Johnson Controls

YORK

Heat Pumps

YCPB Large Packaged Air-to-Water Scroll Heat Pump

Maximize heating with renewable energy and a wider operating envelope

johnsoncontrols.com

The power behind **your mission**

Dedicated design for low ambient heating solutions

A new generation of Ecodesign compliant air-to-water heat pumps

Specifically designed as a low ambient heating solution, the new YCPB heat pump provides maximum heating with a wider operating range, thanks to the advanced large scroll compressors with Enhanced Vapor Injection (EVI) technology. In cold climates the YCPB has an improved heating capacity down to -25°C. In addition, the unit can produce hot water up to 60°C at full load and up to 62°C when operating at part load, allowing it to cover more applications across an extended ambient range.

Its high-level heating SCOP leads the market without compromising the operation and efficiency of the cooling mode. This high performance is achieved through innovation, optimizing and combining only the best components, which translates into significant energy savings throughout the useful life of the heat pump.

The YCPB can be supplied as a 2-pipe system for typical reversible cooling and heating and as a 4-pipe version for simultaneous heating and cooling to meet full-year demand.

YCPB Air-to-Water EVI Scroll Heat Pump

303 to 890 kW* | R454B

YCPB has a dual refrigerant circuit design. Each equipped with industry-leading high efficiency enhanced vapor injection system, super-efficient quiet fans, YORK® expertise heat exchanger and JCI smart control platform. These core technologies deliver next level efficiency and heating capability to set the new benchmark for the industry.

High performance | Innovative technology | High confidence | Wide operation range | Sustainability

* Values corresponds to the 4-Pipe heating capacity range

Innovative technology

The YORK® YCPB uses an array of advanced technologies to deliver higher temperature, optimized efficiency and reliable operation.

4-way reversing valve

Specifically designed for large capacity heat pumps. This valve brings an extremely low refrigerant pressure drop thanks to a unique dual liquid channels design.

Filter dryer

Perfect protection of the system by removing contaminants and moisture from the refrigerant.

High-efficiency economizer

High-efficiency economizer boosts capacity, improves system efficiency and reduces operating costs.

Suction accumulator and R454B low GWP refrigerant

Optimized for R454B with less refrigerant charging.

Super-efficient quiet fans

New Johnson Controls patented bionic design for low noise and high efficiency. Greatly improves unit efficiency and reduces noise level at all configurations, maintaining optimum head pressure.

Cu tube & Al fin ambient coil

Specifically designed for heat pumps and optimized for high efficiency in heating and cooling mode. Hydrophilic coating as standard to shed water during defrost, provide corrosion resistance, improve airflow and overall optimize heat exchange efficiency.

Electronic expansion valve

Precise positioning for optimal control of refrigerant.

Intelligent control

Leveraging technology and expertise from YORK and Johnson Controls, the YCPB is equipped with our own uniquely powerful microprocess controller and easy-to-use HMI.

VSD fan (optional)

Increased efficiency and sound performance at partial load.

Large EVI scroll compressors Tandem/Trio design

Dual circuits with Tandem/Trio configuration advanced large scroll compressors with EVI & IDVs technologies for high temperature applications and low ambient operations.

YCPB Applications

2-Pipe system

For typical reversible cooling and heating.

Ideal applications:

- Comfort cooling and heating for shopping centers, hospitals, hotels, office buildings, schools, etc.
- Process cooling and heating

4-Pipe system

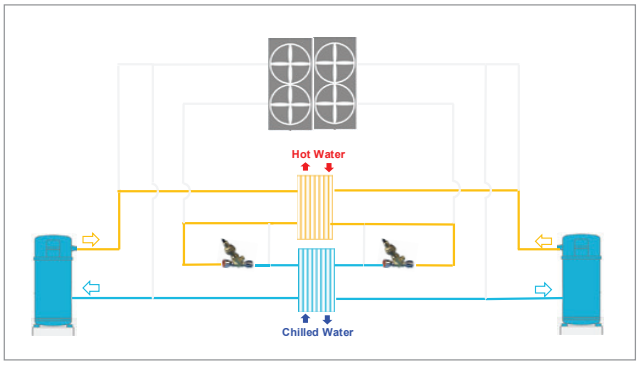
Designed for year-round simultaneous heating and cooling, with multiple operation modes tailored to project needs.

