MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

COMFORT

CHILLERS

# FX-W-G04

## WATER SOURCE CHILLERS WITH SCREW COMPRESSORS, FROM 93 kW TO 372 kW

r HFO 1234ze

ErP COMPLIANT 2021


climaveneta.com

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# FX-W-G04

# THE COMPACT CHILLER FOR THE HIGHEST GREEN EFFICIENCY

## Water source chillers with screw compressors 93 kW - 372 kW

Modern multi-use buildings, shopping centers, business premises, and healthcare facilities are just some of the examples where increased comfort, reduced running costs and the lowest ecological footprint are required at the same time.

**FX-W-G04 is brilliantly engineered to be at the forefront of green innovation in comfort cooling applications, providing customers top-level efficiency for the most advanced projects.**

## COMFORT APPLICATIONS

- Commercial premises
- Office buildings
- Hotels and resorts
- Healthcare facilities
- Retail and department stores
- Sports and leisure installations

ErP 2021 COMPLIANT

## EXTREME EFFICIENCY

FX-W-G04 range has been designed to provide utmost efficiency at both full loads in the summer, and partial loads in the spring and fall when the building cooling requirements decrease.

**ErP 2021 COMPLIANT**
Engineered with selected components and careful design, all FX-W-G04 units are compliant with the latest ErP 2021 efficiency targets for comfort applications.

| Single circuit unit | Dual circuit unit |
|---|---|
| EER*= 4,72 | EER*= 4,80 |
| **SEER*= 5,43** | **SEER*= 5,68** |

*Average values

## ENERGY SAVING SOLUTIONS: HEAT RECOVERY SYSTEMS

HEAT RECOVERY

FX-W-G04 chillers will save money not only when the unit is producing cooling. It also offers the opportunity to recover heat when there is a simultaneous need for chilled and hot water by redirecting this heat from the chiller to various heating applications:

- **Restaurants, hotels, resorts, hospitals, residential buildings:** hot water can be used for the kitchen, laundry and bathrooms.
- **Schools, sports facilities and Spas:** showers, washrooms and swimming pool heating.
- **Offices or residential buildings:** radiant floor heating and restrooms.

### HEAT RECOVERY CONFIGURATIONS

| | | | |
|---|---|---|---|
| - | **Standard unit** | Unit for the production of chilled water. | **Baseline** |
| R | **Total heat recovery** | A devoted refrigerant water heat exchanger recovers all the condensation heat. | **48°C** |

# ALL-ROUND SUSTAINABILITY

r HFO 1234ze

**FX-W-G04 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).

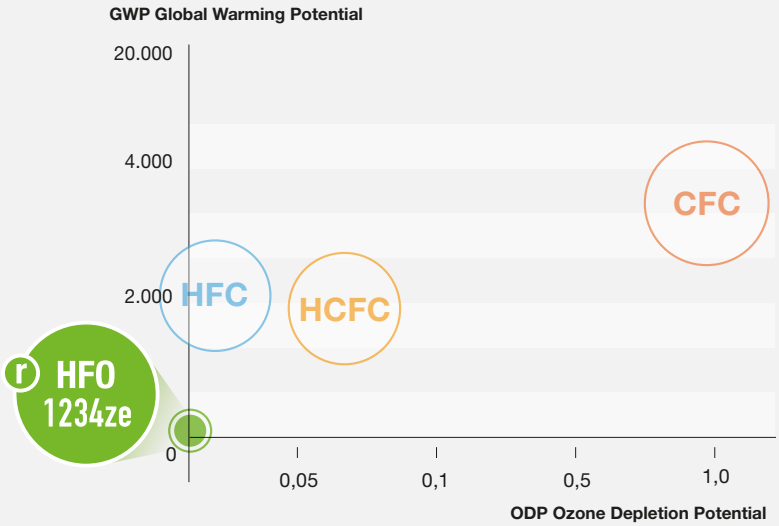
**Fully committed to support the creation of a greener tomorrow, Mitsubishi Electric Hydronics & IT Cooling Systems designed FX-W-G04, a complete chiller range optimized for HFO refrigerant R1234ze, with nearly zero environmental impact.**

Combining brilliant annual efficiency with the use of a low GWP refrigerant, FX-W-G04 tackles both the indirect (due to the primary energy consumption) and the direct global warming impact, thus resulting 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

4th generation refrigerant HFO 1234ze, with negligible greenhouse effect and zero impact on the ozone layer.

