



FORM-FHR

Heat Recovery Units

(Standard and Heat Pump)



FORM GROUP



Founded in 1965, the main activity of Form Group is the Production, Sales & After Sales Services of Commercial and Residential air conditioners, in order to improve the quality of life. The Group is active in the sectors of hotels, hospitals, shopping malls, commercial buildings, schools, factories and homes. The Group consists of 4 companies.

FORM Endüstri Ürünleri A.S. specializes in commercial and industrial air conditioning solutions. The products sold and serviced are either manufactured by the sister companies in the Group; fancoils, air handling units, water source heat pumps, rooftops, or imported from the exclusive representations from world known brands; Lennox, Clivet, Climate Master, Dunhambush, Montair. The main products are rooftops, chillers, fancoils, heat pump units, air handling units, cooling towers and other commercial air conditioning products. The company is one of the top commercial sales and service providers in the Turkish A/C market.

FORM Endüstri Tesisleri A.S. is the manufacturing fields of the Group and maintains its activities in 14,000 m² factory in Izmir. The company has two main fields of activity. The first one is manufacturing and selling of natural smoke and heat extraction systems, evaporative coolers, natural daylight systems and air purifier devices mostly for the roofs of industrial buildings. The second field of activity is manufacturing rooftops, air handling units, water source heat pumps and fancoils for the Group company Form Endüstri Ürünleri.

FORM MHI Klima Sistemleri A.S. is a Joint Venture company with Mitsubishi Heavy Industries. The company provides sales and after sales services for commercial and residential applications, with VRF and Split – Multi Split air conditioners. The company is one of the three biggest suppliers in the Turkish market for VRF equipment.

FORM Yönetim Destek A.S. is the management company that provides finance, accounting, logistics, IT, H&R and marketing services to the above three group companies, as they only comprise of manufacturing, sales and service personnel.

The head office of FORM Group is located in Istanbul, Maslak business district. There are regional offices in Ankara, Antalya, Izmir, Adana and Bursa for each sales company separately, with the factory in Izmir.

FORM Group is a founding member of ISKID Turkish HVAC Association and ISKAV Turkish HVAC Foundation. The group believes in professional organization and work ethics, by being a serious, reliable, technical and trustworthy provider, depending on the ethical values.

Another Innovation from Form

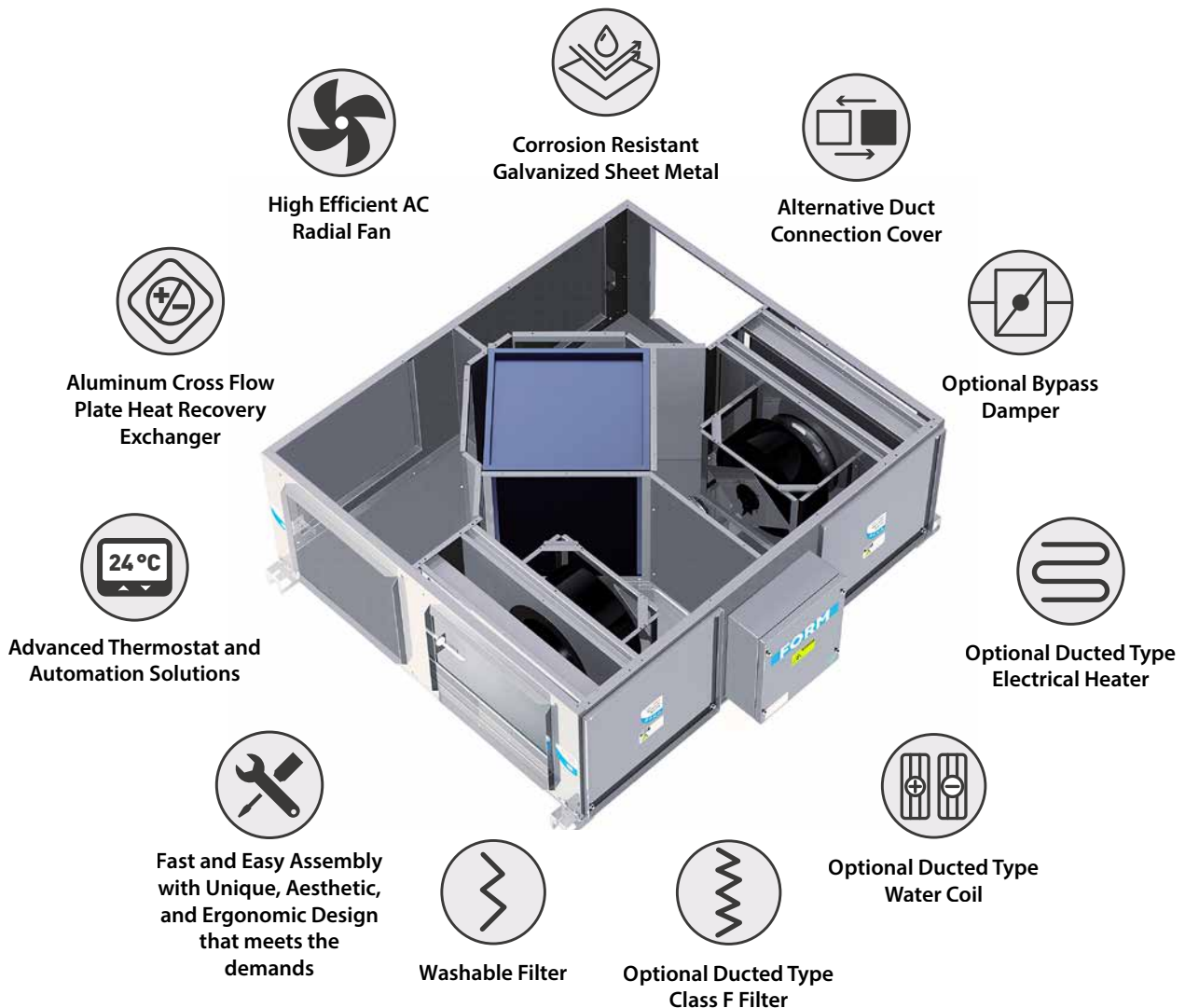
Form, Turkey's leading and experienced company in the air conditioning market since 1965 and heat pumps field for 30 years, introduces with its unique knowledge & experience innovative and energy-efficient heat recovery units to the sector.

