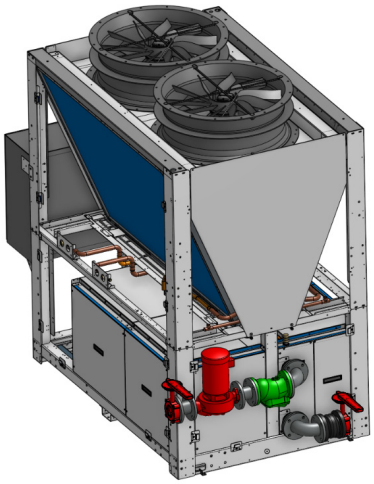
**HydroKit packages are provided as pre-engineered accessory options for the HTH series of air - source heat pump chiller - heaters. The HydroKit packages simplify installation, and aid in proper operation.**

2 - Pipe configuration for chilled / hot water change-over applications.
4 - Pipe configuration for simultaneous operation of chilled and heated water plants.

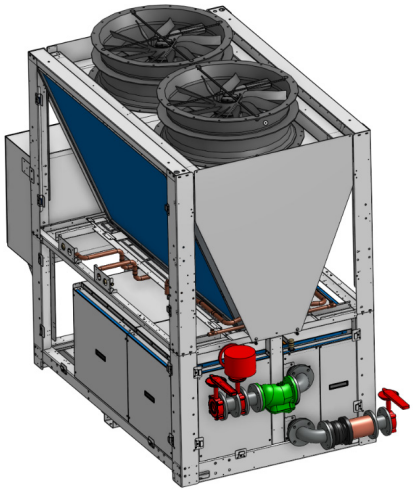
**Available with 2 methods of operation:**

① With primary pump for a primary - secondary system.
② With 2 - way motorized valves for variable - primary systems.

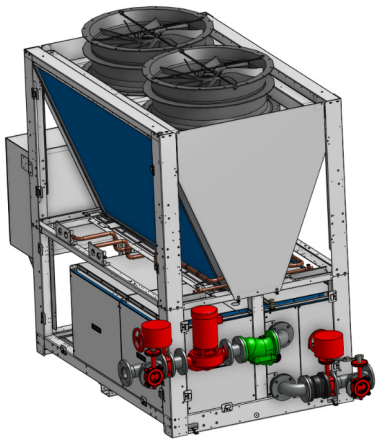
## 2 - PIPE WITH PRIMARY PUMP



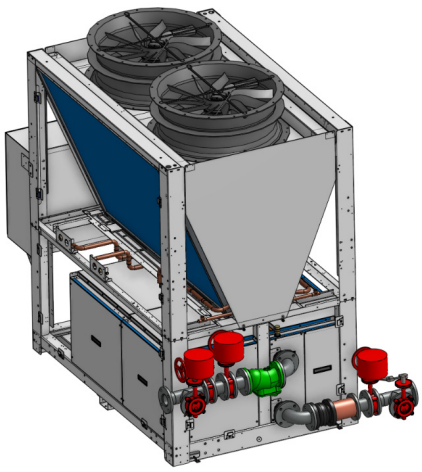
## 2 - PIPE WITH VALVE



## 4 - PIPE WITH PRIMARY PUMP



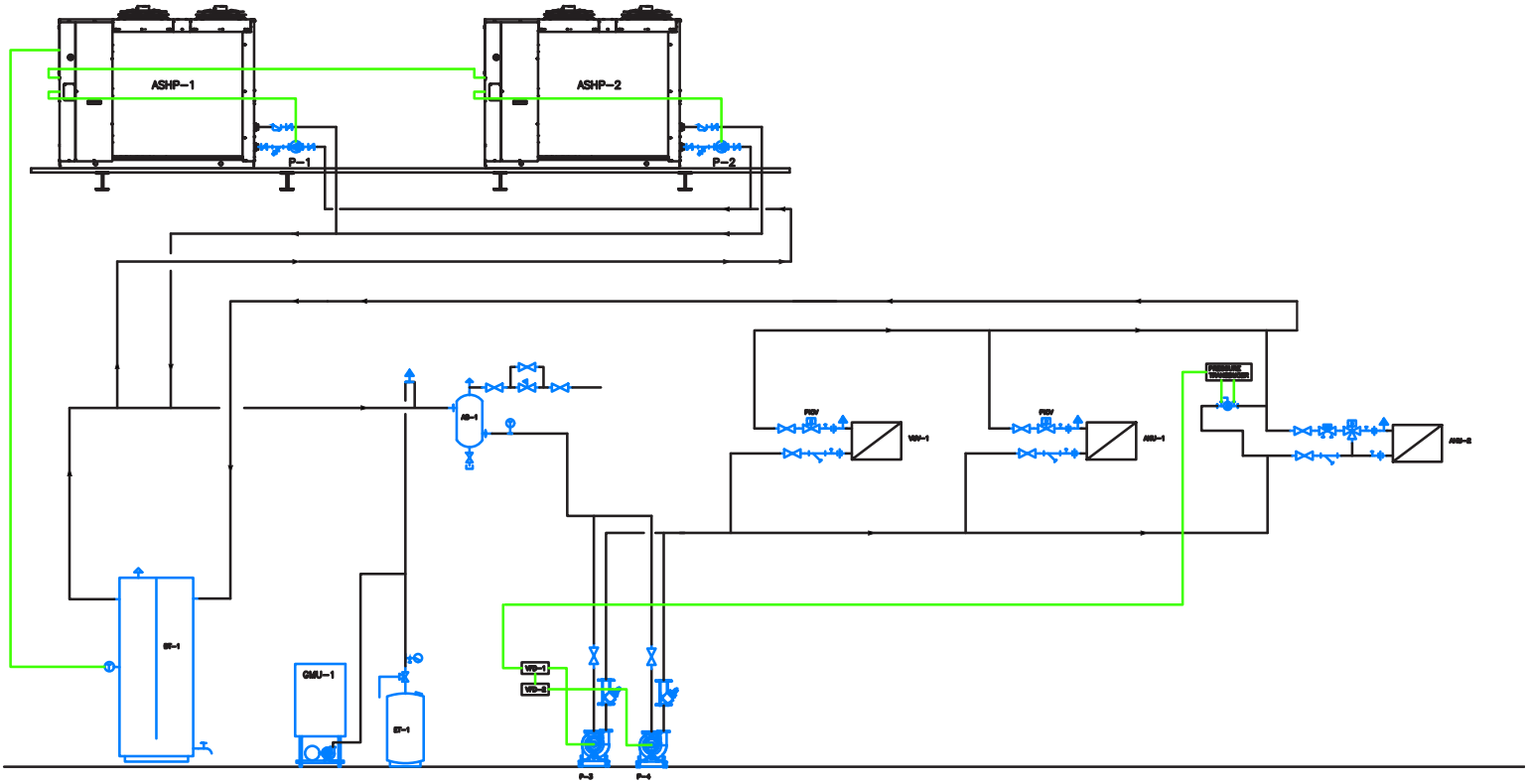
## 4 - PIPE WITH VALVE



- Grooved to flanged adapters
- Flanged elbows
- Low pressure drop y-strainer
- Spool pieces
- Optional: "With Pump" option includes a primary pump with TEFC motor
- Optional: "No Pump" option includes a 2-way motorized valve, and pressure independent balancing valve
- Optional: "4 - Pipe" option includes (2) 2-position, 3-way valves that switch between cold and hot water system headers

# HVAC SCHEMATIC | 2 - PIPE SYSTEM






**SEQUENCE OF OPERATION**

The air-source heat pump (ASHP) plant shall operate based on the return water sensor mounted in the 2 - pipe buffer tank. A set differential temperature will control the leaving water temp.

The ASHP units shall have product integrated controls to allow the plant to sequence units as required, provide lead-lag control, emergency start/stop, etc.

