MITSUBISHI ELECTRIC

Chillers

A new generation of energy saving
and innovative chiller technology

les.mitsubishielectric.co.uk

A new generation of **chiller technology**

There are a number of challenges facing building owners and managers today - and meeting energy reduction targets is among the most urgent.

Recent new legislation requires UK businesses to reduce their carbon emissions, which makes robust technological solutions vital.

Chiller systems have been used for decades to deliver controlled cooling to buildings, but with this increasing pressure on energy efficiency and running costs, we now need a low-carbon, cost effective option.

Mitsubishi Electric has manufactured chillers for over 40 years and in 2015 combined this extensive experience with advanced component technology from the commercial air conditioning sector to produce the e-series modular chiller range.

Later the same year Mitsubishi Electric purchased Climaveneta, enhancing our product line up and marking our full scale entry into the chiller market.

MITSUBISHI ELECTRIC

100 YEARS OF INNOVATION

Climaveneta is a strong European brand supported by 45 years of customer trust and high quality production, and its range of energy-saving, low-noise and innovative chiller technology further expands the application and customisation capabilities we are now able to offer.

Mitsubishi Electric is the first name for **comfort and efficiency**

Founded in 1921, Mitsubishi Electric is now a global, market leading environmental technologies manufacturer. In the UK, the Living Environment Systems Division provides pioneering solutions that heat, cool, ventilate and control our buildings in some of the most energy efficient ways possible.

Through our technical expertise, long experience and innovative product range, we enable building operators everywhere to significantly improve energy efficiency, reduce running costs and adhere to increasingly tough legislation. We believe that global climate challenges need local solutions.

Our aim is to help individuals and businesses reduce the energy consumption of their buildings and their running costs.

Mitsubishi Electric offer advanced technology that really can **make a world of difference**.

The challenge to **reduce carbon emissions**

Recent changes in legislation which has been designed to reduce carbon emissions in commercial buildings include the Minimum Energy Efficiency Standards, Energy Performance Directive and F-Gas regulations.

Minimum Energy Efficiency Standards (MEES)

Currently under SEEM from 1 April 2023, landlords must not continue letting a non-domestic property which is already let if that property has an EPC rating of band F or G.

It is predicted that MEES will have a gradual, but noticeable effect on the commercial rented property market. Figures show that around 20% of commercial properties fall into the F or G ratings for EPCs, which amounts to around 200,000 non-domestic buildings.

The future of MEES

UK government are proposing a performance-based rating scheme for large commercial and industrial buildings to provide businesses and their investors with more information on how to reduce energy consumption and lower both carbon emissions and energy bills. Consultation is due to start early 2021 on how the scheme will work.

Energy Performance Directive (ErP) - Lot 21 Regulation (EU) 2016/2281

The ErP Directive Lot 21 defines minimum allowable seasonal efficiencies for chiller technology. Both EN 14511 and EN 14825 are used to define how the seasonal efficiency of a system should be tested the seasonal efficiency is then presented as a ratio of SEER and the primary energy conversion factor.

Source	Cooling Capacity	Minimum Efficiency	
		Jan 2018	Jan 2021
Air Cooled	<400kW	149%	161%
Air Cooled	≥400kW	161%	179%
Water Cooled	<400kW	196%	200%
Water Cooled	≥400kW / ≤1500kW	227%	252%
Water Cooled	≥1500kW	245%	272%

Information from Official Journal of the European Union,EU 2016/2281, Annex II Tables 3 and 4.

The challenge to **reduce carbon emissions**

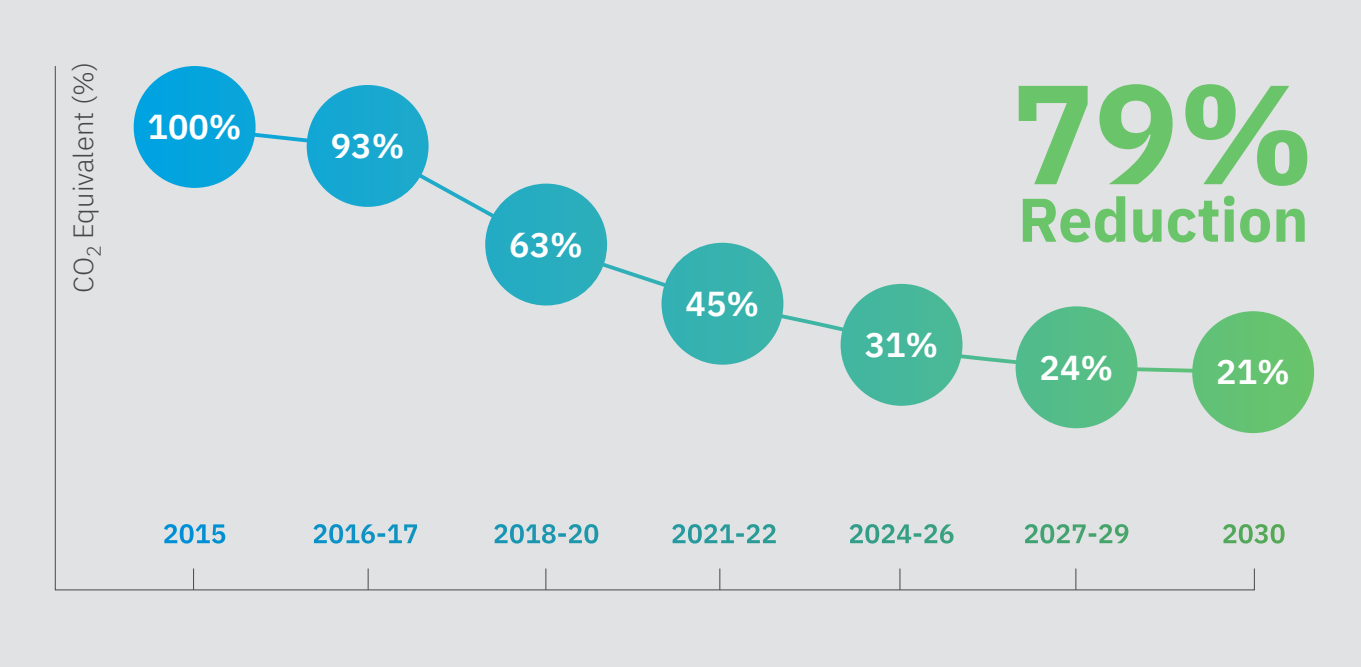
F-Gas regulations

The European Union is committed to reducing the environmental impact of refrigerants and to lower the consumption and use of HFCs within with a number of industry sectors for which HVAC applications form a part of.

The ultimate objective is to cut the availability of HFCs by **79%** between 2015 and 2030.

From 1st January 2015, the Phase Down of hydrofluorocarbons (HFCs), and bans on the use of refrigerants in certain sectors of new equipment began.

HFC Phase Down



Source Regulation (EU) No 517/2014

Further Information

Click on the icons or Scan the QR codes

Read our CPD Certified Guide:

Minimum Energy Efficiency Standards for Non-dwellings

CPD GUIDE

Read our CPD Certified Guide:

Working with F-Gas Regulations

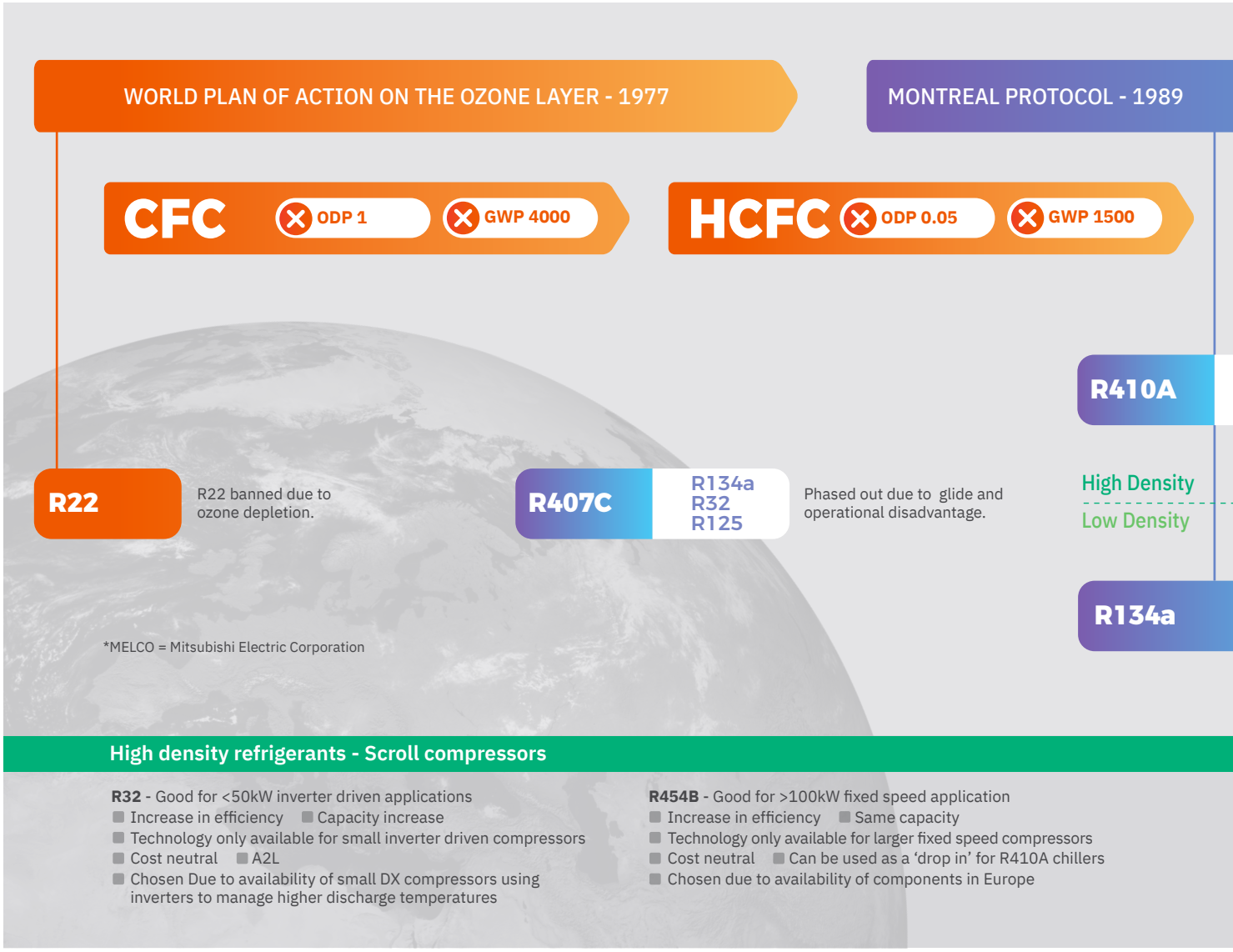
CPD GUIDE

The changing landscape **of refrigerants**

A number of lower GWP refrigerants are now on the market and offer a long-term solution for future proofing air conditioning in buildings.

