Guide Specifications

iMEX HP R454B
Air-to-water heat pumps with R454B refrigerant.

Sound versions std / XLN

25 - 61 kW

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Instructions

Black part = standard
Blue part = to be adapted according to unit selected

General

Hot and Chilled water production will be made by a factory-assembled and tested, air to water Heat pump, Thermocold type iMEX HP R454B. The unit will have one refrigerant circuit with one inverter driven scroll compressor, will be shipped with a full operating charge of HFC-based **R454B** refrigerant and lubrication oil, brazed plate heat exchanger, Air side heat exchanger high efficiency finned coils with seamless copper tubes expanded into corrugated aluminum, with microprocessor-based control.
Documentation including installation-operation-maintenance manual, user guide, wiring diagram and submittal is placed in the control panel.

Performances summary

- Heating capacity at full load:….. (kW)
- Unit power input in heating mode at full load:……(kW)
- Operating conditions: Evaporator entering/leaving temperature: …./…..(°C).
  Outdoor air temperature: ……..(°C).
- Cooling capacity at full load:….. (kW)
- Unit power input in cooling mode at full load:……(kW)
- Operating conditions: Condenser entering/leaving temperature: …./…..(°C).
  Outdoor air temperature: ……..(°C).
- Heating capacity at full load:….. (kW)
- Energy efficiency at full load EER:……. (kW/kW)
- Energy efficiency at full load COP:……. (kW/kW)
- Seasonal Coefficient of performance SCOP:…….
- Sound power level:…… dB(A)

Quality assurance

All units are designed, produced, and checked in compliance with standards ISO 9001, ISO 12001 and ISO 14001. Assembled with components supplied by premium manufacturers, the standard product is subject to:
• Electromagnetic Compatibility Directive 2014/30/EU;
• Machinery Directive 2006/42/EC;
• Pressure Equipment Directive 2014/68/EU.
All units are CE-certified and comply with EU ECODESIGN Directive 2009/125/EC and subsequent Reg 813/2013 minimum seasonal space efficiency requirements.
The performance is certified by Eurovent Chillers & Heat Pumps (LCP-HP) certification programme. Rated performances declared in accordance with EN14511:2022 and EN14825:2022 and verified by tests conducted by third-party laboratories.

Construction Characteristics

Basement and panels made of galvanized carbon steel sheet subjected to phosphor degreasing treatment and painted with a polyester powder coating baked-on at 180 °C, to provide durable weatherproof protection. The structure and the panels finished in orange-peel RAL 7035P light grey with a matt surface finishing. The inner brackets are of carbon steel sheet painted with black RAL 9005 polyester powder coating.
(for XLN option) The compressor compartment internally layered with thermal-acoustic insulation, composed of a 25mm layer in heat-bonded polyester fiber with a density of 40kg/m3 with open cells and 2mm layer of loaded rubber sheet of high specific weight (mass).
Self-supporting frame built to guarantee maximum accessibility for servicing and maintenance operations, thanks also to easily removable panels allowing a quick and easy access to the inside components from either side of the unit.

Compressors and Motors

Variable speed drive (inverter) scroll compressor qualified for R454B, designed to deliver high efficiency and a wide operating envelope to cover all applications.
The compressor is hermetic, with sight-glass and Shrader valve to reduce risk of leakage. The power supply connection is not source of ignition. The compressor is fitted with a motor protection device for overheating, overcurrent and excessive temperatures of the supply gas and crankcase protection heater. The compressor is installed on rubber antivibration mounts and is complete with oil charge, specific for R454B.
To reduce noise emission, as standard the compressor is enclosed in a sound proof 23 mm thick shell, made of melanine, EPDM rubber and PVC5

Evaporator

High-performance Brazed Plate Heat Exchanger (BPHE) with integrated distribution system. It is constructed as a plate package of corrugated channel plates (stainless steel plates) and copper brazing.
The BPHE features a manual air bleed valve and drain valve and are equipped with external thermal insulation and anti-condensation cladding as per standard.
The unit is provided with an integrated differential pressure switch to check the water flow and protect the unit in case the flow rate is too low.
All evaporators are tested and stamped in accordance with PED.
The water side circuit will be provided with water gauge.
A Metal mesh water filter is provided loose with the unit as standard, it must be installed on the heat pump return pipe to trap any impurities in the water circuit that may damage the units heat exchanger

Outdoor coils

Finned coil exchanger made by 7 mm internally corrugated copper tubes and aluminum fins. Copper pipes are brazed to the coil headers and joined, by mechanical expansion, to better adhere to the fin collar. The fins are appropriately spaced to ensure the maximum heat transfer and coated with a hydrophilic layer to ensure correct evacuation of the condensate water. The coil comes with a condensation collection tray integrated into the basement, with a hose for collecting condensate water.
(option) Electric heater on the basement to protect from ice formation in the condensate tray.

(option) The unit will have Copper pipes and aluminum fins, collectors and bends treated with an epoxy primer and a polyurethane-based paint (RAL 7001grey).