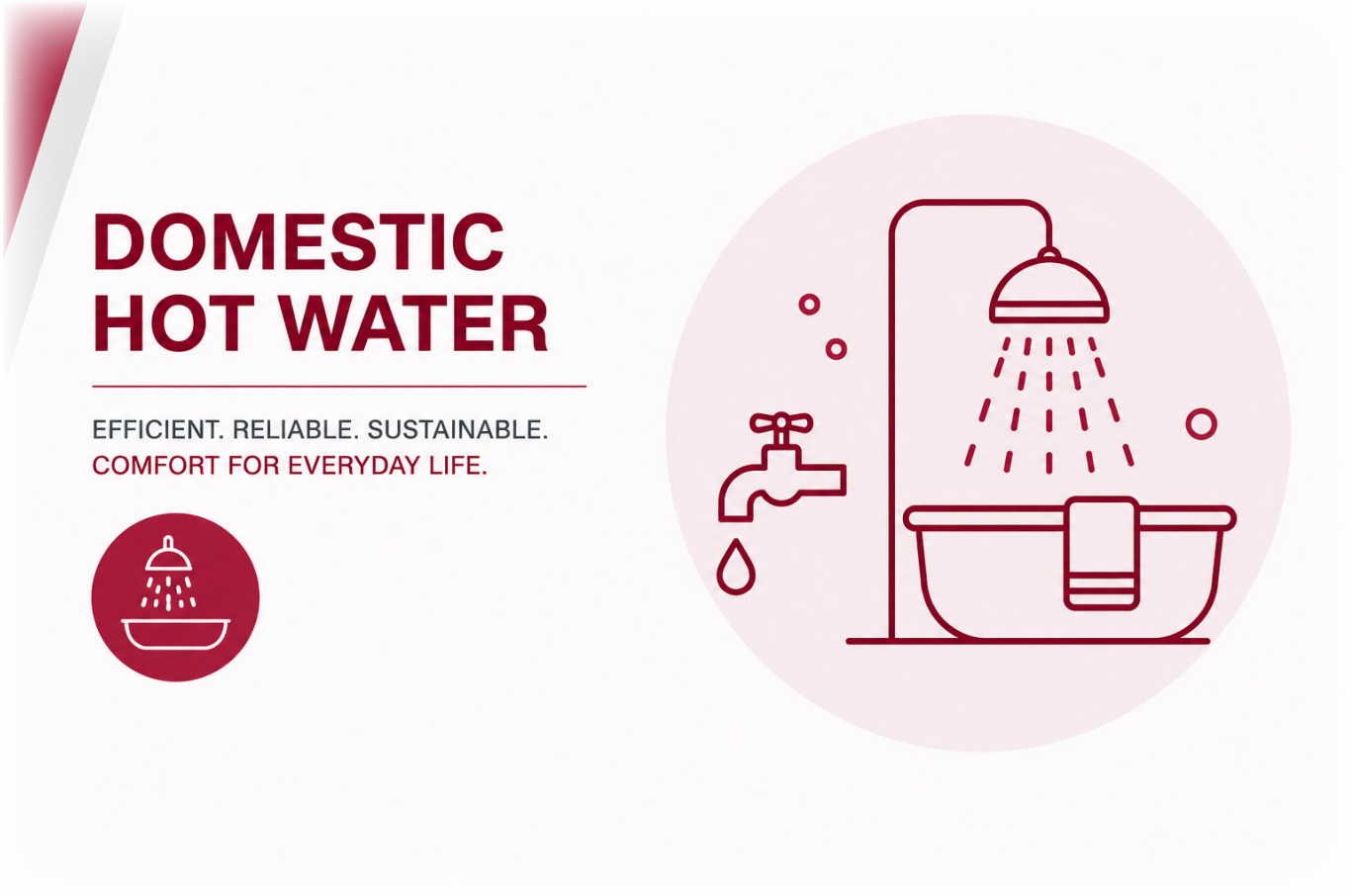
The primary ASHP pumps (P-1, P-2) shall be powered by and controlled by ASHP-1 & ASHP-2 respectively.

The glycol system's primary pump(s) (P-3; P-4 (N+1)), shall be VFD driven.

A manual balancing valve shall be installed at the critical circuit and be balanced to match the pressure drop of the referenced terminal unit. The differential pressure sensor for the VFD shall be placed on the inlet and outlet pressure ports of the manual balancing valve and used to modulate the glycol system's pump(s).

3-way valves shall be installed on the furthest terminal(s), with flows equal to 25% of the full load flow of one system pump. These valves will ensure the minimum flow required for the system are maintained at all times.

# DOMESTIC HOT WATER PERFORMANCE




NOTES:
1. Units built and tested in a Eurovent certified factory
2. Performance data rated and certified to AHRI standard 550/590 I-P
3. Unit should be operated with a Delta T up to 14F
4. Chart of performance provides conditions as outlined in ASHRAE 90.1-2019, Table 6.8 1-16. Last pass conditions per cycle
5. 208-230V/3ph/60hz operation is available with provided step-up transformer (field wired)
6. The EWT and LWT of 135/145F ensures stored water is maintained at 140F
7. Multiple units may be ordered on rigid frame with one point power connection

**Contact a Galletti representative for project specific performance calculations**

| HTH29-456HB | | DOMESTIC HOT WATER PERFORMANCE | |
|---|---|---|---|
| Heating Capacity [Nominal] | MBH (kW) | 293.3 (85.6) | 428.8 (125.6) |
| Ambient Air Temperature [DB/WB]* | F (C) | 17/15 (-8/-9) | 47/43 (8/6) |
| Fluid | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 135 (57.2) | 135 (57.2) |
| Leaving Water Temperature [LWT]* | F (C) | 145 (62.7) | 145 (62.7) |
| Flow Rate [Water] | GPM (LPM) | 59.6 (225.6) | 87.15 (329.8) |
| Pressure Drop [Water] | FT.HD. (kPa) | 5.4 (16.2) | 10.6 (31.6) |
| Total Input Power | kW | 44.1 | 48.4 |
| Total Absorbed Current | A | 70.1 | 77.0 |
| Blended Coefficient of Performance (COP)** | kW / kW | 2.25 | 3.16 |
| Seasonal Coefficient of Performance (COP)*** | kW / kW | 3.71 | |
| Power Supply | V/PH/HZ | 460/3/60 | |
| Start Up Current (LRA) | A | 240 | |
| Full Load Amps (FLA) | A | 66 | |
| Minimum Circuit Amperage (MCA) | A | 82 | |
| Maximum Overcurrent Protection (MOCP) | A | 110 | |
| Fan Power Input | kW | 3.2 | |
| Fan Current | A | 4.6 | |
| Fan Air Flow | CFM (m^3/h) | 22,711 (38,586) | |
| Fan External Static Pressure (ESP) | In.Wg. | 0.48 | |
| Fan Quantity | - | 2 | |
| Sound Pressure [Lp] @32.8FT (10m) | dB (A) | 60 | |
| Sound Power [Lw] | dB (A) | 88 | |
| Refrigerant [R454B] | GWP | 466 | |
| Number of Compressors | | 2 | |
| Number of Refrigeration Circuits | | 1 | |
| Dimensions [LxDxH] | Inches | 105x59x96.5 | |
| Weight | LBS | 3,100 | |

**See notes on page 18**

* Note #4

** The Blended COP is the average performance of the ASHP in a multi-pass configuration with an EWT=75F at the beginning of a cycle and EWT=135F (LWT=145F) at the end of the cycle; at the ambient condition listed.

*** The Seasonal COP applies the IPLV equation to the "Blended COP" values for 100%, 75%, 50%, and 25% load conditions.

The Blended COP and Seasonal COP numbers provide a clearer picture of the operational efficiency of Galletti ASHP units applied to multi-pass domestic hot water applications.