In the chiller arena, there are a number of refrigerants available as shown in the illustration below. The most common new alternatives are hydrofluoroolefins (HFO's), including refrigerants such as **R1234ze** and **R1234yf**.

The future of refrigerants



Watch our CPD certified webinar

Low GWP Refrigerants in Chillers

Click Play or Scan the QR code

KYOTO PROTOCOL - **1997** EU F-GAS REGULATIONS - **2006, 2014**

HFC ODP 0.0 GWP 600-2000

HFO ODP 0.0 GWP <10

R32

High Density <100kW Scroll
R32 chosen due to availability of components within Japan & MELCO.*

R454B — R32 R1234yf

High Density >100kW Scroll
R454B chosen due to availability of components within Europe. Medium term solution with lower GWP than R32.

R32 R125

Blend of R32 for efficiency and performance. R125 added to reduce flammability to reach A1 classification.

R1234ze

Low Density Screw / Centrifugal
Closely matched in terms of refrigeration properties to R134a. Availability of components is now very good in Europe.

R513A — R134a R1234yf

Low Density Screw / Centrifugal
Cost compliant short term solution to provide a compliant GWP solution and maintain A1 classification for application. Same components as R134a.

A HFC developed to replace R12.

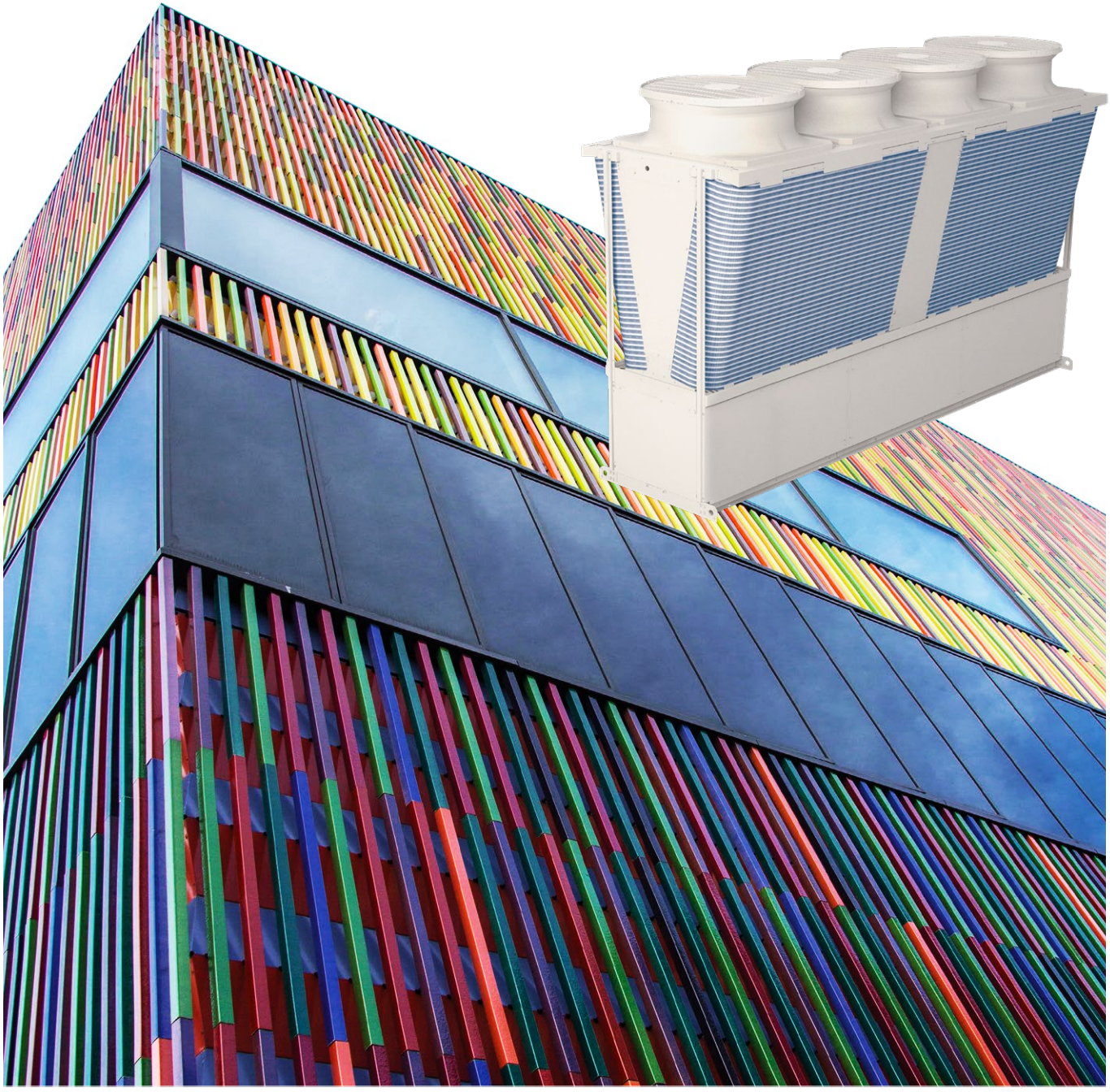
Low density refrigerants - Screw compressors and Turbocor

R1234ze
- Zero Environmental impact
- Small reduction in capacity
- Small increase in efficiency
- Increase in cost
- A2L refrigerant

R513A
- Reduced environmental impact
- A1 classification
- Negligible change in efficiency and capacity when using same components as R134a
- Cost neutral

Our **Modular Chiller** range

Chiller systems have been used for decades to deliver controlled cooling to buildings, but with increasing pressure on energy efficiency, environmental impact and running costs, we need to consider low carbon options.



Comprising of **Cooling Only** and **Heat Pump** models, Mitsubishi Electric's e-series modular chiller range allows up to six individual units to be connected together to provide a system capacity from 150kW to 1,080kW.

High efficiency

The e-series modular chiller range uses **highly efficient scroll compressor technology** from our City Multi VRF units, along with **advanced inverters** and **controls** to deliver exceptional efficiency and a wide operating range.

R32 refrigerant

The e-series range uses R32 refrigerant with a GWP of 675. The move to R32 has contributed to a **90% reduction of equivalent CO_2** (Cooling Only).

Unique modular approach

Using a modular approach **reduces space requirements** and **simplifies lifting and installation**. A modular approach also lends itself to a staged installation or future HVAC demands, as modular chillers can be scaled accordingly.

Reduced plant space

Each module can be positioned in a bank of up to six connected units using the same internal header. Typically **30% ~ 40% space saving** can be achieved when compared with traditional flatbed type chillers.

Low noise levels

By utilising highly efficient components within a uniquely shaped chiller, the e-series modular chiller range offers **market leading low noise levels** as standard.

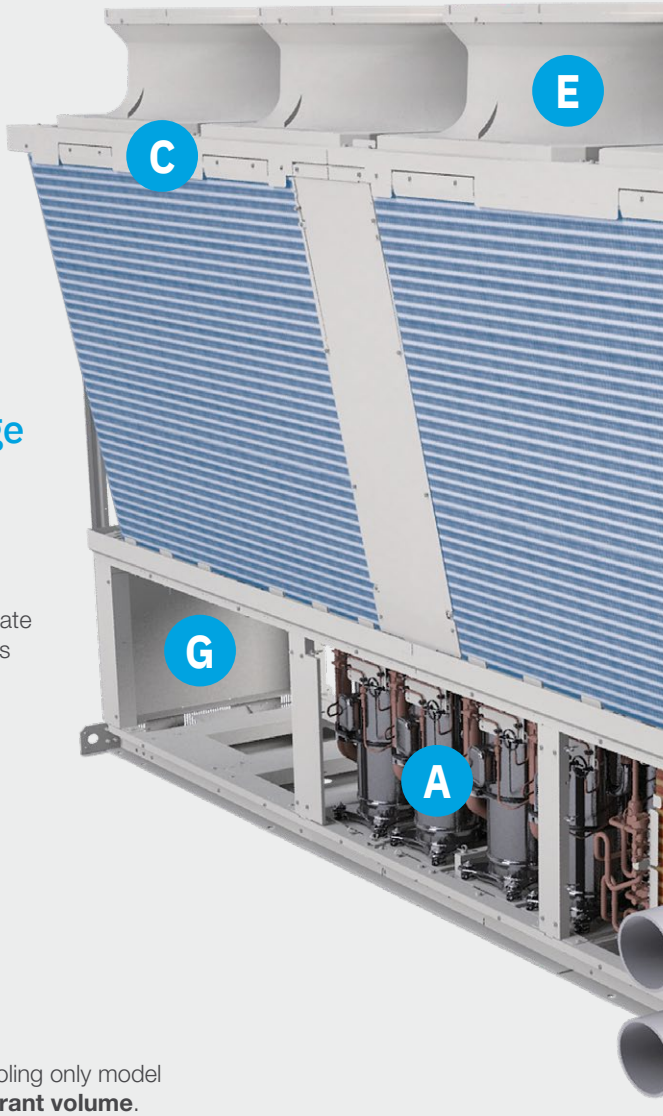
Up to **1,080**kW Capacity

X6 units can be connected together

Our **Modular Chiller** range

Technology Advances

With the e-series modular chiller range, we have examined every single component to find ways of increasing performance, reliability and overall system efficiency.



A High efficiency inverter scroll compressors

Four advanced DC inverter-driven scroll compressors, optimised for R32, give a capacity range of **8% to 100%** for each module.

B Two-stage cooling circuit

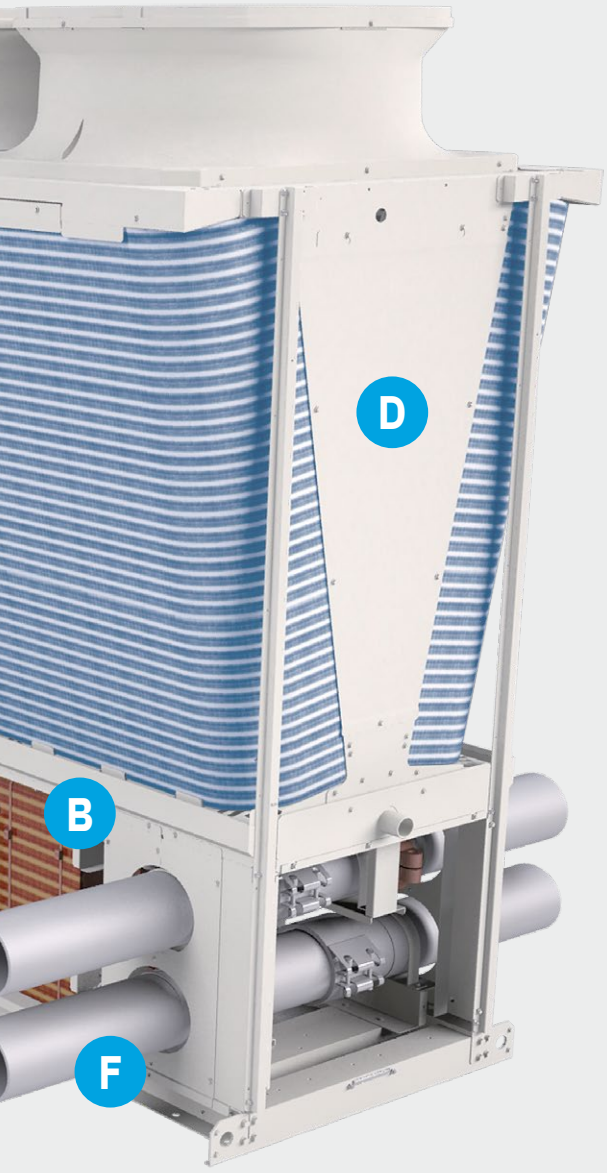
The four compressors serve a two stage cooling circuit using two plate heat exchangers. By modulating the evaporating temperature across the two stages the overall system efficiency can increase by an **additional 3.9%**.

