

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

COMFORT

CHILLERS

# i-FX2

G01  
G04  
G05

**AIR SOURCE CHILLERS  
WITH INVERTER  
SCREW COMPRESSORS,  
FROM 380 TO 1859 kW**



r R134a

r HFO  
1234ze

r R513A



# i-FX2

G01  
G04  
G05

## FULL INVERTER TECHNOLOGY FOR A CONCENTRATION OF EFFICIENCY



**Air source chiller with inverter screw compressors for outdoor installation from 380 to 1859 kW.**

i-FX2 is the new generation of MEHITS air source chillers with inverter driven screw compressors.

The new series is available with 3 refrigerant alternatives: R134a, R513A, and R1234ze. i-FX2 has been designed to perfectly match

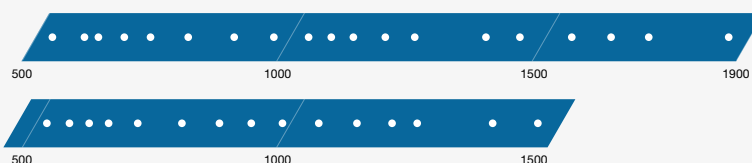
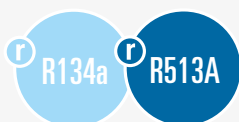
your installation's needs thanks to an extensive list of versions and options.

Thanks to its reduced footprint, i-FX2 is a concentration of efficiency, ideal also for equipment upgrades or replacements, making your building more energy efficient and sustainable.

### EXTENDED RANGE

#### i-FX2-G01\_G05

K: 533 - 1859 kW  
E: 523 - 1483 kW



#### i-FX2-G04

K: 422 - 1676 kW  
E: 380 - 1532 kW



### 3 EFFICIENCY LEVELS FOR THE MOST CHALLENGING NEEDS

✓ K

Compact design featuring variable fan speed regulation as standard for every size. Ideal also for chiller replacement upgrade.

SEER up to

**5,25**

✓ K + EC FANS

Same footprint of K version with the benefit of EC fans, ensuring very high seasonal efficiency.

SEER up to

**5,45**

✓ E

Best efficiency unit, both at full load and partial load, with EC fans provided as standard.