Ideal applications:

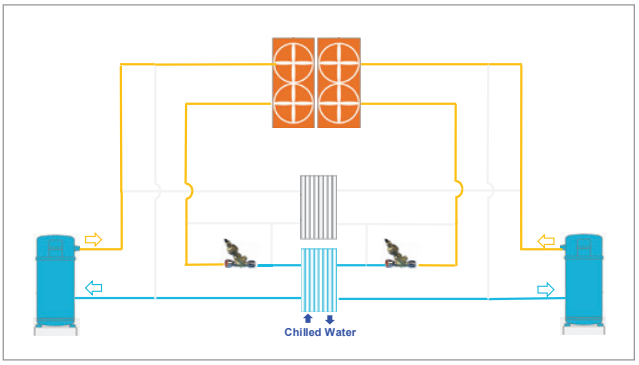
- Comfort cooling and heating for shopping centers, hospitals, hotels, office buildings, schools, etc.
- Process cooling and heating

The system ensures both hot and chilled water are available on demand and supports the following combinations:

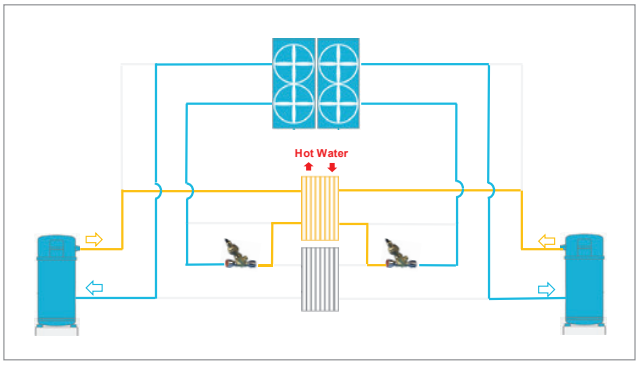
Simultaneous full-capacity heating and cooling
100% Cooling + 100% Heating