Form Heat Recovery Units produced with the cutting-edge technology in the new factory with a closed area of 14,000 m² established on an open area of 20,000 m² in Izmir, Turkey stands out among the locally produced air conditioning systems with its cost benefit and product quality as well as innovative features in the field of heat recovery units.

Form has been producing Lennox Rooftop units since 2019 in Izmir production facility under the license agreement signed with Lennox. Form also expanded the production range with Fancoil production started in 2018, WSHP Water-to-Air Heat Pump units in 2019 and finally Form FKS Air Handling Units in 2021 as a result of R&D studies.

Now, Form launches new Heat Recovery Units.

FHR (Standard Model)



Technical Specifications

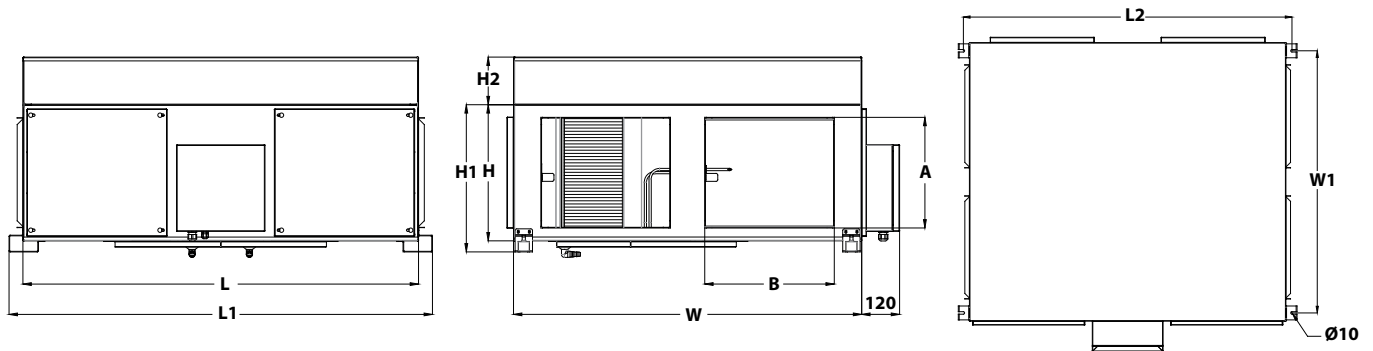
Technical Specifications

MODEL	FHR-05	FHR-08	FHR-10	FHR-15	FHR-20	FHR-30	FHR-40
Air Flow (m ³ /h)	478	790	950	1540	2150	2610	3450
Power Consumption (W)	100	204	310	450	1030	750	940
Operating Current (A)	0,46	0,90	1,36	2,00	4,50	3,54	4,78
Power Supply	230 V/50 Hz/1 ph						
Filter Class	G Class Polyurethane Filter According to EN 779 Standard						
Optional Electrical Heater (kW)	1/1,5/3	1,5/2,5/4	1,5/3,5/5	2,5/5/8,5	4/8,5/12	5/11/13/17	6,5/12,5/17/23
Dimensions (mm) (WxLxH)	710x900x270	830x1000x300	830x1000x300	940x1200x350	1100x1200x430	1300x1600x550	1440x1600x600
Duct Dimensions (mm) (AxB)	190x230	220x270	220x270	270x330	350x410	450x510	520x580
Unit Weight (kg)	35	43	43	56	69	96	115
Unit Weight with Bypass Module (kg)	43	53	53	71	94	126	150

* Air flow is given according to 0 Pa external static pressure.

* Where the outside temperature is below -3°C condensation may occur, it is recommended to use an pre electrical heater to heat the outdoor air entering the unit.