SEER up to

**5,73**

### 4 SOUND CONFIGURATIONS TO MATCH THE MOST SOUND-SENSITIVE ENVIRONMENTS

Standard unit

Baseline

Compressors acoustical enclosure

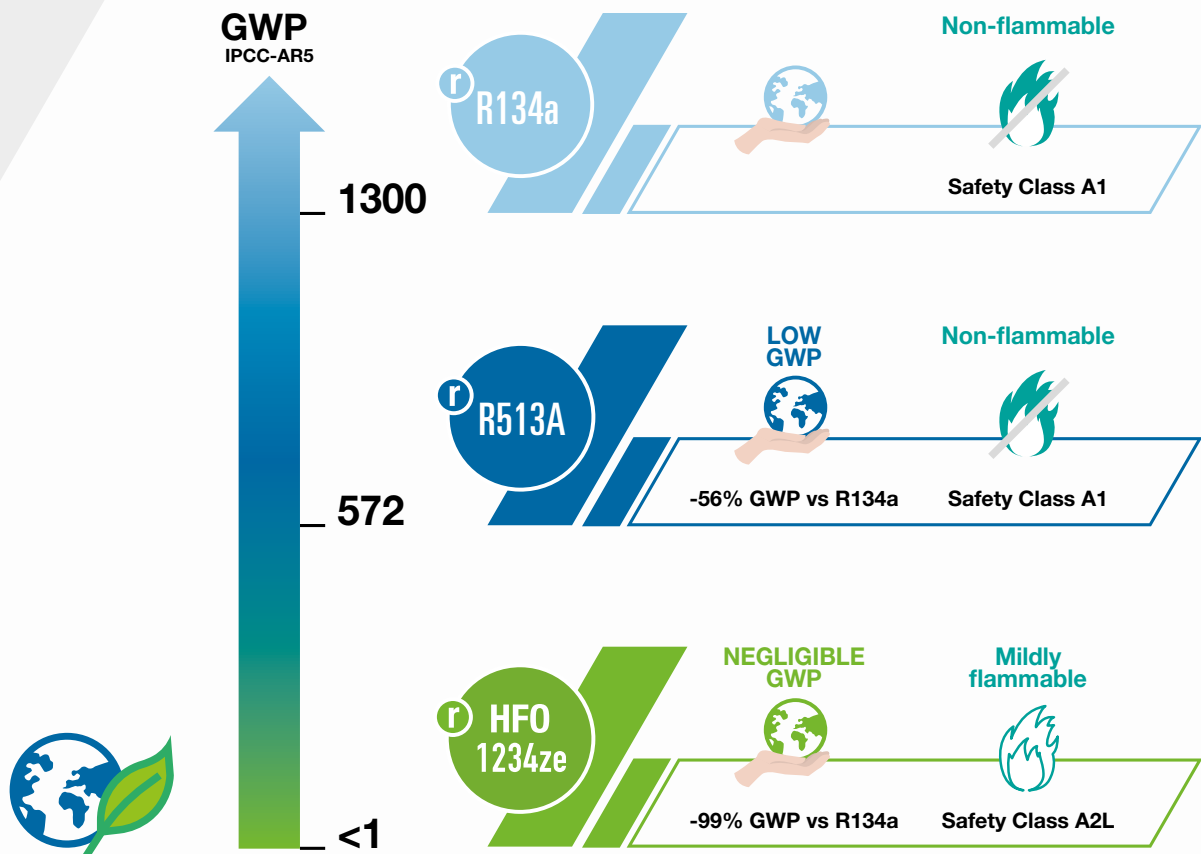
-2 dB(A)

Unit with Noise Reducer (NR) kit

-5 dB(A)

Super Low noise version

-9 dB(A)



## THE IMPORTANCE OF HEAT RECOVERY

Every time there are simultaneous heating and cooling loads, heat recovery provides effective opportunities for energy savings. Chilled water can be provided while recovering heat that would normally be rejected from a building to the environment. With the heat recovery solutions, i-FX2 produces hot water up to 60°C that can be used for space heating, domestic hot water, or any other need.

### **D** Partial heat recovery

An additional heat exchanger on the compressor discharge line recovers approximately 20% of the unit's capacity.

### **R** Total heat recovery

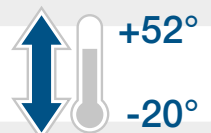
A devoted refrigerant/water heat exchanger recovers the entire thermal load.

### NEW i-FX2-K: EXTREMELY COMPACT UNIT

-21% footprint compared to legacy range with a similar SEER

### EXTENDED OPERATING LIMITS

i-FX2 can operate with outdoor temperatures from -20°C and up to 52°C



# TECHNOLOGICAL CHOICES

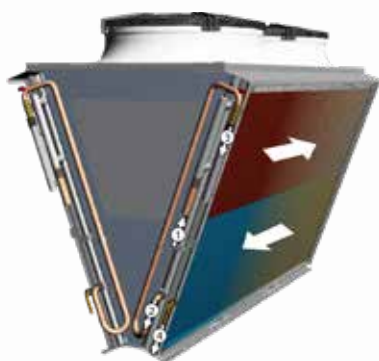
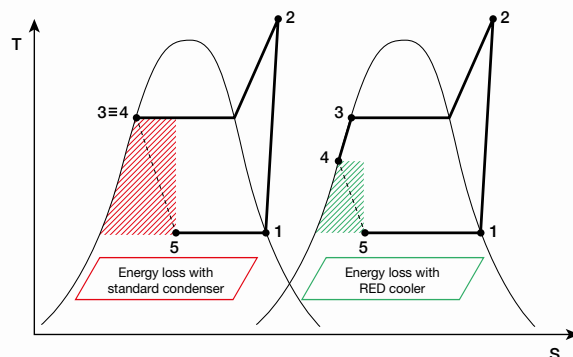
## WHAT'S NEW

### R.E.D. Cooler

Reduced Exergy Depletion



The new i-FX2 comes with the in-house developed **Red Cooler**, a patented technological solution that improves the efficiency of the unit and reduces the exergy loss of the expansion phase.