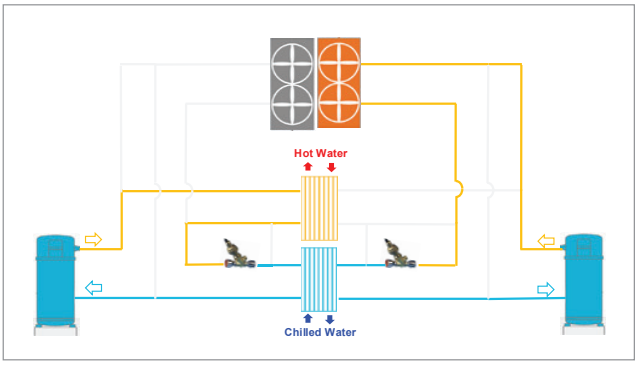
Cooling only
100% Cooling + 0% Heating

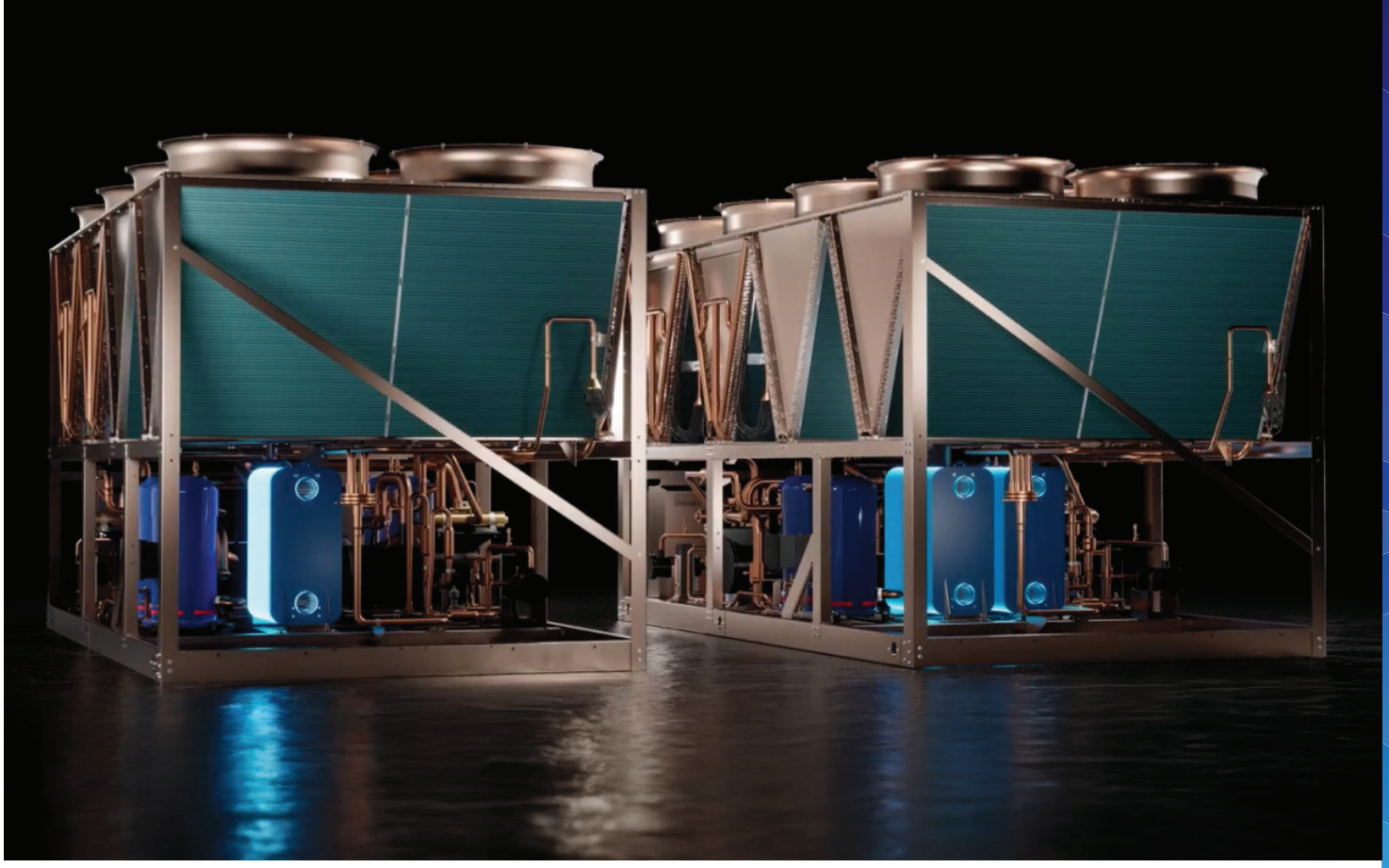


Heating only
0% Cooling + 100% Heating

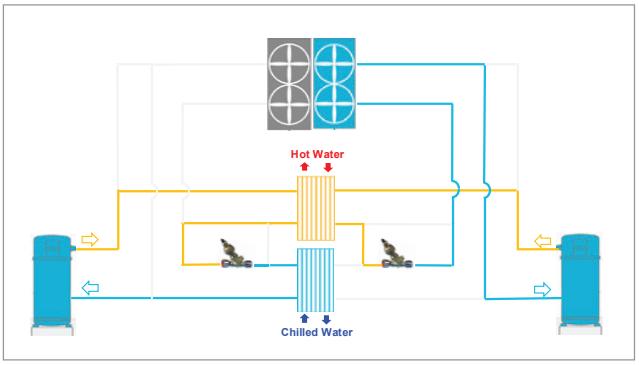


100% cooling and 50% heating
with 50% air rejection

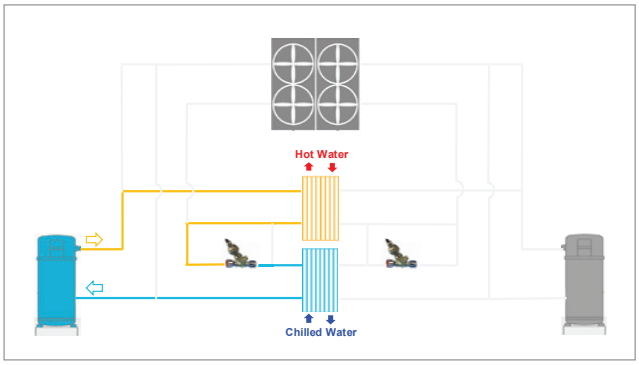




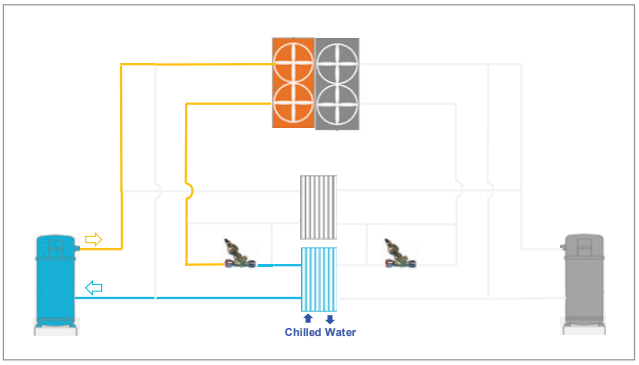
100% heating and 50% cooling
with 50% air rejection



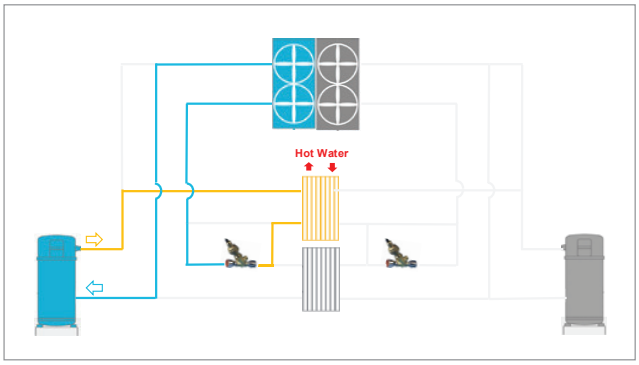
50% Cooling and 50% Heating



50% cooling and 0% heating



50% heating and 0% cooling



High performance without compromise

Advanced large scroll compressor with EVI & IDVs

- Dedicated heat pump for high temperature or low ambient operations.
- New large Scroll integrated with Enhanced Vapor Injection (EVI) & IDVs technologies.
- Extended envelop ensures heating capacity and efficiency at low ambient.
- Dual circuits with Tandem/Trio compressors, well balance full load and part load at all configurations.
- Optimized for R454B.

