



ORYX
HEAT PUMP

AIR TO WATER

ORYX heating technologies are considered as a leading supplier of heat pumps systems and solutions for different and various types of commercial and residential projects. **ORYX** is the heat pump brand being manufactured under the umbrella of the leading heat energy technologies group **APAYDIN ISITMA VE ENERJİ SİSTEMLERİ SAN. TİC.LTD.ŞTİ.** Turkey. The group and its subsidiaries has gained the trust of its clients for more than 35 years in which all the products are strictly manufactured and supplied following the most recent European standards.

Demand for heat energy especially domestic water heating/ cooling is increasing significantly, which makes it very difficult for classic heating systems to cover the sector needs efficiently as they propose major issues and concerns about energy sustainability, cost-effectiveness and environment pollution.

THANKS to **ORYX** Heating Technology which omit all those concerns by introducing the most recent heat pump systems that are considered environment friendly, operational cost effective with higher efficiency!



SAVING ENVIRONMENT IS SAVING THE WORLD!



The massive increase of environment pollution and Global Warming phenomenon has put a huge responsibility on heat energy developers. At **ORYX**, we take this into account by producing a very low that can reach up to zero. CO₂ emissions heat pumps. In addition, ORYX heat pump hybrid systems can be accompanied with other energy sources such as solar collectors to better enhance the system.

SUSTAINABILITY, A MAJOR CONCERN!



The world is moving towards sustainable energy sources and equipment that lower the dependence on fossil fuels and achieve highly energy-efficient systems. At **ORYX** heating technologies, we supply you with renewable energy resources that help you to cover your heating/ cooling requirements using free sources of energy and save your money!

STAY EFFICIENT



ORYX heat pumps provide you with 100% efficient heat recovery with up to 80% free of charge. This is because we use natural resources such as air and water to drag your heat needs. Thanks to our nice nature that keeps heat for us. **ORYX** heat pumps can heat up to more than five times efficiently as traditional heating system can heat. Alongside their classic application as heat generators on cold days, they can also create a pleasant interior in summer by bringing refreshing cool air into the house.

ECONOMICAL BEST SOLUTION



ORYX heat pumps require a low installation cost with less system complexities and accessories. In addition, **ORYX** heat pumps require minimal maintenance cost as well with compared to other heating methodologies such as electric heaters. The EVI compressor technology adapted by **ORYX** heat pumps and the implementation of new inverter technology will optimize your energy consumption and lower your utility running cost. As a result, your ROI will be sooner than you ever expect!



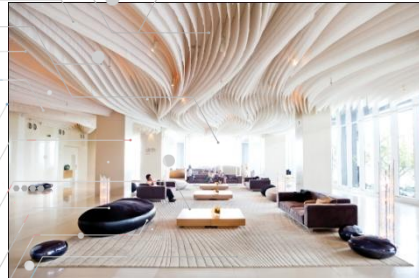
WIDE RANGE APPLICATION

ORYX offers reliable solutions for hotel applications. The system generates efficiently hot water in both heating and cooling modes.

HOTELS

20° to 60°C

- Sanitary
- Kitchen
- Laundry



GYM/ HEALTH CLUB

30° to 60°C

- Swimming Pool
- Steam Bath
- Shower



ORYX easily provides heating and cooling to large number of rooms of different sizes. Cover high load requirements effectively.

ORYX offers reliable solutions for schools and dormitories applications. It can handle load fluctuation easily.

SCHOOLS/ DORMITORY

55° to 60°C

- Sanitary



ORYX AIR TO WATER HEAT PUMP

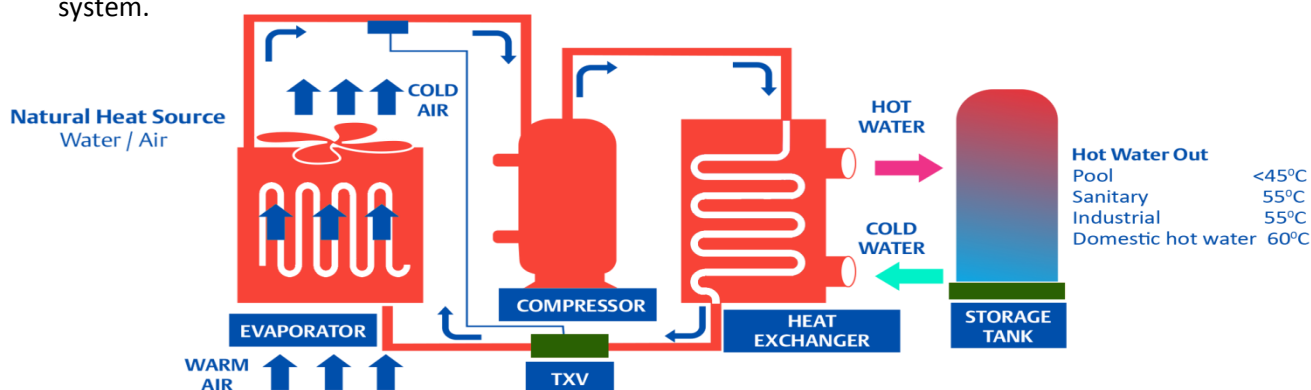
A heat pump is a device that transfers heat from a lower temperature medium to a higher temperature medium with the assistance of a power source. Basically, a heat pump operates in a similar manner as the air conditioner does, but in reverse

Heat pump thermal Cycle

A Heat pump comprises a refrigerant circuit, filled with a special fluid (refrigerant). Depending on the temperature and pressure operating conditions in which it is working, will be in either a gaseous or liquid state. The refrigerant circuit consists mainly:

No.	Equipment	Task	Energy	Pressure	Temp.	Physical Phase
1	Compressor	Compress Refrigerant/ Heat Exchanger	Thermal Energy	High	High	Super Heated
2	Condenser	Phase Transfer/ Heat Exchanger	Thermal Energy	High	Med.	Saturated Liquid
3	Expansion Valve	Lower Pressure	-	Low	Low	Mixed Vapor
4	Evaporator	Phase transfer / Heat Exchanger	Thermal Energy	Low	Med.	Saturated Vapor

The heat pump thermal cycle is best described through the flow of the refrigerant through the prescribed heat pump components. Starting at the discharge side of the compressor, the refrigerant is in a gaseous state, has been compressed and is therefore hot and at high pressure. It passes into the condenser (a coaxial Heat exchanger) where it releases most of its heat. As it cools it changes state (condenses) to a liquid which is warm and at high pressure. This warm liquid refrigerant passes through a pressure reducing device (the electronic expansion valve) as temperature and pressure are directly linked; pressure drop causes the sudden temperature of the refrigerant to plummet. In addition, some of the refrigerant evaporates and the result is a low temperature mix of liquid and gaseous refrigerant that is known as “Flash Gas”. This mixture then passes to another heat exchanger, the evaporator (finned- tube heat exchanger), where the refrigerant, in this gaseous state, passes to the compressor where it is pressurized, heated and circulated back around the system.





NEXT REVOLUTIONARY HEAT PUMP

- **Ecological** : Environmentally friendly refrigerant R410a, CFC free, low CO₂ emission .
- **High Quality**: Partnership with leaders in heating industry.
- **Wide product range**: more than 50 product & system for different fields either residential, commercial or industrial.
- **High Performance**: products are compatible with most recent high standards of European regulations
- **Quality**: starts with **ORYX** optimized design.
- **Flexible**: applicable to different application when ever heating, cooling of domestic hot water generate.
- **Safe & Reliable**: **ORYX** heat pump is provided with electrical protections safe failures, water proof enclosure & smart control system comfort and reliability.
- **Different cases different solutions**: **ORYX** presents customized solutions to satisfy our client's requirements.
- **Expert**: Production over 35 years of heat technology experience.
- **Economical**: **ORYX** heat pump best cost saving energy solutions with savings that can reach up to 80% compared to other heating systems

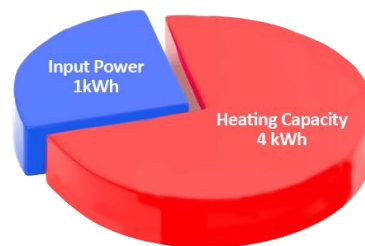




HOW EFFICIENT A HEAT PUMP IS?

Coefficient of performance (COP), is an expression of the efficiency of heat pump. When calculating the COP for a heat pump, the heat rate output from the condenser Q_h is compared to the power supplied to the compressor (W).

$$\text{COP} = \frac{Q_h}{W}$$



The main advantage of the heat pump is the capacity to supply more Energy (thermal) than that required for its operation (electrical). Hence HP classified as renewable energy.

The COP is variable depending on the type of the heat pump and the working conditions but is generally in the region of 3 to 5.5 this means that for 1 kWh of electrical input energy, the unit will supply between 3 and 5.5 kWh of thermal energy to the user.



NEW ENERGY EFFICIENCY METRIC

Calculations of the energy efficiency of buildings require accurate indicators of the efficiency of their equipment. These indicators must be representative of actual operational conditions throughout the year, measuring the performance of equipment on a seasonal basis.



SEPR is the new metric for **chillers in industrial process cooling applications**

SEER is the new metric for **chillers in comfort cooling application**



SCOP is the new metric for **space heating applications.**



HEATING EFFICIENCY $\eta_{s,h}$

In order to compare the energy efficiency of products using different sources of energy, the Eco design regulation introduces a new measurement expressed in primary energy: $\eta_{s,h}$ cool is the equivalent of SEER for cooling applications and $\eta_{s,h}$ heat is the equivalent of SCOP for space heating.

EER and COP belong to the past. Now, and in the future, the focus is on seasonal efficiency. With a broad new products range, **ORYX** is fully engaged to take up the challenge of energy efficiency

Compliance with the new Eco design regulations therefore involves the use of new, more meaningful seasonal efficiency metrics. The Seasonal Energy Efficiency Ratio (**SEER**), Seasonal Energy Performance Ratio (**SEPR**) and Seasonal Coefficient of Performance (**SCOP**) all ensure precise evaluation of the energy actually consumed by chillers and heat pumps, being calculated according to technical standard EN 14825.

SCOP – Seasonal Coefficient of Performance Ratio between the annual heating demand and the annual electrical input energy over the entire heating season. SCOP is calculated using standard

EN14825, which takes the following into account:

- Seasonal efficiency while the compressor is running (SCOPon)
- Electrical consumption when the compressor is not running: crankcase heater, standby or OFF mode
- Backup heater required to achieve the defined heating design load

$$\eta_{s,h} = 1/CC \times SCOP - \sum F_i$$

CC – Conversion Coefficient

European average coefficient that represents the amount of primary energy required to obtain electricity.

CC is defined by the regulation with a constant value of 2,5.

$\sum F_i$ – Correction Factors

Air source heat pumps

$$\eta_{s,h}$$

Water source heat pumps

$$\eta_{s,c}$$



In addition, European Energy Labeling regulation 811/2013 classifies heat pumps up to 70 kW from G to A++, according to their energy efficiency. This enhanced consumer information that drives the market towards more energy-efficient products. From September 2019, the E, F and G classes will no longer exist. A new A+++ class will identify the most energy efficient products. **ORYX** heat pump Classification is A- A+++ !

