

FORM I-WSHP Water to Air Inverter Heat Pump (1.5 ~ 4 kW)



FORM



New innovation from **FORM!** **Inverter Heat Pump**

Cooling Capacity **3.04 kW**
EER 4.23

Heating Capacity **3.80 kW**
COP 4.5

FORM, which has been the leading and experienced company in the air conditioning sector of Turkey since 1965 and in the field of heat pumps for 30 years, introduces the innovative and energy-efficient domestic production FORM Inverter Heat Pump to the sector with its know-how in this field.

FORM, which has very wide references in the field of heat pump applications, has nearly 50,000 water source heat pump device references currently in operation.

FORM WSHP Water-to-Air Heat Pump units, which are produced with the latest technology in its new factory with a closed area of 14,000 m² established on an open area of 20,000 m² in Izmir Pancar Organised Industrial Zone and whose R&D work was completed in 2019, stand out among the domestically produced air conditioning systems with its innovative features for heat pumps as well as its price advantage and product quality. Its

compact design height allows it to be installed in low ceiling spaces up to 23 cm high. This space-saving solution can give architects more freedom. Compared to other water source heat pumps on the market, it reduces the floor-to-floor height and is economically implemented by saving construction materials.

Within the scope of the licence agreement signed with Lennox, FORM started to produce Lennox Package Air Conditioners in Izmir Production Facilities in 2019. In addition, FORM has expanded its domestically produced product range with domestic fan coil production, which it started in 2018, and most recently, FORM FKS Air Handling Units, which it implemented with 100% its own R&D in 2021.

FORM now offers compact, highly efficient heat pumps with inverter technology to the market.



