

AIR+PLUS

Air Conditioning Technologies



AHU Plus Dx Air Handling Units

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AIR-PLUS

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Plug & Play

AHU Plus Dx Air Handling Units

AHU Plus DX - TH: DX Air Handling Unit with 100% Fresh Air **AHU Plus DX - IGK:** DX Air Handling Unit with 100% Fresh Air & Heat Recovery **AHU Plus DX - KH:** DX Air Handling Unit with Mixture Air

► Structure of the Cell Construction

DX air handling unit consists of a combination of necessary module cells according to requirement. Casing of modul cells of our DX air handling units are manufactured from natural anodized aluminum profile and plastic corner elements. Thickness of cell panel is 42 mm or 50 mm, outer wall is electrostatic powder coated and inner wall is manufactured from galvanized sheet. AHU Plus DX air handling units are indispensable for central ventilation and local air conditioning applications due to its high efficient and energy saving 70 kg/m³ dense rock wool filled panels, modern casing structure, static and dynamic balance adjustment, silent, efficient plug-in fans. The electric motors are 380V-50Hz as the standard. High efficiency plug fans with AC motor are also used as per customer request. All double-walled panels are mounted to the aluminum casing with special torch tip M6 bolts. As standard, the service and inspection covers were manufactured by using the air-conditioning unit lock with spaceless rigid hinge, having compression feature so that it will

not permit air leakage, and which does not form protrusions in the cell, and the covers have a dooble-wallrigid structure so that the covers do not rub against frames. Under the cells, there are full-length frame feet with 180 mm height made of 3 mm galvanized sheet. There are eyebolts for crane transport and blade slots for forklift transport on the corners of the frame feet. All the automation holes required on DX air handling units are drilled during the production phase (differential pressure switch, NTC temperature sensor, freeze thermostat, etc.). The motor leads were taken into the switch box outside the cell. According to customer request, all automation can be placed on the panel and the device can be delivered after all settings can be made. The cell merging elements are manufactured from an aluminum alloy material. The internal illumination lamp and sight glass are located in the aspirator, ventilator and filter cells of the air handling unit. Thanks to these accessories, it is possible to control insides of the cells without deactivating the system.

► DX Coil

DX coil is the process of cooling the air by transferring the heat taken from the air passing through the evaporator to refrigerant with the help of compressor. To simply describe the system, a direct expansion cooling coil is adapted to an air handling unit and required number of VRF outdoor needed by this coil is connected. While performing this operation, the refrigerant is evaporated at the source (AHU) where the heat will be transferred. During the heat transfer by conventional cooling groups (chiller / hot water boiler), heat is transferred to water first and then the heat transfer is done inside the AHU via pipes and pumps. AHU with DX coil provides air conditioning in the place without need for traditional cooling groups and together with heatpump operation feature, hot water boilers.

► Usage Features

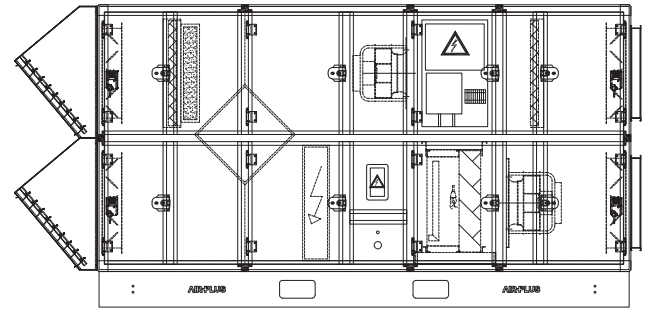
The basic characteristics required in DX Air Handling Units include doing air conditioning by highly productive operating with minimal energy, air tightness, thermal bridges' having a construction that will minimize the heat dissipation, dynamic forces' not causing vibration. Selection of DX series air handling units is made giving the first priority to the low running costs and efficiency. In order to support these priorities, energy-saving fans, efficient heat recovery heat exchangers and coils, and the internal structure of the air handling unit that provides air flow at an optimum level are used in our products. With our automation systems, it is possible to increase this efficiency to higher levels.