Unit Dimensions



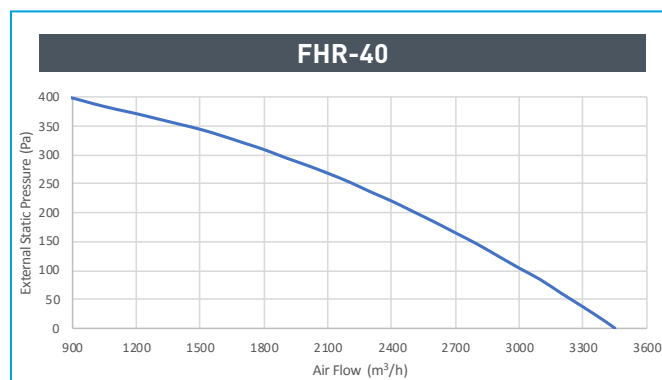
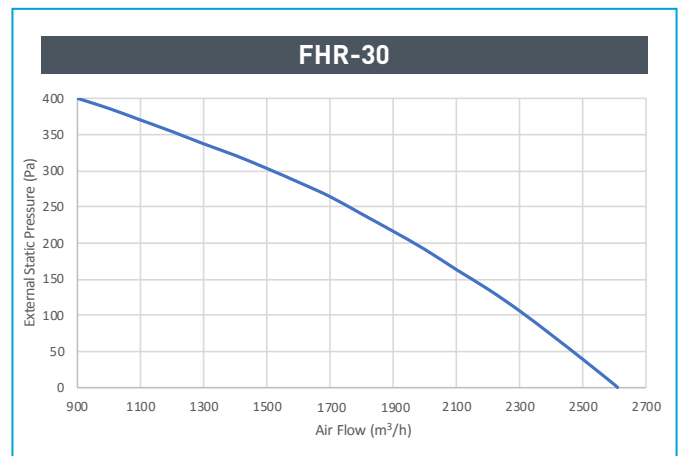
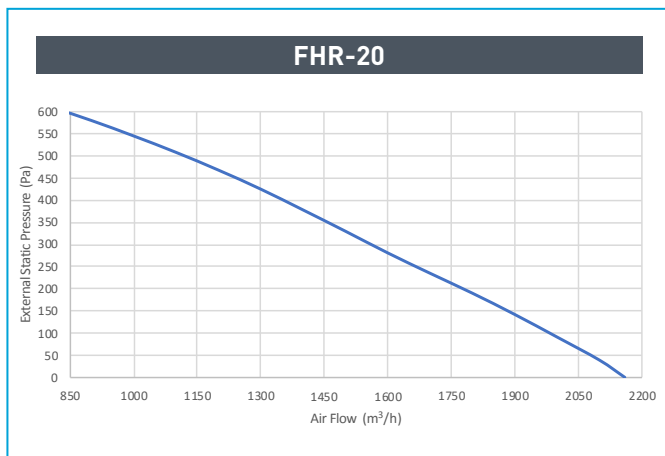
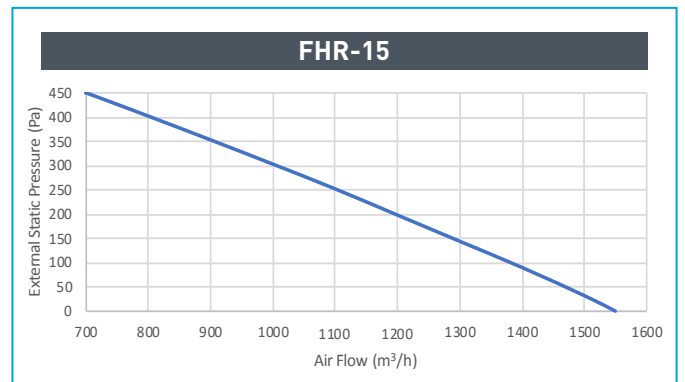
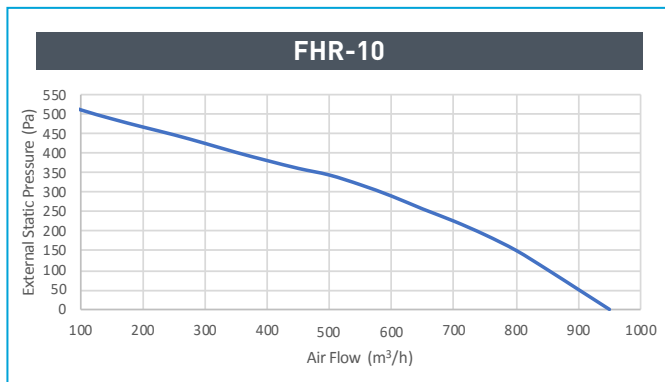
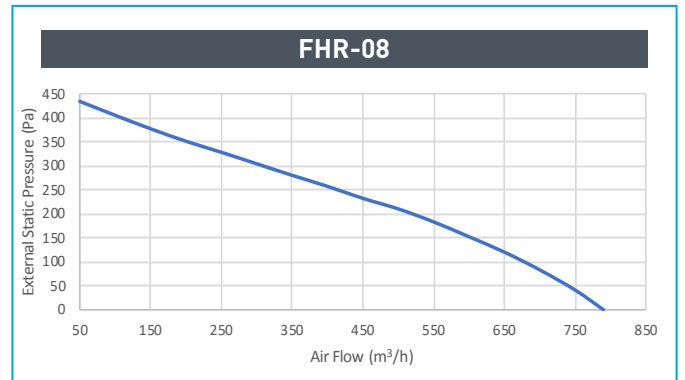
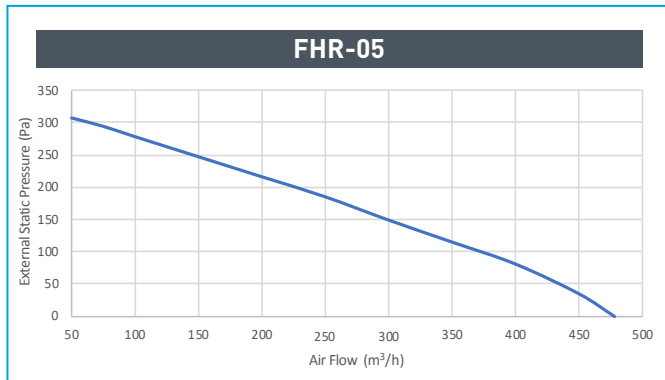
MODEL	W	W1	L	L1	L2	H	H1	H2	AxB
FHR-05	710	647	900	1006	954	270	305	100	190x230
FHR-08	830	767	1000	1106	1054	300	335	100	220x270
FHR-10	830	767	1000	1106	1054	300	335	100	220x270
FHR-15	940	877	1200	1306	1254	350	385	150	270x330
FHR-20	1100	1037	1200	1306	1254	430	465	150	350x410
FHR-30	1300	1237	1600	1706	1654	550	585	150	450x510
FHR-40	1440	1377	1600	1706	1654	600	635	200	520x580

* All the values are given in mm.

* The part indicated as "AxB" in the table is the duct dimensions.