High Energy Efficiency,
Low Operating Cost



High Efficient and Quiet
Rotary Inverter
Horizontal Compressor



R410A Eco-Friendly
Refrigerant



Plug and Play



Coaxial Heat
Exchanger with High
Thermal Efficiency



Only 23cm
Height



Advanced Thermostat and
BMS Solutions



Silent and High
Efficiency
EC Radial Fan



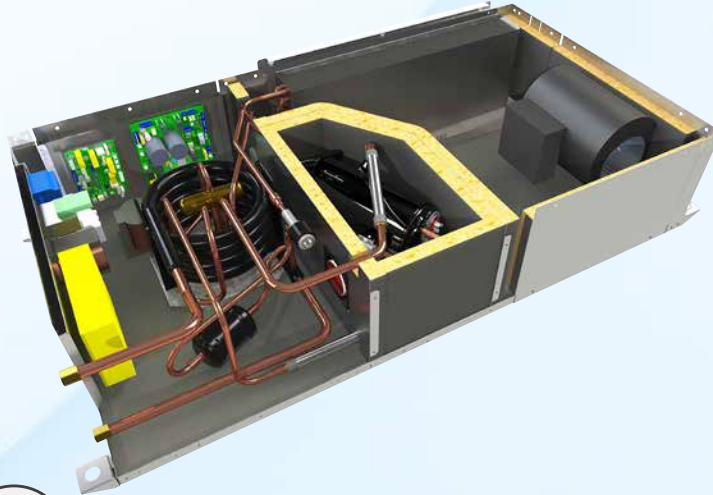
Wide Operating
Limits



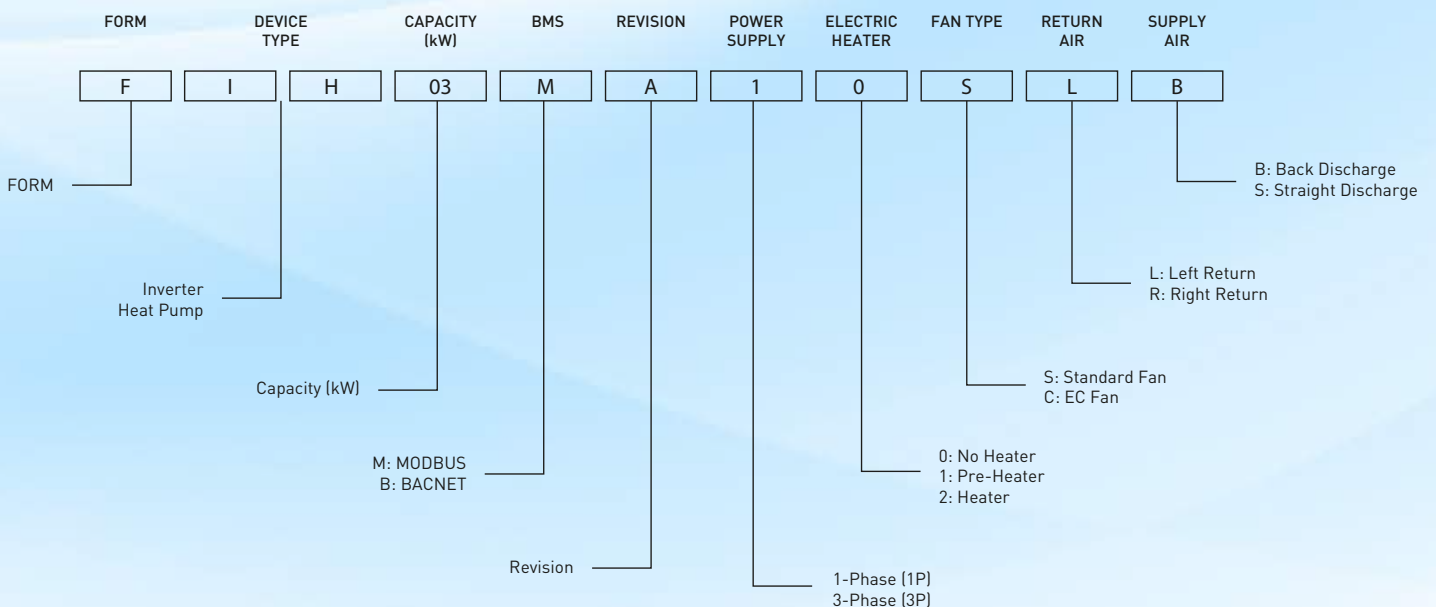
Thanks to Ergonomic
Design, Quick & Easy
Installation



Special Design Filter
Rails for Easy Duct
Connection



FORM I-WSHP Nomenclature

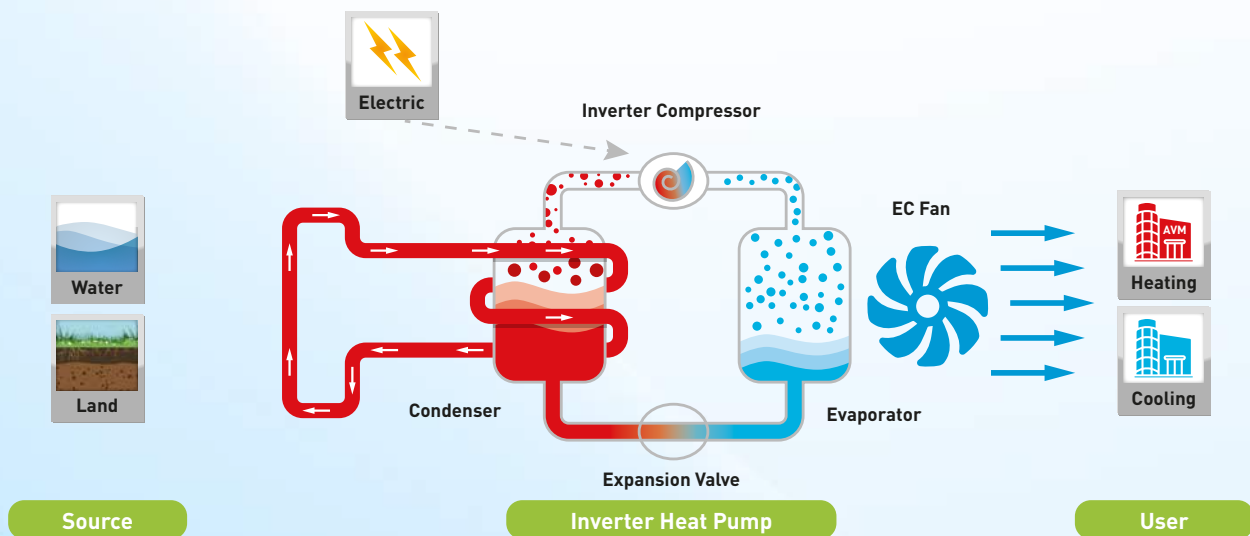


Heat Pump Working Principle

The greatest need of modern buildings is to provide heating and cooling in different sections simultaneously throughout the year. In today's well-insulated buildings such as business centres, shopping centres, hospitals, hotels, etc., the need for heating and cooling often occurs together. This is due to both insulation and increased internal loads. In water source heat pump systems, the existing water source (sea, groundwater, river, lake, well, etc.) is used if available; if not, the system solution and loop line are created by using the cooling tower and boiler.