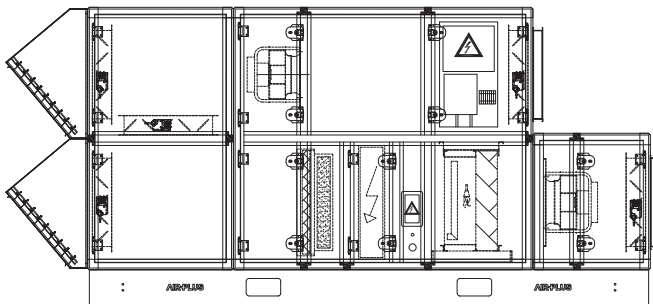
► AHU Plus DX - IGK

DX Air Handling Unit with 100% Fresh Air & Heat Recovery



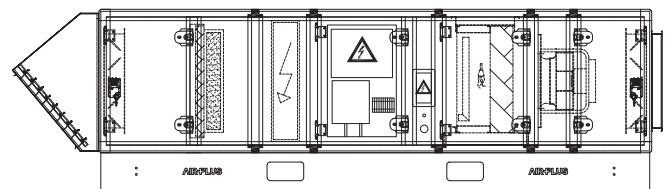
► AHU Plus DX - KH

DX Air Handling Unit with Mixture Air



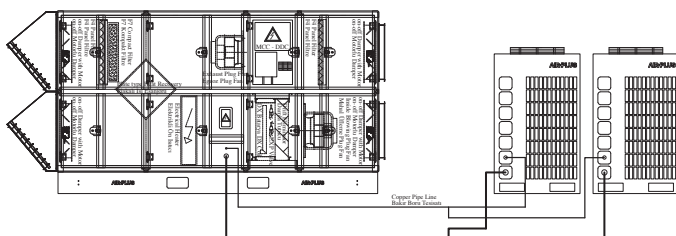
► AHU Plus DX - TH

DX Air Handling Unit with 100% Fresh Air



► Advantages of DX Air Handling Unit

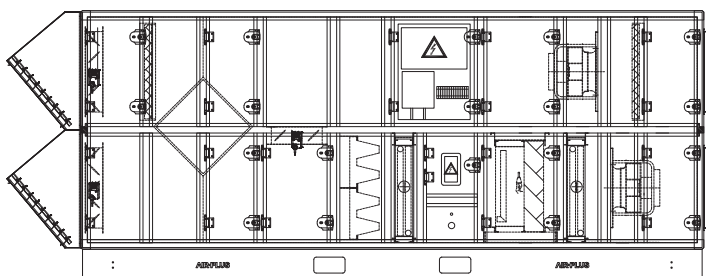
- Energy losses in the refrigerant pipes are much less.
- It is an advantageous system with COP values in terms of both operation and investment costs, it offers new, easy and fast solutions to small and medium sized facilities through a single investment.
- Heating and cooling can be performed by a single VRF outdoor unit; heating, cooling and operating costs are decreased.
- It provides optimum control with the compressors having variable capacity (inverter technology) and the fans it used, thus consumes power just as required thanks to the local control.
- Ability to give quick response to the partial loads.
- Saving large areas we have to reserve for the water cooling group and the boiler.
- Possibility to take it into regime in a very short time.
- Unlike the traditional AHU system water coil there is no freezing risks in this system.
- Maintenance costs are much lower than the traditional systems.
- Low noise level.
- The static charge added by the water amount circulating inside the steel piping, pump, and tubing found in the system with the conventional chiller and the hot water boiler is lower in this system.
- The advantage of not requiring enclosed space thanks to the conformity to the outdoor conditions.
- Longer lasting compared to the conventional devices.



All the automation scenarios are built as suitable for and synchronized with the "Heat Pump Outdoor Unit" system.