C Fan inverter control

Each refrigerant circuit has separately controlled, inverter-driven DC fans, allowing for more precise control to **save energy and optimise system efficiency.**

D Y-shaped aluminium air heat exchangers

The heat pump model uses aluminium tube heat exchanger and cooling only model uses an aluminium microchannel helping to **reduce overall refrigerant volume**. Blue Fin anti-corrosion coating on the heat exchanger is also provided as standard.



E Fans

The fan blades have improved ventilation characteristics and a newly designed rear edge that suppresses wind turbulence to **increase efficiency and reduce noise levels**.

F Internal header pipe

The in-built internal header pipes simplify design, installation and maintenance and makes the e-series range modular and **suitable for almost any situation**.

G Digital indicator

A dedicated digital indicator inside the PCB displays high pressure, low pressure, water inlet temperature, water outlet temperature, error codes etc., thereby **aiding service and maintenance**.

Further Information

Click on the icon or Scan the QR code

Read our Product Information Sheet:

e-series Modular Chiller Range Cooling Only or Heat Pump (150/180kW)

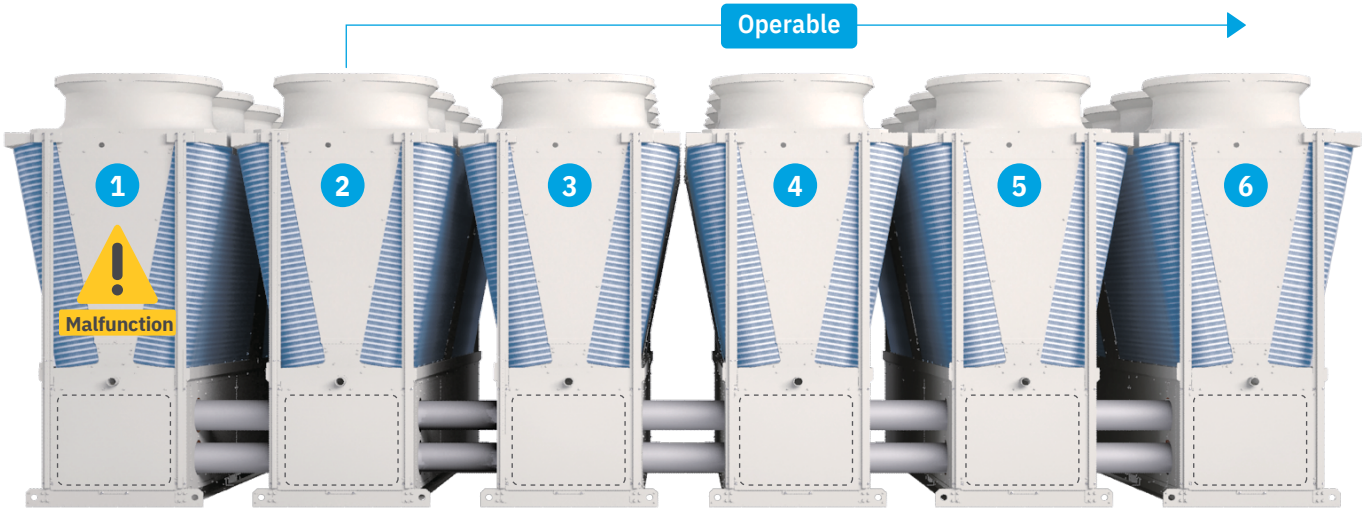
Our **Modular Chiller** range

Exceptional Features

Emergency Operation Mode

When operating as a single unit the four compressors operate as two pairs. If something is wrong with one of the two pairs, the other pair can temporarily continue to operate.

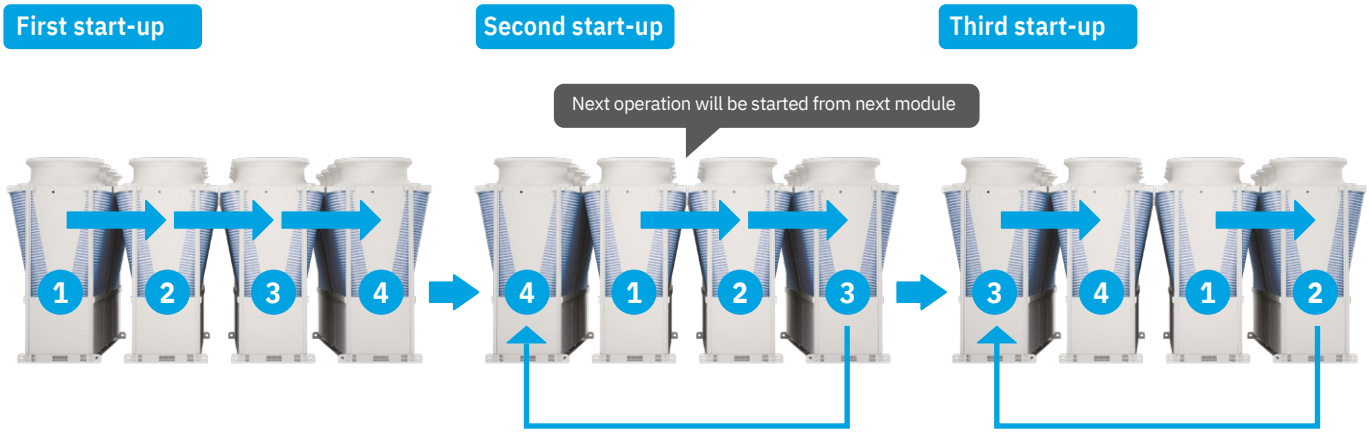
If one of the e-series modules goes down when operating as part of a bank, the remaining modules can continue to operate. Each module can independently control the outlet water temperature.



Note: Units that have been stopped by **thermo OFF** before the main unit goes down are kept in the thermo OFF mode.

Rotation Operation

When multiple modules are installed, the operating time of each module in the same system can be equalized according to the load of the whole system.



Up to 10 degree Delta T

The e-series is capable of a **10 degree Delta T** across the heat exchangers. This means lower flow rates, lower pressure drops and less requirement for pump head.

Watch our webinar about
Modular Chillers

Click **Play** **or Scan**


CLIMAVENETA

Our **Traditional Chiller** range

Consisting of a wide range of models, our Climaveneta range of chillers are a new generation of water chiller designed for comfort and process cooling applications.

Modern multi-function buildings, shopping centres, large business centres and process cooling are just some of the examples where increased comfort and precision control are required.

The Climaveneta range of chillers can deliver all of this and more, through their ability to be easily integrated into ever increasingly complex building systems. In order to maximise performance, reliability and overall system efficiency, the Climaveneta range of products bring advanced technology and know-how together in customisable packages to aid design, specification, installation and on-going operation.

Advanced technology

Air source & water cooled versions

Scalable and fully customisable

Various Heat Exchanger options

Chillers for **Cooling Only** Applications

A wide range of advanced, customisable models for use in efficiently cooling a space or an environment to a set temperature.

Key Features

- Energy efficient, customisable chillers
- Low noise levels
- Lower GWP, HFO and R513A refrigerant options
- Free cooling available

Air Cooled Chillers

i-BX	Inverter driven scroll compressors	R 410A	INVERTER	AXIAL	PLATES
i-NX	Inverter driven scroll compressors	R 410A	INVERTER	AXIAL	PLATES
NX2	Scroll compressors		R 454B	AXIAL	PLATES
NX2	Scroll compressors		R 454B	AXIAL	SHELL&T.
FX2	Screw compressors		R 513A	AXIAL	SHELL&T.
FX2 HFO	Screw compressors		R HFO1234ze	AXIAL	SHELL&T.
i-FX	Inverter driven screw compressors		INVERTER	AXIAL	SHELL&T.
i-FX HFO	Inverter driven screw compressors	R HFO1234ze	INVERTER	AXIAL	SHELL&T.
TECS2	Inverter driven oil-free centrifugal compressors	R 513A	INVERTER	AXIAL	FLOODED
TECS2 HFO	Inverter driven oil-free centrifugal compressors		INVERTER	R HFO1234ze	FLOODED

Water Cooled Chillers

NX-W	Scroll compressors			R 410A	PLATES
FX-W	Screw compressors			R 513A	SHELL&T.
FOCS3-W	Screw compressors			R 513A	FLOODED
i-FX-W (1+i)	Screw compressors	R 513A	INVERTER		FLOODED
TECS2-W HFO	Inverter driven oil-free centrifugal compressors	R HFO1234ze	INVERTER		FLOODED
TX-W	Inverter driven oil-free centrifugal compressors	R 513A	INVERTER		FLOODED

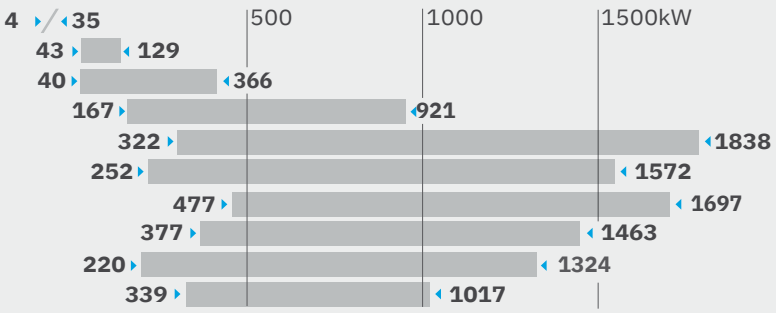
Air Cooled with Free-Cooling Technology

TECS-FC	Inverter driven oil-free centrifugal compressors	R 513A	INVERTER	SHELL&T.

