

mitsubishi electric
HYDRONICS & IT COOLING SYSTEMS S.p.A.

IT COOLING

WATER SOURCE CHILLERS

TR2-W-Z **G04**

**HIGH EFFICIENCY WATER COOLED CHILLERS,
WITH OIL-FREE CENTRIFUGAL COMPRESSORS
AND HFO R1234ZE REFRIGERANT,
FROM 284 TO 2070 kW**

r **HFO**
1234ze



TR2-W-Z

G04

**FOLLOW THE RED LINE.
MEET THE GREEN FUTURE.**



Water-source chillers reversible on the water side with oil-free centrifugal compressors. From 284 kW to 2070 kW.

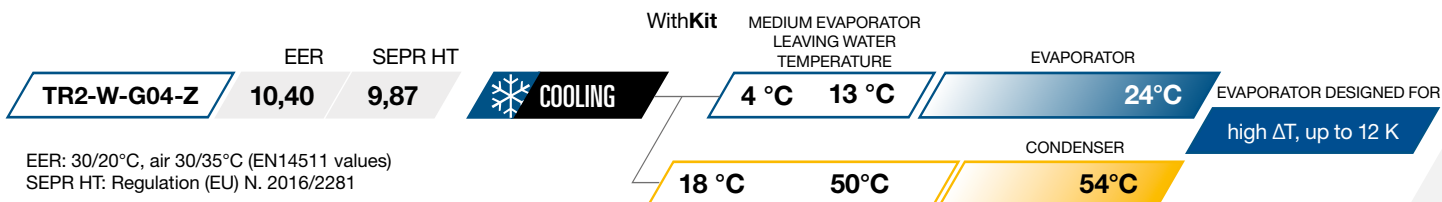


The TR2-W-G04-Z range is specifically engineered to be at the forefront of green innovation in IT cooling applications, thanks to the optimized oil free compressors and the HFO R1234ze refrigerant.

THE MOST EFFICIENT AND GREEN HFO OIL-FREE CHILLER ON THE MARKET

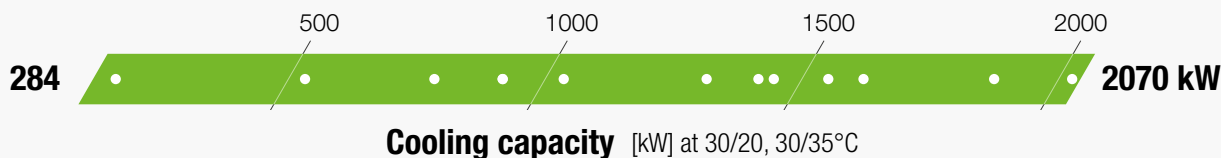
EFFICIENCY UP TO

WIDE OPERATING RANGE FOR IT COOLING APPLICATIONS



WIDE COOLING CAPACITY FOR HFO

TR2-W-G04-Z comes with a wide cooling capacity coverage, with 12 sizes featuring from 1 to 4 oil-free compressors always with a very compact footprint.



HIGH EFFICIENCIES

By choosing TR2-W-G04-Z you are getting a unit which employs a unique combination of specifically designed centrifugal compressors and optimized heat exchangers, perfectly suited for this range.

This combination, along with a careful design and the great know how put into the design, push the levels of efficiency to new heights, making it the perfect choice for any IT cooling application.

SUPER SILENT

Oil-free compressors are among the most silent on the market.

What's more, TR2-W-G04-Z features a special casing structure that makes this unit the best-in-class unit in terms of low sound levels.



BEST kW/m² RATIO

Best Performance/footprint ratio for ensuring a simplified installation and very low shipping costs.

The product dimensions are ideal for container transportation.

G04 VERSION WITH R1234ZE REFRIGERANT

R HFO
1234ze

TR2-W-G04-Z adopts the almost-zero GWP R1234ze refrigerant, which tackles both indirect (due to primary energy consumption) and direct global warming, thus resulting in the perfect choice for any forward-looking cooling system.

COOLING CAPACITIES UP TO 2070 kW

TR2-W-G04-Z covers a large range of cooling capacities.

