

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

PROCESS

CHILLERS

FX-W-G04-Y

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

**r HFO
1234ze**



FX-W-G04-Y

THE COMPACT CHILLER FOR THE HIGHEST GREEN EFFICIENCY



Water source chillers with screw compressors
93 kW - 372 kW

In industrial processes a certain amount of heat is produced due to friction of moving parts or as a result of thermal processes. Process chillers remove the excess heat and, through extremely reliable components, maintain the optimum temperature, 24 hours a day, seven days a week.

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

PROCESS APPLICATIONS

- ✓ Food industry
- ✓ Chemical and Pharmaceutical
- ✓ Printing industry
- ✓ Plastics
- ✓ Winery

EXTREME EFFICIENCY

Thanks to devoted technological solutions and accurate design, the FX-W-G04-Y range provides high full load performance and brilliant part load efficiency together, thus reducing the energy consumption of industrial processes and cutting their running costs.

ErP 2021 COMPLIANT

FX-W-G04-Y units are compliant with the latest ErP 2021 efficiency targets for process applications, satisfying the SEPR HT (High Temperature) requirements.



Single circuit unit

EER* = 4,72

Dual circuit unit

EER* = 4,80

SEPR HT* = 7,05

SEPR HT* = 7,09

*Average values

ENERGY SAVING SOLUTIONS: HEAT RECOVERY SYSTEMS



In all industrial segments, heat produced during production processes can be recovered when there is a simultaneous demand for chilled and hot water. This energy can be reused to:

- ✓ **Serve comfort workplaces** and other areas located close to the industrial facilities.
- ✓ **Produce hot water for heating systems** or floor heating systems.
- ✓ **Feed the Air Handling Unit post-heating coil** to compensate the amount of heat lost during dehumidification.
- ✓ **Pre-heat service fluids** or incoming raw materials before further processing.

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



FX-W-G04-Y 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).

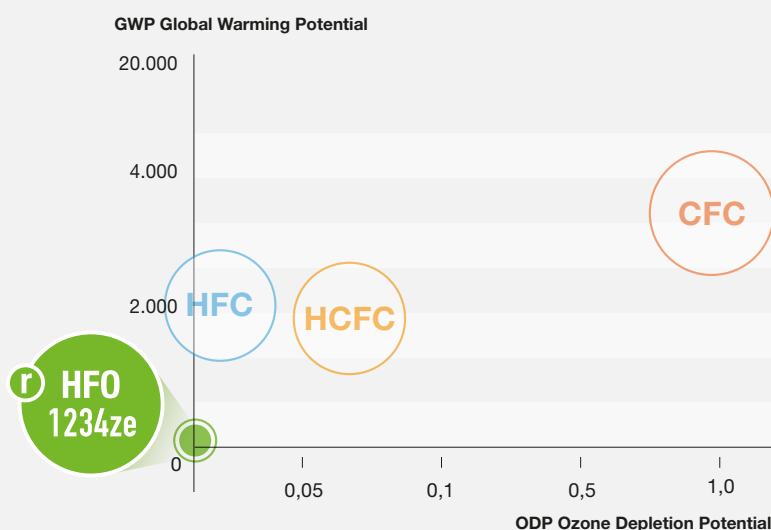
Fully committed to support the creation of a greener tomorrow, Mitsubishi Electric Hydronics & IT Cooling Systems designed FX-W-G04-Y, a complete chiller range optimized for HFO refrigerant R1234ze, with nearly zero environmental impact.

Combining brilliant annual efficiency with the use of a low GWP refrigerant, FX-W-G04-Y 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



TOTAL RELIABILITY

The FX-W-G04-Y range meets the needs of an industry that cannot afford any cooling interruption.

The units are available with one or two independent circuits to guarantee ultimate redundancy and proven dependability. Dedicated features such as Fast Restart and Double power supply ensure uninterruptible operation under any unexpected circumstance.



COMPACT DESIGN FOR THE HIGHEST FLEXIBILITY

As a result of the rationalized design and assembly of the chiller components, the FX-W-G04-Y units feature a compact self-supporting structure, leading to more flexibility during the installation phase, both in case of new plants and already-existing ones.



EXTRA DURABILITY AND REDUCED MAINTENANCE COSTS

Particular attention has been paid to intensive use of the unit (24/7, 365 days a year) and long-lasting operation.

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

Acoustical enclosure (opt.):

- ▶ Compressors enclosure in peraluman panels with 30mm polyester acoustic insulation (-5dB(A))
- ▶ Integral enclosure standard and plus (FX-W-G04-Y 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-Y suitable for a vast range of applications.

- ✓ **2-pass condenser (std):** optimized for water $\Delta T=5^{\circ}\text{C}$ (typically cooling tower).
- ✓ **4-pass condenser (opt):** optimized for water $\Delta T>10^{\circ}\text{C}$ (typically open loop sources: groundwater or waterworks).

Hydraulic connection kits are available for the condenser.

Thermal vector fluid temperature at the evaporator outlet between -2°C and 18°C .

