

Air source chillers with variable speed single screw compressors for outdoor installation

From 339 to 921 kW

R1234ze
R513A
REFRIGERANT

MECH-iF-G04 MECH-iF-G05



MECH-iF-G04 MECH-iF-G05

Bringing the efficiency
to the highest level.



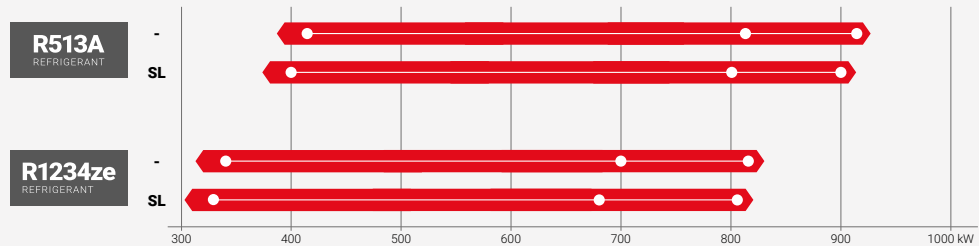
Air source chillers with new Mitsubishi Electric variable speed single screw compressors and R1234ze or R513A refrigerant. From 339 to 921 kW.

MECH-iF-G04 and MECH-iF-G05 are the new Mitsubishi Electric chillers provided with the brand new proprietary single screw variable speed compressors, optimized to deliver the highest level of efficiency through the entire year. Thanks to the Variable Vi technology, the best efficiency is ensured in any working conditions.

Capacity Range

MECH-iF-G05
- : 414 – 921 kW
SL: 407 – 903 kW

MECH-iF-G04
- : 346 – 827 kW
SL: 339 – 810 kW



MECH-iF
with single MS
compressor



MECH-iF
with 2 MS
compressors

Efficiency and reliability above all expectations

Standing out seasonal efficiency with the new MS compressors



MECH-iF-G04 and MECH-iF-G05 feature the brand new screw compressor by Mitsubishi Electric, the new heart of air cooled chillers.

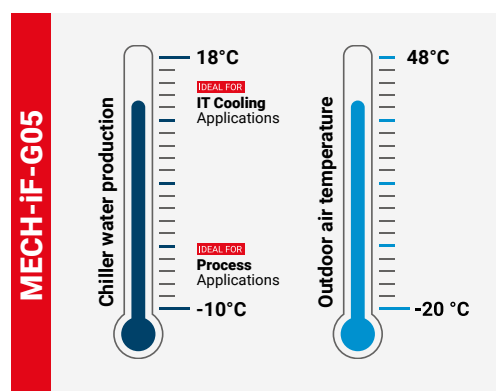
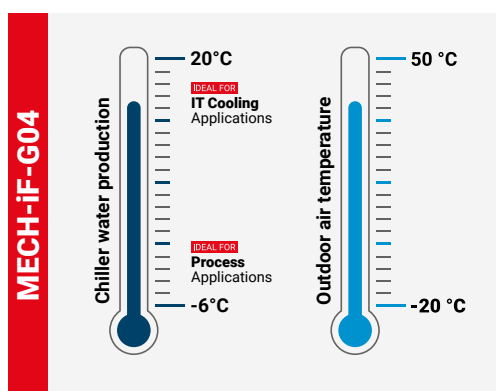
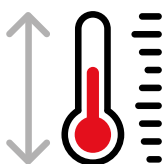
MECH-iF-G04	UP TO	EER: 3.3	SEER: 5.9	SEPR HT: 6.5
MECH-iF-G05	UP TO	EER: 3.2	SEER: 5.7	SEPR HT: 6.8

EER – conditions: evap. 12/7°C, air 35°C – NET values [EN14511 – EN14825]

SEER – Regulation (EU) N.2281/2016

SEPR-HT – Regulation (EU) N.2281/2016

Esteso campo di funzionamento



MECH-iF è in grado di lavorare con temperature di aria esterna da -20°C fino a 50°C (48° per unità G05), fornendo acqua refrigerata da +20°C fino a -10°C (-6°C per unità G04).

Two refrigerants' alternatives, one target: environment sustainability

MEHITS is constantly focused on the developments of sustainable solutions, offering customers high efficiency chillers respectful of the environment.

MECH-iF has been designed for the green refrigerant **R513A**, a non-toxic and non-flammable gas, which guarantees a reduction in GWP of -56% compared to R134a, and for **R1234ze gas**, which have zero ODP and negligible GWP (<1).

R513A
REFRIGERANTE



Low GWP
-56% GWP vs R134a



Non-flammable
Safety Class A1

R1234ze
REFRIGERANTE



Negligible GWP
-99% GWP vs R134a



Mildly flammable
Safety Class A2L



Reduced Environmental Impact

- Zero ODP - Ozone Depletion Potential
- F-Gas phasedown compliant

The most suitable product for each application

Both units MECH-iF-G04 and MECH-iF-G05 stand out for specific operating envelopes suitable for different applications.