**Negligible GWP**
HFO 1234ze $GWP_{100\ year} < 1$ (R134a $GWP_{100\ year} = 1300$)
GWP values according to IPCC rev. 5th

**Rapid molecule disintegration in the atmosphere**
HFO 1234ze = 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

### PERFECT INDOOR COMFORT

The advanced control system is engineered to maintain optimal comfort conditions all year-round according to occupancy needs and variations.
For those projects where quality of acoustical comfort is key, an optional compressor enclosure cuts noise emissions by 5 dB(A).

### COMPACT DESIGN FOR THE HIGHEST FLEXIBILITY

The compact structure resulting from the rationalised design and assembly of the chiller components leads to more flexibility during the installation phase, both in case of new plants and existing ones.

### REDUCED MAINTENANCE COSTS

The latest technology for the compressors and top quality heat exchangers provide outstanding long-term reliability aimed at lower maintenance costs.

# TECHNOLOGICAL CHOICES

## Dual circuit units

From size 1102 for increased reliability and easier maintenance operations


## Compressors enclosure (opt.)

- Compressors enclosure in peraluman panels with 30mm polyester acoustic insulation (-5dB(A)).
- Integral enclosure standard and plus (FX-W-G04 size 2002 only) in peraluman panels enclosure with an additional acoustic insulation in polyester fiber 30 mm (std) and 50 mm (plus) thick: -14 dB(A) and -18 dB(A), respectively.

## Frame in polyester-painted galvanized steel

- Very easy maintenance thanks to the rationalized positioning of components
- Easy transport, lifting and handling
- Compact footprint (width < 950mm for single circuit units)

## Shell-and-tube condenser

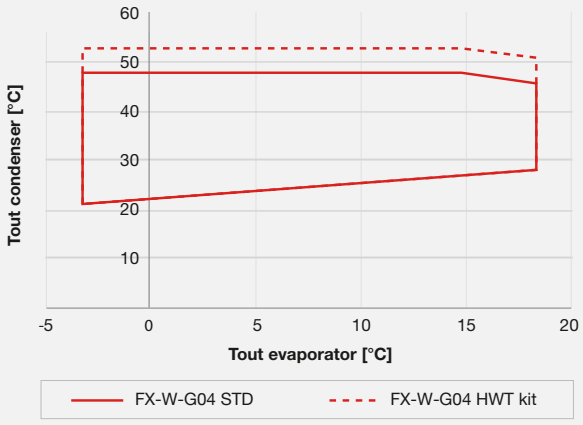
- **2 (std) or 4 (opt.) pass condenser:** to provide the best flexibility for various types of cooling water sources
- **Cu/Ni 90/10 tubes condenser (opt.) for seawater:** to provide protection against corrosion and guarantee reliable operation and optimal condensation

## EXTENDED OPERATING FIELD FOR A VAST ARRAY OF APPLICATIONS

Dedicated heat exchangers and wide operating limits make FX-W-G04 suitable for a vast range of applications.

- **2-pass condenser (std):** optimized for water ΔT=5°C (typically cooling tower).
- **4-pass condenser (opt):** optimized for water ΔT>10°C (typically open loop sources: groundwater or waterworks).

Hydraulic connection kits are available for the condenser.




## PRECISE CONDENSATION CONTROL

FX-W-G04 range provides several solutions for the control of the condenser water system.
A 0-10V signal is provided as standard to control an external modulating valve or the dry-cooler EC fans.

Options include a pressostatic valve for regulating the water flow as a function of the condensing pressure, or the 0-10V signal with relay for external inverter driven pump speed control.

In addition, 2-way modulating valves can be offered as an accessory to control the condenser water flow.

# Advanced technologies smartly combined with the green R1234ze HFO refrigerant: the perfect match for offering the highest efficiency levels.

r HFO 1234ze

## Compact screw compressors, optimized for low pressure ratio applications

- 25% minimum capacity step (opt. for two circuit units).
- Long-life bearings (more than 150.000h at full load)
- Part winding start
- Three-stage oil separator

## VPF control logic

VPF VARIABLE PRIMARY FLOW

The VPF control series (Variable Primary Flow system) adjusts the pump speed on the basis of the plant's thermal load and dynamically optimizes the unit's thermoregulation for variable flow operation. This system ensures both the highest pump energy savings and chiller stable operation.