Advantages of **AHU Plus** Dx Air Handling Units

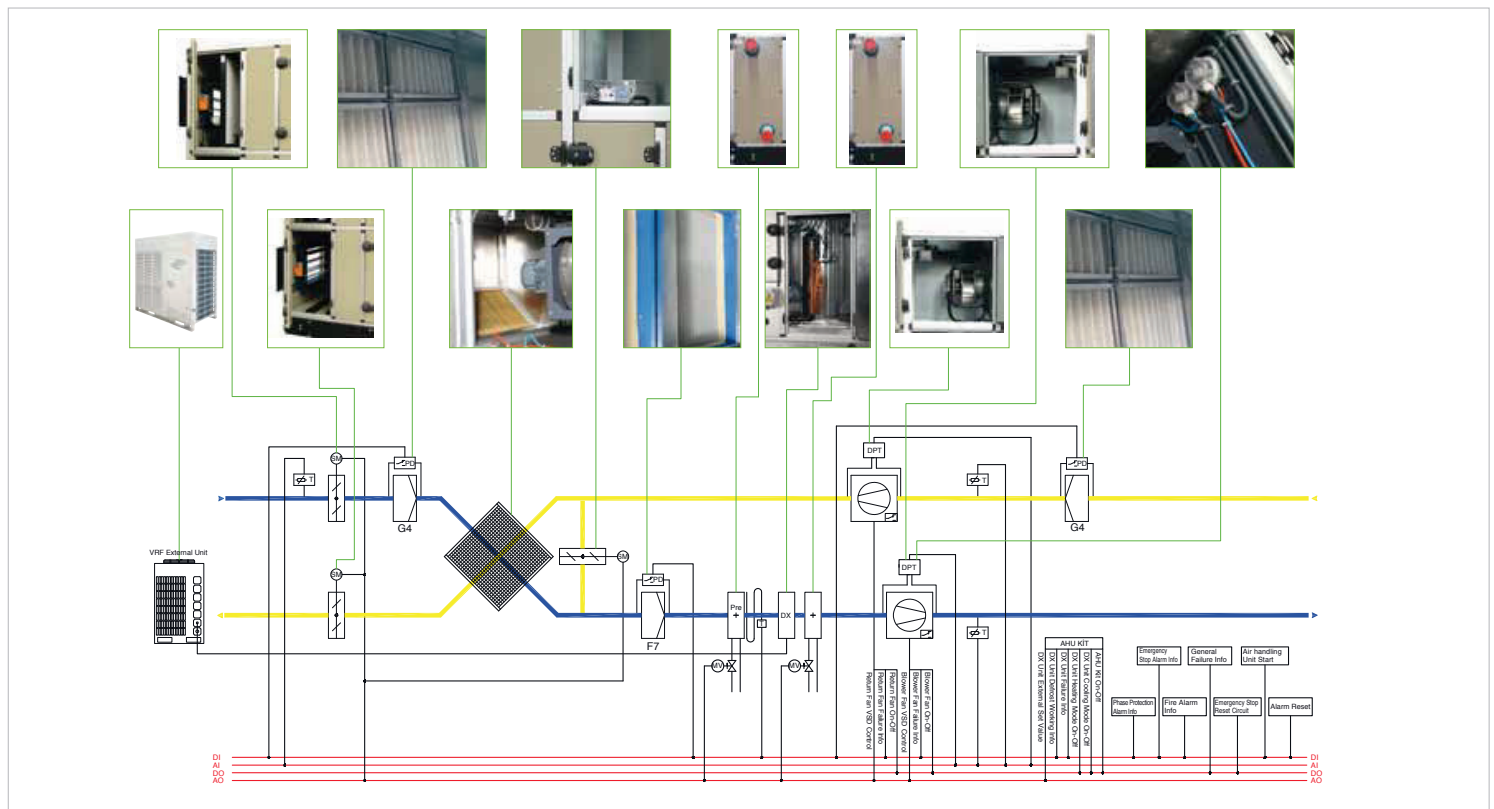
- DX air handling units are manufactured in the range of 1.800 to 25.000 m³/h air flow, and 14-250 kW cooling capacity.
- Saves energy through high efficiency heat recovery rotor or plate recuperator.
- DX Air Handling Units have a panel structure with 42 mm or 50 mm thick rock wool insulation (70kg/m³).
- All the safety and warning signs, and capacity information labels are available on the Air Handling Unit. (The warning marks should be indelible so that they will not be affected by hot, cold, and UV radiation of the sun.)
- The fans are suitable for control by frequency inverter, and have the feature of PLUG being directly coupled to the motor shaft. The plug fans with AC motor are also used as per customer request. (The productivity of the plug fans with AC motors is 92%, and fan application with EC motor is recommended).
- The fan motor powers are selected by considering the dirty filter pressures.
- There are internal MCC (Magnetic Control Center) and DDC (Direct Digital Control) panels having approved protection class on the Air Handling Unit.
- Apart from MCC & DDC panel, there is the "urgent safety" push-button.
- There is a compact switch, which disconnects it from the mains during the urgent intervention to the device.
- In DX Air handling unit; EEV (electronic expansion valve) and temperature sensors have been installed in the device and protected from outdoor air conditions in the production stage.
- When it comes to the defrost process of the VRF unit, which is connected to the air handling unit, the control system belonging to the air handling unit enters standby mode without alarming.
