HTH HS

HEAT PUMPS
WITH EVI COMPRESSORS
FROM 14 TO 54 TONS

Efficiency and reliability in **all weather conditions**

Galletti
AIR CONDITIONING

RIADA

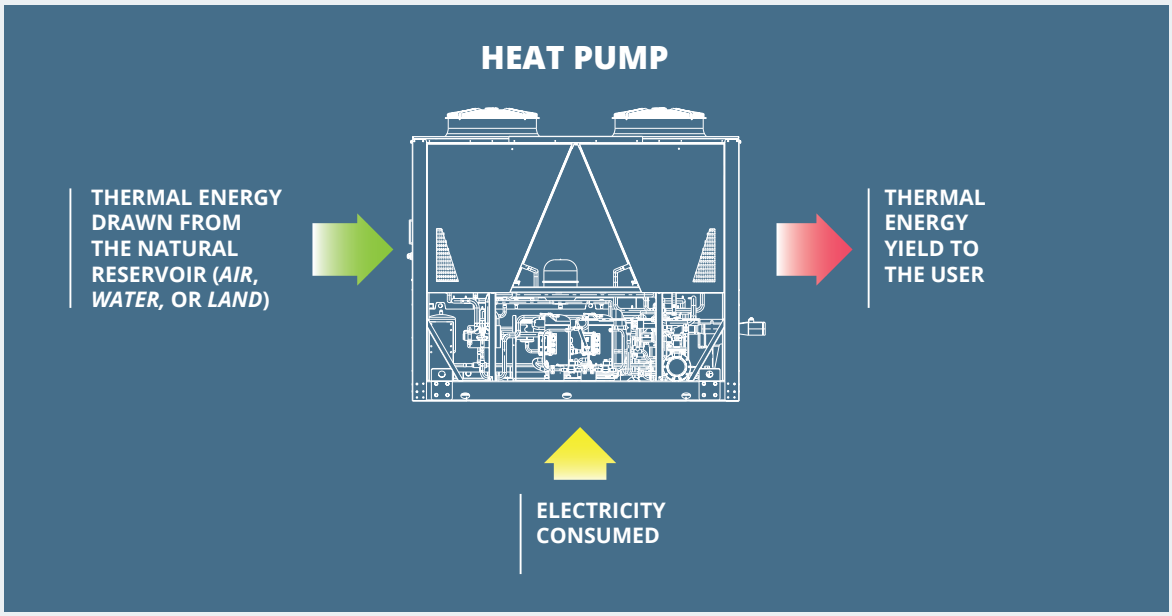
THE CURRENT SCENARIO

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 the 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.

