ARMSTRONG - COMBITHERM

High Temperature Heat Pump

New HFO Ready

About the Manufacturer:

Armstrong International founded in 1900, We are a fifth-generation privately held, family-owned company. The Armstrong heritage of knowledge and expertise reaches back more than a century, giving us a keen ability to think and plan for the future. We have a uniquely clear, long-term perspective that enables us to serve our customers in ways no other company can.
Combitherm GmbH has been renowned since 1972 for innovative and reliable products for refrigeration and heating technology. Our product portfolio is broad, with one of the core competencies being our range of heat pumps. By continuously developing our products, we strive to offer our customers the optimal system solution that will suit their needs perfectly.

High Temperature:

To be one step ahead of the rapid changes in the field of resource utilization we are in a continuous process of product development. At the same time we want to maintain our proven quality standards. An important step is the widening of the performance spectrum in order to generate media temperatures at a high level. To meet the related challenging requirements we offer a wide range of scroll, reciprocating and screw compressors embedded in systems with further favorable components. Adjusted to future standards our systems are based on low GWP solutions like HFCs, HFOs and natural refrigerants.

Large Performance:

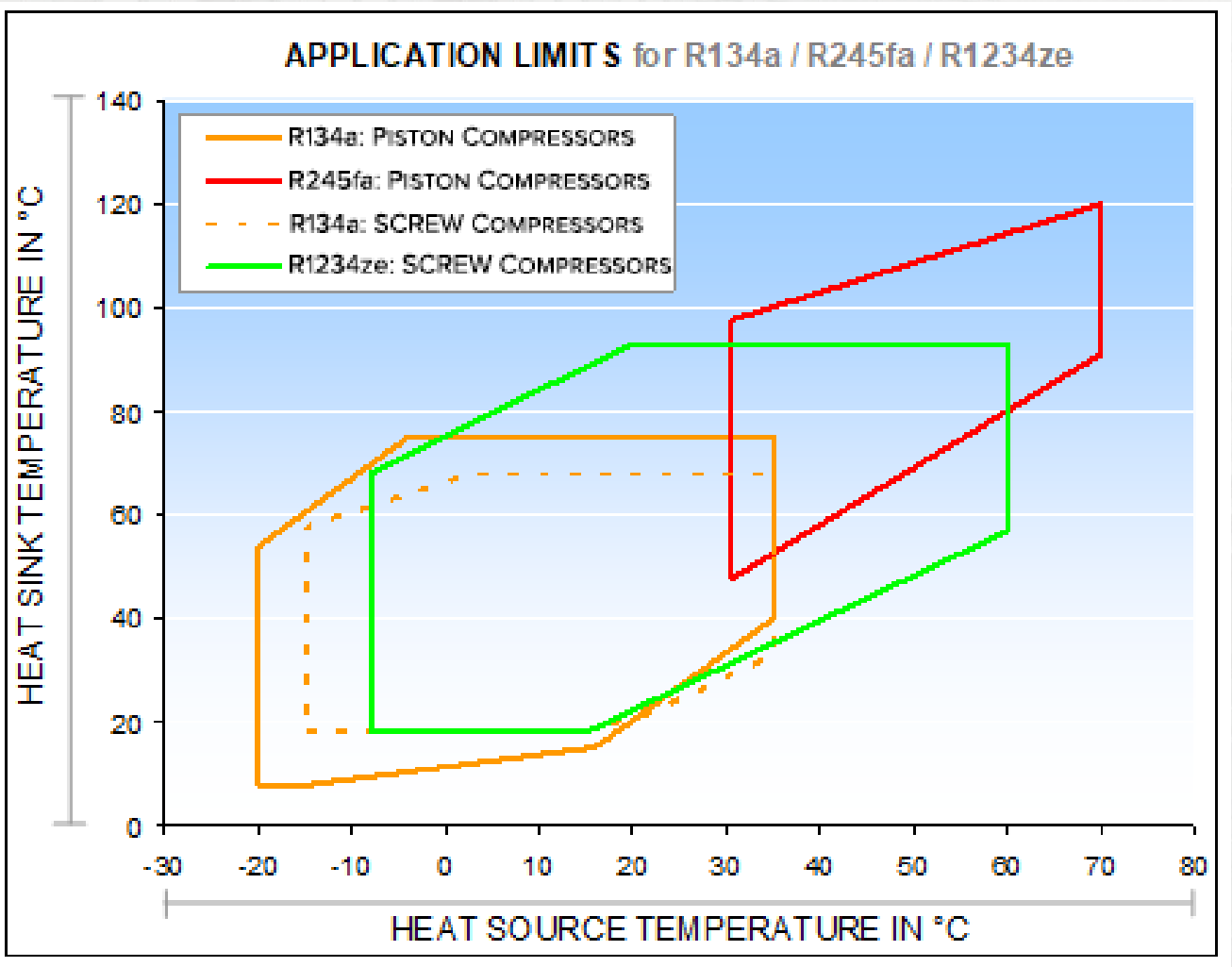
The Combitherm systems are available as single or multi-circuit units. Plants equipped with one scroll or piston compressor for small capacity like in the commercial sector as well as up to 3 screw compressors appointed for large industrial processes are part of the product portfolio.
The wide application and temperature range complemented by our proven heat pump technology with over 40 years of experience can be our customized input for your system.