- DX Coils have been selected as having the feature to be able to work as cooling (evaporator) in summer, and heating (condenser) in winter.
- In DX Air Handling Unit; sight glass and siphon accessories are deliverable by us.
- The start-up (mechanical installation, required terminal connections, setting the parameters) operations of DX air handling unit and VRF outdoor unit are carried out by our company. Start-up and basic maintenance trainings are available as well.
- Optionally, the frequency inverter is employed for the fan with AC motor.
- The plug fans can control the air flow rate by calculating the pressure difference with the internal inverter.
- It is made sure that the air flow rate passing above DX coil is kept stable by the controller through the frequency inverter. Example; pressure changes (Filter impurity))
- Optionally, the controller with microprocessor in the DDC panel has the capability to communicate with at least one communication protocol (e.g.: ModBUS RTU).
- Optionally, the microprocessor controller is programmed with a software suitable for the operating logic of DX systems. The critical operating scenarios having mutual alarm controls (Hot Start, Defrost Time, Defrost Cycle etc.) are included in the software of the DX air handling unit automation. By this means, maximum system safety measures are taken.
- Optionally, all the site sensing and control equipment are installed on DX air handling unit. (E.g.: Damper motors, differential pressure sensors, temperature and humidity sensors, CO₂ or CO/VOC sensors, 3-way valve bodies, proportional valve actuators, freezing securities, etc.)
- In DX Air Handling Unit, intra-cellular lighting can also be given optionally.