**VPF: constant ΔP on the plant side**
For systems with the primary circuit only.

**VPF.D: constant ΔT on the plant side**
For systems with primary and secondary circuits separated by a hydraulic decoupler.

## Electronic expansion valve

managed by proprietary dedicated logics, to guarantee an excellent flow control and a highly precise temperature control.

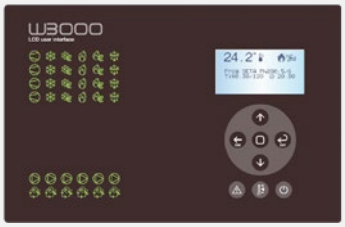
## Dry expansion shell-and-tube evaporator fully developed by Mitsubishi Electric Hydronics & IT Cooling Systems

- Internally grooved copper tubes for enhanced heat exchange
- Low pressure drops
- Fully protected against ice formation

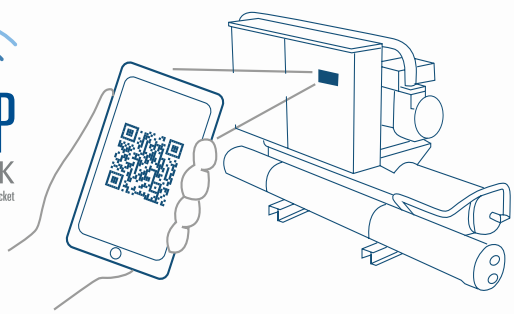
## W3000TE CONTROL AND USER-FRIENDLY INTERFACE

The logic behind FX-W-G04 is the W3000TE control software.
Characterized by advanced functions and algorithms, the proprietary software ensures faster adaptive responses to different dynamics, in all operating conditions:

- ✓ Efficient and reliable operation in all conditions
- ✓ Connectivity with the most commonly used BMS protocols (Opt.)
- ✓ Demand limit option (available for double circuit units).




KIP LINK
Keyboard In your Pocket



As an option, the direct control over the unit comes through the innovative **KIPlink interface**. Based on Wi-Fi technology, KIPlink gets rid of the standard keyboard and **allows one to operate on the unit directly from a mobile device** (smartphone, tablet, notebook).

**Easier on-site operation**

**Real-time graphs and trends**

**Data logger function**

CLIMAVENETA

# FX-W-G04 0551-2002

Chiller, water source for indoor installation, from 93 kW to 372 kW.