This aspect makes the oil-free chiller the ideal solution both for both small-medium applications and large environments where a reduced footprint is key.

BESPOKE SELECTION SOFTWARE

TR2-W-G04-Z can be tailored to suit your plant needs.

Thanks to a dedicated selection software, you can select the most competitive product size according to the cooling demand, without sacrificing any requirements in terms of efficiency or initial investment.

TR2-W-Z **G04** All-round sustainability

TR2-W-G04-Z is the result of Mitsubishi Electric Hydronics & IT Cooling Systems' extensive approach to sustainability.

Achieving outstanding performance and ensuring long-term sustainability are challenges that modern HVAC systems need to tackle.

Increasing concerns about the global warming impact of chillers and heat pumps is driving new

regulatory policies to push towards even more efficient units with the lowest carbon footprint.

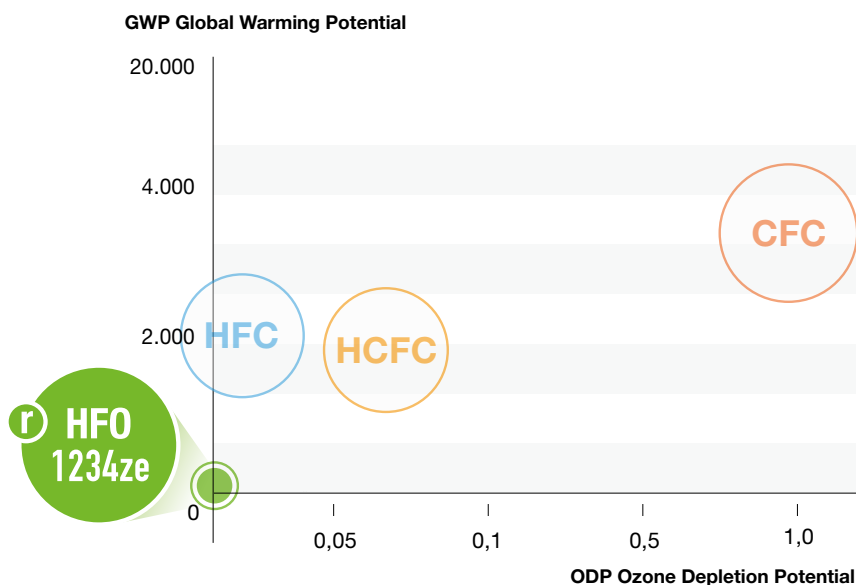
Today, an all-round approach is the only way to effectively reduce the Total Equivalent Warming Impact (TEWI).

Combining brilliant annual efficiency with the use of a low GWP refrigerant, TR2-W-G04-Z tackles both the indirect (due to the primary energy consumption) and the direct global warming impact, thus resulting in the perfect choice for any new, forward-looking cooling system.

The environmental impact of the refrigerants is measured by two parameters:

- ▶ **ODP:** Ozone Depletion Potential
- ▶ **GWP:** Global Warming Potential

While in the past the focus was on reducing ODP values to 0, new regulations encourage Member States to work harder on GWP.





HFO 1234ZE REFRIGERANT KEY FEATURES

Fully committed to supporting the creation of a greener tomorrow, Mitsubishi Electric Hydronics & IT Cooling Systems designed TR2-W-G04-Z, a complete chiller range optimized for HFO refrigerant R1234ze, with nearly zero environmental impact.

**4th generation refrigerant HFO R1234ze,
with negligible greenhouse effect and zero impact on the ozone layer.**

Negligible GWP

HFO R1234ze GWP100 year < 1 (R134a GWP100 year = 1300)
GWP values according to IPCC rev. 5th

Rapid molecule disintegration in the atmosphere

HFO R1234ze = 2 weeks (R134a = 14 years)

Approved by international standards

ASHRAE 34, ISO 817: A2L classification (non toxic, mildly flammable)

Compatible with common construction materials

No special components, No extra cost

In-line with environmental regulation objectives

No future retrofit required

**TO LEARN MORE ABOUT
GREEN REFRIGERANTS**

<https://www.melcohit.com/en/what-we-do/green>



TECHNOLOGICAL CHOICES

Negligible inrush current, quiet operation, unrivalled efficiency and extreme flexibility comes from a definite choice: cutting-edge technologies.