► Outdoor Units and Features Thereof



► DX Air Handling Unit Flow Diagram



► Outdoor Units and Features Thereof

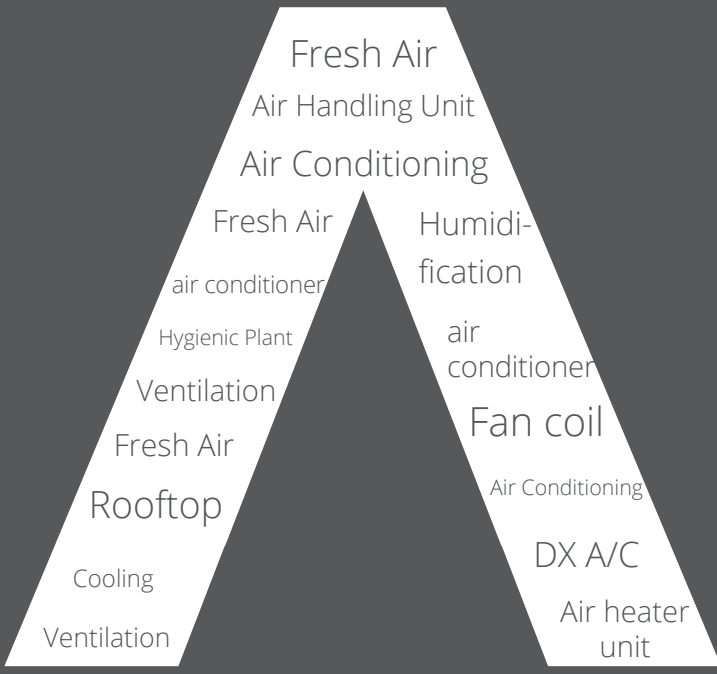
| MODEL | | AIRPLUS - VRF - 140 | | AIRPLUS - VRF - 160 | |
|-----------------------------|------------------|---------------------|--------------------------------------|---------------------|--|
| Power Supply | | V/Ph/Hz | 220-240 / 1 / 50 // 380-415 / 3 / 50 | | |
| Cooling | Capacity | kW | 14,0 | 15,5 | |
| | | RT | 3,9 | 4,3 | |
| | Power Input | kW | 3,95 | 4,52 | |
| | EER | kW/kW | 3,54 | 3,43 | |
| Heating | Capacity | kW | 15,4 | 17,0 | |
| | | RT | 4,30 | 4,80 | |
| | Power Input | kW | 4,16 | 4,77 | |
| | COP | kW/kW | 3,70 | 3,56 | |
| Sound pressure level | | dB(A) | 57 | 57 | |
| Pipe Connections | Fluid Line | mm | Ø 9,53 | Ø 9,53 | |
| | Gas Line | mm | Ø 15,9 | Ø 19,1 | |
| Fan Motor | Type | | DC | DC | |
| | Qty | | 2 | 2 | |
| | Air Flow Rate | m ³ /h | 6000 | 6000 | |
| | Motor Power | W | 85*2 | 85*2 | |
| Rotary Compressor | Qty | | 1 | 1 | |
| | Capacity | kW | 10 | 14 | |
| | Crankcase Heater | W | 25 | 25 | |
| | Oil Type | | FV50S | FV50S | |
| | Oil Loading | ml | 870 + 630 | 1400 + 250 | |
| Refrigerant | Type | | R410A | R410A | |
| | Factory Loading | kg | 3,9 | 3,9 | |
| Design Pressure (High/Low) | | mPa | 4,4/2,6 | | |
| Net Dimensions (WxHxD) | | mm | 900*1327*400 | | |
| Packaging Dimension (WxHxD) | | mm | 1030*1456*435 | | |
| Net Weight | | kg | 95 | 102 | |
| Gross Weight | | kg | 106 | 113 | |
| Operating Temp Range | Cooling | °C | -15-48 | | |
| | Heating | °C | -15-27 | | |