The loop line of the water source heat pump is closed circuit and it is ensured that the water temperature circulating in the loop is kept in the range of 15 -30 °C all year round.

Depending on the wet bulb temperature of the location of the project, this range may vary by plus/minus a few degrees.



Main Applications

- ⦿ Mall & Office Buildings
- ⦿ Stores & Restaurants
- ⦿ Retail & Industrial

Water Source Heat Pump System Design

- ⦿ The space is divided into zones according to needs.
- ⦿ The total cooling and heating loads required for each space are calculated with the heat loss and gain calculation.
- ⦿ One or more units can be selected for each zone according to capacity and usage needs.
- ⦿ According to the annual capacity analysis results, heat recovery capacity between units, maximum heating and cooling capacity and balance processes in the water loop line are determined.
- ⦿ The inverter compressor that can dynamically respond to the changing capacity requirement due to indoor heat loads on a daily basis is selected.
- ⦿ Water loop line piping has 2 pipes and does not require insulation.
- ⦿ Depending on the capacity of the unit, water flow rate in the condenser line is important. For this reason, connection kit with dynamic balancing valve is used in the piping of the installation side in heat pump systems. These kits are available as ready packs. If the circulation pumps in the system have VFD, a motorized valve in the kit should be used to save energy.
- ⦿ Before the startup, flushing in the close loop line should be done.

Advantages of Inverter Compressor Heat Pump

In terms of Investor / Initial Investment

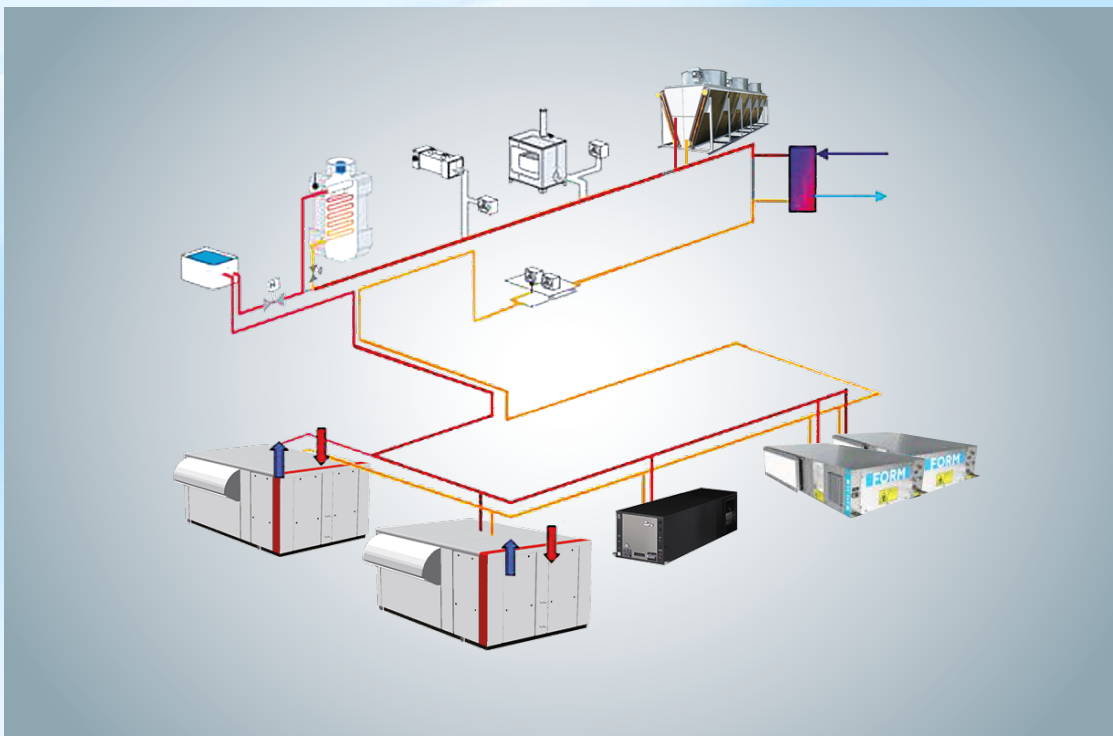
- ⦿ The initial investment cost is minimal compared to alternatives to provide independent heating and cooling at the same time.
- ⦿ Easy Installation and save the time.
- ⦿ With its high efficiency performance, it recovers the initial investment cost in a short time.
- ⦿ WSHP Units can be buy from the customers.
- ⦿ It complies with green deal and environmental regulations and allows to get points for green building certificates.