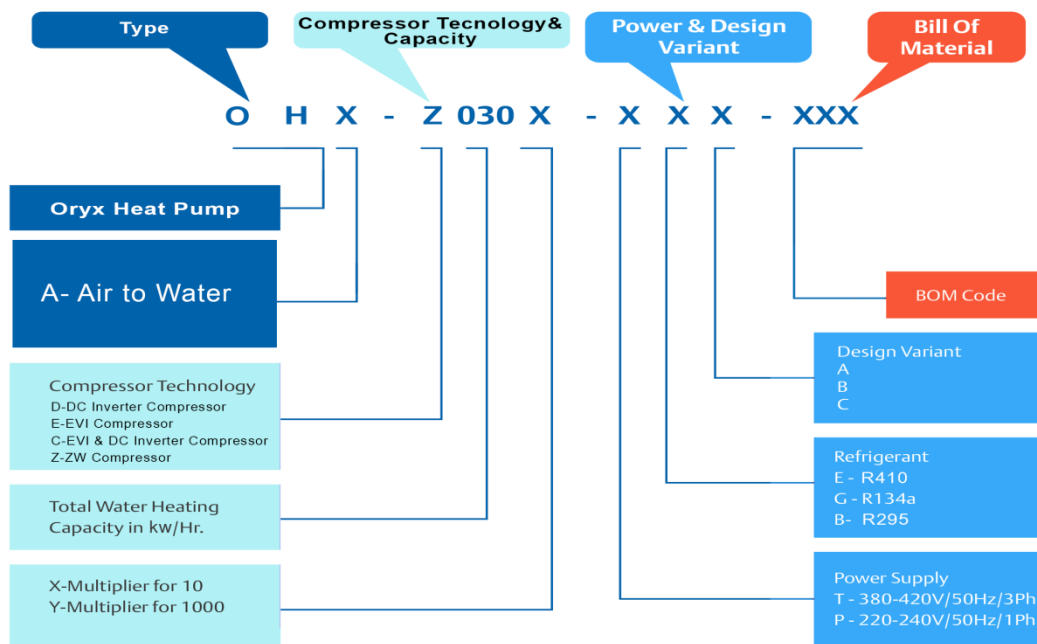
Energy Efficiency Class	Boilers and mid-temperature heat pumps 47/55°	Low temperature heat pumps 30/35°
A+++	$\eta_s \geq 150$	$\eta_s \geq 175$
A++	$125 \leq \eta_s < 150$	$150 \leq \eta_s < 175$
A+	$98 \leq \eta_s < 125$ 100 110	$123 \leq \eta_s < 150$ 125
A	$90 \leq \eta_s < 98$	$115 \leq \eta_s < 123$ 115
B	$82 \leq \eta_s < 90$	$107 \leq \eta_s < 115$
C	$75 \leq \eta_s < 82$	$100 \leq \eta_s < 107$
D	$36 \leq \eta_s < 75$	$61 \leq \eta_s < 100$
E	$34 \leq \eta_s < 36$	$59 \leq \eta_s < 61$
F	$30 \leq \eta_s < 34$	$55 \leq \eta_s < 59$
G	$\eta_s < 30$	$\eta_s < 55$

*A+++ energy class will be implemented from September 2019.

Minimum energy efficiency level from September 2017
Minimum energy efficiency level from September 2015



ORYX NOMENCLATURE



Nomenclature example

OHA- CO35X-TEA-100 (ORYX heat pump air to water, 350Kw/hr with R410A, 3phase)



SIMPLE TO USE DIAGNOSTICS FEATURES

ORYX are design for simple & easy operation in the field for end users like hotels, Hostels & Restaurants etc. these units comes with “Simple User Interface” which allows service teams to get advance warnings about field failures, simple error codes for easy diagnosis & troubleshooting. This reduces the downtime and increases the life of the system





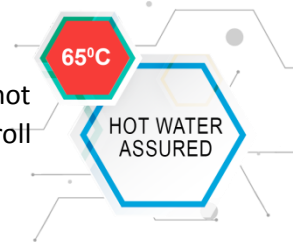
ORYX EVI DC INVENTOR SCROLL COMPRESSORS TECHNOLOGY

Compressors are the main power consumers among other heat pump components. As a result, any improvement in the compressor performance will definitely result in a better heat pump performance. This is why **ORYX** has implemented two new technologies to improve the compressor efficiency up to 27% more than a normal compressor can do.



HIGHER COP: Since both the total heating capacity is increased and the refrigerant enthalpy is increased as well, this will lead to higher COP with the same input.

Hot water Temperature: Normal Heat Pumps can produce hot water up to 55°C. With the implementation of **ORYX EVI** Scroll compressors, the hot water temperature can reach up to 65°C.



High Efficiency: The high efficient Brushless DC Motor that is accompanied with a special design axial compliance has made our scroll compressors highly efficient and suitable for different kinds of heat pumps.

Hot water Reliability: Hot water production requires long operational hours at high capacities and high compression ratios. **ORYX** compressors are designed and tested in such a way to comply with such a hard task, especially at low ambient temperatures.



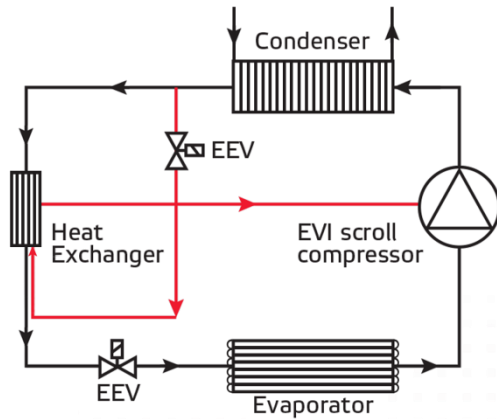
Low Life Cycle cost: The simplicity of the **ORYX** heat pump design makes it an easy mission to maintain the system and operate it for a longer life cycle than other conventional heat pumps. **ORYX** compressors' simple design has lowered the moving parts contained in our compressors to less than 70% than other conventional compressors, which lowers the maintenance and operational cost.