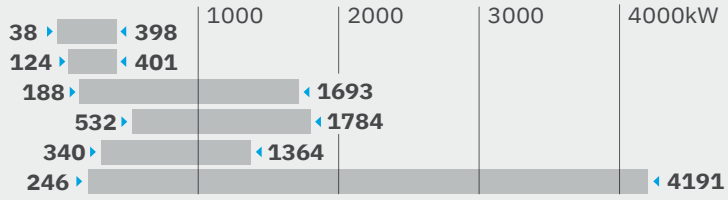
Air Cooled Chillers with Evaporative Free-Cooling Technology

TECS-EFC	Inverter driven oil-free centrifugal compressors	R R134a	INVERTER	AXIAL	FLOODED

Capacity Range

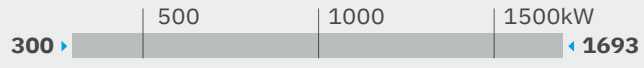


Capacity Range



Capacity Range

Capacity Range



Key

Green HFO Refrigerants

Climaveneta uses green HFO refrigerants such as HFO1234ze and HFO1234yf in many ranges.

Magnetic Levitation

Magnetic levitation centrifugal compressors range from 200kW to 4MW in both air source and water source, free cooling and evaporative free cooling versions, to deliver the highest efficiency in every application.

Inverter Driven Compressor

The capacity is modulated resulting in increased efficiency as well as in the possibility to effectively implement smart management solutions such as active redundancy.

VPF

The VPF (Variable Primary Flow) dynamically optimises the unit's thermoregulation for variable flow operation, thus ensuring both the highest pump energy savings and stable chiller operation.

Leading Heat Recovery Technology

Heat recovery solutions are employed, such as thermodynamic, plate and rotary heat recovery as well as refrigerant booster.

Configurable Efficiency Set

3 energy efficiency standard configurations available with most hydronic units.

High Water Temperature

A complete range of solutions designed to deliver high water temperature for any heating requirement.

Chillers for **Heat Pump** Applications

A wide range of advanced, customisable models for use in efficiently cooling or heating a space or an environment to a set temperature.

Key Features

- Energy efficient, customisable chillers
- Lower noise levels
- Low GWP, HFO and R513A refrigerant options

Air to Water Reversible Heat Pumps

NX2-N	Scroll compressors		R 454B	SCROLL	AXIAL	P PLATES
i-NX-N	Inverter driven scroll compressors	R 410A	INVERTER	SCROLL	AXIAL	P PLATES
i-FX-N	Inverter driven screw compressors	R 454B	INVERTER	SCREW	AXIAL	T SHELL&T.

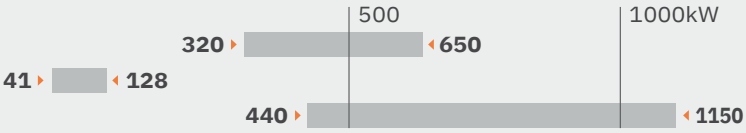
Water to Water Heat Pumps Reversible on Hydraulic Side

NX-W/H	Scroll compressors			R 410A	SCROLL	P PLATES
i-FX-W (1+i/H	Inverter screw compressors	R 513A	INVERTER		SCREW	FL FLOODED

Water to Water Reversible Heat Pumps

NX-WN	Scroll compressors	R 410A	SCROLL	P PLATES

Capacity Range



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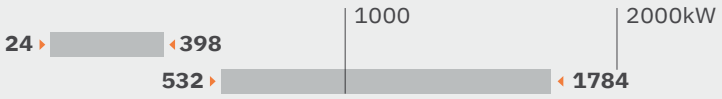

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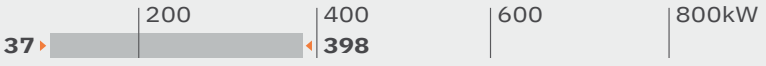

Key

Inverter Driven Compressor

The capacity is modulated resulting in increased efficiency as well as in the possibility to effectively implement smart management solutions such as active redundancy.

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Leading Heat Recovery Technology

Heat recovery solutions are employed, such as thermodynamic, plate and rotary heat recovery as well as refrigerant booster.

Configurable Efficiency Set

3 energy efficiency standard configurations available with most hydronic units.

High Water Temperature

A complete range of solutions designed to deliver high water temperature for any heating requirement.

INTEGRA Simultaneous **Heating** & **Cooling** 4-pipe Chiller System

Air and water sourced units for 4-pipe systems, using either scroll, screw or inverter screw compressors. Available from 45 to 1,125kW, these systems provide simultaneous heating and cooling in a highly efficient manner.

Key Features

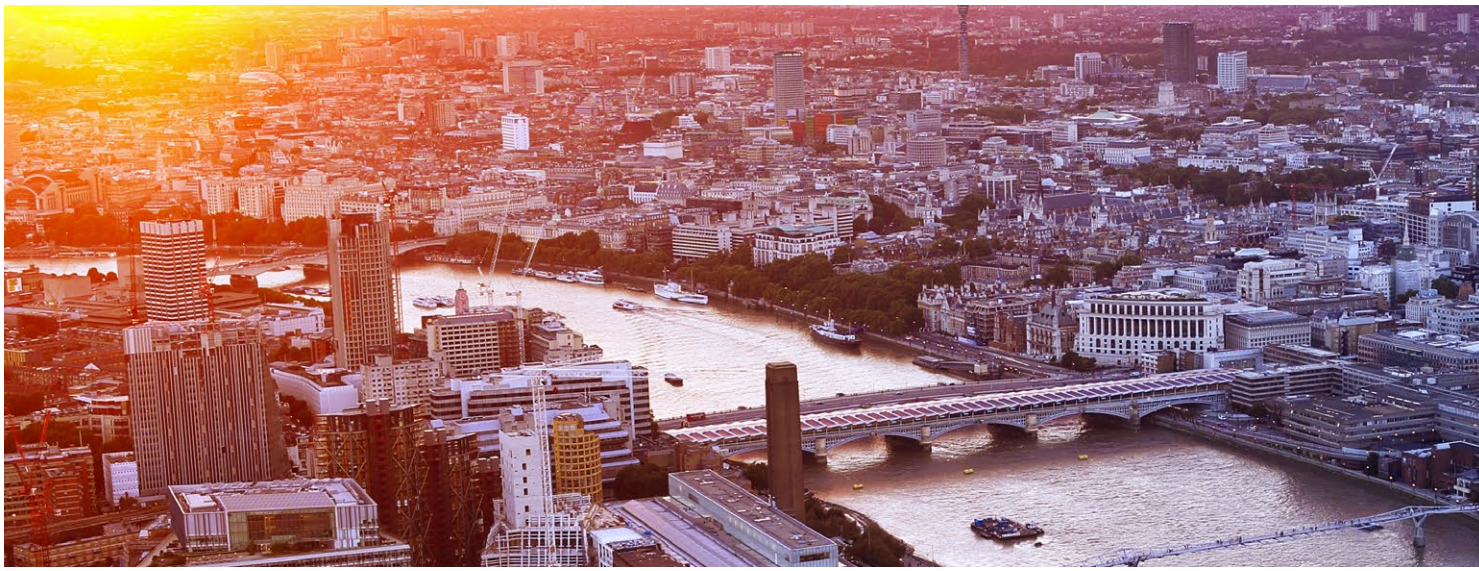
- TER (Total efficiency Ratio) of up to 8
- Minimal footprint requiring less plant space
- Reduction of onsite operations as INTEGRA negates the need to connect to the gas network

Air Cooled Chillers

i-NX-Q	Inverter scroll compressors	R 410A	INVERTER	SCROLL	AXIAL	PLATES
NECS-Q	Scroll compressors		R 410A	SCROLL	AXIAL	SHELL&T.
ERACS2-Q	Screw compressors	R 513A	SCREW	AXIAL	EC FAN	SHELL&T.
i-FX-Q2	Inverter screw compressors	R 513A	INVERTER	SCREW	EC FAN	SHELL&T.
NX2-Q	Scroll compressors		R 454B	SCROLL	AXIAL	PLATES

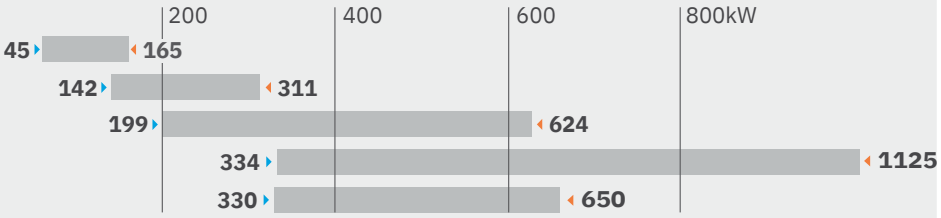
Water Cooled Chillers

NECS-WQ	Scroll compressors				SCROLL	PLATES
ERACS-WQ	Screw compressors	R 410A	R 513A	SCREW		SHELL&T.
i-FX-WQ	Inverter screw compressors	INVERTER	SCREW	AXIAL		SHELL&T.

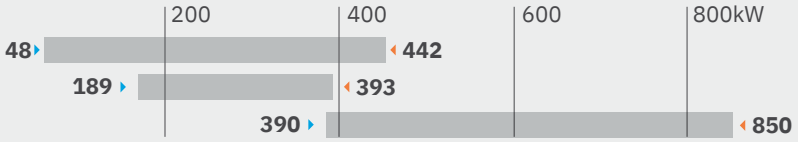


INTEGRA

Capacity Range



Capacity Range



Key

Inverter Driven Compressor
The capacity is modulated resulting in increased efficiency as well as in the possibility to effectively implement smart management solutions such as active redundancy.

VPF
The VPF (Variable Primary Flow) dynamically optimises the unit's thermoregulation for variable flow operation, thus ensuring both the highest pump energy savings and stable chiller operation.

Smart Thermal Energy Management
An innovative heat recovery system that allows the smart use of rejected heat from the industrial process for comfort heating and other neighbouring applications.

Configurable Efficiency Set
3 energy efficiency standard configurations available with most hydronic units.

High Water Temperature
A complete range of solutions designed to deliver high water temperature for any heating requirement.

Our **Traditional Chiller** range

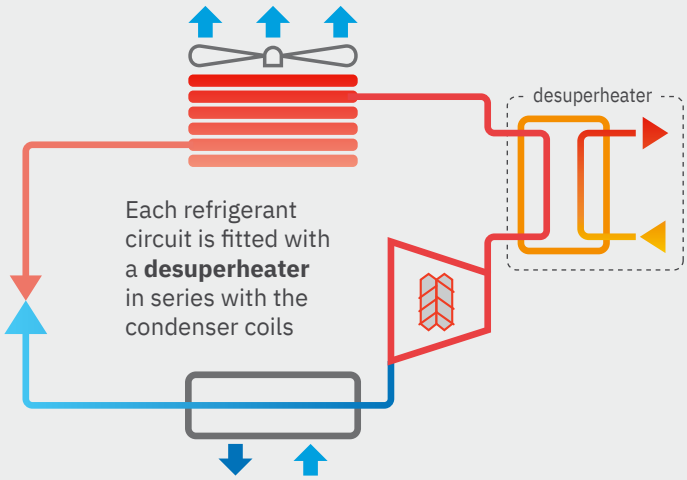
Heat Recovery

Heat is required in buildings throughout the year. Whether it is used for space heating or domestic hot water services, heat is vital for occupant comfort and health.