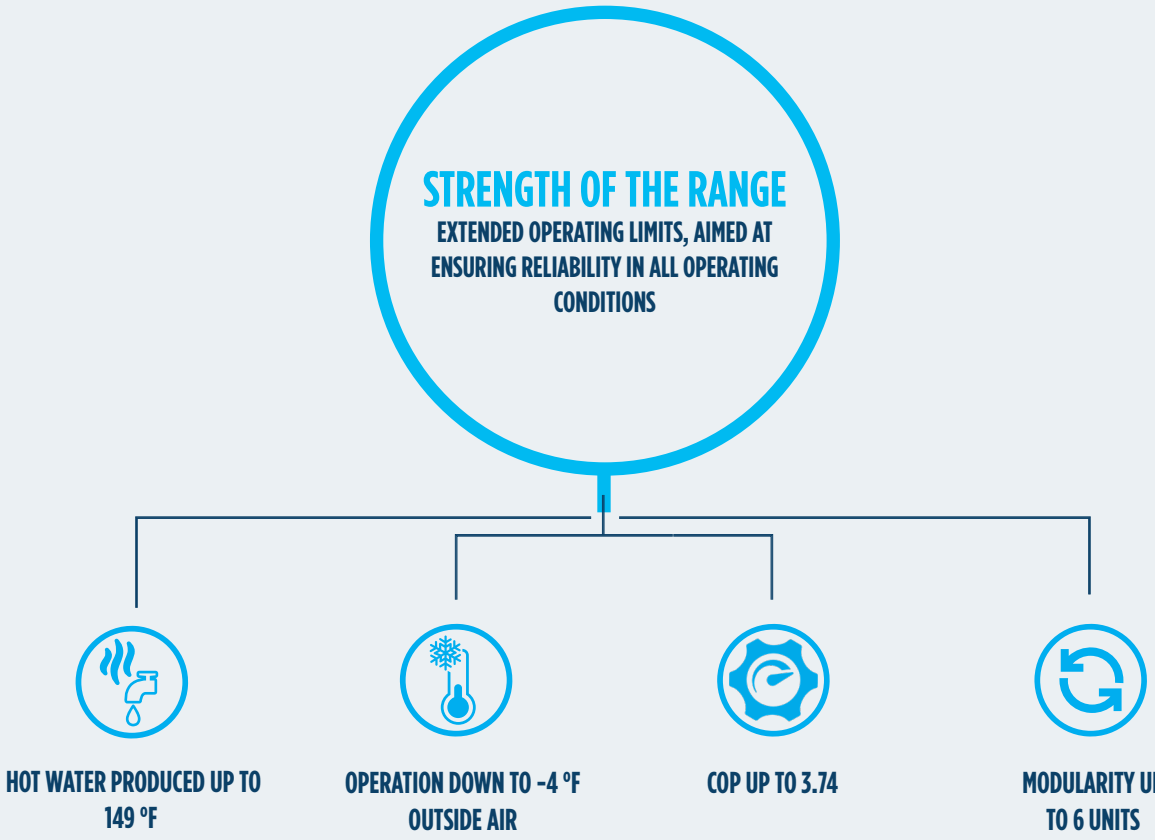


$$\text{RENEWABLE ENERGY} = \text{THERMAL ENERGY YIELD} * \left[1 - \frac{1}{\text{SCOP}}\right]$$

GALLETTI'S RESPONSE

HTH HS is Galletti's high efficiency range, featuring the most advanced technology of the R410A multiscroll units used in HVAC.
A line consisting of 4 air-water models available as reversible heat pump version with cooling capacities ranging from **14** to **54 tons**. The range is characterized by the use of compressors with vapor injection **(EVI)**, which make it possible to extend the operating range of the unit **beyond the conventional operating limits of heat pumps**, together with achieving **high seasonal efficiency.**

The possibility of **producing 149 °F hot water down to the coldest outdoor temperatures** makes **HTH HS** a one-stop solution for cooling, heating, and domestic hot water production.



EVI COMPRESSORS

The **HTH HS** range is fully equipped with scroll compressors with **EVI** (Enhanced Vapor Injection) technology, complete with internal thermal protection of the windings, and installed on special 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:

- **increase in heating capacity, with the compressor displacement being equal.**
- **a significant reduction in compressor flow temperature.**

This results in the extension of the operating range *(hot water production up to 149 °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. In addition the range usees up to 4 compressors in order to favor **high efficiency values not only for time efficiency under rated conditions, but also for seasonal efficiency**.