HFO Ready:

It is a great goal for us to push forward with regard to ecological aspects as well as technical innovations. Especially the integration of new refrigerants into the product portfolio plays a major role. In addition to our reliable products the focus is strongly on the development in the field of Hydrofluoroolefins. Therefore R1234ze is available in Combitherm systems now. With supply temperatures between 20 and 95 °C we can meet numerous requirements in the field of heating technology. And the Global Warming Potential of 7 is a new dimension in regard to the reduction of the greenhouse effect. As the refrigerant is not toxic we can offer systems with the highest level of environmental friendliness. Furthermore, it is an investment in the future since there are no expectable restrictions.

Application Range:

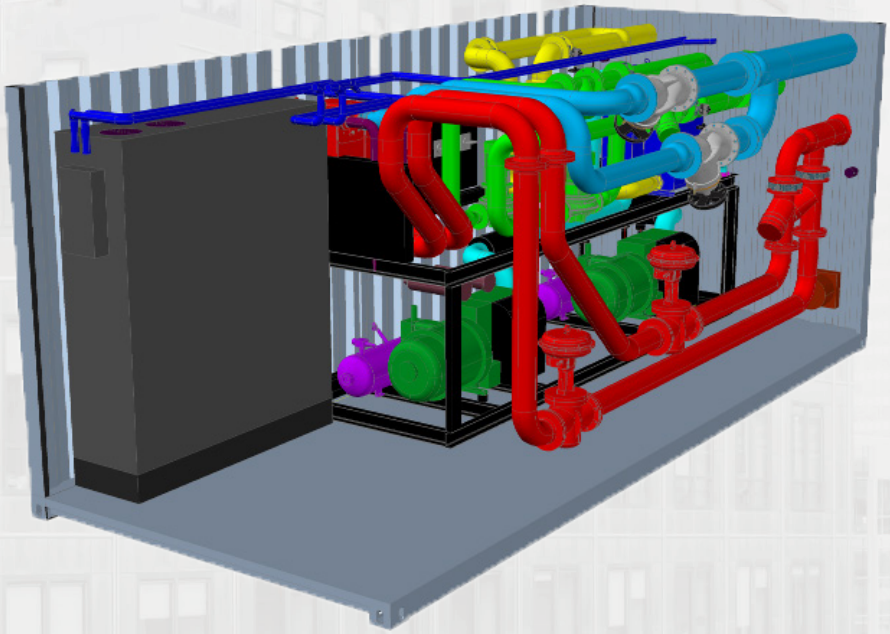
The Combitherm heat pumps provide the opportunity to process energy in a further way. In numerous industrial processes, waste heat is generated that can now used efficiently, and therefore doesn't need to be released into the environment.
Our proved R134a machines can be employed for a temperature range of up to 75 °C. Various compressors are available and different types of heat exchanger can be adapted to the respective need. In addition, with R1234ze, you are provided with an optimal extension to cover an application range of up to 95°C. And for highest demand up to 120 °C the refrigerant R245fa is a suitable solution which combines low pressure characteristic, environmentally friendly proper-ties, and valuable thermody-namic capability. And with all system we can rely on proven standard components.
An additional scope of application is the fusion of different technologies. For high temperature differences between heat sink and heat source, multi-stages systems can be realized. The heat pumps are available in fine graduations across the entire performance range and as single or multiple circuit versions.