Heat recovery offers a number of benefits which are proving very useful for today's built environment. Heat recovery systems can be included in the HVAC plan with little to no impact on space requirements and can have a dramatic impact, reducing energy consumption and carbon emissions.

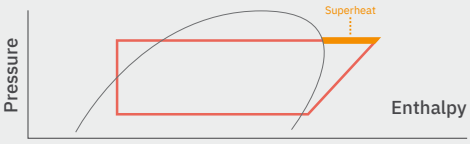
For mixed use projects or large offices, where heat profiles are diverse, heat recovery works particularly well. Heat can be captured from the cooling process and used to reduce the heating requirements in other areas of the building.

Partial heat recovery (desuperheater)

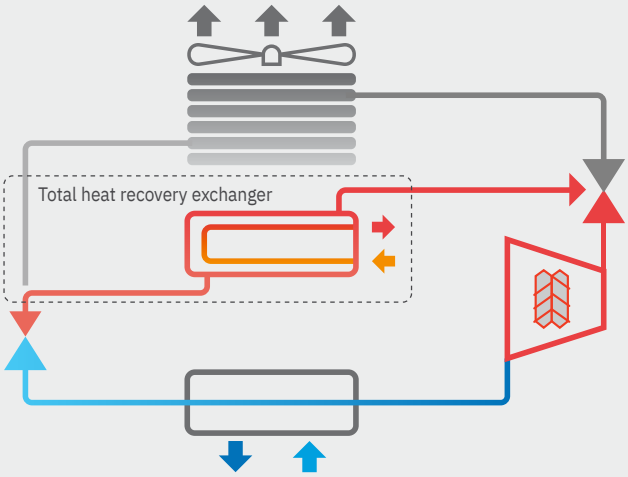


Approximately **20%** of the chiller's capacity

Up to **60°C** of outlet water temperature



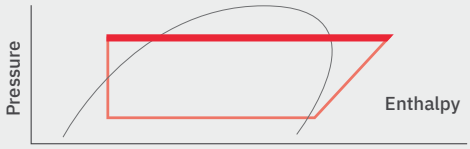
Total heat recovery



Each refrigerant circuit is fitted with a **total heat recovery exchanger** in parallel with the condenser coils.

Always **100%** of the chiller's capacity

Up to **60°C** of outlet water temperature



Read our CPD Certified Guide:

Heat Recovery Chillers

Click on the icon or Scan the QR code

CPD GUIDE

Our **Traditional Chiller** range

Integra

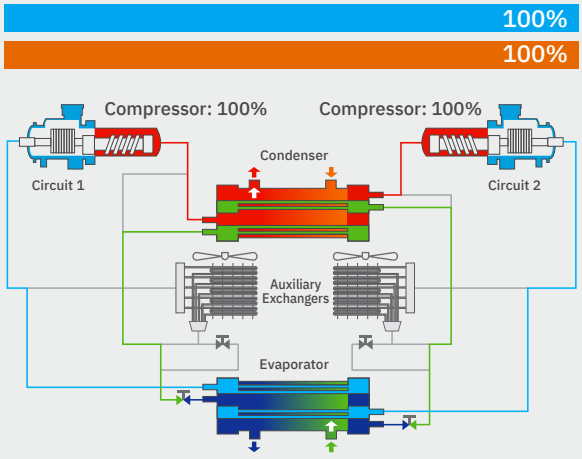
Modern mixed-use buildings, offices and hotels are good examples of buildings characterised by increasingly complex comfort requirements. The demand for an energy efficient solution to satisfy simultaneous heating and cooling has led to the development of the **INTEGRA range**, the versatile and multi-functional heat pump.

Maximum comfort, simultaneous hot and cold water production and unbeatable energy efficiency with TER (Total Energy Ratio) of up to 8, the advantages of the INTEGRA all-in-one units installed in a 4-pipe system are limitless. The main feature of the INTEGRA units is the ability to manage the overall capacity, referring to both cooling and heating demands, based on the actual load requirements of the total system. This operational flexibility means that all combinations of heating and cooling loads can be met.

Watch our video
INTEGRA technology

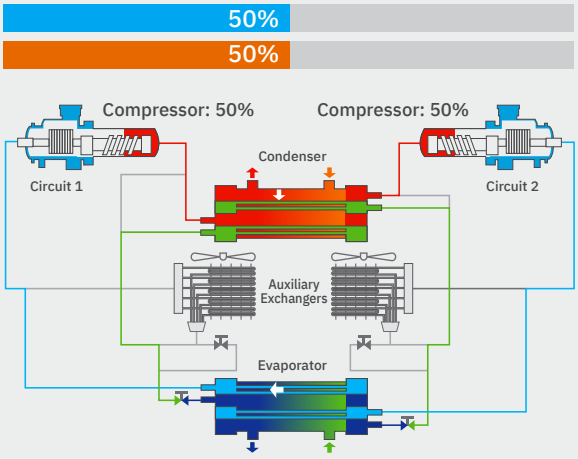
Click **Play** **or Scan**

100% cold side 100% hot side



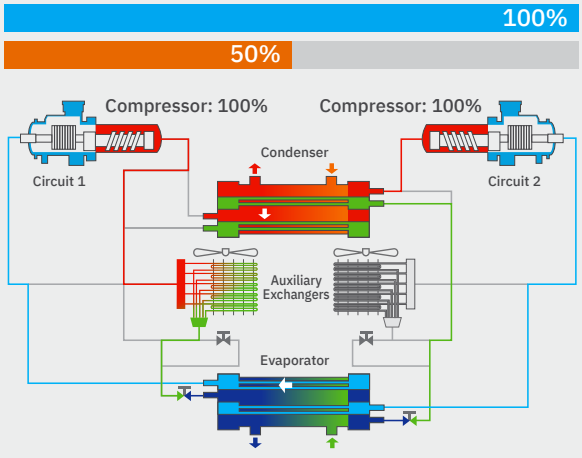
The two circuits operate at maximum power, evaporating in the cold-side exchanger and condensing in the hot-side one. The source-side heat exchanger (air coil or water exchanger, depending on the type of unit) is not used, which means that in these conditions there is no energy waste.

50% cold side 50% hot side



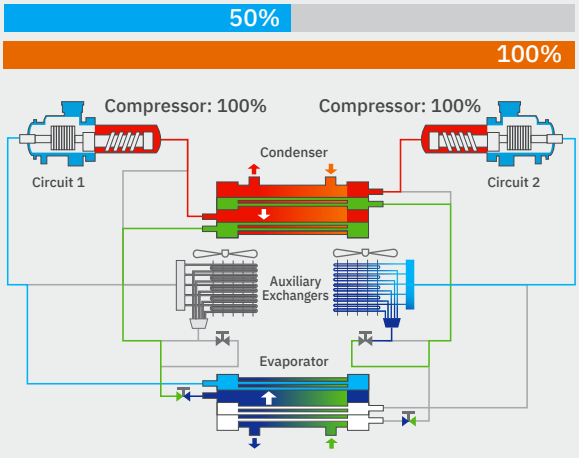
Also in this situation the unit operates like a water-water unit, as all the evaporating and condensing energy is used for the system. Since the system only requires 50% of the total energy, each circuit operates in partial load conditions. In this particular state, the exchangers are oversized, thus achieving an even higher efficiency.

100% cold side 50% hot side



Both the circuits operate to produce the amount of energy necessary for the cooling of the plant, evaporating all the refrigerant in the cold-side heat exchanger. While one circuit carries out the condensation on the hot-side heat exchanger, thus supplying the total energy necessary to heat the building, the other circuit exchanges the remaining heating energy in the external environment by using the auxiliary source-side heat exchanger (air coil or water exchanger, depending on the type of unit).

50% cold side 100% hot side



Just like the previous case, in this state both circuits operate differently, to supply the system with the correct amount of required energy. The unit uses two sources to produce the requested hot water flow: in fact,one circuit evaporates the refrigerant in the cold-side heat exchanger, thus producing the cold water demand, while the other circuit uses the auxiliary source-side heat exchanger. In this way both circuits move energy through the hot-side heat exchanger, fulfilling the request for hot water flow.

Our **Traditional Chiller** range

Performance Witness Testing

Test your Climaventa product before installation and make sure it's **performance is totally reliable**.

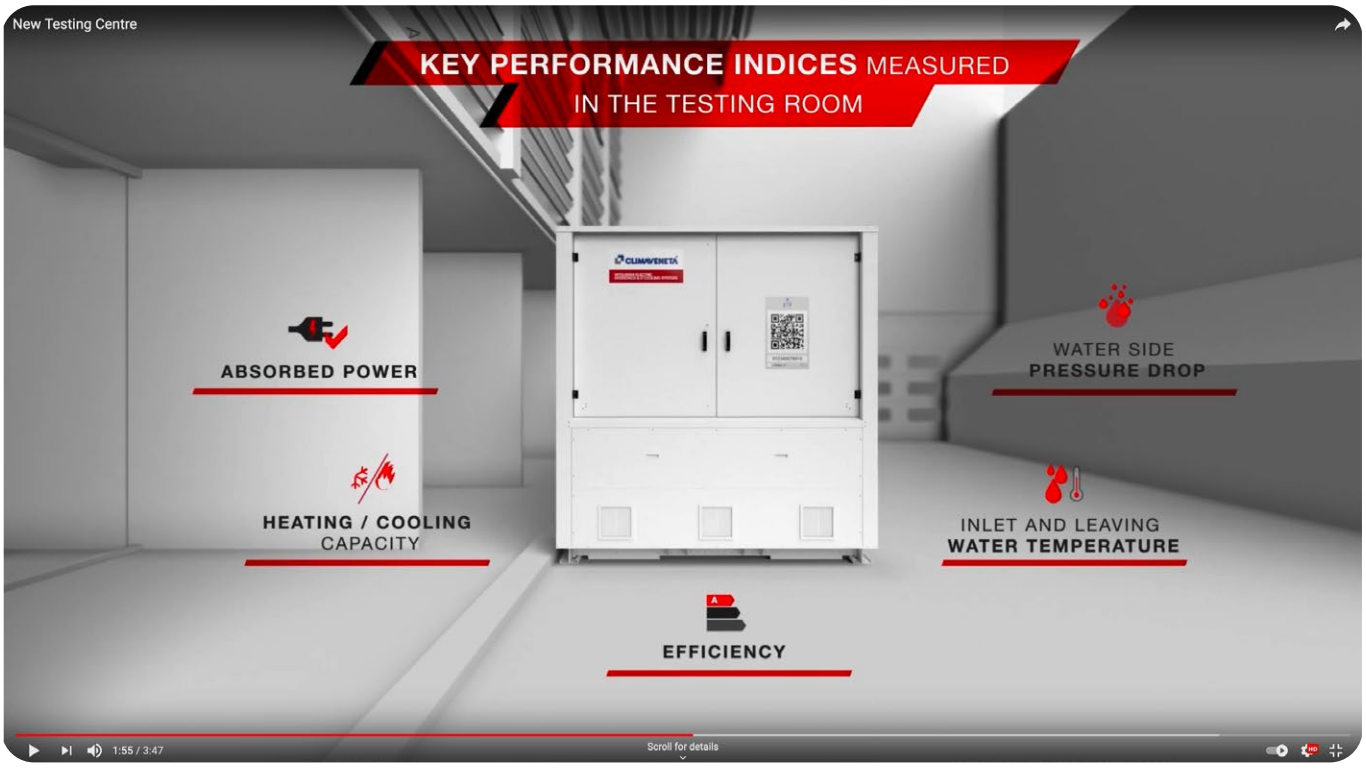
Building on the experience of the Climaveneta brand we are continuing to invest in research and development, our new cutting edge ML12 Testing Centre is proof of our commitment to continuous improvement and excellent manufacturing. Performance witness testing is available as additional service in order to test the unit under specific conditions, Carried out in a modern facility, this service provides the possibility to choose different witness test options in order to:

- Verify unit operation under severe conditions
- Check performance, both at full and partial loads
- Test the unit with low outdoor air temperature operation
- Detect sound emissions
- Time the fast restart

Watch our video

ML12 Testing Centre

Click Play or Scan



Our **Traditional Chiller** range
Product Information

i-BX

Our Climaveneta range of small to medium sized i-BX cooling only chillers efficiently and easily adapt to a wide range of cooling capacities.