HTH HS

EXTENDED OPERATING RANGE

HIGH SEASONAL EFFICIENCY

CONFIGURABILITY

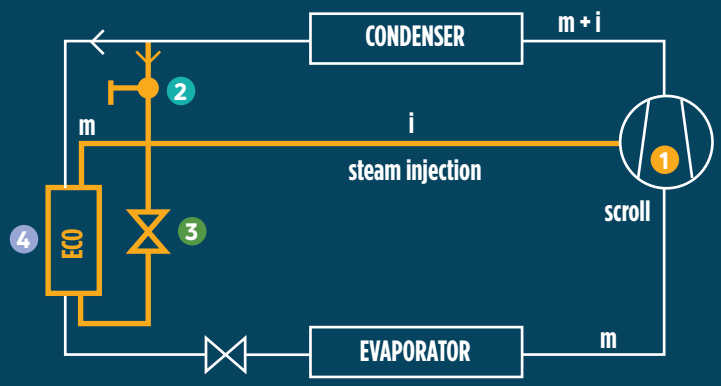
EVI TECHNOLOGY

THE COOLING CYCLE WITH VAPOR INJECTION

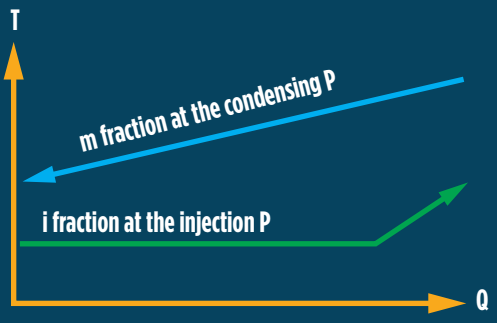
The units that use vapor injection technology are characterized by:

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 **EV1 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.



In the **Economizer**, instead, the heat exchange takes place between the ***i*** fraction at the injection pressure and the warmer ***m*** fraction at the condensing pressure.
In this manner, on the one hand the ***i*** fraction in the two-phase liquid state reaches the super heated vapor state and the dangerous injection of large quantities of liquid inside the compressor is avoided, and on the other hand the ***m*** fraction reaches a high value of under-cooling, **increasing the cooling capacity of the cycle**.