Cooling performance is tested and certified by AHRI, per standard 550/590 I-P
At 95F ambient, 54/44 (EWT/LWT). Tons = 29.01, EER = 9.63

| HTH30-453HB | | DOMESTIC HOT WATER PERFORMANCE | |
|---|---|---|---|
| Heating Capacity [Nominal] | MBH (kW) | 287.4 (84.2) | 422.1 (123.7) |
| Ambient Air Temperature [DB/WB]* | F (C) | 17/15 (-8/-9) | 47/43 (8/6) |
| Fluid | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 135 (57.2) | 135 (57.2) |
| Leaving Water Temperature [LWT]* | F (C) | 145 (62.7) | 145 (62.7) |
| Flow Rate [Water] | GPM (LPM) | 58.4 (221.1) | 85.7 (324.7) |
| Pressure Drop [Water] | FT.HD. (kPa) | 2.67 (8.0) | 5.3 (15.8) |
| Total Input Power | kW | 43.6 | 48 |
| Total Absorbed Current | A | 69.3 | 76.3 |
| Blended Coefficient of Performance (COP)** | kW / kW | 2.24 | 3.15 |
| Seasonal Coefficient of Performance (COP)*** | kW / kW | 3.69 | |
| Power Supply | V/PH/HZ | 460/3/60 | |
| Start Up Current (LRA) | A | 240 | |
| Full Load Amps (FLA) | A | 66 | |
| Minimum Circuit Amperage (MCA) | A | 82 | |
| Maximum Overcurrent Protection (MOCP) | A | 110 | |
| Fan Power Input | kW | 3.2 | |
| Fan Current | A | 4.6 | |
| Fan Air Flow | CFM (m^3/h) | 22,711 (38,586) | |
| Fan External Static Pressure (ESP) | In.Wg. | 0.48 | |
| Fan Quantity | - | 2 | |
| Sound Pressure [Lp] @32.8FT (10m) | dB (A) | 60 | |
| Sound Power [Lw] | dB (A) | 88 | |
| Refrigerant [R454B] | GWP | 466 | |
| Number of Compressors | | 2 | |
| Number of Refrigeration Circuits | | 2 | |
| Dimensions [LxDxH] | Inches | 105x59x96.5 | |
| Weight | LBS | 3,277 | |

**See notes on page 18**

* Note #4

** The Blended COP is the average performance of the ASHP in a multi-pass configuration with an EWT=75F at the beginning of a cycle and EWT=135F (LWT=145F) at the end of the cycle; at the ambient condition listed.

*** The Seasonal COP applies the IPLV equation to the "Blended COP" values for 100%, 75%, 50%, and 25% load conditions.

The Blended COP and Seasonal COP numbers provide a clearer picture of the operational efficiency of Galletti ASHP units applied to multi-pass domestic hot water applications.

Cooling performance is tested and certified by AHRI, per standard 550/590 I-P.
At 95F ambient, 54/44 (EWT/LWT). Tons = 29.41, EER = 9.63

| HTH53-766HB | | DOMESTIC HOT WATER PERFORMANCE | |
|---|---|---|---|
| Heating Capacity [Nominal] | MBH (kW) | 506.7 (148.5) | 773.1 (226.5) |
| Ambient Air Temperature [DB/WB]* | F (C) | 17/15 (-8/-9) | 47/43 (8/6) |
| Fluid | Water | Water | Water |
| Entering Water Temperature [EWT]* | F (C) | 135 (57.2) | 135 (57.2) |
| Leaving Water Temperature [LWT]* | F (C) | 145 (62.7) | 145 (62.7) |
| Flow Rate [Water] | GPM (LPM) | 103.0 (369.9) | 157.1 (594.6) |
| Pressure Drop [Water] | FT.HD. (kPa) | 3.74 (11.2) | 7.9 (23.6) |
| Total Input Power | kW | 77.3 | 85.2 |
| Total Absorbed Current | A | 122.8 | 135.4 |
| Blended Coefficient of Performance (COP)** | kW / kW | 2.22 | 3.16 |
| Seasonal Coefficient of Performance (COP)*** | kW / kW | 3.58 | |
| Power Supply | V/PH/HZ | 460/3/60 | |
| Start Up Current (LRA) | A | 266 | |
| Full Load Amps (FLA) | A | 119 | |
| Minimum Circuit Amperage (MCA) | A | 138 | |
| Maximum Overcurrent Protection (MOCP) | A | 150 | |
| Fan Power Input | kW | 3.2 | |
| Fan Current | A | 4.6 | |
| Fan Air Flow | CFM (m^3/h) | 45,422 (77,172) | |
| Fan External Static Pressure (ESP) | In.Wg. | 0.48 | |
| Fan Quantity | - | 4 | |
| Sound Pressure [Lp] @32.8FT (10m) | dB (A) | 62 | |
| Sound Power [Lw] | dB (A) | 90 | |
| Refrigerant [R454B] | GWP | 466 | |
| Number of Compressors | | 4 | |
| Number of Refrigeration Circuits | | 2 | |
| Dimensions [LxDxH] | Inches | 134x87x96.5 | |
| Weight | LBS | 5,950 | |

**See notes on page 18**

* Note #4

** The Blended COP is the average performance of the ASHP in a multi-pass configuration with an EWT=75F at the beginning of a cycle and EWT=135F (LWT=145F) at the end of the cycle; at the ambient condition listed.

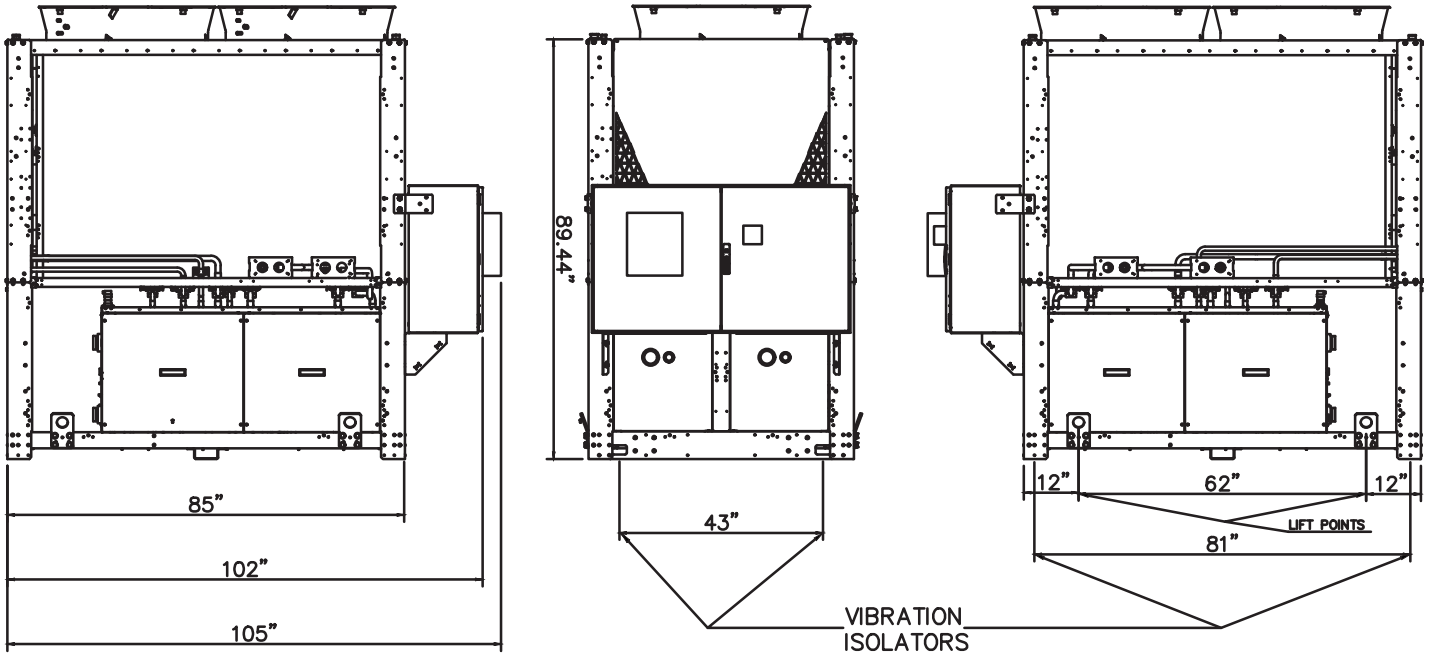
*** The Seasonal COP applies the IPLV equation to the "Blended COP" values for 100%, 75%, 50%, and 25% load conditions.