Enhanced Vapor Injection (EVI)

- Optimized refrigeration cycle with economizer

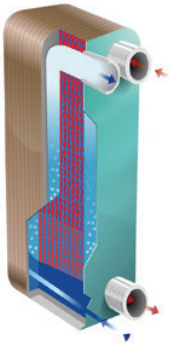
Intermediate Discharge Valves (IDVs)

- Improved compressor efficiency at part load.

High efficiency heat exchangers

Specifically designed for heat pumps and optimized for high efficiency in heating and cooling mode.

Refrigerant-to-water heat exchanger



- Unique features to boost unit performance:
  - Flexible refrigerant distribution system
  - Superior thermal performance
  - Controlled, non-destructive freezing
  - Unparalleled strength for high demands
- Heating counterflow design to remarkably improve heating efficiency.
- Optimized for R454B with less refrigerant charge.
- A weight savings of 10-15% - less structural steel required in the building, lower crane costs.
- Proven reliability.

Ambient coils

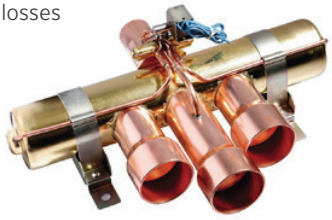
- Johnson Controls design expertise:
  - Maximizes the coil face area in a given footprint.
  - Minimizes the efficiency losses seen on long longitudinal coils.
  - Enhances free flow of air to the coils.
- Smaller 7mm diameter tubes:
  - Improved effective heat transfer area on the refrigerant and air sides.
  - Reduces the air side pressure drop.
- Standard hydrophilic fins:
  - Reduce surface tension to shed condensed water more efficiently

Super-efficient quiet fans

- New Johnson Controls patented bionic design for low noise and high efficiency. Compared to typical fan on the market:
  - Sound power level reduces 4-5 dBA
  - Fan efficiency improves 9-10%
- Greatly improved unit efficiency and reduced noise level at all configurations, maintaining optimum head pressure while minimizing the airflow by using the full coil surface area

Advanced 4-way reversing valve

- Specifically designed for large capacity heat pumps
- Extremely low refrigerant pressure drop thanks to unique dual liquid channels design
- Minimized heat conduction losses
- High reliability



Dual effect distributor configuration

- Patented liquid distribution components to maximize performance and minimize the impact of defrosting

Primary distributor - Johnson Controls Patent

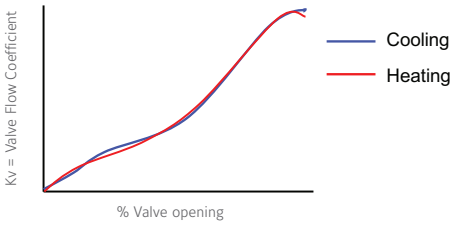
- Exceptional liquid distribution between ambient coils modules

Secondary distributors - Johnson Controls Design

- Even liquid distribution across the ambient coil in each tube

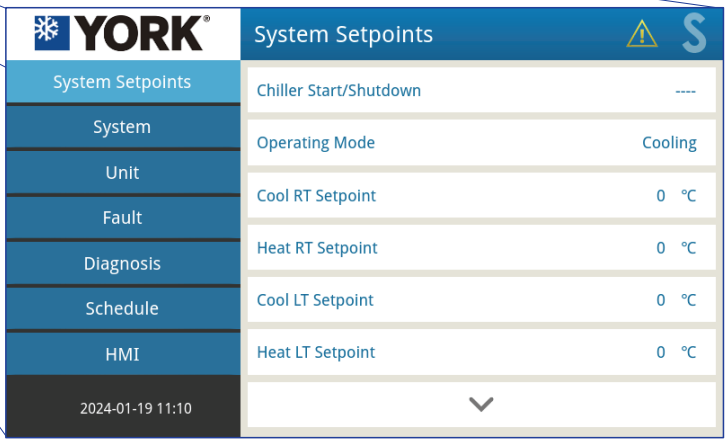
Precise electronic expansion valve (EEV) control

- Precise positioning for optimal control of refrigerant
- Two-way (cooling & heating) peer-to-peer flow curve



- Optimizes efficiency & performance
- Outstanding performance in low ambient environment and defrosting cycle

Next generation YORK JCI intelligent control



- Leveraging YORK and Johnson Controls technology & 'know-how'
- Powerful microprocess controller & user-friendly HMI
- Auto adaptive and optimizes defrost cycle
  - Defrost only when needed

Straight-forward installation

- Designed with simple "plug-and-play" mindset.
- Ready with Modbus/BACnet protocol and can be quickly integrated into a Building Automation System (BAS).
- Compact footprint, competitive in the industry.
- Full support from Johnson Controls during the commissioning period.