The ARMSTONG - COMBITHERM Benefits

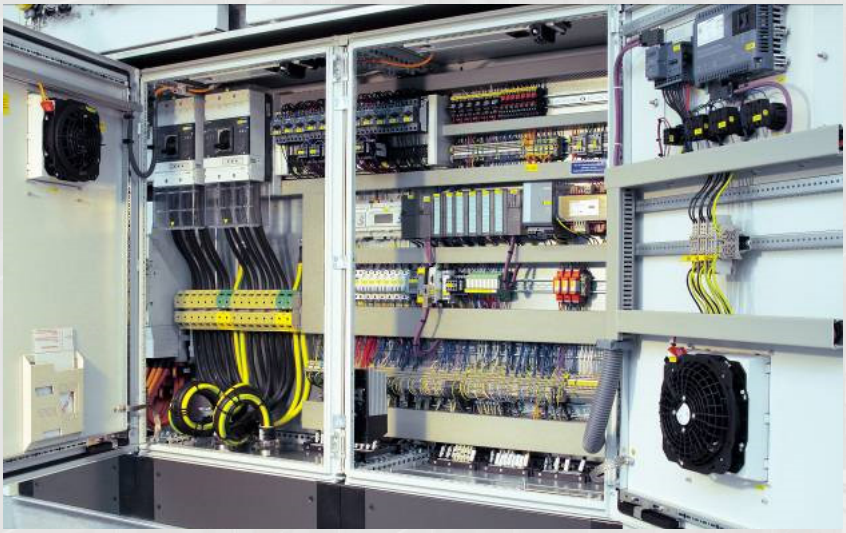
Variability / Engineering:

- Custom made heat pumps, chillers, special applications
- Special heat exchanger materials for various mediums
- Position and execution of connections to customer requirement
- CAD construction and CFD simulation
- Adapted design for replacement or special insertion



Precision / Electric Design:

- Electrical cabinet attuned to all components and accessories
- Control by Programmable Logic Controller
- Data input and output via touch panel
- Extensive visualization of refrigeration circuit and periphery
- All common communication protocols like Modbus, Profibus and BACNet



Extensive / Accessories:

- Additional equipment like pumps, valves, sensors, buffer vessels
- Integrated on the machine or supplied separately
- Adaption of the frame size to special conditions
- Sound isolating and weather proofed housing
- Container installation or truck mounted aggregate

The Components

- **Compressor:** Semi-hermetic compact screw compressors, delivery volumes 140 to 1100 m^3/h, with 4-stepped or continuously variable power control.
  All Compressors with special refrigerant oil and comprehensive oil management (oil separator, oil level monitoring, and oil heater), check valve, integrated protection device, shut-off valves, vibration dampers, start unloading.
- **Evaporator and condenser:** Stainless steel plate heat exchanger for small refrigerant filling quantity and low temperature difference for efficient operation. Tube and shell heat exchanger for high capacity, 1 up to 4 refrigerant circuits in one device, inspection opening for cleaning.
- **Pump:** Electronic in-line pumps with integrated frequency converter, with piping and all necessary attachments such as flow monitor, strainer, stop valve, check valve and sensors.
- **Expansion Valve:** Electromagnetic expansion valve for optimal refrigerant injection in the evaporator.

- **Controller:** Control of the unit by electronic PLC regulation via Touch Panel for visualization of refrigeration cycle, duty point, limitations of use, temperatures, pressures, and clear text fault messages in case of malfunctions. Periphery control. Communication protocol and remote control on demand.
- **Electrical control cabinet:** Panels according to industrial standards, including all switches and safety components as well as wiring.
- **Refrigeration Accessories:** High and low pressure switches, suction gas/ condensation heat exchanger, refrigeration piping within the unit including refrigeration accessories such as filter dryer, inspection glass, refrigerant collector with inspection glass and shut-off valve, refrigerant filling.
- **Frame:** All units are built on stable profile frame with vibration dampers.
- **Attachment:** Sound absorbing and weather proofed housing, capacity control by frequency converter, additional compressor cooling, individual coat of lacquer, collection tray.