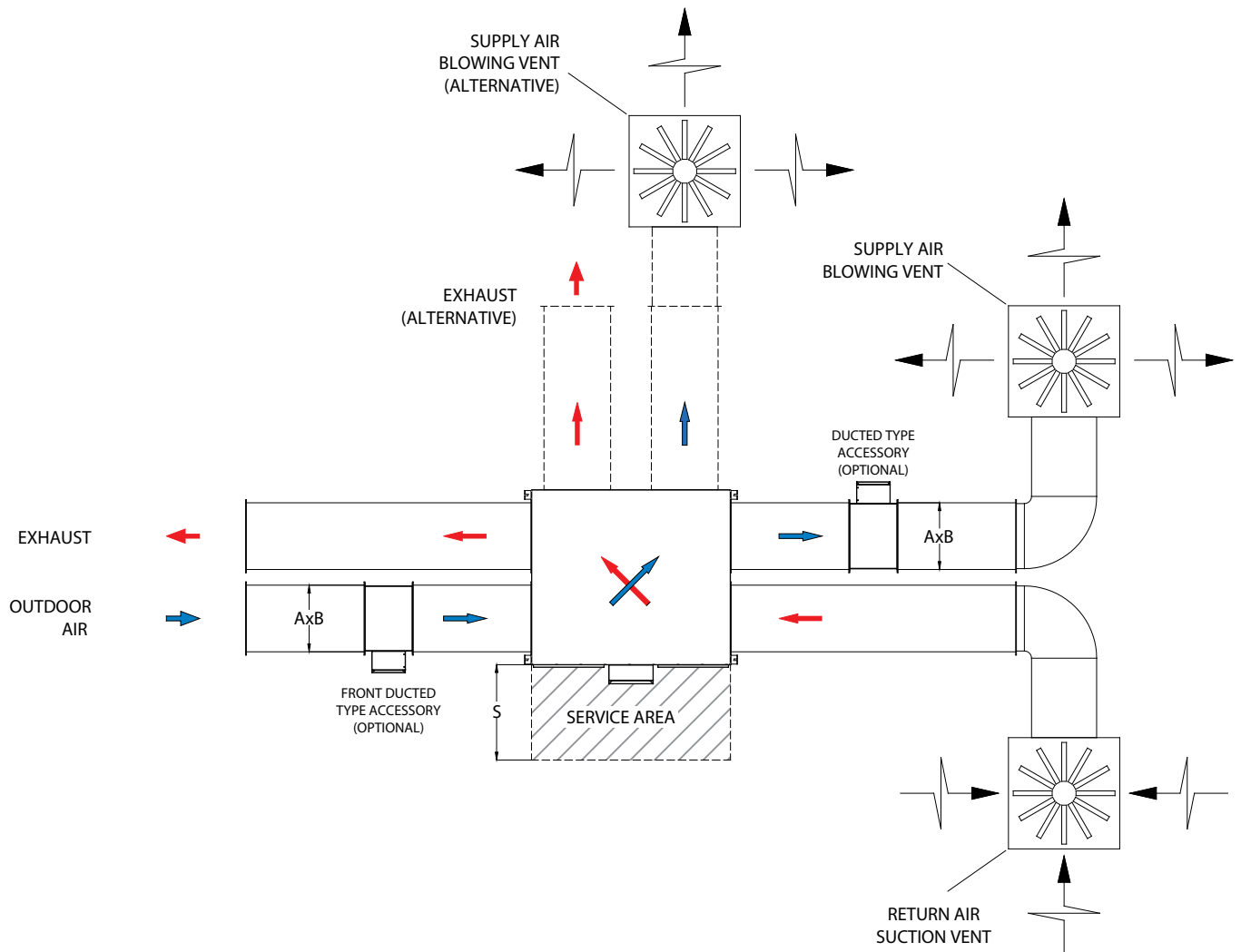
* The H2 dimension belongs to the bypass module (optional).

Performance Curves



Assembly Alternatives & Service Clearances

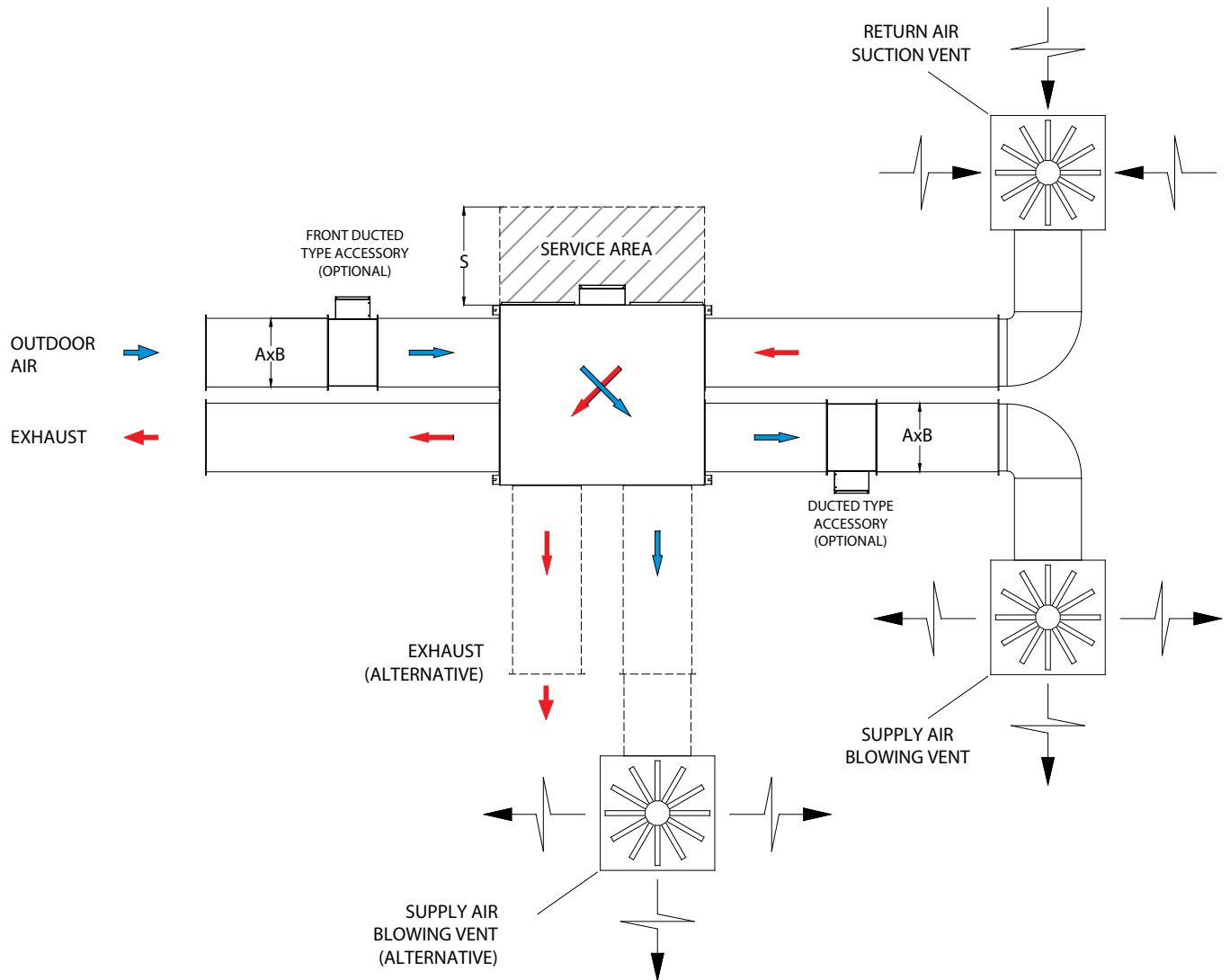
Assembly Alternative-1



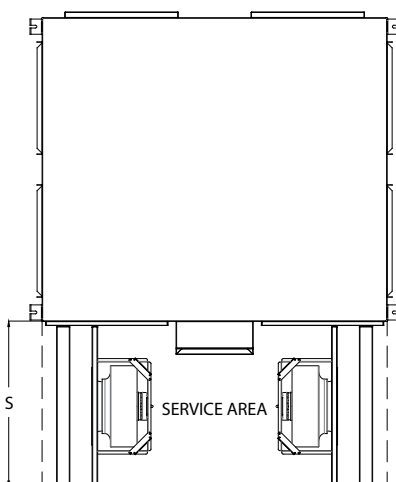
All the components in the units that may need service have been designed to allow removing from the unit through the service covers and reinstalled after service without the need to demount the unit from the duct system in which it is mounted.