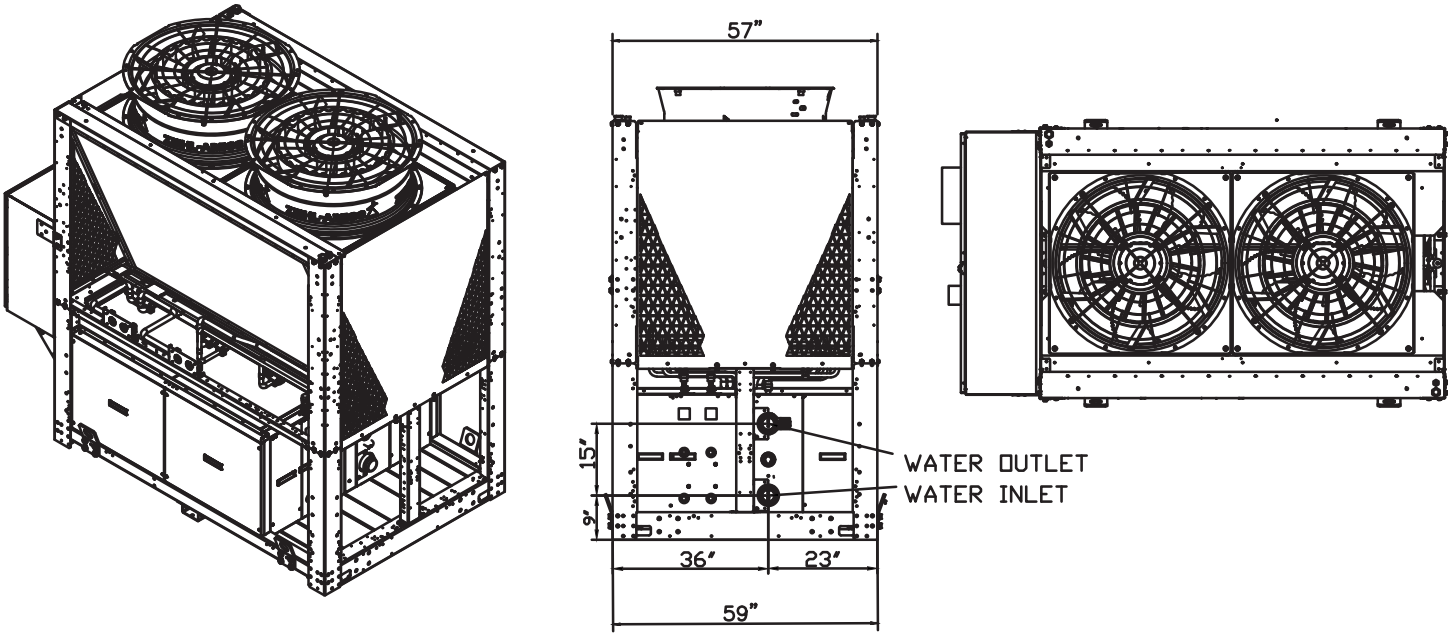
The Blended COP and Seasonal COP numbers provide a clearer picture of the operational efficiency of Galletti ASHP units applied to multi-pass domestic hot water applications.

Cooling performance is tested and certified by AHRI, per standard 550/590 I-P.
At 95F ambient, 54/44 (EWT/LWT). Tons = 51.74, EER = 9.63

# DIMENSIONAL DRAWING MODEL: HTH29 | HTH30

# DHW PERFORMANCE



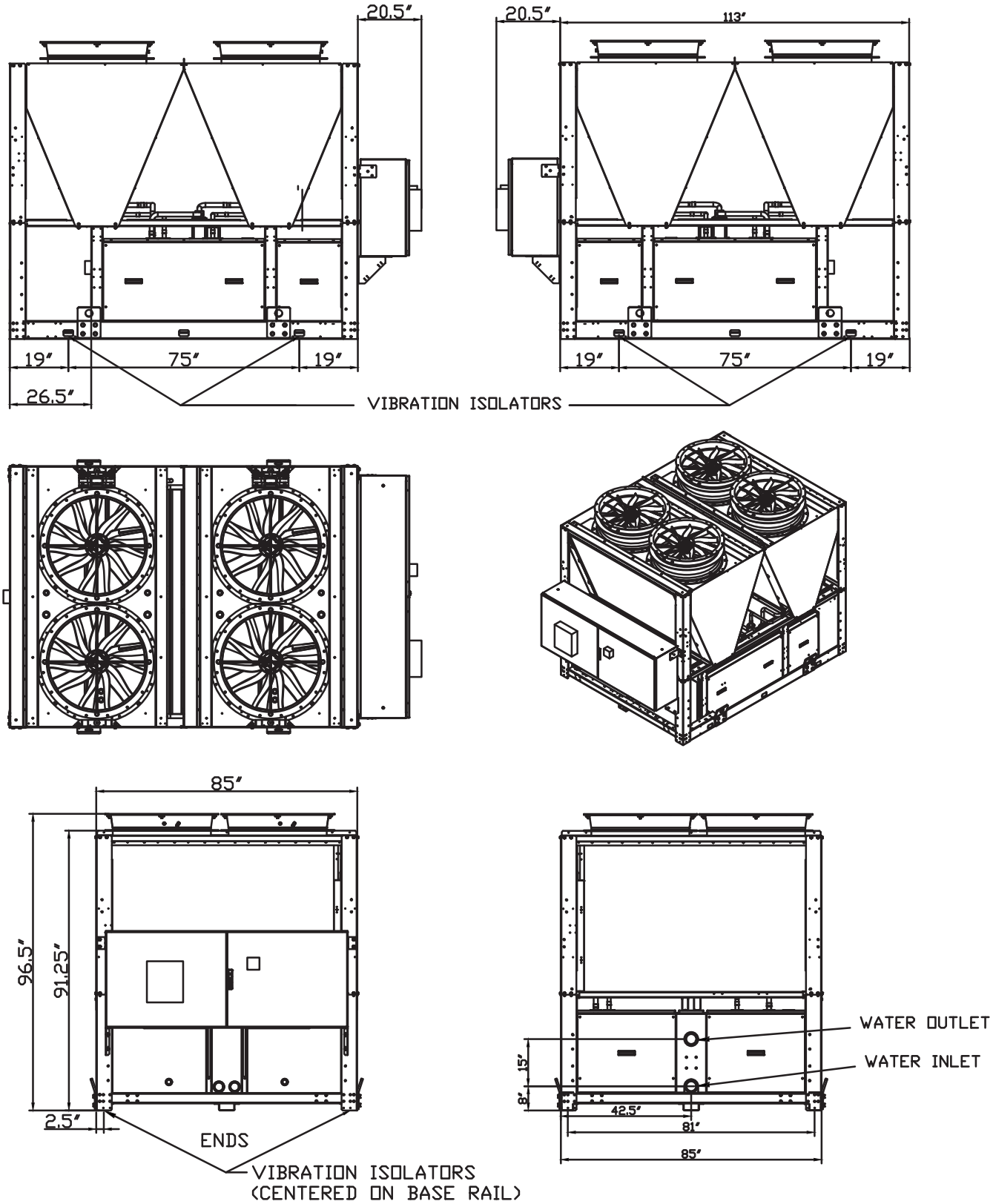

NOTE: The units have grooved 2.5" connections. To keep pressure drops low, 3" piping to and from the unit is recommended.