Performance Data

HWW R134a series with piston compressor up to 75 °C

Heat Pump	Cooling Capacity	Heating Capacity	Power Input	Heat Pump	Cooling Capacity	Heating Capacity	Power Input
Type	kW	kW	kW	Type	kW	kW	kW
HWW 50 R134a	14	17	3.5	HWW 2/50 R134a	28	34	7.0
HWW 60 R134a	18	22	4.5	HWW 2/60 R134a	36	43	9.0
HWW 70 R134a	22	26	5.3	HWW 2/70 R134a	43	52	10.5
HWW 90 R134a	26	32	6.5	HWW 2/90 R134a	53	64	12.9
HWW 100 R134a	28	33	6.4	HWW 2/100 R134a	55	66	12.8
HWW 120 R134a	33	40	7.9	HWW 2/120 R134a	67	80	15.8
HWW 150 R134a	38	46	8.9	HWW 2/150 R134a	77	92	17.8
HWW 200 R134a	45	54	10.6	HWW 2/200 R134a	91	109	21.3
HWW 220 R134a	50	60	11.6	HWW 2/220 R134a	101	120	23.2
HWW 250 R134a	60	71	13.8	HWW 2/250 R134a	120	143	27.6
HWW 300 R134a	70	83	16.2	HWW 2/300 R134a	139	167	32.4
HWW 330 R134a	77	92	17.7	HWW 2/330 R134a	154	184	35.3
HWW 350 R134a	89	106	20.9	HWW 2/350 R134a	177	213	41.8
HWW 400 R134a	102	123	24.9	HWW 2/400 R134a	204	246	49.8
HWW 500 R134a	121	146	29.6	HWW 2/500 R134a	242	292	59.2

HWW R134a series with screw compressor up to 65 °C

Heat Pump	Cooling Capacity	Heating Capacity	Power Input	Heat Pump	Cooling Capacity	Heating Capacity	Power Input
Type	kW	kW	kW	Type	kW	kW	kW
HWW 6553 R134a	110	132	25.9	HWW 2/6553 R134a	221	264	51.8
HWW 6563 R134a	138	165	32.1	HWW 2/6563 R134a	277	331	64.2
HWW 7553 R134a	162	194	37.8	HWW 2/7553 R134a	325	388	75.6
HWW 7563 R134a	187	223	42.9	HWW 2/7563 R134a	373	445	85.8
HWW 7573 R134a	214	255	48.7	HWW 2/7573 R134a	428	510	97.4
HWW 7583 R134a	248	296	56.9	HWW 2/7583 R134a	496	592	113.8
HWW 7593 R134a	283	337	64.6	HWW 2/7593 R134a	566	674	129.2
HWW 8553 R134a	266	316	59.9	HWW 2/8553 R134a	532	632	119.8
HWW 8563 R134a	303	360	68.3	HWW 2/8563 R134a	606	720	136.6
HWW 8573 R134a	349	414	78.0	HWW 2/8573 R134a	698	828	156.0
HWW 8583 R134a	383	457	87.7	HWW 2/8583 R134a	766	913	175.4
HWW 8593 R134a	447	530	99.0	HWW 2/8593 R134a	894	1059	198.0
HWW 9553 R134a	446	527	97.8	HWW 2/9553 R134a	892	1055	195.6
HWW 9563 R134a	520	614	112.7	HWW 2/9563 R134a	1040	1227	225.4
HWW 9573 R134a	602	710	130.2	HWW 2/9573 R134a	1204	1420	260.4
HWW 9583 R134a	692	812	144.8	HWW 2/9583 R134a	1384	1623	289.6
HWW 9593 R134a	800	935	163.7	HWW 2/9593 R134a	1600	1870	327.4
HWW 95103 R134a	867	1031	196.3	HWW 2/95103 R134a	1734	2063	392.6

Data valid for:

R134a

Hot Water IN/OUT: 45/50 °C
Heat Source IN/OUT: 20/15 °C

HWW R1234ze series with screw compressor up to 95 °C

Heat Pump	Cooling Capacity	Heating Capacity	Power Input	Heat Pump	Cooling Capacity	Heating Capacity	Power Input
Type	kW	kW	kW	Type	kW	kW	kW
HWW 6553 R1234a	69	85	18.9	HWW 2/6553 R1234a	138	171	37.8
HWW 6563 R1234a	86	107	23.6	HWW 2/6563 R1234a	173	213	47.2
HWW 7553 R1234a	99	123	27.9	HWW 2/7553 R1234a	197	245	55.8
HWW 7563 R1234a	116	144	32.2	HWW 2/7563 R1234a	232	288	64.4
HWW 7573 R1234a	134	165	36.6	HWW 2/7573 R1234a	267	330	73.2
HWW 7583 R1234a	155	190	41.6	HWW 2/7583 R1234a	309	381	83.2
HWW 7593 R1234a	176	217	47.3	HWW 2/7593 R1234a	352	434	94.6
HWW 8553 R1234a	163	201	43.7	HWW 2/8553 R1234a	327	402	87.4
HWW 8563 R1234a	188	231	49.9	HWW 2/8563 R1234a	376	462	99.8
HWW 8573 R1234a	219	267	56.6	HWW 2/8573 R1234a	438	535	113.2
HWW 8583 R1234a	242	297	63.7	HWW 2/8583 R1234a	484	593	127.4
HWW 8593 R1234a	276	338	72.5	HWW 2/8593 R1234a	552	676	145.0
HWW 9563 R1234a	321	392	82.9	HWW 2/9563 R1234a	642	784	165.8
HWW 9573 R1234a	378	458	93.9	HWW 2/9573 R1234a	756	915	187.8
HWW 9583 R1234a	435	527	108.7	HWW 2/9583 R1234a	870	1055	217.4
HWW 9593 R1234a	495	599	122.9	HWW 2/9593 R1234a	990	1199	245.8
HWW 95103 R1234a	535	650	135.6	HWW 2/95103 R1234a	1070	1301	271.2

Data valid for:

R1234ze

Hot Water IN/OUT: 45/50 °C
Heat Source IN/OUT: 20/15 °C

HWW R245fa series with screw compressor up to 120 °C

Heat Pump	Cooling Capacity	Heating Capacity	Power Input
Type	kW	kW	kW
HWW 180 R245fa	53	62	11.0
HWW 280 R245fa	77	91	16.7
HWW 340 R245fa	88	105	19.6
HWW 2/180 R245fa	106	125	22.0
HWW 2/280 R245fa	154	182	33.4
HWW 2/340 R245fa	177	210	39.2
HWW 2/440 R245fa	212	252	47.2

Data valid for:

R245fa

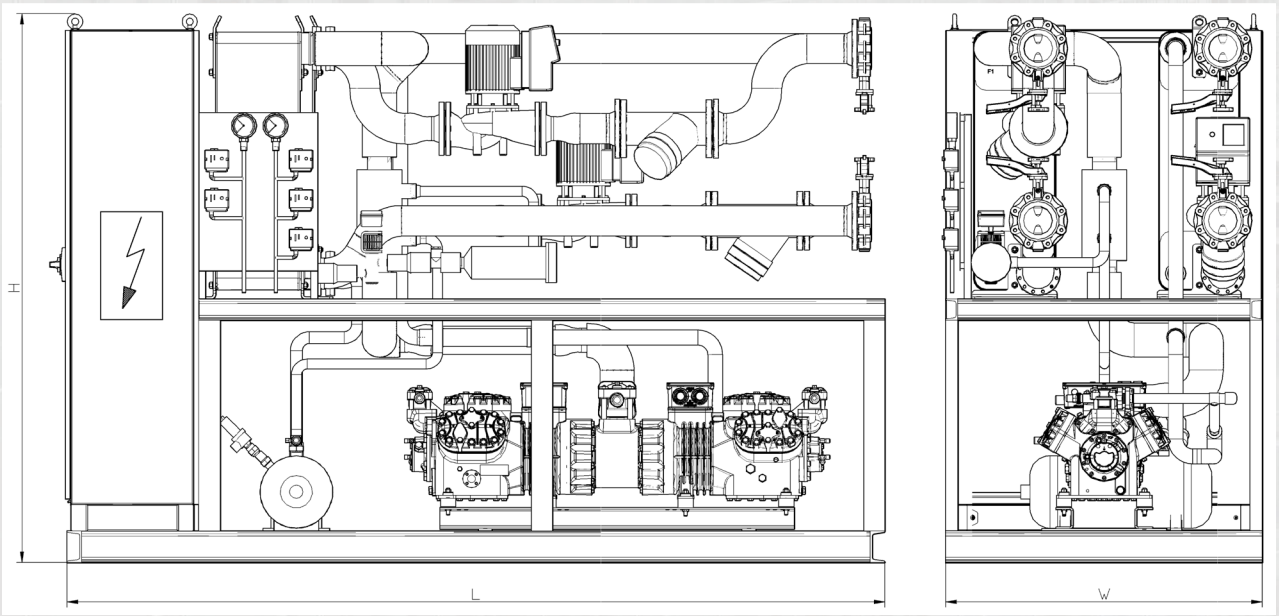
Hot Water IN/OUT: 85/90 °C
Heat Source IN/OUT: 65/60 °C