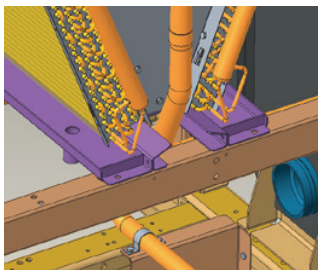
Peace of mind service

Manual defrost

- Dedicated manual defrost mode independent of the normal cooling and heating modes.
- Convenient for service operations.

Defrost tray (option)

- Collects defrost meltwater for treatment before draining.
- A heater is installed as default to prevent freezin in cold climate.
- Avoid ice slipping and safety for service technicians.



Fan cycling during "off cycle"

- Beneficial for regions with heavy snow in winter.
- Prevent snow buildup on the fans to avoid catastrophic fan and outdoor coil failures.

Dedicated to sustainability

At Johnson Controls, we are dedicated to protecting the environment. This goes back to our founder, Warren S. Johnson, and his invention of the electric thermostat in 1885. It sparked a fundamental shift in the energy efficiency of buildings. Now, all over the world, our products and services empower customers and communities to consume less energy and conserve resources.

The European 2050 Vision towards a low-carbon economy is targeting a reduction of 80 to 95 percent in greenhouse gas emissions by looking at the reduction of the three parameters in the graphic compared to 1990 values.

EU energy efficiency improvement targets also strongly influence the HVAC market. Buildings are the largest consumers of energy today, and HVAC systems account for a significant portion of a building's energy consumption. This is why the HVAC industry is a focus of European environmental policies. The F-Gas regulation addresses direct emissions while EPBD, Ecodesign, and RES are directives focused on indirect greenhouse gas emissions by improving the efficiency of HVAC systems and buildings.

With a low GWP of just 466 and zero ODP, the R454B refrigerant belongs in the HFO class, which eliminates ODP and reduces GWP.

The YORK® YCPB Air-to-Water EVI Scroll Heat Pump with R454B refrigerant complies with the HFC phase-down plan to reduce greenhouse gas emissions. The physical properties of R454B are similar to the R410A refrigerant and most of the components designed for R410A can be used with R454B.

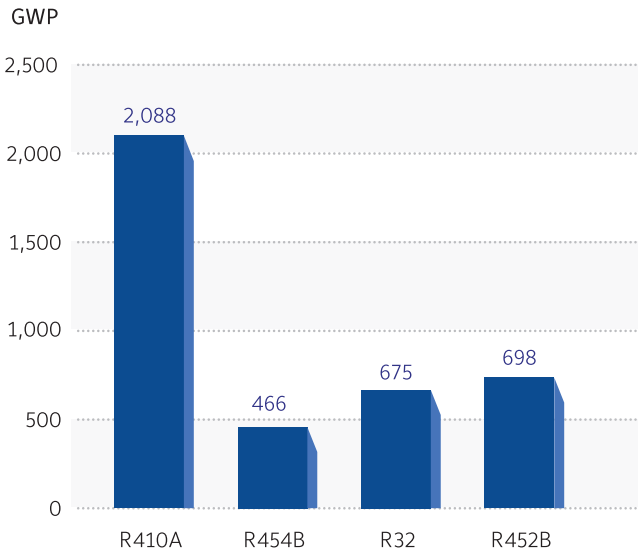
This new range uses 10% less refrigerant compared to products that use R410A. In addition, it will maximize the use of existing components to cut waste. This heat pump is an eco-friendly offering whose operations work to protect our environment.

Want to know more about transitioning to low-GWP refrigerants?
Scan the QR code or visit:
www.johnsoncontrols.com/building-insights/2020/white-paper/making-the-refrigerant-transition

Safe and reliable
Toxicity and flammability must be addressed for all refrigerant options. Systems must be designed for new refrigerants and undergo long-term testing.

Efficient and sustainable
Future refrigerant choices must present equal or better overall performance values than current refrigerants. Energy efficiency is the ultimate priority to reduce the carbon footprint of HVAC products.

Available and affordable
Local availability at a reasonable cost is critical for building owners' bottom line.



R454B

78% lower GWP than R410A
31% lower GWP than R32
10% less charge than R410A

Safety is our priority

The YORK® YCPB Air-to-Water EVI Scroll Heat Pump is designed for safe operation. The new R454B refrigerant was chosen with safety and low toxicity in mind.