Silent Mode: The implementation of shock absorbers and special bearing mounting make **ORYX** compressors not only to operate on low vibrations but on silent mode.



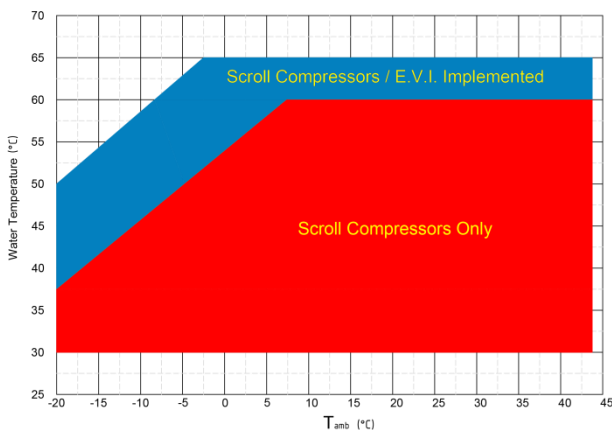
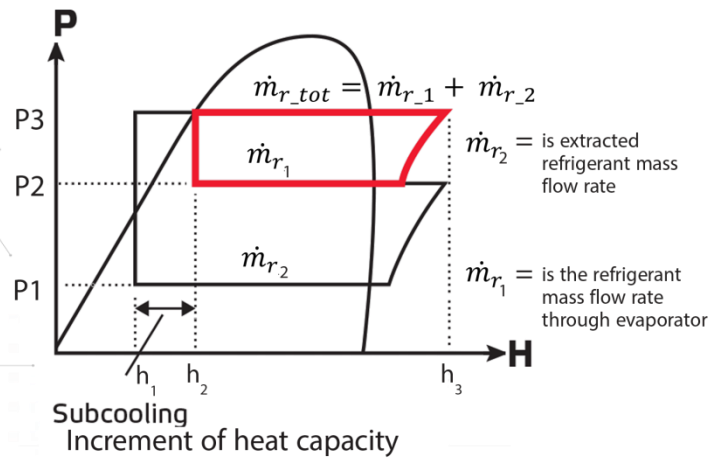


ORYX EVI SCROLL COMPRESSOR TECHNOLOGY



The **EVI** Compressor cycle represents a multi-stage compression that is done with a single compressor leading to less system complexity, better life cycle, low maintenance cost and higher efficiency!

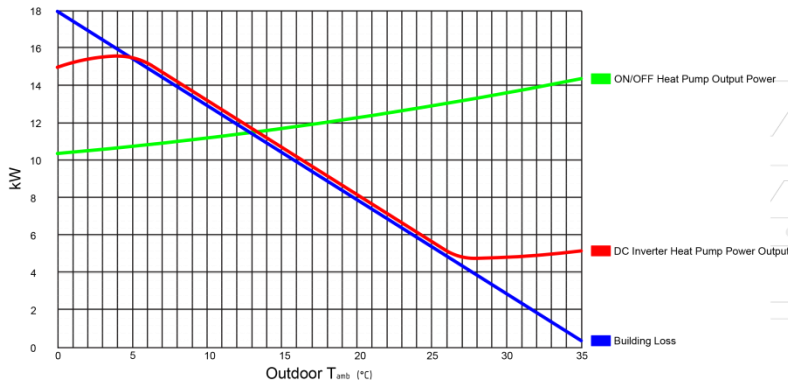
This is done extracting portion of the refrigerant directly after leaving the condenser, expanding it through electronic expansion valve, sub heating it through a brazed-plate heat exchanger and then injecting it back into the compressor.



Improvement of scroll compressors performance characteristics with the implementation of **ORYX EVI** Technology especially for hot water production.

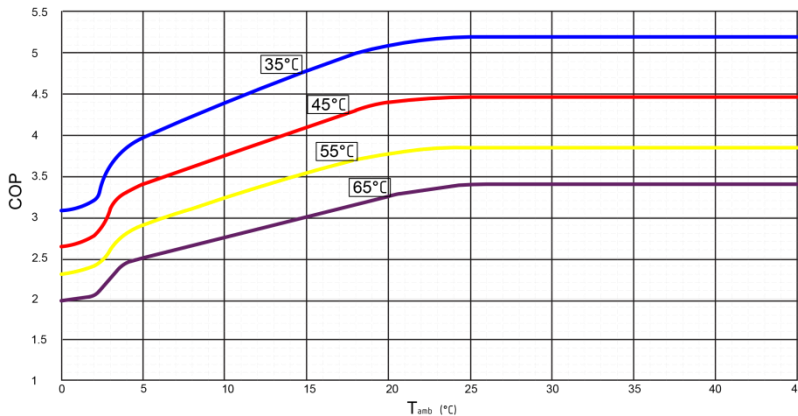
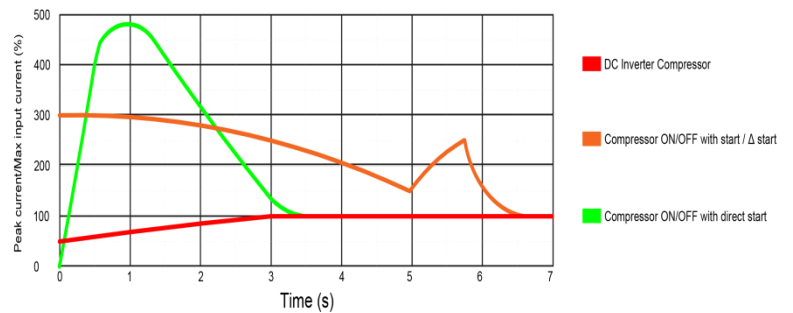


ORYX DC INVERTER TECHNOLOGY



A major concern that affect the compressor durability is the load variation that leads to thermal shocks, pressure blows and noise increase inside the compressor. As the ON / OFF times increases, the compressor durability and performance decrease significantly.