In terms of Architecture / Application

- ⦿ Save spaces / no outside units.
- ⦿ Thanks to the flexible installation feature, the units can be modified at independent times without being affected from each other.
- ⦿ Smaller capacity for cooling tower and boiler.
- ⦿ Thanks to the symmetrical design, the blowing air direction can be changed as short and long side.

In Terms of User/Operating

- ⦿ Individual Control / Same time heating or cooling with 2 pipes system.
- ⦿ It provides high efficiency with inverter compressor that dynamically responds to variable capacity requirements.
- ⦿ It can operate in 100% fresh air mode.
- ⦿ EC Fan provides high efficiency operation under desired conditions.
- ⦿ It can work compatible with building automation.
- ⦿ It provides easy use with advanced, programmable, fault code visible thermostat.
- ⦿ The optimised automatic mode algorithm ensures constant comfort.
- ⦿ It offers fast service and quality maintenance with its wide and experienced service network.
- ⦿ Ergonomic design provides easy access and serviceability to all components.



Technical Specifications

FIH-03

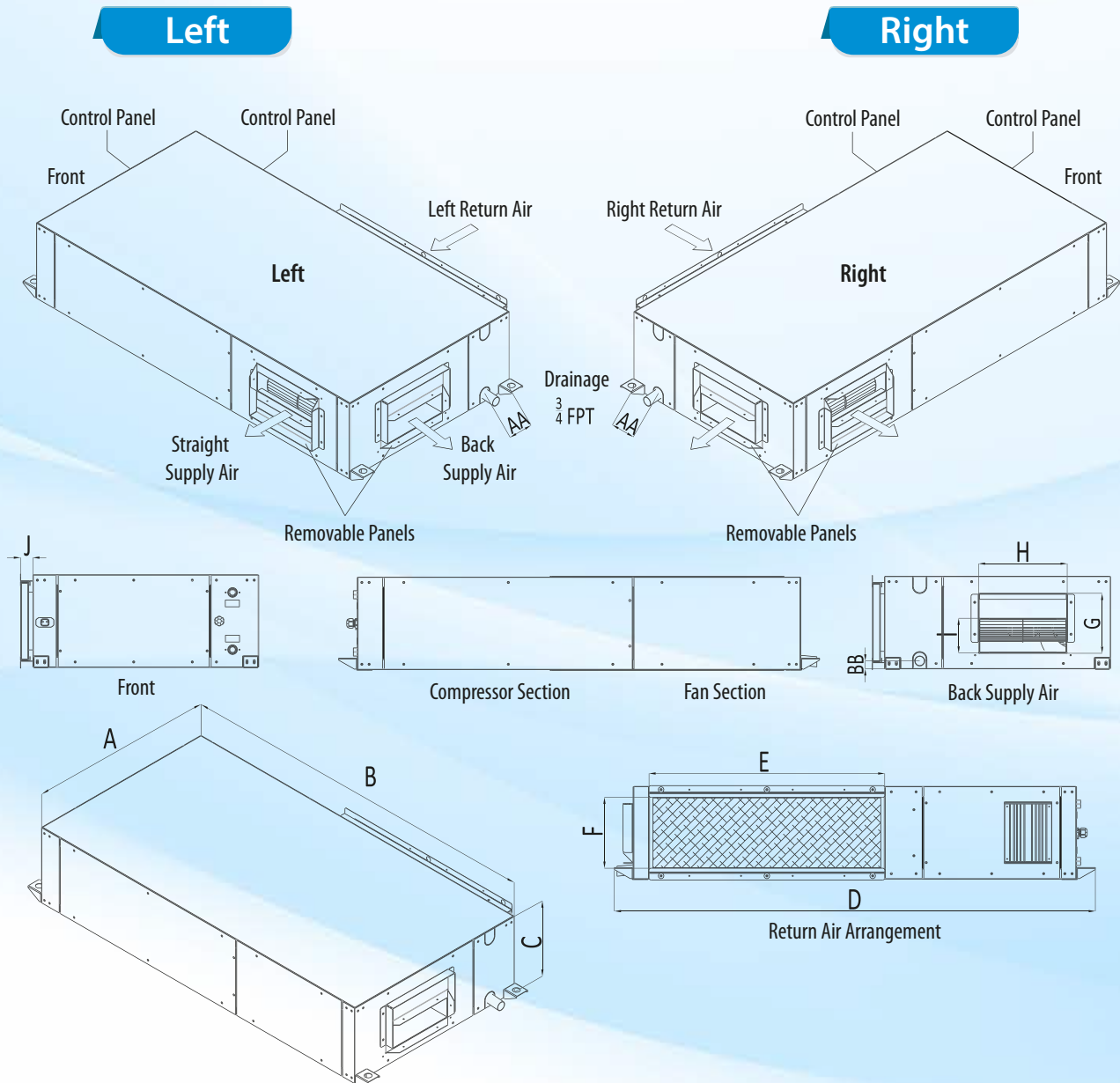
Cooling Capacity ⁽¹⁾	kW	3.05	Compressor Type		Rotary Inverter
Heating Capacity ⁽²⁾	kW	3.80	Number of Compressors	Qty	1
Capacity Range	kW	1.5 ~ 4.0	Refrigerant Gas		R410-A
Power (Cooling)	kW	0.67	Fan Type		EC Fan
Power (Heating)	kW	0.89	Fan Motor Power	kW	0.08
EER ⁽³⁾		4.23	Water Connection Diameter (∅)	inch	3/8"
COP ⁽³⁾		4.5	Weight	kg	50 kg
Supply Airflow	m ³ /h	600	Filter Size	mm	585x193
Water Flow Rate	l/s	0.17	Sound Pressure	dB(A)	44