R454B has a 78% lower GWP value in comparison to R410A and is classified in safety class A2L (non-toxic and difficult to ignite).

To maximise safety, the system design has been verified by a third-party certification body to increase customer peace of mind. The customized components, together with our advanced technology, give absolute confidence.

Flammability	Refrigerant Safety Groups	
Higher	A3	B3
Lower	A2	B2
Difficult to Ignite and Sustain	A2L	B2L
No Flame Propagation	A1	B1
	Lower	Higher
	No identified toxicity at concentrations ≤ 400 ppm	Evidence of toxicity below 400 ppm
	Toxicity	

Source: ASHRAE Standard 34 Safety Classification

Advanced large scroll compressors with Enhanced Vapor Injection (EVI) & IDVs technologies

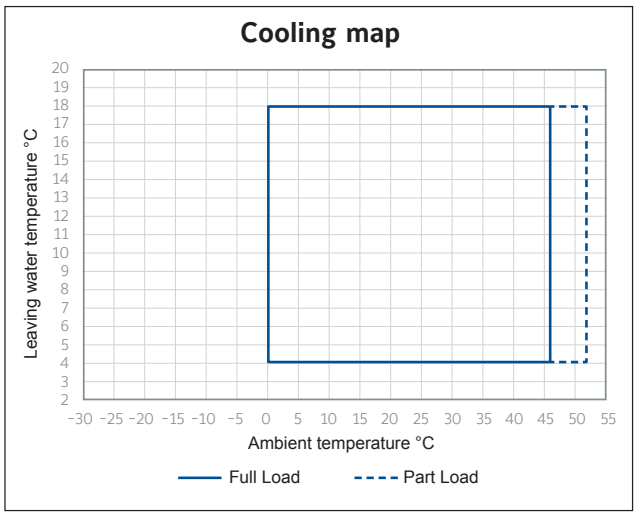
Heat exchangers specifically designed and optimized for high efficiency in heating and cooling modes

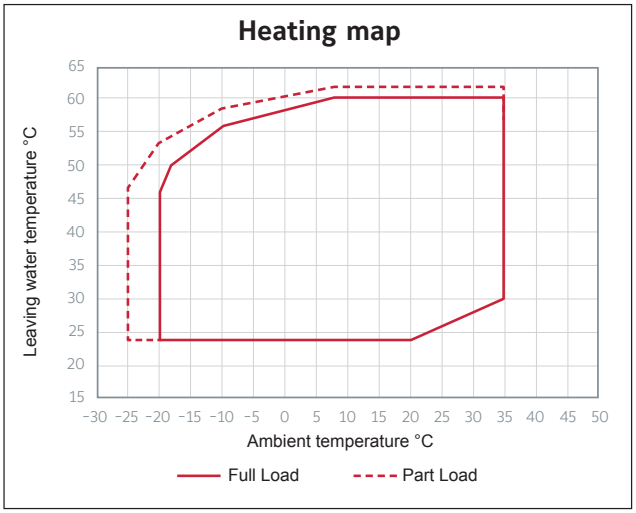
Super-efficient quiet fans with patented bionic design for low noise and high efficiency

Advanced 4-way reversing valve specifically designed for large capacity heat pumps