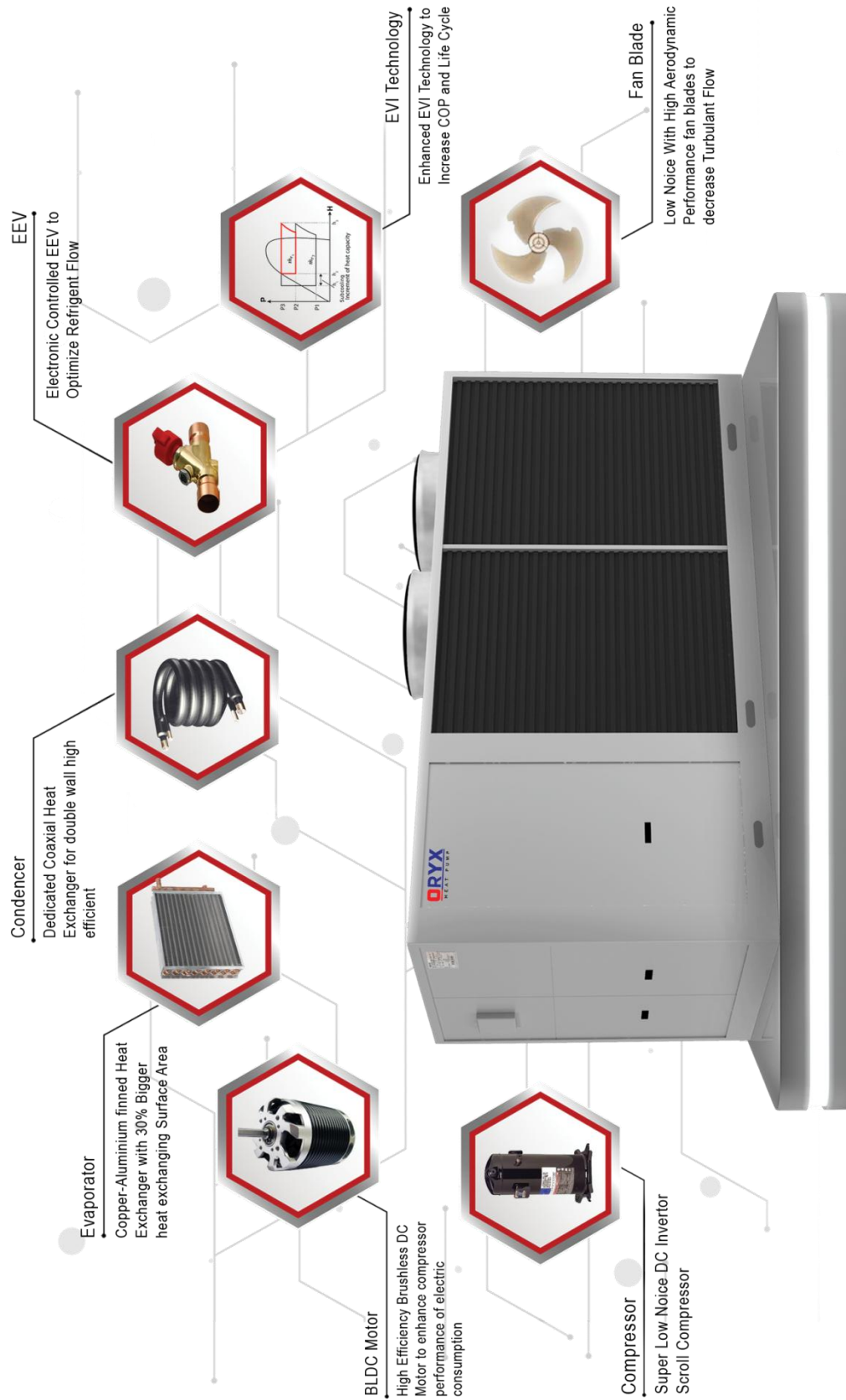
ORYX has implemented the innovative inverters that modulate the compressors power smoothly to avoid thermal shocks and pressure blows inside the compressors. As a result, the compressors power is optimized, the efficiency is increased, the durability is increased and the required hot water is delivered on time.



The COP as a Function of the Ambient temperature. As can be discovered that the achievement of 65°C is very easy with a remarkable COP value equals to 3.8 with the implementation of EVI Dc inverter technology.

ORYX DC INVERTER SCROLL COMPRESSORS TECHNOLOGY

Innovation Criteria	Traditional AC Scroll	ORYX Compressor Scroll Design Innovation
Heating Capacity	Conventional	Up to 27% more than Standard
COP	Conventional	20% more than Standard
Highest Water Temperature	55°C	65°C BLDC (Optimized Compression ratio)
Hot Water Reliability	Conventional	BLDC High Power Motor to operate at Higher Condensing Temperature vs AC compressors





HIGH
EFFICIENCY

25% higher efficiency, evaporator special coating for sea side application.

Advance Evaporator wind field design, the unit is of ultra-quiet operation.



WIDE
APPLICATIONS

Support widely operation condition for all weather conditions to produce hot water all over the year



65°C HOT
WATER OUTLET

Suitable in high temperature for hot water supply. **ORYX** can be applied for any industrial application.

ORYX operating cost is very low compared with conventional heat source, such as electricity, gas and diesel.



ENVIRONMENTAL
FRIENDLY

adopting R410A refrigerant CFC free, Zero air pollution emission which is very environmental friendly.