ECODESIGN COMPLIANT

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

VPF VAR.PRIM.FLOW

R HFO1234ze

COOLING

T SHELL & TUBES

SCREW

| FX-W-G04 | | | 0551 | 0651 | 0751 | 0851 | 0951 | 1102 | 1302 | 1402 | 1502 | 1702 | 1902 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Power supply | | V/ph/Hz | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 |
| **PERFORMANCE** | | | | | | | | | | | | | | |
| **COOLING ONLY (GROSS VALUE)** | | | | | | | | | | | | | | |
| Cooling capacity | (1) | kW | 93,17 | 103,0 | 125,9 | 143,6 | 166,0 | 188,3 | 212,0 | 232,0 | 259,7 | 291,8 | 331,8 | 373,4 |
| Total power input | (1) | kW | 18,52 | 20,89 | 26,21 | 29,65 | 33,88 | 37,05 | 41,78 | 47,06 | 52,41 | 59,28 | 67,77 | 75,44 |
| EER | (1) | kW/kW | 5,038 | 4,928 | 4,805 | 4,851 | 4,897 | 5,089 | 5,072 | 4,926 | 4,956 | 4,921 | 4,894 | 4,952 |
| ESEER | (1) | kW/kW | | | | | | | | | | | | |
| **COOLING ONLY (EN14511 VALUE)** | | | | | | | | | | | | | | |
| Cooling capacity | (1)(2) | kW | 92,90 | 102,6 | 125,5 | 143,1 | 165,5 | 187,7 | 211,3 | 231,2 | 258,9 | 290,8 | 330,7 | 371,9 |
| EER | (1)(2) | kW/kW | 4,850 | 4,740 | 4,650 | 4,670 | 4,710 | 4,910 | 4,910 | 4,760 | 4,800 | 4,750 | 4,730 | 4,770 |
| ESEER | (1)(2) | kW/kW | - | - | - | - | - | - | - | - | - | - | - | - |
| Cooling energy class | | | B | B | B | B | B | B | B | B | B | B | B | B |
| **ENERGY EFFICIENCY** | | | | | | | | | | | | | | |
| **SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)** | | | | | | | | | | | | | | |
| Ambient refrigeration | | | | | | | | | | | | | | |
| Prated,c | (7) | kW | 92,9 | 103 | 126 | 143 | 166 | 188 | 211 | 231 | 259 | 291 | 331 | 372 |
| SEER | (7)(8) | | 5,45 | 5,40 | 5,38 | 5,44 | 5,46 | 5,64 | 5,73 | 5,66 | 5,68 | 5,74 | 5,72 | 5,56 |
| Performance ηs | (7)(9) | % | 210 | 208 | 207 | 209 | 210 | 218 | 221 | 218 | 219 | 222 | 221 | 214 |
| **EXCHANGERS** | | | | | | | | | | | | | | |
| **HEAT EXCHANGER USER SIDE IN REFRIGERATION** | | | | | | | | | | | | | | |
| Water flow | (1) | l/s | 4,455 | 4,927 | 6,020 | 6,866 | 7,936 | 9,007 | 10,14 | 11,09 | 12,42 | 13,96 | 15,87 | 17,86 |
| Pressure drop | (1) | kPa | 23,3 | 28,5 | 20,3 | 27,6 | 27,7 | 30,7 | 30,5 | 36,5 | 31,6 | 39,9 | 38,8 | 49,2 |
| **HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION** | | | | | | | | | | | | | | |
| Water flow | (1) | l/s | 5,320 | 5,902 | 7,242 | 8,249 | 9,517 | 10,74 | 12,09 | 13,29 | 14,87 | 16,72 | 19,03 | 21,38 |
| Pressure drop | (1) | kPa | 19,8 | 19,2 | 23,0 | 27,2 | 29,7 | 20,2 | 20,1 | 21,7 | 24,1 | 27,9 | 29,6 | 29,0 |
| **REFRIGERANT CIRCUIT** | | | | | | | | | | | | | | |
| Compressors nr. | | N° | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| No. Circuits | | N° | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Refrigerant charge | | kg | 22,0 | 21,0 | 24,0 | 35,0 | 35,0 | 44,0 | 46,0 | 44,0 | 48,0 | 55,0 | 55,0 | 69,0 |
| **NOISE LEVEL** | | | | | | | | | | | | | | |
| Sound Pressure | (3) | dB(A) | 75 | 75 | 76 | 76 | 76 | 78 | 78 | 78 | 78 | 78 | 78 | 79 |
| Sound power level in cooling | (4)(5) | dB(A) | 92 | 92 | 93 | 93 | 93 | 95 | 95 | 96 | 96 | 96 | 96 | 98 |
| **SIZE AND WEIGHT** | | | | | | | | | | | | | | |
| Length | (6) | mm | 2400 | 2400 | 2700 | 2700 | 2700 | 3000 | 3000 | 3100 | 3100 | 3100 | 3100 | 3640 |
| Depth | (6) | mm | 945 | 945 | 945 | 945 | 945 | 1100 | 1100 | 1100 | 1100 | 1100 | 1100 | 1240 |
| Height | (6) | mm | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 2050 |
| Operating weight | (6) | kg | 930 | 940 | 1210 | 1290 | 1310 | 1690 | 1700 | 1860 | 2030 | 2170 | 2190 | 3270 |

**Notes:**
1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger water (in/out) 30°C/35°C.
2 Values in compliance with EN14511
3 Average sound pressure level at 1m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
4 Sound power on the basis of measurements made in compliance with ISO 9614.
5 Sound power level in cooling, indoors.
6 Unit in standard configuration/execution, without optional accessories.
7 Parameter calculated according to [REGULATION (EU) N. 2016/2281]
8 Seasonal energy efficiency ratio
9 Seasonal space cooling energy efficiency
**The units highlighted in this publication contain HFC HFO-1234ze [$GWP_{100}$ 7] fluorinated greenhouse gases.**

**Certified data in EUROVENT**

# FURTHER OPTIONS

## ELECTRICAL

**Numbered wiring:**
Electrical board wires are identified by numbered labels also indicated in the unit's wiring scheme to facilitate maintenance of the electrical board connections.