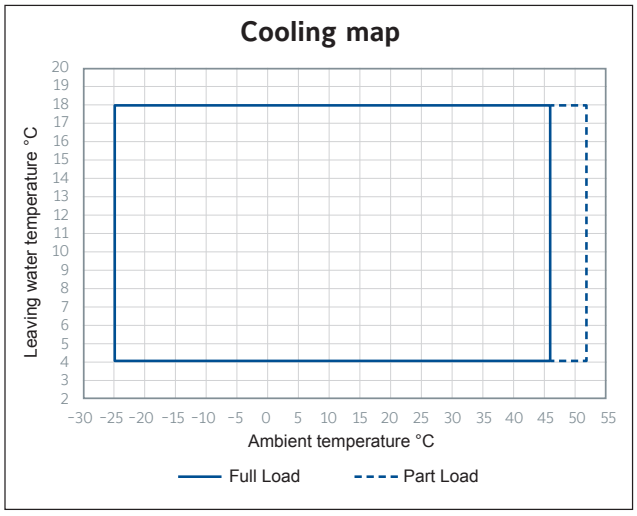
YCPB operating range

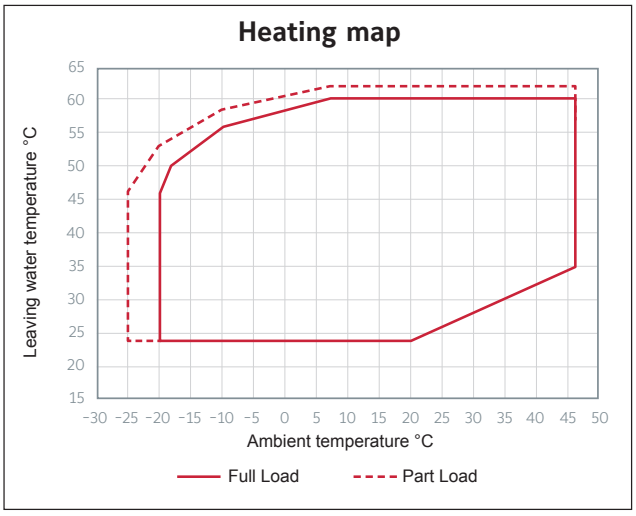
Standard efficiency (with fixed-speed fans)





High efficiency (with VSD fans)





Technical features 2-pipe system

YCPB Standard Efficiency, 2-Pipe			0320S	0420S	0460S	0520S	0600S	0690S	0770S
Cooling	Cooling Capacity	kW	274.8	364.3	406.5	448.8	512.4	590.1	674.2
	EER		2.89	2.98	2.96	2.99	2.73	2.85	2.98
	SEER		4.02	4.01	4.01	4.04	4.13	4.15	4.13
	ηs,c		157.6	157.3	157.5	158.7	162.3	163.1	162.2
Heating	Heating Capacity	kW	305.1	405.9	449	506.7	586.1	672.9	755.8
	COP		3.39	3.37	3.30	3.31	3.27	3.32	3.34
	SCOP		3.81	3.83	3.81	3.74	3.74	3.73	3.71
	ηs,h		149.2	150	149.2	146.7	146.5	146.1	145.5
Sound power level		dB(A)	91.5	92	93	92.5	95	94.5	94
Refrigerant	Type		R454B						
	Circuit quantity	#	2	2	2	2	2	2	2
	Refrigerant charge circuit 1 / 2	kg	36/36	54/36	54/46	54/54	68/68	83/68	86/86
Compressor	Type		Scroll EVI system						
	Quantity	#	2/2	2/2	2/2	2/2	3/3	3/3	3/3
Air side heat exchanger	Fan quantity circuit 1 / 2		2/2	4/2	4/3	4/4	4/4	6/4	6/6
	Total air flow (standard fans)	m^3/s	23	34	40	46	46	57	68
Water side heat exchanger	Type		Brazed plate heat exchanger						
	Quantity	#	1	1	1	1	1	1	1
	Water volume	l	40	47	58	60	69	71	80
	Water connections	inches	4	4	4	4	4	5	5
Electrical features	Power supply		400V-3Ph-50Hz						
Dimensions	Length	mm	3703	3703	4820	4820	4820	5937	7054
	Width	mm	2242	2242	2242	2242	2242	2242	2242
	Height	mm	2450	2450	2450	2450	2450	2450	2450
Weight	Shipping weight	kg	2617	3026	3587	3693	4184	4679	5375
	Operating weight	kg	2657	3073	3667	3775	4254	4788	5455

YCPB High Efficiency, 2-Pipe			0320H	0420H	0460H	0520H	0600H	0690H	0770H
Cooling	Cooling Capacity	kW	274.8	364.3	406.5	448.8	512.4	590.1	674.2
	EER		2.89	2.98	2.96	2.99	2.73	2.85	2.98
	SEER		4.22	4.26	4.21	4.21	4.43	4.55	4.55
	ηs,c		165.7	167.3	165.2	165.3	174.1	179	179.1
Heating	Heating Capacity	kW	305.1	405.9	449	506.7	586.1	672.9	755.8
	COP		3.39	3.37	3.30	3.31	3.27	3.32	3.34
	SCOP		4.10	4.16	4.14	4.04	4.28	4.32	4.33
	ηs,h		160.8	163.2	162.4	158.5	168.1	169.8	170.3
Sound power level		dB(A)	91.5	92	93	92.5	95	94.5	94
Refrigerant	Type		R454B						
	Circuit quantity	#	2	2	2	2	2	2	2
	Refrigerant charge circuit 1 / 2	kg	36/36	54/36	54/46	54/54	68/68	83/68	86/86
Compressor	Type		Scroll EVI system						
	Quantity	#	2/2	2/2	2/2	2/2	3/3	3/3	3/3
Air side heat exchanger	Fan quantity circuit 1 / 2		2/2	4/2	4/3	4/4	4/4	6/4	6/6
	Total air flow (standard fans)	m^3/s	23	34	40	46	46	57	68
Water side heat exchanger	Type		Brazed plate heat exchanger						
	Quantity	#	1	1	1	1	1	1	1
	Water volume	l	40	47	58	60	69	71	80
	Water connections	inches	4	4	4	4	4	5	5
Electrical features	Power supply		400V-3Ph-50Hz						
Dimensions	Length	mm	3703	3703	4820	4820	4820	5937	7054
	Width	mm	2242	2242	2242	2242	2242	2242	2242
	Height	mm	2450	2450	2450	2450	2450	2450	2450
Weight	Shipping weight	kg	2681	3093	3657	3763	4254	4749	5445
	Operating weight	kg	2721	3140	3737	3845	4324	4858	5525