Measurement unit: Inches

| | | |
|---|---|---|
| 1 | GROOVED WATER OUTLET | 2.5" |
| 2 | GROOVED WATER INLET | 2.5" |

# DIMENSIONAL DRAWING MODEL: HTH53





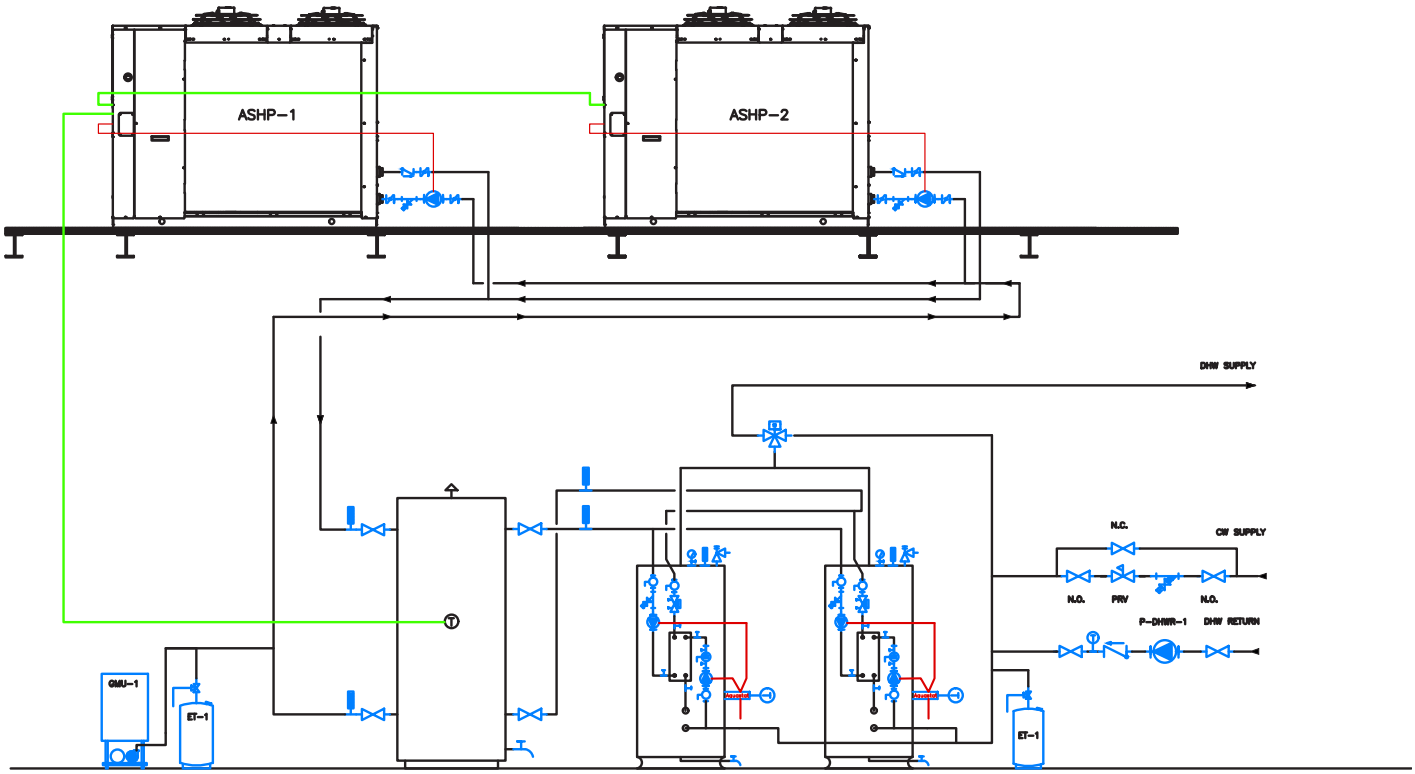

NOTE: The units have grooved 3″ connections. To keep pressure drops low, 4″ piping to and from the unit is recommended.

Measurement unit: Inches

| | | |
|---|---|---|
| 1 | GROOVED WATER OUTLET | 3" |
| 2 | GROOVED WATER INLET | 3" |

# DHW SCHEMATIC

# DHW PERFORMANCE




**SEQUENCE OF OPERATION**

The air-source heat pump (ASHP) plant shall operate based on the return water sensor mounted in the 2 - pipe buffer tank.

A set differential temperature will control the leaving water temp.

The ASHP units shall have product integrated controls to allow the plant to sequence units as required, provide lead-lag control, emergency start/stop, etc.

The primary ASHP pumps (P-1, P-2) shall be powered by and controlled by ASHP-1 & ASHP-2 respectively.

A temperature sensor located in the middle of the 4 - Pipe Buffer Tank shall be wired to the ASHP. The ASHP shall control the set point and staging of the ASHP plant.

The indirect DHW heater shall consist of double wall brazed plate heat exchangers, mounted to the exterior of the DHW storage tanks, with a pump to circulate domestic water from the bottom of the DHW tank into the HXR, and a pump to circulate hot water (or glycol) from the 4 - Pipe Buffer Tank to the non-potable water side of the HXR. A relay controller shall accept a signal from the DHW tank aquastat and enable/disable both tank-mounted pumps on/off on a call for heat from the aqua stat.

If an optional downstream electrical water heater is utilized, then the hot water from the indirect water heaters flows to the downstream electric water heater. If the heat pumps are keeping up with the load, then the electric water heater just provides additional storage. If the temperature in the electric water heater drops below its programmed set point, then the electric water heater will turn on.

# CONFIGURATION OPTION: HYDROKIT



**HydroKit packages are provided as pre-engineered accessory options for the HTH-series of air - source heat pump chiller - heaters. The HydroKit packages simplify installation, and aid in proper operation.**

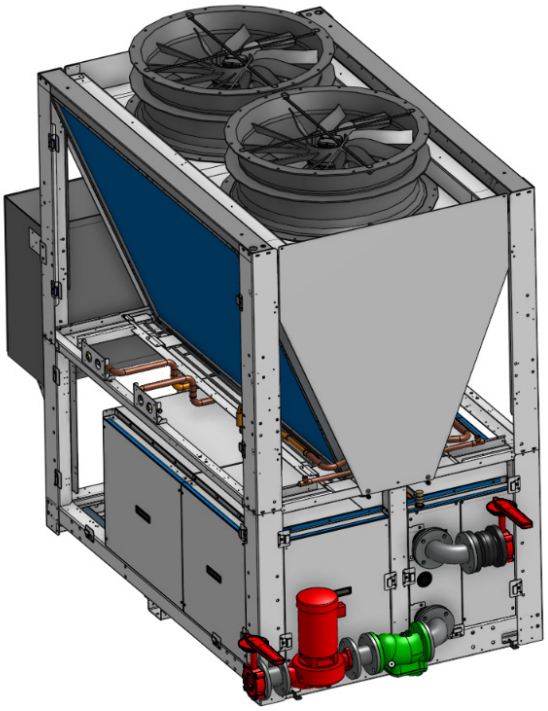
2 - Pipe configuration for chilled / hot water change-over applications.

**Available with 2 methods of operation:**

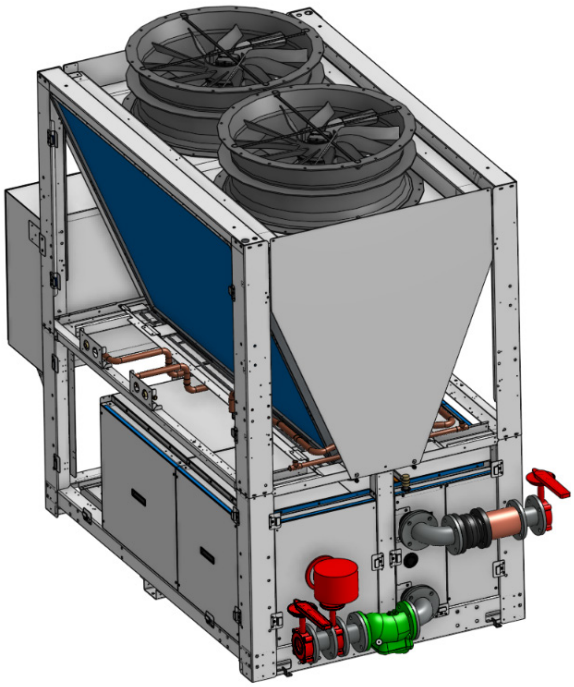
① With primary pump for a primary - secondary system.

② With 2 - way motorized valves for variable - primary systems.