The units has been designed symmetrically. It can be used as right- and left-oriented as desired and according to the duct installation.

Assembly Alternative-2



Service Clearances



MODEL	Service Clearance Distance (S)
FHR-05	400
FHR-08	475
FHR-10	475
FHR-15	550
FHR-20	600
FHR-30	700
FHR-40	800

* All the values are given in mm.

Control System

Main Functions

- Temperature measurement on digital controller (Return air temperature, outdoor air temperature, supply air temperature)
- Adjustable mode selections (automatic heating and cooling, manual heating and cooling, fan mode)
- BMS compliant operation (Modbus RTU)
- Fan speed control (6-steps)
- Possibility of selecting 16 internal HVAC configuration on screen
 - Supply air damper, bypass damper control
 - Filter pollution control (adjustable service time)
 - After heater control
 - Pre-heater control
 - On/off valve control
 - Proportional valve control
 - Cooling coil control
 - Heating coil control
 - Water coil control
 - CO₂ and air quality control (with CO₂ sensor)
- Resume operation in case of power failure
- Weekly programming



Digital Controller Features

- 3.1" Graphic Display
- Exhaust fan, supply air fan, 6-step speed control
- Automatic/manual operation
- Heating/cooling/fan selection
- Language options (Turkish/English)
- Internal local temperature sensor
- User-friendly design
- Minimum and maximum set temperature limiting
- Weekly programming

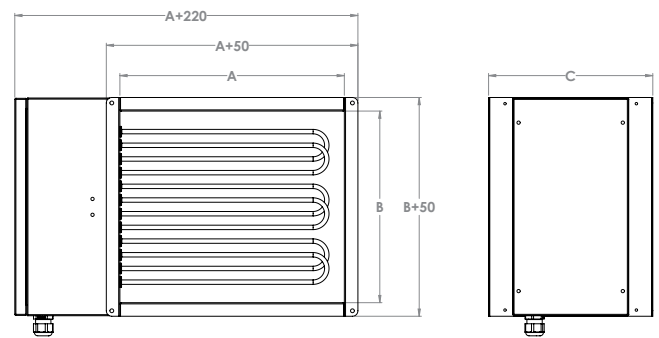
Accessories

Ducted Type Electric Heater

Electrical heater alternatives mountable on the duct for use at supply air inlet in cold/extremely cold regions with the risk of frost or the heat recovery unit, outlet to bring the ambient temperature to the desired level are available. It is produced as rectangular due to the system's duct design. It consists of galvanized sheet metal and resistances as standard.



Model	Electrical Heater Capacities			
FHR-05	1 kW	1.5 kW	3 kW	
	230 x 190 x 300			
FHR-08	1.5 kW	2.5 kW	4 kW	
	270 x 220 x 300		270 x 220 x 400	
FHR-10	1.5 kW	3.5 kW	5 kW	
	270 x 220 x 300	270 x 220 x 400	270 x 220 x 450	
FHR-15	2.5 kW	5 kW	8.5 kW	
	330 x 270 x 300		330 x 270 x 500	
FHR-20	4 kW	8.5 kW	12 kW	
	410 x 350 x 300	410 x 350 x 350	410 x 350 x 450	
FHR-30	5 kW	11 kW	13 kW	17 kW
	510 x 470x 300	510 x 470x 350		510 x 470x 400
FHR-40	6.5 kW	12.5 kW	17 kW	23 kW
	580 x 520 x 300		580 x 520 x 350	



* All the values are given in mm.

* Dimensions are AxBxC.

Ducted Type Water Heater/Cooler Coil

Ducted-type water heater/cooler coils are produced inside a cell and with standard capacities. Coils consist of copper pipe and aluminum fins. Ducted-type water heater/cooler coil cells that are rectangular due to the system's duct design consist of galvanized sheet metal and stainless condensation pan as standard. The condensation pan in the ducted-type cooling coils enables the discharge of the condensed water.



Fan Speed Controller

Monophase fan speed controller is used to control the fan speed of heat recovery unit.

- Elegant design
- Proportional fan control
- Ease of use
- Compact design
- Easy mechanical assembly
- Easily replaceable fuse