COMFORT



PROCESS



IT COOLING

MECH-iF-G04 / MECH-iF-G05

MECH-iF-G04

Different environments, targeted versions

Sound level configurations

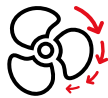
The control of noise emissions is one of the key drivers in MEHITS when designing units. MECH-iF is available with different acoustic set-ups to meet any requirement in terms of quietness.



MECH-iF is provided per standard with compressors' enclosure, to match most of noise-sensitive environments requirements.



When the unit is configured with Noise Reducer kit, fans' speed is reduced (**up to -3dB(A) sound reduction**).



SL version includes an enhanced soundproofing of the compressors and pumps (if present) section, and reduced fans speed, without any compromise on footprint (**up to -9dB(A) sound reduction**).

Heat recovery configurations

Partial heat recovery: a plug&play solution to reduce carbon emission.

While producing cooling, heat is often seen as a by-product that is simply rejected to the environment. Exploiting the wasted heat and reusing it in our buildings is a sustainable opportunity to maximize the efficiency of HVAC plants.

MECH-iF-G04(G05)-D is provided with an additional heat exchanger on the compressor discharge line to recover approximately **20% of the unit's capacity** and produce hot water up to **60°C**. In this way the heat rejected from the chiller can be reuse, saving energy and reducing the operation costs in the long-term without increasing the footprint of the unit.

Huge Benefits for Every Kind of Application



Process Applications

- Large operating map down to -10°C of evaporator leaving water temperature and down to -20°C of outdoor air temperature
- Extremely high reliability components
- Fully accessible service points for an easier maintenance
- Internal refrigerant leak detector logic available per standard
- Several coil solutions including e-coated micro-channel, Cu/Al, pre-painted fins, fin guard silver

Dedicated accessories for mission critical applications:

- Dual power automatic transfer switch, to ensure uninterrupted power supply
- Fast restart option, to ensure the fastest chiller restarts

Comfort Applications

- Full-inverter unit providing best-in-class seasonal efficiency
- Plug&Play solution, thanks to integrated pumps kit
- Different noise levels, to match the most noise sensitive environments
- Variable Vi valve for accurate matching of the operating conditions, both at partial and full load
- Large operating map, from -20° up to 50°C external air temperature.



IT Cooling Applications

- High leaving water temperature up to 20°C
- LAN functions with up to 8 units
- HPC software for optimizing the entire chillers + CRAHs systems
- Wide option availability ideal for this kind of application (demand limit, external capacity cap, thermal energy meter)



■ A complete Mitsubishi Electric cooling package dedicated to your high efficiency data center

MECH-iF-G04

R1234ze
REFRIGERANT

MEWALL



MECH-iF-G04 and **MEWALL** makes a complete chilled water package Mitsubishi Electric branded, for colocation and hyperscale DCs!

Technological Choices

EC Fans

With high efficiency housing, to perfectly match varying air flow requirements and reduce the energy consumption, improving the efficiency of the unit.

Inspectable Fan Section

With removable panel for an easy and fast maintenance.

Source Side Heat Exchanger

V-shape microchannel coils with **RED COOLER** patented solution, fully in-house developed to enhance the chiller efficiency.

Complete Hydronic Kit Option

Factory-installed dual pumps (with VPF options)

High Efficiency Dry Expansion Shell&Tube Evaporator

- low refrigerant charge
- excellent refrigerant distribution.

Fully Accessible Electrical Panel

With numbered wiring to facilitate maintenance interventions, EMI filters and DC line reactors.

Variable Vi Technology

The Variable Vi technology allows the automatic internal volume ratio adaption by integrated Vi slide valve, to ensure the best efficiency in any working condition. This makes the MS compressor the ideal solution for any application.



Full Inverter Technology



MECH-iF adjusts the rotational speed and the internal geometry of the compressor to:

- perfectly match the cooligload of the plant in any condition
- offer stepless and accurate capacity control
- ensure premium efficiency values, thus cutting operating costs

W3000+ Control Software

Available with optional keyboard or standard KIPLink, features proprietary settings, to perfectly manage each single product dynamic.



KIPLink (STD)

Full access by simply scanning the QR code



7 inch touch screen (opt.)



Large keyboard (opt.)

■ PROPRIETARY TECHNOLOGY



Mitsubishi Electric Single Screw Compressor

Variable speed single screw compressor with external inverter, both developed by Mitsubishi Electric. The compressor is equipped with acoustical enclosure as standard.



PROPRIETARY CONTROL LOGIC

■ Internal Refrigerant Leak Detector (Standard)

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

■ With Hydraulic Decoupler Probe

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

New MS compressors, fully designed and developed by Mitsubishi Electric



THANKS TO OVER **35** years

Of experience in single screw compressor design, Mitsubishi Electric is now strongly investing in researching and manufacturing state-of-the art technological solutions, to grant energy efficiency and reliability above all expectations.

The innovative Single Screw compressor driven by Mitsubishi Electric frequency inverter

Is the beating heart of MECH-iF units and is able to guarantee reliability, functionality, and readiness in every application:

- Comfort
- Process
- IT Cooling



MS single screw compressors' working principle



The single screw compressor consists of one central helical grooved screw rotor and two symmetrical star wheels rotors, installed in the compressor's casing.