## 2 - PIPE WITH PRIMARY PUMP



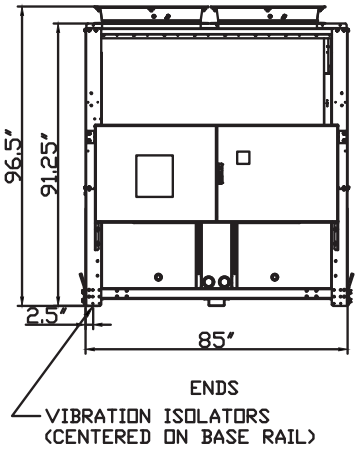
## 2 - PIPE WITH VALVE

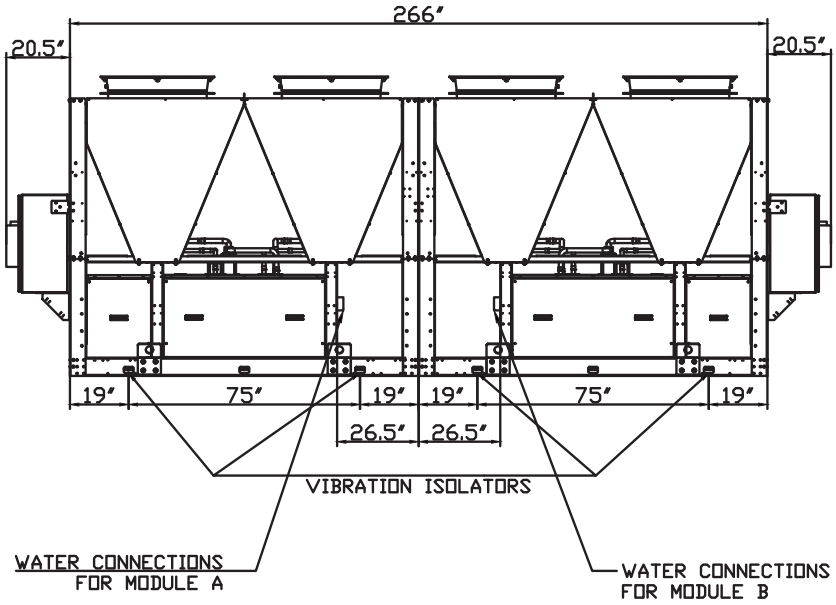


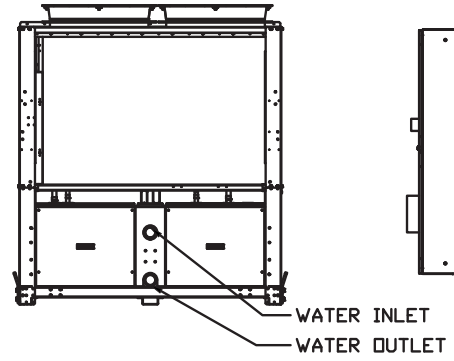
- Grooved to flanged adapters
- Flanged elbows
- Low pressure drop y-strainer
- Spool pieces
- Optional: "With Pump" option includes a primary pump with TEFC motor
- Optional: "No Pump" option includes a 2-way motorized valve, and pressure independent balancing valve

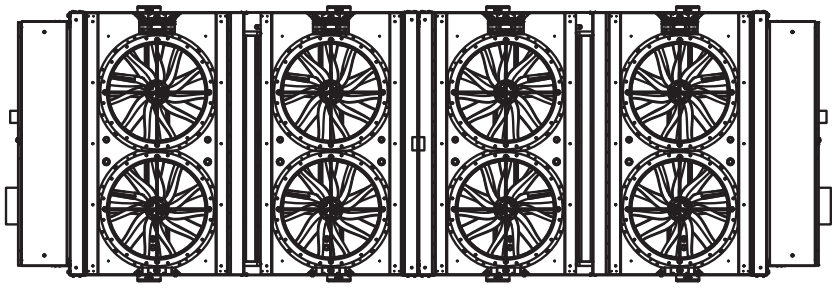
# CONFIGURATION OPTION: MODULAR

Flexible configurations
Two 57 ton unit example
114 tons cooling |1.5M BTUh heating
One rigid lift base
Single point power connection
All communication cables pre-wired



NOTE: The units have grooved 3" connections. To keep pressure drops low, 4" piping to and from the unit is recommended.

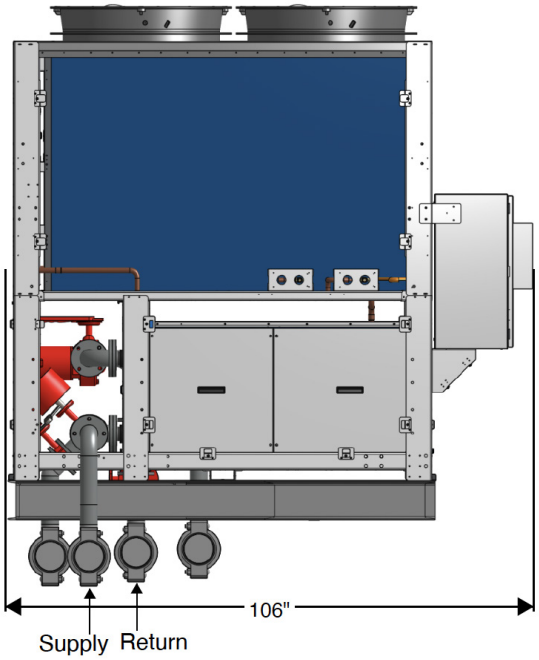
Measurement unit: Inches

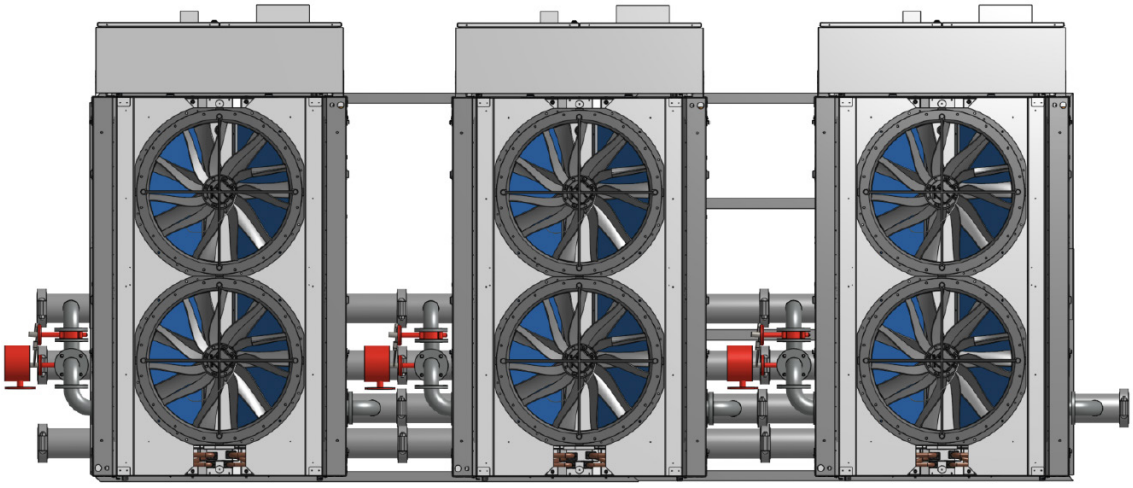
**GALLETTI MODEL: (2) HTH53**

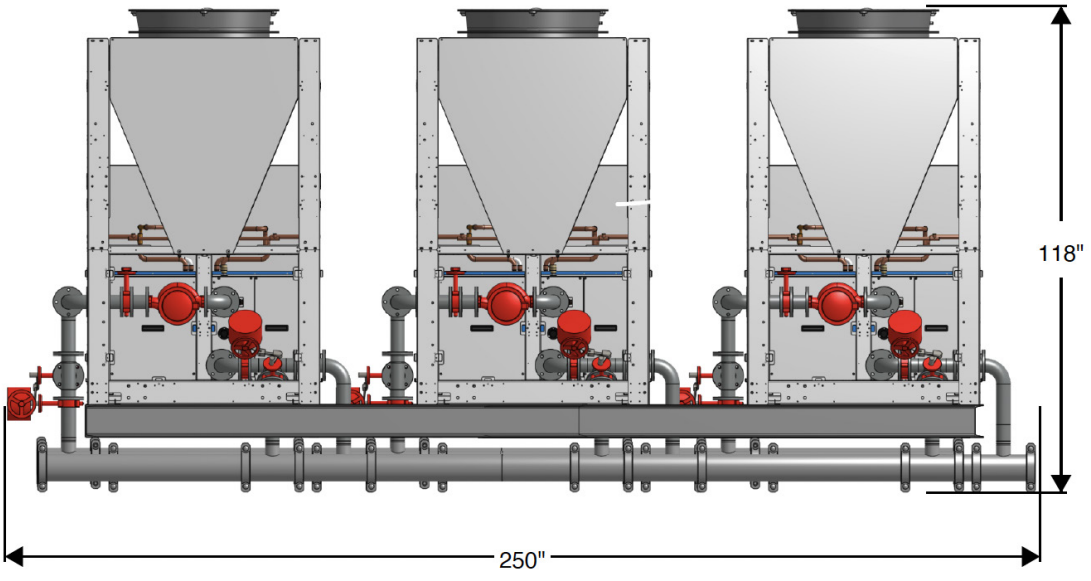
| | | |
|---|---|---|
| 1 | GROOVED WATER OUTLET | 3" |
| 2 | GROOVED WATER INLET | 3" |