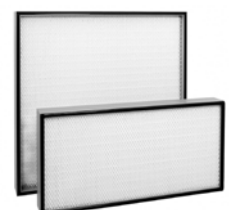
EC Fan

- High efficient EC plug fans
- Quiet operation
- Proportional control

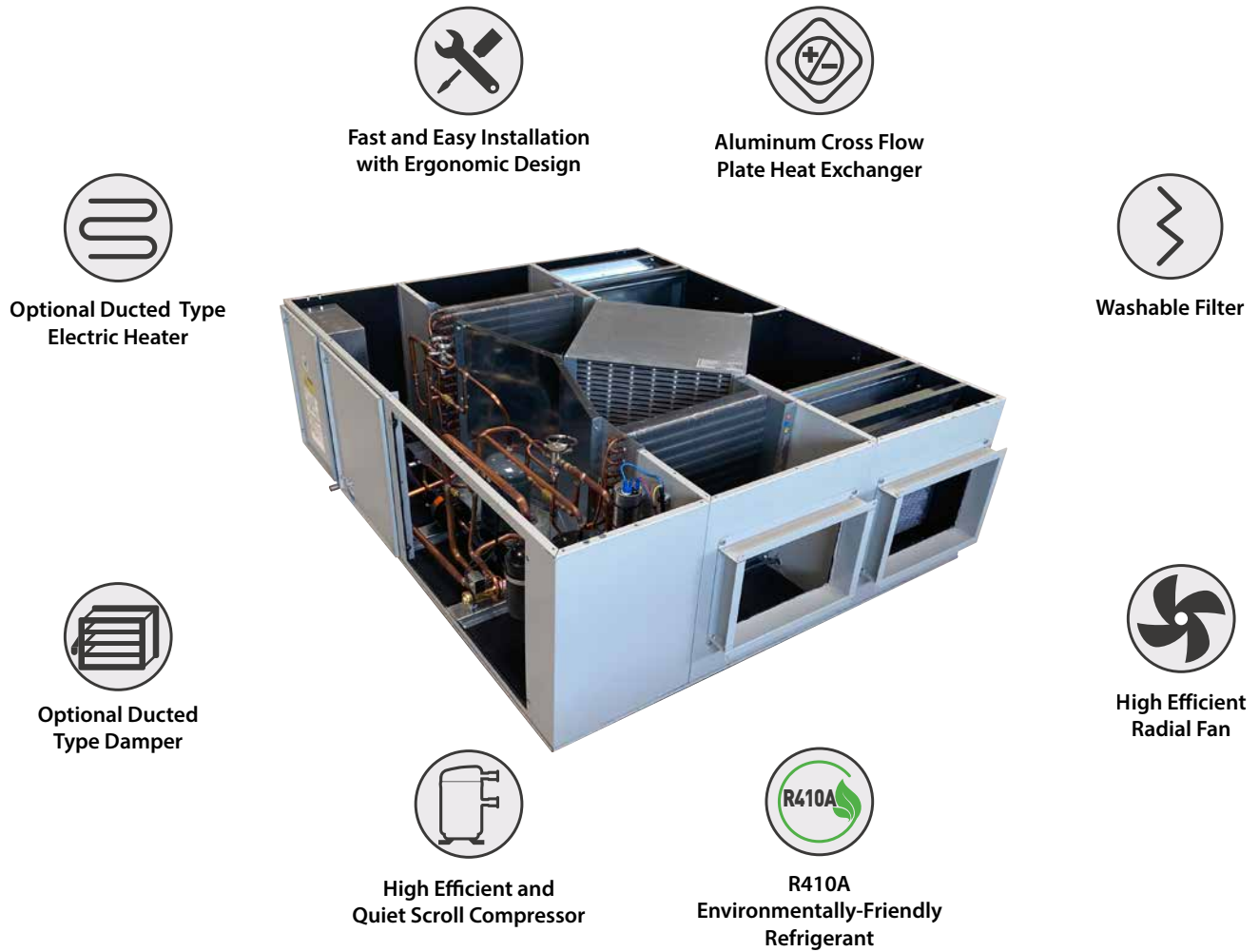


Ducted Type Class F Filter

Class F panel filters are optionally provided as ducted type when more efficient fresh air purification is desired.



FHR-HP (Heat Pump Model)



General Features

- FHR-HP units mainly aim to meet the fresh air demand as well as the heating and cooling load demands with plate heat exchanger and heat pump, producing compact solutions in a single unit.
- The equipment casing has an acoustic isolation and electrostatic powder coating.
- The outdoor and return air lines are equipped with Class G filters.
- Rotary or scroll compressors with R410A refrigerant are used.
- The Copper pipe/Aluminum fin type evaporators and condensers are designed to provide an air velocity below 2.5m/s, ensuring low pressure and high efficiency.
- The unit is equipped with an evaporator, a condenser and a condensate pan that covers the plate exchanger.
- The operating mode can be selected as heating or cooling on the controller.
- The fan speed can be independently controlled on the controller.

Technical Specifications

Technical Specifications

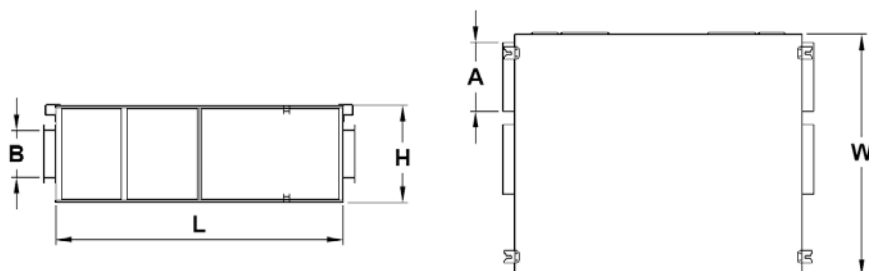
		MODEL	FHR-HP					
			03	04	06	08	12	
Air Flow		m ³ /h	750	1000	1500	2000	3000	4000
External Static Pressure		Pa	150	175	150	200	175	125
Max Air Flow		m ³ /h	875	1250	1750	2375	3500	4500
Fan	Power Consumption	kW	0,27	0,46	0,45	1,03	1,02	1,6
	Operating Current	A	1,2	2,1	2	4,5	3	7
Cooling	Total Cooling Capacity*	kW	3,96	5,27	8,11	10,54	15,35	22,96
	Comp. Power Consumption	kW	0,86	1,24	2	2,29	3,43	5,13
	Max Current	A	4	5,9	8,7	11	16,1	8,8
	COP**	-	4,6	4,2	4,1	4,6	4,5	4,5
Heating	Total Heating Capacity*	kW	5,79	7,51	11,86	15,37	21,95	33,23
	Comp. Power Consumption	kW	0,6	0,87	1,29	1,6	2,4	3,59
	Max Current	A	4	5,9	8,7	11	16,1	8,8
	COP**	-	9,6	8,6	9,2	9,6	9,1	9,2
Power Supply		V / Hz / f	230/50/1					400/50/3

Summer Condition: Outdoor Air 35 °C %40 RH; Return Air 24 °C %50 RH
 Winter Condition: Outdoor Air -2 °C %90 RH; Return Air 22 °C %50 RH
 * Heat exchanger capacity is added to total heating and cooling capacities.
 ** Fan power consumptions are not included in the COP calculation.