The refrigerant is subcooled in a dedicated coil, the **subcooler**, where the refrigerant liquid is cooled down to a temperature very close to the external air, exploiting the sub-cooling energy to the fullest.

RED Cooler increases the cooling capacity of the chiller, the amount of work required by the compressor being equal.

A careful design of the RED Cooler heat rejection section maximizes the unit's efficiency and reduces the footprint of the unit.

- 1) Condensing coil inlet    3) RED Cooler subcooling coil inlet  
2) Condensing coil outlet    4) RED Cooler subcooling coil outlet

### Full inverter driven compressors

for a stepless capacity control

### 2 or 3 independent refrigerant circuits

for simpler maintenance and a more efficient operation

### Factory-installed pumps (with VPF options)

and pre-plumbed hydraulic for the minimum installation time and cost (optional).

### Shell and tube evaporator

Dry expansion, single pass shell and tube evaporator, fully developed and manufactured by Mitsubishi Electric Hydronics & IT Cooling Systems.

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



# FULL INVERTER CHILLER



## HIGHER SEASONAL EFFICIENCY

Inverter driven compressors ensure superior energy efficiency at part load conditions, enhancing the efficiency of building systems through the entire year.



## ABSENCE OF IN-RUSH CURRENTS

### No electrical and mechanical stress

The unit never exceeds the nominal current, not even when starting up.

### No additional equipment needed

Such as star/delta commutators or soft starters



## CONTINUOUS CAPACITY CONTROL

The smart design always has the ideal capacity and extreme modularity control in every load condition thanks to the independent refrigerant circuits and the full inverter technology.



## REDUCED SOUND POWER LEVELS

### LOWER SPEED, LOWER NOISE

i-FX2 range ensures extremely low noise operations compared to fixed speed units. The unit working in partial load conditions is far more silent than a fixed speed compressor unit.

## AC fans featuring variable speed regulation

for a uniform air flow over the coils.  
EC fans standard for E version.



### Electrical panel

with power circuit components and  
**W3000+** control



## Full Aluminum microchannel coils with RED COOLER patented solution

to increase the efficiency of the unit.  
Cu/Al coils and anti corrosion treatments  
available as option.



# MAIN OPTIONS

## FACTORY MOUNTED PUMPS

Low or high head dual pumps, fixed or variable speed

### Hydronic modules and flow controls

i-FX2 units come equipped as standard with terminal and modulating signal (0-10V) to control the activation and speed of one external variable speed pump, with the internally developed VPFE control logic, which adjusts the pump speed on the basis of the plant's thermal load, in order to maintain the defined plant-side  $\Delta T$  (primary circuit).

### Terminals for external pump control

The unit controls the activation and speed of 1 or 2 external pumps.

#### Terminals + Modulating signal

1 pump: Standard

2 pumps: Optional

These arrangements allow to control the activation / deactivation of fixed speed pumps too!



### Factory-mounted pump group

As an option, i-FX2 can be provided with 2 pumps (duty/standby) with 2-pole motor, fixed or variable speed, to provide low or high head (available head approx 100 or 200 kPa).

### Other possible variable primary flow control logics:

#### VPF control logic

The VPF control series (Variable Primary Flow) doesn't only **adjust the pump speed on the basis of the plant's thermal load**, but also **dynamically optimizes the unit's thermoregulation** for variable flow operation, thus ensuring both the highest pump energy savings and chiller stable operation.

#### VPF: constant $\Delta P$ on the plant side

For single unit or multi-unit systems with only the primary circuit.

#### VPF.D: constant $\Delta T$ on the plant side

For single unit or multi-unit systems with primary and secondary circuits separated by a hydraulic decoupler.