Durable and reliable of itself, the unit can run in good condition without the effect of the ambient temperature.



SPECIAL DESIGNED
COAXIAL
HEAT EXCHANGER

The double wall technology assures that no contaminants will pass through walls which make it an excellent solution for hospitals and restaurants.

Overload protection, high & low voltage protection, water storage protection, anti-freezing protection for long service life and stable operation for both short & long term.



WIDE
APPLICATIONS

With advance 4 way valve applied in various unit sizes that can be used in -7°C environment and can be applied in all types of building.

Low cost water heating flexible installation and combination solution equals to HIGH ROI in the long run.



ULTRA-QUIET
OPERATION



LOW
OPERATION
COST



MORE
RELIABLE



MULTIPLE
PROTECTIONS

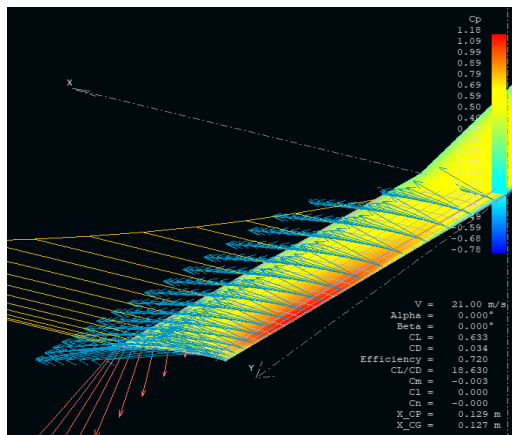


HIGHER
ROI

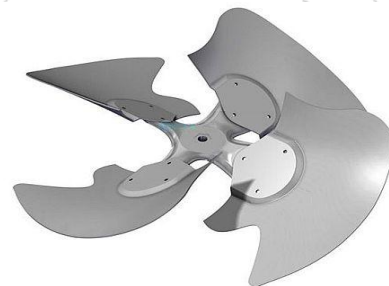


ULTRA-QUIET
OPERATION

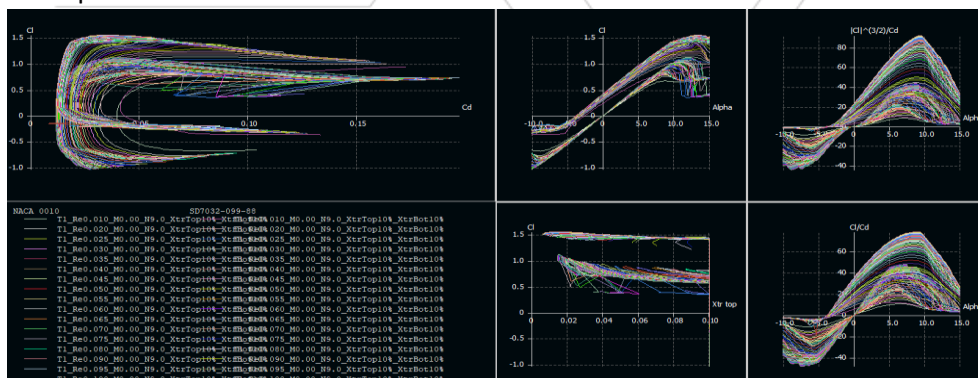
Top case insulation material, Sound absorption & insulation solution.



Fan blades are designed in such a way to give high aerodynamic stability with low drag that will lower the fan noise to the minimum. All blades are analyzed using CFD analysis technology before installation.

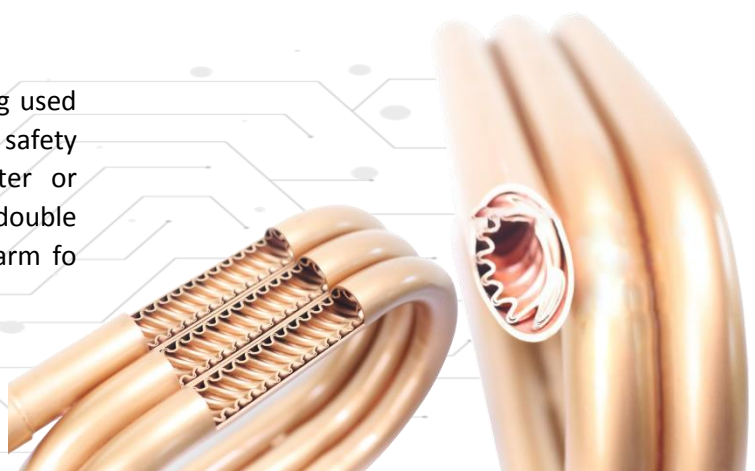


Pressure drop measurements are given a special care in our design, analysis and installation. Variable speed blade are implemented to amend to different load requirements, conditions and wind speeds.



Double wall hot water heat exchanger is being used in application with particularly stringent safety requirements, in the event of a leak, water or refrigerant seeps out between the vented double walls to the atmosphere, thus gives visual alarm for attention.