► Outdoor Units and Features Thereof

| MODEL | | AIRPLUS-VRF-252 | AIRPLUS-VRF-280 | AIRPLUS-VRF-335 | |
|-----------------------------|------------------|-------------------|--------------------|--------------------|--------------------|
| Power Supply | | V/Ph/Hz | 380-415 / 3 / 50 | | |
| Cooling | Capacity | kW | 25,2 | 28,0 | 33,5 |
| | | RT | 7,2 | 8,0 | 9,5 |
| | Power Input | kW | 5,88 | 7,20 | 9,05 |
| Heating | Capacity | kW | 4,29 | 3,89 | 3,70 |
| | | RT | 27,0 | 31,5 | 37,5 |
| | Power Input | kW | 7,70 | 9,00 | 10,70 |
| COP | kW/kW | kW | 6,15 | 7,61 | 8,99 |
| | | kW/kW | 4,39 | 4,14 | 4,17 |
| Sound pressure level | | dB(A) | 57 | 57 | 59 |
| Pipe Connections | Fluid Line | mm | Ø 9,53 | Ø 9,53 | Ø 12,7 |
| | Gas Line | mm | Ø 22,2 | Ø 22,2 | Ø 25,4 |
| | Oil Line | mm | Ø 6 | Ø 6 | Ø 6 |
| Fan Motor | Type | | DC | DC | DC + AC |
| | Qty | | 1 | 1 | 1 + 1 |
| | Air Flow Rate | m ³ /h | 11500 | 11500 | 15100 |
| | Motor Power | W | 750 | 750 | 560 + 380 |
| | ESP | Pa | 0-20 (default) | 0-20 (default) | 0-20 (default) |
| | | Pa | 20-40 (customized) | 20-40 (customized) | 20-60 (customized) |
| DC Inverter Compressor | Qty | | 1 | 1 | 1 |
| | Capacity | kW | 31,59 | 31,59 | 11,80 |
| | Crankcase Heater | W | 27,6*2 | 27,6*2 | 27,6*2 |
| | Oil Type | | FVC68D | FVC68D | FVC68D |
| | Oil Loading | ml | 500 | 500 | 500 |
| Scroll Compressor | Qty | | - | - | 1 |
| | Capacity | kW | - | - | 17,1 |
| | Crankcase Heater | W | - | - | 27,6 |
| | Oil Type | | - | - | FVC68D |
| | Oil Loading | ml | - | - | 500 |
| Refrigerant | Type | | R410A | R410A | R410A |
| | Factory Loading | kg | 9 | 9 | 11 |
| Design Pressure (High/Low) | | mPa | 4,4/2,6 | 4,4/2,6 | 4,4/2,6 |
| Net Dimensions (WxHxD) | | mm | 960*1615*765 | 960*1615*765 | 1250*1615*765 |
| Packaging Dimension (WxHxD) | | mm | 1025*1790*830 | 1025*1790*830 | 1305*1790*820 |
| Net Weight | | kg | 198 | 198 | 268 |
| Gross Weight | | kg | 213 | 213 | 288 |
| Operating Temp Range | Cooling | °C | -5-48 | | |
| | Heating | °C | -20-27 | | |
| MODEL | | AIRPLUS-VRF-400 | AIRPLUS-VRF-450 | AIRPLUS-VRF-500 | |
| Power Supply | | V/Ph/Hz | 380-415 / 3 / 50 | | |
| Cooling | Capacity | kW | 40,0 | 45,0 | 50,0 |
| | | RT | 11,4 | 12,8 | 14,2 |
| | Power Input | kW | 12,31 | 14,02 | 15,20 |
| Heating | Capacity | kW/kW | 3,25 | 3,21 | 3,29 |
| | | kW | 45,0 | 50,0 | 56,0 |
| | Power Input | kW | 11,19 | 12,79 | 14,25 |
| COP | kW/kW | kW | 4,02 | 3,91 | 3,93 |
| | | dB(A) | 60 | 60 | 61 |
| Sound pressure level | | dB(A) | 60 | 60 | 61 |
| Pipe Connections | Fluid Line | mm | Ø 15,9 | Ø 15,9 | Ø 19,1 |
| | Gas Line | mm | Ø 31,8 | Ø 31,8 | Ø 31,8 |
| | Oil Line | mm | Ø 6 | Ø 6 | Ø 6 |
| Fan Motor | Type | | DC + AC | DC + AC | DC + AC |
| | Qty | | 1 + 1 | 1 + 1 | 1 + 1 |
| | Air Flow Rate | m ³ /h | 15100 | 15100 | 15200 |
| | Motor Power | W | 560 + 380 | 560 + 380 | 560 + 380 |
| | ESP | Pa | 0-20 (default) | 0-20 (default) | 0-20 (default) |
| | | Pa | 20-40 (customized) | 20-40 (customized) | 20-60 (customized) |
| DC Inverter Compressor | Qty | | 1 | 1 | 1 |
| | Capacity | kW | 31,59 | 31,59 | 11,80 |
| | Crankcase Heater | W | 27,6*2 | 27,6*2 | 27,6*2 |
| | Oil Type | | FVC68D | FVC68D | FVC68D |
| | Oil Loading | ml | 500 | 500 | 500 |
| Scroll Compressor | Qty | | 1 | 1 | 1 |
| | Capacity | kW | 13,39 | 13,39 | 20,9 |
| | Crankcase Heater | W | 27,6 | 27,6 | 27,6 |
| | Oil Type | | FVC68D | FVC68D | FVC68D |
| | Oil Loading | ml | 500 | 500 | 500 |
| Refrigerant | Type | | R410A | R410A | R410A |
| | Factory Loading | kg | 13 | 13 | 16 |
| Design Pressure (High/Low) | | mPa | 4,4/2,6 | 4,4/2,6 | 4,4/2,6 |
| Net Dimensions (WxHxD) | | mm | 1305*1790*820 | 1250*1615*76 | 1250*1615*765 |
| Packaging Dimension (WxHxD) | | mm | 1305*1790*82 | 1305*1790*820 | 1250*1615*76 |
| Net Weight | | kg | 280 | 280 | 300 |
| Gross Weight | | kg | 300 | 300 | 320 |
| Operating Temp Range | Cooling | °C | -5-48 | | |
| | Heating | °C | -20-27 | | |