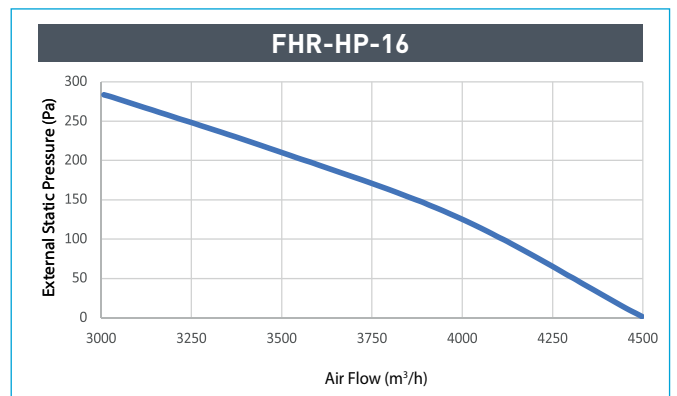
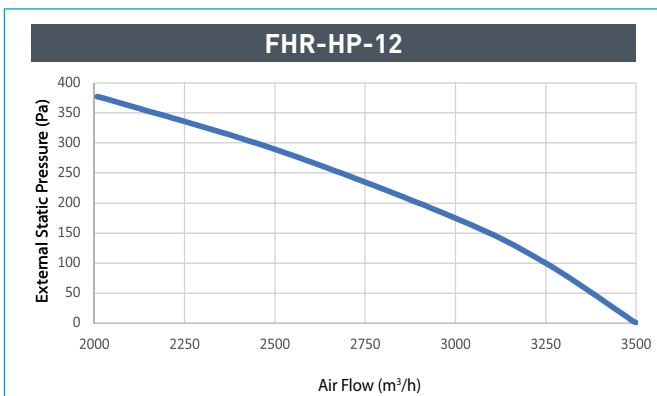
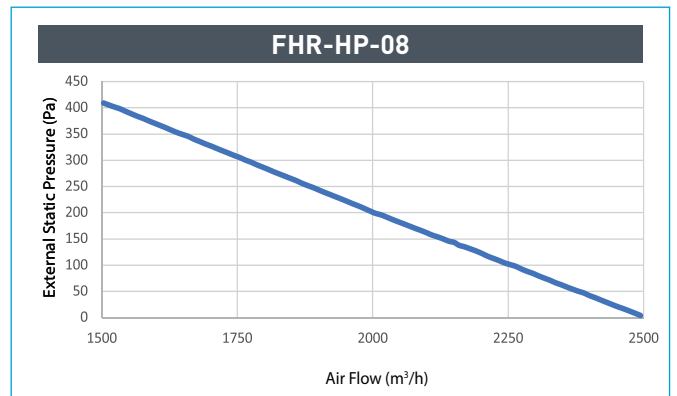
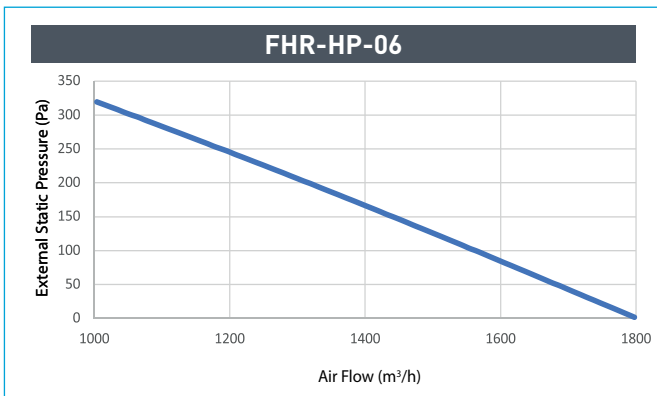
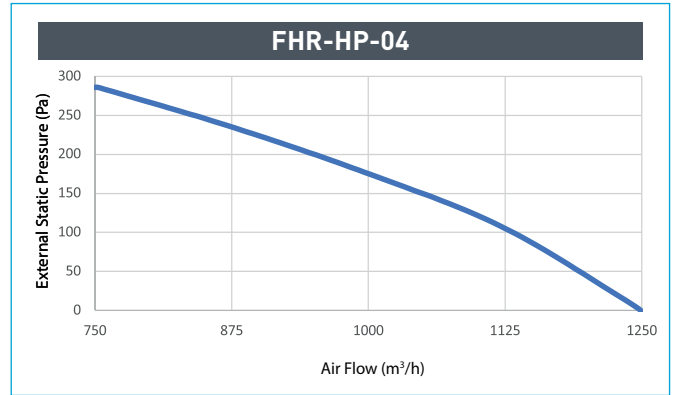
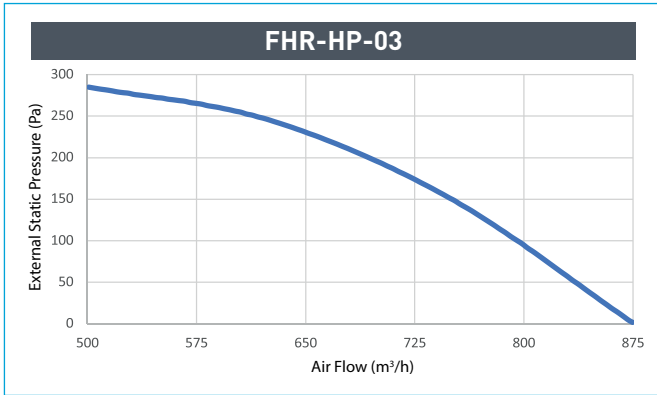
Unit Dimensions

MODEL	W	L	H	AxB	Unit Weight (kg)
FHR-HP-03	1000	1200	405	250 x 200	110
FHR-HP-04	1100	1300	405	300 x 200	140
FHR-HP-06	1250	1600	455	350 x 250	170
FHR-HP-08	1350	1800	455	400 x 300	190
FHR-HP-12	1550	1900	605	500 x 350	270
FHR-HP-16	1850	2100	705	600 x 400	330