Outdoor fan

Axial EC fans with integrated variable speed control, IP55 protection rate, with external rotor and profiled blades, housed in aerodynamic hoods and complete with safety grid. EC motor includes built-in thermal protection and meets the requirements of the current ErP Directive. Biomimetic blade design with a serrated trailing edge and unique rippled leading edge.
The fan assembly ensures smooth operation and high durability thanks to dynamic balancing on 2 levels.
(option) The unit will be equipped with EC axial fans for HESP (up to 140 Pa available in heating mode, 80 Pa in cooling mode)

Refrigerant Circuit

Refrigerant circuit complete with:

- drier filter;
- liquid receiver;
- liquid separator;
- pressure transducers (high and low pressure);
- electronic expansion valve;
- 4-way cycle inversion valve;
- Safety valve
- Full charge R454B or (optional) the unit is fitted with nitrogen charge and oil suitable for R454B refrigerant.

Electrical Panel

Integrated electrical box designed according to CEI EN 60335-1 / CEI EN 60335-2-40 / CEI EN 60204-1.
Sealed electrical box with IP54 - insulation class F, provided with a main disconnect switch with door-lock device.
The electrical box is complete with:

- Auxiliary component protection fuses;
- Compressor protection fuses;
- Fan motor circuit fuses;
- General alarm contact;
- Digital inputs: remote On/Off, remote Change over;
- Smart grid (SG Ready contacts);
- sanitary hot water request.

All wires are numbered.

Controller

Programmable microprocessor-based electronic controller, developed in compliance with the European RoHS directives, featuring a 32-byte microprocessor, delivering high power and operation processing speed. The control software and the operating parameters are saved to FLASH-MEMORY and E2prom, ensuring they are stored even in the event of power failures (without requiring a backup battery). The control board include 2 serial ports, Fieldbus and BMS and an ethernet port for integration in third party systems via Modbus-RTU and/or Modbus-TCP.

It is possible to connect 2 units in a modular configuration without the need for optional devices. The configuration can be extended up to 4, with the appropriate modularity kit (see option)
The regulation logic features the complete management of the unit to deliver the maximum efficiency of the unit in all operating conditions, including advanced functions such as:

- Set-point management via climatic curves;
- Alarm management;
- Complete domestic hot water with anti-legionella cycles management;
- Consumption metering and performance measurement (visible to service);
- Anti-freeze control depending on the temperature of the evaporator outlet water;
- Anti-freeze heaters control;
- Leak detector warning with output contact.

The controller is designed to be easily integrated with a smart grid, following its operating logic with 4 different operating logic and it is SG-Ready certified by Bundesverband Wärmepumpe (BWP).
The unit will include an integrated LCD display to manage all functions.
Following communication protocols are available:
Modbus RTU as standard
Modbus TCP/IP as standard
(optional) the unit will have Bacnet TCP/IP protocol (Bacnet TCP/IP kit)
(optional) Models come with a remote display that replicates the functions of the one installed on the unit.

Testing
Before shipment, all units are tested.
In particular, the main checks performed are the following: correct installation of the components, absence of refrigerant leaks, seal control of the hydraulic circuit and electrical safety tests.

Optional installed on the unit

Coil protection grills
The unit is provided with robust and effective in protecting the air side coils during transportation, installation and extreme weather conditions.

Flow meter
The units can be equipped with a volumetric flow meter. The flow rate is shown on the display and it can be found in the Modbus parameters.

Leak detector
The unit is provided with Leak detector that will detect if refrigerant leak occurs. It will provide an alarm.

Hydraulic module option
The units will be equipped with an hydraulic kit, installed in the factory within the unit volume, characterized by complete kits of all major hydraulic components for an easier installation, with reduced time, cost and space. Hydraulic kit will be with ON-OFF and/or Inverter (VSD) pump.

It will be provided 1 water pump (with nominal 1 bar (P1) / 2 bar (P2) available static pressure). The Centrifugal pumps have 2 poles, axial suction bowls and radial delivery; they have cast iron body and impeller entirely welded using laser technology. Mechanical seal with ceramic components, coal and EPDM elastomers. Three phase electric motor with IP55 protection and insulation class F, suitable for continuous service.
Series motors with higher efficiency IE3 technology.

The connections between the evaporator, pumps and machine connection points are made with tubes insulated with Armaflex.
This option also includes:
• an expansion tank
• an automatic air vent valve
• a drainage tap
• a safety valve

All above combinations can be provided with or without water tank on user side, with

- 100 liters for sizes 007, 009
- 150 liters for sies 011, 013, 017

The tank made of carbon steel with an aluminum-plated, anti-condensate insulating layer

Optional provided loose

Modularity Kit
The unit will have Modularity kit to control up to 4 units in sequence. In this way the units can share the load, set a unit as back up or over boost.

Unit isolators
Isolators provide isolation between unit and structure to help eliminate vibration transmission and they are neoprene type.

Victaulic kit
As standard the unit has treated connection. This kit provide a flange adapter Victaulic type to help unit connection.

Controller expansion kit
The controller expansion kit provides following additional functions:
- DHW demand input
- 3 way valve control (input and output)
- Electric heater placed on external hot sanitary tank control
- Electric heater placed on external inertial tank control
- Management of on-off of an external recirculation pump for DHW production
- Turn on external boiler

The kit includes also water temperature probes (10 m longs) to be placed into the inertial tank and one into the hot sanitary water tank.

3 way solenoid valve for ACS
A physical 3 way solenoid valve is provided to shift water supply to a circuit for hot sanitary water production.
3 way valve kit is not compatible with water tank kit.

Sea container kit
To ship the unit into container a dedicated kit is provided.

EMC Filter kit
The noise filter is an electronic device used to eliminate the presence of conducted electromagnetic interference from the signal or power line and to protect the device from electromagnetic interference signals present in the environment.

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