Comprehensive refrigerant leak detection solutions

TR2-W-G04-Z can be equipped with several leak detection systems that will promptly detect any leakage:

- ▶ Internal refrigerant leak detector
- ▶ Leak detection + migration
- ▶ Leak detection with compressor off

The detector has a double-threshold and can deactivate the compressors and disconnect the exchangers.



Innovative exchanger couples

The expertise makes the difference

The excellent performance of oil-free centrifugal compressors are enhanced by pairing them with specifically designed (flooded evaporator and shell and tube condenser) to ensure the most minimal approach between the refrigerant phase changing and the water.

This provides an increased cooling capacity and reduces the the compressor load, with immediate benefits to overall efficiency.



Specifically designed for IT Cooling applications

TR2-W-G04-Z is already equipped, as a standard with:

- ▶ Fast Restart (UPS excluded)
- ▶ Kit HELWT
- ▶ Dual relief valves with switch
- ▶ Numbered wirings on electrical board
- ▶ Lights on electrical board + socket
- ▶ Internal leak detector
- ▶ Thermal insulation on condenser
- ▶ 2-level alarm management
- ▶ Compressor operation signal
- ▶ Voltage presence relay

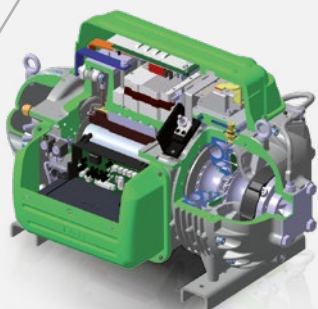
TECHNICAL DATA

TR2-W-Z G04



Centrifugal oil-free compressor

Specially designed for HFO



These top-level compressors bring enormous benefits in terms of efficiency, adjustments, vibrations, and weight. Magnetic levitation eliminates the need for lubricant, with its delicate management and heat exchange loss. Soft start, integrated in the compressors, lowers the inrush current to only 2 Amps, making the selection of power line systems more favourable.

Thorough knowledge is necessary to harness such a concentration of technology and here is where the RC brand really makes the difference thanks to its 15-year experience in magnetic levitation compressor units and thousands of projects all over the world.



Acoustic enclosure

The already minimal noise emissions of TR2-W-G04-Z units can be further reduced by choosing the acoustic enclosure option, available in two versions:

 **Basic -14 dB(A)**

 **Plus -18 dB(A)**

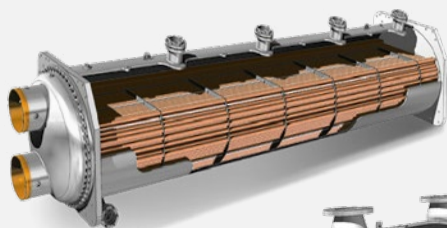


Compact electric panel

Thanks to its careful design, the electric panel can host a number of options, without altering the dimensions of the unit:

- ▶ Smart current limit
- ▶ Signals to control the water flow in both exchangers
- ▶ Lights on electric board + socket
- ▶ Compressors run status device

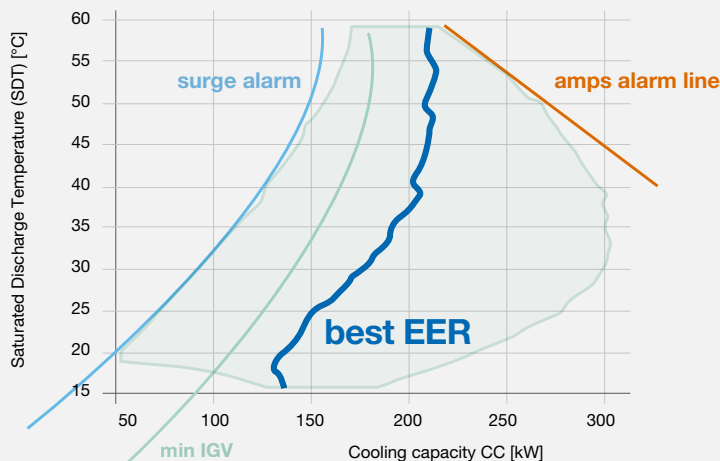
There are many other options for customizing the units according to your needs.