## PUMPS MANAGEMENT CONTROL FUNCTION

### WITH HYDRAULIC DECOUPLER PROBE

Pumps activation is regulated in accordance with the water temperature measured by the storage probe (in the systems with the primary and secondary circuits separated by an hydraulic decoupler). The function reduces the pump operating hours and related energy consumption.

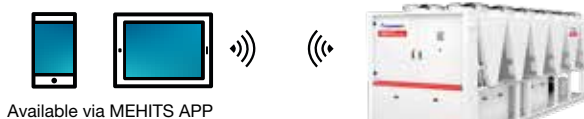
## KIPLink: LOCAL AND REMOTE MONITORING FUNCTIONS

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.

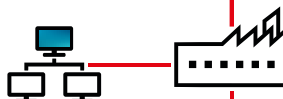
### MAIN FEATURES

- ▶ 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

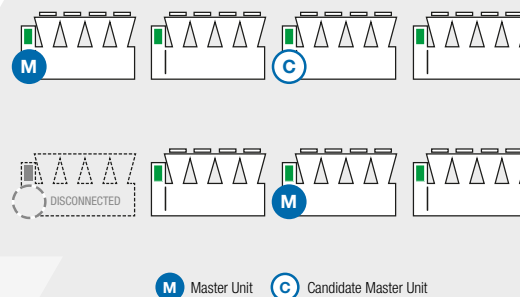
i-FX2 features embedded LAN logics for an easy connection between a group of chillers.

- ▶ Up to 8 chillers connected to the same group.
- ▶ Load sharing and Sequencing.
- ▶ Selectable unit 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



## User interfaces available as an option

- ▶ Touch screen



- ▶ Large keyboard



## REFRIGERANT LEAK DETECTION SOLUTIONS

Several leak detection solutions are available as an option



- ▶ **Internal refrigerant leak detector**

Proprietary control logic that is able to detect a refrigerant leak, without needing external devices, by reading and interpreting of internal cycle parameters.

- ▶ **Leak detector**

In case of a gas leak detection, it raises an alarm.

- ▶ **Leak detection with compressor off**

In case of a gas leak detection, it raises an alarm and stops the units.

- ▶ **Leak detection + pump-down**

In case the device detects a leakage, the unit stops and stores the remaining refrigerant inside the condenser, waiting for the intervention of a technician.



# ANTI CORROSION COIL TREATMENTS

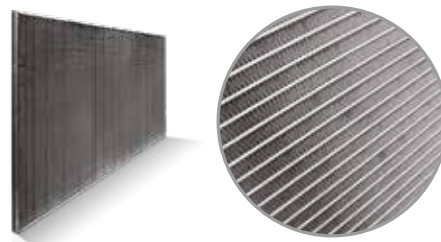
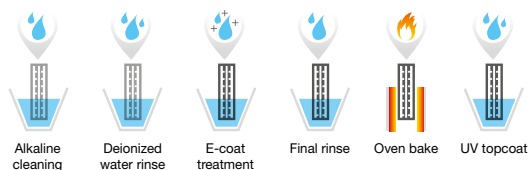
## MICROCHANNEL COILS

Al - Regular (std)

Al - E-coating



E-coating process



## TUBE & FIN COILS

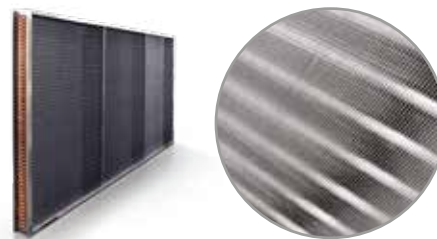
Cu/Al - Regular

Cu/Al - Pre-painted fins

- ▶ Fins treated with protective polyester resin paint.
- ▶ 1000 h of salt spray protection as per ASTM B117.
- ▶ Excellent resistance to UV rays.

Cu/Al - Fin Guard Silver SB

- ▶ Polyurethane paint with metallic emulsion.
- ▶ 3000 h of salt spray protection as per ASTM B117.
- ▶ Excellent resistance to UV rays.