# CONFIGURATION OPTION: SKID, HEADER, HYDROKIT PACKAGE

Flexible configurations - HVAC Performance
Three 33 ton unit example
99 tons cooling | 1.3M BTUh heating
2' spacing between units
One rigid lift base
Single point power connection
All communication cables pre-wired
Hydrokit & header package, 4 - pipe
Lead - lag cascade controller built in



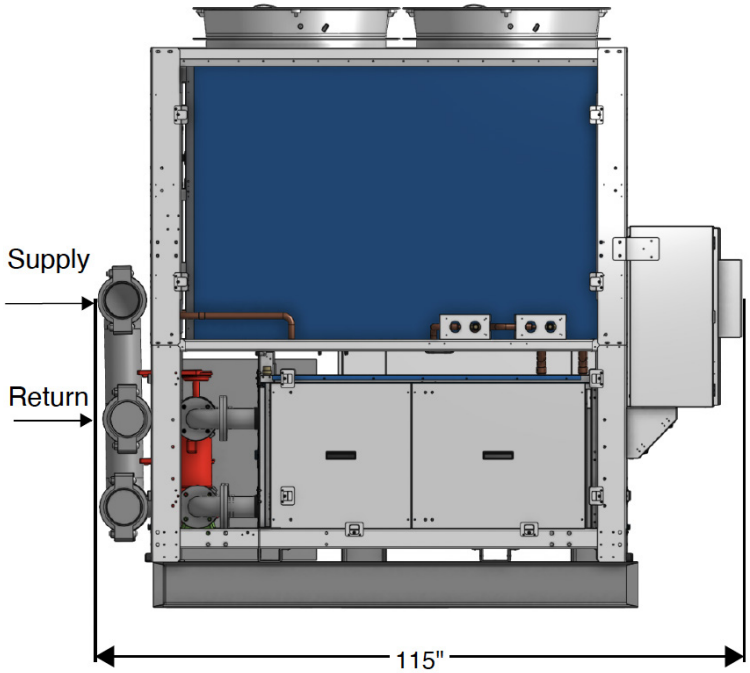



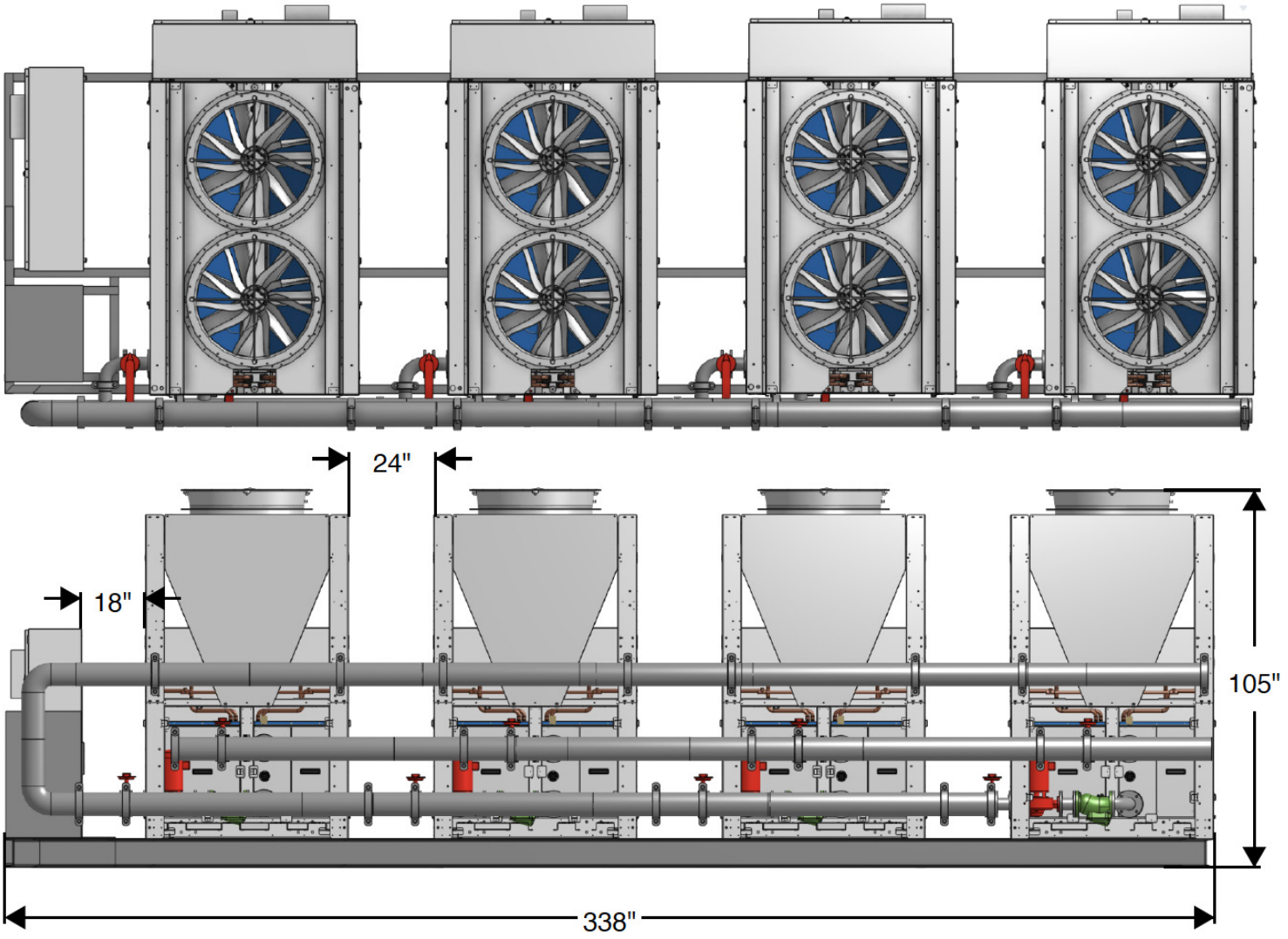



**2' SPACING BETWEEN UNITS**

# CONFIGURATION OPTION: SKID, HEADER, HYDROKIT PACKAGE

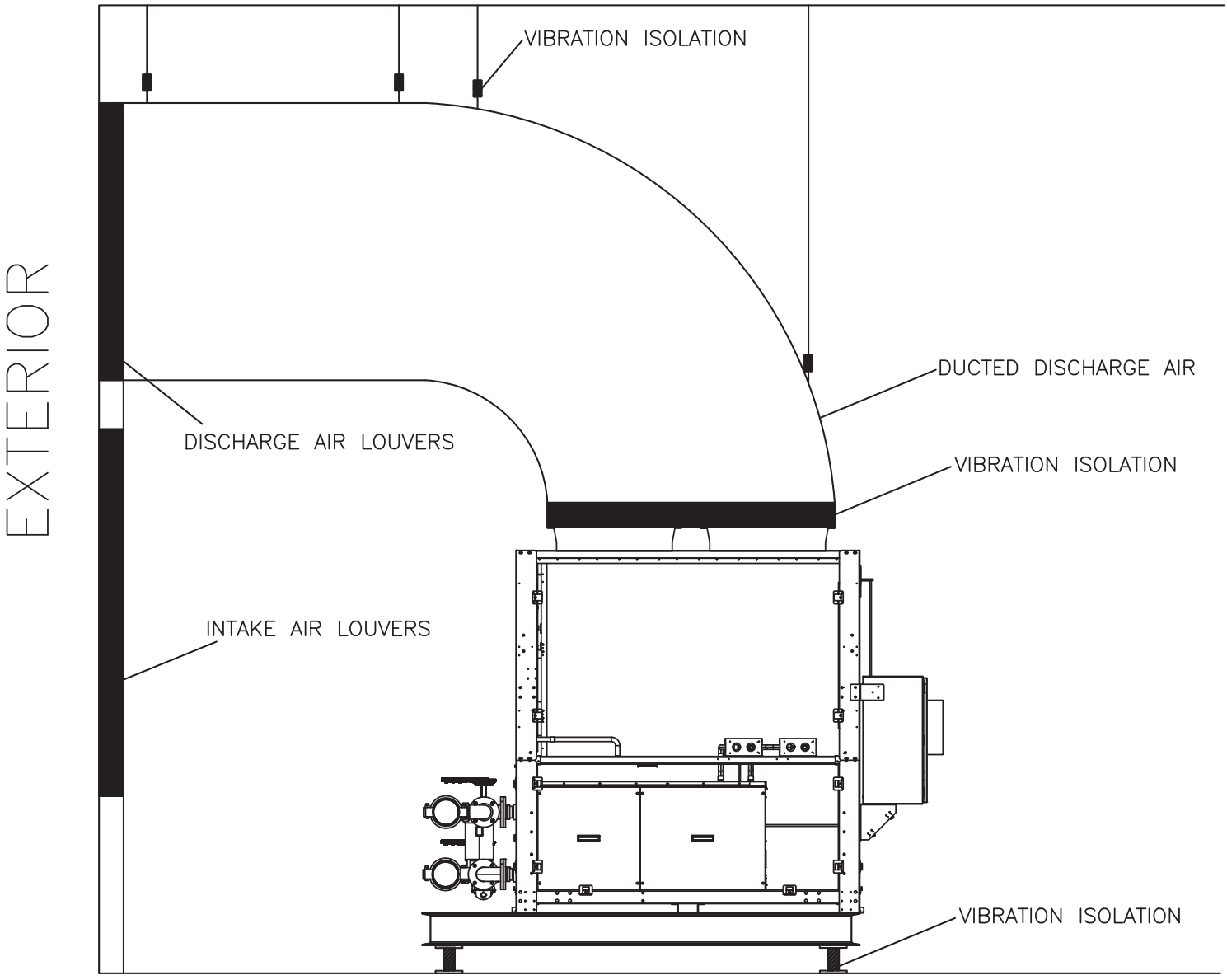
Flexible configurations - DHW Performance
Three unit example
1.7M BTUh heating
One rigid lift base
Single point power connection
All communication cables pre-wired
Hydrokit & header package, 2 - pipe
Lead - lag cascade controller built in



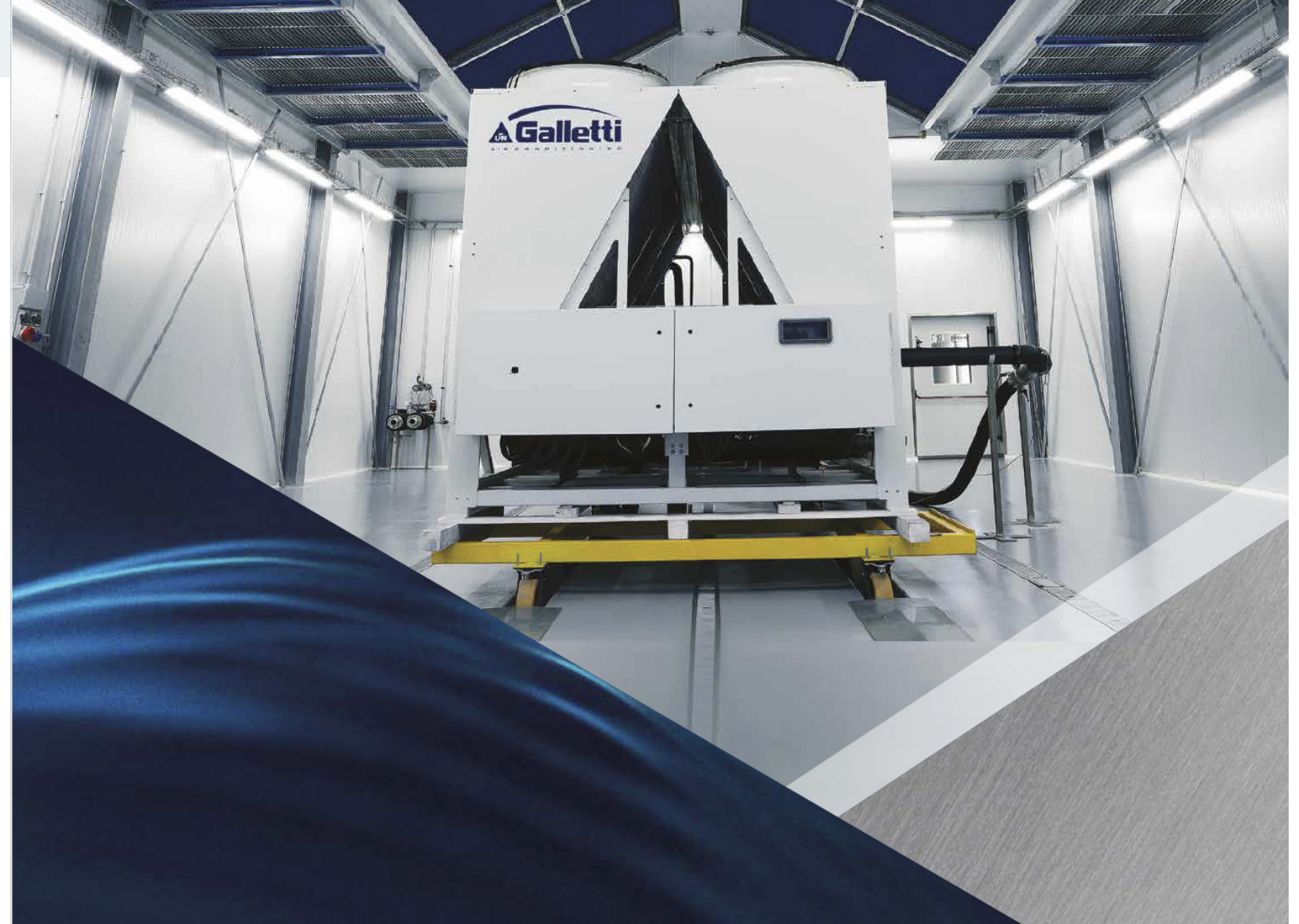
# INTERIOR MECHANICAL ROOM DUCTED OPTION

HTH units are designed to accommodate ducted indoor applications using exterior intake and discharge louvers, allowing fully ducted indoor mechanical room installation without compromising performance. Units are capable of handling external static pressure and maintaining rated airflow and capacity, providing superior flexibility, acoustical control, and equipment protection compared to traditional outdoor installations. Inquire about EC inverter Hi-Turbo, high static, motor fan option.




**DUCTED INSTALLATIONS MUST BE REVIEWED AND APPROVED BY FACTORY IN ORDER TO MAINTAIN WARRANTY**

**Allowable External Static Pressure**
**Standard Fan ESP: 0.48 in.wg.**
**Hi-Static ECM Fan ESP: 1.2 in.wg.**




# The system and technology

### PRECISION AND ACCURACY OF MEASUREMENTS

The structure of the chamber and each of its components have been designed and selected in order to achieve the best precision in accordance with the main reference standards.

### WITNESSED TESTS

HVAC systems require generation systems optimised for the structure to which they are connected, operating under specific working conditions that may differ greatly from the rated ones shown in the catalogues and confirmed by the certification bodies.

# GALLETTI GROUP

The Galletti Group's greatest strength over the years has been its ability to maintain the strategic processes that are the cornerstones of every new solution: Research and Development, Design and Production.

The in-house development and design of semi-finished products, components and finished products ensures extreme flexibility in responding to customer requests.

Galletti Group is now one of the very few companies still wholly Italian-owned and boasts several brands, each with its own specialisation within the sector.






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AIR CONDITIONING