Thermal vector fluid at the condenser outlet between 22°C and 48°C (53°C with the HWT Kit).

PRECISE CONDENSATION CONTROL

FX-W-G04-Y 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 1234ze HFO refrigerant: the perfect match for offering the highest efficiency levels.



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



Electronic expansion valve

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

VPF control logic



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.

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

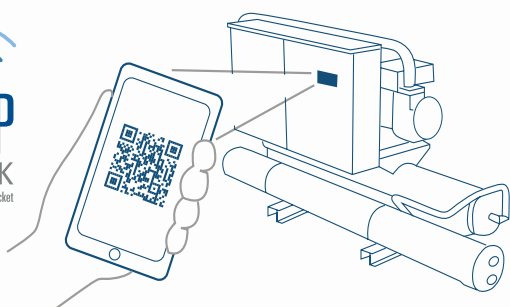
W3000TE CONTROL AND USER-FRIENDLY INTERFACE

The logic behind FX-W-G04-Y 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).



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



FX-W-G04-Y 0551-2002

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



VFP VAR.PRIM.FLOW

R HFO1234ze

COOLING

T SHELL & TUBES

SCREW

FX-W-G04-Y		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)													
Process refrigeration at high temperature													
Prated,c	(7) 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
SEPR	(7)(9)	7,05	7,04	7,03	7,02	7,08	7,05	7,13	7,06	7,15	7,10	7,06	7,07
SEASONAL EFFICIENCY IN COOLING (Reg. EU 2015/1095)													
Process refrigeration at medium temperature													
Prated,c	(8) kW	-	-	-	-	-	-	-	-	-	-	-	-
SEPR	(8)(9)	-	-	-	-	-	-	-	-	-	-	-	-
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:

- Plant (side) cooling exchanger water (in/out) 12°C/7°C;
Source (side) heat exchanger water (in/out) 30°C/35°C.
- Values in compliance with EN14511
- 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.
- Sound power on the basis of measurements made in compliance with ISO 9614.
- Sound power level in cooling, indoors.
- Unit in standard configuration/execution, without optional accessories.

- Seasonal energy efficiency of high temperature process cooling [REGULATION (EU) N. 2016/2281]
- Seasonal Energy Efficiency of Process Cooling at Medium Temperature [REGULATION (EU) N. 2015/1095]
- Seasonal energy efficiency ratio

The units highlighted in this publication contain HFC HFO-1234ze [GWP₁₀₀ 7] fluorinated greenhouse gases.

Certified data in EUROVENT

DEFINED FEATURES FOR MISSION CRITICAL APPLICATIONS

Committed to achieving the best standards, FX-W-G04-Y is equipped with advanced features that ensure the system reliability and maximize the equipment uptime in case of emergency circumstances.

FAST RESTART

Reliable chiller operation and restart

FAST RESTART is the control function that provides a quick resumption of the cooling resources after a power failure in order to re-establish, in the quickest time possible, the correct chilled water temperature.

Ramp-up time for 100% cooling capacity

N. compressors	Standard unit	Unit with fast restart
1	520"	120" ⁽²⁾
2	710"	130" ⁽²⁾

⁽²⁾ if condensing control valve is present, add 30".
Values refer to a unit working at standard conditions.

“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.

Agie Charmilles

2017 Losone - Switzerland



Tools & machinery - Offices

Plant type: Hydronic System
Cooling capacity: 308 kW
Installed machines:
1x FOCS2 HFO-Y air cooled chiller
with screw compressor and HFO refrigerant

Vardar Fjernvarme AS

2017 Honefoss - Norway



Energy industry

Plant type: Hydronic System
Cooling capacity: 606 kW
Installed machines:
1x i-FX HFO-Y /CA full inverter
compressor chiller with HFO refrigerant

Victorinox Swiss Army

2017 Delémont – Switzerland



Tools & machinery

Cooling capacity: 321 kW
Installed machines:
1x FX HFO-Y /SL-E screw
compressor chiller with HFO refrigerant;
1xERACS2Q SL CA screw compressor
4-pipe heat pump

Ratti Plant

2018 Guanzate - Italy



Industrial Process

Cooling capacity: 1056 kW
Installed machines:
2x FX HFO-Y /SL air cooled chillers
with screw compressor and HFO
refrigerant

DOUBLE POWER SUPPLY



Ensure immediate cooling
start-up within 25”

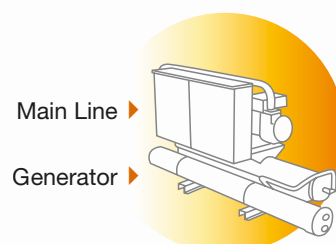


Full load resumption in a shorter time
compared to standard unit restart

Uptime depends on redundancy. For a chiller working 24/7, a secure source of electrical energy is fundamental to keep services running.

With the Automatic Transfer Switch (ATS) option, FX-W-G04-Y can be connected to two separate power lines to enhance the system dependability.

When the primary source fails, the ATS automatically switches over to the backup line, granting an uninterrupted power supply to the unit.





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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