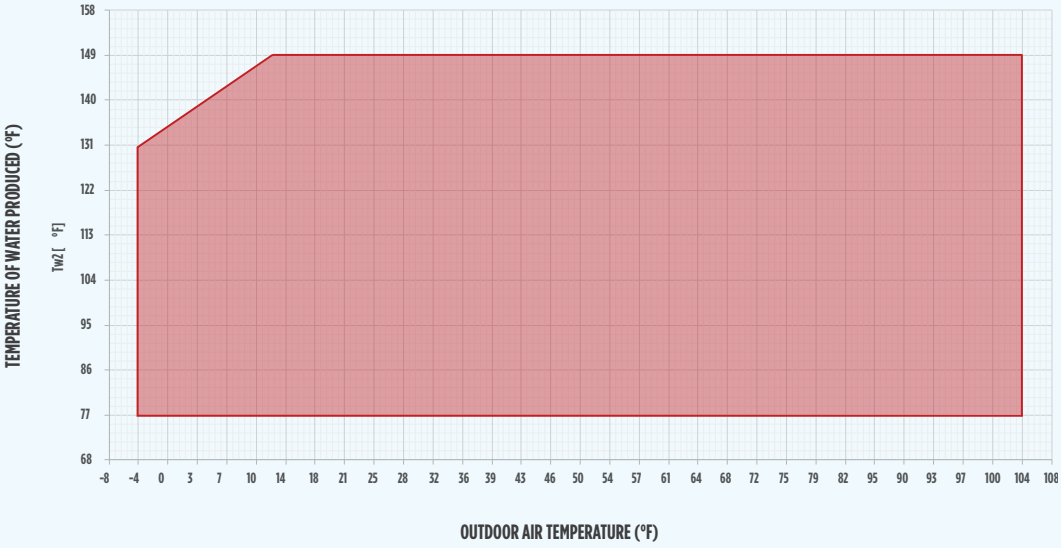


EXTENDED OPERATING RANGE

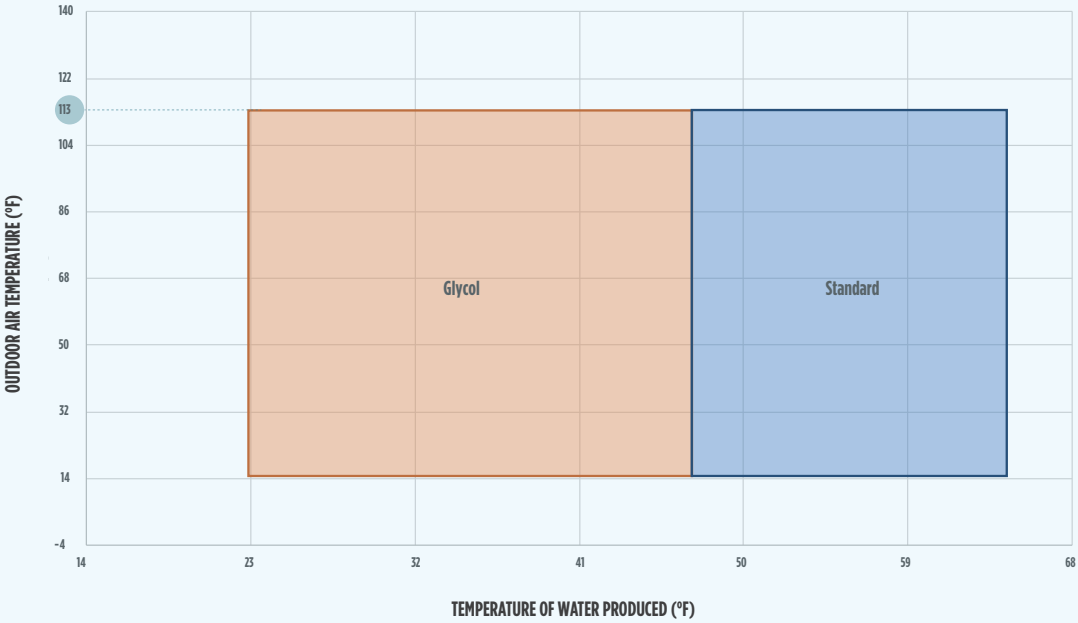
EXTENDED OPERATING RANGE

The generous sizing of the exchange surfaces and the use of EVI compressors has made it possible to create a range that is not only efficient, but also has one of the most extended operating ranges on the market: **hot water production up to 149 °F** and **operation at full capacity with outside air temperatures down to -4 °F**.

OPERATION IN HEATING MODE



OPERATION IN COOLING MODE



CONFIGURABILITY

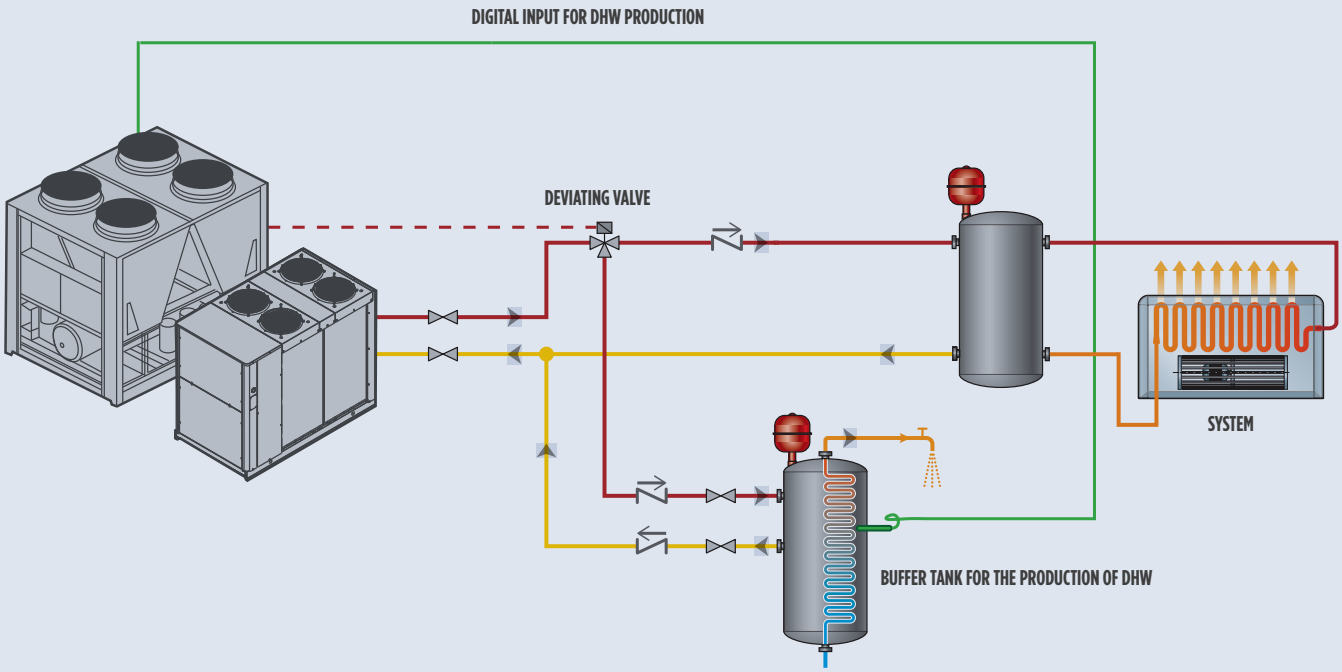
INTELLIGENT MANAGEMENT OF DHW PRODUCTION