1. Cooling capacity is based upon 27°C DB, 19°C WB entering air temperature & 30/35°C water inlet-outlet temperatures.

2. Heating Capacity is based on 20°C DB, entering air temperature & 20°C water inlet-outlet temperatures.

3. Fan power is included in total power input.

4. FORM, reserves the right to modify the design & specs of the products due to R&D.



Dimensions

A (width)	B (length)	C (depth)	D	Return Air Connection		Supply Air Connection		I	J
				E	F	G	H		
590	1100	230	1200	585	176	150	220	85	30

NOTE: Dimensions in mm.

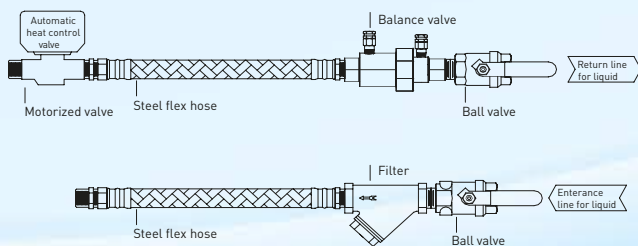
Standard Accessories

Automation Compatible Main Control Card



- Communication with Modbus - BACnet MS/TP - BACnet IP
- Easy access to supply / return air, inlet/ outlet water temperature & condenser gas temperature via service menu
- Weekly timing program
- 3 Speed and automatic fan control
- Return to factory settings
- Alarm codes
- Alarm codes, monitoring and memory options
- Capacity control with inverter compressor
- Precise super-heat control with electronic expansion valve

Hose Kit



Hose kits are provided as a set according to model/flow rate of heat pump.

- 2 pcs. of the flex hose
- 1 pcs. of Y strainer valve
- 1 pcs. of dynamic balance valve
- 2 pcs. of ball valve
- 1 pcs. of motorized valve and test ports

Thermostat



- Cooling/Heating/On/Off/Fan and Automatic selection
- BMS Communication speed selection
- Supply, indoor and return air temperature
- Condenser inlet/outlet water temperature
- Operation according to return air/space sensor
- Weekly programming
- Fault display and memory for last faults
- Encoding/ Locking
- Dimensions: 145x85x30 mm (WxHxD)
- Working with Modbus IP, Modbus RTU, BACnet IP and BACnet MSTP communication protocols

Cleanable Metal Filter



- Cleanable polyurethane material
- Galvanized profile
- Wire grill mesh sheets

Optional Accessories

Central Control (Touch Screen)

- Multi central unit management with the touch screen
- Remote access capability via a single touch screen for up to 25 units



FORM ENDUSTRI URUNLERI

FORM Endustri Urunleri is a sales and service company for Central Air Conditioning equipment. FORM Endustri Urunleri provides equipment and also helps designers and investors in choosing the right system for their building due to long experience. The main desire is creating high efficiency and Green Certified Buildings. The company provides various different kinds of central air conditioning units for any size and type of project. The main equipment provided are Rooftops, Heat Pump units, Chillers, Cooling Towers, Fancoils, Air Handling units and Ventilation systems.

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FORM GROUP COMPANIES

FORM Group Companies, established in 1965, manufacture, import, sell and service Air Conditioning and Industrial systems equipment, to improve the life and manufacturing quality of people and products. FORM Group Companies, offering high energy efficiency and environment friendly system solutions, is one of the leading companies in its field, respecting the environment and the ethical values.



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