W3000+

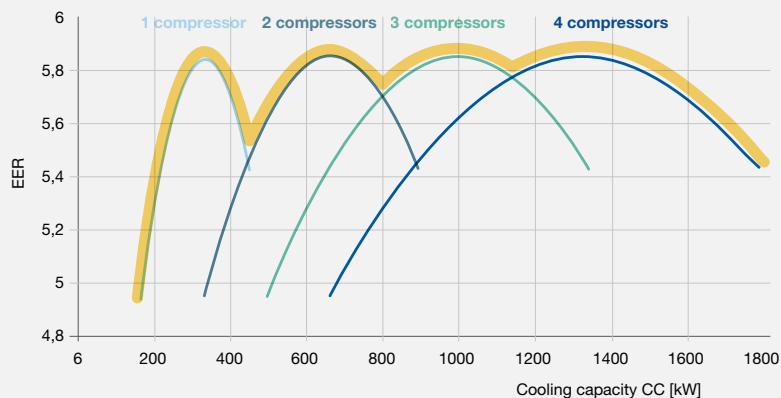
The evolution in the world of controls

ALWAYS THE HIGHEST EFFICIENCY



The brand-new logic, created for W3000+, optimally manages the correct compression ratio, the rotation speed, the position of IGV (Inlet Guide Vane) and the opening of the by-pass valve.

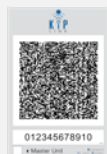
All this to ensure that the compressors - during start-up, in operation, in response to the thermoregulator and during shutdown - always work in complete safety (away from the limits of the "surge" and "amps").



W3000+ constantly monitors the compressor: the cooling capacity required by the thermoregulator is achieved by making the compressor work only in the envelope's area with the highest efficiency (curve "best EER").

In units with multiple compressors, W3000+ employs the exclusive 'jumping staging' logic, enabling, during partialization, only the most efficient combination of compressors.

USER INTERFACES



◀ **KIPLink**
QR Code label
on the front side
(Standard)



◀ **User-friendly**
Large Keyboard
+ KIPLink
(Optional)



◀ **Touch screen**
interface
+ KIPLink
(Optional)

Touch Screen interface and large keyboard are available to substitute KIPLink.

TR2-W-G04-Z can count on the advanced logics of W3000+, the advanced control specially designed to master magnetic levitation technology.

KIPLink: LOCAL AND REMOTE MONITORING FUNCTIONS

An exclusive product of Mitsubishi Electric Hydronics & IT Cooling Systems.

Monitor and control the unit from a LAN device (PC, laptop, mobile phone) with a simple web browser by simply scanning the QR code on the front side of the unit.

- ▶ **Easier on-site operation**
- ▶ **Real-time graphs and trends**
- ▶ **Data logger function**

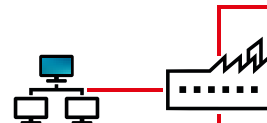
1

WI-FI
Proximity Smart Keyboard



2

LAN via TCP/IP
Local Monitoring



3

REMOTE via VPN
Same as local monitoring



CUSTOMER VPN
Secure accessibility to LAN

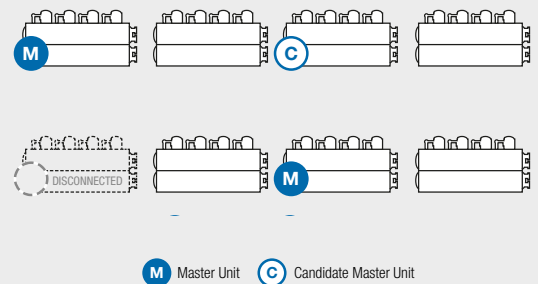
Customer in charge of cyber security

SMART LAN FUNCTIONS

TR2-W-G04-Z features embedded LAN logics for an easy connection between a group of chillers.