The microprocessor on the unit is equipped with a digital input for receiving the demand for DHW production, thanks to which, in the event of a decrease in the temperature in the DHW buffer tank below an established set-point, the following procedure is activated:

1. **Compressors shut down**.
2. **Switching off** the pump on the primary circuit.
3. **Deviation** of the three-way valve flow direction to the DHW side.
4. Possible *switching the operating mode* (summer season).
5. **Switching on** the pump on the primary circuit.
6. **Switching on** the compressors.

Once the DHW production phase has ended, the reverse procedure from that described above is activated to restore normal operation on the system side.

Both during the summer season and during the winter season, a call on the DHW side has priority over one on the system side.



CONFIGURABILITY

MANY FUNCTIONS FOR MANAGING THE UNIT

The electronic control enables the complete control of the unit. It can be easily accessed through a polycarbonate flap with **IP65 protection rating**. The self-adaptive logic allows the unit to operate even in systems where the water content is low, while the reading of the outdoor air temperature makes it possible to automatically change the set-point to adapt it to the outdoor load conditions or to keep the unit running even in the harshest winter conditions.

MAIN FUNCTIONS

Control over the temperature of water entering the evaporator.

Complete alarm management

Centralized remote management system (tERA) to access quickly and easily all the necessary information and optimize the work of the technical team and internal service.

Possibility to set up LAN networks for controlling 6 units in parallel.

Management of the low-noise function with air flow modulation

Management of the weekly scheduling

Management of the algorithm for modulating the water flow rate on the primary circuit

Recording of operating parameters and their storage in the memory as well as the ability to download via a control link

CONFIGURABILITY

CONFIGURATION

POWER SUPPLY

HTH..HS
460V-3-60Hz

CONFIGURATION OPTIONS

Expansion valve
Electronic

Air flow modulation
Condensation control by phse-cut fans

Antifreeze kit
Plate exchangers

Acoustic insulation and attenuation
Compressor sound blanket and compressor compartment sound proofing

Cooling circuit accessories
Refrigerant pressure gauges

Remote control / Serial communication
tERA box monitoring

Special coils / protective treatments
Hydrophilic
Fins pre-coated with epoxy paint