**Compressor rephasing:**
Capacitors installed on the compressors' power inlet line to increase the unit's average cos(phi).

**Automatic circuit breakers:**
Over-current switches provided in place of standard fuses to protect the compressor from possible current peaks.

**Soft-starter:**
Electronic device to manage the inrush current of the compressor.

## HEAT EXCHANGERS

**Double insulation on exchangers:**
Heat exchangers thermal insulation 19mm thick.

**4 Pass condenser:**
Source side heat exchanger compatible with water with high delta temperature.

**Cu/Ni 90/10 water condenser:**
Source side heat exchanger with pipes made of copper nickel alloy for seawater applications.

## AUXILIARY INPUT

**Auxiliary signal 4-20mA:**
Analog input signal that enables the main setpoint variation according to the value of current applied.

**Remote signal double set-point:**
Analog input signal that allows to change the operating set-point switching only among 2 fixed set-points.

**Remote Demand Limit:**
Voltage free digital input to temporarily limit the units' power consumption.

## REFRIGERANT LEAK DETECTOR

**Leak detector:**
Factory installed device. In case of a gas leak detection, it raises an alarm.

**Leak detector+migration:**
Factory installed device. In case of a gas leak detection, it raises an alarm and stores the remaining refrigerant inside the condenser.

## STRUCTURE

**Compressor acoustical enclosure:**
Soundproofing enclosure for compressor(s) section made of hot galvanised metal sheets and acoustic insulation.

**Integral acoustical enclosure standard and plus (FX-W-G04 2002 only):**
Peraluman panels enclosure with an additional acoustic insulation in polyester fiber 30 mm (std) and 50 mm (plus) thick. Sound power level reduction: 14 dB(A) and 18 dB(A), respectively.

**Rubber type antivibration mountings:**
Reduce vibrations, keeping noise to a minimum.

## CONNECTIVITY

**M-Net interface kit:**
Interface module to allow the integration of the unit with Mitsubishi Electric proprietary communication protocol M-Net.

# “BY FAR THE BEST PROOF IS EXPERIENCE”

**Sir Francis Bacon**
British philosopher
(1561 - 1626)

Every project is characterised by different needs and system specifications for various climates. All these projects share high energy efficiency, maximum integration, and total reliability resulting from the Climaveneta brand experience.

## UEFA
2017 Nyon - Switzerland

Sport structures

**Cooling capacity:** 512 kW
**Installed machines:**
2xFOCS2-W HFO /R /CA-E screw compressor chillers with HFO refrigerant

## Siemens
2017 Zurich - Switzerland

Office Building

**Cooling capacity:** 1015 kW
**Heating capacity:** 1340 kW
**Installed machines:**
2x FOCS2-W HFO screw compressor chillers with HFO refrigerant


## Hotel Atlantic
2017 Stavanger - Norway

Hotel and resorts

**Cooling capacity:** 675 kW
**Installed machines:**
2x FOCS2-W HFO screw compressor chillers with HFO refrigerant

## Soclima
2017 Foetz – Luxembourg

Office building

**Cooling capacity:** 1016 kW
**Installed machines:**
1x FOCS2-W HFO screw compressor chiller with HFO refrigerant,
1x TECS2-W HFO oil-free compressor chiller with HFO refrigerant

## Genève Plage
2015 Geneve - Switzerland

Sport structures

**Heating capacity:** 700 kW
**Installed machines:**
2x TECS2-W HFO oil-free compressor chillers with HFO refrigerant


## De Bijenkorf Amsterdam
2018 Amsterdam - Netherlands

Retail

**Cooling capacity:** 415 kW
**Installed machines:**
1x FX HFO SL-A screw compressor chiller with HFO refrigerant

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for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

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