The screw rotor is directly driven by the motor, while the gate rotors are engaged with the screw.



■ Suction

As the screw turns, gas refrigerant is sucked into the grooves of the screw rotor.

■ Compression

The compression process takes place in the space surrounded by the screw channel, the inner surface of the casing, and the teeth of the star wheels.

When the screw rotor rotates, the star wheels also rotate, and the refrigerant is trapped and sealed. The closed volume gradually reduces, so the refrigerant is compressed.

■ Discharge

When the grooves of the screw rotor reach the discharge port, the refrigerant is discharged.

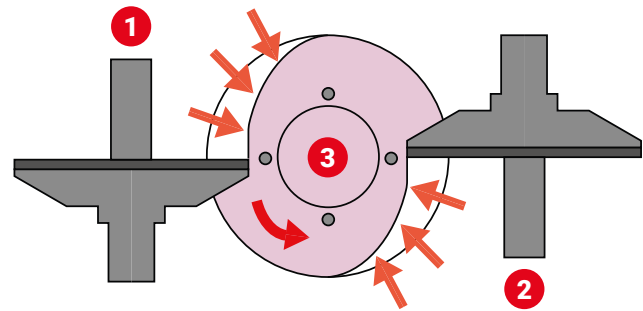
Benefits of MS single screw compressors

MS compressor provides reliability and readiness even in harsh conditions.

Symmetrical Compression Load

As the gate rotors are located at the same height of the main screw, the forces on the screw are balanced so that no radial force is exerted on the bearings.

Reduced and balanced loads ensure bearings lifetime over 150,000 hours, equal to 17.5 years of continuous operation.



1/2. Gate Rotor

3. Screw Rotor

+ Longer life cycle of gate rotors bearings



Gate Rotors Made of Engineering Polymer

During the compression, there is only metal-to-polymer contact, giving the compressor high resistance and reliability even in extreme conditions like the absence of oil.



+ **Extremely high reliability, even in harsh conditions**

1

Optimized design thanks to finite element analysis (FEA) for a long-lasting quality:

- Thermal stress control
- Structure deformation management
- Shape optimization to secure strength and efficiency

2

Unique casing structure

That allows to achieve high compression efficiency.

3

Patented oil management system

4

Over 35 years of experience in single screw compressor design

Group Control Systems

INTEGRATED SOLUTIONS

LAN Multi Manager



01 / Architecture

Exploits proprietary LAN technology to connect a group of chillers and heat pumps.

02 / Interfacing

Completely integrated in the units.

03 / Applications

Comfort, Process and IT Cooling applications. Chillers and heat pumps.

04 / Function

Smart management of the group of units with dynamic master logic, stand-by management, load and resource management.

LAN FUNCTIONS

Thanks to LAN logics integrated into MECH-iF, it is possible to manage up to 8 units in a single group optimizing load distribution, alarm management, and units back-up/stand-by.

CENTRALISED SOLUTIONS

Manager 3000+
Data Center Manager+



01 / Architecture

Designed to be connected to every chiller and heat pump.

02 / Interfacing

Devoted cabinet with 10,1" touch screen display.

03 / Applications

- **Manager 3000+** Comfort and Process applications.
- **Data Center Manager+** IT Cooling applications.

04 / Function

Centralized control and monitoring of a group of units, alarm management and mailing service.

Main Options

Hydronic Kits

Low or high head, fixed or variable speed, dual pumps .

Automatic Circuit Breakers on Loads

Over-current switch on the major electrical loads, compressors included. In case of overcurrent allows resetting of the switch without the replacement of relative fuses.

Double Power Supply (ATS)

Enhances the system's redundancy and reliability. Reduces unit's downtime in case of mains power outage.

Noise Reducer

The dedicated fans' speed calibration together with the soundproofing of the most critical components permit a significant noise reduction.

Cu/Al Coils

Finned coils made from copper tubes and aluminum fins designed to ensure maximum heat exchange efficiency. Anticorrosion treatments are available.

Oversized EC Fans

Fans with oversized EC motor to provide up to 150Pa ESP.

Fast Restart

The management of the fast restart allows to minimize downtimes in case of power failure, keeping all the necessary unit safeties.

Multifunction Card

Night mode, Hydraulic decoupler probe for pump activation and User Limit Control Function.

Demand Limit Solutions

Demand limit, External capacity cap or Smart current limit, to restrict the unit's power absorption or the provided cooling capacity.

Energy Meter for BMS Energy Meter for W3000+

Acquires the electrical data and the power absorbed by the unit. Data is sent to the BMS or directly readable on the unit keyboard.

Thermal Energy Meter

Evaluates the cooling capacity delivered by the unit.

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).

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

Mitsubishi Electric Europe B.V.

Italian Branch

Campus, Energy Park

Via Energy Park 14,

Vimercate 20871 (MB)

climatizzazione.mitsubishielectric.it