Multi-Circuit units and special applications can be designed on request.

Dimension

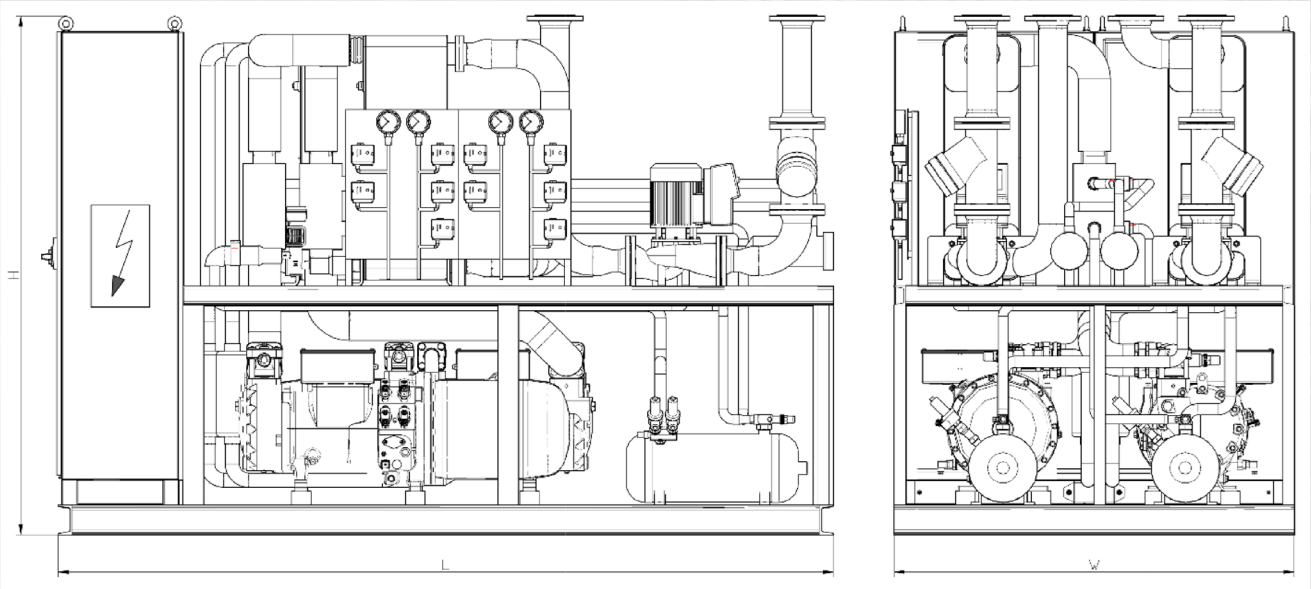
HWW R134a / R245fa series with piston compressor