The range all contain inverter driven scroll compressors for enhanced efficiency and control.

Capacity Range

Single Phase	4 - 13kW
Three Phase	10 - 35kW

Components

Compressor Type	Inverter Scroll
Fan Type	Axial
Refrigerant	R 410A
Heat Exchanger Type	Plate

Operation Range

Ambient Temperature Range	-10 to 45°C
Outlet Water Temperature Range	-8 to 18°C

Note: Please refer to the technical manual for full operating window details.

SEER Range

Seasonal Efficiency in Cooling Reg. EU 2016/2281

	Single Phase					Three Phase						
i-BX	**004**	**006**	**008**	**010**	**013**	**010**	**013**	**015**	**020**	**025**	**030**	**035**
$P_{rated,c}$ (kW)	4.3	6.11	8.11	10.6	12.9	10.7	13.3	15.5	20.6	25	29.9	35.2
SEER	4.38	4.43	4.93	4.39	4.78	4.46	4.8	4.31	4.31	4.52	4.52	4.57
$\eta_{s,c}$	172%	174%	194%	172%	188%	176%	189%	169%	169%	178%	178%	180%

i-BX Features

Dynamic Control

Control of the water supply temperature depending on the outdoor air temperature greatly increases the **comfort and energy efficiency** of the system.

Advanced Management

Cascade management of up to **4 units** to extend total system capacity.

Frost Protection

Frost management based on inside or outside air temperature or water temperature, to protect pipework and heat exchangers inside the unit.

Night Mode

Noise level is reduced limiting maximum compressor frequency and fan speed.

i-BX Product Information

Click on the icons or Scan the QR codes

i-BX
Air Cooled Chiller Range
Single Phase (4.3-12.9kW)

i-BX
Air Cooled Chiller Range
Three Phase (10.7-35.1kW)

i-NX

Our Climaveneta range of i-NX units are air cooled chillers with the exclusive 1 + i compressor philosophy. Both the fixed speed scroll compressor and the scroll inverter compressor are combined in the same circuit.

This technology ensures maximum benefit in terms of efficiency at partial loads compared to a solution with separate circuits. The i-NX range is available from 43.9 to 129kW using R410A refrigerant.

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

1+i Philosophy

ErP 2021 COMPLIANT

Capacity Range

R410A Model	43.9 - 129kW

Components

Compressor Type	1+i Scroll	Refrigerant	R 410A
Fan Type	Axial	Heat Exchanger Type	P Plate

Operation Range

Ambient Temperature Range	-20 to 48°C
Outlet Water Temperature Range	-10 to 20°C

Note: Please refer to the technical manual for full operating window details.

SEER Range

Seasonal Efficiency in Cooling Reg. EU 2016/2281

i-NX	0151	0182	0202	0262	0302	0352	0402	0502
$P_{rated,c}$ (kW)	43.6	52.6	62.7	71.7	83.4	100	119	129
SEER	4.15	4.11	4.13	4.18	4.23	4.36	4.32	4.3
$\eta_{s,c}$	163%	161%	162%	164%	166%	171%	170%	169%

i-NX Features

Aluminium Microchannel Heat Exchangers

The full aluminium micro-channel condenser coils deliver high efficiency while ensuring a **reduced refrigerant volume** and a **lower unit weight**.

Simplified Installation

The availability of the integrated hydronic module provides **quick and easy installation**.

Super Silent Operation

The best compromise between silence and efficiency, as a result of a systematic design oriented to minimise noise reduction. **Noise level reductions of up to 7dB(A)** with the super silent 'SL' version for the most sensitive of installation requirements.

Extensive Options

An extensive option list, including, high efficiency, silent operation, BMS connection, refrigerant leak detection and more means the i-NX can offer a solution for the most demanding of project requirements.

i-NX Product Information

Click on the icon or Scan the QR code

i-NX
Air Cooled Chiller Range (43.6 - 129kW)

i-NX-Q

Our Climaveneta range of i-NX-Q units are air cooled chillers designed to produce chilled and hot water simultaneously and efficiently using variable frequency drive compressors.

The full inverter solution applied on two separate refrigerant circuits ensures maximum reliability and total versatility, matching the thermal load request constantly and with maximum precision.

The i-NX-Q range is available from 44.7 to 152kW using R410A refrigerant.

Capacity Range (Cooling Capacity)

R410A Model	44.7 - 152kW

Components

Compressor Type	Inverter Scroll	Refrigerant	410A
Fan Type	Axial	Heat Exchanger Type	Plate

Operation Range - Cooling

Ambient Temperature Range	-10 to 46°C
Outlet Water Temperature Range	-10 to 20°C

Operation Range - Heating

Ambient Temperature Range	-15 to 40°C
Outlet Water Temperature Range	24 to 60°C

Note: Please refer to the technical manual for full operating window details.

SEER Range

Seasonal Efficiency in Cooling Reg. EU 2016/2281

i-NX-Q	0152	0182	0202	0252	0262	0302	0352	0402	0502	0552
$P_{rated,c}$ (kW)	44.7	51.2	60.8	67.5	79	87.8	100.7	114	132.9	151.7
SEER	4.28	4.39	4.4	4.36	4.24	4.16	4.41	4.33	4.44	4.47
$\eta_{s,c}$	168%	173%	173%	171%	167%	163%	173%	170%	175%	176%

i-NX-Q Features

Unique 4-Pipe Solution

The i-NX-Q is designed to satisfy the chilled and the hot water requirements simultaneously, providing unrivalled heat recovery options with **total system efficiencies as high as 7.62**.

Variable Frequency Drive Compressors

Separate and independent refrigerant circuits each equipped with variable speed drive compressors to achieve **best possible efficiency** at partial load.

Simplified Installation

The availability of the integrated hydronic module provides **quick and easy installation**.

Super Silent Operation

The best compromise between silence and efficiency, as a result of a systematic design oriented to minimise noise reduction. **Noise level reductions of up to 7dB(A)** with the super silent 'SL' version for the most sensitive of installation requirements.

i-NX-Q Product Information

Click on the icon or Scan the QR code

i-NX-Q

Air Cooled, 4 pipe Chillers - Low Noise Version (45-139kW) Heat Pump - Three Phase

NX2

2 Compressor Chassis

Our Climaveneta range of NX2 units are air cooled chillers with scroll compressors designed to deliver high efficiencies in comfort applications.

Available from 40 to 208kW with lower GWP R454B refrigerant.

All the main hydraulic and mechanical components are integrated inside the unit, providing the ideal plug & play solution.

Capacity Range

R454B Model	40 - 208kW

Components

Compressor Type	Scroll	Refrigerant	R 454B
Fan Type	Axial	Heat Exchanger Type	Plate

Operation Range

Ambient Temperature Range	-20 to 50°C
Outlet Water Temperature Range	-10 to 20°C

Note: Depending on configuration, please refer to the technical manual for full operating window details.

SEER Range

Seasonal Efficiency in Cooling Reg. EU 2016/2281

NX2 R454B	0042	0052	0062	0072	0082	0092	0102	0112	0122	0142	0162	0182	0202	0222
$P_{rated,c}$ (kW)	40.4	48.5	54	60.8	68	79.6	93.1	103.5	116.2	129.3	151.7	173.9	186.6	208.3
SEER	4.61	4.72	4.56	4.65	4.57	4.6	4.53	4.29	4.32	4.38	4.48	4.49	4.48	4.46
$\eta_{s,c}$	181%	186%	179%	183%	180%	181%	178%	168%	170%	172%	176%	177%	176%	175%

NX2 Features

Advanced Refrigerant Choice

Thanks to the new generation refrigerant R454B, the environmental impact of NX2 is greatly reduced with a **76% reduction in GWP** vs R410A and a **31% reduction** vs R32.

Aluminium Microchannel Heat Exchangers

The full aluminium micro-channel condenser coils deliver high efficiency while ensuring a **reduced refrigerant volume** and a **lower unit weight**.

Super Silent Operation

The best compromise between silence and efficiency, as a result of a systematic design oriented to minimise noise reduction. **Noise level reductions of up to 4dB(A)** with the noise reduction NR' version for the most sensitive of installation requirements.

Extensive Options

An extensive option list, including, high efficiency, silent operation, BMS connection, refrigerant leak detection and more means the NX2 can offer a solution for the most demanding of project requirements.

NX2 Product Information

Click on the icon or Scan the QR code

NX2
2 Compressor Air Cooled Chillers (40-208kW)

NX2

4 Compressor Chassis

Our Climaveneta range of NX2 units are air cooled chillers with scroll compressors designed to deliver high efficiencies in comfort applications.

Available from 168 to 345kW with lower GWP R454B refrigerant.

All the main hydraulic and mechanical components are integrated inside the unit, providing the ideal plug & play solution.

Capacity Range

R454B Model	168 - 345kW

Components

Compressor Type	Scroll	Refrigerant	R 454B
Fan Type	Axial	Heat Exchanger Type	P T Plate or Shell & Tube

Operation Range

Ambient Temperature Range	-20 to 52°C
Outlet Water Temperature Range	-10 to 20°C

Note: Depending on configuration, please refer to the technical manual for full operating window details.

SEER Range

Seasonal Efficiency in Cooling Reg. EU 2016/2281

NX2 R454B	0184	0214	0244	0264	0294	0334	0374
$P_{rated,c}$ (kW)	168.1	197.2	225.8	250.4	279.7	312.8	345.4
SEER	4.73	4.76	4.78	4.79	4.71	4.73	4.62
$\eta_{s,c}$	186%	188%	188%	189%	185%	186%	182%

Note: Data shown for Plate Heat Exchanger - please refer to technical manual for Shell & Tube data

Features

Advanced Refrigerant Choice

Thanks to the new generation refrigerant R454B, the environmental impact of NX2 is greatly reduced with a **76% reduction in GWP** vs R410A and a **31% reduction** vs R32.