## FURTHER OPTIONS

### OPERATING MAP

**HT kit (only G04 units):** Dedicated electrical components to work with high external air temperature.

**Antifreeze piping, pumps:** Electrical heaters on pipes and pumps to protect the unit against ice formation on its hydraulic components.

**Double insulation on exchangers (+pipes+pumps):** Thermal insulation on heat exchangers, pumps and pipes to reduce heat losses and prevent from condensate problems.

**Oversized EC fans:** To provide an available static pressure at the air discharge of the fans up to 150Pa.



## AUXILIARY INPUTS

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

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

## DEMAND LIMIT SOLUTIONS

**Demand Limit:** Limits the unit's power absorption for safety reasons or in temporary situations (digital input).

**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.

## CONTROL FUNCTIONS

**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.

**Night mode:** The noise of the unit is reduced limiting maximum compressor frequency and fan speed.

## ENERGY METER

**Energy meter for BMS:** Acquires the electrical data and the power absorbed by the unit and sends them to the BMS for energy metering (Modbus RS485).

**Energy meter for W3000+:** The electrical data acquired is available directly on the unit's control.

## CONNECTIVITY

**Serial card interface module to allow integration with BMS protocols:** Modbus / BACnet MS / TP / BACnet over IP / Konnex / Modbus TCP/IP/ SNMP.

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

## 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.**

## 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 hydraulic connections on opposite side.**

## MECHANICAL

**Rubber or spring type antivibration mountings (supplied loose):** Reduce vibrations, keeping noise transmission to a minimum.

# MORE THAN 1000 PROJECTS ALL OVER THE WORLD

**Istanbul - Turkey**

**Medipol Hospital**

**Period:** 2019-2020

**Application:** Healthcare / Hospitals

**System type:** Hydronic System

**Cooling capacity:** 3809

**Installed Units:** 4x i-FX-G01/K 4802,  
311x a-LIFE2 HP, 587x a-LIFE3,  
Manager 3000+



**Al Ain - United Arab Emirates**

**Musanada Al Ain City Center Schools**

**Period:** 2019

**Application:** School / University

**System type:** Hydronic System, HPAC System

**Cooling capacity:** 3520

**Installed Units:** 4x i-FX-G01/SL-A 4802,  
2x t-AV DF DX E3 OVER 026 P1 S,  
Manager 300



**Dhaka - Bangladesh**

**Simple Tree Light House**

**Period:** 2019

**Application type:** Offices

**System type:** Hydronic System

**Cooling capacity:** 1656

**Installed Units:** 3x i-FX-G01 2602, 1x  
WIZARD  
Related products



Mitsubishi Electric Hydronics and IT Cooling's chiller units, with their unbeatable advantages in terms of efficiency, quality, and precision are already the preferred choice of the major brands in the most prestigious projects all over the world.

**Warsaw - Poland**

**Intraco Prime**

**Period:** 2021

**Application type:** Office Buildings

**System type:** Hydronic System

**Cooling capacity:** 1800

**Installed Units:** 1x i-FX-G05/SL-K 6303, 1x FX-FC-G05/NG/T+/S 1902, 1x MANAGER3000



**Vigorso di Budrio (BO) - Italy**

**INAIL Centro Pretesi**

**Period:** 2020

**Application type:** Healthcare / Hospitals

**System type:** Hydronic System

**Cooling capacity:** 4462

**Heating Capacity:** 1018

**Installed Units:** 3x i-FX-G04/SL-A 6603, 1x i-FX-Q2-G05/SL-CA 1102, ClimaPRO



**Wroclaw - Poland**

**Centrum Poludniowe**

**Period:** 2019

**Application type:** Offices

**System type:** Hydronic System

**Cooling capacity:** 2604

**Installed Units:** 2x i-FX-G05/SL-K/ EC 6002





## **mitsubishi electric hydronics & it cooling systems S.p.A.**

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