Vibration isolation
Base spring vibration dumpers

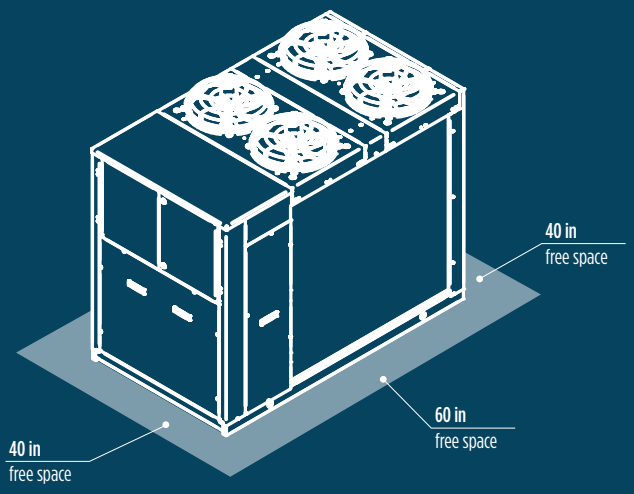
On-board control
Advanced

RATED TECHNICAL DATA OF HTH HS HEAT PUMPS (PRELIMINARY)

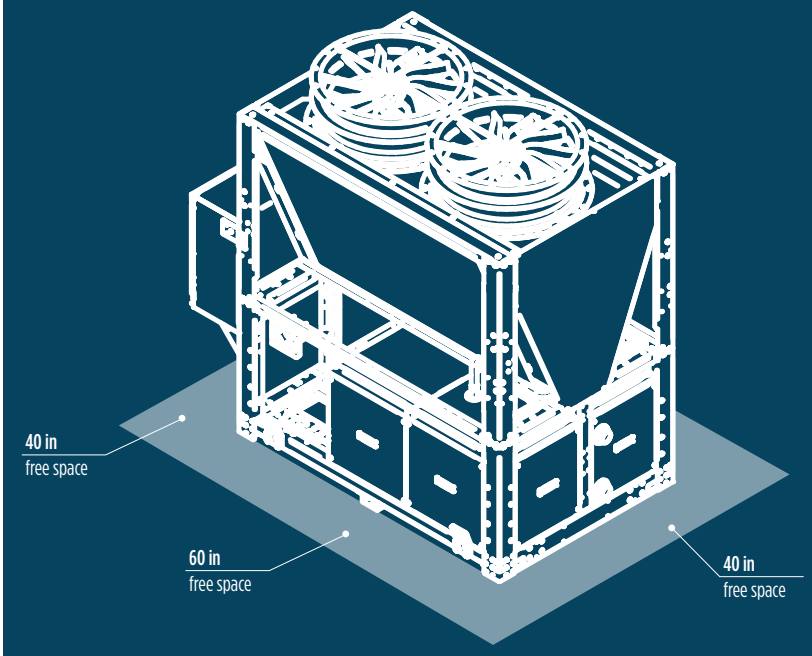
All performace data are calculated in accordance to AHRI standard 550/590 I-P