- Excellent corrosion resistance
- Outstanding anti-freezing capability
- Clean
- High efficiency





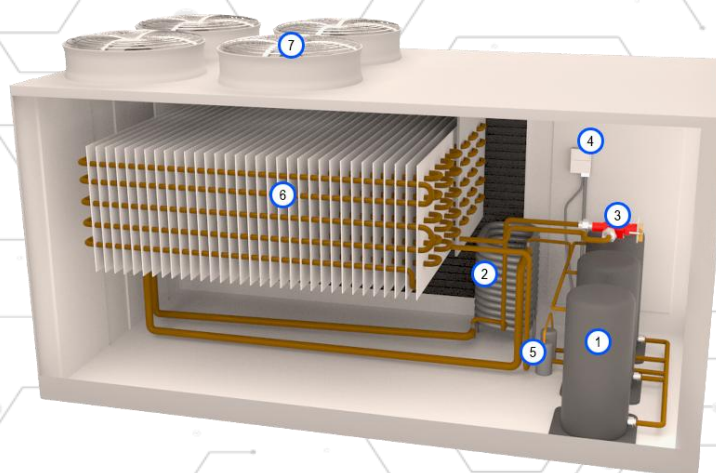
AIR TO WATER HEAT PUMP TECHNICAL DATA

Model		OHA-002X-TEA-100
Heating Capacity	kW	25.4
Input Power	kW	5.8
COP	W/W	4.40
Power supply	V/Ph/Hz	400/3+N/50
Max input current standard unit	A	18.5
Current standard unit	A	53.2
Max air flow (heating mode)	m ³ /h	9600
Fans	n°	2
Compressor (Type)	Scroll	
Compressors / Circuits	n°/n°	2/1
Noise (Power level)	dB(A)	75
Noise (Pressure level)	dB(A)	47
Frame	ECO Friendly Galvanized Metal	
Dimensions	(L) mm	1900
	(W) mm	880
	(H) mm	1470

Performances are referred to the following conditions:

- Heating: Ambient temperature 7°C DB, 6° WB, water temperature 30/35°C
- Sound power level in accordance with ISO 9614.
- Sound pressure level at 10mt from the field conditions, calculated in accordance with ISO 9614

Drawings not a scale.



- 1-Compressor
- 2-Coaxial Heat Exchanger
- 3-Expansion Valve
- 4-Control Panel
- 5-Refrigerant filtration & Storage
- 6-Radiator
- 7-Fan

ORYX reserves the right to change the specifications of the product and/or their accessories without prior notice.



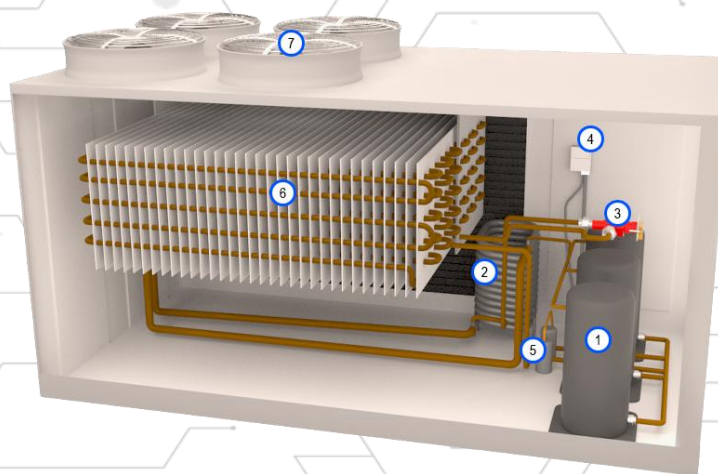
AIR TO WATER TECHNICAL DATA

Model		OHA-065X-TEA-100
Heating Capacity	kW	65.1
Input Power	kW	14.5
COP	W/W	4.50
Power supply	V/Ph/Hz	400/3/50
Max input current standard unit	A	47.8
Current standard unit	A	143.8
Max air flow (heating mode)	m ³ /h	2100
Fans	n°	1
Compressor (Type)	Scroll	
Compressors / Circuits	n°/n°	2/1
Noise (Power level)	dB(A)	78
Noise (Pressure level)	dB(A)	50
Frame	ECO Friendly Galvanized Metal	
Dimensions	(L) mm	2200
	(W) mm	1150
	(H) mm	1820

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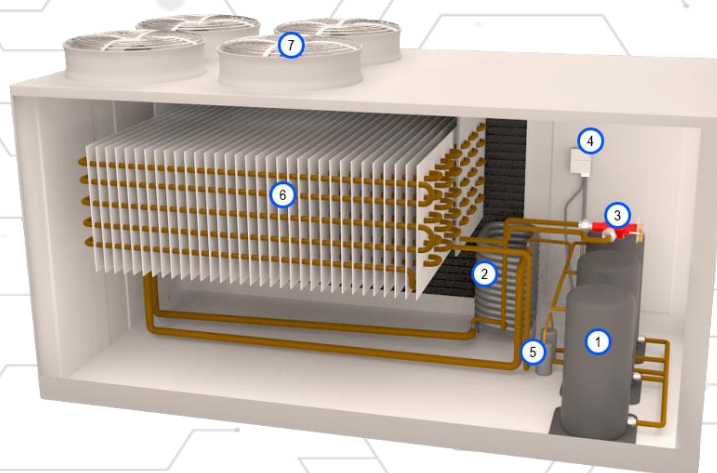
AIR TO WATER TECHNICAL DATA

Model		OHA-012Y-TEA-100
Heating Capacity	kW	123.7
Input Power	kW	28.1
COP	W/W	4.40
Power supply	V/Ph/Hz	400/3/50
Max input current standard unit	A	87.6
Current standard unit	A	272.6
Max air flow (heating mode)	m ³ /h	42000
Fans	n°	2
Compressor (Type)	Scroll	
Compressors / Circuits	n°/n°	2/1
Noise (Power level)	dB(A)	81
Noise (Pressure level)	dB(A)	53
Frame	ECO Friendly Galvanized Metal	
Dimensions	(L) mm	2900
	(W) mm	1150
	(H) mm	1820