| MODEL | | AIRPLUS-VRF-I-200 | AIRPLUS-VRF-I-224 | AIRPLUS-VRF-I-260 | |
|-----------------------------|------------------|-------------------|-------------------|--------------------|---------------|
| Power Supply | | V/Ph/Hz | 380-415 / 3 / 50 | | |
| Cooling | Capacity | kW | 20,0 | 22,4 | 26,0 |
| | | RT | 5,7 | 6,4 | 7,4 |
| | Power Input | kW | 6,10 | 6,80 | 7,60 |
| | EER | kW/kW | 3,28 | 3,29 | 3,42 |
| Heating | Capacity | kW | 22,0 | 24,5 | 28,5 |
| | | RT | 6,30 | 7,00 | 8,10 |
| | Power Input | kW | 6,10 | 5,90 | 6,80 |
| | COP | kW/kW | 3,61 | 4,15 | 4,19 |
| Sound pressure level | | dB(A) | 59 | 59 | 60 |
| Pipe Connections | Fluid Line | mm | Ø 9,53 | Ø 9,53 | Ø 9,53 |
| | Gas Line | mm | Ø 19,1 | Ø 19,1 | Ø 22,2 |
| Fan Motor | Type | | DC | DC | DC |
| | Qty | | 2 | 2 | 2 |
| | Air Flow Rate | m ³ /h | 11000 | 10500 | 10500 |
| | Motor Power | W | 210 + 160 | 200 + 150 | 200 + 150 |
| Scroll Compressor | Qty | | 1 | 1 | 1 |
| | Capacity | kW | 13,98 | 16,86 | 16,86 |
| | Crankcase Heater | W | 25 | 25 | 25 |
| | Oil Type | | FV50S | FV50S | FV50S |
| | Oil Loading | ml | 1400 | 1700 | 1700 |
| Refrigerant | Type | | R410A | R410A | R410A |
| | Factory Loading | kg | 4,8 | 6,2 | 6,2 |
| Design Pressure (High/Low) | | mPa | 4,4/2,6 | | |
| Net Dimensions (WxHxD) | | mm | 1120*1558*400 | | |
| Packaging Dimension (WxHxD) | | mm | 1270*1720*565 | | |
| Net Weight | | kg | 137 | 146,5 | 147 |
| Gross Weight | | kg | 153 | 162,5 | 163 |
| Operating Temp Range | Cooling | °C | -15-48 | | |
| | Heating | °C | -15-27 | | |
| MODEL | | AIRPLUS-VRF-I-560 | AIRPLUS-VRF-I-615 | AIRPLUS-VRF-I-670 | |
| Power Supply | | V/Ph/Hz | 380-415 / 3 / 50 | | |
| Cooling | Capacity | kW | 56,0 | 61,5 | 67,0 |
| | | RT | 15,9 | 17,5 | 19,0 |
| | Power Input | kW | 17,00 | 18,80 | 20,80 |
| | EER | kW/kW | 3,30 | 3,27 | 3,22 |
| Heating | Capacity | kW | 63,0 | 69,0 | 75,0 |
| | | RT | 17,90 | 19,60 | 21,30 |
| | Power Input | kW | 16,00 | 17,90 | 19,80 |
| | COP | kW/kW | 3,94 | 3,86 | 3,79 |
| Sound pressure level | | dB(A) | 62 | 63 | 63 |
| Pipe Connections | Fluid Line | mm | Ø 19,1 | Ø 19,1 | Ø 19,1 |
| | Gas Line | mm | Ø 31,8 | Ø 31,8 | Ø 31,8 |
| Fan Motor | Type | | DC + AC | DC + AC | DC + AC |
| | Qty | | 2 | 2 | 4 |
| | Air Flow Rate | m ³ /h | 20000 | 23000 | 23000 |
| | Motor Power | W | 340 + 450 | 625 + 450 | 625 + 450 |
| | ESP | Pa | | 0-20 (default) | |
| | | Pa | | 20-40 (customized) | |
| DC Inverter Compressor | Qty | | 1 | 1 | 1 |
| | Capacity | kW | 31,59 | 31,59 | 31,59 |
| | Crankcase Heater | W | 33*2 | 33*2 | 33*2 |
| | Oil Type | | FVC68D | FVC68D | FVC68D |
| | Oil Loading | ml | 500 | 500 | 500 |
| Rotary Compressor | Qty | | 2 | 2 | 2 |
| | Capacity | kW | 15,39*2 | 17,1*2 | 20,9*2 |
| | Crankcase Heater | W | 27,6 | 27,6 | 27,6 |
| | Oil Type | | FVC68D | FVC68D | FVC68D |
| | Oil Loading | ml | 500*2 | 500*2 | 1100*2 |
| Refrigerant | Type | | R410A | R410A | R410A |
| | Factory Loading | kg | 17 | 18,5 | 18,5 |
| Design Pressure (High/Low) | | mPa | 4,4/2,6 | | |
| Net Dimensions (WxHxD) | | mm | 1390*1615*765 | 1585*1615*765 | 1585*1615*765 |
| Packaging Dimension (WxHxD) | | mm | 1455*1790*830 | 1650*1810*840 | 1650*1810*840 |
| Net Weight | | kg | 360 | 385 | 390 |
| Gross Weight | | kg | 375 | 400 | 405 |
| Operating Temp Range | Cooling | °C | -5-48 | | |
| | Heating | °C | -20-27 | | |

Rev.08.19



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