- ▶ **Up to 8 chillers connected to the same group.**
- ▶ **Load sharing and Sequencing.**
- ▶ **Selectable units' start-up sequence.**
- ▶ **Stand by unit management with automatic unit rotation.**
- ▶ **Dynamic master with succession priority.**
One master unit is elected to coordinate the group and if it becomes disconnected the candidate unit takes full control.
- ▶ **Resource priority management.**

MASTER SUCCESSION PRIORITY



EQUIPMENT FOR MISSION CRITICAL APPLICATIONS

Committed to ensure the highest standards of reliability, the new range of water cooled chillers includes a full range of devices and functions that maximize the unit's uptime in case of emergency circumstances.

FAST RESTART



Ensure immediate cooling start-up within 26"

Ensures a **faster return to the necessary cooling** levels in the shortest time possible, while maintaining the **reliability** of the chiller.



Have the unit running at full load in a shorter time

All unit in standard working conditions delivers 100% of cooling capacity within 180" after power is restored.

Fast restart - UPS excluded (STD)

It requires an external 230V AC UPS, not supplied with the unit, to keep the on-board controller functional and ensure fast restart after a power outage.

Fast restart - UPS included (Opt. 4502)

This option includes an electric device capable of keeping the controller power supply uninterrupted during a power failure. The capacity of this device is selected on the basis of the needs of a specific project.

DOUBLE POWER SUPPLY

Main Line →
Generator →



TR2-W-G04-Z can be connected to two separate power lines to enhance the system's dependability. In case of a main line power outage, the ATS* automatically switches over to the backup line, granting uninterrupted power supply to the unit.

The double power supply makes TR2-W-G04-Z suitable for Uptime Institute's TIER III and TIER IV** design topologies, the highest standards of reliability.

* ATS: Automatic Transfer Switch

** The Tier Classification System provides the data center industry with a consistent method to compare typically unique facilities based on expected site infrastructure performance, or uptime.

Double power supply (ATS) (Opt. 1561)

The ATS, installed within the electrical board, automatically senses if one of the sources has lost or gained power. The switching is completely automatic (line priority and frequency of checking are selectable).

ENERGY METER



You can't manage what you don't measure.

PUE (Power usage effectiveness) is the ratio that determines how energy efficient data centers.

Thermal energy meter

Acquires water temperature and flow ratio delivered by the unit and compute the cooling capacity produced. together with energy meter you can instantaneously evaluate the EER.

Energy meter

Acquires the electrical data and the power absorbed by the unit and sends them to the supervisor for energy metering.

IT COOLING MANAGEMENT SOLUTIONS

HPC and ClimaPro+ centralised control and optimization solutions are available for managing complex IT cooling systems.

These solutions optimize the entire IT cooling system by managing each component directly involved in production and distribution of heating and cooling energies, therefore involving chillers and indoor units, pumping groups as well as the source-side devices such as cooling towers.

Control solutions for IT cooling systems:

HPC

Hydronic Plant Connect



clima PRO+



Exploits **proprietary LAN technology** to connect chillers or chilled water indoor units.

1 ARCHITECTURE

Completely **custom designed** to be connected to every chiller or other chilled water indoor units.

Completely Integrated in the units.

2 PHYSICAL DEVICE

Devoted cabinet with 19" touch display.

Optimization of the entire cooling system: Fanwalls (or other chilled water indoor units), Chillers, FC availability, fans, pumps, valves.

3 FUNCTION

Full control and monitoring, **advanced and real time optimization based on unit performance curve.**

Straightforward solution for **Medium data centers** with **simple** cooling plant scheme.

4 APPLICATION

State of the art solution for **medium-large** and **Hyperscale data centers** also with complex cooling plant scheme. Ideal for **TIER III – TIER IV** data centers.



TO LEARN MORE ABOUT HPC

TO LEARN MORE ABOUT ClimaPRO+



FURTHER OPTIONS

Set-point adjustment

4-20 mA: Enables remote set-point adjustments (analog input).

Double set-point: Enables the remote switch between 2 set-points (digital input).

Control functions

External capacity cap: Limits the unit's cooling capacity to a specific % value, by acting on active resources and their operating frequencies. The unit can exceed this limit in specific conditions.

U.L.C. User Limit Control: Controls a mixing valve (not included) to ensure a safe start-up and operation of the unit even in critical conditions.