Heat Pump Type	Length mm	Width mm	Height mm	Weight kg	Heat Pump Type	Length mm	Width mm	Height mm	Weight kg
HWW 50	2400	1000	2000	800	HWW 2/50	2400	1200	2000	1100
HWW 60	2400	1000	2000	900	HWW 2/60	2400	1200	2000	1100
HWW 70	2400	1000	2000	900	HWW 2/70	2400	1200	2000	1100
HWW 90	2400	1000	2000	900	HWW 2/90	2400	1200	2000	1200
HWW 100	2400	1200	2000	1000	HWW 2/100	2400	1200	2000	1300
HWW 120	2600	1200	2100	1000	HWW 2/120	2600	1200	2100	1400
HWW 150	2600	1200	2100	1000	HWW 2/150	2600	1200	2100	1500
HWW 200	2600	1200	2100	1100	HWW 2/200	2600	1200	2100	1500
HWW 220	2600	1200	2100	1200	HWW 2/220	2600	1200	2100	1500
HWW 250	2600	1200	2100	1200	HWW 2/250	2600	1400	2100	1700
HWW 300	2800	1200	2200	1300	HWW 2/300	2800	1400	2200	1800
HWW 330	2800	1200	2200	1300	HWW 2/330	2800	1400	2200	1900
HWW 350	2800	1200	2200	1400	HWW 2/350	2800	1400	2200	1900
HWW 400	2800	1200	2200	1400	HWW 2/400	2800	1400	2200	2000
HWW 500	2800	1200	2200	1500	HWW 2/500	2800	1400	2200	2100



HWW R134a / R1234ze series with screw compressor

Heat Pump Type	Length mm	Width mm	Height mm	Weight kg	Heat Pump Type	Length mm	Width mm	Height mm	Weight kg
HWW 6553	3000	1200	2000	1500	HWW 2/6553	3000	1600	2000	2400
HWW 6563	3100	1200	2000	1600	HWW 2/6563	3100	1600	2000	2400
HWW 7553	3100	1200	2100	1900	HWW 2/7553	3100	1600	2100	3000
HWW 7563	3200	1200	2100	1900	HWW 2/7563	3200	1600	2100	3200
HWW 7573	3200	1200	2100	2000	HWW 2/7573	4200	2000	2100	4000
HWW 7583	3200	1200	2100	2200	HWW 2/7583	4200	2000	2100	4200
HWW 7593	3300	1200	2100	2300	HWW 2/7593	4200	2000	2100	4400
HWW 8553	3300	1200	2100	2500	HWW 2/8553	4200	2000	2100	4800
HWW 8563	3300	1200	2100	2600	HWW 2/8563	4300	2000	2100	5100
HWW 8573	3400	1200	2100	2800	HWW 2/8573	4500	2000	2100	5300
HWW 8583	3500	1200	2100	2900	HWW 2/8583	4700	2000	2100	5600
HWW 8593	4000	2000	2100	3600	HWW 2/8593	4900	2000	2100	6300
HWW 9553	4000	2000	2200	4000	HWW 2/9553	4900	2000	2200	7200
HWW 9563	4000	2000	2200	4200	HWW 2/9563	4900	2000	2200	7400
HWW 9573	4100	2000	2200	4500	HWW 2/9573	4900	2000	2200	7800
HWW 9583	4100	2000	2200	4800	HWW 2/9583	4900	2000	2200	8500
HWW 9593	4400	2000	2200	5100	HWW 2/9593	4900	2000	2200	9800
HWW 95103	4600	2000	2200	5200	HWW 2/95103	4900	2000	2200	9800



Hotel and Residential

Single-circuit high temperature heat pump with screw compressor

Geothermal Energy

Multi-circuit high temperature heat pump with piston compressor (2 pcs)

Electroplating

Multi-circuit high temperature heat pump with piston compressor (8 pcs)

Your Application Solutions

All heat pumps made by Combitherm GmbH and constructed specifically for a project and according to customer desires. Thus a wide variety of applications can be implemented and integrated into new or existing designs.

- Brewery and malt house
  - Wort preparation
  - Drum and bottle cleaning
  - Malt drying
- Dairy
  - Container sterilisation
- Sugar production
  - Boiling process for making syrups
  - Thickening
- Food manufacture
  - Boiling processes
  - Grain and fodder drying
- Paper production
  - Pulp drying
- Textile processing
  - Finishing polyester
- Processing technology
  - Reclaiming of cleaning solutions
  - Metal processing
- Electroplating
  - Immersion bath
- Glass, ceramics and stone industry
  - Brick drying
  - Ceramic drying
- Energy
  - Geothermal energy
  - Long-distance heating
  - Combined heat and power plants
- Residential areas, hotel and gastronomy
  - Hot and cold-water preparation

INTELLIGENT SOLUTIONS IN STEAM, AIR AND HOT WATER

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