Aluminium Microchannel Heat Exchangers

The full aluminium micro-channel condenser coils deliver high efficiency while ensuring a **reduced refrigerant volume** and a **lower unit weight**.

Super Silent Operation

The best compromise between silence and efficiency, as a result of a systematic design oriented to minimise noise reduction. **Noise level reductions of up to 9dB(A)** with the noise reduction NR' version for the most sensitive of installation requirements.

Extensive Options

An extensive option list, including, high efficiency, silent operation, BMS connection, refrigerant leak detection and more means the NX2 can offer a solution for the most demanding of project requirements.

NX2 Product Information

Click on the icon or Scan the QR code

NX2

4 Compressor Air Cooled Chillers (168-345kW)

NX2

4-8 Compressor Chassis

Our Climaveneta range of NX2 units are air cooled chillers with scroll compressors designed to deliver high efficiencies in comfort applications.

Available from 379 to 872kW with lower GWP R454B refrigerant.

All the main hydraulic and mechanical components are integrated inside the unit, providing the ideal plug & play solution.

Capacity Range

R454B Model	379 - 872kW

Components

Compressor Type	Scroll	Refrigerant	R 454B
Fan Type	Axial	Heat Exchanger Type	T Shell & Tube

Operation Range

Ambient Temperature Range	-20 to 52°C
Outlet Water Temperature Range	-12 to 20°C

Note: Depending on configuration, please refer to the technical manual for full operating window details.

SEER Range

Seasonal Efficiency in Cooling Reg. EU 2016/2281

NX2 R454B	0404	0424	0464	0515	0576	0585	0636	0676	0706	0768	0808	0848	0898	0928
$P_{rated,c}$ (kW)	378.6	398.5	436.5k	487.5	538.3	546.2	597.3	635.7	655.8	719.8	758.8	797.4	834.8	866.3
SEER	4.67	4.68	4.65	4.7	4.7	4.76	4.75	4.73	4.77	4.75	4.74	4.75	4.75	4.74
$\eta_{s,c}$	184%	184%	183%	185%	185%	187%	187%	186%	188%	187%	187%	187%	187%	187%

Note: Data shown for standard efficiency model.

NX2 Features

Advanced Refrigerant Choice

Thanks to the new generation refrigerant R454B, the environmental impact of NX2 is greatly reduced with a **76% reduction in GWP** vs R410A and a **31% reduction** vs R32.

Aluminium Microchannel Heat Exchangers

The full aluminium micro-channel condenser coils deliver high efficiency while ensuring a **reduced refrigerant volume** and a **lower unit weight**.

Super Silent Operation

The best compromise between silence and efficiency, as a result of a systematic design oriented to minimise noise reduction. **Noise level reductions of up to 9dB(A)** with the noise reduction NR' version for the most sensitive of installation requirements.

Extensive Options

An extensive option list, including, high efficiency, silent operation, BMS connection, refrigerant leak detection and more means the NX2 can offer a solution for the most demanding of project requirements.

NX2 Product Information

Click on the icon or Scan the QR code

NX2
4-8 Compressor Air Cooled Chillers (379-872kW)

i-FX

Our Climaveneta range of i-FX units air cooled chillers with inverter screw compressors are designed for delivering high efficiencies in comfort applications.

Available with low GWP R513A refrigerant, the new i-FX chillers apply variable speed technology in all of its main components, achieving top-level performances in any load condition.

Capacity Range

R513A Model	477 - 1697kW

Components

Compressor Type	Inverter Screw	Refrigerant	R 513A
Fan Type	Axial	Heat Exchanger Type	T Shell & Tube

Operation Range

Ambient Temperature Range	-20 to 48°C
Outlet Water Temperature Range	-10 to 20°C

Note: Depending on configuration, please refer to the technical manual for full operating window details.

SEER Range - i-FX-R513A

Seasonal Efficiency in Cooling Reg. EU 2016/2281

i-FX-R513A	2202	2602	2652	2702	2722	3152	3602	3902	4202	4502	4802	4812
$P_{rated,c}$ (kW)	477.3	529.4	559.6	596.2	654.7	718.2	798.9	871.3	928.7	987.3	1026	1050
SEER	4.77	4.78	4.73	4.76	4.76	4.82	4.83	4.79	4.82	4.77	4.80	4.79
$\eta_{s,c}$	188%	188%	186%	187%	187%	190%	190%	189%	190%	188%	189%	189%

i-FX-R513A	4822	5412	6002	6022	6303	6903	7203	7213	7223
$P_{rated,c}$ (kW)	1124	1166	1238	1297	1405	1488	1555	1644	1691
SEER	4.82	4.89	4.90	4.90	4.74	4.77	4.76	4.76	4.79
$\eta_{s,c}$	190%	193%	193%	193%	187%	188%	187%	187%	189%

i-FX Features

Total Inverter Technology

Inverter control on all compressors, fans and optional hydraulic modules means **perfectly matched cooling loads** of the plant in every condition and stepless capacity control with high accuracy.

Multiple Heat Recovery Configurations

Available in either partial or full heat recovery the i-FX range can produce **DHW up to 60°C** for sanitary uses integrated with existing DHW plant.

Aluminium Microchannel Heat Exchangers

The full aluminium micro-channel condenser coils deliver high efficiency while ensuring a **reduced refrigerant volume** and a l**ower unit weight**.

Extensive Options

An extensive option list, including, high efficiency, silent operation, BMS connection, refrigerant leak detection and more means the i-FX can offer a solution for the most demanding of project requirements.

i-FX Product Information

Click on the icon or Scan the QR code

i-FX
Air Cooled, Inverter Screw Chillers (477-1697kW)

i-FX HFO

Our Climaveneta range of i-FX units air cooled chillers with inverter screw compressors and HFO green refrigerant are designed for delivering high efficiencies in comfort applications.

Using HFO1234ze achieves outstanding performance, ensuring long-term sustainability, with nearly zero environmental impact.

The new i-FX chillers apply variable speed technology in all of its main components, achieving top-level performances in any load condition.

Capacity Range

HFO1234ze Model	377 - 1463kW

Components

Compressor Type		Inverter Screw	Refrigerant	HFO 1234ze
Fan Type		Axial	Heat Exchanger Type	T Shell & Tube

Operation Range

Ambient Temperature Range	-15 to 52°C
Outlet Water Temperature Range	-2 to 20°C

Note: Please refer to the technical manual for full operating window details.

SEER Range - i-FX-HFO1234ze

Seasonal Efficiency in Cooling Reg. EU 2016/2281

i-FX-HFO1234ze	2202	2602	2702	2722	3602	4202	4802
$P_{rated,c}$ (kW)	381.5	416.4	485.7	533.2	639.7	723.4	841.1
SEER	5.18	5.26	5.26	5.18	5.09	5.18	5.09
$\eta_{s,c}$	204%	207%	208%	204%	201%	204%	201%
i-FX-HFO1234ze	**4822**	**6002**	**6022**	**6603**	**7203**	**7223**	**7823**
$P_{rated,c}$ (kW)	912.6	991	1035	1143	1276	1394	1458
SEER	5.06	5.13	5.09	5.11	5.04	5.04	5.00
$\eta_{s,c}$	199%	202%	201%	201%	198%	198%	197%

i-FX-HFO Features

HFO Refrigerant

Fully committed to supporting the creation of a greener tomorrow with the 4th generation refrigerant HFO1234ze, with negligible greenhouse effect and **zero impact on the ozone layer** - GWP<1 & ODP=0.

Total Inverter Technology:

Inverter control on all compressors, fans and optional hydraulic modules means **perfectly matched cooling loads** of the plant in every condition and stepless capacity control with high accuracy.

Aluminium Microchannel Heat Exchangers

The full aluminium micro-channel condenser coils deliver high efficiency while ensuring a **reduced refrigerant volume** and a **lower unit weight**.

Extensive Options

An extensive option list, including, high efficiency, silent operation, BMS connection, refrigerant leak detection and more means the i-FX can offer a solution for the most demanding of project requirements.

i-FX-HFO Product Information

Click on the icon or Scan the QR code

i-FX-HFO

Air Cooled, Inverter Screw Chillers (377-1463kW)

i-FX-Q2

Our Climaveneta range of i-FX-Q2 units are air cooled chillers designed to produce chilled and hot water simultaneously and efficiently using variable frequency drive compressors.

The full inverter solution applied on two separate refrigerant circuits ensures maximum reliability and total versatility, matching the thermal load request constantly and with maximum precision.

The i-FX-Q2 range is available with lower GWP R513A refrigerant.

Capacity Range

R513A Model	485 - 1079kW

Components

Compressor Type	Inverter Screw	Refrigerant	R 513A
Fan Type	EC	Heat Exchanger Type	T Shell & Tube

Operation Range Cooling

Ambient Temperature Range	-10 to 46°C
Outlet Water Temperature Range	-8 to 18°C

Operation Range Heating

Ambient Temperature Range	-12 to 35°C
Outlet Water Temperature Range	26 to 60°C

Note: Please refer to the technical manual for full operating window details.

SEER Range i-FX-Q2

Seasonal Efficiency in Cooling Reg. EU 2016/2281

i-FX-Q2	0502	0532	0602	0652	0702	0802	0902	1002	1102
$P_{rated,c}$ (kW)	485.9	529.2	568.5	624.8	686.6	785.6	912.3	982.3	1079
SEER	5.15	5.09	5.11	5.08	5.12	5.02	4.73	4.66	4.63
$\eta_{s,c}$	203%	201%	202%	200%	202%	198%	186%	183%	182%

i-FX-Q2 Features

Unique 4-Pipe Solution

The i-FX-Q2 is designed to satisfy the chilled and the hot water requirements simultaneously, providing unrivalled heat recovery options with **total system efficiencies as high as 7.94**.

Variable Frequency Drive Compressors

Separate and independent refrigerant circuits each equipped with variable speed drive compressors to achieve **best possible efficiency at partial load**.

EC Fans as Standard

The addition of EC fans as standard provides superior full and part load efficiency and **extremely quiet operation** for the most demanding of project requirements.

Advanced Refrigerant Choice

Thanks to the new generation low density refrigerant R513A, the environmental impact of i-FX-Q2 is greatly reduced with a **56% reduction in GWP** vs R134a.

i-FX-Q2 Product Information

Click on the icon or Scan the QR code

i-FX-Q2

Air Cooled, 4 Pipe Inverter Screw Chillers (485-1079kW)

FX2

Our Climaveneta range of FX2 units are air cooled chillers with screw compressors designed for delivering high efficiencies in comfort applications.

Available with lower GWP R513A refrigerant, the new range features 2 or 3 compressors in multi-circuit configuration.