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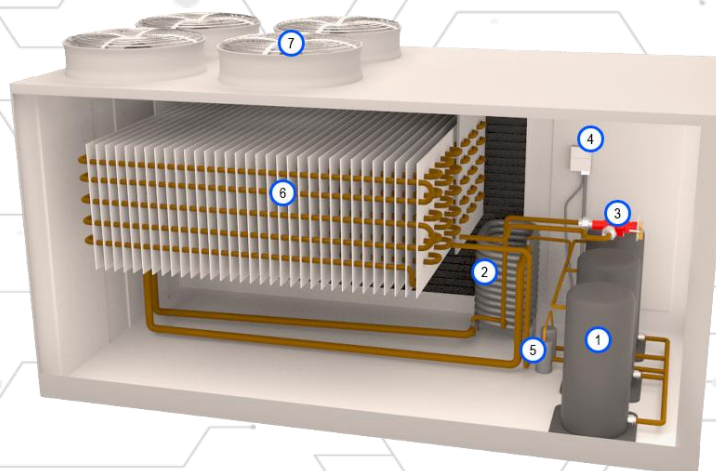
AIR TO WATER TECHNICAL DATA

Model		OHA-017Y-TEA-100
Heating Capacity	kW	177.1
Input Power	kW	41.2
COP	W/W	4.30
Power supply	V/Ph/Hz	400/3/50
Max input current standard unit	A	125.3
Current standard unit	A	359.3
Max air flow (heating mode)	m ³ /h	62000
Fans	n°	3
Compressor (Type)	Scroll	
Compressors / Circuits	n°/n°	2/1
Noise (Power level)	dB(A)	84
Noise (Pressure level)	dB(A)	56
Frame	ECO Friendly Galvanized Metal	
Dimensions	(L) mm	3900
	(W) mm	1150
	(H) mm	1820

Performances are referred to the following conditions:

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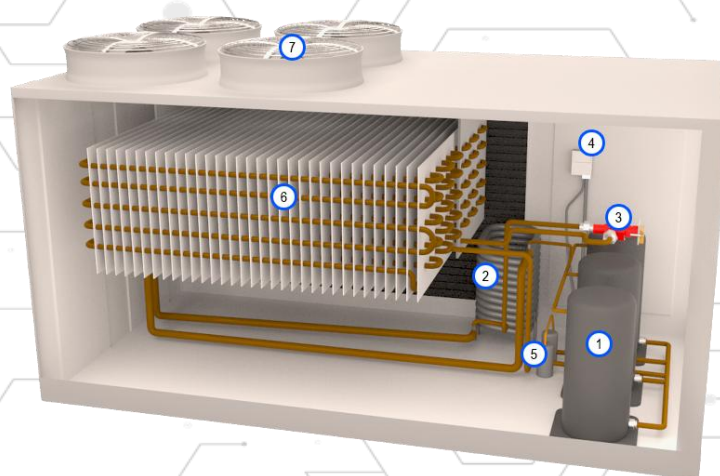
AIR TO WATER TECHNICAL DATA

Model		OHA-024Y-TEA-100
Heating Capacity	kW	246.0
Input Power	kW	57.2
COP	W/W	4.10
Power supply	V/Ph/Hz	400/3/50
Max input current standard unit	A	175.2
Current standard unit	A	360.2
Max air flow (heating mode)	m ³ /h	81500
Fans	n°	4
Compressor (Type)	Scroll	
Compressors / Circuits	n°/n°	4/2
Noise (Power level)	dB(A)	85
Noise (Pressure level)	dB(A)	57
Frame	ECO Friendly Galvanized Metal	
Dimensions	(L) mm	2200
	(W) mm	1150
	(H) mm	1820

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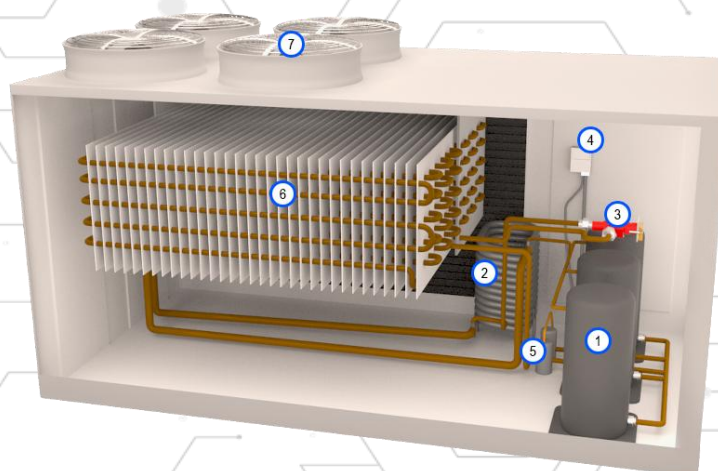
AIR TO WATER TECHNICAL DATA

Model		OHA-30Y-TEA-100
Heating Capacity	kW	306.8
Input Power	kW	74.8
COP	W/W	4.10
Power supply	V/Ph/Hz	400/3/50
Max input current standard unit	A	216.8
Current standard unit	A	440.3
Max air flow (heating mode)	m ³ /h	110000
Fans	n°	6
Compressor (Type)	Scroll	
Compressors / Circuits	n°/n°	4/2
Noise (Power level)	dB(A)	86
Noise (Pressure level)	dB(A)	58
Frame	ECO Friendly Galvanized Metal	
Dimensions	(L) mm	2900
	(W) mm	1150
	(H) mm	1820

Performances are referred to the following conditions:

- Heating: Ambient temperature 7°C DB, 6° WB, water temperature 30/35°C
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Drawings not a scale.



- 1-Compressor
- 2-Coaxial Heat Exchanger
- 3-Expansion Valve
- 4-Control Panel
- 5-Refrigerant filtration & Storage
- 6-Radiator
- 7-Fan

ORYX reserves the right to change the specifications of the product and/or their accessories without prior notice.



At **ORYX** we are proud of our cooperative Partner that are considered leaders in their different fields. Our high efficient systems solutions & technologies are a result of such a perfect collaboration.