1. Net values at Eurovent nominal conditions:
   - Cooling capacities in kW given for 7°C leaving water temperature, 12°C entering water temperature and 35°C ambient temperature.
   - Heating capacities in kW given for 45°C leaving water temperature, 40°C entering water temperature and 7°C ambient temperature.
   - SEER and SCOP are calculated according to EN14511 and EN14825.
   - ηs is calculated according to Ecodesign regulation for chillers comfort cooling and heating (813/2013, 2016/2281)
2. Ecodesign figures are calculated following variable water and variable outlet approach (VW/VO). For other Ecodesign calculations, please contact your JCI representative
3. Sound data is tested according to ISO9614. The sound values are taking into account the "Acoustic Blanket" option.

Technical features 4-pipe system

YCPB High Efficiency, 4-Pipe			0320H-S	0420H-S	0460H-S	0520H-S	0600H-S	0690H-S	0770H-S
Cooling	Cooling Capacity	kW	282.8	370.3	415.0	457.2	518	592.6	679.1
	EER		2.98	3.03	3.02	3.04	2.76	2.87	3.01
	SEER		4.33	4.36	4.31	4.31	4.55	4.60	4.66
	ηs,c		170.1	171.5	169.4	169.4	179.1	180.8	183.2
Heating	Heating Capacity	kW	303.6	403.0	445.5	502.3	580.0	664.4	744.7
	COP		3.38	3.35	3.28	3.29	3.24	3.29	3.31
	SCOP		4.10	4.16	4.14	4.04	4.28	4.32	4.33
	ηs,h		160.8	163.2	162.4	158.5	168.1	169.8	170.3
Simultaneous Cooling & Heating	Cooling Capacity	kW	284.1	372.8	417.1	462.5	524.7	602.8	679.1
	Heating Capacity	kW	368.1	485.9	542.8	602.3	694.9	792.5	889.5
	TER		7.69	7.49	7.52	7.49	7.06	7.25	7.34
Sound power level		dB(A)	91.5	92	93	92.5	95	94.5	94
Refrigerant	Type		R454B						
	Circuit quantity	#	2	2	2	2	2	2	2
	Refrigerant charge circuit 1 / 2	kg	36/36	54/36	54/46	54/54	68/68	83/68	86/86
Compressor	Type		Scroll EVI system						
	Quantity	#	2/2	2/2	2/2	2/2	3/3	3/3	3/3
Air side heat exchanger	Fan quantity circuit 1 / 2		2/2	4/2	4/3	4/4	4/4	6/4	6/6
	Total air flow (standard fans)	m^3/s	23	34	40	46	46	57	68
Water side heat exchanger	Type		Brazed plate heat exchanger						
	Quantity	#	2	2	2	2	2	2	2
	Water volume	l	40/40	47/47	58/58	60/60	69/69	71/71	80/80
	Water connections	inches	4/4	4/4	4/4	4/4	4/4	5/5	5/5
Electrical features	Power supply		400V-3Ph-50Hz						
Dimensions	Length	mm	3703	3703	4820	4820	4820	5937	7054
	Width	mm	2242	2242	2242	2242	2242	2242	2242
	Height	mm	2450	2450	2450	2450	2450	2450	2450
Weight	Shipping weight	kg	2925	3363	4001	4126	4598	5129	5858
	Operating weight	kg	3005	3457	4161	4290	4738	5347	6154

1. Net values at Eurovent nominal conditions:
   - Cooling capacities in kW given for 7°C leaving water temperature, 12°C entering water temperature and 35°C ambient temperature.
   - Heating capacities in kW given for 45°C leaving water temperature, 40°C entering water temperature and 7°C ambient temperature.
   - Simultaneous cooling & heating capacities in kW given for 7°C leaving chilled water temperature, 12°C entering chilled water temperature and 45°C leaving hot water temperature, 40°C entering hot water temperature.
   - SEER and SCOP are calculated according to EN14511 and EN14825.
   - ηs is calculated according to Ecodesign regulation for chillers comfort cooling and heating (813/2013, 2016/2281)
2. Ecodesign figures are calculated following variable water and variable outlet approach (VW/VO). For other Ecodesign calculations, please contact your JCI representative
3. Sound data is tested according to ISO9614. The sound values are taking into account the "Acoustic Blanket" option.