Remote probe: Controls the unit's and pump's activation on the base of the water temperature of the buffer tank or hydraulic decoupler.

Smart current limit: Controls the maximum current and power absorption of the unit under a determined value.

Connectivity

Serial card interface module to allow integration with BMS protocols:

Modbus / LonWorks / BACnet MS/TP / BACnet over IP / Konnex / Modbus TCP/IP/ SNMP

Multi Manager options to allow easy connection between a group of chillers

Acoustical enclosures

Integral base acoustic enclosure: the complete acoustic insulation of the unit that can reduce the sound level by 14 dB(A).

Integral plus acoustic enclosure: the supreme acoustic insulation that can reduce the sound level by 18 dB(A).

A WIDE SELECTION OF OPTIONS IS AVAILABLE IN ORDER TO FURTHER CUSTOMIZE THE UNIT AND MEET THE MOST CRITICAL PROJECT REQUIREMENTS.

Refrigerant leak detection

Internal refrigerant leak control: new proprietary algorithm that is able to check, by reading and interpretation of the internal parameters of the refrigerant circuits, if there is a refrigerant leak, without needing an external leak detector.

Leak detector + migration: Refrigerant leak detection and migration system. If the device detects a leak the unit stops and stores the remaining refrigerant inside the evaporator.

Leak Detector with compressor off: Refrigerant leak detection system, supplied factory mounted and wired in the electrical board. In case of leak detection, it will raise an alarm and stop the unit.

Light on electrical board + power socket

230V power socket in the electrical board, CEE 7/3 type (Schuko).

The maximum power available is 500VA.

Electrical board equipped with lights.

Condensing water control with 0-10V signal

0-10V signal for 2-way valve: 0-10V signal on terminal board to control the 2-way valve

0-10V signal for 3-way valve: 0-10V signal on terminal board to control the 3-way valve.

Hydraulic

Evaporator flow switch: Flow switch with AISI 316L stainless steel basket and IP65 protection suitable for installation in industrial plant pipes

Electronic water flow switch: Flow switch with electronic detection of the flow in the pipes.

Evaporator and/or Condenser hydraulic connections on opposite sides

“BY FAR THE BEST PROOF IS EXPERIENCE”

Sir Francis Bacon

British Philosopher (1561 - 1626)

OS-IX DATA CENTER

2017 - 2020 Oslo - Norway

Application:

Data Center

Plant type:

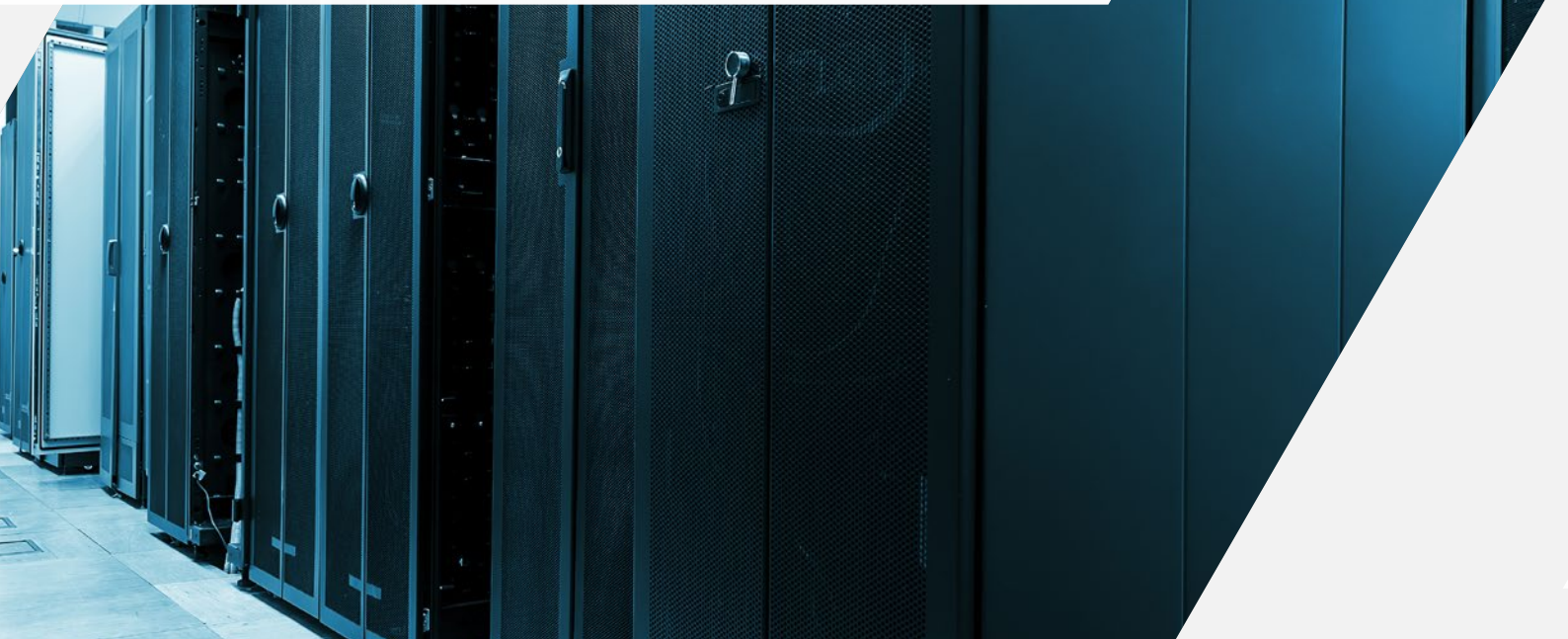
Hydronic System, HPAC System

Cooling capacity:

5550 kW

Installed Units:

5x UNICO FREE FLG 620 T2E VT6,
9x X Type T2.S, 4xNEXT EVO Inv DW.U 030.M1.E4L,
2x NEXT EVO CW.SU 013.F1, 2x NEXT EVO CW.SU 021.F2,
2x NEXT EVO CW.DL 012.F1,
2x NEXT EVO CW.DL 022.F2,
3x TRCS-FC-HFO-Z/K/S 0903, 20x Coolside CW-I 0060,
Aisle Containment



PROJECT

OS-IX data center is owned by Bulk Infrastructure and Akershus Energi. The OS-IX complex has a total area of 25,000 m², which makes it the largest data center in Oslo. OS-IX is a connectivity hub for the national and international fiber grid to ensure redundancy.

CHALLENGE

Bulk Infrastructure and Akershus Energi decided to revitalize the building with new infrastructure with the aim of becoming the most competitive data center location in Oslo, both in terms of cost effectiveness and in terms of achieving low PUE (Power Usage Effectiveness).

SOLUTION

When it came time to choose the IT cooling solution, a system based on RC units was selected. X TYPE T2 S close control air conditioners were chosen for the data halls, NEXT EVO Inv DW for the UPS/Battery rooms, NEXT EVO CW for the two MMR and carrier rooms, and UNICO TURBO air cooled chillers with free-cooling, designed for cooling capacity of 3,200 kW for the overall building. A solution of this kind, offers the lowest possible LCC and PUE and 100% free-cooling up to ambient temperature 16°C. Since the average year around temperature in Oslo is between -6 and 22°C, there is free-cooling 365 days a year.

INTERXION DATA CENTER

2017 Copenhagen - Denmark

Application:
Data Center

Cooling capacity:
3830 kW

Plant type:
Hydronic System

Installed Units:
2x UNICO TURBO FLG 520 T2E VT5,
3xFRIGO TURBO FLG 930 T3E



DNV-GØDSTRUP HOSPITAL

2020 Herning - Denmark

Application:
Healthcare / Hospitals, Data Center

Cooling capacity:
766 kW

Plant type:
Hydronic System, HPAC System

Installed Units:
2x TRCS2-W HFO-Z/HC/S, 24x Coolside CW-I 0060,
2x w-NEXT DL/S 042, 2x w-NEXT DL 022,
2x w-NEXT DL 042, 84x RACK





mitsubishi electric hydronics & it cooling systems s.p.a.

Head Office: Via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy

Tel (+39) 0424 509 500 - Fax (+39) 0424 509 509

www.rcitcooling.com

www.melcohit.com