Capacity Range

R513A Model	322 - 1838kW

Components

Compressor Type	Screw	Refrigerant	R 513A
Fan Type	Axial	Heat Exchanger Type	T Shell & Tube

Operation Range

Ambient Temperature Range	-20 to 50°C
Outlet Water Temperature Range	-8 to 20°C

Note: Depending on configuration, please refer to the technical manual for full operating window details.

SEER Range - FX2-R513A

Seasonal Efficiency in Cooling Reg. EU 2016/2281

FX2-R513A	0322	0352	0402	0472	0512	0572	0652	0702	0772	0852	0902	1002
$P_{rated,c}$ (kW)	321.8	349.8	411.5	463.9	516.2	572.9	645.2	707	779.1	862.3	936.6	995.2
SEER	4.51	4.50	4.56	4.58	4.58	4.56	4.58	4.57	4.57	4.58	4.59	4.59
$\eta_{s,c}$	177%	177%	179%	180%	179%	179%	180%	180%	180%	180%	180%	181%
FX2-R513A	**1052**	**1102**	**1152**	**1222**	**1262**	**1322**	**1402**	**1503**	**1593**	**1663**	**1773**	**1883**
$P_{rated,c}$ (kW)	1055	1097	1138	1231	1264	1331	1399	1505	1591	1663	1777	1838
SEER	4.56	4.56	4.58	4.60	4.56	4.57	4.58	4.59	4.59	4.58	4.60	4.63
$\eta_{s,c}$	180%	179%	180%	180%	179%	180%	180%	181%	181%	181%	181%	182%

FX2 Features

Advanced Refrigerant Choice

Thanks to the new generation low density refrigerant R513A, the environmental impact of FX2 is greatly reduced with a **56% reduction in GWP** vs R134a.

Compact Design

FX2 delivers an **8% increase in cooling capacity and 10% increase in efficiency** compared to the previous generation, exceeding the most demanding efficiency thresholds.

Advanced Technology

A dry expansion, single pass shell & tube evaporator fully developed in-house with internally grooved copper tubes with low pressure drops.

Super Silent Operation

The best compromise between silence and efficiency, as a result of a systematic design oriented to minimise noise reduction. **Noise level reductions of up to 12dB(A)** with the super silent 'SL' version for the most sensitive of installation requirements.

FX2 Product Information

Click on the icon or Scan the QR code

FX2-R513A
Air Cooled Screw Chiller (322-1838kW)

FX2 - HFO

Our Climaveneta range of FX2 units are air cooled chillers with screw compressors and HFO green refrigerant.

From 252 to 1572 kW the FX2 with HFO1234ze achieving outstanding performance and ensuring long-term sustainability, with nearly zero environmental impact.

Capacity Range

HFO1234ze Model	252 - 1572kW

Components

Compressor Type	Screw	Refrigerant	HFO 1234ze
Fan Type	Axial	Heat Exchanger Type	T Shell & Tube

Operation Range

Ambient Temperature Range	-15 to 52°C
Outlet Water Temperature Range	-2 to 20°C

Note: Please refer to the technical manual for full operating window details.

SEER Range - FX2-HFO1234ze

Seasonal Efficiency in Cooling Reg. EU 2016/2281

FX2-HFO1234ze	0252	0302	0322	0352	0402	0452	0512	0572	0652
$P_{rated,c}$ (kW)	255	289.5	314.7	364.7	405	445.4	519.2	572.9	678.4
SEER	4.55	4.52	4.61	4.54	4.56	4.61	4.56	4.61	4.60
$\eta_{s,c}$	179%	178%	181%	178%	179%	181%	179%	182%	181%
FX2-HFO1234ze	**0772**	**0902**	**0972**	**1052**	**1152**	**1243**	**1373**	**1503**	**1593**
$P_{rated,c}$ (kW)	781	902.9	967.1	1057	1145	1238	1361	1487	1560
SEER	4.63	4.64	4.64	4.65	4.69	4.63	4.58	4.67	4.69
$\eta_{s,c}$	182%	183%	183%	183%	185%	182%	180%	184%	185%

FX2-HFO Features

HFO Refrigerant

Fully committed to supporting the creation of a greener tomorrow with the 4th generation refrigerant HFO1234ze, with negligible greenhouse effect and **zero impact on the ozone layer** - GWP<1 & ODP=0.

Compact Design

FX2 delivers an **8% increase in cooling capacity and 10% increase in efficiency** compared to the previous generation, exceeding the most demanding efficiency thresholds.

Advanced Technology

A dry expansion, single pass shell & tube evaporator fully developed in-house with internally grooved copper tubes with low pressure drops.

Super Silent Operation

The best compromise between silence and efficiency, as a result of a systematic design oriented to minimise noise reduction. **Noise level reductions of up to 12dB(A)** with the super silent 'SL' version for the most sensitive of installation requirements.

FX2-HFO Product Information

Click on the icon or Scan the QR code

FX2-HFO
Air Cooled Screw Chiller (252-1572kW)

Total support for total reliability

MELSMART
TECHNICAL SERVICES

Mitsubishi Electric have been manufacturing chillers for over 40 years and, to keep your equipment working at optimum performance, we provide comprehensive technical support and bespoke maintenance packages to maximise energy efficiency.

Our onsite services comprise a range of options for partners. From commissioning, to fault-finding and regular health checks, we offer a menu of services you can select from to make up a service support proposition that addresses short- and long-term needs.

The Mitsubishi Electric Service and Maintenance team does more than respond to your HVAC needs; we help you anticipate them with planned preventive maintenance. Our customer service commitment is to add value by helping you eliminate unnecessary expenditure, and attain the highest levels of efficiency your equipment and systems can deliver.

All of our chiller and heat pump products come with warranty as standard. Our e-series modular product comes complete with a **5-year warranty as standard** and our Climaveneta range comes with a 1-year warranty that can be extended to 3-year*.

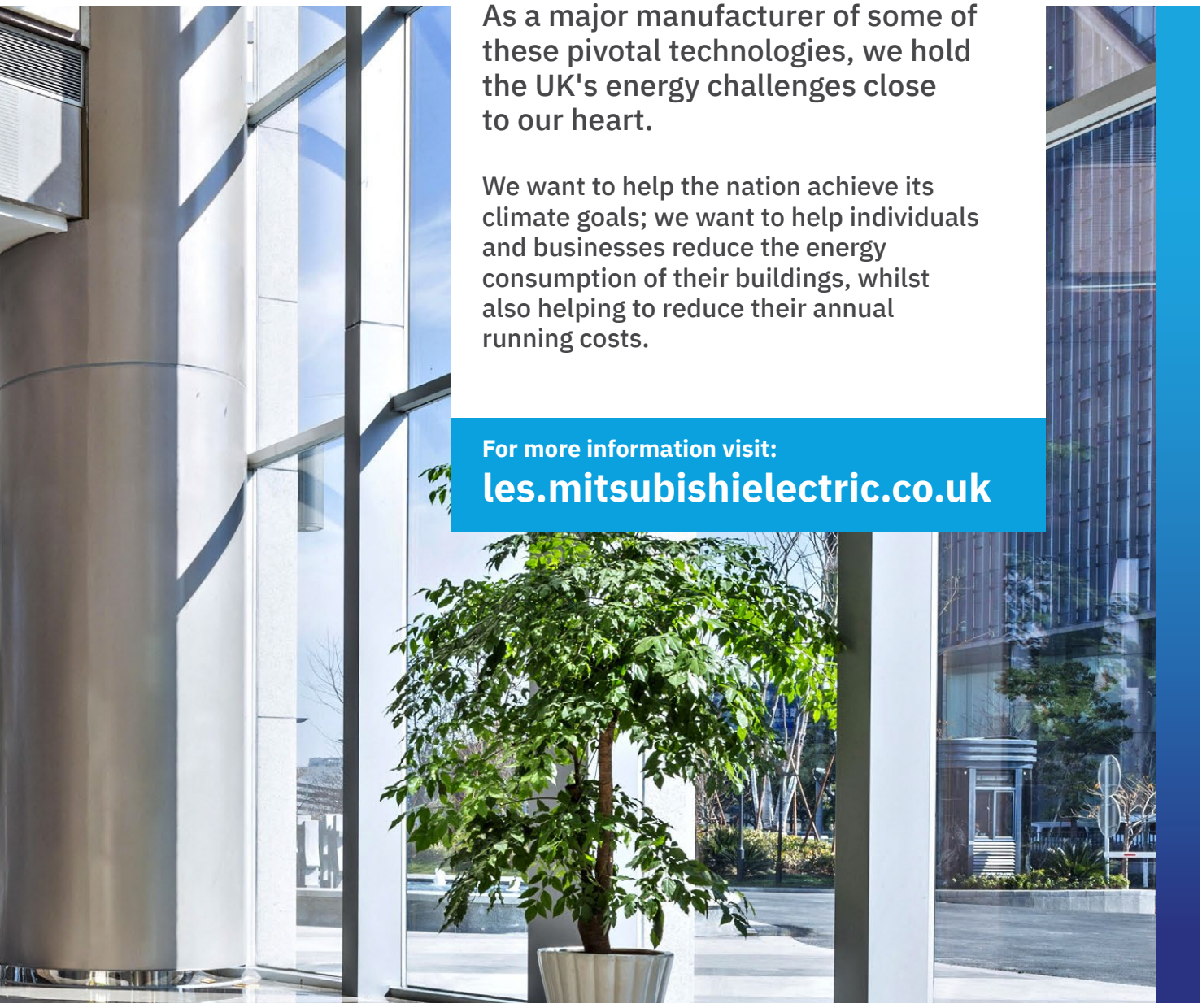
Further Information

Click the icon or scan the QR code to download our Service & Maintenance Brochure

*Subject to warranty terms and conditions being met.


SIEMENS
VL250

Mitsubishi Electric is a market leader in providing solutions to cool, heat, ventilate and control our buildings



As a major manufacturer of some of these pivotal technologies, we hold the UK's energy challenges close to our heart.

We want to help the nation achieve its climate goals; we want to help individuals and businesses reduce the energy consumption of their buildings, whilst also helping to reduce their annual running costs.

For more information visit:

les.mitsubishielectric.co.uk

MITSUBISHI ELECTRIC
Changes for the Better

Telephone: 01707 282880

MELSmart Technical Services: 0161 866 6089
Technical Help - option 1
Warranty - option 3
Training - option 6 followed by option 1

email: chillers@meuk.mee.com
website: les.mitsubishielectric.co.uk
microsite: mechillers.co.uk

@meuk_les
@green_gateway

Mitsubishi Electric Living Environmental Systems UK

Mitsubishi Electric Cooling and Heating UK

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Note: The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

Effective as of April 2021

Mitsubishi Electric Quality

FSC www.fsc.org MIX From responsible sources FSC® C000000

Green Gateway
www.greengateway.mitsubishielectric.co.uk
Mitsubishi Electric UK's commitment to the environment

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