HTH HS		HTH14-204HS	HTH30-460HS	HTH42-638HS	HTH54-778HS
Load Percentage	%	100	100	100	100
Water Temperature In	°F (°C)	54 (12.2)	54 (12.2)	54 (12.2)	54 (12.2)
Water Temperature Out	°F (°C)	44 (6.7)	44 (6.7)	44 (6.7)	44 (6.7)
Glycol Percentage	%	0	0	0	0
Air Temperature	°F (°C)	95 (35)	95 (35)	95 (35)	95 (35)
Relative Humidity	%	40	40	40	40
Cooling Capacity	ton (kW)	13.6 (47.7)	29.6 (104.0)	42.4 (149.1)	53.6 (188.5)
Water Flow User Side	gpm (l/h)	32.3 (7,329)	70.3 (15,968)	100.8 (22,892)	127.4 (28,942)
Water Pressure Drops User Side	ft H2O (kPa)	4.0 (12)	5.0 (15)	4.0 (12)	5.7 (17)
Total Power Input	kW	17.5	38.0	50.8	64.7
Total Absorbed Current	A	29.5	61.3	82.2	107.1
EER	BTU/Wh (kW/kW)	9.3 (2.74)	9.3 (2.74)	10.0 (2.94)	9.9 (2.91)
IPLV	BTU/Wh	12.92	13.65	14.61	14.50
Load Percentage	%	100	100	100	100
Water Temperature In	°F (°C)	104 (40)	104 (40)	104 (40)	104 (40)
Water Temperature Out	°F (°C)	113 (45)	113 (45)	113 (45)	113 (45)
Glycol Percentage	%	0	0	0	0
Air Temperature	°F (°C)	44.6 (7)	44.6 (7)	44.6 (7)	44.6 (7)
Relative Humidity	%	89	89	89	89
Heating Capacity	BTU/h (kW)	204,387 (59.9)	460,297 (134.9)	637,729 (186.9)	777,626 (227.9)
Water Flow User Side	gpm (l/h)	45.3 (10,298)	102.2 (23,202)	141.6 (32,149)	172,6 (39,207)
Water Pressure Drops User Side	ft H2O (kPa)	6.0 (18)	7.4 (22)	6.7 (20)	10.0 (30)
Total Power Input	kW	18.3	36.1	51.6	62.8
Total Absorbed Current	A	30.3	58.4	83.2	106.1
COP	kW/kW	3.27	3.74	3.62	3.63
Start Up Current (LRA) [without options]	A	187	219	243	293
Minimum Circuit Amperage (MCA)	A	44	85	152	152
Maximum Overcurrent Permitted by the Protection Device (MOP)	A	50	100	175	175
Sound Power Level Lw	db(A)	83	86	88	89
Sound Pressure Level Lp @ 10 m	db(A)	55	58	60	61
Source Air Volumetric Flow	cfm (m3/h)	21,895 (37,200)	26,780 (45,500)	53,560 (91,000)	53,560 (91,000)
Source Fans Number		4	2	4	4
Source Fans Power Input	kW	4.4	4.1	8.2	8.2
Source Fans Absorbed Current	A	8.0	7.6	15.2	15.2
Compressors/Circuits		1/1	2/2	4/2	4/2
Power Supply	V-ph-Hz	460-3-60			
Refrigerant		R410A			
GWP		2088			
Dimensions [LxDxH]	in	82x46x69	102x59x96.5	130x87x96.5	130x87x96.5
Weight without options	lb	1060	2606	4210	4210

DIMENSIONS

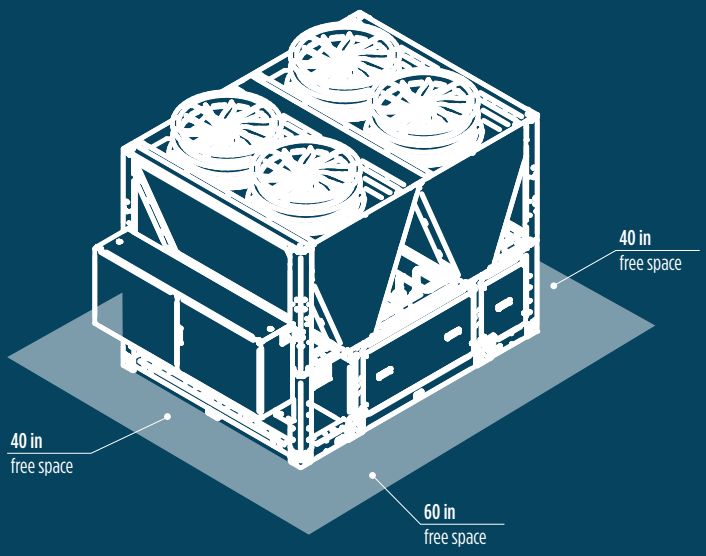


HTH 14-204 HS	
Water inlet 2" Victaulic	
Water outlet 2" Victaulic	
D	46 in
L	82 in
H	69 in



HTH 30-460 HS	
Water inlet 3" Victaulic	
Water outlet 3" Victaulic	
D	59 in
L	102 in
H	96.5 in

DIMENSIONS



HTH 42-638 HS AND HTH 54-778 HS	
Water inlet 4" Victaulic	
Water outlet 4" Victaulic	
D	87 in
L	130 in
H	96.5 in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