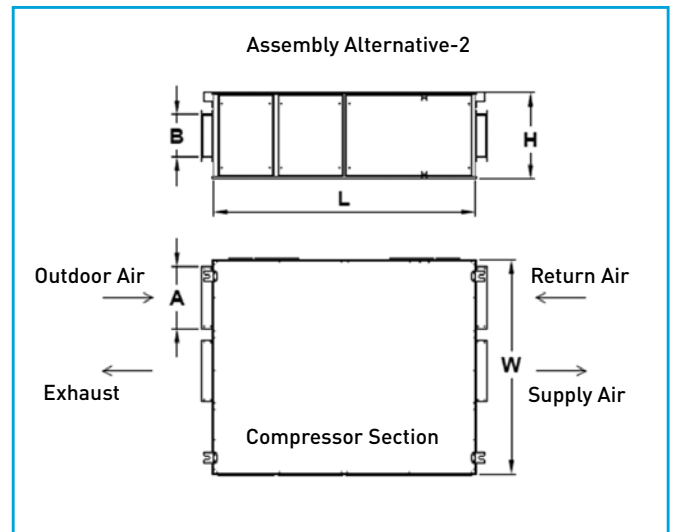
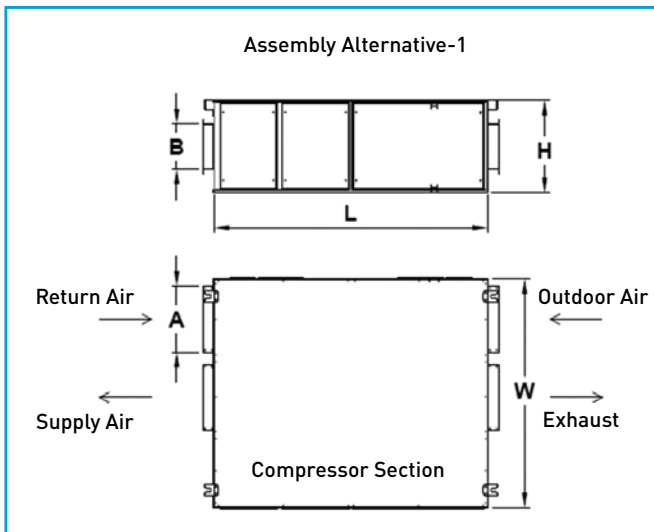
* All the values are given in mm.



Performance Curves



Assembly Alternatives



Control System

General Features

- Control board and digital controller with heat recovery and heat pump scenario
- Possibility of setting the heating, cooling, and fan functions of the heat pump on the digital controller
- BMS compliant operation (Modbus RTU)
- Possibility of monitoring heat pump fault notifications on the digital controller
- Ducted type electrical heater control (optional)
- Supply air and exhaust damper control (optional)



Accessories

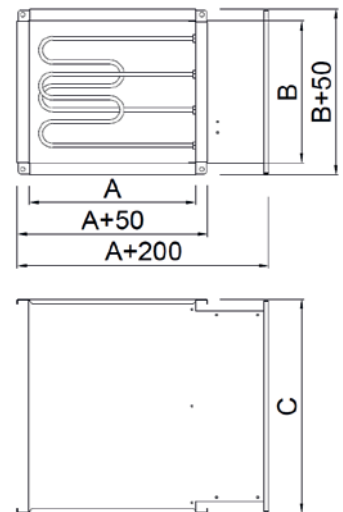
Ducted Type Electrical Heater

	Nom. Air Flow m ³ /h	Capacity kW	Stage	Power Supply V	Operating Current A	Min Air Flow m ³ /h	Max Air Flow m ³ /h
25-20-2	500	2	1	230/380	8,7/2,9	350	2000
25-20-4	750	4	2	230/380	17,4/5,8	350	2000
25-25-3	1500	3	1	230/380	13/4,3	450	2500
25-25-6	1500	6	2	380	8,7	450	2500
30-30-4	2000	4	1	230/380	17,4/5,8	650	3500
30-30-8	2000	8	2	380	11,6	650	3500
35-30-6	3000	7	2	380	10,1	750	4000
35-30-10	3000	10	2	380	14,5	750	4000
40-35-8	4000	8	2	380	11,6	1000	6000
40-35-12	4000	12	2	380	17,4	1000	6000

- Adjustable limit thermostat with automatic reset
- Manual reset safety thermostat
- Additional panel protector thermostat
- Contactor per heater stage

Ducted Type Electrical Heater Dimensions

	A	B	C
25-20-2	250	200	350
25-20-4	250	200	350
25-25-3	250	250	350
25-25-6	250	250	350
30-30-4	300	300	350
30-30-8	300	300	350
35-30-6	350	300	350
35-30-10	350	300	350
40-35-8	400	350	350
40-35-12	400	350	350



Damper

	Dimension (mm)	Actuator On/Off
	A	B
FHR-HP-03-DM	250x200	2 Nm
FHR-HP-04-DM	300x200	2 Nm
FHR-HP-06-DM	350x250	2 Nm
FHR-HP-08-DM	400x300	2 Nm
FHR-HP-12-DM	500x350	2 Nm
FHR-HP-16-DM	600x400	2 Nm



2 dampers + 2 actuators in the Supply Air and Exhaust

References



YDA Center
Ankara



Nidapark Kayasehir
Istanbul



Guzelyurt Mall
North Cyprus



Academic Hospital
Istanbul



Bati Bahat Hospital
Istanbul



Museum of Butterflies & Insects
Kahramanmaraş



Gokceada Criminal Court
Canakkale



Oytas Factory
Bursa



TPAO Natural Gas Processing Plant
Zonguldak



Bosch Rexroth
Bursa



Lesaffre Turquie Ceyhan Factory
Adana



Seluz Chemicals Factory
Kocaeli

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.

FORM ENDUSTRI URUNLERI TIC. A.S.

Eski Buyukdere Cad. Sumer Sokak No:1B
Ayazaga Ticaret Merkezi Kat:16
Maslak 34398 Istanbul
T : +90 212 286 18 38
F : +90 212 286 66 48
E : merkeziklima@formgroup.com
W : www.formmerkeziklima.com

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.



Commercial Air-Conditioning Systems Sales and Service

Eski Buyukdere Caddesi, Sumer Sokak,
No: 1B, Ayazaga Ticaret Merkezi, Kat: 16,
Maslak 34398, Istanbul, Turkey
T : +90 (212) 286 18 38
E : merkeziklima@formgroup.com



VRF-Residential Air-Conditioning Sales and Service

Eski Buyukdere Caddesi, Sumer Sokak,
No: 1B, Ayazaga Ticaret Merkezi, Kat: 12,
34398 Maslak - Istanbul, Turkey
T : +90 (212) 286 08 73
E : mitsubishiform@formgroup.com



Industrial Systems Manufacturing, Sale & Service

Kazım Karabekir Mahallesi
Pancar Organize Sanayi Bolgesi, 7. Cadde,
No: 13, Ayrancilar Torbali, Izmir, Turkey
T : +90 (232) 864 21 00
E : formfabrika@formgroup.com

Regional Offices

Adana

Ankara

Antalya

Bursa

Izmir

www.formmerkeziklima.com
www.formgroup.com

